MOBILE DEVICES BUSINESS

PRODUCT SAFETY AND COMPLIANCE EMC LABORATORY

EMC TEST REPORT - Addendum

Test Report Number – 23305-1 WLAN

Report Date – 2009-08-26

The test results contained herein relate only to the model(s) identified. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics.

Signature: Lei Yang Name: Lei Yang

Title: EMC Project Manager Test: 2009-05-06 to 2009-05-18

As the responsible test lab manager, I hereby declare that the model tested as specified in this report conforms to the requirements indicated.

Signature: Name: Yilin Zhao

Title: Test Lab Manager Date: 2009-08-26

FCC Registration Number: 177885
IC Registration Number: 109AW-1

ADR Testing Service location ADR BJ
ISO/IEC-17025:2005 accredited by UKAS

UKAS TESTING
2404

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Test Report Details

Tests Performed By:	Motorola (China) Technologies Ltd. Asia Global Compliance Labs No.1 Wang Jing East Road Chao Yang District Beijing, 100102, P. R. China Phone: +86 10 8473 2610 FCC Registration Number: 177885 IC Registration Number: 109AW-1
Tests Requested By:	Motorola Inc. Mobile Devices business 600 North US Hwy 45 Libertyville, IL 60048
Product Type:	Cell phone with WLAN (WiFi)
Form Factor:	Slider
Signaling Capability:	WCDMA 850/1900/2100, GSM 850/900/1800/1900, HSDPA 7.2 Mbps (Category 7/8), EDGE Class 12, GPRS Class 12, AGPS /Standalone GPS/aGPS, Bluetooth Class I, Version 2.0+EDR, 802.11b/802.11g
Serial Numbers:	004401026995387
Battery Type:	BP6X with model number SNN5843A
FCC ID:	IHDT56KV2
Project Number:	23305-1
Testing Complete Date:	05-18-2009

Applicable Standards

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

__X__Part 15 Subpart C – Intentional Radiators
______Part 22 Subpart H - Public Mobile Services
______Part 24 - Personal Communications Services
______Part 27 - Wireless Communications Service
______ Part 90 - Private Land Mobile Radio Service

Applicable Standards: ANSI 63.4-2003, RSS-GEN, RSS-210 (WLAN).

The following tests were performed according to the regulations:

- The **spurious radiated emission** requirements of **§ 15.247 and § 15.249 of CFR47 Part 15 2007**, specifically" radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

- Under this project only 30 to 1000 MHz, 1 to 26.5 GHz radiated and radiated band-edge measurements were performed.

- For frequencies below 1 GHz a 100 kHz RBW (6 dB) is used and above 1 GHz a 1 MHz RBW (6 dB) is used.

Summary of Testing

Test	Test Name	Pass/Fail
1	Field Strength of Spurious Emissions	Pass
2	Band-edge Compliance of RF Radiated Emissions	Pass ( )

Test	Test Name	Results
1	Field Strength of Spurious Emissions	See plots
2	Band-edge Compliance of RF Radiated Emissions	See plots

The margin with respect to the limit is the minimum margin for all modes and bands. ( ) indicates the margin at which the product exceeds the limit.

General and Special Conditions

The 23305-1 test sample was tested using a fully charged battery when applicable. Where a battery could not be used due to the need for a controlled variation of input voltage, an external power supply was utilized.

Special test SW was used for these tests. In all band (b) tests, the WLAN was transmitting at 11Mbps (DSSS) @18 dBm and in all band (g) tests, the WLAN was transmitting at 54 Mbps (OFDM) @14 dBm.

802.11g Data Rates	
48/54 Mbps	14.0 dBm
36/24 Mbps	14.0 dBm
18/12 Mbps	14.0 dBm
9/6 Mbps	14.0 dBm

802.11b Data Rates	
11 Mbps	18.0 dBm

All testing was done in an indoor controlled environment with an average temperature of 25 º C ± 1 º C and relative humidity of 45 % ± 6 % over the dates used for testing.

Equipment and Cable Configurations

The EUT was tested in a stand-alone configuration that is representative of typical use.

Measuring Equipment and Calibration Information

Equipment related to the semi-anechoic chamber testing:

Equipment	Model/type	Serial number	Operational range	Date of calibration
EMI Receiver	ESU 40	100036	20 Hz – 40 GHz	05.15.2009
Pre Amplifiers	PA-02-0001:	2007343	10 kHz – 3 GHz	06.26.2009
	PA-02-218	2007344	3 GHz – 18 GHz	06.26.2009
	PA-02-5	2007345	18 GHz – 40 GHz	06.26.2009
Radio Communication Tester	CMU 200	112790	GSM 850/900/1800/1900, IS95, UMTS, CDMA, Bluetooth	N/A
Band Reject Filter	WRCG	N/A	ISM band	N/A
	4N45-24241/3/6	N/A	WLAN	N/A

The antennas used in the various tests are listed in the below table.

Antenna	Type	Serial number	Operational range	Date of calibration
Hybrid-log periodic	TDK HLP 3003C	130361	30 MHz – 3 GHz	11.07.08
Double ridged Horn	TDK HRN0118	130303	1 GHz – 18 GHz	03.26.09
Double ridged Horn	ETS HRN3116	00071938	18 GHz – 40 GHz	10.17.08

All equipment is on a one-year calibration cycle except for antennas

Description of WLAN (WiFi) Transmitter

The 23305-1 cell phone offers WLAN as a feature. The WLAN direct sequence spread-spectrum transceiver is designed to operate between 2400 and 2483 MHz. The WLAN antenna is mounted on the PCB inside of the EUT. The antenna installation is permanent. For a more thorough description of the functionality please refer to Exhibit 12 of this package.

As a WLAN transmitter, it is designed operate with other WLAN devices as defined by industrial standard. In this application, the device is battery-operated.

There is a switch in the Bluetooth/WLAN (BT/WiFi) module that switches between BT and WiFi. They share the same antenna, and you are able to use a BT headset while in a WiFi VoIP call, however, they do not transmit and receive at the same time. There is a 20 ms delay (for switching between the two systems in time domain) using an intelligent multiplexing scheme. Even though they share the same antenna they are **NOT ON** at the same time. The WiFi is therefore tested as a standalone transmitter.

Measurement Procedures and Data

MAXIMUM PEAK OUTPUT POWER (RADIATED)

CFR Part 15.249(a)

Measurement Procedure

The Equipment-Under-Test is placed inside the semi-anechoic chamber on a polystyrene table at the turntable center. The device is turned 360 degrees while the carrier power is measured. At the point of maximum radiation the carrier power is recorded.

The field strength of the carrier power is calculated by correcting the EMI receiver level for cable loss, amplifier gain, and antenna correction factors.

Field Strength (dBµV/m) = EMI Receiver Level (dBµV) + Cable Loss (dB) + Filter Loss (dB) - Amplifier Gain (dB) + Antenna Correction Factor (3/m)

A fully charged battery was used for the supply voltage.

The test sample was operated during the measurements under the following conditions:

- Tests were performed at low, mid and high channels.
- Tests were performed in both horizontal and vertical polarity.
- Tests were performed in both operational WiFi bands (b) and (g)

Maximum radiating position and orientation

The test sample was placed on top of the non-conductive pedestal and a WLAN link towards the communication test set was established. The test sample was scanned with a log periodic antenna connected to a spectrum analyzer over the whole sphere and the maximum radiation orientation was determined to be the Z orientation with slider down in horizontal polarity of the test antenna, see picture section.

A check of carrier on the WLAN channel 1, 6 and 11 was performed with a RBW setting that matches the WLAN transmitter bandwidth. Due to instrument limitations the test is carried out using an RBW= 10 MHz (3 dB) to determine the expected maximum radiation of any WLAN carrier for the test sample placed in orientation Z at vertical and horizontal polarity.

The WLAN carrier level is calculated as follows:

WLAN_carrier (dBm) = WLAN_carrier_measured (dBµV/m) – 10 dB (RBW 10MHz to 1 MHz) – 97.4 dB (Chamber factor at 3-meter)

Channel 6 WLAN band (b) (RBW=10 MHz (3dB)):

Title: FCC 15.205, 15.209, 15.247
File: Morrison (5.31) (ESU) FCC15.247 WIFI b Tch-mid_Z_Down Carrier-PK 05-21-2009.set
Operator: Hongzhi Sun
EUT Type: Morrison, IMEI:004401026995387
EUT Condition: HW:P3B
Comments: FCC 15.247(c)(1) WIFI emission in TCH mode.
WIFI ch. 6 (2437 MHZ) do in test mode. Orientation Z=V
HLP 3003C antenna (30MHz - 3 GHz). Peak detector used.

Table13

Freq (MHz)	(PEAK) EMI (dBµV/m)	Freq (Max) (MHz)	Ttbl Agl (deg)	Pol
2437.00	114.22	2438.44	302.70	H
2437.00	115.12	2437.58	254.30	V

The WLAN band (b) radiated TX power is measured to 7.72 dBm on channel 6 for RBW = 1 MHz (3 dB).

Channel 6 WLAN band (g) (RBW=10 MHz (3dB)):

Title: FCC 15.205, 15.209, 15.247
File: Morrison (5.31) (ESU) FCC15.247 WIFI g Tch-mid_Z_Down Carrier-PK 05-21-2009.set
Operator: Hongzhi Sun
EUT Type: Morrison, IMEI:004401026995387
EUT Condition: HW:P3B
Comments: FCC 15.247(c)(1) WIFI emission in TCH mode.
WIFI ch. 6 (2437 MHZ) do in test mode. Orientation Z=V
HLP 3003C antenna (30MHz - 3 GHz). Peak detector used.

Table13

Freq (MHz)	(PEAK) EMI (dBµV/m)	Freq (Max) (MHz)	Ttbl Agl (deg)	Pol
2437.00	114.41	2437.13	304.10	H
2437.00	114.89	2437.10	313.30	V

The WLAN band (g) radiated TX power is measured to 7.49 dBm on channel 6 for RBW = 1 MHz (3 dB).

FIELD STRENGTH OF SPURIOUS EMISSIONS

CFR Part 2.1053, 15.247, 15.249

Measurement Procedure

The Equipment-Under-Test is placed inside the semi-anechoic chamber on a polystyrene table at the turntable center. For each spurious frequency, the antenna mast is raised and lowered from 1 to 4 meters and the turntable is rotated 360 degrees to obtain a maximum reading on the spectrum analyzer. This is repeated for both horizontal and vertical polarizations of the receive antenna.

The field strength of each radiated emission is calculated by correcting the EMI receiver level for cable loss, amplifier gain, and antenna correction factors.

For 30 MHz – 18 GHz:
Field Strength (dBµV/m) = EMI Receiver Level (dBµV) + Cable Loss (dB) - Amplifier Gain (dB) + Filter loss (dB) + Antenna Correction Factor (3/m)

For 18 GHz – 26.5 GHz:
Field Strength (dBµV/m) = EMI Receiver Level (dBµV) + Cable Loss (dB) - Amplifier Gain (dB) + Filter loss (dB) + Antenna Correction Factor (1/m)

A fully charged battery was used for the supply voltage.

The test sample was operated during the measurements under the following conditions:

- Tests were performed at low, mid and high channels.
- Tests were performed in both horizontal and vertical polarity.
- Tests were performed in both operational WiFi bands (b) and (g)
- Investigation of maximum radiation orientation and position of the product sample to determine test orientations angles.
    - Tests were performed with the sample orientated along X, Y and Z orthogonal axis based on findings.
    - Tests were performed with the test sample placed in worst case position either open or closed based on form factor. Verification tests were performed for the other position.

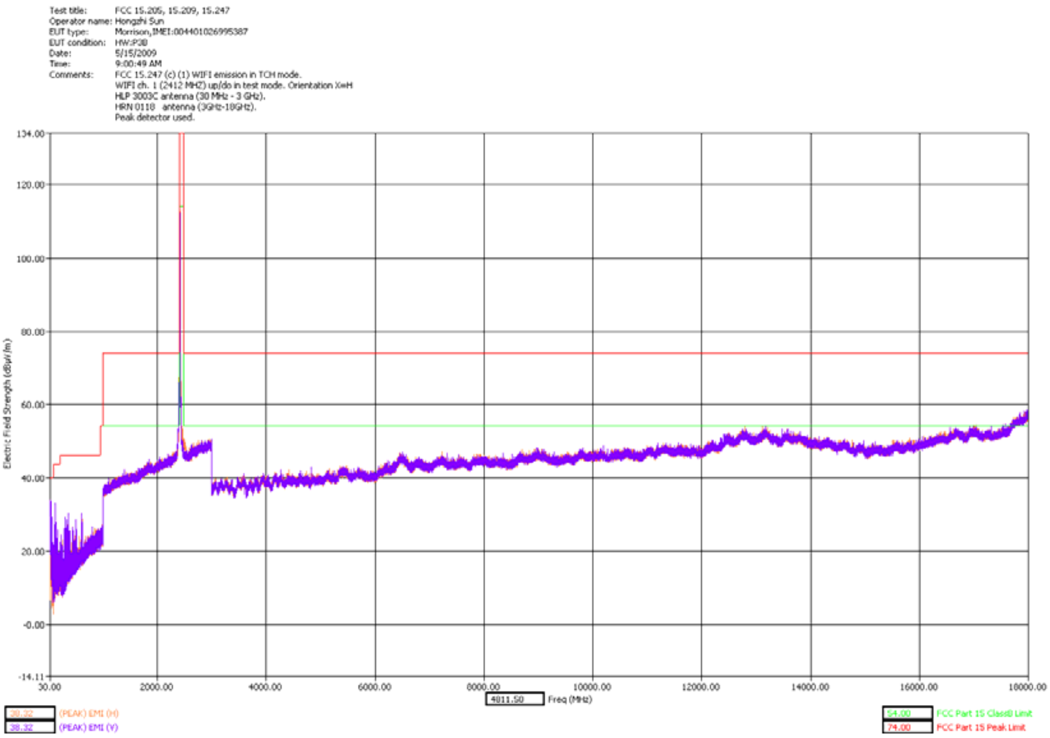
Measurement Results

Comments:
The band edge measurements crossing the corner for the low channel with respect to the average limit line is acceptable when applying the FCC rule specified in CFR 15.35(b) for the use of peak detector above 1 GHz. The peak detector limit line has been added to the graphical plots.

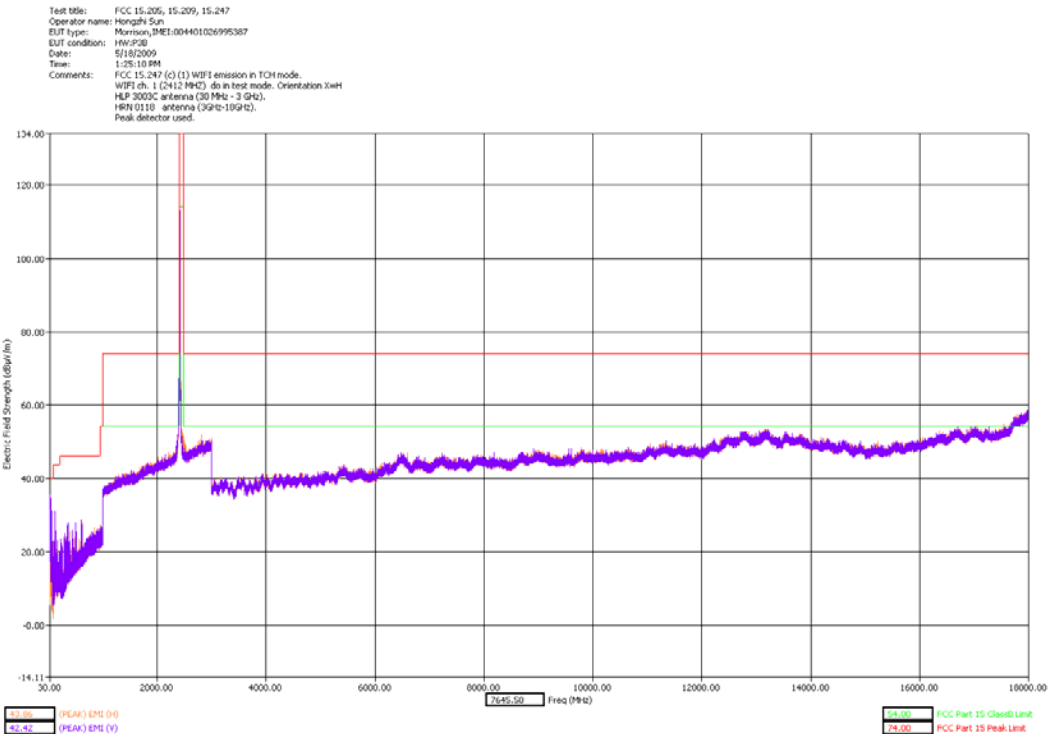
For peak emissions detected above 1 GHz, only those emissions that are higher than the AVG limit line plus 8 dB are selected for final emission analysis.

WLAN Band (b):

All data measured for WLAN band (b).



30 - 18000MHz Low Channel Dual Polarization X - slider open



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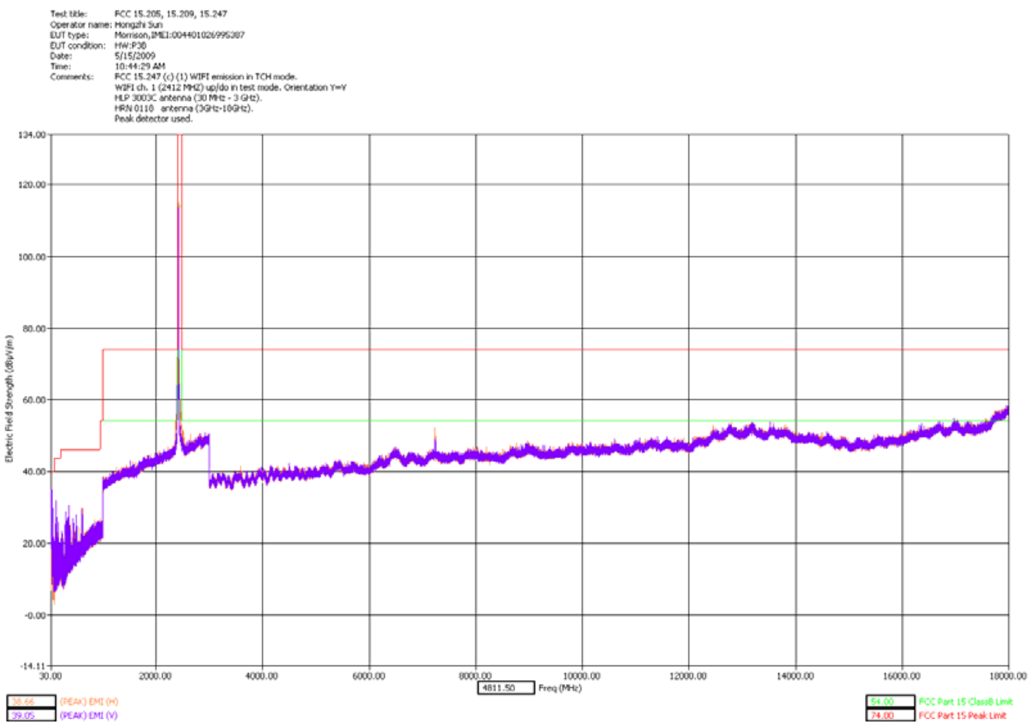
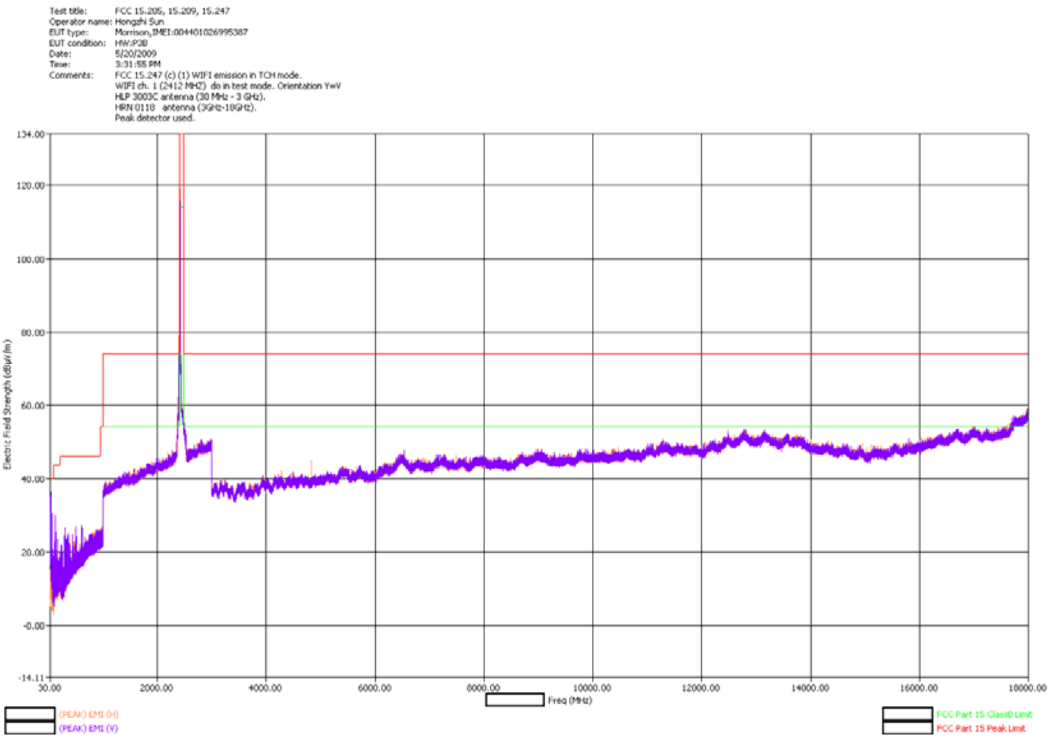
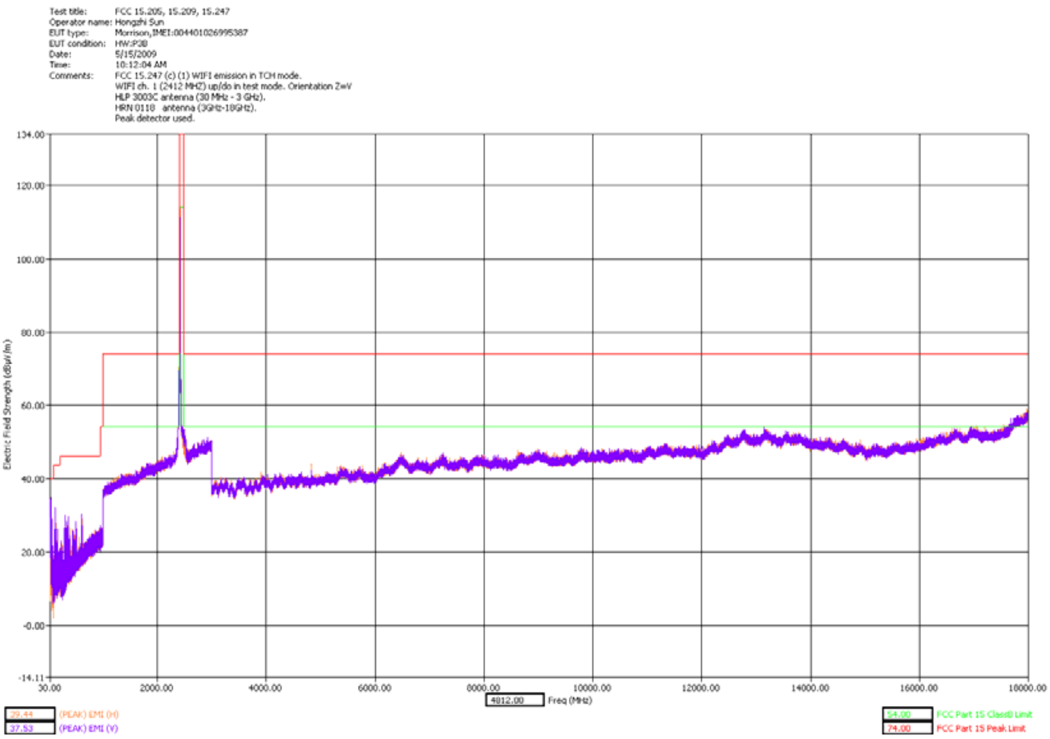


