



FCC PART 15 TEST REPORT No.I22Z70331-IOT05

for

SAMSUNG Electronics Co., Ltd.

Multi-band GSM/WCDMA/LTE/5GNR Phone with Bluetooth,WLAN

SM-A146U

With

FCC ID: ZCasma146U

Hardware Version: REV1.0

Software Version: A146U.001

Issued Date: 2022-11-18

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

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REPORT HISTORY

| Report Number | Revision | Description | Issue Date |
|----------------------|-----------------|--|-------------------|
| I22Z60331-IOT05 | Rev.0 | 1st edition | 2022-11-13 |
| I22Z60331-IOT05 | Rev.1 | Deleted the description of KDB 558074 D01 Deleted AE8 internal identification | 2022-11-18 |

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1. TEST LABORATORY

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0, and is also an FCC accredited test laboratory (CN5017), and ISED accredited test laboratory (ISED#: 24849). The detail accreditation scope can be found on NVLAP website.

1.2. Testing Location

Location 1: CTTL(Huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing,
P. R. China100191

Location 2: CTTL(BDA)

Address: No.18A, Kangding Street, Beijing Economic-Technology
Development Area, Beijing, P. R. China 100176

1.3. Testing Environment

Normal Temperature: 15-35°C

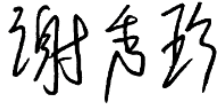
Relative Humidity: 20-75%

1.4. Project date

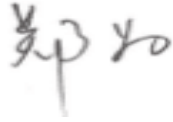
Testing Start Date: 2022-09-12

Testing End Date: 2022-11-10

1.5. Signature



Xie Xiuzhen
(Prepared this test report)



Zheng Wei
(Reviewed this test report)



Pang Shuai
(Approved this test report)



2. CLIENT INFORMATION

2.1 Applicant Information

Company Name: SAMSUNG Electronics Co., Ltd.
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City: NJ
Postal Code: 07058
Country: America
Email: j1.chun@samsung.com
Telephone: +1-201-937-4203
Fax: /

2.2 Manufacturer Information

Company Name: SAMSUNG Electronics Co., Ltd.
Address: Samsung R5, Maetan dong 129, Samsung ro
Youngtong gu, Suwon city 443 742, Korea
Contact: Kobe Cho
Email: ggobi.cho@samsung.com
Telephone: +82 - 10 - 2722 - 4159

3. EQUIPMENT UNDER TEST (EUT) AND

ANCILLARY EQUIPMENT (AE)

3.1. About EUT

| | |
|---------------------|--|
| Description | Multi-band GSM/WCDMA/LTE/5GNR Phone with Bluetooth,WLAN |
| Model name | SM-A146U |
| FCC ID | ZCASMA146U |
| WLAN Frequency Band | ISM Bands: -5150MHz~5250MHz -5250MHz~5350MHz -5470MHz~5725MHz |
| Type of modulation | OFDM |
| Antenna | Integral Antenna |
| Voltage | 3.85V |

3.2. Internal Identification of EUT used during the test

| EUT ID* | SN or IMEI | HW Version | SW Version |
|---------|--------------|------------|------------|
| UT31a | 2270331UT31a | REV1.0 | A146U.001 |
| UT05a | 2270331UT05a | REV1.0 | A146U.001 |

*EUT ID: is used to identify the test sample in the lab internally.

UT05a is used for Conduction test, UT31a is used for Radiation test.

3.3. Internal Identification of AE used during the test

| AE ID* | Description | Type | SN |
|--------|-------------|------|----|
| AE1 | Adapter | / | / |
| AE2 | USB Cable1 | / | / |
| AE3 | USB Cable2 | / | / |
| AE4 | USB Cable3 | / | / |
| AE5 | USB Cable4 | / | / |
| AE6 | Headset | / | / |
| AE7 | Battery1 | / | / |

AE1

| | |
|-----------------|--------------|
| Model | EP-T1510 |
| Manufacturer | HAEM Co.,Ltd |
| Length of cable | / |

AE2

| | |
|-----------------|-------------------|
| Model | EP-DT725BWE |
| Manufacturer | RFTECH Co., Ltd.. |
| Length of cable | / |

AE3

| | |
|-------|-------------|
| Model | EP-DN980BWZ |
|-------|-------------|

| | |
|-----------------|--|
| Manufacturer | RFTECH Co., Ltd. |
| Length of cable | / |
| AE4 | |
| Model | EP-DT725BWE |
| Manufacturer | CRESYN HANOI Co., Ltd |
| Length of cable | / |
| AE5 | |
| Model | EP-DN980BWE |
| Manufacturer | Guangxi Broad Telecommunication Co.,Ltd. |
| Length of cable | / |
| AE6 | |
| Model | EHS61ASFWE |
| Manufacturer | Shenzhen Grandsound Electronics Co.,Ltd |
| Length of cable | / |
| AE7 | |
| Model | WT-S-W1 |
| Type | Secondary Li-ion Polymer Battery |
| Manufacturer | SCUD (Fujian) Electronics CO.,LTD |

*AE ID: is used to identify the test sample in the lab internally.

3.4. General Description

The Equipment under Test (EUT) is a model of Multi-band GSM/WCDMA/LTE/5GNR Phone with Bluetooth,WLAN with integrated antenna and inbuilt battery.

It has Bluetooth (EDR)function.

It consists of normal options: travel charger, USB cable.

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the client.

3.5. Interpretation of the Test Environment

For the test methods, the test environment uncertainty figures correspond to an expansion factor k=2.

Measurement Uncertainty

| Parameter | Uncertainty |
|-------------|-------------|
| temperature | 0.48°C |
| humidity | 2 % |
| DC voltages | 0.003V |

4. REFERENCE DOCUMENTS

4.1. Documents supplied by applicant

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

| | | |
|-------------------------|--|---------|
| FCC Part15 | Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices | 2018 |
| ANSI C63.10 | Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz | 2013 |
| UNII: KDB 789033 D02 | General U-NII Test Procedures New Rules v02r01 | 2017-12 |

5. LABORATORY ENVIRONMENT

Conducted RF performance testing is performed in shielding room.

EMC performance testing is performed in Semi-anechoic chamber.

6. SUMMARY OF TEST RESULTS

6.1. Summary of Test Results

| SUMMARY OF MEASUREMENT RESULTS | Sub-clause of Part15E | Sub-clause of IC | Verdict |
|---|-----------------------|------------------|---------|
| Maximum Output Power | 15.407 | / | P |
| Peak Power Spectral Density | 15.407 | / | P |
| Occupied 26dB Bandwidth | 15.403 | / | P |
| Band edge compliance (Radiated) | 15.209 | / | P |
| Transmitter spurious emissions (Radiated) | 15.407 | / | P |
| AC Powerline Conducted Emission (150kHz- 30MHz) | 15.407 | / | P |
| Frequency Stability | 15.407 | / | P |
| 99% Occupied bandwidth | / | / | P |
| Transmit Power Control | 15.407 | / | NA |

Please refer to **ANNEX A** for detail.

Terms used in Verdict column

| | |
|----|---|
| P | Pass, The EUT complies with the essential requirements in the standard. |
| NM | Not measured, The test was not measured by CTTL |
| NA | Not Applicable, The test was not applicable |
| F | Fail, The EUT does not comply with the essential requirements in the standard |

6.2. Statements

CTTL has evaluated the test cases requested by the client/manufacturer as listed in section 6.1 of this report for the EUT specified in section 3 according to the standards or reference documents listed in section 4.1.

This report only deals with the WLAN function among the features described in section 3.

6.3. Test Conditions

For this report, all the test cases are tested under normal temperature and normal voltage, and also under norm humidity, the specific condition is shown as follows:

| | |
|-------------|-------|
| Temperature | 26°C |
| Voltage | 3.85V |
| Humidity | 44% |

7. TEST EQUIPMENTS UTILIZED

Conducted test system

| No. | Equipment | Model | Serial Number | Manufacturer | Calibration Period | Calibration Due date |
|-----|------------------------|-------|---------------|-----------------|--------------------|----------------------|
| 1 | Vector Signal Analyzer | FSQ40 | 200089 | Rohde & Schwarz | 1 year | 2023-05-15 |
| 2 | Shielding Room | S81 | / | ETS-Lindgren | / | / |

Radiated emission test system

| No. | Equipment | Model | Manufacturer | Serial Number | Calibration Period | Calibration Due date |
|-----|---------------|-------------------|--------------|---------------|--------------------|----------------------|
| 1 | Test Receiver | ESU26 | R&S | 100376 | 1 year | 2023-09-22 |
| 2 | Test Receiver | ESW44 | R&S | 103015 | 1 year | 2023-02-23 |
| 3 | Test Receiver | ESU26 | R&S | 100235 | 1 year | 2023-03-08 |
| 4 | Loop Antenna | HFH2-Z2 | R&S | 829324/007 | 1 year | 2022-12-22 |
| 5 | EMI Antenna | VULB9163 | Schwarzbeck | 01176 | 1 year | 2022-11-15 |
| 6 | EMI Antenna | 3117 | ETS-Lindgren | 00119024 | 1 year | 2023-06-07 |
| 7 | EMI Antenna | 3115 | ETS-Lindgren | 00167252 | 1 year | 2022-12-26 |
| 8 | EMI Antenna | LB-180400-25-C-KF | A-INFO | J211060826 | 1 year | 2023-02-27 |

AC Power Line Conducted Emission

| No. | Equipment | Model | Manufacturer | Serial Number | Calibration Period | Calibration Due date |
|-----|---------------|--------|--------------|---------------|--------------------|----------------------|
| 1 | LISN | ENV216 | R&S | 101459 | 1 year | 2023-03-26 |
| 2 | Test Receiver | ESCI | R&S | 100766 | 1 year | 2023-03-02 |

8. Measurement Uncertainty

8.1 Transmitter Output Power

Measurement Uncertainty: 0.387dB,k=1.96

8.2 Peak Power Spectral Density

Measurement Uncertainty: 0.705dB,k=1.96

8.3 Occupied Channel Bandwidth

Measurement Uncertainty: 60.80Hz,k=1.96

8.4 Band Edges Compliance

Measurement Uncertainty : 0.62dB,k=1.96

8.5 Spurious Emissions

Conducted (k=1.96)

| Frequency Range | Uncertainty(dB) |
|--|-----------------|
| $30\text{MHz} \leq f \leq 2\text{GHz}$ | 1.22 |
| $2\text{GHz} \leq f \leq 3.6\text{GHz}$ | 1.22 |
| $3.6\text{GHz} \leq f \leq 8\text{GHz}$ | 1.22 |
| $8\text{GHz} \leq f \leq 12.75\text{GHz}$ | 1.51 |
| $12.75\text{GHz} \leq f \leq 26\text{GHz}$ | 1.51 |
| $26\text{GHz} \leq f \leq 40\text{GHz}$ | 1.59 |

Radiated (k=2)

| Frequency Range | Uncertainty(dB) |
|---|-----------------|
| 9kHz-30MHz | 4.92 |
| $30\text{MHz} \leq f \leq 1\text{GHz}$ | 5.73 |
| $1\text{GHz} \leq f \leq 18\text{GHz}$ | 5.58 |
| $18\text{GHz} \leq f \leq 40\text{GHz}$ | 3.37 |

8.1. AC Power-line Conducted Emission

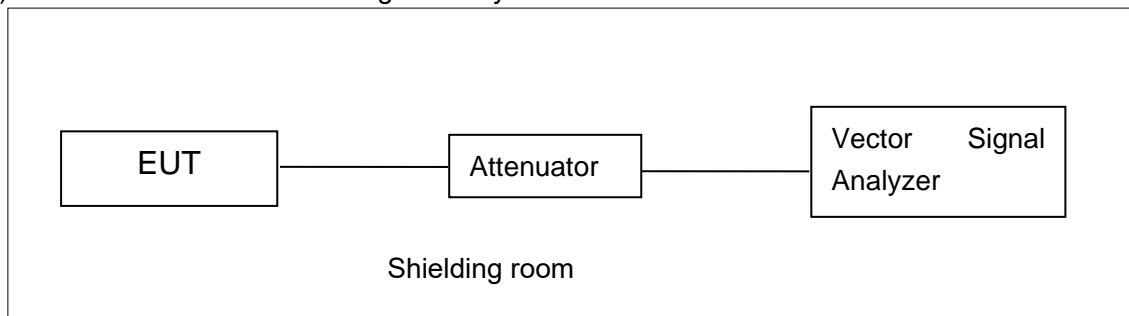
Measurement Uncertainty : 3.10,k=2.

ANNEX A: MEASUREMENT RESULTS

A.1. Measurement Method

A.1.1. Conducted Measurements

- 1). Connect the EUT to the test system correctly.
- 2). Set the EUT to the required work mode.
- 3). Set the EUT to the required channel.
- 4). Set the spectrum analyzer to start measurement.
- 5). Record the values. Vector Signal Analyzer

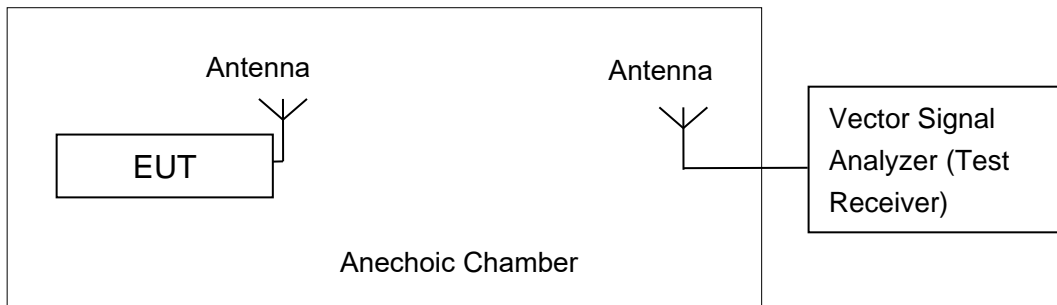


A.1.2. Radiated Emission Measurements

In the case of radiated emission, the used settings are as follows,

Sweep frequency from 30 MHz to 1GHz, RBW = 100 kHz, VBW = 300 kHz;

Sweep frequency from 1 GHz to 26GHz, RBW = 1MHz, VBW = 10Hz;



The measurement is made according to KDB 789033

The radiated emission test is performed in semi-anechoic chamber. The distance from the EUT to the reference point of measurement antenna is 3m. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept. During the test, the turntable is rotated 360° and the measurement antenna is moved from 1m to 4m to get the maximization result.

A.2. Maximum output Power

Measurement Limit and Method:

| Standard | Frequency (MHz) | Limit (dBm) |
|------------------------|-----------------|--------------------|
| FCC CRF Part 15.407(a) | 5150MHz~5250MHz | 24dBm |
| | 5250MHz~5350MHz | 24dBm or 11+10logB |
| | 5470MHz~5725MHz | 24dBm or 11+10logB |

Limit use the less value, and B is the 26dB bandwidth.

The measurement method SA-2 is made according to KDB 789033

Antenna gain is -1.73dBi and the value is supplied by the applicant or manufacturer.

Measurement Results:

802.11a mode

| Mode | Frequency | Test Result (dBm) | | | | | | | |
|---------|-----------|-------------------|---|----|----|----|----|----|----|
| | | Data Rate (Mbps) | | | | | | | |
| | | 6 | 9 | 12 | 18 | 24 | 36 | 48 | 54 |
| 802.11a | 5180MHz | 19.30 | / | / | / | / | / | / | / |
| | 5200MHz | 19.15 | / | / | / | / | / | / | / |
| | 5240MHz | 19.02 | / | / | / | / | / | / | / |
| | 5260MHz | 18.56 | / | / | / | / | / | / | / |
| | 5280MHz | 18.91 | / | / | / | / | / | / | / |
| | 5320MHz | 19.83 | / | / | / | / | / | / | / |
| | 5500MHz | 19.11 | / | / | / | / | / | / | / |
| | 5580MHz | 18.02 | / | / | / | / | / | / | / |
| | 5700MHz | 19.57 | / | / | / | / | / | / | / |
| | 5720MHz | 19.25 | / | / | / | / | / | / | / |

The data rate 6Mbps is selected as worst condition, and the following cases are performed with this condition.

802.11n-HT20 mode

| Mode | Frequency | Test Result (dBm) | | | | | | | |
|-------------------|-----------|-------------------|-------|-------|-------|-------|-------|-------|-------|
| | | Data Rate | | | | | | | |
| | | MCS0 | MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 |
| 802.11n (HT20) | 5180MHz | 18.67 | 16.05 | 15.99 | 15.91 | 15.91 | 15.43 | 14.05 | 13.96 |
| | 5200MHz | 18.63 | / | / | / | / | / | / | / |
| | 5240MHz | 18.57 | / | / | / | / | / | / | / |
| | 5260MHz | 18.05 | / | / | / | / | / | / | / |
| | 5280MHz | 18.01 | / | / | / | / | / | / | / |
| | 5320MHz | 18.10 | / | / | / | / | / | / | / |
| | 5500MHz | 17.50 | / | / | / | / | / | / | / |
| | 5580MHz | 16.30 | / | / | / | / | / | / | / |
| | 5700MHz | 17.77 | / | / | / | / | / | / | / |
| | 5720MHz | 17.61 | / | / | / | / | / | / | / |

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

802.11ac-HT20 mode

| Mode | Frequency | Test Result (dBm) | | | | | | | | |
|--------------------|-----------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | Data Rate | | | | | | | | |
| | | MCS0 | MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 | MCS8 |
| 802.11ac (HT20) | 5180MHz | 18.59 | 15.86 | 15.82 | 15.78 | 15.67 | 15.33 | 14.14 | 13.23 | 12.13 |
| | 5200MHz | 18.66 | / | / | / | / | / | / | / | / |
| | 5240MHz | 18.60 | / | / | / | / | / | / | / | / |
| | 5260MHz | 18.08 | / | / | / | / | / | / | / | / |
| | 5280MHz | 17.95 | / | / | / | / | / | / | / | / |
| | 5320MHz | 18.12 | / | / | / | / | / | / | / | / |
| | 5500MHz | 17.48 | / | / | / | / | / | / | / | / |
| | 5580MHz | 16.32 | / | / | / | / | / | / | / | / |
| | 5700MHz | 17.68 | / | / | / | / | / | / | / | / |
| | 5720MHz | 17.91 | / | / | / | / | / | / | / | / |

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

802.11n-HT40 mode

| Mode | Frequency | Test Result (dBm) | | | | | | | |
|-------------------|-----------|-------------------|-------|-------|-------|-------|-------|-------|-------|
| | | Data Rate | | | | | | | |
| | | MCS0 | MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 |
| 802.11n (HT40) | 5190MHz | 15.70 | 14.92 | 14.83 | 14.40 | 14.37 | 13.87 | 12.82 | 11.83 |
| | 5230MHz | 15.77 | / | / | / | / | / | / | / |
| | 5270MHz | 15.49 | / | / | / | / | / | / | / |
| | 5310MHz | 15.52 | / | / | / | / | / | / | / |
| | 5510MHz | 15.34 | / | / | / | / | / | / | / |
| | 5550MHz | 15.49 | / | / | / | / | / | / | / |
| | 5670MHz | 15.60 | / | / | / | / | / | / | / |
| | 5710MHz | 15.64 | / | / | / | / | / | / | / |

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

802.11ac-HT40 mode

| Mode | Frequency | Test Result (dBm) | | | | | | | | | |
|--------------------|-----------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | Data Rate | | | | | | | | | |
| | | MCS0 | MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 | MCS8 | MCS9 |
| 802.11ac (HT40) | 5190MHz | 15.76 | 14.88 | 14.86 | 13.92 | 13.87 | 13.49 | 12.88 | 12.85 | 11.86 | 11.86 |
| | 5230MHz | 15.79 | / | / | / | / | / | / | / | / | / |
| | 5270MHz | 15.44 | / | / | / | / | / | / | / | / | / |
| | 5310MHz | 15.53 | / | / | / | / | / | / | / | / | / |
| | 5510MHz | 15.37 | / | / | / | / | / | / | / | / | / |
| | 5550MHz | 15.52 | / | / | / | / | / | / | / | / | / |
| | 5670MHz | 15.58 | / | / | / | / | / | / | / | / | / |
| | 5710MHz | 15.55 | / | / | / | / | / | / | / | / | / |

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

802.11ac-HT80 mode

| Mode | Frequency | Test Result (dBm) | | | | | | | | | |
|--------------------|-----------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | Data Rate | | | | | | | | | |
| | | MCS0 | MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 | MCS8 | MCS9 |
| 802.11ac (HT80) | 5210MHz | 16.00 | 15.11 | 15.10 | 14.11 | 14.05 | 13.52 | 12.94 | 12.92 | 11.93 | 11.91 |
| | 5290MHz | 15.59 | / | / | / | / | / | / | / | / | / |
| | 5530MHz | 15.30 | / | / | / | / | / | / | / | / | / |
| | 5610MHz | 14.66 | / | / | / | / | / | / | / | / | / |
| | 5690MHz | 15.55 | / | / | / | / | / | / | / | / | / |

