



SPORTON International Inc.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
Ph: 886-3-327-3456 / FAX: 886-3-327-0973 / www.sporton.com.tw

FCC RADIO TEST REPORT

| | |
|------------------------|--|
| Applicant's company | Qualcomm Atheros, Inc |
| Applicant Address | 1700 Technology Dr, San Jose, CA 95110 |
| FCC ID | PPD-AR5BHB116 |
| Manufacturer's company | Qualcomm Atheros, Inc |
| Manufacturer Address | 1700 Technology Dr, San Jose, CA 95110 |

| | |
|-------------------|---|
| Product Name | AR5BHB116 2x2 802.11n PCIe module |
| Brand Name | Atheros |
| Model No. | AR5BHB116 |
| Test Rule Part(s) | 47 CFR FCC Part 15 Subpart E § 15.407 |
| Test Freq. Range | 5150 ~ 5350 MHz / 5470 ~ 5725 MHz / 5725 ~ 5850 MHz |
| Received Date | Aug. 06, 2010 |
| Final Test Date | Mar. 29, 2016 |
| Submission Type | Class II Change |

Statement

Test result included is for the IEEE 802.11n and IEEE 802.11a 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 C63.10-2013, 47 CFR FCC Part 15 Subpart E, KDB789033 D02 v01r01, KDB662911 D01 v02r01.

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



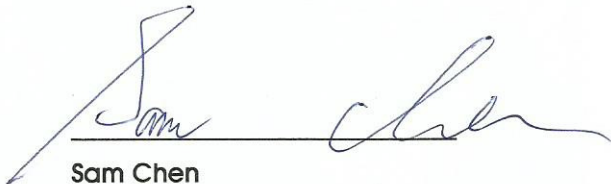
Table of Contents

| | |
|---|----------------|
| 1. VERIFICATION OF COMPLIANCE | 1 |
| 2. SUMMARY OF THE TEST RESULT | 2 |
| 3. GENERAL INFORMATION | 3 |
| 3.1. Product Details..... | 3 |
| 3.2. Accessories..... | 4 |
| 3.3. Table for Filed Antenna..... | 5 |
| 3.4. Table for Carrier Frequencies | 6 |
| 3.5. Table for Test Modes | 7 |
| 3.6. Table for Testing Locations..... | 8 |
| 3.7. Table for Class II Change | 8 |
| 3.8. Table for Supporting Units | 8 |
| 3.9. Table for Parameters of Test Software Setting | 9 |
| 3.10. EUT Operation during Test | 9 |
| 3.11. Duty Cycle..... | 9 |
| 3.12. Test Configurations | 10 |
| 4. TEST RESULT | 11 |
| 4.1. 26dB Bandwidth and 99% Occupied Bandwidth Measurement..... | 11 |
| 4.2. 6dB Spectrum Bandwidth Measurement | 18 |
| 4.3. Maximum Conducted Output Power Measurement..... | 23 |
| 4.4. Power Spectral Density Measurement | 26 |
| 4.5. Radiated Emissions Measurement | 31 |
| 4.6. Band Edge Emissions Measurement | 61 |
| 4.7. Frequency Stability Measurement | 73 |
| 4.8. Antenna Requirements | 77 |
| 5. LIST OF MEASURING EQUIPMENTS | 78 |
| 6. MEASUREMENT UNCERTAINTY | 79 |
| APPENDIX A. TEST PHOTOS | A1 ~ A3 |

1. VERIFICATION OF COMPLIANCE

Product Name : AR5BHB116 2x2 802.11n PCIe module
Brand Name : Atheros
Model No. : AR5BHB116
Applicant : Qualcomm Atheros, Inc
Test Rule Part(s) : 47 CFR FCC Part 15 Subpart E § 15.407

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Aug. 06, 2010 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.



Sam Chen

SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

| Applied Standard: 47 CFR FCC Part 15 Subpart E | | | | |
|--|--------------|--|----------|-------------|
| Part | Rule Section | Description of Test | Result | Under Limit |
| 4.1 | 15.407(a) | 26dB Spectrum Bandwidth and 99% Occupied Bandwidth | Complies | - |
| 4.2 | 15.407(e) | 6dB Spectrum Bandwidth | Complies | - |
| 4.3 | 15.407(a) | Maximum Conducted Output Power | Complies | 9.38 dB |
| 4.4 | 15.407(a) | Power Spectral Density | Complies | 25.77 dB |
| 4.5 | 15.407(b) | Radiated Emissions | Complies | 1.86 dB |
| 4.6 | 15.407(b) | Band Edge Emissions | Complies | 1.53 dB |
| 4.7 | 15.407(g) | Frequency Stability | Complies | - |
| 4.8 | 15.203 | Antenna Requirements | Complies | - |

3. GENERAL INFORMATION

3.1. Product Details

| Items | Description |
|--------------------------------|---|
| Product Type | WLAN (2TX, 2RX) |
| Radio Type | Intentional Transceiver |
| Power Type | From host system |
| Modulation | IEEE 802.11a: OFDM IEEE 802.11n: see the below table |
| Data Modulation | IEEE 802.11a/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) |
| Data Rate (Mbps) | IEEE 802.11a: OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n: see the below table |
| Frequency Range | 5150 ~ 5350 MHz / 5470 ~ 5725 MHz / 5725 ~ 5850 MHz |
| Channel Number | 24 for 20MHz bandwidth ; 11 for 40MHz bandwidth |
| Channel Band Width (99%) | IEEE 802.11a: 22.40 MHz IEEE 802.11n MCS0 (HT20): 22.84 MHz IEEE 802.11n MCS0 (HT40): 40.23 MHz |
| Maximum Conducted Output Power | IEEE 802.11a: 18.54 dBm IEEE 802.11n MCS0 (HT20): 18.85 dBm IEEE 802.11n MCS0 (HT40): 15.27 dBm |
| Carrier Frequencies | Please refer to section 3.4 |
| Antenna | Please refer to section 3.3 |

| Items | Description | |
|-----------------------------|---|---|
| Communication Mode | <input checked="" type="checkbox"/> IP Based (Load Based) | <input type="checkbox"/> Frame Based |
| TPC Function | <input checked="" type="checkbox"/> With TPC | <input type="checkbox"/> Without TPC |
| Weather Band (5600~5650MHz) | <input checked="" type="checkbox"/> With 5600~5650MHz | <input type="checkbox"/> Without 5600~5650MHz |
| Beamforming Function | <input checked="" type="checkbox"/> With beamforming | <input type="checkbox"/> Without beamforming |
| Operate Condition | <input checked="" type="checkbox"/> Indoor | <input type="checkbox"/> Outdoor |

Note: The product has beamforming function for 802.11abgn.

Antenna and Band width

| Antenna | Two (TX) | |
|-----------------|----------|--------|
| Band width Mode | 20 MHz | 40 MHz |
| IEEE 802.11a | V | X |
| IEEE 802.11n | V | V |

IEEE 11n Spec.

| Protocol | Number of Transmit Chains (NTX) | Data Rate / MCS |
|----------------|---------------------------------|-----------------|
| 802.11n (HT20) | 2 | MCS0-15 |
| 802.11n (HT40) | 2 | MCS0-15 |

Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput).

Then EUT supports HT20 and HT40.

Note 2: Modulation modes consist of below configuration: HT20/HT40: IEEE 802.11n

3.2. Accessories

N/A

3.3. Table for Filed Antenna

| Brand / Model Name | Frequency Range (MHz) | Antenna Type | Connector | Antenna Gain (dBi) | Composite Gain (dBi) |
|--|-----------------------|--------------|-----------|--------------------|----------------------|
| Winstron Neweb Corporation / EBJ Main + EBJ Aux. | 2400~2500 | PIFA Antenna | I-PEX | 3.0/3.62 | 6.33 |
| Winstron Neweb Corporation / EBJ Aux. + EBJ Aux. | 5150~5350 | PIFA Antenna | I-PEX | 3.08 | 6.08 |
| Winstron Neweb Corporation / EBJ Main + EBJ Main | 5470~5725 | PIFA Antenna | I-PEX | 4.76 | 7.77 |
| Winstron Neweb Corporation / EBJ Main + EBJ Main | 5725~5850 | PIFA Antenna | I-PEX | 4.76 | 7.7 |

Note:

For 5GHz function:

For IEEE 802.11 a/n mode (2TX/2RX)

Chain 1 and Chain 2 can be used as transmitting/receiving antenna.

Chain 1 and Chain 2 could transmit/receive simultaneously.



3.4. Table for Carrier Frequencies

The EUT has two bandwidth system.

For 20MHz bandwidth systems, use Channel 36, 40, 44, 48, 52, 56, 60, 64, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140, 149, 153, 157, 161, 165.

For 40MHz bandwidth systems, use Channel 38, 46, 54, 62, 102, 110, 118, 126, 134, 151, 159.

| Frequency Band | Channel No. | Frequency | Channel No. | Frequency |
|-------------------------|-------------|-----------|-------------|-----------|
| 5150~5250 MHz Band 1 | 36 | 5180 MHz | 44 | 5220 MHz |
| | 38 | 5190 MHz | 46 | 5230 MHz |
| | 40 | 5200 MHz | 48 | 5240 MHz |
| 5250~5350 MHz Band 2 | 52 | 5260 MHz | 60 | 5300 MHz |
| | 54 | 5270 MHz | 62 | 5310 MHz |
| | 56 | 5280 MHz | 64 | 5320 MHz |
| 5470~5725 MHz Band 3 | 100 | 5500 MHz | 120 | 5600 MHz |
| | 102 | 5510 MHz | 124 | 5620 MHz |
| | 104 | 5520 MHz | 126 | 5630 MHz |
| | 108 | 5540 MHz | 128 | 5640 MHz |
| | 110 | 5550 MHz | 132 | 5660 MHz |
| | 112 | 5560 MHz | 134 | 5670 MHz |
| | 116 | 5580 MHz | 136 | 5680 MHz |
| | 118 | 5590 MHz | 140 | 5700 MHz |
| 5725~5850 MHz Band 4 | 149 | 5745 MHz | 159 | 5795 MHz |
| | 151 | 5755 MHz | 161 | 5805 MHz |
| | 153 | 5765 MHz | 165 | 5825 MHz |
| | 157 | 5785 MHz | - | - |

3.5. Table for Test Modes

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

| Test Items | Mode | | Data Rate | Channel | Chain |
|--|----------|--------|-----------|-------------|-------|
| Max. Conducted Output Power | 11a/BPSK | Band 4 | 6Mbps | 149/157/165 | 1+2 |
| | 11n HT20 | Band 4 | MCS0 | 149/157/165 | 1+2 |
| | 11n HT40 | Band 4 | MCS0 | 151/159 | 1+2 |
| Power Spectral Density | 11a/BPSK | Band 4 | 6Mbps | 149/157/165 | 1+2 |
| | 11n HT20 | Band 4 | MCS0 | 149/157/165 | 1+2 |
| | 11n HT40 | Band 4 | MCS0 | 151/159 | 1+2 |
| 26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement | 11a/BPSK | Band 4 | 6Mbps | 149/157/165 | 1+2 |
| | 11n HT20 | Band 4 | MCS0 | 149/157/165 | 1+2 |
| | 11n HT40 | Band 4 | MCS0 | 151/159 | 1+2 |
| 6dB Spectrum Bandwidth Measurement | 11a/BPSK | Band 4 | 6Mbps | 149/157/165 | 1+2 |
| | 11n HT20 | Band 4 | MCS0 | 149/157/165 | 1+2 |
| | 11n HT40 | Band 4 | MCS0 | 151/159 | 1+2 |
| Radiated Emission Above 1GHz | 11a/BPSK | Band 4 | 6Mbps | 149/157/165 | 1+2 |
| | 11n HT20 | Band 4 | MCS0 | 149/157/165 | 1+2 |
| | 11n HT40 | Band 4 | MCS0 | 151/159 | 1+2 |
| Band Edge Emission | 11a/BPSK | Band 4 | 6Mbps | 149/157/165 | 1+2 |
| | 11n HT20 | Band 4 | MCS0 | 149/157/165 | 1+2 |
| | 11n HT40 | Band 4 | MCS0 | 151/159 | 1+2 |
| Frequency Stability | 20 MHz | Band 4 | - | 157 | 1 |
| | 40 MHz | Band 4 | - | 151 | 1 |

Note: There are two modes of EUT, one is beamforming mode and the other is non-beamforming mode. After evaluating, beamforming mode had been evaluated to be the worst case, so it was selected to record in this test report.

The following test modes were performed for all tests:

For Radiated Emission test (Above 1GHz):

Mode 1: CTX - EUT

3.6. Table for Testing Locations

| Test Site Location | | | | | |
|--------------------|--|----------|---------------------|-------------|--------------|
| Address: | No.8, Lane 724, Bo-ai St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C. | | | | |
| TEL: | 886-3-656-9065 | | | | |
| FAX: | 886-3-656-9085 | | | | |
| Test Site No. | Site Category | Location | FCC Designation No. | IC File No. | VCCI Reg. No |
| 03CH01-CB | SAC | Hsin Chu | TW0006 | IC 4086D | - |
| TH01-CB | OVEN Room | Hsin Chu | - | - | - |

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

3.7. Table for Class II Change

This product is an extension of original one reported under Sporton project number: 080603

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

| Modifications | Performance Checking |
|---|--|
| Updating 5GHz Band 1 to "New Rules" from "Old Rules". | The output power remains the same, so it's no need to re-test. |
| Updating 5GHz Band 2~3 to "New Rules" from "Old Rules". | After evaluating, it's no need to re-test. |
| Updating 5GHz Band 4 to "New Rules" from "Old Rules". | <ol style="list-style-type: none"> 1. 26dB Bandwidth and 99% Occupied Bandwidth 2. 6dB Spectrum Bandwidth 3. Maximum Conducted Output Power 4. Power Spectral Density 5. Radiated Emission Above 1GHz 6. Band Edge Emissions 7. Frequency Stability |

3.8. Table for Supporting Units

| Support Unit | Brand | Model | FCC ID |
|--------------|--------|-------|--------|
| Notebook | DELL | E4300 | DoC |
| Test fixture | Liteon | TB003 | N/A |

3.9. Table for Parameters of Test Software Setting

During testing, Channel and 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.

| Test Software Version | ART2-GUI | | |
|-----------------------|----------------------|----------|----------|
| Mode | Test Frequency (MHz) | | |
| | NCB: 20MHz | | |
| | 5745 MHz | 5785 MHz | 5825 MHz |
| 802.11a | 7.5 | 17 | 12 |
| 802.11n MCS0 HT20 | 7 | 17 | 11 |
| Mode | NCB: 40MHz | | |
| 802.11n MCS0 HT40 | 5755 MHz | | 5795 MHz |
| | 4.5 | | 12 |

3.10. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

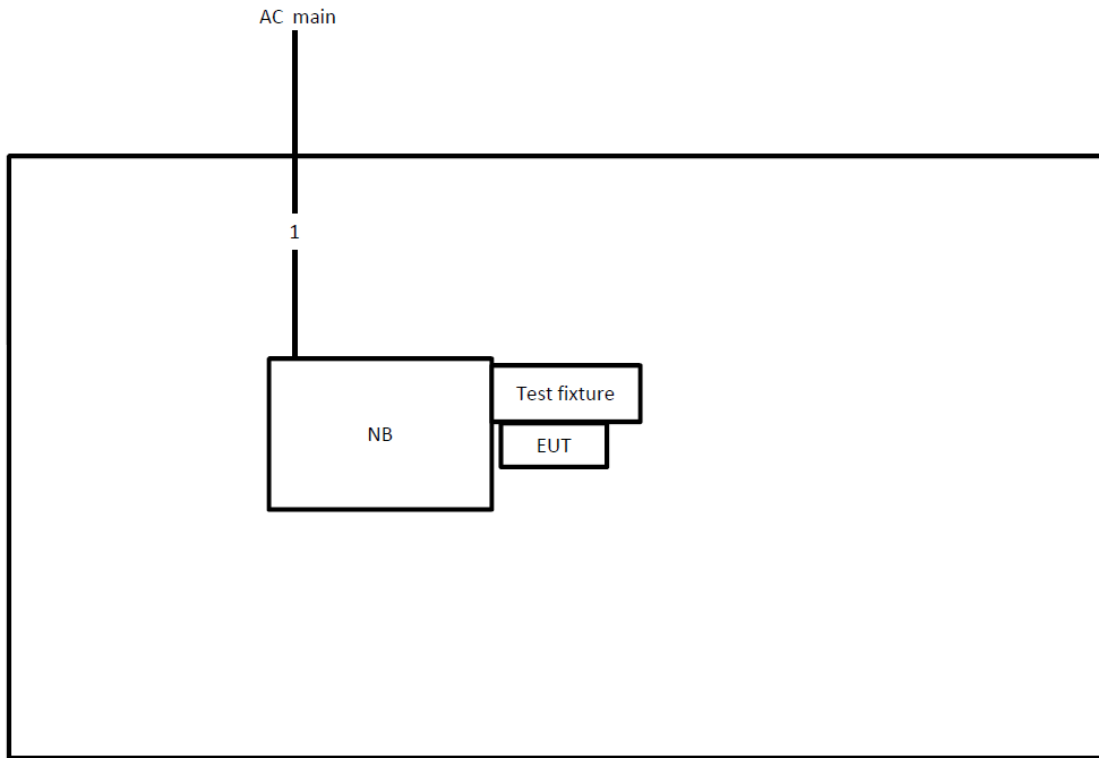
3.11. Duty Cycle

| Mode | On Time (ms) | On+Off Time (ms) | Duty Cycle (%) | Duty Factor (dB) | 1/T Minimum VBW (kHz) |
|-------------------|--------------|------------------|----------------|------------------|-----------------------|
| 802.11a | 1.341 | 1.406 | 95.36% | 0.21 | 0.75 |
| 802.11n MCS0 HT20 | 1.254 | 1.319 | 95.06% | 0.22 | 0.80 |
| 802.11n MCS0 HT40 | 0.610 | 0.665 | 91.72% | 0.38 | 1.64 |

3.12. Test Configurations

3.12.1. Radiation Emissions Test Configuration

Test Configuration: above 1GHz



| Item | Connection | Shielded | Length |
|------|-------------|----------|--------|
| 1 | Power cable | No | 1.5m |

4. TEST RESULT

4.1. 26dB Bandwidth and 99% Occupied Bandwidth Measurement

4.1.1. Limit

No restriction limits.

4.1.2. Measuring Instruments and Setting

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

| 26dB Bandwidth | |
|------------------------|--|
| Spectrum Parameters | Setting |
| Attenuation | Auto |
| Span Frequency | > 26dB Bandwidth |
| RBW | Approximately 1% of the emission bandwidth |
| VBW | VBW > RBW |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |
| 99% Occupied Bandwidth | |
| Spectrum Parameters | Setting |
| Span | 1.5 times to 5.0 times the OBW |
| RBW | 1 % to 5 % of the OBW |
| VBW | $\geq 3 \times \text{RBW}$ |
| Detector | Peak |
| Trace | Max Hold |

4.1.3. Test Procedures

For Radiated 26dB Bandwidth and 99% Occupied Bandwidth Measurement:

1. The transmitter was radiated to the spectrum analyzer in peak hold mode.
2. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

4.1.4. Test Setup Layout

For Radiated 26dB Bandwidth and 99% Occupied Bandwidth Measurement:

This test setup layout is the same as that shown in section 4.5.4.

4.1.5. Test Deviation

There is no deviation with the original standard.

4.1.6. EUT Operation during Test

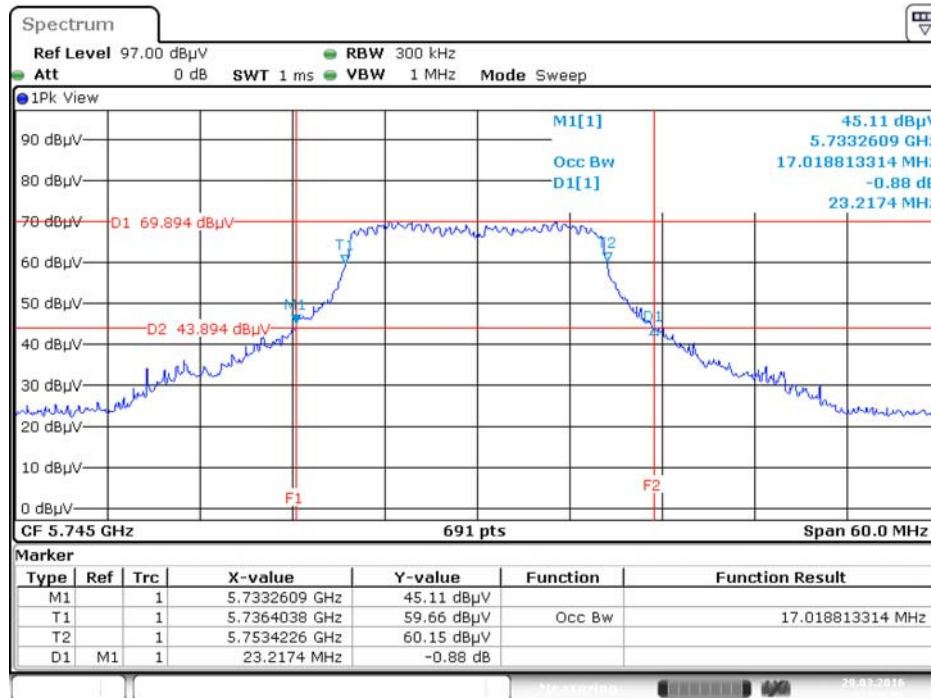
The EUT was programmed to be in continuously transmitting mode.

