

EMC Test Report

Application for FCC Grant of Equipment Authorization Canada Certification

Innovation, Science and Economic Development Canada RSS-Gen Issue 4 / RSS 247 Issue 1 FCC Part 15 Subpart C

Model: H44-100

FCC ID: G95H44-100A

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IC SITE REGISTRATION #: 2845B-3; 2845B-4, 2845B-5, 2845B-7

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REVISION HISTORY

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SCOPE

An electromagnetic emissions test has been performed on the Technicolor Connected Home USA LLC model H44-100, pursuant to the following rules:

FCC Part 15 Subpart C

Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in the following reference standards and as outlined in 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.).

STATEMENT OF COMPLIANCE

The tested sample of Technicolor Connected Home USA LLC model H44-100 complied with the requirements of the following regulations:

FCC Part 15 Subpart C

Maintenance of compliance is the responsibility of the manufacturer. Any modifications to the product should be assessed to determine their potential impact on the compliance status of the device with respect to the standards detailed in this test report.

The test results recorded herein are based on a single type test of Technicolor Connected Home USA LLC model H44-100 and therefore apply only to the tested sample. The sample was selected and prepared by Austin Moore of Technicolor Connected Home USA LLC.

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) – IEEE 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 DSSS techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 247 5.2 (1)	6dB Bandwidth	11b: 8.0 MHz 11g: 16.4 MHz n20: 17.6 MHz	>500kHz	Complies
15.247 (b) (3)	RSS 247 5.4 (4)	Output Power (multipoint systems)	1TX: 11b: 22.1 dBm 11g: 22.0 dBm n20: 23.5 dBm (0.224 Watts)	1Watt, EIRP limited to 4 Watts.	Complies
15.247(e)	RSS 247 5.2 (2)	Power Spectral Density	1TX: 11b: 7.4 dBm/10kHz 11g: 3.8 dBm/10kHz 2TX: n20: 4.7 dBm/3kHz	8dBm/3kHz	Complies
15.247(d)	RSS 247 5.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	< -30dBc	< -30dBc ^{Note 2}	Complies
15.247(d) / 15.209	RSS 247 5.5	Radiated Spurious Emissions 30MHz – 25 GHz	53.9 dB μ V/m @ 2483.5 MHz (-0.1 dB)	Refer to the limits section (p22) for restricted bands, all others <-30dBc ^{Note 2}	Complies

Note 2: Limit of -30dBc used because the power was measured using the UNII test procedure (maximum power averaged over a transmission burst).

DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHz) – RF4CE Operation

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)	RSS 210 A8.2	Digital Modulation	Systems uses DSSS techniques	System must utilize a digital transmission technology	Complies
15.247 (a) (2)	RSS 210 A8.2 (1)	6dB Bandwidth	1.523 MHz	>500kHz	Complies
15.247 (b) (3)	RSS 210 A8.2 (4)	Output Power (multipoint systems)	4.5dBm (0.003W) EIRP = 5.6 mW <small>Note 1</small>	1Watt, EIRP limited to 4 Watts.	Complies
15.247(d)	RSS 210 A8.2 (2)	Power Spectral Density	1.2 dBm/100kHz	8dBm/3kHz	Complies
15.247(c)	RSS 210 A8.5	Antenna Port Spurious Emissions 30MHz – 25 GHz	All emissions below -30dBc	< -30dBc <small>Note 2</small>	Complies
15.247(c) / 15.209	RSS 210 A8.5	Radiated Spurious Emissions 30MHz – 25 GHz	45.9 dB μ V/m @ 4809.1 MHz (-8.1 dB)	15.207 in restricted bands, all others <-30dBc <small>Note 2</small>	Complies

Note 1: EIRP calculated using antenna gain of 3.0 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	Antennas are internal	Unique or integral antenna required	Complies
15.407 (b) (6)	RSS-Gen Table 3	AC Conducted Emissions	46.7 dB μ V @ 0.444 MHz (-0.3 dB)	Refer to page 21	Complies
15.247 (i) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to MPE calculations in separate exhibit	Refer to OET 65, FCC Part 1 and RSS 102	Complies
-	RSP-100 RSS-Gen 6.6	Occupied Bandwidth	11b: 10.8 MHz 11g: 16.6 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)	dB μ V/m	25 to 1000 MHz	± 3.6 dB
		1000 to 40000 MHz	± 6.0 dB
Conducted Emissions (AC Power)	dB μ V	0.15 to 30 MHz	± 2.4 dB

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

The Technicolor Connected Home USA LLC model H44-100 is a satellite dish receiver/set-top-box. Since the EUT would be placed on a tabletop during operation, the EUT was treated as tabletop equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 120 Volts, 60 Hz, 1.3 Amps.

The sample was received on February 20, 2015 and February 24, 2016 and tested on February 20 and 22, 2015 and February 24, 26 and 29 and March 1, 2016. The EUT consisted of the following component(s):

RF4CE Sample from Feb 2015

Company	Model	Description	Serial Number	FCC ID
Technicolor	H44-100	Set-top Box	A44LA5BG100113 (emc sample)	G95H44-100A
DirectTV	EPS44R3-15	AC/DC Power Supply	CL44E1445A0360	N/A
DirectTV	EPS44R3-15	AC/DC Power Supply	CL44E1445A0364 (AC conducted emissions)	N/A

Sample from Feb 2016

Company	Model	Description	Serial Number	FCC ID
Technicolor	H44-100	Set-top Box	A44LA5RW110013	G95H44-100A
DirectTV	EPS44R3-15	AC/DC Power Supply	CL44E1532A0351	N/A

OTHER EUT DETAILS

The following EUT details should be noted:

20MHz only

FCC "New" 5GHz rules

11a legacy data rates supported in 1Tx (with Tx diversity)

HT20 - 2Tx

DFS Client device

Indoor device

FCC approval only

RF4CE radio - allows for simultaneous transmission

Use of channel 144 is not supported by the product.

ANTENNA SYSTEM

Wifi: Airgain, Model N2420DS, 3.1dBi peak gain @ 2.44GHz; 2.8dBi peak gain @ 5.2GHz

Wifi: Airgain, Model N2415D2, 2.13dBi peak gain @ 2.44GHz; 2.88dBi peak gain @ 5.2GHz; 3.57 dBi peak gain @ 5.5GHz; 4.58dBi peak gain @ 5.8GHz

RF4CE: 3.0dBi pcb trace antenna

ENCLOSURE

The EUT enclosure is primarily constructed of uncoated plastic. It measures approximately 21 cm wide by 21 cm deep by 4 cm high.

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 local support equipment for testing:

Radio

Company	Model	Description	Serial Number	FCC ID
HP	Pavillion dv6000	Laptop*	CNF73411TQ	N/A
Samsung	T24E310ND	TV	04NBHCKG706391H	N/A
Seagate	SRD00F1	External Drive	NA7090R4	N/A
Kingston	DataTraveler SE8	USB Flash Drive	N/A	-
Technicolor	-	Resistive Termination	-	-

* - used to configured the EUT and then disconnected prior to testing.

Conducted Emissions

Company	Model	Description	Serial Number	FCC ID
Acer	S242HL	Monitor	40302364485	N/A
Asian Power Devices	DA-40A19	AC/DC Adapter	YE56113731053854300	N/A
Seagate	SRD00F1	SSD	NA7090JC	N/A
Verbatim	-	USB Thumb Drive	-	N/A
Technicolor	-	Resistive Termination	-	-

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

Company	Model	Description	Serial Number	FCC ID
DirecTV	SWM16R-03	16 channel SWM	49001337	N/A
DirecTV	PI29R1-03	Power Inserter	YG29B1345B0238	N/A

EUT INTERFACE PORTS

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

Radio

Port		Cable(s)		
From	To	Description	Shielded/Unshielded	Length(m)
SAT IN (SWM-5)	SWM-16 (SWM2)	COAX	Shielded	10
A/V Out	Resistive Terminator	6 Wire RC	Shielded	1
Digital Audio Out	Resistive Terminator	RC Cable	Shielded	2
HDMI	TV	Multiconductor	Shielded	1.5
USB	Thumb Drive	Direct	-	-
Hard Drive	SDD	Multiconductor	Shielded	0.2
Power Input	AC/DC Adapter	Multiconductor	Shielded	1.5
Internal Header*	USB-Serial Adapter Laptop	Multiconductor	Unshielded	1.0

* - The EUT was connected to the laptop via a USB-to-serial adapter connected to an internal header to configure the radio operation. This cable was disconnected prior to testing.

AC Conducted Emissions

Port		Cable(s)		
From	To	Description	Shielded/Unshielded	Length(m)
SAT IN (SWM-5)	SWM-16 (SWM2)	COAX	Shielded	10
A/V Out	Resistive Terminator	6 Wire RC	Shielded	1
Digital Audio Out	Resistive Terminator	RC Cable	Shielded	2
HDMI	Monitor	Multiconductor	Shielded	1.5
USB	Thumb Drive	Multiconductor	Shielded	2
Hard Drive	SDD	Multiconductor	Shielded	0.2
Power Input	AC/DC Adapter	Multiconductor	Shielded	1.5

Additional on Support Equipment

Port		Cable(s)		
From	To	Description	Shielded/Unshielded	Length(m)
AC/DC Adapter (EUT)	AC Mains	2wire	Unshielded	1.5
Monitor - Power In	AC/DC Adapter	Multiconductor	Shielded	1.5
AC/DC Adapter (Monitor)	AC Mains	3wire	Unshielded	1.5
SWM-16 DC/Power	SWM-1	Coax	Shielded	1
SWM-16 SAT 99/101	Dish Antenna	Coax (x2)	Shielded	40
SWM-16 SAT103/110/119	Dish Antenna	Coax (x2)	Shielded	40
SWM-1 Power	AC Mains	2wire	Unshielded	1.5



EUT OPERATION

Radio testing: The EUT was configured to continuously transmit at the maximum output power on the noted channel. Testing was performed to confirm the worse case data rate for each mode tested, and is noted in the test data.

As the product supports simultaneous transmission from the Wifi and the RF4CE radios, additional testing was performed with both radios operating.

AC Conducted Emissions: The EUT was configured to transmit continuously on CH157, n20, maximum power. RF4CE was configured to continuous transmission at 2450MHz.

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 FCC	Designation / Registration Numbers Canada	Location
Chamber 3	US0027	2845B-3	41039 Boyce Road
Chamber 4	US0027	2845B-4	Fremont, CA 94538-2435
Chamber 5	US0027	2845B-5	

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

Software is used to view and convert 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 software used for radiated and conducted emissions measurements is NTS EMI Test Software (rev 2.10)

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.

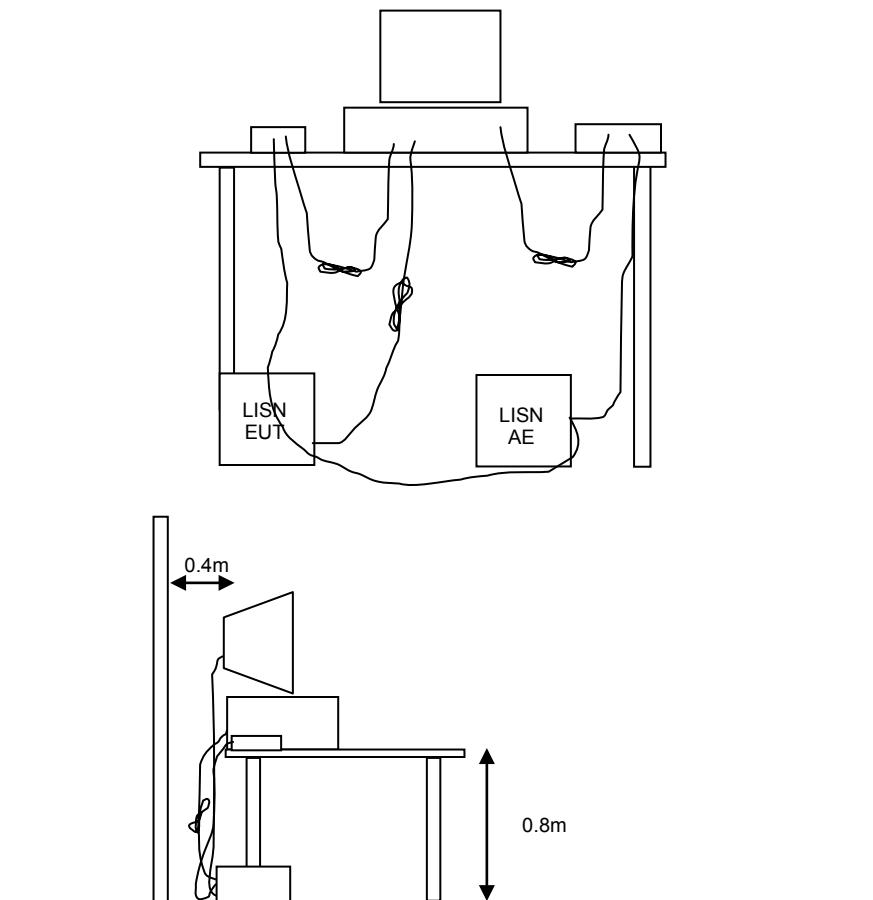


Figure 1 Typical Conducted Emissions Test Configuration

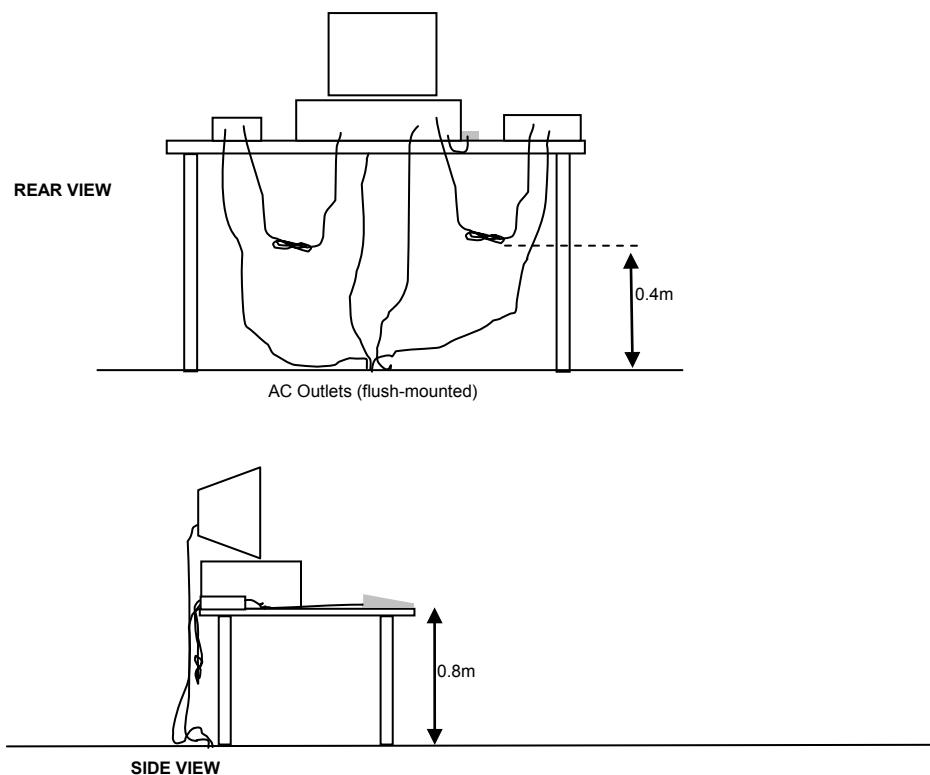
RADIATED EMISSIONS

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.

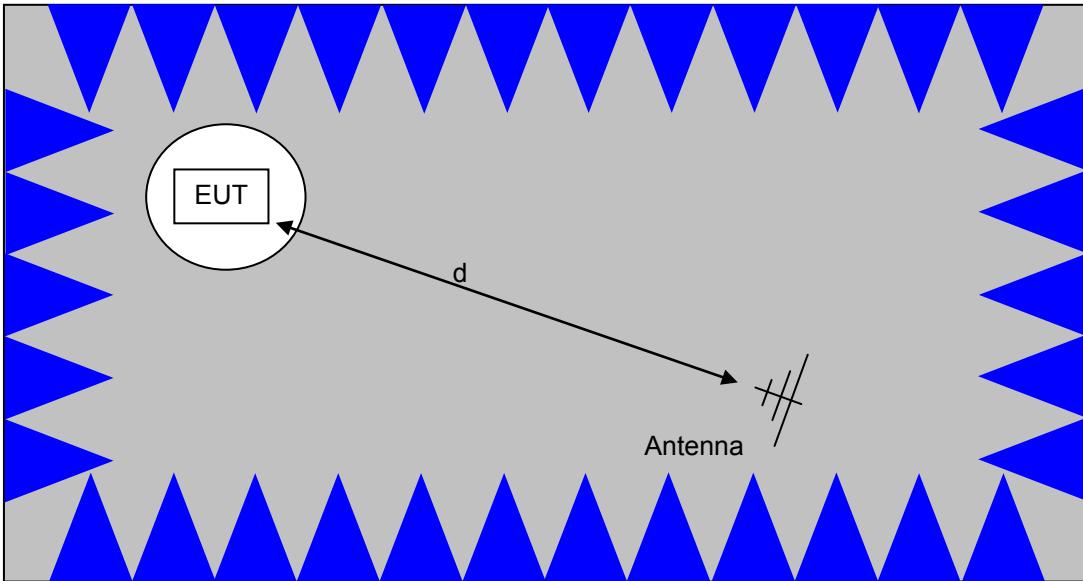
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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.

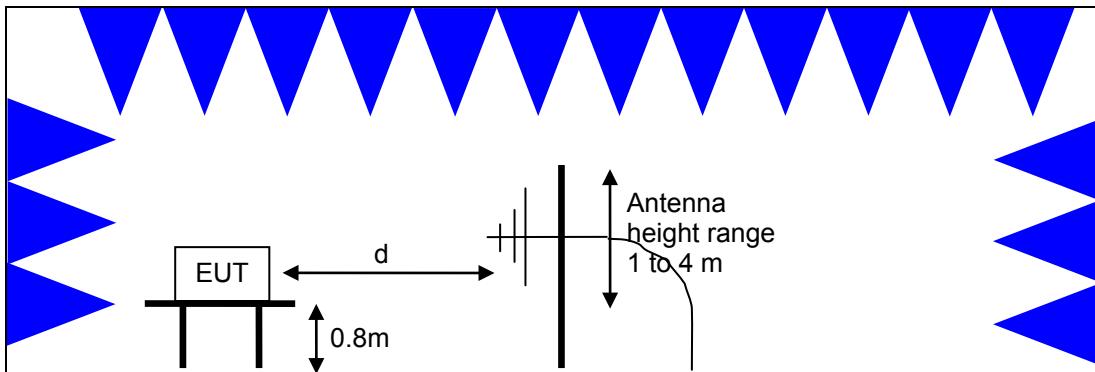


Typical Test Configuration for Radiated Field Strength Measurements



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.

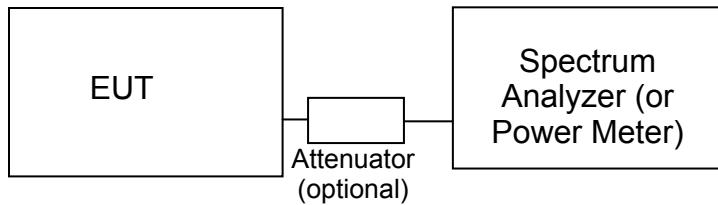
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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 bands¹.

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

RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from receivers as detailed in FCC Part 15.109 and RSS GEN Table 2. Note that receivers operating outside of the frequency range 30 MHz – 960 MHz are exempt from the requirements of 15.109 and receivers that are not stand-alone are exempt from the ISED Canada requirements per RSS-GEN.

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

¹ The restricted bands are detailed in FCC 15.205 and RSS-Gen Table 6

OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS

The table below shows the limits for output power and output power density. Where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

Operating Frequency (MHz)	Output Power	Power Spectral Density
902 – 928	1 Watt (30 dBm)	8 dBm/3kHz
2400 – 2483.5	1 Watt (30 dBm)	8 dBm/3kHz
5725 – 5850	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 210. All other unwanted (spurious) emissions shall be at least 20dB below the level of the highest in-band signal level (30dB if the power is measured using the sample detector/power averaging method).

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

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

$$R_f - S = M$$

where:

R_f = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

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

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

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

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

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

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

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

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

$$R_c = R_f + F_d$$

and

$$M = R_c - L_s$$

where:

R_f = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION

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

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

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

T101171

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Calibrated</u>	<u>Cal Due</u>
Radiated Emissions, 1,000 - 6,500 MHz, 12-Feb-15					
EMCO	Antenna, Horn, 1-18 GHz	3115	487	7/29/2014	7/29/2016
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	6/21/2014	6/21/2015
Radiated Emissions, 1,000 - 6,500 MHz, 17-Feb-15					
EMCO	Antenna, Horn, 1-18 GHz	3115	786	12/20/2013	12/20/2015
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	6/21/2014	6/21/2015
Radiated Emissions, 1000 - 12,000 MHz, 17-Feb-15					
EMCO	Antenna, Horn, 1-18 GHz	3115	786	12/20/2013	12/20/2015
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	6/21/2014	6/21/2015
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/20/2014	2/20/2015
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2238	9/16/2014	9/16/2015
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	2/27/2014	2/27/2015
Radiated Emissions, 1000 - 25,000 MHz, 18-Feb-15					
EMCO	Antenna, Horn, 1-18 GHz	3115	786	12/20/2013	12/20/2015
Hewlett Packard	High Pass filter, 8.2 GHz (Purple System)	P/N 84300-80039	1767	11/14/2014	11/14/2015
Hewlett Packard	Head (Inc W1-W4, 1946 , 1947) Purple	84125C	1772	1/20/2015	1/20/2016
A. H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	8/11/2014	8/11/2015
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/20/2014	2/20/2015
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2238	9/16/2014	9/16/2015
Radiated Emissions, 1,000 - 12,000 MHz, 19-Feb-15					
EMCO	Antenna, Horn, 1-18 GHz	3115	786	12/20/2013	12/20/2015
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/20/2014	2/20/2015
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BR50703-02	2239	9/16/2014	9/16/2015
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BR50704-02	2240	9/16/2014	9/16/2015
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BR50705-02	2241	9/16/2014	9/16/2015
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	2/27/2014	2/27/2015
Radiated Emissions, 1,000 - 40,000 MHz, 20-Feb-15					
EMCO	Antenna, Horn, 1-18 GHz	3115	786	12/20/2013	12/20/2015
Hewlett Packard	High Pass filter, 8.2 GHz (Purple System)	P/N 84300-80039	1767	11/14/2014	11/14/2015

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Calibrated</u>	<u>Cal Due</u>
Hewlett Packard	Head (Inc W1-W4, 1946 , 1947) Purple	84125C	1772	1/20/2015	1/20/2016
A. H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	8/11/2014	8/11/2015
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/20/2014	2/20/2015
Micro-Tronics	Band Reject Filter, 5150-5350 MHz	BRC50703-02	2239	9/16/2014	9/16/2015
Micro-Tronics	Band Reject Filter, 5470-5725 MHz	BRC50704-02	2240	9/16/2014	9/16/2015
Micro-Tronics	Band Reject Filter, 5725-5875 MHz	BRC50705-02	2241	9/16/2014	9/16/2015
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	2/27/2014	2/27/2015
Radiated Emissions, 30 - 6,500 MHz, 22-Feb-15					
EMCO	Antenna, Horn, 1-18 GHz	3115	786	12/20/2013	12/20/2015
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	6/21/2014	6/21/2015
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	2237	8/29/2014	8/29/2016
Com-Power	Preamplifier, 1-1000 MHz	PAM-103	2885	10/22/2014	10/22/2015
Radiated Emissions, 30 - 6,500 MHz, 22-Feb-15					
EMCO	Antenna, Horn, 1-18 GHz	3115	786	12/20/2013	12/20/2015
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	6/21/2014	6/21/2015
Radiated Emissions, 30 - 1,000 MHz, 23-Feb-15					
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1657	6/25/2014	6/25/2016
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	6/14/2014	6/14/2015
Hewlett Packard	9KHz-1300MHz pre-amp	8447F	2777	3/5/2014	3/5/2015
Radio Antenna Port (Power and Spurious Emissions), 24-Feb-15 to 26-Feb-15					
Rohde & Schwarz	Signal Analyzer 20 Hz - 26.5 GHz	FSQ26	2327	4/28/2014	4/28/2015
Radiated Emissions, 30 - 1,000 MHz, 27-Feb-15					
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1657	6/25/2014	6/25/2016
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	6/14/2014	6/14/2015
Hewlett Packard	9KHz-1300MHz pre-amp	8447F	2777	3/5/2014	3/5/2015
Radiated Emissions, 30 - 18,000 MHz, 01-Mar-15					
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1657	6/25/2014	6/25/2016
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	6/14/2014	6/14/2015
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/20/2015	2/20/2016
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	2/27/2014	3/27/2015
Hewlett Packard	9KHz-1300MHz pre-amp	8447F	2777	3/5/2014	3/5/2015
EMCO	Antenna, Horn, 1-18 GHz	3115	2870	8/20/2013	8/20/2015
Conducted Emissions - AC Power Ports, 02-Mar-15					
EMCO	LISN, 10 kHz-100 MHz, 25A	3825/2	1292	2/13/2014	3/13/2015
EMCO	LISN, 10 kHz-100 MHz	3825/2	1293	2/13/2014	4/13/2015

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Calibrated</u>	<u>Cal Due</u>
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1594	5/15/2014	5/15/2015
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1756	6/14/2014	6/14/2015
FCC	Decoupling Network	F-203I-DCN-23mm	2457		N/A

Radiated Emissions, 11,000 - 26,000 MHz, 02-Mar-15

Hewlett Packard	Head (Inc W1-W4, 1946 , 1947) Purple	84125C	1772	1/20/2015	1/20/2016
A. H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	8/11/2014	8/11/2015
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	2/20/2015	2/20/2016
Hewlett Packard	SpecAn 9 kHz - 40 GHz, (SA40) Purple	8564E (84125C)	2415	2/27/2014	3/27/2015
FCC	Decoupling Network	F-203I-DCN-23mm	2457		N/A
EMCO	Antenna, Horn, 1-18 GHz	3115	2870	8/20/2013	8/20/2015

T100900

<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Calibrated</u>	<u>Cal Due</u>
Radiated Emissions, 1000 - 6,000 MHz, 22-Feb-16					
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/27/2014	6/27/2016
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	7/6/2015	7/6/2016

Bandage Measurement, 24-Feb-16

EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/27/2014	6/27/2016
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	7/6/2015	7/6/2016

Radiated Emissions, 1 - 5 GHz, 26-Feb-16

EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/27/2014	6/27/2016
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	7/6/2015	7/6/2016

Radiated Emissions, 1,000 - 25,000 MHz, 29-Feb-16

EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/27/2014	6/27/2016
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	10/9/2015	10/9/2016
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2249	9/16/2015	9/16/2016
Hewlett Packard	Spectrum Analyzer (SA40) Purple 9 kHz - 40 GHz,	8564E (84125C)	2415	3/7/2015	3/7/2016

Radiated Emissions, 1000 - 25,000 MHz, 29-Feb-16

Hewlett Packard	High Pass filter, 8.2 GHz	P/N 84300-80039	1156	6/2/2015	6/2/2016
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	6/27/2014	6/27/2016
HP / Miteq	SA40 Head (Purple)	TTA1840-45-5P-HG-S	1772	12/21/2015	12/21/2016
A. H. Systems	Spare System Horn, 18-40GHz	SAS-574, p/n: 2581	2162	7/29/2015	7/29/2017
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	10/9/2015	10/9/2016



<u>Manufacturer</u>	<u>Description</u>	<u>Model</u>	<u>Asset #</u>	<u>Calibrated</u>	<u>Cal Due</u>
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2249	9/16/2015	9/16/2016
Hewlett Packard	Spectrum Analyzer (SA40) Purple 9 kHz - 40 GHz,	8564E (84125C)	2415	3/7/2015	3/7/2016
Radiated Emissions, 30 - 1,000 MHz, 01-Mar-16					
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1548	9/17/2014	9/17/2016
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB7	1630	7/6/2015	7/6/2016
Com-Power	Preamplifier, 1-1000 MHz	PAM-103	2885	10/13/2015	10/13/2016
Radio Antenna Port (Power and Spurious Emissions), 01-Mar-16					
Agilent Technologies	3Hz -44GHz PSA Spectrum Analyzer	E4446A	2796	3/31/2015	3/31/2016



Appendix B Test Data

T101171 Pages 31 – 61
T100900 Pages 62 – 134



EMC Test Data

Client:	Technicolor USA, Inc.	Job Number:	J97449
Product	H44-100	T-Log Number:	T101171
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	
Emissions Standard(s):	FCC 15.247/15.407/15.B	Class:	B
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Technicolor USA, Inc.

Product

H44-100

Date of Last Test: 3/4/2015

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	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: L044A505250029

Driver: 5.99 RC188.10

Date of Test: 2/12/2015

Test Engineer: Mark Hill

Test Location: Lab #4

Mode	Data Rate	Power (dBm)	Chain	Power setting
802.11a	6	19.2	2	20.0
	9	19.3	2	
	12	19.3	2	
	18	19.2	2	
	24	19.3	2	
	36	19.2	2	
	48	19.3	2	
	54	19.3	2	
	9	19.7	1	
802.11n 20MHz	6.5	19.42	2	MCS8 MCS9 MCS10 MCS11 MCS12 MCS13 MCS14 MCS15
	13	19.36	2	
	19.5	19.27	2	
	26	19.17	2	
	39	19.02	2	
	52	19.01	2	
	58.5	19.27	2	
	65	18.96	2	

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

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
		Class:	N/A

Duty Cycle

Date of Test: 2/12/2015

Test Engineer: Mark Hill

Test Location: Lab #4

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)
11g	9Mb/s	0.99	Yes	-	0	0	-
n20	6.5	0.978	Yes	-	0.10	0.19	-
RF4CE	-	100.00	Yes	-	0	0	-

* Correction factor when using RMS/Power averaging - $10 \cdot \log(1/x)$

** Correction factor when using linear voltage average - $20 \cdot \log(1/x)$

T = Minimum transmission duration



EMC Test Data

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
		Class:	N/A

RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions

Test Specific Details

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

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: 21.4 °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	RF4CE	2405MHz	3	3	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	37.5 dB μ V/m @ 2390.0 MHz (-16.5 dB)
	RF4CE	2475MHz	3	3	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	43.8 dB μ V/m @ 2484.0 MHz (-10.2 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: L044A505250029

Driver: 5.99 RC188.10

Antenna: PCB



EMC Test Data

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
		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 $\geq 98\%$ 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)
RF4CE	-	100.00	Yes	-	0	0	-

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 $\geq 98\%$, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces
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.



