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Test Report

Radio Test Report: EDCS - 1404064

CP-DX70
Desktop Telepresence

FCC ID:LDKDX700976 IC: 2461B- DX700976

5470-5725 MHz

Against the following Specifications:

CFR47 Part 15.407

RSS210

Cisco Systems

170 West Tasman Drive

San Jose, CA 95134

Author: Allan Beecroft

Approved By: See EDCS

Title: See EDCS

This report replaces any previously entered test report under EDCS - 1404064

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This test report has been electronically authorized and archived using the CISCO Engineering Document Control system.

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Section 1: Overview

1.1 Test Summary

samples were assessed against the tests detailed in section 3 under the requirements of the following specifications:

Emission	Immunity
CFR47 Part 15.407 RSS210	N/A

The specifications listed above represent actual tests performed to demonstrate compliance against the specifications

and basic standards listed on the front cover of this report. This list is not a one to one match to the front cover for one

or more of the following reasons.

1.   Basic standards call up many different test phenomena specifications such as the 61000-4-X series. The basic standards define which elements and levels shall be applied from these specifications and as such it is not appropriate to list the individual specifications on the front cover.
2.   A Standard listed on the front cover may be required in a particular country but is not appropriate for the particular technologies included in the equipment under test. E.g. You cannot test a DC product to the mains Harmonics requirements in EN61000-3-2. See section 3.2.
3.   Test results against a particular standard or specification may be included in a different test report. See section 3.2 for an EDCS reference of this data.
4.   Where appropriate, Cisco may have substituted a later revision of a basic standard to those referenced in the specification on the front sheet of this test report. This decision was based upon improved test methodology and repeatability and/or where the newer revision represented a more stringent test.
5.   Where relevant, testing has been carried out to the requirements of both EN and IEC Specifications. This was possible because of the similarities of the test methods involved and the Cisco EMC test procedures.
6.   Testing may have been performed to an equivalent test that satisfies the requirements of the standards and specifications listed on the front cover of the report. See section 3.2.
7.   Where radiated emissions testing has been performed to EN55022/CISPR22 the additional requirements of VCCI: V- 3/2006.04, EN55022: 1994 +A1/2 and CAN/CSA- CISPR 22-02 have also been evaluated unless otherwise stated.
8.   Testing to the requirements of CFR47 Part 15 was performed against the CISPR22 limits. The results are therefore deemed satisfactory evidence of compliance with Industry Canada Interference Causing Equipment Standard ICES-003.
9.   Where assessment has been performed to CISPR24, all the applicable test requirements may have not been covered. Refer to the results section for the tests performed.

Notes:

1)   Where a specification listed on the front cover of this report has deviations from the basic standards listed above, the additional technical requirements of the specification were also assessed.
2)   Where appropriate, Cisco may have substituted a later revision of a basic standard to those referenced in the specification on the front sheet of this test report. This decision was based upon improved test methodology and repeatability and/or where the newer revision represented a more stringent test.
3)   Where relevant, testing has been carried out to the requirements of both EN and IEC Specifications. This was possible because of the similarities of the test methods involved and the Cisco EMC test procedures.

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Section 2: Assessment Information

2.1 General

This report contains an assessment of an apparatus against Electromagnetic Compatibility Standards based upon tests carried out on the samples submitted. The testing was performed by and for the use of Cisco systems Inc:

With regard to this assessment, the following points should be noted:

a)   The results contained in this report relate only to the items tested and were obtained in the period between the date of the initial assessment and the date of issue of the report. Manufactured products will not necessarily give identical results due to production and measurement tolerances.

b)   The apparatus was set up and exercised using the configuration and modes of operation defined in this report only.

c)   Where relevant, the apparatus was only assessed using the susceptibility criteria defined in this report and the Test Assessment Plan (TAP).

d)   All testing was performed under the following environmental conditions:

Temperature   15°C to 35°C (54°F to 95°F)

Atmospheric Pressure   860mbar to 1060mbar (25.4" to 31.3")

Humidity   10% to 75*%

*[Where applicable] For ESD testing the humidity limits used were 30% to 60% and for EFT/B tests the humidity limits used were 25% to 75%.

e)   All AC testing was performed at the following supply voltage:

  110V 60 Hz (+/-20%)

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2.2 Date of testing

04-MARCH-2014

2.3 Report Issue Date

Cisco uses an electronic system to issue, store and control the revision of test reports. This system is called the Engineering Document Control System (EDCS). The actual report issue date is embedded into the original file on EDCS. Any copies of this report, either electronic or paper, that are not on EDCS must be considered uncontrolled

2.4 Testing facilities

This assessment was performed by:

Testing Laboratory

 Cisco Systems, Inc.

170 West Tasman Drive

San Jose, CA 95134

USA

Registration Numbers for Industry Canada

Cisco System Site	Site Identifier
Building P, 10m Chamber	Company #: 2461N-2
Building P, 5m Chamber	Company #: 2461N-1
Building I, 5m Chamber	Company #: 2461M-1

Test Engineers

Allan Beecroft, Technical Leader, CISCO Systems Inc.

2.5 Equipment Assessed (EUT)
CP-DX70 Desktop TelePresence

2.6 EUT Description

The Cisco DX70 offers uncompromised collaboration for every desk. Experience best in class HD video and expanded collaboration capabilities such as UC features, Android applications and email all within a single integrated device. Now is the time for simple to use Collaboration experience at a price so affordable you can empower every office and home office desktop.

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The following antennas are supported by this product series.
The data included in this report represent the worst case data for all antennas.

Frequency	Part Number	Antenna Type	Antenna Gain (dBi)
5470MHz to 5725MHz	Internal	Omni-Directional	3.5

Section 3: Result Summary

Conducted emissions

Basic Standard	Result
99% and 26dB Bandwidth	Pass
20dB Bandwidth	Pass
Peak Output Power	Pass
Power Spectral Density	Pass
Peak Excursion	Pass
Conducted Spurious Emissions	Pass
Restricted Band Edge Measurements	Pass
AC Power Line Conducted Emissions	Pass

Radiated emissions

Basic Standard	Result
Radiated Spurious and Harmonic Emissions	Pass
Co-Locator Radiated Spurions Emissions	Pass

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Section 4: Sample Details

Note: Each sample was evaluated to ensure that its condition was suitable to be used as a test sample prior to the commencement of testing. Please also refer to the "Justification for worst Case test Configuration" section of this report for further details on the selection of EUT samples.

4.1 Sample Details

Sample Number	Equipment Details	Serial Number	Part Number
S01	CP-DX70 Desktop TelePresence (Charcoal)	FOC1803N9SE	CP-DX70
S02	LITEON PA-1600-2A-LF AC/DC Adapter	LIT1748098P	N/A
S03	CP-DX70 Desktop TelePresence (Charcoal)	FOC1803N9PR	CP-DX70
S04	AIR-CAP2702I-A-K9 Access Point	RFDP1BVZ017	N/A

The following antennas were evaluated as part of this testing process. The antennas listed reflect the maximum gain allowed for each family type of antenna:

Fixed internal Amphenol Dual Band Antenna at 5GHz, Gain: (no external antenna can be used.)

5150 – 5250MHz: 3.3dBi
5250 – 5350MHz: 3.1dBi
5500 – 5700MHz: 3.5dBi
5745 – 5805MHz: 4dBi

4.2 System Details

System #	Description	Samples
1	Radio Test Sample and Power Supply	S01 & S02
2	Radio Test Sample for Radiated Co-Located Tests	S03, S02 & S04

4.3 Mode of Operation Details

Mode#	Description	Comments
1	802.11a/n Test Mode	System is placed in a continuous Transmit Mode at various channels per Test Requirements. Worse Case Data Rate used for all Testing.

		802.11a set to 6Mbps, HT20 set to MCS0 & HT40 set to MCS0
2	802.11a/n & Bluetooth Test Mode	System is placed in a continuous Transmit Mode with wi-fi & Bluetooth active at various channels per Test Requirements. Worse Case Data Rate used for all Testing. 802.11a set to 6Mbps, HT20 set to MCS0 & HT40 set to MCS0.

Section 5: Modifications

5.1 Sample Modifications Performed During Assessment

No modifications were performed during assessment.

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Appendix A: Test Results

Target Maximum Channel Power

The following table details the maximum supported Total Channel Power for all operating modes.

	Maximum Channel Power (dBm)		
	Frequency (MHz)		
Operating Mode	**5500**	**5580**	**5700**
802.11a (6 to 54 Mbps)	15	16	16
802.11n (HT-20, MCS0 to MCS7 upto 72Mbps)	16	16	15
	5510	**5670**	
802.11n (HT-40, MCS0 to MCS7 upto 150Mbps)	16	16	

Frequency Stability 802.11a:

Test Conditions (see clause EN 301 893 V1.6.1, clause 5.3.2.1):

Power Setting (for a single TX chain):	14 dBm (5500MHz) 13 dBm (5700MHz)		☐ EIRP	⊠ Conducted		
Duty Cycle: 100 %			Test results			
Rel. Humidity: 34 %			Measured Frequency (MHz)	Delta Frequency (kHz)	20 ppm Limit (+/- kHz)	Margin (kHz)
Test Frequency: **5 500 MHz**						
T_{nom} 23 °C	V_{nom} 230 Vac		5499.9680	-32.0	110	78
T_{min} 0 °C	V_{min} 207 Vac		5499.9535	-46.5	110	63.5
	V_{max} 253 Vac		5499.9205	-79.5	110	30.5
T_{max} 40 °C	V_{min} 207 Vac		5499.9810	-19.0	110	91
	V_{max} 253 Vac		5499.9925	-7.5	110	102.5
Test Frequency: **5 700 MHz**						
T_{nom} 23 °C	V_{nom} 230 Vac		5699.9530	-47.0	114	67
T_{min} 0 °C	V_{min} 207 Vac		5699.9285	-71.5	114	42.5

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			V_{max}	253	Vac	5699.9260	-74.0	114	40
T_{max}	40	°C	**V_{min}**	207	Vac	5699.9675	-32.5	114	81.5
			V_{max}	253	Vac	5699.9210	-79.0	114	35

Frequency Stability 802.11 (HT20):

<table>
<tr><td colspan="11">Test Conditions (see clause EN 301 893 V1.6.1, clause 5.3.2.1):</td></tr>
<tr>
<td colspan="3">Power Setting
(for a single TX chain):</td>
<td>14 dBm
14 dBm</td>
<td colspan="2">(5500MHz)
(5700MHz)</td>
<td>☐ EIRP</td>
<td colspan="4">☒ Conducted</td>
</tr>
<tr>
<td colspan="3">Duty Cycle:</td>
<td>100 %</td>
<td colspan="2"></td>
<td colspan="5" align="center">Test results</td>
</tr>
<tr>
<td colspan="3">Rel. Humidity:</td>
<td>34 %</td>
<td colspan="2"></td>
<td>Measured Frequency (MHz)</td>
<td>Delta Frequency (kHz)</td>
<td>20 ppm Limit (+/- kHz)</td>
<td colspan="2">Margin (kHz)</td>
</tr>
<tr>
<td colspan="3">Test Frequency:</td>
<td colspan="3">5 500   MHz</td>
<td></td><td></td><td></td><td colspan="2"></td>
</tr>
<tr>
<td>T_{nom}</td><td>23</td><td>°C</td>
<td>V_{nom}</td><td>230</td><td>Vac</td>
<td>5499.9375</td><td>-62.5</td><td>110</td><td colspan="2">47.5</td>
</tr>
<tr>
<td>T_{min}</td><td>0</td><td>°C</td>
<td>V_{min}</td><td>207</td><td>Vac</td>
<td>5499.9365</td><td>-63.5</td><td>110</td><td colspan="2">46.5</td>
</tr>
<tr>
<td></td><td></td><td></td>
<td>V_{max}</td><td>253</td><td>Vac</td>
<td>5499.9245</td><td>-75.5</td><td>110</td><td colspan="2">34.5</td>
</tr>
<tr>
<td>T_{max}</td><td>40</td><td>°C</td>
<td>V_{min}</td><td>207</td><td>Vac</td>
<td>5499.9825</td><td>-17.5</td><td>110</td><td colspan="2">92.5</td>
</tr>
<tr>
<td></td><td></td><td></td>
<td>V_{max}</td><td>253</td><td>Vac</td>
<td>5499.9760</td><td>-24.0</td><td>110</td><td colspan="2">86</td>
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<tr>
<td colspan="3">Test Frequency:</td>
<td colspan="3">5 700   MHz</td>
<td colspan="5"></td>
</tr>
<tr>
<td>T_{nom}</td><td>23</td><td>°C</td>
<td>V_{nom}</td><td>230</td><td>Vac</td>
<td>5699.9485</td><td>-51.5</td><td>114</td><td colspan="2">62.5</td>
</tr>
<tr>
<td>T_{min}</td><td>0</td><td>°C</td>
<td>V_{min}</td><td>207</td><td>Vac</td>
<td>5699.8880</td><td>-112.0</td><td>114</td><td colspan="2">2</td>
</tr>
<tr>
<td></td><td></td><td></td>
<td>V_{max}</td><td>253</td><td>Vac</td>
<td>5699.9165</td><td>-83.5</td><td>114</td><td colspan="2">30.5</td>
</tr>
<tr>
<td>T_{max}</td><td>40</td><td>°C</td>
<td>V_{min}</td><td>207</td><td>Vac</td>
<td>5699.9580</td><td>-42.0</td><td>114</td><td colspan="2">72</td>
</tr>
<tr>
<td></td><td></td><td></td>
<td>V_{max}</td><td>253</td><td>Vac</td>
<td>5699.9380</td><td>-62.0</td><td>114</td><td colspan="2">52</td>
</tr>
</table>

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 Frequency Stability 802.11 (HT40):

Test Conditions (see clause EN 301 893 V1.6.1, clause 5.3.2.1):									
Power Setting (for a single TX chain):		15 dBm 15 dBm	(5510MHz) (5670MHz)	☐ EIRP		☒ Conducted			
Duty Cycle:	100	%		Test results					
Rel. Humidity:	34	%		Measured Frequency (MHz)	Delta Frequency (kHz)	20 ppm Limit (+/- kHz)	Margin (kHz)		
Test Frequency:			**5 510 MHz**						
T$_{nom}$	23	°C	**V$_{nom}$**	230	Vac	5510.0590	59.0	110.2	51.2
T$_{min}$	0	°C	**V$_{min}$**	207	Vac	5510.0935	93.5	110.2	16.7
			V$_{max}$	253	Vac	5510.0855	85.5	110.2	24.7
T$_{max}$	40	°C	**V$_{min}$**	207	Vac	5510.0870	87.0	110.2	23.2
			V$_{max}$	253	Vac	5510.0970	97.0	110.2	13.2
Test Frequency:			**5 670 MHz**						
T$_{nom}$	23	°C	**V$_{nom}$**	230	Vac	5670.1090	109.0	113.4	4.4
T$_{min}$	0	°C	**V$_{min}$**	207	Vac	5670.0820	82.0	113.4	31.4
			V$_{max}$	253	Vac	5670.0775	77.5	113.4	35.9
T$_{max}$	40	°C	**V$_{min}$**	207	Vac	5670.0955	95.5	113.4	17.9
			V$_{max}$	253	Vac	5670.1030	103.0	113.4	10.4

99% and 26dB Bandwidth

Connect the antenna port(s) to the spectrum analyzer input. Using the spectrum analyzer Channel Bandwidth mode, configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).