4.1.7. Test Result of 26dB Bandwidth and 99% Occupied Bandwidth

| | | | |
|---------------|----------|----------|-----|
| Temperature | 26°C | Humidity | 45% |
| Test Engineer | Wen Chao | | |

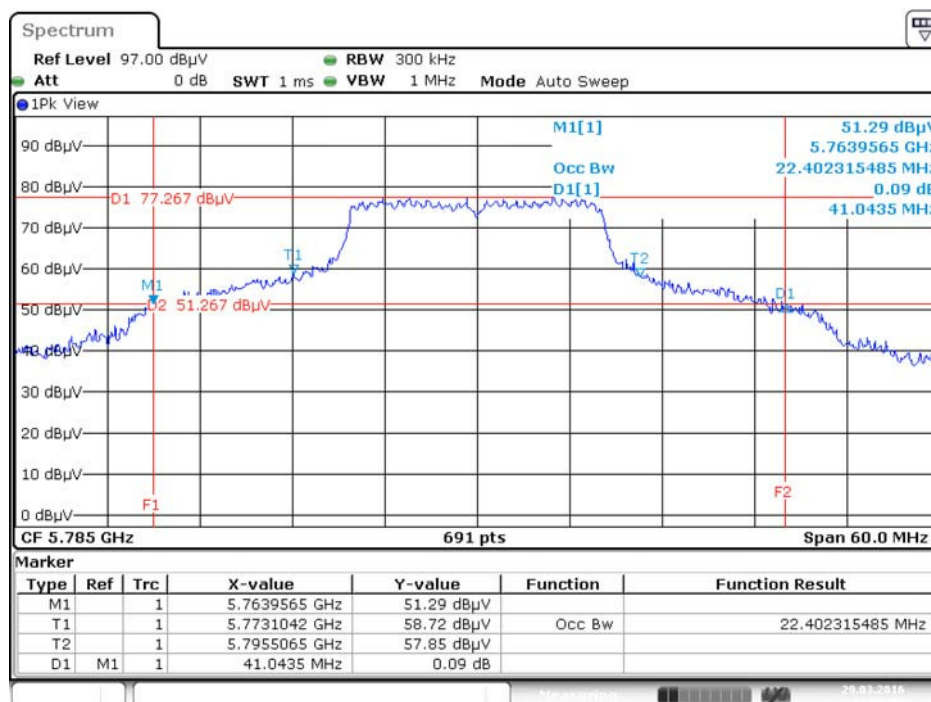
| Mode | Frequency | 26dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) |
|-------------------|-----------|----------------------|------------------------------|
| 802.11a | 5745 MHz | 23.22 | 17.02 |
| | 5785 MHz | 41.04 | 22.40 |
| | 5825 MHz | 28.17 | 17.54 |
| 802.11n MCS0 HT20 | 5745 MHz | 25.22 | 18.32 |
| | 5785 MHz | 42.17 | 22.84 |
| | 5825 MHz | 27.91 | 18.67 |
| 802.11n MCS0 HT40 | 5755 MHz | 52.90 | 38.64 |
| | 5795 MHz | 74.20 | 40.23 |

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 / 5745 MHz



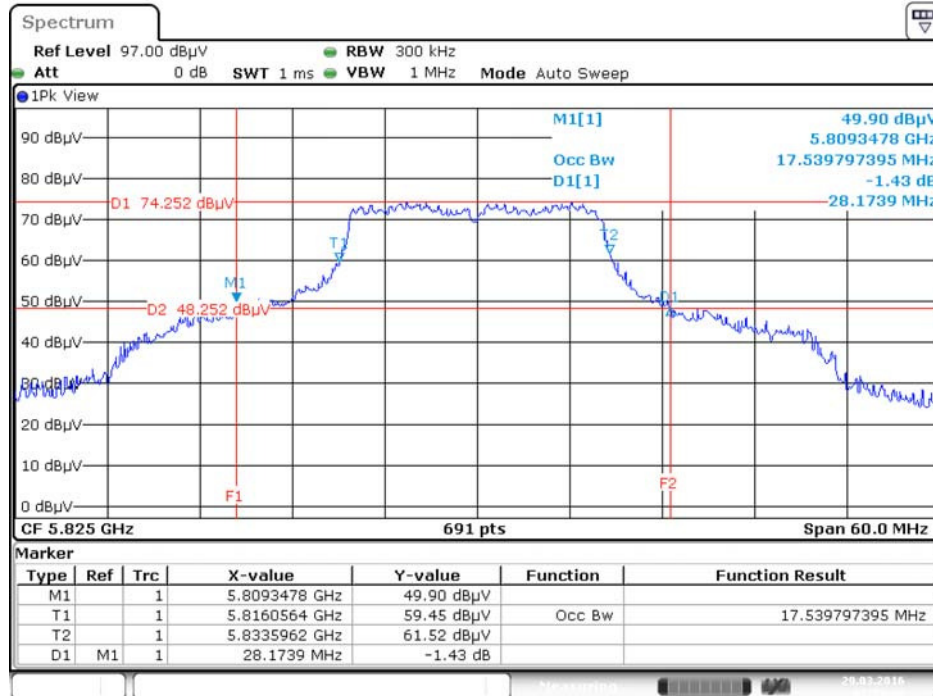
Date: 29.MAR.2016 02:55:36

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 / 5785 MHz



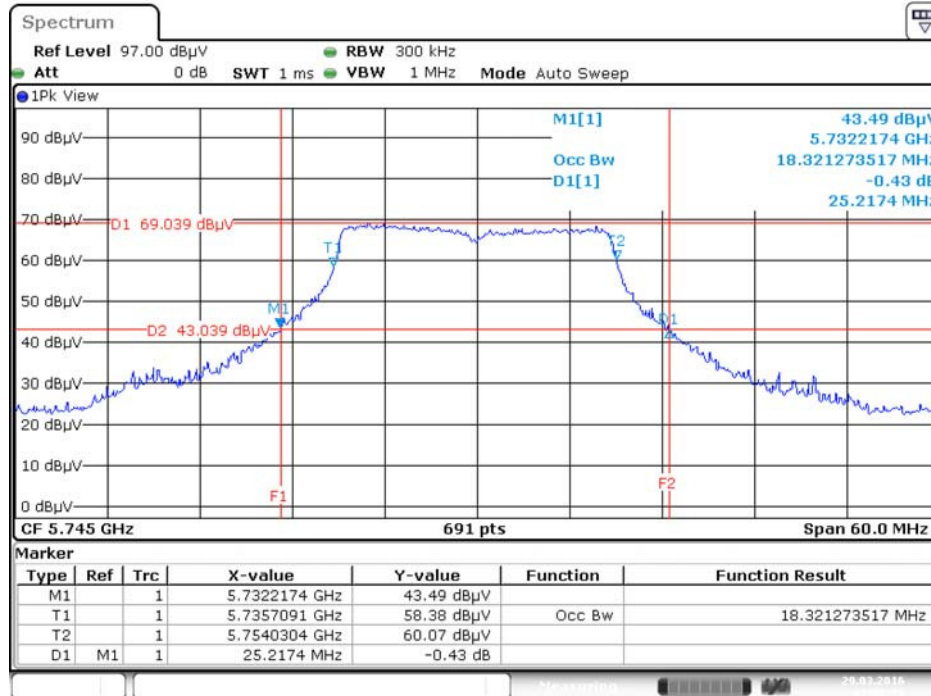
Date: 29.MAR.2016 02:58:59

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 / 5825 MHz



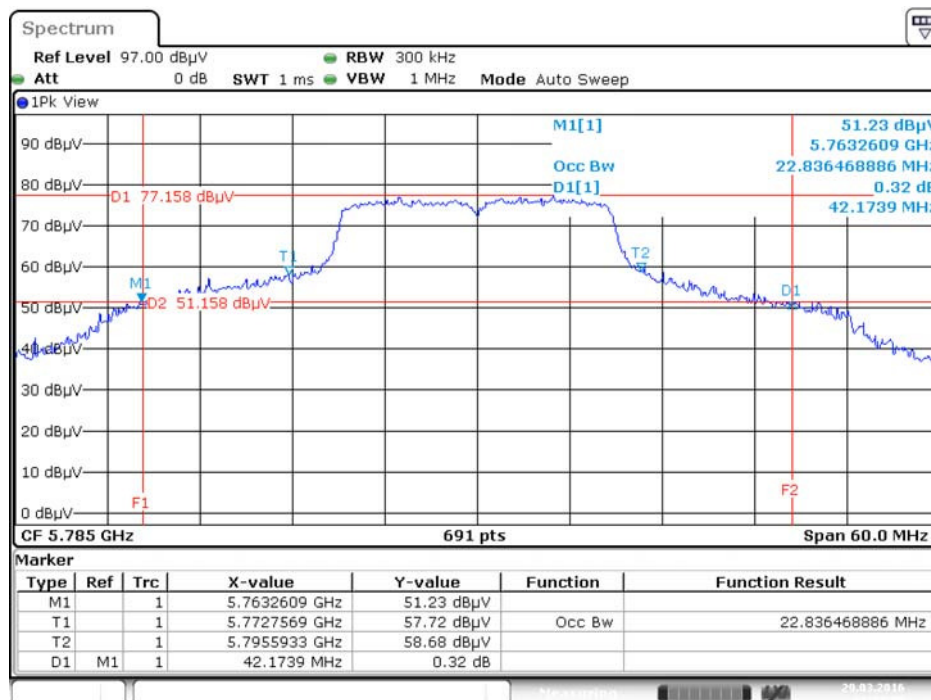
Date: 29.MAR.2016 02:59:47

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 1 + Chain 2 / 5745 MHz



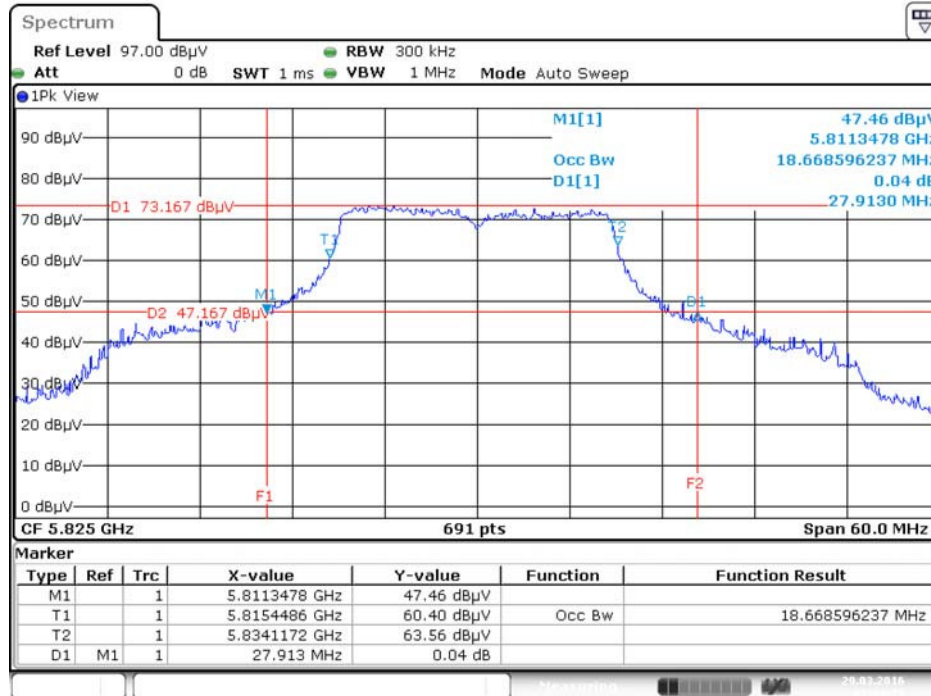
Date: 29.MAR.2016 03:02:32

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 1 + Chain 2 / 5785 MHz



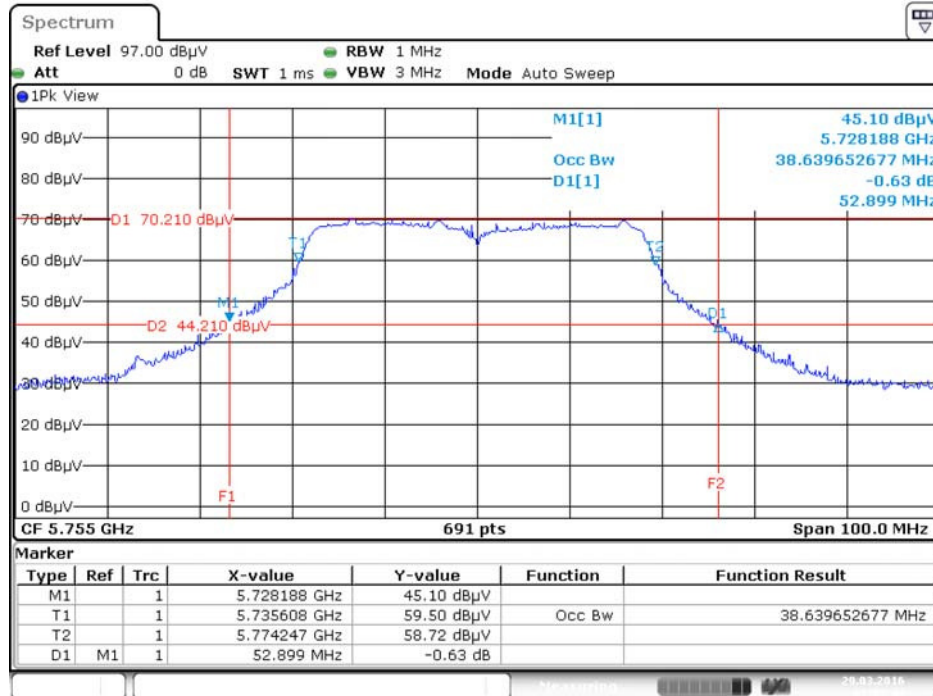
Date: 29.MAR.2016 03:03:30

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 1 + Chain 2 / 5825 MHz



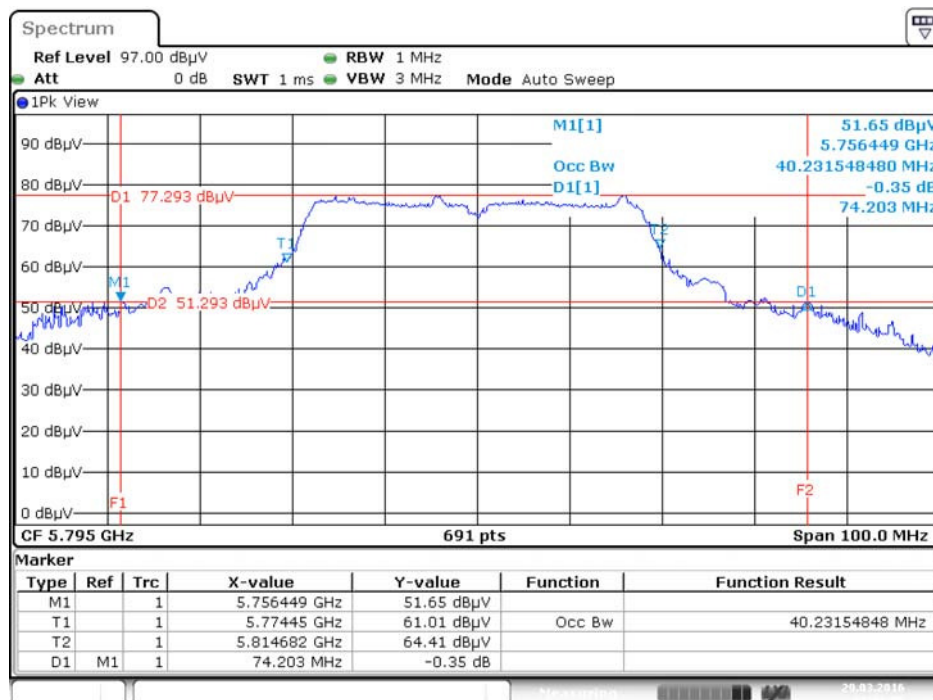
Date: 29.MAR.2016 03:04:51

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / Chain 1 + Chain 2 / 5755 MHz



Date: 29.MAR.2016 03:05:49

26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / Chain 1 + Chain 2 / 5795 MHz



Date: 29.MAR.2016 03:06:36

4.2. 6dB Spectrum Bandwidth Measurement

4.2.1. Limit

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

4.2.2. Measuring Instruments and Setting

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

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

4.2.3. Test Procedures

For Radiated 6dB Bandwidth Measurement:

1. The transmitter was radiated to the spectrum analyzer in peak hold mode.
2. Test was performed in accordance with KDB789033 D02 v01r01 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (C) Emission Bandwidth.
3. Multiple antenna system was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. Measured the spectrum width with power higher than 6dB below carrier.

4.2.4. Test Setup Layout

For Radiated 6dB Bandwidth Measurement:

This test setup layout is the same as that shown in section 4.5.4.

4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of 6dB Spectrum Bandwidth

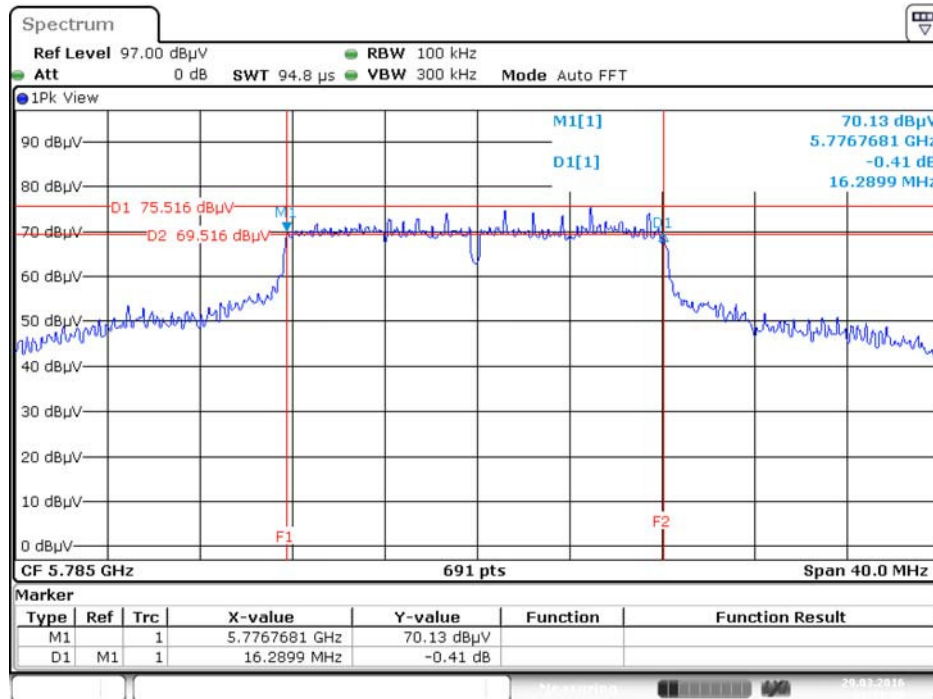
| | | | |
|----------------------|----------|-----------------|-----|
| Temperature | 26°C | Humidity | 45% |
| Test Engineer | Wen Chao | | |

| Mode | Frequency | 6dB Bandwidth (MHz) | Min. Limit (kHz) | Test Result |
|----------------------|-----------|---------------------|------------------|-------------|
| 802.11a | 5745 MHz | 16.41 | 500 | Complies |
| | 5785 MHz | 16.29 | 500 | Complies |
| | 5825 MHz | 16.29 | 500 | Complies |
| 802.11n MCS0 HT20 | 5745 MHz | 17.57 | 500 | Complies |
| | 5785 MHz | 15.71 | 500 | Complies |
| | 5825 MHz | 17.33 | 500 | Complies |
| 802.11n MCS0 HT40 | 5755 MHz | 36.06 | 500 | Complies |
| | 5795 MHz | 36.06 | 500 | Complies |

Note: All the test values were listed in the report.

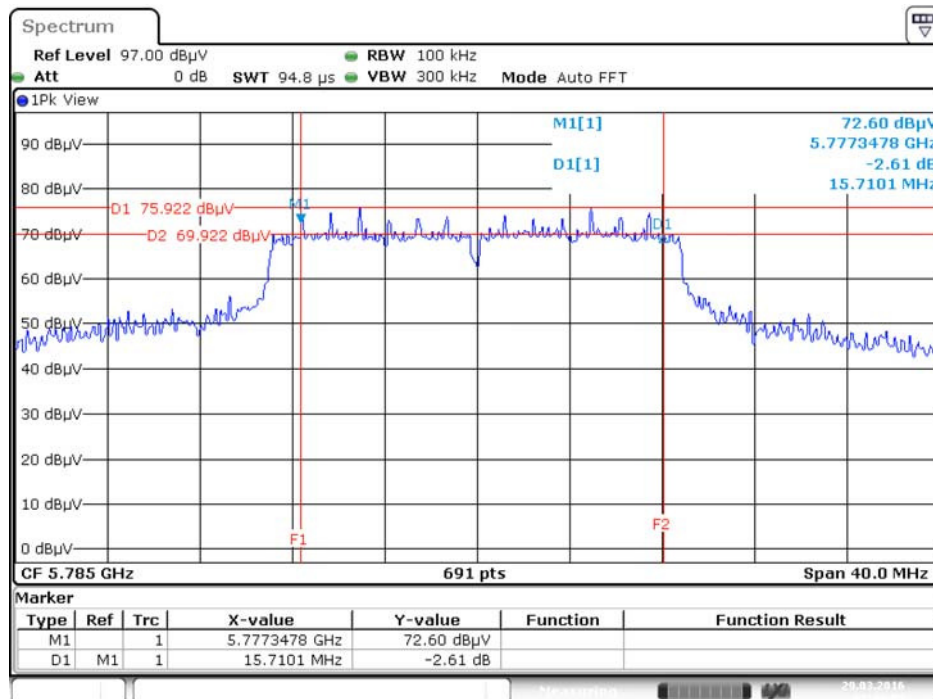
For plots, only the channel with worse result was shown.

6 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 / 5785 MHz



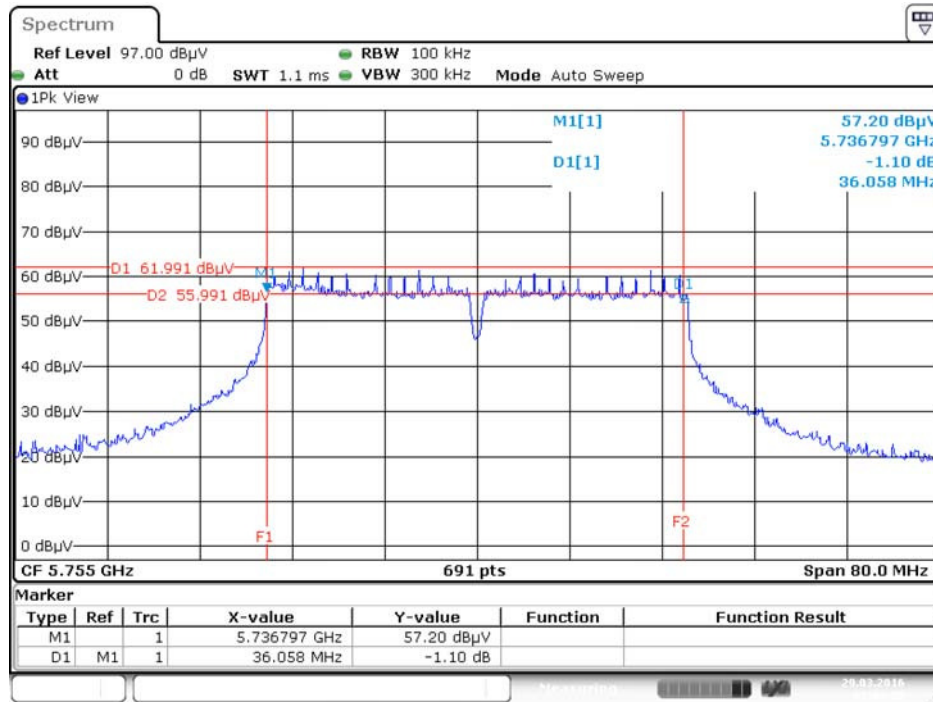
Date: 29.MAR.2016 03:52:01

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 1 + Chain 2 / 5785 MHz



Date: 29.MAR.2016 03:49:03

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / Chain 1 + Chain 2 / 5755MHz



Date: 29.MAR.2016 03:09:20

4.3. Maximum Conducted Output Power Measurement

4.3.1. Limit

| Frequency Band | Limit |
|--|--|
| <input checked="" type="checkbox"/> 5.725~5.85 GHz | The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm). If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. |

4.3.2. Measuring Instruments and Setting

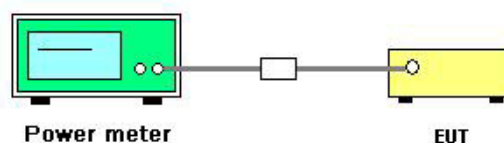
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

| Power Meter Parameter | Setting |
|-----------------------|--|
| Bandwidth | 50MHz bandwidth is greater than the EUT emission bandwidth |
| Detector | AVERAGE |

4.3.3. Test Procedures

1. The transmitter output (antenna port) was connected to the power meter.
2. Test was performed in accordance with KDB789033 D02 v01r01 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (E) Maximum conducted output power =>3. Measurement using a Power Meter (PM) =>b) Method PM-G (Measurement using a gated RF average power meter).
3. Multiple antenna systems was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. When measuring maximum conducted output power with multiple antenna systems, add every result of the values by mathematic formula.

