

FCC RADIO TEST REPORT

according to

47 CFR FCC Part 15 Subpart E § 15.407

Equipment : Dual Mode 2.4GHz/5GHz Access Point
Model No. : MP-82
Brand Name : Mobility Point
Filing Type : New Application
Applicant : Trapeze Networks, Inc.
5753 W. Las Positas Blvd. Pleasanton CA 94588 USA
FCC ID : QZE280
Manufacturer : DONGGUAN G-COM COMPUTER CO., LTD.
1st Row Yin Shan Rd., Yin Hwu Industrial Area, Qingxi Town
DongGuan City, Guang Dong, China
Received Date : Apr. 22, 2008
Final Test Date : May 30, 2008

Statement

Test result included is only for the 802.11a/n (5150 ~ 5250MHz) of the product.

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.4-2003** and **47 CFR FCC Part 15 Subpart E**.

The test equipment used to perform the test is calibrated and traceable to NML/ROC.



SPORTON International Inc.

6F, No. 106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

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History of This Test Report

Original Issue Date: Dec. 29, 2008

Report No.: FR843032-06AI

- No additional attachment.
- Additional attachment were issued as following record:

| Attachment No. | Issue Date | Description |
|----------------|------------|-------------|
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CERTIFICATE OF COMPLIANCE

according to

47 CFR FCC Part 15 Subpart E § 15.407

Equipment : Dual Mode 2.4GHz/5GHz Access Point
Model No. : MP-82
Brand Name : Mobility Point
Applicant : Trapeze Networks, Inc.
5753 W. Las Positas Blvd. Pleasanton CA 94588 USA

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Apr. 22, 2008 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.



Wayne Hsu

SPORTON International Inc.

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

1 SUMMARY OF THE TEST RESULT

| Applied Standard: 47 CFR FCC Part 15 Subpart E | | | | |
|---|---------------------|-----------------------------------|---------------|--------------------|
| Part | Rule Section | Description of Test | Result | Under Limit |
| 3.1 | 15.207 | AC Power Line Conducted Emissions | Complies | 12.63 dB |
| 3.2 | 15.407(a) | 26dB Spectrum Bandwidth | Complies | - |
| 3.3 | 15.407(a) | Maximum Conducted Output Power | Complies | 1.92 dB |
| 3.4 | 15.407(a) | Power Spectral Density | Complies | 0.01 dB |
| 3.5 | 15.407(a) | Peak Excursion | Complies | 7.23 dB |
| 3.6 | 15.407(b) | Radiated Emissions | Complies | 3.06 dB |
| 3.7 | 15.407(b) | Band Edge Emissions | Complies | 1.30 dB |
| 3.8 | 15.407(g) | Frequency Stability | Complies | - |
| 3.9 | 15.203 | Antenna Requirements | Complies | - |

| Test Items | Uncertainty | Remark |
|---|-----------------------|--------------------------|
| AC Power Line Conducted Emissions | ±2.3dB | Confidence levels of 95% |
| Maximum Conducted Output Power | ±0.5dB | Confidence levels of 95% |
| Power Spectral Density | ±0.5dB | Confidence levels of 95% |
| Peak Excursion | ±0.5dB | Confidence levels of 95% |
| 26dB Spectrum Bandwidth / Frequency Stability | ±8.5×10 ⁻⁸ | Confidence levels of 95% |
| Radiated Emissions (9kHz~30MHz) | ±0.8dB | Confidence levels of 95% |
| Radiated Emissions (30MHz~1000MHz) | ±1.9dB | Confidence levels of 95% |
| Radiated / Band Edge Emissions (1GHz~18GHz) | ±1.9dB | Confidence levels of 95% |
| Radiated Emissions (18GHz~40GHz) | ±1.9dB | Confidence levels of 95% |
| Temperature | ±0.7 | Confidence levels of 95% |
| Humidity | ±3.2% | Confidence levels of 95% |
| DC / AC Power Source | ±1.4% | Confidence levels of 95% |

2 GENERAL INFORMATION

2.1 Product Details

Only the radio detail of IEEE 802.11n of PCB Antenna (TFF-A015MPAX-361) is shown in the table below. For more detailed features description, please refer to the manufacturer's specifications or user's manual.

| Items | Description |
|--------------------------|---|
| Modulation | See the below table for IEEE 802.11n |
| Data Modulation | OFDM (BPSK / QPSK / 16QAM / 64QAM) |
| Data Rate (Mbps) | See the below table for IEEE 802.11n |
| Frequency Range | 5150 ~ 5250MHz |
| Channel Number | 11a: 6 |
| Channel Band Width (99%) | 1TX-11a Band 1: 17.12 MHz 1TX-11n Band 1 MCS 0 (20MHz): 18.24 MHz ; MCS 0 (40MHz): 36.80 MHz 2TX-11n Band 1 MCS 8 (20MHz): 17.92 MHz ; MCS 0 (40MHz): 36.48 MHz |
| Conducted Output Power | 1TX-11a Band 1: 14.36 dBm 1TX-11n Band 1 MCS 0 (20MHz): 14.55 dBm ; MCS 0 (40MHz): 16.15 dBm 2TX-11n Band 1 MCS 8 (20MHz): 13.58 dBm ; MCS 8 (40MHz): 15.08 dBm |

2.2 Table for Filed Antenna

Antenna & Bandwidth

| Antenna Mode | Single Chain | | Two Chain | |
|-----------------------------|--------------|--------|-----------|--------|
| | 20 MHz | 40 MHz | 20 MHz | 40 MHz |
| Bandwidth Mode | | | | |
| 802.11b | V | X | X | X |
| 802.11g | V | X | X | X |
| 802.11n(2.4GHz) | V | V | V | V |
| 802.11a (5150~5250MHz) | V | X | X | X |
| 802.11a (5725~5850/5825MHz) | V | X | X | X |
| 802.11n (5150~5250MHz) | V | V | V | V |
| 802.11n (5725~5850/5825MHz) | V | V | V | V |

PCB Antenna (TFF-A015MPAX-361)

| Ant. | Antenna Type | Connector | Gain (dBi) | Remark |
|------|--------------|-----------|------------|---------|
| | | | 5G | |
| A | PCB Antenna | U.FL | 3 | TX / RX |
| B | PCB Antenna | U.FL | 3 | TX / RX |
| C | PCB Antenna | U.FL | 3 | RX |

Antenna: 2T3R Spatial Multiplexing MIMO configuration. 2 antennas are for signal transmitting and 3 antennas are for signal receiving. For IEEE 802.11 a only 1 antenna (Antenna A) for signal transmitting and receiving

IEEE 802.11n Modulation Scheme

| MCS Index | Nss | Modulation | R | NBPS | NCBPS | | NDBPS | | Data rate(Mbps) | |
|-----------|-----|------------|-----|------|-------|-------|-------|-------|-----------------|-------|
| | | | | | 20MHz | 40MHz | 20MHz | 40MHz | 800nsGI | |
| | | | | | | | | | 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 | 13.0 | 27.0 |
| 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 | 26.0 | 54.0 |
| 4 | 1 | 16-QAM | 3/4 | 4 | 208 | 432 | 156 | 324 | 39.0 | 81.0 |
| 5 | 1 | 64-QAM | 2/3 | 6 | 312 | 648 | 208 | 432 | 52.0 | 108.0 |
| 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 | 65.0 | 135.0 |
| 8 | 2 | BPSK | 1/2 | 1 | 104 | 216 | 52 | 108 | 13.0 | 27.0 |
| 9 | 2 | QPSK | 1/2 | 2 | 208 | 432 | 104 | 216 | 26.0 | 54.0 |
| 10 | 2 | QPSK | 3/4 | 2 | 208 | 432 | 156 | 324 | 39.0 | 81.0 |
| 11 | 2 | 16-QAM | 1/2 | 4 | 416 | 864 | 208 | 432 | 52.0 | 108.0 |
| 12 | 2 | 16-QAM | 3/4 | 4 | 416 | 864 | 312 | 648 | 78.0 | 162.0 |
| 13 | 2 | 64-QAM | 2/3 | 6 | 624 | 1296 | 416 | 864 | 104.0 | 216.0 |
| 14 | 2 | 64-QAM | 3/4 | 6 | 624 | 1296 | 468 | 972 | 117.0 | 243.0 |
| 15 | 2 | 64-QAM | 5/6 | 6 | 624 | 1296 | 520 | 1080 | 130.0 | 270.0 |

| Symbol | Explanation |
|--------|---|
| NSS | Number of spatial streams |
| R | Code rate |
| NBPS | Number of coded bits per single carrier |
| NCBPS | Number of coded bits per symbol |
| NDBPS | Number of data bits per symbol |
| GI | guard interval |

2.3 Table for Carrier Frequencies

Frequency Allocation

For 802.11a: use Channel 36, 40, 44, and 48.

For 802.11n:

There are two bandwidth systems for IEEE 802.11n.

For 20MHz bandwidth systems, use Channel 36, 40, 44, and 48.

For 40MHz bandwidth systems, use Channel 38, 46.

| Frequency Band | Channel No. | Frequency |
|---|--------------------|------------------|
| 5150~5250 MHz (USA/Canada) Band 1 | 36 | 5180 MHz |
| | 38 | 5190 MHz |
| | 40 | 5200 MHz |
| | 44 | 5220 MHz |
| | 46 | 5230 MHz |
| | 48 | 5240 MHz |

2.4 Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on the entire possible Configuration for searching the worst cases. The following table is a list of the test modes shown in this test report.

| Test Items | Mode | Data Rate | Channel | Antenna |
|--|----------------------------------|------------------|----------------|----------------|
| AC Power Conducted Emission | See the note | Auto | - | - |
| Max. Conducted Output Power | 11a Band 1/BPSK | 6Mbps | 36/40/48 | A |
| | 11n Band 1/BPSK MCS 0 (20MHz) | 6.5Mbps | 36/40/48 | A |
| | 11n Band 1/BPSK MCS 0 (40MHz) | 13.5Mbps | 38/46 | A |
| | 11n Band 1/BPSK MCS 8 (20MHz) | 13Mbps | 36/40/48 | A/B/A+B |
| | 11n Band 1/BPSK MCS 8 (40MHz) | 27Mbps | 38/46 | A/B/A+B |
| 26dB Spectrum Bandwidth 99% Occupied Bandwidth Measurement Power Spectral Density Peak Excursion | 11a Band 1/BPSK | 6Mbps | 36/40/48 | A |
| | 11n Band 1/BPSK MCS 0 (20MHz) | 6.5Mbps | 36/40/48 | A |
| | 11n Band 1/BPSK MCS 0 (40MHz) | 13.5Mbps | 38/46 | A |
| | 11n Band 1/BPSK MCS 8 (20MHz) | 13Mbps | 36/40/48 | A+B |
| | 11n Band 1/BPSK MCS 8 (40MHz) | 27Mbps | 38/46 | A+B |
| Radiated Emission Below 1GHz | See the note | Auto | - | - |
| Radiated Emission Above 1GHz Band Edge Emission | 11a Band 1/BPSK | 6Mbps | 36/40/48 | A |
| | 11n Band 1/BPSK MCS 0 (20MHz) | 6.5Mbps | 36/40/48 | A |
| | 11n Band 1/BPSK MCS 0 (40MHz) | 13.5Mbps | 38/46 | A |
| | 11n Band 1/BPSK MCS 8 (20MHz) | 13Mbps | 36/40/48 | A+B |
| | 11n Band 1/BPSK MCS 8 (40MHz) | 27Mbps | 38/46 | A+B |
| Frequency Stability | 11a Band 1/BPSK | 6Mbps | 40 | A |
| | 11n Band 1/BPSK | 6.5Mbps | 40 | A |

Note: For EMI test, the following modes were MCS 8 (20MHz/40MHz) tested:

Conducted Emissions Below 1GHz

LAN 1Gbps (Normal Mode)

Radiated Emissions Below 1GHz

Power Supply: POE20U-560(G) -R

There are performed the worst test result; it was reported as final data.

2.5 Table for Testing Locations

| Test Site No. | Site Category | Location | FCC Reg. No. | IC File No. | VCCI Reg. No |
|---------------|---------------|----------|--------------|-------------|--------------|
| 03CH03-HY | SAC | Hwa Ya | 101377 | IC 4086B-1 | - |
| CO01-LK | Conduction | Lin Kou | 93596 | IC 4086C-1 | - |
| TH01-HY | OVEN Room | Hwa Ya | - | - | - |

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC); Fully Anechoic Chamber (FAC).

2.6 Table for Supporting Units

| Support Unit | Brand | Model | FCC ID |
|--|---------|------------------|-----------|
| P.C. (Remote Workstation) | COMPAQ | Evo D380mx | DoC |
| Notebook (Remote Workstation) | DELL | PP01L | DoC |
| Monitor (Remote Workstation) | COMPAQ | S510 | DoC |
| Keyboard (PS2) (Remote Workstation) | COMPAQ | 6511-VA | DoC |
| Mouse (PS2) (Remote Workstation) | COMPAQ | M-S69 | JNZ211443 |
| Notebook (Remote Workstation) | DELL | D400 | DoC |
| Switching Power Supply | PHIHONG | POE20U-560(G) -R | - |

2.7 Table for Parameters of Test Software Setting

During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

For Single Chain:

Power Parameters of IEEE 802.11a

| Test Software Version | ART 0.5 BUILD#25 | | |
|------------------------------|-------------------------|----------|----------|
| Frequency | 5180 MHz | 5200 MHz | 5240 MHz |
| IEEE 802.11a(20MHz) | 14 | 14.5 | 15 |

Power Parameters of IEEE 802.11n

| Test Software Version | ART 0.5 BUILD#25 | | |
|------------------------------|-------------------------|----------|----------|
| Frequency | 5180 MHz | 5200 MHz | 5240 MHz |
| IEEE 802.11n(20MHz) | 14.5 | 15 | 15 |
| Frequency | 5190 MHz | 5230 MHz | - |
| IEEE 802.11n(40MHz) | 8.5 | 17 | - |

For Two Chain:

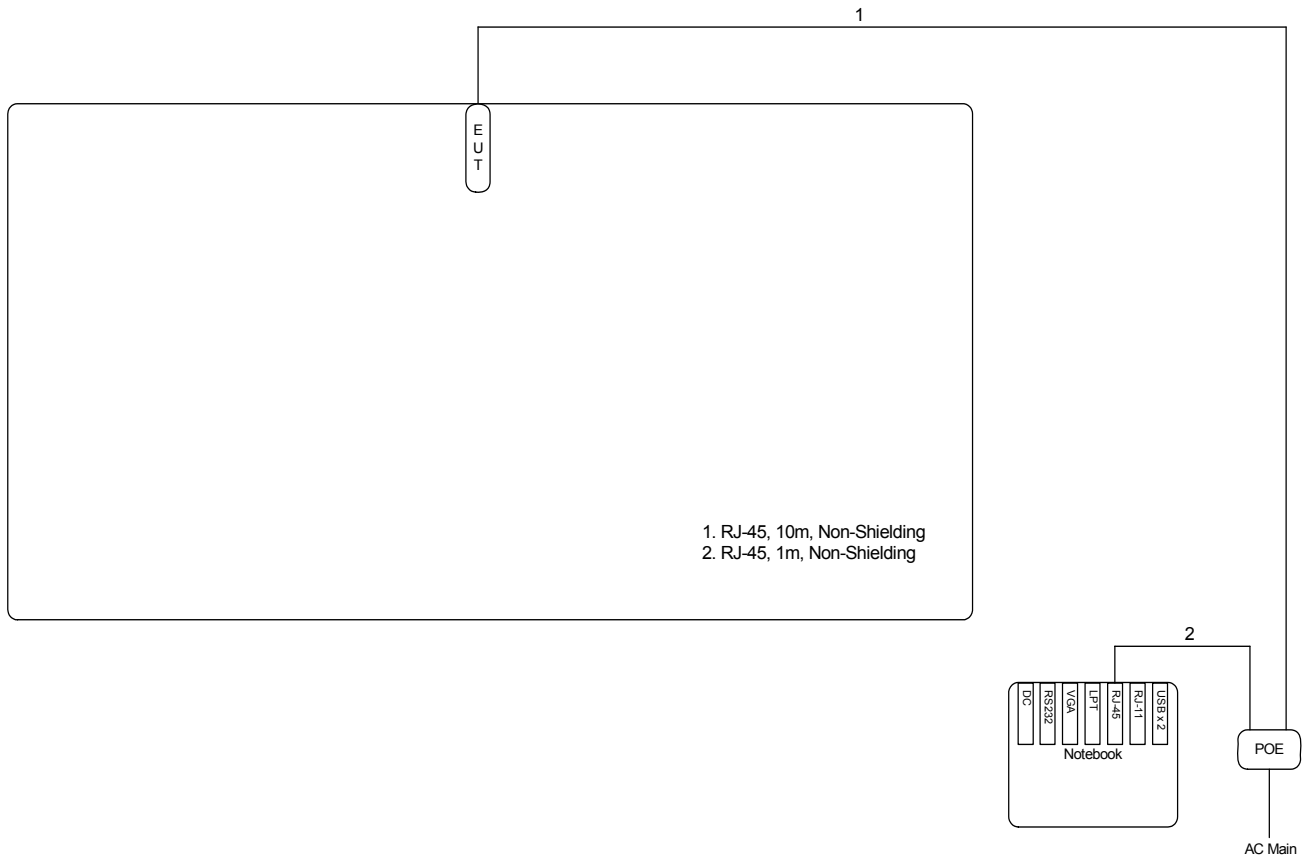
Power Parameters of IEEE 802.11n Ant. A & B

| Test Software Version | ART 0.5 BUILD#25 | | |
|------------------------------|-------------------------|----------|----------|
| Frequency | 5180 MHz | 5200 MHz | 5240 MHz |
| IEEE 802.11n(20MHz) | 10.5 | 10.5 | 11.5 |
| Frequency | 5190 MHz | 5230 MHz | - |
| IEEE 802.11n(40MHz) | 8 | 12.5 | - |

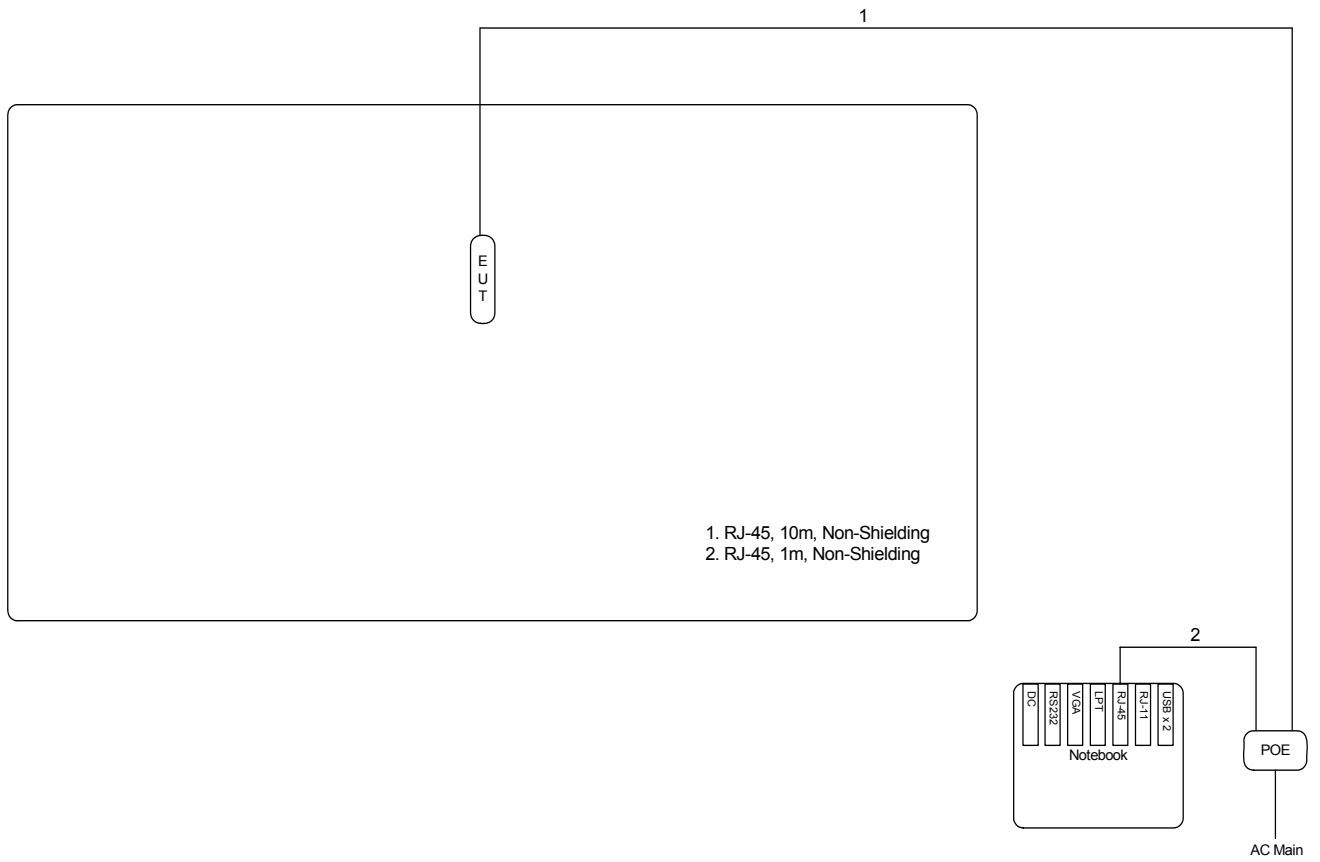
2.8 Test Configuration

2.8.1 Radiation Emissions Test Configuration

For radiated emissions 9kHz~1GHz



For radiated emissions above 1GHz



3 TEST RESULT

3.1 AC Power Line Conducted Emissions Measurement

3.1.1 Limit

For this product which is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

| Frequency (MHz) | QP Limit (dBuV) | AV Limit (dBuV) |
|-----------------|-----------------|-----------------|
| 0.15~0.5 | 66~56 | 56~46 |
| 0.5~5 | 56 | 46 |
| 5~30 | 60 | 50 |

3.1.2 Measuring Instruments and Setting

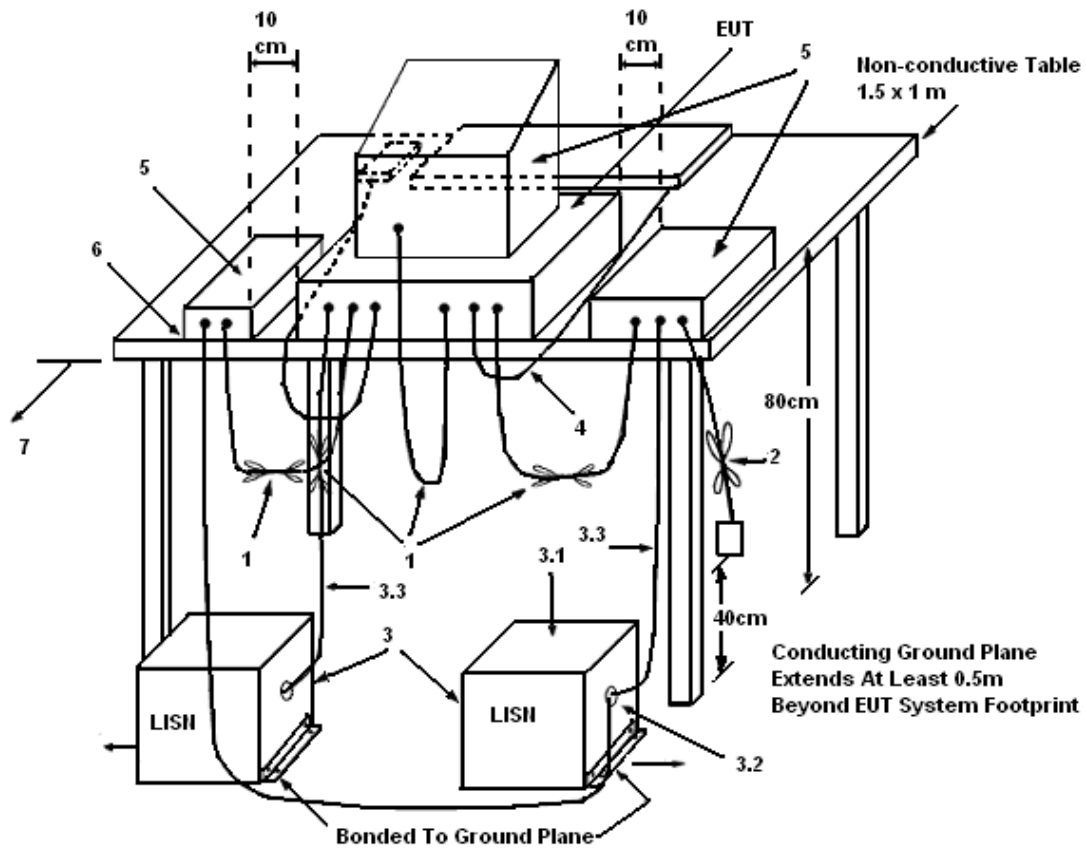
Please refer to section 4 of equipments list in this report. The following table is the setting of the receiver.

| Receiver Parameters | Setting |
|---------------------|----------|
| Attenuation | 10 dB |
| Start Frequency | 0.15 MHz |
| Stop Frequency | 30 MHz |
| IF Bandwidth | 9 KHz |

3.1.3 Test Procedures

1. Configure the EUT according to ANSI C63.4. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 KHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

3.1.4 Test Setup Layout



LEGEND:

- (1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- (2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- (3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, reference ground plane.
- (3.1) All other equipment powered from additional LISN(s).
- (3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
- (3.3) LISN at least 80 cm from nearest part of EUT chassis.
- (4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.
- (5) Non-EUT components of EUT system being tested.
- (6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.
- (7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

3.1.5 Test Deviation

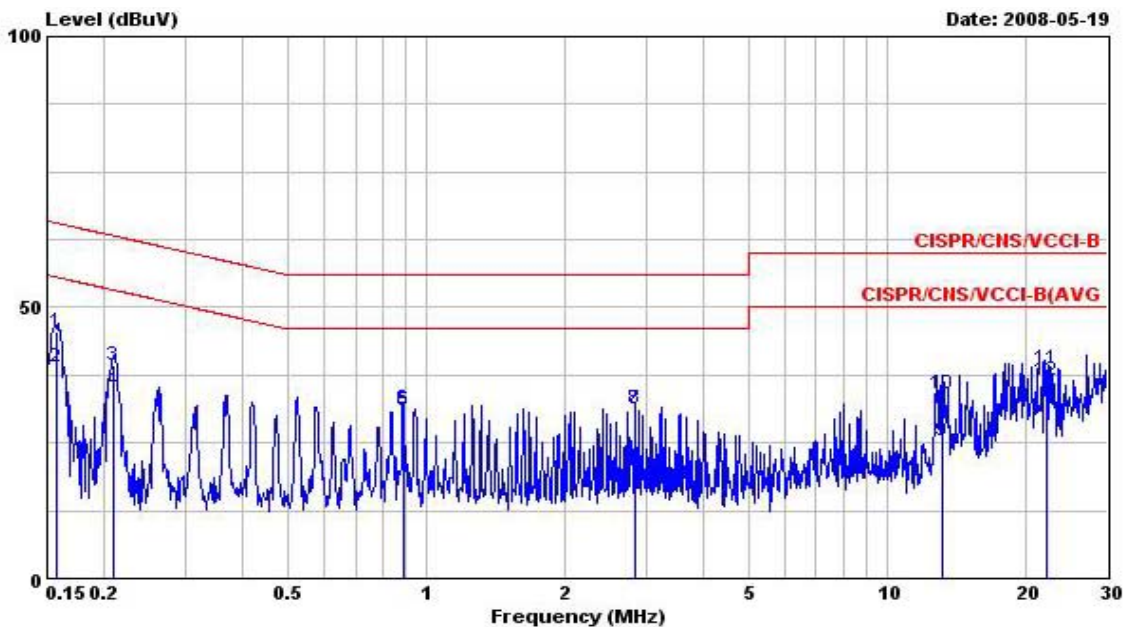
There is no deviation with the original standard.

3.1.6 EUT Operation during Test

The EUT was placed on the test table and programmed in normal function.

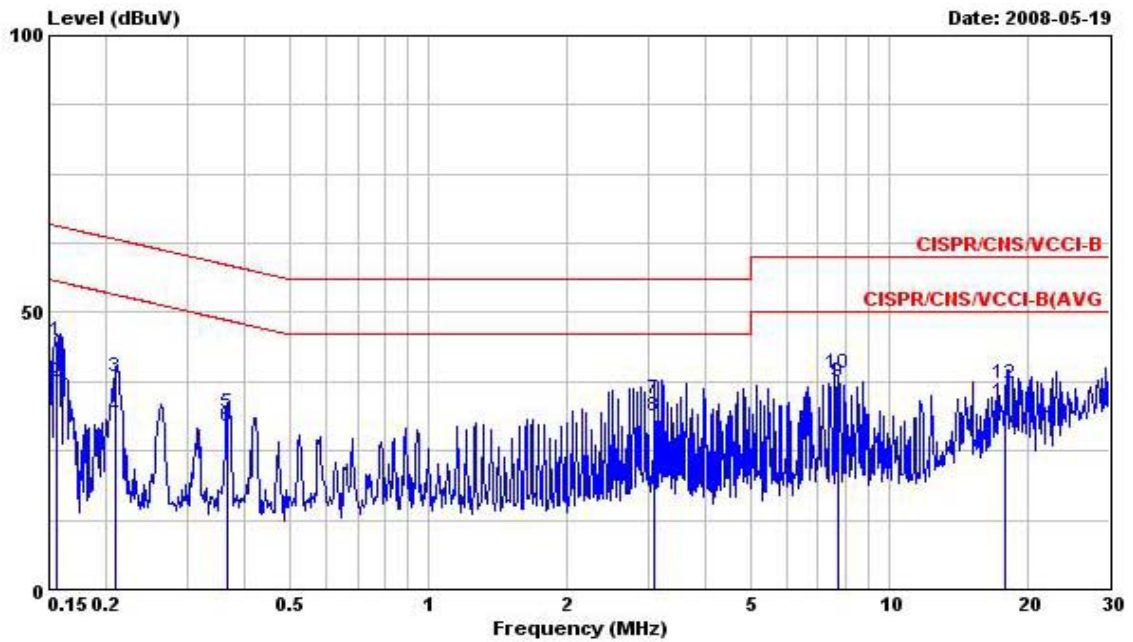
3.1.7 Results of AC Power Line Conducted Emissions Measurement

| | | | |
|---------------|-------------------------|---------------|---------|
| Test date | May 19, 2008 | Test Site No. | CO01-LK |
| Temperature | 25 | Humidity | 49% |
| Test Engineer | Peter | Phase | Line |
| Configuration | LAN 1Gbps (Normal Mode) | | |



| | Freq | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Remark |
|----|--------|-------|------------|------------|------------|-------------|------------|---------|
| | MHz | dBuV | dB | dBuV | dBuV | dB | dB | |
| 1 | 0.157 | 45.47 | -20.13 | 65.60 | 45.33 | 0.10 | 0.04 | QP |
| 2 | 0.157 | 39.05 | -16.55 | 55.60 | 38.91 | 0.10 | 0.04 | Average |
| 3 | 0.209 | 39.43 | -23.81 | 63.24 | 39.28 | 0.10 | 0.05 | QP |
| 4 | 0.209 | 34.77 | -18.47 | 53.24 | 34.62 | 0.10 | 0.05 | Average |
| 5 | 0.890 | 30.93 | -25.07 | 56.00 | 30.73 | 0.10 | 0.10 | QP |
| 6 | 0.890 | 31.37 | -14.63 | 46.00 | 31.17 | 0.10 | 0.10 | Average |
| 7 | 2.826 | 31.11 | -24.89 | 56.00 | 30.79 | 0.20 | 0.12 | QP |
| 8 | 2.826 | 31.36 | -14.64 | 46.00 | 31.04 | 0.20 | 0.12 | Average |
| 9 | 13.137 | 25.24 | -24.76 | 50.00 | 24.30 | 0.57 | 0.37 | Average |
| 10 | 13.137 | 34.21 | -25.79 | 60.00 | 33.27 | 0.57 | 0.37 | QP |
| 11 | 22.190 | 38.55 | -21.45 | 60.00 | 37.28 | 0.85 | 0.42 | QP |
| 12 | 22.190 | 36.48 | -13.52 | 50.00 | 35.21 | 0.85 | 0.42 | Average |

| | | | |
|---------------|-------------------------|---------------|---------|
| Test date | May 19, 2008 | Test Site No. | CO01-LK |
| Temperature | 21 | Humidity | 62% |
| Test Engineer | Steven | Phase | Neutral |
| Configuration | LAN 1Gbps (Normal Mode) | | |



| | Freq | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Remark |
|-----|--------|-------|------------|------------|------------|-------------|------------|---------|
| | MHz | dBuV | dB | dBuV | dBuV | dB | dB | |
| 1 | 0.156 | 44.77 | -20.90 | 65.67 | 44.63 | 0.10 | 0.04 | QP |
| 2 | 0.156 | 37.35 | -18.32 | 55.67 | 37.21 | 0.10 | 0.04 | Average |
| 3 | 0.209 | 38.52 | -24.72 | 63.24 | 38.37 | 0.10 | 0.05 | QP |
| 4 | 0.209 | 31.35 | -21.89 | 53.24 | 31.20 | 0.10 | 0.05 | Average |
| 5 | 0.367 | 31.95 | -26.62 | 58.57 | 31.81 | 0.10 | 0.04 | QP |
| 6 | 0.367 | 29.48 | -19.09 | 48.57 | 29.34 | 0.10 | 0.04 | Average |
| 7 | 3.090 | 34.23 | -21.77 | 56.00 | 33.95 | 0.16 | 0.12 | QP |
| 8 | 3.090 | 31.29 | -14.71 | 46.00 | 31.01 | 0.16 | 0.12 | Average |
| 9 @ | 7.702 | 37.37 | -12.63 | 50.00 | 36.77 | 0.34 | 0.26 | Average |
| 10 | 7.702 | 38.96 | -21.04 | 60.00 | 38.36 | 0.34 | 0.26 | QP |
| 11 | 17.763 | 33.61 | -16.39 | 50.00 | 32.52 | 0.72 | 0.37 | Average |
| 12 | 17.763 | 37.25 | -22.75 | 60.00 | 36.16 | 0.72 | 0.37 | QP |

Note:

Level = Read Level + LISN Factor + Cable Loss.

