

# FCC RADIO TEST REPORT

according to

47 CFR FCC Part 15 Subpart C § 15.247

**Model Name** : Wi-Fi 5GHz Access Point  
**Model No.** : TG233  
**Filing Type** : New Application  
**FCC ID** : RSE-TG233  
**Trade Name** : technicolor  
**Applicant** : Technicolor Delivery Technologies Belgium  
Prins Boudewijnlaan 47 B-2650 Edegem Belgium

## Statement

**Test result included is only for the IEEE 802.11n part and IEEE 802.11a (5725 ~ 5850MHz) 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 C63.10-2009, 47 CFR FCC Part 15 Subpart C, KDB 558074 D01 v03r01 and KDB 662911 D01 v02.**

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



***SPORTON International Inc.***

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

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### History of This Test Report

| REPORT NO. | VERSION | DESCRIPTION             | ISSUED DATE   |
|------------|---------|-------------------------|---------------|
| FR3N0114AA | Rev.01  | Initial issue of report | Jan. 29, 2014 |
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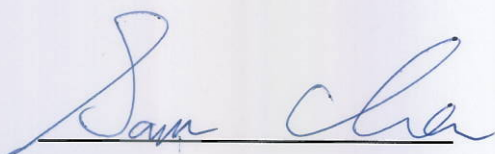
# **CERTIFICATE OF COMPLIANCE**

according to

**47 CFR FCC Part 15 Subpart C § 15.247**

Model Name : Wi-Fi 5GHz Access Point  
Model No. : TG233  
Trade Name : technicolor  
Applicant : Technicolor Delivery Technologies Belgium  
Prins Boudewijnlaan 47 B-2650 Edegem Belgium

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Oct. 30, 2013 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.



**Sam Chen**

***SPORTON International Inc.***

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

## 1 SUMMARY OF THE TEST RESULT

| Applied Standard: 47 CFR FCC Part 15 Subpart C |              |                                   |          |             |
|------------------------------------------------|--------------|-----------------------------------|----------|-------------|
| Part                                           | Rule Section | Description of Test               | Result   | Under Limit |
| 3.1                                            | 15.207       | AC Power Line Conducted Emissions | Complies | 11.59 dB    |
| 3.2                                            | 15.247(b)(3) | Conducted Output Power            | Complies | 4.71 dB     |
| 3.3                                            | 15.247(e)    | Power Spectral Density            | Complies | 12.1 dB     |
| 3.4                                            | 15.247(a)(2) | 6dB Spectrum Bandwidth            | Complies | -           |
| 3.5                                            | 15.247(d)    | Radiated Emissions                | Complies | 4.38 dB     |
| 3.6                                            | 15.247(d)    | Band Edge Emissions               | Complies | -           |
| 3.7                                            | 15.203       | Antenna Requirements              | Complies | -           |

## 1.1 Information provided by the manufacturer

Model Name: Wi-Fi 5GHz Access Point

Model No.: TG233

Trade Name: technicolor

Power Supply: Switching-Type, 12Vdc, 1A, Manufacturer: Huntkey, Model: HKA01212010-2G  
DSL37094480

AC Power Cord: Wall-mount, 2pin

Hardware Version: PEM2

Interface Availability

| Model Name \ Interface | DC<br>12Vdc 1A | Ethernet<br>10/100/ 1000 Mbps | WLAN<br>IEEE 802.11n 5G<br>(20MHz / 40MHz) |
|------------------------|----------------|-------------------------------|--------------------------------------------|
| TG233                  | •              | •                             | •                                          |

• : Equipped

○ : Not Equipped

## 1.2 Application of harmonized standard

US Standard: 47 CFR FCC Part 15 Subpart C § 15.247

ANSI C63.10-2009

KDB662911 D01 Multiple Transmitter Output v02, 05/28/2013

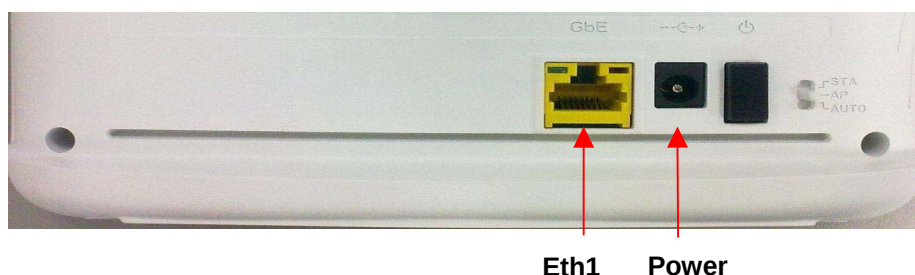
KDB558074 D01 DTS Meas Guidance v03r01, 04/09/2013

## 1.3 Cabling Attached to the Equipment

Table 1- Cable and Interconnection

| Interface | Cable type | Cable length delivered with the modem | "Real life" Cable length that can be attached to this type of interface | Cable length to be used for testing | Internal / external connection |
|-----------|------------|---------------------------------------|-------------------------------------------------------------------------|-------------------------------------|--------------------------------|
| Eth1      | UTP Cat 5  | 2 meter                               | > 10 meter                                                              | Two 10 meter cables                 | Internal                       |
| AC power  | -          | -                                     | -                                                                       | -                                   | External                       |

## 1.4 Panel Drawing



## 2 GENERAL INFORMATION

### 2.1 Product Details

| Items                                                | Description                                                                                                   |                                                                                                |                                     |                                                             |
|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------------------------------|
| Product                                              | Stand alone                                                                                                   |                                                                                                |                                     |                                                             |
| Model No.                                            | TG233                                                                                                         |                                                                                                |                                     |                                                             |
| FCC ID                                               | RSE- TG233                                                                                                    |                                                                                                |                                     |                                                             |
| Power Type                                           | From power adapter                                                                                            |                                                                                                |                                     |                                                             |
| EUT Stage                                            | <input checked="" type="checkbox"/>                                                                           | Product Unit                                                                                   | <input type="checkbox"/>            | Pre-Sample                                                  |
| Antenna Type                                         | Please see Section 2.3                                                                                        |                                                                                                |                                     |                                                             |
| Product Type                                         | IEEE 802.11a: WLAN (4TX, 4RX)<br>IEEE 802.11n (20MHz): WLAN(4TX, 4RX)<br>IEEE 802.11n (40MHz): WLAN(4TX, 4RX) |                                                                                                |                                     |                                                             |
| Nominal Chennel Bandwidth                            | 20MHz / 40MHz                                                                                                 |                                                                                                |                                     |                                                             |
| Modulation                                           | 802.11a: OFDM (BPSK / QPSK / 16QAM / 64QAM)<br>802.11n: See the below table.                                  |                                                                                                |                                     |                                                             |
| Data Rate (Mbps)                                     | 11a mode:OFDM (6/9/12/18/24/36/48/54)<br>11n(20MHz) mode:(MCS0~MCS31); 11n(40MHz)mode:(MCS0~MCS31)            |                                                                                                |                                     |                                                             |
| Operating Band,<br>Maximum Conducted Output<br>Power | 5725~5850MHz                                                                                                  | <input checked="" type="checkbox"/>                                                            | IEEE 802.11a: 25.29 dBm             |                                                             |
|                                                      |                                                                                                               | <input checked="" type="checkbox"/>                                                            | IEEE 802.11n (20MHz): 25.29 dBm     |                                                             |
|                                                      |                                                                                                               | <input checked="" type="checkbox"/>                                                            | IEEE 802.11n (40MHz): 25.13 dBm     |                                                             |
| TPC Function                                         | <input checked="" type="checkbox"/>                                                                           | With TPC                                                                                       | <input type="checkbox"/>            | Without TPC                                                 |
| Beam forming Function                                | <input type="checkbox"/>                                                                                      | With Beam forming                                                                              | <input checked="" type="checkbox"/> | Without Beam forming, but it has Total Max Composition Gain |
| DFS Operating Mode(s)                                | <input checked="" type="checkbox"/>                                                                           | Master                                                                                         | <input checked="" type="checkbox"/> | Slave without radar detection                               |
| DFS Function                                         | <input checked="" type="checkbox"/>                                                                           | 5250~5350MHz                                                                                   |                                     |                                                             |
|                                                      | <input checked="" type="checkbox"/>                                                                           | 5470~5725MHz                                                                                   |                                     |                                                             |
|                                                      | <input type="checkbox"/>                                                                                      | 5600~5650MHz                                                                                   |                                     |                                                             |
| User Access Restrictions                             | <input checked="" type="checkbox"/>                                                                           | DFS controls (hardware or software) related to radar detection are NOT accessible to the user. |                                     |                                                             |
| Software Version                                     | v35.1.0.30                                                                                                    |                                                                                                |                                     |                                                             |
| Associated Devices                                   | Power supply x 1                                                                                              |                                                                                                |                                     |                                                             |

## 2.2 Accessories

| Power                        | Brand   | Model          | Rating                                             |
|------------------------------|---------|----------------|----------------------------------------------------|
| Switching-Type Power Adapter | Huntkey | HKA01212010-2G | Input:100-240V~0.5A 50/60Hz<br>Output: 12.0V, 1.0A |

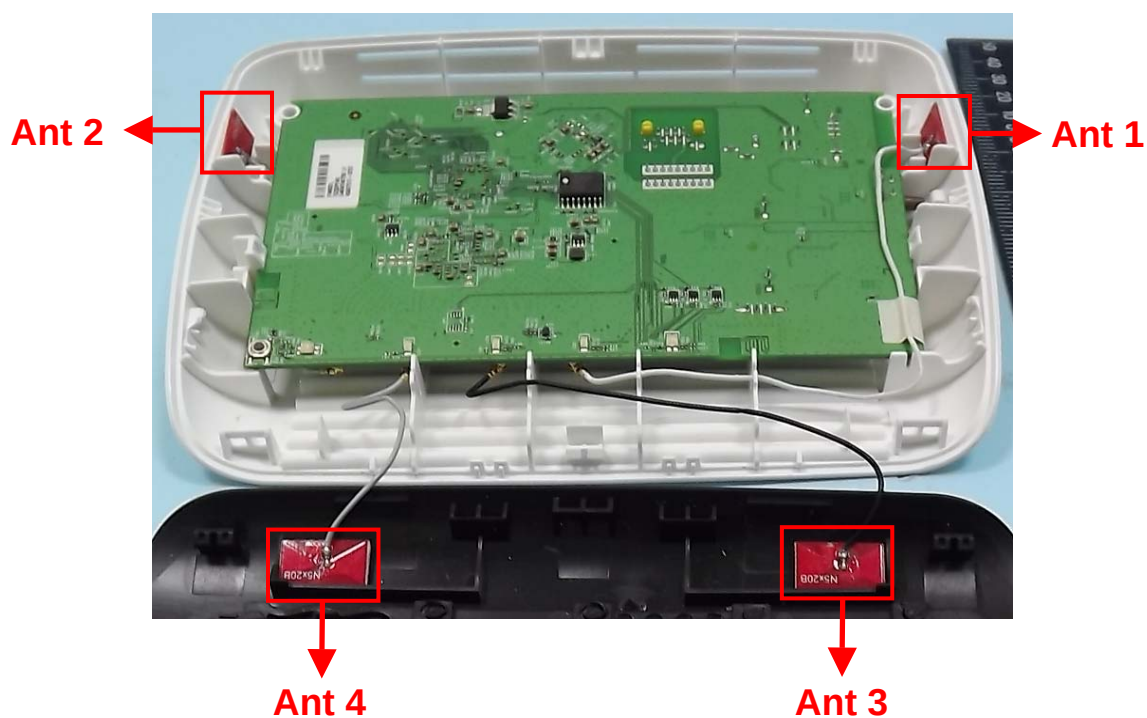
## 2.3 Table for Filed Antenna

| Ant. | Brand   | Model Name           | Antenna Type | Connector |
|------|---------|----------------------|--------------|-----------|
| 1    | Airgain | N5X20B-T-PK1-W170UR2 | PCB Antenna  | I-PEX     |
| 2    | Airgain | N5X20B-T-PK1-G85UR2  | PCB Antenna  | I-PEX     |
| 3    | Airgain | N5X20B-T-PK1-G85UR2  | PCB Antenna  | I-PEX     |
| 4    | Airgain | N5X20B-T-PK1-B130UR2 | PCB Antenna  | I-PEX     |

### Antenna & Bandwidth

| Antenna        | 4 steam (TX) |        |
|----------------|--------------|--------|
| Bandwidth Mode | 20 MHz       | 40 MHz |
| 802.11a        | V            | X      |
| 802.11n        | V            | V      |

| Bandwidth | Total Max Composition Gain (dBi) for Band4 (5725MHz~5850MHz) |         |         |         |         |         |
|-----------|--------------------------------------------------------------|---------|---------|---------|---------|---------|
|           | Ant. 1 + 2 + 3 + 4                                           |         |         |         |         |         |
|           | 5745MHz                                                      | 5755MHz | 5785MHz | 5795MHz | 5805MHz | 5825MHz |
| 20MHz     | 1.07                                                         | -       | 1.22    | -       | 1.27    | 0.48    |
| 40MHz     | -                                                            | 0.89    | -       | 1.27    | -       | -       |



## IEEE 802.11n Data Rate spec

| Standard                                     | INDEX | Data Rate (Mbps) |             | Standard                                     | INDEX | Data Rate (Mbps) |             |
|----------------------------------------------|-------|------------------|-------------|----------------------------------------------|-------|------------------|-------------|
|                                              |       | LGI (800ns)      | SGI (400ns) |                                              |       | LGI (800ns)      | SGI (400ns) |
| 11n<br>20MHz<br>1 stream<br>on 4<br>antennas | MCS0  | 6.5              | 7.2         | 11n<br>40MHz<br>1 stream<br>on 4<br>antennas | MCS0  | 13.5             | 15          |
|                                              | MCS1  | 13               | 14.4        |                                              | MCS1  | 27               | 30          |
|                                              | MCS2  | 19.5             | 21.7        |                                              | MCS2  | 40.5             | 45          |
|                                              | MCS3  | 26               | 28.9        |                                              | MCS3  | 54               | 60          |
|                                              | MCS4  | 39               | 43.3        |                                              | MCS4  | 81               | 90          |
|                                              | MCS5  | 52               | 57.8        |                                              | MCS5  | 108              | 120         |
|                                              | MCS6  | 58.5             | 65          |                                              | MCS6  | 121.5            | 135         |
| 11n<br>20MHz<br>2 stream<br>on 4<br>antennas | MCS7  | 65               | 72.2        | 11n<br>40MHz<br>2 stream<br>on 4<br>antennas | MCS7  | 135              | 150         |
|                                              | MCS8  | 13               | 14.4        |                                              | MCS8  | 27               | 30          |
|                                              | MCS9  | 26               | 28.9        |                                              | MCS9  | 54               | 60          |
|                                              | MCS10 | 39               | 43.3        |                                              | MCS10 | 81               | 90          |
|                                              | MCS11 | 52               | 57.8        |                                              | MCS11 | 108              | 120         |
|                                              | MCS12 | 78               | 86.7        |                                              | MCS12 | 162              | 180         |
|                                              | MCS13 | 104              | 115.6       |                                              | MCS13 | 216              | 240         |
| 11n<br>20MHz<br>3 stream<br>on 4<br>antennas | MCS14 | 117              | 130         | 11n<br>40MHz<br>3 stream<br>on 4<br>antennas | MCS14 | 243              | 270         |
|                                              | MCS15 | 130              | 144.4       |                                              | MCS15 | 270              | 300         |
|                                              | MCS16 | 19.5             | 21.7        |                                              | MCS16 | 40.5             | 45          |
|                                              | MCS17 | 39               | 43.3        |                                              | MCS17 | 81               | 90          |
|                                              | MCS18 | 58.5             | 65          |                                              | MCS18 | 121.5            | 135         |
|                                              | MCS19 | 78               | 86.7        |                                              | MCS19 | 162              | 180         |
|                                              | MCS20 | 117              | 130         |                                              | MCS20 | 243              | 270         |
| 11n<br>20MHz<br>4 stream<br>on 4<br>antennas | MCS21 | 156              | 173.3       | 11n<br>40MHz<br>4 stream<br>on 4<br>antennas | MCS21 | 324              | 360         |
|                                              | MCS22 | 175.5            | 195         |                                              | MCS22 | 364.5            | 405         |
|                                              | MCS23 | 195              | 216.7       |                                              | MCS23 | 405              | 450         |
|                                              | MCS24 | 26               | 28.9        |                                              | MCS24 | 54               | 60          |
|                                              | MCS25 | 52               | 57.8        |                                              | MCS25 | 108              | 120         |
|                                              | MCS26 | 78               | 86.7        |                                              | MCS26 | 162              | 180         |
|                                              | MCS27 | 104              | 115.6       |                                              | MCS27 | 216              | 240         |
| 11n<br>20MHz<br>4 stream<br>on 4<br>antennas | MCS28 | 156              | 173.3       | 11n<br>40MHz<br>4 stream<br>on 4<br>antennas | MCS28 | 324              | 360         |
|                                              | MCS29 | 208              | 231.1       |                                              | MCS29 | 432              | 480         |
|                                              | MCS30 | 234              | 260         |                                              | MCS30 | 486              | 540         |
|                                              | MCS31 | 260              | 288.9       |                                              | MCS31 | 540              | 600         |

## 2.4 Transmit Operating Modes

| Transmit Operating Mode |               |                                                                                                                       | Transmit Multiple Antennas |          |
|-------------------------|---------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
| ■                       | 802.11a       | Operating mode (multiple antenna, without beam forming, with Total Max Composition Gain, with TPC for Band2 & Band 3) | ■                          | 4TX only |
|                         | 802.11n 20MHz |                                                                                                                       |                            |          |
|                         | 802.11n 40MHz |                                                                                                                       |                            |          |

Note1: For IEEE802.11n, MCS0~MCS31: 4TX only

## 2.5 Table for Carrier Frequencies

5 channels are provided for 802.11a, 802.11n Band4 (20MHz):

| Frequency Band     | Channel No. | Frequency | Channel No. | Frequency |
|--------------------|-------------|-----------|-------------|-----------|
| 5725MHz ~ 5850 MHz | 149         | 5745MHz   | 161         | 5805MHz   |
|                    | 153         | 5765MHz   | 165         | 5825MHz   |
|                    | 157         | 5785MHz   | -           | -         |

Note: Master mode doesn't support 5825MHz, slave without radar detection mode supports 5825MHz.

2 channels are provided for 802.11n Band4 (40MHz):

| Frequency Band     | Channel No. | Frequency | Channel No. | Frequency |
|--------------------|-------------|-----------|-------------|-----------|
| 5725MHz ~ 5850 MHz | 151         | 5755MHz   | 159         | 5795MHz   |

## 2.6 Table for Test Modes

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.

| Test Items                               | Mode       | Note      | Channel         | Data Rate | Antenna |
|------------------------------------------|------------|-----------|-----------------|-----------|---------|
| AC Power Line Conducted Emissions        | CTX        | -         | -               | -         | -       |
| Maximum Conducted Output Power (Average) | 11a        | OFDM/BPSK | 149/157/161/165 | 6Mbps     | 1+2+3+4 |
|                                          | 11n(20MHz) |           | 149/157/161/165 | MCS0      | 1+2+3+4 |
|                                          | 11n(40MHz) |           | 151/159         | MCS0      | 1+2+3+4 |
| Power Spectral Density                   | 11a        | OFDM/BPSK | 149/157/161/165 | 6Mbps     | 1+2+3+4 |
|                                          | 11n(20MHz) |           | 149/157/161/165 | MCS0      | 1+2+3+4 |
|                                          | 11n(40MHz) |           | 151/159         | MCS0      | 1+2+3+4 |
| 6dB Spectrum Bandwidth                   | 11a        | OFDM/BPSK | 149/157/161/165 | 6Mbps     | 1+2+3+4 |
|                                          | 11n(20MHz) |           | 149/157/161/165 | MCS0      | 1+2+3+4 |
|                                          | 11n(40MHz) |           | 151/159         | MCS0      | 1+2+3+4 |
| Band Edge Emissions (Radiated)           | 11a        | OFDM/BPSK | 149/165         | 6Mbps     | 1+2+3+4 |
|                                          | 11n(20MHz) |           | 149/165         | MCS0      | 1+2+3+4 |
|                                          | 11n(40MHz) |           | 151/159         | MCS0      | 1+2+3+4 |
| Radiated Emissions Above 1GHz (Radiated) | 11a        | OFDM/BPSK | 149/157/161/165 | 6Mbps     | 1+2+3+4 |
|                                          | 11n(20MHz) |           | 149/157/161/165 | MCS0      | 1+2+3+4 |
|                                          | 11n(40MHz) |           | 151/159         | MCS0      | 1+2+3+4 |
| Radiated Emissions Below 1GHz(Radiated)  | CTX        | -         | -               | -         | -       |

## 2.7 Table for Testing Locations

| Test Site No. | Site Category | Location | FCC Reg. No. | IC File No. | VCCI Reg. No |
|---------------|---------------|----------|--------------|-------------|--------------|
| 03CH01-CB     | SAC           | Hsin Chu | 262045       | IC 4086D    | -            |
| CO01-CB       | Conduction    | Hsin Chu | 262045       | IC 4086D    | -            |
| TH01-CB       | OVEN Room     | Hsin Chu | -            | -           | -            |

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

## 2.8 Table for Supporting Units

| Support Unit | Brand | Model | FCC ID |
|--------------|-------|-------|--------|
| Notebook     | DELL  | E6430 | DoC    |

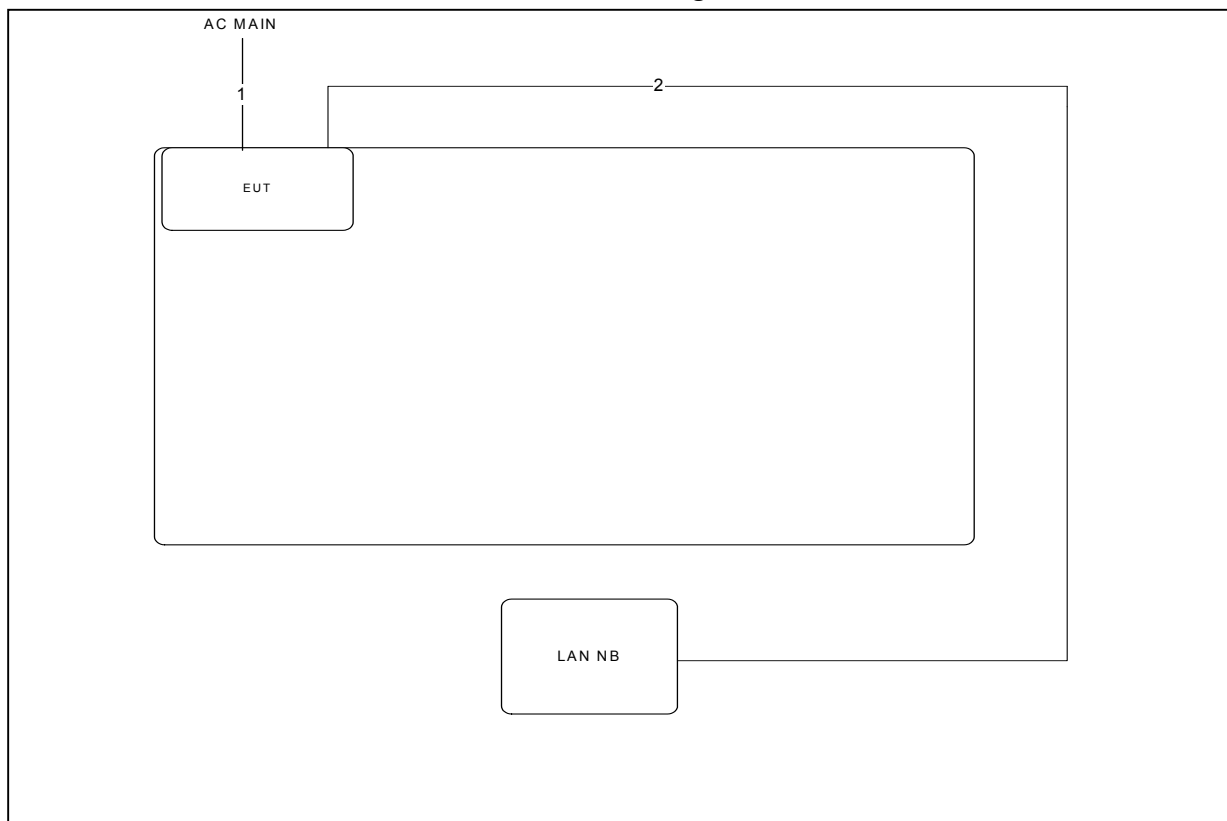
## 2.9 Table for the 5G Band 4 (5725~5850MHz) Parameters of Test Software Setting

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.

| The Power Setting Parameter |               |                                 |                 |               |                 |
|-----------------------------|---------------|---------------------------------|-----------------|---------------|-----------------|
| Power Level                 |               | 1                               |                 |               |                 |
| Test Software Version       |               | DOS                             |                 |               |                 |
| Worst Modulation Mode       |               | Number of Transmit Chains (NTX) | Frequency (MHz) | Power Setting | Data Rate / MCS |
| Ant. 1+2+3+4                | 802.11a       | 4                               | 5745            | 19            | 6Mbps           |
| Ant. 1+2+3+4                | 802.11a       | 4                               | 5785            | 19            | 6Mbps           |
| Ant. 1+2+3+4                | 802.11a       | 4                               | 5805            | 19            | 6Mbps           |
| Ant. 1+2+3+4                | 802.11a       | 4                               | 5825            | 19            | 6Mbps           |
| Ant. 1+2+3+4                | 802.11n 20MHz | 4                               | 5745            | 19            | MCS0            |
| Ant. 1+2+3+4                | 802.11n 20MHz | 4                               | 5785            | 19            | MCS0            |
| Ant. 1+2+3+4                | 802.11n 20MHz | 4                               | 5805            | 19            | MCS0            |
| Ant. 1+2+3+4                | 802.11n 20MHz | 4                               | 5825            | 19            | MCS0            |
| Ant. 1+2+3+4                | 802.11n 40MHz | 4                               | 5755            | 19            | MCS0            |
| Ant. 1+2+3+4                | 802.11n 40MHz | 4                               | 5795            | 19            | MCS0            |

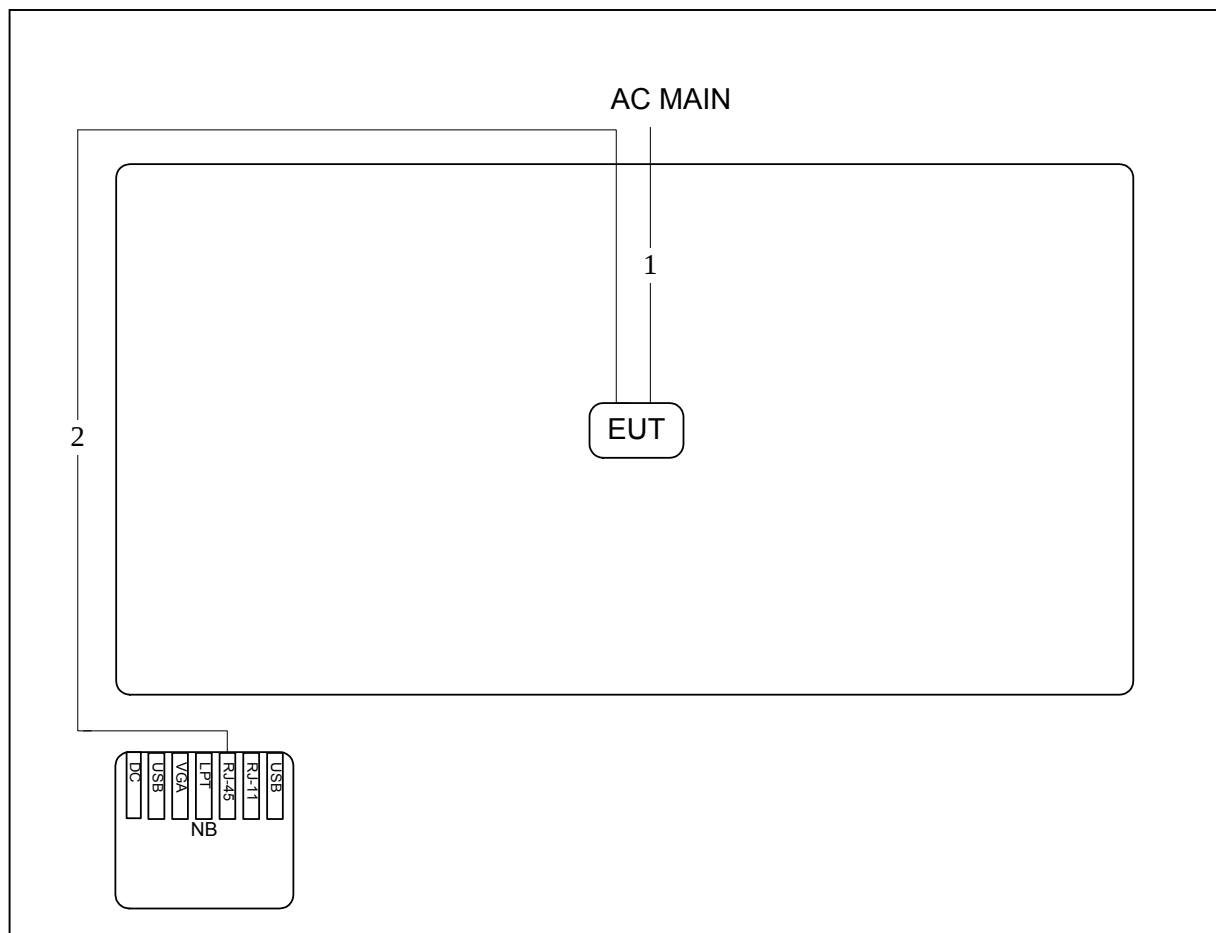
## 2.10 Test Configuration

### 2.10.1 AC Power Line Conduction Emissions Test Configuration



| Item | Connection  | Shielded | Length |
|------|-------------|----------|--------|
| 1    | Power cable | No       | 1.5M   |
| 2    | RJ-45 cable | No       | 10M    |

## 2.10.2 Radiation Emissions Test Configuration



| Item | Connection  | Shielded | Length |
|------|-------------|----------|--------|
| 1    | Power cable | No       | 1.5M   |
| 2    | RJ-45 cable | No       | 10M    |

### 3 THE 5G BAND 4 (5725~5850MHZ) TEST RESULT

#### 3.1 AC Power Line Conducted Emissions Measurement

##### 3.1.1 Limit

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

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

##### 3.1.2 Measuring Instruments and Setting

Please refer to section 6 of equipments list in this report. The following table is the setting of the receiver.

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

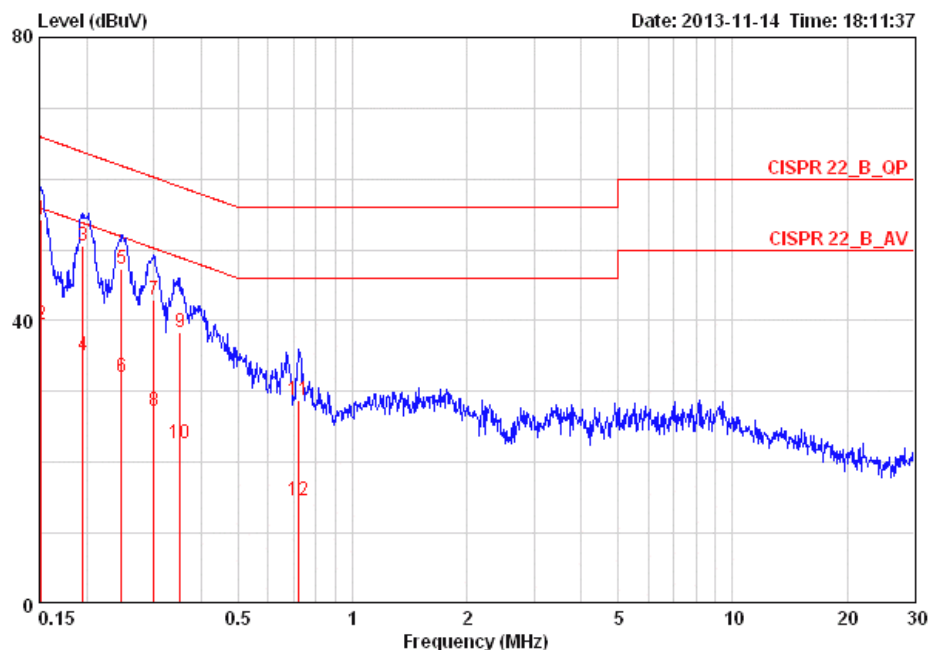
##### 3.1.3 Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 kHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.



## 3.1.7 Results of AC Power Line Conducted Emissions Measurement

|               |         |          |      |
|---------------|---------|----------|------|
| Temperature   | 25°C    | Humidity | 58%  |
| Test Engineer | Da Deng | Phase    | Line |
| Configuration | CTX     |          |      |



|    | Freq    | Level | Over   | Limit | Read  | LISN   | Cable |           |         |
|----|---------|-------|--------|-------|-------|--------|-------|-----------|---------|
|    | MHz     | dBuV  | Limit  | Line  | Level | Factor | Loss  | Pol/Phase | Remark  |
|    |         |       | dB     | dBuV  | dBuV  | dB     | dB    |           |         |
| 1  | 0.15160 | 54.32 | -11.59 | 65.91 | 53.98 | 0.16   | 0.18  | LINE      | QP      |
| 2  | 0.15160 | 39.54 | -16.37 | 55.91 | 39.20 | 0.16   | 0.18  | LINE      | AVERAGE |
| 3  | 0.19550 | 50.64 | -13.16 | 63.80 | 50.29 | 0.15   | 0.20  | LINE      | QP      |
| 4  | 0.19550 | 35.00 | -18.80 | 53.80 | 34.65 | 0.15   | 0.20  | LINE      | AVERAGE |
| 5  | 0.24682 | 47.24 | -14.62 | 61.86 | 46.89 | 0.15   | 0.20  | LINE      | QP      |
| 6  | 0.24682 | 32.12 | -19.74 | 51.86 | 31.77 | 0.15   | 0.20  | LINE      | AVERAGE |
| 7  | 0.30028 | 42.87 | -17.37 | 60.24 | 42.52 | 0.15   | 0.20  | LINE      | QP      |
| 8  | 0.30028 | 27.14 | -23.10 | 50.24 | 26.79 | 0.15   | 0.20  | LINE      | AVERAGE |
| 9  | 0.35201 | 38.35 | -20.56 | 58.91 | 38.00 | 0.15   | 0.20  | LINE      | QP      |
| 10 | 0.35201 | 22.70 | -26.21 | 48.91 | 22.35 | 0.15   | 0.20  | LINE      | AVERAGE |
| 11 | 0.72360 | 28.78 | -27.22 | 56.00 | 28.42 | 0.16   | 0.20  | LINE      | QP      |
| 12 | 0.72360 | 14.55 | -31.45 | 46.00 | 14.19 | 0.16   | 0.20  | LINE      | AVERAGE |

Note 1: The test was passed at the minimum margin that marked by the frame in the following data

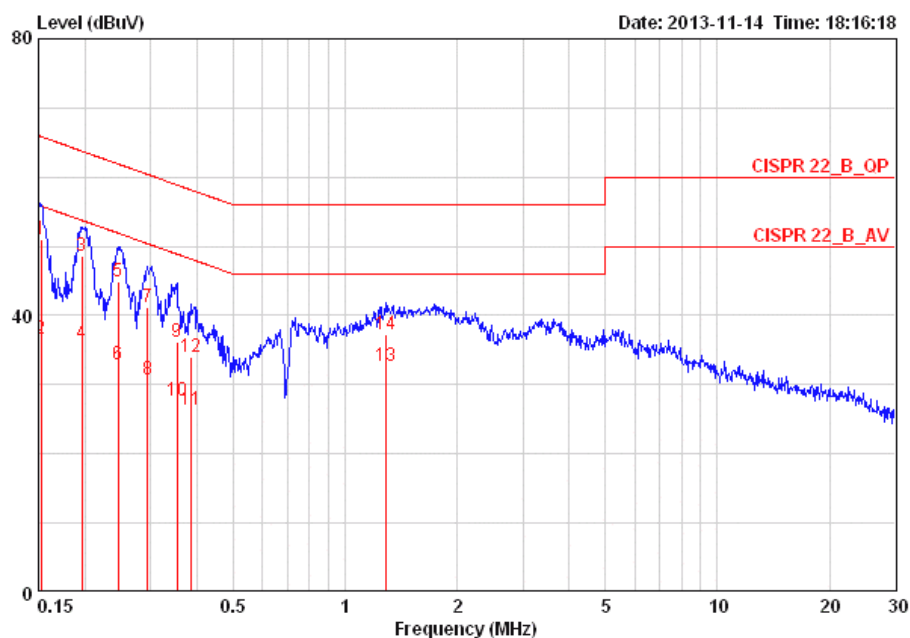
Note 2: The emission levels of other frequencies were very low against the limit.

Note 3: Q.P. and AV. are abbreviations of quasi-peak and average individually.

Note 4: Corrected Reading (dBuV) = LISN Factor + Cable Loss + Read Level = Level

Note 5: Over Limit value = level - Limit value

|               |         |          |         |
|---------------|---------|----------|---------|
| Temperature   | 25°C    | Humidity | 58%     |
| Test Engineer | Da Deng | Phase    | Neutral |
| Configuration | CTX     |          |         |



Note 1: The test was passed at the minimum margin that marked by the frame in the following data

Note 2: The emission levels of other frequencies were very low against the limit.

Note 3: Q.P. and AV. are abbreviations of quasi-peak and average individually.

Note 4: Corrected Reading (dBuV) = LISN Factor + Cable Loss + Read Level = Level

Note 5: Over Limit value = level - Limit value

## 3.2 Maximum Conducted Output Power Measurement

### 3.2.1 Limit

For systems using digital modulation in the 5725~5850MHz, the limit for peak output power is 30dBm. The limited has to be reduced by the amount in dB that the gain of the antenna exceed 6dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

### 3.2.2 Measuring Instruments and Setting

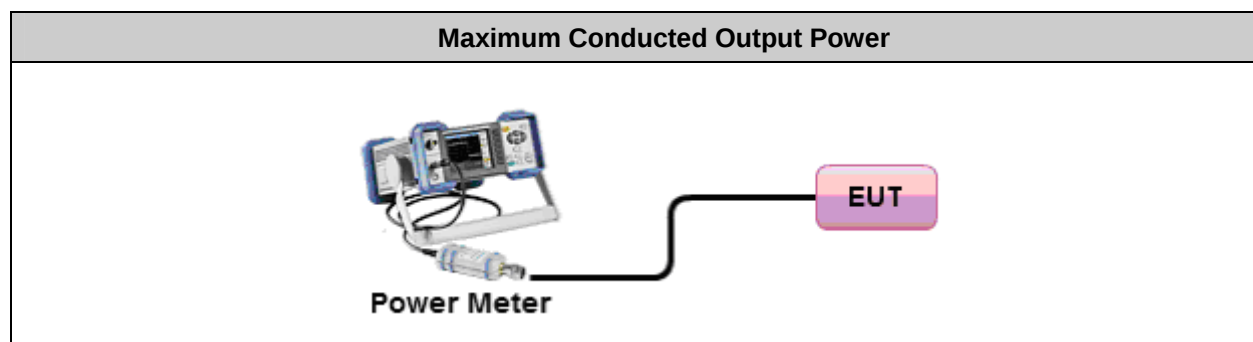
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

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

### 3.2.3 Test Procedures

1. Test was performed in accordance with Measurement of Digital Transmission Systems Operating under KDB558074 D01 v03r01 04/09/2013.
2. The average power sensor was used on the output port of the EUT. A power meter was used to read the response of the average power sensor and enable the trigger function to get the all on time transmission . Record the average power level.
3. When measuring maximum conducted output power with multiple antenna systems, add every result of the values by mathematic formula.

