STC Test Report

Date : 2010-07-07
No. : MH183886

Applicant (C00802): Billion Electric Co., Ltd.
8F, No. 192, Sec.2, Chung Hsing Rd., Hsin Tien City, Taipei Hsien Taiwan.

Manufacturer: Billion Electric Co., Ltd.
8F, No. 192, Sec.2, Chung Hsing Rd., Hsin Tien City, Taipei Hsien Taiwan.

Description of Sample(s): Submitted sample(s) said to be

Product:	3.75G Wireless-N Broadband Router
Brand Name:	BILLION
Model Number:	BiPAC 6200NXL
FCC ID:	QI3BIL-6200NX

Date Sample(s) Received: 2010-02-23

Date Tested: 2010-03-05 to 2010-07-21

Investigation Requested: Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2009 and ANSI C63.4:2003 for FCC Certification.

Conclusion(s): The submitted product COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report.

Remark(s): For additional model(s) details, see page 4

Dr. LEE Kam Chuen
Authorized Signatory
ElectroMagnetic Compatibility Department
For and on behalf of
The Hong Kong Standards and Testing Centre Ltd.

The Hong Kong Standards and Testing Centre Ltd.
10 Dai Wang Street, Taipo Industrial Estate, N.T., Hong Kong
Tel: (852) 2666 1888 Fax: (852) 2664 4353 Homepage: www.hkstc.org E-mail: hkstc@hkstc.org

CONTENT:

1.0 General Details

1.1 Test Laboratory

The Hong Kong Standards and Testing Centre Ltd.
EMC Laboratory
10 Dai Wang Street, Taipo Industrial Estate
New Territories, Hong Kong

1.2 Applicant Details

Applicant

Billion Electric Co., Ltd.
8F, No. 192, Sec.2, Chung Hsing Rd., Hsin Tien City, Taipei Hsien Taiwan.

Manufacturer

Billion Electric Co., Ltd.
8F, No. 192, Sec.2, Chung Hsing Rd., Hsin Tien City, Taipei Hsien Taiwan.

1.3 Equipment Under Test [EUT]
Description of Sample(s)

Product:	3.75G Wireless-N Broadband Router
Manufacturer:	Billion Electric Co., Ltd.
Brand Name:	BILLION
Model Number:	BiPAC 6200NXL
Additional Product Name(s):	3.75G Broadband Router, 3.75G Wireless-N VPN Broadband Router, 3.75G VPN Broadband Router
Additional Model Number(s):	BiPAC 6200NX
Input Voltage:	The AC/DC Adaptor used for the tests was provided by the applicant with the following details: Two pins (Live / Neutral) only adaptor, Model Number: PAW018A12UL 8066, Input: 100-240Va.c. 50/60Hz 0.5A, Output: 12Vd.c. 1.2A.

1.3.1 Description of EUT Operation

The Equipment Under Test (EUT) is a Billion Electric Co., Ltd., 3.75G Wireless-N Broadband Router, the transmission signal is digital modulated with channel frequency range 2412-2462MHz / 2422-2452MHz. The measurement were conducted at different modulation and data rate, the test results shown in this test report is based on the worst case.of the initial investigation.

1.4 Date of Order

2010-02-23

1.5 Submitted Sample(s):

1 Sample

1.6 Test Duration

2010-03-05 to 2010-04-12

1.7 Country of Origin

China

2.0 Technical Details

2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2009 Regulations and ANSI C63.4:2003 for FCC Certification.

2.2 Test Standards and Results Summary Tables

EMISSION
Results Summary

Test Condition	Test Requirement	Test Method	Class / Severity	Test Result		
				Pass	Fail	N/A
Output Power of Fundamental Emissions	FCC 47CFR 15.247(b)(3)	ANSI C63.4:2003	N/A	☒	☐	☐
Radiated Emissions	FCC 47CFR 15.209	ANSI C63.4:2003	N/A	☒	☐	☐
Conducted Emissions	FCC 47CFR 15.207	N/A	N/A	☒	☐	☐
Power Spectral Density	FCC 47CFR 15.247(e)	N/A	N/A	☒	☐	☐
Bandwidth	FCC 47CFR 15.247(a)(2)	N/A	N/A	☒	☐	☐
Band Edge Emissions	FCC 47CFR 15.247(d)	N/A	N/A	☒	☐	☐
Antenna requirement	FCC 47CFR 15.203	N/A	N/A	☒	☐	☐

Note: N/A - Not Applicable

3.0 Test Results

3.1 Emission

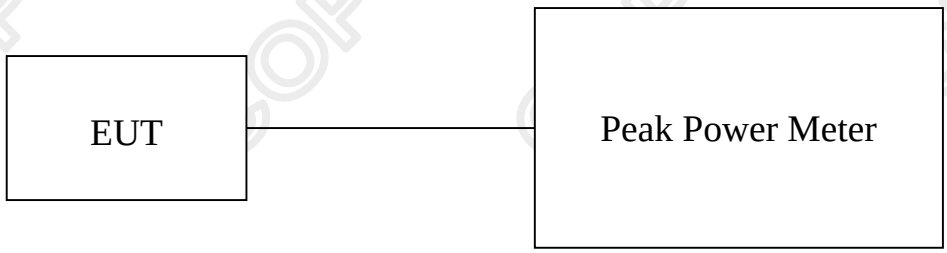
3.1.1 Maximum Peak Output Power

Test Requirement:	FCC 47CFR 15.247(b)(3)
Test Method:	N/A
Test Date:	2010-03-05
Mode of Operation:	Tx mode

Test Method:

The RF output of the EUT was connected to the peak power meter. All the attenuation or cable loss will be added to the measured maximum output power. The results are recorded in mW.

Test Setup:



Limits for Peak Output Power of Fundamental & Harmonics Emissions [FCC 47CFR 15.247]:

For Digital Transmission systems in 2400-2483.5 MHz Band: 1 Watt (30dBm)

Results of Tx Mode 802.11 b 11Mbit, (2412MHz to 2462MHz) : Pass (TX Unit)
Maximum conducted output power

Channel	Frequency(MHz)	Output Power
Low	2412	14.38 dBm
Middle	2437	14.98 dBm
High	2462	14.27 dBm

Results of Tx Mode 802.11 g 54Mbit , (2412MHz to 2462MHz) : Pass (TX Unit)
Maximum conducted output power

Channel	Frequency(MHz)	Output Power
Low	2412	11.40 dBm
Middle	2437	14.47 dBm
High	2462	13.95 dBm

Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Limits for Peak Output Power of Fundamental & Harmonics Emissions [FCC 47CFR 15.247]:

For Digital Transmission systems in 2400-2483.5 MHz Band: 1 Watt (30dBm)

Results of Tx Mode 802.11 n20 130Mbit, Antenna 2, (2412MHz to 2462MHz) : Pass (TX Unit)
Maximum conducted output power

Channel	Frequency(MHz)	Output Power 1 (Antenna 1)	Output Power 2 (Antenna 2)	Total Output Power*
Low	2412	12.54 dBm	11.12 dBm	14.89 dBm
Middle	2437	13.32 dBm	11.45 dBm	15.49 dBm
High	2462	12.85 dBm	11.20 dBm	15.11 dBm

Results of Tx Mode 802.11 n40 130Mbit , Antenna 2, (2422MHz to 2452MHz) : Pass (TX Unit)
Maximum conducted output power

Channel	Frequency(MHz)	Output Power 1 (Antenna 1)	Output Power 2 (Antenna 2)	Total Output Power*
Low	2422	8.97 dBm	8.83 dBm	11.91 dBm
Middle	2437	9.40 dBm	9.61 dBm	12.51 dBm
High	2452	9.98 dBm	5.86 dBm	11.40 dBm

Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

*Total Power (mW) = Output power 1(mW) + Output power 2 (mW)

3.1.2 Radiated Emissions

Test Requirement:	FCC 47CFR 15.209
Test Method:	ANSI C63.4:2003
Test Date:	2010-03-17
Mode of Operation:	Communication mode

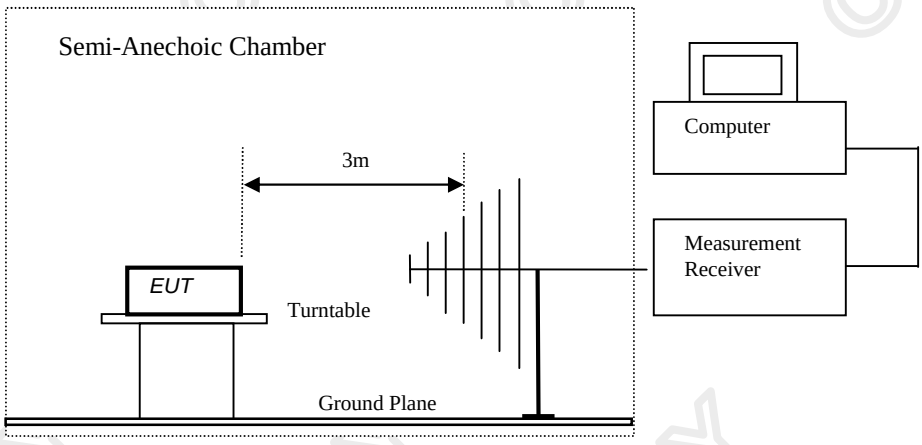
Test Method:

The sample was placed 0.8m above the ground plane of semi-anechoic Chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

Test Procedure:
The test was conducted in normal mode, with all the input/ output ports terminated(e.g. LAN port terminated with resistive termination, USB port terminated with supported device – HSPA USB modem and USB flash drive), to simulate the normal usage and to produce the maximum electromagnetic disturbances.

* Semi-anechoic chamber located on the G/F of "The Hong Kong Standards and Testing Centre Ltd." with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 607756.

Test Setup:



Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Tx Mode 802.11 b 11Mbit (CH1) (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the limit line(s)

The limit for transmitter spurious emission is 20dB below the fundamental.
Radio Frequency Power of fundamental = 96.6 dBμV/m. Limit for spurious emission = 76.6 dBμV/m.

Result of Tx Mode 802.11 b 11Mbit (CH1): PASS

Field Strength of Harmonic Emissions PeakValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4824.0	12.8	41.9	54.7	74.0	-19.3	Vertical
7236.0	6.9	47.8	54.7	74.0	-19.3	Vertical

Field Strength of Harmonic Emissions AverageValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4824.0	4.7	41.9	46.6	54.0	-7.4	Vertical
7236.0	0.7	47.8	48.5	54.0	-5.5	Vertical

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Tx Mode 802.11 b 11Mbit (CH6) (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the limit line(s)

The limit for transmitter spurious emission is 20dB below the fundamental.
Radio Frequency Power of fundamental = 96.6 dBμV/m. Limit for spurious emission = 76.6 dBμV/m.

Result of Tx Mode 802.11 b 11Mbit (CH6): PASS

Field Strength of Harmonic Emissions PeakValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4874.0	13.8	42	55.8	74.0	-18.2	Vertical
7311.0	7.9	48	55.9	74.0	-18.1	Vertical

Field Strength of Harmonic Emissions AverageValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4874.0	4.5	42.0	46.5	54.0	-7.5	Vertical
7311.0	1.6	48.0	49.6	54.0	-4.4	Vertical

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits o f FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Tx Mode 802.11 b 11Mbit (CH11) (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the limit line(s)

The limit for transmitter spurious emission is 20dB below the fundamental.
Radio Frequency Power of fundamental = 97.7 dBμV/m. Limit for spurious emission = 77.7 dBμV/m.

Result of Tx Mode 802.11 b 11Mbit (CH11): PASS

Field Strength of Harmonic Emissions PeakValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4924.0	14.4	42.0	56.4	74.0	-17.6	Vertical
7386.0	7.8	48.1	55.9	74.0	-18.1	Vertical

Field Strength of Harmonic Emissions AverageValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4924.0	5.6	42.0	47.6	54.0	-6.4	Vertical
7386.0	1.3	48.1	49.4	54.0	-4.6	Vertical

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Tx Mode 802.11 g 54Mbit (CH1) (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the limit line(s)

The limit for transmitter spurious emission is 20dB below the fundamental.
Radio Frequency Power of fundamental = 96.2 dBμV/m. Limit for spurious emission = 76.2 dBμV/m.

Result of Tx Mode 802.11 g 54Mbit (CH1): PASS

Field Strength of Harmonic Emissions PeakValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4824.0	13.5	41.9	55.4	74.0	-18.6	Vertical
7236.0	7.8	47.8	55.6	74.0	-18.4	Vertical

Field Strength of Harmonic Emissions AverageValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4824.0	5.1	41.9	47.0	54.0	-7.0	Vertical
7236.0	1.4	47.8	49.2	54.0	-4.8	Vertical

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Tx Mode 802.11 g 54Mbit (CH6) (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the limit line(s)

The limit for transmitter spurious emission is 20dB below the fundamental.
Radio Frequency Power of fundamental = 96.6 dBμV/m. Limit for spurious emission = 76.6 dBμV/m.

Result of Tx Mode 802.11 g 54Mbit (CH6): PASS

Field Strength of Harmonic Emissions PeakValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4874.0	13.5	42.0	55.5	74.0	-18.5	Vertical
7311.0	8.0	48.0	56.0	74.0	-18.0	Vertical

Field Strength of Harmonic Emissions AverageValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4874.0	4.3	42.0	46.3	54.0	-7.7	Vertical
7311.0	1.6	48.0	49.6	54.0	-4.4	Vertical

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Tx Mode 802.11 g 54Mbit (CH11) (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the limit line(s)

The limit for transmitter spurious emission is 20dB below the fundamental.
Radio Frequency Power of fundamental = 98.0 dBμV/m. Limit for spurious emission = 78.0 dBμV/m.