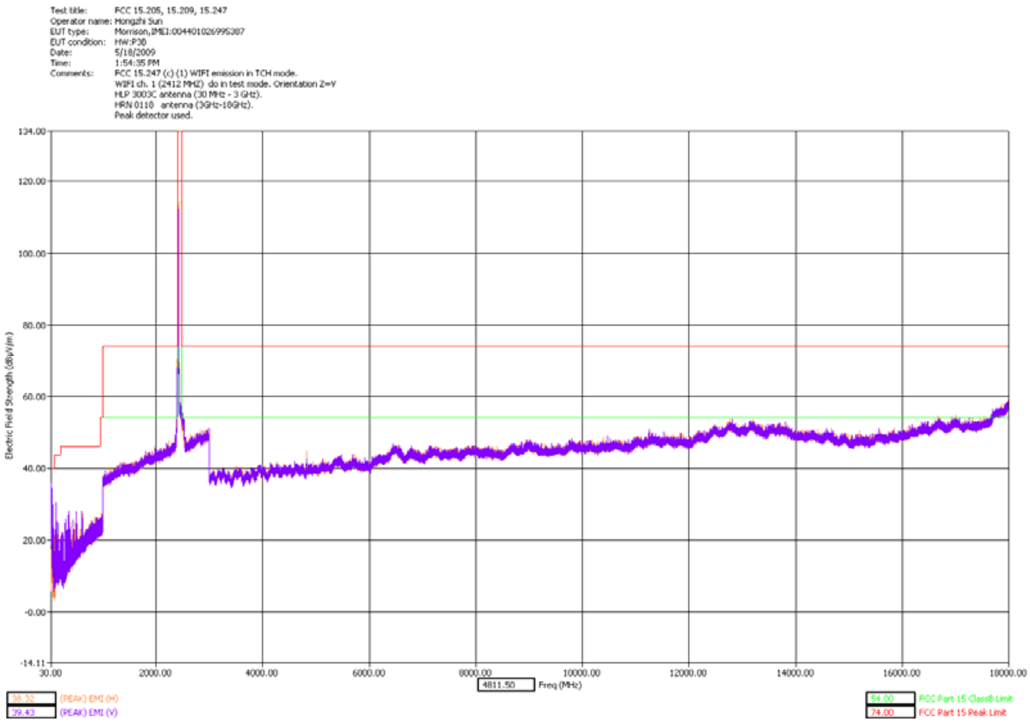
30 - 18000MHz Low Channel Dual Polarization Y - slider open



30 - 18000MHz Low Channel Dual Polarization Y - slider closed



30 - 18000MHz Low Channel Dual Polarization Z - slider open



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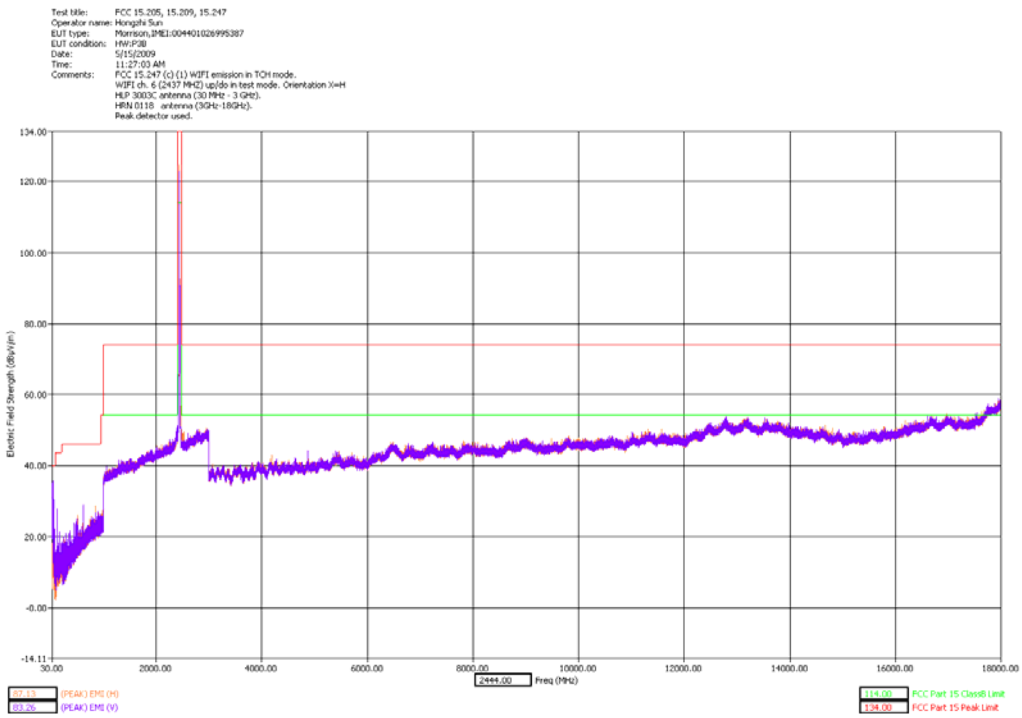
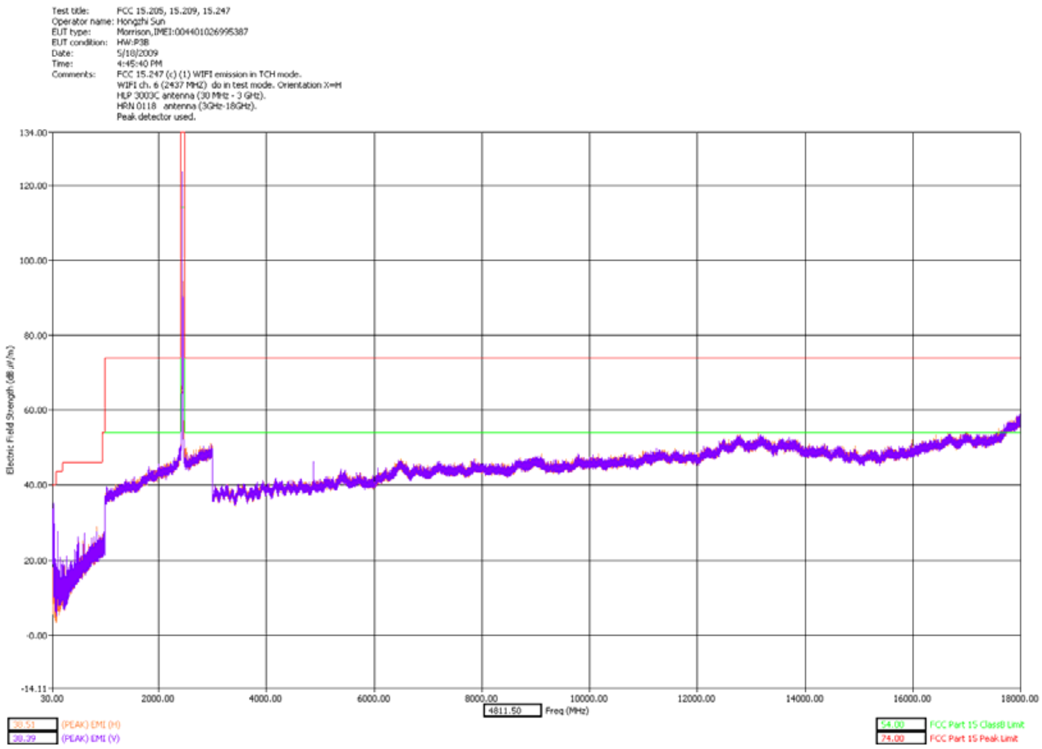
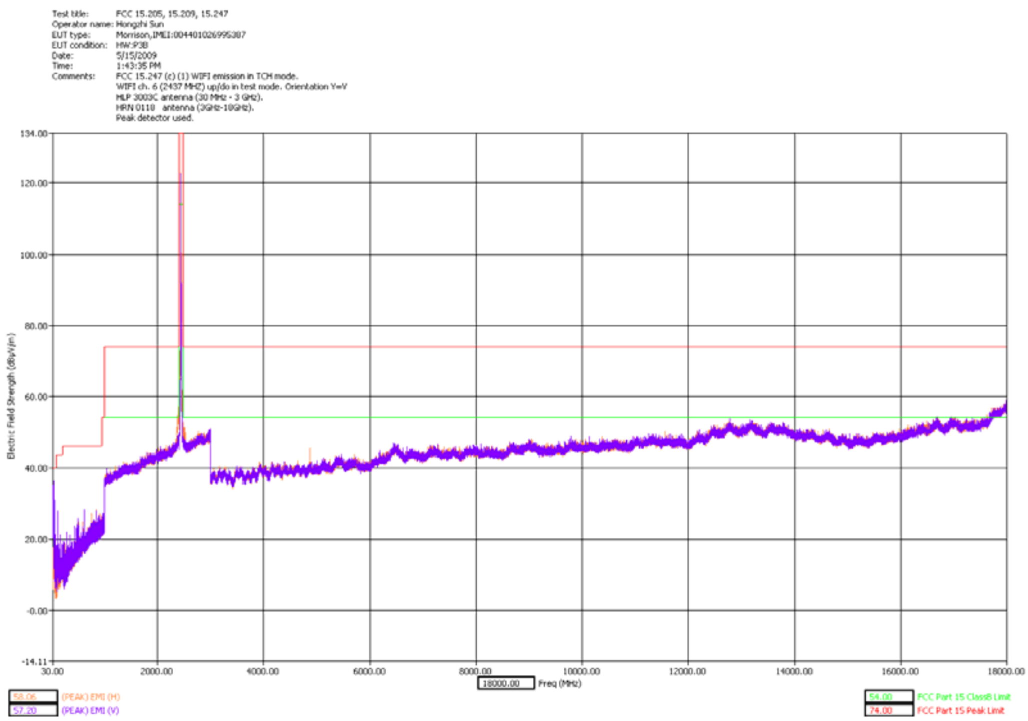


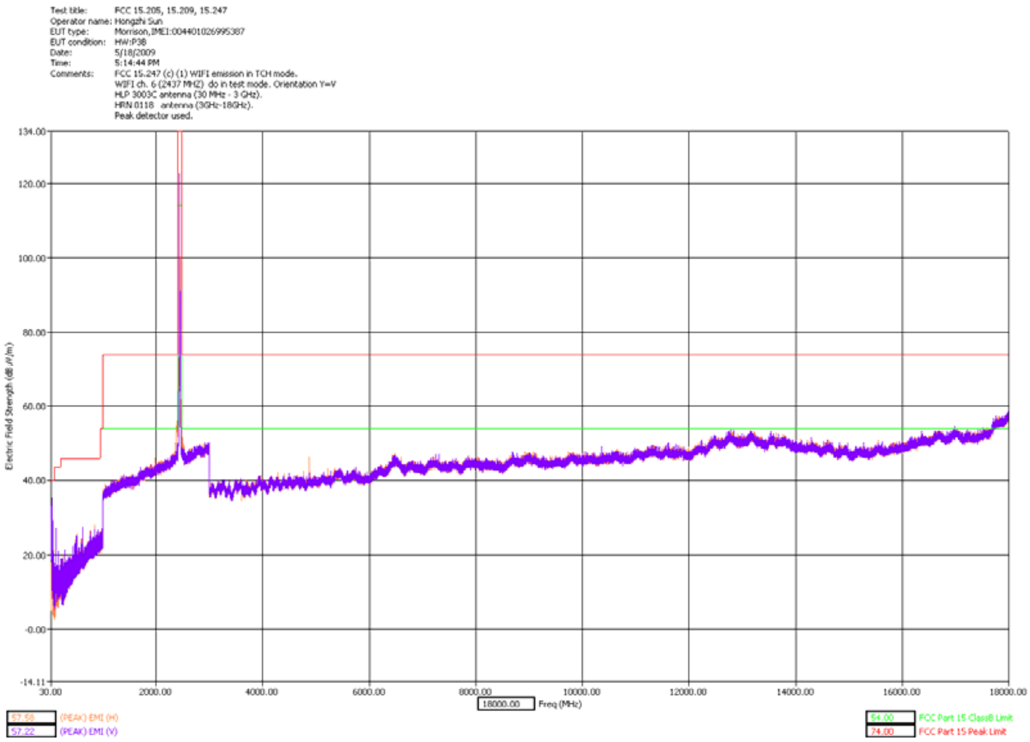
30 - 18000MHz Middle Channel Dual Polarization X - slider open



30 - 18000MHz Middle Channel Dual Polarization X - slider closed



30 - 18000MHz Middle Channel Dual Polarization Y - slider open



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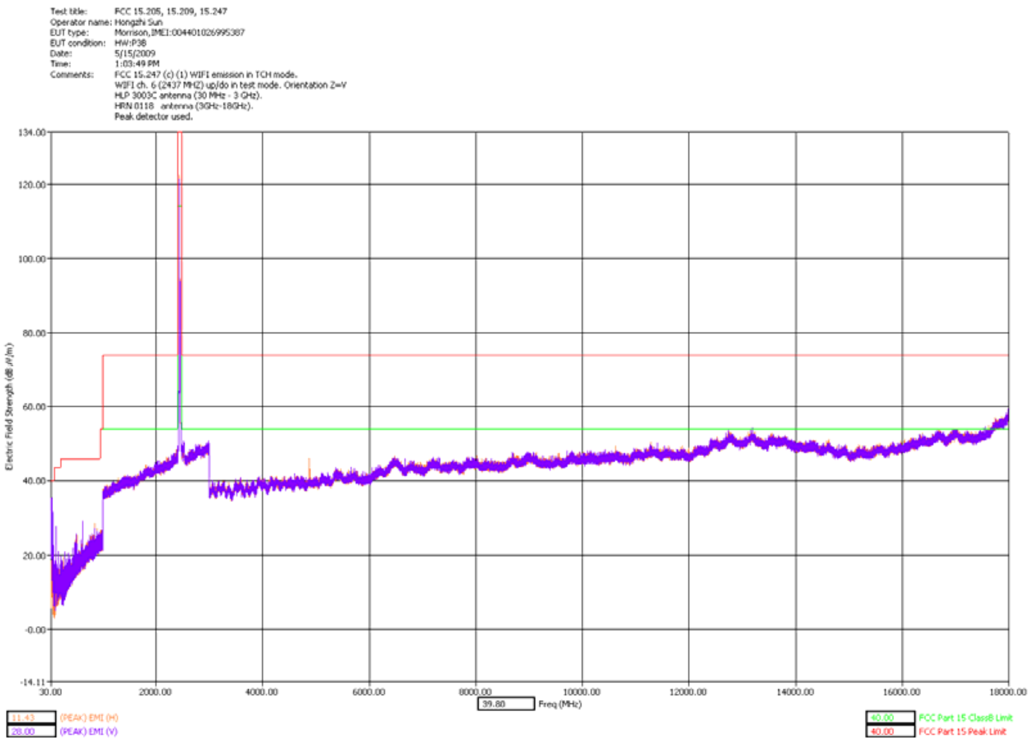
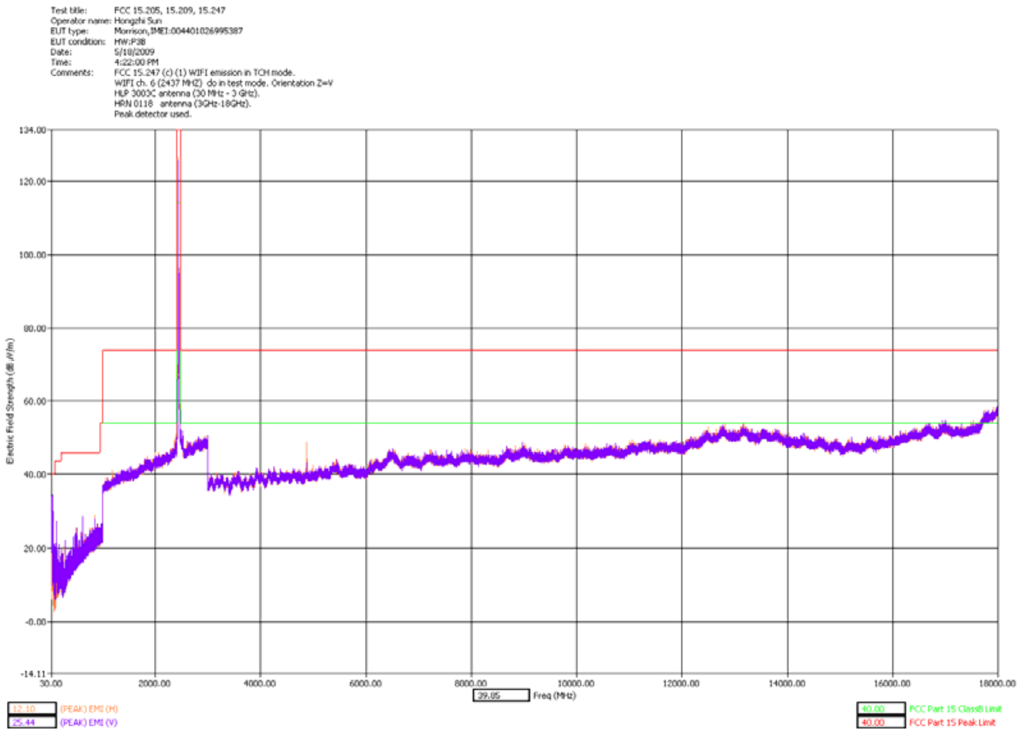
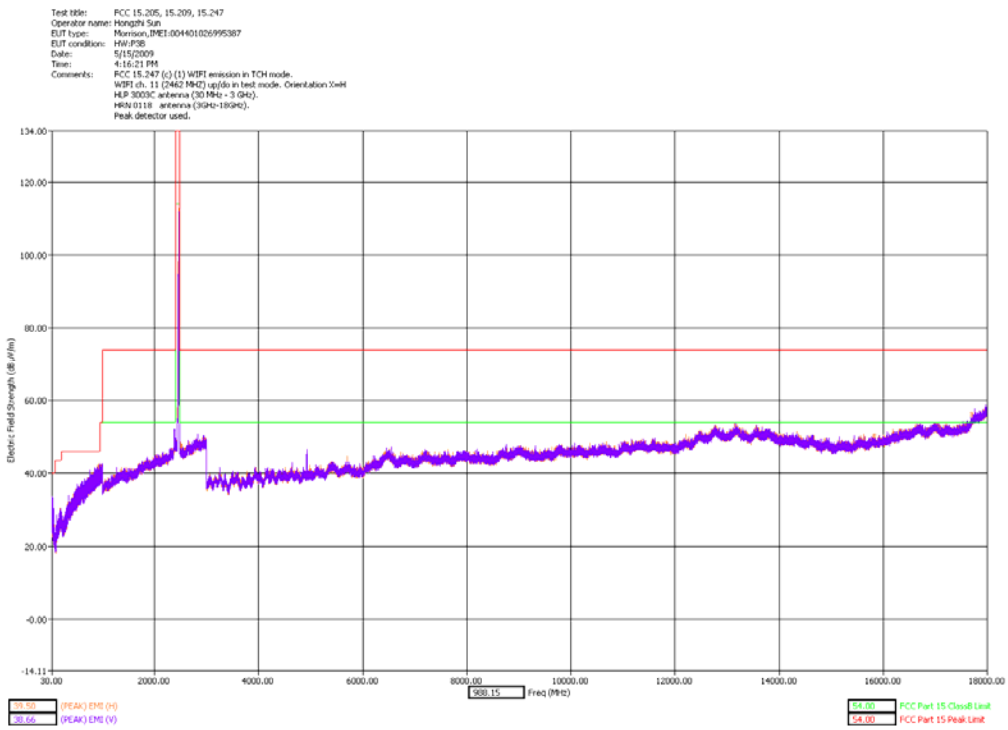


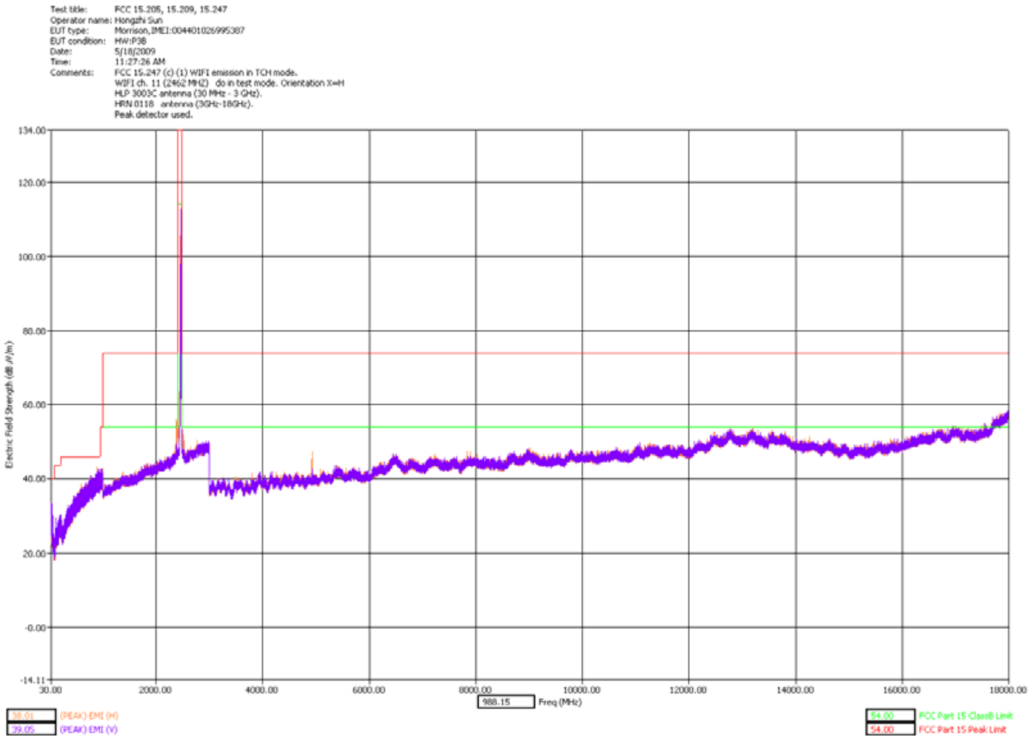
30 - 18000MHz Middle Channel Dual Polarization Z - slider open