EMC Test Data

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
		Class:	N/A

Run #1: Radiated Bandedge Measurements

Date of Test: 2/22/2015

Config. Used: 2

Test Engineer: Jack Liu

Config Change: -

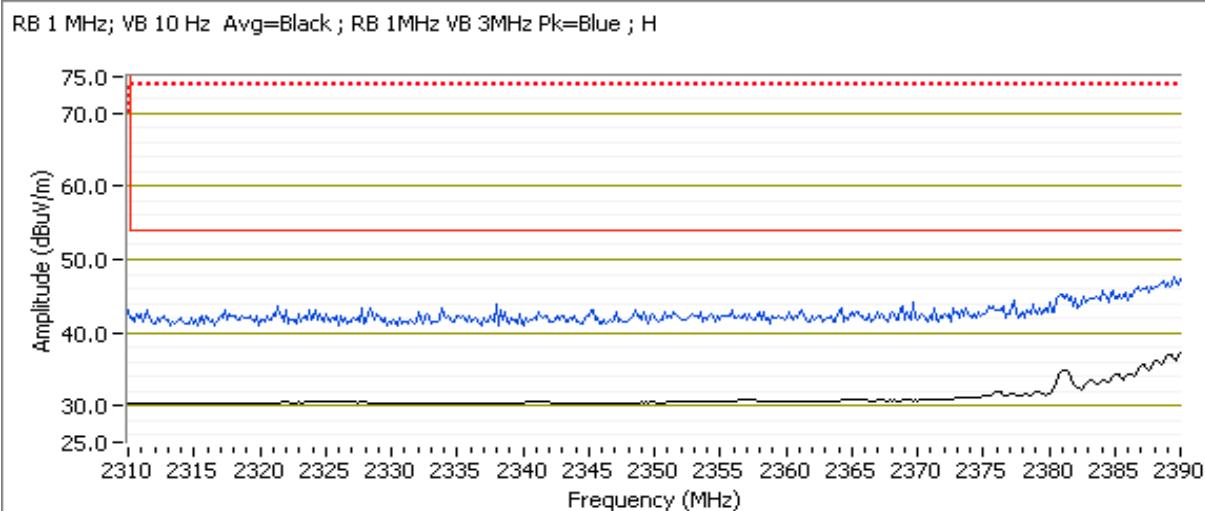
Test Location: FT Chamber#4

EUT Voltage: 120V/60Hz

Channel: 2405MHz Mode: RF4CE
Tx Chain: - Data Rate: -

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters
2390.000	37.5	H	54.0	-16.5	AVG	61	1.1
2389.840	47.3	H	74.0	-26.7	PK	61	1.1
2376.050	31.9	V	54.0	-22.1	AVG	341	1.0
2388.080	43.2	V	74.0	-30.8	PK	341	1.0





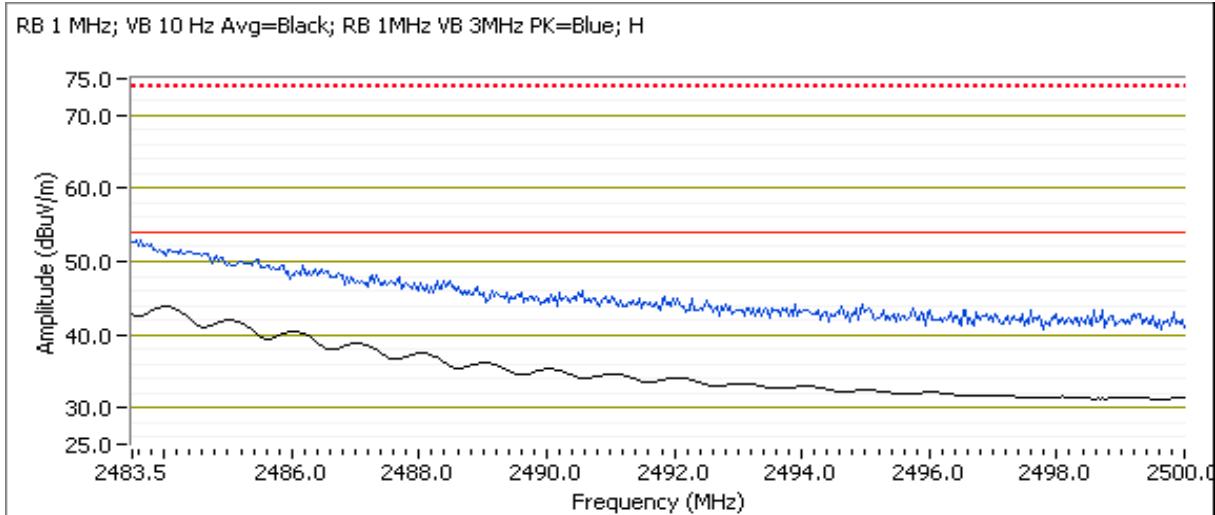
EMC Test Data

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
			Class: N/A

Channel: 2475MHz Mode: RF4CE
Tx Chain: - Data Rate: -

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters
2484.000	43.8	H	54.0	-10.2	AVG	77	1.0
2483.730	52.4	H	74.0	-21.6	PK	77	1.0
2484.000	37.0	V	54.0	-17.0	AVG	97	1.3
2484.330	45.7	V	74.0	-28.3	PK	97	1.3





EMC Test Data

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
		Class:	N/A

RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions

Test Specific Details

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

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: 21.2 °C
Rel. Humidity: 39 %

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

Run #	Mode	Channel	Target Power	Passing Power Setting	Test Performed	Limit	Result / Margin
1	RF4CE	2405MHz	3	3	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	45.9 dB μ V/m @ 4809.1 MHz (-8.1 dB)
	RF4CE	2450MHz	3	3	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	43.4 dB μ V/m @ 7351.5 MHz (-10.6 dB)
	RF4CE	2475MHz	3	3	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	44.0 dB μ V/m @ 7426.5 MHz (-10.0 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.



EMC Test Data

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
		Class:	N/A

Sample Notes

Sample S/N: L044A505250029

Driver: 5.99 RC188.10

Antenna: PCB

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 \geq 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)
RF4CE	-	100.00	Yes	-	0	0	-

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 \geq 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces
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:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
		Class:	N/A

Run #1: Radiated Spurious Emissions, 1,000 - 25000 MHz. Operating Mode: RF4CE

Date of Test: 2/20/2015 0:00

Config. Used: 2

Test Engineer: Rafael Varelas

Config Change: -

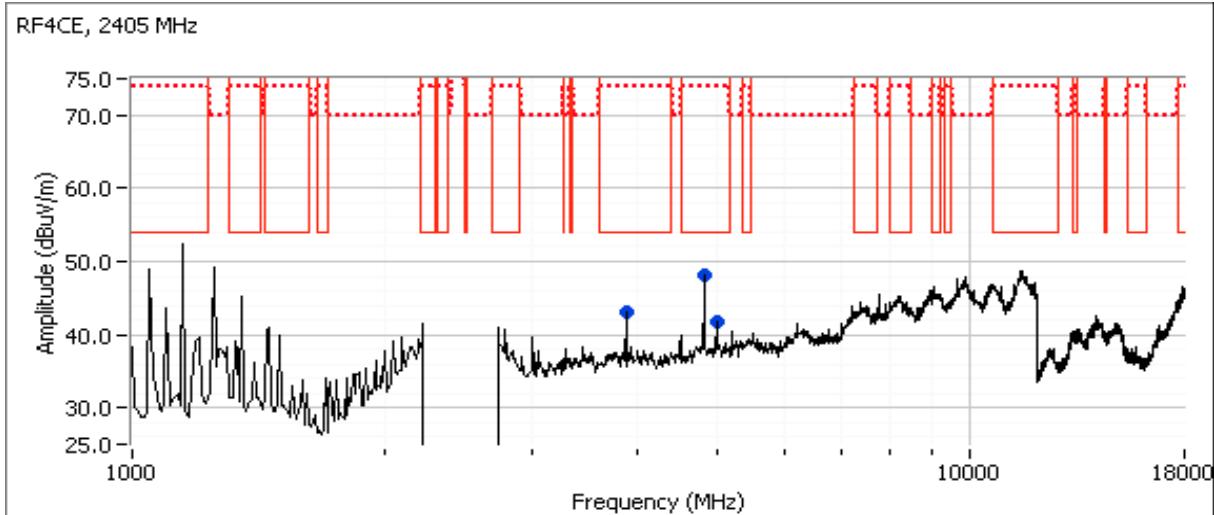
Test Location: FT Chamber# 4

EUT Voltage: 120V/60Hz

Run #1a: Low Channel

 Channel: 2405MHz Mode: RF4CE
 Tx Chain: - Data Rate: -

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters
4809.050	45.9	V	54.0	-8.1	AVG	259	1.4
4808.990	53.1	V	74.0	-20.9	PK	259	1.4
4968.010	39.2	V	54.0	-14.8	AVG	150	1.0
4968.000	46.4	V	74.0	-27.6	PK	150	1.0
3883.370	42.6	V	54.0	-11.4	AVG	274	1.0
3883.420	47.5	V	74.0	-26.5	PK	274	1.0





EMC Test Data

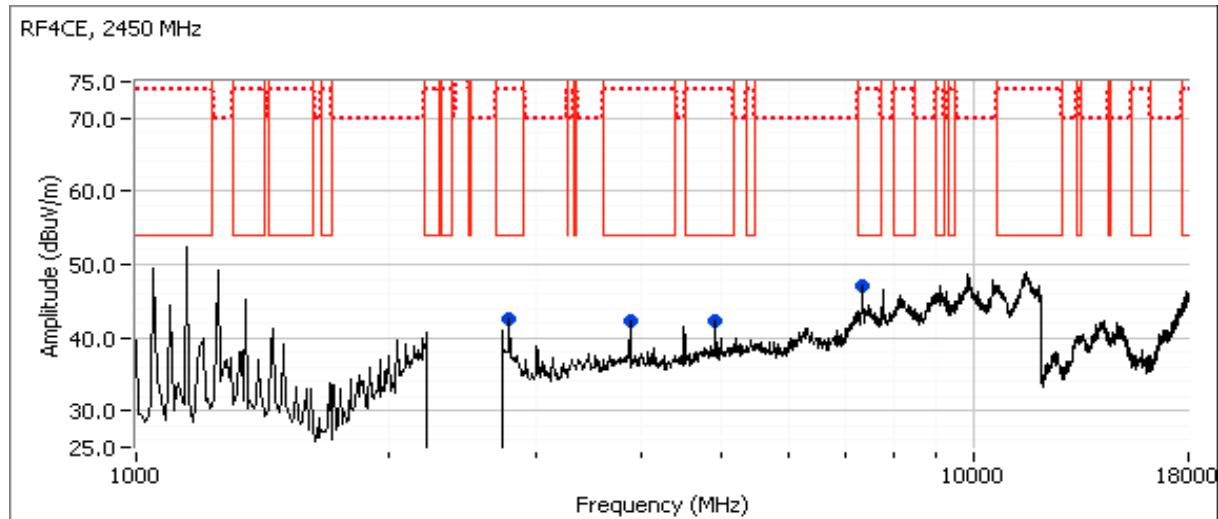
Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
			Class: N/A

Run #1b: Center Channel

Channel: 2450MHz Mode: RF4CE
Tx Chain: - Data Rate: -

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7351.530	43.4	V	54.0	-10.6	AVG	339	1.7	RB 1 MHz;VB 10 Hz;Peak
7351.730	53.7	V	74.0	-20.3	PK	339	1.7	RB 1 MHz;VB 3 MHz;Peak
2782.650	41.6	V	54.0	-12.4	AVG	164	1.0	RB 1 MHz;VB 10 Hz;Peak
2782.780	49.1	V	74.0	-24.9	PK	164	1.0	RB 1 MHz;VB 3 MHz;Peak
4899.010	39.9	V	54.0	-14.1	AVG	237	1.6	RB 1 MHz;VB 10 Hz;Peak
4901.010	48.5	V	74.0	-25.5	PK	237	1.6	RB 1 MHz;VB 3 MHz;Peak
3883.340	43.1	V	54.0	-10.9	AVG	269	1.8	RB 1 MHz;VB 10 Hz;Peak
3883.360	47.9	V	74.0	-26.1	PK	269	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

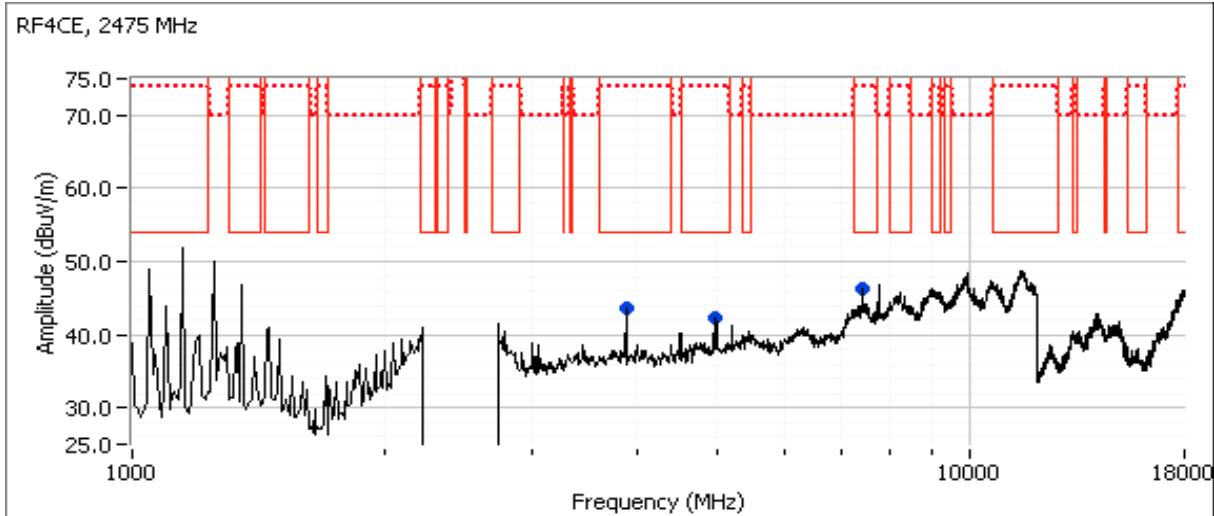


Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
		Class:	N/A

Run #1c: High Channel

Channel: 2475MHz Mode: RF4CE
 Tx Chain: - Data Rate: -

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7426.490	44.0	V	54.0	-10.0	AVG	334	1.6	RB 1 MHz;VB 10 Hz;Peak
7423.840	53.7	V	74.0	-20.3	PK	334	1.6	RB 1 MHz;VB 3 MHz;Peak
3883.360	42.7	V	54.0	-11.3	AVG	267	1.8	RB 1 MHz;VB 10 Hz;Peak
3883.100	48.1	V	74.0	-25.9	PK	267	1.8	RB 1 MHz;VB 3 MHz;Peak
4949.030	38.5	V	54.0	-15.5	AVG	187	1.3	RB 1 MHz;VB 10 Hz;Peak
4950.980	47.5	V	74.0	-26.5	PK	187	1.3	RB 1 MHz;VB 3 MHz;Peak





EMC Test Data

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
		Class:	N/A

RSS 210 and FCC 15.247 (DTS) Antenna Port Measurements 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.

Date of Test: 2/22/2015
Test Engineer: Jack Liu / R. Varelas
Test Location: FT Chamber#4

Config. Used: 2
Config Change: -
EUT Voltage: 120V/60Hz

General Test Configuration

All measurements were performed radiated at a distance of 3m. All measurements have been corrected for the measurement system.

Ambient Conditions:

Temperature: 23 °C
Rel. Humidity: 35 %

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
1	3		Output Power	15.247(b)	Pass	4.5dBm (0.003W)
2	3		Power spectral Density (PSD)	15.247(d)	Pass	1.2 dBm/100kHz
3	3		Minimum 6dB Bandwidth	15.247(a)	Pass	1.523 MHz
3	3		99% Bandwidth	RSS GEN	-	2.238 MHz
4	3		Spurious emissions	15.247(b)	Pass	All emissions are below 30dB the limit

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



EMC Test Data

Client:	Technicolor USA, Inc.			Job Number:	J97449		
Model:	H44-100			T-Log Number:	T101171		
Contact:	Steven Hershberger			Project Manager:	Christine Krebill		
Standard:	FCC 15.247/15.407/15.B			Project Coordinator:	-		

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
RF4CE	-	100.00	Yes	-	0	0	-

Sample Notes

Sample S/N: L044A505250029

Driver: 5.99 RC188.10

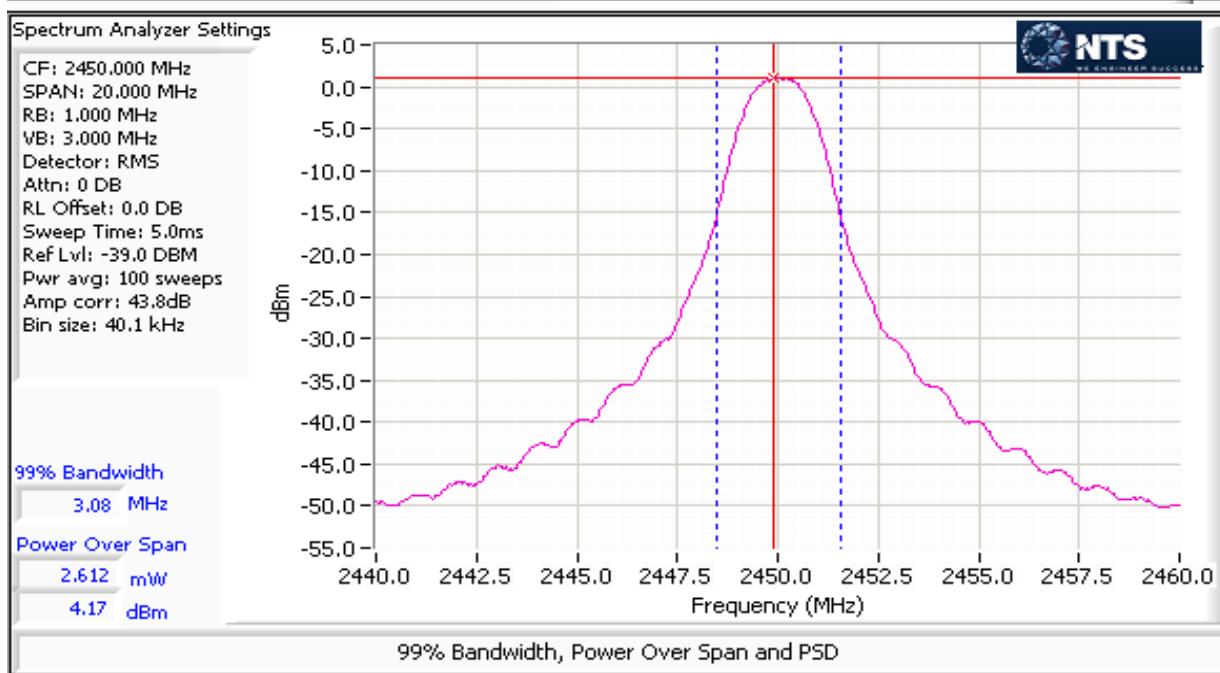
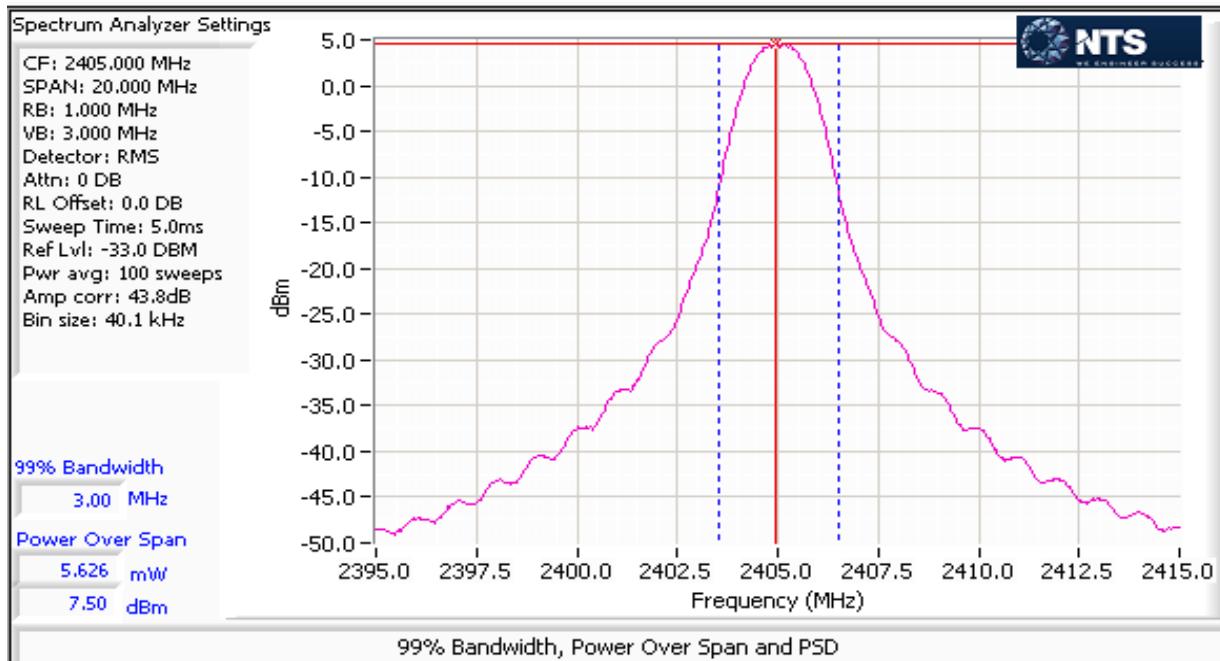
Antenna: PCB



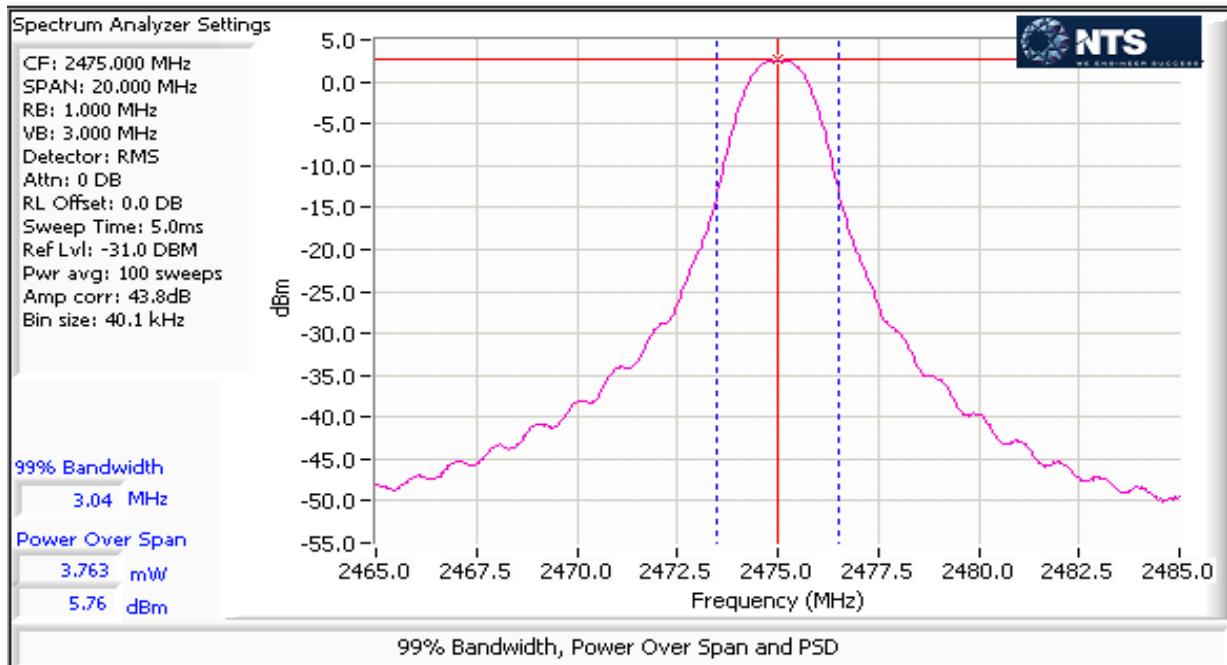
EMC Test Data

Client:	Technicolor USA, Inc.					Job Number:	J97449							
Model:	H44-100					T-Log Number:	T101171							
Contact:	Steven Hershberger					Project Manager:	Christine Krebill							
Standard:	FCC 15.247/15.407/15.B					Project Coordinator:	-							
Run #1: Output Power														
Mode: RF4CE														
Power Setting ²	Frequency (MHz)	Output Power (EIRP) (dBm) ¹		Antenna Gain (dBi)	Result	Power dBm	Power W	Output Power (dBm) ³						
Vertical														
3	2405	-4.3	0.4	3.0	Pass	-7.3	0.0002							
3	2450	-3.5	0.4	3.0	Pass	-6.5	0.0002							
3	2475	-3.5	0.4	3.0	Pass	-6.5	0.0002							
Horizontal														
3	2405	7.5	5.6	3.0	Pass	4.5	0.003							
3	2450	4.2	2.6	3.0	Pass	1.2	0.001							
3	2475	5.8	3.8	3.0	Pass	2.8	0.002							
Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments							
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters							
2405	87.3	V			Peak	268	1.7							
2405	99.3	H			Peak	61	POS; RB 100 kHz; VB: 300 kHz							
2450	88.4	V			Peak	97	RB 100kHz;VB 300kHz;Peak							
2450	95.5	H			Peak	153	RB 100kHz;VB 300kHz;Peak							
2475	87.9	V			Peak	97	RB 100kHz;VB 300kHz;Peak							
2475	97.1	H			Peak	68	RB 100kHz;VB 300kHz;Peak							
FCC15.247 Spurious Emission limit (non-restricted band)				Peak Limit	79.3 dB μ V									
				Avg Limit	69.3 dB μ V									
Note 1:	Duty Cycle \geq 98%. Output power measured using a spectrum analyzer (see plots below) with RBW= 1-5% of OBW, VB \geq 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 - the software power setting used during testing, included for reference only.													
Note 3:	Power measured using average power meter (non-gated) and is included for reference only.													

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
		Class:	N/A



Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
		Class:	N/A





EMC Test Data

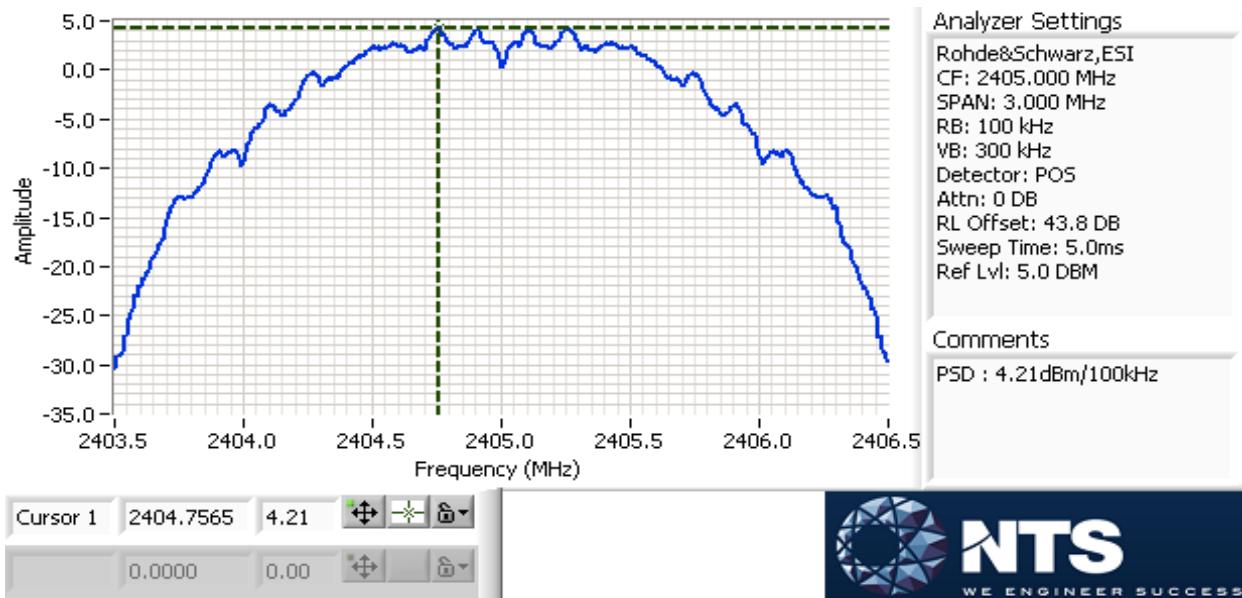
Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
			Class: N/A

Run #2: Power spectral Density

Mode: 11b

Power Setting	Frequency (MHz)	PSD (eirp)	Ant Gain	PSD	Limit	Result
		(dBm/100kHz) <small>Note 1</small>	(dBi)	(dBm/100kHz) <small>Note 1</small>		
3	2405	4.2	3	1.2	8.0	Pass
3	2450	0.5	3	-2.5	8.0	Pass
3	2475	2.1	3	-0.9	8.0	Pass

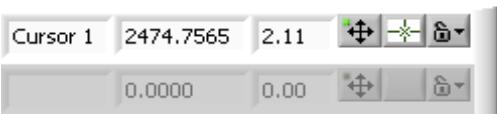
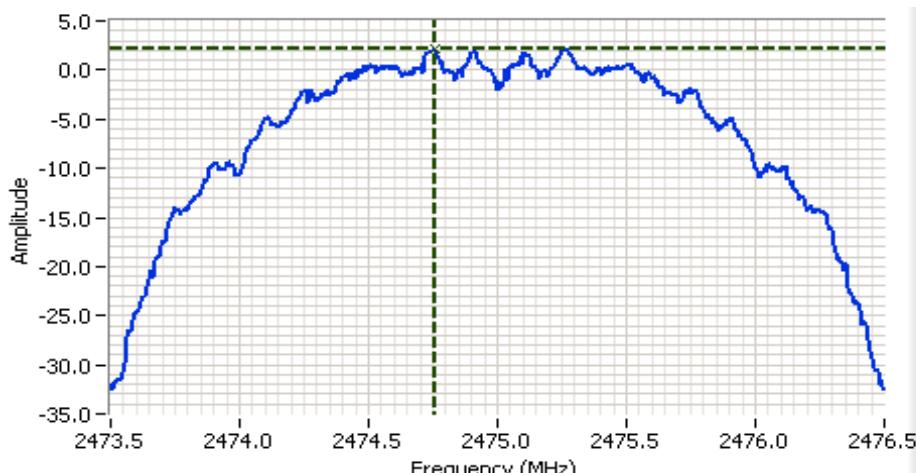
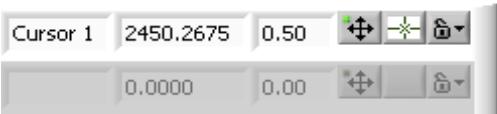
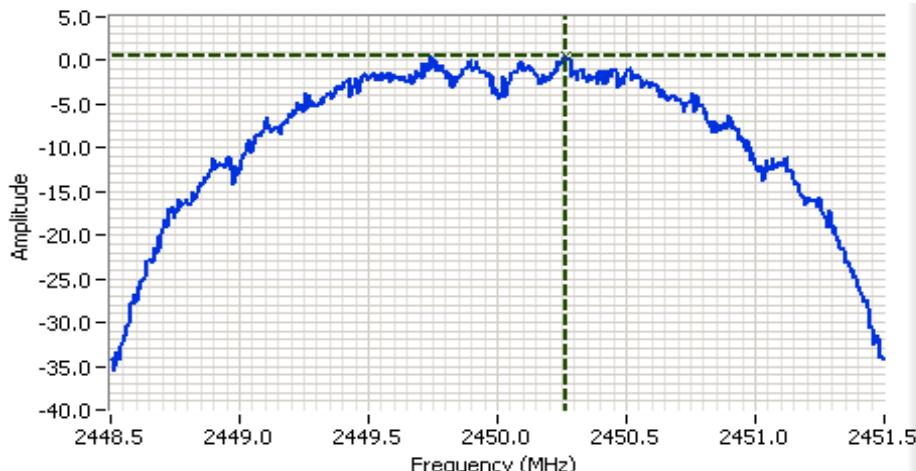
Note 1: Test performed per method PKSPD, in KDB 558074. Power spectral density measured using: $3\text{kHz} \leq \text{RBW} \leq 100\text{kHz}$, $\text{VBW}=3*\text{RBW}$, peak detector, span = $1.5*\text{DTS BW}$, auto sweep time, max hold.