3.2 99% Occupied Bandwidth Measurement

3.2.1 Limit

No restriction limits. But resolution bandwidth within band edge measurement is 1% of the 99% occupied bandwidth.

3.2.2 Measuring Instruments and Setting

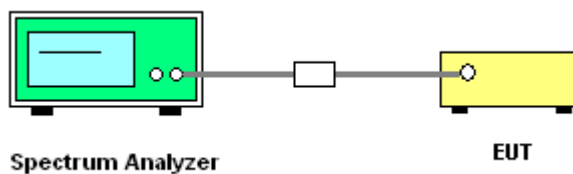
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

| Spectrum Parameters | Setting |
|---------------------|------------------|
| Attenuation | Auto |
| Span Frequency | > 26dB Bandwidth |
| RB | 300 kHz |
| VB | 1000 kHz |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |

3.2.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak hold mode.
2. The resolution bandwidth of 300 kHz and the video bandwidth of 1000 kHz were used.
3. Measured the spectrum width with power higher than 26dB below carrier.
4. Measuring multiple antennas, the connectors are required to link with Spectrum Analyzer through a combiner.

3.2.4 Test Setup Layout



3.2.5 Test Deviation

There is no deviation with the original standard.

3.2.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.2.7 Test Result of 99% Occupied Bandwidth

| | | | |
|----------------------|--------------|----------------------|-----------|
| Test date | May 10, 2008 | Test Site No. | TH01-HY |
| Temperature | 27 | Humidity | 55% |
| Test Engineer | Sam | Configuration | 802.11a/n |

For Single Chain:

Configuration of IEEE 802.11a

| Channel | Frequency | 26dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) |
|---------|-----------|----------------------|------------------------------|
| 36 | 5180 MHz | 24.48 | 17.12 |
| 40 | 5200 MHz | 24.16 | 17.12 |
| 48 | 5240 MHz | 24.32 | 17.12 |

Configuration IEEE 802.11n (20MHz)

| Channel | Frequency | 26dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) |
|---------|-----------|----------------------|------------------------------|
| 36 | 5180 MHz | 25.76 | 18.24 |
| 40 | 5200 MHz | 25.92 | 18.24 |
| 48 | 5240 MHz | 25.12 | 18.24 |

Configuration IEEE 802.11n (40MHz)

| Channel | Frequency | 26dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) |
|---------|-----------|----------------------|------------------------------|
| 38 | 5190 MHz | 46.88 | 36.48 |
| 46 | 5230 MHz | 55.68 | 36.80 |

For Two Chain:

Configuration IEEE 802.11n Ant. A & B (20MHz)

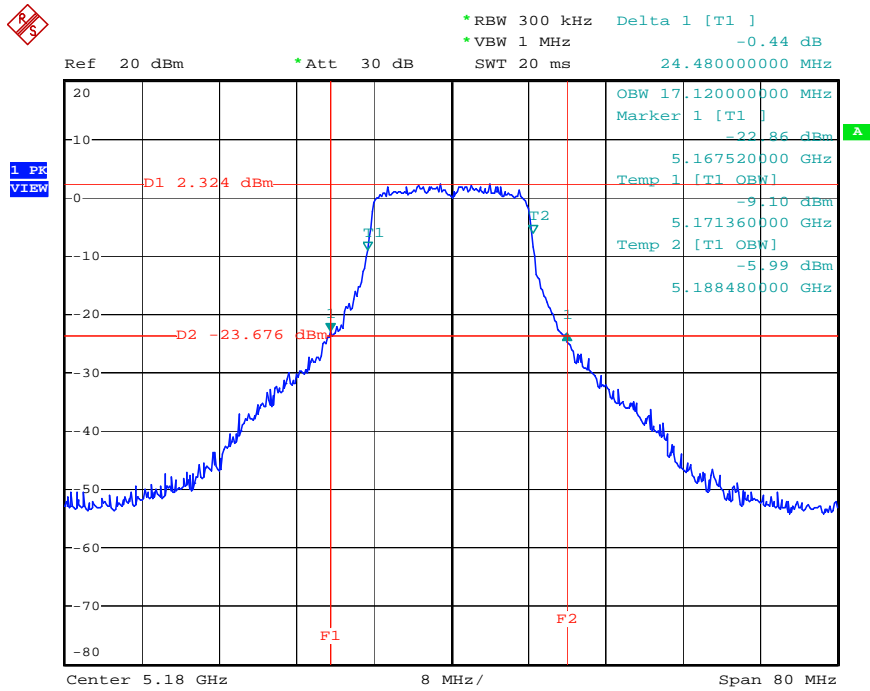
| Channel | Frequency | 26dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) |
|----------------|------------------|-----------------------------|-------------------------------------|
| 36 | 5180 MHz | 23.04 | 17.92 |
| 40 | 5200 MHz | 22.72 | 17.92 |
| 48 | 5240 MHz | 22.88 | 17.92 |

Configuration IEEE 802.11n Ant. A & B (40MHz)

| Channel | Frequency | 26dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) |
|----------------|------------------|-----------------------------|-------------------------------------|
| 38 | 5190 MHz | 43.68 | 36.48 |
| 46 | 5230 MHz | 43.84 | 36.48 |

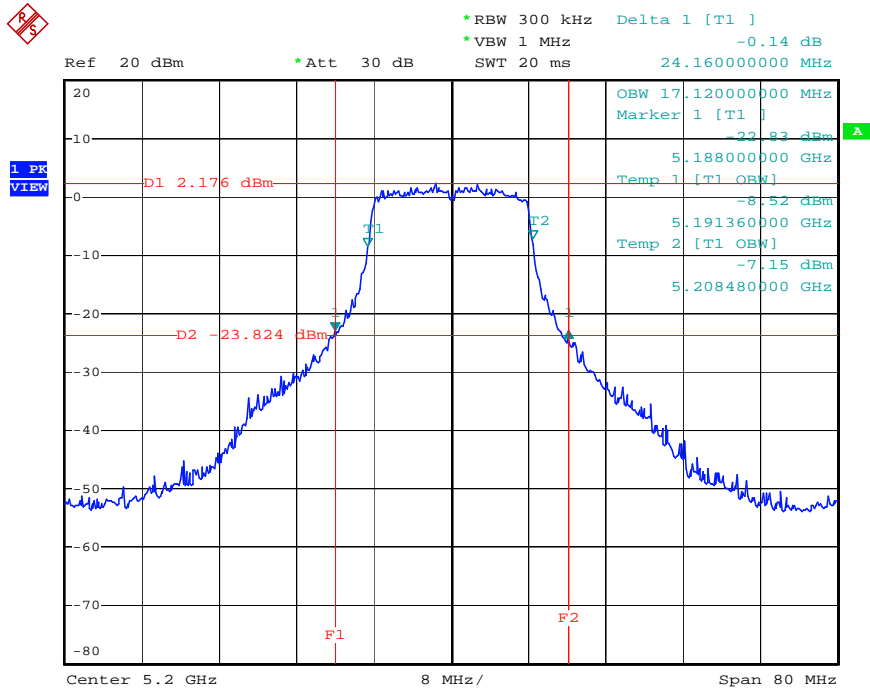
For Single Chain:

26 dB Bandwidth Plot on Configuration IEEE 802.11a / 5180 MHz



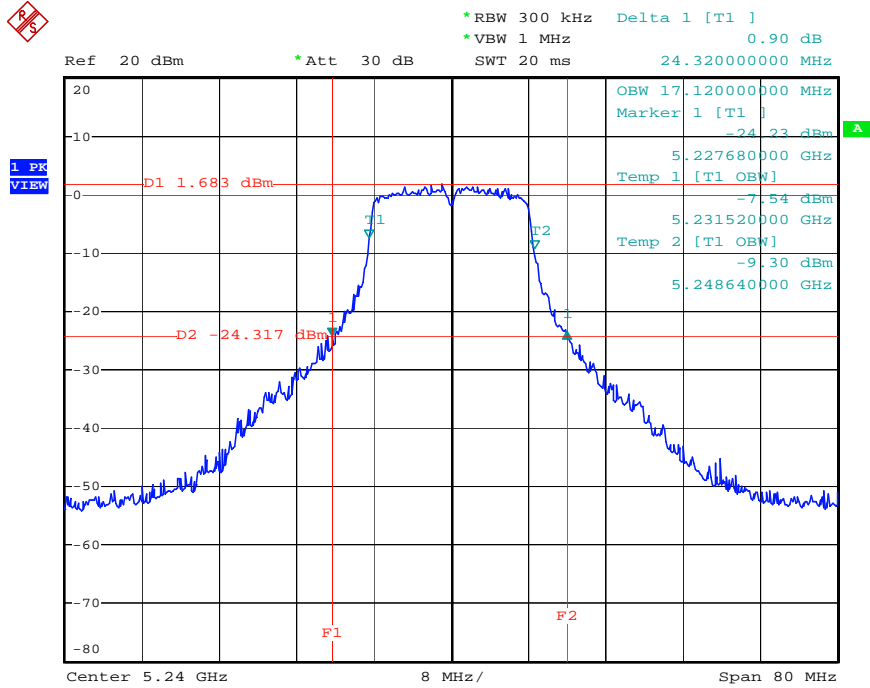
Date: 10.MAY.2008 02:51:21

26 dB Bandwidth Plot on Configuration IEEE 802.11a / 5200 MHz



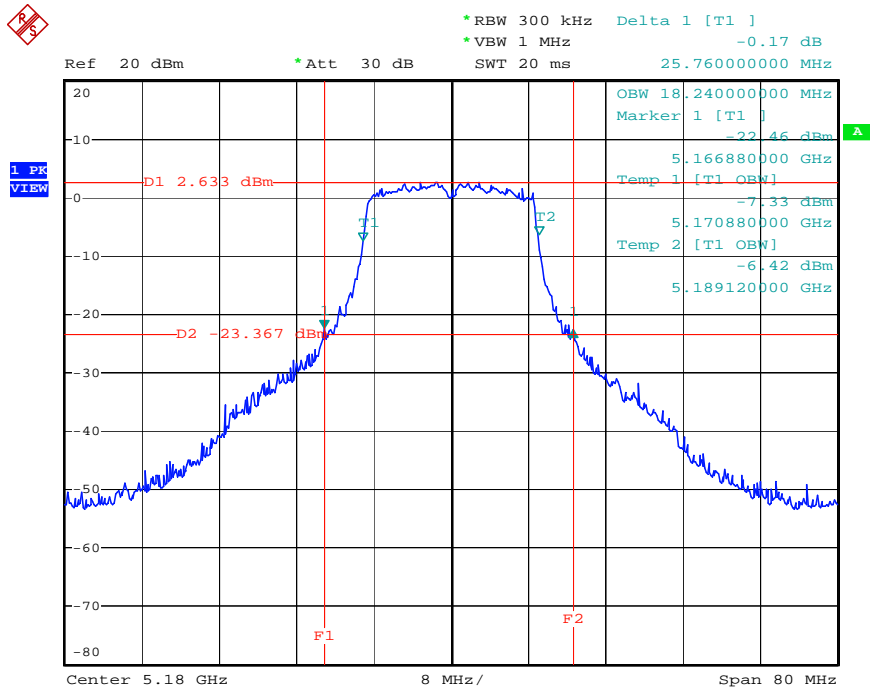
Date: 10.MAY.2008 02:49:21

26 dB Bandwidth Plot on Configuration IEEE 802.11a / 5240 MHz



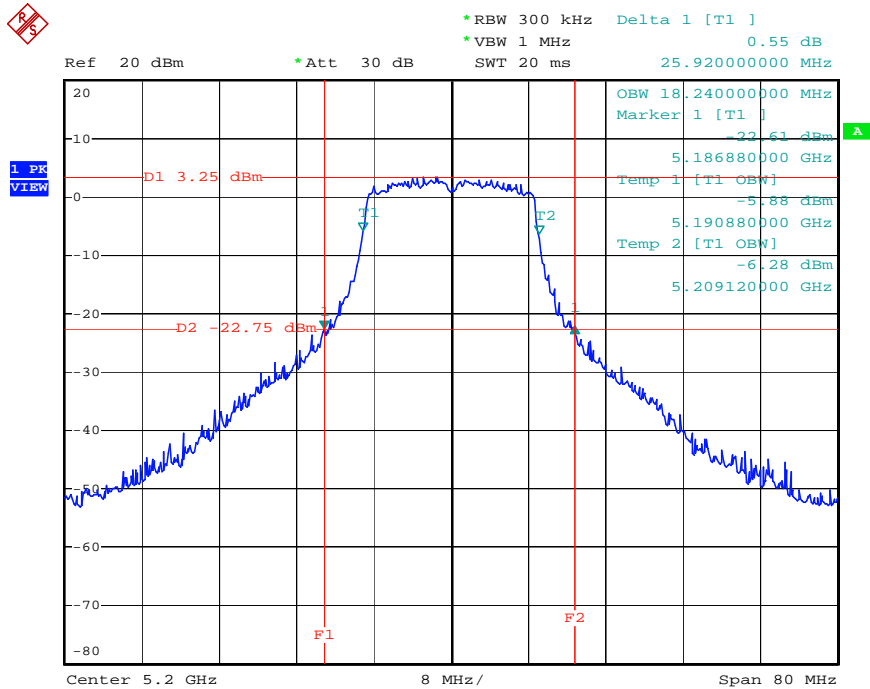
Date: 10.MAY.2008 02:46:50

26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz)/ 5180 MHz



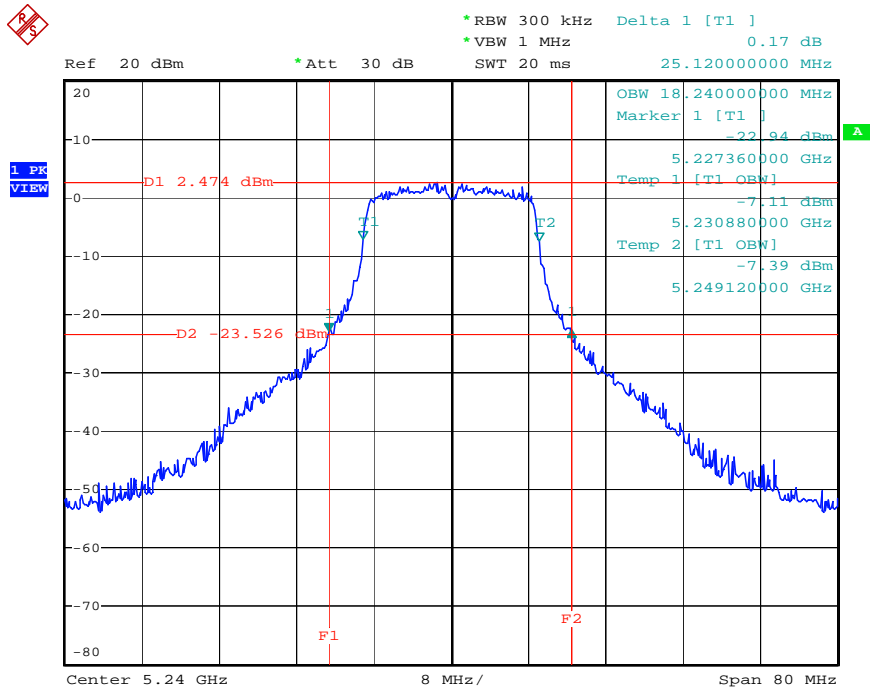
Date: 10.MAY.2008 04:11:06

26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) / 5200 MHz



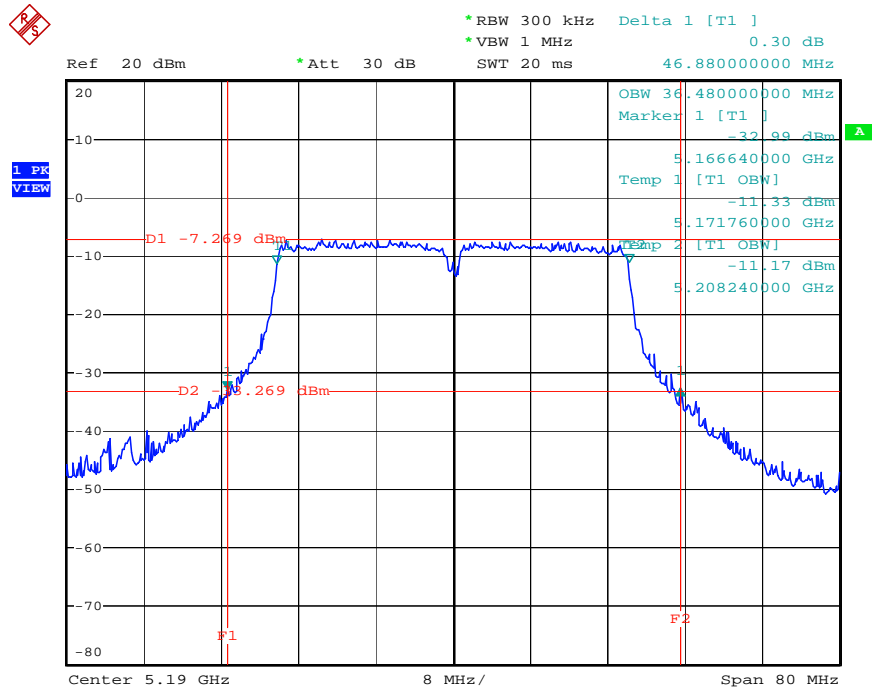
Date: 10.MAY.2008 04:12:35

26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz)/ 5240 MHz



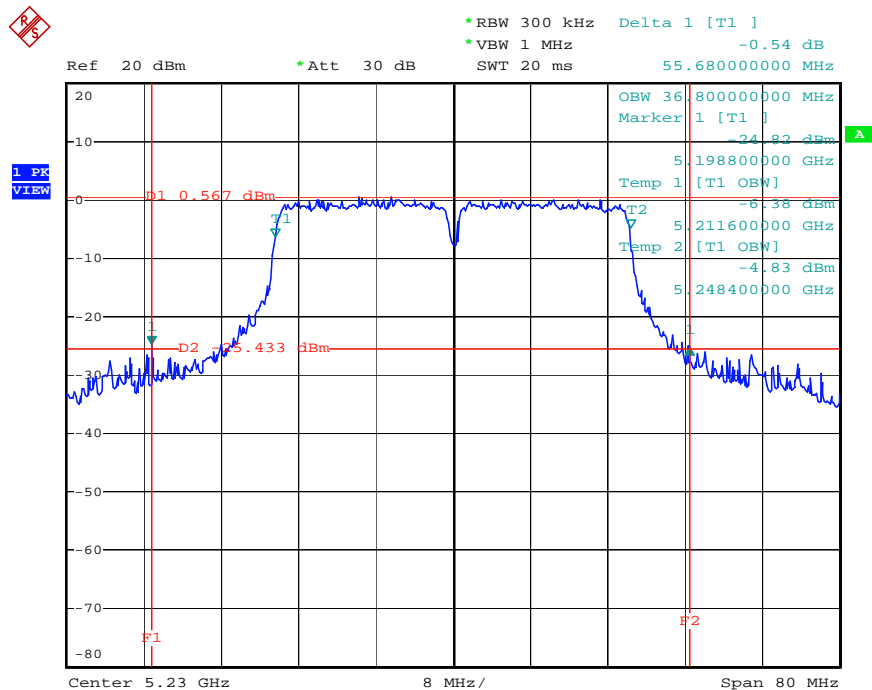
Date: 10.MAY.2008 04:14:04

26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz)/ 5190 MHz



Date: 10.MAY.2008 03:34:07

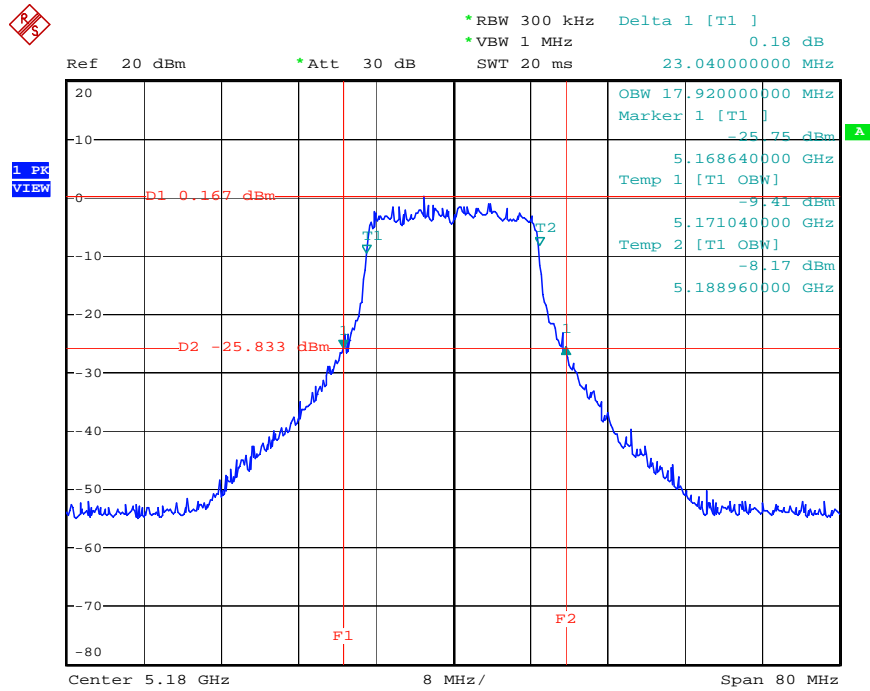
26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) / 5230 MHz



Date: 10.MAY.2008 03:36:10

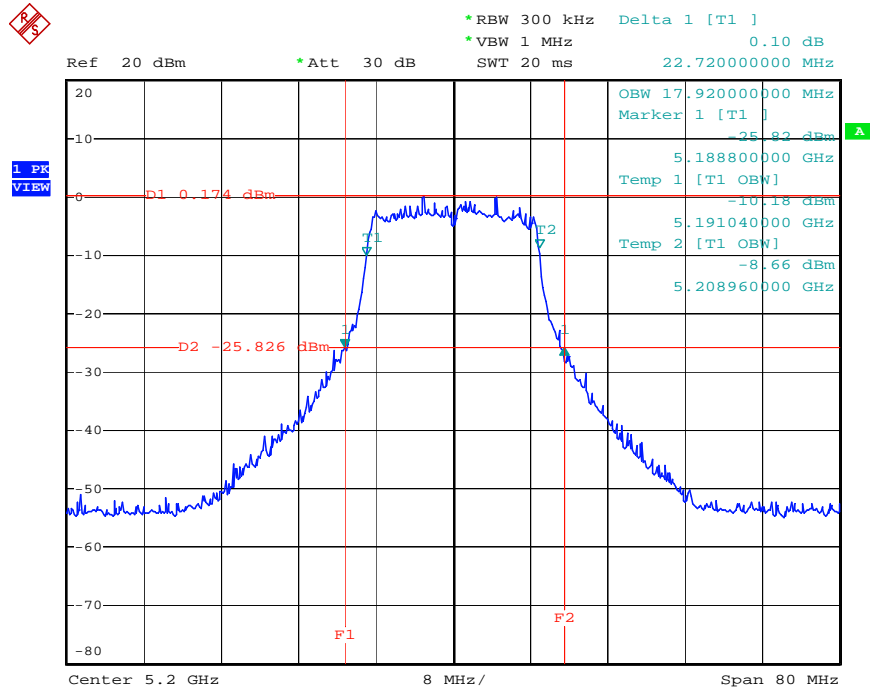
For Two Chain:

26 dB Bandwidth Plot on Configuration IEEE 802.11n Ant. A & B (20MHz)/ 5180 MHz



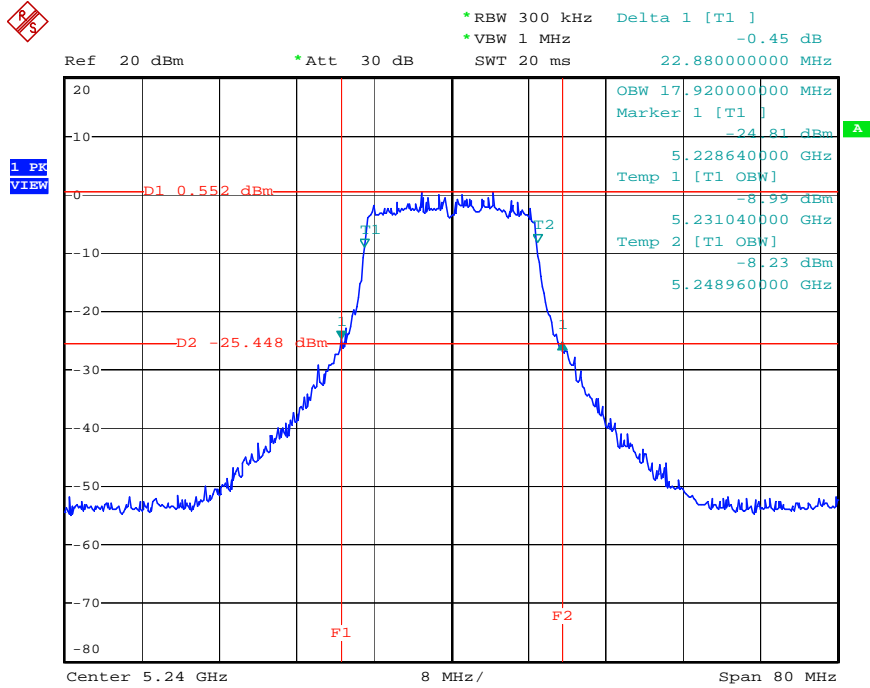
Date: 10.MAY.2008 06:28:32

26 dB Bandwidth Plot on Configuration IEEE 802.11n Ant. A & B (20MHz) / 5200 MHz



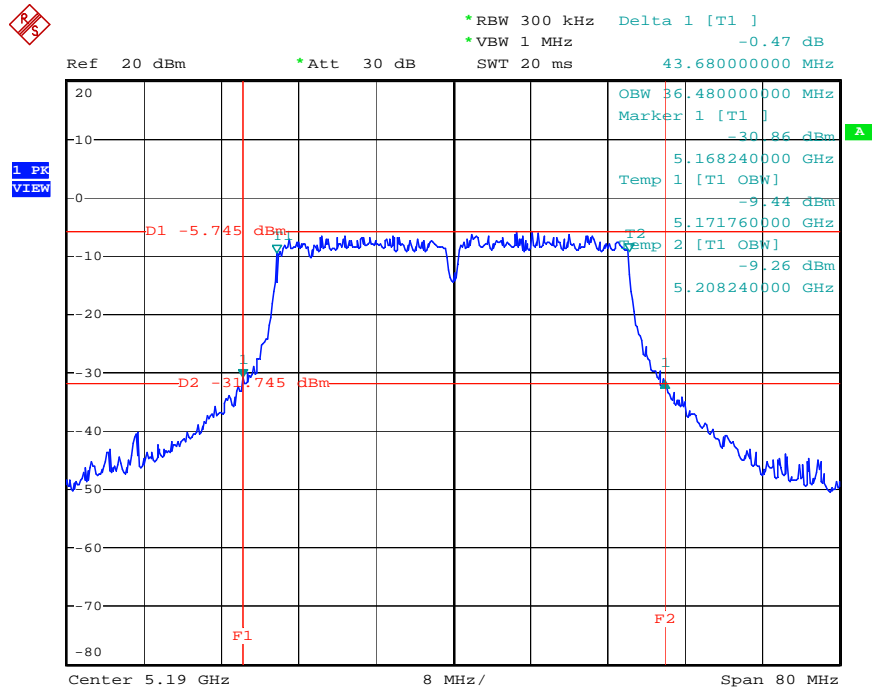
Date: 10.MAY.2008 06:30:30

26 dB Bandwidth Plot on Configuration IEEE 802.11n Ant. A & B (20MHz) / 5240 MHz



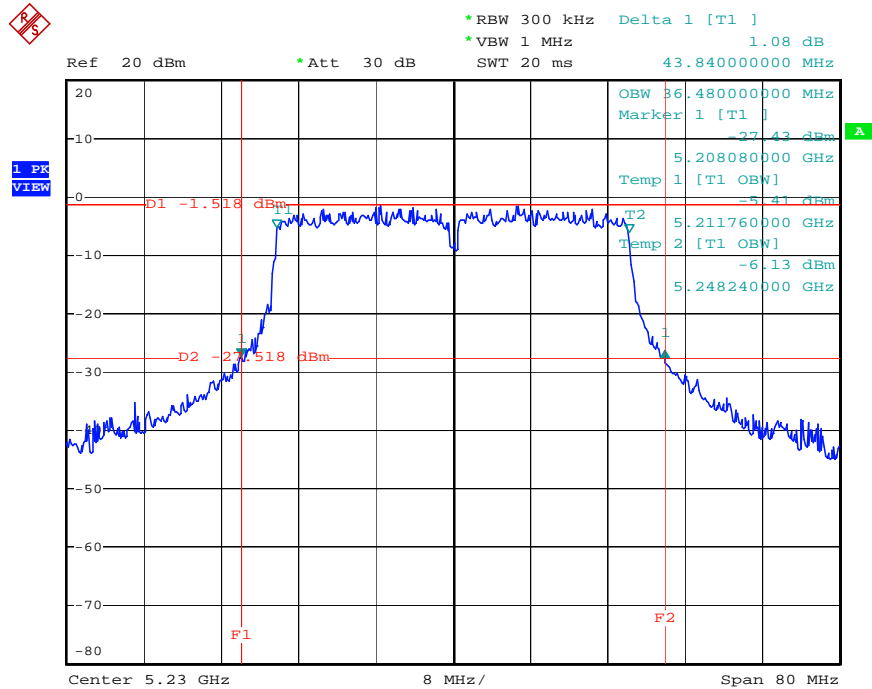
Date: 10.MAY.2008 06:33:29

26 dB Bandwidth Plot on Configuration IEEE 802.11n Ant. A & B (40MHz) / 5190 MHz



Date: 10.MAY.2008 07:01:13

26 dB Bandwidth Plot on Configuration IEEE 802.11n Ant. A & B (40MHz) / 5230 MHz



Date: 10.MAY.2008 07:02:51

3.3 Maximum Conducted Output Power Measurement

3.3.1 Limit

For the band 5.15~5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log B, where B is the 26 dB emissions bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power and power density from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.2 Measuring Instruments and Setting

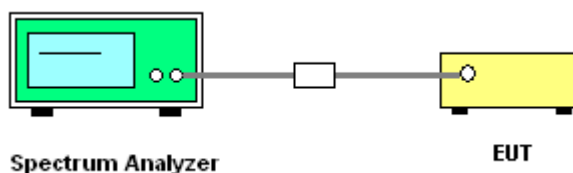
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

| Spectrum Parameter | Setting |
|--------------------|--|
| Attenuation | Auto |
| Span Frequency | Encompass the entire emissions bandwidth (EBW) of the signal |
| RB | 1000 kHz |
| VB | 300 kHz |
| Detector | Sample |
| Trace | Max Hold |
| Sweep Time | 60s |

3.3.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Test was performed in accordance with method #3 of FCC Public Notice DA-02-2138.
3. When measuring maximum conducted output power within multiple antenna systems, add every result of the values by mathematic formula.

3.3.4 Test Setup Layout



3.3.5 Test Deviation

There is no deviation with the original standard.

