MOTOROLA

MOBILE DEVICES BUSINESS

PRODUCT SAFETY AND COMPLIANCE EMC LABORATORY

EMC TEST REPORT - Addendum

Test Report Number – 23633-1 WLAN

Report Date –2010-03-08

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: 2010-02-22 to 2010-03-08

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: 2010-05-14

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 (China) Technologies Ltd. Mobile Devices business No.1 Wangjing East Road Chao Yang District Beijing, 100102, P. R. China
Product Type:	Cell phone with embedded WLAN
Signaling Capability:	GSM 850/900/1800/1900, TD-SCDMA 2010/2025, HSDPA 2.8 Mbps (Category 15), EDGE Class 10, GPRS Class 10, Standalone GPS/aGPS, Bluetooth, 802.11b/802.11g
IMEI:	351553040000013
FCC ID:	IHDT56LG1
Project number:	23633-1
Testing Complete Date:	03-08-2010

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 C63.4-2003, RSS-Gen Issue 2, RSS-210 Issue 7.

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.

General and Special Conditions

The 23633-1 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. Radiated testing was done in the following modes:
802.11 b mode @ 11 Mbps
802.11 g mode @ 54 Mbps

Please refer to exhibit 6A5 for the conducted power levels.

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

Note that the hybrid antenna and horn antenna are on a three-year calibration cycle. All other equipments are on a one-year calibration cycle.

Description of WLAN (WiFi) Transmitter

The 23633-1 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

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)

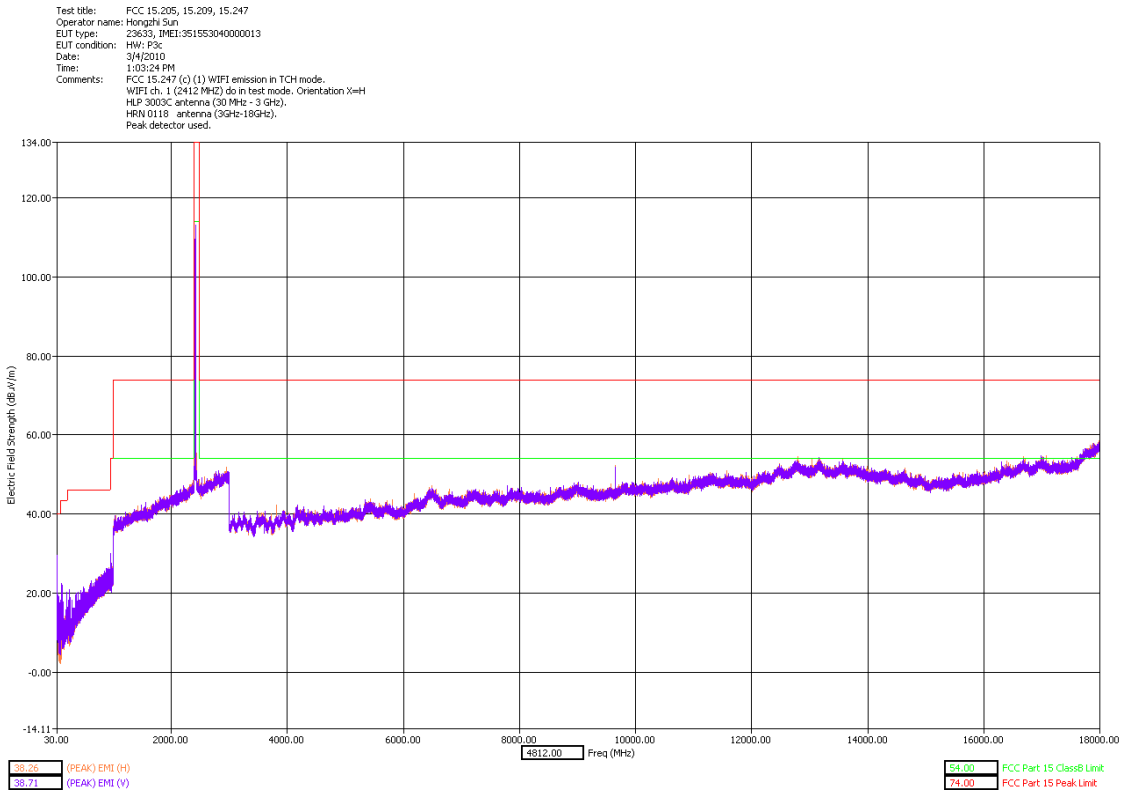
Measurement Results

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.

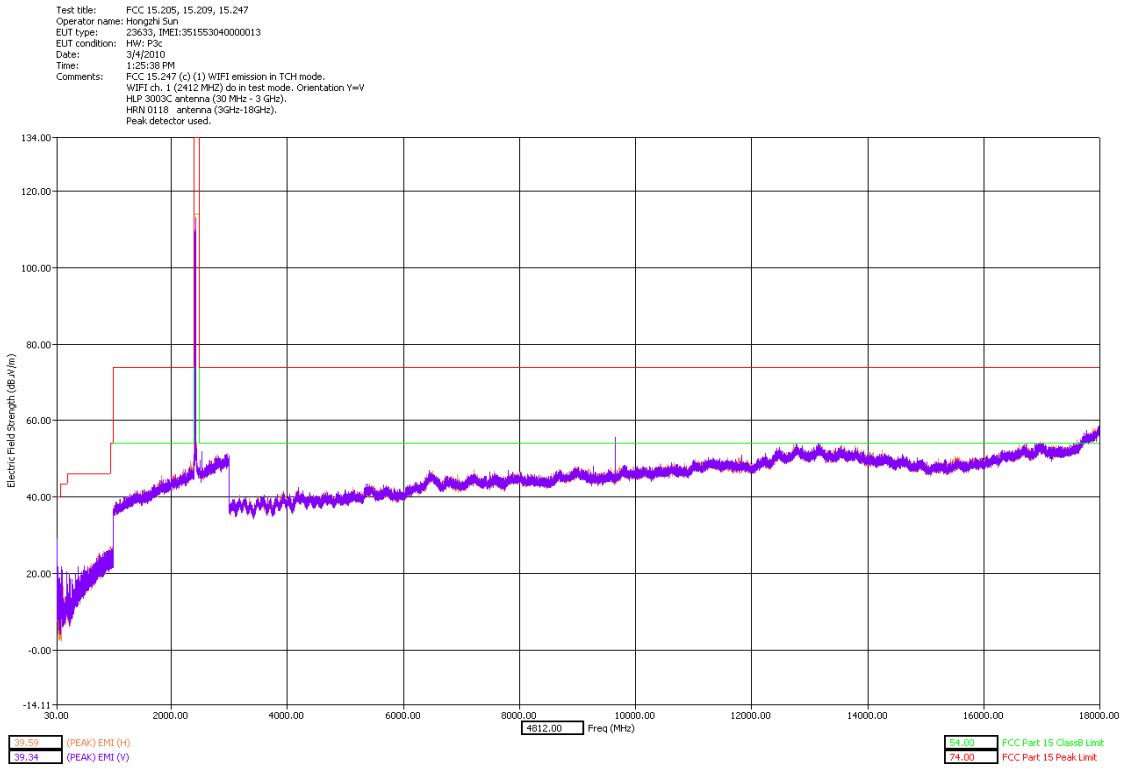
For peak emissions detected above 1 GHz, only those emissions that are higher than the AVG limit line plus 8 dB are selected for final emission analysis.

WLAN Band (b)

All data measured for WLAN band (b).



30 - 18000MHz Low Channel Dual Polarization X



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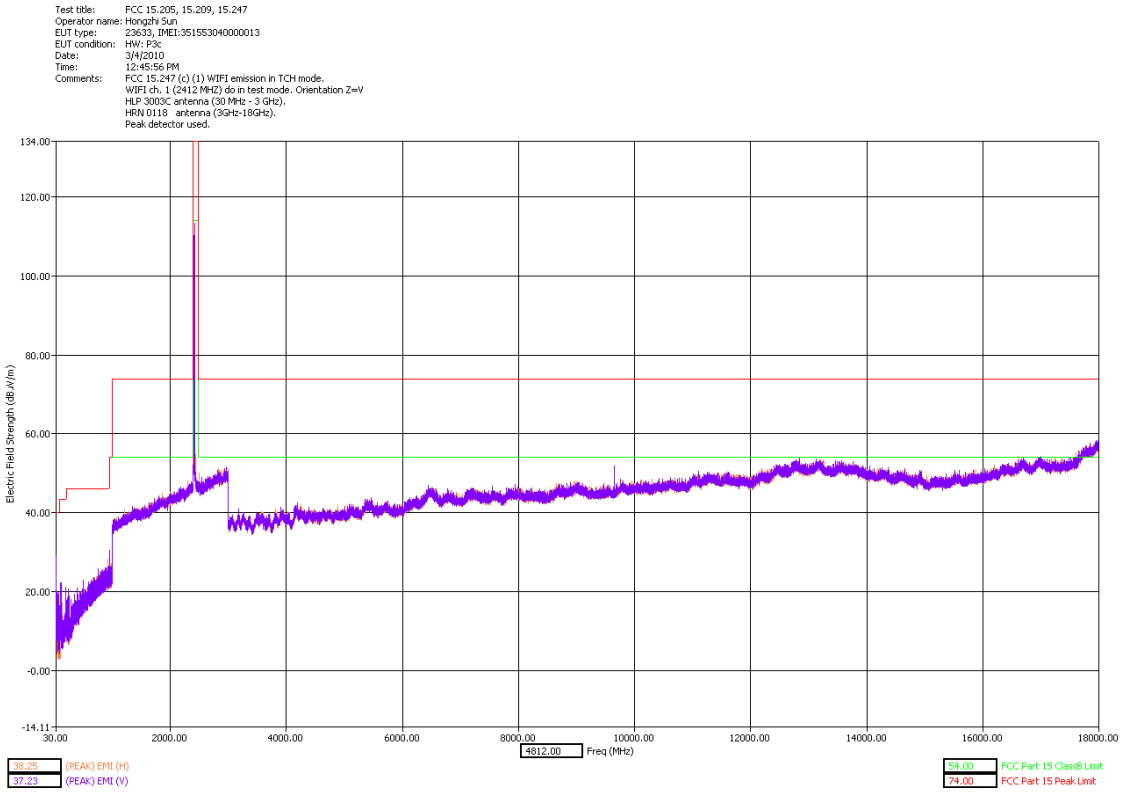