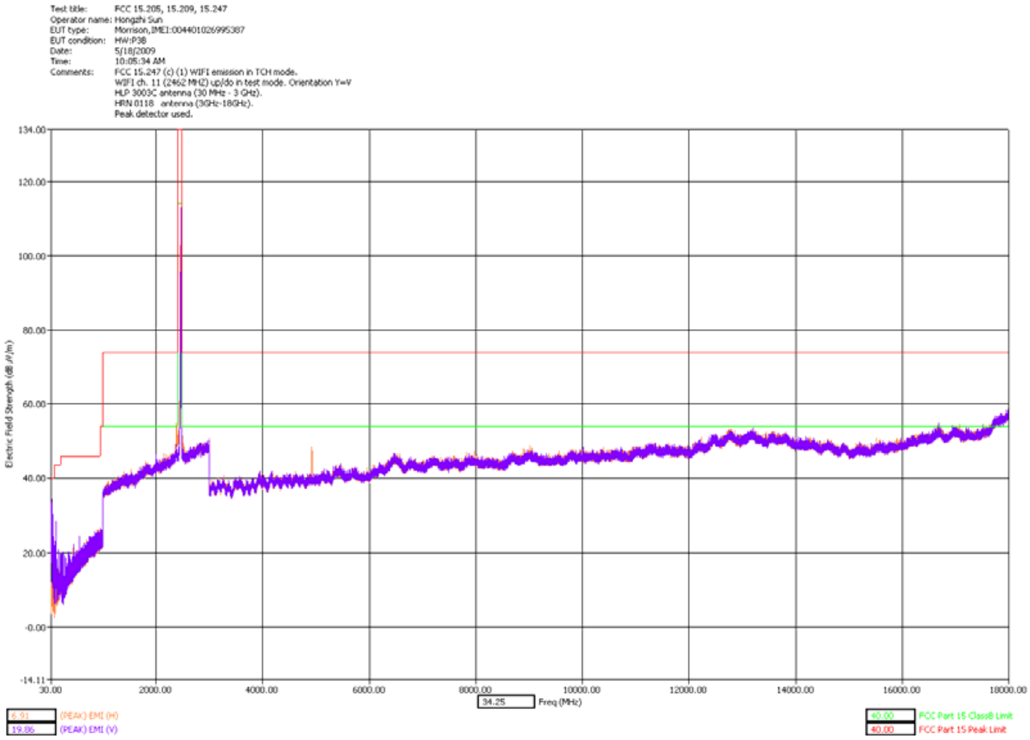
30 - 18000MHz Middle Channel Dual Polarization Z - slider closed



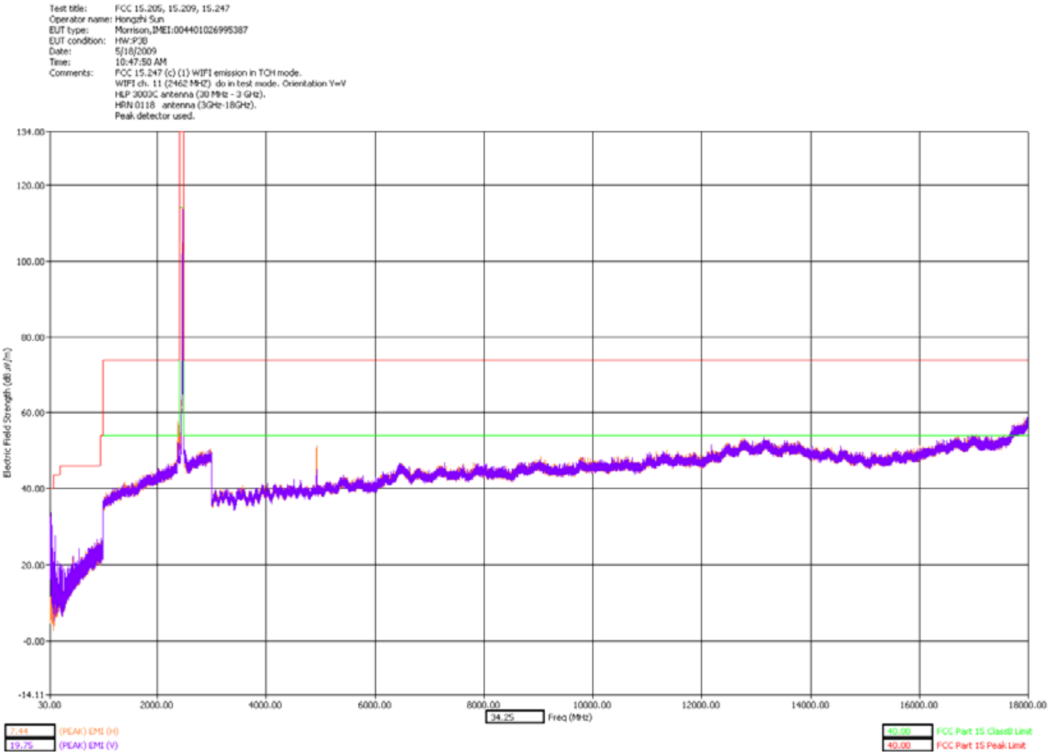
30 - 18000MHz High Channel Dual Polarization X - slider open



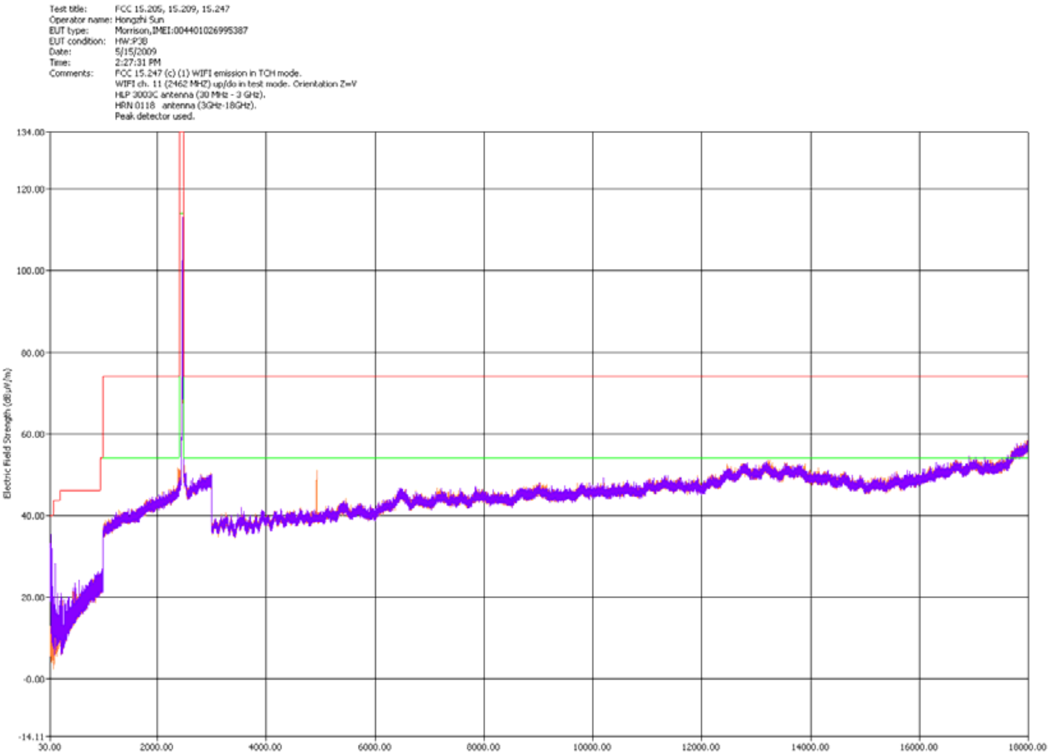
30 - 18000MHz High Channel Dual Polarization X - slider closed



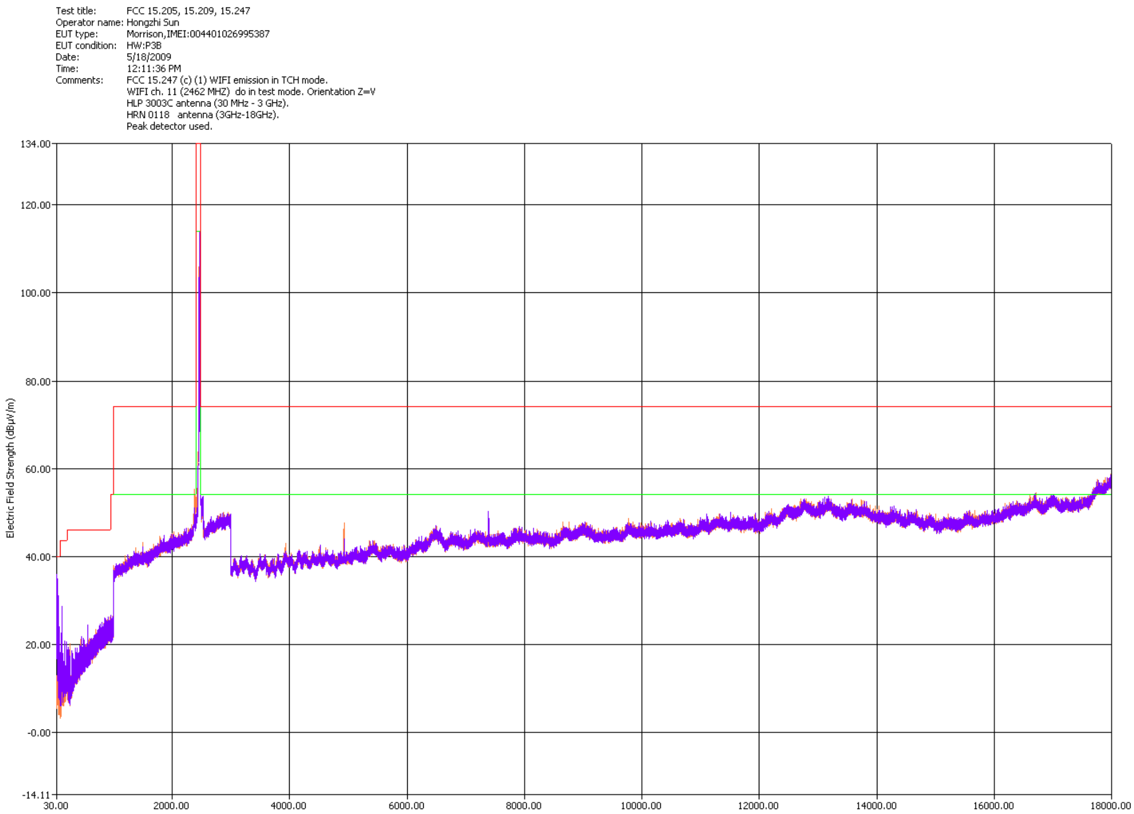
30 - 18000MHz High Channel Dual Polarization Y - slider open



30 - 18000MHz High Channel Dual Polarization Y - slider closed



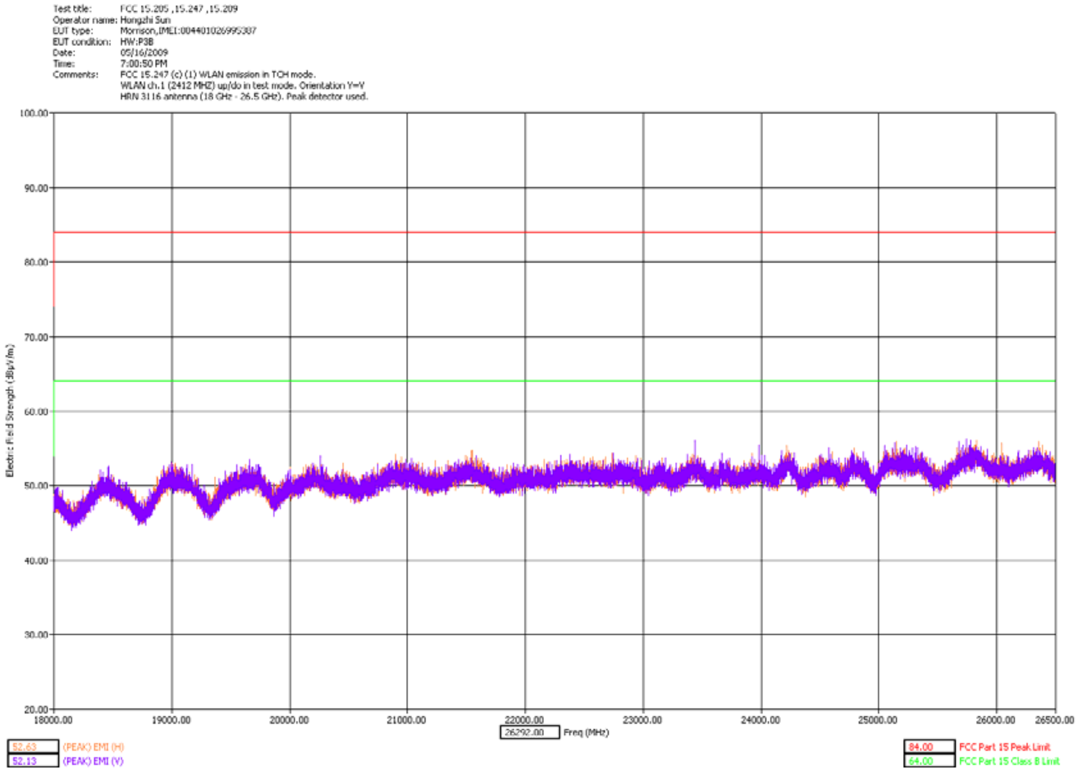
30 - 18000MHz High Channel Dual Polarization Z - slider open



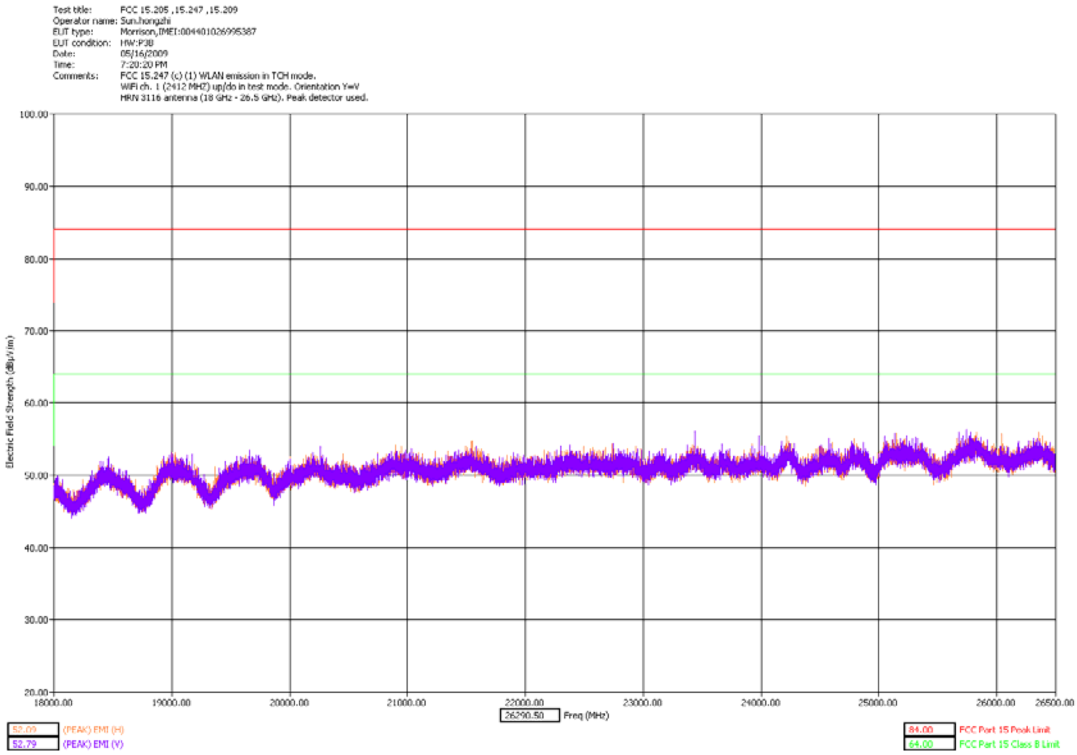
30 - 18000MHz High Channel Dual Polarization Z - slider closed

There were no discernible emissions above the noise floor for 18-26.5 GHz for Low, Mid and High Channels and all polarizations in WLAN band. The distance between EUT and receiving antenna is 1m.

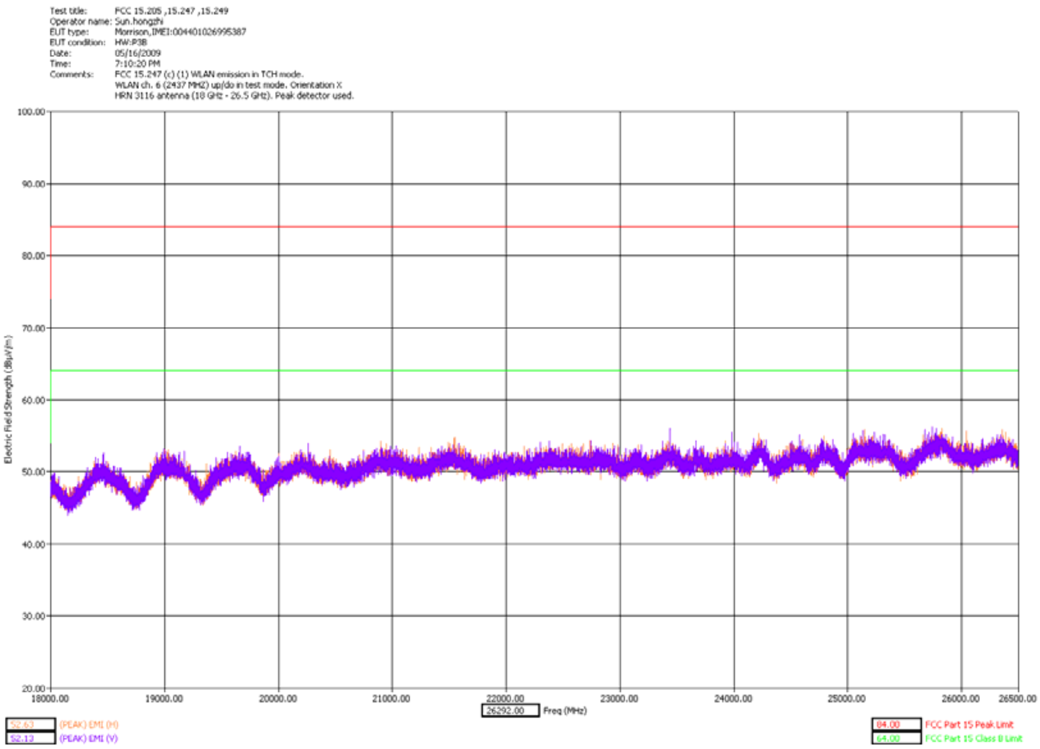
Only the worst case plot for each test frequency are shown in the below plots in the range from 18 GHz – 26.5 GHz.



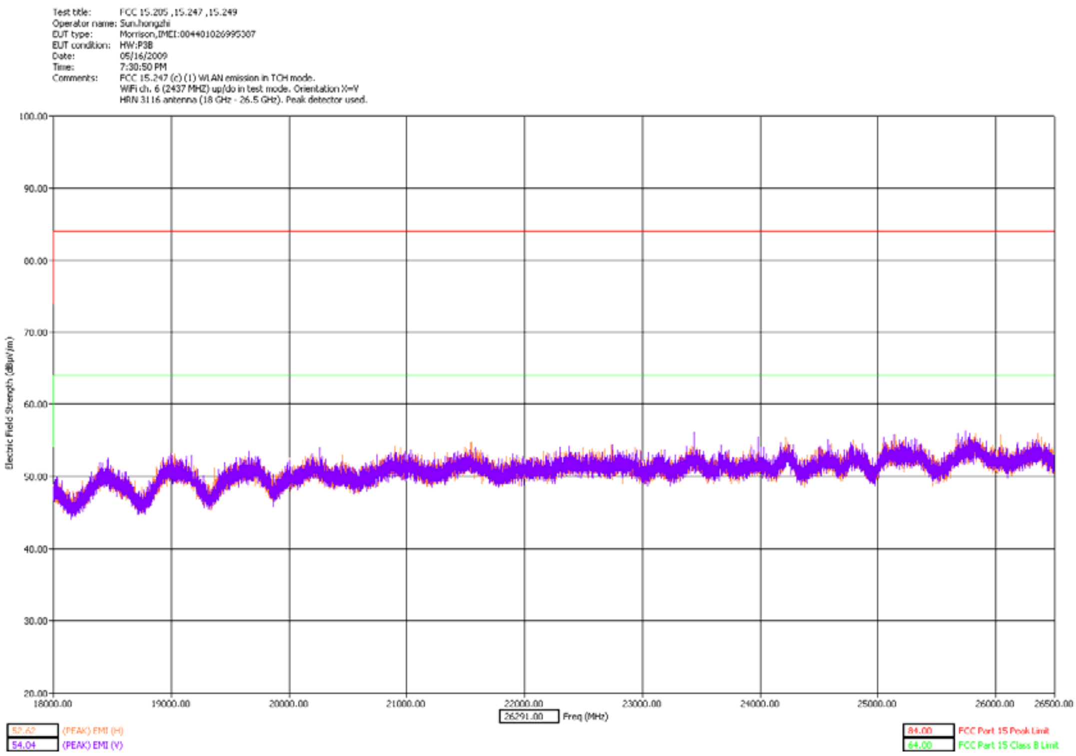
18-26.5GHz Low Channel Y Orientation - slider open