Center Frequency:	Frequency from table below
Span:	2 x Nominal Bandwidth
Reference Level:	30 dBm
Attenuation:	24 dB
Sweep Time:	5 s
Resolution Bandwidth:	1%-3% of 26 dB Bandwidth
Video Bandwidth:	≥Resolution Bandwidth
X dB Bandwidth:	26 dB
Detector:	Peak
Trace:	Single

Place the radio in continuous transmit mode. View the transmitter waveform on the spectrum analyzer, and record the pertinent measurements:

26dB / 99% Bandwidth, 802.11a, 6 to 54 Mbps

Frequency (MHz)	Data Rate	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
5500	6	16.578	19.58
5580	6	16.604	19.94
5700	6	16.605	19.95

26dB / 99% Bandwidth, 802.11n, HT20, MCS0 to MCS7

Frequency (MHz)	Data Rate	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
5500	MCS0	17.804	20.26
5580	MCS0	17.826	20.38
5700	MCS0	17.818	20.41

26dB / 99% Bandwidth, 802.11n, HT40, MCS0 to MCS7

Frequency (MHz)	Data Rate	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
5510	MCS0	36.437	40.09
5670	MCS0	36.447	40.22

26dB / 99% Bandwidth, 5500MHz, 802.11a, 6 to 54 Mbps

Agilent Spectrum Analyzer - Occupied BW

L	RF	50 Ω	DC	SENSE:INT	ALIGN AUTO	10:05:56 AM Apr 07, 2014

Center Freq 5.500000000 GHz
Center Freq: 5.500000000 GHz   Radio Std: None
Trig: Free Run
#IFGain:Low   #Atten: 24 dB   Radio Device: BTS

Ref Offset 10.5 dB
Ref 30.84 dBm
10 dB/div
Log
20.8
10.8
0.840
-9.16
-19.2
-29.2
-39.2
-49.2
-59.2

Center 5.5 GHz   **Span 40 MHz**
#Res BW 390 kHz   **#VBW 1.2 MHz**   **#Sweep 5 s**

Frequency

Center Freq
5.500000000 GHz

CF Step
4.000000 MHz
Auto   Man

Freq Offset
0 Hz

Occupied Bandwidth   **Total Power**   **14.9 dBm**

16.578 MHz

Transmit Freq Error   5.206 kHz   **OBW Power**   99.00 %
x dB Bandwidth   19.58 MHz   **x dB**   -26.00 dB

MSG   STATUS

26dB / 99% Bandwidth, 5580MHz, 802.11a, 6 to 54 Mbps

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26dB / 99% Bandwidth, 5700MHz, 802.11a, 6 to 54 Mbps

26dB / 99% Bandwidth, 5500MHz, 802.11n, HT20 MCS0 to MCS7

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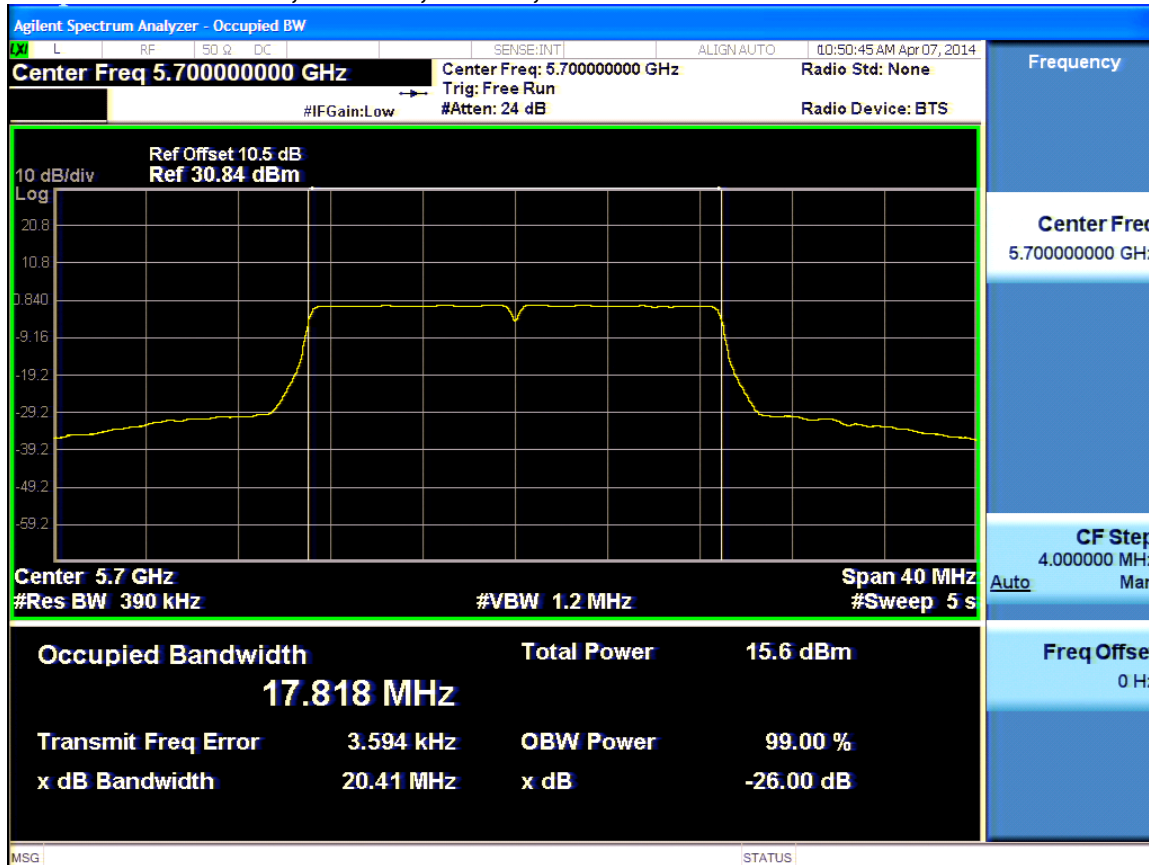FCC ID: **LDKDX700976** IC: **2461B- DX700976**

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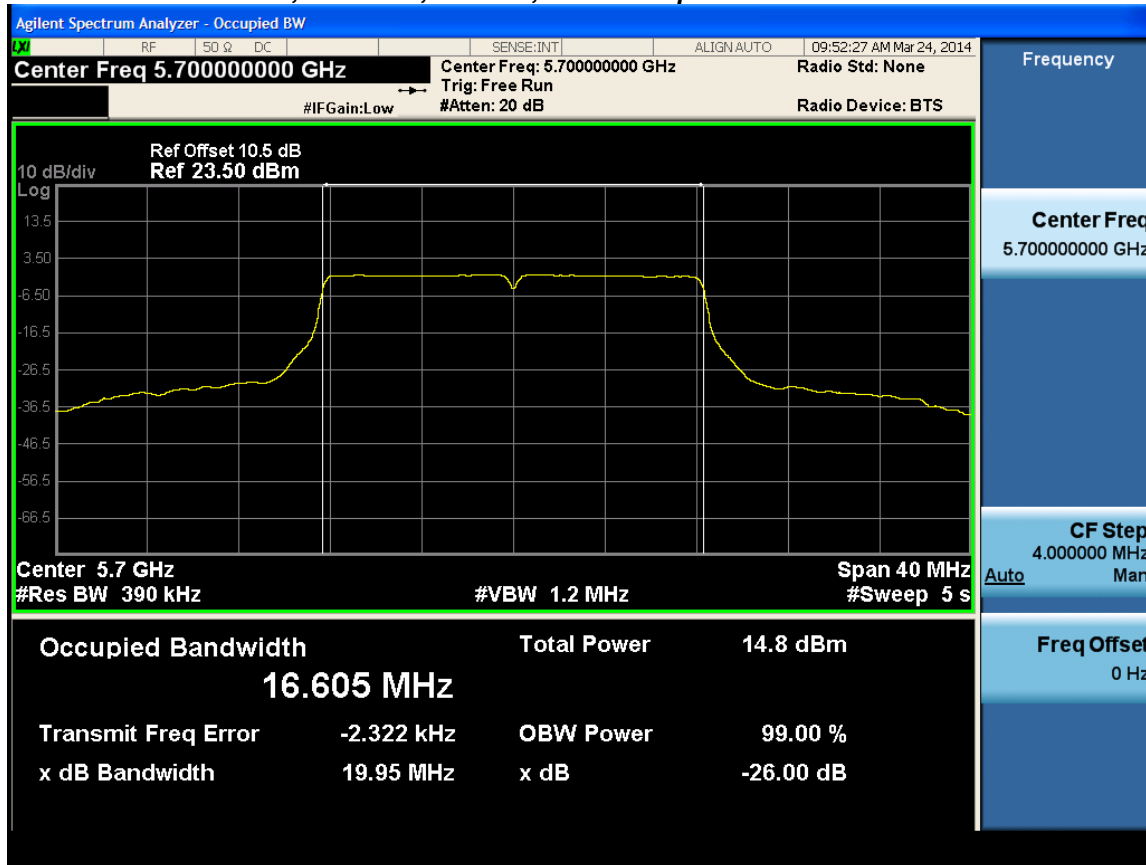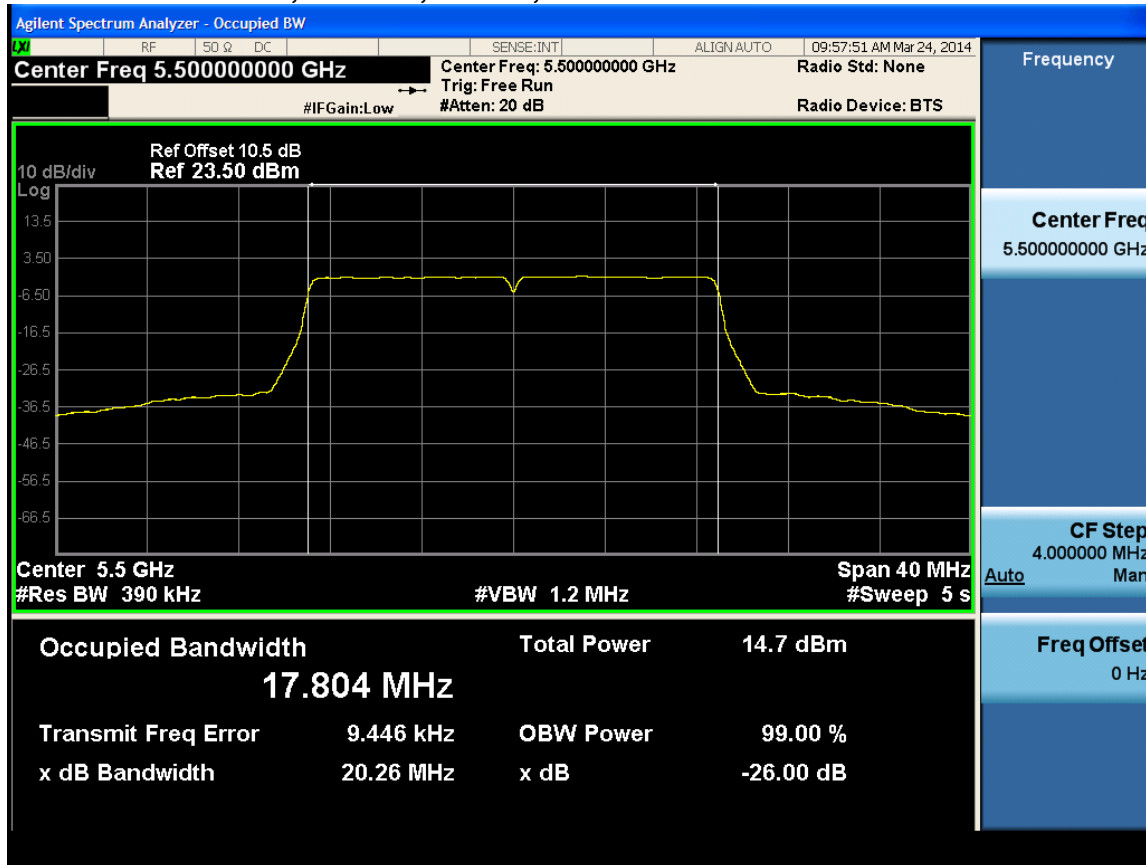
26dB / 99% Bandwidth, 5580MHz, 802.11n, HT20 MCS0 to MCS7
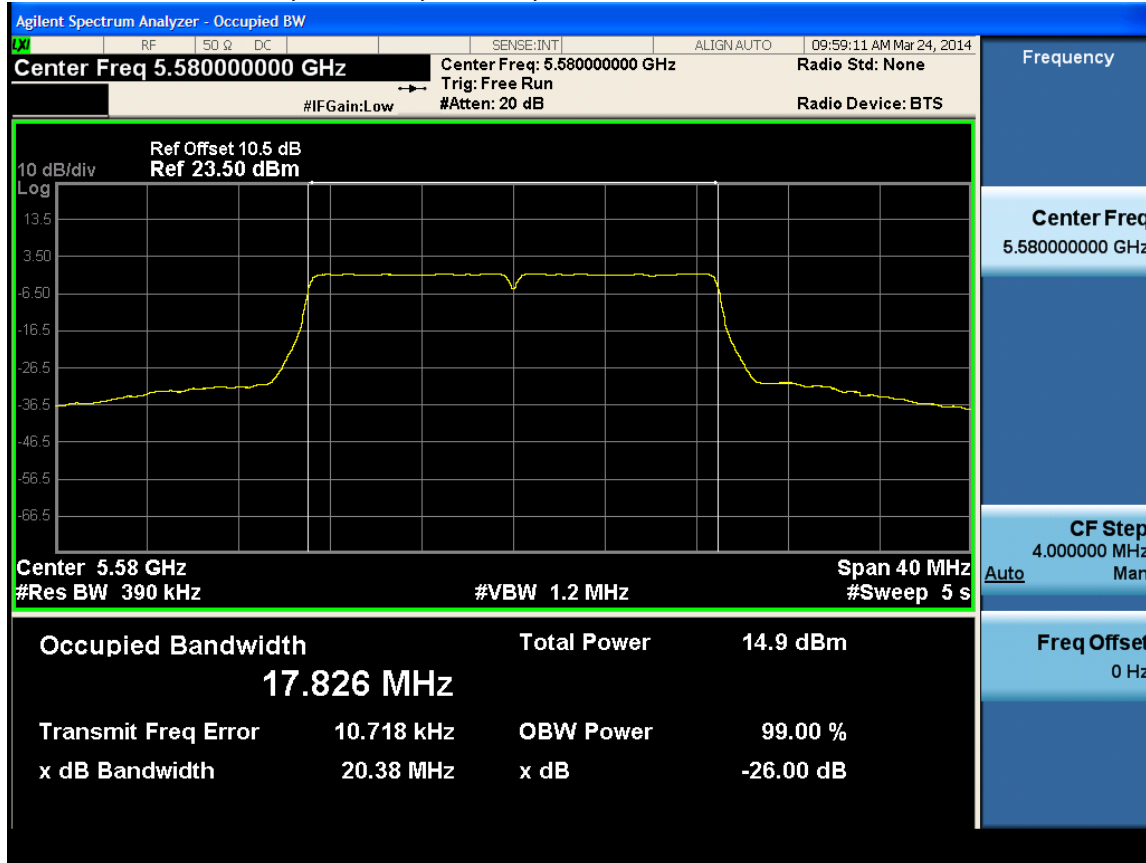
26dB / 99% Bandwidth, 5700MHz, 802.11n, HT20 MCS0 to MCS7

