

# FCC RADIO TEST REPORT

according to

47 CFR FCC Part 15 Subpart E § 15.407

**Equipment** : SX-DS-3000WAN  
**Brand Name** : Silex  
**Model No.** : SX-DS-3000WAN  
**Filing Type** : New Application  
**Applicant** : Silex technology, Inc.  
2-3-1 Hikaridai, Seika-cho,  
Soraku-gun, Kyoto, Japan  
**Manufacturer** : EDIMAX Technology Co.,Ltd.  
No.3, Wu-Chuan 3rd Road, Wu-Gu,  
New Taipei City 248, Taiwan  
**FCC ID** : N6C-SXDS3000WAN  
**Received Date** : Sep. 09, 2011  
**Final Test Date** : Nov. 09, 2011

## Statement

Test result included is only for the PIFA antennas 802.11a/n (5150~5250MHz; 5250~5350MHz) 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.***

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

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## History of This Test Report

Original Issue Date: Nov. 14, 2011

Report No.: FR192614AN

■ 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 : SX-DS-3000WAN  
Brand Name : Silex  
Model No. : SX-DS-3000WAN  
Applicant : Silex technology, Inc.  
2-3-1 Hikaridai, Seika-cho,  
Soraku-gun, Kyoto, Japan

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Sep. 09, 2011 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 / Assistant Manager

**SPORTON International Inc.**

No. 52 Hwa Ya 1<sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan 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 | 8.14 dB     |
| 3.2                                            | 15.407(a)    | 26dB Spectrum Bandwidth           | Complies | -           |
| 3.3                                            | 15.407(a)    | Maximum Conducted Output Power    | Complies | 1.19 dB     |
| 3.4                                            | 15.407(a)    | Power Spectral Density            | Complies | 0.40 dB     |
| 3.5                                            | 15.407(a)    | Peak Excursion                    | Complies | 6.03 dB     |
| 3.6                                            | 15.407(b)    | Radiated Emissions                | Complies | 1.34 dB     |
| 3.7                                            | 15.407(b)    | Band Edge Emissions               | Complies | 1.16 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 <sup>-8</sup> | 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 802.11a/n is shown in this report. For more detailed features description, please refer to the manufacturer's specifications or user's manual.

| Items                               | Description                                                                                                            |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Power Type                          | 5Vdc from adapter                                                                                                      |
| Data Modulation<br>Data Rate (Mbps) | OFDM for IEEE 802.11a (BPSK / QPSK / 16QAM / 64QAM)<br>(6/9/12/18/24/36/48/54)<br>See the below table for IEEE 802.11n |
| Data Modulation                     | OFDM (BPSK / QPSK / 16QAM / 64QAM)                                                                                     |
| Frequency Range                     | 5150~5250MHz; 5250~5350MHz                                                                                             |
| Channel Band Width (99%)            | 802.11a: 16.60 MHz<br>802.11n MCS 8 (20MHz) : 17.40 MHz ; MCS 8 (40MHz) : 35.80 MHz                                    |
| Conducted Output Power              | 802.11a: 12.84 dBm<br>802.11n MCS 8 (20MHz) : 15.81 dBm ; MCS 8 (40MHz) : 15.47 dBm                                    |

### 2.2 Accessories

| Power         | Brand   | Model    | Rating                                                  |
|---------------|---------|----------|---------------------------------------------------------|
| AC/DC Adapter | UNIFIVE | US115-05 | INPUT : AC 100-120V 50/60Hz 0.4A<br>OUTPUT : DC 5V 2.5A |

### 2.3 Table for Filed Antenna

| Antenna Category Information (5GHz Band) |                                                      |
|------------------------------------------|------------------------------------------------------|
| <input type="checkbox"/>                 | Equipment placed on the market without antennas      |
| <input checked="" type="checkbox"/>      | Integral antenna (antenna permanently attached)      |
| <input checked="" type="checkbox"/>      | Temporary RF connector provided                      |
| <input type="checkbox"/>                 | No temporary RF connector provided                   |
| <input type="checkbox"/>                 | External antenna (dedicated antennas)                |
| <input type="checkbox"/>                 | Single power level with corresponding antenna(s)     |
| <input type="checkbox"/>                 | Multiple power settings and corresponding antenna(s) |
| <input type="checkbox"/>                 | Professional Install                                 |
| <input type="checkbox"/>                 | Unique antenna connector                             |
| <input type="checkbox"/>                 | BIOS lock.                                           |

| Antenna General Information (5GHz Band)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |      |             |                     |            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------|-------------|---------------------|------------|
| Ant. No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Category | Type | Brand       | Model               | Gain (dBi) |
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Internal | PIFA | ARISTOTLE   | RFA-25-P149-70-100L | 2          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Internal | PIFA | ENTERPRISES | RFA-25-P149-70B-50T | 2          |
| <input type="checkbox"/> EUT is consist of single model antenna assembly for spatial multiplexing MIMO configuration.<br><input type="checkbox"/> EUT is consist of multiple model antennas assembly (secondary source multiple model antennas regardless of spatial multiplexing MIMO configuration), the test (except DFS test) should be performed with highest antenna gain of each antenna type. Then Port No. 1 shall be performed the test.<br><input checked="" type="checkbox"/> EUT is consist of multiple model antennas assembly for spatial multiplexing MIMO configuration (e.g. model A shall be installed in port 1 and model B shall be installed in port 2...). |          |      |             |                     |            |

| Transmitter Outputs & Receiver Inputs Information |                     |                 |                            |             |
|---------------------------------------------------|---------------------|-----------------|----------------------------|-------------|
| Modulation                                        | Transmitter Outputs | Receiver Inputs | Transmitter Output Signals | Co-location |
| 802.11a                                           | 1                   | 1               | Correlated                 | No          |
| 802.11n HT20                                      | 2 (SM)              | 2               | Uncorrelated               | No          |
| 802.11n HT40                                      | 2 (SM)              | 2               | Uncorrelated               | No          |

Note 1: CDD - Cyclic Delay Diversity (CDD) modes (e.g., legacy modes in 802.11n devices). In CDD modes, the same digital data is carried by each transmit antenna, but with different cyclic delays.

Note 2: STBC - Space Time Block Codes (STBC) for which different digital data is carried by each transmit antenna during any symbol period.

Note 3: SM - Spatial Multiplexing MIMO (SM-MIMO), for which independent data streams are sent to each transmit antenna.

Note 4: Co-location, Co-location is generally defined as simultaneously transmitting (co-transmitting) antennas within 20 cm of each other.

| Antenna Directional Gain (5GHz Band) |              |                                        |                         |                                |                        |
|--------------------------------------|--------------|----------------------------------------|-------------------------|--------------------------------|------------------------|
| Port No.                             | Modulation   | Transmitter Outputs Signals Correlated | Transmitter Outputs (N) | Antenna Gain Combination (dBi) | Directional Gain (dBi) |
| 1                                    | 802.11a      | Correlated                             | 1                       | 2                              | 2                      |
| 1+2                                  | 802.11n HT20 | Uncorrelated                           | 2                       | 2, 2                           | 2                      |
| 1+2                                  | 802.11n HT40 | Uncorrelated                           | 2                       | 2, 2                           | 2                      |

☒ For all transmitter outputs with equal antenna gains, directional gain is to be computed as follows

- Any transmit signals are correlated, Directional Gain =  $G_{ANT} + 10 \log(N)$  dBi
- All transmit signals are completely uncorrelated, Directional Gain =  $G_{ANT}$

☐ For all transmitter outputs with unequal antenna gains, directional gain is to be computed as follows:

- Any transmit signals are correlated, Directional Gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N]$  dBi
- All transmit signals are completely uncorrelated, Directional Gain =  $10 \log[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10}) / N]$  dBi

## IEEE 802.11n Modulation Scheme

| MCS   | Spatial | Modulation | Coding Rate | Data rate(Mbps)           |                           |
|-------|---------|------------|-------------|---------------------------|---------------------------|
| Index | Streams | Type       | Type        | 20 MHz channel<br>800nsGI | 40 MHz channel<br>800nsGI |
| 0     | 1       | BPSK       | 1/2         | 6.5                       | 13.5                      |
| 1     | 1       | QPSK       | 1/2         | 13                        | 27                        |
| 2     | 1       | QPSK       | 3/4         | 19.5                      | 40.5                      |
| 3     | 1       | 16-QAM     | 1/2         | 26                        | 54                        |
| 4     | 1       | 16-QAM     | 3/4         | 39                        | 81                        |
| 5     | 1       | 64-QAM     | 2/3         | 52                        | 108                       |
| 6     | 1       | 64-QAM     | 3/4         | 58.5                      | 121.5                     |
| 7     | 1       | 64-QAM     | 5/6         | 65                        | 135                       |
| 8     | 2       | BPSK       | 1/2         | 13                        | 27                        |
| 9     | 2       | QPSK       | 1/2         | 26                        | 54                        |
| 10    | 2       | QPSK       | 3/4         | 39                        | 81                        |
| 11    | 2       | 16-QAM     | 1/2         | 52                        | 108                       |
| 12    | 2       | 16-QAM     | 3/4         | 78                        | 162                       |
| 13    | 2       | 64-QAM     | 2/3         | 104                       | 216                       |
| 14    | 2       | 64-QAM     | 3/4         | 117                       | 243                       |
| 15    | 2       | 64-QAM     | 5/6         | 130                       | 270                       |

## 2.4 Table for Carrier Frequencies

| Frequency Band          | Channel No. | Frequency (20MHz) | Channel No. | Frequency (40MHz) |
|-------------------------|-------------|-------------------|-------------|-------------------|
| 5150~5250 MHz<br>Band 1 | 36          | 5180 MHz          | 38          | 5190 MHz          |
|                         | 40          | 5200 MHz          | 46          | 5230 MHz          |
|                         | 44          | 5220 MHz          | -           | -                 |
|                         | 48          | 5240 MHz          | -           | -                 |

| Frequency Band          | Channel No. | Frequency (20MHz) | Channel No. | Frequency (40MHz) |
|-------------------------|-------------|-------------------|-------------|-------------------|
| 5250~5350 MHz<br>Band 2 | 52          | 5260 MHz          | 54          | 5270 MHz          |
|                         | 56          | 5280 MHz          | 62          | 5310 MHz          |
|                         | 60          | 5300 MHz          | -           | -                 |
|                         | 64          | 5320 MHz          | -           | -                 |

## 2.5 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           | Port No.    |
|-------------------------------------------------------------------------|------------------------------------|-----------|-------------------|-------------|
| AC Power Conducted Emission<br>Radiated Emission Below 1GHz             | Normal Mode                        | Auto      | -                 | -           |
| 26dB Spectrum Bandwidth<br>99% Occupied Bandwidth                       | 11a Band 1~2/BPSK                  | 6Mbps     | 36/40/48/52/56/64 | 1           |
|                                                                         | 11n Band 1~2/BPSK<br>MCS 8 (20MHz) | 13Mbps    | 36/40/48/52/56/64 | 1/2         |
|                                                                         | 11n Band 1~2/BPSK<br>MCS 8 (40MHz) | 27Mbps    | 38/46/54/62       |             |
| Max. Conducted Output Power<br>Power Spectral Density<br>Peak Excursion | 11a Band 1~2/BPSK                  | 6Mbps     | 36/40/48/52/56/64 | 1           |
|                                                                         | 11n Band 1~2/BPSK<br>MCS 8 (20MHz) | 13Mbps    | 36/40/48/52/56/64 | 1/2;<br>1+2 |
|                                                                         | 11n Band 1~2/BPSK<br>MCS 8 (40MHz) | 27Mbps    | 38/46/54/62       |             |
| Radiated Emission Above 1GHz                                            | 11a Band 1~2/BPSK                  | 6Mbps     | 36/40/48/52/56/64 | 1           |
|                                                                         | 11n Band 1~2/BPSK<br>MCS 8 (20MHz) | 13Mbps    | 36/40/48/52/56/64 | 1+2         |
|                                                                         | 11n Band 1~2/BPSK<br>MCS 8 (40MHz) | 27Mbps    | 38/46/54/62       |             |
| Band Edge Emission                                                      | 11a Band 1~2/BPSK                  | 6Mbps     | 36/40/48/52/56/64 | 1           |
|                                                                         | 11n Band 1~2/BPSK<br>MCS 8 (20MHz) | 13Mbps    | 36/40/48/52/56/64 | 1+2         |
|                                                                         | 11n Band 1~2/BPSK<br>MCS 8 (40MHz) | 27Mbps    | 38/46/54/62       |             |

## 2.6 Table for Testing Locations

| Test Site No. | Site Category | Location |
|---------------|---------------|----------|
| CO01-HY       | Conduction    | Hwa Ya   |
| TH01-HY       | OVEN Room     | Hwa Ya   |
| 03CH02-HY     | SAC           | Hwa Ya   |

Semi Anechoic Chamber (SAC).

## 2.7 Table for Supporting Units

| Support Unit                  | Brand     | Model    | FCC ID     | Remark             |
|-------------------------------|-----------|----------|------------|--------------------|
| Notebook                      | DELL      | E5500    | N/A        | Conducted Emission |
| Modem                         | ACEEX     | DM1414   | IFAXDM1414 |                    |
| iPod nano *2                  | Apple     | A1199    | N/A        |                    |
| (USB) Mouse                   | Microsoft | 1004     | DoC        |                    |
| Notebook (Remote workstation) | DELL      | PP32LB   | DoC        |                    |
| Notebook                      | DELL      | DNS-G120 | N/A        | Radiated Emission  |
| Modem                         | ACEEX     | DM1414   | IFAXDM1414 |                    |
| (USB) Mouse                   | Microsoft | 1004     | DoC        |                    |
| iPod nano *2                  | Apple     | 1320     | N/A        |                    |

## 2.8 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 | Ralink RT3883 QA |          |          |
|-----------------------|------------------|----------|----------|
| Frequency             | 5180 MHz         | 5200 MHz | 5240 MHz |
| IEEE 802.11a          | 7                | 6        | 6        |
| Frequency             | 5260 MHz         | 5280 MHz | 5320 MHz |
| IEEE 802.11a          | 5                | 5        | 4        |

## For Two Chains:

## Power Parameters of IEEE 802.11n (20MHz)

| Test Software Version | Ralink RT3883 QA |          |          |
|-----------------------|------------------|----------|----------|
| Frequency             | 5180 MHz         | 5200 MHz | 5240 MHz |
| IEEE 802.11n          | 9/12             | 8/12     | 8/12     |
| Frequency             | 5260 MHz         | 5280 MHz | 5320 MHz |
| IEEE 802.11n          | 7/11             | 7/11     | 7/11     |

## Power Parameters of IEEE 802.11n (40MHz)

| Test Software Version | Ralink RT3883 QA |          |          |          |
|-----------------------|------------------|----------|----------|----------|
| Frequency             | 5190 MHz         | 5230 MHz | 5270 MHz | 5310 MHz |
| IEEE 802.11n          | 6/0F             | 5/0F     | 4/0F     | 4/0F     |

## **2.9 EUT Operation during Test**

For Conducted Emissions :

An executive program, "EMITEST.EXE" under WIN XP, which generates a complete line of continuously repeating "H" pattern was used as the test software.

The program was executed as follows :

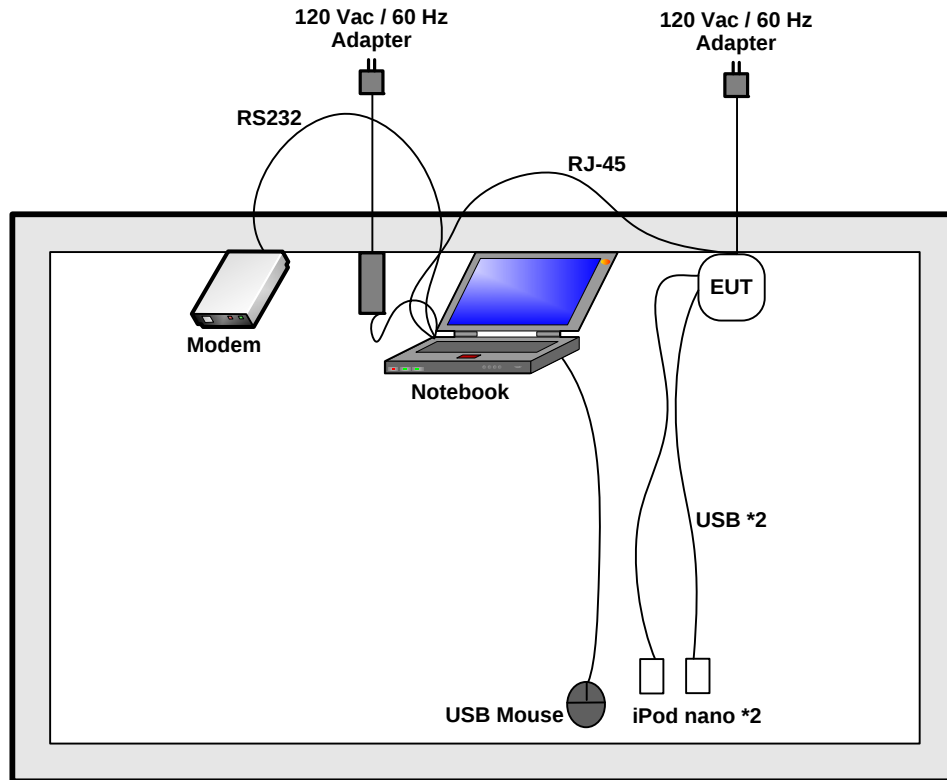
- a. Turn on the power of all equipment.
- b. The NB reads the test program from the hard disk drive and runs it.
- c. The NB sends "H" messages to the panel, and the panel displays "H" patterns on the screen.
- d. The NB sends messages to the modem.
- e. The NB sends "H" messages to the internal hard disk, and the hard disk reads and writes the message.
- f. Repeat the steps from c to e.

At the same time, the following programs were executed:

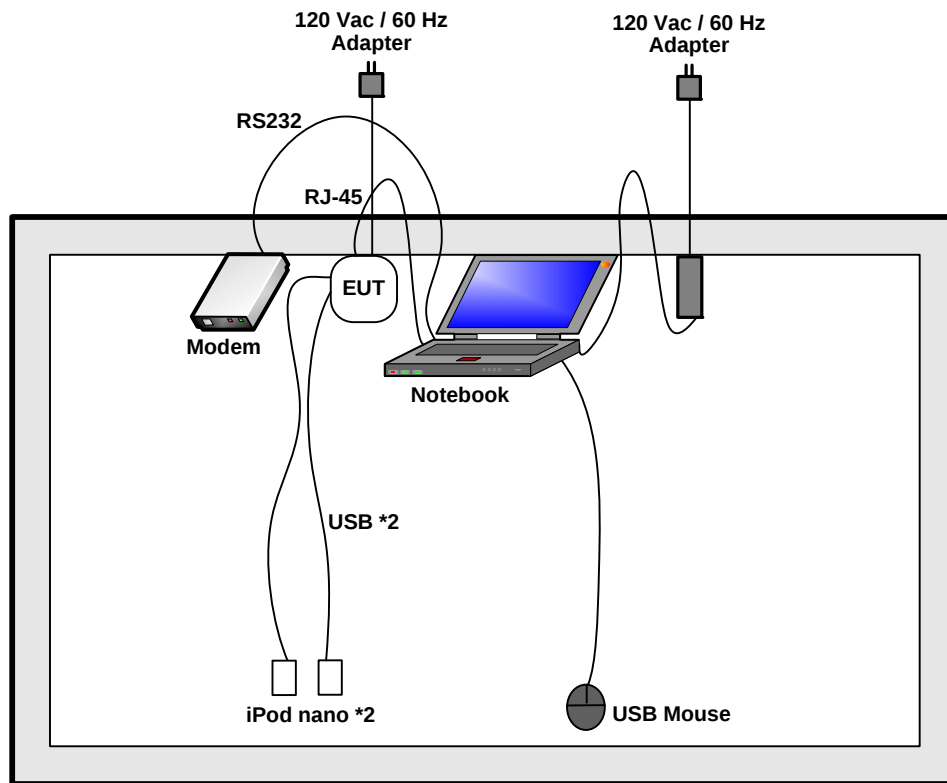
- Executed "Ping.exe" to link with the remote workstation to receive and transmit data by RJ45 cable.

For Radiated Emissions :

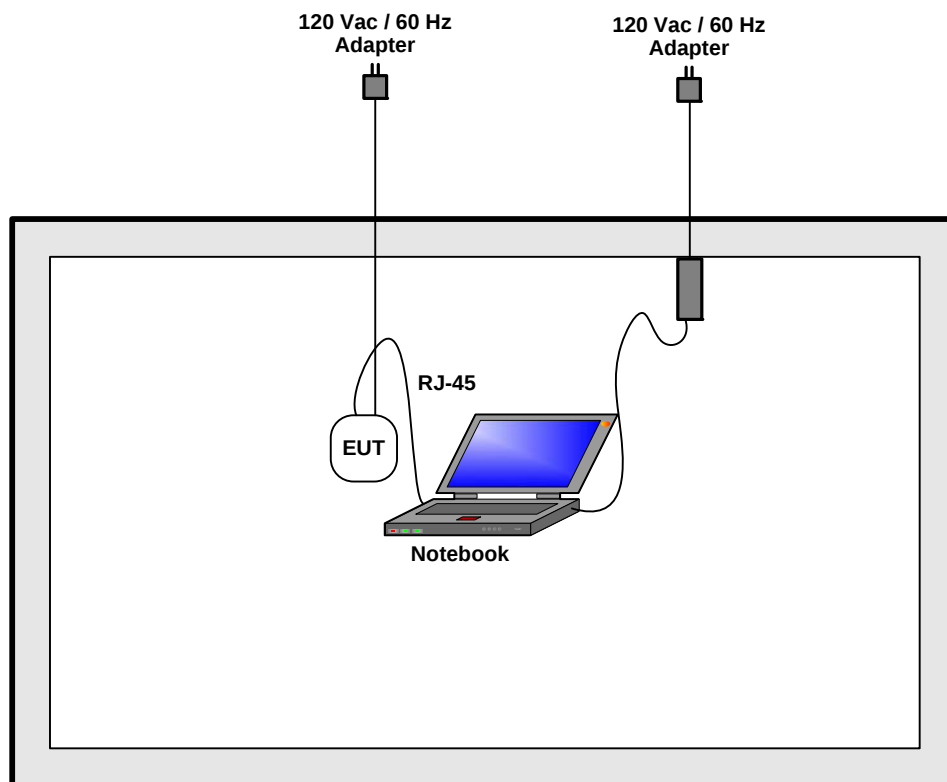
- Executed "Ralink RT3883 QA" to keep transmitting signals at fixed frequency.

**2.10 Test Configuration****Conducted emission**

## Radiated emissions 9kHz~1GHz



## 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.

##### Class B

| 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

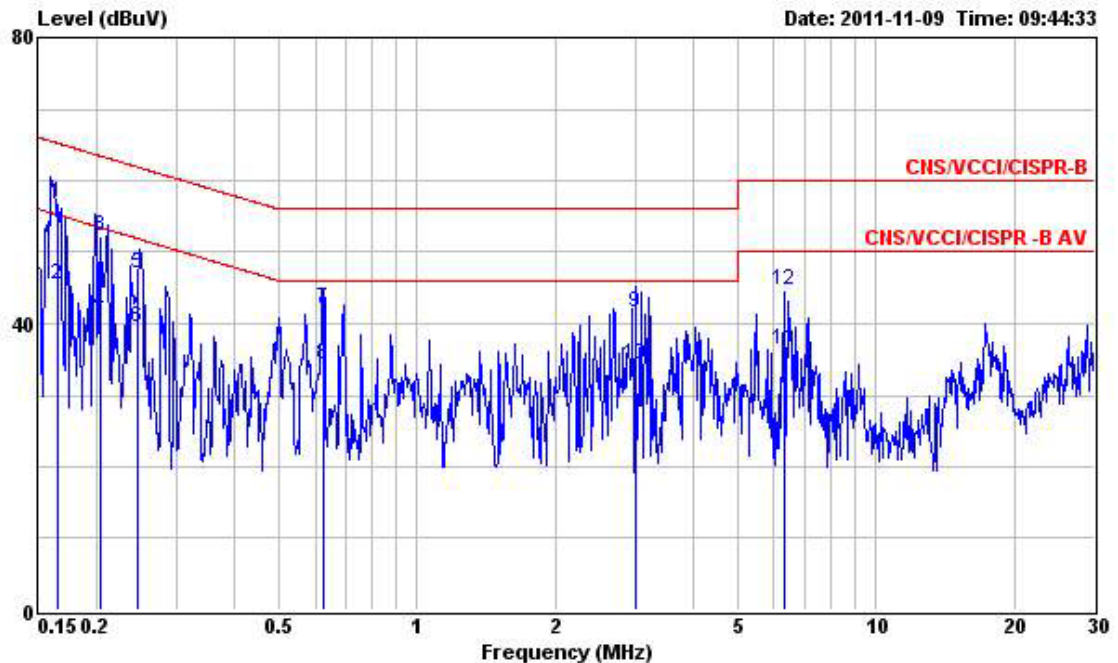
1. The EUT warm up about 15 minutes then start test.
2. Configure the EUT according to ANSI C63.4. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
5. The frequency range from 150 KHz to 30 MHz was searched.
6. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
7. The measurement has to be done between each power line and ground at the power terminal.



## 3.1.7 Results of AC Power Line Conducted Emissions Measurement

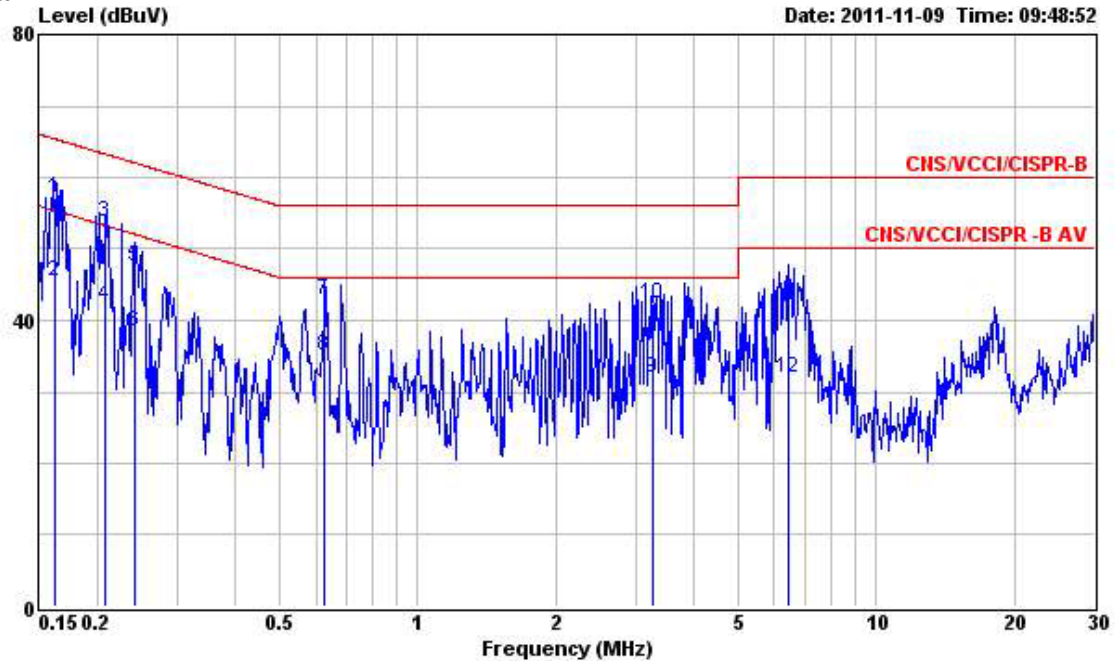
|                 |               |               |             |
|-----------------|---------------|---------------|-------------|
| Final Test Date | Nov. 09, 2011 | Test Site No. | CO01-HY     |
| Temperature     | 20°C          | Humidity      | 52%         |
| Test Engineer   | David         | Configuration | Normal Mode |

Line



|    | Freq  | Level | Over Limit | Limit Line | Read Level | Probe Factor | Cable Loss | Remark  |
|----|-------|-------|------------|------------|------------|--------------|------------|---------|
|    | MHz   | dBuV  | dB         | dBuV       | dBuV       | dB           | dB         |         |
| 1  | 0.165 | 56.89 | -8.32      | 65.21      | 56.71      | 0.08         | 0.10       | QP      |
| 2  | 0.165 | 45.41 | -9.80      | 55.21      | 45.23      | 0.08         | 0.10       | Average |
| 3  | 0.205 | 52.14 | -11.28     | 63.42      | 51.96      | 0.08         | 0.10       | QP      |
| 4  | 0.205 | 41.43 | -11.99     | 53.42      | 41.25      | 0.08         | 0.10       | Average |
| 5  | 0.245 | 47.08 | -14.84     | 61.92      | 46.90      | 0.08         | 0.10       | QP      |
| 6  | 0.245 | 39.48 | -12.44     | 51.92      | 39.30      | 0.08         | 0.10       | Average |
| 7  | 0.624 | 42.19 | -13.81     | 56.00      | 41.99      | 0.10         | 0.10       | QP      |
| 8  | 0.624 | 34.28 | -11.72     | 46.00      | 34.08      | 0.10         | 0.10       | Average |
| 9  | 3.000 | 41.47 | -14.53     | 56.00      | 41.22      | 0.15         | 0.10       | QP      |
| 10 | 3.000 | 34.21 | -11.79     | 46.00      | 33.96      | 0.15         | 0.10       | Average |
| 11 | 6.310 | 36.46 | -13.54     | 50.00      | 36.14      | 0.22         | 0.10       | Average |
| 12 | 6.313 | 44.65 | -15.35     | 60.00      | 44.33      | 0.22         | 0.10       | QP      |

Neutral



|    | Freq  | Level | Over   | Limit | Read  | Probe  | Cable |         |
|----|-------|-------|--------|-------|-------|--------|-------|---------|
|    | MHz   | dBuV  | Limit  | Line  | Level | Factor | Loss  | Remark  |
|    | MHz   | dBuV  | dB     | dBuV  | dBuV  | dB     | dB    |         |
| 1  | 0.162 | 57.22 | -8.14  | 65.36 | 57.05 | 0.07   | 0.10  | QP      |
| 2  | 0.162 | 45.48 | -9.88  | 55.36 | 45.31 | 0.07   | 0.10  | Average |
| 3  | 0.207 | 53.70 | -9.62  | 63.32 | 53.54 | 0.06   | 0.10  | QP      |
| 4  | 0.207 | 41.98 | -11.34 | 53.32 | 41.82 | 0.06   | 0.10  | Average |
| 5  | 0.242 | 47.42 | -14.61 | 62.03 | 47.26 | 0.06   | 0.10  | QP      |
| 6  | 0.242 | 38.34 | -13.69 | 52.03 | 38.18 | 0.06   | 0.10  | Average |
| 7  | 0.627 | 42.77 | -13.23 | 56.00 | 42.59 | 0.08   | 0.10  | QP      |
| 8  | 0.627 | 35.07 | -10.93 | 46.00 | 34.89 | 0.08   | 0.10  | Average |
| 9  | 3.260 | 31.85 | -14.15 | 46.00 | 31.62 | 0.13   | 0.10  | Average |
| 10 | 3.260 | 42.26 | -13.74 | 56.00 | 42.03 | 0.13   | 0.10  | QP      |
| 11 | 6.450 | 42.41 | -17.59 | 60.00 | 42.11 | 0.20   | 0.10  | QP      |
| 12 | 6.450 | 31.99 | -18.01 | 50.00 | 31.69 | 0.20   | 0.10  | Average |

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

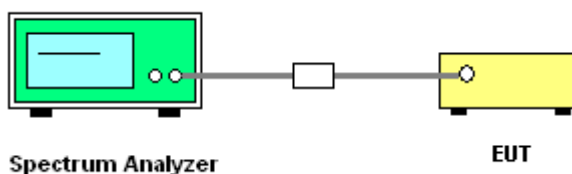
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

| 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.

