

## TEST REPORT

|           |                                                               |
|-----------|---------------------------------------------------------------|
| Applicant | PEGATRON CORPORATION                                          |
| Address   | 5F., NO. 76, LIGONG ST., BEITOU DISTRICT, TAIPEI CITY, Taiwan |

|                                     |                                                               |
|-------------------------------------|---------------------------------------------------------------|
| Manufacturer or Supplier            | PEGATRON CORPORATION                                          |
| Address                             | 5F., NO. 76, LIGONG ST., BEITOU DISTRICT, TAIPEI CITY, Taiwan |
| Product                             | Tablet PC                                                     |
| Brand Name                          | Q00Q/SQ00L                                                    |
| Model                               | MT10UWA116                                                    |
| Additional Model & Model Difference | N/A                                                           |
| Date of tests                       | Oct. 23, 2015 ~ Nov. 3, 2015<br>Apr 10, 2016 ~ May 17, 2016   |

the tests have been carried out according to the requirements of the following standard:

☒ **FCC Part 15, Subpart E, Section 15.407**

**CONCLUSION: The submitted sample was found to COMPLY with the test requirement**

|                                                                                     |                                                                                                          |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| Tested by Breeze Jiang<br>Project Engineer / EMC Department                         | Approved by Chris Chen<br>Assistant Manager / EMC Department                                             |
|  | <br><br>May 17, 2016 |

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification

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Test Report No.: RF151008N004-3R1

## RELEASE CONTROL RECORD

| ISSUE NO.            | REASON FOR CHANGE | DATE ISSUED  |
|----------------------|-------------------|--------------|
| RF151008N004-3<br>R1 | Original release  | May 17, 2016 |

## 1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC PART 15, SUBPART E (SECTION 15.407 Under New/ Old Rule ) |                                         |        |                                |
|--------------------------------------------------------------------------------|-----------------------------------------|--------|--------------------------------|
| STANDARD SECTION                                                               | TEST TYPE AND LIMIT                     | RESULT | REMARK                         |
| 15.407(b)(6)                                                                   | AC Power Conducted Emission             | PASS   | Meet the requirement of limit. |
| 15.407 (b)(1/2/3/4/6)                                                          | Radiated Emissions:<br>30MHz ~ 40000MHz | PASS   | Meet the requirement of limit. |
| 15.407 (b)(1/2/3/4/6)                                                          | Band Edge Measurement                   | PASS   | Meet the requirement of limit. |
| 15.407(a)(1/2/3)                                                               | Conducted output Power                  | PASS   | Meet the requirement of limit. |
| 15.407(a)(1/2/3)                                                               | Peak Power Spectral Density             | PASS   | Meet the requirement of limit. |
| 15.407(g)                                                                      | Frequency Stability                     | PASS   | Meet the requirement of limit. |
| 15.203                                                                         | Antenna Requirement                     | PASS   | No antenna connector is used   |

## 2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| MEASUREMENT         | FREQUENCY     | UNCERTAINTY |
|---------------------|---------------|-------------|
| Conducted emissions | 9kHz~30MHz    | 2.66dB      |
| Radiated emissions  | 9KHz ~ 30MHz  | 2.74dB      |
|                     | 30MHz ~ 1GMHz | 3.55dB      |
|                     | 1GHz ~ 18GHz  | 4.84dB      |
|                     | 18GHz ~ 40GHz | 4.84dB      |

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k = 2$ .

### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

|                              |                                                                                                                                                                                                                      |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EUT</b>                   | Tablet PC                                                                                                                                                                                                            |
| <b>MODEL NO.</b>             | MT10UWA116                                                                                                                                                                                                           |
| <b>ADDITIONAL MODELS</b>     | N/A                                                                                                                                                                                                                  |
| <b>FCC ID</b>                | VUI-MT10UW                                                                                                                                                                                                           |
| <b>POWER SUPPLY</b>          | DC 3.8V by Li-ion Battery,<br>DC5.0V by Adaptor or USB Host Unit                                                                                                                                                     |
| <b>MODULATION TYPE</b>       | 64QAM, 16QAM, QPSK, BPSK                                                                                                                                                                                             |
| <b>MODULATION TECHNOLOGY</b> | OFDM                                                                                                                                                                                                                 |
| <b>TRANSFER RATE</b>         | 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps<br>802.11n: up to 135Mbps                                                                                                                                  |
| <b>OPERATING FREQUENCY</b>   | 5180 ~ 5240MHz, 5260 ~ 5320MHz<br>5500 ~ 5700MHz, 5745 ~ 5825MHz                                                                                                                                                     |
| <b>NUMBER OF CHANNEL</b>     | 5180 ~ 5240MHz: 3 for 802.11a, 802.11n (20MHz)<br>5260 ~ 5320MHz: 3 for 802.11a, 802.11n (20MHz)<br>5500 ~ 5700MHz: 3 for 802.11a, 802.11n (20MHz)<br>5745 ~ 5825MHz: 3 for 802.11a, 802.11n (20MHz)                 |
| <b>OUTPUT POWER</b>          | 8.78 dBm for 5180 ~ 5240MHz (Maximum Peak Power)<br>9.01 dBm for 5260 ~ 5320MHz (Maximum Peak Power)<br>8.39 dBm for 5500 ~ 5700MHz (Maximum Peak Power)<br>8.86 dBm for 5745 ~ 5825MHz (Maximum Peak Power)         |
| <b>ANTENNA TYPE</b>          | 5180 ~ 5240MHz: Monopole antenna with 3.51dBi gain<br>5260 ~ 5320MHz: Monopole antenna with 3.51dBi gain<br>5500 ~ 5700MHz: Monopole antenna with 3.51dBi gain<br>5745 ~ 5825MHz: Monopole antenna with 3.51dBi gain |
| <b>DATA CABLE</b>            | USB Cable : Shielded, detachable, 1.0m                                                                                                                                                                               |
| <b>I/O PORTS</b>             | Refer to user's manual                                                                                                                                                                                               |

**NOTE:**

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
3. Please refer to the EUT photo document (Reference No.: 151008N004) for detailed product photo.
4. Please refer to the EUT photo document (Reference No.: 150612N055) for detailed product photo.



5. The EUT was powered by the following adapters:

| ADAPTER 1 |                             |
|-----------|-----------------------------|
| BRAND:    | N/A                         |
| MODEL:    | SA69-050200V                |
| INPUT:    | AC 100-240V, 50/60HZ, 300MA |
| OUTPUT:   | DC 5V, 2000MA               |
| ADAPTER 2 |                             |
| BRAND:    | N/A                         |
| MODEL:    | ASSA55e-050200              |
| INPUT:    | AC 100-240V, 50/60HZ, 0.45A |
| OUTPUT:   | DC 5V, 2A                   |

## 3.2 DESCRIPTION OF TEST MODES

### FOR 5150 ~ 5250MHz

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

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 36      | 5180 MHz  | 44      | 5220 MHz  |
| 48      | 5240 MHz  |         |           |

### FOR 5250 ~ 5350MHz

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

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 52      | 5260 MHz  | 60      | 5300MHz   |
| 64      | 5320 MHz  |         |           |

### FOR 5470 ~ 5725MHz

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

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 100     | 5500 MHz  | 116     | 5580 MHz  |
| 140     | 5700 MHz  |         |           |

### FOR 5725 ~ 5850MHz

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

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 149     | 5745MHz   | 157     | 5785MHz   |
| 161     | 5805MHz   |         |           |



### 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

| EUT<br>CONFIGURE<br>MODE | APPLICABLE TO |       |     |      | DESCRIPTION                           |
|--------------------------|---------------|-------|-----|------|---------------------------------------|
|                          | RE≥1G         | RE<1G | PLC | APCM |                                       |
| A                        | √             | √     | √   | -    | Powered by Adapter with wifi(5G) link |
| B                        | -             | -     | -   | √    | Powered by Battery with wifi(5G) link |
| C                        | -             | -     | -   | -    | Powered by USB with wifi(5G) link     |

Where **RE≥1G**: Radiated Emission above 1GHz

**RE<1G**: Radiated Emission below 1GHz

**PLC**: Power Line Conducted Emission

**APCM**: Antenna Port Conducted Measurement

**NOTE:**

The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.

**NOTE:** “-” means no effect.

#### RADIATED EMISSION TEST (ABOVE 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT<br>CONFIGURE<br>MODE | MODE            | FREQ. BAND<br>(MHz) | AVAILABLE<br>CHANNEL | TESTED<br>CHANNEL | MODULATION<br>TECHNOLOGY | MODULATION<br>TYPE | DATA<br>RATE<br>(Mbps) |
|--------------------------|-----------------|---------------------|----------------------|-------------------|--------------------------|--------------------|------------------------|
| A                        | 802.11a         | 5180-5240           | 36 to 48             | 36, 44, 48        | OFDM                     | BPSK               | 6.0                    |
| A                        | 802.11n (20MHz) |                     | 36 to 48             | 36, 44, 48        | OFDM                     | BPSK               | MCS0                   |
| A                        | 802.11a         | 5260-5320           | 52 to 64             | 52, 60, 64        | OFDM                     | BPSK               | 6.0                    |
| A                        | 802.11n (20MHz) |                     | 52 to 64             | 52, 60, 64        | OFDM                     | BPSK               | MCS0                   |
| A                        | 802.11a         | 5500-5700           | 100 to 140           | 100, 116, 140     | OFDM                     | BPSK               | 6.0                    |
| A                        | 802.11n (20MHz) |                     | 100 to 140           | 100, 116, 140     | OFDM                     | BPSK               | MCS0                   |
| A                        | 802.11a         | 5725-5825           | 149 to 165           | 149, 157, 161     | OFDM                     | BPSK               | 6.0                    |
| A                        | 802.11n (20MHz) |                     | 149 to 165           | 149, 157, 161     | OFDM                     | BPSK               | MCS0                   |

#### RADIATED EMISSION TEST (BELOW 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT<br>CONFIGURE<br>MODE | MODE    | FREQ. BAND<br>(MHz) | AVAILABLE<br>CHANNEL | TESTED<br>CHANNEL | MODULATION<br>TECHNOLOGY | MODULATION<br>TYPE | DATA<br>RATE<br>(Mbps) |
|--------------------------|---------|---------------------|----------------------|-------------------|--------------------------|--------------------|------------------------|
| A                        | 802.11a | 5180-5320           | 36 to 64             | 36                | OFDM                     | BPSK               | 6.0                    |

**POWER LINE CONDUCTED EMISSION TEST:**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | MODE    | FREQ. BAND (MHz) | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|--------------------|---------|------------------|-------------------|----------------|-----------------------|-----------------|------------------|
| A                  | 802.11a | 5180-5320        | 36 to 64          | 36             | OFDM                  | BPSK            | 6.0              |

**BANDEDGE MEASUREMENT:**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | MODE            | FREQ. BAND (MHz) | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|--------------------|-----------------|------------------|-------------------|----------------|-----------------------|-----------------|------------------|
| A                  | 802.11a         | 5180-5240        | 36 to 48          | 36             | OFDM                  | BPSK            | 6.0              |
| A                  | 802.11n (20MHz) |                  | 36 to 48          | 36             | OFDM                  | BPSK            | MCS0             |
| A                  | 802.11a         | 5260-5320        | 52 to 64          | 64             | OFDM                  | BPSK            | 6.0              |
| A                  | 802.11n (20MHz) |                  | 52 to 64          | 64             | OFDM                  | BPSK            | MCS0             |
| A                  | 802.11a         | 5500-5700        | 100 to 140        | 100            | OFDM                  | BPSK            | 6.0              |
| A                  | 802.11n (20MHz) |                  | 100 to 140        | 100            | OFDM                  | BPSK            | MCS0             |

#### ANTENNA PORT CONDUCTED MEASUREMENT:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT CONFIGURE MODE | MODE            | FREQ. BAND (MHz) | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|--------------------|-----------------|------------------|-------------------|----------------|-----------------------|-----------------|------------------|
| B                  | 802.11a         | 5180-5240        | 36 to 48          | 36, 44, 48     | OFDM                  | BPSK            | 6.0              |
| B                  | 802.11n (20MHz) |                  | 36 to 48          | 36, 44, 48     | OFDM                  | BPSK            | MCS0             |
| B                  | 802.11a         | 5260-5320        | 52 to 64          | 52, 60, 64     | OFDM                  | BPSK            | 6.0              |
| B                  | 802.11n (20MHz) |                  | 52 to 64          | 52, 60, 64     | OFDM                  | BPSK            | MCS0             |
| B                  | 802.11a         | 5500-5700        | 100 to 140        | 100, 116, 140  | OFDM                  | BPSK            | 6.0              |
| B                  | 802.11n (20MHz) |                  | 100 to 140        | 100, 116, 140  | OFDM                  | BPSK            | MCS0             |
| B                  | 802.11a         | 5725-5825        | 149 to 165        | 149, 157, 161  | OFDM                  | BPSK            | 6.0              |
| B                  | 802.11n (20MHz) |                  | 149 to 165        | 149, 157, 161  | OFDM                  | BPSK            | MCS0             |

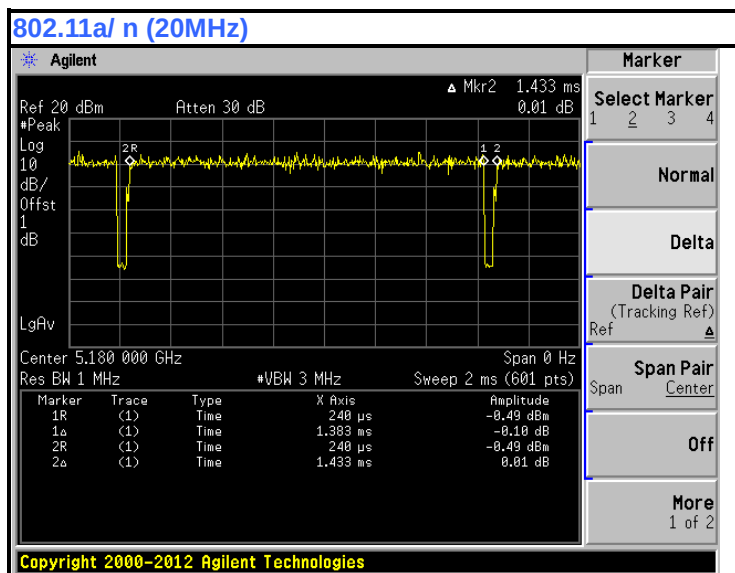
#### TEST CONDITION:

| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | INPUT POWER          | TESTED BY  |
|---------------|--------------------------|----------------------|------------|
| RE<1G         | 26deg. C, 67%RH          | DC 5.0V from Adapter | Sen He     |
| RE≥1G         | 26deg. C, 67%RH          | DC 5.0V from Adapter | Sen He     |
| PLC           | 20deg. C, 56%RH          | DC 5.0V from Adapter | Sen He     |
| APCM          | 20deg. C, 55%RH          | DC 3.8V from Battery | Blue Zheng |

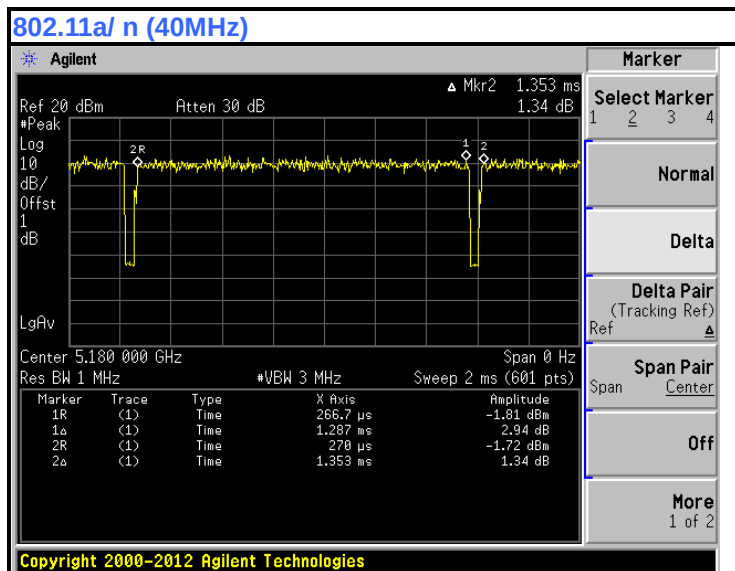
### 3.3 DUTY CYCLE OF TEST SIGNAL

Duty cycle of test signal is < 98%, duty factor shall be considered.

**802.11a/ n (20MHz)** Duty cycle = 0.965, Duty factor =  $10 * \log(0.965) = -0.154$



**802.11a/ n (40MHz)** Duty cycle = 0.951, Duty factor =  $10 * \log(0.951) = -0.217$





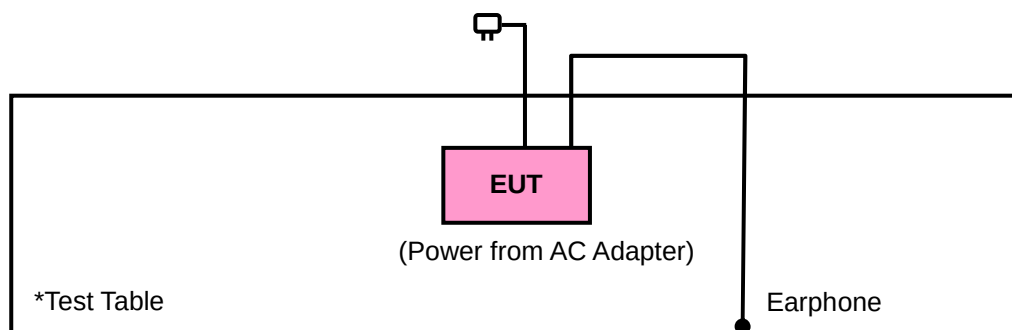
### 3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| NO. | PRODUCT   | BRAND | MODEL NO. | SERIAL NO. | FCC ID |
|-----|-----------|-------|-----------|------------|--------|
| 1   | DC source | REC   | N/A       | N/A        | N/A    |

| NO. | DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|-----|----------------------------------------|
| 1   | AC Line;unshielded, detachable 1.0m.   |

#### 3.4.1 CONFIGURATION OF SYSTEM UNDER TEST



### 3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC Part 15, Subpart E (15.407)**

**789033 D02 General UNII Test Procedures New Rules v01r02**

**ANSI C63.10-2014**

All test items have been performed and recorded as per the above standards.

**NOTE:** The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

## 4. TEST TYPES AND RESULTS

### 4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

#### 4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table:

| FREQUENCIES<br>(MHz) | FIELD STRENGTH<br>(microvolts/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                                |

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

#### 4.1.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

| APPLICABLE TO | LIMIT                         |                                          |
|---------------|-------------------------------|------------------------------------------|
|               | FIELD STRENGTH AT 3m (dBμV/m) |                                          |
|               | PK                            | AV                                       |
|               | 74                            | 54                                       |
| √             | EIRP LIMIT (dBm)              | EQUIVALENT FIELD STRENGTH AT 3m (dBμV/m) |
|               | PK                            | PK                                       |
|               | -27                           | 68.3                                     |
|               | -17                           | 78.3                                     |

**NOTE:** The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts).}$$

**4.1.3 TEST INSTRUMENTS**

| <b>Equipment</b>             | <b>Manufacturer</b> | <b>Model No.</b>         | <b>Serial No.</b> | <b>Last Cal.</b> | <b>Next Cal.</b> |
|------------------------------|---------------------|--------------------------|-------------------|------------------|------------------|
| EMI Test Receiver            | Rohde&Schwarz       | ESR7                     | 101494            | Apr 27,16        | Apr 26,17        |
| Signal and Spectrum Analyzer | Rohde&Schwarz       | FSV40                    | 101094            | Apr 23,16        | Apr 22,17        |
| Bilog Antenna                | Teseq               | CBL 6111D                | 30643             | Jul. 16, 15      | Jul. 15, 16      |
| Horn Antenna                 | ETS-Lindgren        | 3117                     | 00062558          | May 30,16        | May. 29,18       |
| Amplifier (9kHz-1GHz)        | SONOMA              | 310D                     | 186955            | Mar. 04,16       | Mar. 03, 17      |
| Pre-Amplifier (0.5~18GHz)    | SCHWARZBECK         | BBV 9718                 | 9718-266          | Mar 26,16        | Mar 25,18        |
| GPS Generator+ Antenna       | TOJOIN              | GNSS-5000A               | E1-010119         | Aug. 08, 15      | Aug. 07, 16      |
| 3m Semi-anechoic Chamber     | ETS-LINDGREN        | 9m*6m*6m                 | NSEMC003          | April. 19,16     | April. 18,18     |
| Test Software                | ADT                 | ADT_Radiated V7.6.15.9.2 | N/A               | N/A              | N/A              |

**NOTE:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GREGT/CHINA and NIM/CHINA.
2. The test was performed in 966 Chamber.
3. The FCC Site Registration No. is 502831.

#### 4.1.4 TEST PROCEDURES

Since the emission limits are specified in terms of radiated field strength levels, measurements performed to demonstrate compliance have traditionally relied on a radiated test configuration. Radiated measurements remain the principal method for demonstrating compliance to the specified limits; however antenna-port conducted measurements are also now acceptable to demonstrate compliance (see below for details). When radiated measurements are utilized, test site requirements and procedures for maximizing and measuring radiated emissions that are described in ANSI C63.10 shall be followed.

Antenna-port conducted measurements may also be used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case spurious emissions is required.

##### General Procedure for conducted measurements in restricted bands

- a) Measure the conducted output power (in dBm) using the detector specified (see guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).
- b) Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see guidance on determining the applicable antenna gain)
- c) Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies  $\leq 30$  MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies  $> 1000$  MHz).
- d) For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW).
- e) Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:  
$$E = \text{EIRP} - 20\log D + 104.8$$

where:

E = electric field strength in dB $\mu$ V/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.
- f) Compare the resultant electric field strength level to the applicable limit.
- g) Perform radiated spurious emission test.

##### Quasi-Peak measurement procedure





The specifications for measurements using the CISPR quasi-peak detector can be found in Publication 16 of the International Special Committee on Radio Frequency Interference (CISPR) of the International Electrotechnical Commission.

As an alternative to CISPR quasi-peak measurement, compliance can be demonstrated to the applicable emission limits using a peak detector.

#### Peak power measurement procedure

Peak emission levels are measured by setting the instrument as follows:

- a) RBW = as specified in Table 1.
- b) VBW  $\geq 3 \times$  RBW.
- c) Detector = Peak.
- d) Sweep time = auto.
- e) Trace mode = max hold.
- f) Allow sweeps to continue until the trace stabilizes. (Note that the required measurement time may be longer for low duty cycle applications).

Table 1—RBW as a function of frequency

Frequency RBW

9-150 kHz 200-300 Hz

0.15-30 MHz 9-10 kHz

30-1000 MHz 100-120 kHz

> 1000 MHz 1 MHz

If the peak-detected amplitude can be shown to comply with the average limit, then it is not necessary to perform a separate average measurement.

Trace averaging across on and off times of the EUT transmissions followed by duty cycle correction

If continuous transmission of the EUT (i.e., duty cycle  $\geq 98$  percent) cannot be achieved and the duty cycle is constant (i.e., duty cycle variations are less than  $\pm 2$  percent), then the following procedure shall be used:

- a) The EUT shall be configured to operate at the maximum achievable duty cycle.
- b) Measure the duty cycle, x, of the transmitter output signal as described in section 6.0.
- c) RBW = 1 MHz (unless otherwise specified).
- d) VBW  $\geq 3 \times$  RBW.



e) Detector = RMS, if  $\text{span}/(\# \text{ of points in sweep}) \leq (\text{RBW}/2)$ . Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.

f) Averaging type = power (i.e., RMS).

1) As an alternative, the detector and averaging type may be set for linear voltage averaging.

2) Some instruments require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.

g) Sweep time = auto.

h) Perform a trace average of at least 100 traces.

i) A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:

1) If power averaging (RMS) mode was used in step f), then the applicable correction factor is  $10 \log(1/x)$ , where x is the duty cycle.

2) If linear voltage averaging mode was used in step f), then the applicable correction factor is  $20 \log(1/x)$ , where x is the duty cycle.

3) If a specific emission is demonstrated to be continuous ( $\geq 98$  percent duty cycle) rather than turning on and off with the transmit cycle, then no duty cycle correction is required for that emission.

NOTE: Reduction of the measured emission amplitude levels to account for operational duty factor is not permitted. Compliance is based on emission levels occurring during transmission - not on an average across on and off times of the transmitter.

Determining the applicable transmit antenna gain

A conducted power measurement will determine the maximum output power associated with a restricted band emission; however, in order to determine the associated EIRP level, the gain of the transmitting antenna (in dBi) must be added to the measured output power (in dBm).

Since the out-of-band characteristics of the EUT transmit antenna will often be unknown, the use of a conservative antenna gain value is necessary. Thus, when determining the EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater. However, for devices that operate in multiple frequency bands while using the same transmit antenna, the highest gain of the antenna within the operating band nearest in frequency to the restricted band emission being measured may be used in lieu of the overall highest gain when the emission is at a frequency that is within 20 percent of the nearest band edge frequency, but in no



case shall a value less than 2 dBi be used.

See KDB 662911 for guidance on calculating the additional array gain term when determining the effective antenna gain for a EUT with multiple outputs occupying the same or overlapping frequency ranges in the same band.

#### Radiated spurious emission test

An additional consideration when performing conducted measurements of restricted band emissions is that unwanted emissions radiating from the EUT cabinet, control circuits, power leads, or intermediate circuit elements will likely go undetected in a conducted measurement configuration. To address this concern, a radiated test shall be performed to ensure that emissions emanating from the EUT cabinet (rather than the antenna port) also comply with the applicable limits.

For these cabinet radiated spurious emission measurements the EUT transmit antenna may be replaced with a termination matching the nominal impedance of the antenna. Procedures for performing radiated measurements are specified in ANSI C63.10. All detected emissions shall comply with the applicable limits.

The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for  $f \geq 1$  GHz, 100 kHz for  $f < 1$  GHz

VBW  $\geq$  RBW

Sweep = auto

Detector function = peak

Trace = max hold

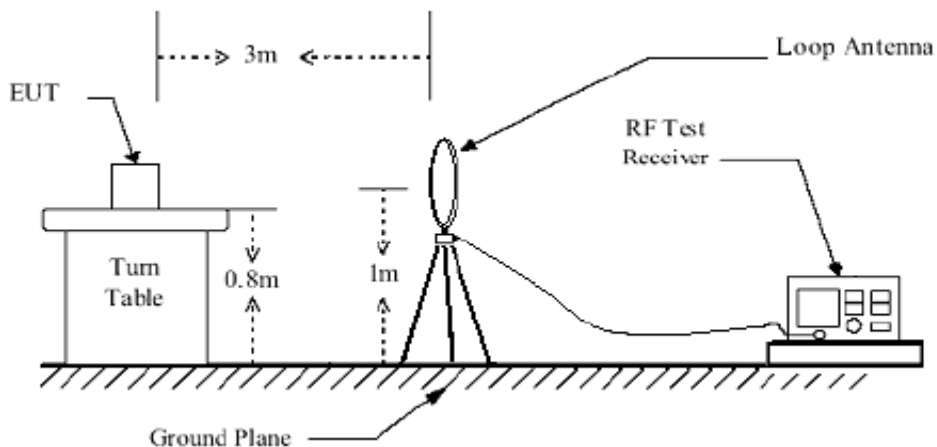
#### 4.1.5 DEVIATION FROM TEST STANDARD

No deviation.

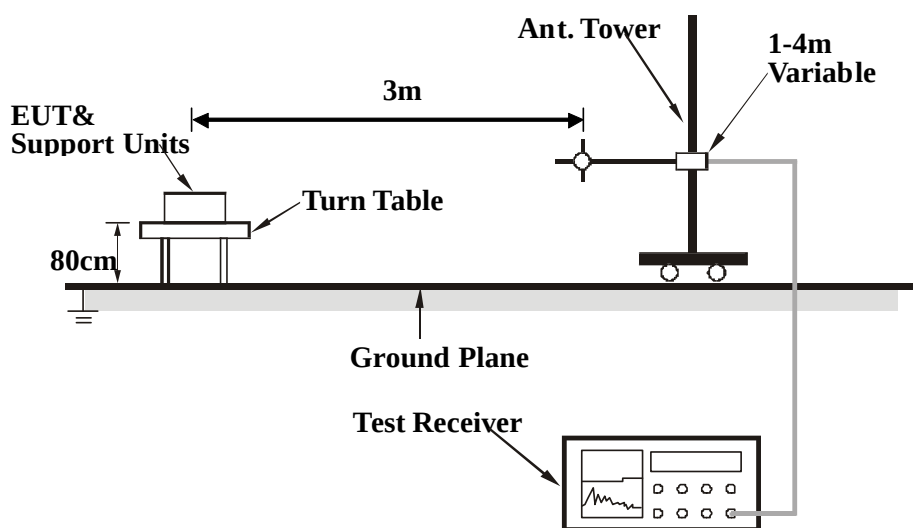


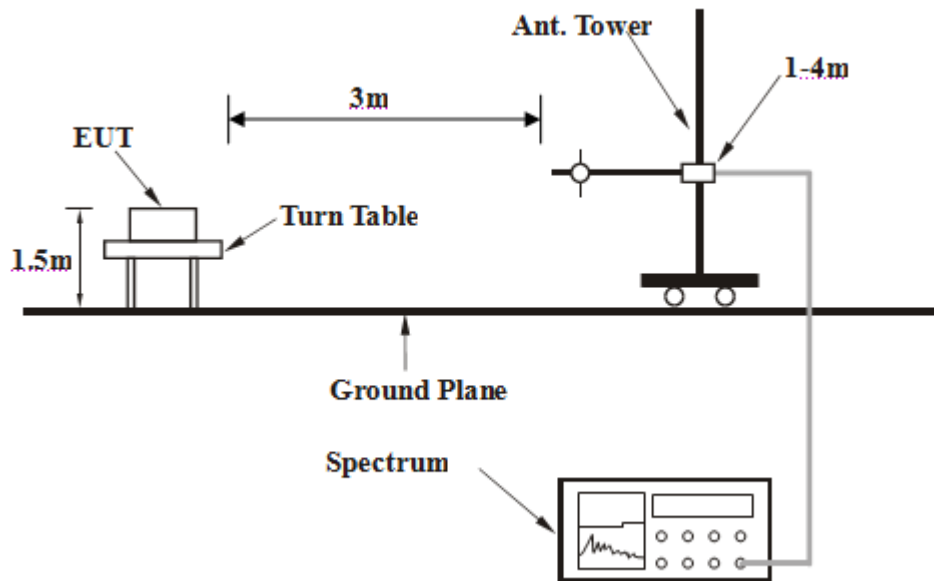
#### 4.1.6 TEST SETUP

##### Below 30MHz

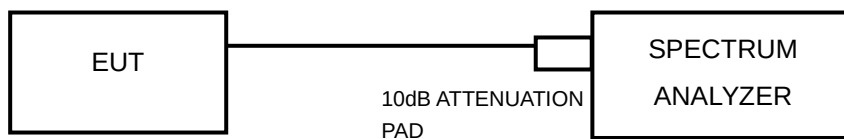


##### 30MHz~1GHz





#### RADIATED TEST



#### CONDUCTED TEST

For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.1.7 EUT OPERATING CONDITION

- Set the EUT under full load condition and placed them on a testing table.
- Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.
- The necessary accessories enable the EUT in full functions.