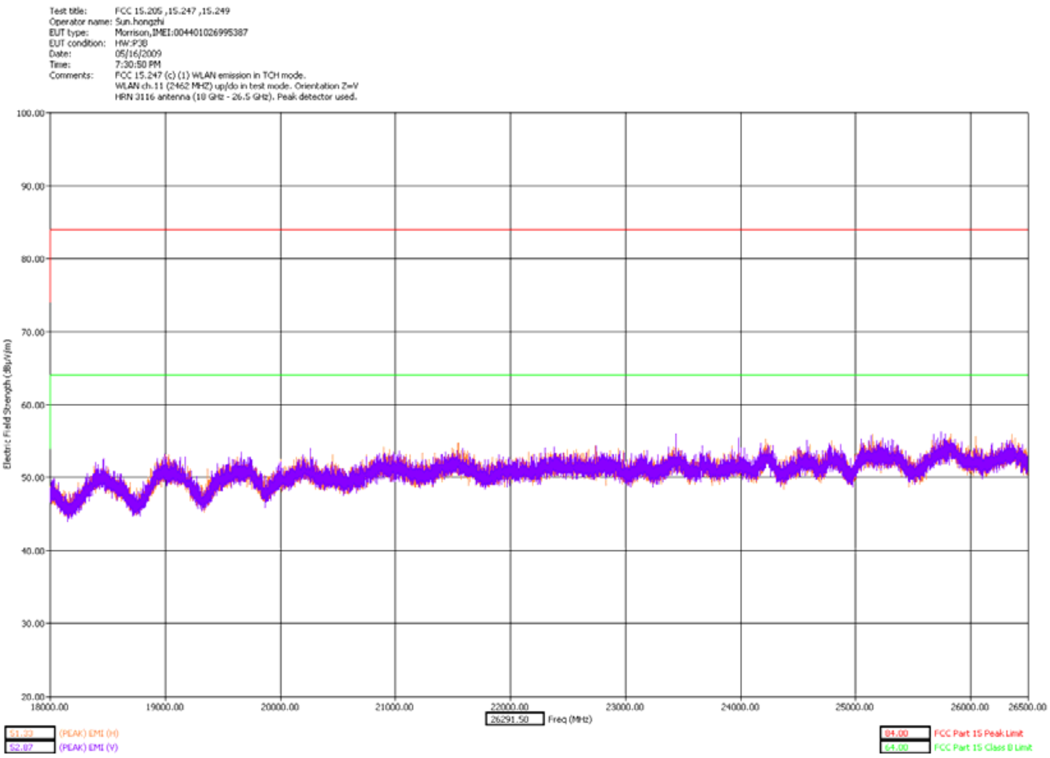
18-26.5GHz Low Channel Y Orientation - slider closed



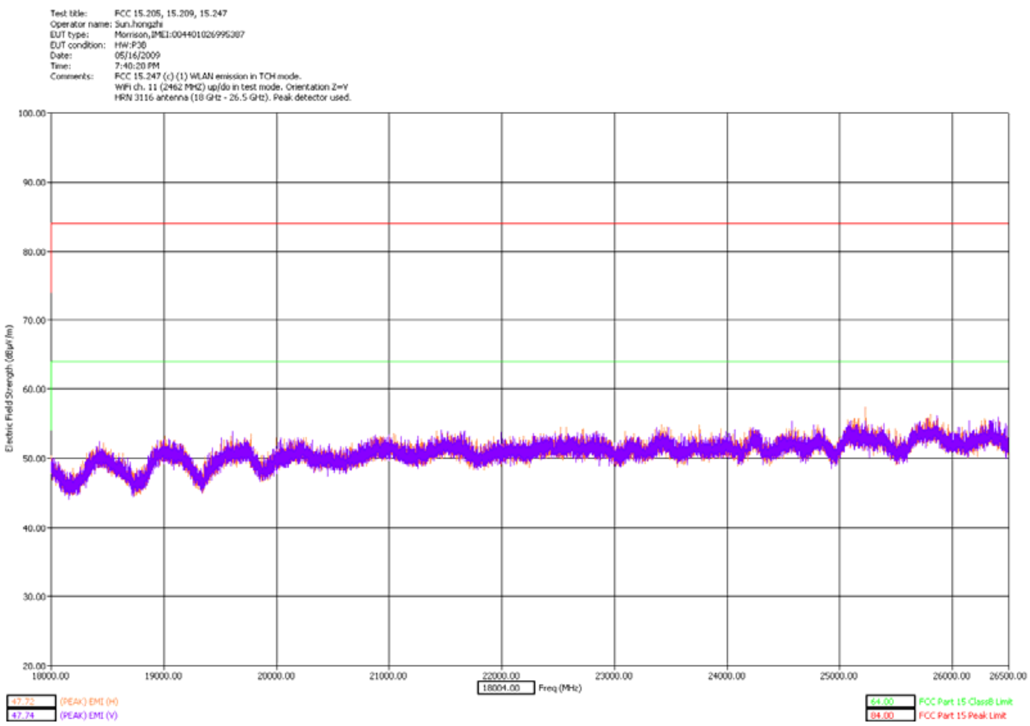
18-26.5GHz Middle Channel X Orientation - slider open



18-26.5GHz Middle Channel X Orientation - slider closed



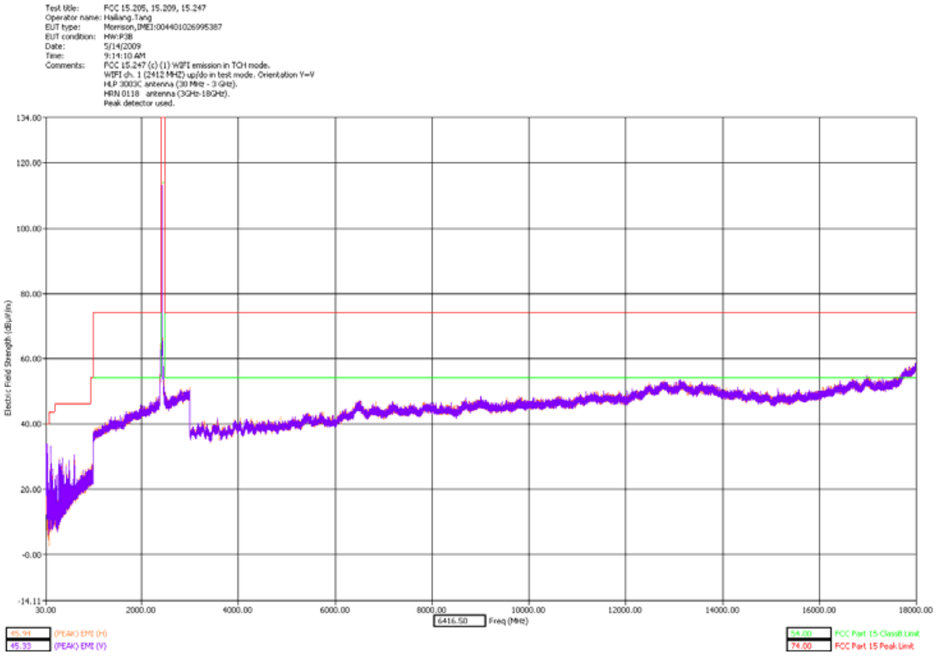
18-26.5GHz High Channel Z Orientation - slider open



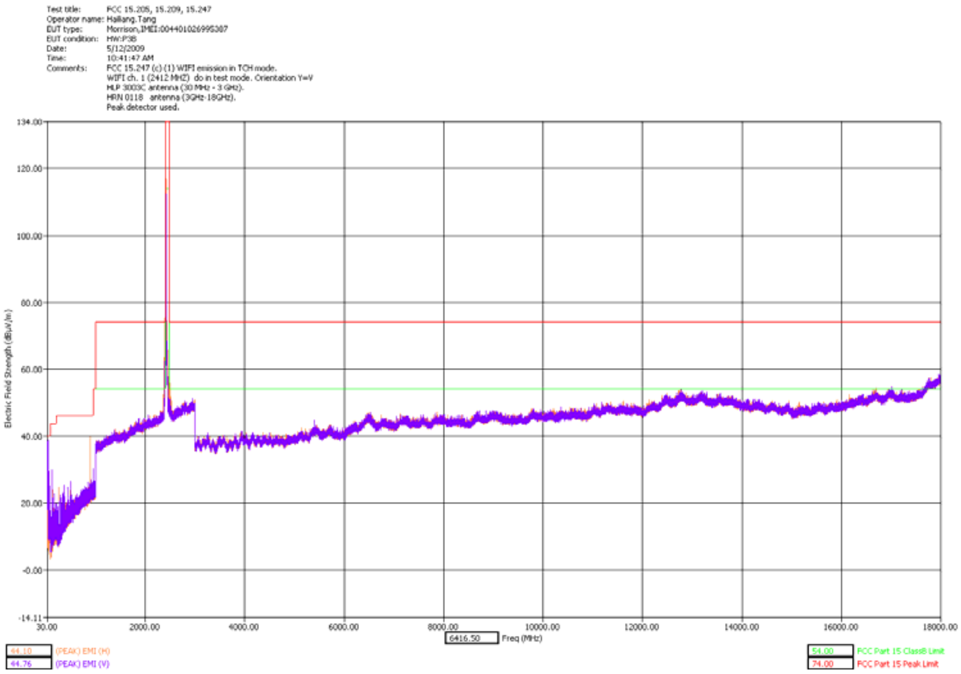
18-26.5GHz High Channel Z Orientation - slider closed

WLAN Band (g)

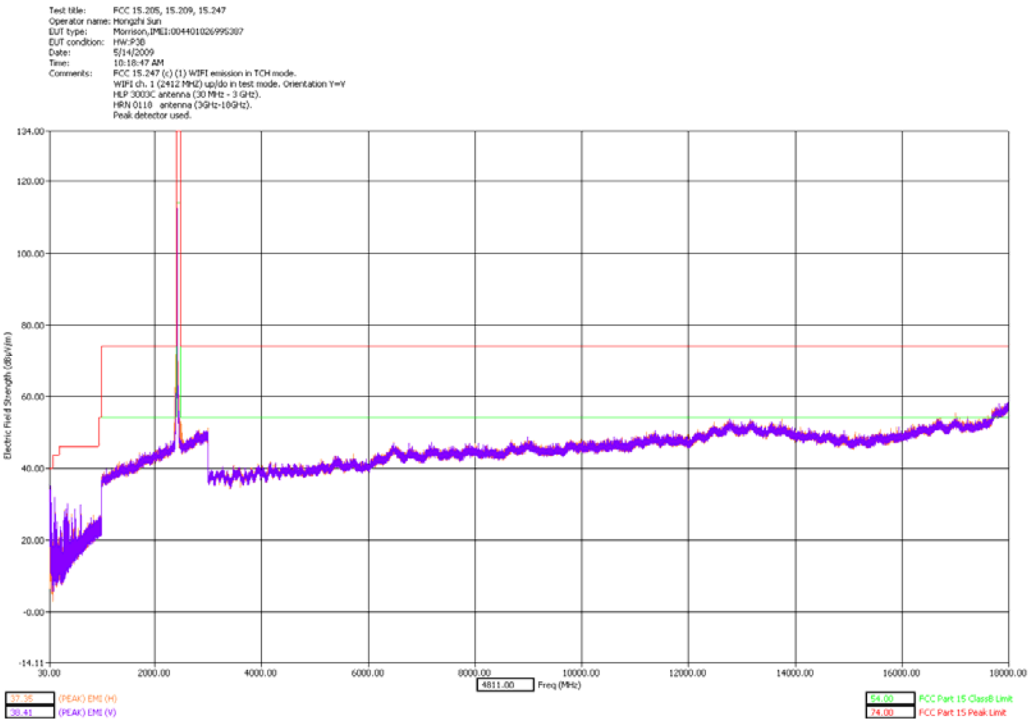
There were no discernible emissions above the noise floor for 30-18000MHz for Low, Mid and High Channels and all polarizations in WLAN band (g).



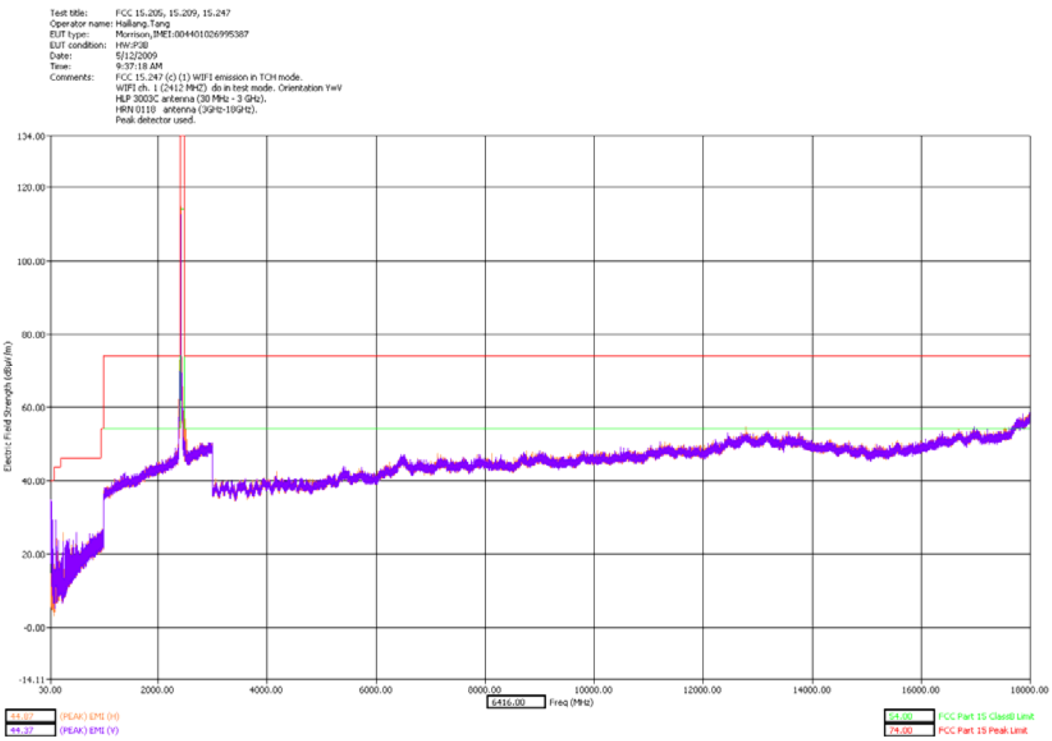
30 - 18000MHz Low Channel Dual Polarization X - slider open



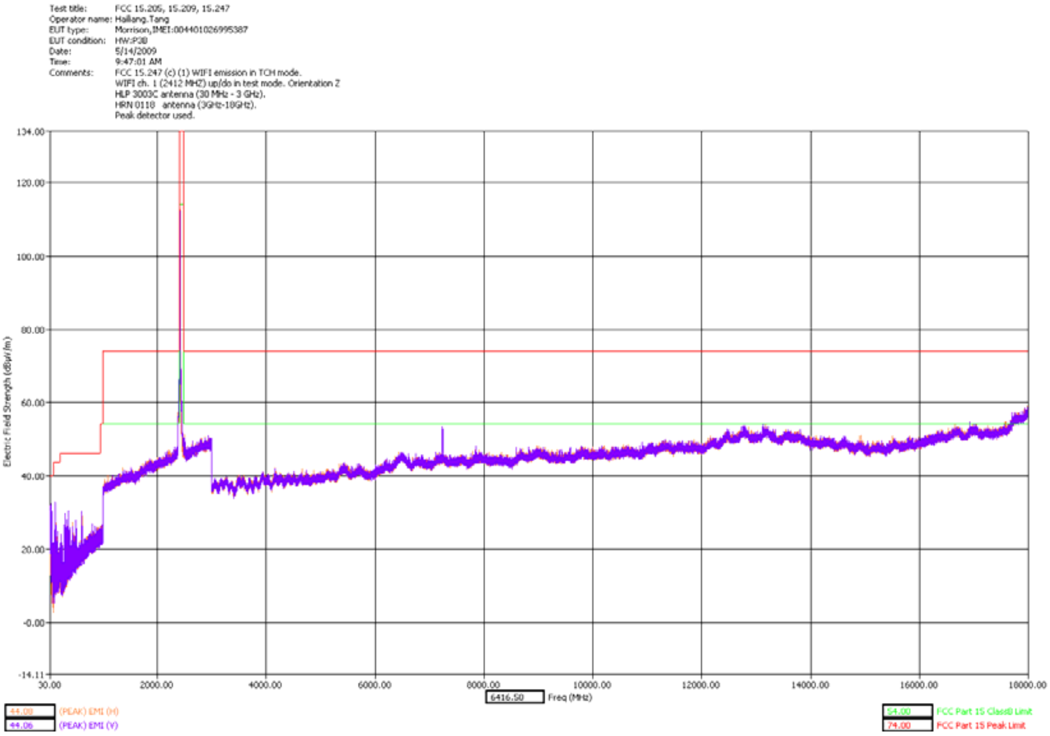
30 - 18000MHz Low Channel Dual Polarization X - slider closed



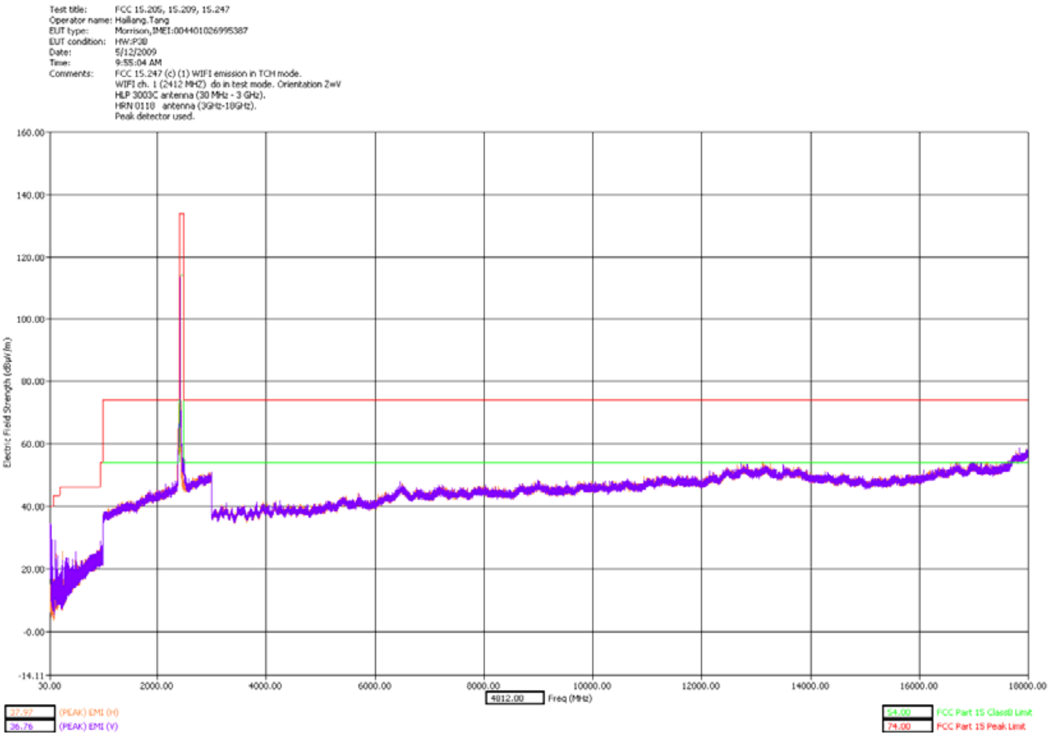
30 - 18000MHz Low Channel Dual Polarization Y - slider open



30 - 18000MHz Low Channel Dual Polarization Y - slider closed



30 - 18000MHz Low Channel Dual Polarization Z - slider open



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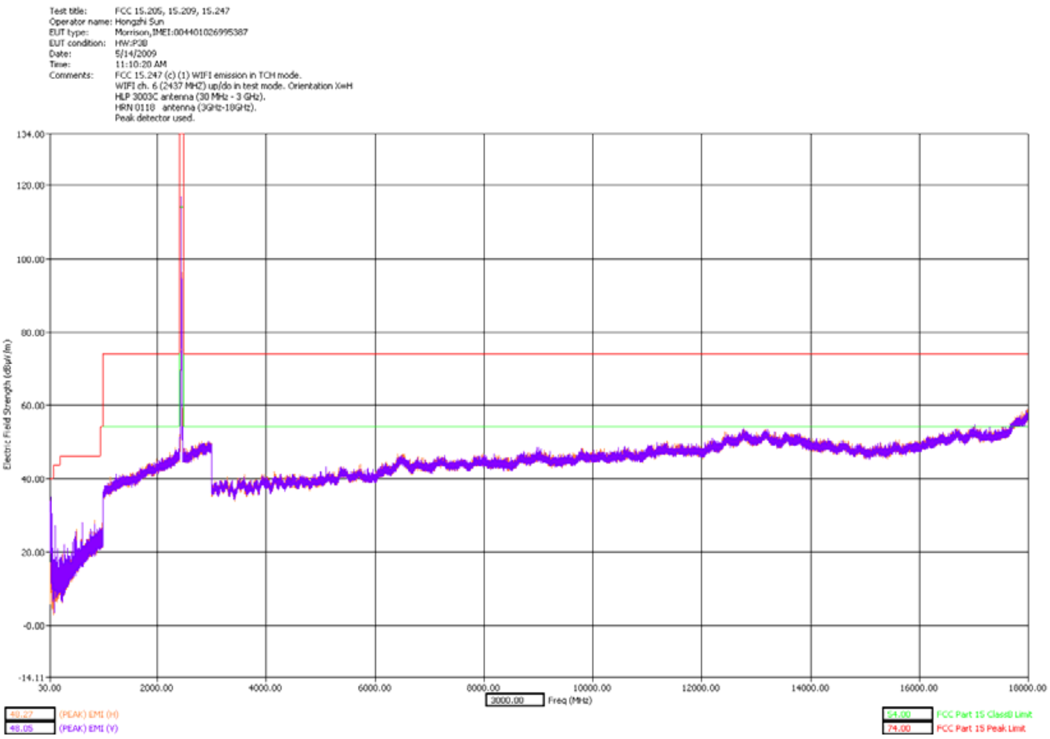
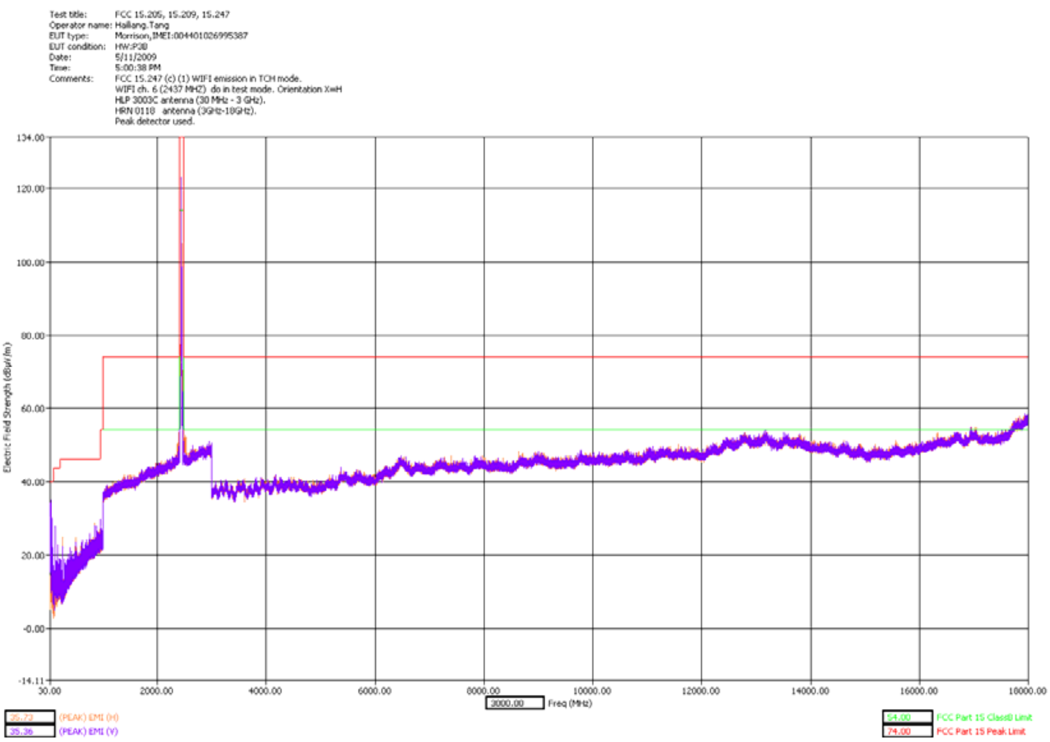
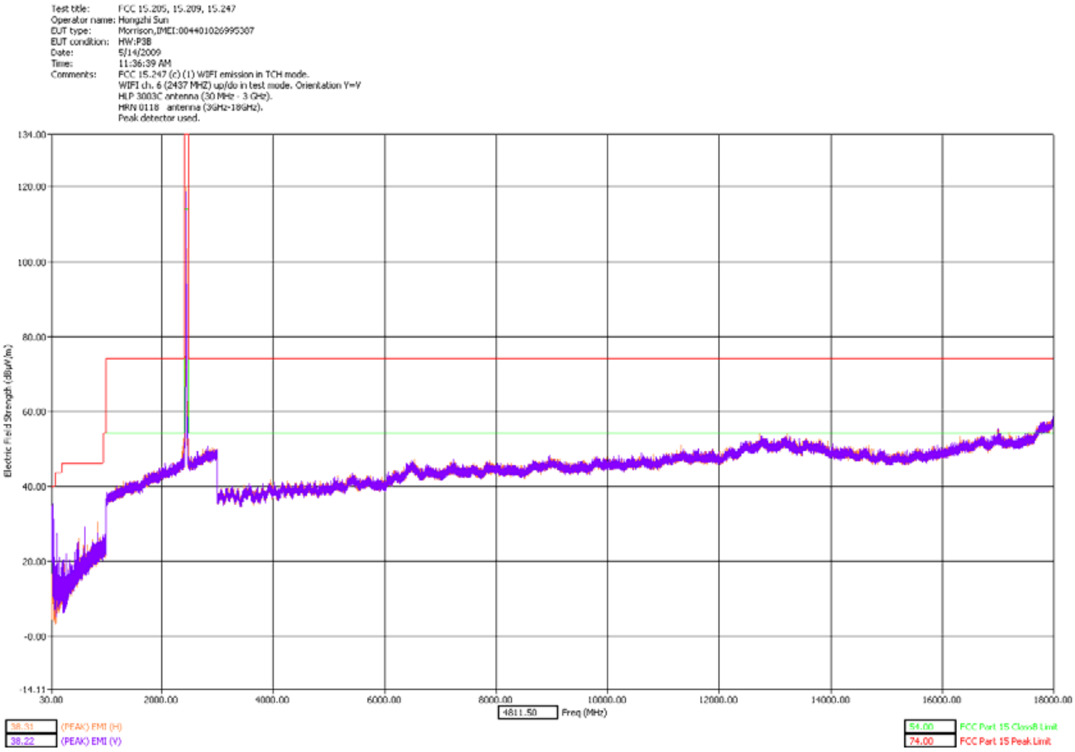


