



# FCC PART 15C TEST REPORT No.I21Z61265-IOT21

for

**Wingtech Group (Hong Kong) Limited**

**LTE 4G mobile phone**

**WTVIS01**

**With**

**FCC ID: 2APXW-WTVIS01**

**Hardware Version: V1.1**

**Software Version: WTVIS01\_0.01.01**

**Issued Date: 2021-08-31**

**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.

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## **REPORT HISTORY**

| <b>Report Number</b> | <b>Revision</b> | <b>Description</b>               | <b>Issue Date</b> |
|----------------------|-----------------|----------------------------------|-------------------|
| I21Z61265-IOT21      | Rev.0           | 1st edition                      | 2021-08-31        |
| I21Z61265-IOT21      | Rev.1           | Change P.5.Testing<br>Location 1 | 2021-09-09        |

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## **1. TEST LATORATORY**

### **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

Radiated testing Location: CTTL(huayuan North Road)

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

### **1.3. TestingEnvironment**

Normal Temperature: 15-35°C

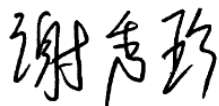
Relative Humidity: 20-75%

### **1.4. Project date**

Testing Start Date: 2021-07-15

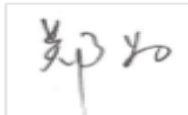
Testing End Date: 2021-08-31

### 1.5. Signature



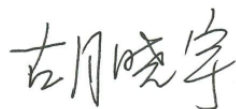
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Xie Xiuzhen  
( Prepared this test report )



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Zheng Wei  
(Reviewed this test report)



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Hu Xiaoyu  
(Approved this test report)

## **2. CLIENT INFORMATION**

### **2.1. Applicant Information**

Company Name: Wingtech Group (Hong Kong) Limited  
Address: Flat/RM 1903, 19/F, Podium Plaza 5 Hanoi Road, Tsim Sha Tsui  
Kowloon, Hong Kong  
City: Hong Kong  
Postal Code: /  
Country: China  
Telephone: /  
Fax: /

### **2.2. Manufacturer Information**

Company Name: Wingtech Group (Hong Kong) Limited  
Address: Flat/RM 1903, 19/F, Podium Plaza 5 Hanoi Road, Tsim Sha Tsui  
Kowloon, Hong Kong  
City: Hong Kong  
Postal Code: /  
Country: China  
Telephone: /  
Fax: /

### **3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT(AE)**

#### **3.1. About EUT**

|                     |                           |
|---------------------|---------------------------|
| Description         | LTE 4G mobile phone       |
| Model name          | WTVIS01                   |
| FCC ID              | 2APXW-WTVIS01             |
| WLAN Frequency Band | ISM Band: 5725MHz~5850MHz |
| Type of modulation  | OFDM                      |
| Voltage             | 3.87V                     |

#### **3.2. Internal Identification of EUT used during the test**

| <b>EUT ID*</b> | <b>IMEI</b>     | <b>HW Version</b> | <b>SW Version</b> |
|----------------|-----------------|-------------------|-------------------|
| EUT1           | 869633050010865 | V1.1              | WTVIS01_0.01.01   |
| EUT2           | 869633050014230 | V1.1              | WTVIS01_0.01.01   |

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

#### **3.3. Internal Identification of AE used during the test**

| <b>AE ID*</b> | <b>Description</b> | <b>SN</b> |
|---------------|--------------------|-----------|
| AE1           | SWITCHING ADAPTER  | /         |
| AE2           | A TO C CABLE       | /         |
| AE3           | BATTERY            | /         |

##### **AE1**

|                 |                                       |
|-----------------|---------------------------------------|
| Model           | ASUC62a-050240                        |
| Manufacturer    | Shenzhen Aquilstar Technology Co.,Ltd |
| Length of cable | /                                     |

##### **AE2**

|                 |                                        |
|-----------------|----------------------------------------|
| Type            | NB_30130-01978                         |
| Manufacturer    | DongGuan Mingxinhui Technology CO.,LTD |
| Length of cable | /                                      |

##### **AE3**

|                 |                                           |
|-----------------|-------------------------------------------|
| Type            | JU001                                     |
| Manufacturer    | Jiade Energy Technology (Zhuhai) Co.,Ltd. |
| Length of cable | /                                         |

\*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 LTE 4G mobile phone 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;                                                                                                                                                                                                                                                  | 2018    |
|                      | 15.209 Radiated emission limits, general requirements;                                                                                                                                                                                                                                 |         |
|                      | 15.407 General technical requirements                                                                                                                                                                                                                                                  |         |
| 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<br>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/manufacture 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     | 3.87 |
| 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             | 2022-05-24           |
| 2   | LISN                   | ENV216 | 101200        | R&S             | 1 year             | 2022-05-30           |
| 3   | Test Receiver          | ESCI   | 100344        | R&S             | 1 year             | 2022-02-23           |
| 4   | Shielding Room         | S81    | /             | ETS-Lindgren    | /                  | /                    |