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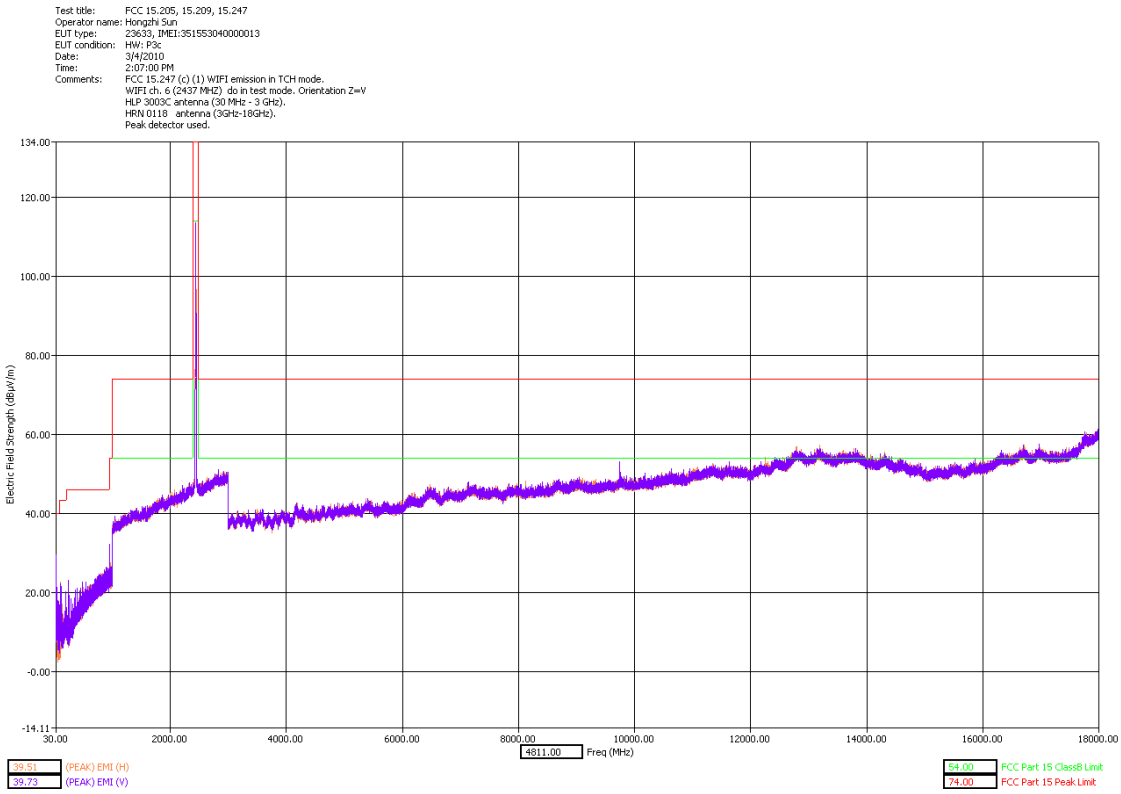
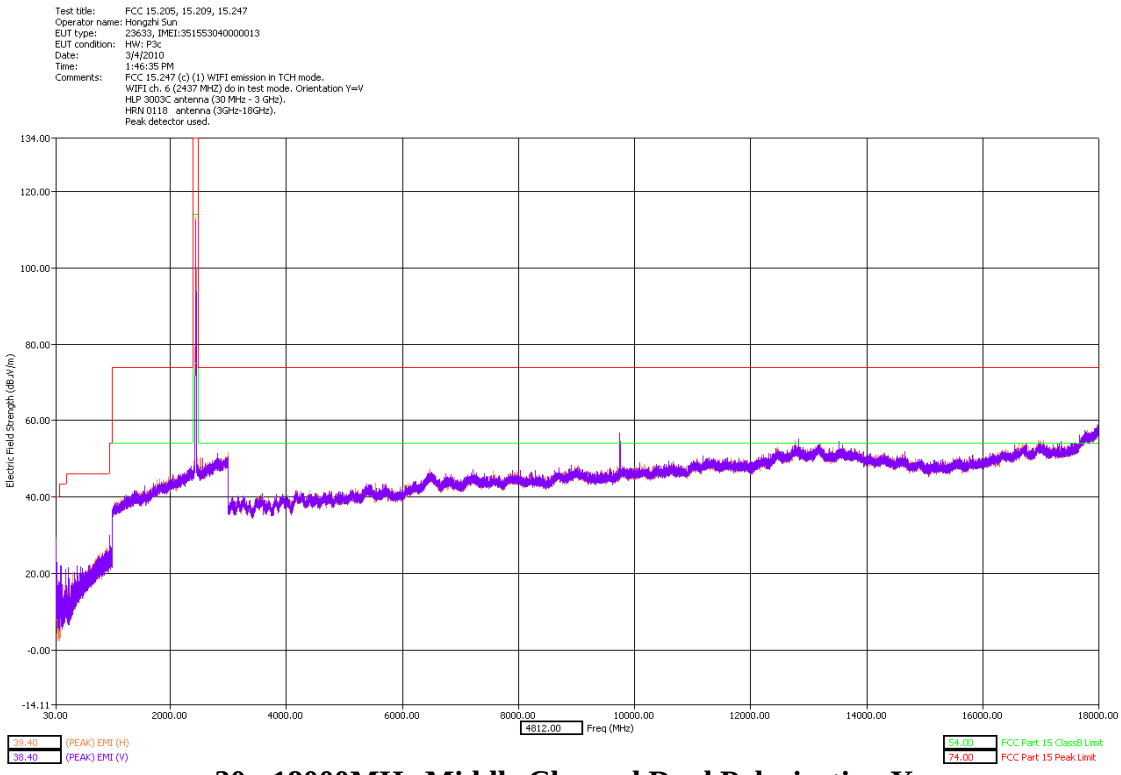


30 - 18000MHz Middle Channel Dual Polarization X



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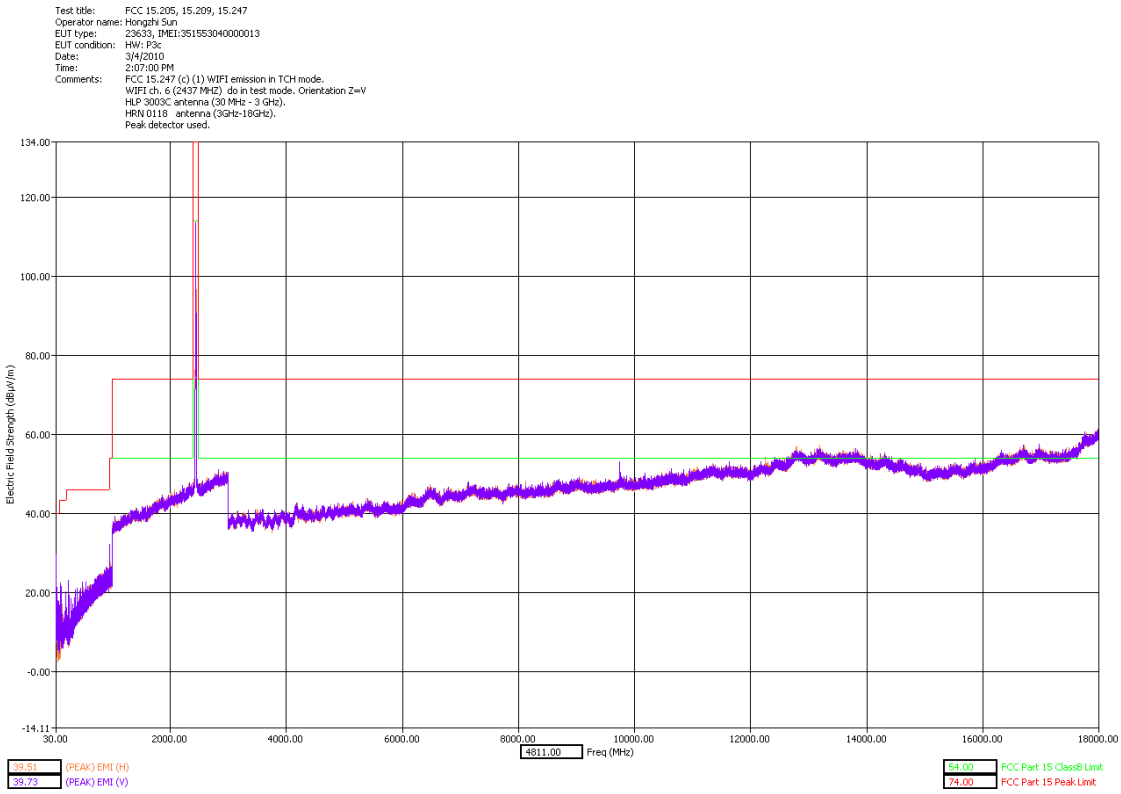

