



FCC PART 15C TEST REPORT No.I21Z70098-IOT07

for

Samsung Electronics Co., Ltd.

Tablet PC

SM-T227U

With

FCC ID: ZCASMT227U

Hardware Version: REV1.0

Software Version: T227U.001

Issued Date: 2021-05-13

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 |
|----------------------|-----------------|------------------------------------|-------------------|
| I21Z70098-IOT07 | Rev.0 | 1st edition | 2021-05-09 |
| I21Z70098-IOT07 | Rev.1 | Add the information of attenuator. | 2021-05-13 |

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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

Conducted testing Location: CTTL(huayuan North Road)

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

Radiated testing Location: CTTL(huayuan North Road)

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

1.3. Testing Environment

Normal Temperature: 15-35°C

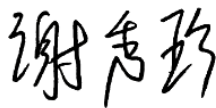
Relative Humidity: 20-75%

1.4. Project date

Testing Start Date: 2021-03-16

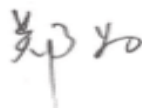
Testing End Date: 2021-05-08

1.5. Signature



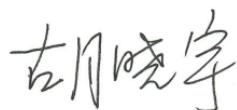
Xie Xiuzhen

(Prepared this test report)



Zheng Wei

(Reviewed this test report)



Hu Xiaoyu

(Approved this test report)



2. CLIENT INFORMATION

2.1. Applicant Information

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Contact: Jenni Chun
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Telephone: +1-201-937-4203
Fax: /

2.2. Manufacturer Information

Company Name: Samsung Electronics Co., Ltd.
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Youngtong gu, Suwon city 443 742, Korea
Contact: Sunghoon Cho
Email: ggobi.cho@samsung.com
Telephone: +82-10-2722-4159
Fax: /

3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY

EQUIPMENT(AE)

3.1. About EUT

| | |
|---------------------|---------------------------|
| Description | Tablet PC |
| Model name | SM-T227U |
| FCC ID | ZCASMT227U |
| WLAN Frequency Band | ISM Band: 5725MHz~5850MHz |
| Type of modulation | OFDM |
| Voltage | 4.0V |

3.2. Internal Identification of EUT used during the test

| EUT ID* | IMEI | HW Version | SW Version |
|----------------|--------------|-------------------|-------------------|
| UT14a | 2170098UT14a | REV1.0 | T227U.001 |
| UT22a | 2170098UT22a | REV1.0 | T227U.001 |

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

3.3. Internal Identification of AE used during the test

| AE ID* | Description | Type | SN |
|---------------|--------------------|-------------|-----------|
| AE1 | Charger1 | / | / |
| AE2 | Charger2 | / | / |
| AE3 | Charger3 | / | / |
| AE4 | Charger4 | / | / |
| AE5 | Charger5 | / | / |
| AE6 | Charger6 | / | / |
| AE7 | USB cable | / | / |
| AE8 | Headset1 | / | / |
| AE9 | Headset2 | / | / |
| AE10 | battery | / | / |

AE1

| | |
|-----------------|------------------|
| Model | EP-TA50JWE |
| Manufacturer | RFTECH Co., Ltd. |
| Length of cable | / |

AE2

| | |
|-----------------|----------------|
| Model | EP-TA50JWE |
| Manufacturer | HAEM Co., Ltd. |
| Length of cable | / |

| | | |
|-----------------|-----------------------------------|--|
| AE3 | | |
| Model | EP-TA200 | |
| Manufacturer | DongYang E&P Inc. | |
| Length of cable | / | |
| AE4 | | |
| Model | EP-TA200 | |
| Manufacturer | HAEM Co., Ltd. | |
| Length of cable | / | |
| AE5 | | |
| Model | EP-TA200 | |
| Manufacturer | SoluM Co.,Ltd | |
| Length of cable | / | |
| AE6 | | |
| Model | EP-TA200 | |
| Manufacturer | RFTECH Co., Ltd. | |
| Length of cable | / | |
| AE7 | | |
| Model | EP-DT725BWE | |
| Manufacturer | Samsung Electronics Co., Ltd. | |
| Length of cable | / | |
| AE8 | | |
| Model | EHS61ASFWE | |
| Manufacturer | ALMUS | |
| Length of cable | / | |
| AE9 | | |
| Model | EHS61ASFWE | |
| Manufacturer | Cresyn | |
| Length of cable | / | |
| AE10 | | |
| Type | Secondary Li-ion Battery | |
| SN | HQ-3565S | |
| Manufacturer | SCUD (Fujian) Electronics CO.,LTD | |

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

3.4. General Description

Equipment Under Test (EUT) is a model of Tablet PC with integrated antenna. It consists of normal options: Battery and Charger.

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

Samples undergoing test were selected by the Client.

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 | FCC CFR 47, Part 15, Subpart C and E: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.407 General technical requirements | 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 |
| KDB 558074 D01 | Federal Communications Commission Office of Engineering and Technology Laboratory Division GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES | 2019 |

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 Part15C | Sub-clause of IC | Verdict |
|---|------------------------|------------------|---------|
| Maximum Peak Output Power | 15.407 (a) | / | P |
| Peak Power Spectral Density | 15.407 (a) | / | P |
| Occupied 6dB Bandwidth | 15.407 (e) | / | P |
| Band Edges Compliance - Conducted& Radiated | 15.407 (b) | / | P |
| Transmitter Spurious Emission - Conducted | 15.407 | / | P |
| Transmitter Spurious Emission - Radiated | 15.407, 15.205, 15.209 | / | P |
| AC Powerline Conducted Emission | 15.107, 15.207 | / | P |

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 | 4.0V |
| 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 | 2021-06-06 |
| 2 | LISN | ENV216 | 101200 | Rohde & Schwarz | 1 year | 2021-05-19 |
| 3 | Test Receiver | ESCI | 100344 | Rohde & Schwarz | 1 year | 2022-02-23 |
| 4 | Shielding Room | S81 | / | ETS-Lindgren | / | / |
| 5 | Attenuator | 10dB/2W | / | Rosenberger | / | / |

Radiated emission test system

| No. | Equipment | Model | Serial Number | Manufacturer | Calibration Period | Calibration Due date |
|-----|-----------------------------------|----------|---------------|-----------------|--------------------|----------------------|
| 1 | Test Receiver | ESU26 | 100235 | Rohde & Schwarz | 1 year | 2022-02-23 |
| 2 | BiLog Antenna | VULB9163 | 9163-483 | Schwarzbeck | 1 year | 2022-03-22 |
| 3 | Antenna | 3115 | 00167250 | ETS-Lindgren | 1 year | 2021-05-14 |
| 4 | Dual-Ridge Waveguide Horn Antenna | 3116 | 2663 | ETS-Lindgren | 1 year | 2021-08-05 |
| 5 | Analytical Spectrometer | FSV40 | R&S | 101047 | 1 year | 2021-06-18 |

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 6dB 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 | / |
| $30\text{MHz} \leq f \leq 1\text{GHz}$ | 5.16 |
| $1\text{GHz} \leq f \leq 18\text{GHz}$ | 5.44 |
| $18\text{GHz} \leq f \leq 40\text{GHz}$ | 5.28 |

8.6. AC Power-line Conducted Emission

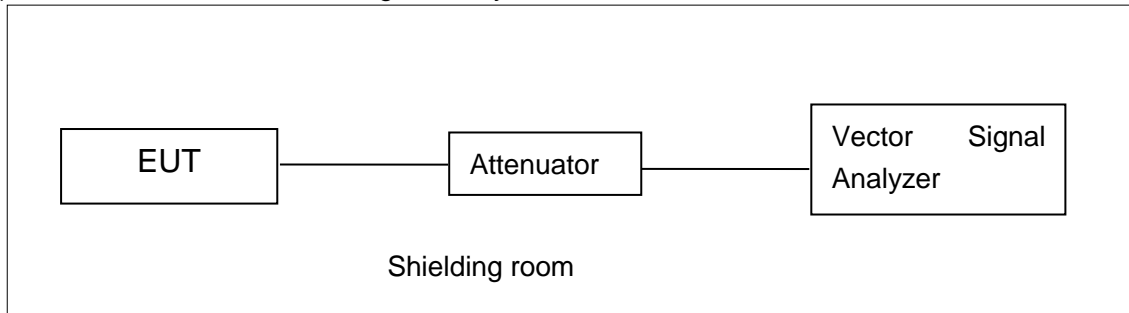
Measurement Uncertainty : 3.08dB,k=2

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

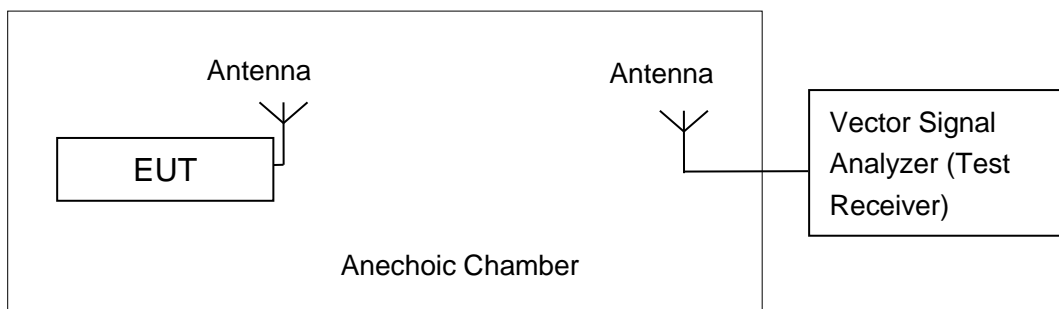


A.1.2. Radiated Emission Measurements

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 ANSI C63.10.

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 Peak Output Power

Measurement Limit and Method:

| Standard | Limit (dBm) |
|------------------------|-------------|
| FCC CRF Part 15.407(a) | < 30 |

A.2.1 Antenna Gain

Antenna gain is -1.1dBi and the value is supplied by the applicant or manufacturer.

A.2.2. Maximum Average Output Power-Conducted

Measurement Results:

802.11a mode

| Mode | Data Rate (Mbps) | Test Result (dBm) | | |
|---------|------------------|-------------------|-----------------|-----------------|
| | | 5745MHz (Ch149) | 5785MHz (Ch157) | 5825MHz (Ch165) |
| 802.11a | 6 | 15.71 | 15.34 | 15.32 |
| | 9 | 15.45 | / | / |
| | 12 | 14.74 | / | / |
| | 18 | 14.80 | / | / |
| | 24 | 13.80 | / | / |
| | 36 | 13.75 | / | / |
| | 48 | 12.17 | / | / |
| | 54 | 12.34 | / | / |

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

802.11n-HT20 mode

| Mode | Data Rate (Index) | Test Result (dBm) | | |
|-----------------|-------------------|-------------------|-----------------|-----------------|
| | | 5745MHz (Ch149) | 5785MHz (Ch157) | 5825MHz (Ch165) |
| 802.11n (20MHz) | MCS0 | 15.48 | 15.07 | 15.21 |
| | MCS1 | 15.43 | / | / |
| | MCS2 | 14.54 | / | / |
| | MCS3 | 14.60 | / | / |
| | MCS4 | 13.70 | / | / |
| | MCS5 | 13.14 | / | / |
| | MCS6 | 12.14 | / | / |
| | MCS7 | 12.12 | / | / |

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

802.11ac-HT20 mode

| Mode | Data Rate (Index) | Test Result (dBm) | | |
|------------------|-------------------|-------------------|-----------------|-----------------|
| | | 5745MHz (Ch149) | 5785MHz (Ch157) | 5825MHz (Ch165) |
| 802.11ac (20MHz) | MCS0 | 15.65 | 15.13 | 15.05 |
| | MCS1 | 15.55 | / | / |
| | MCS2 | 14.76 | / | / |
| | MCS3 | 14.75 | / | / |
| | MCS4 | 13.81 | / | / |
| | MCS5 | 13.23 | / | / |
| | MCS6 | 12.24 | / | / |
| | MCS7 | 12.20 | / | / |
| | MCS8 | 11.24 | / | / |

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

802.11n-HT40 mode

| Mode | Data Rate (Index) | Test Result (dBm) | |
|-----------------|-------------------|-------------------|-----------------|
| | | 5755MHz (Ch151) | 5795MHz (Ch159) |
| 802.11n (40MHz) | MCS0 | 15.07 | / |
| | MCS1 | 15.33 | 14.82 |
| | MCS2 | 14.52 | / |
| | MCS3 | 14.35 | / |
| | MCS4 | 13.42 | / |
| | MCS5 | 12.85 | / |
| | MCS6 | 11.87 | / |
| | MCS7 | 11.83 | / |

The data rate MCS1 is selected as worse condition, and the following cases are performed with this condition.

