



# SPORTON International Inc.

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## FCC RADIO TEST REPORT

|                        |   |
|------------------------|---|
| Applicant's company    | Proxim Wireless Corporation               |
| Applicant Address      | 1561 Buckeye Drive, Milpitas CA 95035 USA |
| FCC ID                 | HZB-PROXMB92                              |
| Manufacturer's company | Proxim Wireless Corporation               |
| Manufacturer Address   | 1561 Buckeye Drive, Milpitas CA 95035 USA |

|                   |   |
|-------------------|---|
| Product Name      | miniPCI High Power MIMO IEEE 802.11 a/b/g/n RF Module |
| Brand Name        | PROXIM  |
| Model Name        | PROXMB92  |
| Test Rule Part(s) | 47 CFR FCC Part 15 Subpart E § 15.407                 |
| Test Freq. Range  | 5250 ~ 5350MHz / 5470 ~ 5725MHz                       |
| Received Date     | May 10, 2010  |
| Final Test Date   | Jun. 17, 2010   |
| Submission Type   | Class II Change                                       |
| Operating Mode    | Master / Client (without radar detection function)    |

### Statement

Test result included is for the 802.11n and 802.11a (5250 ~ 5350MHz / 5470 ~ 5725MHz) 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.



## Table of Contents

|  |                |
|--|----------------|
| <b>1. CERTIFICATE OF COMPLIANCE .....</b>                | <b>1</b>       |
| <b>2. SUMMARY OF THE TEST RESULT .....</b>               | <b>2</b>       |
| <b>3. GENERAL INFORMATION .....</b>                      | <b>3</b>       |
| 3.1. Product Details.....                                | 3              |
| 3.2. Accessories.....                                    | 5              |
| 3.3. Table for Filed Antenna.....                        | 6              |
| 3.4. Table for Carrier Frequencies .....                 | 7              |
| 3.5. Table for Test Modes.....                           | 7              |
| 3.6. Table for Testing Locations.....                    | 8              |
| 3.7. Table for Class II Change .....                     | 9              |
| 3.8. Table for Supporting Units .....                    | 9              |
| 3.9. Table for Parameters of Test Software Setting ..... | 9              |
| 3.10. Test Configurations .....                          | 11             |
| <b>4. TEST RESULT .....</b>                              | <b>15</b>      |
| 4.1. 99% Occupied Bandwidth Measurement .....            | 15             |
| 4.2. Maximum Conducted Output Power Measurement.....     | 38             |
| 4.3. Power Spectral Density Measurement .....            | 59             |
| 4.4. Peak Excursion Measurement.....                     | 73             |
| 4.5. Radiated Emissions Measurement .....                | 82             |
| 4.6. Band Edge Emissions Measurement .....               | 117            |
| 4.7. Frequency Stability Measurement .....               | 130            |
| 4.8. Antenna Requirements .....                          | 135            |
| <b>5. LIST OF MEASURING EQUIPMENTS .....</b>             | <b>136</b>     |
| <b>6. TEST LOCATION.....</b>                             | <b>138</b>     |
| <b>7. TAF CERTIFICATE OF ACCREDITATION .....</b>         | <b>139</b>     |
| <b>APPENDIX A. TEST PHOTOS .....</b>                     | <b>A1 ~ A5</b> |
| <b>APPENDIX B. MAXIMUM PERMISSIBLE EXPOSURE .....</b>    | <b>B1 ~ B5</b> |



### History of This Test Report

Original Issue Date: Apr. 12, 2011

Report No.: FR051015

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

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

Product Name : miniPCI High Power MIMO IEEE 802.11 a/b/g/n RF Module  
Brand Name : PROXIM  
Model Name : PROXMB92  
Applicant : Proxim Wireless Corporation  
Test Rule Part(s) : 47 CFR FCC Part 15 Subpart E § 15.407

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on May 10, 2010 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.

*Jordan Hsiao 2011. 4.15*

Jordan Hsiao

SPORTON INTERNATIONAL INC.

## 2. SUMMARY OF THE TEST RESULT

| Applied Standard: 47 CFR FCC Part 15 Subpart E |              |                                   |          |             |
|--|--------------|-----------------------------------|----------|-------------|
| Part   | Rule Section | Description of Test               | Result   | Under Limit |
| -  | 15.207       | AC Power Line Conducted Emissions | -        | -           |
| 4.1  | 15.407(a)    | 26dB Spectrum Bandwidth           | Complies | -           |
| 4.2  | 15.407(a)    | Maximum Conducted Output Power    | Complies | 0.08 dB     |
| 4.3  | 15.407(a)    | Power Spectral Density            | Complies | 0.12 dB     |
| 4.4  | 15.407(a)    | Peak Excursion                    | Complies | 5.98 dB     |
| 4.5  | 15.407(b)    | Radiated Emissions                | Complies | 0.09 dB     |
| 4.6  | 15.407(b)    | Band Edge Emissions               | Complies | 0.03 dB     |
| 4.7  | 15.407(g)    | Frequency Stability               | Complies | -           |
| 4.8  | 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°C                | Confidence levels of 95% |
| Humidity                                      | ±3.2%                 | Confidence levels of 95% |
| DC / AC Power Source                          | ±1.4%                 | Confidence levels of 95% |

### 3. GENERAL INFORMATION

#### 3.1. Product Details

##### IEEE 802.11n

| Items                    | Description  |
|--------------------------|--|
| Product Type             | WLAN (2TX, 2RX)  |
| Radio Type               | Intentional Transceiver  |
| Power Type               | From POE   |
| Modulation               | see the below table for IEEE 802.11n   |
| Data Modulation          | OFDM (BPSK / QPSK / 16QAM / 64QAM)   |
| Data Rate (Mbps)         | see the below table for IEEE 802.11n   |
| Frequency Range          | <For Ant. 1, Ant. 2>: 5250 ~ 5350MHz<br><For Ant. 3, Ant. 4>: 5250 ~ 5350MHz / 5470 ~ 5725MHz  |
| Channel Number           | <For Ant. 1, Ant. 2>: 4 for 20MHz bandwidth ; 2 for 40MHz bandwidth<br><For Ant. 3, Ant. 4>: 8 for 20MHz bandwidth ; 3 for 40MHz bandwidth   |
| Channel Band Width (99%) | <For Ant. 1>:<br>MCS8 (40MHz): 36.48 MHz<br><For Ant. 2>:<br>MCS8 (40MHz): 36.64 MHz<br><For Ant. 3>:<br>MCS8 (40MHz): 36.64 MHz<br><For Ant. 4>:<br>MCS8 (40MHz): 36.48 MHz   |
| Conducted Output Power   | <For Ant. 1>:<br>Band 2: MCS8 (40MHz): 11.49 dBm<br><For Ant. 2>:<br>Band 2: MCS8 (40MHz): 21.92 dBm<br><For Ant. 3>:<br>Band 2: MCS8 (40MHz): 19.32 dBm<br>Band 3: MCS8 (40MHz): 19.73 dBm<br><For Ant. 4>:<br>Band 2: MCS8 (40MHz): 21.60 dBm<br>Band 3: MCS8 (40MHz): 23.83 dBm |
| Carrier Frequencies      | Please refer to section 3.4  |
| Antenna                  | Please refer to section 3.3  |

**IEEE 802.11a**

| Items                    | Description  |
|--------------------------|--|
| Product Type             | WLAN (2TX, 2RX)  |
| Radio Type               | Intentional Transceiver  |
| Power Type               | From POE   |
| Modulation               | OFDM for IEEE 802.11a  |
| Data Modulation          | OFDM (BPSK / QPSK / 16QAM / 64QAM)   |
| Data Rate (Mbps)         | OFDM (6/9/12/18/24/36/48/54)   |
| Frequency Range          | <For Ant. 1, Ant. 2>: 5250 ~ 5350MHz<br><For Ant. 3, Ant. 4>: 5250 ~ 5350MHz / 5470 ~ 5725MHz  |
| Channel Number           | <For Ant. 1, Ant. 2>: 4<br><For Ant. 3, Ant. 4>: 8   |
| Channel Band Width (99%) | <For Ant. 1>:<br>11a: 17.28 MHz<br><For Ant. 2>:<br>11a: 17.44 MHz<br><For Ant. 3>:<br>11a: 17.60 MHz<br><For Ant. 4>:<br>11a: 17.44 MHz   |
| Conducted Output Power   | <For Ant. 1>:<br>Band 2: 11.71 dBm<br><For Ant. 2>:<br>Band 2: 21.72 dBm<br><For Ant. 3>:<br>Band 2: 19.77 dBm ; Band 3: 19.51 dBm<br><For Ant. 4>:<br>Band 2: 23.35 dBm ; Band 3: 23.79 dBm |
| Carrier Frequencies      | Please refer to section 3.4  |
| Antenna                  | Please refer to section 3.3  |

**Antenna & Band width**

| Antenna      | Single (TX) |        | Two (TX) |        |
|--------------|-------------|--------|----------|--------|
|              | 20 MHz      | 40 MHz | 20 MHz   | 40 MHz |
| IEEE 802.11a | V           | V      | V        | V      |
| IEEE 802.11n | V           | V      | V        | V      |

## IEEE 802.11n spec

| MCS Index | Nss | Modulation | R   | NBPSC | NCBPS |       | NDBPS |       | Datarate(Mbps) |       |         |       |
|-----------|-----|------------|-----|-------|-------|-------|-------|-------|----------------|-------|---------|-------|
|           |     |            |     |       | 20MHz | 40MHz | 20MHz | 40MHz | 800nsGI        |       | 400nsGI |       |
|           |     |            |     |       |       |       |       |       | 20MHz          | 40MHz | 20MHz   | 40MHz |
| 0         | 1   | BPSK       | 1/2 | 1     | 52    | 108   | 26    | 54    | 6.5            | 13.5  | 7.200   | 15    |
| 1         | 1   | QPSK       | 1/2 | 2     | 104   | 216   | 52    | 108   | 13.0           | 27.0  | 14.400  | 30    |
| 2         | 1   | QPSK       | 3/4 | 2     | 104   | 216   | 78    | 162   | 19.5           | 40.5  | 21.700  | 45    |
| 3         | 1   | 16-QAM     | 1/2 | 4     | 208   | 432   | 104   | 216   | 26.0           | 54.0  | 28.900  | 60    |
| 4         | 1   | 16-QAM     | 3/4 | 4     | 208   | 432   | 156   | 324   | 39.0           | 81.0  | 43.300  | 90    |
| 5         | 1   | 64-QAM     | 2/3 | 6     | 312   | 648   | 208   | 432   | 52.0           | 108.0 | 57.800  | 120   |
| 6         | 1   | 64-QAM     | 3/4 | 6     | 312   | 648   | 234   | 486   | 58.5           | 121.5 | 65.000  | 135   |
| 7         | 1   | 64-QAM     | 5/6 | 6     | 312   | 648   | 260   | 540   | 65.0           | 135.0 | 72.200  | 150   |
| 8         | 2   | BPSK       | 1/2 | 1     | 104   | 216   | 52    | 108   | 13.0           | 27.0  | 14.444  | 30    |
| 9         | 2   | QPSK       | 1/2 | 2     | 208   | 432   | 104   | 216   | 26.0           | 54.0  | 28.889  | 60    |
| 10        | 2   | QPSK       | 3/4 | 2     | 208   | 432   | 156   | 324   | 39.0           | 81.0  | 43.333  | 90    |
| 11        | 2   | 16-QAM     | 1/2 | 4     | 416   | 864   | 208   | 432   | 52.0           | 108.0 | 57.778  | 120   |
| 12        | 2   | 16-QAM     | 3/4 | 4     | 416   | 864   | 312   | 648   | 78.0           | 162.0 | 86.667  | 180   |
| 13        | 2   | 64-QAM     | 2/3 | 6     | 624   | 1296  | 416   | 864   | 104.0          | 216.0 | 115.556 | 240   |
| 14        | 2   | 64-QAM     | 3/4 | 6     | 624   | 1296  | 468   | 972   | 117.0          | 243.0 | 130.000 | 270   |
| 15        | 2   | 64-QAM     | 5/6 | 6     | 624   | 1296  | 520   | 1080  | 130.0          | 270.0 | 144.444 | 300   |

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

## 3.2. Accessories

N/A



### 3.3. Table for Filed Antenna

| Ant. | Brand        | Model Name        | Antenna Type   | Connector    | Attenuator (dBi) | Antenna gain |           | Cable Loss  |           | Test Antenna gain |           |
|------|--------------|-------------------|----------------|--------------|------------------|--------------|-----------|-------------|-----------|-------------------|-----------|
|      |              |                   |                |              |                  | 2.4GHz Band  | 5GHz Band | 2.4GHz Band | 5GHz Band | 2.4GHz Band       | 5GHz Band |
| 1    | MARS         | MA-WA55-30        | Panel Antenna  | N-Type       | 10               | -            | 30        | -           | 2         | -                 | 18        |
| 2    | MARS         | MA-WB55-20        | Sector Antenna | N-Type       | 10               | -            | 20        | -           | 2         | -                 | 8         |
| 3    | CSC Networks | 65812 ODN         | Omni Antenna   | N-Type       | -                | -            | 12        | -           | 2         | -                 | 10        |
| 4    | SmartAnt     | USI05-2201 70 -V1 | Dipole Antenna | Reversed-SMA | -                | 2.5          | 5         | 0.5         | 0.5       | 2                 | 4.5       |
| 5    | MARS         | MA-WA25-20        | Panel Antenna  | N-Type       | 10               | 20           | -         | 1           | -         | 9                 | -         |
| 6    | CSC Networks | 62420 SN-120      | Sector Antenna | N Female     | 10               | 20           | -         | 1           | -         | 9                 | -         |
| 7    | CSC Networks | 62416 ODN         | Omni Antenna   | N-Type       | 10               | 17           | -         | 1           | -         | 6                 | -         |

**Note:**

The EUT has two antenna connectors which can be used for transmitting and receiving simultaneously as 2Tx and 2Rx. Also there are seven types of antenna provided to this EUT and all of them can be used as transmitting and receiving antenna.

**Connector 1(J8): TX/RX**

**Connector 2(J9): TX/RX**



### 3.4. Table for Carrier Frequencies

For IEEE 802.11a, use Channel 52, 56, 60, 64, 100, 104, 108, 112, 116, 132, 136, 140.

There are two bandwidth systems for IEEE 802.11n.

For both 20MHz bandwidth systems, use Channel 52, 56, 60, 64, 100, 104, 108, 112, 116, 132, 136, 140.

For both 40MHz bandwidth systems, use Channel 54, 62, 102, 110, 134.

| Frequency Band          | Channel No. | Frequency | Channel No. | Frequency |
|-------------------------|-------------|-----------|-------------|-----------|
| 5250~5350 MHz<br>Band 2 | 52          | 5260 MHz  | 60          | 5300 MHz  |
|                         | 54          | 5270 MHz  | 62          | 5310 MHz  |
|                         | 56          | 5280 MHz  | 64          | 5320 MHz  |
| 5470~5725 MHz<br>Band 3 | 100         | 5500 MHz  | 116         | 5580 MHz  |
|                         | 102         | 5510MHz   | 132         | 5660 MHz  |
|                         | 104         | 5520 MHz  | 134         | 5670 MHz  |
|                         | 108         | 5540 MHz  | 136         | 5680 MHz  |
|                         | 110         | 5550 MHz  | 140         | 5700 MHz  |
|                         | 112         | 5560 MHz  |             |           |

### 3.5. 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 all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

<For Ant. 1 / Ant. 2>:

| Test Items  | Mode          |        | Data Rate | Channel  | Antenna |
|---|---------------|--------|-----------|----------|---------|
| Max. Conducted Output Power   | MCS8/40MHz    | Band 2 | 27Mbps    | 54/62    | 1, 2    |
|   | 11a/BPSK      | Band 2 | 6Mbps     | 52/60/64 | 1, 2    |
| 26dB Spectrum Bandwidth<br>99% Occupied Bandwidth Measurement<br>Power Spectral Density<br>Peak Excursion | MCS8/40MHz    | Band 2 | 27Mbps    | 54/62    | 1, 2    |
|   | 11a/BPSK      | Band 2 | 6Mbps     | 52/60/64 | 1, 2    |
| Radiated Emission Above 1GHz  | MCS8/40MHz    | Band 2 | 27Mbps    | 54/62    | 1, 2    |
|   | 11a/BPSK      | Band 2 | 6Mbps     | 52/60/64 | 1, 2    |
| Band Edge Emission  | MCS8/40MHz    | Band 2 | 27Mbps    | 54/62    | 1, 2    |
|   | 11a/BPSK      | Band 2 | 6Mbps     | 52/60/64 | 1, 2    |
| Frequency Stability   | Un-modulation |        | -         | 60       | N/A     |

<For Ant. 3 / Ant. 4>:

| Test Items  | Mode          | Data Rate | Channel | Antenna     |      |
|---|---------------|-----------|---------|-------------|------|
| Max. Conducted Output Power   | MCS8/40MHz    | Band 2    | 27Mbps  | 54/62       | 3, 4 |
|   |               | Band 3    | 27Mbps  | 102/110/134 | 3, 4 |
|   | 11a/BPSK      | Band 2    | 6Mbps   | 52/60/64    | 3, 4 |
|   |               | Band 3    | 6Mbps   | 100/116/140 | 3, 4 |
| 26dB Spectrum Bandwidth<br>99% Occupied Bandwidth Measurement<br>Power Spectral Density<br>Peak Excursion | MCS8/40MHz    | Band 2    | 27Mbps  | 54/62       | 3, 4 |
|   |               | Band 3    | 27Mbps  | 102/110/134 | 3, 4 |
|   | 11a/BPSK      | Band 2    | 6Mbps   | 52/60/64    | 3, 4 |
|   |               | Band 3    | 6Mbps   | 100/116/140 | 3, 4 |
| Radiated Emission Above 1GHz  | MCS8/40MHz    | Band 2    | 27Mbps  | 54/62       | 3, 4 |
|   |               | Band 3    | 27Mbps  | 102/110/134 | 3, 4 |
|   | 11a/BPSK      | Band 2    | 6Mbps   | 52/60/64    | 3, 4 |
|   |               | Band 3    | 6Mbps   | 100/116/140 | 3, 4 |
| Band Edge Emission  | MCS8/40MHz    | Band 2    | 27Mbps  | 54/62       | 3, 4 |
|   |               | Band 3    | 27Mbps  | 102/110/134 | 3, 4 |
|   | 11a/BPSK      | Band 2    | 6Mbps   | 52/60/64    | 3, 4 |
|   |               | Band 3    | 6Mbps   | 100/116/140 | 3, 4 |
| Frequency Stability   | Un-modulation | -         | 60/64   | N/A         |      |

Note 1. In theory, the test mode of two antennas transmitting simultaneously is worse case than single antenna.

Note 2. 11a is same modulation type with 11an-HT20 so that 11a is representative in test.

Note 3. Ant.1, Ant 2 would be only used in Band 2 of 5GHz band due to outdoor antenna.

The following test modes were performed for all tests:

Test Mode 1. EUT + Antenna 1 (5GHz Antenna)

Test Mode 2. EUT + Antenna 2 (5GHz Antenna)

Test Mode 3. EUT + Antenna 3 (5GHz Antenna)

Test Mode 4. EUT + Antenna 4 (5GHz Antenna)

All the test results were tested and recorded in the report.

### 3.6. Table for Testing Locations

| Test Site No. | Site Category | Location | FCC Reg. No. | IC File No. | VCCI Reg. No |
|---------------|---------------|----------|--------------|-------------|--------------|
| 03CH03-HY     | SAC           | Hwa Ya   | 879474       | IC 4086     | -            |
| TH01-HY       | OVEN Room     | Hwa Ya   | -            | -           | -            |

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

Please refer section 6 for Test Site Address.

### 3.7. Table for Class II Change

This product is an extension of original one reported under Sporton project number: 051015

Below is the table for the change of the product with respect to the original one.

| Modifications  | Performance Checking  |
|--|---|
| Add DFS function testing and evaluation for IEEE 802.11a / IEEE 802.11an Band 2 and Band 3 (5250~5350MHz, 5470~5725MHz). | 26dB Spectrum Bandwidth<br>99% Occupied Bandwidth Measurement<br>Power Spectral Density<br>Peak Excursion<br>Radiated Emission Above 1GHz<br>Band Edge Emission |

### 3.8. Table for Supporting Units

| Support Unit | Brand      | Model    | FCC ID       |
|--------------|------------|----------|--------------|
| POE          | PowerDsine | PD-7001G | DoC          |
| Notebook     | DELL       | M1330    | E2KWM3945ABG |
| Notebook     | DELL       | D400     | E2K24GBRL    |
| Notebook     | DELL       | 1200     | E2K4965AGNM  |

### 3.9. 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 Antenna 1>:

#### Power Parameters of IEEE 802.11n MCS8 40MHz

| Test Software Version     | ART      |          |
|---------------------------|----------|----------|
| Frequency                 | 5270 MHz | 5310 MHz |
| IEEE 802.11n 40MHz Ant. 1 | 6.5      | 6.5      |

#### Power Parameters of IEEE 802.11a

| Test Software Version | ART      |          |          |
|-----------------------|----------|----------|----------|
| Frequency             | 5260 MHz | 5300 MHz | 5320 MHz |
| IEEE 11a Ant. 1       | 6.5      | 7        | 6.5      |

<For Antenna 2>:

**Power Parameters of IEEE 802.11n MCS8 40MHz**

| Test Software Version     | ART      |          |
|---------------------------|----------|----------|
| Frequency                 | 5270 MHz | 5310 MHz |
| IEEE 802.11n 40MHz Ant. 2 | 16.5     | 12.5     |

**Power Parameters of IEEE 802.11a**

| Test Software Version | ART      |          |          |
|-----------------------|----------|----------|----------|
| Frequency             | 5260 MHz | 5300 MHz | 5320 MHz |
| IEEE 11a Ant. 2       | 17       | 17       | 17       |

<For Antenna 3>:

**Power Parameters of IEEE 802.11n MCS8 40MHz**

| Test Software Version     | ART      |          |          |          |
|---------------------------|----------|----------|----------|----------|
| Frequency                 | 5310 MHz | 5510 MHz | 5550 MHz | 5670 MHz |
| IEEE 802.11n 40MHz Ant. 3 | 33       | 36       | 37       | 38       |

**Power Parameters of IEEE 802.11a**

| Test Software Version | ART      |          |          |          |          |          |
|-----------------------|----------|----------|----------|----------|----------|----------|
| Frequency             | 5260 MHz | 5300 MHz | 5320 MHz | 5500 MHz | 5580 MHz | 5700 MHz |
| IEEE 11a Ant. 3       | 38       | 38       | 37       | 36       | 38       | 38       |

<For Antenna 4>:

**Power Parameters of IEEE 802.11n MCS8 40MHz**

| Test Software Version     | ART      |          |          |          |
|---------------------------|----------|----------|----------|----------|
| Frequency                 | 5310 MHz | 5510 MHz | 5550 MHz | 5670 MHz |
| IEEE 802.11n 40MHz Ant. 4 | 11       | 14.5     | 18.5     | 19       |

**Power Parameters of IEEE 802.11a**

| Test Software Version | ART      |          |          |          |          |          |
|-----------------------|----------|----------|----------|----------|----------|----------|
| Frequency             | 5260 MHz | 5300 MHz | 5320 MHz | 5500 MHz | 5580 MHz | 5700 MHz |
| IEEE 11a Ant. 4       | 19.5     | 18.5     | 15       | 16.5     | 19       | 19       |

During the test, the following program under WIN XP was executed:

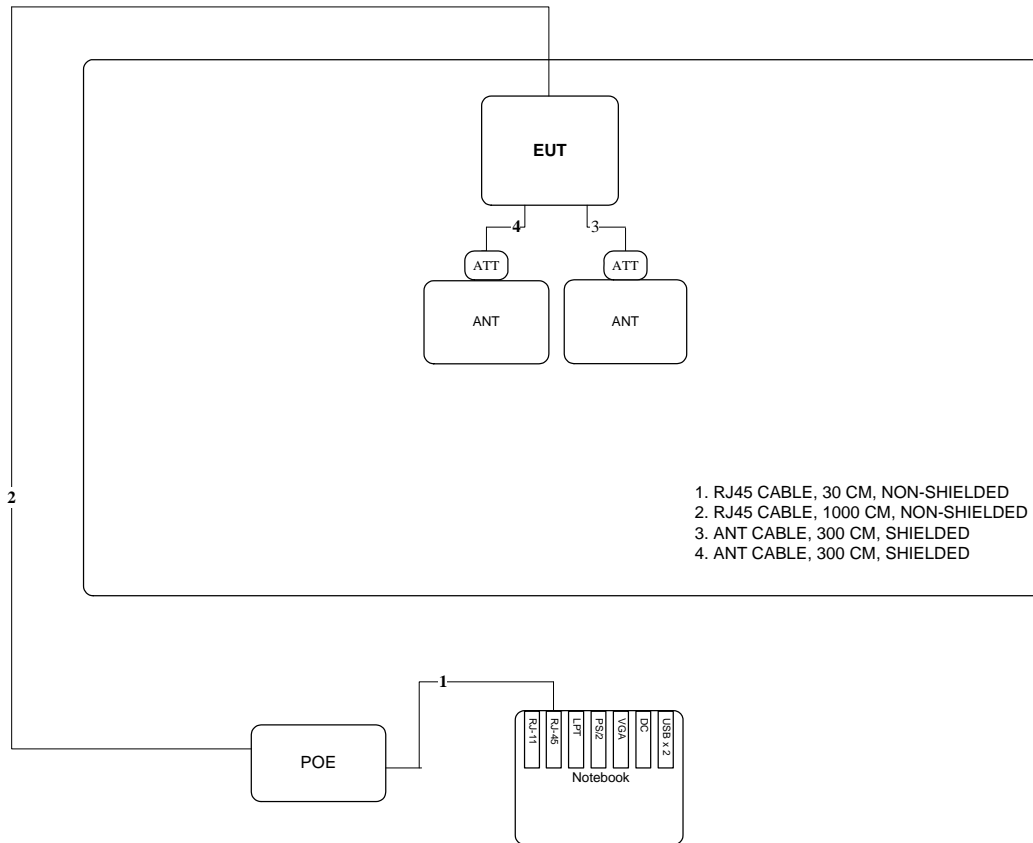
Executed "ART" to control the EUT continuously transmit RF signal.

### 3.10. Test Configurations

#### 3.10.1. Radiation Emissions Test Configuration

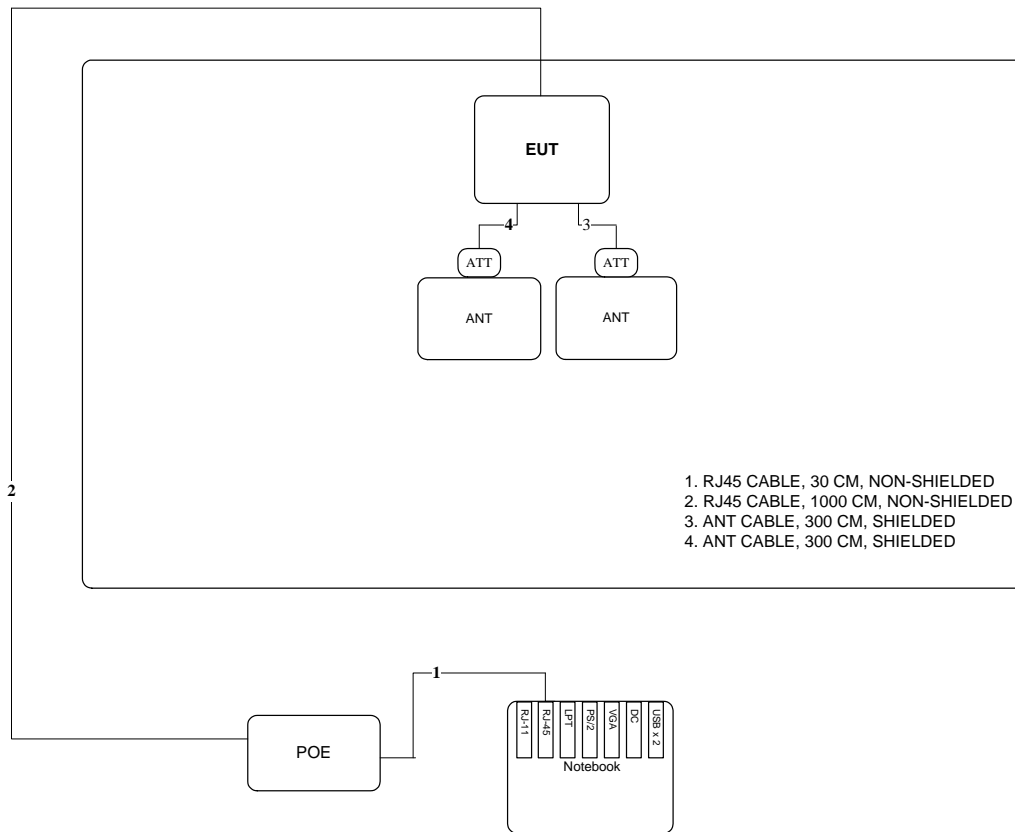
Test Configuration: above 1GHz

<For Antenna 1> <5GHz>:



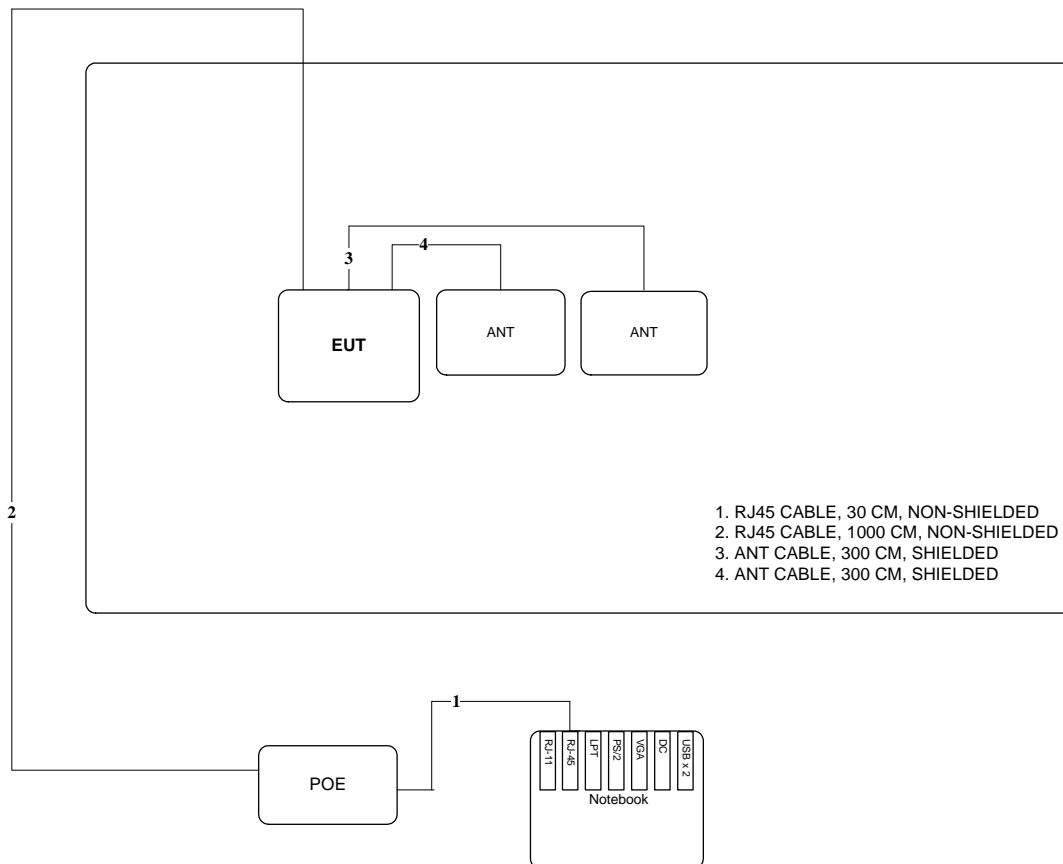
Test Configuration: above 1GHz

<For Antenna 2> <5GHz>:



Test Configuration: above 1GHz

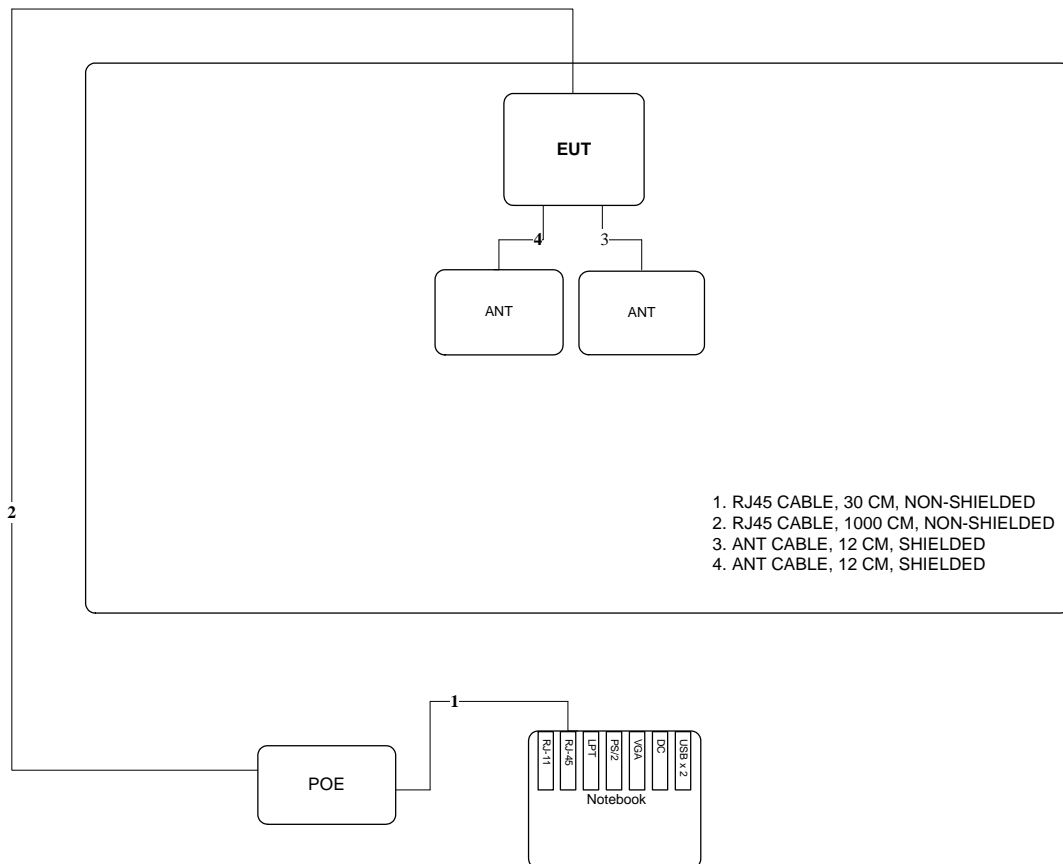
<For Antenna 3> <5GHz>:





Test Configuration: above 1GHz

<For Antenna 4> <5GHz>:



## 4. TEST RESULT

### 4.1. 99% Occupied Bandwidth Measurement

#### 4.1.1. Limit

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

#### 4.1.2. Measuring Instruments and Setting

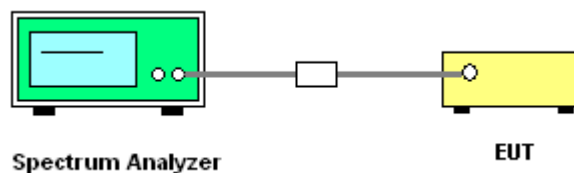
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

#### 4.1.3. Test Procedures

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

#### 4.1.4. Test Setup Layout



#### 4.1.5. Test Deviation

There is no deviation with the original standard.