3.3.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.3.7 Test Result of Maximum Conducted Output Power

| | | | |
|----------------------|--------------|----------------------|-----------|
| Test date | May 17, 2008 | Test Site No. | TH01-HY |
| Temperature | 27 | Humidity | 55% |
| Test Engineer | Sam | Configuration | 802.11a/n |

For Single Chain:

Configuration of IEEE 802.11a

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result |
|---------|-----------|-----------------------|------------------|-----------------|
| 36 | 5180 MHz | 13.78 | 17.00 | Complies |
| 40 | 5200 MHz | 14.34 | 17.00 | Complies |
| 48 | 5240 MHz | 14.36 | 17.00 | Complies |

Configuration IEEE 802.11n (20MHz)

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result |
|---------|-----------|-----------------------|------------------|-----------------|
| 36 | 5180 MHz | 14.55 | 17.00 | Complies |
| 40 | 5200 MHz | 14.35 | 17.00 | Complies |
| 48 | 5240 MHz | 14.19 | 17.00 | Complies |

Configuration IEEE 802.11n (40MHz)

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result |
|---------|-----------|-----------------------|------------------|-----------------|
| 38 | 5190 MHz | 8.29 | 17.00 | Complies |
| 46 | 5230 MHz | 16.15 | 17.00 | Complies |

For Two Chain:

Configuration IEEE 802.11n Ant. A (20MHz)

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result |
|---------|-----------|-----------------------|------------------|----------|
| 36 | 5180 MHz | 10.36 | 17.00 | Complies |
| 40 | 5200 MHz | 10.15 | 17.00 | Complies |
| 48 | 5240 MHz | 10.40 | 17.00 | Complies |

Configuration IEEE 802.11n Ant. B (20MHz)

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result |
|---------|-----------|-----------------------|------------------|----------|
| 36 | 5180 MHz | 10.66 | 17.00 | Complies |
| 40 | 5200 MHz | 10.28 | 17.00 | Complies |
| 48 | 5240 MHz | 10.73 | 17.00 | Complies |

Configuration IEEE 802.11n Ant. A & B (20MHz)

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result |
|---------|-----------|-----------------------|------------------|----------|
| 36 | 5180 MHz | 13.52 | 17.00 | Complies |
| 40 | 5200 MHz | 13.23 | 17.00 | Complies |
| 48 | 5240 MHz | 13.58 | 17.00 | Complies |

Configuration IEEE 802.11n Ant. A (40MHz)

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result |
|---------|-----------|-----------------------|------------------|-----------------|
| 38 | 5190 MHz | 8.54 | 17.00 | Complies |
| 46 | 5230 MHz | 11.92 | 17.00 | Complies |

Configuration IEEE 802.11n Ant. B (40MHz)

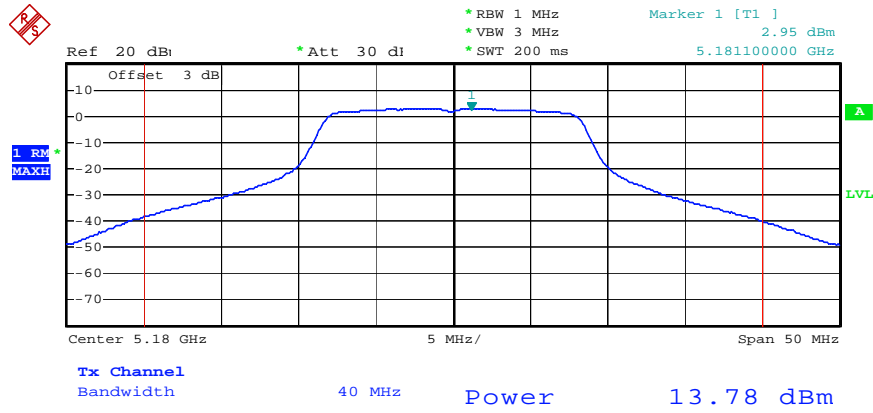
| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result |
|---------|-----------|-----------------------|------------------|-----------------|
| 38 | 5190 MHz | 8.26 | 17.00 | Complies |
| 46 | 5230 MHz | 12.21 | 17.00 | Complies |

Configuration IEEE 802.11n Ant. A & B (40MHz)

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result |
|---------|-----------|-----------------------|------------------|-----------------|
| 38 | 5190 MHz | 11.41 | 17.00 | Complies |
| 46 | 5230 MHz | 15.08 | 17.00 | Complies |

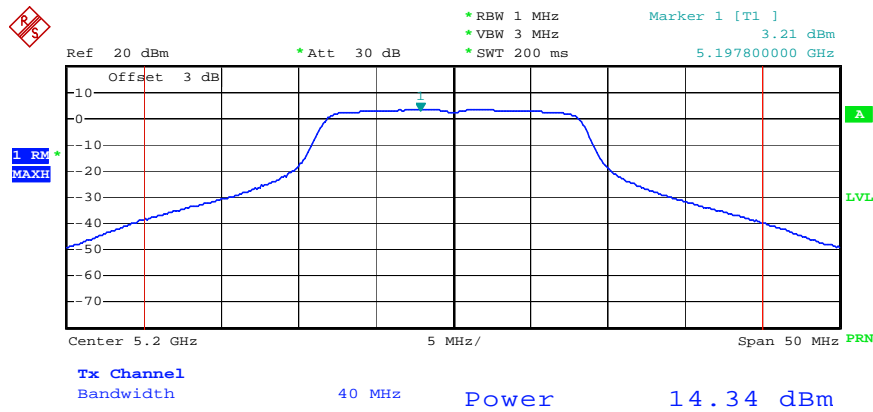
For Single Chain:

Channel Output Power Plot on Configuration IEEE 802.11a / 5180 MHz



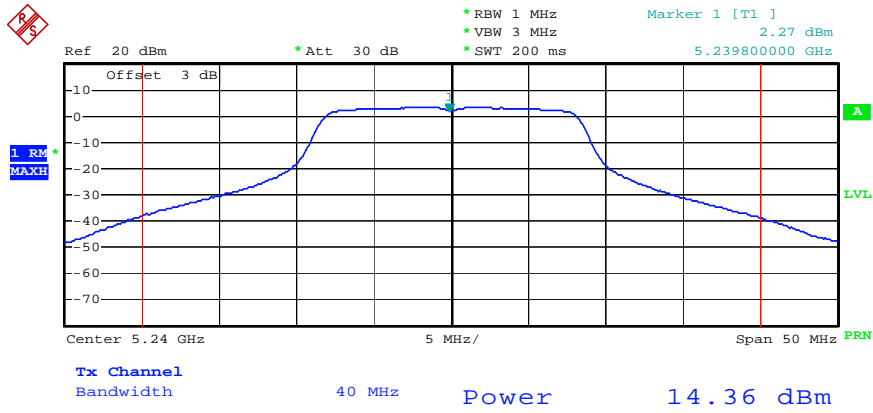
Date: 10.MAY.2008 02:52:10

Channel Output Power Plot on Configuration IEEE 802.11a / 5200 MHz



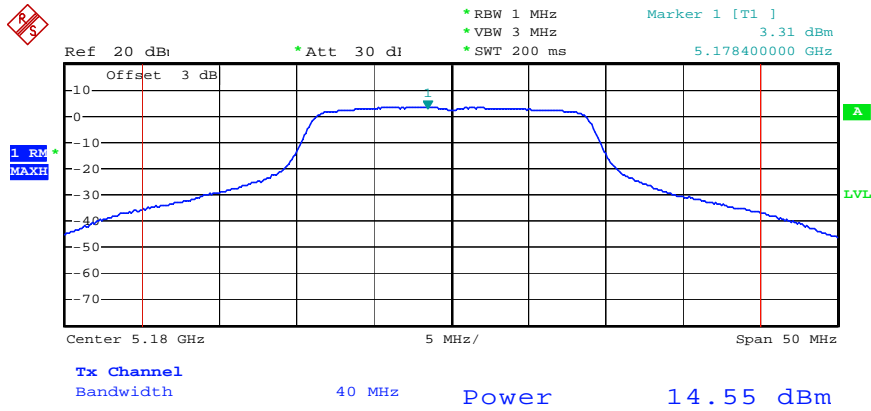
Date: 17.MAY.2008 15:45:32

Channel Output Power Plot on Configuration IEEE 802.11a / 5240 MHz



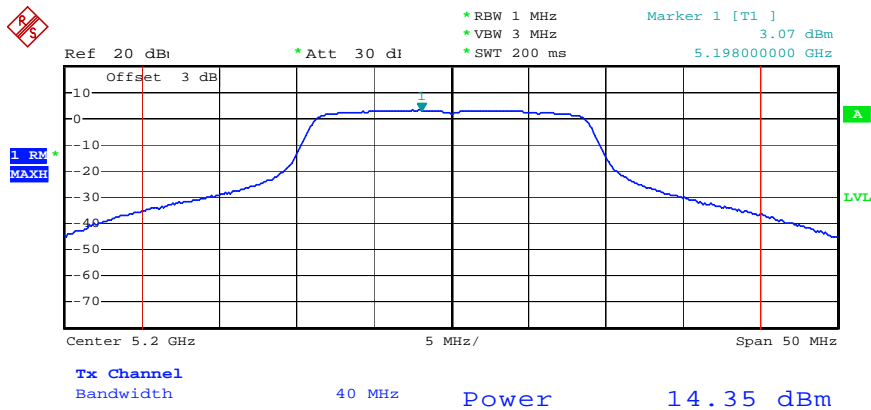
Date: 17.MAY.2008 15:47:59

Channel Output Power Plot on Configuration IEEE 802.11n (20MHz) / 5180 MHz



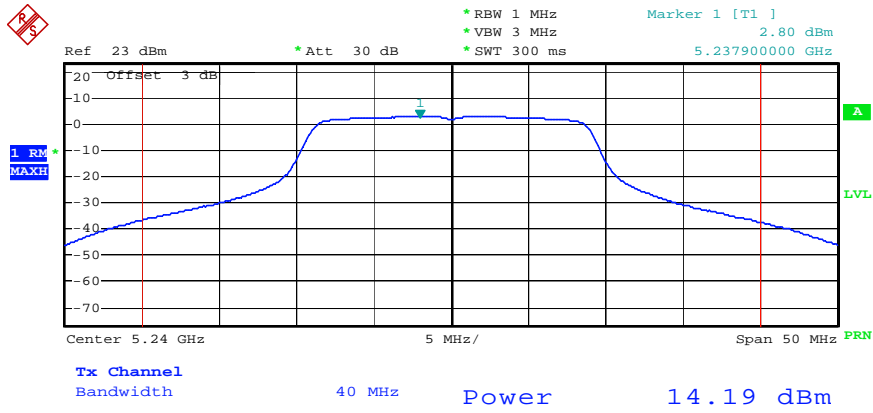
Date: 10.MAY.2008 04:11:54

Channel Output Power Plot on Configuration IEEE 802.11n (20MHz) / 5200 MHz



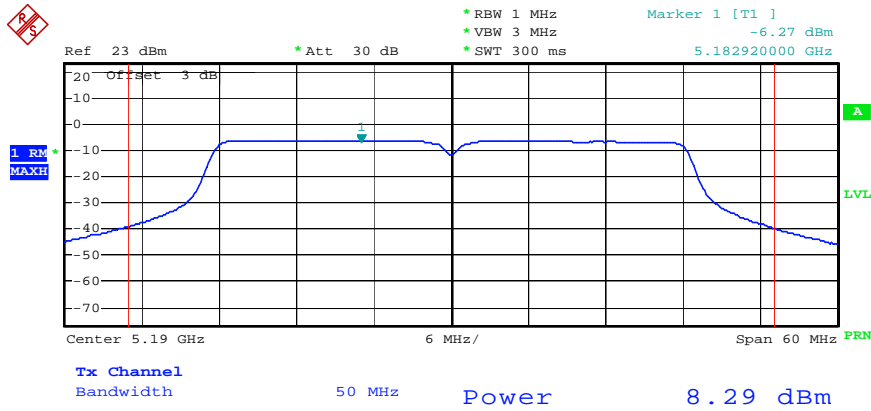
Date: 10.MAY.2008 04:34:13

Channel Output Power Plot on Configuration IEEE 802.11n (20MHz) / 5240 MHz



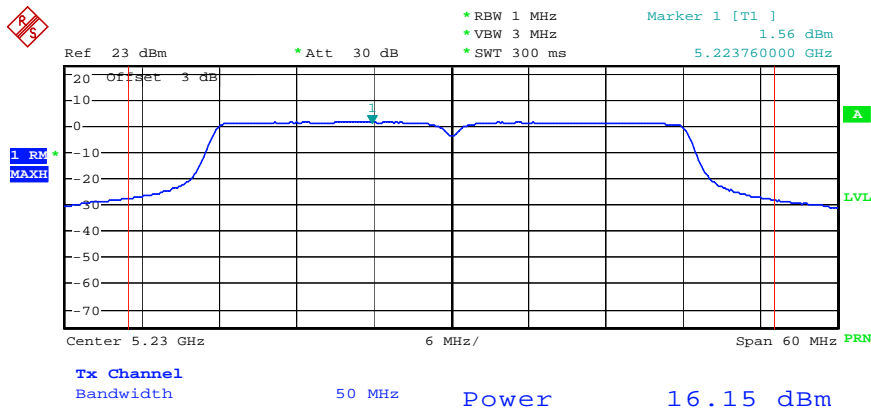
Date: 17.MAY.2008 16:02:35

Channel Output Power Plot on Configuration IEEE 802.11n (40MHz) / 5190 MHz



Date: 17.MAY.2008 16:11:22

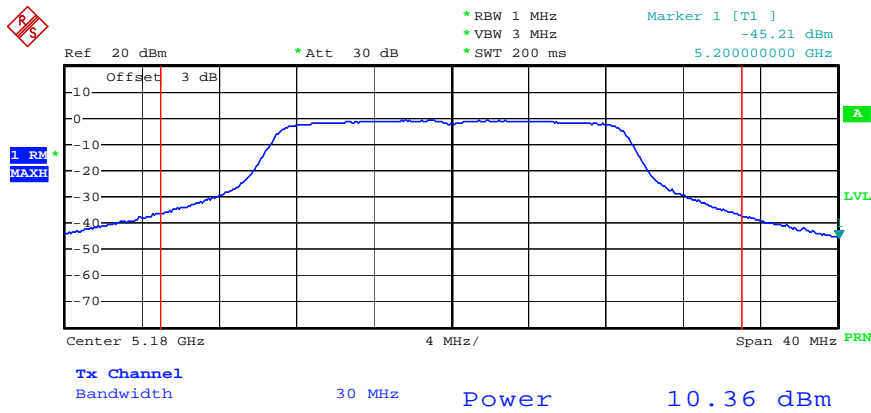
Channel Output Power Plot on Configuration IEEE 802.11n (40MHz) / 5230 MHz



Date: 17.MAY.2008 16:13:06

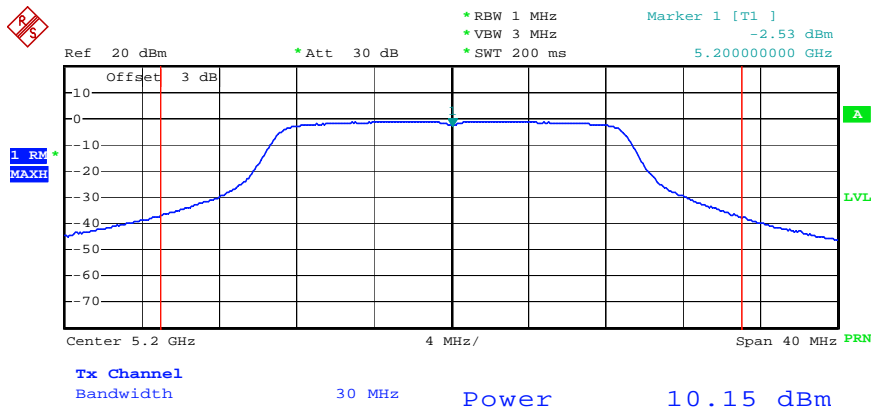
For Two Chain:

Channel Output Power Plot on Configuration IEEE 802.11n Ant. A (20MHz) / 5180 MHz



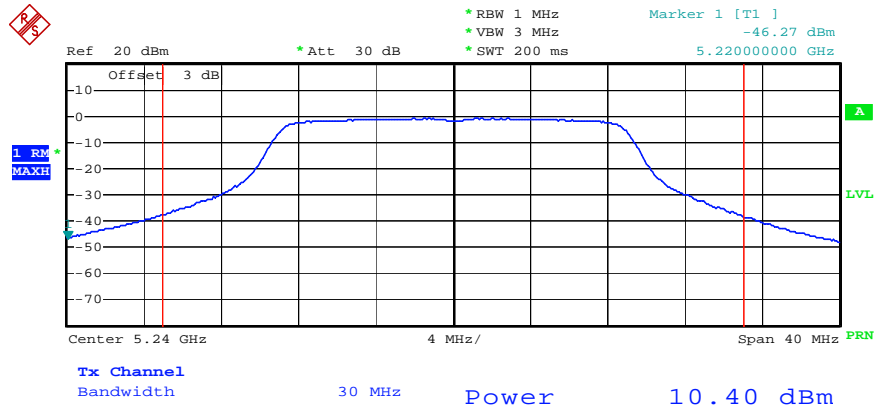
Date: 17.MAY.2008 15:07:39

Channel Output Power Plot on Configuration IEEE 802.11n Ant. A (20MHz) / 5200 MHz



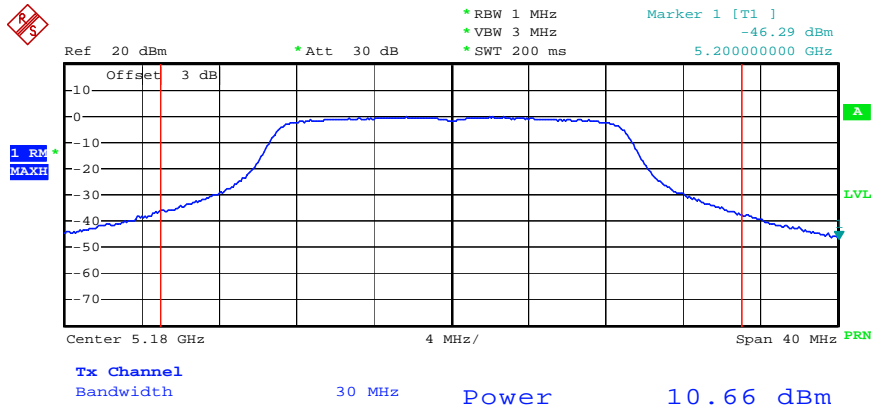
Date: 17.MAY.2008 15:08:25

Channel Output Power Plot on Configuration IEEE 802.11n Ant. A (20MHz) / 5240 MHz



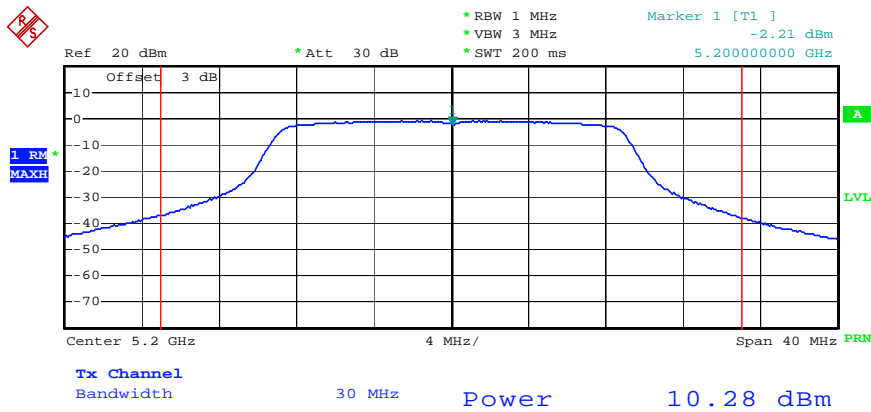
Date: 17.MAY.2008 15:09:15

Channel Output Power Plot on Configuration IEEE 802.11n Ant. B (20MHz) / 5180 MHz



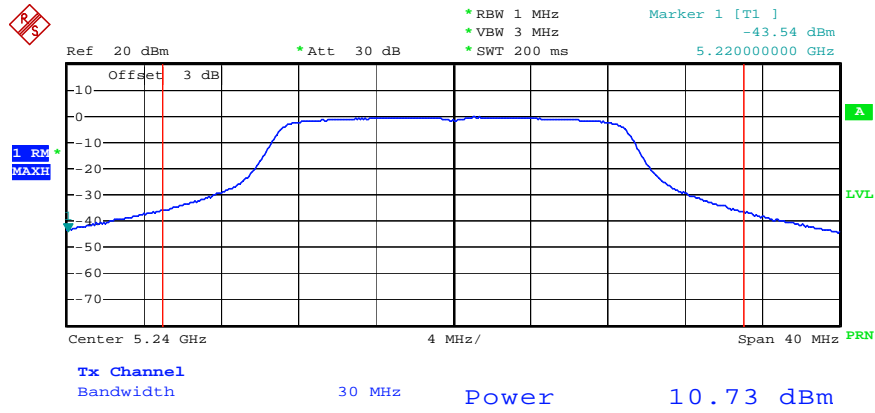
Date: 17.MAY.2008 15:18:13

Channel Output Power Plot on Configuration IEEE 802.11n Ant. B (20MHz) / 5200 MHz



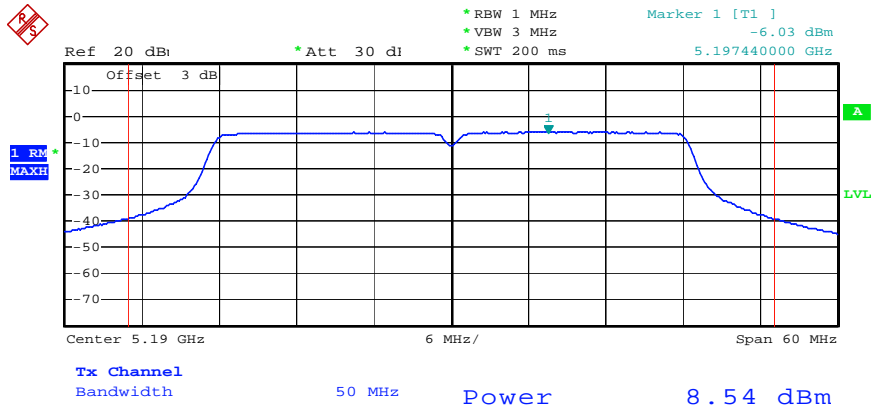
Date: 17.MAY.2008 15:18:43

Channel Output Power Plot on Configuration IEEE 802.11n Ant. B (20MHz) / 5240 MHz



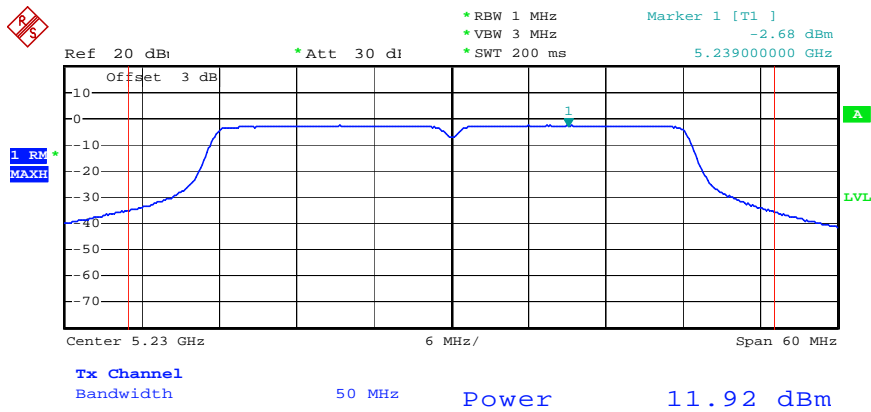
Date: 17.MAY.2008 15:19:17

Channel Output Power Plot on Configuration IEEE 802.11n Ant. A (40MHz) / 5190 MHz



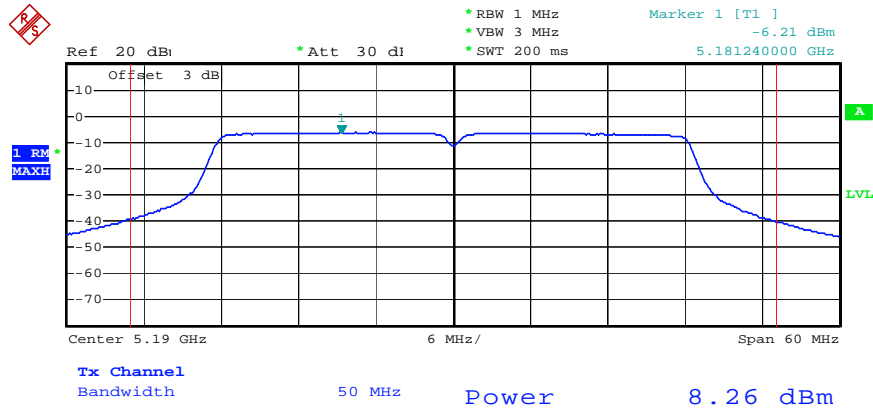
Date: 17.MAY.2008 14:33:57

Channel Output Power Plot on Configuration IEEE 802.11n Ant. A (40MHz) / 5230 MHz



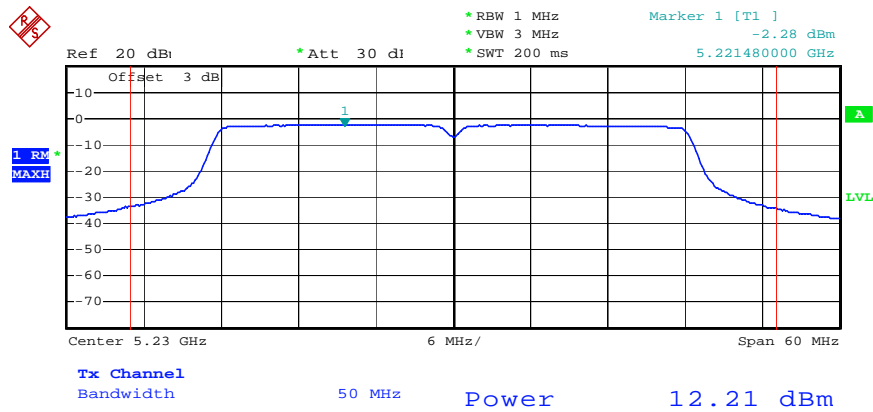
Date: 17.MAY.2008 14:32:58

Channel Output Power Plot on Configuration IEEE 802.11n Ant. B (40MHz) / 5190 MHz



Date: 17.MAY.2008 14:35:08

Channel Output Power Plot on Configuration IEEE 802.11n Ant. B (40MHz) / 5230 MHz



Date: 17.MAY.2008 14:31:52

3.4 Power Spectral Density Measurement

3.4.1 Limit

The power spectral density is defined as the highest level of power in dBm per MHz generated by the transmitter within the power envelope. The following table is power spectral density limits and decrease power density limit rule refer to section 3.3.1.

| Frequency Range | Power Spectral Density limit (dBm/MHz) |
|-----------------|--|
| 5.15~5.25 GHz | 4 |
| 5.25-5.35 GHz | 11 |
| 5.725-5.825 | 17 |

3.4.2 Measuring Instruments and Setting

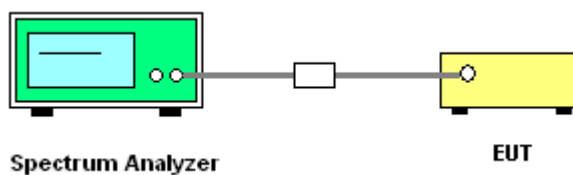
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

| Spectrum Parameter | Setting |
|--------------------|--|
| Attenuation | Auto |
| Span Frequency | Encompass the entire emissions bandwidth (EBW) of the signal |
| RB | 1000 kHz |
| VB | 3000 kHz |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |

3.4.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set RBW of spectrum analyzer to 1000kHz and VBW to 3000kHz. Set Detector to Peak, Trace to Max Hold. Mark the frequency with maximum peak power as the center of the display of the spectrum.
3. Measuring multiple antennas, the connectors are required to link with Spectrum Analyzer through a combiner.

3.4.4 Test Setup Layout



3.4.5 Test Deviation

There is no deviation with the original standard.

3.4.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.4.7 Test Result of Power Spectral Density

| | | | |
|----------------------|--------------|----------------------|-----------|
| Test date | May 10, 2008 | Test Site No. | TH01-HY |
| Temperature | 27 | Humidity | 55% |
| Test Engineer | Sam | Configuration | 802.11a/n |

For Single Chain:

Configuration of IEEE 802.11a

| Frequency | Power Density (dBm) | Max. Limit (dBm) | Result |
|------------------|----------------------------|-------------------------|-----------------|
| 5180 MHz | 3.18 | 4.00 | Complies |
| 5200 MHz | 3.02 | 4.00 | Complies |
| 5240 MHz | 2.84 | 4.00 | Complies |

Configuration IEEE 802.11n (20MHz)

| Frequency | Power Density (dBm) | Max. Limit (dBm) | Result |
|------------------|----------------------------|-------------------------|-----------------|
| 5180 MHz | 3.74 | 4.00 | Complies |
| 5200 MHz | 3.63 | 4.00 | Complies |
| 5240 MHz | 3.12 | 4.00 | Complies |

Configuration IEEE 802.11n (40MHz)

| Frequency | Power Density (dBm) | Max. Limit (dBm) | Result |
|------------------|----------------------------|-------------------------|-----------------|
| 5190 MHz | -6.29 | 4.00 | Complies |
| 5230 MHz | 1.47 | 4.00 | Complies |

For Two Chain:

Configuration IEEE 802.11n Ant. A & B (20MHz)

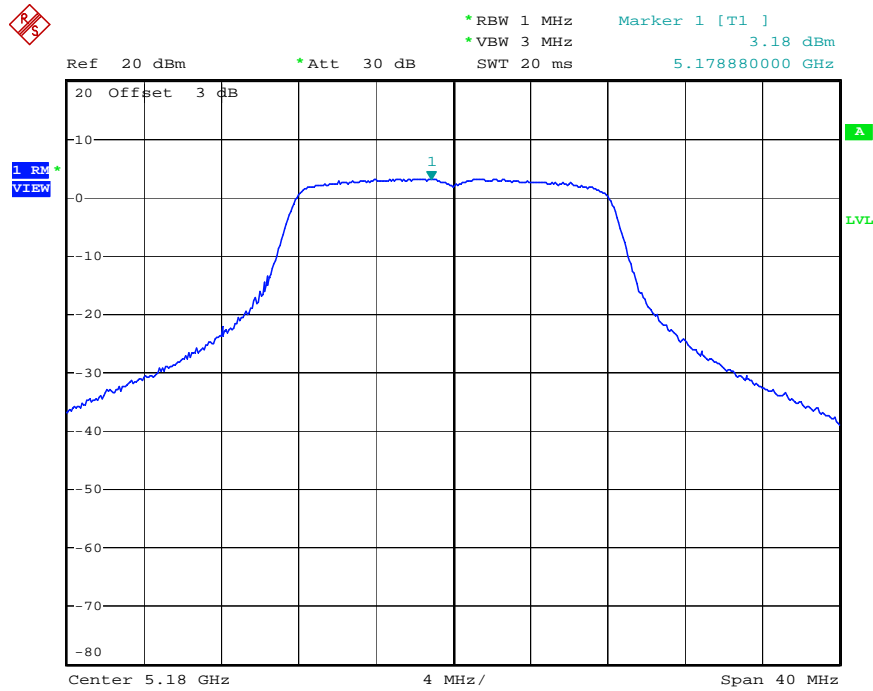
| Frequency | Power Density (dBm) | Max. Limit (dBm) | Result |
|------------------|--------------------------------|-----------------------------|-----------------|
| 5180 MHz | 3.79 | 4.00 | Complies |
| 5200 MHz | 3.34 | 4.00 | Complies |
| 5240 MHz | 3.99 | 4.00 | Complies |

Configuration IEEE 802.11n Ant. A & B (40MHz)

| Frequency | Power Density (dBm) | Max. Limit (dBm) | Result |
|------------------|--------------------------------|-----------------------------|-----------------|
| 5190 MHz | -1.85 | 4.00 | Complies |
| 5230 MHz | 2.64 | 4.00 | Complies |

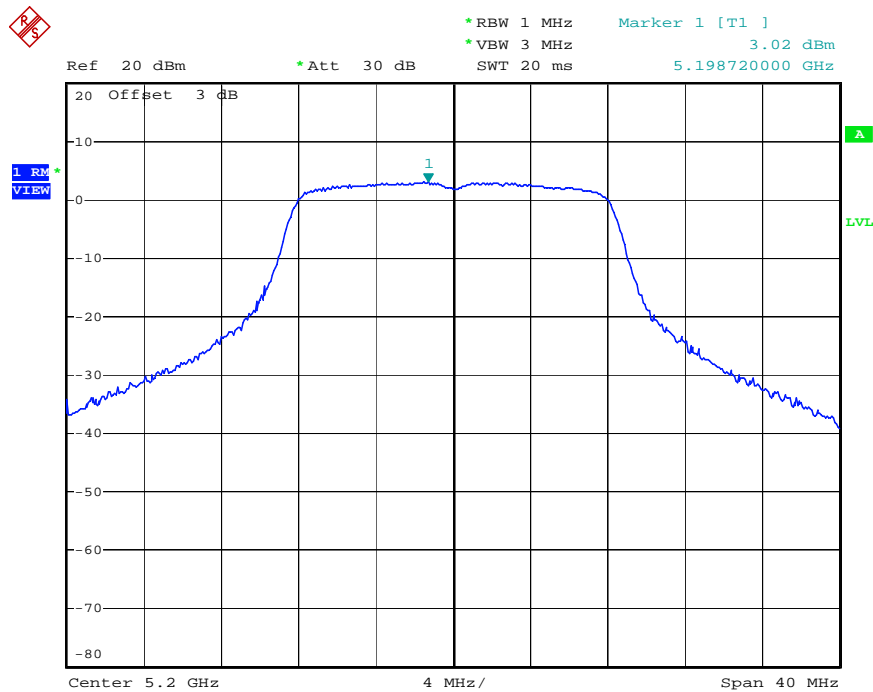
For Single Chain:

Power Density Plot on Configuration IEEE 802.11a / 5180 MHz



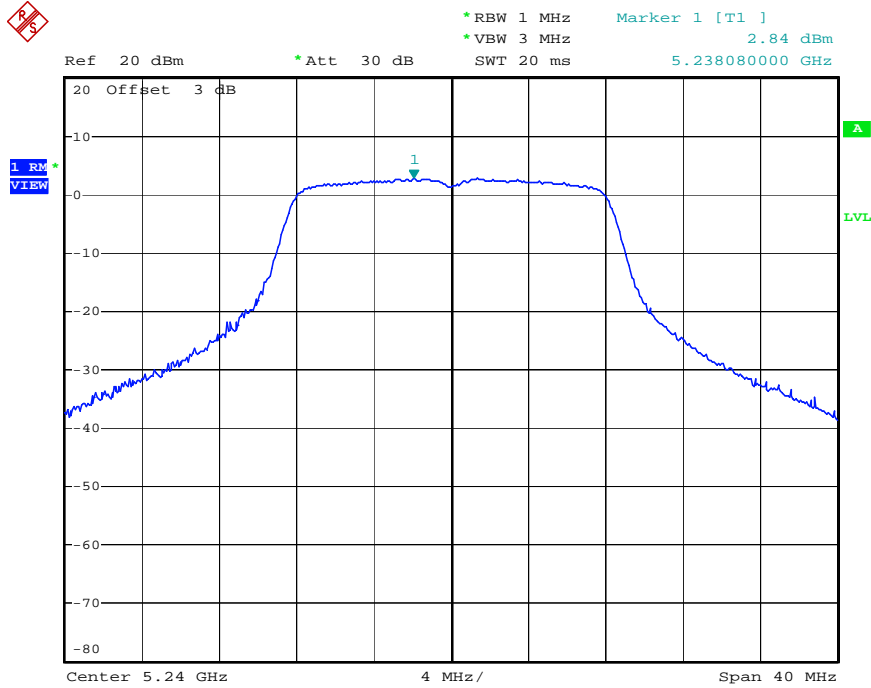
Date: 10.MAY.2008 02:51:34

Power Density Plot on Configuration IEEE 802.11a / 5200 MHz



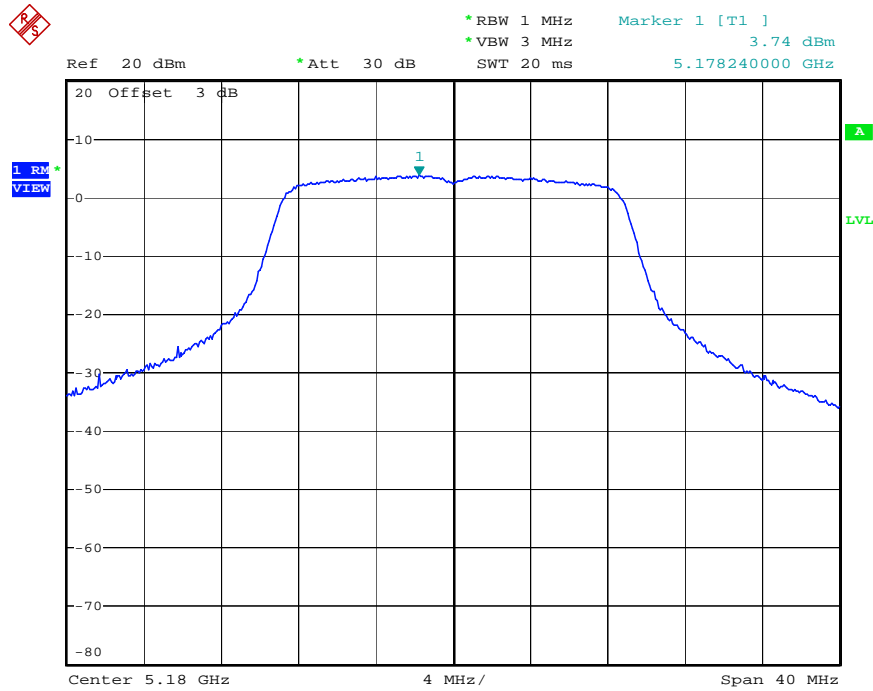
Date: 10.MAY.2008 02:49:35

Power Density Plot on Configuration IEEE 802.11a / 5240 MHz



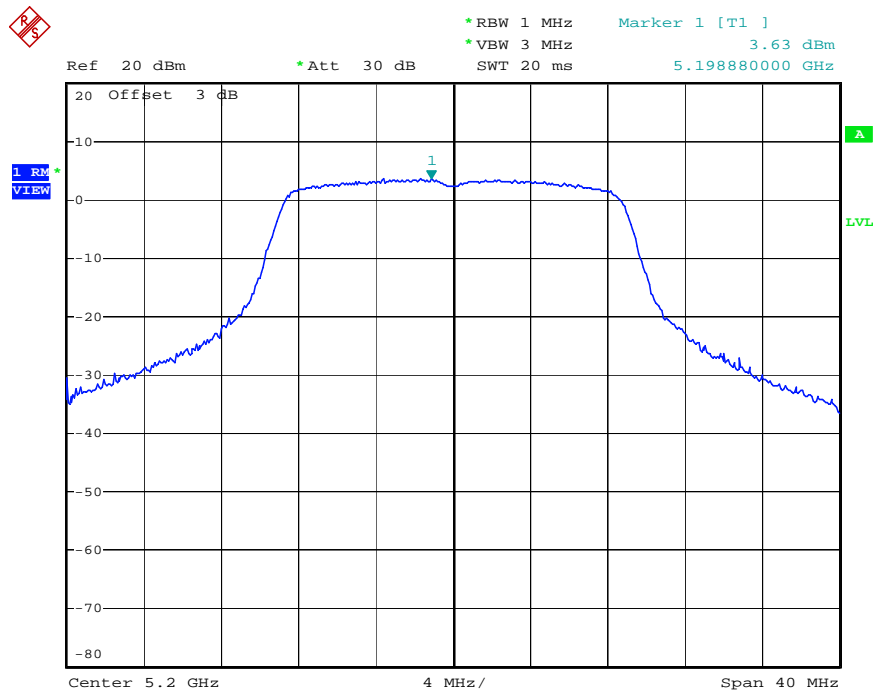
Date: 10.MAY.2008 02:47:04

Power Density Plot on Configuration IEEE 802.11n (20MHz) / 5180 MHz



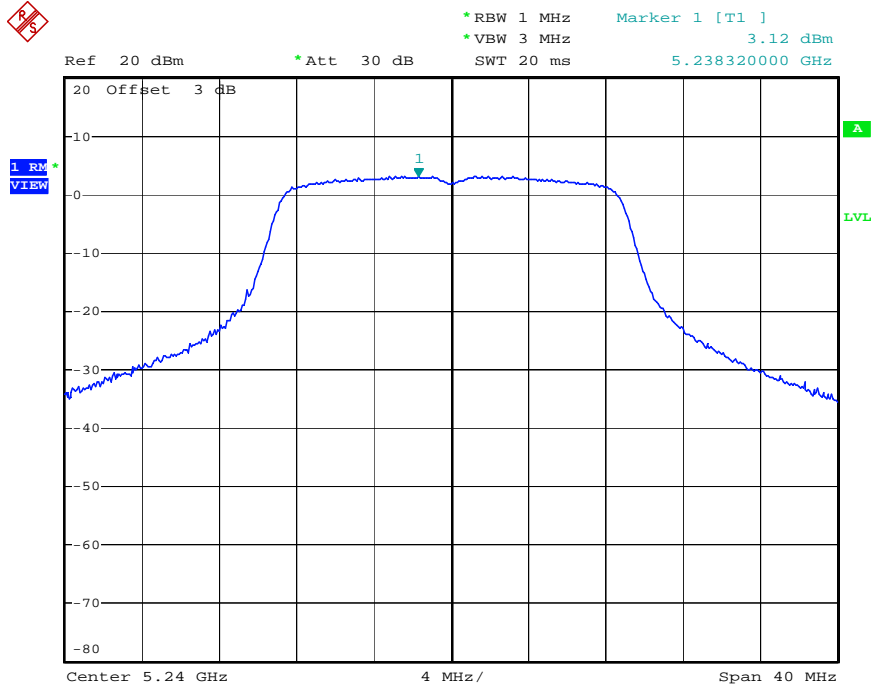
Date: 10.MAY.2008 04:11:19

Power Density Plot on Configuration IEEE 802.11n (20MHz) / 5200 MHz



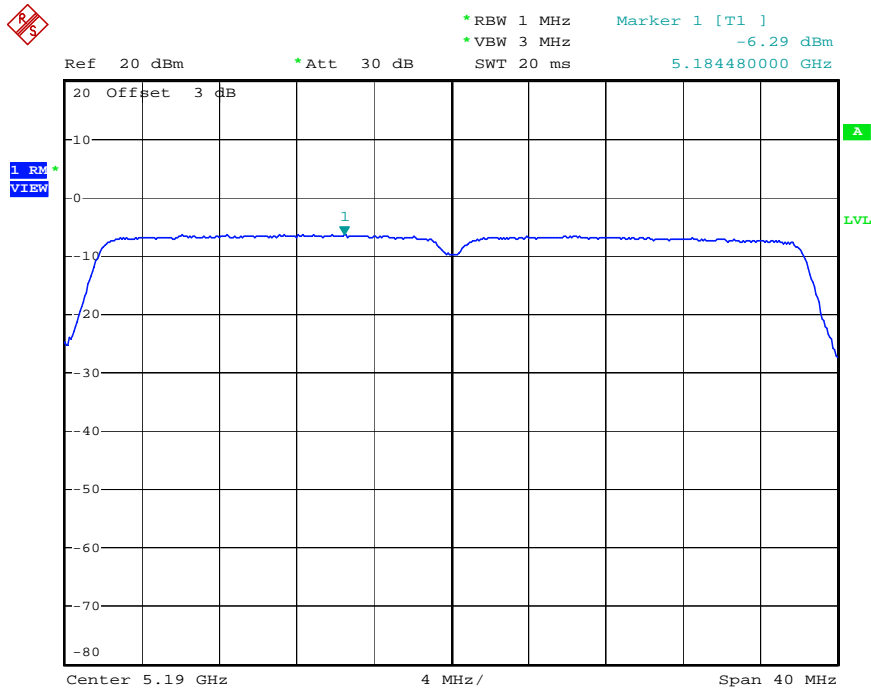
Date: 10.MAY.2008 04:33:38

Power Density Plot on Configuration IEEE 802.11n (20MHz) / 5240 MHz



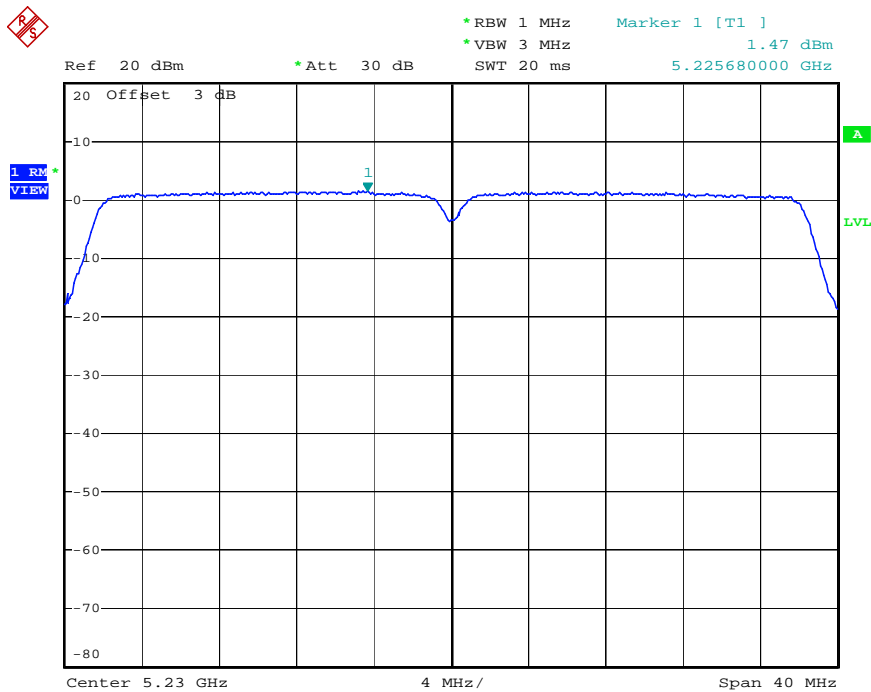
Date: 10.MAY.2008 04:14:18

Power Density Plot on Configuration IEEE 802.11n (40MHz) / 5190 MHz



Date: 10.MAY.2008 03:34:20

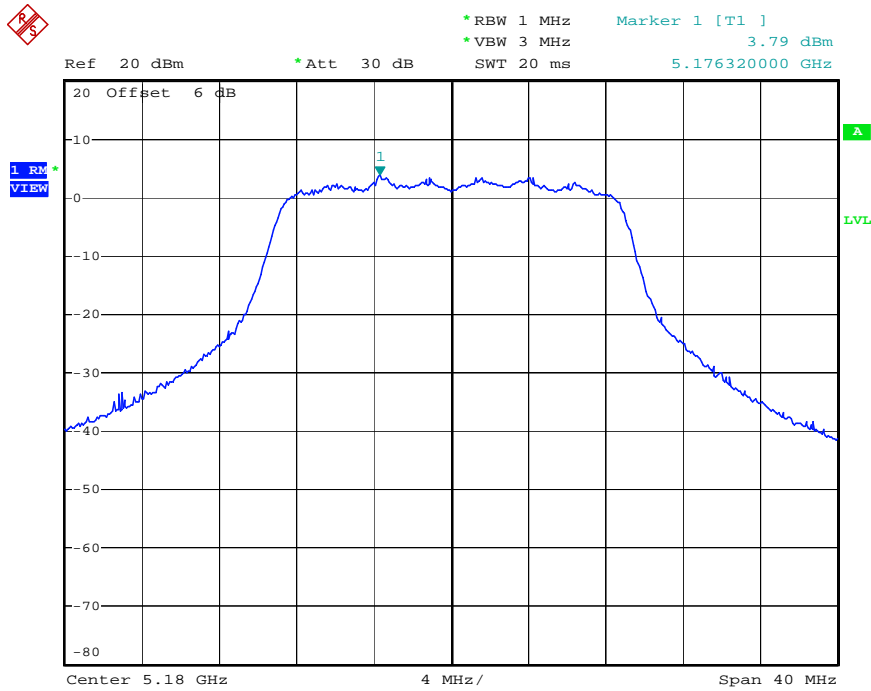
Power Density Plot on Configuration IEEE 802.11n (40MHz) / 5230 MHz



Date: 10.MAY.2008 03:36:23

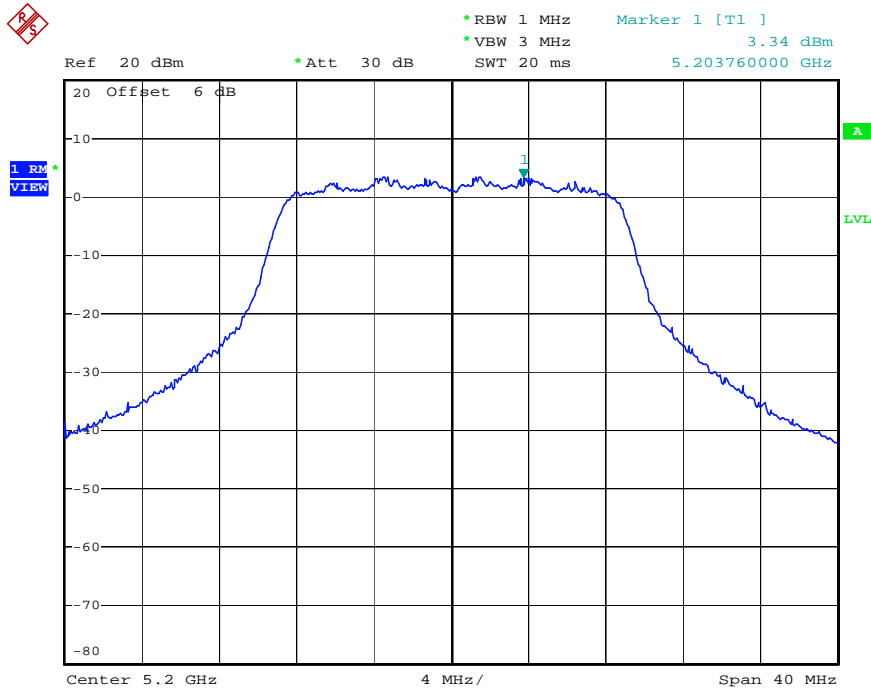
For Two Chain:

Power Density Plot on Configuration IEEE 802.11n Ant. A & B (20MHz) / 5180 MHz



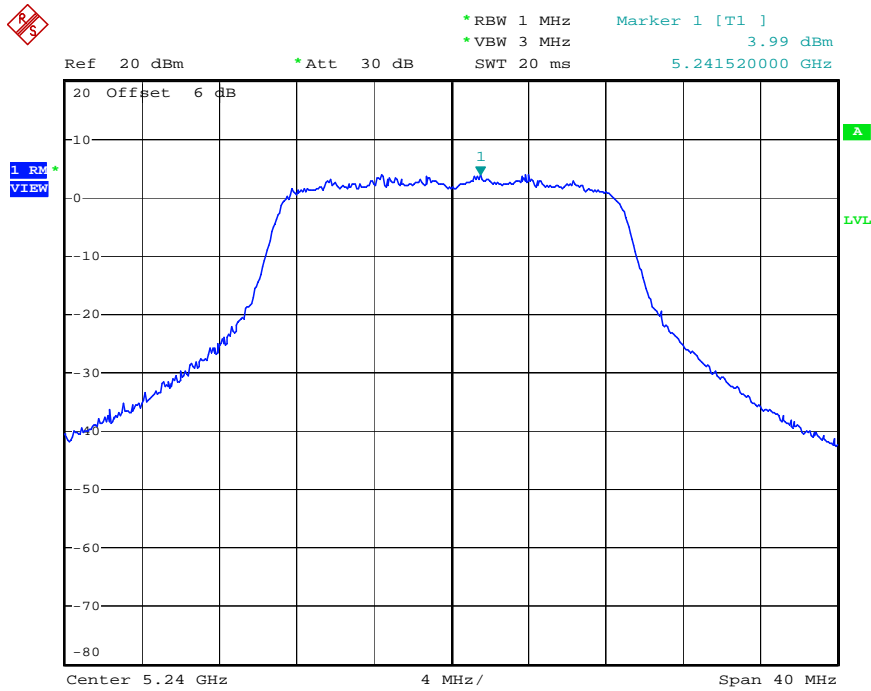
Date: 10.MAY.2008 06:28:45

Power Density Plot on Configuration IEEE 802.11n Ant. A & B (20MHz) / 5200 MHz



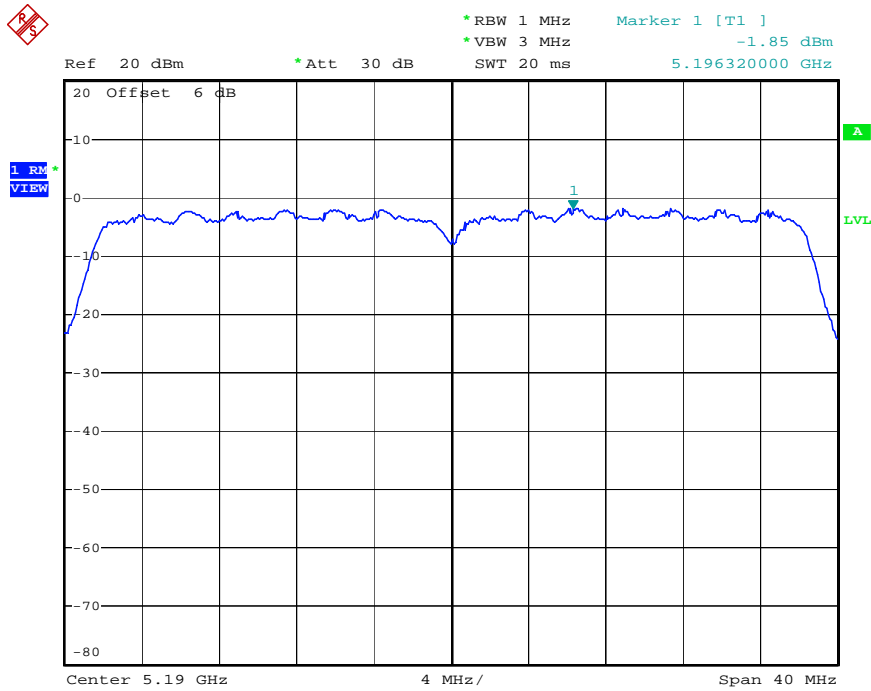
Date: 10.MAY.2008 06:30:43

Power Density Plot on Configuration IEEE 802.11n Ant. A & B (20MHz) / 5240 MHz



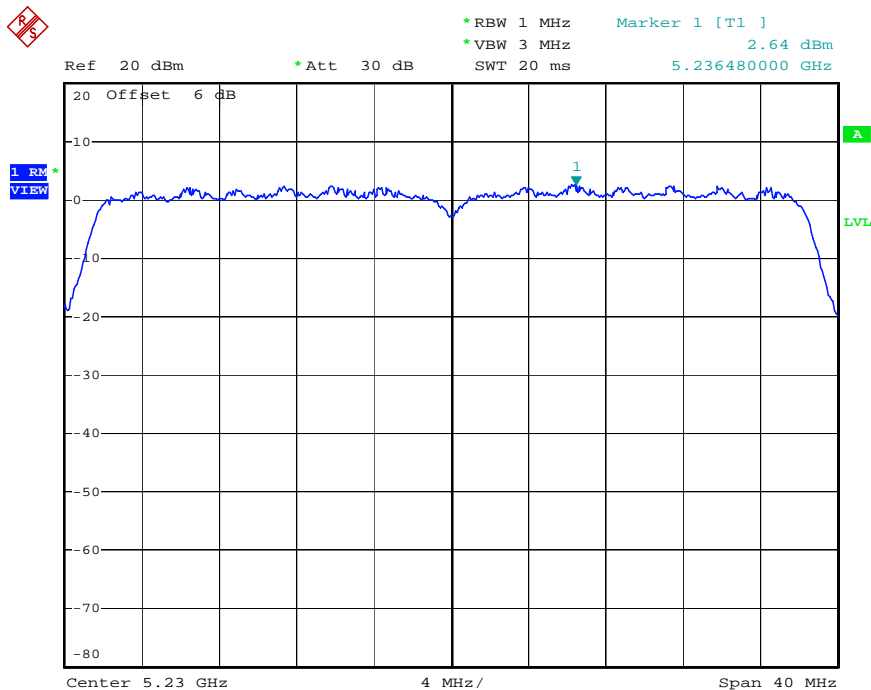
Date: 10.MAY.2008 06:33:43

Power Density Plot on Configuration IEEE 802.11n Ant. A & B (40MHz) / 5190 MHz



Date: 10.MAY.2008 07:01:26

Power Density Plot on Configuration IEEE 802.11n Ant. A & B (40MHz) / 5230 MHz



Date: 10.MAY.2008 07:03:04

3.5 Peak Excursion Measurement

3.5.1 Limit

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

3.5.2 Measuring Instruments and Setting

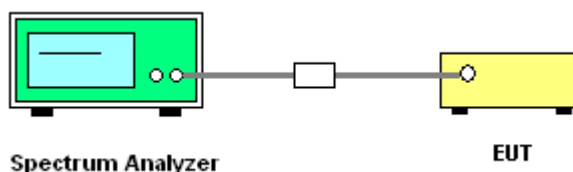
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

| Spectrum Parameter | Setting |
|--------------------|--|
| Attenuation | Auto |
| Span Frequency | Encompass the entire emissions bandwidth (EBW) of the signal |
| RB | 1000 kHz (Peak Trace) / 1000 kHz (Average Trace) |
| VB | 3000 kHz (Peak Trace) / 300 kHz (Average Trace) |
| Detector | Peak (Peak Trace) / Sample (Average Trace) |
| Trace | Max Hold |
| Sweep Time | 60s |

3.5.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set the spectrum analyzer span to view the entire emissions bandwidth. The largest difference between the following two traces (Peak Trace and Average Trace) must be ≤ 13 dB for all frequencies across the emissions bandwidth. Submit a plot.
3. Peak Trace: Set RBW = 1 MHz, VBW ≥ 3 MHz with peak detector and max-hold settings.
4. Average Trace: Method #3—video averaging with max hold—and sum power across the band. Set span to encompass the entire emissions bandwidth (EBW) of the signal. Set sweep trigger to “free run”. Set RBW = 1 MHz. Set VBW $\geq 1/T$ (IEEE 802.11a VBW = 300kHz $\geq 1/4\mu$ s). Use sample detector mode if bin width (i.e., span/number of points in spectrum) < 0.5 RBW. Otherwise use peak detector mode. Set max hold. Allow max hold to run for 60 seconds.
5. When measuring maximum conducted output power within multiple antenna systems, add every result of the values by mathematic formula.

3.5.4 Test Setup Layout



3.5.5 Test Deviation

There is no deviation with the original standard.

3.5.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.5.7 Test Result of Peak Excursion

| | | | |
|----------------------|--------------|----------------------|-----------|
| Test date | May 10, 2008 | Test Site No. | TH01-HY |
| Temperature | 27 | Humidity | 55% |
| Test Engineer | Sam | Configuration | 802.11a/n |

For Single Chain:

Configuration of IEEE 802.11a

| Frequency | Peak Excursion (dB) | Max. Limit (dB) | Result |
|------------------|----------------------------|------------------------|-----------------|
| 5180 MHz | 4.71 | 13 | Complies |
| 5200 MHz | 5.29 | 13 | Complies |
| 5240 MHz | 4.84 | 13 | Complies |

Configuration IEEE 802.11n (20MHz)

| Frequency | Peak Excursion (dB) | Max. Limit (dB) | Result |
|------------------|----------------------------|------------------------|-----------------|
| 5180 MHz | 5.63 | 13 | Complies |
| 5200 MHz | 4.60 | 13 | Complies |
| 5240 MHz | 5.52 | 13 | Complies |

Configuration IEEE 802.11n (40MHz)

| Frequency | Peak Excursion (dB) | Max. Limit (dB) | Result |
|------------------|----------------------------|------------------------|-----------------|
| 5190 MHz | 5.34 | 13 | Complies |
| 5230 MHz | 5.77 | 13 | Complies |

For Two Chain:

Configuration IEEE 802.11n Ant. A & B (20MHz)

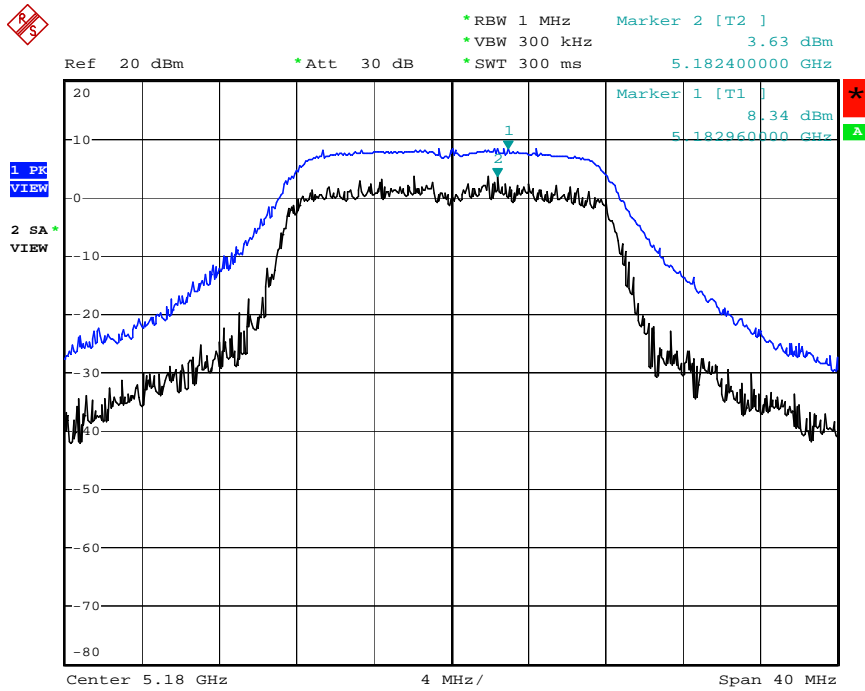
| Frequency | Peak Excursion (dB) | Max. Limit (dB) | Result |
|-----------|------------------------|--------------------|----------|
| 5180 MHz | 5.00 | 13 | Complies |
| 5200 MHz | 4.68 | 13 | Complies |
| 5240 MHz | 5.33 | 13 | Complies |

Configuration IEEE 802.11n Ant. A & B (40MHz)

| Frequency | Peak Excursion (dB) | Max. Limit (dB) | Result |
|-----------|------------------------|--------------------|----------|
| 5190 MHz | 5.09 | 13 | Complies |
| 5230 MHz | 5.05 | 13 | Complies |

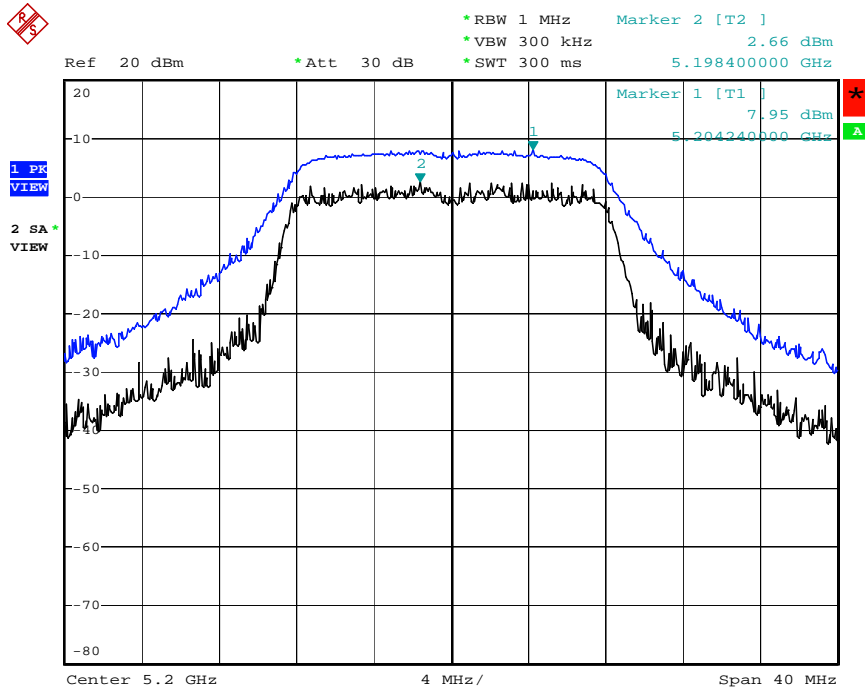
For Single Chain:

Peak Excursion Plot on Configuration IEEE 802.11a / 5180 MHz



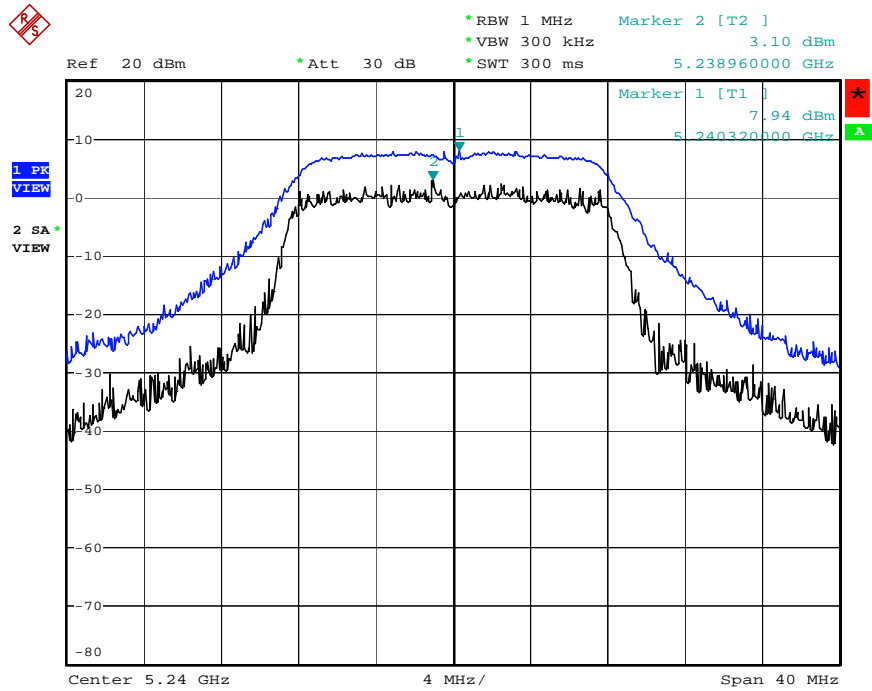
Date: 10.MAY.2008 02:52:22

Peak Excursion Plot on Configuration IEEE 802.11a / 5200 MHz



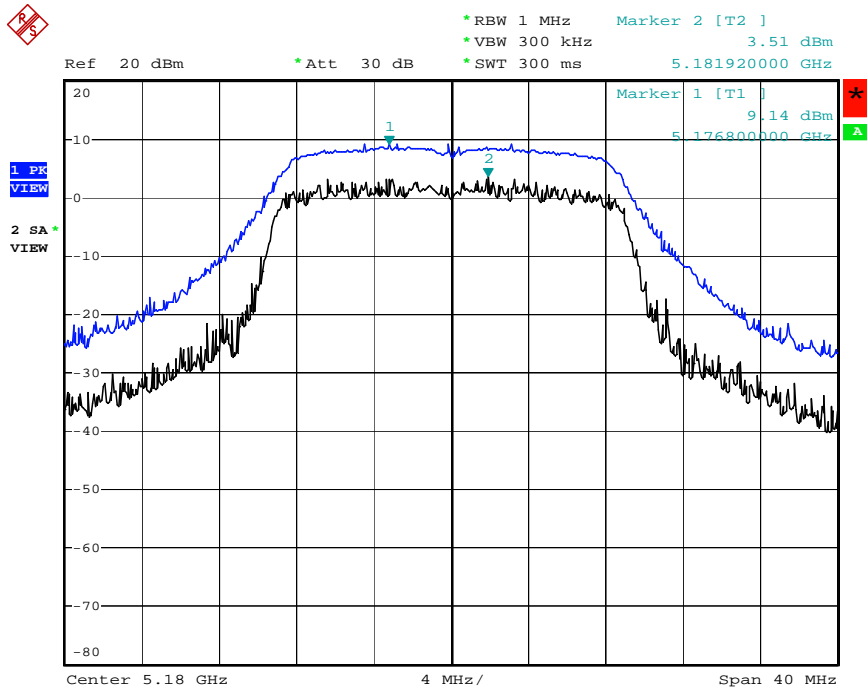
Date: 10.MAY.2008 02:50:22

Peak Excursion Plot on Configuration IEEE 802.11a / 5240 MHz



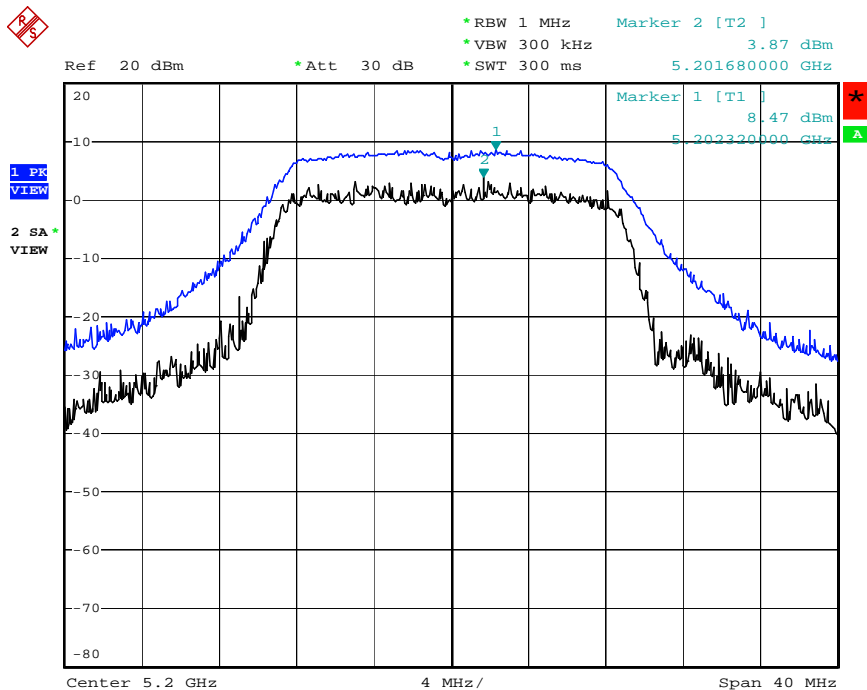
Date: 10.MAY.2008 02:47:51

Peak Excursion Plot on Configuration IEEE 802.11n (20MHz) / 5180 MHz



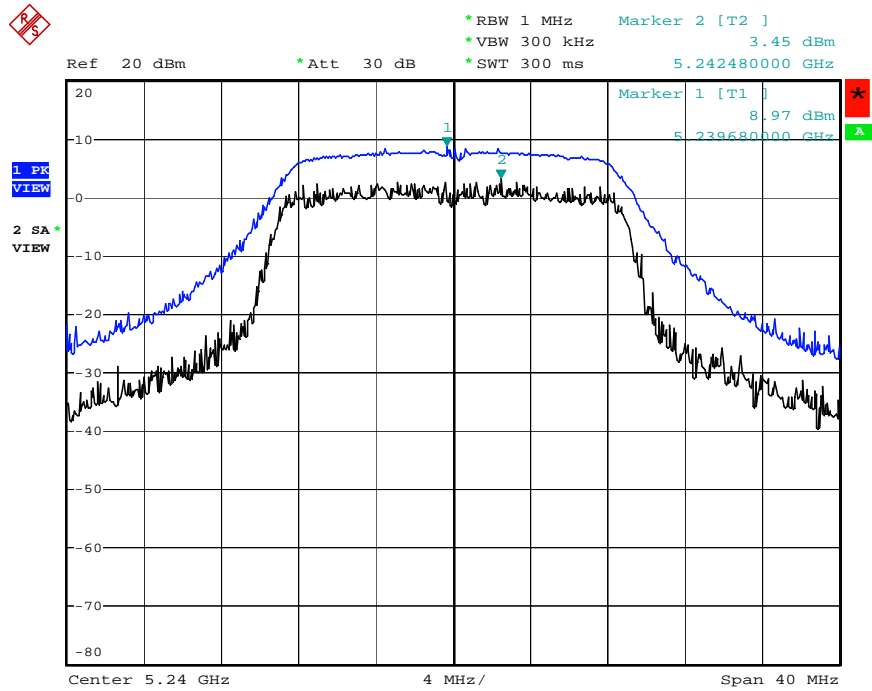
Date: 10.MAY.2008 04:12:07

Peak Excursion Plot on Configuration IEEE 802.11n (20MHz) / 5200 MHz



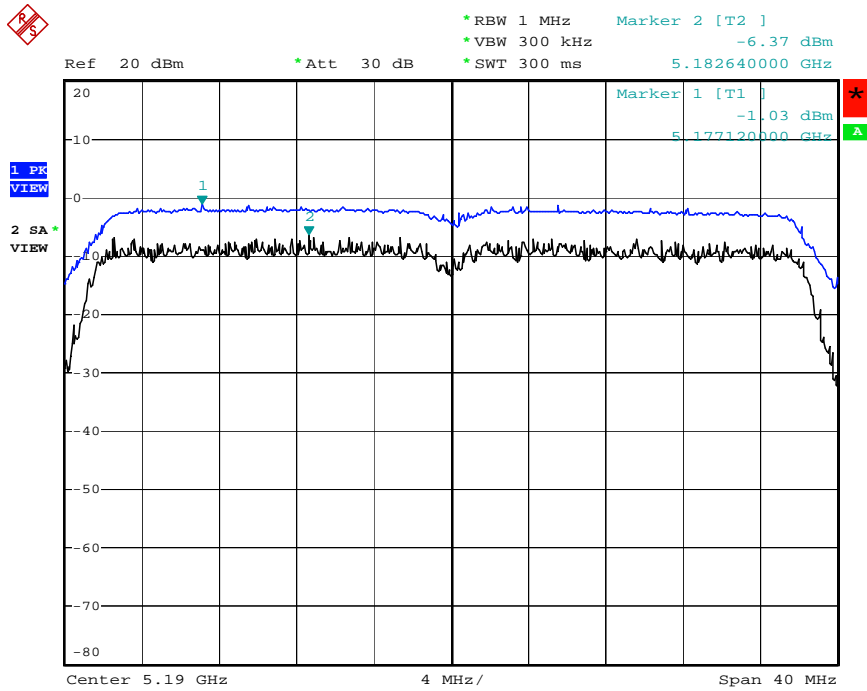
Date: 10.MAY.2008 04:34:25

Peak Excursion Plot on Configuration IEEE 802.11n (20MHz) / 5240 MHz



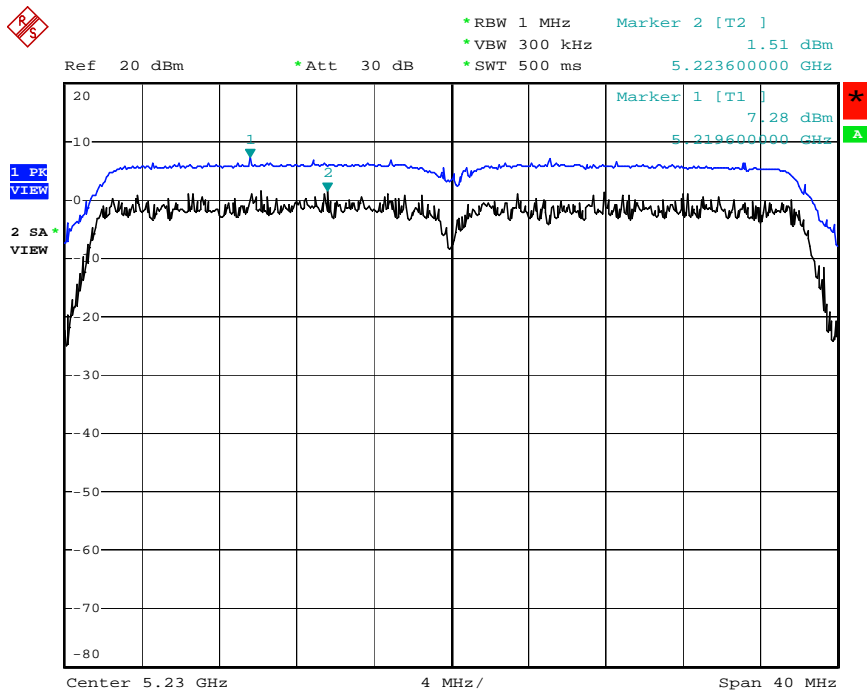
Date: 10.MAY.2008 04:15:05

Peak Excursion Plot on Configuration IEEE 802.11n (40MHz) / 5190 MHz



Date: 10.MAY.2008 03:35:07

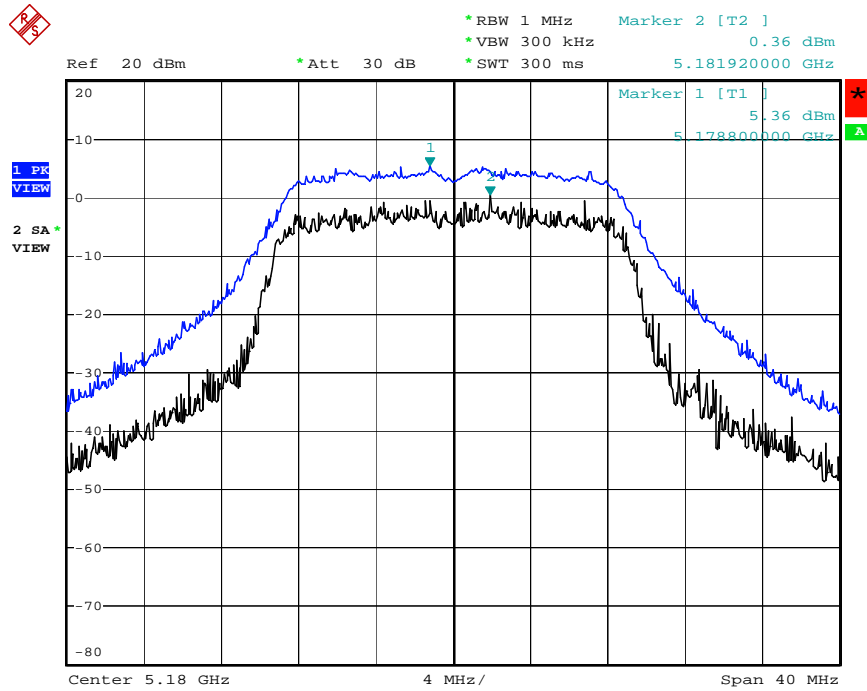
Peak Excursion Plot on Configuration IEEE 802.11n (40MHz) / 5230 MHz



Date: 10.MAY.2008 03:37:11

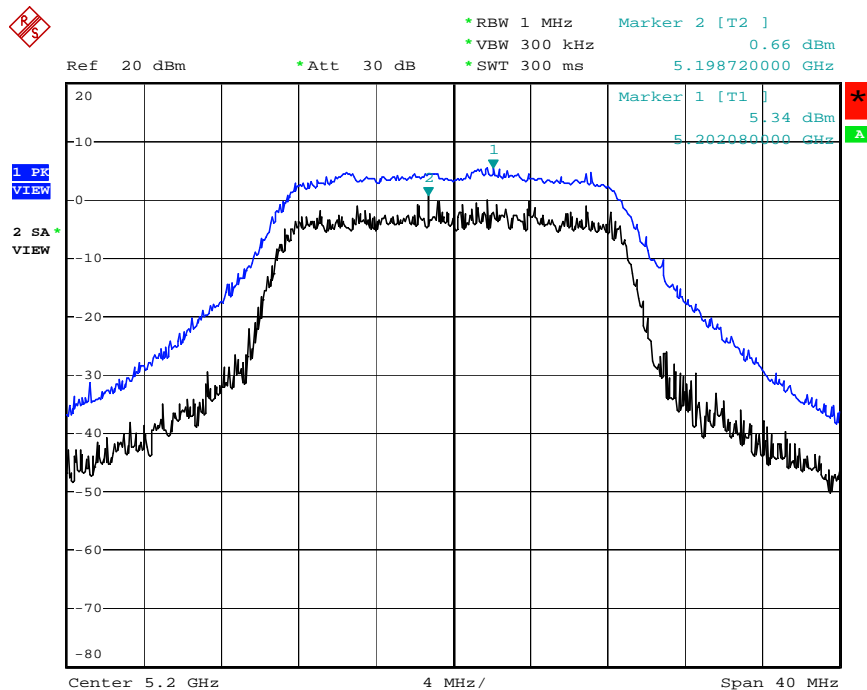
For Two Chain:

Peak Excursion Plot on Configuration IEEE 802.11n Ant. A & B (20MHz) / 5180 MHz



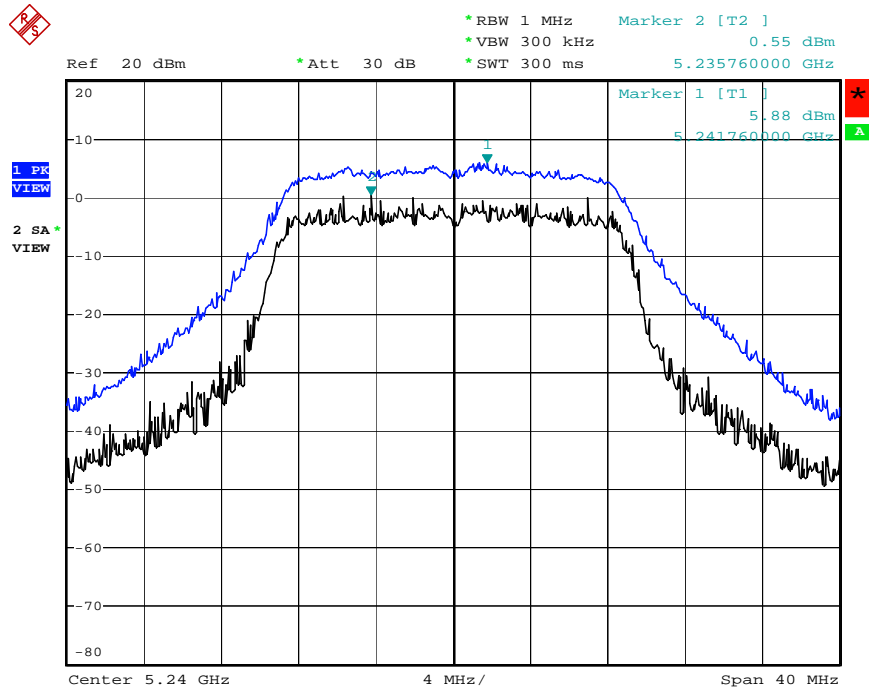
Date: 10.MAY.2008 06:29:32

Peak Excursion Plot on Configuration IEEE 802.11n Ant. A & B (20MHz) / 5200 MHz



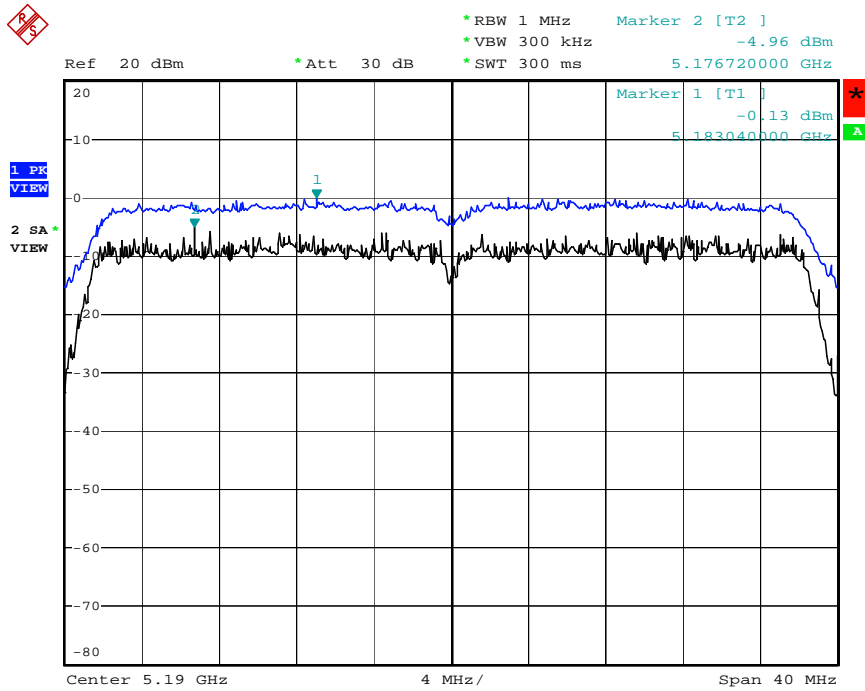
Date: 10.MAY.2008 06:31:31

Peak Excursion Plot on Configuration IEEE 802.11n Ant. A & B (20MHz) / 5240 MHz



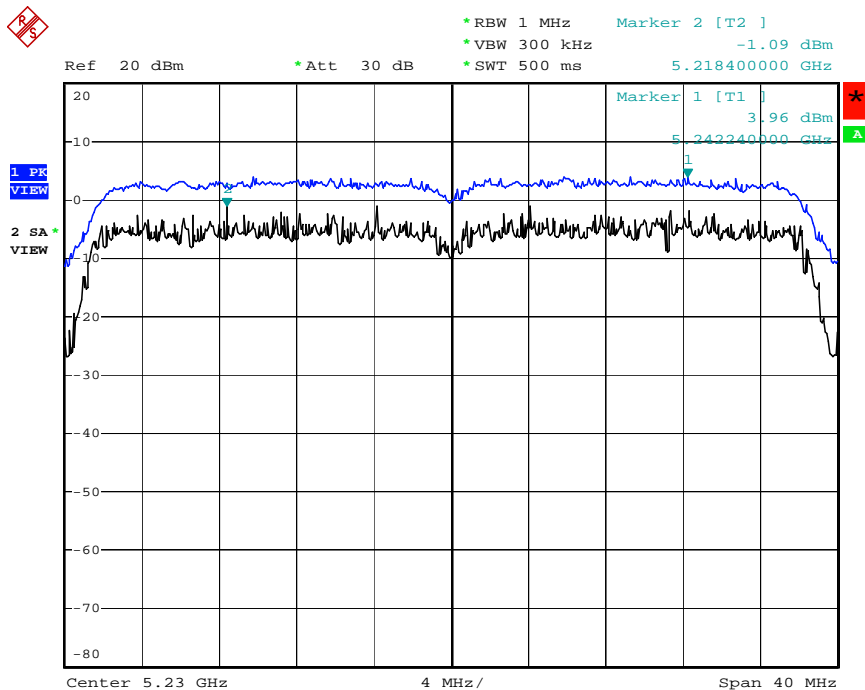
Date: 10.MAY.2008 06:34:30

Peak Excursion Plot on Configuration IEEE 802.11n Ant. A & B (40MHz) / 5190 MHz



Date: 10.MAY.2008 07:02:13

Peak Excursion Plot on Configuration IEEE 802.11n Ant. A & B (40MHz) / 5230 MHz



Date: 10.MAY.2008 07:03:53

3.6 Radiated Emissions Measurement

3.6.1 Limit

For transmitters operating in the 5.15-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz (78.3dBuV/m at 3m); for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

| Frequencies (MHz) | Field Strength (micorvolts/meter) | Measurement Distance (meters) |
|--------------------------|--|--------------------------------------|
| 0.009~0.490 | 2400/F(KHz) | 300 |
| 0.490~1.705 | 24000/F(KHz) | 30 |
| 1.705~30.0 | 30 | 30 |
| 30~88 | 100 | 3 |
| 88~216 | 150 | 3 |
| 216~960 | 200 | 3 |
| Above 960 | 500 | 3 |

3.6.2 Measuring Instruments and Setting

Please refer to section 4 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

| Spectrum Parameter | Setting |
|---|--|
| Attenuation | Auto |
| Start Frequency | 1000 MHz |
| Stop Frequency | 40 GHz |
| RB / VB (Emission in restricted band) | 1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average |
| RB / VB (Emission in non-restricted band) | 1000KHz / 1000KHz for peak |

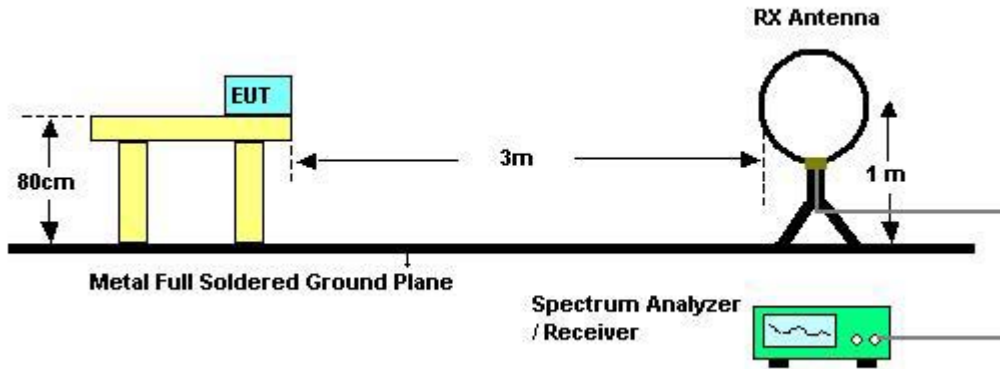
| Receiver Parameter | Setting |
|---------------------------|----------------------------------|
| Attenuation | Auto |
| Start ~ Stop Frequency | 9kHz~150kHz / RB 200Hz for QP |
| Start ~ Stop Frequency | 150kHz~30MHz / RB 9kHz for QP |
| Start ~ Stop Frequency | 30MHz~1000MHz / RB 120kHz for QP |

3.6.3 Test Procedures

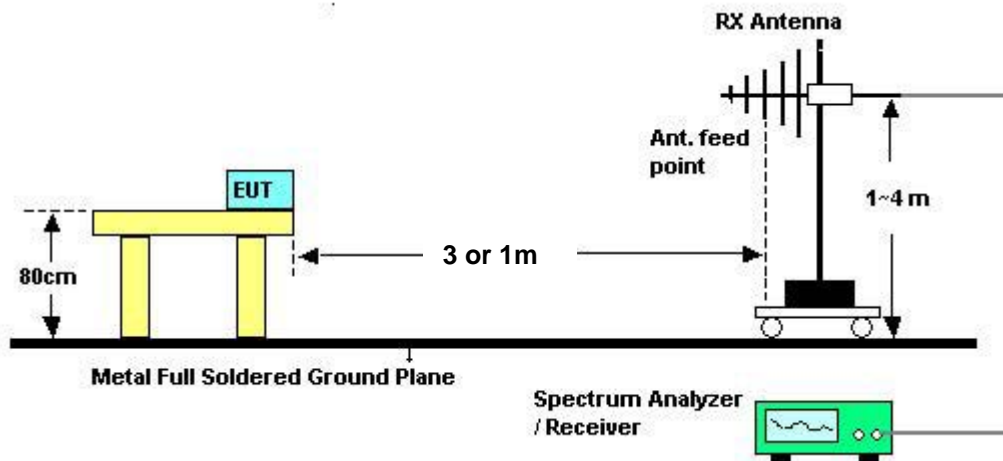
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

3.6.4 Test Setup Layout

For radiated emissions below 30MHz



For radiated emissions above 30MHz



Above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.

Distance extrapolation factor = $20 \log(\text{specific distance [3m]} / \text{test distance [1m]})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

3.6.5 Test Deviation

There is no deviation with the original standard.

3.6.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.6.7 Results of Radiated Emissions (9kHz~30MHz)

| | | | |
|----------------------|--------------|----------------------|-----------|
| Test date | May 01, 2008 | Test Site No. | 03CH03-HY |
| Temperature | 26 | Humidity | 54% |
| Test Engineer | Duncan | | |

| Freq. (MHz) | Level (dBuV) | Over Limit (dB) | Limit Line (dBuV) | Remark |
|--------------------|---------------------|------------------------|--------------------------|---------------|
| - | - | - | - | See Note |

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

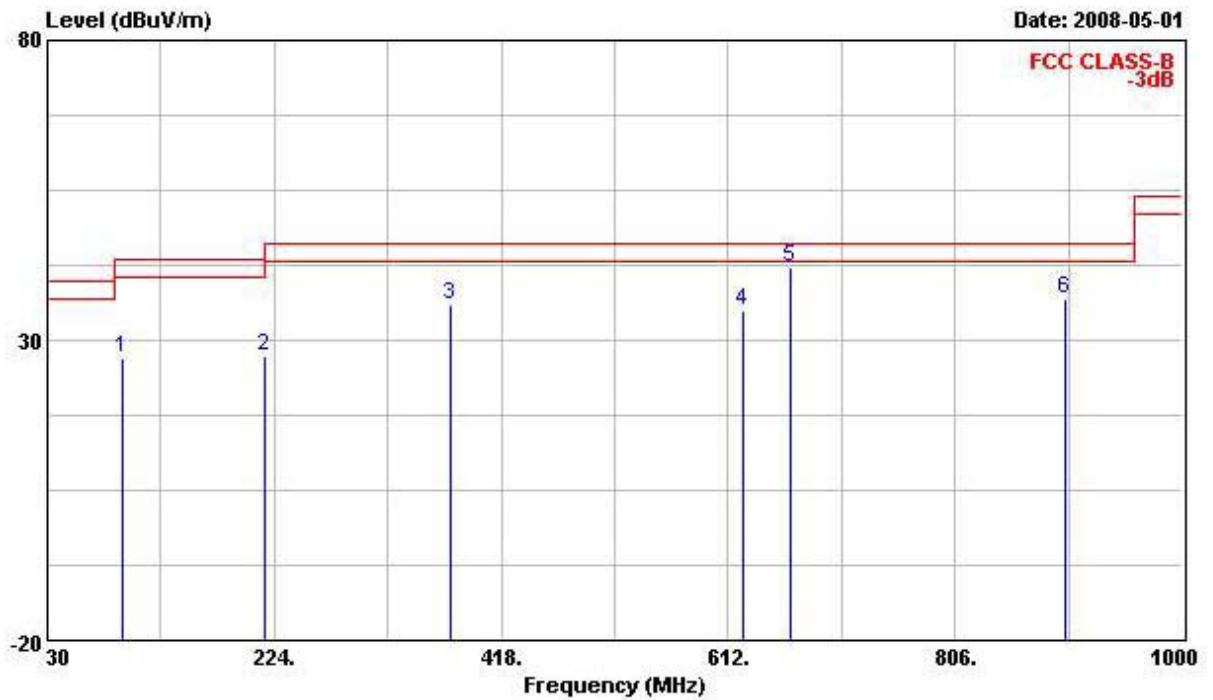
Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

3.6.8 Results of Radiated Emissions (30MHz~1GHz)

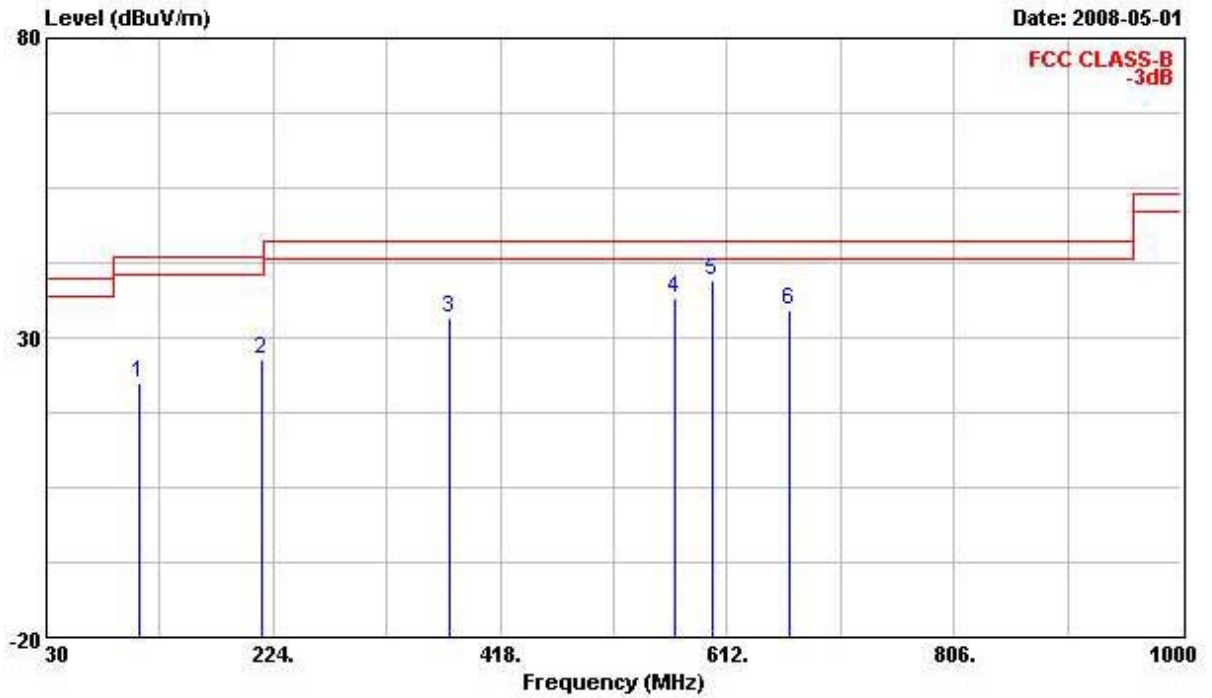
| | | | |
|---------------|--------------|---------------|----------------------------------|
| Test date | May 01, 2008 | Test Site No. | 03CH03-HY |
| Temperature | 26 | Humidity | 54% |
| Test Engineer | Duncan | Configuration | (Power Supply: POE20U-560(G) -R) |

Horizontal



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|-----|---------|--------|------------|------------|-------------------|----------------|------------|---------------|--------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 94.990 | 27.16 | -16.34 | 43.50 | 42.95 | 10.35 | 1.68 | 27.81 | Peak |
| 2 | 215.270 | 27.24 | -16.26 | 43.50 | 43.61 | 9.27 | 2.52 | 28.15 | Peak |
| 3 | 374.350 | 36.00 | -10.00 | 46.00 | 45.72 | 15.62 | 3.42 | 28.76 | Peak |
| 4 | 625.580 | 34.80 | -11.20 | 46.00 | 40.54 | 19.47 | 4.29 | 29.50 | Peak |
| 5 @ | 665.350 | 42.26 | -3.74 | 46.00 | 47.62 | 19.73 | 4.45 | 29.55 | Peak |
| 6 | 901.060 | 36.81 | -9.19 | 46.00 | 39.85 | 21.04 | 5.25 | 29.33 | Peak |

Vertical



| | Freq | Level | Over Limit | Limit Line | ReadAntenna | Cable | Preamp | Remark |
|---|---------|--------|------------|------------|-------------|-------|--------|------------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB |
| 1 | 109.540 | 22.36 | -21.14 | 43.50 | 36.00 | 12.40 | 1.76 | 27.80 Peak |
| 2 | 214.300 | 26.38 | -17.12 | 43.50 | 42.71 | 9.29 | 2.53 | 28.15 Peak |
| 3 | 374.350 | 33.36 | -12.64 | 46.00 | 43.08 | 15.62 | 3.42 | 28.76 Peak |
| 4 | 567.380 | 36.47 | -9.53 | 46.00 | 41.97 | 19.30 | 4.09 | 28.90 Peak |
| 5 | 599.390 | 39.62 | -6.38 | 46.00 | 45.00 | 19.30 | 4.45 | 29.14 Peak |
| 6 | 665.350 | 34.75 | -11.25 | 46.00 | 40.11 | 19.73 | 4.45 | 29.55 Peak |

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

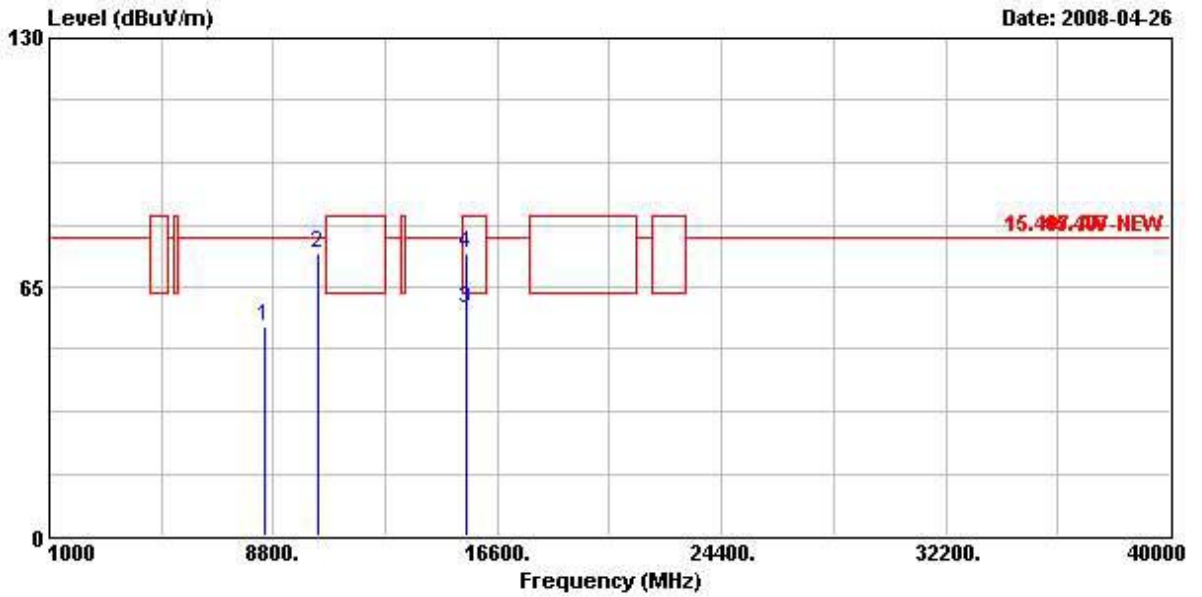
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