802.11ac-HT40 mode

| Mode | Data Rate (Index) | Test Result (dBm) | |
|------------------|-------------------|-------------------|-----------------|
| | | 5755MHz (Ch151) | 5795MHz (Ch159) |
| 802.11ac (40MHz) | MCS0 | 15.08 | / |
| | MCS1 | 15.15 | 14.87 |
| | MCS2 | 14.36 | / |
| | MCS3 | 14.38 | / |
| | MCS4 | 13.38 | / |
| | MCS5 | 12.05 | / |
| | MCS6 | 11.90 | / |
| | MCS7 | 11.84 | / |

| | | | |
|--|------|-------|---|
| | MCS8 | 10.86 | / |
| | MCS9 | 11.04 | / |

The data rate MCS1 is selected as worse condition, and the following cases are performed with this condition.

802.11ac-HT80 mode

| Mode | Data Rate (Index) | Test Result (dBm) |
|------------------|-------------------|-------------------|
| | | 5775MHz (Ch155) |
| 802.11ac (80MHz) | MCS0 | 14.96 |
| | MCS1 | 15.06 |
| | MCS2 | 14.25 |
| | MCS3 | 14.29 |
| | MCS4 | 13.33 |
| | MCS5 | 12.88 |
| | MCS6 | 11.89 |
| | MCS7 | 11.76 |
| | MCS8 | 10.78 |
| | MCS9 | 10.84 |

The data rate MCS1 is selected as worse condition, and the following cases are performed with this condition.

Conclusion: PASS

A.3. Peak Power Spectral Density

Measurement Limit:

| Standard | Limit |
|---------------------------|------------------|
| FCC 47 CFR Part 15.407(a) | < 30 dBm/500 kHz |

The measurement is made according to ANSI C63.10 and KDB789033 D02

Measurement Uncertainty:

| | |
|-------------------------|--------|
| Measurement Uncertainty | 0.75dB |
|-------------------------|--------|

Measurement Results:

| Mode | Channel | Power Spectral Density (dBm/500kHz) | Conclusion |
|------------------|---------|--|------------|
| 802.11a | 149 | 0.36 | P |
| | 157 | -0.47 | P |
| | 165 | -0.60 | P |
| 802.11ac HT20 | 149 | -0.43 | P |
| | 157 | -0.94 | P |
| | 165 | -1.16 | P |
| 802.11n HT40 | 151 | -3.47 | P |
| | 159 | -4.04 | P |
| 802.11ac HT80 | 155 | -7.46 | P |

Conclusion: PASS

A.4. Occupied 6dB Bandwidth

Measurement Limit:

| Standard | Limit (kHz) |
|----------------------------|-------------|
| FCC 47 CFR Part 15.407 (e) | ≥ 500 |

The measurement is made according to KDB789033 D02 .

Measurement Uncertainty:

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

Measurement Result:

| Mode | Channel | Occupied 6dB Bandwidth (MHz) | | conclusion |
|---------------|---------|-------------------------------|-------|------------|
| 802.11a | 149 | Fig.1 | 16.35 | P |
| | 157 | Fig.2 | 16.35 | P |
| | 165 | Fig.3 | 16.35 | P |
| 802.11ac HT20 | 149 | Fig.4 | 17.55 | P |
| | 157 | Fig.5 | 17.55 | P |
| | 165 | Fig.6 | 17.55 | P |
| 802.11n HT40 | 151 | Fig.7 | 36.32 | P |
| | 159 | Fig.8 | 36.08 | P |
| 802.11ac HT80 | 155 | Fig.9 | 76.00 | P |

Conclusion: PASS

Test graphs as below:

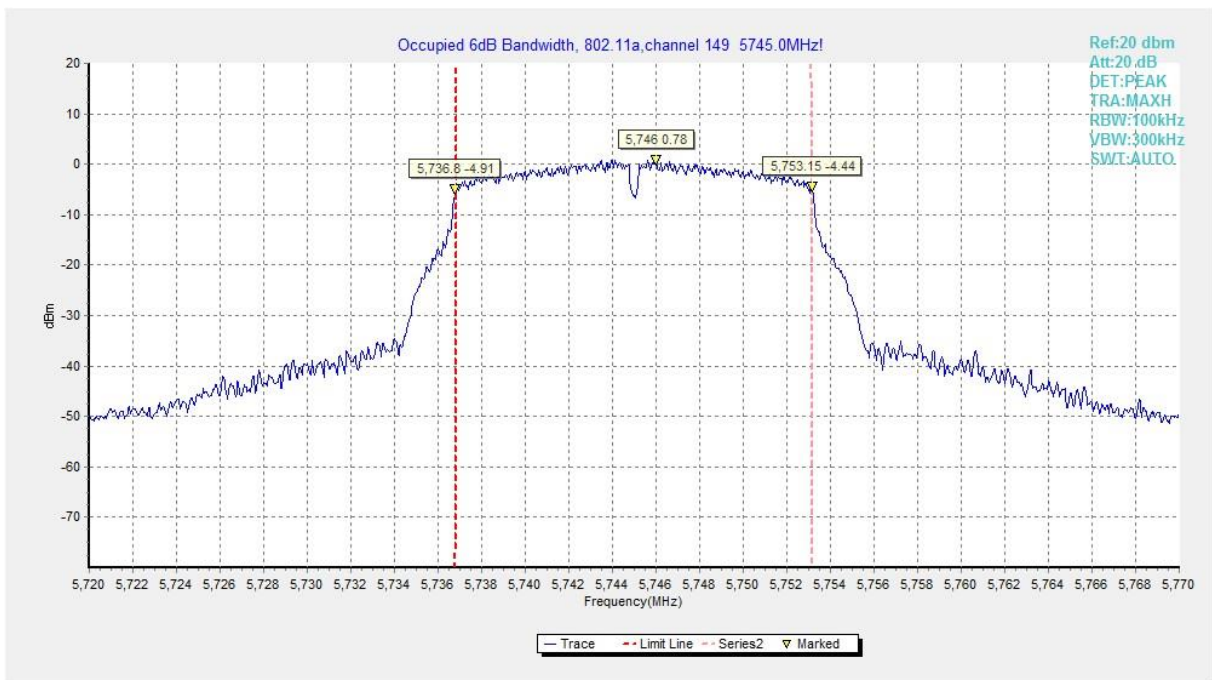


Fig. 1 Occupied 6dB Bandwidth (802.11a, Ch 149)

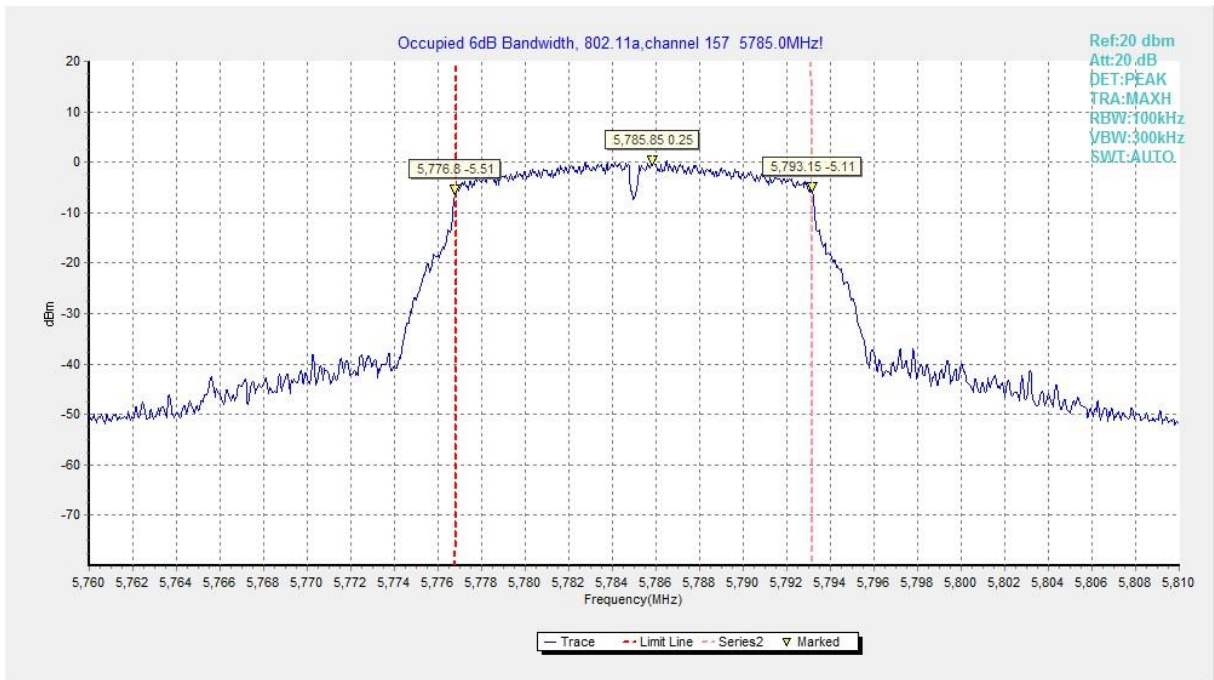


Fig. 2 Occupied 6dB Bandwidth (802.11a, Ch 157)