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

The duty cycle of all mode are 100%

Conclusion: PASS

A.3. Peak Power Spectral Density (conducted)

Measurement Limit:

| Standard | Frequency (MHz) | Limit (dBm/MHz) |
|------------------------|-----------------|-----------------|
| FCC CRF Part 15.407(a) | 5150MHz~5250MHz | 11 |
| | 5250MHz~5350MHz | 11 |
| | 5470MHz~5725MHz | 11 |

The output power measurement method Section F is made according to KDB 789033

Measurement Results:

| Mode | Frequency | Power Spectral Density (dBm/MHz) | Conclusion |
|------------------|-----------|----------------------------------|------------|
| 802.11a | 5180 MHz | 8.73 | P |
| | 5200 MHz | 8.70 | P |
| | 5240 MHz | 9.03 | P |
| | 5260 MHz | 6.97 | P |
| | 5280 MHz | 7.28 | P |
| | 5320 MHz | 7.39 | P |
| | 5500 MHz | 7.11 | P |
| | 5580 MHz | 7.92 | P |
| | 5700 MHz | 7.99 | P |
| 802.11n HT20 | 5180 MHz | 8.39 | P |
| | 5200 MHz | 8.36 | P |
| | 5240 MHz | 7.41 | P |
| | 5260 MHz | 6.66 | P |
| | 5280 MHz | 6.93 | P |
| | 5320 MHz | 6.16 | P |
| | 5500 MHz | 6.86 | P |
| | 5580 MHz | 7.71 | P |
| | 5700 MHz | 7.65 | P |
| 802.11ac HT40 | 5190 MHz | 2.61 | P |
| | 5230 MHz | 3.05 | P |
| | 5270 MHz | 1.04 | P |
| | 5310 MHz | 1.41 | P |
| | 5510 MHz | 2.11 | P |
| | 5550 MHz | 2.51 | P |
| | 5670 MHz | 3.14 | P |
| | 5710 MHz | 3.65 | P |
| 802.11ac HT80 | 5210MHz | -0.33 | P |
| | 5290MHz | -1.84 | P |
| | 5530MHz | -0.78 | P |

| | | | |
|--|---------|------|---|
| | 5610MHz | -0.1 | P |
| | 5690MHz | 0.75 | P |

Conclusion: PASS

A.4. Occupied 26dB Bandwidth(conducted)

Measurement Limit:

| Standard | Limit (kHz) |
|----------------------------|-------------|
| FCC 47 CFR Part 15.403 (i) | / |

The measurement is made according to KDB 789033

Measurement Uncertainty:

| | |
|-------------------------|---------|
| Measurement Uncertainty | 60.80Hz |
|-------------------------|---------|

Measurement Result:

| Mode | Frequency | Occupied 26dB Bandwidth (MHz) | | conclusion |
|------------------|-----------|--------------------------------|-------|------------|
| 802.11a | 5180 MHz | Fig.1 | 29.10 | P |
| | 5200 MHz | Fig.2 | 29.20 | P |
| | 5240 MHz | Fig.3 | 30.00 | P |
| | 5260 MHz | Fig.4 | 25.75 | P |
| | 5280 MHz | Fig.5 | 29.40 | P |
| | 5320 MHz | Fig.6 | 28.95 | P |
| | 5500 MHz | Fig.7 | 24.50 | P |
| | 5580 MHz | Fig.8 | 20.45 | P |
| | 5700 MHz | Fig.9 | 24.10 | P |
| | 5720 MHz | Fig.10 | 29.75 | P |
| 802.11n HT20 | 5180 MHz | Fig.11 | 32.00 | P |
| | 5200 MHz | Fig.12 | 34.40 | P |
| | 5240 MHz | Fig.13 | 28.65 | P |
| | 5260 MHz | Fig.14 | 26.00 | P |
| | 5280 MHz | Fig.15 | 27.00 | P |
| | 5320 MHz | Fig.16 | 31.75 | P |
| | 5500 MHz | Fig.17 | 26.35 | P |
| | 5580 MHz | Fig.18 | 23.25 | P |
| | 5700 MHz | Fig.19 | 22.95 | P |
| | 5720 MHz | Fig.20 | 27.00 | P |
| 802.11ac HT40 | 5190 MHz | Fig.21 | 40.40 | P |
| | 5230 MHz | Fig.22 | 40.16 | P |
| | 5270 MHz | Fig.23 | 40.56 | P |
| | 5310 MHz | Fig.24 | 40.56 | P |
| | 5510 MHz | Fig.25 | 40.56 | P |
| | 5550 MHz | Fig.26 | 40.32 | P |

| | | | | |
|------------------|----------|--------|-------|---|
| | 5670 MHz | Fig.27 | 40.56 | P |
| | 5710 MHz | Fig.28 | 41.04 | P |
| 802.11ac HT80 | 5210MHz | Fig.29 | 80.32 | P |
| | 5290MHz | Fig.30 | 80.48 | P |
| | 5530MHz | Fig.31 | 80.32 | P |
| | 5610MHz | Fig.32 | 80.16 | P |
| | 5690MHz | Fig.33 | 81.12 | P |

Conclusion: PASS

Test graphs as below:

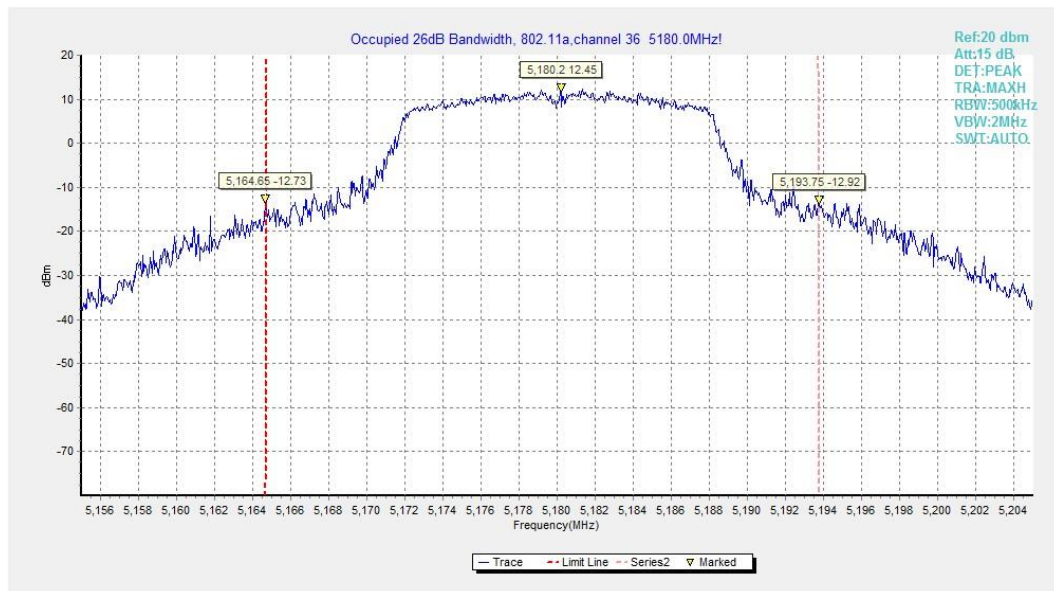


Fig.1 Occupied 26dB Bandwidth (802.11a, 5180MHz)

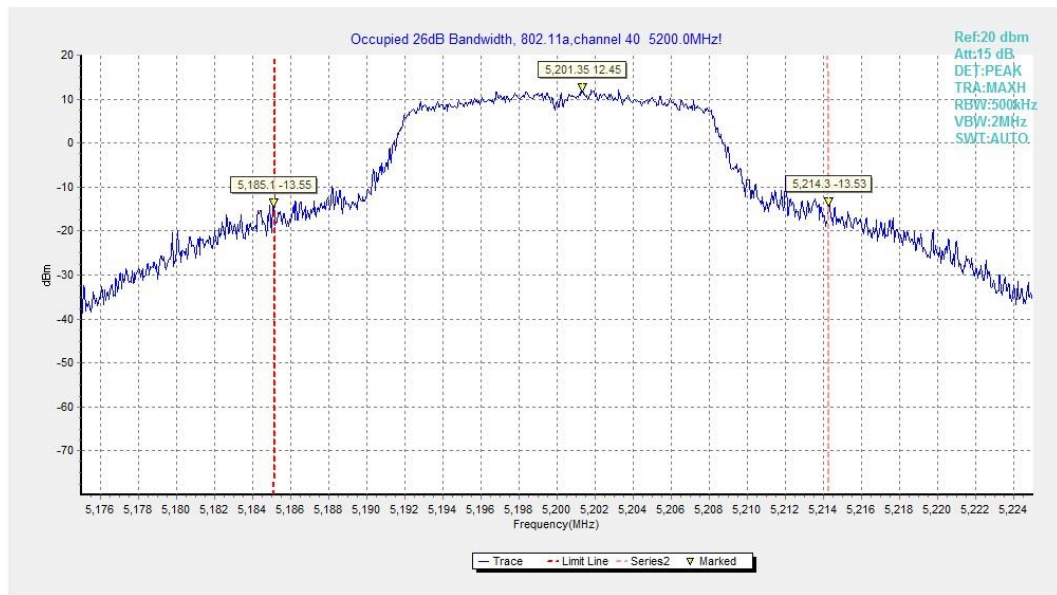


Fig.2 Occupied 26dB Bandwidth (802.11a, 5200MHz)

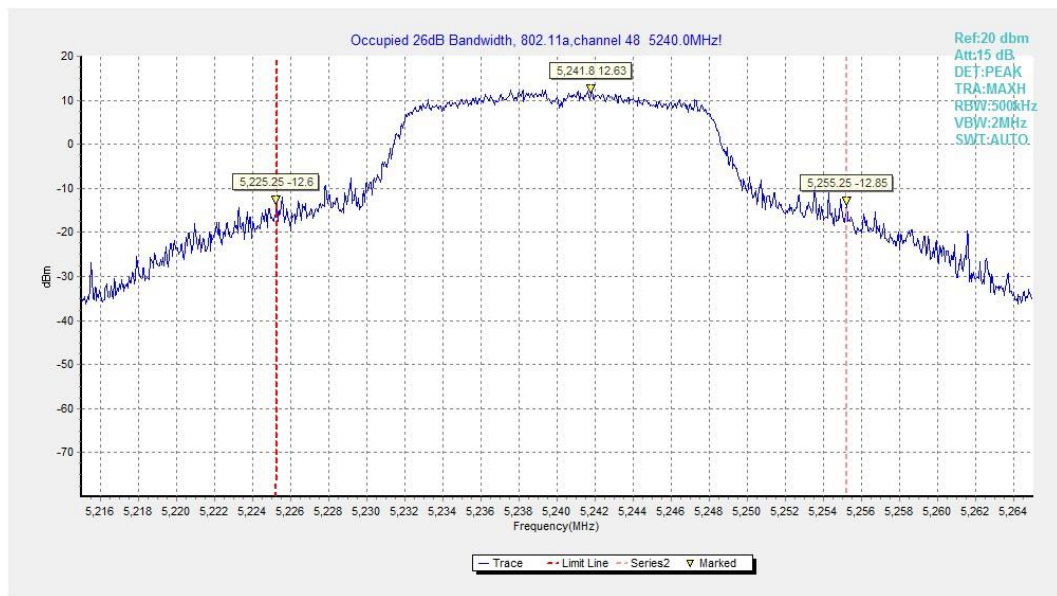


Fig.3 Occupied 26dB Bandwidth (802.11a, 5240MHz)

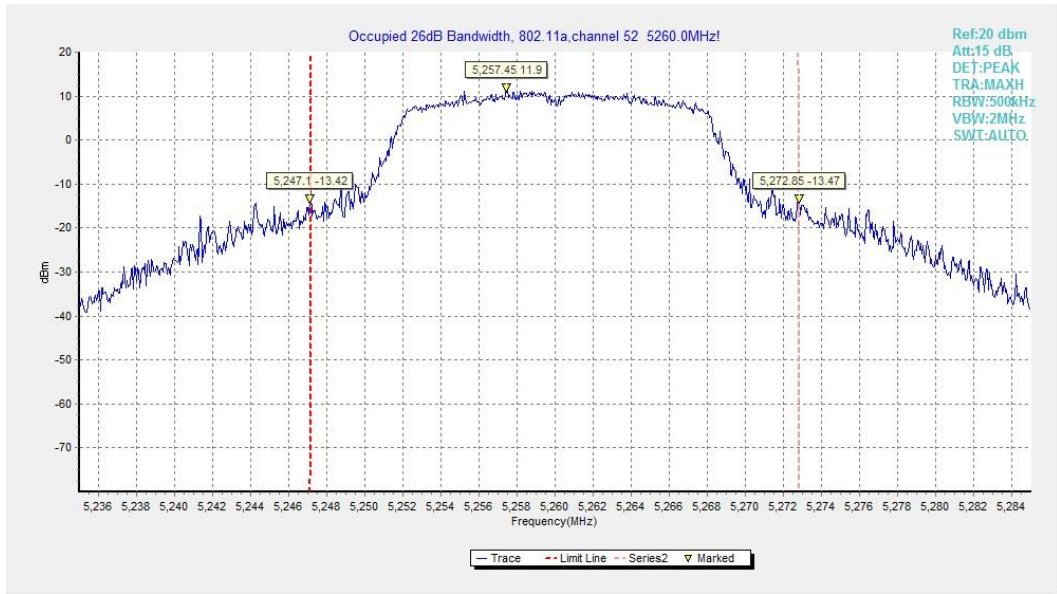


Fig.4 Occupied 26dB Bandwidth (802.11a, 5260MHz)

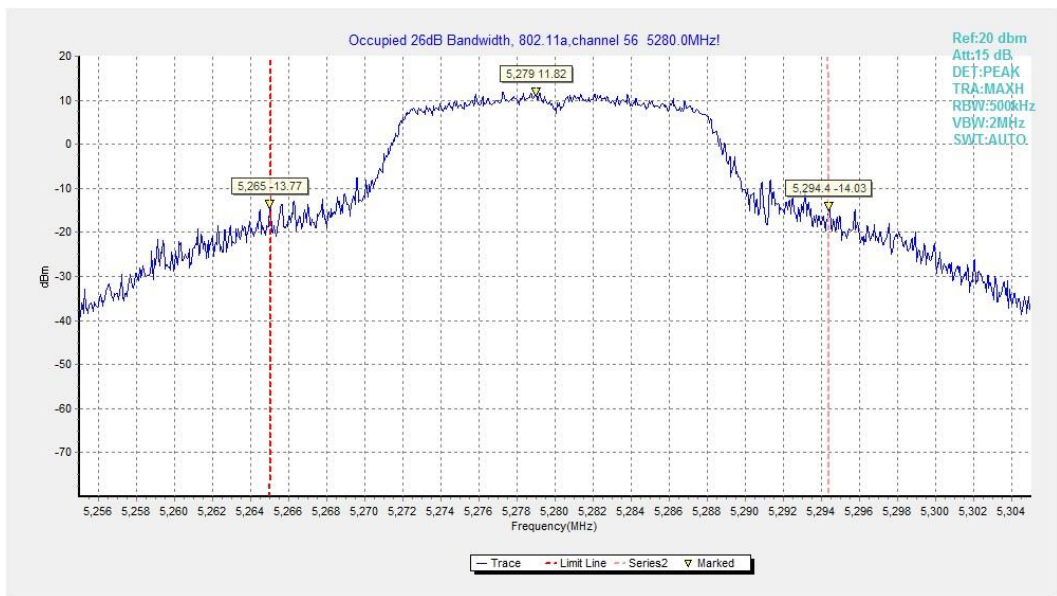


Fig.5 Occupied 26dB Bandwidth (802.11a, 5280MHz)

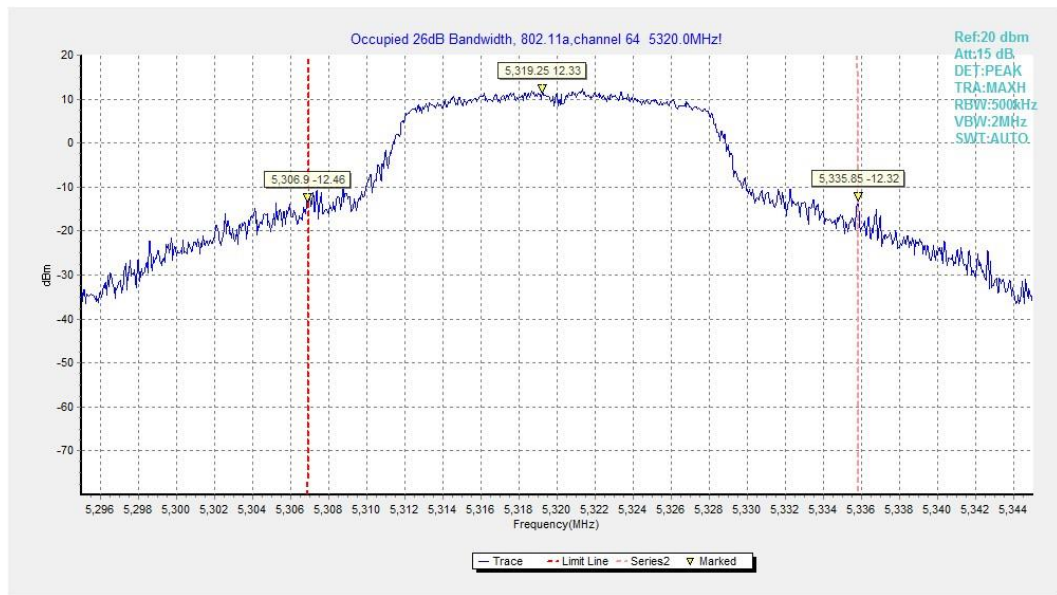


Fig.6 Occupied 26dB Bandwidth (802.11a, 5320MHz)

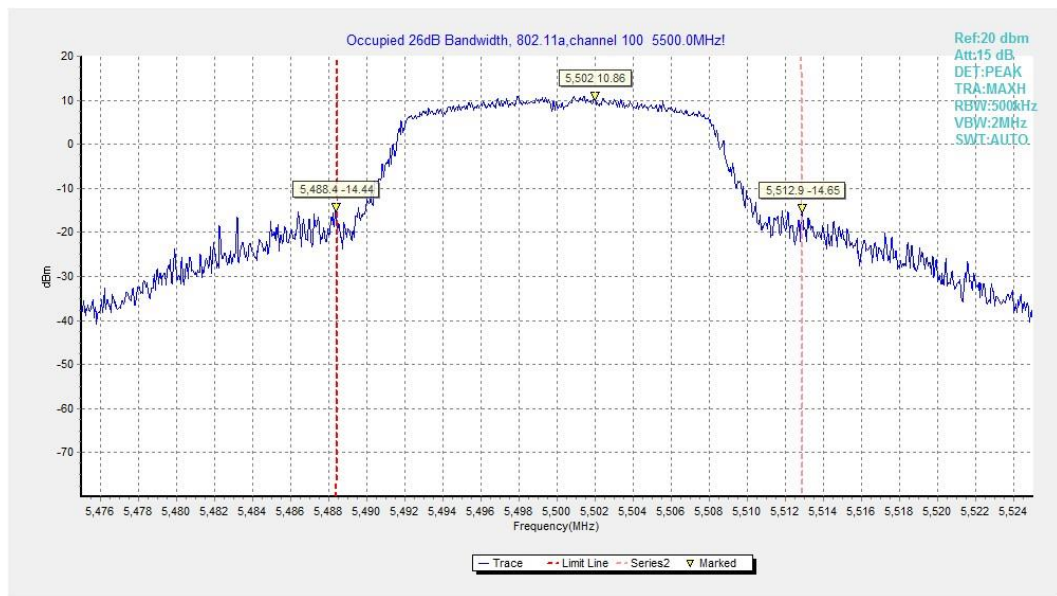


Fig.7 Occupied 26dB Bandwidth (802.11a, 5500MHz)

