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EMC Test Report

Application for Grant of Equipment Authorization

Industry Canada RSS-Gen Issue 4 / RSS 210 Issue 8
FCC Part 15, Subpart E

Model: H44-100

FCC ID:	G95H44-100
APPLICANT:	Technicolor USA Inc. 101 W. 103rd St Indianapolis, IN 46290
TEST SITE(S):	National Technical Systems - Silicon Valley 41039 Boyce Road. Fremont, CA. 94538-2435
IC SITE REGISTRATION #:	2845B-4
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ACCREDITED
Testing Cert #0214.26

REVISION HISTORY

Rev#	Date	Comments	Modified By
-	March 25, 2015	First release	
1.0	May 27, 2015	Clarified PSD measurement for MIMO modes. Clarified worse case for bandedge for SISO modes. Clarified spurious emissions results.	MEH
2.0	June 10, 2015	Clarified conducted emissions operation. Updated frequency stability reference and corrected typo in Duty Cycle	MEH

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SCOPE

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

FCC Part 15, Subpart E requirements for UNII Devices

Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in the following reference standards and as outlined in National Technical Systems - Silicon Valley test procedures:

ANSI C63.10-2009
FCC General UNII Test Procedures KDB789033

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.

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 USA Inc. model H44-100 complied with the requirements of the following regulations:

FCC Part 15, Subpart E requirements for UNII Devices

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

The test results recorded herein are based on a single type test of Technicolor USA Inc. model H44-100 and therefore apply only to the tested sample. The sample was selected and prepared by Steven Hershberger of Technicolor USA Inc.

DEVIATIONS FROM THE STANDARDS

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

TEST RESULTS SUMMARY

UNII / LELAN DEVICES

Operation in the 5.15 – 5.25 GHz Band

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.407(a) (1) (iv)	-	Output Power	11a: 18.9dBm (77.6mW) n20: 21.8dBm (150.1mW) (Max eirp: 291.3mW)	24 dBm / 250mW (eirp < 30dBm)	Complies
15.407 (a) (1)	-	Power Spectral Density	11a: 7.9 dBm/MHz n20: 10.4 dBm/MHz	11 dBm/MHz	Complies

Operation in the 5.25 – 5.35 GHz Band

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(a) (2)	-	26dB Bandwidth	20.6MHz minimum	N/A – limits output power if < 20MHz	N/A
15.407(a) (2)	-	Output Power	11a: 18.7dBm (74.1mW) n20: 21.5dBm (140.3mW) (Max eirp: 24.4 dBm / 272.3mW)	24 dBm / 250mW (eirp < 30dBm)	Complies
15.407(a) (2)	-	Power Spectral Density	11a: 7.4 dBm/MHz n20: 10.1 dBm/MHz	11 dBm/MHz	Complies

Operation in the 5.47 – 5.725 GHz Band

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(a) (2)		26dB Bandwidth	20.6MHz minimum	N/A – limits output power if < 20MHz	N/A
15.407(a) (2)	-	Output Power	11a: 19.0dBm (79.4mW) n20: 21.7dBm (148.2mW) (Max eirp: 25.3 dBm / 337.2mW)	24 dBm / 250mW (eirp < 30dBm)	Complies
15.407(a) (2)	-	Power Spectral Density	11a: 7.7 dBm/MHz n20: 10.3 dBm/MHz	11 dBm/MHz	Complies

Operation in the 5.725 – 5.850 GHz Band

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.407(a)(3) / 15.407 (e)	-	6dB Bandwidth	16.3MHz minimum	> 500kHz	N/A
15.407(a) (2)	-	Output Power	11a: 19.0dBm (79.4mW) n20: 22.0dBm (157.0mW) (Max eirp: 26.5 dBm / 450.7 mW)	30 dBm / 1000mW (eirp < 36dBm)	Complies
15.407(a) (2)	-	Power Spectral Density	11a: 7.8 dBm/MHz n20: 10.6 dBm/MHz	30dBm/500kHz (27dBm/MHz)	Complies

Requirements for all U-NII/LELAN bands

FCC Rule Part	RSS Rule Part	Description	Measured Value / Comments	Limit / Requirement	Result
15.407	-	Modulation	Digital Modulation is used	Digital modulation is required	Complies
15.407(b) (5) / 15.209	-	Spurious Emissions	67.7 dBµV/m @ 5725.7 MHz (-0.6 dB)	Refer to page 21	Complies
15.407 (c)	-	Operation in the absence of information to transmit	Operation is discontinued in the absence of information	Device shall automatically discontinue operation in the absence of information to transmit	Complies
15.407 (g)	-	Frequency Stability	Frequency stability is better than 15ppm	Signal shall remain within the allocated band	Complies
15.407 (h1)	-	Transmit Power Control	TPC is not required as the device operates at below 500mW eirp	The U-NII device shall have the capability to operate with a mean EIRP value lower than 24dBm (250mW)	Complies
15.407 (h2)	RSS-210 A9.4	Dynamic frequency Selection (device without radar detection)	Refer to separate test report, reference R97755	Channel move time < 10s Channel closing transmission time < 260ms	Complies

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
15.207	RSS GEN Table 3	AC Conducted Emissions	46.7 dBµV @ 0.444 MHz (-0.3 dB)	Refer to page 20	Complies
15.247 (b) (5) 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

MEASUREMENT UNCERTAINTIES

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

Measurement Type	Measurement Unit	Frequency Range	Expanded Uncertainty
RF power, conducted (power meter)	dBm	25 to 7000 MHz	± 0.52 dB
RF power, conducted (Spectrum analyzer)	dBm	25 to 7000 MHz	± 0.7 dB
Conducted emission of transmitter	dBm	25 to 26500 MHz	± 0.7 dB
Conducted emission of receiver	dBm	25 to 26500 MHz	± 0.7 dB
Radiated emission (substitution method)	dBm	25 to 26500 MHz	± 2.5 dB
Radiated emission (field strength)	dBµV/m	25 to 1000 MHz	± 3.6 dB
		1000 to 40000 MHz	± 6.0 dB
Conducted Emissions (AC Power)	dBµV	0.15 to 30 MHz	± 2.4 dB

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Technicolor USA Inc. 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 12, 2015 and tested on February 17, 19, 20 and 25, 2015. The EUT consisted of the following component(s):

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

Conducted Emissions

Company	Model	Description	Serial Number	FCC ID
Acer	S242HL	Monitor	40302364485	N/A
Asian Power Devices	DA-40A19	AC/DC Adapter	YE561137310538543 00	N/A
Seagate	SRD00F1	SSD	NA7090JC	N/A
Verbatim	-	USB Thumb Drive	-	N/A

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

(Conducted Emissions)

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)	not connected	-	-	-
A/V Out	not connected	-	-	-
Digital Audio Out	not connected	-	-	-
HDMI	not connected	-	-	-
USB	not connected	-	-	-
Hard Drive	not connected	-	-	-
Power Input	AC/DC Adapter	Multiconductor	Shielded	1.5
Internal Header	USB-Serial Adapter Laptop	Multiconductor	Unshielded	1.0

Note: For all radio tests, except AC conducted emissions, the EUT was connected to the laptop via a USB-to-serial adapter connected to an internal header. Preliminary testing showed no affect to the radio related emissions from the interface cables.

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		Location
	FCC	Canada	
Chamber 3	US0027	2845B-3	41039 Boyce Road Fremont, CA 94538-2435
Chamber 4	US0027	2845B-4	

ANSI C63.4 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement. The test site(s) contain separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.10. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

RADIATED EMISSIONS CONSIDERATIONS

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

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

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

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

INSTRUMENT CONTROL COMPUTER

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

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

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

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

FILTERS/ATTENUATORS

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

ANTENNAS

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

ANTENNA MAST AND EQUIPMENT TURNTABLE

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

ANSI C63.10 specifies that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor as specified in ANSI C63.4. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

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

TEST PROCEDURES

EUT AND CABLE PLACEMENT

The regulations require that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.10, and the worst-case orientation is used for final measurements.

CONDUCTED EMISSIONS

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

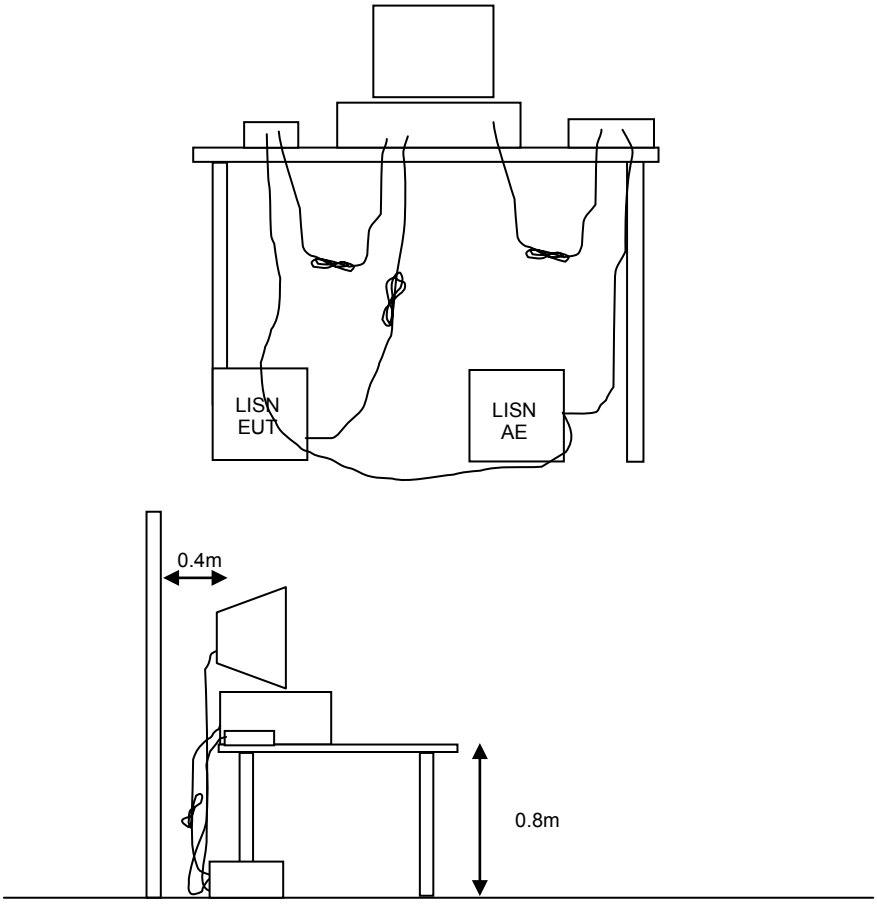


Figure 1 Typical Conducted Emissions Test Configuration

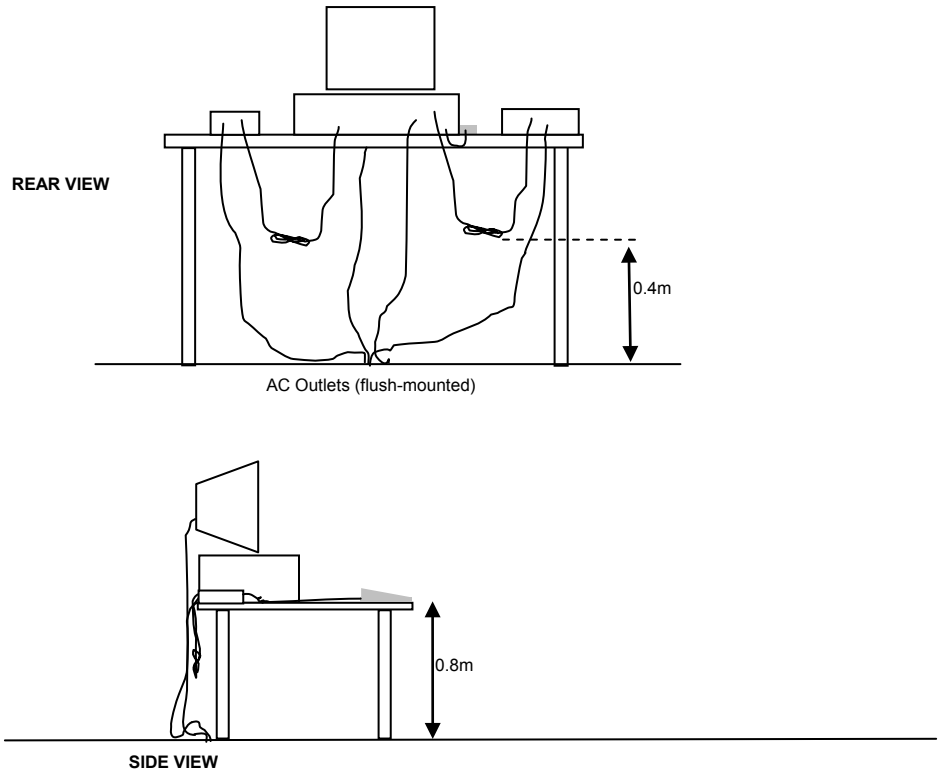
RADIATED EMISSIONS

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

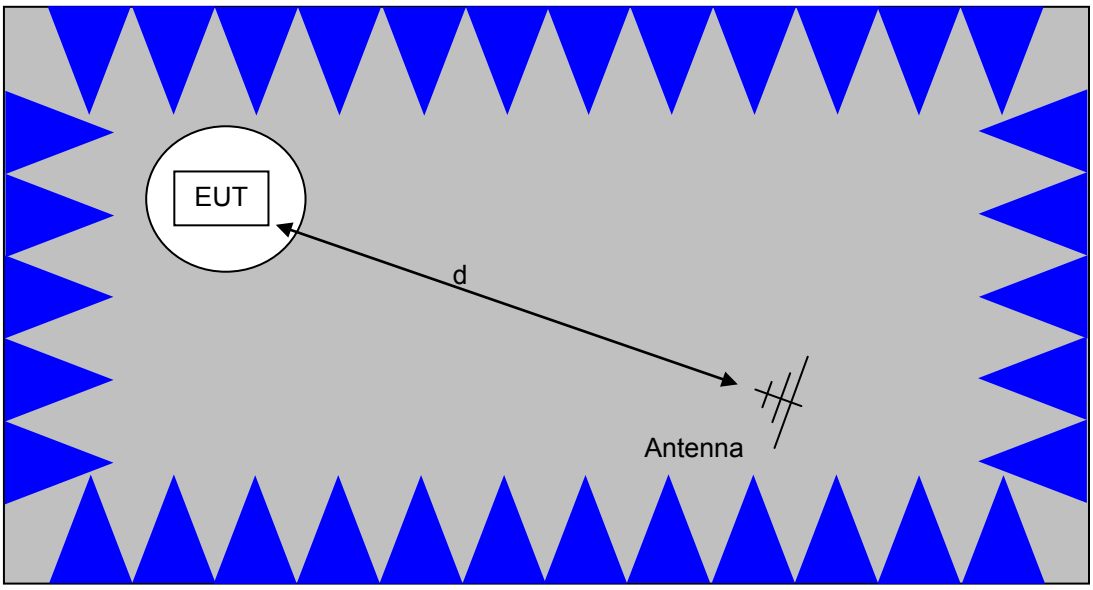
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

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

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

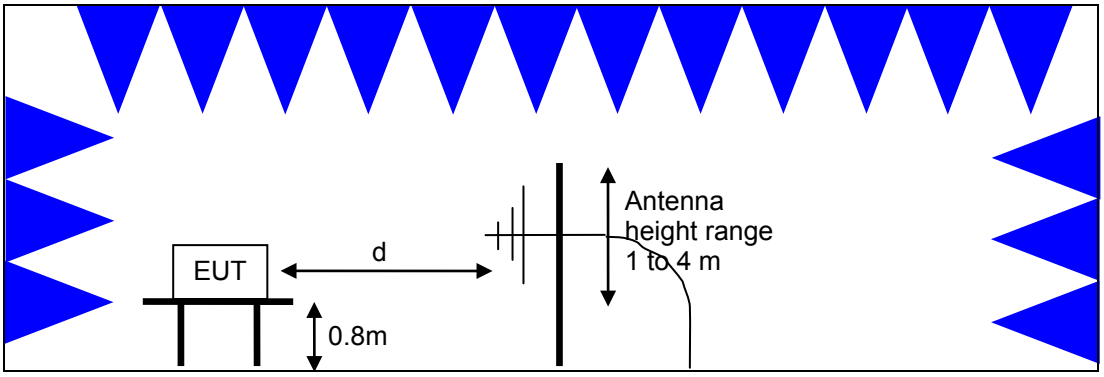


Typical Test Configuration for Radiated Field Strength Measurements



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

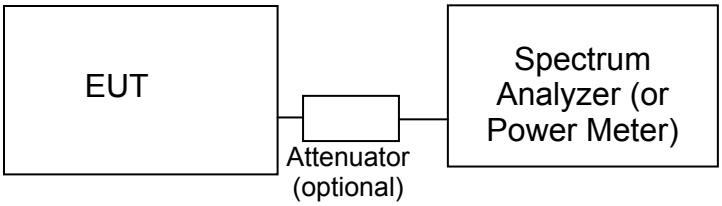
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



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

CONDUCTED EMISSIONS FROM ANTENNA PORT

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



Test Configuration for Antenna Port Measurements

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

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

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

BANDWIDTH MEASUREMENTS

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

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

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

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

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

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

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

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

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

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

FCC 15.407 (a) OUTPUT POWER LIMITS

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
5150 – 5250 (client devices)	250 mW (24 dBm)	11 dBm/MHz
5250 – 5350 / 5470-5725	250 mW (24 dBm)	11 dBm/MHz
5725 – 5850	1 Watts (30 dBm)	27 dBm/MHz

For system using antennas with gains exceeding 6dBi, the output power and power spectral density limits are reduced by 1dB for every dB the antenna gain exceeds 6dBi.

SPURIOUS EMISSIONS LIMITS –UNII and LELAN DEVICES

The spurious emissions limits for signals below 1GHz are the FCC/RSS-GEN general limits. For emissions above 1GHz, signals in restricted bands are subject to the FCC/RSS GEN general limits. All other signals have a limit of –27dBm/MHz, which is a field strength of 68.3dBuV/m/MHz at a distance of 3m. For devices operating in the 5725-5850Mhz bands under the LELAN/UNII rules, the limit within 10MHz of the allocated band is increased to –17dBm/MHz.

[1] The restricted bands are detailed in FCC 15.205, RSS 210 Table 1 and RSS 310 Table 2

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

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

$$R_r - S = M$$

where:

R_r = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

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

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

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

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

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

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

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

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

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_C = Corrected Reading in dBuV/m

L_S = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION

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

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

where P is the eirp (Watts)

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

Appendix A Test Equipment Calibration Data

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
Radiated Emissions, 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	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, 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
Hewlett Packard	Head (Inc W1-W4, 1946 , 1947) Purple	84125C	1772	1/20/2015	1/20/2016

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
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
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1594	5/15/2014	5/15/2015

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
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

Appendix B Test Data

T97497 Pages 28 – 96

Client:	Technicolor USA, Inc.	Job Number:	J97449
Product	H44-100	T-Log Number:	T97497
		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:	T97497
		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 redcued as the data rate increases, therefore testing was performed at the data rate in the mode wiht 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
802.11b	1	20.0	2	20.0
	2	20.5	2	
	5.5	19.9	2	
	11	19.9	2	
	2	**21.3**	1	
802.11g	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	

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Mode	Data Rate	Power (dBm)	Chain	Power setting	
802.11n 20MHz	6.5	**19.42**	2	20.0	MCS8
	13	19.36	2		MCS9
	19.5	19.27	2		MCS10
	26	19.17	2		MCS11
	39	19.02	2		MCS12
	52	19.01	2		MCS13
	58.5	19.27	2		MCS14
	65	18.96	2		MCS15

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

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)
11b	2Mb/s	0.99	Yes	-	0	0	-
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*log(1/x)
** Correction factor when using linear voltage average - 20*log(1/x)
T = Minimum transmission duration

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

FCC 15.407 (UNII) 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: 22-24 °C
Rel. Humidity: 33-38 %

Summary of Results

Run #	Mode	Channel	Target Power Setting	Passing Power Setting	Test Performed	Limit	Result / Margin
1	a (chain 1)	36 - 5180MHz	20.0	20	Restricted Band Edge at 5150 MHz	15.209	49.3 dBµV/m @ 5150.0 MHz (-4.7 dB)
	a (chain 2)	36 - 5180MHz	20.0	20	Restricted Band Edge at 5150 MHz	15.209	51.7 dBµV/m @ 5150.0 MHz (-2.3 dB)
	n20 (2x2)	36 - 5180MHz	20.0	20	Restricted Band Edge at 5150 MHz	15.209	50.6 dBµV/m @ 5150.0 MHz (-3.4 dB)
2	a (chain 2)	64 - 5320MHz	20.0	20	Restricted Band Edge at 5350 MHz	15.209	48.0 dBµV/m @ 5350.0 MHz (-6.0 dB)
	n20 (2x2)	64 - 5320MHz	20.0	20	Restricted Band Edge at 5350 MHz	15.209	49.4 dBµV/m @ 5350.0 MHz (-4.6 dB)
3	a (chain 2)	100 - 5500MHz	20.0	20	Restricted Band Edge at 5460 MHz	15.209	48.4 dBµV/m @ 5458.9 MHz (-5.6 dB)
					Band Edge 5460 - 5470 MHz	15E	52.2 dBµV/m @ 5470.0 MHz (-1.8 dB)
	n20 (2x2)	100 - 5500MHz	20.0	20	Restricted Band Edge at 5460 MHz	15.209	47.1 dBµV/m @ 5426.1 MHz (-6.9 dB)
					Band Edge 5460 - 5470 MHz	15E	63.6 dBµV/m @ 5469.6 MHz (-4.7 dB)
	a (chain 2)	140 - 5700MHz	20.0	20	Band Edge 5725MHz	15E	67.2 dBµV/m @ 5725.7 MHz (-1.1 dB)
	n20 (2x2)	140 - 5700MHz	20.0	20	Band Edge 5725MHz	15E	67.7 dBµV/m @ 5725.7 MHz (-0.6 dB)

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #	Mode	Channel	Target Power Setting	Passing Power Setting	Test Performed	Limit	Result / Margin
4	a (chain 2)	149 - 5745MHz	20.0	20	Band Edge 5725MHz	15E	74.3 dBµV/m @ 5724.7 MHz (-4.0 dB)
					Band Edge 5715MHz		64.4 dBµV/m @ 5711.3 MHz (-3.9 dB)
	n20 (2x2)	149 - 5745MHz	20.0	20	Band Edge 5725MHz	15E	77.1 dBµV/m @ 5724.4 MHz (-1.2 dB)
					Band Edge 5715MHz		64.4 dBµV/m @ 5714.8 MHz (-3.9 dB)
	a (chain 2)	165 - 5825MHz	20.0	20	Band Edge 5850MHz	15E	66.8 dBµV/m @ 5851.1 MHz (-11.5 dB)
					Band Edge 5860MHz		62.2 dBµV/m @ 5860.9 MHz (-6.1 dB)
	n20 (2x2)	165 - 5825MHz	20.0	20	Band Edge 5850MHz	15E	66.8 dBµV/m @ 5850.1 MHz (-11.5 dB)
					Band Edge 5860MHz		58.6 dBµV/m @ 5860.8 MHz (-9.7 dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Note

Data is provided for the UNII1 bandedges to show that both chains were evaluated for the 11a operation. This was repeated for the the other bands, with chain 2 always being the worse case. Only the chain 2 data is presented.