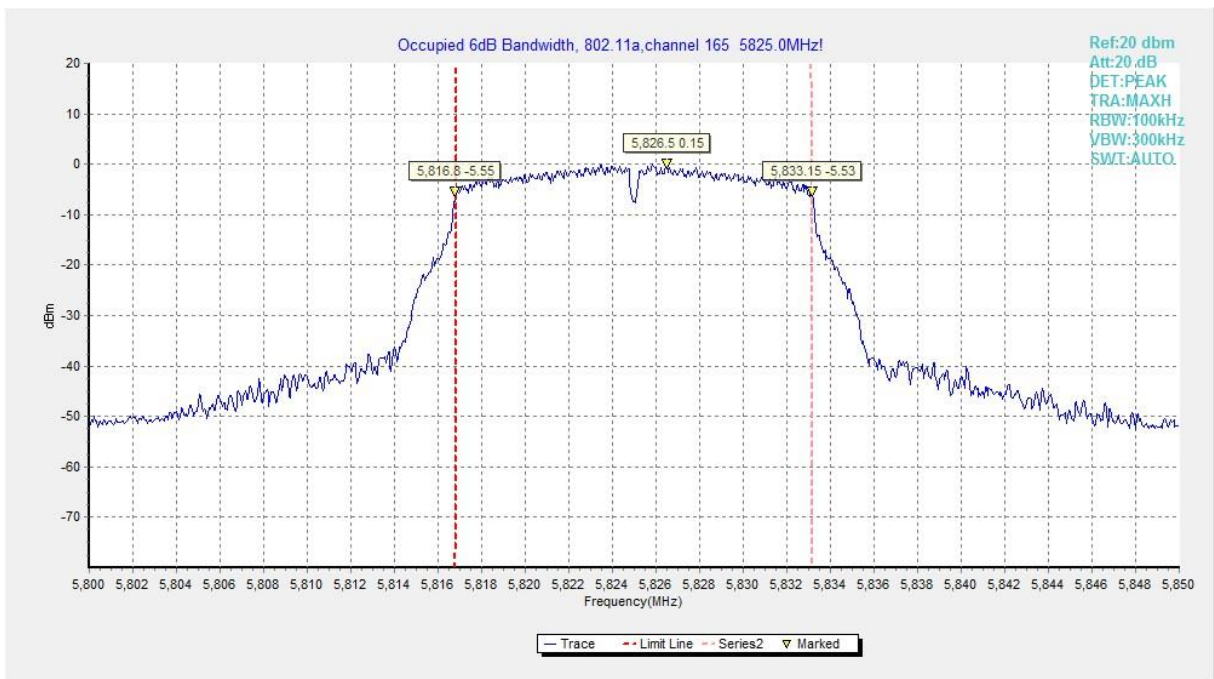


Fig. 3 Occupied 6dB Bandwidth (802.11a, Ch 165)

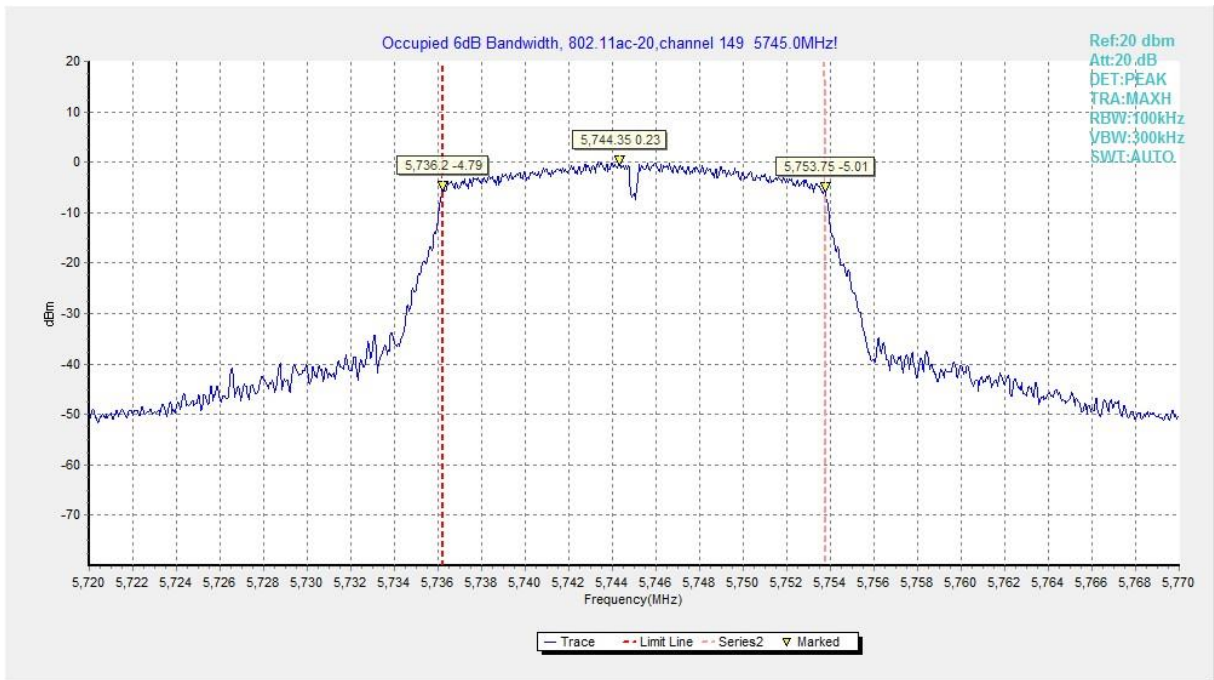


Fig. 4 Occupied 6dB Bandwidth (802.11ac-HT20, Ch 149)

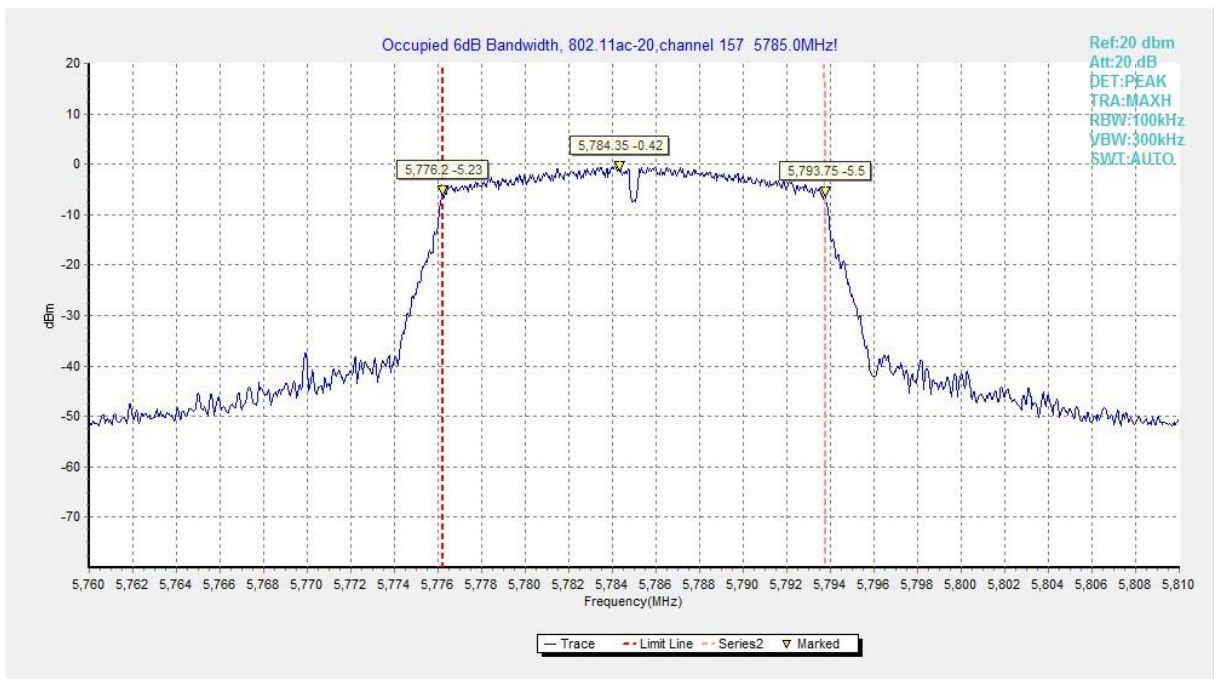


Fig. 5 Occupied 6dB Bandwidth (802.11ac-HT20, Ch 157)

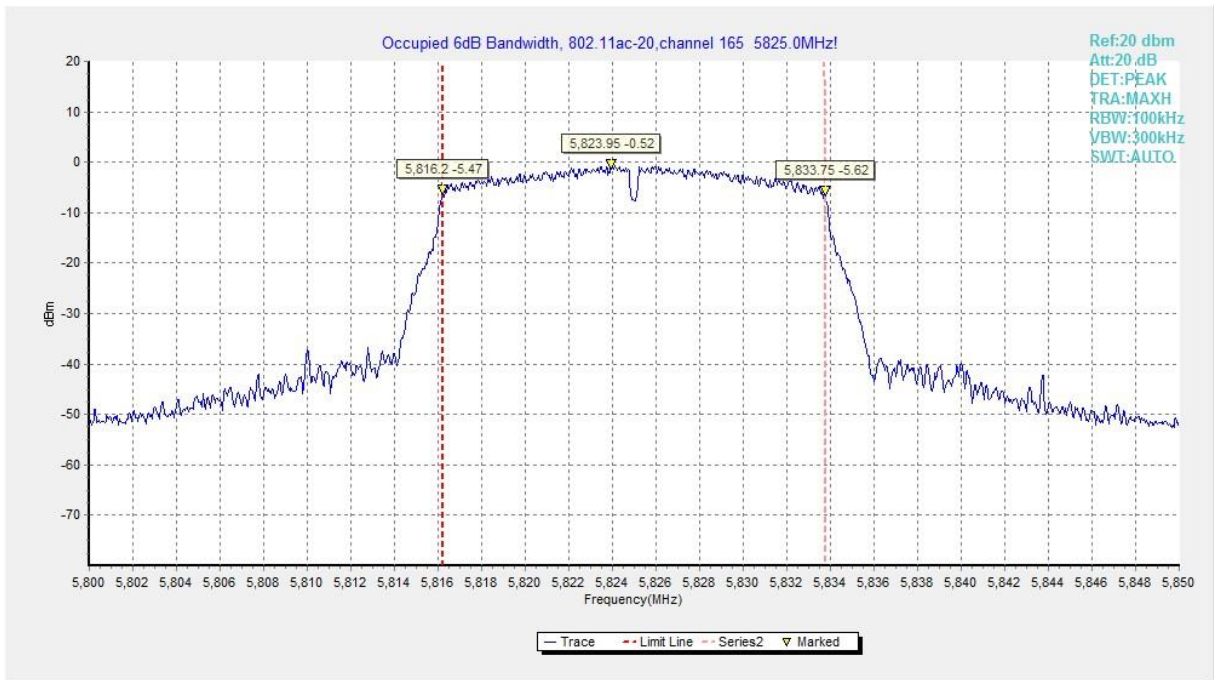


Fig. 6 Occupied 6dB Bandwidth (802.11ac-HT20, Ch 165)

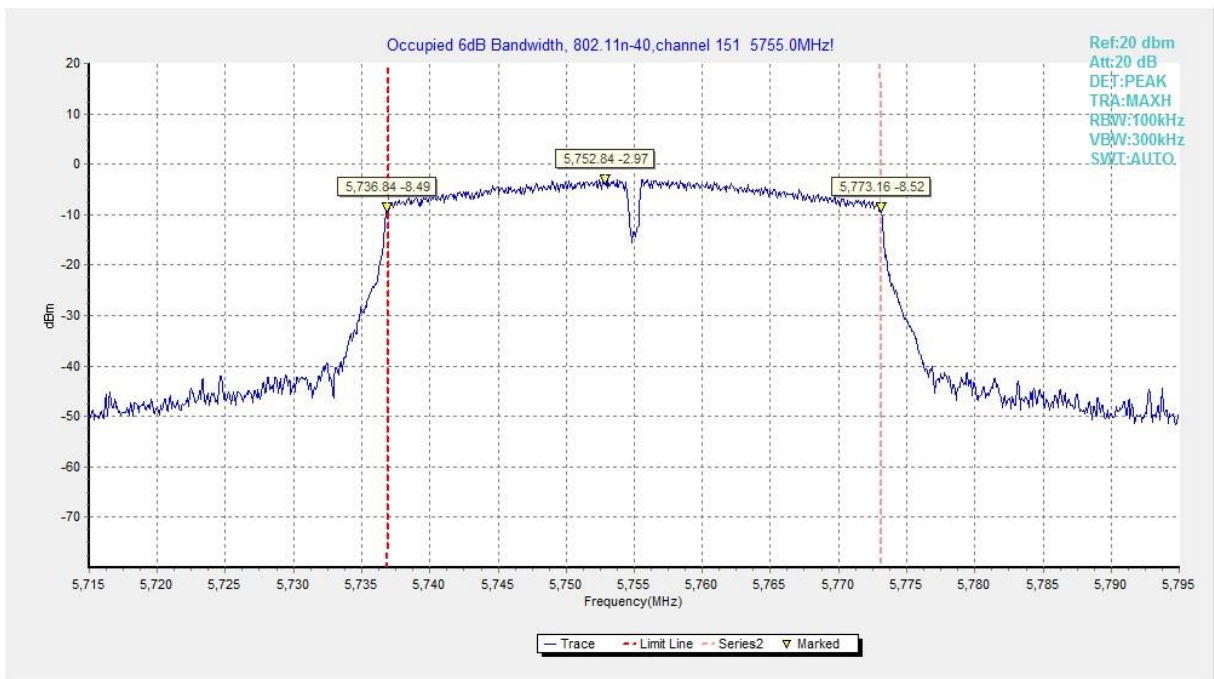


Fig. 7 Occupied 6dB Bandwidth (802.11n-HT40, Ch 151)