EMC Test Data

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
		Class:	N/A





EMC Test Data

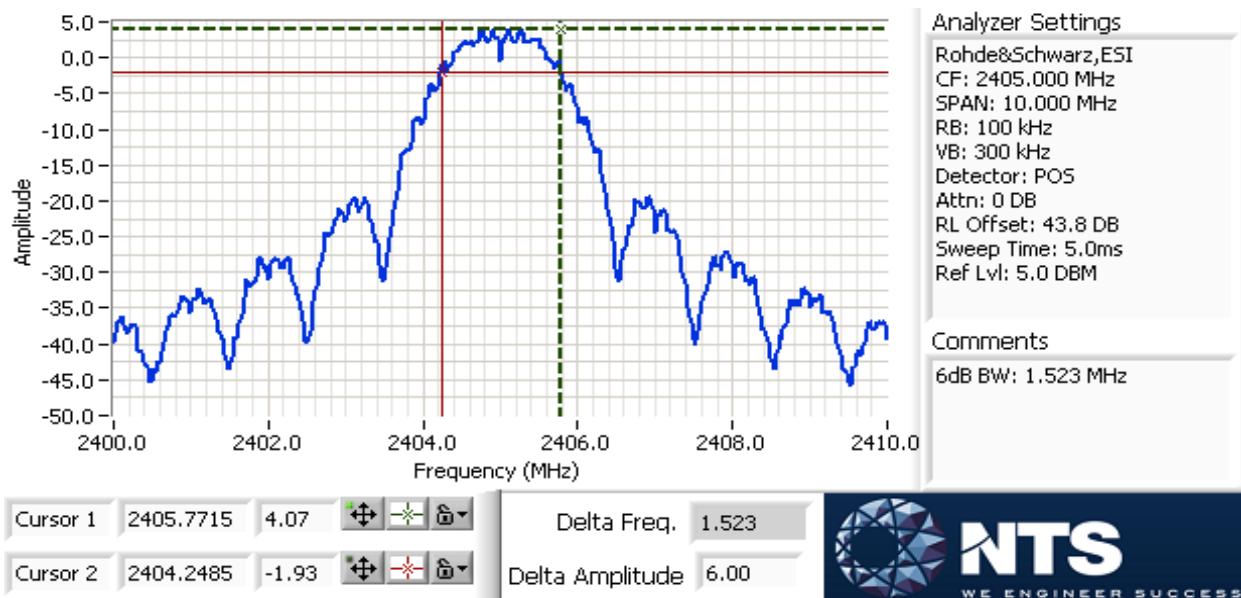
Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
			Class: N/A

Run #3: Signal Bandwidth

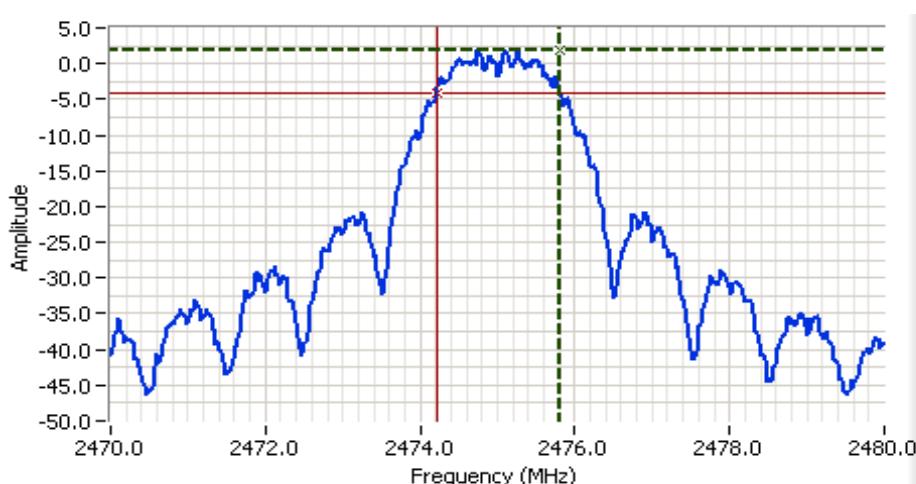
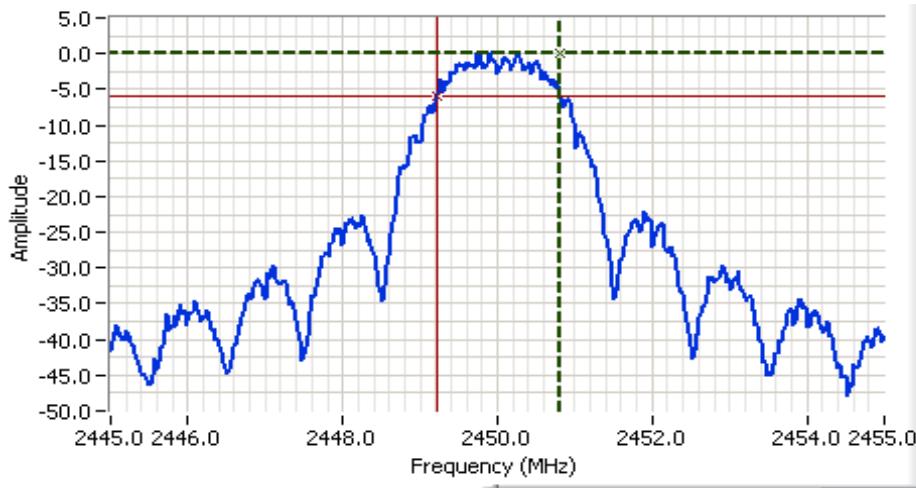
Mode: RF4CE

Power Setting	Frequency (MHz)	Bandwidth (MHz)		RBW Setting (kHz)	
		6dB	99%	6dB	99%
3	2405	1.523	2.226	100	30
3	2450	1.583	2.238	100	30
3	2475	1.583	2.232	100	30

Note 1: DTS BW: RBW=100kHz, VBW \geq 3*RBW, peak detector, max hold, auto sweep time.
99% BW: RBW=1-5% of 99%BW, VBW \geq 3*RBW, peak detector, max hold, auto sweep time.



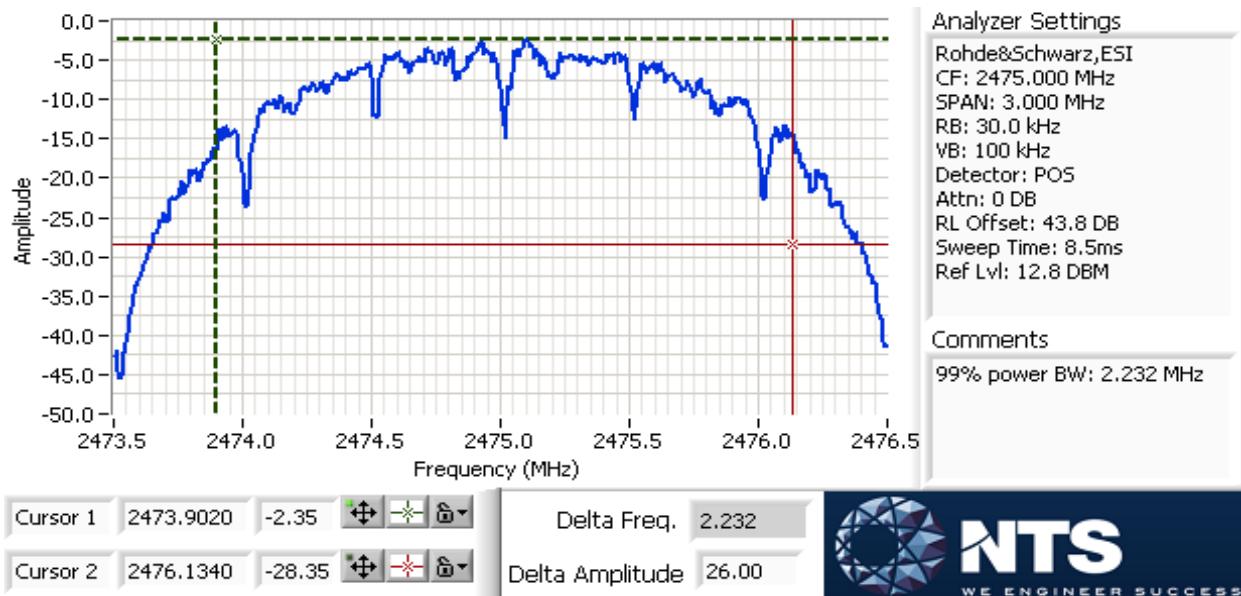
Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
		Class:	N/A



Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
		Class:	N/A



Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
		Class:	N/A

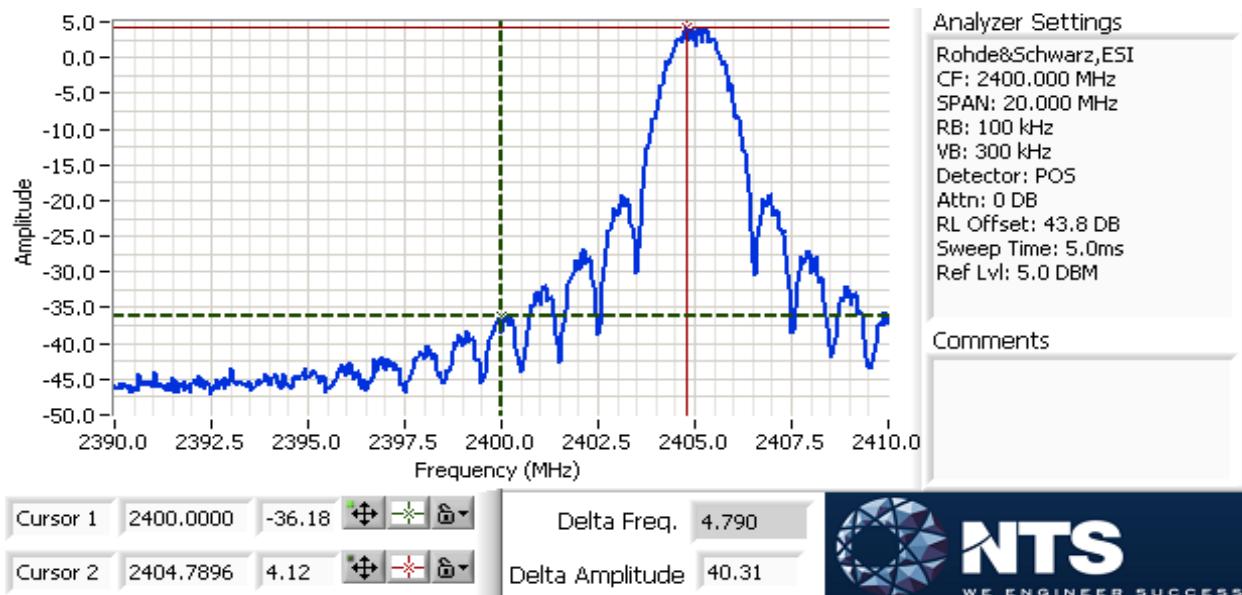


Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-

Run #4a: Out of Band Spurious Emissions

Frequency (MHz)	Power Setting	Mode	Limit	Result
2405(2400 Band Edge)	3	-	-30dBc	Pass
2405		-	-30dBc	
2450		-	-30dBc	
2475		-	-30dBc	Refer to 2.4GHz RF4CE Spurious

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.





EMC Test Data

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
		Class:	N/A

RSS 210 and FCC 15.247 (DTS) Radiated Spurious Emissions

Test Specific Details

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

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: 21.2 °C
Rel. Humidity: 39 %

Summary of Results - Intermodulation

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
Simultaneous Tx - RF4CE + Wifi - using the worse case 5GHz wifi channel and the worse case for RF4CE channel							
2	RF4CE + Worse case Wifi	n20	-	20 / 3	Radiated Emissions 30MHz - 1000MHz	FCC 15.209 / 15 E	34.6 dB μ V/m @ 971.99 MHz (-19.4 dB)
		CH165 - 5825 MHz & Zigbee CH11			Radiated Emissions 1 - 40 GHz	FCC 15.209 / 15 E	51.6 dB μ V/m @ 5412.9 MHz (-2.4 dB)

Notes:

When determining worse case, non-radio spurious emissions were excluded

Note - original testing including evaluation of 2.4GHz wifi transmission + RF4CE. Due to the project in Feb 2016, the power in the 2.4GHz wifi was increased. Refer to T100900. No intermod spurious emissions observed.



EMC Test Data

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
		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

Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time

Unless otherwise stated/noted, emission has duty cycle $\geq 98\%$ 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)
n20	13	0.978	Yes	-	0.10	0.19	-
RF4CE	-	100.00	Yes	-	0	0	-

Sample Notes

Wifi

Sample S/N: L044A505250029

Driver: 5.99 RC188.10

Antenna: Airgain N2420DS / N2415D2

RF4CE

Sample S/N: L044A505250029

Driver: 5.99 RC188.10

Antenna: PCB

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 $\geq 98\%$, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces
Note 3:	Emission has duty cycle $< 98\%$, but constant, average measurement performed: RBW=1MHz, VBW=10Hz, peak detector, linear averaging, auto sweep, trace average 100 traces, measurement corrected by Linear Voltage 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.



EMC Test Data

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
		Class:	N/A

Run #2: Radiated Spurious Emissions, 30 - 40,000 MHz.

Date of Test: 2/20/15, 2/22/15

Test Engineer: Rafael Varelas / Jack Liu

Test Location: FT Chamber #4

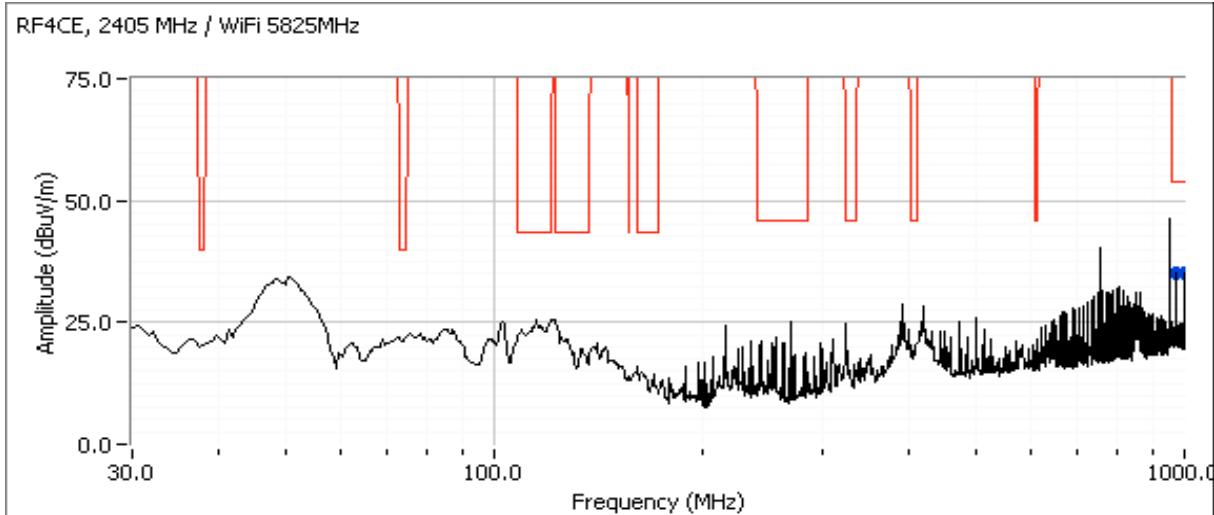
EUT Voltage: 120V/60Hz

Channel: 165 Mode: n20 Power Setting: 20
Tx Chain: 2x2 Data Rate: MCS1

RF4CE: 2405 MHz Power Setting: 3
Tx Chain: -

30-1000MHz

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
971.989	34.6	H	54.0	-19.4	QP	123	1.0	QP (1.00s)
999.989	31.8	V	54.0	-22.2	QP	112	1.0	QP (1.00s)

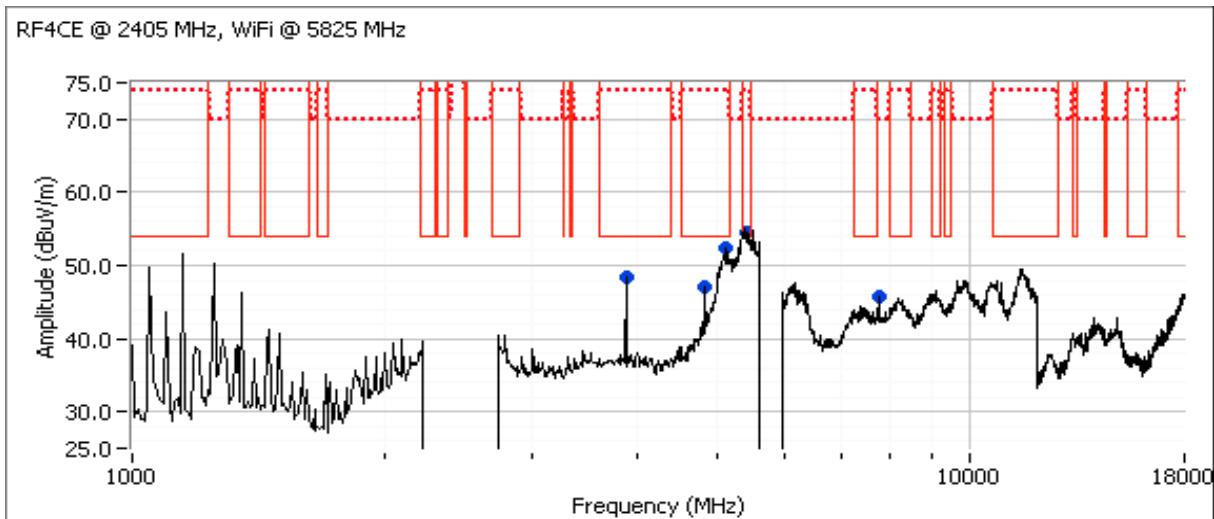


Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
			Class: N/A

1000-40,000MHz

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5412.930	51.6	H	54.0	-2.4	AVG	360	1.0	RB 1 MHz;VB 10 Hz;Peak
5413.200	62.9	H	74.0	-11.1	PK	360	1.0	RB 1 MHz;VB 3 MHz;Peak
3883.330	48.2	H	54.0	-5.8	AVG	174	1.2	RB 1 MHz;VB 10 Hz;Peak
3883.400	51.5	H	74.0	-22.5	PK	174	1.2	RB 1 MHz;VB 3 MHz;Peak
7766.640	44.8	V	54.0	-9.2	AVG	178	1.7	Note1, RB 1 MHz;VB 10 Hz;Peak
7766.690	51.6	V	74.0	-22.4	PK	178	1.7	Note 1, RB 1 MHz;VB 3 MHz;Peak
4809.040	45.8	V	54.0	-8.2	AVG	219	1.5	RB 1 MHz;VB 10 Hz;Peak
4811.020	53.1	V	74.0	-20.9	PK	219	1.5	RB 1 MHz;VB 3 MHz;Peak
5138.150	48.1	V	54.0	-5.9	AVG	249	1.6	RB 1 MHz;VB 10 Hz;Peak
5131.740	60.5	V	74.0	-13.5	PK	249	1.6	RB 1 MHz;VB 3 MHz;Peak

Note:	Preliminary Scans made between 18 - 40 GHz with the measurement antenna moved around the card and its antennas 20-50cm from the device. No emissions observed. Plot not included.
Note 2:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dB μ V/m). The measurement method required is a peak measurement (RB=1MHz, VB \geq 3MHz, peak detector).





EMC Test Data

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	B

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: 3/2/2015 Config. Used: 3
Test Engineer: Aлика Hirano Config Change: -
Test Location: Fremont Chamber #3 EUT Voltage: 120V/60Hz

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. A second LISN was used for all local support equipment. Remote support equipment was located outside of the semi-anechoic chamber. Any cables running to remote support equipment were routed through metal conduit and when possible passed through a ferrite clamp upon exiting the chamber.

Ambient Conditions: Temperature: 22 °C
Rel. Humidity: 37 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power, 120V/60Hz	15.207	Pass	46.7 dB μ V @ 0.444 MHz (-0.3 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.

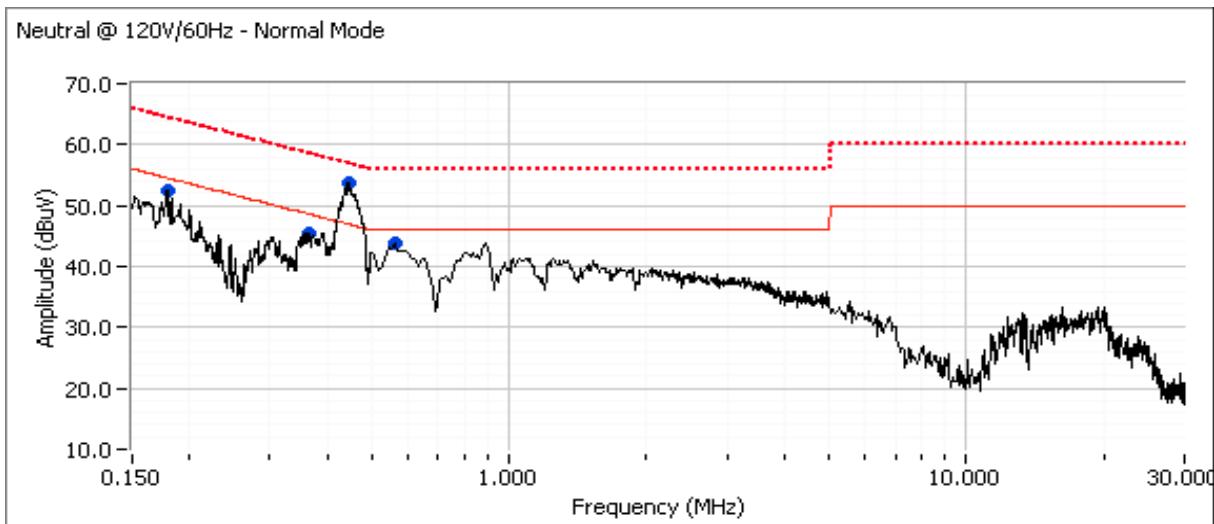
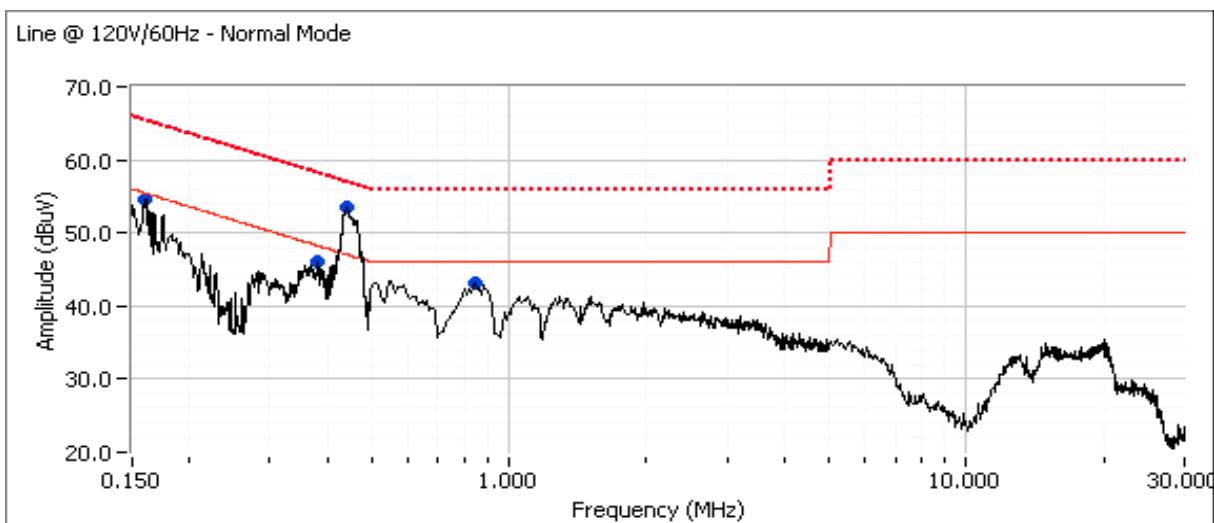
Sample Notes

Sample S/N:A44LA5BG100113

EUT was configured to transmit continuously on CH157, n20, maximum power. RF4CE was configured to continuous transmission at 2450MHz

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T101171
Contact:	Steven Hershberger	Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B	Project Coordinator:	-
		Class:	B

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





EMC Test Data

Client:	Technicolor USA, Inc.			Job Number:	J97449
Model:	H44-100			T-Log Number:	T101171
Contact:	Steven Hershberger			Project Manager:	Christine Krebill
Standard:	FCC 15.247/15.407/15.B			Project Coordinator:	-
				Class:	B

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

Frequency MHz	Level dB μ V	AC Line	15.207		Detector QP/Ave	Comments
			Limit	Margin		
0.159	54.6	Line 1	55.4	-0.8	Peak	
0.383	46.1	Line 1	48.2	-2.1	Peak	
0.443	53.4	Line 1	47.0	6.4	Peak	
0.842	43.2	Line 1	46.0	-2.8	Peak	
0.177	52.5	Neutral	54.5	-2.0	Peak	
0.365	45.4	Neutral	48.6	-3.2	Peak	
0.444	53.8	Neutral	47.0	6.8	Peak	
0.553	43.8	Neutral	46.0	-2.2	Peak	

Final quasi-peak and average readings

Frequency MHz	Level dB μ V	AC Line	15.207		Detector QP/Ave	Comments
			Limit	Margin		
0.444	46.7	Neutral	47.0	-0.3	AVG	AVG (0.10s)
0.443	46.4	Line 1	47.0	-0.6	AVG	AVG (0.10s)
0.444	53.6	Neutral	57.0	-3.4	QP	QP (1.00s)
0.443	53.3	Line 1	57.0	-3.7	QP	QP (1.00s)
0.365	36.8	Neutral	48.6	-11.8	AVG	AVG (0.10s)
0.842	33.0	Line 1	46.0	-13.0	AVG	AVG (0.10s)
0.365	45.2	Neutral	58.6	-13.4	QP	QP (1.00s)
0.553	32.0	Neutral	46.0	-14.0	AVG	AVG (0.10s)
0.553	41.8	Neutral	56.0	-14.2	QP	QP (1.00s)
0.383	33.9	Line 1	48.2	-14.3	AVG	AVG (0.10s)
0.383	43.9	Line 1	58.2	-14.3	QP	QP (1.00s)
0.177	40.0	Neutral	54.6	-14.6	AVG	AVG (0.10s)
0.842	41.1	Line 1	56.0	-14.9	QP	QP (1.00s)
0.159	39.8	Line 1	55.5	-15.7	AVG	AVG (0.10s)
0.177	48.9	Neutral	64.6	-15.7	QP	QP (1.00s)
0.159	49.7	Line 1	65.5	-15.8	QP	QP (1.00s)



EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Product	H44-100	T-Log Number:	T100900
System Configuration:	-	Project Manager:	Christine Krebill
Contact:	Austin Moore	Project Coordinator:	-
Emissions Standard(s):	FCC 15.247	Class:	B
Immunity Standard(s):	-	Environment:	-

EMC Test Data

For The

Techicolor

Product

H44-100

Date of Last Test: 3/2/2016

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

Duty Cycle

Date of Test: 2/29/2016
Test Engineer: Mehran Birgani
Test Location: FT Chamber #5

Duty cycle measurements performed on the worse case data rate for power (taken from original testing)

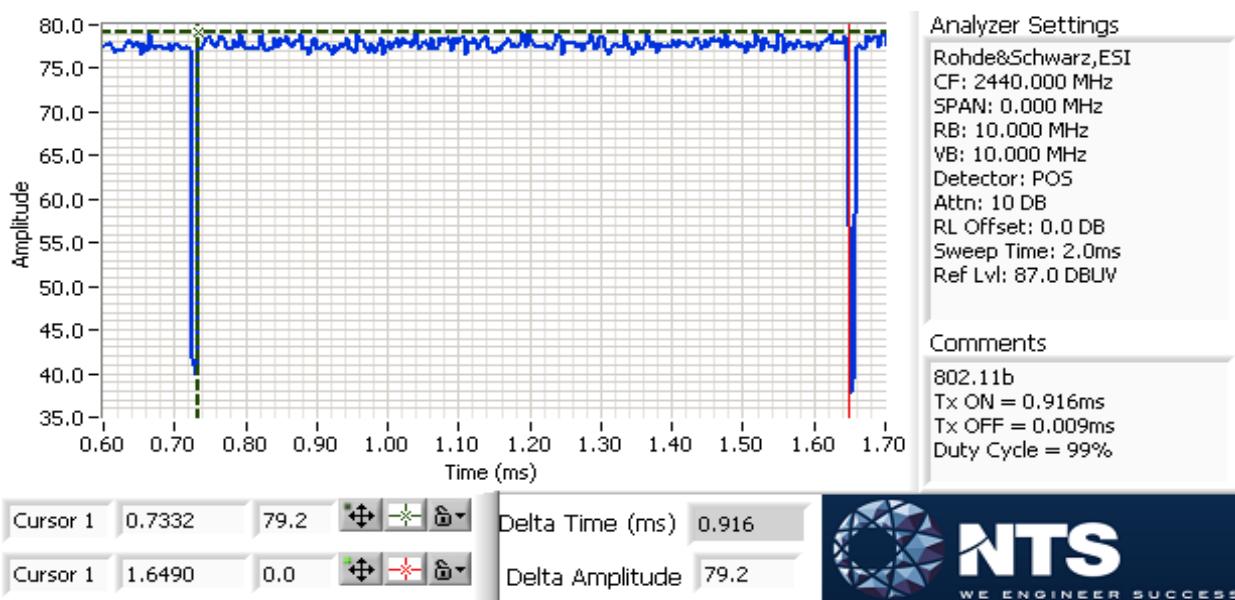
Notes: Measurements taken with maximum RBW/VBW settings allowed.