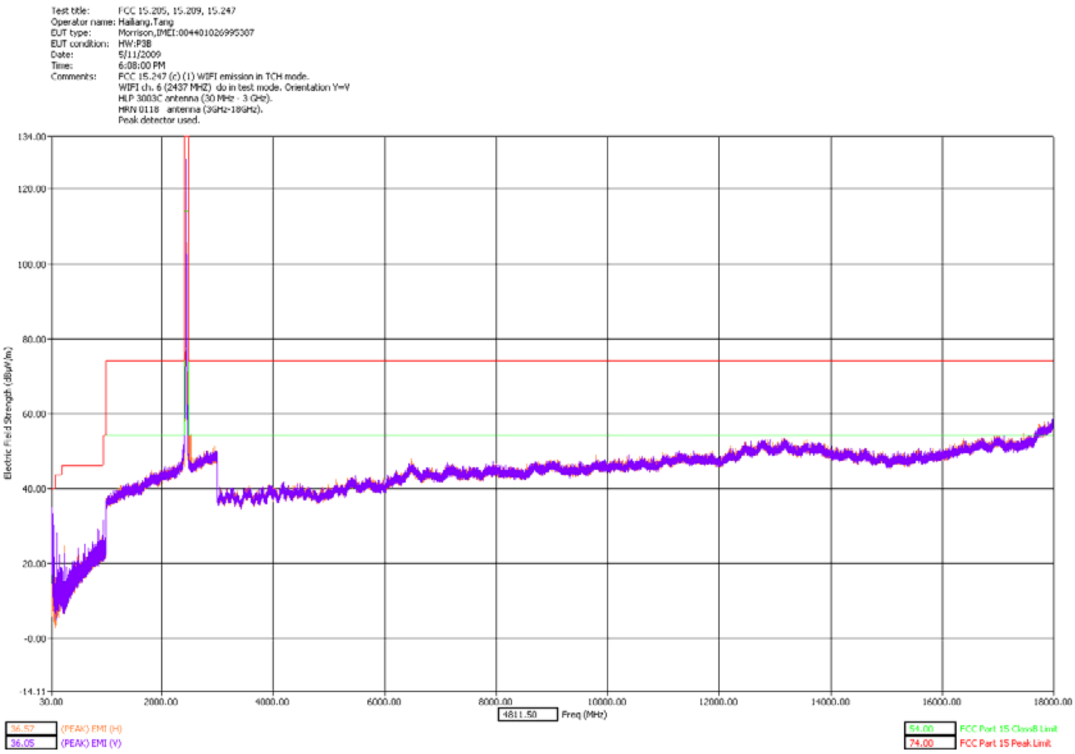
30 - 18000MHz Middle Channel Dual Polarization X - slider open



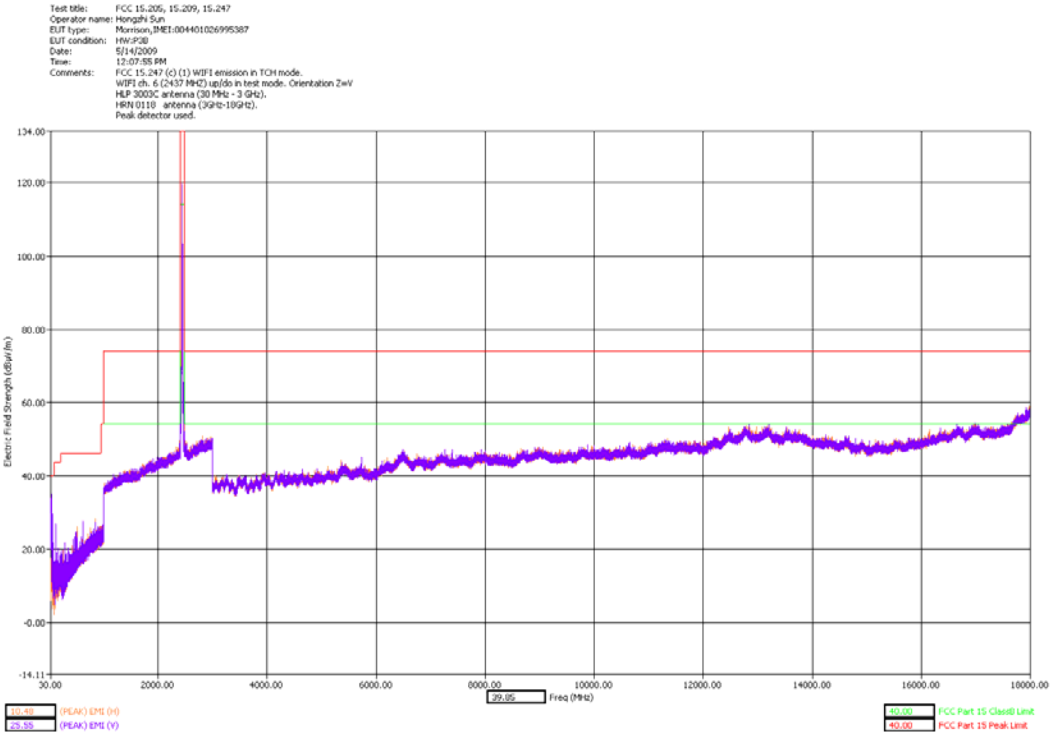
30 - 18000MHz Middle Channel Dual Polarization X - slider closed



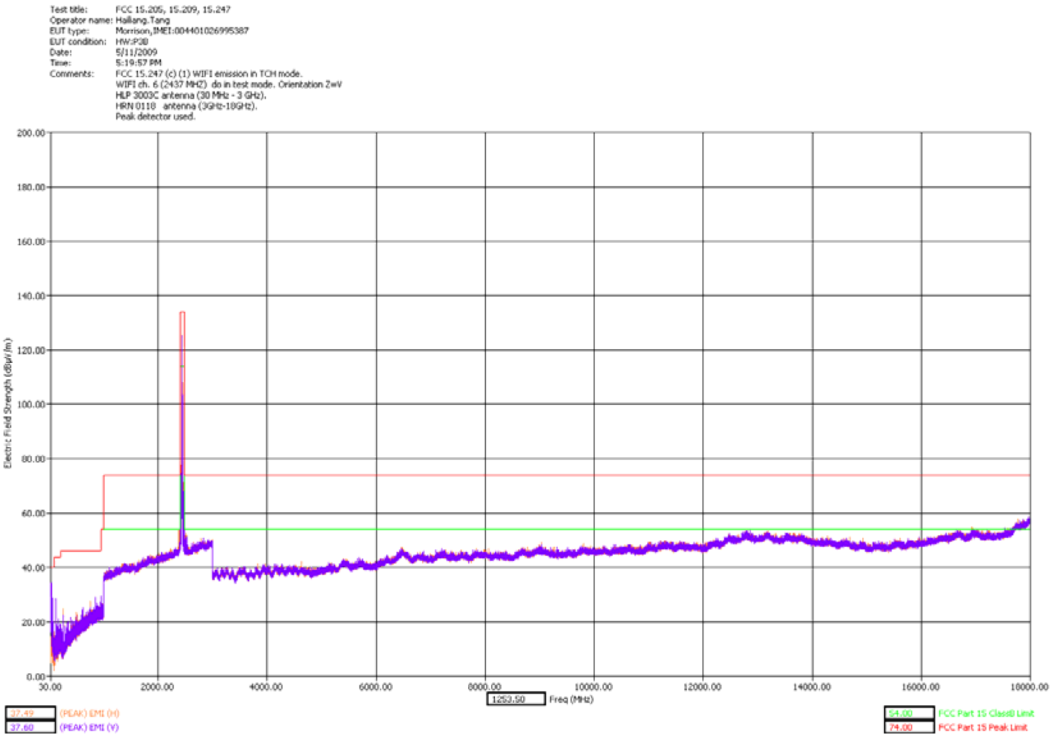
30 - 18000MHz Middle Channel Dual Polarization Y - slider open



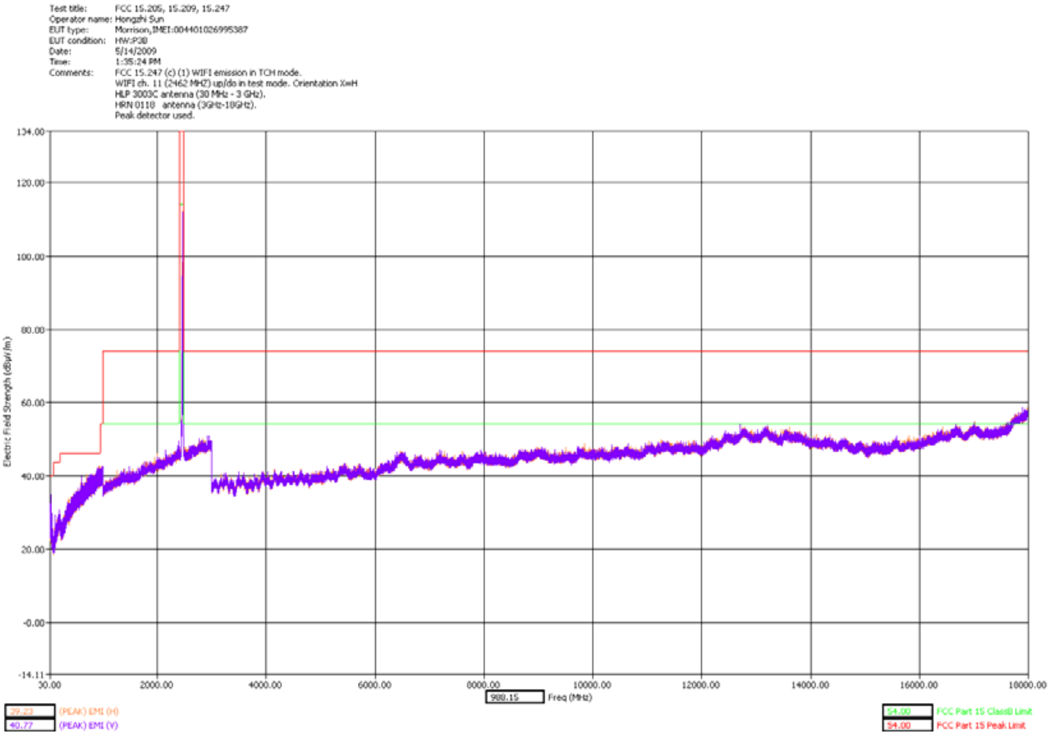
30 - 18000MHz Middle Channel Dual Polarization Y - slider closed



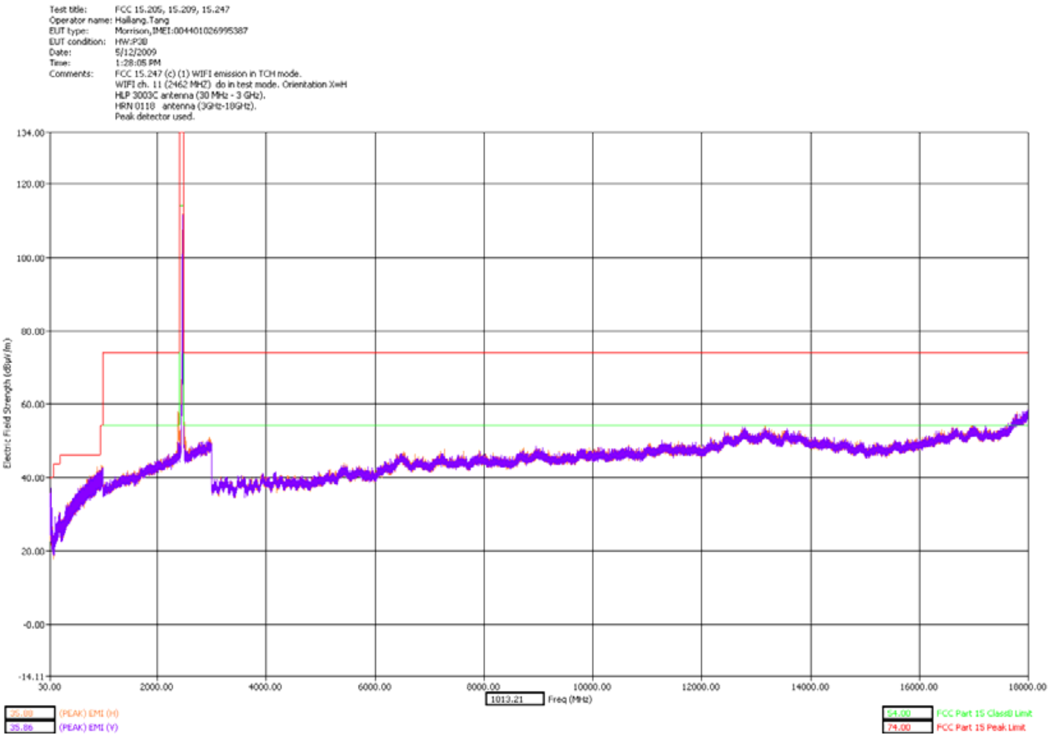
30 - 18000MHz Middle Channel Dual Polarization Z - slider open



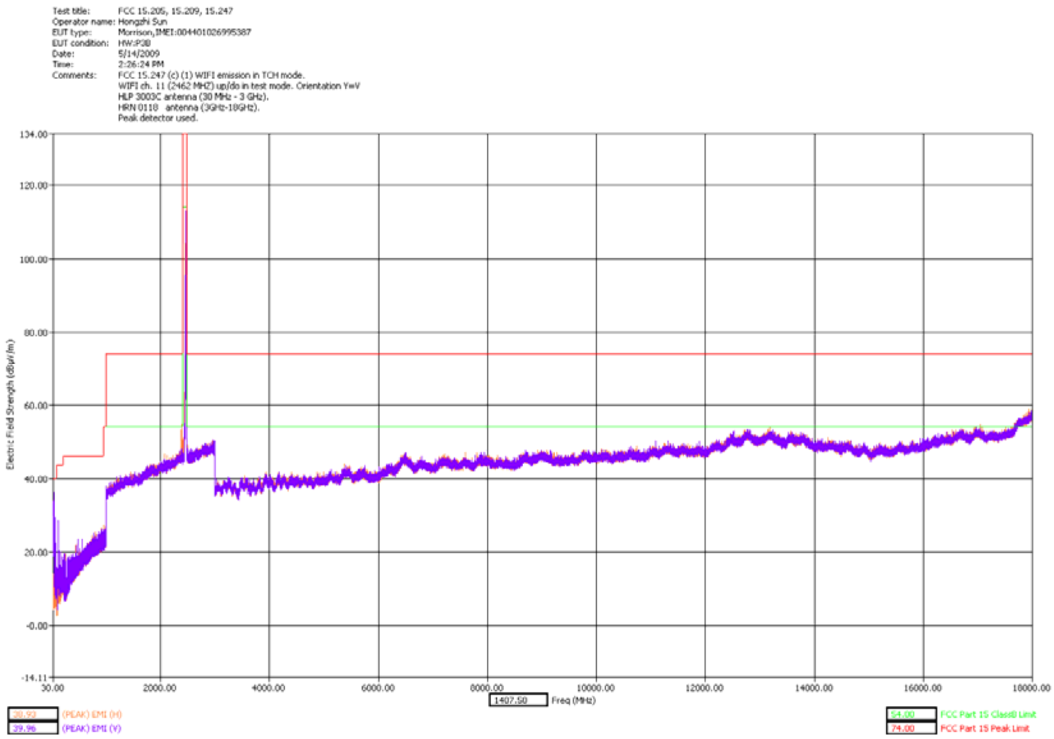
30 - 18000MHz Middle Channel Dual Polarization Z - slider closed



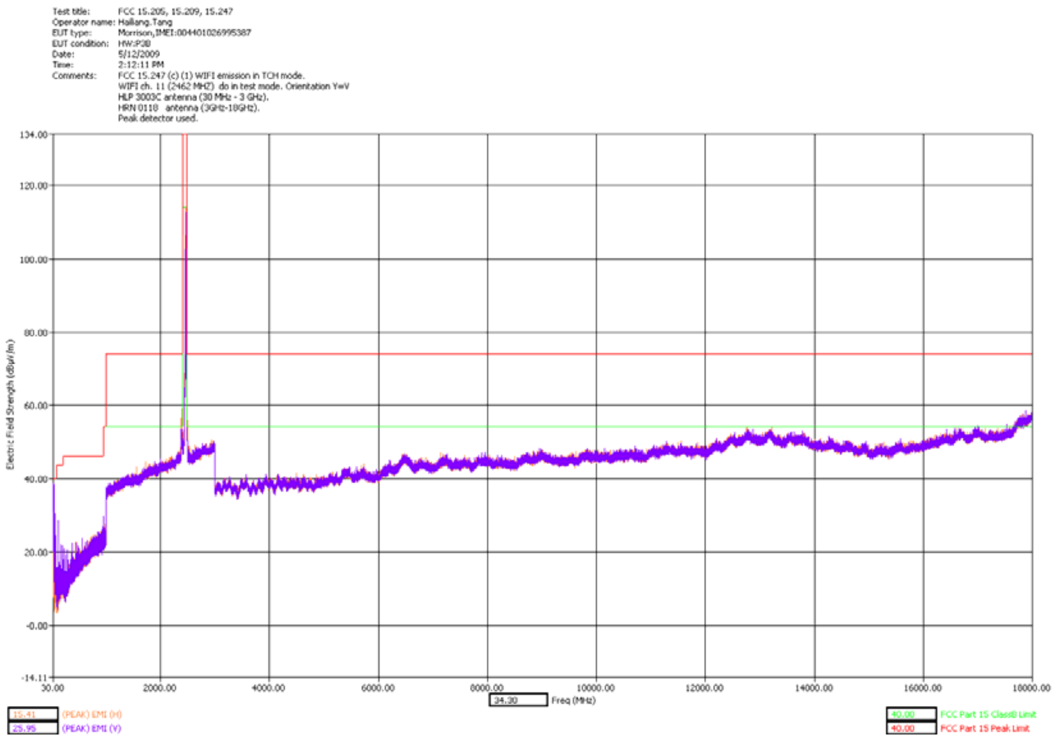
30 - 18000MHz High Channel Dual Polarization X - slider open



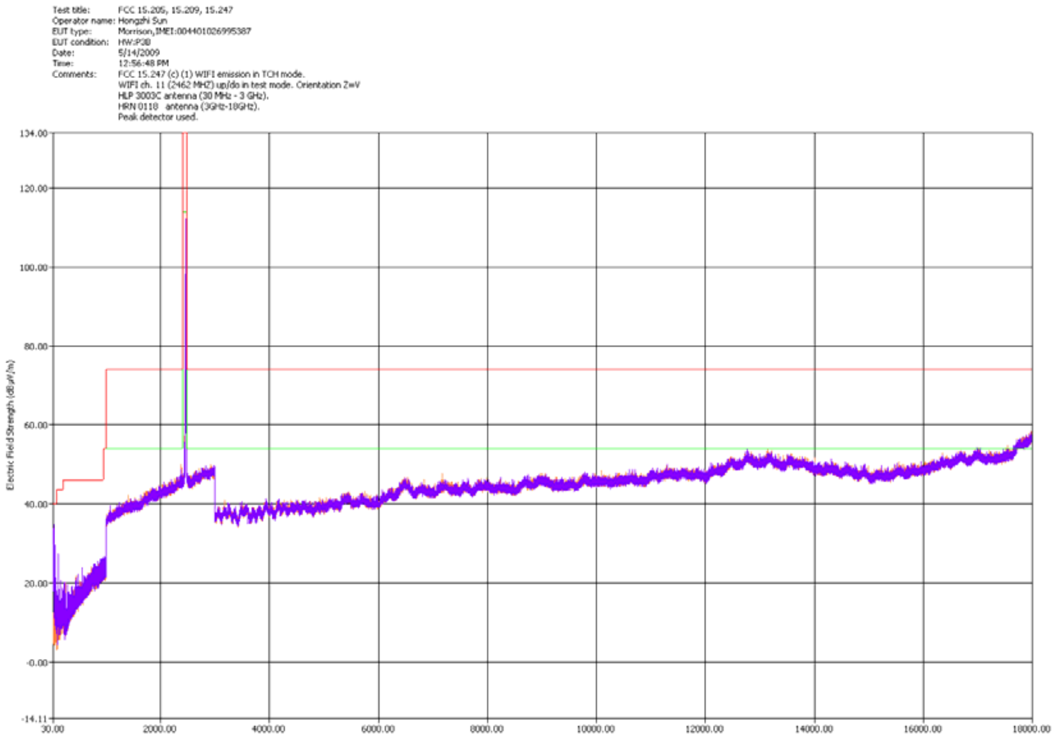
30 - 18000MHz High Channel Dual Polarization X - slider closed