26dB / 99% Bandwidth, 5510MHz 802.11n, HT40, MCS0 to MCS7

Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**
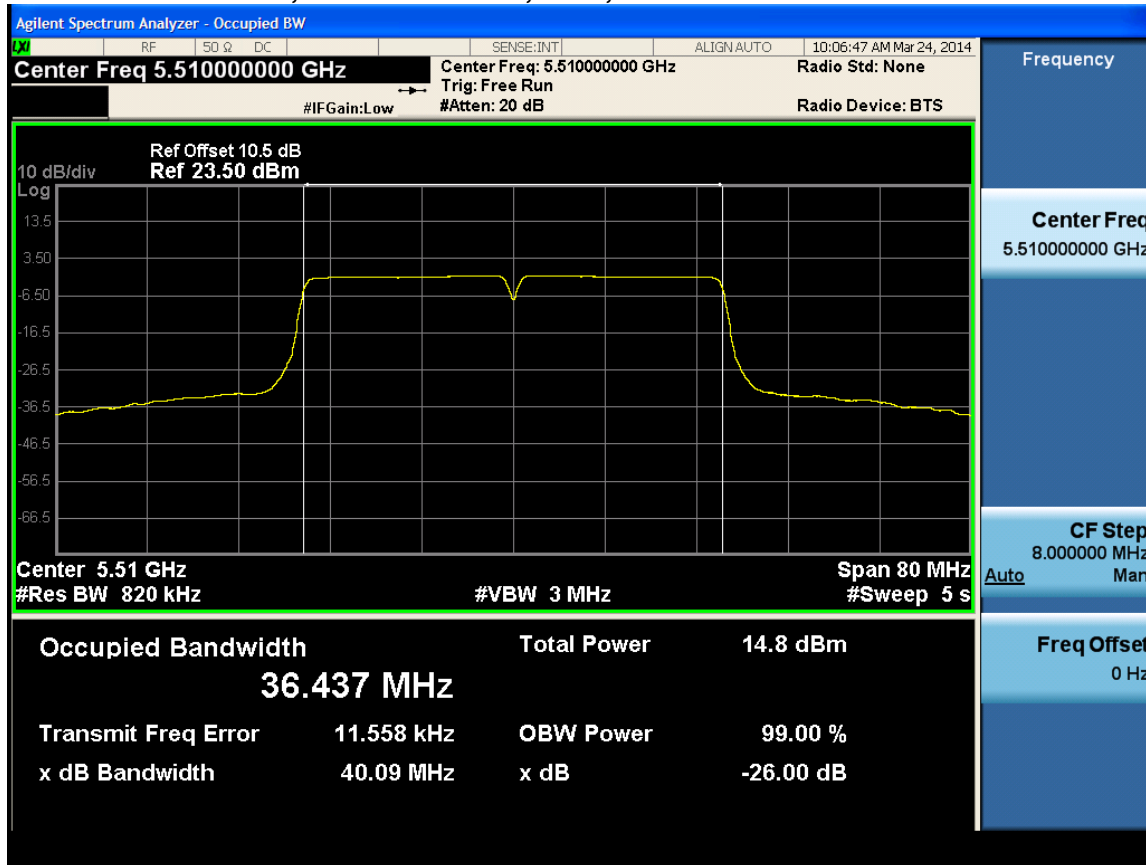
26dB / 99% Bandwidth, 5670MHz 802.11n, HT40, MCS0 to MCS7
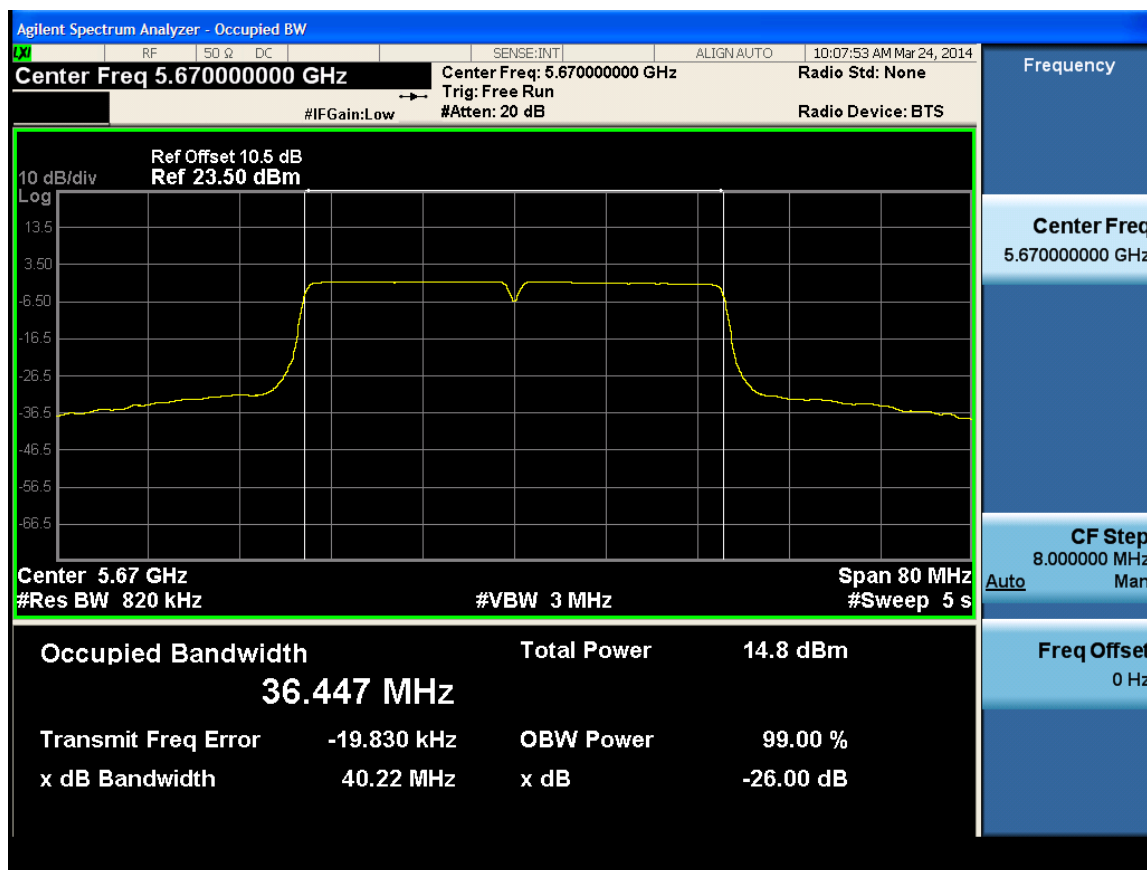
Peak Output Power

15.407: For the bands 5.25-5.35 and 5.47-5.725 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The smallest 26dB bandwidth for all channels is 19.48 MHz. The maximum conducted output power is calculated as 11dBm+10*log(19.48MHz) = 24dBm. This is greater than 250mW.

The maximum supported antenna gain for all bands is 3.5dBi. The peak correlated gain for each mode is listed in the table below. See the Theory of Operation for details on the correlated gain for each mode.

Power Spectral Density

15.407: For the bands 5.25-5.35 and 5.47-5.725 GHz, the peak power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum supported antenna gain is 3.5dBi. The peak correlated gain for each mode is listed in the table below. See the Theory of Operation for details on the correlated gain for each mode.

Method SA-1 from KDB 789033

Connect the antenna port(s) to the spectrum analyzer input. Place the radio in continuous transmit mode. Configure the spectrum analyzer as shown below.

Enable "Channel Power" function of analyzer
Center Frequency: Frequency from table below
Span: 20 MHz (must be greater than 26dB bandwidth, adjust as necessary)
Ref Level Offset: Correct for attenuator and cable loss.
Reference Level: 20 dBm
Attenuation: 20 dB
Sweep Time: Auto
Resolution Bandwidth: 1 MHz
Video Bandwidth: 3 MHz
Detector: Sample
Trace: Trace Average 100 traces in Power Averaging Mode
Integration BW: =99% BW from 99% Bandwidth Data

After averaging 100 traces of the transmitter waveform on the spectrum analyzer, record the spectrum analyzer Channel Power. Perform a Marker Peak Search function, and record this value as the Power Spectral Density.

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Peak Output Power for 802.11a (6Mbps to 54Mbps):

Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
5500	6	15.05	24	-8.95
5580	6	15.12	24	-8.88
5700	6	14.90	24	-9.10

Power Spectral Density for 802.11a (6Mbps to 54Mbps):

Frequency (MHz)	Data Rate	Peak Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
5500	6	3.58	11	-7.42
5580	6	3.60	11	-7.40
5700	6	3.41	11	-7.59

Peak Output Power for 802.11n HT20 (MCS0 to MCS7):

Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
5500	MCS0	14.84	24	-9.16
5580	MCS0	14.95	24	-9.05
5700	MCS0	15.64	24	-8.36

Power Spectral Density for 802.11n HT20 (MCS0 to MCS7):

Frequency (MHz)	Data Rate	Peak Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
5500	MCS0	2.97	11	-8.03
5580	MCS0	3.53	11	-7.47
5700	MCS0	3.85	11	-7.15

Peak Output Power for 802.11n HT40 (MCS0 to MCS7):

Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
5510	MCS0	15.88	24	-8.12
5670	MCS0	15.76	24	-8.24

Power Spectral Density for 802.11n HT40 (MCS0 to MCS7):

Frequency (MHz)	Data Rate	Peak Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
5510	MCS0	1.02	11	-9.98
5670	MCS0	0.87	11	-10.13

Peak Output Power / PSD, 5500 MHz, 802.11a (6 to 54 Mbps)

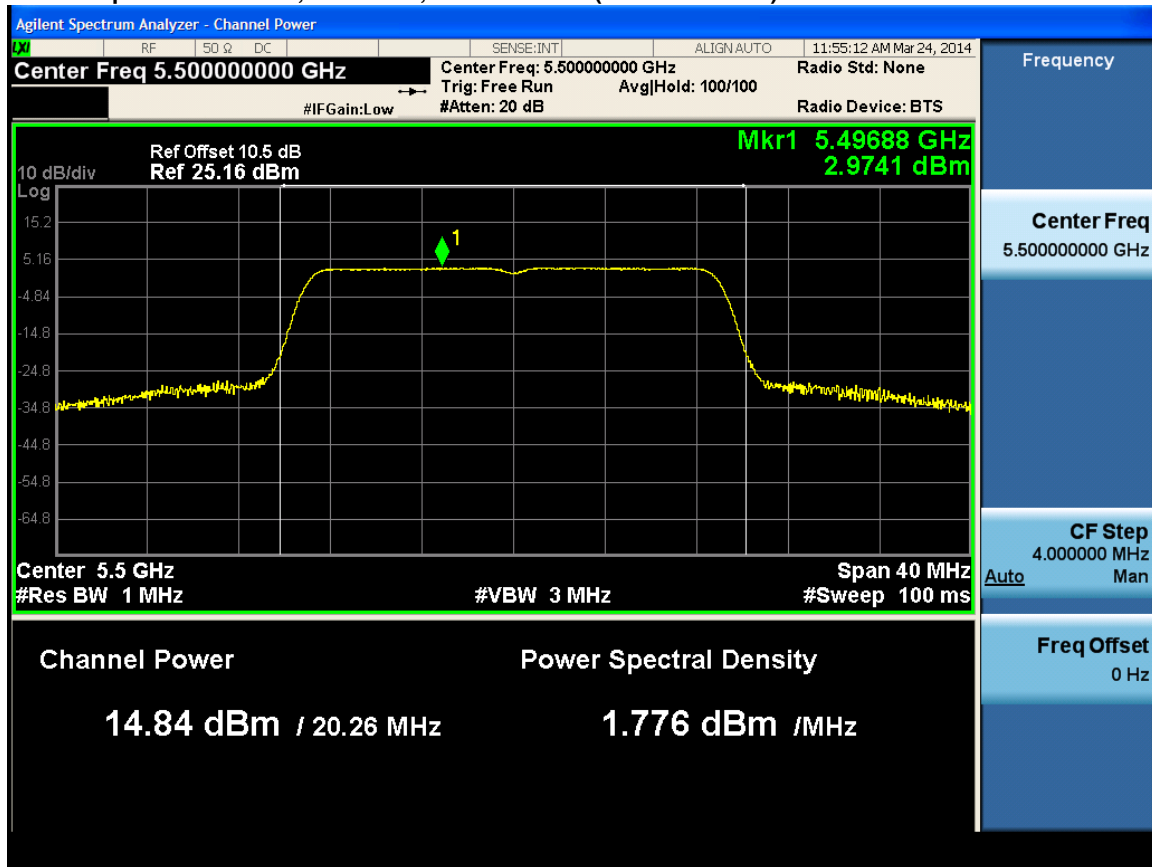**Peak Output Power / PSD, 5580 MHz, 802.11a (6 to 54 Mbps)**

Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**

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Peak Output Power / PSD, 5700 MHz, 802.11a (6 to 54 Mbps)

Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**

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Peak Output Power / PSD, 5500 MHz, 802.11n HT20 (MCS0 to MCS7)

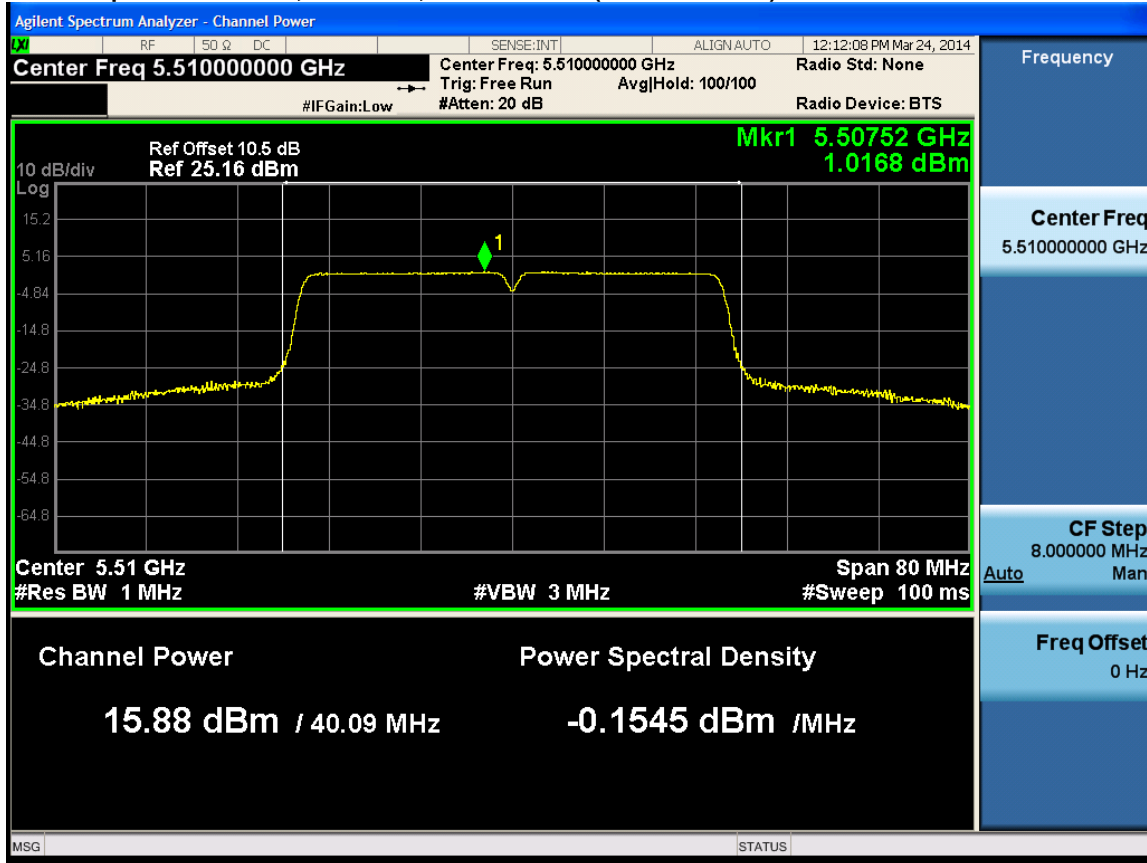**Peak Output Power / PSD, 5580 MHz, 802.11n HT20 (MCS0 to MCS7)**

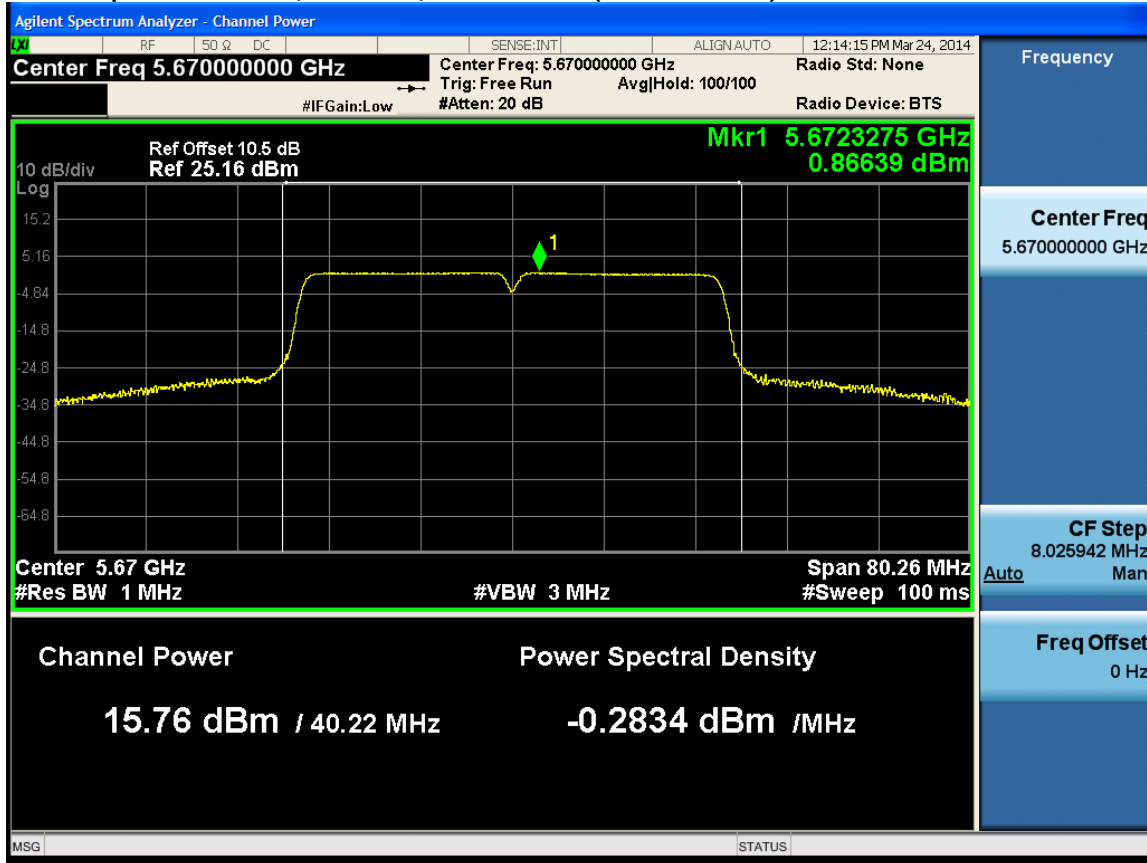Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**

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Peak Output Power / PSD, 5700 MHz, 802.11n HT20 (MCS0 to MCS7)

Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**
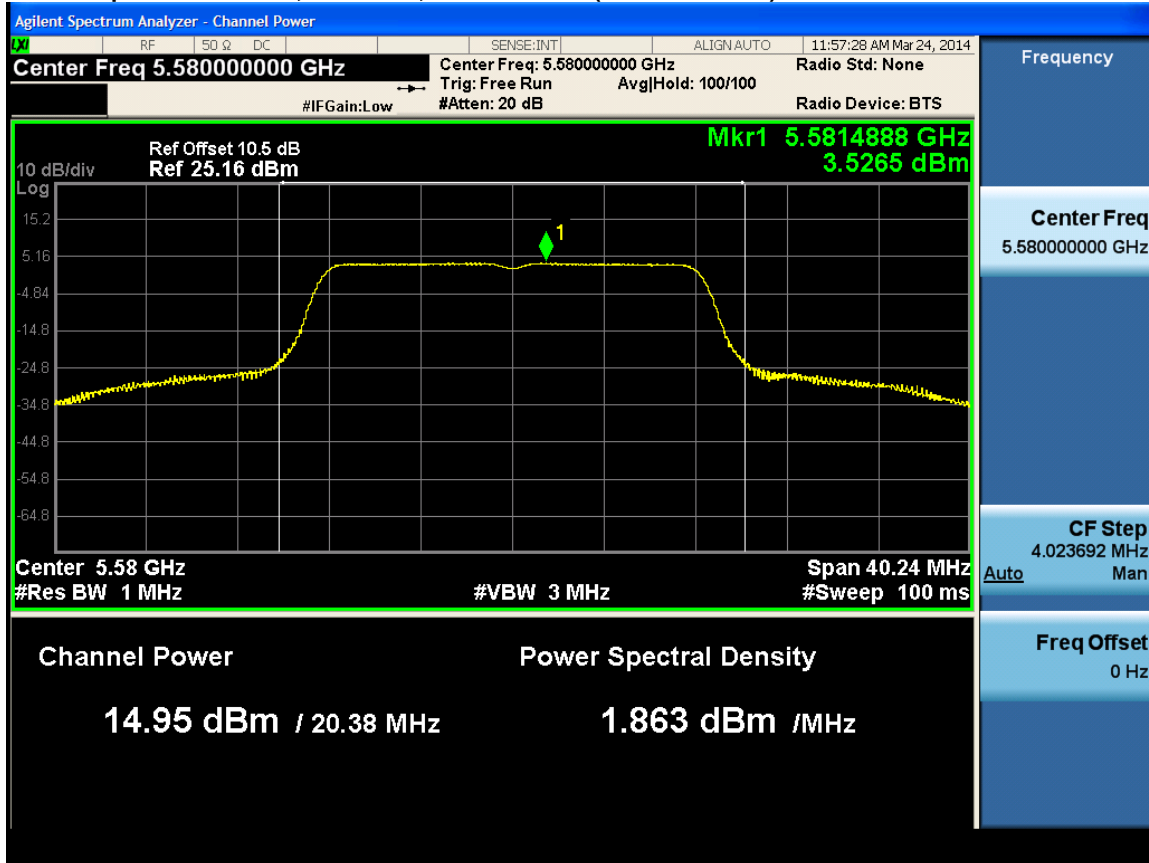
Peak Output Power / PSD, 5510 MHz, 802.11n HT40 (MCS0 to MCS7)

Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**

Peak Output Power / PSD, 5670 MHz, 802.11n HT40 (MCS0 to MCS7)

Peak Excursion

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15.407: The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

Set the spectrum analyzer span to view the entire emission bandwidth. The largest difference between the following two traces must be <= 13 dB for all frequencies across the emission bandwidth.

Set the spectrum analyzer span to view the entire emission bandwidth. The largest difference between the following two traces must be <= 13 dB for all frequencies across the emission bandwidth.

  1st Trace: (Peak)

      Set Span to encompass the entire emission bandwidth of the signal.

      RBW = 1 MHz, VBW = 3 MHz

      Detector = Peak

      Sweep = Auto

      Trace 1 = Max-hold

      Ref Level Offset = correct for attenuator and cable loss

      Ref Level = 20dBm

      Atten = 30dBm

2nd Trace: (Average)

      Trace 2 = clear right

      Detector = Sample

      Avg/VBW type = Pwr(RMS)

      Average = 100

      Sweep = single

Set marker Deltas

      Trace 1 & Peak search

      Marker Delta

      Trace 2 & Peak search

Record the difference between the Peak and Average Markers

Results for 802.11a (6Mbps to 54Mbps):

Frequency (MHz)	Data Rate	Peak Excursion (dB)	Limit (dBm)	Margin (dB)
5500	6	7.13	13	-5.87
5580	6	7.30	13	-5.70
5700	6	7.49	13	-5.51

Results for 802.11n HT20 (MCS0 to MCS7):

Frequency (MHz)	Data Rate	Peak Excursion (dB)	Limit (dBm)	Margin (dB)
5500	MCS0	7.74	13	-5.26
5580	MCS0	7.12	13	-5.88
5700	MCS0	6.95	13	-6.05

Results for 802.11n HT40 (MCS0 to MCS7):

Frequency (MHz)	Data Rate	Peak Excursion (dB)	Limit (dBm)	Margin (dB)
5510	MCS0	7.48	13	-5.52
5670	MCS0	7.51	13	-5.49

Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**

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Graphical Test Results for 802.11a:

Peak Excursion, 5500 MHz, 6 to 54 Mbps

Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**

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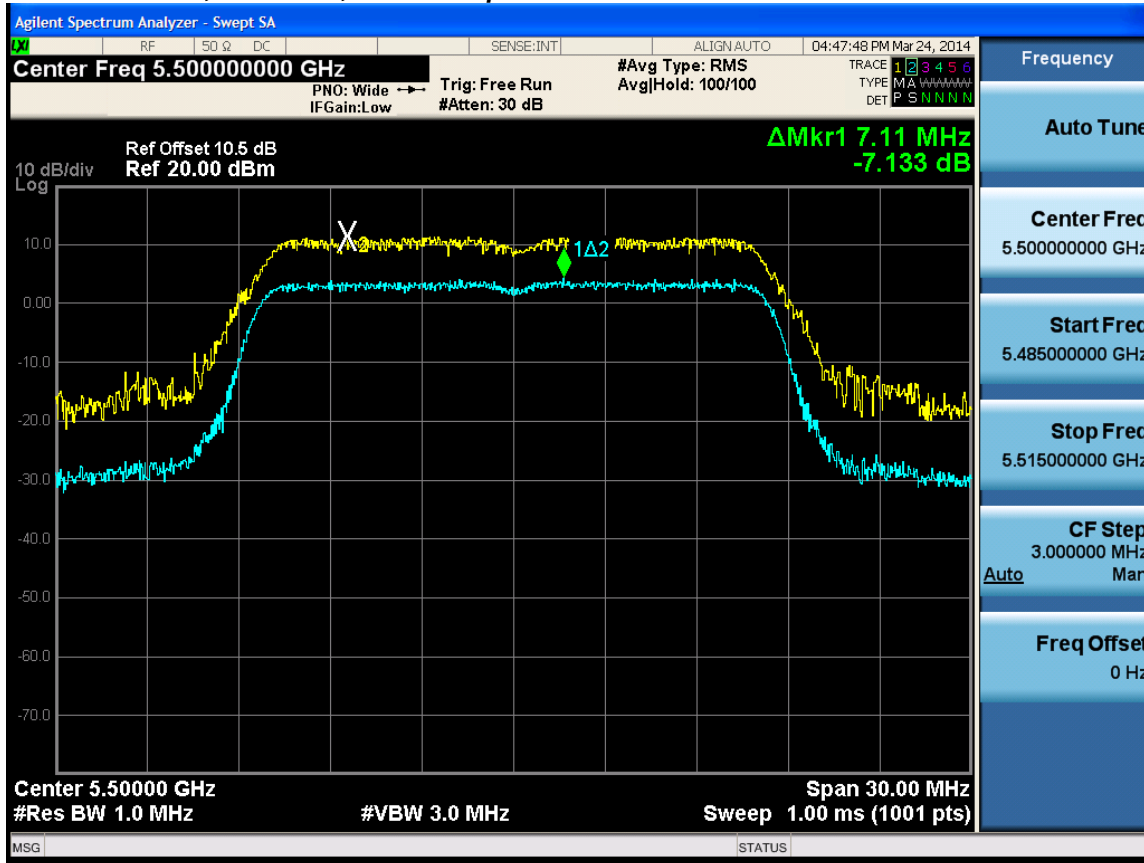
Peak Excursion, 5580 MHz, 6 to 54 Mbps

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Cisco Systems, Inc. Company Confidential

Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**
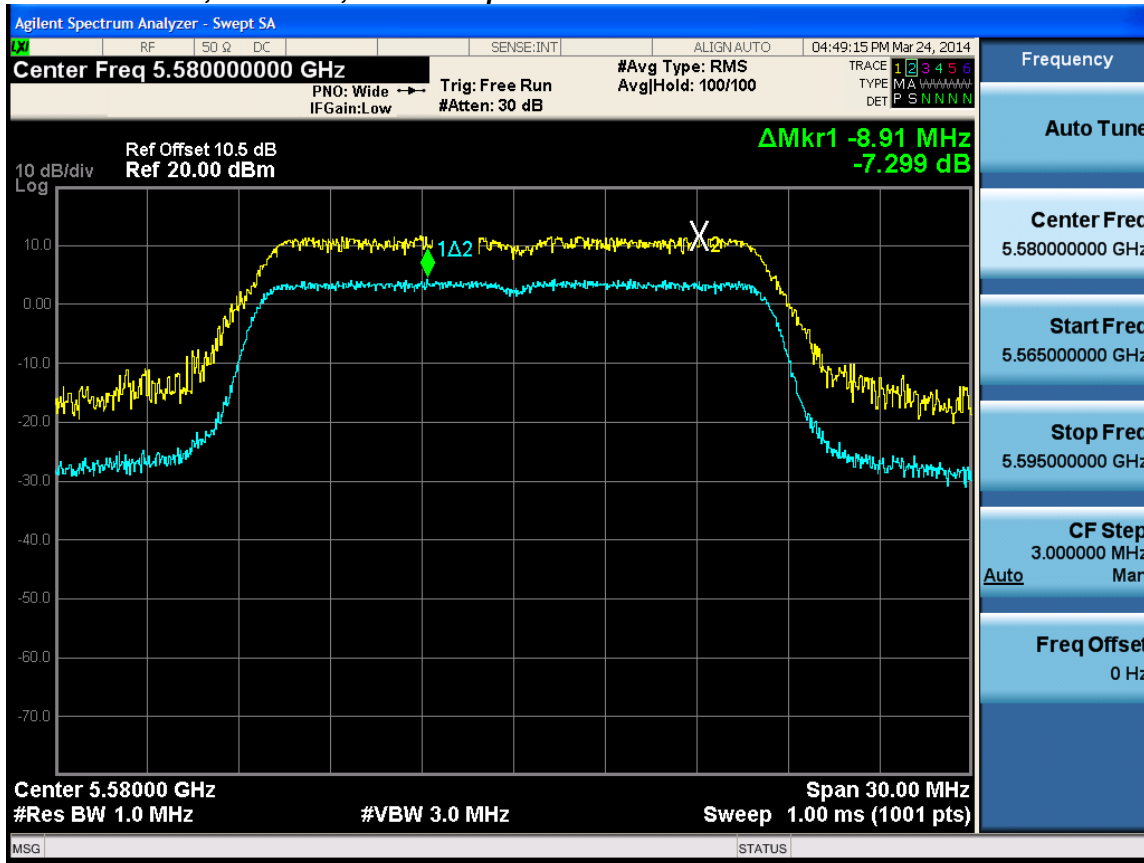
Peak Excursion, 5700 MHz, 6 to 54 Mbps

Radio Test Report No: EDCS - 1404064
FCC ID: LDKDX700976 IC: 2461B- DX700976

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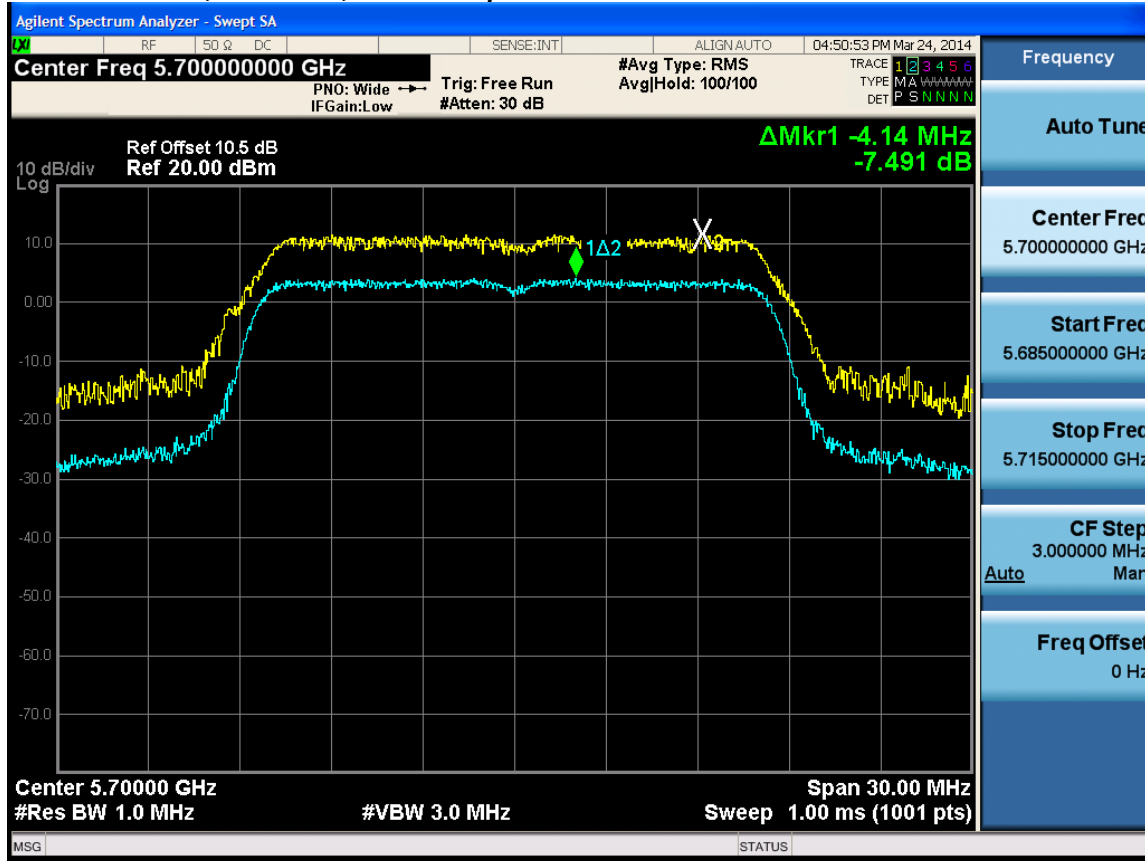
Graphical Test Results for 802.11n HT20:

Peak Excursion, 5500 MHz, MCS0 to MCS7

Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**
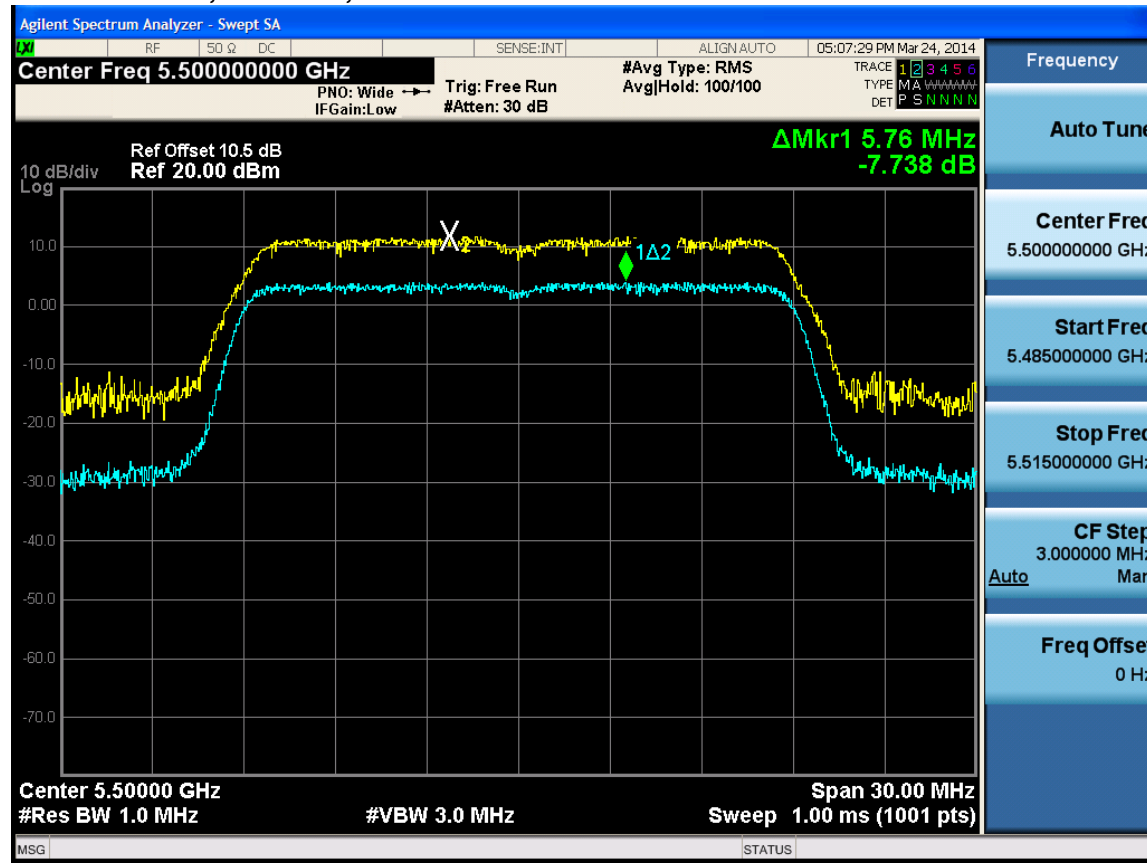
Peak Excursion, 5580 MHz, MCS0 to MCS7

Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**
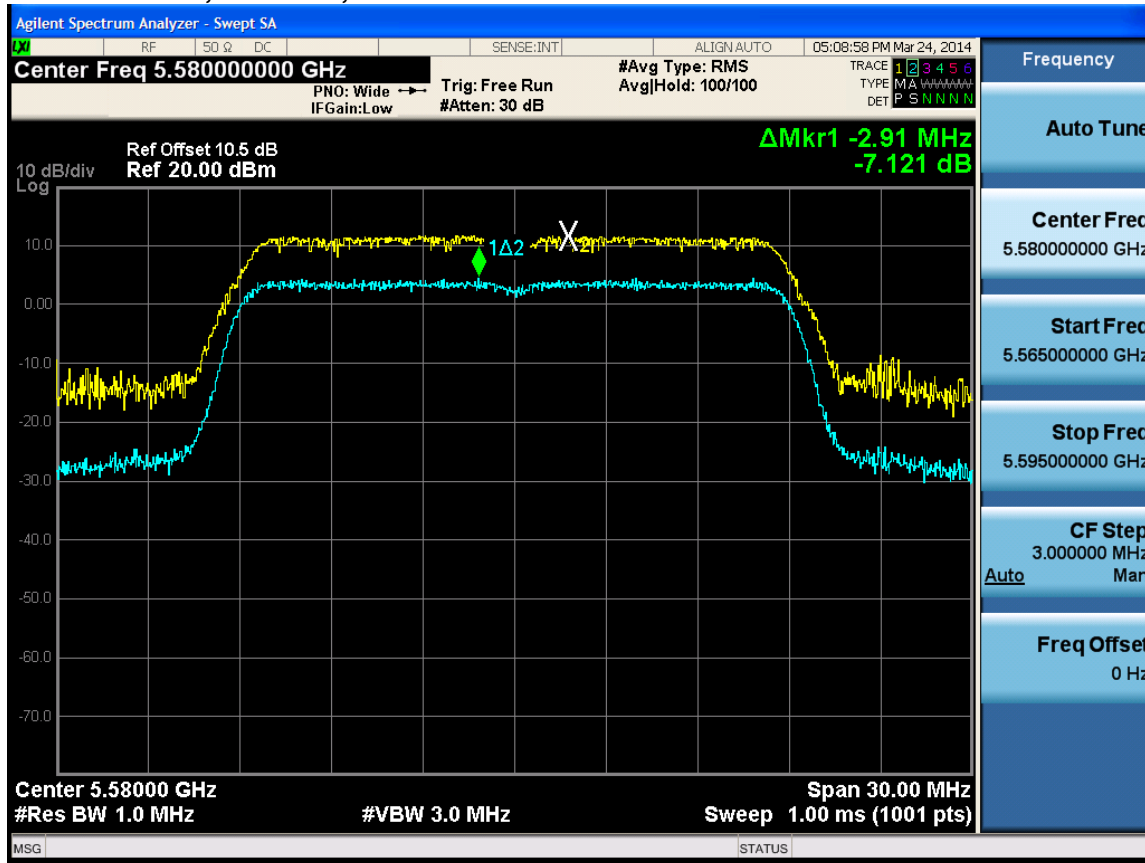
Peak Excursion, 5700 MHz, MCS0 to MCS7

Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**

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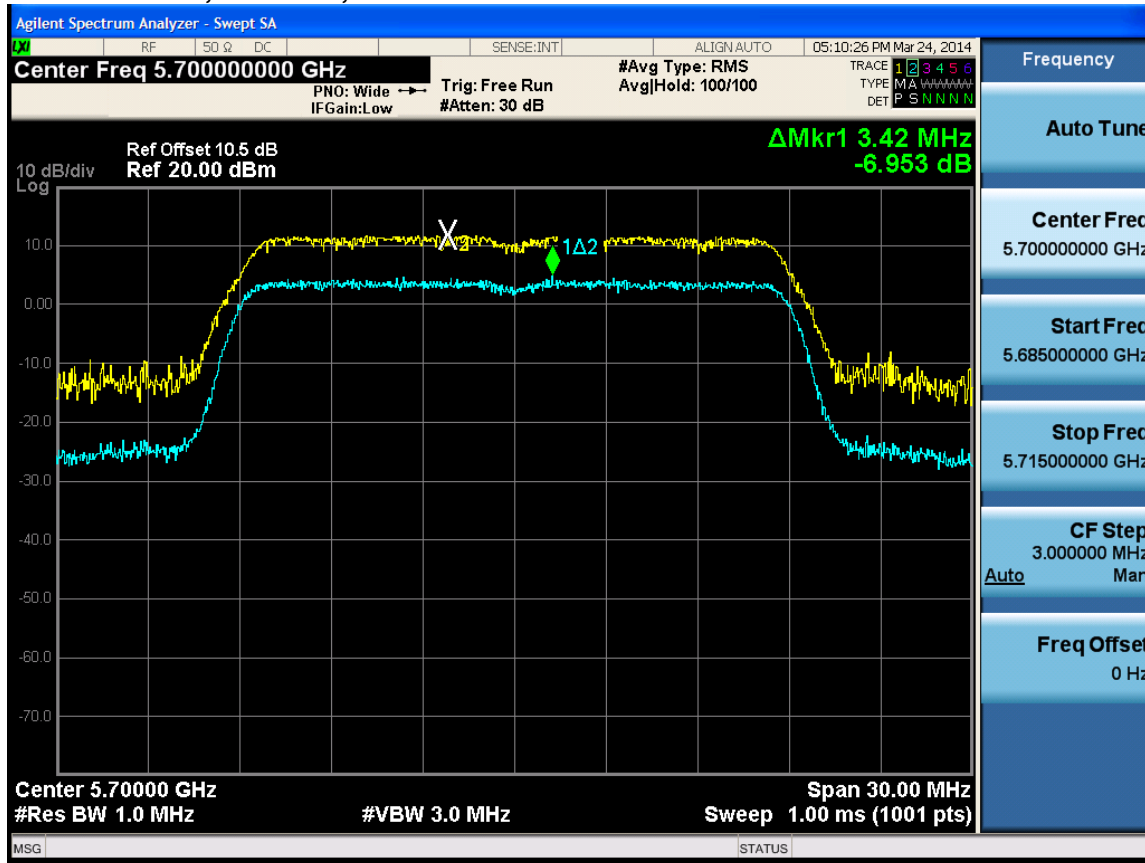
Graphical Test Results for 802.11n HT40:

Peak Excursion, 5510 MHz, MCS0 to MCS7

Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**

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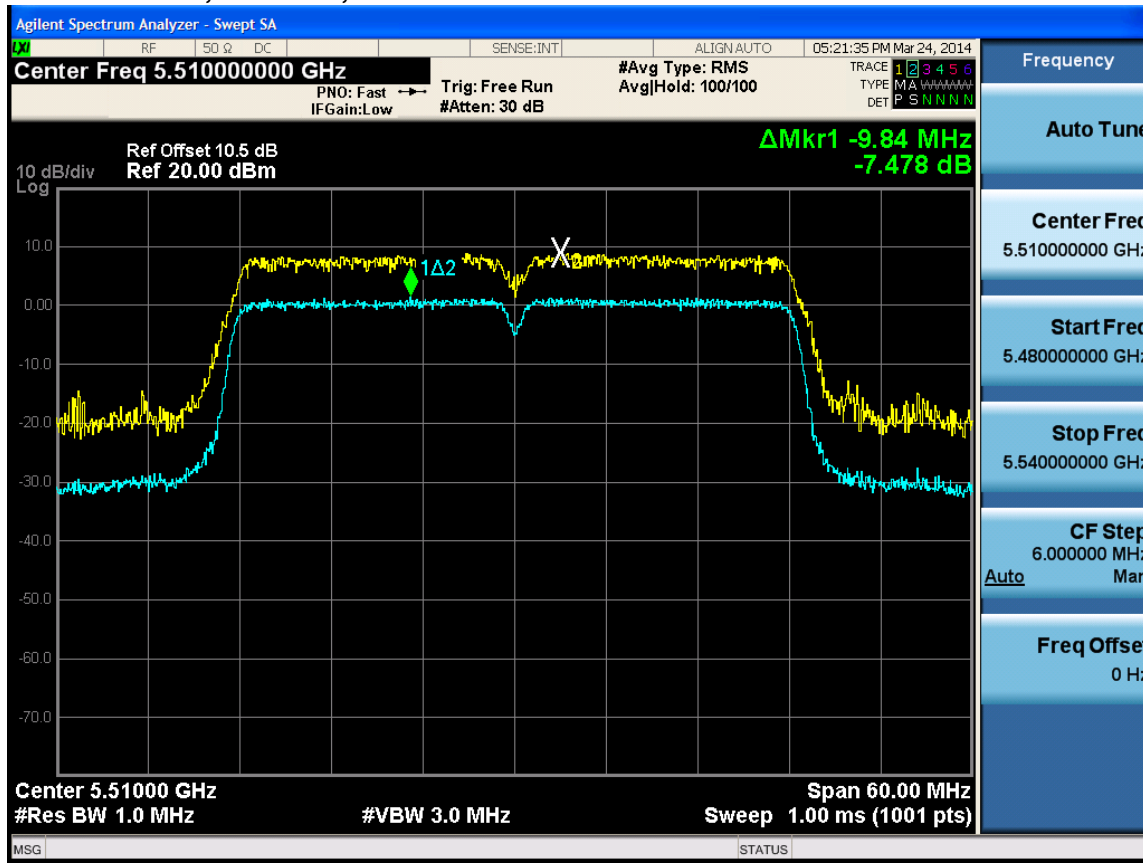
Peak Excursion, 5670 MHz, MCS0 to MCS7
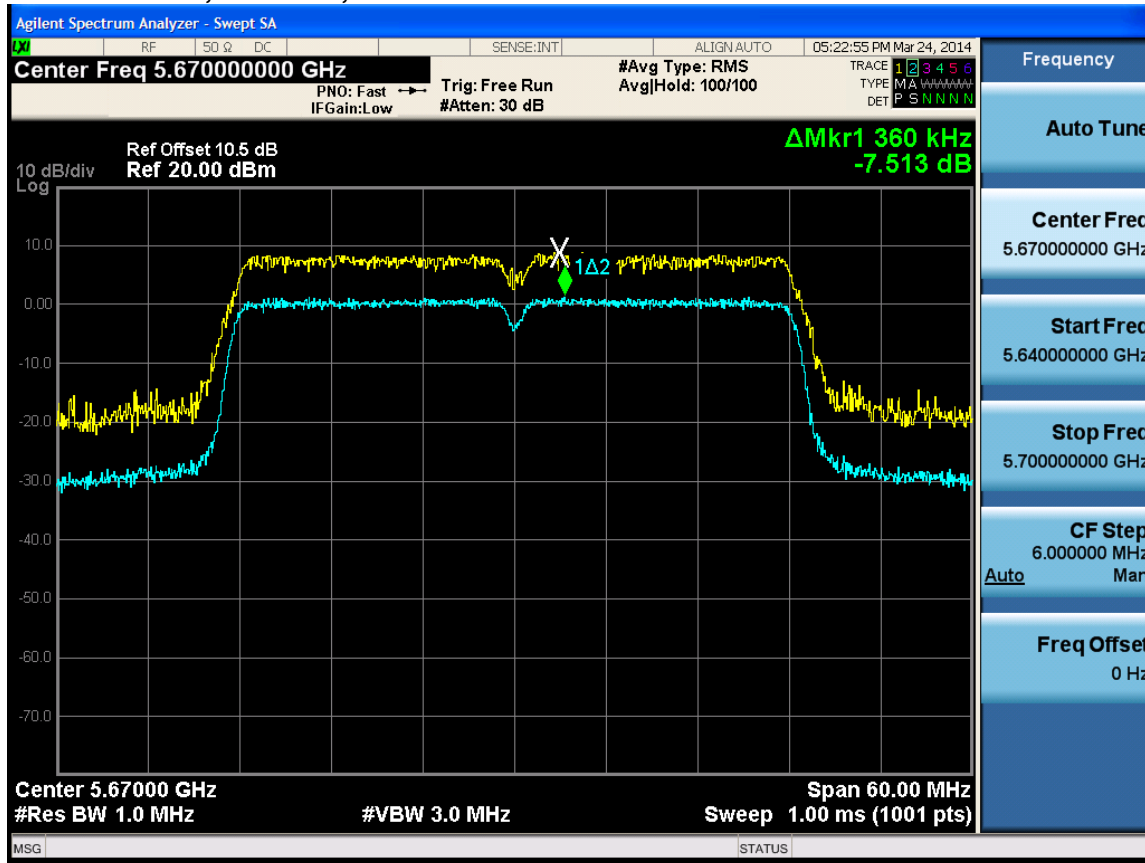
Conducted Spurious Emissions

15.407: For transmitters operating in the 5.25-5.35 and 5.47-5.725 GHz band: all emissions outside of the 5.25-5.35 and 5.47-5.725 GHz bands shall not exceed an EIRP of -27dBm/MHz.
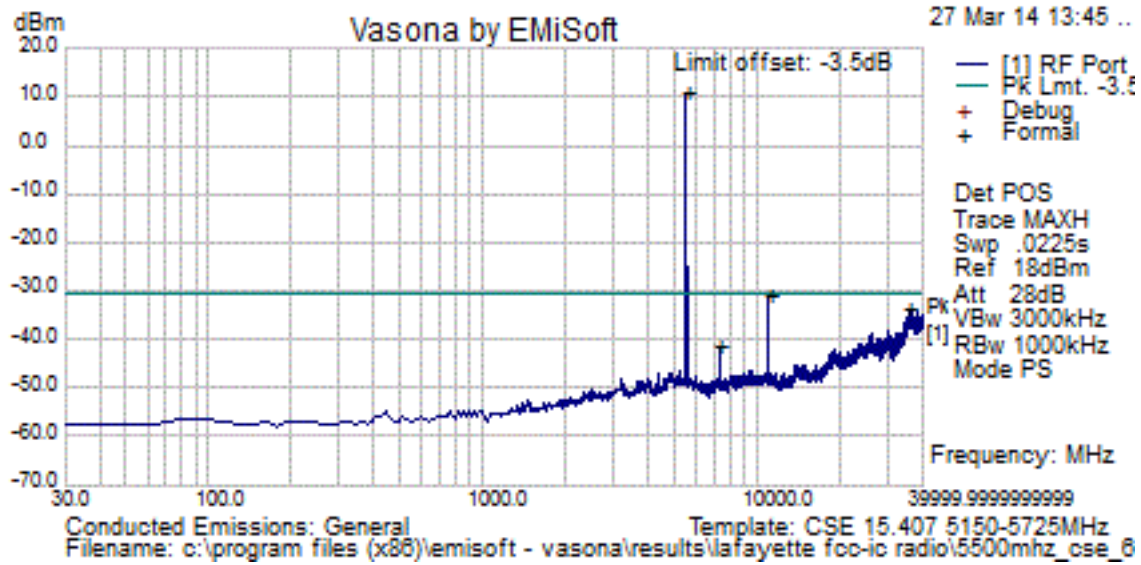
Connect the antenna port(s) to the spectrum analyzer input. Place the radio in continuous transmit mode. Configure the spectrum analyzer as shown below (be sure to enter all losses between the transmitter output and the spectrum analyzer).