Result of Tx Mode 802.11 g 54Mbit (CH11): PASS

Field Strength of Harmonic Emissions PeakValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4924.0	14.2	42.0	56.2	74.0	-17.8	Vertical
7386.0	7.4	48.1	55.5	74.0	-18.5	Vertical

Field Strength of Harmonic Emissions AverageValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4924.0	5.5	42.0	47.5	54.0	-6.5	Vertical
7386.0	1.1	48.1	49.2	54.0	-4.8	Vertical

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Tx Mode 802.11 n20 130Mbit (CH1) (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the limit line(s)

Result of Tx Mode 802.11 n20 130Mbit (CH1): PASS

Field Strength of Harmonic Emissions PeakValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4824.0	13.0	41.9	54.9	74.0	-19.1	Vertical
7236.0	7.1	47.8	54.9	74.0	-19.1	Vertical

Field Strength of Harmonic Emissions AverageValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4824.0	5.1	41.9	47.0	54.0	-7.0	Vertical
7236.0	0.8	47.8	48.6	54.0	-5.4	Vertical

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Tx Mode 802.11 n20 130Mbit (CH6) (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the limit line(s)

Result of Tx Mode 802.11 n20 130Mbit (CH6): PASS

Field Strength of Harmonic Emissions PeakValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4874.0	13.7	42.0	55.7	74.0	-18.3	Vertical
7311.0	8.4	48.0	56.4	74.0	-17.6	Vertical

Field Strength of Harmonic Emissions AverageValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4874.0	5.1	42.0	47.1	54.0	-6.9	Vertical
7311.0	1.7	48.0	49.7	54.0	-4.3	Vertical

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Tx Mode 802.11 n20 130Mbit (CH11) (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the limit line(s)

Result of Tx Mode 802.11 n20 130Mbit (CH11): Pass

Field Strength of Harmonic Emissions PeakValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4924.0	14.6	42.0	56.6	74.0	-17.4	Vertical
7386.0	7.8	48.1	55.9	74.0	-18.1	Vertical

Field Strength of Harmonic Emissions AverageValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4924.0	5.8	42.0	47.8	54.0	-6.2	Vertical
7386.0	1.4	48.1	49.5	54.0	-4.5	Vertical

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Tx Mode 802.11 n40 130Mbit (CH3) (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the limit line(s)

Result of Tx Mode 802.11 n40 130Mbit (CH3): Pass

Field Strength of Harmonic Emissions PeakValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4844.0	14.1	42.0	56.1	74.0	-17.9	Vertical
7266.0	7.1	47.9	55.0	74.0	-19.0	Vertical

Field Strength of Harmonic Emissions AverageValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4844.0	6.2	42.0	48.2	54.0	-5.8	Vertical
7266.0	0.8	47.9	48.7	54.0	-5.3	Vertical

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Sect ion 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Tx Mode 802.11 n40 130Mbit (CH6) (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the limit line(s)

Result of Tx Mode 802.11 n40 130Mbit (CH6): Pass

Field Strength of Harmonic Emissions PeakValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4874.0	13.3	42.0	55.3	74.0	-18.7	Vertical
7311.0	7.9	48.0	55.9	74.0	-18.1	Vertical

Field Strength of Harmonic Emissions AverageValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4874.0	4.4	42.0	46.4	54.0	-7.6	Vertical
7311.0	1.5	48.0	49.5	54.0	-4.5	Vertical

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Tx Mode 802.11 n40 130Mbit (CH9) (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the limit line(s)

Result of Tx Mode 802.11 n40 130Mbit (CH9): PASS

Field Strength of Harmonic Emissions PeakValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4904.0	12.9	42.0	54.9	74.0	-19.1	Vertical
7356.0	6.7	48.1	54.8	74.0	-19.2	Vertical

Field Strength of Harmonic Emissions AverageValue						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
4904.0	4.8	42.0	46.8	54.0	-7.2	Vertical
7356.0	0.3	48.1	48.4	54.0	-5.6	Vertical

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of Tx Mode (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the limit line(s)

Result of Tx Mode (30MHz – 24GHz): PASS

Field Strength of Radiated Emissions Quasi-Peak Value						
Frequency MHz	Measured Level @3m dBμV	Correction Factor dB/m	Field Strength dBμV/m	Limit @3m dBμV/m	Margin dBμV/m	E-Field Polarity
30.4	22.1	16.6	38.7	40.0	-1.3	Vertical
79.1	24.6	8.5	33.1	40.0	-6.9	Vertical
250.0	31.0	13.9	44.9	46.0	-1.1	Vertical
384.0	25.6	18.1	43.7	46.0	-2.3	Horizontal
768.0	17.2	25.8	43.0	46.0	-3.0	Horizontal
896.0	17.7	26.0	43.7	46.0	-2.3	Vertical

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

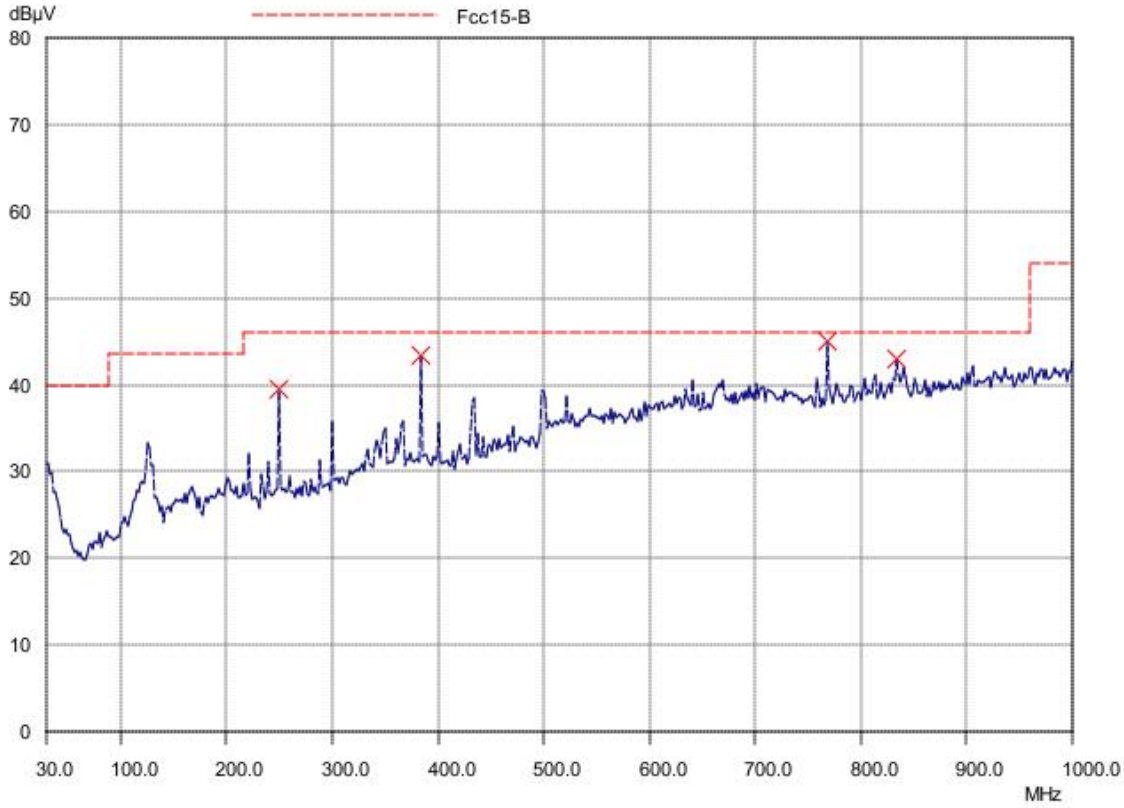
Result of GSM dongle and WLAN On Mode (9kHz – 30MHz): PASS
Emissions detected are more than 20 dB below the limit line(s)

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Result of GSM dongle and WLAN On Mode (30MHz – 1GHz, Horizontal): PASS



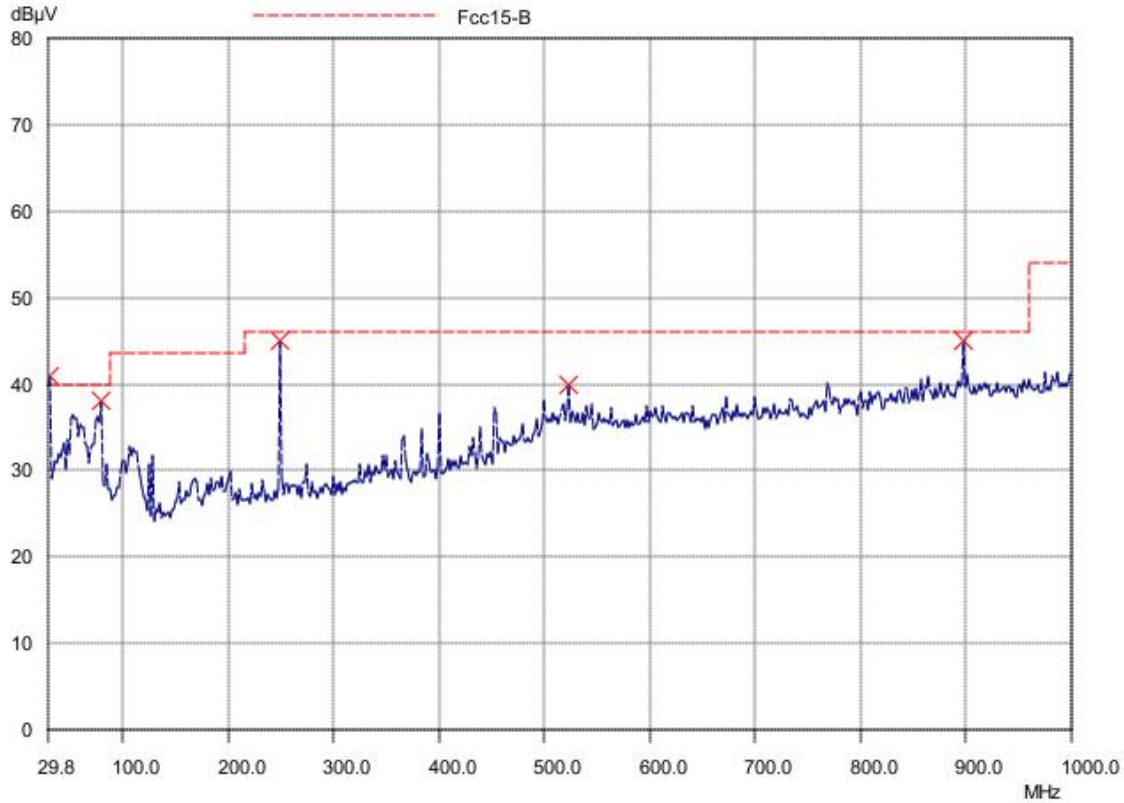
Radiated Emission Quasi-Peak Value			
Frequency MHz	Quasi Peak Level dB μ V	Quasi Peak Limit dB μ V	Margin dB
250.00	38.4	46.0	-7.6
384.00	43.3	46.0	-2.7
768.00	43.1	46.0	-2.9
833.25	41.8	46.0	-4.2

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Result of GSM dongle and WLAN On Mode (30MHz – 1GHz, Vertical): PASS



Radiated Emission Quasi-Peak Value			
Frequency MHz	Quasi Peak Level dB μ V	Quasi Peak Limit dB μ V	Margin dB
30.00	38.4	40.0	-1.6
79.00	34.0	40.0	-6.0
250.00	45.0	46.0	-1.0
520.875	39.9	46.0	-6.1
896.00	43.5	46.0	-2.5

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

Limits for Radiated Emissions [FCC 47 CFR 15.209 Class B]:

Frequency Range [MHz]	Quasi-Peak Limits [μV/m]
0.009-0.490	2400/F (kHz)
0.490-1.705	24000/F (kHz)
1.705-30	30
30-88	100
88-216	150
216-960	200
Above960	500

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Result of GSM dongle and WLAN On Mode (1GHz – 24GHz): PASS
Emissions detected are more than 20 dB below the limit line(s)

Remarks:

* Denotes restricted band of operation.
Measurements were made using a peak detector. Any emission less than 1000MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.

Correction Factor included Antenna Factor and Cable Attenuation.
Calculated measurement uncertainty : 30MHz to 1GHz 5.1dB
1GHz to 25GHz 5.1dB

3.1.3 Power Spectral Density

Test Requirement: FCC 47CFR 15.247(e)
Test Method: ANSI C63.4:2003
Test Date: 2010-04-12
Mode of Operation: Tx Mode

Test Method:

The RF output of the EUT was connected to the spectrum analyzer. Set the fundamental frequency as the center frequency of the spectral analyzer. Use RBW=3kHz and sweep time = span/3kHz. Measure the Power Spectral Density (PSD) and record the results in dBm.

For multiple antenna measurement, all the available transmitter output will be connected to the spectrum analyzer through a power combiner.

Test Setup:

As Test Setup of clause 3.1.1 in this test report.

Test Limit:
The maximum power spectral density (PSD) shall not exceeded 8dBm in any 3kHz band.