#### 4.1.8 TEST RESULTS

Antenna-port Conducted test data

Note: Below the 1GHz, all configurations have been tested, only the worst configuration (Band I 802.11a CH36) show here

$$E = \text{EIRP} - 20\log D + 104.8$$

where:

E = electric field strength in dBμV/m,

EIRP = equivalent isotropic radiated power in dBm

D = specified measurement distance in meters.

EIRP= Measure Conducted output power Value (dBm) + Maximum transmit antenna gain (dBi)

+ the appropriate maximum ground reflection factor (dB)

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51 dBi

Note 1: The frequency is fundamental signal which can be ignored.

Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

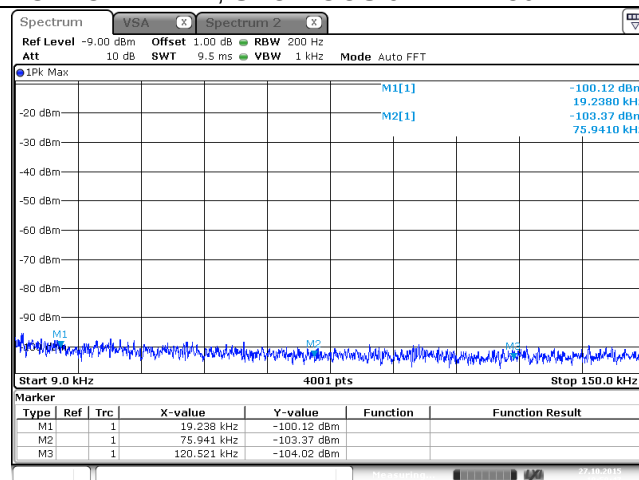
Note 4: The harmonic (3th ,4th, 5th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 0.019238        | -100.12     | 6                             | 3    | 2             | QP       | 3.14       | -20.00         | -23.14      | Note 2 | PASS    |
| 1.2504          | -79.74      | 6                             | 3    | 2             | QP       | 23.52      | -20.00         | -43.52      | Note 2 | PASS    |
| 599.37          | -80.02      | 4.7                           | 3    | 2             | QP       | 21.94      | -20.00         | -41.94      | Note 2 | PASS    |
| 833.81          | -80.96      | 4.7                           | 3    | 2             | QP       | 21.00      | -20.00         | -41.00      | Note 2 | PASS    |



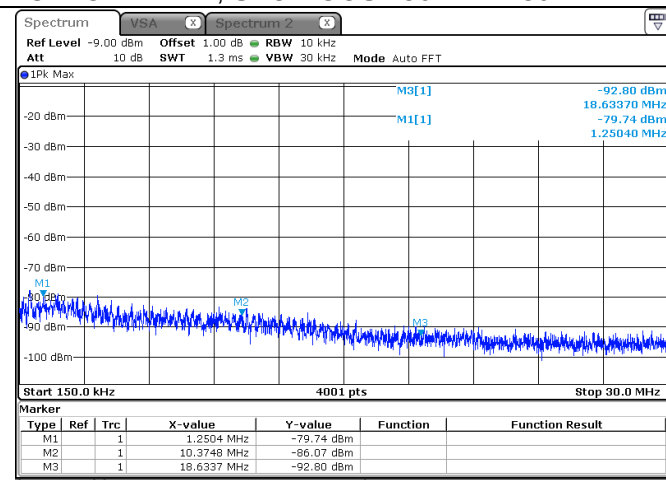
## Test Plots

### LOW CHANNEL, SPURIOUS 9 kHz ~ 150 kHz



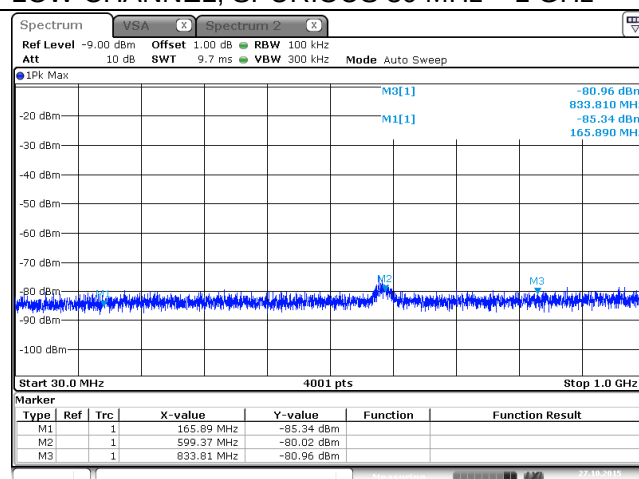
Date: 27.OCT.2015 19:59:48

### LOW CHANNEL, SPURIOUS 150 kHz ~ 30 MHz



Date: 27.OCT.2015 20:01:25

### LOW CHANNEL, SPURIOUS 30 MHz ~ 1 GHz



Date: 27.OCT.2015 20:02:34



## Band 1

## 802.11a

|                 |               |                      |              |
|-----------------|---------------|----------------------|--------------|
| CHANNEL         | TX Channel 36 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz  |                      | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51 dBi

Note 1: The frequency is fundamental signal which can be ignored.

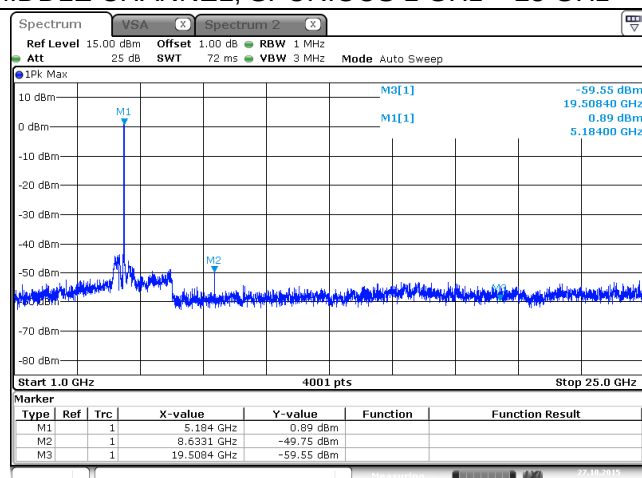
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th ,3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 8633.1          | -49.75      | 0                             | 3    | 3.51          | PK       | 49.02      | 79.66          | 30.64       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 59.66          | N/A         | Note 3 | PASS    |
| 19508.4         | -59.55      | 0                             | 3    | 3.51          | PK       | 39.22      | 74.00          | 34.78       | --     | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 54.00          | N/A         | Note 3 | PASS    |
| 5184            | 0.89        | 0                             | 3    | 3.51          | PK       | 99.66      | N/A            | N/A         | Note 1 | N/A     |
|                 | 0.44        |                               | 3    | 3.51          | AV       | 74.81      | N/A            | N/A         |        | N/A     |

## MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz



Date: 27 OCT.2015 20:08:35



|                        |               |                              |              |
|------------------------|---------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 44 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 25GHz  |                              | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51 dBi

Note 1: The frequency is fundamental signal which can be ignored.

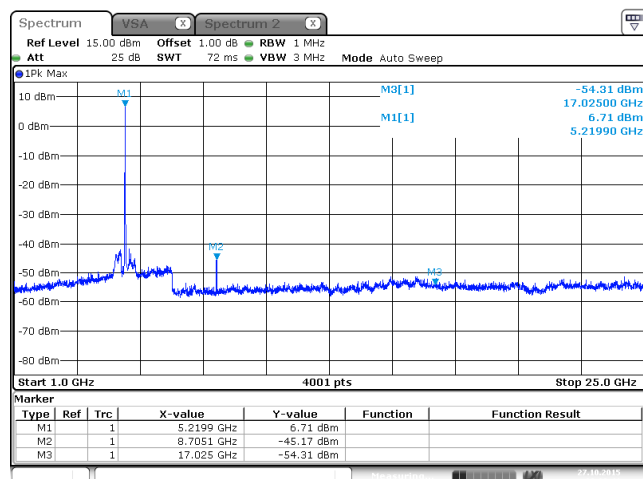
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th, 3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 8705.1          | -45.17      | 0                             | 3    | 3.51          | PK       | 53.60      | 85.48          | 31.88       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 65.48          | N/A         | Note 3 | PASS    |
| 1702.5          | -54.31      | 0                             | 3    | 3.51          | PK       | 44.46      | 74.00          | 29.54       | --     | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 54.00          | N/A         | Note 3 | PASS    |
| 5219.9          | 6.71        | 0                             | 3    | 3.51          | PK       | 105.48     | N/A            | N/A         | Note 1 | N/A     |
|                 | 6.26        |                               | 3    | 3.51          | AV       | 80.63      | N/A            | N/A         |        | N/A     |

#### MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz



Date: 27.OCT.2015 20:09:41



|                 |               |                      |              |
|-----------------|---------------|----------------------|--------------|
| CHANNEL         | TX Channel 48 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz  |                      | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51 dBi

Note 1: The frequency is fundamental signal which can be ignored.

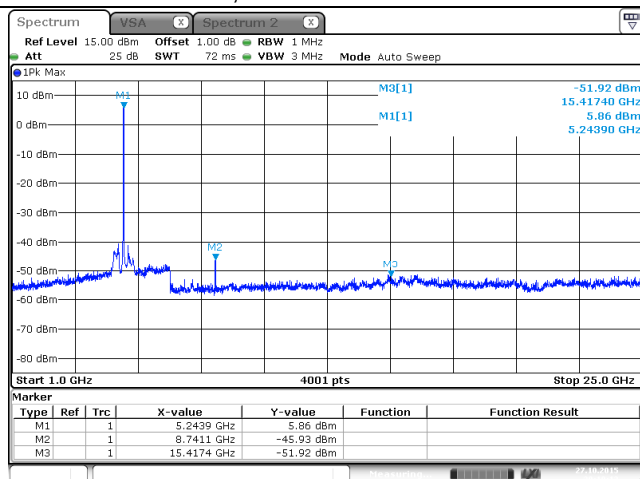
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th, 3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 8741.1          | -45.93      | 0                             | 3    | 3.51          | PK       | 52.84      | 84.63          | 31.79       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 64.63          | N/A         | Note 3 | PASS    |
| 15417.4         | -51.92      | 0                             | 3    | 3.51          | PK       | 46.85      | 74.00          | 27.15       | --     | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 54.00          | N/A         | Note 3 | PASS    |
| 5243.9          | 5.86        | 0                             | 3    | 3.51          | PK       | 104.63     | N/A            | N/A         | Note 1 | N/A     |
|                 | 5.41        |                               | 3    | 3.51          | AV       | 79.78      | N/A            | N/A         |        | N/A     |

#### MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz



Date: 27.OCT.2015 20:10:13



**802.11n (20MHz)**

|                        |               |                              |              |
|------------------------|---------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 36 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 25GHz  |                              | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.76 dBi

Note 1: The frequency is fundamental signal which can be ignored.

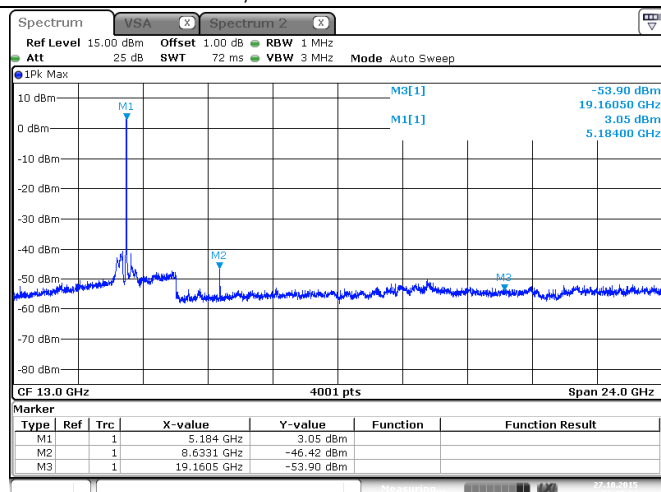
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th, 3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 8633.1          | -46.42      | 0                             | 3    | 3.51          | PK       | 52.35      | 81.82          | 29.47       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 61.82          | N/A         | Note 3 | PASS    |
| 19160.5         | -53.9       | 0                             | 3    | 3.51          | PK       | 44.87      | 74.00          | 29.13       | --     | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 54.00          | N/A         | Note 3 | PASS    |
| 5184            | 3.05        | 0                             | 3    | 3.51          | PK       | 101.82     | N/A            | N/A         | Note 1 | N/A     |
|                 | 2.60        |                               | 3    | 3.51          | AV       | 76.97      | N/A            | N/A         |        | N/A     |

**MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz**



Date: 27.OCT.2015 20:17:04



|                 |               |                      |              |
|-----------------|---------------|----------------------|--------------|
| CHANNEL         | TX Channel 44 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz  |                      | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51 dBi

Note 1: The frequency is fundamental signal which can be ignored.

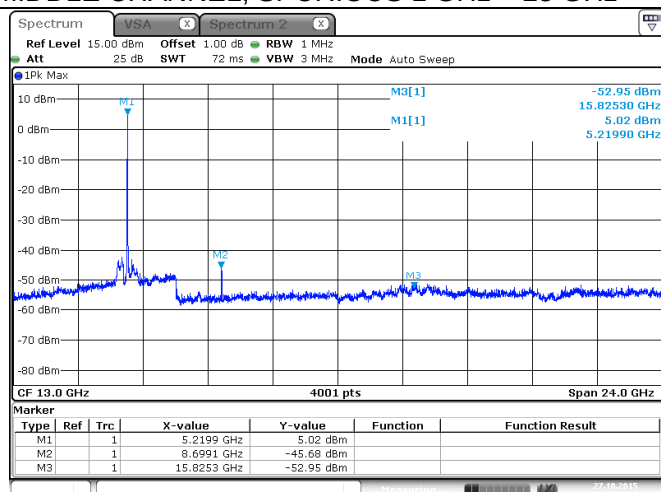
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th, 3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 8699.1          | -45.68      | 0                             | 3    | 3.51          | PK       | 53.09      | 83.79          | 30.70       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 63.79          | N/A         | Note 3 | PASS    |
| 15825.3         | -52.95      | 0                             | 3    | 3.51          | PK       | 45.82      | 83.79          | 37.97       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 63.79          | N/A         | Note 3 | PASS    |
| 5219.9          | 5.02        | 0                             | 3    | 3.51          | PK       | 103.79     | N/A            | N/A         | Note 1 | N/A     |
|                 | 4.57        |                               | 3    | 3.51          | AV       | 78.94      | N/A            | N/A         |        | N/A     |

#### MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz



Date: 27.OCT.2015 20:17:43



|                 |               |                      |              |
|-----------------|---------------|----------------------|--------------|
| CHANNEL         | TX Channel 48 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz  |                      | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51 dBi

Note 1: The frequency is fundamental signal which can be ignored.

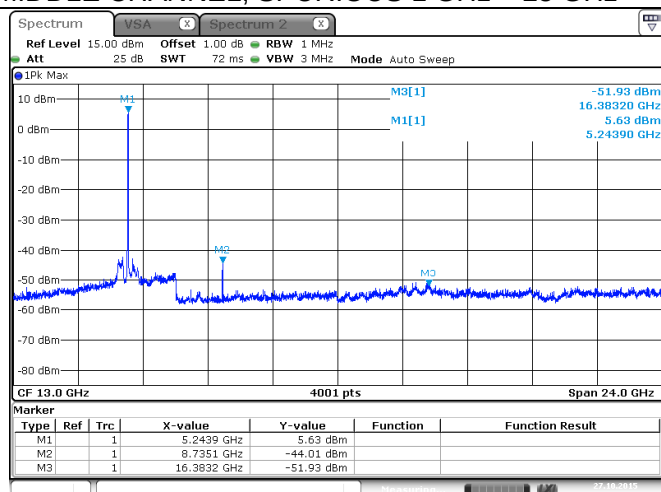
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th ,3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 8735.1          | -44.01      | 0                             | 3    | 3.51          | PK       | 54.76      | 84.40          | 29.64       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 64.40          | N/A         | Note 3 | PASS    |
| 16383.2         | -51.93      | 0                             | 3    | 3.51          | PK       | 46.84      | 84.40          | 37.56       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 64.40          | N/A         | Note 3 | PASS    |
| 5243.9          | 5.63        | 0                             | 3    | 3.51          | PK       | 104.40     | N/A            | N/A         | Note 1 | N/A     |
|                 | 5.18        |                               | 3    | 3.51          | AV       | 79.55      | N/A            | N/A         |        | N/A     |

#### MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz



Date: 27.OCT.2015 20:18:26

**ABOVE 1GHz WORST-CASE DATA: Band 2**

**802.11a**

|                        |               |                              |              |
|------------------------|---------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 52 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 25GHz  |                              | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51 dBi

Note 1: The frequency is fundamental signal which can be ignored.

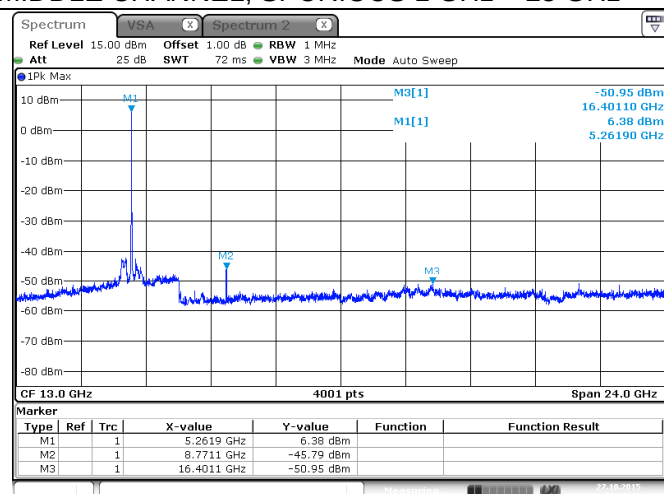
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th, 3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 8771.1          | -45.27      | 0                             | 3    | 3.51          | PK       | 53.50      | 89.64          | 36.14       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 69.64          | N/A         | Note 3 | PASS    |
| 19076.5         | -54.2       | 0                             | 3    | 3.51          | PK       | 44.57      | 74.00          | 29.43       | --     | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 54.00          | N/A         | Note 3 | PASS    |
| 5.2559          | 4.87        | 6                             | 3    | 3.51          | PK       | 109.64     | N/A            | N/A         | Note 1 | N/A     |
|                 | 4.42        |                               | 3    | 3.51          | AV       | 78.79      | N/A            | N/A         |        | N/A     |

**MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz**



Date: 27.OCT.2015 20:10:49

|                        |               |                              |              |
|------------------------|---------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 60 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 25GHz  |                              | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51 dBi

Note 1: The frequency is fundamental signal which can be ignored.

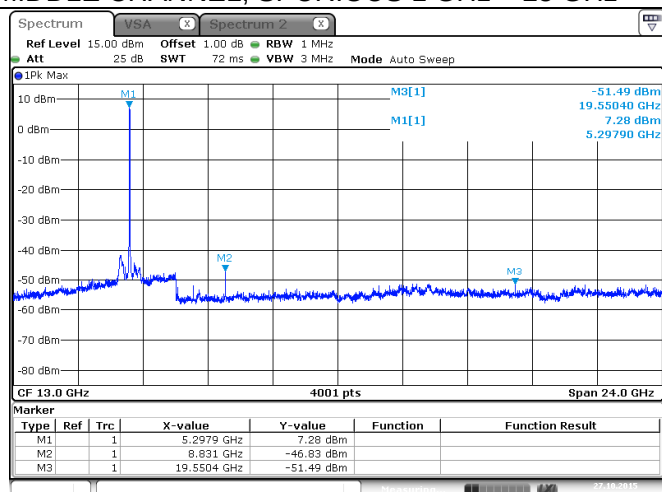
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th ,3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 8831            | -46.83      | 0                             | 3    | 3.51          | PK       | 51.94      | 86.05          | 34.11       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 66.05          | N/A         | Note 3 | PASS    |
| 19550.4         | -51.49      | 0                             | 3    | 3.51          | PK       | 47.28      | 74.00          | 26.72       | --     | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 54.00          | N/A         | Note 3 | PASS    |
| 5297.9          | 7.28        | 0                             | 3    | 3.51          | PK       | 106.05     | N/A            | N/A         | Note 1 | N/A     |
|                 | 6.83        |                               | 3    | 3.51          | AV       | 81.20      | N/A            | N/A         |        | N/A     |

#### MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz



Date: 27.OCT.2015 20:11:29



|                 |               |                      |              |
|-----------------|---------------|----------------------|--------------|
| CHANNEL         | TX Channel 64 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz  |                      | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51 dBi

Note 1: The frequency is fundamental signal which can be ignored.

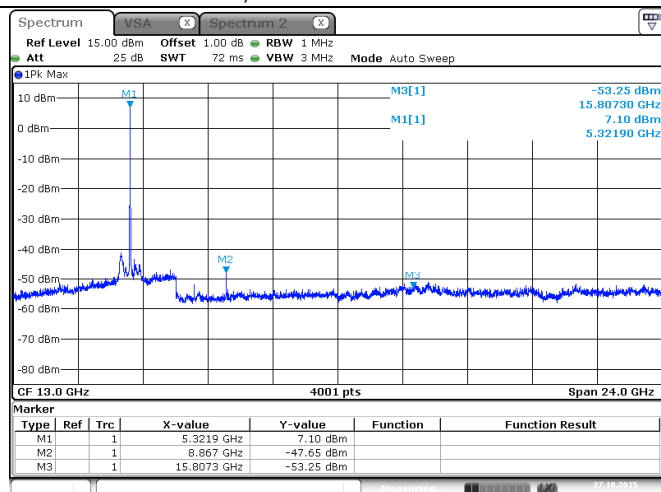
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th, 3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 8867            | -47.65      | 0                             | 3    | 3.51          | PK       | 51.12      | 85.87          | 34.75       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 65.87          | N/A         | Note 3 | PASS    |
| 15807.3         | -53.25      | 0                             | 3    | 3.51          | PK       | 45.52      | 74.00          | 28.48       | --     | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 54.00          | N/A         | Note 3 | PASS    |
| 5321.9          | 7.1         | 0                             | 3    | 3.51          | PK       | 105.87     | N/A            | N/A         | Note 1 | N/A     |
|                 | 6.65        |                               | 3    | 3.51          | AV       | 81.02      | N/A            | N/A         |        | N/A     |

#### MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz



Date: 27.OCT.2015 20:12:09





## 802.11n (20MHz)

|                 |               |                      |              |
|-----------------|---------------|----------------------|--------------|
| CHANNEL         | TX Channel 52 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz  |                      | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51 dBi

Note 1: The frequency is fundamental signal which can be ignored.

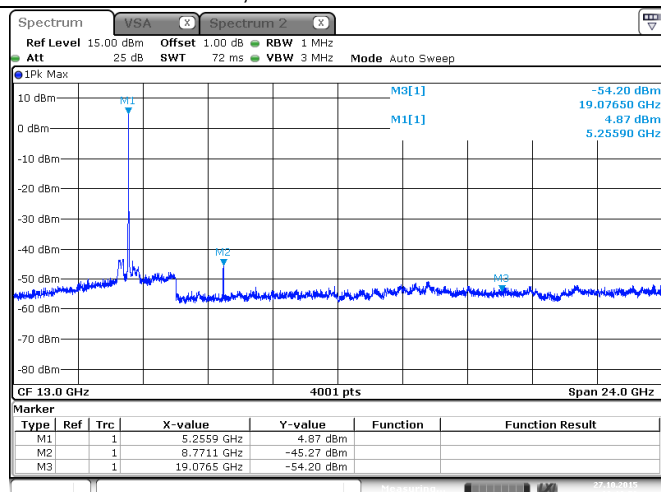
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th, 3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 8771.1          | -45.27      | 0                             | 3    | 3.51          | PK       | 53.50      | 83.64          | 30.14       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 63.64          | N/A         | Note 3 | PASS    |
| 19076.5         | -54.2       | 0                             | 3    | 3.51          | PK       | 44.57      | 74.00          | 29.43       | --     | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 54.00          | N/A         | Note 3 | PASS    |
| 5255.9          | 4.87        | 0                             | 3    | 3.51          | PK       | 103.64     | N/A            | N/A         | Note 1 | N/A     |
|                 | 4.42        |                               | 3    | 3.51          | AV       | 78.79      | N/A            | N/A         |        | N/A     |

## MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz



Date: 27.OCT.2015 20:18:56



|                 |               |                      |              |
|-----------------|---------------|----------------------|--------------|
| CHANNEL         | TX Channel 60 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz  |                      | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51 dBi

Note 1: The frequency is fundamental signal which can be ignored.

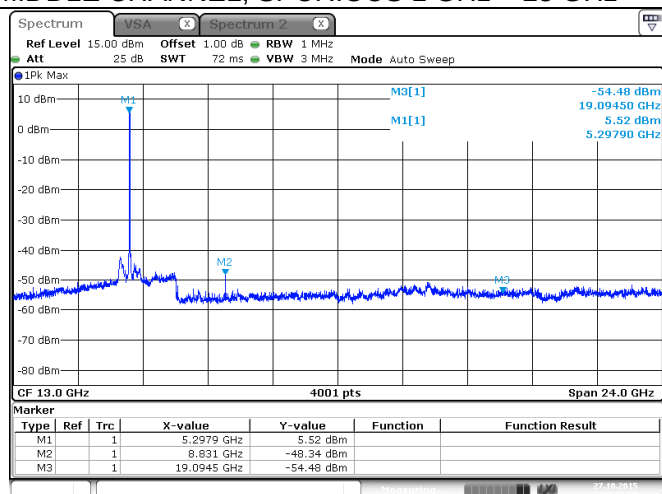
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th, 3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 8831            | -48.34      | 0                             | 3    | 3.51          | PK       | 50.43      | 84.29          | 33.86       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 64.29          | N/A         | Note 3 | PASS    |
| 19094.5         | -54.48      | 0                             | 3    | 3.51          | PK       | 44.29      | 74.00          | 29.71       | --     | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 54.00          | N/A         | Note 3 | PASS    |
| 5297.9          | 5.52        | 0                             | 3    | 3.51          | PK       | 104.29     | N/A            | N/A         | Note 1 | N/A     |
|                 | 5.07        |                               | 3    | 3.51          | AV       | 79.44      | N/A            | N/A         |        | N/A     |

#### MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz



Date: 27.OCT.2015 20:19:39

|                        |               |                              |              |
|------------------------|---------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 64 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 25GHz  |                              | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51 dBi

Note 1: The frequency is fundamental signal which can be ignored.

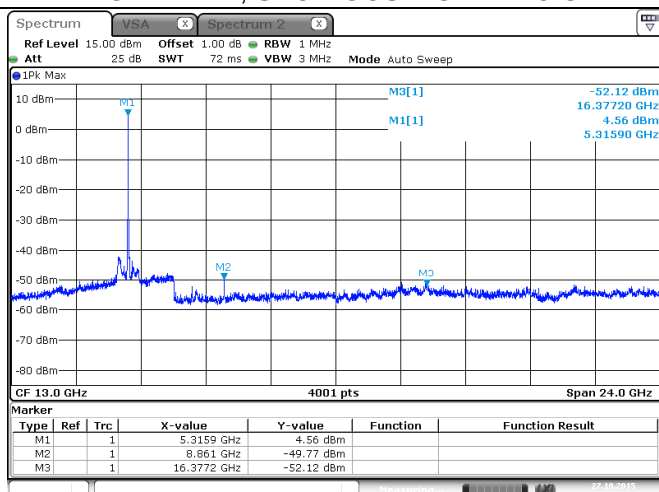
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th, 3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 8861            | -49.77      | 0                             | 3    | 3.51          | PK       | 49.00      | 83.33          | 34.33       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 63.33          | N/A         | Note 3 | PASS    |
| 16377.2         | -52.12      | 0                             | 3    | 3.51          | PK       | 46.65      | 83.33          | 36.68       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 63.33          | N/A         | Note 3 | PASS    |
| 5315.9          | 4.56        | 0                             | 3    | 3.51          | PK       | 103.33     | N/A            | N/A         | Note 1 | N/A     |
|                 | 4.11        |                               | 3    | 3.51          | AV       | 78.48      | N/A            | N/A         |        | N/A     |

#### MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz



Date: 27.OCT.2015 20:20:15



## ABOVE 1GHz WORST-CASE DATA: Band 3

## 802.11a

|                 |                |                      |              |
|-----------------|----------------|----------------------|--------------|
| CHANNEL         | TX Channel 100 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz   |                      | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51 dBi

Note 1: The frequency is fundamental signal which can be ignored.

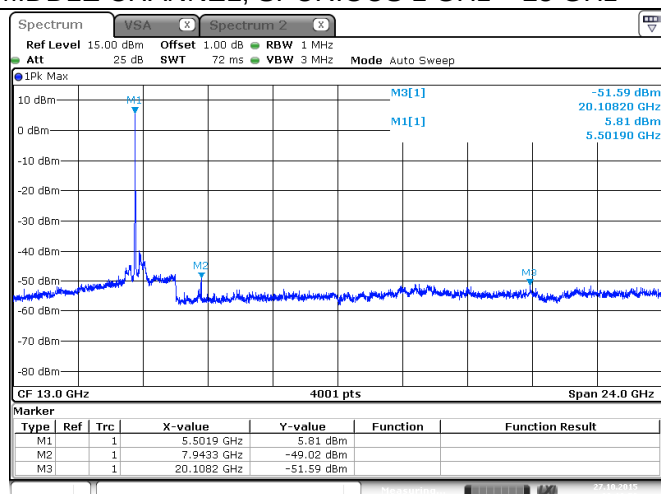
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th, 3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 7943.3          | -49.02      | 0                             | 3    | 3.51          | PK       | 49.75      | 84.58          | 34.83       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 64.58          | N/A         | Note 3 | PASS    |
| 20108.2         | -51.59      | 0                             | 3    | 3.51          | PK       | 47.18      | 74.00          | 26.82       | --     | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 54.00          | N/A         | Note 3 | PASS    |
| 5501.9          | 5.81        | 0                             | 3    | 3.51          | PK       | 104.58     | N/A            | N/A         | Note 1 | N/A     |
|                 | 5.36        |                               | 3    | 3.51          | AV       | 79.73      | N/A            | N/A         |        | N/A     |

## MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz



Date: 27.OCT.2015 20:12:50



|                 |                |                      |              |
|-----------------|----------------|----------------------|--------------|
| CHANNEL         | TX Channel 116 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz   |                      | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51 dBi

Note 1: The frequency is fundamental signal which can be ignored.