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11b	2Mb/s	99.0%	Yes	0.92	0	0	10
11g	9Mb/s	98.0%	Yes	1.41	0	0	10
n20	6.5	97.3%	Yes	0.67	0.12	0.24	1486

* Correction factor when using RMS/Power averaging - $10 \log(1/x)$

** Correction factor when using linear voltage average - $20 \log(1/x)$

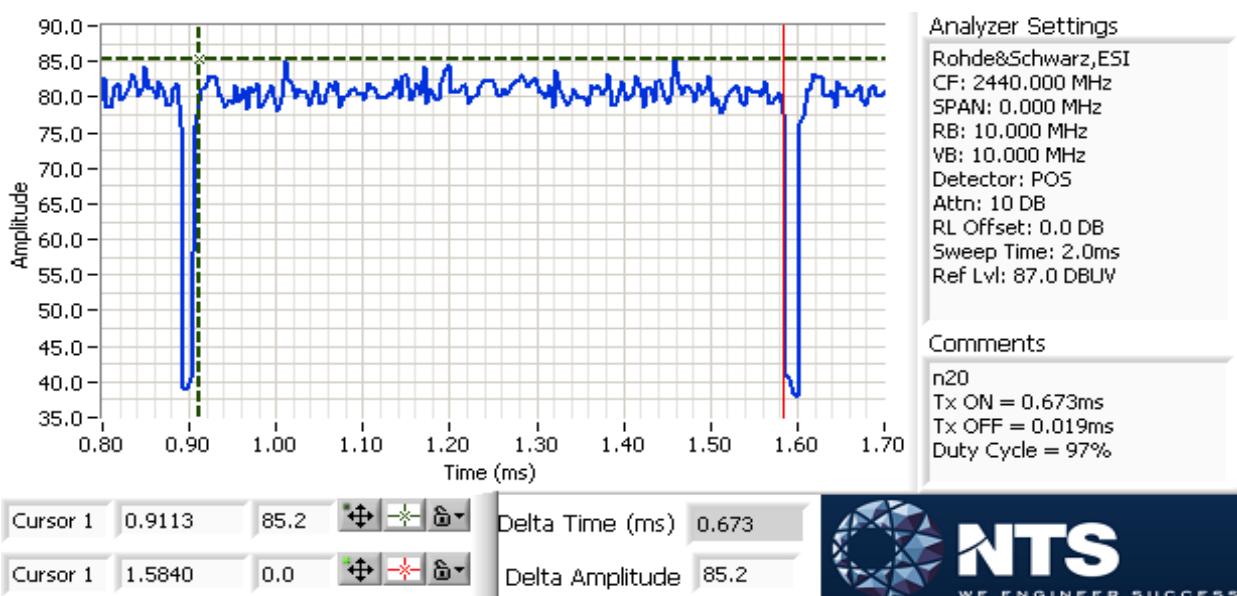
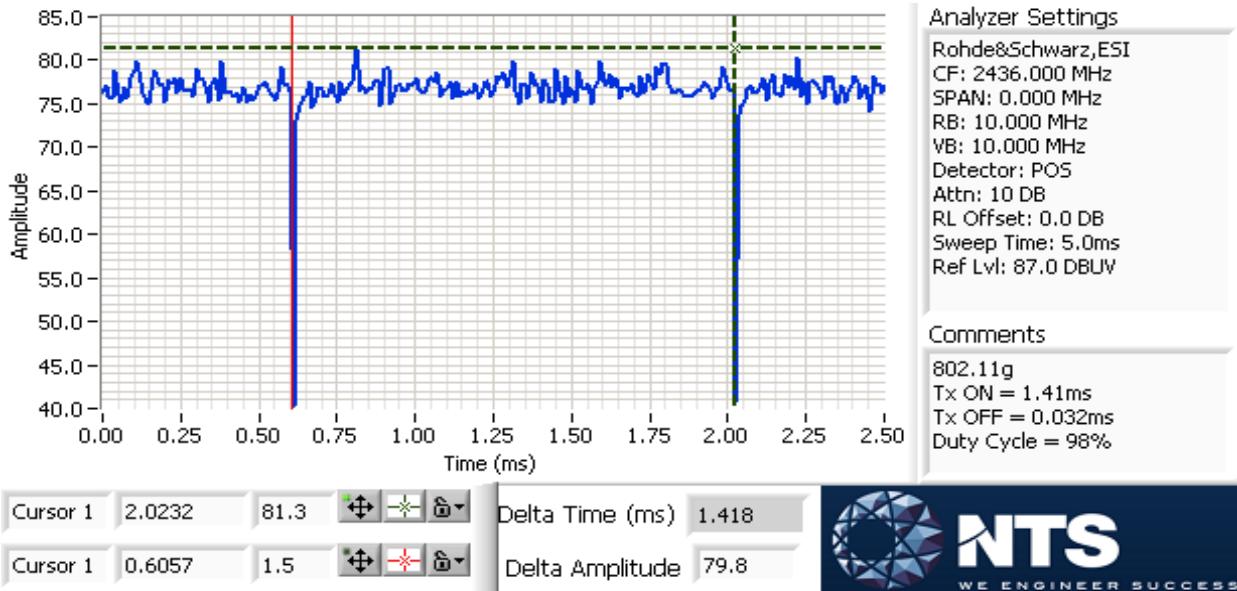
T = Minimum transmission duration





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-

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: 21.5 °C
Rel. Humidity: 36 %

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: A44LA5RW110013

Driver: -

Antenna: Airgain N2420DS / N2415D2



EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
		Project Manager:	Christine Krebill
Contact:	Austin Moore	Project Coordinator:	-
Standard:	FCC 15.247	Class:	N/A

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 (chain 1)	1 - 2412MHz	23	22	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	50.2 dB μ V/m @ 2387.4 MHz (-3.8 dB)
	b (chain 1)	2 - 2417MHz	23	23	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	50.7 dB μ V/m @ 2388.6 MHz (-3.3 dB)
	b (chain 1)	9 - 2452MHz	23	23	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	50.5 dB μ V/m @ 2484.5 MHz (-3.5 dB)
	b (chain 1)	10 - 2457MHz	23	22	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	48.7 dB μ V/m @ 2483.6 MHz (-5.3 dB)
	b (chain 1)	11 - 2462MHz	23	21	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	45.6 dB μ V/m @ 2486.5 MHz (-8.4 dB)
2	g (chain 1)	1 - 2412MHz	23	18	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	73.5 dB μ V/m @ 2389.6 MHz (-0.5 dB)
	g (chain 1)	2 - 2417MHz	23	20	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	52.1 dB μ V/m @ 2390.0 MHz (-1.9 dB)
	g (chain 1)	3 - 2422MHz	23	21	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	71.1 dB μ V/m @ 2388.5 MHz (-2.9 dB)
	g (chain 1)	4 - 2427MHz	23	22	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	71.7 dB μ V/m @ 2388.6 MHz (-2.3 dB)
	g (chain 1)	5 - 2432MHz	23	23	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	51.6 dB μ V/m @ 2389.8 MHz (-2.4 dB)
	g (chain 1)	8 - 2447MHz	23	23	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	53.4 dB μ V/m @ 2483.5 MHz (-0.6 dB)
	g (chain 1)	9 - 2452MHz	23	21	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	49.9 dB μ V/m @ 2483.6 MHz (-4.1 dB)
	g (chain 1)	10 - 2457MHz	23	20	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	72.2 dB μ V/m @ 2484.8 MHz (-1.8 dB)
	g (chain 1)	11 - 2462MHz	23	17	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	72.8 dB μ V/m @ 2484.5 MHz (-1.2 dB)



EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

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

Run #	Mode	Channel	Target Power	Power Setting	Test Performed	Limit	Result / Margin
3	n20 (2x2)	1 - 2412MHz	23	16	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	72.1 dB μ V/m @ 2389.8 MHz (-1.9 dB)
	n20 (2x2)	2 - 2417MHz	23	18	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	51.3 dB μ V/m @ 2388.1 MHz (-2.7 dB)
	n20 (2x2)	3 - 2422MHz	23	20	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	51.8 dB μ V/m @ 2389.4 MHz (-2.2 dB)
	n20 (2x2)	4 - 2427MHz	23	21	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	52.6 dB μ V/m @ 2390.0 MHz (-1.4 dB)
	n20 (2x2)	5 - 2432MHz	23	22	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	52.6 dB μ V/m @ 2389.9 MHz (-1.4 dB)
	n20 (2x2)	7 - 2442MHz	23	22	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	51.4 dB μ V/m @ 2483.6 MHz (-2.6 dB)
	n20 (2x2)	8 - 2447MHz	23	22	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	53.4 dB μ V/m @ 2483.5 MHz (-0.6 dB)
	n20 (2x2)	9 - 2452MHz	23	21	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	53.9 dB μ V/m @ 2483.5 MHz (-0.1 dB)
	n20 (2x2)	10 - 2457MHz	23	20	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	53.6 dB μ V/m @ 2483.9 MHz (-0.4 dB)
	n20 (2x2)	11 - 2462MHz	23	16	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	72.7 dB μ V/m @ 2485.1 MHz (-1.3 dB)

Worse case chain for the 11b/11g mode was taken from original certification.



EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		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 a duty cycle $\geq 98\%$ 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	2Mb/s	99.0%	Yes	0.92	0	0	10
11g	9Mb/s	98.0%	Yes	1.41	0	0	10
n20	6.5	97.3%	Yes	0.67	0.12	0.24	1486

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 3:	Emission has a duty cycle $\geq 98\%$, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces
Note 4:	Emission has constant duty cycle $< 98\%$, average measurement performed: RBW=1MHz, VBW>1/T but not less than 10Hz, peak detector, linear averaging, auto sweep, trace average 100 traces, measurement corrected by Linear voltage correction factor
Note 5:	Emission has constant duty cycle $< 98\%$, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces, measurement corrected by Pwr correction factor
Note 8:	Plots of the average and peak bandedge do not account for any duty cycle correction. Refer to the tabular results for final measurements.

Measurement Specific Notes:

Preliminary testing was performed to determine the worse case measurement polarity for each channel mode. In some cases, only results for the worse case polarity is provided below.



EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

Run #1: Radiated Bandedge Measurements

Date of Test: 02/24/16

Config. Used: 1

Test Engineer: M. Birgani

Config Change: None

Test Location: FT Chamber #4

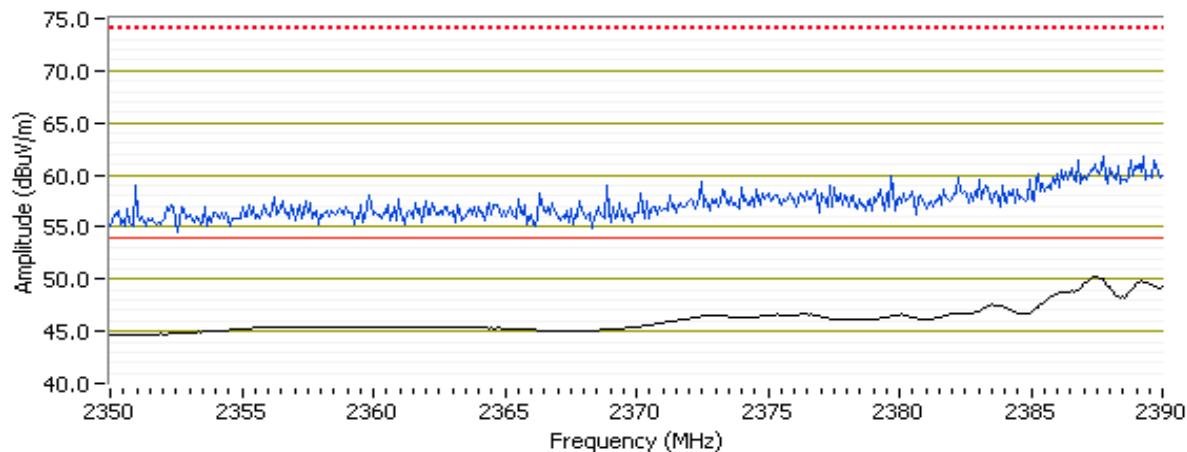
EUT Voltage: 120V/60Hz

Channel: 1 Mode: b Power Setting: 22
Tx Chain: 1 Data Rate: 2Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2387.430	50.2	H	54.0	-3.8	AVG	0	2.5
2387.430	43.2	V	54.0	-10.8	AVG	61	3.5
2389.360	61.6	H	74.0	-12.4	PK	0	2.5
2386.470	55.1	V	74.0	-18.9	PK	61	3.5

RB 1 MHz; VB 10 Hz; Average (Black trace); RB 1MHz; VB 3 MHz; Peak (Blue trace)





EMC Test Data

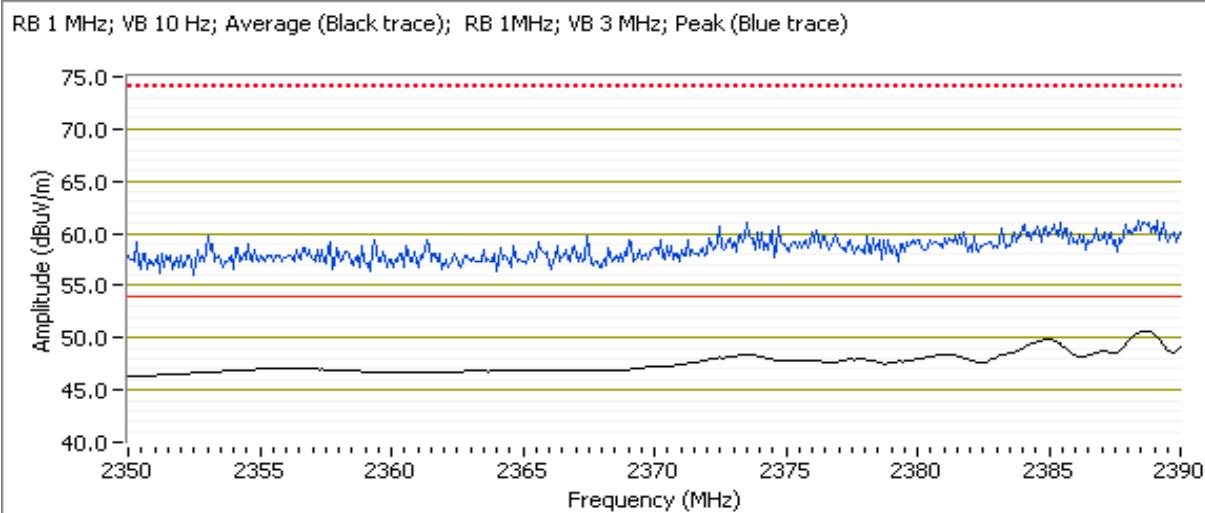
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Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
			Class: N/A

Channel: 2 Mode: b Power Setting: 23

Tx Chain: 1 Data Rate: 2Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2388.640	50.7	H	54.0	-3.3	AVG	0	2.1
2384.630	62.5	H	74.0	-11.5	PK	0	2.1
2350.160	38.3	V	54.0	-15.7	AVG	39	2.0
2368.280	52.1	V	74.0	-21.9	PK	39	2.0





EMC Test Data

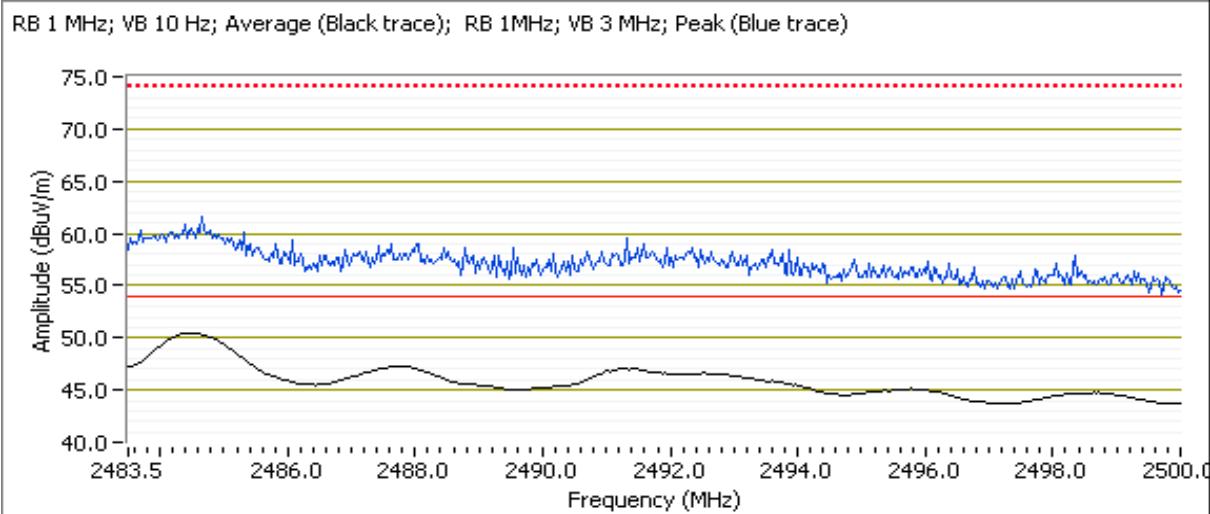
Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
Class:	N/A		

Channel: 9 Mode: b Power Setting: 23

Tx Chain: 1 Data Rate: 2Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2484.460	50.5	H	54.0	-3.5	AVG	0	2.9
2484.920	61.2	H	74.0	-12.8	PK	0	2.9





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

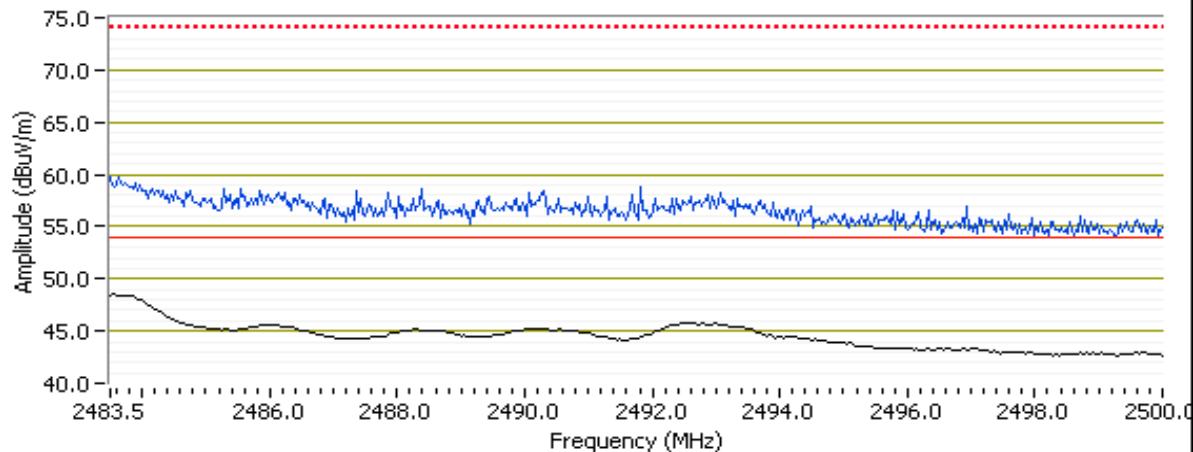
Channel: 10 Mode: b Power Setting: 22

Tx Chain: 1 Data Rate: 2Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2483.570	48.7	H	54.0	-5.3	AVG	0	2.6
2483.860	60.6	H	74.0	-13.4	PK	0	2.6

RB 1 MHz; VB 10 Hz; Average (Black trace); RB 1MHz; VB 3 MHz; Peak (Blue trace)





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
Class:	N/A		

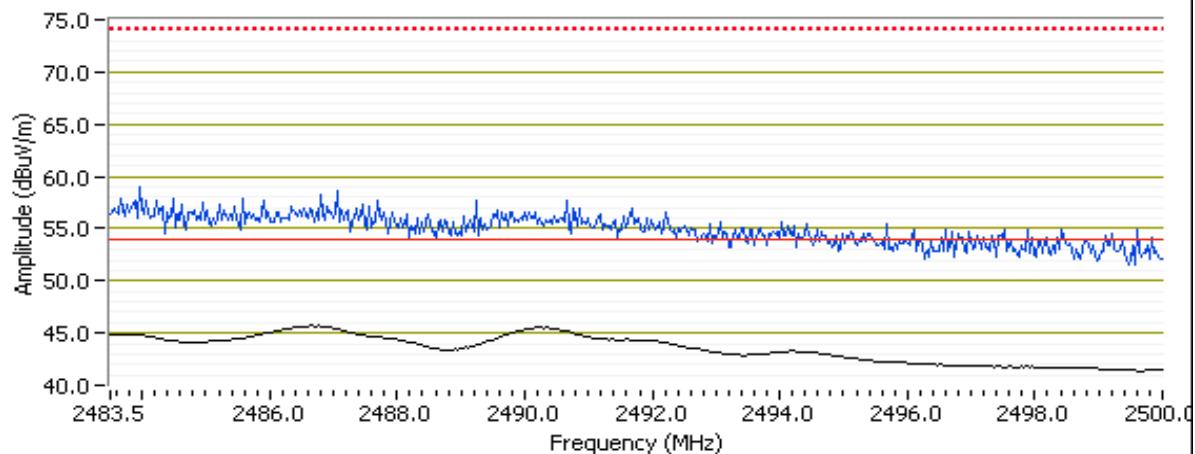
Channel: 11 Mode: b Power Setting: 21

Tx Chain: 1 Data Rate: 2Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2486.510	45.6	H	54.0	-8.4	AVG	0	2.6
2483.570	58.9	H	74.0	-15.1	PK	0	2.6

RB 1 MHz; VB 10 Hz; Average (Black trace); RB 1MHz; VB 3 MHz; Peak (Blue trace)





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

Run #2: Radiated Bandedge Measurements

Date of Test: 02/24/16

Config. Used: 1

Test Engineer: M. Birgani

Config Change: None

Test Location: FT Chamber #4

EUT Voltage: 120V/60Hz

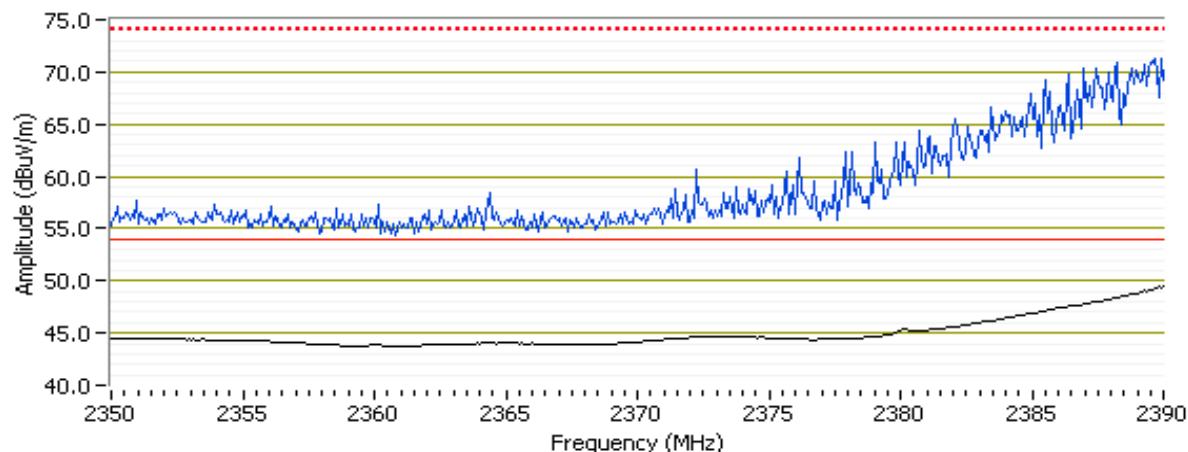
Channel: 1 Mode: g Power Setting: 18

Tx Chain: 1 Data Rate: 9Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2389.600	73.5	H	74.0	-0.5	PK	4	1.9
2390.000	49.9	H	54.0	-4.1	AVG	4	1.9

RB 1 MHz; VB 10 Hz; Average (Black trace); RB 1MHz; VB 3 MHz; Peak (Blue trace)





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
			Class: N/A

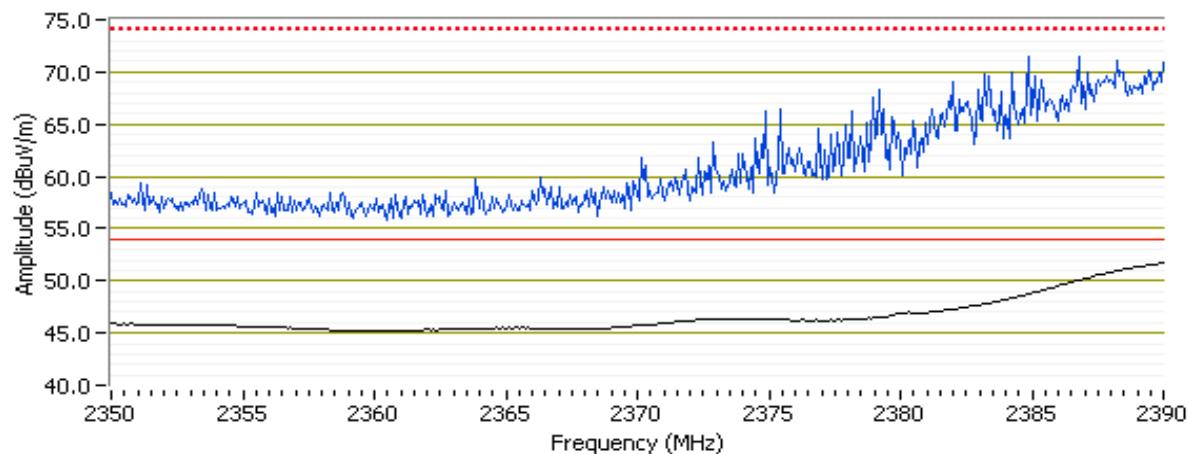
Channel: 2 Mode: g Power Setting: 20

Tx Chain: 1 Data Rate: 9Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2390.000	52.1	H	54.0	-1.9	AVG	0	2.0
2389.360	71.5	H	74.0	-2.5	PK	0	2.0

RB 1 MHz; VB 10 Hz; Average (Black trace); RB 1MHz; VB 3 MHz; Peak (Blue trace)





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
			Class: N/A

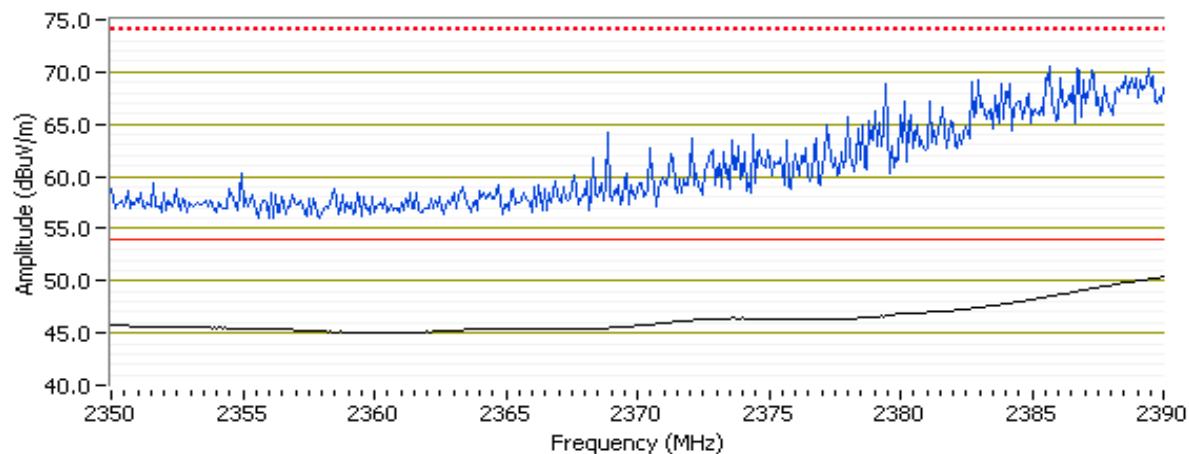
Channel: 3 Mode: g Power Setting: 21

Tx Chain: 1 Data Rate: 9Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2388.480	71.1	H	74.0	-2.9	PK	0	2.0
2390.000	50.6	H	54.0	-3.4	AVG	0	2.0

RB 1 MHz; VB 10 Hz; Average (Black trace); RB 1MHz; VB 3 MHz; Peak (Blue trace)





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
Class:	N/A		

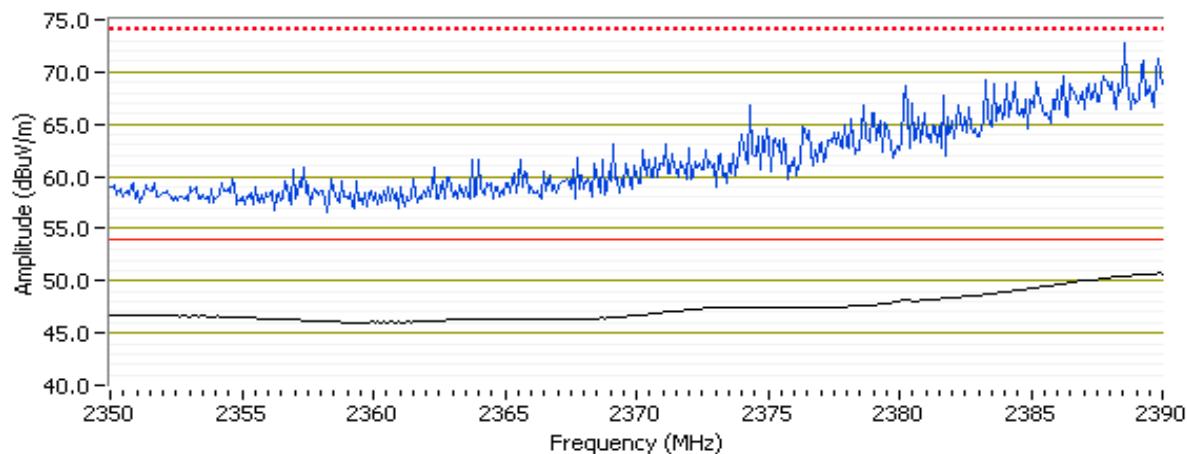
Channel: 4 Mode: g Power Setting: 22

Tx Chain: 1 Data Rate: 9Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2388.560	71.7	H	74.0	-2.3	PK	4	1.9
2390.000	51.0	H	54.0	-3.0	AVG	4	1.9

RB 1 MHz; VB 10 Hz; Average (Black trace); RB 1MHz; VB 3 MHz; Peak (Blue trace)





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
			Class: N/A

Date of Test: 02/26/16

Config. Used: 1

Test Engineer: M. Birgani

Config Change: None

Test Location: FT Chamber #4

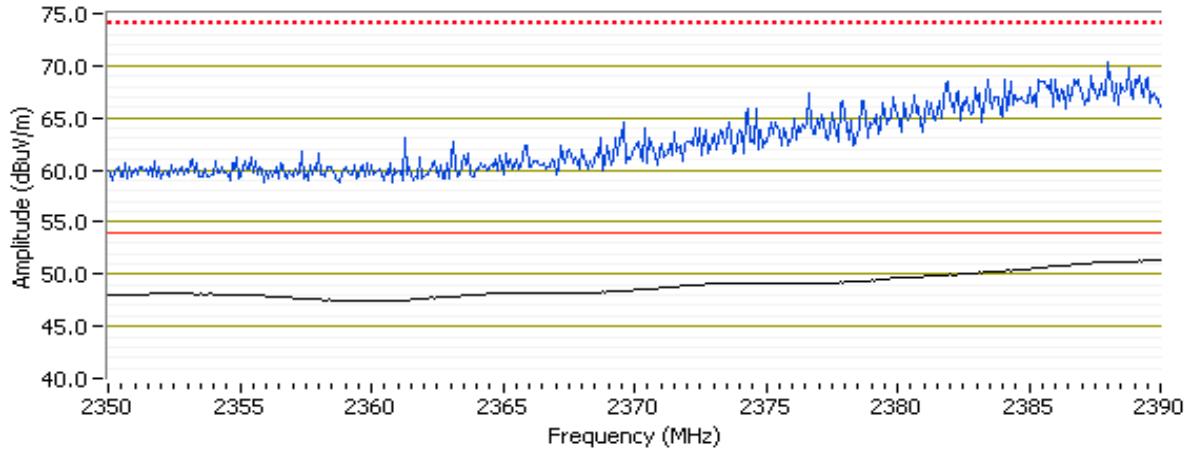
EUT Voltage: 120V/60Hz

Channel: 5 Mode: g Power Setting: 23
Tx Chain: 1 Data Rate: 9Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2389.840	51.6	H	54.0	-2.4	AVG	0	1.5
2387.680	71.0	H	74.0	-3.0	PK	0	1.5

RB 1 MHz; VB 10 Hz; Average (Black trace); RB 1 MHz; VB 3 MHz; Peak (Blue trace)





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
			Class: N/A

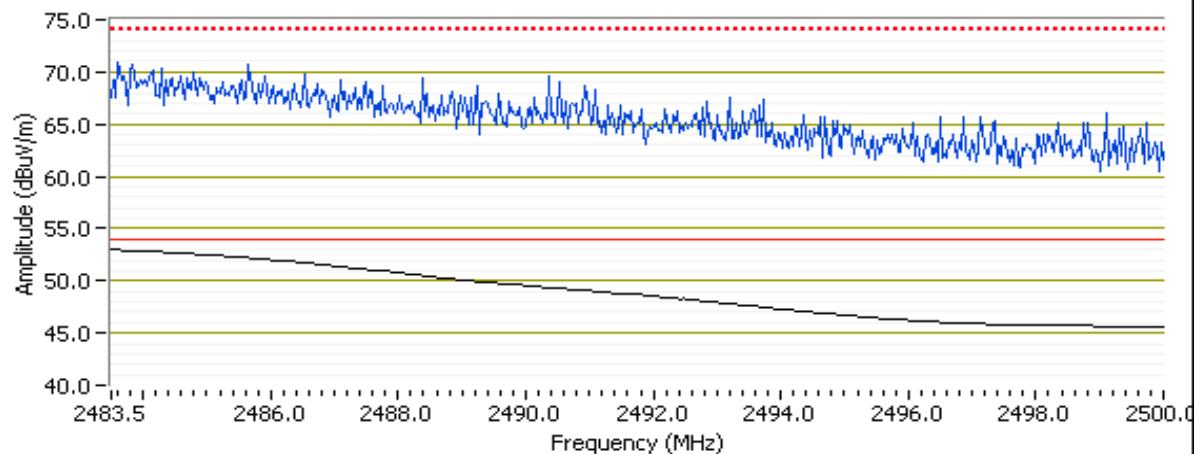
Channel: 8 Mode: g Power Setting: 23

Tx Chain: 1 Data Rate: 9Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2483.500	53.4	H	54.0	-0.6	AVG	357	2.0
2485.650	71.3	H	74.0	-2.7	PK	357	2.0