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Procedure Comments:

Measurements performed in accordance with FCC KDB 789033
Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time
Unless otherwise stated/noted, emission has duty cycle ≥ 98% and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	9Mb/s	0.99	Yes	-	0	0	-
n20	MCS8	0.978	Yes	-	0.10	0.19	-

Sample Notes

Sample S/N: L044A505250029
Driver: 5.99 RC188.10
Antenna: Airgain N2420DS / N2415D2

Measurement Specific Notes:

Note 1:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m) or -17dBm/MHz eirp (78.3dBuV/m) . The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector). Per KDB 789033 G 2) c) i) , compliance can be demonstrated by meeing the average and peak limits of 15.209, as an alternative.
Note 2:	Emission has duty cycle ≥ 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 * 1/DC 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 tabluar results for final measurements.

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #1: Radiated Bandedge Measurements, 5150-5250MHz

Run 1a: 5150 MHz Band Edge Signal Radiated Field Strength

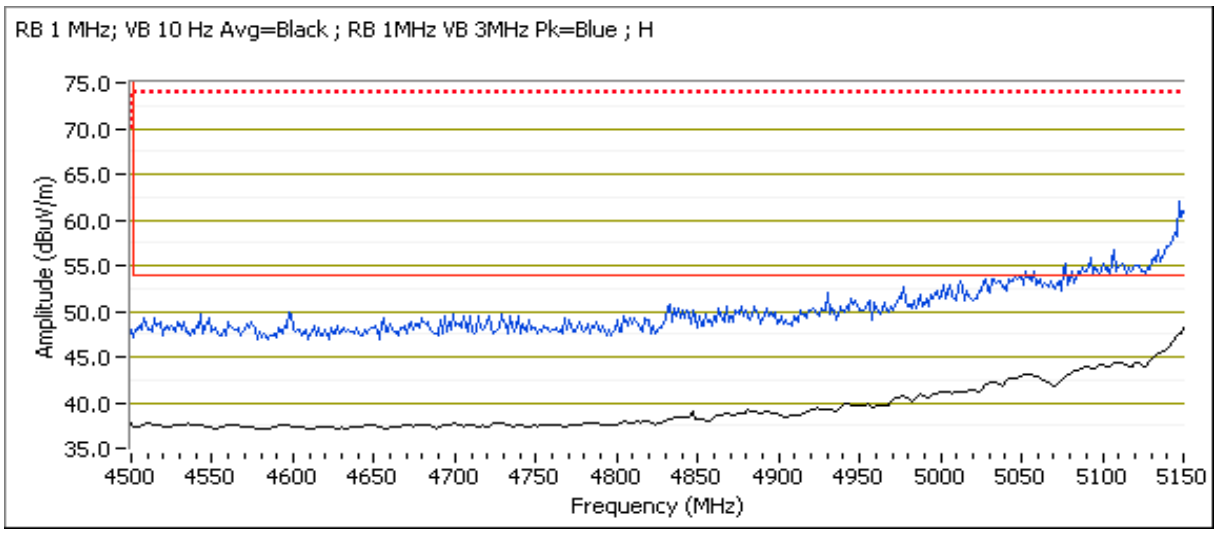
Date of Test: 02/17/15 Test Location: FT Chamber#4

Test Engineer: Jack Liu EUT Voltage: 120V/60Hz

Channel: 36 Mode: a Power Setting: 20

Tx Chain: 1 Data Rate: 9Mb/s

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5150.000	49.3	H	54.0	-4.7	AVG	337	1.0	POS; RB 1 MHz; VB: 10 Hz
5148.960	64.9	H	74.0	-9.1	PK	337	1.0	POS; RB 1 MHz; VB: 3 MHz
5150.000	48.7	V	54.0	-5.3	AVG	257	1.6	POS; RB 1 MHz; VB: 10 Hz
5149.800	63.8	V	74.0	-10.2	PK	257	1.6	POS; RB 1 MHz; VB: 3 MHz



Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run 1b: 5150 MHz Band Edge Signal Radiated Field Strength

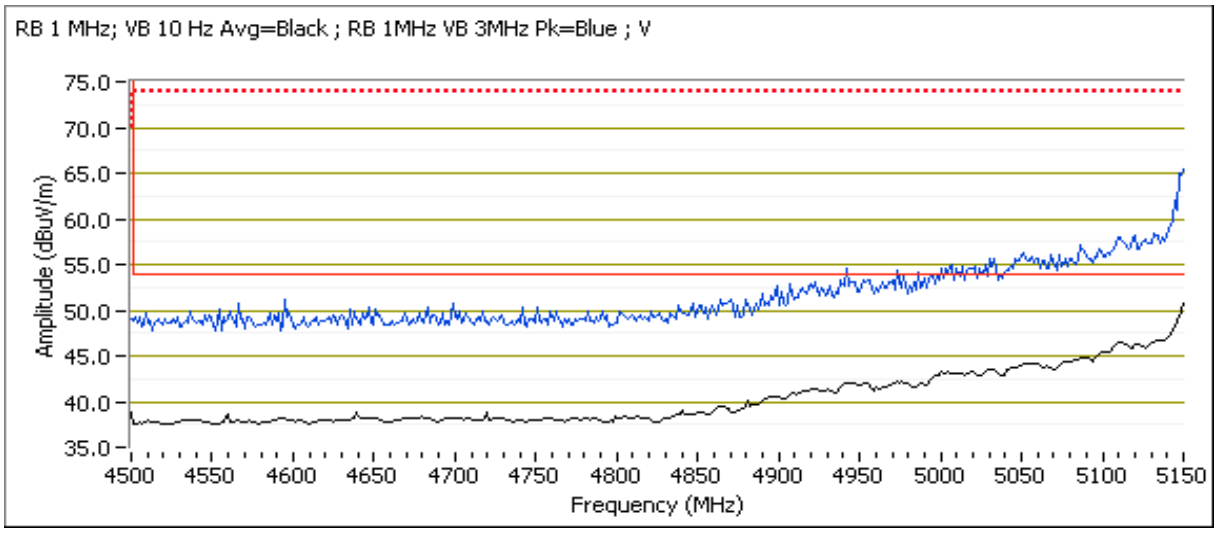
Date of Test: 02/17/15 Test Location: FT Chamber#4

Test Engineer: Jack Liu EUT Voltage: 120V/60Hz

Channel: 36 Mode: a Power Setting: 20

Tx Chain: 2 Data Rate: 9Mb/s

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5150.000	51.7	V	54.0	-2.3	AVG	2	1.3	POS; RB 1 MHz; VB: 10 Hz
5147.440	67.7	V	74.0	-6.3	PK	2	1.3	POS; RB 1 MHz; VB: 3 MHz
5150.000	45.9	H	54.0	-8.1	AVG	259	1.0	POS; RB 1 MHz; VB: 10 Hz
5149.440	61.5	H	74.0	-12.5	PK	259	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run 1c: 5150 MHz Band Edge Signal Radiated Field Strength

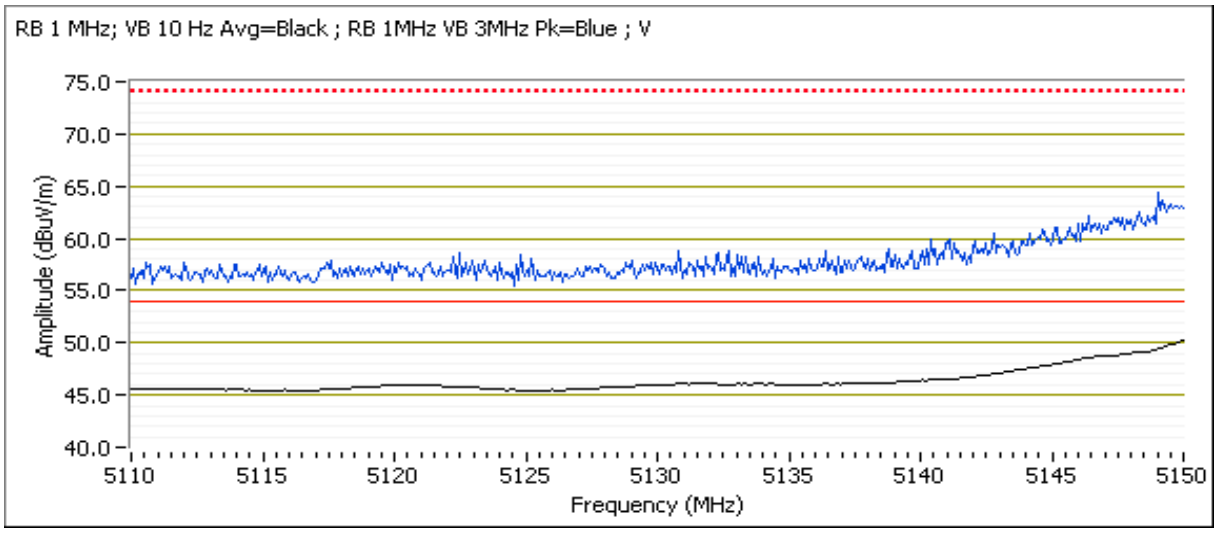
Date of Test: 02/17/15 Test Location: FT Chamber#4

Test Engineer: Jack Liu EUT Voltage: 120V/60Hz

Channel: 36 Mode: n20 Power Setting: 20

Tx Chain: 2x2 Data Rate: MCS1

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5150.000	50.6	V	54.0	-3.4	AVG	256	1.6	Note3; POS; RB 1 MHz; VB: 10 Hz
5149.920	64.1	V	74.0	-9.9	PK	256	1.6	POS; RB 1 MHz; VB: 3 MHz
5150.000	50.0	H	54.0	-4.0	AVG	334	1.0	Note3; POS; RB 1 MHz; VB: 10 Hz
5150.000	63.8	H	74.0	-10.2	PK	334	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #2: Radiated Bandedge Measurements, 5250-5350MHz

Date of Test: 02/17/15 Test Location: FT Chamber#4

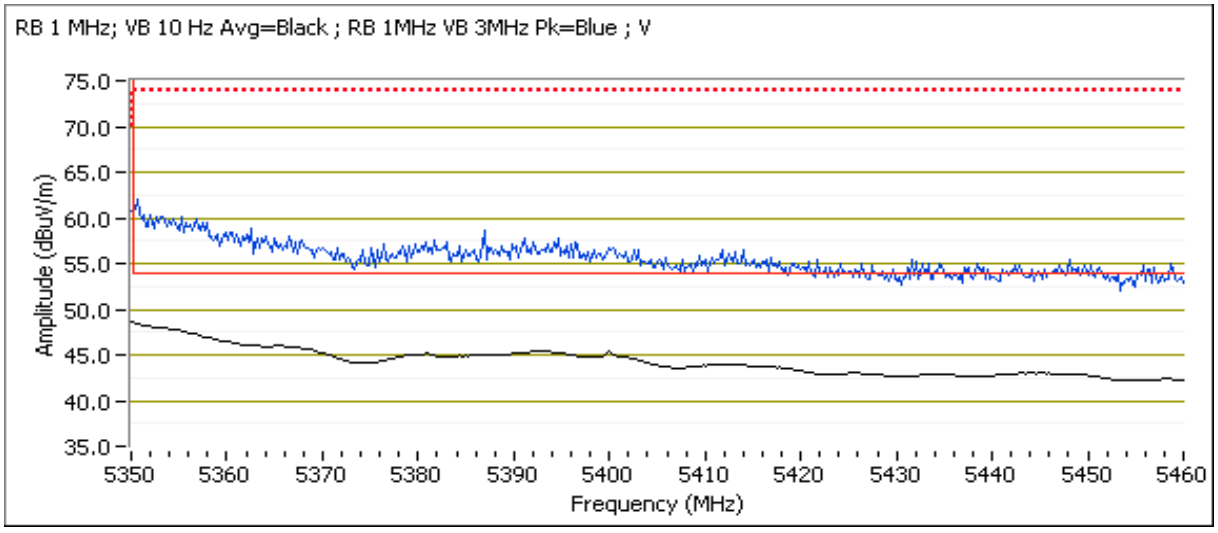
Test Engineer: Jack Liu EUT Voltage: 120V/60Hz

Channel: 64 Mode: 11a Power Setting:

Tx Chain: 2 Data Rate: 9Mb/s

5350 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.000	48.0	V	54.0	-6.0	AVG	359	1.4	POS; RB 1 MHz; VB: 10 Hz
5350.320	60.0	V	74.0	-14.0	PK	359	1.4	POS; RB 1 MHz; VB: 3 MHz
5350.000	44.8	H	54.0	-9.2	AVG	273	1.0	POS; RB 1 MHz; VB: 10 Hz
5351.040	57.4	H	74.0	-16.6	PK	273	1.0	POS; RB 1 MHz; VB: 3 MHz

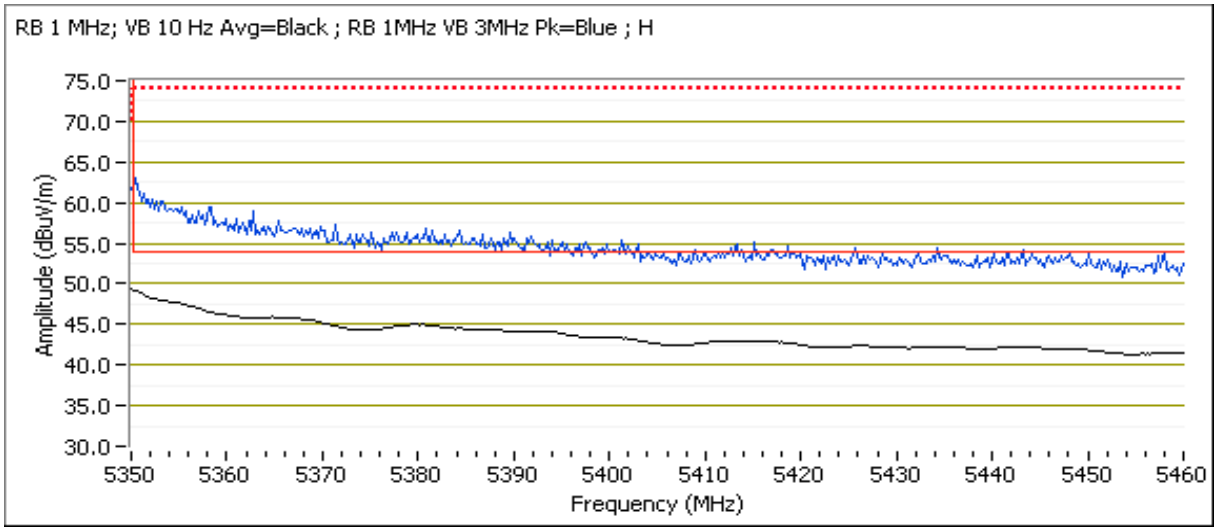


Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Channel: 64 Mode: n20 Power Setting: 20
Tx Chain: 2x2 Data Rate: MCS0

5350 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.000	49.4	H	54.0	-4.6	AVG	332	1.2	Note3; POS; RB 1 MHz; VB: 10 Hz
5350.300	63.3	H	74.0	-10.7	PK	332	1.2	POS; RB 1 MHz; VB: 3 MHz
5350.000	48.5	V	54.0	-5.5	AVG	250	1.4	Note3; POS; RB 1 MHz; VB: 10 Hz
5351.840	61.9	V	74.0	-12.1	PK	250	1.4	POS; RB 1 MHz; VB: 3 MHz



Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

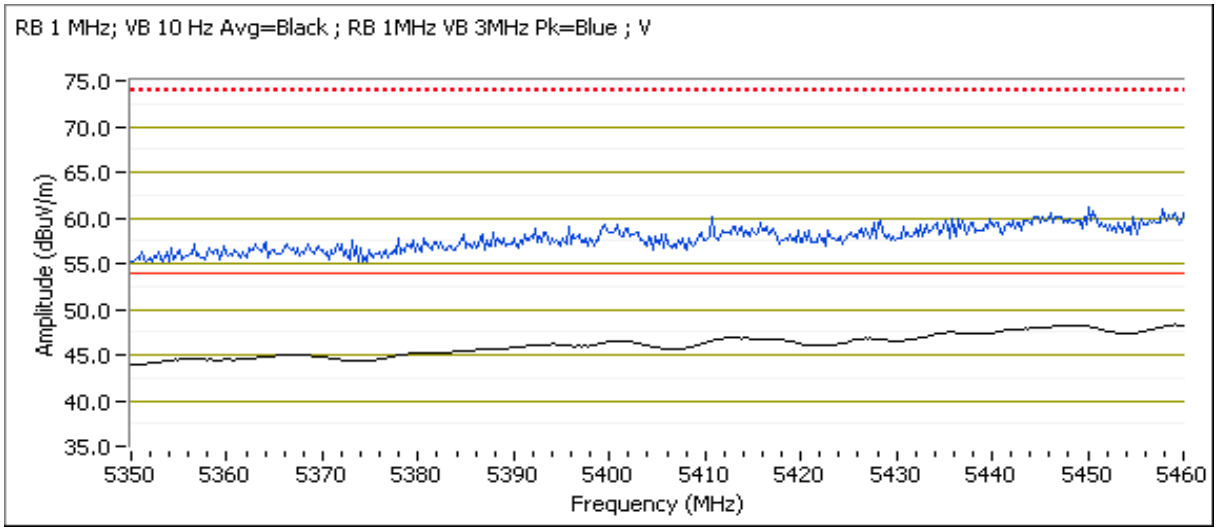
Run #3: Radiated Bandedge Measurements, 5470-5725MHz

Date of Test: 02/17/15 Test Location: FT Chamber#4
Test Engineer: Jack Liu EUT Voltage: 120V/60Hz

Channel: 100 Mode: 11a Power Setting: 20
Tx Chain: 2 Data Rate: 9Mb/s

5460 MHz Band Edge Signal Radiated Field Strength

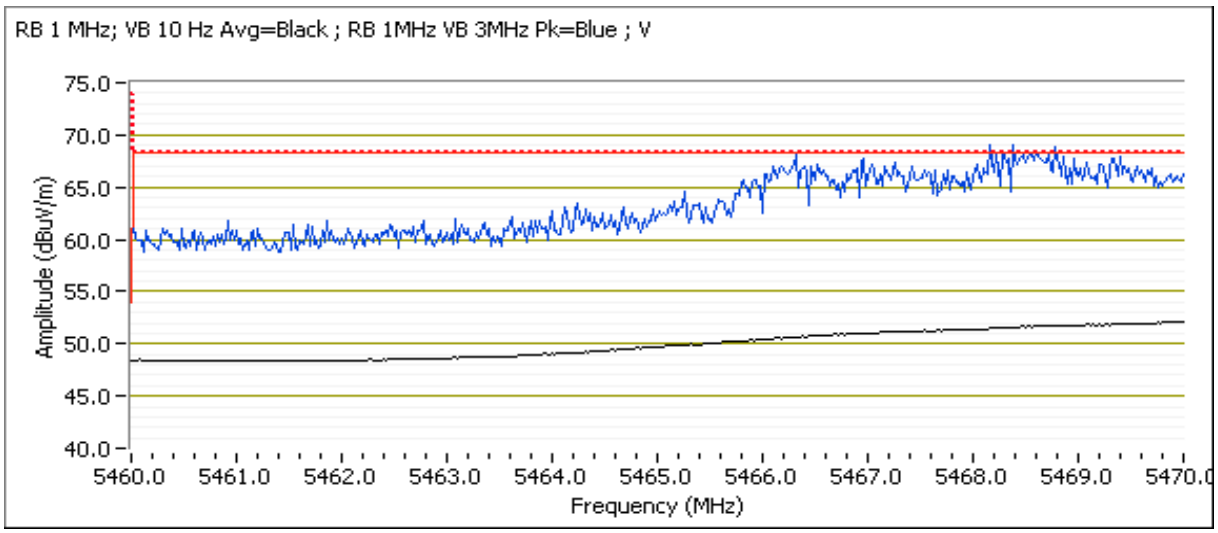
Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5458.900	48.4	V	54.0	-5.6	AVG	6	1.3	POS; RB 1 MHz; VB: 10 Hz
5446.990	61.1	V	74.0	-12.9	PK	6	1.3	POS; RB 1 MHz; VB: 3 MHz
5459.120	43.2	H	54.0	-10.8	AVG	268	1.0	POS; RB 1 MHz; VB: 10 Hz
5437.960	55.5	H	74.0	-18.5	PK	268	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

5470 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5470.000	52.2	V	54.0	-1.8	AVG	2	1.1	Note1;POS; RB 1 MHz; VB: 10 Hz
5468.160	68.4	V	74.0	-5.6	PK	2	1.1	Note1;POS; RB 1 MHz; VB: 3 MHz
5470.000	45.7	H	54.0	-8.3	AVG	30	1.0	Note1;POS; RB 1 MHz; VB: 10 Hz
5469.380	62.1	H	74.0	-11.9	PK	30	1.0	Note1;POS; RB 1 MHz; VB: 3 MHz



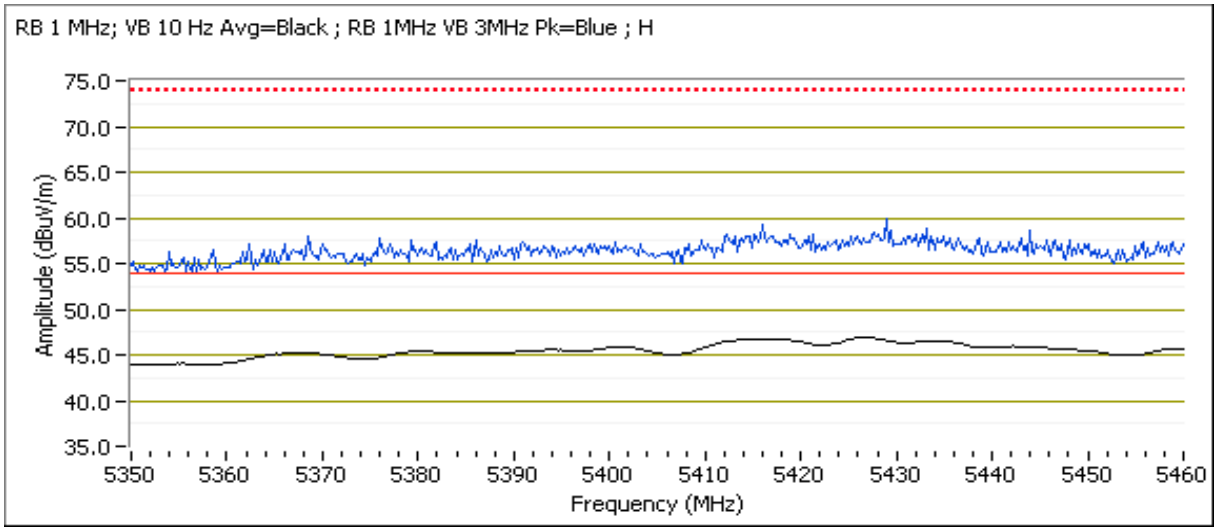
Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Date of Test: 02/17/15 Test Location: FT Chamber#4
Test Engineer: Jack Liu EUT Voltage: 120V/60Hz