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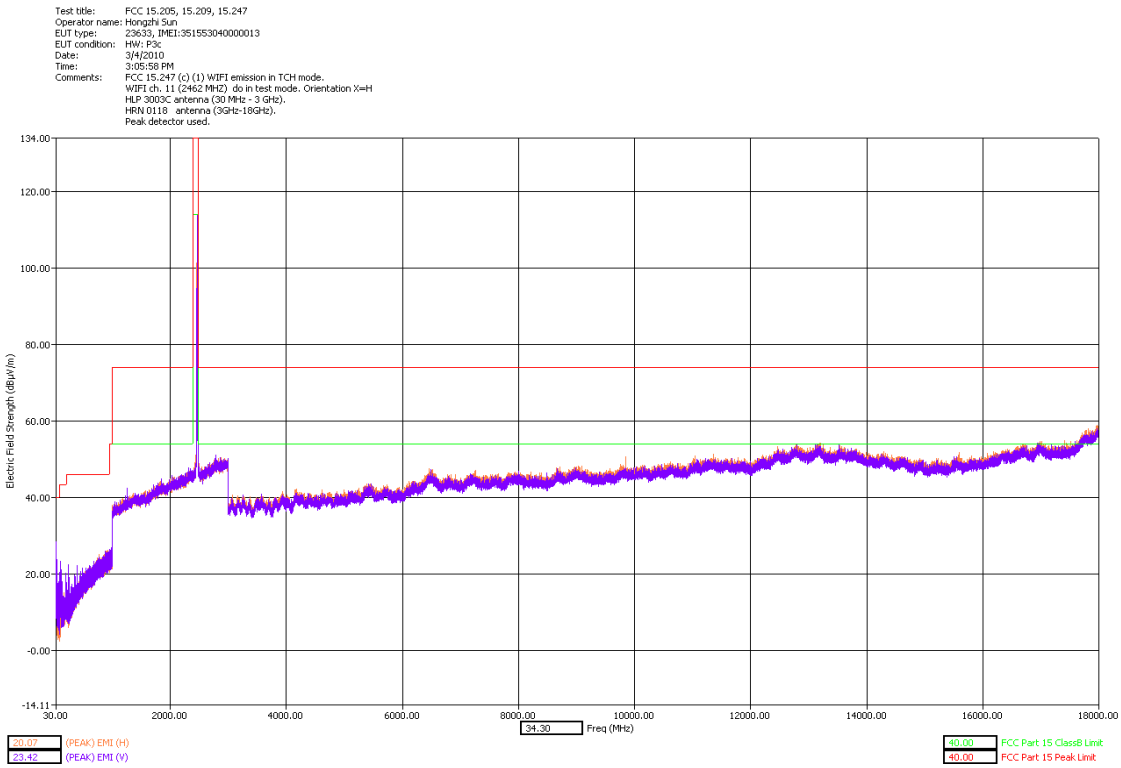
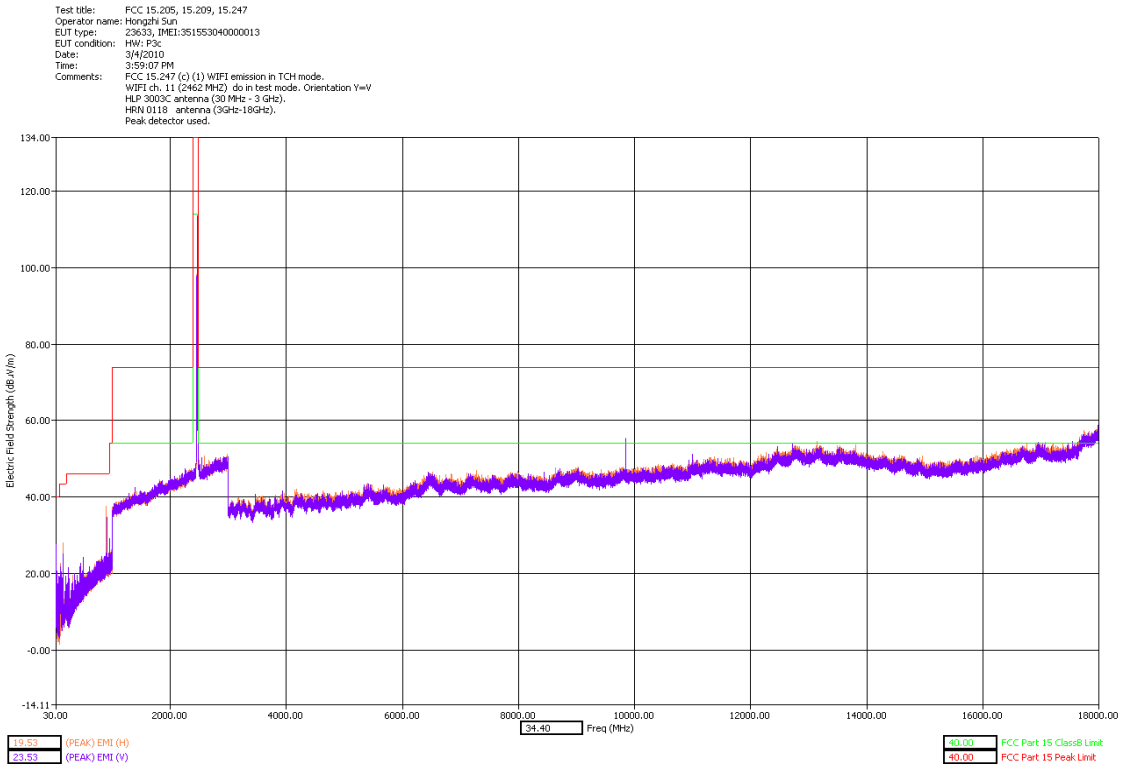
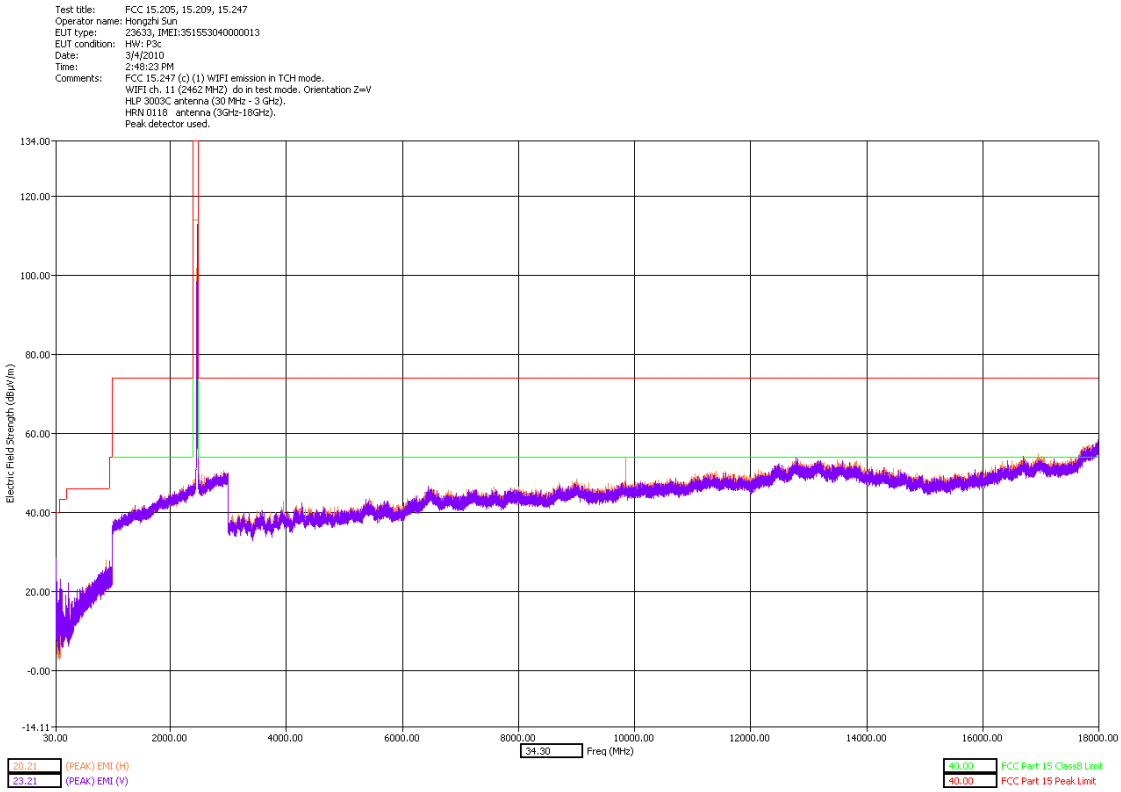


30 - 18000MHz High Channel Dual Polarization X



30 - 18000MHz High Channel Dual Polarization Y

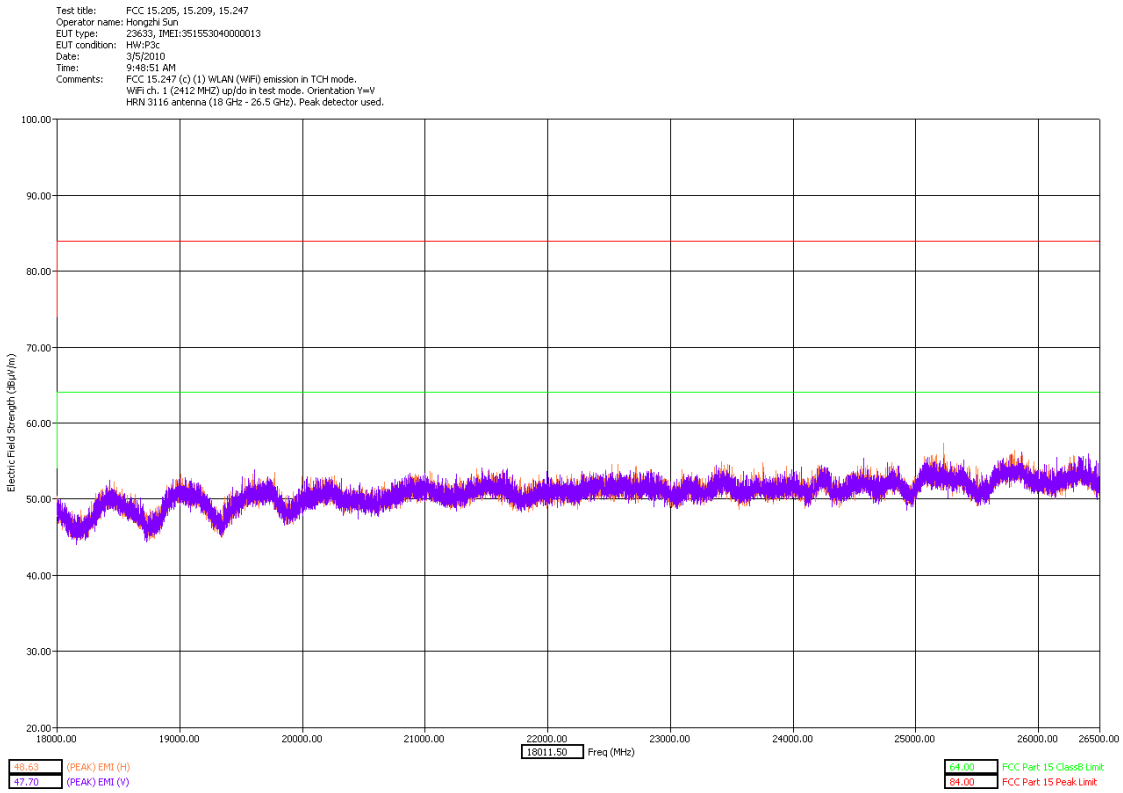


30 - 18000MHz High Channel Dual Polarization Z

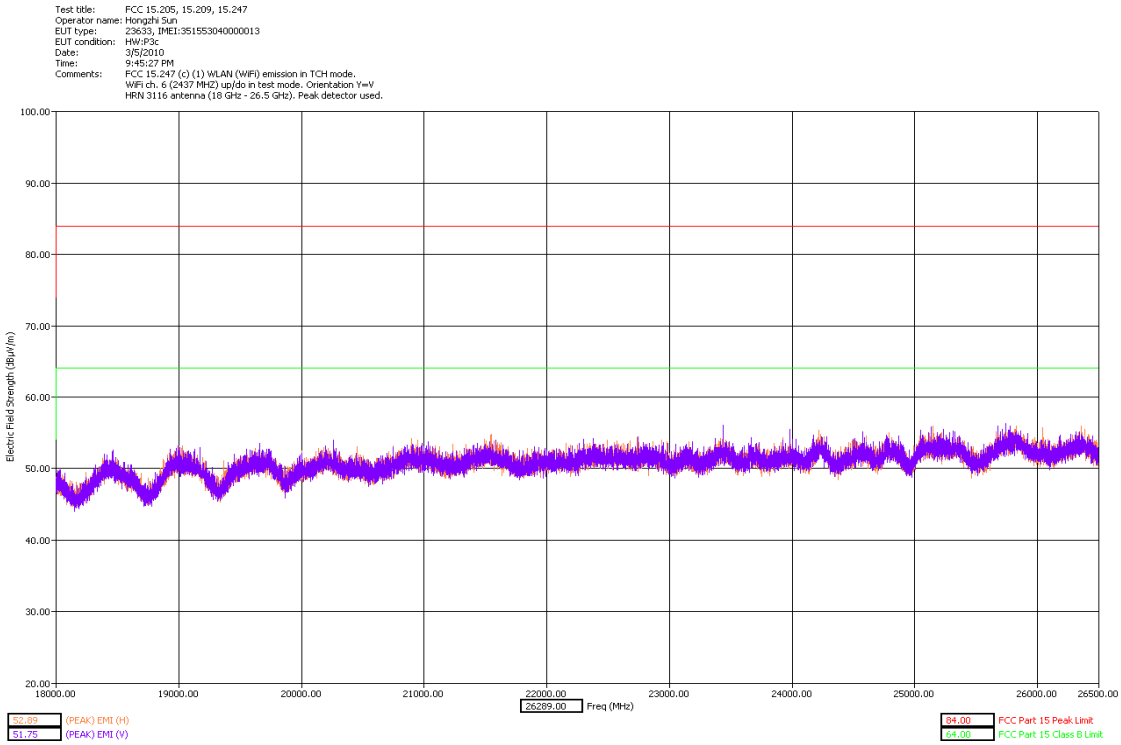
Note: The emission of the 4th harmonic for low, mid and high channels which exceeds the average limit belongs to the restricted bands of operation which should be ignored.