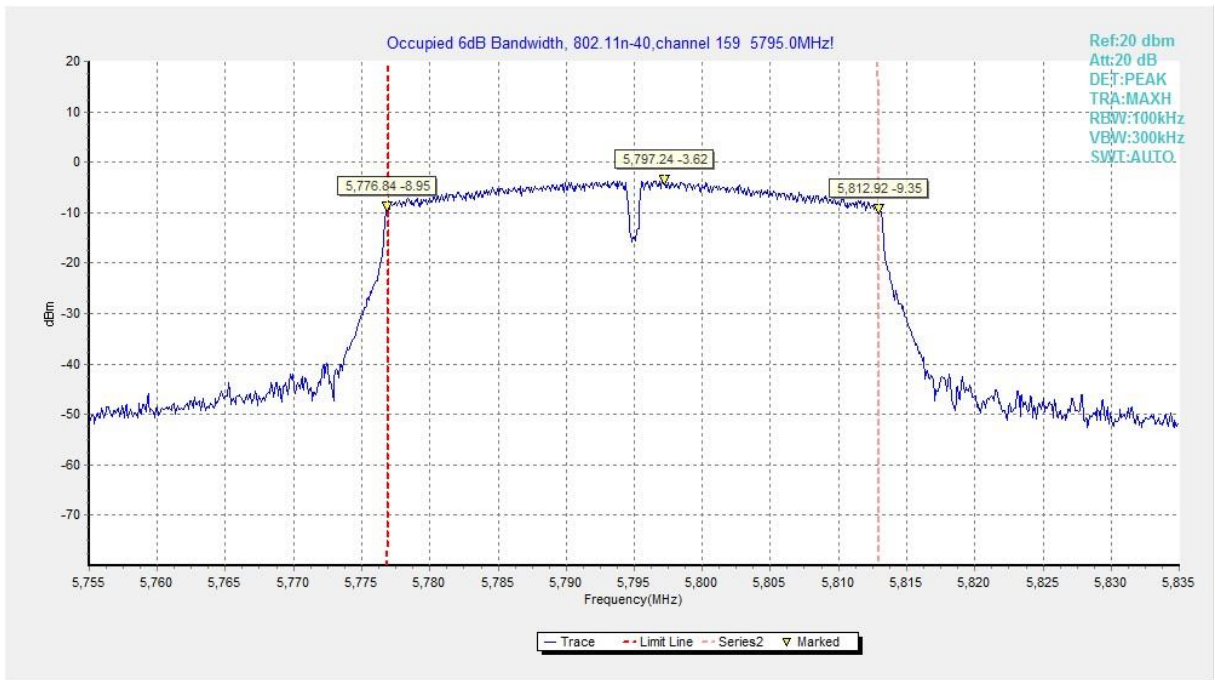


Fig. 8 Occupied 6dB Bandwidth (802.11n-HT40, Ch 159)

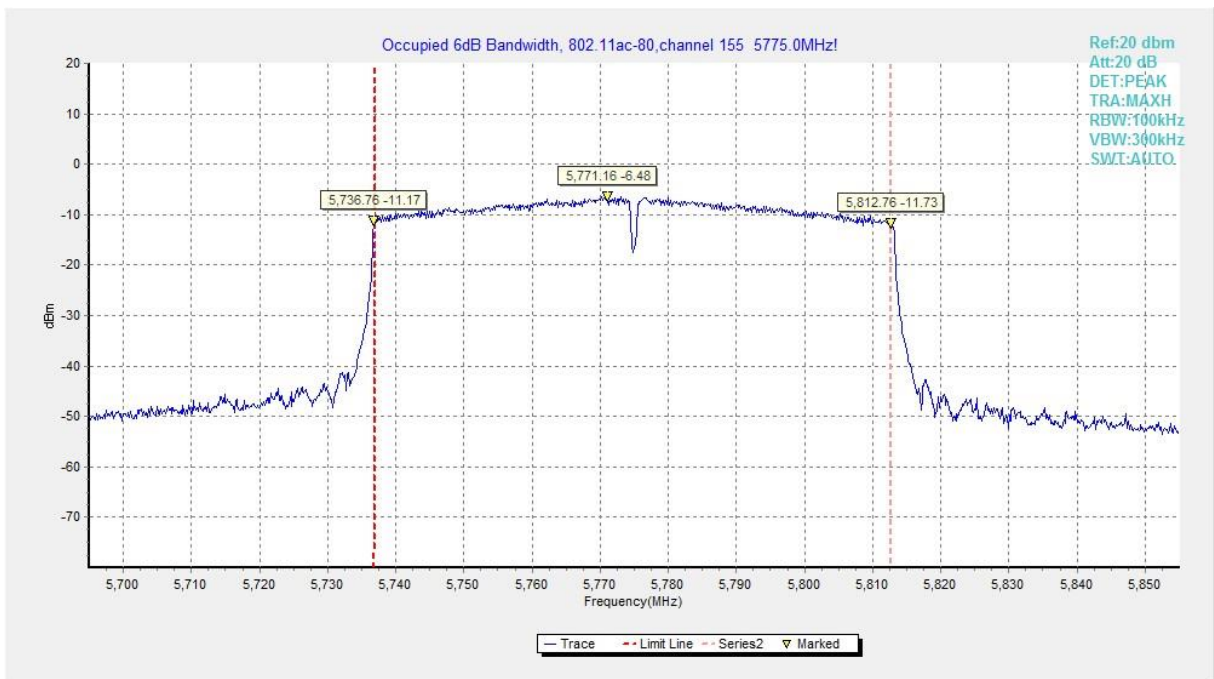


Fig. 9 Occupied 6dB Bandwidth (802.11ac-HT80, Ch 155)

A.5. Transmitter Spurious Emission

A.5.1 Transmitter Spurious Emission - Radiated

Measurement Limit:

| Standard | Limit (dBm/MHz) | |
|---------------------------|--|------|
| FCC 47 CFR Part 15.407 | at the band edge | 27 |
| | at 5 MHz above or below the band edge | 15.6 |
| | at 25 MHz above or below the band edge | 10 |
| | at 75 MHz or more above or below the band edge | -27 |
| | Note: Increasing linearly from point to point. | |

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(μ V/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(uV/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 KDB 789033

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. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

| Frequency of emission (MHz) | RBW/VBW | Sweep Time(s) |
|-----------------------------|---------------|---------------|
| 30-1000 | 100KHz/300KHz | 5 |
| 1000-4000 | 1MHz/3MHz | 15 |
| 4000-18000 | 1MHz/3MHz | 40 |
| 18000-40000 | 1MHz/3MHz | 20 |

Measurement Results:
802.11a mode

| Mode | Channel | Frequency Range | Test Results | Conclusion | |
|---------|---------|-----------------|-------------------|------------|---|
| 802.11a | 149 | 1 GHz ~ 3 GHz | --- | P | |
| | | 3 GHz ~ 7 GHz | --- | P | |
| | | 7 GHz ~ 18 GHz | --- | P | |
| | 157 | 157 | 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 |
| | 165 | 165 | 26.5 GHz~ 40 GHz | --- | P |
| | | | 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) | 149 | 1 GHz ~ 3 GHz | --- | P | |
| | | 3 GHz ~ 7 GHz | --- | P | |
| | | 7 GHz ~ 18 GHz | --- | P | |
| | 157 | 157 | 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 |
| | 165 | 165 | 26.5 GHz~ 40 GHz | --- | P |
| | | | 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) | 151 | 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 |

| | | | | |
|--|-----|----------------|-----|---|
| | 159 | 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) | 149 | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |
| | 157 | 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 |
| | 165 | 26.5 GHz~ 40 GHz | --- | P |
| | | 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) | 151 | 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 |
| | 159 | 1 GHz ~ 3 GHz | --- | P |
| | | 3 GHz ~ 7 GHz | --- | P |
| | | 7 GHz ~ 18 GHz | --- | P |

802.11ac-HT80 mode

| Mode | Channel | Frequency Range | Test Results | Conclusion |
|--------------------|---------|-------------------|--------------|------------|
| 802.11ac (HT80) | 155 | 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 |

Conclusion: PASS

Note:

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.

Average Results:

802.11a

Channel 149

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17981.300 | 42.85 | -25.50 | 46.66 | 21.69 | 54.00 | 11.15 | H |
| 17981.800 | 42.80 | -25.50 | 46.66 | 21.64 | 54.00 | 11.20 | V |
| 14477.800 | 37.86 | -28.59 | 42.46 | 23.99 | 54.00 | 16.14 | V |
| 14474.500 | 37.82 | -28.59 | 42.46 | 23.95 | 54.00 | 16.18 | V |
| 11939.500 | 34.67 | -31.48 | 39.09 | 27.06 | 54.00 | 19.33 | V |
| 11920.900 | 34.59 | -31.48 | 39.09 | 26.98 | 54.00 | 19.41 | V |

Channel 157

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17998.900 | 42.71 | -25.50 | 46.66 | 21.55 | 54.00 | 11.29 | V |
| 17956.000 | 42.68 | -25.50 | 46.66 | 21.52 | 54.00 | 11.32 | V |
| 14494.300 | 38.00 | -28.59 | 42.46 | 24.13 | 54.00 | 16.00 | V |
| 14494.900 | 37.91 | -28.59 | 42.46 | 24.04 | 54.00 | 16.09 | H |
| 11816.400 | 34.61 | -31.85 | 39.05 | 27.41 | 54.00 | 19.39 | V |
| 11502.300 | 34.58 | -32.26 | 38.84 | 28.01 | 54.00 | 19.42 | V |

Channel 165

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17981.800 | 42.79 | -25.50 | 46.66 | 21.63 | 54.00 | 11.21 | H |
| 17997.200 | 42.75 | -25.50 | 46.66 | 21.59 | 54.00 | 11.25 | V |
| 14485.000 | 37.85 | -28.59 | 42.46 | 23.98 | 54.00 | 16.15 | V |
| 14489.900 | 37.76 | -28.59 | 42.46 | 23.89 | 54.00 | 16.24 | V |
| 11815.800 | 34.68 | -31.85 | 39.05 | 27.48 | 54.00 | 19.32 | V |
| 11820.800 | 34.65 | -31.85 | 39.05 | 27.45 | 54.00 | 19.35 | V |