#### 4.1.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.1.7. Test Result of 99% Occupied Bandwidth

<For Antenna 1>:

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11n / Antenna 1 |

Configuration IEEE 802.11n MCS8 40MHz Ant. 1-1 + Ant. 1-2

| Channel | Frequency | 26dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) |
|---------|-----------|----------------------|------------------------------|
| 54      | 5270 MHz  | 44.48                | 36.48                        |
| 62      | 5310 MHz  | 44.32                | 36.48                        |

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11a / Antenna 1 |

Configuration IEEE 802.11a Ant. 1-1 + Ant. 1-2

| Channel | Frequency | 26dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) |
|---------|-----------|----------------------|------------------------------|
| 52      | 5260 MHz  | 23.04                | 17.12                        |
| 60      | 5300 MHz  | 24.32                | 17.28                        |
| 64      | 5320 MHz  | 23.68                | 17.28                        |

<For Antenna 2>:

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11n / Antenna 2 |

Configuration IEEE 802.11n MCS8 40MHz Ant. 2-1 + Ant. 2-2

| Channel | Frequency | 26dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) |
|---------|-----------|----------------------|------------------------------|
| 54      | 5270 MHz  | 46.40                | 36.64                        |
| 62      | 5310 MHz  | 47.52                | 36.48                        |

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11a / Antenna 2 |

Configuration IEEE 802.11a Ant. 2-1 + Ant. 2-2

| Channel | Frequency | 26dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) |
|---------|-----------|----------------------|------------------------------|
| 52      | 5260 MHz  | 24.64                | 17.28                        |
| 60      | 5300 MHz  | 24.00                | 17.44                        |
| 64      | 5320 MHz  | 24.16                | 17.28                        |

<For Antenna 3>:

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11n / Antenna 3 |

Configuration IEEE 802.11n MCS8 40MHz Ant. 3-1 + Ant. 3-2

| Channel | Frequency | 26dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) |
|---------|-----------|----------------------|------------------------------|
| 54      | 5270 MHz  | 46.08                | 36.64                        |
| 62      | 5310 MHz  | 46.40                | 36.48                        |
| 102     | 5510MHz   | 47.68                | 36.48                        |
| 110     | 5550 MHz  | 45.76                | 36.48                        |
| 134     | 5670 MHz  | 46.88                | 36.48                        |

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11a / Antenna 3 |

Configuration IEEE 802.11a Ant. 3-1 + Ant. 3-2

| Channel | Frequency | 26dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) |
|---------|-----------|----------------------|------------------------------|
| 52      | 5260 MHz  | 24.16                | 17.60                        |
| 60      | 5300 MHz  | 25.12                | 17.44                        |
| 64      | 5320 MHz  | 24.96                | 17.28                        |
| 100     | 5500 MHz  | 24.48                | 17.28                        |
| 116     | 5580 MHz  | 24.00                | 17.28                        |
| 140     | 5700 MHz  | 24.16                | 17.28                        |

<For Antenna 4>:

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11n / Antenna 4 |

Configuration IEEE 802.11n MCS8 40MHz Ant. 4-1 + Ant. 4-2

| Channel | Frequency | 26dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) |
|---------|-----------|----------------------|------------------------------|
| 54      | 5270 MHz  | 46.40                | 36.48                        |
| 62      | 5310 MHz  | 46.40                | 36.48                        |
| 102     | 5510MHz   | 45.12                | 36.48                        |
| 110     | 5550 MHz  | 46.88                | 36.48                        |
| 134     | 5670 MHz  | 46.72                | 36.48                        |

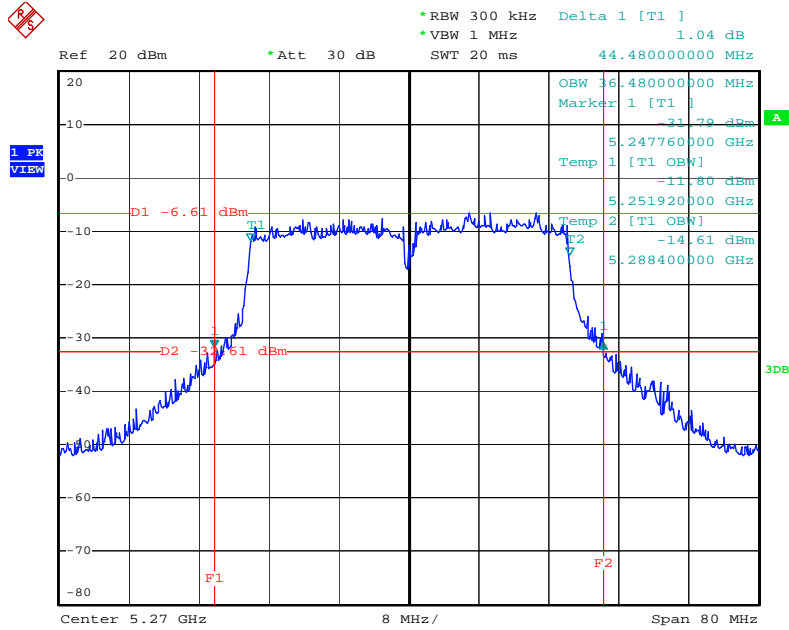
|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11a / Antenna 4 |

Configuration IEEE 802.11a Ant. 4-1 + Ant. 4-2

| Channel | Frequency | 26dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) |
|---------|-----------|----------------------|------------------------------|
| 52      | 5260 MHz  | 25.12                | 17.44                        |
| 60      | 5300 MHz  | 24.48                | 17.28                        |
| 64      | 5320 MHz  | 24.32                | 17.28                        |
| 100     | 5500 MHz  | 24.32                | 17.28                        |
| 116     | 5580 MHz  | 25.28                | 17.44                        |
| 140     | 5700 MHz  | 25.28                | 17.28                        |

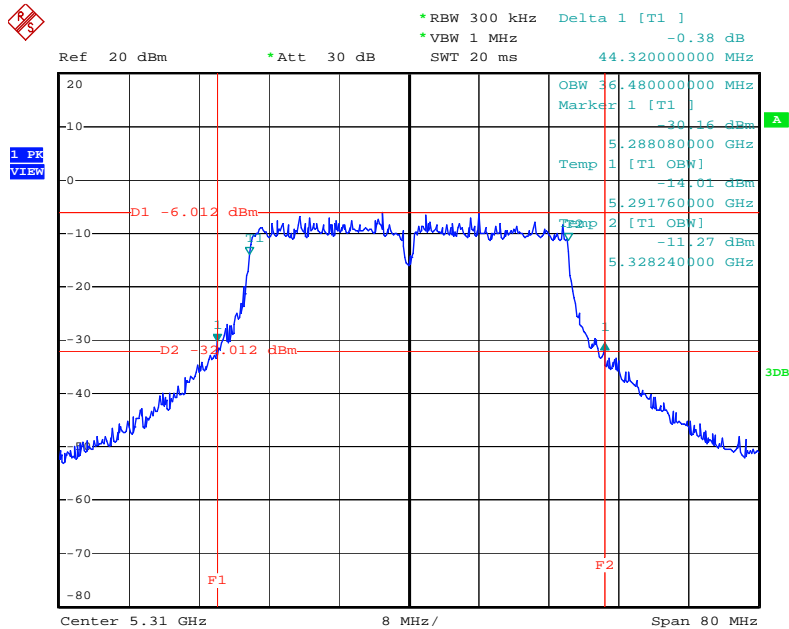
<For Antenna 1>:

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 1-1 + Ant. 1-2 / 5270 MHz



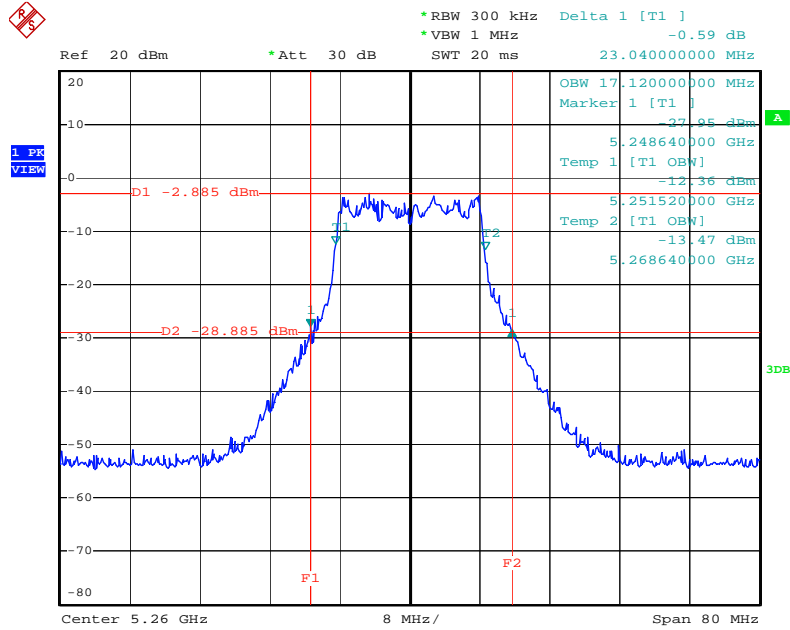
Date: 30.MAY.2010 12:14:50

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 1-1 + Ant. 1-2 / 5310 MHz



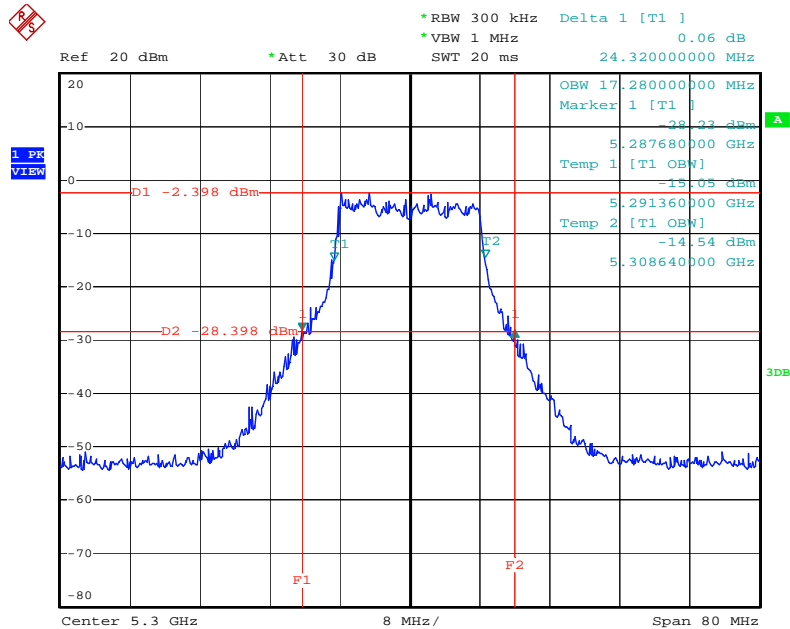
Date: 30.MAY.2010 12:16:58

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 1-1 + Ant. 1-2 / 5260 MHz



Date: 30.MAY.2010 12:21:07

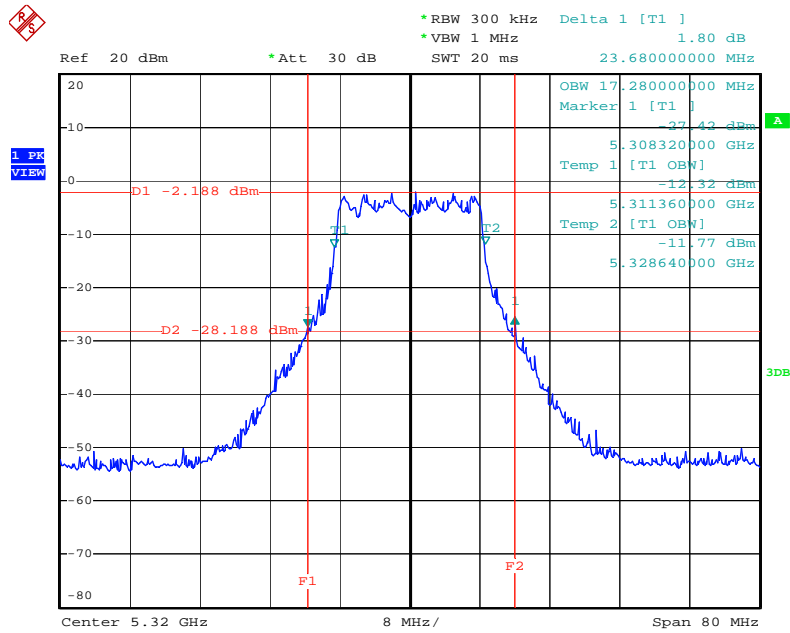
26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 1-1 + Ant. 1-2 / 5300 MHz



Date: 30.MAY.2010 12:19:47



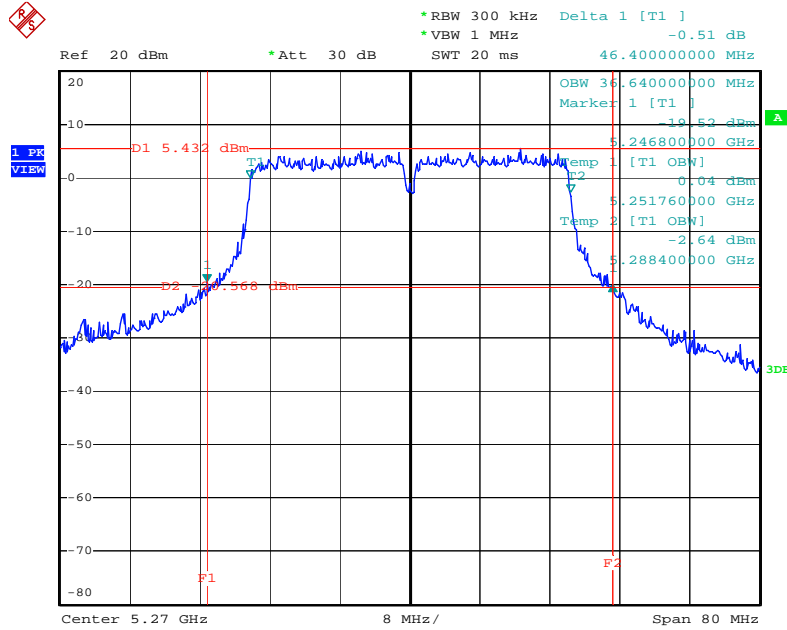
26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 1-1 + Ant. 1-2 / 5320 MHz



Date: 30.MAY.2010 12:18:48

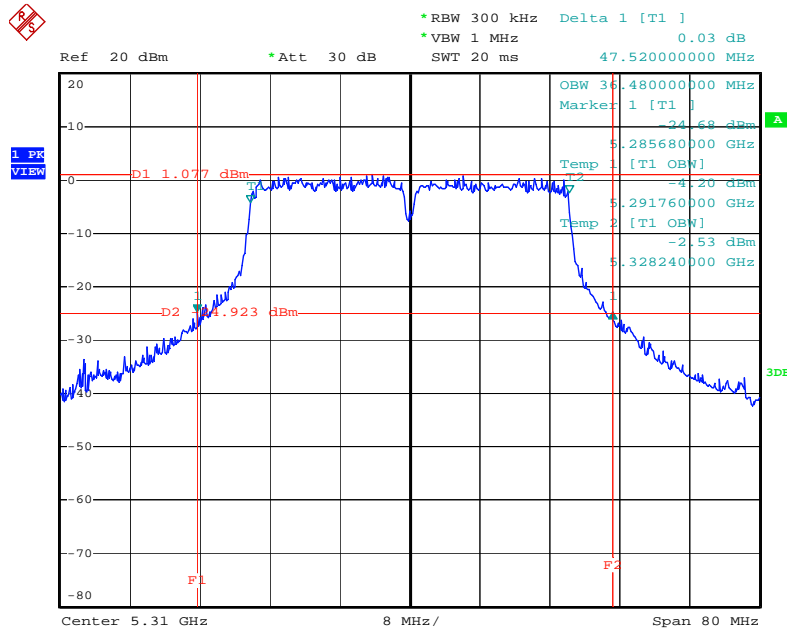
<For Antenna 2>:

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 2-1 + Ant. 2-2 / 5270 MHz



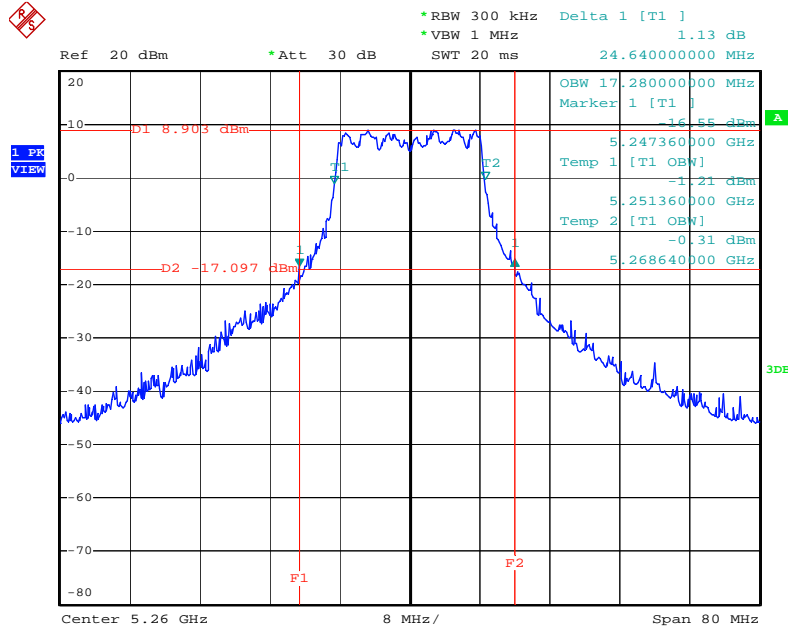
Date: 28.MAY.2010 17:26:28

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 2-1 + Ant. 2-2 / 5310 MHz



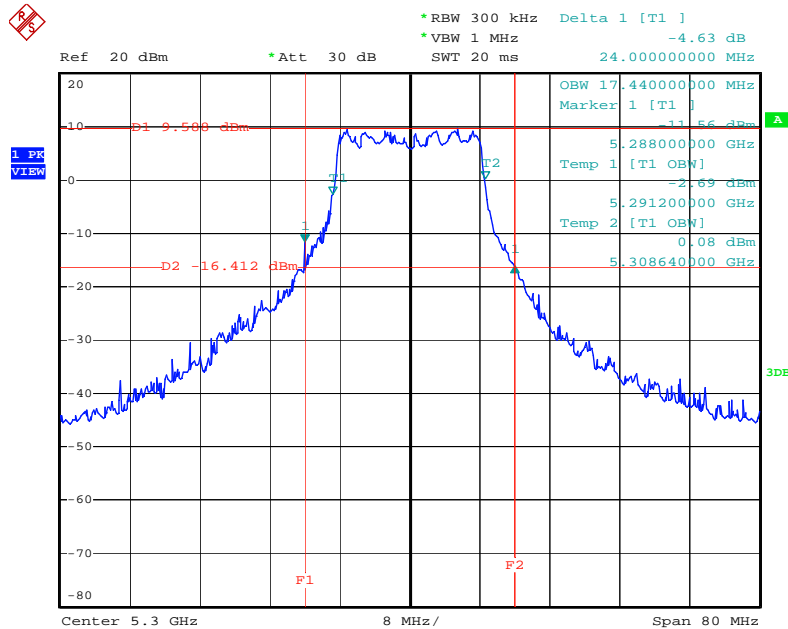
Date: 28.MAY.2010 17:30:58

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 2-1 + Ant. 2-2 / 5260 MHz



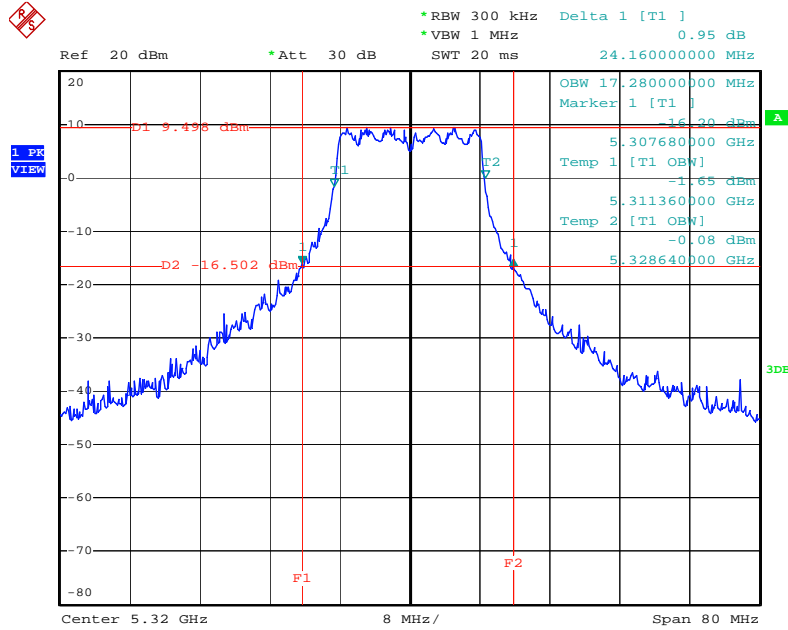
Date: 28.MAY.2010 17:34:40

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 2-1 + Ant. 2-2 / 5300 MHz



Date: 28.MAY.2010 17:33:39

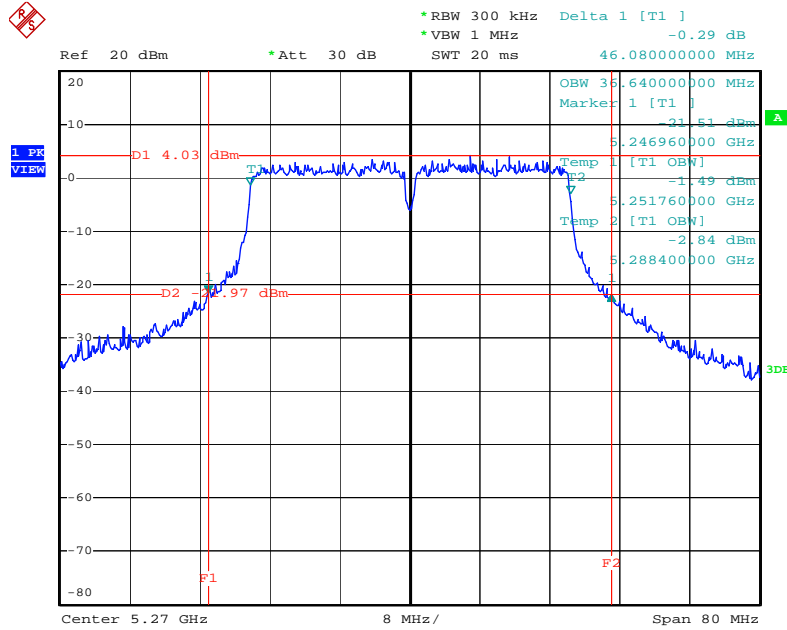
26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 2-1 + Ant. 2-2 / 5320 MHz



Date: 28.MAY.2010 17:32:38

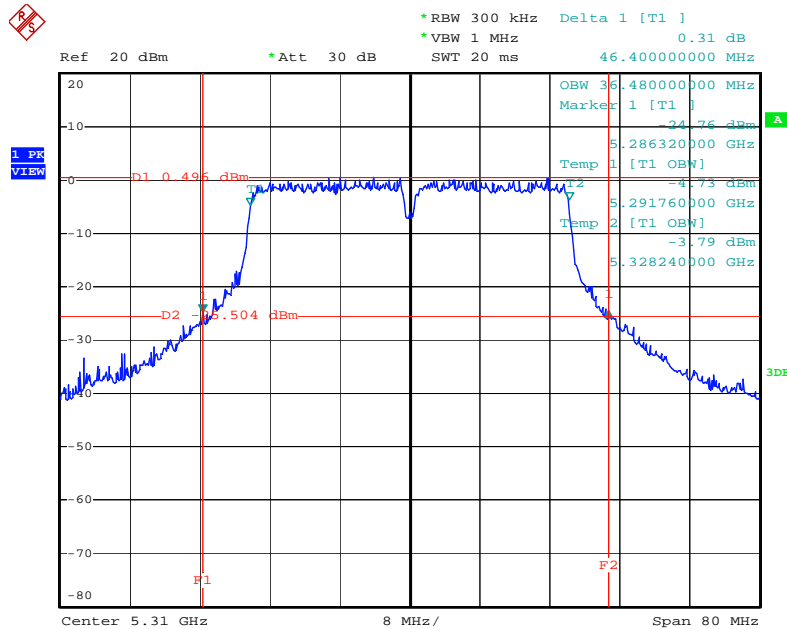
<For Antenna 3>:

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 3-1 + Ant. 3-2 / 5270 MHz



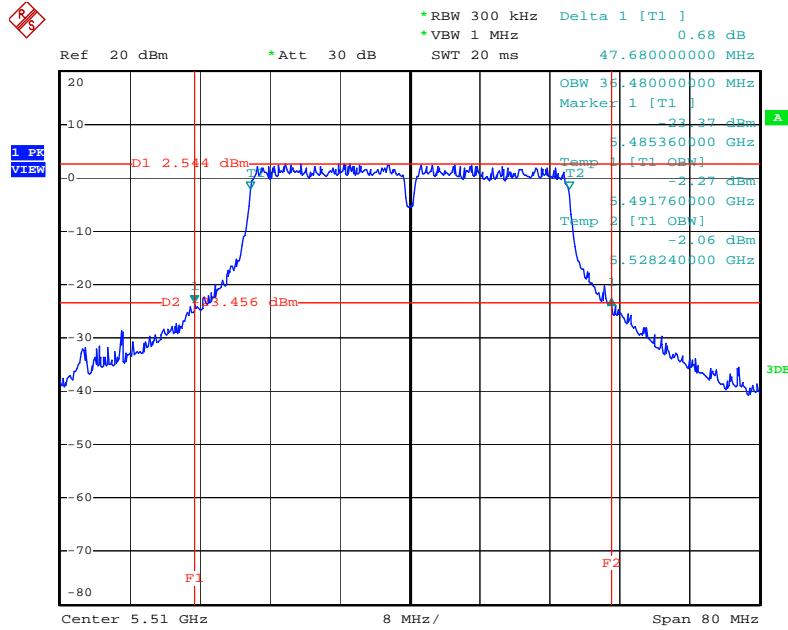
Date: 30.MAY.2010 18:41:46

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 3-1 + Ant. 3-2 / 5310 MHz



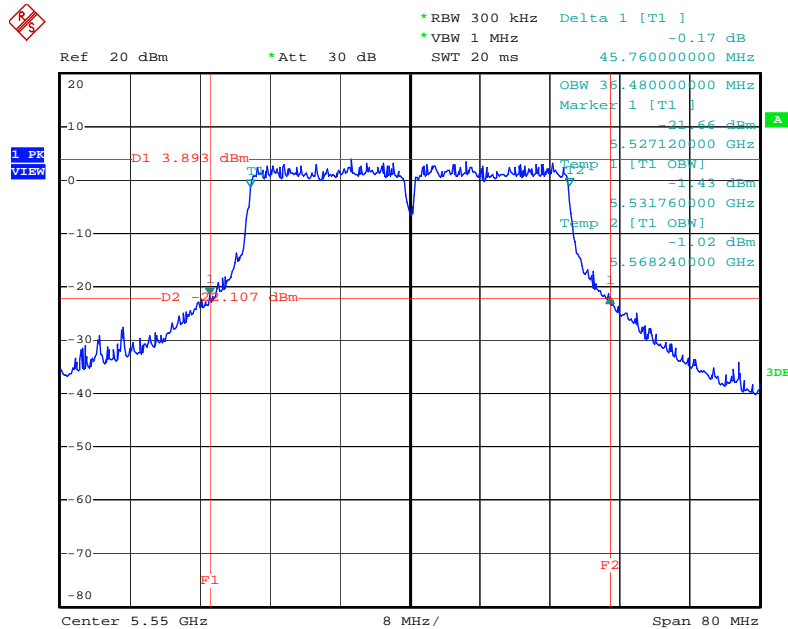
Date: 30.MAY.2010 18:43:28

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 3-1 + Ant. 3-2 / 5510MHz



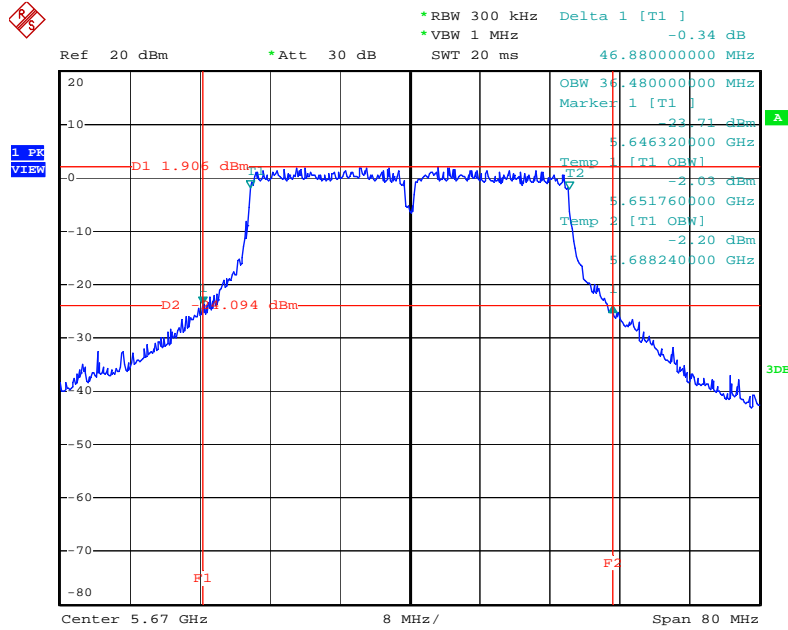
Date: 30.MAY.2010 18:44:23

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 3-1 + Ant. 3-2 / 5550 MHz



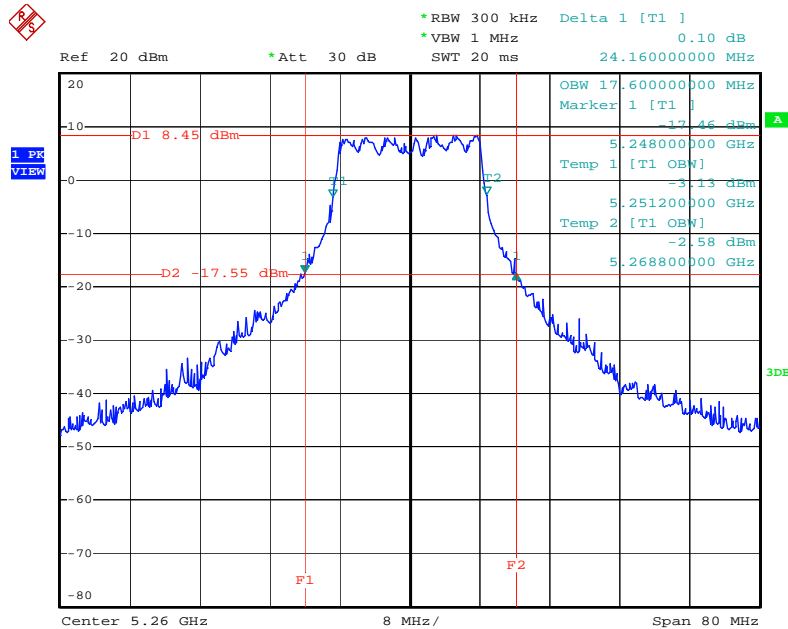
Date: 30.MAY.2010 18:45:23

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 3-1 + Ant. 3-2 / 5670 MHz



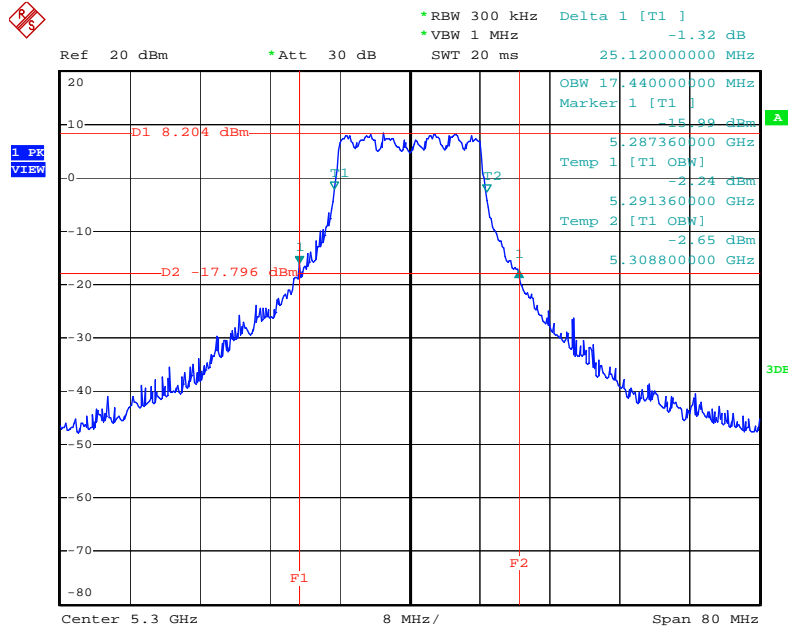
Date: 30.MAY.2010 18:46:15

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 3-1 + Ant. 3-2 / 5260 MHz



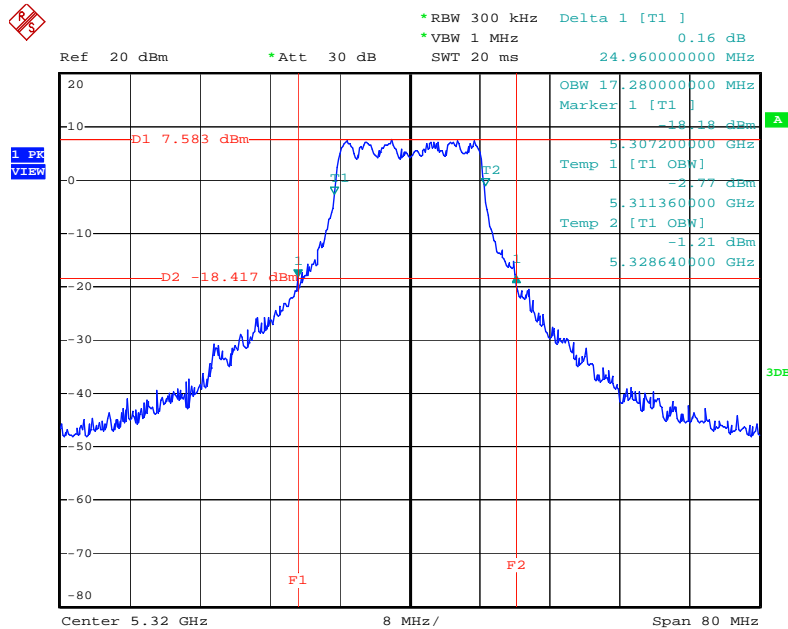
Date: 30.MAY.2010 19:11:06

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 3-1 + Ant. 3-2 / 5300 MHz



Date: 30.MAY.2010 19:11:57

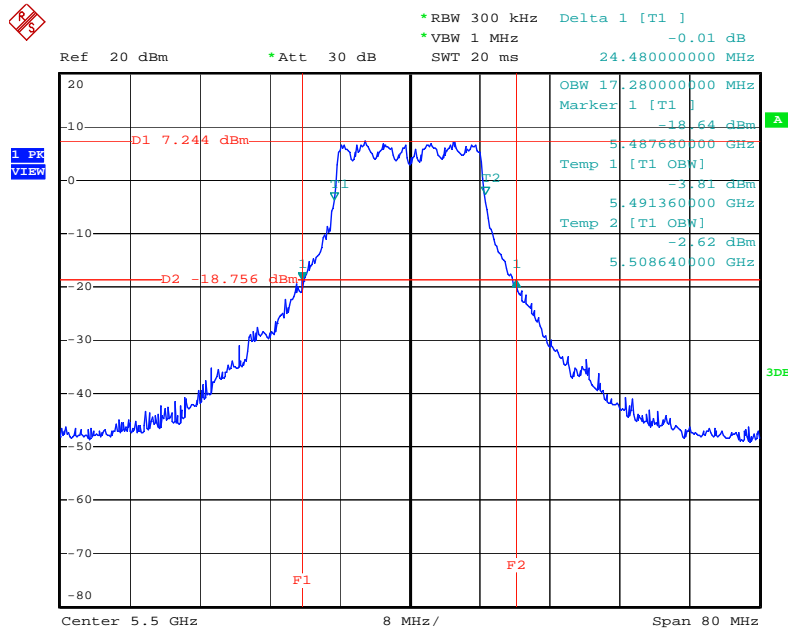
26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 3-1 + Ant. 3-2 / 5320 MHz



Date: 30.MAY.2010 19:13:06

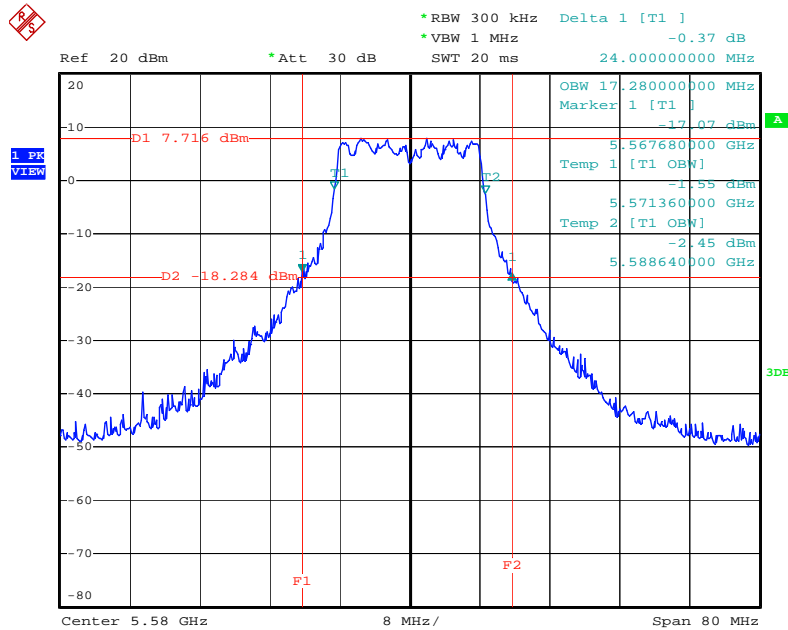


26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 3-1 + Ant. 3-2 / 5500 MHz



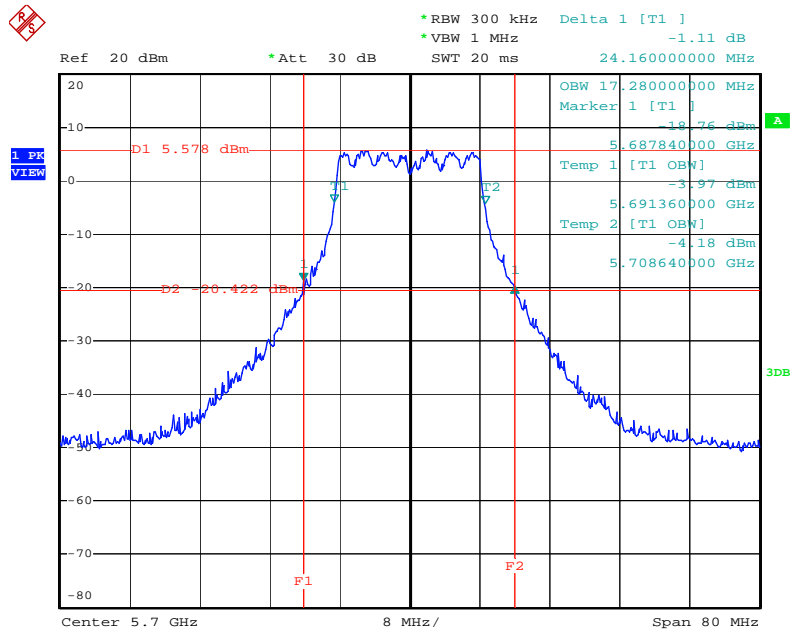
Date: 30.MAY.2010 18:49:47

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 3-1 + Ant. 3-2 / 5580 MHz



Date: 30.MAY.2010 18:48:32

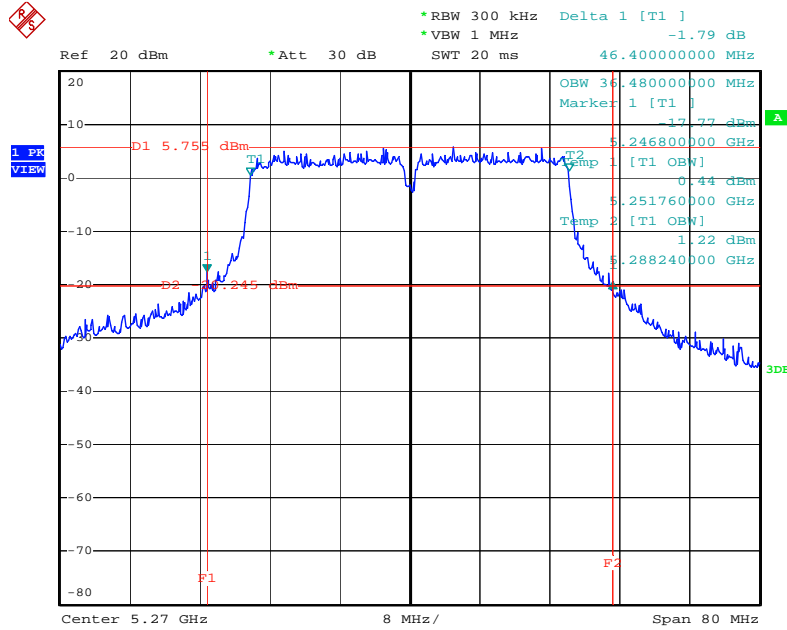
26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 3-1 + Ant. 3-2 / 5700 MHz



Date: 30.MAY.2010 18:47:40

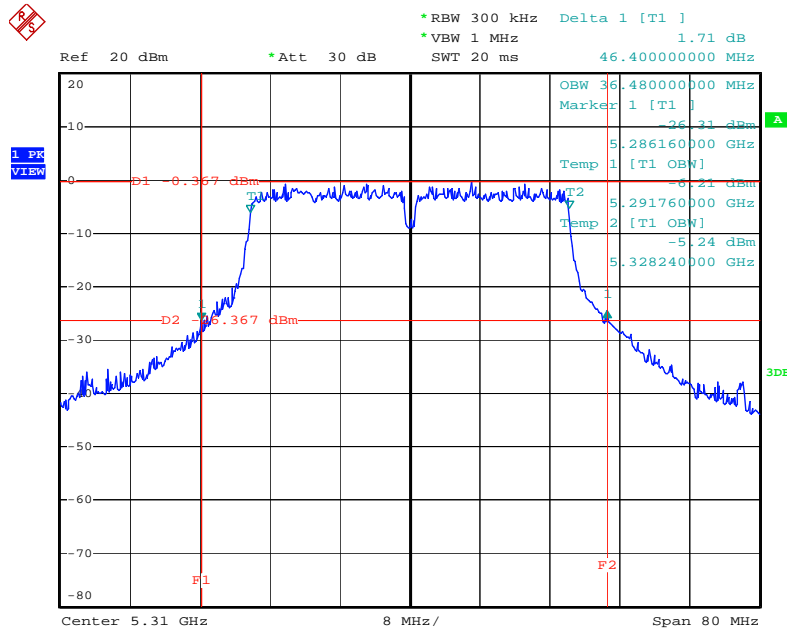
<For Antenna 4>:

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 4-1 + Ant. 4-2 / 5270 MHz



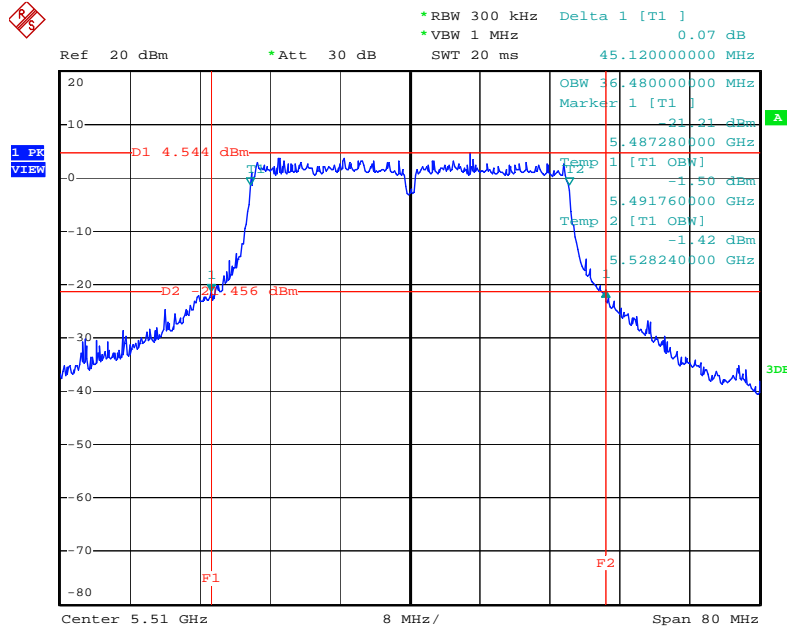
Date: 27.MAY.2010 17:45:47

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 4-1 + Ant. 4-2 / 5310 MHz



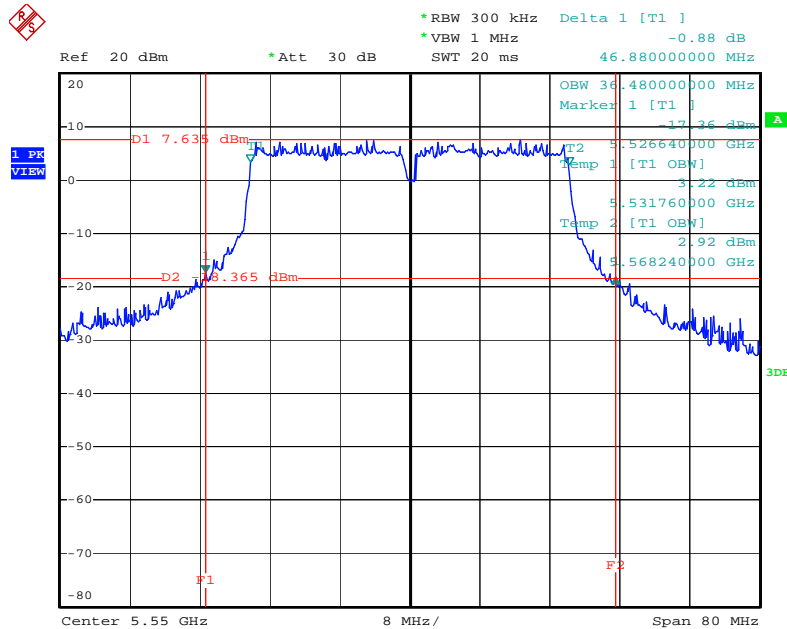
Date: 27.MAY.2010 17:44:30

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 4-1 + Ant. 4-2 / 5510MHz



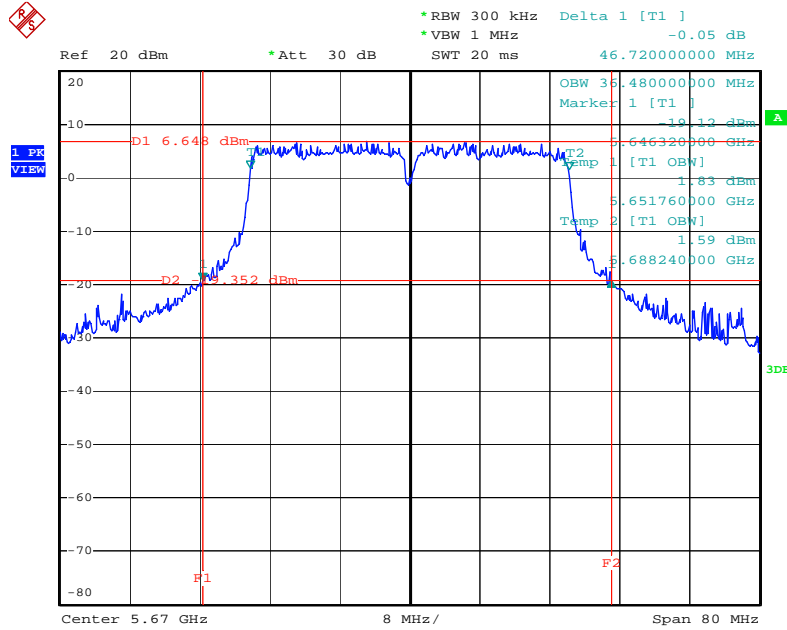
Date: 27.MAY.2010 17:42:58

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 4-1 + Ant. 4-2 / 5550 MHz



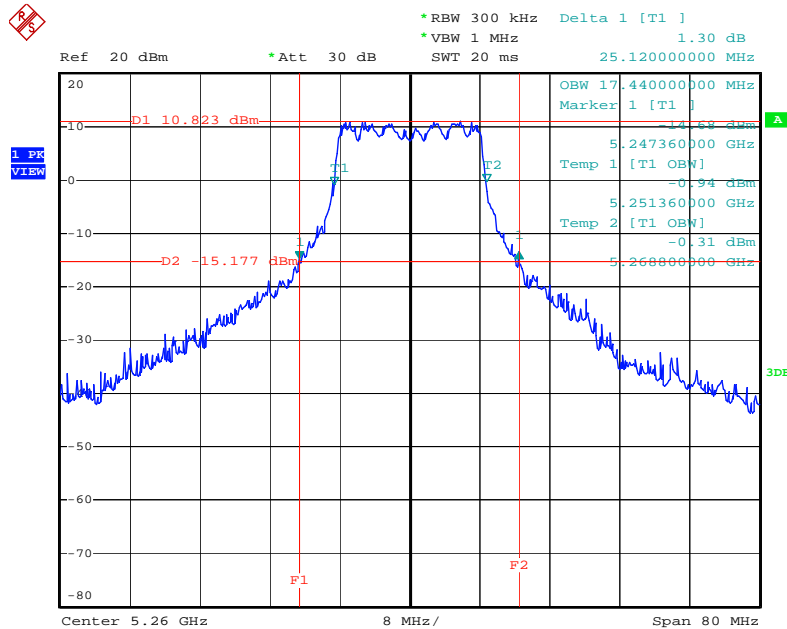
Date: 27.MAY.2010 17:41:40

26 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 4-1 + Ant. 4-2 / 5670 MHz



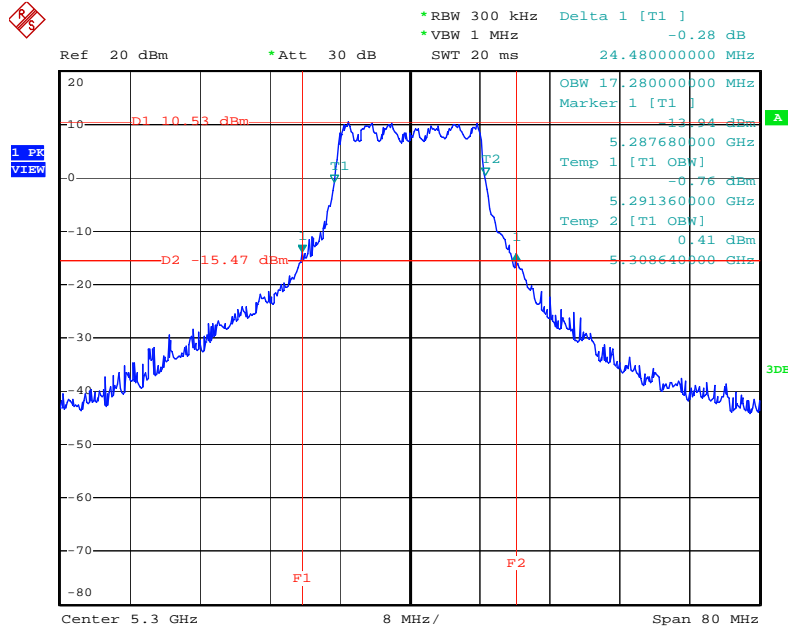
Date: 27.MAY.2010 17:40:11

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 4-1 + Ant. 4-2 / 5260 MHz



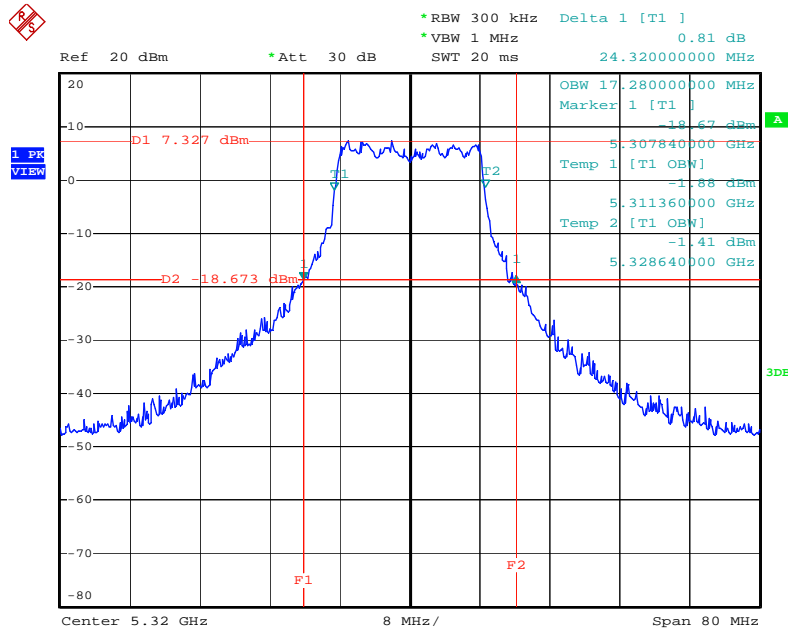
Date: 27.MAY.2010 17:58:25

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 4-1 + Ant. 4-2 / 5300 MHz



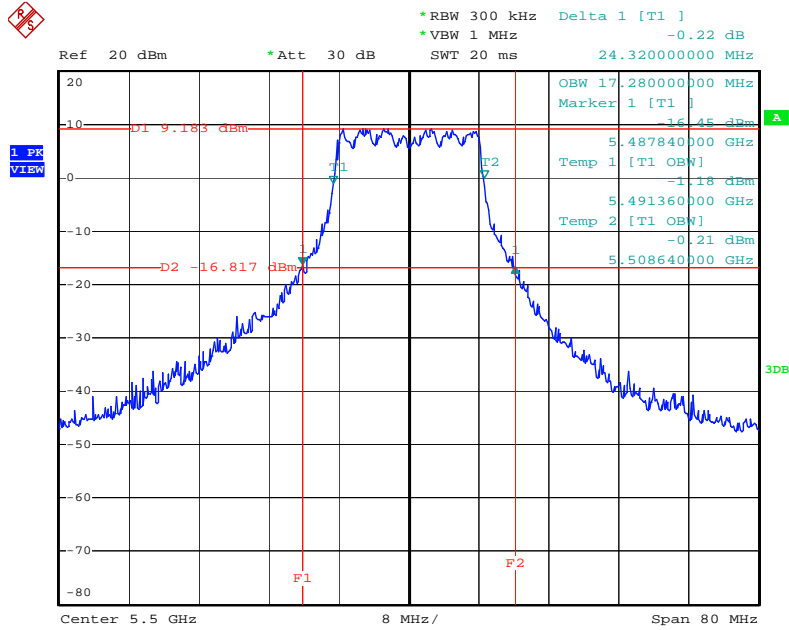
Date: 27.MAY.2010 18:00:06

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 4-1 + Ant. 4-2 / 5320 MHz



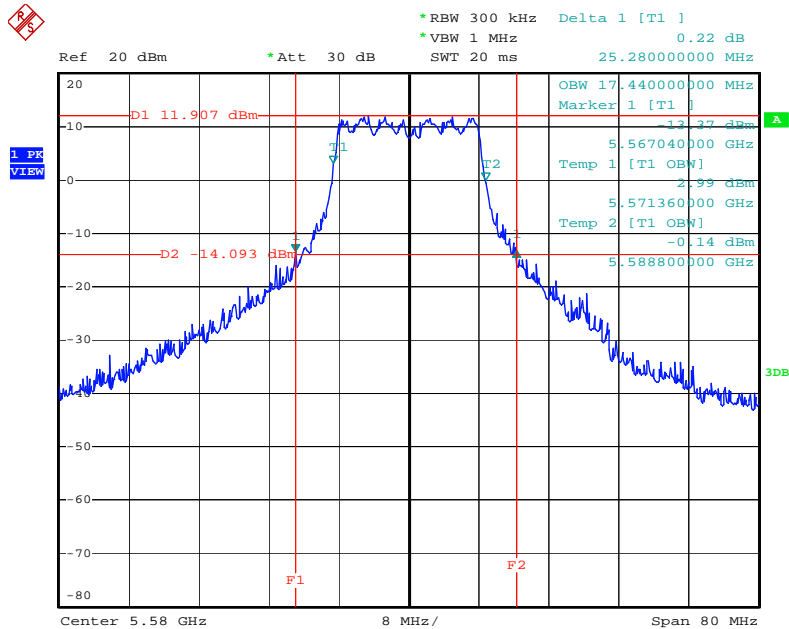
Date: 27.MAY.2010 18:03:23

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 4-1 + Ant. 4-2 / 5500 MHz



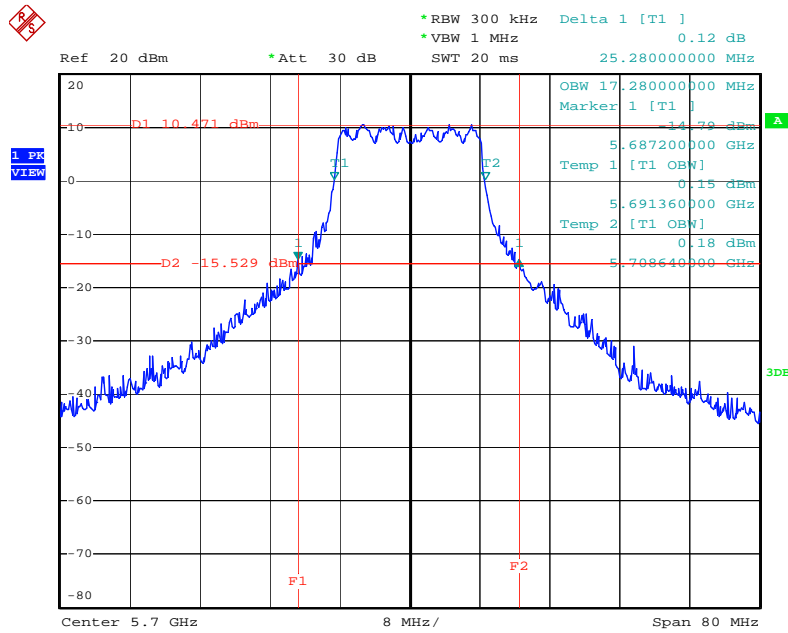
Date: 27.MAY.2010 18:05:09

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 4-1 + Ant. 4-2 / 5580 MHz



Date: 27.MAY.2010 18:06:35

26 dB Bandwidth Plot on Configuration IEEE 802.11a Ant. 4-1 + Ant. 4-2 / 5700 MHz



Date: 27.MAY.2010 18:07:39



## 4.2. Maximum Conducted Output Power Measurement

### 4.2.1. 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  $4 \text{ dBm} + 10\log B$ , 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 and 5.470-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW (24dBm) or  $11 \text{ dBm} + 10\log B$ . 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.

However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain up to 23 dBi without any corresponding reduction in the transmitter peak output power and peak power spectral density. For fixed, point-to-point U-NII transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in peak transmitter power and peak power spectral density for each 1 dB of antenna gain in excess of 23 dBi would be required.

### 4.2.2. Measuring Instruments and Setting

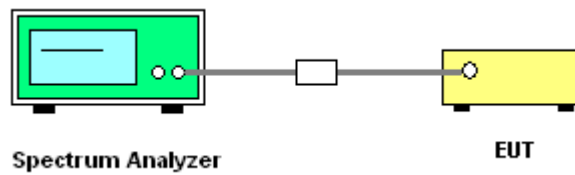
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

| 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   |

#### 4.2.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Test was performed in accordance with FCC Public Notice DA 02-2138, August 30, 2002.
3. When measuring maximum conducted output power with multiple antenna systems, add every result of the values by mathematic formula.

#### 4.2.4. Test Setup Layout



#### 4.2.5. Test Deviation

There is no deviation with the original standard.

#### 4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.2.7. Test Result of Maximum Conducted Output Power

<For Antenna 1>:

|               |               |                |                     |
|---------------|---------------|----------------|---------------------|
| Temperature   | 21°C          | Humidity       | 56%                 |
| Test Engineer | Johnson Chang | Configurations | 802.11n / Antenna 1 |

##### Configuration IEEE 802.11n MCS8 40MHz Ant. 1-1

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 54      | 5270 MHz  | 9.37                  | 12.00            | Complies |
| 62      | 5310 MHz  | 9.50                  | 12.00            | Complies |

##### Configuration IEEE 802.11n MCS8 40MHz Ant. 1-2

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 54      | 5270 MHz  | 7.35                  | 12.00            | Complies |
| 62      | 5310 MHz  | 6.64                  | 12.00            | Complies |

##### Configuration IEEE 802.11n MCS8 40MHz Ant. 1-1 + Ant. 1-2

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 54      | 5270 MHz  | 11.49                 | 12.00            | Complies |
| 62      | 5310 MHz  | 11.31                 | 12.00            | Complies |

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11a / Antenna 1 |

**Configuration IEEE 802.11a Ant. 1-1**

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 52      | 5260 MHz  | 9.14                  | 12.00            | Complies |
| 60      | 5300 MHz  | 9.58                  | 12.00            | Complies |
| 64      | 5320 MHz  | 9.66                  | 12.00            | Complies |

**Configuration IEEE 802.11a Ant. 1-2**

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 52      | 5260 MHz  | 7.59                  | 12.00            | Complies |
| 60      | 5300 MHz  | 7.52                  | 12.00            | Complies |
| 64      | 5320 MHz  | 7.47                  | 12.00            | Complies |

**Configuration IEEE 802.11a Ant. 1-1 + Ant. 1-2**

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 52      | 5260 MHz  | 11.44                 | 12.00            | Complies |
| 60      | 5300 MHz  | 11.68                 | 12.00            | Complies |
| 64      | 5320 MHz  | 11.71                 | 12.00            | Complies |

Note: All the test values were listed in the report. For plots, only the worse case of OFDM modulation was listed in the report.