### 3.2.4 Test Setup Layout



### 3.2.5 Test Deviation

There are no deviation with the original standard.

### 3.2.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

## 3.2.7 Test Result for Maximum Conducted Output Power

|               |               |               |         |
|---------------|---------------|---------------|---------|
| Test date     | Nov. 05, 2013 | Test Site No. | TH01-CB |
| Temperature   | 26°C          | Humidity      | 63%     |
| Test Engineer | Wen Chao      | Configuration | 802.11a |
| Duty Cycle    | 99.26%        | Duty Factor   | 0.032   |

Configuration IEEE 802.11a

&lt;6Mbps, Ant. 1+2+3+4&gt;

| Channel | Frequency | Conducted Power (dBm) |        |        |        | Max. Limit (dBm) | Total Conducted Power (dBm) | Result   |
|---------|-----------|-----------------------|--------|--------|--------|------------------|-----------------------------|----------|
|         |           | Ant. 1                | Ant. 2 | Ant. 3 | Ant. 4 |                  |                             |          |
| 149     | 5745 MHz  | 18.06                 | 18.52  | 20.67  | 18.78  | 30.00            | 25.18                       | Complies |
| 157     | 5785 MHz  | 18.35                 | 18.05  | 20.8   | 19.02  | 30.00            | 25.25                       | Complies |
| 161     | 5805 MHz  | 18.21                 | 18.64  | 20.51  | 18.89  | 30.00            | 25.21                       | Complies |
| 165     | 5825 MHz  | 18.44                 | 18.41  | 20.75  | 18.91  | 30.00            | 25.29                       | Complies |

Note: 5745MHz Total conducted power

$$=(10*\text{LOG}((10^{(18.06\text{dBm}/10)}+(10^{(18.52\text{dBm}/10)}+(10^{(20.67\text{dBm}/10)}+(10^{(18.78\text{dBm}/10)))))+\text{duty factor}$$

$$=(10*\text{LOG}((10^{(18.06\text{dBm}/10)}+(10^{(18.52\text{dBm}/10)}+(10^{(20.67\text{dBm}/10)}+(10^{(18.78\text{dBm}/10)))))+0.032\text{dB}$$

$$=(10*\text{LOG}((63.97\text{mW})+(71.12\text{mW})+(116.68\text{mW})+(75.51\text{mW}))+0.032\text{dB}$$

$$=(10*\text{LOG}(327.28\text{mW}))+0.032\text{dB}$$

$$=25.15\text{dBm}+0.032\text{dB}$$

$$=25.18\text{dBm}$$

|               |               |               |               |
|---------------|---------------|---------------|---------------|
| Test date     | Nov. 05, 2013 | Test Site No. | TH01-CB       |
| Temperature   | 26°C          | Humidity      | 63%           |
| Test Engineer | Wen Chao      | Configuration | 802.11n 20MHz |
| Duty Cycle    | 99.20%        | Duty Factor   | 0.035         |

Configuration IEEE 802.11n 20MHz

<MCS0, Ant. 1+2+3+4>

| Channel | Frequency | Conducted Power (dBm) |        |        |        | Max. Limit (dBm) | Total Conducted Power (dBm) | Result   |
|---------|-----------|-----------------------|--------|--------|--------|------------------|-----------------------------|----------|
|         |           | Ant. 1                | Ant. 2 | Ant. 3 | Ant. 4 |                  |                             |          |
| 149     | 5745 MHz  | 18.24                 | 18.35  | 20.66  | 18.67  | 30.00            | 25.16                       | Complies |
| 157     | 5785 MHz  | 18.11                 | 18.34  | 20.77  | 18.71  | 30.00            | 25.18                       | Complies |
| 161     | 5805 MHz  | 18.45                 | 18.47  | 20.43  | 18.94  | 30.00            | 25.21                       | Complies |
| 165     | 5825 MHz  | 18.53                 | 18.32  | 20.67  | 19.02  | 30.00            | 25.29                       | Complies |

Note: 5745MHz Total conducted power

$= (10 \cdot \log((10^{(Ant\ 1/10)}) + (10^{(Ant\ 2/10)}) + (10^{(Ant\ 3/10)}) + (10^{(Ant\ 4/10)}))) + \text{duty factor}$

$= (10 \cdot \log((10^{(18.24\text{dBm}/10)}) + (10^{(18.35\text{dBm}/10)}) + (10^{(20.66\text{dBm}/10)}) + (10^{(18.67\text{dBm}/10)}))) + 0.035\text{dB}$

$= (10 \cdot \log((66.68\text{mW}) + (68.39\text{mW}) + (116.41\text{mW}) + (73.62\text{mW}))) + 0.035\text{dB}$

$= (10 \cdot \log(327.28\text{mW})) + 0.035\text{dB}$

$= 25.12\text{dBm} + 0.035\text{dB}$

$= 25.16\text{dBm}$

|               |               |               |               |
|---------------|---------------|---------------|---------------|
| Test date     | Nov. 05, 2013 | Test Site No. | TH01-CB       |
| Temperature   | 26°C          | Humidity      | 63%           |
| Test Engineer | Wen Chao      | Configuration | 802.11n 40MHz |
| Duty Cycle    | 97.97%        | Duty Factor   | 0.09          |

Configuration IEEE 802.11n 40MHz

<MCS0, Ant. 1+2+3+4>

| Channel | Frequency | Conducted Power (dBm) |        |        |        | Max. Limit (dBm) | Total Conducted Power (dBm) | Result   |
|---------|-----------|-----------------------|--------|--------|--------|------------------|-----------------------------|----------|
|         |           | Ant. 1                | Ant. 2 | Ant. 3 | Ant. 4 |                  |                             |          |
| 151     | 5755 MHz  | 18.09                 | 18.15  | 20.74  | 18.52  | 30.00            | 25.13                       | Complies |
| 159     | 5795 MHz  | 17.91                 | 18.22  | 20.66  | 18.56  | 30.00            | 25.09                       | Complies |

Note: 5755MHz Total conducted power

$= (10 \cdot \log((10^{(18.09/10)} + 10^{(18.15/10)} + 10^{(20.74/10)} + 10^{(18.52/10)}))) + \text{duty factor}$

$= (10 \cdot \log((10^{(18.09\text{dBm}/10)} + 10^{(18.15\text{dBm}/10)} + 10^{(20.74\text{dBm}/10)} + 10^{(18.52\text{dBm}/10)}))) + 0.09\text{dB}$

$= (10 \cdot \log((64.42\text{mW}) + (65.31\text{mW}) + (118.58\text{mW}) + (71.12\text{mW}))) + 0.09\text{dB}$

$= (10 \cdot \log(319.43\text{mW})) + 0.09\text{dB}$

$= 25.04\text{dBm} + 0.09\text{dB}$

$= 25.13\text{dBm}$

### 3.3 Power Spectral Density Measurement

#### 3.3.1 Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

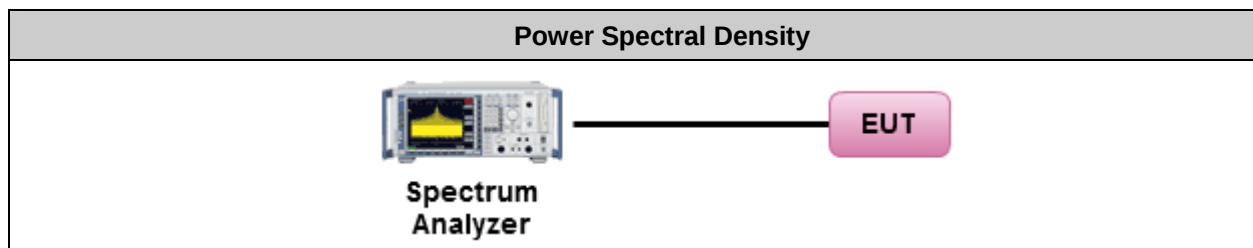
#### 3.3.2 Measuring Instruments and Setting

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

| Power Meter Parameter | Setting                                                   |
|-----------------------|-----------------------------------------------------------|
| Attenuation           | Auto                                                      |
| Span Frequency        | Set span to at least 1.5 times the DTS channel bandwidth. |
| RBW                   | $3\text{ kHz} \leq \text{RBW} \leq 100\text{kHz}$         |
| VBW                   | $\geq 3 \times \text{RBW}$ .                              |
| Detector              | RMS                                                       |
| Trace                 | Max Hold                                                  |
| Sweep Time            | 100 traces                                                |

#### 3.3.3 Test Procedures

1. Test procedures refer KDB 558074 D01 v03r01 section 10.3 Method Method AVGPS-1 (trace averaging with EUT transmitting at full power throughout each sweep) and KDB 662911 D01 v02 section In-Band Power Spectral Density (PSD) Measurements option (b) Measure and sum spectral maximal across the outputs.
2. Use this procedure when the maximum conducted output power in the fundamental emission is used to demonstrate compliance. The EUT must be configured to transmit continuously at full power over the measurement duration.
3. Ensure that the number of measurement points in the sweep  $\geq 2 \times \text{span/RBW}$  (use of a greater number of measurement points than this minimum requirement is recommended).
4. Use the peak marker function to determine the maximum level in any 3 kHz band segment within the fundamental EBW.
5. The resulting PSD level must be  $\leq 8\text{ dBm}$ .

**3.3.4 Test Setup Layout****3.3.5 Test Deviation**

There are no deviation with the original standard.

**3.3.6 EUT Operation during Test**

The EUT was programmed to be in continuously transmitting mode.

## 3.3.7 Test Result of Power Spectral Density

|               |               |               |         |
|---------------|---------------|---------------|---------|
| Test date     | Nov. 05, 2013 | Test Site No. | TH01-CB |
| Temperature   | 26°C          | Humidity      | 63%     |
| Test Engineer | Wen Chao      | Configuration | 802.11a |
| Duty Cycle    | 99.26%        | Duty Factor   | 0.032   |

## Configuration IEEE 802.11a

&lt;6Mbps, Ant. 1+2+3+4&gt;

| Channel | Frequency | Power Density (dBm/3kHz) |        |        |        | Total Power Density (dBm/3kHz) | Power Density Limit (dBm/3kHz) | Result   |
|---------|-----------|--------------------------|--------|--------|--------|--------------------------------|--------------------------------|----------|
|         |           | Ant. 1                   | Ant. 2 | Ant. 3 | Ant. 4 |                                |                                |          |
| 149     | 5745 MHz  | -16.76                   | -9.85  | -13.95 | -17.07 | -7.31                          | 6.91                           | Complies |
| 157     | 5785 MHz  | -16.90                   | -6.75  | -14.46 | -16.85 | -5.37                          | 6.76                           | Complies |
| 161     | 5805 MHz  | -17.27                   | -7.28  | -15.16 | -17.19 | -5.90                          | 6.71                           | Complies |
| 165     | 5825 MHz  | -16.79                   | -7.32  | -14.88 | -17.24 | -5.86                          | 7.50                           | Complies |

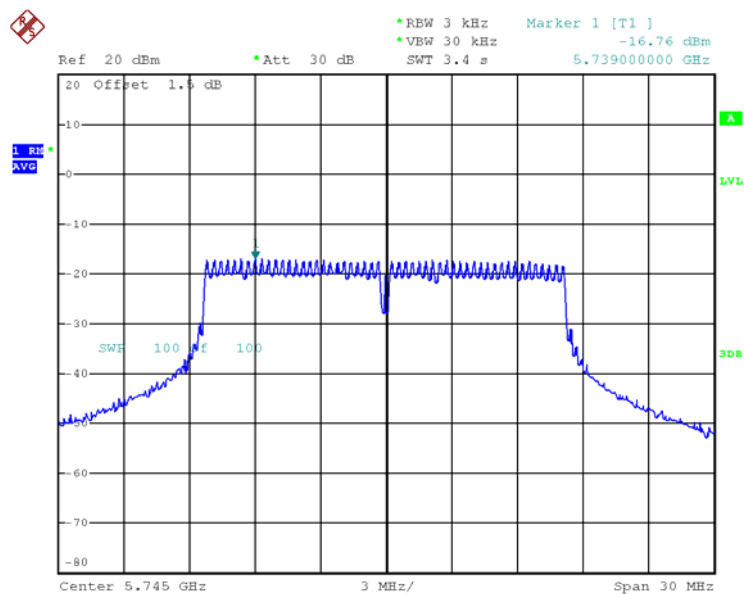
Note: Directional gain= $G_{ANT}+10\log(N_{ANT}/N_{ss})=7.09\text{dBi}$  >6dBi, So 5745MHz Limit = $8-(7.09-6)=6.91\text{dBm/MHz}$

Note: Directional gain= $G_{ANT}+10\log(N_{ANT}/N_{ss})=7.24\text{dBi}$  >6dBi, So 5785MHz Limit = $8-(7.24-6)=6.76\text{dBm/MHz}$

Note: Directional gain= $G_{ANT}+10\log(N_{ANT}/N_{ss})=7.29\text{dBi}$  >6dBi, So 5805MHz Limit = $8-(7.29-6)=6.71\text{dBm/MHz}$

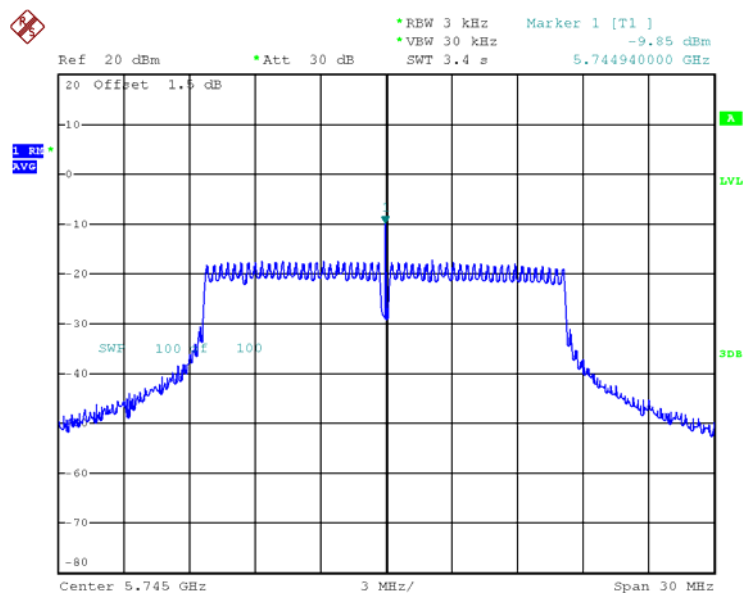
Note: Directional gain= $G_{ANT}+10\log(N_{ANT}/N_{ss})=6.50\text{dBi}$  >6dBi, So 5825MHz Limit = $8-(6.50-6)=7.50\text{dBm/MHz}$

## Power Density Plot on Configuration IEEE 802.11a / Ant. 1 / 5745 MHz



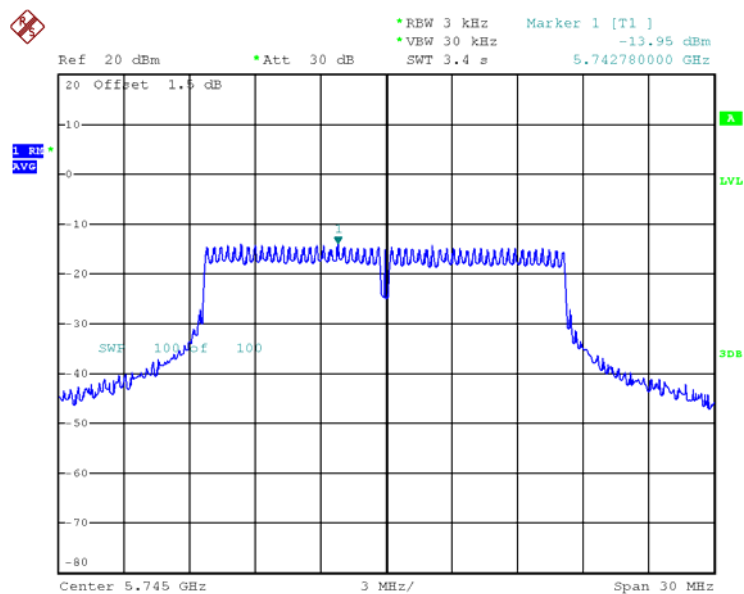
Date: 5.NOV.2013 17:07:11

## Power Density Plot on Configuration IEEE 802.11a / Ant. 2 / 5745 MHz



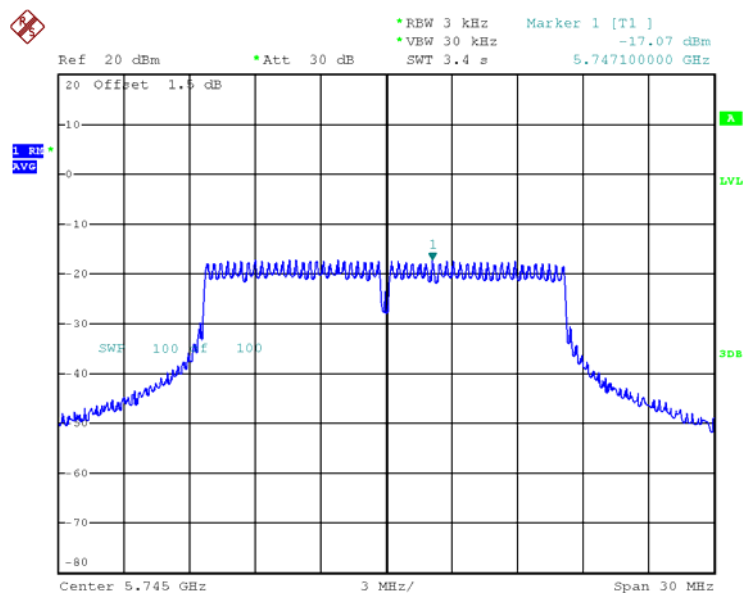
Date: 5.NOV.2013 17:09:58

## Power Density Plot on Configuration IEEE 802.11a / Ant. 3 / 5745 MHz



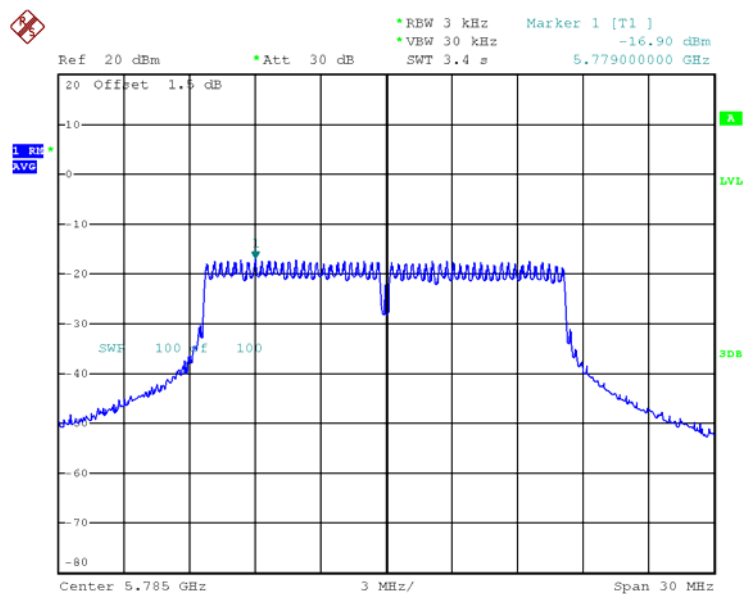
Date: 5.NOV.2013 17:16:22

## Power Density Plot on Configuration IEEE 802.11a / Ant. 4 / 5745 MHz



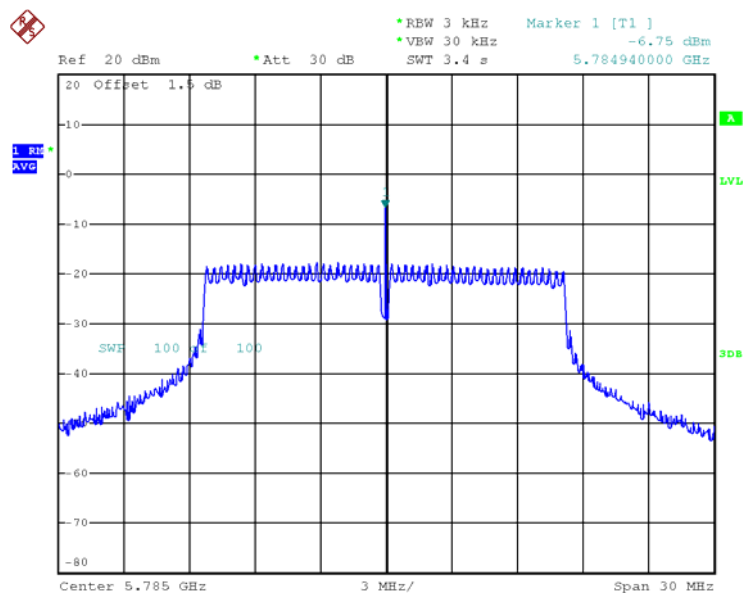
Date: 5.NOV.2013 17:17:22

## Power Density Plot on Configuration IEEE 802.11a / Ant. 1 / 5785 MHz



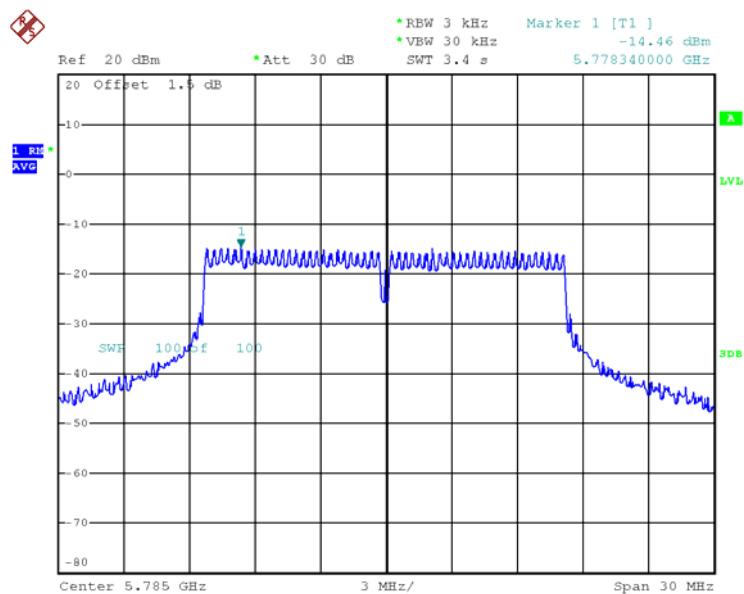
Date: 5.NOV.2013 17:20:32

## Power Density Plot on Configuration IEEE 802.11a / Ant. 2 / 5785 MHz



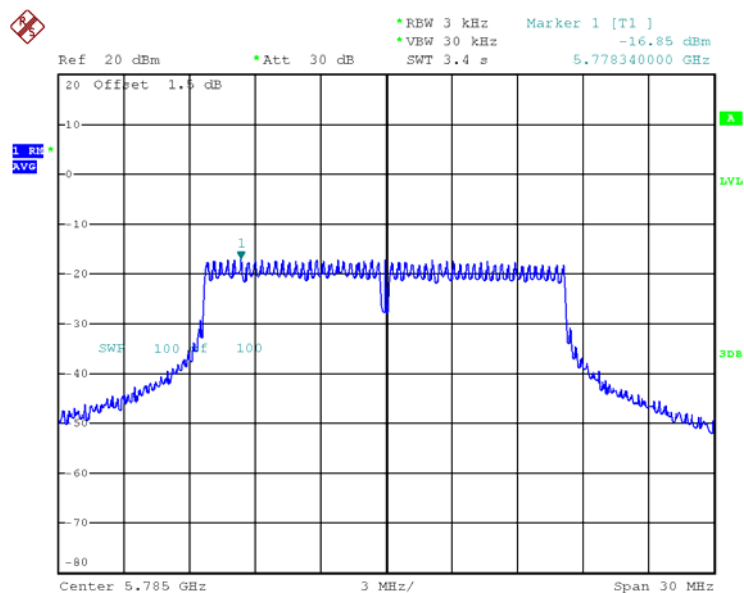
Date: 5.NOV.2013 17:19:23

## Power Density Plot on Configuration IEEE 802.11a / Ant. 3 / 5785 MHz



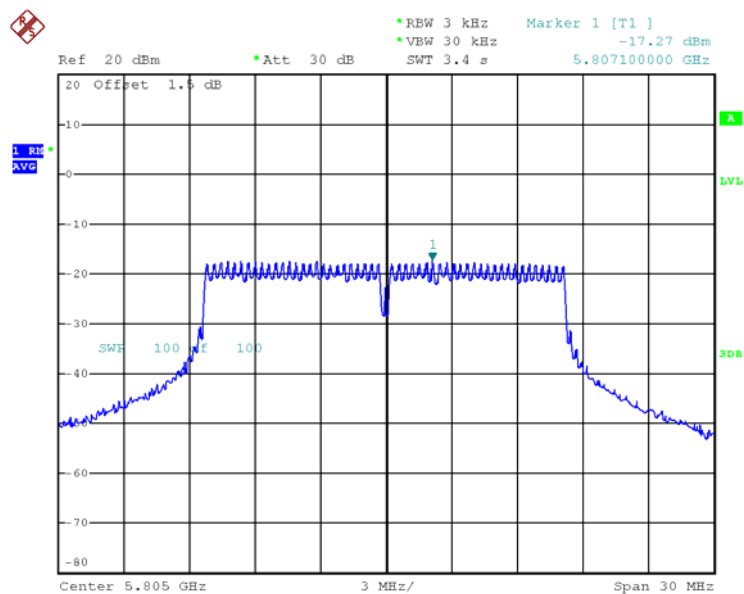
Date: 5.NOV.2013 17:23:41

## Power Density Plot on Configuration IEEE 802.11a / Ant. 4 / 5785 MHz



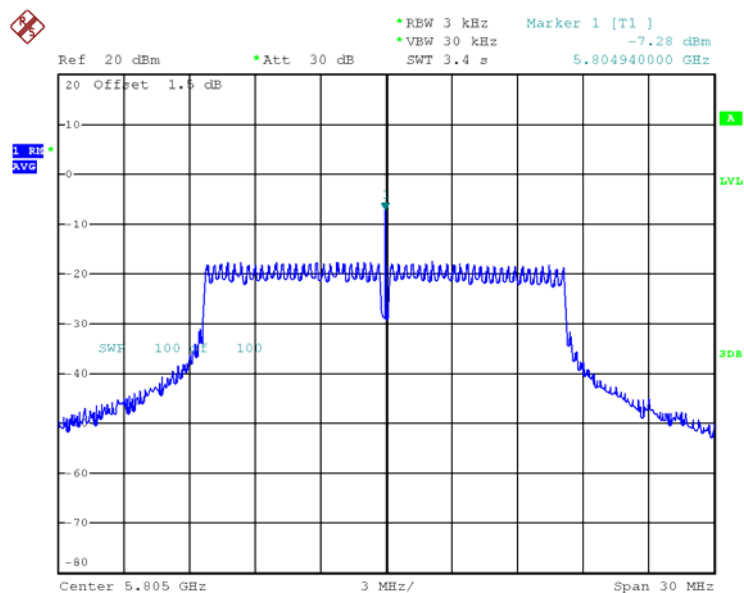
Date: 5.NOV.2013 17:18:16

## Power Density Plot on Configuration IEEE 802.11a / Ant. 1 / 5805 MHz



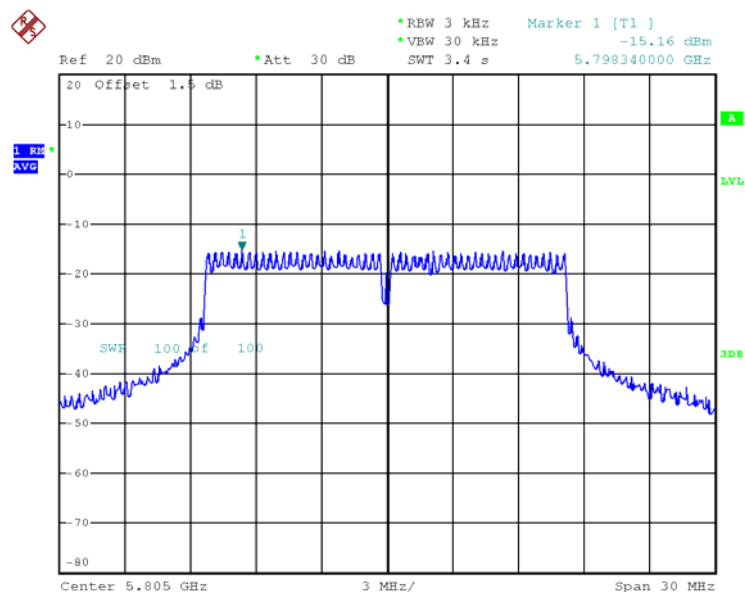
Date: 5.NOV.2013 17:31:50

## Power Density Plot on Configuration IEEE 802.11a / Ant. 2 / 5805 MHz



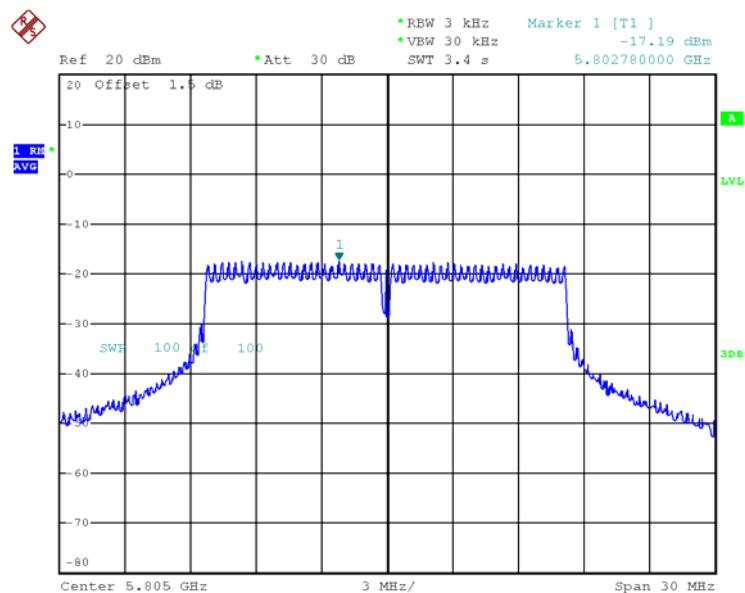
Date: 5.NOV.2013 17:32:43

## Power Density Plot on Configuration IEEE 802.11a / Ant. 3 / 5805 MHz



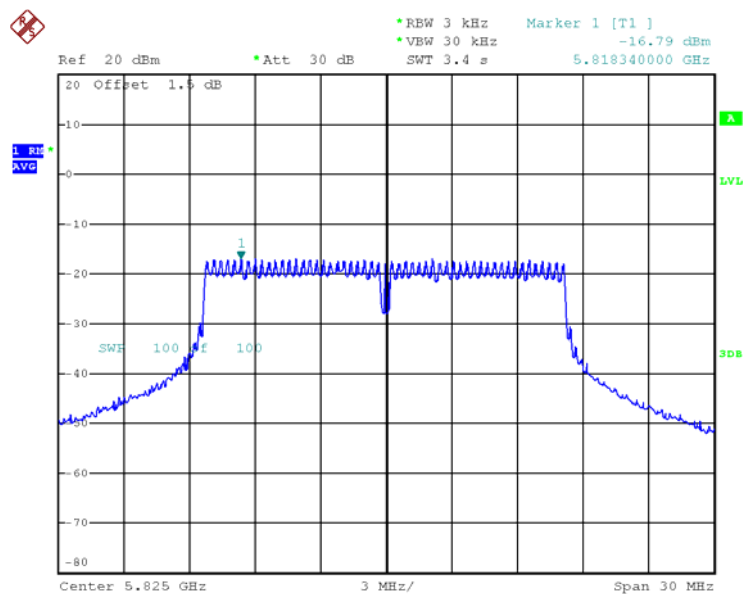
Date: 5.NOV.2013 17:33:29

## Power Density Plot on Configuration IEEE 802.11a / Ant. 4 / 5805 MHz



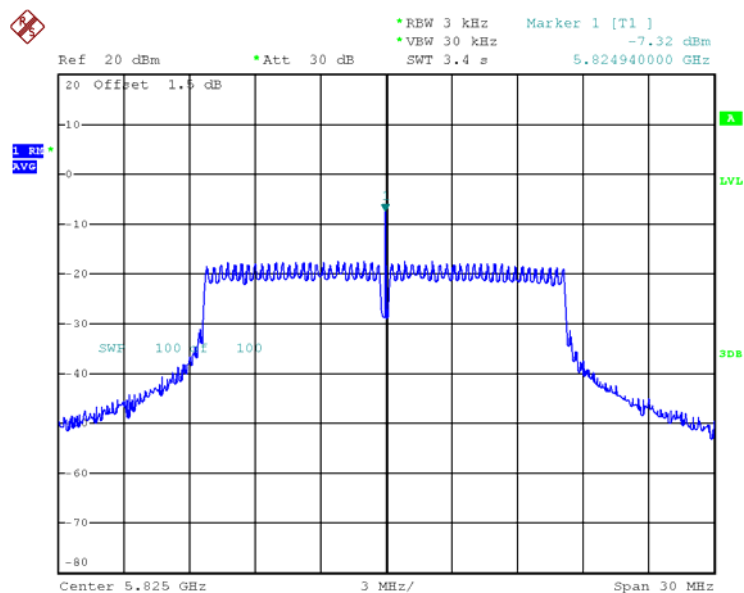
Date: 5.NOV.2013 17:34:12

## Power Density Plot on Configuration IEEE 802.11a / Ant. 1 / 5825 MHz



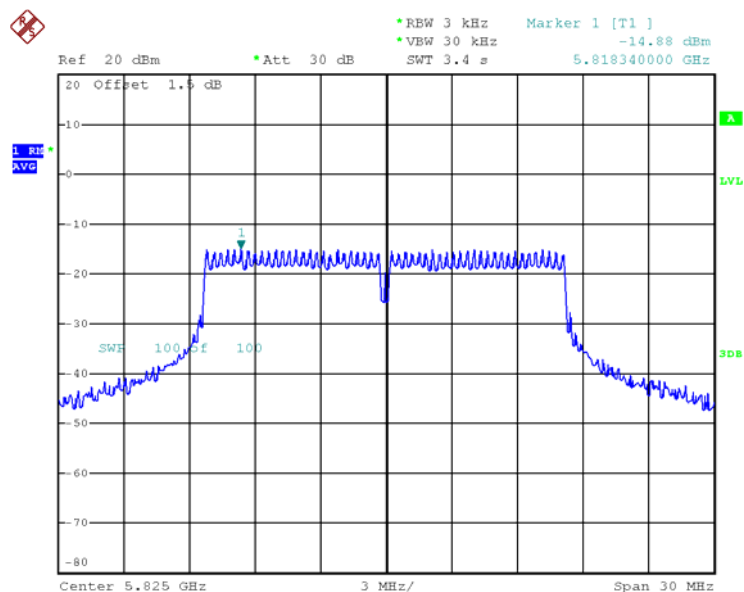
Date: 5.NOV.2013 17:28:13

## Power Density Plot on Configuration IEEE 802.11a / Ant. 2 / 5825 MHz



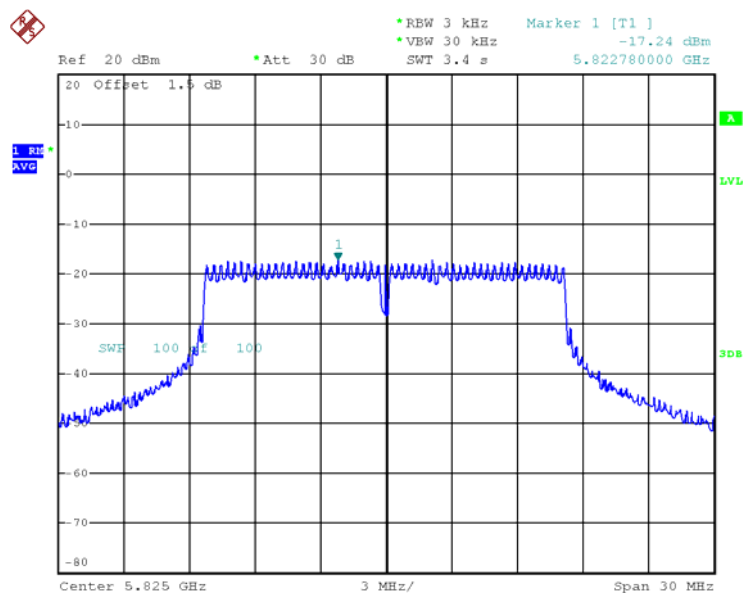
Date: 5.NOV.2013 17:27:11

## Power Density Plot on Configuration IEEE 802.11a / Ant. 3 / 5825 MHz



Date: 5.NOV.2013 17:25:16

## Power Density Plot on Configuration IEEE 802.11a / Ant. 4 / 5825 MHz



Date: 5.NOV.2013 17:26:14

|               |               |               |               |
|---------------|---------------|---------------|---------------|
| Test date     | Nov. 05, 2013 | Test Site No. | TH01-CB       |
| Temperature   | 26°C          | Humidity      | 63%           |
| Test Engineer | Wen Chao      | Configuration | 802.11n 20MHz |
| Duty Cycle    | 99.20%        | Duty Factor   | 0.035         |

## Configuration IEEE 802.11n 20MHz

&lt;MCS0, Ant. 1+2+3+4&gt;

| Channel | Frequency | Power Density (dBm/3kHz) |        |        |        | Total Power Density (dBm/3kHz) | Power Density Limit (dBm/3kHz) | Result   |
|---------|-----------|--------------------------|--------|--------|--------|--------------------------------|--------------------------------|----------|
|         |           | Ant. 1                   | Ant. 2 | Ant. 3 | Ant. 4 |                                |                                |          |
| 149     | 5745 MHz  | -16.21                   | -11.70 | -14.42 | -17.00 | -8.27                          | 6.91                           | Complies |
| 157     | 5785 MHz  | -17.21                   | -6.66  | -14.84 | -16.50 | -5.34                          | 6.76                           | Complies |
| 161     | 5805 MHz  | -17.15                   | -6.80  | -15.73 | -17.63 | -5.65                          | 6.71                           | Complies |
| 165     | 5825 MHz  | -16.92                   | -7.47  | -15.42 | -17.15 | -6.03                          | 7.50                           | Complies |

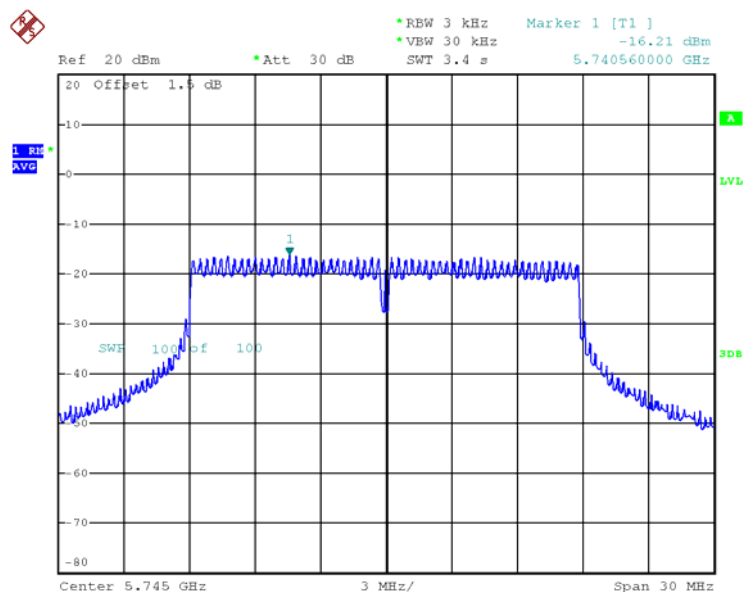
Note: Directional gain= $G_{ANT}+10\log(N_{ANT}/N_{ss})=7.09\text{dBi}$  >6dBi, So 5745MHz Limit = $8-(7.09-6)=6.91\text{dBm/MHz}$