3.6.9 Results for Radiated Emissions (1GHz~40GHz)

For Single Chain:

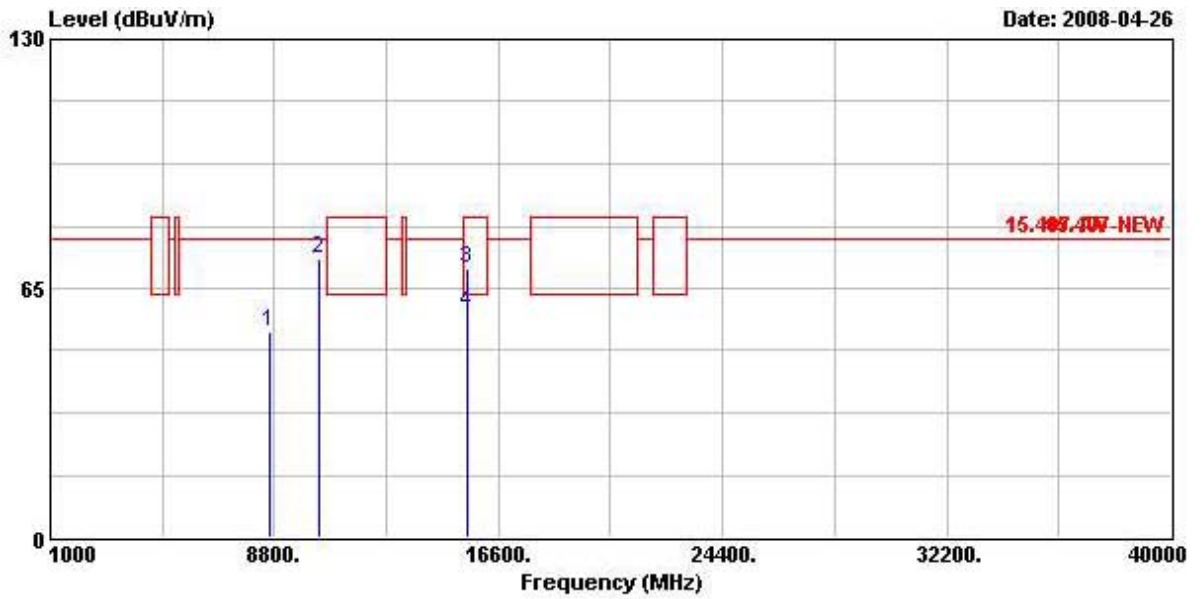
| | | | |
|---------------|---------------|---------------|---------------|
| Test date | Apr. 26, 2008 | Test Site No. | 03CH03-HY |
| Temperature | 26 | Humidity | 54% |
| Test Engineer | Duncan | Configuration | 802.11a CH 36 |

Horizontal



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|-----|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 8520.000 | 54.52 | -23.32 | 77.84 | 43.60 | 38.31 | 5.42 | 32.81 | PEAK |
| 2 @ | 10364.000 | 73.62 | -4.22 | 77.84 | 59.88 | 39.33 | 6.09 | 31.67 | PEAK |
| 3 @ | 15540.000 | 59.58 | -3.96 | 63.54 | 44.39 | 37.51 | 7.37 | 29.69 | Average |
| 4 | 15540.000 | 73.64 | -9.90 | 83.54 | 58.45 | 37.51 | 7.37 | 29.69 | PEAK |

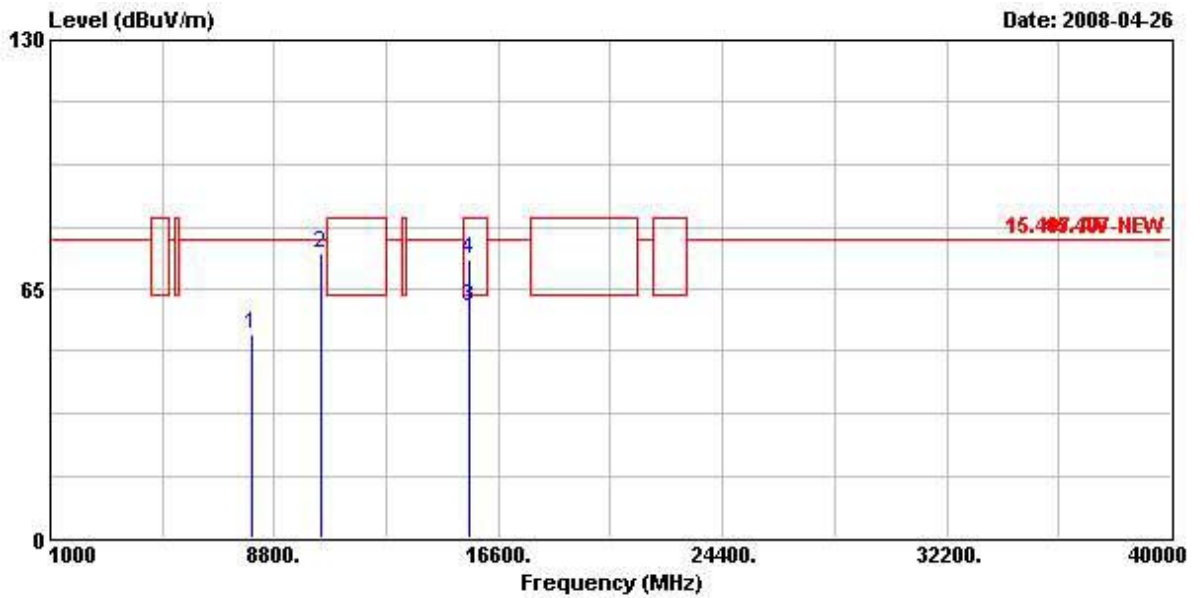
Vertical



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBUV/m | dB | dBUV/m | dBuV | dB/m | dB | dB | |
| 1 | 8664.000 | 53.68 | -24.16 | 77.84 | 42.95 | 38.40 | 5.15 | 32.81 | PEAK |
| 2 | 10364.000 | 72.97 | -4.87 | 77.84 | 59.23 | 39.33 | 6.09 | 31.67 | PEAK |
| 3 | 15536.000 | 70.41 | -13.13 | 83.54 | 55.22 | 37.51 | 7.37 | 29.69 | PEAK |
| 4 | 15536.000 | 58.91 | -4.63 | 63.54 | 43.72 | 37.51 | 7.37 | 29.69 | Average |

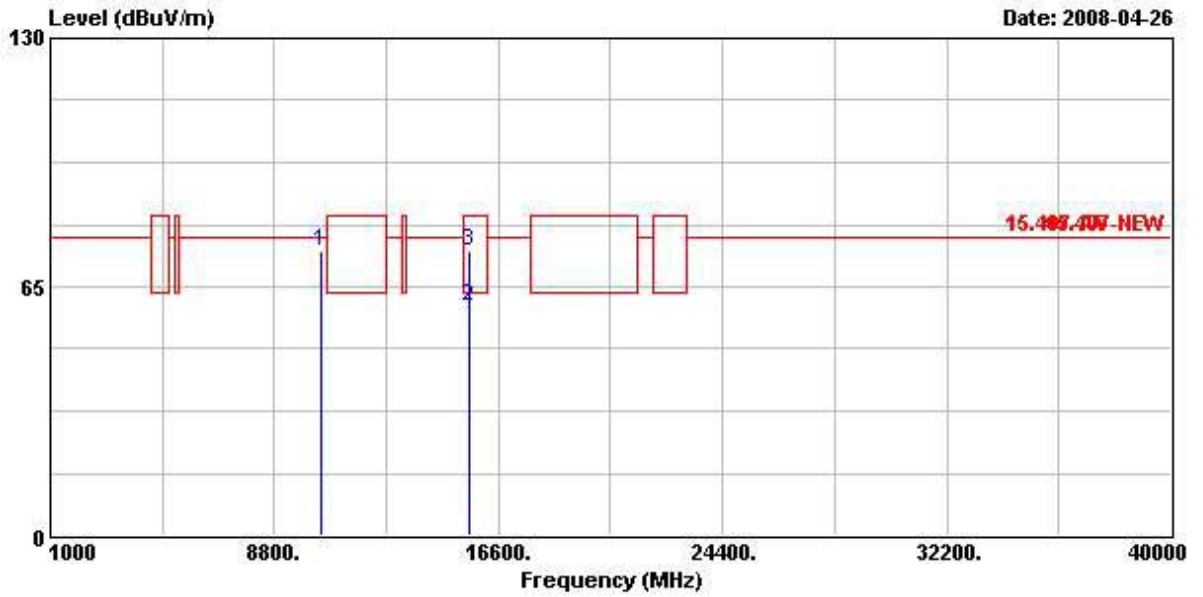
| | | | |
|---------------|---------------|---------------|---------------|
| Test date | Apr. 26, 2008 | Test Site No. | 03CH03-HY |
| Temperature | 26 | Humidity | 54% |
| Test Engineer | Duncan | Configuration | 802.11a CH 40 |

Horizontal



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|-----|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 8004.000 | 53.24 | -24.60 | 77.84 | 43.52 | 37.80 | 4.71 | 32.79 | Peak |
| 2 @ | 10400.000 | 74.48 | -3.36 | 77.84 | 60.53 | 39.32 | 6.14 | 31.51 | Peak |
| 3 @ | 15600.000 | 60.31 | -3.23 | 63.54 | 45.04 | 37.54 | 7.38 | 29.65 | Average |
| 4 | 15600.000 | 72.49 | -11.05 | 83.54 | 57.22 | 37.54 | 7.38 | 29.65 | Peak |

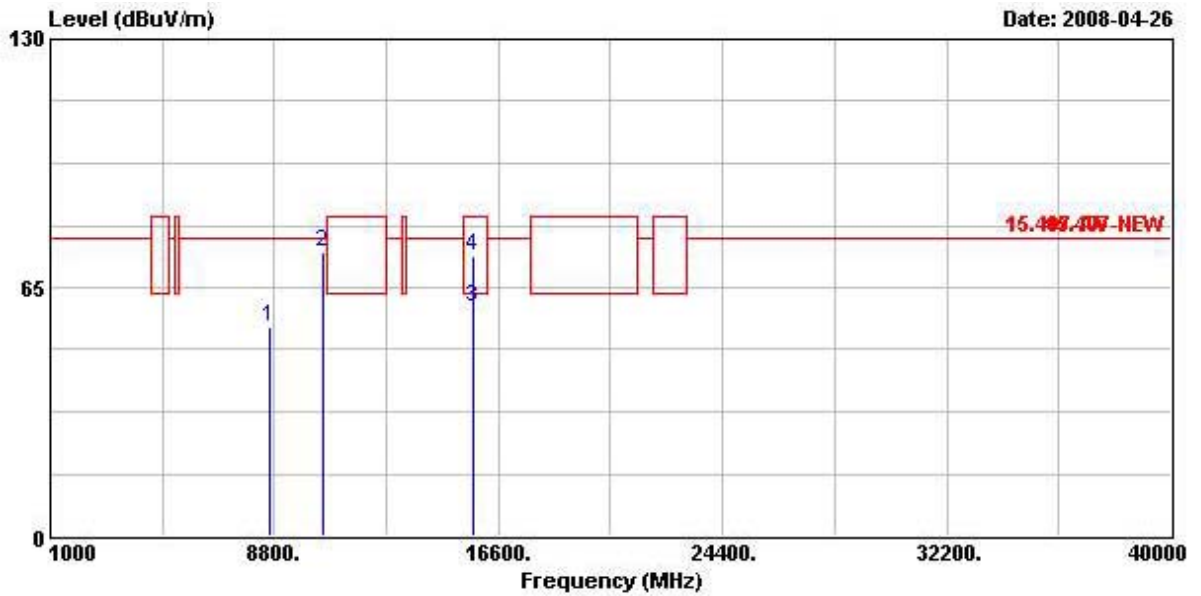
Vertical



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|-----|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 @ | 10396.000 | 74.20 | -3.64 | 77.84 | 60.34 | 39.32 | 6.14 | 31.59 | Peak |
| 2 @ | 15596.000 | 59.99 | -3.55 | 63.54 | 44.73 | 37.54 | 7.38 | 29.67 | Average |
| 3 | 15596.000 | 74.37 | -9.17 | 83.54 | 59.11 | 37.54 | 7.38 | 29.67 | Peak |

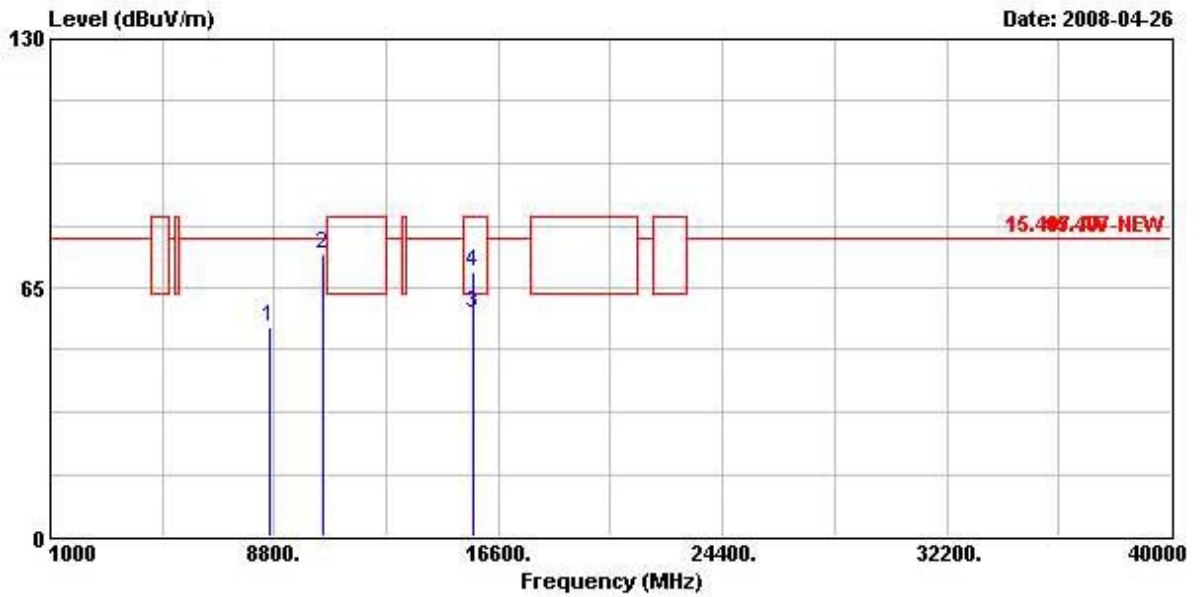
| | | | |
|---------------|---------------|---------------|---------------|
| Test date | Apr. 26, 2008 | Test Site No. | 03CH03-HY |
| Temperature | 26 | Humidity | 54% |
| Test Engineer | Duncan | Configuration | 802.11a CH 48 |

Horizontal



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|-----|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBUV/m | dB | dBUV/m | dBuV | dB/m | dB | dB | |
| 1 | 8604.000 | 54.45 | -23.39 | 77.84 | 43.61 | 38.36 | 5.28 | 32.81 | PEAK |
| 2 @ | 10484.000 | 74.20 | -3.64 | 77.84 | 59.92 | 39.30 | 6.23 | 31.25 | PEAK |
| 3 @ | 15724.000 | 59.75 | -3.79 | 63.54 | 44.35 | 37.59 | 7.41 | 29.60 | Average |
| 4 | 15724.000 | 73.50 | -10.04 | 83.54 | 58.10 | 37.59 | 7.41 | 29.60 | PEAK |

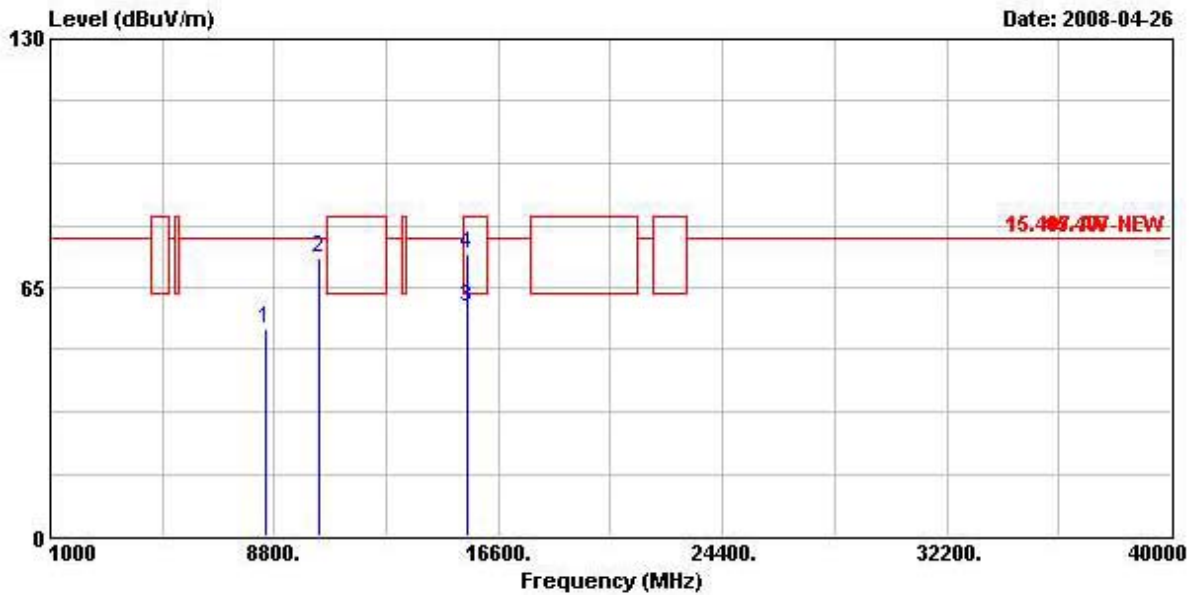
Vertical



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBUV/m | dB | dBUV/m | dBuV | dB/m | dB | dB | |
| 1 | 8608.000 | 54.74 | -23.10 | 77.84 | 43.89 | 38.37 | 5.28 | 32.81 | PEAK |
| 2 | 10480.000 | 73.84 | -4.00 | 77.84 | 59.56 | 39.30 | 6.23 | 31.25 | PEAK |
| 3 | 15728.000 | 58.18 | -5.36 | 63.54 | 42.76 | 37.59 | 7.41 | 29.58 | Average |
| 4 | 15728.000 | 68.93 | -14.61 | 83.54 | 53.52 | 37.59 | 7.41 | 29.58 | PEAK |

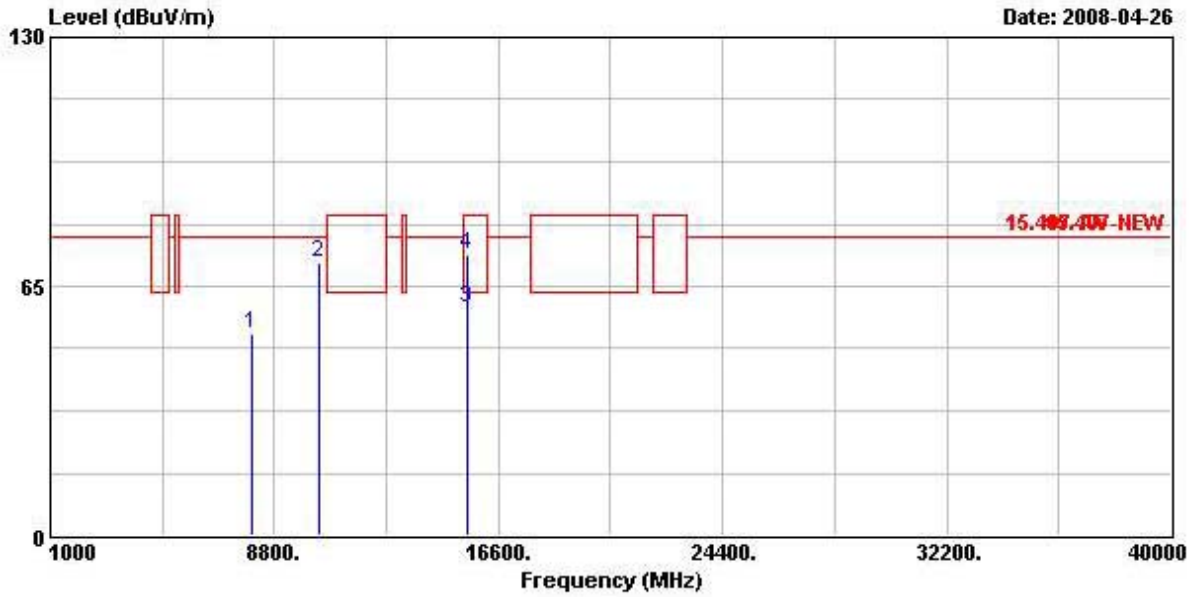
| | | | |
|---------------|---------------|---------------|-----------------------|
| Test date | Apr. 26, 2008 | Test Site No. | 03CH03-HY |
| Temperature | 26 | Humidity | 54% |
| Test Engineer | Duncan | Configuration | 802.11n CH 36 (20MHz) |

Horizontal



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 8504.000 | 53.99 | -23.85 | 77.84 | 43.01 | 38.30 | 5.49 | 32.81 | PEAK |
| 2 | 10360.000 | 72.73 | -5.11 | 77.84 | 58.99 | 39.33 | 6.09 | 31.67 | PEAK |
| 3 | 15537.500 | 59.97 | -3.57 | 63.54 | 44.78 | 37.51 | 7.37 | 29.69 | Average |
| 4 | 15537.500 | 74.01 | -9.53 | 83.54 | 58.82 | 37.51 | 7.37 | 29.69 | PEAK |

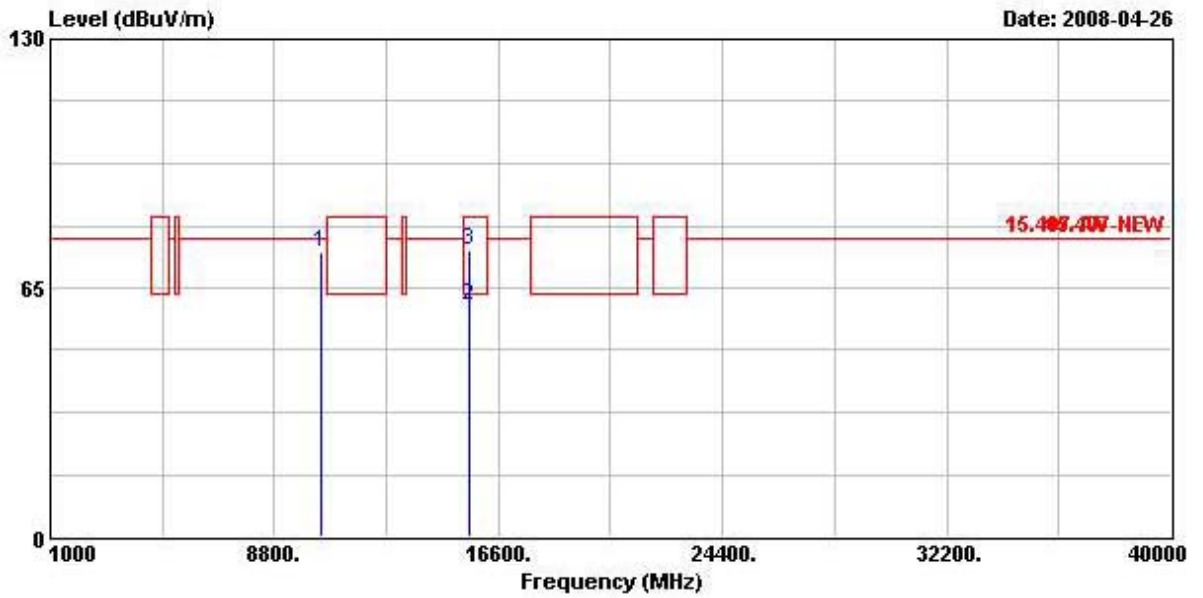
Vertical



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|-----|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 8000.000 | 52.57 | -25.27 | 77.84 | 42.85 | 37.80 | 4.71 | 32.79 | PEAK |
| 2 | 10364.000 | 70.98 | -6.86 | 77.84 | 57.24 | 39.33 | 6.09 | 31.67 | PEAK |
| 3 @ | 15540.700 | 59.43 | -4.11 | 63.54 | 44.24 | 37.51 | 7.37 | 29.69 | Average |
| 4 | 15540.700 | 73.32 | -10.22 | 83.54 | 58.13 | 37.51 | 7.37 | 29.69 | PEAK |

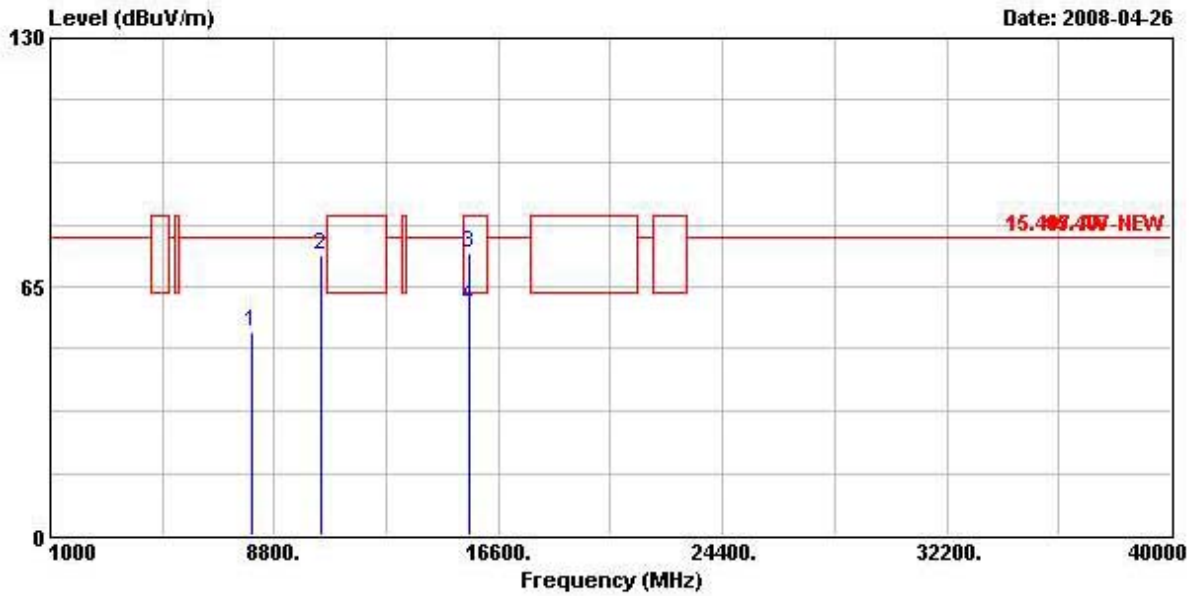
| | | | |
|---------------|---------------|---------------|-----------------------|
| Test date | Apr. 26, 2008 | Test Site No. | 03CH03-HY |
| Temperature | 26 | Humidity | 54% |
| Test Engineer | Duncan | Configuration | 802.11n CH 40 (20MHz) |

Horizontal



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 10404.000 | 74.39 | -3.45 | 77.84 | 60.44 | 39.32 | 6.14 | 31.51 | PEAK |
| 2 | 15600.600 | 60.48 | -3.06 | 63.54 | 45.21 | 37.54 | 7.38 | 29.65 | Average |
| 3 | 15600.600 | 75.04 | -8.50 | 83.54 | 59.77 | 37.54 | 7.38 | 29.65 | PEAK |

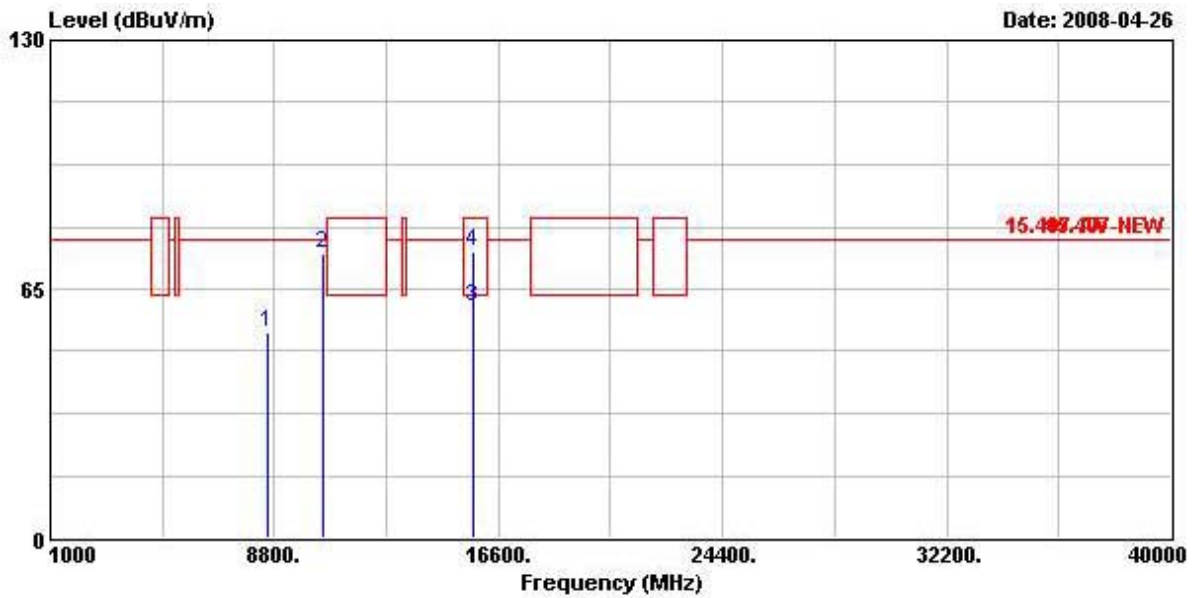
Vertical



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 8016.000 | 53.08 | -24.76 | 77.84 | 43.34 | 37.82 | 4.71 | 32.79 | PEAK |
| 2 | 10404.000 | 73.11 | -4.73 | 77.84 | 59.16 | 39.32 | 6.14 | 31.51 | PEAK |
| 3 | 15600.800 | 73.57 | -9.97 | 83.54 | 58.31 | 37.54 | 7.38 | 29.65 | PEAK |
| 4 | 15600.800 | 59.66 | -3.88 | 63.54 | 44.39 | 37.54 | 7.38 | 29.65 | Average |

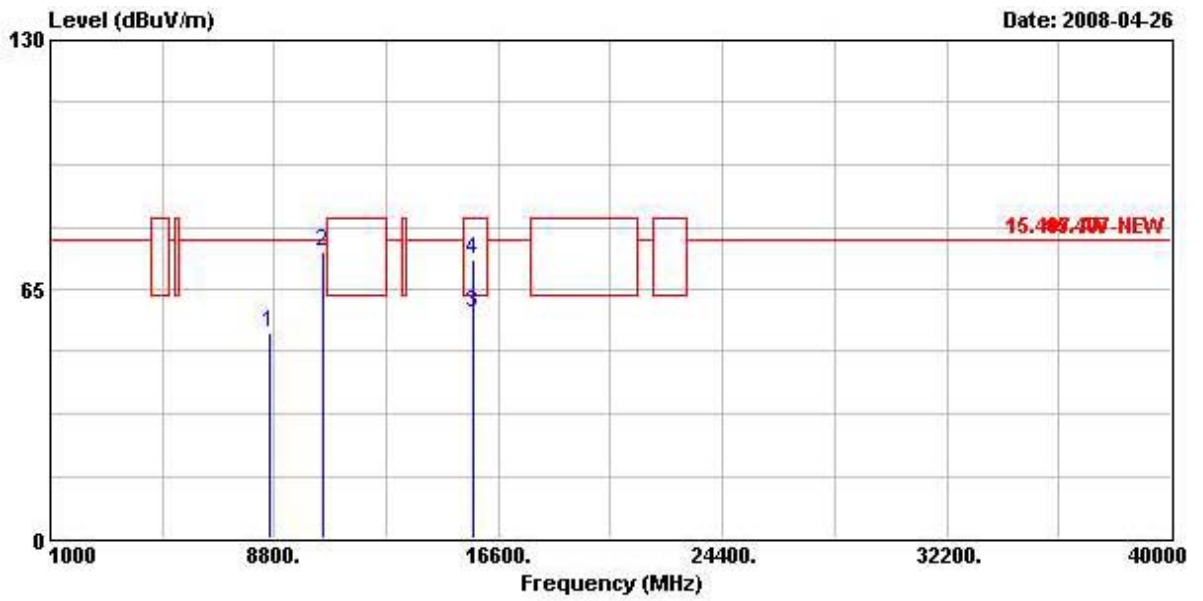
| | | | |
|---------------|---------------|---------------|-----------------------|
| Test date | Apr. 26, 2008 | Test Site No. | 03CH03-HY |
| Temperature | 26 | Humidity | 54% |
| Test Engineer | Duncan | Configuration | 802.11n CH 48 (20MHz) |

Horizontal



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|-----|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBUV/m | dB | dBUV/m | dBuV | dB/m | dB | dB | |
| 1 | 8560.000 | 53.69 | -24.15 | 77.84 | 42.81 | 38.34 | 5.35 | 32.81 | PEAK |
| 2 @ | 10488.000 | 74.51 | -3.33 | 77.84 | 60.23 | 39.30 | 6.23 | 31.25 | PEAK |
| 3 @ | 15724.700 | 60.38 | -3.16 | 63.54 | 44.98 | 37.59 | 7.41 | 29.60 | Average |
| 4 | 15724.700 | 74.88 | -8.66 | 83.54 | 59.48 | 37.59 | 7.41 | 29.60 | PEAK |