802.11n-HT20

Channel 149

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17972.500 | 43.06 | -25.50 | 46.66 | 21.90 | 54.00 | 10.94 | H |
| 17996.200 | 42.75 | -25.50 | 46.66 | 21.59 | 54.00 | 11.25 | H |
| 14482.800 | 37.89 | -28.59 | 42.46 | 24.02 | 54.00 | 16.11 | V |
| 14491.000 | 37.75 | -28.59 | 42.46 | 23.88 | 54.00 | 16.25 | V |
| 11813.000 | 34.70 | -31.85 | 39.05 | 27.50 | 54.00 | 19.30 | V |
| 11824.600 | 34.65 | -31.85 | 39.05 | 27.45 | 54.00 | 19.35 | V |

Channel 157

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17979.700 | 42.71 | -25.50 | 46.66 | 21.55 | 54.00 | 11.29 | V |
| 17997.800 | 42.67 | -25.50 | 46.66 | 21.51 | 54.00 | 11.33 | H |
| 14479.500 | 37.76 | -28.59 | 42.46 | 23.89 | 54.00 | 16.24 | H |
| 14498.700 | 37.75 | -28.59 | 42.46 | 23.88 | 54.00 | 16.25 | V |
| 11820.800 | 34.79 | -31.85 | 39.05 | 27.59 | 54.00 | 19.21 | V |
| 11816.900 | 34.71 | -31.85 | 39.05 | 27.51 | 54.00 | 19.29 | V |

Channel 165

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17983.500 | 42.67 | -25.50 | 46.66 | 21.51 | 54.00 | 11.33 | V |
| 17994.000 | 42.63 | -25.50 | 46.66 | 21.47 | 54.00 | 11.37 | H |
| 14496.500 | 37.79 | -28.59 | 42.46 | 23.92 | 54.00 | 16.21 | H |
| 14477.800 | 37.74 | -28.59 | 42.46 | 23.87 | 54.00 | 16.26 | H |
| 11908.800 | 34.87 | -31.85 | 39.05 | 27.67 | 54.00 | 19.13 | H |
| 11911.000 | 34.68 | -31.85 | 39.05 | 27.48 | 54.00 | 19.32 | H |

802.11n-HT40

Channel 151

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17970.300 | 42.87 | -25.50 | 46.66 | 21.71 | 54.00 | 11.13 | H |
| 17991.800 | 42.80 | -25.50 | 46.66 | 21.64 | 54.00 | 11.20 | V |
| 14475.600 | 37.86 | -28.59 | 42.46 | 23.99 | 54.00 | 16.14 | H |
| 14489.400 | 37.83 | -28.59 | 42.46 | 23.96 | 54.00 | 16.17 | V |
| 11053.000 | 34.75 | -32.49 | 38.72 | 28.51 | 54.00 | 19.25 | V |
| 11846.000 | 34.72 | -31.85 | 39.05 | 27.52 | 54.00 | 19.28 | H |

Channel 159

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17982.400 | 42.75 | -25.50 | 46.66 | 21.59 | 54.00 | 11.25 | H |
| 17992.800 | 42.72 | -25.50 | 46.66 | 21.56 | 54.00 | 11.28 | H |
| 14499.800 | 37.78 | -28.59 | 42.46 | 23.91 | 54.00 | 16.22 | H |
| 14493.800 | 37.71 | -28.59 | 42.46 | 23.84 | 54.00 | 16.29 | V |
| 11916.500 | 34.57 | -31.48 | 39.09 | 26.96 | 54.00 | 19.43 | V |
| 11847.700 | 34.52 | -31.85 | 39.05 | 27.32 | 54.00 | 19.48 | H |

802.11ac-HT20

Channel 149

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17990.100 | 42.70 | -25.50 | 46.66 | 21.54 | 54.00 | 11.30 | V |
| 17981.300 | 42.68 | -25.50 | 46.66 | 21.52 | 54.00 | 11.32 | H |
| 14494.900 | 37.77 | -28.59 | 42.46 | 23.90 | 54.00 | 16.23 | H |
| 14484.400 | 37.75 | -28.59 | 42.46 | 23.88 | 54.00 | 16.25 | H |
| 11848.200 | 34.76 | -31.85 | 39.05 | 27.56 | 54.00 | 19.24 | V |
| 11840.500 | 34.75 | -31.85 | 39.05 | 27.55 | 54.00 | 19.25 | H |

Channel 157

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17996.200 | 43.00 | -25.50 | 46.66 | 21.84 | 54.00 | 11.00 | V |
| 17981.800 | 42.62 | -25.50 | 46.66 | 21.46 | 54.00 | 11.38 | V |
| 14475.000 | 37.92 | -28.59 | 42.46 | 24.05 | 54.00 | 16.08 | V |
| 14472.300 | 37.91 | -28.59 | 42.46 | 24.04 | 54.00 | 16.09 | H |
| 11818.500 | 34.65 | -31.85 | 39.05 | 27.45 | 54.00 | 19.35 | H |
| 11816.900 | 34.62 | -31.85 | 39.05 | 27.42 | 54.00 | 19.38 | H |

Channel 165

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17974.200 | 42.97 | -25.50 | 46.66 | 21.81 | 54.00 | 11.03 | H |
| 17998.300 | 42.83 | -25.50 | 46.66 | 21.67 | 54.00 | 11.17 | V |
| 14470.100 | 37.75 | -28.59 | 42.46 | 23.88 | 54.00 | 16.25 | V |
| 14474.500 | 37.71 | -28.59 | 42.46 | 23.84 | 54.00 | 16.29 | V |
| 11850.500 | 34.70 | -31.85 | 39.05 | 27.50 | 54.00 | 19.30 | V |
| 11906.000 | 34.64 | -31.85 | 39.05 | 27.44 | 54.00 | 19.36 | V |

802.11ac-HT40

Channel 151

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17979.100 | 43.01 | -25.50 | 46.66 | 21.85 | 54.00 | 10.99 | H |
| 17986.800 | 42.72 | -25.50 | 46.66 | 21.56 | 54.00 | 11.28 | H |
| 14482.200 | 37.82 | -28.59 | 42.46 | 23.95 | 54.00 | 16.18 | V |
| 14492.100 | 37.78 | -28.59 | 42.46 | 23.91 | 54.00 | 16.22 | V |
| 11885.600 | 34.57 | -31.85 | 39.05 | 27.37 | 54.00 | 19.43 | H |
| 11827.400 | 34.56 | -31.85 | 39.05 | 27.36 | 54.00 | 19.44 | V |

Channel 159

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17990.700 | 42.94 | -25.50 | 46.66 | 21.78 | 54.00 | 11.06 | V |
| 17974.200 | 42.71 | -25.50 | 46.66 | 21.55 | 54.00 | 11.29 | H |
| 14497.000 | 37.64 | -28.59 | 42.46 | 23.77 | 54.00 | 16.36 | V |
| 14497.600 | 37.60 | -28.59 | 42.46 | 23.73 | 54.00 | 16.40 | V |
| 11203.600 | 34.74 | -32.60 | 38.75 | 28.60 | 54.00 | 19.26 | V |
| 11824.600 | 34.57 | -31.85 | 39.05 | 27.37 | 54.00 | 19.43 | H |

802.11ac-HT80

Channel 155

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17976.900 | 42.70 | -25.50 | 46.66 | 21.54 | 54.00 | 11.30 | V |
| 17982.400 | 42.67 | -25.50 | 46.66 | 21.51 | 54.00 | 11.33 | H |
| 14497.000 | 37.85 | -28.59 | 42.46 | 23.98 | 54.00 | 16.15 | H |
| 14477.200 | 37.74 | -28.59 | 42.46 | 23.87 | 54.00 | 16.26 | V |
| 11824.000 | 34.70 | -31.85 | 39.05 | 27.50 | 54.00 | 19.30 | H |
| 11838.900 | 34.70 | -31.85 | 39.05 | 27.50 | 54.00 | 19.30 | V |

Peak Results:
802.11a

Channel 149

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17910.300 | 53.96 | -25.50 | 46.66 | 32.80 | 74.00 | 20.04 | V |
| 17789.300 | 53.57 | -25.50 | 46.66 | 32.41 | 74.00 | 20.43 | V |
| 16606.800 | 51.66 | -26.87 | 40.65 | 37.88 | 68.30 | 16.64 | V |
| 16962.700 | 51.29 | -26.32 | 42.36 | 35.24 | 68.30 | 17.01 | H |
| 10964.400 | 47.21 | -32.82 | 38.70 | 41.33 | 74.00 | 26.79 | H |
| 11611.800 | 46.82 | -32.31 | 38.91 | 40.23 | 74.00 | 27.18 | V |

Channel 157

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17996.700 | 53.86 | -25.50 | 46.66 | 32.70 | 74.00 | 20.14 | H |
| 17947.200 | 53.84 | -25.50 | 46.66 | 32.68 | 74.00 | 20.16 | V |
| 16997.900 | 51.43 | -26.32 | 42.36 | 35.38 | 68.30 | 16.87 | V |
| 16737.800 | 51.26 | -26.62 | 41.49 | 36.39 | 68.30 | 17.04 | V |
| 11730.000 | 47.66 | -31.99 | 38.98 | 40.67 | 74.00 | 26.34 | H |
| 11893.400 | 46.28 | -31.85 | 39.05 | 39.08 | 74.00 | 27.72 | V |

Channel 165

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17974.700 | 54.99 | -25.50 | 46.66 | 33.83 | 74.00 | 19.01 | V |
| 17786.000 | 54.08 | -25.50 | 46.66 | 32.92 | 74.00 | 19.92 | V |
| 16546.900 | 51.67 | -26.87 | 40.65 | 37.89 | 68.30 | 16.63 | H |
| 16887.900 | 51.08 | -26.32 | 42.36 | 35.03 | 68.30 | 17.22 | H |
| 10798.300 | 46.36 | -32.33 | 38.59 | 40.10 | 74.00 | 27.64 | H |
| 11880.100 | 46.12 | -31.85 | 39.05 | 38.92 | 74.00 | 27.88 | H |

802.11n-HT20

Channel 149

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17991.800 | 54.77 | -25.50 | 46.66 | 33.61 | 74.00 | 19.23 | H |
| 17961.500 | 54.27 | -25.50 | 46.66 | 33.11 | 74.00 | 19.73 | H |
| 16819.700 | 51.35 | -26.62 | 41.49 | 36.48 | 68.30 | 16.95 | H |
| 16891.800 | 51.25 | -26.32 | 42.36 | 35.20 | 68.30 | 17.05 | H |
| 10830.200 | 47.70 | -32.33 | 38.59 | 41.44 | 74.00 | 26.30 | V |
| 10807.600 | 46.72 | -32.33 | 38.59 | 40.46 | 74.00 | 27.28 | H |

Channel 157

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17990.700 | 54.24 | -25.50 | 46.66 | 33.08 | 74.00 | 19.76 | H |
| 17982.400 | 53.65 | -25.50 | 46.66 | 32.49 | 74.00 | 20.35 | H |
| 16994.000 | 51.76 | -26.32 | 42.36 | 35.71 | 68.30 | 16.54 | V |
| 16692.700 | 51.28 | -26.87 | 40.65 | 37.50 | 68.30 | 17.02 | V |
| 11955.000 | 46.68 | -31.48 | 39.09 | 39.07 | 74.00 | 27.32 | V |
| 11722.300 | 46.64 | -31.99 | 38.98 | 39.65 | 74.00 | 27.36 | H |