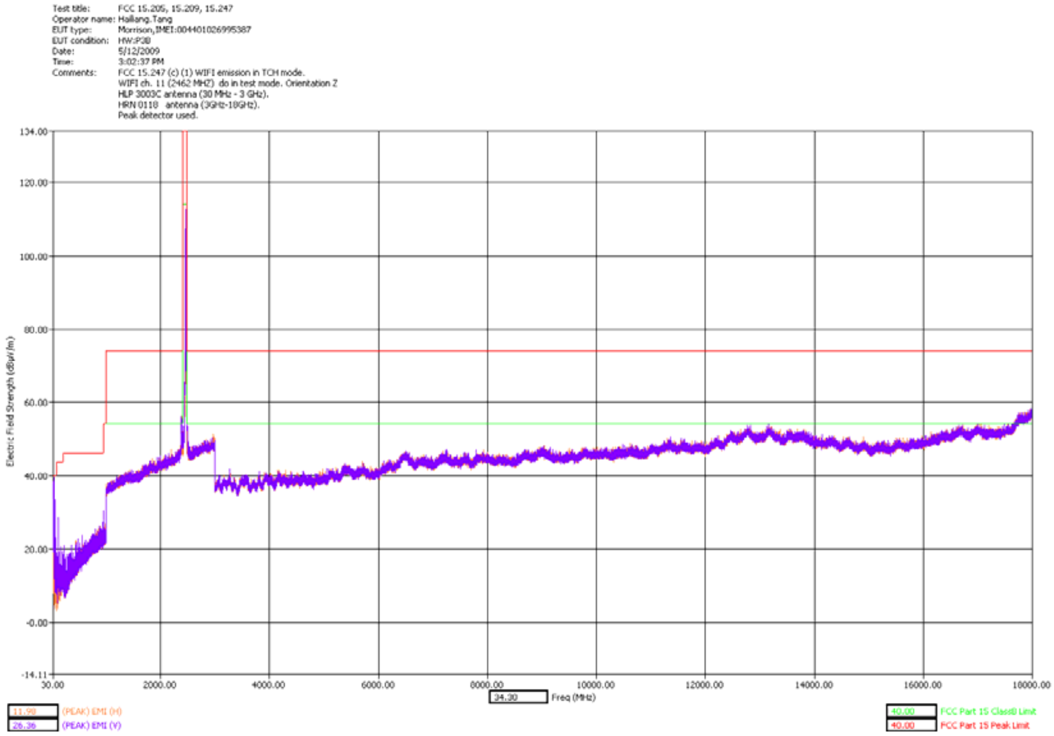
30 - 18000MHz High Channel Dual Polarization Y - slider open



30 - 18000MHz High Channel Dual Polarization Y - slider closed



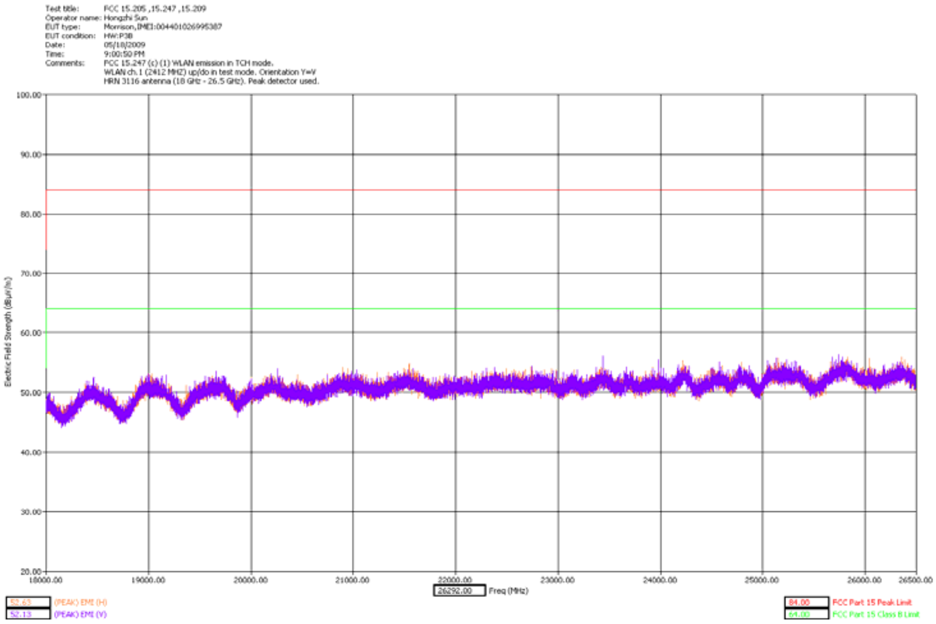
30 - 18000MHz High Channel Dual Polarization Z - slider open



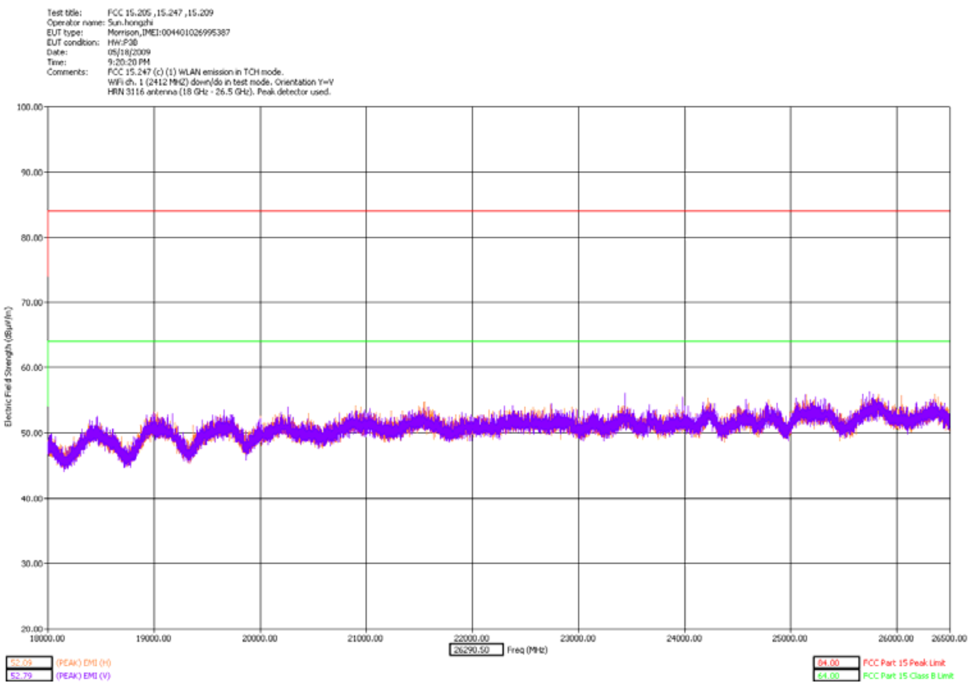
30 - 18000MHz High Channel Dual Polarization Z - slider closed

There were no discernible emissions above the noise floor for 18-26.5 GHz for Low, Mid and High Channels and all polarizations in WLAN band. The distance between EUT and receiving antenna is 1m.

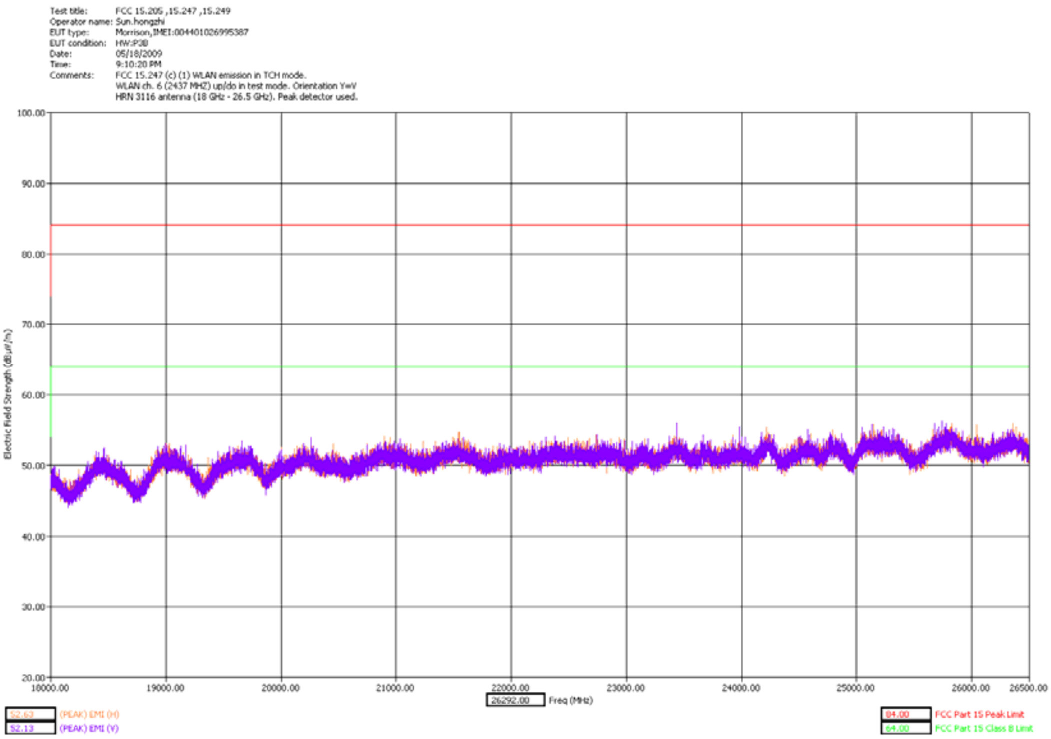
Only the worst case plot for each test frequency are shown in the below plots in the range from 18 GHz – 26.5 GHz.



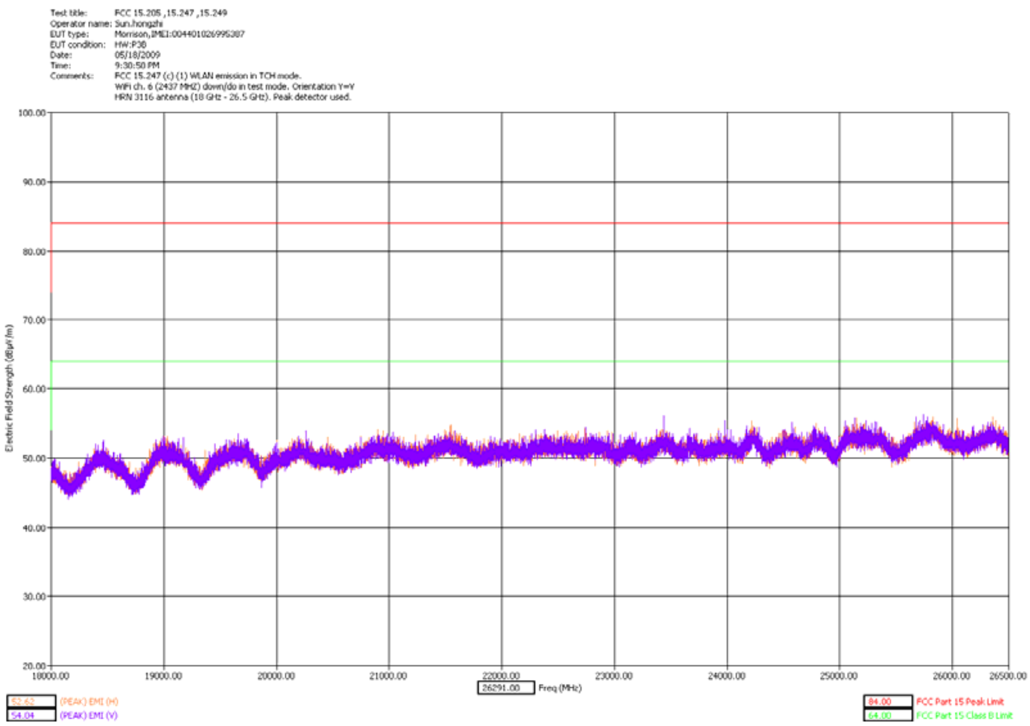
18 – 26.5 GHz Low Channel Dual Polarization Y- slider open



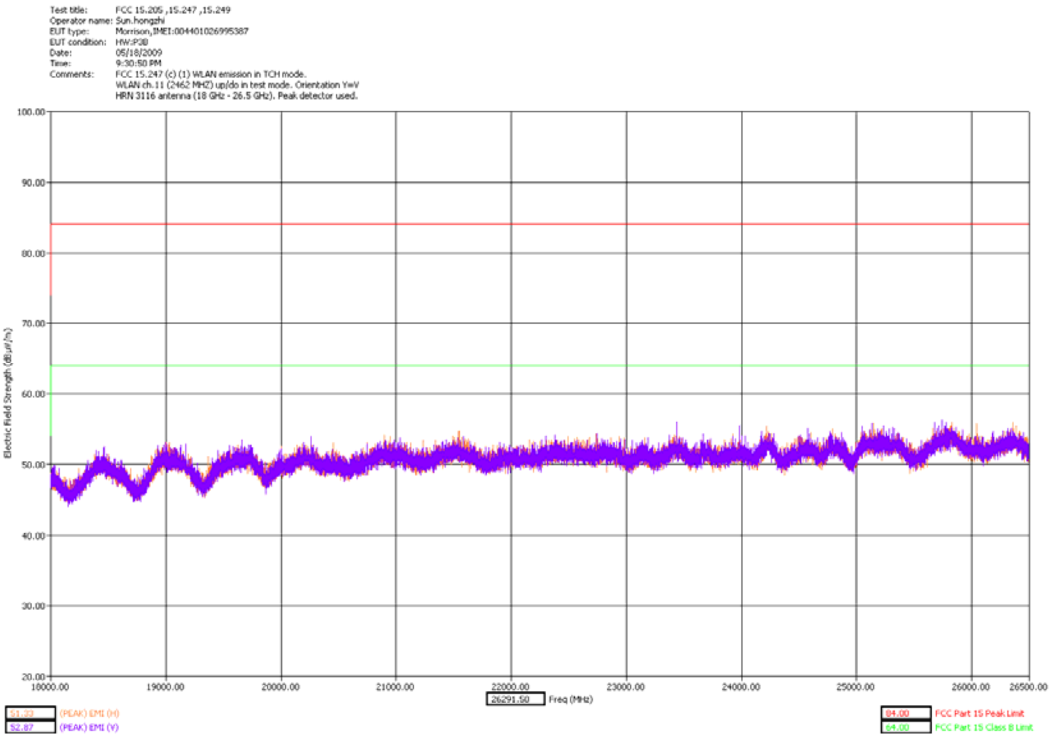
18 – 26.5 GHz Low Channel Dual Polarization Y- slider closed



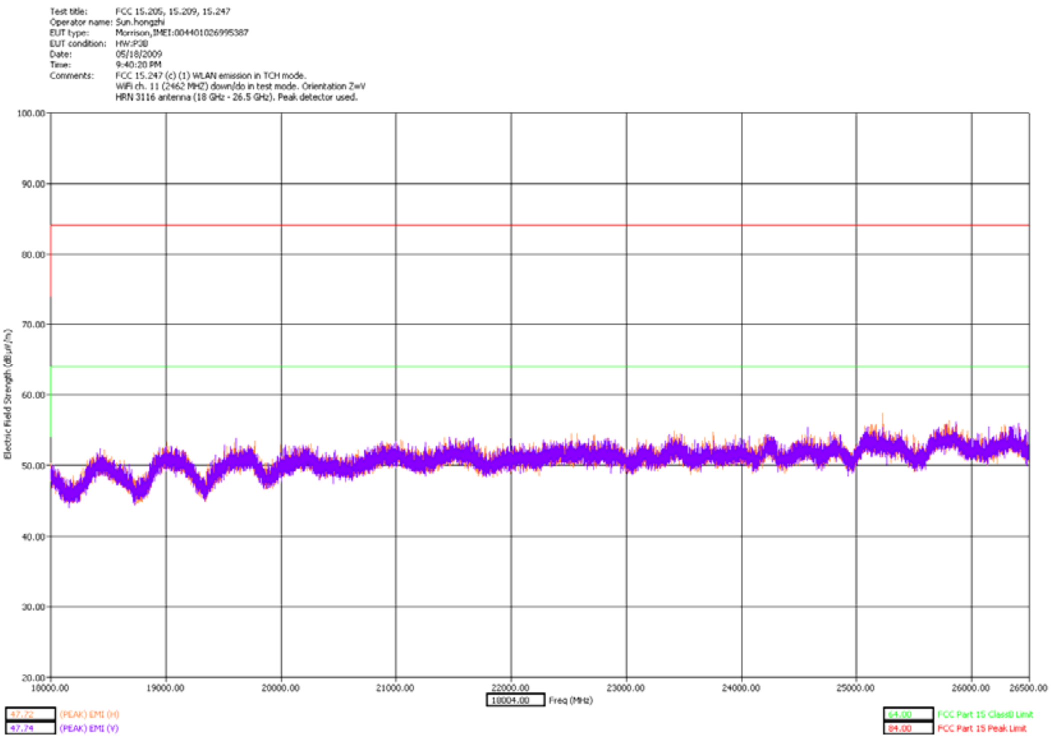
18 – 26.5 GHz Middle Channel Dual Polarization Y – slider open



18 – 26.5 GHz Middle Channel Dual Polarization Y – slider closed



18 – 26.5 GHz High Channel Dual Polarization Y – slider open



18 – 26.5 GHz High Channel Dual Polarization Y – slider closed

BAND-EDGE COMPLIANCE OF RF RADIATED EMISSIONS

CFR 47 Part 15.247

Measurement Procedure

The test sample is placed inside the semi-anechoic chamber on a wooden table at the turntable center. For each spurious frequency, the antenna mast is raised and lowered from 1 to 4 meters and the turntable is rotated 360 degrees to obtain a maximum reading on the spectrum analyzer. This is repeated for both horizontal and vertical polarizations of the receive antenna.

For 30 MHz – 18 GHz:
Field Strength (dBµV/m) = EMI Receiver Level (dBµV) + Cable Loss (dB) - Amplifier Gain (dB) + Filter loss (dB) + Antenna Correction Factor (3/m)

For 18 GHz – 26.5 GHz:
Field Strength (dBµV/m) = EMI Receiver Level (dBµV) + Cable Loss (dB) - Amplifier Gain (dB) + Filter loss (dB) + Antenna Correction Factor (1/m)

The test sample WLAN transmitter was enabled using a test script.

A fully charged battery was used for the supply voltage.

Measurement Results

Comments:
The band edge measurements crossing the corner for the low/high channel with respect to the average limit line is acceptable when applying the FCC rule specified in CFR 47 part 15.35(b) for the use of peak detector above 1 GHz.

The test was repeated performed in 22.5 degree angular step size when the band edge crossing is measured to be +6 dB above the AVG limit line to determine if the FCC rule specified in CFR 47 part 15.247 (d) should be applied.

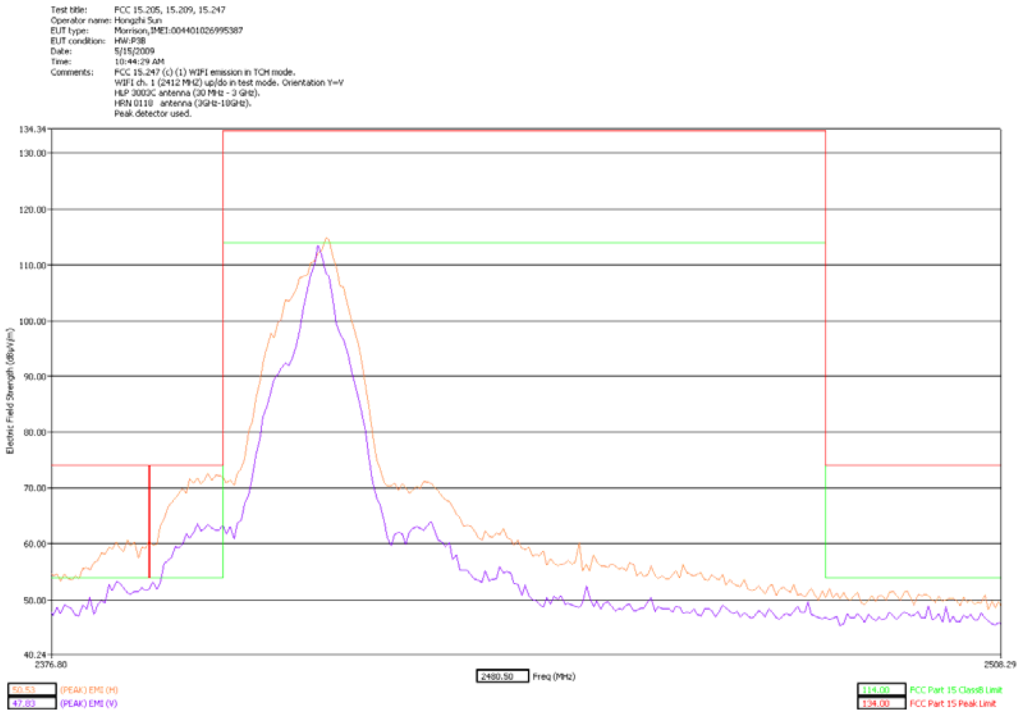
The peak detector limit line has been added to the graphical plots.