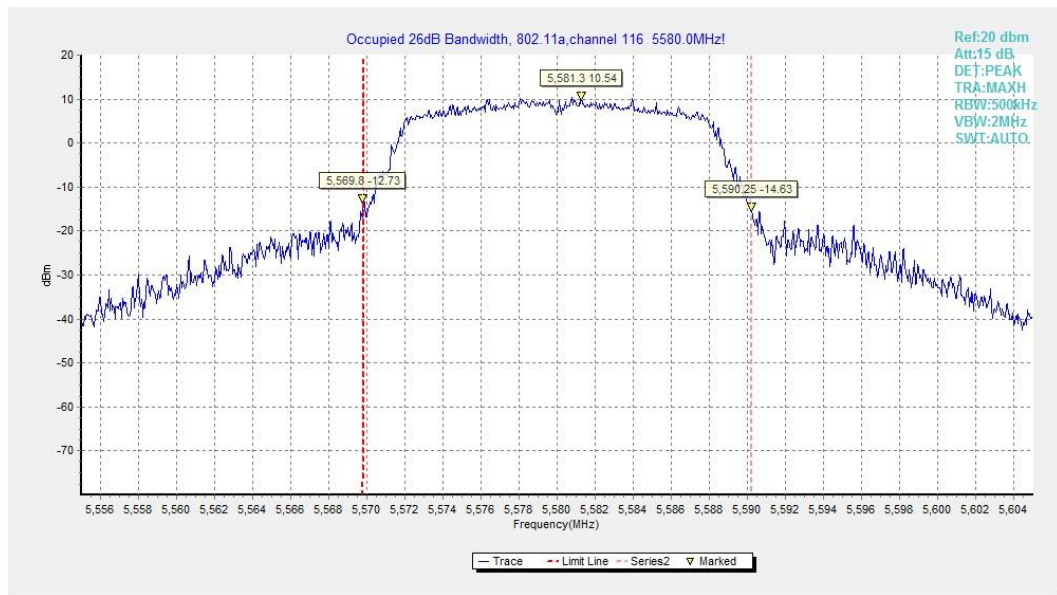


Fig.8 Occupied 26dB Bandwidth (802.11a, 5580MHz)

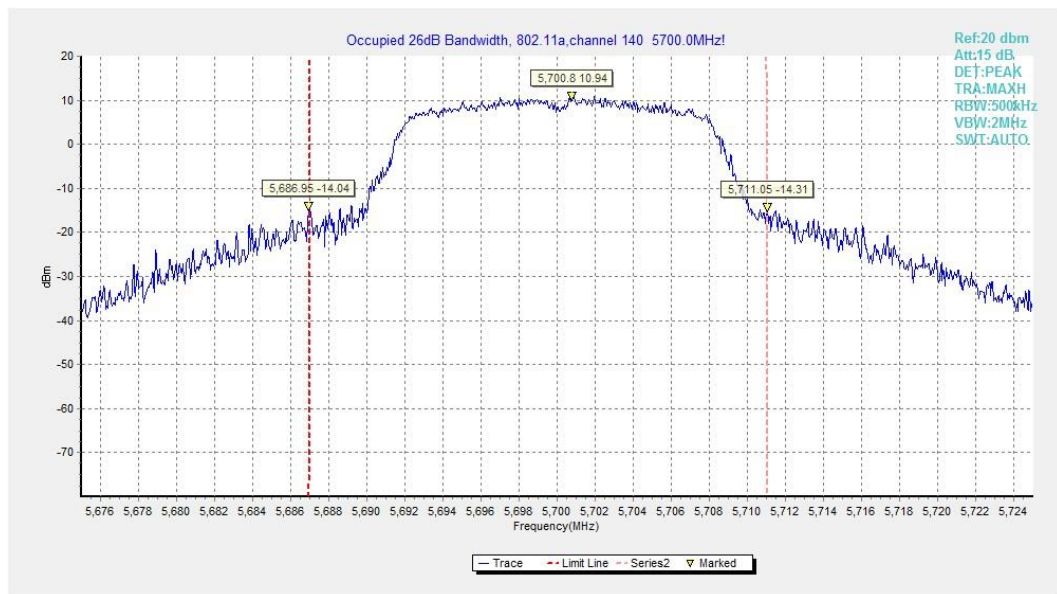


Fig.9 Occupied 26dB Bandwidth (802.11a, 5700MHz)

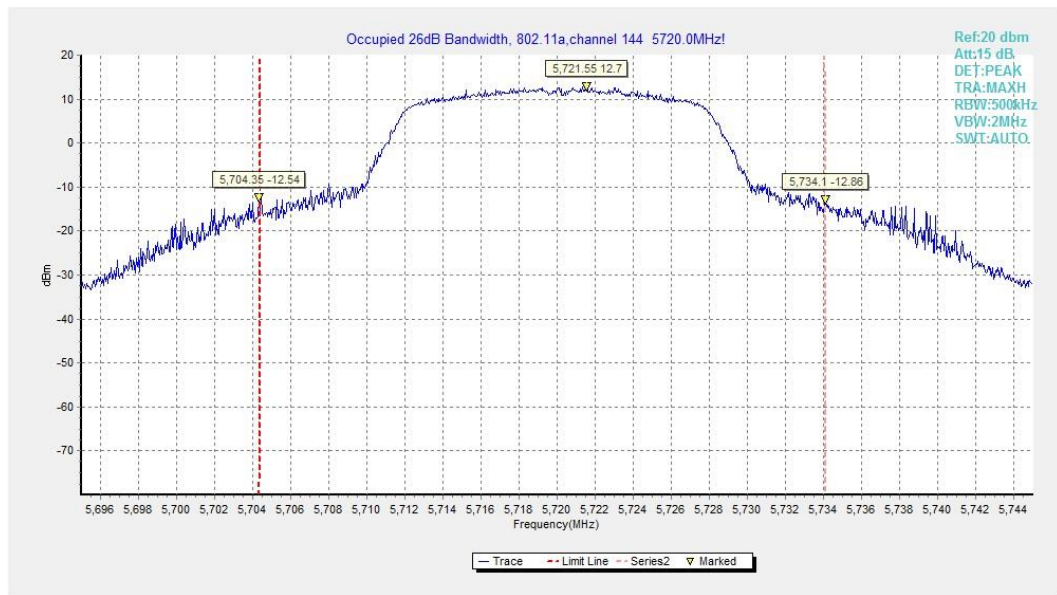


Fig.10 Occupied 26dB Bandwidth (802.11a, 5720MHz)

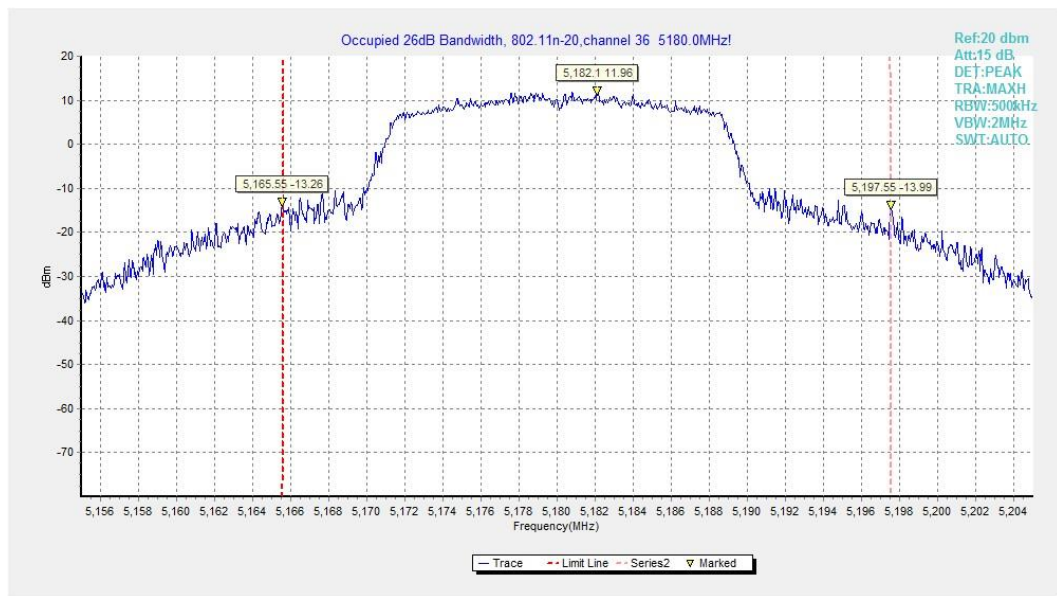


Fig.11 Occupied 26dB Bandwidth (802.11n-HT20, 5180MHz)

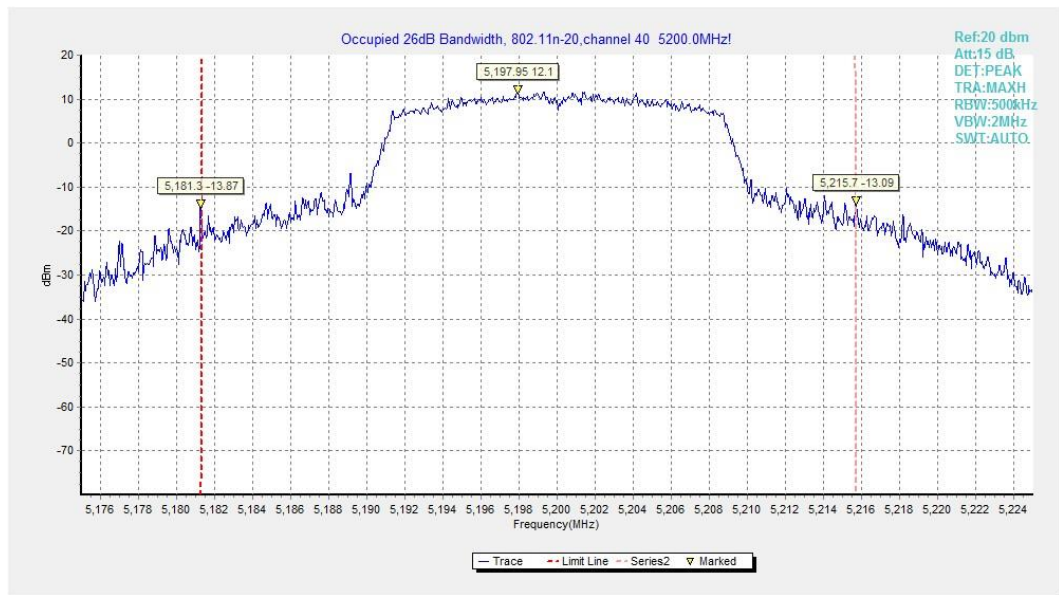


Fig.12 Occupied 26dB Bandwidth (802.11n-HT20, 5200MHz)

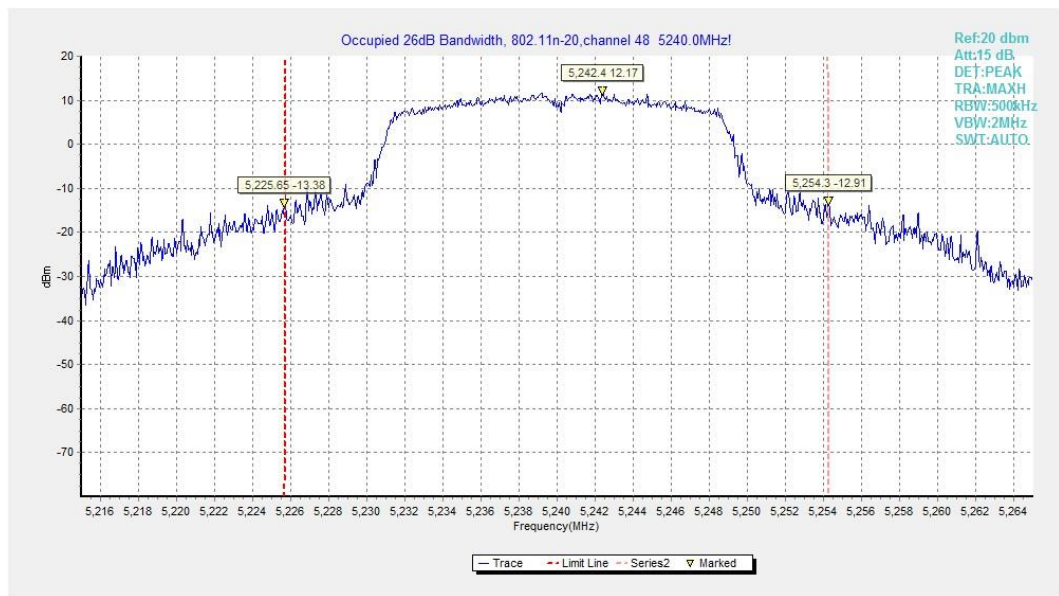


Fig.13 Occupied 26dB Bandwidth (802.11n-HT20, 5240MHz)

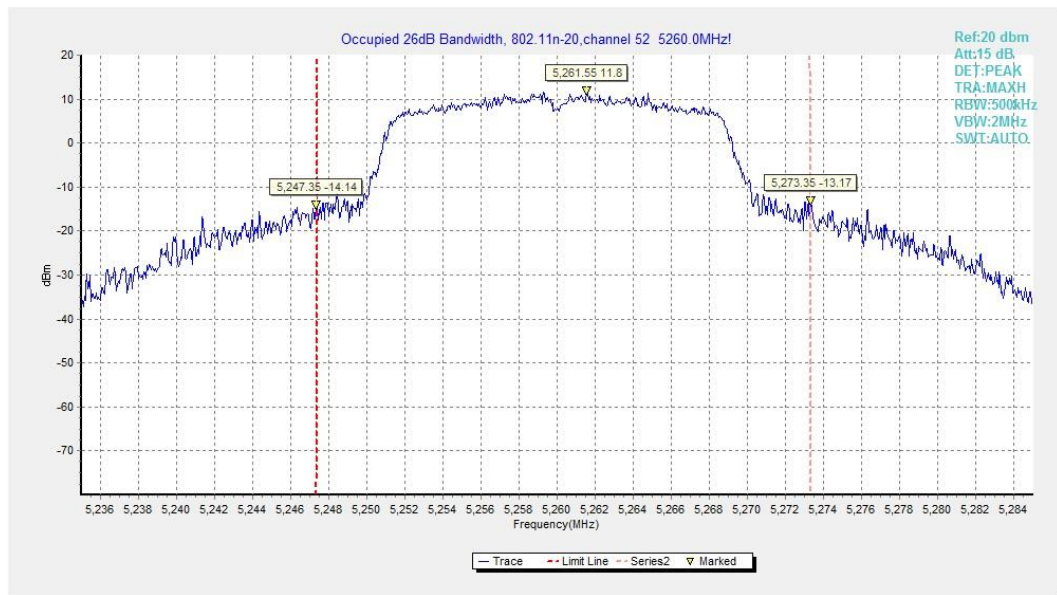


Fig.14 Occupied 26dB Bandwidth (802.11n-HT20, 5260MHz)

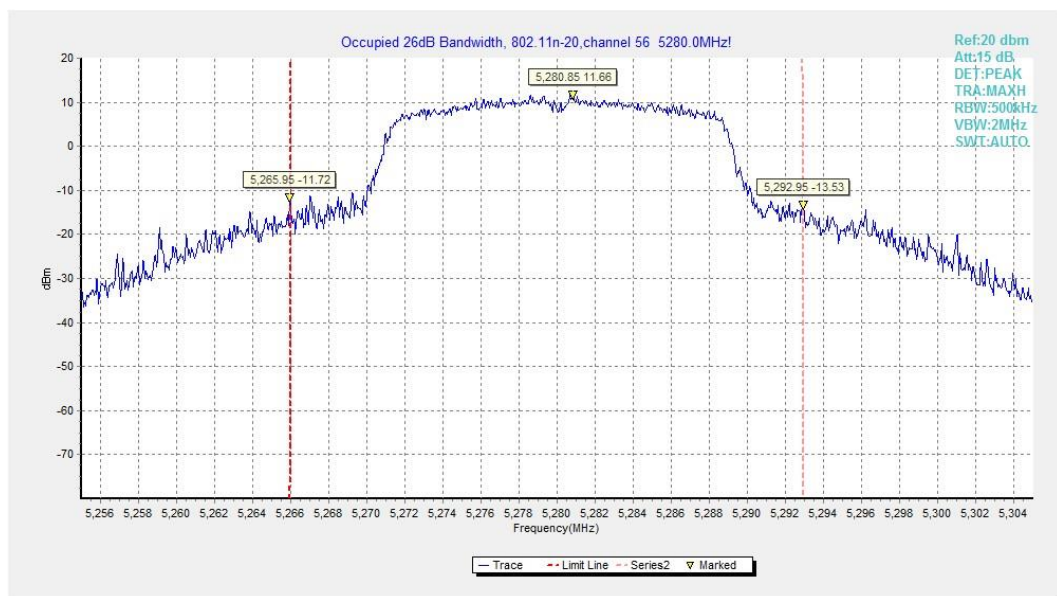


Fig.15 Occupied 26dB Bandwidth (802.11n-HT20, 5280MHz)

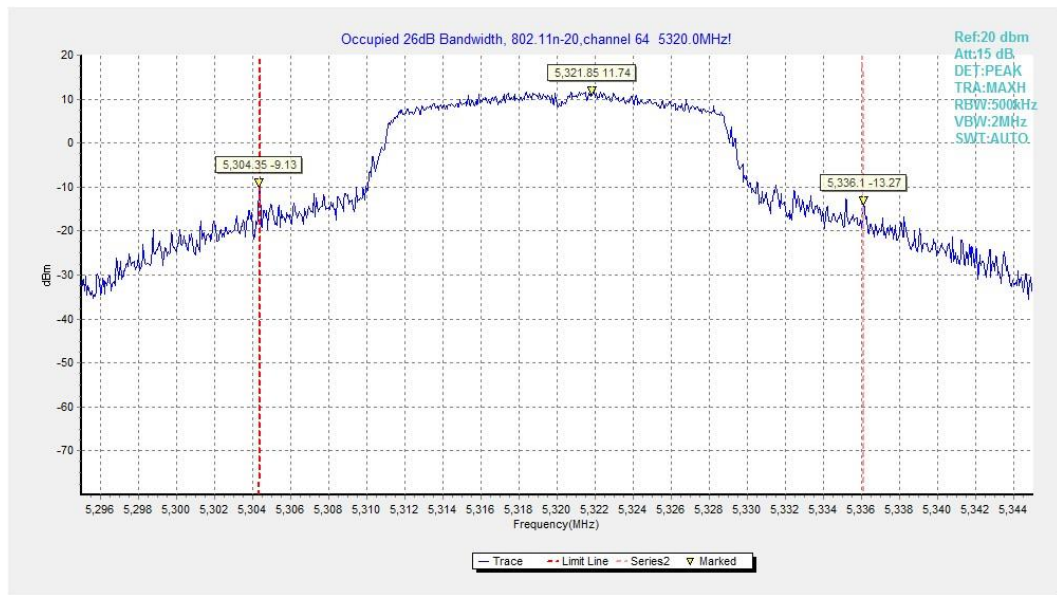


Fig.16 Occupied 26dB Bandwidth (802.11n-HT20, 5320MHz)

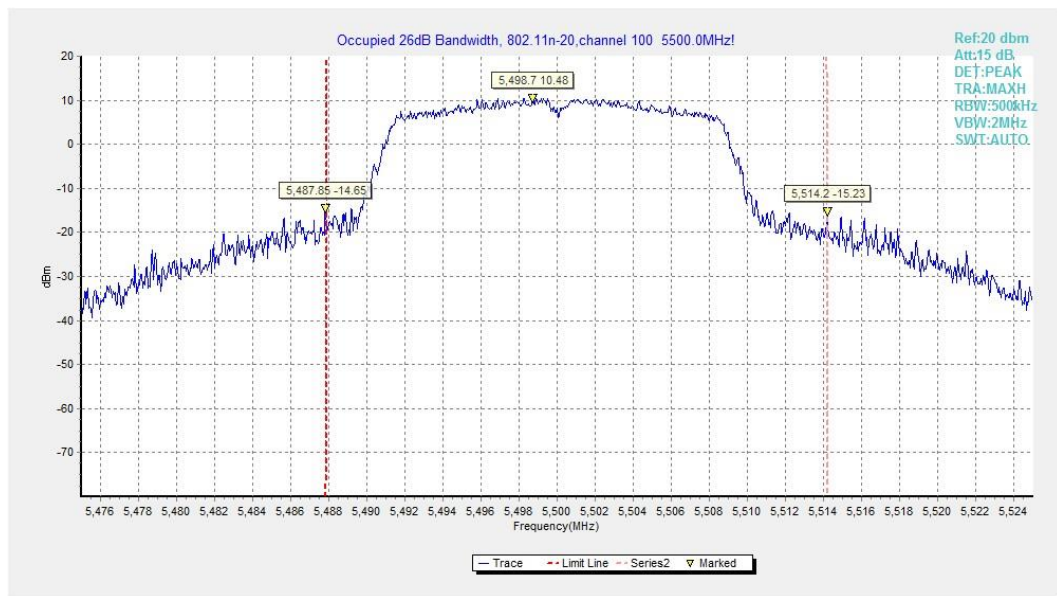


Fig.17 Occupied 26dB Bandwidth (802.11n-HT20, 5500MHz)