### 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 | 9163-01223    | Schwarzbeck     | 1 year             | 2022-03-22           |
| 3   | Antenna                           | 3115     | 6914          | ETS-Lindgren    | 1 year             | 2022-02-03           |
| 4   | Dual-Ridge Waveguide Horn Antenna | 3116     | 2661          | ETS-Lindgren    | 1 year             | 2022-01-05           |
| 5   | Analytical Spectrometer           | FSV40    | R&S           | 101047          | 1 year             | 2022-05-17           |

## 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

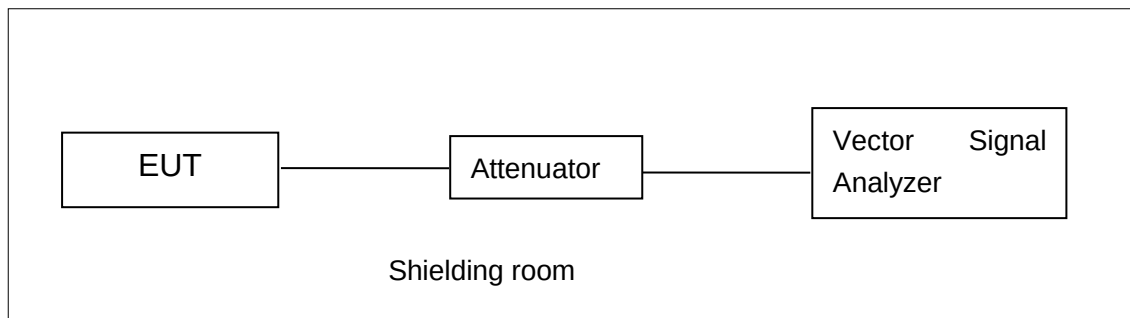
Measurement Uncertainty : 3.08dB,k=2

## 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

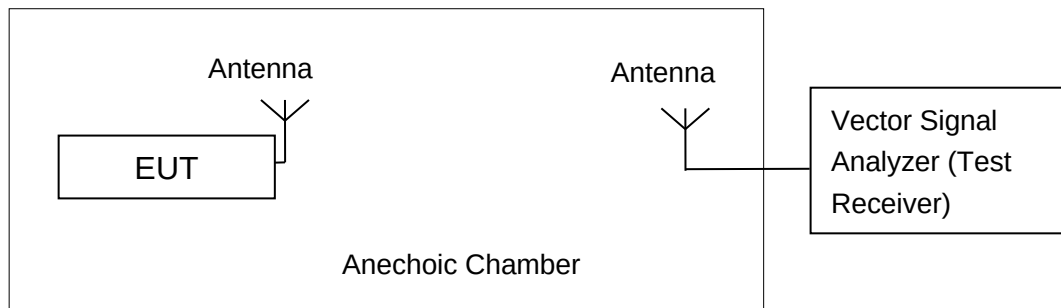


#### A.1.2. Radiated Emission Measurements

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. 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                | 19.58             | 19.42           | 19.89           |

The data rate 6 Mbps 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              | 18.52             | 18.82           | 19.02           |

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              | 18.21             | 18.57           | 19.02           |

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              | 17.59             | 17.99           |

The data rate MCS0 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              | 17.92             | 18.32           |

The data rate MCS0 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              | 17.69             |

The data rate MCS0 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<br>( dBm/500kHz ) | Conclusion |
|------------------|---------|------------------------------------------|------------|
| 802.11a          | 149     | 5.82                                     | P          |
|                  | 157     | 5.78                                     | P          |
|                  | 165     | 5.94                                     | P          |
| 802.11ac<br>HT20 | 149     | 5.62                                     | P          |
|                  | 157     | 5.55                                     | P          |
|                  | 165     | 5.70                                     | P          |
| 802.11ac<br>HT40 | 151     | 1.92                                     | P          |
|                  | 159     | 2.07                                     | P          |
| 802.11ac HT80    | 155     | -1.33                                    | P          |

**Conclusion: PASS**



#### A.4. Occupied 6dB Bandwidth

##### Measurement Limit:

| Standard                   | Limit (kHz) |
|----------------------------|-------------|
| FCC 47 CFR Part 15.407 (e) | $\geq 500$  |

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                         | 17.60 | P          |
| 802.11ac HT40 | 151     | Fig.7                         | 36.32 | P          |
|               | 159     | Fig.8                         | 36.24 | P          |
| 802.11ac HT80 | 155     | Fig.9                         | 76.32 | P          |