4.3.4. Test Setup Layout



4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of Maximum Conducted Output Power

| | | | |
|---------------|----------|-----------|-------------------------------|
| Temperature | 26°C | Humidity | 45% |
| Test Engineer | Wen Chao | Test Date | Jan. 05, 2016 ~ Mar. 29, 2016 |

| Mode | Frequency | Conducted Power (dBm) | | | Max. Limit (dBm) | Result |
|----------------------|-----------|-----------------------|---------|-------|------------------|----------|
| | | Chain 1 | Chain 2 | Total | | |
| 802.11a | 5745 MHz | 9.44 | 7.66 | 11.65 | 28.23 | Complies |
| | 5785 MHz | 15.92 | 15.09 | 18.54 | 28.23 | Complies |
| | 5825 MHz | 13.37 | 11.87 | 15.69 | 28.23 | Complies |
| 802.11n MCS0 HT20 | 5745 MHz | 8.96 | 6.77 | 11.01 | 28.23 | Complies |
| | 5785 MHz | 16.28 | 15.35 | 18.85 | 28.23 | Complies |
| | 5825 MHz | 12.59 | 11.07 | 14.91 | 28.23 | Complies |
| 802.11n MCS0 HT40 | 5755 MHz | 6.06 | 4.44 | 8.34 | 28.23 | Complies |
| | 5795 MHz | 12.80 | 11.65 | 15.27 | 28.23 | Complies |

Note: Directional gain=7.77dBi>6dBi, so limit=30(7.77-6)=28.23

4.4. Power Spectral Density Measurement

4.4.1. Limit

The following table is power spectral density limits and decrease power density limit rule refer to section 4.3.1.

| | Frequency Band | Limit |
|-------------------------------------|----------------|---------------|
| <input checked="" type="checkbox"/> | 5.725~5.85 GHz | 30 dBm/500kHz |

4.4.2. Measuring Instruments and Setting

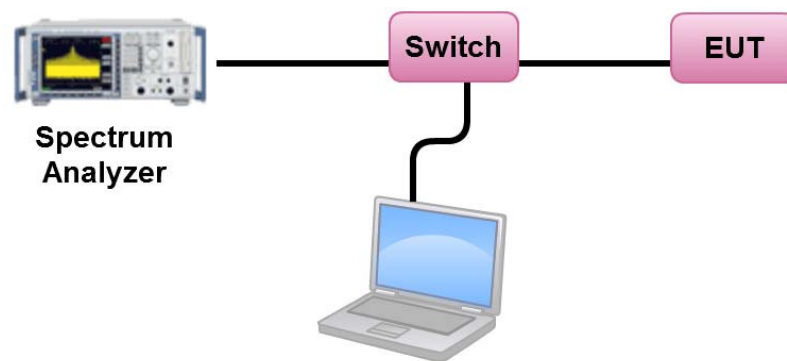
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

| Spectrum Parameter | Setting |
|--|--|
| Attenuation | Auto |
| Span Frequency | Encompass the entire emissions bandwidth (EBW) of the signal |
| RBW | 1000 kHz |
| VBW | 3000 kHz |
| Detector | RMS |
| Trace | AVERAGE |
| Sweep Time | Auto |
| Trace Average | 100 times |
| Note: If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10\log(500\text{kHz}/\text{RBW})$ to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement. | |

4.4.3. Test Procedures

1. The transmitter output (antenna port) was connected RF switch to the spectrum analyzer.
2. Test was performed in accordance with KDB789033 D02 v01r01 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (F) Maximum Power Spectral Density (PSD).
3. Multiple antenna systems was performed in accordance KDB662911 D01 v02r01 in-Band Power Spectral Density (PSD) Measurements and sum the spectra across the outputs.
4. For 5.725~5.85 GHz, the measured result of PSD level must add $10\log(500\text{kHz}/\text{RBW})$ and the final result should ≤ 30 dBm.

4.4.4. Test Setup Layout



4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of Power Spectral Density

| | | | |
|---------------|----------|-----------|-------------------------------|
| Temperature | 26°C | Humidity | 45% |
| Test Engineer | Wen Chao | Test Date | Jan. 05, 2016 ~ Mar. 29, 2016 |

Configuration IEEE 802.11a / Chain 1 + Chain 2

| Channel | Frequency | Power Density (dBm/MHz) | 10log(500kHz/RBW) Factor (dB) | Power Density (dBm/500kHz) | Power Density Limit (dBm/500kHz) | Result |
|---------|-----------|-------------------------|-------------------------------|----------------------------|----------------------------------|----------|
| 149 | 5745 MHz | -1.62 | -3.01 | -4.63 | 28.23 | Complies |
| 157 | 5785 MHz | 5.19 | -3.01 | 2.18 | 28.23 | Complies |
| 165 | 5825 MHz | 2.32 | -3.01 | -0.69 | 28.23 | Complies |

Note: Directional gain=7.77dBi>6dBi, so limit=30(7.77-6)=28.23

Configuration IEEE 802.11n MCS0 HT20 / Chain 1 + Chain 2

| Channel | Frequency | Power Density (dBm/MHz) | 10log(500kHz/RBW) Factor (dB) | Power Density (dBm/500kHz) | Power Density Limit (dBm/500kHz) | Result |
|---------|-----------|-------------------------|-------------------------------|----------------------------|----------------------------------|----------|
| 149 | 5745 MHz | -2.50 | -3.01 | -5.51 | 28.23 | Complies |
| 157 | 5785 MHz | 5.47 | -3.01 | 2.46 | 28.23 | Complies |
| 165 | 5825 MHz | 1.42 | -3.01 | -1.59 | 28.23 | Complies |

Note: Directional gain=7.77dBi>6dBi, so limit=30(7.77-6)=28.23

Configuration IEEE 802.11n MCS0 HT40 / Chain 1 + Chain 2

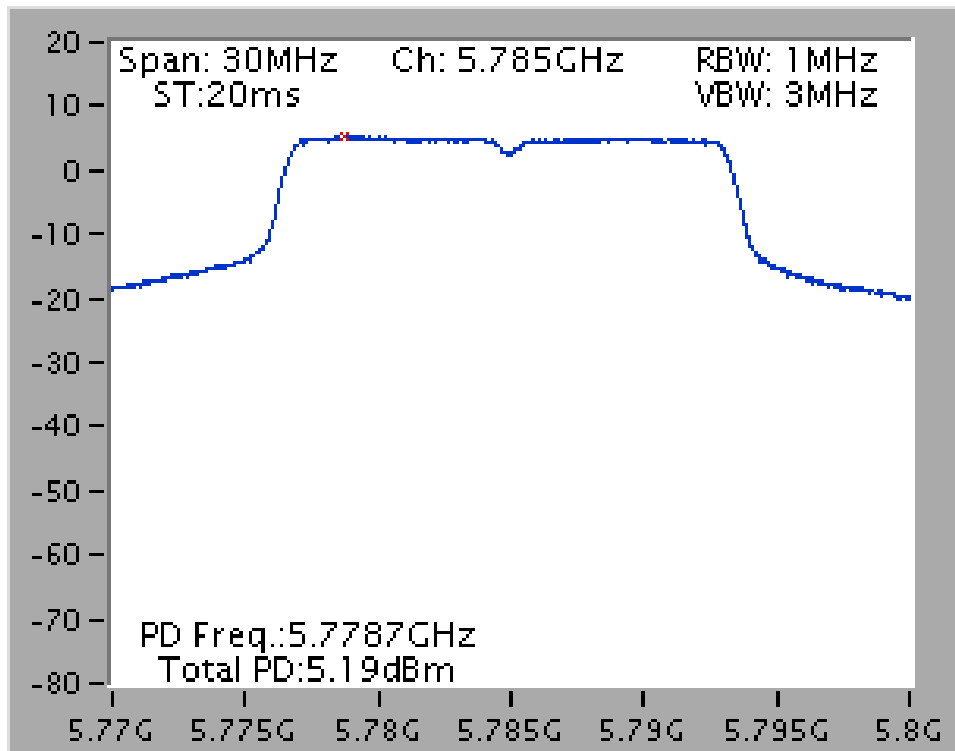
| Channel | Frequency | Power Density (dBm/MHz) | 10log(500kHz/RBW) Factor (dB) | Power Density (dBm/500kHz) | Power Density Limit (dBm/500kHz) | Result |
|---------|-----------|-------------------------|-------------------------------|----------------------------|----------------------------------|----------|
| 151 | 5755 MHz | -8.17 | -3.01 | -11.18 | 28.23 | Complies |
| 159 | 5795 MHz | -0.83 | -3.01 | -3.84 | 28.23 | Complies |

Note: Directional gain=7.77dBi>6dBi, so limit=30(7.77-6)=28.23

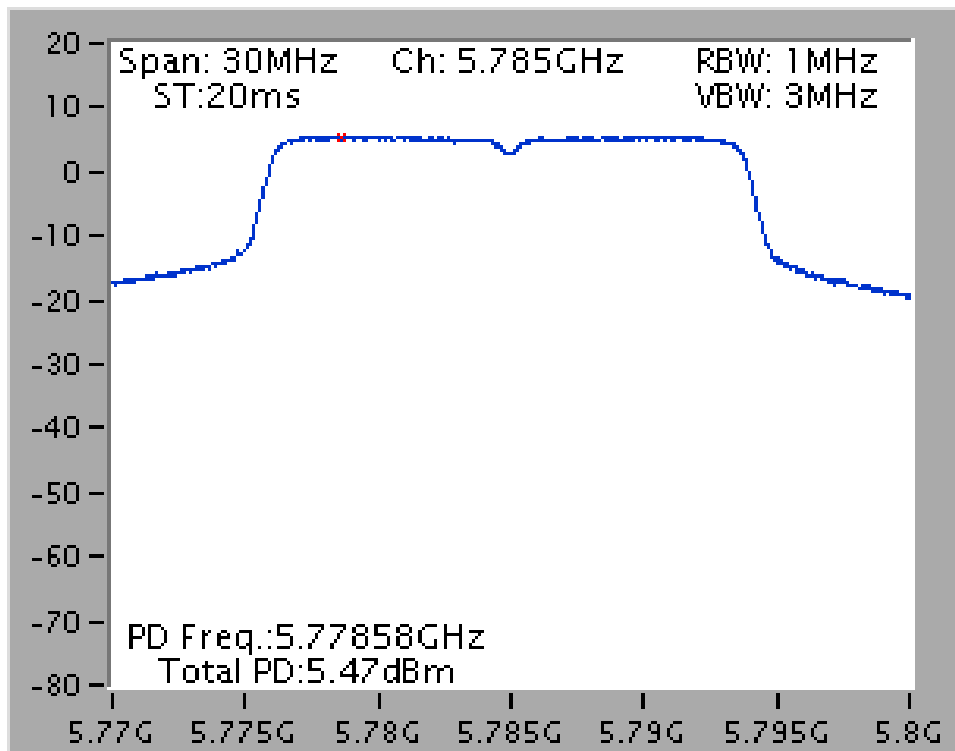
Note: All the test values were listed in the report.

For plots, only the channel with worse result was shown.

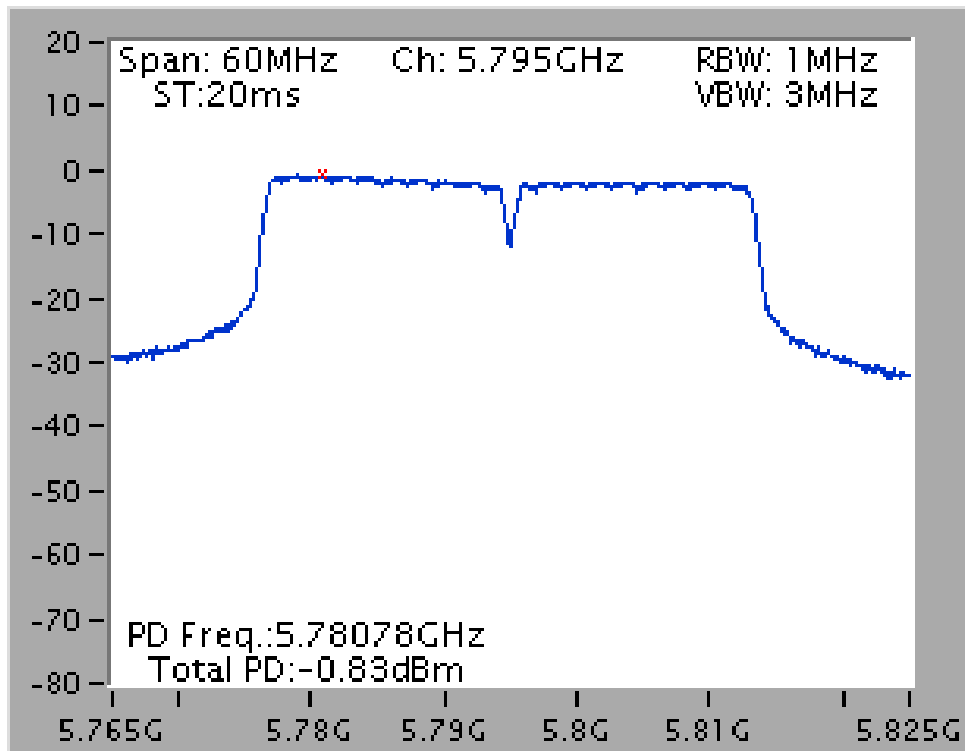
Power Density Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 / 5785 MHz



Power Density Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 1 + Chain 2 / 5785 MHz



Power Density Plot on Configuration IEEE 802.11n MCS0 HT40 / Chain 1 + Chain 2 / 5795 MHz



4.5. Radiated Emissions Measurement

4.5.1. Limit

For transmitters operating in the 5.725-5.85 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.

In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

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

4.5.2. Measuring Instruments and Setting

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

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start Frequency | 1000 MHz |
| Stop Frequency | 40 GHz |
| RBW / VBW (Emission in restricted band) | 1 MHz / 3MHz for Peak, 1 MHz / 1/T for Average |
| RBW / VBW (Emission in non-restricted band) | 1 MHz / 3MHz 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~1000MHz / RBW 120kHz for QP |

4.5.3. Test Procedures

Radiated:

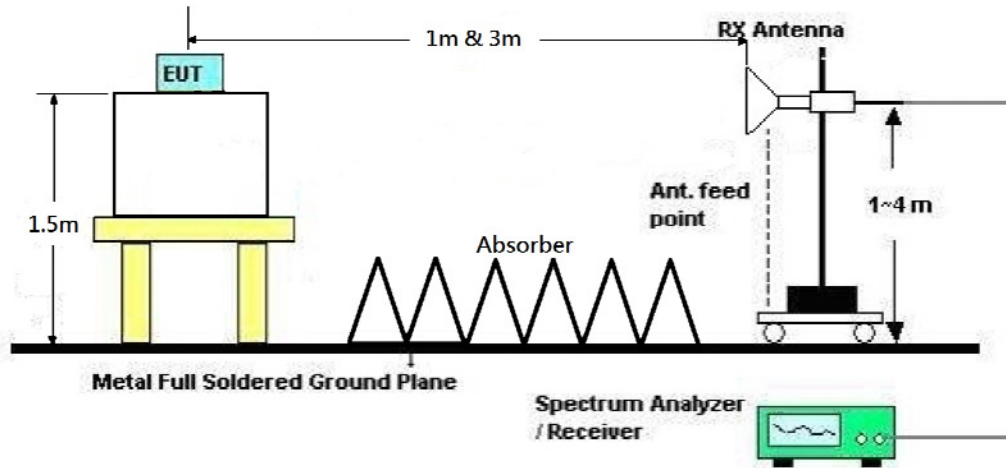
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting 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 1/T VBW for average reading in spectrum analyzer.
7. 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.
8. 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.
9. 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.

Conducted:

The Conducted test procedure is the same as section 4.4.3.

4.5.4. Test Setup Layout

Radiated:



Conducted:

The Conducted test procedure is the same as section 4.4.4.

4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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

Radiated measurement:

| | | | |
|---------------|---------------|----------------|---|
| Temperature | 22°C | Humidity | 66% |
| Test Engineer | Lucke Hhieh | Configurations | IEEE 802.11a CH 149 / Chain 1 + Chain 2 |
| Test Date | Jan. 05, 2016 | | |

Horizontal

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|------------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11485.86 | 47.53 | 54.00 | -6.47 | 27.46 | 14.24 | 39.20 | 33.37 | 169 | 161 | Average | HORIZONTAL |
| 2 | 11489.82 | 60.36 | 74.00 | -13.64 | 40.29 | 14.24 | 39.20 | 33.37 | 169 | 161 | Peak | HORIZONTAL |

Vertical

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11494.64 | 60.67 | 74.00 | -13.33 | 40.60 | 14.24 | 39.20 | 33.37 | 155 | 62 | Peak | VERTICAL |
| 2 | 11498.88 | 48.42 | 54.00 | -5.58 | 28.35 | 14.24 | 39.20 | 33.37 | 155 | 62 | Average | VERTICAL |

| | | | |
|----------------------|---------------|-----------------------|---|
| Temperature | 22°C | Humidity | 66% |
| Test Engineer | Lucke Hhieh | Configurations | IEEE 802.11a CH 157 / Chain 1 + Chain 2 |
| Test Date | Jan. 05, 2016 | | |

Horizontal

| | Freq | Level | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|------------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11575.44 | 61.22 | 74.00 | -12.78 | 41.06 | 14.35 | 39.20 | 33.39 | 100 | 233 | Peak | HORIZONTAL |
| 2 | 11575.64 | 49.45 | 54.00 | -4.55 | 29.29 | 14.35 | 39.20 | 33.39 | 100 | 233 | Average | HORIZONTAL |

Vertical

| | Freq | Level | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11569.76 | 50.82 | 54.00 | -3.18 | 30.66 | 14.35 | 39.20 | 33.39 | 108 | 143 | Average | VERTICAL |
| 2 | 11575.52 | 63.29 | 74.00 | -10.71 | 43.13 | 14.35 | 39.20 | 33.39 | 108 | 143 | Peak | VERTICAL |

| | | | |
|----------------------|---------------|-----------------------|---|
| Temperature | 22°C | Humidity | 66% |
| Test Engineer | Lucke Hhieh | Configurations | IEEE 802.11a CH 165 / Chain 1 + Chain 2 |
| Test Date | Jan. 05, 2016 | | |

Horizontal

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|------------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11644.96 | 63.57 | 74.00 | -10.43 | 43.33 | 14.45 | 39.20 | 33.41 | 123 | 133 | Peak | HORIZONTAL |
| 2 | 11650.72 | 50.95 | 54.00 | -3.05 | 30.71 | 14.45 | 39.20 | 33.41 | 123 | 133 | Average | HORIZONTAL |

Vertical

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11645.36 | 63.72 | 74.00 | -10.28 | 43.48 | 14.45 | 39.20 | 33.41 | 125 | 69 | Peak | VERTICAL |
| 2 | 11650.44 | 50.56 | 54.00 | -3.44 | 30.32 | 14.45 | 39.20 | 33.41 | 125 | 69 | Average | VERTICAL |

| | | | |
|----------------------|---------------|-----------------------|---|
| Temperature | 22°C | Humidity | 66% |
| Test Engineer | Lucke Hhieh | Configurations | IEEE 802.11n MCS0 HT20 CH 149 / Chain 1 + Chain 2 |
| Test Date | Jan. 05, 2016 | | |

Horizontal

| | Freq | Level | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|------------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11496.84 | 60.94 | 74.00 | -13.06 | 40.87 | 14.24 | 39.20 | 33.37 | 131 | 294 | Peak | HORIZONTAL |
| 2 | 11498.04 | 47.31 | 54.00 | -6.69 | 27.24 | 14.24 | 39.20 | 33.37 | 131 | 294 | Average | HORIZONTAL |

Vertical

| | Freq | Level | Limit Line | Over Limit | Read Level | CableAntenna Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|----------|--------|------------|------------|------------|-------------------|----------------|---------------|-------|-------|---------|-----------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11488.04 | 60.36 | 74.00 | -13.64 | 40.29 | 14.24 | 39.20 | 33.37 | 141 | 103 | Peak | VERTICAL |
| 2 | 11498.36 | 48.00 | 54.00 | -6.00 | 27.93 | 14.24 | 39.20 | 33.37 | 141 | 103 | Average | VERTICAL |

| | | | |
|----------------------|---------------|-----------------------|---|
| Temperature | 22°C | Humidity | 66% |
| Test Engineer | Lucke Hhieh | Configurations | IEEE 802.11n MCS0 HT20 CH 157 / Chain 1 + Chain 2 |
| Test Date | Jan. 05, 2016 | | |

Horizontal

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|------------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11574.60 | 49.03 | 54.00 | -4.97 | 28.87 | 14.35 | 39.20 | 33.39 | 146 | 166 | Average | HORIZONTAL |
| 2 | 11594.30 | 61.12 | 74.00 | -12.88 | 40.92 | 14.40 | 39.20 | 33.40 | 146 | 166 | Peak | HORIZONTAL |

Vertical

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11568.70 | 63.19 | 74.00 | -10.81 | 43.03 | 14.35 | 39.20 | 33.39 | 100 | 23 | Peak | VERTICAL |
| 2 | 11572.30 | 50.61 | 54.00 | -3.39 | 30.45 | 14.35 | 39.20 | 33.39 | 100 | 23 | Average | VERTICAL |

| | | | |
|----------------------|---------------|-----------------------|---|
| Temperature | 22°C | Humidity | 66% |
| Test Engineer | Lucke Hhieh | Configurations | IEEE 802.11n MCS0 HT20 CH 165 / Chain 1 + Chain 2 |
| Test Date | Jan. 05, 2016 | | |

Horizontal

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|------------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11652.10 | 49.57 | 54.00 | -4.43 | 29.27 | 14.51 | 39.20 | 33.41 | 156 | 117 | Average | HORIZONTAL |
| 2 | 11654.10 | 61.58 | 74.00 | -12.42 | 41.28 | 14.51 | 39.20 | 33.41 | 156 | 117 | Peak | HORIZONTAL |

Vertical

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11646.40 | 61.32 | 74.00 | -12.68 | 41.08 | 14.45 | 39.20 | 33.41 | 173 | 282 | Peak | VERTICAL |
| 2 | 11654.00 | 49.01 | 54.00 | -4.99 | 28.71 | 14.51 | 39.20 | 33.41 | 173 | 282 | Average | VERTICAL |

| | | | |
|----------------------|---------------|-----------------------|---|
| Temperature | 22°C | Humidity | 66% |
| Test Engineer | Lucke Hhieh | Configurations | IEEE 802.11n MCS0 HT40 CH 151 / Chain 1 + Chain 2 |
| Test Date | Jan. 05, 2016 | | |

Horizontal

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|------------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11524.60 | 48.12 | 54.00 | -5.88 | 28.01 | 14.29 | 39.20 | 33.38 | 159 | 271 | Average | HORIZONTAL |
| 2 | 11526.80 | 60.67 | 74.00 | -13.33 | 40.56 | 14.29 | 39.20 | 33.38 | 159 | 271 | Peak | HORIZONTAL |

Vertical

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11522.70 | 60.45 | 74.00 | -13.55 | 40.34 | 14.29 | 39.20 | 33.38 | 100 | 35 | Peak | VERTICAL |
| 2 | 11529.70 | 48.25 | 54.00 | -5.75 | 28.14 | 14.29 | 39.20 | 33.38 | 100 | 35 | Average | VERTICAL |



| | | | |
|----------------------|---------------|-----------------------|---|
| Temperature | 22°C | Humidity | 66% |
| Test Engineer | Lucke Hhieh | Configurations | IEEE 802.11n MCS0 HT40 CH 159 / Chain 1 + Chain 2 |
| Test Date | Jan. 05, 2016 | | |