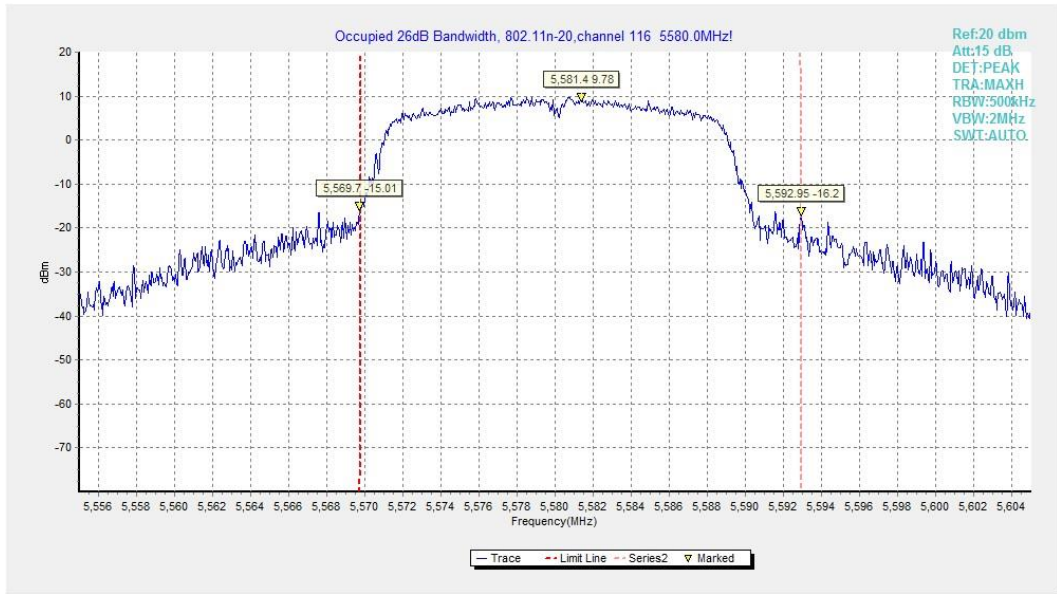


Fig.18 Occupied 26dB Bandwidth (802. 11n-HT20, 5580MHz)

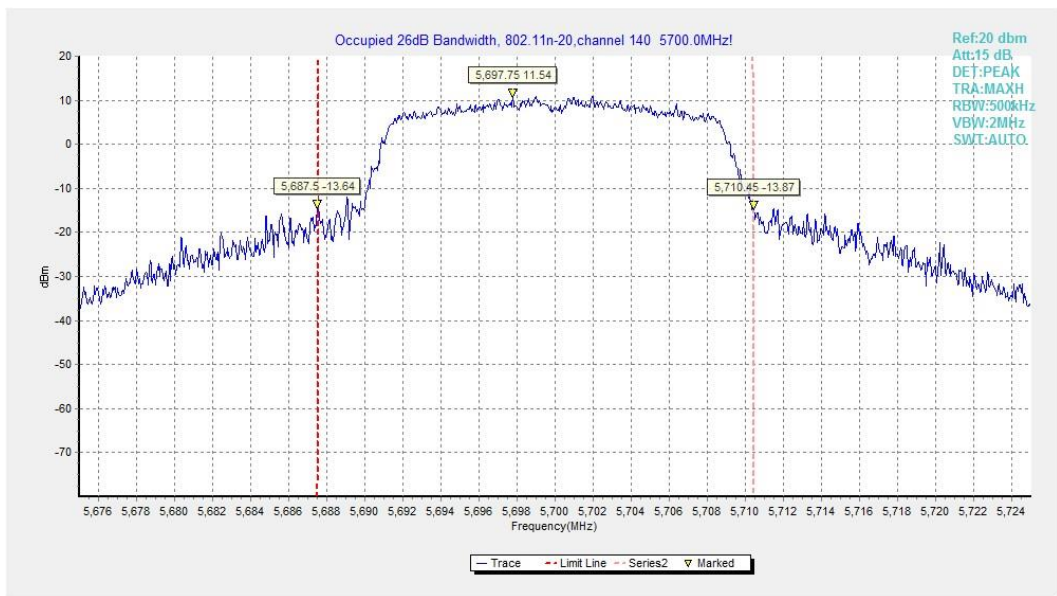


Fig.19 Occupied 26dB Bandwidth (802. 11n-HT20, 5700MHz)

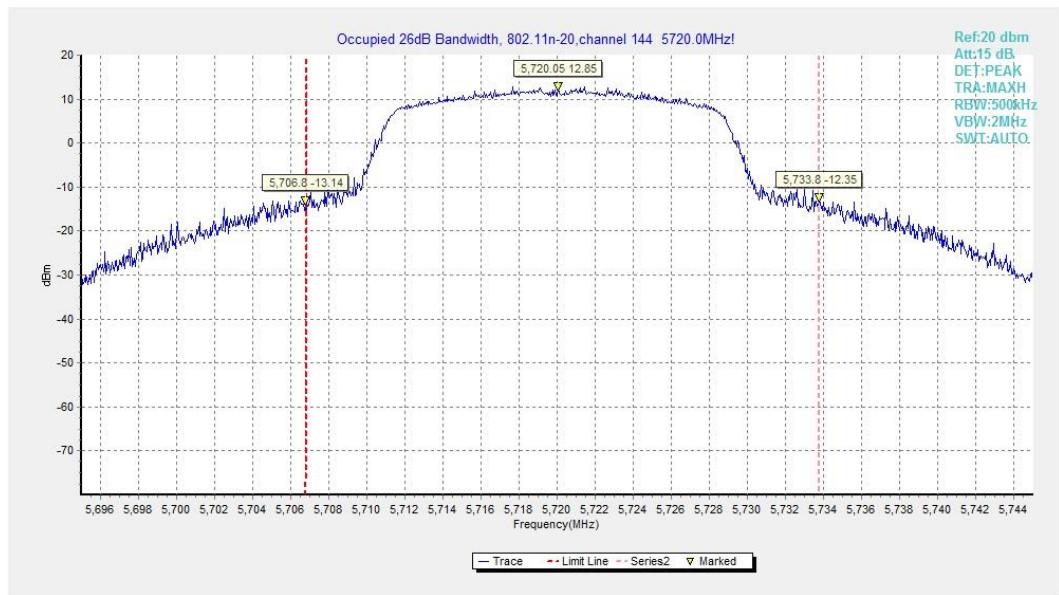


Fig.20 Occupied 26dB Bandwidth (802.11n-HT20, 5720MHz)

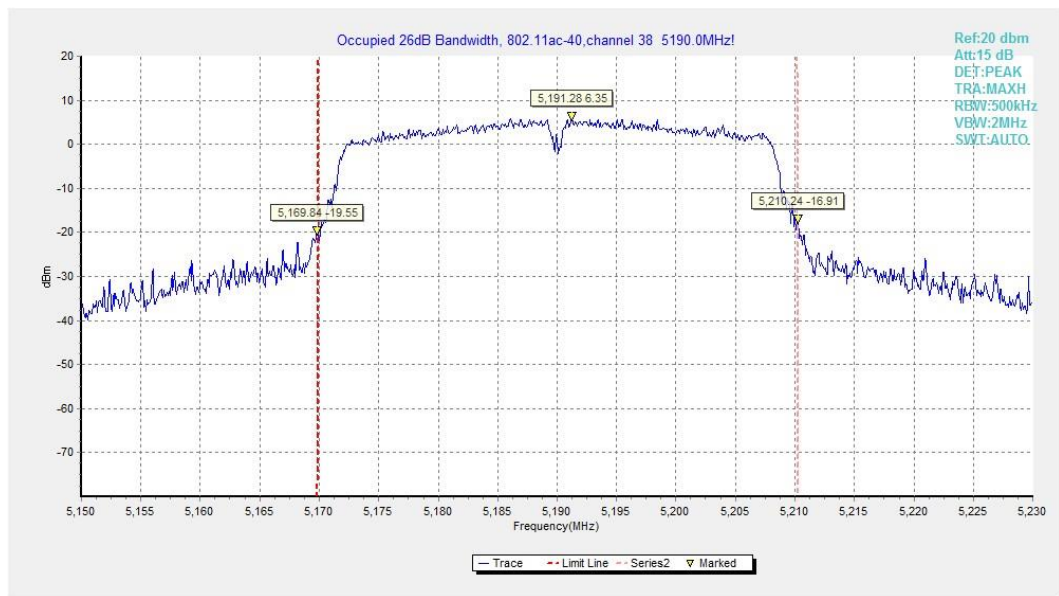


Fig.21 Occupied 26dB Bandwidth (802.11ac-HT40, 5190MHz)

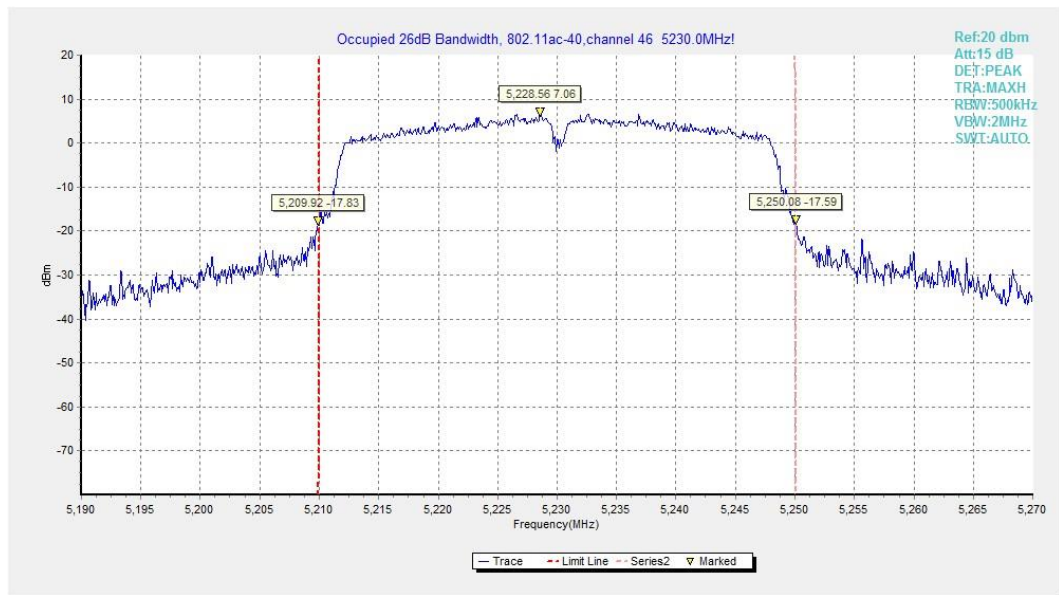


Fig.22 Occupied 26dB Bandwidth (802.11ac-HT40, 5230MHz)

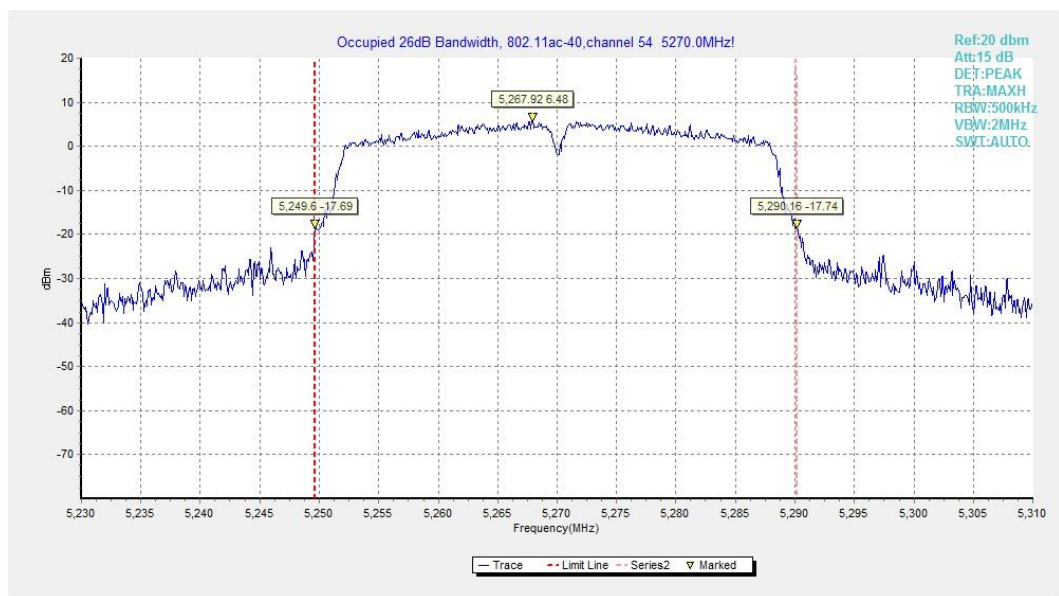


Fig.23 Occupied 26dB Bandwidth (802.11ac-HT40, 5270MHz)

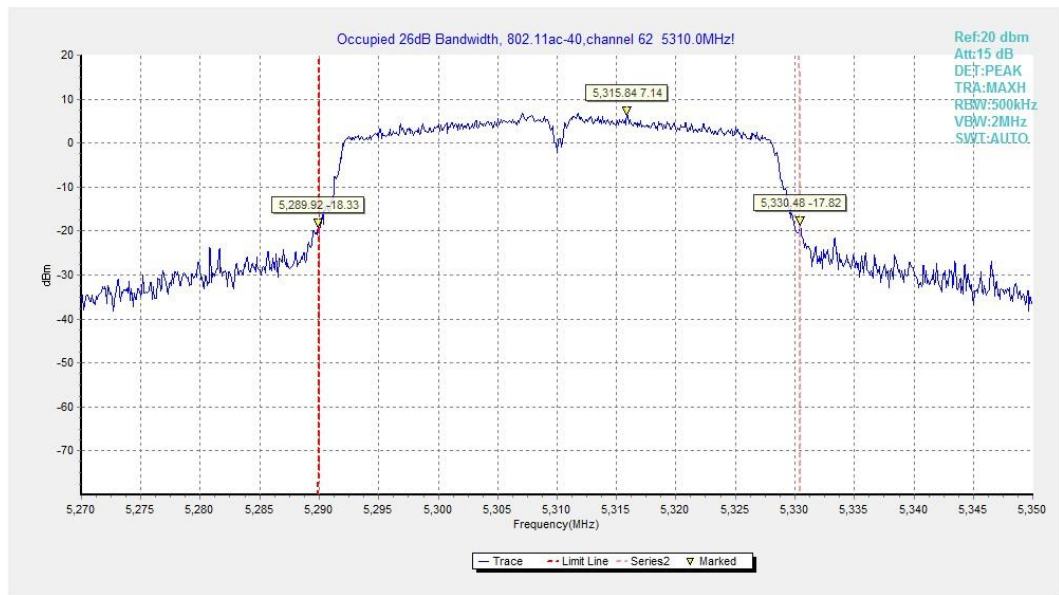


Fig.24 Occupied 26dB Bandwidth (802.11ac-HT40, 5310MHz)

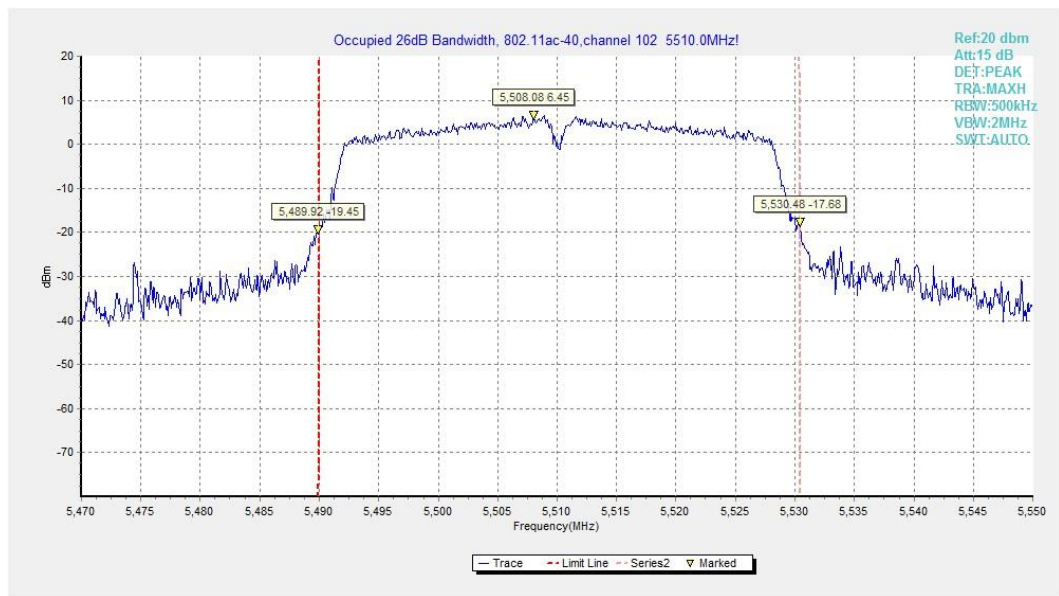


Fig.25 Occupied 26dB Bandwidth (802.11ac-HT40, 5510MHz)

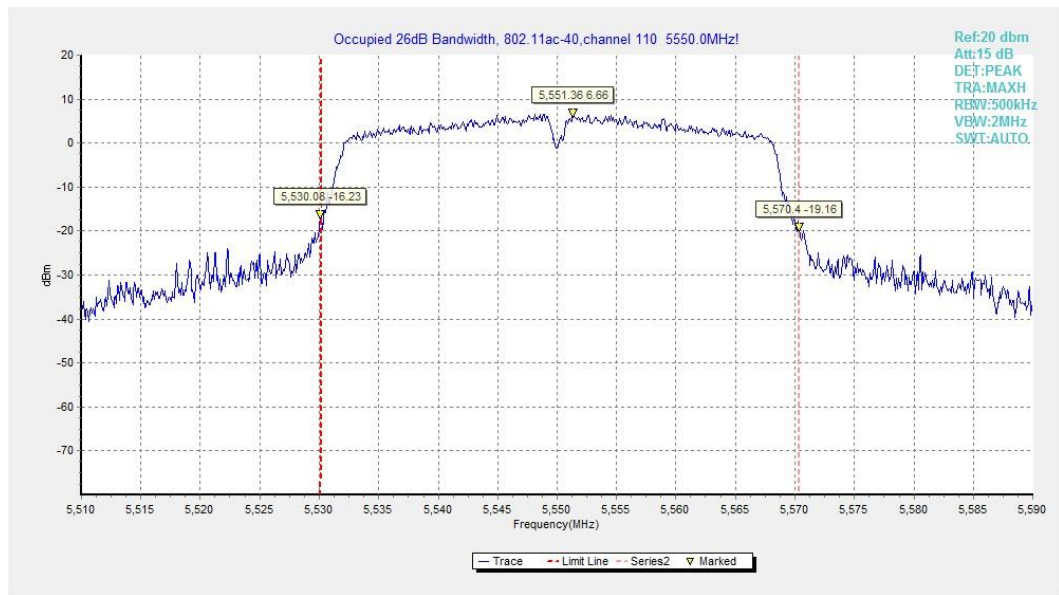


Fig.26 Occupied 26dB Bandwidth (802.11ac-HT40, 5550MHz)

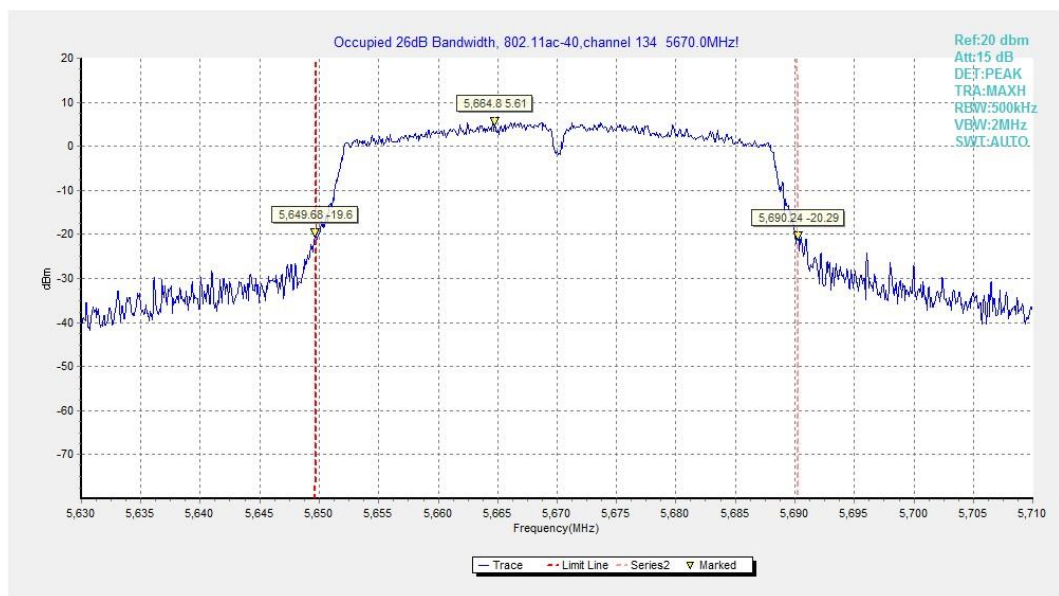


Fig.27 Occupied 26dB Bandwidth (802. 11ac-HT40, 5670MHz)