Results of Tx Mode 802.11 b 11Mbit, Antenna 1, (2412MHz to 2462MHz) : Pass (TX Unit)
Maximum power spectral density

Transmitter Frequency (MHz)	Maximum power spectral density (dBm)
2412.0	-18.05

Transmitter Frequency (MHz)	Maximum power spectral density (dBm)
2437.0	-17.94

Transmitter Frequency (MHz)	Maximum power spectral density (dBm)
2462.0	-17.20

Results of Tx Mode 802.11 g 54Mbit, Antenna 1, (2412MHz to 2462MHz) : Pass (TX Unit)
Maximum power spectral density

Transmitter Frequency (MHz)	Maximum power spectral density (dBm)
2412.0	-26.90

Transmitter Frequency (MHz)	Maximum power spectral density (dBm)
2437.0	-26.01

Transmitter Frequency (MHz)	Maximum power spectral density (dBm)
2462.0	-25.55

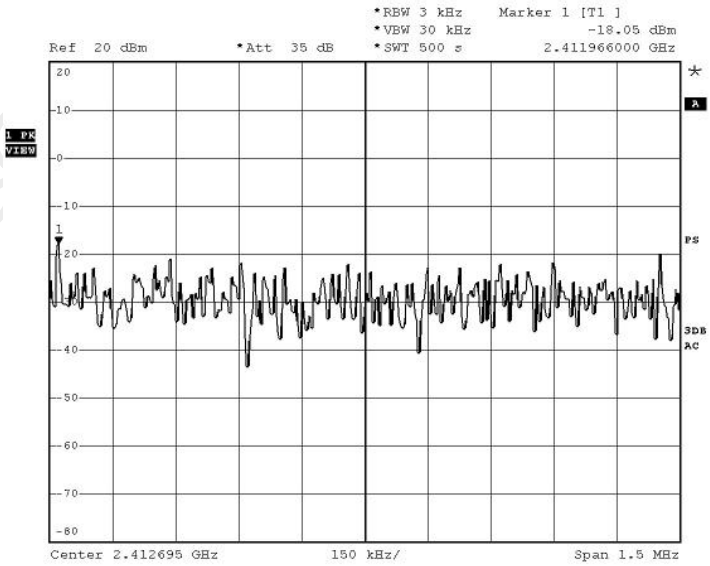
Results of Tx Mode 802.11 n20 130Mbit, Antenna 1 + 2, (2412MHz to 2462MHz) : Pass (TX Unit)
Maximum power spectral density

Transmitter Frequency (MHz)	Maximum power spectral density (dBm)		
	Power spectral density (Antenna 1 + 2)	Combiner Insertion loss (dB)	Total Power spectral density*
2422.0	-22.01 dBm	6.0 dB	-16.01 dBm
2437.0	-23.84 dBm	6.0 dB	-17.84 dBm
2452.0	-22.53 dBm	6.0 dB	-16.53 dBm

Results of Tx Mode 802.11 n40 130Mbit, Antenna 1 + 2, (2422MHz to 2452MHz) : Pass (TX Unit)
Maximum power spectral density

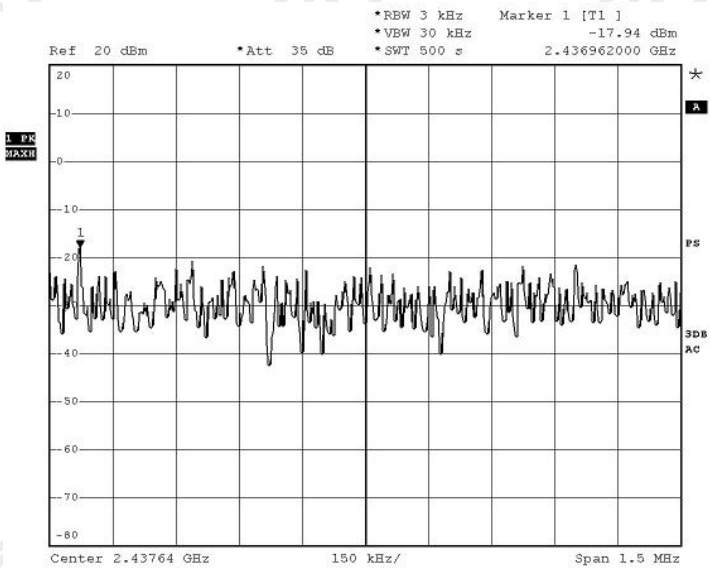
Transmitter Frequency (MHz)	Maximum power spectral density (dBm)		
	Power spectral density (Antenna 1 + 2)	Combiner Insertion loss (dB)	Total Power spectral density*
2422.0	-24.36 dBm	6.0 dB	-18.36 dBm
2437.0	-24.88 dBm	6.0 dB	-18.88 dBm
2452.0	-24.56 dBm	6.0 dB	-18.56 dBm

Tx Mode 802.11 b 11Mbit, (2412MHz to 2462MHz)
Ch 1



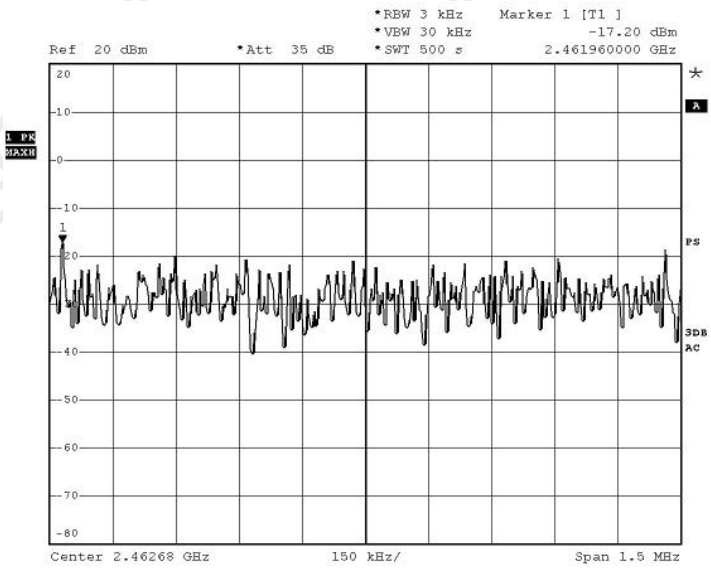
Date: 12.APR.2010 08:42:54

Ch 6



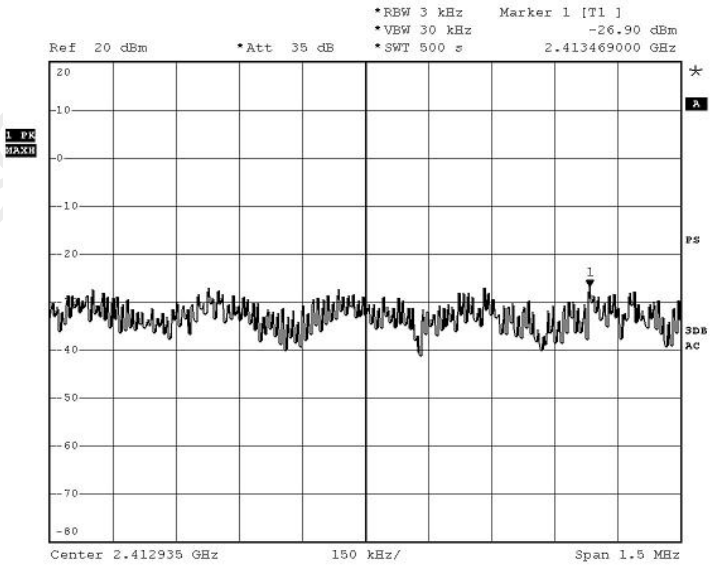
Date: 12.APR.2010 09:29:59

Ch 11



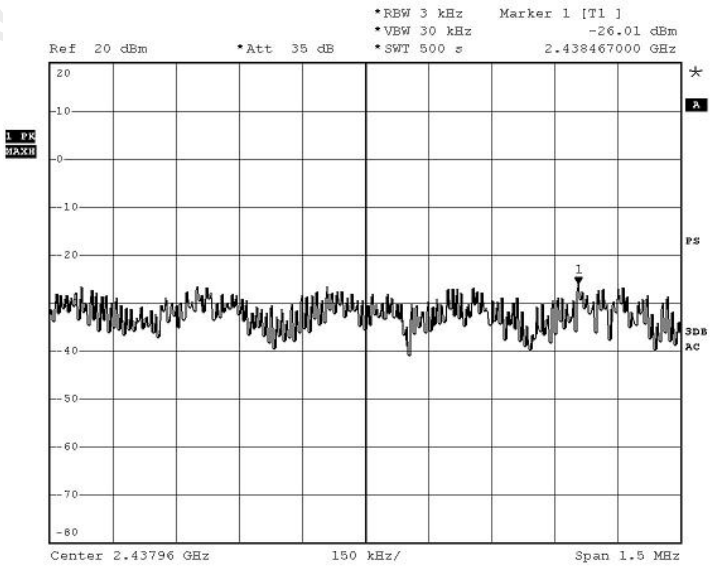
Date: 12.APR.2010 10:47:19

Tx Mode 802.11 g 54Mbit, (2412MHz to 2462MHz)
Ch 1



Date: 12.APR.2010 08:54:42

Ch 6



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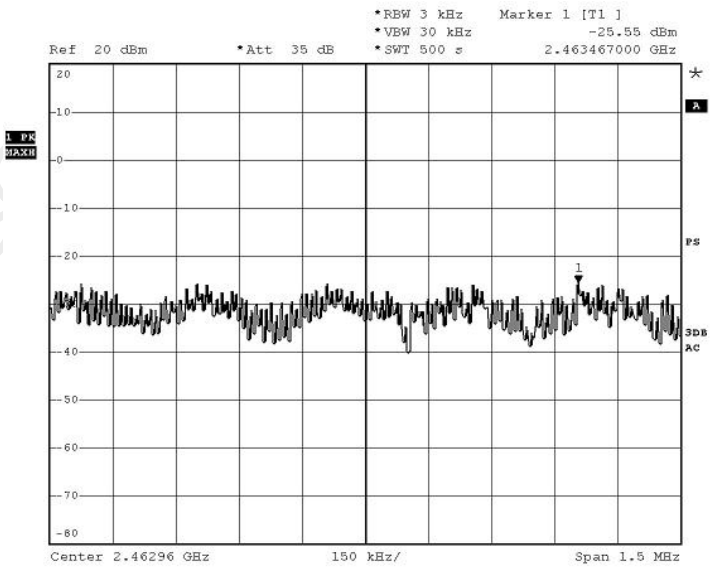
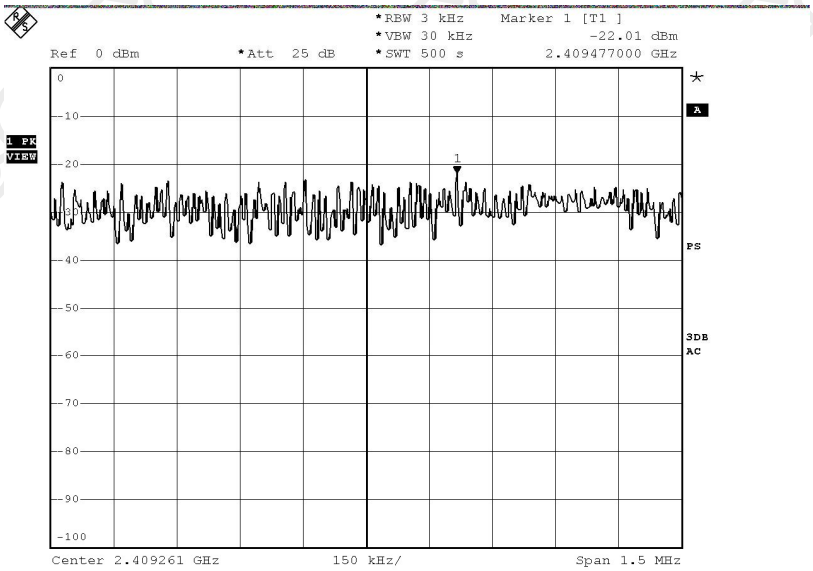
Ch 11



