# FCC TEST REPORT
# FCC ID: 2BFR7-C6

| | | |
|---|---|---|
| **Product** | : | **AI dental mirror** |
| **Model Name** | : | **C6** |
| **Brand** | : | **N/A** |
| **Report No.** | : | **NCT24015142E** |

Prepared for

**HeadSpring Biology (BeiJing) Technology Co., Ltd.**

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Prepared by

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# 1 TEST RESULT CERTIFICATION

| | | |
|---|---|---|
| Applicant's name | : | HeadSpring Biology (BeiJing) Technology Co., Ltd. |
| Address | : | 1st Floor, No.1 Building, ZhongGuanCun HighTechnology Zone. PingGu District, Beijing 101200, China |
| Manufacture's name | : | Zhuhai Aicreate Medical Technology Co., Ltd. |
| Address | : | Building E, F, and G on the third floor of Building 1, No. 8 Chuangxin 1st Road, Jinding Science and Technology Innovation Coast, Tangjiawan Town, High tech Zone, Zhuhai City |
| Product name | : | AI dental mirror |
| Model name | : | C6 |
| Standards | : | FCC CFR47 Part 15 Section 15.247 |
| Test procedure | : | ANSI C63.10:2013 |
| Date of Receipt | : | Apr. 01, 2024 |
| Test Date | : | Apr. 01, 2024 - Apr. 12, 2024 |
| Date of Issue | : | Apr. 12, 2024 |

This device described above has been tested by NCT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Test Engineer:

Keven Wu / Engineer

Technical Manager:

Henry Wang / Manager

Shenzhen NCT Testing Technology Co., Ltd. 2008

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# 2 Test Summary

| Test Items | Test Requirement | Result |
|---|---|---|
| Conduct Emission | 15.207 | PASS |
| Radiated Spurious Emissions | 15.205(a)<br>15.209<br>15.247(d) | PASS |
| Conducted Spurious Emission | 15.247(d) | PASS |
| Band edge | 15.247(d)<br>15.205(a) | PASS |
| 6dB Bandwidth | 15.247(a)(2) | PASS |
| Maximum Peak Output Power | 15.247(b)(3) | PASS |
| Power Spectral Density | 15.247(e) | PASS |
| Antenna Requirement | 15.203 | PASS |

Remark:

1. The EUT is powered by full-charged battery during the test.

## 2.1 Test Site

Site Description

| | | |
|---|---|---|
| EMC Lab. | : | Accredited by CNAS, 2022-09-27 |
| | | The certificate is valid until 2028.01.07 |
| | | The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2006 (identical to ISO/IEC 17025:2017) |
| | | The Certificate Registration Number is L8251 |
| | | Designation Number: CN1347 |
| | | Test Firm Registration Number: 894804 |
| | | Accredited by A2LA, June 14, 2023 |
| | | The Certificate Registration Number is 6837.01 |
| | | Accredited by Industry Canada, November 09, 2018 |
| | | The Conformity Assessment Body Identifier is CN0150 |
| Name of Firm | : | Shenzhen NCT Testing Technology Co., Ltd. |
| Site Location | : | A101&B2, Fuqiao 6th Area , Xintian Community, Fuhai Street, |
| | | Baoan District, Shenzhen, China |

# 3 General Information

## 3.1 General Description of E.U.T.

| | | |
|---|---|---|
| Product Name | : | AI dental mirror |
| Model Name | : | C6 |
| Sample ID | : | NCT24015142# |
| Sample(s) Status: | : | Engineering Sample |
| Operating Frequency | : | 802.11b/g/n (20MHz): 2412~2462MHz |
| Number of Channels | : | 802.11b/g/n (20MHz): 11Channels |
| Type of Modulation | : | 802.11b(DSSS): CCK, DQPSK, DBPSK<br>802.11g(OFDM): BPSK, QPSK,16-QAM, 64-QAM<br>802.11n(OFDM): BPSK, QPSK,16-QAM, 64-QAM |
| Antenna Installation | : | Cable Antenna |
| Antenna Gain | : | 0.5 dBi |
| Power Supply | : | DC3.7V from Battery, DC 5V from Adapter |
| Hardware Version | : | N/A |
| Software Version | : | N/A |
| Remark:the Antenna gain is provided by customer from Antenna spec. and the laboratory will not be responsible for the accumulated calculation results which covers the information provided by the applicant. | | |

## 3.2 Channel List

The EUT has been tested under its typical operating condition. Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting. Only the worst case data were reported.

The EUT has been associated with peripherals pursuant to ANSI C63.10-2013 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiation (9 KHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

The details of test channels and bandwidth were for RF conductive measurement.

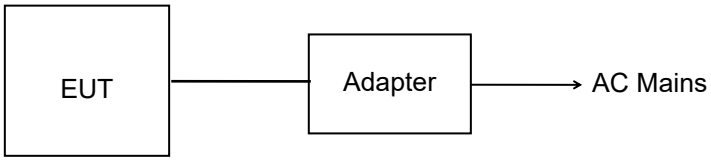
Channel List:

| Channel Lists | | | | | | | |
|---|---|---|---|---|---|---|---|
| 802.11b/ g/ n(20MHz) | | | | | | | |
| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 01 | 2412 | 05 | 2432 | 09 | 2452 | / | / |
| 02 | 2417 | 06 | 2437 | 10 | 2457 | / | / |
| 03 | 2422 | 07 | 2442 | 11 | 2462 | / | / |
| 04 | 2427 | 08 | 2447 | / | / | / | / |

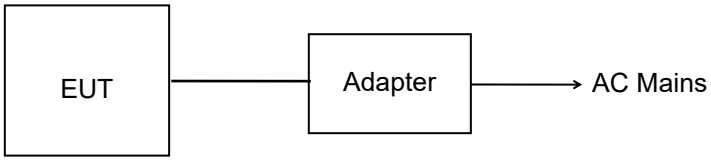
Note:
1. Test of channel was included the lowest, middle and highest frequency in highest data rate and to perform the test, then record on this report.

## 3.3 Test Setup Configuration

Conducted Emission




Radiated Emission



## 3.4 Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

| Pretest Mode | Description |
|---|---|
| | 802.11b/g/n(20MHz) |
| Low Channel | 2412MHz |
| Middle Channel | 2437MHz |
| Middle Channel | 2462MHz |

# 4 Equipment During Test

## 4.1 Equipments List

| Name | Model No. | Serial No. | Manufacturer | Date of Cal. | Due Date |
|---|---|---|---|---|---|
| 944 Shielded Room | 944 Room | / | EMToni | 2022/5/31 | 2025/5/30 |
| EMI Test Receiver | ESPI | 101604 | Rohde & Schwarz | 2023/6/21 | 2024/6/20 |
| LISN | ENV 216 | 102796 | Rohde & Schwarz | 2023/6/21 | 2024/6/20 |
| LISN | VN1-13S | 004023 | CRANAGE | 2023/6/21 | 2024/6/20 |
| Cable | RG223-1500MM | NA | RG | 2023/6/21 | 2024/6/20 |

Radiated emission & Radio Frequency Test Equipment

| Name | Model No. | Serial No. | Manufacturer | Date of Cal. | Due Date |
|---|---|---|---|---|---|
| 966 Shielded Room | 966 Room | / | EMToni | 2022/5/31 | 2025/5/30 |
| EMI Test Receiver | ESCI | 101178 | Rohde & Schwarz | 2023/6/21 | 2024/6/20 |
| Amplifi （30MHz-1GHz） | BBV 9743 B | 00374 | SCHNWARZBECK | 2023/6/21 | 2024/6/20 |
| Bilog Antenna （30MHz-1GHz） | VULB9162 | 00473 | SCHNWARZBECK | 2023/3/19 | 2025/3/18 |
| Horn antenna （1GHz-18GHz） | BBHA 9120 D | 02622 | SCHNWARZBECK | 2023/3/19 | 2025/3/18 |
| Pream plifier （1GHz-18GHz） | BBV 9718D | 0024 | SCHNWARZBECK | 2023/6/21 | 2024/6/20 |
| Spectrum Analyze （10Hz-40GHz） | FSV 40 | 100952 | Rohde & Schwarz | 2023/6/21 | 2024/6/20 |
| Pream plifier （18GHz-40GHz） | BBV 9721 | 0056 | SCHNWARZBECK | 2023/6/21 | 2024/6/20 |
| Double Ridge Guide Horn Antenna （18GHz-40GHz） | SAS-574 | 588 | A.H.System | 2023/3/19 | 2025/3/18 |
| Loop Antenna (9KHz-30MHz) | FMZB 1513-60 | 00115 | SCHNWARZBECK | 2023/6/21 | 2024/6/20 |
| Amplifier (9KHz-30MHz) | CVP 9222 C BBV 9745 | 00109 | CHNWARZBECK | 2023/6/21 | 2024/6/20 |
| MXG Signal Analyzer | N9020A | MY50510202 | Agilent | 2023/6/21 | 2024/6/20 |

| | | | | | |
|---|---|---|---|---|---|
| Comprehensive tester | CWM500 | 104995 | Rohde & Schwarz | 2023/6/21 | 2024/6/20 |
| MXG Vector Signal Generator | N5182A | MY50140020 | Agilent | 2023/6/21 | 2024/6/20 |
| MXG Analog Signal Generator | N5181A | MY47420919 | Agilent | 2023/6/21 | 2024/6/20 |
| Power Sensor | TR1029-2 | 512364 | Techoy | 2023/6/21 | 2024/6/20 |
| RF Swith | TR1029-1 | 512364 | Techoy | 2023/6/21 | 2024/6/20 |
| Cable | DA800-4000MM | NA | DA | 2023/6/21 | 2024/6/20 |
| Cable | DA800-11000MM | NA | DA | 2023/6/21 | 2024/6/20 |

Other

| Item | Name | Manufacturer | Model | Software version |
|---|---|---|---|---|
| 1 | EMC Conduction Test System | AUDIX | e3 | 6.120718 |
| 2 | EMC radiation test system | AUDIX | e3 | 6.120718 |
| 3 | RF test system | TACHOY | RFTest | V1.0.0 |
| 4 | RF communication test system | TACHOY | RFTest | V1.0.0 |

Peak Output Power Test Equipment

| Peak Output Power | | | | | |
|---|---|---|---|---|---|
| Name | Model No. | Serial No. | Manufacturer | Date of Cal. | Due Date |
| Power Meter | E4419B | 230480 | Agilent | 2023/6/21 | 2024/6/20 |
| RF Cable | MWX322 | MY50510202 | 1305G006 | 2023/6/21 | 2024/6/20 |
| 10dB Attenuator | 2AS102-K10S3 | N/A | Rosenberger | 2023/6/21 | 2024/6/20 |

## 4.2 Measurement Uncertainty

| Parameter | Uncertainty |
|---|---|
| RF output power, conducted | ±1.0dB |
| Power Spectral Density, conducted | ±2.2dB |
| Radio Frequency | ± 1 x $10^{-6}$ |
| Bandwidth | ± 1.5 x $10^{-6}$ |
| Time | ±2% |
| Duty Cycle | ±2% |
| Temperature | ±1°C |
| Humidity | ±5% |
| DC and low frequency voltages | ±3% |
| Conducted Emissions (150kHz~30MHz) | ±3.64dB |
| Radiated Emission(30MHz~1GHz) | ±5.03dB |
| Radiated Emission(1GHz~25GHz) | ±4.74dB |
| Remark: The coverage Factor (k=2), and measurement Uncertainty for a level of Confidence of 95% | |

## 4.3 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.

| Item | Equipment | Mfr/Brand | Model/Type No. | Series No. | Note |
|---|---|---|---|---|---|
| 1 | AI dental mirror | N/A | C6 | N/A | EUT |
| 2 | Notebook | Lenovo | G475 | GB14477457 | AE |
| 3 | Adapter | GAT | GAT-0501000U | N/A | AE |
| | | | | | |
| | | | | | |
| | | | | | |

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

# 5 Conducted Emission

| | | |
|---|---|---|
| Test Requirement | : | FCC CFR 47 Part 15 Section 15.207&RSS-Gen § 8.8 |
| Test Method | : | ANSI C63.10: 2013 |
| Test Result | : | PASS |
| Frequency Range | : | 150kHz to 30MHz |
| Class/Severity | : | Class B |