Horizontal

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|------------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11591.10 | 50.02 | 54.00 | -3.98 | 29.82 | 14.40 | 39.20 | 33.40 | 107 | 42 | Average | HORIZONTAL |
| 2 | 11613.10 | 62.25 | 74.00 | -11.75 | 42.05 | 14.40 | 39.20 | 33.40 | 107 | 42 | Peak | HORIZONTAL |

Vertical

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|----------------|---------------|-------|-------|---------|-----------|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11593.30 | 49.52 | 54.00 | -4.48 | 29.32 | 14.40 | 39.20 | 33.40 | 255 | 324 | Average | VERTICAL |
| 2 | 11604.00 | 61.57 | 74.00 | -12.43 | 41.37 | 14.40 | 39.20 | 33.40 | 255 | 324 | Peak | VERTICAL |

Note:

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

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

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

Conducted measurement:

| | | | |
|----------------------|----------|-----------------------|--|
| Temperature | 26°C | Humidity | 46% |
| Test Engineer | Wen Chao | Configurations | IEEE 802.11a / Average / Chain 1 + Chain 2 |

| Frequency(MHz) | Chain 1 (TX1) Spruious Level (dBm) | Chain 2 (TX2) Spruious Level (dBm) | Total Spruious Level (dBm) | Limit (dBm) | Margin (dB) |
|----------------|------------------------------------|------------------------------------|----------------------------|-------------|-------------|
| 5745 | -59.81 | -59.97 | -49.11 | -41.20 | 7.91 |
| 5785 | -54.64 | -53.17 | -43.06 | -41.20 | 1.86 |
| 5825 | -54.61 | -54.35 | -43.70 | -41.20 | 2.50 |

| | | | |
|----------------------|----------|-----------------------|---|
| Temperature | 26°C | Humidity | 46% |
| Test Engineer | Wen Chao | Configurations | IEEE 802.11a / Peak / Chain 1 + Chain 2 |

| Frequency(MHz) | Chain 1 (TX1) Spruious Level (dBm) | Chain 2 (TX2) Spruious Level (dBm) | Total Spruious Level (dBm) | Limit (dBm) | Margin (dB) |
|----------------|------------------------------------|------------------------------------|----------------------------|-------------|-------------|
| 5745 | -45.95 | -46.36 | -35.37 | -21.20 | 14.17 |
| 5785 | -40.83 | -38.33 | -28.62 | -21.20 | 7.42 |
| 5825 | -39.91 | -40.32 | -29.33 | -21.20 | 8.13 |

| | | | |
|----------------------|----------|-----------------------|--|
| Temperature | 26°C | Humidity | 46% |
| Test Engineer | Wen Chao | Configurations | IEEE 802.11n MCS0 HT20 / Average / Chain 1 + Chain 2 |

| Frequency(MHz) | Chain 1 (TX1) Spruious Level (dBm) | Chain 2 (TX2) Spruious Level (dBm) | Total Spruious Level (dBm) | Limit (dBm) | Margin (dB) |
|----------------|------------------------------------|------------------------------------|----------------------------|-------------|-------------|
| 5745 | -63.13 | -62.62 | -52.09 | -41.20 | 10.89 |
| 5785 | -54.02 | -53.74 | -43.10 | -41.20 | 1.90 |
| 5825 | -56.47 | -58.87 | -46.73 | -41.20 | 5.53 |

| | | | |
|----------------------|----------|-----------------------|---|
| Temperature | 26°C | Humidity | 46% |
| Test Engineer | Wen Chao | Configurations | IEEE 802.11n MCS0 HT20 / Peak / Chain 1 + Chain 2 |

| Frequency(MHz) | Chain 1 (TX1) Spruious Level (dBm) | Chain 2 (TX2) Spruious Level (dBm) | Total Spruious Level (dBm) | Limit (dBm) | Margin (dB) |
|----------------|------------------------------------|------------------------------------|----------------------------|-------------|-------------|
| 5745 | -47.90 | -47.64 | -36.99 | -21.20 | 15.79 |
| 5785 | -41.35 | -40.79 | -30.28 | -21.20 | 9.08 |
| 5825 | -42.33 | -44.37 | -32.45 | -21.20 | 11.25 |

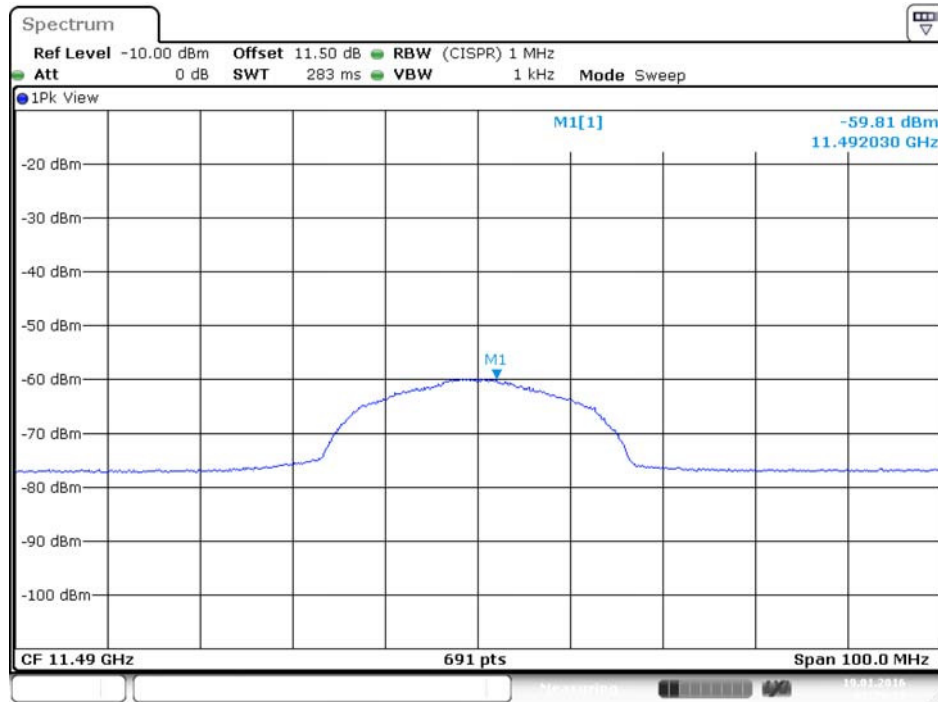
| | | | |
|----------------------|----------|-----------------------|--|
| Temperature | 26°C | Humidity | 46% |
| Test Engineer | Wen Chao | Configurations | IEEE 802.11n MCS0 HT40 / Average / Chain 1 + Chain 2 |

| Frequency(MHz) | Chain 1 (TX1) Spruious Level (dBm) | Chain 2 (TX2) Spruious Level (dBm) | Total Spruious Level (dBm) | Limit (dBm) | Margin (dB) |
|----------------|------------------------------------|------------------------------------|----------------------------|-------------|-------------|
| 5755 | -69.32 | -69.32 | -58.54 | -41.20 | 17.34 |
| 5795 | -59.81 | -57.11 | -47.47 | -41.20 | 6.27 |

| | | | |
|----------------------|----------|-----------------------|---|
| Temperature | 26°C | Humidity | 46% |
| Test Engineer | Wen Chao | Configurations | IEEE 802.11n MCS0 HT40 / Peak / Chain 1 + Chain 2 |

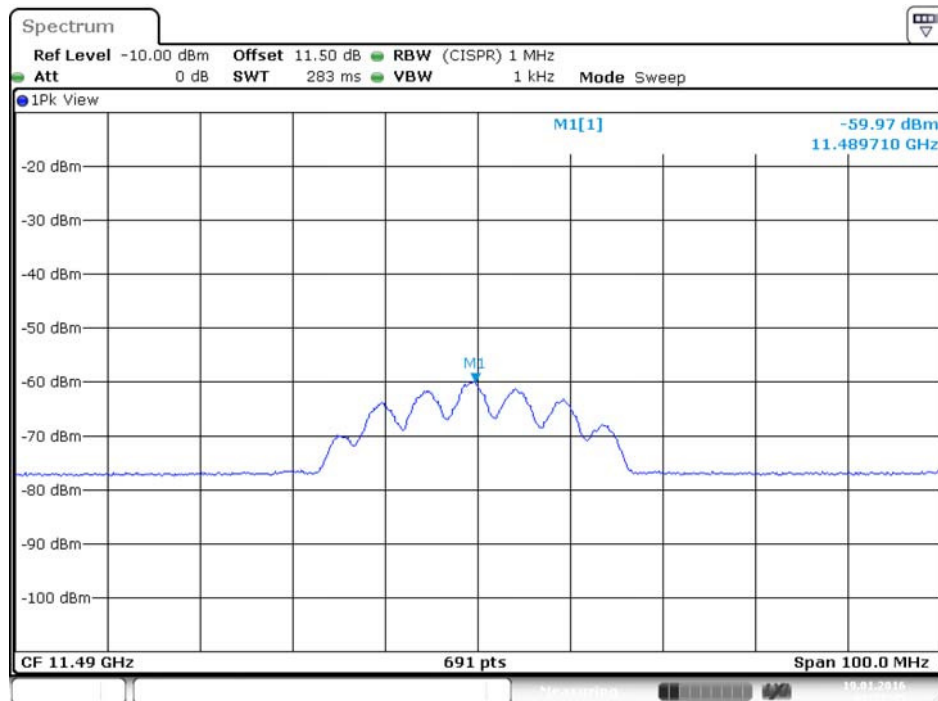
| Frequency(MHz) | Chain 1 (TX1) Spruious Level (dBm) | Chain 2 (TX2) Spruious Level (dBm) | Total Spruious Level (dBm) | Limit (dBm) | Margin (dB) |
|----------------|------------------------------------|------------------------------------|----------------------------|-------------|-------------|
| 5745 | -54.47 | -55.90 | -44.35 | -21.20 | 23.15 |
| 5785 | -45.54 | -43.48 | -33.61 | -21.20 | 12.41 |

Plot on Configuration IEEE 802.11a / 5745MHz / Average / Chain 1 (TX1)



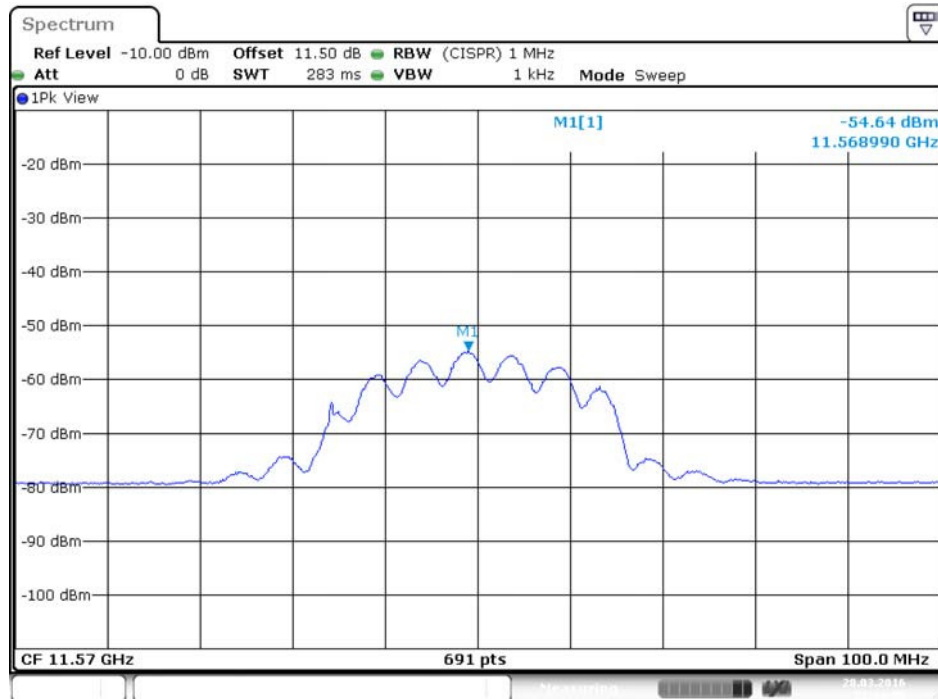
Date: 19. JAN 2016 01:29:19

Plot on Configuration IEEE 802.11a / 5745MHz / Average / Chain 2 (TX2)

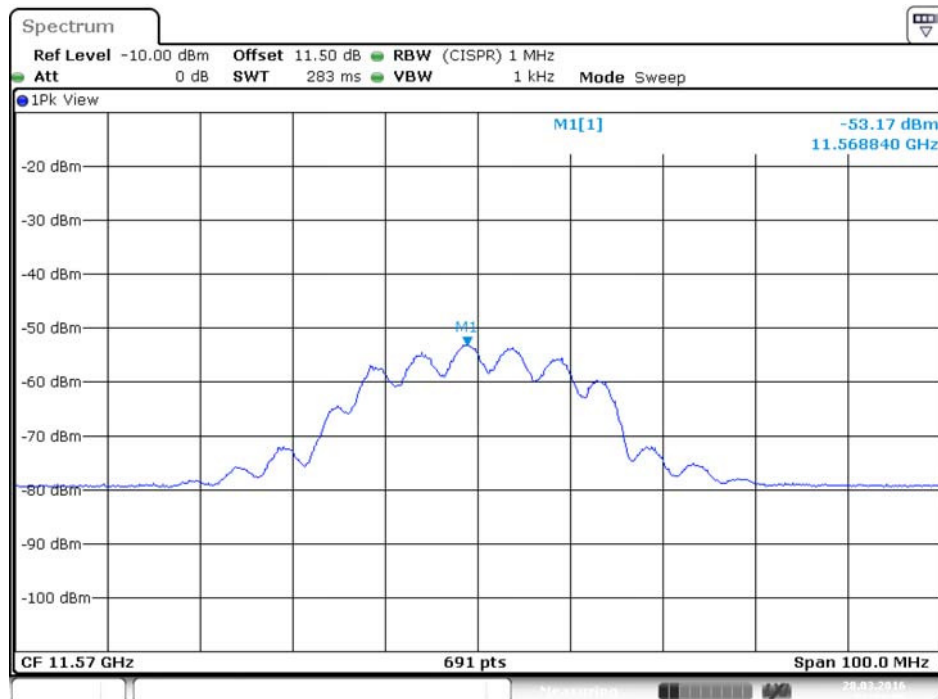


Date: 19. JAN 2016 01:27:44

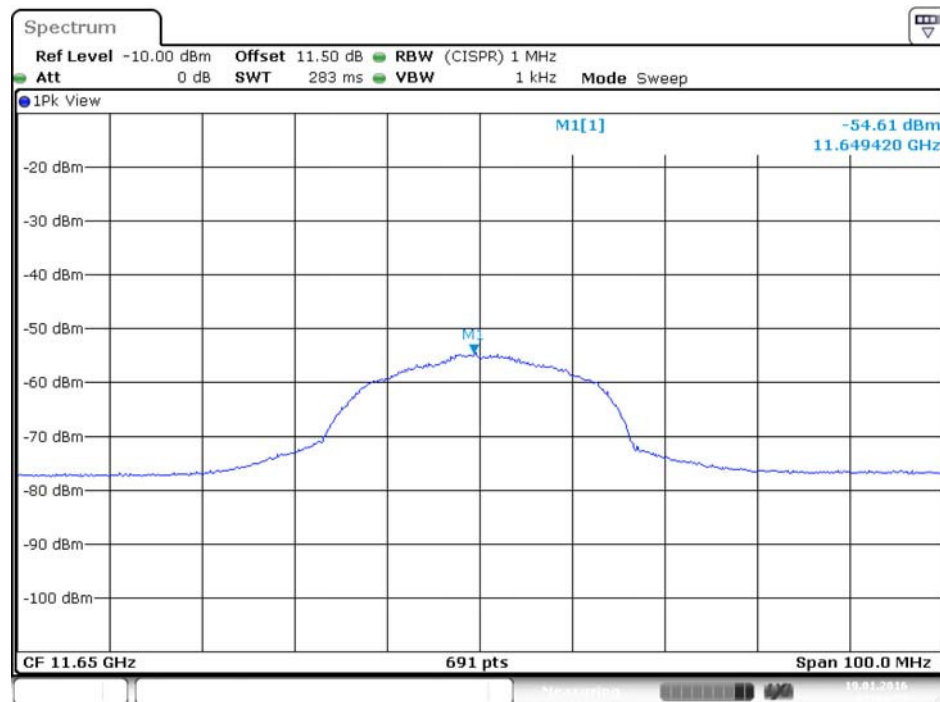
Plot on Configuration IEEE 802.11a / 5785MHz / Average / Chain 1 (TX1)



Plot on Configuration IEEE 802.11a / 5785MHz / Average / Chain 2 (TX2)



Plot on Configuration IEEE 802.11a / 5825MHz / Average / Chain 1 (TX1)



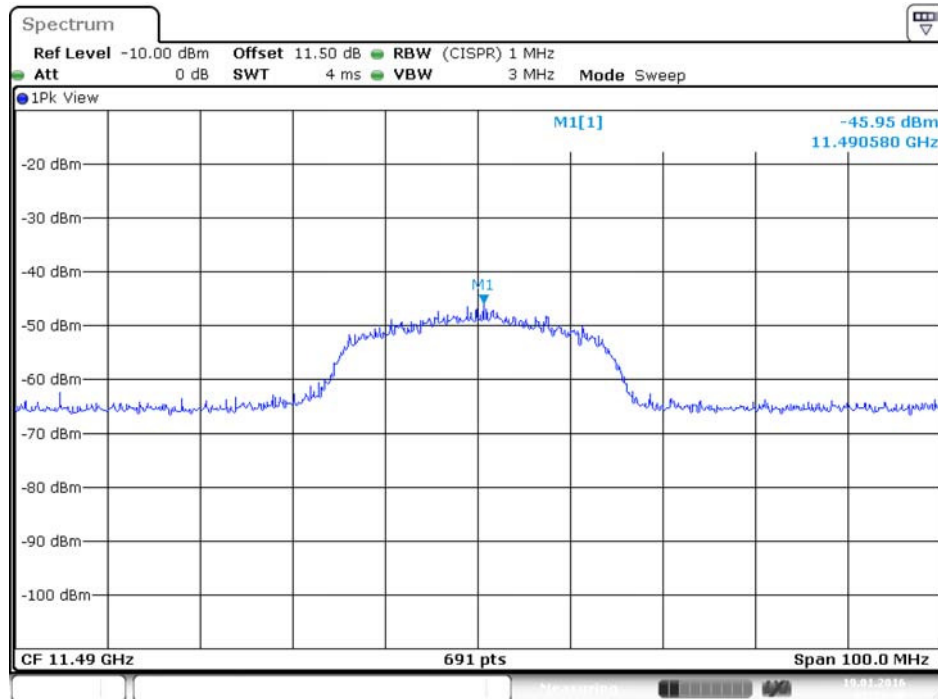
Date: 19.JAN.2016 01:44:29

Plot on Configuration IEEE 802.11a / 5825MHz / Average / Chain 2 (TX2)



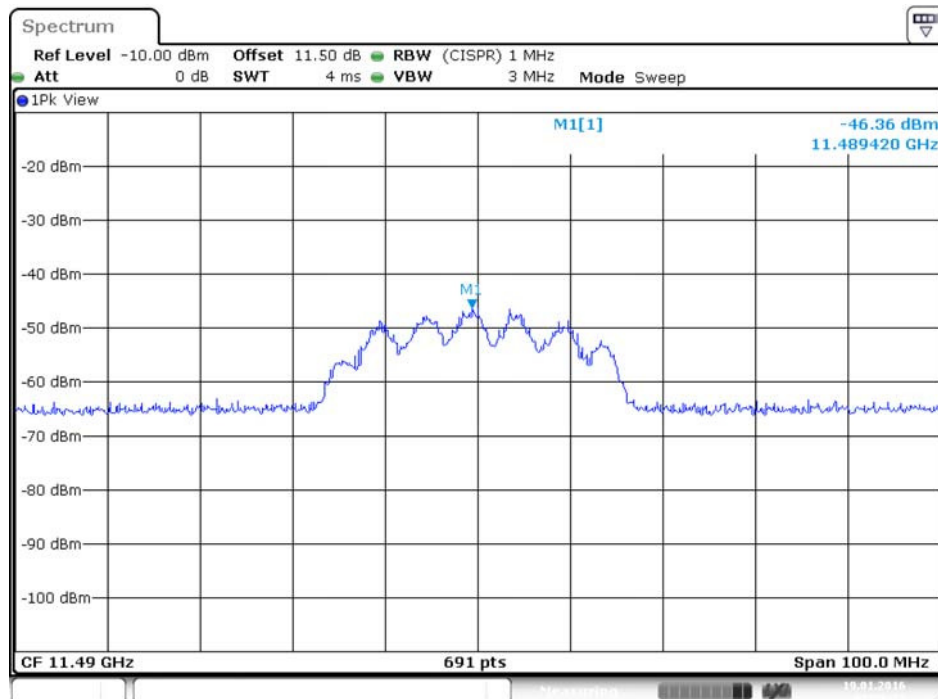
Date: 19.JAN.2016 01:46:27

Plot on Configuration IEEE 802.11a / 5745MHz / Peak / Chain 1 (TX1)



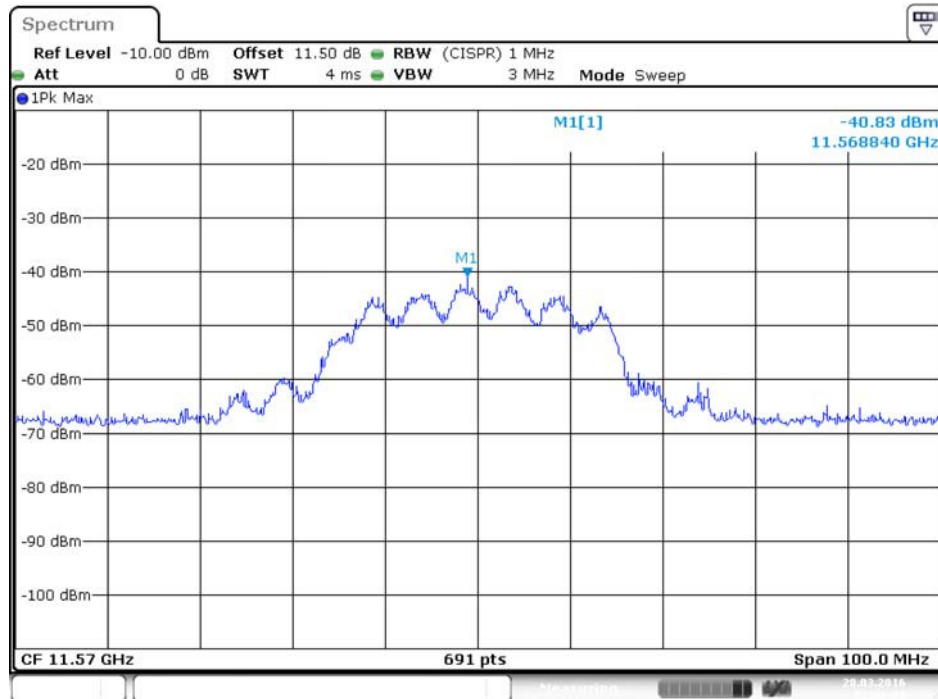
Date: 19. JAN 2016 01:24:49

Plot on Configuration IEEE 802.11a / 5745MHz / Peak / Chain 2 (TX2)