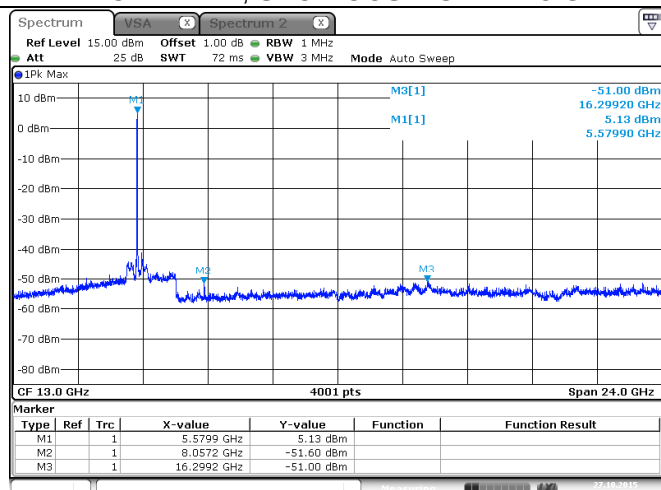
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th, 3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 8057.2          | -51.6       | 0                             | 3    | 3.51          | PK       | 47.17      | 74.00          | 26.83       | --     | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 54.00          | N/A         | Note 3 | PASS    |
| 16299.2         | -51         | 0                             | 3    | 3.51          | PK       | 47.77      | 83.90          | 36.13       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 63.90          | N/A         | Note 3 | PASS    |
| 5579.9          | 5.13        | 0                             | 3    | 3.51          | PK       | 103.90     | N/A            | N/A         | Note 1 | N/A     |
|                 | 4.68        |                               | 3    | 3.51          | AV       | 79.05      | N/A            | N/A         |        | N/A     |

#### MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz



Date: 27.OCT.2015 20:13:29



|                        |                |                              |              |
|------------------------|----------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 140 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 25GHz   |                              | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51 dBi

Note 1: The frequency is fundamental signal which can be ignored.

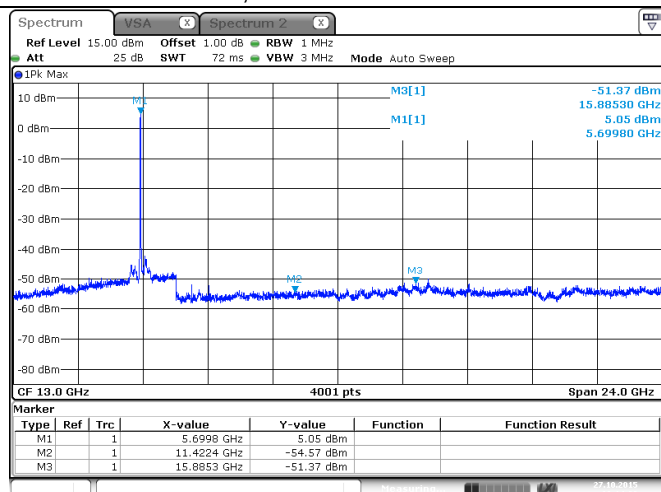
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th, 3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 11422.4         | -54.57      | 0                             | 3    | 3.51          | PK       | 44.20      | 74.00          | 29.80       | --     | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 54.00          | N/A         | Note 3 | PASS    |
| 15885.3         | -51.37      | 0                             | 3    | 3.51          | PK       | 47.40      | 83.82          | 36.42       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 63.82          | N/A         | Note 3 | PASS    |
| 5699.8          | 5.05        | 0                             | 3    | 3.51          | PK       | 103.82     | N/A            | N/A         | Note 1 | N/A     |
|                 | 4.60        |                               | 3    | 3.51          | AV       | 78.97      | N/A            | N/A         |        | N/A     |

#### MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz



Date: 27.OCT.2015 20:14:03

802.11n (20MHz)

|                        |                |                              |              |
|------------------------|----------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 100 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 25GHz   |                              | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51 dBi

Note 1: The frequency is fundamental signal which can be ignored.

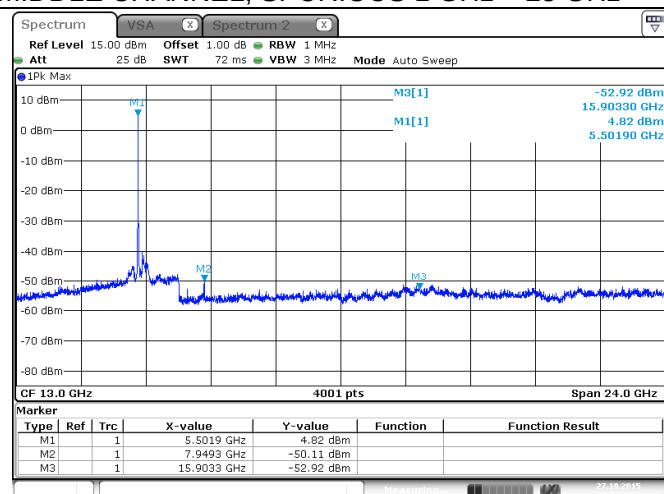
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th ,3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 7949.3          | -50.11      | 0                             | 3    | 3.51          | PK       | 48.66      | 83.59          | 34.93       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 63.59          | N/A         | Note 3 | PASS    |
| 15903.3         | -52.92      | 0                             | 3    | 3.51          | PK       | 45.85      | 83.59          | 37.74       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 63.59          | N/A         | Note 3 | PASS    |
| 5501.9          | 4.82        | 0                             | 3    | 3.51          | PK       | 103.59     | N/A            | N/A         | Note 1 | N/A     |
|                 | 4.37        |                               | 3    | 3.51          | AV       | 78.74      | N/A            | N/A         |        | N/A     |

MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz



Date: 27.OCT.2015 20:20:54



|                 |                |                      |              |
|-----------------|----------------|----------------------|--------------|
| CHANNEL         | TX Channel 116 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz   |                      | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51 dBi

Note 1: The frequency is fundamental signal which can be ignored.

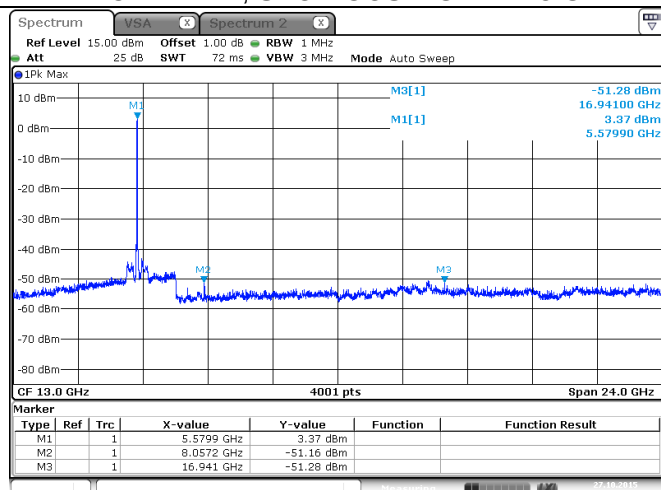
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th, 3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 8057.2          | -51.16      | 0                             | 3    | 3.51          | PK       | 47.61      | 74.00          | 26.39       | --     | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 54.00          | N/A         | Note 3 | PASS    |
| 16941           | -51.28      | 0                             | 3    | 3.51          | PK       | 47.49      | 82.14          | 34.65       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 62.14          | N/A         | Note 3 | PASS    |
| 5579.9          | 3.37        | 0                             | 3    | 3.51          | PK       | 102.14     | N/A            | N/A         | Note 1 | N/A     |
|                 | 2.92        |                               | 3    | 3.51          | AV       | 77.29      | N/A            | N/A         |        | N/A     |

#### MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz



Date: 27.OCT.2015 20:21:34





|                        |                |                              |              |
|------------------------|----------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 140 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 25GHz   |                              | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51 dBi

Note 1: The frequency is fundamental signal which can be ignored.

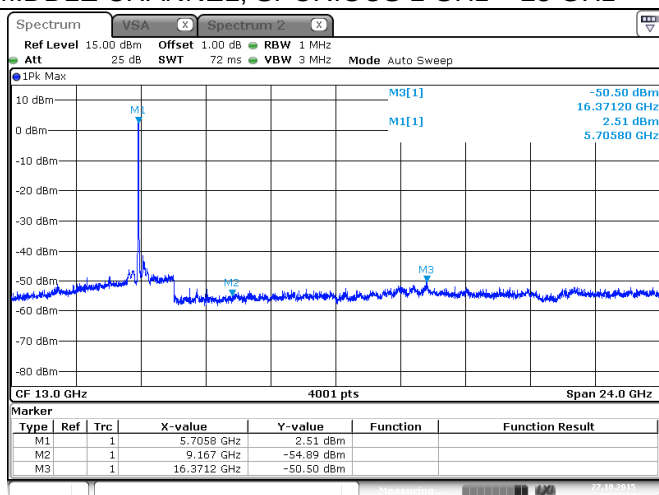
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th, 3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 9167            | -54.89      | 0                             | 3    | 3.51          | PK       | 43.88      | 74.00          | 30.12       | --     | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 54.00          | N/A         | Note 3 | PASS    |
| 16371.2         | -50.5       | 0                             | 3    | 3.51          | PK       | 48.27      | 81.28          | 33.01       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 61.28          | N/A         | Note 3 | PASS    |
| 5705.8          | 2.51        | 0                             | 3    | 3.51          | PK       | 101.28     | N/A            | N/A         | Note 1 | N/A     |
|                 | 2.06        |                               | 3    | 3.51          | AV       | 76.43      | N/A            | N/A         |        | N/A     |

#### MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz



Date: 27.OCT.2015 20:22:19

**ABOVE 1GHz WORST-CASE DATA: Band 4**

**802.11a**

|                        |                |                              |              |
|------------------------|----------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 149 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 25GHz   |                              | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51 dBi

Note 1: The frequency is fundamental signal which can be ignored.

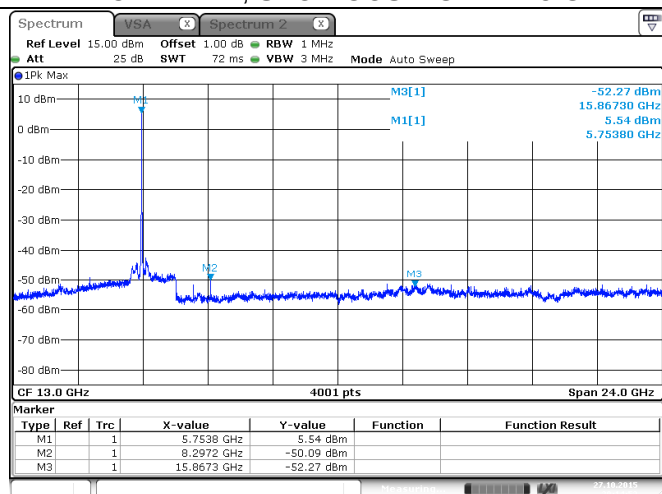
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th, 3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 8297.2          | -50.09      | 0                             | 3    | 3.51          | PK       | 48.68      | 74.00          | 25.32       | --     | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 54.00          | N/A         | Note 3 | PASS    |
| 15867.3         | -52.27      | 0                             | 3    | 3.51          | PK       | 46.50      | 84.31          | 37.81       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 64.31          | N/A         | Note 3 | PASS    |
| 5753.8          | 5.54        | 0                             | 3    | 3.51          | PK       | 104.31     | N/A            | N/A         | Note 1 | N/A     |
|                 | 5.09        |                               | 3    | 3.51          | AV       | 79.46      | N/A            | N/A         |        | N/A     |

**MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz**



Date: 27.OCT.2015 20:14:52

|                        |                |                              |              |
|------------------------|----------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 157 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 25GHz   |                              | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51 dBi

Note 1: The frequency is fundamental signal which can be ignored.

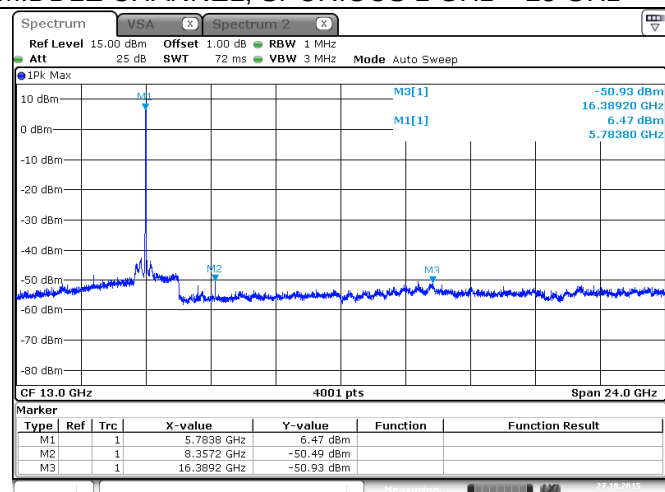
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th ,3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 8357.2          | -50.49      | 0                             | 3    | 3.51          | PK       | 48.28      | 74.00          | 25.72       | --     | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 54.00          | N/A         | Note 3 | PASS    |
| 16389.2         | -50.93      | 0                             | 3    | 3.51          | PK       | 47.84      | 85.24          | 37.40       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 65.24          | N/A         | Note 3 | PASS    |
| 5783.8          | 6.47        | 0                             | 3    | 3.51          | PK       | 105.24     | N/A            | N/A         | Note 1 | N/A     |
|                 | 6.02        |                               | 3    | 3.51          | AV       | 80.39      | N/A            | N/A         |        | N/A     |

#### MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz



Date: 27.OCT.2015 20:15:33



|                 |                |                      |              |
|-----------------|----------------|----------------------|--------------|
| CHANNEL         | TX Channel 161 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz   |                      | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51 dBi

Note 1: The frequency is fundamental signal which can be ignored.

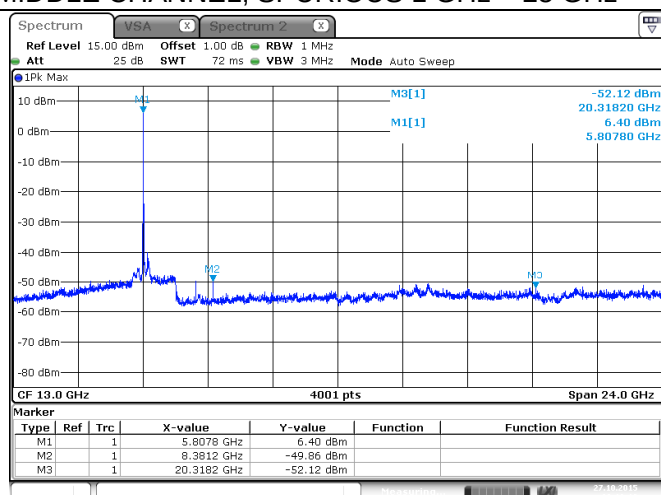
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th, 3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 8381.2          | -49.86      | 0                             | 3    | 3.51          | PK       | 48.91      | 74.00          | 25.09       | --     | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 54.00          | N/A         | Note 3 | PASS    |
| 20318.2         | -52.12      | 0                             | 3    | 3.51          | PK       | 46.65      | 85.17          | 38.52       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 65.17          | N/A         | Note 3 | PASS    |
| 5807.8          | 6.4         | 0                             | 3    | 3.51          | PK       | 105.17     | N/A            | N/A         | Note 1 | N/A     |
|                 | 5.95        |                               | 3    | 3.51          | AV       | 80.32      | N/A            | N/A         |        | N/A     |

#### MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz



Date: 27.OCT.2015 20:16:10

802.11n (20MHz)



|                 |                |                      |              |
|-----------------|----------------|----------------------|--------------|
| CHANNEL         | TX Channel 149 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz   |                      | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51 dBi

Note 1: The frequency is fundamental signal which can be ignored.

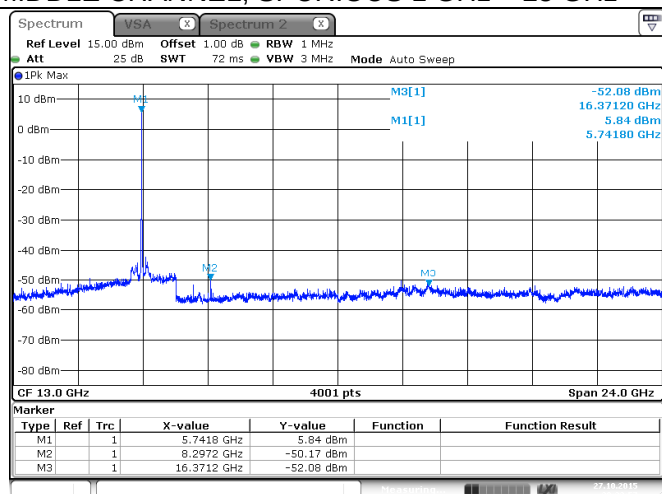
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th, 3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 8297.2          | -50.17      | 0                             | 3    | 3.51          | PK       | 48.60      | 74.00          | 25.40       | --     | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 54.00          | N/A         | Note 3 | PASS    |
| 16371.2         | -52.08      | 0                             | 3    | 3.51          | PK       | 46.69      | 84.61          | 37.92       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 64.61          | N/A         | Note 3 | PASS    |
| 5741.8          | 5.84        | 0                             | 3    | 3.51          | PK       | 104.61     | N/A            | N/A         | Note 1 | N/A     |
|                 | 5.39        |                               | 3    | 3.51          | AV       | 79.76      | N/A            | N/A         |        | N/A     |

#### MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz



Date: 27.OCT.2015 20:22:58



|                 |                |                      |              |
|-----------------|----------------|----------------------|--------------|
| CHANNEL         | TX Channel 157 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz   |                      | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51 dBi

Note 1: The frequency is fundamental signal which can be ignored.

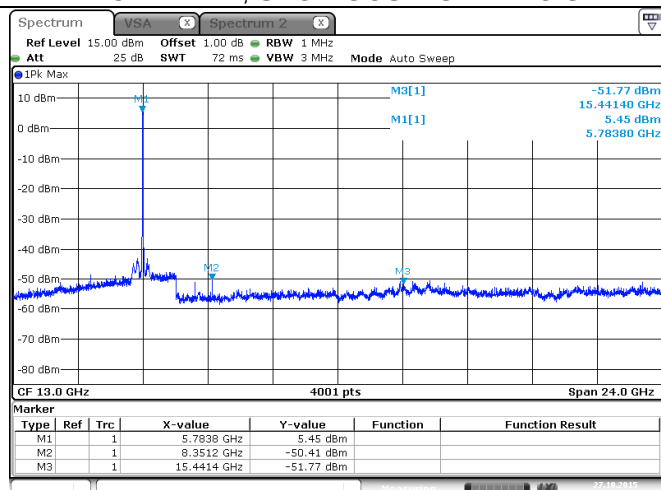
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th, 3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 8351.2          | -50.41      | 0                             | 3    | 3.51          | PK       | 48.36      | 74.00          | 25.64       | --     | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 54.00          | N/A         | Note 3 | PASS    |
| 15441.4         | -51.77      | 0                             | 3    | 3.51          | PK       | 47.00      | 84.22          | 37.22       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 64.22          | N/A         | Note 3 | PASS    |
| 5783.8          | 5.45        | 0                             | 3    | 3.51          | PK       | 104.22     | N/A            | N/A         | Note 1 | N/A     |
|                 | 5.00        |                               | 3    | 3.51          | AV       | 79.37      | N/A            | N/A         |        | N/A     |

#### MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz



Date: 27.OCT.2015 20:23:35



|                 |                |                      |              |
|-----------------|----------------|----------------------|--------------|
| CHANNEL         | TX Channel 161 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 25GHz   |                      | Average (AV) |

The EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2dBi, whichever is greater.

And the maximum in-band gain of the antenna is 3.51dBi

Note 1: The frequency is fundamental signal which can be ignored.

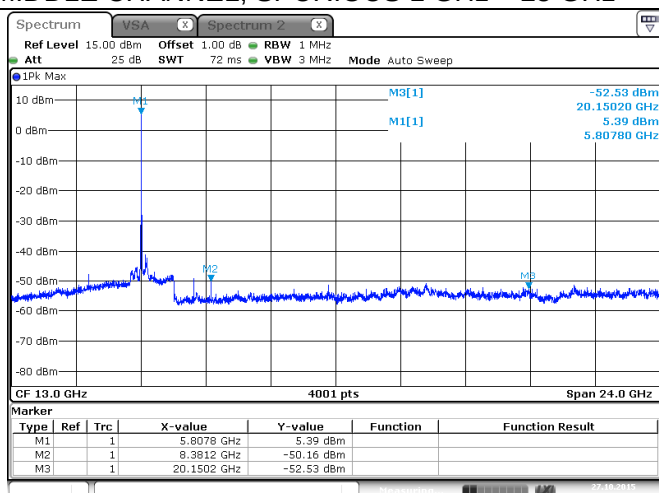
Note 2: Which frequency is not within a restricted band, and its limit line is 20dB below the highest emission level.

Note 3: Average measurement was not performed if peak level went lower than the average limit.

Note 4: The harmonic (2th, 3th, 4th,...etc.) and other spurious are not reported, because those levels are lower than average limit line and background noise

| Frequency (MHz) | Value (dBm) | Ground Reflection Factor (dB) | D(m) | Max gain(dBi) | Detector | E (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Remark | Verdict |
|-----------------|-------------|-------------------------------|------|---------------|----------|------------|----------------|-------------|--------|---------|
| 8381.2          | -50.16      | 0                             | 3    | 3.51          | PK       | 48.61      | 74.00          | 25.39       | --     | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 54.00          | N/A         | Note 3 | PASS    |
| 20150.2         | -52.53      | 0                             | 3    | 3.51          | PK       | 46.24      | 84.16          | 37.92       | Note 2 | PASS    |
|                 | N/A         |                               | 3    | 3.51          | AV       | N/A        | 64.16          | N/A         | Note 3 | PASS    |
| 5807.8          | 5.39        | 0                             | 3    | 3.51          | PK       | 104.16     | N/A            | N/A         | Note 1 | N/A     |
|                 | 4.94        |                               | 3    | 3.51          | AV       | 79.31      | N/A            | N/A         |        | N/A     |

#### MIDDLE CHANNEL, SPURIOUS 1 GHz ~ 25 GHz



Date: 27.OCT.2015 20:24:08

### Cabinet Radiated spurious emission test

Note 1: The symbol of "--" in the table which means not application.

Note 2: For the test data above 1 GHz, according the ANSI C63.4, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

Note 3: The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

Note 4: All configurations have been tested, only the worst configuration (Band I 802.11a CH36) show here

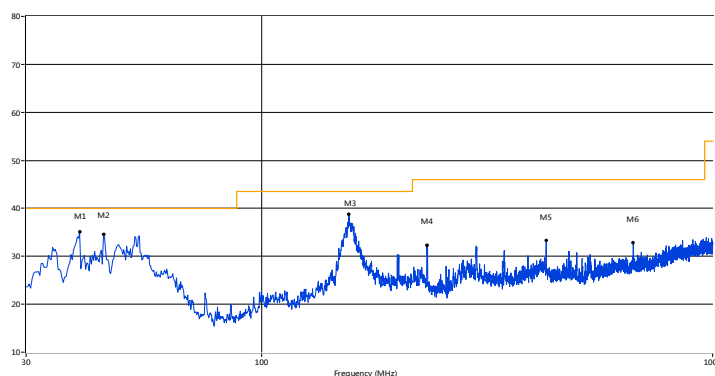
### 802.11a

|                        |              |                              |                 |
|------------------------|--------------|------------------------------|-----------------|
| <b>CHANNEL</b>         | Channel 36   | <b>DETECTOR<br/>FUNCTION</b> | Quasi-Peak (QP) |
| <b>FREQUENCY RANGE</b> | 30MHz ~ 1GHz |                              |                 |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                 |                  |             |                |             |          |           |             |
|-----------------------------------------------------|-----------------|------------------|-------------|----------------|-------------|----------|-----------|-------------|
| NO.                                                 | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Margin (dB) | Detector | Table (o) | Height (cm) |
| 1                                                   | 35.58           | 26.98            | -21.22      | 40.0           | -13.02      | Peak     | 233.20    | 100         |
| 2                                                   | 58.85           | 31.08            | -19.94      | 40.0           | -8.92       | Peak     | 0.40      | 100         |
| 3                                                   | 108.79          | 26.31            | -20.24      | 43.5           | -17.19      | Peak     | 111.10    | 100         |
| 4                                                   | 341.78          | 31.13            | -16.31      | 46.0           | -14.87      | Peak     | 344.40    | 100         |
| 5                                                   | 427.36          | 35.30            | -14.62      | 46.0           | -10.70      | Peak     | 38.70     | 100         |
| 6                                                   | 512.94          | 32.32            | -13.01      | 46.0           | -13.68      | Peak     | 99.90     | 100         |

### REMARKS:

- The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.3. The other emission levels were very low against the limit.
- According the ANSI C63.4, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.
- Margin value = Results– Limit.



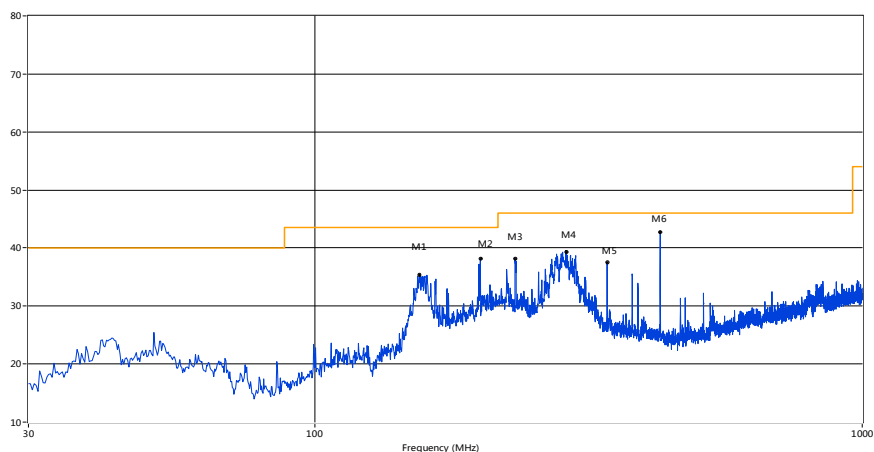


|                        |              |                              |                 |
|------------------------|--------------|------------------------------|-----------------|
| <b>CHANNEL</b>         | Channel 36   | <b>DETECTOR<br/>FUNCTION</b> | Quasi-Peak (QP) |
| <b>FREQUENCY RANGE</b> | 30MHz ~ 1GHz |                              |                 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                 |                  |             |                |             |          |           |             |
|---------------------------------------------------|-----------------|------------------|-------------|----------------|-------------|----------|-----------|-------------|
| NO.                                               | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Margin (dB) | Detector | Table (o) | Height (cm) |
| 1                                                 | 70.49           | 27.14            | -22.93      | 40.0           | -12.86      | Peak     | 42.50     | 100         |
| 2                                                 | 108.31          | 28.11            | -20.20      | 43.5           | -15.39      | Peak     | -0.00     | 100         |
| 3                                                 | 170.86          | 28.10            | -22.62      | 43.5           | -15.40      | Peak     | 227.40    | 100         |
| 4                                                 | 256.44          | 40.97            | -18.74      | 46.0           | -5.03       | Peak     | 53.60     | 100         |
| 5                                                 | 341.78          | 36.83            | -16.31      | 46.0           | -9.17       | Peak     | 155.00    | 100         |
| 6                                                 | 427.36          | 39.90            | -14.62      | 46.0           | -6.10       | Peak     | 277.30    | 100         |

**REMARKS:**

1. The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.3. The other emission levels were very low against the limit.
2. According the ANSI C63.4, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.
3. Margin value = Results– Limit.