### 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

|                 |               |                |           |
|-----------------|---------------|----------------|-----------|
| Final Test Date | Sep. 10, 2011 | Test Site No.  | TH01-HY   |
| Temperature     | 24.5°C        | Humidity       | 56%       |
| Test Engineer   | Cain          | Configurations | 802.11a/n |

## For Single Chain:

## Configuration of IEEE 802.11a Port 1

| Channel | Frequency | 26dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) |
|---------|-----------|----------------------|------------------------------|
| 36      | 5180 MHz  | 20.20                | 16.50                        |
| 40      | 5200 MHz  | 21.10                | 16.50                        |
| 48      | 5240 MHz  | 20.10                | 16.50                        |
| 52      | 5260 MHz  | 21.10                | 16.50                        |
| 56      | 5280 MHz  | 21.10                | 16.60                        |
| 64      | 5320 MHz  | 21.20                | 16.50                        |

## For Two Chains:

## Configuration IEEE 802.11n (20MHz) Port 1

| Channel | Frequency | 26dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) |
|---------|-----------|----------------------|------------------------------|
| 36      | 5180 MHz  | 19.70                | 17.40                        |
| 40      | 5200 MHz  | 19.70                | 17.30                        |
| 48      | 5240 MHz  | 19.50                | 17.30                        |
| 52      | 5260 MHz  | 20.30                | 17.30                        |
| 56      | 5280 MHz  | 20.50                | 17.30                        |
| 64      | 5320 MHz  | 19.70                | 17.30                        |

## Configuration IEEE 802.11n (20MHz) Port 2

| Channel | Frequency | 26dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) |
|---------|-----------|----------------------|------------------------------|
| 36      | 5180 MHz  | 19.50                | 17.30                        |
| 40      | 5200 MHz  | 19.50                | 17.40                        |
| 48      | 5240 MHz  | 19.40                | 17.30                        |
| 52      | 5260 MHz  | 19.40                | 17.30                        |
| 56      | 5280 MHz  | 19.50                | 17.30                        |
| 64      | 5320 MHz  | 19.50                | 17.40                        |

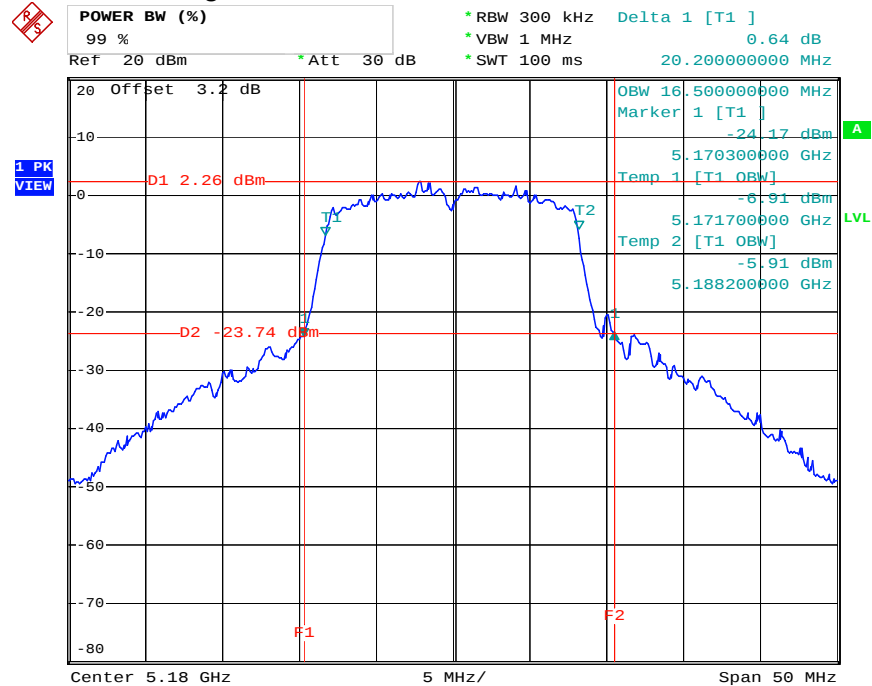
**Configuration IEEE 802.11n (40MHz) Port 1**

| Channel | Frequency | 26dB Bandwidth<br>(MHz) | 99% Occupied Bandwidth<br>(MHz) |
|---------|-----------|-------------------------|---------------------------------|
| 38      | 5190 MHz  | 41.80                   | 35.80                           |
| 46      | 5230 MHz  | 43.00                   | 35.80                           |
| 54      | 5270 MHz  | 42.60                   | 35.80                           |
| 62      | 5310 MHz  | 39.80                   | 35.80                           |

**Configuration IEEE 802.11n (40MHz) Port 2**

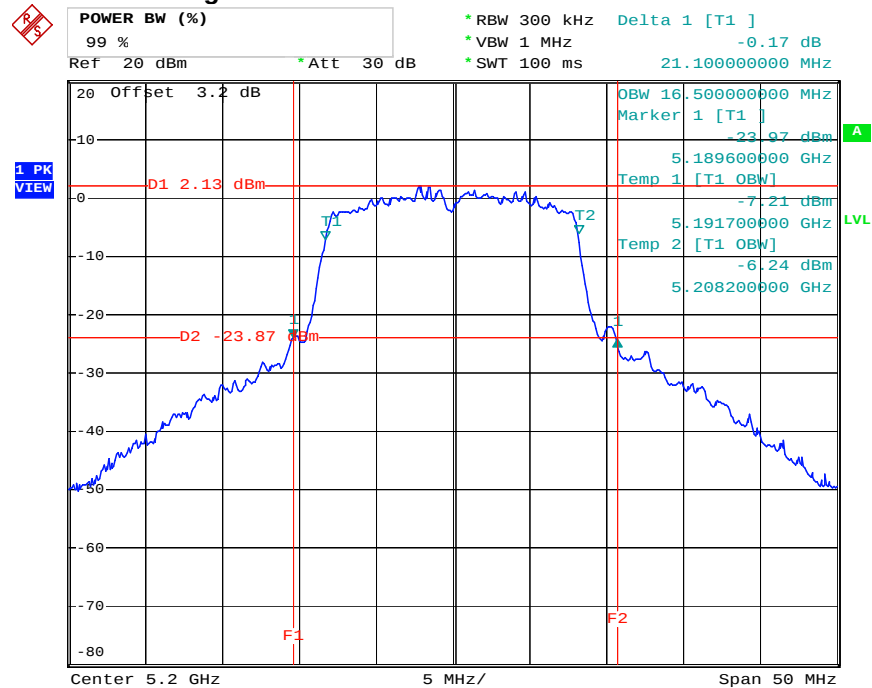
| Channel | Frequency | 26dB Bandwidth<br>(MHz) | 99% Occupied Bandwidth<br>(MHz) |
|---------|-----------|-------------------------|---------------------------------|
| 38      | 5190 MHz  | 41.80                   | 35.80                           |
| 46      | 5230 MHz  | 41.40                   | 35.80                           |
| 54      | 5270 MHz  | 41.40                   | 35.80                           |
| 62      | 5310 MHz  | 41.60                   | 35.80                           |

For Single Chain:  
26 dB Bandwidth Plot on Configuration IEEE 802.11a Port 1 / 5180 MHz



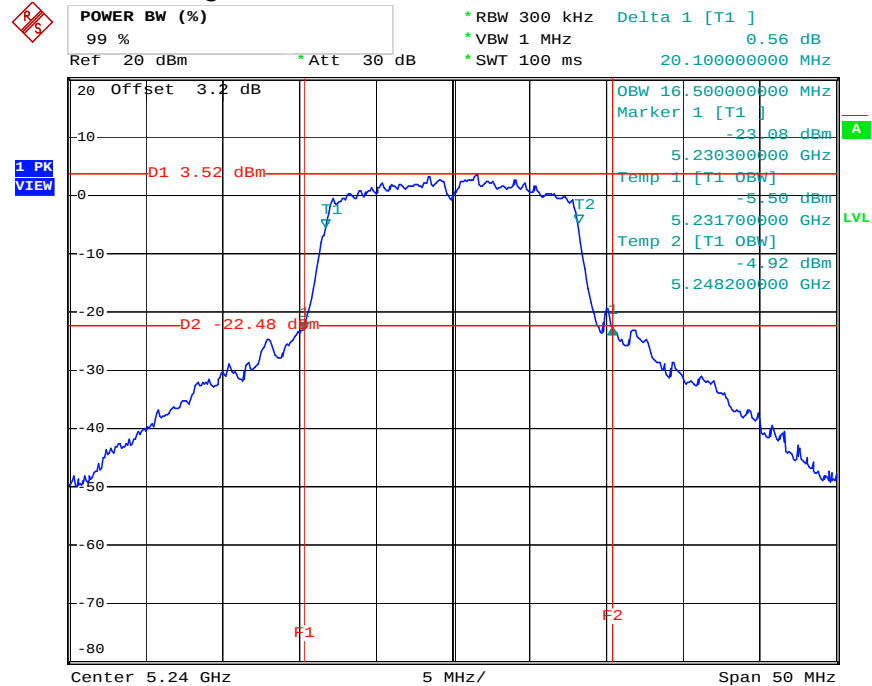
Date: 8.SEP.2011 20:51:59

26 dB Bandwidth Plot on Configuration IEEE 802.11a Port 1 / 5200 MHz



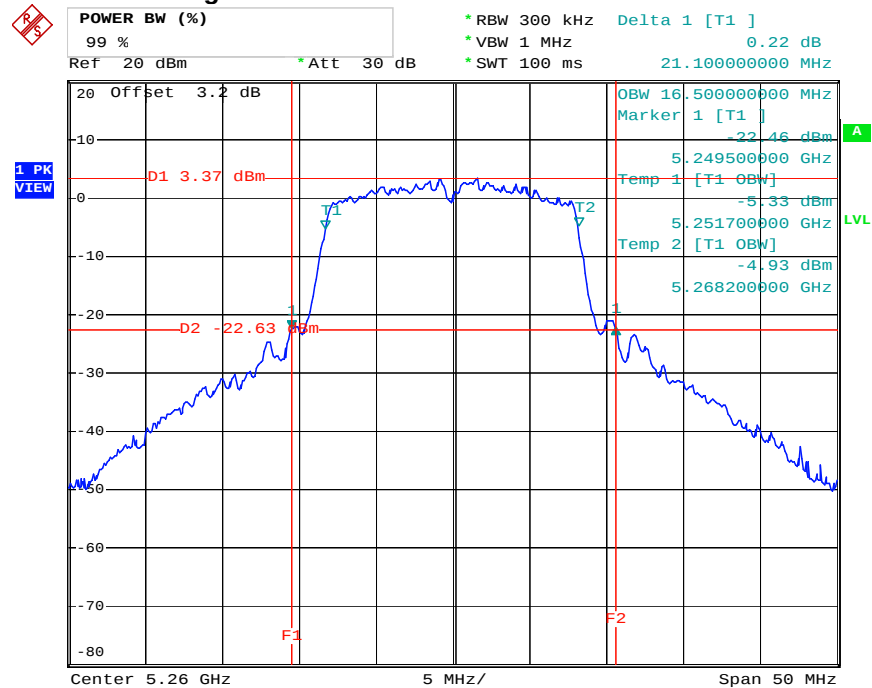
Date: 8.SEP.2011 20:58:25

## 26 dB Bandwidth Plot on Configuration IEEE 802.11a Port 1 / 5240 MHz



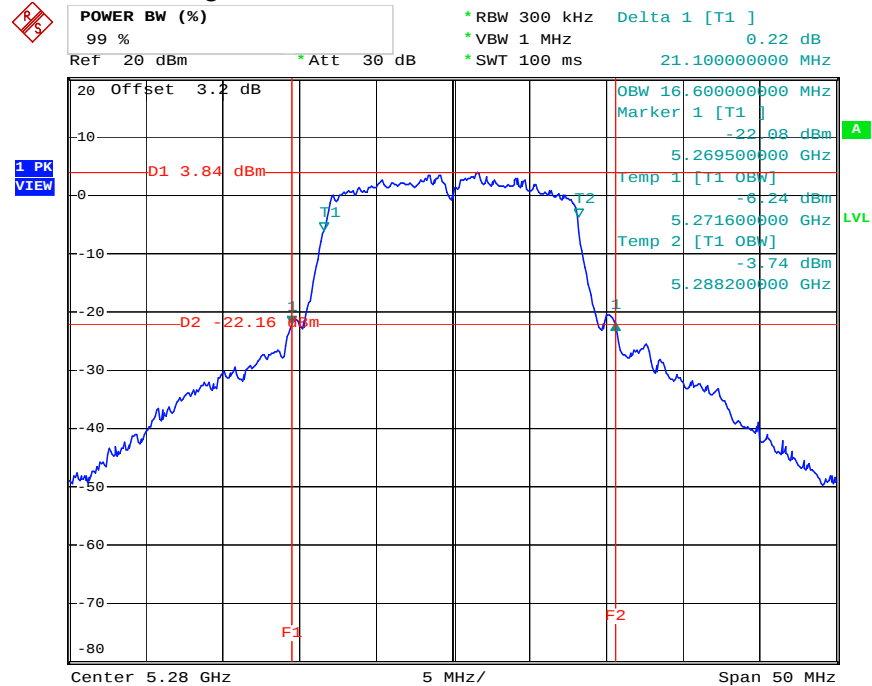
Date: 8.SEP.2011 21:00:48

## 26 dB Bandwidth Plot on Configuration IEEE 802.11a Port 1 / 5260 MHz



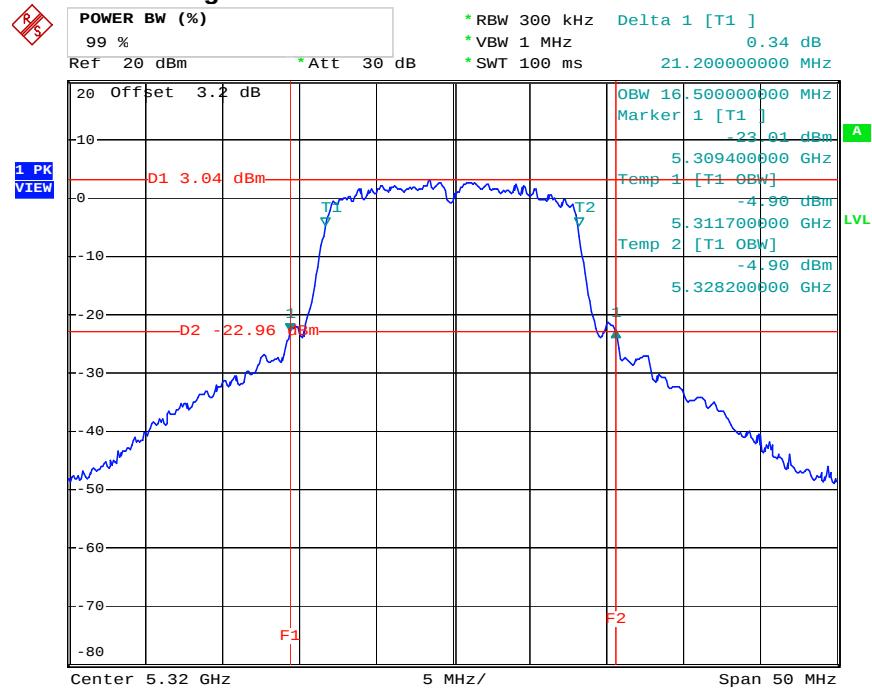
Date: 8.SEP.2011 21:05:13

## 26 dB Bandwidth Plot on Configuration IEEE 802.11a Port 1 / 5280 MHz



Date: 8.SEP.2011 21:06:46

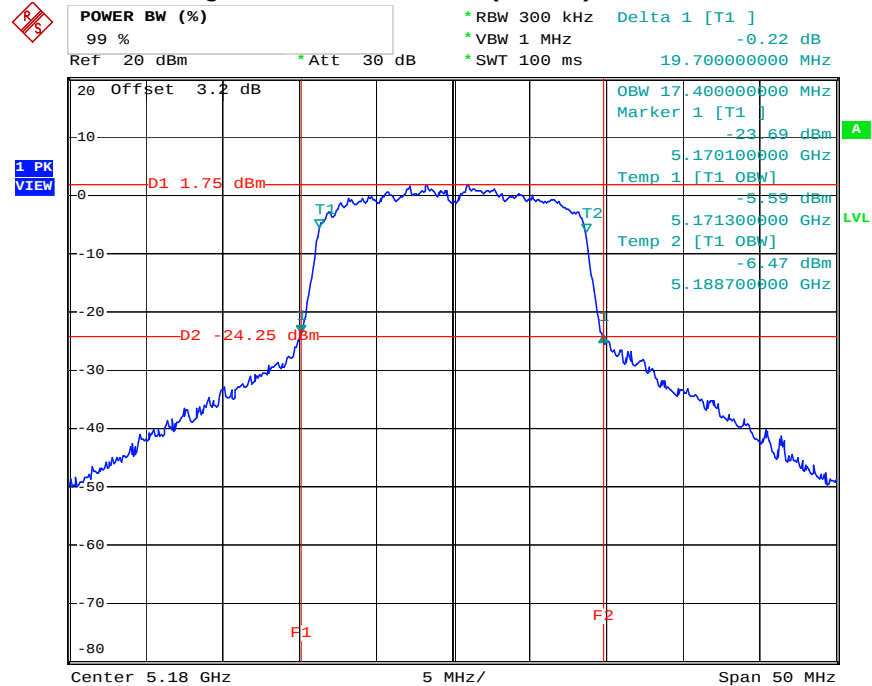
## 26 dB Bandwidth Plot on Configuration IEEE 802.11a Port 1 / 5320 MHz



Date: 8.SEP.2011 21:10:17

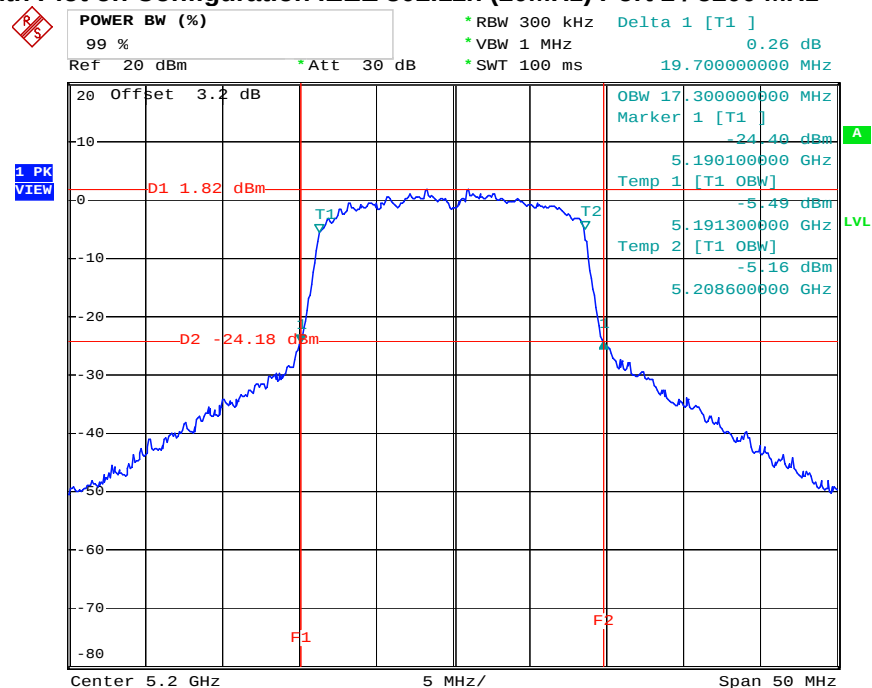
For Two Chains:

## 26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Port 1 / 5180 MHz



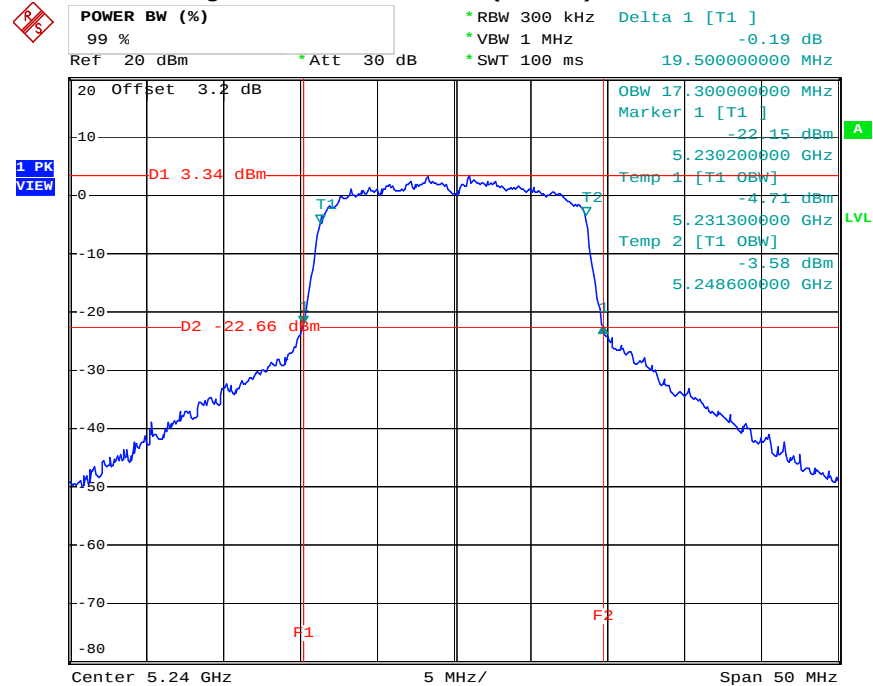
Date: 8.SEP.2011 23:32:31

## 26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Port 1 / 5200 MHz



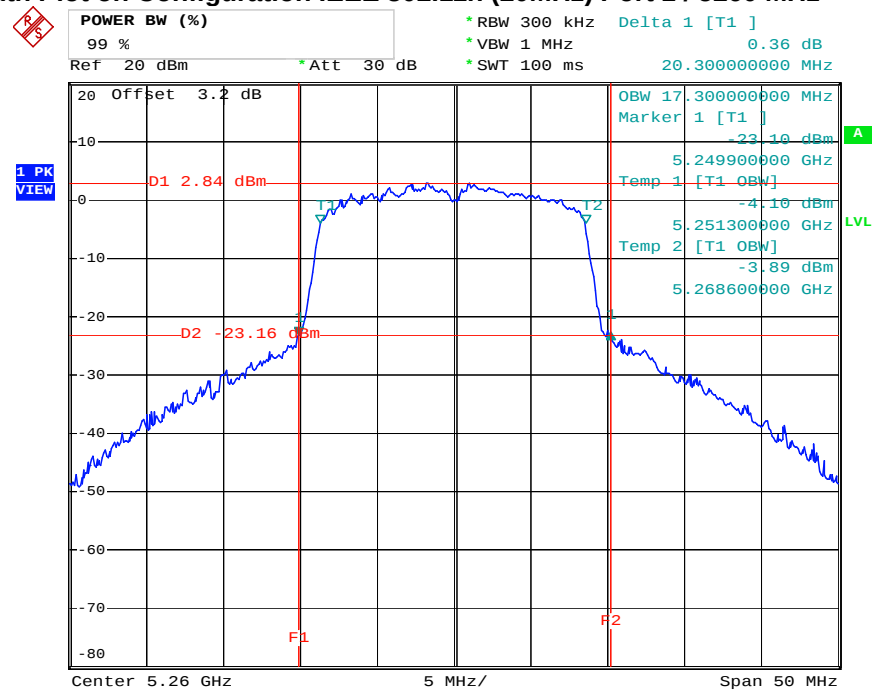
Date: 8.SEP.2011 23:38:05

## 26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Port 1 / 5240 MHz



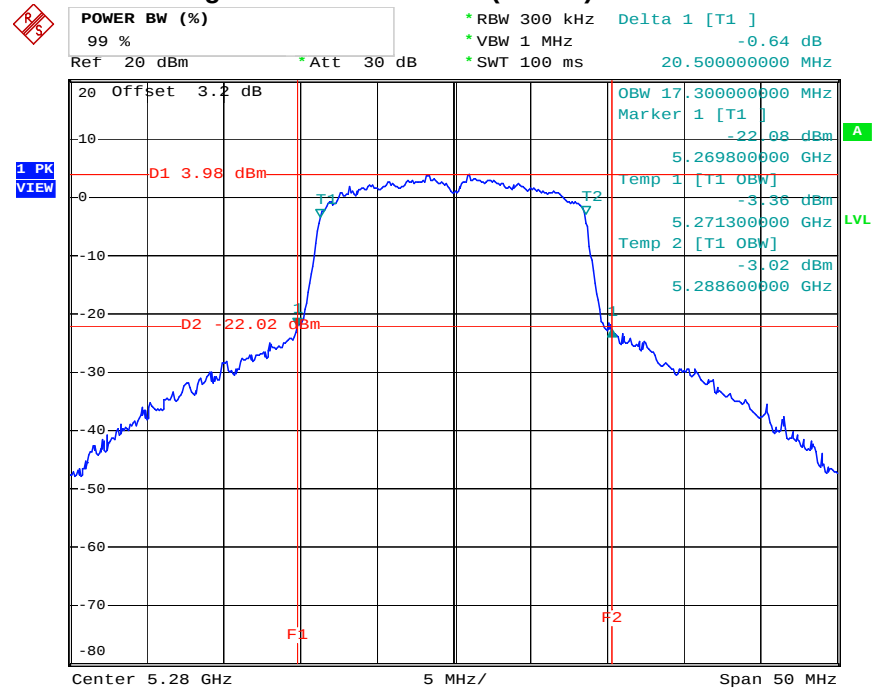
Date: 8.SEP.2011 23:42:45

## 26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Port 1 / 5260 MHz



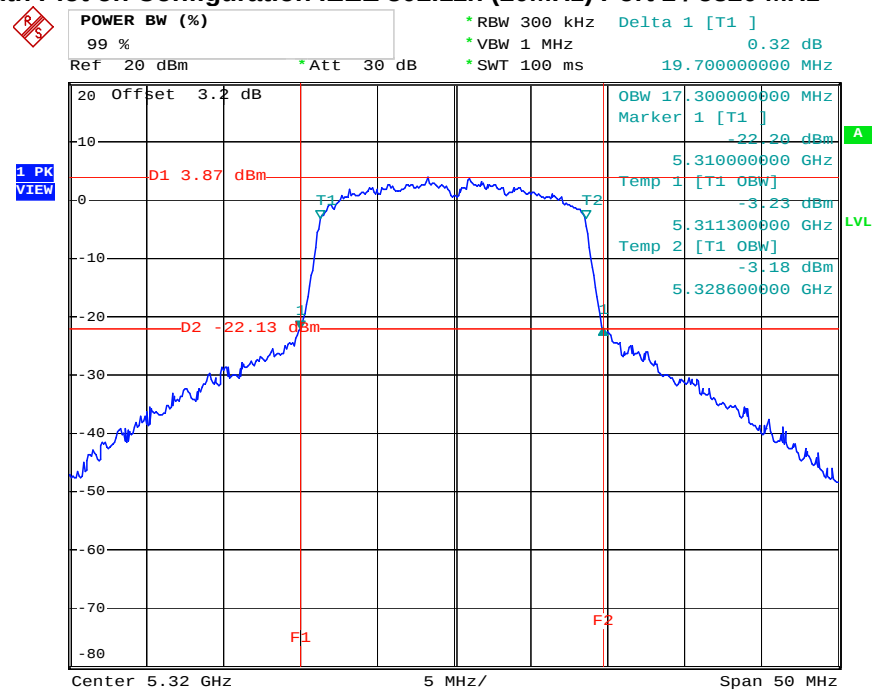
Date: 8.SEP.2011 23:48:22

## 26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Port 1 / 5280 MHz



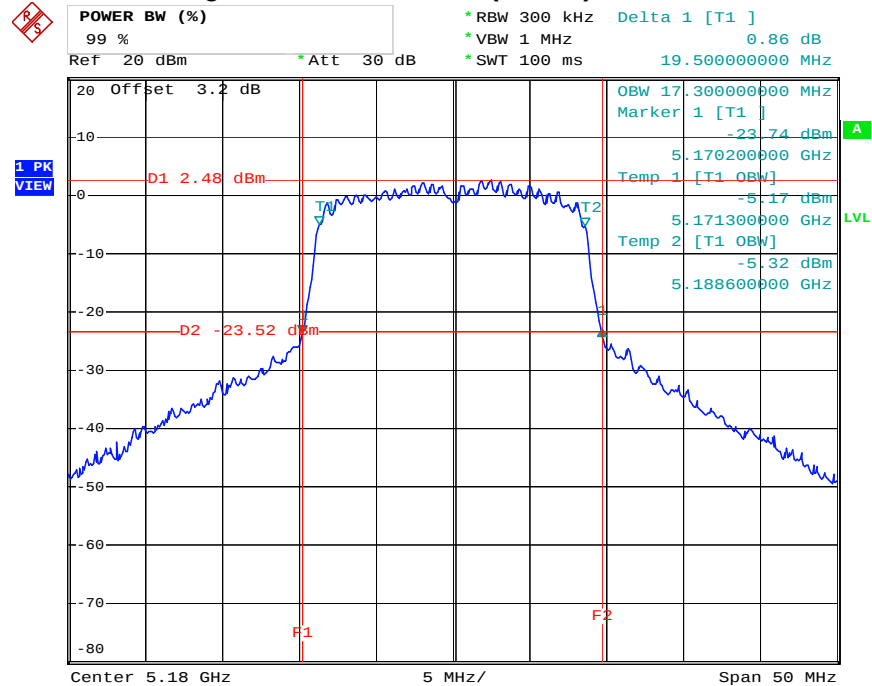
Date: 9.SEP.2011 00:09:52

## 26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Port 1 / 5320 MHz



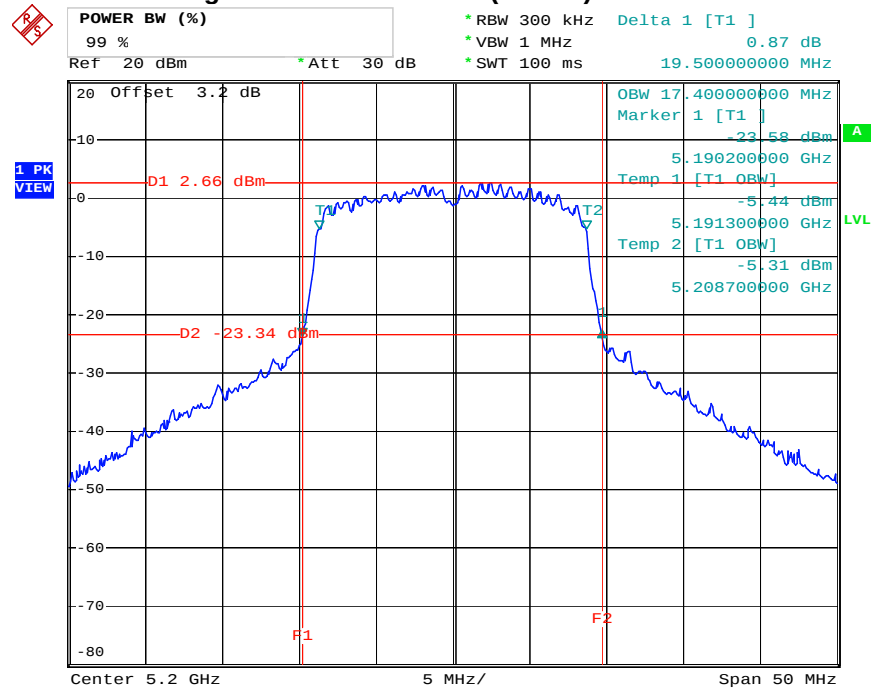
Date: 9.SEP.2011 00:20:17

## 26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Port 2 / 5180 MHz



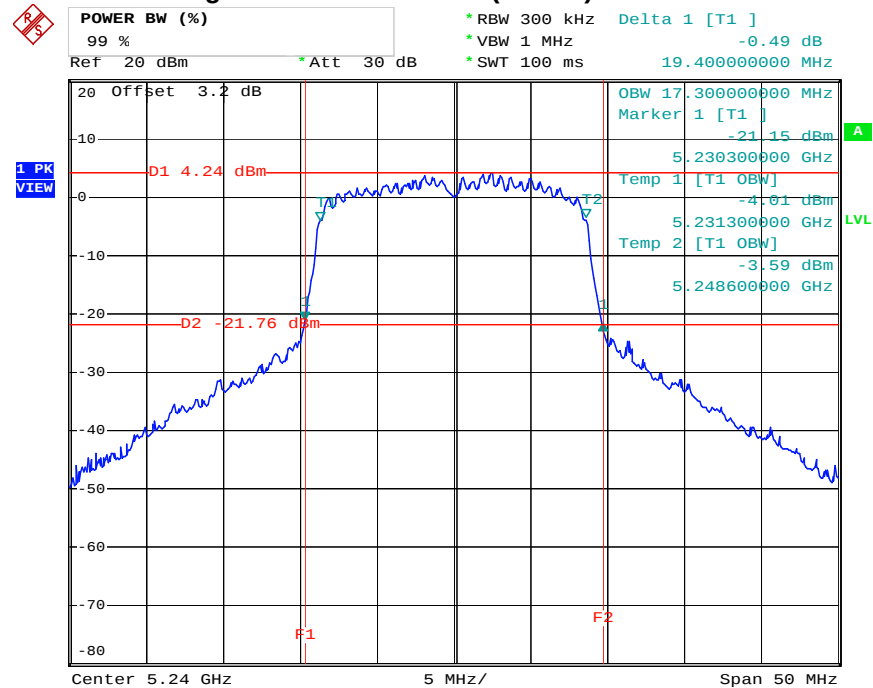
Date: 10.SEP.2011 00:06:48

## 26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Port 2 / 5200 MHz



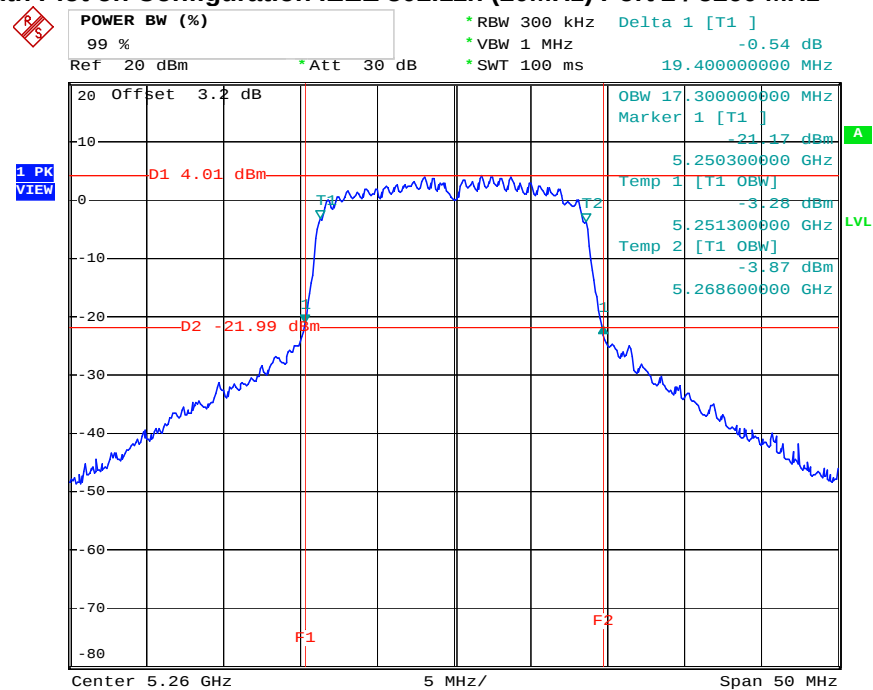
Date: 10.SEP.2011 00:14:13

## 26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Port 2 / 5240 MHz



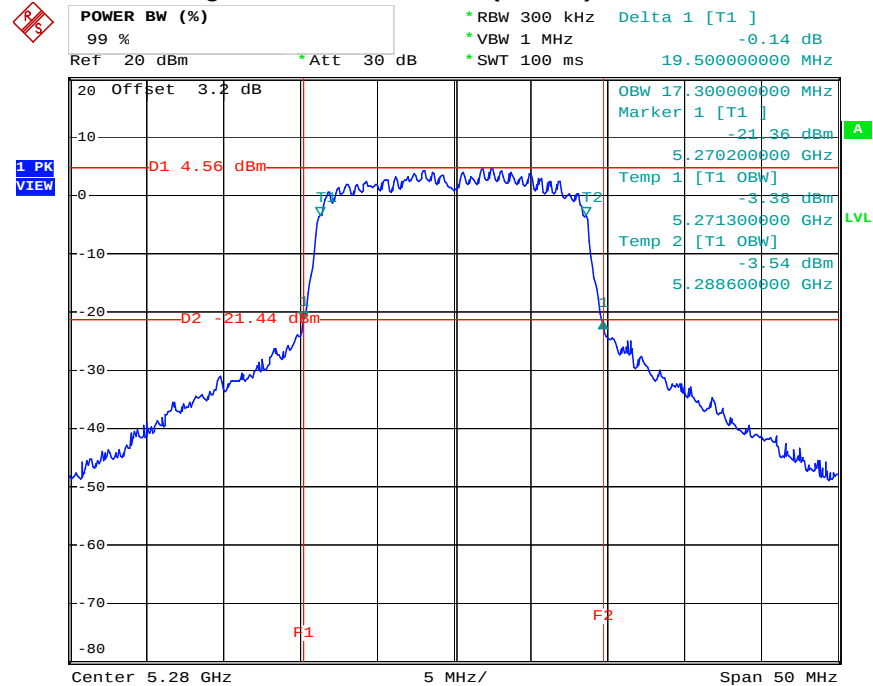
Date: 10.SEP.2011 00:16:07

## 26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Port 2 / 5260 MHz



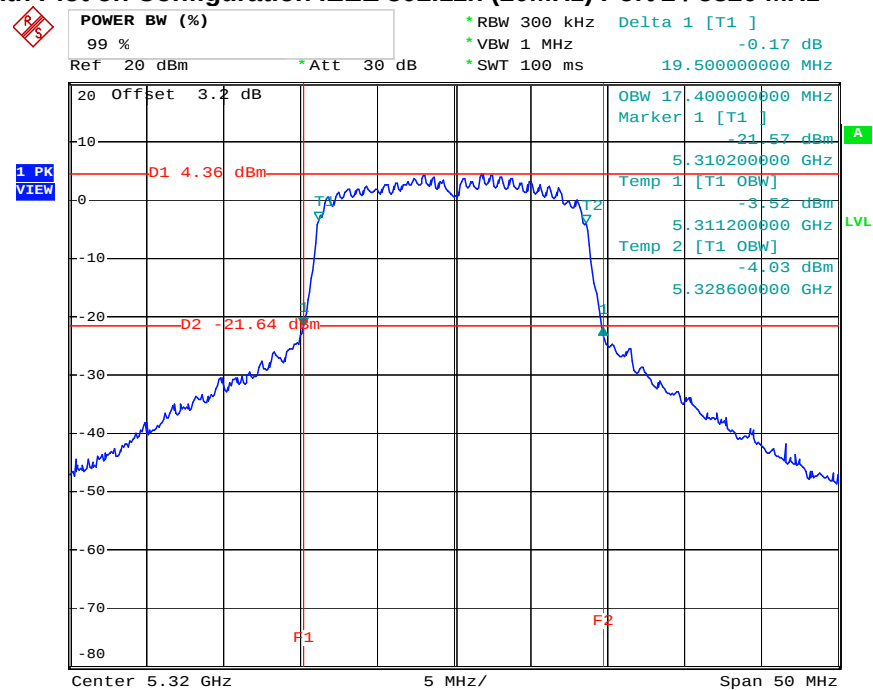
Date: 10.SEP.2011 00:23:55

## 26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Port 2 / 5280 MHz



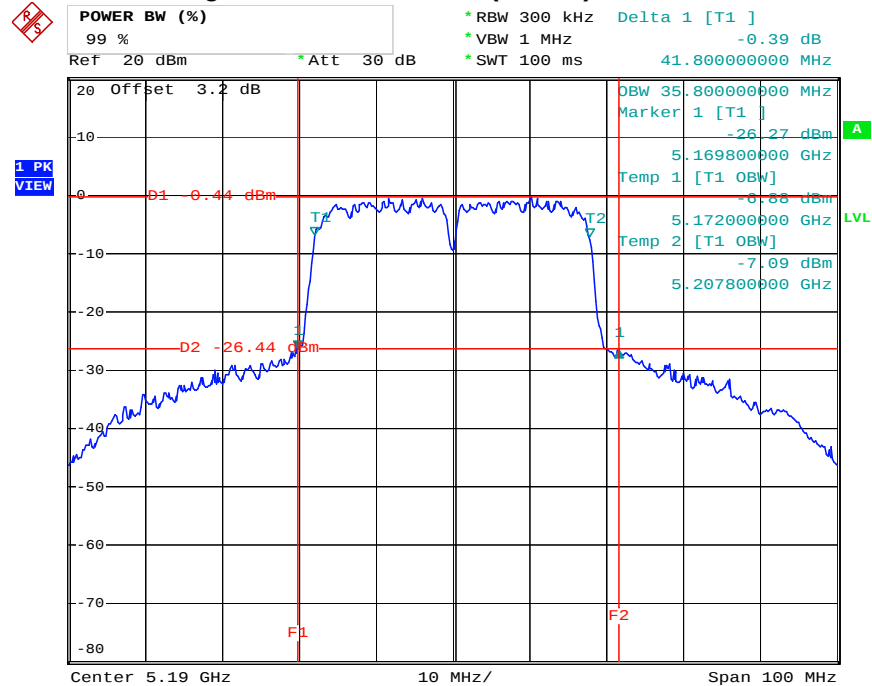
Date: 10.SEP.2011 00:25:13

## 26 dB Bandwidth Plot on Configuration IEEE 802.11n (20MHz) Port 2 / 5320 MHz



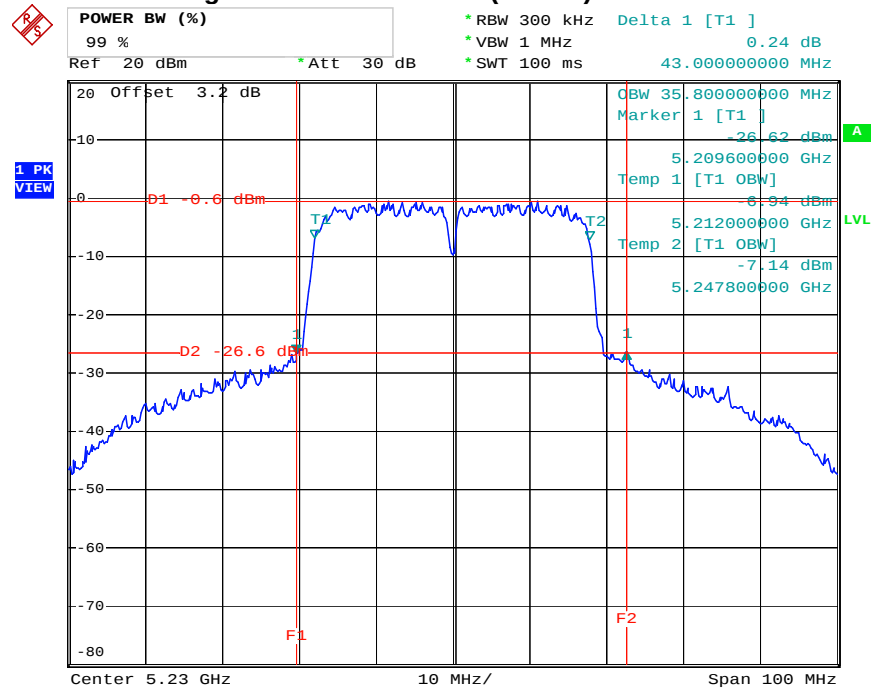
Date: 10.SEP.2011 00:30:11

## 26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) Port 1 / 5190 MHz



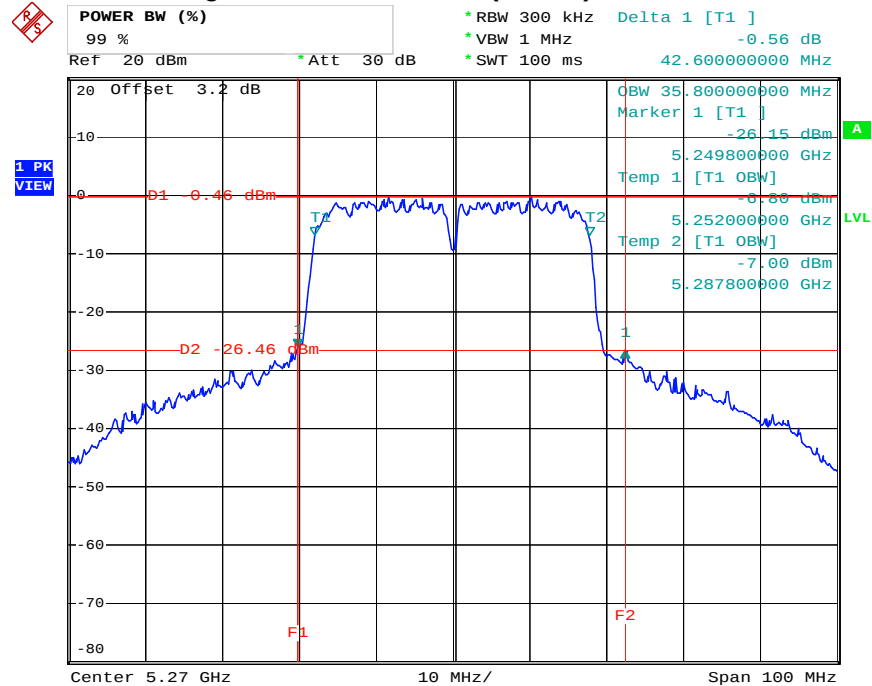
Date: 9.SEP.2011 10:20:48

## 26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) Port 1 / 5230 MHz



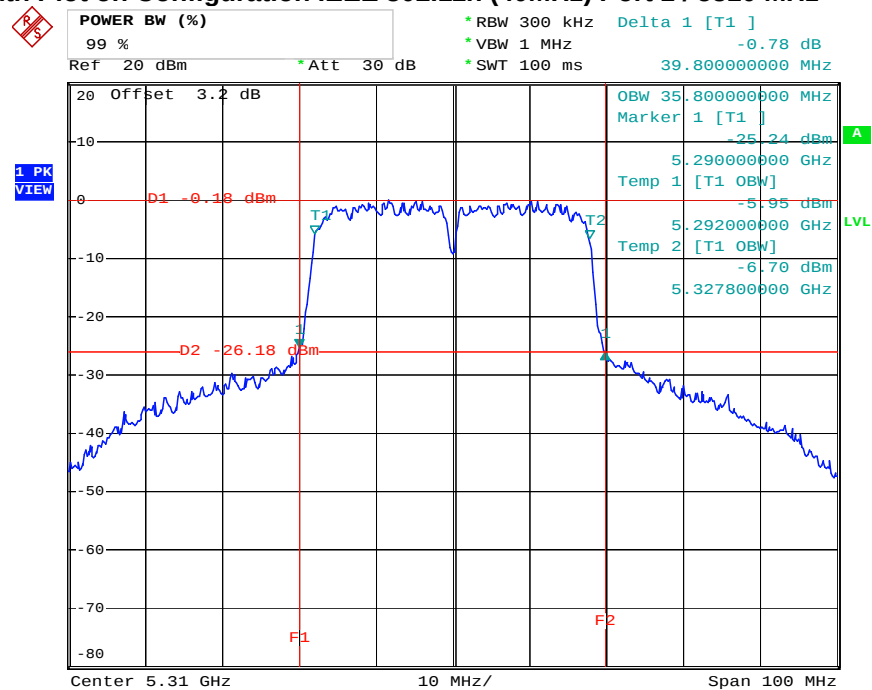
Date: 9.SEP.2011 11:03:43

## 26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) Port 1 / 5270 MHz



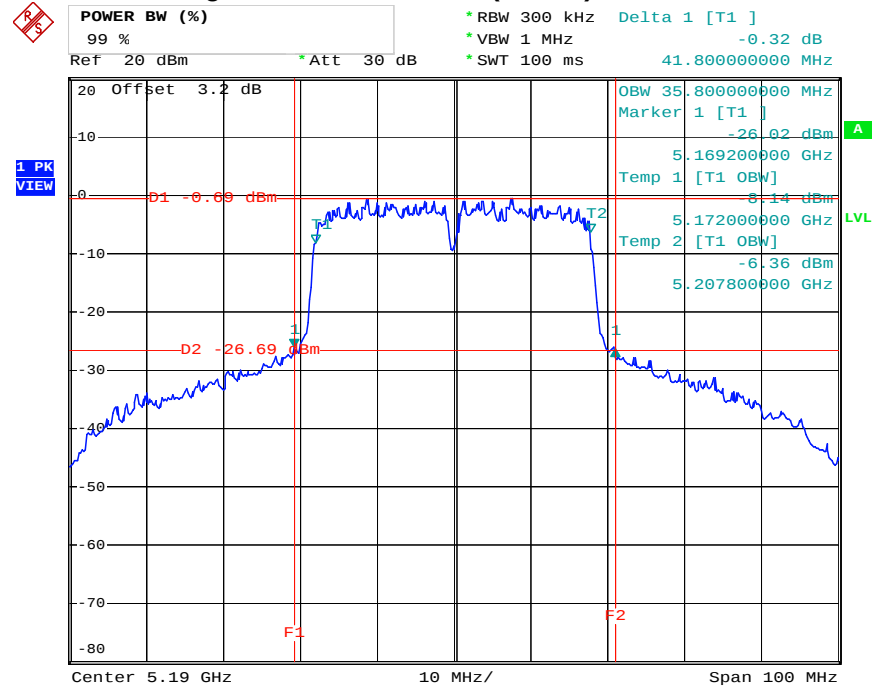
Date: 9.SEP.2011 11:15:56

## 26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) Port 1 / 5310 MHz



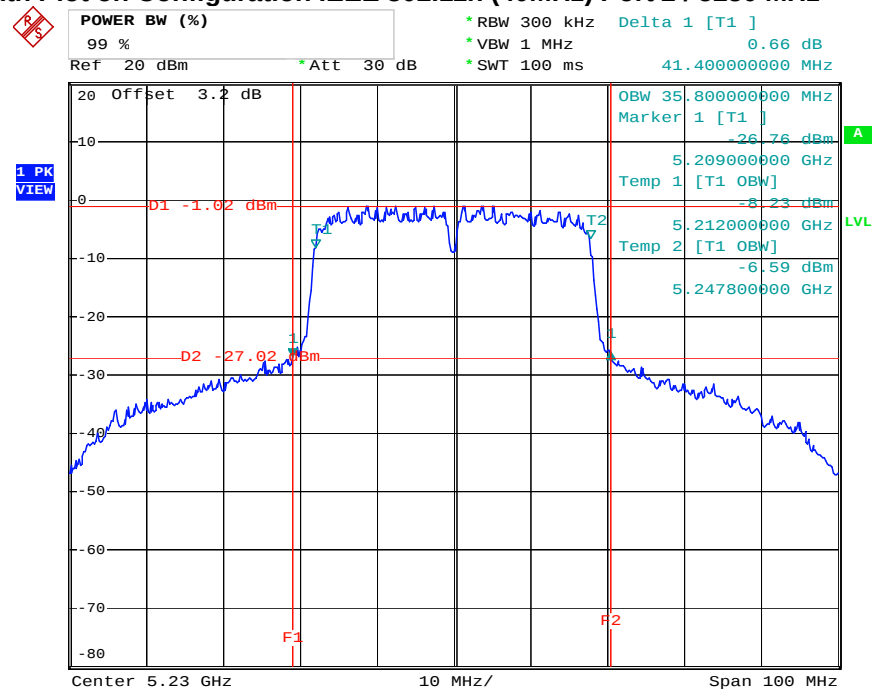
Date: 9.SEP.2011 11:30:29

## 26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) Port 2 / 5190 MHz



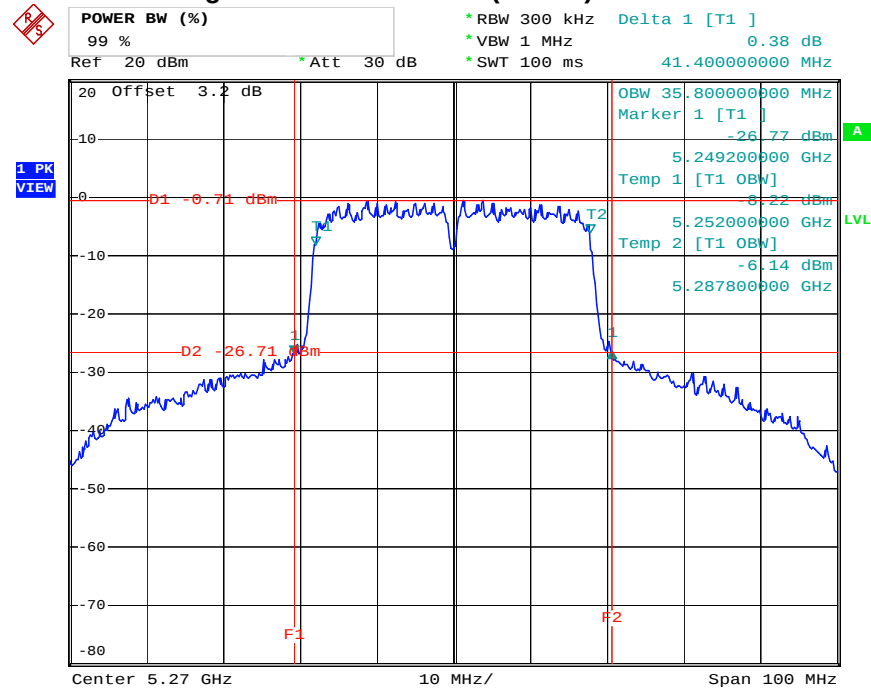
Date: 9.SEP.2011 10:38:14

## 26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) Port 2 / 5230 MHz



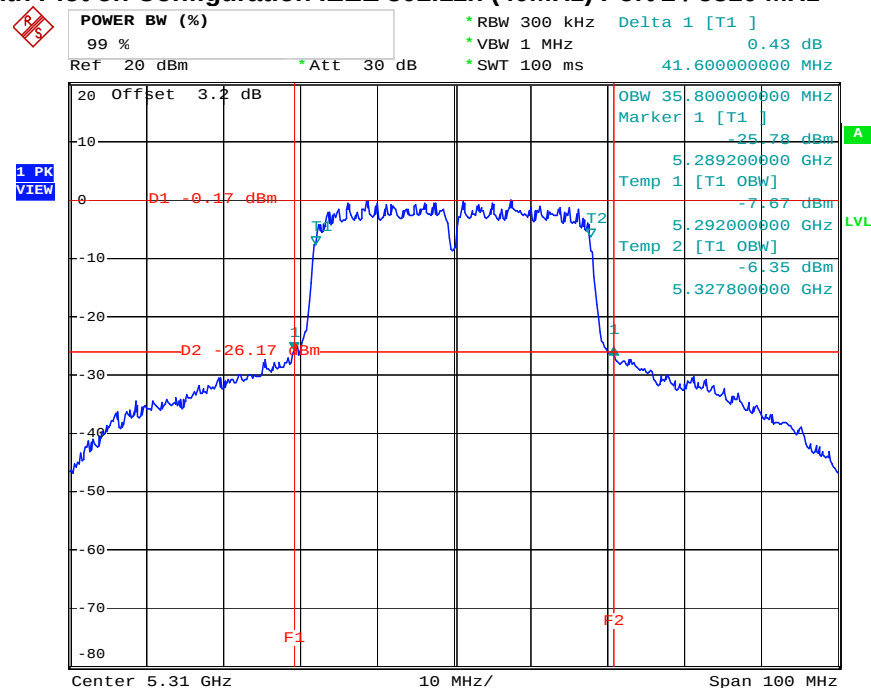
Date: 9.SEP.2011 10:50:33

## 26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) Port 2 / 5270 MHz



Date: 9.SEP.2011 11:21:26

## 26 dB Bandwidth Plot on Configuration IEEE 802.11n (40MHz) Port 2 / 5310 MHz



Date: 9.SEP.2011 11:34:05

### 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.

For the 5.25-5.35 GHz, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW (24dBm) or 11 dBm + 10log B. 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.

Maximum Conducted Output Power mean that the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level.

#### 3.3.2 Measuring Instruments and Setting

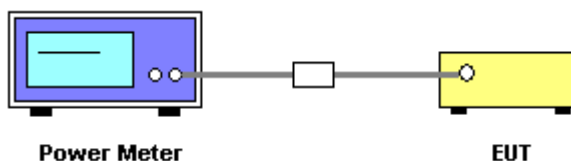
Please refer to section 4 of equipments list in this report. The following table is the setting of the power meter.

| Power Meter Parameter | Setting        |
|-----------------------|----------------|
| Filter No.            | Auto           |
| Measurement time      | 0.135 s ~ 26 s |
| Used Sensor           | MA2411B        |

#### 3.3.3 Test Procedures

1. The transmitter output (antenna port) was connected to the wideband power meter.
2. Turn on the EUT and power meter and then record the power value.
3. Repeat above procedures on all channels needed to be tested.
4. When measuring maximum conducted output power within multiple antenna systems, add every result of the values by mathematic formula. (Only for IEEE 802.11n test)

#### 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

|                        |               |                       |           |
|------------------------|---------------|-----------------------|-----------|
| <b>Final Test Date</b> | Sep. 09, 2011 | <b>Test Site No.</b>  | TH01-HY   |
| <b>Temperature</b>     | 24.5°C        | <b>Humidity</b>       | 56%       |
| <b>Test Engineer</b>   | Cain          | <b>Configurations</b> | 802.11a/n |

For Single Chain:

Configuration of IEEE 802.11a Port 1

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 36      | 5180 MHz  | 12.62                 | 17.00            | Complies |
| 40      | 5200 MHz  | 12.48                 | 17.00            | Complies |
| 48      | 5240 MHz  | 12.84                 | 17.00            | Complies |
| 52      | 5260 MHz  | 12.56                 | 24.00            | Complies |
| 56      | 5280 MHz  | 12.63                 | 24.00            | Complies |
| 64      | 5320 MHz  | 12.46                 | 24.00            | Complies |

For Two Chains:

Configuration IEEE 802.11n (20MHz) Port 1

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 36      | 5180 MHz  | 12.74                 | 17.00            | Complies |
| 40      | 5200 MHz  | 12.56                 | 17.00            | Complies |
| 48      | 5240 MHz  | 12.85                 | 17.00            | Complies |
| 52      | 5260 MHz  | 12.23                 | 24.00            | Complies |
| 56      | 5280 MHz  | 12.28                 | 24.00            | Complies |
| 64      | 5320 MHz  | 12.55                 | 24.00            | Complies |

Configuration IEEE 802.11n (20MHz) Port 2

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 36      | 5180 MHz  | 12.31                 | 17.00            | Complies |
| 40      | 5200 MHz  | 12.57                 | 17.00            | Complies |
| 48      | 5240 MHz  | 12.75                 | 17.00            | Complies |
| 52      | 5260 MHz  | 12.16                 | 24.00            | Complies |
| 56      | 5280 MHz  | 12.14                 | 24.00            | Complies |
| 64      | 5320 MHz  | 12.36                 | 24.00            | Complies |

Configuration IEEE 802.11n (20MHz) Port 1+Port 2

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 36      | 5180 MHz  | 15.54                 | 17.00            | Complies |
| 40      | 5200 MHz  | 15.58                 | 17.00            | Complies |
| 48      | 5240 MHz  | 15.81                 | 17.00            | Complies |
| 52      | 5260 MHz  | 15.21                 | 24.00            | Complies |
| 56      | 5280 MHz  | 15.22                 | 24.00            | Complies |
| 64      | 5320 MHz  | 15.47                 | 24.00            | Complies |

**Configuration IEEE 802.11n (40MHz) Port 1**

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 38      | 5190 MHz  | 12.73                 | 17.00            | Complies |
| 46      | 5230 MHz  | 12.77                 | 17.00            | Complies |
| 54      | 5270 MHz  | 12.52                 | 24.00            | Complies |
| 62      | 5310 MHz  | 12.73                 | 24.00            | Complies |

**Configuration IEEE 802.11n (40MHz) Port 2**

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 38      | 5190 MHz  | 12.18                 | 17.00            | Complies |
| 46      | 5230 MHz  | 12.03                 | 17.00            | Complies |
| 54      | 5270 MHz  | 12.00                 | 24.00            | Complies |
| 62      | 5310 MHz  | 12.10                 | 24.00            | Complies |

**Configuration IEEE 802.11n (40MHz) Port 1+Port 2**

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 38      | 5190 MHz  | 15.47                 | 17.00            | Complies |
| 46      | 5230 MHz  | 15.43                 | 17.00            | Complies |
| 54      | 5270 MHz  | 15.28                 | 24.00            | Complies |
| 62      | 5310 MHz  | 15.44                 | 24.00            | Complies |

### 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                                     |

#### 3.4.2 Measuring Instruments and Setting

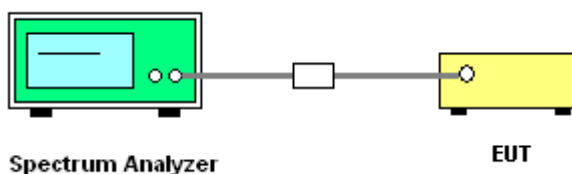
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

| Spectrum Parameter | Setting                                                      |
|--------------------|--------------------------------------------------------------|
| Attenuation        | Auto                                                         |
| Span Frequency     | Encompass the entire emissions bandwidth (EBW) of the signal |
| RB                 | 1000 kHz                                                     |
| VB                 | 3000 kHz                                                     |
| Detector           | RMS                                                          |
| 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 1000 kHz and VBW to 3000 kHz. 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. When measuring maximum conducted output power within multiple antenna systems, add every result of the values by mathematic formula. (Only for IEEE 802.11n test)

#### 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

|                        |               |                       |           |
|------------------------|---------------|-----------------------|-----------|
| <b>Final Test Date</b> | Sep. 10, 2011 | <b>Test Site No.</b>  | TH01-HY   |
| <b>Temperature</b>     | 24.5°C        | <b>Humidity</b>       | 56%       |
| <b>Test Engineer</b>   | Cain          | <b>Configurations</b> | 802.11a/n |

For Single Chain:

Configuration of IEEE 802.11a Port 1

| Frequency | Power Density (dBm) | Max. Limit (dBm) | Result   |
|-----------|---------------------|------------------|----------|
| 5180 MHz  | -1.28               | 4.00             | Complies |
| 5200 MHz  | -0.85               | 4.00             | Complies |
| 5240 MHz  | 0.46                | 4.00             | Complies |
| 5260 MHz  | 0.67                | 11.00            | Complies |
| 5280 MHz  | 1.04                | 11.00            | Complies |
| 5320 MHz  | 1.18                | 11.00            | Complies |

For Two Chains:

Configuration IEEE 802.11n (20MHz) Port 1

| Frequency | Power Density (dBm) | Max. Limit (dBm) | Result   |
|-----------|---------------------|------------------|----------|
| 5180 MHz  | -1.42               | 4.00             | Complies |
| 5200 MHz  | -1.25               | 4.00             | Complies |
| 5240 MHz  | 0.11                | 4.00             | Complies |
| 5260 MHz  | -0.02               | 11.00            | Complies |
| 5280 MHz  | 0.87                | 11.00            | Complies |
| 5320 MHz  | 0.80                | 11.00            | Complies |

Configuration IEEE 802.11n (20MHz) Port 2

| Frequency | Power Density (dBm) | Max. Limit (dBm) | Result   |
|-----------|---------------------|------------------|----------|
| 5180 MHz  | -0.88               | 4.00             | Complies |
| 5200 MHz  | 0.28                | 4.00             | Complies |
| 5240 MHz  | 1.03                | 4.00             | Complies |
| 5260 MHz  | 1.74                | 11.00            | Complies |
| 5280 MHz  | 1.51                | 11.00            | Complies |
| 5320 MHz  | 1.99                | 11.00            | Complies |

Configuration IEEE 802.11n (20MHz) Port 1+Port 2

| Frequency | Power Density (dBm) | Max. Limit (dBm) | Result   |
|-----------|---------------------|------------------|----------|
| 5180 MHz  | 1.87                | 4.00             | Complies |
| 5200 MHz  | 2.59                | 4.00             | Complies |
| 5240 MHz  | 3.60                | 4.00             | Complies |
| 5260 MHz  | 3.96                | 11.00            | Complies |
| 5280 MHz  | 4.21                | 11.00            | Complies |
| 5320 MHz  | 4.45                | 11.00            | Complies |

**Configuration IEEE 802.11n (40MHz) Port 1**

| Frequency | Power Density (dBm) | Max. Limit (dBm) | Result   |
|-----------|---------------------|------------------|----------|
| 5190 MHz  | -3.52               | 4.00             | Complies |
| 5230 MHz  | -3.30               | 4.00             | Complies |
| 5270 MHz  | -3.14               | 11.00            | Complies |
| 5310 MHz  | -3.18               | 11.00            | Complies |

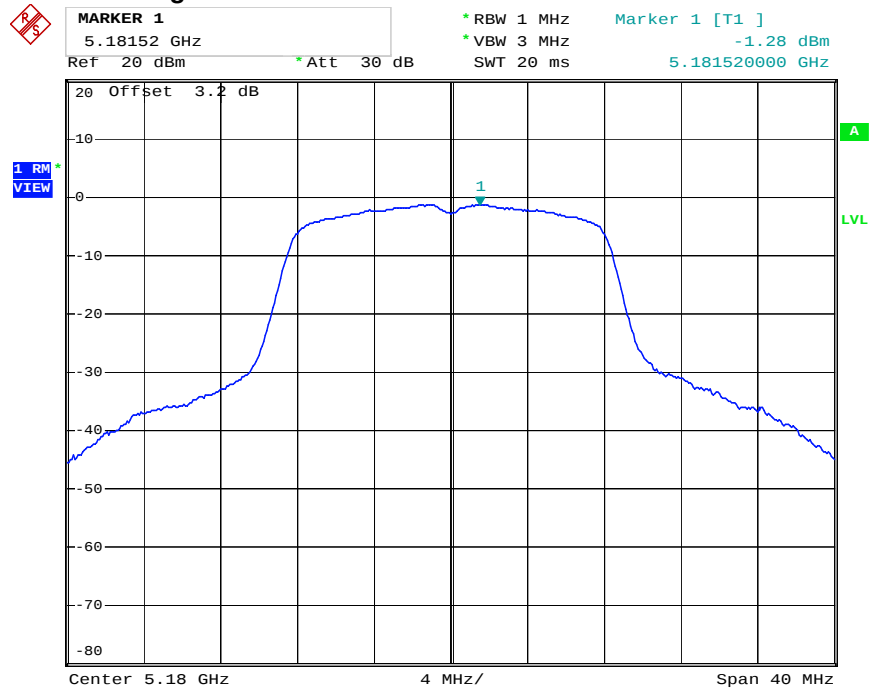
**Configuration IEEE 802.11n (40MHz) Port 2**

| Frequency | Power Density (dBm) | Max. Limit (dBm) | Result   |
|-----------|---------------------|------------------|----------|
| 5190 MHz  | -3.99               | 4.00             | Complies |
| 5230 MHz  | -3.74               | 4.00             | Complies |
| 5270 MHz  | -3.27               | 11.00            | Complies |
| 5310 MHz  | -3.33               | 11.00            | Complies |