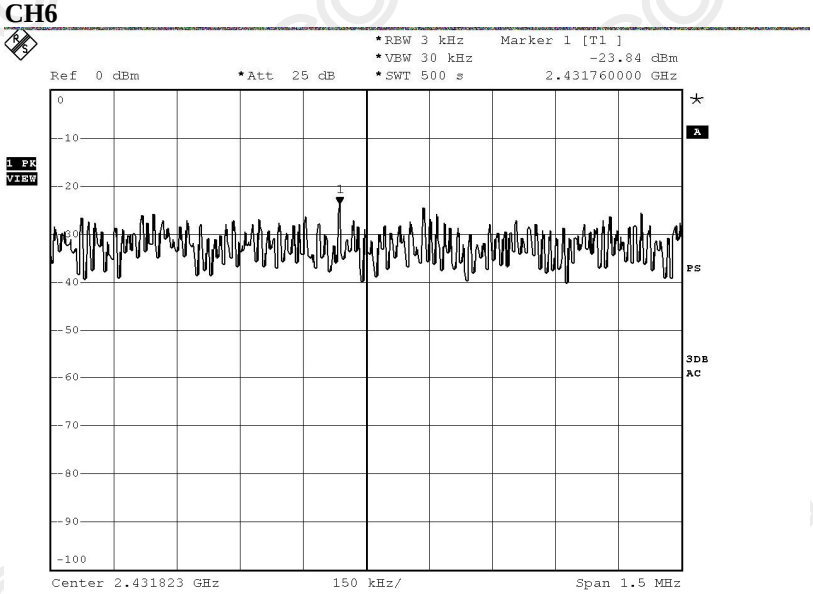
Date: 12.APR.2010 10:57:12

Tx Mode 802.11 n20 130Mbit, Antenna 1+Antenna 2 (2412MHz to 2462MHz)
CH1



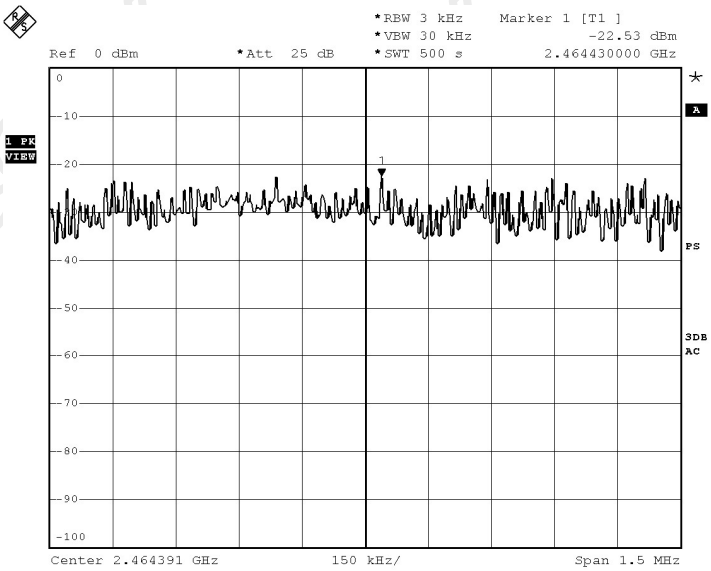
Date: 21.JUL.2010 13:16:11

CH6



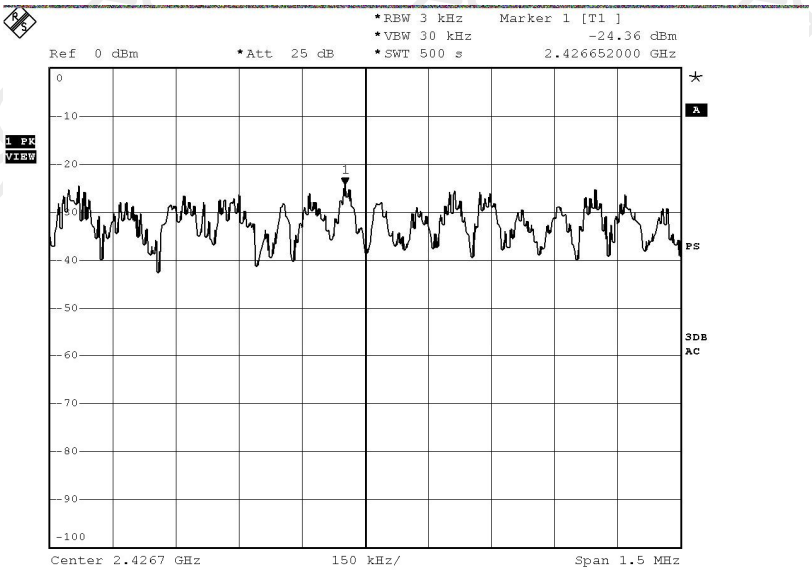
Date: 21.JUL.2010 13:42:15

CH11



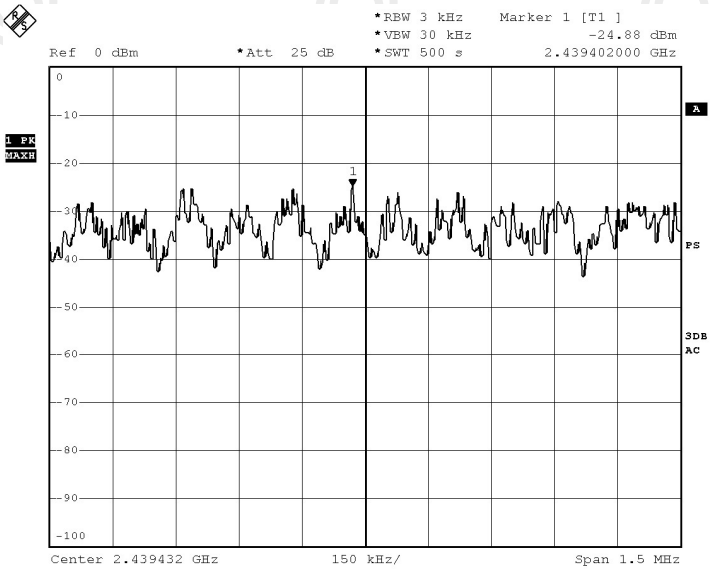
Date: 22.JUL.2010 02:28:16

Tx Mode 802.11 n40 130Mbit, Antenna 1+Antenna 2 (242MHz to 2452MHz)
CH3



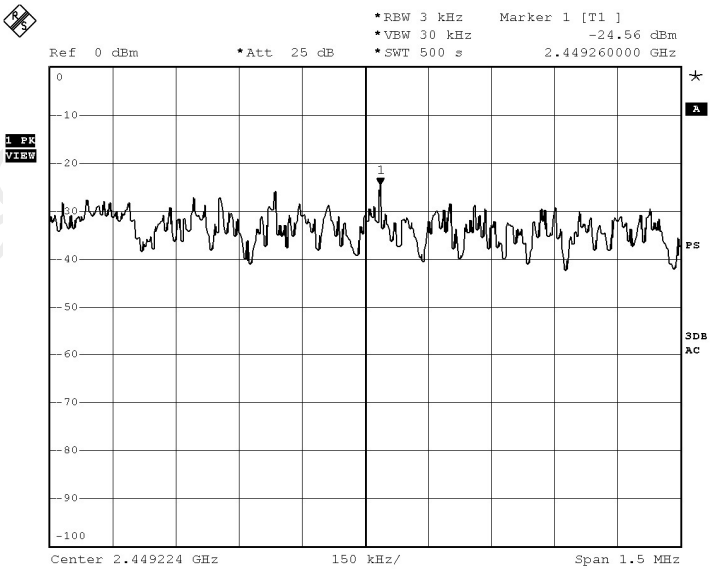
Date: 21.JUL.2010 13:27:49

CH6



Date: 21.JUL.2010 14:02:05

CH9



Date: 21.JUL.2010 14:21:27

3.1.4 6dB Spectrum Bandwidth Measurement

Test Requirement:	FCC 47CFR 15.247(a)(2)
Test Method:	ANSI C63.4:2003
Test Date:	2010-03-06
Mode of Operation:	Tx Mode

Test Method:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

For multiple antenna measurement, all the available transmitter output will be connected to the spectrum analyzer through a power combiner.

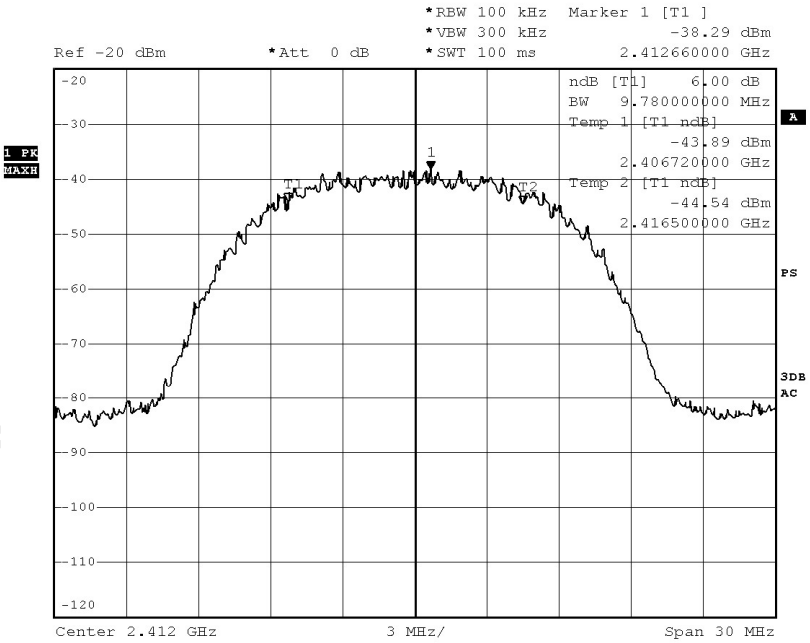
Test Setup:

As Test Setup of clause 3.1.1 in this test report.

Limits for 6dB Spectrum Bandwidth Measurement:

Center Frequency [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2412.0	9.78	> 500

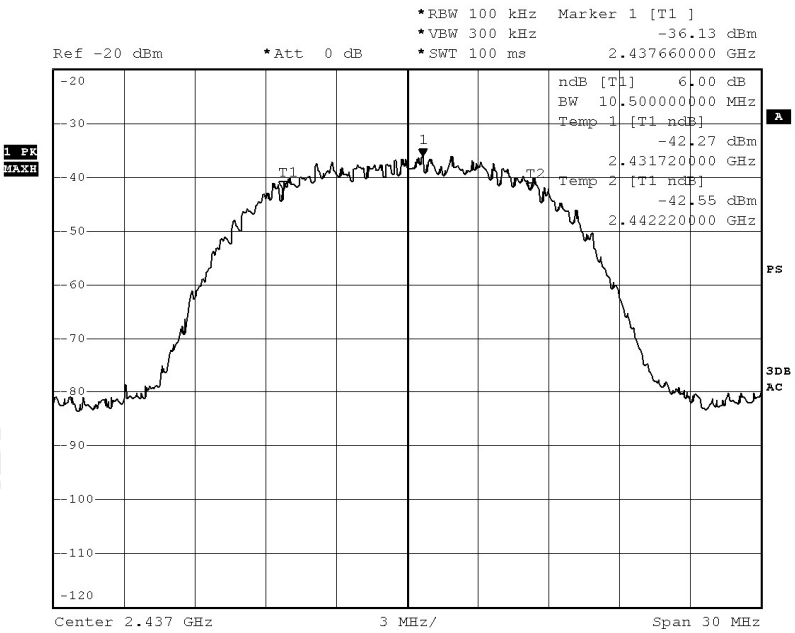
Tx mode 6 dB Bandwidth Plot on Configuration IEEE 802.11b CH1 **(Lowest Operating Frequency)**



Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2437.0	10.50	> 500

Tx mode 6 dB Bandwidth Plot on Configuration IEEE 802.11b CH6 **(Mid. Operating Frequency)**

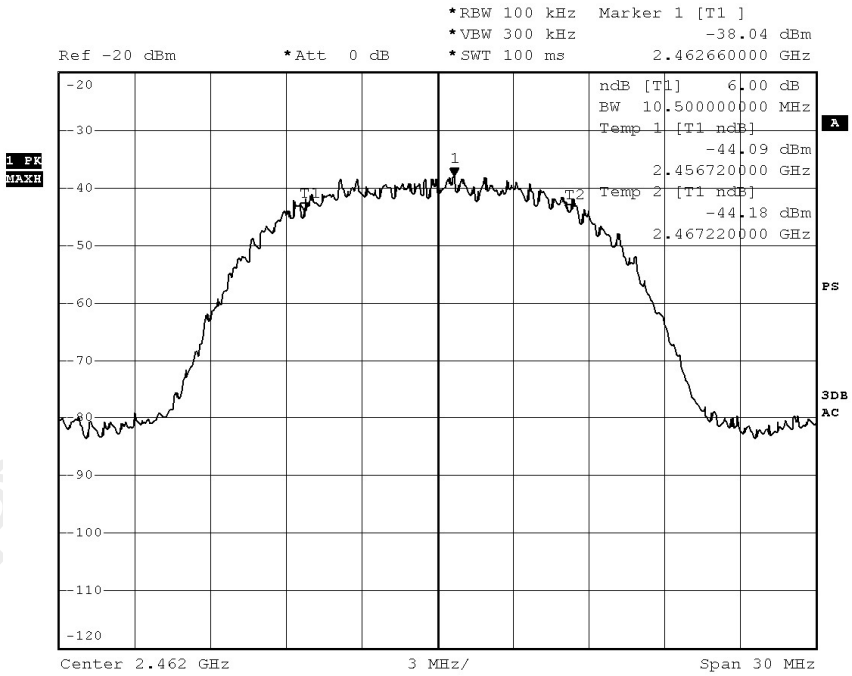


Date: 6.MAR.2010 07:08:31

Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2462.0	10.5	> 500

Tx Mode 6 dB Bandwidth Plot on Configuration IEEE 802.11b CH11**(Highest Operating Frequency)**

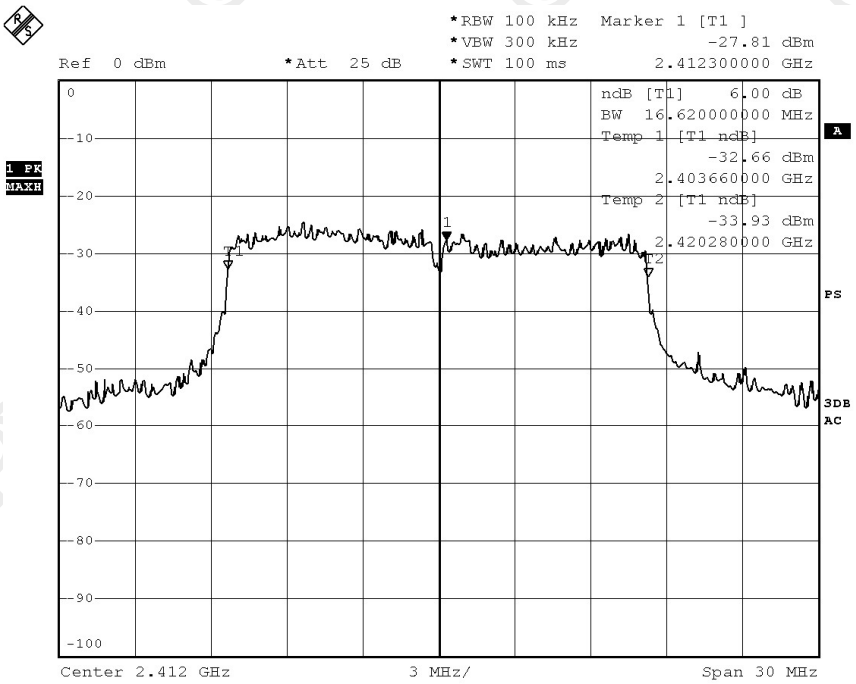


Date: 6.MAR.2010 07:13:35

Limits for 6dB Spectrum Bandwidth Measurement:

Center Frequency [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2412.0	16.62	> 500