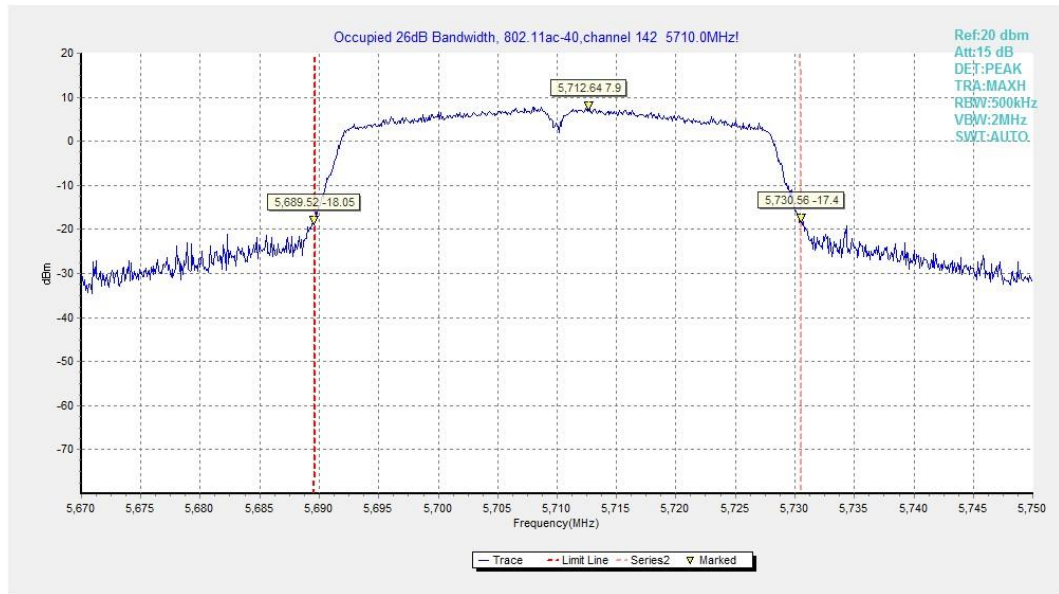


Fig.28 Occupied 26dB Bandwidth (802. 11ac-HT40, 5710MHz)

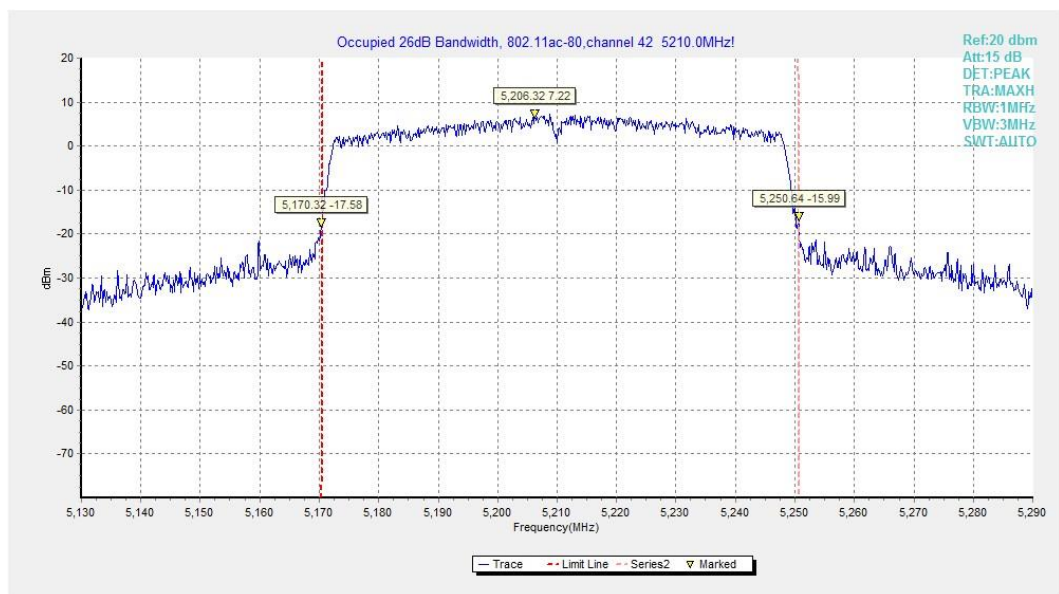


Fig.29 Occupied 26dB Bandwidth (802. 11ac-HT80, 5210MHz)

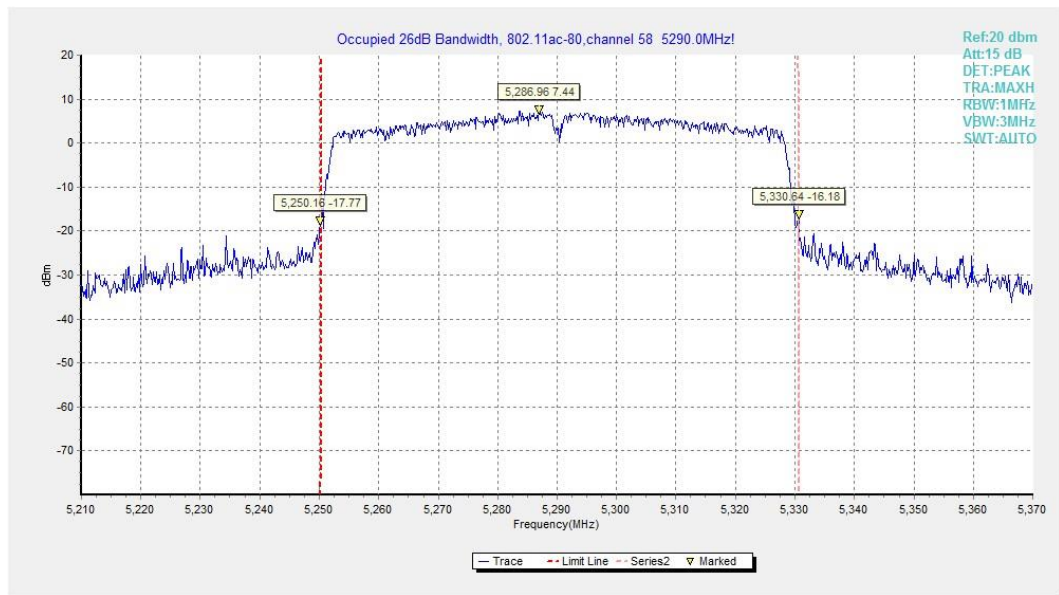


Fig.30 Occupied 26dB Bandwidth (802. 11ac-HT80, 5290MHz)

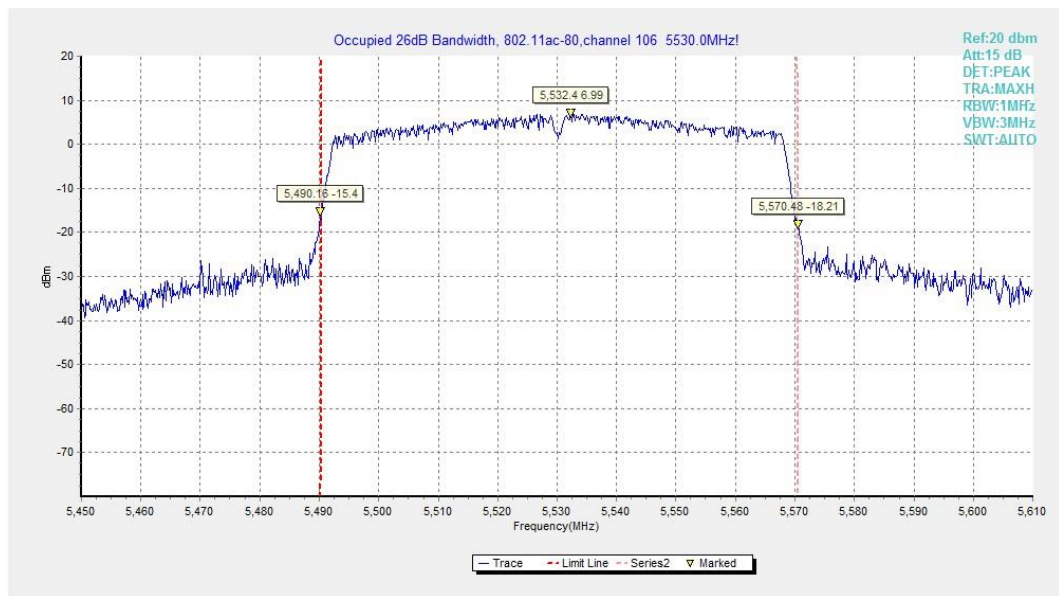


Fig.31 Occupied 26dB Bandwidth (802. 11ac-HT80, 5530MHz)

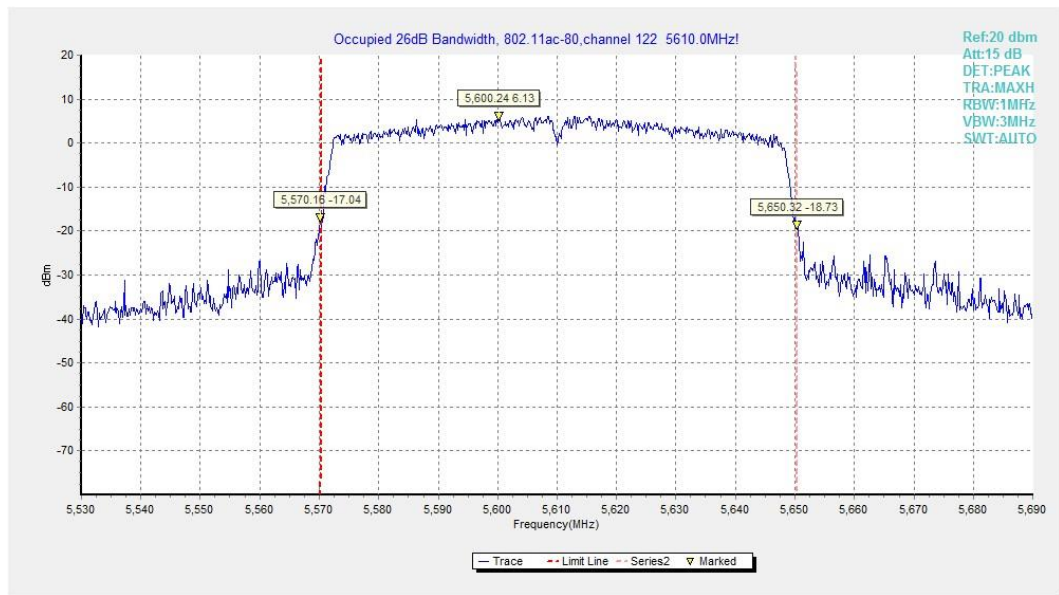


Fig.32 Occupied 26dB Bandwidth (802. 11ac-HT80, 5610MHz)

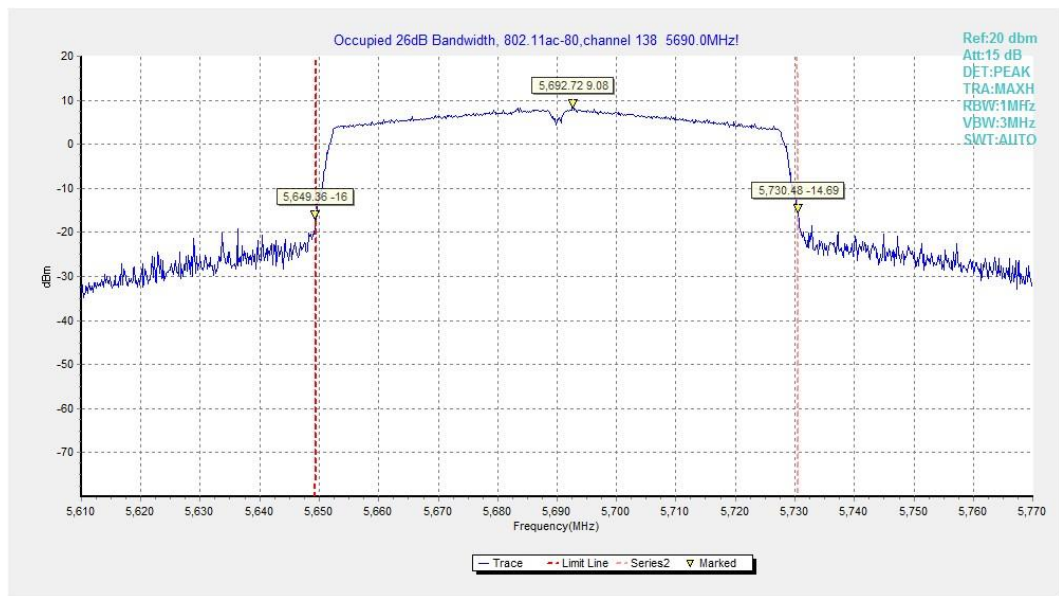


Fig.33 Occupied 26dB Bandwidth (802. 11ac-HT80, 5690MHz)

A.5. Band Edges Compliance

A5.1 Band Edges - Radiated

Measurement Limit:

| Standard | Limit |
|------------------------|-------------|
| FCC 47 CFR Part 15.407 | -27 dBm/MHz |

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)).

Limit in restricted band:

| Frequency of emission (MHz) | Field strength(uV/m) | Field strength(dBuV/m) | Measurement distance(m) |
|-----------------------------|----------------------|------------------------|-------------------------|
| Above 960 | 500 | 54 | 3 |

The measurement is made according to ANSI C63.10-2013 and KDB 789033

Set up:

Tabletop devices shall be placed on a nonconducting platform with nominal top surface dimensions 1 m by 1.5 m and the table height shall be 1.5 m.

The EUT and transmitting antenna shall be centered on the turntable.

Test Procedure

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept. During the test, the turntable is rotated 360° and the measurement antenna is moved from 1m to 4m to get the maximization result. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

The receiver references:

| Frequency of emission (MHz) | RBW/VBW | Sweep Time(s) |
|-----------------------------|---------------|---------------|
| 30-1000 | 100kHz/300kHz | 5 |
| 1000-4000 | 1MHz/3MHz | 15 |
| 4000-18000 | 1MHz/3MHz | 40 |
| 18000-26500 | 1MHz/3MHz | 20 |

Sample Calculations

1. Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:

$$E = \text{EIRP} - 20 \log(D) + 104.77 \quad \text{Where:}$$

E is the field strength in dB μ V/m

D is the measurement distance in meters

EIRP is the equivalent isotropically radiated power in dbm

Measurement Result:

| Mode | Channel | Test Results | Conclusion |
|------------------|----------|--------------|------------|
| 802.11a | 5180 MHz | Fig.34 | P |
| | 5320 MHz | Fig.35 | P |
| | 5500 MHz | Fig.36 | P |
| | 5700 MHz | Fig.37 | P |
| 802.11n HT20 | 5180 MHz | Fig.38 | P |
| | 5320 MHz | Fig.39 | P |
| | 5500 MHz | Fig.40 | P |
| | 5700 MHz | Fig.41 | P |
| 802.11n HT40 | 5190 MHz | Fig.42 | P |
| | 5310 MHz | Fig.43 | P |
| | 5510 MHz | Fig.44 | P |
| | 5670 MHz | Fig.45 | P |
| 802.11ac HT20 | 5180 MHz | Fig.46 | P |
| | 5320 MHz | Fig.47 | P |
| | 5500 MHz | Fig.48 | P |
| | 5700 MHz | Fig.49 | P |
| 802.11ac HT40 | 5190 MHz | Fig.50 | P |
| | 5310 MHz | Fig.51 | P |
| | 5510 MHz | Fig.52 | P |
| | 5670 MHz | Fig.53 | P |
| 802.11ac HT80 | 5210MHz | Fig.54 | P |
| | 5290MHz | Fig.55 | P |
| | 5530MHz | Fig.56 | P |
| | 5610MHz | Fig.57 | P |

Conclusion: PASS

Test graphs as below:

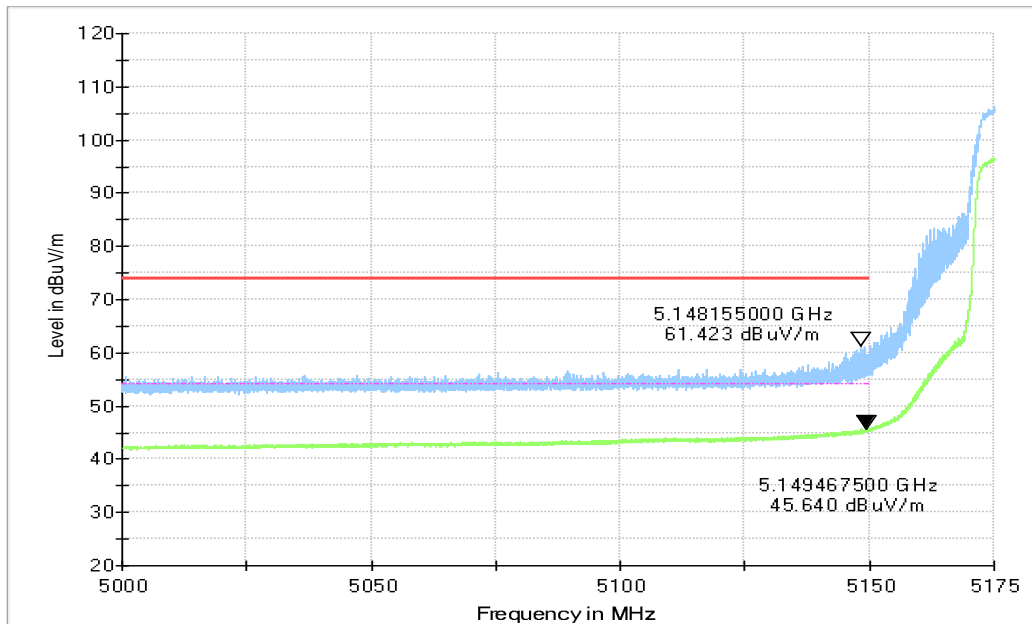


Fig.34 Band Edges (802.11a Ch36, 5180MHz)

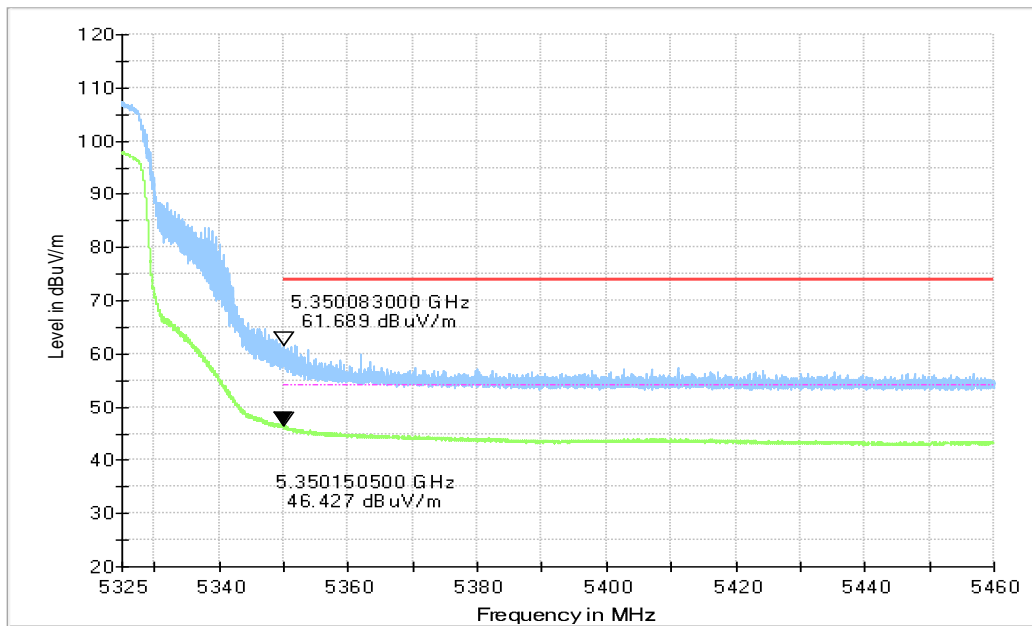


Fig.35 Band Edges (802.11a Ch64, 5320MHz)