Channel: 100 Mode: n20 Power Setting: 20
Tx Chain: 2x2 Data Rate: MCS 0

5460 MHz Band Edge Signal Radiated Field Strength

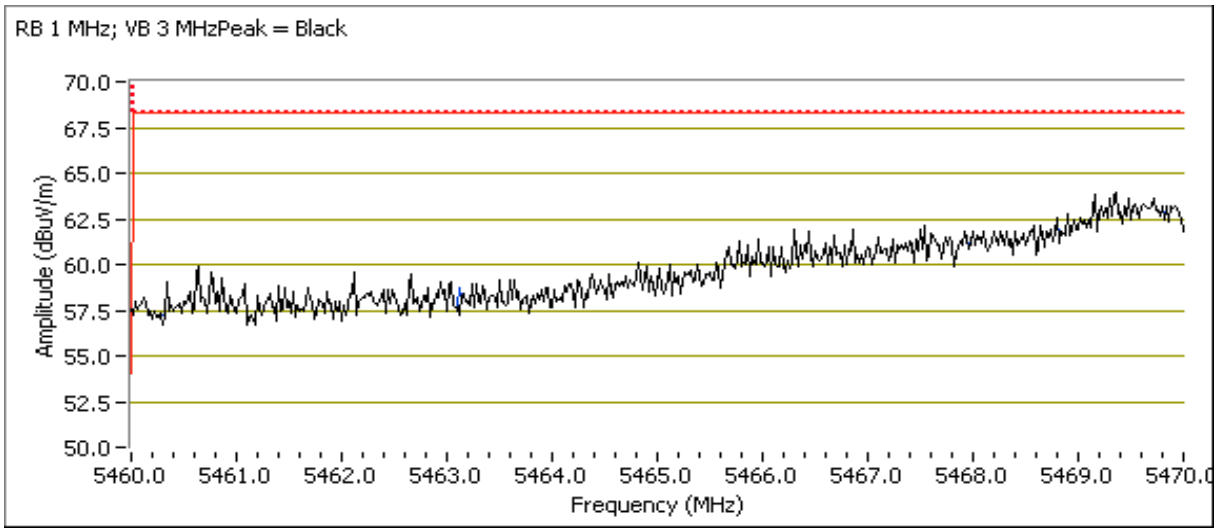
Frequency	Level	Pol	FCC 15.209		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5426.050	47.1	H	54.0	-6.9	AVG	12	1.2	Note3; POS; RB 1 MHz; VB: 10 Hz
5418.120	59.2	H	74.0	-14.8	PK	12	1.2	POS; RB 1 MHz; VB: 3 MHz
5416.570	45.3	V	54.0	-8.7	AVG	307	1.0	Note3; POS; RB 1 MHz; VB: 10 Hz
5411.500	57.3	V	74.0	-16.7	PK	307	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

5470 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5469.640	63.6	H	68.3	-4.7	PK	12	1.2	POS; RB 1 MHz; VB: 3 MHz
5469.380	62.5	V	68.3	-5.8	PK	308	1.0	POS; RB 1 MHz; VB: 3 MHz



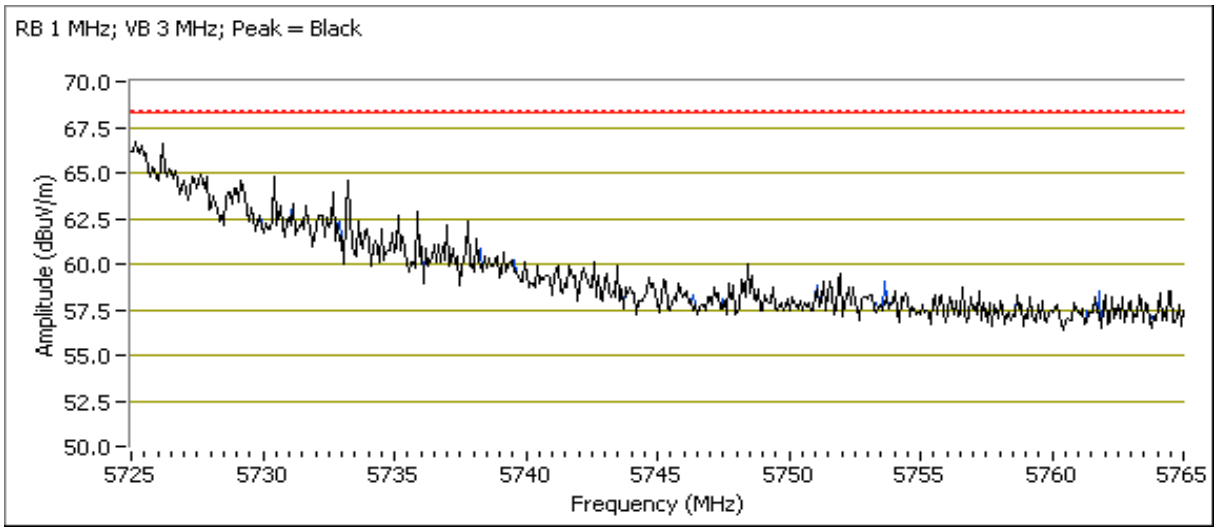
Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Date of Test: 02/17/15 Test Location: Chamber #4
Test Engineer: M. Birgani EUT Voltage: 120V/ 60Hz

Channel: 140 Mode: 11a Power Setting: 20
Tx Chain: 2 Data Rate: 9Mb/s

5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5725.720	67.2	V	68.3	-1.1	PK	26	1.0	POS; RB 1 MHz; VB: 3 MHz
5725.960	58.3	H	68.3	-10.0	PK	262	1.0	POS; RB 1 MHz; VB: 3 MHz



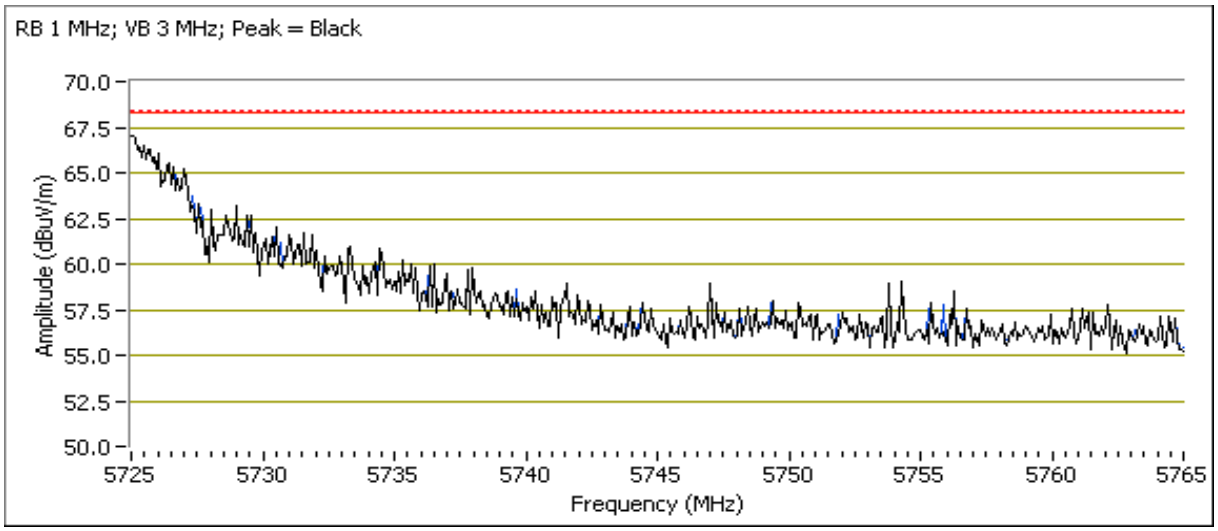
Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Date of Test: 02/17/15 Test Location: Chamber #4
Test Engineer: M. Birgani EUT Voltage: 120V/ 60Hz

Channel: 140 Mode: n20 Power Setting: 20
Tx Chain: 2x2 Data Rate: MCS 1

5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5725.720	67.7	H	68.3	-0.6	PK	25	1.0	POS; RB 1 MHz; VB: 3 MHz
5725.160	62.6	V	68.3	-5.7	PK	310	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #4: Radiated Bandedge Measurements, 5725-5850MHz

Date of Test: 02/17/15 Test Location: Chamber #4

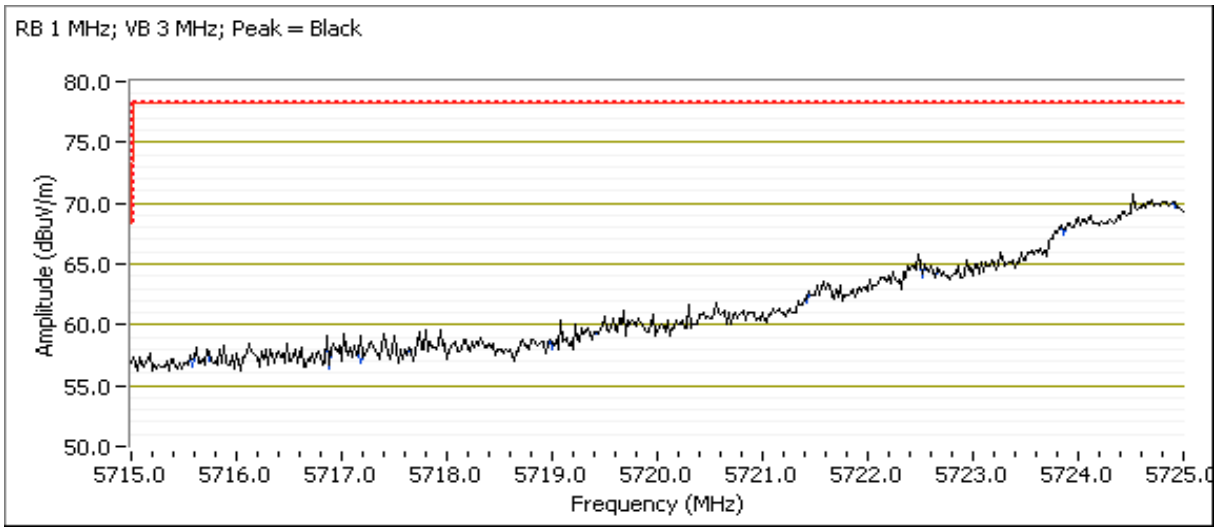
Test Engineer: M. Birgani EUT Voltage: 120V/ 60Hz

Channel: 149 Mode: 11a Power Setting: 20

Tx Chain: 2 Data Rate: 9MB/s

5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5724.720	74.3	H	78.3	-4.0	PK	268	1.0	POS; RB 1 MHz; VB: 3 MHz
5724.920	70.8	V	78.3	-7.5	PK	268	1.0	POS; RB 1 MHz; VB: 3 MHz

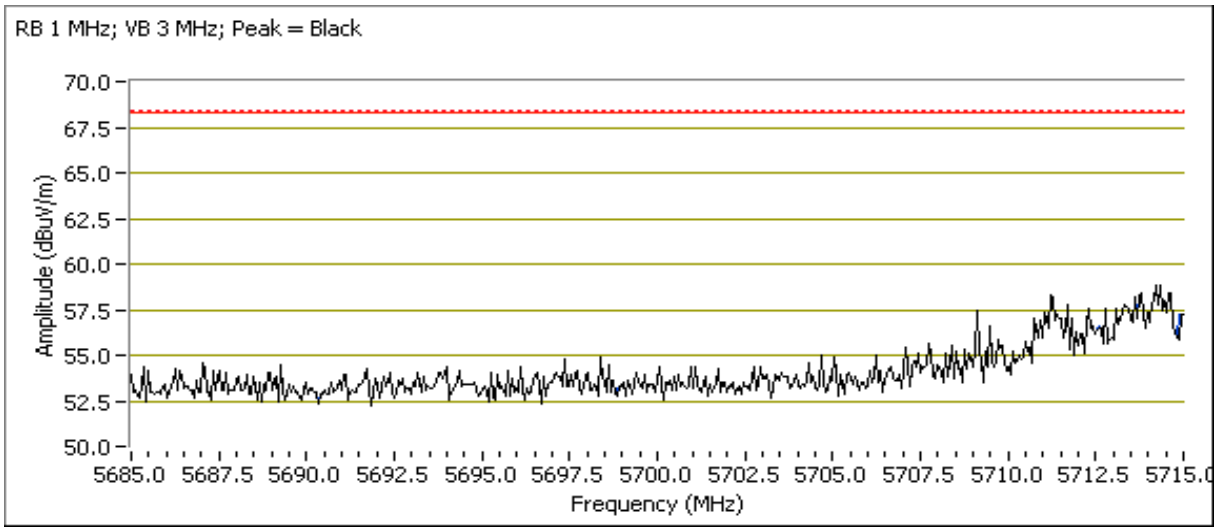


Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Power Setting: 20

5715 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5711.270	64.4	V	68.3	-3.9	PK	268	1.0	POS; RB 1 MHz; VB: 3 MHz
5712.960	58.8	H	68.3	-9.5	PK	268	1.0	POS; RB 1 MHz; VB: 3 MHz



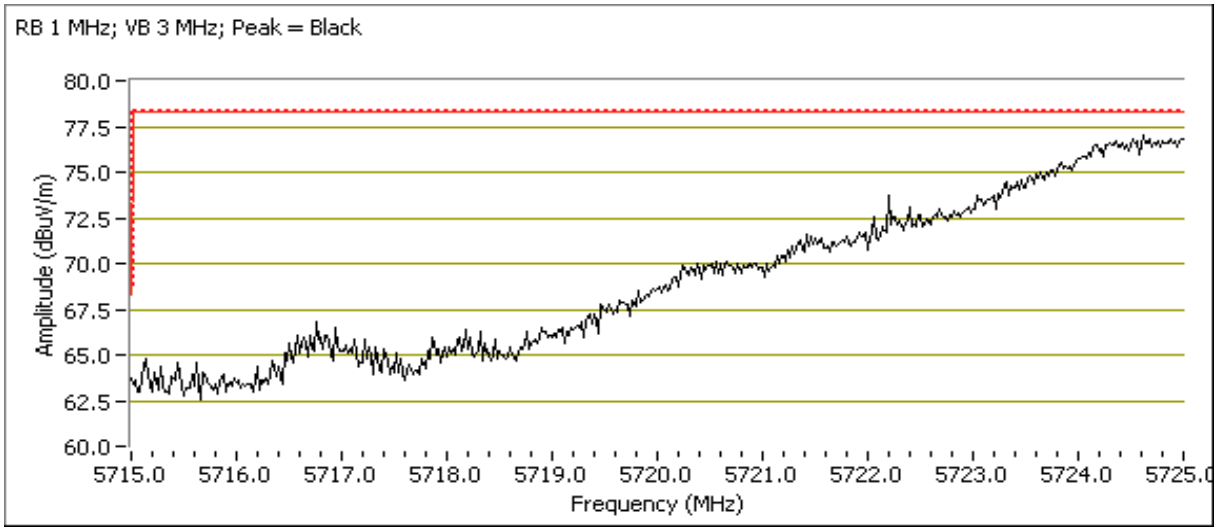
Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Date of Test: 02/17/15 Test Location: Chamber #4
Test Engineer: M. Birgani EUT Voltage: 120V/ 60Hz

Channel: 149 Mode: n20 Power Setting: 20
Tx Chain: 2x2 Data Rate: MCS 1

5725 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5724.400	77.1	H	78.3	-1.2	PK	23	1.0	POS; RB 1 MHz; VB: 3 MHz
5724.480	76.1	V	78.3	-2.2	PK	21	1.0	POS; RB 1 MHz; VB: 3 MHz

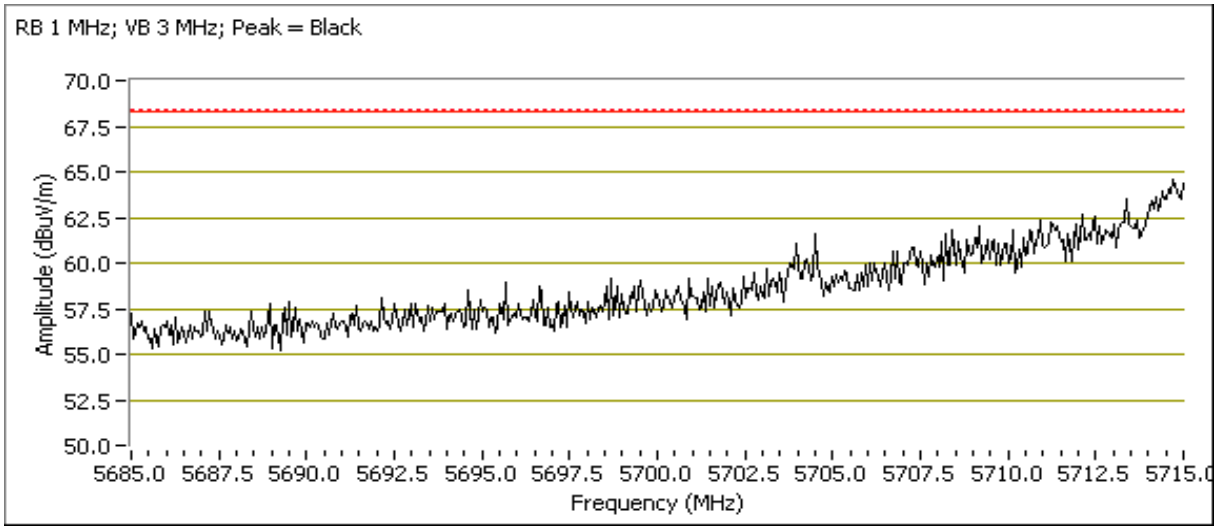


Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Power Setting: 20

5715 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5714.760	64.4	H	68.3	-3.9	PK	23	1.0	POS; RB 1 MHz; VB: 3 MHz
5710.430	64.4	V	68.3	-3.9	PK	21	1.0	POS; RB 1 MHz; VB: 3 MHz



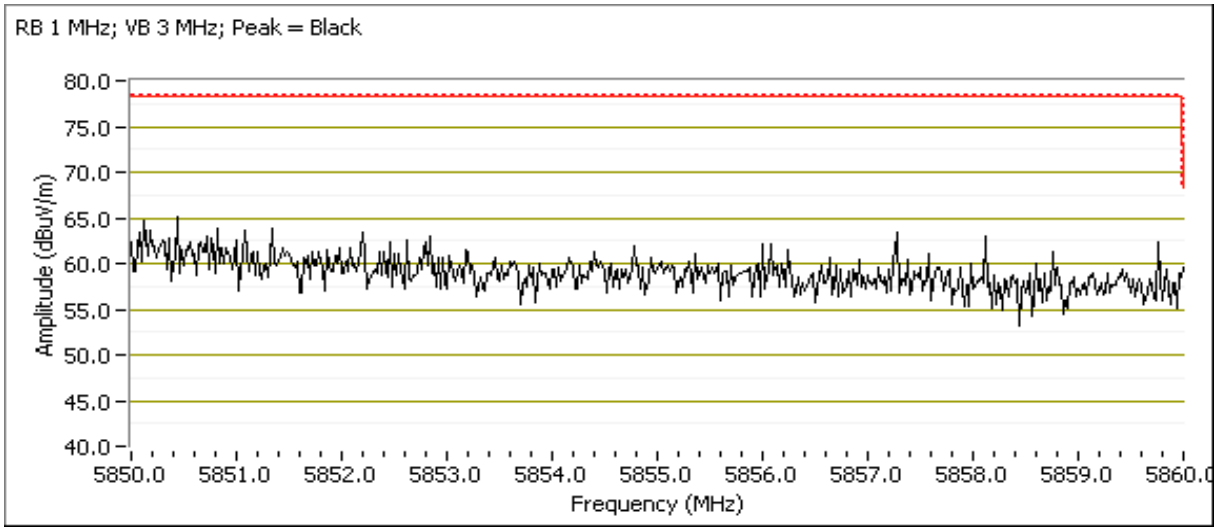
Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Date of Test: 02/17/15 Test Location: Chamber #4
Test Engineer: R. Varelas EUT Voltage: 120V/ 60Hz

Channel: 165 Mode: 11a Power Setting: 20
Tx Chain: 2 Data Rate: 9MB/s

5850 MHz Band Edge Signal Radiated Field Strength

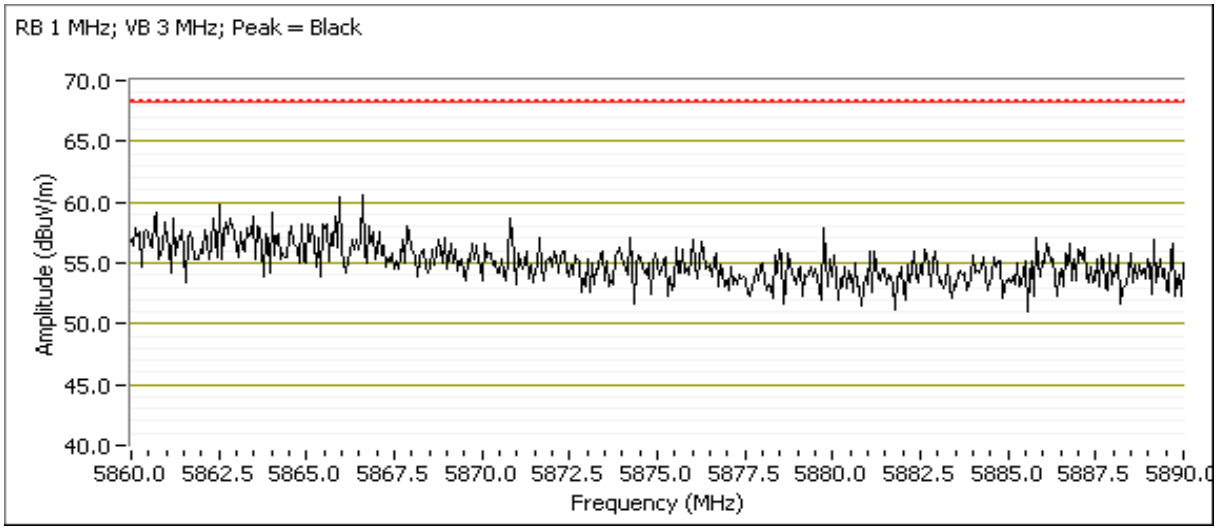
Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5851.100	66.8	V	78.3	-11.5	PK	10	1.0	POS; RB 1 MHz; VB: 3 MHz
5850.260	64.9	H	78.3	-13.4	PK	360	1.0	POS; RB 1 MHz; VB: 3 MHz



Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

5860 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5860.900	62.2	V	68.3	-6.1	PK	29	1.1	POS; RB 1 MHz; VB: 3 MHz
5884.350	54.7	H	68.3	-13.6	PK	360	1.0	POS; RB 1 MHz; VB: 3 MHz



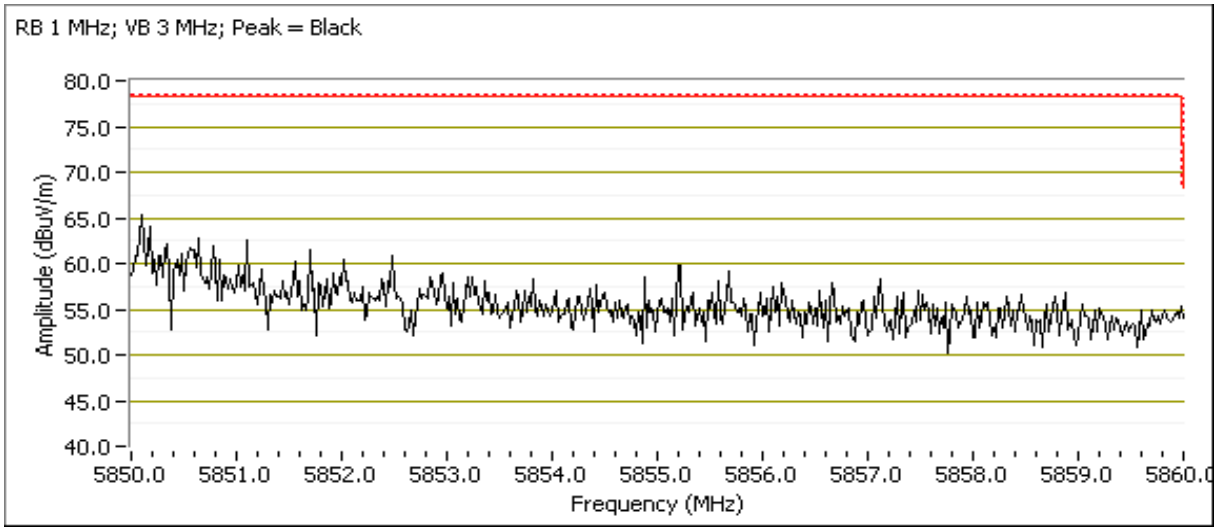
Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Date of Test: 02/17/15 Test Location: Chamber #4
Test Engineer: R. Varelas EUT Voltage: 120V/ 60Hz

Channel: 165 Mode: n20 Power Setting: 20
Tx Chain: 2x2 Data Rate: MCS 0

5850 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5850.100	66.8	H	78.3	-11.5	PK	26	1.0	POS; RB 1 MHz; VB: 3 MHz
5850.080	63.4	V	78.3	-14.9	PK	268	1.2	POS; RB 1 MHz; VB: 3 MHz

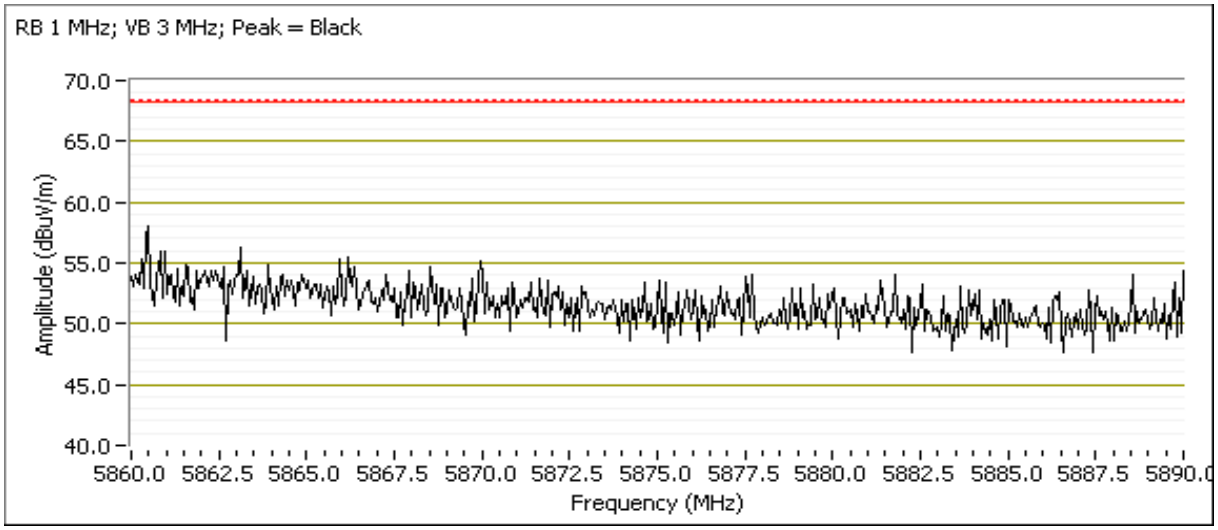


Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Power Setting:

5860 MHz Band Edge Signal Radiated Field Strength

Frequency	Level	Pol	15.E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	V/H	Limit	Margin	Pk/QP/Avg	degrees	meters	
5860.780	58.6	H	68.3	-9.7	PK	26	1.0	POS; RB 1 MHz; VB: 3 MHz
5860.840	55.7	V	68.3	-12.6	PK	268	1.2	POS; RB 1 MHz; VB: 3 MHz



Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

RSS 210 and FCC 15.407 (UNII) 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: 22-25 °C
Rel. Humidity: 35-38 %

Summary of Results

Run #	Mode	Channel	Target Power	Passing Power Setting	Test Performed	Limit	Result / Margin
Scans on "center" channel in all OFDM modes to determine the worst case mode.							
1 UNII-1	a (chain 1)	40 - 5200MHz	20	20	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	50.6 dBµV/m @ 1150.0 MHz (-3.4 dB)
	a (chain 2)	40 - 5200MHz	20	20	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	51.8 dBµV/m @ 1150.0 MHz (-2.2 dB)
	n20 (2x2)	40 - 5200MHz	20	20	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	51.6 dBµV/m @ 1150.0 MHz (-2.4 dB)
Measurements on low and high channels in worst-case OFDM mode.							
2 UNII-1	a (chain 2)	36 - 5180MHz	20	20	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	51.4 dBµV/m @ 1150.0 MHz (-2.6 dB)
	a (chain 2)	48 - 5240MHz	20	20	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	45.2 dBµV/m @ 4920.0 MHz (-8.8 dB)
Scans on "center" channel in all OFDM modes to determine the worst case mode.							
3 UNII-2A	a (chain 2)	60 - 5300MHz	20	20	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	50.9 dBµV/m @ 1150.0 MHz (-3.1 dB)
	n20	60 - 5300MHz	20	20	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	46.5 dBµV/m @ 4960.0 MHz (-7.5 dB)

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #	Mode	Channel	Target Power	Passing Power Setting	Test Performed	Limit	Result / Margin
Measurements on low and high channels in worst-case OFDM mode.							
4 UNII-2A	a (chain 2)	52 - 5260MHz	20	20	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	51.1 dBµV/m @ 1150.0 MHz (-2.9 dB)
	a (chain 2)	64 - 5320MHz	20	20	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	51.1 dBµV/m @ 1150.0 MHz (-2.9 dB)
Scans on "center" channel in all OFDM modes to determine the worst case mode.							
5 UNII-2C	a (chain 2)	116 - 5580MHz	20	20	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	50.9 dBµV/m @ 1150.0 MHz (-3.1 dB)
	n20	116 - 5580MHz	20	20	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	51.7 dBµV/m @ 5371.0 MHz (-2.3 dB)
Measurements on low and high channels in worst-case OFDM mode.							
6 UNII-2C	n20	100 - 5500MHz	20	20	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	50.2 dBµV/m @ 1150.0 MHz (-3.8 dB)
	n20	140- 5700MHz	20	20	Radiated Emissions, 1 - 40 GHz	FCC 15.209 / 15 E	52.7 dBµV/m @ 5350.4 MHz (-1.3 dB)
Scans on "center" channel in all OFDM modes to determine the worst case mode.							
7 UNII-3	a (chain 2)	157 - 5785MHz	20	20	Radiated Emissions 1 - 40 GHz	FCC 15.209 / 15 E	50.6 dBµV/m @ 1150.0 MHz (-3.4 dB)
	n20	157 - 5785MHz	20	20	Radiated Emissions 1 - 40 GHz	FCC 15.209 / 15 E	50.5 dBµV/m @ 1150.0 MHz (-3.5 dB)
Measurements on low and high channels in worst-case OFDM mode.							
8 UNII-3	n20	149 - 5745MHz	20	20	Radiated Emissions 1 - 40 GHz	FCC 15.209 / 15 E	51.0 dBµV/m @ 1150.0 MHz (-3.0 dB)
	n20	165 - 5825MHz	20	20	Radiated Emissions 1 - 40 GHz	FCC 15.209 / 15 E	50.8 dBµV/m @ 1150.0 MHz (-3.2 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.

Procedure Comments:

Measurements performed in accordance with FCC KDB 789033
Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time
Unless otherwise stated/noted, emission has duty cycle ≥ 98% and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	9Mb/s	0.99	Yes	-	0	0	-
n20	MCS1	0.978	Yes	-	0.10	0.19	-

Sample Notes

Sample S/N: L044A505250029
Driver: 5.99 RC188.10
Antenna: Airgain N2420DS / N2415D2

Measurement Specific Notes:

Note 1:	For emissions outside of the restricted bands the limit is -27dBm/MHz eirp (68.3dBuV/m) or -17dBm/MHz eirp (78.3dBuV/m) . The measurement method required is a peak measurement (RB=1MHz, VB≥3MHz, peak detector). Per KDB 789033 G 2) c) i) , compliance can be demonstrated by meeing the average and peak limits of 15.209, as an alternative.
Note 2:	For emissions in restricted bands, the limit of 15.209 was used which requires average and peak measurements.
Note 3:	Emission has duty cycle ≥ 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces
Note 4:	Emission has duty cycle < 98%, but constant, average measurement performed: RBW=1MHz, VBW=10Hz, peak detector, linear averaging, auto sweep, trace average 100 * 1/DC traces, measurement corrected by Linear Voltage correction factor
Note 7:	Plots of the average and peak bandedge do not account for any duty cycle correction. Refer to the tabluar results for final measurements.

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #1, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5150-5250 MHz Band

Date of Test: 2/19/15, 2/20/15 Config. Used: 2

Test Engineer: Jack Liu / Rafael Varelas Config Change: -

Test Location: FT Chamber# 4 EUT Voltage: 120V/60Hz

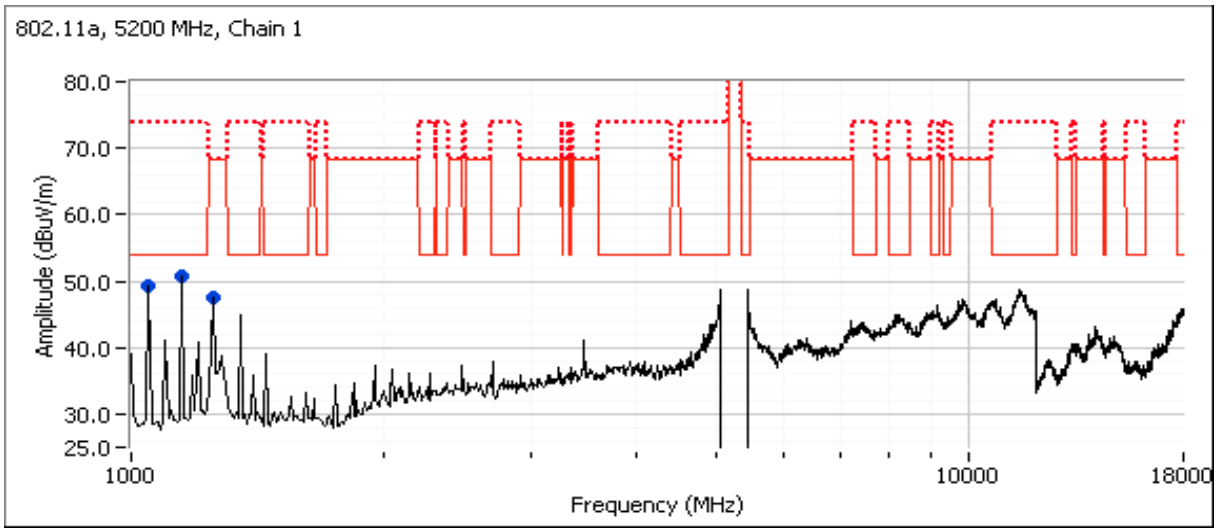
Run #1a: Center Channel

Channel: 40 Mode: a Power Setting: 20

Tx Chain: chain 1 Data Rate: 9Mb/s

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1150.030	50.6	V	54.0	-3.4	AVG	258	1.0	RB 1 MHz;VB 10 Hz;Peak
1150.080	52.1	V	74.0	-21.9	PK	258	1.0	RB 1 MHz;VB 3 MHz;Peak
1049.990	48.9	V	54.0	-5.1	AVG	62	1.3	RB 1 MHz;VB 10 Hz;Peak
1049.970	50.8	V	74.0	-23.2	PK	62	1.3	RB 1 MHz;VB 3 MHz;Peak
1250.000	47.9	V	68.3	-20.4	AVG	245	1.0	RB 1 MHz;VB 10 Hz;Peak
1250.070	50.3	V	68.3	-18.0	PK	245	1.0	RB 1 MHz;VB 3 MHz;Peak

Note:	*Scans made between 18 - 40 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*



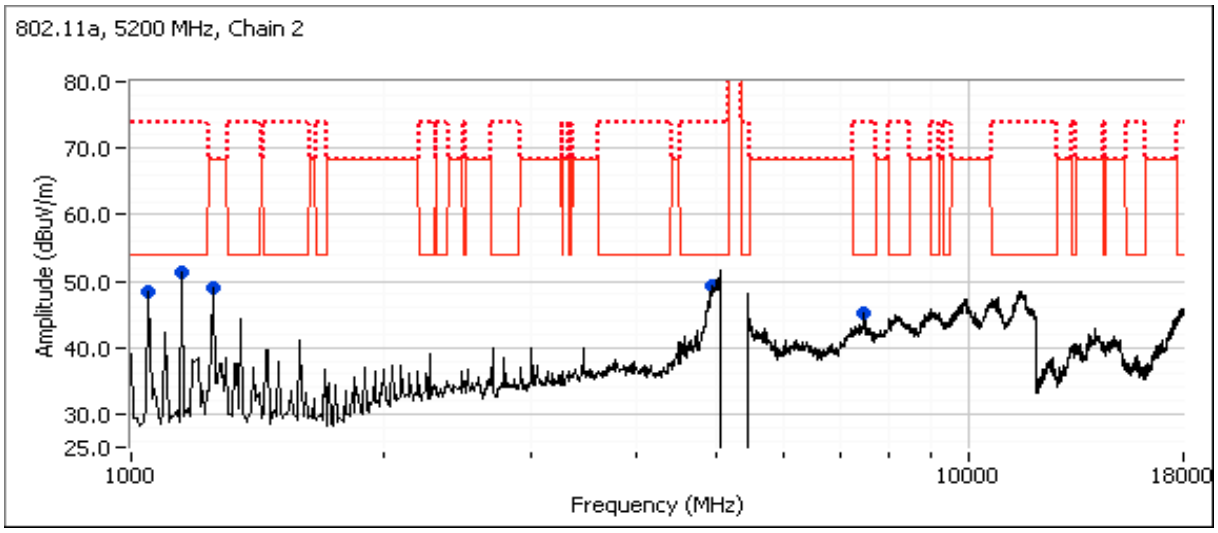
Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #1b: Center Channel

Channel: 40 Mode: a Power Setting: 20
Tx Chain: chain 2 Data Rate: 9Mb/s

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1149.990	51.8	V	54.0	-2.2	AVG	74	1.1	RB 1 MHz;VB 10 Hz;Peak
1150.110	53.1	V	74.0	-20.9	PK	74	1.1	RB 1 MHz;VB 3 MHz;Peak
1050.010	48.8	V	54.0	-5.2	AVG	63	1.2	RB 1 MHz;VB 10 Hz;Peak
1050.010	50.5	V	74.0	-23.5	PK	63	1.2	RB 1 MHz;VB 3 MHz;Peak
4960.250	48.2	V	54.0	-5.8	AVG	330	1.5	RB 1 MHz;VB 10 Hz;Peak
4943.450	59.3	V	74.0	-14.7	PK	330	1.5	RB 1 MHz;VB 3 MHz;Peak
1249.990	49.1	V	68.3	-19.2	AVG	247	1.0	RB 1 MHz;VB 10 Hz;Peak
1250.030	50.8	V	68.3	-17.5	PK	247	1.0	RB 1 MHz;VB 3 MHz;Peak
7500.220	41.6	V	54.0	-12.4	AVG	127	1.1	RB 1 MHz;VB 10 Hz;Peak
7503.150	52.7	V	74.0	-21.3	PK	127	1.1	RB 1 MHz;VB 3 MHz;Peak

Note: *Scans made between 18 - 40 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*



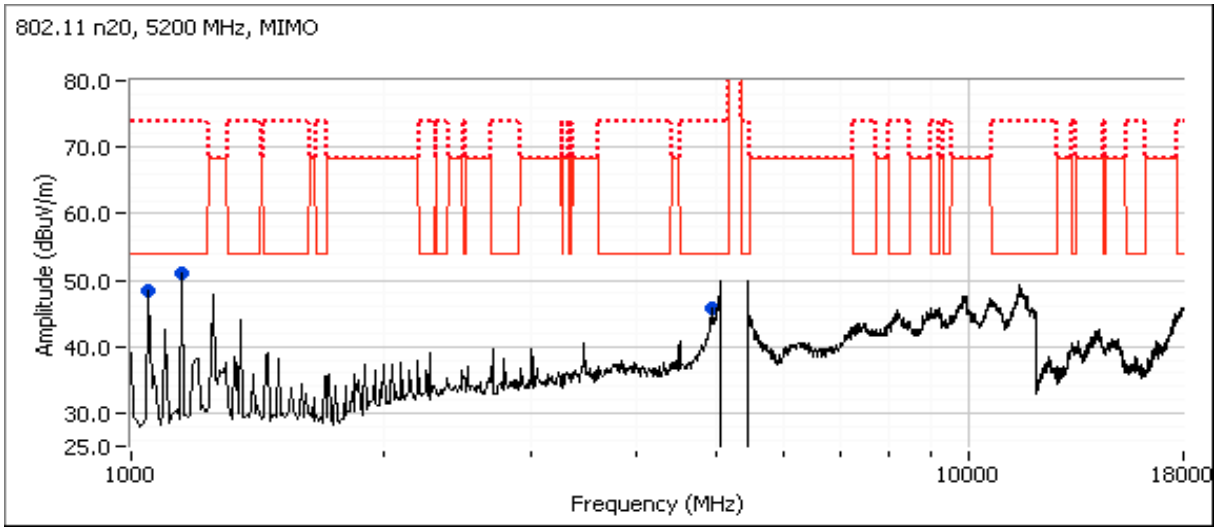
Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #1c: Center Channel

Channel: 40 Mode: n20 Power Setting: 20
Tx Chain: 2x2 Data Rate: MCS1

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1150.030	51.6	V	54.0	-2.4	AVG	73	1.1	RB 1 MHz;VB 10 Hz;Peak
1150.070	53.2	V	74.0	-20.8	PK	73	1.1	RB 1 MHz;VB 3 MHz;Peak
5001.220	42.6	V	54.0	-11.4	AVG	258	1.6	RB 1 MHz;VB 10 Hz;Peak, Note 4
5000.350	55.4	V	74.0	-18.6	PK	258	1.6	RB 1 MHz;VB 3 MHz;Peak
1050.000	48.7	V	54.0	-5.3	AVG	62	1.3	RB 1 MHz;VB 10 Hz;Peak
1050.010	50.6	V	74.0	-23.4	PK	62	1.3	RB 1 MHz;VB 3 MHz;Peak

Note:	*Scans made between 18 - 40 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:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #2: Radiated Spurious Emissions, 1,000 - 40000 MHz. Operating Mode: Worse case from Run #1

Date of Test: 2/19/15, 2/20/15 Config. Used: 2

Test Engineer: Jack Liu / Rafael Varelas Config Change: -

Test Location: FT Chamber# 4 EUT Voltage: 120V/60Hz

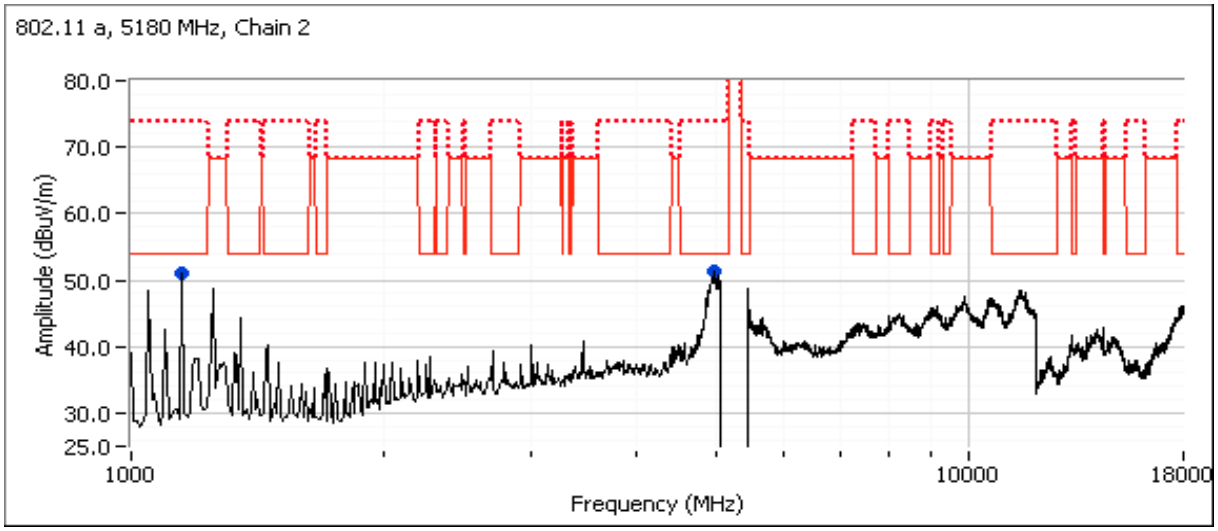
Run #2a: Low Channel

Channel: 36 Mode: a Power Setting: 20

Tx Chain: chain 2 Data Rate: 9Mb/s

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1150.030	51.4	V	54.0	-2.6	AVG	74	1.1	RB 1 MHz;VB 10 Hz;Peak
1150.020	52.7	V	74.0	-21.3	PK	74	1.1	RB 1 MHz;VB 3 MHz;Peak
4960.000	45.5	V	54.0	-8.5	AVG	31	1.5	RB 1 MHz;VB 10 Hz;Peak
4944.170	57.4	V	74.0	-16.6	PK	31	1.5	RB 1 MHz;VB 3 MHz;Peak