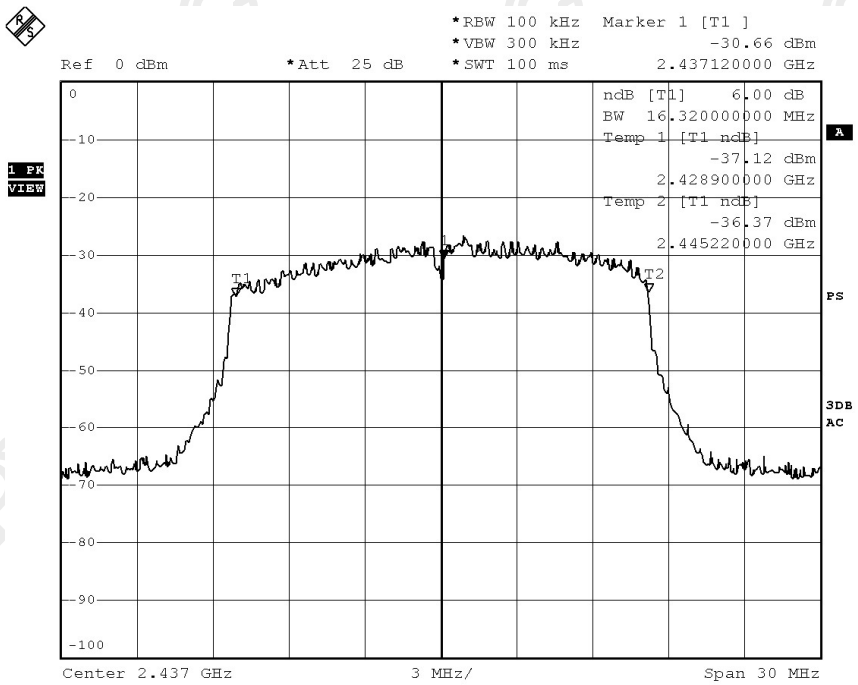
Tx mode 6 dB Bandwidth Plot on Configuration IEEE 802.11g CH1 **(Lowest Operating Frequency)**



Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2437.0	16.32	> 500

Tx Mode 6 dB Bandwidth Plot on Configuration IEEE 802.11g CH6 **(Mid. Operating Frequency)**

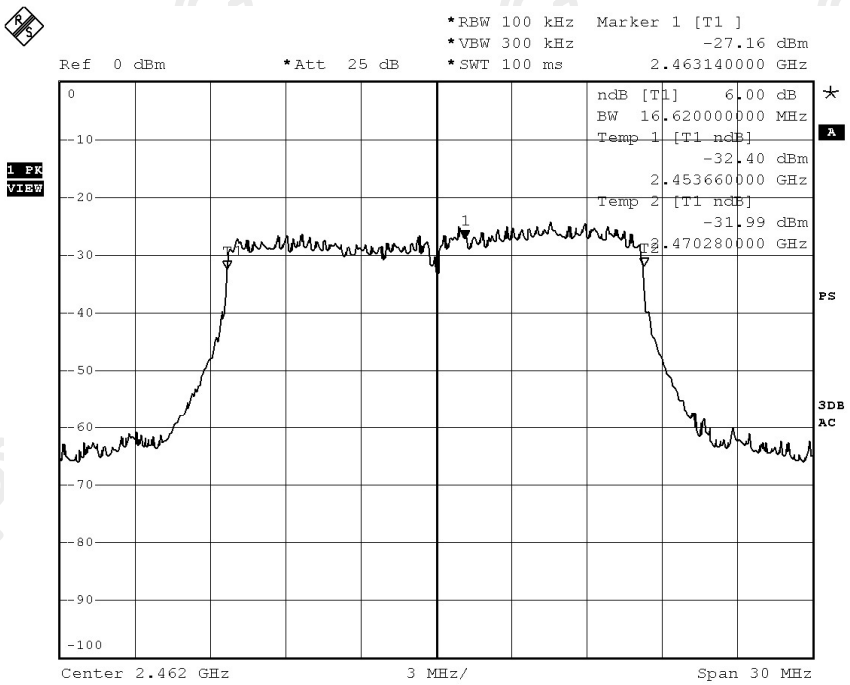


Date: 21.JUL.2010 12:53:16

Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2462.0	16.62	> 500

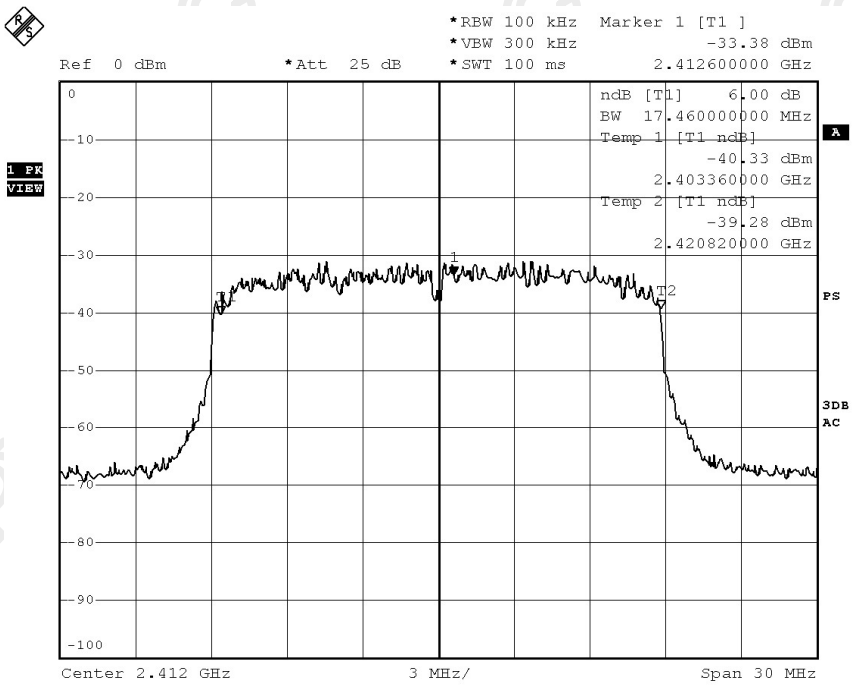
Tx Mode 6 dB Bandwidth Plot on Configuration IEEE 802.11g CH11 **(Highest Operating Frequency)**



Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2412.0	17.46	> 500

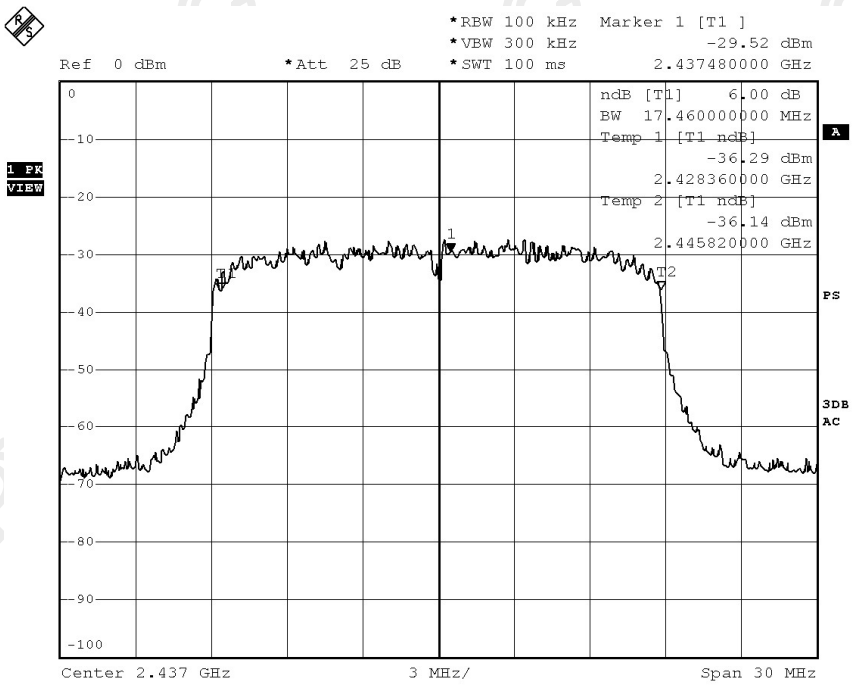
Tx Mode6 dB Bandwidth Plot on Configuration IEEE 802.11 n20 CH1 **(Lowest Operating Frequency)**



Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2437.0	17.46	> 500

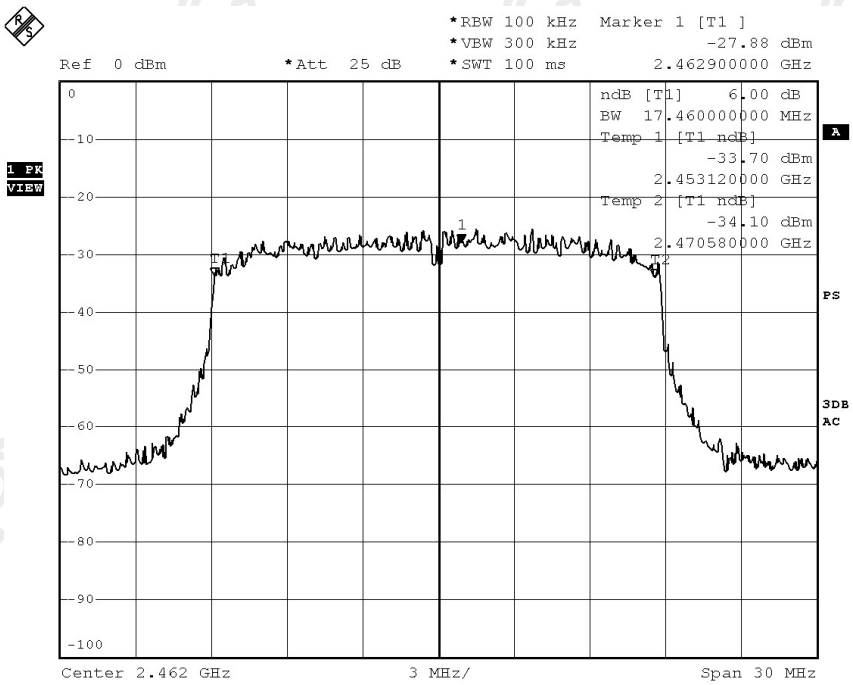
Tx Mode6 dB Bandwidth Plot on Configuration IEEE 802.11 n20 CH6 **(Mid. Operating Frequency)**



Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2462.0	17.46	> 500

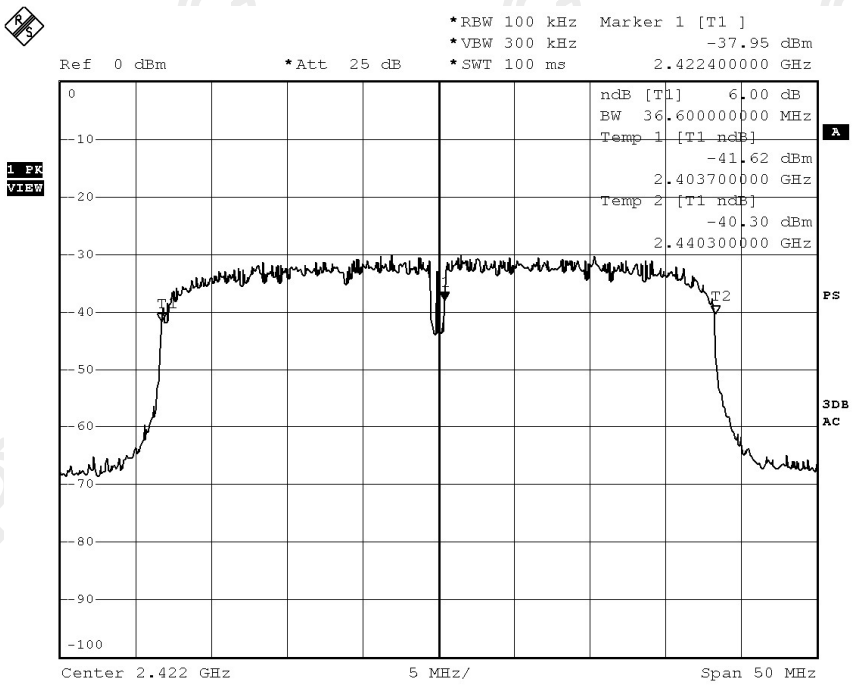
Tx Mode6 dB Bandwidth Plot on Configuration IEEE 802.11 n20 CH11 **(Highest Operating Frequency)**



Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2422.0	36.6	> 500

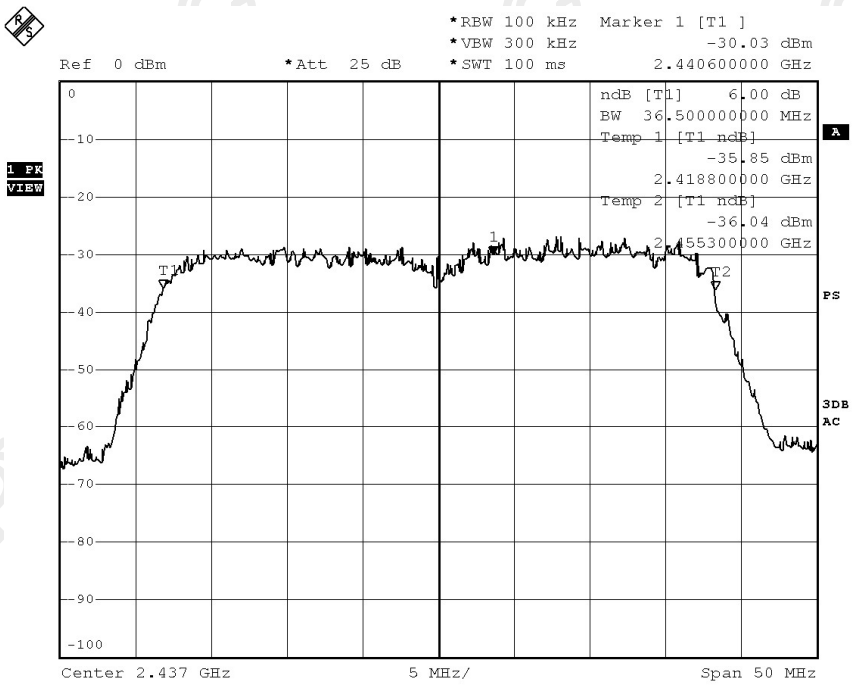
Tx Mode6 dB Bandwidth Plot on Configuration IEEE 802.11 n40 CH3 **(Lowest Operating Frequency)**



Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2437.0	36.5	> 500

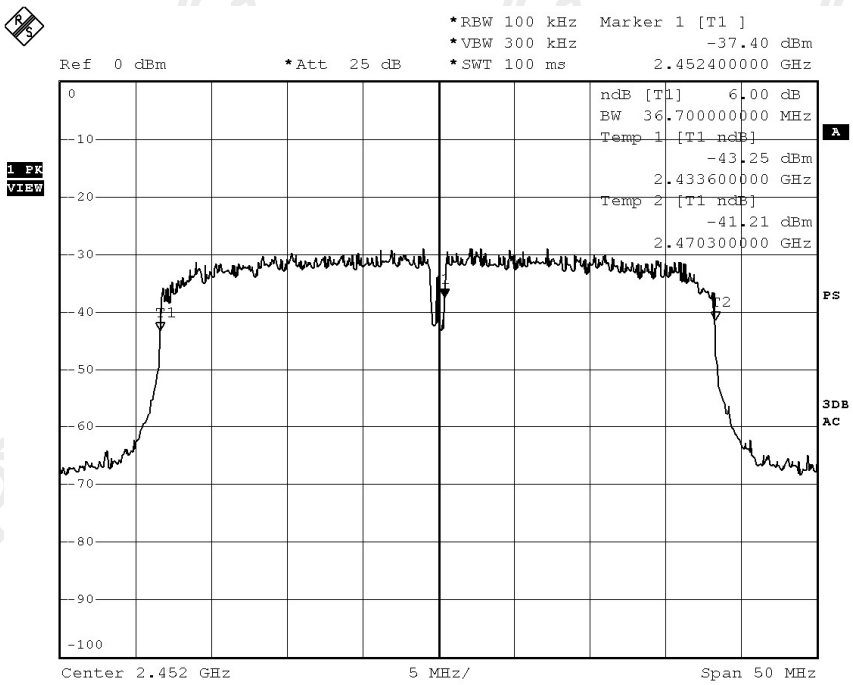
Tx Mode6 dB Bandwidth Plot on Configuration IEEE 802.11 n40 CH6 **(Mid. Operating Frequency)**



Limits for 6dB Spectrum Bandwidth Measurement:

Frequency Range [MHz]	6dB Bandwidth [MHz]	FCC Limits [kHz]
2452.0	36.7	> 500

Tx Mode 6 dB Bandwidth Plot on Configuration IEEE 802.11 n40 CH9 **(Highest Operating Frequency)**



3.1.5 Band Edges Measurement

Test Requirement:	FCC 47CFR 15.247
Test Method:	ANSI C63.4:2003
Test Date:	2010-03-06
Mode of Operation:	On Mode

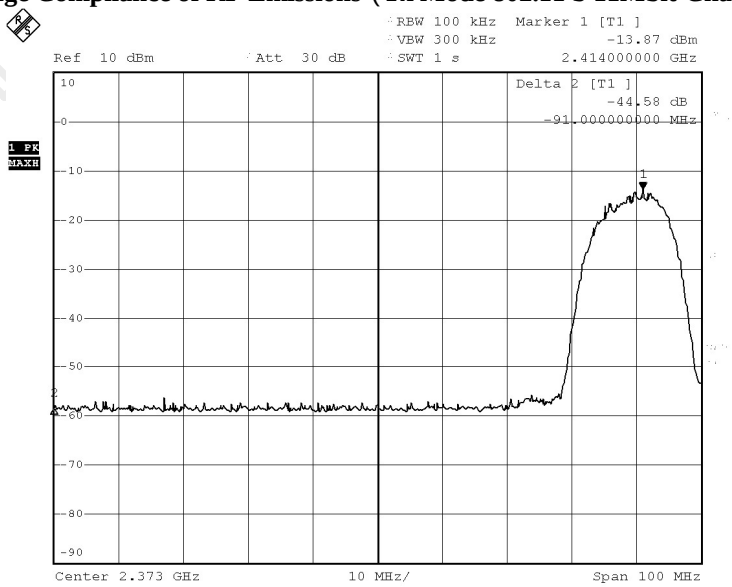
Test Method:

The band edge is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. The RBW and VBW are set to 100kHz for this measurement.

Test Setup:

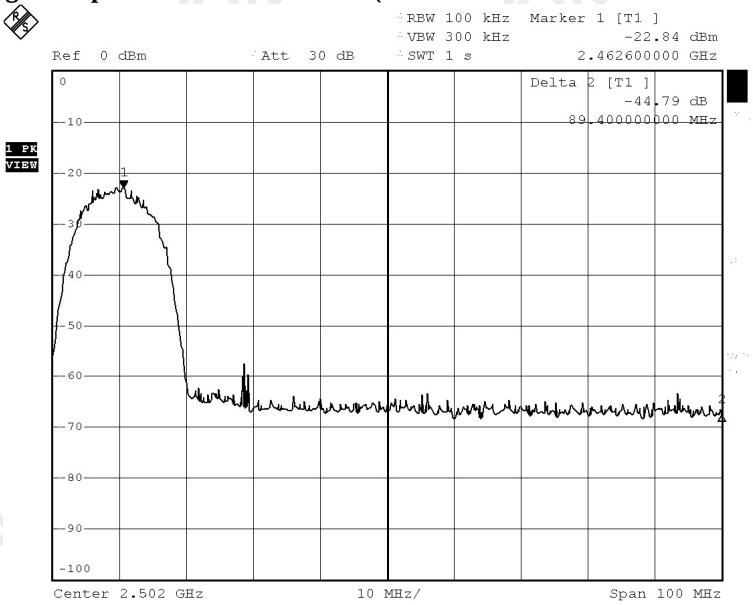
As Test Setup of clause 3.1.2 in this test report.

Band-edge Compliance of RF Emissions（Tx Mode 802.11 b 11Mbit Channel 1 - Lowest）



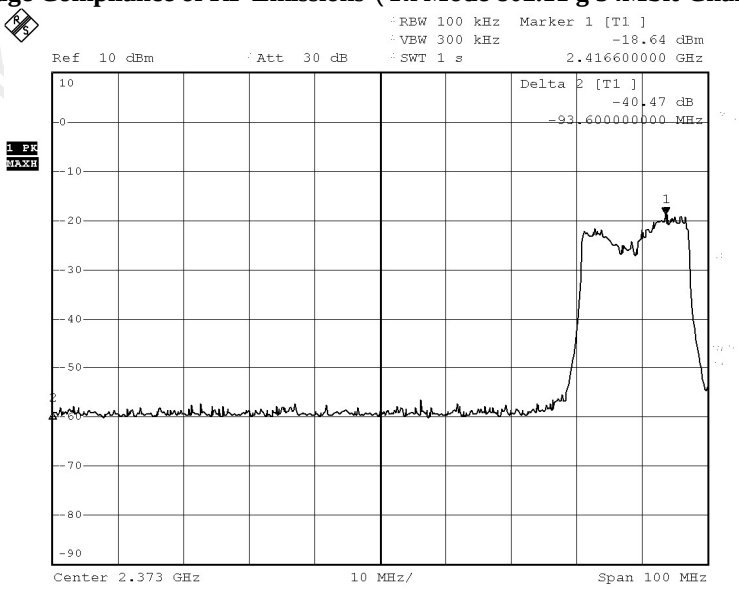
Date: 21.JUL.2010 04:18:40

Band-edge Compliance of RF Emissions（Tx Mode 802.11 b 11Mbit Channel 11 - Highest）



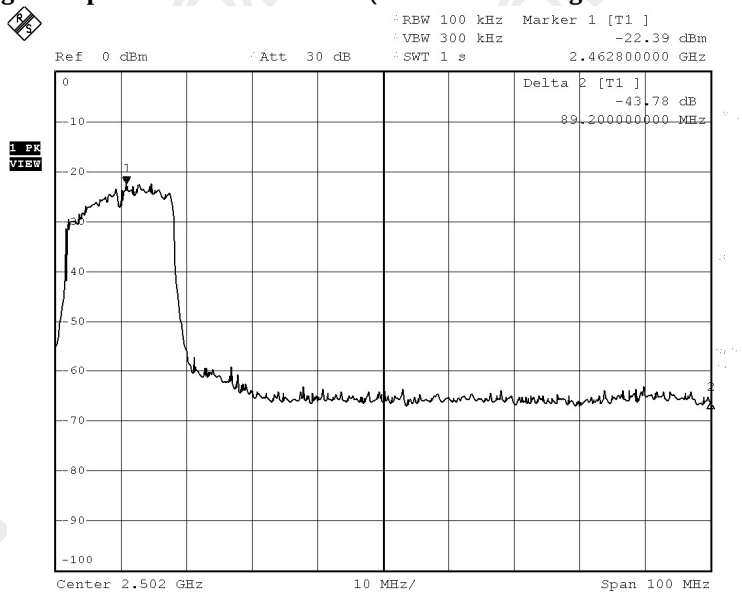
Date: 21.JUL.2010 04:38:19

Band-edge Compliance of RF Emissions（Tx Mode 802.11 g 54Mbit Channel 1 - Lowest）



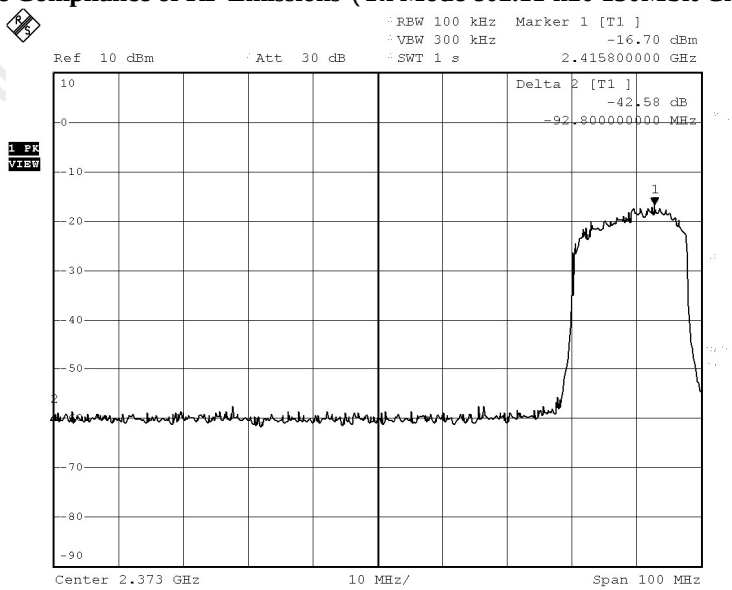
Date: 21.JUL.2010 04:31:07

Band-edge Compliance of RF Emissions（Tx Mode 802.11 g 54Mbit Channel 11 - Highest）



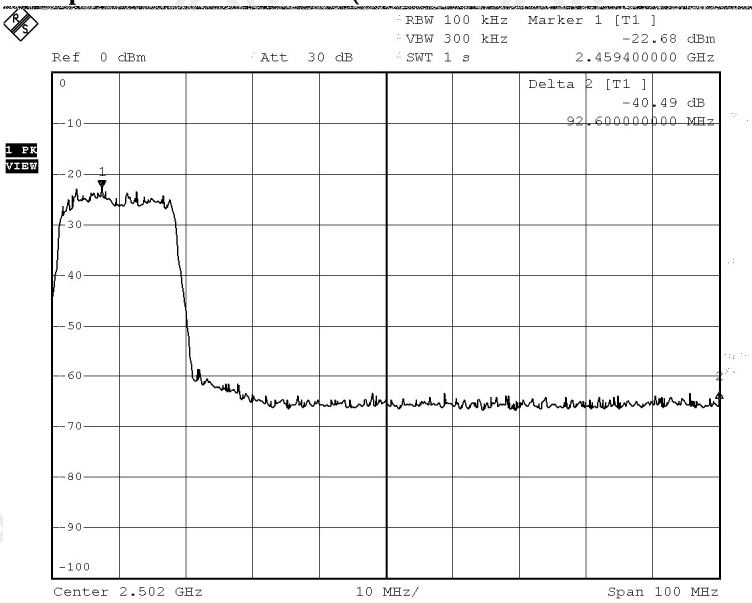
Date: 21.JUL.2010 04:39:54

Band-edge Compliance of RF Emissions（Tx Mode 802.11 n20 130Mbit Channel 1 - Lowest）



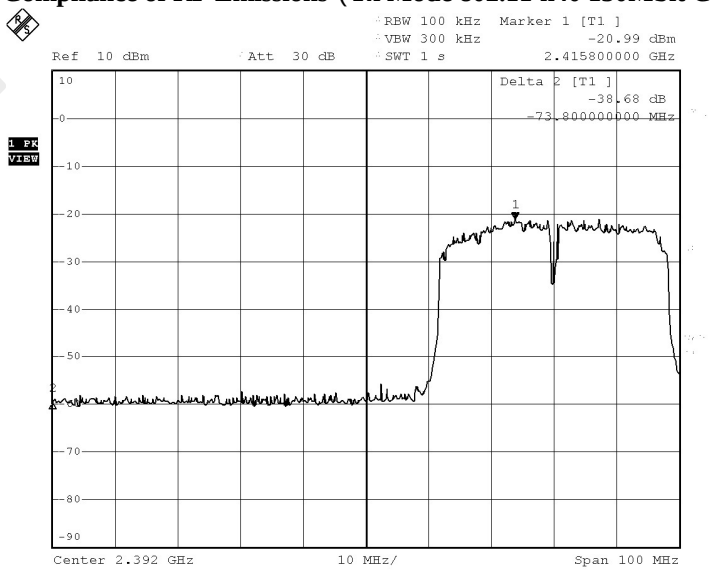
Date: 21.JUL.2010 04:29:38

Band-edge Compliance of RF Emissions（Tx Mode 802.11 n20 130Mbit Channel 11 - Highest）