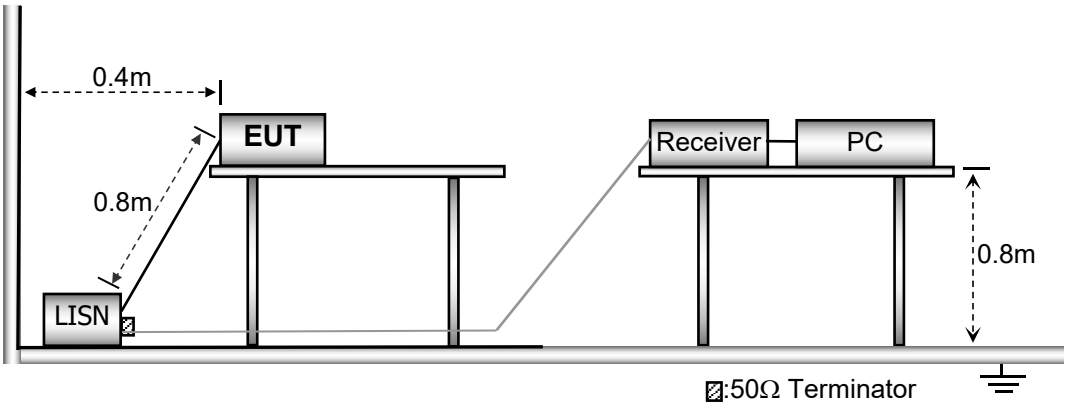
## 5.1 E.U.T. Operation

Operating Environment :

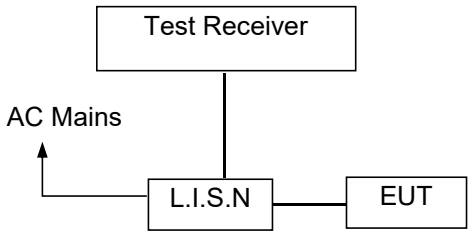
| | | |
|---|---|---|
| Temperature | : | 25.5 °C |
| Humidity | : | 51 % RH |
| Atmospheric Pressure | : | 101.2kPa |

## 5.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10:2013.



## 5.3 Test SET-UP (Block Diagram of Configuration)




## 5.4 Measurement Procedure

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

## 5.5 Conducted Emission Limit

**Conducted Emission**

| Frequency(MHz) | Quasi-peak | Average |
|---|---|---|
| 0.15-0.5 | 66-56 | 56-46 |
| 0.5-5.0 | 56 | 46 |
| 5.0-30.0 | 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.

## 5.6 Measurement Description

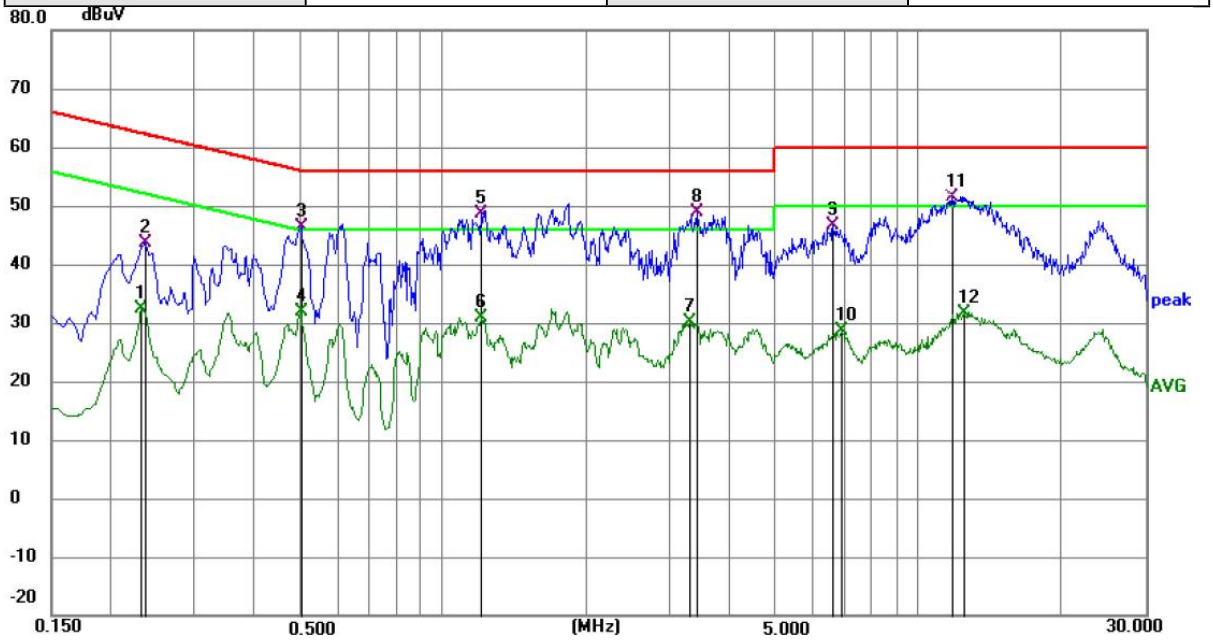
The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

## 5.7 Conducted Emission Test Result

Pass.

All modes were tested at AC 120V and 240V, only the worst result of AC 120V was reported.
All modes of 802.11b/g/n20 were test at Low, Middle, and High channel, only the worst result of 802.11b Low Channel was reported.

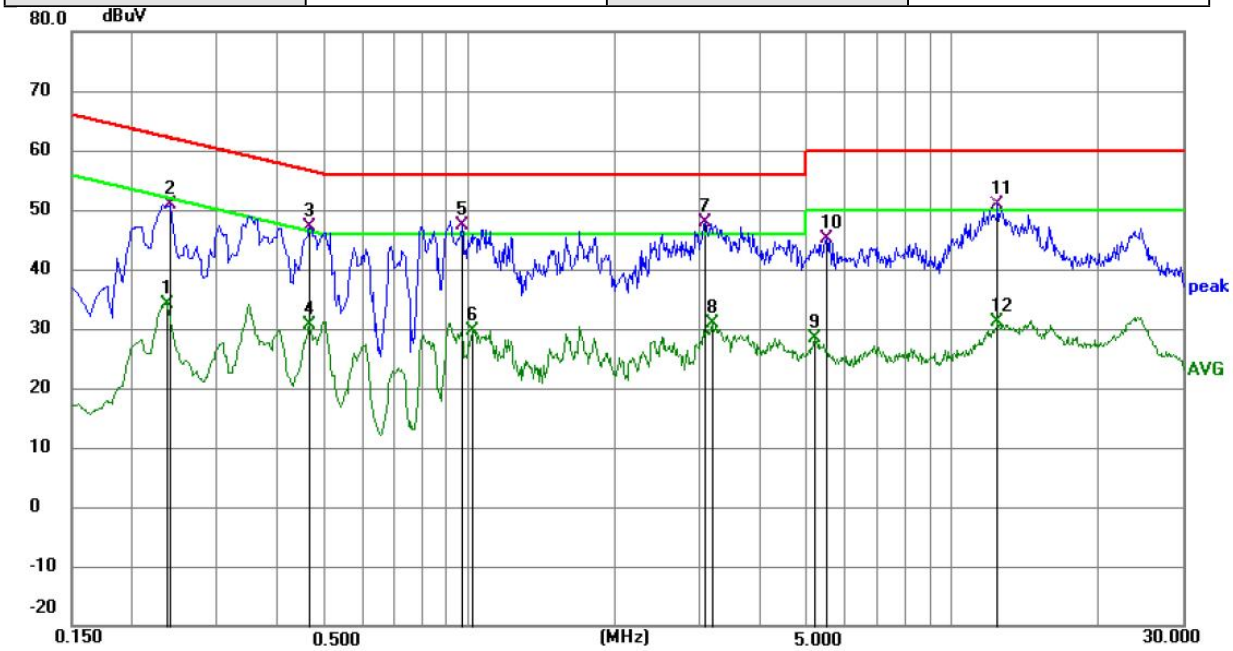
| | | | |
|---|---|---|---|
| Temperature: | 26℃ | Relative Humidity: | 54% |
| Pressure: | 101kPa | Phase : | L |
| Test Voltage : | DC 5V from Adapter | Test Mode : | 802.11b 2412MHz |




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 0.2310 | 21.75 | 10.56 | 32.31 | 52.41 | -20.10 | AVG |
| 2 | 0.2354 | 33.12 | 10.56 | 43.68 | 62.26 | -18.58 | QP |
| 3 | 0.5010 | 35.74 | 10.57 | 46.31 | 56.00 | -9.69 | QP |
| 4 | 0.5010 | 21.24 | 10.57 | 31.81 | 46.00 | -14.19 | AVG |
| 5 | 1.2075 | 38.00 | 10.66 | 48.66 | 56.00 | -7.34 | QP |
| 6 | 1.2075 | 20.28 | 10.66 | 30.94 | 46.00 | -15.06 | AVG |
| 7 | 3.3000 | 19.51 | 10.65 | 30.16 | 46.00 | -15.84 | AVG |
| 8 * | 3.4214 | 38.33 | 10.64 | 48.97 | 56.00 | -7.03 | QP |
| 9 | 6.6165 | 35.92 | 10.78 | 46.70 | 60.00 | -13.30 | QP |
| 10 | 6.8910 | 17.82 | 10.78 | 28.60 | 50.00 | -21.40 | AVG |
| 11 | 11.7870 | 41.54 | 10.83 | 52.37 | 60.00 | -7.63 | QP |
| 12 | 12.4530 | 20.88 | 10.83 | 31.71 | 50.00 | -18.29 | AVG |

Notes:
1.An initial pre-scan was performed on the line and neutral lines with peak detector.
2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.

| | | | |
|---|---|---|---|
| Temperature: | 26℃ | Relative Humidity: | 54% |
| Pressure: | 101kPa | Phase : | N |
| Test Voltage : | DC 5V from Adapter | Test Mode : | 802.11b 2412MHz |




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 0.2354 | 23.51 | 10.56 | 34.07 | 52.26 | -18.19 | AVG |
| 2 | 0.2400 | 40.29 | 10.56 | 50.85 | 62.10 | -11.25 | QP |
| 3 | 0.4650 | 36.60 | 10.57 | 47.17 | 56.60 | -9.43 | QP |
| 4 | 0.4650 | 19.96 | 10.57 | 30.53 | 46.60 | -16.07 | AVG |
| 5 | 0.9645 | 36.77 | 10.67 | 47.44 | 56.00 | -8.56 | QP |
| 6 | 1.0184 | 18.87 | 10.66 | 29.53 | 46.00 | -16.47 | AVG |
| 7 * | 3.0840 | 37.28 | 10.67 | 47.95 | 56.00 | -8.05 | QP |
| 8 | 3.1740 | 20.30 | 10.66 | 30.96 | 46.00 | -15.04 | AVG |
| 9 | 5.1900 | 17.76 | 10.74 | 28.50 | 50.00 | -21.50 | AVG |
| 10 | 5.5004 | 34.27 | 10.75 | 45.02 | 60.00 | -14.98 | QP |
| 11 | 12.4484 | 39.94 | 10.88 | 50.82 | 60.00 | -9.18 | QP |
| 12 | 12.4484 | 20.25 | 10.88 | 31.13 | 50.00 | -18.87 | AVG |

Notes:
1.An initial pre-scan was performed on the line and neutral lines with peak detector.
2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.