Channel 165

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17996.700 | 54.52 | -25.50 | 46.66 | 33.36 | 74.00 | 19.48 | V |
| 17968.700 | 54.34 | -25.50 | 46.66 | 33.18 | 74.00 | 19.66 | H |
| 16996.200 | 51.15 | -26.32 | 42.36 | 35.10 | 68.30 | 17.15 | V |
| 16600.200 | 51.09 | -26.87 | 40.65 | 37.31 | 68.30 | 17.21 | V |
| 10510.100 | 46.67 | -32.99 | 38.27 | 41.38 | 68.30 | 21.63 | H |
| 11897.800 | 46.54 | -31.85 | 39.05 | 39.34 | 74.00 | 27.46 | V |

802.11n-HT40

Channel 151

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17913.100 | 54.53 | -25.50 | 46.66 | 33.37 | 74.00 | 19.47 | V |
| 17871.800 | 54.25 | -25.50 | 46.66 | 33.09 | 74.00 | 19.75 | V |
| 16998.500 | 51.34 | -26.32 | 42.36 | 35.29 | 68.30 | 16.96 | H |
| 14397.500 | 51.01 | -28.59 | 42.46 | 37.14 | 68.30 | 17.29 | H |
| 10933.000 | 47.28 | -32.82 | 38.70 | 41.40 | 74.00 | 26.72 | H |
| 11931.900 | 46.53 | -31.48 | 39.09 | 38.92 | 74.00 | 27.47 | V |

Channel 159

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17967.000 | 54.45 | -25.50 | 46.66 | 33.29 | 74.00 | 19.55 | H |
| 17968.700 | 54.00 | -25.50 | 46.66 | 32.84 | 74.00 | 20.00 | V |
| 16923.700 | 51.58 | -26.32 | 42.36 | 35.53 | 68.30 | 16.72 | V |
| 16977.000 | 51.39 | -26.32 | 42.36 | 35.34 | 68.30 | 16.91 | H |
| 11072.800 | 47.06 | -32.49 | 38.72 | 40.82 | 74.00 | 26.94 | H |
| 11002.400 | 46.89 | -32.49 | 38.72 | 40.65 | 74.00 | 27.11 | V |

802.11ac-HT20

Channel 149

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17929.600 | 54.36 | -25.50 | 46.66 | 33.20 | 74.00 | 19.64 | H |
| 17995.600 | 54.06 | -25.50 | 46.66 | 32.90 | 74.00 | 19.94 | V |
| 16998.500 | 52.00 | -26.32 | 42.36 | 35.95 | 68.30 | 16.30 | V |
| 16605.200 | 51.36 | -26.87 | 40.65 | 37.58 | 68.30 | 16.94 | H |
| 11282.300 | 46.59 | -32.36 | 38.77 | 40.19 | 74.00 | 27.41 | V |
| 11379.100 | 46.46 | -32.42 | 38.79 | 40.09 | 74.00 | 27.54 | H |

Channel 157

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17962.600 | 55.14 | -25.50 | 46.66 | 33.98 | 74.00 | 18.86 | H |
| 17983.500 | 54.55 | -25.50 | 46.66 | 33.39 | 74.00 | 19.45 | H |
| 16896.700 | 50.98 | -26.32 | 42.36 | 34.93 | 68.30 | 17.32 | V |
| 16815.800 | 50.90 | -26.62 | 41.49 | 36.03 | 68.30 | 17.40 | H |
| 10955.600 | 46.39 | -32.82 | 38.70 | 40.51 | 74.00 | 27.61 | H |
| 11420.400 | 46.34 | -32.42 | 38.79 | 39.97 | 74.00 | 27.66 | V |

Channel 165

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17997.800 | 54.62 | -25.50 | 46.66 | 33.46 | 74.00 | 19.38 | H |
| 17897.700 | 54.59 | -25.50 | 46.66 | 33.43 | 74.00 | 19.41 | V |
| 16900.500 | 51.69 | -26.32 | 42.36 | 35.64 | 68.30 | 16.61 | V |
| 16960.500 | 51.69 | -26.32 | 42.36 | 35.64 | 68.30 | 16.61 | V |
| 7031.900 | 46.97 | -35.37 | 36.25 | 46.09 | 68.30 | 21.33 | H |
| 10810.400 | 46.48 | -32.33 | 38.59 | 40.22 | 74.00 | 27.52 | H |

802.11ac-HT40

Channel 151

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17996.200 | 54.16 | -25.50 | 46.66 | 33.00 | 74.00 | 19.84 | V |
| 17962.600 | 54.10 | -25.50 | 46.66 | 32.94 | 74.00 | 19.90 | V |
| 16707.000 | 51.16 | -26.87 | 40.65 | 37.38 | 68.30 | 17.14 | V |
| 16958.300 | 50.98 | -26.32 | 42.36 | 34.93 | 68.30 | 17.32 | V |
| 10644.300 | 46.35 | -32.76 | 38.38 | 40.73 | 74.00 | 27.65 | H |
| 10328.600 | 46.32 | -33.68 | 38.17 | 41.82 | 68.30 | 21.98 | H |

Channel 159

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17995.000 | 54.28 | -25.50 | 46.66 | 33.12 | 74.00 | 19.72 | H |
| 17881.200 | 54.27 | -25.50 | 46.66 | 33.11 | 74.00 | 19.73 | V |
| 16813.700 | 50.97 | -26.62 | 41.49 | 36.10 | 68.30 | 17.33 | H |
| 16721.200 | 50.84 | -26.62 | 41.49 | 35.97 | 68.30 | 17.46 | H |
| 11982.500 | 46.60 | -31.48 | 39.09 | 38.99 | 74.00 | 27.40 | H |
| 11737.100 | 46.53 | -31.99 | 38.98 | 39.54 | 74.00 | 27.47 | H |

802.11ac-HT80

Channel 155

| 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17979.700 | 53.97 | -25.50 | 46.66 | 32.81 | 74.00 | 20.03 | H |
| 17962.000 | 53.71 | -25.50 | 46.66 | 32.55 | 74.00 | 20.29 | H |
| 16745.500 | 51.52 | -26.62 | 41.49 | 36.65 | 68.30 | 16.78 | H |
| 16706.400 | 50.97 | -26.87 | 40.65 | 37.19 | 68.30 | 17.33 | V |
| 11905.500 | 47.59 | -31.85 | 39.05 | 40.39 | 74.00 | 26.41 | V |
| 11043.600 | 47.05 | -32.49 | 38.72 | 40.81 | 74.00 | 26.95 | V |

A.6. Band Edges Compliance

A6.1 Band Edges - Radiated

Measurement Limit:

| Standard | Limit (dBm/MHz) | |
|---------------------------|--|------|
| FCC 47 CFR Part 15.407 | at the band edge | 27 |
| | at 5 MHz above or below the band edge | 15.6 |
| | at 25 MHz above or below the band edge | 10 |
| | at 75 MHz or more above or below the band edge | -27 |
| | Note: increasing linearly from point to point. | |

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

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. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

| 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 |

Measurement Result:

| Mode | Channel | Test Results | Conclusion |
|------------------|----------|------------------|------------|
| 802.11a | 5745 MHz | Fig.10 | P |
| | 5825 MHz | Fig.11 | P |
| 802.11n HT20 | 5745 MHz | Fig.12 | P |
| | 5825 MHz | Fig.13 | P |
| 802.11n HT40 | 5755 MHz | Fig.14 | P |
| | 5795 MHz | Fig.15 | P |
| 802.11ac HT20 | 5745 MHz | Fig.16 | P |
| | 5825 MHz | Fig.17 | P |
| 802.11ac HT40 | 5755 MHz | Fig.18 | P |
| | 5795 MHz | Fig.19 | P |
| 802.11ac HT80 | 5775 MHz | Fig.20 Fig.21 | P |

Conclusion: PASS

Test graphs as below:

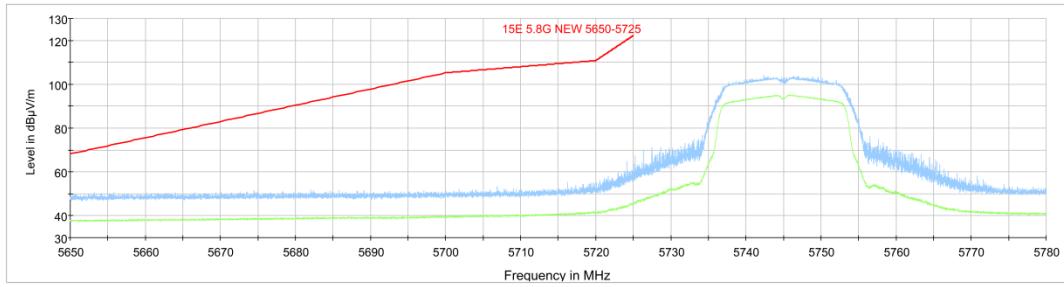


Fig. 10 Band Edges (802.11a Ch149,5745MHz)

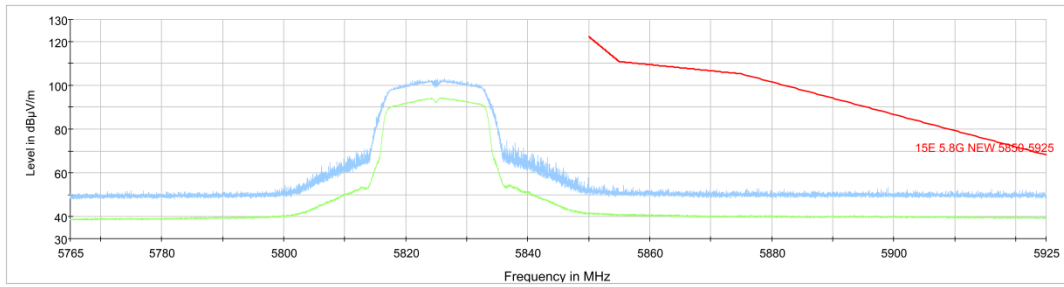


Fig. 11 Band Edges (802.11a Ch165, 5825MHz)

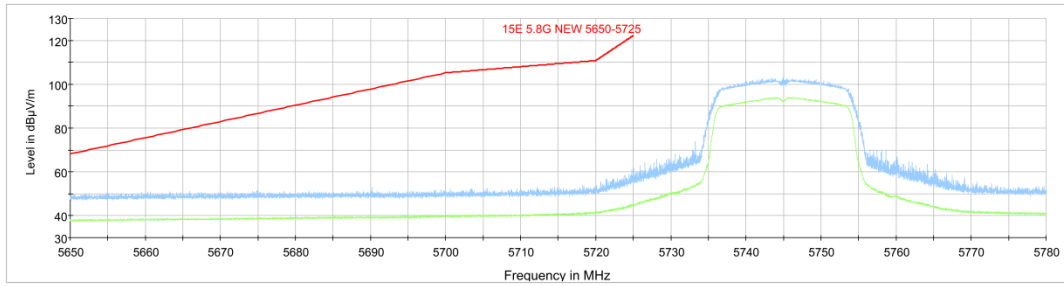


Fig. 12 Band Edges (802.11n-HT20 Ch149, 5745MHz)

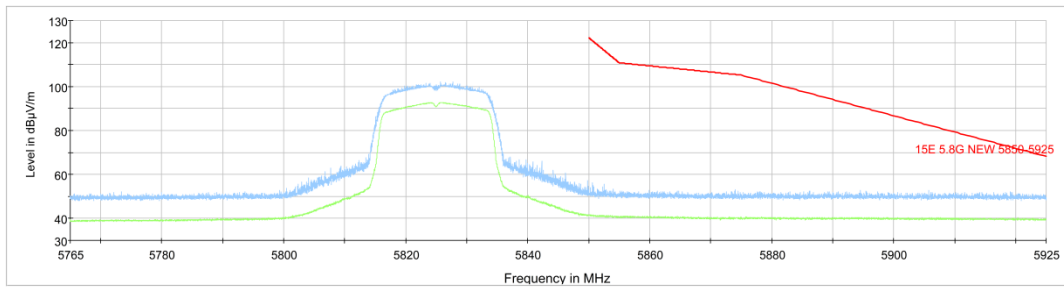


Fig. 13 Band Edges (802.11n-HT20 Ch165, 5825MHz)