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 (b).

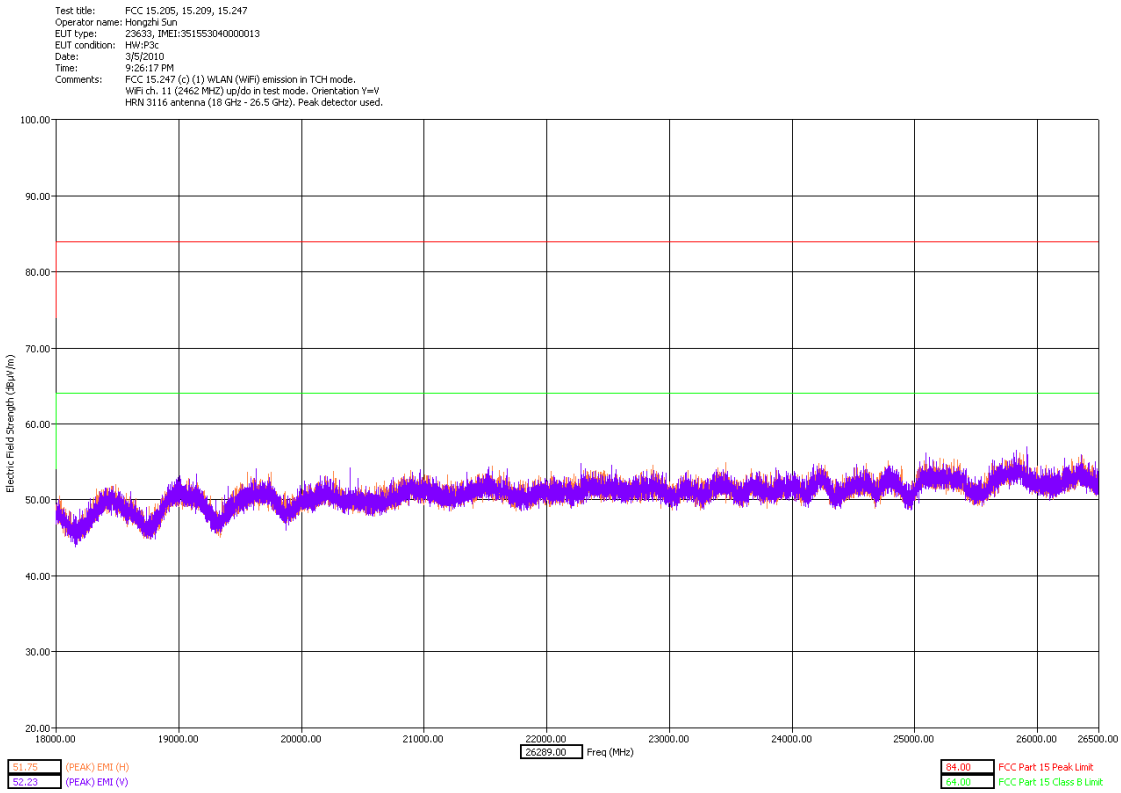
Only Y position for each test frequency are shown in the below plots in the range from 18 GHz – 26.5 GHz.



18-26.5GHz Low Channel Y Orientation



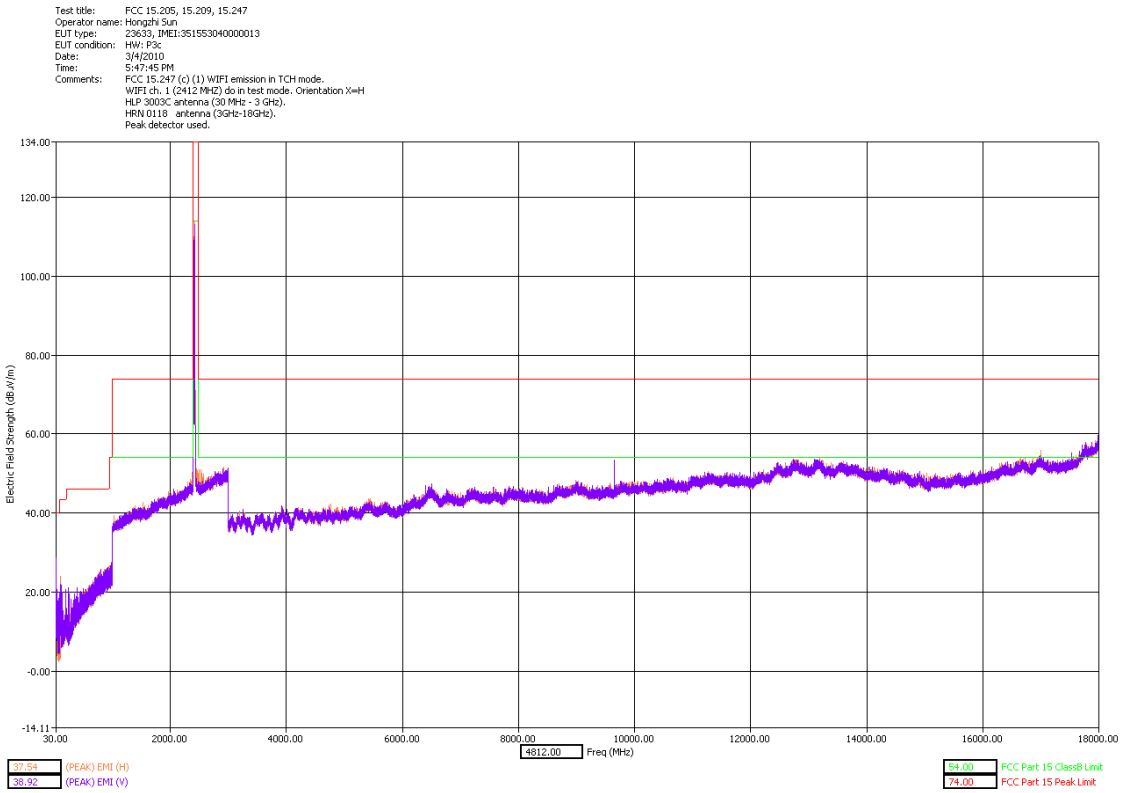
18-26.5GHz Middle Channel Y Orientation



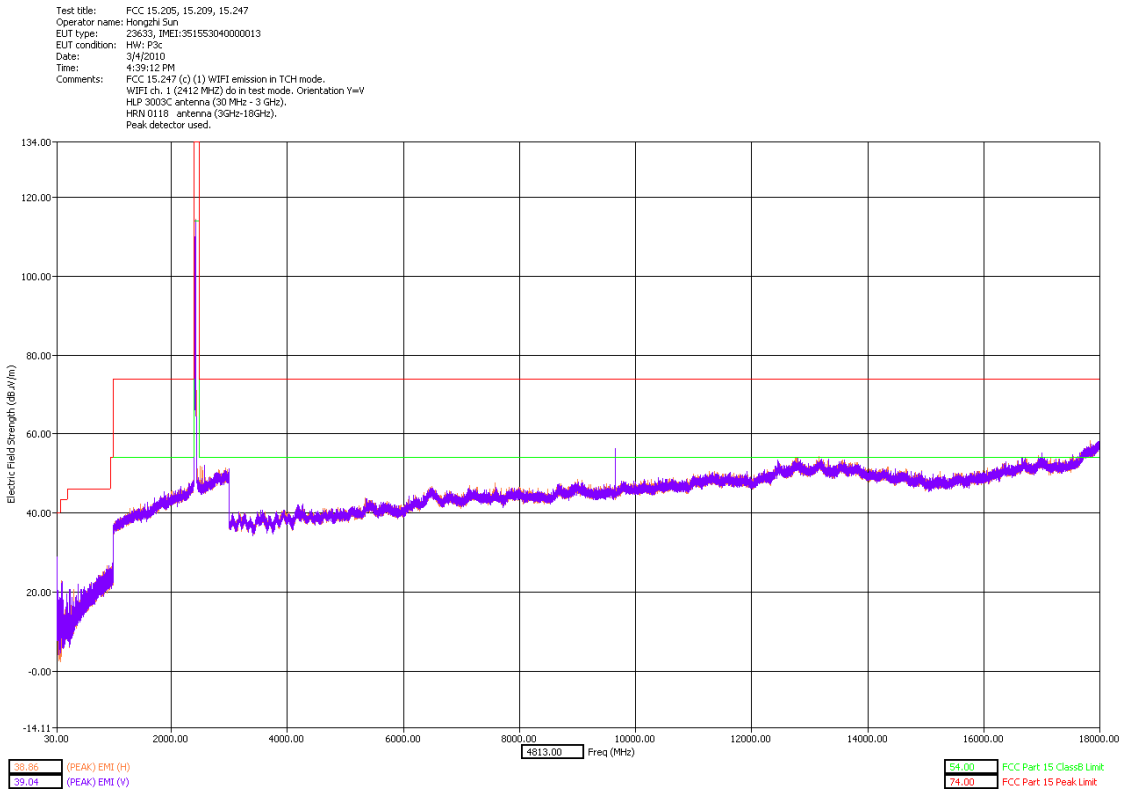
18-26.5GHz High Channel Y Orientation

WLAN Band (g)

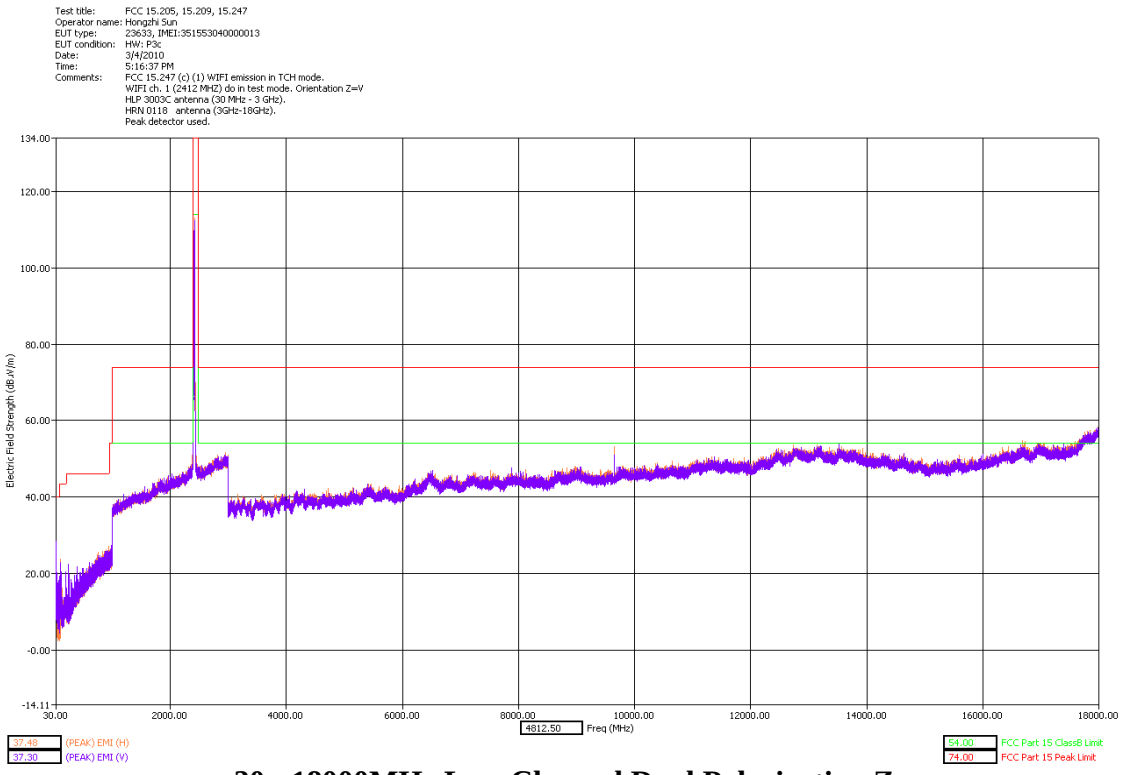
All data measured for WLAN band (g).