Note: Directional gain= $G_{ANT}+10\log(N_{ANT}/N_{ss})=7.24\text{dBi}$  >6dBi, So 5785MHz Limit = $8-(7.24-6)=6.76\text{dBm/MHz}$

Note: Directional gain= $G_{ANT}+10\log(N_{ANT}/N_{ss})=7.29\text{dBi}$  >6dBi, So 5805MHz Limit = $8-(7.29-6)=6.71\text{dBm/MHz}$

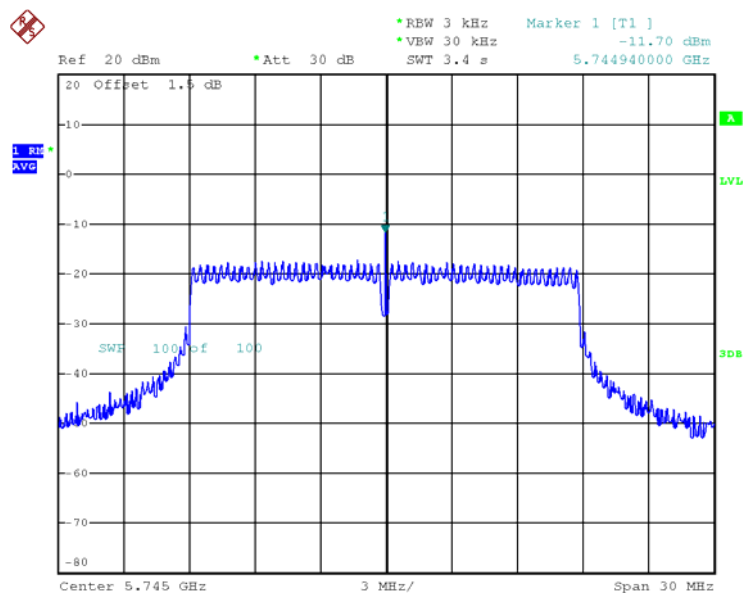
Note: Directional gain= $G_{ANT}+10\log(N_{ANT}/N_{ss})=6.50\text{dBi}$  >6dBi, So 5825MHz Limit = $8-(6.50-6)=7.50\text{dBm/MHz}$

## Power Density Plot on Configuration IEEE 802.11n 20MHz MCS0 / Ant. 1 / 5745 MHz



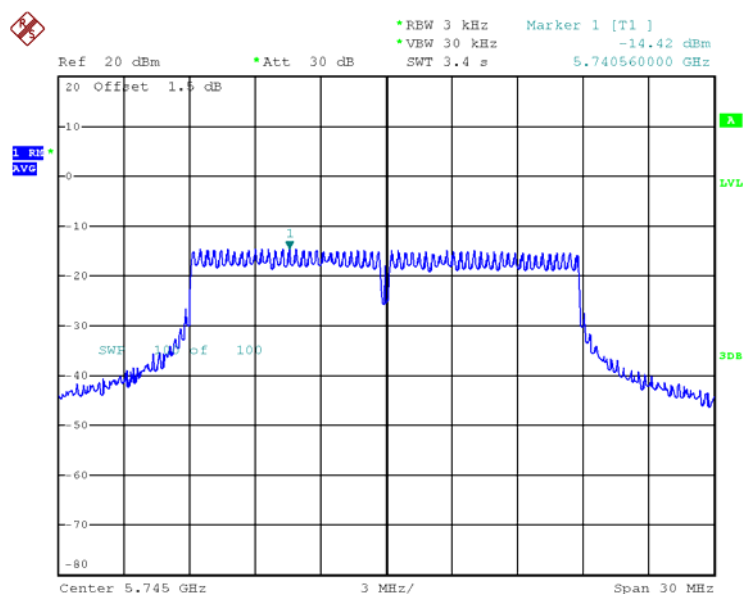
Date: 5.NOV.2013 17:50:09

## Power Density Plot on Configuration IEEE 802.11n 20MHz MCS0 / Ant. 2 / 5745 MHz



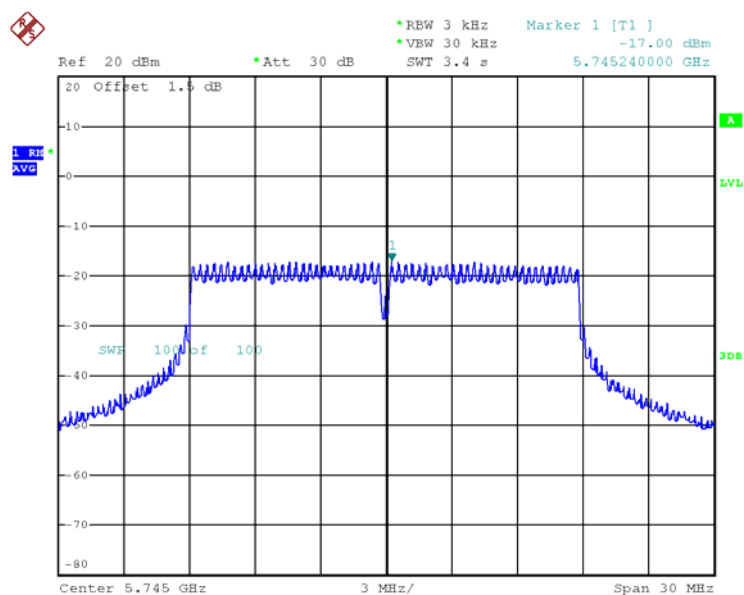
Date: 5.NOV.2013 17:48:16

## Power Density Plot on Configuration IEEE 802.11n 20MHz MCS0 / Ant. 3 / 5745 MHz



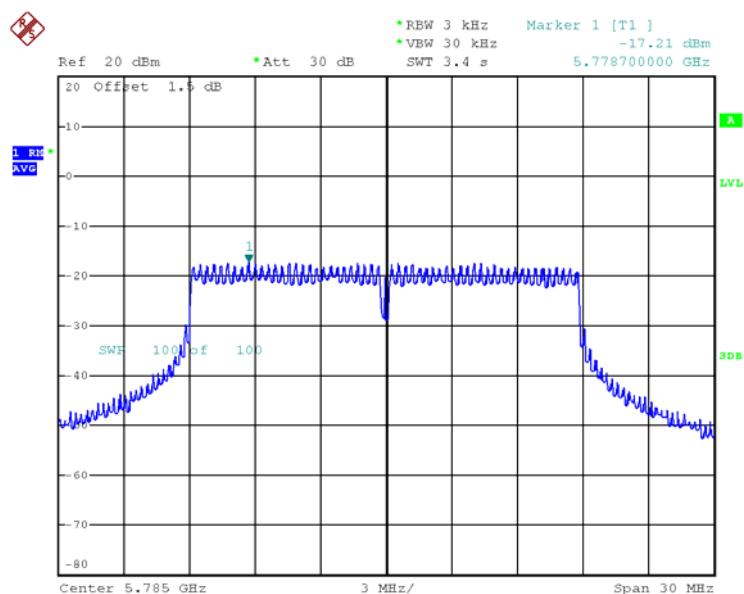
Date: 5.NOV.2013 17:47:34

## Power Density Plot on Configuration IEEE 802.11n 20MHz MCS0 / Ant. 4 / 5745 MHz



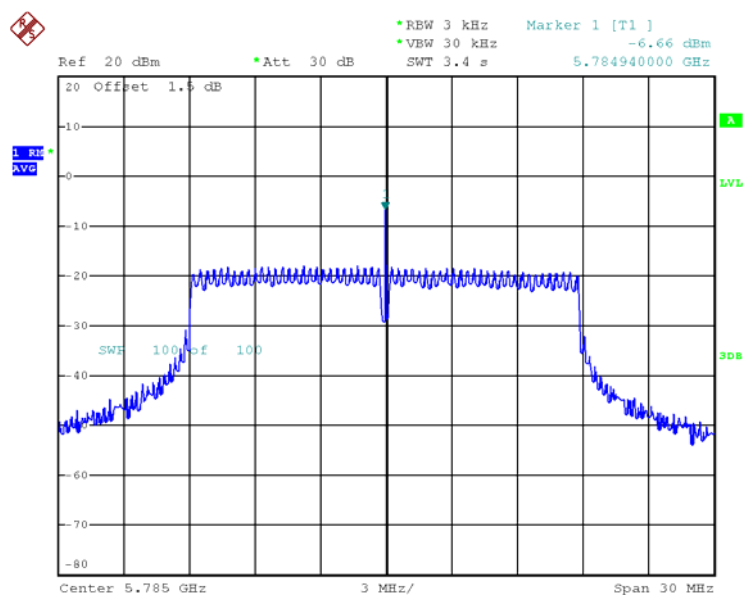
Date: 5.NOV.2013 17:40:37

## Power Density Plot on Configuration IEEE 802.11n 20MHz MCS0 / Ant. 1 / 5785 MHz



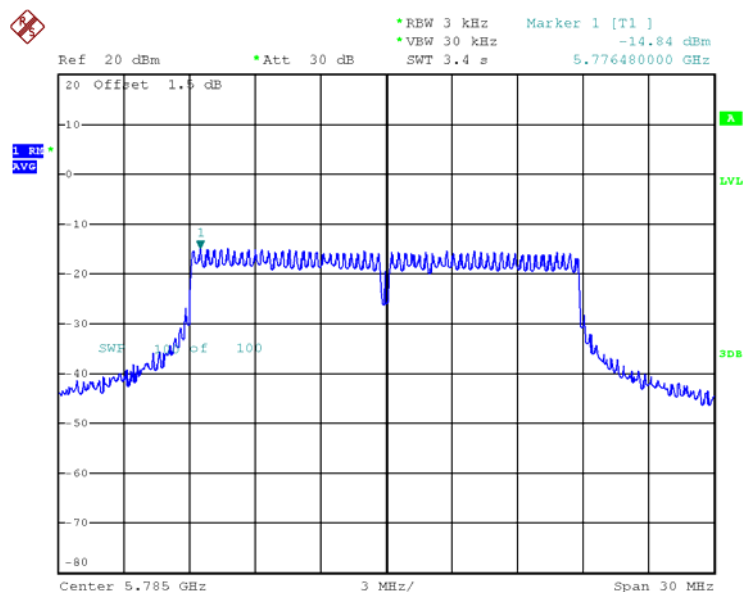
Date: 5.NOV.2013 17:52:42

## Power Density Plot on Configuration IEEE 802.11n 20MHz MCS0 / Ant. 2 / 5785 MHz



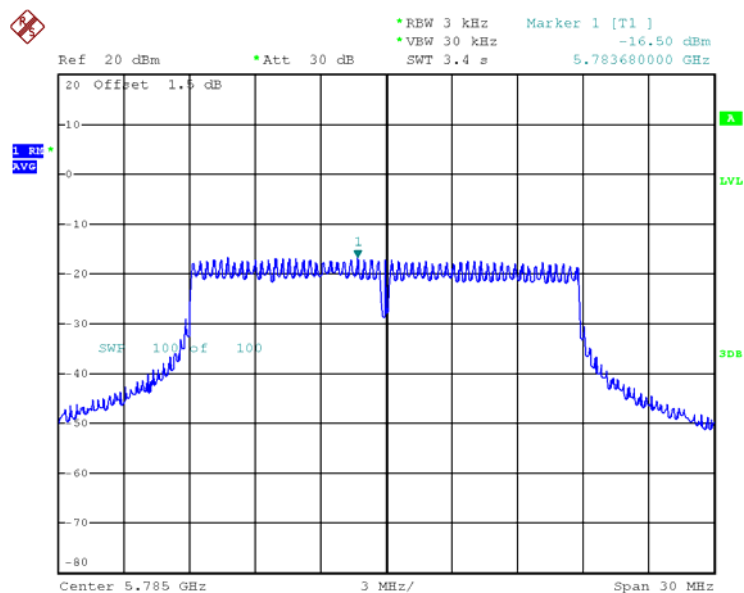
Date: 5.NOV.2013 17:53:55

## Power Density Plot on Configuration IEEE 802.11n 20MHz MCS0 / Ant. 3 / 5785 MHz



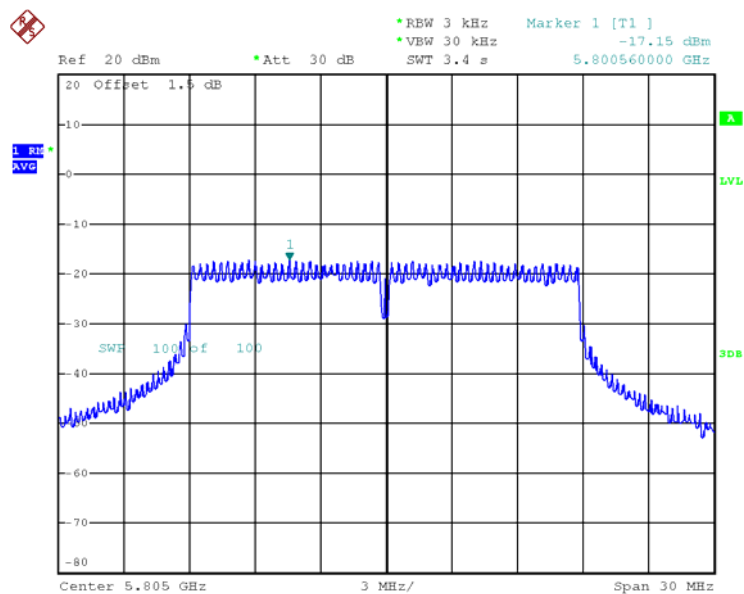
Date: 5.NOV.2013 17:55:54

## Power Density Plot on Configuration IEEE 802.11n 20MHz MCS0 / Ant. 4 / 5785 MHz



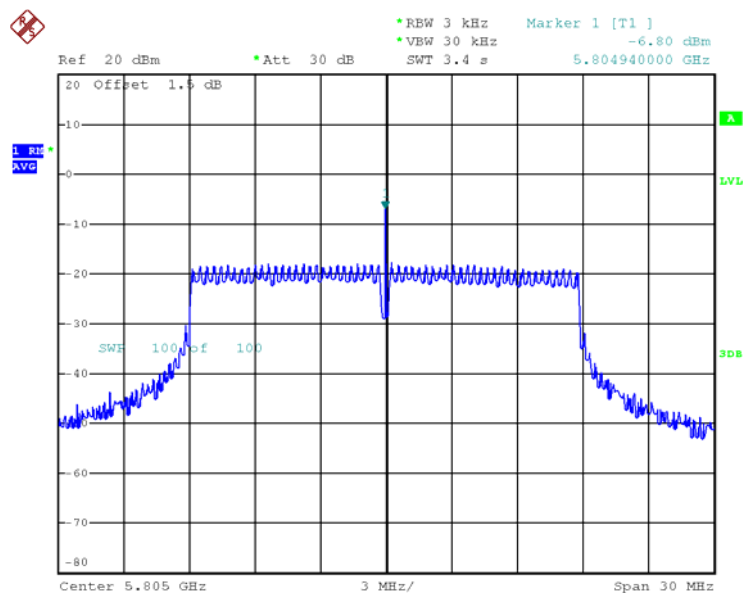
Date: 5.NOV.2013 17:57:56

## Power Density Plot on Configuration IEEE 802.11n 20MHz MCS0 / Ant. 1 / 5805 MHz



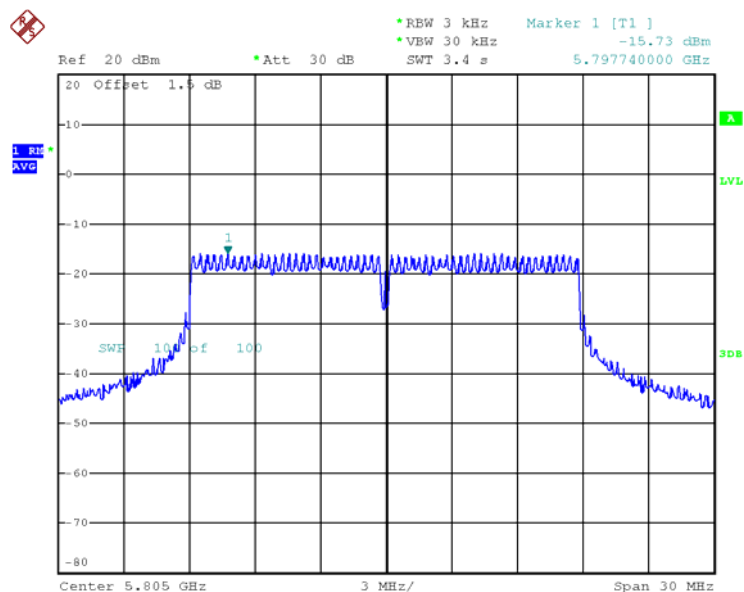
Date: 5.NOV.2013 18:08:32

## Power Density Plot on Configuration IEEE 802.11n 20MHz MCS0 / Ant. 2 / 5805 MHz



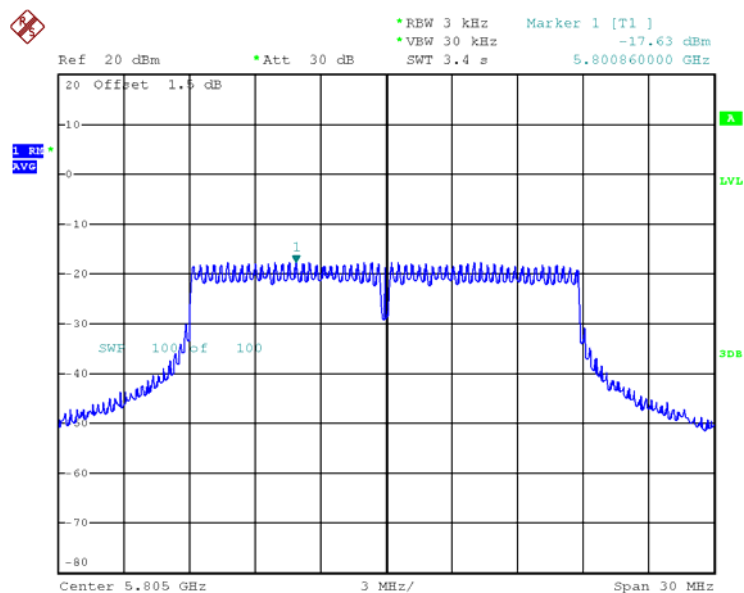
Date: 5.NOV.2013 18:07:37

## Power Density Plot on Configuration IEEE 802.11n 20MHz MCS0 / Ant. 3 / 5805 MHz



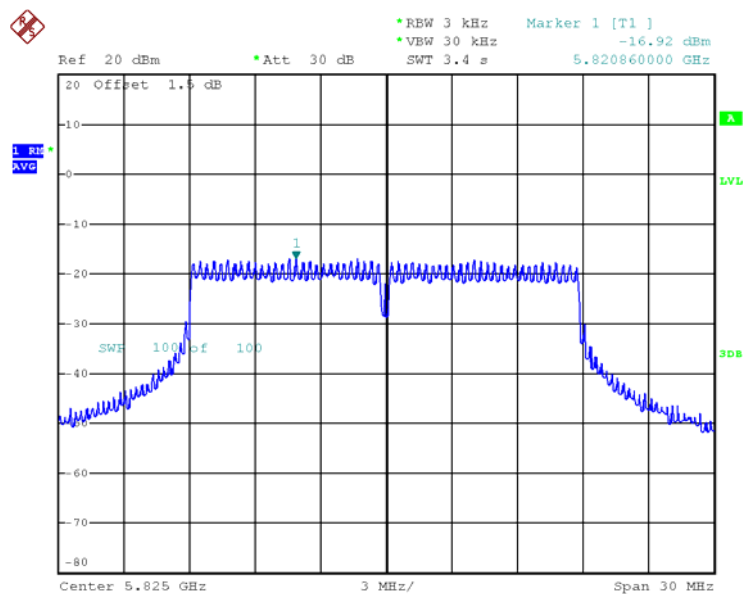
Date: 5.NOV.2013 18:06:49

## Power Density Plot on Configuration IEEE 802.11n 20MHz MCS0 / Ant. 4 / 5805 MHz



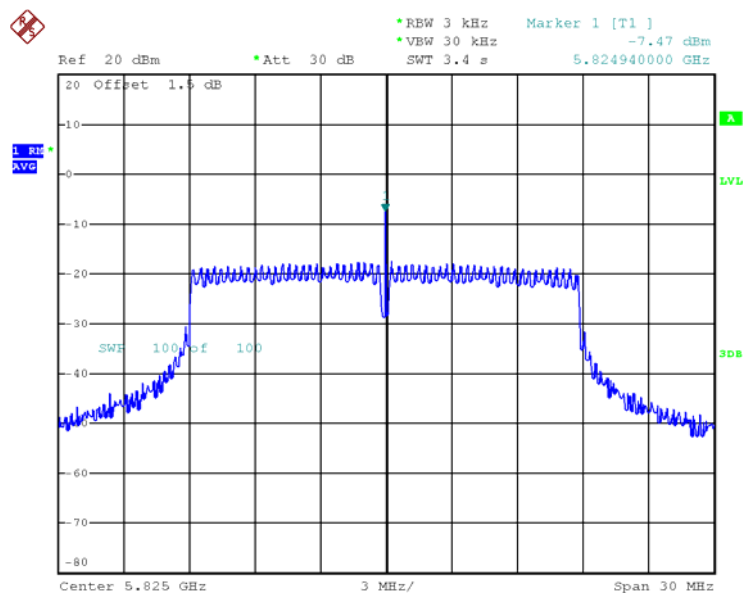
Date: 5.NOV.2013 18:00:05

## Power Density Plot on Configuration IEEE 802.11n 20MHz MCS0 / Ant. 1 / 5825 MHz



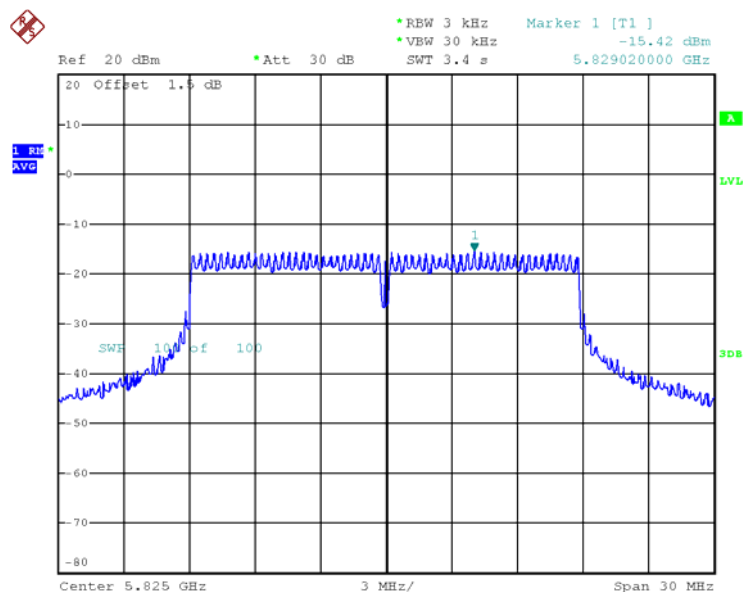
Date: 5.NOV.2013 18:09:27

## Power Density Plot on Configuration IEEE 802.11n 20MHz MCS0 / Ant. 2 / 5825 MHz



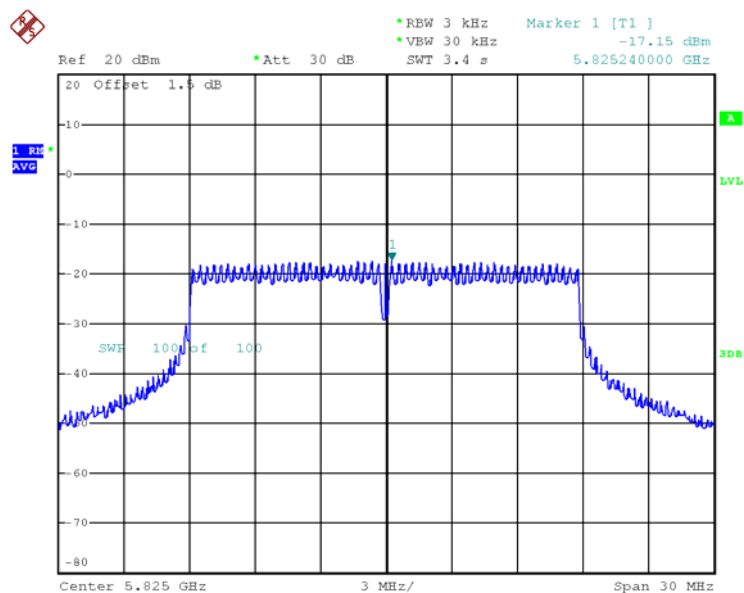
Date: 5.NOV.2013 18:10:24

## Power Density Plot on Configuration IEEE 802.11n 20MHz MCS0 / Ant. 3 / 5825 MHz



Date: 5.NOV.2013 18:16:36

## Power Density Plot on Configuration IEEE 802.11n 20MHz / Ant. 4 / 5825 MHz



Date: 5.NOV.2013 18:17:32

|               |               |               |               |
|---------------|---------------|---------------|---------------|
| Test date     | Nov. 05, 2013 | Test Site No. | TH01-CB       |
| Temperature   | 26°C          | Humidity      | 63%           |
| Test Engineer | Wen Chao      | Configuration | 802.11n 40MHz |
| Duty Cycle    | 97.97%        | Duty Factor   | 0.09          |

## Configuration IEEE 802.11n 40MHz

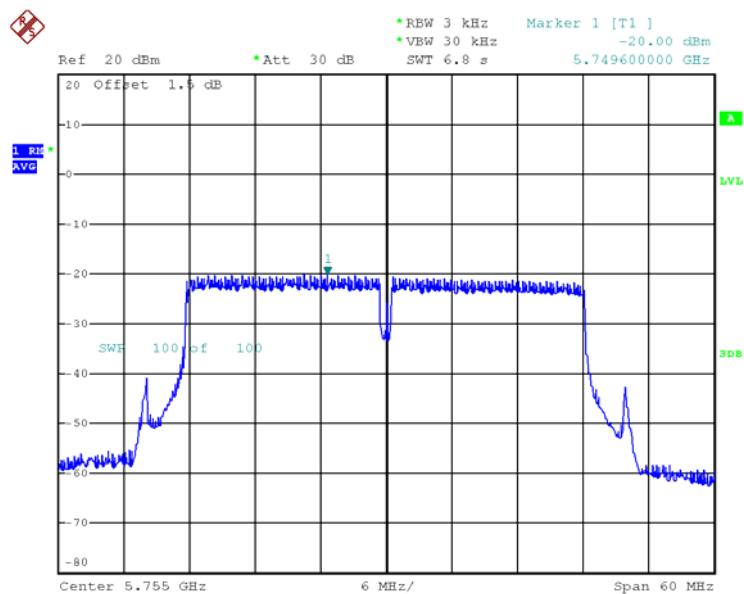
&lt;MCS0, Ant. 1+2+3+4&gt;

| Channel | Frequency | Power Density (dBm/3kHz) |        |        |        | Total Power Density (dBm/3kHz) | Power Density Limit (dBm/3kHz) | Result   |
|---------|-----------|--------------------------|--------|--------|--------|--------------------------------|--------------------------------|----------|
|         |           | Ant. 1                   | Ant. 2 | Ant. 3 | Ant. 4 |                                |                                |          |
| 151     | 5755 MHz  | -20.00                   | -13.99 | -17.47 | -20.44 | -11.05                         | 7.09                           | Complies |
| 159     | 5795 MHz  | -21.10                   | -12.21 | -18.46 | -20.59 | -10.33                         | 6.71                           | Complies |

Note: Directional gain= $G_{ANT}+10\log(N_{ANT}/N_{ss})=6.91\text{dBi}$  >6dBi, So 5755MHz Limit = $8-(6.91-6)=7.09\text{dBm/MHz}$

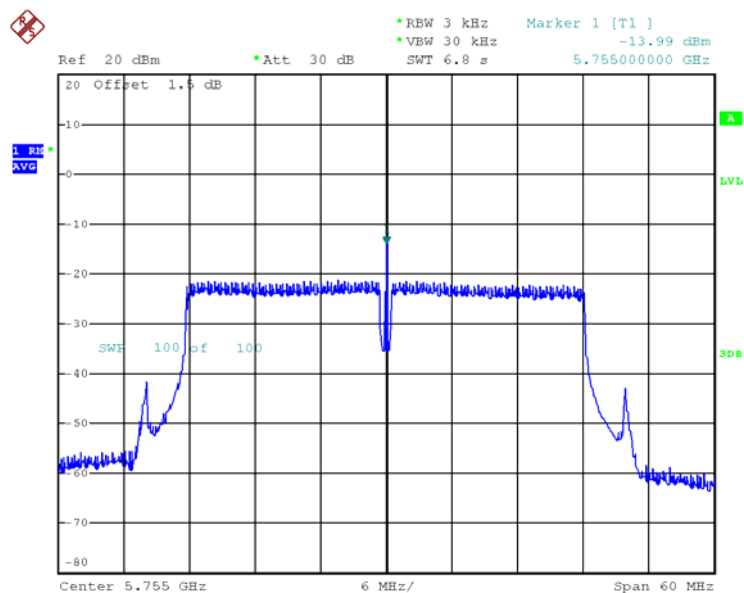
Note: Directional gain= $G_{ANT}+10\log(N_{ANT}/N_{ss})=7.29\text{dBi}$  >6dBi, So 5795MHz Limit = $8-(7.29-6)=6.71\text{dBm/MHz}$

## Power Density Plot on Configuration IEEE 802.11n 40MHz MCS0 / Ant. 1 / 5755 MHz



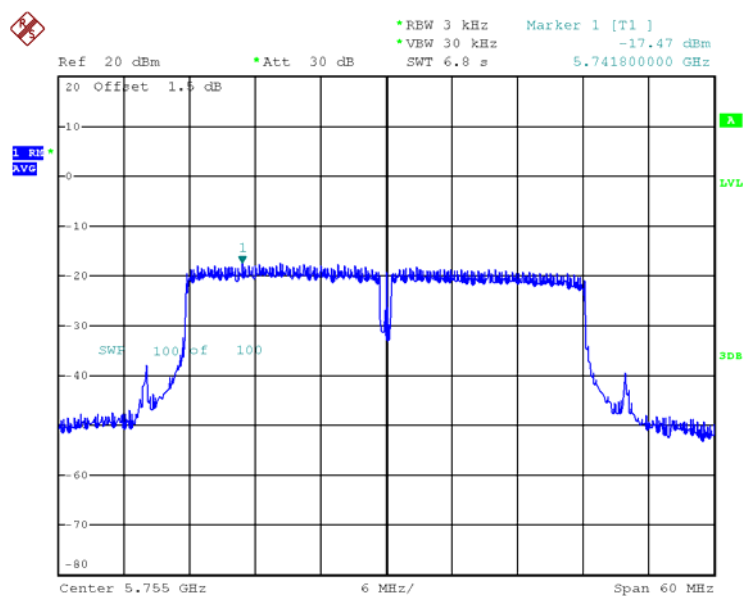
Date: 5.NOV.2013 18:21:38

## Power Density Plot on Configuration IEEE 802.11n 40MHz MCS0 / Ant. 2 / 5755 MHz



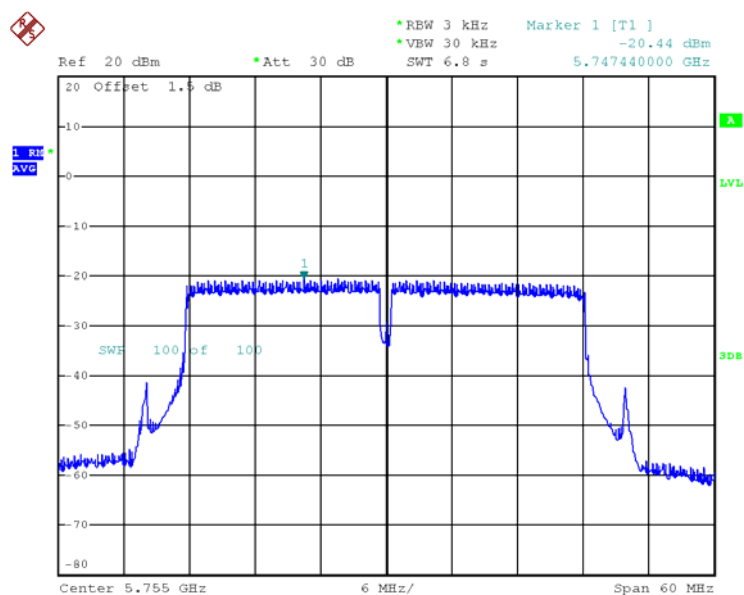
Date: 5.NOV.2013 18:20:28

## Power Density Plot on Configuration IEEE 802.11n 40MHz MCS0 / Ant. 3 / 5755 MHz



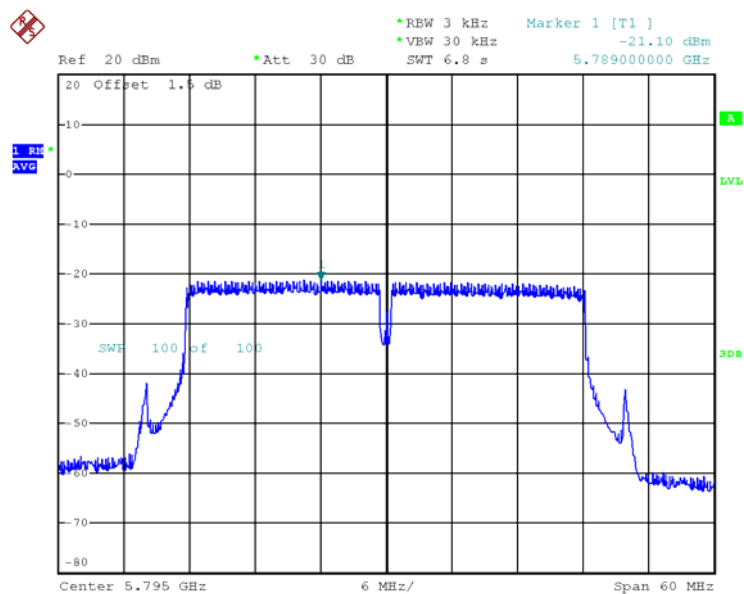
Date: 5.NOV.2013 18:22:27

## Power Density Plot on Configuration IEEE 802.11n 40MHz MCS0 / Ant. 4 / 5755 MHz



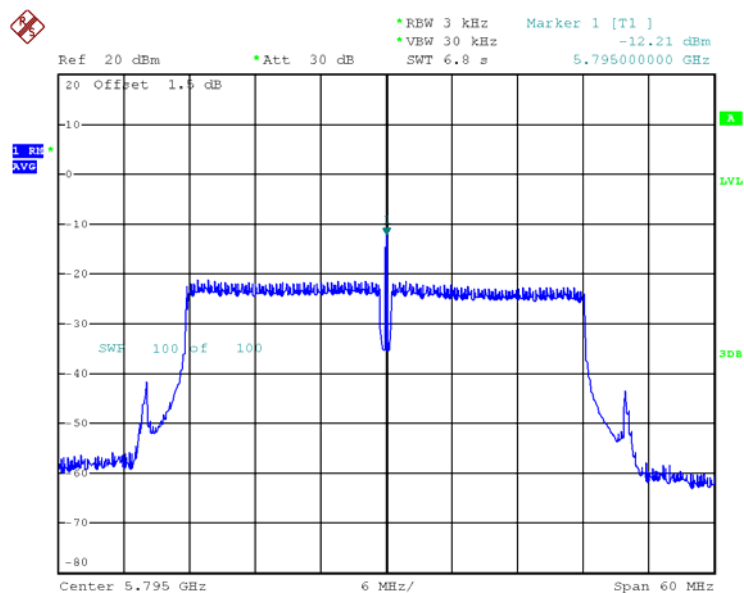
Date: 5.NOV.2013 18:19:23

## Power Density Plot on Configuration IEEE 802.11n 40MHz MCS0 / Ant. 1 / 5795 MHz



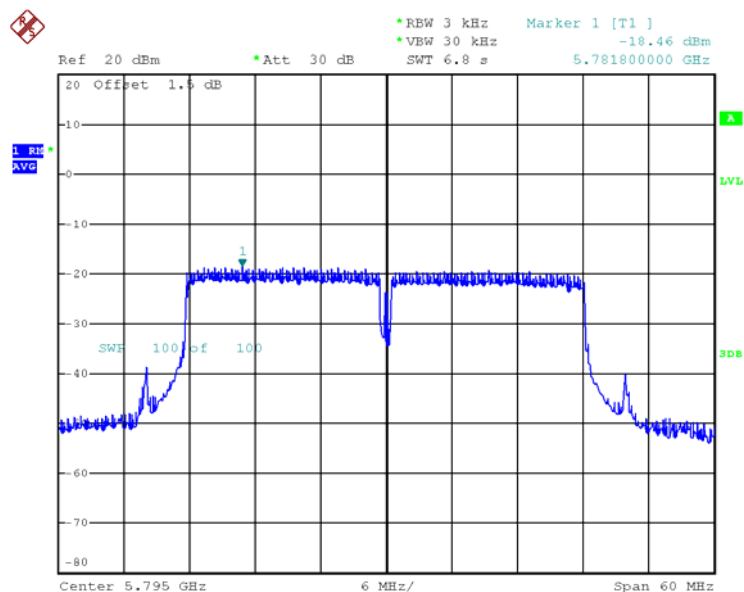
Date: 5.NOV.2013 18:27:11

## Power Density Plot on Configuration IEEE 802.11n 40MHz MCS0 / Ant. 2 / 5795 MHz



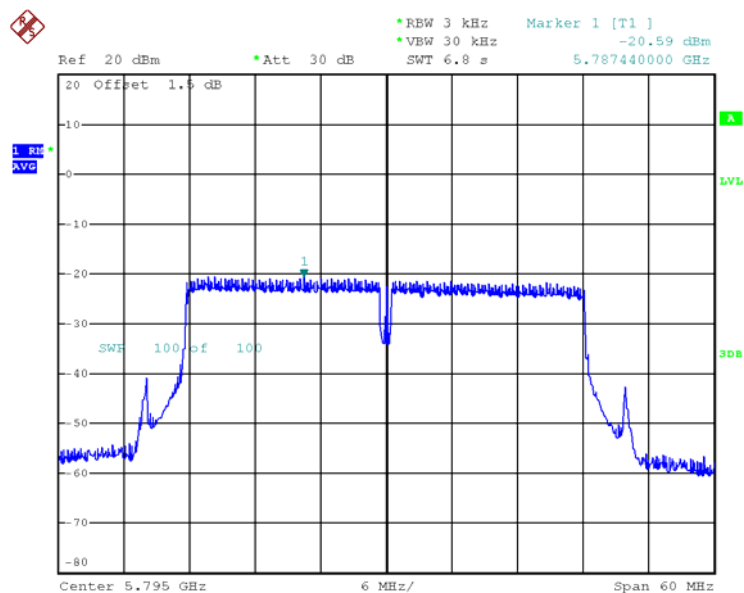
Date: 5.NOV.2013 18:25:57

## Power Density Plot on Configuration IEEE 802.11n 40MHz MCS0 / Ant. 3 / 5795 MHz



Date: 5.NOV.2013 18:24:54

## Power Density Plot on Configuration IEEE 802.11n 40MHz MCS0 / Ant. 4 / 5795 MHz



Date: 5.NOV.2013 18:28:16

### 3.4 6dB Spectrum Bandwidth Measurement

#### 3.4.1 Limit

For digital modulation systems, the minimum 6dB bandwidth shall be at least 500 kHz.