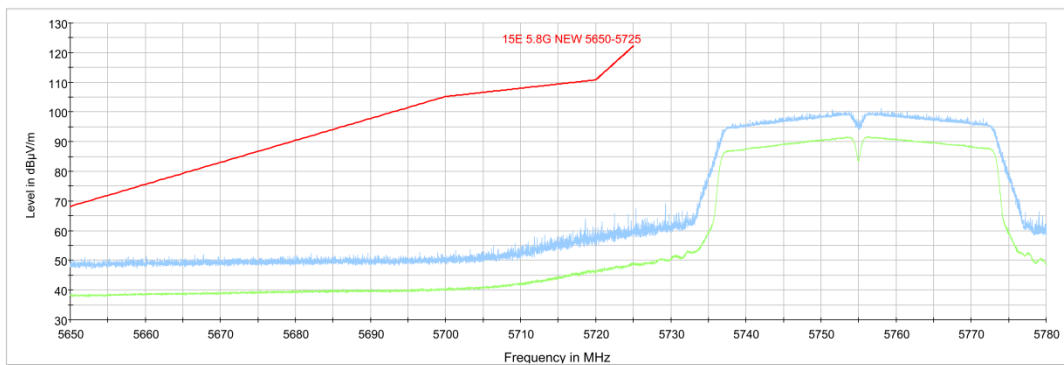


Fig. 14 Band Edges (802.11n-HT40 Ch151, 5755MHz)

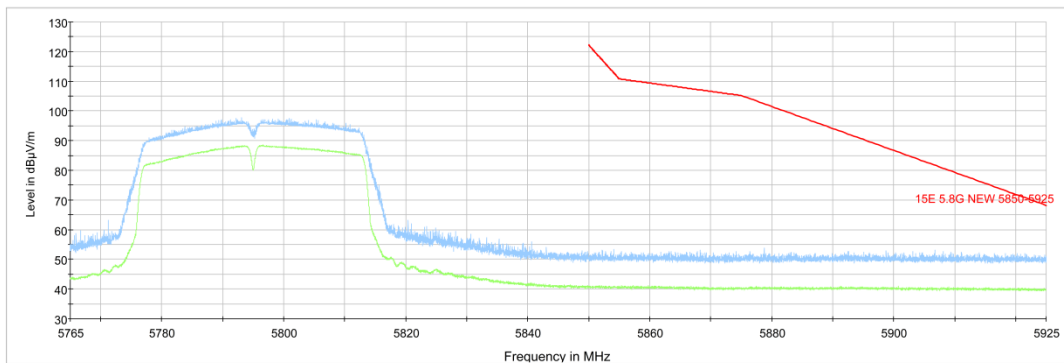


Fig. 15 Band Edges (802.11n-HT40 Ch159, 5795MHz)

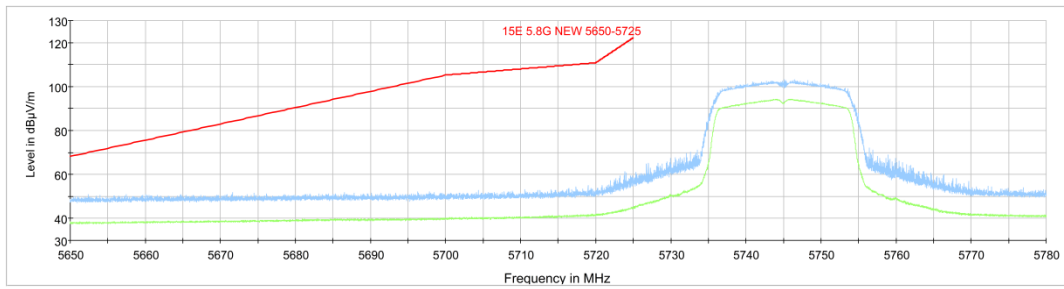


Fig. 16 Band Edges (802.11ac-HT20 Ch149, 5745MHz)

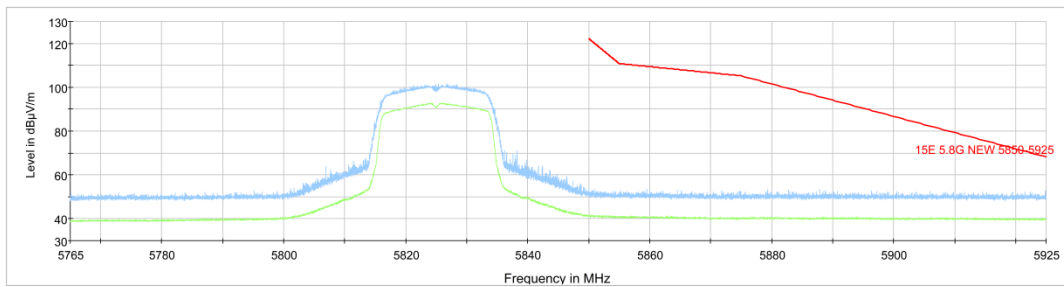


Fig. 17 Band Edges (802.11ac-HT20 Ch165, 5825MHz)

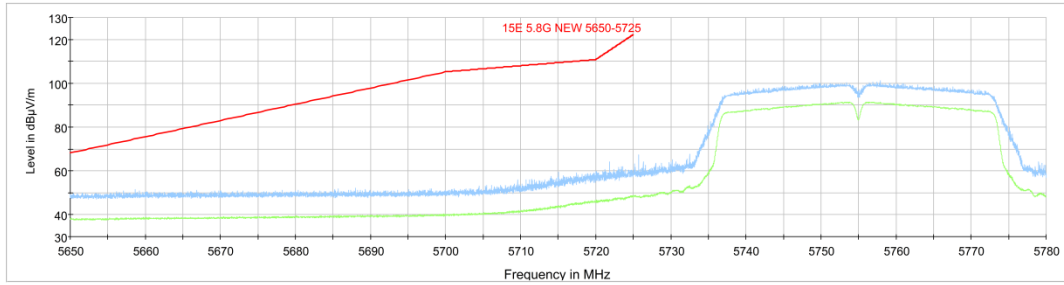


Fig. 18 Band Edges (802.11ac-HT40 Ch151, 5755MHz)

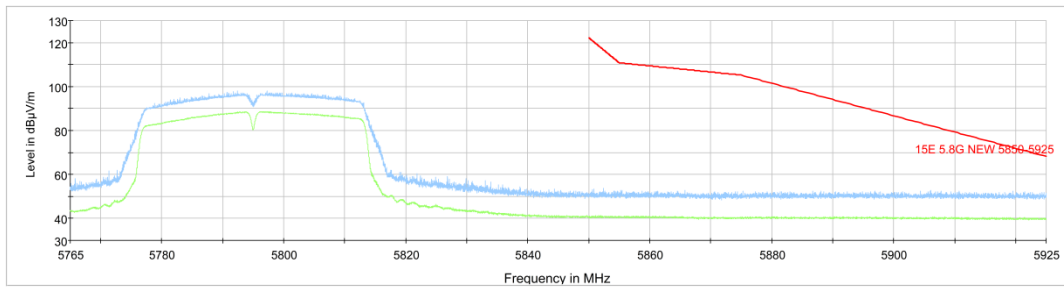


Fig. 19 Band Edges (802.11ac-HT40 Ch159, 5795MHz)

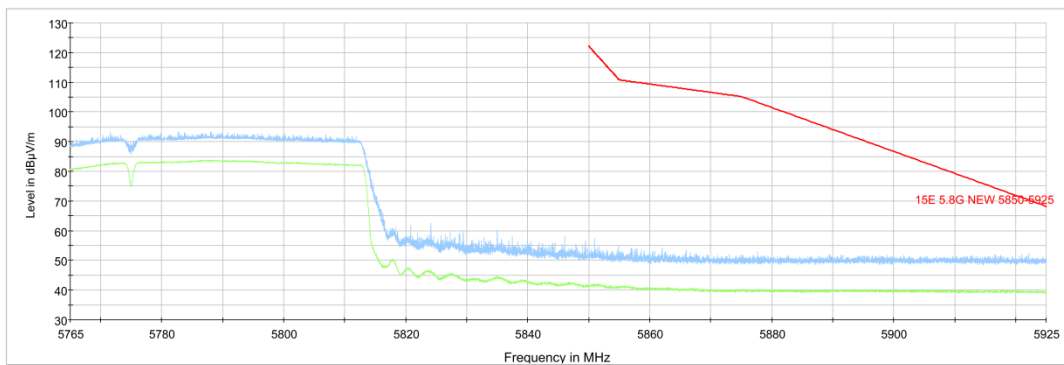


Fig. 20 Band Edges (802.11ac-HT80 Ch155, 5775MHz)

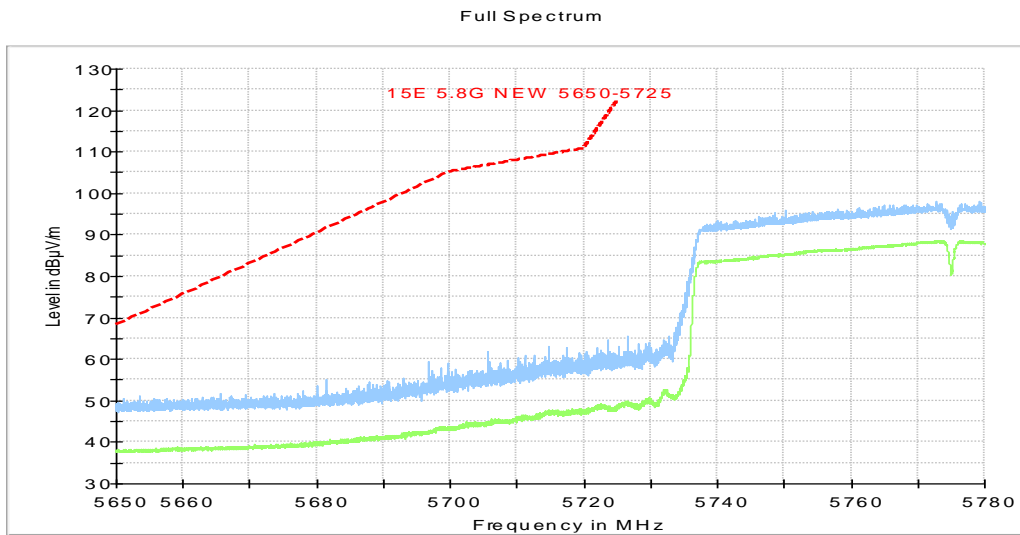


Fig. 21 Band Edges (802.11ac-HT80 Ch155, 5775MHz)

A.7. AC Powerline Conducted Emission

Method of Measurement: See ANSI C63.10-2013-clause 6.2

- 1 The one EUT cable configuration and arrangement and mode of operation that produced the emission with the highest amplitude relative to the limit is selected for the final measurement, while applying the appropriate modulating signal to the EUT.
- 2 If the EUT is relocated from an exploratory test site to a final test site, the highest emissions shall be remaximized at the final test location before final ac power-line conducted emission measurements are performed.
- 3 The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment in the system) is then performed for the full frequency range for which the EUT is being tested for compliance without further variation of the EUT arrangement, cable positions, or EUT mode of operation.
- 4 If the EUT is comprised of equipment units that have their own separate ac power connections, e.g., floor-standing equipment with independent power cords for each shelf that are able to connect directly to the ac power network, each current-carrying conductor of one unit is measured while the other units are connected to a second (or more) LISN(s). All units shall be separately measured. If a power strip is provided by the manufacturer, to supply all of the units making up the EUT, only the conductors in the power cord of the power strip shall be measured.
- 5 If the EUT uses a detachable antenna, these measurements shall be made with a suitable dummy load connected to the antenna output terminals; otherwise, the tests shall be made with the antenna connected and, if adjustable, fully extended. When measuring the ac conducted emissions from a device that operates between 150 kHz and 30 MHz a non-detachable antenna may be replaced with a dummy load for the measurements within the fundamental emission band of the transmitter, but only for those measurements.³⁶ Record the six highest EUT emissions relative to the limit of each of the current-carrying conductors of the power cords of the equipment that comprises the EUT over the frequency range specified by the procuring or regulatory agency. Diagram or photograph the test setup that was used. See Clause 8 for full reporting requirements.