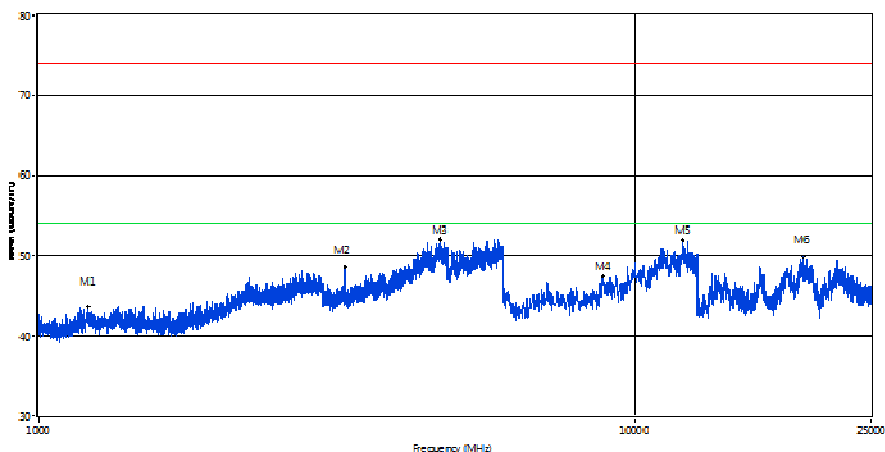


|                        |              |                              |              |
|------------------------|--------------|------------------------------|--------------|
| <b>CHANNEL</b>         | Channel 36   | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 25GHz |                              | Average (AV) |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                |                     |             |                   |             |          |           |             |
|---------------------------------------------------|----------------|---------------------|-------------|-------------------|-------------|----------|-----------|-------------|
| NO.                                               | FREQ.<br>(MHz) | Results<br>(dBuV/m) | Factor (dB) | Limit<br>(dBuV/m) | Margin (dB) | Detector | Table (o) | Height (cm) |
| 1                                                 | 1215.95        | 43.63               | -5.09       | 74.0              | -30.37      | Peak     | 208.80    | 100         |
| 2                                                 | 3263.93        | 48.67               | 9.06        | 74.0              | -25.33      | Peak     | 129.20    | 100         |
| 3                                                 | 4728.32        | 51.99               | 13.62       | 74.0              | -22.01      | Peak     | 178.10    | 100         |
| 4                                                 | 8841.51        | 47.33               | 16.58       | 74.0              | -26.67      | Peak     | 121.20    | 100         |
| 5                                                 | 12042.43       | 51.83               | 20.83       | 74.0              | -22.17      | Peak     | 0.30      | 100         |
| 6                                                 | 19179.70       | 49.84               | 14.04       | 74.0              | -24.16      | Peak     | 66.70     | 100         |

**REMARKS:**

1. According the ANSI C63.4, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.
2. Margin value = Results– Limit.

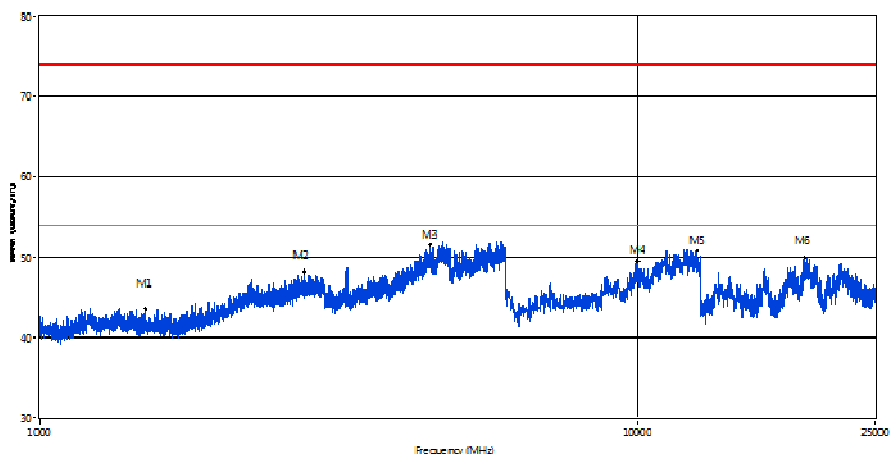


|                        |              |                              |              |
|------------------------|--------------|------------------------------|--------------|
| <b>CHANNEL</b>         | Channel 36   | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 25GHz |                              | Average (AV) |

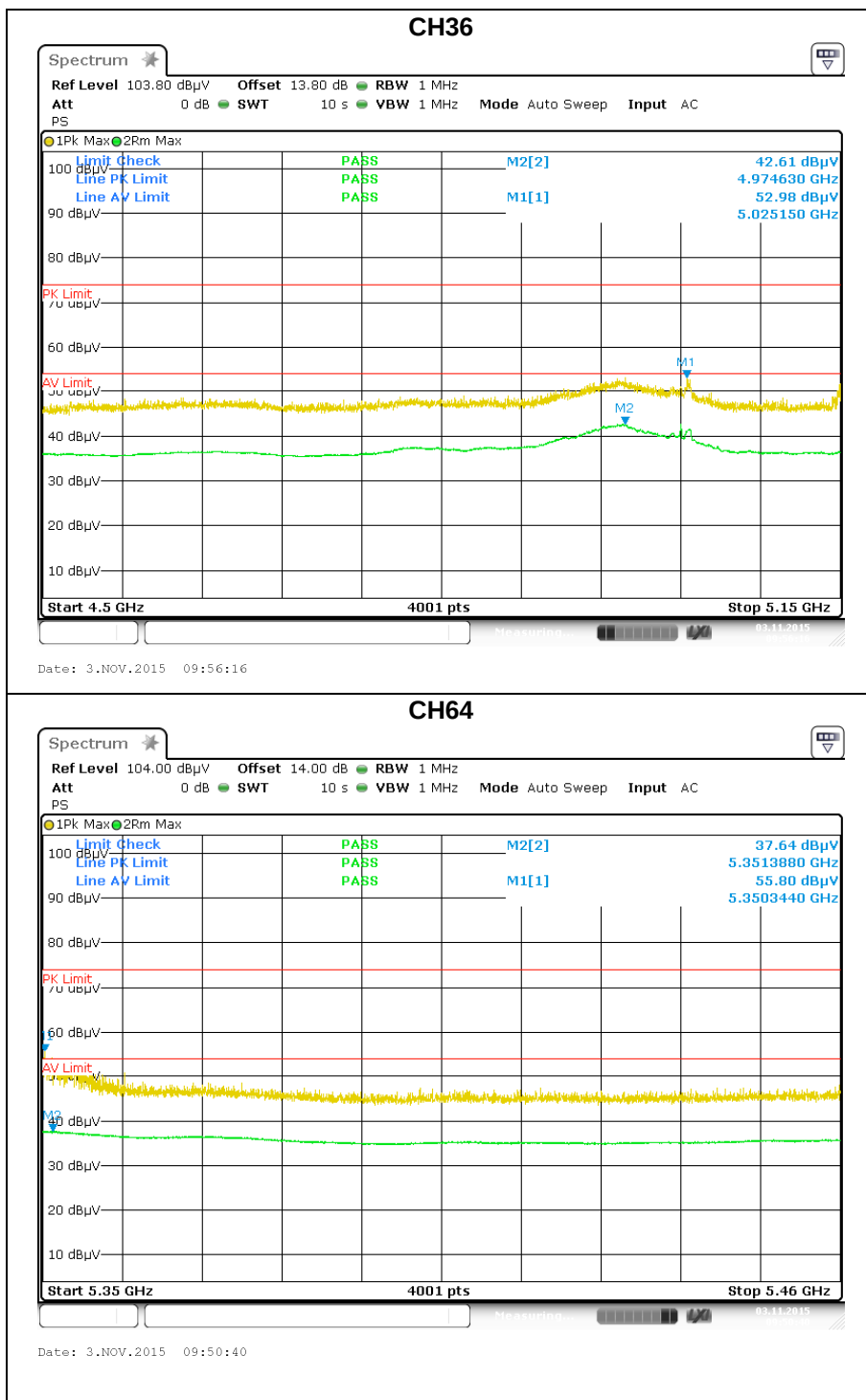
| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                |                     |             |                   |             |          |           |             |
|-----------------------------------------------------|----------------|---------------------|-------------|-------------------|-------------|----------|-----------|-------------|
| NO.                                                 | FREQ.<br>(MHz) | Results<br>(dBuV/m) | Factor (dB) | Limit<br>(dBuV/m) | Margin (dB) | Detector | Table (o) | Height (cm) |
| 1                                                   | 1505.87        | 43.63               | -4.33       | 74.0              | -30.37      | Peak     | 57.80     | 100         |
| 2                                                   | 2770.56        | 48.17               | 1.53        | 74.0              | -25.83      | Peak     | 10.10     | 100         |
| 3                                                   | 4510.87        | 51.55               | 12.74       | 74.0              | -22.45      | Peak     | 110.00    | 100         |
| 4                                                   | 10009.57       | 49.46               | 19.33       | 74.0              | -24.54      | Peak     | 281.00    | 100         |
| 5                                                   | 12559.07       | 50.75               | 19.96       | 74.0              | -23.25      | Peak     | 157.90    | 100         |
| 6                                                   | 19009.98       | 49.93               | 13.42       | 74.0              | -24.07      | Peak     | 189.80    | 100         |

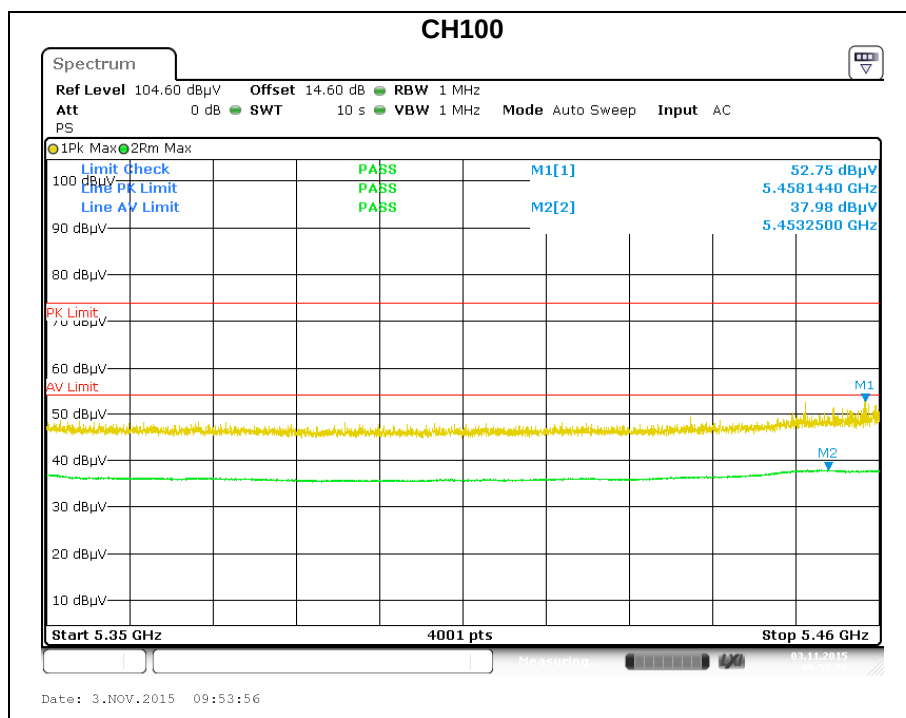
**REMARKS:**

1. According the ANSI C63.4, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.
2. Margin value = Results– Limit.



Bandage  
802.11a



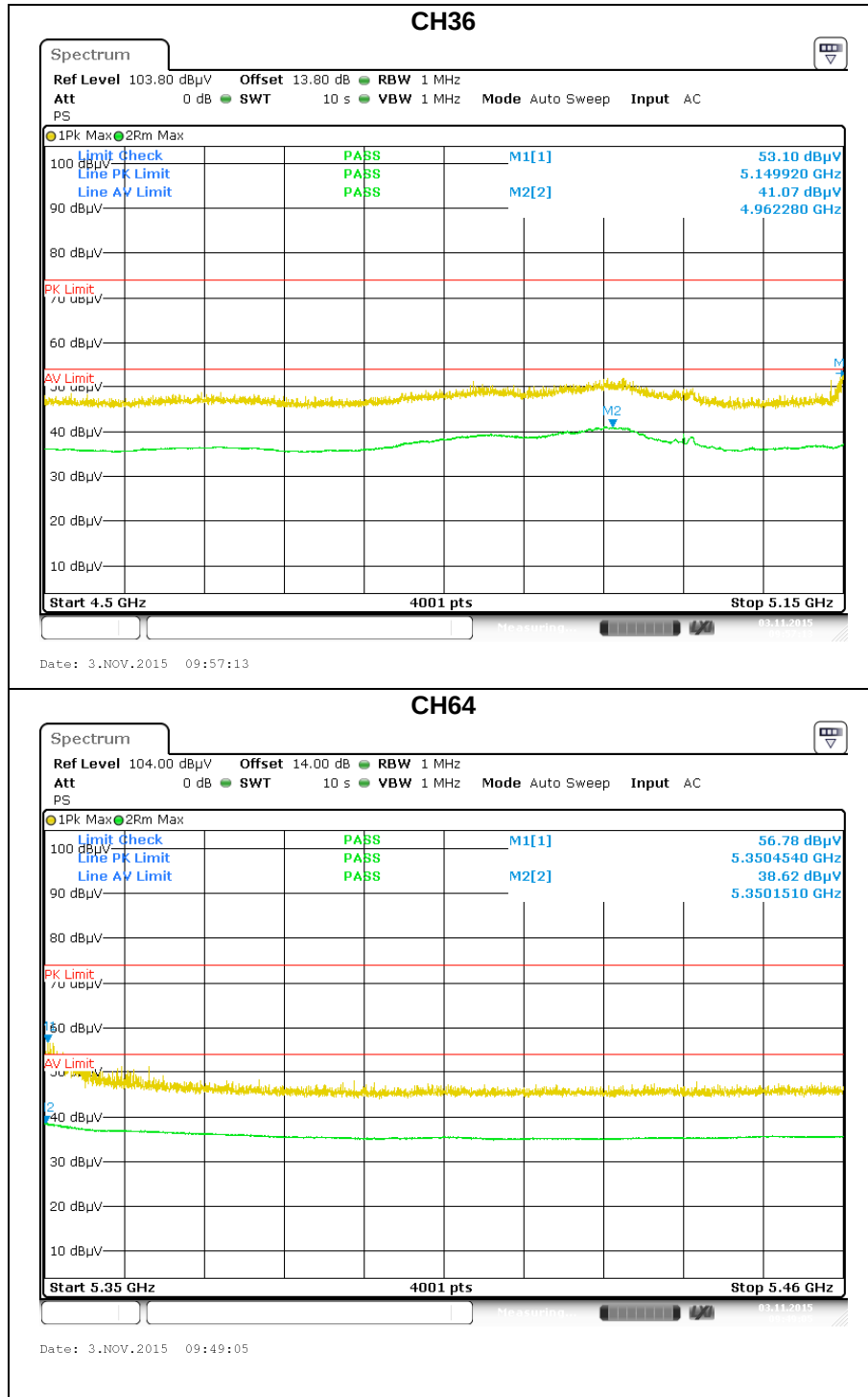




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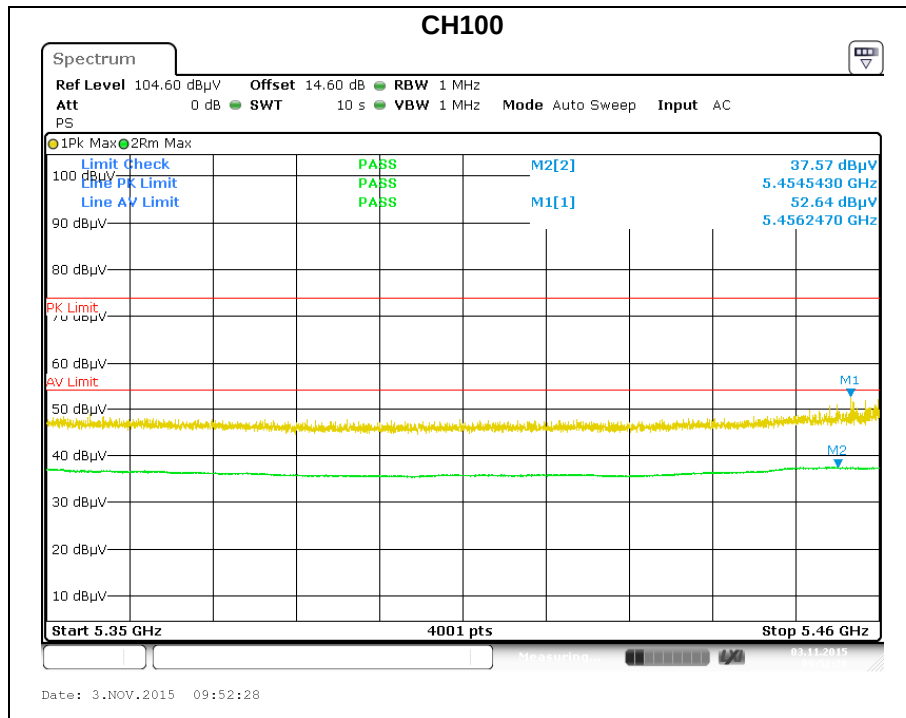
802.11n20





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Test Report No.: RF151008N004-3R1



## 4.2 CONDUCTED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

| FREQUENCY OF EMISSION (MHz) | CONDUCTED LIMIT (dBμV) |          |
|-----------------------------|------------------------|----------|
|                             | Quasi-peak             | Average  |
| 0.15 ~ 0.5                  | 66 to 56               | 56 to 46 |
| 0.5 ~ 5                     | 56                     | 46       |
| 5 ~ 30                      | 60                     | 50       |

**NOTE:** 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

### 4.2.2 TEST INSTRUMENTS

| Equipment                | Manufacturer  | Model No.       | Serial No. | Last Cal.  | Next Cal.  |
|--------------------------|---------------|-----------------|------------|------------|------------|
| EMI Test Receiver        | Rohde&Schwarz | ESU 26          | 100005     | Apr. 25,15 | Apr. 24,16 |
| Artificial Mains Network | Rohde&Schwarz | ENV216          | 101173     | Apr. 25,15 | Apr. 24,16 |
| Artificial Mains Network | Rohde&Schwarz | ESH3-Z5         | 100317     | Apr. 25,15 | Apr. 24,16 |
| Test software            | ADT           | ADT_Conc_V7.3.7 | N/A        | N/A        | N/A        |

**NOTE:**

1. The test was performed in shielded room 553.

2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

### 4.2.3 TEST PROCEDURES

- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

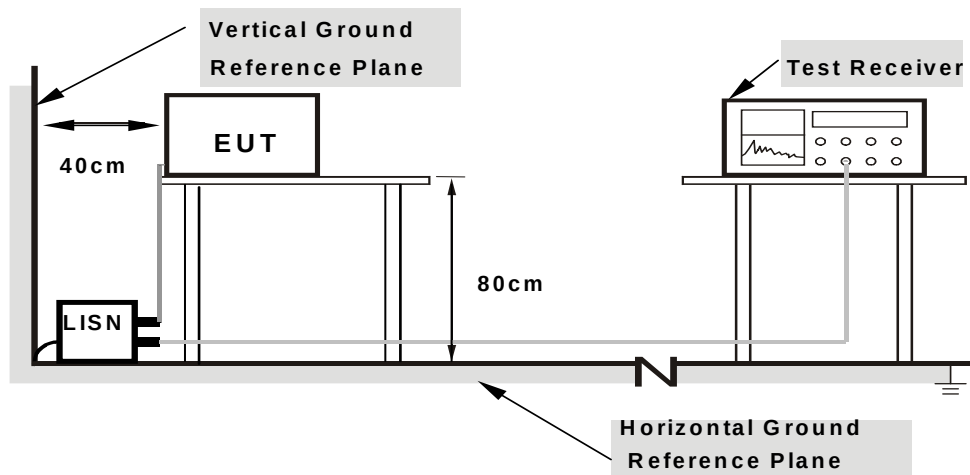
**NOTE:** All modes of operation were investigated and the worst-case emissions are reported.



#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.2.5 TEST SETUP



**Note:** 1.Support units were connected to second LISN.  
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80  
from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

#### 4.2.7 TEST RESULTS

##### CONDUCTED WORST-CASE DATA : 802.11a

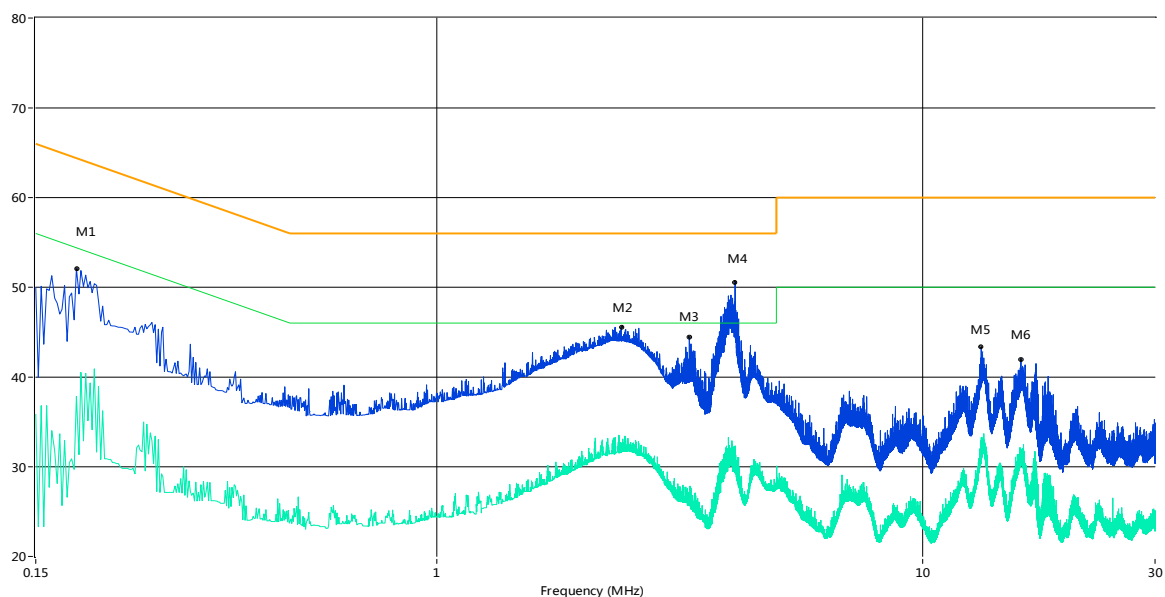
|         |            |               |      |
|---------|------------|---------------|------|
| PHASE   | Line       | 6dB BANDWIDTH | 9kHz |
| CHANNEL | Channel 36 |               |      |

| No  | Frequency (MHz) | Results (dBuV) | Factor (dB)  | Limit (dBuV) | Margin (dB)  | Detector    |
|-----|-----------------|----------------|--------------|--------------|--------------|-------------|
| 1   | 0.18            | 52.1           | 13.00        | 65.1         | -13.00       | Peak        |
| 1** | 0.18            | 37.8           | 13.00        | 55.1         | -17.30       | AV          |
| 2   | 2.40            | 45.5           | 13.00        | 56.0         | -10.50       | Peak        |
| 2** | 2.40            | 32.6           | 13.00        | 46.0         | -13.40       | AV          |
| 3   | 3.31            | 44.4           | 13.00        | 56.0         | -11.60       | Peak        |
| 3** | 3.31            | 26.7           | 13.00        | 46.0         | -19.30       | AV          |
| 4   | <b>4.11</b>     | <b>50.6</b>    | <b>13.00</b> | <b>56.0</b>  | <b>-5.40</b> | <b>Peak</b> |
| 4** | 4.11            | 32.3           | 13.00        | 46.0         | -13.70       | AV          |
| 5   | 13.18           | 43.3           | 13.00        | 60.0         | -16.70       | Peak        |
| 5** | 13.18           | 33.3           | 13.00        | 50.0         | -16.70       | AV          |
| 6   | 15.89           | 42.0           | 13.00        | 60.0         | -18.00       | Peak        |
| 6** | 15.89           | 30.2           | 13.00        | 50.0         | -19.80       | AV          |

#### REMARKS:

1. The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors.

2. Margin value = Results - Limit



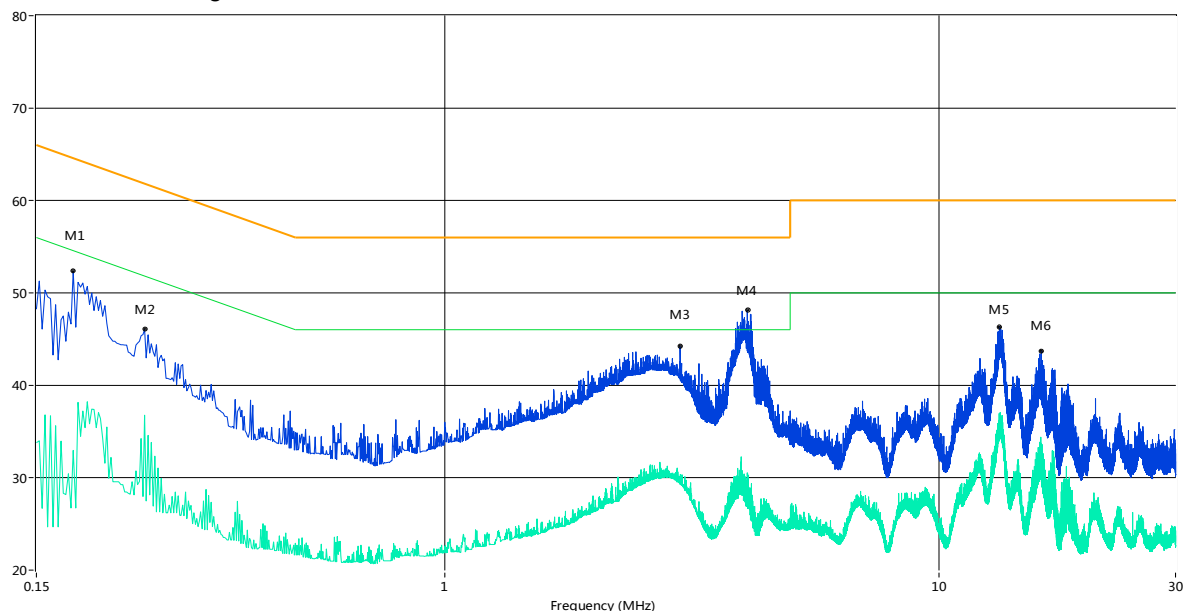
|         |            |               |      |
|---------|------------|---------------|------|
| PHASE   | Neutral    | 6dB BANDWIDTH | 9kHz |
| CHANNEL | Channel 36 |               |      |

| No  | Frequency (MHz) | Results (dBuV) | Factor (dB) | Limit (dBuV) | Margin (dB) | Detector |
|-----|-----------------|----------------|-------------|--------------|-------------|----------|
| 1   | 0.18            | 52.4           | 13.00       | 65.2         | -12.80      | Peak     |
| 1** | 0.18            | 32.9           | 13.00       | 55.2         | -22.30      | AV       |
| 2   | 0.25            | 46.0           | 13.00       | 63.2         | -17.20      | Peak     |
| 2** | 0.25            | 36.7           | 13.00       | 53.2         | -16.50      | AV       |
| 3   | 2.99            | 44.2           | 13.00       | 56.0         | -11.80      | Peak     |
| 3** | 2.99            | 29.3           | 13.00       | 46.0         | -16.70      | AV       |
| 4   | 4.09            | 48.1           | 13.00       | 56.0         | -7.90       | Peak     |
| 4** | 4.09            | 30.5           | 13.00       | 46.0         | -15.50      | AV       |
| 5   | 13.23           | 46.3           | 13.00       | 60.0         | -13.70      | Peak     |
| 5** | 13.23           | 33.8           | 13.00       | 50.0         | -16.20      | AV       |
| 6   | 16.08           | 43.7           | 13.00       | 60.0         | -16.30      | Peak     |
| 6** | 16.08           | 33.7           | 13.00       | 50.0         | -16.30      | AV       |

**REMARKS:**

1. The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors.

2. Margin value = Results - Limit





Charger ASSA55e-050200

**CONDUCTED WORST-CASE DATA : 802.11a**

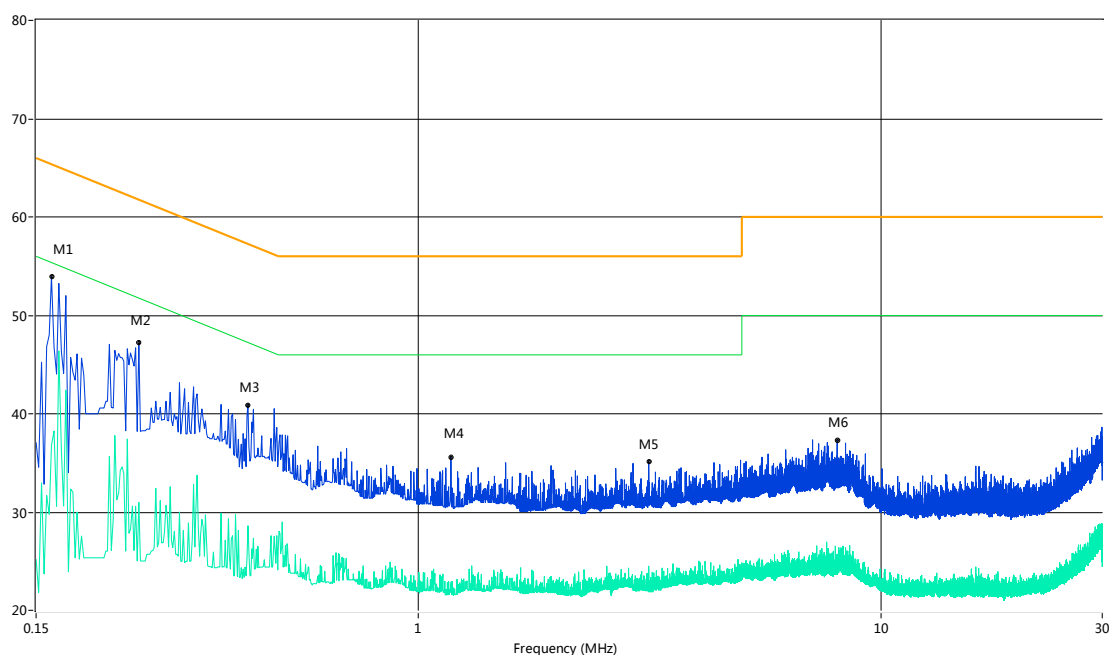
|         |            |               |      |
|---------|------------|---------------|------|
| PHASE   | Line       | 6dB BANDWIDTH | 9kHz |
| CHANNEL | Channel 36 |               |      |

| No  | Frequency (MHz) | Results (dBuV) | Factor (dB) | Limit (dBuV) | Margin (dB) | Detector |
|-----|-----------------|----------------|-------------|--------------|-------------|----------|
| 1   | 0.16            | 54.0           | 13.00       | 65.7         | -11.7       | Peak     |
| 1** | 0.16            | 36.8           | 13.00       | 55.7         | -18.9       | AV       |
| 2   | 0.25            | 47.2           | 13.00       | 63.1         | -15.9       | Peak     |
| 2** | 0.25            | 31.0           | 13.00       | 53.1         | -22.1       | AV       |
| 3   | 0.43            | 40.9           | 13.00       | 58.0         | -17.1       | Peak     |
| 3** | 0.43            | 28.6           | 13.00       | 48.0         | -19.4       | AV       |
| 4   | 1.18            | 35.6           | 13.00       | 56.0         | -20.4       | Peak     |
| 4** | 1.18            | 22.8           | 13.00       | 46.0         | -23.2       | AV       |
| 5   | 3.15            | 35.2           | 13.00       | 56.0         | -20.8       | Peak     |
| 5** | 3.15            | 24.5           | 13.00       | 46.0         | -21.5       | AV       |
| 6   | 8.03            | 37.3           | 13.00       | 60.0         | -22.7       | Peak     |
| 6** | 8.03            | 23.7           | 13.00       | 50.0         | -26.3       | AV       |

**REMARKS:**

1. The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors.

2. Margin value = Results - Limit



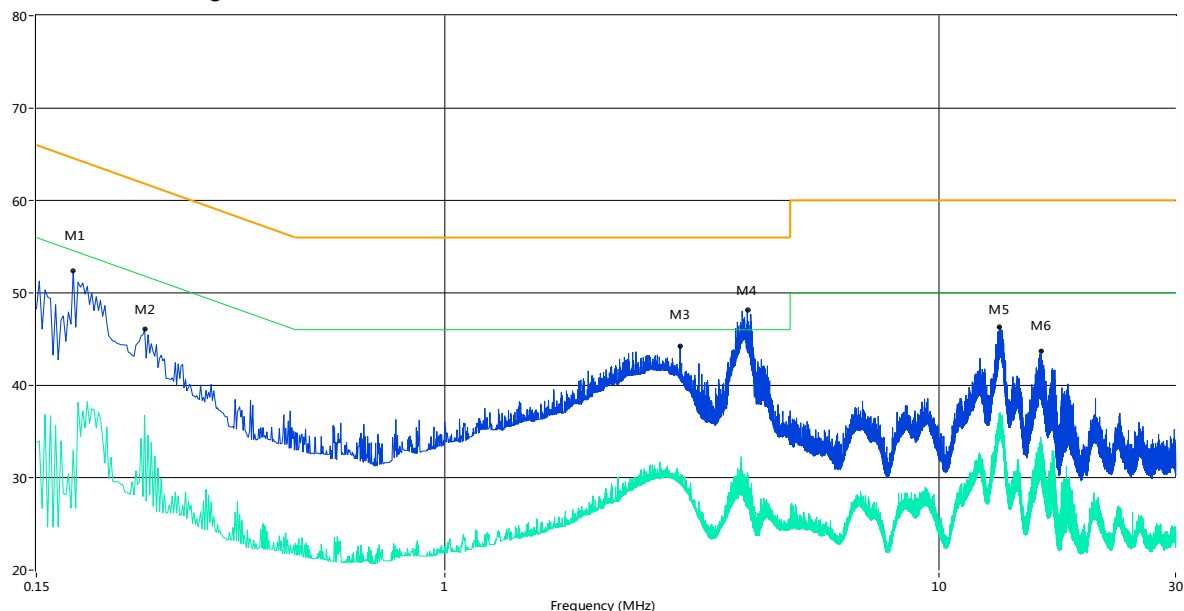
|         |            |               |      |
|---------|------------|---------------|------|
| PHASE   | Neutral    | 6dB BANDWIDTH | 9kHz |
| CHANNEL | Channel 36 |               |      |

| No  | Frequency (MHz) | Results (dBuV) | Factor (dB) | Limit (dBuV) | Margin (dB) | Detector |
|-----|-----------------|----------------|-------------|--------------|-------------|----------|
| 1   | 0.17            | 51.6           | 13.00       | 65.5         | -13.9       | Peak     |
| 1** | 0.17            | 37.5           | 13.00       | 55.5         | -18.0       | AV       |
| 2   | 0.24            | 46.2           | 13.00       | 63.5         | -17.3       | Peak     |
| 2** | 0.24            | 30.7           | 13.00       | 53.5         | -22.8       | AV       |
| 3   | 0.49            | 40.7           | 13.00       | 56.2         | -15.5       | Peak     |
| 3** | 0.49            | 26.1           | 13.00       | 46.2         | -20.1       | AV       |
| 4   | 0.69            | 39.5           | 13.00       | 56.0         | -16.5       | Peak     |
| 4** | 0.69            | 23.3           | 13.00       | 46.0         | -22.7       | AV       |
| 5   | 2.54            | 37.9           | 13.00       | 56.0         | -18.1       | Peak     |
| 5** | 2.54            | 21.9           | 13.00       | 46.0         | -24.1       | AV       |
| 6   | 5.05            | 38.0           | 13.00       | 60.0         | -22.0       | Peak     |
| 6** | 5.05            | 24.2           | 13.00       | 50.0         | -25.8       | AV       |

**REMARKS:**

1. The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors.

2. Margin value = Results - Limit



## 4.3 CONDUCTED OUTPUT POWER MEASUREMENT

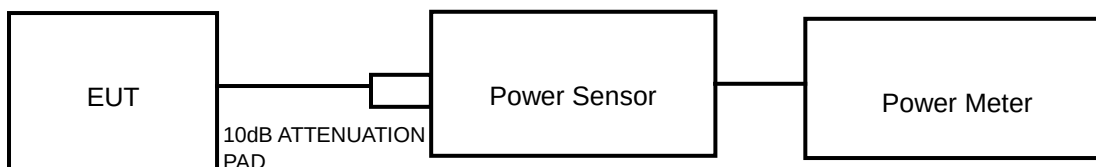
### 4.3.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

| Operation Band | EUT Category |                                   | LIMIT                                                                                                                       |
|----------------|--------------|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| U-NII-1        |              | Outdoor Access Point              | 1 Watt (30 dBm)<br>(Max. e.i.r.p $\leq$ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon) |
|                |              | Fixed point-to-point Access Point | 1 Watt (30 dBm)                                                                                                             |
|                |              | Indoor Access Point               | 1 Watt (30 dBm)                                                                                                             |
|                | √            | Mobile and Portable client device | 250mW (24 dBm)                                                                                                              |
| U-NII-2A       | √            |                                   | 250mW(24dBm) or 11 dBm+10LogB*                                                                                              |
| U-NII-2C       | √            |                                   | 250mW(24dBm) or 11 dBm+10LogB*                                                                                              |
| U-NII-3        | √            |                                   | 1 Watt (30 dBm)                                                                                                             |

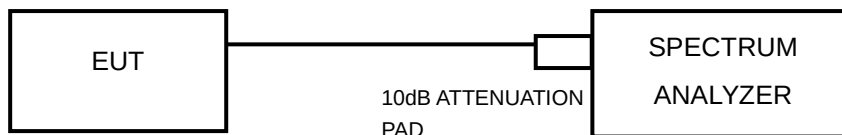
**NOTE:** 1. Where B is the 26dB emission bandwidth in MHz.