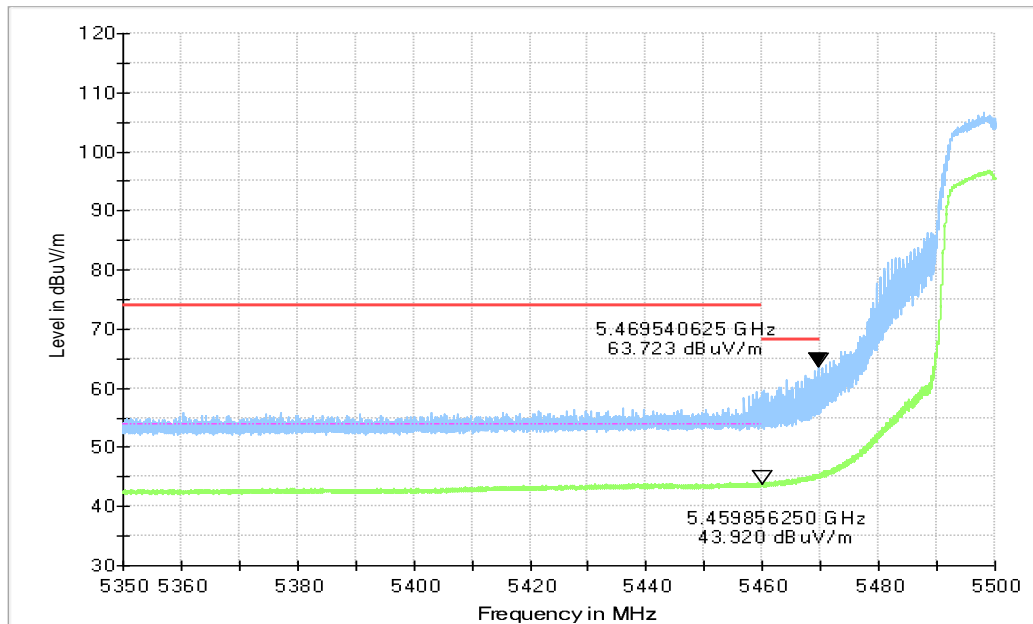


Fig.36 Band Edges (802.11a Ch100, 5500MHz)

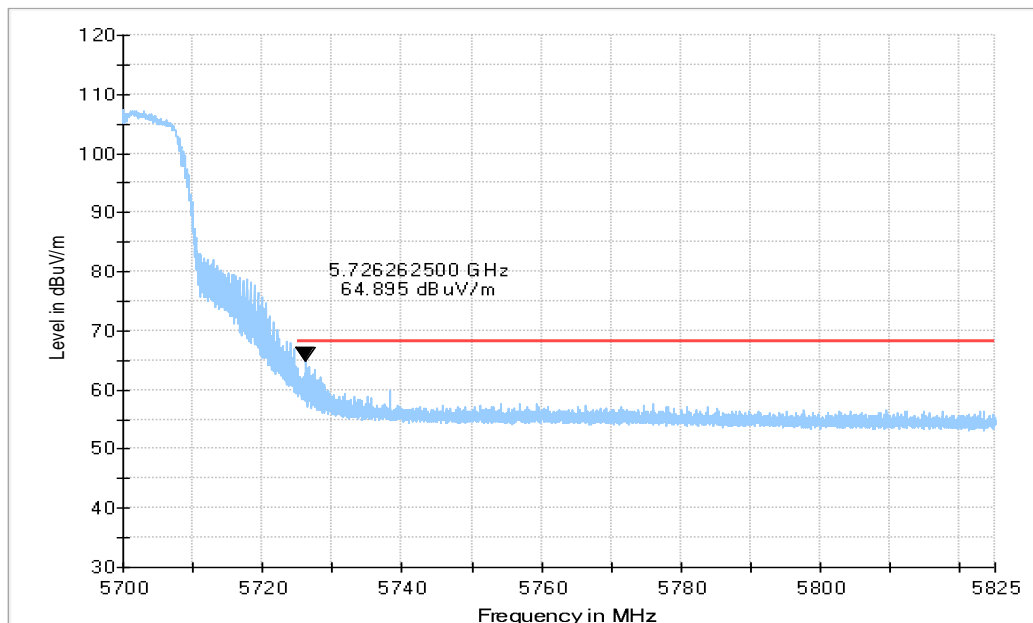


Fig.37 Band Edges (802.11a Ch140, 5700MHz)

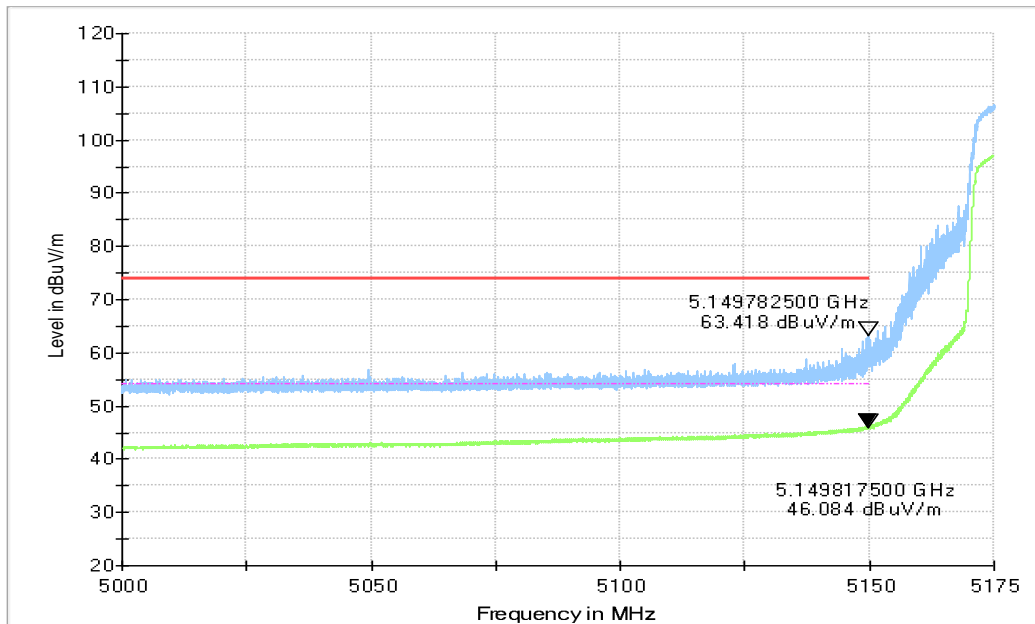


Fig.38 Band Edges (802.11n-HT20 Ch36, 5180MHz)

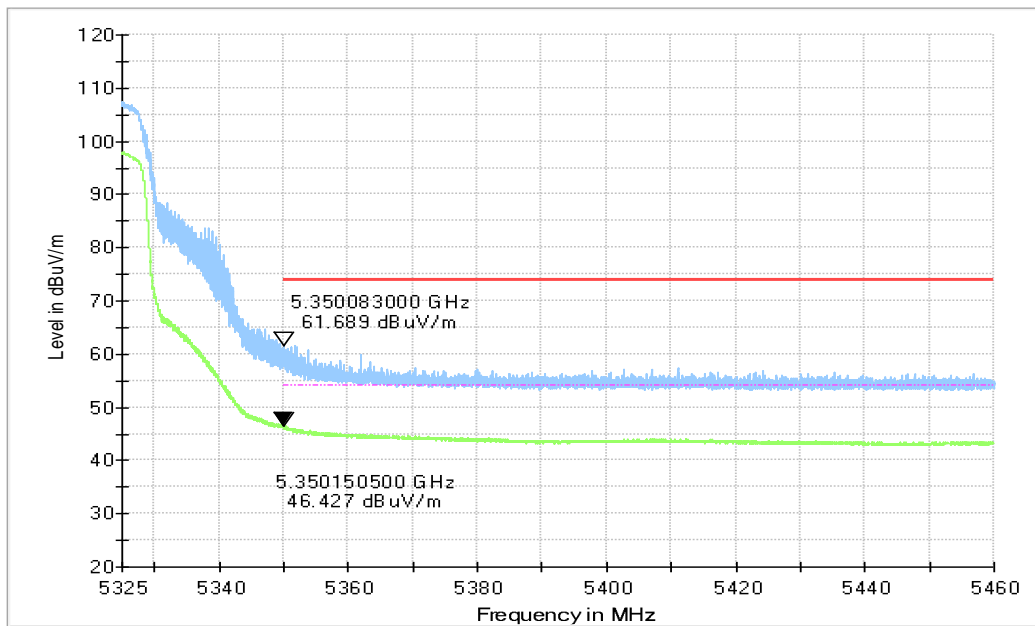


Fig.39 Band Edges (802.11n-HT20 Ch64, 5320MHz)

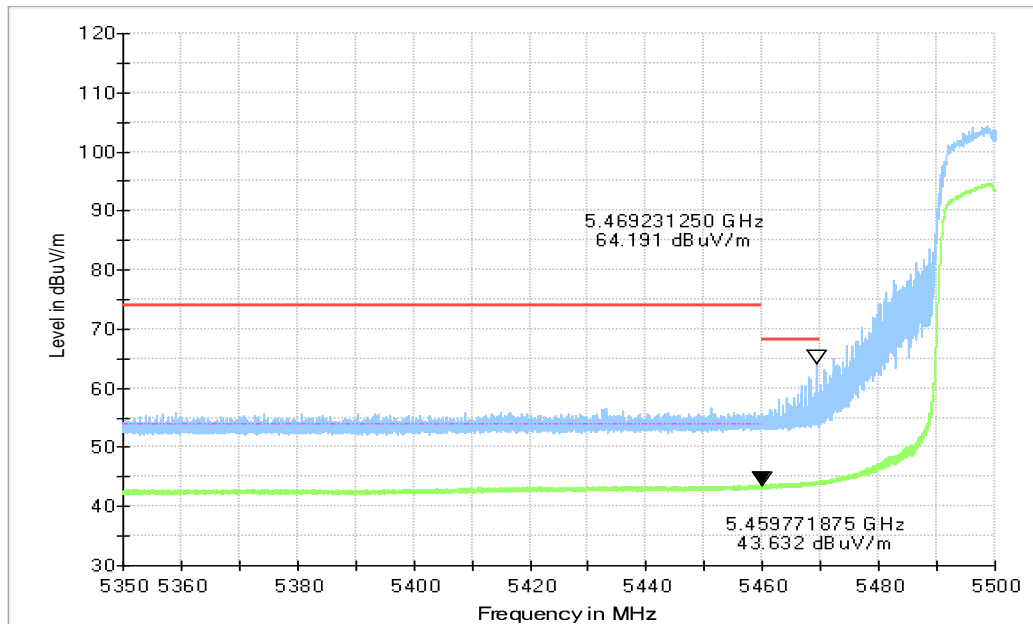


Fig.40 Band Edges (802.11n-HT20 Ch100, 5500MHz)

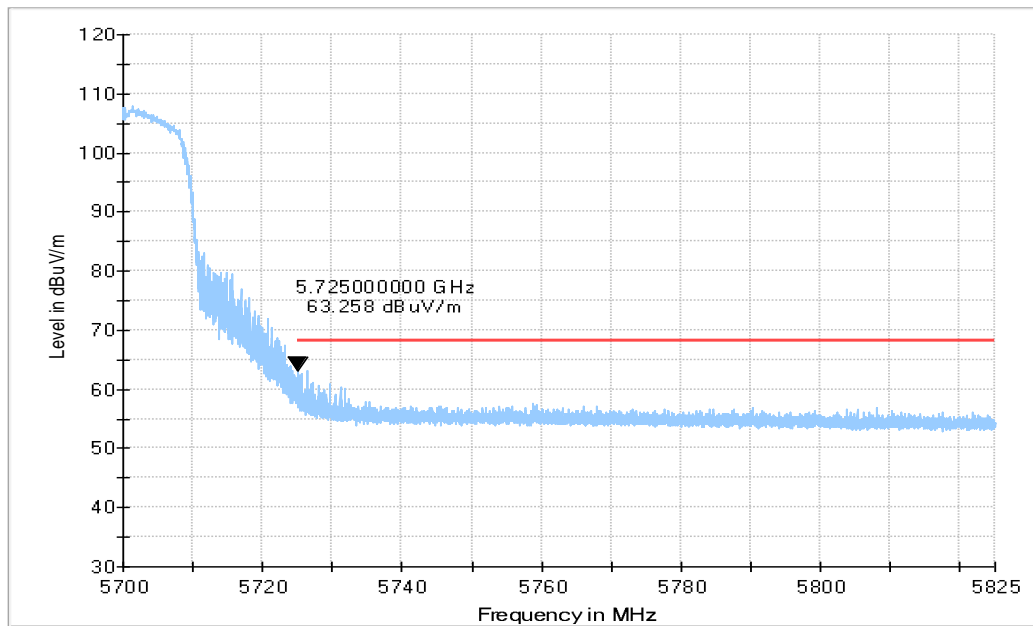


Fig.41 Band Edges (802.11n-HT20 Ch140, 5700MHz)

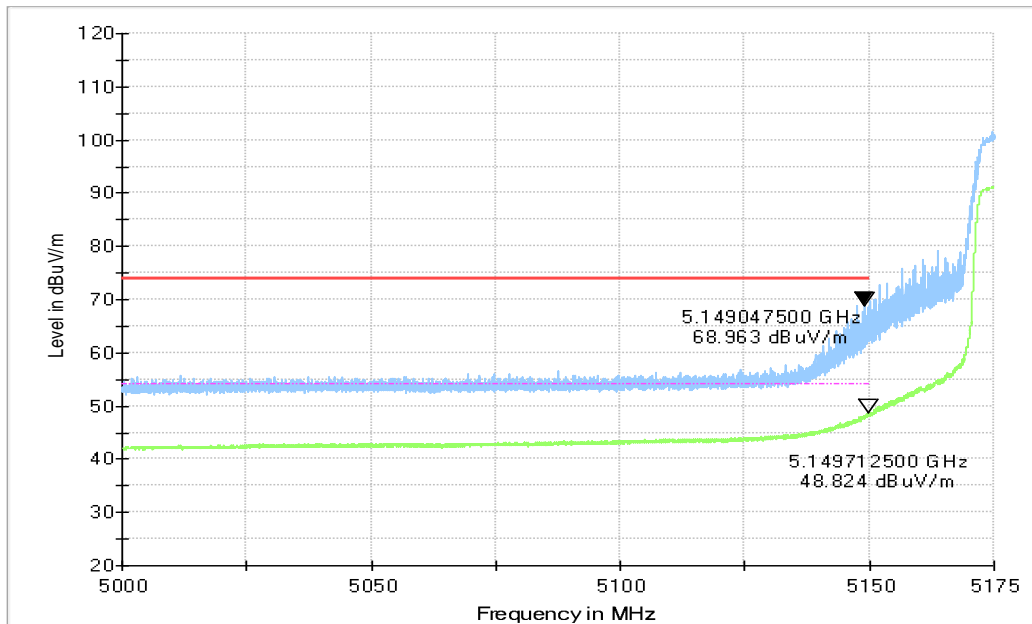


Fig.42 Band Edges (802.11n-HT40 Ch38, 5190MHz)

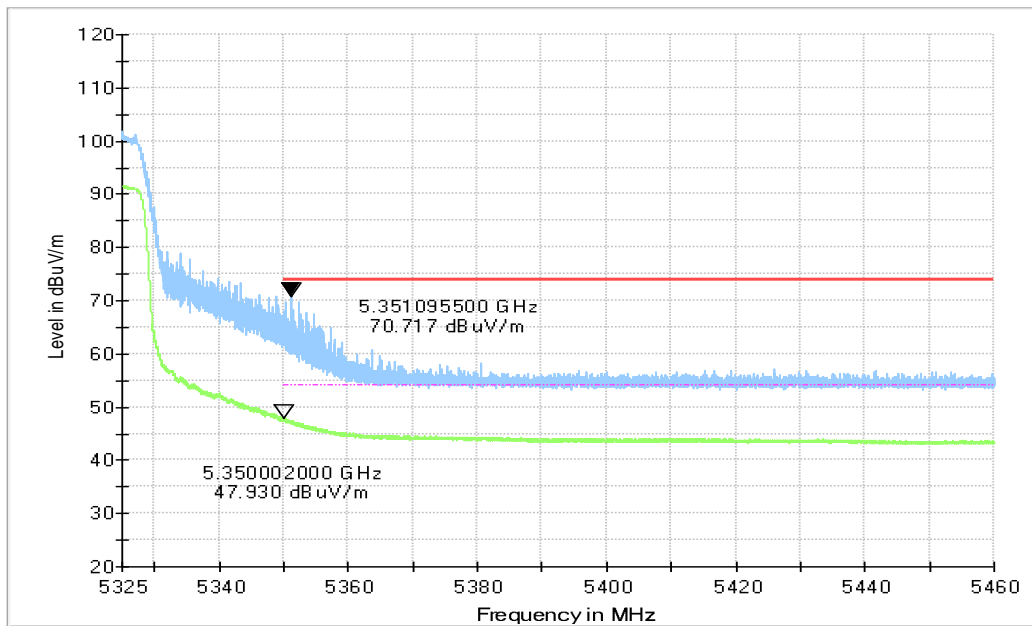


Fig.43 Band Edges (802.11n-HT40 Ch62, 5310MHz)

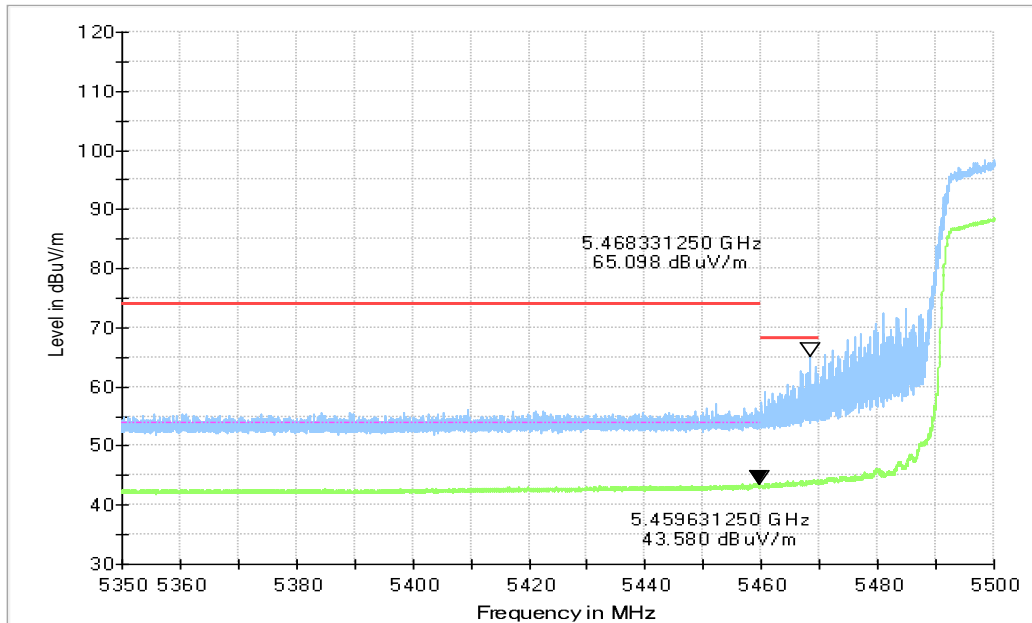


Fig.44 Band Edges (802.11n-HT40 Ch102, 5510MHz)

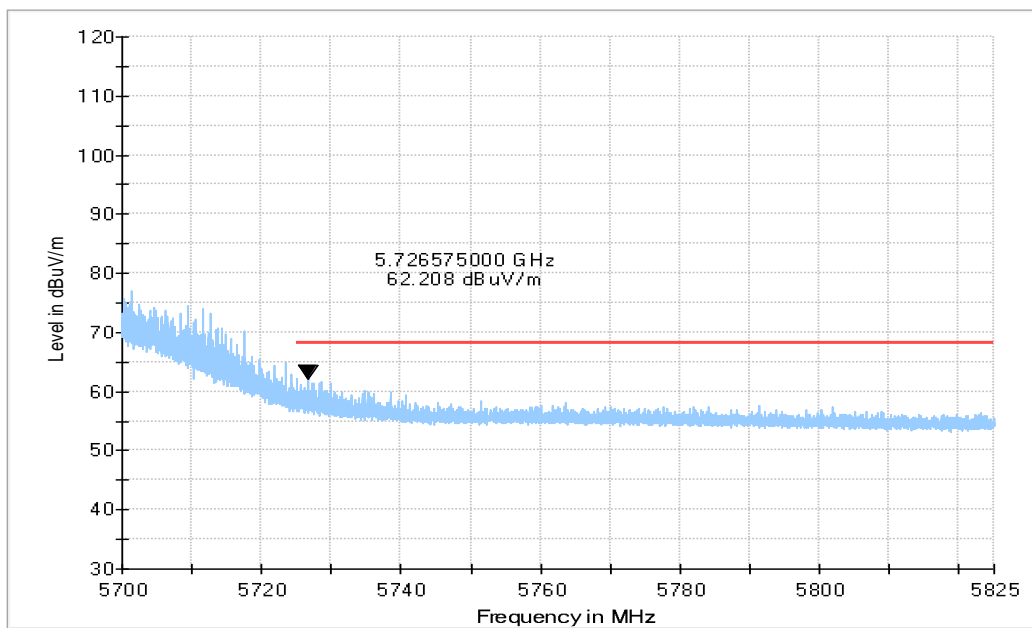


Fig.45 Band Edges (802.11n-HT40 Ch134, 5670MHz)