Note: *Scans made between 18 - 40 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*



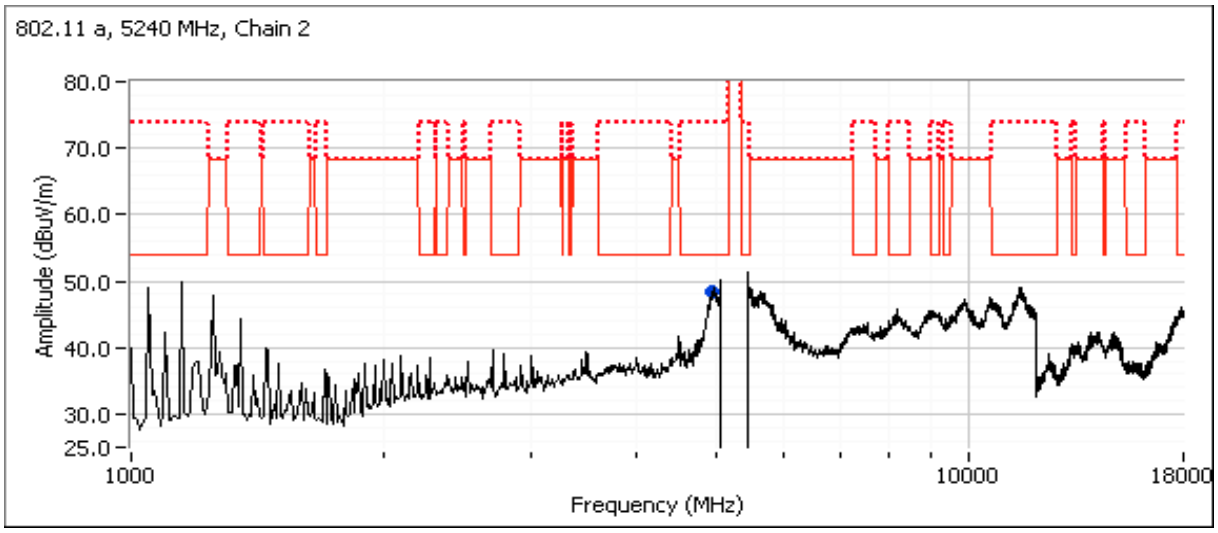
Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #2b: High Channel

Channel: 48 Mode: a Power Setting: 20
Tx Chain: chain 2 Data Rate: 9Mb/s

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4920.030	45.2	V	54.0	-8.8	AVG	340	1.3	RB 1 MHz;VB 10 Hz;Peak
4924.470	57.4	V	74.0	-16.6	PK	340	1.3	RB 1 MHz;VB 3 MHz;Peak

Note: *Scans made between 18 - 40 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:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #3, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5250-5350 MHz Band

Date of Test: 2/19/15, 2/20/15 Config. Used: 2

Test Engineer: Jack Liu / Rafael Varelas Config Change: -

Test Location: FT Chamber# 4 EUT Voltage: 120V/60Hz

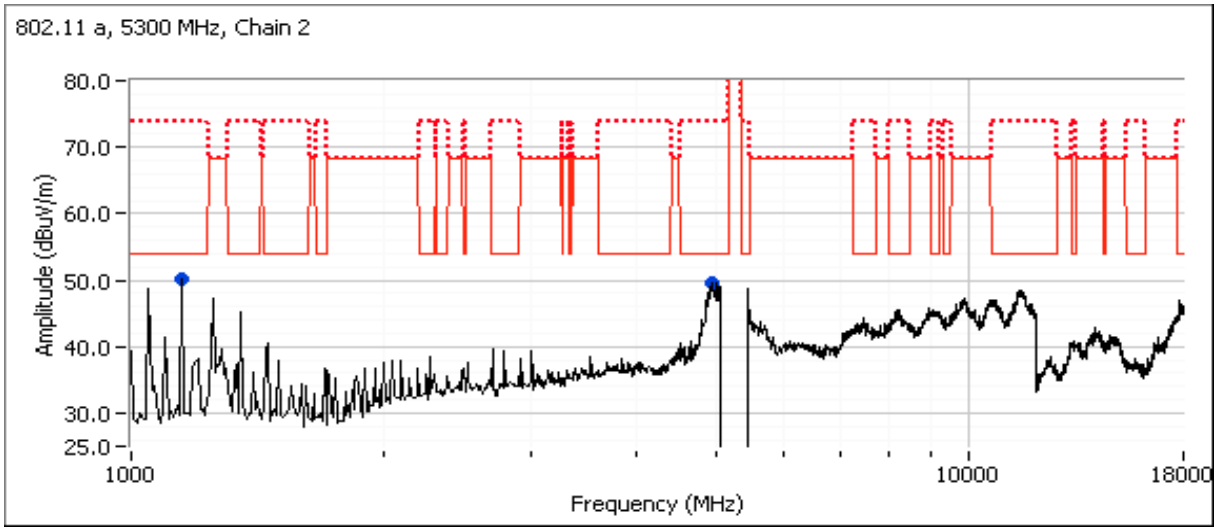
Run #3a: Center Channel

Channel: 60 Mode: a Power Setting: 20

Tx Chain: chain 2 Data Rate: 9Mb/s

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1150.020	50.9	V	54.0	-3.1	AVG	255	1.0	RB 1 MHz;VB 10 Hz;Peak
1149.860	53.2	V	74.0	-20.8	PK	255	1.0	RB 1 MHz;VB 3 MHz;Peak
4919.970	44.1	V	54.0	-9.9	AVG	32	1.3	RB 1 MHz;VB 10 Hz;Peak
4906.900	56.7	V	74.0	-17.3	PK	32	1.3	RB 1 MHz;VB 3 MHz;Peak

Note:	*Scans made between 18 - 40 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*



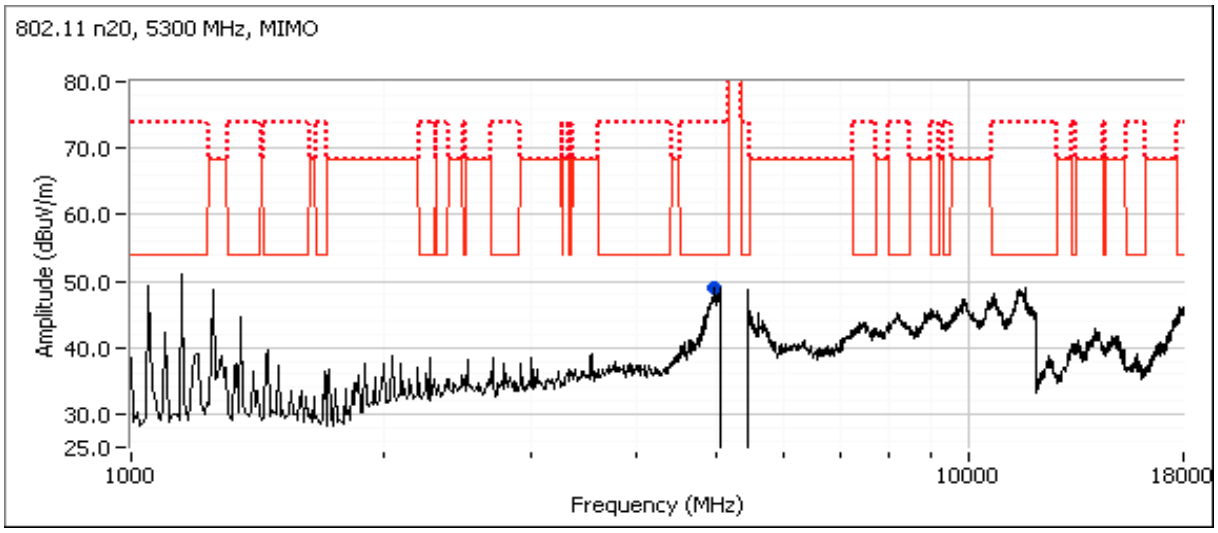
Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #3b: Center Channel

Channel: 60 Mode: 11n20 Power Setting: 20
Tx Chain: 2x2 Data Rate: MCS1

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
4959.980	46.5	V	54.0	-7.5	AVG	226	1.6	RB 1 MHz;VB 10 Hz;Peak, Note 4
4964.940	57.6	V	74.0	-16.4	PK	226	1.6	RB 1 MHz;VB 3 MHz;Peak

Note:	*Scans made between 18 - 40 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:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #4: Radiated Spurious Emissions, 1,000 - 40000 MHz. Operating Mode: Worse case from Run #3

Date of Test: 2/19/15, 2/20/15 Config. Used: 2

Test Engineer: Rafael Varelas / Jack Liu Config Change: -

Test Location: FT Chamber# 4 EUT Voltage: 120V/60Hz

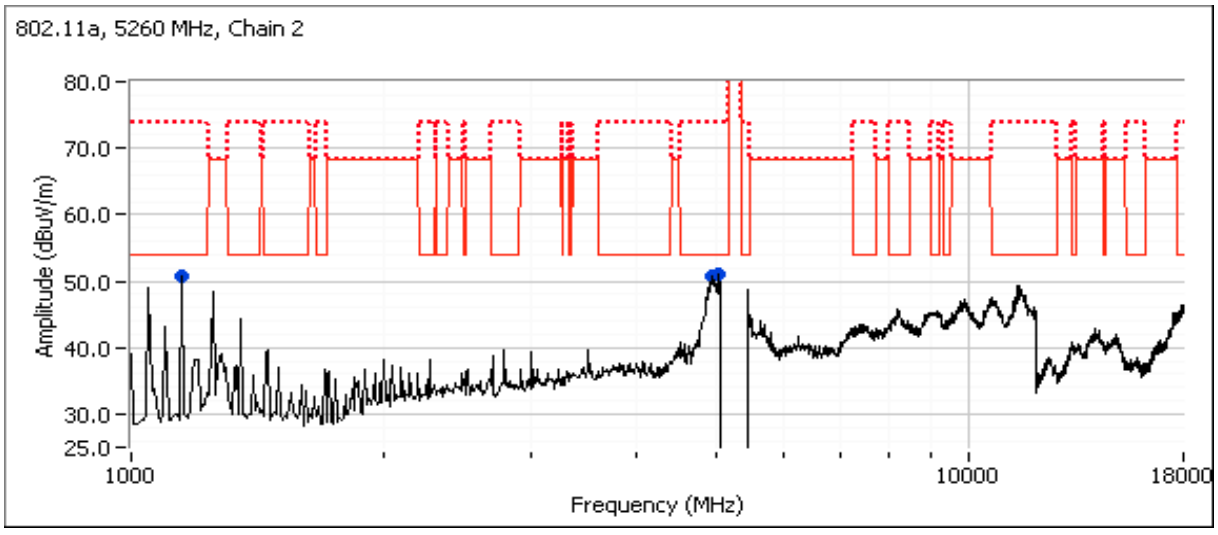
Run #4a: Low Channel

Channel: 52 Mode: a Power Setting: 20

Tx Chain: Chain 2 Data Rate: 9Mb/s

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1149.990	51.1	V	54.0	-2.9	AVG	255	1.0	RB 1 MHz;VB 10 Hz;Peak
1150.010	52.3	V	74.0	-21.7	PK	255	1.0	RB 1 MHz;VB 3 MHz;Peak
4919.980	45.8	V	54.0	-8.2	AVG	355	1.0	RB 1 MHz;VB 10 Hz;Peak
4915.910	57.3	V	74.0	-16.7	PK	355	1.0	RB 1 MHz;VB 3 MHz;Peak
4999.940	45.8	V	54.0	-8.2	AVG	349	1.1	RB 1 MHz;VB 10 Hz;Peak
4999.690	57.1	V	74.0	-16.9	PK	349	1.1	RB 1 MHz;VB 3 MHz;Peak

Note: *Scans made between 18 - 40 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*



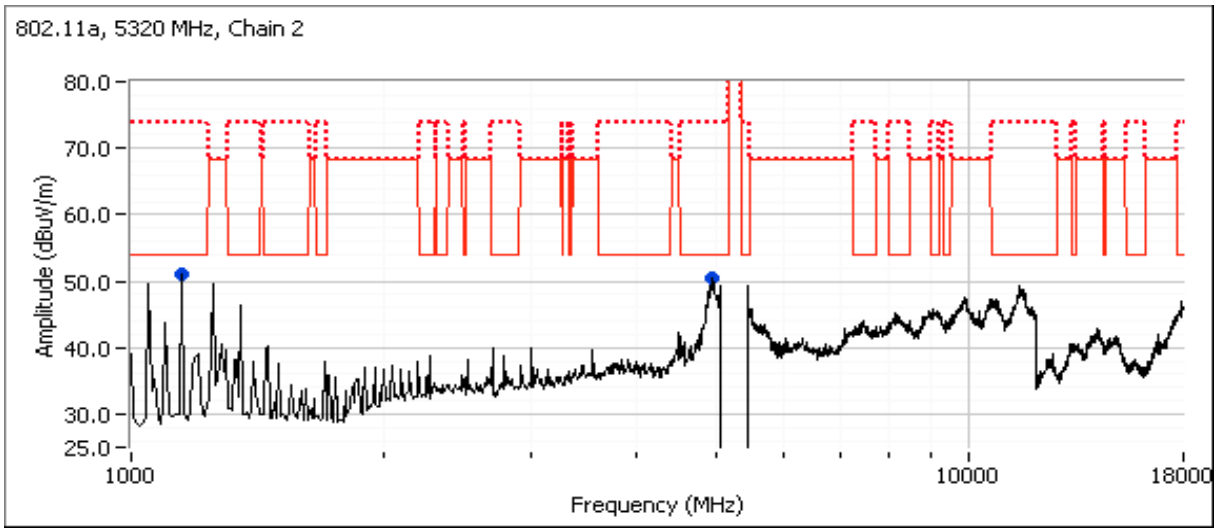
Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #4b: High Channel

Channel: 64 Mode: a Power Setting: 20
Tx Chain: Chain 2 Data Rate: 9Mb/s

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1150.010	51.1	V	54.0	-2.9	AVG	254	1.0	RB 1 MHz;VB 10 Hz;Peak
1149.890	52.4	V	74.0	-21.6	PK	254	1.0	RB 1 MHz;VB 3 MHz;Peak
4921.410	45.3	V	54.0	-8.7	AVG	336	1.1	RB 1 MHz;VB 10 Hz;Peak
4921.630	56.9	V	74.0	-17.1	PK	336	1.1	RB 1 MHz;VB 3 MHz;Peak

Note:	*Scans made between 18 - 40 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:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #5, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5470-5725 MHz Band

Date of Test: 2/19/15, 2/20/15 Config. Used: 2

Test Engineer: Rafael Varelas / Jack Liu Config Change: -

Test Location: FT Chamber# 4 EUT Voltage: 120V/60Hz

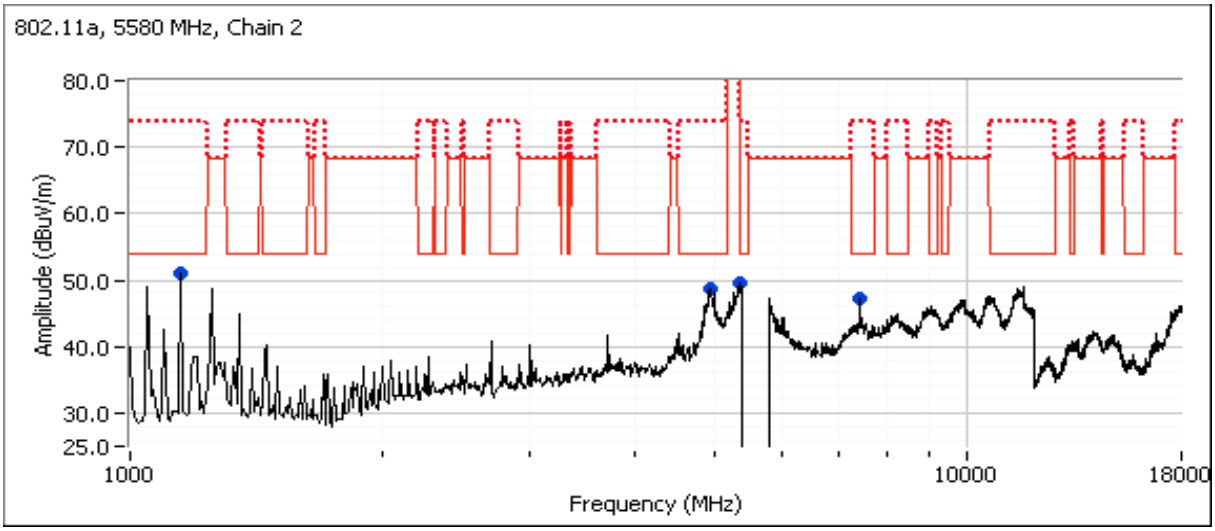
Run #5a: Center Channel

Channel: 116 Mode: a Power Setting: 20

Tx Chain: Chain 2 Data Rate: 9Mb/s

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1150.000	50.9	V	54.0	-3.1	AVG	254	1.0	RB 1 MHz;VB 10 Hz;Peak
1150.020	52.3	V	74.0	-21.7	PK	254	1.0	RB 1 MHz;VB 3 MHz;Peak
5371.640	47.9	V	54.0	-6.1	AVG	7	1.4	RB 1 MHz;VB 10 Hz;Peak
5367.720	59.5	V	74.0	-14.5	PK	7	1.4	RB 1 MHz;VB 3 MHz;Peak
7439.970	46.5	V	54.0	-7.5	AVG	178	1.8	RB 1 MHz;VB 10 Hz;Peak
7440.120	53.6	V	74.0	-20.4	PK	178	1.8	RB 1 MHz;VB 3 MHz;Peak
4919.620	43.8	V	54.0	-10.2	AVG	341	1.4	RB 1 MHz;VB 10 Hz;Peak
4917.220	55.1	V	74.0	-18.9	PK	341	1.4	RB 1 MHz;VB 3 MHz;Peak

Note: *Scans made between 18 - 40 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*



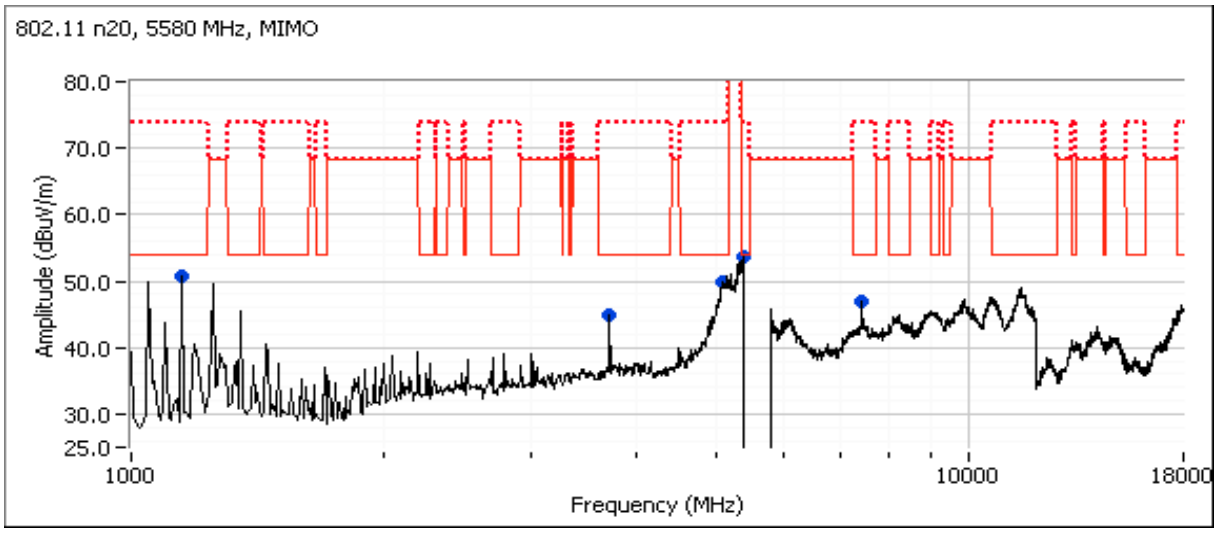
Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #5b: Center Channel

Channel: 116 Mode: 11n20 Power Setting: 20
Tx Chain: 2x2 Data Rate: MCS1

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5371.010	51.7	H	54.0	-2.3	AVG	328	1.2	RB 1 MHz;VB 10 Hz;Peak, Note 4
5370.490	62.8	H	74.0	-11.2	PK	328	1.2	RB 1 MHz;VB 3 MHz;Peak
7440.010	46.3	V	54.0	-7.7	AVG	179	1.9	RB 1 MHz;VB 10 Hz;Peak, Note 4
7440.040	54.5	V	74.0	-19.5	PK	179	1.9	RB 1 MHz;VB 3 MHz;Peak
1150.010	50.5	V	54.0	-3.5	AVG	256	1.0	RB 1 MHz;VB 10 Hz;Peak
1149.960	51.7	V	74.0	-22.3	PK	256	1.0	RB 1 MHz;VB 3 MHz;Peak
5077.290	45.0	V	54.0	-9.0	AVG	245	1.6	RB 1 MHz;VB 10 Hz;Peak, Note 4
5082.890	56.3	V	74.0	-17.7	PK	245	1.6	RB 1 MHz;VB 3 MHz;Peak
3719.980	44.5	V	54.0	-9.5	AVG	273	1.7	RB 1 MHz;VB 10 Hz;Peak
3720.020	48.5	V	74.0	-25.5	PK	273	1.7	RB 1 MHz;VB 3 MHz;Peak

Note: *Scans made between 18 - 40 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:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #6: Radiated Spurious Emissions, 1,000 - 40000 MHz. Operating Mode: Worse case from Run #5