<For Antenna 2>:

|                      |               |                       |                          |
|----------------------|---------------|-----------------------|--------------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                      |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | IEEE 802.11n / Antenna 2 |

Configuration IEEE 802.11n MCS8 40MHz Ant. 2-1

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 54      | 5270 MHz  | 19.60                 | 22.00            | Complies |
| 62      | 5310 MHz  | 15.25                 | 22.00            | Complies |

Configuration IEEE 802.11n MCS8 40MHz Ant. 2-2

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 54      | 5270 MHz  | 18.08                 | 22.00            | Complies |
| 62      | 5310 MHz  | 13.03                 | 22.00            | Complies |

Configuration IEEE 802.11n MCS8 40MHz Ant. 2-1 + Ant. 2-2

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 54      | 5270 MHz  | 21.92                 | 22.00            | Complies |
| 62      | 5310 MHz  | 17.29                 | 22.00            | Complies |

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11a / Antenna 2 |

**Configuration IEEE 802.11a Ant. 2-1**

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 52      | 5260 MHz  | 19.23                 | 22.00            | Complies |
| 60      | 5300 MHz  | 19.29                 | 22.00            | Complies |
| 64      | 5320 MHz  | 19.56                 | 22.00            | Complies |

**Configuration IEEE 802.11a Ant. 2-2**

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 52      | 5260 MHz  | 18.11                 | 22.00            | Complies |
| 60      | 5300 MHz  | 17.66                 | 22.00            | Complies |
| 64      | 5320 MHz  | 17.56                 | 22.00            | Complies |

**Configuration IEEE 802.11a Ant. 2-1 + Ant. 2-2**

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 52      | 5260 MHz  | 21.72                 | 22.00            | Complies |
| 60      | 5300 MHz  | 21.56                 | 22.00            | Complies |
| 64      | 5320 MHz  | 21.68                 | 22.00            | Complies |

Note: All the test values were listed in the report. For plots, only the worse case of OFDM modulation was listed in the report.

<For Antenna 3>:

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11n / Antenna 3 |

**Configuration IEEE 802.11n MCS8 40MHz Ant. 3-1**

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 54      | 5270 MHz  | 17.74                 | 20.00            | Complies |
| 62      | 5310 MHz  | 15.32                 | 20.00            | Complies |
| 102     | 5510MHz   | 18.08                 | 20.00            | Complies |
| 110     | 5550 MHz  | 17.59                 | 20.00            | Complies |
| 134     | 5670 MHz  | 15.63                 | 20.00            | Complies |

**Configuration IEEE 802.11n MCS8 40MHz Ant. 3-2**

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 54      | 5270 MHz  | 14.17                 | 20.00            | Complies |
| 62      | 5310 MHz  | 11.37                 | 20.00            | Complies |
| 102     | 5510MHz   | 14.74                 | 20.00            | Complies |
| 110     | 5550 MHz  | 14.94                 | 20.00            | Complies |
| 134     | 5670 MHz  | 14.58                 | 20.00            | Complies |

**Configuration IEEE 802.11n MCS8 40MHz Ant. 3-1 + Ant. 3-2**

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 54      | 5270 MHz  | 19.32                 | 20.00            | Complies |
| 62      | 5310 MHz  | 16.79                 | 20.00            | Complies |
| 102     | 5510MHz   | 19.73                 | 20.00            | Complies |
| 110     | 5550 MHz  | 19.47                 | 20.00            | Complies |
| 134     | 5670 MHz  | 18.15                 | 20.00            | Complies |

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11a / Antenna 3 |

**Configuration IEEE 802.11a Ant. 3-1**

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 52      | 5260 MHz  | 17.23                 | 20.00            | Complies |
| 60      | 5300 MHz  | 18.38                 | 20.00            | Complies |
| 64      | 5320 MHz  | 17.55                 | 20.00            | Complies |
| 100     | 5500 MHz  | 17.55                 | 20.00            | Complies |
| 116     | 5580 MHz  | 17.53                 | 20.00            | Complies |
| 140     | 5700 MHz  | 14.74                 | 20.00            | Complies |

**Configuration IEEE 802.11a Ant. 3-2**

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 52      | 5260 MHz  | 14.63                 | 20.00            | Complies |
| 60      | 5300 MHz  | 14.16                 | 20.00            | Complies |
| 64      | 5320 MHz  | 13.07                 | 20.00            | Complies |
| 100     | 5500 MHz  | 14.53                 | 20.00            | Complies |
| 116     | 5580 MHz  | 15.14                 | 20.00            | Complies |
| 140     | 5700 MHz  | 14.30                 | 20.00            | Complies |

**Configuration IEEE 802.11a Ant. 3-1 + Ant. 3-2**

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 52      | 5260 MHz  | 19.13                 | 20.00            | Complies |
| 60      | 5300 MHz  | 19.77                 | 20.00            | Complies |
| 64      | 5320 MHz  | 18.87                 | 20.00            | Complies |
| 100     | 5500 MHz  | 19.31                 | 20.00            | Complies |
| 116     | 5580 MHz  | 19.51                 | 20.00            | Complies |
| 140     | 5700 MHz  | 17.54                 | 20.00            | Complies |

Note: All the test values were listed in the report. For plots, only the worse case of OFDM modulation was listed in the report.



<For Antenna 4>:

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11n / Antenna 4 |

**Configuration IEEE 802.11n MCS8 40MHz Ant. 4-1**

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 54      | 5270 MHz  | 19.18                 | 24.00            | Complies |
| 62      | 5310 MHz  | 13.55                 | 24.00            | Complies |
| 102     | 5510MHz   | 18.03                 | 24.00            | Complies |
| 110     | 5550 MHz  | 21.25                 | 24.00            | Complies |
| 134     | 5670 MHz  | 20.48                 | 24.00            | Complies |

**Configuration IEEE 802.11n MCS8 40MHz Ant. 4-2**

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 54      | 5270 MHz  | 17.91                 | 24.00            | Complies |
| 62      | 5310 MHz  | 10.79                 | 24.00            | Complies |
| 102     | 5510MHz   | 16.85                 | 24.00            | Complies |
| 110     | 5550 MHz  | 20.34                 | 24.00            | Complies |
| 134     | 5670 MHz  | 19.77                 | 24.00            | Complies |

**Configuration IEEE 802.11n MCS8 40MHz Ant. 4-1 + Ant. 4-2**

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 54      | 5270 MHz  | 21.60                 | 24.00            | Complies |
| 62      | 5310 MHz  | 15.40                 | 24.00            | Complies |
| 102     | 5510MHz   | 20.49                 | 24.00            | Complies |
| 110     | 5550 MHz  | 23.83                 | 24.00            | Complies |
| 134     | 5670 MHz  | 23.15                 | 24.00            | Complies |

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11a / Antenna 4 |

**Configuration IEEE 802.11a Ant. 4-1**

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 52      | 5260 MHz  | 21.15                 | 24.00            | Complies |
| 60      | 5300 MHz  | 19.98                 | 24.00            | Complies |
| 64      | 5320 MHz  | 17.64                 | 24.00            | Complies |
| 100     | 5500 MHz  | 18.73                 | 24.00            | Complies |
| 116     | 5580 MHz  | 21.19                 | 24.00            | Complies |
| 140     | 5700 MHz  | 19.91                 | 24.00            | Complies |

**Configuration IEEE 802.11a Ant. 4-2**

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 52      | 5260 MHz  | 19.34                 | 24.00            | Complies |
| 60      | 5300 MHz  | 18.16                 | 24.00            | Complies |
| 64      | 5320 MHz  | 14.43                 | 24.00            | Complies |
| 100     | 5500 MHz  | 18.63                 | 24.00            | Complies |
| 116     | 5580 MHz  | 20.32                 | 24.00            | Complies |
| 140     | 5700 MHz  | 19.16                 | 24.00            | Complies |

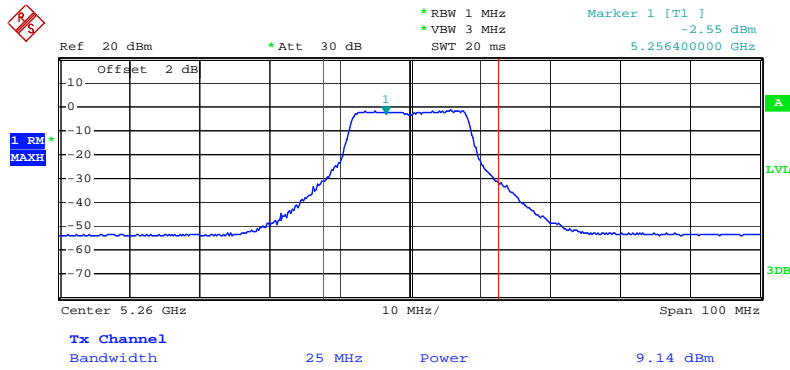
**Configuration IEEE 802.11a Ant. 4-1 + Ant. 4-2**

| Channel | Frequency | Conducted Power (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|------------------|----------|
| 52      | 5260 MHz  | 23.35                 | 24.00            | Complies |
| 60      | 5300 MHz  | 22.17                 | 24.00            | Complies |
| 64      | 5320 MHz  | 19.34                 | 24.00            | Complies |
| 100     | 5500 MHz  | 21.69                 | 24.00            | Complies |
| 116     | 5580 MHz  | 23.79                 | 24.00            | Complies |
| 140     | 5700 MHz  | 22.56                 | 24.00            | Complies |

Note: All the test values were listed in the report. For plots, only the worse case of OFDM modulation was listed in the report.

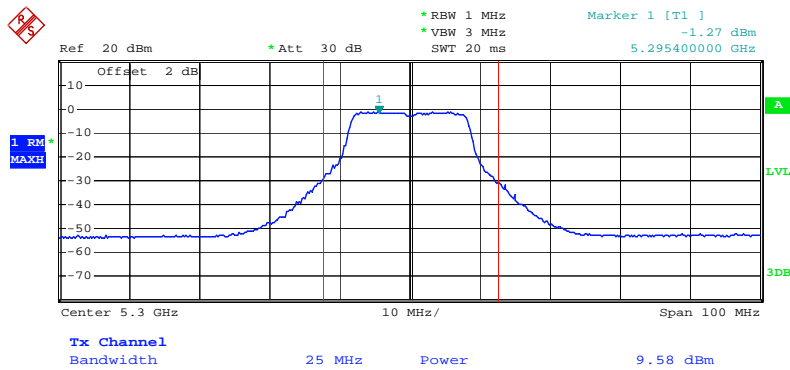
<For Antenna 1>:

Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 1-1 / 5260 MHz



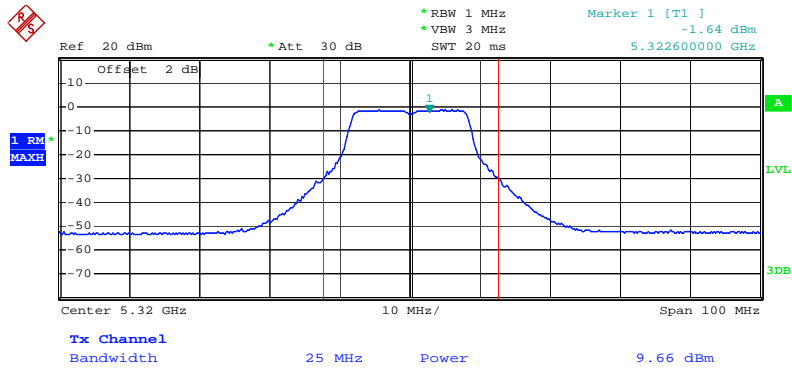
Date: 30.MAY.2010 11:38:54

Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 1-1 / 5300 MHz



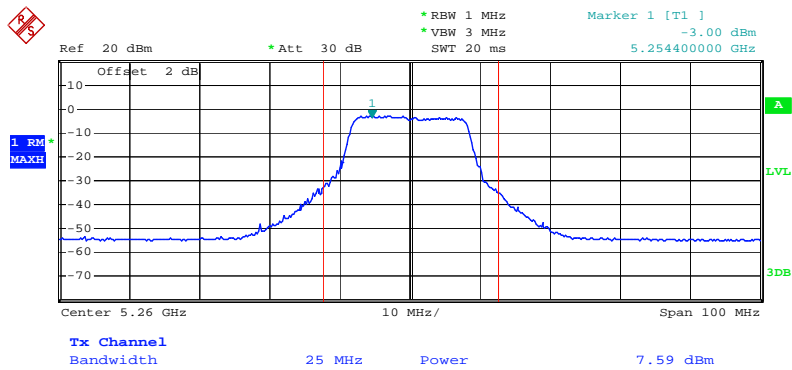
Date: 30.MAY.2010 11:43:47

Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 1-1 / 5320 MHz



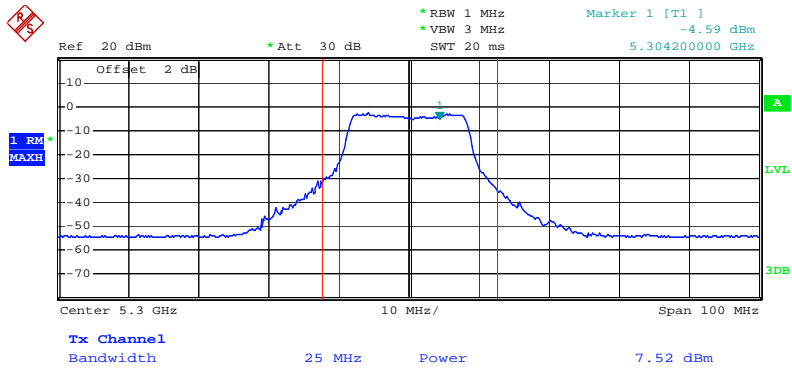
Date: 30.MAY.2010 11:44:38

Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 1-2 / 5260 MHz



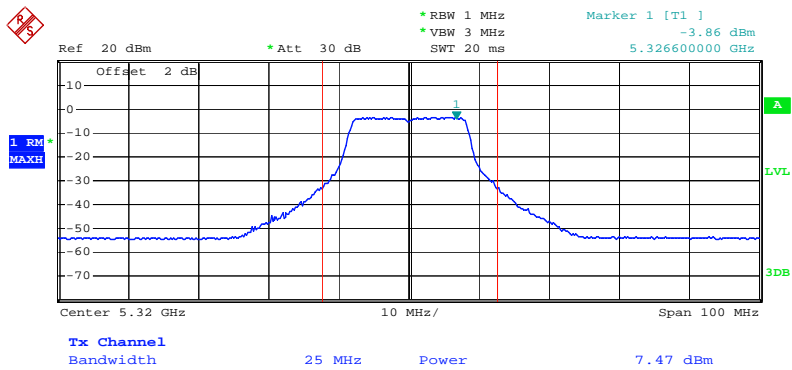
Date: 30.MAY.2010 11:39:31

Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 1-2 / 5300 MHz



Date: 30.MAY.2010 11:43:02

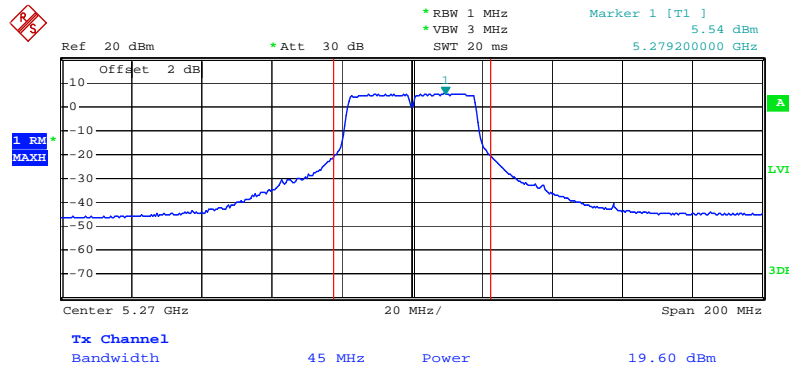
Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 1-2 / 5320 MHz



Date: 30.MAY.2010 11:45:34

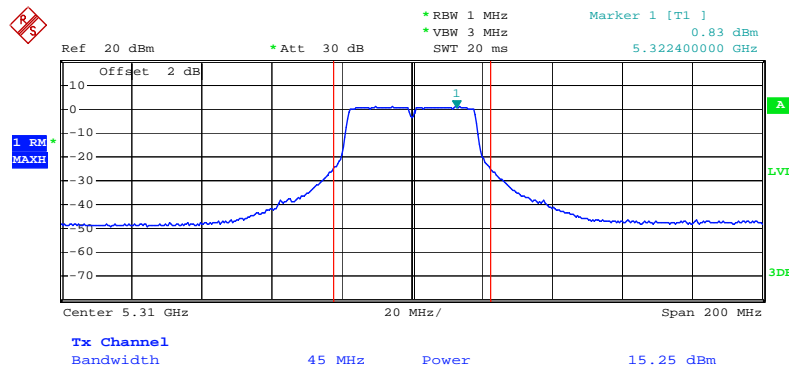
&lt;For Antenna 2&gt;:

## Conducted Output Power Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 2-1 / 5270 MHz



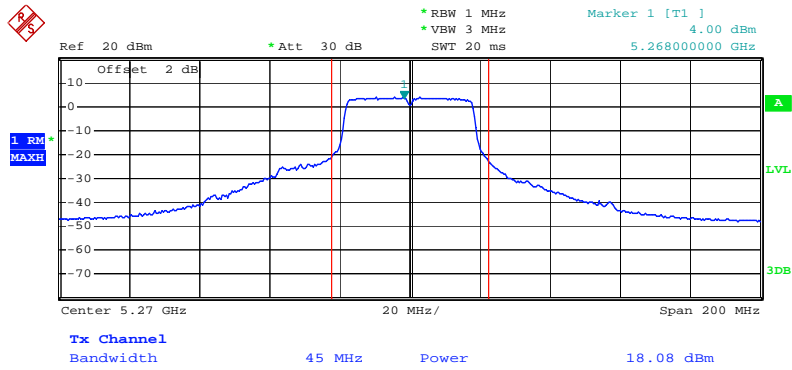
Date: 28.MAY.2010 17:22:48

## Conducted Output Power Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 2-1 / 5310 MHz



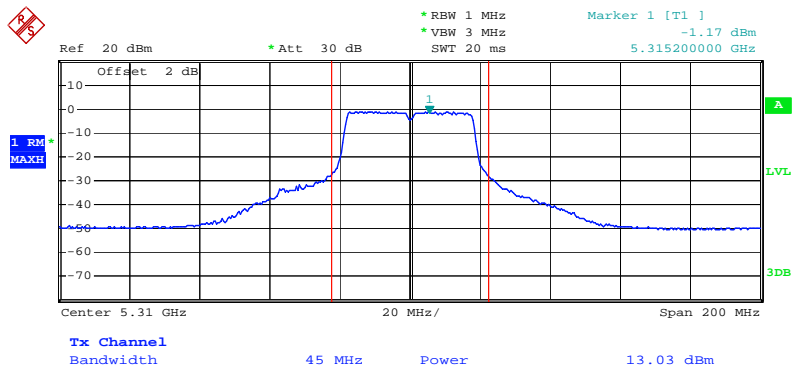
Date: 28.MAY.2010 17:18:20

**Conducted Output Power Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 2-2 / 5270 MHz**



Date: 28.MAY.2010 17:21:55

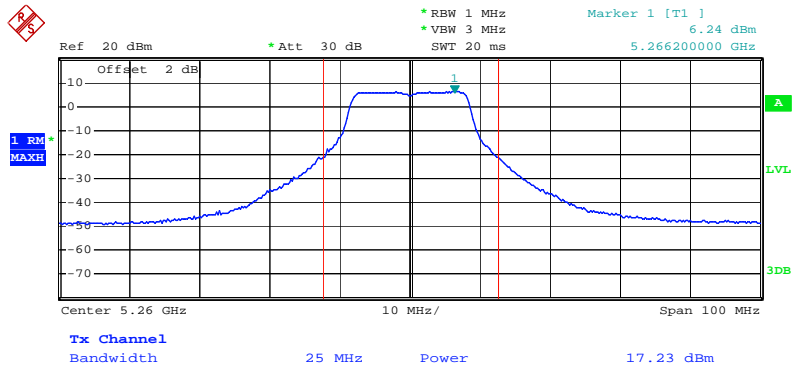
**Conducted Output Power Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 2-2 / 5310 MHz**



Date: 28.MAY.2010 17:17:44

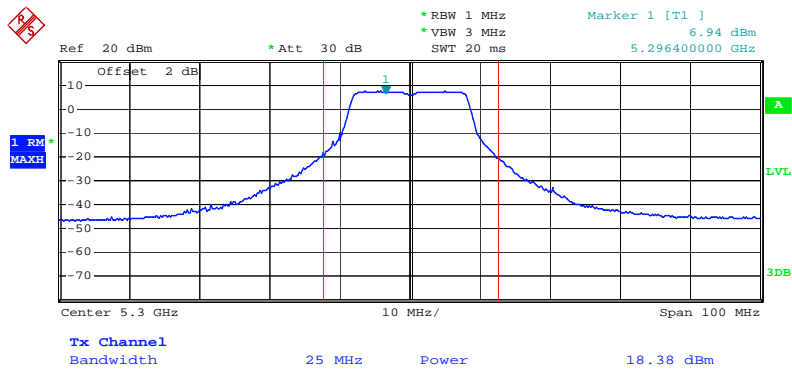
<For Antenna 3>:

Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 3-1 / 5260 MHz



Date: 30.MAY.2010 17:58:14

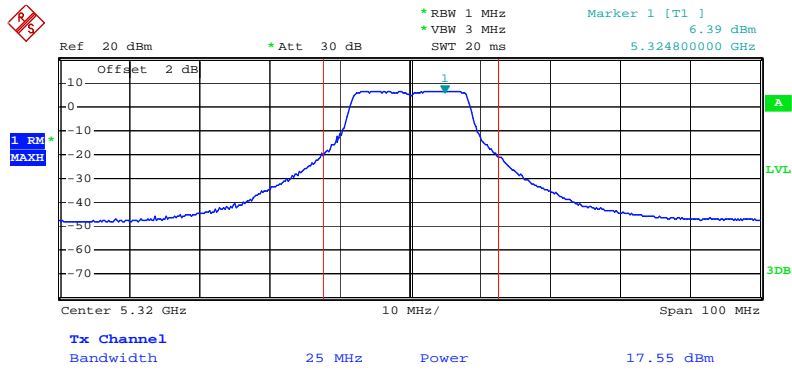
Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 3-1 / 5300 MHz



Date: 30.MAY.2010 17:55:51

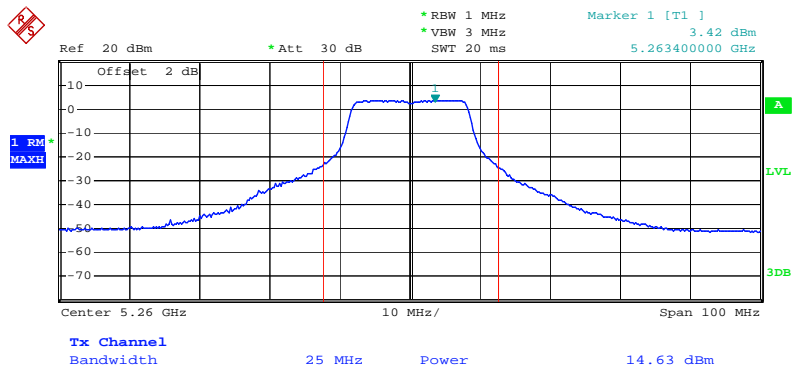


**Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 3-1 / 5320 MHz**



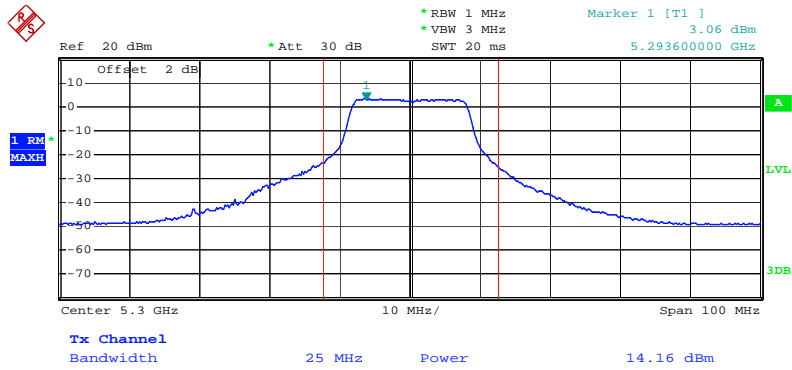
Date: 30.MAY.2010 17:52:56

**Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 3-2 / 5260 MHz**



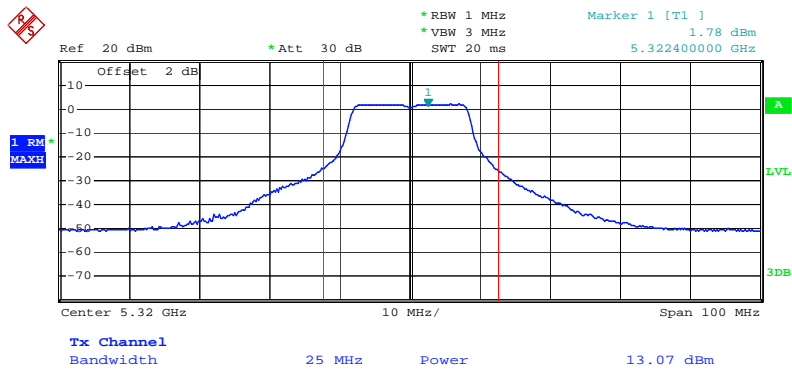
Date: 30.MAY.2010 17:57:37

**Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 3-2 / 5300 MHz**



Date: 30.MAY.2010 17:56:31

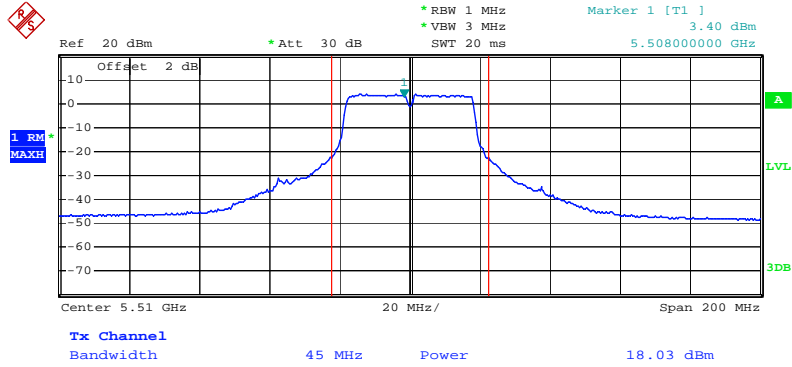
**Conducted Output Power Plot on Configuration IEEE 802.11a Ant. 3-2 / 5320 MHz**



Date: 30.MAY.2010 17:53:23

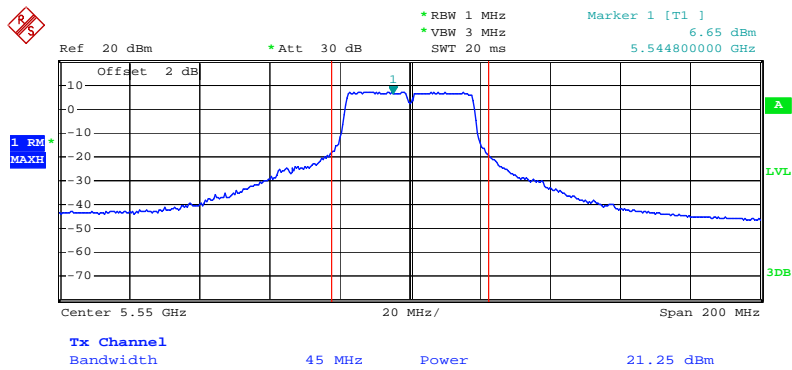
<For Antenna 4>:

Conducted Output Power Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 4-1 / 5510MHz



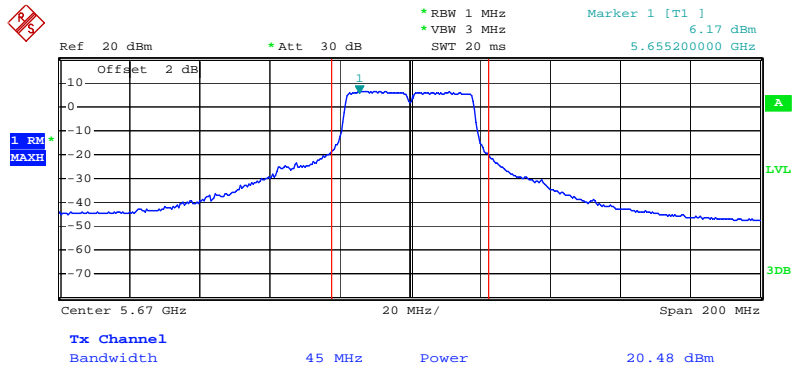
Date: 27.MAY.2010 15:21:27

Conducted Output Power Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 4-1 / 5550 MHz



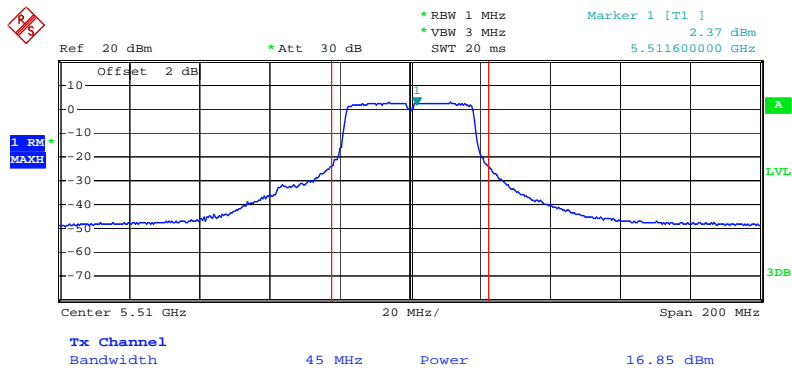
Date: 27.MAY.2010 15:19:55

**Conducted Output Power Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 4-1 / 5670 MHz**



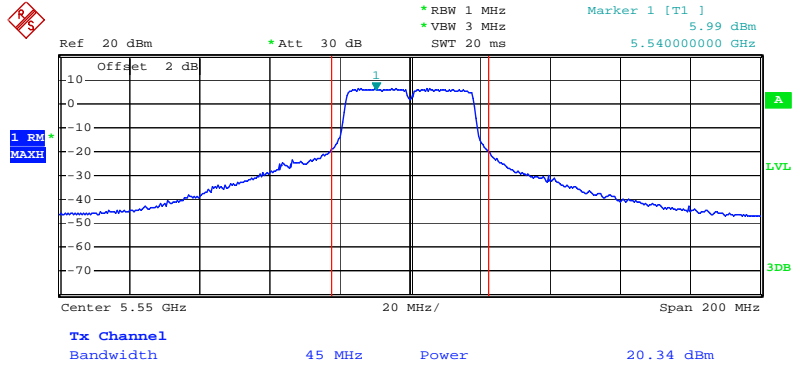
Date: 27.MAY.2010 15:17:30

**Conducted Output Power Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 4-2 / 5510 MHz**



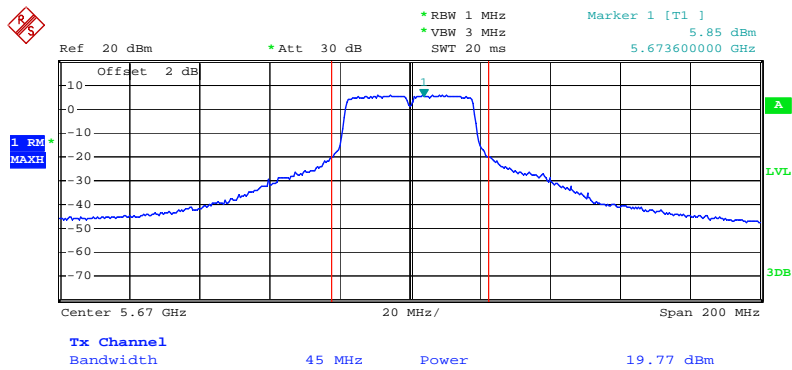
Date: 27.MAY.2010 15:22:05

**Conducted Output Power Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 4-2 / 5550 MHz**



Date: 27.MAY.2010 15:19:27

**Conducted Output Power Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 4-2 / 5670 MHz**



Date: 27.MAY.2010 15:16:46

### 4.3. Power Spectral Density Measurement

#### 4.3.1. 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 4.3.1.

<For Antenna 1>:

| Frequency Range | Power Spectral Density limit (dBm/MHz) |
|-----------------|--|
| 5.25-5.35 GHz   | -1.00                                  |

<For Antenna 2>:

| Frequency Range | Power Spectral Density limit (dBm/MHz) |
|-----------------|--|
| 5.25-5.35 GHz   | 9.00                                   |

<For Antenna 3>:

| Frequency Range | Power Spectral Density limit (dBm/MHz) |
|-----------------|--|
| 5.25-5.35 GHz   | 7.00                                   |
| 5470-5725       | 7.00                                   |

<For Antenna 4>:

| Frequency Range | Power Spectral Density limit (dBm/MHz) |
|-----------------|--|
| 5.25-5.35 GHz   | 11.00                                  |
| 5470-5725       | 11.00                                  |

#### 4.3.2. Measuring Instruments and Setting

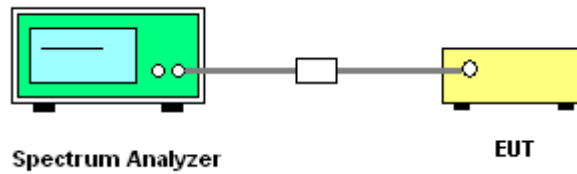
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

#### 4.3.3. Test Procedures

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

#### 4.3.4. Test Setup Layout



#### 4.3.5. Test Deviation

There is no deviation with the original standard.