#### 3.4.2 Measuring Instruments and Setting

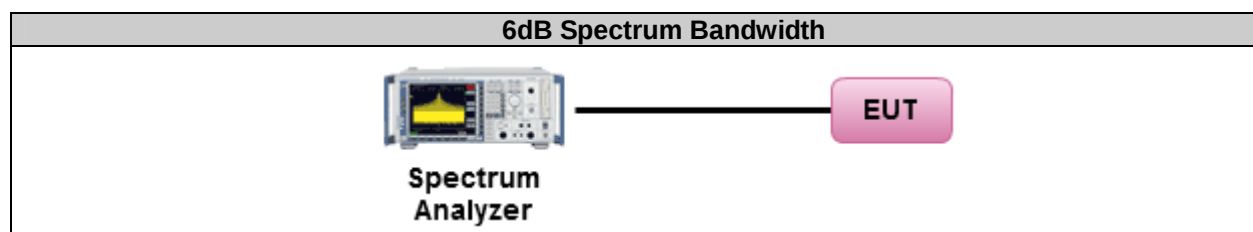
The following table is the setting of the spectrum analyzer.

| Spectrum Parameters | Setting                    |
|---------------------|----------------------------|
| Attenuation         | Auto                       |
| Span Frequency      | > 6dB Bandwidth            |
| RBW                 | 100 kHz.                   |
| VBW                 | $\geq 3 \times \text{RBW}$ |
| Detector            | Peak                       |
| Trace               | Max Hold                   |
| Sweep Time          | Auto                       |

#### 3.4.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak hold mode.
2. Test was performed in accordance with KDB 558074 v03r01 Guidance for Performing Compliance Measurements on Digital Transmission Systems(DTS) Operating under §15.247 section 7.1 DTS channel bandwidth
3. Multiple antennas system was performed in accordance with KDB 662911 D01 v02 Emission Testing of Transmitters with Multiple Outputs in the Same Band
4. Measured the spectrum width with power higher than 6d account by this measurement.

#### 3.4.4 Test Setup Layout



#### 3.4.5 Test Deviation

There are no deviation with the original standard.

#### 3.4.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

## 3.4.7 Test Result of 6dB Spectrum Bandwidth

|               |               |               |         |
|---------------|---------------|---------------|---------|
| Test date     | Dec. 12, 2013 | Test Site No. | TH01-CB |
| Temperature   | 26°C          | Humidity      | 63%     |
| Test Engineer | Wen Chao      | Configuration | 802.11a |
| Duty Cycle    | 99.26%        | Duty Factor   | 0.032   |

## Configuration IEEE 802.11a

## &lt;6Mbps, Ant 1&gt;

| Channel | Frequency | 6dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) | Data Rate / MCS |
|---------|-----------|---------------------|------------------------------|-----------------|
| 149     | 5745 MHz  | 16.40               | 16.64                        | 6Mbps           |
| 157     | 5785 MHz  | 16.40               | 16.64                        | 6Mbps           |
| 161     | 5805 MHz  | 16.40               | 16.64                        | 6Mbps           |
| 165     | 5825 MHz  | 16.32               | 16.64                        | 6Mbps           |

## &lt;6Mbps, Ant 2&gt;

| Channel | Frequency | 6dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) | Data Rate / MCS |
|---------|-----------|---------------------|------------------------------|-----------------|
| 149     | 5745 MHz  | 16.40               | 16.64                        | 6Mbps           |
| 157     | 5785 MHz  | 16.40               | 16.64                        | 6Mbps           |
| 161     | 5805 MHz  | 16.40               | 16.64                        | 6Mbps           |
| 165     | 5825 MHz  | 16.32               | 16.64                        | 6Mbps           |

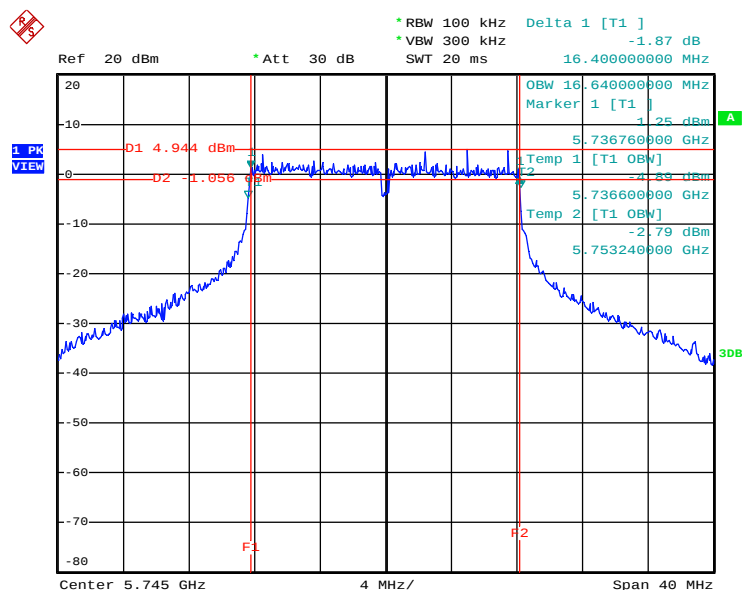
## &lt;6Mbps, Ant 3&gt;

| Channel | Frequency | 6dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) | Data Rate / MCS |
|---------|-----------|---------------------|------------------------------|-----------------|
| 149     | 5745 MHz  | 16.32               | 16.64                        | 6Mbps           |
| 157     | 5785 MHz  | 16.40               | 16.64                        | 6Mbps           |
| 161     | 5805 MHz  | 16.40               | 16.64                        | 6Mbps           |
| 165     | 5825 MHz  | 16.40               | 16.64                        | 6Mbps           |

## &lt;6Mbps, Ant 4&gt;

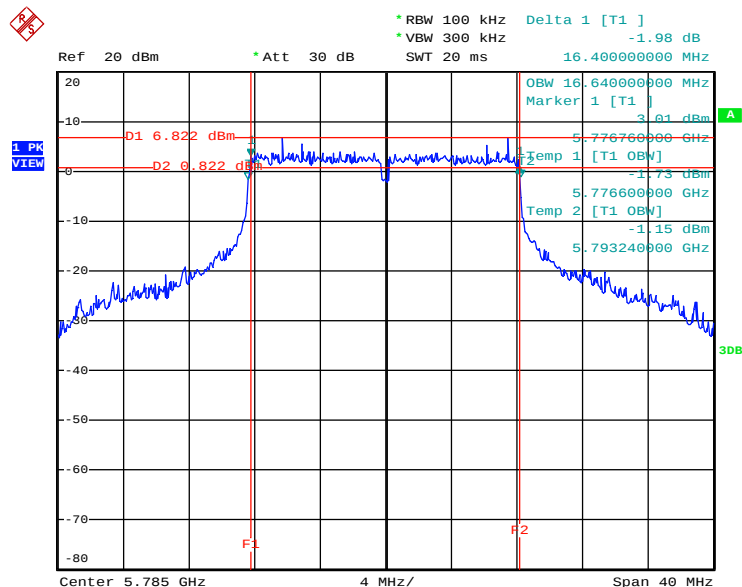
| Channel | Frequency | 6dB Bandwidth (MHz) | 99% Occupied BW (MHz) | Data Rate / MCS |
|---------|-----------|---------------------|-----------------------|-----------------|
| 149     | 5745 MHz  | 16.40               | 16.64                 | 6Mbps           |
| 157     | 5785 MHz  | 16.32               | 16.64                 | 6Mbps           |
| 161     | 5805 MHz  | 16.40               | 16.64                 | 6Mbps           |
| 165     | 5825 MHz  | 16.32               | 16.64                 | 6Mbps           |

## 6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5745 MHz / Ant. 1



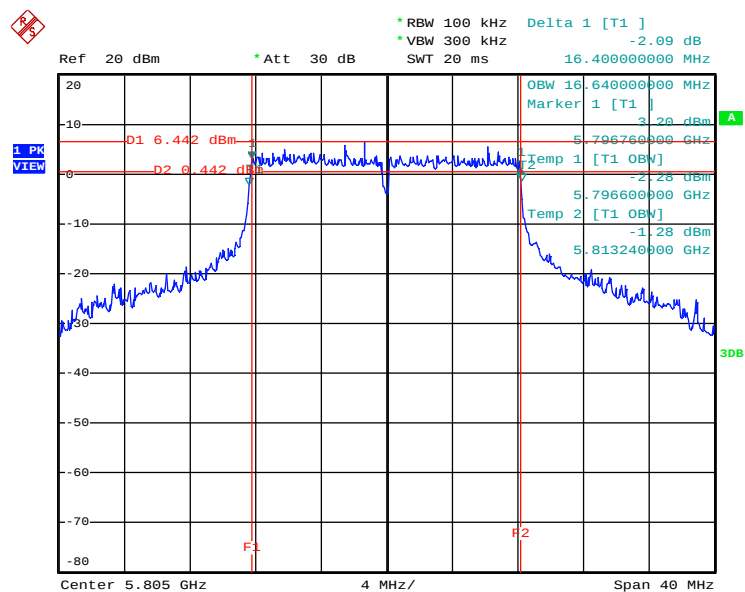
Date: 12.DEC.2013 01:18:50

## 6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5785 MHz / Ant. 1



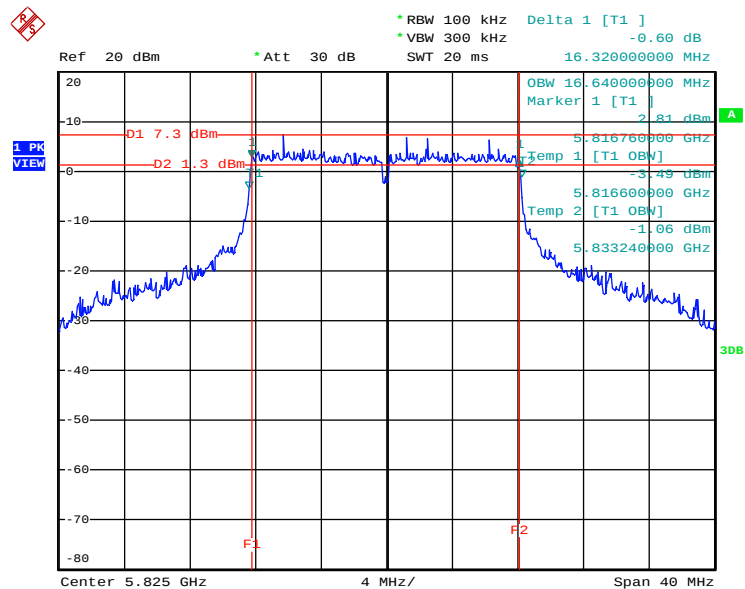
Date: 12.DEC.2013 01:22:32

## 6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5805 MHz / Ant. 1



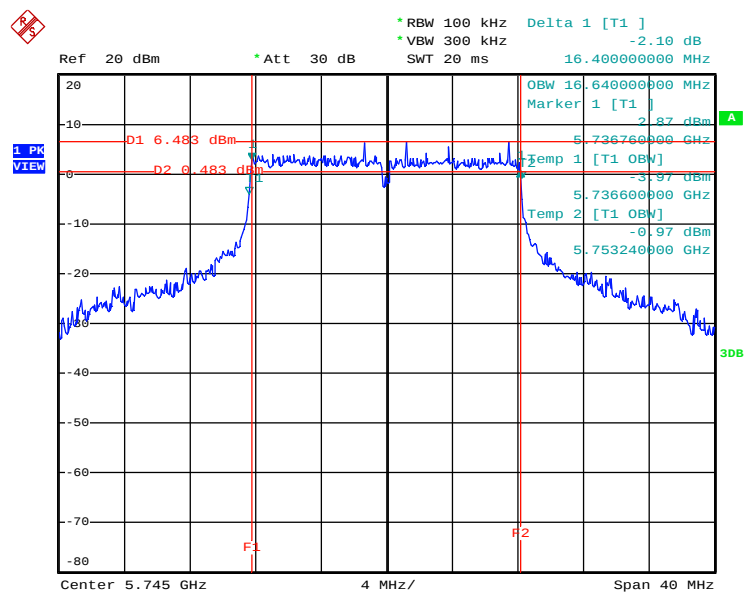
Date: 12.DEC.2013 01:23:10

## 6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5825 MHz / Ant. 1



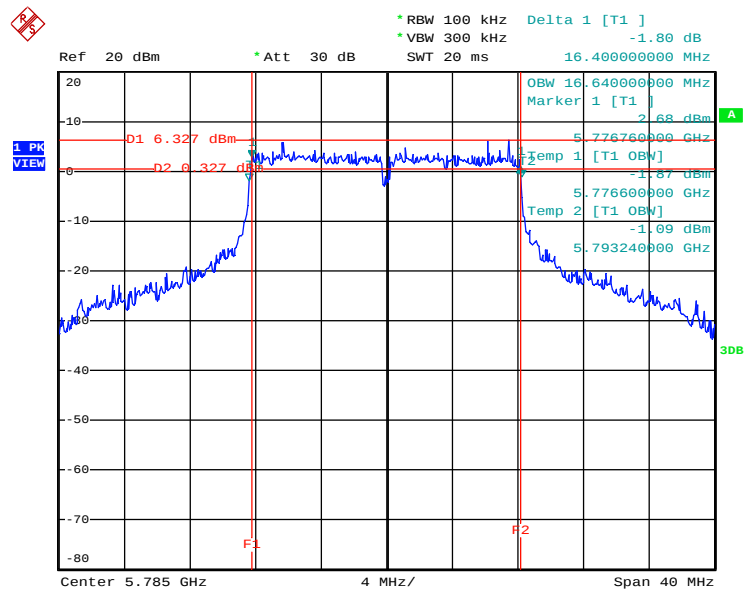
Date: 12.DEC.2013 01:25:01

## 6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5745 MHz / Ant. 2



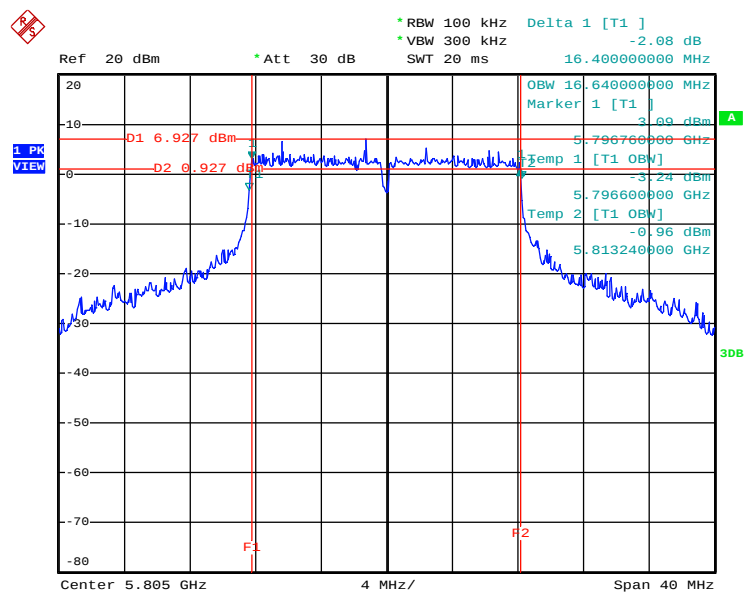
Date: 12.DEC.2013 01:19:32

## 6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5785 MHz / Ant. 2



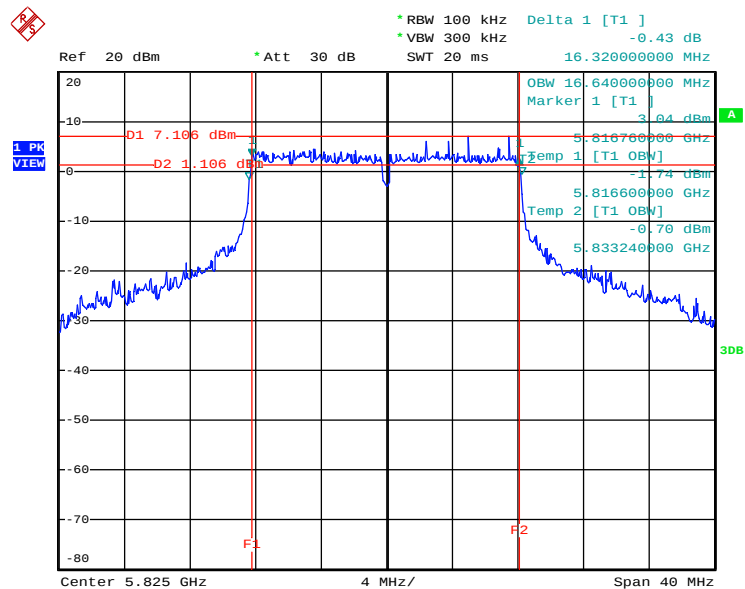
Date: 12.DEC.2013 01:22:17

## 6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5805 MHz / Ant. 2



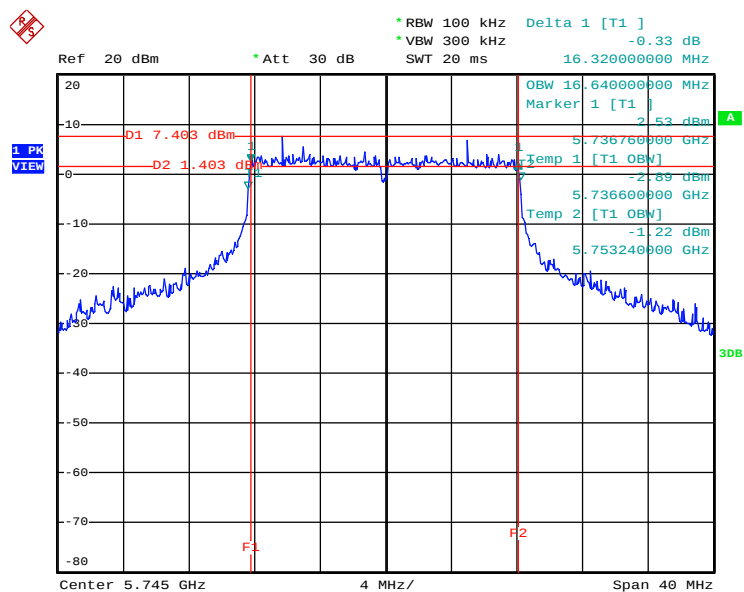
Date: 12.DEC.2013 01:23:22

## 6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5825 MHz / Ant. 2



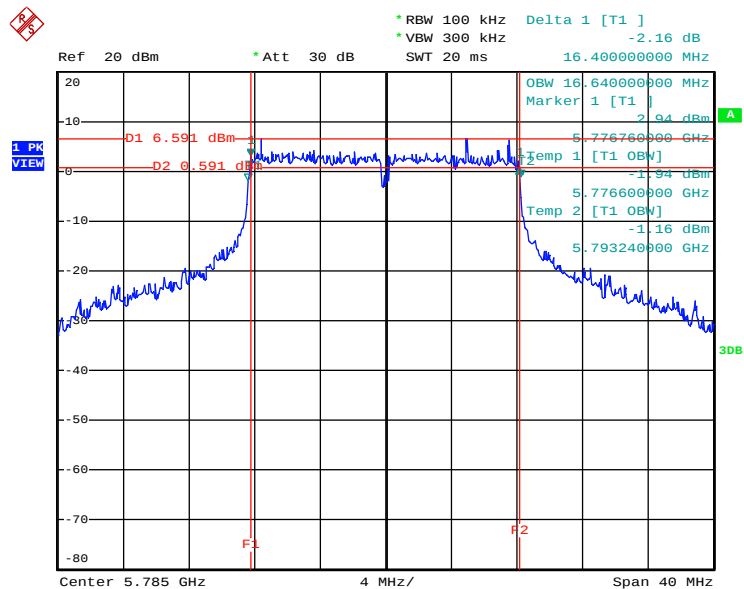
Date: 12.DEC.2013 01:24:46

## 6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5745 MHz / Ant. 3



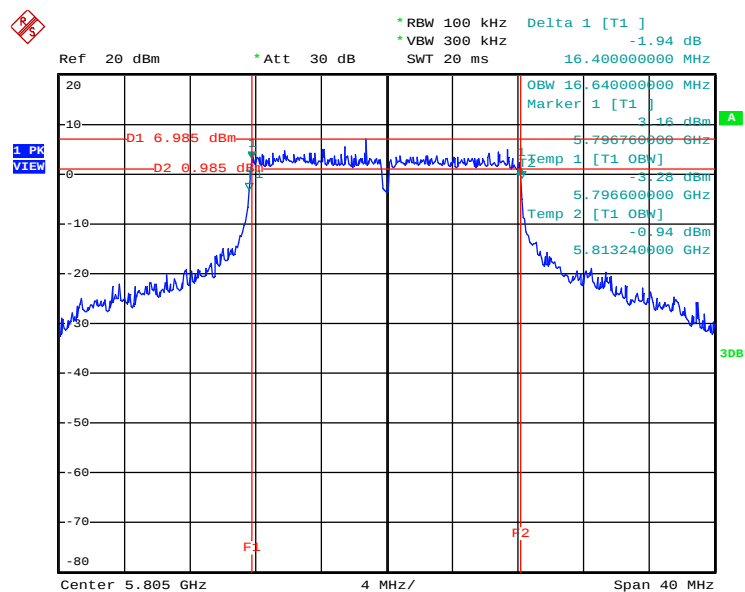
Date: 12.DEC.2013 01:19:47

## 6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5785 MHz / Ant. 3



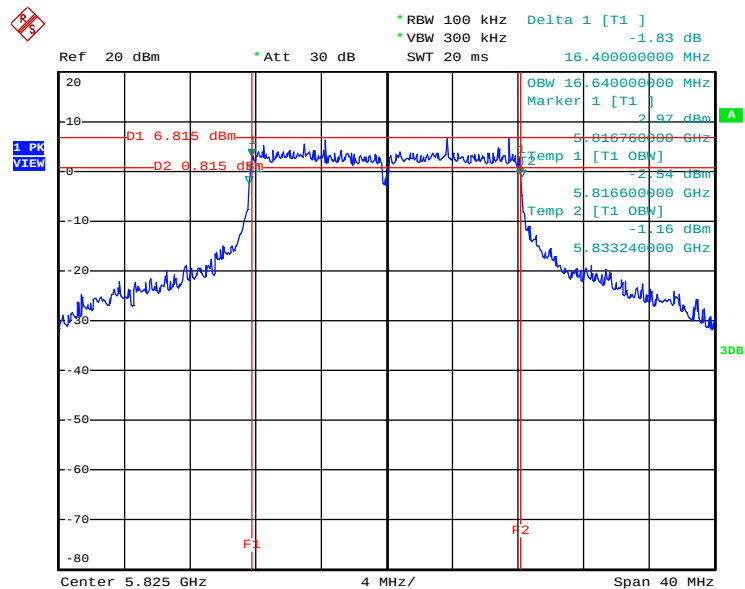
Date: 12.DEC.2013 01:22:04

## 6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5805 MHz / Ant. 3



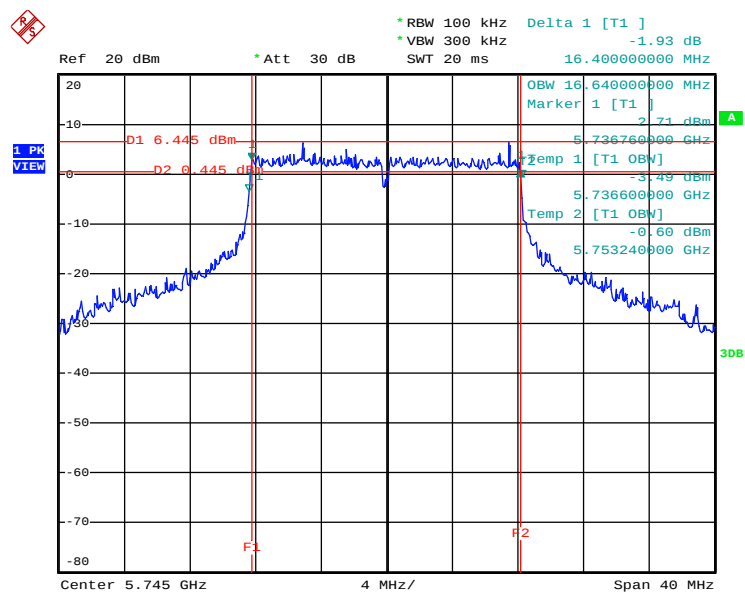
Date: 12.DEC.2013 01:23:37

## 6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5825 MHz / Ant. 3



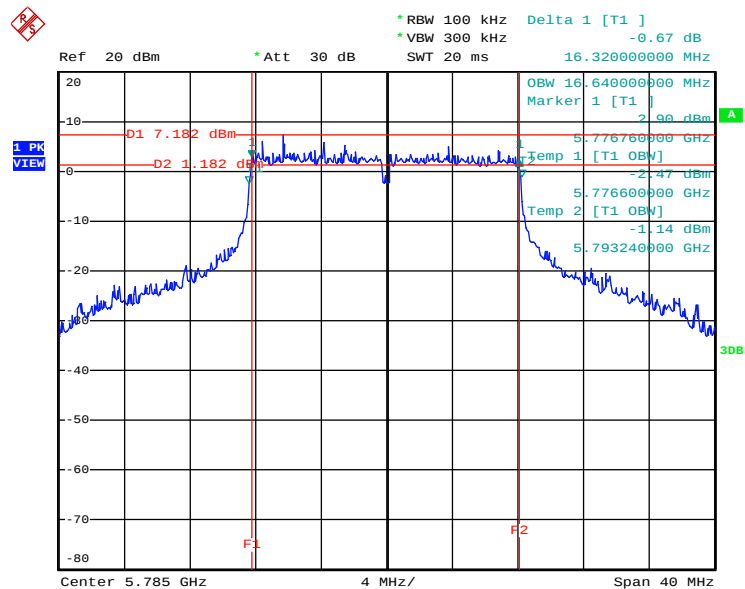
Date: 12.DEC.2013 01:24:32

## 6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5745 MHz / Ant. 4



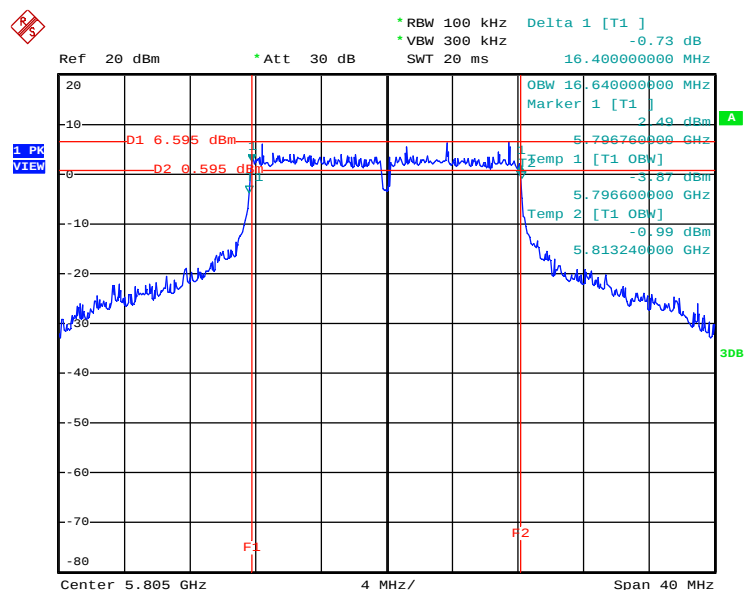
Date: 12.DEC.2013 01:20:06

## 6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5785 MHz / Ant. 4



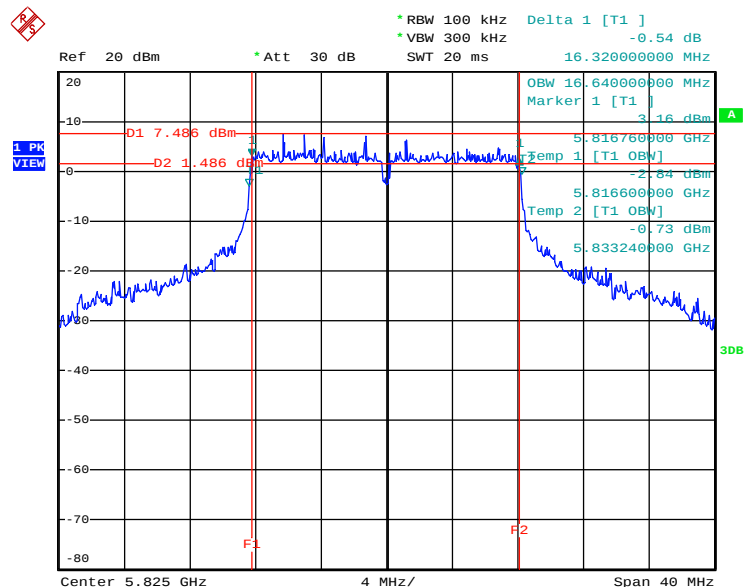
Date: 12.DEC.2013 01:21:50

## 6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5805 MHz / Ant. 4



Date: 12.DEC.2013 01:23:51

## 6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5825 MHz / Ant. 4



Date: 12.DEC.2013 01:24:17

|               |               |               |               |
|---------------|---------------|---------------|---------------|
| Test date     | Dec. 12, 2013 | Test Site No. | TH01-CB       |
| Temperature   | 26°C          | Humidity      | 63%           |
| Test Engineer | Wen Chao      | Configuration | 802.11n 20MHz |
| Duty Cycle    | 99.20%        | Duty Factor   | 0.035         |

## Configuration IEEE 802.11n 20MHz

## &lt;MCS0, Ant 1&gt;

| Channel | Frequency | 6dB Bandwidth (MHz) | 99% Occupied BW (MHz) | Data Rate / MCS |
|---------|-----------|---------------------|-----------------------|-----------------|
| 149     | 5745 MHz  | 17.68               | 17.92                 | MCS0            |
| 157     | 5785 MHz  | 17.60               | 17.92                 | MCS0            |
| 161     | 5805 MHz  | 17.60               | 17.92                 | MCS0            |
| 165     | 5825 MHz  | 17.68               | 17.92                 | MCS0            |

## &lt;MCS0, Ant 2&gt;

| Channel | Frequency | 6dB Bandwidth (MHz) | 99% Occupied BW (MHz) | Data Rate / MCS |
|---------|-----------|---------------------|-----------------------|-----------------|
| 149     | 5745 MHz  | 17.60               | 17.92                 | MCS0            |
| 157     | 5785 MHz  | 17.60               | 17.92                 | MCS0            |
| 161     | 5805 MHz  | 17.84               | 17.92                 | MCS0            |
| 165     | 5825 MHz  | 17.60               | 17.92                 | MCS0            |

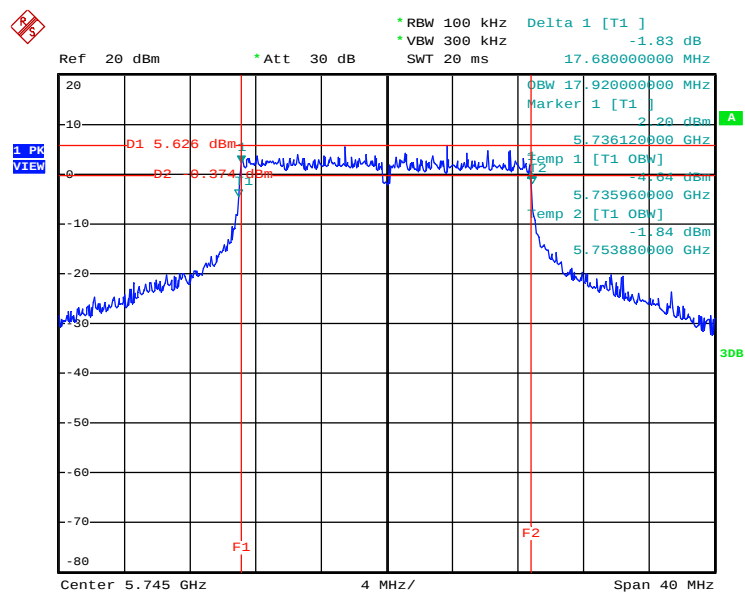
## &lt;MCS0, Ant 3&gt;

| Channel | Frequency | 6dB Bandwidth (MHz) | 99% Occupied BW (MHz) | Data Rate / MCS |
|---------|-----------|---------------------|-----------------------|-----------------|
| 149     | 5745 MHz  | 17.68               | 17.92                 | MCS0            |
| 157     | 5785 MHz  | 17.60               | 17.92                 | MCS0            |
| 161     | 5805 MHz  | 17.60               | 17.92                 | MCS0            |
| 165     | 5825 MHz  | 17.60               | 17.92                 | MCS0            |

## &lt;MCS0, Ant 4&gt;

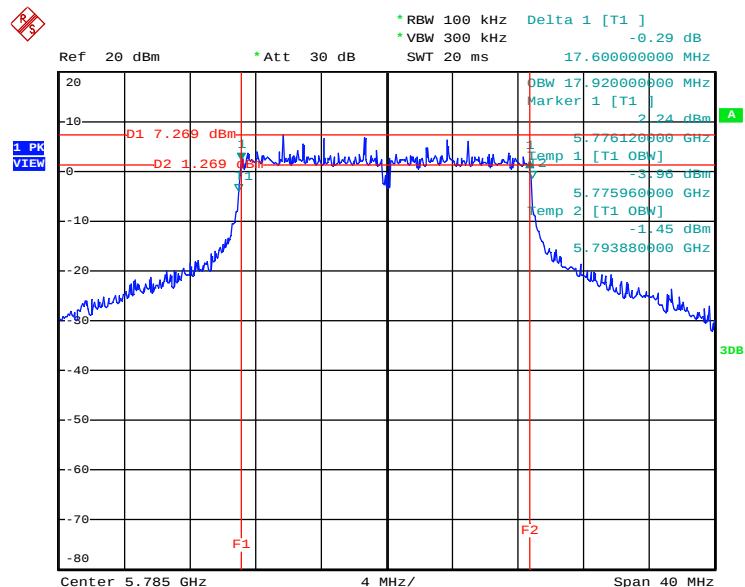
| Channel | Frequency | 6dB Bandwidth (MHz) | 99% Occupied BW (MHz) | Data Rate / MCS |
|---------|-----------|---------------------|-----------------------|-----------------|
| 149     | 5745 MHz  | 17.60               | 17.92                 | MCS0            |
| 157     | 5785 MHz  | 17.76               | 17.92                 | MCS0            |
| 161     | 5805 MHz  | 17.68               | 17.92                 | MCS0            |
| 165     | 5825 MHz  | 17.60               | 17.92                 | MCS0            |

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 20MHz MCS0 / 5745 MHz / Ant. 1



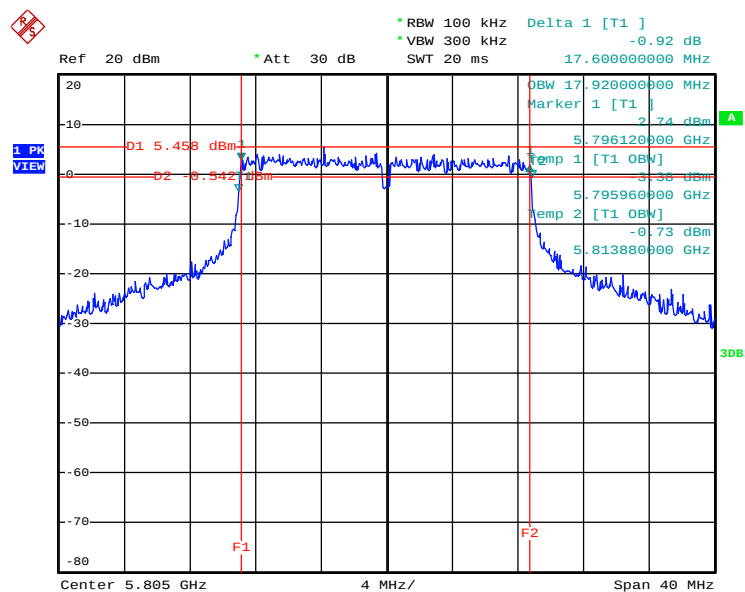
Date: 12.DEC.2013 01:29:43

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 20MHz MCS0 / 5785 MHz / Ant. 1



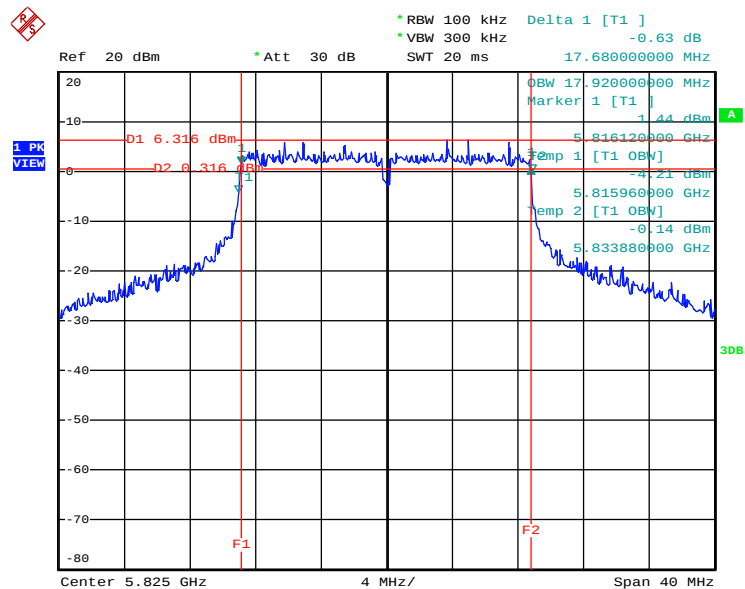
Date: 12.DEC.2013 01:28:07

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 20MHz MCS0 / 5805 MHz / Ant. 1



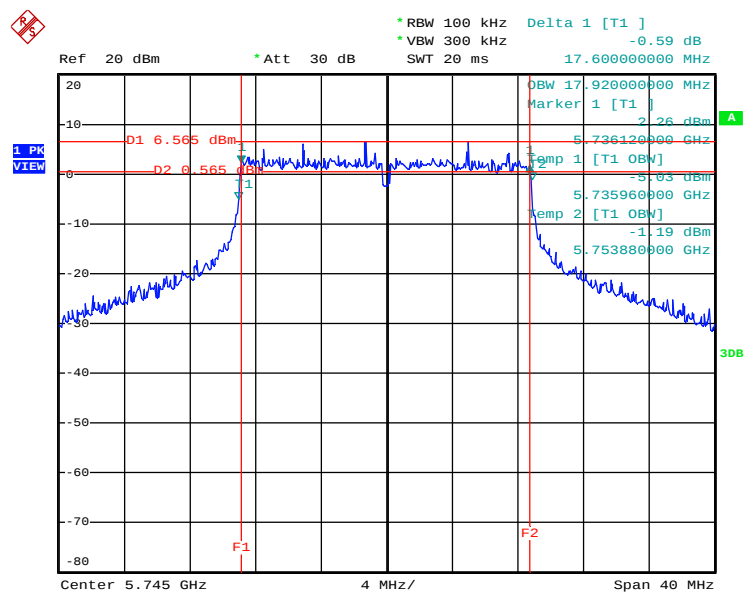
Date: 12.DEC.2013 01:27:42

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 20MHz MCS0 / 5825 MHz / Ant. 1