### 4.3.2 TEST SETUP

#### FOR POWER OUTPUT MEASUREMENT



#### FOR 6/26dB BANDWIDTH



### 4.3.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

#### 4.3.4 TEST PROCEDURE

##### FOR AVERAGE POWER MEASUREMENT

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

##### FOR 26dB BANDWIDTH

- 1) Set RBW = approximately 1% of the emission bandwidth.
- 2) Set the VBW > RBW.
- 3) Detector = RMS.
- 4) Trace mode = max hold.
- 5) 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%.

##### FOR 6dB BANDWIDTH

- 1) Set RBW = 100 kHz.
- 2) Set the video bandwidth (VBW)  $\geq 3$  RBW.
- 3) Detector = Peak.
- 4) Trace mode = max hold.
- 5) Sweep = auto couple.
- 6) Allow the trace to stabilize.
- 7) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

#### 4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.



#### 4.3.7 TEST RESULTS

##### OUTPUT POWER:

##### Band I

| Mode       | CHANNEL | CHANNEL<br>FREQUENCY<br>(MHz) | MAX. OUTPUT<br>POWER (mW) | MAX. OUTPUT<br>POWER (dBm) | POWER LIMIT<br>(dBm) | PASS/FAIL |
|------------|---------|-------------------------------|---------------------------|----------------------------|----------------------|-----------|
| 11a        | 36      | 5180                          | 5.1286                    | 7.10                       | 24                   | PASS      |
| 11a        | 44      | 5220                          | 7.0469                    | 8.48                       | 24                   | PASS      |
| 11a        | 48      | 5240                          | 7.5509                    | 8.78                       | 24                   | PASS      |
| 11n (HT20) | 36      | 5180                          | 4.9545                    | 6.95                       | 24                   | PASS      |
| 11n (HT20) | 44      | 5220                          | 5.5719                    | 7.46                       | 24                   | PASS      |
| 11n (HT20) | 48      | 5240                          | 5.3088                    | 7.25                       | 24                   | PASS      |

##### Band II

| Mode       | CHANNEL | CHANNEL<br>FREQUENCY<br>(MHz) | MAX. OUTPUT<br>POWER (mW) | MAX. OUTPUT<br>POWER (dBm) | POWER LIMIT<br>(dBm) | PASS/FAIL |
|------------|---------|-------------------------------|---------------------------|----------------------------|----------------------|-----------|
| 11a        | 52      | 5260                          | 7.8886                    | 8.97                       | 24                   | PASS      |
| 11a        | 60      | 5300                          | 7.9616                    | 9.01                       | 24                   | PASS      |
| 11a        | 64      | 5320                          | 7.8886                    | 8.97                       | 24                   | PASS      |
| 11n (HT20) | 52      | 5260                          | 5.0699                    | 7.05                       | 24                   | PASS      |
| 11n (HT20) | 60      | 5280                          | 6.4863                    | 8.12                       | 24                   | PASS      |
| 11n (HT20) | 64      | 5320                          | 6.0814                    | 7.84                       | 24                   | PASS      |

##### Band III

| Mode       | CHANNEL | CHANNEL<br>FREQUENCY<br>(MHz) | MAX. OUTPUT<br>POWER (mW) | MAX. OUTPUT<br>POWER (dBm) | POWER LIMIT<br>(dBm) | PASS/FAIL |
|------------|---------|-------------------------------|---------------------------|----------------------------|----------------------|-----------|
| 11a        | 100     | 5500                          | 6.9024                    | 8.39                       | 24                   | PASS      |
| 11a        | 116     | 5580                          | 5.4576                    | 7.37                       | 24                   | PASS      |
| 11a        | 140     | 5700                          | 5.1050                    | 7.08                       | 24                   | PASS      |
| 11n (HT20) | 100     | 5500                          | 4.6881                    | 6.71                       | 24                   | PASS      |
| 11n (HT20) | 116     | 5580                          | 4.4157                    | 6.45                       | 24                   | PASS      |
| 11n (HT20) | 140     | 5700                          | 4.5290                    | 6.56                       | 24                   | PASS      |





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Band IV

| Mode       | CHANNEL | CHANNEL<br>FREQUENCY<br>(MHz) | MAX. OUTPUT<br>POWER (mW) | MAX. OUTPUT<br>POWER (dBm) | POWER LIMIT<br>(dBm) | PASS/FAIL |
|------------|---------|-------------------------------|---------------------------|----------------------------|----------------------|-----------|
| 11a        | 149     | 5745                          | 7.5509                    | 8.78                       | 24                   | PASS      |
| 11a        | 157     | 5785                          | 7.6913                    | 8.86                       | 24                   | PASS      |
| 11a        | 161     | 5805                          | 7.6033                    | 8.81                       | 24                   | PASS      |
| 11n (HT20) | 149     | 5745                          | 6.6988                    | 8.26                       | 24                   | PASS      |
| 11n (HT20) | 157     | 5785                          | 5.6885                    | 7.55                       | 24                   | PASS      |
| 11n (HT20) | 161     | 5805                          | 5.4828                    | 7.39                       | 24                   | PASS      |

**26dB BANDWIDTH & 6dB BANDWIDTH:****802.11a**

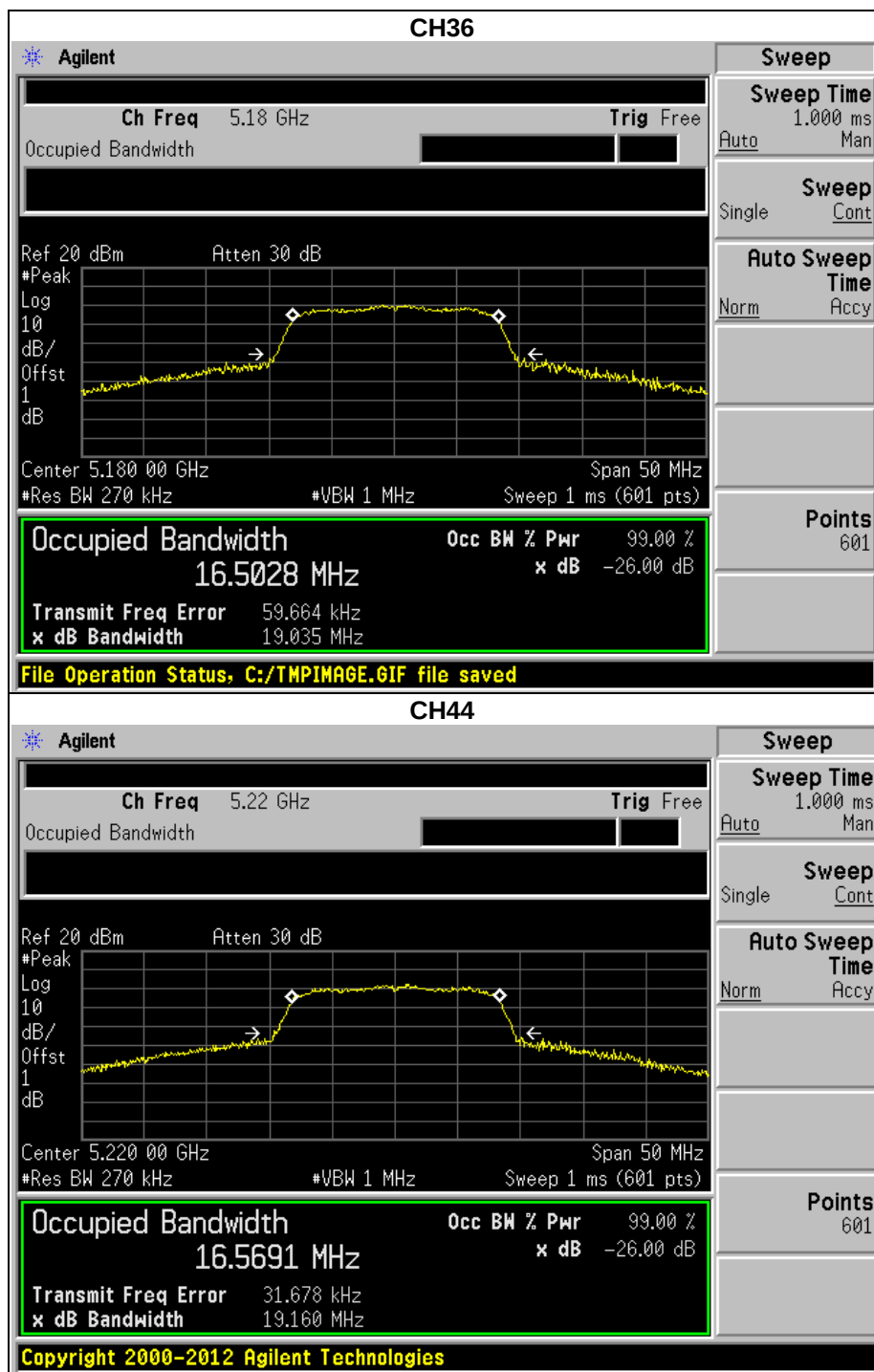
| CHANNEL | CHANNEL FREQUENCY<br>(MHz) | 26dBc BANDWIDTH<br>(MHz) | PASS / FAIL |
|---------|----------------------------|--------------------------|-------------|
| 36      | 5180                       | 19.04                    | PASS        |
| 44      | 5220                       | 19.16                    | PASS        |
| 48      | 5240                       | 19.62                    | PASS        |
| 52      | 5260                       | 19.00                    | PASS        |
| 60      | 5300                       | 19.56                    | PASS        |
| 64      | 5320                       | 19.07                    | PASS        |
| 100     | 5500                       | 19.11                    | PASS        |
| 116     | 5580                       | 19.05                    | PASS        |
| 140     | 5700                       | 19.23                    | PASS        |
| CHANNEL | CHANNEL FREQUENCY<br>(MHz) | 6dBc BANDWIDTH<br>(MHz)  | PASS / FAIL |
| 149     | 5745                       | 15.16                    | PASS        |
| 157     | 5785                       | 15.15                    | PASS        |
| 161     | 5805                       | 15.16                    | PASS        |

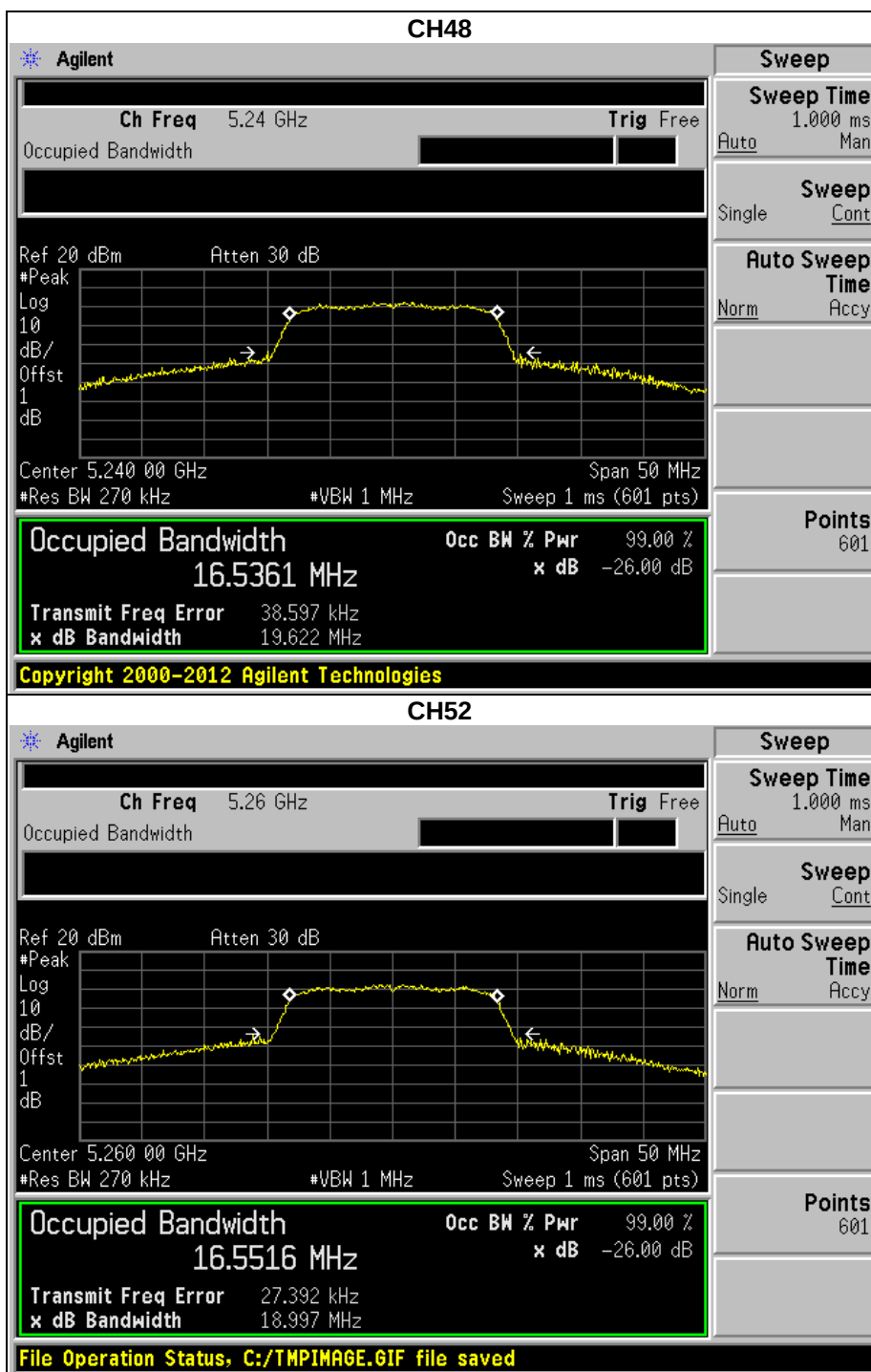
**802.11n (20MHz)**

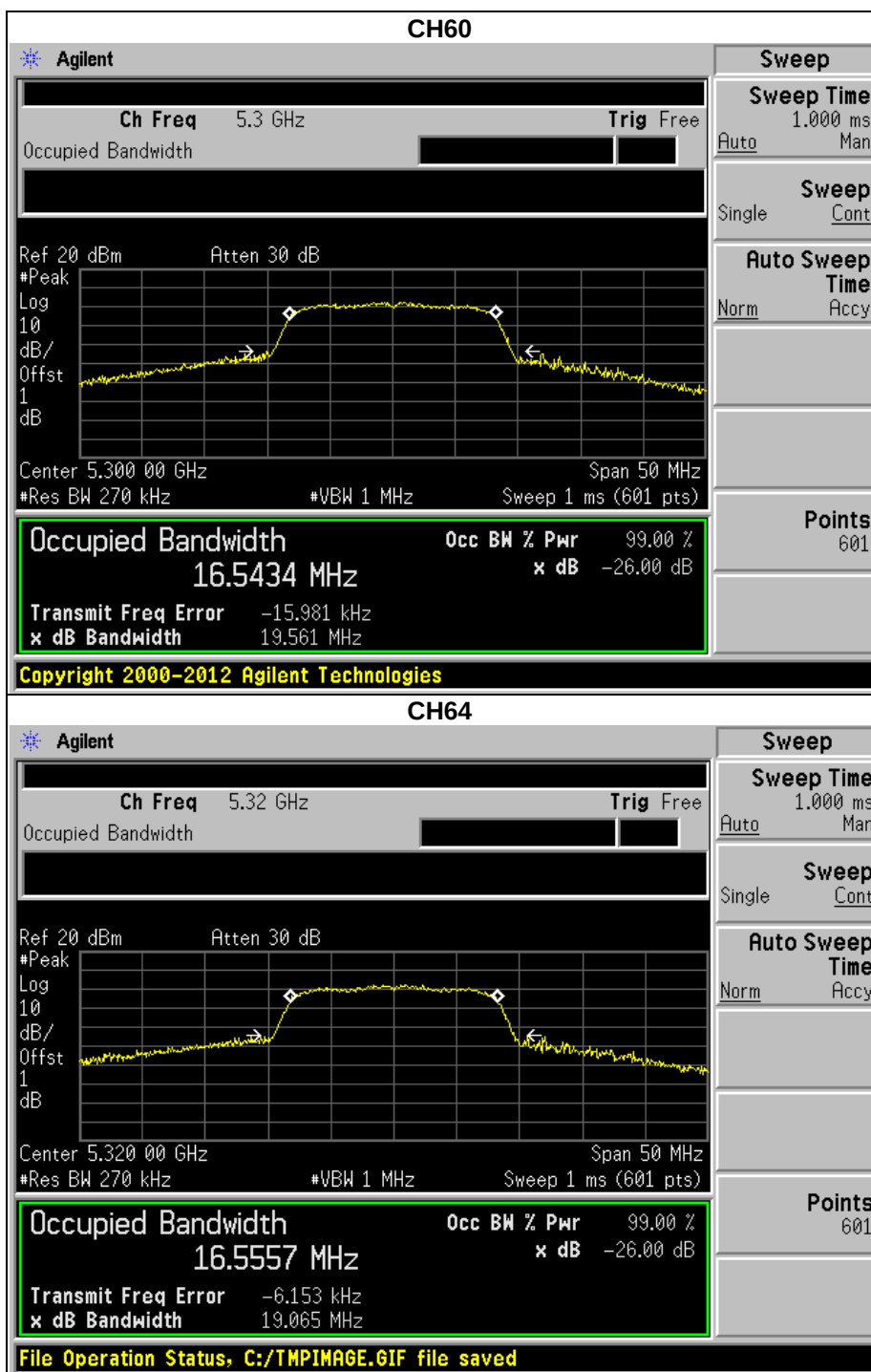
| CHANNEL | CHANNEL FREQUENCY<br>(MHz) | 26dBc BANDWIDTH<br>(MHz) | PASS / FAIL |
|---------|----------------------------|--------------------------|-------------|
| 36      | 5180                       | 19.26                    | PASS        |
| 44      | 5220                       | 19.37                    | PASS        |
| 48      | 5240                       | 19.39                    | PASS        |
| 52      | 5260                       | 19.36                    | PASS        |
| 60      | 5300                       | 19.35                    | PASS        |
| 64      | 5320                       | 19.36                    | PASS        |
| 100     | 5500                       | 19.35                    | PASS        |
| 116     | 5580                       | 19.38                    | PASS        |
| 140     | 5700                       | 19.33                    | PASS        |
| CHANNEL | CHANNEL FREQUENCY<br>(MHz) | 6dBc BANDWIDTH<br>(MHz)  | PASS / FAIL |
| 149     | 5745                       | 15.98                    | PASS        |
| 157     | 5785                       | 15.16                    | PASS        |
| 161     | 5805                       | 15.13                    | PASS        |