# 6 Radiated Spurious Emissions

Test Requirement : FCC CFR47 Part 15 Section 15.209 & 15.247&RSS-247 § 5.5

Test Method : ANSI C63.10:2013

Test Result : PASS

Measurement Distance : 3m

Limit : See the follow table

| Frequency (MHz) | Field Strength | | Field Strength Limit at 3m Measurement Dist | |
|---|---|---|---|---|
| | uV/m | Distance (m) | uV/m | dBuV/m |
| 0.009 ~ 0.490 | 2400/F(kHz) | 300 | 10000 * 2400/F(kHz) | $20\log^{(2400/F(kHz))} + 80$ |
| 0.490 ~ 1.705 | 24000/F(kHz) | 30 | 100 * 24000/F(kHz) | $20\log^{(24000/F(kHz))} + 40$ |
| 1.705 ~ 30 | 30 | 30 | 100 * 30 | $20\log^{(30)} + 40$ |
| 30 ~ 88 | 100 | 3 | 100 | $20\log^{(100)}$ |
| 88 ~ 216 | 150 | 3 | 150 | $20\log^{(150)}$ |
| 216 ~ 960 | 200 | 3 | 200 | $20\log^{(200)}$ |
| Above 960 | 500 | 3 | 500 | $20\log^{(500)}$ |

## 6.1 EUT Operation

Operating Environment :

Temperature : 23.5 °C

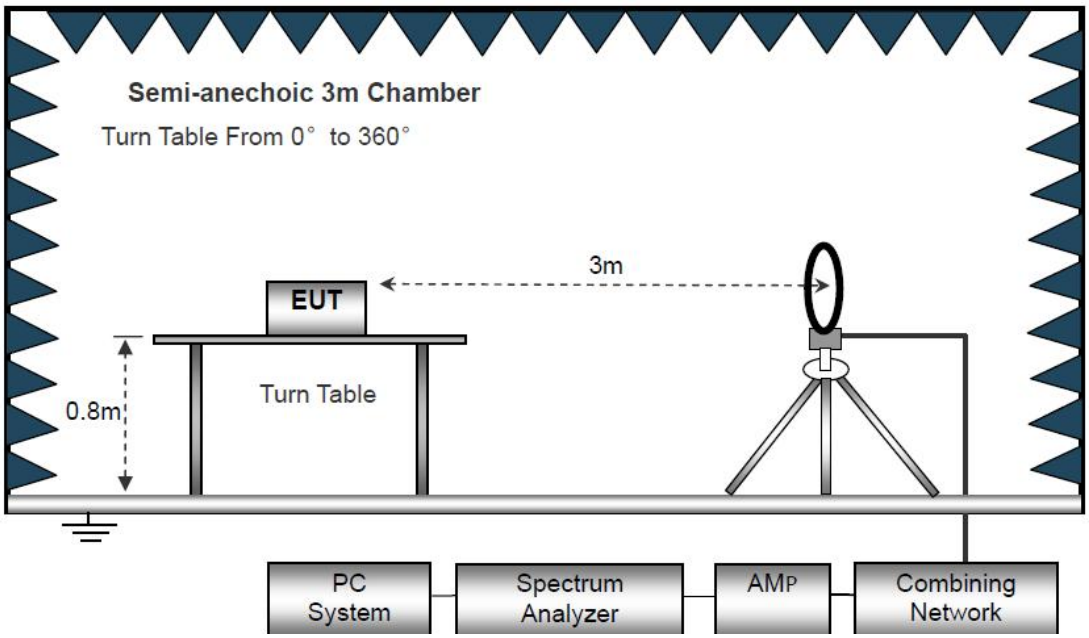
Humidity : 51.1 % RH

Atmospheric Pressure : 101.2kPa

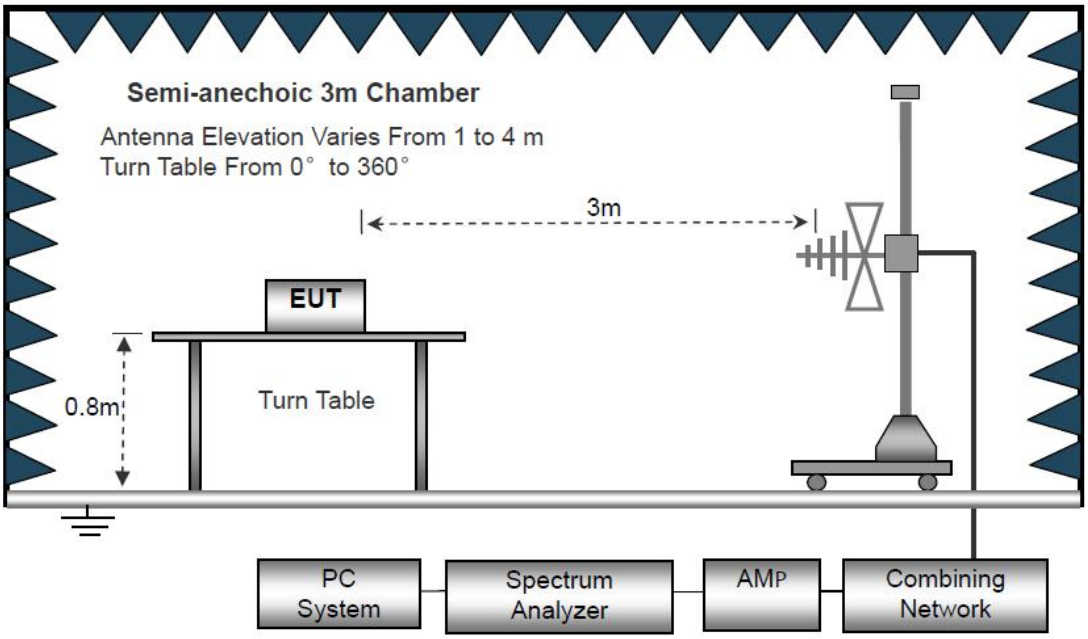
## 6.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site

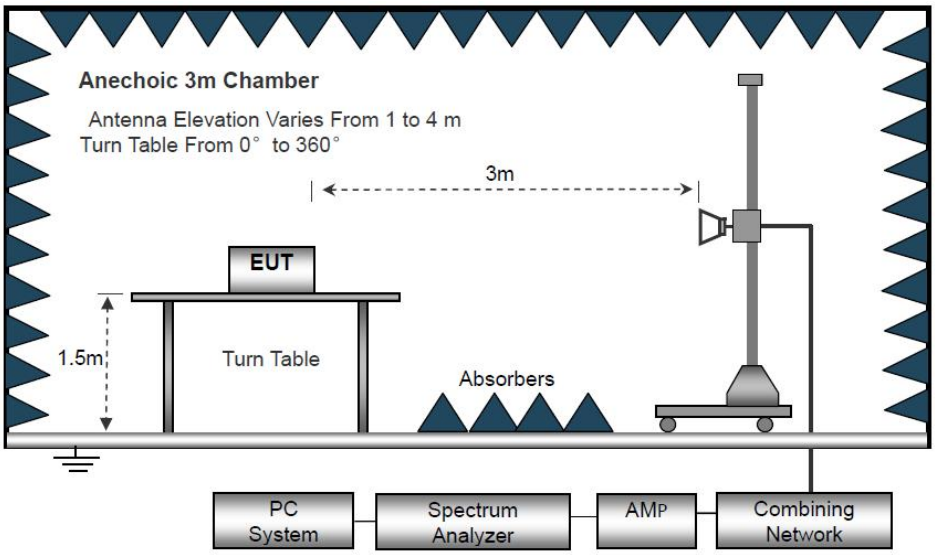
The test setup for emission measurement below 30MHz




The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz




## 6.3 Spectrum Analyzer Setup

| | Frequency | Detector | RBW | VBW | Remark |
|---|---|---|---|---|---|
| Receiver Setup | Below 30MHz | -- | 10kHz | 10kHz | -- |
| | 30MHz ~ 1GHz | Quasi-peak | 120kHz | 300kHz | Quasi-peak Value |
| | Above 1GHz | Peak | 1MHz | 3MHz | Peak Value |
| | | RMS | 1MHz | 3MHz | Average Value |

## 6.4 Test Procedure

1. The testing follows the guidelines in Spurious Radiated Emissions of ANSI C63.10-2013.

2. Below 1000MHz, The EUT was placed on a turn table which is 0.8m above ground plane. And above 1000MHz, The EUT was placed on a styrofoam table which is 1.5m above ground plane.

3. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (From 1m to 4m) and turntable (from 0 degree to 360 degree) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.

5. Set to the maximum power setting and enable the EUT transmit continuously.

6. Final measurement (Above 1GHz): The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The EMI Receiver set to peak and average mode and a resolution bandwidth of 1MHz. The measurement will be performed in horizontal and vertical polarization of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 degree to 360 degree in order to have the antenna inside the cone of radiation.

7. Test Procedure of measurement (For Above 1GHz):

1) Monitor the frequency range at horizontal polarization and move the antenna over all sides of the EUT(if necessary move the EUT to another orthogonal axis).

2) Change the antenna polarization and repeat 1) with vertical polarization.

3) Make a hardcopy of the spectrum.

4) Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.

5) Change the analyser mode to Clear/ Write and found the cone of emission.

6) Rotate and move the EUT, so that the measuring distance can be enlarged to 3m and the antenna will be still inside the cone of emission.

7) Measure the level of the detected frequency with the correct resolution bandwidth, with the antenna polarization and azimuth and the peak and average detector, which causes the maximum emission.

8) Repeat steps 1) to 7) for the next antenna spot if the EUT is larger than the antenna beamwidth.

8. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.

For Average Measurement:

VBW=10Hz, when duty cycle is no less than 98 percent.

VBW≥1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

| Band | Duty Cycle(%) | T(μs) | 1/T(KHz) | Average Correction Factor | VBW Setting |
|---|---|---|---|---|---|
| 2412-2462 | 100 | - | - | 0 | 10Hz |

## 6.5 Summary of Test Results

**Test Frequency: 9KHz-30MHz**

| Freq. | Ant.Pol. | Emission Level | Limit 3m | Over |
|---|---|---|---|---|
| (MHz) | H/V | (dBuV/m) | (dBuV/m) | (dB) |
| -- | -- | -- | -- | >20 |

Note:

The amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

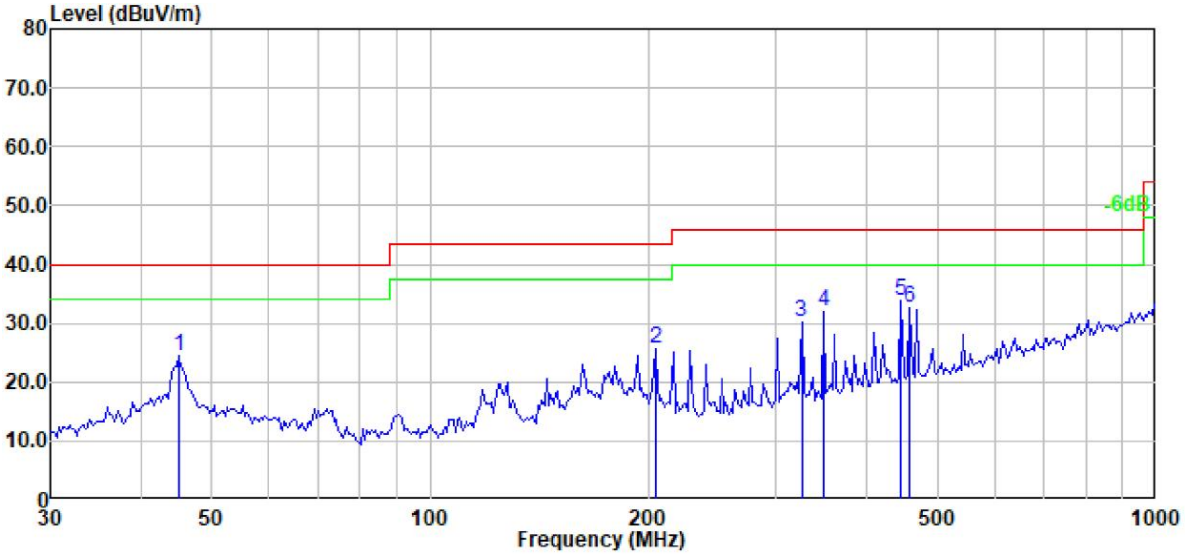
Distance extrapolation factor =40log(Specific distance/ test distance)( dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.

**Test Frequency: 30MHz ~ 1GHz**

Pass.

Note: All modes of 802.11b/g/n20 were test at Low, Middle, and High channel, only the worst result of 802.11b Low Channel was reported for below 1GHz test.