Date of Test: 2/19/15, 2/20/15 Config. Used: 2

Test Engineer: Rafael Varelas / Jack Liu Config Change: -

Test Location: FT Chamber# 4 EUT Voltage: 120V/60Hz

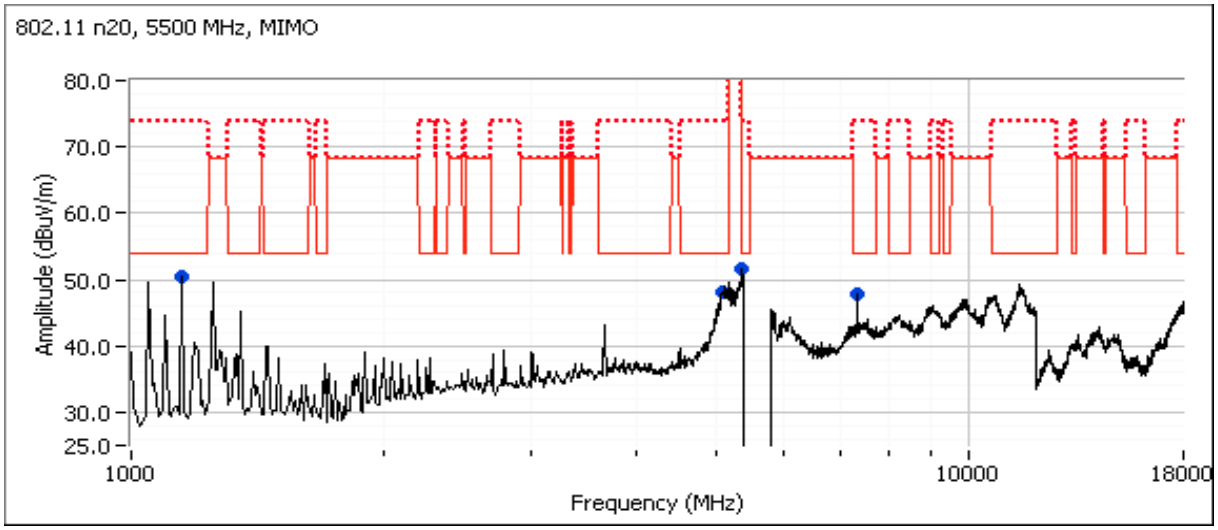
Run #6a: Low Channel

Channel: 100 Mode: 11n20 Power Setting: 20

Tx Chain: 2x2 Data Rate: MCS1

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1150.010	50.2	V	54.0	-3.8	AVG	261	1.0	RB 1 MHz;VB 10 Hz;Peak
1149.880	51.2	V	74.0	-22.8	PK	261	1.0	RB 1 MHz;VB 3 MHz;Peak
7343.320	40.2	V	54.0	-13.8	AVG	173	1.0	RB 1 MHz;VB 10 Hz;Peak, Note 4
7342.070	52.8	V	74.0	-21.2	PK	173	1.0	RB 1 MHz;VB 3 MHz;Peak
5077.250	43.6	V	54.0	-10.4	AVG	255	1.6	RB 1 MHz;VB 10 Hz;Peak, Note 4
5075.960	56.2	V	74.0	-17.8	PK	255	1.6	RB 1 MHz;VB 3 MHz;Peak
5368.670	48.9	H	54.0	-5.1	AVG	328	1.2	RB 1 MHz;VB 10 Hz;Peak, Note 4
5375.270	60.0	H	74.0	-14.0	PK	328	1.2	RB 1 MHz;VB 3 MHz;Peak

Note:	*Scans made between 18 - 40 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*



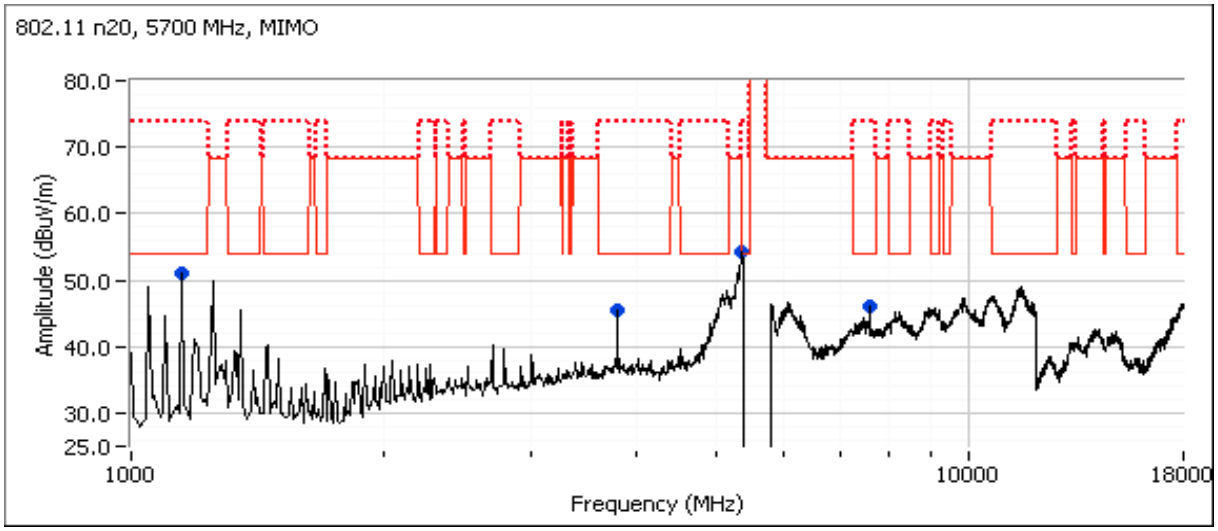
Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #6b: High Channel

Channel: 140 Mode: 11n20 Power Setting: 20
Tx Chain: 2x2 Data Rate: MCS1

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
5350.400	52.7	V	54.0	-1.3	AVG	256	1.3	RB 1 MHz;VB 10 Hz;Peak, Note 4
5351.970	64.8	V	74.0	-9.2	PK	256	1.3	RB 1 MHz;VB 3 MHz;Peak
3800.020	44.6	V	54.0	-9.4	AVG	265	1.9	RB 1 MHz;VB 10 Hz;Peak
3800.100	49.7	V	74.0	-24.3	PK	265	1.9	RB 1 MHz;VB 3 MHz;Peak
1150.000	51.2	V	54.0	-2.8	AVG	72	1.0	RB 1 MHz;VB 10 Hz;Peak
1150.020	52.6	V	74.0	-21.4	PK	72	1.0	RB 1 MHz;VB 3 MHz;Peak
7599.950	45.6	V	54.0	-8.4	AVG	168	2.1	RB 1 MHz;VB 10 Hz;Peak, Note 4
7600.020	54.2	V	74.0	-19.8	PK	168	2.1	RB 1 MHz;VB 3 MHz;Peak

Note: *Scans made between 18 - 40 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:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #7, Radiated Spurious Emissions, 1,000 - 40,000 MHz. Operation in the 5725-5850 MHz Band

Date of Test: 2/19/15, 2/20/15 Config. Used: 2

Test Engineer: Rafael Varelas / Jack Liu Config Change: -

Test Location: FT Chamber# 4 EUT Voltage: 120V/60Hz

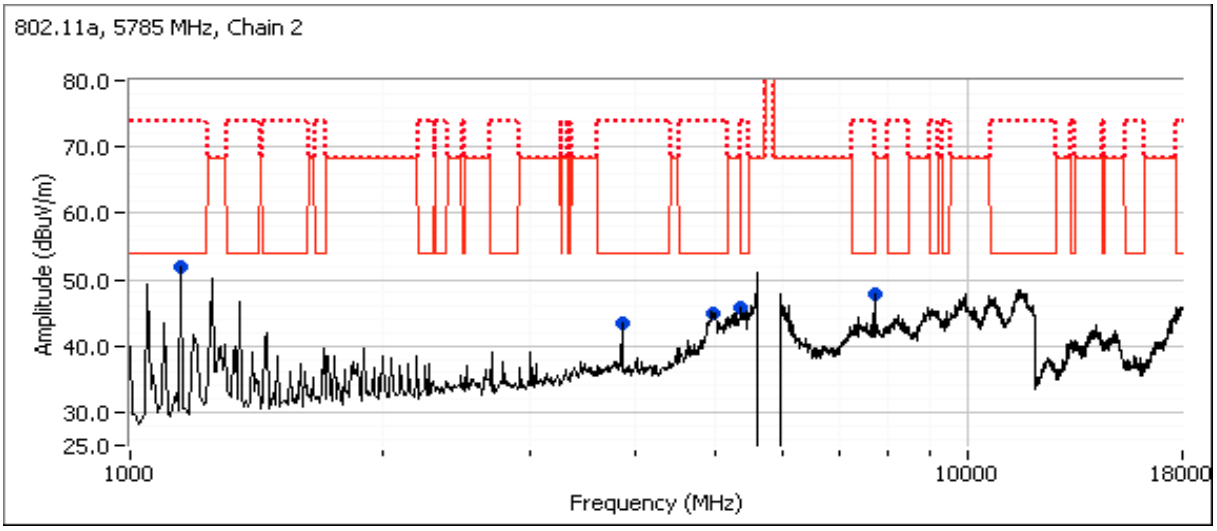
Run #5a: Center Channel

Channel: 157 Mode: a Power Setting: 20

Tx Chain: Chain 2 Data Rate: 9Mb/s

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1150.000	50.6	V	54.0	-3.4	AVG	296	1.0	RB 1 MHz;VB 10 Hz;Peak
1150.070	51.9	V	74.0	-22.1	PK	296	1.0	RB 1 MHz;VB 3 MHz;Peak
5360.110	42.0	V	54.0	-12.0	AVG	359	1.0	RB 1 MHz;VB 10 Hz;Peak
5358.070	53.3	V	74.0	-20.7	PK	359	1.0	RB 1 MHz;VB 3 MHz;Peak
3856.610	43.5	V	54.0	-10.5	AVG	271	1.8	RB 1 MHz;VB 10 Hz;Peak
3856.580	48.0	V	74.0	-26.0	PK	271	1.8	RB 1 MHz;VB 3 MHz;Peak
4967.880	42.2	V	54.0	-11.8	AVG	209	1.5	RB 1 MHz;VB 10 Hz;Peak
4972.670	53.5	V	74.0	-20.5	PK	209	1.5	RB 1 MHz;VB 3 MHz;Peak
7713.320	46.0	V	54.0	-8.0	AVG	180	1.7	RB 1 MHz;VB 10 Hz;Peak
7713.370	52.5	V	74.0	-21.5	PK	180	1.7	RB 1 MHz;VB 3 MHz;Peak

Note: *Scans made between 18 - 40 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*



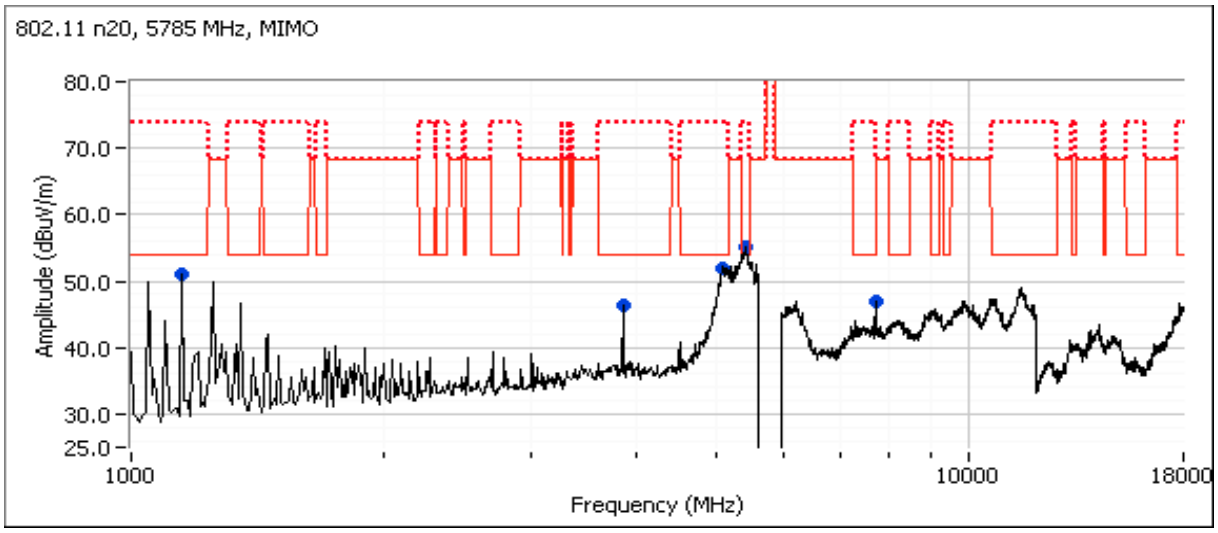
Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #5b: Center Channel

Channel: 157 Mode: 11n20 Power Setting: 20
Tx Chain: 2x2 Data Rate: MCS1

Frequency	Level	Pol	15.209 / 15E		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1150.020	50.5	V	54.0	-3.5	AVG	263	1.0	RB 1 MHz;VB 10 Hz;Peak
1150.030	52.4	V	74.0	-21.6	PK	263	1.0	RB 1 MHz;VB 3 MHz;Peak
5406.030	50.3	H	54.0	-3.7	AVG	0	1.0	RB 1 MHz;VB 10 Hz;Peak, Note 4
5411.970	61.9	H	74.0	-12.1	PK	0	1.0	RB 1 MHz;VB 3 MHz;Peak
3856.640	47.2	H	54.0	-6.8	AVG	315	1.8	RB 1 MHz;VB 10 Hz;Peak
3856.570	51.4	H	74.0	-22.6	PK	315	1.8	RB 1 MHz;VB 3 MHz;Peak
5069.860	45.6	V	54.0	-8.4	AVG	246	1.0	RB 1 MHz;VB 10 Hz;Peak, Note 4
5072.840	58.1	V	74.0	-15.9	PK	246	1.0	RB 1 MHz;VB 3 MHz;Peak
7713.350	41.6	V	54.0	-12.4	AVG	188	1.0	RB 1 MHz;VB 10 Hz;Peak, Note 4
7713.170	50.4	V	74.0	-23.6	PK	188	1.0	RB 1 MHz;VB 3 MHz;Peak

Note: *Scans made between 18 - 40 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:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #8: Radiated Spurious Emissions, 1,000 - 40000 MHz. Operating Mode: Worse case from Run #7

Date of Test: 2/19/15, 2/20/15 Config. Used: 2

Test Engineer: Rafael Varelas / Jack Liu Config Change: -

Test Location: FT Chamber# 4 EUT Voltage: 120V/60Hz

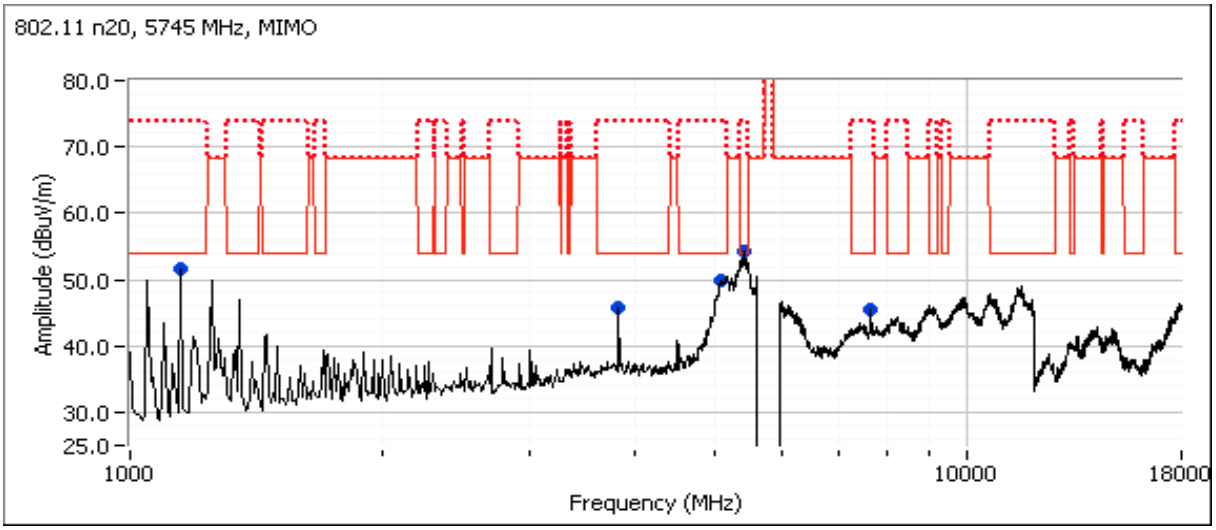
Run #6a: Low Channel

Channel: 149 Mode: 11n20 Power Setting: 20

Tx Chain: 2x2 Data Rate: MCS1

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1149.990	51.0	V	54.0	-3.0	AVG	64	1.7	RB 1 MHz;VB 10 Hz;Peak
1150.080	52.5	V	74.0	-21.5	PK	64	1.7	RB 1 MHz;VB 3 MHz;Peak
5405.220	49.4	H	54.0	-4.6	AVG	360	1.0	RB 1 MHz;VB 10 Hz;Peak, Note 4
5405.520	61.3	H	74.0	-12.7	PK	360	1.0	RB 1 MHz;VB 3 MHz;Peak
5081.150	45.1	H	54.0	-8.9	AVG	337	1.0	RB 1 MHz;VB 10 Hz;Peak, Note 4
5078.690	56.9	H	74.0	-17.1	PK	337	1.0	RB 1 MHz;VB 3 MHz;Peak
3830.020	43.3	H	54.0	-10.7	AVG	328	1.6	RB 1 MHz;VB 10 Hz;Peak
3829.900	48.0	H	74.0	-26.0	PK	328	1.6	RB 1 MHz;VB 3 MHz;Peak
7659.960	45.8	V	54.0	-8.2	AVG	175	2.0	RB 1 MHz;VB 10 Hz;Peak, Note 4
7659.830	53.2	V	74.0	-20.8	PK	175	2.0	RB 1 MHz;VB 3 MHz;Peak

Note: *Scans made between 18 - 40 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*



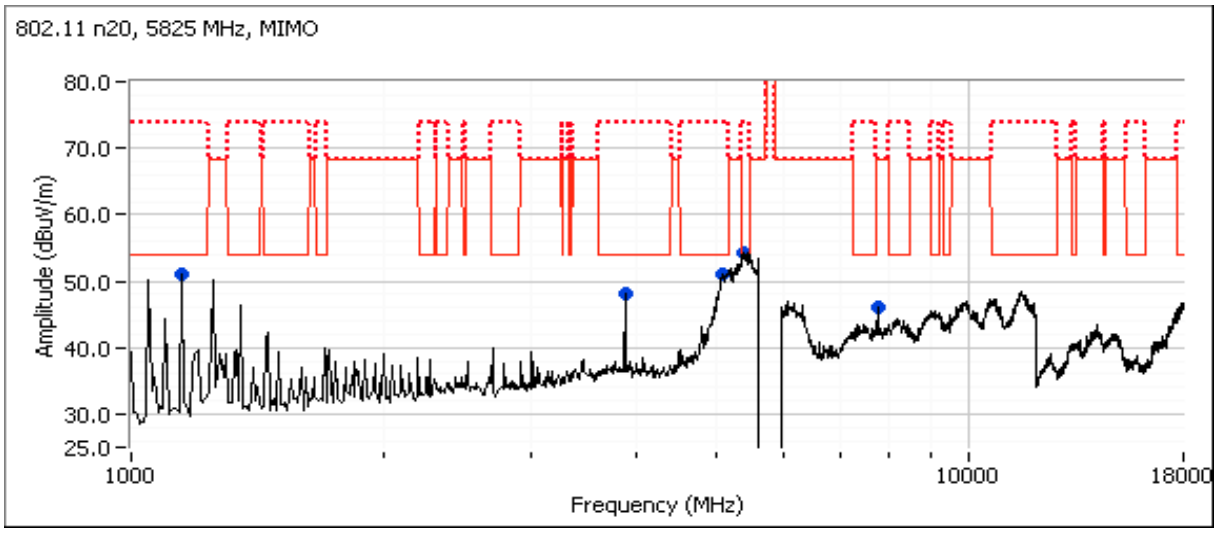
Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #6b: High Channel

Channel: 165 Mode: 11n20 Power Setting: 20
Tx Chain: 2x2 Data Rate: MCS1

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
1150.010	50.8	V	54.0	-3.2	AVG	258	1.0	RB 1 MHz;VB 10 Hz;Peak
1150.060	52.5	V	74.0	-21.5	PK	258	1.0	RB 1 MHz;VB 3 MHz;Peak
5072.960	46.0	V	54.0	-8.0	AVG	247	1.7	RB 1 MHz;VB 10 Hz;Peak, Note 4
5074.870	58.2	V	74.0	-15.8	PK	247	1.7	RB 1 MHz;VB 3 MHz;Peak
7766.660	45.0	V	68.3	-23.3	AVG	173	1.9	RB 1 MHz;VB 10 Hz;Peak, Note 4
7766.860	51.9	V	68.3	-16.4	PK	173	1.9	RB 1 MHz;VB 3 MHz;Peak
3883.300	48.0	H	54.0	-6.0	AVG	136	1.9	RB 1 MHz;VB 10 Hz;Peak
3883.420	51.1	H	74.0	-22.9	PK	136	1.9	RB 1 MHz;VB 3 MHz;Peak
5391.870	50.0	H	54.0	-4.0	AVG	8	1.3	RB 1 MHz;VB 10 Hz;Peak, Note 4
5407.770	61.7	H	74.0	-12.3	PK	8	1.3	RB 1 MHz;VB 3 MHz;Peak

Note: *Scans made between 18 - 40 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:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

RSS-210 (LELAN) and FCC 15.407(UNII)
Antenna Port Measurements
Power, PSD, Peak Excursion, Bandwidth and Spurious Emissions

Test Specific Details

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

General Test Configuration

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

Ambient Conditions:

Temperature: 21.4 °C
Rel. Humidity: 39 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5150 - 5250MHz	15.407(a) (1)	Pass	11a: 18.9dBm(77.6mW) n20: 21.8dBm(150.1mW)
1	PSD, 5150 - 5250MHz	15.407(a) (1)	Pass	11a: 7.9 dBm/MHz n20: 10.4 dBm/MHz
1	Power, 5250 - 5350MHz	15.407(a) (2)	Pass	11a: 18.7dBm(74.1mW) n20: 21.5dBm(140.3mW)
1	PSD, 5250 - 5350MHz	15.407(a) (2)	Pass	11a: 7.4 dBm/MHz n20: 10.1 dBm/MHz
1	Max EIRP 5250 - 5350MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold = -64dBm.	-	EIRP = 24.4 dBm (272.3 mW)

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Power, 5470 - 5725MHz	15.407(a) (2)	Pass	11a: 19.0dBm(79.4mW) n20: 21.7dBm(148.2mW)
1	PSD, 5470 - 5725MHz	15.407(a) (2)	Pass	11a: 7.7 dBm/MHz n20: 10.3 dBm/MHz
1	Max EIRP 5470 - 5725MHz	TPC required if EIRP≥ 500mW (27dBm). EIRP ≥ 200mW (23dBm) DFS threshold	-	EIRP = 25.3 dBm (337.2 mW)
1	Power, 5725 - 5850MHz	15.407(a) (3)	Pass	11a: 19.0dBm (79.4mW) n20: 22.0dBm (157.0mW)
1	PSD, 5725 - 5850MHz	15.407(a) (3)	Pass	11a: 7.8 dBm/MHz n20: 10.6 dBm/MHz
2	26dB Bandwidth	15.407(h)(2)	Pass	a: 20.83 MHz n20: 20.91 MHz
2	Minimum 6dB Bandwidth for UNII3 band	15.407(e)	Pass	a: 16.3 MHz n20: 17.6 MHz

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 789033 D02 v01

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
11a	9Mb/s	98.9%	Yes	-	0	0	-
n20	MCS13	97.8%	Yes	-	0.10	0.19	-

Sample Notes

Sample S/N: L044A505250029
Driver: 5.99 RC188.10

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #1: Bandwidth, Output Power and Power Spectral Density - MIMO Systems

Date of Test: 2/25/2015 0:00 Config. Used: 1

Test Engineer: Rafael Varelas Config Change: None

Test Location: FT Lab #4B EUT Voltage: 120V/60Hz

Note 1:	For 11a - Output power measured using a spectrum analyzer (see plots below). RBW=1MHz, VB=3 MHz, # of points in sweep ≥ 2*span/RBW, sample RMS detector, power averaging on (transmitted signal was continuous) and power integration over 40 MHz (method SA-1 of KDB 789033).
Note 2:	PSD was measured using the same analyzer settings used for output power.
Note 3:	For 11n - Duty Cycle < 98%, constant duty cycle. Output power measured using a spectrum analyzer (see plots below) with RBW= 1-5% of OBW, VB≥3* RBW, RMS detector, power averaging on, and power integration over the OBW, trace average 100 traces (option SA-2, in KDB 789033). Measurement corrected by Pwr Cor Factor.
Note 4:	99% Bandwidth measured in accordance with RSS GEN - RB > 1% of span and VB >=3xRB
Note 5:	For MIMO systems the total output power and total PSD are calculated form the sum of the powers of the individual chains (in linear terms). The antenna gain used to determine the EIRP and limits for PSD/Output power depends on the operating mode of the MIMO device. If the signals on the non-coherent between the transmit chains then the gain used to determine the limits is the highest gain of the individual chains and the EIRP is the sum of the products of gain and power on each chain. If the signals are coherent then the effective antenna gain is the sum (in linear terms) of the gains for each chain and the EIRP is the product of the effective gain and total power.