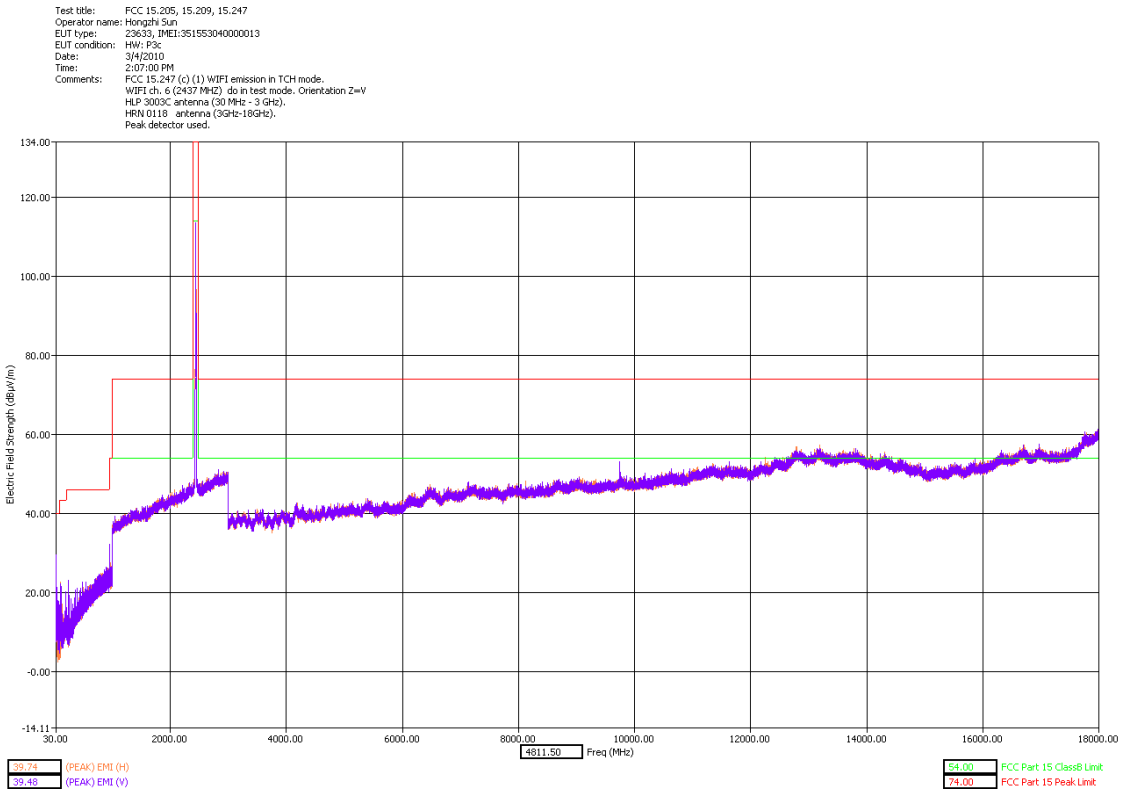
30 - 18000MHz Low Channel Dual Polarization X



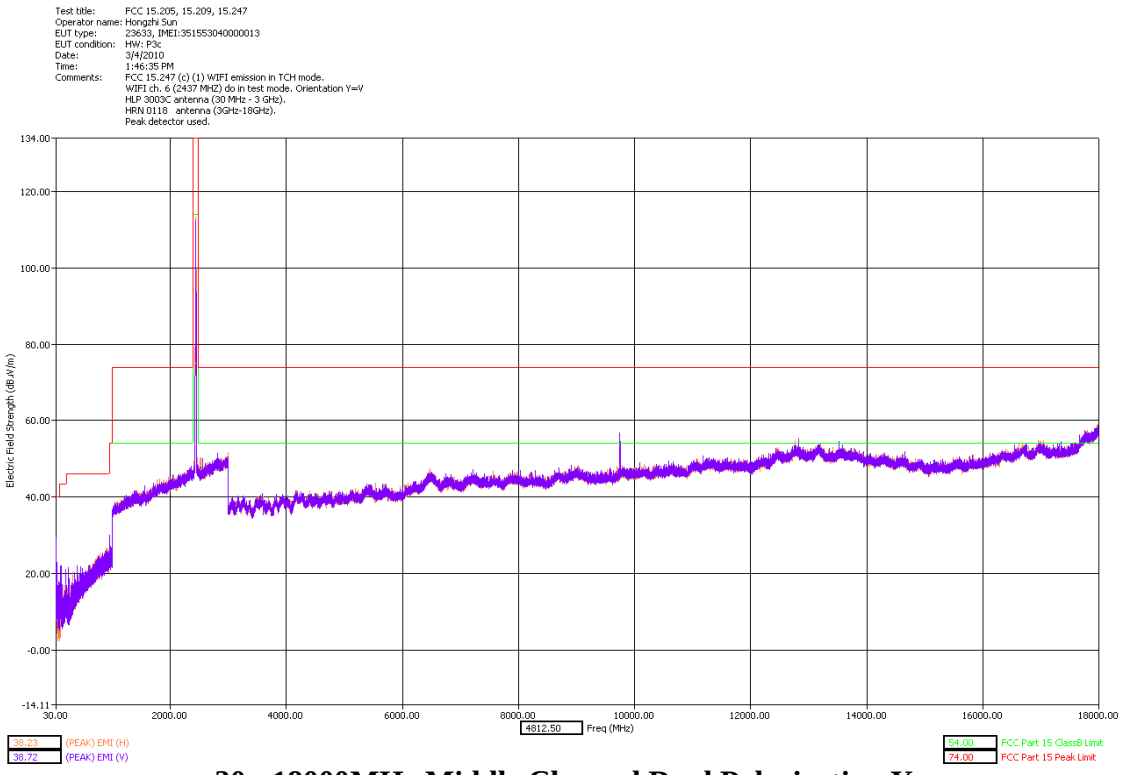
30 - 18000MHz Low Channel Dual Polarization Y



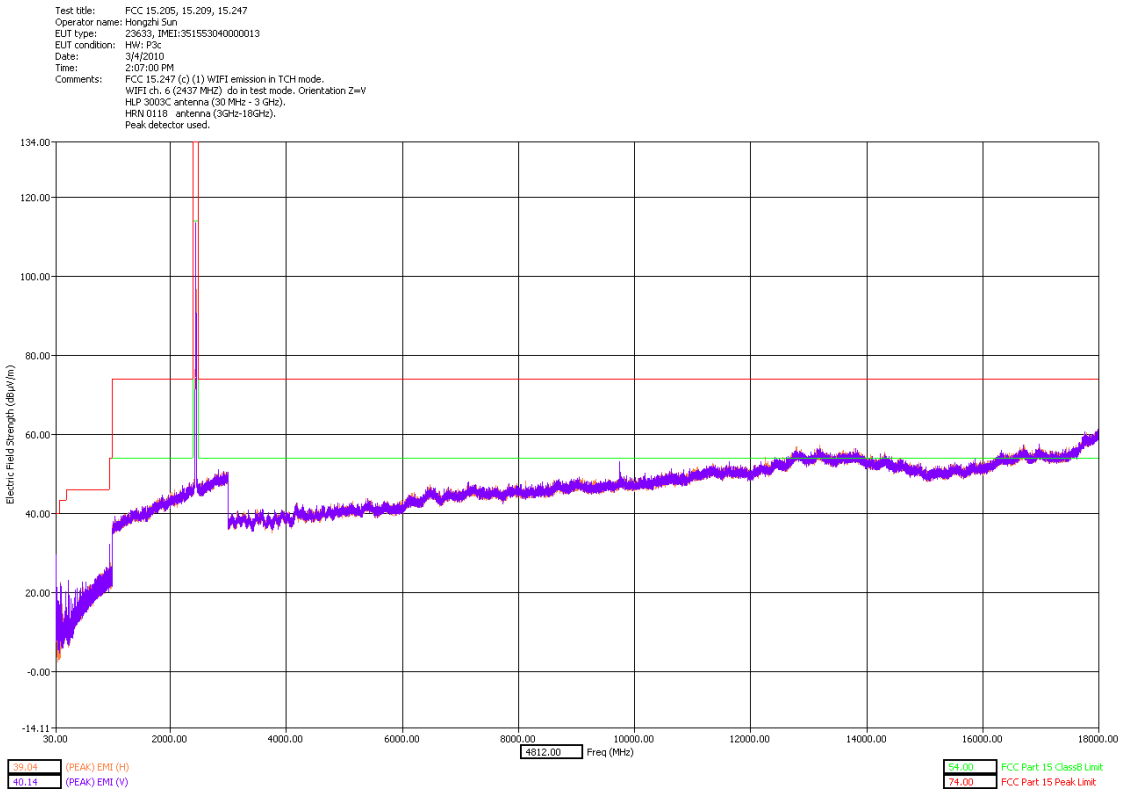
30 - 18000MHz Low Channel Dual Polarization Z