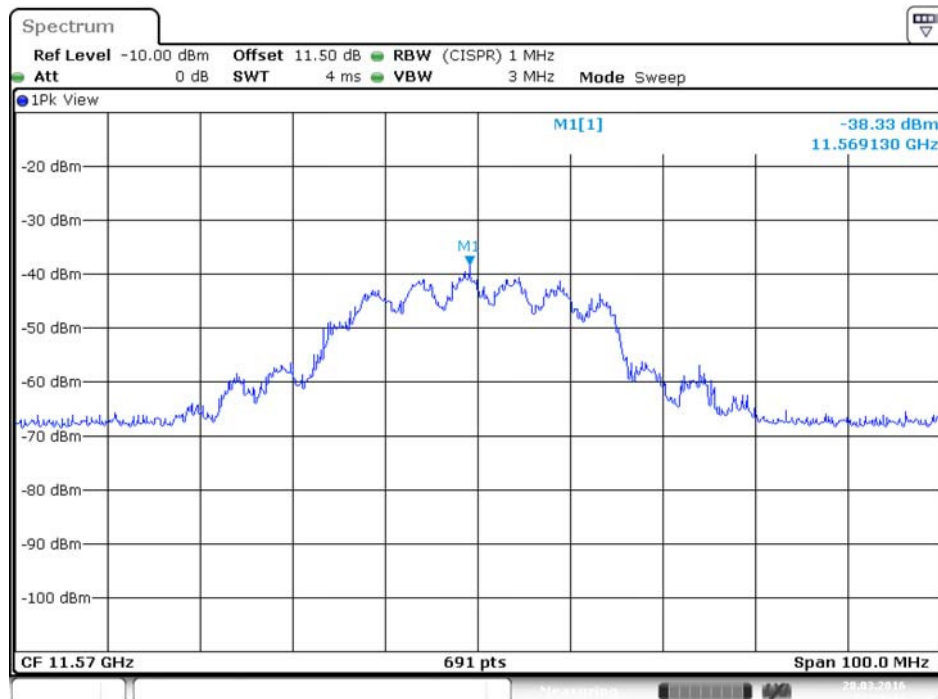
Date: 19. JAN 2016 01:26:37

Plot on Configuration IEEE 802.11a / 5785MHz / Peak / Chain 1 (TX1)



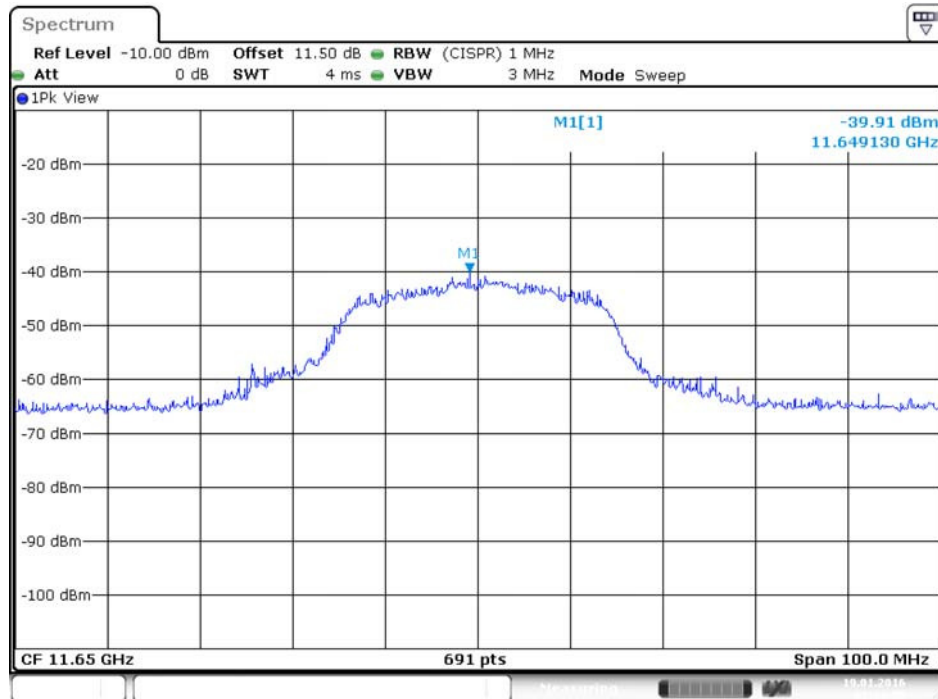
Date: 28.MAR.2016 22:36:18

Plot on Configuration IEEE 802.11a / 5785MHz / Peak / Chain 2 (TX2)

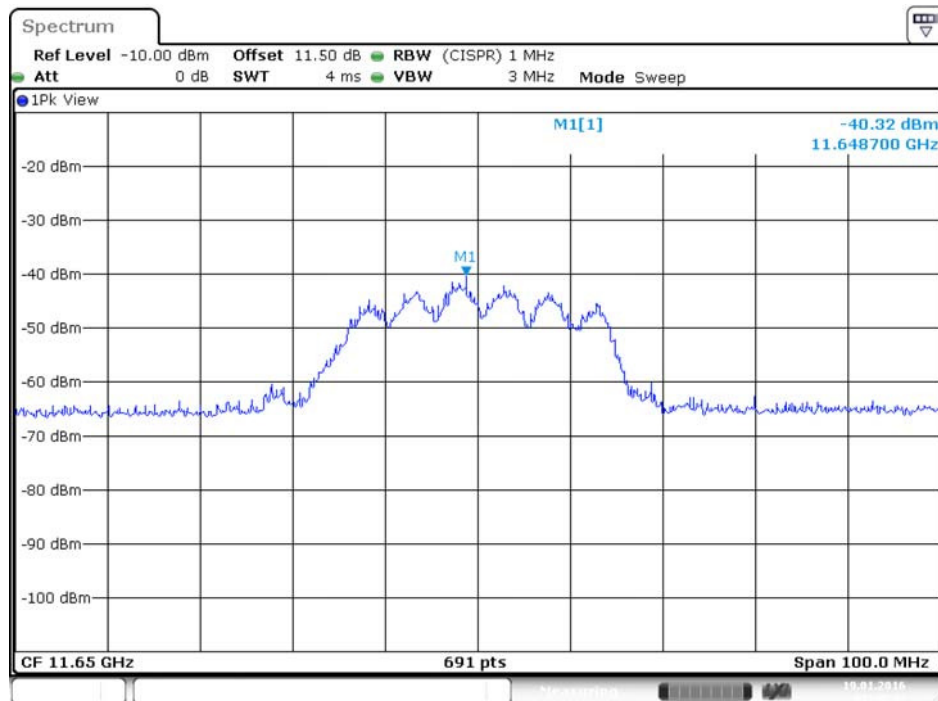


Date: 28.MAR.2016 22:36:41

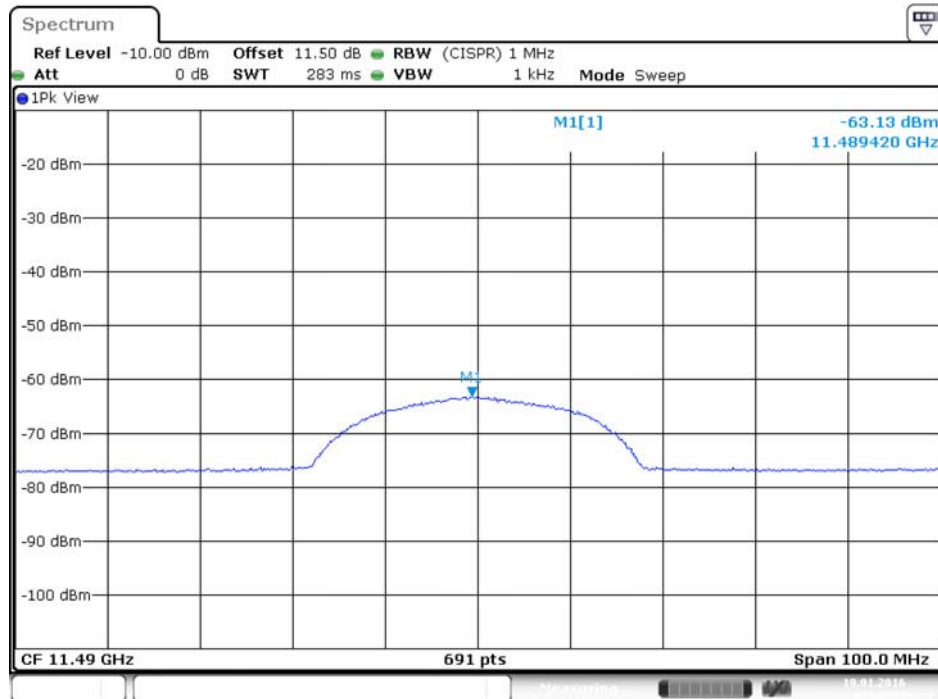
Plot on Configuration IEEE 802.11a / 5825MHz / Peak / Chain 1 (TX1)



Plot on Configuration IEEE 802.11a / 5825MHz / Peak / Chain 2 (TX2)

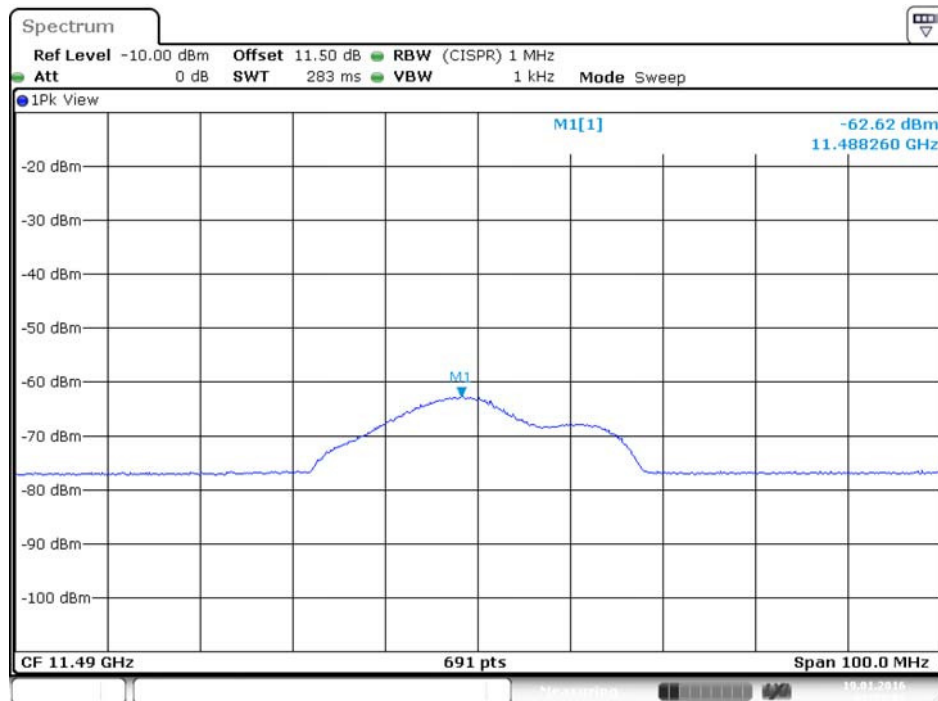


Plot on Configuration IEEE 802.11n MCS0 HT20 / 5745MHz / Average / Chain 1 (TX1)



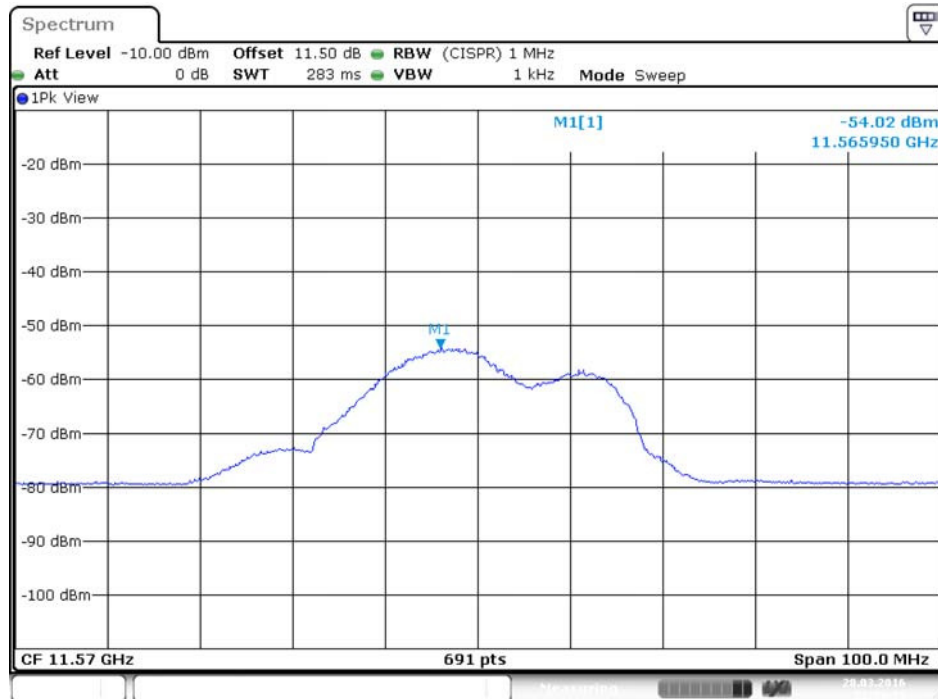
Date: 19.JAN.2016 01:48:29

Plot on Configuration IEEE 802.11n MCS0 HT20 / 5745MHz / Average / Chain 2 (TX2)



Date: 19.JAN.2016 01:53:01

Plot on Configuration IEEE 802.11n MCS0 HT20 / 5785MHz / Average / Chain 1 (TX1)



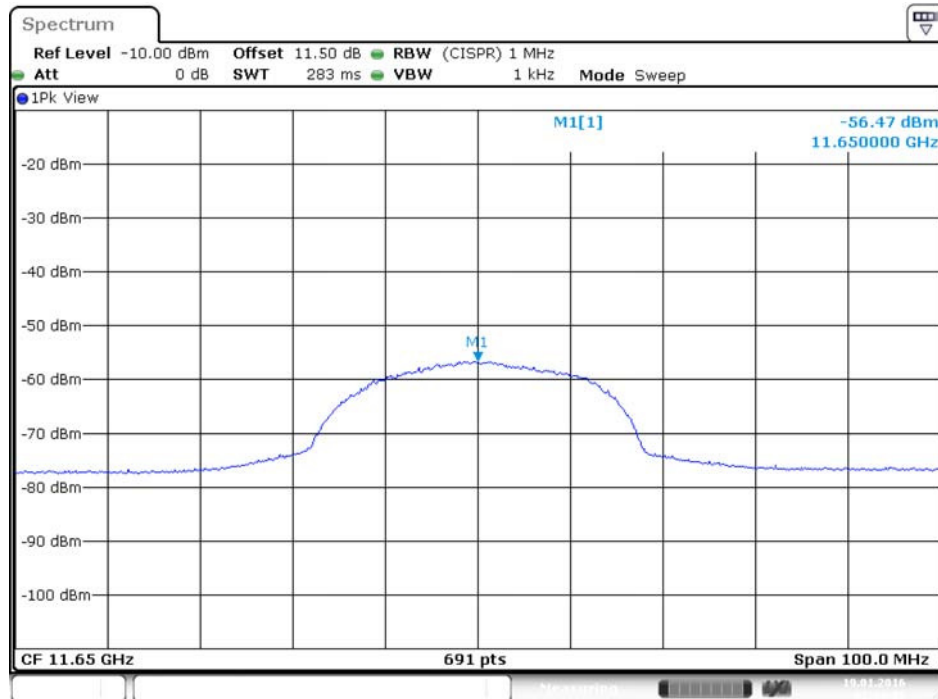
Date: 28.MAR.2016 22:39:15

Plot on Configuration IEEE 802.11n MCS0 HT20 / 5785MHz / Average / Chain 2 (TX2)



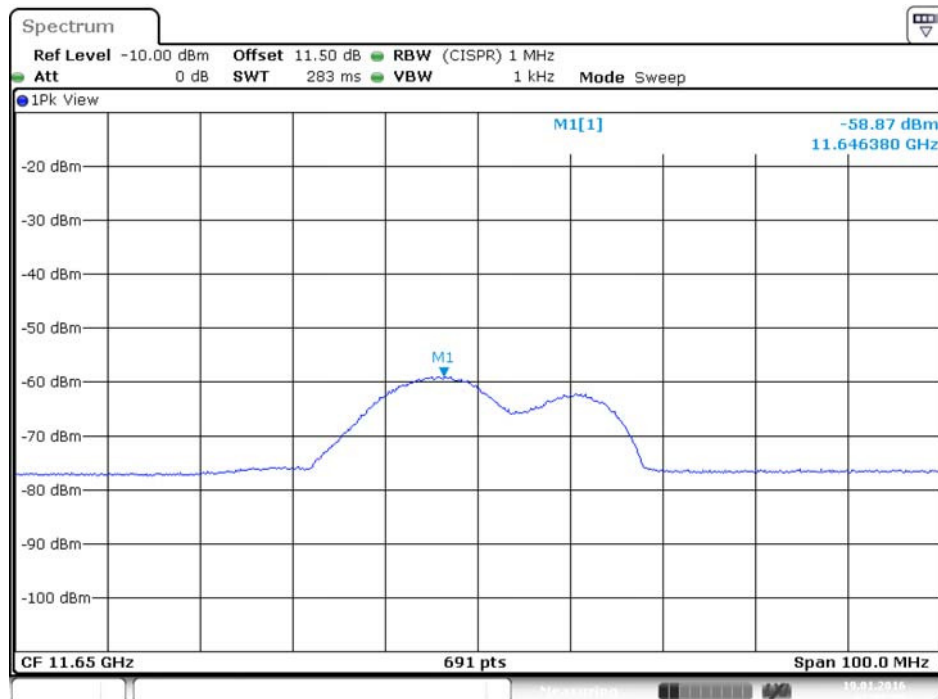
Date: 28.MAR.2016 22:40:11

Plot on Configuration IEEE 802.11n MCS0 HT20 / 5825MHz / Average / Chain 1 (TX1)



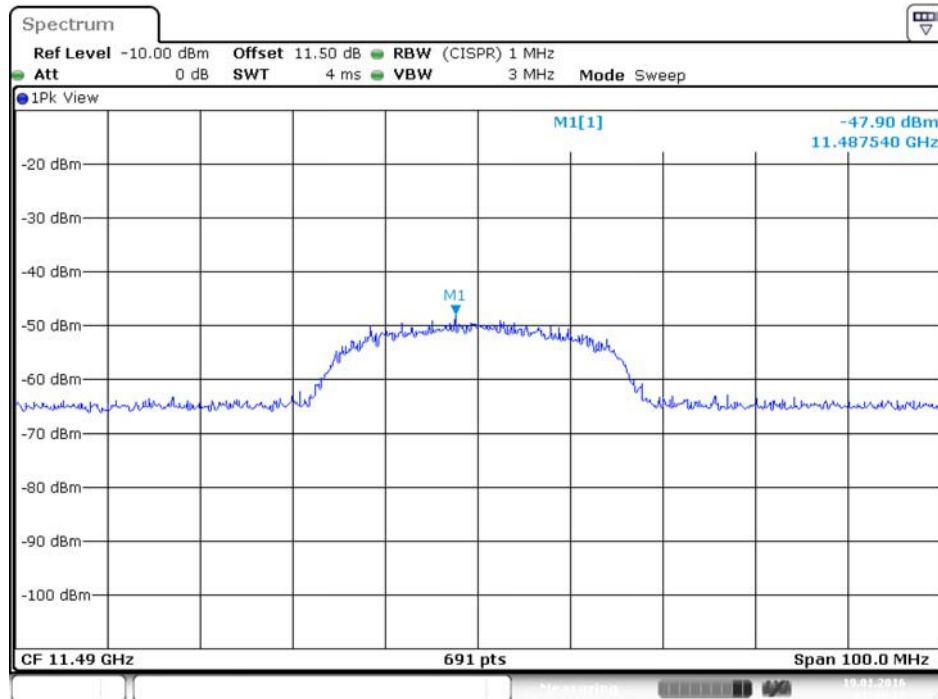
Date: 19. JAN 2016 02:04:17

Plot on Configuration IEEE 802.11n MCS0 HT20 / 5825MHz / Average / Chain 2 (TX2)



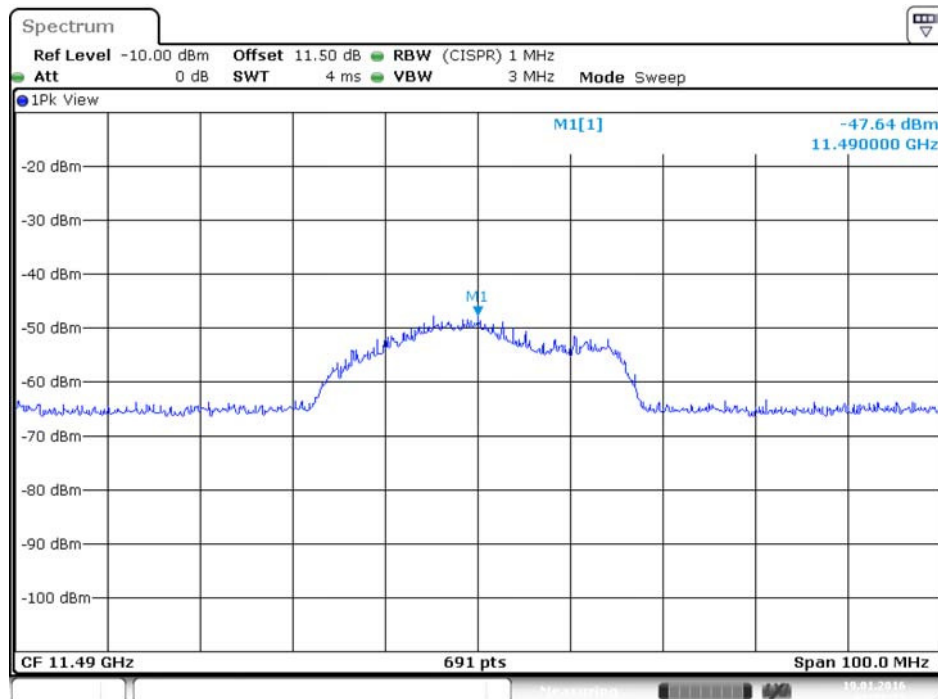
Date: 19. JAN 2016 02:07:30

Plot on Configuration IEEE 802.11n MCS0 HT20 / 5745MHz / Peak / Chain 1 (TX1)