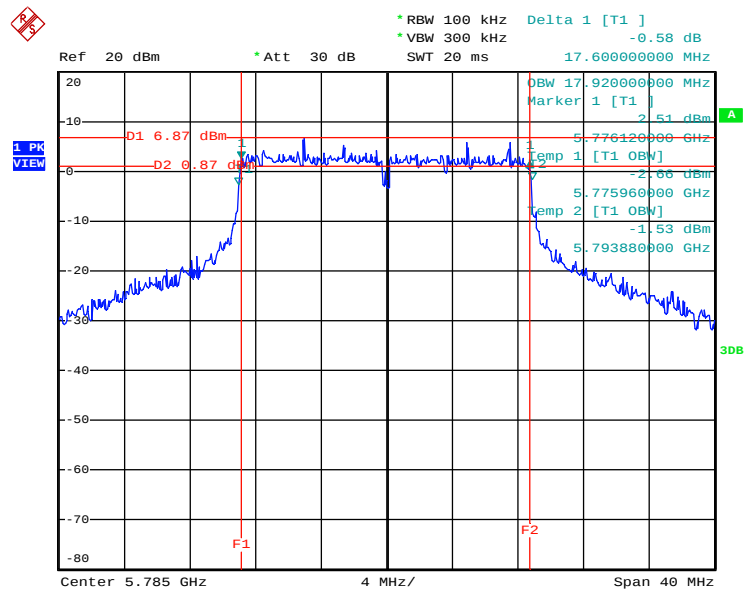
Date: 12.DEC.2013 01:25:30

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 20MHz MCS0 / 5745 MHz / Ant. 2



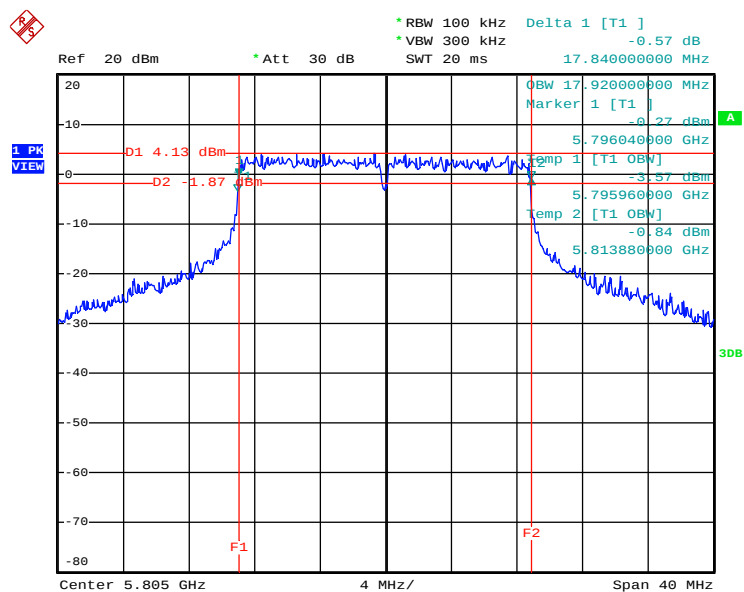
Date: 12.DEC.2013 01:29:31

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 20MHz MCS0 / 5785 MHz / Ant. 2



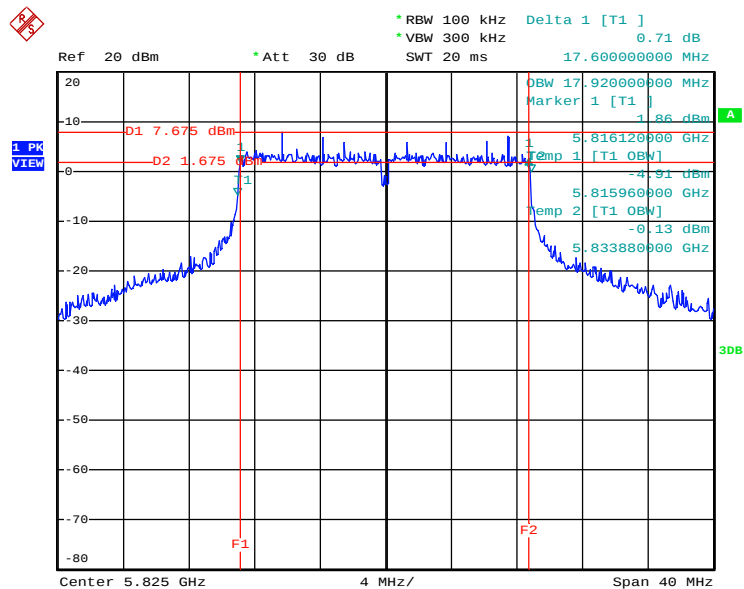
Date: 12.DEC.2013 01:28:19

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 20MHz MCS0 / 5805 MHz / Ant. 2



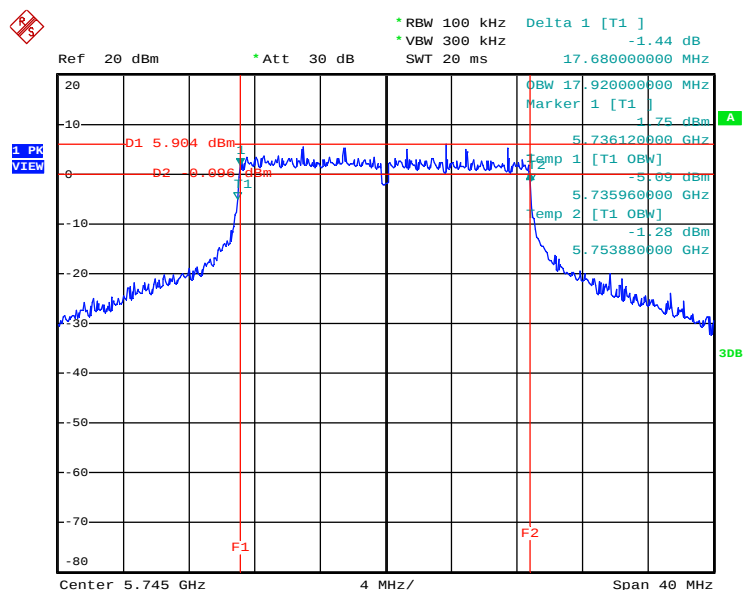
Date: 12.DEC.2013 01:27:30

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 20MHz MCS0 / 5825 MHz / Ant. 2



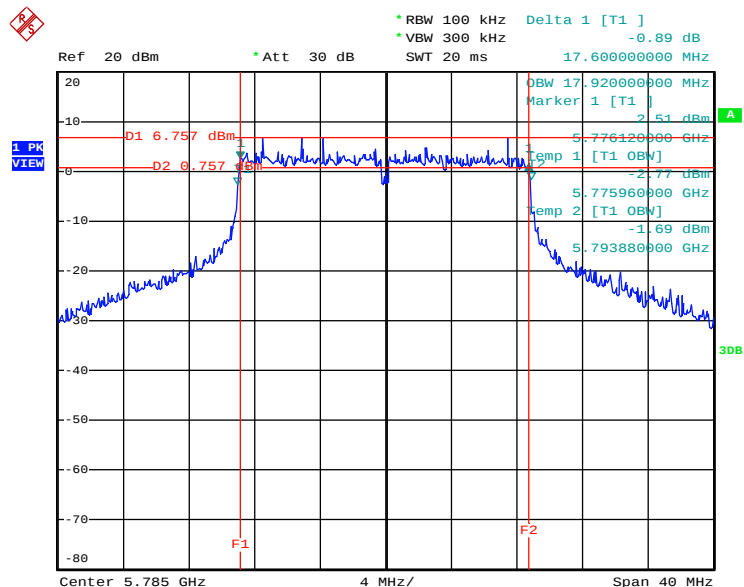
Date: 12.DEC.2013 01:25:46

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 20MHz MCS0 / 5745 MHz / Ant. 3



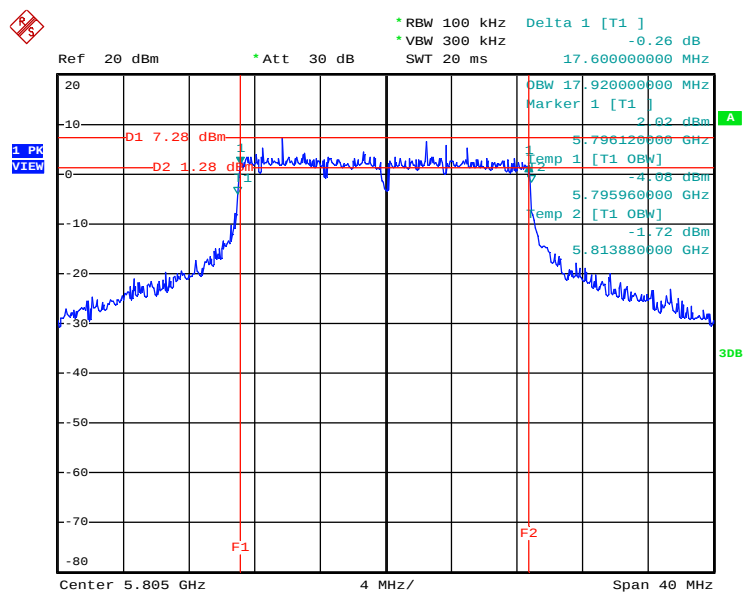
Date: 12.DEC.2013 01:29:20

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 20MHz MCS0 / 5785 MHz / Ant. 3



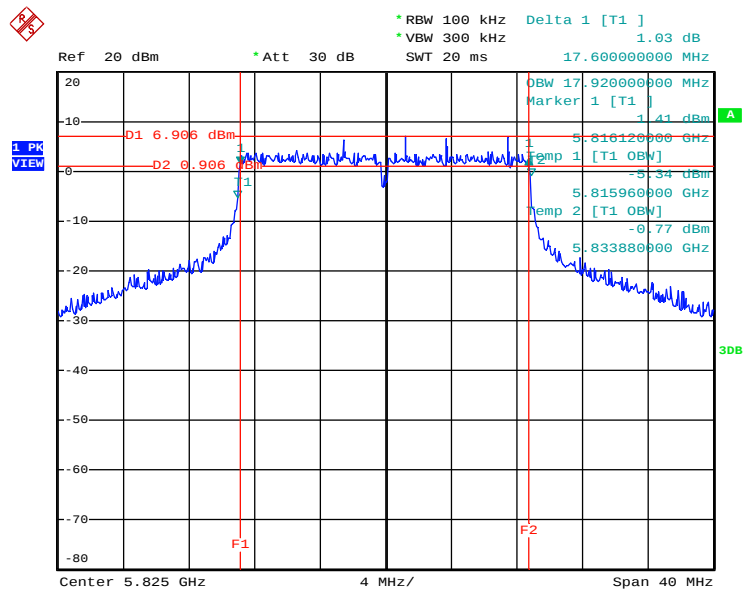
Date: 12.DEC.2013 01:28:31

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 20MHz MCS0 / 5805 MHz / Ant. 3



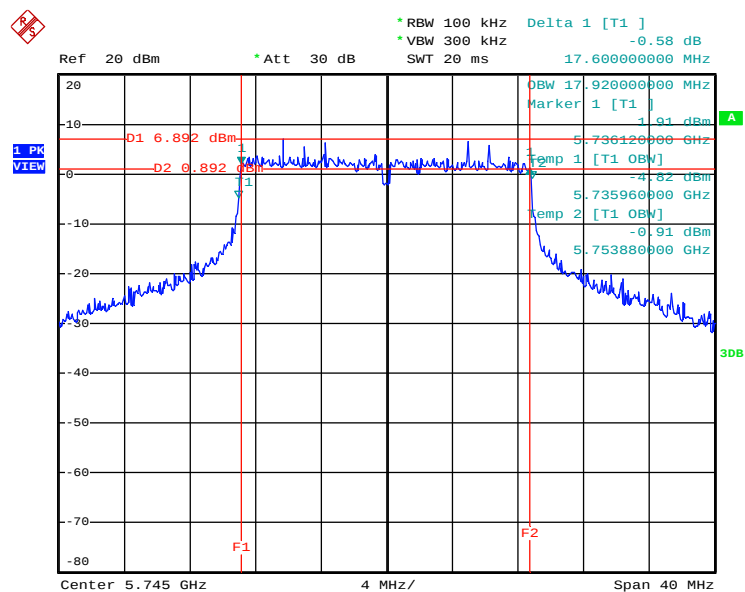
Date: 12.DEC.2013 01:27:10

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 20MHz MCS0 / 5825 MHz / Ant. 3



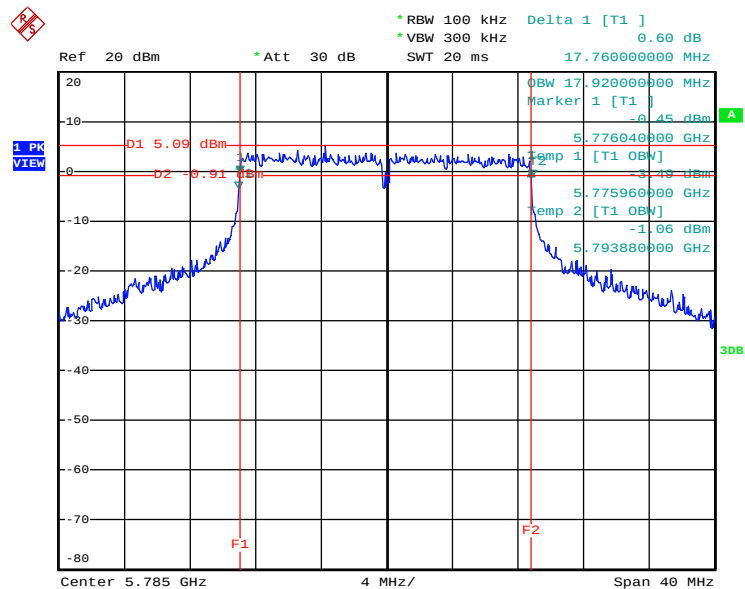
Date: 12.DEC.2013 01:26:00

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 20MHz MCS0 / 5745 MHz / Ant. 4



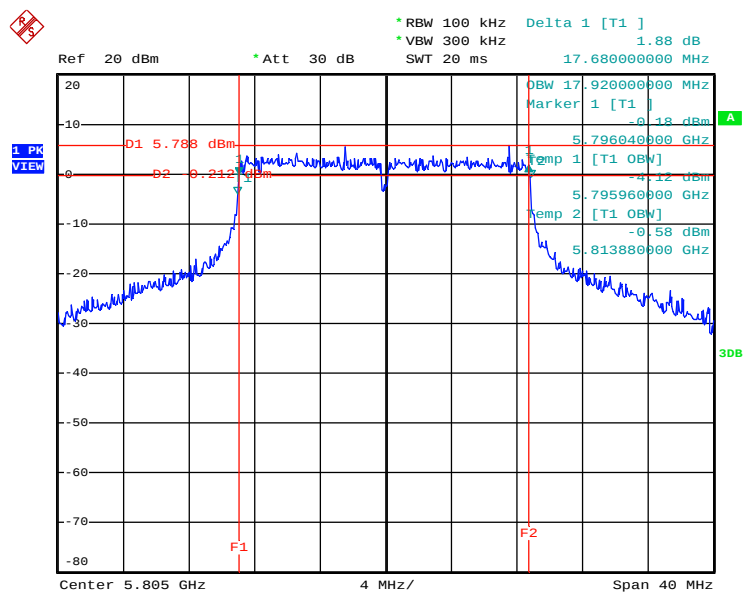
Date: 12.DEC.2013 01:29:08

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 20MHz MCS0 / 5785 MHz / Ant. 4



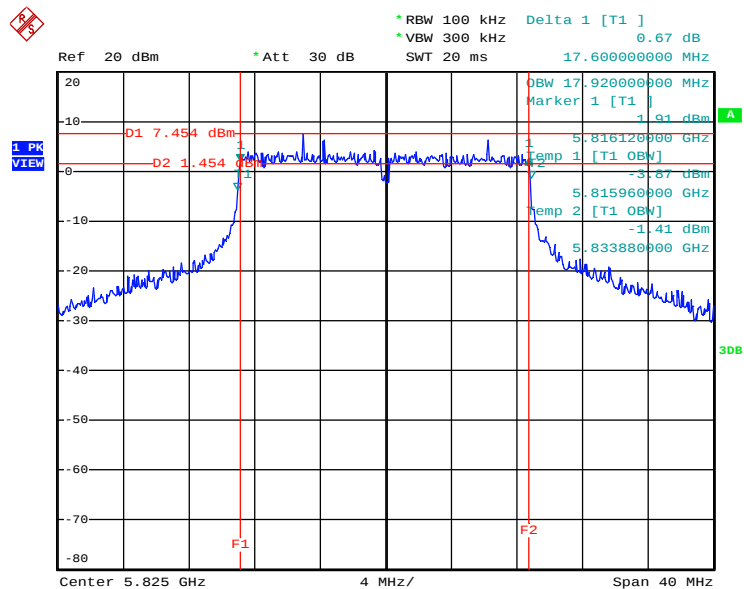
Date: 12.DEC.2013 01:28:45

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 20MHz MCS0 / 5805 MHz / Ant. 4



Date: 12.DEC.2013 01:26:39

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 20MHz MCS0 / 5825 MHz / Ant. 4



Date: 12.DEC.2013 01:26:13

|               |               |               |               |
|---------------|---------------|---------------|---------------|
| Test date     | Dec. 12, 2013 | Test Site No. | TH01-CB       |
| Temperature   | 26°C          | Humidity      | 63%           |
| Test Engineer | Wen Chao      | Configuration | 802.11n 40MHz |
| Duty Cycle    | 97.97%        | Duty Factor   | 0.09          |

## Configuration IEEE 802.11n 40MHz

## &lt;MCS0, Ant 1&gt;

| Channel | Frequency | 6dB Bandwidth (MHz) | 99% Occupied BW (MHz) | Data Rate / MCS |
|---------|-----------|---------------------|-----------------------|-----------------|
| 151     | 5755 MHz  | 36.16               | 36.32                 | MCS0            |
| 159     | 5795 MHz  | 35.84               | 36.32                 | MCS0            |

## &lt;MCS0, Ant 2&gt;

| Channel | Frequency | 6dB Bandwidth (MHz) | 99% Occupied BW (MHz) | Data Rate / MCS |
|---------|-----------|---------------------|-----------------------|-----------------|
| 151     | 5755 MHz  | 36.00               | 36.32                 | MCS0            |
| 159     | 5795 MHz  | 36.32               | 36.32                 | MCS0            |

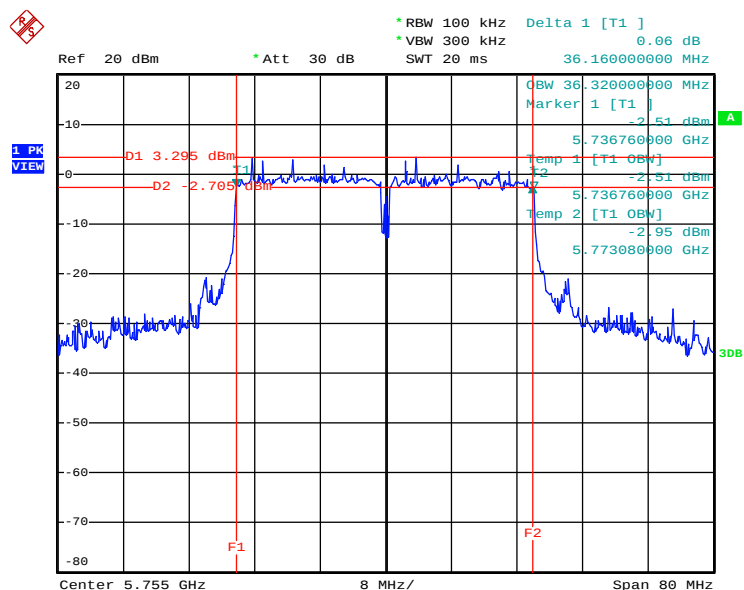
## &lt;MCS0, Ant 3&gt;

| Channel | Frequency | 6dB Bandwidth (MHz) | 99% Occupied BW (MHz) | Data Rate / MCS |
|---------|-----------|---------------------|-----------------------|-----------------|
| 151     | 5755 MHz  | 36.16               | 36.32                 | MCS0            |
| 159     | 5795 MHz  | 36.16               | 36.32                 | MCS0            |

## &lt;MCS0, Ant 4&gt;

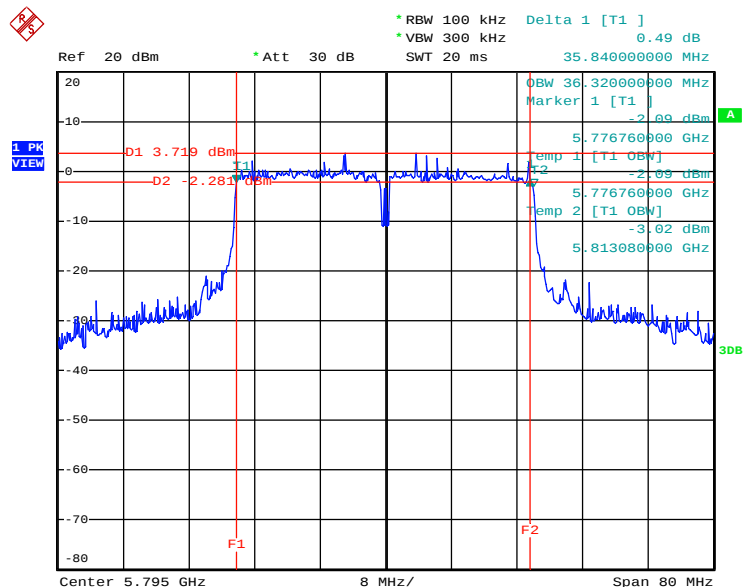
| Channel | Frequency | 6dB Bandwidth (MHz) | 99% Occupied BW (MHz) | Data Rate / MCS |
|---------|-----------|---------------------|-----------------------|-----------------|
| 151     | 5755 MHz  | 36.16               | 36.32                 | MCS0            |
| 159     | 5795 MHz  | 35.36               | 36.32                 | MCS0            |

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 40MHz MCS0 / 5755 MHz / Ant. 1



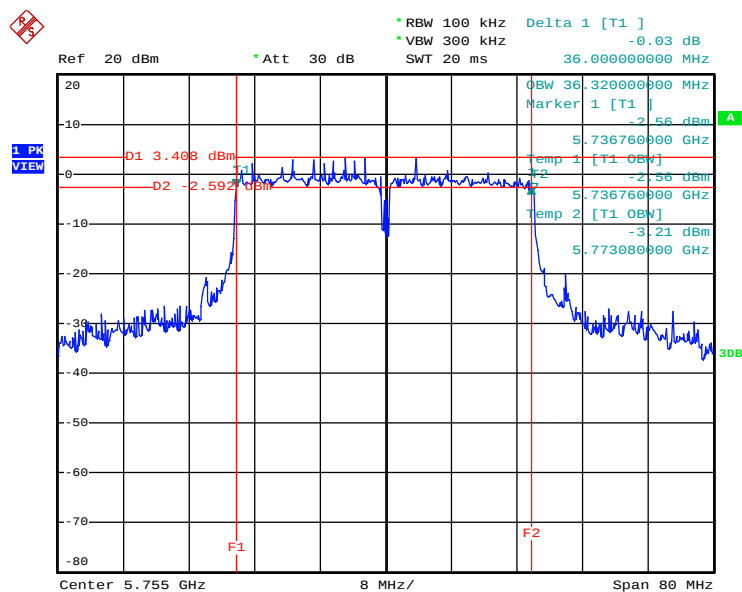
Date: 12.DEC.2013 01:30:10

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 40MHz MCS0 / 5795 MHz / Ant. 1



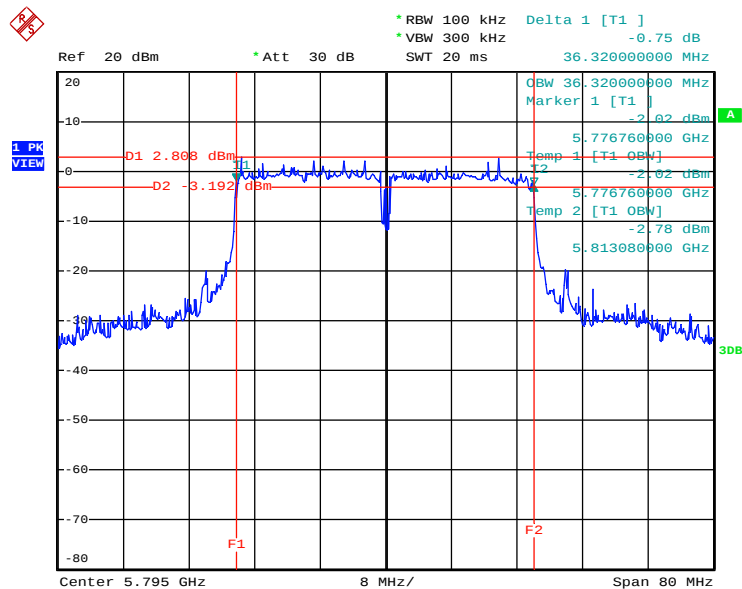
Date: 12.DEC.2013 01:32:04

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 40MHz MCS0 / 5755 MHz / Ant. 2



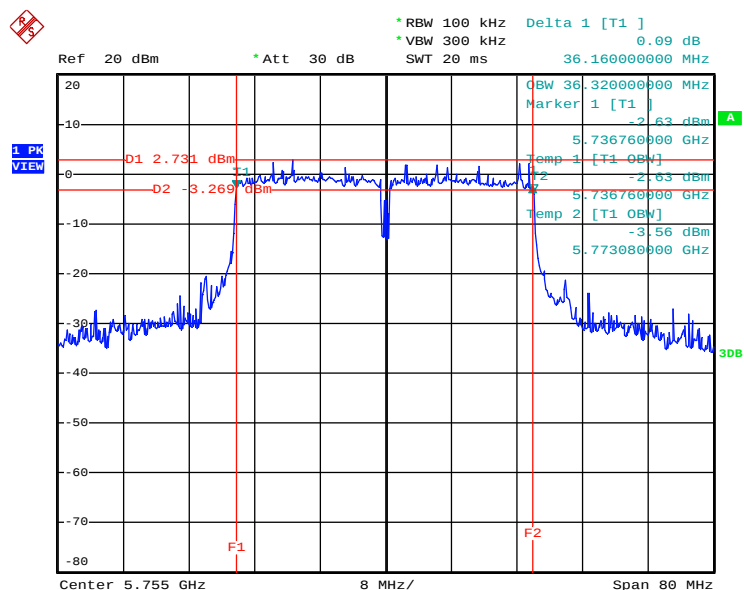
Date: 12.DEC.2013 01:30:26

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 40MHz MCS0 / 5795 MHz / Ant. 2



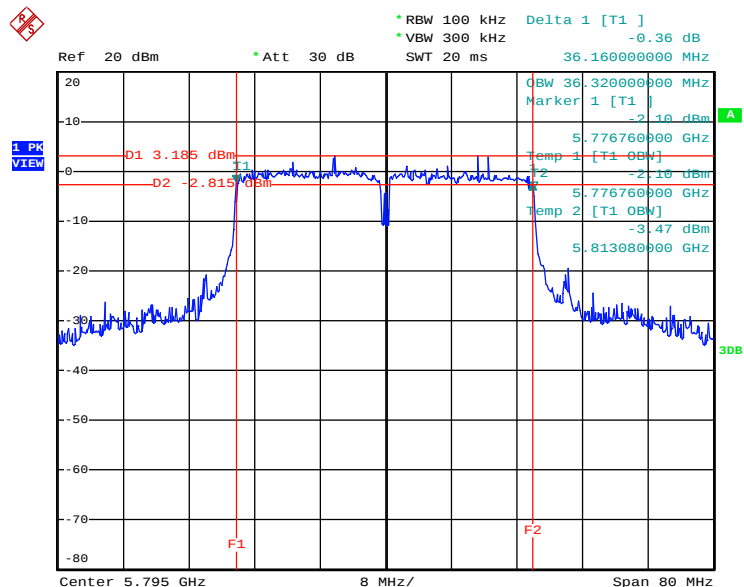
Date: 12.DEC.2013 01:31:52

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 40MHz MCS0 / 5755 MHz / Ant. 3



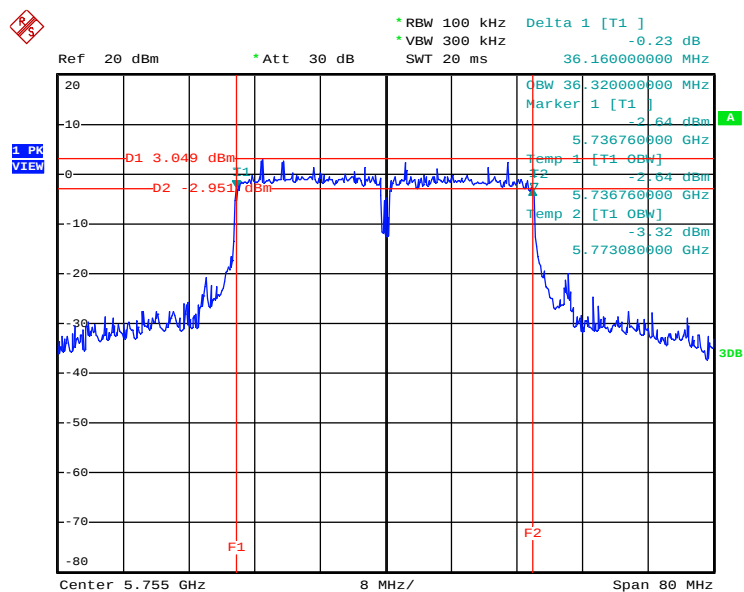
Date: 12.DEC.2013 01:30:38

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 40MHz MCS0 / 5795 MHz / Ant. 3



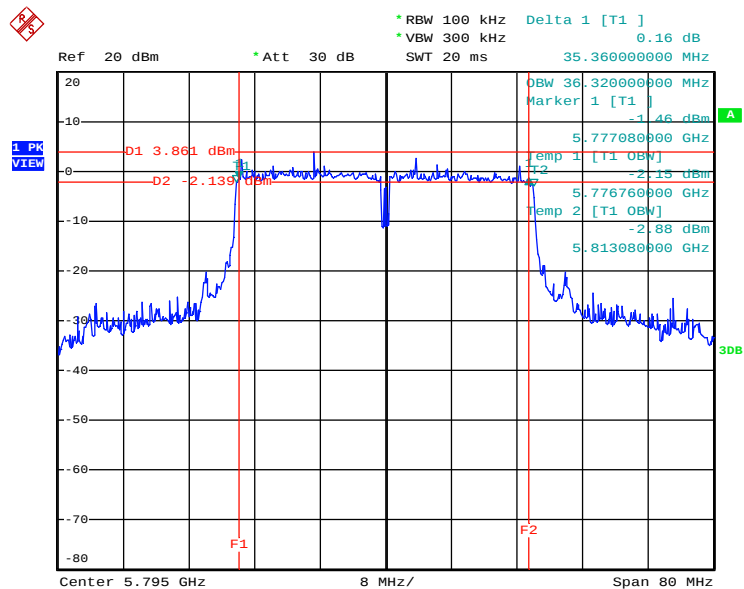
Date: 12.DEC.2013 01:31:39

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 40MHz MCS0 / 5755 MHz / Ant. 4



Date: 12.DEC.2013 01:30:51

## 6 dB Bandwidth Plot on Configuration IEEE 802.11n 40MHz MCS0 / 5795 MHz / Ant. 4



Date: 12.DEC.2013 01:31:22

### 3.5 Radiated Emissions Measurement

#### 3.5.1 Limit

30dBc in any 100 kHz bandwidth outside the operating frequency band. 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>(microvolt/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                                |

#### 3.5.2 Measuring Instruments and Setting

Please refer to section 6 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

| Spectrum Parameter                          | Setting                                       |
|---------------------------------------------|-----------------------------------------------|
| Attenuation                                 | Auto                                          |
| Start Frequency                             | 1GHz                                          |
| Stop Frequency                              | 10th carrier harmonic                         |
| RBW / VBW (Emission in restricted band)     | 1MHz / 3MHz for Peak, 1MHz / 10Hz for Average |
| RBW / VBW (Emission in non-restricted band) | 100kHz / 300kHz for peak                      |

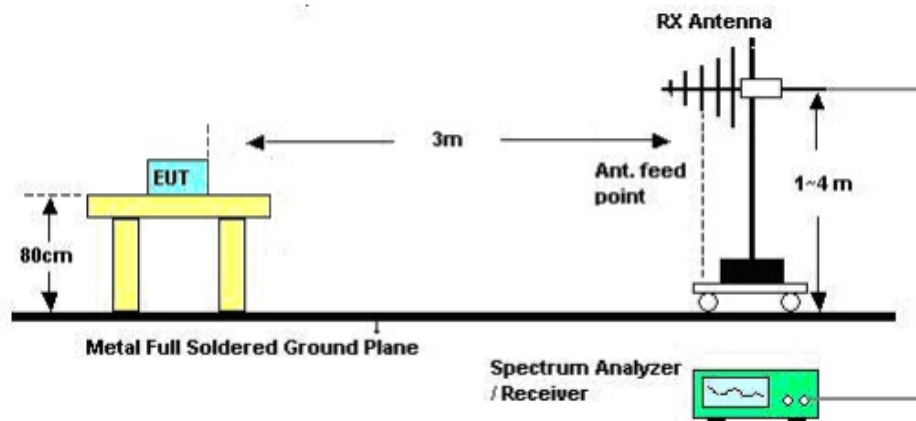
| Receiver Parameter     | Setting                        |
|------------------------|--------------------------------|
| Attenuation            | Auto                           |
| Start ~ Stop Frequency | 9kHz~150kHz / RBW 200Hz for QP |
| Start ~ Stop Frequency | 150kHz~30MHz / RBW 9kHz for QP |
| Start ~ Stop Frequency | 30MHz~1GHz / RBW 120kHz for QP |

**3.5.3 Test Procedures**

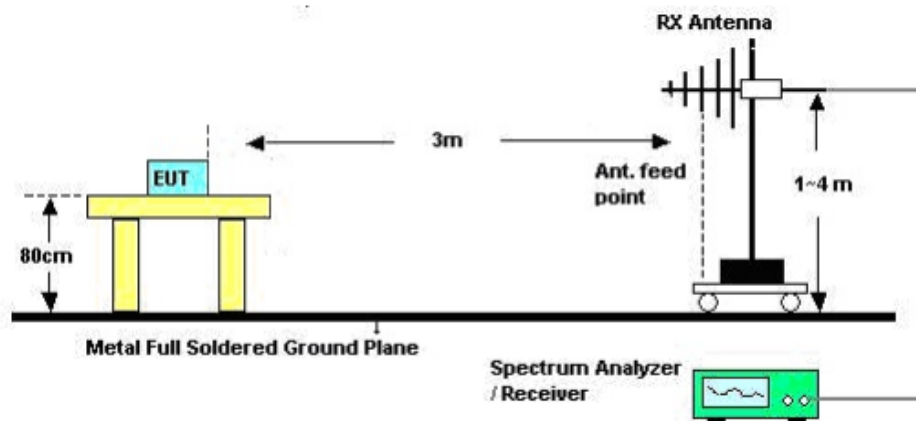
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting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

### 3.5.4 Test Setup Layout

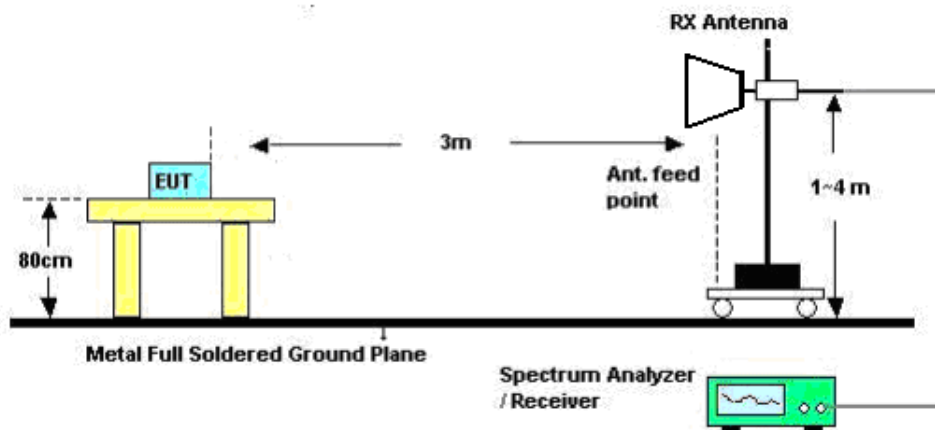
For Radiated Emissions below 1GHz (9kHz~30MHz)



For Radiated Emissions below 1GHz (30MHz~1GHz)



For Radiated Emissions above 1GHz



### 3.5.5 Test Deviation

There are no deviations with the original standard.

**3.5.6 EUT Operation during Test**

The EUT was programmed to be in continuously transmitting mode.