RB 1 MHz; VB 10 Hz; Average (Black trace); RB 1 MHz; VB 3 MHz; Peak (Blue trace)





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
			Class: N/A

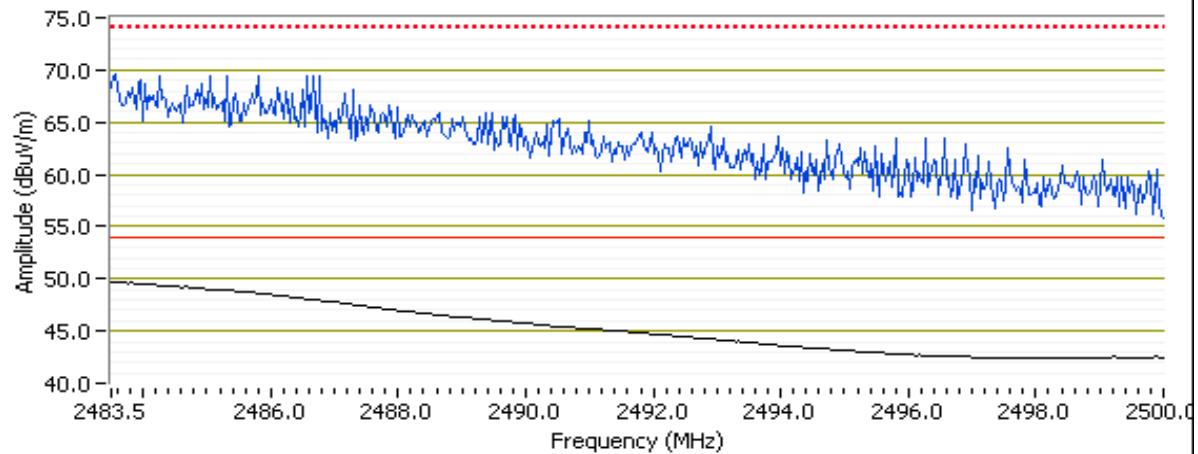
Channel: 9 Mode: g Power Setting: 21

Tx Chain: 1 Data Rate: 9Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2483.570	49.9	H	54.0	-4.1	AVG	357	2.0
2487.340	69.4	H	74.0	-4.6	PK	357	2.0

RB 1 MHz; VB 10 Hz; Average (Black trace); RB 1 MHz; VB 3 MHz; Peak (Blue trace)





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
			Class: N/A

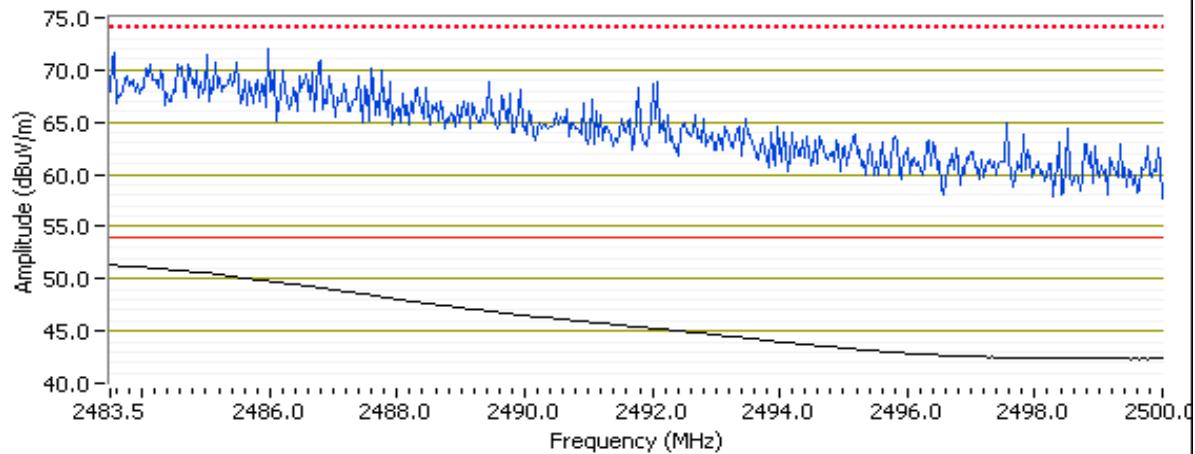
Channel: 10 Mode: g Power Setting: 20

Tx Chain: 1 Data Rate: 9Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2484.760	72.2	H	74.0	-1.8	PK	357	2.0
2483.530	51.6	H	54.0	-2.4	AVG	357	2.0

RB 1 MHz; VB 10 Hz; Average (Black trace); RB 1 MHz; VB 3 MHz; Peak (Blue trace)





EMC Test Data

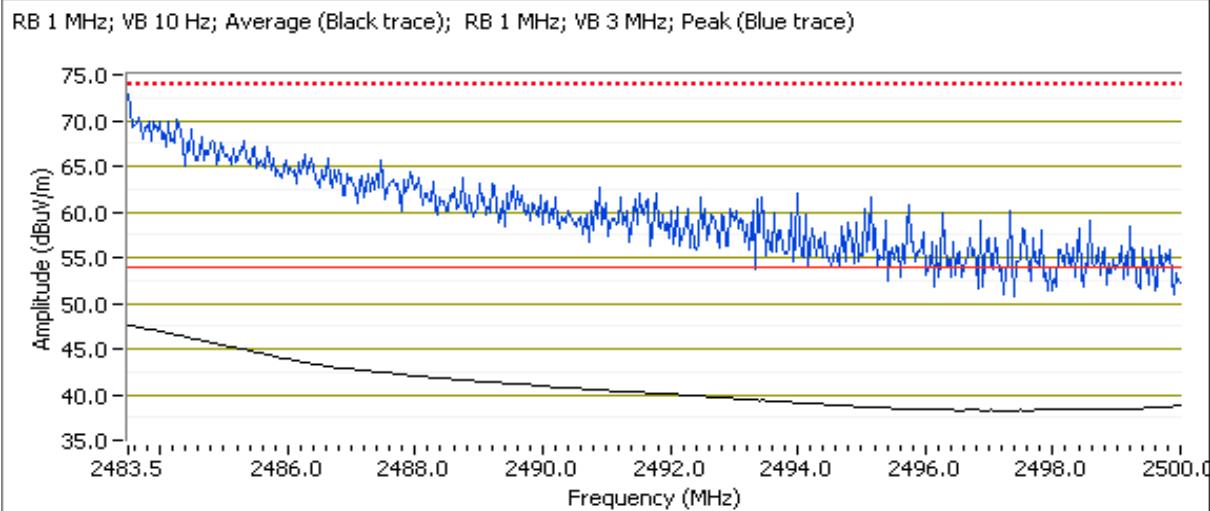
Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
			Class: N/A

Channel: 11 Mode: g Power Setting: 17

Tx Chain: 1 Data Rate: 9Mb/s

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2484.490	72.8	H	74.0	-1.2	PK	357	2.0
2483.500	47.7	H	54.0	-6.3	AVG	357	2.0





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

Run #3: Radiated Bandedge Measurements

Date of Test: 02/26/16

Config. Used: 1

Test Engineer: M. Birgani

Config Change: None

Test Location: FT Chamber #4

EUT Voltage: 120V/60Hz

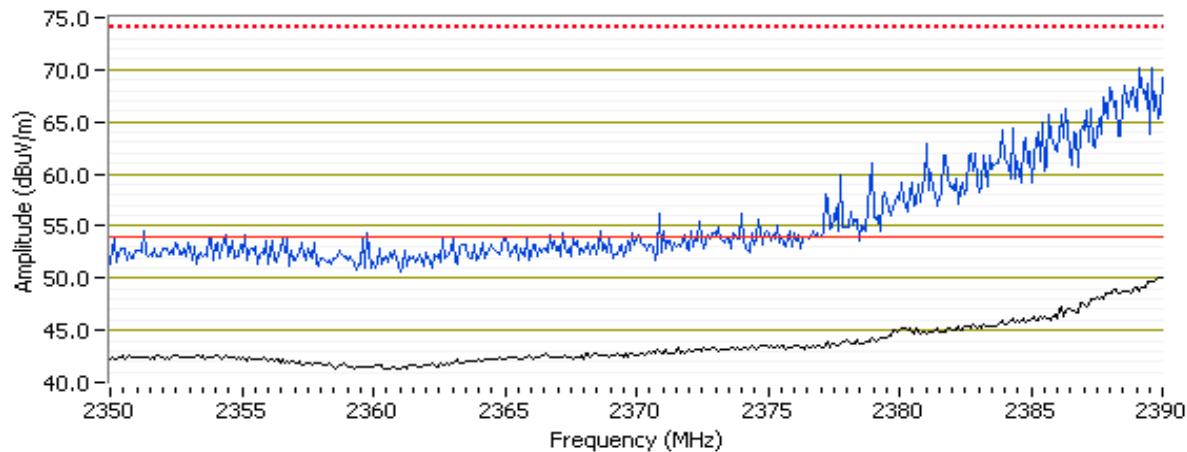
Channel: 1 Mode: n20 Power Setting: 16

Tx Chain: 2x2 Data Rate: 6.5

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2389.840	72.1	H	74.0	-1.9	PK	347	1.3
2389.920	50.6	H	54.0	-3.4	AVG	347	1.3
2389.520	67.1	V	74.0	-6.9	PK	60	1.6
2389.040	46.9	V	54.0	-7.1	AVG	60	1.6

RB 1 MHz; VB 2 kHz; Average (Black trace); RB 1 MHz; VB 3 MHz; Peak (Blue trace)





EMC Test Data

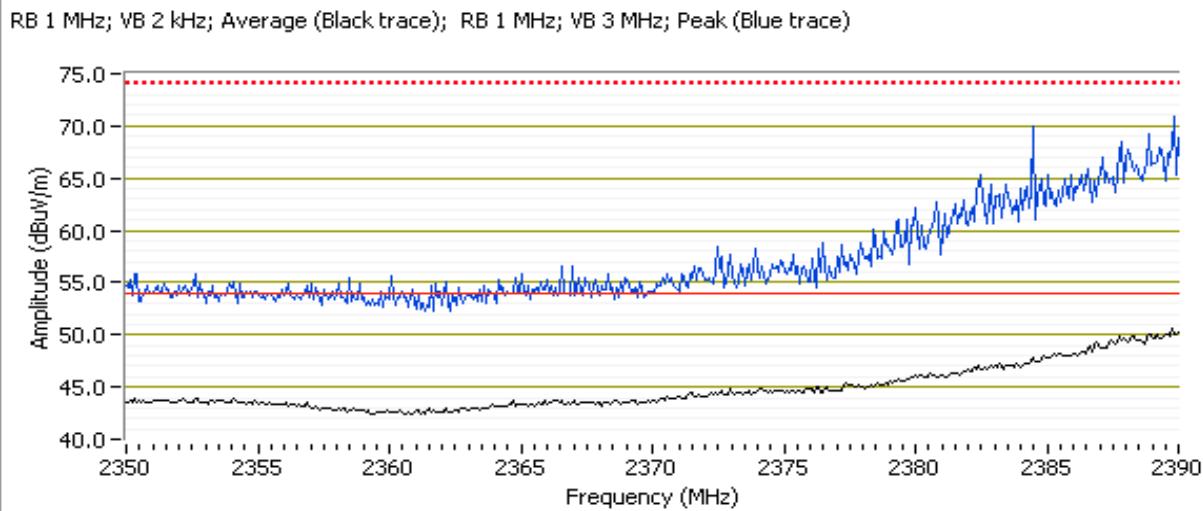
Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
			Class: N/A

Channel: 2 Mode: n20 Power Setting: 18

Tx Chain: 2x2 Data Rate: 6.5

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2388.080	51.3	H	54.0	-2.7	AVG	346	1.3
2389.520	70.7	H	74.0	-3.3	PK	346	1.3





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
			Class: N/A

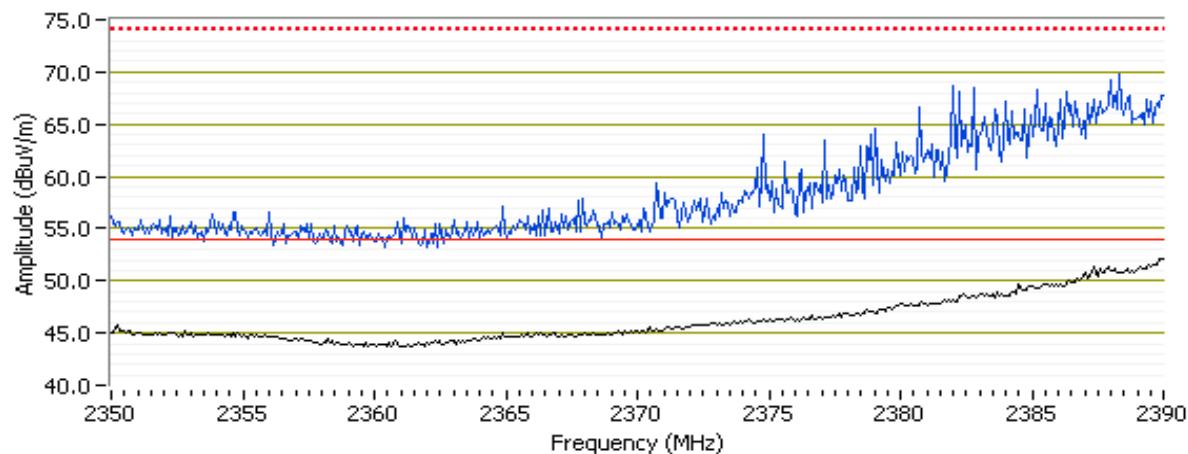
Channel: 3 Mode: n20 Power Setting: 20

Tx Chain: 2x2 Data Rate: 6.5

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2389.440	51.8	H	54.0	-2.2	AVG	346	1.3
2387.680	68.6	H	74.0	-5.4	PK	346	1.3

RB 1 MHz; VB 2 kHz; Average (Black trace); RB 1 MHz; VB 3 MHz; Peak (Blue trace)





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
			Class: N/A

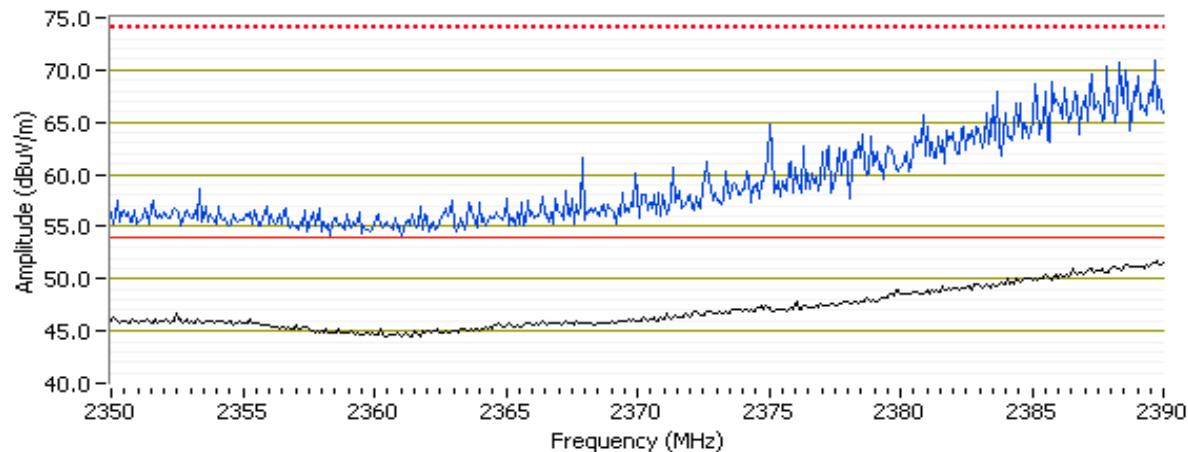
Channel: 4 Mode: n20 Power Setting: 21

Tx Chain: 2x2 Data Rate: 6.5

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2390.000	52.6	H	54.0	-1.4	AVG	346	1.3
2389.840	70.8	H	74.0	-3.2	PK	346	1.3

RB 1 MHz; VB 2 kHz; Average (Black trace); RB 1 MHz; VB 3 MHz; Peak (Blue trace)





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

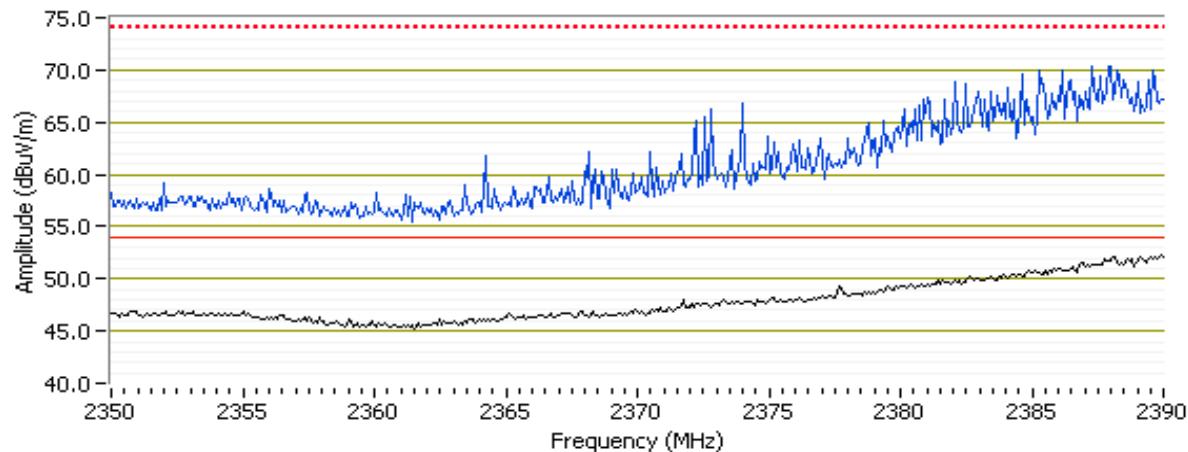
Channel: 5 Mode: n20 Power Setting: 22

Tx Chain: 2x2 Data Rate: 6.5

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2389.920	52.6	H	54.0	-1.4	AVG	346	1.3
2387.760	70.8	H	74.0	-3.2	PK	346	1.3

RB 1 MHz; VB 2 kHz; Average (Black trace); RB 1 MHz; VB 3 MHz; Peak (Blue trace)





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
			Class: N/A

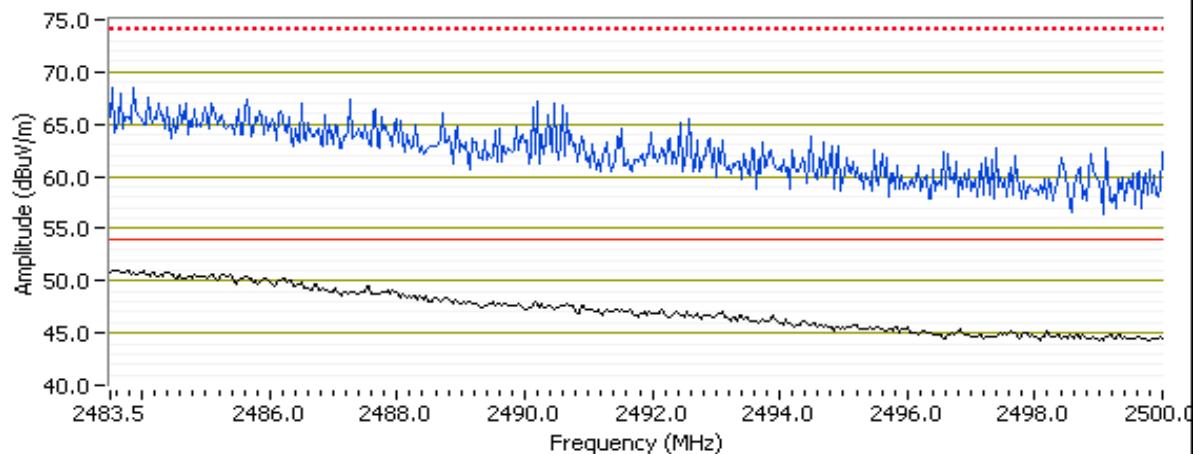
Channel: 7 Mode: n20 Power Setting: 22

Tx Chain: 2x2 Data Rate: 6.5

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2483.630	51.4	H	54.0	-2.6	AVG	0	2.0
2490.280	68.3	H	74.0	-5.7	PK	0	2.0

RB 1 MHz; VB 2 kHz; Average (Black trace); RB 1 MHz; VB 3 MHz; Peak (Blue trace)





EMC Test Data

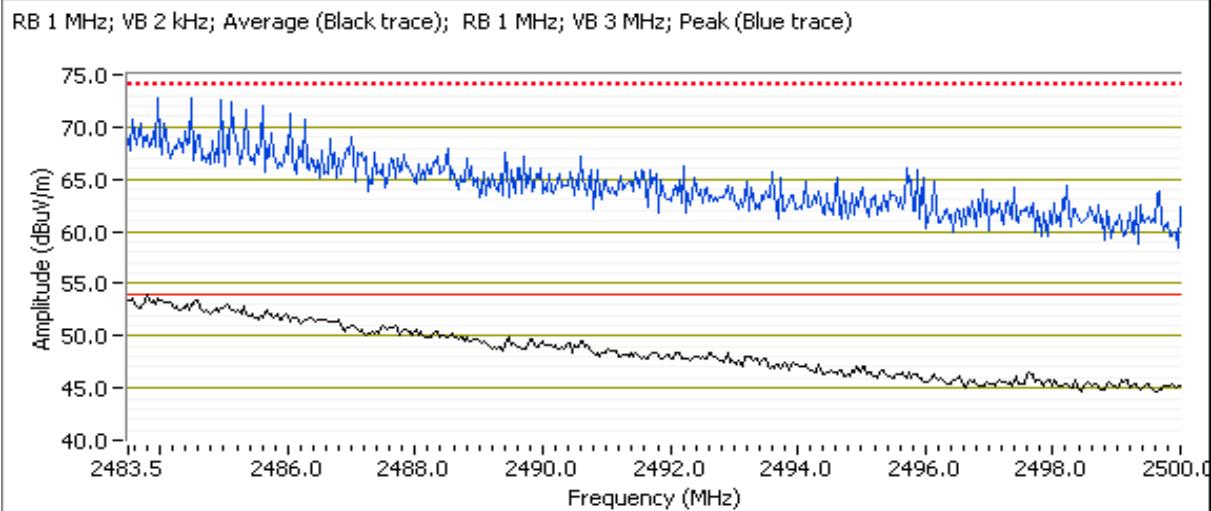
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Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

Channel: 8 Mode: n20 Power Setting: 22

Tx Chain: 2x2 Data Rate: 6.5

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2483.500	53.4	H	54.0	-0.6	AVG	0	2.0
2483.830	72.9	H	74.0	-1.1	PK	0	2.0





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

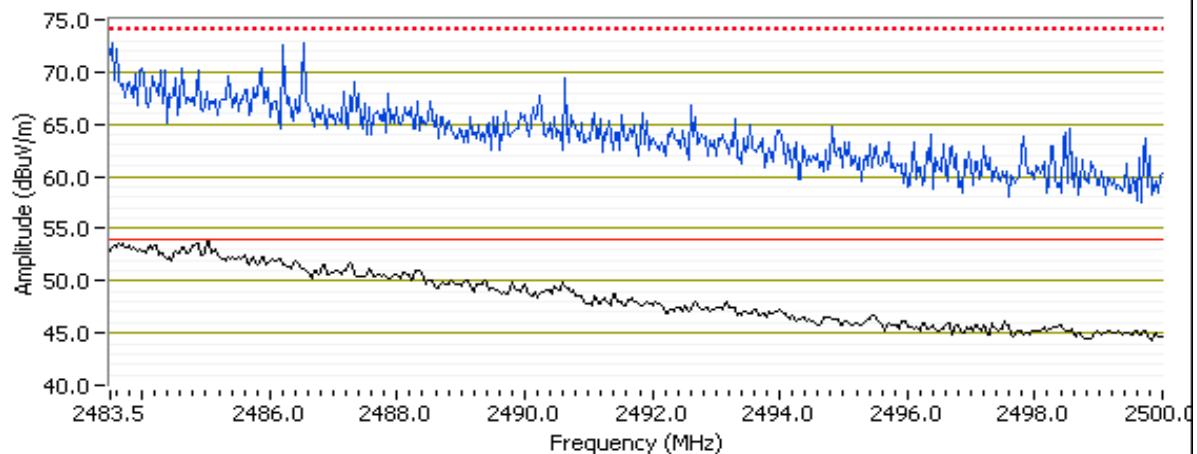
Channel: 9 Mode: n20 Power Setting: 21

Tx Chain: 2x2 Data Rate: 6.5

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2483.500	53.9	H	54.0	-0.1	AVG	0	2.0
2484.290	73.1	H	74.0	-0.9	PK	0	2.0

RB 1 MHz; VB 2 kHz; Average (Black trace); RB 1 MHz; VB 3 MHz; Peak (Blue trace)





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
Class:	N/A		

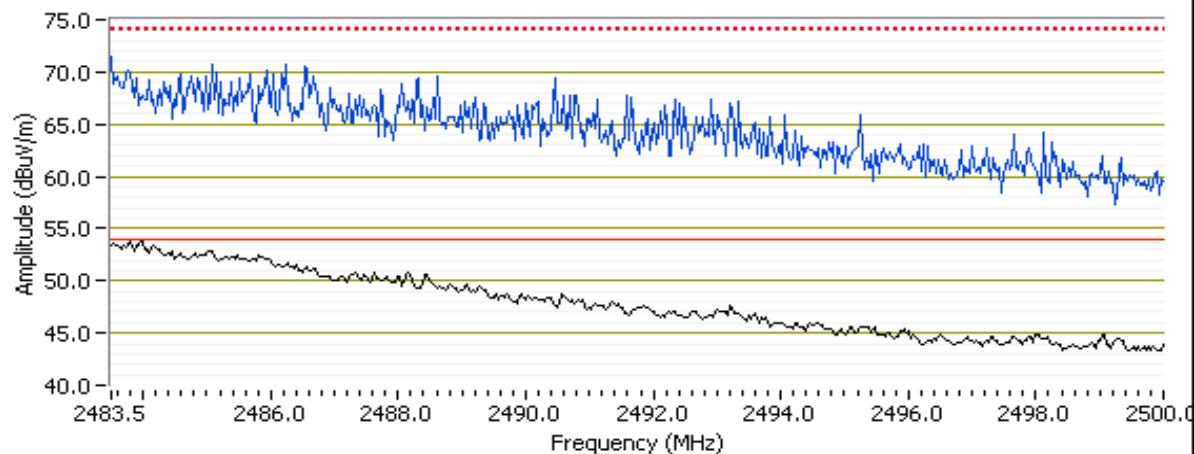
Channel: 10 Mode: n20 Power Setting: 20

Tx Chain: 2x2 Data Rate: 6.5

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2483.900	53.6	H	54.0	-0.4	AVG	0	2.0
2483.530	71.0	H	74.0	-3.0	PK	0	2.0

RB 1 MHz; VB 2 kHz; Average (Black trace); RB 1 MHz; VB 3 MHz; Peak (Blue trace)





EMC Test Data

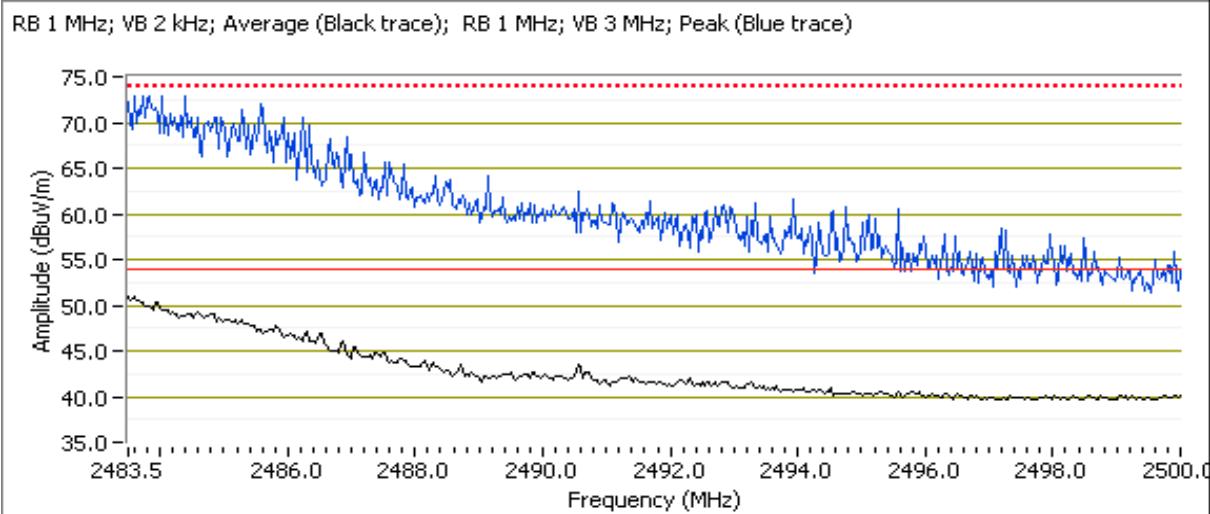
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Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
Class:	N/A		

Channel: 11 Mode: n20 Power Setting: 16

Tx Chain: 2x2 Data Rate: 6.5

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters
2485.050	72.7	H	74.0	-1.3	PK	0	2.0
2483.600	50.5	H	54.0	-3.5	AVG	0	2.0





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
		Project Manager:	Christine Krebill
Contact:	Austin Moore	Project Coordinator:	-
Standard:	FCC 15.247	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: 35 %

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.



EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
			Class: N/A

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 (chain 1)	1 - 2412MHz	23	23	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	42.7 dB μ V/m @ 1497.9 MHz (-11.3 dB)
	b (chain 1)	6 - 2437MHz	23	22	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	53.0 dB μ V/m @ 7310.0 MHz (-1.0 dB)
	b (chain 1)	11 - 2462MHz	23	20	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	49.7 dB μ V/m @ 7386.7 MHz (-4.3 dB)

Scans on center channel in all OFDM modes to determine the worst case mode.

2	g (chain 1)	6 - 2437MHz	23	23	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	47.7 dB μ V/m @ 7307.6 MHz (-6.3 dB)
	n20	6 - 2437MHz	23	23	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	49.1 dB μ V/m @ 7309.4 MHz (-4.9 dB)

Measurements on low and high channels in worst-case OFDM mode.

3	n20	1 - 2412MHz	23	23	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	49.0 dB μ V/m @ 7234.3 MHz (-5.0 dB)
	n20	11 - 2462MHz	23	23	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	51.6 dB μ V/m @ 7385.5 MHz (-2.4 dB)

Worse case chain for the 11b/11g mode was taken from original certification.