**Configuration IEEE 802.11n (40MHz) Port 1+Port 2**

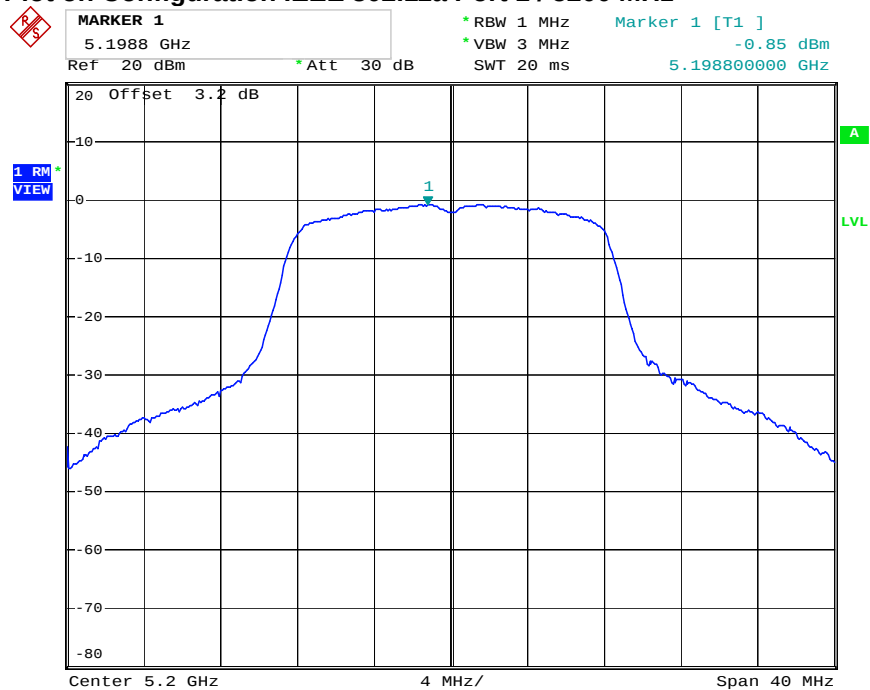
| Frequency | Power Density (dBm) | Max. Limit (dBm) | Result   |
|-----------|---------------------|------------------|----------|
| 5190 MHz  | -0.74               | 4.00             | Complies |
| 5230 MHz  | -0.50               | 4.00             | Complies |
| 5270 MHz  | -0.19               | 11.00            | Complies |
| 5310 MHz  | -0.24               | 11.00            | Complies |

For Single Chain:  
Power Density Plot on Configuration IEEE 802.11a Port 1 / 5180 MHz



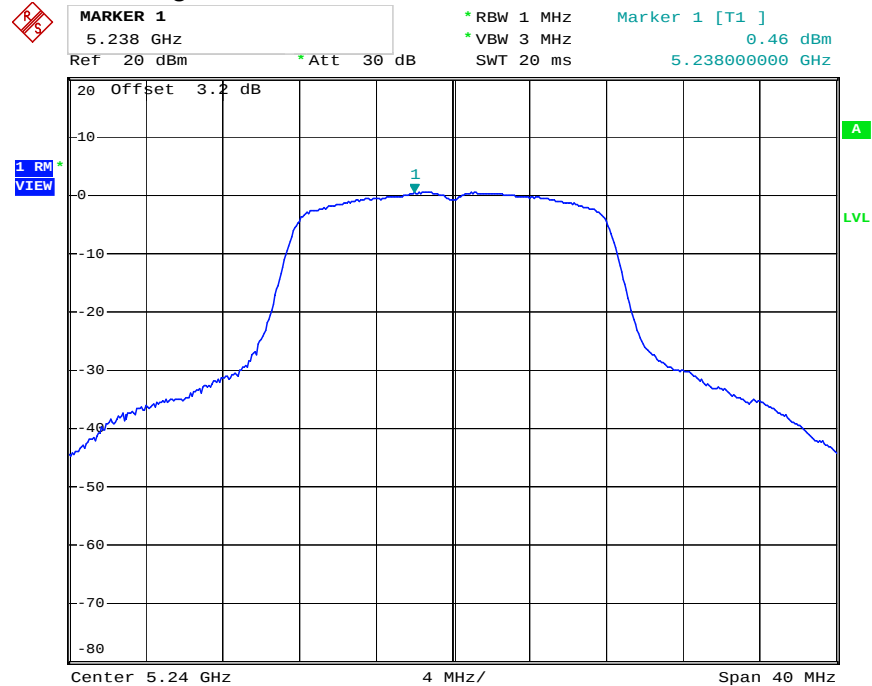
Date: 8.SEP.2011 20:54:43

Power Density Plot on Configuration IEEE 802.11a Port 1 / 5200 MHz



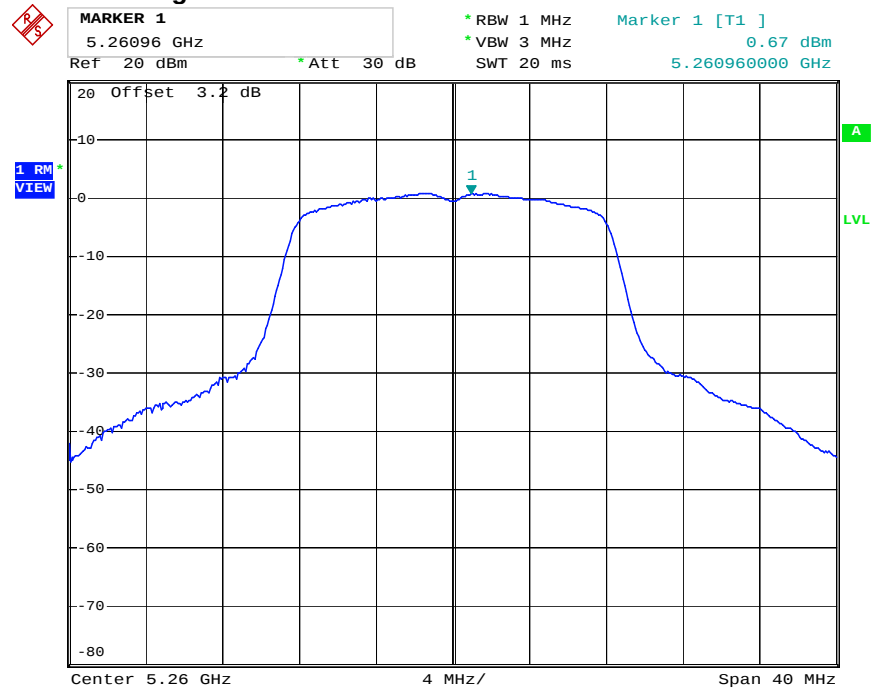
Date: 8.SEP.2011 20:55:58

## Power Density Plot on Configuration IEEE 802.11a Port 1 / 5240 MHz



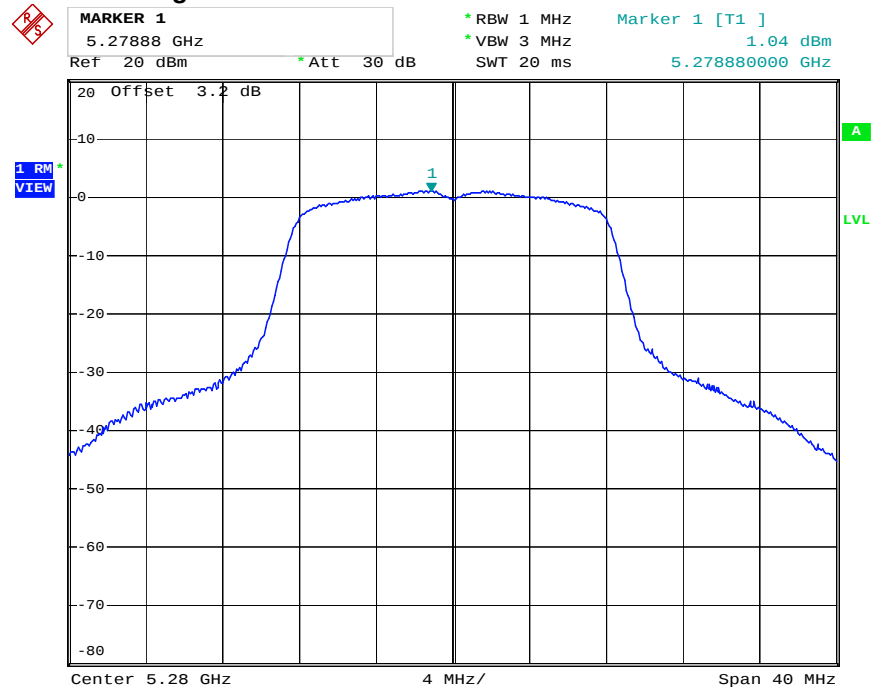
Date: 8.SEP.2011 21:02:17

## Power Density Plot on Configuration IEEE 802.11a Port 1 / 5260 MHz



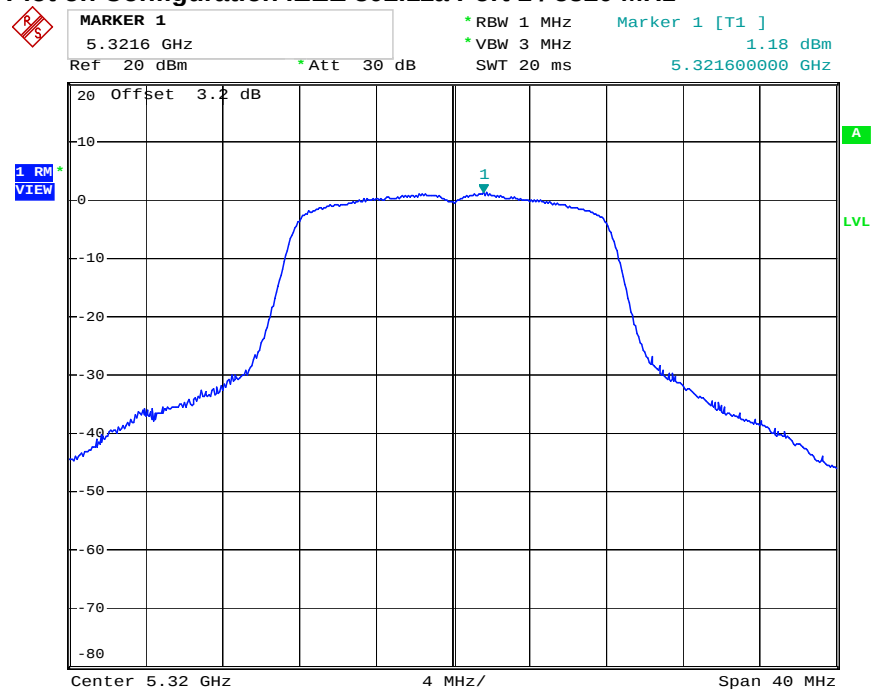
Date: 8.SEP.2011 21:03:21

## Power Density Plot on Configuration IEEE 802.11a Port 1 / 5280 MHz



Date: 8.SEP.2011 21:07:42

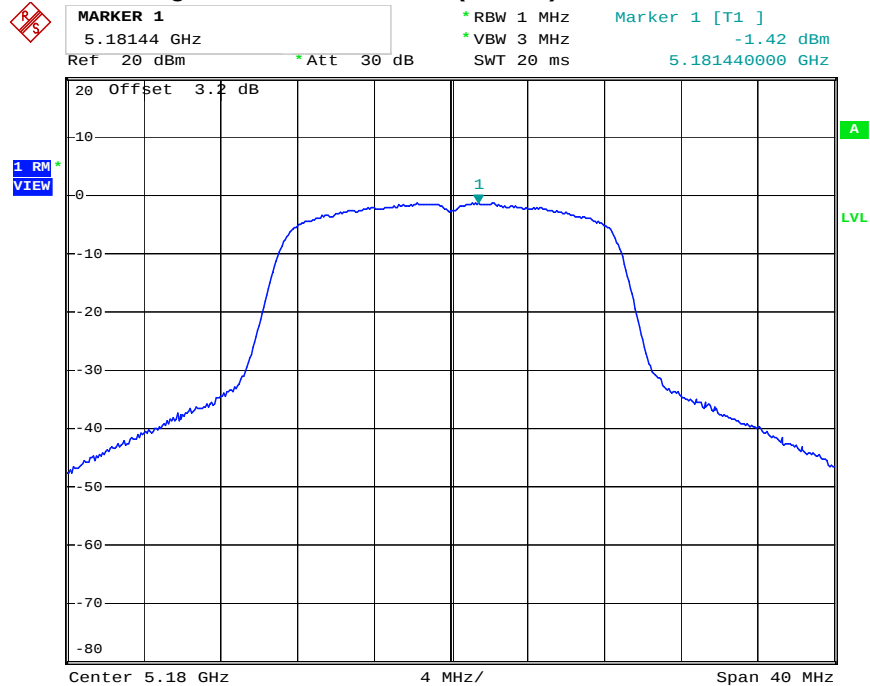
## Power Density Plot on Configuration IEEE 802.11a Port 1 / 5320 MHz



Date: 8.SEP.2011 21:08:41

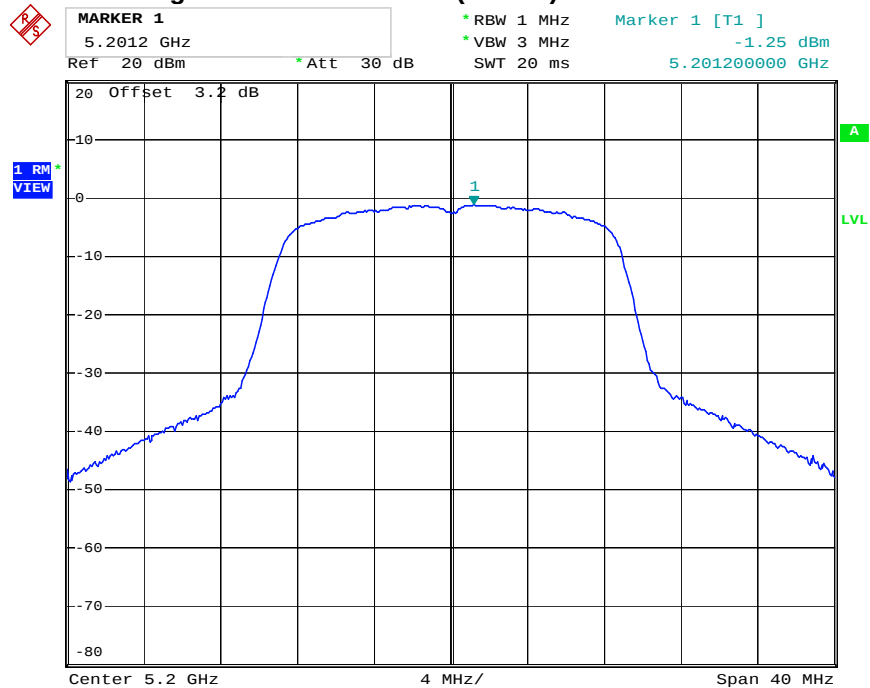
For Two Chains:

## Power Density Plot on Configuration IEEE 802.11n (20MHz) Port 1 / 5180 MHz



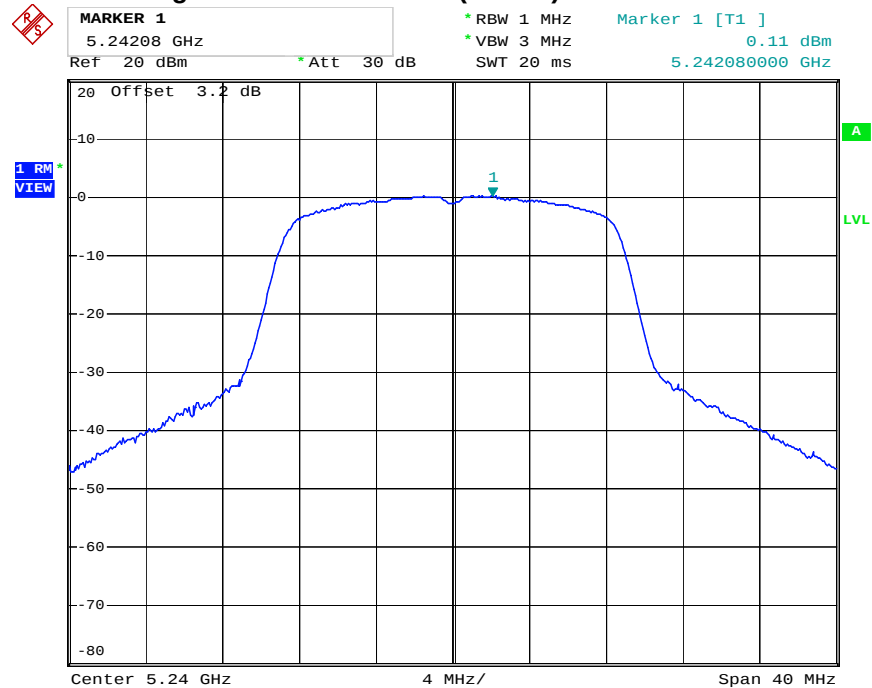
Date: 8.SEP.2011 23:33:54

## Power Density Plot on Configuration IEEE 802.11n (20MHz) Port 1 / 5200 MHz



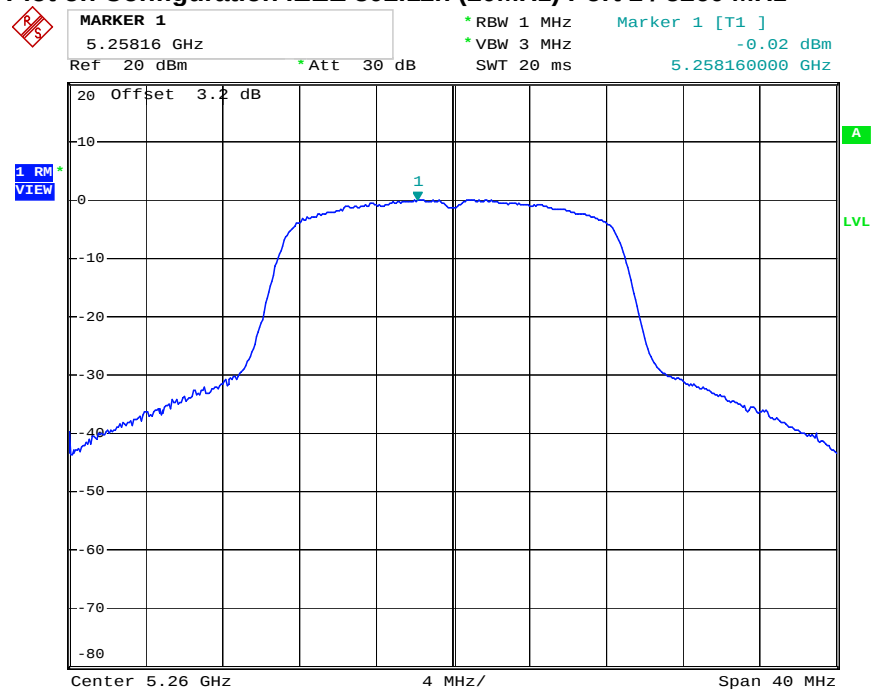
Date: 8.SEP.2011 23:38:54

## Power Density Plot on Configuration IEEE 802.11n (20MHz) Port 1 / 5240 MHz



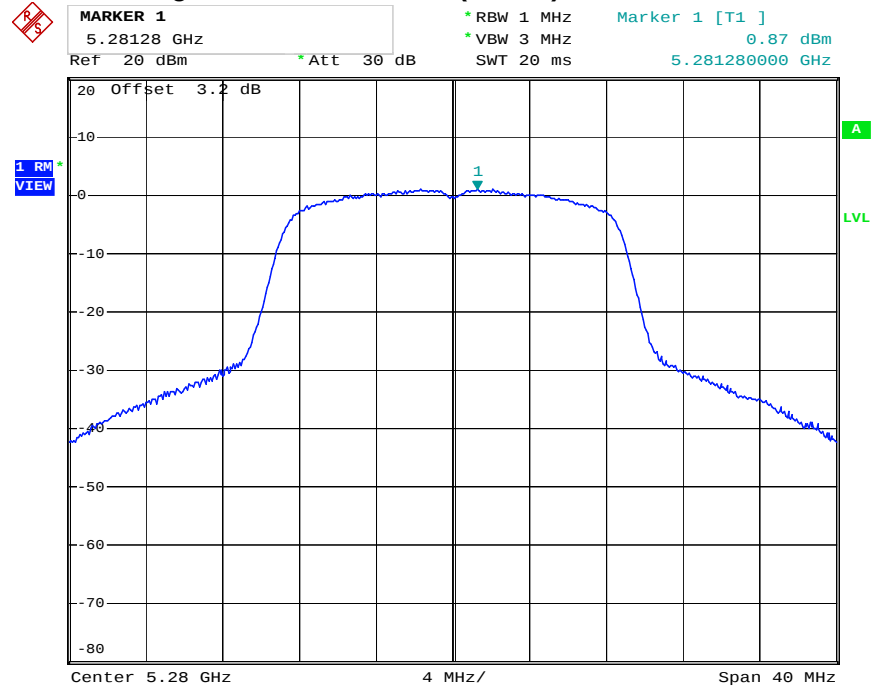
Date: 8.SEP.2011 23:43:45

## Power Density Plot on Configuration IEEE 802.11n (20MHz) Port 1 / 5260 MHz



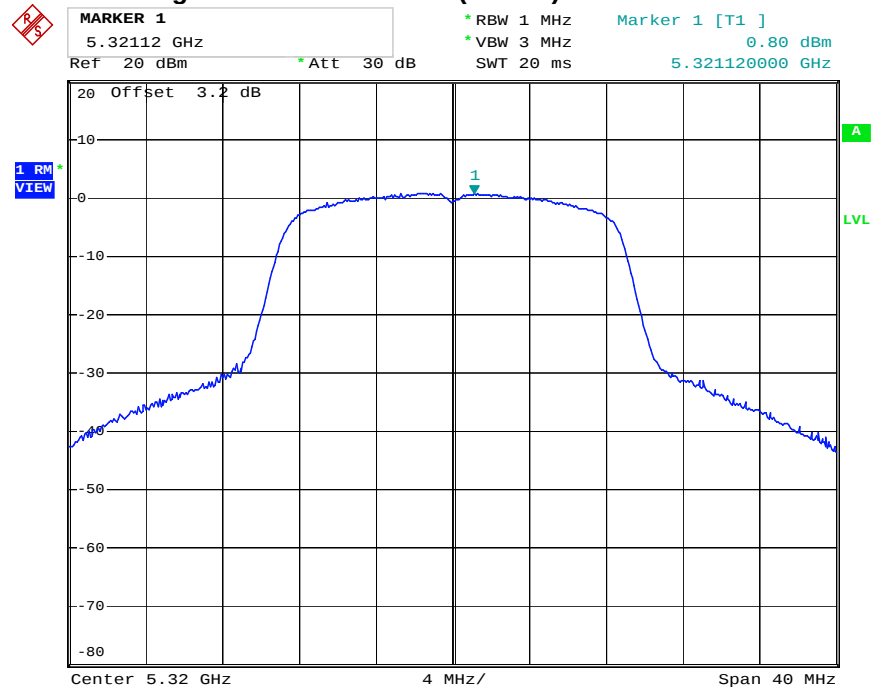
Date: 8.SEP.2011 23:49:39

## Power Density Plot on Configuration IEEE 802.11n (20MHz) Port 1 / 5280 MHz



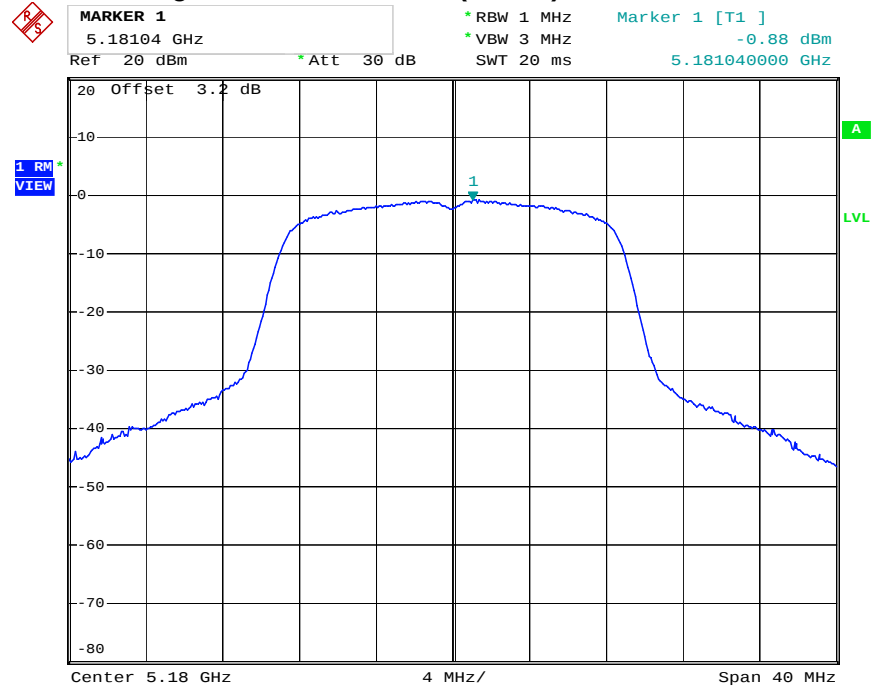
Date: 9.SEP.2011 00:10:52

## Power Density Plot on Configuration IEEE 802.11n (20MHz) Port 1 / 5320 MHz



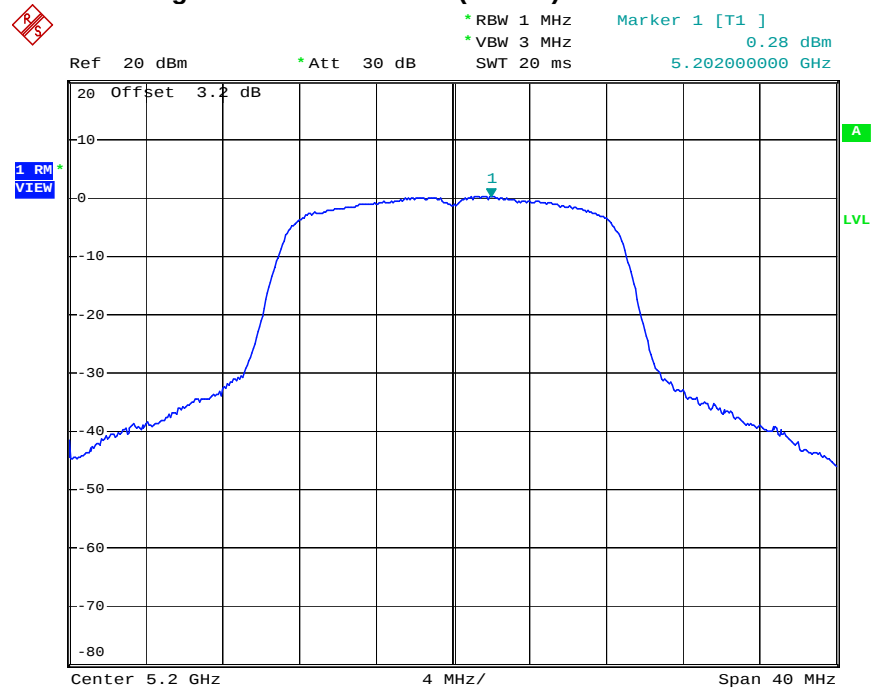
Date: 9.SEP.2011 00:21:11

## Power Density Plot on Configuration IEEE 802.11n (20MHz) Port 2 / 5180 MHz



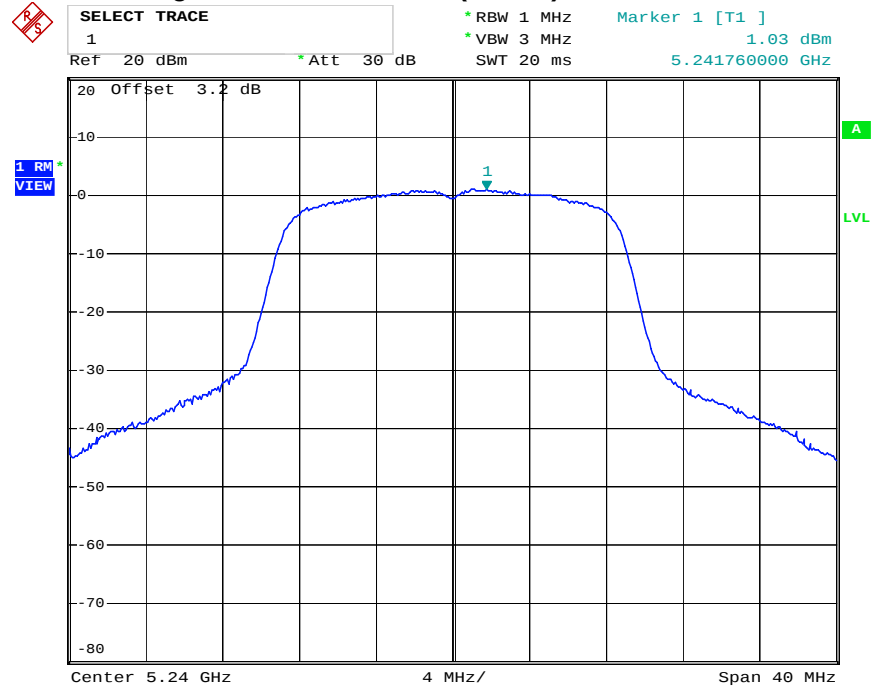
Date: 10.SEP.2011 00:08:50

## Power Density Plot on Configuration IEEE 802.11n (20MHz) Port 2 / 5200 MHz



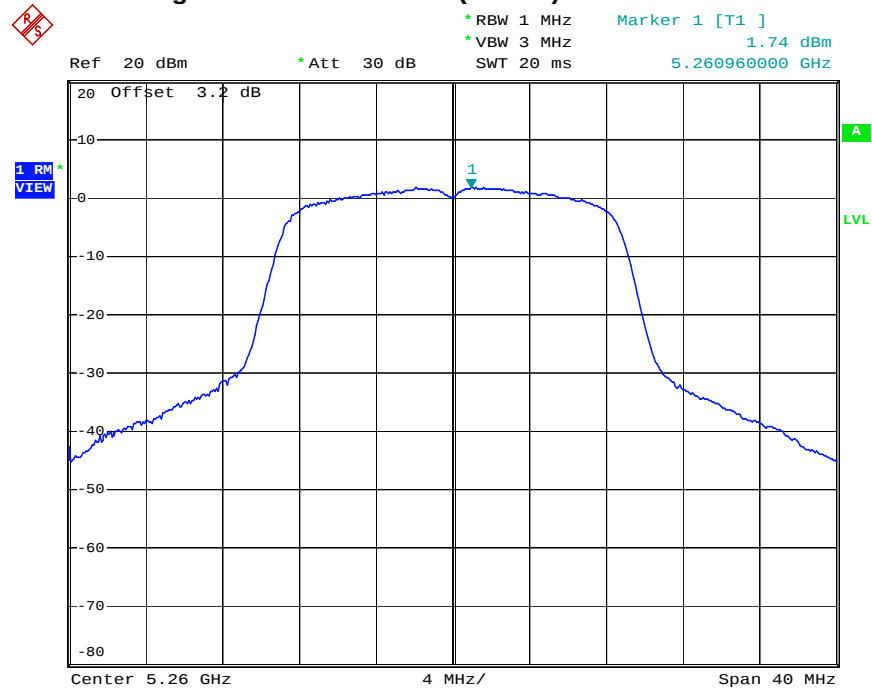
Date: 10.SEP.2011 00:12:14

## Power Density Plot on Configuration IEEE 802.11n (20MHz) Port 2 / 5240 MHz



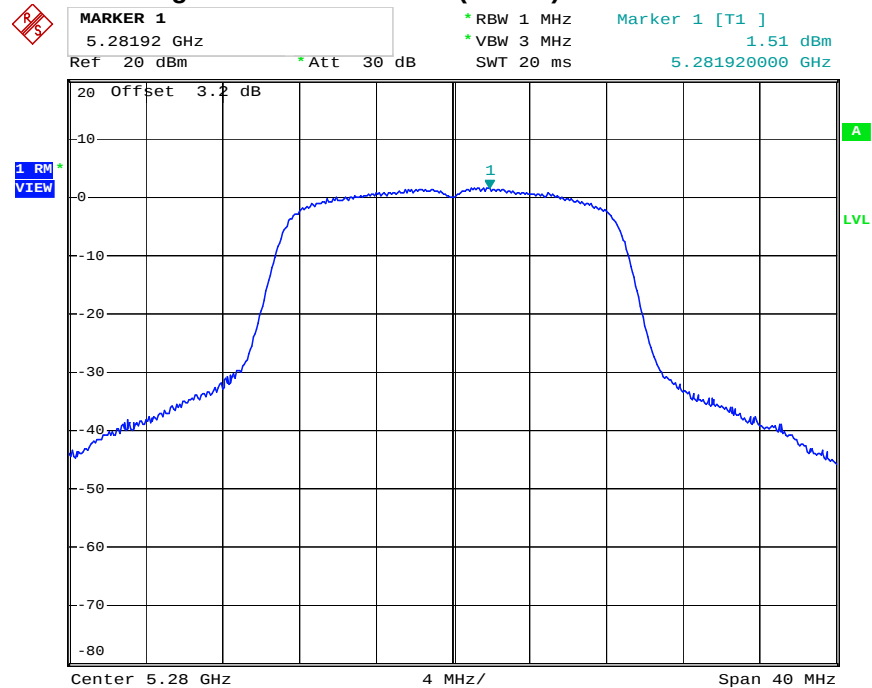
Date: 10.SEP.2011 00:17:48

## Power Density Plot on Configuration IEEE 802.11n (20MHz) Port 2 / 5260 MHz



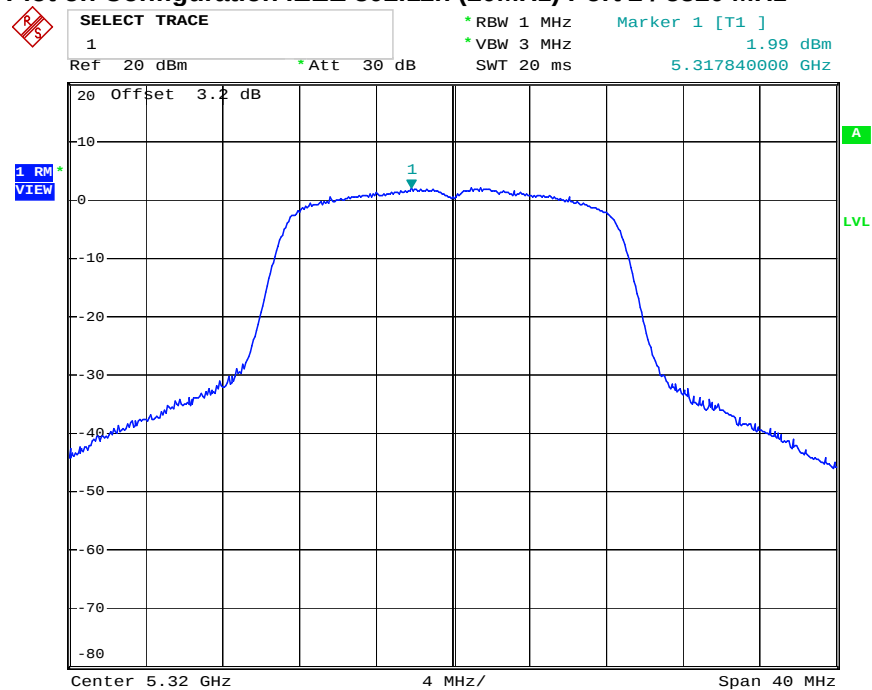
Date: 10.SEP.2011 00:22:18

## Power Density Plot on Configuration IEEE 802.11n (20MHz) Port 2 / 5280 MHz



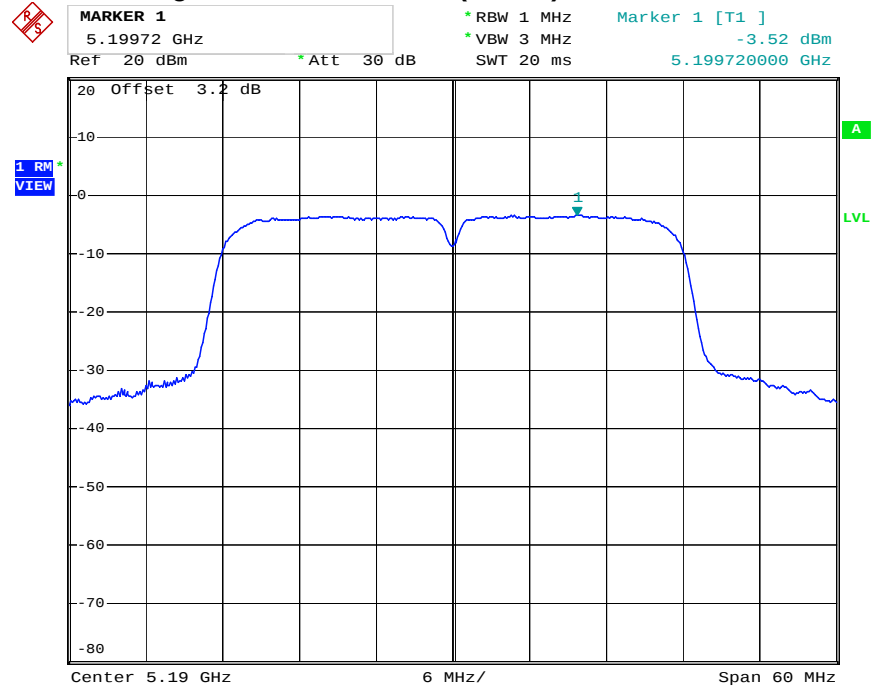
Date: 10.SEP.2011 00:26:11

## Power Density Plot on Configuration IEEE 802.11n (20MHz) Port 2 / 5320 MHz



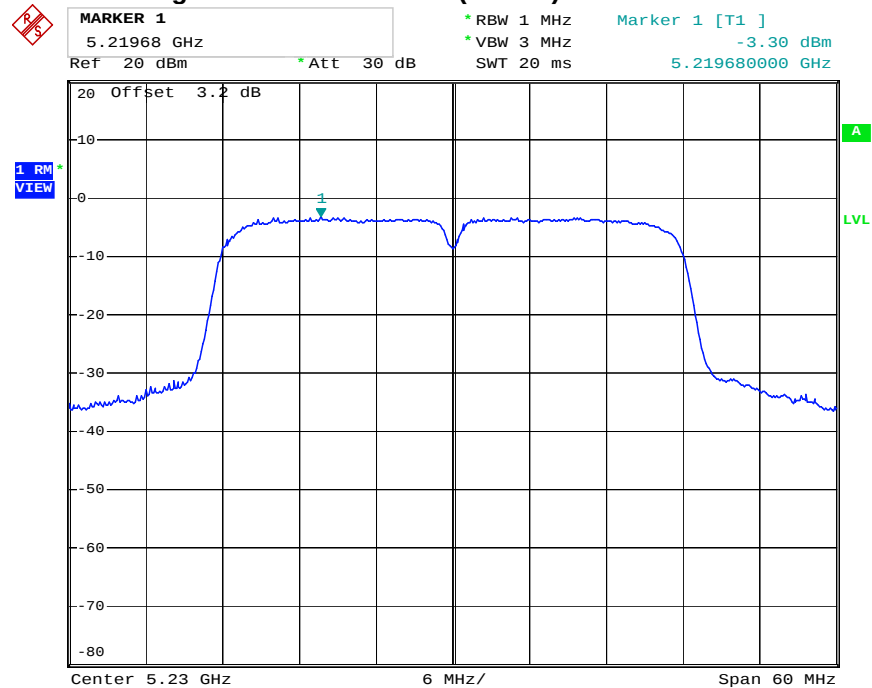
Date: 10.SEP.2011 00:28:02

## Power Density Plot on Configuration IEEE 802.11n (40MHz) Port 1 / 5190 MHz



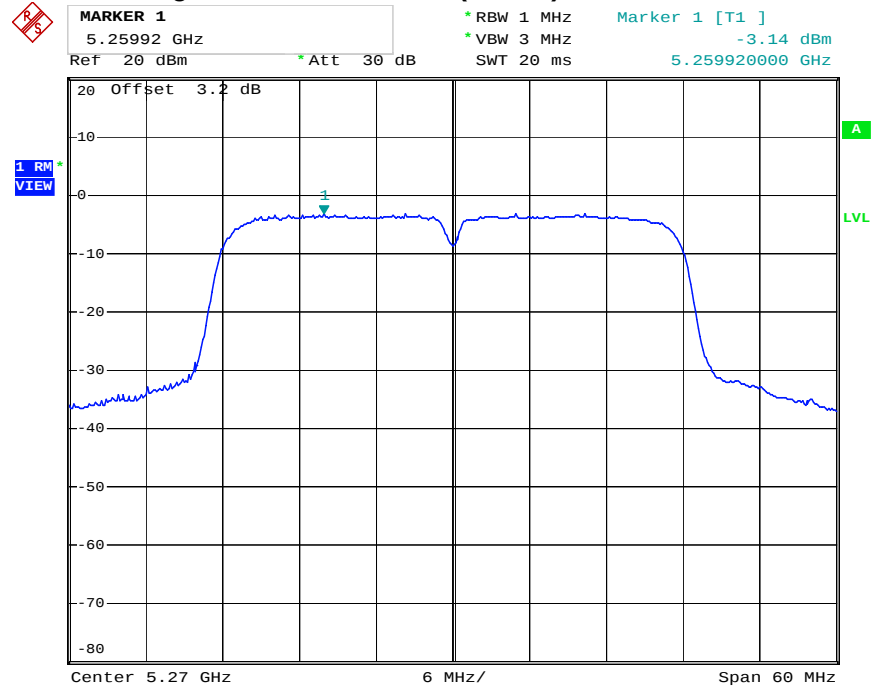
Date: 9.SEP.2011 10:25:03

## Power Density Plot on Configuration IEEE 802.11n (40MHz) Port 1 / 5230 MHz



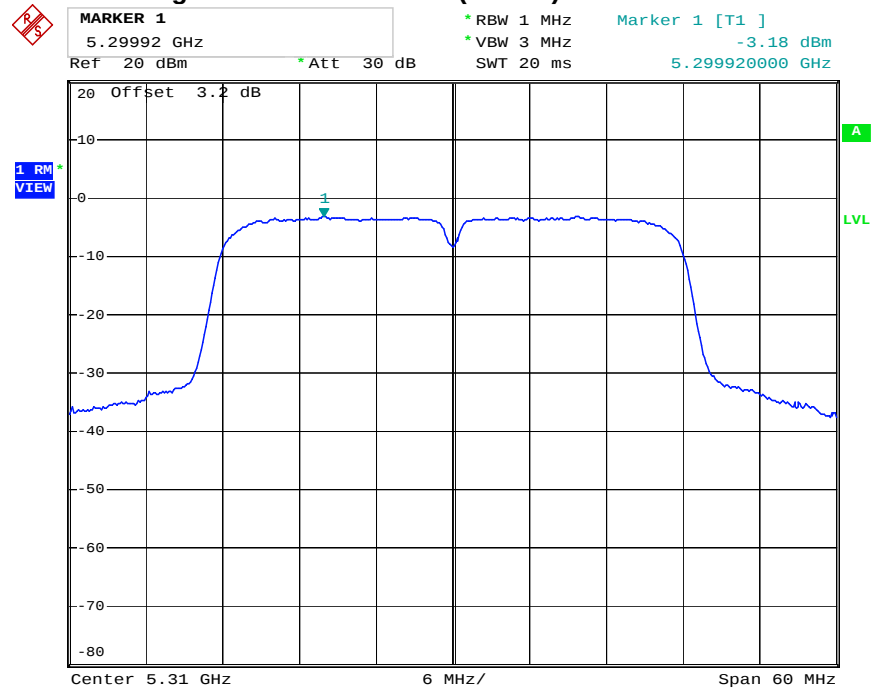
Date: 9.SEP.2011 11:05:36

## Power Density Plot on Configuration IEEE 802.11n (40MHz) Port 1 / 5270 MHz



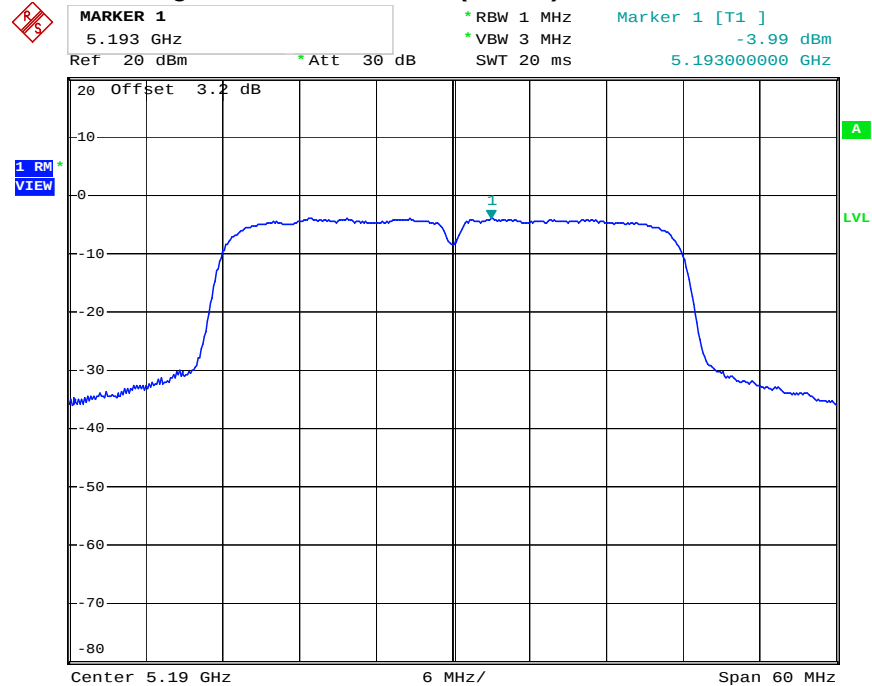
Date: 9.SEP.2011 11:18:30

## Power Density Plot on Configuration IEEE 802.11n (40MHz) Port 1 / 5310 MHz



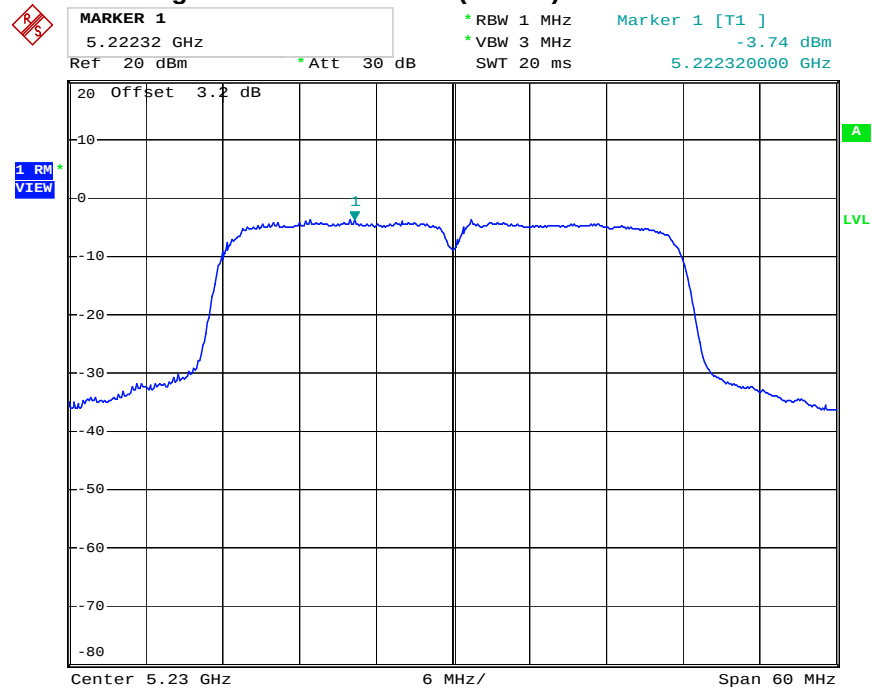
Date: 9.SEP.2011 11:32:28

## Power Density Plot on Configuration IEEE 802.11n (40MHz) Port 2 / 5190 MHz



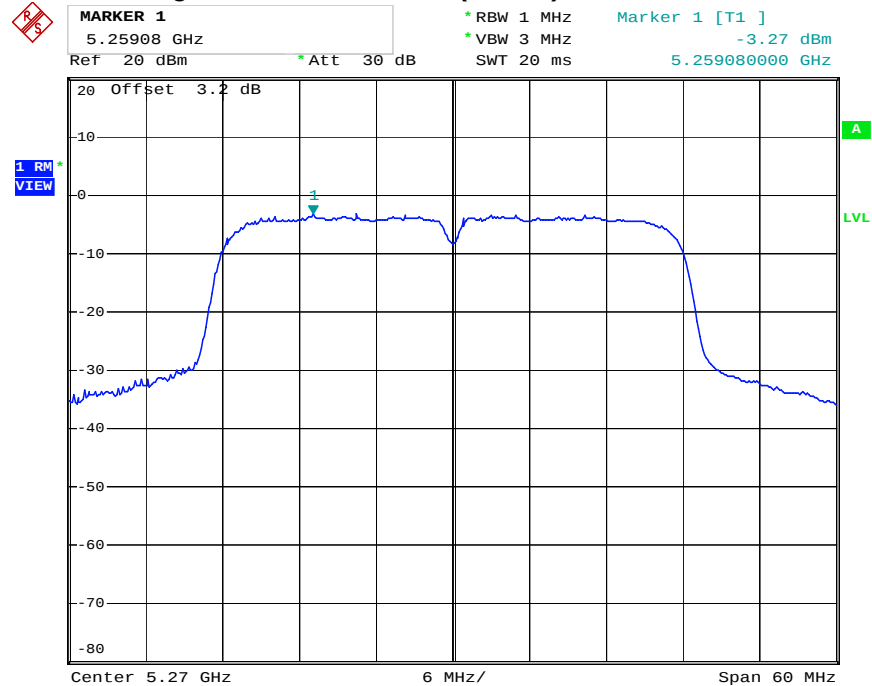
Date: 9.SEP.2011 10:42:01

## Power Density Plot on Configuration IEEE 802.11n (40MHz) Port 2 / 5230 MHz



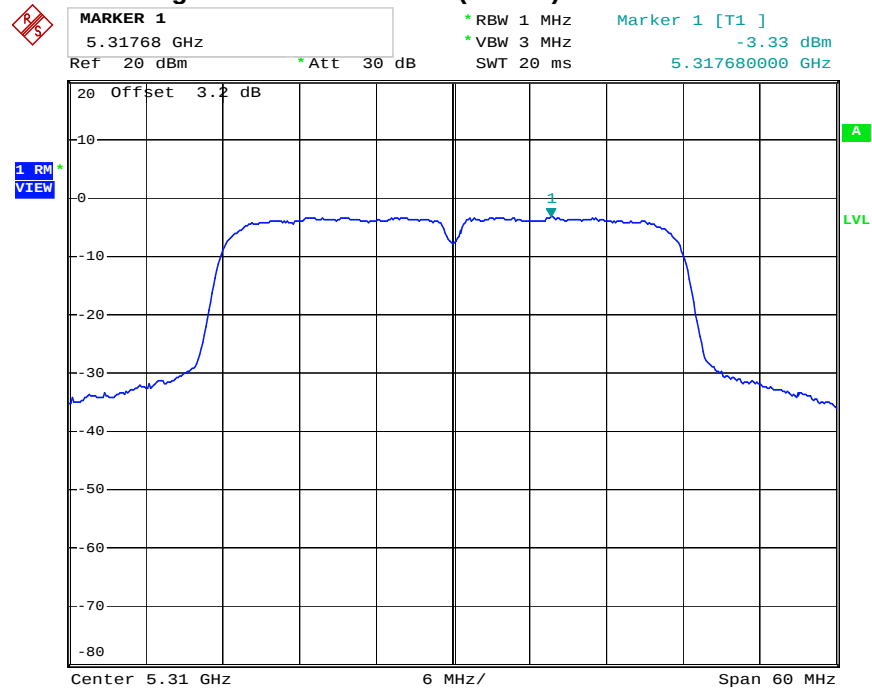
Date: 9.SEP.2011 10:53:30

## Power Density Plot on Configuration IEEE 802.11n (40MHz) Port 2 / 5270 MHz



Date: 9.SEP.2011 11:23:08

## Power Density Plot on Configuration IEEE 802.11n (40MHz) Port 2 / 5310 MHz



Date: 9.SEP.2011 11:35:59

### 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

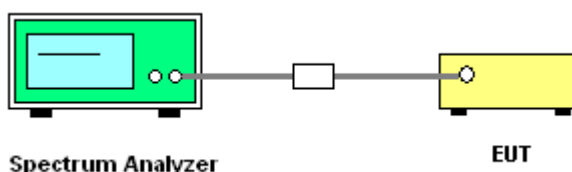
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

| 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                 | 300 kHz (Peak Trace) / 300 kHz (Average Trace)               |
| Detector           | Peak (Peak Trace) / RMS (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  $\leq 13$  dB for all frequencies across the emissions bandwidth. Submit a plot.
3. Peak Trace: Set RBW = 1 MHz, VBW  $\geq 300$  kHz 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  $\geq 1/4\mu\text{s}$ ). 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.

#### 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**

|                        |               |                       |           |
|------------------------|---------------|-----------------------|-----------|
| <b>Final Test Date</b> | Sep. 10, 2011 | <b>Test Site No.</b>  | TH01-HY   |
| <b>Temperature</b>     | 24.5°C        | <b>Humidity</b>       | 56%       |
| <b>Test Engineer</b>   | Cain          | <b>Configurations</b> | 802.11a/n |

**For Single Chain:****Configuration of IEEE 802.11a Port 1**

| <b>Frequency</b> | <b>Peak Excursion (dB)</b> | <b>Max. Limit (dB)</b> | <b>Result</b>   |
|------------------|----------------------------|------------------------|-----------------|
| 5180 MHz         | 5.07                       | 13                     | <b>Complies</b> |
| 5200 MHz         | 5.32                       | 13                     | <b>Complies</b> |
| 5240 MHz         | 5.41                       | 13                     | <b>Complies</b> |
| 5260 MHz         | 5.31                       | 13                     | <b>Complies</b> |
| 5280 MHz         | 5.27                       | 13                     | <b>Complies</b> |
| 5320 MHz         | 5.10                       | 13                     | <b>Complies</b> |

**For Two Chains:****Configuration IEEE 802.11n (20MHz) Port 1**

| <b>Frequency</b> | <b>Peak Excursion (dB)</b> | <b>Max. Limit (dB)</b> | <b>Result</b>   |
|------------------|----------------------------|------------------------|-----------------|
| 5180 MHz         | 5.05                       | 13                     | <b>Complies</b> |
| 5200 MHz         | 5.03                       | 13                     | <b>Complies</b> |
| 5240 MHz         | 5.08                       | 13                     | <b>Complies</b> |
| 5260 MHz         | 5.07                       | 13                     | <b>Complies</b> |
| 5280 MHz         | 5.07                       | 13                     | <b>Complies</b> |
| 5320 MHz         | 5.13                       | 13                     | <b>Complies</b> |

**Configuration IEEE 802.11n (20MHz) Port 2**

| <b>Frequency</b> | <b>Peak Excursion (dB)</b> | <b>Max. Limit (dB)</b> | <b>Result</b>   |
|------------------|----------------------------|------------------------|-----------------|
| 5180 MHz         | 6.54                       | 13                     | <b>Complies</b> |
| 5200 MHz         | 6.71                       | 13                     | <b>Complies</b> |
| 5240 MHz         | 6.57                       | 13                     | <b>Complies</b> |
| 5260 MHz         | 6.72                       | 13                     | <b>Complies</b> |
| 5280 MHz         | 6.60                       | 13                     | <b>Complies</b> |
| 5320 MHz         | 6.57                       | 13                     | <b>Complies</b> |

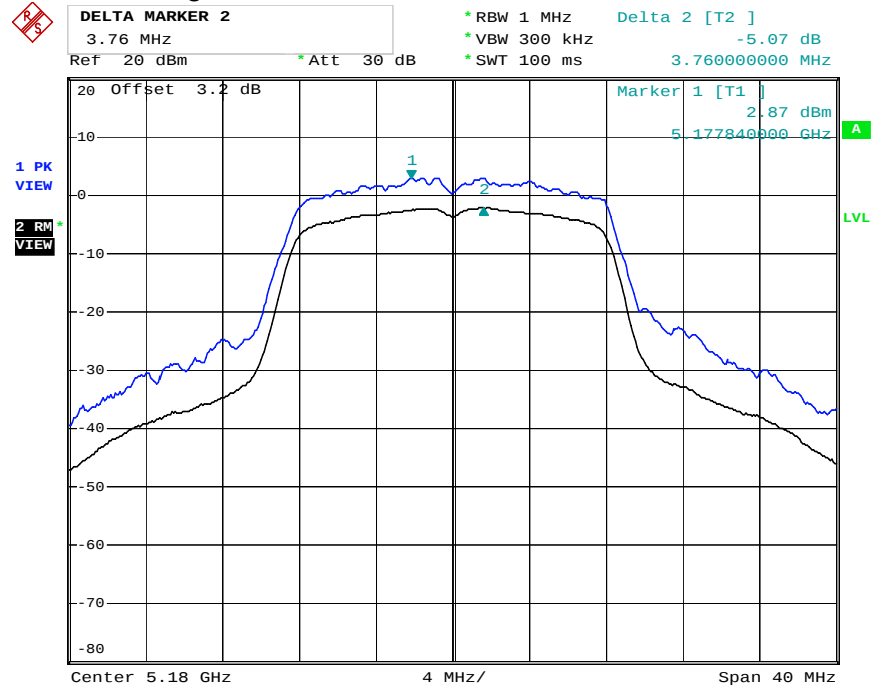
**Configuration IEEE 802.11n (40MHz) Port 1**

| <b>Frequency</b> | <b>Peak Excursion<br/>(dB)</b> | <b>Max. Limit<br/>(dB)</b> | <b>Result</b>   |
|------------------|--------------------------------|----------------------------|-----------------|
| 5190 MHz         | 6.22                           | 13                         | <b>Complies</b> |
| 5230 MHz         | 5.97                           | 13                         | <b>Complies</b> |
| 5270 MHz         | 6.08                           | 13                         | <b>Complies</b> |
| 5310 MHz         | 5.99                           | 13                         | <b>Complies</b> |

**Configuration IEEE 802.11n (40MHz) Port 2**

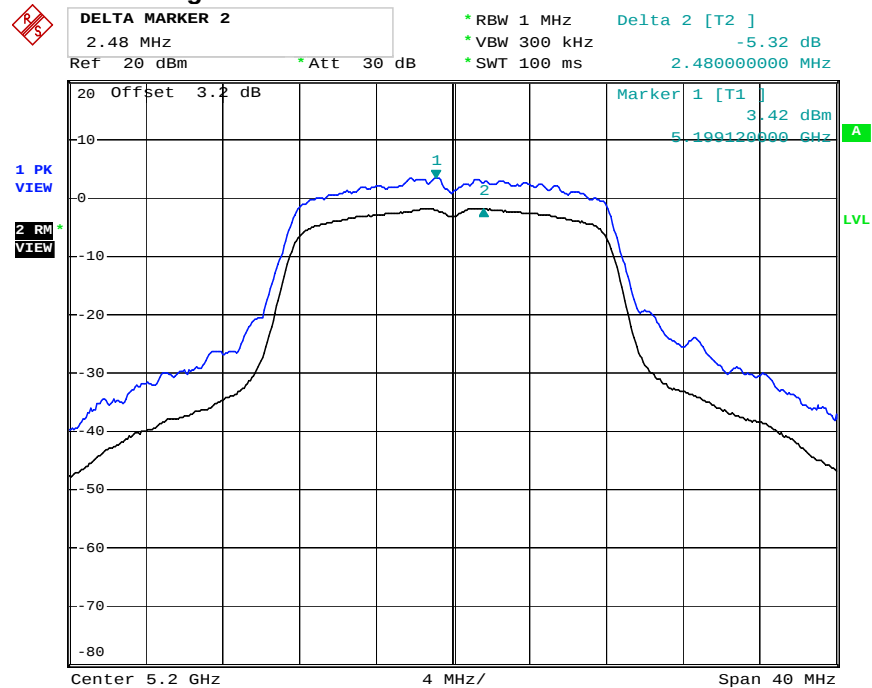
| <b>Frequency</b> | <b>Peak Excursion<br/>(dB)</b> | <b>Max. Limit<br/>(dB)</b> | <b>Result</b>   |
|------------------|--------------------------------|----------------------------|-----------------|
| 5190 MHz         | 6.87                           | 13                         | <b>Complies</b> |
| 5230 MHz         | 6.80                           | 13                         | <b>Complies</b> |
| 5270 MHz         | 6.89                           | 13                         | <b>Complies</b> |
| 5310 MHz         | 6.97                           | 13                         | <b>Complies</b> |

For Single Chain:  
Peak Excursion Plot on Configuration IEEE 802.11a Port 1 / 5180 MHz