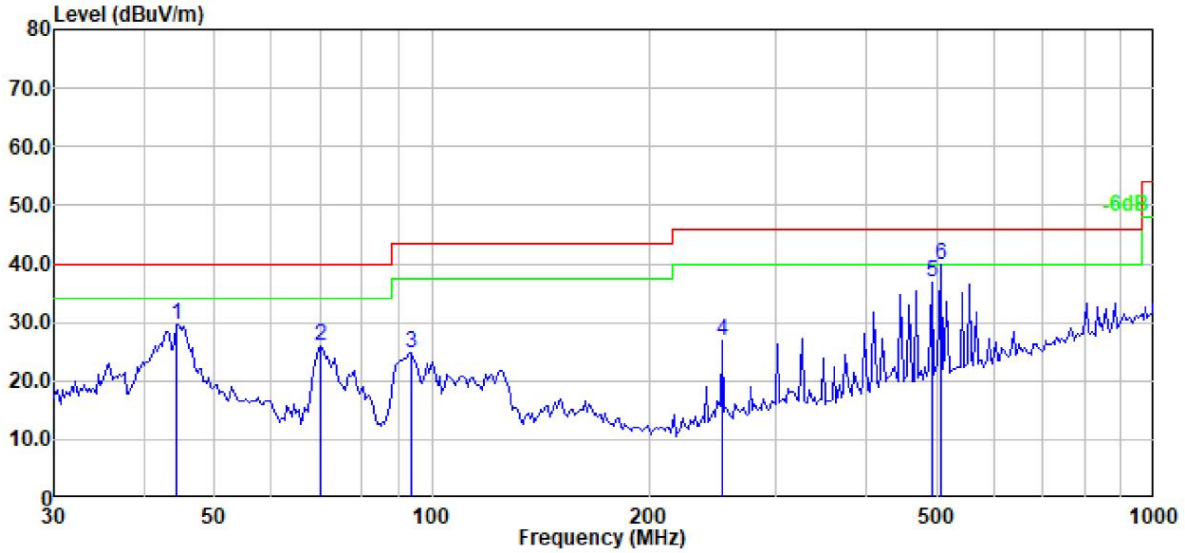
| | | | |
|---|---|---|---|
| Temperature: | 26℃ | Relative Humidity: | 53% |
| Pressure: | 101kPa | Polarization: | Horizontal |
| Test Voltage : | DC 5V from Adapter | Test Mode : | 802.11b 2412MHz |




Remark: Level=Reading Level + Factor; Factor = Antenna Factor + Cable Loss - Pre-amplifier.

| | Freq | Read Level | Level | Factor | Limit Line | Over Limit | Pol/Phase | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dBuV/m | dB/m | dBuV/m | dB | | |
| 1 | 45.095 | 36.89 | 24.50 | -12.39 | 40.00 | -15.50 | Horizontal | QP |
| 2 | 204.305 | 39.81 | 25.71 | -14.10 | 43.50 | -17.79 | Horizontal | QP |
| 3 | 324.865 | 39.47 | 30.12 | -9.35 | 46.00 | -15.88 | Horizontal | QP |
| 4 | 348.515 | 41.64 | 31.88 | -9.76 | 46.00 | -14.12 | Horizontal | QP |
| 5 | 445.693 | 40.26 | 33.82 | -6.44 | 46.00 | -12.18 | Horizontal | QP |
| 6 | 458.399 | 38.88 | 32.60 | -6.28 | 46.00 | -13.40 | Horizontal | QP |

| | | | |
|---|---|---|---|
| Temperature: | 26℃ | Relative Humidity: | 53% |
| Pressure: | 101kPa | Polarization: | Vertical |
| Test Voltage : | DC 5V from Adapter | Test Mode : | 802.11b 2412MHz |




Remark: Level=Reading Level + Factor; Factor = Antenna Factor + Cable Loss - Pre-amplifier.

| | Freq | Read Level | Level | Factor | Limit Line | Over Limit | Pol/Phase | Remark |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dBuV/m | dB/m | dBuV/m | dB | | |
| 1 | 44.466 | 41.82 | 29.44 | -12.38 | 40.00 | -10.56 | Vertical | QP |
| 2 | 70.210 | 40.56 | 25.98 | -14.58 | 40.00 | -14.02 | Vertical | QP |
| 3 | 93.653 | 40.47 | 24.86 | -15.61 | 43.50 | -18.64 | Vertical | QP |
| 4 | 252.252 | 39.28 | 26.86 | -12.42 | 46.00 | -19.14 | Vertical | QP |
| 5 | 491.770 | 42.90 | 36.98 | -5.92 | 46.00 | -9.02 | Vertical | QP |
| 6 | 505.789 | 45.57 | 39.92 | -5.65 | 46.00 | -6.08 | Vertical | QP |

## Test Frequency 1GHz-25GHz:

All modes of 802.11b/g/n20 were test at Low, Middle, and High channel, only the worst result of 802.11b mode results were reported.

| Polar (H/V) | Frequency (MHz) | Meter Reading (dBuV) | Pre-amplifier (dB) | Cable Loss (dB) | Antenna Factor (dB) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|---|---|---|
| 802.11b Low Channel: 2412MHz | | | | | | | | | |
| V | 4824 | 51.8 | 34.11 | 5.04 | 32.44 | 55.17 | 74.00 | -18.83 | Pk |
| V | 4824 | 38.8 | 34.11 | 5.04 | 32.44 | 42.17 | 54.00 | -11.83 | AV |
| V | 7236 | 41.9 | 32.57 | 6.3 | 35.89 | 51.52 | 74.00 | -22.48 | Pk |
| V | 7236 | 26.83 | 32.57 | 6.3 | 35.89 | 36.45 | 54.00 | -17.55 | AV |
| V | 9648 | 36.56 | 32.96 | 7.56 | 38.4 | 49.56 | 74.00 | -24.44 | Pk |
| V | 9648 | 24.57 | 32.96 | 7.56 | 38.4 | 37.57 | 54.00 | -16.43 | AV |
| V | 12060 | 32.45 | 32.06 | 8.92 | 39.01 | 48.32 | 74.00 | -25.68 | Pk |
| V | 12060 | 24.12 | 32.06 | 8.92 | 39.01 | 39.99 | 54.00 | -14.01 | AV |
| H | 4824 | 46.47 | 34.11 | 5.04 | 32.44 | 49.84 | 74.00 | -24.16 | Pk |
| H | 4824 | 35.33 | 34.11 | 5.04 | 32.44 | 38.7 | 54.00 | -15.30 | AV |
| H | 7236 | 40.05 | 32.57 | 6.3 | 35.89 | 49.67 | 74.00 | -24.33 | Pk |
| H | 7236 | 25.93 | 32.57 | 6.3 | 35.89 | 35.55 | 54.00 | -18.45 | AV |
| H | 9648 | 39.73 | 32.96 | 7.56 | 38.4 | 52.73 | 74.00 | -21.27 | Pk |
| H | 9648 | 24.45 | 32.96 | 7.56 | 38.4 | 37.45 | 54.00 | -16.55 | AV |
| H | 12060 | 35.76 | 32.06 | 8.92 | 39.01 | 51.63 | 74.00 | -22.37 | Pk |
| H | 12060 | 26.04 | 32.06 | 8.92 | 39.01 | 41.91 | 54.00 | -12.09 | AV |

| Polar (H/V) | Frequency (MHz) | Meter Reading (dBuV) | Pre-amplifier (dB) | Cable Loss (dB) | Antenna Factor (dB) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|---|---|---|
| 802.11b Middle Channel: 2437MHz | | | | | | | | | |
| V | 4824 | 50.56 | 34.08 | 5.08 | 32.57 | 54.13 | 74.00 | -19.87 | Pk |
| V | 4824 | 36.78 | 34.08 | 5.08 | 32.57 | 40.35 | 54.00 | -13.65 | AV |
| V | 7236 | 44.79 | 32.62 | 6.34 | 35.95 | 54.46 | 74.00 | -19.54 | Pk |
| V | 7236 | 34.16 | 32.62 | 6.34 | 35.95 | 43.83 | 54.00 | -10.17 | AV |
| V | 9648 | 40.94 | 32.93 | 7.58 | 38.4 | 53.99 | 74.00 | -20.01 | Pk |
| V | 9648 | 30.85 | 32.93 | 7.58 | 38.4 | 43.9 | 54.00 | -10.10 | AV |
| V | 12060 | 41.53 | 31.97 | 8.89 | 39.04 | 57.49 | 74.00 | -16.51 | Pk |
| V | 12060 | 28.31 | 31.97 | 8.89 | 39.04 | 44.27 | 54.00 | -9.73 | AV |
| H | 4824 | 47.22 | 34.08 | 5.08 | 32.57 | 50.79 | 74.00 | -23.21 | Pk |
| H | 4824 | 31.08 | 34.08 | 5.08 | 32.57 | 34.65 | 54.00 | -19.35 | AV |
| H | 7236 | 41.25 | 32.62 | 6.34 | 35.95 | 50.92 | 74.00 | -23.08 | Pk |
| H | 7236 | 30.14 | 32.62 | 6.34 | 35.95 | 39.81 | 54.00 | -14.19 | AV |
| H | 9648 | 43.97 | 32.93 | 7.58 | 38.4 | 57.02 | 74.00 | -16.98 | Pk |
| H | 9648 | 26.19 | 32.93 | 7.58 | 38.4 | 39.24 | 54.00 | -14.76 | AV |
| H | 12060 | 35.56 | 31.97 | 8.89 | 39.04 | 51.52 | 74.00 | -22.48 | Pk |
| H | 12060 | 25.63 | 31.97 | 8.89 | 39.04 | 41.59 | 54.00 | -12.41 | AV |

| Polar (H/V) | Frequency (MHz) | Meter Reading (dBuV) | Pre-amplifier (dB) | Cable Loss (dB) | Antenna Factor (dB) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|---|---|---|
| 802.11b High Channel: 2462MHz | | | | | | | | | |
| V | 4824 | 51.33 | 34.08 | 5.08 | 32.57 | 54.9 | 74.00 | -19.10 | Pk |
| V | 4824 | 35.37 | 34.08 | 5.08 | 32.57 | 38.94 | 54.00 | -15.06 | AV |
| V | 7236 | 45.39 | 32.62 | 6.34 | 35.95 | 55.06 | 74.00 | -18.94 | Pk |
| V | 7236 | 34.82 | 32.62 | 6.34 | 35.95 | 44.49 | 54.00 | -9.51 | AV |
| V | 9648 | 43.84 | 32.93 | 7.58 | 38.4 | 56.89 | 74.00 | -17.11 | Pk |
| V | 9648 | 31.63 | 32.93 | 7.58 | 38.4 | 44.68 | 54.00 | -9.32 | AV |
| V | 12060 | 42.93 | 31.97 | 8.89 | 39.04 | 58.89 | 74.00 | -15.11 | Pk |
| V | 12060 | 26.57 | 31.97 | 8.89 | 39.04 | 42.53 | 54.00 | -11.47 | AV |
| H | 4824 | 47.23 | 34.08 | 5.08 | 32.57 | 50.8 | 74.00 | -23.20 | Pk |
| H | 4824 | 35.66 | 34.08 | 5.08 | 32.57 | 39.23 | 54.00 | -14.77 | AV |
| H | 7236 | 43.45 | 32.62 | 6.34 | 35.95 | 53.12 | 74.00 | -20.88 | Pk |
| H | 7236 | 33.06 | 32.62 | 6.34 | 35.95 | 42.73 | 54.00 | -11.27 | AV |
| H | 9648 | 43.54 | 32.93 | 7.58 | 38.4 | 56.59 | 74.00 | -17.41 | Pk |
| H | 9648 | 28.17 | 32.93 | 7.58 | 38.4 | 41.22 | 54.00 | -12.78 | AV |
| H | 12060 | 37.61 | 31.97 | 8.89 | 39.04 | 53.57 | 74.00 | -20.43 | Pk |
| H | 12060 | 23.62 | 31.97 | 8.89 | 39.04 | 39.58 | 54.00 | -14.42 | AV |

Note: 1. The testing has been conformed to 10*2480MHz=24800MHz.

2. All other emissions more than 30dB below the limit.

3. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Emission Level = Reading + Factor
Margin=Emission Level-Limit

## Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz

All modes of 802.11b/g/n20 were test at Low, Middle, and High channel, only the worst result of 802.11b mode results were reported.

| Polar (H/V) | Frequency (MHz) | Meter Reading (dBuV) | Pre-amplifier (dB) | Cable Loss (dB) | Antenna Factor (dB/m) | Emission level (dBuV/m) | Limit (dBuV/m) | Detector Type |
|---|---|---|---|---|---|---|---|---|
| Low Channel: 2412MHz | | | | | | | | |
| H | 2390 | 57.68 | 35.17 | 3.48 | 27.49 | 53.48 | 74.00 | PK |
| H | 2390 | 49.68 | 35.17 | 3.48 | 27.49 | 45.48 | 54.00 | AV |
| H | 2400 | 60.17 | 35.16 | 3.49 | 27.52 | 56.02 | 74.00 | PK |
| H | 2400 | 49.45 | 35.16 | 3.49 | 27.52 | 45.30 | 54.00 | AV |
| V | 2390 | 57.66 | 35.17 | 3.48 | 27.49 | 53.46 | 74.00 | PK |
| V | 2390 | 50.36 | 35.17 | 3.48 | 27.49 | 46.16 | 54.00 | AV |
| V | 2400 | 59.35 | 35.16 | 3.49 | 27.52 | 55.20 | 74.00 | PK |
| V | 2400 | 50.15 | 35.16 | 3.49 | 27.52 | 46.00 | 54.00 | AV |
| High Channel: 2462MHz | | | | | | | | |
| H | 2483.5 | 57.87 | 35.11 | 3.56 | 27.75 | 54.07 | 74.00 | PK |
| H | 2485.5 | 48.95 | 35.11 | 3.56 | 27.75 | 45.15 | 54.00 | AV |
| H | 2483.5 | 59.64 | 35.10 | 3.57 | 27.8 | 55.91 | 74.00 | PK |
| H | 2485.5 | 49.62 | 35.10 | 3.57 | 27.8 | 45.89 | 54.00 | AV |
| V | 2483.5 | 58.26 | 35.11 | 3.56 | 27.75 | 54.46 | 74.00 | PK |
| V | 2485.5 | 49.72 | 35.11 | 3.56 | 27.75 | 45.92 | 54.00 | AV |
| V | 2483.5 | 58.84 | 35.10 | 3.57 | 27.8 | 55.11 | 74.00 | PK |
| V | 2485.5 | 50.13 | 35.10 | 3.57 | 27.80 | 46.40 | 54.00 | AV |