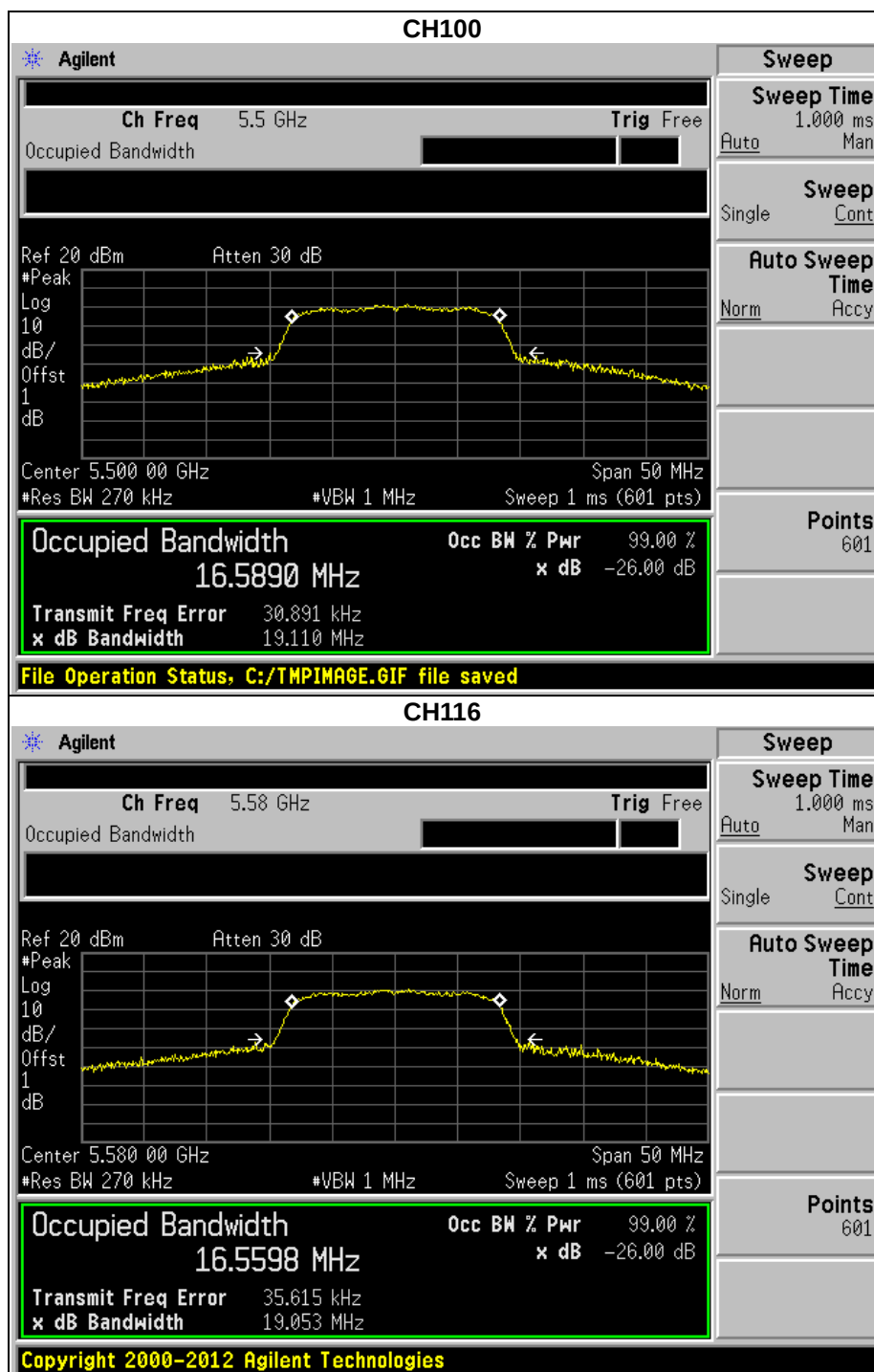
## 26dB bandwidth Test Plot

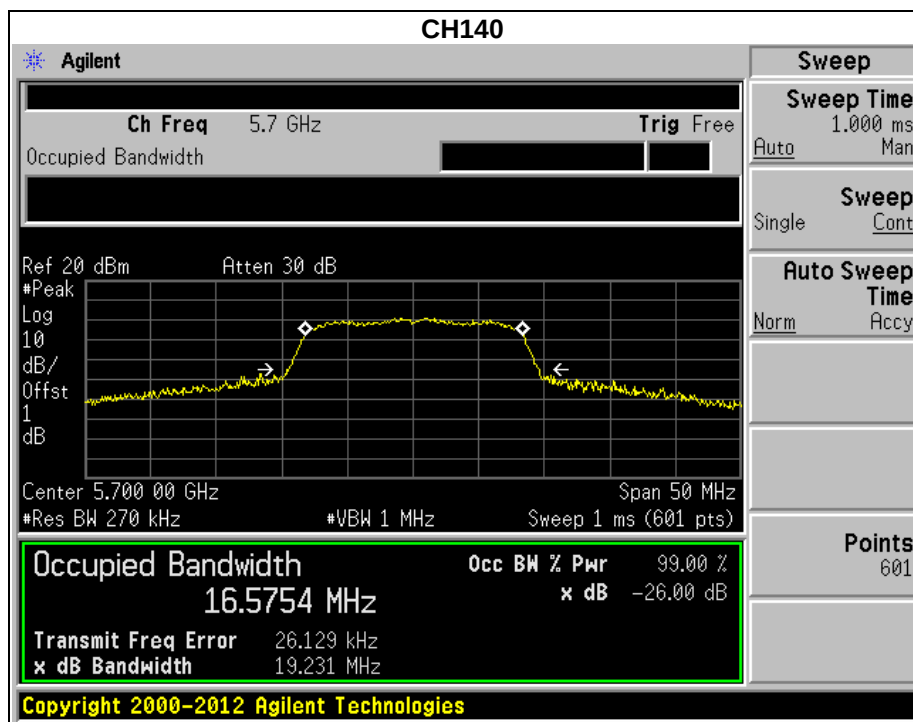
802.11a





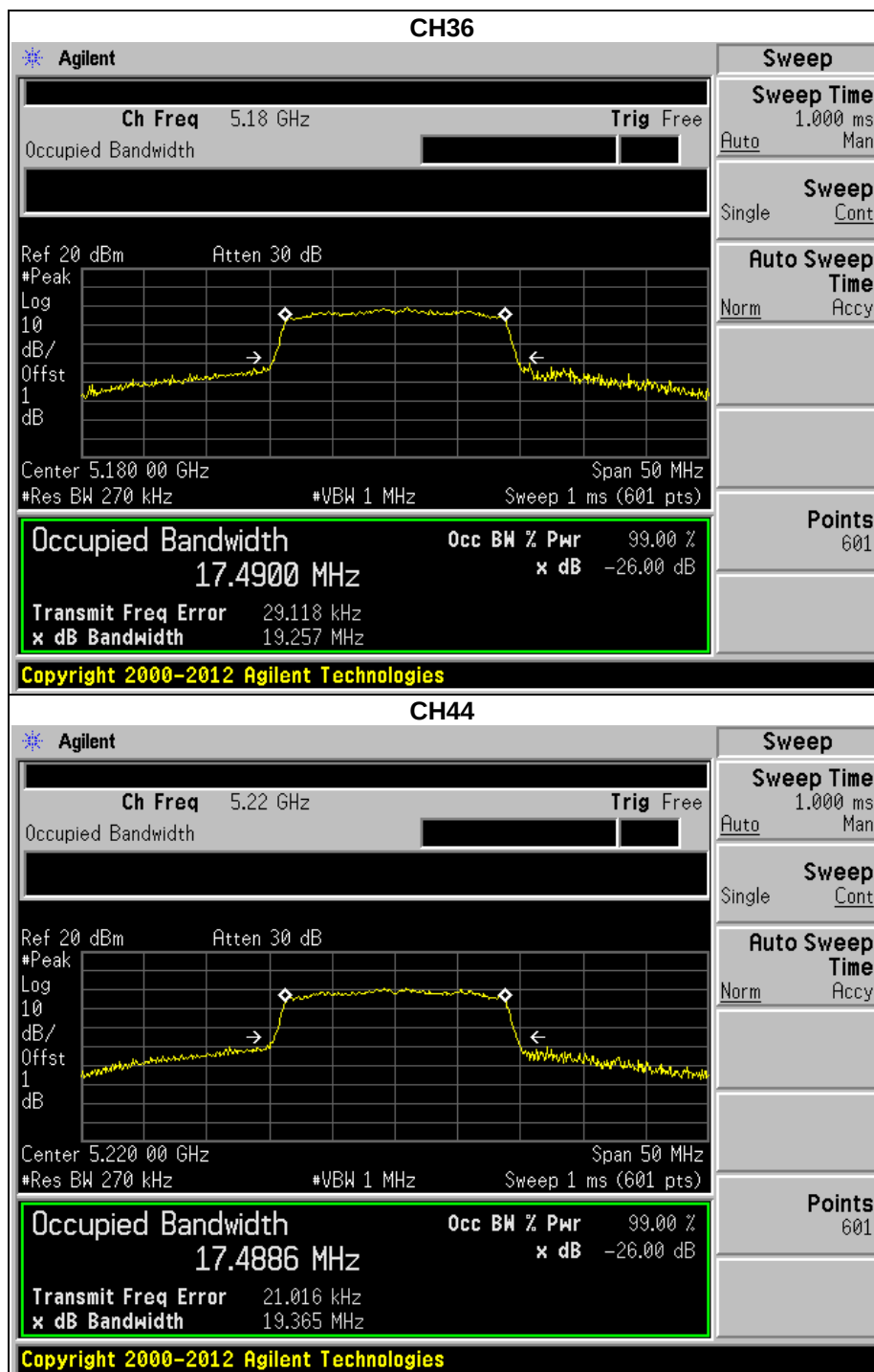




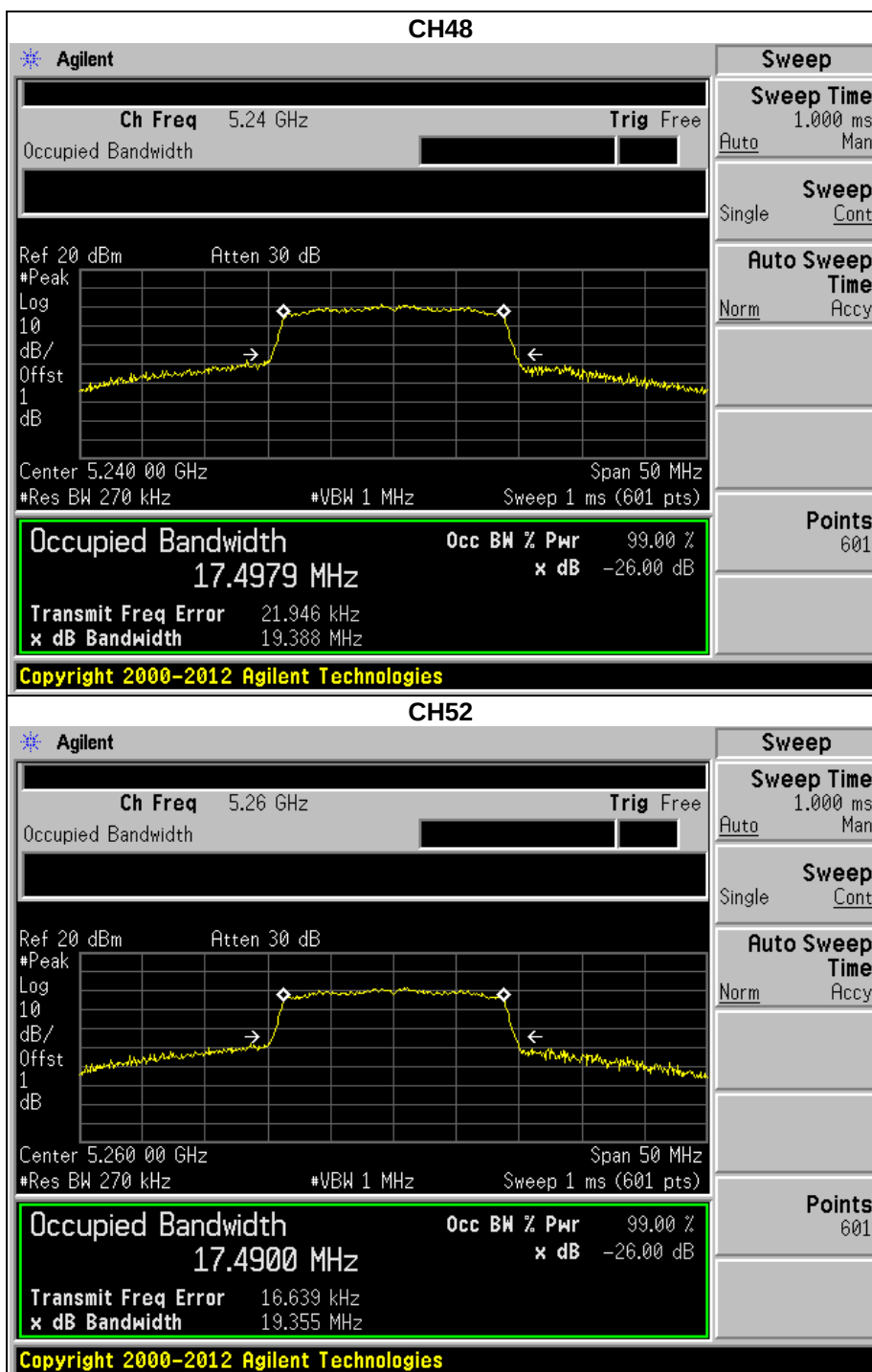


## 26dB bandwidth Test Plot

802.11n(20MHz)



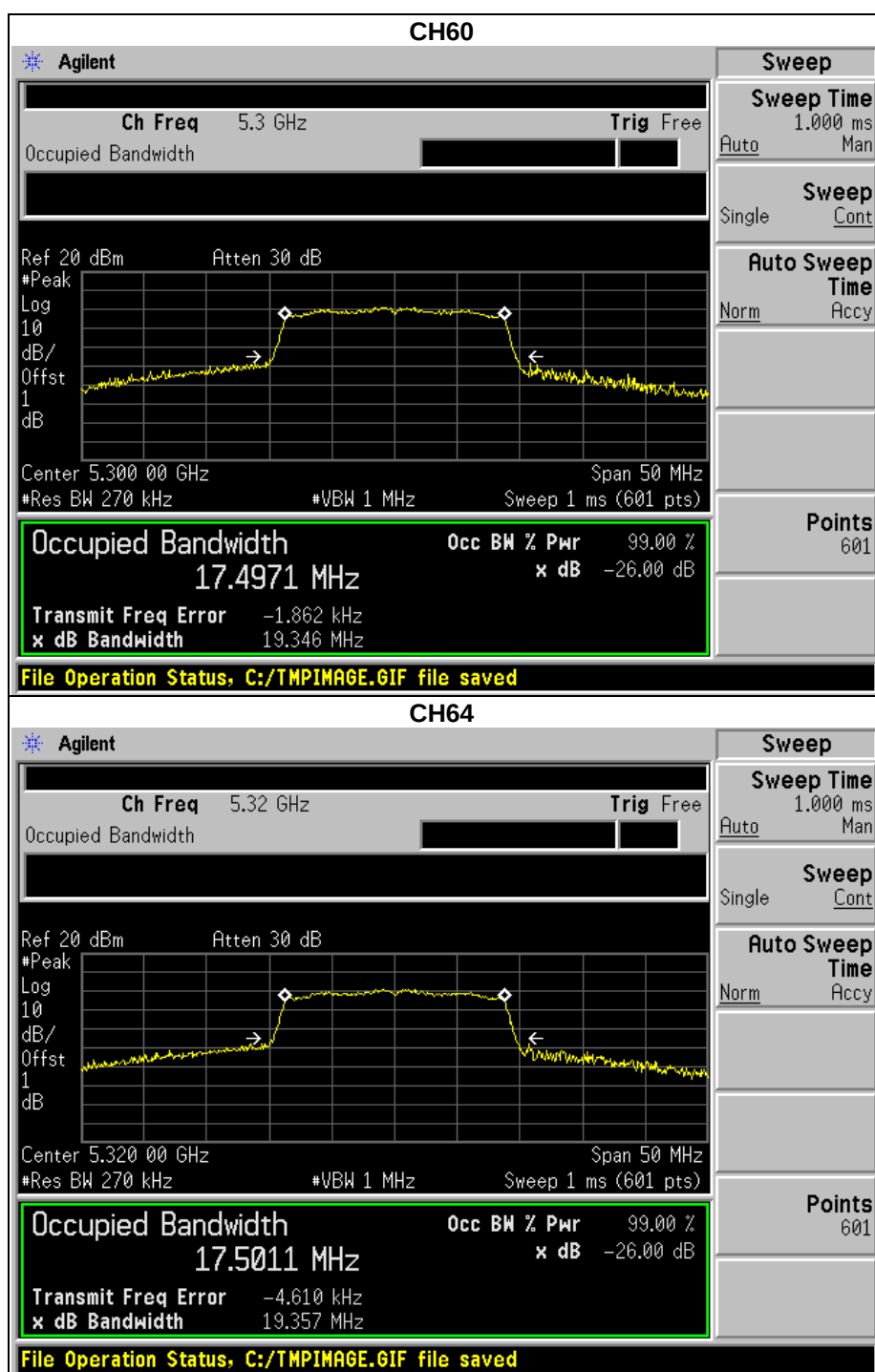


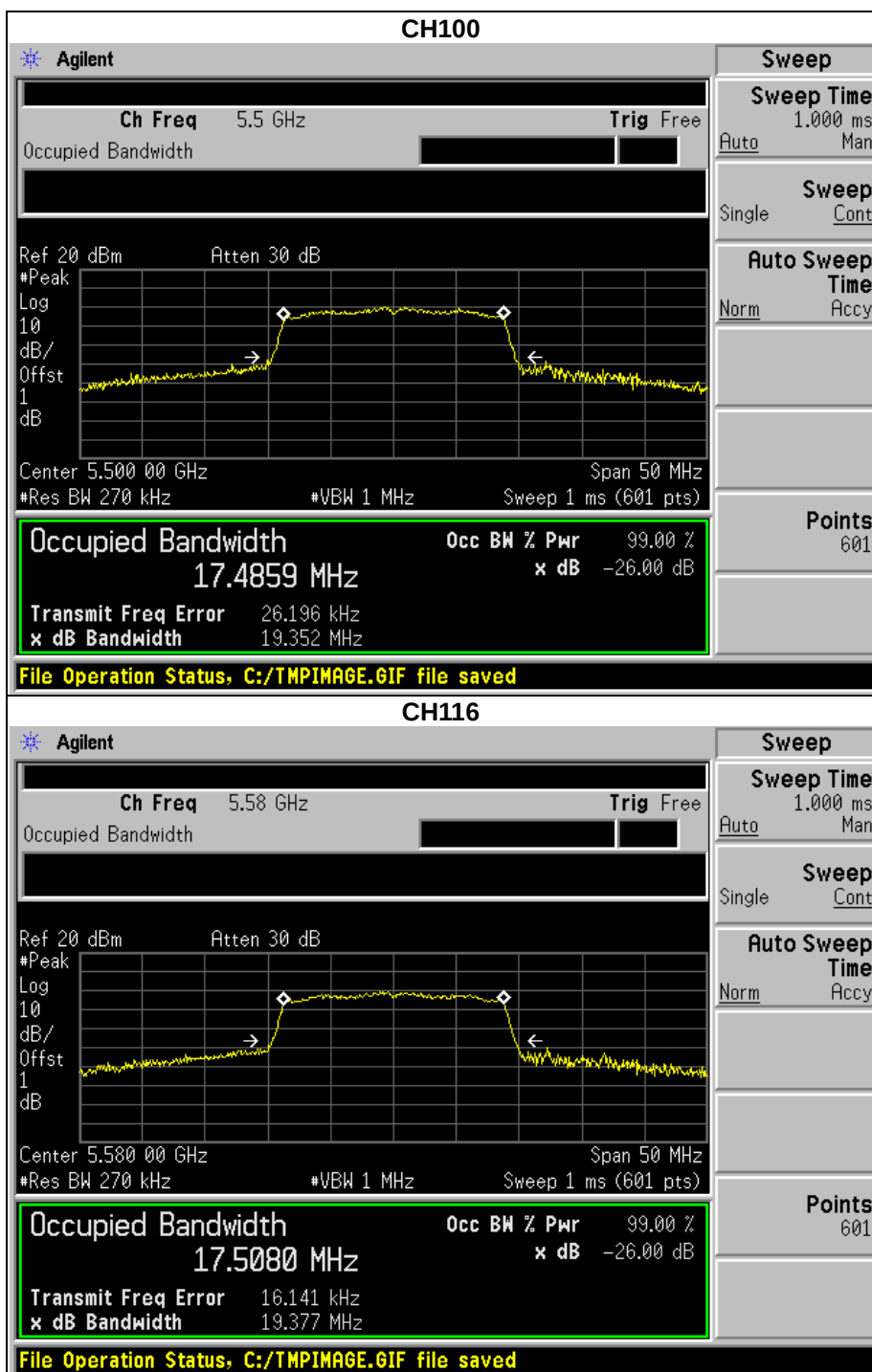


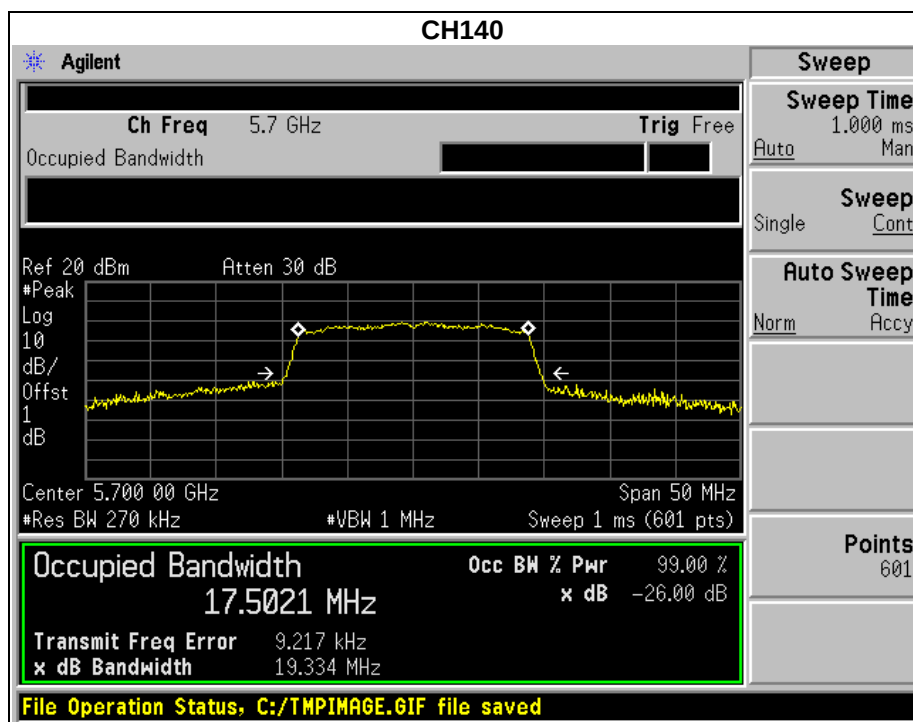


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VERITAS

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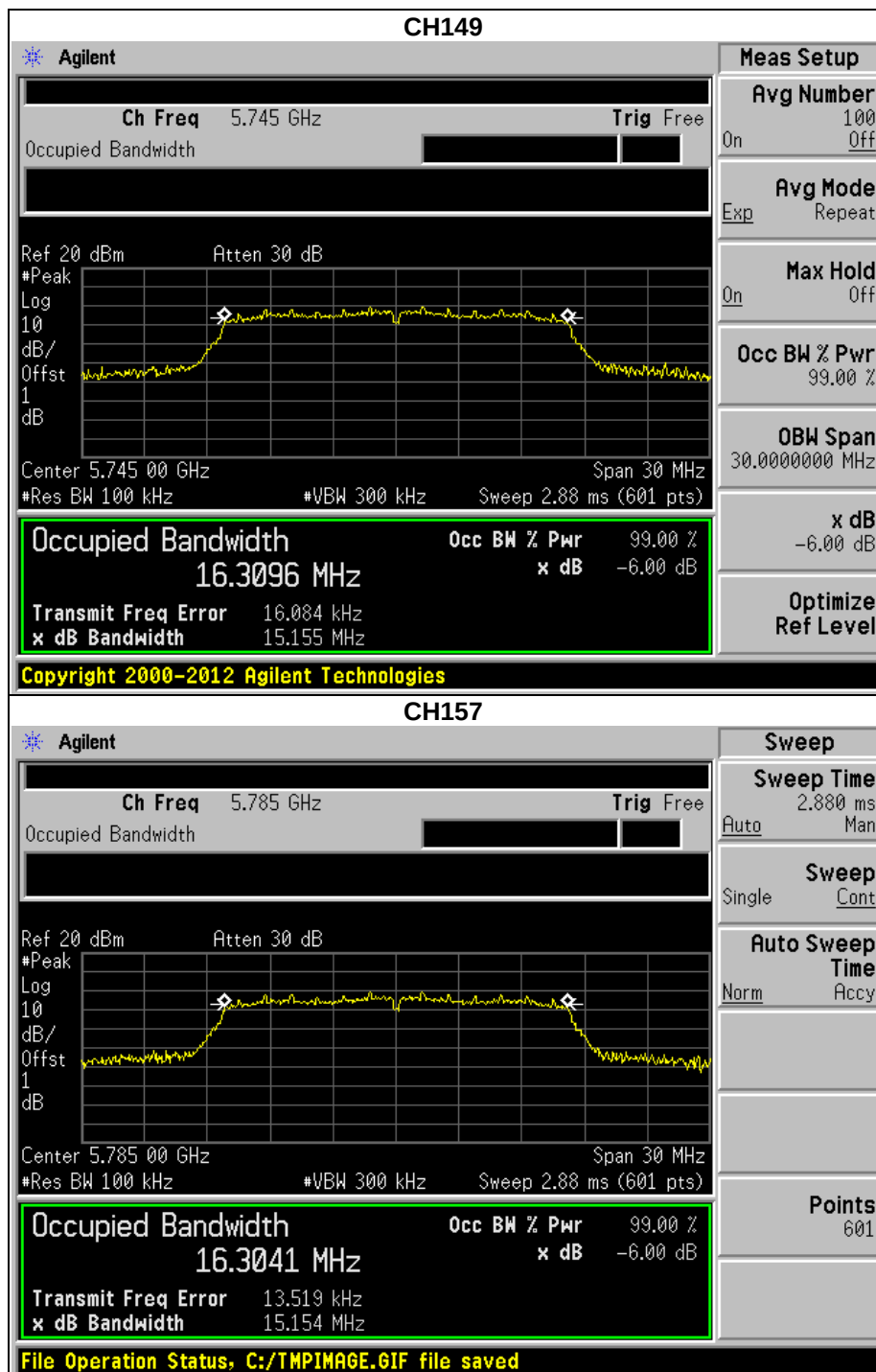


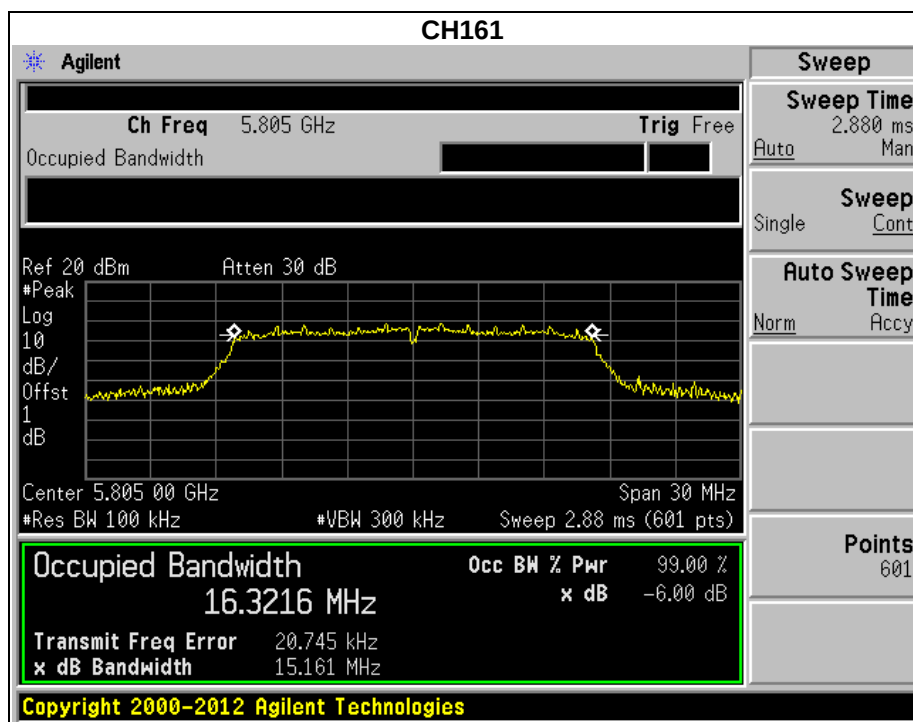




6dB bandwidth Test Plot

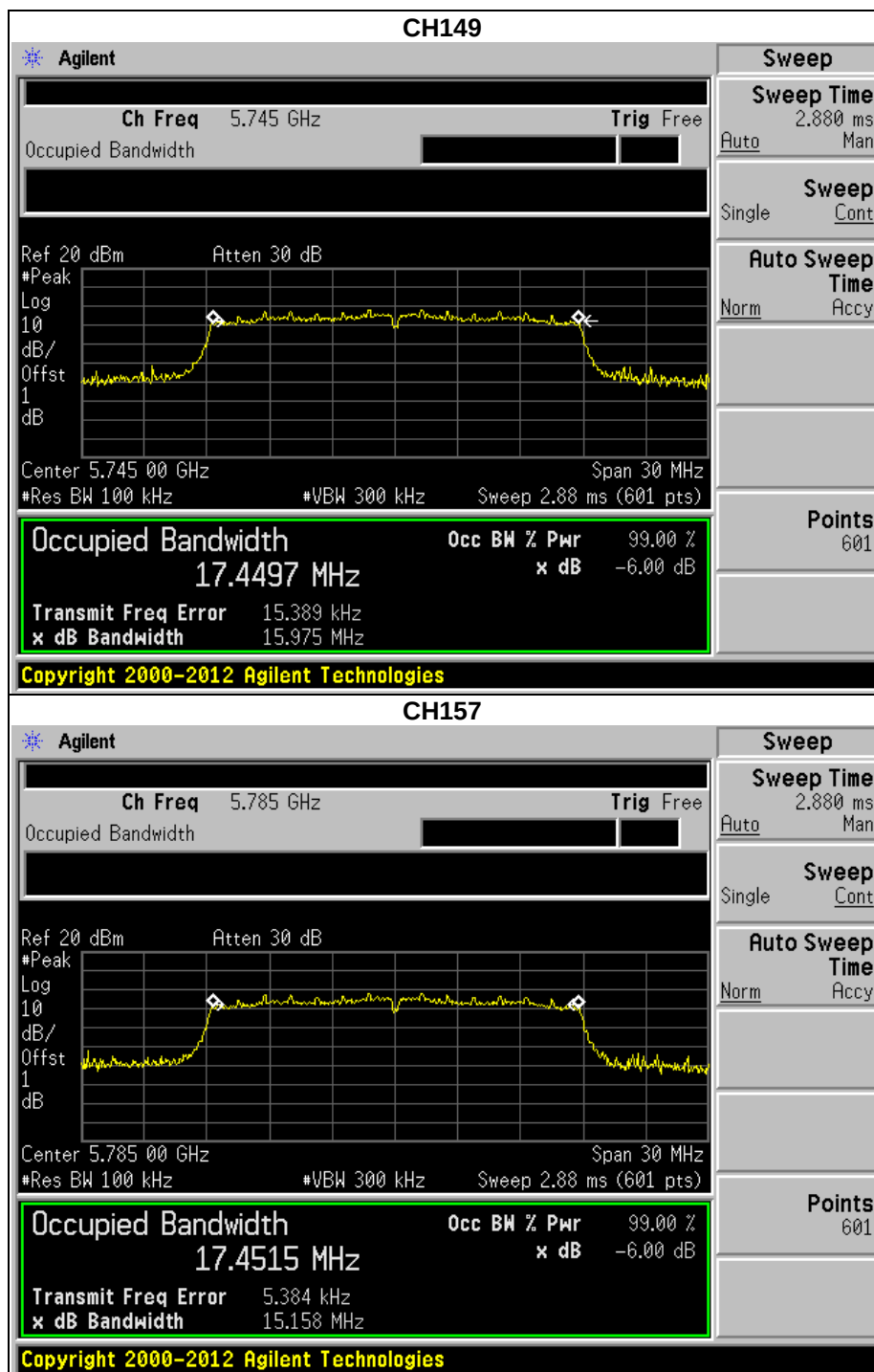
802.11a

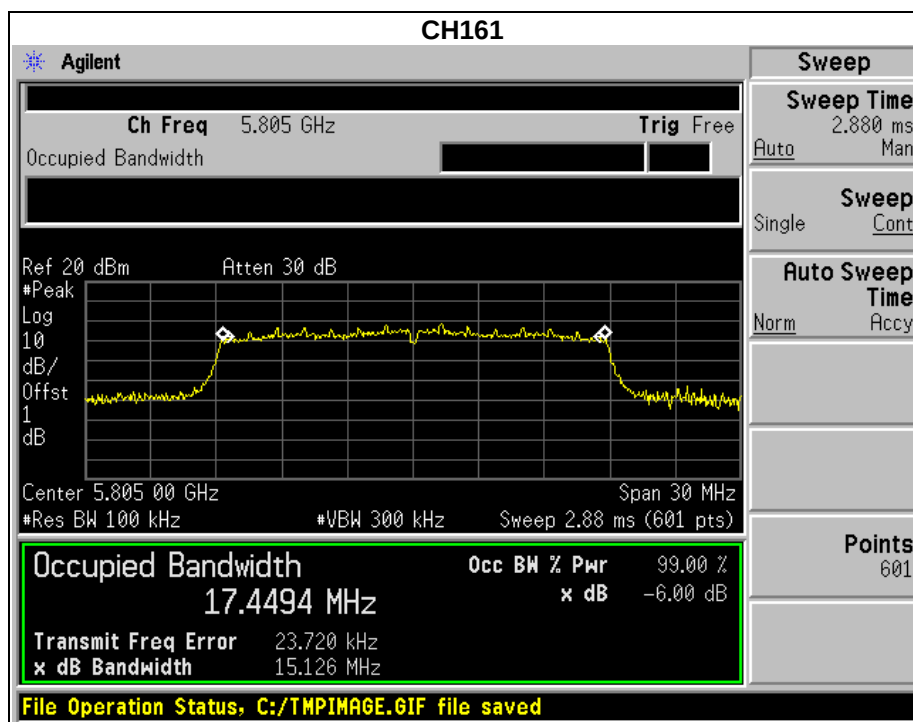




## 6dB bandwidth Test Plot

802.11n(20MHz)





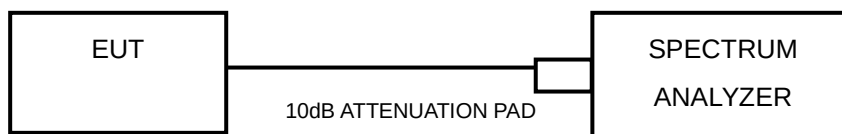


## 4.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT

### 4.4.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

| Operation Band | EUT Category |                                   | LIMIT         |
|----------------|--------------|-----------------------------------|---------------|
| U-NII-1        |              | Outdoor Access Point              | 17dBm/ MHz    |
|                |              | Fixed point-to-point Access Point |               |
|                |              | Indoor Access Point               |               |
|                | √            | Mobile and Portable client device | 11dBm/ MHz    |
| U-NII-2A       | √            |                                   | 11dBm/ 500kHz |
| U-NII-2C       | √            |                                   | 11dBm/ 500kHz |
| U-NII-3        | √            |                                   | 30dBm/ 500kHz |

### 4.4.2 TEST SETUP



### 4.4.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

### 4.4.4 TEST PROCEDURES

Using method SA-1

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 30 KHz, Set VBW ≥ 1 MHz, Detector = RMS for U-NII-1  
Set RBW = 1MHz, Set VBW ≥ 3 MHz, Detector = RMS for U-NII-3
- 3) Set Channel power measure = 1MHz
- 4) Sweep time = auto, trigger set to “free run”.
- 5) Trace average at least 100 traces in power averaging mode.
- 6) Record the max value



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#### 4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.4.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

#### 4.4.7 TEST RESULTS

For U-NII-1, U-NII-2A & U-NII-2C:  
802.11a

| CHANNEL | FREQUENCY (MHz) | PSD (dBm/MHz) | MAXIMUM LIMIT (dBm/MHz) | PASS/FAIL |
|---------|-----------------|---------------|-------------------------|-----------|
| 36      | 5180            | 7.40          | 11                      | PASS      |
| 44      | 5220            | 9.22          | 11                      | PASS      |
| 48      | 5240            | 9.81          | 11                      | PASS      |
| 52      | 5260            | 10.47         | 11                      | PASS      |
| 60      | 5300            | 10.48         | 11                      | PASS      |
| 64      | 5320            | 9.79          | 11                      | PASS      |
| 100     | 5500            | 8.35          | 11                      | PASS      |
| 116     | 5580            | 8.14          | 11                      | PASS      |
| 140     | 5700            | 8.57          | 11                      | PASS      |

802.11n (20MHz)

| CHANNEL | FREQUENCY (MHz) | PSD with Duty Factor (dBm/MHz) | MAXIMUM LIMIT (dBm/MHz) | PASS/FAIL |
|---------|-----------------|--------------------------------|-------------------------|-----------|
| 36      | 5180            | 5.70                           | 11                      | PASS      |
| 44      | 5220            | 7.45                           | 11                      | PASS      |
| 48      | 5240            | 7.26                           | 11                      | PASS      |
| 52      | 5260            | 7.57                           | 11                      | PASS      |
| 60      | 5300            | 7.83                           | 11                      | PASS      |
| 64      | 5320            | 7.87                           | 11                      | PASS      |
| 100     | 5500            | 6.66                           | 11                      | PASS      |
| 116     | 5580            | 6.51                           | 11                      | PASS      |
| 140     | 5700            | 6.64                           | 11                      | PASS      |