Antenna Gain Information

Freq	Antenna Gain (dBi) / Chain				BF	MultiChain Legacy	CDD	Sectorized / Xpol	Dir G (PWR)	Dir G (PSD)
	1	2	3	4						
5150-5250	2.80	2.88			No	No	Yes	No	2.88	5.89
5250-5350	2.80	2.88			No	No	Yes	No	2.88	5.89
5470-5725	2.80	3.57			No	No	Yes	No	3.57	6.58
5725-5880	2.80	4.58			No	No	Yes	No	4.58	7.59

For devices that support CDD modes

Min # of spatial streams: 1

Max # of spatial streams: 2

Note: Preliminary measurements showed Chain 1 to be worse case for the 11a operation

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

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; GA (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 DKB 662911 D01. Spatial Multiplexing with Nant=4, Nss=2, for worse case condition. Array gain = 10*log(4/2) = 3dB.
Notes:	For systems with Beamforming and CDD, choose one the following options: Option 1: Delays are optimized for beamforming, rather than being selected from cyclic delay table of 802.11; Array gains calculated based on beamforming criteria. Option 2: Antennas are paired for beamforming, and the pairs are configured to use the cyclic delay diversity of 802.11; the array gain assoicated with beamforming with 2 antennas (3dB), and the array gain assoicated with CDD with two antennas (3dB for PSD and 0 dB for power)
Notes:	For multiple output mode, the total PSD was calculated per KDB 662911. The maximum PSD value for each output summed (in linear units).

MIMO Device - 5150-5250 MHz Band - FCC

Mode: 11a — Max EIRP (mW): 150.6

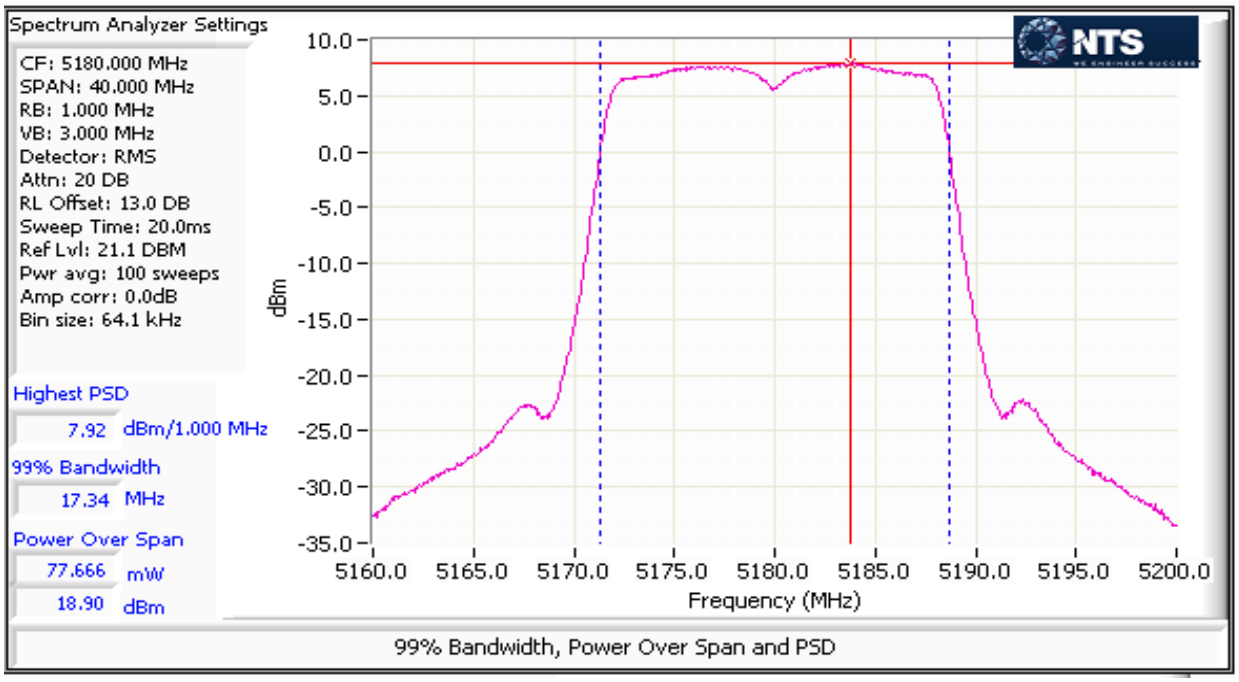
Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power[1] dBm	Total Power mW	Total Power dBm	FCC Limit dBm	Max Power (W)	Result
5180	1	20	20.67	99	18.9	77.6	18.9	24.0	0.078	Pass
	3									
	4									
	2									
5200	1	20	20.67	99	18.9	77.6	18.9	24.0		Pass
	3									
	4									
	2									
5240	1	20	20.51	99	18.8	75.9	18.8	24.0		Pass
	3									
	4									
	2									

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

5150-5250 PSD - FCC/IC

Mode: 11a

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5180	1	20	17.34	99	7.9	6.2	7.9	11.0	-	Pass
	3									
	4									
	2									
5200	1	20	17.34	99	7.8	6.0	7.8	11.0	-	Pass
	3									
	4									
	2									
5240	1	20	17.34	99	7.7	5.9	7.7	11.0	-	Pass
	3									
	4									
	2									



Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

MIMO Device - 5150-5250 MHz Band - FCC

Mode: n20 Max EIRP (mW): 291.3

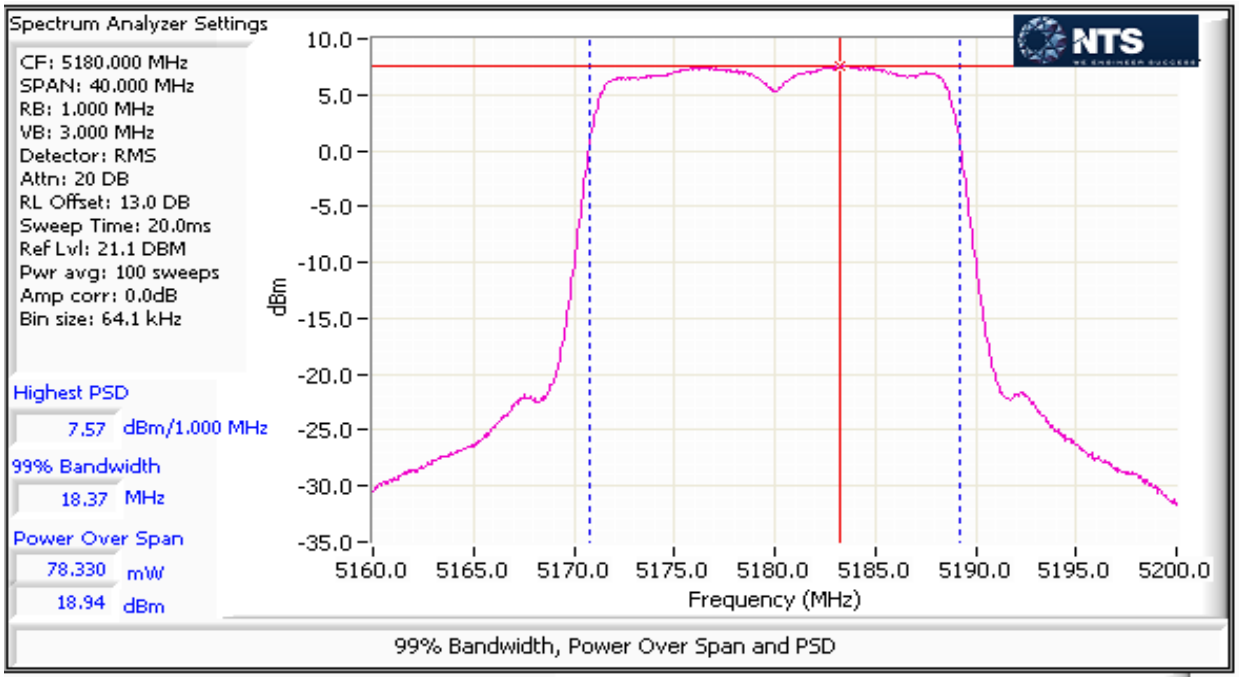
Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power[3] dBm	Total Power mW	Total Power dBm	FCC Limit dBm	Max Power (W)	Result
5180	1	20	20.9	98	18.9	150.1	21.8	24.0	0.150	Pass
	3									
	4									
	2				18.4					
5200	1	20	20.7	98	18.9	148.5	21.7	24.0		Pass
	3									
	4									
	2				18.3					
5240	1	20	20.8	98	18.9	145.4	21.6	24.0		Pass
	3									
	4									
	2				18.1					

5150-5250 PSD - FCC/IC

Mode: n20

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5180	1	20	18.43	98	7.6	11.0	10.4	11.0	-	Pass
	3									
	4									
	2				7.0					
5200	1	20	18.43	98	7.6	10.9	10.4	11.0	-	Pass
	3									
	4									
	2				6.9					
5240	1	20	18.43	98	7.6	10.7	10.3	11.0	-	Pass
	3									
	4									
	2				6.7					

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A



Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

MIMO Device - 5250-5350 MHz Band - FCC

Mode: 11a Max EIRP (mW): 143.8

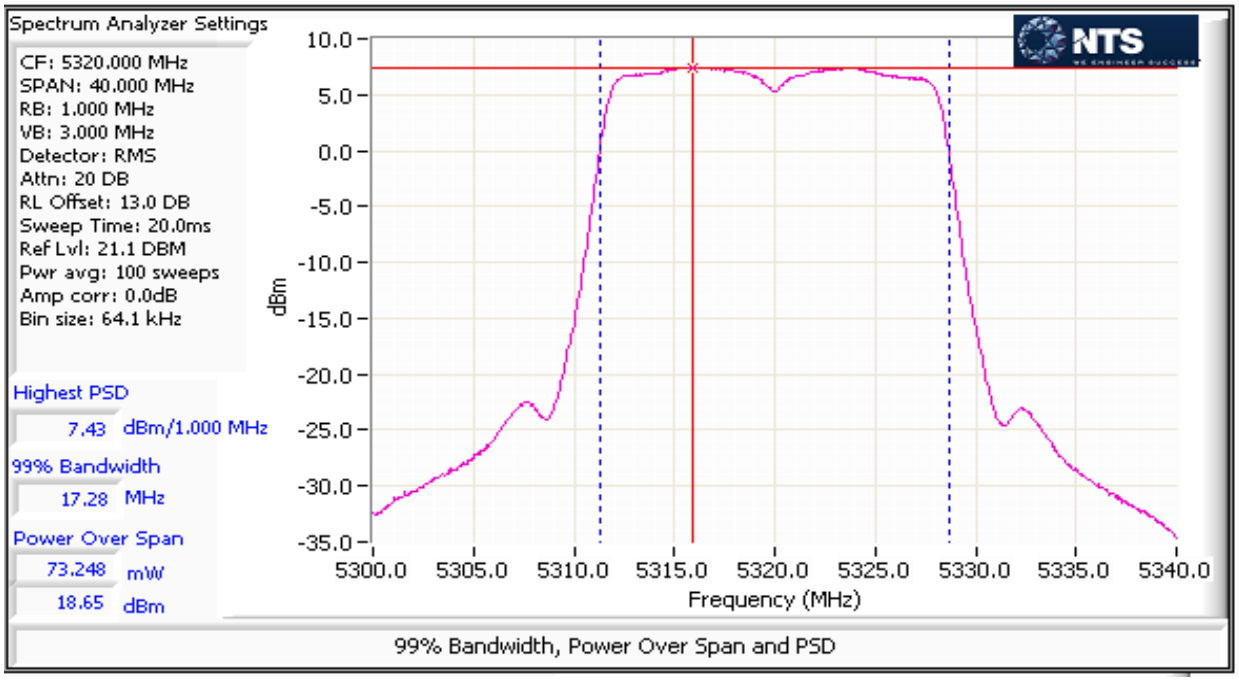
Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power dBm	Total Power[1] mW	Total Power[1] dBm	FCC Limit dBm	Max Power (W)	Result
5260	1	20	20.59	99	18.6	72.4	18.6	24.0	0.074	Pass
	3									
	4									
	2									
5300	1	20	20.59	99	18.6	72.4	18.6	24.0		Pass
	3									
	4									
	2									
5320	1	20	20.67	99	18.7	74.1	18.7	24.0		Pass
	3									
	4									
	2									

5250-5350 PSD - FCC/IC

Mode: 11a

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5260	1	20	17.34	99	7.4	5.5	7.4	11.0	-	Pass
	3									
	4									
	2									
5300	1	20	17.28	99	7.4	5.5	7.4	11.0	-	Pass
	3									
	4									
	2									
5320	1	20	17.28	99	7.4	5.5	7.4	11.0	-	Pass
	3									
	4									
	2									

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A



Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

MIMO Device - 5250-5350 MHz Band - FCC

Mode: n20 Max EIRP (mW): 272.3

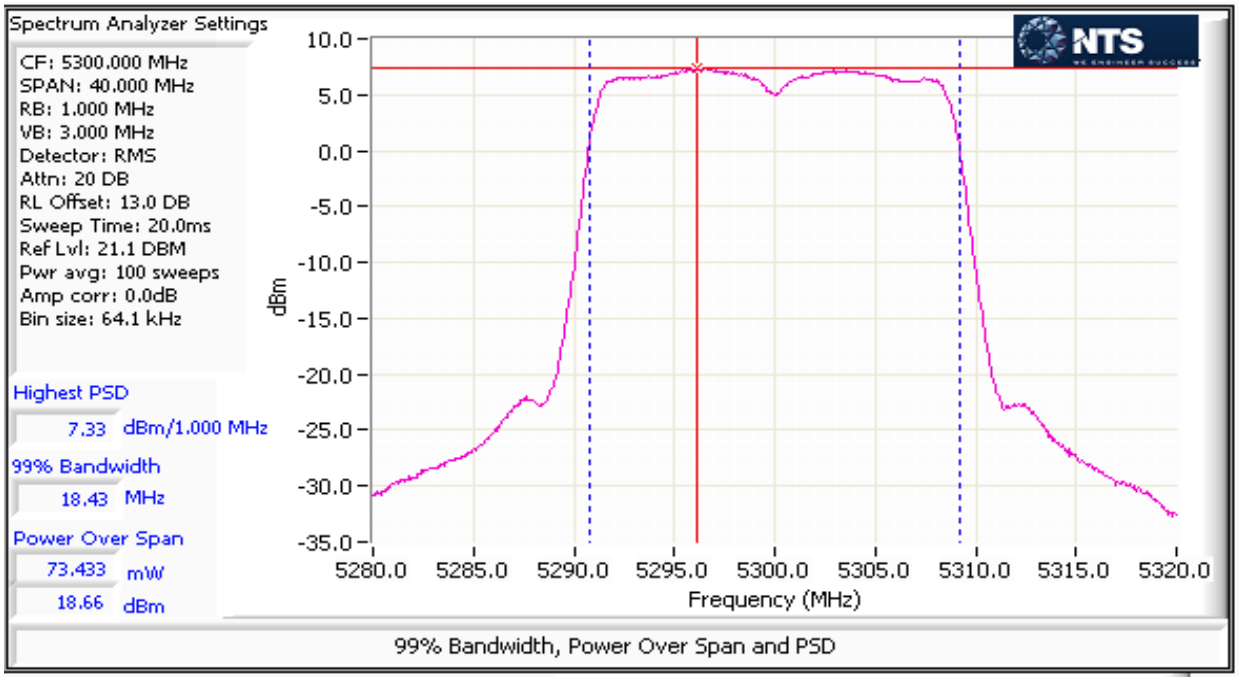
Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power[3] dBm	Total Power[1] mW	Total Power[1] dBm	FCC Limit dBm	Max Power (W)	Result
5260	1	20	20.75	98	18.6	138.6	21.4	24.0	0.140	Pass
	3									
	4									
	2				18.0					
5300	1	20	20.67	98	18.7	140.3	21.5	24.0		Pass
	3									
	4									
	2				18.0					
5320	1	20	20.83	98	18.6	138.6	21.4	24.0		Pass
	3									
	4									
	2				18.0					

5250-5350 PSD - FCC/IC

Mode: n20

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5260	1	20	18.43	98	7.2	9.9	10.0	11.0	-	Pass
	3									
	4									
	2				6.5					
5300	1	20	18.43	98	7.3	10.3	10.1	11.0	-	Pass
	3									
	4									
	2				6.7					
5320	1	20	18.43	98	7.3	10.2	10.1	11.0	-	Pass
	3									
	4									
	2				6.6					

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A



Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

MIMO Device - 5470-5725 MHz Band - FCC

Mode: 11a Max EIRP (mW): 180.6

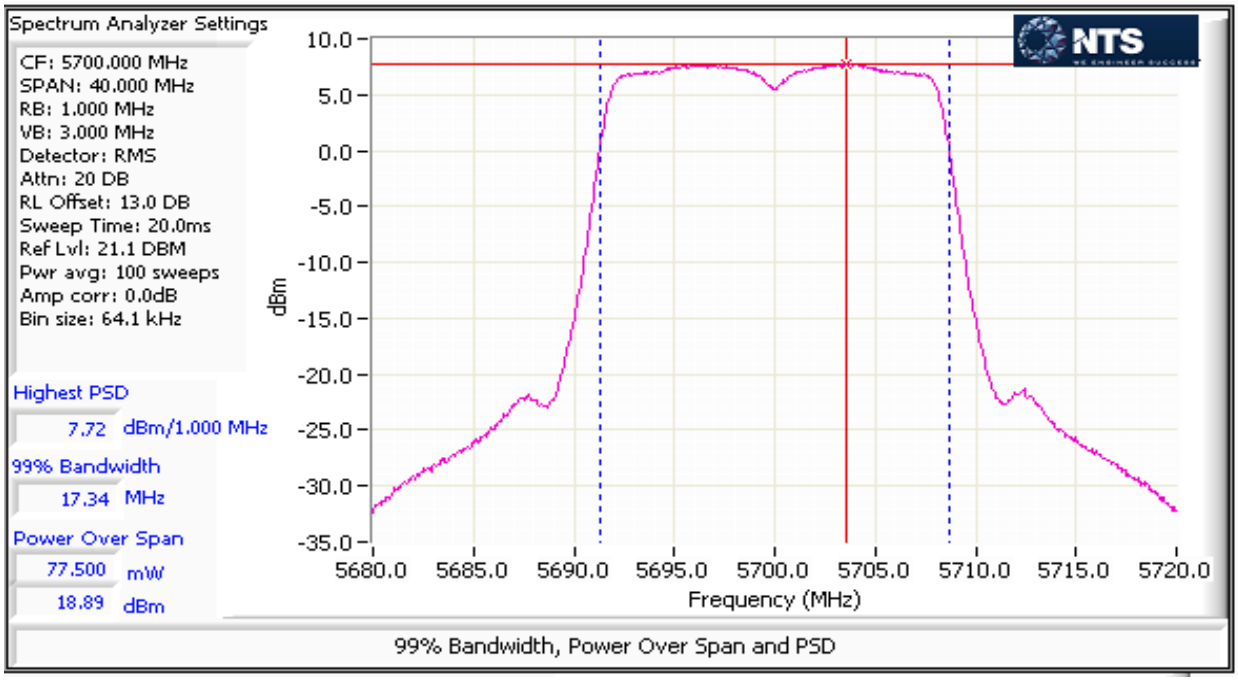
Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power dBm	Total Power[1] mW	Total Power[1] dBm	FCC Limit dBm	Max Power (W)	Result
5500	1	20	20.59	99	18.5	70.8	18.5	24.0	0.079	Pass
	3									
	4									
	2									
5580	1	20	20.83	99	18.4	69.2	18.4	24.0		Pass
	3									
	4									
	2									
5700	1	20	20.83	99	19.0	79.4	19.0	24.0		Pass
	3									
	4									
	2									