# 7 Conduct Band Edge And Spurious Emissions Measurement

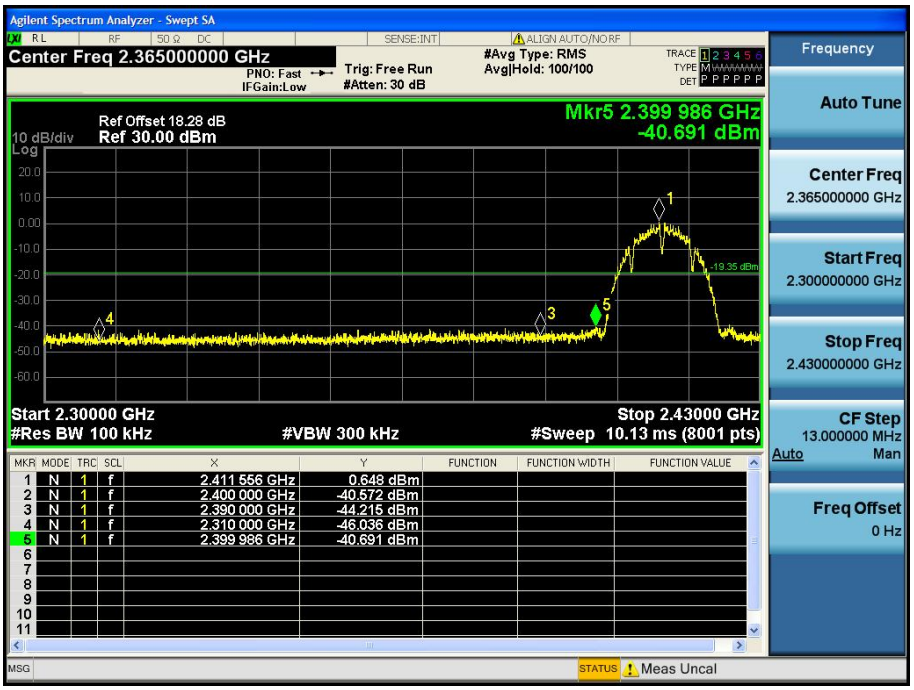
| | | |
|---|---|---|
| Test Requirement | : | RSS-247 §5.5 &Section 15.247(d) In addition, radiated emissions which fall in the restricted bands. as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)). |
| Test Method | : | ANSI C63.10:2013 |
| Test Limit | : | Regulation 15.247 (d),In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)). |

## 7.1 Test Procedure

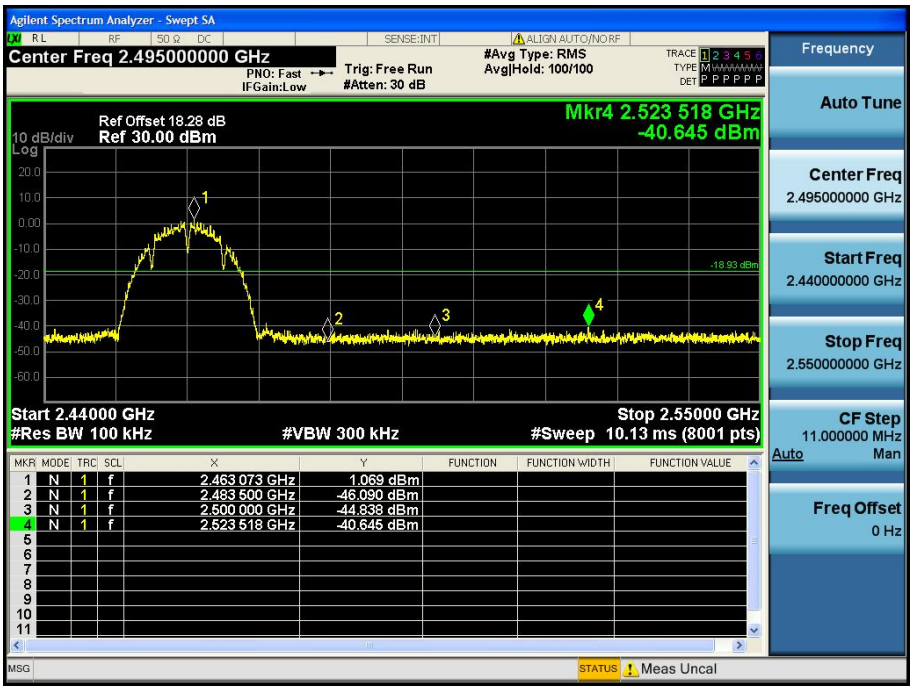
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz, Sweep = auto
Detector function = peak, Trace = max hold

## 7.2 Test Result

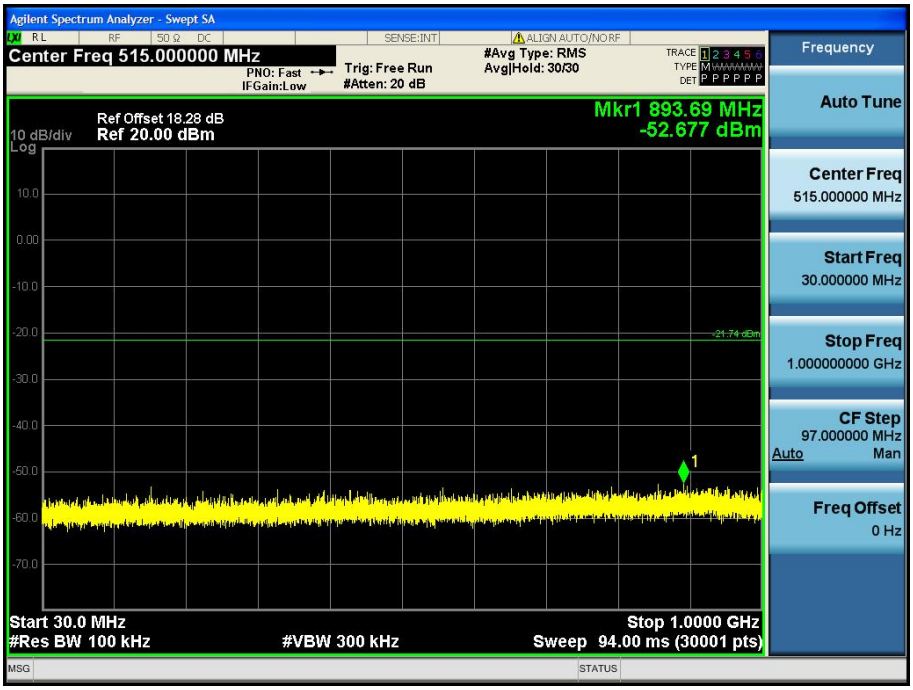
802.11b CH01 (Lower)



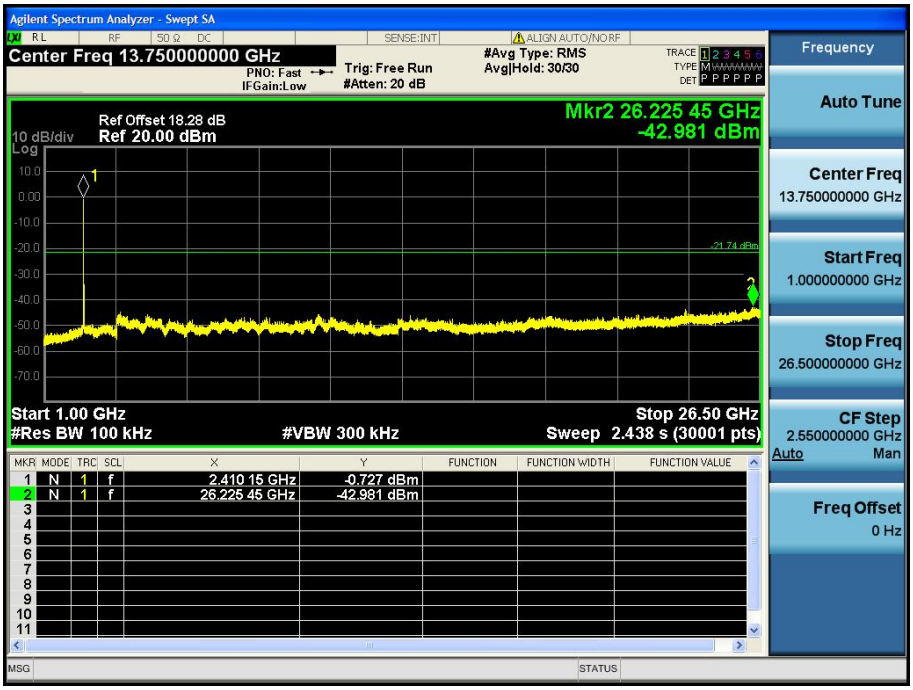

802.11b CH 11(Upper)