Test Condition:

| Voltage (V) | Frequency (Hz) |
|-------------|----------------|
| 120 | 60 |

Measurement uncertainty:

Expanded measurement uncertainty for this test item is $U = 3.08\text{dB}$, $k=2$.

Measurement Result and limit:

WLAN (Quasi-peak Limit)

| Frequency range (MHz) | Quasi-peak Limit (dB μ V) | Result (dB μ V) | | Conclusion |
|-----------------------|-------------------------------|---------------------|--------|------------|
| | | With charger | | |
| | | 802.11a | Idle | |
| 0.15 to 0.5 | 66 to 56 | Fig.22 | Fig.23 | P |
| 0.5 to 5 | 56 | | | |
| 5 to 30 | 60 | | | |

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

WLAN (Average Limit)

| Frequency range (MHz) | Average Limit (dB μ V) | Result (dB μ V) | | Conclusion |
|-----------------------|----------------------------|---------------------|--------|------------|
| | | With charger | | |
| | | 802.11a | Idle | |
| 0.15 to 0.5 | 56 to 46 | Fig.22 | Fig.23 | P |
| 0.5 to 5 | 46 | | | |
| 5 to 30 | 50 | | | |

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

The measurement is made according to ANSI C63.10 .

Conclusion: PASS
Test graphs as below:

Result for Traffic:

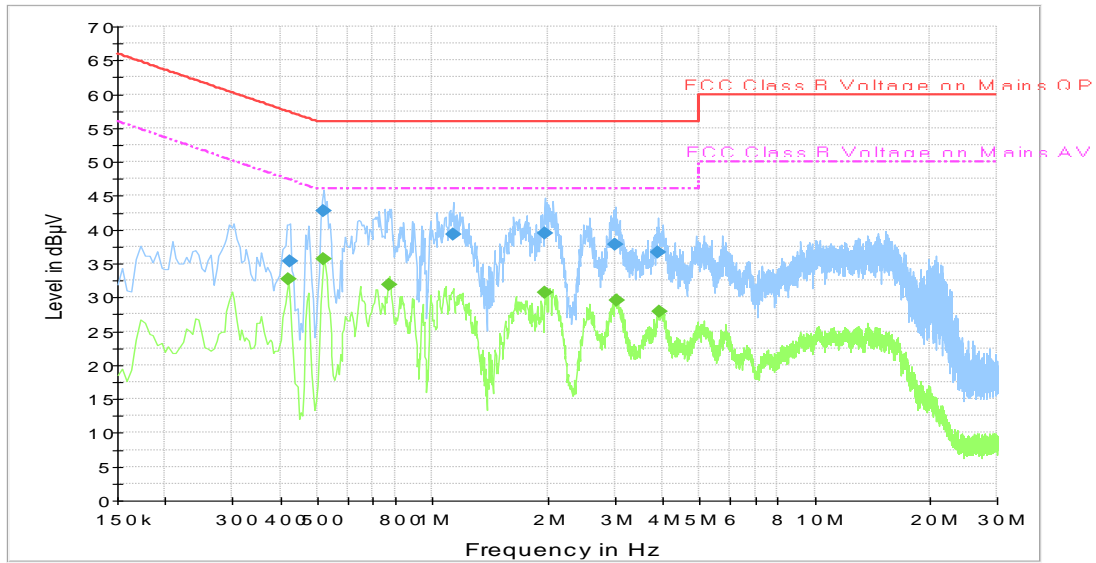


Fig. 22 AC Powerline Conducted Emission-802.11a

Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Final Result 1

| Frequency (MHz) | QuasiPeak (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|-----------------|------------------|-----------------|-----------------|------|------------|-------------|--------------|
| 0.424500 | 35.3 | 1000. | 9.000 | L1 | 19.6 | 22.1 | 57.4 |
| 0.519000 | 42.7 | 1000. | 9.000 | L1 | 19.6 | 13.3 | 56.0 |
| 1.131000 | 39.4 | 1000. | 9.000 | L1 | 19.6 | 16.6 | 56.0 |
| 1.963500 | 39.4 | 1000. | 9.000 | L1 | 19.5 | 16.6 | 56.0 |
| 2.998500 | 37.8 | 1000. | 9.000 | L1 | 19.6 | 18.2 | 56.0 |
| 3.880500 | 36.7 | 1000. | 9.000 | L1 | 19.7 | 19.3 | 56.0 |

Final Result 2

| Frequency (MHz) | Average (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|-----------------|----------------|-----------------|-----------------|------|------------|-------------|--------------|
| 0.420000 | 32.7 | 1000.0 | 9.000 | L1 | 19.6 | 14.8 | 47.4 |
| 0.519000 | 35.6 | 1000.0 | 9.000 | L1 | 19.6 | 10.4 | 46.0 |
| 0.771000 | 31.8 | 1000.0 | 9.000 | L1 | 19.6 | 14.2 | 46.0 |
| 1.972500 | 30.7 | 1000.0 | 9.000 | L1 | 19.5 | 15.3 | 46.0 |
| 3.043500 | 29.6 | 1000.0 | 9.000 | L1 | 19.6 | 16.4 | 46.0 |
| 3.930000 | 27.9 | 1000.0 | 9.000 | L1 | 19.7 | 18.1 | 46.0 |

Note: The measurement results showed here are worst cases of the combinations of different chargers

Result for Idle:

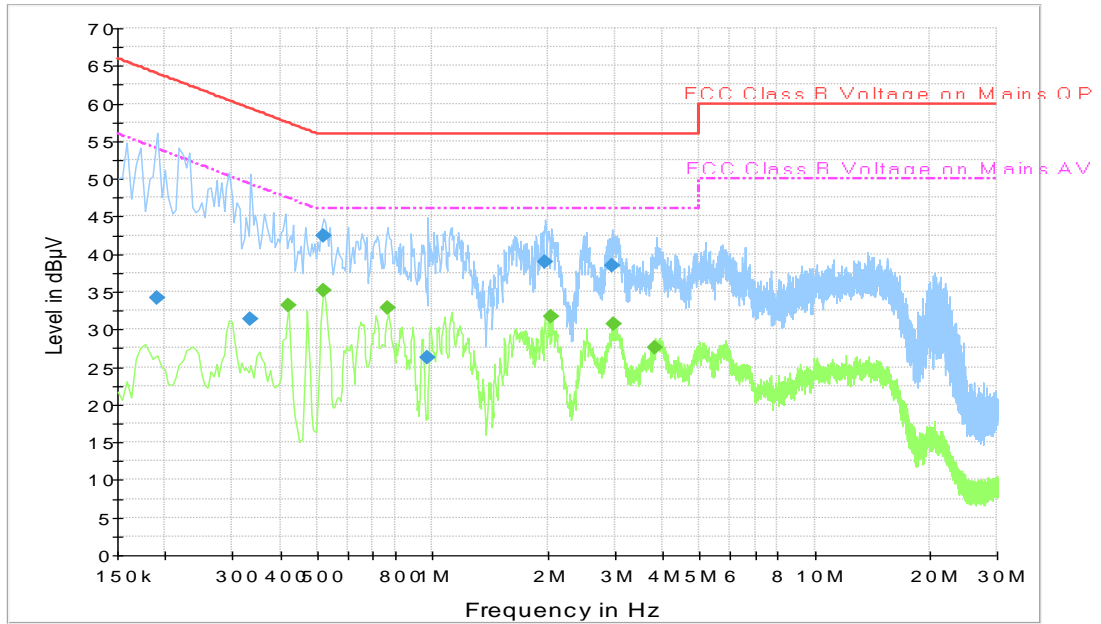


Fig. 23 AC Powerline Conducted Emission-Idle

Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Final Result 1

| Frequency (MHz) | QuasiPeak (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|-----------------|------------------|-----------------|-----------------|------|------------|-------------|--------------|
| 0.190500 | 34.1 | 1000. | 9.000 | L1 | 19.7 | 29.9 | 64.0 |
| 0.334500 | 31.4 | 1000. | 9.000 | L1 | 19.6 | 27.9 | 59.3 |
| 0.519000 | 42.5 | 1000. | 9.000 | L1 | 19.6 | 13.5 | 56.0 |
| 0.973500 | 26.2 | 1000. | 9.000 | N | 19.6 | 29.8 | 56.0 |
| 1.977000 | 38.9 | 1000. | 9.000 | L1 | 19.5 | 17.1 | 56.0 |
| 2.962500 | 38.5 | 1000. | 9.000 | L1 | 19.6 | 17.5 | 56.0 |

Final Result 2




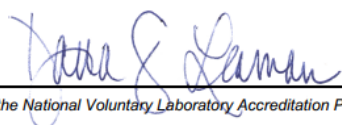
| Frequency (MHz) | Average (dBµV) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) | Margin (dB) | Limit (dBµV) |
|-----------------|----------------|-----------------|-----------------|------|------------|-------------|--------------|
| 0.420000 | 33.2 | 1000.0 | 9.000 | L1 | 19.6 | 14.2 | 47.4 |
| 0.519000 | 35.2 | 1000.0 | 9.000 | L1 | 19.6 | 10.8 | 46.0 |
| 0.766500 | 32.9 | 1000.0 | 9.000 | L1 | 19.6 | 13.1 | 46.0 |
| 2.053500 | 31.7 | 1000.0 | 9.000 | L1 | 19.5 | 14.3 | 46.0 |
| 2.989500 | 30.7 | 1000.0 | 9.000 | L1 | 19.6 | 15.3 | 46.0 |
| 3.835500 | 27.6 | 1000.0 | 9.000 | L1 | 19.7 | 18.4 | 46.0 |

Note2: The measurement results showed here are worst cases of the combinations of different chargers.

ANNEX B: EUT parameters

Disclaimer: The antenna gain provided by the client may affect the validity of the measurement results in this report, and the client shall bear the impact and consequences arising therefrom.

ANNEX C: Accreditation Certificate

| | |
|--|--|
| <p>United States Department of Commerce National Institute of Standards and Technology</p>   | |
| <hr/> <h3>Certificate of Accreditation to ISO/IEC 17025:2017</h3> <hr/> | |
| <p>NVLAP LAB CODE: 600118-0</p> | |
| <p>Telecommunication Technology Labs, CAICT Beijing China</p> | |
| <p><i>is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:</i></p> | |
| <p>Electromagnetic Compatibility & Telecommunications</p> | |
| <p><i>This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).</i></p> | |
| <hr/> <p>2020-09-29 through 2021-09-30 <i>Effective Dates</i></p> |   <hr/> <p><i>For the National Voluntary Laboratory Accreditation Program</i></p> |

*** END OF REPORT BODY ***