Sample Notes

Sample S/N: A44LA5RW110013

Driver: -

Antenna: Airgain N2420DS / N2415D2



EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		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 \geq 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	2Mb/s	99.0%	Yes	0.92	0	0	10
11g	9Mb/s	98.0%	Yes	1.41	0	0	10
n20	6.5	97.3%	Yes	0.67	0.12	0.24	1486

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 3:	Emission has a duty cycle \geq 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces
Note 4:	Emission has constant duty cycle $<$ 98%, average measurement performed: RBW=1MHz, VBW>1/T but not less than 10Hz, peak detector, linear averaging, auto sweep, trace average 100 traces, measurement corrected by Linear voltage correction factor
Note 5:	Emission has constant duty cycle $<$ 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces, measurement corrected by Pwr correction factor
Note 6:	Emission has non constant 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 7:	Emission has non constant duty cycle $<$ 98%, average measurement performed: RBW=1MHz, VBW>1/T, RMS detector, sweep time auto, max hold. Max hold for 50*(1/DC) traces

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

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

Date of Test: 02/29/16

Config. Used: 1

Test Engineer: M. Birgani

Config Change: None

Test Location: FT Chamber #5

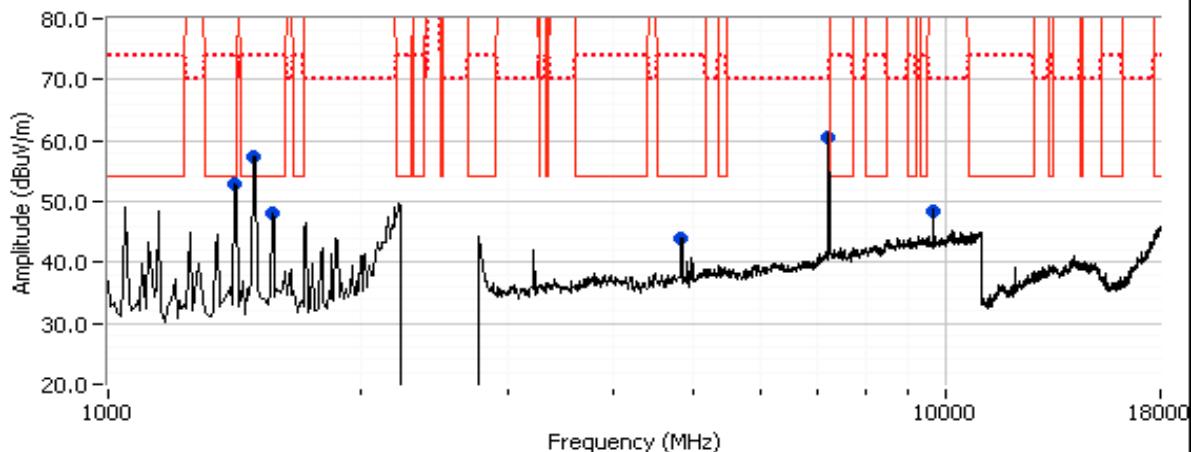
EUT Voltage: 120V/60Hz

Run #1a: Low Channel

Channel: 1 Mode: b Power Setting: 23
Tx Chain: 1 Data Rate: 2Mb/s

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters
1497.940	42.7	H	54.0	-11.3	AVG	315	2.5
1499.780	60.6	H	74.0	-13.4	PK	315	2.5
1419.400	40.2	H	54.0	-13.8	AVG	179	2.2
1418.010	56.9	H	74.0	-17.1	PK	179	2.2
1568.610	35.8	V	54.0	-18.2	AVG	159	1.6
1567.490	51.4	V	74.0	-22.6	PK	159	1.6
4824.290	42.2	V	54.0	-11.8	AVG	269	1.6
4824.270	48.6	V	74.0	-25.4	PK	269	1.6
2410.900	102.2	V	-	-	PK	211	1.0
2410.300	112.8	H	-	-	PK	0	1.0
7237.090	60.6	V	82.8	-22.2	PK	342	2.5
9648.090	48.5	V	82.8	-34.3	PK	0	1.3
							Note 2

802.11b mode channel 1



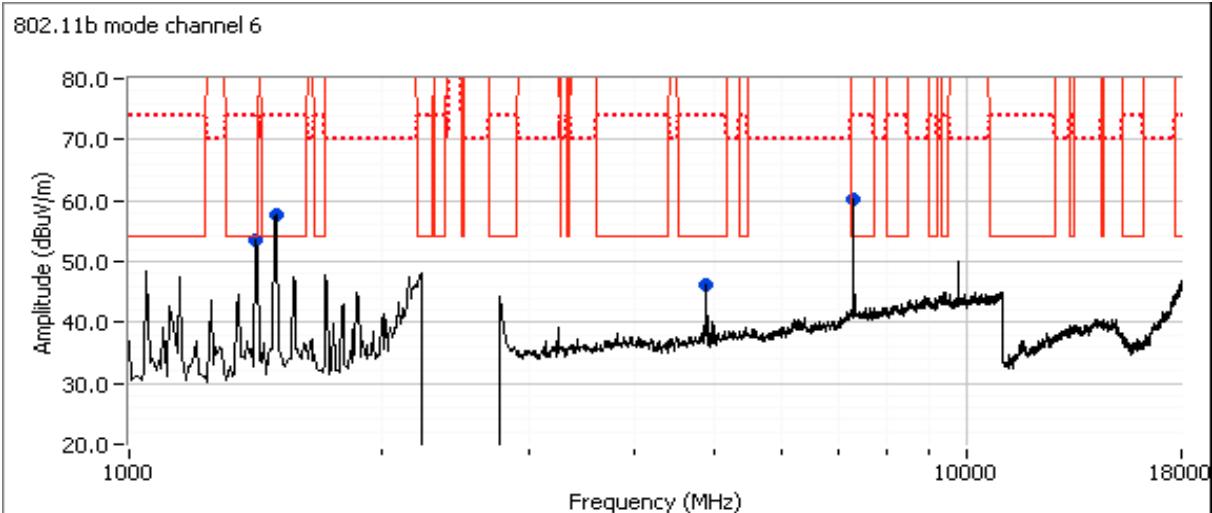
Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

Run #1b: Center Channel

Channel: 6 Mode: b Power Setting: 22
 Tx Chain: 1 Data Rate: 2Mb/s

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters
7310.000	53.0	V	54.0	-1.0	AVG	184	2.2
7308.520	59.5	V	74.0	-14.5	PK	184	2.2
1497.740	43.5	H	54.0	-10.5	AVG	203	1.9
1499.820	62.8	H	74.0	-11.2	PK	203	1.9
1419.490	41.9	H	54.0	-12.1	AVG	195	1.9
1418.030	59.0	H	74.0	-15.0	PK	195	1.9

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



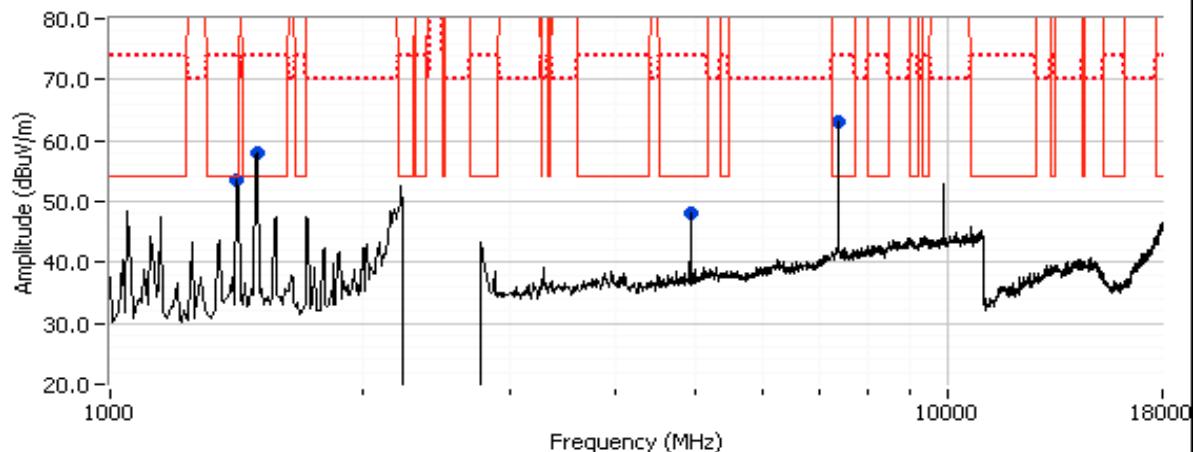
Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

Run #1c: High Channel

Channel: 11 Mode: b Power Setting: 20
Tx Chain: 1 Data Rate: 2Mb/s

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters
7386.710	49.7	V	54.0	-4.3	AVG	337	2.5
7386.270	57.4	V	74.0	-16.6	PK	337	2.5
1494.930	44.6	H	54.0	-9.4	AVG	199	1.9
1492.650	63.3	H	74.0	-10.7	PK	199	1.9
1419.240	41.1	H	54.0	-12.9	AVG	193	1.9
1417.990	58.7	H	74.0	-15.3	PK	193	1.9
4924.100	45.3	V	54.0	-8.7	AVG	229	1.6
4923.980	51.0	V	74.0	-23.0	PK	229	1.6

802.11b mode channel 11



Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

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

Date of Test: 02/29/16

Config. Used: 1

Test Engineer: Rafael Varelas

Config Change: None

Test Location: FT Chamber #5

EUT Voltage: 120V/60Hz

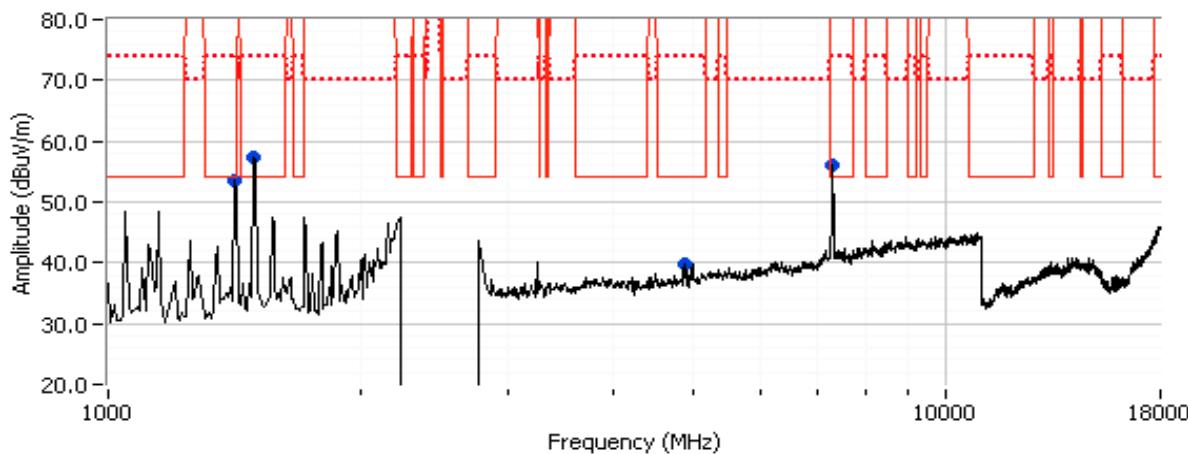
Run #2a: Center Channel

Channel: 6 Mode: g
Tx Chain: 1 Data Rate: 9Mb/s

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters
7307.600	47.7	V	54.0	-6.3	AVG	233	1.0
7311.200	61.1	V	74.0	-12.9	PK	233	1.0
4873.790	35.2	V	54.0	-18.8	AVG	292	1.3
4874.720	48.5	V	74.0	-25.5	PK	292	1.3
1497.420	42.9	H	54.0	-11.1	AVG	200	1.8
1499.840	64.4	H	74.0	-9.6	PK	200	1.8
1419.850	42.3	H	54.0	-11.7	AVG	193	2.0
1418.030	58.8	H	74.0	-15.2	PK	193	2.0

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

802.11g mode channel 6



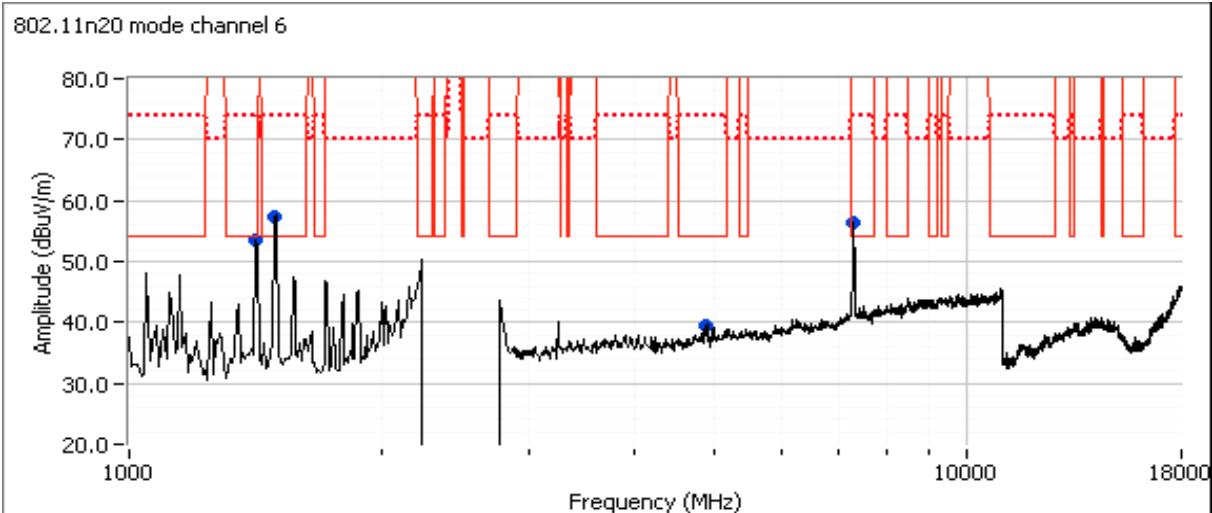
Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

Run #2b: Center Channel

Channel: 6 Mode: n20
Tx Chain: 2x2 Data Rate: 6.5

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters
7309.420	49.1	V	54.0	-4.9	AVG	297	1.0
7316.070	62.6	V	74.0	-11.4	PK	297	1.0
4873.300	33.9	H	54.0	-20.1	AVG	167	1.6
4871.650	45.1	H	74.0	-28.9	PK	167	1.6
1497.930	43.7	H	54.0	-10.3	AVG	193	2.0
1499.890	61.3	H	74.0	-12.7	PK	193	2.0
1419.500	41.0	H	54.0	-13.0	AVG	221	1.7
1418.130	58.0	H	74.0	-16.0	PK	221	1.7

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:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

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

Date of Test: 02/29/16

Config. Used: 1

Test Engineer: Rafael Varelas

Config Change: None

Test Location: FT Chamber #5

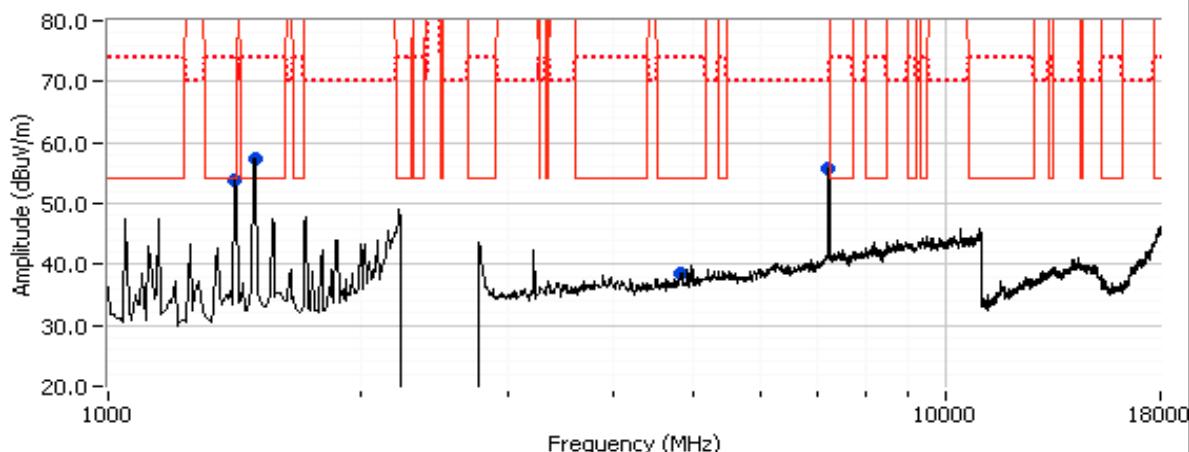
EUT Voltage: 120V/60Hz

Run #3a: Low Channel

Channel: 1 Mode: n20
Tx Chain: 2x2 Data Rate: 6.5

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters
7234.250	49.0	V	54.0	-5.0	AVG	317	2.4
7244.160	62.1	V	74.0	-11.9	PK	317	2.4
1494.690	44.5	H	54.0	-9.5	AVG	196	2.2
1492.960	63.9	H	74.0	-10.1	PK	196	2.2
1419.570	42.2	H	54.0	-11.8	AVG	180	2.0
1418.050	59.7	H	74.0	-14.3	PK	180	2.0
4824.020	34.8	V	54.0	-19.2	AVG	49	1.5
4821.350	45.9	V	74.0	-28.1	PK	49	1.5

802.11n20 mode channel 1

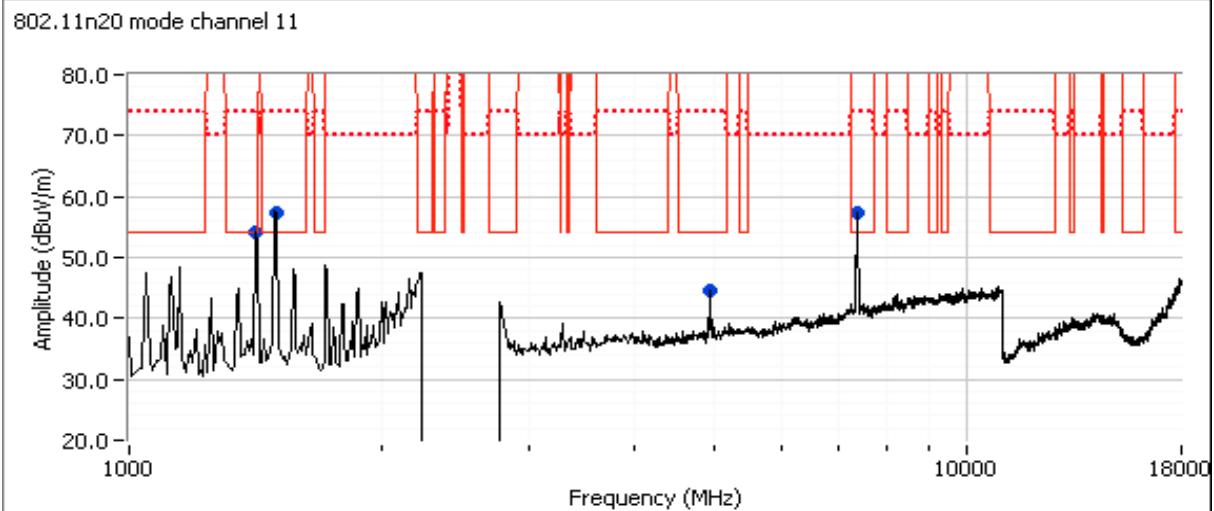


Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

Run #3b: High Channel

Channel: 11 Mode: n20
 Tx Chain: 2x2 Data Rate: 6.5

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7385.470	51.6	V	54.0	-2.4	AVG	289	1.0	Note 4,RB 1 MHz;VB 3 kHz;Peak VA
7385.760	64.8	V	74.0	-9.2	PK	289	1.0	RB 1 MHz;VB 3 MHz;Peak
1494.490	43.5	H	54.0	-10.5	AVG	194	1.8	Note 4,RB 1 MHz;VB 3 kHz;Peak VA
1492.670	63.8	H	74.0	-10.2	PK	194	1.8	RB 1 MHz;VB 3 MHz;Peak
1419.670	40.3	H	54.0	-13.7	AVG	187	2.1	Note 4,RB 1 MHz;VB 3 kHz;Peak VA
1419.290	58.5	H	74.0	-15.5	PK	187	2.1	RB 1 MHz;VB 3 MHz;Peak
4924.110	35.8	V	54.0	-18.2	AVG	144	1.0	Note 4,RB 1 MHz;VB 3 kHz;Peak VA
4924.700	47.2	V	74.0	-26.8	PK	144	1.0	RB 1 MHz;VB 3 MHz;Peak





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

RSS-247 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.

Date of Test: 3/1/2016

Config. Used: 1

Test Engineer: M. Birgani / R. Varelas

Config Change: None

Test Location: FT Lab #4A

EUT Voltage: 120V/60Hz

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 °C
Rel. Humidity: 35 %

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: A44LA5RW110013

Driver: -

Antenna: Airgain N2420DS / N2415D2



EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

Summary of Results

Run #	Pwr setting	Avg Pwr	Test Performed	Limit	Pass / Fail	Result / Margin
1Tx						
1			Output Power	15.247(b)	Pass	11b: 22.1 dBm 11g: 22.0 dBm
2			Power spectral Density (PSD)	15.247(d)	Pass	11b: 7.4 dBm/10kHz 11g: 3.8 dBm/10kHz
2Tx						
3			Output Power	15.247(b)	Pass	n20: 23.5 dBm
4			Power spectral Density (PSD)	15.247(d)	Pass	n20: 4.7 dBm/3kHz
All Modes						
3			Minimum 6dB Bandwidth	15.247(a)	Pass	11b: 8.0 MHz 11g: 16.4 MHz n20: 17.6 MHz
3			99% Bandwidth	RSS GEN	-	11b: 10.8 MHz 11g: 16.6 MHz n20: 17.6 MHz
4			Spurious emissions	15.247(b)	Pass	>-30dBc



EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		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	2Mb/s	99.0%	Yes	0.92	0	0	10
11g	9Mb/s	98.0%	Yes	1.41	0	0	10
n20	6.5	97.3%	Yes	0.67	0.12	0.24	1486

Antenna 1: Gray cable JE381

Antenna 2: Black cable JE351

Antenna Gain Information

Freq	Antenna Gain (dBi) / Chain				BF	MultiChain Legacy	CDD	Sectorized / Xpol	Dir G (PWR)	Dir G (PSD)
	1	2	3	4						
For 11b/ 11g operation										
2.4GHz	3.1	2.13			No	No	N/A	No	3.1	6.1
For n20 operation										
2.4GHz	3.1	2.13			No	No	Yes	No	3.1	6.1

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.



EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-

Run #1: Output Power

Note 1:	For 11b/11g: Duty Cycle \geq 98%. Output power measured using a spectrum analyzer (see plots below) with RBW= 1-5% of OBW and \leq 1 MHz, VB \geq 3* RBW, Span \geq 1.5 of OBW, auto sweep time, RMS detector, power averaging on, and power integration over the OBW, trace average 100 traces (option AVGSA-1 in ANSI C63.10). Spurious limit becomes -30dBc.
Note 1:	For n20: Constant Duty Cycle $<$ 98%. Output power measured using a spectrum analyzer (see plots below) with RBW= 1-5% of OBW and \leq 1 MHz, VB \geq 3* RBW, Span \geq 1.5 of OBW, RMS detector, auto sweep time, power averaging on, and power integration over the OBW, trace average 100 traces (option AVGSA-2 in ANSI C63.10). Measurement corrected by Pwr Cor Factor. Spurious limit becomes -30dBc.
Note 2:	Power setting - the software power setting used during testing, included for reference only.
Note 3:	Power measured using average power meter (non-gated) and is included for reference only.

Operating Mode: 11b
 Directional Gain (dBi): 3.1

Max EIRP (mW): 331.13112

Frequency (MHz)	Chain	Software Setting	Power ¹		Total		Max Power (W)	Limit dBm	Result	Power (dBm) ³	
			dBm	mW	mW	dBm					
2412	1	22	22.1	162.2	162.2	22.1	0.162	30.0	Pass		
	3										
	4										
	2										
2437	1	22	21.8	151.4	151.4	21.8		30.0	Pass		
	3										
	4										
	2										
2462	1	20	20.1	102.3	102.3	20.1	0.162	30.0	Pass		
	3										
	4										
	2										



EMC Test Data

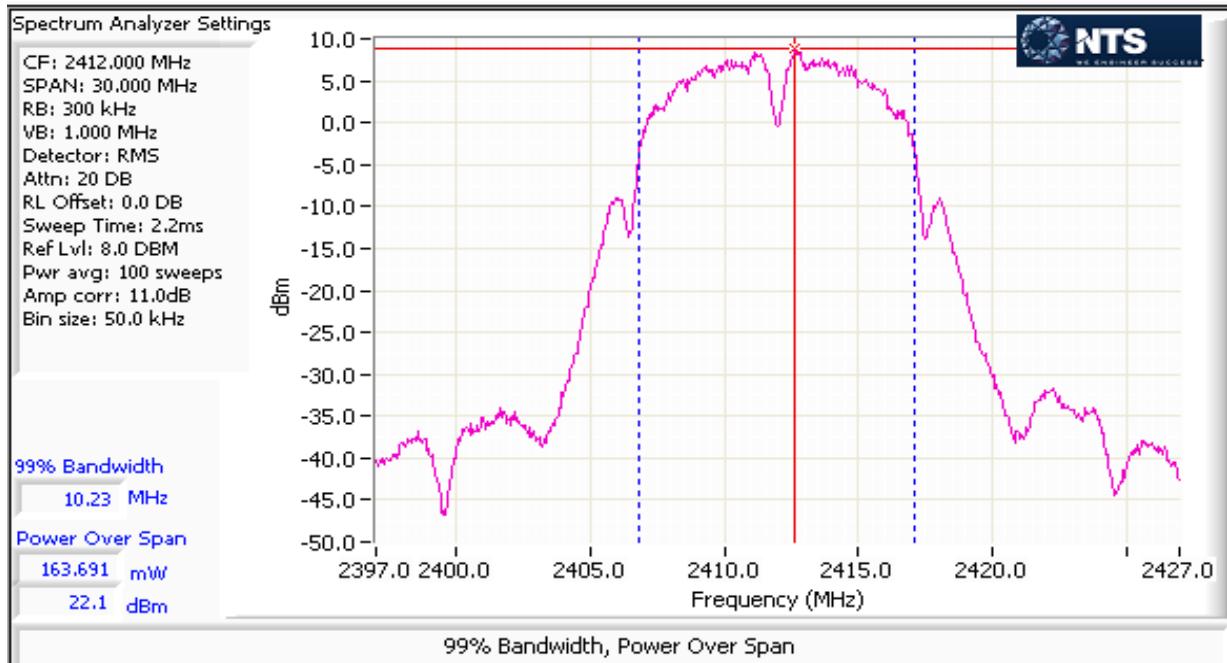
Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
			Class: N/A

Operating Mode: 11b
Directional Gain (dBi): 2.1

Max EIRP (mW): 275.42287

Frequency (MHz)	Chain	Software Setting	Power ¹		Total		Max Power (W)	Limit dBm	Result	Power (dBm) ³
			dBm	mW	mW	dBm				
2412	1	22			134.9	21.3	0.135	30.0	Pass	
	3									
	4									
	2		21.3	134.9						
2437	1	22			128.8	21.1	0.135	30.0	Pass	
	3									
	4									
	2		21.1	128.8						
2462	1	20			81.3	19.1	0.135	30.0	Pass	
	3									
	4									
	2		19.1	81.3						

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-

Operating Mode: 11g
 Directional Gain (dBi): 3.1

Max EIRP (mW): 323.59366

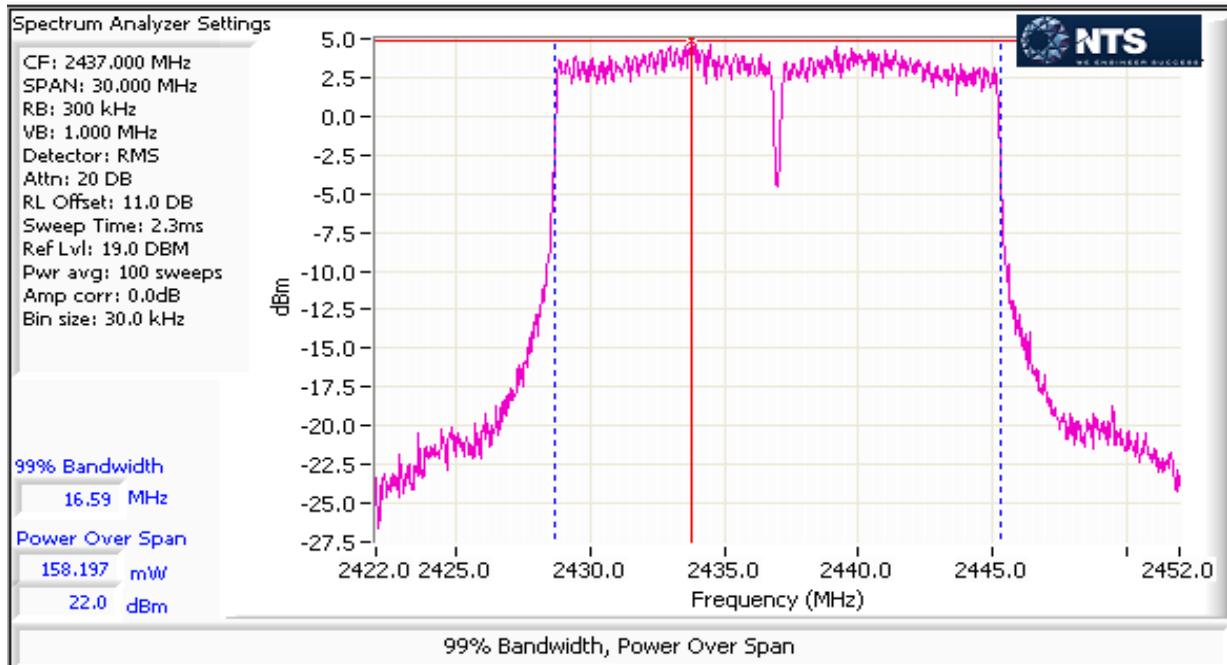
Frequency (MHz)	Chain	Software Setting	Power ¹		Total		Max Power (W)	Limit dBm	Result	Power (dBm) ³	
			dBm	mW	mW	dBm					
2412	1	18	17.8	60.3	60.3	17.8	0.158	30.0	Pass		
	3										
	4										
	2										
2437	1	23	22.0	158.5	158.5	22.0		30.0	Pass		
	3										
	4										
	2										
2462	1	17	16.6	45.7	45.7	16.6	0.135	30.0	Pass		
	3										
	4										
	2										

Operating Mode: 11g
 Directional Gain (dBi): 2.1

Max EIRP (mW): 275.42287

Frequency (MHz)	Chain	Software Setting	Power ¹		Total		Max Power (W)	Limit dBm	Result	Power (dBm) ³	
			dBm	mW	mW	dBm					
2412	1	18			44.7	16.5	0.135	30.0	Pass		
	3										
	4										
	2		16.5	44.7							
2437	1	23			134.9	21.3		30.0	Pass		
	3										
	4										
	2		21.3	134.9							
2462	1	17			36.3	15.6	0.135	30.0	Pass		
	3										
	4										
	2		15.6	36.3							