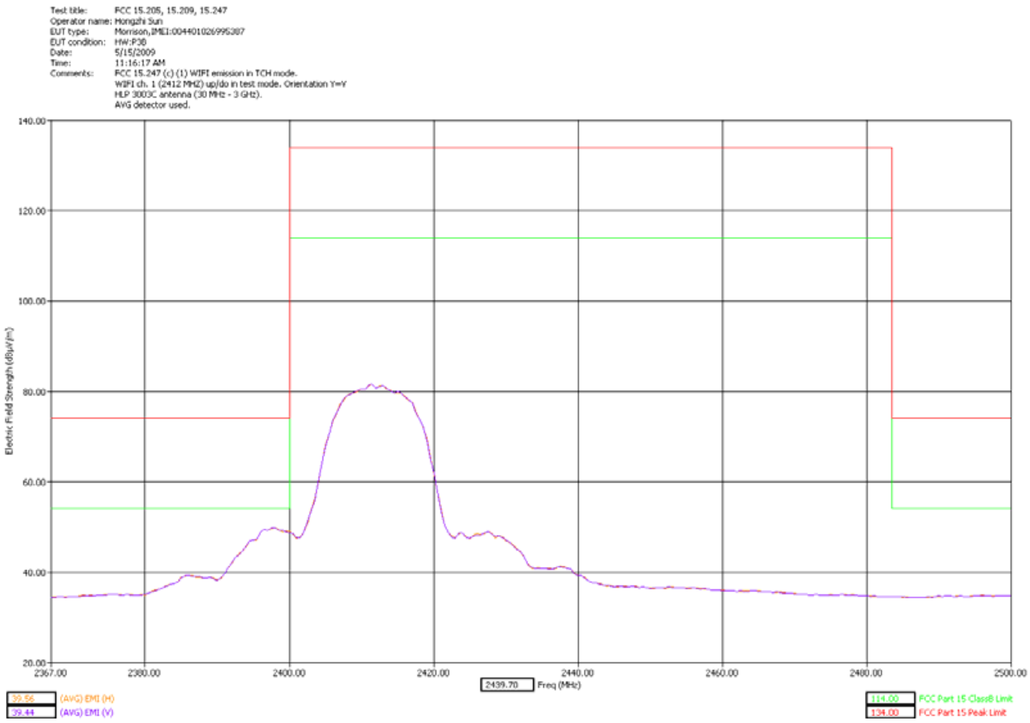
Note: No WLAN band notch filters were used.

See below attached plots for the measurement results with both peak detector and average detector:

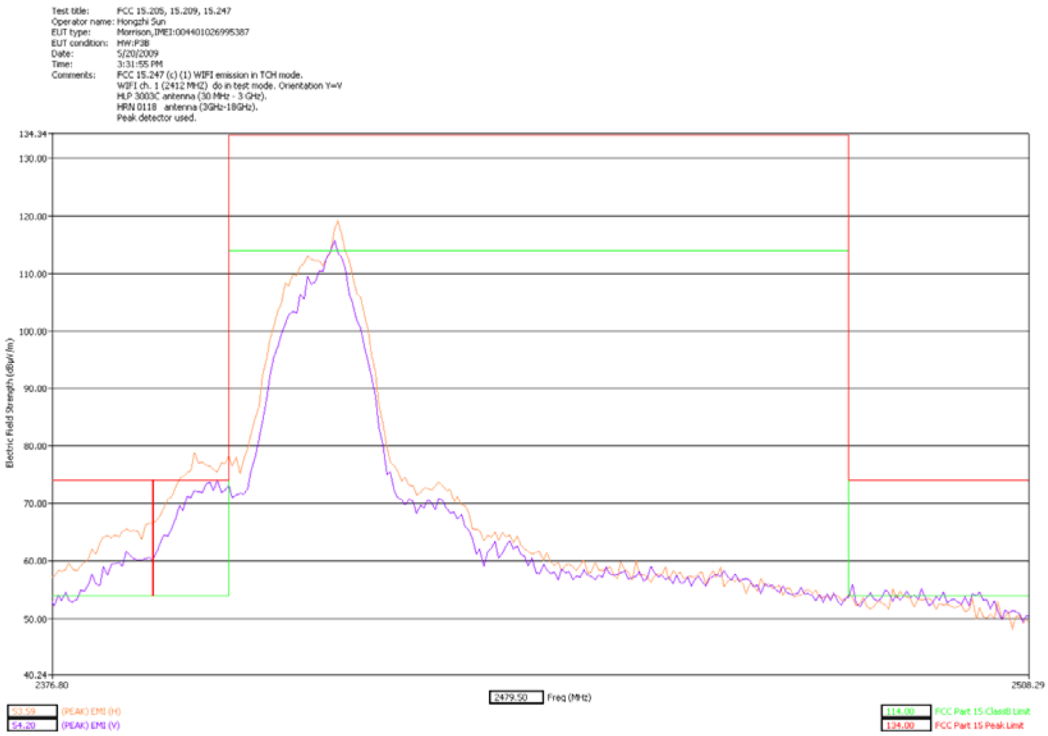
WLAN Band (b)

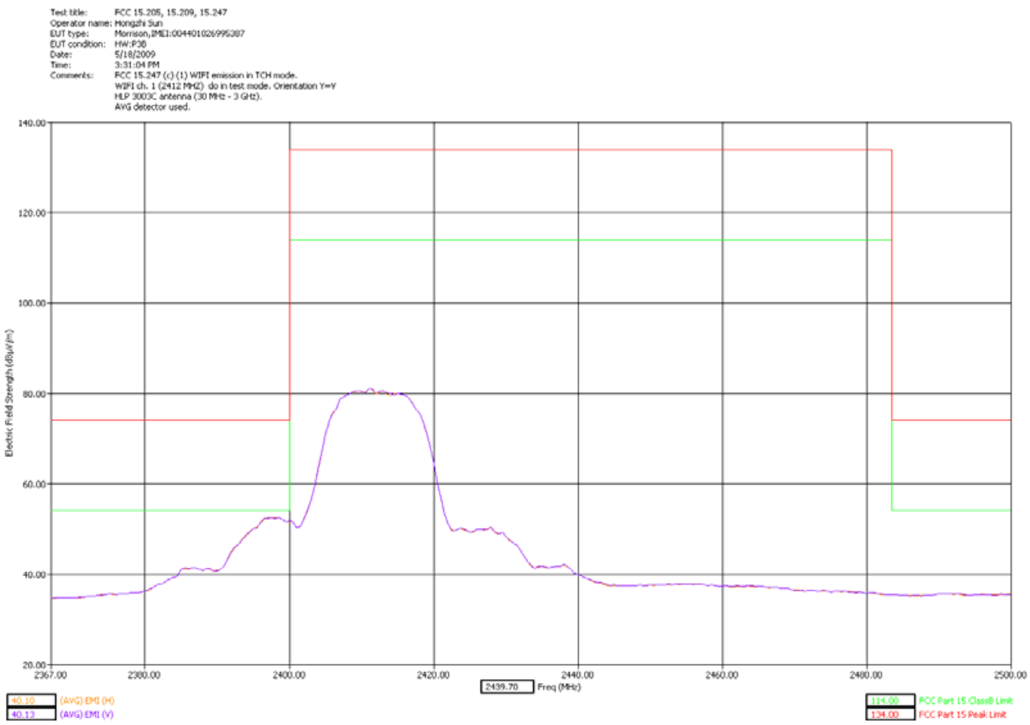
Only the worst band edge is displayed for WLAN band (b)





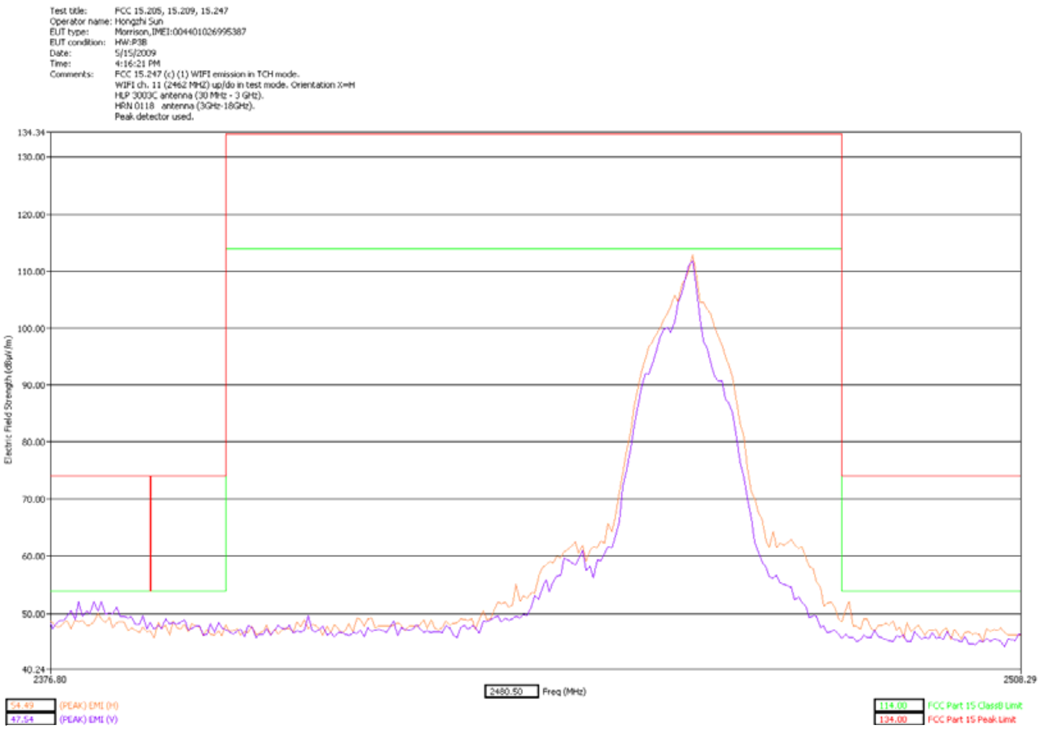
Low Band Edge Y Orientation – slider open

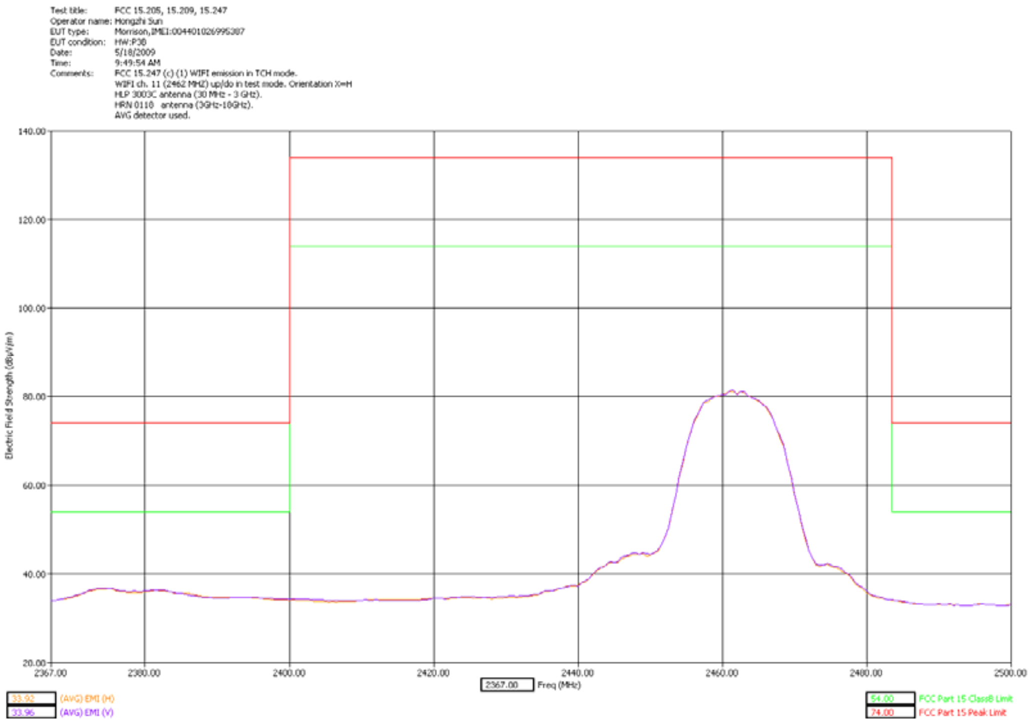




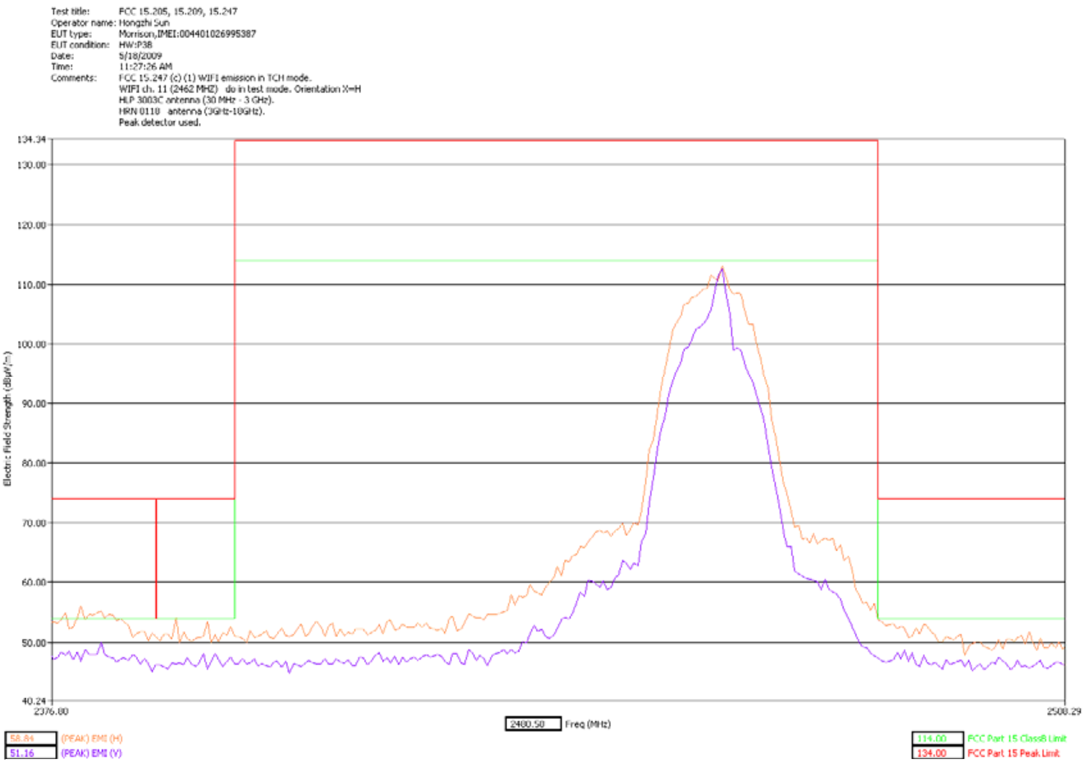
Low Band Edge Y Orientation – slider closed

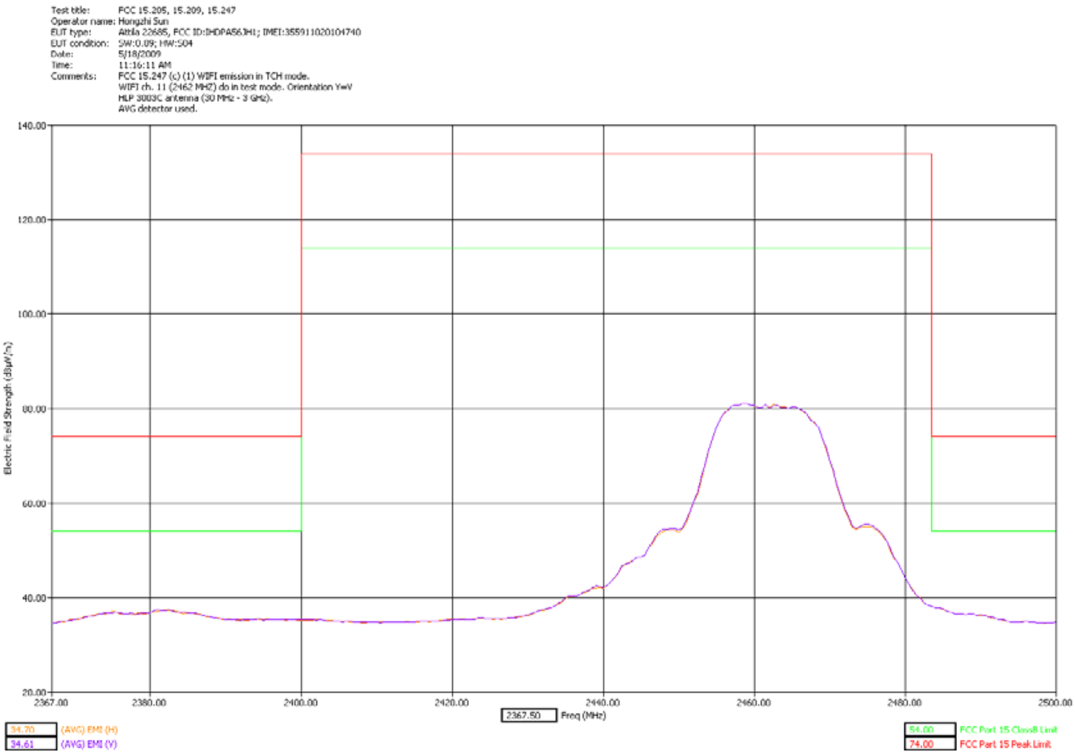
(Refer to Appendix)





High Band Edge X Orientation – slider open

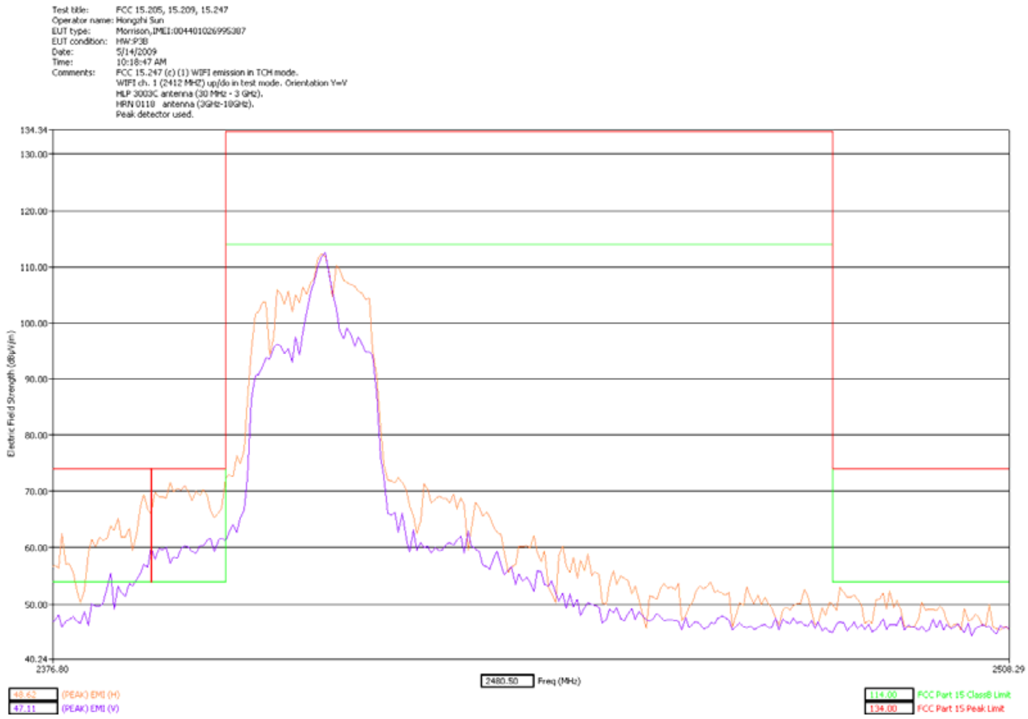


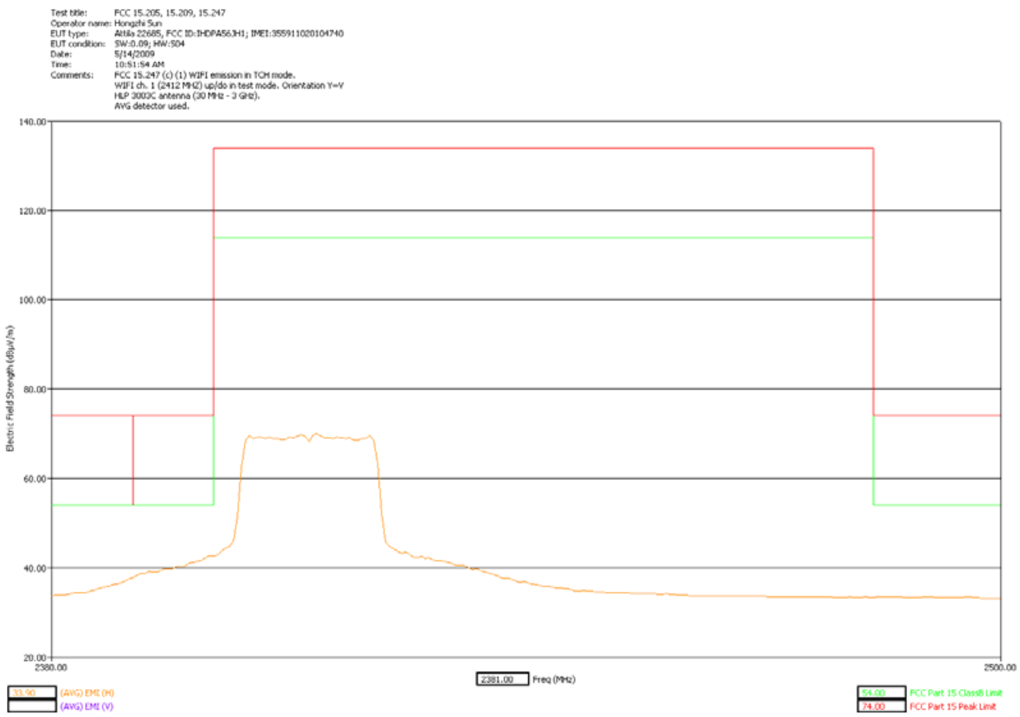


High Band Edge X Orientation – slider closed

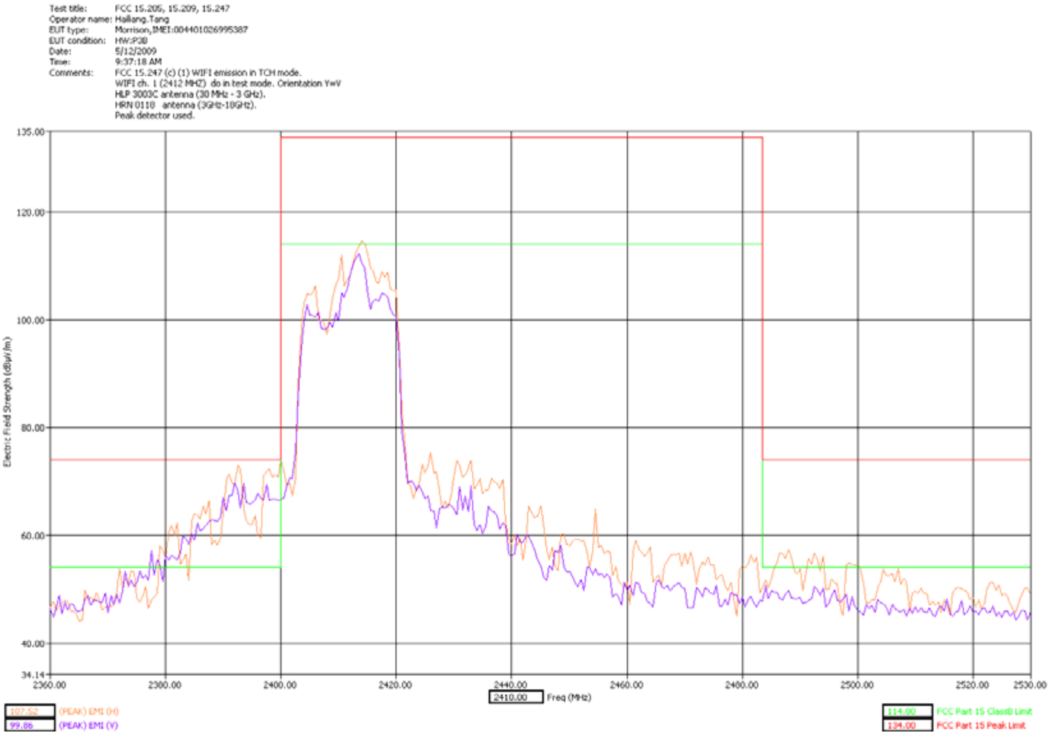
WLAN Band (g)