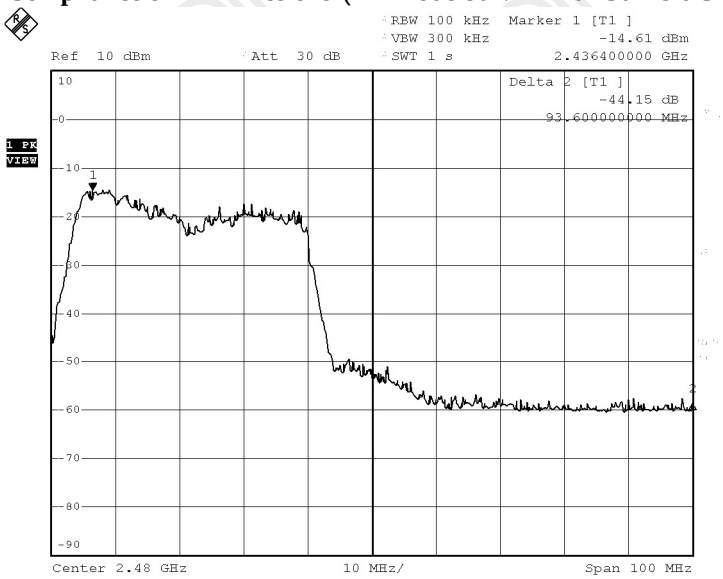
Date: 21.JUL.2010 04:40:32

Band-edge Compliance of RF Emissions（Tx Mode 802.11 n40 130Mbit Channel 1 - Lowest）



Date: 21.JUL.2010 04:32:14

Band-edge Compliance of RF Emissions（Tx Mode 802.11 n40 130Mbit Channel 9 - Highest）



Date: 21.JUL.2010 04:35:55

3.1.6 Conducted Emissions (0.15MHz to 30MHz)

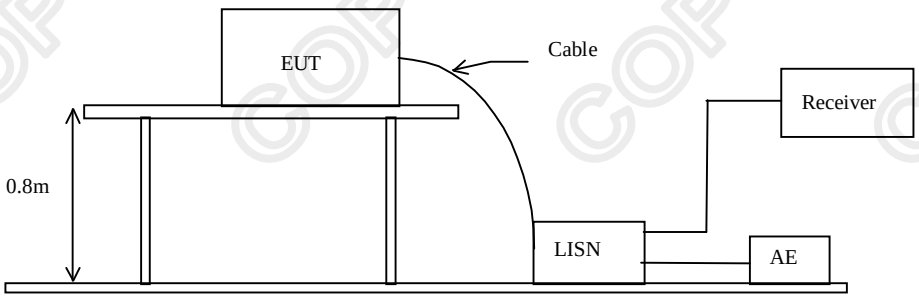
Test Requirement:	FCC 47CFR 15.207
Test Method:	ANSI C63.4:2003
Test Date:	2010-03-06
Mode of Operation:	On mode

Test Method:

The test was performed in accordance with ANSI C63.4: 2003, with the following: an initial measurement was performed in peak and average detection mode on the live line, any emissions recorded within 30dB of the relevant limit line were re-measured using quasi-peak and average detection on the live and neutral lines with the worst case recorded in the table of results.

Test Procedure:
The test was conducted in normal mode, with all the input/ output ports terminated(e.g. LAN port terminated with resistive termination, USB port terminated with supported device – HSPA USB modem and USB flash drive), to simulate the normal usage and to produce the maximum electromagnetic disturbances.

Test Setup:



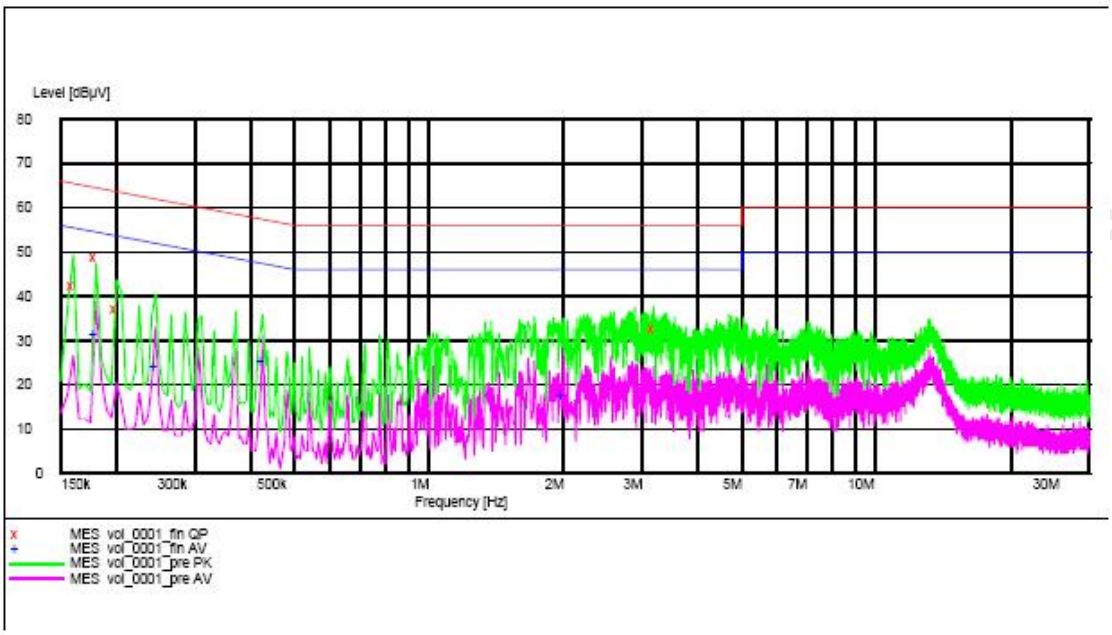
Limit for Conducted Emissions (FCC 47 CFR 15.207):

Frequency Range [MHz]	Quasi-Peak Limits [dBµV]	Average [dBµV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results of On mode, EUT mains(L): PASS
Please refer to the following diagram for individual results.



Results of On mode, EUT mains (L): PASS

Conductor Live or Neutral	Frequency MHz	Quasi-peak		Average	
		Level dBμV	Limit dBμV	Level dBμV	Limit dBμV
Live	0.160	42.4	66.0	-*-	-*-
Live	0.180	48.8	65.0	31.6	55.0
Live	0.200	37.0	64.0	-*-	-*-
Live	0.245	-*-	-*-	24.3	52.0
Live	0.425	-*-	-*-	25.4	47.0
Live	2.000	-*-	-*-	17.6	46.0
Live	3.180	32.8	56.0	-*-	-*-

Remarks:
Calculated measurement uncertainty : 3.97dB
-*- Emission(s) that is far below the corresponding limit line.

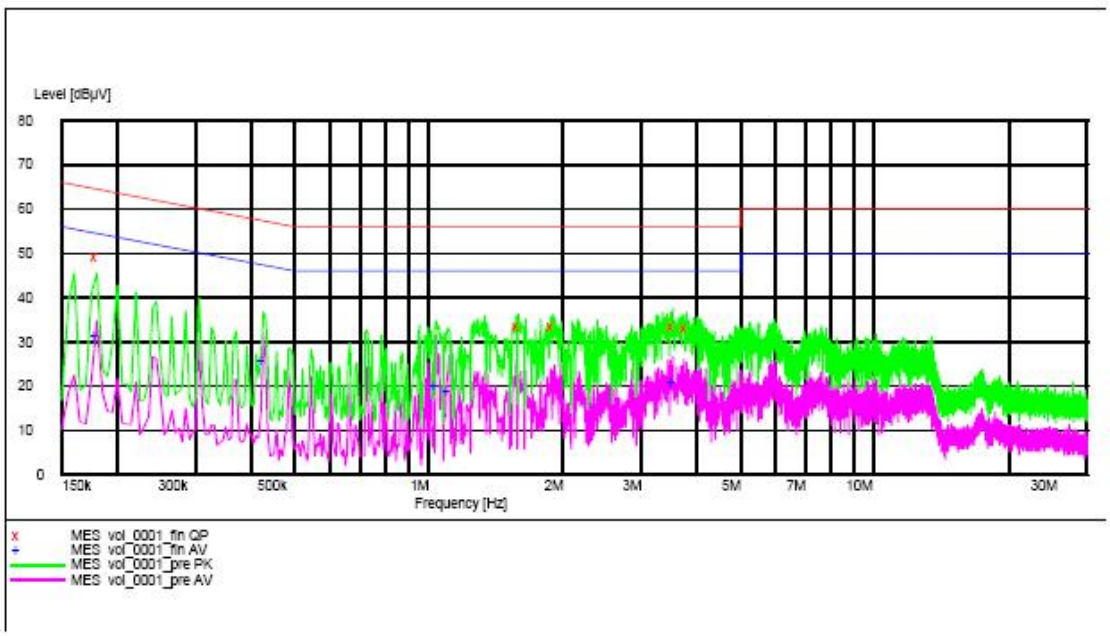
Limit for Conducted Emissions (FCC 47 CFR 15.207):

Frequency Range [MHz]	Quasi-Peak Limits [dBµV]	Average [dBµV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results of On mode, EUT mains(N): PASS
Please refer to the following diagram for individual results.



Results of On mode, EUT mains(N): PASS

Conductor Live or Neutral	Frequency MHz	Quasi-peak		Average	
		Level dBμV	Limit dBμV	Level dBμV	Limit dBμV
Neutral	0.180	49.0	65.0	31.6	55.0
Neutral	0.425	-*-	-*-	25.9	47.0
Neutral	1.040	-*-	-*-	20.3	46.0
Neutral	1.110	-*-	-*-	18.9	46.0
Neutral	1.590	33.4	56.0	-*-	-*-
Neutral	1.900	33.3	56.0	-*-	-*-
Neutral	3.535	33.4	56.0	20.9	46.0
Neutral	3.790	33.0	56.0	-*-	-*-

Remarks:
Calculated measurement uncertainty : 3.97dB
-*- Emission(s) that is far below the corresponding limit line.

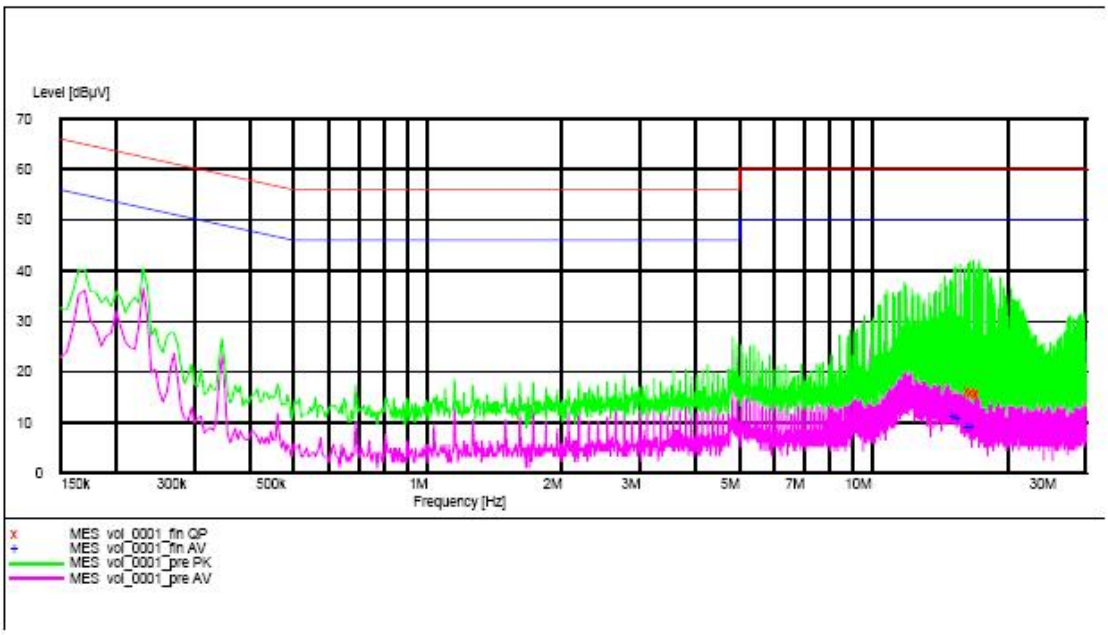
Limit for Conducted Emissions (FCC 47 CFR 15.207):

Frequency Range [MHz]	Quasi-Peak Limits [dBµV]	Average [dBµV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results of On mode, PC Mains(L): PASS
Please refer to the following diagram for individual results.



Results of On mode, PC Mains(N): PASS

Conductor Live or Neutral	Frequency MHz	Quasi-peak		Average	
		Level dBμV	Limit dBμV	Level dBμV	Limit dBμV
Live	15.340	-*-	-*-	11.4	50.0
Live	15.690	-*-	-*-	10.8	50.0
Live	16.495	16.2	60.0	9.3	50.0
Live	16.845	15.7	60.0	9.0	50.0
Live	17.195	15.5	60.0	-*-	-*-
Live	17.310	15.7	60.0	-*-	-*-

Remarks:
Calculated measurement uncertainty : 3.97dB
-*- Emission(s) that is far below the corresponding limit line.

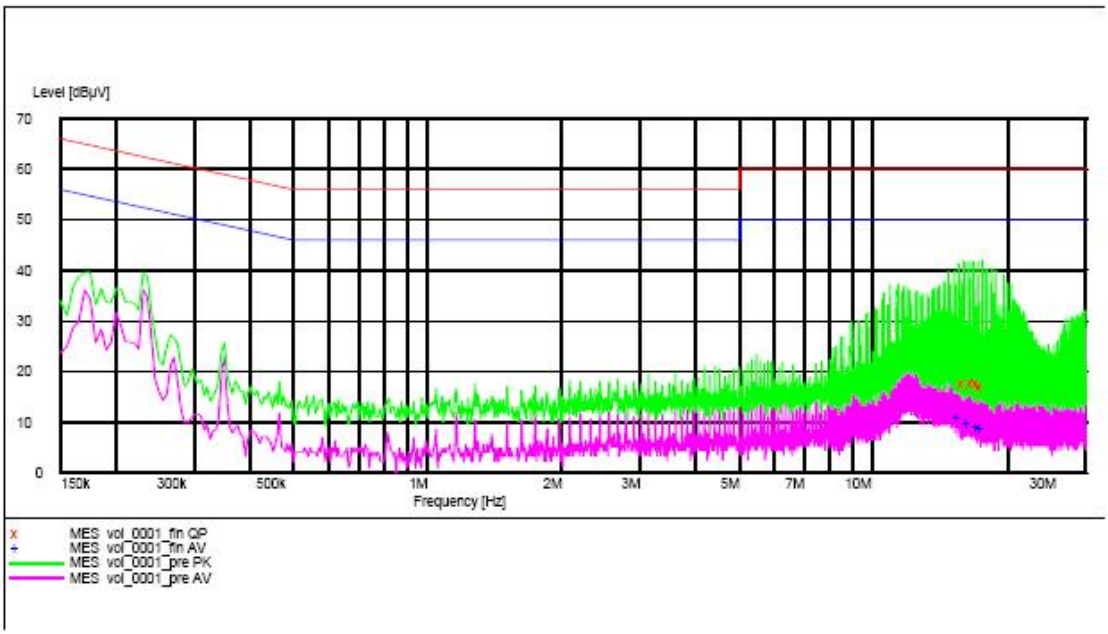
Limit for Conducted Emissions (FCC 47 CFR 15.207):

Frequency Range [MHz]	Quasi-Peak Limits [dBµV]	Average [dBµV]
0.15-0.5	66 to 56*	56 to 46*
0.5-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency.