#### 4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.3.7. Test Result of Power Spectral Density

<For Antenna 1>:

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11n / Antenna 1 |

##### Configuration IEEE 802.11n MCS8 40MHz Ant. 1-1 + Ant. 1-2

| Channel | Frequency | Power Density (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|---------------------|------------------|----------|
| 54      | 5270 MHz  | -9.71               | -1.00            | Complies |
| 62      | 5310 MHz  | -9.20               | -1.00            | Complies |

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11a / Antenna 1 |

##### Configuration IEEE 802.11a Ant. 1-1 + Ant. 1-2

| Channel | Frequency | Power Density (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|---------------------|------------------|----------|
| 52      | 5260 MHz  | -6.74               | -1.00            | Complies |
| 60      | 5300 MHz  | -5.93               | -1.00            | Complies |
| 64      | 5320 MHz  | -5.06               | -1.00            | Complies |

Note: All the test values were listed in the report. For plots, only the worse case of OFDM modulation was listed in the report.



<For Antenna 2>:

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11n / Antenna 2 |

Configuration IEEE 802.11n MCS8 40MHz Ant. 2-1 + Ant. 2-2

| Channel | Frequency | Power Density (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|---------------------|------------------|----------|
| 54      | 5270 MHz  | 4.16                | 9.00             | Complies |
| 62      | 5310 MHz  | 0.16                | 9.00             | Complies |

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11a / Antenna 2 |

Configuration IEEE 802.11a Ant. 2-1 + Ant. 2-2

| Channel | Frequency | Power Density (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|---------------------|------------------|----------|
| 52      | 5260 MHz  | 7.80                | 9.00             | Complies |
| 60      | 5300 MHz  | 8.15                | 9.00             | Complies |
| 64      | 5320 MHz  | 8.23                | 9.00             | Complies |

Note: All the test values were listed in the report. For plots, only the worse case of OFDM modulation was listed in the report.

<For Antenna 3>:

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11n / Antenna 3 |

Configuration IEEE 802.11n MCS8 40MHz Ant. 3-1 + Ant. 3-2

| Channel | Frequency | Power Density (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|---------------------|------------------|----------|
| 54      | 5270 MHz  | 2.98                | 7.00             | Complies |
| 62      | 5310 MHz  | 0.08                | 7.00             | Complies |
| 102     | 5510MHz   | 2.54                | 7.00             | Complies |
| 110     | 5550 MHz  | 2.61                | 7.00             | Complies |
| 134     | 5670 MHz  | 1.61                | 7.00             | Complies |

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11a / Antenna 3 |

Configuration IEEE 802.11a Ant. 3-1 + Ant. 3-2

| Channel | Frequency | Power Density (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|---------------------|------------------|----------|
| 52      | 5260 MHz  | 6.80                | 7.00             | Complies |
| 60      | 5300 MHz  | 6.47                | 7.00             | Complies |
| 64      | 5320 MHz  | 6.55                | 7.00             | Complies |
| 100     | 5500 MHz  | 6.10                | 7.00             | Complies |
| 116     | 5580 MHz  | 6.88                | 7.00             | Complies |
| 140     | 5700 MHz  | 4.65                | 7.00             | Complies |

Note: All the test values were listed in the report. For plots, only the worse case of OFDM modulation was listed in the report.

<For Antenna 4>:

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11n / Antenna 4 |

Configuration IEEE 802.11n MCS8 40MHz Ant. 4-1 + Ant. 4-2

| Channel | Frequency | Power Density (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|---------------------|------------------|----------|
| 54      | 5270 MHz  | 4.96                | 11.00            | Complies |
| 62      | 5310 MHz  | -1.57               | 11.00            | Complies |
| 102     | 5510MHz   | 2.78                | 11.00            | Complies |
| 110     | 5550 MHz  | 6.65                | 11.00            | Complies |
| 134     | 5670 MHz  | 6.24                | 11.00            | Complies |

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11a / Antenna 4 |

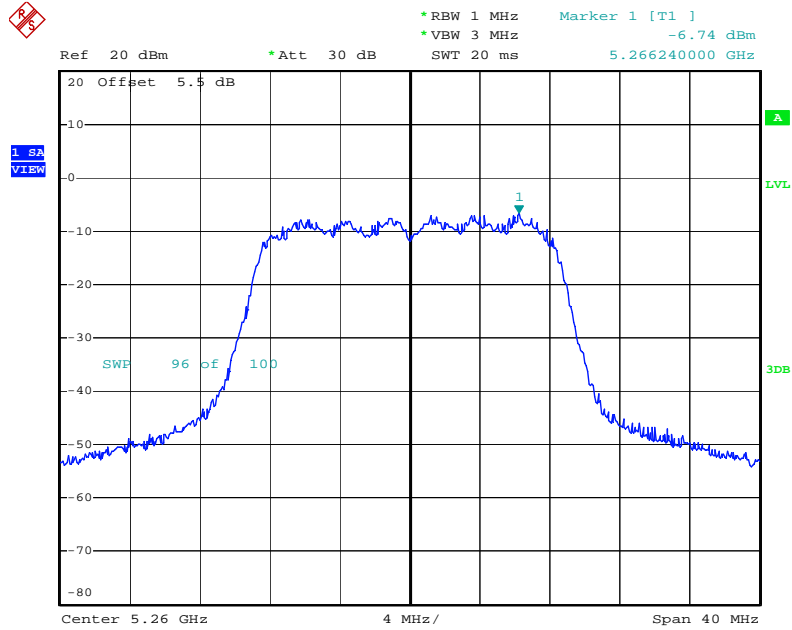
Configuration IEEE 802.11a Ant. 4-1 + Ant. 4-2

| Channel | Frequency | Power Density (dBm) | Max. Limit (dBm) | Result   |
|---------|-----------|---------------------|------------------|----------|
| 52      | 5260 MHz  | 10.20               | 11.00            | Complies |
| 60      | 5300 MHz  | 9.68                | 11.00            | Complies |
| 64      | 5320 MHz  | 5.88                | 11.00            | Complies |
| 100     | 5500 MHz  | 8.29                | 11.00            | Complies |
| 116     | 5580 MHz  | 10.80               | 11.00            | Complies |
| 140     | 5700 MHz  | 9.25                | 11.00            | Complies |

Note: All the test values were listed in the report. For plots, only the worse case of OFDM modulation was listed in the report.

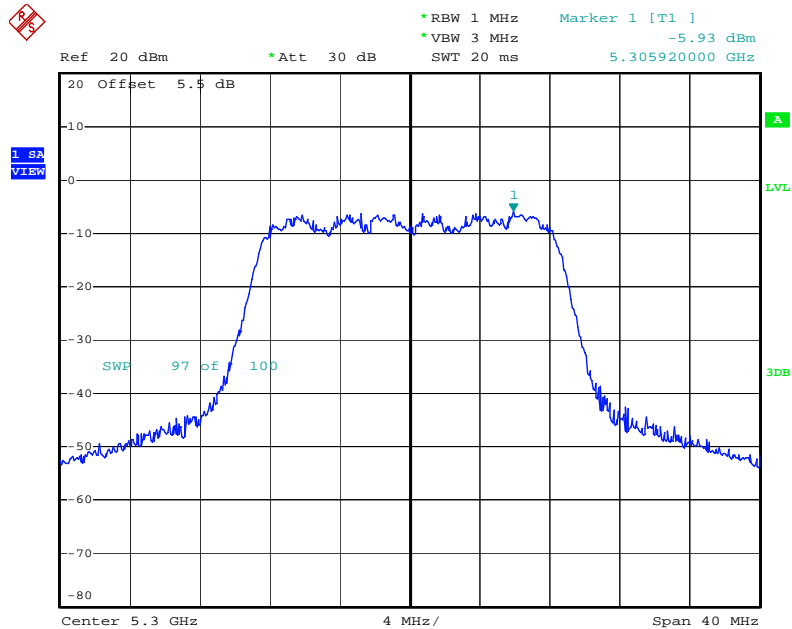
<For Antenna 1>:

Power Density Plot on Configuration IEEE 802.11a Ant. 1-1 + Ant. 1-2 / 5260 MHz



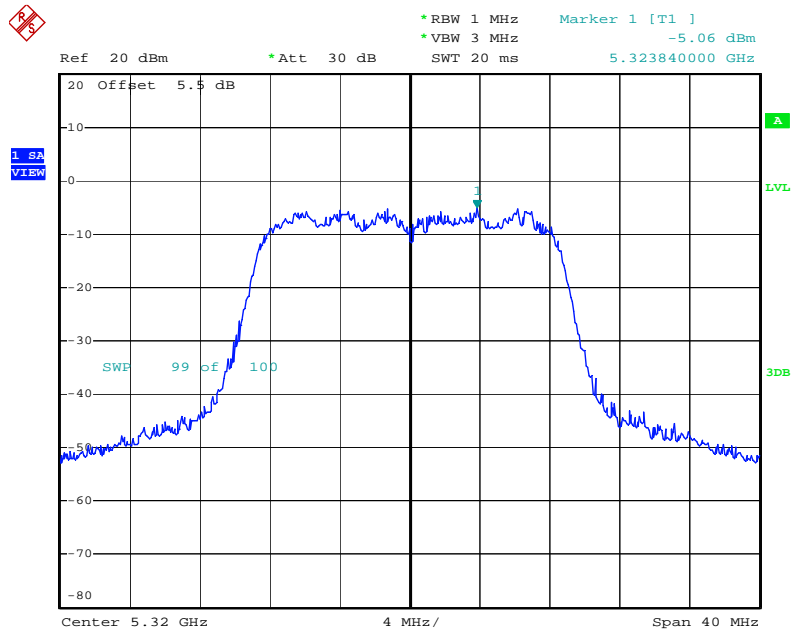
Date: 30.MAY.2010 12:21:15

Power Density Plot on Configuration IEEE 802.11a Ant. 1-1 + Ant. 1-2 / 5300 MHz



Date: 30.MAY.2010 12:19:56

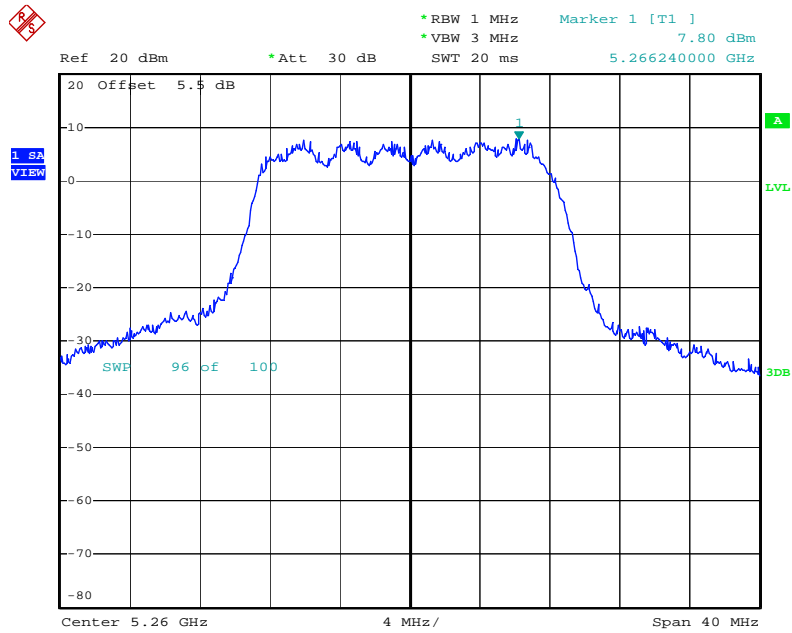
### Power Density Plot on Configuration IEEE 802.11a Ant. 1-1 + Ant. 1-2 / 5320 MHz



Date: 30.MAY.2010 12:18:56

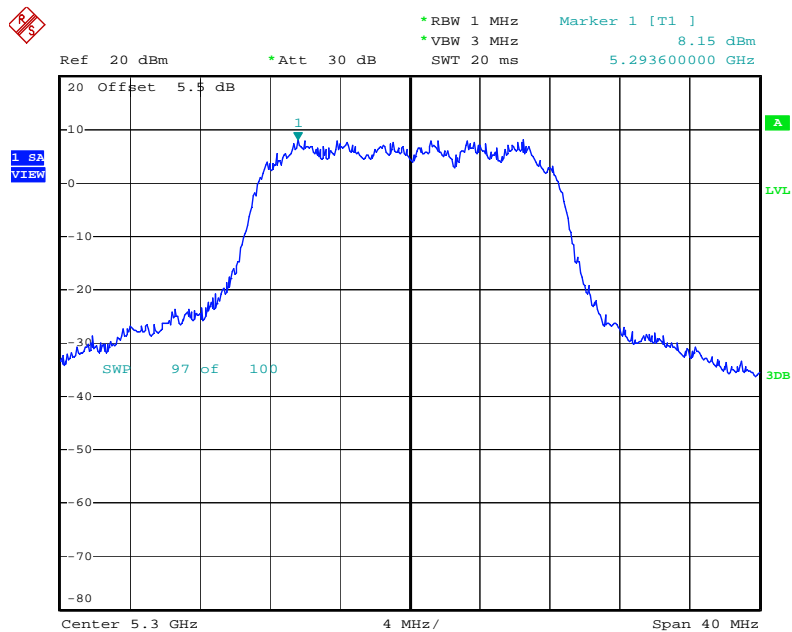
<For Antenna 2>:

Power Density Plot on Configuration IEEE 802.11a Ant. 2-1 + Ant. 2-2 / 5260 MHz



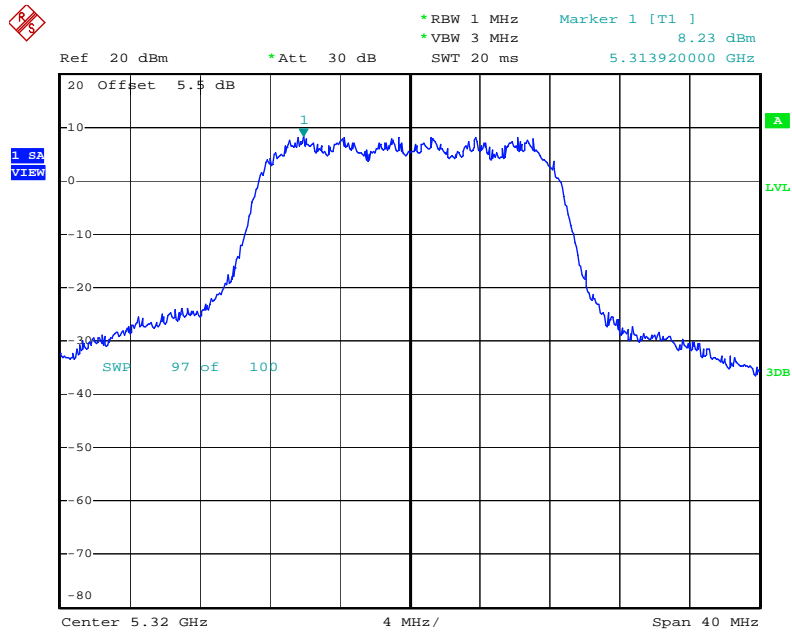
Date: 28.MAY.2010 17:34:48

Power Density Plot on Configuration IEEE 802.11a Ant. 2-1 + Ant. 2-2 / 5300 MHz



Date: 28.MAY.2010 17:33:47

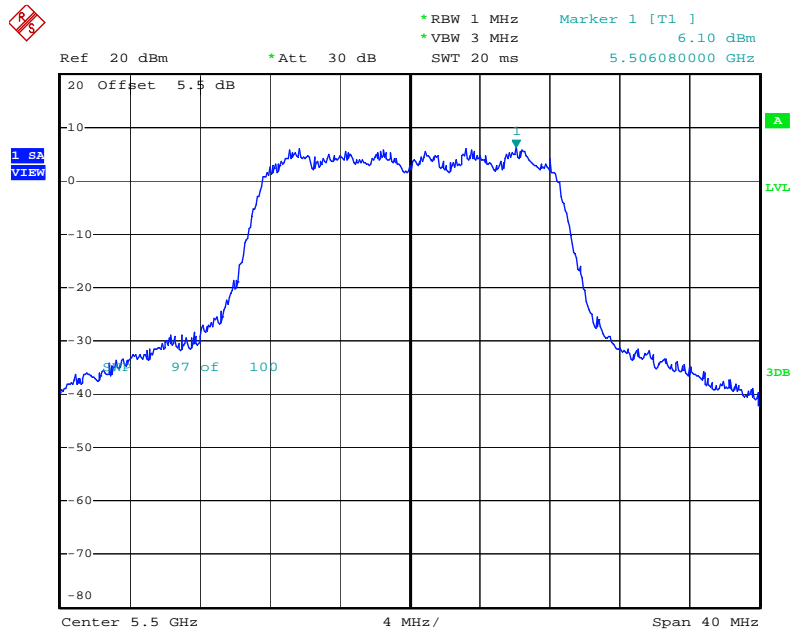
Power Density Plot on Configuration IEEE 802.11a Ant. 2-1 + Ant. 2-2 / 5320 MHz



Date: 28.MAY.2010 17:32:46

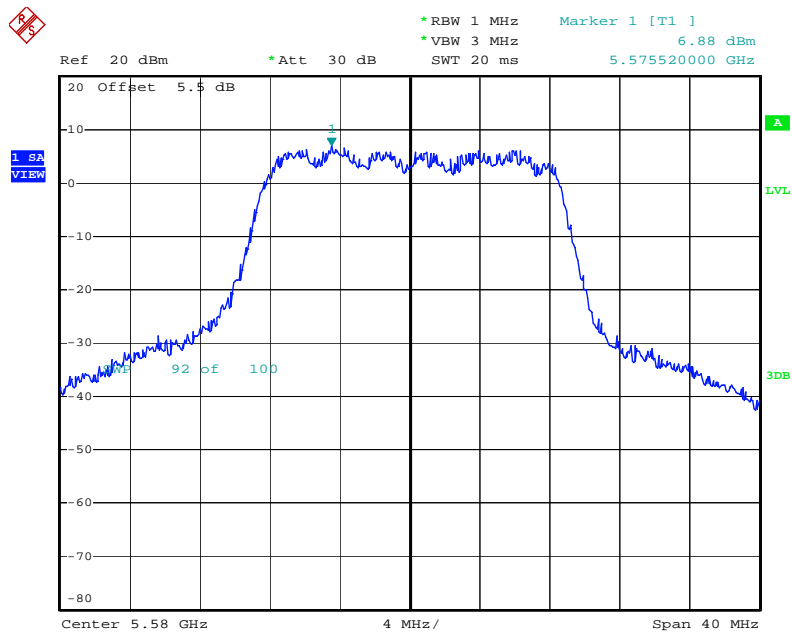
<For Antenna 3>:

Power Density Plot on Configuration IEEE 802.11a Ant. 3-1 + Ant. 3-2 / 5500 MHz



Date: 30.MAY.2010 18:49:57

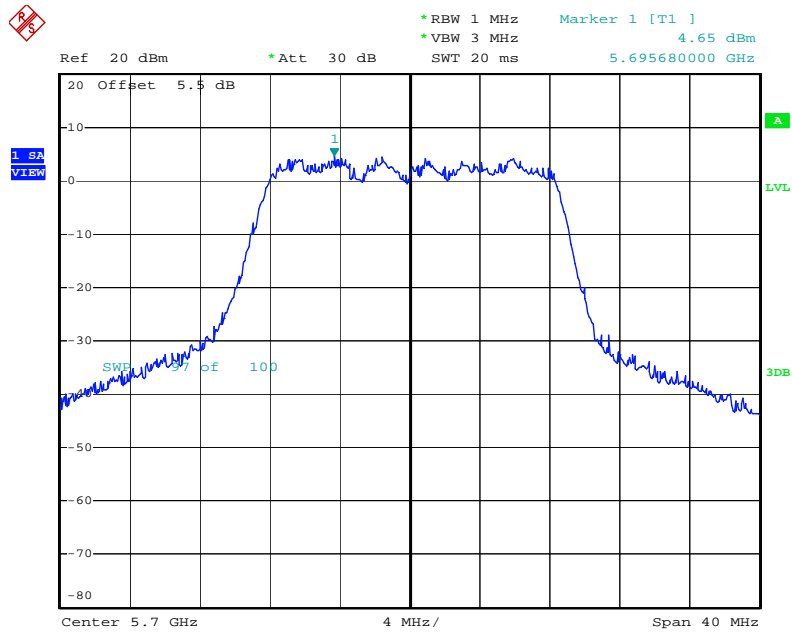
Power Density Plot on Configuration IEEE 802.11a Ant. 3-1 + Ant. 3-2 / 5580 MHz



Date: 30.MAY.2010 18:48:41



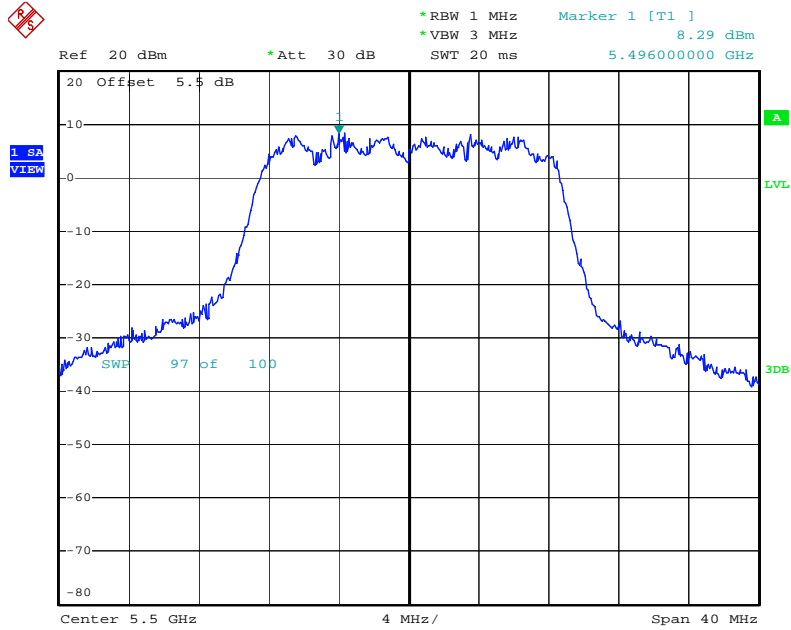
Power Density Plot on Configuration IEEE 802.11a Ant. 3-1 + Ant. 3-2 / 5700 MHz



Date: 30.MAY.2010 18:47:49

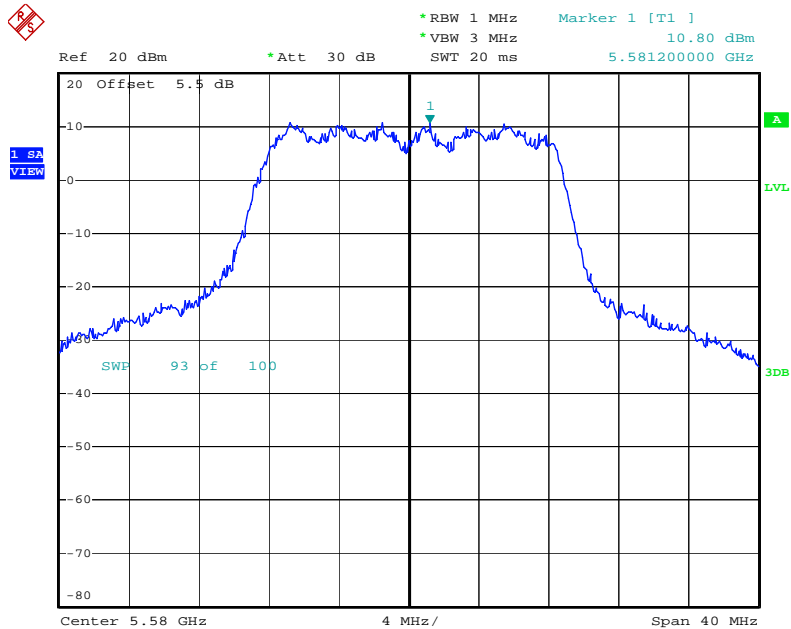
<For Antenna 4>:

**Power Density Plot on Configuration IEEE 802.11a Ant. 4-1 + Ant. 4-2 / 5500 MHz**



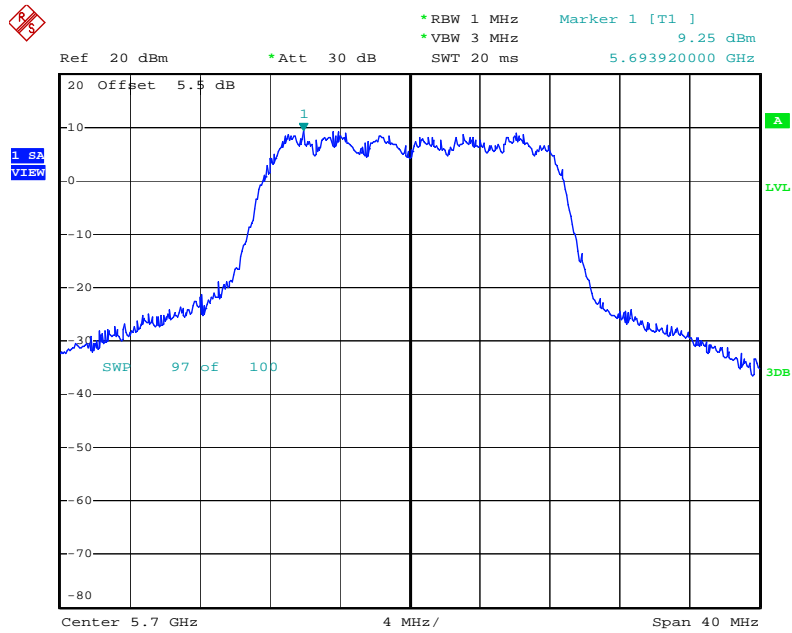
Date: 27.MAY.2010 18:05:18

**Power Density Plot on Configuration IEEE 802.11a Ant. 4-1 + Ant. 4-2 / 5580 MHz**



Date: 27.MAY.2010 18:06:45

Power Density Plot on Configuration IEEE 802.11a Ant. 4-1 + Ant. 4-2 / 5700 MHz



Date: 27.MAY.2010 18:07:48

## 4.4. Peak Excursion Measurement

### 4.4.1. 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.

### 4.4.2. Measuring Instruments and Setting

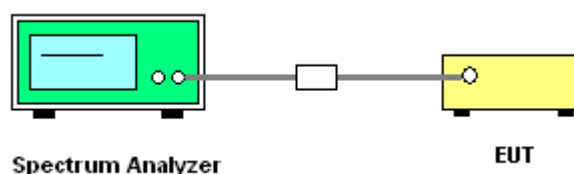
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

### 4.4.3. 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  $\geq 3$  MHz with peak detector and max-hold settings.
4. Average Trace: Method #3—video averaging with max hold--and sum power across the band. Set span to encompass the entire emissions bandwidth (EBW) of the signal. Set sweep trigger to "free run". Set RBW = 1 MHz. Set VBW  $\geq 1/T$  (IEEE 802.11n VBW = 300kHz  $\geq 1/4\mu$ s). Use sample detector mode if bin width (i.e., span/number of points in spectrum)  $< 0.5$  RBW. Otherwise use peak detector mode. Set max hold. Allow max hold to run for 60 seconds.
5. Measuring multiple antennas, the connector is required to link with spectrum analyzer through a combiner.

### 4.4.4. Test Setup Layout



#### 4.4.5. Test Deviation

There is no deviation with the original standard.