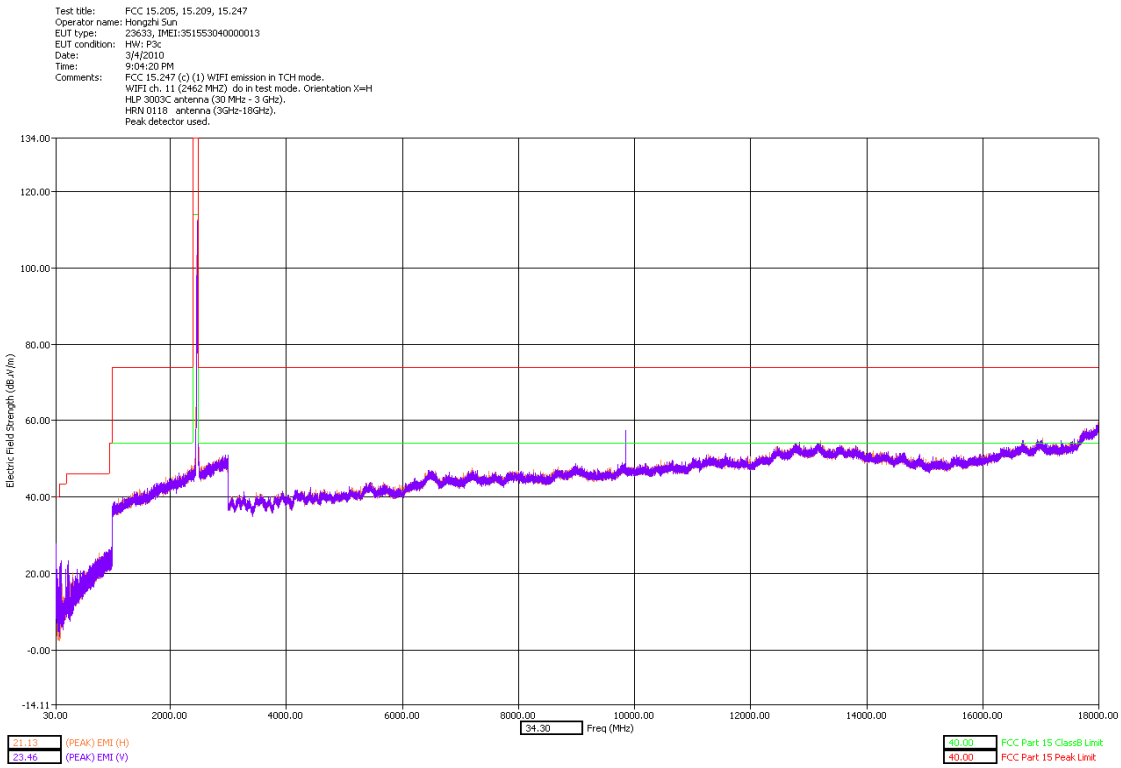
30 - 18000MHz Middle Channel Dual Polarization X



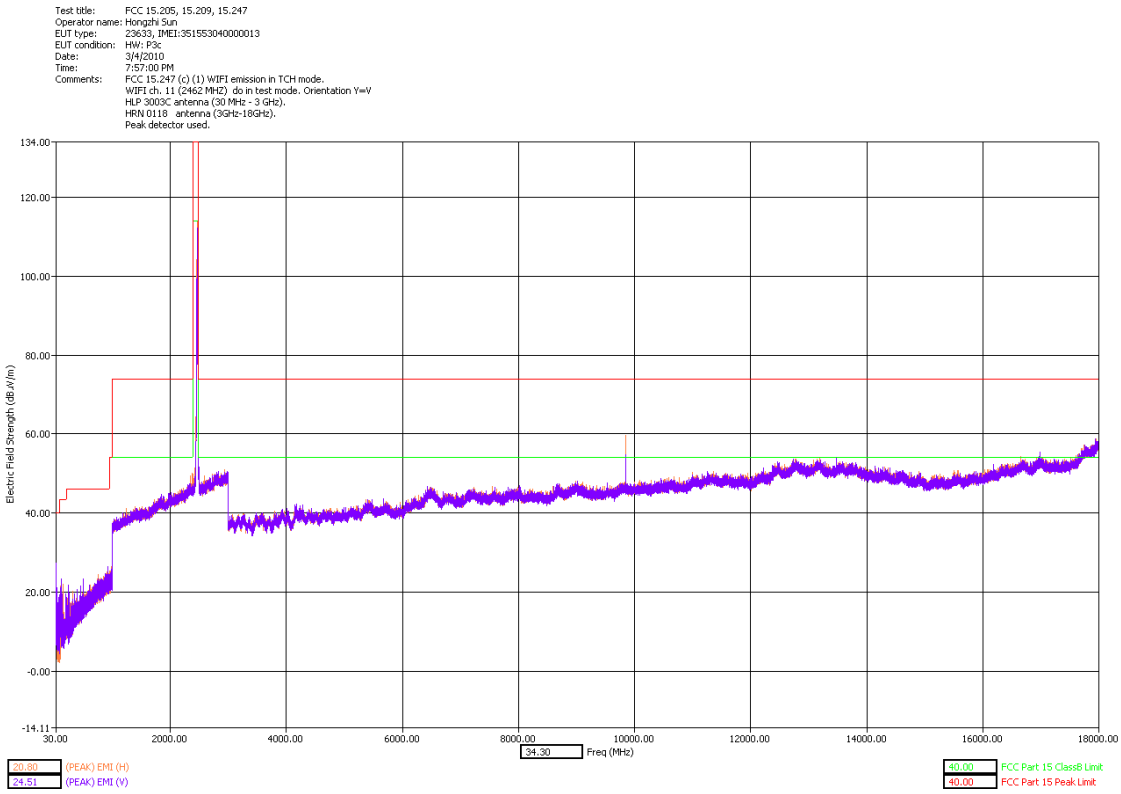
30 - 18000MHz Middle Channel Dual Polarization Y



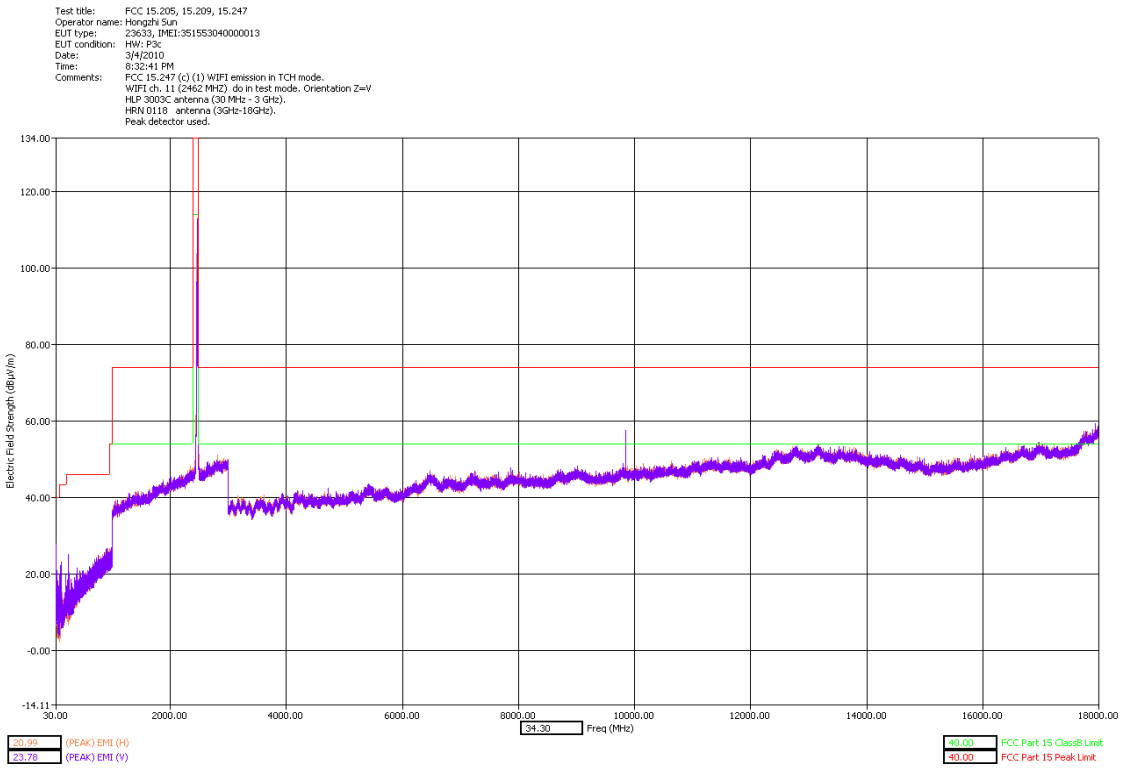
30 - 18000MHz Middle Channel Dual Polarization Z