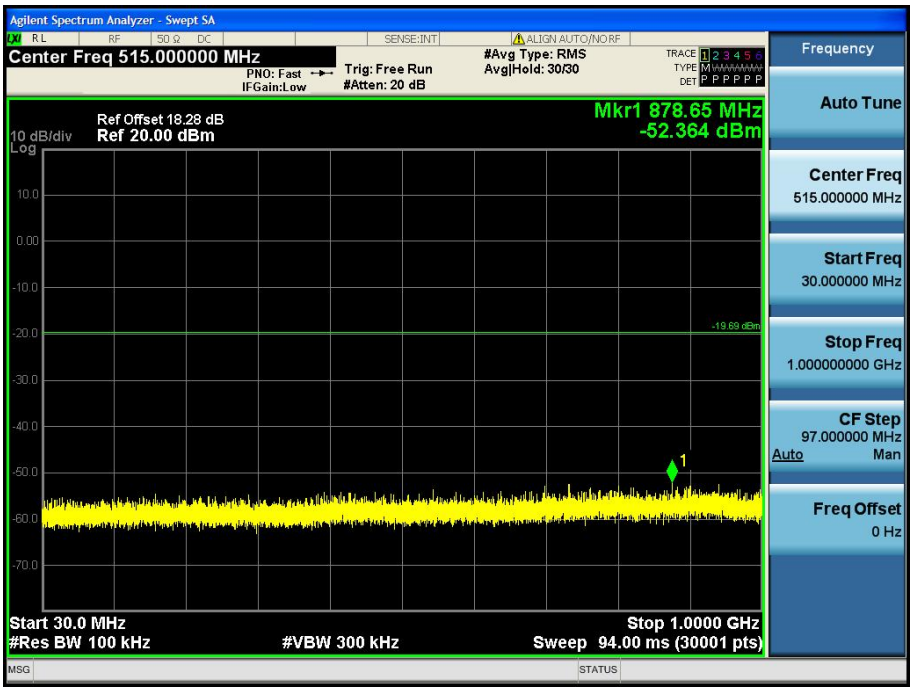
802.11b CH01



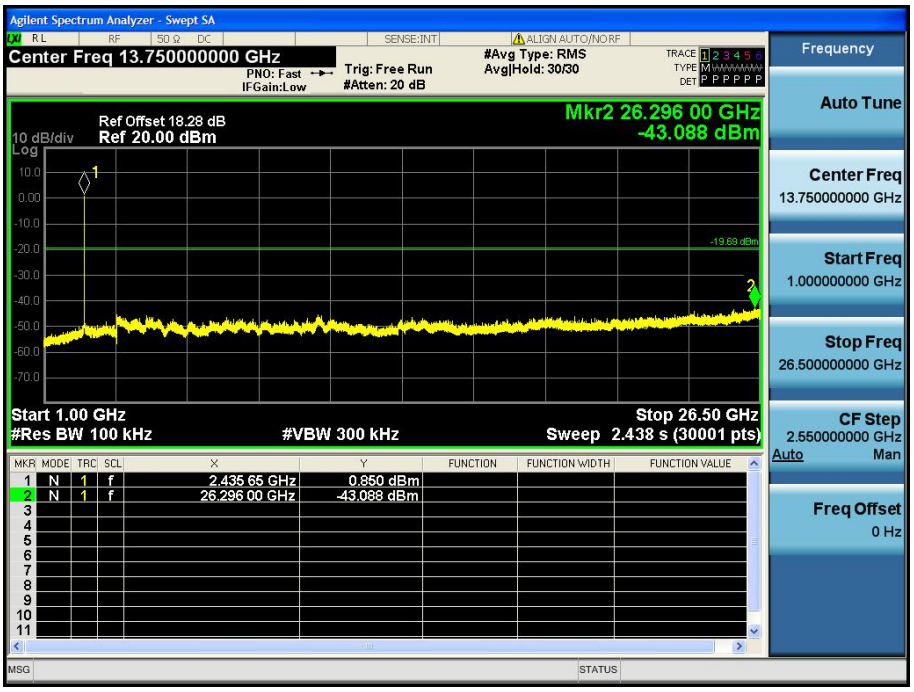

802.11b CH01



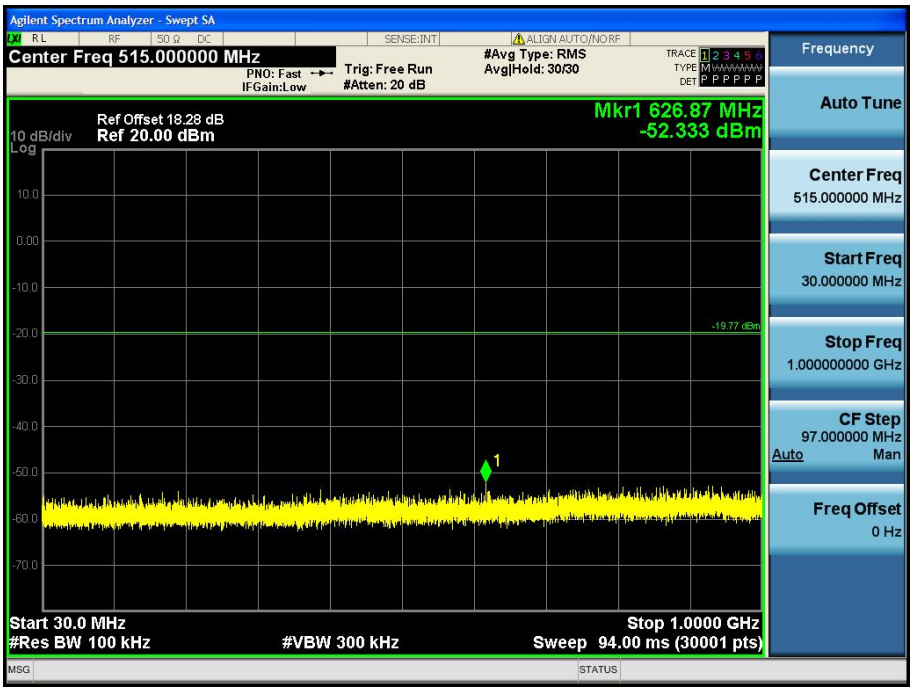
802.11b CH06



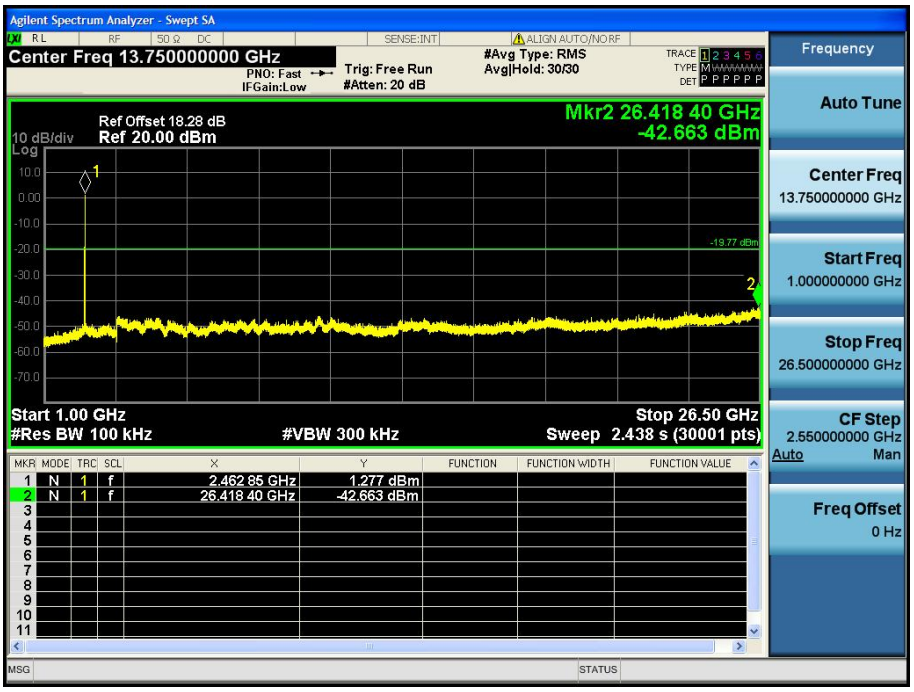

802.11b CH06



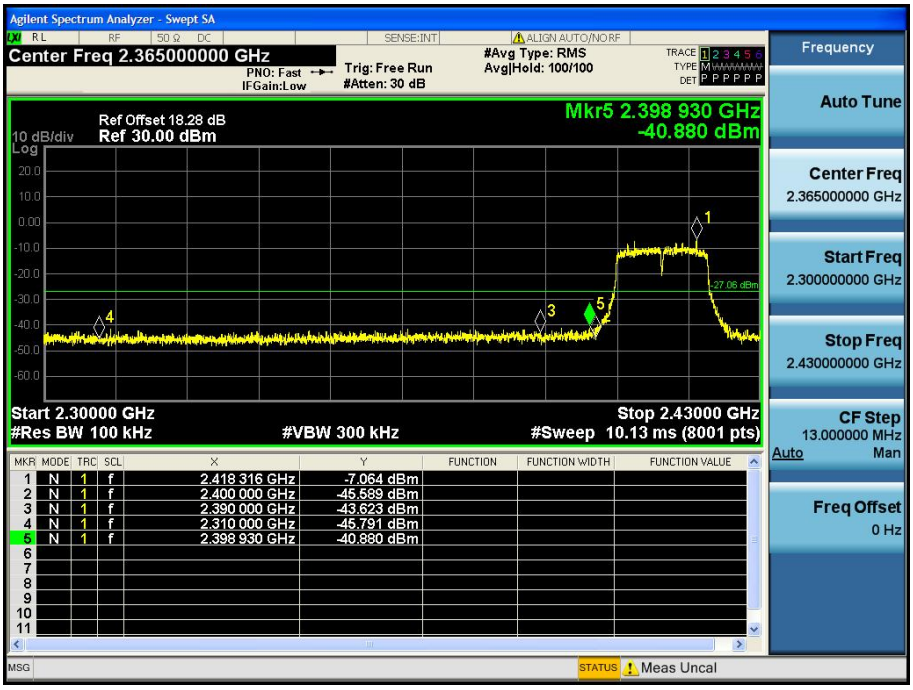
802.11b CH11



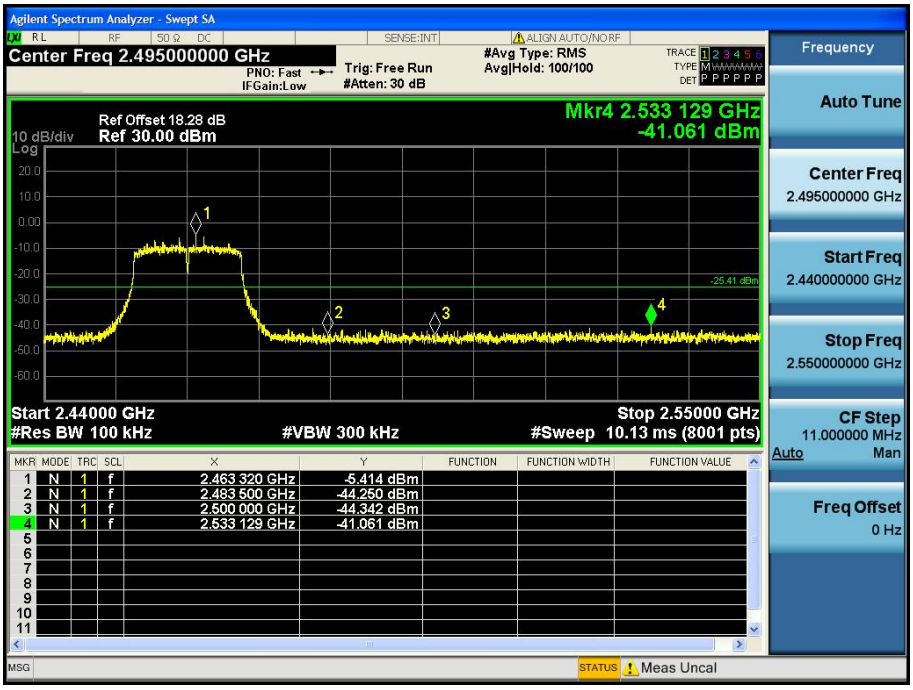

802.11b CH11



802.11g CH01 (Lower)




802.11g CH 11(Upper)



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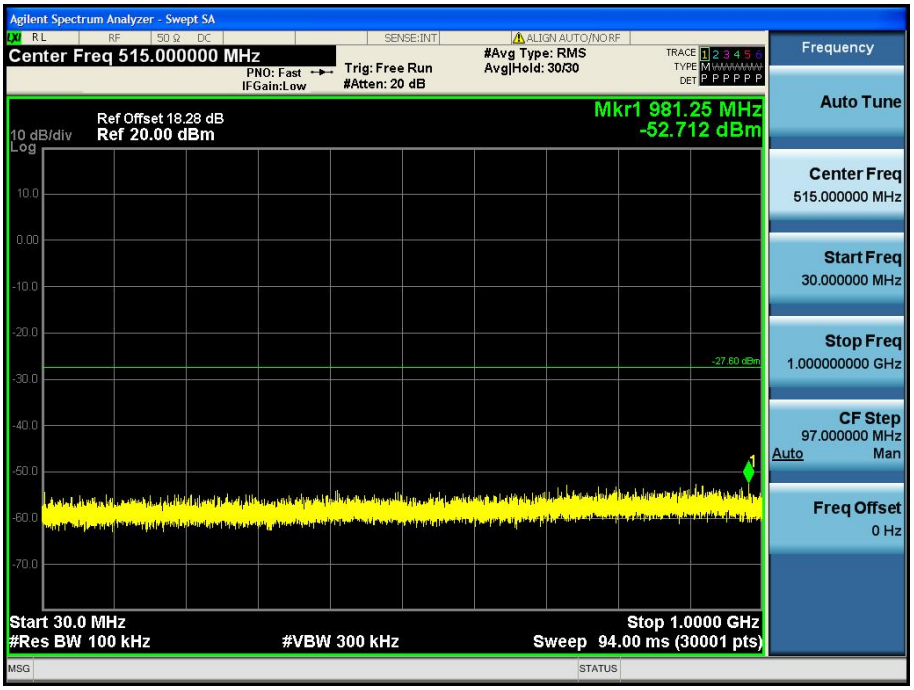


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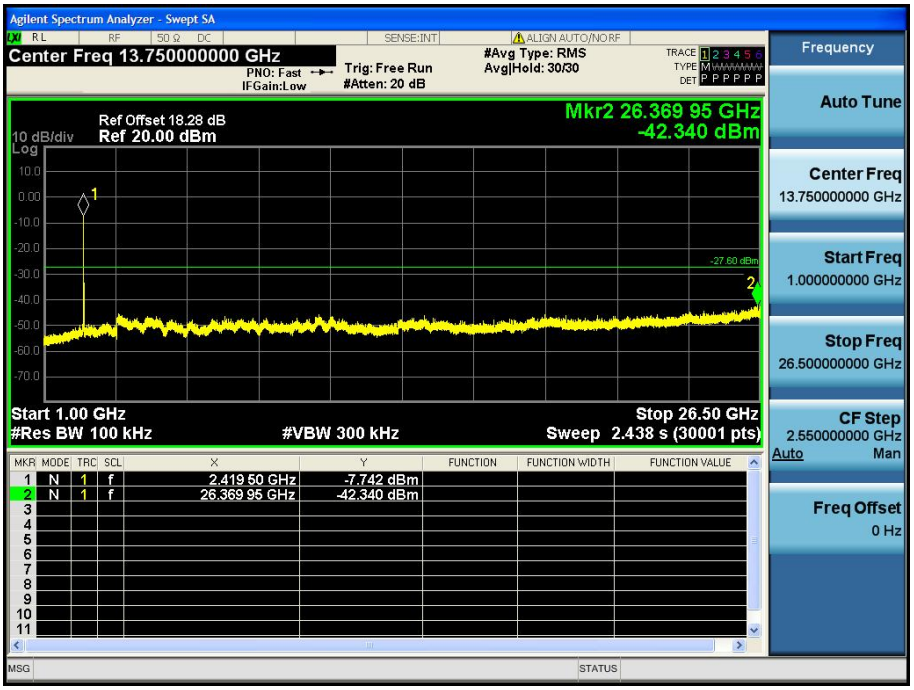