#### 4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.4.7. Test Result of Peak Excursion

<For Antenna 1>:

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11n / Antenna 1 |

##### Configuration IEEE 802.11n MCS8 40MHz Ant. 1-1 + Ant. 1-2

| Channel | Frequency | Peak Excursion (dB) | Max. Limit (dB) | Result   |
|---------|-----------|---------------------|-----------------|----------|
| 54      | 5270 MHz  | 6.50                | 13              | Complies |
| 62      | 5310 MHz  | 7.02                | 13              | Complies |

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11a / Antenna 1 |

##### Configuration IEEE 802.11a Ant. 1-1 + Ant. 1-2

| Channel | Frequency | Peak Excursion (dB) | Max. Limit (dB) | Result   |
|---------|-----------|---------------------|-----------------|----------|
| 52      | 5260 MHz  | 5.98                | 13              | Complies |
| 60      | 5300 MHz  | 6.61                | 13              | Complies |
| 64      | 5320 MHz  | 5.56                | 13              | Complies |

<For Antenna 2>:

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11n / Antenna 2 |

Configuration IEEE 802.11n MCS8 40MHz Ant. 2-1 + Ant. 2-2

| Channel | Frequency | Peak Excursion (dB) | Max. Limit (dB) | Result   |
|---------|-----------|---------------------|-----------------|----------|
| 54      | 5270 MHz  | 5.58                | 13              | Complies |
| 62      | 5310 MHz  | 5.75                | 13              | Complies |

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11a / Antenna 2 |

Configuration IEEE 802.11a Ant. 2-1 + Ant. 2-2

| Channel | Frequency | Peak Excursion (dB) | Max. Limit (dB) | Result   |
|---------|-----------|---------------------|-----------------|----------|
| 52      | 5260 MHz  | 4.65                | 13              | Complies |
| 60      | 5300 MHz  | 4.64                | 13              | Complies |
| 64      | 5320 MHz  | 4.63                | 13              | Complies |

<For Antenna 3>:

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11n / Antenna 3 |

Configuration IEEE 802.11n MCS8 40MHz Ant. 3-1 + Ant. 3-2

| Channel | Frequency | Peak Excursion (dB) | Max. Limit (dB) | Result   |
|---------|-----------|---------------------|-----------------|----------|
| 54      | 5270 MHz  | 5.88                | 13              | Complies |
| 62      | 5310 MHz  | 5.50                | 13              | Complies |
| 102     | 5510MHz   | 5.50                | 13              | Complies |
| 110     | 5550 MHz  | 5.61                | 13              | Complies |
| 134     | 5670 MHz  | 5.71                | 13              | Complies |

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11a / Antenna 3 |

Configuration IEEE 802.11a Ant. 3-1 + Ant. 3-2

| Channel | Frequency | Peak Excursion (dB) | Max. Limit (dB) | Result   |
|---------|-----------|---------------------|-----------------|----------|
| 52      | 5260 MHz  | 5.57                | 13              | Complies |
| 60      | 5300 MHz  | 4.31                | 13              | Complies |
| 64      | 5320 MHz  | 5.08                | 13              | Complies |
| 100     | 5500 MHz  | 5.47                | 13              | Complies |
| 116     | 5580 MHz  | 4.83                | 13              | Complies |
| 140     | 5700 MHz  | 5.23                | 13              | Complies |

<For Antenna 4>:

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11n / Antenna 4 |

Configuration IEEE 802.11n MCS8 40MHz Ant. 4-1 + Ant. 4-2

| Channel | Frequency | Peak Excursion (dB) | Max. Limit (dB) | Result   |
|---------|-----------|---------------------|-----------------|----------|
| 54      | 5270 MHz  | 4.85                | 13              | Complies |
| 62      | 5310 MHz  | 6.23                | 13              | Complies |
| 102     | 5510MHz   | 5.01                | 13              | Complies |
| 110     | 5550 MHz  | 5.46                | 13              | Complies |
| 134     | 5670 MHz  | 5.27                | 13              | Complies |

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11a / Antenna 4 |

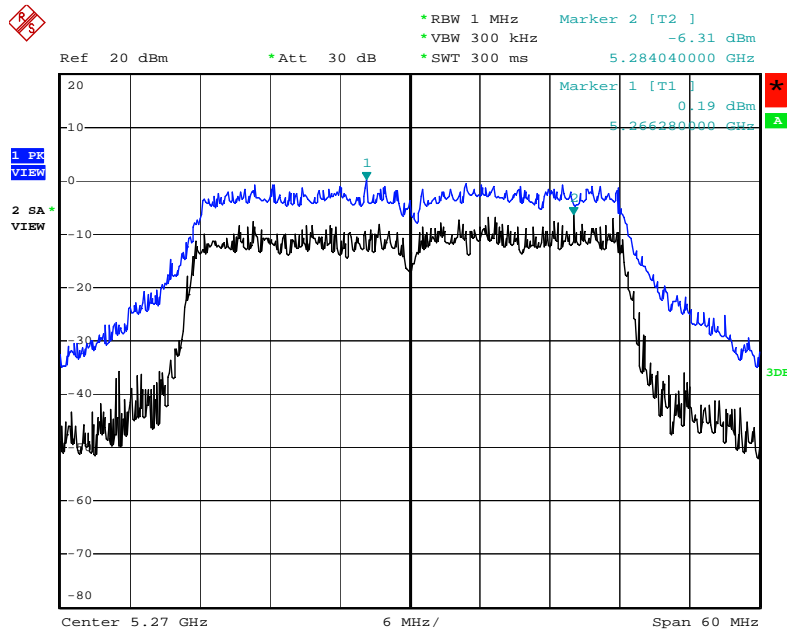
Configuration IEEE 802.11a Ant. 4-1 + Ant. 4-2

| Channel | Frequency | Peak Excursion (dB) | Max. Limit (dB) | Result   |
|---------|-----------|---------------------|-----------------|----------|
| 52      | 5260 MHz  | 5.78                | 13              | Complies |
| 60      | 5300 MHz  | 4.66                | 13              | Complies |
| 64      | 5320 MHz  | 5.74                | 13              | Complies |
| 100     | 5500 MHz  | 6.19                | 13              | Complies |
| 116     | 5580 MHz  | 5.13                | 13              | Complies |
| 140     | 5700 MHz  | 4.98                | 13              | Complies |



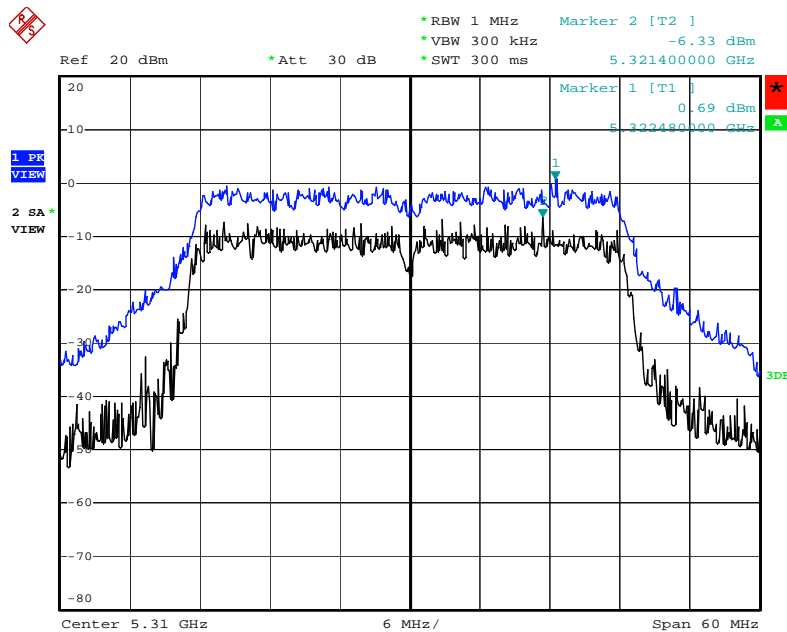
<For Antenna 1>:

Peak Excursion Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 1-1 + Ant. 1-2 / 5270 MHz



Date: 30.MAY.2010 12:15:11

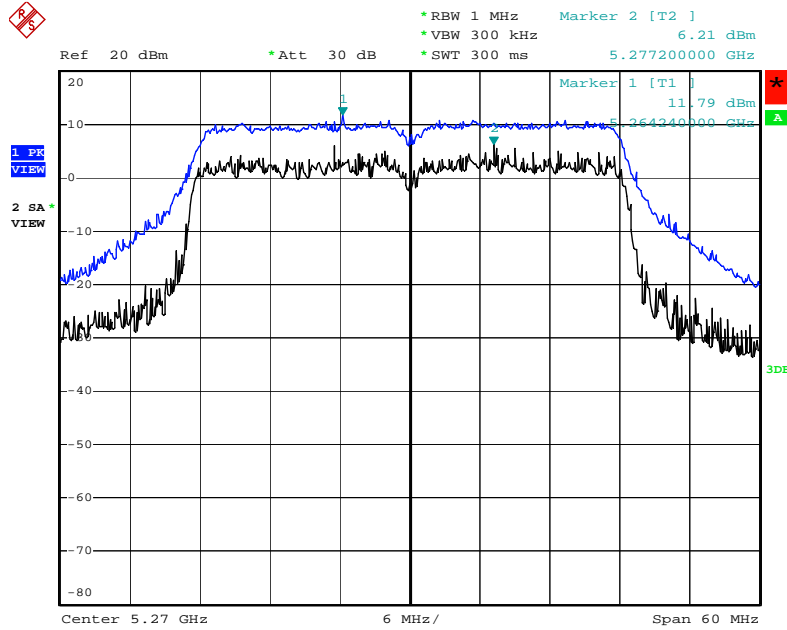
Peak Excursion Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 1-1 + Ant. 1-2 / 5310 MHz



Date: 30.MAY.2010 12:17:20

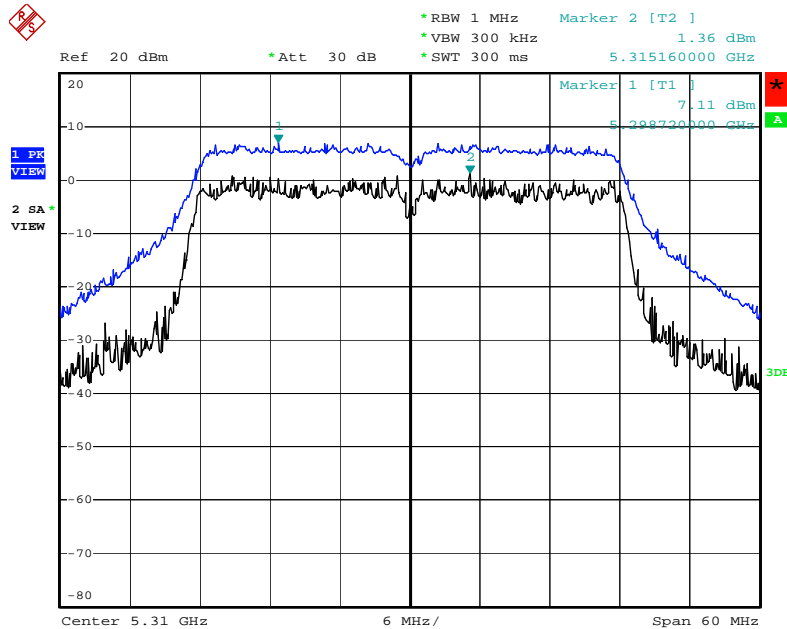
<For Antenna 2>:

Peak Excursion Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 2-1 + Ant. 2-2 / 5270 MHz



Date: 28.MAY.2010 17:26:49

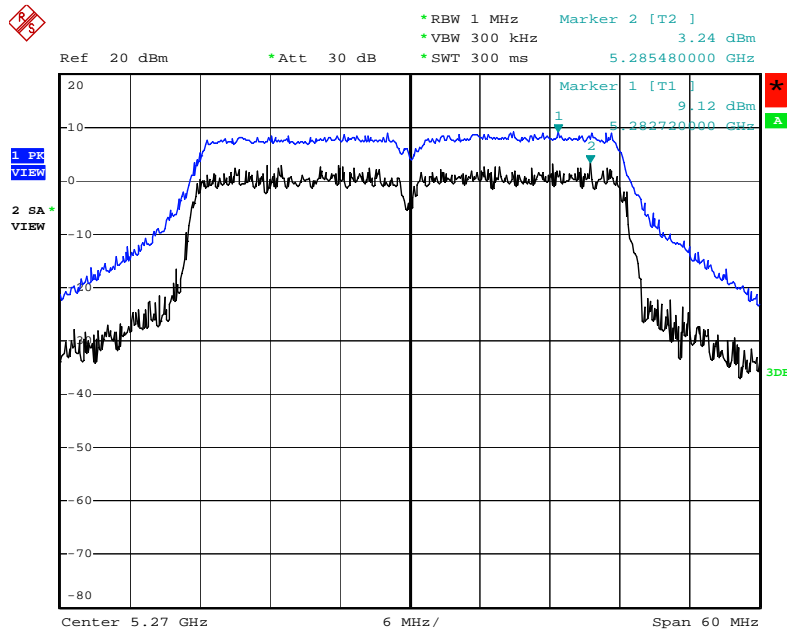
Peak Excursion Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 2-1 + Ant. 2-2 / 5310 MHz



Date: 28.MAY.2010 17:31:19

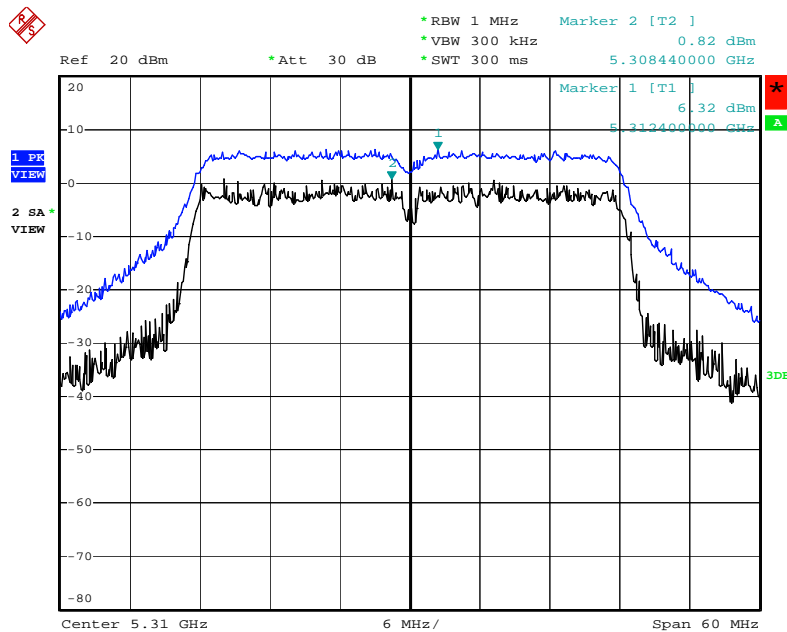
<For Antenna 3>:

Peak Excursion Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 3-1 + Ant. 3-2 / 5270 MHz



Date: 30.MAY.2010 18:42:07

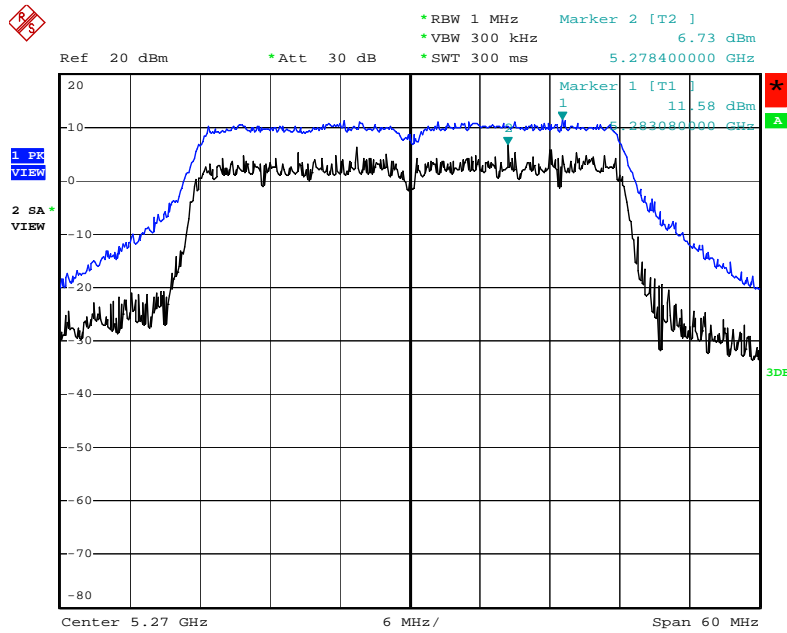
Peak Excursion Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 3-1 + Ant. 3-2 / 5310 MHz



Date: 30.MAY.2010 18:43:49

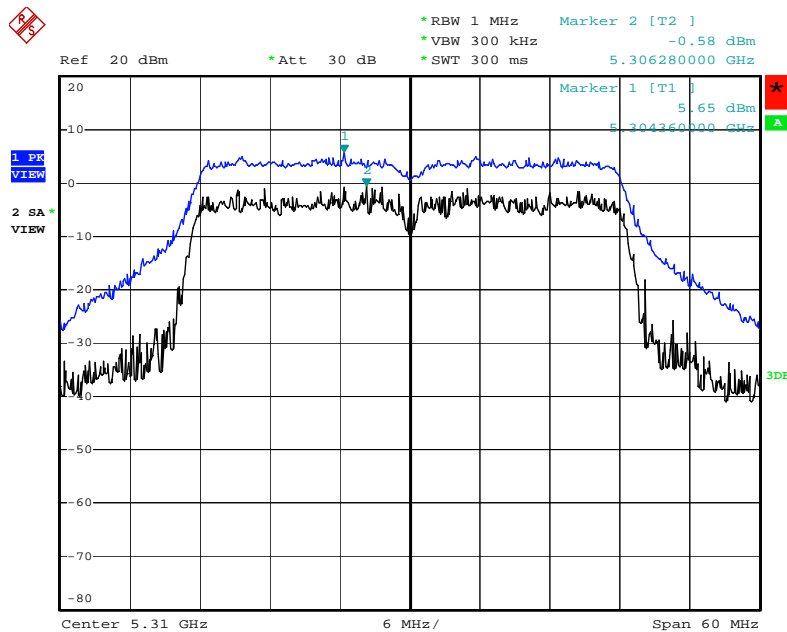
<For Antenna 4>:

Peak Excursion Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 4-1 + Ant. 4-2 / 5270 MHz



Date: 27.MAY.2010 17:46:08

Peak Excursion Plot on Configuration IEEE 802.11n MCS8 40MHz Ant. 4-1 + Ant. 4-2 / 5310 MHz



Date: 27.MAY.2010 17:44:52

## 4.5. Radiated Emissions Measurement

### 4.5.1. Limit

For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.25-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.470-5.725 GHz band: all emissions outside of the 5.470-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

| Frequencies<br>(MHz) | Field Strength<br>(micровolts/meter) | Measurement Distance<br>(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                                |

### 4.5.2. Measuring Instruments and Setting

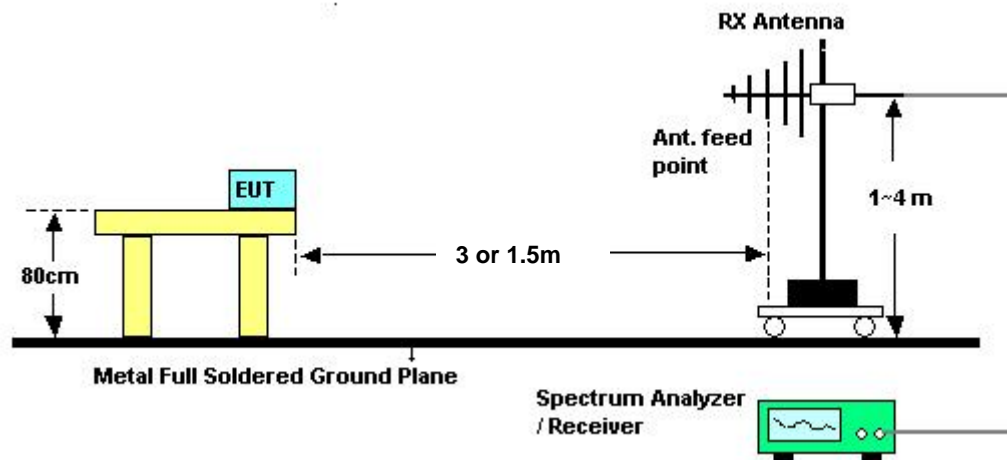
Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

| 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 |

#### 4.5.3. 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.

#### 4.5.4. Test Setup Layout



Above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1.5m.

Distance extrapolation factor =  $20 \log(\text{specific distance [3m]} / \text{test distance [1.5m]})$  (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

#### 4.5.5. Test Deviation

There is no deviation with the original standard.

#### 4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.5.7. Results for Radiated Emissions (1GHz~40GHz)

<For Antenna 1 >:

|               |              |                |  |
|---------------|--------------|----------------|--|
| Temperature   | 23°C         | Humidity       | 60%  |
| Test Engineer | Alan Huang   | Configurations | IEEE 802.11n MCS8 40MHz Ch 54<br>/ Mode 1 (Ant. 1) |
| Test Date     | May 25, 2010 |                |  |

##### Horizontal

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |            |
| 1 | 10540.02 | 64.79  | 94.00      | -29.21     | 56.79      | 5.09       | 38.39          | 35.48         | 163   | 100   | Peak    | HORIZONTAL |
| 2 | 10540.03 | 49.78  | 74.00      | -24.22     | 41.78      | 5.09       | 38.39          | 35.48         | 163   | 100   | Average | HORIZONTAL |

##### Vertical

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 10539.97 | 56.92  | 74.00      | -17.08     | 48.92      | 5.09       | 38.39          | 35.48         | 149   | 100   | Average | VERTICAL  |
| 2 | 10539.99 | 71.89  | 94.00      | -22.11     | 63.89      | 5.09       | 38.39          | 35.48         | 149   | 100   | Peak    | VERTICAL  |



|                      |              |                       |  |
|----------------------|--------------|-----------------------|--|
| <b>Temperature</b>   | 25.6°C       | <b>Humidity</b>       | 56%  |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11n MCS8 40MHz Ch 62<br>/ Mode 1 (Ant. 1) |
| <b>Test Date</b>     | May 25, 2010 |                       |  |

**Horizontal**

|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Antenna | Preamp | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|--------|--------|-------|-------|---------|--------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | Loss  | Factor  | Factor | deg   | cm    |         |            |
| 1 | 10620.00 | 38.69  | 60.00  | -21.31 | 30.62 | 5.11  | 38.38   | 35.42  | 149   | 100   | Average | HORIZONTAL |
| 2 | 10620.00 | 68.89  | 94.00  | -25.11 | 60.89 | 5.09  | 38.39   | 35.48  | 149   | 100   | Peak    | HORIZONTAL |

**Vertical**

|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Antenna | Preamp | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|--------|--------|-------|-------|---------|--------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | Loss  | Factor  | Factor | deg   | cm    |         |           |
| 1 | 10620.00 | 56.69  | 74.00  | -17.31 | 48.69 | 5.09  | 38.39   | 35.48  | 149   | 100   | Average | VERTICAL  |
| 2 | 10620.00 | 71.89  | 94.00  | -22.11 | 63.89 | 5.09  | 38.39   | 35.48  | 149   | 100   | Peak    | VERTICAL  |

|                      |              |                       |                                      |
|----------------------|--------------|-----------------------|--------------------------------------|
| <b>Temperature</b>   | 25.6°C       | <b>Humidity</b>       | 56%                                  |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11a Ch 52 / Mode 1 (Ant. 1) |
| <b>Test Date</b>     | May 25, 2010 |                       |                                      |

### Horizontal

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |            |
| 1 | 10519.97 | 58.20  | 74.00      | -15.80     | 50.22      | 5.08              | 38.40          | 35.50         | 142   | 100   | Average | HORIZONTAL |
| 2 | 10519.98 | 71.19  | 94.00      | -22.81     | 63.21      | 5.08              | 38.40          | 35.50         | 142   | 100   | Peak    | HORIZONTAL |

### Vertical

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 10520.00 | 77.95  | 94.00      | -16.05     | 69.98      | 5.08              | 38.39          | 35.50         | 151   | 100   | Peak    | VERTICAL  |
| 2 | 10520.03 | 62.59  | 74.00      | -11.41     | 54.62      | 5.08              | 38.39          | 35.50         | 151   | 100   | Average | VERTICAL  |

|                      |              |                       |                                 |
|----------------------|--------------|-----------------------|---------------------------------|
| <b>Temperature</b>   | 25.6°C       | <b>Humidity</b>       | 56%                             |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | 802.11a Ch 60 / Mode 1 (Ant. 1) |
| <b>Test Date</b>     | May 25, 2010 |                       |                                 |

### Horizontal

|   | Freq     | Level  | Limit  | Over   | Read  | CableAntenna | Preamp | T/Pos | A/Pos | Remark      | Pol/Phase  |
|---|----------|--------|--------|--------|-------|--------------|--------|-------|-------|-------------|------------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | dB           | dB/m   | dB    | deg   | cm          |            |
| 1 | 10600.01 | 55.29  | 60.00  | -4.71  | 47.22 | 5.11         | 38.38  | 35.42 | 146   | 100 Average | HORIZONTAL |
| 2 | 10600.01 | 69.56  | 80.00  | -10.44 | 61.49 | 5.11         | 38.38  | 35.42 | 146   | 100 Peak    | HORIZONTAL |

### Vertical

|   | Freq     | Level  | Limit  | Over   | Read  | CableAntenna | Preamp | T/Pos | A/Pos | Remark      | Pol/Phase |
|---|----------|--------|--------|--------|-------|--------------|--------|-------|-------|-------------|-----------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | dB           | dB/m   | dB    | deg   | cm          |           |
| 1 | 10600.00 | 51.41  | 60.00  | -8.59  | 43.34 | 5.11         | 38.38  | 35.42 | 113   | 100 Average | VERTICAL  |
| 2 | 10600.01 | 65.95  | 80.00  | -14.05 | 57.88 | 5.11         | 38.38  | 35.42 | 113   | 100 Peak    | VERTICAL  |

|                      |              |                       |                                      |
|----------------------|--------------|-----------------------|--------------------------------------|
| <b>Temperature</b>   | 25.6°C       | <b>Humidity</b>       | 56%                                  |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11a Ch 64 / Mode 1 (Ant. 1) |
| <b>Test Date</b>     | May 25, 2010 |                       |                                      |

#### Horizontal

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |            |
| 1 | 10639.97 | 50.94  | 60.00      | -9.06      | 42.84      | 5.12       | 38.37          | 35.39         | 148   | 100   | Average | HORIZONTAL |
| 2 | 10639.99 | 62.27  | 80.00      | -17.73     | 54.17      | 5.12       | 38.37          | 35.39         | 148   | 100   | Peak    | HORIZONTAL |

#### Vertical

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 10639.97 | 56.98  | 60.00      | -3.02      | 48.88      | 5.12       | 38.37          | 35.39         | 130   | 100   | Average | VERTICAL  |
| 2 | 10640.00 | 71.23  | 80.00      | -8.77      | 63.13      | 5.12       | 38.37          | 35.39         | 130   | 100   | Peak    | VERTICAL  |

#### Note:

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

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

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

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1.5m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

<For Mode 2 (Ant. 2)>:

|                      |              |                       |  |
|----------------------|--------------|-----------------------|--|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%  |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11n MCS8 40MHz Ch 54<br>/ Mode 2 (Ant. 2) |
| <b>Test Date</b>     | May 25, 2010 |                       |  |

**Horizontal**

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |            |
| 1 | 10540.04 | 70.08  | 94.00      | -23.92     | 62.08      | 5.09       | 38.39          | 35.48         | 160   | 100   | Peak    | HORIZONTAL |
| 2 | 10540.80 | 51.71  | 74.00      | -22.29     | 43.71      | 5.09       | 38.39          | 35.48         | 160   | 100   | Average | HORIZONTAL |

**Vertical**

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 10539.20 | 57.05  | 74.00      | -16.95     | 49.05      | 5.09       | 38.39          | 35.48         | 196   | 124   | Average | VERTICAL  |
| 2 | 10539.96 | 72.14  | 94.00      | -21.86     | 64.14      | 5.09       | 38.39          | 35.48         | 196   | 124   | Peak    | VERTICAL  |

|                      |              |                       |  |
|----------------------|--------------|-----------------------|--|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%  |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11n MCS8 40MHz Ch 62<br>/ Mode 2 (Ant. 2) |
| <b>Test Date</b>     | May 25, 2010 |                       |  |

### Horizontal

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |            |
| 1 | 10620.12 | 57.09  | 80.00      | -22.91     | 49.02      | 5.11              | 38.38          | 35.42         | 157   | 100   | Peak    | HORIZONTAL |
| 2 | 10620.48 | 41.25  | 60.00      | -18.75     | 33.18      | 5.11              | 38.38          | 35.42         | 157   | 100   | Average | HORIZONTAL |

### Vertical

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 10620.00 | 45.05  | 60.00      | -14.95     | 36.98      | 5.11              | 38.38          | 35.42         | 191   | 126   | Average | VERTICAL  |
| 2 | 10620.52 | 59.99  | 80.00      | -20.01     | 51.92      | 5.11              | 38.38          | 35.42         | 191   | 126   | Peak    | VERTICAL  |

### Note:

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

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

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

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1.5m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

|                      |              |                       |                                      |
|----------------------|--------------|-----------------------|--------------------------------------|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%                                  |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11a Ch 52 / Mode 2 (Ant. 2) |
| <b>Test Date</b>     | May 25, 2010 |                       |                                      |

### Horizontal

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |            |
| 1 | 10517.84 | 71.56  | 94.00      | -22.44     | 63.58      | 5.08              | 38.40          | 35.50         | 160   | 107   | Peak    | HORIZONTAL |
| 2 | 10517.88 | 56.61  | 74.00      | -17.39     | 48.63      | 5.08              | 38.40          | 35.50         | 160   | 107   | Average | HORIZONTAL |

### Vertical

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 10512.28 | 76.09  | 94.00      | -17.91     | 68.12      | 5.08              | 38.39          | 35.50         | 179   | 100   | Peak    | VERTICAL  |
| 2 | 10517.24 | 62.10  | 74.00      | -11.90     | 54.13      | 5.08              | 38.39          | 35.50         | 179   | 100   | Average | VERTICAL  |

|                      |              |                       |                                      |
|----------------------|--------------|-----------------------|--------------------------------------|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%                                  |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11a Ch 60 / Mode 2 (Ant. 2) |
| <b>Test Date</b>     | May 25, 2010 |                       |                                      |

**Horizontal**

|   | Freq     | Level  | Limit  | Over   | Read  | CableAntenna | Preamp | T/Pos | A/Pos | Remark | Pol/Phase |            |
|---|----------|--------|--------|--------|-------|--------------|--------|-------|-------|--------|-----------|------------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | dB           | dB/m   | dB    | deg   | cm     |           |            |
| 1 | 10601.84 | 52.56  | 60.00  | -7.44  | 44.49 | 5.11         | 38.38  | 35.42 | 160   | 100    | Average   | HORIZONTAL |
| 2 | 10602.33 | 67.39  | 80.00  | -12.61 | 59.32 | 5.11         | 38.38  | 35.42 | 160   | 100    | Peak      | HORIZONTAL |

**Vertical**

|   | Freq     | Level  | Limit  | Over  | Read  | CableAntenna | Preamp | T/Pos | A/Pos | Remark | Pol/Phase |          |
|---|----------|--------|--------|-------|-------|--------------|--------|-------|-------|--------|-----------|----------|
|   | MHz      | dBuV/m | dBuV/m | dB    | dBuV  | dB           | dB/m   | dB    | deg   | cm     |           |          |
| 1 | 10601.68 | 59.84  | 60.00  | -0.16 | 51.77 | 5.11         | 38.38  | 35.42 | 179   | 112    | Average   | VERTICAL |
| 2 | 10601.92 | 75.19  | 80.00  | -4.81 | 67.12 | 5.11         | 38.38  | 35.42 | 179   | 112    | Peak      | VERTICAL |



|                      |              |                       |                                      |
|----------------------|--------------|-----------------------|--------------------------------------|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%                                  |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11a Ch 64 / Mode 2 (Ant. 2) |
| <b>Test Date</b>     | May 25, 2010 |                       |                                      |

### Horizontal

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |            |
| 1 | 10641.72 | 51.10  | 60.00      | -8.90      | 43.00      | 5.12       | 38.37          | 35.39         | 160   | 100   | Average | HORIZONTAL |
| 2 | 10642.24 | 66.49  | 80.00      | -13.51     | 58.39      | 5.12       | 38.37          | 35.39         | 160   | 100   | Peak    | HORIZONTAL |

### Vertical

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 10641.12 | 73.99  | 80.00      | -6.01      | 65.89      | 5.12       | 38.37          | 35.39         | 172   | 100   | Peak    | VERTICAL  |
| 2 | 10641.20 | 58.17  | 60.00      | -1.83      | 50.07      | 5.12       | 38.37          | 35.39         | 172   | 100   | Average | VERTICAL  |

### Note:

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

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

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

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1.5m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

<For Mode 3 (Ant. 3)>:

|                      |              |                       |  |
|----------------------|--------------|-----------------------|--|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%  |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11n MCS8 40MHz Ch 54<br>/ Mode 3 (Ant. 3) |
| <b>Test Date</b>     | May 26, 2010 |                       |  |

**Horizontal**

|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Antenna | Preamp | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|--------|--------|-------|-------|---------|--------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | Loss  | Factor  | Factor | deg   | cm    |         |            |
| 1 | 10539.97 | 49.97  | 74.00  | -24.03 | 41.97 | 5.09  | 38.39   | 35.48  | 202   | 100   | Average | HORIZONTAL |
| 2 | 10540.02 | 67.32  | 94.00  | -26.68 | 59.32 | 5.09  | 38.39   | 35.48  | 202   | 100   | Peak    | HORIZONTAL |

**Vertical**

|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Antenna | Preamp | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|--------|--------|-------|-------|---------|--------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | Loss  | Factor  | Factor | deg   | cm    |         |           |
| 1 | 10539.97 | 57.12  | 74.00  | -16.88 | 49.12 | 5.09  | 38.39   | 35.48  | 239   | 100   | Average | VERTICAL  |
| 2 | 10540.02 | 72.02  | 94.00  | -21.98 | 64.02 | 5.09  | 38.39   | 35.48  | 239   | 100   | Peak    | VERTICAL  |

|                      |              |                       |  |
|----------------------|--------------|-----------------------|--|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%  |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11n MCS8 40MHz Ch 62<br>/ Mode 3 (Ant. 3) |
| <b>Test Date</b>     | May 26, 2010 |                       |  |

**Horizontal**

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |            |
| 1 | 10620.00 | 51.12  | 80.00      | -28.88     | 43.05      | 5.11       | 38.38          | 35.42         | 118   | 100   | Peak    | HORIZONTAL |
| 2 | 10620.01 | 39.74  | 60.00      | -20.26     | 31.67      | 5.11       | 38.38          | 35.42         | 118   | 100   | Average | HORIZONTAL |

**Vertical**

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 10619.97 | 43.47  | 60.00      | -16.53     | 35.40      | 5.11       | 38.38          | 35.42         | 239   | 100   | Average | VERTICAL  |
| 2 | 10620.01 | 58.70  | 80.00      | -21.30     | 50.63      | 5.11       | 38.38          | 35.42         | 239   | 100   | Peak    | VERTICAL  |

|                      |              |                       |   |
|----------------------|--------------|-----------------------|---|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%   |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11n MCS8 40MHz Ch 102<br>/ Mode 3 (Ant. 3) |
| <b>Test Date</b>     | May 26, 2010 |                       |   |

**Horizontal**

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Preamp Factor | T/Pos | A/Pos | Remark      | Pol/Phase  |
|---|----------|--------|------------|------------|------------|-------------------|---------------|-------|-------|-------------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m          | deg   | cm    |             |            |
| 1 | 11019.99 | 44.83  | 60.00      | -15.17     | 36.37      | 5.24              | 38.33         | 35.11 | 207   | 100 Average | HORIZONTAL |
| 2 | 11020.01 | 57.60  | 80.00      | -22.40     | 49.14      | 5.24              | 38.33         | 35.11 | 207   | 100 Peak    | HORIZONTAL |