Limits for Conducted Emissions Test, please refer to limit lines (Quasi-Peak and Average) in the following diagram.

Results of On mode, PC Mains(N): PASS
Please refer to the following diagram for individual results.



Results of On mode, PC Mains(N): PASS

Conductor Live or Neutral	Frequency MHz	Quasi-peak		Average	
		Level dBμV	Limit dBμV	Level dBμV	Limit dBμV
Neutral	15.757	-*-	-*-	10.9	50.0
Neutral	15.925	17.8	60.0	-*-	-*-
Neutral	16.390	-*-	-*-	9.9	50.0
Neutral	16.740	17.8	60.0	-*-	-*-
Neutral	17.205	17.8	60.0	9.3	50.0
Neutral	17.555	17.0	60.0	8.9	50.0

Remarks:
Calculated measurement uncertainty : 3.97dB
-*- Emission(s) that is far below the corresponding limit line.

Antenna Requirement

Test Requirements: § 15.203

Test Specification:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Test Results:

The EUT has 2 Dipole Antenna which is connected to the reverse-polarity SMA connector on the PCB of the main unit, the antenna gain = 2dBi. All component install on inside of EUT. User unable to remove or changed the Antenna.

Frequency List for 802.11 b/g, n20/40
There are two bandwidth systems for IEEE 802.11n
For both 20MHz bandwidth systems, use Channel 1-Channel 11.
For both 40MHz bandwidth systems, use Channel 3-Channel 9.

Item	Frequency（MHz）	Item	Frequency（MHz）
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	—	—

Appendix A

List of Measurement Equipment

Conducted RF Power

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM229	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB40	100248	2009/09/08	2010/09/08
N/A	2 WAY RESISTIVE POWER COMBINER	JFW	50PD-379	0941	2010/07/15	2011/07/15

Radiated Emission

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM020	HORN ANTENNA	EMCO	3115	4032	2009/09/11	2011/09/11
EM022	LOOP ANTENNA	EMCO	6502	1189-2424	2009/07/26	2011/07/26
EM215	MULTIDEVICE CONTROLLER	EMCO	2090	00024676	N/A	N/A
EM216	MINI MAST SYSTEM	EMCO	2075	00026842	N/A	N/A
EM217	ELECTRIC POWERED TURNTABLE	EMCO	2088	00029144	N/A	N/A
EM218	ANECHOIC CHAMBER	ETS-Linggren	FACT-3	--	2008/12/01	2011/12/01
EM174	BICONILOG ANTENNA	EMCO	3142C	00029071	2010/02/09	2012/02/09
EM229	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB40	100248	2009/09/08	2010/09/08

Line Conducted

EQP NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CAL	DUE CAL
EM197	LISN	EMCO	4825/2	1193	2007/10/30	2009/10/30
EM181	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB7	100072	2009/06/29	2010/06/29
EM154	SHIELDING ROOM	SIEMENS MATSUSHITA COMPONENTS	N/A	803-740-057-99A	2009/01/23	2010/01/23

Remarks:-

CM Corrective Maintenance
N/A Not Applicable
TBD To Be Determined

Appendix B

Ancillary Equipment

ITEM NO.	DESCRIPTION	MODEL NO.	FCC ID	REMARK
1	DELL COMPUTER	DMC	N/A	N/A
2	DELL MONITOR	E551C	ARSCM356N	RESOLUTION:800x600(DURING TESTING) 1.0M UNSHIEDED POWER CORD CONNECTED TO THE COMPUTER 2.8M SHIELDED CABLE CONNECTED TO THE COMPUTER
3	DELL KEYBOARD	SK-8110	N/A	1.8M SHIELDED COILED CABLE CONNECTED TO THE COMPUTER
4	DELL MOUSE	N/A	N/A	2.4M UNSHIELDED CABLE CONNECTED TO THE COMPUTER
5	LASER PRINTER	HP LaserJet 1020 Plus	N/A	1.8M UNSHIELDED POWER CORD 2.8M SHIELDED CABLE (BUNDLED TO 1M) CONNECTED TO THE COMPUTER
6	HUAWEI WIRELESS DATA MODEM HSD USB CARD	EC1260	QISEC1260	N/A
7	SONY 4GB USB MICRO VAULT CLASSIC	USM4GN	N/A	HIGH-SPEED USB 2.0 4GB FLASH DRIVE

Appendix C

Transmitter Function Parameters

Table of Transmit mode and antenna

Antenna	Single Antenna		Two Antenna	
Bandwidth mode	**20 MHz**	**40 MHz**	**20 MHz**	**40 MHz**
802.11b	Support	Not Support	Not Support	Not Support
802.11g	Support	Not Support	Not Support	Not Support
802.11n	Not Support	Not Support	Support	Support

IEEE 8021.11n Modulation Scheme

MCS Index	Nss	Modulation	R	NBPSC	NCBPS		NDBPS		Data rate (Mbps)	
									800nsGI	
					20MHz	40MHz	20MHz	40MHz	20MHz	40MHz
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5
1	1	QPSK	1/2	2	104	216	52	108	13	27
2	1	QPSK	3/4	2	104	216	78	162	19.5	40.5
3	1	16-QAM	1/2	4	208	432	104	216	26	54
4	1	16-QAM	3/4	4	208	432	156	324	39	81
5	1	64-QAM	2/3	6	312	648	208	432	52	108
6	1	64-QAM	3/4	6	312	648	234	486	58.5	121.5
7	1	64-QAM	5/6	6	312	648	260	540	65	135
8	2	BPSK	1/2	1	104	216	52	108	13	27
9	2	QPSK	1/2	2	208	432	104	216	26	54
10	2	QPSK	3/4	2	208	432	156	324	39	81
11	2	16-QAM	1/2	4	416	864	208	432	52	108
12	2	16-QAM	3/4	4	416	864	312	648	78	162
13	2	64-QAM	2/3	6	624	1296	416	864	104	216
14	2	64-QAM	3/4	6	624	1296	468	972	117	243
15	2	64-QAM	5/6	6	624	1296	520	1080	130	270

Abbreivation:
NSS – Number of spatial streams
R – Code rate
NBPSC – Number of coded bits per single carrier
NCBPS – Number of coded bits per symbol
NDBPS – Number of data bits per symbol
GI – Guard interval

Table of Test Modes
802.11 b/g

Test Items	Mode	Data Rate	Channel
AC Power Line Conducted emissions	Normal Mode	Auto	N/A
Radiated Emissions 9kHz to 1GHz	Normal Mode	Auto	N/A
- Max. Peak Conducted Output Power - Power Spectral Density - 6dB Spectrum Bandwidth - Band Edge Emissions - Spurious Emissions	11b/CCK	11 Mbps	1/6/11
	11g/BPSK	6 Mbps	1/6/11

802.11 n

Test Items	Mode	Data Rate	Channel	Antenna
AC Power Line Conducted emissions	Normal Mode	Auto	N/A	N/A
Radiated Emissions 9kHz to 1GHz	Normal Mode	Auto	N/A	N/A
- Max. Peak Conducted Output Power - Power Spectral Density - 6dB Spectrum Bandwidth - Band Edge Emissions - Spurious Emissions	MCS 0 (20MHz)	6.5 Mbps	1/6/11	1
	MCS 0 (40MHz)	13.5 Mbps	3/6/9	1
	MCS 8 (20MHz)	13 Mbps	1/6/11	1 or 2 1 + 2
	MCS 8 (40MHz)	27 Mbps	3/6/9	1 or 2 1 + 2

Test mode used for measurement
802.11 b/g

Frequency (MHz)	2412	2437	2462
IEEE 802.11b	15 dBm	15 dBm	15 dBm
IEEE 802.11g	15 dBm	15 dBm	15 dBm

802.11 n

Frequency (MHz)	2412	2437	2462
IEEE 802.11n (20MHz)	15 dBm	15 dBm	15 dBm
Frequency (MHz)	**2422**	**2437**	**2452**
IEEE 802.11n (40MHz)	15 dBm	15 dBm	15 dBm

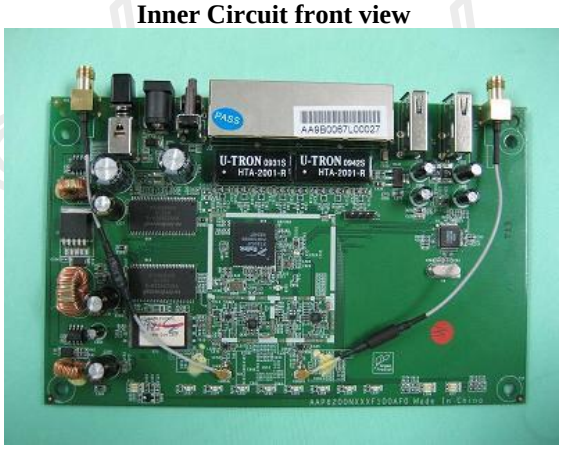
Appendix D

Photographs of EUT

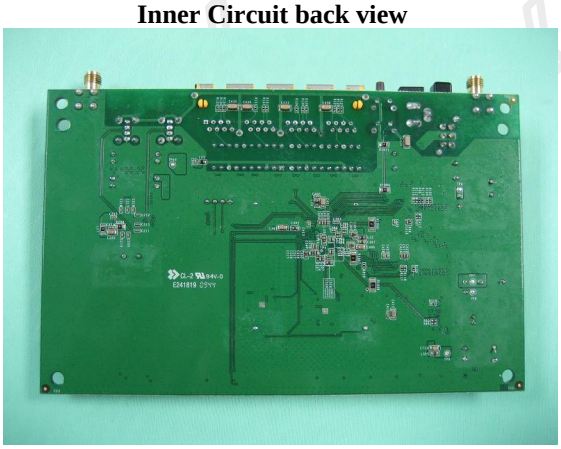
Front View of the product

Rear View of the product

Inner Circuit front view

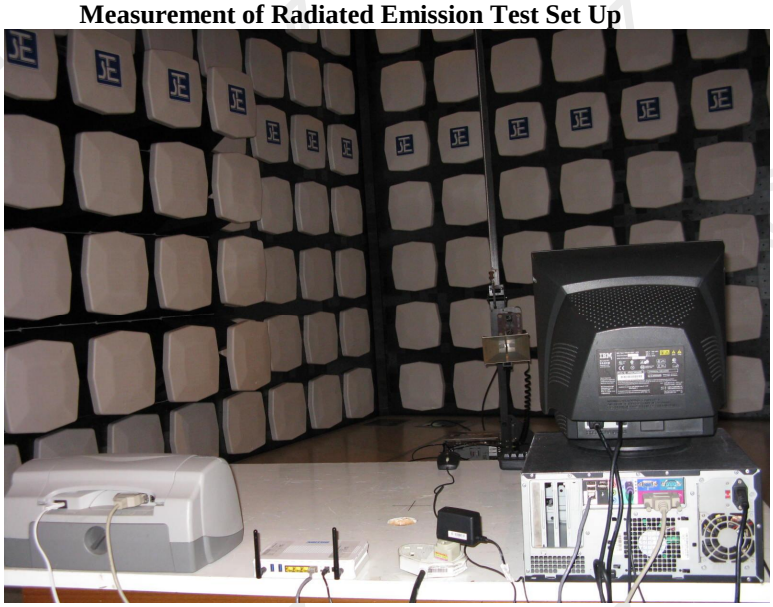


Inner Circuit back view

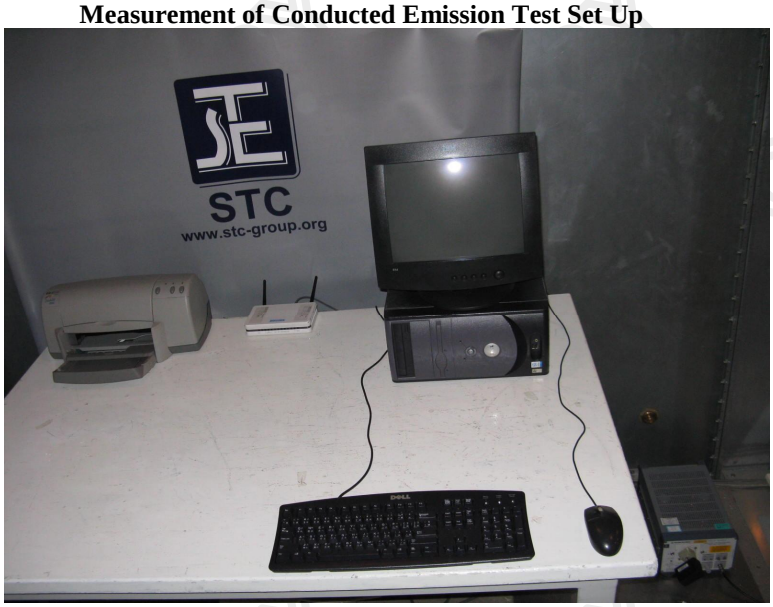


Photographs of EUT

Measurement of Radiated Emission Test Set Up



Measurement of Conducted Emission Test Set Up



******* End of Test Report *******