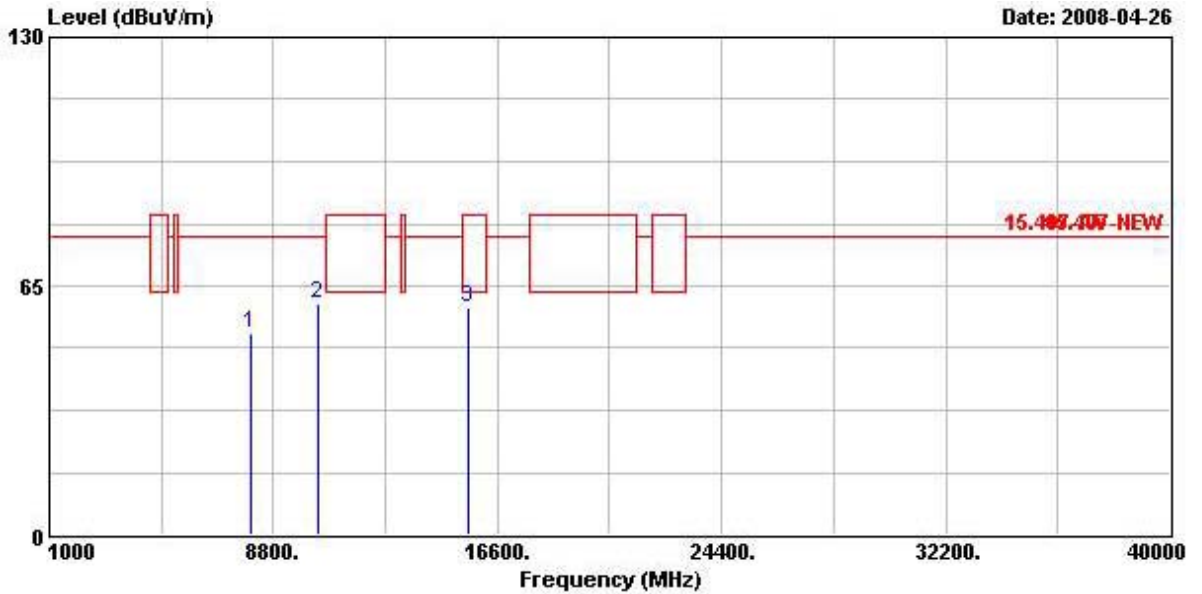
Vertical



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|-----|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBUV/m | dB | dBUV/m | dBuV | dB/m | dB | dB | |
| 1 | 8640.000 | 53.58 | -24.26 | 77.84 | 42.79 | 38.38 | 5.21 | 32.81 | PEAK |
| 2 @ | 10480.000 | 74.60 | -3.24 | 77.84 | 60.33 | 39.30 | 6.23 | 31.25 | PEAK |
| 3 @ | 15721.100 | 58.95 | -4.59 | 63.54 | 43.55 | 37.59 | 7.41 | 29.60 | Average |
| 4 | 15721.100 | 72.97 | -10.57 | 83.54 | 57.57 | 37.59 | 7.41 | 29.60 | PEAK |

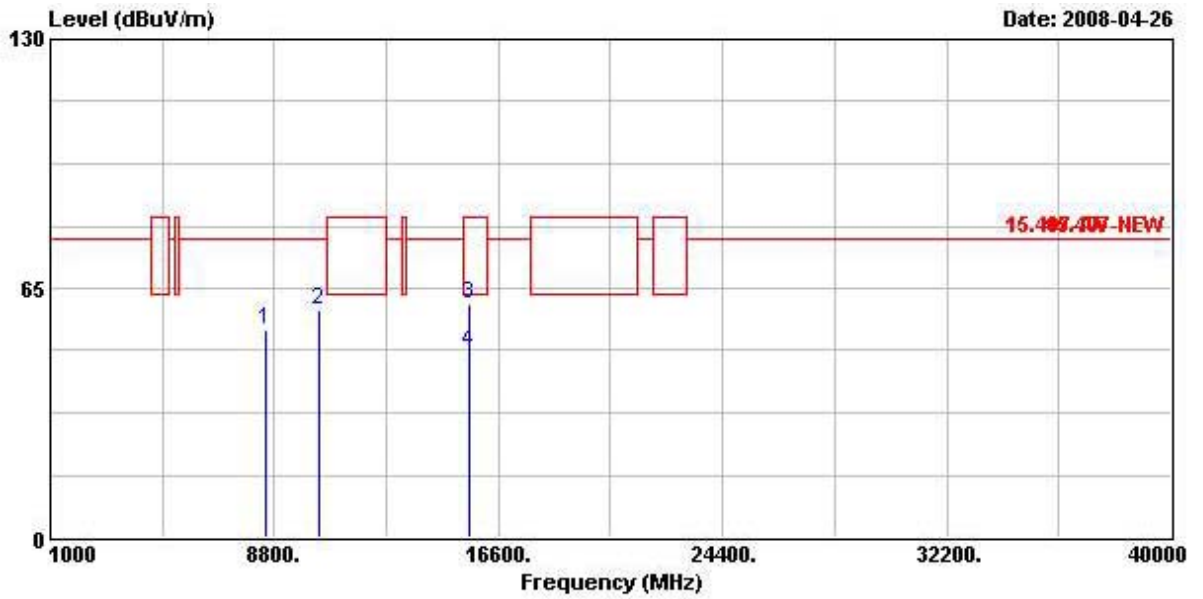
| | | | |
|---------------|---------------|---------------|-----------------------|
| Test date | Apr. 26, 2008 | Test Site No. | 03CH03-HY |
| Temperature | 26 | Humidity | 54% |
| Test Engineer | Duncan | Configuration | 802.11n CH 38 (40MHz) |

Horizontal



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|--------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 8024.000 | 52.54 | -25.30 | 77.84 | 42.80 | 37.82 | 4.71 | 32.79 | PEAK |
| 2 | 10380.000 | 60.11 | -17.73 | 77.84 | 46.24 | 39.32 | 6.14 | 31.59 | PEAK |
| 3 | 15570.000 | 59.44 | -4.10 | 63.54 | 44.21 | 37.53 | 7.38 | 29.68 | PK |

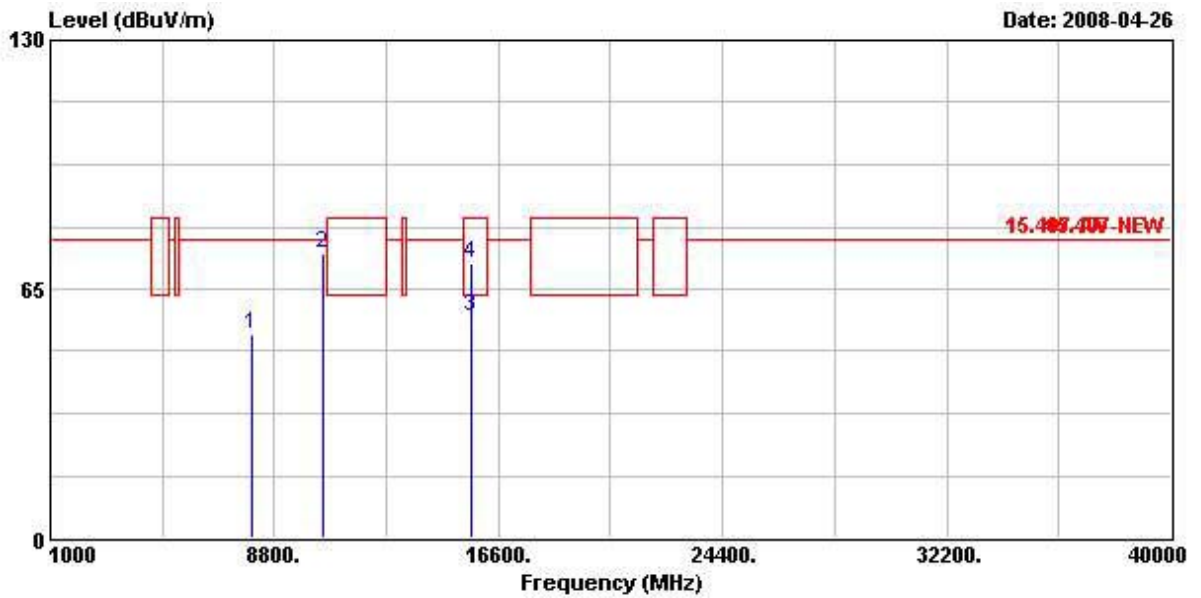
Vertical



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 8512.000 | 54.23 | -23.61 | 77.84 | 43.31 | 38.31 | 5.42 | 32.81 | PEAK |
| 2 | 10384.000 | 59.43 | -18.41 | 77.84 | 45.56 | 39.32 | 6.14 | 31.59 | PEAK |
| 3 | 15566.000 | 60.77 | -22.77 | 83.54 | 45.54 | 37.53 | 7.38 | 29.68 | PEAK |
| 4 | 15566.000 | 48.68 | -14.86 | 63.54 | 33.45 | 37.53 | 7.38 | 29.68 | Average |

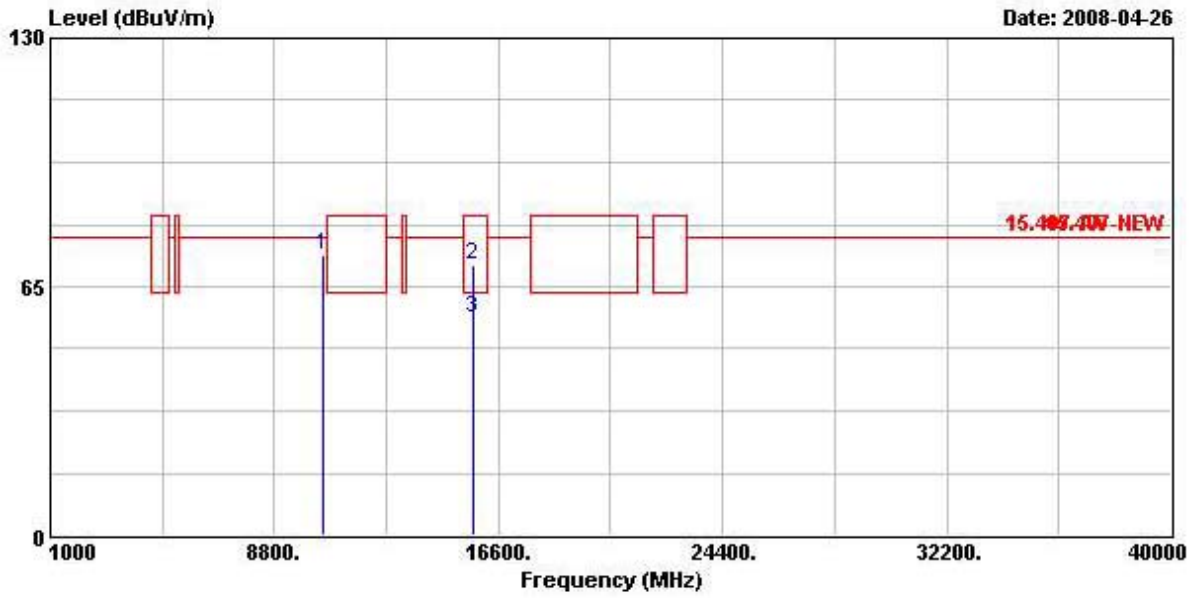
| | | | |
|---------------|---------------|---------------|-----------------------|
| Test date | Apr. 26, 2008 | Test Site No. | 03CH03-HY |
| Temperature | 26 | Humidity | 54% |
| Test Engineer | Duncan | Configuration | 802.11n CH 46 (40MHz) |

Horizontal



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|-----|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 8024.000 | 53.21 | -24.63 | 77.84 | 43.47 | 37.82 | 4.71 | 32.79 | PEAK |
| 2 @ | 10460.000 | 74.04 | -3.80 | 77.84 | 59.84 | 39.31 | 6.23 | 31.34 | PEAK |
| 3 | 15680.800 | 57.67 | -5.87 | 63.54 | 42.30 | 37.58 | 7.40 | 29.61 | AVERAGE |
| 4 | 15680.800 | 71.49 | -12.05 | 83.54 | 56.12 | 37.58 | 7.40 | 29.61 | Peak |

Vertical

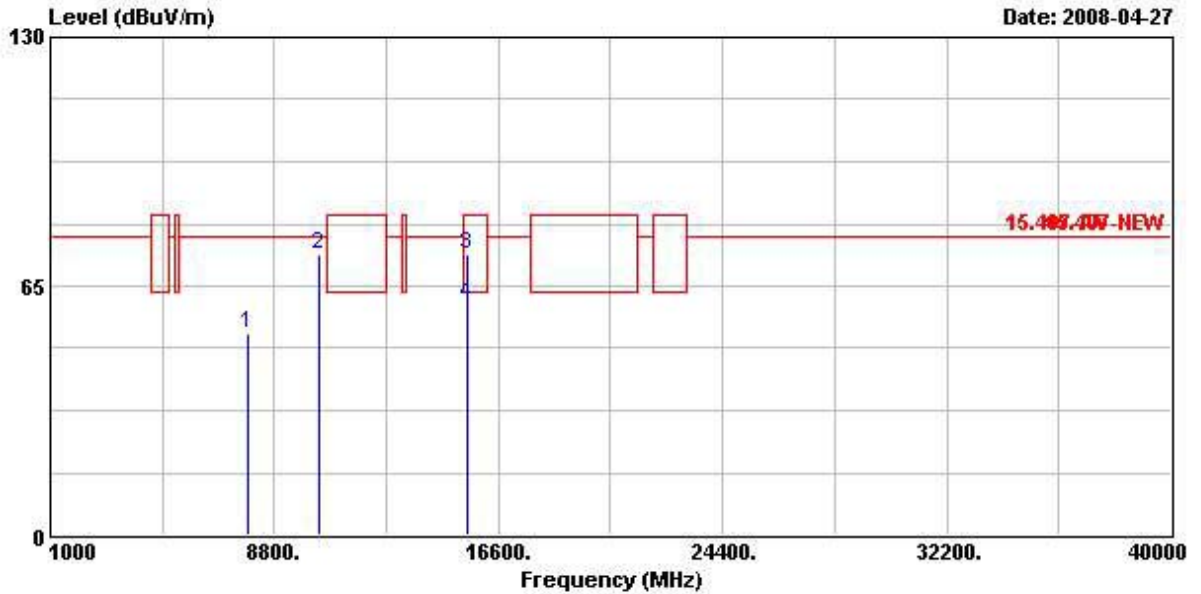


| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 10460.000 | 73.04 | -4.80 | 77.84 | 58.84 | 39.31 | 6.23 | 31.34 | PEAK |
| 2 | 15690.800 | 70.48 | -13.06 | 83.54 | 55.11 | 37.58 | 7.40 | 29.61 | Peak |
| 3 | 15690.800 | 56.92 | -6.62 | 63.54 | 41.56 | 37.58 | 7.40 | 29.61 | AVERAGE |

For Two Chain:

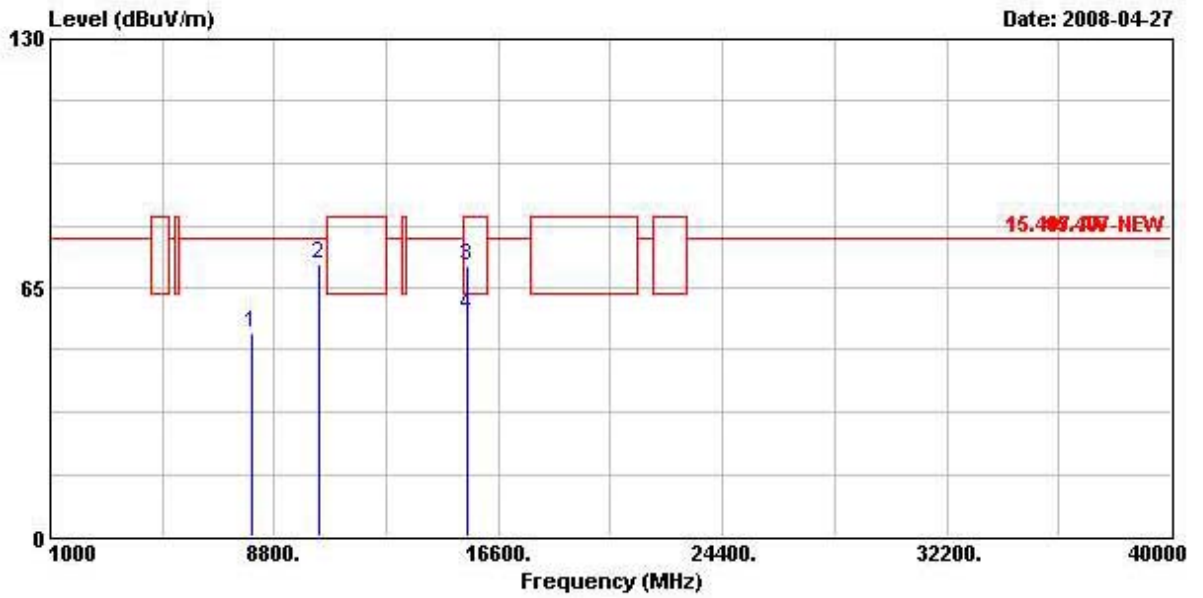
| | | | |
|---------------|---------------|---------------|-----------------------|
| Test date | Apr. 27, 2008 | Test Site No. | 03CH03-HY |
| Temperature | 26 | Humidity | 54% |
| Test Engineer | Duncan | Configuration | 802.11n CH 36 (20MHz) |

Horizontal



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 7896.000 | 52.48 | -25.36 | 77.84 | 42.95 | 37.70 | 4.67 | 32.84 | PEAK |
| 2 | 10356.000 | 73.47 | -4.37 | 77.84 | 59.72 | 39.33 | 6.09 | 31.67 | PEAK |
| 3 | 15537.900 | 73.18 | -10.36 | 83.54 | 57.99 | 37.51 | 7.37 | 29.69 | Peak |
| 4 | 15537.900 | 60.10 | -3.44 | 63.54 | 44.91 | 37.51 | 7.37 | 29.69 | AVERAGE |

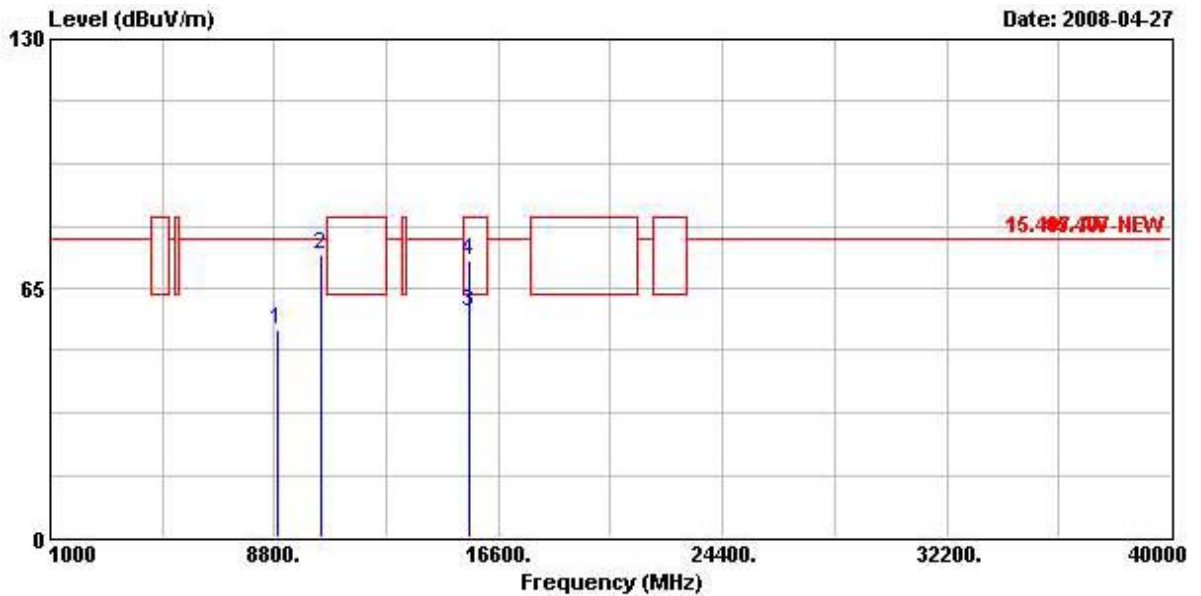
Vertical



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 7984.000 | 53.04 | -24.80 | 77.84 | 43.36 | 37.78 | 4.70 | 32.80 | PEAK |
| 2 | 10352.000 | 71.12 | -6.72 | 77.84 | 57.38 | 39.33 | 6.09 | 31.67 | PEAK |
| 3 | 15539.100 | 70.72 | -12.82 | 83.54 | 55.53 | 37.51 | 7.37 | 29.69 | Peak |
| 4 | 15539.100 | 57.69 | -5.85 | 63.54 | 42.50 | 37.51 | 7.37 | 29.69 | AVERAGE |

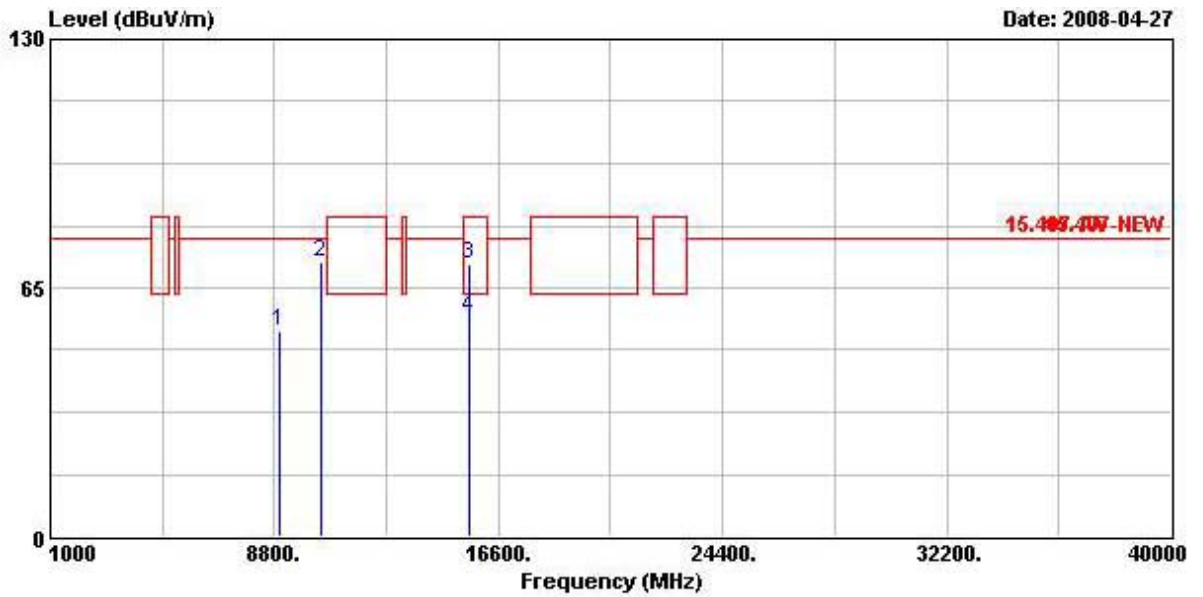
| | | | |
|---------------|---------------|---------------|-----------------------|
| Test date | Apr. 27, 2008 | Test Site No. | 03CH03-HY |
| Temperature | 26 | Humidity | 54% |
| Test Engineer | Duncan | Configuration | 802.11n CH 40 (20MHz) |

Horizontal



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|-----|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBUV/m | dB | dBUV/m | dBuV | dB/m | dB | dB | |
| 1 | 8884.000 | 54.08 | -23.76 | 77.84 | 43.55 | 38.53 | 4.81 | 32.81 | PEAK |
| 2 @ | 10400.000 | 73.97 | -3.87 | 77.84 | 60.02 | 39.32 | 6.14 | 31.51 | PEAK |
| 3 @ | 15601.800 | 58.92 | -4.62 | 63.54 | 43.64 | 37.54 | 7.39 | 29.65 | AVERAGE |
| 4 | 15601.800 | 72.23 | -11.31 | 83.54 | 56.95 | 37.54 | 7.39 | 29.65 | Peak |

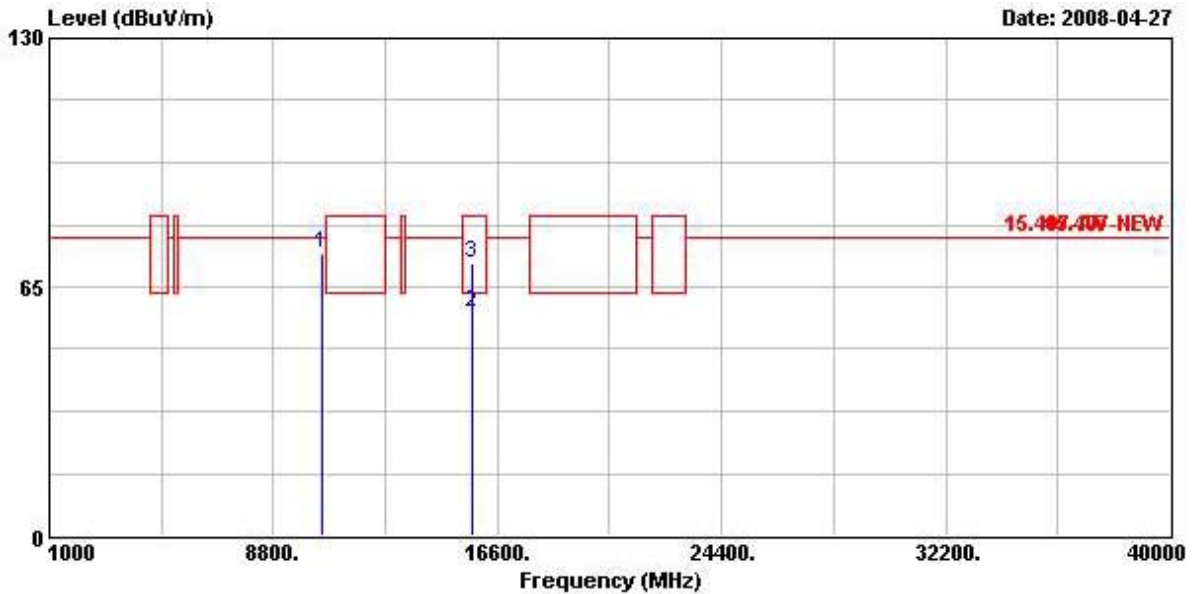
Vertical



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBUV/m | dB | dBUV/m | dBuV | dB/m | dB | dB | |
| 1 | 8956.000 | 53.48 | -24.36 | 77.84 | 43.05 | 38.57 | 4.67 | 32.81 | PEAK |
| 2 | 10404.000 | 71.78 | -6.06 | 77.84 | 57.82 | 39.32 | 6.14 | 31.51 | PEAK |
| 3 | 15601.800 | 71.10 | -12.44 | 83.54 | 55.82 | 37.54 | 7.39 | 29.65 | Peak |
| 4 | 15601.800 | 57.45 | -6.09 | 63.54 | 42.18 | 37.54 | 7.39 | 29.65 | AVERAGE |

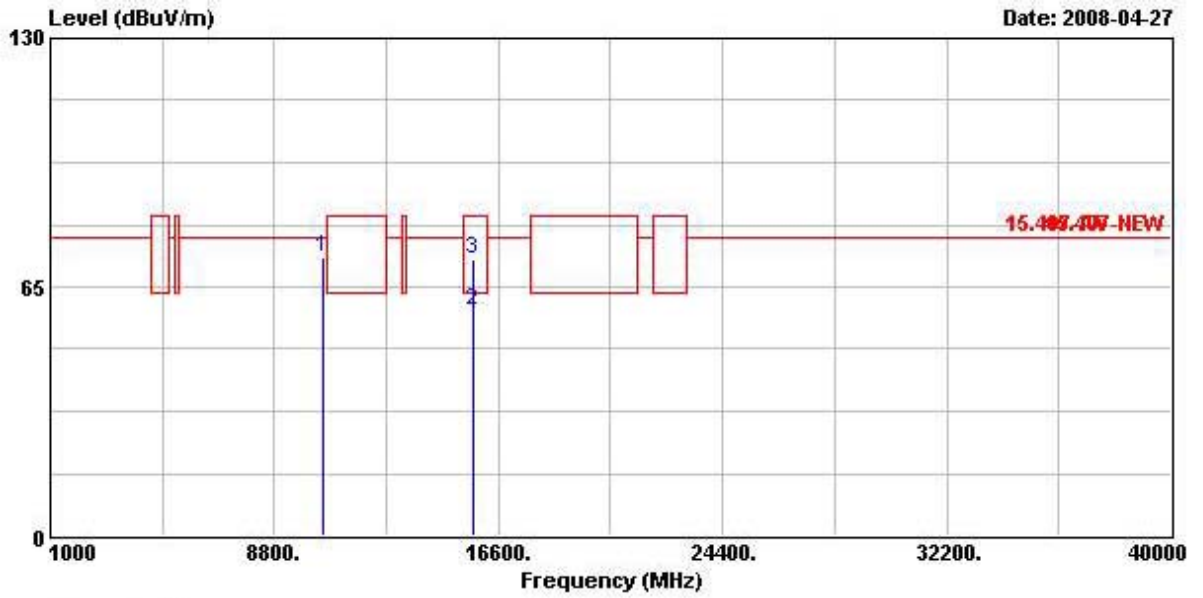
| | | | |
|---------------|---------------|---------------|-----------------------|
| Test date | Apr. 27, 2008 | Test Site No. | 03CH03-HY |
| Temperature | 26 | Humidity | 54% |
| Test Engineer | Duncan | Configuration | 802.11n CH 48 (20MHz) |

Horizontal



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 10480.000 | 73.94 | -3.90 | 77.84 | 59.66 | 39.30 | 6.23 | 31.25 | PEAK |
| 2 | 15719.900 | 58.12 | -5.42 | 63.54 | 42.72 | 37.59 | 7.41 | 29.60 | AVERAGE |
| 3 | 15719.900 | 71.08 | -12.46 | 83.54 | 55.68 | 37.59 | 7.41 | 29.60 | Peak |

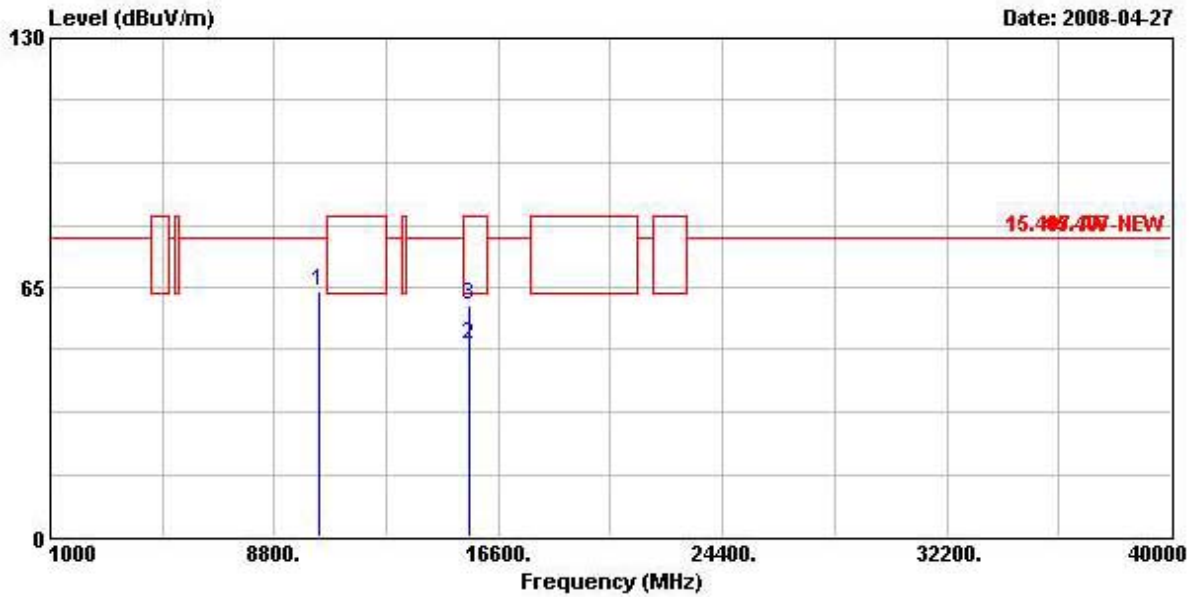
Vertical



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 10480.000 | 72.84 | -5.00 | 77.84 | 58.56 | 39.30 | 6.23 | 31.25 | PEAK |
| 2 | 15722.400 | 58.86 | -4.68 | 63.54 | 43.46 | 37.59 | 7.41 | 29.60 | AVERAGE |
| 3 | 15722.400 | 72.17 | -11.37 | 83.54 | 56.77 | 37.59 | 7.41 | 29.60 | Peak |