**Vertical**

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Preamp Factor | T/Pos | A/Pos | Remark      | Pol/Phase |
|---|----------|--------|------------|------------|------------|-------------------|---------------|-------|-------|-------------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m          | deg   | cm    |             |           |
| 1 | 11020.01 | 51.84  | 60.00      | -8.16      | 43.39      | 5.24              | 38.32         | 35.11 | 245   | 100 Average | VERTICAL  |
| 2 | 11020.01 | 66.69  | 80.00      | -13.31     | 58.24      | 5.24              | 38.32         | 35.11 | 245   | 100 Peak    | VERTICAL  |

|                      |              |                       |   |
|----------------------|--------------|-----------------------|---|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%   |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11n MCS8 40MHz Ch 110<br>/ Mode 3 (Ant. 3) |
| <b>Test Date</b>     | May 26, 2010 |                       |   |

**Horizontal**

|   | Freq     | Level  | Limit  | Over   | Read  | CableAntenna | Preamp | T/Pos | A/Pos | Remark      | Pol/Phase  |
|---|----------|--------|--------|--------|-------|--------------|--------|-------|-------|-------------|------------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | dB           | dB/m   | deg   | cm    |             |            |
| 1 | 11099.97 | 45.85  | 60.00  | -14.15 | 37.35 | 5.24         | 38.40  | 35.14 | 244   | 100 Average | HORIZONTAL |
| 2 | 11099.98 | 61.08  | 80.00  | -18.92 | 52.58 | 5.24         | 38.40  | 35.14 | 244   | 100 Peak    | HORIZONTAL |

**Vertical**

|   | Freq     | Level  | Limit  | Over   | Read  | CableAntenna | Preamp | T/Pos | A/Pos | Remark      | Pol/Phase |
|---|----------|--------|--------|--------|-------|--------------|--------|-------|-------|-------------|-----------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | dB           | dB/m   | deg   | cm    |             |           |
| 1 | 11100.00 | 68.41  | 80.00  | -11.59 | 59.91 | 5.24         | 38.40  | 35.14 | 246   | 100 Peak    | VERTICAL  |
| 2 | 11100.03 | 53.82  | 60.00  | -6.18  | 45.32 | 5.24         | 38.40  | 35.14 | 246   | 100 Average | VERTICAL  |

|                      |              |                       |   |
|----------------------|--------------|-----------------------|---|
| <b>Temperature</b>   | 25.6°C       | <b>Humidity</b>       | 56%   |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11n MCS8 40MHz Ch 134<br>/ Mode 3 (Ant. 3) |
| <b>Test Date</b>     | May 26, 2010 |                       |   |

#### Horizontal

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |            |
| 1 | 11340.02 | 58.28  | 80.00      | -21.72     | 49.65      | 5.24       | 38.63          | 35.24         | 206   | 100   | Peak    | HORIZONTAL |
| 2 | 11340.03 | 44.41  | 60.00      | -15.59     | 35.78      | 5.24       | 38.63          | 35.24         | 206   | 100   | Average | HORIZONTAL |

#### Vertical

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 11339.98 | 67.67  | 80.00      | -12.33     | 59.04      | 5.24       | 38.63          | 35.24         | 238   | 100   | Peak    | VERTICAL  |
| 2 | 11340.03 | 51.16  | 60.00      | -8.84      | 42.53      | 5.24       | 38.63          | 35.24         | 238   | 100   | Average | VERTICAL  |

#### Note:

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

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

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

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1.5m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

|                      |              |                       |                                      |
|----------------------|--------------|-----------------------|--------------------------------------|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%                                  |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11a Ch 52 / Mode 3 (Ant. 3) |
| <b>Test Date</b>     | May 26, 2010 |                       |                                      |

### Horizontal

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |            |
| 1 | 10520.00 | 67.58  | 94.00      | -26.42     | 59.60      | 5.08              | 38.40          | 35.50         | 246   | 100   | Peak    | HORIZONTAL |
| 2 | 10520.03 | 52.85  | 74.00      | -21.15     | 44.87      | 5.08              | 38.40          | 35.50         | 246   | 100   | Average | HORIZONTAL |

### Vertical

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 10519.97 | 62.31  | 74.00      | -11.69     | 54.34      | 5.08              | 38.39          | 35.50         | 236   | 100   | Average | VERTICAL  |
| 2 | 10520.01 | 77.02  | 94.00      | -16.98     | 69.05      | 5.08              | 38.39          | 35.50         | 236   | 100   | Peak    | VERTICAL  |

|                      |              |                       |                                      |
|----------------------|--------------|-----------------------|--------------------------------------|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%                                  |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11a Ch 60 / Mode 3 (Ant. 3) |
| <b>Test Date</b>     | May 26, 2010 |                       |                                      |

**Horizontal**

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |            |
| 1 | 10600.00 | 56.67  | 60.00      | -3.33      | 48.60      | 5.11              | 38.38          | 35.42         | 207   | 100   | Average | HORIZONTAL |
| 2 | 10600.00 | 72.64  | 80.00      | -7.36      | 64.57      | 5.11              | 38.38          | 35.42         | 207   | 100   | Peak    | HORIZONTAL |

**Vertical**

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 10600.01 | 59.81  | 60.00      | -0.19      | 51.74      | 5.11              | 38.38          | 35.42         | 243   | 100   | Average | VERTICAL  |
| 2 | 10600.01 | 74.68  | 80.00      | -5.32      | 66.61      | 5.11              | 38.38          | 35.42         | 243   | 100   | Peak    | VERTICAL  |



|                      |              |                       |                                      |
|----------------------|--------------|-----------------------|--------------------------------------|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%                                  |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11a Ch 64 / Mode 3 (Ant. 3) |
| <b>Test Date</b>     | May 26, 2010 |                       |                                      |

### Horizontal

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |            |
| 1 | 10639.99 | 64.94  | 80.00      | -15.06     | 56.84      | 5.12              | 38.37          | 35.39         | 206   | 100   | Peak    | HORIZONTAL |
| 2 | 10640.03 | 50.50  | 60.00      | -9.50      | 42.40      | 5.12              | 38.37          | 35.39         | 206   | 100   | Average | HORIZONTAL |

### Vertical

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 10640.01 | 55.86  | 60.00      | -4.14      | 47.76      | 5.12              | 38.37          | 35.39         | 237   | 100   | Average | VERTICAL  |
| 2 | 10640.01 | 71.22  | 80.00      | -8.78      | 63.12      | 5.12              | 38.37          | 35.39         | 237   | 100   | Peak    | VERTICAL  |

|                      |              |                       |                                       |
|----------------------|--------------|-----------------------|---------------------------------------|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%                                   |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11a Ch 100 / Mode 3 (Ant. 3) |
| <b>Test Date</b>     | May 26, 2010 |                       |                                       |

**Horizontal**

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |            |
| 1 | 11000.01 | 65.32  | 80.00      | -14.68     | 56.86      | 5.24              | 38.32          | 35.10         | 231   | 100   | Peak    | HORIZONTAL |
| 2 | 11000.03 | 50.22  | 60.00      | -9.78      | 41.76      | 5.24              | 38.32          | 35.10         | 231   | 100   | Average | HORIZONTAL |

**Vertical**

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 10999.97 | 53.17  | 60.00      | -6.83      | 44.73      | 5.24              | 38.30          | 35.10         | 240   | 100   | Average | VERTICAL  |
| 2 | 10999.99 | 67.25  | 80.00      | -12.75     | 58.81      | 5.24              | 38.30          | 35.10         | 240   | 100   | Peak    | VERTICAL  |

|                      |              |                       |                                       |
|----------------------|--------------|-----------------------|---------------------------------------|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%                                   |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11a Ch 116 / Mode 3 (Ant. 3) |
| <b>Test Date</b>     | May 26, 2010 |                       |                                       |

### Horizontal

|   | Freq     | Level  | Limit  | Over   | Read  | CableAntenna | Preamp | T/Pos  | A/Pos | Remark | Pol/Phase |            |
|---|----------|--------|--------|--------|-------|--------------|--------|--------|-------|--------|-----------|------------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | Loss         | Factor | Factor | deg   | cm     |           |            |
| 1 | 11159.97 | 47.17  | 60.00  | -12.83 | 38.63 | 5.24         | 38.47  | 35.17  | 210   | 100    | Average   | HORIZONTAL |
| 2 | 11160.00 | 58.63  | 80.00  | -21.37 | 50.09 | 5.24         | 38.47  | 35.17  | 210   | 100    | Peak      | HORIZONTAL |

### Vertical

|   | Freq     | Level  | Limit  | Over   | Read  | CableAntenna | Preamp | T/Pos  | A/Pos | Remark | Pol/Phase |          |
|---|----------|--------|--------|--------|-------|--------------|--------|--------|-------|--------|-----------|----------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | Loss         | Factor | Factor | deg   | cm     |           |          |
| 1 | 11159.97 | 53.83  | 60.00  | -6.17  | 45.29 | 5.24         | 38.47  | 35.17  | 244   | 100    | Average   | VERTICAL |
| 2 | 11160.02 | 69.02  | 80.00  | -10.98 | 60.48 | 5.24         | 38.47  | 35.17  | 244   | 100    | Peak      | VERTICAL |

|                      |              |                       |                                       |
|----------------------|--------------|-----------------------|---------------------------------------|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%                                   |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11a Ch 140 / Mode 3 (Ant. 3) |
| <b>Test Date</b>     | May 26, 2010 |                       |                                       |

#### Horizontal

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |            |
| 1 | 11400.01 | 50.10  | 60.00      | -9.90      | 41.41      | 5.24       | 38.70          | 35.25         | 207   | 100   | Average | HORIZONTAL |
| 2 | 11400.02 | 62.79  | 80.00      | -17.21     | 54.10      | 5.24       | 38.70          | 35.25         | 207   | 100   | Peak    | HORIZONTAL |

#### Vertical

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 11400.02 | 70.16  | 80.00      | -9.84      | 61.47      | 5.24       | 38.70          | 35.25         | 239   | 100   | Peak    | VERTICAL  |
| 2 | 11400.03 | 56.82  | 60.00      | -3.18      | 48.13      | 5.24       | 38.70          | 35.25         | 239   | 100   | Average | VERTICAL  |

#### Note:

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

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

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

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1.5m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

<For Mode 4 (Ant. 4)>:

|                      |              |                       |  |
|----------------------|--------------|-----------------------|--|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%  |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11n MCS8 40MHz Ch 54<br>/ Mode 4 (Ant. 4) |
| <b>Test Date</b>     | May 24, 2010 |                       |  |

**Horizontal**

|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Antenna | Preamp | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|--------|--------|-------|-------|---------|--------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | Loss  | Factor  | Factor | deg   | cm    |         |            |
| 1 | 10538.60 | 43.82  | 74.00  | -30.18 | 35.82 | 5.09  | 38.39   | 35.48  | 100   | 100   | Average | HORIZONTAL |
| 2 | 10540.20 | 58.12  | 94.00  | -35.88 | 50.12 | 5.09  | 38.39   | 35.48  | 100   | 100   | Peak    | HORIZONTAL |

**Vertical**

|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Antenna | Preamp | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|--------|--------|-------|-------|---------|--------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | Loss  | Factor  | Factor | deg   | cm    |         |           |
| 1 | 10540.00 | 52.49  | 74.00  | -21.51 | 44.49 | 5.09  | 38.39   | 35.48  | 121   | 100   | Average | VERTICAL  |
| 2 | 10540.00 | 68.09  | 94.00  | -25.91 | 60.09 | 5.09  | 38.39   | 35.48  | 121   | 100   | Peak    | VERTICAL  |

|                      |              |                       |  |
|----------------------|--------------|-----------------------|--|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%  |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11n MCS8 40MHz Ch 62<br>/ Mode 4 (Ant. 4) |
| <b>Test Date</b>     | May 24, 2010 |                       |  |

#### Horizontal

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |            |
| 1 | 10622.40 | 40.03  | 60.00      | -19.97     | 31.96      | 5.11       | 38.38          | 35.42         | 106   | 100   | Average | HORIZONTAL |
| 2 | 10643.60 | 52.66  | 80.00      | -27.34     | 44.56      | 5.12       | 38.37          | 35.39         | 106   | 100   | Peak    | HORIZONTAL |

#### Vertical

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 10620.60 | 56.89  | 80.00      | -23.11     | 48.82      | 5.11       | 38.38          | 35.42         | 45    | 100   | Peak    | VERTICAL  |
| 2 | 10621.60 | 41.96  | 60.00      | -18.04     | 33.89      | 5.11       | 38.38          | 35.42         | 45    | 100   | Average | VERTICAL  |

|                      |              |                       |   |
|----------------------|--------------|-----------------------|---|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%   |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11n MCS8 40MHz Ch 102<br>/ Mode 4 (Ant. 4) |
| <b>Test Date</b>     | May 24, 2010 |                       |   |

**Horizontal**

|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Antenna | Preamp | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|--------|--------|-------|-------|---------|--------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | Loss  | Factor  | Factor | deg   | cm    |         |            |
| 1 | 11021.80 | 40.89  | 60.00  | -19.11 | 32.43 | 5.24  | 38.33   | 35.11  | 175   | 100   | Average | HORIZONTAL |
| 2 | 11052.40 | 52.61  | 80.00  | -27.39 | 44.13 | 5.24  | 38.36   | 35.12  | 175   | 100   | Peak    | HORIZONTAL |

**Vertical**

|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Antenna | Preamp | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|--------|--------|-------|-------|---------|--------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | Loss  | Factor  | Factor | deg   | cm    |         |           |
| 1 | 11019.80 | 50.53  | 60.00  | -9.47  | 42.08 | 5.24  | 38.32   | 35.11  | 42    | 100   | Average | VERTICAL  |
| 2 | 11020.80 | 64.03  | 80.00  | -15.97 | 55.58 | 5.24  | 38.32   | 35.11  | 42    | 100   | Peak    | VERTICAL  |

|                      |              |                       |   |
|----------------------|--------------|-----------------------|---|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%   |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11n MCS8 40MHz Ch 110<br>/ Mode 4 (Ant. 4) |
| <b>Test Date</b>     | May 24, 2010 |                       |   |

**Horizontal**

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |            |
| 1 | 11095.00 | 53.42  | 80.00      | -26.58     | 44.92      | 5.24       | 38.40          | 35.14         | 117   | 100   | Peak    | HORIZONTAL |
| 2 | 11096.80 | 41.46  | 60.00      | -18.54     | 32.96      | 5.24       | 38.40          | 35.14         | 117   | 100   | Average | HORIZONTAL |

**Vertical**

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 11099.60 | 50.55  | 60.00      | -9.45      | 42.05      | 5.24       | 38.40          | 35.14         | 36    | 109   | Average | VERTICAL  |
| 2 | 11100.00 | 63.73  | 80.00      | -16.27     | 55.23      | 5.24       | 38.40          | 35.14         | 36    | 109   | Peak    | VERTICAL  |



|                      |              |                       |   |
|----------------------|--------------|-----------------------|---|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%   |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11n MCS8 40MHz Ch 134<br>/ Mode 4 (Ant. 4) |
| <b>Test Date</b>     | May 24, 2010 |                       |   |

#### Horizontal

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |            |
| 1 | 11337.00 | 43.63  | 60.00      | -16.37     | 35.00      | 5.24       | 38.63          | 35.24         | 232   | 100   | Average | HORIZONTAL |
| 2 | 11340.00 | 56.46  | 80.00      | -23.54     | 47.83      | 5.24       | 38.63          | 35.24         | 232   | 100   | Peak    | HORIZONTAL |

#### Vertical

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 11340.20 | 51.07  | 60.00      | -8.93      | 42.44      | 5.24       | 38.63          | 35.24         | 51    | 114   | Average | VERTICAL  |
| 2 | 11347.60 | 64.44  | 80.00      | -15.56     | 55.79      | 5.24       | 38.65          | 35.24         | 51    | 114   | Peak    | VERTICAL  |

#### Note:

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

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

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

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1.5m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

|                      |              |                       |                                      |
|----------------------|--------------|-----------------------|--------------------------------------|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%                                  |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11a Ch 52 / Mode 4 (Ant. 4) |
| <b>Test Date</b>     | May 22, 2010 |                       |                                      |

### Horizontal

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |            |
| 1 | 10518.00 | 72.04  | 94.00      | -21.96     | 63.85      | 4.78              | 38.59          | 35.18         | 54    | 119   | Peak    | HORIZONTAL |
| 2 | 10518.40 | 57.71  | 74.00      | -16.29     | 49.52      | 4.78              | 38.59          | 35.18         | 54    | 119   | Average | HORIZONTAL |

### Vertical

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 10518.40 | 60.96  | 74.00      | -13.04     | 52.77      | 4.78              | 38.59          | 35.18         | 56    | 130   | Average | VERTICAL  |
| 2 | 10518.80 | 76.63  | 94.00      | -17.37     | 68.44      | 4.78              | 38.59          | 35.18         | 56    | 130   | Peak    | VERTICAL  |

|                      |              |                       |                                      |
|----------------------|--------------|-----------------------|--------------------------------------|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%                                  |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11a Ch 60 / Mode 4 (Ant. 4) |
| <b>Test Date</b>     | May 22, 2010 |                       |                                      |

### Horizontal

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |            |
| 1 | 10600.00 | 61.54  | 80.00      | -18.46     | 61.54      | 0.00       | 0.00           | 0.00          | 55    | 121   | Peak    | HORIZONTAL |
| 2 | 10600.90 | 46.88  | 60.00      | -13.12     | 46.88      | 0.00       | 0.00           | 0.00          | 55    | 121   | Average | HORIZONTAL |

### Vertical

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 10600.20 | 65.46  | 80.00      | -14.54     | 65.46      | 0.00       | 0.00           | 0.00          | 352   | 120   | Peak    | VERTICAL  |
| 2 | 10600.90 | 58.27  | 60.00      | -1.73      | 50.08      | 4.71       | 38.56          | 35.08         | 352   | 120   | Average | VERTICAL  |

|                      |              |                       |                                      |
|----------------------|--------------|-----------------------|--------------------------------------|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%                                  |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11a Ch 64 / Mode 4 (Ant. 4) |
| <b>Test Date</b>     | May 22, 2010 |                       |                                      |

**Horizontal**

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |            |
| 1 | 10637.70 | 46.18  | 60.00      | -13.82     | 37.99      | 4.70              | 38.54          | 35.05         | 56    | 100   | Average | HORIZONTAL |
| 2 | 10637.80 | 61.48  | 80.00      | -18.52     | 53.29      | 4.70              | 38.54          | 35.05         | 56    | 100   | Peak    | HORIZONTAL |

**Vertical**

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 10640.60 | 52.65  | 60.00      | -7.35      | 44.46      | 4.70              | 38.54          | 35.05         | 354   | 100   | Average | VERTICAL  |
| 2 | 10641.00 | 68.94  | 80.00      | -11.06     | 60.75      | 4.70              | 38.54          | 35.05         | 354   | 100   | Peak    | VERTICAL  |



|                      |              |                       |                                       |
|----------------------|--------------|-----------------------|---------------------------------------|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%                                   |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11a Ch 100 / Mode 4 (Ant. 4) |
| <b>Test Date</b>     | May 24, 2010 |                       |                                       |

**Horizontal**

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |            |
| 1 | 10999.60 | 61.26  | 80.00      | -18.74     | 52.80      | 5.24              | 38.32          | 35.10         | 305   | 120   | Peak    | HORIZONTAL |
| 2 | 10999.80 | 48.00  | 60.00      | -12.00     | 39.54      | 5.24              | 38.32          | 35.10         | 305   | 120   | Average | HORIZONTAL |

**Vertical**

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 10994.90 | 74.55  | 80.00      | -5.45      | 66.11      | 5.24              | 38.30          | 35.10         | 39    | 121   | Peak    | VERTICAL  |
| 2 | 11000.30 | 59.91  | 60.00      | -0.09      | 51.47      | 5.24              | 38.30          | 35.10         | 39    | 121   | Average | VERTICAL  |

|                      |              |                       |                                       |
|----------------------|--------------|-----------------------|---------------------------------------|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%                                   |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11a Ch 116 / Mode 4 (Ant. 4) |
| <b>Test Date</b>     | May 24, 2010 |                       |                                       |

### Horizontal

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |            |
| 1 | 11159.70 | 48.68  | 60.00      | -11.32     | 40.14      | 5.24              | 38.47          | 35.17         | 295   | 111   | Average | HORIZONTAL |
| 2 | 11159.90 | 62.32  | 80.00      | -17.68     | 53.78      | 5.24              | 38.47          | 35.17         | 295   | 111   | Peak    | HORIZONTAL |

### Vertical

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 11155.60 | 73.55  | 80.00      | -6.45      | 65.02      | 5.24              | 38.45          | 35.16         | 48    | 116   | Peak    | VERTICAL  |
| 2 | 11160.70 | 58.69  | 60.00      | -1.31      | 50.15      | 5.24              | 38.47          | 35.17         | 48    | 116   | Average | VERTICAL  |

|                      |              |                       |                                       |
|----------------------|--------------|-----------------------|---------------------------------------|
| <b>Temperature</b>   | 23°C         | <b>Humidity</b>       | 60%                                   |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11a Ch 140 / Mode 4 (Ant. 4) |
| <b>Test Date</b>     | May 24, 2010 |                       |                                       |

#### Horizontal

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase  |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |            |
| 1 | 11400.90 | 50.52  | 60.00      | -9.48      | 41.83      | 5.24       | 38.70          | 35.25         | 285   | 124   | Average | HORIZONTAL |
| 2 | 11401.00 | 65.67  | 80.00      | -14.33     | 56.98      | 5.24       | 38.70          | 35.25         | 285   | 124   | Peak    | HORIZONTAL |

#### Vertical

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 11401.10 | 56.49  | 60.00      | -3.51      | 47.80      | 5.24       | 38.70          | 35.25         | 286   | 100   | Average | VERTICAL  |
| 2 | 11401.80 | 71.53  | 80.00      | -8.47      | 62.84      | 5.24       | 38.70          | 35.25         | 286   | 100   | Peak    | VERTICAL  |

#### Note:

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

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

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

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1.5m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

## 4.6. Band Edge Emissions Measurement

### 4.6.1. Limit

For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.25-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.470-5.725 GHz band: all emissions outside of the 5.470-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

| Frequencies<br>(MHz) | Field Strength<br>(micровolts/meter) | Measurement Distance<br>(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                                |

### 4.6.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

### 4.6.3. Test Procedures

1. The test procedure is the same as section 4.6.3, only the frequency range investigated is limited to 100MHz around bandedges.
2. In case the emission is fail due to the used RB/VB is too wide, marker-delta method of FCC Public Notice DA00-705 will be followed.

### 4.6.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.6.4.



#### 4.6.5. Test Deviation

There is no deviation with the original standard.

#### 4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.6.7. Test Result of Band Edge and Fundamental Emissions

<For Mode 1 (Ant. 1)>:

|               |              |                |   |
|---------------|--------------|----------------|---|
| Temperature   | 21°C         | Humidity       | 56%   |
| Test Engineer | Alan Huang   | Configurations | IEEE 802.11n MCS8 40MHz Ch 54, 62 / Mode 1 (Ant. 1) |
| Test Date     | May 25, 2010 |                |   |

##### Channel 54

|   | Freq    | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Preamp Factor | T/Pos | A/Pos | Remark      | Pol/Phase |
|---|---------|--------|------------|------------|------------|-------------------|---------------|-------|-------|-------------|-----------|
|   | MHz     | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m          | deg   | cm    |             |           |
| 1 | 5277.20 | 121.13 | 94.00      |            |            | 2.63              | 33.88         | 0.00  | 38    | 100 Peak    | VERTICAL  |
| 2 | 5287.20 | 108.35 | 74.00      |            |            | 2.63              | 33.91         | 0.00  | 38    | 100 Average | VERTICAL  |
| 3 | 5350.00 | 59.80  | 60.00      | -0.20      | 23.10      | 2.67              | 34.03         | 0.00  | 38    | 100 Average | VERTICAL  |
| 4 | 5354.40 | 74.00  | 80.00      | -6.00      | 37.30      | 2.67              | 34.03         | 0.00  | 38    | 100 Peak    | VERTICAL  |

Item 1, 2 are the fundamental frequency at 5270 MHz.

##### Channel 62

|   | Freq    | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Preamp Factor | T/Pos | A/Pos | Remark      | Pol/Phase |
|---|---------|--------|------------|------------|------------|-------------------|---------------|-------|-------|-------------|-----------|
|   | MHz     | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m          | deg   | cm    |             |           |
| 1 | 5318.00 | 114.20 | 94.00      |            |            | 2.66              | 33.97         | 0.00  | 37    | 100 Peak    | VERTICAL  |
| 2 | 5322.80 | 102.72 | 74.00      |            |            | 2.66              | 33.97         | 0.00  | 37    | 100 Average | VERTICAL  |
| 3 | 5350.00 | 59.61  | 60.00      | -0.39      | 22.91      | 2.67              | 34.03         | 0.00  | 37    | 100 Average | VERTICAL  |
| 4 | 5350.80 | 73.21  | 80.00      | -6.79      | 36.51      | 2.67              | 34.03         | 0.00  | 37    | 100 Peak    | VERTICAL  |

Item 1, 2 are the fundamental frequency at 5310 MHz.

Note:

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

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

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1.5m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

|                      |              |                       |  |
|----------------------|--------------|-----------------------|--|
| <b>Temperature</b>   | 21°C         | <b>Humidity</b>       | 56%                                      |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11a Ch 60, 64 / Mode 1 (Ant. 1) |
| <b>Test Date</b>     | May 25, 2010 |                       |  |

**Channel 60**

|   | Freq    | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|---------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz     | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 5292.80 | 111.02 | 74.00      |            |            | 2.64              | 33.91          | 0.00          | 38    | 100   | Average | VERTICAL  |
| 2 | 5294.00 | 120.96 | 94.00      |            |            | 2.64              | 33.91          | 0.00          | 38    | 100   | Peak    | VERTICAL  |
| 3 | 5354.40 | 72.68  | 80.00      | -7.32      | 35.98      | 2.67              | 34.03          | 0.00          | 38    | 100   | Peak    | VERTICAL  |
| 4 | 5354.80 | 59.44  | 60.00      | -0.56      | 22.74      | 2.67              | 34.03          | 0.00          | 38    | 100   | Average | VERTICAL  |

Item 1, 2 are the fundamental frequency at 5300 MHz.

**Channel 64**

|   | Freq    | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|---------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz     | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 5325.80 | 120.37 | 94.00      |            |            | 2.66              | 33.97          | 0.00          | 38    | 100   | Peak    | VERTICAL  |
| 2 | 5326.40 | 110.20 | 74.00      |            |            | 2.66              | 33.97          | 0.00          | 38    | 100   | Average | VERTICAL  |
| 3 | 5350.00 | 59.54  | 60.00      | -0.46      | 22.84      | 2.67              | 34.03          | 0.00          | 38    | 100   | Average | VERTICAL  |
| 4 | 5352.00 | 74.16  | 80.00      | -5.84      | 37.46      | 2.67              | 34.03          | 0.00          | 38    | 100   | Peak    | VERTICAL  |

Item 1, 2 are the fundamental frequency at 5320 MHz.

**Note:**

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

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

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1.5m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

<For Mode 2 (Ant. 2)>:

|                      |              |                       |  |
|----------------------|--------------|-----------------------|--|
| <b>Temperature</b>   | 21°C         | <b>Humidity</b>       | 56%  |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11n MCS8 40MHz Ch 54, 62<br>/ Mode 2 (Ant. 2) |
| <b>Test Date</b>     | May 25, 2010 |                       |  |

#### Channel 54

|   | Freq    | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | PoI/Phase |
|---|---------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz     | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 5275.20 | 121.20 | 94.00      | :          |            | 2.63              | 33.88          | 0.00          | 28    | 112   | Peak    | VERTICAL  |
| 2 | 5276.80 | 108.17 | 74.00      | :          |            | 2.63              | 33.88          | 0.00          | 28    | 112   | Average | VERTICAL  |
| 3 | 5350.00 | 59.74  | 60.00      | -0.26      | 23.04      | 2.67              | 34.03          | 0.00          | 28    | 112   | Average | VERTICAL  |
| 4 | 5352.40 | 73.35  | 80.00      | -6.65      | 36.65      | 2.67              | 34.03          | 0.00          | 28    | 112   | Peak    | VERTICAL  |

Item 1, 2 are the fundamental frequency at 5270 MHz.

#### Channel 62

|   | Freq    | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | PoI/Phase |
|---|---------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz     | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 5312.40 | 101.07 | 74.00      |            |            | 2.64              | 33.94          | 0.00          | 28    | 110   | Average | VERTICAL  |
| 2 | 5323.60 | 113.67 | 94.00      |            |            | 2.66              | 33.97          | 0.00          | 28    | 110   | Peak    | VERTICAL  |
| 3 | 5350.00 | 59.42  | 60.00      | -0.58      | 22.72      | 2.67              | 34.03          | 0.00          | 28    | 110   | Average | VERTICAL  |
| 4 | 5350.00 | 73.36  | 80.00      | -6.64      | 36.66      | 2.67              | 34.03          | 0.00          | 28    | 110   | Peak    | VERTICAL  |

Item 1, 2 are the fundamental frequency at 5310 MHz.

Note:

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

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

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1.5m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

|                      |              |                       |                                     |
|----------------------|--------------|-----------------------|-------------------------------------|
| <b>Temperature</b>   | 21°C         | <b>Humidity</b>       | 56%                                 |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | 802.11a Ch 60, 64 / Mode 2 (Ant. 2) |
| <b>Test Date</b>     | May 25, 2010 |                       |                                     |

#### Channel 60

|   | Freq    | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|---------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz     | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 5296.80 | 122.26 | 94.00      |            |            | 2.64       | 33.94          | 0.00          | 23    | 111   | Peak    | VERTICAL  |
| 2 | 5297.60 | 111.50 | 74.00      |            |            | 2.64       | 33.94          | 0.00          | 23    | 111   | Average | VERTICAL  |
| 3 | 5350.00 | 58.18  | 60.00      | -1.82      | 21.48      | 2.67       | 34.03          | 0.00          | 23    | 111   | Average | VERTICAL  |
| 4 | 5355.20 | 71.31  | 80.00      | -8.69      | 34.61      | 2.67       | 34.03          | 0.00          | 23    | 111   | Peak    | VERTICAL  |

Item 1, 2 are the fundamental frequency at 5300 MHz.

#### Channel 64

|   | Freq    | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|---------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz     | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 5324.00 | 111.51 | 74.00      |            |            | 2.66       | 33.97          | 0.00          | 17    | 113   | Average | VERTICAL  |
| 2 | 5326.60 | 122.16 | 94.00      |            |            | 2.66       | 33.97          | 0.00          | 17    | 113   | Peak    | VERTICAL  |
| 3 | 5350.00 | 59.81  | 60.00      | -0.19      | 23.11      | 2.67       | 34.03          | 0.00          | 17    | 113   | Average | VERTICAL  |
| 4 | 5352.40 | 75.71  | 80.00      | -4.29      | 39.01      | 2.67       | 34.03          | 0.00          | 17    | 113   | Peak    | VERTICAL  |

Item 1, 2 are the fundamental frequency at 5320 MHz.

Note:

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

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

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1.5m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

<For Mode 3 (Ant. 3)>:

|                      |              |                       |  |
|----------------------|--------------|-----------------------|--|
| <b>Temperature</b>   | 21°C         | <b>Humidity</b>       | 56%  |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11n MCS8 40MHz Ch 54, 62<br>/ Mode 3 (Ant. 3) |
| <b>Test Date</b>     | May 26, 2010 |                       |  |

#### Channel 54

|   | Freq    | Level  | Limit  | Over  | Read  | CableAntenna | Preamp | T/Pos | A/Pos | Remark      | Pol/Phase |
|---|---------|--------|--------|-------|-------|--------------|--------|-------|-------|-------------|-----------|
|   | MHz     | dBuV/m | dBuV/m | dB    | dBuV  | dB           | dB/m   | deg   | cm    |             |           |
| 1 | 5256.00 | 121.02 | 94.00  |       |       | 2.62         | 33.85  | 0.00  | 119   | 119 Peak    | VERTICAL  |
| 2 | 5267.20 | 108.79 | 74.00  |       |       | 2.63         | 33.88  | 0.00  | 119   | 119 Average | VERTICAL  |
| 3 | 5350.00 | 59.90  | 60.00  | -0.10 | 23.20 | 2.67         | 34.03  | 0.00  | 119   | 119 Average | VERTICAL  |
| 4 | 5354.40 | 73.69  | 80.00  | -6.31 | 36.99 | 2.67         | 34.03  | 0.00  | 119   | 119 Peak    | VERTICAL  |

Item 1, 2 are the fundamental frequency at 5270 MHz.