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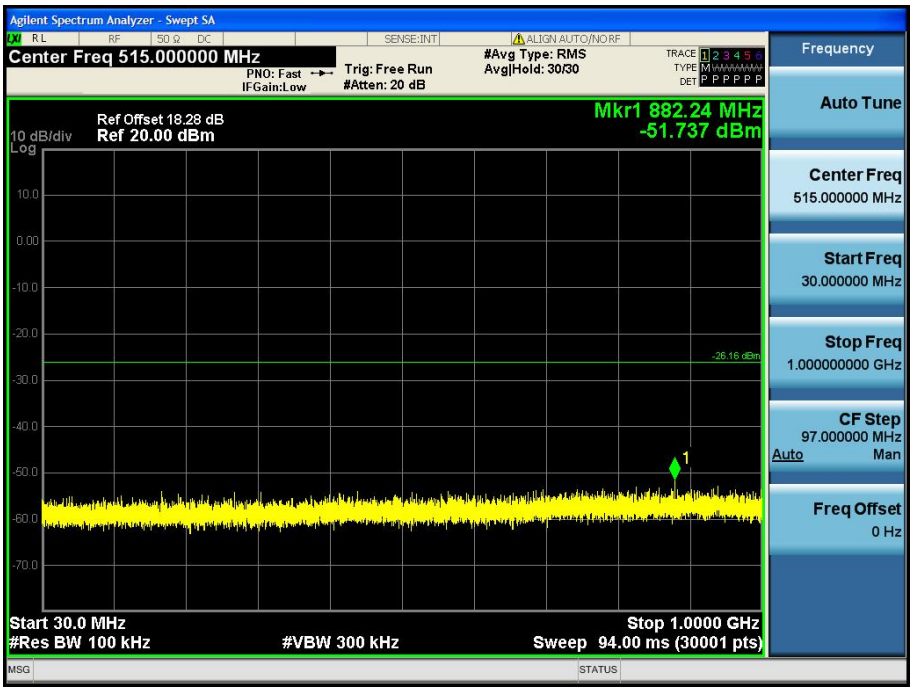


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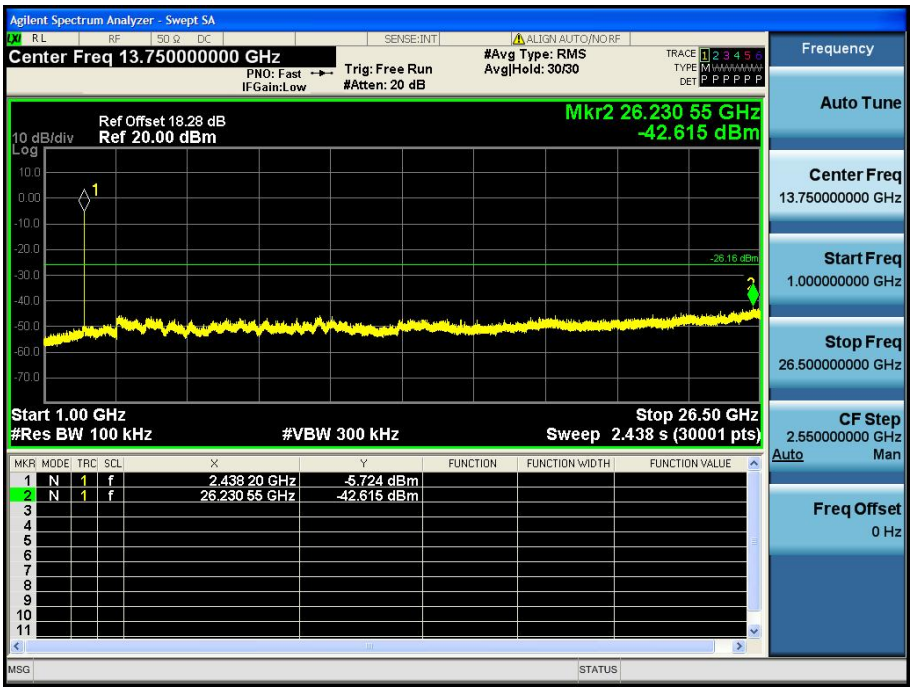

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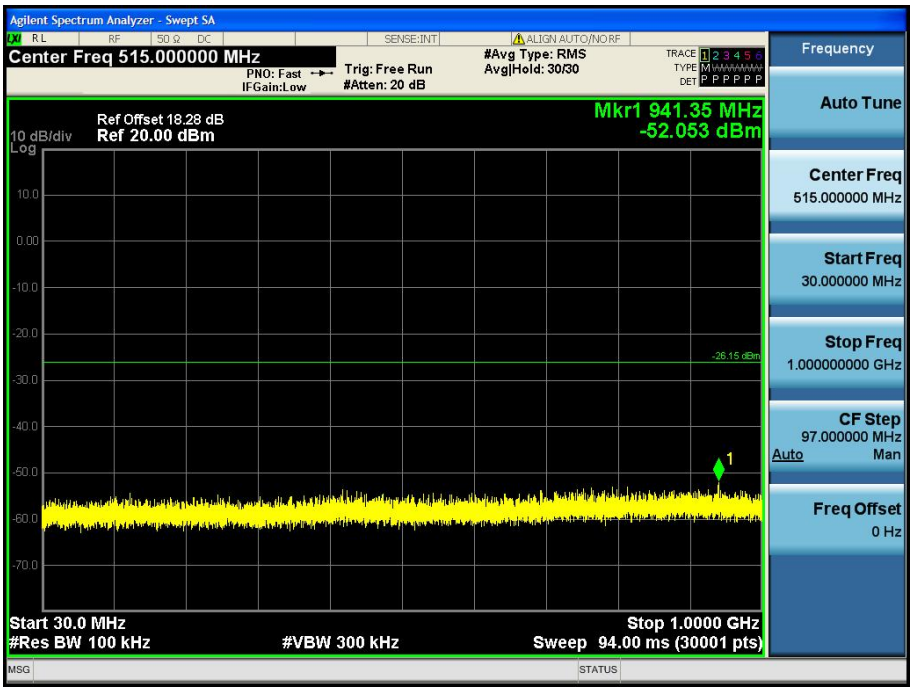


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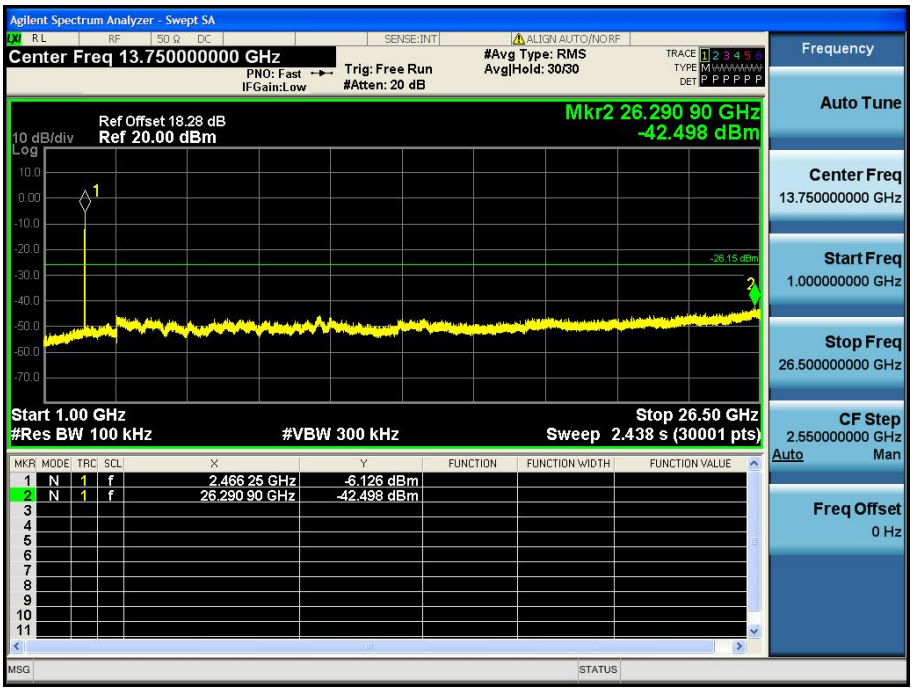
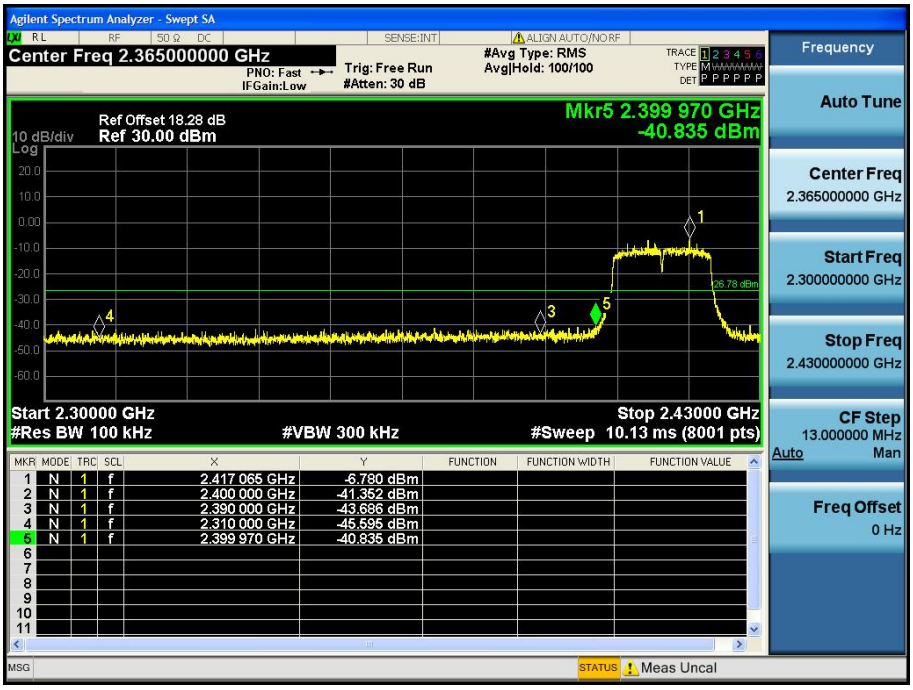
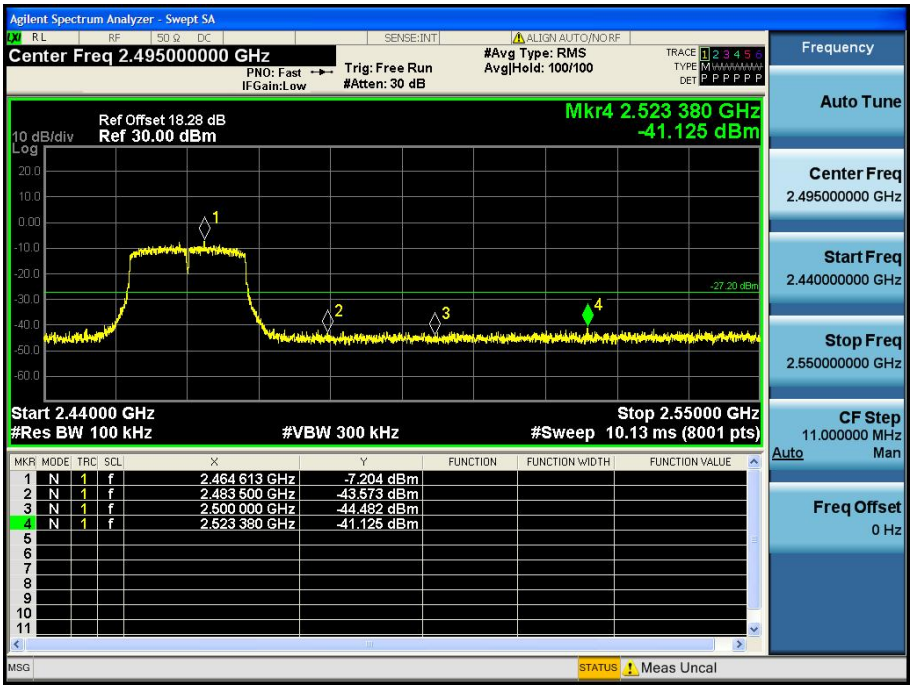