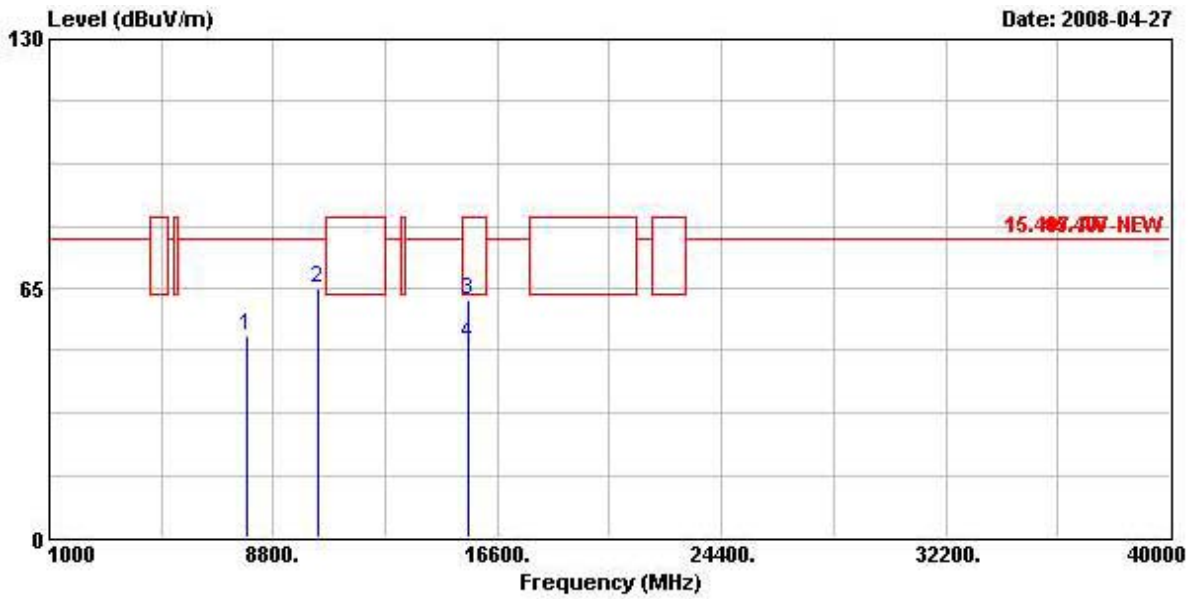
| | | | |
|---------------|---------------|---------------|-----------------------|
| Test date | Apr. 27, 2008 | Test Site No. | 03CH03-HY |
| Temperature | 26 | Humidity | 54% |
| Test Engineer | Duncan | Configuration | 802.11n CH 38 (40MHz) |

Horizontal



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 10380.000 | 64.04 | -13.80 | 77.84 | 50.17 | 39.32 | 6.14 | 31.59 | PEAK |
| 2 | 15574.000 | 50.13 | -13.41 | 63.54 | 34.89 | 37.53 | 7.38 | 29.67 | Average |
| 3 | 15574.000 | 60.59 | -22.95 | 83.54 | 45.35 | 37.53 | 7.38 | 29.67 | PEAK |

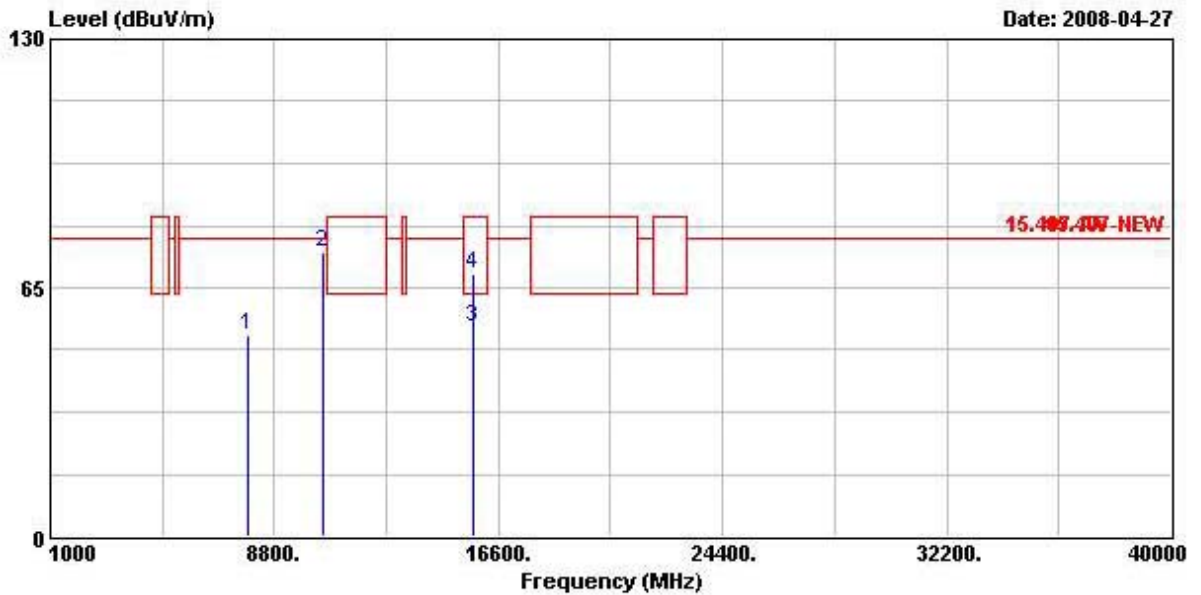
Vertical



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBUV/m | dB | dBUV/m | dBuV | dB/m | dB | dB | |
| 1 | 7908.000 | 52.80 | -25.04 | 77.84 | 43.26 | 37.70 | 4.67 | 32.83 | PEAK |
| 2 | 10380.000 | 65.04 | -12.80 | 77.84 | 51.17 | 39.32 | 6.14 | 31.59 | PEAK |
| 3 | 15576.000 | 61.65 | -21.89 | 83.54 | 46.41 | 37.53 | 7.38 | 29.67 | PEAK |
| 4 | 15576.000 | 50.32 | -13.22 | 63.54 | 35.08 | 37.53 | 7.38 | 29.67 | Average |

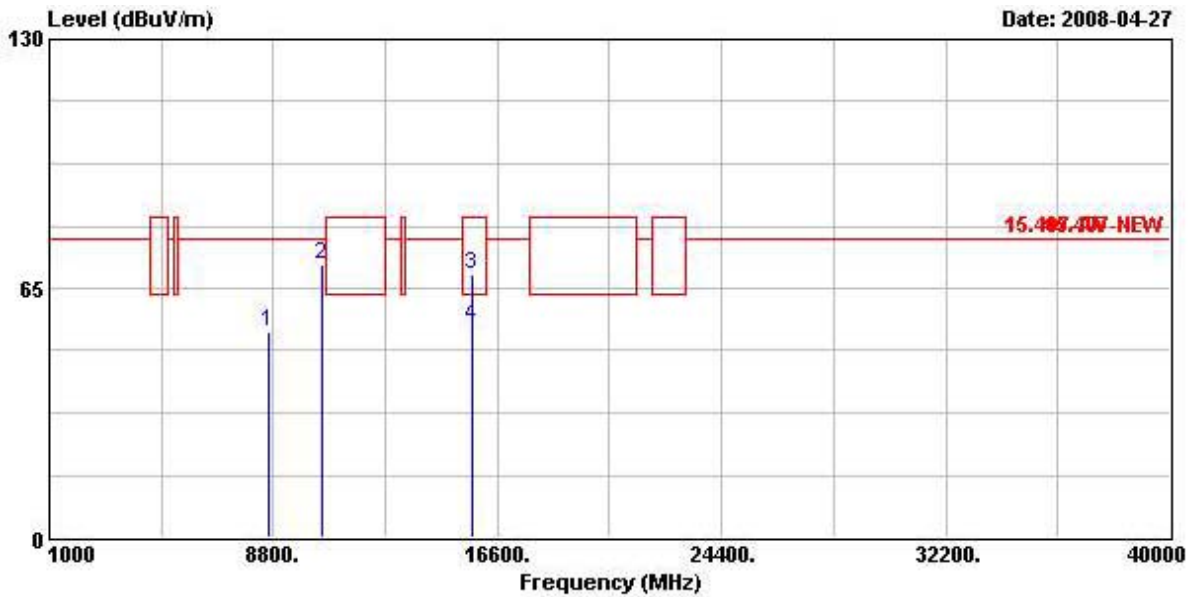
| | | | |
|---------------|---------------|---------------|-----------------------|
| Test date | Apr. 27, 2008 | Test Site No. | 03CH03-HY |
| Temperature | 26 | Humidity | 54% |
| Test Engineer | Duncan | Configuration | 802.11n CH 46 (40MHz) |

Horizontal



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|-----|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBUV/m | dB | dBUV/m | dBuV | dB/m | dB | dB | |
| 1 | 7904.000 | 52.84 | -25.00 | 77.84 | 43.30 | 37.70 | 4.67 | 32.83 | PEAK |
| 2 @ | 10460.000 | 74.21 | -3.63 | 77.84 | 60.01 | 39.31 | 6.23 | 31.34 | PEAK |
| 3 | 15692.400 | 54.44 | -9.10 | 63.54 | 39.08 | 37.58 | 7.40 | 29.61 | AVERAGE |
| 4 | 15692.400 | 68.47 | -15.07 | 83.54 | 53.10 | 37.58 | 7.40 | 29.61 | Peak |

Vertical



| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|---|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 8624.000 | 53.89 | -23.95 | 77.84 | 43.12 | 38.37 | 5.21 | 32.81 | PEAK |
| 2 | 10460.000 | 71.04 | -6.80 | 77.84 | 56.84 | 39.31 | 6.23 | 31.34 | PEAK |
| 3 | 15687.000 | 68.82 | -14.72 | 83.54 | 53.45 | 37.58 | 7.40 | 29.61 | Peak |
| 4 | 15687.000 | 54.97 | -8.57 | 63.54 | 39.60 | 37.58 | 7.40 | 29.61 | AVERAGE |

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

3.7 Band Edge Emissions Measurement

3.7.1 Limit

For transmitters operating in the 5.15-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz (78.3dBuV/m at 3m); for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

| Frequencies (MHz) | Field Strength (micorvolts/meter) | Measurement Distance (meters) |
|--------------------------|--|--------------------------------------|
| 0.009~0.490 | 2400/F(KHz) | 300 |
| 0.490~1.705 | 24000/F(KHz) | 30 |
| 1.705~30.0 | 30 | 30 |
| 30~88 | 100 | 3 |
| 88~216 | 150 | 3 |
| 216~960 | 200 | 3 |
| Above 960 | 500 | 3 |

3.7.2 Measuring Instruments and Setting

Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

| Spectrum Parameter | Setting |
|---|--|
| Attenuation | Auto |
| Span Frequency | 100 MHz |
| RB / VB (Emission in restricted band) | 1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average |
| RB / VB (Emission in non-restricted band) | 1 MHz /1 MHz for Peak |

3.7.3 Test Procedures

1. The test procedure is the same as section 3.6.3, only the frequency range investigated is limited to 100MHz around band edges.
2. In case the emission is fail due to the used RB/VB is too wide, marker-delta method of FCC Public Notice DA00-705 will be followed.

3.7.4 Test Setup Layout

This test setup layout is the same as that shown in section 3.6.4.

3.7.5 Test Deviation

There is no deviation with the original standard.

3.7.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.7.7 Test Result of Band Edge and Fundamental Emissions

For Single Chain:

| | | | |
|----------------------|---------------|----------------------|-----------------------|
| Test date | Apr. 22, 2008 | Test Site No. | 03CH03-HY |
| Temperature | 26 | Humidity | 54% |
| Test Engineer | Duncan | Configuration | 802.11a CH 36, 40, 48 |

Channel 36

| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|-----|----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 5149.400 | 76.25 | -7.29 | 83.54 | 37.96 | 34.35 | 3.94 | 0.00 | Peak |
| 2 @ | 5177.100 | 123.77 | | | 85.46 | 34.38 | 3.92 | 0.00 | Peak |
| 1 | 5149.950 | 59.83 | -3.71 | 63.54 | 21.54 | 34.35 | 3.94 | 0.00 | Average |
| 2 X | 5177.100 | 114.55 | | | 76.24 | 34.38 | 3.92 | 0.00 | Average |

An item 2 is Fundamental Emissions.

Channel 40

| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|-----|----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 5109.350 | 69.40 | -14.14 | 83.54 | 31.12 | 34.32 | 3.96 | 0.00 | Peak |
| 2 X | 5202.500 | 123.41 | | | 85.11 | 34.40 | 3.90 | 0.00 | Peak |
| 3 | 5368.100 | 69.74 | -13.80 | 83.54 | 31.36 | 34.57 | 3.82 | 0.00 | Peak |
| 1 | 5150.000 | 58.22 | -5.32 | 63.54 | 19.93 | 34.35 | 3.94 | 0.00 | Average |
| 2 X | 5202.500 | 114.46 | | | 76.16 | 34.40 | 3.90 | 0.00 | Average |
| 3 | 5399.150 | 57.92 | -5.62 | 63.54 | 19.52 | 34.60 | 3.80 | 0.00 | Average |

An item 2 is Fundamental Emissions.

Channel 48

| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|-----|----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 5057.200 | 69.69 | -13.85 | 83.54 | 31.44 | 34.27 | 3.98 | 0.00 | Peak |
| 2 X | 5242.800 | 121.22 | | | 82.89 | 34.45 | 3.88 | 0.00 | Peak |
| 3 | 5370.800 | 69.89 | -13.65 | 83.54 | 31.51 | 34.57 | 3.82 | 0.00 | Peak |
| 1 | 5113.200 | 58.14 | -5.40 | 63.54 | 19.86 | 34.32 | 3.96 | 0.00 | Average |
| 2 X | 5242.800 | 112.19 | | | 73.86 | 34.45 | 3.88 | 0.00 | Average |
| 3 | 5395.200 | 57.92 | -5.62 | 63.54 | 19.52 | 34.60 | 3.80 | 0.00 | Average |

An item 2 is Fundamental Emissions.

| | | | |
|----------------------|---------------|----------------------|----------------------------------|
| Test date | Apr. 22, 2008 | Test Site No. | 03CH03-HY |
| Temperature | 26 | Humidity | 54% |
| Test Engineer | Duncan | Configuration | 802.11n CH 36, 40, 48 (20MHz) |

Channel 36

| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|-----|-------------|--------------|-------------------|-------------------|--------------------------|-----------------------|-------------------|----------------------|---------------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 5149.500 | 78.10 | -5.44 | 83.54 | 39.81 | 34.35 | 3.94 | 0.00 | Peak |
| 2 @ | 5177.900 | 124.84 | | | 86.53 | 34.38 | 3.92 | 0.00 | Peak |
| 1 | 5149.900 | 60.76 | -2.78 | 63.54 | 22.47 | 34.35 | 3.94 | 0.00 | Average |
| 2 X | 5181.000 | 115.00 | | | 76.69 | 34.38 | 3.92 | 0.00 | Average |

An item 2 is Fundamental Emissions.

Channel 40

| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|-----|-------------|--------------|-------------------|-------------------|--------------------------|-----------------------|-------------------|----------------------|---------------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 5094.500 | 70.01 | -13.53 | 83.54 | 31.75 | 34.30 | 3.96 | 0.00 | Peak |
| 2 @ | 5197.550 | 123.81 | | | 85.51 | 34.40 | 3.90 | 0.00 | Peak |
| 3 | 5397.350 | 69.50 | -14.04 | 83.54 | 31.10 | 34.60 | 3.80 | 0.00 | Peak |
| 1 | 5149.000 | 58.41 | -5.13 | 63.54 | 20.12 | 34.35 | 3.94 | 0.00 | Average |
| 2 X | 5197.550 | 114.20 | | | 75.90 | 34.40 | 3.90 | 0.00 | Average |
| 3 | 5390.150 | 58.05 | -5.49 | 63.54 | 19.67 | 34.58 | 3.80 | 0.00 | Average |

An item 2 is Fundamental Emissions.

Channel 48

| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|-----|-------------|--------------|-------------------|-------------------|--------------------------|-----------------------|-------------------|----------------------|---------------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 5129.200 | 69.67 | -13.87 | 83.54 | 31.39 | 34.33 | 3.94 | 0.00 | Peak |
| 2 X | 5241.200 | 122.36 | | | 84.05 | 34.43 | 3.88 | 0.00 | Peak |
| 3 | 5433.200 | 70.13 | -13.41 | 83.54 | 31.72 | 34.63 | 3.78 | 0.00 | Peak |
| 1 | 5126.400 | 58.37 | -5.17 | 63.54 | 20.09 | 34.33 | 3.94 | 0.00 | Average |
| 2 X | 5241.200 | 112.88 | | | 74.57 | 34.43 | 3.88 | 0.00 | Average |
| 3 | 5387.200 | 58.16 | -5.38 | 63.54 | 19.78 | 34.58 | 3.80 | 0.00 | Average |

An item 2 is Fundamental Emissions.

| | | | |
|----------------------|--------------|----------------------|---------------------------|
| Test date | Apr. 22 2008 | Test Site No. | 03CH03-HY |
| Temperature | 26 | Humidity | 54% |
| Test Engineer | Duncan | Configuration | 802.11n CH 38, 46 (40MHz) |

Channel 38

| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|-----|-------------|--------------|-------------------|-------------------|--------------------------|-----------------------|-------------------|----------------------|---------------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 5149.800 | 77.24 | -6.30 | 83.54 | 38.95 | 34.35 | 3.94 | 0.00 | Peak |
| 2 X | 5192.200 | 114.31 | | | 76.01 | 34.40 | 3.90 | 0.00 | Peak |
| 1 | 5149.900 | 62.24 | -1.30 | 63.54 | 23.95 | 34.35 | 3.94 | 0.00 | Average |
| 2 X | 5192.800 | 104.66 | | | 66.36 | 34.40 | 3.90 | 0.00 | Average |

An item 2 is Fundamental Emissions.

Channel 46

| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|-----|-------------|--------------|-------------------|-------------------|--------------------------|-----------------------|-------------------|----------------------|---------------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 5138.150 | 74.76 | -8.78 | 83.54 | 36.48 | 34.33 | 3.94 | 0.00 | Peak |
| 2 X | 5219.740 | 122.88 | | | 84.56 | 34.42 | 3.90 | 0.00 | Peak |
| 3 | 5387.020 | 71.08 | -12.46 | 83.54 | 32.70 | 34.58 | 3.80 | 0.00 | Peak |
| 1 | 5149.950 | 60.62 | -2.92 | 63.54 | 22.33 | 34.35 | 3.94 | 0.00 | Average |
| 2 X | 5219.740 | 113.74 | | | 75.42 | 34.42 | 3.90 | 0.00 | Average |
| 3 | 5372.670 | 60.25 | -3.29 | 63.54 | 21.87 | 34.57 | 3.82 | 0.00 | Average |

An item 2 is Fundamental Emissions.

For Two Chain:

| | | | |
|----------------------|---------------|----------------------|----------------------------------|
| Test date | Apr. 22, 2008 | Test Site No. | 03CH03-HY |
| Temperature | 26 | Humidity | 54% |
| Test Engineer | Duncan | Configuration | 802.11n CH 36, 40, 48 (20MHz) |

Channel 36

| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|------------|-----------------|---------------|-------------------|-------------------|--------------------------|-----------------------|-------------------|----------------------|----------------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 5149.900 | 78.08 | -5.46 | 83.54 | 39.79 | 34.35 | 3.94 | 0.00 | Peak |
| 2 @ | 5178.200 | 126.00 | | | 87.69 | 34.38 | 3.92 | 0.00 | Peak |
| 1 | 5149.900 | 61.94 | -1.60 | 63.54 | 23.65 | 34.35 | 3.94 | 0.00 | Average |
| 2 X | 5178.600 | 115.29 | | | 76.98 | 34.38 | 3.92 | 0.00 | Average |

An item 2 is Fundamental Emissions.

Channel 40

| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|------------|-----------------|---------------|-------------------|-------------------|--------------------------|-----------------------|-------------------|----------------------|----------------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 5102.150 | 70.71 | -12.83 | 83.54 | 32.45 | 34.30 | 3.96 | 0.00 | Peak |
| 2 @ | 5192.150 | 126.88 | | | 88.58 | 34.40 | 3.90 | 0.00 | Peak |
| 3 | 5416.700 | 69.57 | -13.97 | 83.54 | 31.16 | 34.62 | 3.80 | 0.00 | Peak |
| 1 | 5149.950 | 59.41 | -4.13 | 63.54 | 21.12 | 34.35 | 3.94 | 0.00 | Average |
| 2 X | 5192.150 | 115.84 | | | 77.54 | 34.40 | 3.90 | 0.00 | Average |
| 3 | 5400.950 | 58.27 | -5.27 | 63.54 | 19.87 | 34.60 | 3.80 | 0.00 | Average |

An item 2 is Fundamental Emissions.

Channel 48

| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|------------|-----------------|---------------|-------------------|-------------------|--------------------------|-----------------------|-------------------|----------------------|----------------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 5129.600 | 69.59 | -13.95 | 83.54 | 31.31 | 34.33 | 3.94 | 0.00 | Peak |
| 2 @ | 5241.600 | 126.82 | | | 88.49 | 34.45 | 3.88 | 0.00 | Peak |
| 3 | 5356.800 | 69.81 | -13.73 | 83.54 | 31.44 | 34.55 | 3.82 | 0.00 | Peak |
| 1 | 5129.200 | 58.66 | -4.88 | 63.54 | 20.38 | 34.33 | 3.94 | 0.00 | Average |
| 2 X | 5241.600 | 116.58 | | | 78.25 | 34.45 | 3.88 | 0.00 | Average |
| 3 | 5386.800 | 58.53 | -5.01 | 63.54 | 20.15 | 34.58 | 3.80 | 0.00 | Average |

An item 2 is Fundamental Emissions.

| | | | |
|----------------------|---------------|----------------------|---------------------------|
| Test date | Apr. 22, 2008 | Test Site No. | 03CH03-HY |
| Temperature | 26 | Humidity | 54% |
| Test Engineer | Duncan | Configuration | 802.11n CH 38, 46 (40MHz) |

Channel 38

| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|------------|-----------------|---------------|-------------------|-------------------|--------------------------|-----------------------|-------------------|----------------------|----------------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 5149.900 | 76.25 | -7.29 | 83.54 | 37.96 | 34.35 | 3.94 | 0.00 | Peak |
| 2 X | 5177.800 | 116.23 | | | 77.92 | 34.38 | 3.92 | 0.00 | Peak |
| 1 | 5149.900 | 62.03 | -1.51 | 63.54 | 23.74 | 34.35 | 3.94 | 0.00 | Average |
| 2 X | 5192.800 | 104.57 | | | 66.27 | 34.40 | 3.90 | 0.00 | Average |

An item 2 is Fundamental Emissions.

Channel 46

| | Freq | Level | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark |
|------------|-----------------|---------------|-------------------|-------------------|--------------------------|-----------------------|-------------------|----------------------|----------------|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | |
| 1 | 5149.950 | 73.87 | -9.67 | 83.54 | 35.58 | 34.35 | 3.94 | 0.00 | Peak |
| 2 @ | 5223.020 | 124.05 | | | 85.73 | 34.42 | 3.90 | 0.00 | Peak |
| 3 | 5372.260 | 71.13 | -12.41 | 83.54 | 32.75 | 34.57 | 3.82 | 0.00 | Peak |
| 1 | 5149.950 | 60.93 | -2.61 | 63.54 | 22.64 | 34.35 | 3.94 | 0.00 | Average |
| 2 X | 5223.020 | 113.33 | | | 75.01 | 34.42 | 3.90 | 0.00 | Average |
| 3 | 5372.670 | 59.95 | -3.59 | 63.54 | 21.57 | 34.57 | 3.82 | 0.00 | Average |

An item 2 is Fundamental Emissions.

Note:

Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

3.8 Frequency Stability Measurement

3.8.1 Limit

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emissions is maintained within the band of operation under all conditions of normal operation as specified in the user’s manual or ±20ppm (IEEE 802.11a specification).

3.8.2 Measuring Instruments and Setting

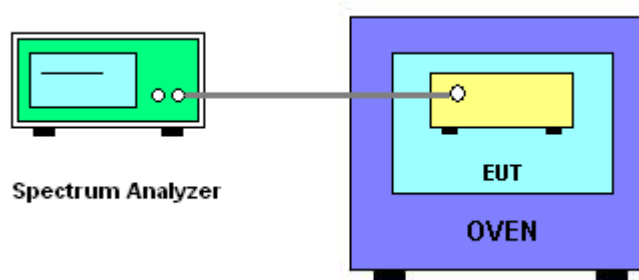
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

| Spectrum Parameter | Setting |
|--------------------|--|
| Attenuation | Auto |
| Span Frequency | Entire absence of modulation emissions bandwidth |
| RB | 10 kHz |
| VB | 10 kHz |
| Sweep Time | Auto |

3.8.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is $(fc-f)/fc \times 10^6$ ppm and the limit is less than ±20ppm (IEEE 802.11a specification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature rule is -30°C~50°C.
8. When measuring maximum conducted output power within multiple antenna systems, add every result of the values by mathematic formula.

3.8.4 Test Setup Layout



3.8.5 Test Deviation

There is no deviation with the original standard.

3.8.6 EUT Operation during Test

The EUT was programmed to be in continuously un-modulation transmitting mode.

3.8.7 Test Result of Frequency Stability

Voltage vs. Frequency Stability

For Single Chain

| Voltage | Measurement Frequency (MHz) |
|-----------------------------|------------------------------------|
| (V) | IEEE 802.11a 5200 |
| 126.5 | 5199.998700 |
| 110 | 5199.998400 |
| 93.5 | 5199.996900 |
| Max. Deviation (MHz) | 0.003100 |
| Max. Deviation (ppm) | 0.60 |

Temperature vs. Frequency Stability

| Temperature | Measurement Frequency (MHz) |
|-----------------------------|------------------------------------|
| () | IEEE 802.11a 5200 |
| -30 | 5199.988700 |
| -20 | 5199.991700 |
| -10 | 5199.994200 |
| 0 | 5199.997400 |
| 10 | 5199.998700 |
| 20 | 5199.998400 |
| 30 | 5199.999200 |
| 40 | 5200.009400 |
| 50 | 5200.015700 |
| Max. Deviation (MHz) | 0.015700 |
| Max. Deviation (ppm) | 3.02 |

For Two Chain

| Voltage | Measurement Frequency (MHz) | |
|----------------------|-----------------------------|---------------------------|
| | IEEE 802.11n 5200 (20MHz) | IEEE 802.11n 5230 (40MHz) |
| (V) | | |
| 126.5 | 5219.9988 | 5229.9988 |
| 110 | 5219.9978 | 5229.9978 |
| 93.5 | 5219.9974 | 5229.9974 |
| Max. Deviation (MHz) | 0.0026 | 0.002600 |
| Max. Deviation (ppm) | 0.50 | 0.50 |

Temperature vs. Frequency Stability

| Temperature | Measurement Frequency (MHz) | |
|----------------------|-----------------------------|---------------------------|
| | IEEE 802.11n 5200 (20MHz) | IEEE 802.11n 5230 (40MHz) |
| () | | |
| -30 | 5219.991700 | 5229.991700 |
| -20 | 5219.988400 | 5229.988400 |
| -10 | 5219.989700 | 5229.989700 |
| 0 | 5219.992800 | 5229.992800 |
| 10 | 5219.994100 | 5229.994100 |
| 20 | 5219.997800 | 5229.998800 |
| 30 | 5219.998800 | 5229.998800 |
| 40 | 5220.001100 | 5230.007500 |
| 50 | 5220.009200 | 5230.010400 |
| Max. Deviation (MHz) | 0.011600 | 0.011600 |
| Max. Deviation (ppm) | 2.22 | 2.2180 |

3.9 Antenna Requirements

3.9.1 Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. 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 the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

3.9.2 Antenna Connector Construction

Please refer to section 2.2 in this test report; antenna connector complied with the requirements.

4 LIST OF MEASURING EQUIPMENTS

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Remark |
|--------------|-----------------------|-----------|------------|------------------|------------------|----------------------|
| Receiver | R&S | ESCS 30 | 836858/024 | 9 kHz - 2.75 GHz | Sep. 11, 2007 | Conduction (CO01-LK) |
| LISN | SCHAFFNER | NNB-41 | 98087 | 9 kHz - 30 MHz | Sep. 21, 2007 | Conduction (CO01-LK) |
| RF Cable-CON | Suhner Switzerland | RG223/U | CB017 | 9 kHz - 30 MHz | Nov. 30, 2007 | Conduction (CO01-LK) |

Note: Calibration Interval of instruments listed above is one year.

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Remark |
|----------------------------|--------------|-----------|------------|-----------------|------------------|---------------------|
| Spectrum Analyzer | R&S | FSP30 | 100023 | 9kHz ~ 30GHz | Jan. 10, 2008 | Conducted (TH01-HY) |
| Power Meter | R&S | NRVS | 100444 | DC ~ 40GHz | Jun. 27, 2007 | Conducted (TH01-HY) |
| Power Sensor | R&S | NRV-Z51 | 100458 | DC ~ 30GHz | Jun. 27, 2007 | Conducted (TH01-HY) |
| Power Sensor | R&S | NRV-Z32 | 100057 | 30MHz ~ 6GHz | Jun. 27, 2007 | Conducted (TH01-HY) |
| DC Power Source | G.W. | GPC-6030D | C671845 | DC 1V ~ 60V | Mar. 13, 2008 | Conducted (TH01-HY) |
| Temp. and Humidity Chamber | KSON | THS-C3L | 612 | N/A | Oct. 01, 2007 | Conducted (TH01-HY) |
| RF CABLE-1m | Jye Bao | RG142 | CB034-1m | 20MHz ~ 7GHz | Dec. 01, 2007 | Conducted (TH01-HY) |
| RF CABLE-2m | Jye Bao | RG142 | CB035-2m | 20MHz ~ 1GHz | Dec. 01, 2007 | Conducted (TH01-HY) |
| Vector Signal Generator | R&S | SMU200A | 102098 | 100kHz ~ 6GHz | Nov. 14, 2007 | Conducted (TH01-HY) |
| Signal Generator | R&S | SMR40 | 100116 | 10MHz ~ 40GHz | Mar. 10, 2008 | Conducted (TH01-HY) |

Note: Calibration Interval of instruments listed above is one year.

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Remark |
|--------------------------|----------------|--------------|-------------|----------------------|------------------|--------------------------|
| 3m Semi Anechoic Chamber | SIDT FRANKONIA | SAC-3M | 03CH03-HY | 30 MHz - 1 GHz 3m | Jun. 14, 2007 | Radiation (03CH03-HY) |
| Amplifier | SCHAFFNER | COA9231A | 18667 | 9 kHz - 2 GHz | Jan. 14, 2008 | Radiation (03CH03-HY) |
| Amplifier | Agilent | 8449B | 3008A02120 | 1 GHz - 26.5 GHz | Jun. 07, 2007 | Radiation (03CH03-HY) |
| Spectrum Analyzer | R&S | FSP40 | 100305 | 9 kHz - 40 GHz | Sep. 27, 2007 | Radiation (03CH03-HY) |
| Bilog Antenna | SCHAFFNER | CBL 6112D | 22237 | 30 MHz – 1 GHz | Jul. 21, 2007 | Radiation (03CH03-HY) |
| Horn Antenna | EMCO | 3115 | 6741 | 1GHz ~ 18GHz | Mar. 04, 2008 | Radiation (03CH03-HY) |
| Horn Antenna | SCHWARZBECK | BBHA9170 | BBHA9170154 | 15 GHz - 40 GHz | Jan.18, 2008 | Radiation (03CH03-HY) |
| RF Cable-R03m | Jye Bao | RG142 | CB021 | 30 MHz - 1 GHz | Dec. 03, 2007 | Radiation (03CH03-HY) |
| RF Cable-HIGH | SUHNER | SUCOFLEX 106 | 03CH03-HY | 1 GHz - 40 GHz | Dec. 03, 2007 | Radiation (03CH03-HY) |
| Turn Table | HD | DS 420 | 420/650/00 | 0 – 360 degree | N/A | Radiation (03CH03-HY) |
| Antenna Mast | HD | MA 240 | 240/560/00 | 1 m - 4 m | N/A | Radiation (03CH03-HY) |

Note: Calibration Interval of instruments listed above is one year.

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Remark |
|-----------------|--------------|---------------|-------------|-------------------|------------------|--------------------------|
| AC Power Source | HPC | HPA-500W | HPA-9100024 | AC 0 ~ 300V | May 04, 2007* | Conducted (TH01-HY) |
| Amplifier | MITEQ | AMF-6F-260400 | 9121372 | 26.5 GHz - 40 GHz | Jan. 22, 2007* | Radiation (03CH03-HY) |
| Loop Antenna | R&S | HFH2-Z2 | 860004/001 | 9 kHz - 30 MHz | May 22, 2008* | Radiation (03CH03-HY) |

Note: Calibration Interval of instruments listed above is two year.

5 TEST LOCATION

| | |
|--------|--|
| SHIJR | ADD : 6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C. TEL : 886-2-2696-2468 FAX : 886-2-2696-2255 |
| HWA YA | ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-318-0055 |
| LINKOU | ADD : No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C TEL : 886-2-2601-1640 FAX : 886-2-2601-1695 |
| DUNGHU | ADD : No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C. TEL : 886-2-2631-4739 FAX : 886-2-2631-9740 |
| JUNGHE | ADD : 7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C. TEL : 886-2-8227-2020 FAX : 886-2-8227-2626 |
| NEIHU | ADD : 4Fl., No. 339, Hsin Hu 2 nd Rd., Taipei 114, Taiwan, R.O.C. TEL : 886-2-2794-8886 FAX : 886-2-2794-9777 |
| JHUBEI | ADD : No.8, Lane 728, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085 |

6 TAF CERTIFICATE OF ACCREDITATION



Certificate No. : L1190-070110

財團法人全國認證基金會
Taiwan Accreditation Foundation

Certificate of Accreditation

This is to certify that

Sporton International Inc.

EMC & Wireless Communications Laboratory

No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien,
Taiwan, R.O.C.

is accredited in respect of laboratory

- Accreditation Criteria : ISO/IEC 17025:2005
- Accreditation Number : 1190
- Originally Accredited : December 15, 2003
- Effective Period : January 10, 2007 to January 09, 2010
- Accredited Scope : Testing Field, see described in the Appendix
Accreditation Program for Designated Testing Laboratory
- Specific Accreditation Program : for Commodities Inspection
Accreditation Program for Telecommunication Equipment Testing Laboratory

Jay-San Chen
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The Appendix forms an integral part of this Certificate, which shall be invalid when used without the Appendix.