#### Channel 62

|   | Freq    | Level  | Limit  | Over  | Read  | CableAntenna | Preamp | T/Pos | A/Pos | Remark      | Pol/Phase |
|---|---------|--------|--------|-------|-------|--------------|--------|-------|-------|-------------|-----------|
|   | MHz     | dBuV/m | dBuV/m | dB    | dBuV  | dB           | dB/m   | deg   | cm    |             |           |
| 1 | 5312.40 | 100.45 | 74.00  |       |       | 2.64         | 33.94  | 0.00  | 82    | 117 Average | VERTICAL  |
| 2 | 5315.60 | 112.44 | 94.00  |       |       | 2.66         | 33.97  | 0.00  | 82    | 117 Peak    | VERTICAL  |
| 3 | 5350.00 | 59.69  | 60.00  | -0.31 | 22.99 | 2.67         | 34.03  | 0.00  | 82    | 117 Average | VERTICAL  |
| 4 | 5350.00 | 72.88  | 80.00  | -7.12 | 36.18 | 2.67         | 34.03  | 0.00  | 82    | 117 Peak    | VERTICAL  |

Item 1, 2 are the fundamental frequency at 5310 MHz.

|                      |              |                       |  |
|----------------------|--------------|-----------------------|--|
| <b>Temperature</b>   | 21°C         | <b>Humidity</b>       | 56%  |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11n MCS8 40MHz Ch 102, 110, 134 / Mode 3 (Ant. 3) |
| <b>Test Date</b>     | May 26, 2010 |                       |  |

### Channel 102

|   | Freq    | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|---------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz     | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 5460.00 | 59.67  | 60.00      | -0.33      | 22.73      | 2.73              | 34.21          | 0.00          | 100   | 125   | Average | VERTICAL  |
| 2 | 5460.00 | 74.24  | 80.00      | -5.76      | 37.30      | 2.73              | 34.21          | 0.00          | 100   | 125   | Peak    | VERTICAL  |
| 3 | 5494.37 | 103.00 | 74.00      |            |            | 2.76              | 34.26          | 0.00          | 100   | 125   | Average | VERTICAL  |
| 4 | 5497.55 | 114.36 | 94.00      |            |            | 2.76              | 34.26          | 0.00          | 100   | 125   | Peak    | VERTICAL  |

Item 3, 4 are the fundamental frequency at 5510MHz.

### Channel 110

|   | Freq    | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|---------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz     | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 5455.66 | 70.49  | 80.00      | -9.51      | 33.55      | 2.73              | 34.21          | 0.00          | 356   | 132   | Peak    | VERTICAL  |
| 2 | 5460.00 | 57.67  | 60.00      | -2.33      | 20.73      | 2.73              | 34.21          | 0.00          | 356   | 132   | Average | VERTICAL  |
| 3 | 5560.71 | 120.64 | 94.00      |            |            | 2.79              | 34.31          | 0.00          | 356   | 132   | Peak    | VERTICAL  |
| 4 | 5561.29 | 108.17 | 74.00      |            |            | 2.79              | 34.31          | 0.00          | 356   | 132   | Average | VERTICAL  |

Item 3, 4 are the fundamental frequency at 5550 MHz.

### Channel 134

|   | Freq    | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|---------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz     | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 5666.40 | 107.93 | 74.00      |            |            | 2.84              | 34.33          | 0.00          | 101   | 135   | Average | VERTICAL  |
| 2 | 5672.40 | 119.62 | 94.00      |            |            | 2.86              | 34.33          | 0.00          | 101   | 135   | Peak    | VERTICAL  |
| 3 | 5725.00 | 62.40  | 74.00      | -11.60     | 25.17      | 2.89              | 34.34          | 0.00          | 101   | 135   | Average | VERTICAL  |
| 4 | 5727.80 | 77.84  | 94.00      | -16.16     | 40.61      | 2.89              | 34.34          | 0.00          | 101   | 135   | Peak    | VERTICAL  |

Item 1, 2 are the fundamental frequency at 5670 MHz.

Note:

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

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

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1.5m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

|                      |              |                       |  |
|----------------------|--------------|-----------------------|--|
| <b>Temperature</b>   | 21°C         | <b>Humidity</b>       | 56%                                      |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11a Ch 60, 64 / Mode 3 (Ant. 3) |
| <b>Test Date</b>     | May 26, 2010 |                       |  |

**Channel 60**

|   | Freq    | Level  | Limit  | Over   | Read  | CableAntenna | Preamp | T/Pos | A/Pos | Remark      | Pol/Phase |
|---|---------|--------|--------|--------|-------|--------------|--------|-------|-------|-------------|-----------|
|   | MHz     | dBuV/m | dBuV/m | dB     | dBuV  | dB           | dB/m   | dB    | deg   | cm          |           |
| 1 | 5295.20 | 122.69 | 94.00  |        |       | 2.64         | 33.91  | 0.00  | 84    | 121 Peak    | VERTICAL  |
| 2 | 5298.00 | 112.70 | 74.00  |        |       | 2.64         | 33.94  | 0.00  | 84    | 121 Average | VERTICAL  |
| 3 | 5350.00 | 57.10  | 60.00  | -2.90  | 20.40 | 2.67         | 34.03  | 0.00  | 84    | 121 Average | VERTICAL  |
| 4 | 5354.40 | 69.97  | 80.00  | -10.03 | 33.27 | 2.67         | 34.03  | 0.00  | 84    | 121 Peak    | VERTICAL  |

Item 1, 2 are the fundamental frequency at 5300 MHz.

**Channel 64**

|   | Freq    | Level  | Limit  | Over  | Read  | CableAntenna | Preamp | T/Pos | A/Pos | Remark      | Pol/Phase |
|---|---------|--------|--------|-------|-------|--------------|--------|-------|-------|-------------|-----------|
|   | MHz     | dBuV/m | dBuV/m | dB    | dBuV  | dB           | dB/m   | dB    | deg   | cm          |           |
| 1 | 5312.80 | 111.53 | 74.00  |       |       | 2.64         | 33.94  | 0.00  | 85    | 119 Average | VERTICAL  |
| 2 | 5315.00 | 121.50 | 94.00  |       |       | 2.66         | 33.97  | 0.00  | 85    | 119 Peak    | VERTICAL  |
| 3 | 5350.00 | 59.84  | 60.00  | -0.16 | 23.14 | 2.67         | 34.03  | 0.00  | 85    | 119 Average | VERTICAL  |
| 4 | 5350.40 | 74.98  | 80.00  | -5.02 | 38.28 | 2.67         | 34.03  | 0.00  | 85    | 119 Peak    | VERTICAL  |

Item 1, 2 are the fundamental frequency at 5320 MHz.

|                      |              |                       |   |
|----------------------|--------------|-----------------------|---|
| <b>Temperature</b>   | 21°C         | <b>Humidity</b>       | 56%   |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11a Ch 100, 140<br>/ Mode 3 (Ant. 3) |
| <b>Test Date</b>     | May 26, 2010 |                       |   |

### Channel 100

|   | Freq    | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|---------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz     | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 5457.60 | 77.87  | 80.00      | -2.13      | 40.93      | 2.73              | 34.21          | 0.00          | 85    | 129   | Peak    | VERTICAL  |
| 2 | 5460.00 | 59.43  | 60.00      | -0.57      | 22.49      | 2.73              | 34.21          | 0.00          | 85    | 129   | Average | VERTICAL  |
| 3 | 5494.20 | 125.13 | 94.00      |            |            | 2.76              | 34.26          | 0.00          | 85    | 129   | Peak    | VERTICAL  |
| 4 | 5494.40 | 114.21 | 74.00      |            |            | 2.76              | 34.26          | 0.00          | 85    | 129   | Average | VERTICAL  |

Item 3, 4 are the fundamental frequency at 5500 MHz.

### Channel 140

|   | Freq    | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|---------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz     | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 5705.60 | 123.55 | 94.00      |            |            | 2.88              | 34.34          | 0.00          | 95    | 131   | Peak    | VERTICAL  |
| 2 | 5707.60 | 113.33 | 74.00      |            |            | 2.88              | 34.34          | 0.00          | 95    | 131   | Average | VERTICAL  |
| 3 | 5725.00 | 64.20  | 74.00      | -9.80      | 26.97      | 2.89              | 34.34          | 0.00          | 95    | 131   | Average | VERTICAL  |
| 4 | 5727.20 | 83.61  | 94.00      | -10.39     | 46.38      | 2.89              | 34.34          | 0.00          | 95    | 131   | Peak    | VERTICAL  |

Item 1, 2 are the fundamental frequency at 5700 MHz.

Note:

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

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

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1.5m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].



<For Mode 4 (Ant. 4)>:

|                      |              |                       |  |
|----------------------|--------------|-----------------------|--|
| <b>Temperature</b>   | 21°C         | <b>Humidity</b>       | 56%  |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11n MCS8 40MHz Ch 54, 62<br>/ Mode 4 (Ant. 4) |
| <b>Test Date</b>     | May 24, 2010 |                       |  |

#### Channel 54

|   | Freq    | Level  | Limit  | Over  | Read  | CableAntenna | Preamp | T/Pos | A/Pos | Remark      | PoI/Phase |
|---|---------|--------|--------|-------|-------|--------------|--------|-------|-------|-------------|-----------|
|   | MHz     | dBuV/m | dBuV/m | dB    | dBuV  | dB           | dB/m   | dB    | deg   | cm          |           |
| 1 | 5262.40 | 119.72 | 94.00  |       |       | 2.62         | 33.85  | 0.00  | 227   | 101 Peak    | VERTICAL  |
| 2 | 5274.80 | 107.60 | 74.00  |       |       | 2.63         | 33.88  | 0.00  | 227   | 101 Average | VERTICAL  |
| 3 | 5350.00 | 59.28  | 60.00  | -0.72 | 22.58 | 2.67         | 34.03  | 0.00  | 227   | 101 Average | VERTICAL  |
| 4 | 5352.40 | 71.22  | 80.00  | -8.78 | 34.52 | 2.67         | 34.03  | 0.00  | 227   | 101 Peak    | VERTICAL  |

Item 1, 2 are the fundamental frequency at 5270 MHz.

#### Channel 62

|   | Freq    | Level  | Limit  | Over  | Read  | CableAntenna | Preamp | T/Pos | A/Pos | Remark      | PoI/Phase |
|---|---------|--------|--------|-------|-------|--------------|--------|-------|-------|-------------|-----------|
|   | MHz     | dBuV/m | dBuV/m | dB    | dBuV  | dB           | dB/m   | dB    | deg   | cm          |           |
| 1 | 5312.80 | 101.55 | 74.00  |       |       | 2.64         | 33.94  | 0.00  | 229   | 100 Average | VERTICAL  |
| 2 | 5320.40 | 114.74 | 94.00  |       |       | 2.66         | 33.97  | 0.00  | 229   | 100 Peak    | VERTICAL  |
| 3 | 5350.00 | 59.72  | 60.00  | -0.28 | 23.02 | 2.67         | 34.03  | 0.00  | 229   | 100 Average | VERTICAL  |
| 4 | 5350.80 | 72.14  | 80.00  | -7.86 | 35.44 | 2.67         | 34.03  | 0.00  | 229   | 100 Peak    | VERTICAL  |

Item 1, 2 are the fundamental frequency at 5310 MHz.

|                      |              |                       |  |
|----------------------|--------------|-----------------------|--|
| <b>Temperature</b>   | 21°C         | <b>Humidity</b>       | 56%  |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11n MCS8 40MHz Ch 102, 110, 134 / Mode 4 (Ant. 4) |
| <b>Test Date</b>     | May 24, 2010 |                       |  |

### Channel 102

|   | Freq    | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|---------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz     | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 5459.36 | 74.21  | 80.00      | -5.79      | 37.27      | 2.73              | 34.21          | 0.00          | 123   | 103   | Peak    | VERTICAL  |
| 2 | 5460.00 | 59.52  | 60.00      | -0.48      | 22.58      | 2.73              | 34.21          | 0.00          | 123   | 103   | Average | VERTICAL  |
| 3 | 5497.50 | 105.03 | 74.00      |            |            | 2.76              | 34.26          | 0.00          | 123   | 103   | Average | VERTICAL  |
| 4 | 5500.71 | 117.91 | 94.00      |            |            | 2.76              | 34.26          | 0.00          | 123   | 103   | Peak    | VERTICAL  |

Item 3, 4 are the fundamental frequency at 5510MHz.

### Channel 110

|   | Freq    | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|---------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz     | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 5460.00 | 59.81  | 60.00      | -0.19      | 22.87      | 2.73              | 34.21          | 0.00          | 122   | 100   | Average | VERTICAL  |
| 2 | 5460.00 | 72.40  | 80.00      | -7.60      | 35.46      | 2.73              | 34.21          | 0.00          | 122   | 100   | Peak    | VERTICAL  |
| 3 | 5539.10 | 122.30 | 94.00      |            |            | 2.77              | 34.31          | 0.00          | 122   | 100   | Peak    | VERTICAL  |
| 4 | 5541.35 | 109.35 | 74.00      |            |            | 2.77              | 34.31          | 0.00          | 122   | 100   | Average | VERTICAL  |

Item 3, 4 are the fundamental frequency at 5550 MHz.

### Channel 134

|   | Freq    | Level  | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | Pol/Phase |
|---|---------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz     | dBuV/m | dBuV/m     | dB         | dBuV       | dB                | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 5677.20 | 111.26 | 74.00      |            |            | 2.86              | 34.33          | 0.00          | 202   | 108   | Average | VERTICAL  |
| 2 | 5678.00 | 123.61 | 94.00      |            |            | 2.86              | 34.33          | 0.00          | 202   | 108   | Peak    | VERTICAL  |
| 3 | 5725.00 | 65.52  | 74.00      | -8.48      | 28.29      | 2.89              | 34.34          | 0.00          | 202   | 108   | Average | VERTICAL  |
| 4 | 5730.60 | 83.95  | 94.00      | -10.05     | 46.72      | 2.89              | 34.34          | 0.00          | 202   | 108   | Peak    | VERTICAL  |

Item 1, 2 are the fundamental frequency at 5670 MHz.

Note:

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

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

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1.5m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

|                      |              |                       |  |
|----------------------|--------------|-----------------------|--|
| <b>Temperature</b>   | 21°C         | <b>Humidity</b>       | 56%                                      |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11a Ch 60, 64 / Mode 4 (Ant. 4) |
| <b>Test Date</b>     | May 22, 2010 |                       |  |

**Channel 60**

|   | Freq    | Level  | Limit  | Over  | Read  | CableAntenna | Preamp | T/Pos | A/Pos | Remark      | PoI/Phase |
|---|---------|--------|--------|-------|-------|--------------|--------|-------|-------|-------------|-----------|
|   | MHz     | dBuV/m | dBuV/m | dB    | dBuV  | dB           | dB/m   | dB    | deg   | cm          |           |
| 1 | 5297.20 | 125.88 | 94.00  |       |       | 3.14         | 33.34  | 0.00  | 201   | 100 Peak    | VERTICAL  |
| 2 | 5307.60 | 115.41 | 74.00  |       |       | 3.14         | 33.34  | 0.00  | 201   | 100 Average | VERTICAL  |
| 3 | 5350.00 | 59.92  | 60.00  | -0.08 | 23.33 | 3.16         | 33.43  | 0.00  | 201   | 100 Average | VERTICAL  |
| 4 | 5352.40 | 73.61  | 80.00  | -6.39 | 37.02 | 3.16         | 33.43  | 0.00  | 201   | 100 Peak    | VERTICAL  |

Item 1, 2 are the fundamental frequency at 5300 MHz.

**Channel 64**

|   | Freq    | Level  | Limit  | Over  | Read  | CableAntenna | Preamp | T/Pos | A/Pos | Remark      | PoI/Phase |
|---|---------|--------|--------|-------|-------|--------------|--------|-------|-------|-------------|-----------|
|   | MHz     | dBuV/m | dBuV/m | dB    | dBuV  | dB           | dB/m   | dB    | deg   | cm          |           |
| 1 | 5313.60 | 111.93 | 74.00  |       |       | 3.14         | 33.37  | 0.00  | 196   | 100 Average | VERTICAL  |
| 2 | 5326.80 | 123.64 | 94.00  |       |       | 3.15         | 33.40  | 0.00  | 196   | 100 Peak    | VERTICAL  |
| 3 | 5350.00 | 59.97  | 60.00  | -0.03 | 23.38 | 3.16         | 33.43  | 0.00  | 196   | 100 Average | VERTICAL  |
| 4 | 5350.20 | 76.78  | 80.00  | -3.22 | 40.19 | 3.16         | 33.43  | 0.00  | 196   | 100 Peak    | VERTICAL  |

Item 1, 2 are the fundamental frequency at 5320 MHz.

|                      |              |                       |   |
|----------------------|--------------|-----------------------|---|
| <b>Temperature</b>   | 21°C         | <b>Humidity</b>       | 56%   |
| <b>Test Engineer</b> | Alan Huang   | <b>Configurations</b> | IEEE 802.11a Ch 100, 140<br>/ Mode 4 (Ant. 4) |
| <b>Test Date</b>     | May 24, 2010 |                       |   |

### Channel 100

|   | Freq    | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | PoI/Phase |
|---|---------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz     | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 5458.20 | 73.62  | 80.00      | -6.38      | 36.68      | 2.73       | 34.21          | 0.00          | 246   | 100   | Peak    | VERTICAL  |
| 2 | 5460.00 | 59.97  | 60.00      | -0.03      | 23.03      | 2.73       | 34.21          | 0.00          | 246   | 100   | Average | VERTICAL  |
| 3 | 5495.00 | 125.98 | 94.00      |            |            | 2.76       | 34.26          | 0.00          | 246   | 100   | Peak    | VERTICAL  |
| 4 | 5505.60 | 115.16 | 74.00      |            |            | 2.76       | 34.28          | 0.00          | 246   | 100   | Average | VERTICAL  |

Item 3, 4 are the fundamental frequency at 5500 MHz.

### Channel 140

|   | Freq    | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark  | PoI/Phase |
|---|---------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
|   | MHz     | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            | deg   | cm    |         |           |
| 1 | 5704.00 | 115.99 | 74.00      |            |            | 2.88       | 34.34          | 0.00          | 231   | 100   | Average | VERTICAL  |
| 2 | 5707.00 | 127.04 | 94.00      |            |            | 2.88       | 34.34          | 0.00          | 231   | 100   | Peak    | VERTICAL  |
| 3 | 5725.20 | 66.79  | 74.00      | -7.21      | 29.56      | 2.89       | 34.34          | 0.00          | 231   | 100   | Average | VERTICAL  |
| 4 | 5728.80 | 85.65  | 94.00      | -8.35      | 48.42      | 2.89       | 34.34          | 0.00          | 231   | 100   | Peak    | VERTICAL  |

Item 1, 2 are the fundamental frequency at 5700 MHz.

Note:

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

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

The limits above 5GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1.5m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

## 4.7. Frequency Stability Measurement

### 4.7.1. Limit

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emissions is maintained within the band of operation under all conditions of normal operation as specified in the user's manual or  $\pm 20\text{ppm}$  (IEEE 802.11n specification).

### 4.7.2. Measuring Instruments and Setting

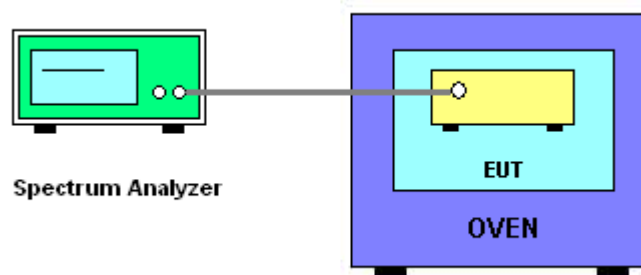
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

### 4.7.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5.  $f_c$  is declaring of channel frequency. Then the frequency error formula is  $(f_c - f) / f_c \times 10^6$  ppm and the limit is less than  $\pm 20\text{ppm}$  (IEEE 802.11n specification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature rule is  $-30^\circ\text{C} \sim 50^\circ\text{C}$ .
8. Measuring multiple antennas, the connector is required to link with spectrum analyzer through a combiner.

### 4.7.4. Test Setup Layout



#### 4.7.5. Test Deviation

There is no deviation with the original standard.

#### 4.7.6. EUT Operation during Test

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

#### 4.7.7. Test Result of Frequency Stability

<For Antenna 1>:

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11a / Antenna 1 |
| <b>Test Date</b>     | May 31, 2010  |                       |                     |

#### Voltage vs. Frequency Stability

| Voltage              | Measurement Frequency (MHz) |
|----------------------|-----------------------------|
| (V)                  | <b>5300</b>                 |
| 126.50               | 5300.021100                 |
| 110.00               | 5300.013200                 |
| 93.50                | 5300.020000                 |
| Max. Deviation (MHz) | <b>0.021100</b>             |
| Max. Deviation (ppm) | <b>3.98</b>                 |

#### Temperature vs. Frequency Stability

| Temperature          | Measurement Frequency (MHz) |
|----------------------|-----------------------------|
| (°C)                 | <b>5300</b>                 |
| -30                  | 5299.998800                 |
| -20                  | 5299.998800                 |
| -10                  | 5300.003000                 |
| 0                    | 5300.004800                 |
| 10                   | 5300.010800                 |
| 20                   | 5300.022200                 |
| 30                   | 5300.017400                 |
| 40                   | 5300.019200                 |
| 50                   | 5300.025800                 |
| Max. Deviation (MHz) | <b>0.025800</b>             |
| Max. Deviation (ppm) | <b>4.8679</b>               |

<For Antenna 2>:

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11a / Antenna 2 |
| <b>Test Date</b>     | May 28, 2010  |                       |                     |

**Voltage vs. Frequency Stability**

| <b>Voltage</b>       | <b>Measurement Frequency (MHz)</b> |
|----------------------|------------------------------------|
| (V)                  | <b>5300</b>                        |
| 126.50               | 5300.021100                        |
| 110.00               | 5300.013200                        |
| 93.50                | 5300.020000                        |
| Max. Deviation (MHz) | <b>0.021100</b>                    |
| Max. Deviation (ppm) | <b>3.98</b>                        |

**Temperature vs. Frequency Stability**

| <b>Temperature</b>   | <b>Measurement Frequency (MHz)</b> |
|----------------------|------------------------------------|
| (°C)                 | <b>5300</b>                        |
| -30                  | 5299.998800                        |
| -20                  | 5299.998800                        |
| -10                  | 5300.003000                        |
| 0                    | 5300.004800                        |
| 10                   | 5300.010800                        |
| 20                   | 5300.022200                        |
| 30                   | 5300.017400                        |
| 40                   | 5300.019200                        |
| 50                   | 5300.025800                        |
| Max. Deviation (MHz) | <b>0.025800</b>                    |
| Max. Deviation (ppm) | <b>4.8679</b>                      |

<For Antenna 3>:

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11a / Antenna 3 |
| <b>Test Date</b>     | May 31, 2010  |                       |                     |

#### Voltage vs. Frequency Stability

| Voltage              | Measurement Frequency (MHz) |
|----------------------|-----------------------------|
| (V)                  | 5300                        |
| 126.50               | 5300.021100                 |
| 110.00               | 5300.013200                 |
| 93.50                | 5300.020000                 |
| Max. Deviation (MHz) | 0.021100                    |
| Max. Deviation (ppm) | 3.98                        |

#### Temperature vs. Frequency Stability

| Temperature          | Measurement Frequency (MHz) |
|----------------------|-----------------------------|
| (°C)                 | 5300                        |
| -30                  | 5299.998800                 |
| -20                  | 5299.998800                 |
| -10                  | 5300.003000                 |
| 0                    | 5300.004800                 |
| 10                   | 5300.010800                 |
| 20                   | 5300.022200                 |
| 30                   | 5300.017400                 |
| 40                   | 5300.019200                 |
| 50                   | 5300.025800                 |
| Max. Deviation (MHz) | 0.025800                    |
| Max. Deviation (ppm) | 4.8679                      |



<For Antenna 4>:

|                      |               |                       |                     |
|----------------------|---------------|-----------------------|---------------------|
| <b>Temperature</b>   | 21°C          | <b>Humidity</b>       | 56%                 |
| <b>Test Engineer</b> | Johnson Chang | <b>Configurations</b> | 802.11a / Antenna 4 |
| <b>Test Date</b>     | May 28, 2010  |                       |                     |

#### Voltage vs. Frequency Stability

| Voltage              | Measurement Frequency (MHz) |
|----------------------|-----------------------------|
| (V)                  | <b>5300</b>                 |
| 126.50               | 5300.021100                 |
| 110.00               | 5300.013200                 |
| 93.50                | 5300.020000                 |
| Max. Deviation (MHz) | <b>0.021100</b>             |
| Max. Deviation (ppm) | <b>3.98</b>                 |

#### Temperature vs. Frequency Stability

| Temperature          | Measurement Frequency (MHz) |
|----------------------|-----------------------------|
| (°C)                 | <b>5300</b>                 |
| -30                  | 5299.998800                 |
| -20                  | 5299.998800                 |
| -10                  | 5300.003000                 |
| 0                    | 5300.004800                 |
| 10                   | 5300.010800                 |
| 20                   | 5300.022200                 |
| 30                   | 5300.017400                 |
| 40                   | 5300.019200                 |
| 50                   | 5300.025800                 |
| Max. Deviation (MHz) | <b>0.025800</b>             |
| Max. Deviation (ppm) | <b>4.8679</b>               |

## **4.8. Antenna Requirements**

### **4.8.1. Limit**

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

### **4.8.2. Antenna Connector Construction**

Please refer to section 3.3 in this test report; antenna connector complied with the requirements.

## 5. LIST OF MEASURING EQUIPMENTS

| Instrument                 | Manufacturer   | Model No.     | Serial No.  | Characteristics      | Calibration Date | Remark                   |
|----------------------------|----------------|---------------|-------------|----------------------|------------------|--------------------------|
| 3m Semi Anechoic Chamber   | SIDT FRANKONIA | SAC-3M        | 03CH03-HY   | 30 MHz - 1 GHz<br>3m | Jun. 07, 2009    | Radiation<br>(03CH03-HY) |
| 3m Semi Anechoic Chamber   | SIDT FRANKONIA | SAC-3M        | 03CH03-HY   | 30 MHz - 1 GHz<br>3m | Jun. 07, 2010    | Radiation<br>(03CH03-HY) |
| Amplifier                  | SCHAFFNER      | COA9231A      | 18667       | 9 kHz - 2 GHz        | Jan. 24, 2010    | Radiation<br>(03CH03-HY) |
| Amplifier                  | Agilent        | 8449B         | 3008A02120  | 1 GHz - 26.5 GHz     | Jul. 21, 2009    | Radiation<br>(03CH03-HY) |
| Amplifier                  | MITEQ          | AMF-6F-260400 | 9121372     | 26.5 GHz - 40 GHz    | Apr. 06, 2009*   | Radiation<br>(03CH03-HY) |
| Spectrum Analyzer          | R&S            | FSP40         | 100004      | 9 kHz - 40 GHz       | Oct. 03, 2009    | Radiation<br>(03CH03-HY) |
| Loop Antenna               | R&S            | HFH2-Z2       | 860004/001  | 9 kHz - 30 MHz       | Jul. 28, 2008*   | Radiation<br>(03CH03-HY) |
| Bilog Antenna              | SCHAFFNER      | CBL 6112D     | 22237       | 30 MHz - 1 GHz       | Sep. 26, 2009    | Radiation<br>(03CH03-HY) |
| Horn Antenna               | EMCO           | 3115          | 6741        | 1GHz ~ 18GHz         | Apr. 28, 2010    | Radiation<br>(03CH03-HY) |
| Horn Antenna               | SCHWARZBECK    | BBHA9170      | BBHA9170154 | 15 GHz - 40 GHz      | Jan. 11, 2010    | Radiation<br>(03CH03-HY) |
| RF Cable-R03m              | Jye Bao        | RG142         | CB021       | 30 MHz - 1 GHz       | Jan. 05, 2010    | Radiation<br>(03CH03-HY) |
| RF Cable-HIGH              | SUHNER         | SUCOFLEX 106  | 03CH03-HY   | 1 GHz - 40 GHz       | Jan. 05, 2010    | Radiation<br>(03CH03-HY) |
| Turn Table                 | HD             | DS 420        | 420/650/00  | 0 - 360 degree       | N/A              | Radiation<br>(03CH03-HY) |
| Antenna Mast               | HD             | MA 240        | 240/560/00  | 1 m - 4 m            | N/A              | Radiation<br>(03CH03-HY) |
| Spectrum Analyzer          | R&S            | FSU26.5       | 100015      | 20Hz ~ 26.5GHz       | Oct. 29, 2009    | Conducted<br>(TH01-HY)   |
| Power Meter                | R&S            | NRVS          | 100444      | DC ~ 40GHz           | Jul. 31, 2009    | Conducted<br>(TH01-HY)   |
| Power Sensor               | R&S            | NRV-Z51       | 100666      | DC ~ 30GHz           | Aug. 05, 2009    | Conducted<br>(TH01-HY)   |
| Power Sensor               | R&S            | NRV-Z32       | 100057      | 30MHz ~ 6GHz         | Jul. 31, 2009    | Conducted<br>(TH01-HY)   |
| AC Power Source            | HPC            | HPA-500W      | HPA-9100024 | AC 0 ~ 300V          | Jul. 12, 2009*   | Conducted<br>(TH01-HY)   |
| DC Power Source            | G.W.           | GPC-6030D     | C671845     | DC 1V ~ 60V          | Mar. 13, 2010    | Conducted<br>(TH01-HY)   |
| Temp. and Humidity Chamber | Giant Force    | GTH-225-20-S  | MAB0103-001 | N/A                  | Aug. 06, 2009    | Conducted<br>(TH01-HY)   |
| RF CABLE-1m                | Jye Bao        | RG142         | CB034-1m    | 20MHz ~ 7GHz         | Dec. 02, 2009    | Conducted<br>(TH01-HY)   |
| RF CABLE-2m                | Jye Bao        | RG142         | CB035-2m    | 20MHz ~ 1GHz         | Dec. 02, 2009    | Conducted<br>(TH01-HY)   |
| Vector Signal Generator    | R&S            | SMU200A       | 102098      | 100kHz ~ 6GHz        | Feb. 13, 2010    | Conducted<br>(TH01-HY)   |
| Signal Generator           | R&S            | SMR40         | 100116      | 10MHz ~ 40GHz        | Mar. 25, 2010    | Conducted<br>(TH01-HY)   |
| Power Sensor               | Anritsu        | MA2411B       | 0917017     | 300MHz~40GHz         | Dec. 03, 2009    | Conducted<br>(TH01-HY)   |



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| Instrument  | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Remark              |
|-------------|--------------|-----------|------------|-----------------|------------------|---------------------|
| Power Meter | Anritsu      | ML2495A   | 0949003    | 300MHz~40GHz    | Dec. 03, 2009    | Conducted (TH01-HY) |

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

Note: For "\*" Calibration Interval of instruments listed above is two years.

## 6. TEST LOCATION

|        |  |
|--------|--|
| SHIJR  | ADD : 6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C.<br>TEL : 886-2-2696-2468<br>FAX : 886-2-2696-2255 |
| HWA YA | ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.<br>TEL : 886-3-327-3456<br>FAX : 886-3-318-0055         |
| LINKOU | ADD : No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C<br>TEL : 886-2-2601-1640<br>FAX : 886-2-2601-1695               |
| DUNGHU | ADD : No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C.<br>TEL : 886-2-2631-4739<br>FAX : 886-2-2631-9740            |
| JUNGHE | ADD : 7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C.<br>TEL : 886-2-8227-2020<br>FAX : 886-2-8227-2626           |
| NEIHU  | ADD : 4Fl., No. 339, Hsin Hu 2 <sup>nd</sup> Rd., Taipei 114, Taiwan, R.O.C.<br>TEL : 886-2-2794-8886<br>FAX : 886-2-2794-9777         |
| JHUBEI | ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.<br>TEL : 886-3-656-9065<br>FAX : 886-3-656-9085       |

## 7. TAF CERTIFICATE OF ACCREDITATION



Certificate No. : L1190-091230

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

### Certificate of Accreditation

This is to certify that

**Sporton International Inc.**  
**EMC & Wireless Communications Laboratory**  
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien,  
Taiwan, R.O.C.

**is accredited in respect of laboratory**

|                                       |  |
|---------------------------------------|--|
| <b>Accreditation Criteria</b>         | : ISO/IEC 17025:2005   |
| <b>Accreditation Number</b>           | : 1190   |
| <b>Originally Accredited</b>          | : December 15, 2003  |
| <b>Effective Period</b>               | : January 10, 2010 to January 09, 2013   |
| <b>Accredited Scope</b>               | : Testing Field, see described in the Appendix   |
| <b>Specific Accreditation Program</b> | : Accreditation Program for Designated Testing Laboratory for Commodities Inspection<br>Accreditation Program for Telecommunication Equipment Testing Laboratory<br>Accreditation Program for BSMI Mutual Recognition Arrangement with Foreign Authorities |

*Jay-san Chen*

Jay-San Chen  
President, Taiwan Accreditation Foundation  
Date : December 30, 2009

Pl, total 22 pages

The Appendix forms an integral part of this Certificate, which shall be invalid when use without the Appendix