**For U-NII-3:****802.11a**

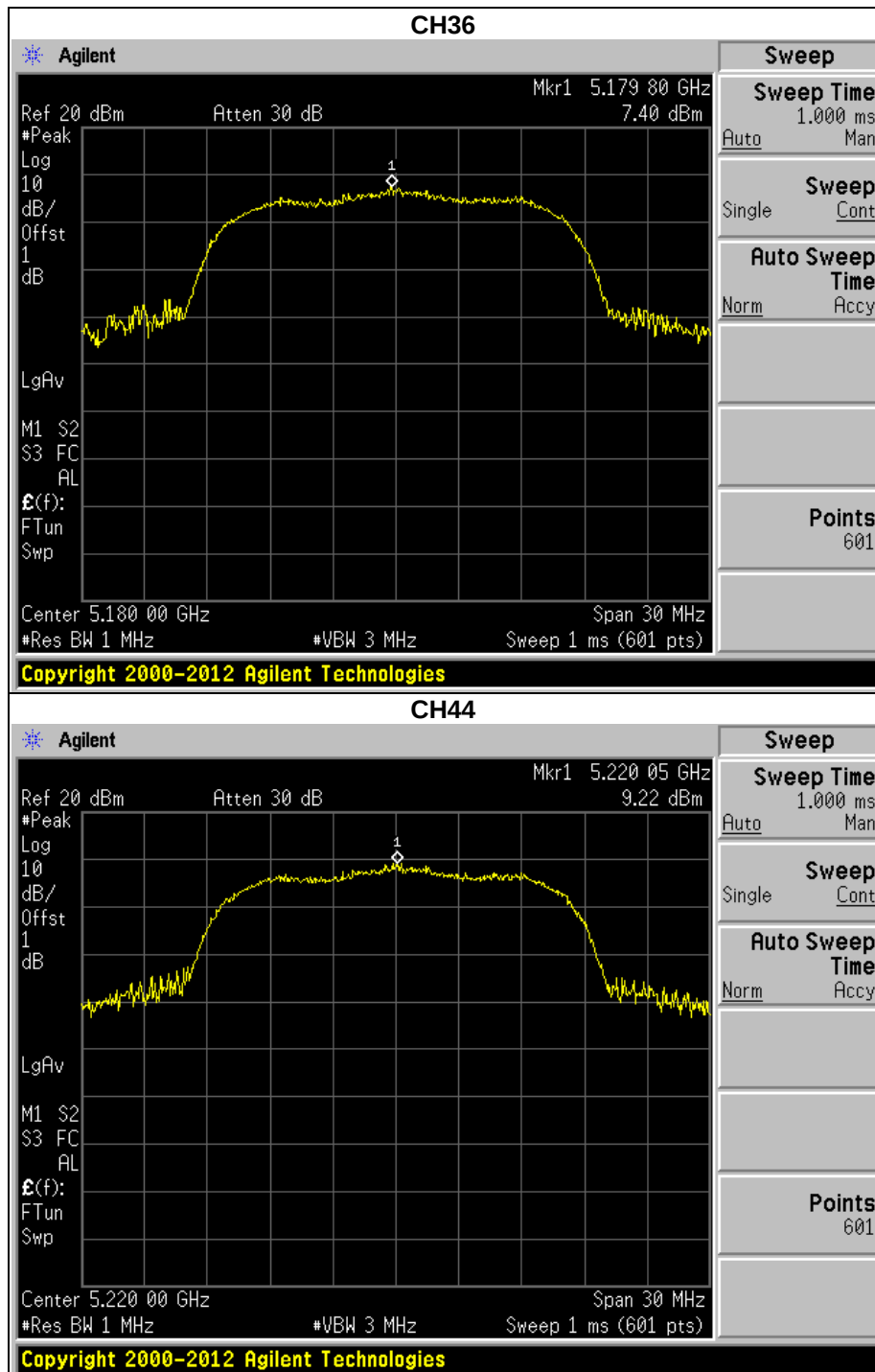
| CHANNEL | FREQUENCY<br>(MHz) | PSD with<br>(dBm/500kHz) | LIMIT<br>(dBm/500kHz) | PASS<br>/FAIL |
|---------|--------------------|--------------------------|-----------------------|---------------|
| 149     | 5745               | 10.51                    | 30                    | PASS          |
| 157     | 5785               | 9.59                     | 30                    | PASS          |
| 161     | 5805               | 9.28                     | 30                    | PASS          |

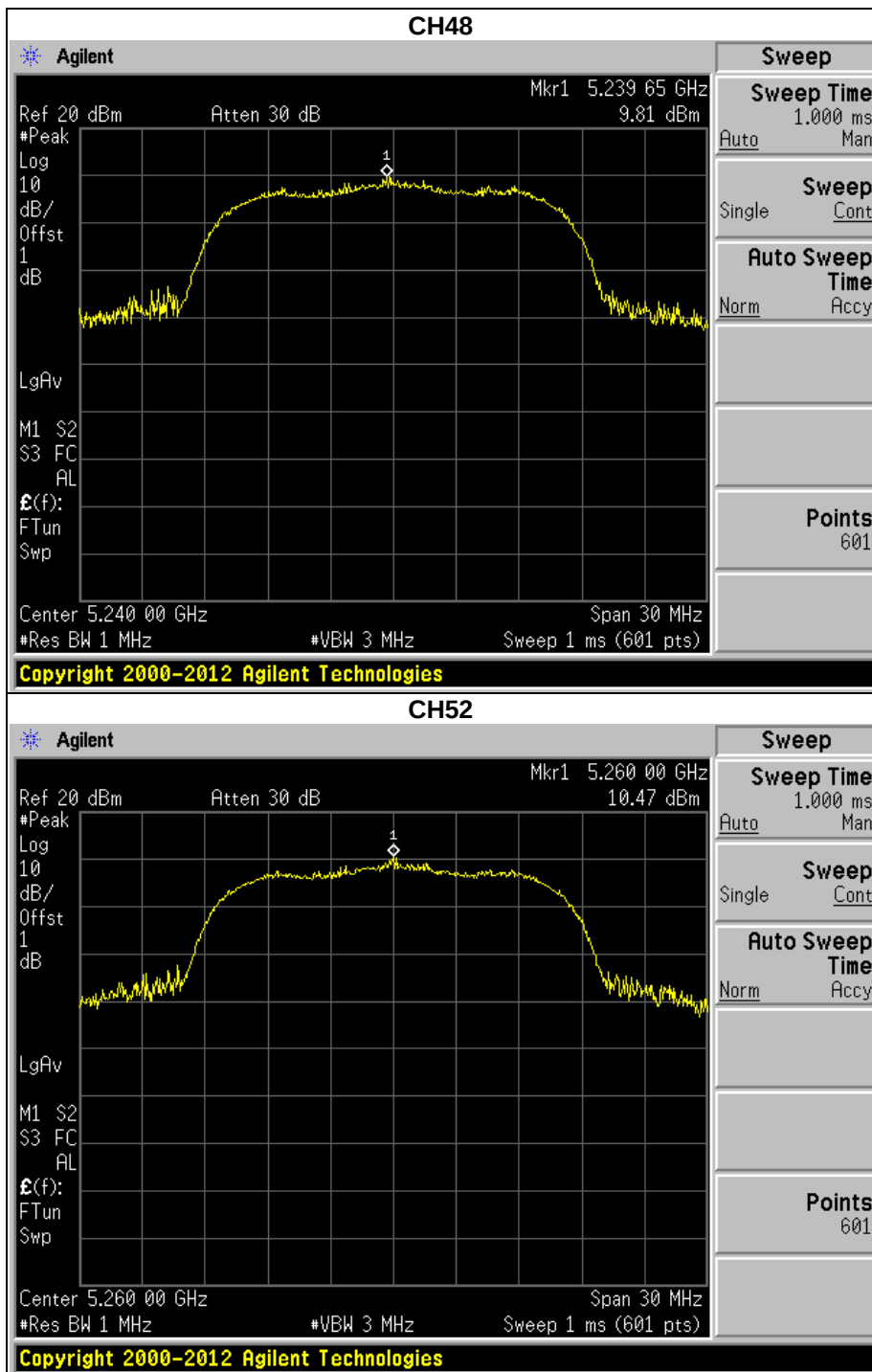
**802.11n (20M)**

| CHANNEL | FREQUENCY<br>(MHz) | PSD with<br>(dBm/500kHz) | LIMIT<br>(dBm/500kHz) | PASS<br>/FAIL |
|---------|--------------------|--------------------------|-----------------------|---------------|
| 149     | 5745               | 8.39                     | 30                    | PASS          |
| 157     | 5785               | 7.79                     | 30                    | PASS          |
| 161     | 5805               | 7.51                     | 30                    | PASS          |

## PSD Test Plot

802.11a

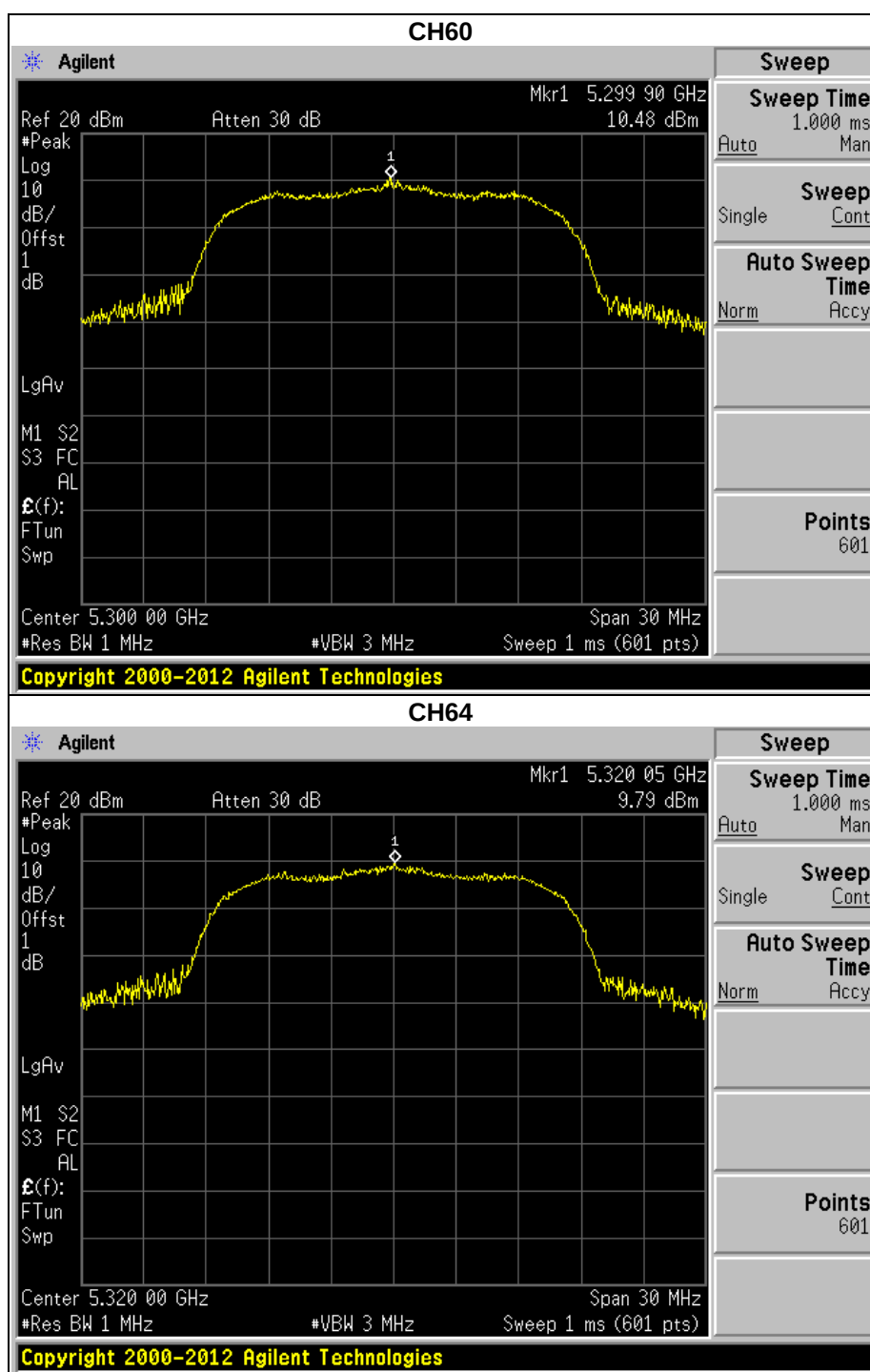


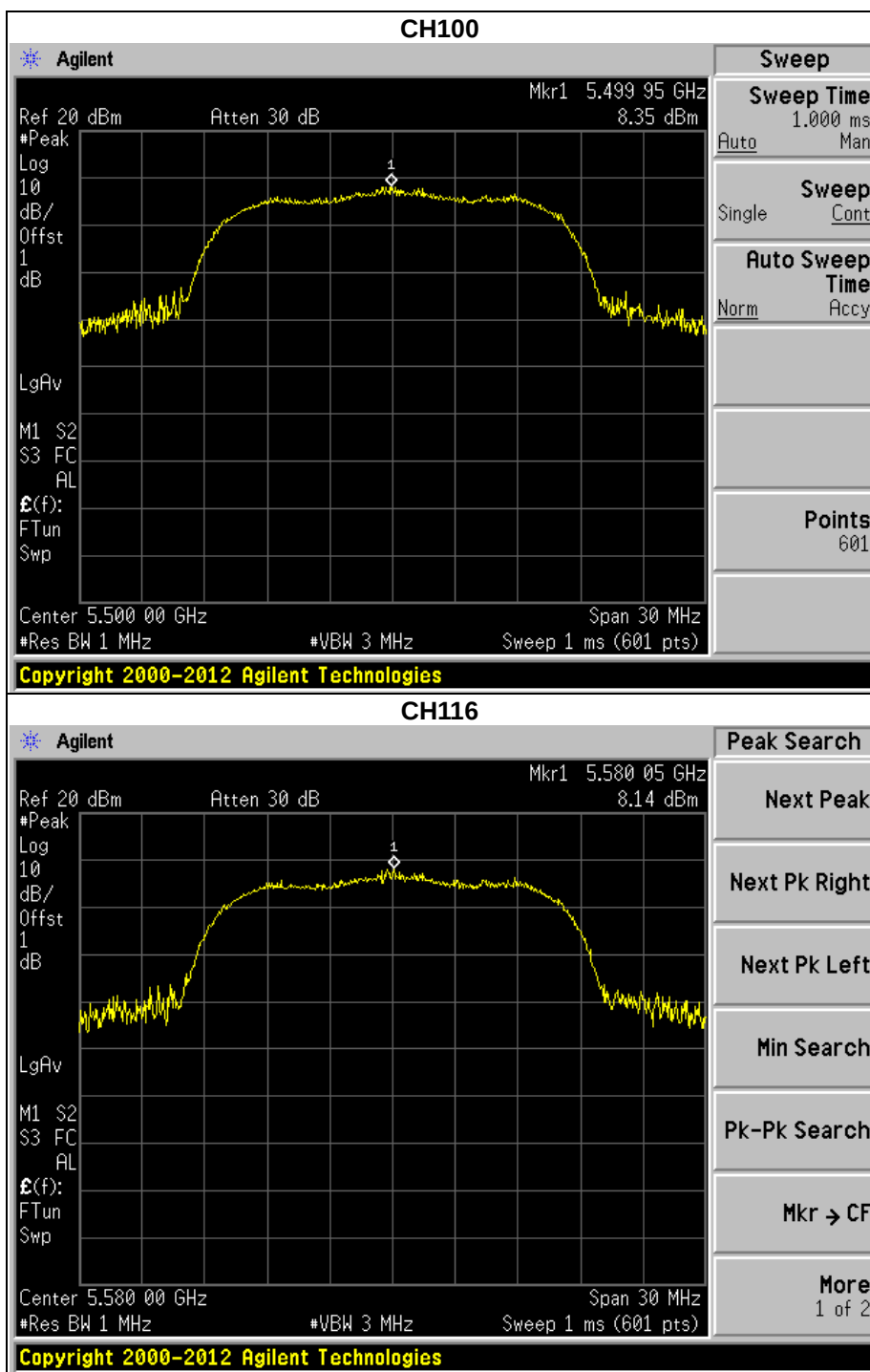




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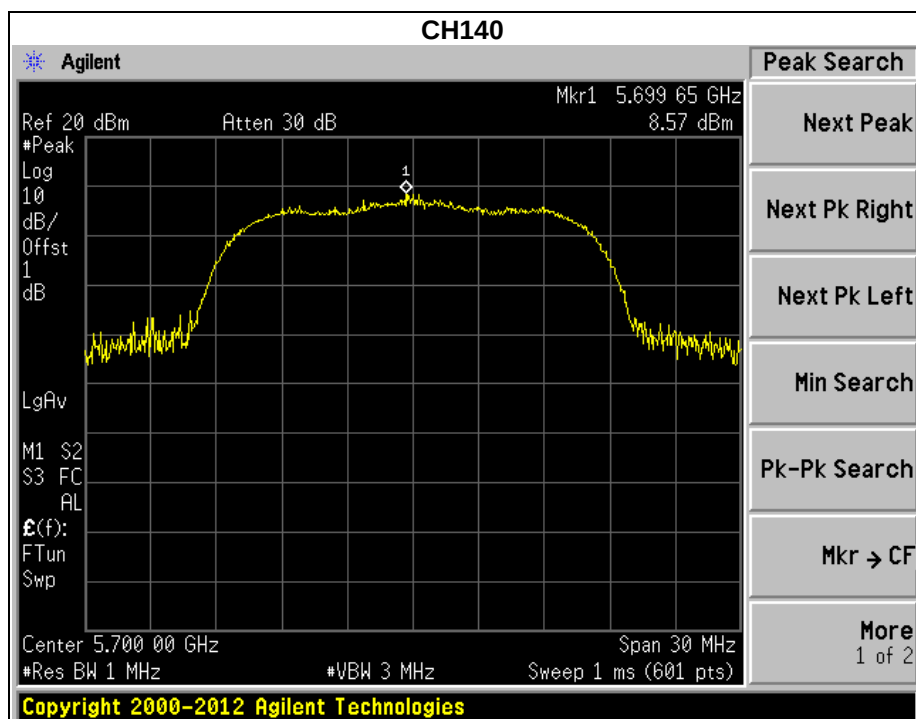






BUREAU  
VERITAS

Test Report No.: RF151008N004-3R1

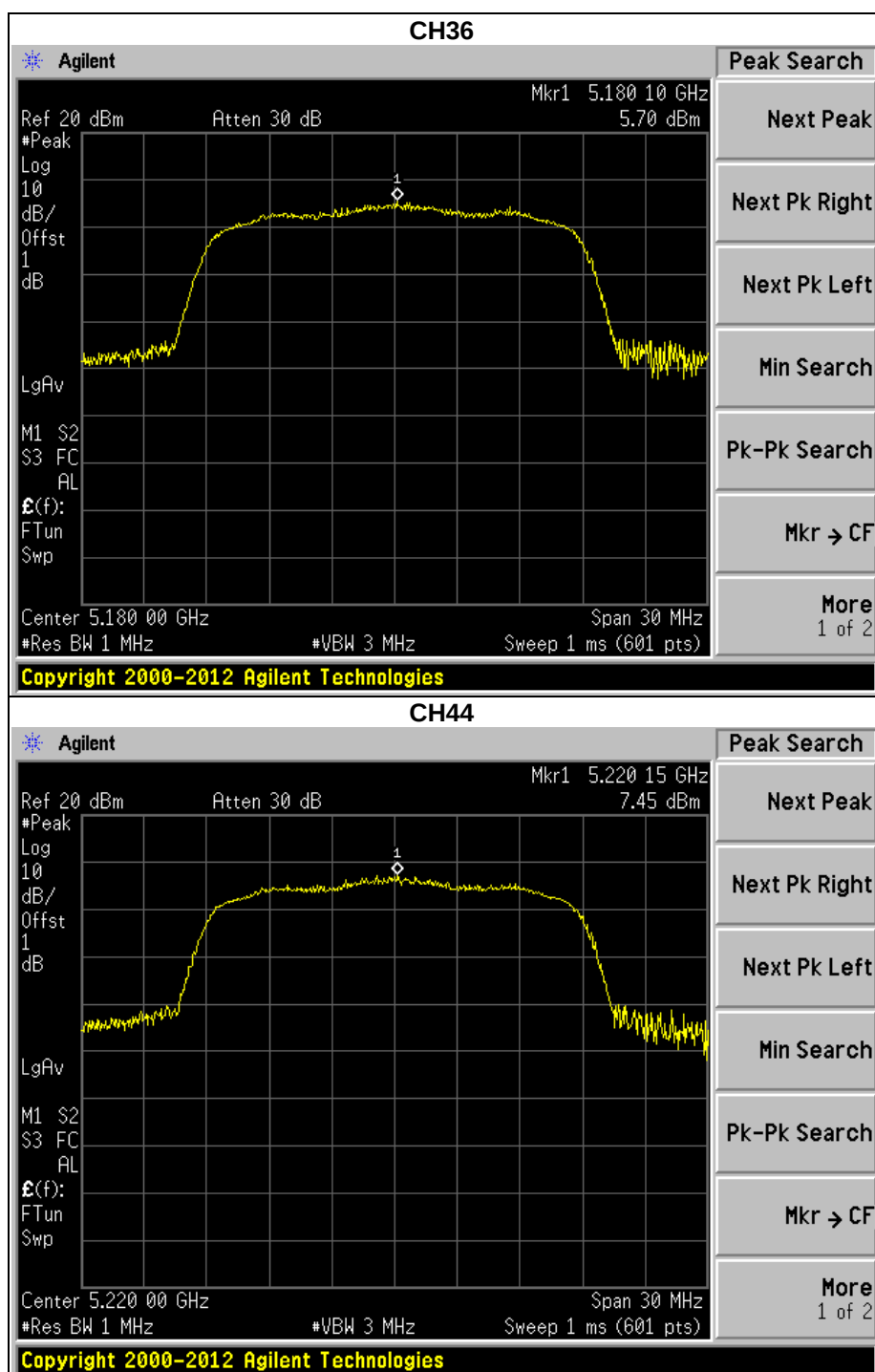


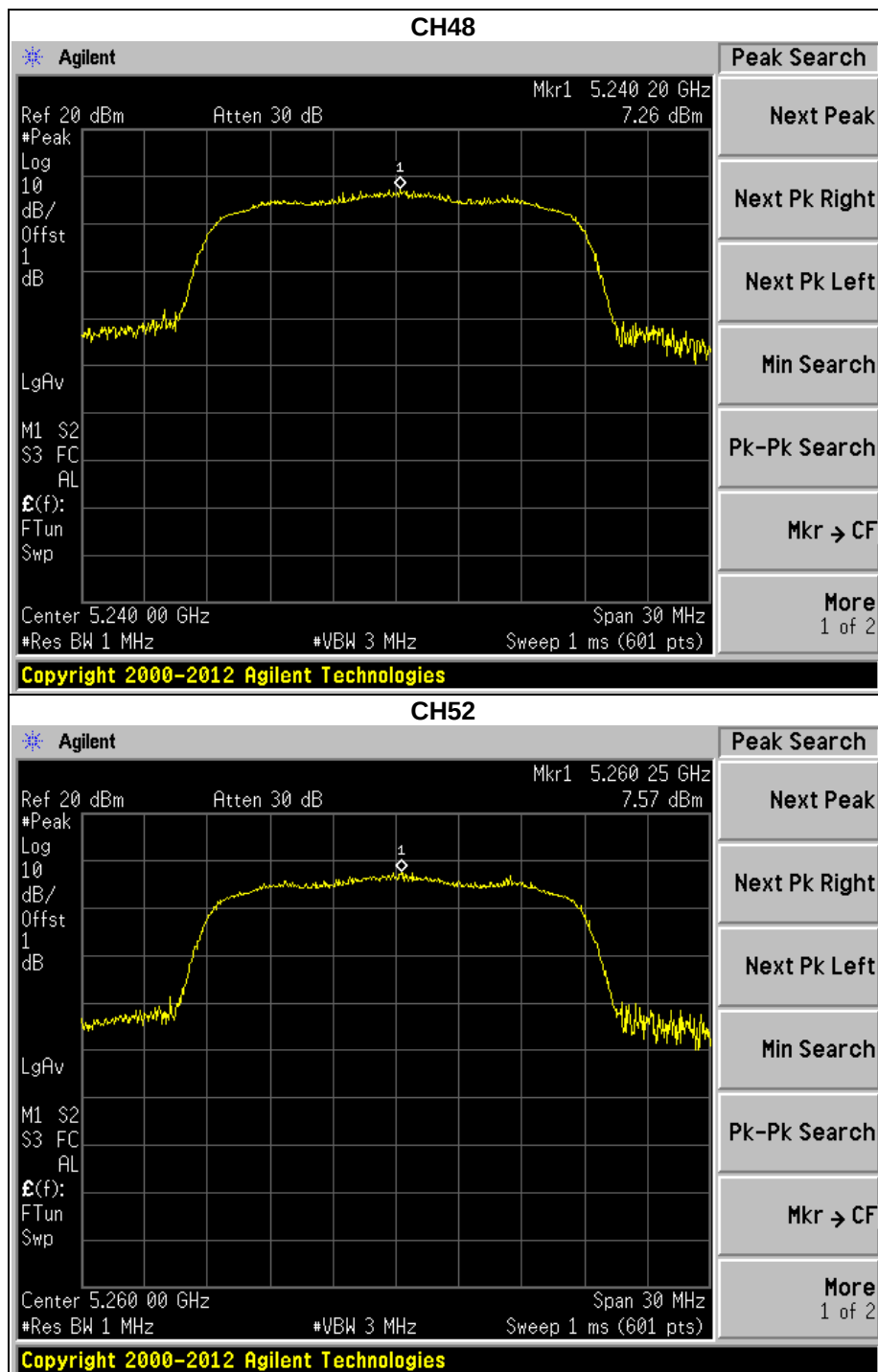


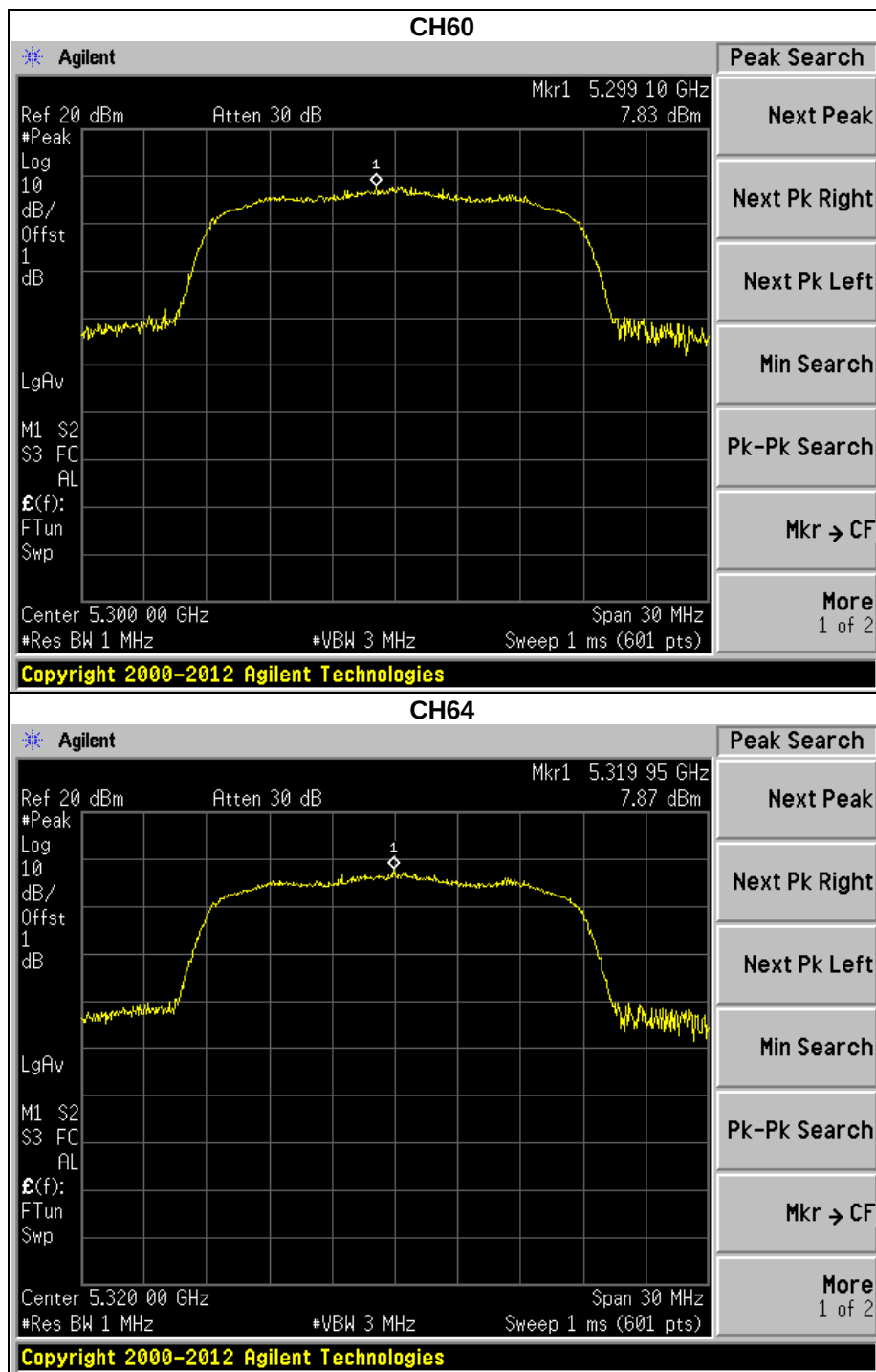
BUREAU  
VERITAS

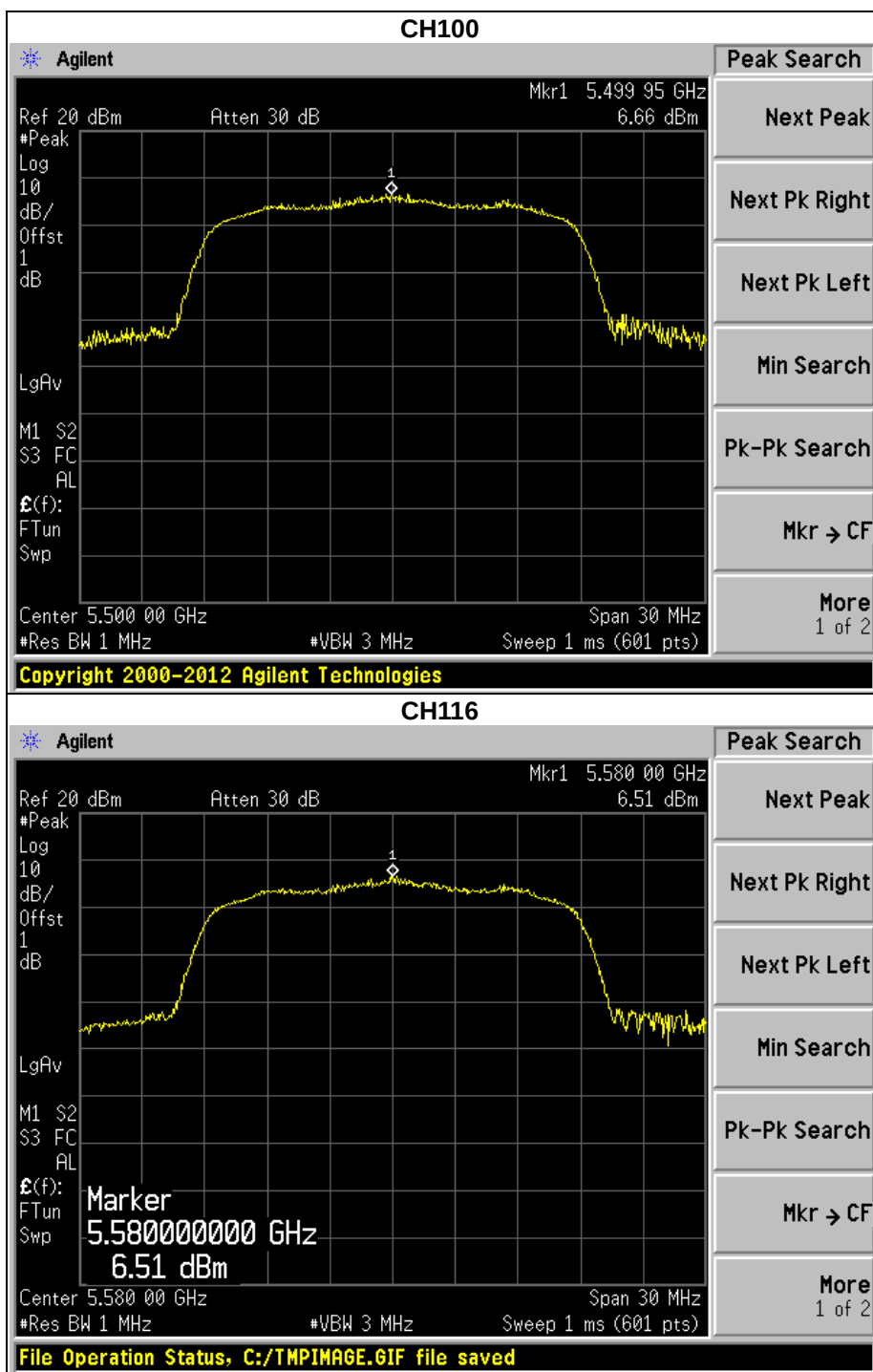
Test Report No.: RF151008N004-3R1

802.11n(20MHz)