**3.5.7 Results of Radiated Emissions (9kHz~30MHz)**

|                        |               |                       |           |
|------------------------|---------------|-----------------------|-----------|
| <b>Frequency Range</b> | 9kHz~30MHz    | <b>Test Site No.</b>  | 03CH01-CB |
| <b>Temperature</b>     | 24°C          | <b>Humidity</b>       | 59%       |
| <b>Test Engineer</b>   | Kenneth Huang | <b>Configurations</b> | CTX       |
| <b>Test Date</b>       | Nov. 12, 2013 |                       |           |

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

**Note:**

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

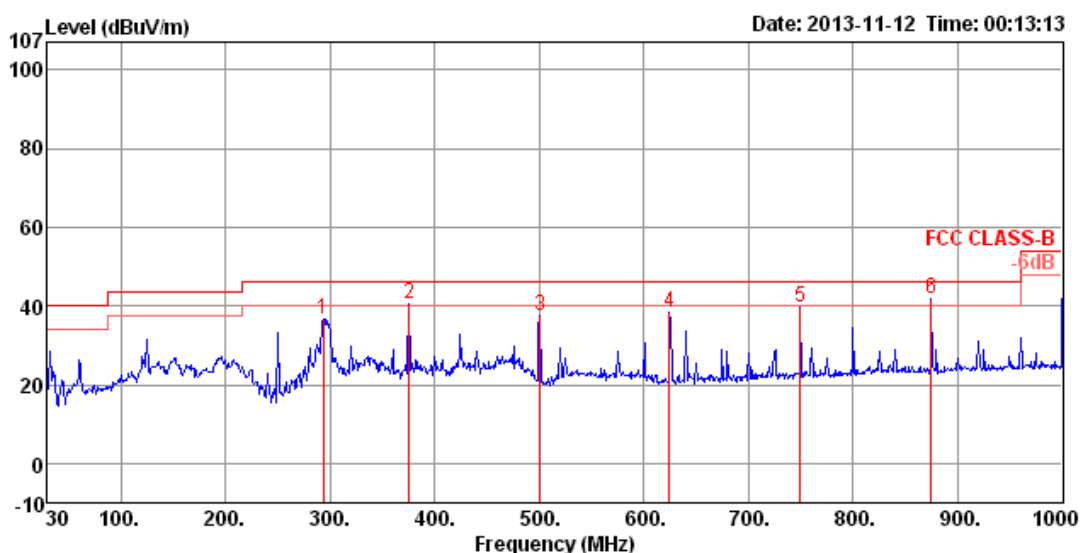
Distance extrapolation factor =  $40 \log (\text{specific distance} / \text{test distance})$  (dB);

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

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

|                 |               |                |           |
|-----------------|---------------|----------------|-----------|
| Frequency Range | 30MHz~1GHz    | Test Site No.  | 03CH01-CB |
| Temperature     | 24°C          | Humidity       | 59%       |
| Test Engineer   | Kenneth Huang | Configurations | CTX       |

## Horizontal



|   | Freq   | Level  | Limit  | Over  | Read  | Cable | Antenna | Preamp | A/Pos | T/Pos | Pol/Phase  | Remark |
|---|--------|--------|--------|-------|-------|-------|---------|--------|-------|-------|------------|--------|
|   | MHz    | dBuV/m | dBuV/m | dB    | dBuV  | dB    | dB/m    | dB     | cm    | deg   |            |        |
| 1 | 293.84 | 36.60  | 46.00  | -9.40 | 53.20 | 2.10  | 12.79   | 31.49  | 100   | 127   | HORIZONTAL | Peak   |
| 2 | 375.32 | 40.71  | 46.00  | -5.29 | 54.77 | 2.44  | 14.93   | 31.43  | 100   | 151   | HORIZONTAL | QP     |
| 3 | 500.45 | 37.37  | 46.00  | -8.63 | 49.04 | 2.82  | 16.92   | 31.41  | 200   | 135   | HORIZONTAL | Peak   |
| 4 | 624.61 | 38.51  | 46.00  | -7.49 | 48.12 | 3.18  | 18.61   | 31.40  | 150   | 177   | HORIZONTAL | Peak   |
| 5 | 749.74 | 39.50  | 46.00  | -6.50 | 47.65 | 3.53  | 19.69   | 31.37  | 125   | 217   | HORIZONTAL | Peak   |
| 6 | 874.87 | 41.62  | 46.00  | -4.38 | 48.64 | 3.89  | 20.24   | 31.15  | 100   | 163   | HORIZONTAL | QP     |

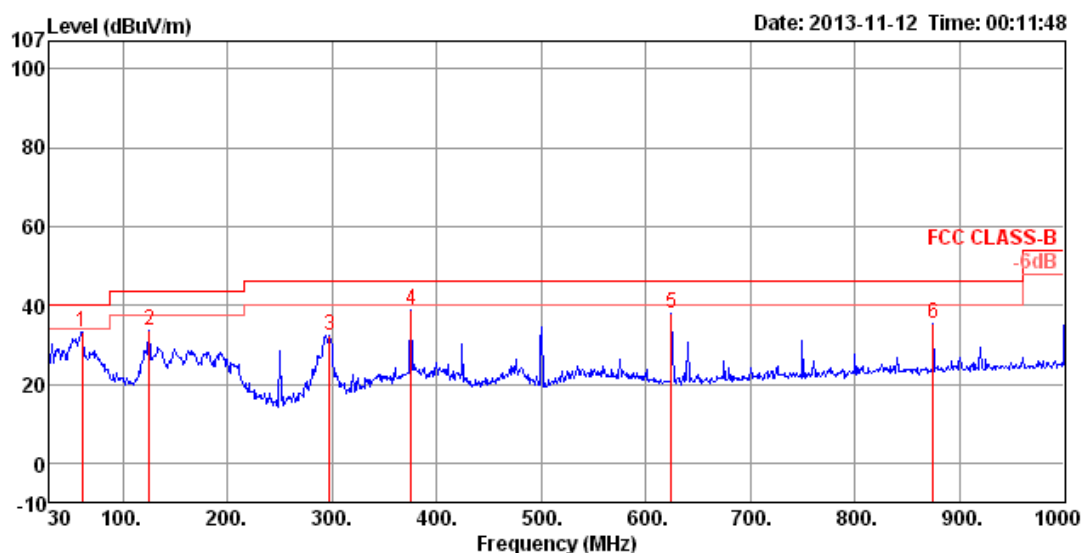
## Note:

The amplitude of spurious emissions which are attenuated by more than 20 dB 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.

## Vertical



|   | Freq   | Level  | Limit  | Over   | Read  | CableAntenna | Preamp | A/Pos | T/Pos | Pol/Phase    | Remark |
|---|--------|--------|--------|--------|-------|--------------|--------|-------|-------|--------------|--------|
|   | MHz    | dBuV/m | dBuV/m | dB     | dBuV  | dB           | dB/m   | dB    | cm    | deg          |        |
| 1 | 61.04  | 33.24  | 40.00  | -6.76  | 59.26 | 0.90         | 4.87   | 31.79 | 100   | 122 VERTICAL | Peak   |
| 2 | 125.06 | 33.41  | 43.50  | -10.09 | 51.92 | 1.33         | 11.73  | 31.57 | 100   | 182 VERTICAL | Peak   |
| 3 | 297.72 | 32.35  | 46.00  | -13.65 | 48.74 | 2.12         | 12.94  | 31.45 | 100   | 284 VERTICAL | Peak   |
| 4 | 375.32 | 38.86  | 46.00  | -7.14  | 52.92 | 2.44         | 14.93  | 31.43 | 100   | 182 VERTICAL | Peak   |
| 5 | 624.61 | 37.76  | 46.00  | -8.24  | 47.37 | 3.18         | 18.61  | 31.40 | 100   | 122 VERTICAL | Peak   |
| 6 | 874.87 | 35.32  | 46.00  | -10.68 | 42.34 | 3.89         | 20.24  | 31.15 | 100   | 89 VERTICAL  | Peak   |

## Note:

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

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

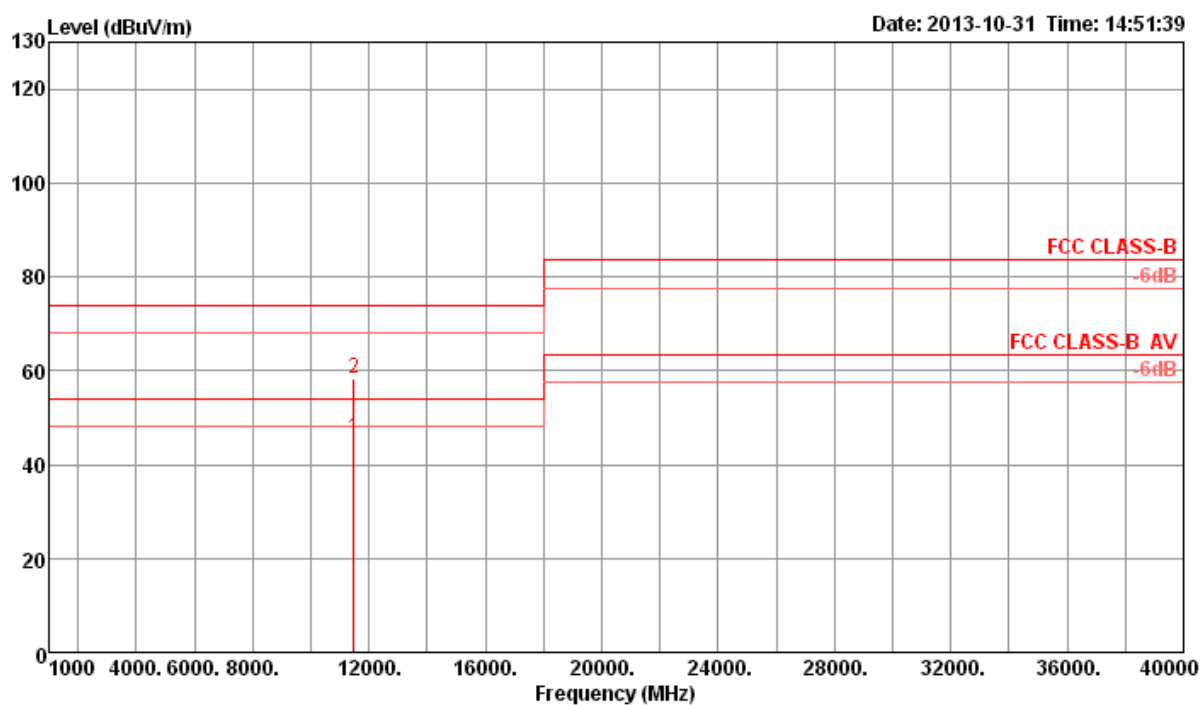
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

**3.5.9 Results for Radiated Emissions (1GHz~10<sup>th</sup> Harmonic)**

Following channel(s) was (were) selected for the final test as listed below.

| Mode          | TX Chain    | Test Channel       | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|---------------|-------------|--------------------|-----------------------|-----------------|------------------|
| 802.11a       | Ant.1+2+3+4 | 149, 157, 161, 165 | OFDM                  | BPSK            | 6                |
| 802.11n 20MHz | Ant.1+2+3+4 | 149, 157, 161, 165 | OFDM                  | BPSK            | MCS0             |
| 802.11n 40MHz | Ant.1+2+3+4 | 151, 159           | OFDM                  | BPSK            | MCS0             |

| Emission not in Restricted Bands (Above 1GHz) |                                                       |              |     |
|-----------------------------------------------|-------------------------------------------------------|--------------|-----|
| Operating Mode                                | IEEE 802.11a 20MHz 6Mbps / CH149 / Ant. 1 + 2 + 3 + 4 |              |     |
| Temperature                                   | 24°C                                                  | Humidity     | 59% |
| Test Engineer                                 | Kenneth Huang                                         | Polarization | H   |



|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark  | A/Pos | T/Pos | Pol/Phase  |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|---------|-------|-------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            |         | cm    | deg   |            |
| 1 | 11490.00 | 45.59  | 54.00      | -8.41      | 36.98      | 5.11       | 38.78          | 35.28         | Average | 100   | 130   | HORIZONTAL |
| 2 | 11490.48 | 58.25  | 74.00      | -15.75     | 49.64      | 5.11       | 38.78          | 35.28         | Peak    | 100   | 130   | HORIZONTAL |

Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

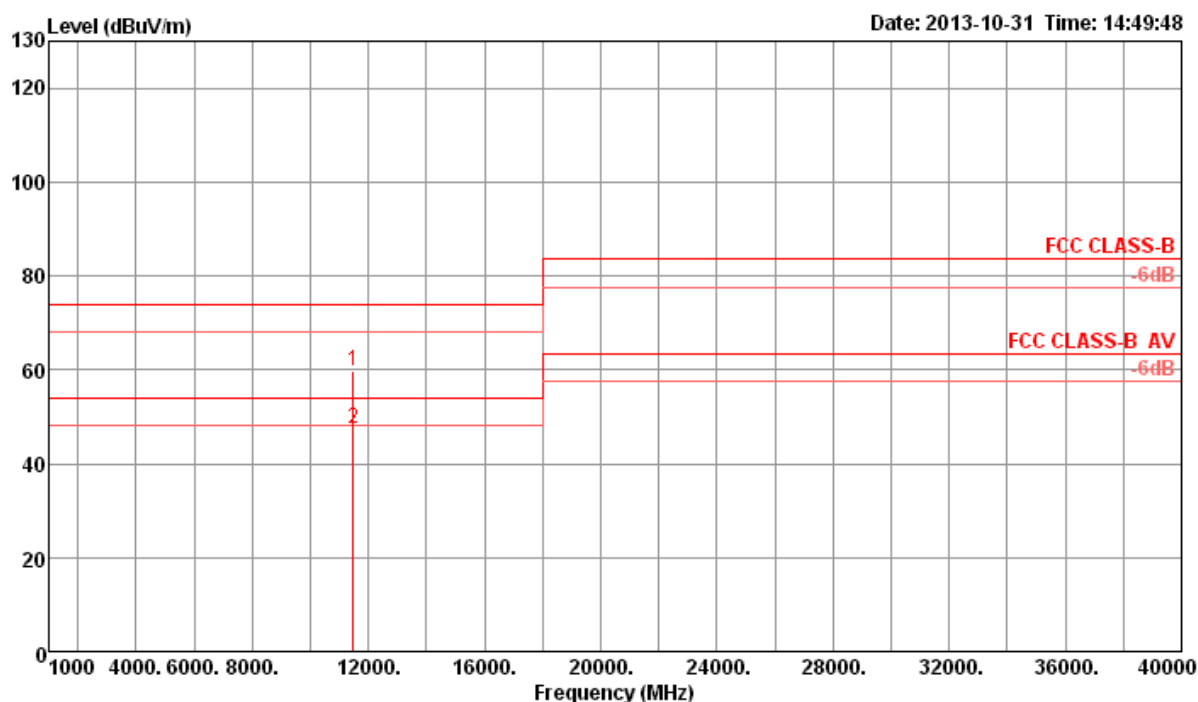
Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).

Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

## Emission not in Restricted Bands (Above 1GHz)

|                |                                                       |              |     |
|----------------|-------------------------------------------------------|--------------|-----|
| Operating Mode | IEEE 802.11a 20MHz 6Mbps / CH149 / Ant. 1 + 2 + 3 + 4 |              |     |
| Temperature    | 24°C                                                  | Humidity     | 59% |
| Test Engineer  | Kenneth Huang                                         | Polarization | V   |



|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Antenna | Preamp |         | A/Pos | T/Pos | Pol/Phase |
|---|----------|--------|--------|--------|-------|-------|---------|--------|---------|-------|-------|-----------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | dB    | dB/m    | dB     | Remark  | cm    | deg   |           |
| 1 | 11491.60 | 59.78  | 74.00  | -14.22 | 51.17 | 5.11  | 38.78   | 35.28  | Peak    | 100   | 154   | VERTICAL  |
| 2 | 11492.08 | 47.45  | 54.00  | -6.55  | 38.84 | 5.11  | 38.78   | 35.28  | Average | 100   | 154   | VERTICAL  |

Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

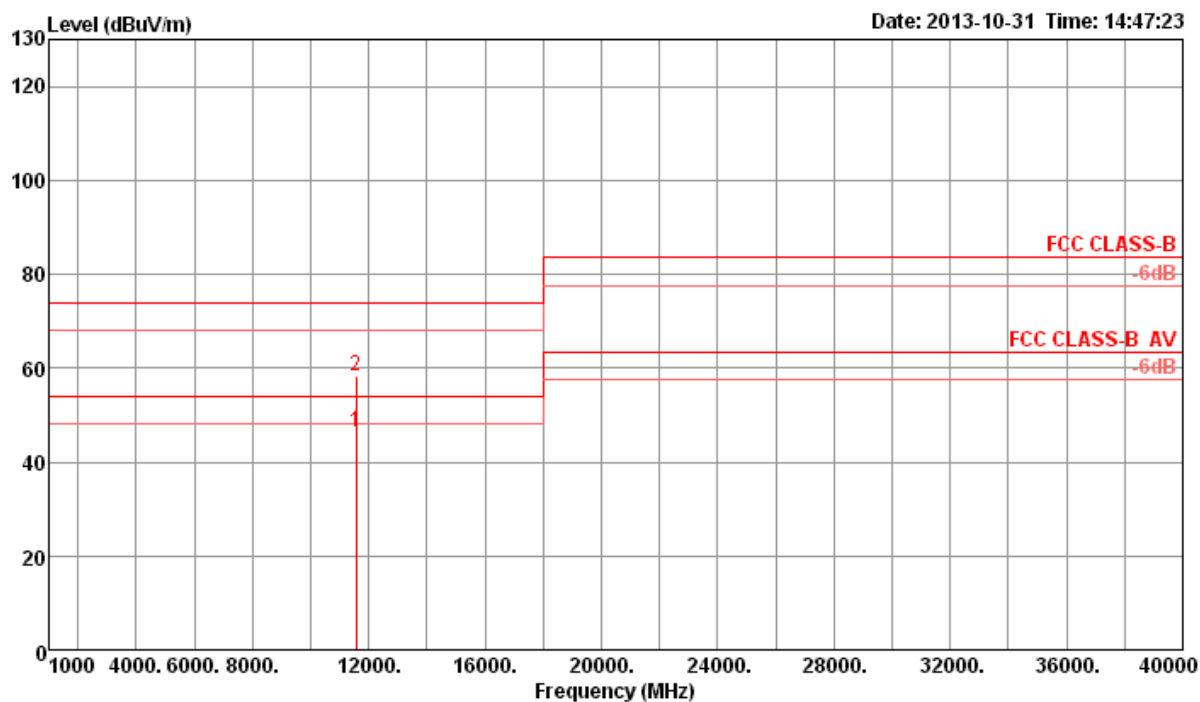
Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).

Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

## Emission not in Restricted Bands (Above 1GHz)

|                |                                                       |              |     |
|----------------|-------------------------------------------------------|--------------|-----|
| Operating Mode | IEEE 802.11a 20MHz 6Mbps / CH157 / Ant. 1 + 2 + 3 + 4 |              |     |
| Temperature    | 24°C                                                  | Humidity     | 59% |
| Test Engineer  | Kenneth Huang                                         | Polarization | H   |



|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark  | A/Pos | T/Pos | Pol/Phase  |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|---------|-------|-------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            |         | cm    | deg   |            |
| 1 | 11569.84 | 46.52  | 54.00      | -7.48      | 37.85      | 5.14       | 38.83          | 35.30         | Average | 100   | 130   | HORIZONTAL |
| 2 | 11570.48 | 58.31  | 74.00      | -15.69     | 49.64      | 5.14       | 38.83          | 35.30         | Peak    | 100   | 130   | HORIZONTAL |

Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

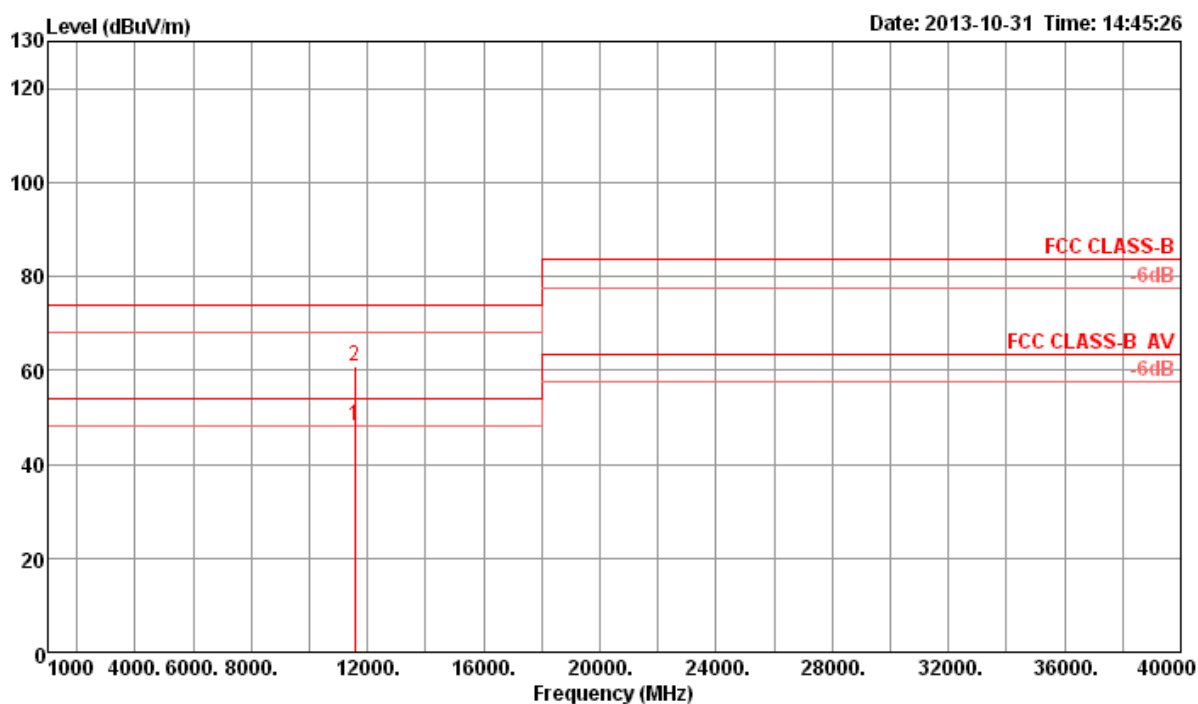
Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).

Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

## Emission not in Restricted Bands (Above 1GHz)

|                |                                                       |              |     |
|----------------|-------------------------------------------------------|--------------|-----|
| Operating Mode | IEEE 802.11a 20MHz 6Mbps / CH157 / Ant. 1 + 2 + 3 + 4 |              |     |
| Temperature    | 24°C                                                  | Humidity     | 59% |
| Test Engineer  | Kenneth Huang                                         | Polarization | V   |



|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark  | A/Pos | T/Pos | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|---------|-------|-------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            |         | cm    | deg   |           |
| 1 | 11563.43 | 48.18  | 54.00      | -5.82      | 39.53      | 5.13       | 38.82          | 35.30         | Average | 100   | 167   | VERTICAL  |
| 2 | 11563.59 | 60.87  | 74.00      | -13.13     | 52.22      | 5.13       | 38.82          | 35.30         | Peak    | 100   | 167   | VERTICAL  |

Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

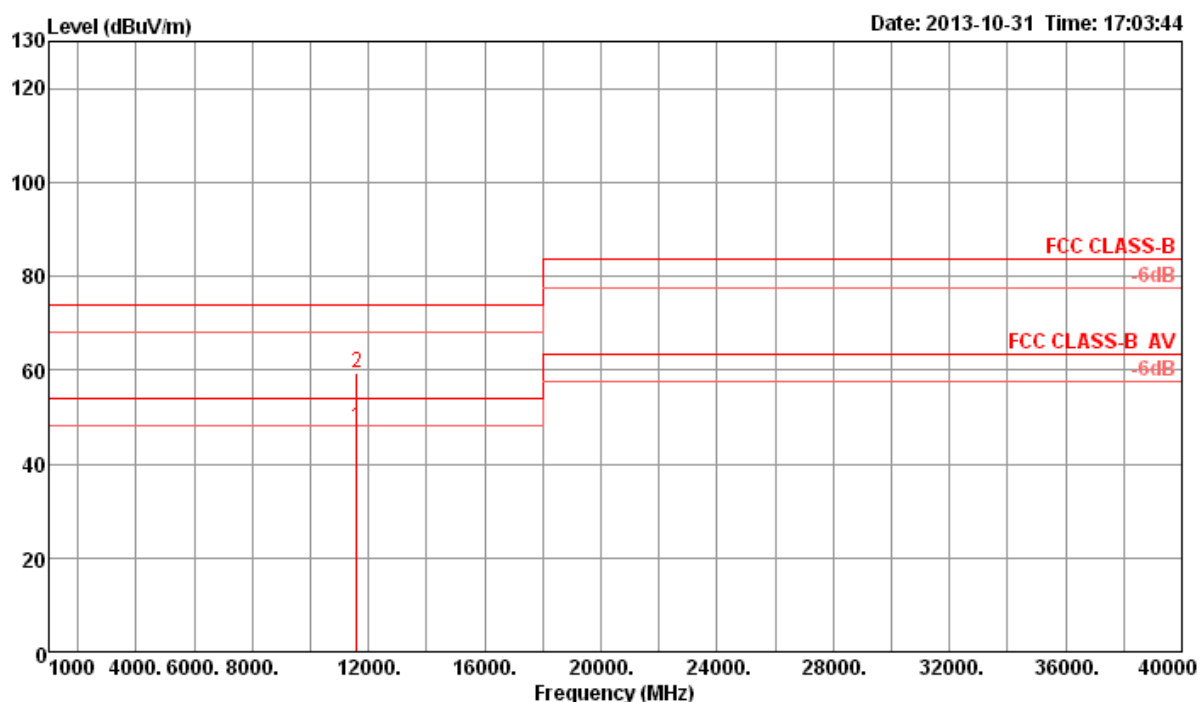
Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).

Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

## Emission not in Restricted Bands (Above 1GHz)

|                |                                                       |              |     |
|----------------|-------------------------------------------------------|--------------|-----|
| Operating Mode | IEEE 802.11a 20MHz 6Mbps / CH161 / Ant. 1 + 2 + 3 + 4 |              |     |
| Temperature    | 24°C                                                  | Humidity     | 59% |
| Test Engineer  | Kenneth Huang                                         | Polarization | H   |



|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Antenna | Preamp |         | A/Pos | T/Pos |            |
|---|----------|--------|--------|--------|-------|-------|---------|--------|---------|-------|-------|------------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | dB    | dB/m    | dB     | Remark  | cm    | deg   | Pol/Phase  |
| 1 | 11610.00 | 47.82  | 54.00  | -6.18  | 39.13 | 5.15  | 38.84   | 35.30  | Average | 100   | 128   | HORIZONTAL |
| 2 | 11610.60 | 59.46  | 74.00  | -14.54 | 50.77 | 5.15  | 38.84   | 35.30  | Peak    | 100   | 128   | HORIZONTAL |

Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

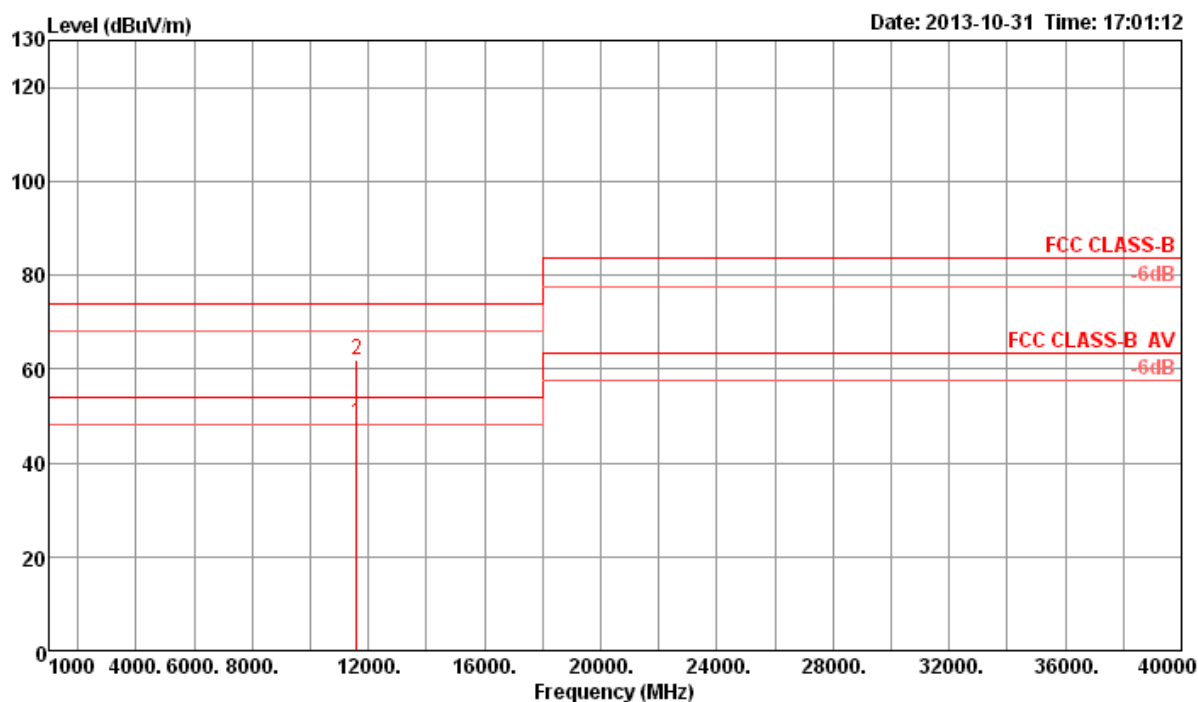
Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).

Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

## Emission not in Restricted Bands (Above 1GHz)

|                |                                                       |              |     |
|----------------|-------------------------------------------------------|--------------|-----|
| Operating Mode | IEEE 802.11a 20MHz 6Mbps / CH161 / Ant. 1 + 2 + 3 + 4 |              |     |
| Temperature    | 24°C                                                  | Humidity     | 59% |
| Test Engineer  | Kenneth Huang                                         | Polarization | V   |



|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Antenna | Preamp |         | A/Pos | T/Pos |           |
|---|----------|--------|--------|--------|-------|-------|---------|--------|---------|-------|-------|-----------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | dB    | dB/m    | dB     | Remark  | cm    | deg   | Pol/Phase |
| 1 | 11603.40 | 48.65  | 54.00  | -5.35  | 39.96 | 5.15  | 38.84   | 35.30  | Average | 100   | 166   | VERTICAL  |
| 2 | 11604.20 | 61.77  | 74.00  | -12.23 | 53.08 | 5.15  | 38.84   | 35.30  | Peak    | 100   | 166   | VERTICAL  |

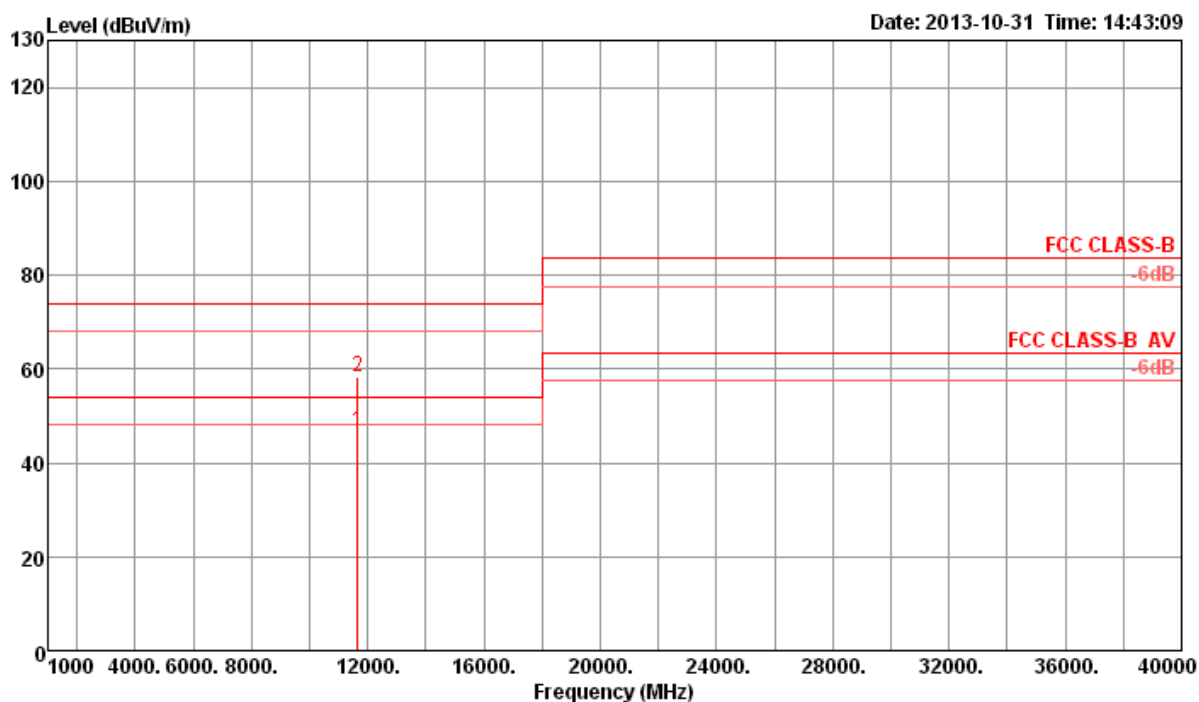
Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).

Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

| Emission not in Restricted Bands (Above 1GHz) |                                                       |              |     |
|-----------------------------------------------|-------------------------------------------------------|--------------|-----|
| Operating Mode                                | IEEE 802.11a 20MHz 6Mbps / CH165 / Ant. 1 + 2 + 3 + 4 |              |     |
| Temperature                                   | 24°C                                                  | Humidity     | 59% |
| Test Engineer                                 | Kenneth Huang                                         | Polarization | H   |



|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Antenna | Preamp |         | A/Pos | T/Pos |            |
|---|----------|--------|--------|--------|-------|-------|---------|--------|---------|-------|-------|------------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | dB    | dB/m    | dB     | Remark  | cm    | deg   | Pol/Phase  |
| 1 | 11649.92 | 46.78  | 54.00  | -7.22  | 38.06 | 5.16  | 38.86   | 35.30  | Average | 100   | 135   | HORIZONTAL |
| 2 | 11650.48 | 58.20  | 74.00  | -15.80 | 49.48 | 5.16  | 38.86   | 35.30  | Peak    | 100   | 135   | HORIZONTAL |

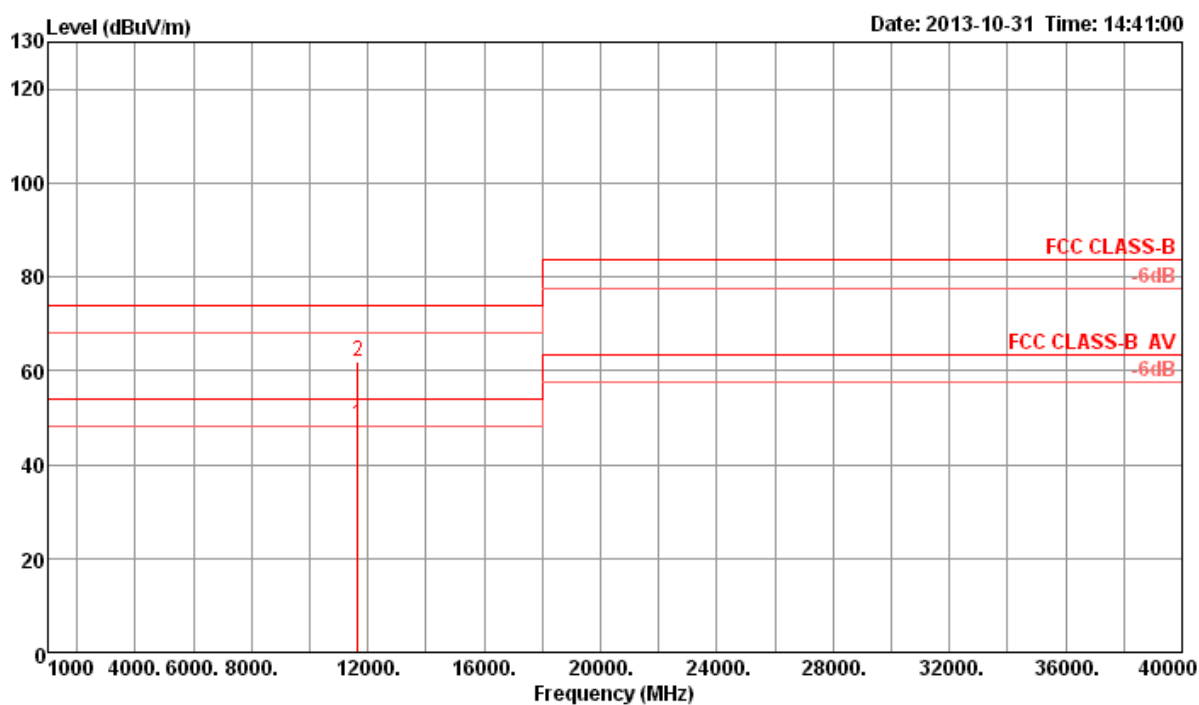
Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).

Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

| Emission not in Restricted Bands (Above 1GHz) |                                                       |              |     |
|-----------------------------------------------|-------------------------------------------------------|--------------|-----|
| Operating Mode                                | IEEE 802.11a 20MHz 6Mbps / CH165 / Ant. 1 + 2 + 3 + 4 |              |     |
| Temperature                                   | 24°C                                                  | Humidity     | 59% |
| Test Engineer                                 | Kenneth Huang                                         | Polarization | V   |



|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark  | A/Pos | T/Pos | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|---------|-------|-------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            |         | cm    | deg   |           |
| 1 | 11643.43 | 48.60  | 54.00      | -5.40      | 39.88      | 5.16       | 38.86          | 35.30         | Average | 100   | 167   | VERTICAL  |
| 2 | 11644.31 | 61.89  | 74.00      | -12.11     | 53.17      | 5.16       | 38.86          | 35.30         | Peak    | 100   | 167   | VERTICAL  |

Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

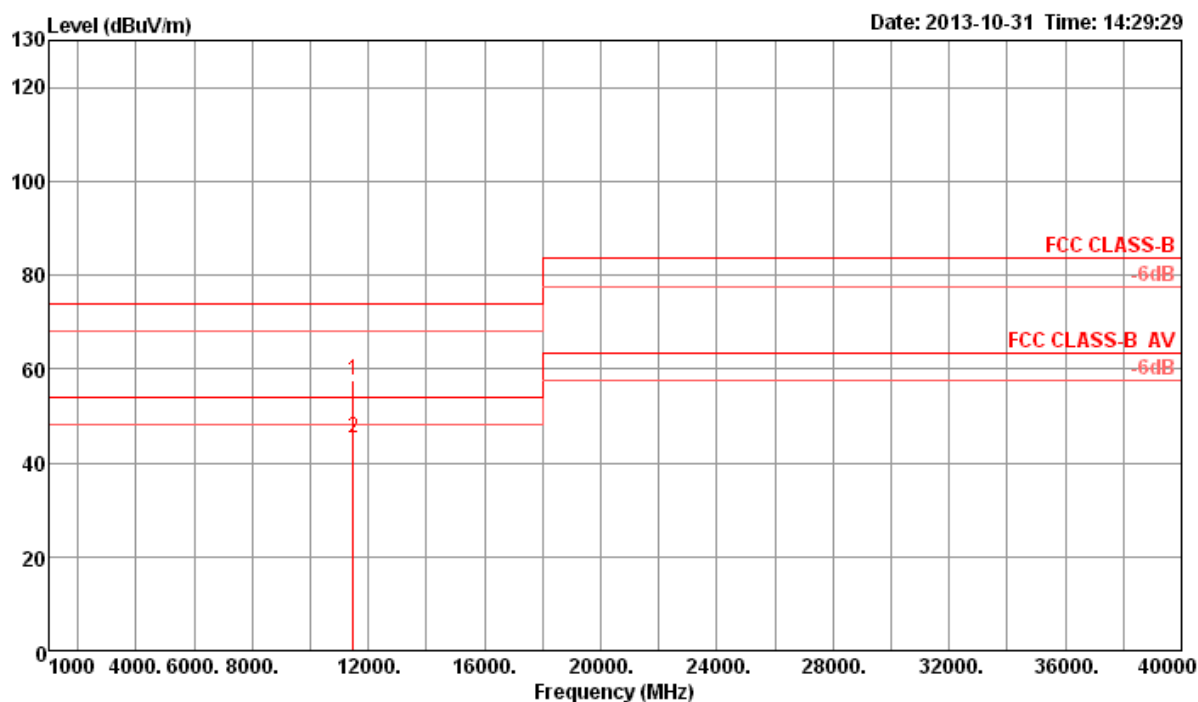
Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).

Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

## Emission not in Restricted Bands (Above 1GHz)

|                |                                                       |              |     |
|----------------|-------------------------------------------------------|--------------|-----|
| Operating Mode | IEEE 802.11n 20MHz MCS0 / CH 149 / Ant. 1 + 2 + 3 + 4 |              |     |
| Temperature    | 24°C                                                  | Humidity     | 59% |
| Test Engineer  | Kenneth Huang                                         | Polarization | H   |



|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Antenna | Preamp |         | A/Pos | T/Pos |            |
|---|----------|--------|--------|--------|-------|-------|---------|--------|---------|-------|-------|------------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | dB    | dB/m    | dB     | Remark  | cm    | deg   | Pol/Phase  |
| 1 | 11489.04 | 57.64  | 74.00  | -16.36 | 49.03 | 5.11  | 38.78   | 35.28  | Peak    | 100   | 130   | HORIZONTAL |
| 2 | 11489.84 | 45.19  | 54.00  | -8.81  | 36.58 | 5.11  | 38.78   | 35.28  | Average | 100   | 130   | HORIZONTAL |

Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

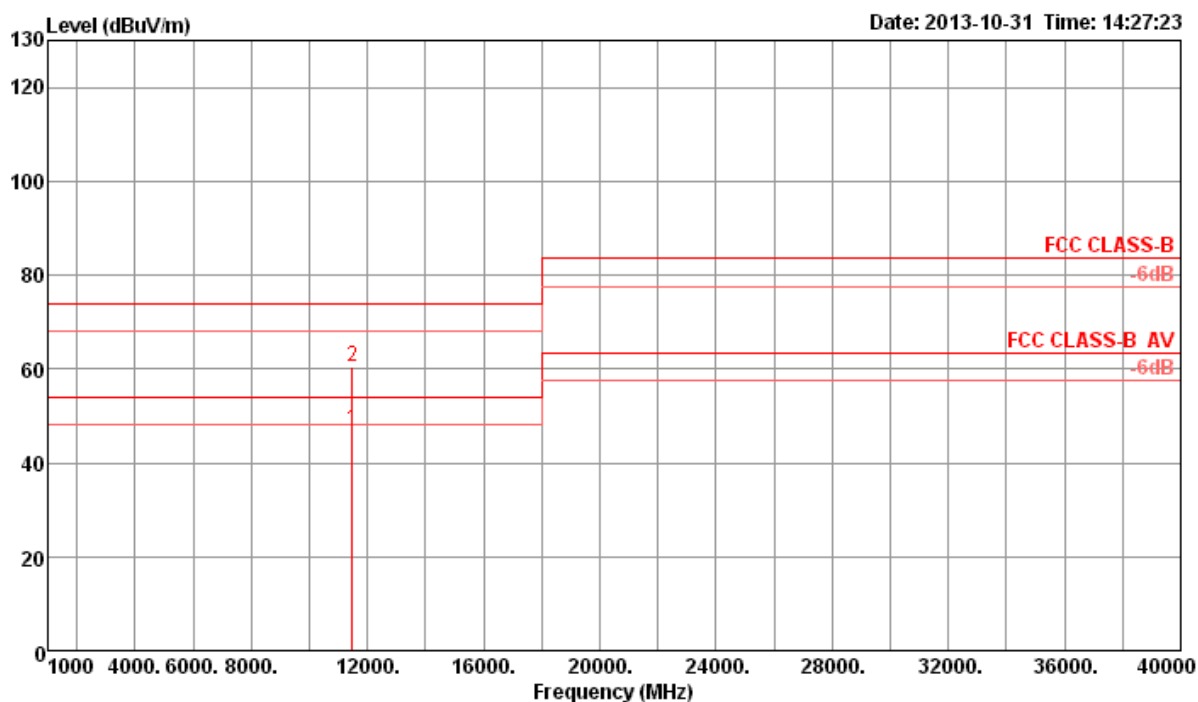
Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).

Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

## Emission not in Restricted Bands (Above 1GHz)

|                |                                                       |              |     |
|----------------|-------------------------------------------------------|--------------|-----|
| Operating Mode | IEEE 802.11n 20MHz MCS0 / CH 149 / Ant. 1 + 2 + 3 + 4 |              |     |
| Temperature    | 24°C                                                  | Humidity     | 59% |
| Test Engineer  | Kenneth Huang                                         | Polarization | V   |



|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Antenna | Preamp |         | A/Pos | T/Pos | Pol/Phase |
|---|----------|--------|--------|--------|-------|-------|---------|--------|---------|-------|-------|-----------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | dB    | dB/m    | dB     | Remark  | cm    | deg   |           |
| 1 | 11492.64 | 47.07  | 54.00  | -6.93  | 38.46 | 5.11  | 38.78   | 35.28  | Average | 106   | 151   | VERTICAL  |
| 2 | 11492.72 | 60.29  | 74.00  | -13.71 | 51.68 | 5.11  | 38.78   | 35.28  | Peak    | 106   | 151   | VERTICAL  |

Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

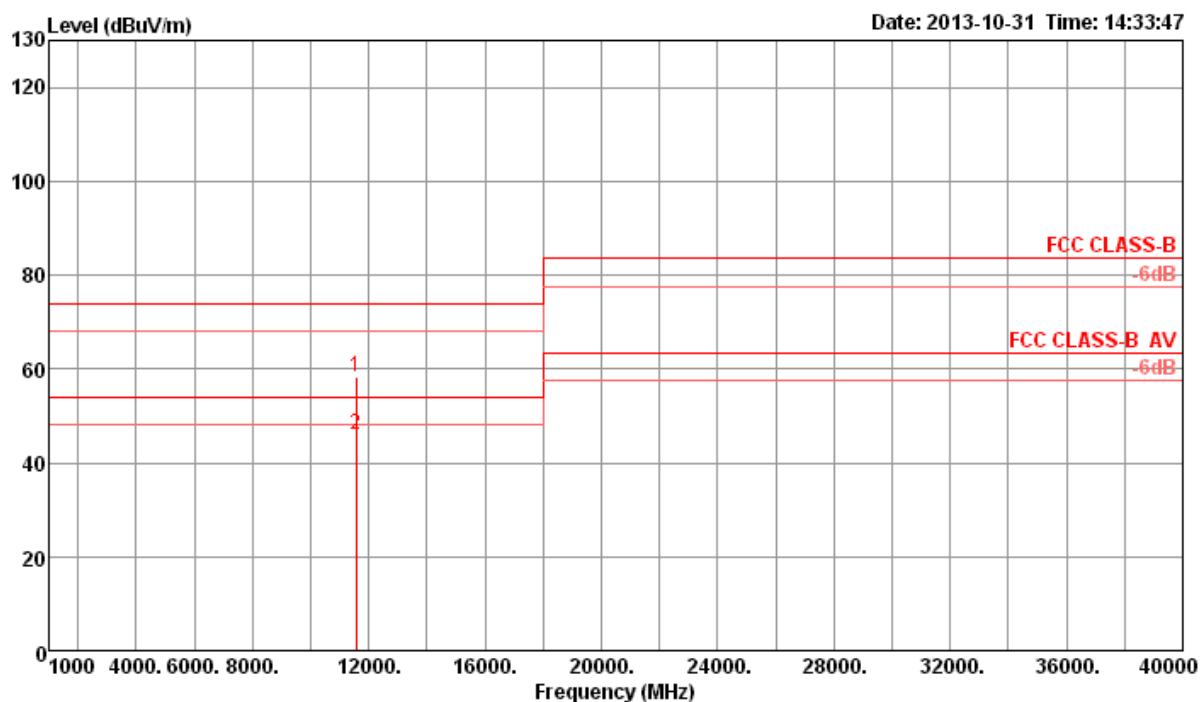
Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).

Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

## Emission not in Restricted Bands (Above 1GHz)

|                |                                                       |              |     |
|----------------|-------------------------------------------------------|--------------|-----|
| Operating Mode | IEEE 802.11n 20MHz MCS0 / CH 157 / Ant. 1 + 2 + 3 + 4 |              |     |
| Temperature    | 24°C                                                  | Humidity     | 59% |
| Test Engineer  | Kenneth Huang                                         | Polarization | H   |



|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark  | A/Pos | T/Pos | Pol/Phase  |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|---------|-------|-------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            |         | cm    | deg   |            |
| 1 | 11569.68 | 58.21  | 74.00      | -15.79     | 49.55      | 5.13       | 38.83          | 35.30         | Peak    | 100   | 130   | HORIZONTAL |
| 2 | 11569.84 | 45.89  | 54.00      | -8.11      | 37.22      | 5.14       | 38.83          | 35.30         | Average | 100   | 130   | HORIZONTAL |

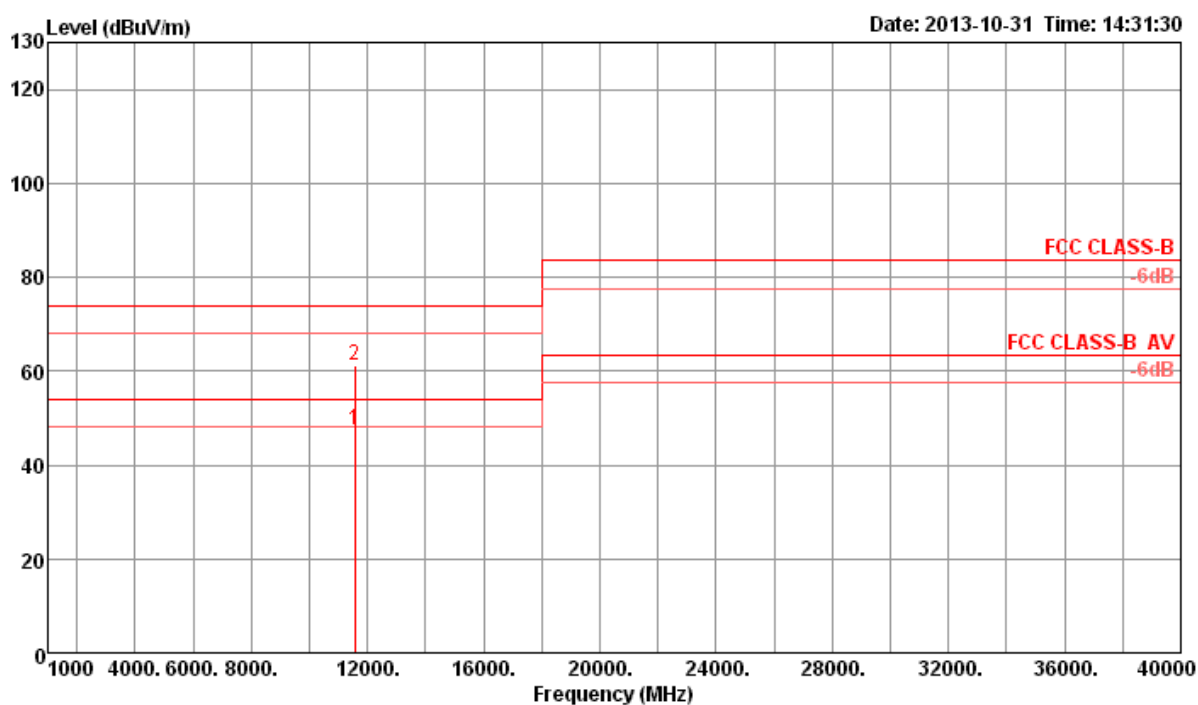
Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).

Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

| Emission not in Restricted Bands (Above 1GHz) |                                                       |              |     |
|-----------------------------------------------|-------------------------------------------------------|--------------|-----|
| Operating Mode                                | IEEE 802.11n 20MHz MCS0 / CH 157 / Ant. 1 + 2 + 3 + 4 |              |     |
| Temperature                                   | 24°C                                                  | Humidity     | 59% |
| Test Engineer                                 | Kenneth Huang                                         | Polarization | V   |



|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Antenna | Preamp |         | A/Pos | T/Pos | Pol/Phase |
|---|----------|--------|--------|--------|-------|-------|---------|--------|---------|-------|-------|-----------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | dB    | dB/m    | dB     | Remark  | cm    | deg   |           |
| 1 | 11562.95 | 47.39  | 54.00  | -6.61  | 38.74 | 5.13  | 38.82   | 35.30  | Average | 100   | 165   | VERTICAL  |
| 2 | 11563.27 | 61.23  | 74.00  | -12.77 | 52.58 | 5.13  | 38.82   | 35.30  | Peak    | 100   | 165   | VERTICAL  |

Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

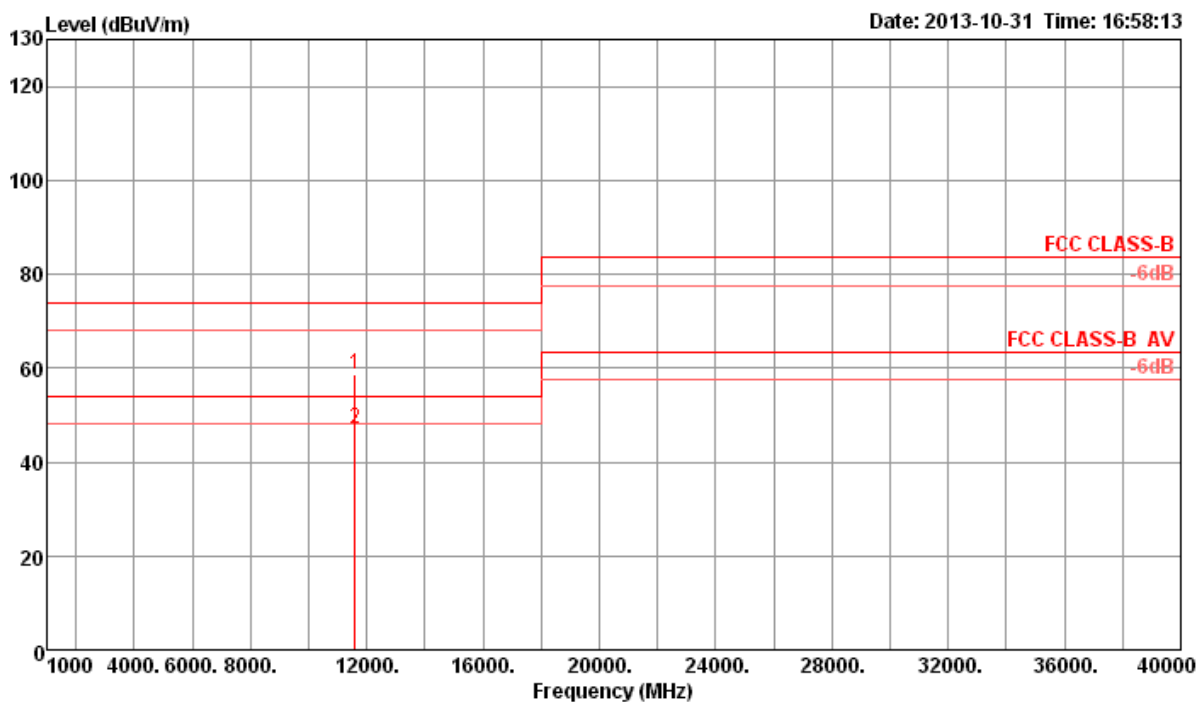
Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).

Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

## Emission not in Restricted Bands (Above 1GHz)

|                |                                                       |              |     |
|----------------|-------------------------------------------------------|--------------|-----|
| Operating Mode | IEEE 802.11n 20MHz MCS0 / CH 161 / Ant. 1 + 2 + 3 + 4 |              |     |
| Temperature    | 24°C                                                  | Humidity     | 59% |
| Test Engineer  | Kenneth Huang                                         | Polarization | H   |



|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Antenna | Preamp |         | A/Pos | T/Pos | Pol/Phase  |
|---|----------|--------|--------|--------|-------|-------|---------|--------|---------|-------|-------|------------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | dB    | dB/m    | dB     | Remark  | cm    | deg   |            |
| 1 | 11609.90 | 58.53  | 74.00  | -15.47 | 49.84 | 5.15  | 38.84   | 35.30  | Peak    | 101   | 129   | HORIZONTAL |
| 2 | 11610.00 | 47.09  | 54.00  | -6.91  | 38.40 | 5.15  | 38.84   | 35.30  | Average | 101   | 129   | HORIZONTAL |

Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

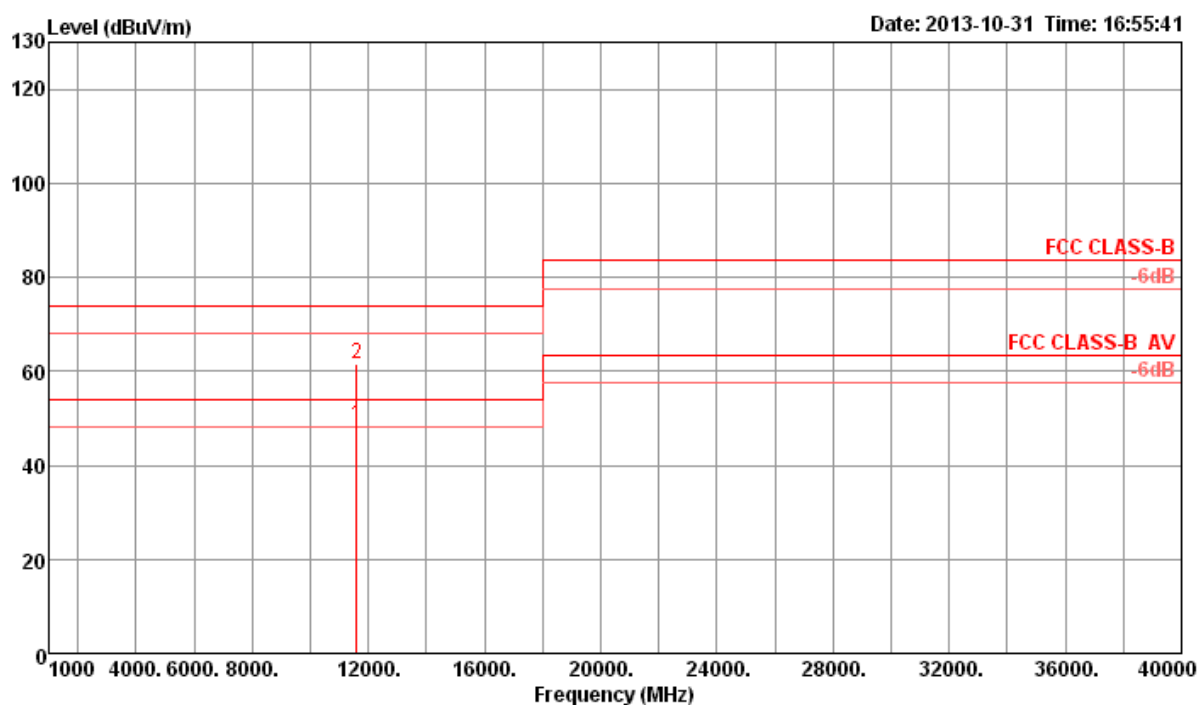
Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).

Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

## Emission not in Restricted Bands (Above 1GHz)

|                |                                                       |              |     |
|----------------|-------------------------------------------------------|--------------|-----|
| Operating Mode | IEEE 802.11n 20MHz MCS0 / CH 161 / Ant. 1 + 2 + 3 + 4 |              |     |
| Temperature    | 24°C                                                  | Humidity     | 59% |
| Test Engineer  | Kenneth Huang                                         | Polarization | V   |



|   | Freq     | Level  | Limit | Over   | Read  | Cable | Antenna | Preamp |         | A/Pos | T/Pos |           |
|---|----------|--------|-------|--------|-------|-------|---------|--------|---------|-------|-------|-----------|
|   | MHz      | dBuV/m | Line  | Limit  | Level | Loss  | Factor  | Factor | Remark  | cm    | deg   | Pol/Phase |
| 1 | 11603.10 | 48.52  | 54.00 | -5.48  | 39.83 | 5.15  | 38.84   | 35.30  | Average | 100   | 163   | VERTICAL  |
| 2 | 11603.60 | 61.45  | 74.00 | -12.55 | 52.76 | 5.15  | 38.84   | 35.30  | Peak    | 100   | 163   | VERTICAL  |

Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

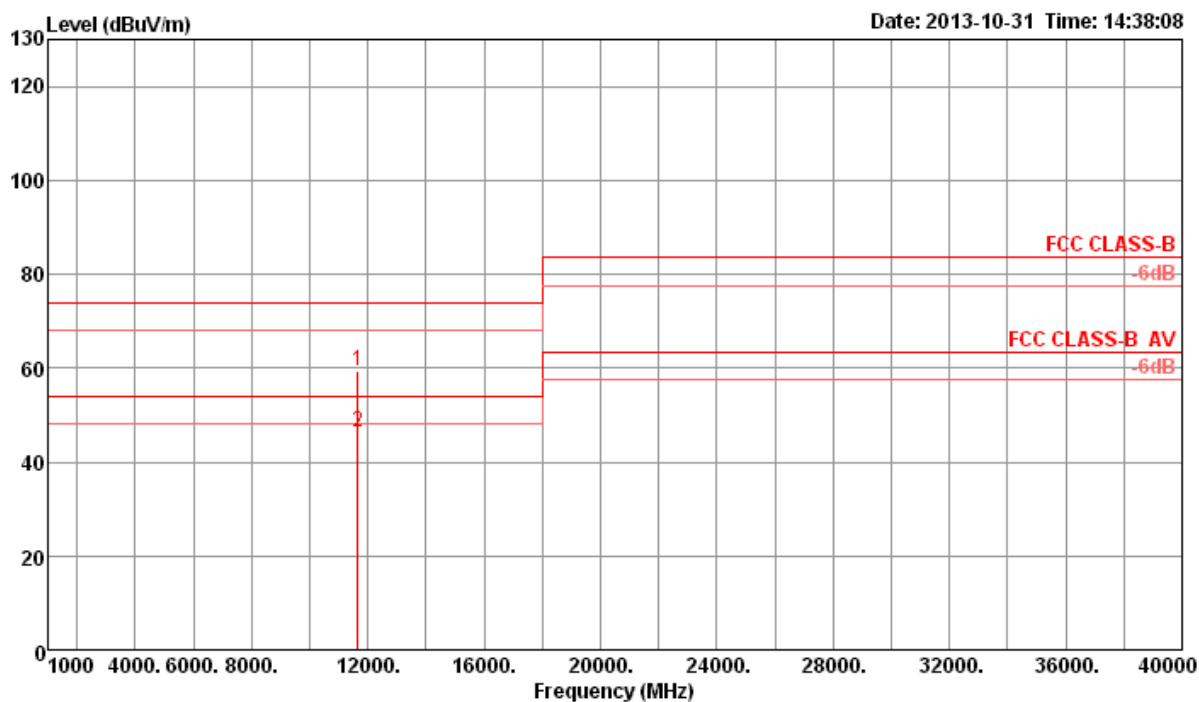
Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).

Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

## Emission not in Restricted Bands (Above 1GHz)

|                |                                                       |              |     |
|----------------|-------------------------------------------------------|--------------|-----|
| Operating Mode | IEEE 802.11n 20MHz MCS0 / CH 165 / Ant. 1 + 2 + 3 + 4 |              |     |
| Temperature    | 24°C                                                  | Humidity     | 59% |
| Test Engineer  | Kenneth Huang                                         | Polarization | H   |



|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Antenna | Preamp |         | A/Pos | T/Pos |            |
|---|----------|--------|--------|--------|-------|-------|---------|--------|---------|-------|-------|------------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | dB    | dB/m    | dB     | Remark  | cm    | deg   | Pol/Phase  |
| 1 | 11648.00 | 59.52  | 74.00  | -14.48 | 50.80 | 5.16  | 38.86   | 35.30  | Peak    | 100   | 135   | HORIZONTAL |
| 2 | 11649.84 | 46.40  | 54.00  | -7.60  | 37.68 | 5.16  | 38.86   | 35.30  | Average | 100   | 135   | HORIZONTAL |

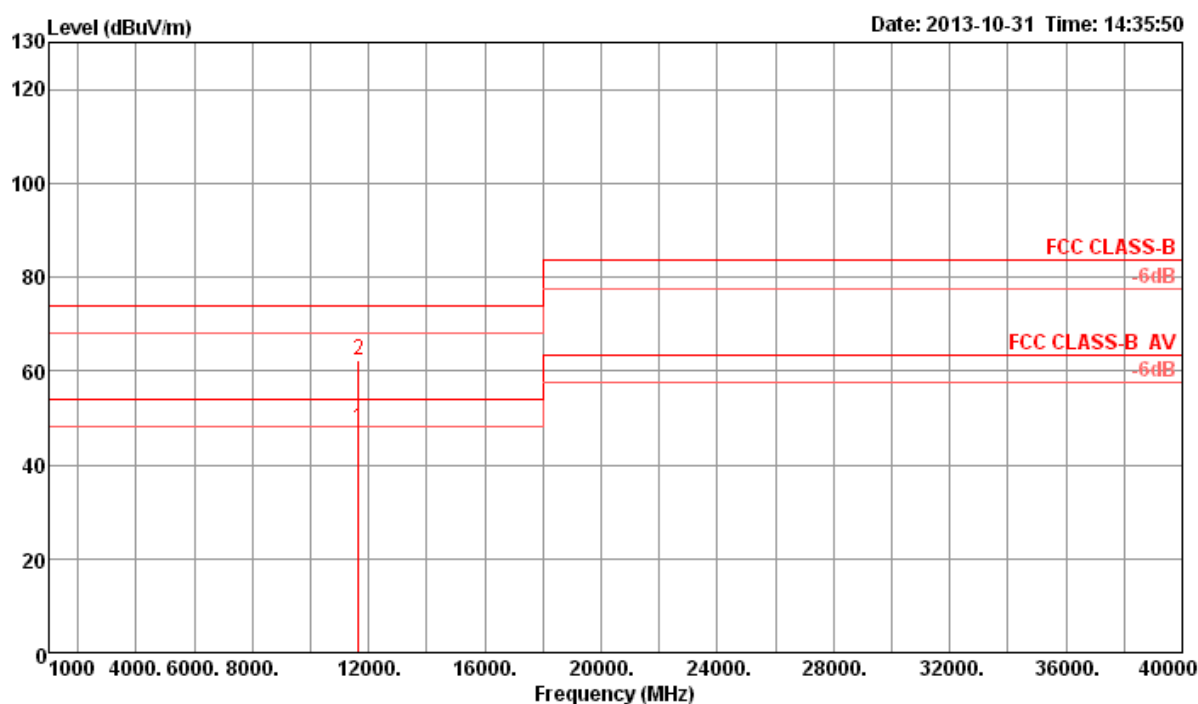
Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).

Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

| Emission not in Restricted Bands (Above 1GHz) |                                                       |              |     |
|-----------------------------------------------|-------------------------------------------------------|--------------|-----|
| Operating Mode                                | IEEE 802.11n 20MHz MCS0 / CH 165 / Ant. 1 + 2 + 3 + 4 |              |     |
| Temperature                                   | 24°C                                                  | Humidity     | 59% |
| Test Engineer                                 | Kenneth Huang                                         | Polarization | V   |



|   | Freq     | Level  | Limit<br>Line | Over<br>Limit | Read<br>Level | CableAntenna<br>Loss Factor | Preamp<br>Factor | Remark        | A/Pos | T/Pos | Pol/Phase |
|---|----------|--------|---------------|---------------|---------------|-----------------------------|------------------|---------------|-------|-------|-----------|
|   | MHz      | dBuV/m | dBuV/m        | dB            | dBuV          | dB                          | dB/m             | dB            | cm    | deg   |           |
| 1 | 11642.47 | 47.87  | 54.00         | -6.13         | 39.15         | 5.16                        | 38.86            | 35.30 Average | 100   | 168   | VERTICAL  |
| 2 | 11643.27 | 62.23  | 74.00         | -11.77        | 53.51         | 5.16                        | 38.86            | 35.30 Peak    | 100   | 168   | VERTICAL  |

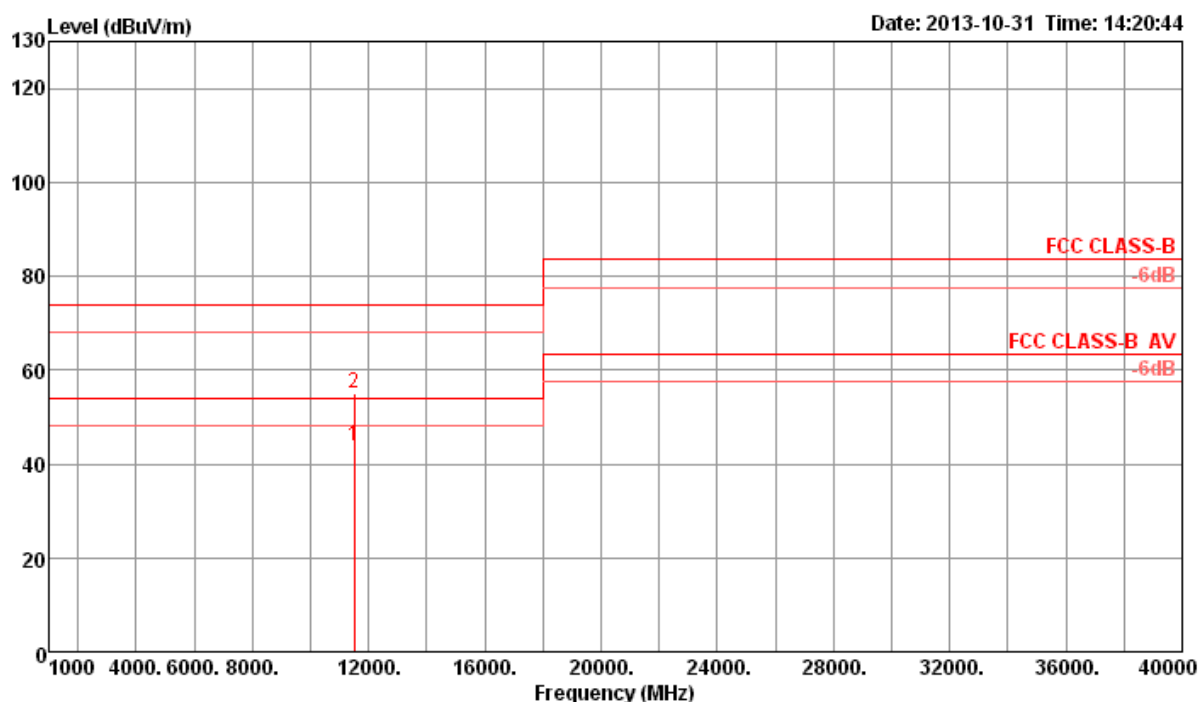
Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).

Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

| Emission not in Restricted Bands (Above 1GHz) |                                                       |              |     |
|-----------------------------------------------|-------------------------------------------------------|--------------|-----|
| Operating Mode                                | IEEE 802.11n 40MHz MCS0 / CH 151 / Ant. 1 + 2 + 3 + 4 |              |     |
| Temperature                                   | 24°C                                                  | Humidity     | 59% |
| Test Engineer                                 | Kenneth Huang                                         | Polarization | H   |



|   | Freq     | Level  | Limit | Over   | Read  | Cable | Antenna | Preamp |         | A/Pos | T/Pos |            |
|---|----------|--------|-------|--------|-------|-------|---------|--------|---------|-------|-------|------------|
|   | MHz      | dBuV/m | Line  | Limit  | Level | Loss  | Factor  | Factor | Remark  | cm    | deg   | Pol/Phase  |
| 1 | 11509.84 | 43.82  | 54.00 | -10.18 | 35.19 | 5.12  | 38.79   | 35.28  | Average | 99    | 127   | HORIZONTAL |
| 2 | 11510.32 | 54.90  | 74.00 | -19.10 | 46.27 | 5.12  | 38.79   | 35.28  | Peak    | 99    | 127   | HORIZONTAL |

Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

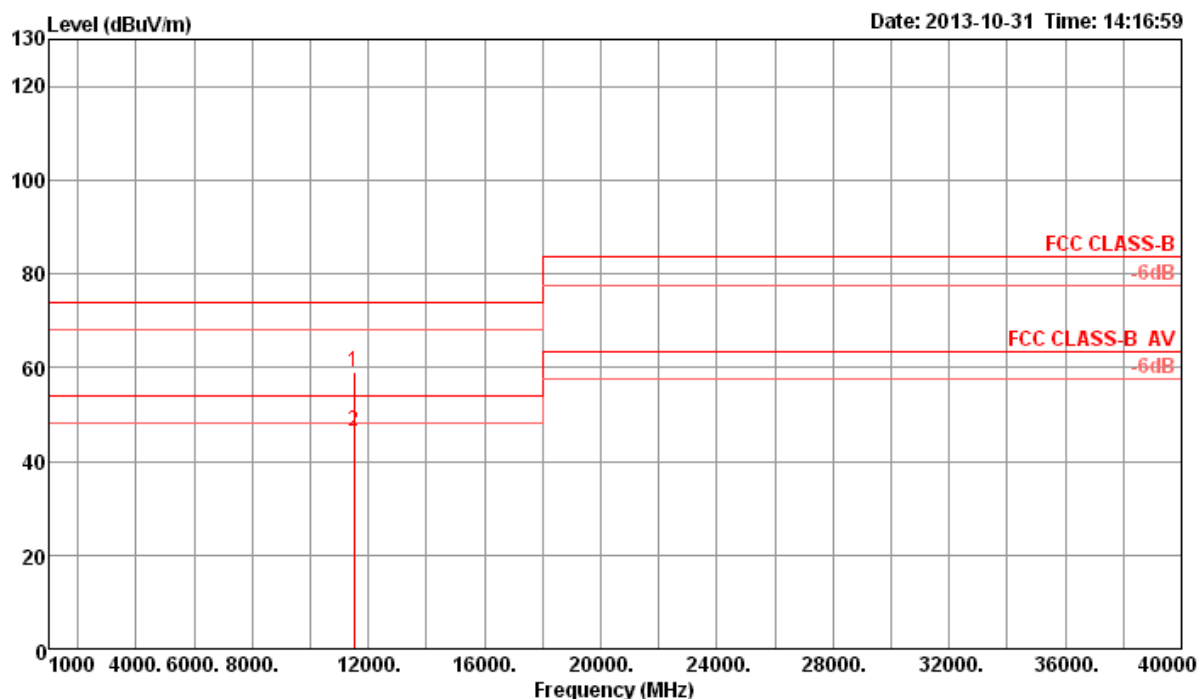
Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).

Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

## Emission not in Restricted Bands (Above 1GHz)

|                |                                                       |              |     |
|----------------|-------------------------------------------------------|--------------|-----|
| Operating Mode | IEEE 802.11n 40MHz MCS0 / CH 151 / Ant. 1 + 2 + 3 + 4 |              |     |
| Temperature    | 24°C                                                  | Humidity     | 59% |
| Test Engineer  | Kenneth Huang                                         | Polarization | V   |



|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark  | A/Pos | T/Pos | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|---------|-------|-------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            |         | cm    | deg   |           |
| 1 | 11509.79 | 59.08  | 74.00      | -14.92     | 50.45      | 5.12       | 38.79          | 35.28         | Peak    | 102   | 165   | VERTICAL  |
| 2 | 11510.03 | 46.37  | 54.00      | -7.63      | 37.74      | 5.12       | 38.79          | 35.28         | Average | 102   | 165   | VERTICAL  |

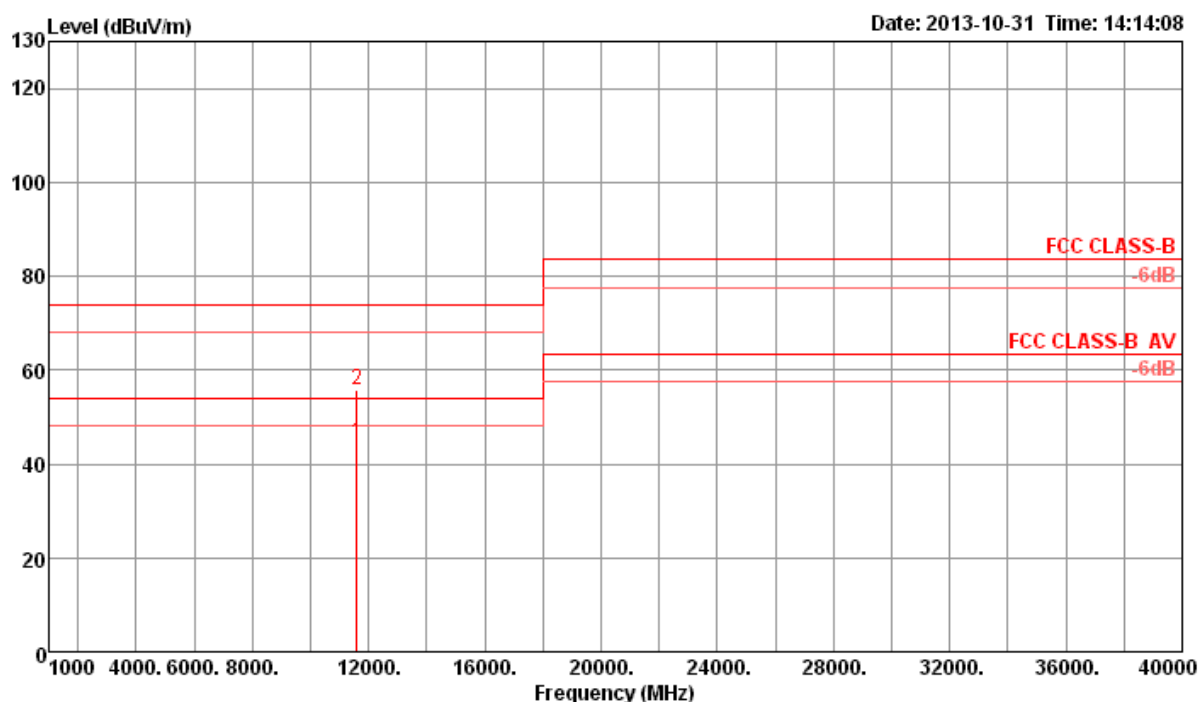
Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).

Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

| Emission not in Restricted Bands (Above 1GHz) |                                                       |              |     |
|-----------------------------------------------|-------------------------------------------------------|--------------|-----|
| Operating Mode                                | IEEE 802.11n 40MHz MCS0 / CH 159 / Ant. 1 + 2 + 3 + 4 |              |     |
| Temperature                                   | 24°C                                                  | Humidity     | 59% |
| Test Engineer                                 | Kenneth Huang                                         | Polarization | H   |



|   | Freq     | Level  | Limit | Over   | Read  | Cable | Antenna | Preamp |         | A/Pos | T/Pos |            |
|---|----------|--------|-------|--------|-------|-------|---------|--------|---------|-------|-------|------------|
|   | MHz      | dBuV/m | Line  | Limit  | Level | Loss  | Factor  | Factor | Remark  | cm    | deg   | Pol/Phase  |
| 1 | 11589.92 | 44.65  | 54.00 | -9.35  | 35.98 | 5.14  | 38.83   | 35.30  | Average | 100   | 131   | HORIZONTAL |
| 2 | 11590.32 | 55.78  | 74.00 | -18.22 | 47.11 | 5.14  | 38.83   | 35.30  | Peak    | 100   | 131   | HORIZONTAL |

Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

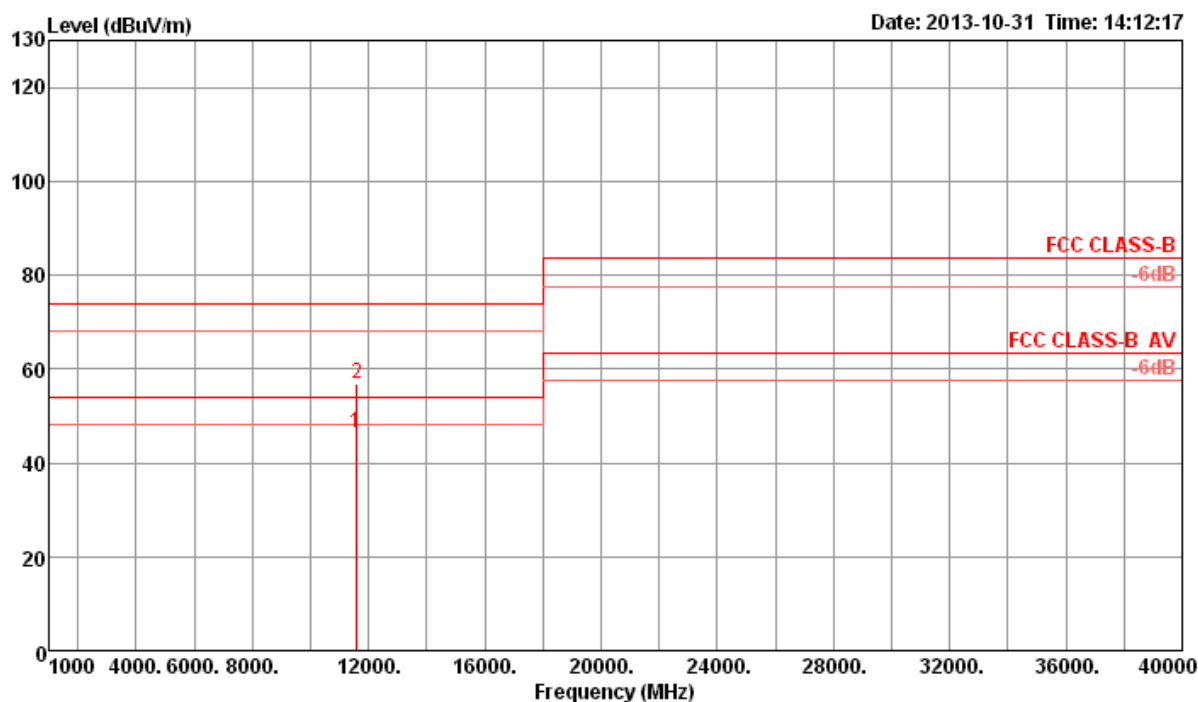
Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).

Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

## Emission not in Restricted Bands (Above 1GHz)

|                |                                                       |              |     |
|----------------|-------------------------------------------------------|--------------|-----|
| Operating Mode | IEEE 802.11n 40MHz MCS0 / CH 159 / Ant. 1 + 2 + 3 + 4 |              |     |
| Temperature    | 24°C                                                  | Humidity     | 59% |
| Test Engineer  | Kenneth Huang                                         | Polarization | V   |



|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Antenna | Preamp |         | A/Pos | T/Pos | Pol/Phase |
|---|----------|--------|--------|--------|-------|-------|---------|--------|---------|-------|-------|-----------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | dB    | dB/m    | dB     | Remark  | cm    | deg   |           |
| 1 | 11581.99 | 46.27  | 54.00  | -7.73  | 37.60 | 5.14  | 38.83   | 35.30  | Average | 100   | 171   | VERTICAL  |
| 2 | 11583.35 | 56.92  | 74.00  | -17.08 | 48.25 | 5.14  | 38.83   | 35.30  | Peak    | 100   | 171   | VERTICAL  |

Note 1: The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

Note 2: Emission level (dBuV/m) = 20 log Emission level (uV/m).

Note 3: Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Note 4: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

### 3.6 Band Edge and Fundamental Emissions Measurement

#### 3.6.1 Limit

30dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

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

#### 3.6.2 Measuring Instruments and Setting

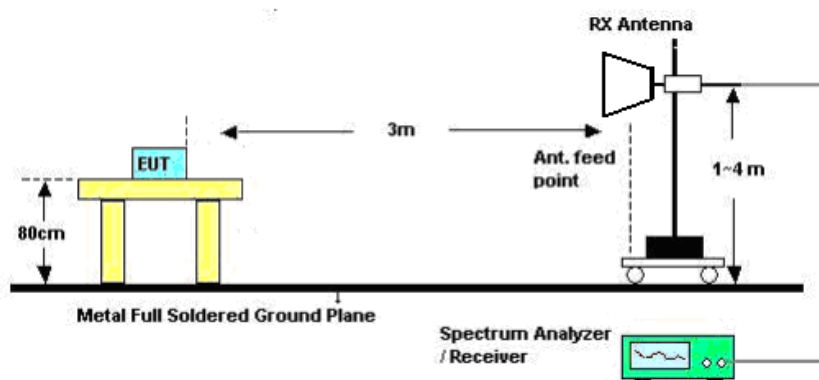
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

| Spectrum Analyzer                           | Setting                                       |
|---------------------------------------------|-----------------------------------------------|
| Attenuation                                 | Auto                                          |
| Span Frequency                              | 100 MHz                                       |
| RBW / VBW (Emission in restricted band)     | 1MHz / 3MHz for Peak, 1MHz / 10Hz for Average |
| RBW / VBW (Emission in non-restricted band) | 100 kHz / 300 kHz for Peak                    |

#### 3.6.3 Test Procedures

1. The test procedure is the same as section 3.5.3, only the frequency range investigated is limited to 100MHz around bandedges.
2. In case the emission is fail due to the used RBW/VBW is too wide, marker-delta method of FCC Public Notice DA00-705 will be followed.

#### 3.6.4 Test Setup Layout



**3.6.5 Test Deviation**

There are no deviations with the original standard.

**3.6.6 EUT Operation during Test**

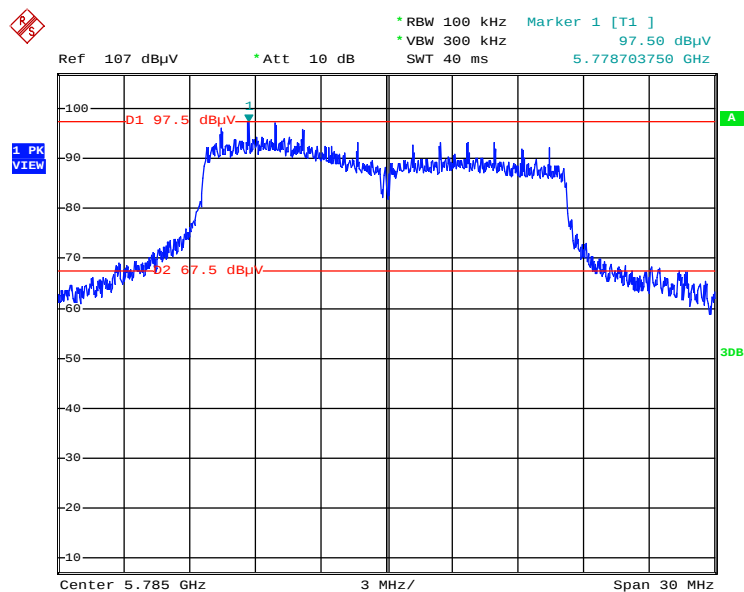
The EUT was programmed to be in continuously transmitting mode.

**3.6.7 Test Result of Band Edge and Fundamental Emissions**

Following channel(s) was (were) selected for the final test as listed below.

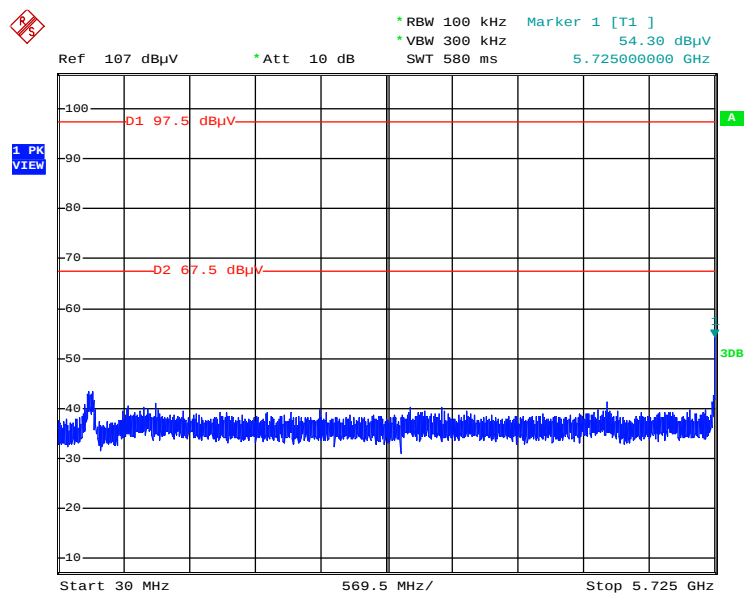
| Mode          | TX Chain    | Test Channel       | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|---------------|-------------|--------------------|-----------------------|-----------------|------------------|
| 802.11a       | Ant.1+2+3+4 | 149, 157, 161, 165 | OFDM                  | BPSK            | 6                |
| 802.11n 20MHz | Ant.1+2+3+4 | 149, 157, 161, 165 | OFDM                  | BPSK            | MCS0             |
| 802.11n 40MHz | Ant.1+2+3+4 | 151, 159           | OFDM                  | BPSK            | MCS0             |

## Low Band Edge Plot on Configuration IEEE 802.11a / Reference Level / Ant. 1 + 2 + 3 + 4



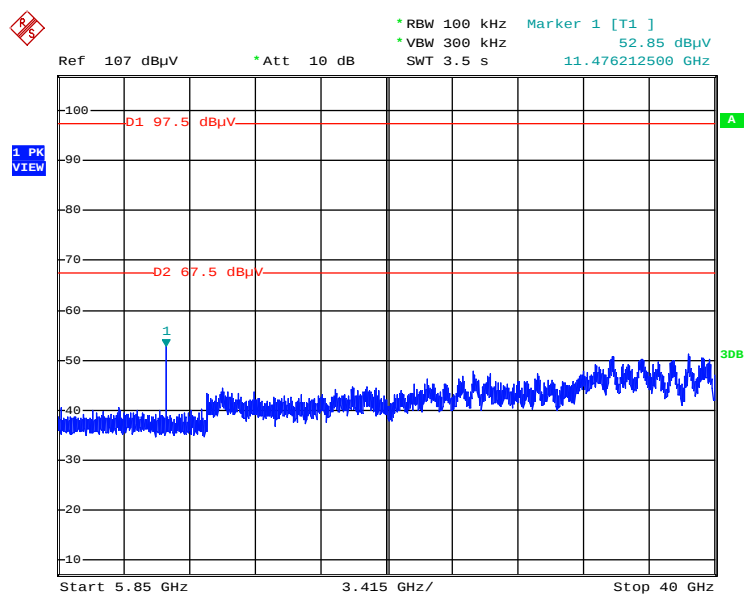
Date: 31.OCT.2013 18:40:17

## Low Band Edge Plot on Configuration IEEE 802.11a / 5745 MHz / Ant. 1 + 2 + 3 + 4



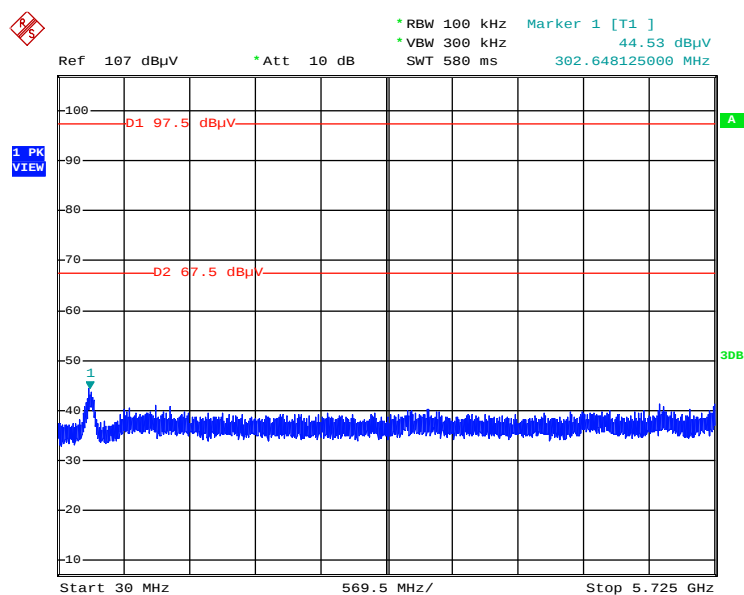
Date: 31.OCT.2013 18:41:37

## Low Band Edge Plot on Configuration IEEE 802.11a / 5745 MHz / Ant. 1 + 2 + 3 + 4



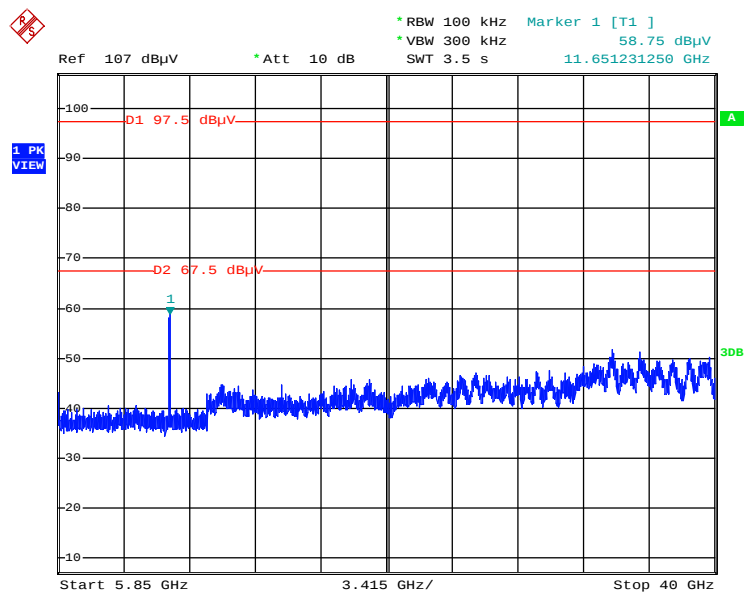
Date: 31.OCT.2013 18:42:28

## Low Band Edge Plot on Configuration IEEE 802.11a / 5825 MHz / Ant. 1 + 2 + 3 + 4



Date: 31.OCT.2013 18:44:06

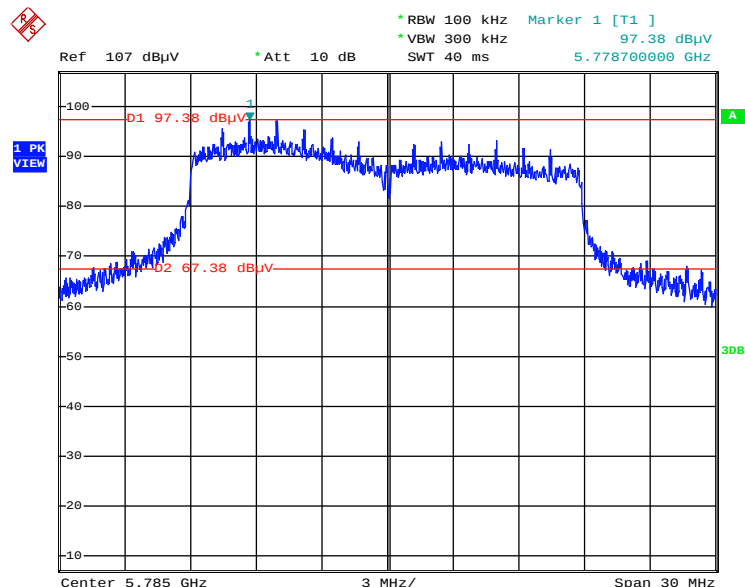
## Low Band Edge Plot on Configuration IEEE 802.11a / 5825 MHz / Ant. 1 + 2 + 3 + 4



Date: 31.OCT.2013 18:44:59

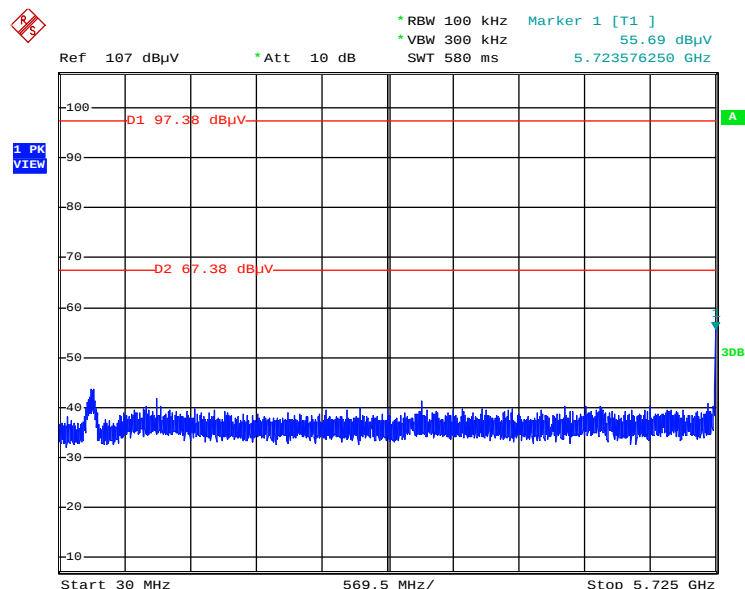
## Low Band Edge Plot on Configuration IEEE 802.11n 20MHz MCS0 / Reference Level /

Ant. 1 + 2 + 3 + 4



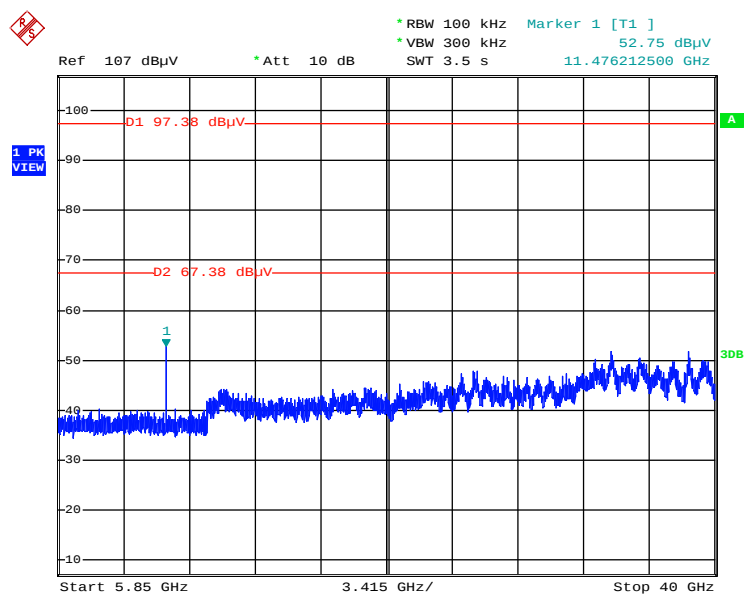
Date: 31.OCT.2013 18:32:37

## Low Band Edge Plot on Configuration IEEE 802.11n 20MHz MCS0 / 5745 MHz / Ant. 1 + 2 + 3 + 4



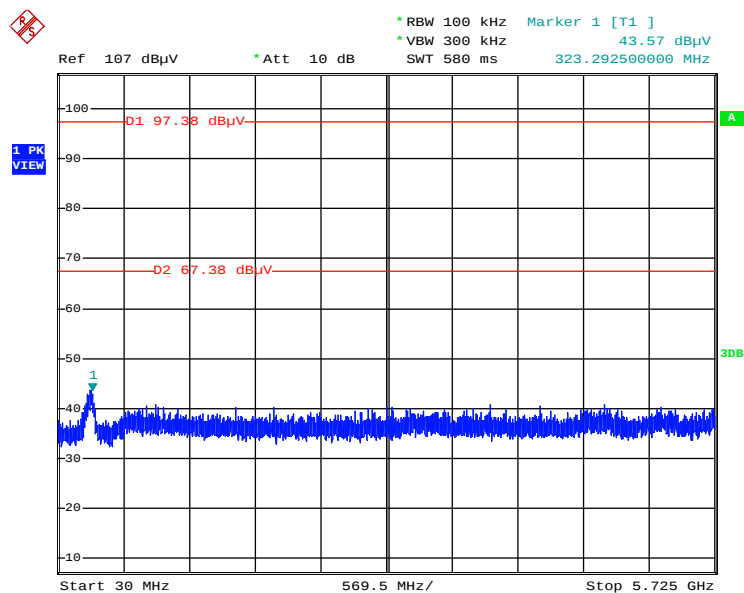
Date: 31.OCT.2013 18:34:22

## Low Band Edge Plot on Configuration IEEE 802.11n 20MHz MCS0 / 5745 MHz / Ant. 1 + 2 + 3 + 4



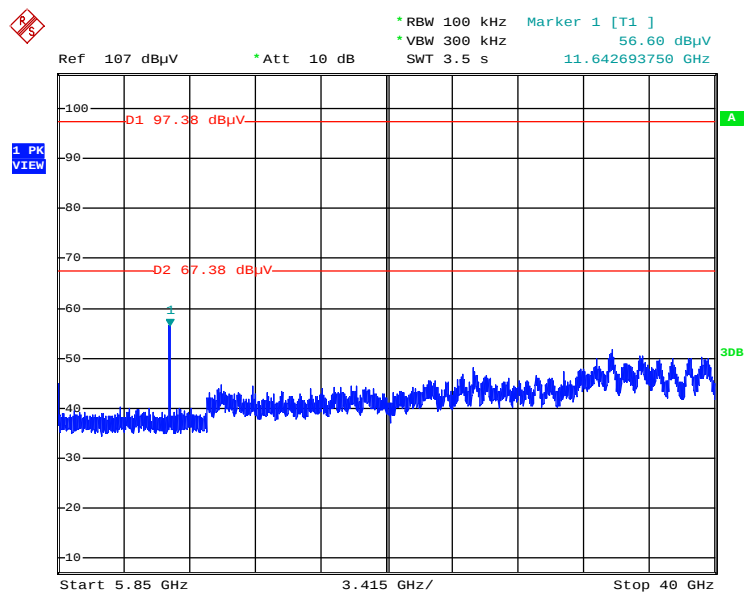
Date: 31.OCT.2013 18:35:20

## Low Band Edge Plot on Configuration IEEE 802.11n 20MHz MCS0 / 5825 MHz / Ant. 1 + 2 + 3 + 4



Date: 31.OCT.2013 18:36:31

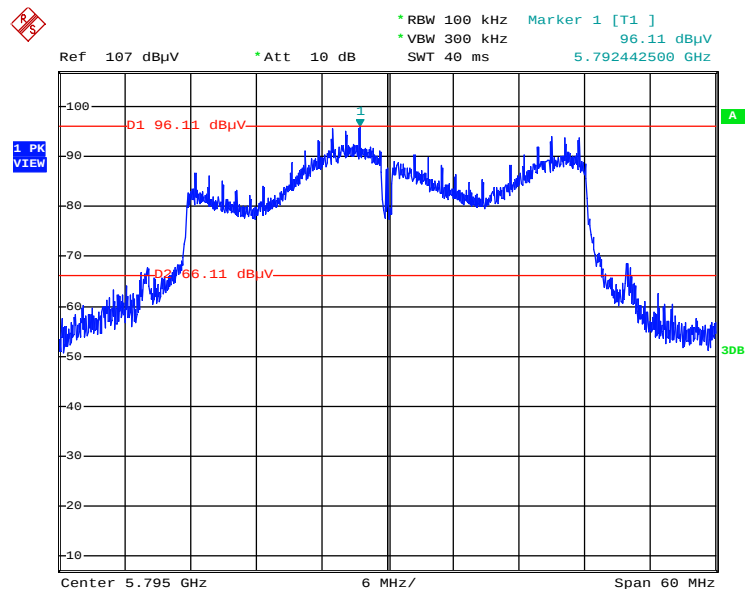
## Low Band Edge Plot on Configuration IEEE 802.11n 20MHz MCS0 / 5825 MHz / Ant. 1 + 2 + 3 + 4



Date: 31.OCT.2013 18:37:31

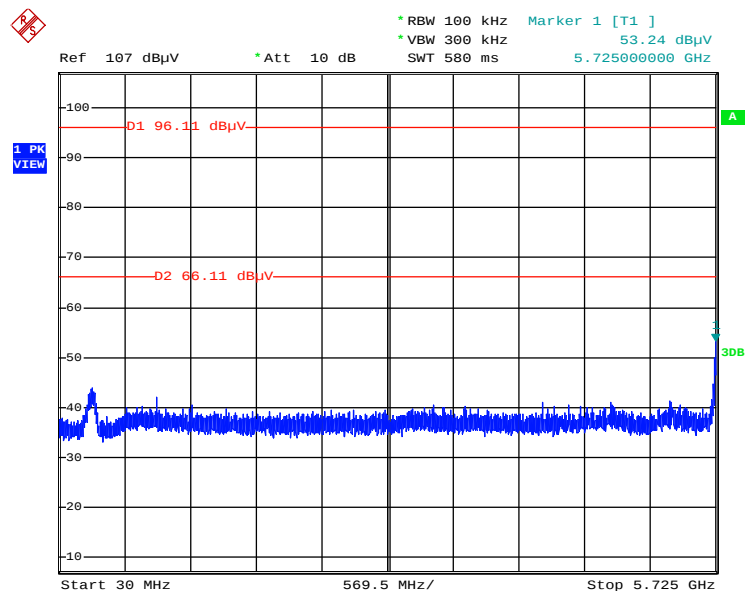
## Low Band Edge Plot on Configuration IEEE 802.11n 40MHz MCS0 / Reference Level /

Ant. 1 + 2 + 3 + 4



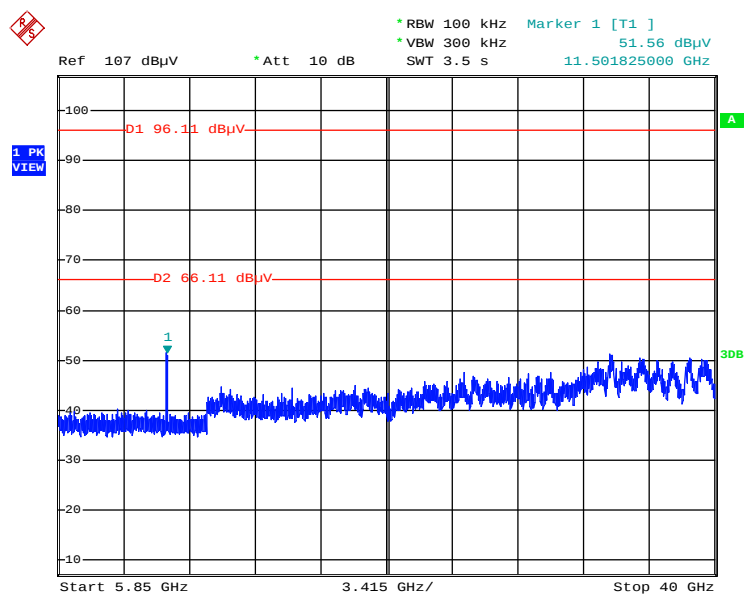
Date: 31.OCT.2013 18:21:42

## Low Band Edge Plot on Configuration IEEE 802.11n 40MHz MCS0 / 5755 MHz / Ant. 1 + 2 + 3 + 4



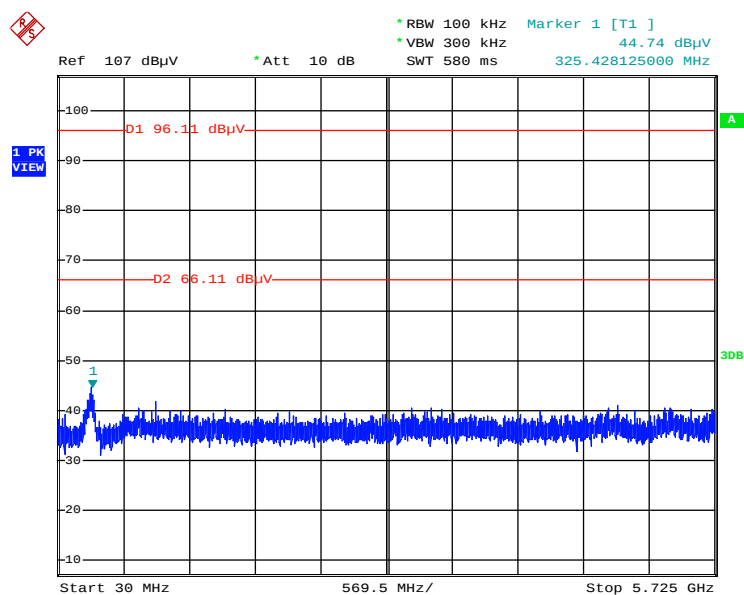
Date: 31.OCT.2013 18:26:31

## Low Band Edge Plot on Configuration IEEE 802.11n 40MHz MCS0 / 5755 MHz / Ant. 1 + 2 + 3 + 4



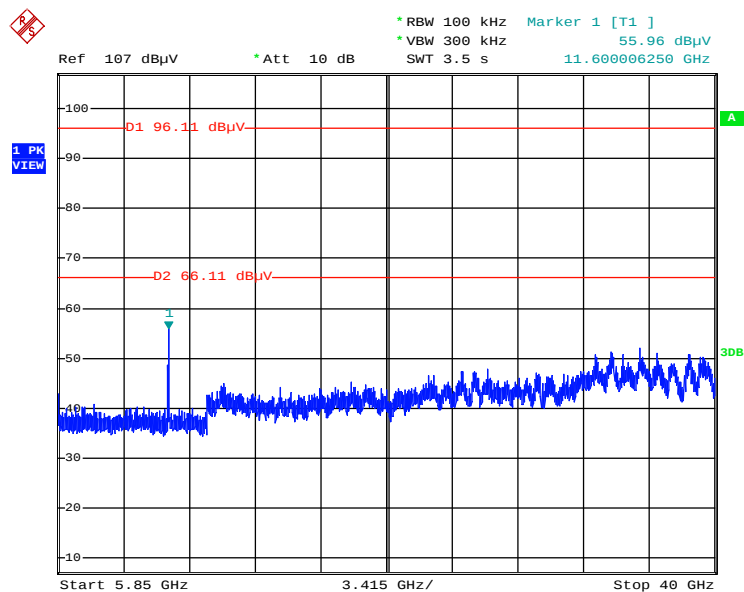
Date: 31.OCT.2013 18:27:31

## Low Band Edge Plot on Configuration IEEE 802.11n 40MHz MCS0 / 5795 MHz / Ant. 1 + 2 + 3 + 4



Date: 31.OCT.2013 18:23:32

## Low Band Edge Plot on Configuration IEEE 802.11n 40MHz MCS0 / 5795 MHz / Ant. 1 + 2 + 3 + 4



Date: 31.OCT.2013 18:24:38

### **3.7 Antenna Requirements**

#### **3.7.1 Limit**

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

#### **3.7.2 Antenna Connector Construction**

Please refer to section 2.3 in this test report; antenna connector complied with the requirements.

## 4 LIST OF MEASURING EQUIPMENTS

| Instrument               | Manufacturer | Model No.        | Serial No.  | Characteristics  | Calibration Date | Remark                |
|--------------------------|--------------|------------------|-------------|------------------|------------------|-----------------------|
| EMI Test Receiver        | R&S          | ESCS 30          | 100355      | 9 kHz ~ 2.75 GHz | Apr. 12, 2013    | Conduction (CO01-CB)  |
| LISN                     | F.C.C.       | FCC-LISN-50-16-2 | 04083       | 150 kHz~100 MHz  | Nov. 26, 2012    | Conduction (CO01-CB)  |
| Artificial Mains Network | Schwarzbeck  | NSLK 8127        | 8127647     | 9kHz ~ 30MHz     | Nov. 11, 2013    | Conduction (CO01-CB)  |
| COND Cable               | Woken        | Cable            | 01          | 150 kHz ~ 30 MHz | Dec. 04, 2012    | Conduction (CO01-CB)  |
| Software                 | Audix        | E3               | 5.410e      | -                | -                | Conduction (CO01-CB)  |
| BILOG ANTENNA            | Schaffner    | CBL6112D         | 22021       | 20MHz ~ 2GHz     | Apr. 16, 2013    | Radiation (03CH01-CB) |
| Loop Antenna             | Teseq        | HLA 6120         | 24155       | 9 kHz - 30 MHz   | Nov. 05, 2012*   | Radiation (03CH01-CB) |
| Horn Antenna             | EMCO         | 3115             | 00075790    | 750MHz~18GHz     | Nov. 27, 2012    | Radiation (03CH01-CB) |
| Horn Antenna             | SCHWARZBEAK  | BBHA 9170        | BBHA9170252 | 15GHz ~ 40GHz    | Nov. 23, 2012    | Radiation (03CH01-CB) |
| Pre-Amplifier            | Agilent      | 8447D            | 2944A10991  | 0.1MHz ~ 1.3GHz  | Nov. 12, 2013    | Radiation (03CH01-CB) |
| Pre-Amplifier            | Agilent      | 8449B            | 3008A02310  | 1GHz ~ 26.5GHz   | Nov. 23, 2012    | Radiation (03CH01-CB) |
| Pre-Amplifier            | WM           | TF-130N-R1       | 923365      | 26GHz ~ 40GHz    | Oct. 23, 2013    | Radiation (03CH01-CB) |
| Spectrum analyzer        | R&S          | FSP40            | 100056      | 9kHz~40GHz       | Nov. 16, 2012    | Radiation (03CH01-CB) |
| EMI Test Receiver        | Agilent      | N9038A           | MY52260123  | 9kHz ~ 8GHz      | Nov. 26, 2012    | Radiation (03CH01-CB) |
| Turn Table               | INN CO       | CO 2000          | N/A         | 0 ~ 360 degree   | N.C.R            | Radiation (03CH01-CB) |
| Antenna Mast             | INN CO       | CO2000           | N/A         | 1 m - 4 m        | N.C.R            | Radiation (03CH01-CB) |
| RF Cable-low             | Woken        | Low Cable-1      | N/A         | 30 MHz - 1 GHz   | Nov. 18, 2012    | Radiation (03CH01-CB) |
| RF Cable-high            | Woken        | High Cable-1     | N/A         | 1 GHz – 26.5 GHz | Nov. 18, 2012    | Radiation (03CH01-CB) |
| RF Cable-high            | Woken        | High Cable-2     | N/A         | 1 GHz – 26.5 GHz | Nov. 18, 2012    | Radiation (03CH01-CB) |
| RF Cable-high            | Woken        | High Cable-3     | N/A         | 1 GHz - 40 GHz   | Nov. 18, 2012    | Radiation (03CH01-CB) |
| RF Cable-high            | Woken        | High Cable-4     | N/A         | 1 GHz - 40 GHz   | Nov. 18, 2012    | Radiation (03CH01-CB) |
| Signal analyzer          | R&S          | FSV40            | 100979      | 9kHz~40GHz       | Nov. 29, 2013    | Conducted (TH01-CB)   |
| RF Cable-high            | Woken        | High Cable-7     | -           | 1 GHz – 26.5 GHz | Nov. 17, 2013    | Conducted (TH01-CB)   |
| RF Cable-high            | Woken        | High Cable-8     | -           | 1 GHz – 26.5 GHz | Nov. 17, 2013    | Conducted (TH01-CB)   |
| RF Cable-high            | Woken        | High Cable-9     | -           | 1 GHz – 26.5 GHz | Nov. 17, 2013    | Conducted (TH01-CB)   |

| Instrument    | Manufacturer | Model No.     | Serial No. | Characteristics  | Calibration Date | Remark              |
|---------------|--------------|---------------|------------|------------------|------------------|---------------------|
| RF Cable-high | Woken        | High Cable-10 | -          | 1 GHz – 26.5 GHz | Nov. 17, 2013    | Conducted (TH01-CB) |
| RF Cable-high | Woken        | High Cable-11 | -          | 1 GHz – 26.5 GHz | Nov. 17, 2013    | Conducted (TH01-CB) |
| Power Sensor  | Anritsu      | MA2411B       | 0917223    | 300MHz~40GHz     | Sep. 18, 2013    | Conducted (TH01-CB) |
| Power Meter   | Anritsu      | ML2495A       | 1035008    | 300MHz~40GHz     | Sep. 18, 2013    | Conducted (TH01-CB) |

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

\*Calibration Interval of instruments listed above is two year.

N.C.R. means Non-Calibration required.

**5 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       |

## 6 MEASUREMENT UNCERTAINTY

### Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

| Contribution                                                    | Uncertainty of $x_i$ |      |                               | $u(x_i)$ |
|-----------------------------------------------------------------|----------------------|------|-------------------------------|----------|
|                                                                 | Value                | Unit | Probability Distribution<br>k |          |
| Receiver reading                                                | 0.026                | dB   | normal(k=2)                   | 0.013    |
| Cable loss                                                      | 0.002                | dB   | normal(k=2)                   | 0.001    |
| AMN/LISN specification                                          | 1.200                | dB   | normal(k=2)                   | 0.600    |
| Mismatch<br>Receiver VSWR 1=<br>AMN/LISN VSWR 2=                | -0.080               | dB   | U-shaped                      | 0.060    |
| Combined standard uncertainty Uc(y)                             |                      |      |                               | 1.2      |
| Measuring uncertainty for a level of confidence of 95% U=2Uc(y) |                      |      |                               | 2.4      |

### Uncertainty of Radiated Emission Measurement (30MHz ~ 1,000MHz)

| Contribution                                                    | Uncertainty of $x_i$ |      |                               | $u(x_i)$ |
|-----------------------------------------------------------------|----------------------|------|-------------------------------|----------|
|                                                                 | Value                | Unit | Probability Distribution<br>k |          |
| Receiver reading                                                | ±0.173               | dB   | K=1                           | 0.086    |
| Cable loss                                                      | ±0.174               | dB   | K=2                           | 0.087    |
| Antenna gain                                                    | ±0.169               | dB   | K=2                           | 0.084    |
| Site imperfection                                               | ±0.433               | dB   | Triangular                    | 0.214    |
| Pre-amplifier gain                                              | ±0.366               | dB   | K=2                           | 0.183    |
| Transmitter antenna                                             | ±1.200               | dB   | Rectangular                   | 0.600    |
| Signal generator                                                | ±0.461               | dB   | Rectangular                   | 0.231    |
| Mismatch                                                        | ±0.080               | dB   | U-shape                       | 0.040    |
| Spectrum analyzer                                               | ±0.500               | dB   | Rectangular                   | 0.250    |
| Combined standard uncertainty Uc(y)                             |                      |      |                               | 1.778    |
| Measuring uncertainty for a level of confidence of 95% U=2Uc(y) |                      |      |                               | 3.555    |

**Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)**

| Contribution                                                       | Uncertainty of $x_i$ |      |                            | $u(x_i)$ |
|--------------------------------------------------------------------|----------------------|------|----------------------------|----------|
|                                                                    | Value                | Unit | Probability Distribution k |          |
| Receiver reading                                                   | ±0.191               | dB   | K=1                        | 0.095    |
| Cable loss                                                         | ±0.169               | dB   | K=2                        | 0.084    |
| Antenna gain                                                       | ±0.191               | dB   | K=2                        | 0.096    |
| Site imperfection                                                  | ±0.582               | dB   | Triangular                 | 0.291    |
| Pre-amplifier gain                                                 | ±0.304               | dB   | K=2                        | 0.152    |
| Transmitter antenna                                                | ±1.200               | dB   | Rectangular                | 0.600    |
| Signal generator                                                   | ±0.461               | dB   | Rectangular                | 0.231    |
| Mismatch                                                           | ±0.080               | dB   | U-shape                    | 0.040    |
| Spectrum analyzer                                                  | ±0.500               | dB   | Rectangular                | 0.250    |
| Combined standard uncertainty $U_c(y)$                             |                      |      |                            | 1.839    |
| Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$ |                      |      |                            | 3.678    |

**Uncertainty of Radiated Emission Measurement (18GHz ~ 40GHz)**

| Contribution                                                       | Uncertainty of $x_i$ |      |                            | $u(x_i)$ |
|--------------------------------------------------------------------|----------------------|------|----------------------------|----------|
|                                                                    | Value                | Unit | Probability Distribution k |          |
| Receiver reading                                                   | ±0.186               | dB   | K=1                        | 0.093    |
| Cable loss                                                         | ±0.167               | dB   | K=2                        | 0.083    |
| Antenna gain                                                       | ±0.190               | dB   | K=2                        | 0.095    |
| Site imperfection                                                  | ±0.488               | dB   | Triangular                 | 0.244    |
| Pre-amplifier gain                                                 | ±0.269               | dB   | K=2                        | 0.134    |
| Transmitter antenna                                                | ±1.200               | dB   | Rectangular                | 0.600    |
| Signal generator                                                   | ±0.461               | dB   | Rectangular                | 0.231    |
| Mismatch                                                           | ±0.080               | dB   | U-shape                    | 0.040    |
| Spectrum analyzer                                                  | ±0.500               | dB   | Rectangular                | 0.250    |
| Combined standard uncertainty $U_c(y)$                             |                      |      |                            | 1.771    |
| Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$ |                      |      |                            | 3.541    |

**Uncertainty of Conducted Emission Measurement**

| Contribution                                                       | Uncertainty of $x_i$ |      |                               | $u(x_i)$ |
|--------------------------------------------------------------------|----------------------|------|-------------------------------|----------|
|                                                                    | Value                | Unit | Probability Distribution<br>k |          |
| Cable loss                                                         | ±0.038               | dB   | K=2                           | 0.019    |
| Attenuator                                                         | ±0.047               | dB   | K=2                           | 0.024    |
| Power Meter specification                                          | ±0.300               | dB   | Triangular                    | 0.150    |
| Power Sensor specification                                         | ±0.300               | dB   | Rectangular                   | 0.150    |
| Signal generator                                                   | ±0.461               | dB   | Rectangular                   | 0.231    |
| Mismatch                                                           | ±0.080               | dB   | U-shape                       | 0.040    |
| Spectrum analyzer                                                  | ±0.500               | dB   | Rectangular                   | 0.250    |
| Combined standard uncertainty $U_c(y)$                             |                      |      |                               | 0.863    |
| Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$ |                      |      |                               | 1.726    |