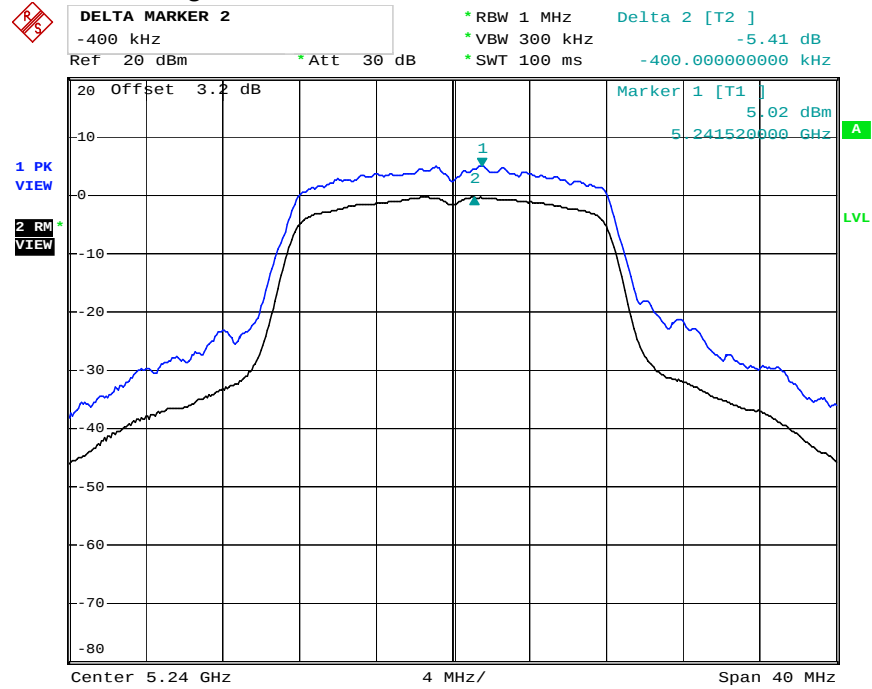
Date: 8.SEP.2011 20:54:02

Peak Excursion Plot on Configuration IEEE 802.11a Port 1 / 5200 MHz



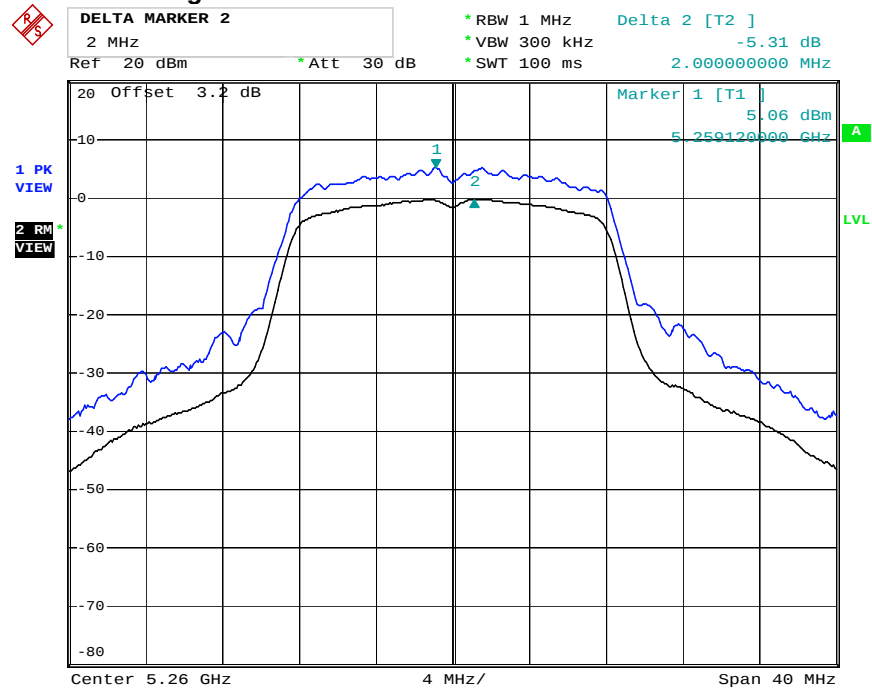
Date: 8.SEP.2011 20:56:48

## Peak Excursion Plot on Configuration IEEE 802.11a Port 1 / 5240 MHz



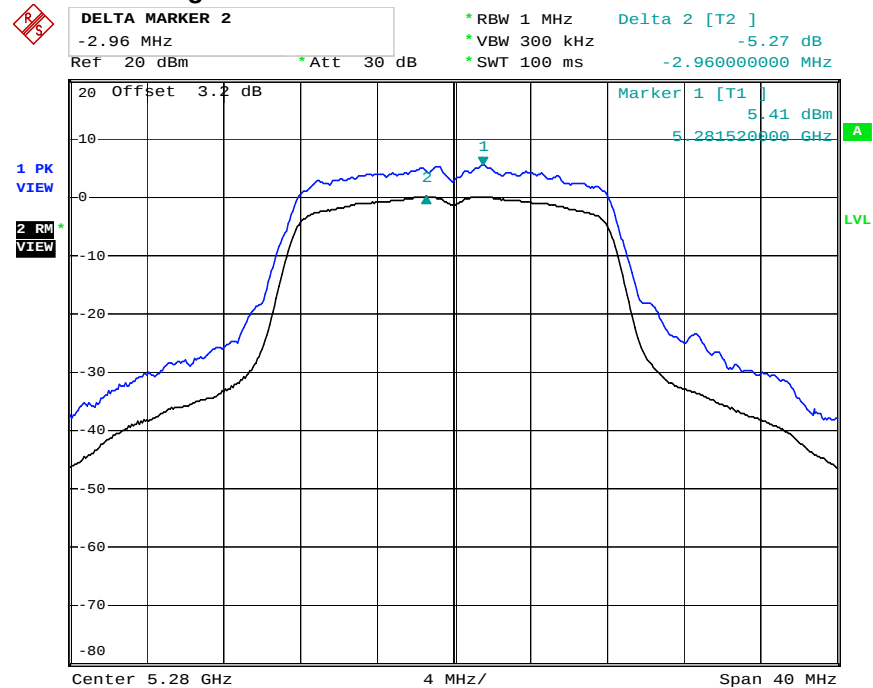
Date: 8.SEP.2011 21:01:42

## Peak Excursion Plot on Configuration IEEE 802.11a Port 1 / 5260 MHz



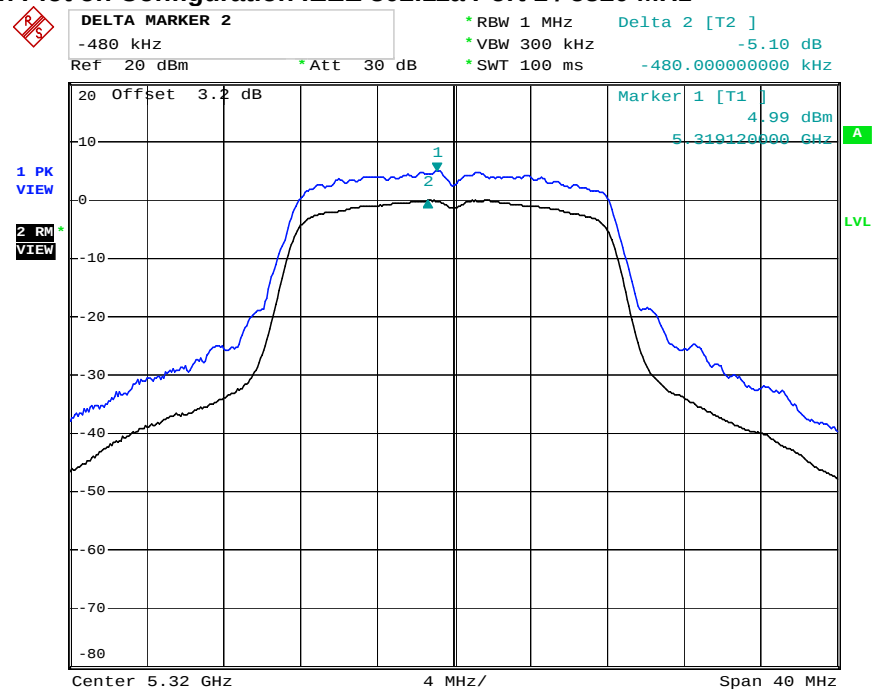
Date: 8.SEP.2011 21:03:51

## Peak Excursion Plot on Configuration IEEE 802.11a Port 1 / 5280 MHz



Date: 8.SEP.2011 21:07:22

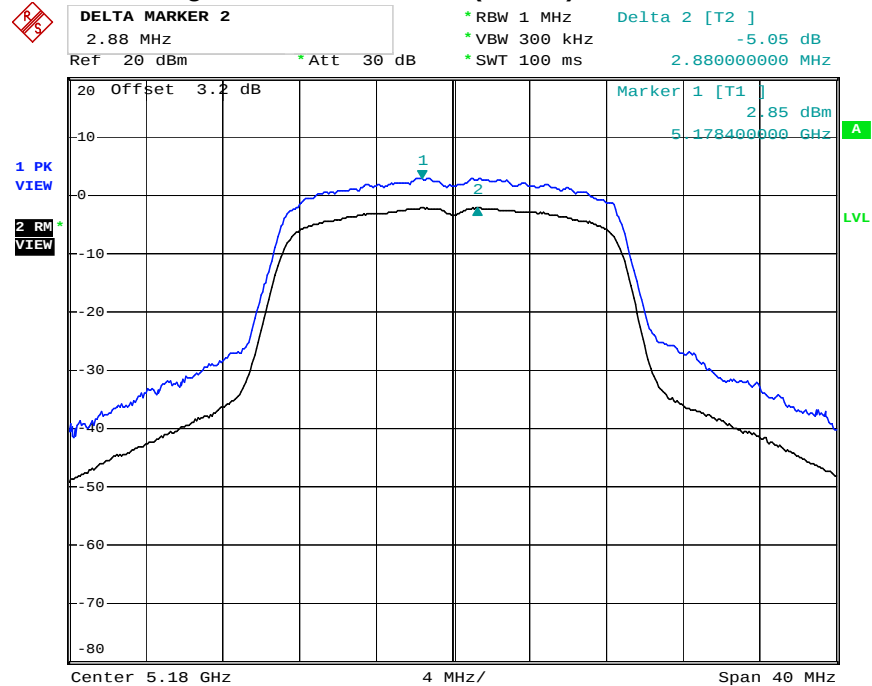
## Peak Excursion Plot on Configuration IEEE 802.11a Port 1 / 5320 MHz



Date: 8.SEP.2011 21:09:14

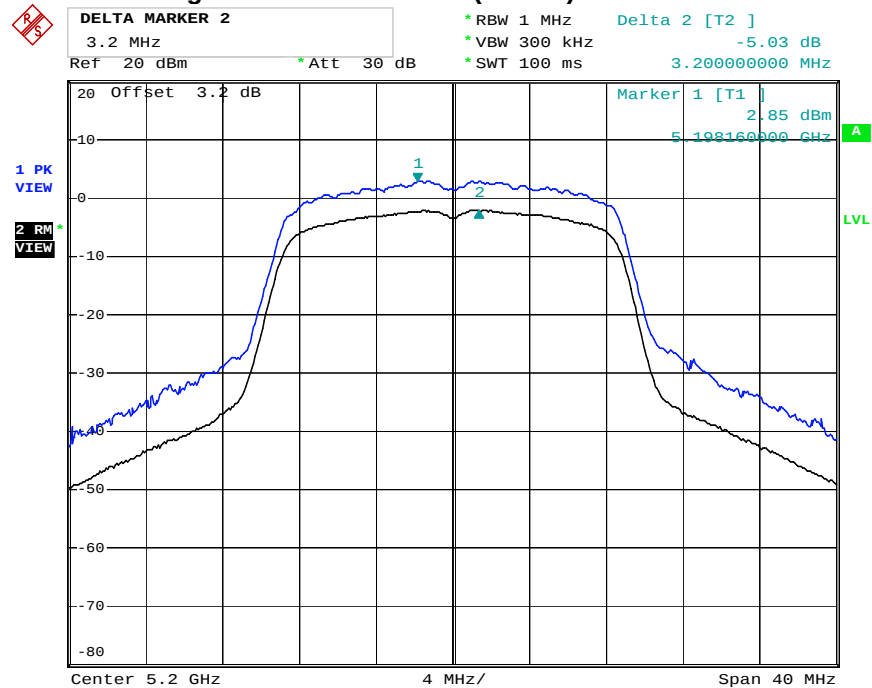
For Two Chains:

## Peak Excursion Plot on Configuration IEEE 802.11n (20MHz) Port 1 / 5180 MHz



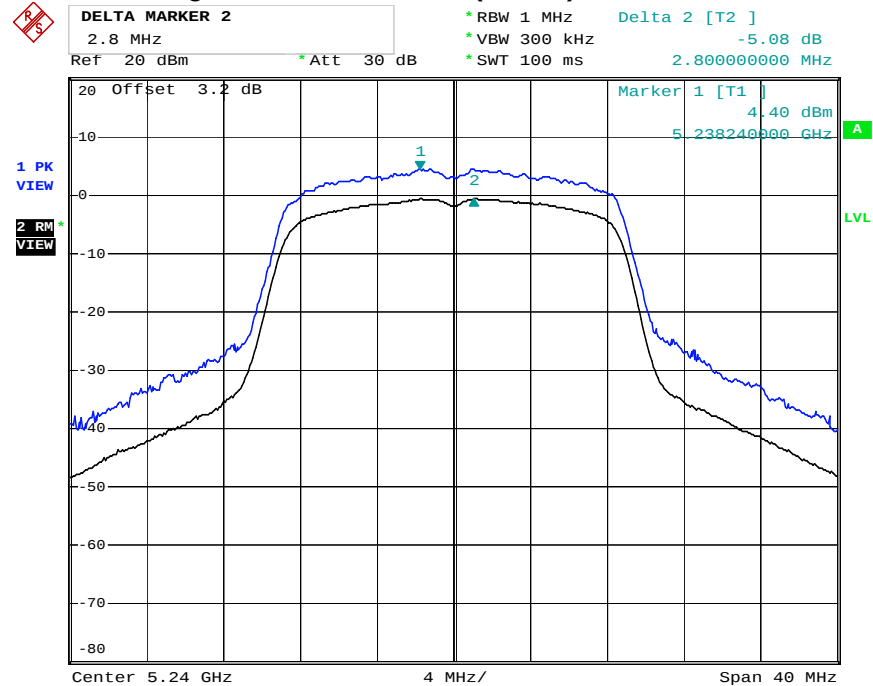
Date: 8.SEP.2011 23:33:29

## Peak Excursion Plot on Configuration IEEE 802.11n (20MHz) Port 1 / 5200 MHz



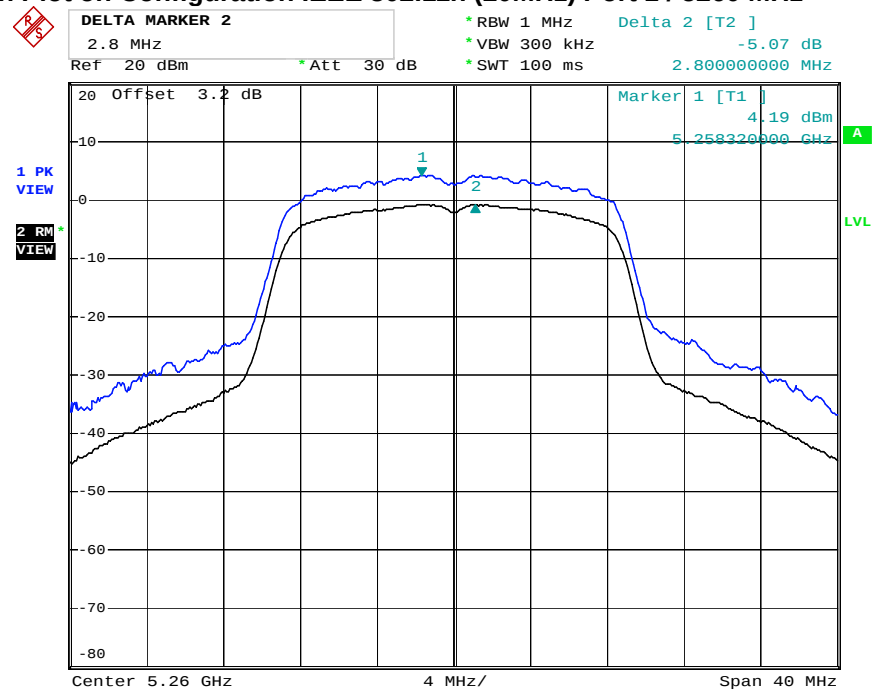
Date: 8.SEP.2011 23:38:32

## Peak Excursion Plot on Configuration IEEE 802.11n (20MHz) Port 1 / 5240 MHz



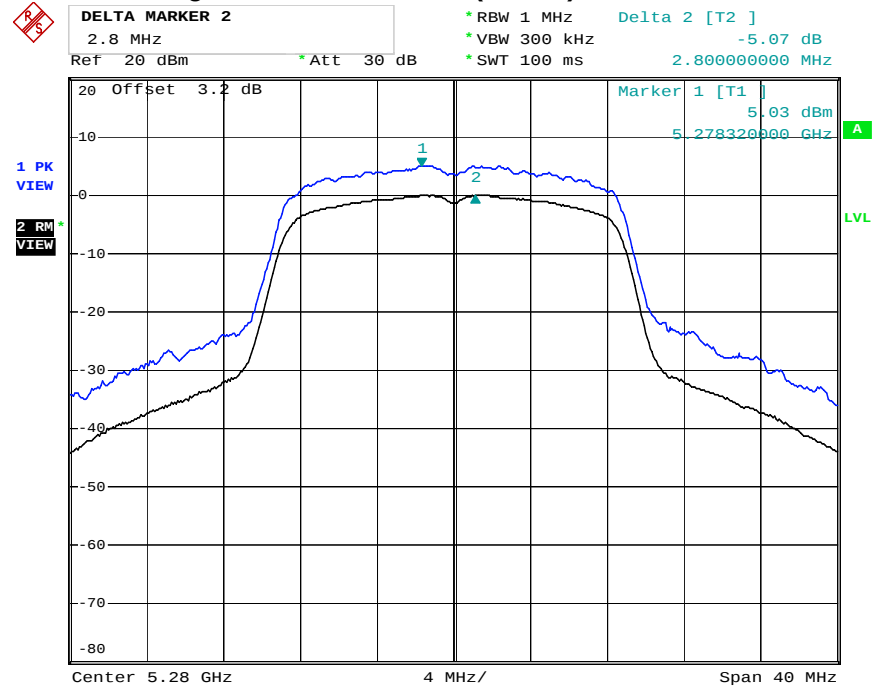
Date: 8.SEP.2011 23:43:20

## Peak Excursion Plot on Configuration IEEE 802.11n (20MHz) Port 1 / 5260 MHz



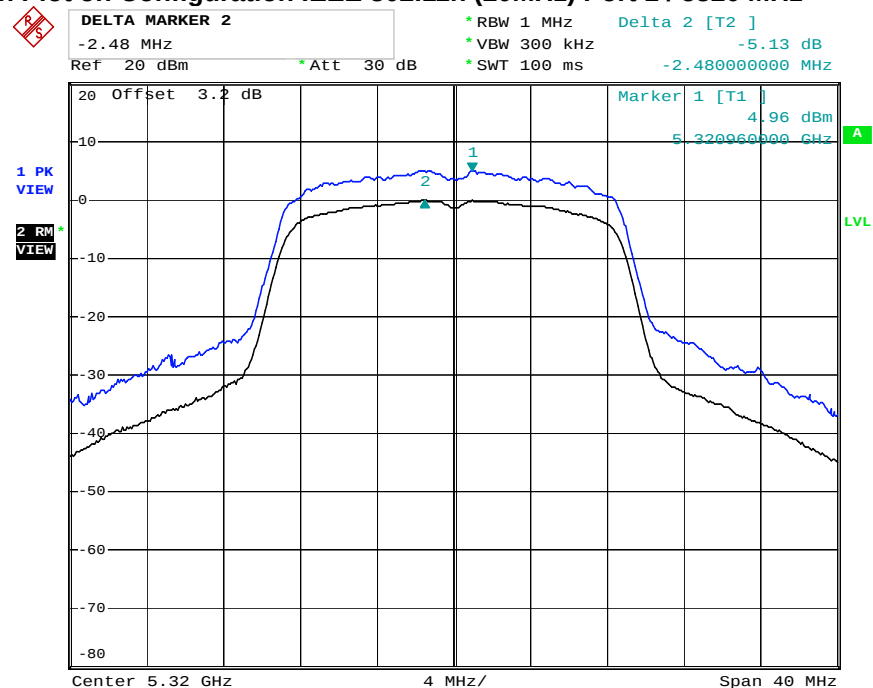
Date: 8.SEP.2011 23:49:02

## Peak Excursion Plot on Configuration IEEE 802.11n (20MHz) Port 1 / 5280 MHz



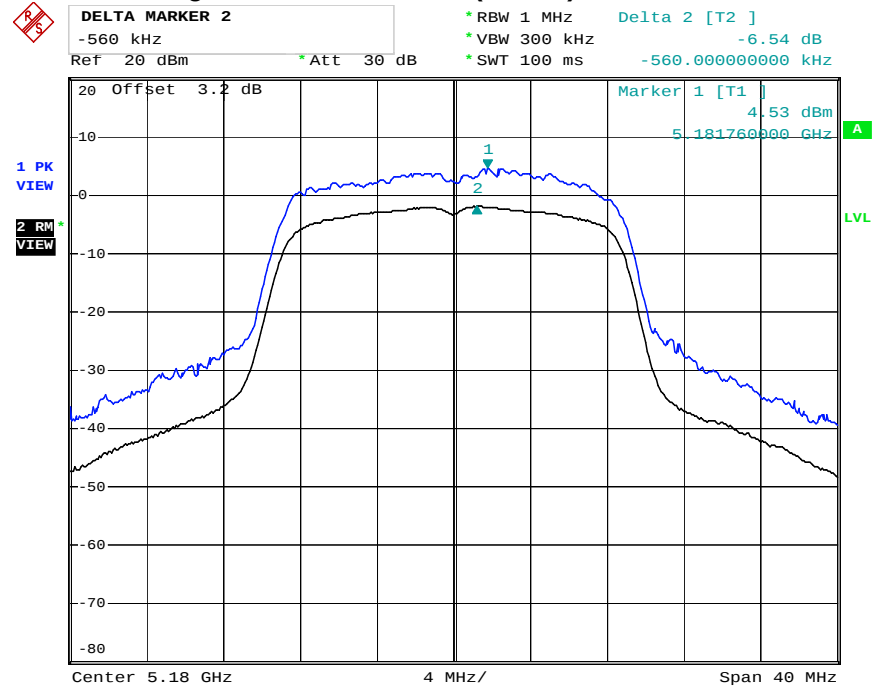
Date: 9.SEP.2011 00:10:29

## Peak Excursion Plot on Configuration IEEE 802.11n (20MHz) Port 1 / 5320 MHz



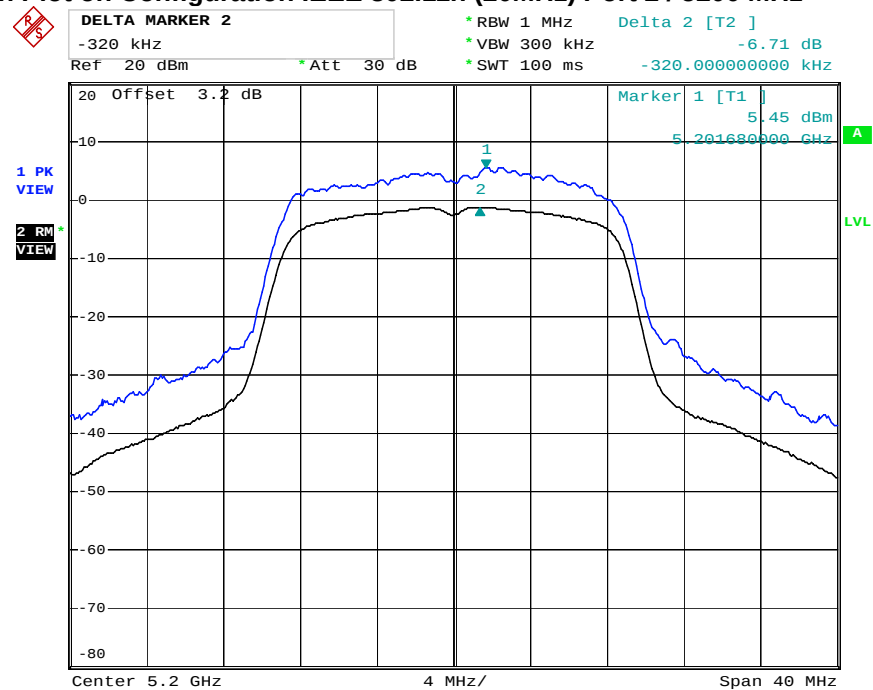
Date: 9.SEP.2011 00:20:54

## Peak Excursion Plot on Configuration IEEE 802.11n (20MHz) Port 2 / 5180 MHz



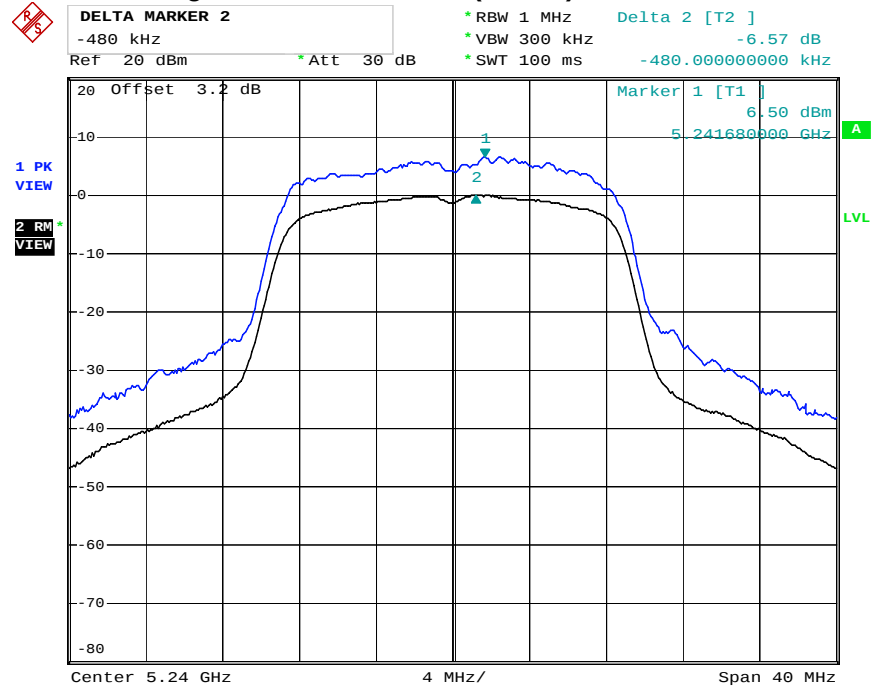
Date: 10.SEP.2011 00:08:20

## Peak Excursion Plot on Configuration IEEE 802.11n (20MHz) Port 2 / 5200 MHz



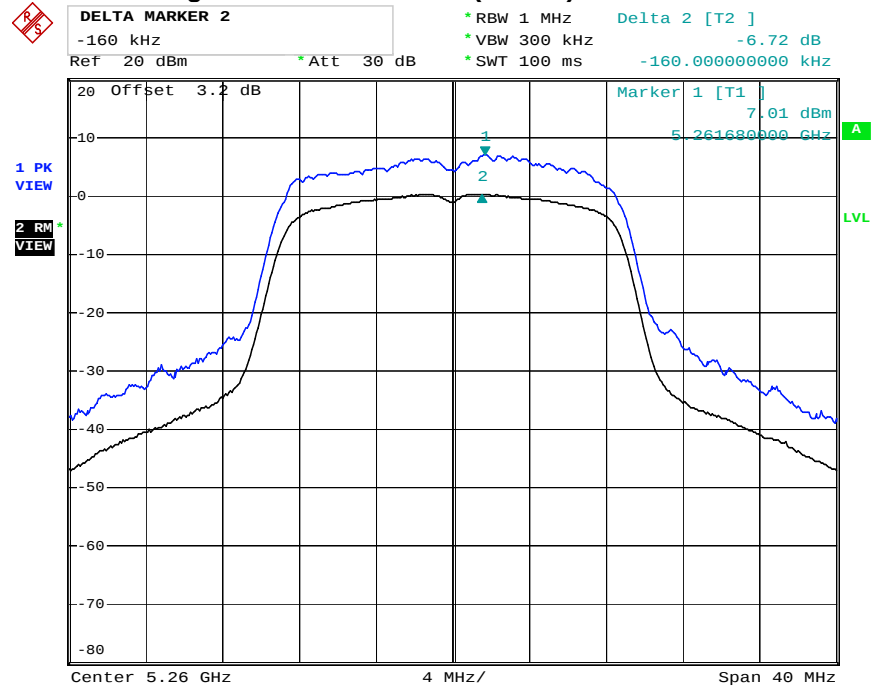
Date: 10.SEP.2011 00:13:05

## Peak Excursion Plot on Configuration IEEE 802.11n (20MHz) Port 2 / 5240 MHz



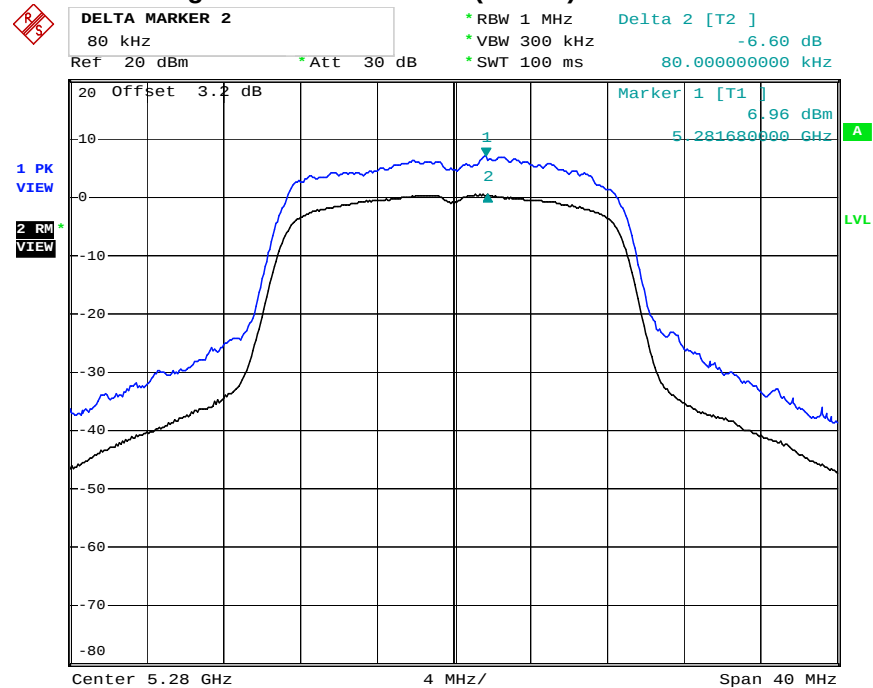
Date: 10.SEP.2011 00:16:42

## Peak Excursion Plot on Configuration IEEE 802.11n (20MHz) Port 2 / 5260 MHz



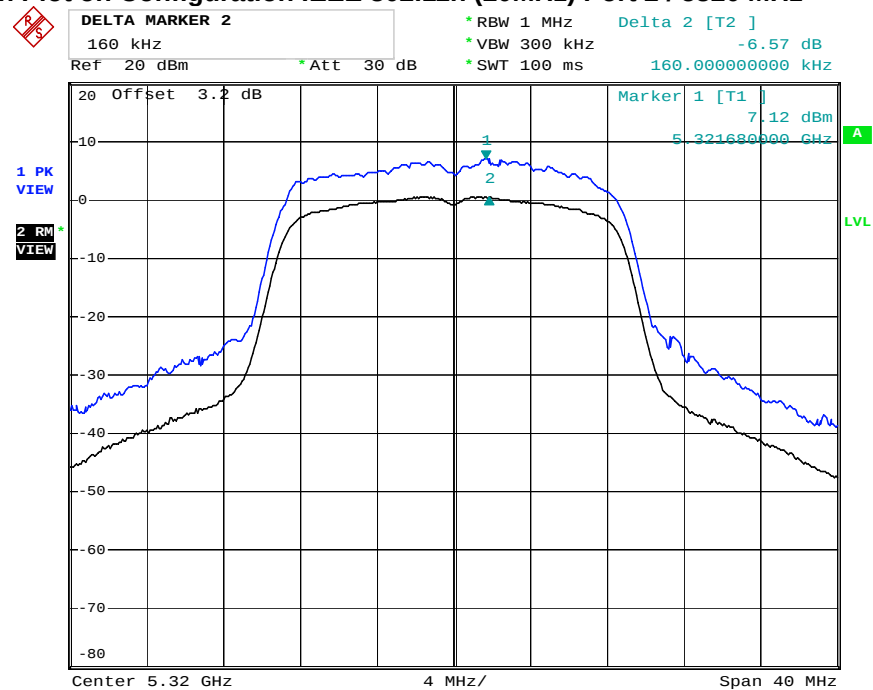
Date: 10.SEP.2011 00:22:54

## Peak Excursion Plot on Configuration IEEE 802.11n (20MHz) Port 2 / 5280 MHz



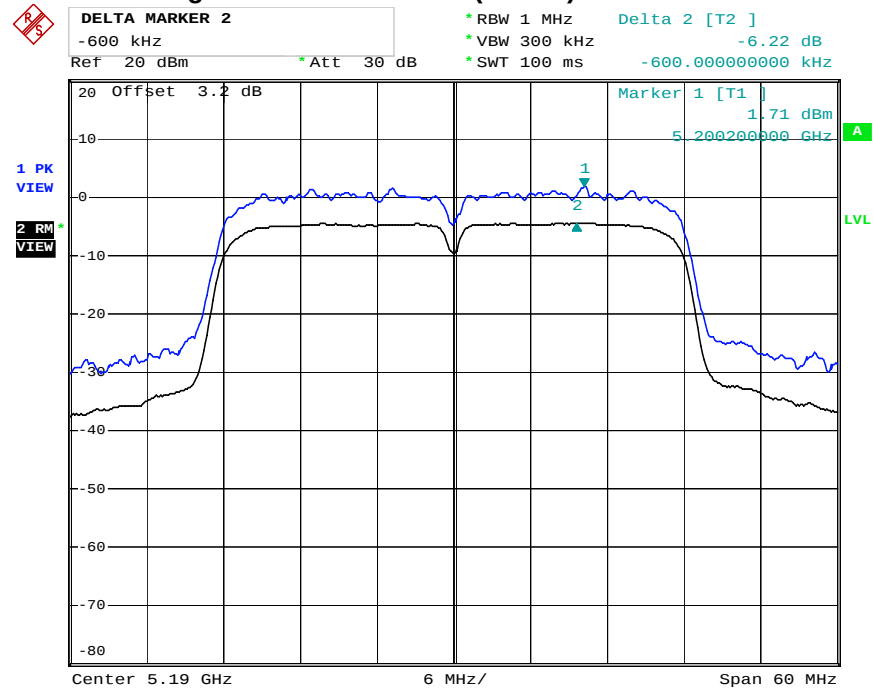
Date: 10.SEP.2011 00:25:49

## Peak Excursion Plot on Configuration IEEE 802.11n (20MHz) Port 2 / 5320 MHz



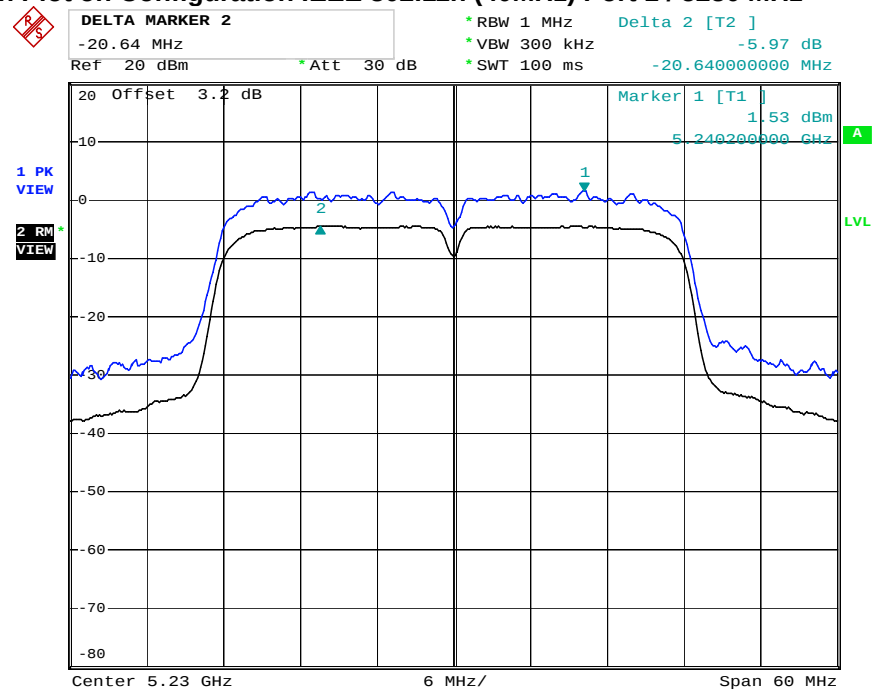
Date: 10.SEP.2011 00:29:21

## Peak Excursion Plot on Configuration IEEE 802.11n (40MHz) Port 1 / 5190 MHz



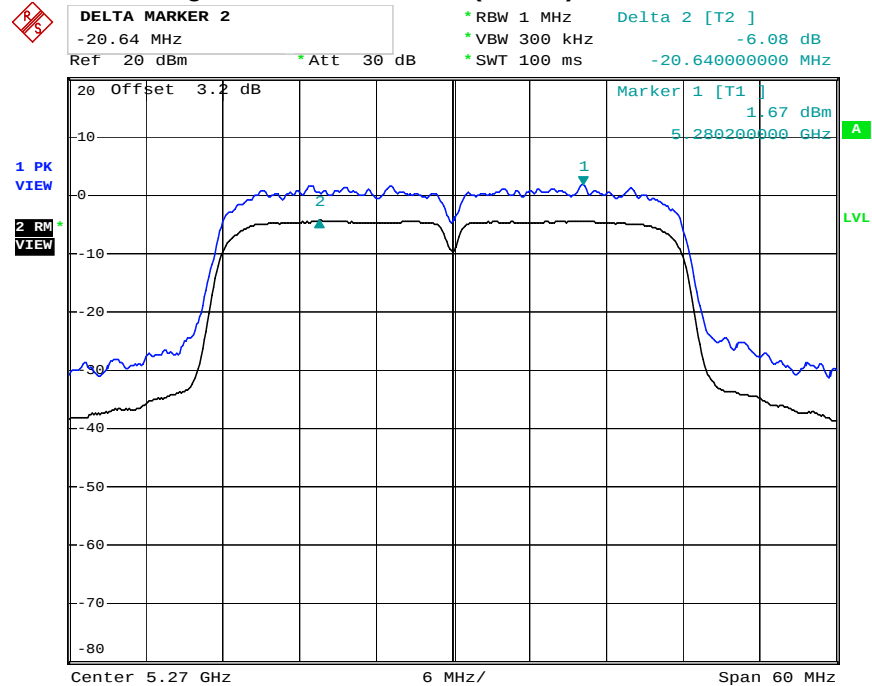
Date: 9.SEP.2011 10:23:55

## Peak Excursion Plot on Configuration IEEE 802.11n (40MHz) Port 1 / 5230 MHz



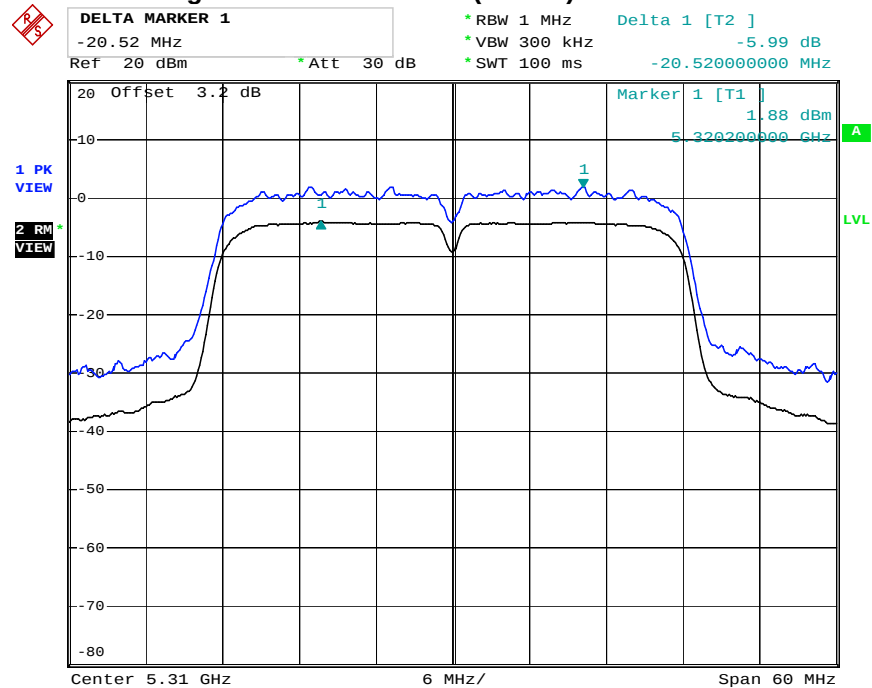
Date: 9.SEP.2011 11:04:54

## Peak Excursion Plot on Configuration IEEE 802.11n (40MHz) Port 1 / 5270 MHz



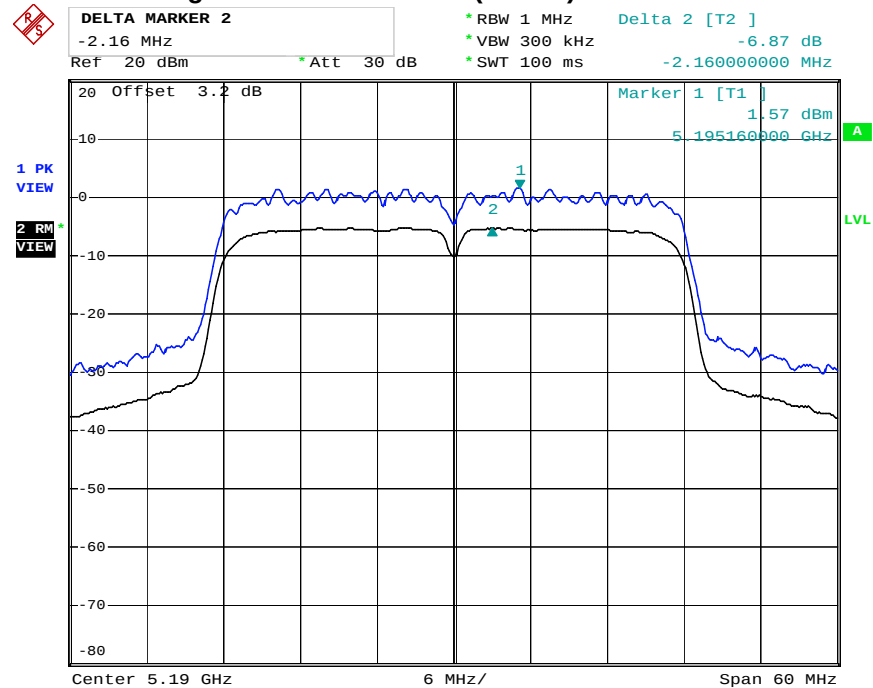
Date: 9.SEP.2011 11:17:31

## Peak Excursion Plot on Configuration IEEE 802.11n (40MHz) Port 1 / 5310 MHz



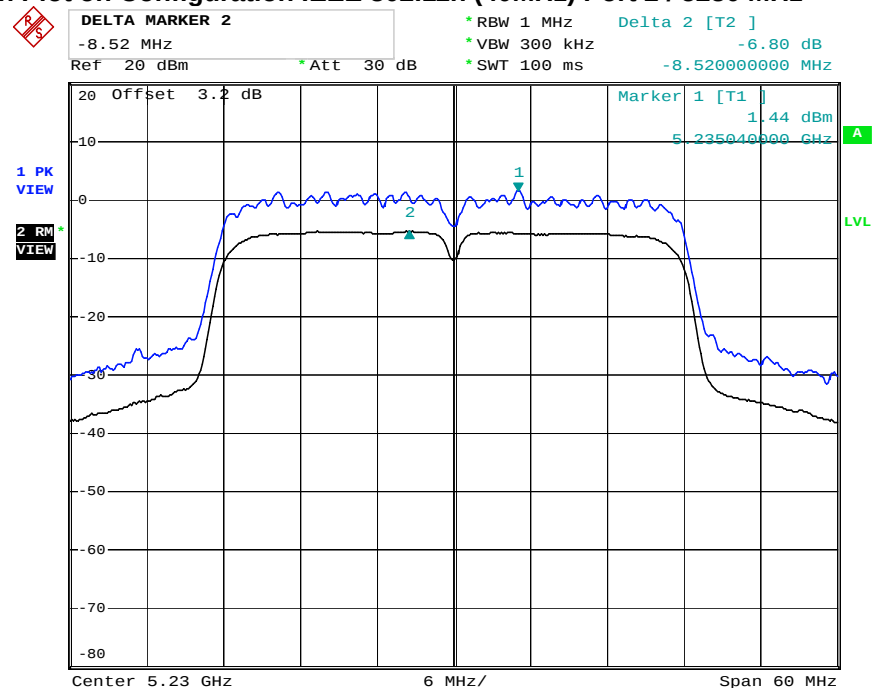
Date: 9.SEP.2011 11:31:33

## Peak Excursion Plot on Configuration IEEE 802.11n (40MHz) Port 2 / 5190 MHz



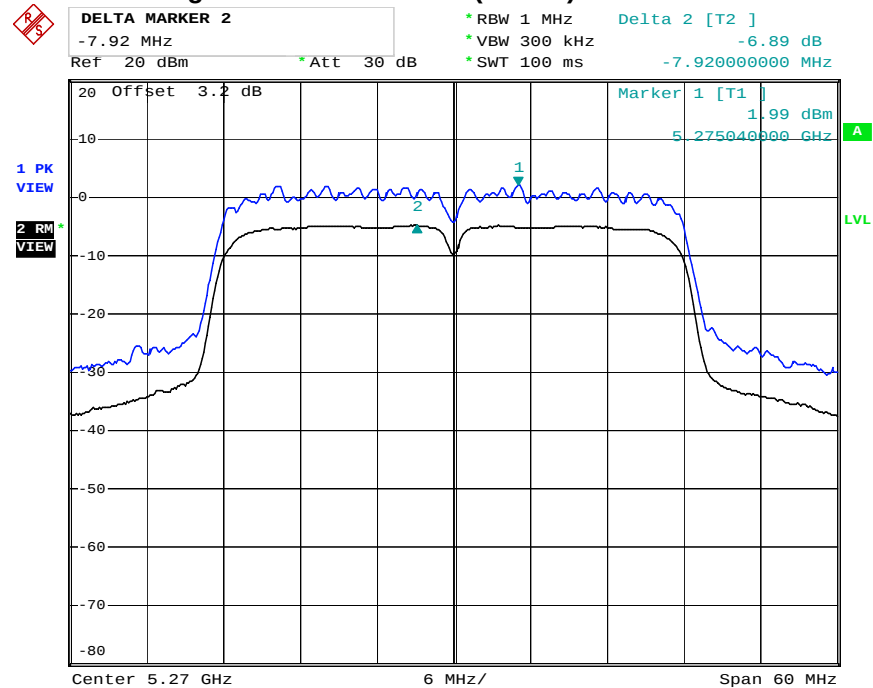
Date: 9.SEP.2011 10:40:42

## Peak Excursion Plot on Configuration IEEE 802.11n (40MHz) Port 2 / 5230 MHz



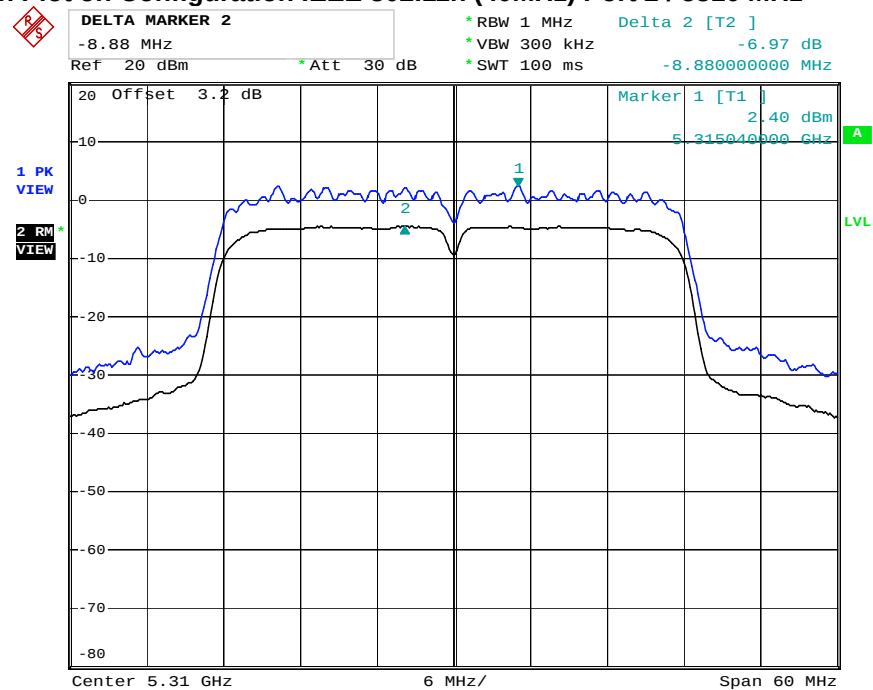
Date: 9.SEP.2011 10:52:21

## Peak Excursion Plot on Configuration IEEE 802.11n (40MHz) Port 2 / 5270 MHz



Date: 9.SEP.2011 11:22:25

## Peak Excursion Plot on Configuration IEEE 802.11n (40MHz) Port 2 / 5310 MHz



Date: 9.SEP.2011 11:35:14

### 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). 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) | 1MHz / 1MHz z for peak                         |

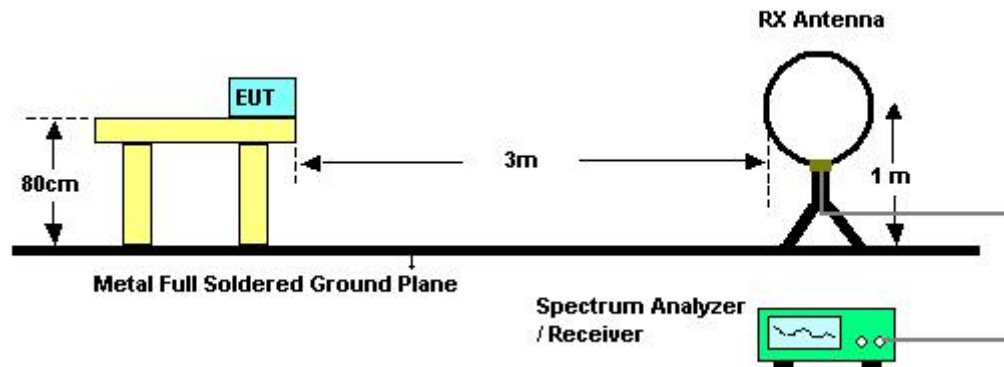
| Receiver Parameter     | Setting                          |
|------------------------|----------------------------------|
| Attenuation            | Auto                             |
| Start ~ Stop Frequency | 9kHz~150kHz / RB 200Hz for QP    |
| Start ~ Stop Frequency | 150kHz~30MHz / RB 9kHz for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

**3.6.3 Test Procedures**

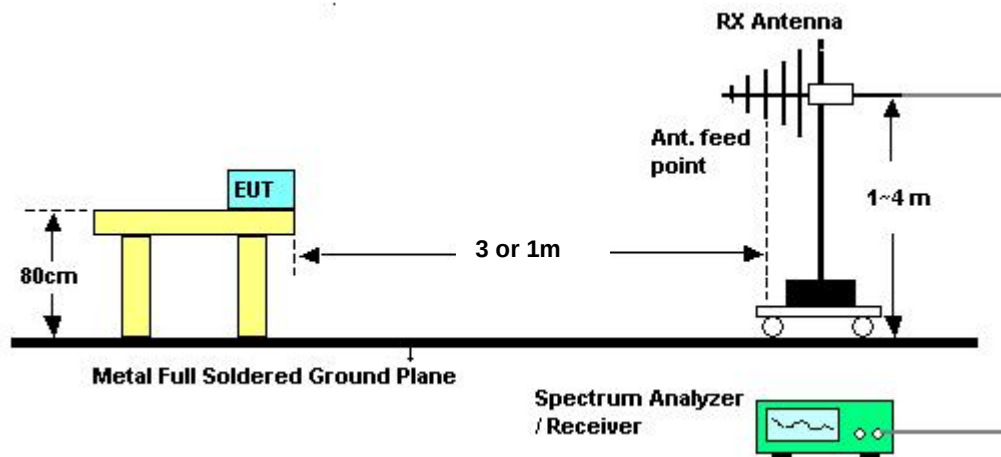
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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)**

|                        |               |                      |           |
|------------------------|---------------|----------------------|-----------|
| <b>Final Test Date</b> | Sep. 06, 2011 | <b>Test Site No.</b> | 03CH02-HY |
| <b>Temperature</b>     | 23℃           | <b>Humidity</b>      | 58%       |
| <b>Test Engineer</b>   | Chris         |                      |           |

| <b>Freq.<br/>(MHz)</b> | <b>Level<br/>(dBuV)</b> | <b>Over Limit<br/>(dB)</b> | <b>Limit Line<br/>(dBuV)</b> | <b>Remark</b> |
|------------------------|-------------------------|----------------------------|------------------------------|---------------|
| -                      | -                       | -                          | -                            | 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.

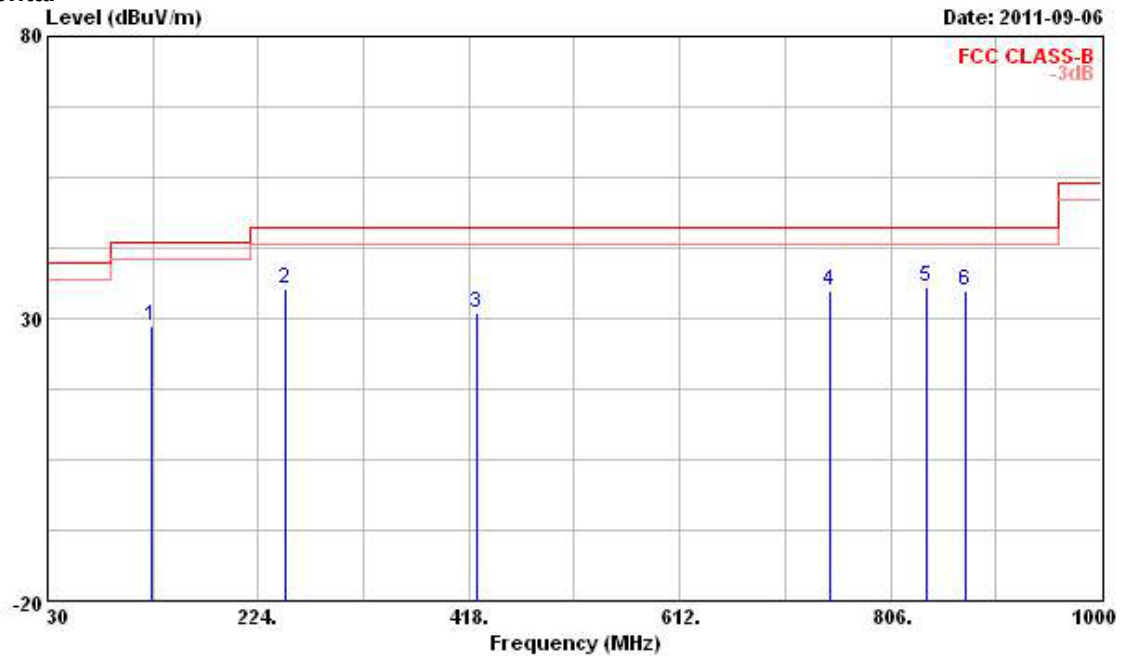
Distance extrapolation factor =  $40 \log (\text{specific distance} / \text{test distance})$  (dB);

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

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

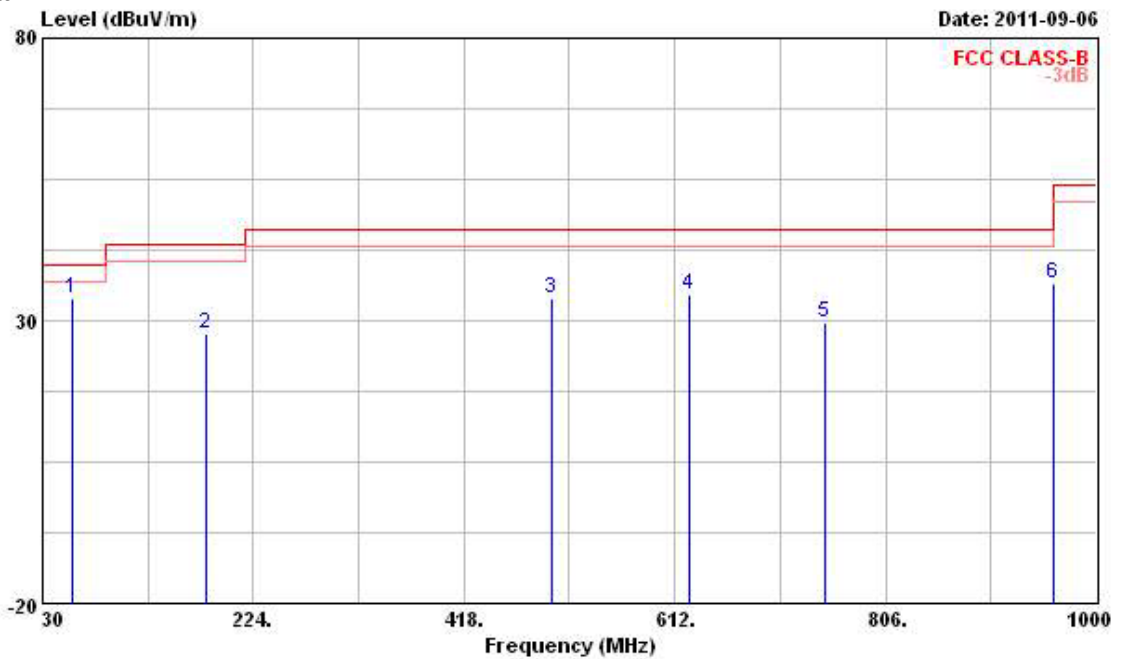
|                 |               |                |             |
|-----------------|---------------|----------------|-------------|
| Final Test Date | Sep. 06, 2011 | Test Site No.  | 03CH02-HY   |
| Temperature     | 23℃           | Humidity       | 58%         |
| Test Engineer   | Chris         | Configurations | Normal Mode |

## Horizontal



|   | Freq    | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark | Ant Pos | Table Pos |
|---|---------|--------|------------|------------|-------------------|----------------|------------|---------------|--------|---------|-----------|
|   | MHz     | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m           | dB         | dB            |        | cm      | deg       |
| 1 | 125.060 | 28.69  | -14.81     | 43.50      | 41.43             | 13.18          | 1.82       | 27.74         | Peak   | ---     | ---       |
| 2 | 249.220 | 35.34  | -10.66     | 46.00      | 46.98             | 12.97          | 2.68       | 27.29         | Peak   | ---     | ---       |
| 3 | 424.790 | 30.84  | -15.16     | 46.00      | 39.67             | 15.76          | 3.41       | 28.00         | Peak   | ---     | ---       |
| 4 | 749.740 | 34.94  | -11.06     | 46.00      | 38.93             | 19.55          | 4.57       | 28.11         | Peak   | ---     | ---       |
| 5 | 839.950 | 35.74  | -10.26     | 46.00      | 38.52             | 20.17          | 4.85       | 27.80         | Peak   | ---     | ---       |
| 6 | 874.870 | 35.06  | -10.94     | 46.00      | 37.73             | 20.09          | 4.93       | 27.69         | Peak   | ---     | ---       |

## Vertical



|   | Freq    | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark | Ant Pos | Table Pos |
|---|---------|--------|------------|------------|-------------------|----------------|------------|---------------|--------|---------|-----------|
|   | MHz     | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m           | dB         | dB            |        | cm      | deg       |
| 1 | 57.160  | 33.84  | -6.16      | 40.00      | 52.65             | 7.83           | 1.21       | 27.85         | Peak   | ---     | ---       |
| 2 | 180.350 | 27.85  | -15.65     | 43.50      | 43.24             | 9.90           | 2.21       | 27.50         | Peak   | ---     | ---       |
| 3 | 498.510 | 33.87  | -12.13     | 46.00      | 41.19             | 17.26          | 3.78       | 28.36         | Peak   | ---     | ---       |
| 4 | 625.580 | 34.76  | -11.24     | 46.00      | 39.19             | 19.84          | 4.14       | 28.41         | Peak   | ---     | ---       |
| 5 | 749.740 | 29.83  | -16.17     | 46.00      | 33.82             | 19.55          | 4.57       | 28.11         | Peak   | ---     | ---       |
| 6 | 960.230 | 36.50  | -17.50     | 54.00      | 37.06             | 21.52          | 5.29       | 27.37         | 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).

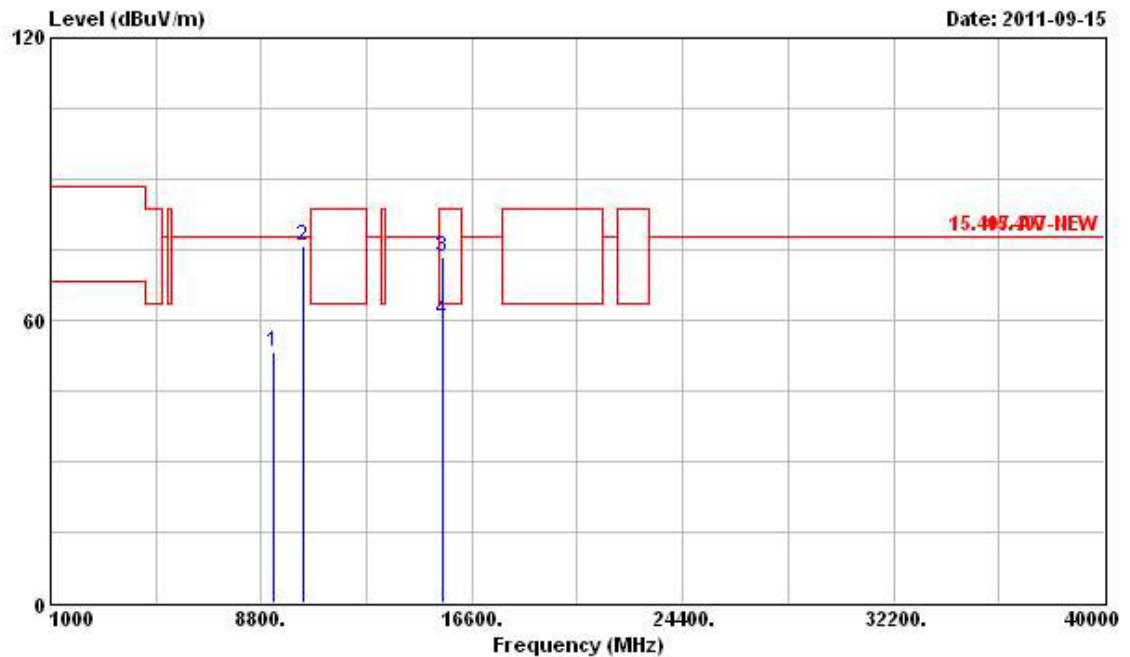
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

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

For Single Chain:

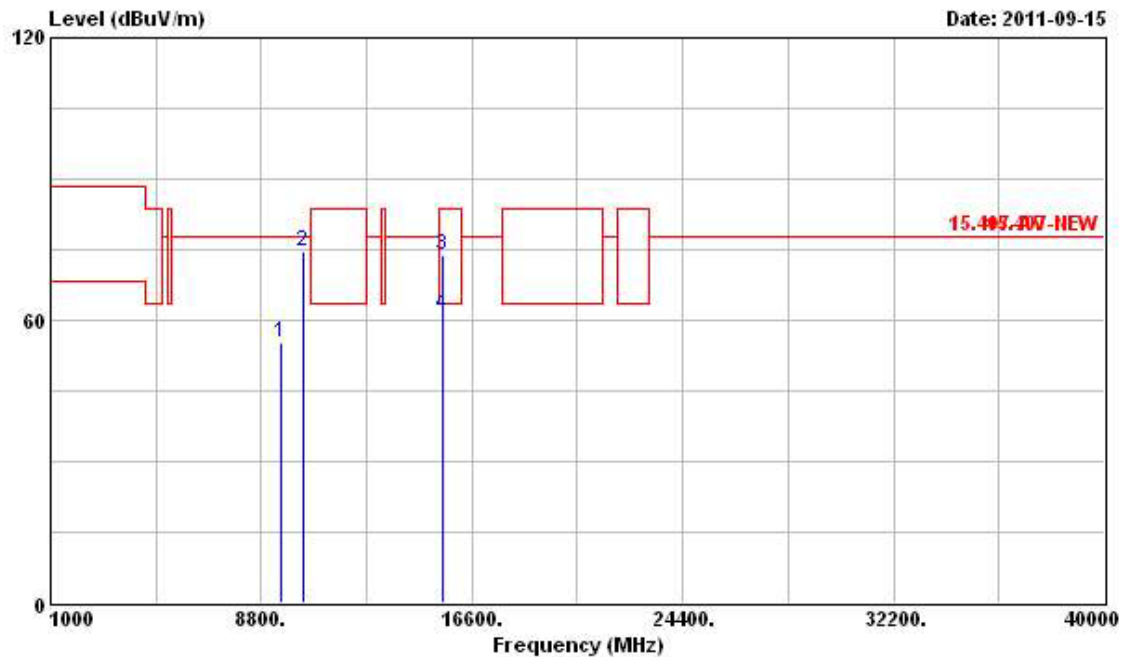
|                 |               |               |                |
|-----------------|---------------|---------------|----------------|
| Final Test Date | Sep. 15, 2011 | Test Site No. | 03CH02-HY      |
| Temperature     | 23°C          | Humidity      | 58%            |
| Test Engineer   | Chris         | Configuration | 802.11a Ch. 36 |

Horizontal



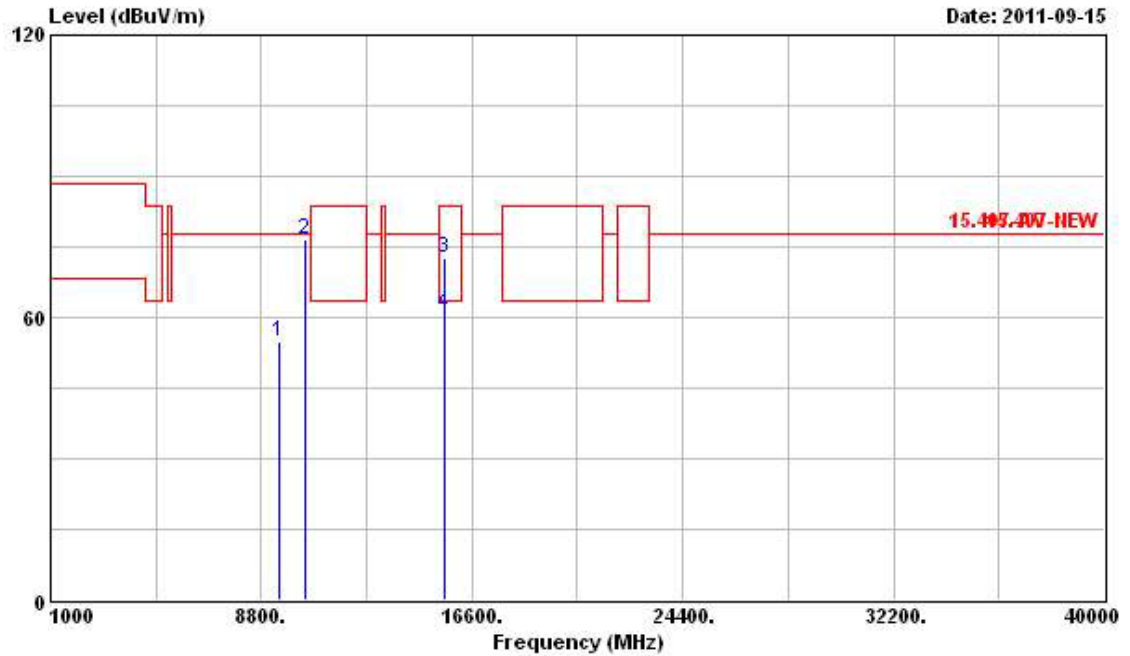
|   | Freq       | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark  | Ant Pos | Table Pos |
|---|------------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|---------|-----------|
|   | MHz        | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m           | dB         | dB            |         | cm      | deg       |
| 1 | 9279.000   | 53.45  | -44.39     | 97.84      | 43.89             | 38.71          | 6.25       | 35.40         | Peak    | ---     | ---       |
| 2 | 10360.000  | 75.83  | -22.01     | 97.84      | 64.32             | 40.02          | 6.71       | 35.22         | Peak    | ---     | ---       |
| 3 | 15540.000  | 73.54  | -10.00     | 83.54      | 57.31             | 42.81          | 8.45       | 35.03         | Peak    | ---     | ---       |
| 4 | @15540.000 | 60.13  | -3.41      | 63.54      | 43.90             | 42.81          | 8.45       | 35.03         | Average | ---     | ---       |