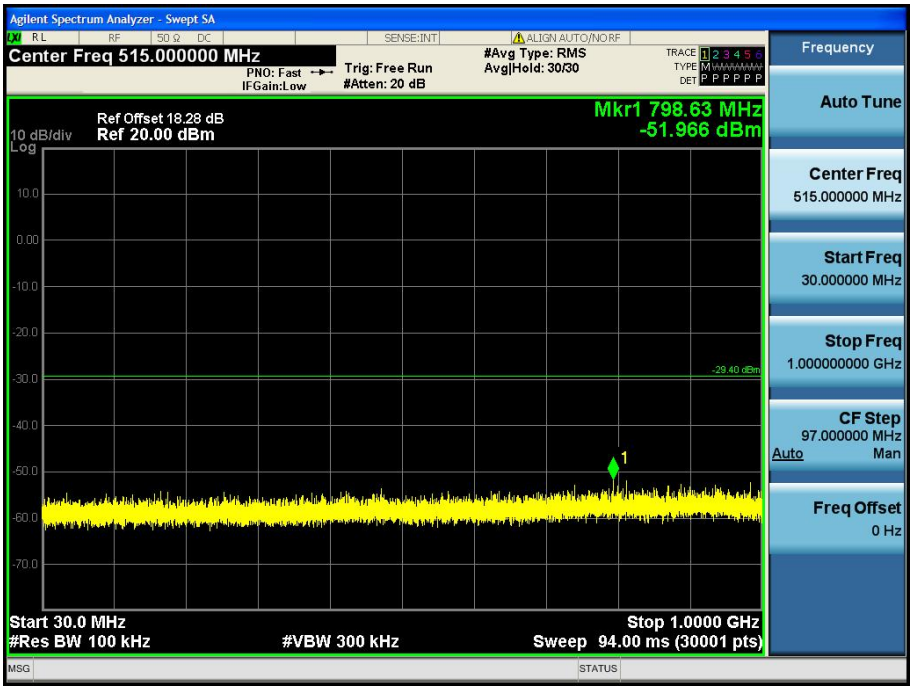
802.11n CH01 (Lower)



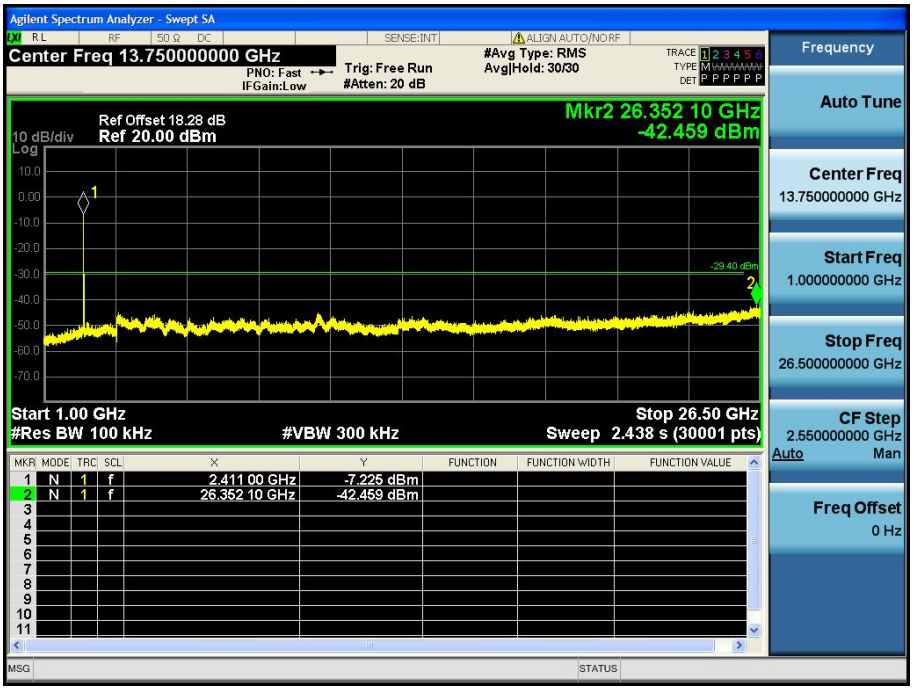

802.11n CH 11(Upper)



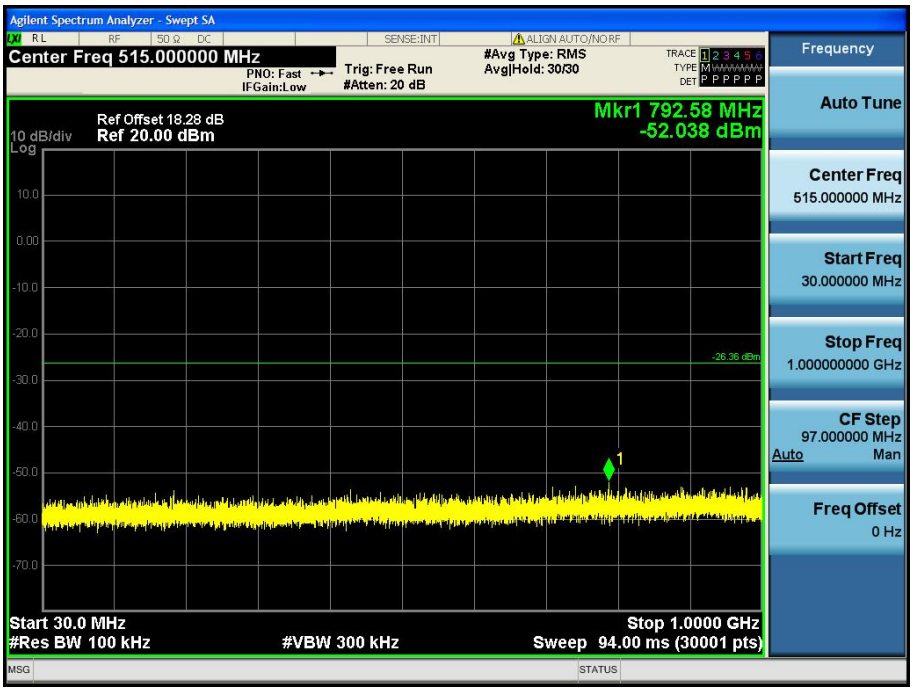
802.11n CH01



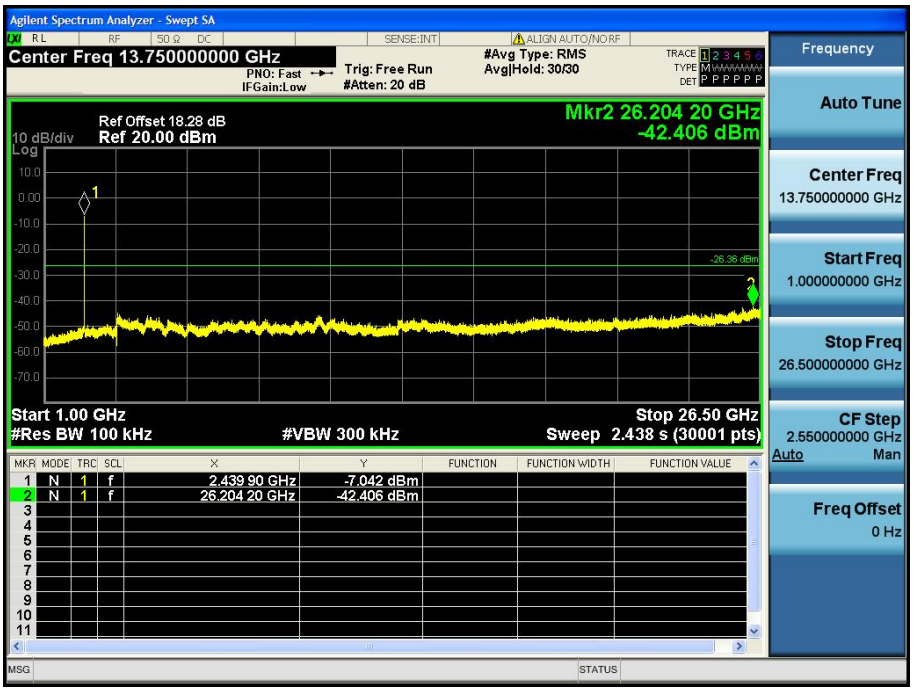

802.11n CH01



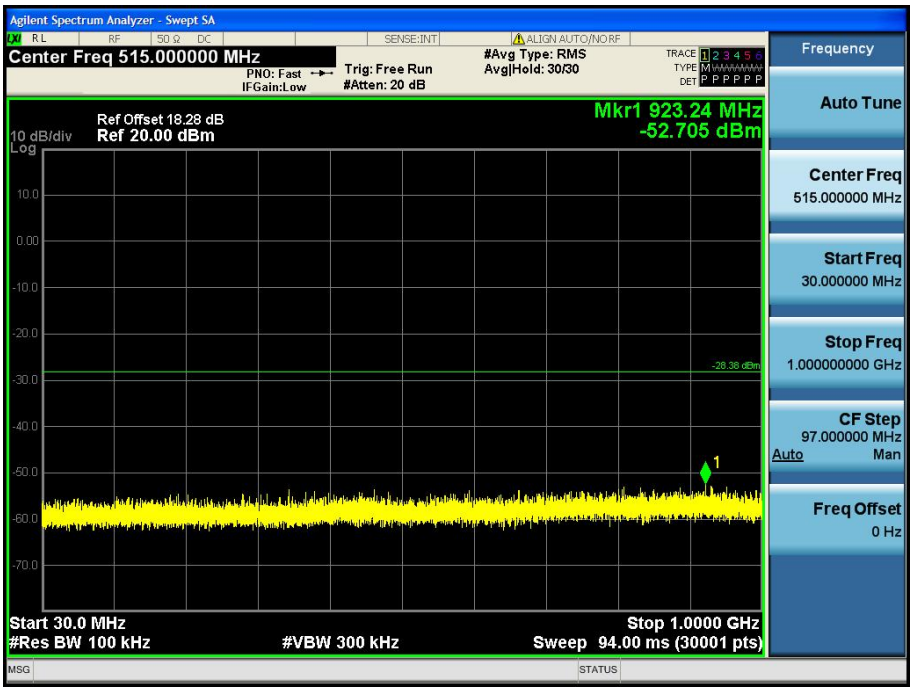
802.11n CH06



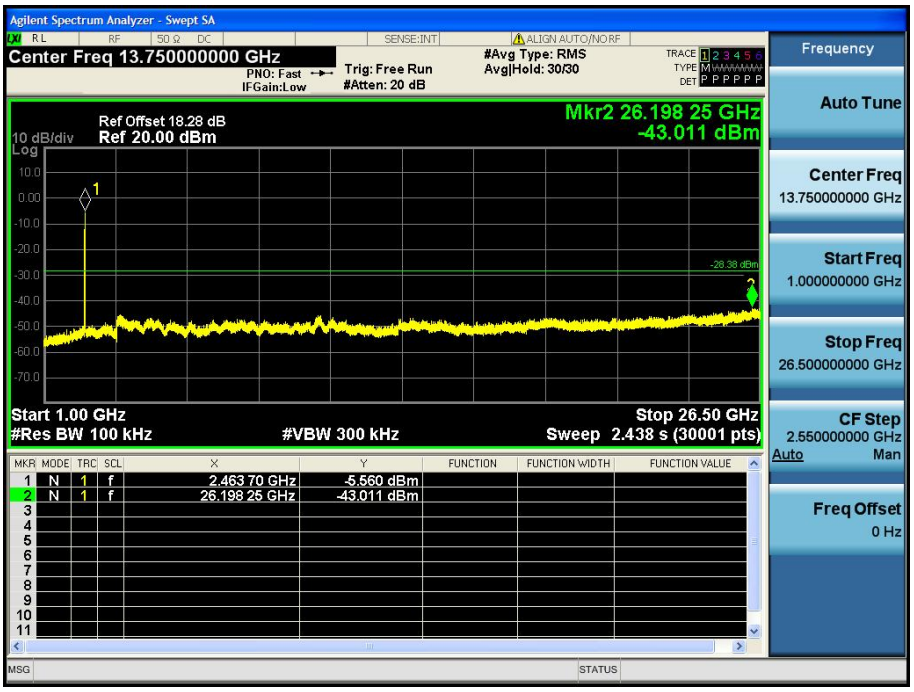

802.11n CH06



802.11n CH11




802.11n CH11



# 8 6dB Bandwidth Measurement

| | | |
|---|---|---|
| Test Requirement | : | FCC CFR47 Part 15 Section 15.247&RSS-247 § 5.2 |
| Test Method | : | ANSI C63.10:2013 |
| Test Limit | : | Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz. |

## 8.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

## 8.2 Test Result

| Test Mode | Channel frequency (MHz) | Measurement level (MHz) | Required Limit (KHz) |
|---|---|---|---|
| 802.11b | 2412 | 9.080 | >500 |
| | 2437 | 9.040 | >500 |
| | 2462 | 10.000 | >500 |
| 802.11g | 2412 | 16.040 | >500 |
| | 2437 | 16.280 | >500 |
| | 2462 | 16.280 | >500 |
| 802.11n(20) | 2412 | 16.880 | >500 |
| | 2437 | 16.280 | >500 |
| | 2462 | 16.520 | >500 |

802.11b Channel 2412

802.11b Channel 2437