Span:	30 MHz-40 GHz
Reference Level:	18 dBm
Attenuation:	28 dB
Sweep Time:	Auto
Resolution Bandwidth:	1 MHz
Video Bandwidth:	3 MHz
Detector:	Peak
Trace:	Max Hold
Marker:	Peak

Record the marker waveform peak to spur difference

Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**

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Graphical result 5500MHz, 802.11a (6Mbps to 54Mbps)

Results Table:

	Formal Data										
No	Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
1	5500.000	10.4	.6	.0	11.0	Peak [Scan]	RF Port	-30.5	41.5	N/A	tx freq
2	11000.000	-31.6	.9	.0	-30.8	Peak [Scan]	RF Port	-30.5	-.3	Pass	2nd harmonic
3	36009.063	-35.4	1.6	.0	-33.8	Peak [Scan]	RF Port	-30.5	-3.3	Pass	
4	7342.338	-42.2	.7	.0	-41.5	Peak [Scan]	RF Port	-30.5	-11.0	Pass	

Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**

Graphical result 5580MHz, 802.11a (6Mbps to 54Mbps)
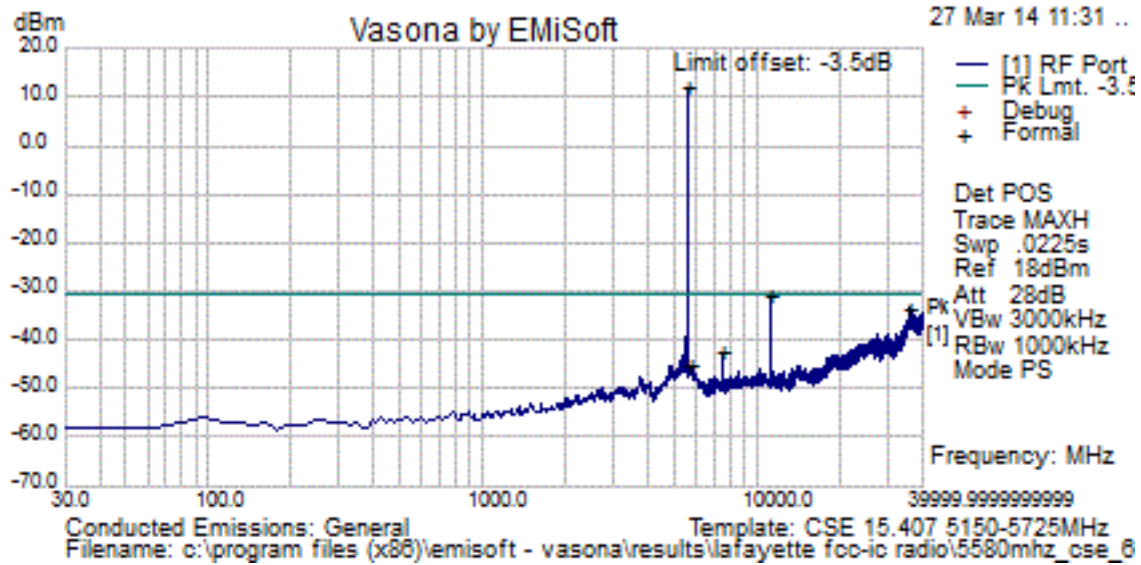
Results Table:

No	Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
1	5580.000	11.3	.6	.0	12.0	Peak [Scan]	RF Port	-30.5	42.5	N/A	tx freq
2	11160.000	-31.7	.9	.0	-30.8	Peak [Scan]	RF Port	-30.5	-.3	Pass	2nd harmonic
3	35916.250	-35.1	1.7	.0	-33.5	Peak [Scan]	RF Port	-30.5	-3.0	Pass	
4	7441.600	-43.4	.7	.0	-42.7	Peak [Scan]	RF Port	-30.5	-12.2	Pass	
5	5737.594	-46.0	.6	.0	-45.4	Peak [Scan]	RF Port	-30.5	-14.9	Pass	
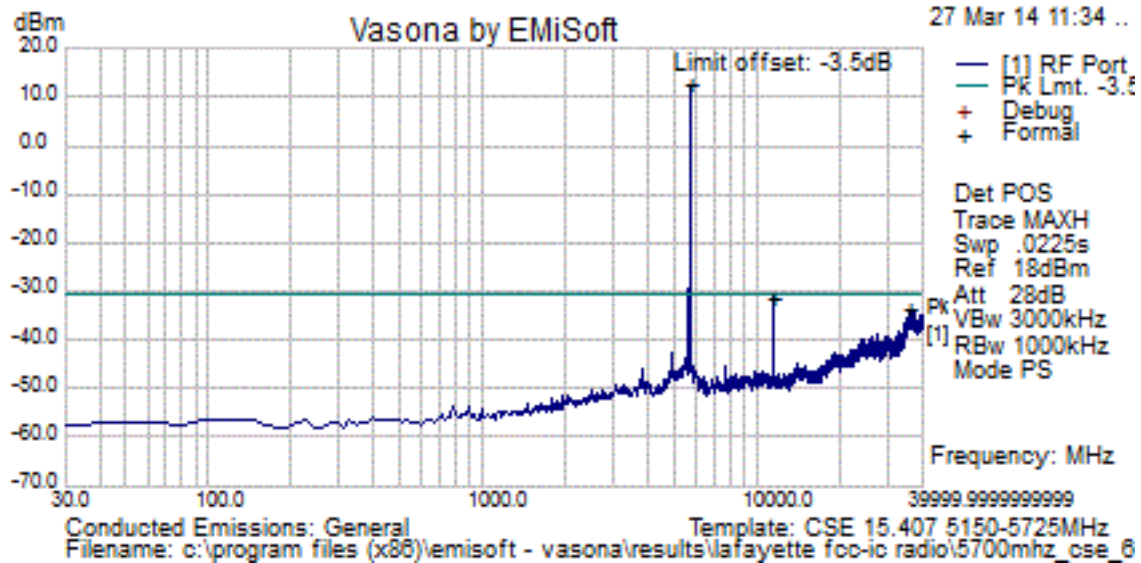
Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**

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Graphical result 5700MHz, 802.11a (6Mbps to 54Mbps)

Conducted Emissions: General   Template: CSE 15.407 5150-5725MHz
Filename: c:\program files (x86)\emisoft - vasona\results\lafayette fcc-ic radio\5700mhz_cse_6

Results Table:

No	Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
1	5700.000	11.8	.6	.0	12.5	Peak [Scan]	RF Port	-30.5	43.0	N/A	tx freq
2	11400.000	-32.2	.9	.0	-31.3	Peak [Scan]	RF Port	-30.5	-.8	Pass	2nd harmonic
3	35857.188	-35.4	1.6	.0	-33.8	Peak [Scan]	RF Port	-30.5	-3.3	Pass	
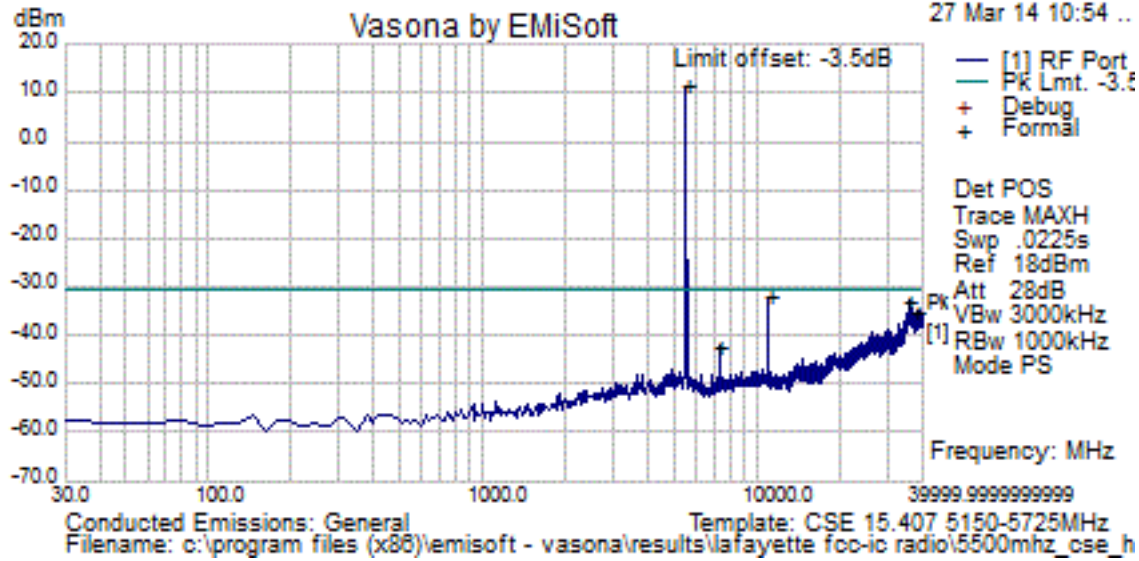
Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**

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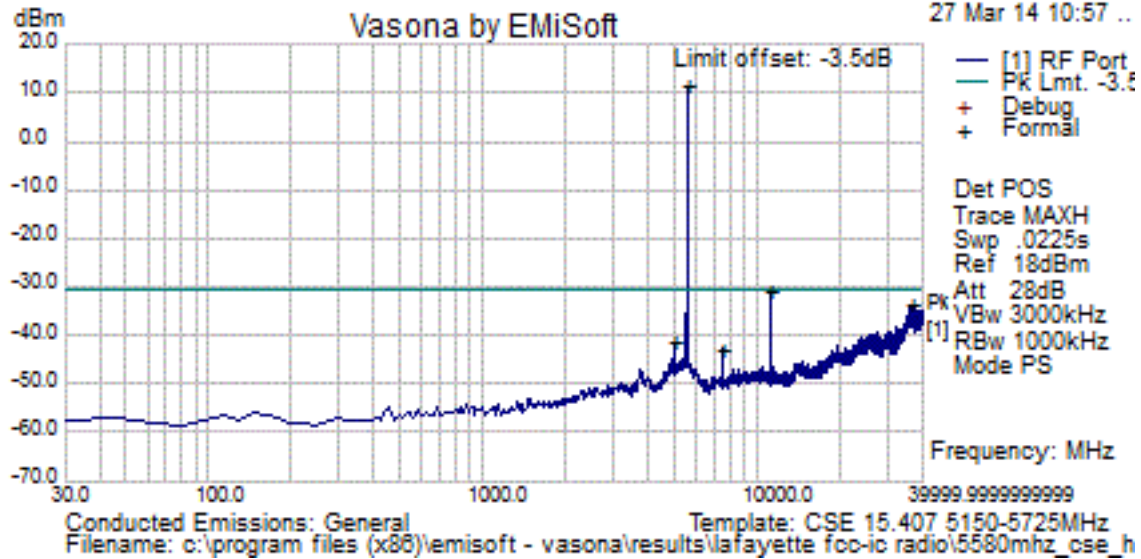**Graphical result 5500MHz, 802.11n HT20 (MCS0 to MCS7)**

Results Table:

No	Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
1	5500.000	10.8	.6	.0	11.4	Peak [Scan]	RF Port	-30.5	41.9	N/A	tx freq
2	11000.000	-32.9	.9	.0	-32.1	Peak [Scan]	RF Port	-30.5	-1.6	Pass	2nd harmonic
3	35958.438	-34.5	1.7	.0	-32.9	Peak [Scan]	RF Port	-30.5	-2.4	Pass	
4	38160.625	-36.7	1.7	.0	-35.0	Peak [Scan]	RF Port	-30.5	-4.5	Pass	
5	7342.338	-43.0	.7	.0	-42.3	Peak [Scan]	RF Port	-30.5	-11.8	Pass	

Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**

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Graphical result 5580MHz, 802.11n HT20 (MCS0 to MCS7)

Conducted Emissions: General
Filename: c:\program files (x86)\emisoft - vasona\results\lafayette fcc-ic radio\5580mhz_cse_h

Results Table:

No	Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
1	5580.000	10.9	.6	.0	11.5	Peak [Scan]	RF Port	-30.5	42.0	N/A	tx freq
2	11160.000	-31.8	.9	.0	-30.9	Peak [Scan]	RF Port	-30.5	-.4	Pass	2nd harmonic
3	36650.313	-35.3	1.7	.0	-33.6	Peak [Scan]	RF Port	-30.5	-3.1	Pass	
4	4960.038	-42.0	.6	.0	-41.4	Peak [Scan]	RF Port	-30.5	-10.9	Pass	
5	7441.600	-43.6	.7	.0	-42.9	Peak [Scan]	RF Port	-30.5	-12.4	Pass	
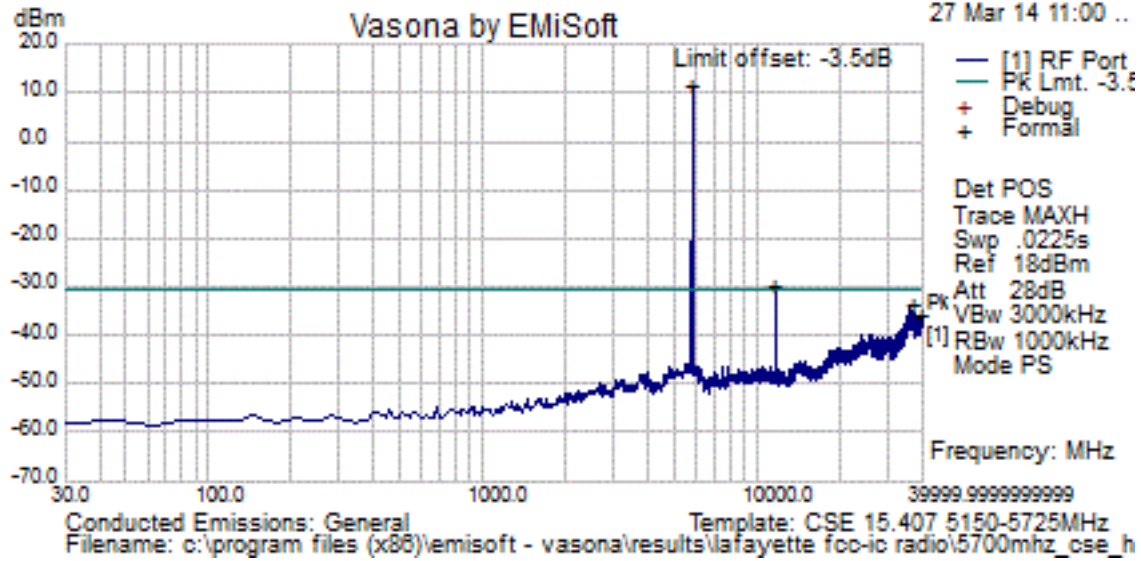
Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**

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Graphical result 5700MHz, 802.11n HT20 (MCS0 to MCS7)

Results Table:

No	Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
1	5700.000	10.8	.6	.0	11.4	Peak [Scan]	RF Port	-30.5	41.9	N/A	tx freq
2	11400.000	-31.2	.9	.0	-30.3	Peak	RF Port	-30.5	-0.2	Pass	2nd harmonic
3	36228.438	-35.4	1.7	.0	-33.8	Peak [Scan]	RF Port	-30.5	-3.3	Pass	
4	39257.500	-37.6	1.8	.0	-35.8	Peak [Scan]	RF Port	-30.5	-5.3	Pass	

Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**

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Graphical result 5510MHz, 802.11n HT40 (MCS0 to MCS7)
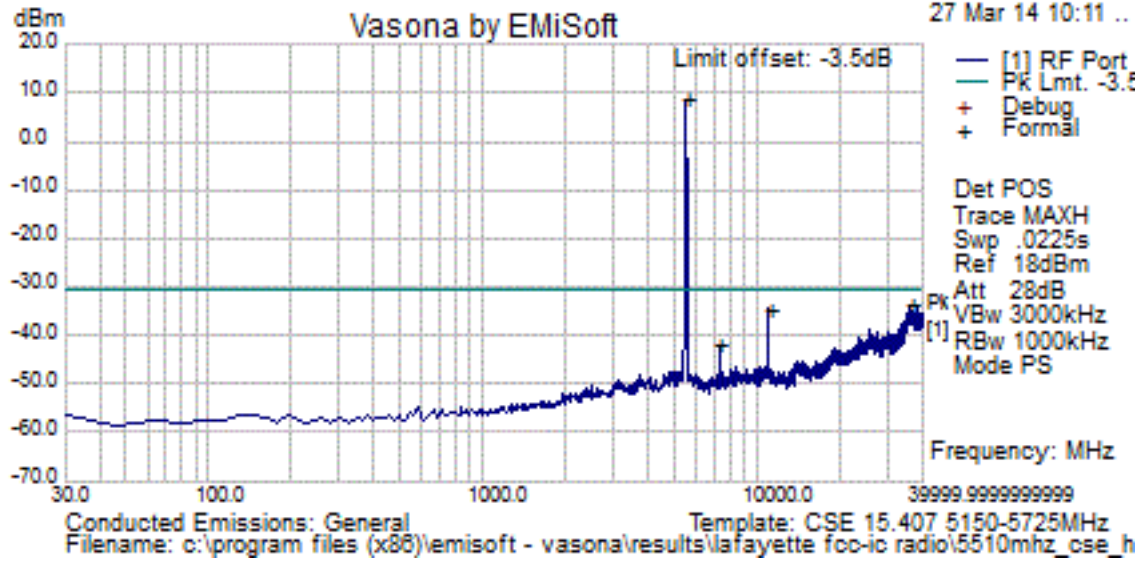
Results Table:

| | Formal Data | | | | | | | | | | |
No	Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
1	5510.000	8.2	.6	.0	8.8	Peak [Scan]	RF Port	-30.5	39.3	N/A	tx freq
2	36177.813	-35.4	1.7	.0	-33.7	Peak [Scan]	RF Port	-30.5	-3.2	Pass	
3	11020.000	-35.4	.9	.0	-34.5	Peak [Scan]	RF Port	-30.5	-4.0	Pass	2nd harmonic
4	7342.338	-42.7	.7	.0	-42.0	Peak [Scan]	RF Port	-30.5	-11.5	Pass	

Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**

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Graphical result 5670MHz, 802.11n HT40 (MCS0 to MCS7)
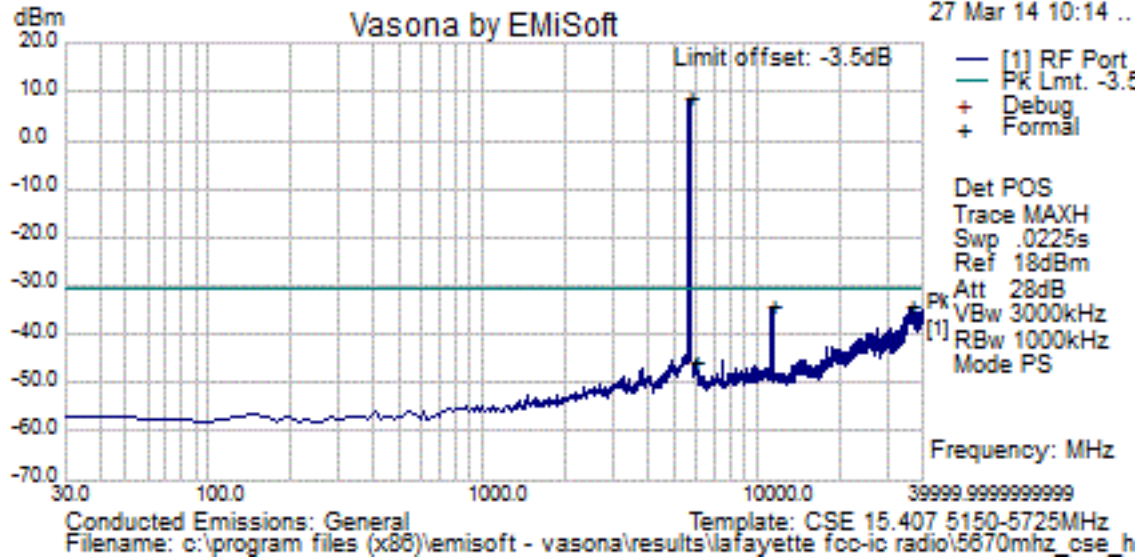
Conducted Emissions: General
Filename: c:\program files (x86)\emisoft - vasona\results\lafayette fcc-ic radio\5670mhz_cse_h

Results Table:

No	Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
	Formal Data										
1	5670.000	8.2	.6	.0	8.9	Peak [Scan]	RF Port	-30.5	39.4	N/A	tx freq
2	36270.625	-35.9	1.7	.0	-34.3	Peak [Scan]	RF Port	-30.5	-3.8	Pass	
3	11340.000	-35.2	.9	.0	-34.3	Peak [Scan]	RF Port	-30.5	-3.8	Pass	2nd harmonic
4	6002.294	-46.3	.7	.0	-45.7	Peak [Scan]	RF Port	-30.5	-15.2	Pass	

Conducted Bandedge

15.407: For transmitters operating in the 5.25-5.35 and 5.47-5.725 GHz band: all emissions outside of the 5.25-5.35 and 5.47-5.725 GHz bands shall not exceed an EIRP of -27dBm/MHz.

Connect the antenna port(s) to the spectrum analyzer input. Place the radio in continuous transmit mode. Configure the spectrum analyzer as shown below (be sure to enter all losses between the transmitter output and the spectrum analyzer).
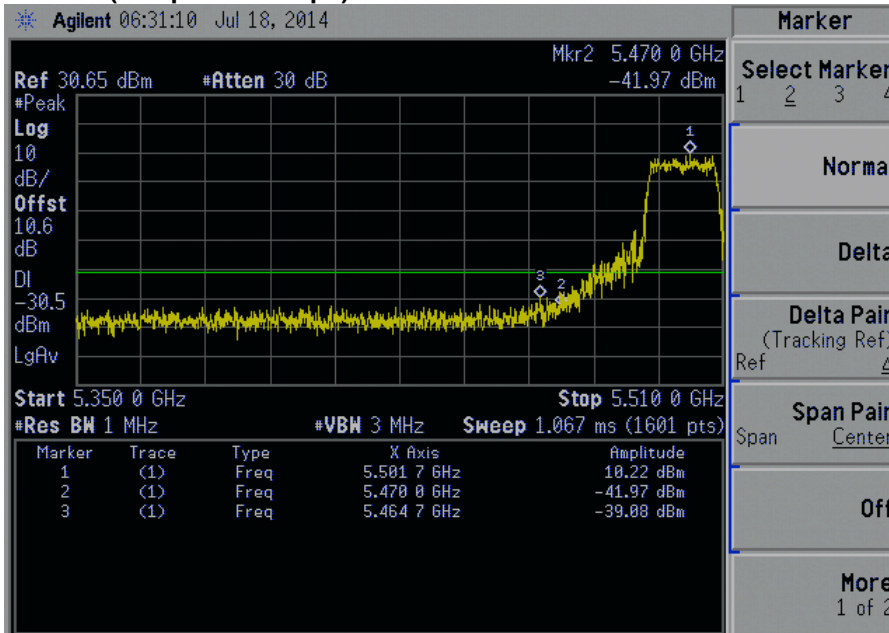
Span:	100MHz – 150MHz
Reference Level:	30 dBm
Attenuation:	30 dB
Sweep Time:	Auto
Resolution Bandwidth:	1 MHz
Video Bandwidth:	3 MHz
Detector:	Peak
Trace:	Single
Marker:	Peak

Record the marker waveform peak to spur difference

Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**

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Test Results:

802.11a (6Mbps to 54Mbps) Peak

Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**

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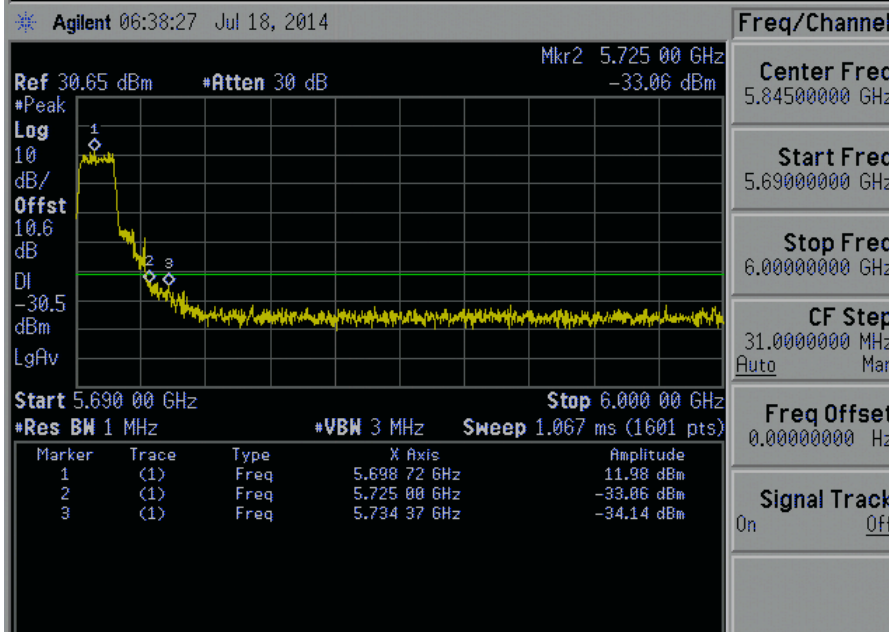
Test Results:

802.11n HT20 (MCS0 to MCS7) Peak

Radio Test Report No: **EDCS - 1404064**
FCC ID: **LDKDX700976** IC: **2461B- DX700976**

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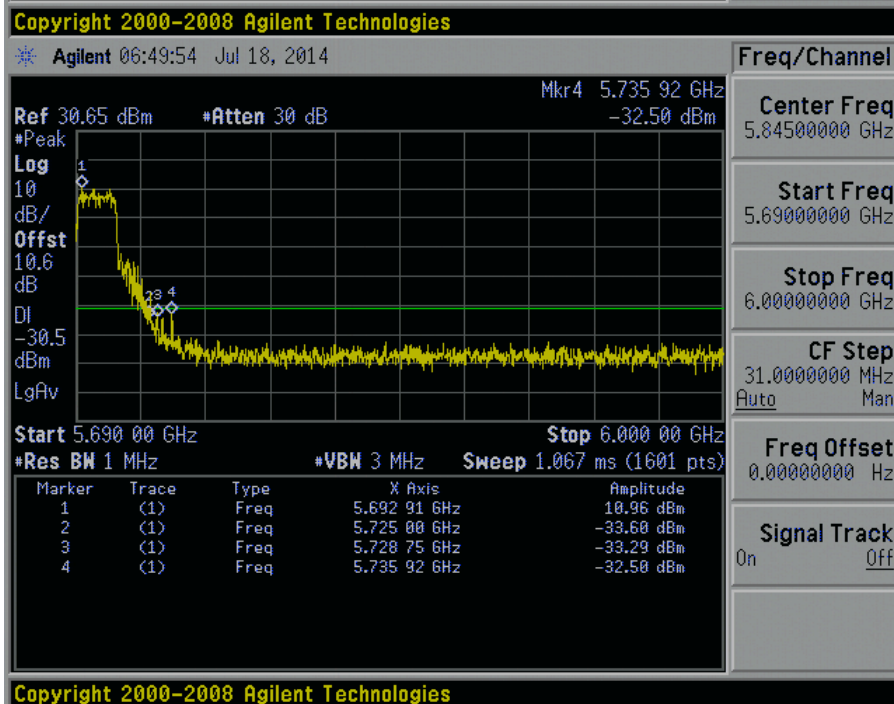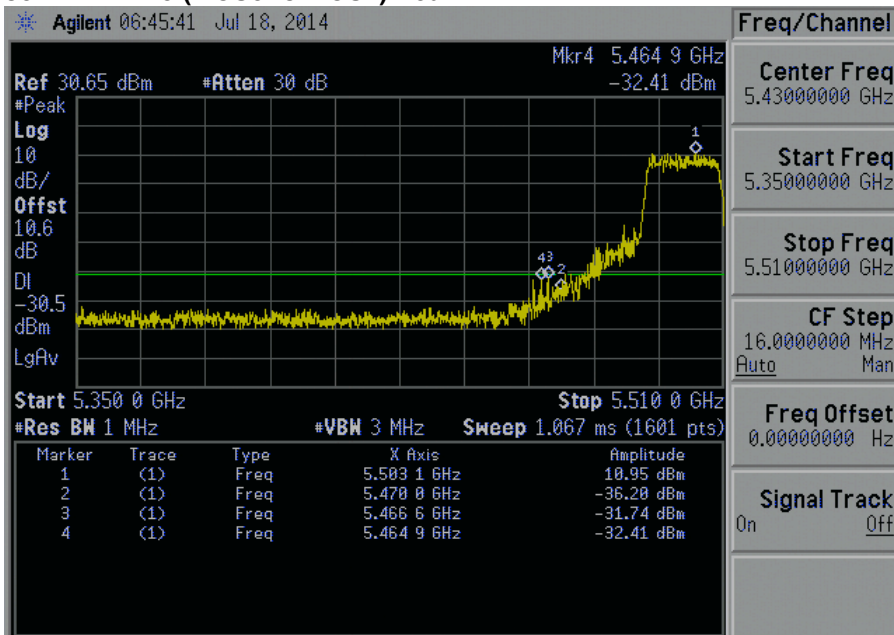
Test Results:

802.11n HT40 (MCS0 to MCS7) Peak