30 - 18000MHz High Channel Dual Polarization X



30 - 18000MHz High Channel Dual Polarization Y

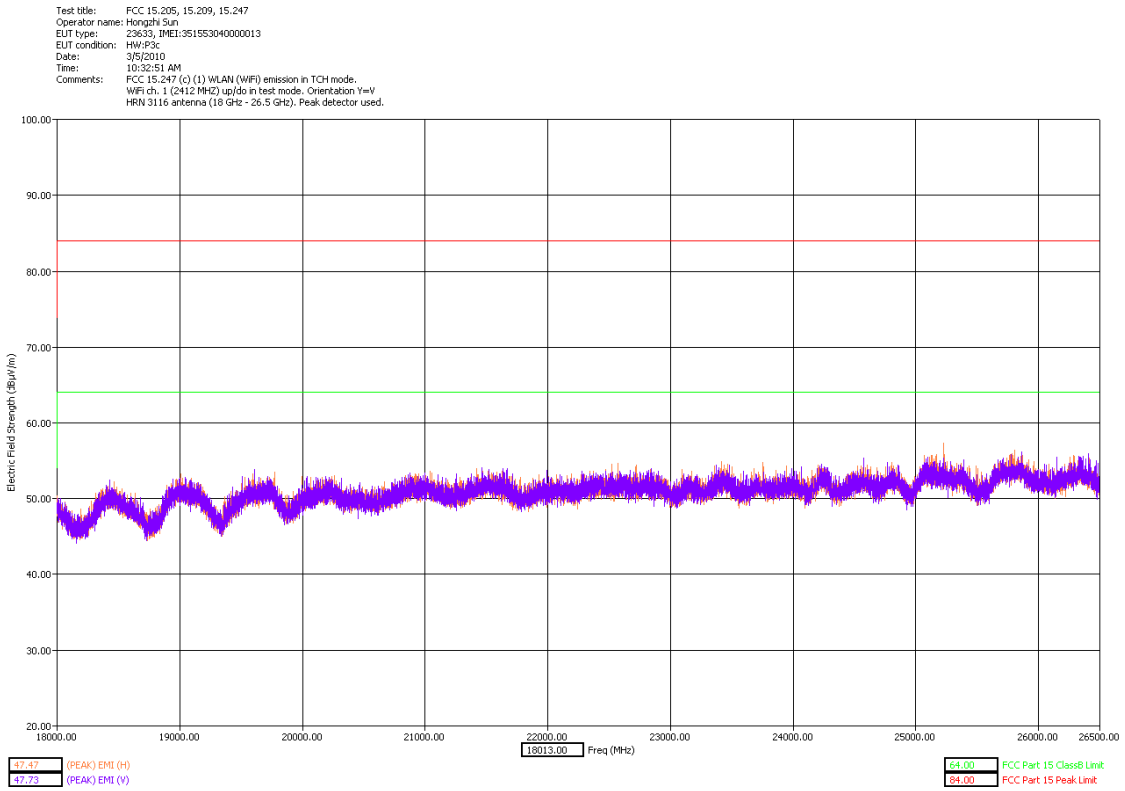


30 - 18000MHz High Channel Dual Polarization Z

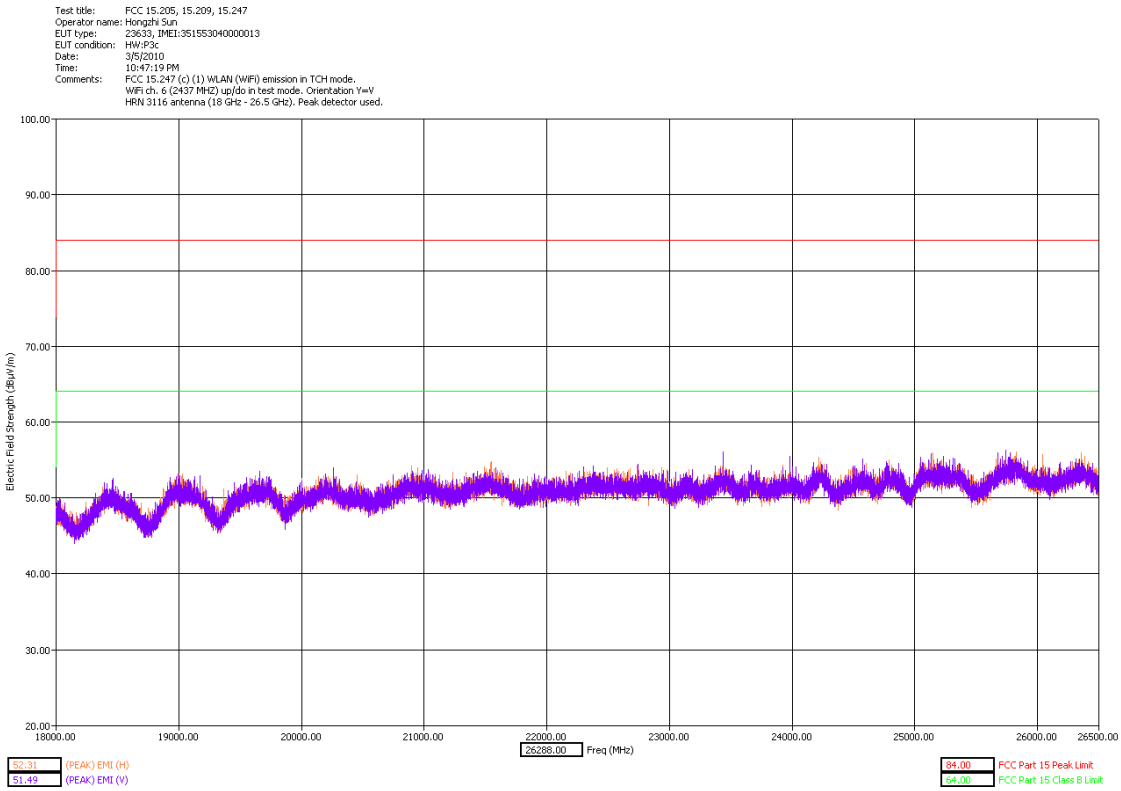
Note: The emission of the 4th harmonic for low, mid and high channels which exceeds the average limit belongs to the restricted bands of operation which should be ignored.

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 (g).

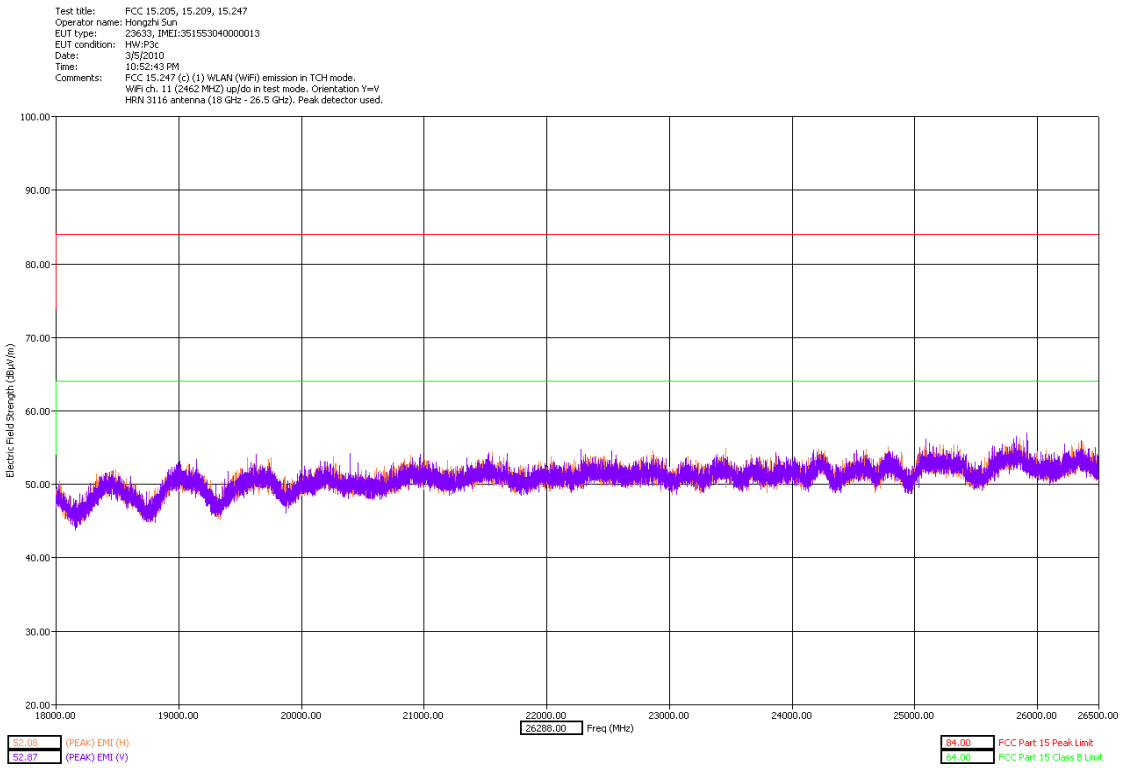
Only Y position for each test frequency are shown in the below plots in the range from 18 GHz – 26.5 GHz.



18 – 26.5 GHz Low Channel Dual Polarization Y



18 – 26.5 GHz Middle Channel Dual Polarization Y



18 – 26.5 GHz High Channel Dual Polarization Y

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.

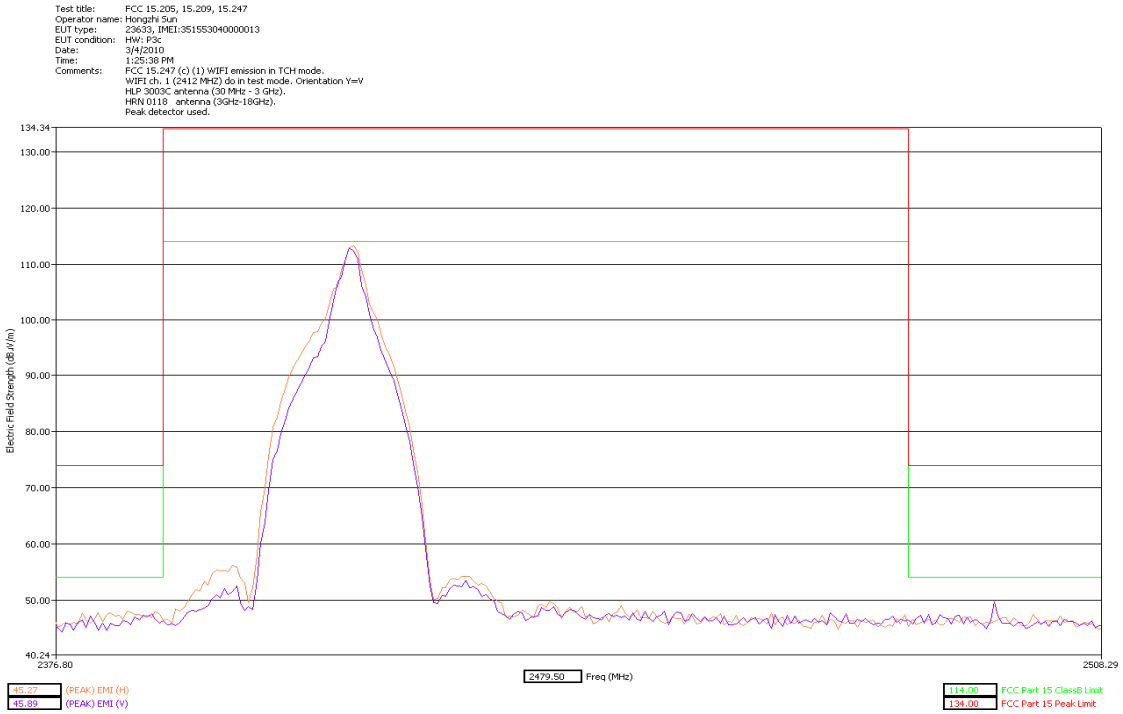
The peak detector limit line has been added to the graphical plots.

Note: No WLAN band notch filters were used.

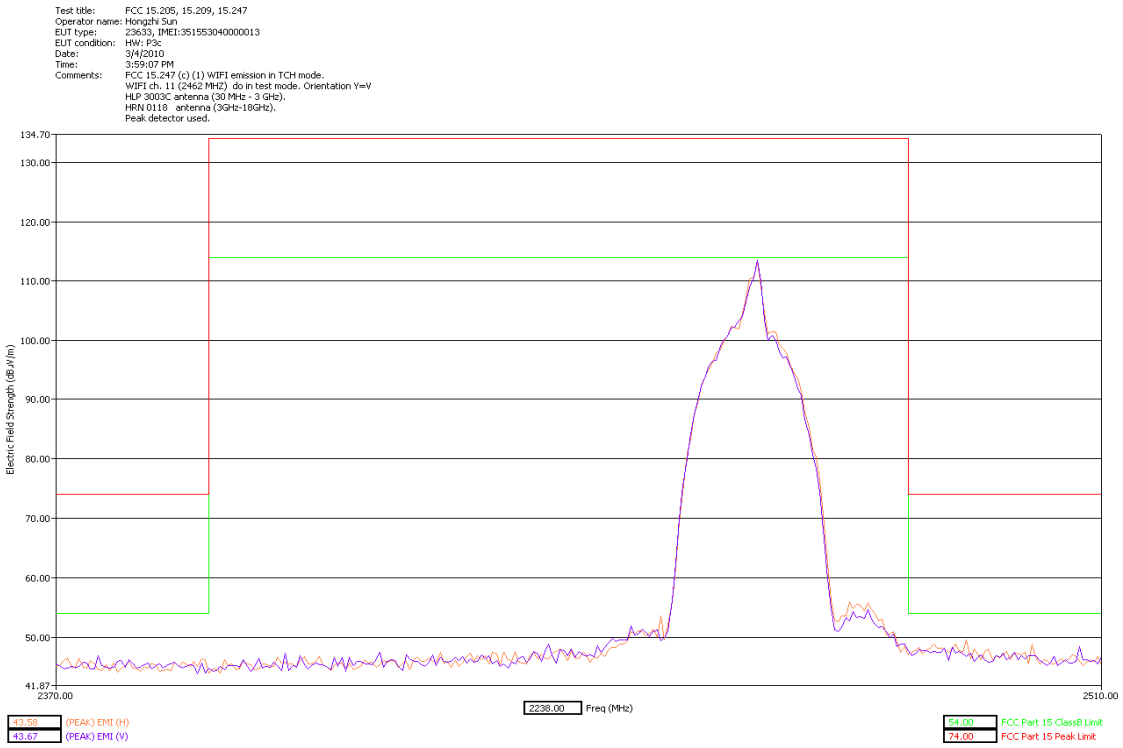
See below attached plots for the measurement results with both peak detector and average detector:

WLAN Band (b)

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



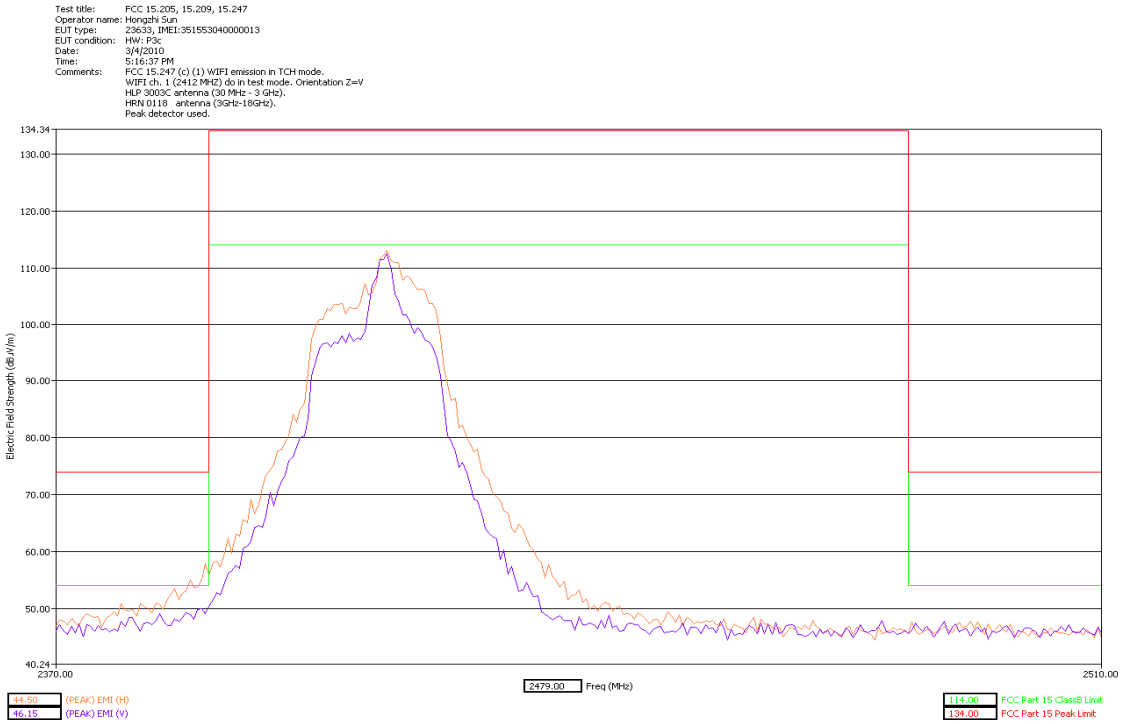
Low Band Edge Y Orientation

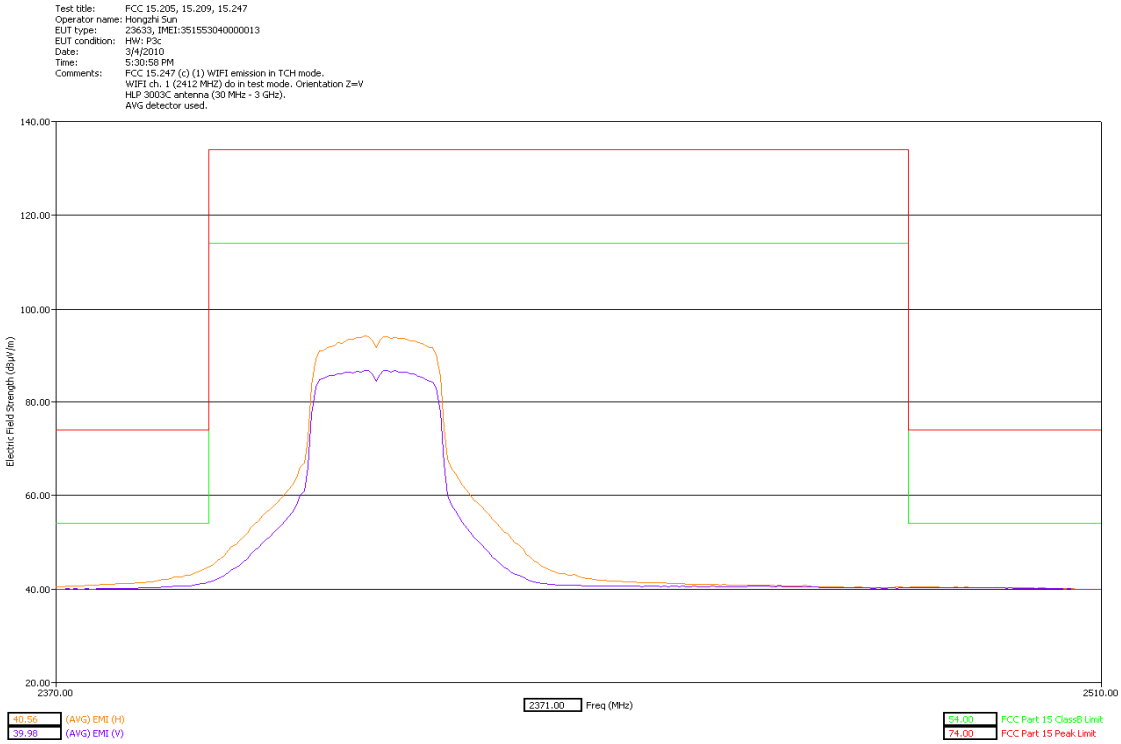


High Band Edge Y Orientation

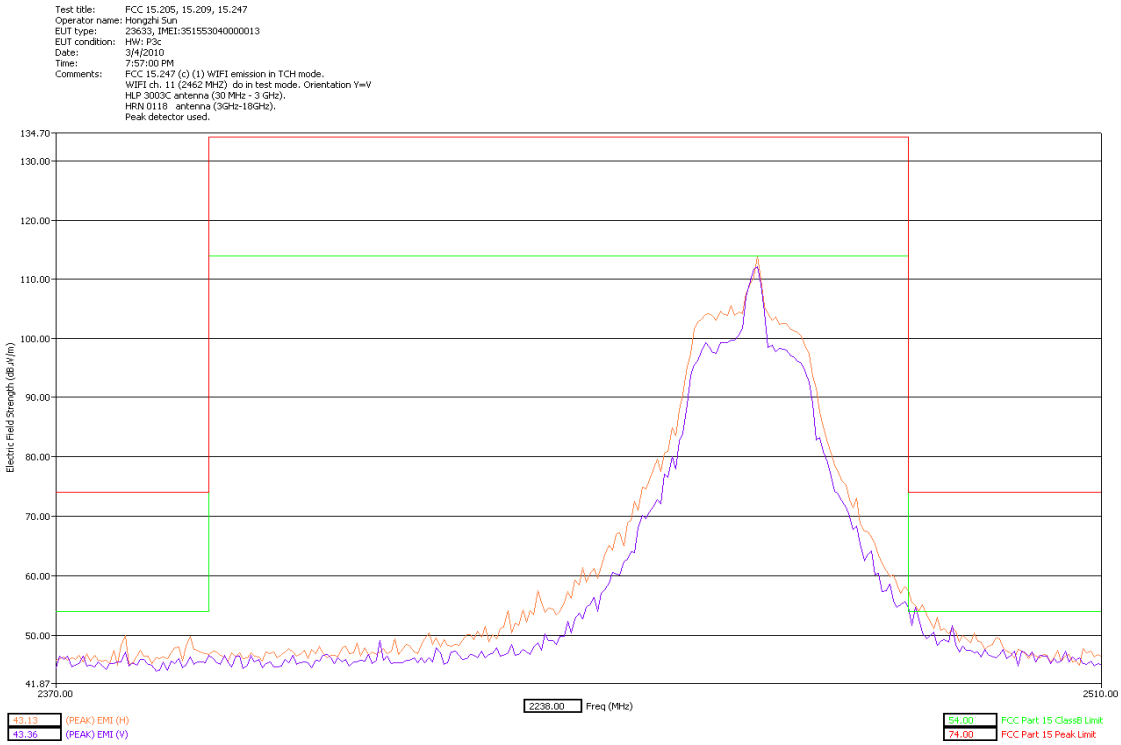
WLAN Band (g)

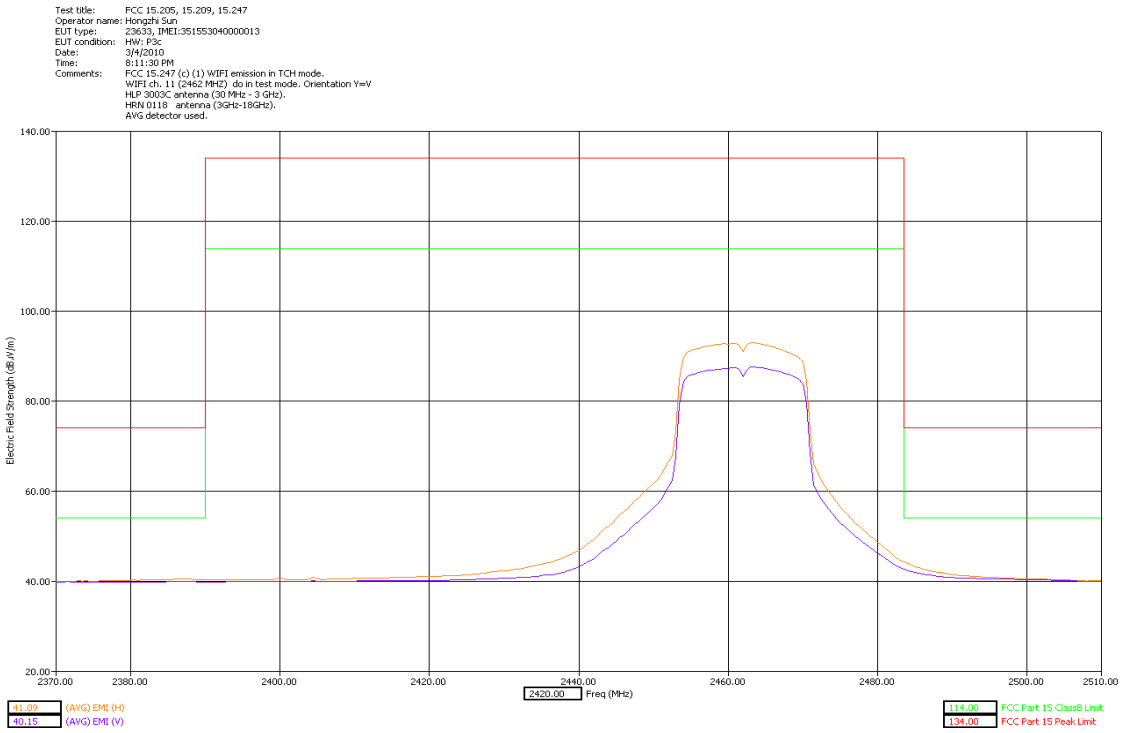
Only the worst band edge is displayed for WLAN band (g)





Low Band Edge Z Orientation





High Band Edge Y Orientation

End of Test Report