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A





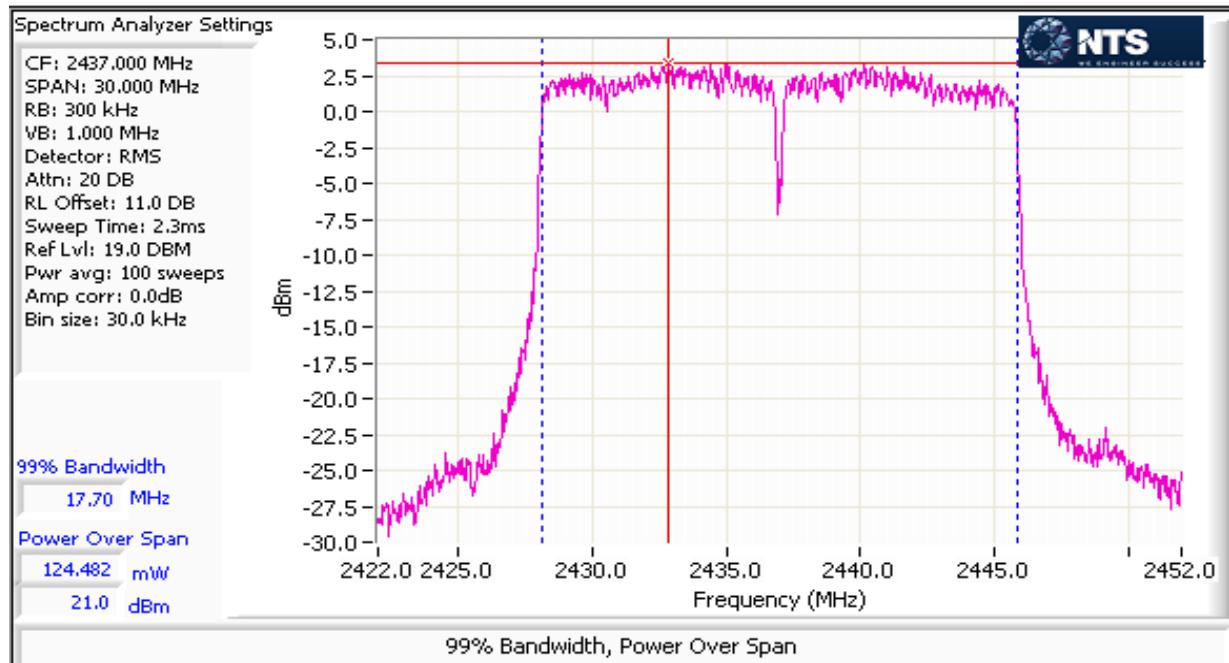
EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-

Operating Mode: n20
Directional Gain (dBi): 3.1

Max EIRP (mW): 456.56581

Frequency (MHz)	Chain	Software Setting	Power ¹		Total		Max Power (W)	Limit dBm	Result	Power (dBm) ³
			dBm	mW	mW	dBm				
2412	1	16	16.0	39.8	69.3	18.4		30.0	Pass	
	3									
	4									
	2		14.7	29.5						
2437	1	22	21.0	125.9	223.6	23.5	0.224	30.0	Pass	
	3									
	4									
	2		19.9	97.7						
2462	1	16	15.5	35.5	61.2	17.9		30.0	Pass	
	3									
	4									
	2		14.1	25.7						





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
		Project Manager:	Christine Krebill
Contact:	Austin Moore	Project Coordinator:	-
Standard:	FCC 15.247	Class:	N/A

Run #2: Power spectral Density

Mode: 11b

Power Setting	Frequency (MHz)	PSD (dBm/10kHz) ^{Note 1}				Total	Limit dBm/3kHz	Result
		Chain 1	Chain 2	Chain 3	Chain 4			
23	2412	7.4				7.4	8.0	Pass
23	2437	7.0				7.0	8.0	Pass
23	2462	7.3				7.3	8.0	Pass

Mode: 11b

Power Setting	Frequency (MHz)	PSD (dBm/10kHz) ^{Note 1}				Total	Limit dBm/3kHz	Result
		Chain 1	Chain 2	Chain 3	Chain 4			
23	2412		6.7			6.7	8.0	Pass
23	2437		5.9			5.9	8.0	Pass
23	2462		6.0			6.0	8.0	Pass

Mode: 11g

Power Setting	Frequency (MHz)	PSD (dBm/10kHz) ^{Note 1}				Total	Limit dBm/3kHz	Result
		Chain 1	Chain 2	Chain 3	Chain 4			
23	2412	3.6				3.6	8.0	Pass
23	2437	3.3				3.3	8.0	Pass
23	2462	3.8				3.8	8.0	Pass

Mode: 11g

Power Setting	Frequency (MHz)	PSD (dBm/10kHz) ^{Note 1}				Total	Limit dBm/3kHz	Result
		Chain 1	Chain 2	Chain 3	Chain 4			
23	2412		2.3			2.3	8.0	Pass
23	2437		2.7			2.7	8.0	Pass
23	2462		3.3			3.3	8.0	Pass

Mode: n20

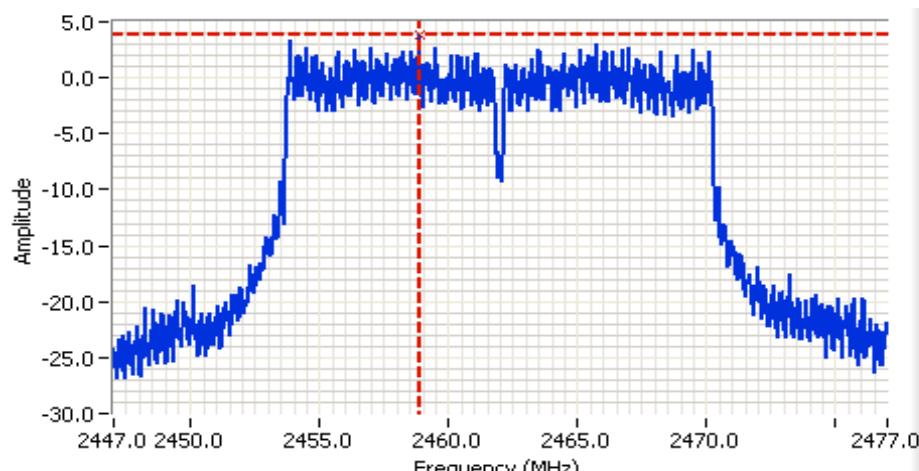
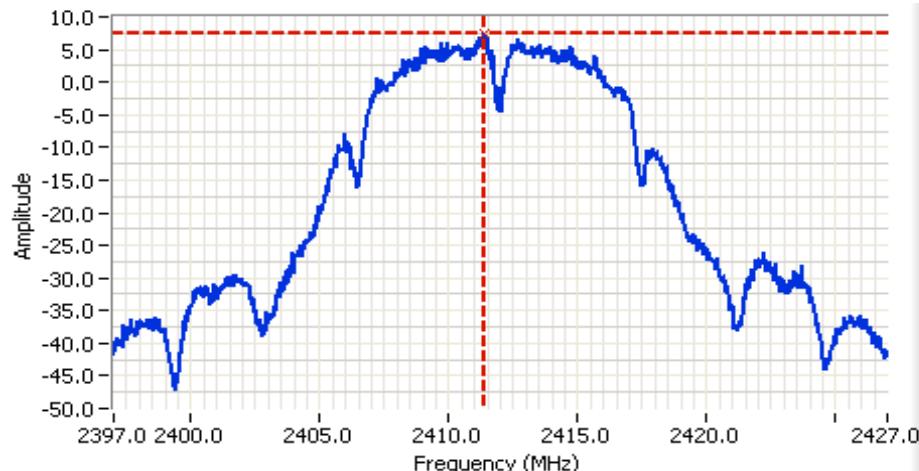
Power Setting	Frequency (MHz)	PSD (dBm/10kHz) ^{Note 1}				Total	Limit dBm/3kHz	Result
		Chain 1	Chain 2	Chain 3	Chain 4			
22	2412	2.3	0.8			4.6	8.0	Pass
22	2437	2.0	1.1			4.6	8.0	Pass
22	2462	2.0	1.4			4.7	8.0	Pass

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



EMC Test Data

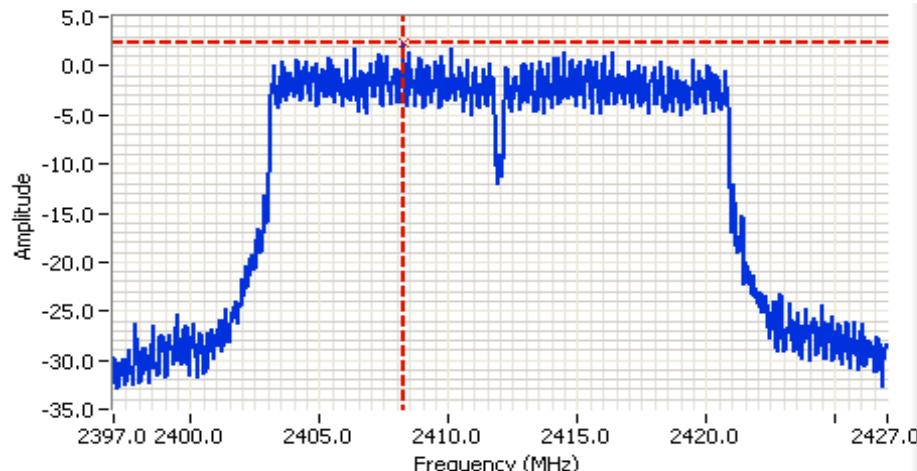
Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A



Cursor 1 2408.2312 2.3

0.0000 0.0





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

Run #3: Signal Bandwidth

Mode: 11b

Power Setting	Frequency (MHz)	Bandwidth (kHz)		RBW Setting (MHz)	
		6dB	99%	6dB	99%
22	2412	100	300	8.1	10.3
22	2437	100	300	8.0	10.8
20	2462	100	300	8.3	10.1

Mode: 11g

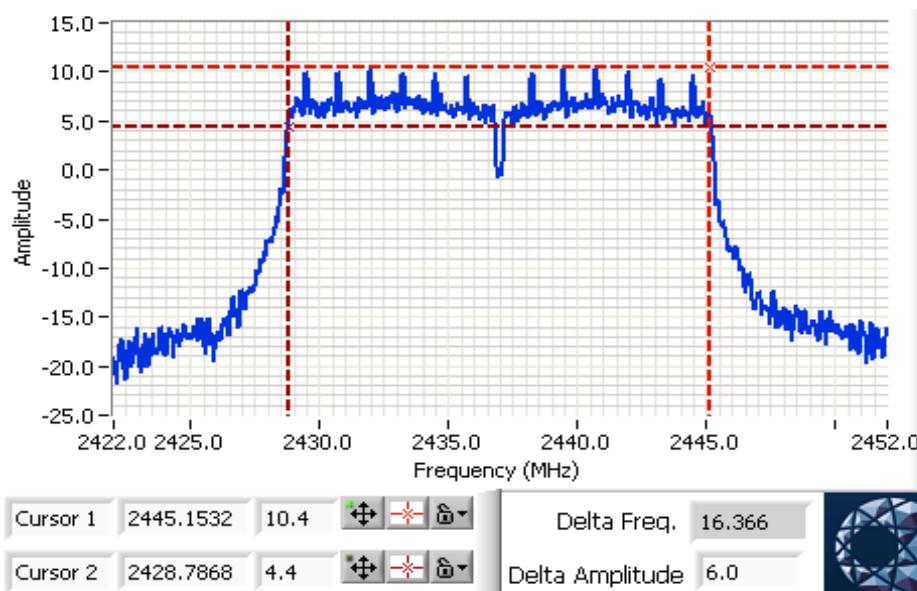
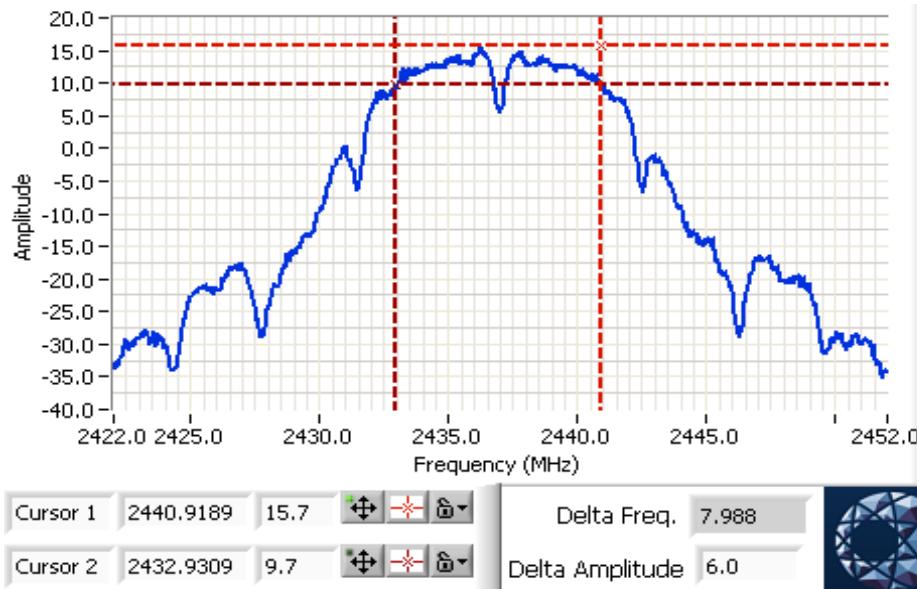
Power Setting	Frequency (MHz)	Bandwidth (MHz)		RBW Setting (MHz)	
		6dB	99%	6dB	99%
18	2412	100	300	16.4	16.5
23	2437	100	300	16.4	16.6
17	2462	100	300	16.4	16.6

Mode: n20

Power Setting	Frequency (MHz)	Bandwidth (MHz)		RBW Setting (MHz)	
		6dB	99%	6dB	99%
16	2412	100	300	17.6	17.7
22	2437	100	300	17.6	17.7
16	2462	100	300	17.6	17.7

Note 1:	DTS BW: RBW=100kHz, VBW \geq 3*RBW, peak detector, max hold, auto sweep time, Span 2-5 times measured BW. 99% BW: RBW=1-5% of 99%BW, VBW \geq 3*RBW, peak detector, max hold, auto sweep time. Span 1.5-5 times OBW.
Note 2:	Measurements performed on chain 1

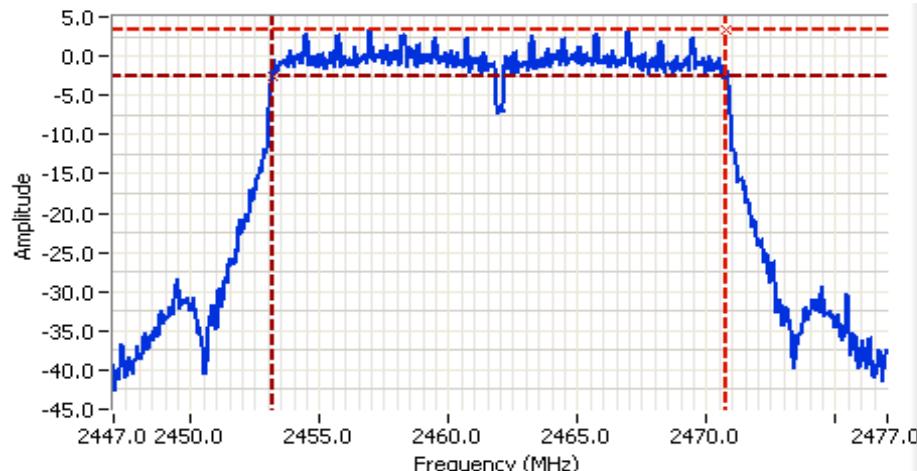
Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A



Analyzer Settings
Agilent Technologies, E4446A
CF: 2462.000 MHz
SPAN: 30.000 MHz
RB: 100 kHz
VB: 300 kHz
Detector: POS
Attn: 20 dB
RL Offset: 11.0 dB
Sweep Time: 2.9ms
Ref Lvl: 19.0 dBm

Comments
6dB BW: 17.6 MHz
802.11n20 mode chain 1

Cursor 1 2470.7838 3.4 Delta Freq. 17.598
Cursor 2 2453.1862 -2.6 Delta Amplitude 6.0





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
			Class: N/A

Run #4a: Out of Band Spurious Emissions

#1	Power Setting Per Chain			Mode	Frequency (MHz)	Limit	Result
	#2	#3	#4				
23				b	2412	-30dBc	Pass
23				b	2437	-30dBc	Pass
23				b	2462	-30dBc	Pass
20				g	2412	-30dBc	Pass
23				g	2437	-30dBc	Pass
23				g	2462	-30dBc	Pass
20	20			n20	2412	-30dBc	Pass
23	23			n20	2437	-30dBc	Pass
23	23			n20	2462	-30dBc	Pass

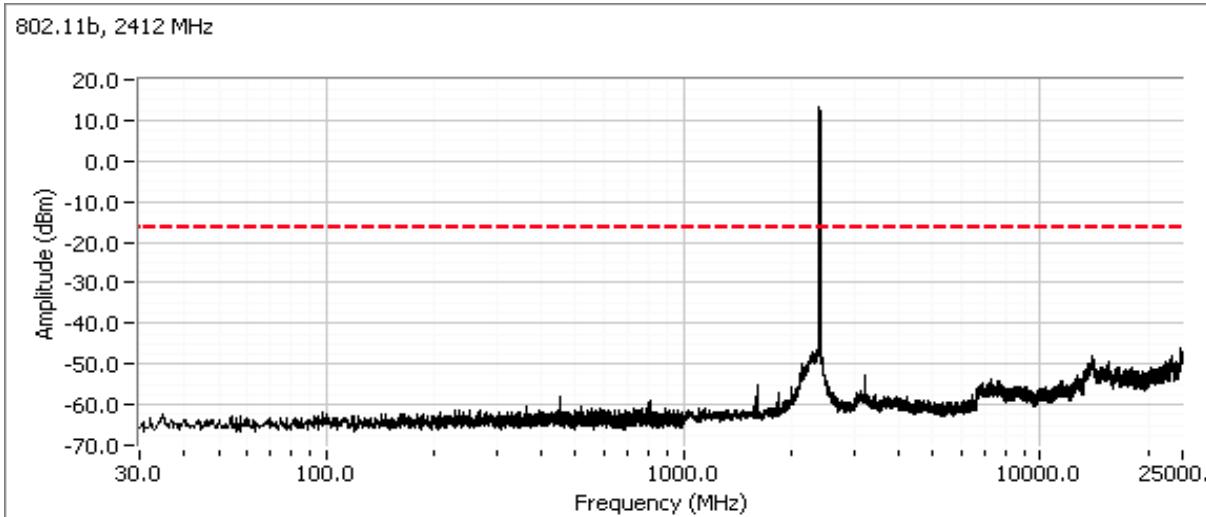
Note 1: Measured on each chain individually

Note: All plots performed using RBW=100kHz, VBW=300kHz, peak detector, max hold

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

802.11b

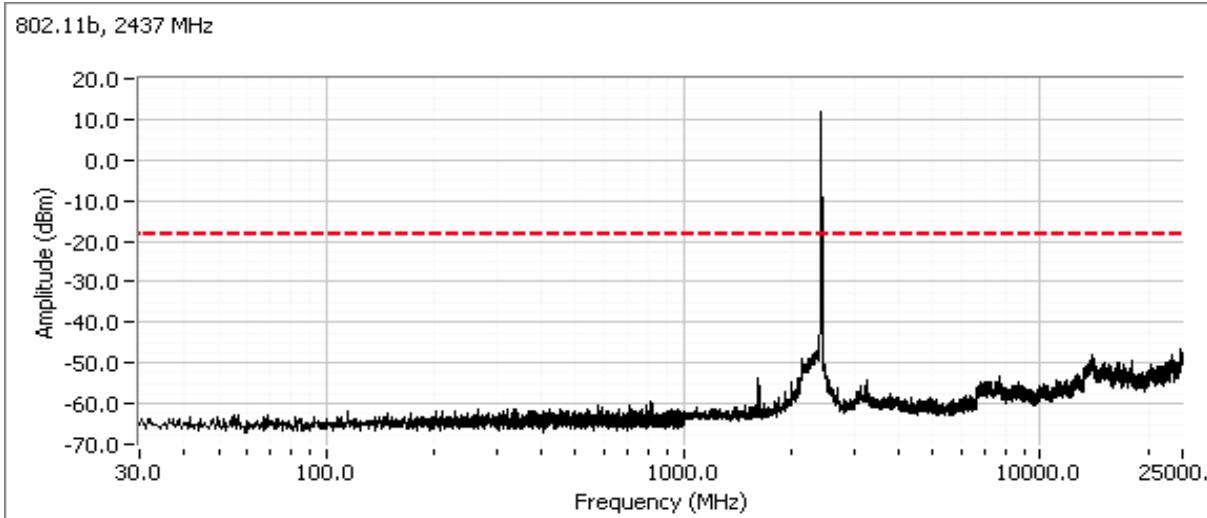
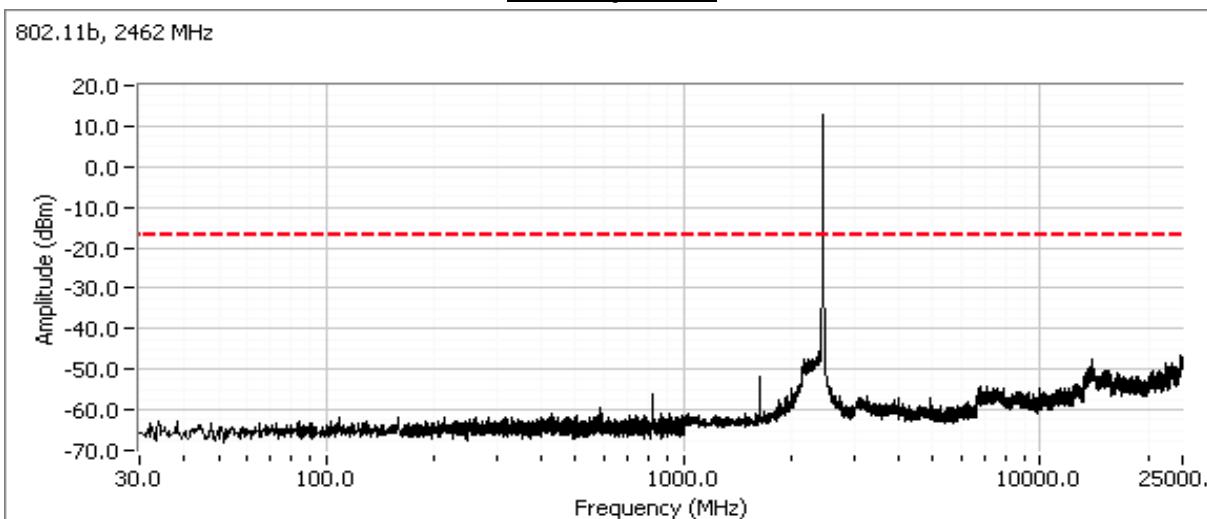
Plots for low channel



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.



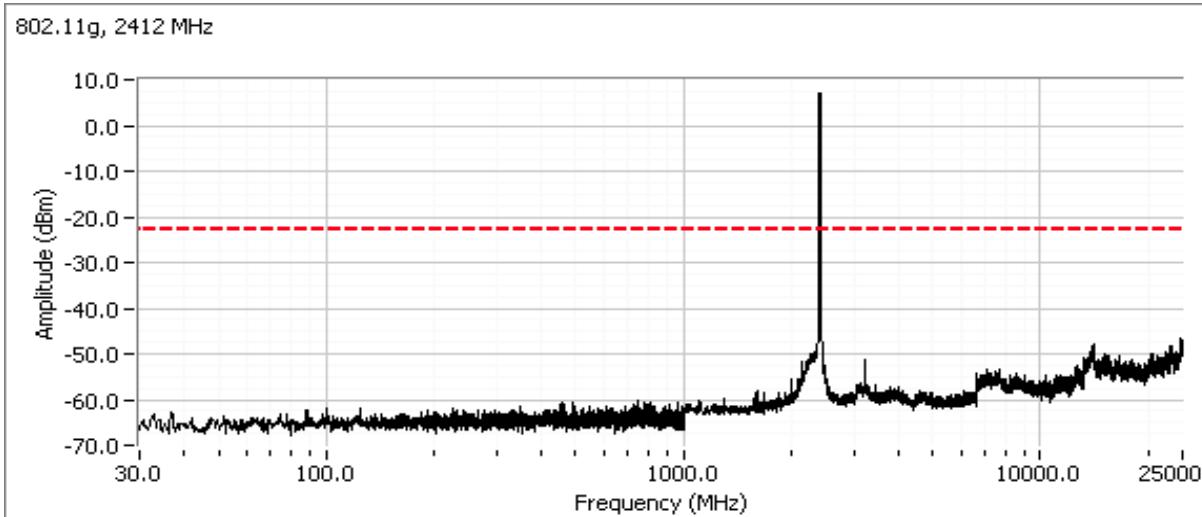
Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

Plots for center channel

Plots for high channel


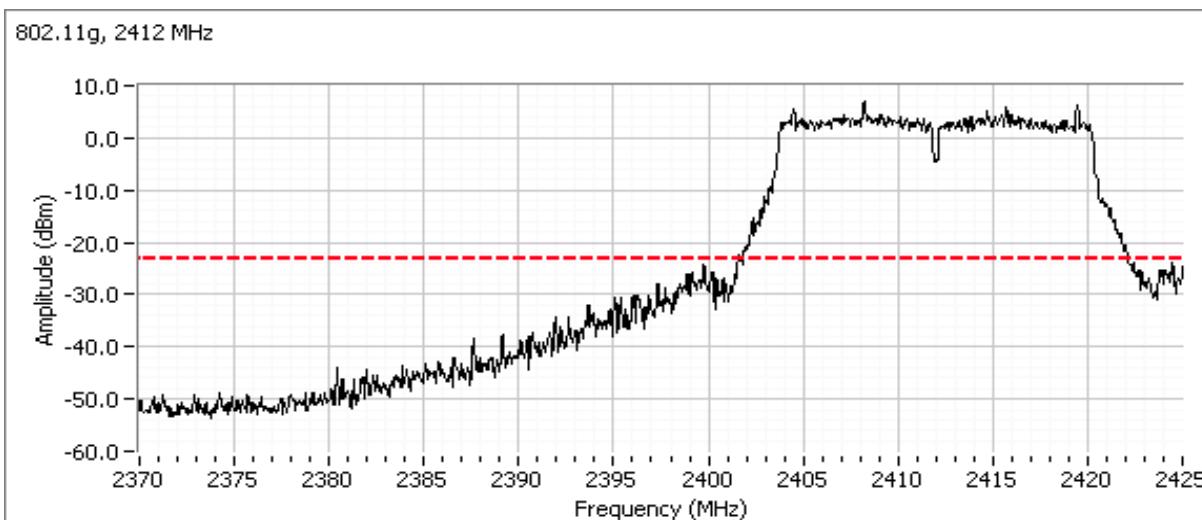
Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

802.11g

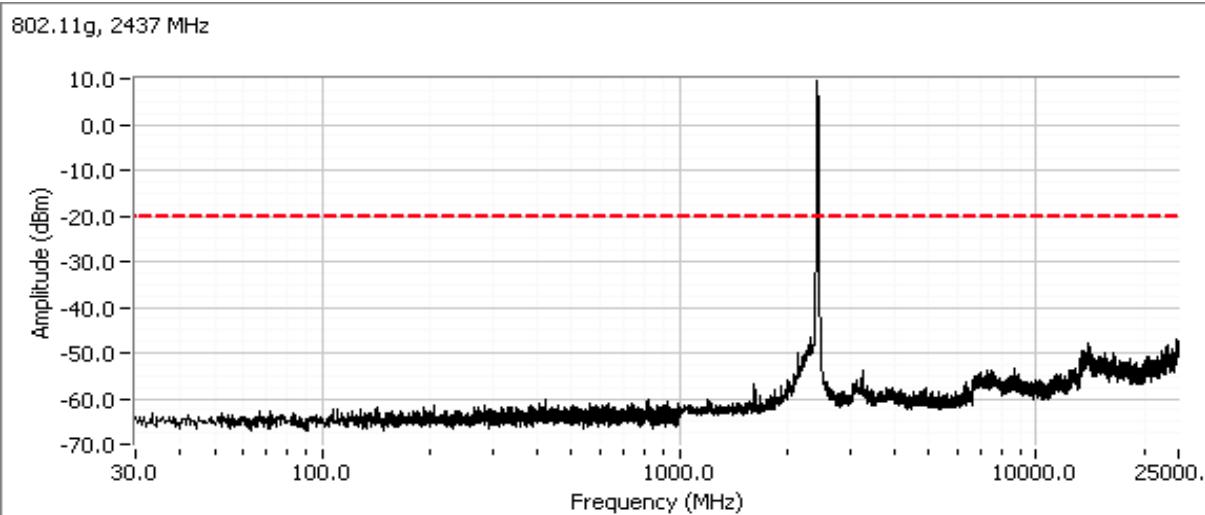
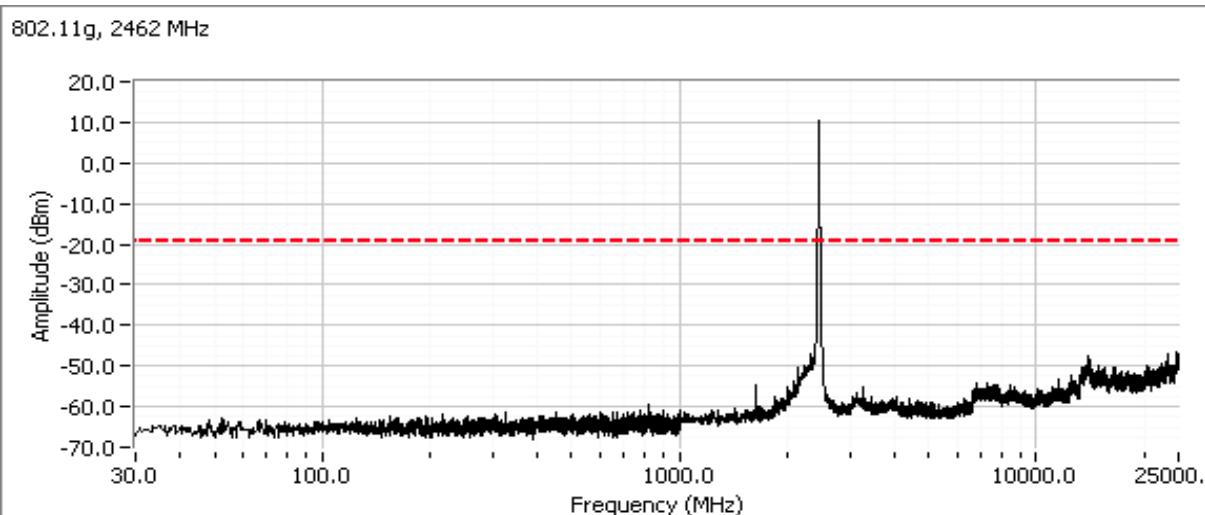
Plots for low channel



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.