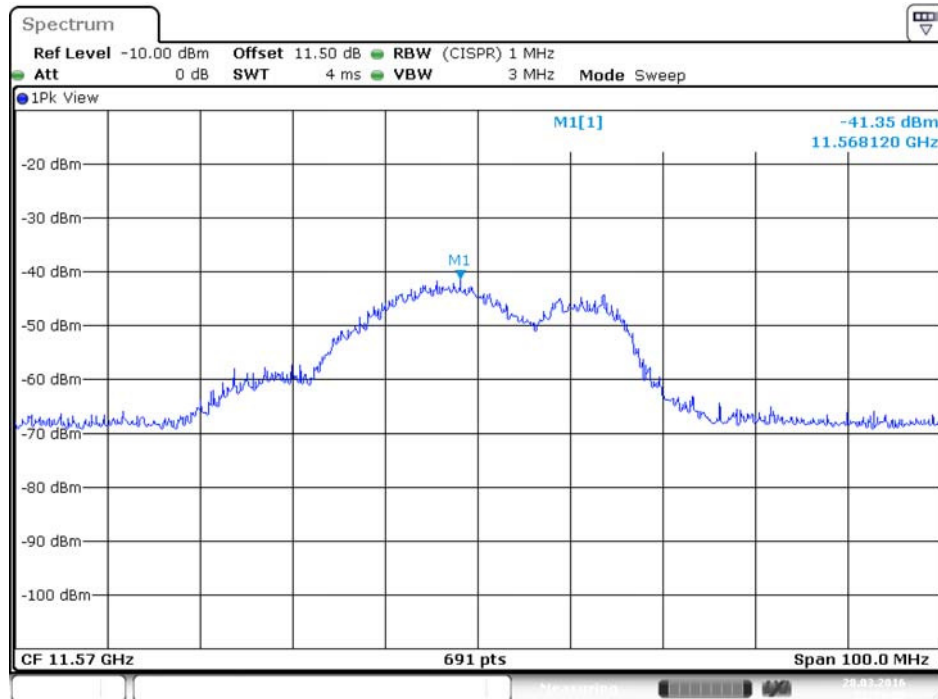
Date: 19.JAN.2016 01:49:17

Plot on Configuration IEEE 802.11n MCS0 HT20 / 5745MHz / Peak / Chain 2 (TX2)



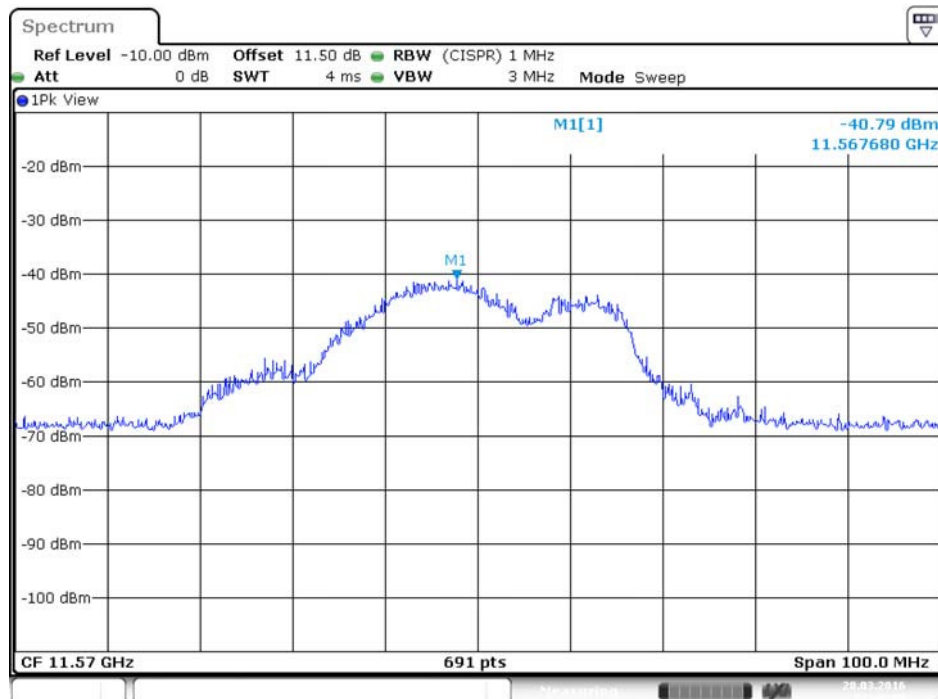
Date: 19.JAN.2016 01:52:28

Plot on Configuration IEEE 802.11n MCS0 HT20 / 5785MHz / Peak / Chain 1 (TX1)



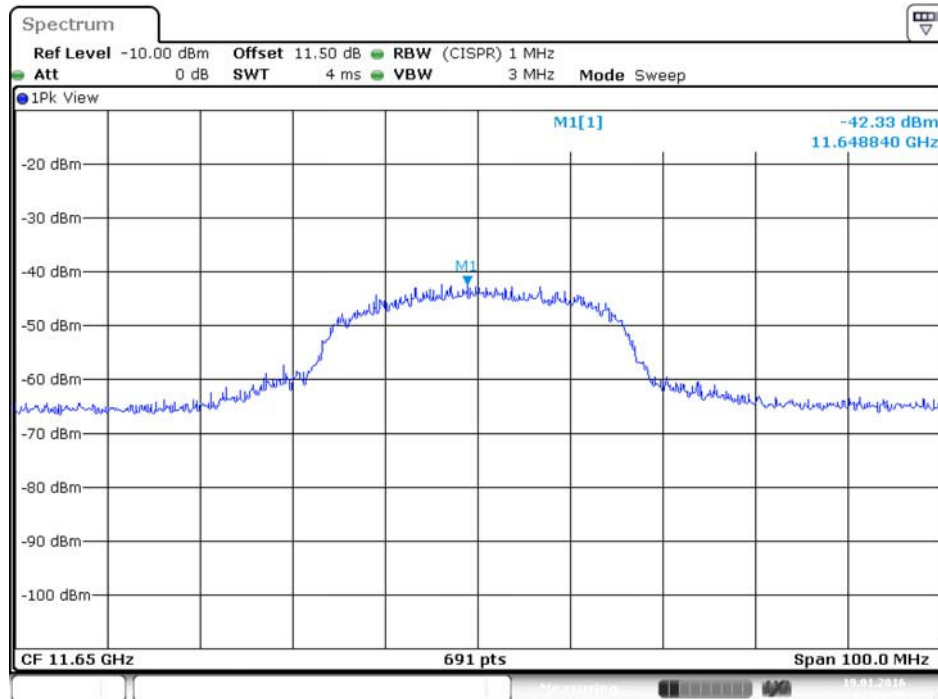
Date: 28. MAR 2016 22:39:29

Plot on Configuration IEEE 802.11n MCS0 HT20 / 5785MHz / Peak / Chain 2 (TX2)



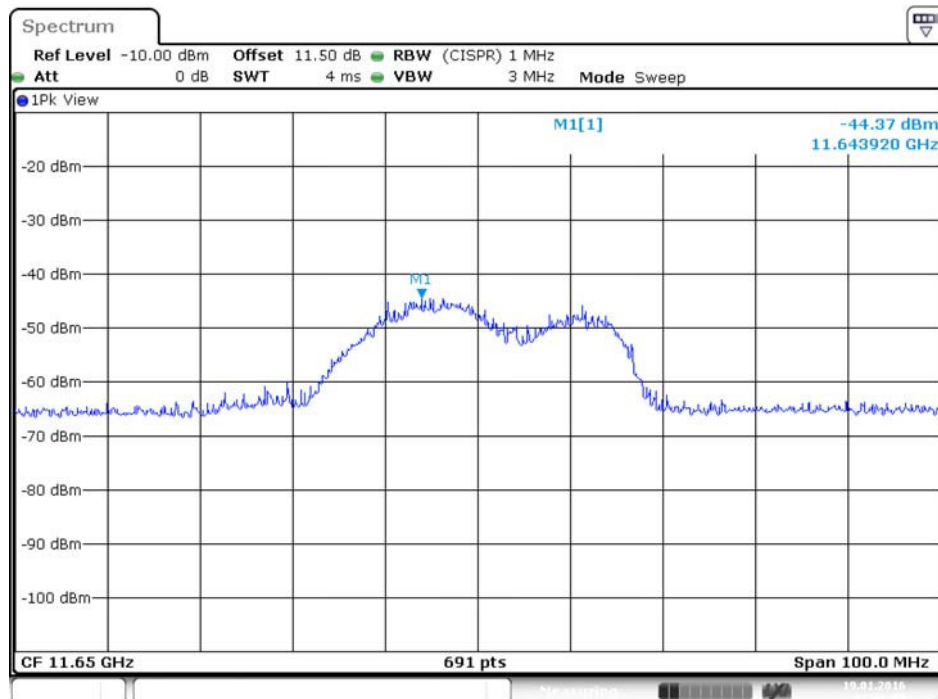
Date: 28. MAR 2016 22:40:28

Plot on Configuration IEEE 802.11n MCS0 HT20 / 5825MHz / Peak / Chain 1 (TX1)



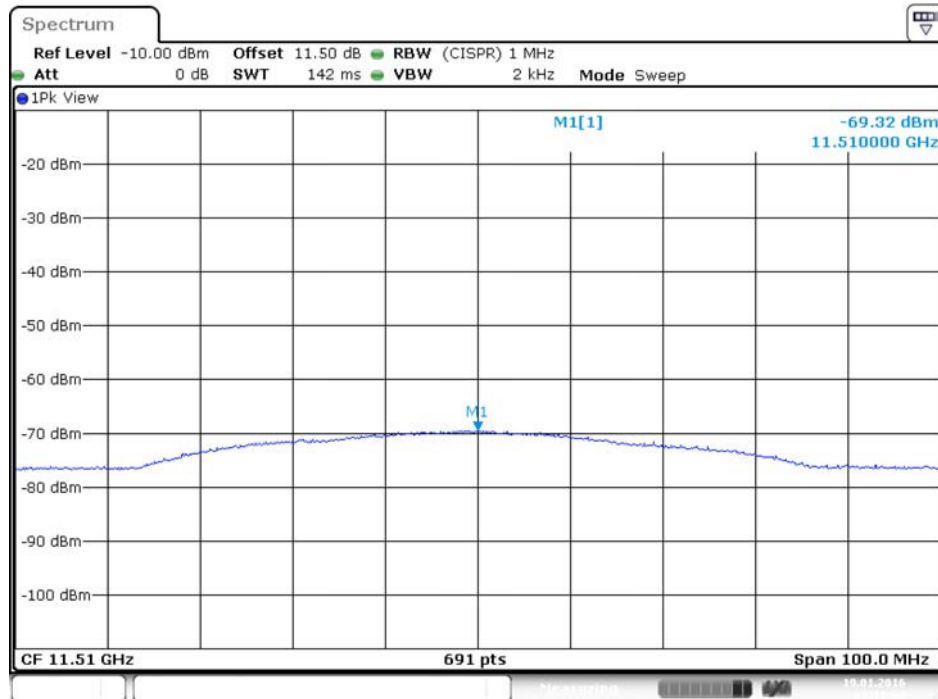
Date: 19.JAN.2016 02:04:53

Plot on Configuration IEEE 802.11n MCS0 HT20 / 5825MHz / Peak / Chain 2 (TX2)



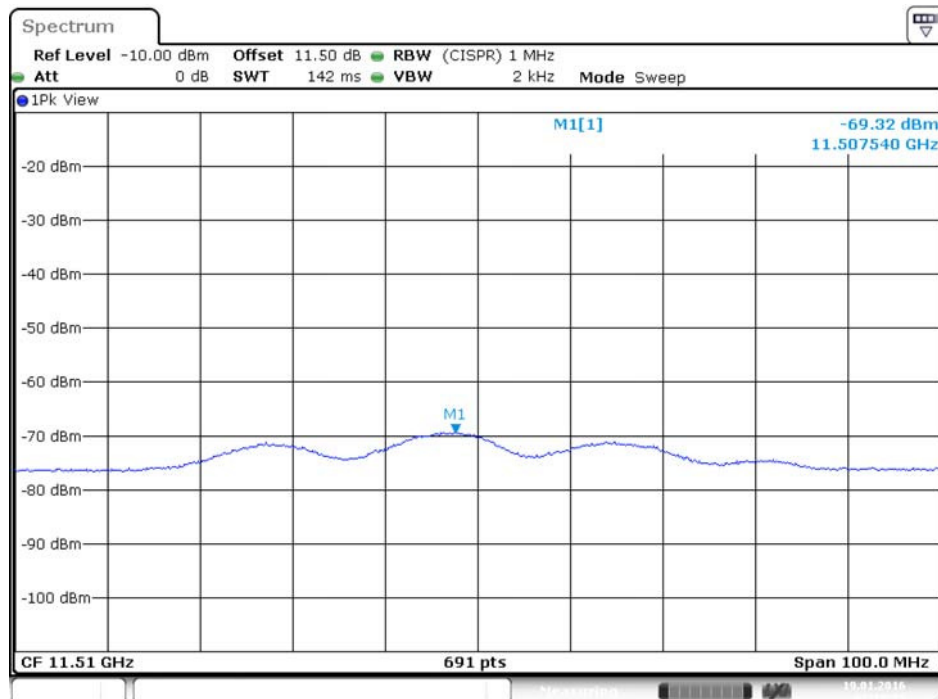
Date: 19.JAN.2016 02:06:59

Plot on Configuration IEEE 802.11n MCS0 HT40 / 5755MHz / Average / Chain 1 (TX1)



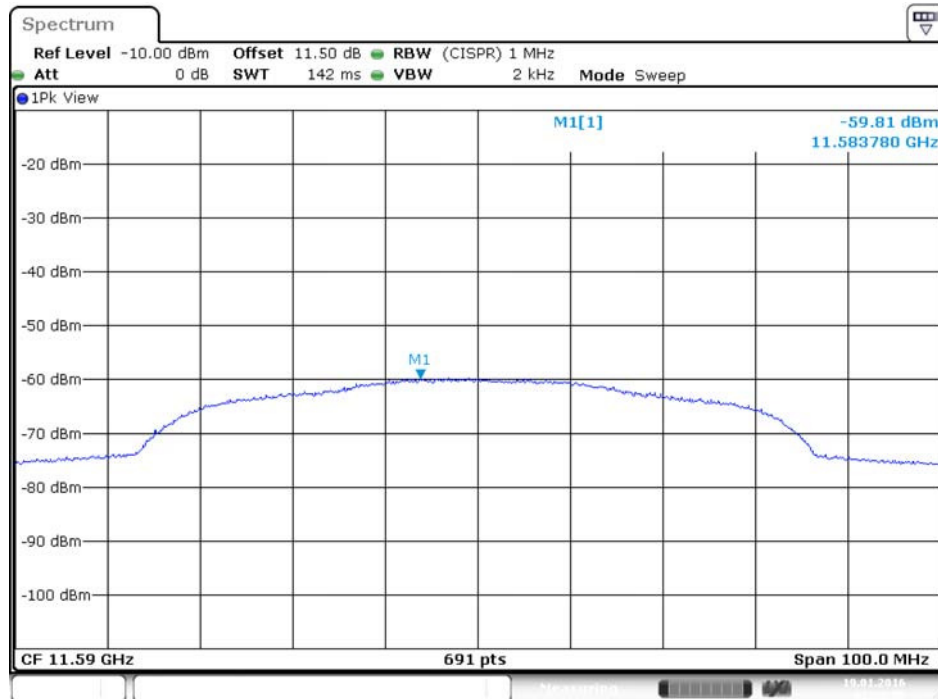
Date: 19.JAN.2016 02:18:34

Plot on Configuration IEEE 802.11n MCS0 HT40 / 5755MHz / Average / Chain 2 (TX2)

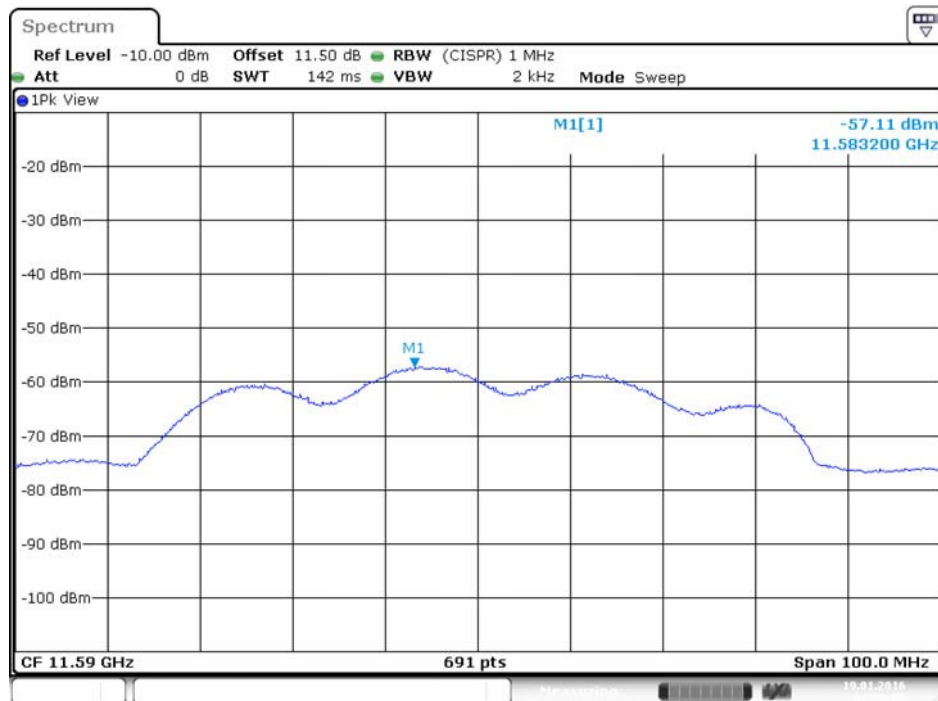


Date: 19.JAN.2016 02:13:14

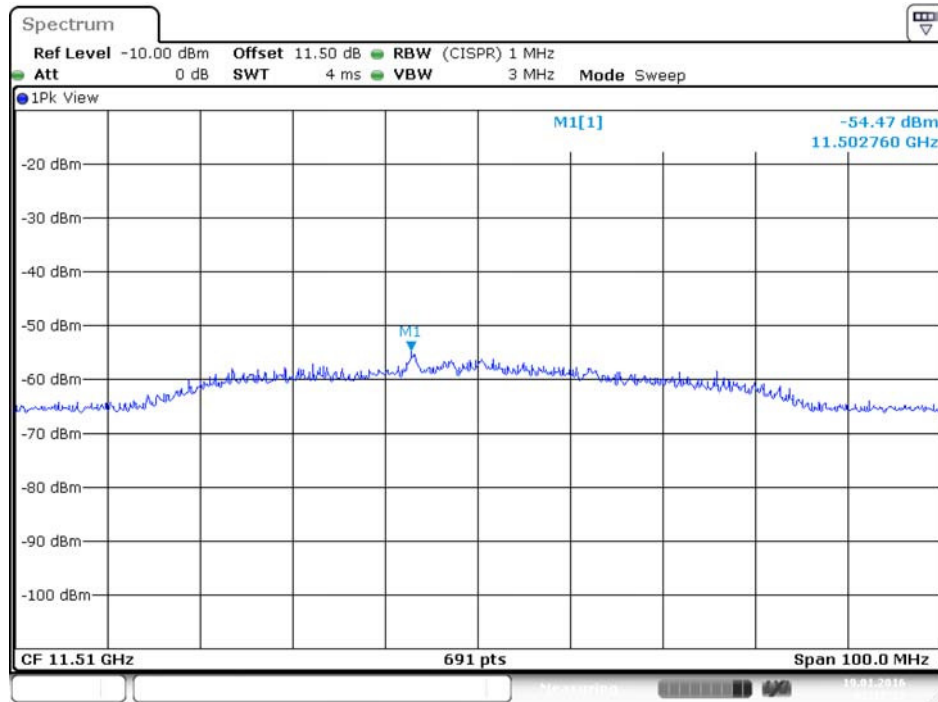
Plot on Configuration IEEE 802.11n MCS0 HT40 / 5795MHz / Average / Chain 1 (TX1)



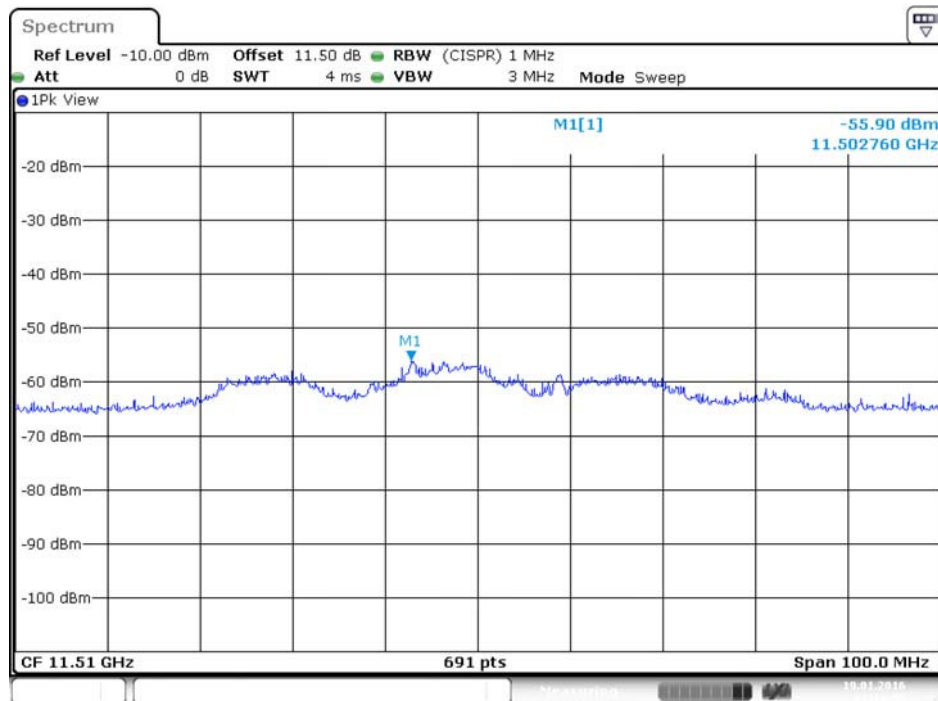
Plot on Configuration IEEE 802.11n MCS0 HT40 / 5795MHz / Average / Chain 2 (TX2)



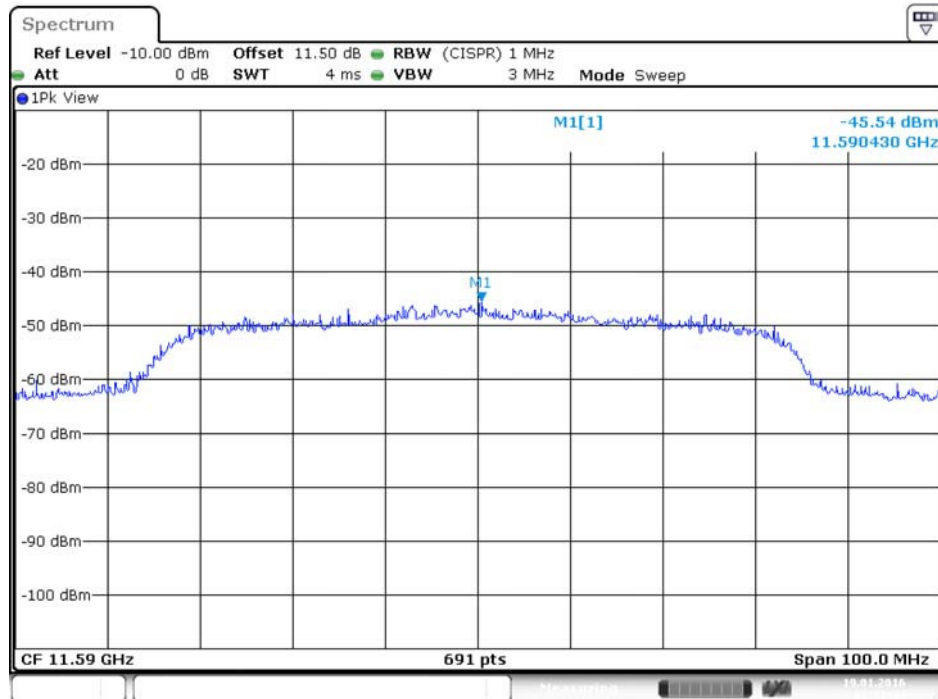
Plot on Configuration IEEE 802.11n MCS0 HT40 / 5755MHz / Peak / Chain 1 (TX1)



Plot on Configuration IEEE 802.11n MCS0 HT40 / 5755MHz / Peak / Chain 2 (TX2)

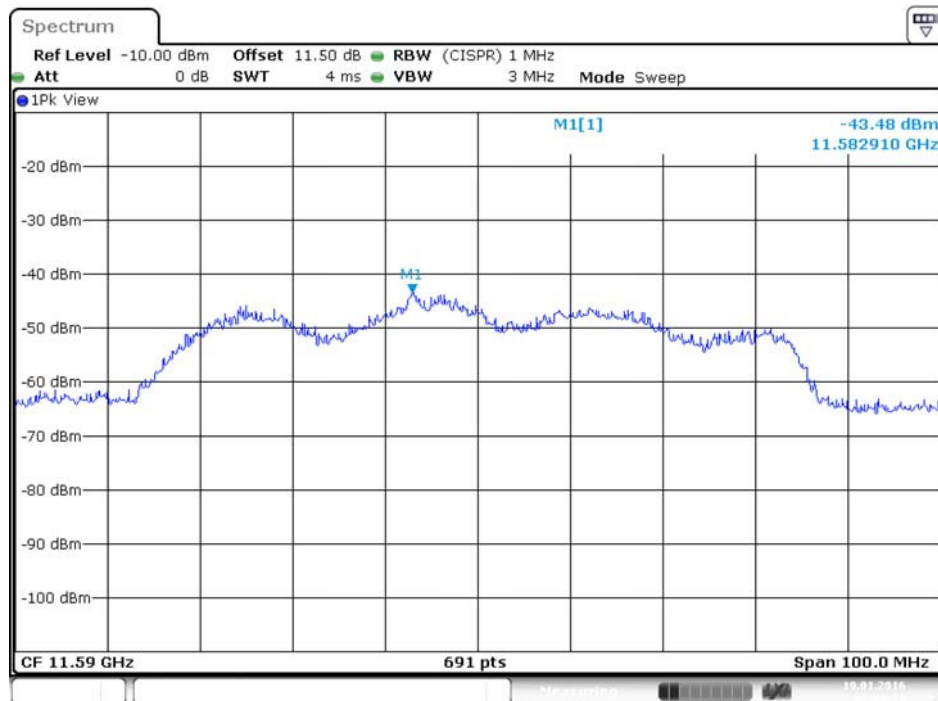


Plot on Configuration IEEE 802.11n MCS0 HT40 / 5795MHz / Peak / Chain 1 (TX1)



Date: 19.JAN.2016 02:21:44

Plot on Configuration IEEE 802.11n MCS0 HT40 / 5795MHz / Peak / Chain 2 (TX2)



Date: 19.JAN.2016 02:24:15

4.6. Band Edge Emissions Measurement

4.6.1. Limit

For transmitters operating in the 5.725-5.85 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.