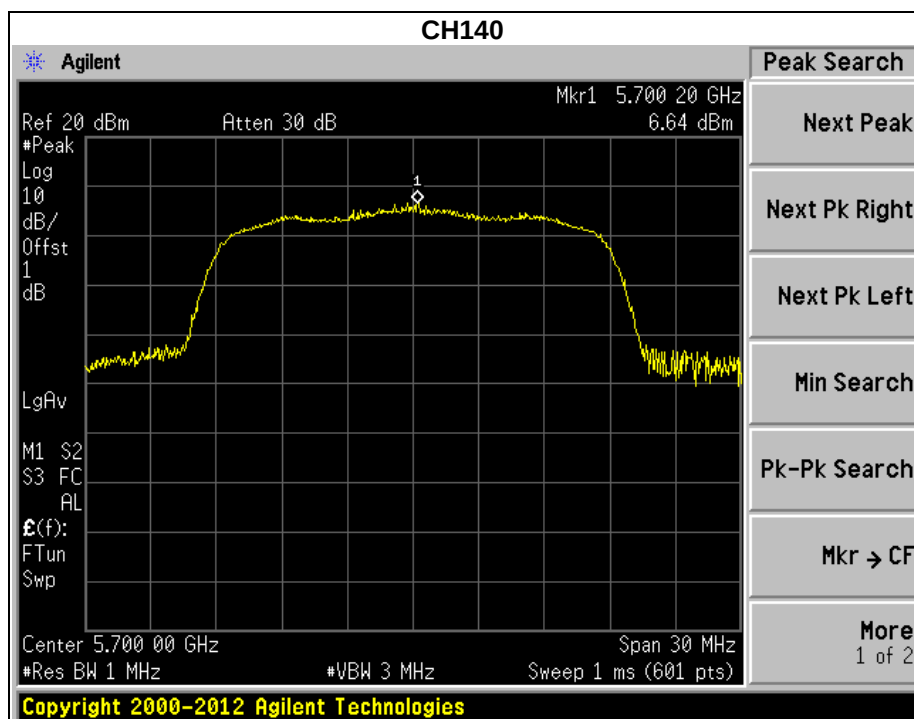






BUREAU  
VERITAS

Test Report No.: RF151008N004-3R1

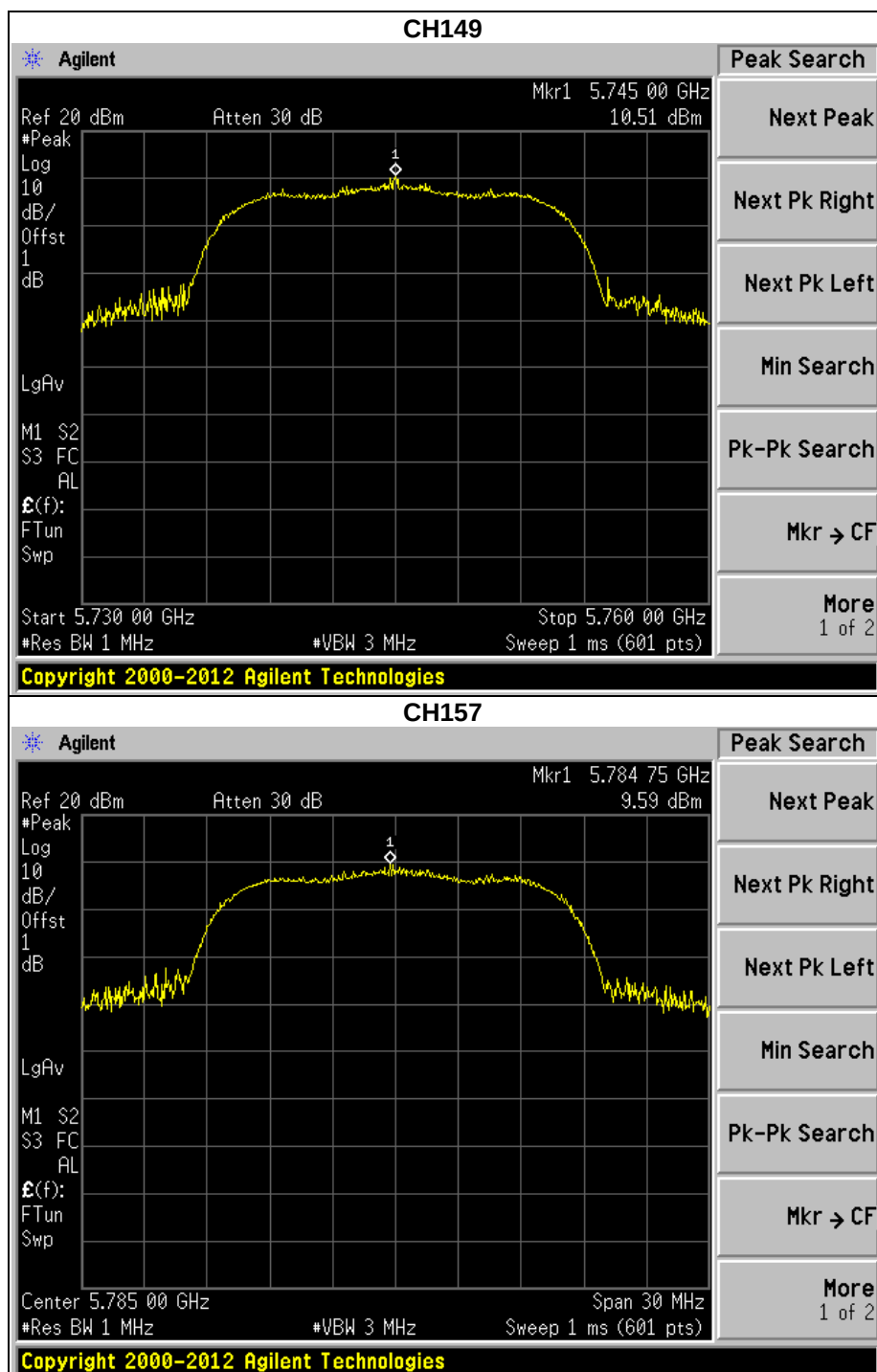


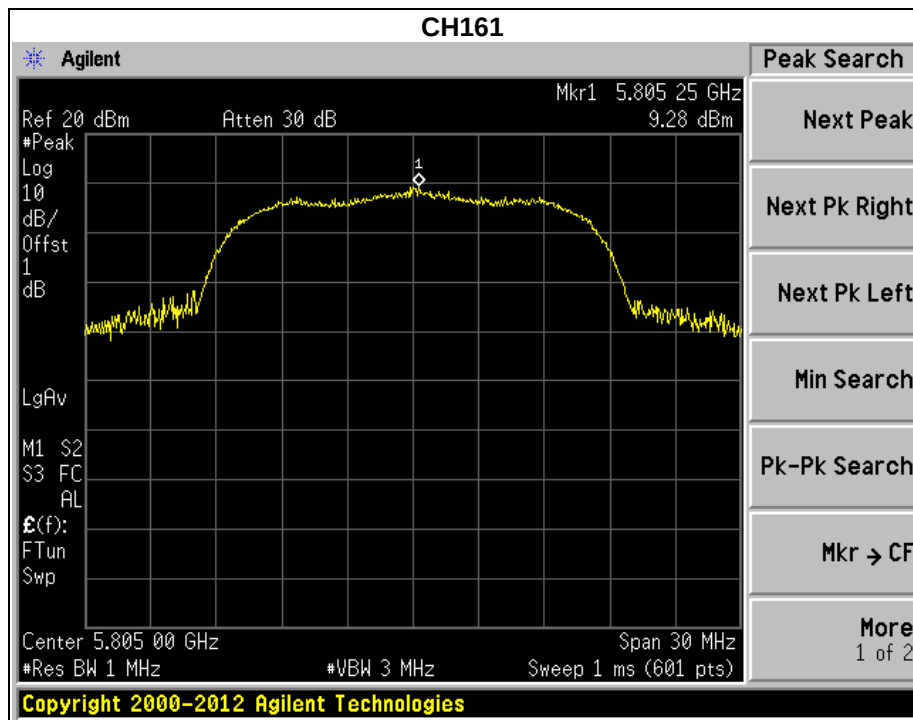


BUREAU  
VERITAS

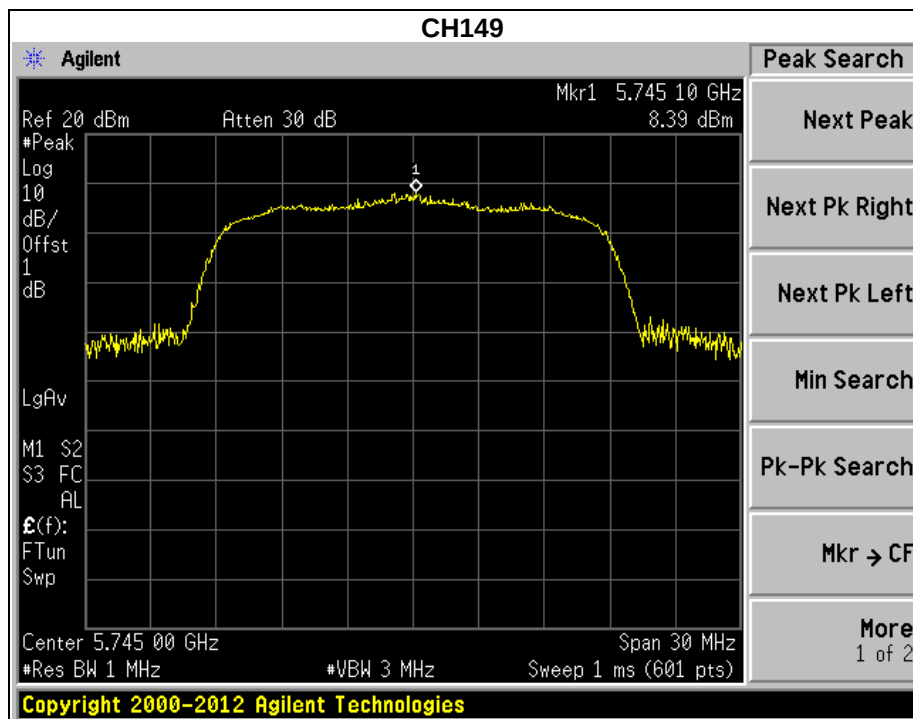
Test Report No.: RF151008N004-3R1

For U-NII-3:  
802.11a

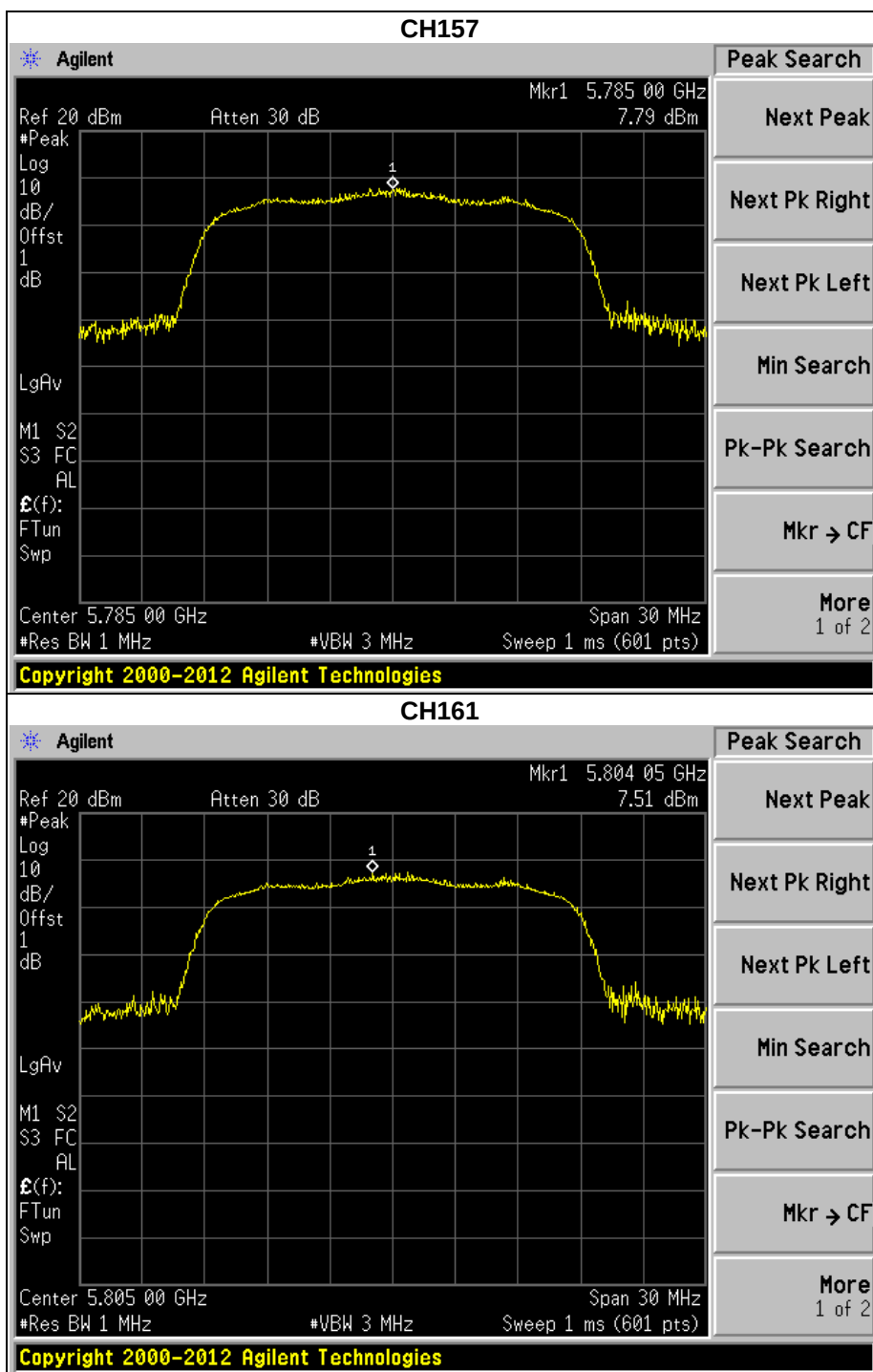




802.11n(20MHz)





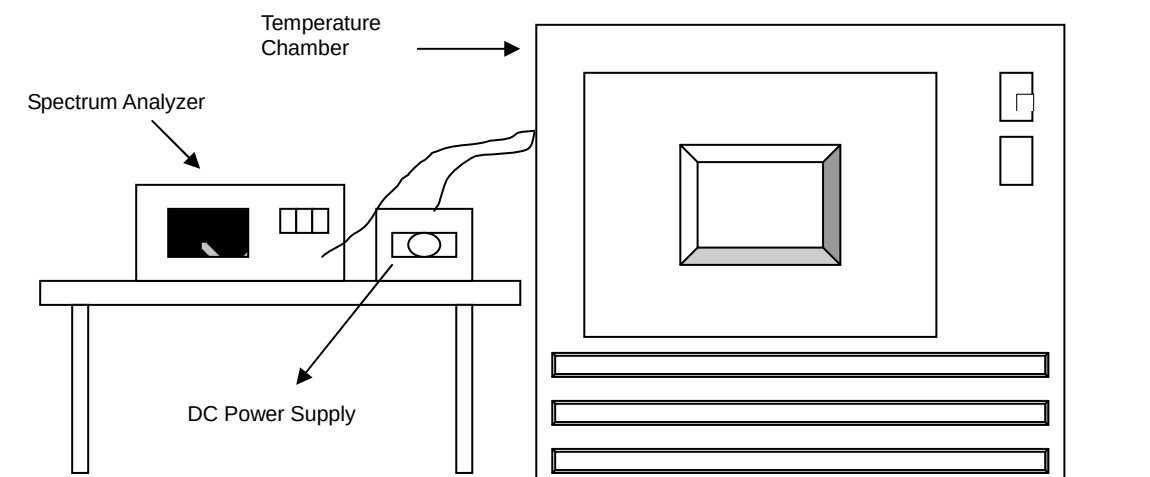


## 4.5 FREQUENCY STABILITY

### 4.5.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency of the carrier signal shall be maintained within band of operation

### 4.5.2 TEST SETUP



### 4.5.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

#### 4.5.4 TEST PROCEDURE

The EUT is installed in an environment test chamber with external power source.

Set the chamber to operate at 50 centigrade and external power source to output at nominal voltage of EUT.

A sufficient stabilization period at each temperatures is used prior to each frequency measurement.

When temperature is stabled, measure the frequency stability.

The test shall be performed under -30 to 50 centigrade and 85 to 115 percent of the nominal voltage.

Change setting of chamber and external power source to complete all conditions.

#### 4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.5.6 EUT OPERATING CONDITION

Set the EUT transmit at un-modulation mode to test frequency stability.

#### 4.5.7 TEST RESULTS

##### Band I:

##### Voltage vs. Frequency Stability (11a CH44)

| Test Conditions     |               | Test Frequency<br>(MHz) | Measurement<br>Frequency (MHz) | Max. Deviation<br>(ppm) |
|---------------------|---------------|-------------------------|--------------------------------|-------------------------|
| Temperature<br>(°C) | Voltage (VDC) |                         |                                |                         |
| 20                  | 4.2           | 5220                    | 5219.978633                    | -4.093295019            |
|                     | 3.8           | 5220                    | 5219.978455                    | -4.127394636            |
|                     | 3.4           | 5220                    | 5219.978128                    | -4.190038314            |

##### Temperature vs. Frequency Stability (11a CH44)

| Test Conditions |                     | Test Frequency<br>(MHz) | Measurement<br>Frequency (MHz) | Max. Deviation<br>(ppm) |
|-----------------|---------------------|-------------------------|--------------------------------|-------------------------|
| Voltage (VDC)   | Temperature<br>(°C) |                         |                                |                         |
| 3.8             | 5                   | 5220                    | 5219.978145                    | -4.186781609            |
|                 | 10                  | 5220                    | 5219.978745                    | -4.07183908             |
|                 | 15                  | 5220                    | 5219.978463                    | -4.125862069            |
|                 | 20                  | 5220                    | 5219.978477                    | -4.123180077            |
|                 | 25                  | 5220                    | 5219.978536                    | -4.111877395            |
|                 | 30                  | 5220                    | 5219.978498                    | -4.119157088            |
|                 | 35                  | 5220                    | 5219.978475                    | -4.123563218            |

##### Voltage vs. Frequency Stability (11a CH44)

| Test Conditions     |               | Test Frequency<br>(MHz) | Measurement<br>Frequency (MHz) | Max. Deviation<br>(ppm) |
|---------------------|---------------|-------------------------|--------------------------------|-------------------------|
| Temperature<br>(°C) | Voltage (VDC) |                         |                                |                         |
| 20                  | 4.2           | 5220                    | 5219.978482                    | -4.122222222            |
|                     | 3.8           | 5220                    | 5219.978756                    | -4.069731801            |
|                     | 3.4           | 5220                    | 5219.978389                    | -4.140038314            |

##### Temperature vs. Frequency Stability (11a(HT20) CH44)

| Test Conditions |                     | Test Frequency<br>(MHz) | Measurement<br>Frequency (MHz) | Max. Deviation<br>(ppm) |
|-----------------|---------------------|-------------------------|--------------------------------|-------------------------|
| Voltage (VDC)   | Temperature<br>(°C) |                         |                                |                         |
| 3.8             | 5                   | 5220                    | 5219.978489                    | -4.120881226            |
|                 | 10                  | 5220                    | 5219.978567                    | -4.105938697            |
|                 | 15                  | 5220                    | 5219.978351                    | -4.147318008            |
|                 | 20                  | 5220                    | 5219.978462                    | -4.12605364             |
|                 | 25                  | 5220                    | 5219.978736                    | -4.073563218            |
|                 | 30                  | 5220                    | 5219.978447                    | -4.128927203            |
|                 | 35                  | 5220                    | 5219.978768                    | -4.06743295             |



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## Band II:

### Voltage vs. Frequency Stability (11a CH60)

| Test Conditions  |               | Test Frequency (MHz) | Measurement Frequency (MHz) | Max. Deviation (ppm) |
|------------------|---------------|----------------------|-----------------------------|----------------------|
| Temperature (°C) | Voltage (VDC) |                      |                             |                      |
| 20               | 4.2           | 5300                 | 5299.986745                 | -2.500943396         |
|                  | 3.8           | 5300                 | 5299.986396                 | -2.566792453         |
|                  | 3.4           | 5300                 | 5299.986416                 | -2.563018868         |

### Temperature vs. Frequency Stability (11a CH60)

| Test Conditions |                  | Test Frequency (MHz) | Measurement Frequency (MHz) | Max. Deviation (ppm) |
|-----------------|------------------|----------------------|-----------------------------|----------------------|
| Voltage (VDC)   | Temperature (°C) |                      |                             |                      |
| 3.8             | 5                | 5300                 | 5299.986865                 | -2.478301887         |
|                 | 10               | 5300                 | 5299.986795                 | -2.491509434         |
|                 | 15               | 5300                 | 5299.986258                 | -2.592830189         |
|                 | 20               | 5300                 | 5299.986489                 | -2.549245283         |
|                 | 25               | 5300                 | 5299.986632                 | -2.522264151         |
|                 | 30               | 5300                 | 5299.986726                 | -2.504528302         |
|                 | 35               | 5300                 | 5299.986463                 | -2.554150943         |

### Voltage vs. Frequency Stability (11a(HT20) CH60)

| Test Conditions  |               | Test Frequency (MHz) | Measurement Frequency (MHz) | Max. Deviation (ppm) |
|------------------|---------------|----------------------|-----------------------------|----------------------|
| Temperature (°C) | Voltage (VDC) |                      |                             |                      |
| 20               | 4.2           | 5300                 | 5299.986896                 | -2.47245283          |
|                  | 3.8           | 5300                 | 5299.986269                 | -2.590754717         |
|                  | 3.4           | 5300                 | 5299.986681                 | -2.513018868         |

### Temperature vs. Frequency Stability (11a(HT20) CH60)

| Test Conditions |                  | Test Frequency (MHz) | Measurement Frequency (MHz) | Max. Deviation (ppm) |
|-----------------|------------------|----------------------|-----------------------------|----------------------|
| Voltage (VDC)   | Temperature (°C) |                      |                             |                      |
| 3.8             | 5                | 5300                 | 5299.986389                 | -2.568113208         |
|                 | 10               | 5300                 | 5299.986419                 | -2.56245283          |
|                 | 15               | 5300                 | 5299.986596                 | -2.529056604         |
|                 | 20               | 5300                 | 5299.986387                 | -2.568490566         |
|                 | 25               | 5300                 | 5299.986569                 | -2.534150943         |
|                 | 30               | 5300                 | 5299.986476                 | -2.551698113         |
|                 | 35               | 5300                 | 5299.986759                 | -2.498301887         |



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### Band III:

#### Voltage vs. Frequency Stability (11a CH116)

| Test Conditions  |               | Test Frequency (MHz) | Measurement Frequency (MHz) | Max. Deviation (ppm) |
|------------------|---------------|----------------------|-----------------------------|----------------------|
| Temperature (°C) | Voltage (VDC) |                      |                             |                      |
| 20               | 4.2           | 5580                 | 5579.988729                 | -2.019892473         |
|                  | 3.8           | 5580                 | 5579.988469                 | -2.066487455         |
|                  | 3.4           | 5580                 | 5579.988598                 | -2.043369176         |

#### Temperature vs. Frequency Stability (11a CH116)

| Test Conditions |                  | Test Frequency (MHz) | Measurement Frequency (MHz) | Max. Deviation (ppm) |
|-----------------|------------------|----------------------|-----------------------------|----------------------|
| Voltage (VDC)   | Temperature (°C) |                      |                             |                      |
| 3.8             | 5                | 5580                 | 5579.988389                 | -2.080824373         |
|                 | 10               | 5580                 | 5579.988781                 | -2.010573477         |
|                 | 15               | 5580                 | 5579.988569                 | -2.048566308         |
|                 | 20               | 5580                 | 5579.988697                 | -2.02562724          |
|                 | 25               | 5580                 | 5579.988369                 | -2.084408602         |
|                 | 30               | 5580                 | 5579.988746                 | -2.016845878         |
|                 | 35               | 5580                 | 5579.988643                 | -2.03530466          |

#### Voltage vs. Frequency Stability (11a(HT20) CH116)

| Test Conditions  |               | Test Frequency (MHz) | Measurement Frequency (MHz) | Max. Deviation (ppm) |
|------------------|---------------|----------------------|-----------------------------|----------------------|
| Temperature (°C) | Voltage (VDC) |                      |                             |                      |
| 20               | 4.2           | 5580                 | 5579.988685                 | -2.027777778         |
|                  | 3.8           | 5580                 | 5579.988542                 | -2.053405018         |
|                  | 3.4           | 5580                 | 5579.988396                 | -2.079569893         |

#### Temperature vs. Frequency Stability (11a(HT20) CH116)

| Test Conditions |                  | Test Frequency (MHz) | Measurement Frequency (MHz) | Max. Deviation (ppm) |
|-----------------|------------------|----------------------|-----------------------------|----------------------|
| Voltage (VDC)   | Temperature (°C) |                      |                             |                      |
| 3.8             | 5                | 5580                 | 5579.988791                 | -2.008781362         |
|                 | 10               | 5580                 | 5579.988469                 | -2.066487455         |
|                 | 15               | 5580                 | 5579.988387                 | -2.081182796         |
|                 | 20               | 5580                 | 5579.988591                 | -2.044623656         |
|                 | 25               | 5580                 | 5579.988543                 | -2.053225806         |
|                 | 30               | 5580                 | 5579.988759                 | -2.014516129         |
|                 | 35               | 5580                 | 5579.988618                 | -2.039784946         |



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Band IV:

Voltage vs. Frequency Stability (11a CH157)

| Test Conditions  |               | Test Frequency (MHz) | Measurement Frequency (MHz) | Max. Deviation (ppm) |
|------------------|---------------|----------------------|-----------------------------|----------------------|
| Temperature (°C) | Voltage (VDC) |                      |                             |                      |
| 20               | 4.2           | 5785                 | 5784.988492                 | -1.989282627         |
|                  | 3.8           | 5785                 | 5784.988567                 | -1.976318064         |
|                  | 3.4           | 5785                 | 5784.988746                 | -1.945375972         |

Temperature vs. Frequency Stability (11a CH157)

| Test Conditions |                  | Test Frequency (MHz) | Measurement Frequency (MHz) | Max. Deviation (ppm) |
|-----------------|------------------|----------------------|-----------------------------|----------------------|
| Voltage (VDC)   | Temperature (°C) |                      |                             |                      |
| 3.8             | 5                | 5785                 | 5784.988385                 | -2.007778738         |
|                 | 10               | 5785                 | 5784.988429                 | -2.000172861         |
|                 | 15               | 5785                 | 5784.988651                 | -1.961797753         |
|                 | 20               | 5785                 | 5784.988742                 | -1.946067416         |
|                 | 25               | 5785                 | 5784.988359                 | -2.01227312          |
|                 | 30               | 5785                 | 5784.988651                 | -1.961797753         |
|                 | 35               | 5785                 | 5784.988459                 | -1.994987035         |

Voltage vs. Frequency Stability (11a(HT20) CH157)

| Test Conditions  |               | Test Frequency (MHz) | Measurement Frequency (MHz) | Max. Deviation (ppm) |
|------------------|---------------|----------------------|-----------------------------|----------------------|
| Temperature (°C) | Voltage (VDC) |                      |                             |                      |
| 20               | 4.2           | 5785                 | 5784.988554                 | -1.978565255         |
|                  | 3.8           | 5785                 | 5784.988386                 | -2.007605877         |
|                  | 3.4           | 5785                 | 5784.988476                 | -1.992048401         |

Temperature vs. Frequency Stability (11a(HT20) CH157)

| Test Conditions |                  | Test Frequency (MHz) | Measurement Frequency (MHz) | Max. Deviation (ppm) |
|-----------------|------------------|----------------------|-----------------------------|----------------------|
| Voltage (VDC)   | Temperature (°C) |                      |                             |                      |
| 3.8             | 5                | 5785                 | 5784.988582                 | -1.973725151         |
|                 | 10               | 5785                 | 5784.988394                 | -2.00622299          |
|                 | 15               | 5785                 | 5784.988741                 | -1.946240277         |
|                 | 20               | 5785                 | 5784.988634                 | -1.964736387         |
|                 | 25               | 5785                 | 5784.988941                 | -1.911668107         |
|                 | 30               | 5785                 | 5784.988726                 | -1.948833189         |
|                 | 35               | 5785                 | 5784.988449                 | -1.996715644         |



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## 5. PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).



## **6. APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB**

No modifications were made to the EUT by the lab during the test.

**---END---**