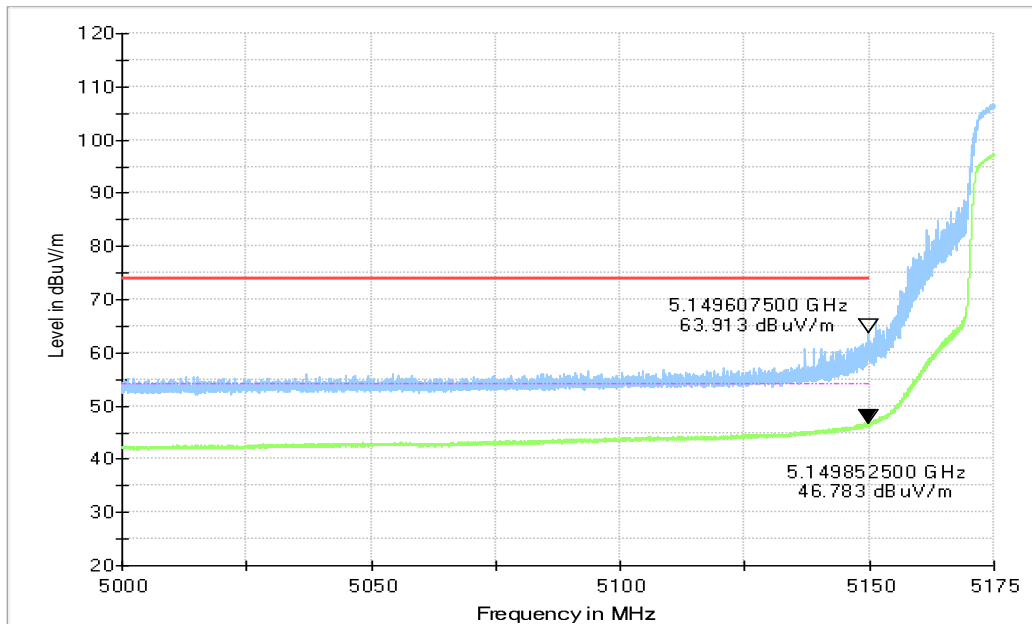


Fig.46 Band Edges (802.11ac-HT20 Ch36, 5180MHz)

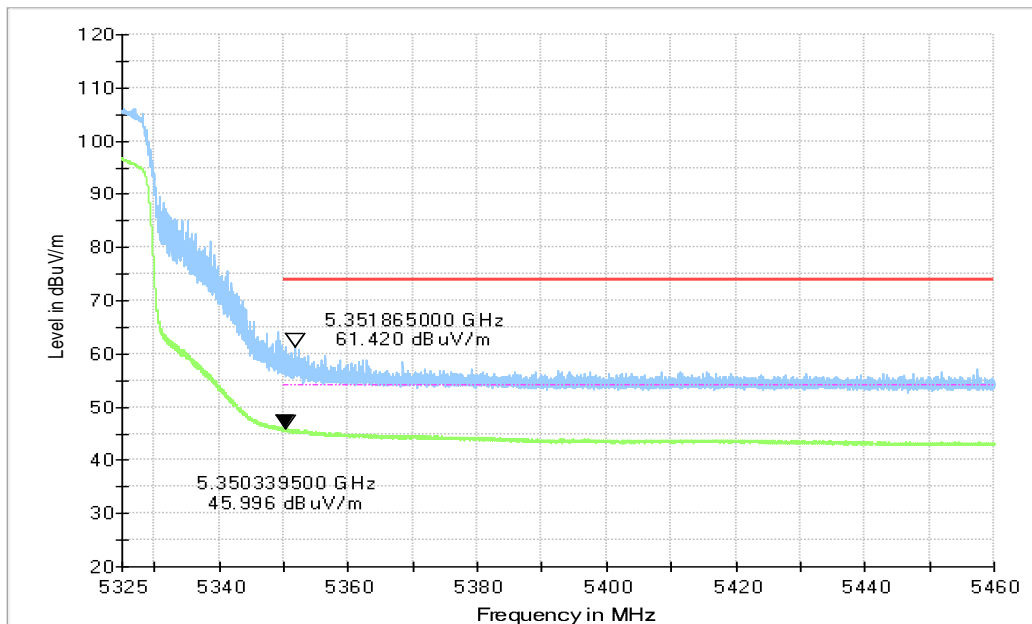


Fig.47 Band Edges (802.11ac-HT20 Ch64, 5320MHz)

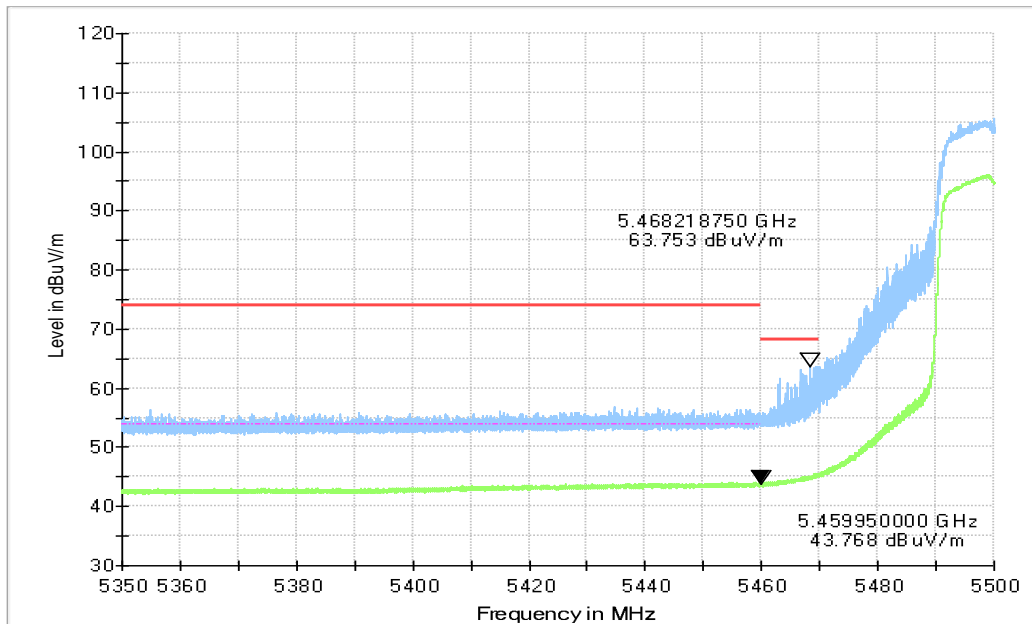


Fig.48 Band Edges (802.11ac-HT20 Ch100, 5500MHz)

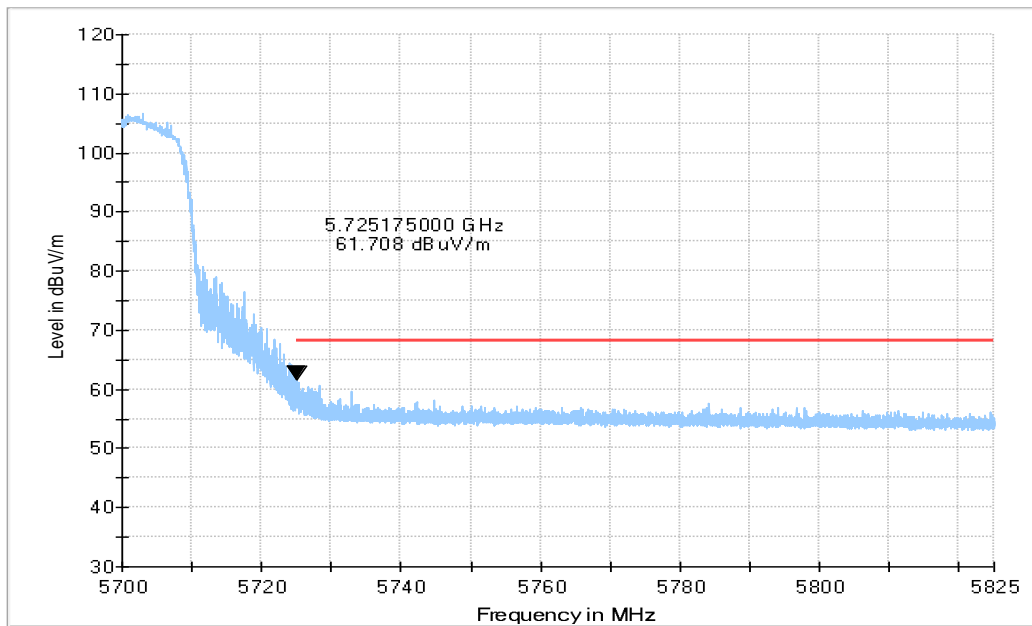


Fig.49 Band Edges (802.11ac-HT20 Ch140, 5700MHz)

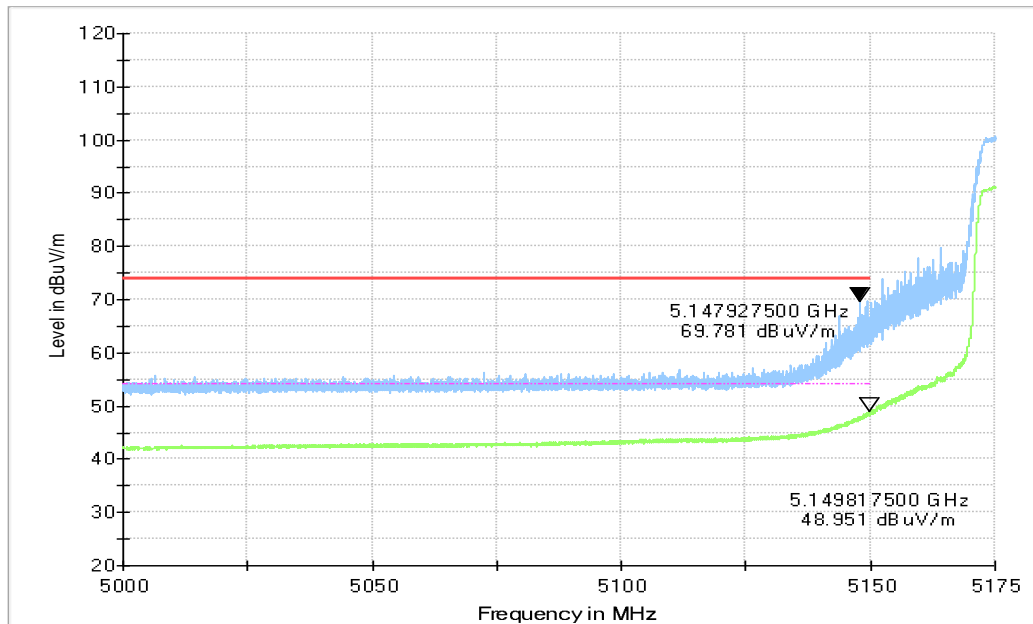


Fig.50 Band Edges (802.11ac-HT40 Ch38, 5190MHz)

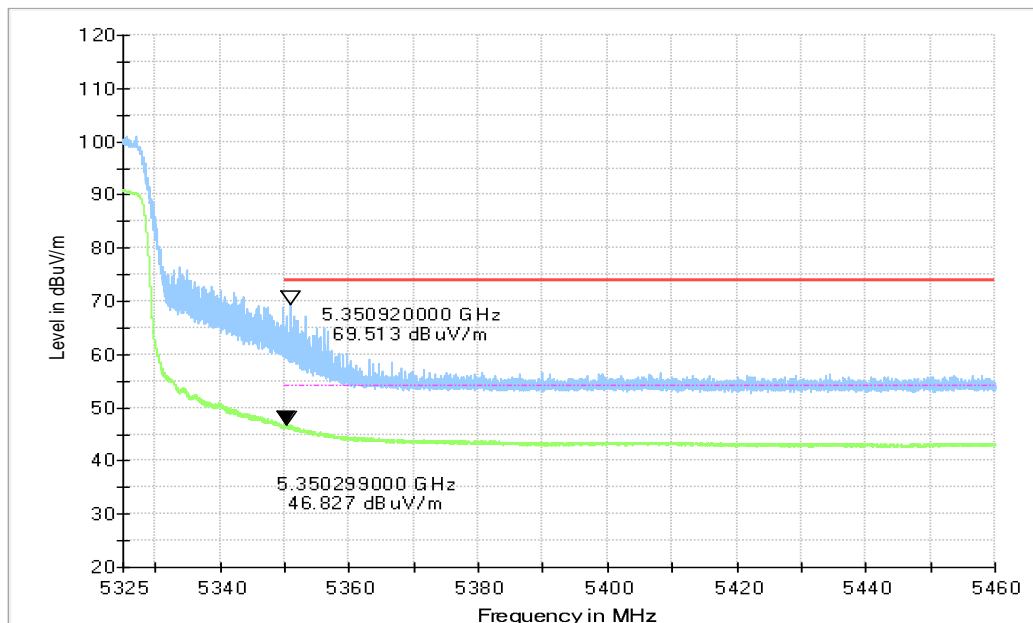


Fig.51 Band Edges (802.11ac-HT40 Ch62, 5310MHz)

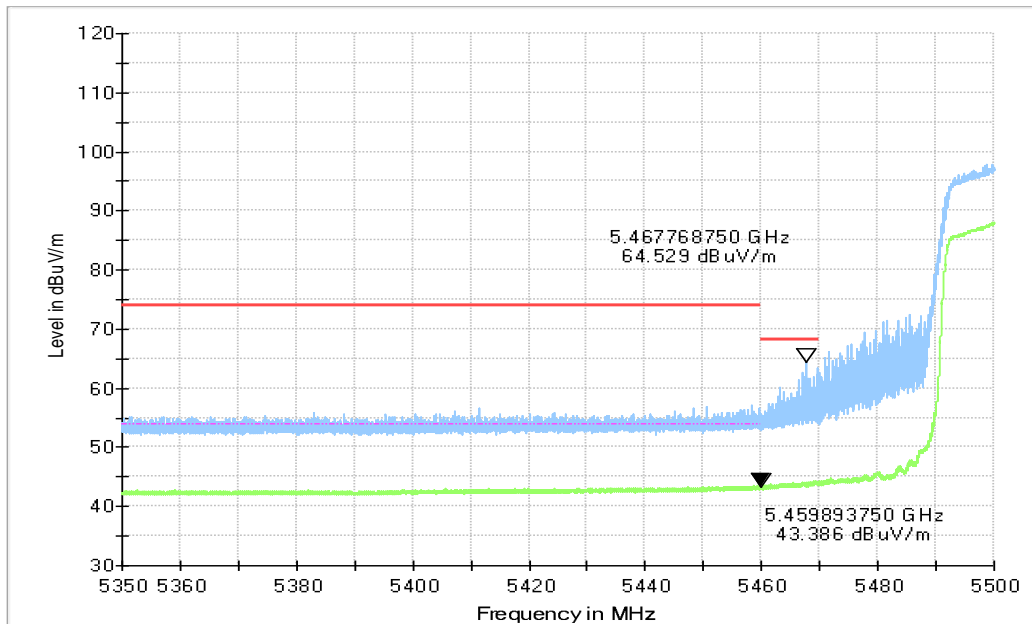


Fig.52 Band Edges (802.11ac-HT40 Ch102, 5510MHz)

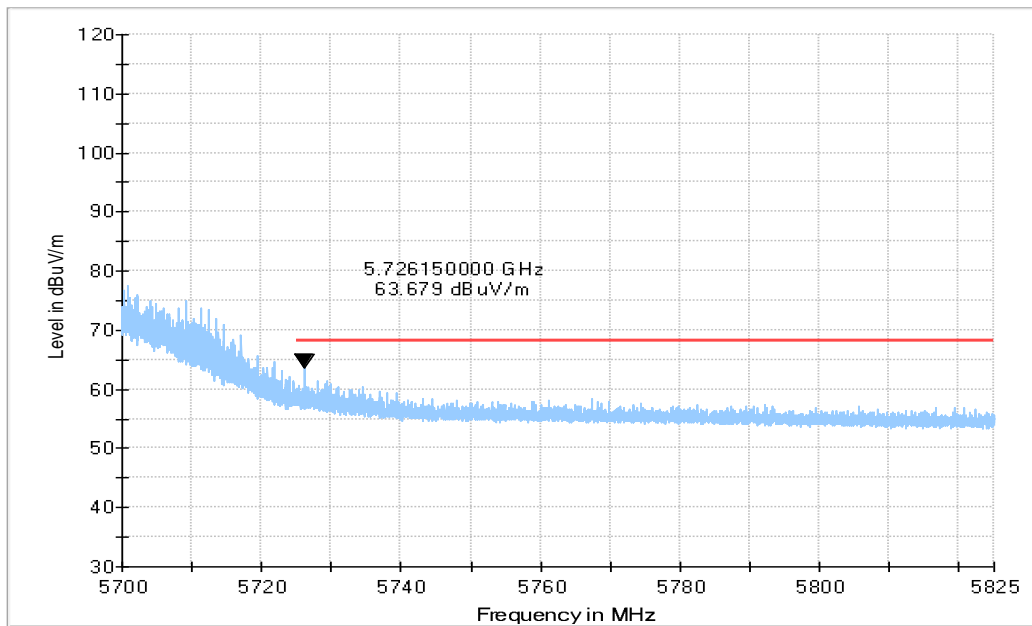


Fig.53 Band Edges (802.11ac-HT40 Ch134, 5670MHz)

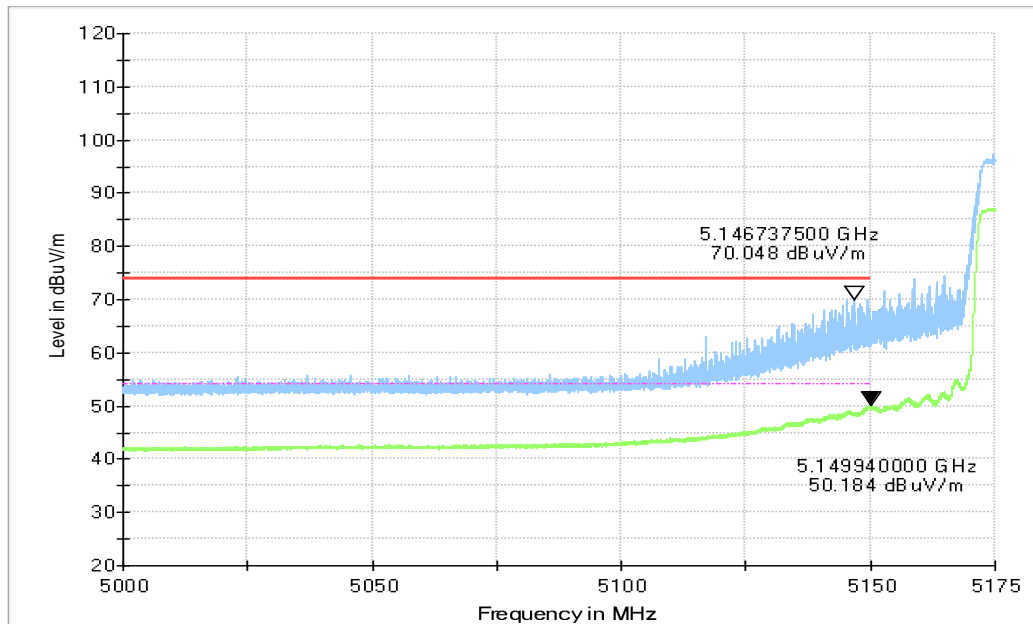


Fig.54 Band Edges (802.11ac-HT80 Ch42 , 5210MHz)

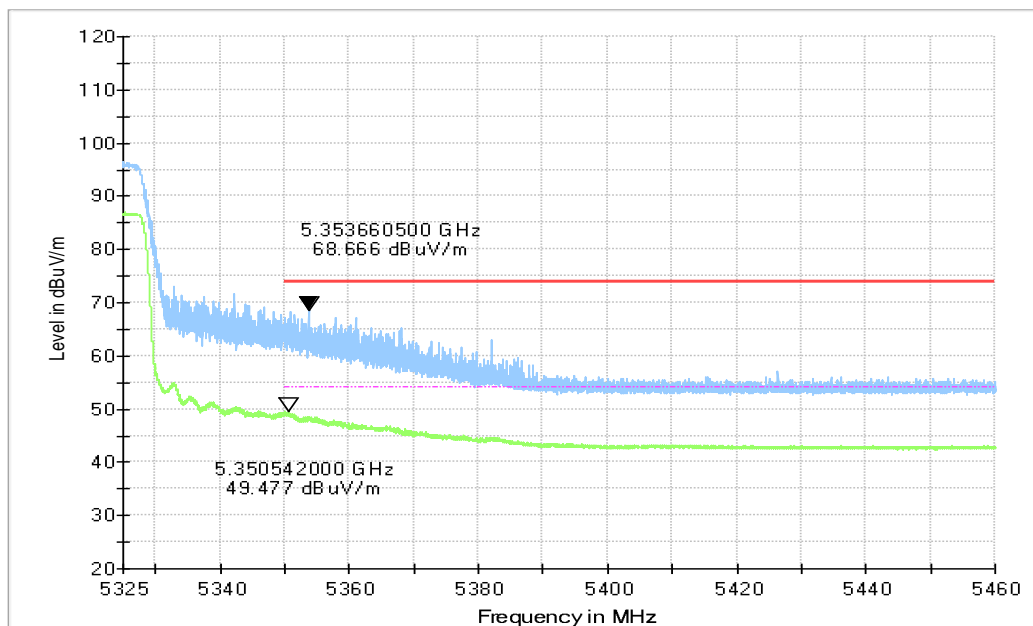


Fig.55 Band Edges (802.11ac-HT80 Ch58, 5290MHz)