In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

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

4.6.2. Measuring Instruments and Setting

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

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Span Frequency | 100 MHz |
| RBW / VBW (Emission in restricted band) | 1 MHz / 3MHz for Peak, 1 MHz / 1/T for Average |
| RBW / VBW (Emission in non-restricted band) | 1 MHz / 3MHz for Peak |

4.6.3. Test Procedures

The Conducted test procedure is the same as section 4.4.3.

4.6.4. Test Setup Layout

The Conducted test procedure is the same as section 4.4.4.

4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.6.7. Test Result of Band Edge and Fundamental Emissions

| | | | |
|----------------------|----------|-----------------------|---|
| Temperature | 26°C | Humidity | 46% |
| Test Engineer | Wen Chao | Configurations | IEEE 802.11a / Peak / Chain 1 + Chain 2 |

| Frequency(MHz) | Chain 1 (TX1) Spruious Level (dBm) | Chain 2 (TX2) Spruious Level (dBm) | Total Spruious Level (dBm) | Limit (dBm) | Margin (dB) |
|----------------|------------------------------------|------------------------------------|----------------------------|-------------|-------------|
| 5745 | -44.50 | -46.16 | -34.47 | -27.00 | 7.47 |
| 5785 | -43.99 | -45.54 | -33.92 | -27.00 | 6.92 |
| 5825 | -38.52 | -40.79 | -28.73 | -27.00 | 1.73 |

| Frequency(MHz) | Chain 1 (TX1) Spruious Level (dBm) | Chain 2 (TX2) Spruious Level (dBm) | Total Spruious Level (dBm) | Limit (dBm) | Margin (dB) |
|----------------|------------------------------------|------------------------------------|----------------------------|-------------|-------------|
| 5745 | -27.17 | -33.72 | -18.53 | -17.00 | 1.53 |
| 5785 | -41.79 | -44.54 | -32.17 | -17.00 | 15.17 |
| 5825 | -30.30 | -34.07 | -21.01 | -17.00 | 4.01 |

| | | | |
|----------------------|----------|-----------------------|--|
| Temperature | 26°C | Humidity | 46% |
| Test Engineer | Wen Chao | Configurations | IEEE 802.11n MCS0 HT20 / Average / Chain 1 + Chain 2 |

| Frequency(MHz) | Chain 1 (TX1) Spruious Level (dBm) | Chain 2 (TX2) Spruious Level (dBm) | Total Spruious Level (dBm) | Limit (dBm) | Margin (dB) |
|----------------|------------------------------------|------------------------------------|----------------------------|-------------|-------------|
| 5745 | -45.99 | -46.56 | -35.49 | -27.00 | 8.49 |
| 5785 | -42.56 | -45.33 | -32.95 | -27.00 | 5.95 |
| 5825 | -41.28 | -37.99 | -28.55 | -27.00 | 1.55 |

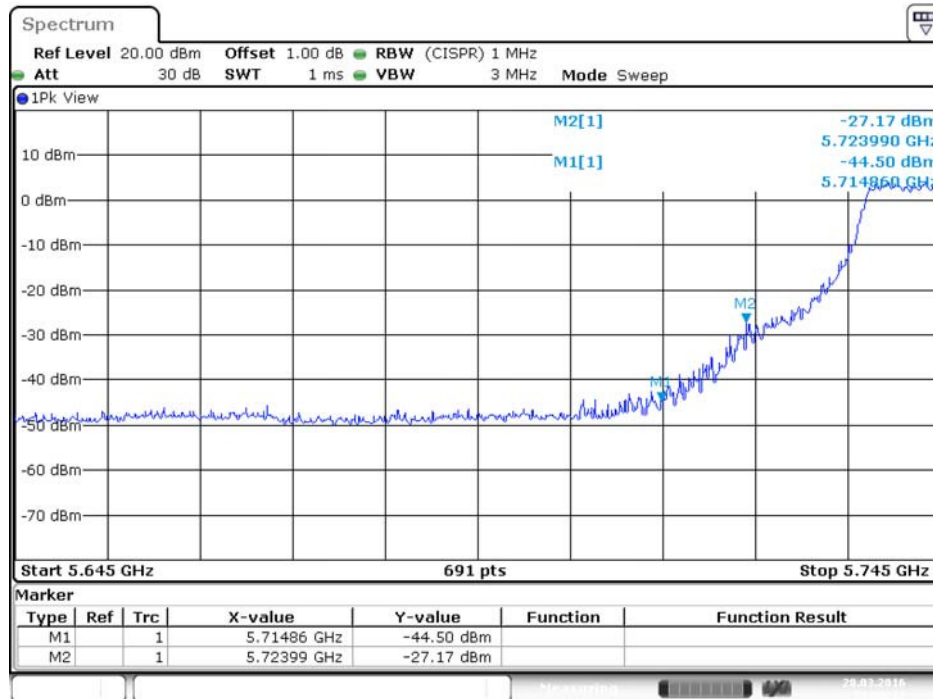
| Frequency(MHz) | Chain 1 (TX1) Spruious Level (dBm) | Chain 2 (TX2) Spruious Level (dBm) | Total Spruious Level (dBm) | Limit (dBm) | Margin (dB) |
|----------------|------------------------------------|------------------------------------|----------------------------|-------------|-------------|
| 5745 | -28.43 | -30.88 | -18.70 | -17.00 | 1.70 |
| 5785 | -35.09 | -43.13 | -26.69 | -17.00 | 9.69 |
| 5825 | -31.34 | -28.69 | -19.04 | -17.00 | 2.04 |

| | | | |
|----------------------|----------|-----------------------|--|
| Temperature | 26°C | Humidity | 46% |
| Test Engineer | Wen Chao | Configurations | IEEE 802.11n MCS0 HT40 / Average / Chain 1 + Chain 2 |

| Frequency(MHz) | Chain 1 (TX1) Spruious Level (dBm) | Chain 2 (TX2) Spruious Level (dBm) | Total Spruious Level (dBm) | Limit (dBm) | Margin (dB) |
|----------------|------------------------------------|------------------------------------|----------------------------|-------------|-------------|
| 5755 | -38.59 | -40.28 | -28.57 | -27.00 | 1.57 |
| 5795 | -37.40 | -43.38 | -28.65 | -27.00 | 1.65 |

| Frequency(MHz) | Chain 1 (TX1) Spruious Level (dBm) | Chain 2 (TX2) Spruious Level (dBm) | Total Spruious Level (dBm) | Limit (dBm) | Margin (dB) |
|----------------|------------------------------------|------------------------------------|----------------------------|-------------|-------------|
| 5745 | -32.80 | -34.56 | -22.81 | -17.00 | 5.81 |
| 5785 | -34.12 | -38.81 | -25.08 | -17.00 | 8.08 |

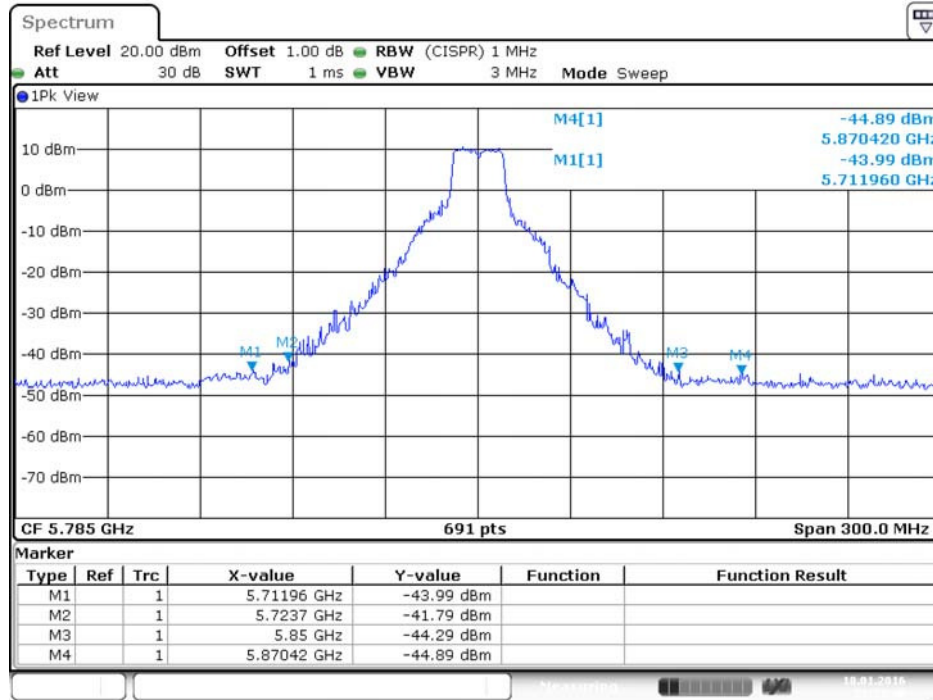
Plot on Configuration IEEE 802.11a / 5745MHz / Peck / Chain 1 (TX1)



Plot on Configuration IEEE 802.11a / 5745MHz / Peck / Chain 2 (TX2)

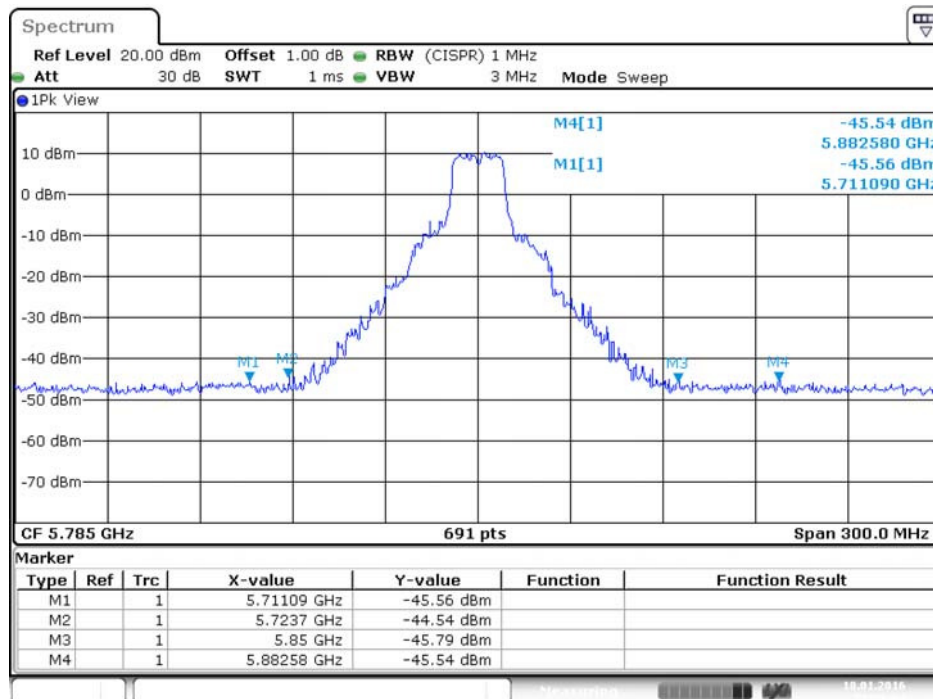


Plot on Configuration IEEE 802.11a / 5785MHz / Peck / Chain 1 (TX1)



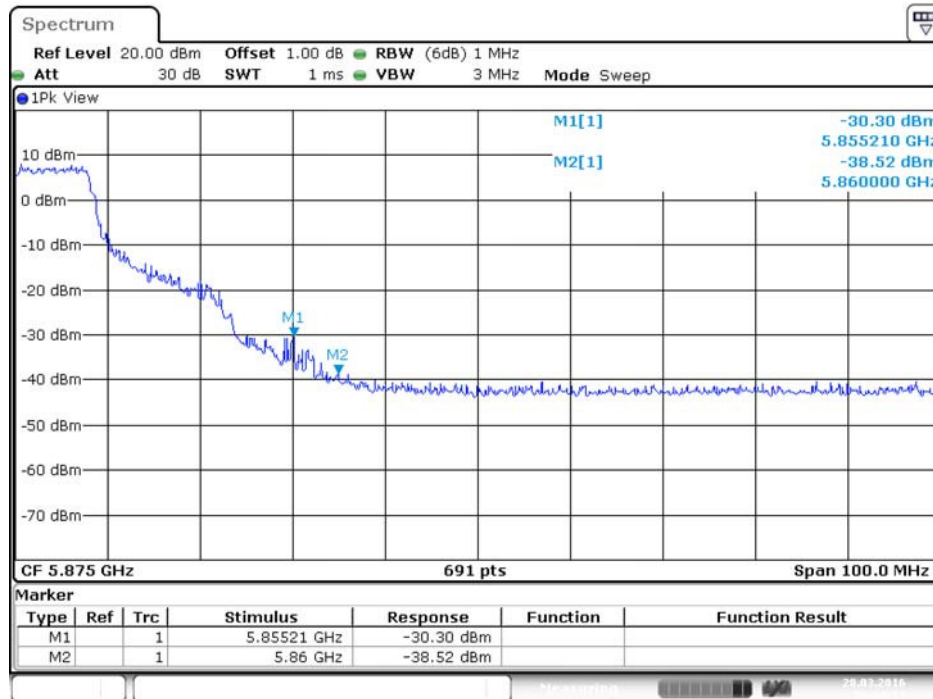
Date: 18. JAN 2016 23:23:48

Plot on Configuration IEEE 802.11a / 5785MHz / Peck / Chain 2 (TX2)

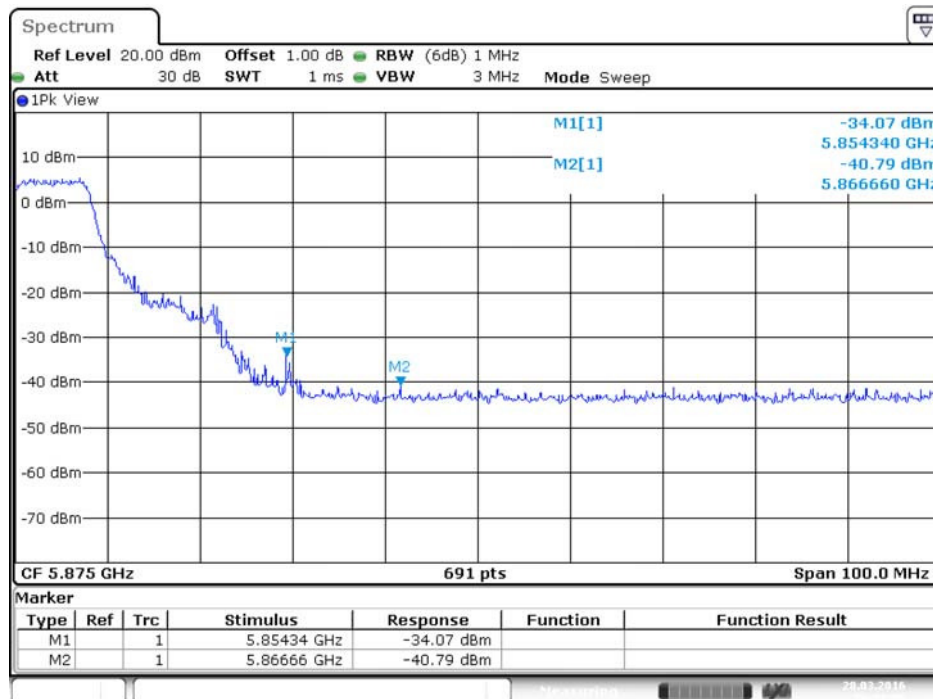


Date: 18. JAN 2016 23:26:04

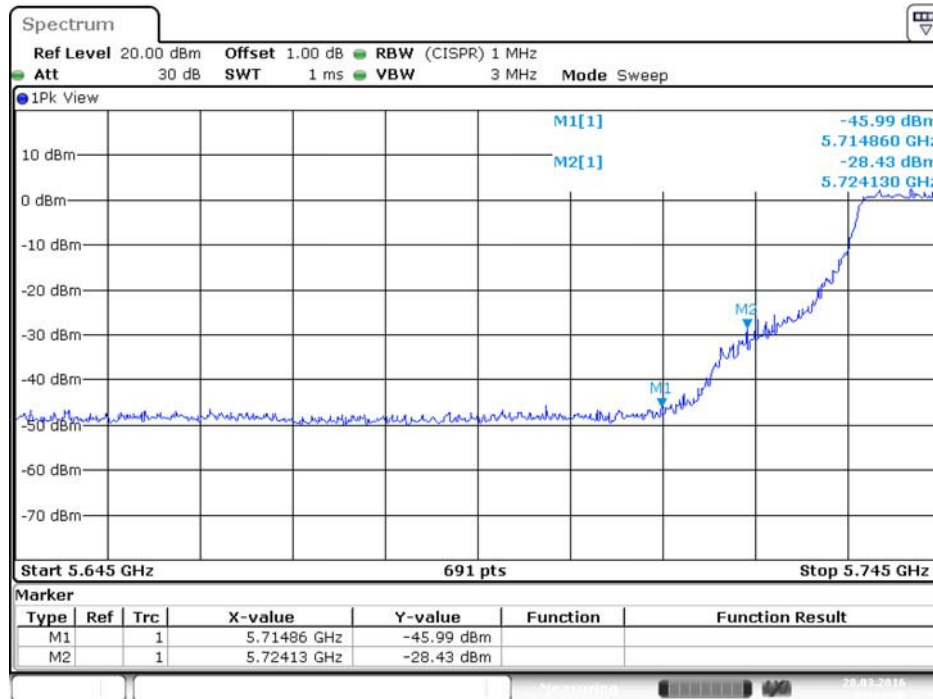
Plot on Configuration IEEE 802.11a / 5825MHz / Peck / Chain 1 (TX1)



Plot on Configuration IEEE 802.11a / 5825MHz / Peck / Chain 2 (TX2)



Plot on Configuration IEEE 802.11n MCS0 HT20 / 5745MHz / Peak / Chain 1 (TX1)



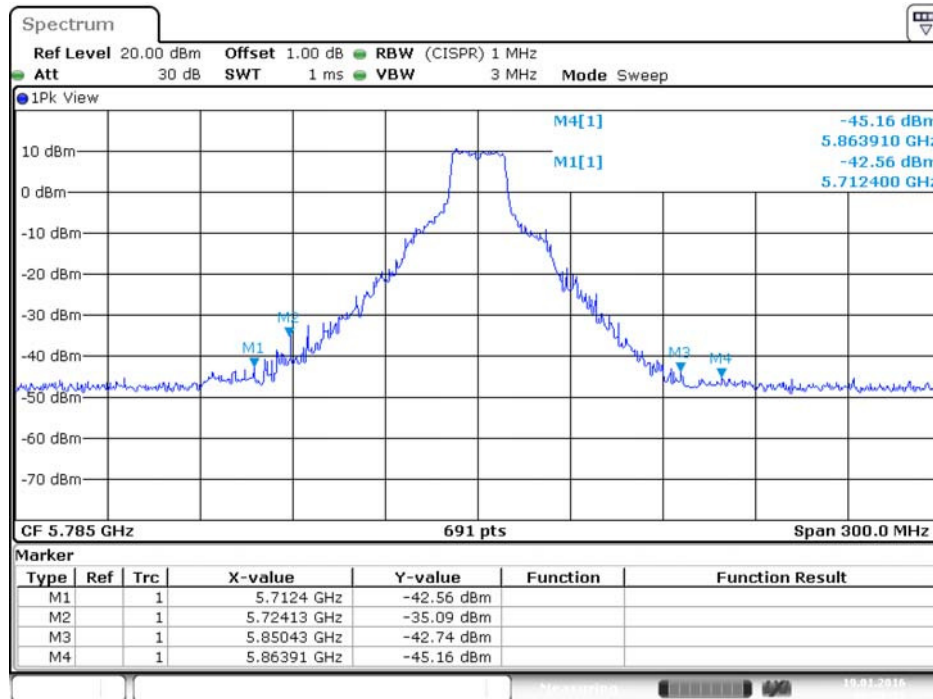
Date: 28.MAR.2016 21:34:46

Plot on Configuration IEEE 802.11n MCS0 HT20 / 5745MHz / Peak / Chain 2 (TX2)