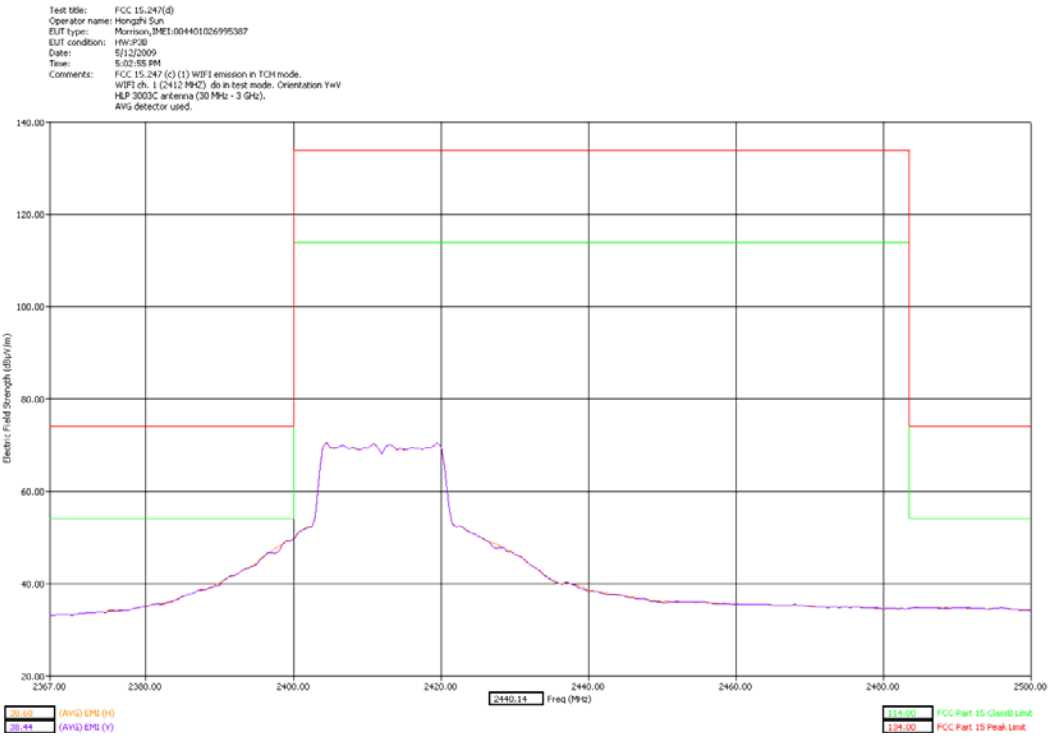
Only the worst band edge is displayed for WLAN band (g)



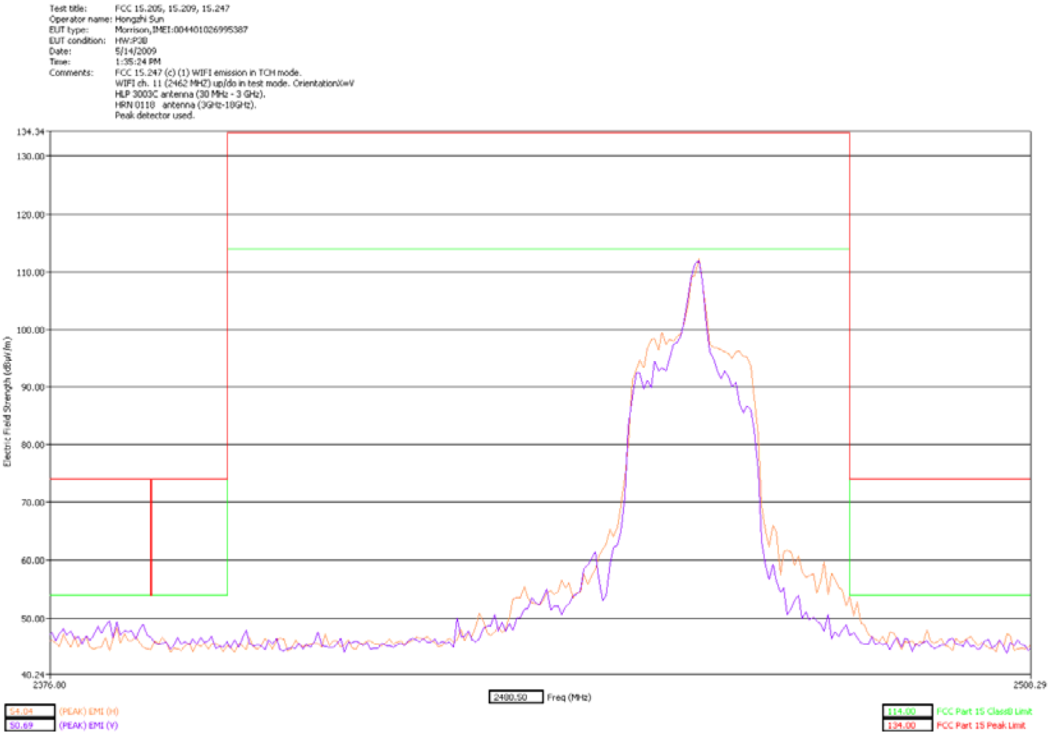


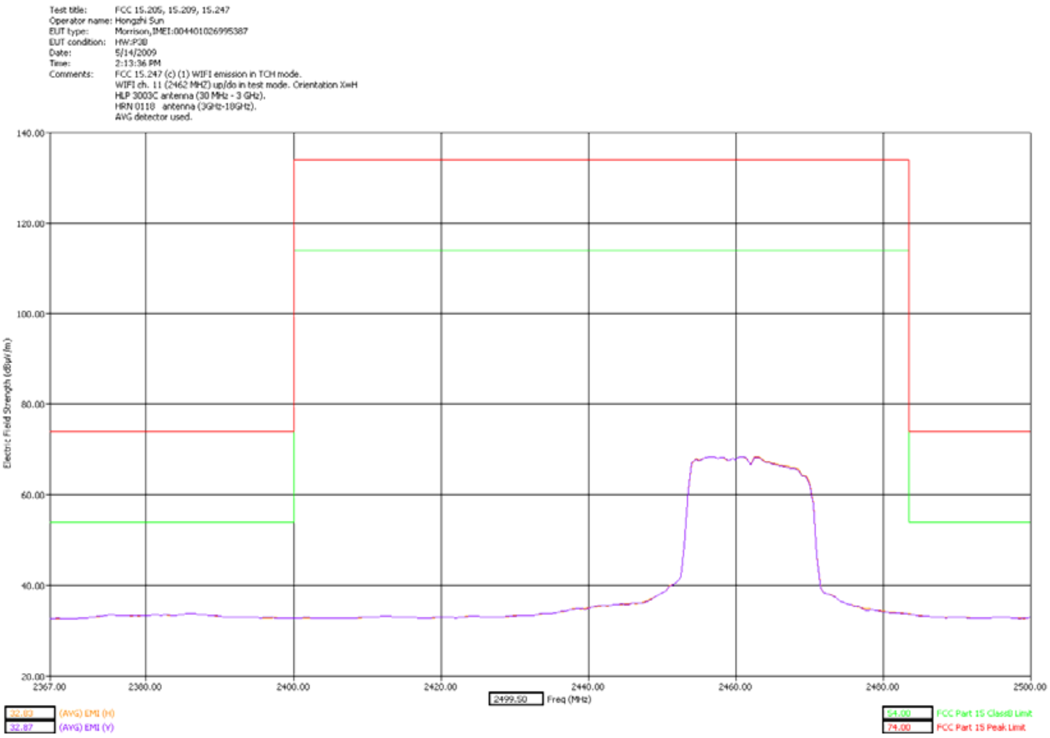
Low Band Edge Y Orientation – slider open



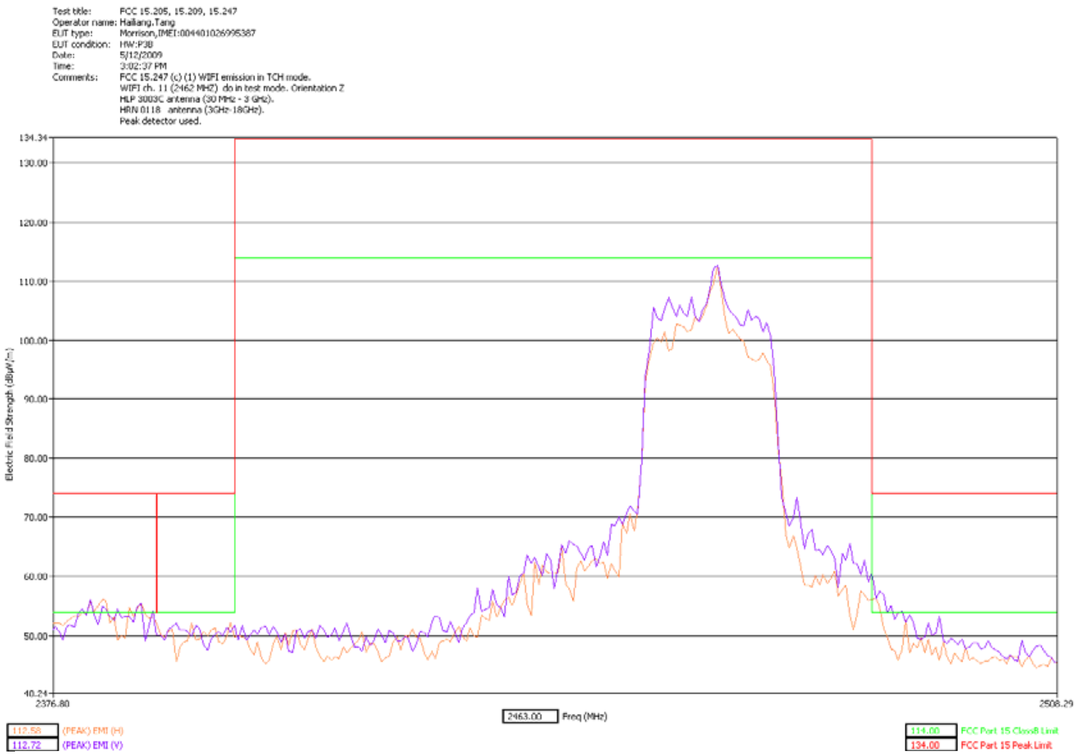


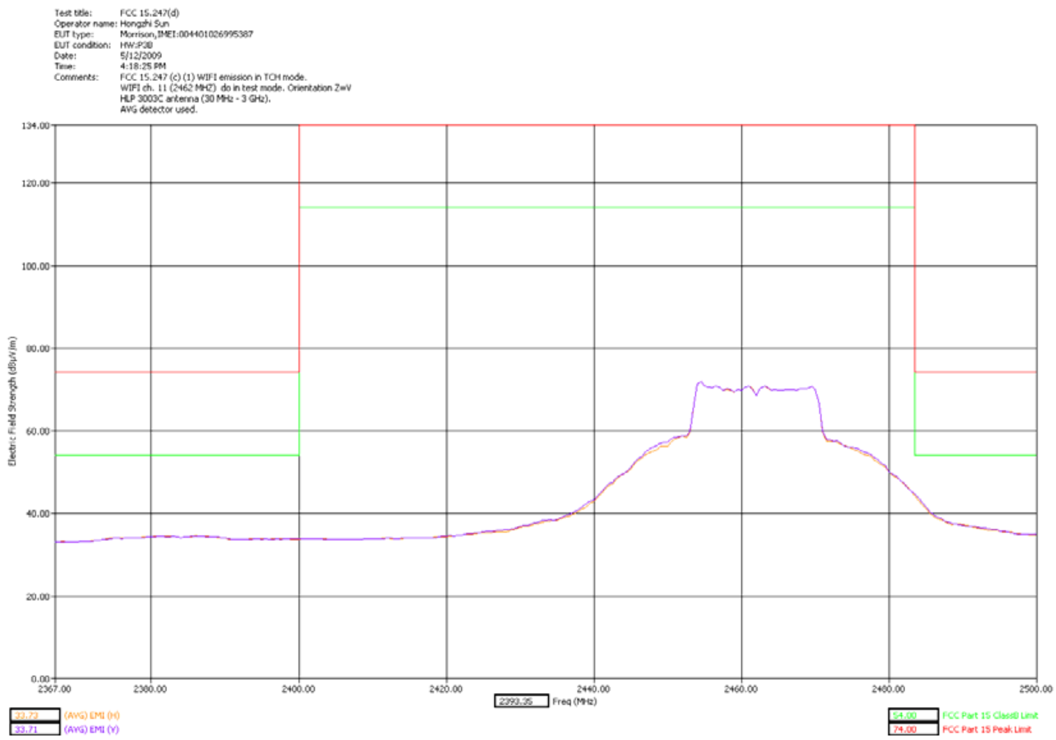
Low Band Edge Y Orientation – slider closed





High Band Edge Y Orientation – slider open





High Band Edge Z Orientation – slider closed

PICTURES

The pictures related to the above test results are placed in the associated report denoted as EXHIBIT 7A2.

APPENDIX

Appendix- 1 Out of band emission – band edge

The WLAN band (b) low channel band edge performance is further evaluated using the described method in FCC part 15.247(d).

The carrier is measured using a 100 kHz RBW.

Title: FCC 15.205, 15.209, 15.247
File: Morrison (5.31) (ESU) FCC15.247 WIFI b Tch-low_Y_Down Carrier-PK 05-21-2009.set
Operator: Hongzhi Sun
EUT Type: Morrison, IMEI:004401026995387
EUT Condition: HW:P3B
Comments: FCC 15.247(c)(1) WIFI emission in TCH mode.
WIFI ch. 1 (2412 MHZ) do in test mode. Orientation Y=V
HLP 3003C antenna (30MHz - 3 GHz). Peak detector used.

Table13

Freq (MHz)	(PEAK) EMI (dBµV/m)	Freq (Max) (MHz)	Ttbl Agl (deg)	Pol
2412.00	106.63	2412.45	267.90	H
2412.00	104.85	2412.77	239.40	V

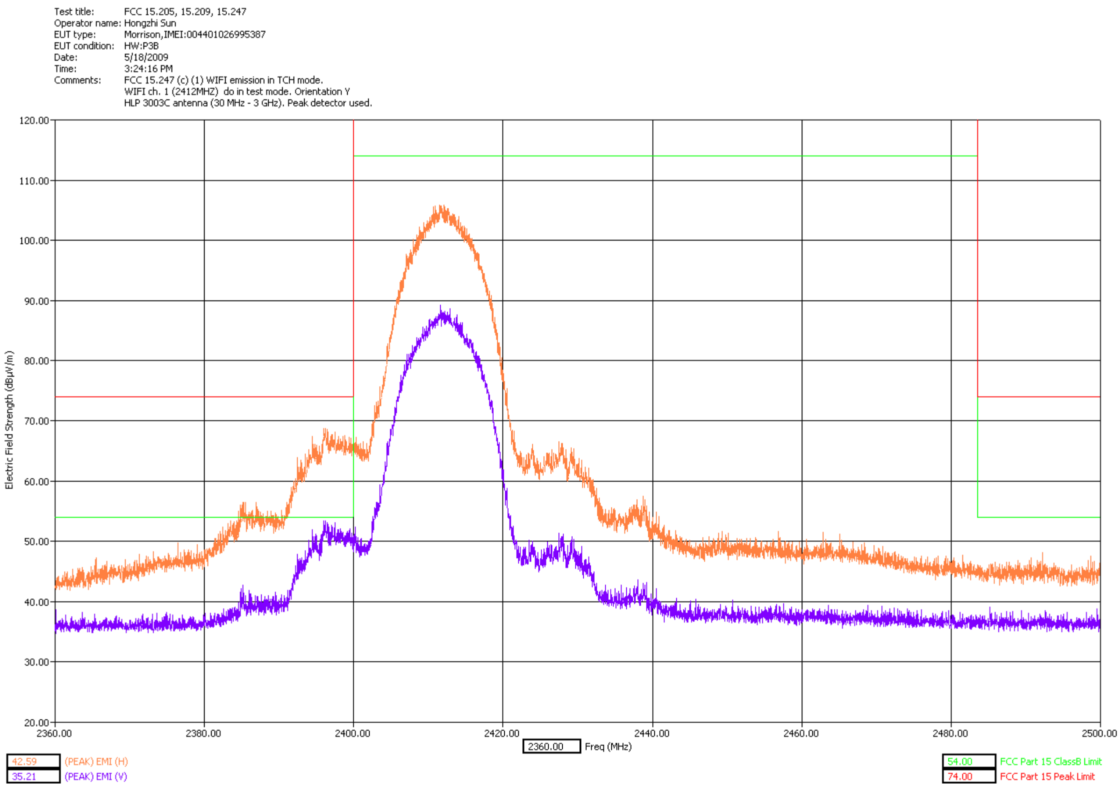
Carrier Y Orientation-RBW = 100 kHz (6 dB)

The peak value of the carrier field strength is measured to: 106.63dBµV/m.

The new out of band emission limit line for emissions that does not fall inside any restricted band as defined in FCC part 15.205 and is limited to the frequency band 2390 MHz to 2400 MHz is:

106.63dBµV/m – 20dB = 86.63 dBµV/m.

A test with this unmodified limit line included is performed.



Low Band Edge Y-Orientation-RBW = 100 kHz (6 dB)

The band edge performance in the out of band emission frequency range from 2390 MHz to 2400 MHz is attenuated by more than 20 dB with respect to the carrier.

The WLAN band (g) low channel band edge performance is further evaluated using the described method in FCC part 15.247(d).

The carrier is measured using a 100 kHz RBW.

Title: FCC 15.205, 15.209, 15.247
File: Morrison (5.31) (ESU) FCC15.247 WIFI g Tch-low_Y_Down Carrier-PK 05-21-2009.set
Operator: Hongzhi Sun
EUT Type: Morrison, IMEI:004401026995387
EUT Condition: HW:P3B
Comments: FCC 15.247(c)(1) WIFI emission in TCH mode.
WIFI ch. 1 (2412 MHZ) do in test mode. Orientation Y=V
HLP 3003C antenna (30MHz - 3 GHz). Peak detector used.

Table13

Freq (MHz)	(PEAK) EMI (dBµV/m)	Freq (Max) (MHz)	Ttbl Agl (deg)	Pol
2412.00	111.66	2411.84	340.00	H
2412.00	104.14	2412.54	360.00	V

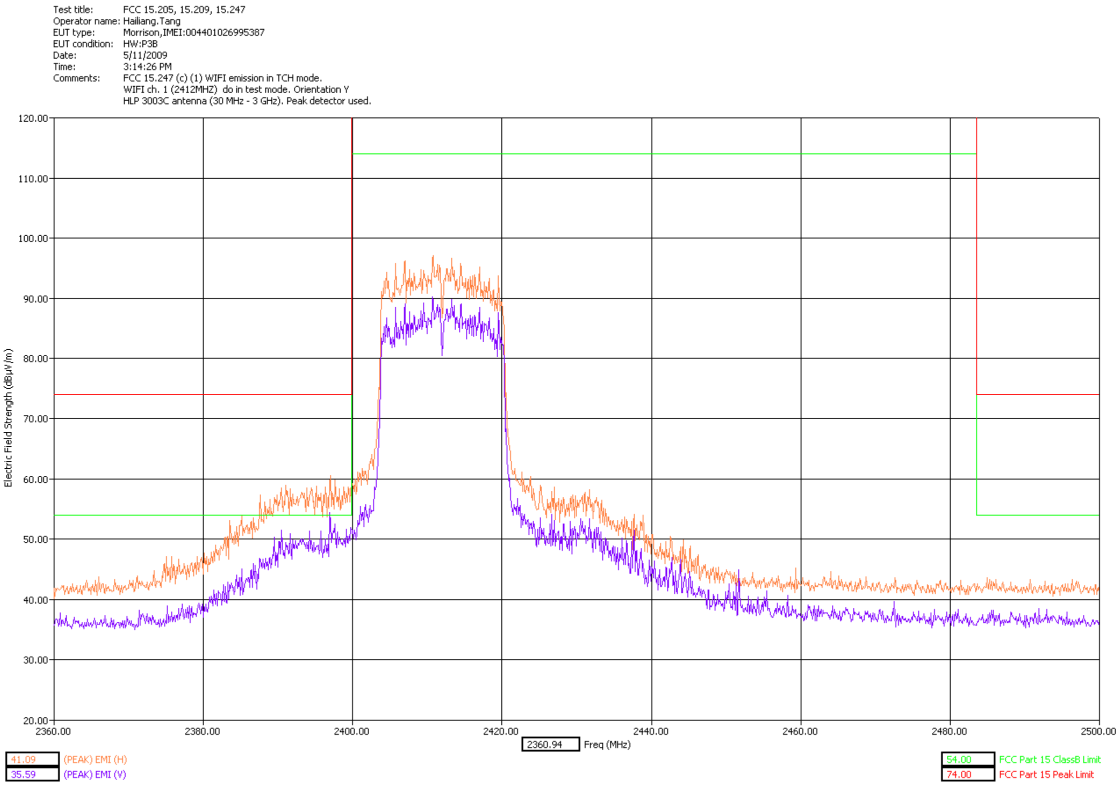
Carrier Y Orientation-RBW = 100 kHz (6 dB)

The peak value of the carrier field strength is measured to: 111.66dBµV/m.

The new out of band emission limit line for emissions that does not fall inside any restricted band as defined in FCC part 15.205 and is limited to the frequency band 2390 MHz to 2400 MHz is:

111.66dBµV/m – 20dB = 91.66dBµV/m.

A test with this unmodified limit line included is performed.



Low Band Edge Y-Orientation-RBW = 100 kHz (6 dB)

The band edge performance in the out of band emission frequency range from 2390 MHz to 2400 MHz is attenuated by more than 20 dB with respect to the carrier.

End of Test Report