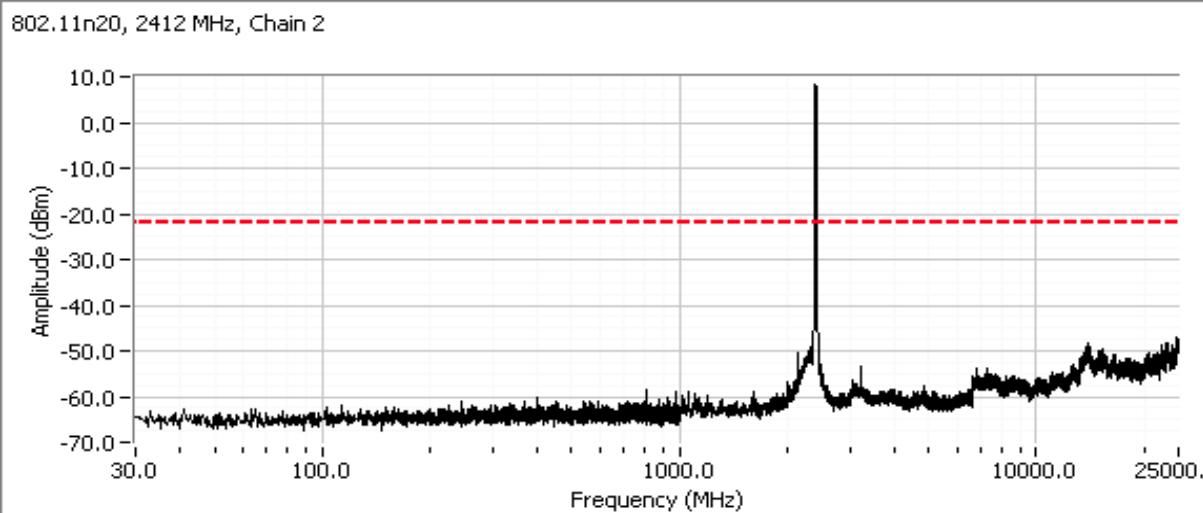
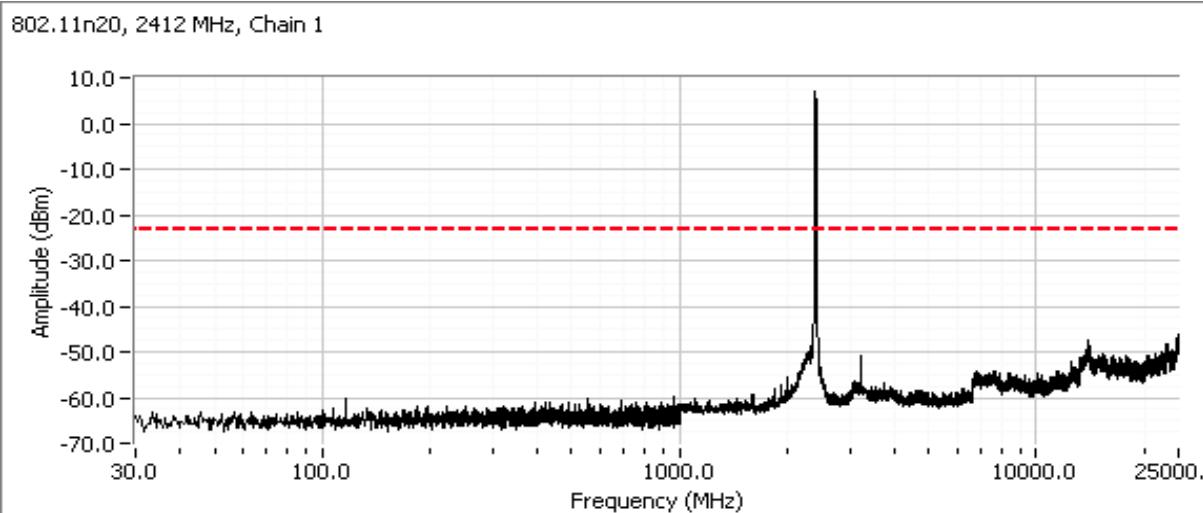
Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

Plots for center channel

Plots for high channel


Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

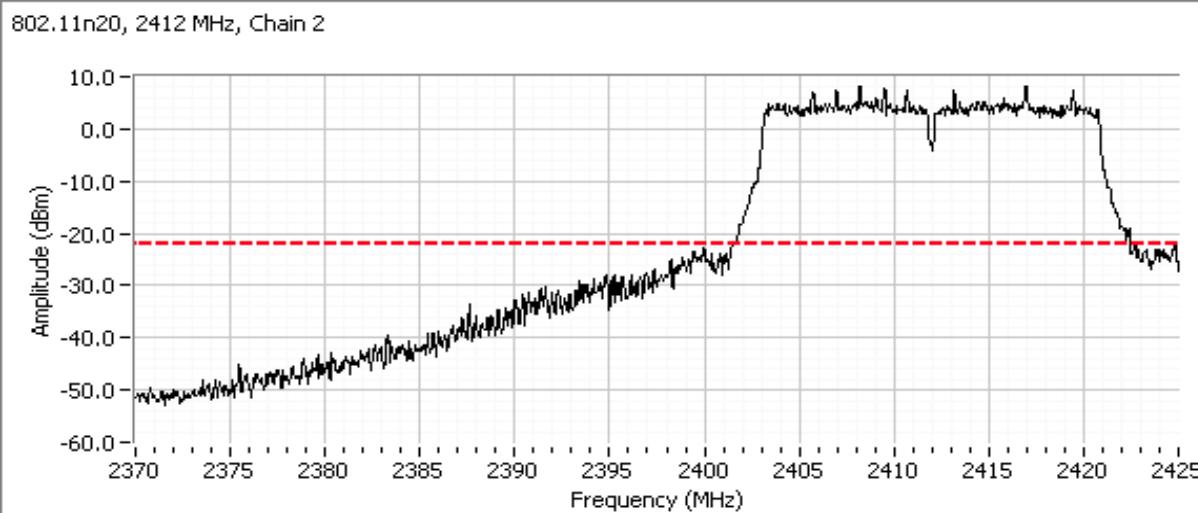
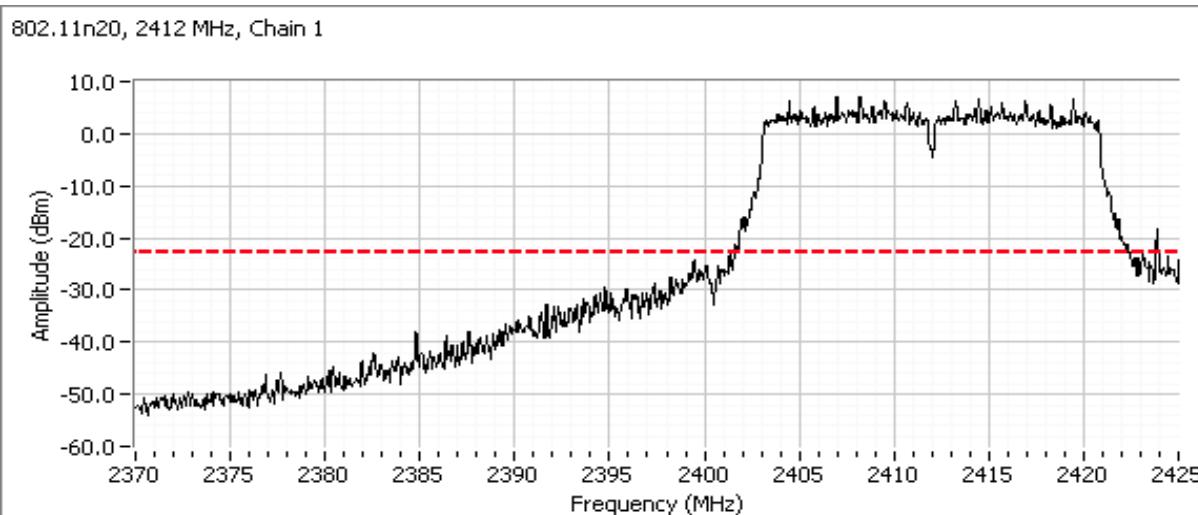
802.11n20

Plots for low channel



Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

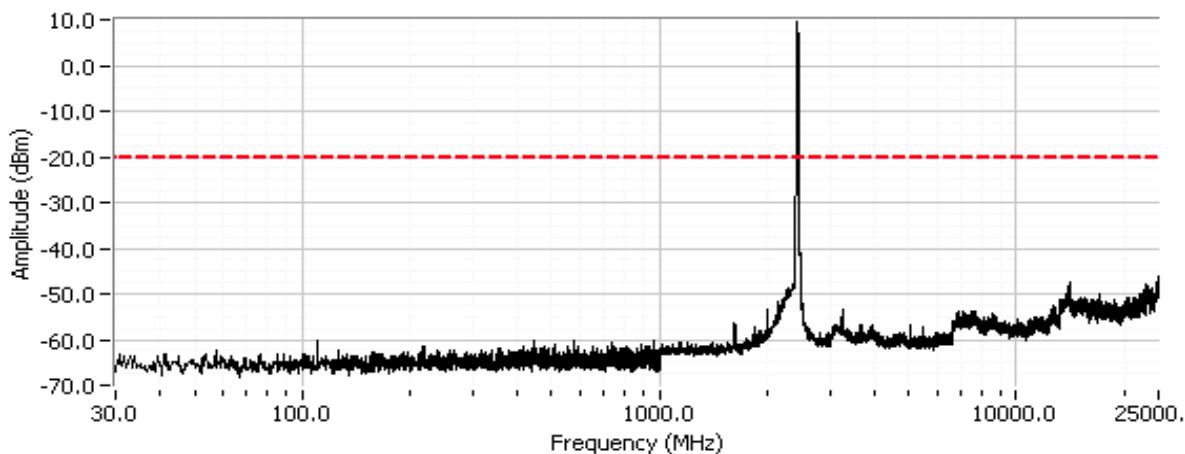
Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.



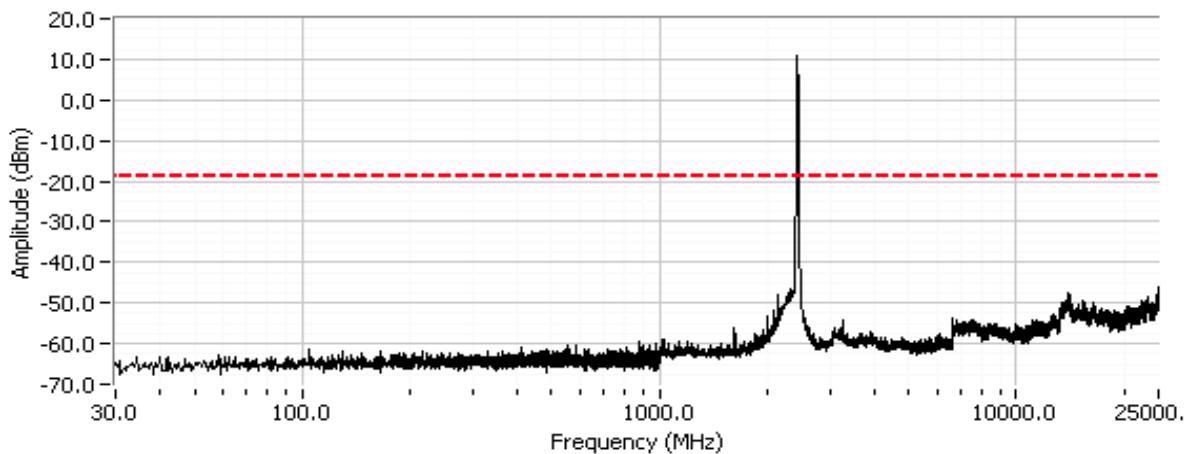
Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

Plots for center channel

802.11n20, 2437 MHz, Chain 1



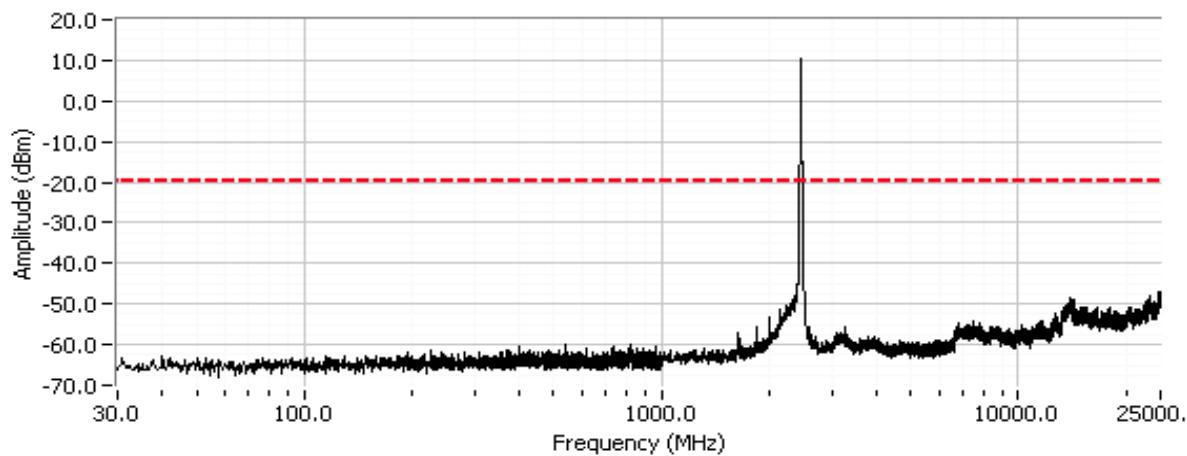
802.11n20, 2437 MHz, Chain 2



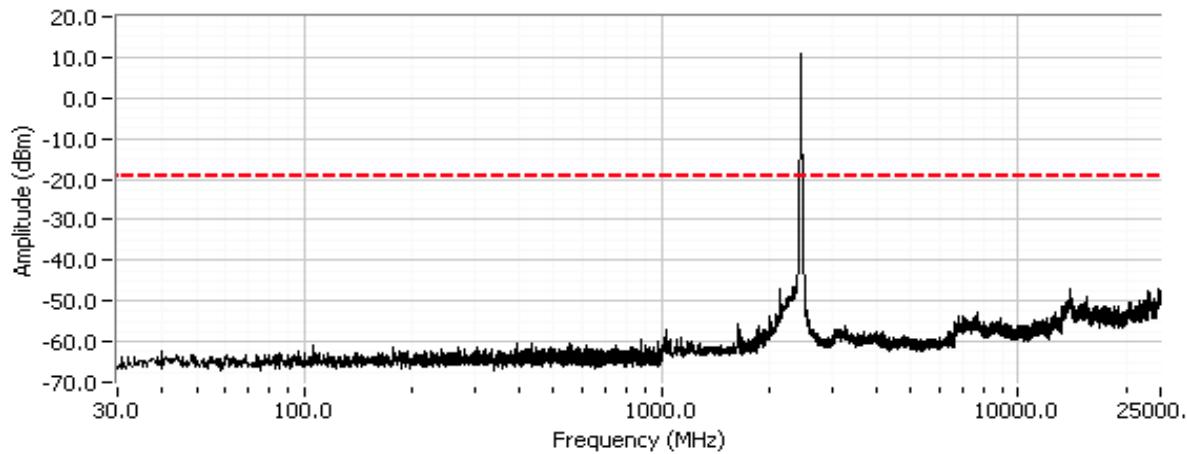
Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

Plots for high channel

802.11n20, 2462 MHz, Chain 1



802.11n20, 2462 MHz, Chain 2





EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		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: 35 %

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

Run #	Mode	Channel	Target Power	Power Setting	Test Performed	Limit	Result / Margin
Simultaneous Tx - RF4CE + Wifi - using the worse case 2.4GHz wifi channel and the worse case for RF4CE channel							
1	RF4CE + Worse case Wifi	b (Chain1) 2462MHz & Zigbee CH11	-	23 / 3	Radiated Emissions 30MHz - 1000MHz	FCC 15.209 / 15.247	39.9 dB μ V/m @ 522.85 MHz (-6.1 dB)
			-		Radiated Emissions 1 - 25 GHz	FCC 15.209 / 15.247	48.4 dB μ V/m @ 7386.6 MHz (-5.6 dB)
2	RF4CE + Worse case Wifi	n20 (2x2) 2462MHz & Zigbee CH11	-	23 / 3	Radiated Emissions 30MHz - 1000MHz	FCC 15.209 / 15.247	44.3 dB μ V/m @ 949.99 MHz (-9.7 dB)
			-		Radiated Emissions 1 - 25 GHz	FCC 15.209 / 15.247	51.4 dB μ V/m @ 7387.6 MHz (-2.6 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.



EMC Test Data

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

Sample Notes

Sample S/N: A44LA5RW110013

Driver: -

Antenna: Airgain N2420DS / N2415D2

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 $\geq 98\%$ 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	2Mb/s	99.0%	Yes	0.92	0	0	10
11g	9Mb/s	98.0%	Yes	1.41	0	0	10
n20	6.5	97.3%	Yes	0.67	0.12	0.24	1486

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 3:	Emission has a duty cycle $\geq 98\%$, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces
Note 4:	Emission has constant duty cycle $< 98\%$, average measurement performed: RBW=1MHz, VBW>1/T but not less than 10Hz, peak detector, linear averaging, auto sweep, trace average 100 traces, measurement corrected by Linear voltage correction factor
Note 5:	Emission has constant duty cycle $< 98\%$, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces, measurement corrected by Pwr correction factor

Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

Run #1: Radiated Spurious Emissions, 30 - 40,000 MHz.

Date of Test: 2/29 & 3/1/2016

Config. Used: 1

Test Engineer: Rafael Varelas

Config Change: None

Test Location: FT Chamber #5

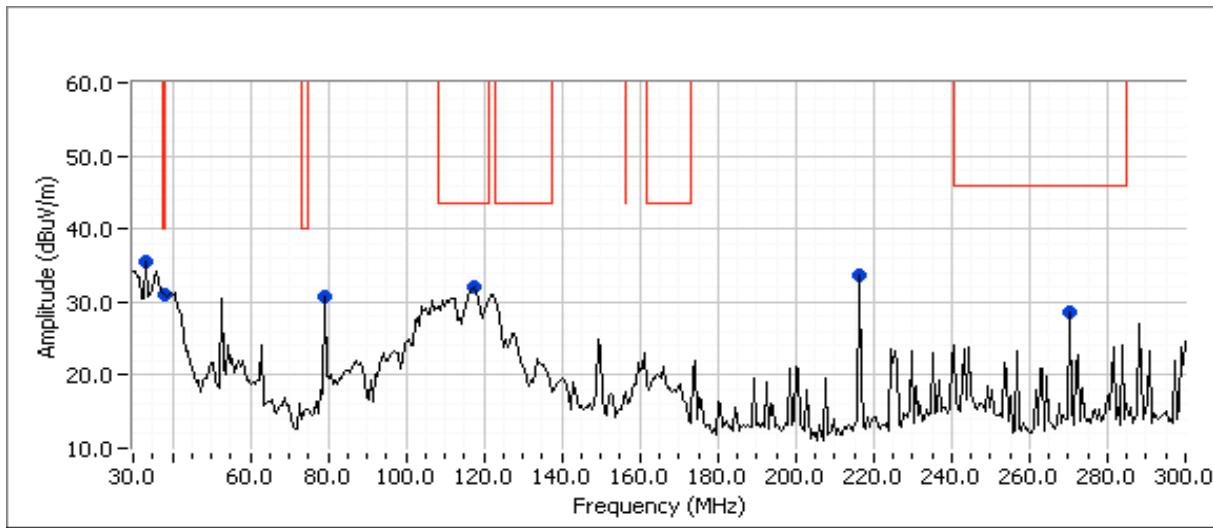
EUT Voltage: 120V/60Hz

 Channel: 11 Mode: b Power Setting: 23
 Tx Chain: 1 Data Rate: 2Mb/s

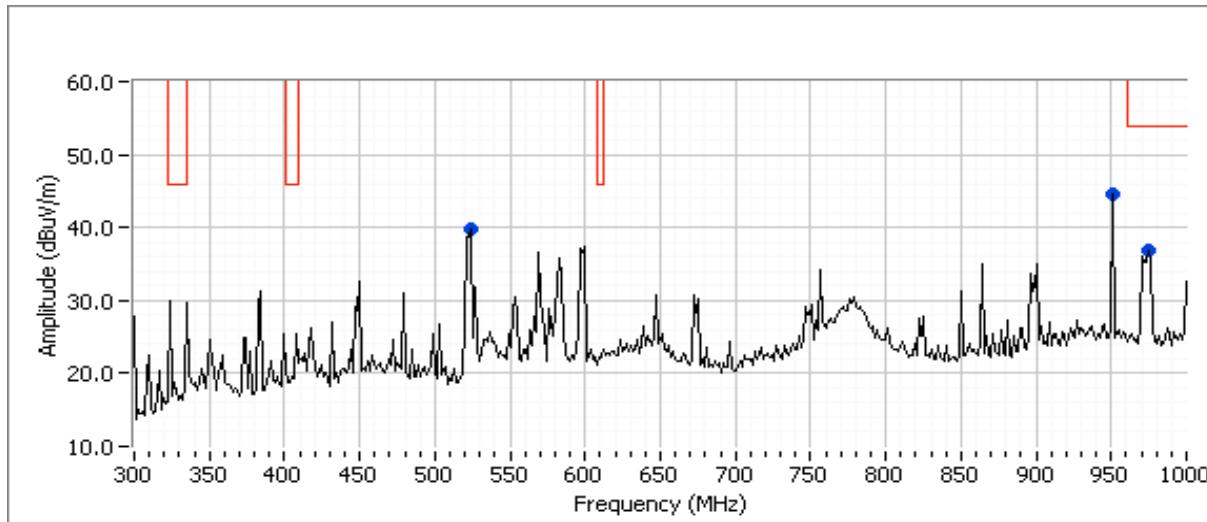
 RF4CE: 2405 MHz Power Setting: 3
 Tx Chain: -

30-1000MHz

Frequency	Level	Pol	15.209 / 15.247	Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters
522.848	39.9	H	46.0	-6.1	QP	125	1.0
949.989	44.7	V	54.0	-9.3	QP	270	1.4
215.999	33.4	H	46.0	-12.6	QP	130	1.5
117.969	29.4	V	43.5	-14.1	QP	289	1.0
31.576	25.8	V	40.0	-14.2	QP	0	1.0
37.953	24.0	V	40.0	-16.0	QP	177	1.0
270.001	28.2	H	46.0	-17.8	QP	47	1.0
78.340	18.2	V	40.0	-21.8	QP	5	1.0
971.991	32.2	H	54.0	-21.8	QP	316	1.0



Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

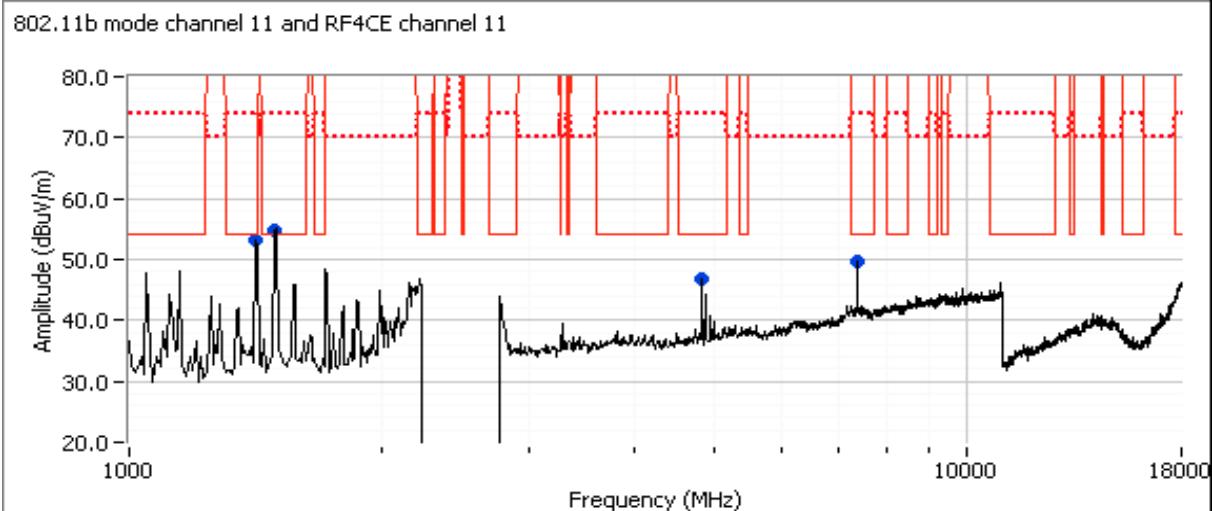


Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
Class:	N/A		

1000-25000MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7386.590	48.4	V	54.0	-5.6	AVG	299	1.0	RB 1 MHz;VB 10 Hz;Peak
7386.820	56.3	V	74.0	-17.7	PK	299	1.0	RB 1 MHz;VB 3 MHz;Peak
1494.180	40.7	H	54.0	-13.3	AVG	244	1.3	RB 1 MHz;VB 10 Hz;Peak
1492.660	57.3	H	74.0	-16.7	PK	244	1.3	RB 1 MHz;VB 3 MHz;Peak
4810.950	42.2	V	54.0	-11.8	AVG	265	2.3	RB 1 MHz;VB 10 Hz;Peak
4810.930	50.7	V	74.0	-23.3	PK	265	2.3	RB 1 MHz;VB 3 MHz;Peak
1419.550	38.9	H	54.0	-15.1	AVG	326	2.3	RB 1 MHz;VB 10 Hz;Peak
1418.040	56.7	H	74.0	-17.3	PK	326	2.3	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



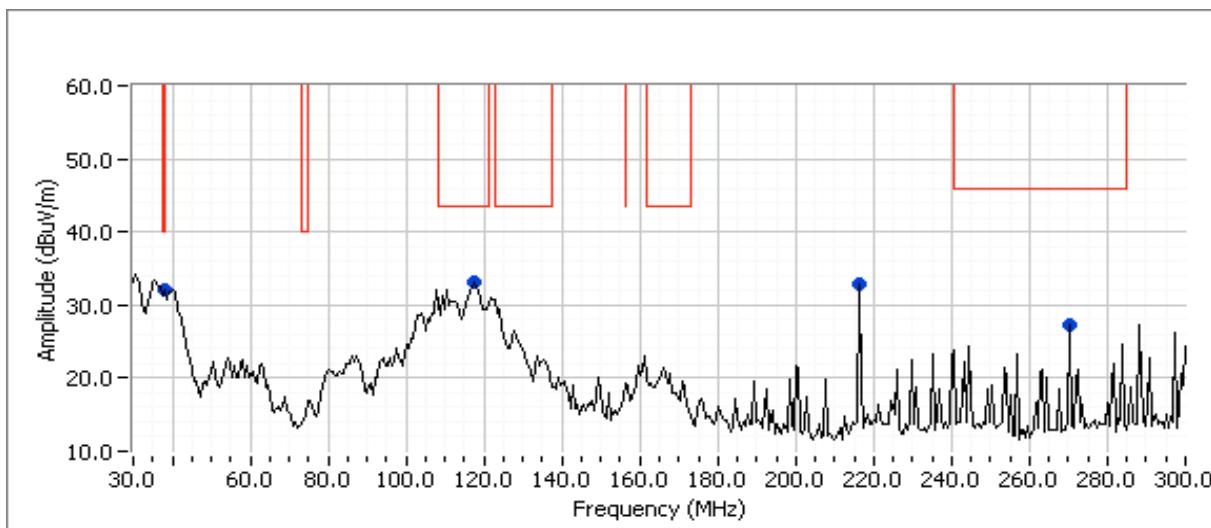
Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
			Class: N/A

Channel: 11 Mode: n20 Power Setting: 23
 Tx Chain: 2x2 Data Rate: 6.5

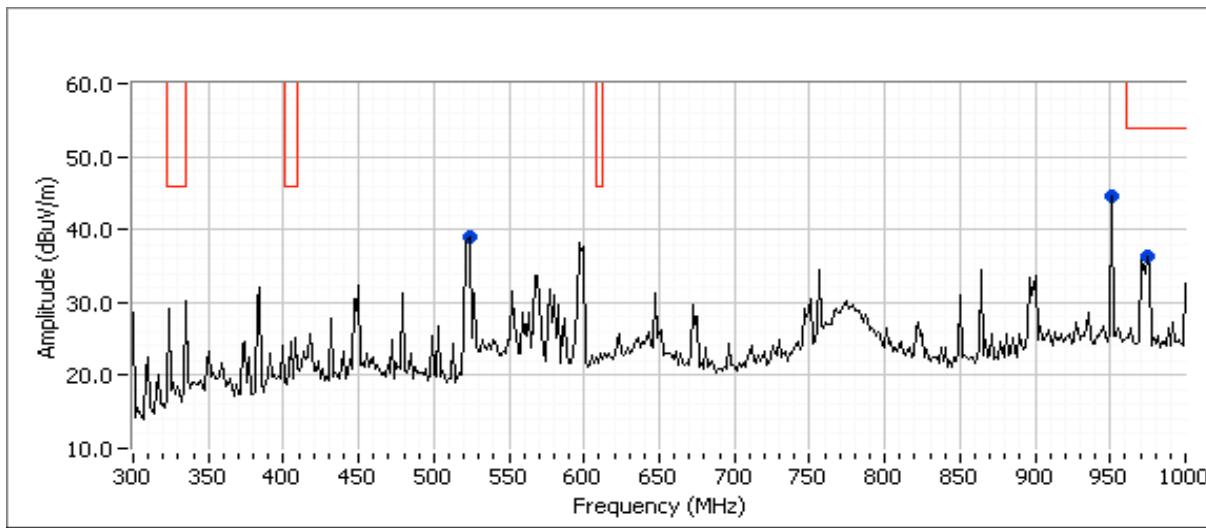
RF4CE: 2405 MHz Power Setting: 3
 Tx Chain: -

30-1000MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
949.989	44.3	V	54.0	-9.7	QP	304	1.4	Note 1,QP (1.00s)
522.846	34.3	H	46.0	-11.7	QP	282	1.0	Note 1,QP (1.00s)
117.909	31.2	V	43.5	-12.3	QP	280	1.1	QP (1.00s)
216.007	33.3	H	46.0	-12.7	QP	117	1.6	Note 1,QP (1.00s)
37.711	23.7	V	40.0	-16.3	QP	111	1.0	QP (1.00s)
270.001	27.4	H	46.0	-18.6	QP	105	1.1	QP (1.00s)
971.991	31.6	H	54.0	-22.4	QP	315	1.0	QP (1.00s)



Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
		Class:	N/A

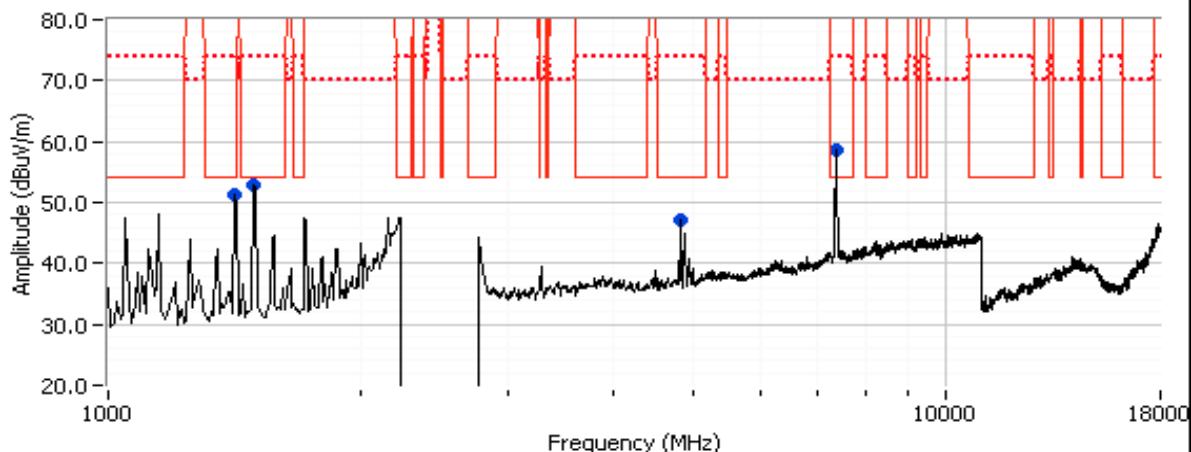


Client:	Techicolor	Job Number:	JD100835
Model:	H44-100	T-Log Number:	T100900
Contact:	Austin Moore	Project Manager:	Christine Krebill
Standard:	FCC 15.247	Project Coordinator:	-
Class:	N/A		

1000-25000MHz

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dB μ V/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7387.580	51.4	V	54.0	-2.6	AVG	300	1.0	Note 4,RB 1 MHz;VB 3 kHz;Peak VA
7388.250	64.3	V	74.0	-9.7	PK	300	1.0	RB 1 MHz;VB 3 MHz;Peak
4809.020	41.7	V	54.0	-12.3	AVG	239	1.5	Note 4,RB 1 MHz;VB 3 kHz;Peak VA
4809.240	49.4	V	74.0	-24.6	PK	239	1.5	RB 1 MHz;VB 3 MHz;Peak
1419.760	39.3	H	54.0	-14.7	AVG	242	1.3	Note 4,RB 1 MHz;VB 3 kHz;Peak VA
1418.070	57.2	H	74.0	-16.8	PK	242	1.3	RB 1 MHz;VB 3 MHz;Peak
1494.260	40.6	H	54.0	-13.4	AVG	320	2.0	Note 4,RB 1 MHz;VB 3 kHz;Peak VA
1492.690	58.1	H	74.0	-15.9	PK	320	2.0	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

802.11n20 mode channel 11 and RF4CE channel 11




End of Report

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