5470-5700 PSD - FCC/IC

Mode: 11a

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5500	1	20	17.28	99	7.3	5.4	7.3	10.4	-	Pass
	3									
	4									
	2									
5580	1	20	17.34	99	7.2	5.2	7.2	10.4	-	Pass
	3									
	4									
	2									
5700	1	20	17.34	99	7.7	5.9	7.7	10.4	-	Pass
	3									
	4									
	2									

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A



Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

MIMO Device - 5470-5725 MHz Band - FCC

Mode: n20 Max EIRP (mW): 337.2

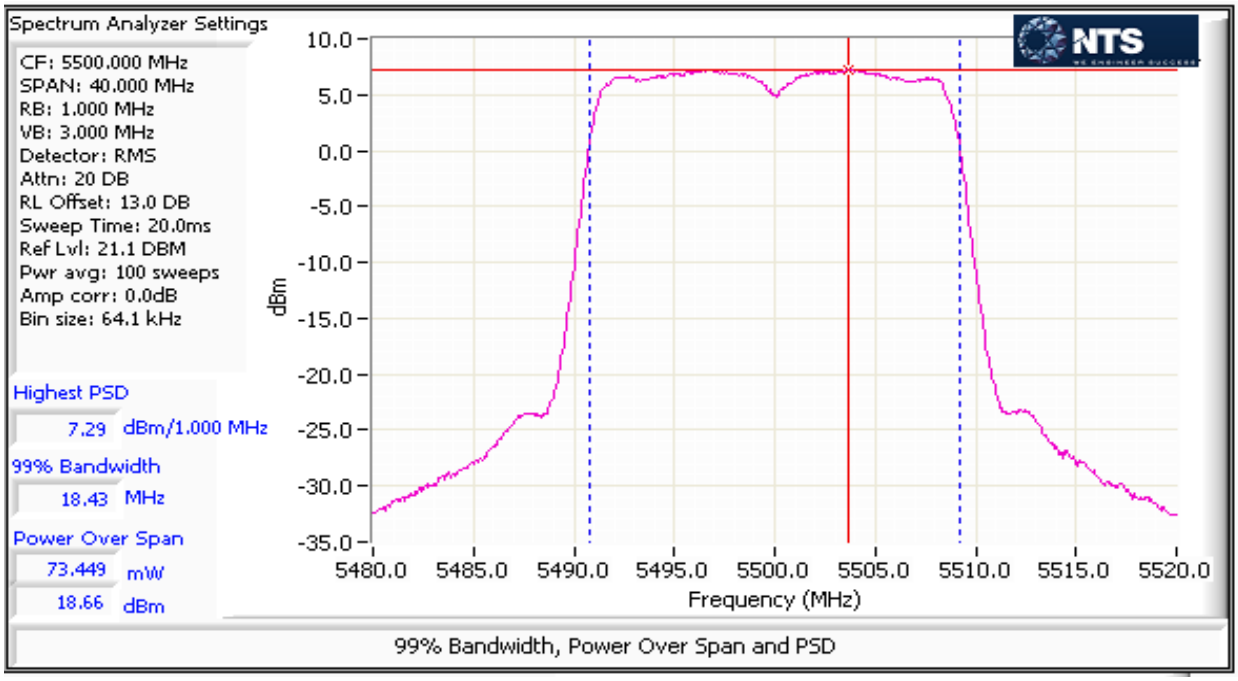
Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power[3] dBm	Total Power[1] mW	Total Power[1] dBm	FCC Limit dBm	Max Power (W)	Result
5500	1	20	20.75	98	18.5	148.2	21.7	24.0	0.148	Pass
	3									
	4									
	2				18.7					
5580	1	20	20.83	98	18.1	133.6	21.3	24.0		Pass
	3									
	4									
	2				18.2					
5700	1	19	20.83	98	17.9	129.1	21.1	24.0		Pass
	3									
	4									
	2				18.1					

5470-5725 PSD - FCC/IC

Mode: n20

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/MHz	IC Limit dBm/MHz	Result
5500	1	20	18.43	98	7.1	10.7	10.3	10.4	-	Pass
	3									
	4									
	2				7.3					
5580	1	20	18.43	98	6.7	9.7	9.9	10.4	-	Pass
	3									
	4									
	2				6.8					
5700	1	19	18.43	98	6.5	9.1	9.6	10.4	-	Pass
	3									
	4									
	2				6.5					

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A



Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

MIMO Device - 5725-5850 MHz Band - FCC

Mode: 11a Max EIRP (mW): 227.9

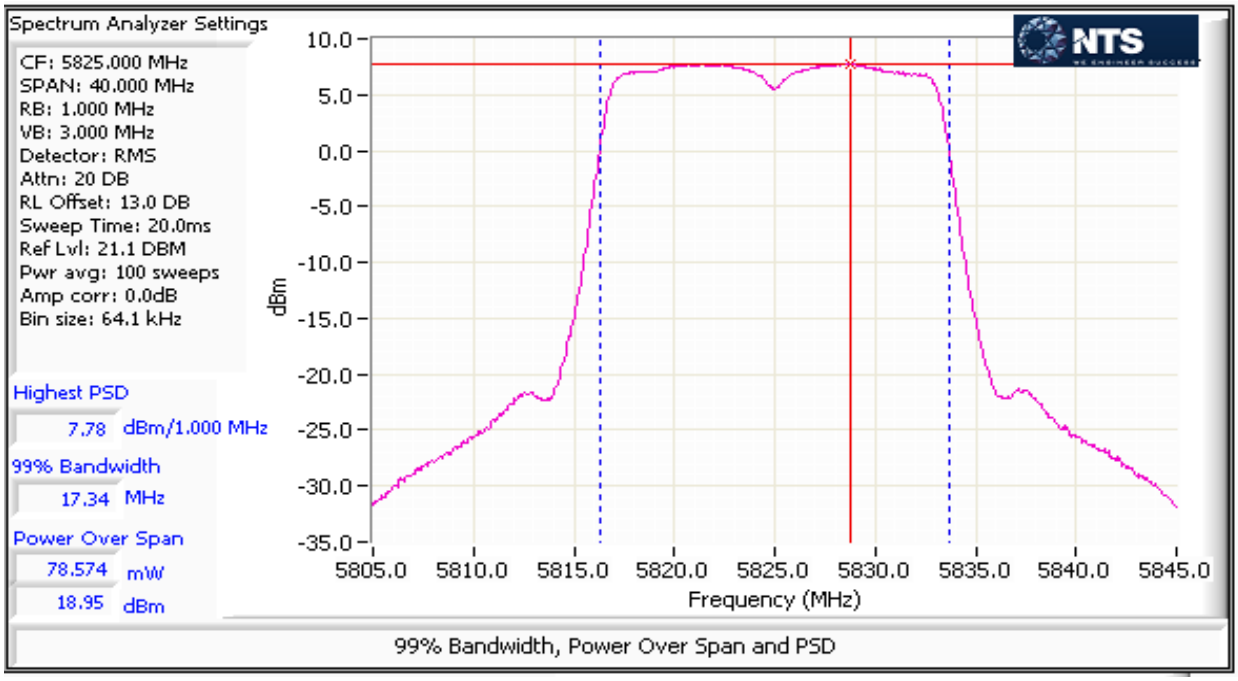
Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power dBm	Total Power[1] mW	Total Power[1] dBm	FCC Limit dBm	Max Power (W)	Result
5745	1	20		99	18.8	75.9	18.8	30.0		Pass
	3									
	4									
	2									
5785	1	20		99	18.7	74.1	18.7	30.0	0.079	Pass
	3									
	4									
	2									
5825	1	20		99	19.0	79.4	19.0	30.0		Pass
	3									
	4									
	2									

5725-5850 PSD - FCC/IC

Mode: 11a

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/500kHz	IC Limit dBm/500kHz	Result
5745	1	20	17.34	99	7.6	5.8	7.6	28.4	-	Pass
	3									
	4									
	2									
5785	1	20	17.34	99	7.6	5.8	7.6	28.4	-	Pass
	3									
	4									
	2									
5825	1	20	17.34	99	7.8	6.0	7.8	28.4	-	Pass
	3									
	4									
	2									

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A



Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

MIMO Device - 5725-5850 MHz Band - FCC

Mode: n20 Max EIRP (mW): 450.7

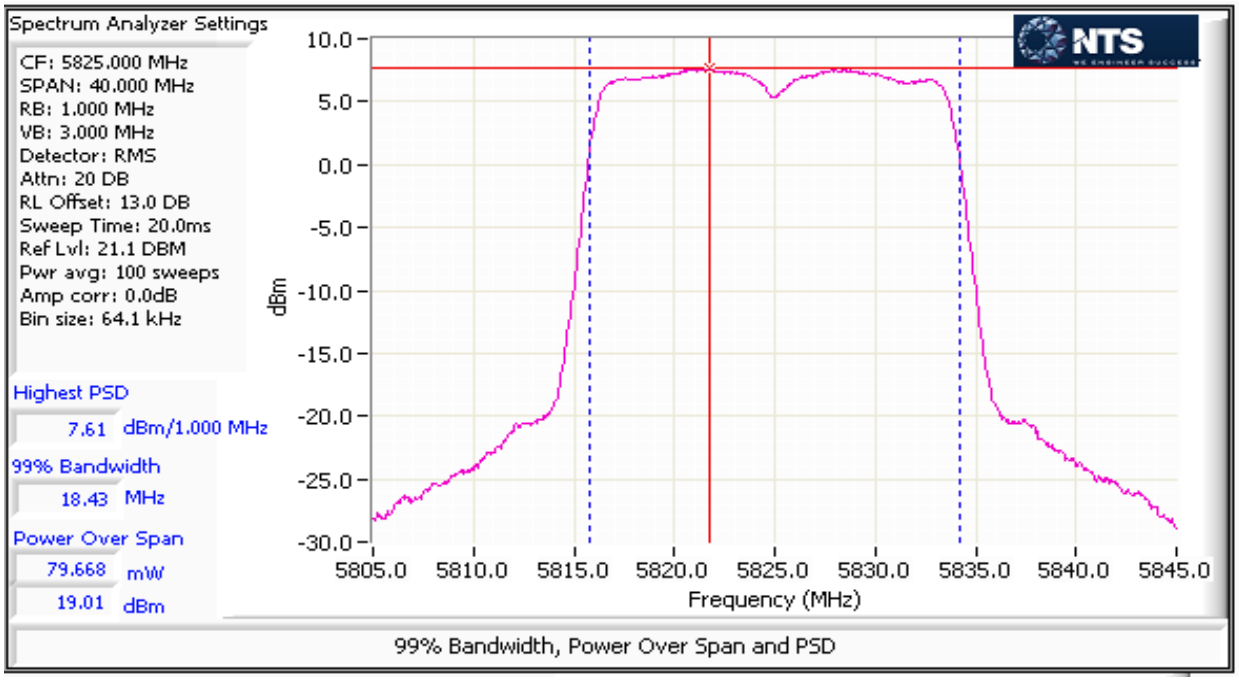
Frequency (MHz)	Chain	Software Setting	26dB BW (MHz)	Duty Cycle %	Power[3] dBm	Total Power[1] mW	Total Power[1] dBm	FCC Limit dBm	Max Power (W)	Result
5745	1	20		98	18.7	149.9	21.8	30.0	0.157	Pass
	3									
	4									
	2				18.6					
5785	1	20		98	18.7	148.2	21.7	30.0		Pass
	3									
	4									
	2				18.5					
5825	1	20		98	19.0	157.0	22.0	30.0		Pass
	3									
	4									
	2				18.7					

5725-5850 PSD - FCC/IC

Mode: n20

Frequency (MHz)	Chain	Software Setting	99% BW (MHz)	Duty Cycle %	PSD dBm/MHz	Total PSD[1] mW/MHz	Total PSD[1] dBm/MHz	FCC Limit dBm/500kHz	IC Limit dBm/500kHz	Result
5745	1	20	18.43	98	7.4	11.0	10.4	28.4	-	Pass
	3									
	4									
	2				7.2					
5785	1	20	18.43	98	7.4	10.9	10.4	28.4	-	Pass
	3									
	4									
	2				7.1					
5825	1	20	18.43	98	7.6	11.5	10.6	28.4	-	Pass
	3									
	4									
	2				7.4					

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A



Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A

Run #2: Bandwidth Measurements

Date of Test: 2/25/2015 Config. Used: 1

Test Engineer: Rafael Varelas Config Change: None

Test Location: FT Lab #4B EUT Voltage: 120V/60Hz

Mode: 11a

5725-5850MHz band (UNII3)

Testing performed on port: 2

Power Setting	Frequency (MHz)	Bandwidth (MHz)		RBW Setting (MHz)	
		6dB	99%	6dB	99%
20	5745	16.4	17.3	100kHz	300kHz
20	5785	16.3	17.3	100kHz	300kHz
20	5825	16.3	17.4	100kHz	300kHz

Mode: n20

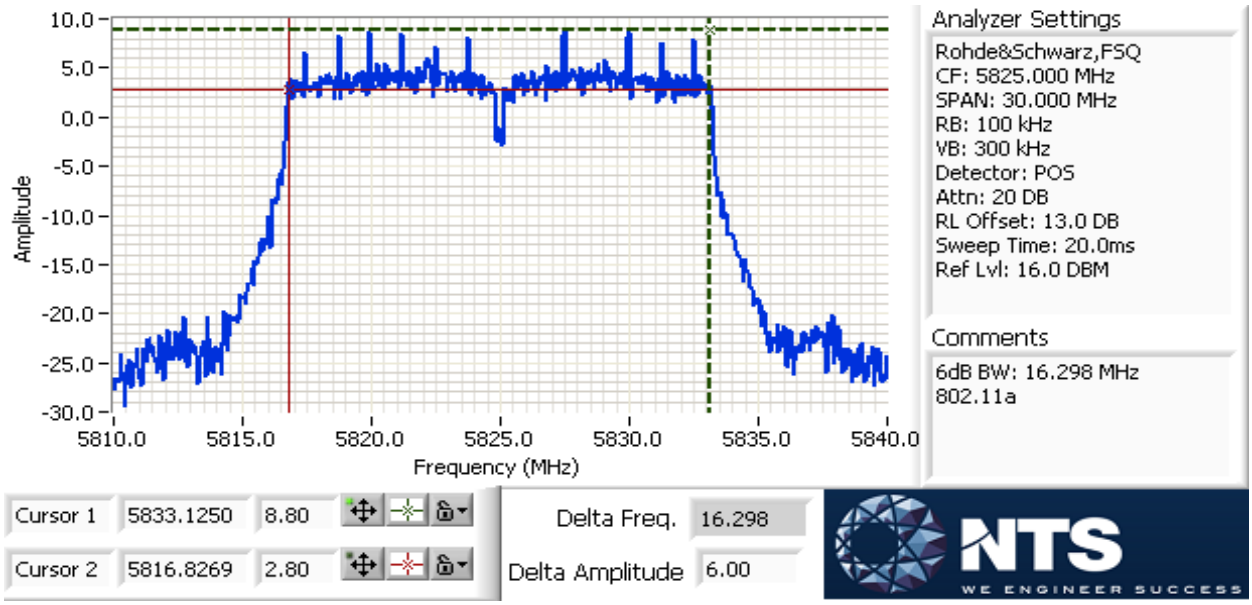
5725-5850MHz band (UNII3)

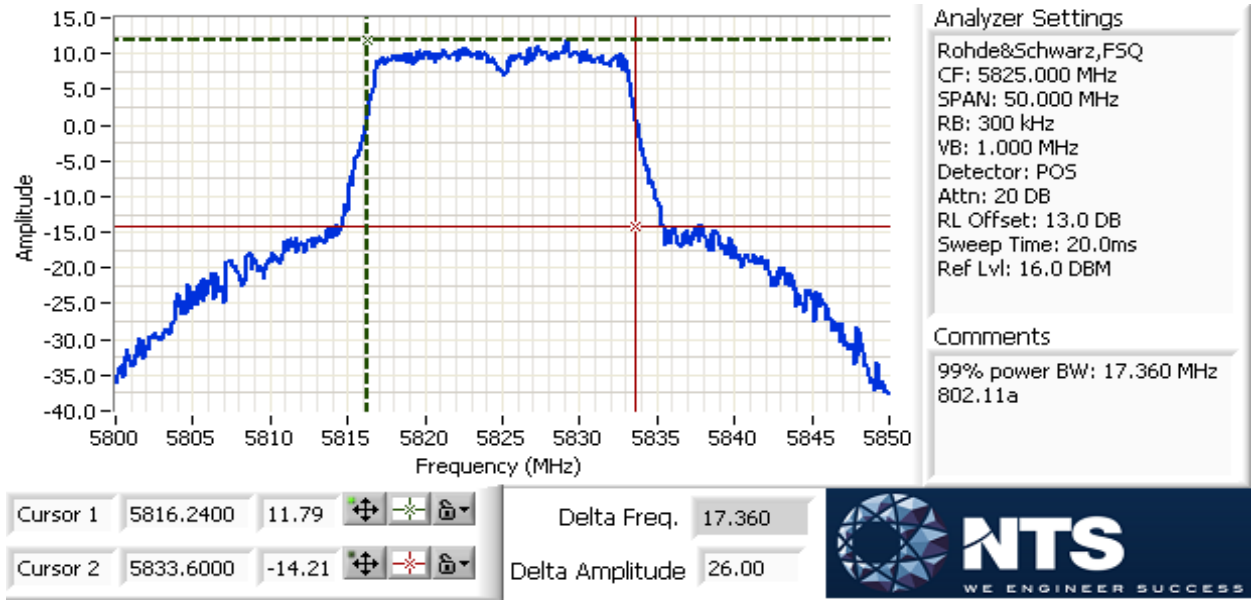
Testing performed on port: 2

Power Setting	Frequency (MHz)	Bandwidth (MHz)		RBW Setting (MHz)	
		6dB	99%	6dB	99%
20	5745	17.6	18.0	100kHz	300kHz
20	5785	17.6	18.1	100kHz	300kHz
20	5825	17.7	18.2	100kHz	300kHz

Note 1:	6dB BW: RBW=100kHz, VBW ≥ 3*RBW, peak detector, max hold, auto sweep time. 99% BW: RBW=1-5% of of 99%BW, VBW ≥ 3*RBW, peak detector, max hold, auto sweep time.

Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	N/A





Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		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
Test Engineer: Alika Hirano
Test Location: Fremont Chamber #3
Config. Used: 3
Config Change: -
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 where 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 dBµV @ 0.444 MHz (-0.3 dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

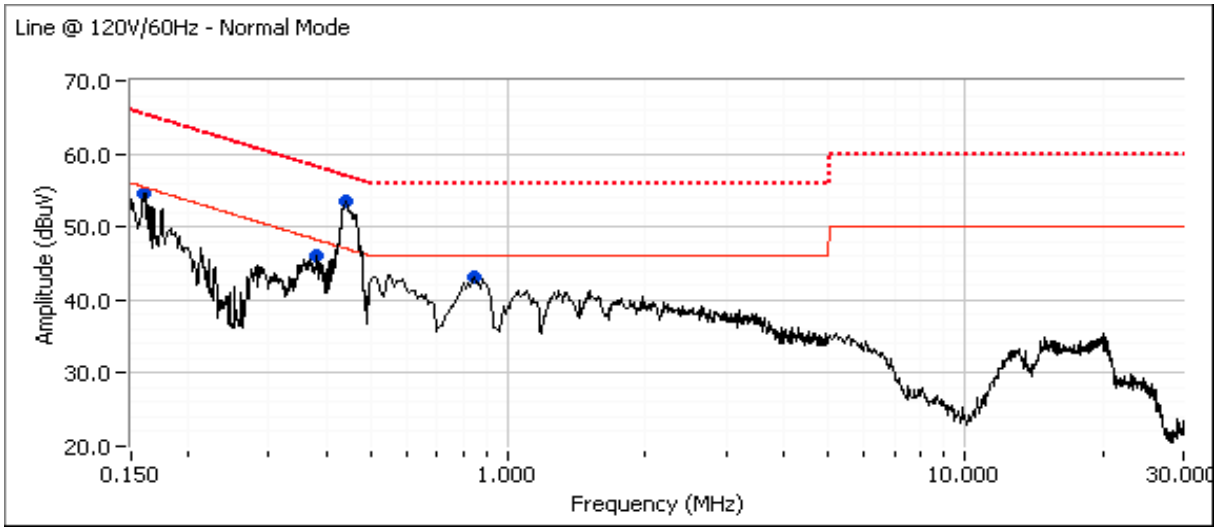
No deviations were made from the requirements of the standard.

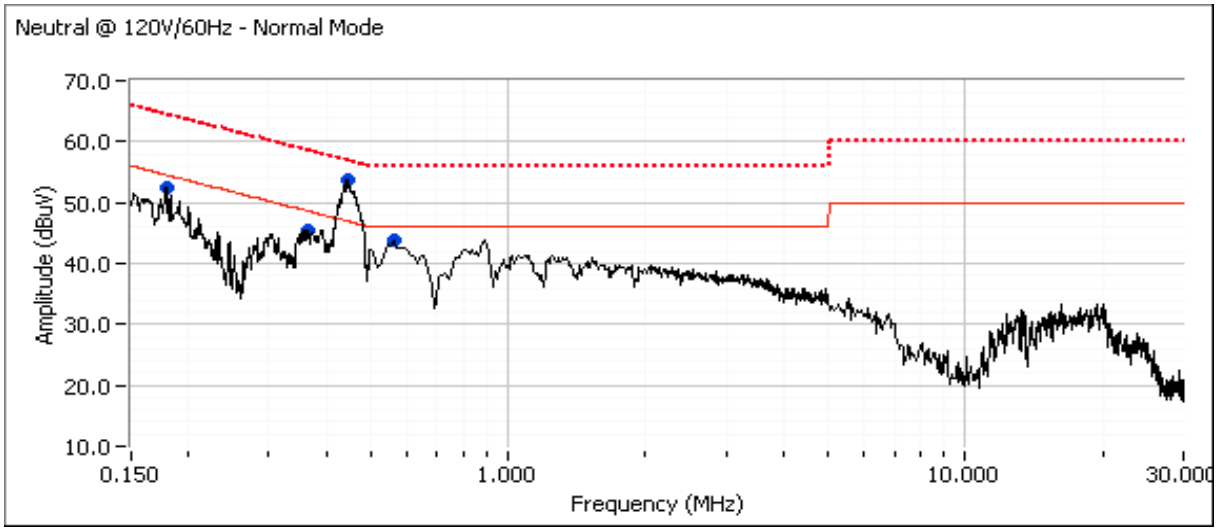
Sample Notes

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:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	B

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





Client:	Technicolor USA, Inc.	Job Number:	J97449
Model:	H44-100	T-Log Number:	T97497
		Project Manager:	Christine Krebill
Contact:	Steven Hershberger	Project Coordinator:	-
Standard:	FCC 15.247/15.407/15.B	Class:	B

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

Frequency	Level	AC	15.207		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
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	Level	AC	15.207		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
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)

End of Report

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