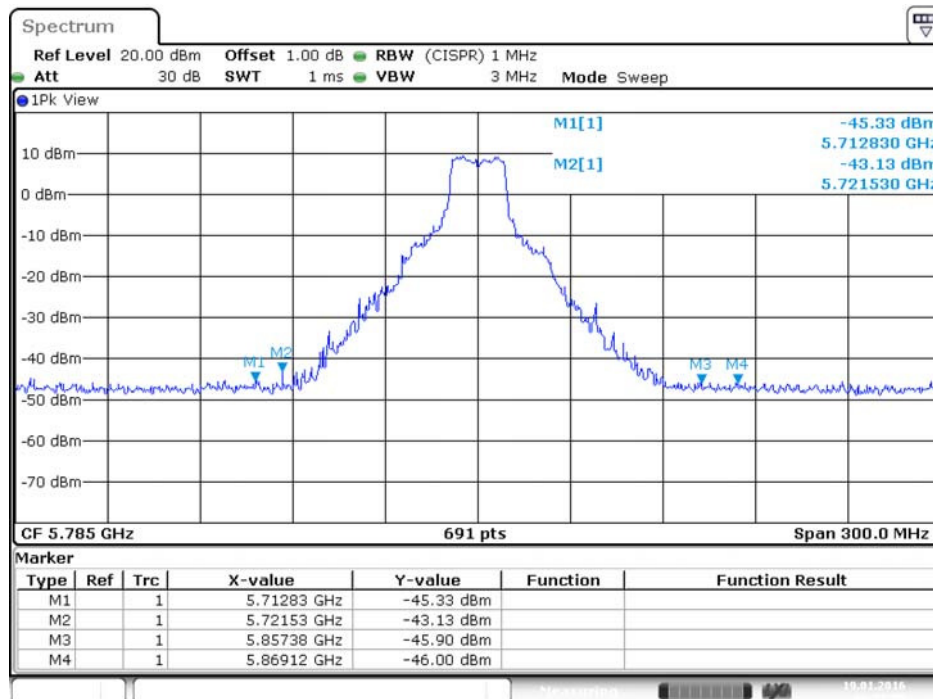


Date: 28.MAR.2016 21:38:09

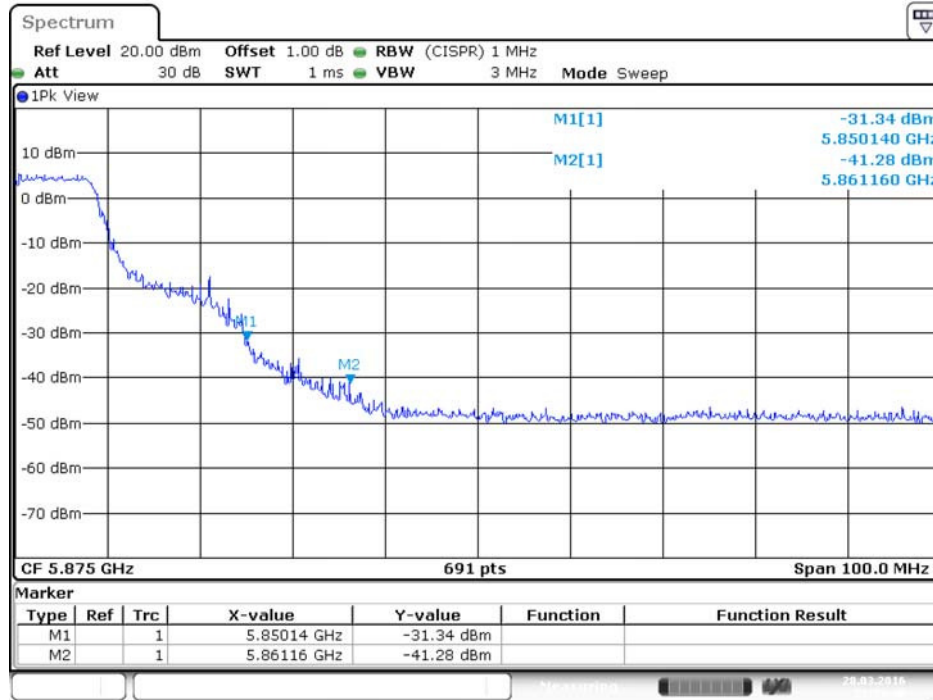
Plot on Configuration IEEE 802.11n MCS0 HT20 / 5785MHz / Peak / Chain 1 (TX1)



Plot on Configuration IEEE 802.11n MCS0 HT20 / 5785MHz / Peak / Chain 2 (TX2)

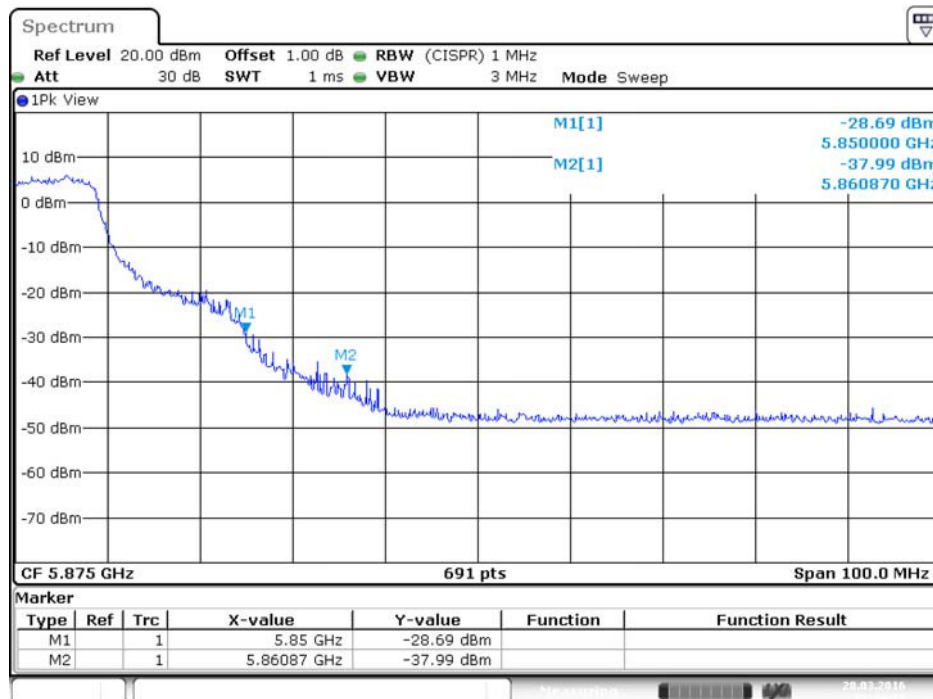


Plot on Configuration IEEE 802.11n MCS0 HT20 / 5825MHz / Peak / Chain 1 (TX1)



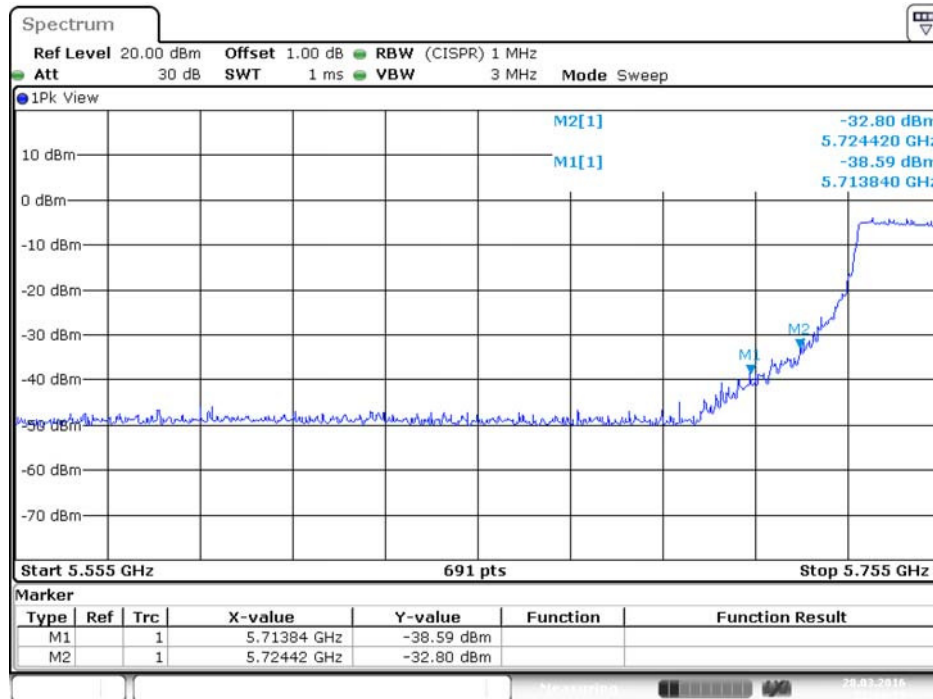
Date: 28.MAR.2016 21:59:41

Plot on Configuration IEEE 802.11n MCS0 HT20 / 5825MHz / Peak / Chain 2 (TX2)



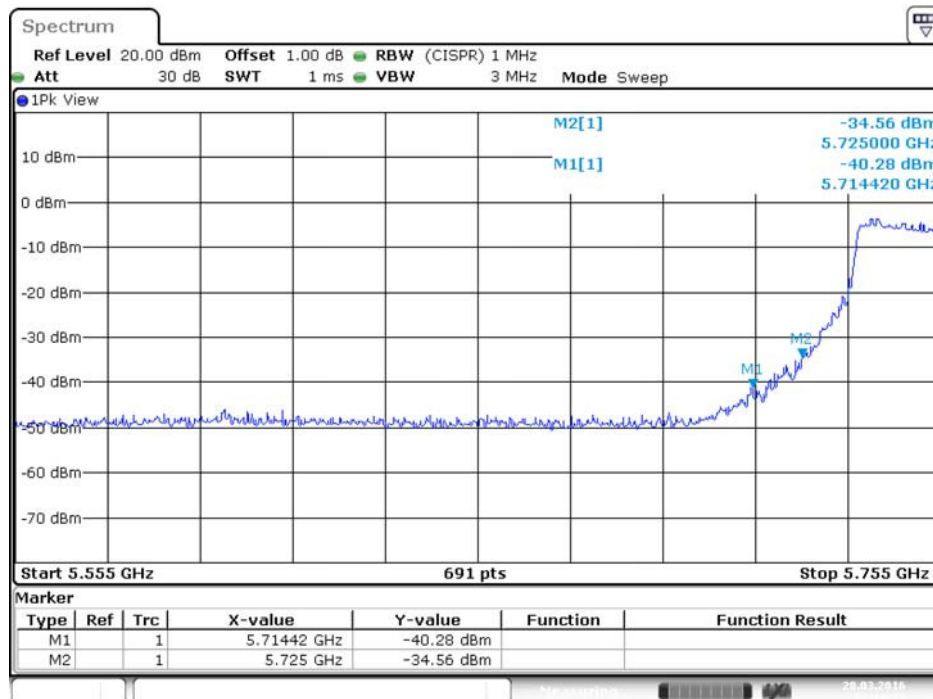
Date: 28.MAR.2016 21:49:31

Plot on Configuration IEEE 802.11n MCS0 HT40 / 5755MHz / Peak / Chain 1 (TX1)



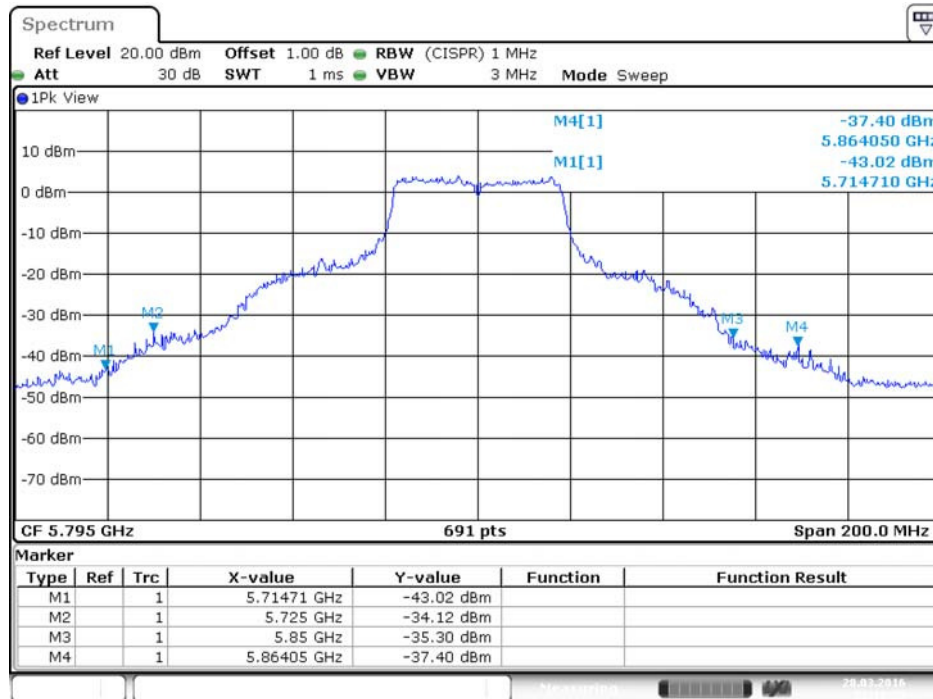
Date: 28.MAR.2016 22:04:33

Plot on Configuration IEEE 802.11n MCS0 HT40 / 5755MHz / Peak / Chain 2 (TX2)

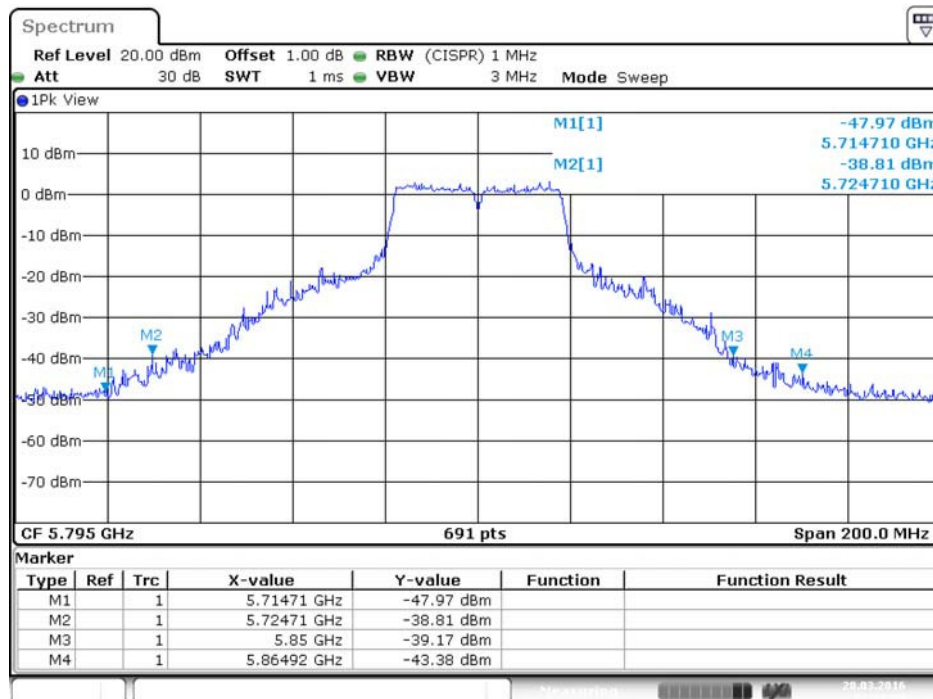


Date: 28.MAR.2016 22:10:27

Plot on Configuration IEEE 802.11n MCS0 HT40 / 5795MHz / Peak / Chain 1 (TX1)



Plot on Configuration IEEE 802.11n MCS0 HT40 / 5795MHz / Peak / Chain 2 (TX2)



4.7. Frequency Stability Measurement

4.7.1. Limit

In-band emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification).

4.7.2. Measuring Instruments and Setting

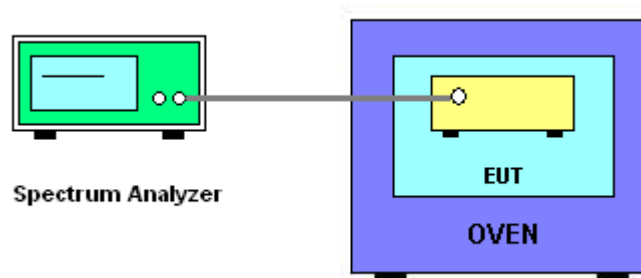
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

4.7.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. f_c is declaring of channel frequency. Then the frequency error formula is $(f_c - f) / f_c \times 10^6$ ppm and the limit is less than ± 20 ppm (IEEE 802.11n specification).
6. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
7. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
8. Extreme temperature is $-30^\circ\text{C} \sim 50^\circ\text{C}$.

4.7.4. Test Setup Layout



4.7.5. Test Deviation

There is no deviation with the original standard.

4.7.6. EUT Operation during Test

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

4.7.7. Test Result of Frequency Stability

| | | | |
|---------------|----------|-----------|-------------------------------|
| Temperature | 26°C | Humidity | 45% |
| Test Engineer | Wen Chao | Test Date | Jan. 05, 2016 ~ Mar. 29, 2016 |

Mode: 20 MHz / Chain 1

Voltage vs. Frequency Stability

| Voltage (V) | Measurement Frequency (MHz) | | | |
|----------------------|-----------------------------|-----------|-----------|-----------|
| | 5785 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| 126.50 | 5784.9340 | 5784.9332 | 5784.9325 | 5784.9321 |
| 110.00 | 5784.9335 | 5784.9333 | 5784.9324 | 5784.9318 |
| 93.50 | 5784.9333 | 5784.9325 | 5784.9315 | 5784.9314 |
| Max. Deviation (MHz) | 0.0667 | 0.0675 | 0.0685 | 0.0686 |
| Max. Deviation (ppm) | 11.53 | 11.67 | 11.84 | 11.86 |
| Result | Complies | | | |

Temperature vs. Frequency Stability

| Temperature (°C) | Measurement Frequency (MHz) | | | |
|----------------------|-----------------------------|-----------|-----------|-----------|
| | 5785 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| -30 | 5784.9366 | 5784.9362 | 5784.9352 | 5784.9350 |
| -20 | 5784.9360 | 5784.9356 | 5784.9352 | 5784.9348 |
| -10 | 5784.9357 | 5784.9349 | 5784.9346 | 5784.9345 |
| 0 | 5784.9350 | 5784.9347 | 5784.9340 | 5784.9332 |
| 10 | 5784.9337 | 5784.9328 | 5784.9323 | 5784.9313 |
| 20 | 5784.9335 | 5784.9326 | 5784.9320 | 5784.9319 |
| 30 | 5784.9335 | 5784.9331 | 5784.9326 | 5784.9324 |
| 40 | 5784.9339 | 5784.9337 | 5784.9335 | 5784.9326 |
| 50 | 5784.9342 | 5784.9339 | 5784.9330 | 5784.9327 |
| Max. Deviation (MHz) | 0.0665 | 0.0674 | 0.0680 | 0.0687 |
| Max. Deviation (ppm) | 11.50 | 11.65 | 11.75 | 11.88 |
| Result | Complies | | | |

Mode: 40 MHz / Chain 1

Voltage vs. Frequency Stability

| Voltage | Measurement Frequency (MHz) | | | |
|----------------------|-----------------------------|-----------|-----------|-----------|
| (V) | 5755 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| 126.50 | 5754.9343 | 5754.9341 | 5754.9338 | 5754.9329 |
| 110.00 | 5754.9335 | 5754.9332 | 5754.9326 | 5754.9319 |
| 93.50 | 5754.9327 | 5754.9324 | 5754.9314 | 5754.9312 |
| Max. Deviation (MHz) | 0.0673 | 0.0676 | 0.0686 | 0.0688 |
| Max. Deviation (ppm) | 11.69 | 11.75 | 11.92 | 11.95 |
| Result | Complies | | | |

Temperature vs. Frequency Stability

| Temperature | Measurement Frequency (MHz) | | | |
|----------------------|-----------------------------|-----------|-----------|-----------|
| (°C) | 5755 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| -30 | 5754.9371 | 5754.9363 | 5754.9355 | 5754.9347 |
| -20 | 5754.9356 | 5754.9348 | 5754.9342 | 5754.9338 |
| -10 | 5754.9353 | 5754.9347 | 5754.9343 | 5754.9342 |
| 0 | 5754.9352 | 5754.9348 | 5754.9343 | 5754.9339 |
| 10 | 5754.9344 | 5754.9334 | 5754.9325 | 5754.9323 |
| 20 | 5754.9335 | 5754.9334 | 5754.9327 | 5754.9326 |
| 30 | 5754.9335 | 5754.9325 | 5754.9319 | 5754.9313 |
| 40 | 5754.9352 | 5754.9346 | 5754.9345 | 5754.9336 |
| 50 | 5754.9368 | 5754.9363 | 5754.9358 | 5754.9356 |
| Max. Deviation (MHz) | 0.0665 | 0.0675 | 0.0681 | 0.0687 |
| Max. Deviation (ppm) | 11.56 | 11.73 | 11.83 | 11.94 |
| Result | Complies | | | |

4.8. Antenna Requirements

4.8.1. Limit

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

4.8.2. Antenna Connector Construction

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

5. LIST OF MEASURING EQUIPMENTS

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Remark |
|----------------------------|--------------|------------------|---------------|------------------|------------------|-----------------------|
| Horn Antenna | EMCO | 3115 | 00075790 | 750MHz ~ 18GHz | Oct. 22, 2015 | Radiation (03CH01-CB) |
| Horn Antenna | Schwarzbeck | BBHA 9170 | BBHA9170252 | 15GHz ~ 40GHz | Jul. 21, 2015 | Radiation (03CH01-CB) |
| Pre-Amplifier | Agilent | 8449B | 3008A02310 | 1GHz ~ 26.5GHz | Jan. 12, 2015 | Radiation (03CH01-CB) |
| Pre-Amplifier | WM | TF-130N-R1 | 923365 | 26GHz ~ 40GHz | Nov.13, 2015 | Radiation (03CH01-CB) |
| Spectrum Analyzer | R&S | FSP40 | 100056 | 9kHz ~ 40GHz | Oct. 27, 2015 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-16 | N/A | 1 GHz ~ 18 GHz | Nov. 02, 2015 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-17 | N/A | 1 GHz ~ 18 GHz | Nov. 02, 2015 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-40G-1 | N/A | 18GHz ~ 40 GHz | Nov. 02, 2015 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-40G-2 | N/A | 18GHz ~ 40 GHz | Nov. 02, 2015 | Radiation (03CH01-CB) |
| Test Software | Audix | E3 | 6.2009-10-7 | N/A | N/A | Radiation (03CH01-CB) |
| Spectrum analyzer | R&S | FSV40 | 100979 | 9kHz~40GHz | Dec. 09, 2015 | Conducted (TH01-CB) |
| Temp. and Humidity Chamber | Ten Billion | TTH-D3SP | TBN-931011 | -30~100 degree | Jun. 02, 2015 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-7 | 1 GHz – 26.5 GHz | Nov. 02, 2015 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-8 | 1 GHz – 26.5 GHz | Nov. 02, 2015 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-9 | 1 GHz – 26.5 GHz | Nov. 02, 2015 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-10 | 1 GHz – 26.5 GHz | Nov. 02, 2015 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-6 | 1 GHz – 26.5 GHz | Nov. 02, 2015 | Conducted (TH01-CB) |
| Power Sensor | Agilent | U2021XA | MY53410001 | 50MHz~18GHz | Nov. 02, 2015 | Conducted (TH01-CB) |

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

6. MEASUREMENT UNCERTAINTY

| Test Items | Uncertainty | Remark |
|-----------------------------------|-------------|--------------------------|
| Radiated Emission (1GHz ~ 18GHz) | 3.7 dB | Confidence levels of 95% |
| Radiated Emission (18GHz ~ 40GHz) | 3.5 dB | Confidence levels of 95% |
| Conducted Emission | 1.7 dB | Confidence levels of 95% |