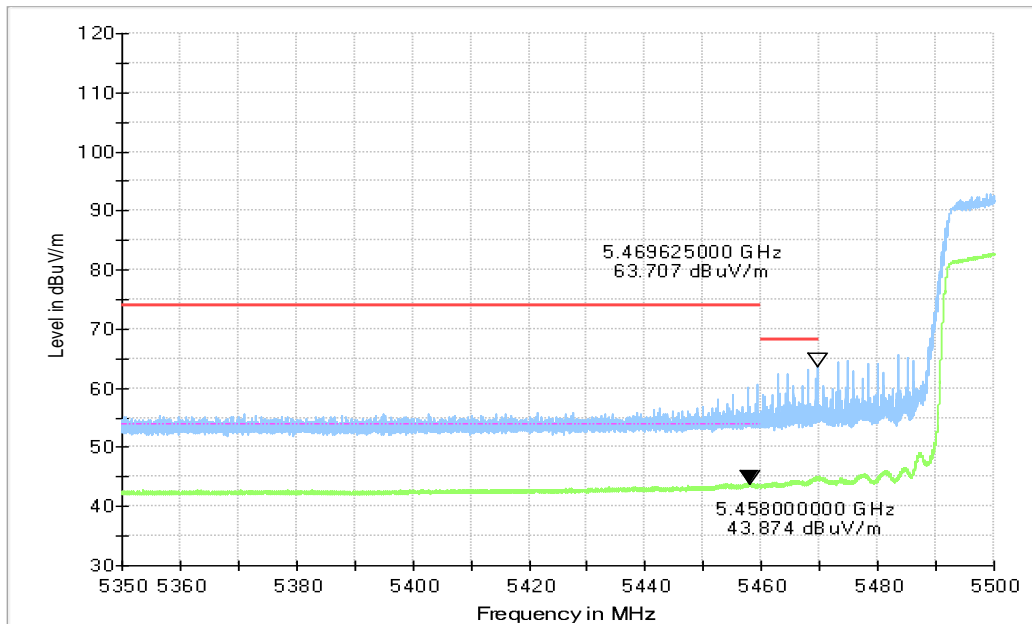


Fig.56 Band Edges (802.11ac-HT80 Ch106, 5530MHz)

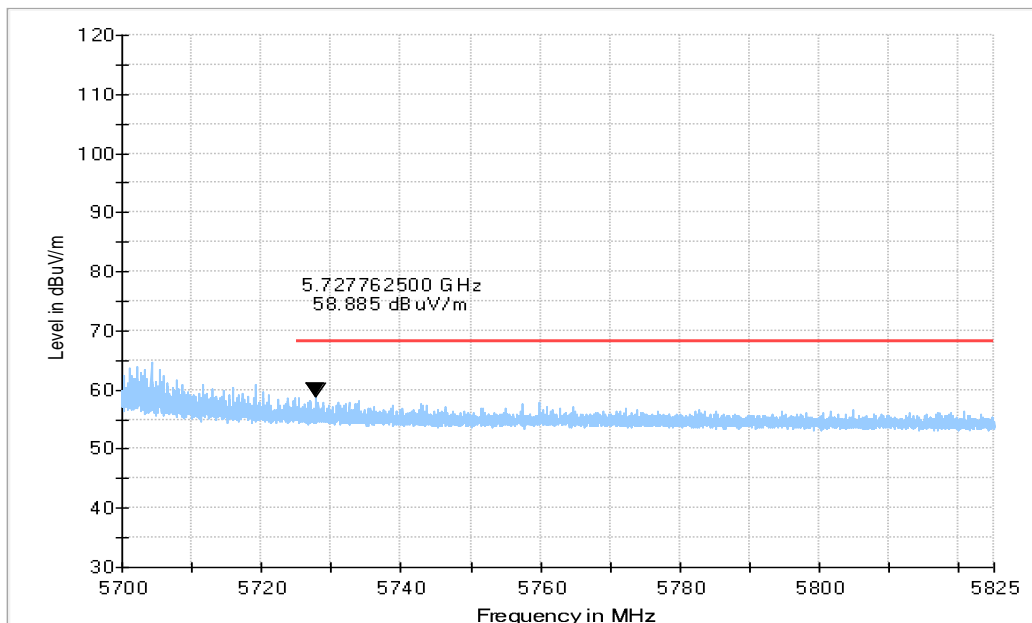


Fig.57 Band Edges (802.11ac-HT80 Ch122, 5610MHz)

A.6. Transmitter Spurious Emission

Measurement Limit:

| Standard | Limit |
|------------------------|-------------|
| FCC 47 CFR Part 15.407 | -27 dBm/MHz |

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)).

Limit in restricted band:

| Frequency (MHz) | Field strength($\mu\text{V}/\text{m}$) | Measurement distance(m) |
|-----------------|--|-------------------------|
| 0.009 - 0.490 | 2400/F(kHz) | 300 |
| 0.490 - 1.705 | 24000/F(kHz) | 30 |
| 1.705 – 30.0 | 30 | 30 |

| Frequency of emission (MHz) | Field strength($\mu\text{V}/\text{m}$) | Field strength(dBuV/m) | Measurement distance(m) |
|-----------------------------|--|------------------------|-------------------------|
| 30-88 | 100 | 40 | 3 |
| 88-216 | 150 | 43.5 | 3 |
| 216-960 | 200 | 46 | 3 |
| Above 960 | 500 | 54 | 3 |

The measurement is made according to ANSI C63.10-2013 and KDB 789033

Set up:

Tabletop devices shall be placed on a nonconducting platform with nominal top surface dimensions 1 m by 1.5 m. For emissions testing at or below 1 GHz, the table height shall be 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m

The EUT and transmitting antenna shall be centered on the turntable.

Test Procedure

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept. During the test, the turntable is rotated 360° and the measurement antenna is moved from 1m to 4m to get the maximization result. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

The receiver references:

| Frequency of emission (MHz) | RBW/VBW | Sweep Time(s) |
|-----------------------------|---------------|---------------|
| 30-1000 | 100kHz/300kHz | 5 |
| 1000-4000 | 1MHz/3MHz | 15 |
| 4000-18000 | 1MHz/3MHz | 40 |
| 18000-26500 | 1MHz/3MHz | 20 |

Sample Calculations

1. Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:

$$E = \sqrt{EIRP - 20 \log(D) + 104.77}$$

Where:

E is the field strength in dB μ V/m

D is the measurement distance in meters

EIRP is the equivalent isotropically radiated power in dbm

2. The measurement results are obtained as described below:

$$\text{Result} = P_{\text{Mea}} + A_{\text{Rpl}} = P_{\text{Mea}} + \text{Cable Loss} + \text{Antenna Factor}$$

A "reference path loss" is established and the A_{Rpl} is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

P_{Mea} is the field strength recorded from the instrument.

Measurement Results:

802.11a mode

| Mode | Channel | Frequency Range | Test Results | Conclusion |
|----------------|-------------|-------------------|--------------|------------|
| 802.11a | 36(5180MHz) | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | 40(5200MHz) | 9kHz ~30 MHz | --- | P |
| | | 30 MHz ~1 GHz | --- | P |
| | | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | | 18 GHz ~ 26.5 GHz | --- | P |
| | | 26.5 GHz ~ 40 GHz | --- | P |
| | 48(5240MHz) | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | 52(5260MHz) | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | 56(5280MHz) | 9kHz ~30 MHz | --- | P |
| | | 30 MHz ~1 GHz | --- | P |
| | | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | | 18 GHz ~ 26.5 GHz | --- | P |
| | | 26.5 GHz ~ 40 GHz | --- | P |
| | 64(5320MHz) | 1 GHz ~ 3 GHz | --- | P |
| 3 GHz ~ 7 GHz | | --- | P | |
| 7 GHz ~ 18 GHz | | --- | P | |

| | | | | |
|--|--------------|-------------------|-----|---|
| | 100(5500MHz) | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | 120(5600MHz) | 9kHz ~30 MHz | --- | P |
| | | 30 MHz ~1 GHz | --- | P |
| | | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | | 18 GHz ~ 26.5 GHz | --- | P |
| | | 26.5 GHz ~ 40 GHz | --- | P |
| | 140(5700MHz) | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |

802.11n-HT20 mode

| Mode | Channel | Frequency Range | Test Results | Conclusion |
|------------------|----------------|-------------------|---------------|------------|
| 802.11n -HT20 | 36(5180MHz) | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | 40(5200MHz) | 30 MHz ~1 GHz | --- | P |
| | | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | | 18 GHz ~ 26.5 GHz | --- | P |
| | | 26.5 GHz ~ 40 GHz | --- | P |
| | | 48(5240MHz) | 1 GHz ~ 3 GHz | --- |
| | 3 GHz ~ 7 GHz | | --- | P |
| | 7 GHz ~ 18 GHz | | --- | P |
| | 52(5260MHz) | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | 56(5280MHz) | 9kHz ~30 MHz | --- | P |
| | | 30 MHz ~1 GHz | --- | P |
| | | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | | 18 GHz ~ 26.5 GHz | --- | P |
| | | 26.5 GHz ~ 40 GHz | --- | P |
| | 64(5320MHz) | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | 100(5500MHz) | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |

| | | | | |
|--|--------------|-------------------|-----|---|
| | 120(5600MHz) | 7 GHz ~ 18 GHz | --- | P |
| | | 9kHz ~30 MHz | --- | P |
| | | 30 MHz ~1 GHz | --- | P |
| | | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | | 18 GHz ~ 26.5 GHz | --- | P |
| | | 26.5 GHz ~ 40 GHz | --- | P |
| | 140(5700MHz) | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |

802.11n-HT40 mode

| Mode | Channel | Frequency Range | Test Results | Conclusion | |
|-----------------|--------------|-------------------|----------------|------------|---|
| 802.11n HT40 | 38(5190MHz) | 30 MHz ~1 GHz | --- | P | |
| | | 1 GHz ~ 3 GHz | --- | P | |
| | | 3 GHz ~ 7 GHz | --- | P | |
| | | 7 GHz ~ 18 GHz | --- | P | |
| | | 18 GHz ~ 26.5 GHz | --- | P | |
| | | 26.5 GHz ~ 40 GHz | --- | P | |
| | 46(5230MHz) | 1 GHz ~ 3 GHz | --- | P | |
| | | 3 GHz ~ 7 GHz | --- | P | |
| | | 7 GHz ~ 18 GHz | --- | P | |
| | 54(5270MHz) | 9kHz ~30 MHz | --- | P | |
| | | 30 MHz ~1 GHz | --- | P | |
| | | 1 GHz ~ 3 GHz | --- | P | |
| | | 3 GHz ~ 7 GHz | --- | P | |
| | | 7 GHz ~ 18 GHz | --- | P | |
| | | 18 GHz ~ 26.5 GHz | --- | P | |
| | 62(5310MHz) | 26.5 GHz ~ 40 GHz | --- | P | |
| | | 1 GHz ~ 3 GHz | --- | P | |
| | | 3 GHz ~ 7 GHz | --- | P | |
| | 102(5510MHz) | 7 GHz ~ 18 GHz | --- | P | |
| | | 9kHz ~30 MHz | --- | P | |
| | | 30 MHz ~1 GHz | --- | P | |
| | | 1 GHz ~ 3 GHz | --- | P | |
| | | 3 GHz ~ 7 GHz | --- | P | |
| | | 7 GHz ~ 18 GHz | --- | P | |
| | | 18 GHz ~ 26.5 GHz | --- | P | |
| | 118(5590MHz) | 26.5 GHz ~ 40 GHz | --- | P | |
| | | 1 GHz ~ 3 GHz | --- | P | |
| | | 3 GHz ~ 7 GHz | --- | P | |
| | | | 7 GHz ~ 18 GHz | --- | P |

| | | | | |
|--|--------------|----------------|-----|---|
| | 134(5670MHz) | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |

802.11ac-HT20 mode

| Mode | Channel | Frequency Range | Test Results | Conclusion |
|-------------------|----------------|-------------------|---------------|------------|
| 802.11ac -HT20 | 36(5180MHz) | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | 40(5200MHz) | 30 MHz ~1 GHz | --- | P |
| | | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | | 18 GHz ~ 26.5 GHz | --- | P |
| | | 26.5 GHz ~ 40 GHz | --- | P |
| | | 48(5240MHz) | 1 GHz ~ 3 GHz | --- |
| | 3 GHz ~ 7 GHz | | --- | P |
| | 7 GHz ~ 18 GHz | | --- | P |
| | 52(5260MHz) | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | 56(5280MHz) | 9kHz ~30 MHz | --- | P |
| | | 30 MHz ~1 GHz | --- | P |
| | | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | | 18 GHz ~ 26.5 GHz | --- | P |
| | | 26.5 GHz ~ 40 GHz | --- | P |
| | 64(5320MHz) | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | 100(5500MHz) | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | 120(5600MHz) | 9kHz ~30 MHz | --- | P |
| | | 30 MHz ~1 GHz | --- | P |
| | | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | | 18 GHz ~ 26.5 GHz | --- | P |
| | | 26.5 GHz ~ 40 GHz | --- | P |
| | 140(5700MHz) | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |

| | | | | |
|--|--|----------------|-----|---|
| | | 7 GHz ~ 18 GHz | --- | P |
|--|--|----------------|-----|---|

802.11ac-HT40 mode

| Mode | Channel | Frequency Range | Test Results | Conclusion |
|------------------|--------------|-------------------|--------------|------------|
| 802.11ac HT40 | 38(5190MHz) | 30 MHz ~1 GHz | --- | P |
| | | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | | 18 GHz ~ 26.5 GHz | --- | P |
| | | 26.5 GHz ~ 40 GHz | --- | P |
| | 46(5230MHz) | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | 54(5270MHz) | 9kHz ~30 MHz | --- | P |
| | | 30 MHz ~1 GHz | --- | P |
| | | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | | 18 GHz ~ 26.5 GHz | --- | P |
| | 62(5310MHz) | 26.5 GHz ~ 40 GHz | --- | P |
| | | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | 102(5510MHz) | 9kHz ~30 MHz | --- | P |
| | | 30 MHz ~1 GHz | --- | P |
| | | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | | 18 GHz ~ 26.5 GHz | --- | P |
| | 118(5590MHz) | 26.5 GHz ~ 40 GHz | --- | P |
| | | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | 134(5670MHz) | 7 GHz ~ 18 GHz | --- | P |
| | | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |

802.11ac-HT80 mode

| Mode | Channel | Frequency Range | Test Results | Conclusion |
|-----------------|--------------|-------------------|--------------|------------|
| 802.11ac – HT80 | 42(5210MHz) | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | 58(5290MHz) | 9kHz ~30 MHz | --- | P |
| | | 30 MHz ~1 GHz | --- | P |
| | | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | | 18 GHz ~ 26.5 GHz | --- | P |
| | 106(5530MHz) | 26.5 GHz ~ 40 GHz | --- | P |
| | | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | 122(5610MHz) | 7 GHz ~ 18 GHz | --- | P |
| | | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |

Conclusion: PASS

AVERAGE Results:
802.11a

Channel 36

| Frequency (MHz) | Measurement Result (dBuV/m) | Cable Loss (dB) | Antenna Factor (dB/m) | Receiver Reading (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Pol. (H/V) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 5149.200 | 43.98 | -25.70 | 34.10 | 35.58 | 54.00 | 10.02 | V |
| 5150.000 | 44.34 | -25.70 | 34.10 | 35.94 | 54.00 | 9.66 | V |
| 11888.400 | 34.00 | -31.83 | 38.78 | 27.06 | 54.00 | 20.00 | V |
| 15540.400 | 34.76 | -28.84 | 39.90 | 23.70 | 54.00 | 19.24 | H |
| 17959.300 | 36.07 | -26.09 | 40.20 | 21.96 | 54.00 | 17.93 | H |
| 17991.200 | 35.83 | -26.07 | 40.20 | 21.69 | 54.00 | 18.17 | H |

Channel 40

| Frequency (MHz) | Measurement Result (dBuV/m) | Cable Loss (dB) | Antenna Factor (dB/m) | Receiver Reading (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Pol. (H/V) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 5141.000 | 42.97 | -25.67 | 34.08 | 34.57 | 54.00 | 11.03 | V |
| 5148.800 | 43.10 | -25.70 | 34.10 | 34.70 | 54.00 | 10.90 | V |
| 11882.900 | 33.97 | -31.85 | 38.77 | 27.05 | 54.00 | 20.03 | H |
| 15599.800 | 34.44 | -28.71 | 39.90 | 23.25 | 54.00 | 19.56 | H |
| 17776.700 | 35.46 | -26.48 | 40.32 | 21.62 | 54.00 | 18.54 | V |
| 17960.400 | 35.75 | -26.09 | 40.20 | 21.64 | 54.00 | 18.25 | V |

Channel 48

| Frequency (MHz) | Measurement Result (dBuV/m) | Cable Loss (dB) | Antenna Factor (dB/m) | Receiver Reading (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Pol. (H/V) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 5141.800 | 41.73 | -25.68 | 34.08 | 33.33 | 54.00 | 12.27 | V |
| 5149.000 | 41.88 | -25.70 | 34.10 | 33.48 | 54.00 | 12.12 | V |
| 11925.800 | 33.83 | -31.73 | 38.80 | 26.76 | 54.00 | 20.17 | H |
| 15719.700 | 33.46 | -28.48 | 40.06 | 21.88 | 54.00 | 20.54 | H |
| 17951.600 | 35.66 | -26.11 | 40.20 | 21.57 | 54.00 | 18.34 | H |
| 17970.300 | 35.66 | -26.07 | 40.20 | 21.53 | 54.00 | 18.34 | V |

Channel 52

| Frequency (MHz) | Measurement Result (dBuV/m) | Cable Loss (dB) | Antenna Factor (dB/m) | Receiver Reading (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Pol. (H/V) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 5139.000 | 43.39 | -25.67 | 34.08 | 34.98 | 54.00 | 10.61 | V |
| 5352.200 | 43.55 | -25.76 | 34.30 | 35.00 | 54.00 | 10.45 | V |
| 11758.600 | 33.89 | -31.99 | 38.48 | 27.40 | 54.00 | 20.11 | H |
| 15780.200 | 34.74 | -28.38 | 40.24 | 22.88 | 54.00 | 19.26 | H |
| 17860.300 | 35.79 | -26.32 | 40.24 | 21.87 | 54.00 | 18.21 | V |
| 17957.000 | 36.44 | -26.10 | 40.20 | 22.34 | 54.00 | 17.56 | V |

Channel 56

| Frequency (MHz) | Measurement Result (dBuV/m) | Cable Loss (dB) | Antenna Factor (dB/m) | Receiver Reading (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Pol. (H/V) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 5350.000 | 43.85 | -25.76 | 34.30 | 35.31 | 54.00 | 10.15 | V |
| 5351.000 | 43.95 | -25.76 | 34.30 | 35.40 | 54.00 | 10.05 | V |
| 11882.900 | 34.18 | -31.85 | 38.77 | 27.27 | 54.00 | 19.82 | H |
| 15839.600 | 36.06 | -28.18 | 40.30 | 23.94 | 54.00 | 17.94 | H |
| 17747.000 | 35.75 | -26.52 | 40.35 | 21.92 | 54.00 | 18.25 | V |
| 17957.100 | 36.59 | -26.10 | 40.20 | 22.49 | 54.00 | 17.41 | H |

Channel 64

| Frequency (MHz) | Measurement Result (dBuV/m) | Cable Loss (dB) | Antenna Factor (dB/m) | Receiver Reading (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Pol. (H/V) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 5350.200 | 45.81 | -25.76 | 34.30 | 37.27 | 54.00 | 8.19 | V |
| 5350.600 | 45.96 | -25.76 | 34.30 | 37.41 | 54.00 | 8.04 | V |
| 10638.800 | 32.20 | -33.31 | 37.90 | 27.60 | 54.00 | 21.80 | H |
| 15959.500 | 35.82 | -27.65 | 40.30 | 23.18 | 54.00 | 18.18 | V |
| 17861.400 | 35.71 | -26.32 | 40.24 | 21.80 | 54.00 | 18.29 | H |
| 17959.300 | 36.45 | -26.09 | 40.20 | 22.34 | 54.00 | 17.55 | V |