## Vertical



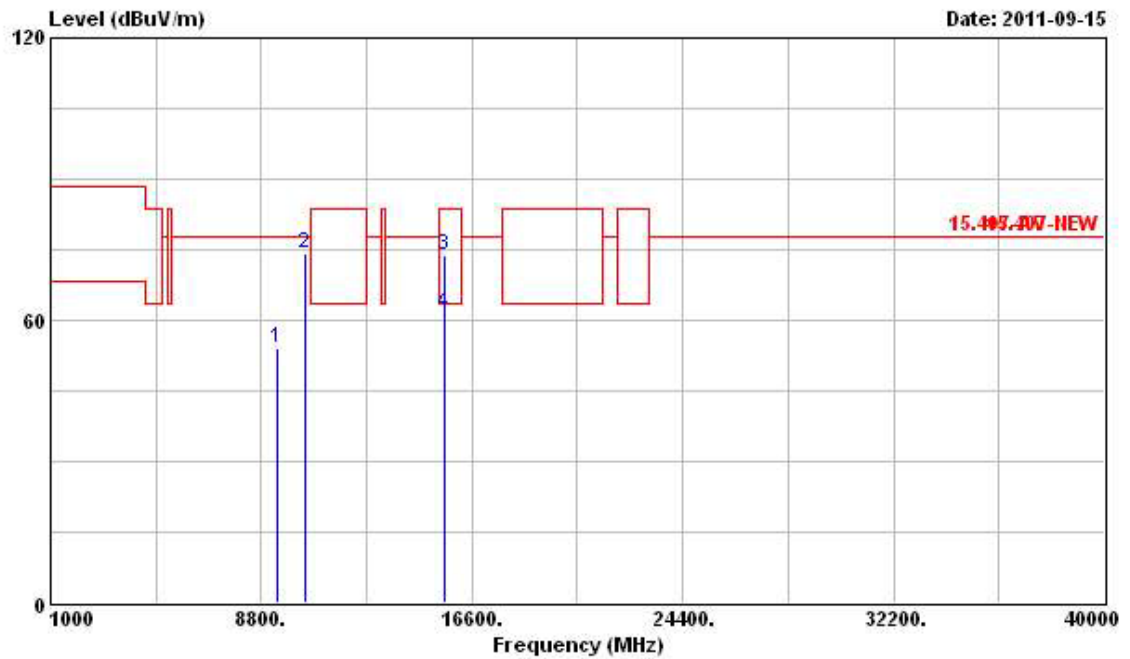
|   | Freq       | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark  | Ant Pos | Table Pos |
|---|------------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|---------|-----------|
|   | MHz        | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m           | dB         | dB            |         | cm      | deg       |
| 1 | 9495.000   | 55.12  | -22.72     | 77.84      | 45.06             | 39.20          | 6.32       | 35.46         | PK      | ---     | ---       |
| 2 | 10360.000  | 74.57  | -23.27     | 97.84      | 63.06             | 40.02          | 6.71       | 35.22         | Peak    | ---     | ---       |
| 3 | 15540.000  | 73.96  | -9.58      | 83.54      | 57.73             | 42.81          | 8.45       | 35.03         | Peak    | ---     | ---       |
| 4 | @15540.000 | 61.33  | -2.21      | 63.54      | 45.10             | 42.81          | 8.45       | 35.03         | Average | ---     | ---       |

|                 |               |               |                |
|-----------------|---------------|---------------|----------------|
| Final Test Date | Sep. 15, 2011 | Test Site No. | 03CH02-HY      |
| Temperature     | 23°C          | Humidity      | 58%            |
| Test Engineer   | Chris         | Configuration | 802.11a Ch. 40 |

**Horizontal**

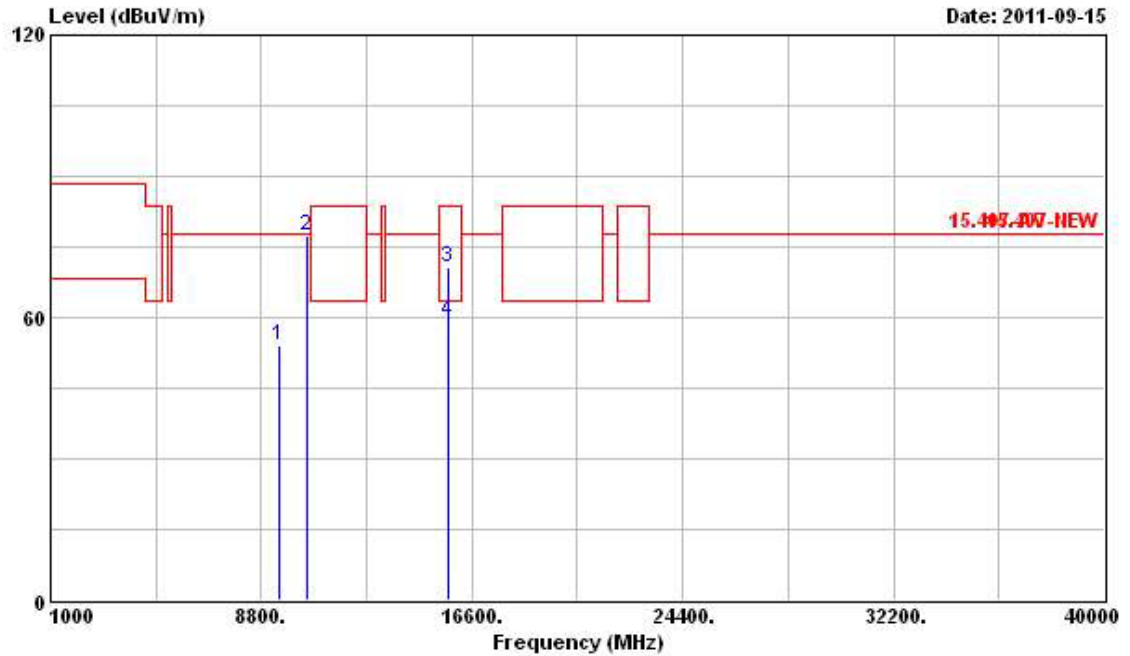
|   | Freq       | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark  | Ant Pos | Table Pos |
|---|------------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|---------|-----------|
|   | MHz        | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m           | dB         | dB            |         | cm      | deg       |
| 1 | 9459.000   | 54.72  | -23.12     | 77.84      | 44.74             | 39.12          | 6.31       | 35.45         | PK      | 0       | 0         |
| 2 | 10400.000  | 76.67  | -21.17     | 97.84      | 65.06             | 40.04          | 6.75       | 35.18         | Peak    | 0       | 0         |
| 3 | 15600.000  | 72.52  | -11.02     | 83.54      | 56.35             | 42.82          | 8.45       | 35.10         | Peak    | 0       | 0         |
| 4 | @15600.000 | 60.92  | -2.62      | 63.54      | 44.75             | 42.82          | 8.45       | 35.10         | Average | 0       | 0         |

## Vertical



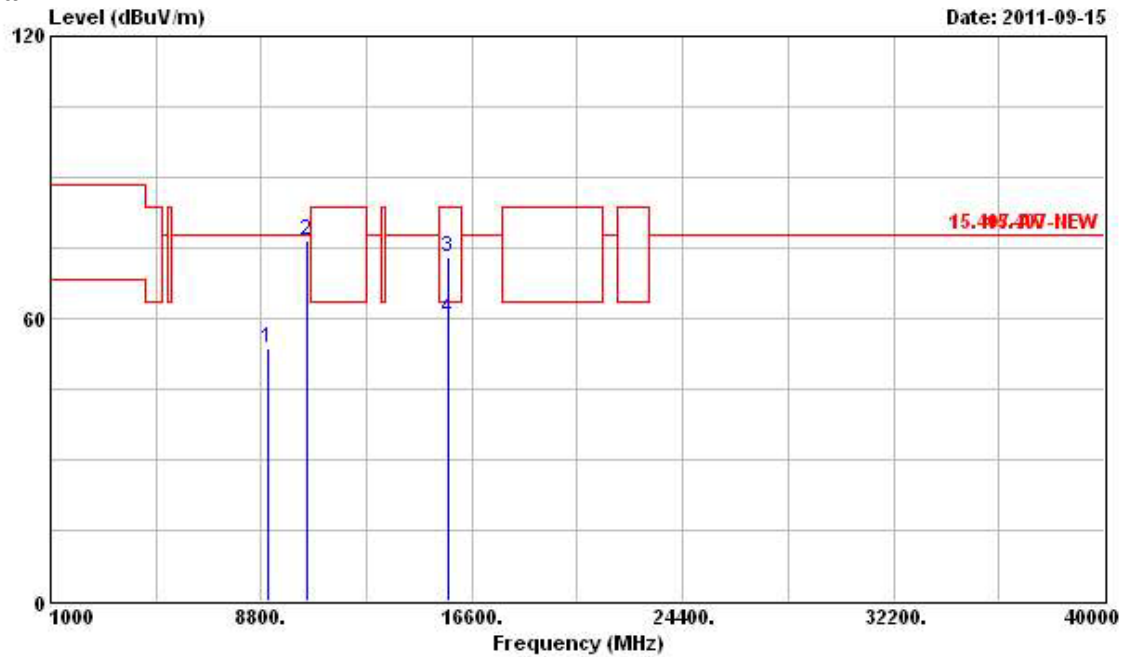
|   | Freq       | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark  | Ant Pos | Table Pos |
|---|------------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|---------|-----------|
|   | MHz        | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m           | dB         | dB            |         | cm      | deg       |
| 1 | 9414.000   | 54.13  | -23.71     | 77.84      | 44.26             | 39.01          | 6.30       | 35.44         | PK      | ---     | ---       |
| 2 | 10400.000  | 74.23  | -23.61     | 97.84      | 62.62             | 40.04          | 6.75       | 35.18         | Peak    | ---     | ---       |
| 3 | 15600.000  | 73.66  | -9.88      | 83.54      | 57.49             | 42.82          | 8.45       | 35.10         | Peak    | ---     | ---       |
| 4 | @15600.000 | 61.64  | -1.90      | 63.54      | 45.47             | 42.82          | 8.45       | 35.10         | Average | ---     | ---       |

|                 |               |               |                |
|-----------------|---------------|---------------|----------------|
| Final Test Date | Sep. 15, 2011 | Test Site No. | 03CH02-HY      |
| Temperature     | 23°C          | Humidity      | 58%            |
| Test Engineer   | Chris         | Configuration | 802.11a Ch. 48 |

**Horizontal**

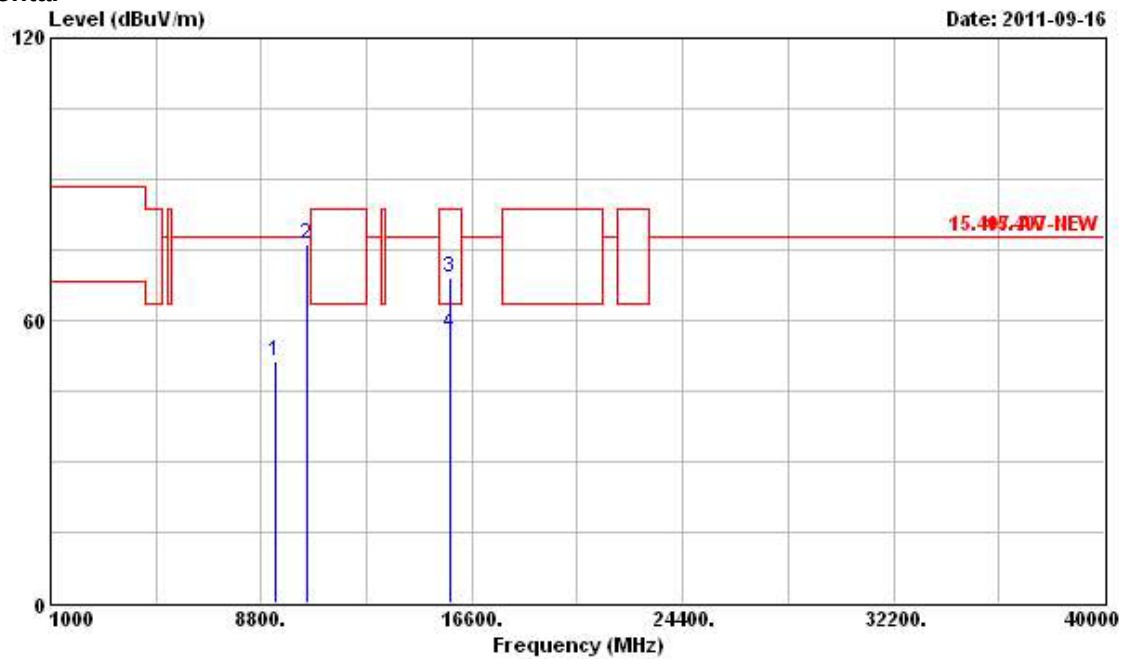
|   | Freq       | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark  | Ant Pos | Table Pos |
|---|------------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|---------|-----------|
|   | MHz        | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m           | dB         | dB            |         | cm      | deg       |
| 1 | 9450.000   | 54.19  | -23.65     | 77.84      | 44.24             | 39.09          | 6.31       | 35.45         | PK      | ---     | ---       |
| 2 | 10480.000  | 77.29  | -20.55     | 97.84      | 65.50             | 40.09          | 6.82       | 35.12         | Peak    | ---     | ---       |
| 3 | 15720.000  | 70.77  | -12.77     | 83.54      | 54.67             | 42.84          | 8.46       | 35.20         | Peak    | ---     | ---       |
| 4 | @15720.000 | 59.38  | -4.16      | 63.54      | 43.28             | 42.84          | 8.46       | 35.20         | Average | ---     | ---       |

## Vertical



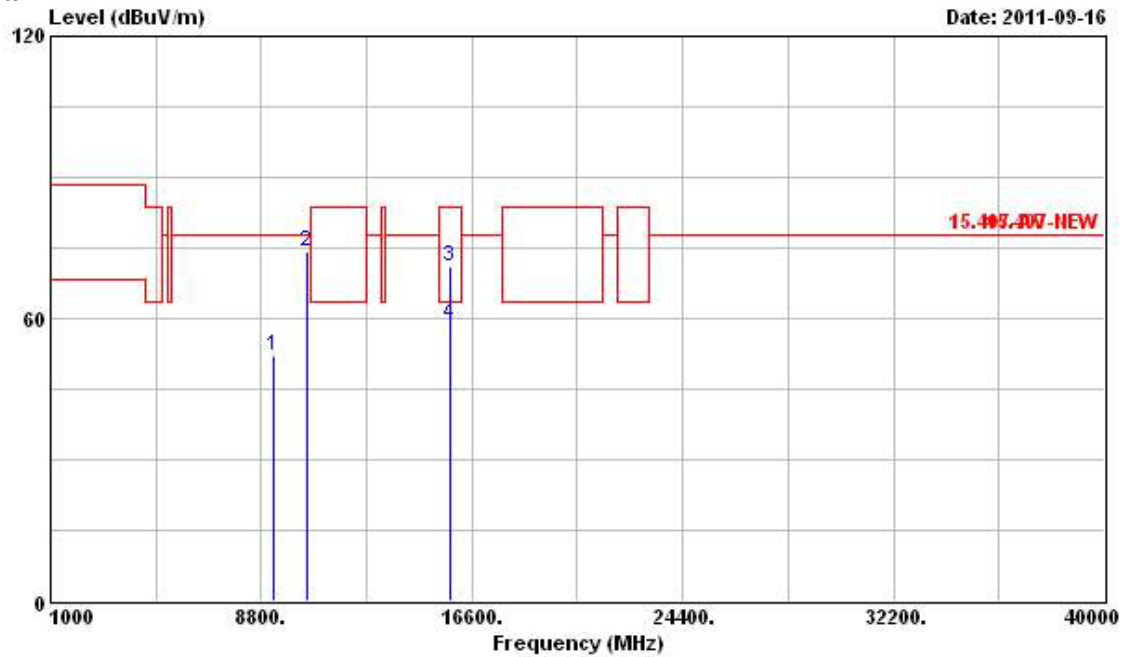
|   | Freq       | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark  | Ant Pos | Table Pos |
|---|------------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|---------|-----------|
|   | MHz        | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m           | dB         | dB            |         | cm      | deg       |
| 1 | 9027.000   | 53.72  | -24.12     | 77.84      | 44.74             | 38.14          | 6.17       | 35.33         | PK      | ---     | ---       |
| 2 | 10480.000  | 76.59  | -21.25     | 97.84      | 64.80             | 40.09          | 6.82       | 35.12         | Peak    | ---     | ---       |
| 3 | 15720.000  | 73.05  | -10.49     | 83.54      | 56.95             | 42.84          | 8.46       | 35.20         | Peak    | ---     | ---       |
| 4 | @15720.000 | 59.99  | -3.55      | 63.54      | 43.89             | 42.84          | 8.46       | 35.20         | Average | ---     | ---       |

|                 |               |               |                |
|-----------------|---------------|---------------|----------------|
| Final Test Date | Sep. 16, 2011 | Test Site No. | 03CH02-HY      |
| Temperature     | 23°C          | Humidity      | 58%            |
| Test Engineer   | Chris         | Configuration | 802.11a Ch. 52 |

**Horizontal**

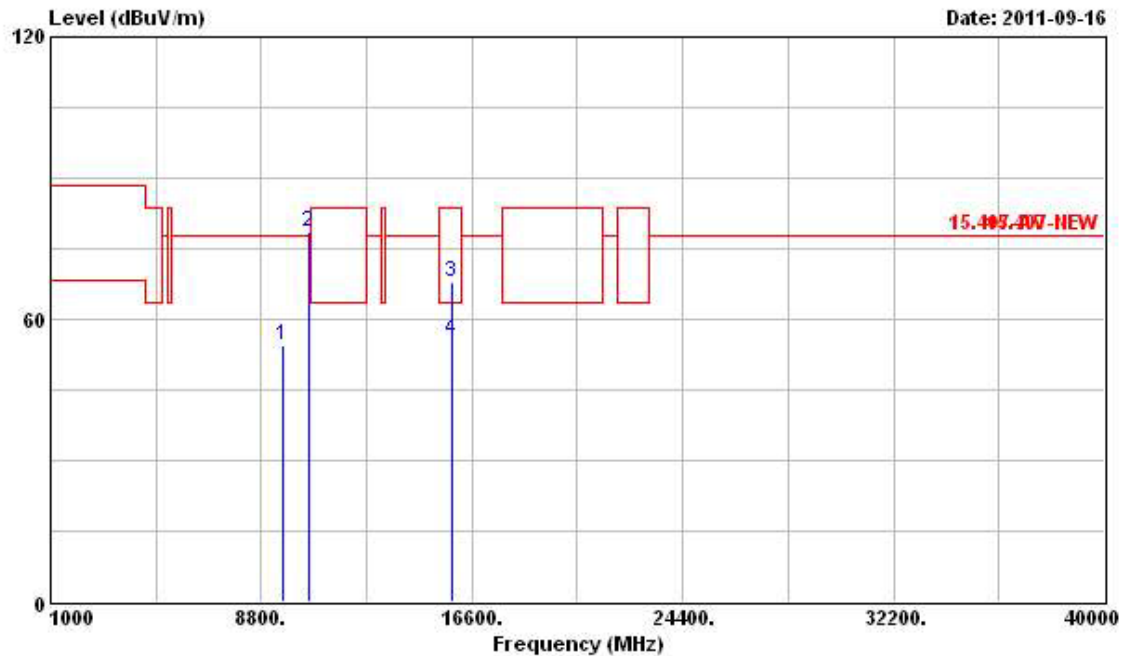
|   | Freq      | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark  | Ant Pos | Table Pos |
|---|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|---------|-----------|
|   | MHz       | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m           | dB         | dB            |         | cm      | deg       |
| 1 | 9315.000  | 51.19  | -26.65     | 77.84      | 41.56             | 38.78          | 6.26       | 35.41         | PK      | ---     | ---       |
| 2 | 10503.000 | 76.24  | -21.60     | 97.84      | 64.39             | 40.10          | 6.85       | 35.10         | Peak    | ---     | ---       |
| 3 | 15786.000 | 69.21  | -14.33     | 83.54      | 53.17             | 42.86          | 8.46       | 35.28         | Peak    | ---     | ---       |
| 4 | 15786.000 | 57.33  | -6.21      | 63.54      | 41.29             | 42.86          | 8.46       | 35.28         | Average | ---     | ---       |

## Vertical



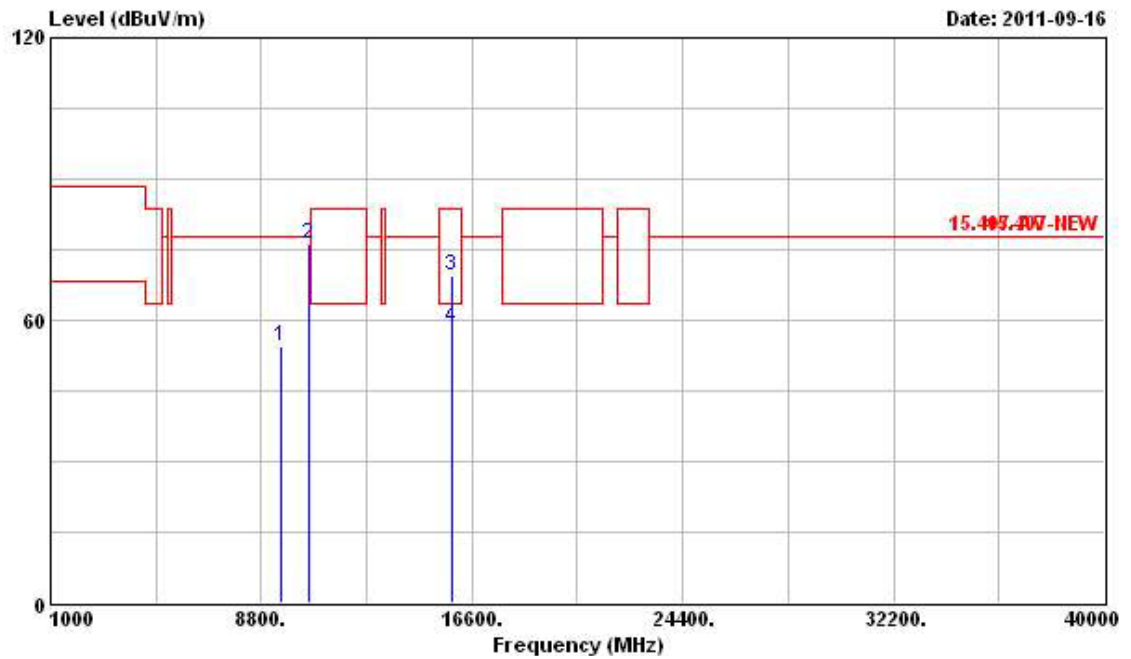
|   | Freq       | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark  | Ant Pos | Table Pos |
|---|------------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|---------|-----------|
|   | MHz        | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m           | dB         | dB            |         | cm      | deg       |
| 1 | 9234.000   | 52.15  | -45.69     | 97.84      | 42.72             | 38.59          | 6.23       | 35.39         | Peak    | ---     | ---       |
| 2 | 10503.000  | 74.31  | -23.53     | 97.84      | 62.46             | 40.10          | 6.85       | 35.10         | Peak    | ---     | ---       |
| 3 | 15786.000  | 71.15  | -12.39     | 83.54      | 55.11             | 42.86          | 8.46       | 35.28         | Peak    | ---     | ---       |
| 4 | @15786.000 | 58.69  | -4.85      | 63.54      | 42.65             | 42.86          | 8.46       | 35.28         | Average | ---     | ---       |

|                 |               |               |                |
|-----------------|---------------|---------------|----------------|
| Final Test Date | Sep. 16, 2011 | Test Site No. | 03CH02-HY      |
| Temperature     | 23°C          | Humidity      | 58%            |
| Test Engineer   | Chris         | Configuration | 802.11a Ch. 56 |

**Horizontal**

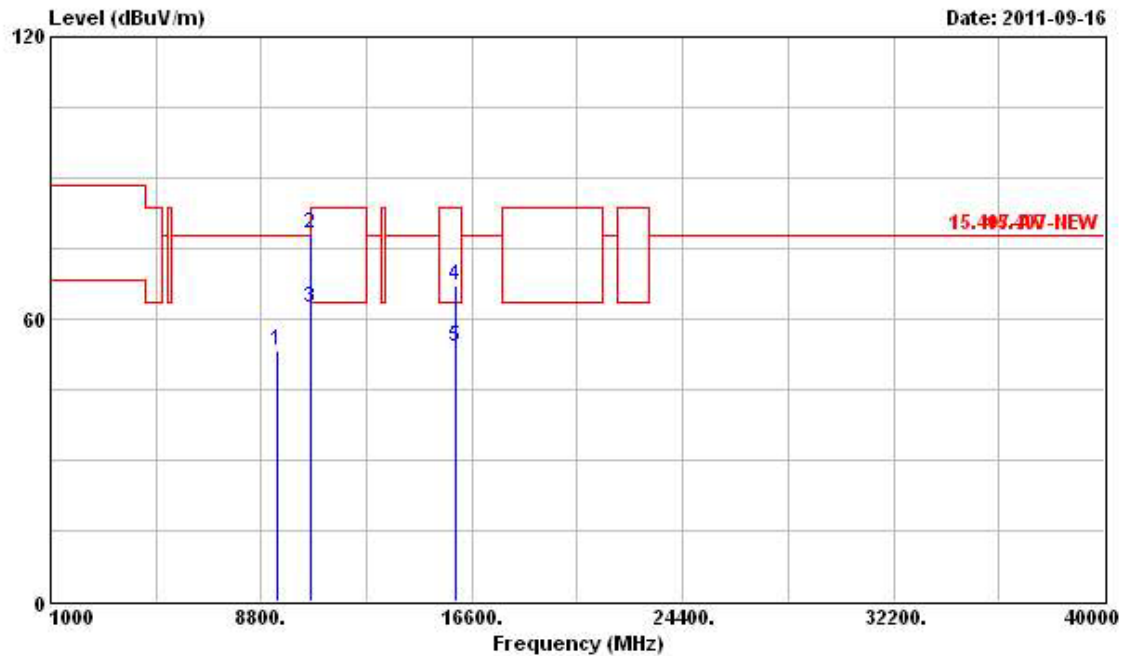
|   | Freq      | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark  | Ant Pos | Table Pos |
|---|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|---------|-----------|
|   | MHz       | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m           | dB         | dB            |         | cm      | deg       |
| 1 | 9567.000  | 54.38  | -43.46     | 97.84      | 44.24             | 39.28          | 6.33       | 35.47         | Peak    | ---     | ---       |
| 2 | 10566.000 | 78.60  | -19.24     | 97.84      | 66.64             | 40.14          | 6.88       | 35.06         | Peak    | ---     | ---       |
| 3 | 15831.000 | 68.01  | -15.53     | 83.54      | 52.01             | 42.87          | 8.46       | 35.33         | Peak    | ---     | ---       |
| 4 | 15831.000 | 55.79  | -7.75      | 63.54      | 39.79             | 42.87          | 8.46       | 35.33         | Average | ---     | ---       |

## Vertical



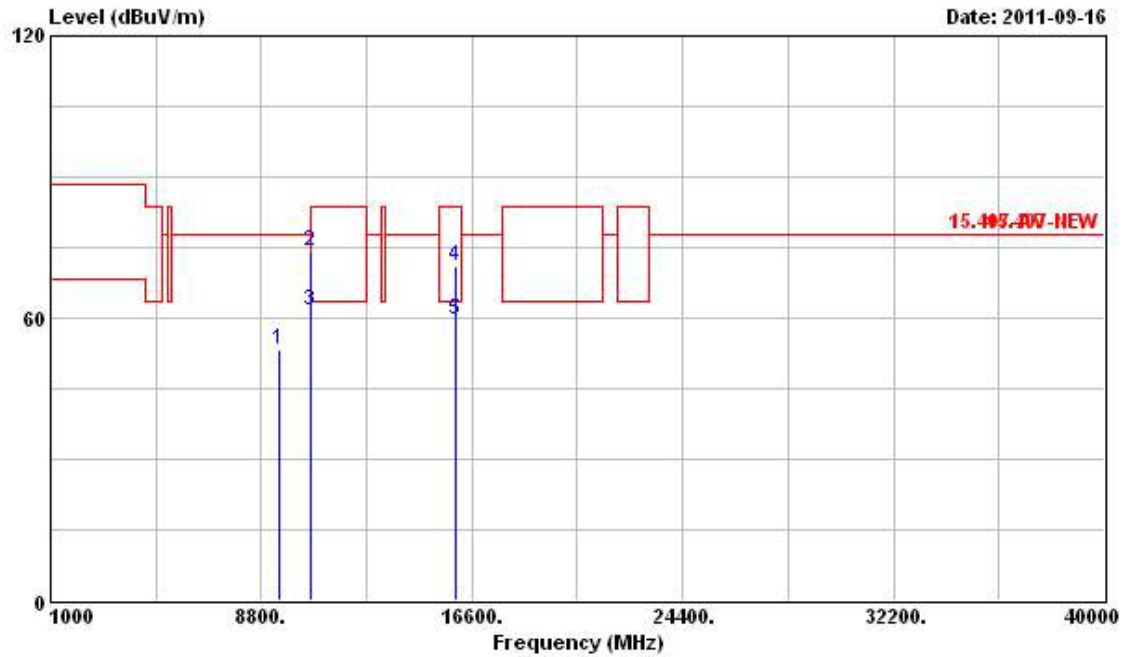
|   | Freq       | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark  | Ant Pos | Table Pos |
|---|------------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|---------|-----------|
|   | MHz        | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m           | dB         | dB            |         | cm      | deg       |
| 1 | 9558.000   | 54.55  | -43.29     | 97.84      | 44.43             | 39.26          | 6.33       | 35.47         | Peak    | ---     | ---       |
| 2 | 10566.000  | 76.10  | -21.74     | 97.84      | 64.14             | 40.14          | 6.88       | 35.06         | Peak    | ---     | ---       |
| 3 | 15831.000  | 69.50  | -14.04     | 83.54      | 53.50             | 42.87          | 8.46       | 35.33         | Peak    | ---     | ---       |
| 4 | @15831.000 | 58.30  | -5.24      | 63.54      | 42.30             | 42.87          | 8.46       | 35.33         | Average | ---     | ---       |

|                 |               |               |                |
|-----------------|---------------|---------------|----------------|
| Final Test Date | Sep. 16, 2011 | Test Site No. | 03CH02-HY      |
| Temperature     | 23°C          | Humidity      | 58%            |
| Test Engineer   | Chris         | Configuration | 802.11a Ch. 64 |

**Horizontal**

|   | Freq      | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark  | Ant Pos | Table Pos |
|---|-----------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|---------|-----------|
|   | MHz       | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m           | dB         | dB            |         | cm      | deg       |
| 1 | 9387.000  | 53.12  | -24.72     | 77.84      | 43.34             | 38.93          | 6.28       | 35.43         | PK      | ---     | ---       |
| 2 | 10638.000 | 78.07  | -5.47      | 83.54      | 65.96             | 40.18          | 6.93       | 35.00         | Peak    | ---     | ---       |
| 3 | 10638.000 | 62.20  | -1.34      | 63.54      | 50.09             | 40.18          | 6.93       | 35.00         | Average | ---     | ---       |
| 4 | 15966.000 | 66.92  | -16.62     | 83.54      | 51.01             | 42.89          | 8.47       | 35.45         | Peak    | ---     | ---       |
| 5 | 15966.000 | 54.26  | -9.28      | 63.54      | 38.35             | 42.89          | 8.47       | 35.45         | Average | ---     | ---       |

## Vertical



|   | Freq       | Level  | Over Limit | Limit Line | ReadAntenna Level | Antenna Factor | Cable Loss | Preamp Factor | Remark  | Ant Pos | Table Pos |
|---|------------|--------|------------|------------|-------------------|----------------|------------|---------------|---------|---------|-----------|
|   | MHz        | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m           | dB         | dB            |         | cm      | deg       |
| 1 | 9459.000   | 53.31  | -24.53     | 77.84      | 43.33             | 39.12          | 6.31       | 35.45         | PK      | ---     | ---       |
| 2 | 10638.000  | 74.24  | -9.30      | 83.54      | 62.13             | 40.18          | 6.93       | 35.00         | Peak    | ---     | ---       |
| 3 | @10638.000 | 61.70  | -1.84      | 63.54      | 49.59             | 40.18          | 6.93       | 35.00         | Average | ---     | ---       |
| 4 | 15966.000  | 70.98  | -12.56     | 83.54      | 55.07             | 42.89          | 8.47       | 35.45         | Peak    | ---     | ---       |
| 5 | @15966.000 | 59.47  | -4.07      | 63.54      | 43.56             | 42.89          | 8.47       | 35.45         | Average | ---     | ---       |