##### Conclusion: PASS

##### Test graphs as below:

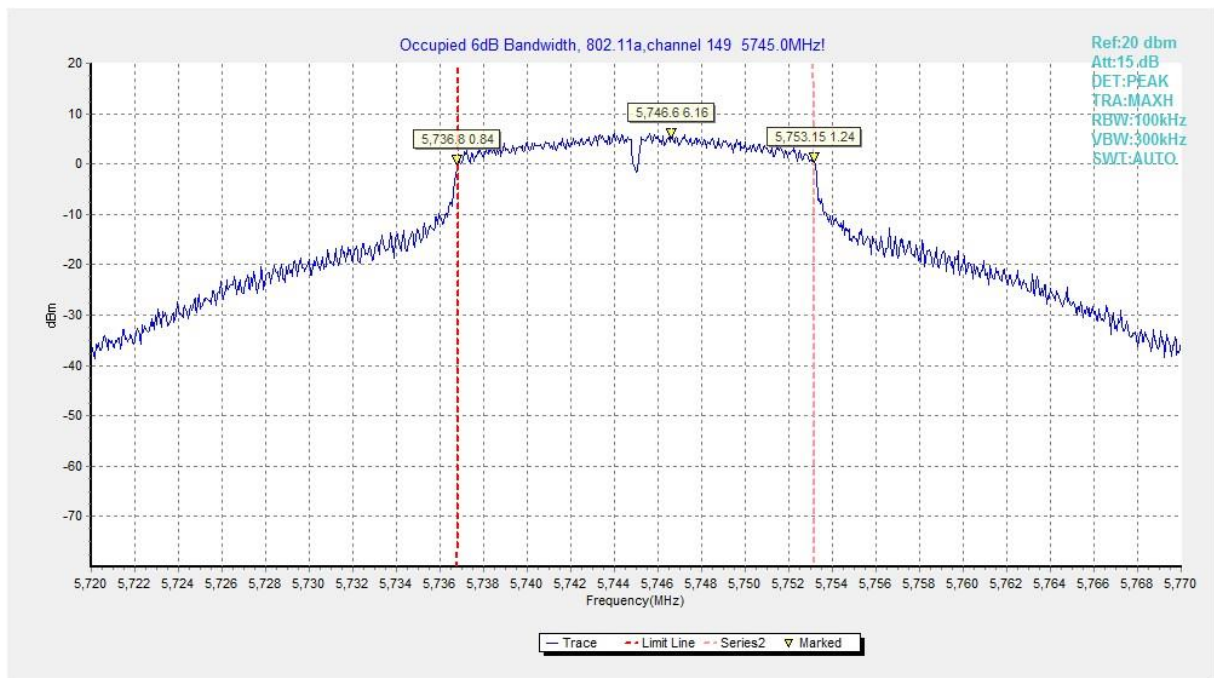
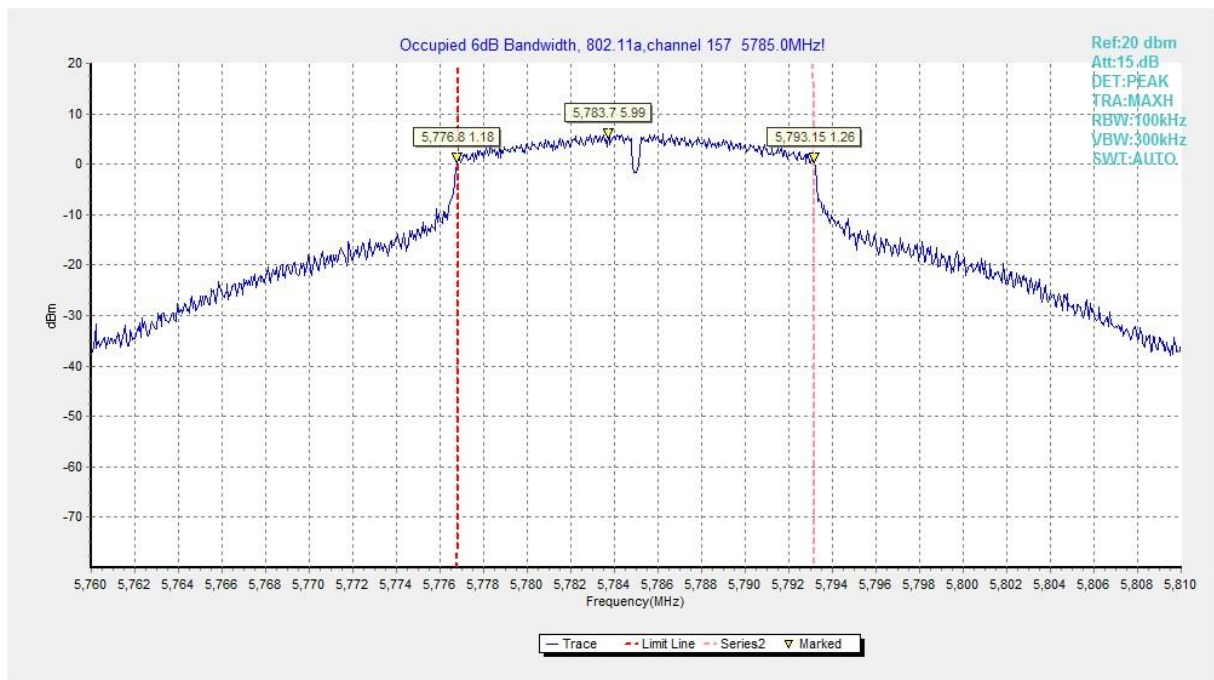
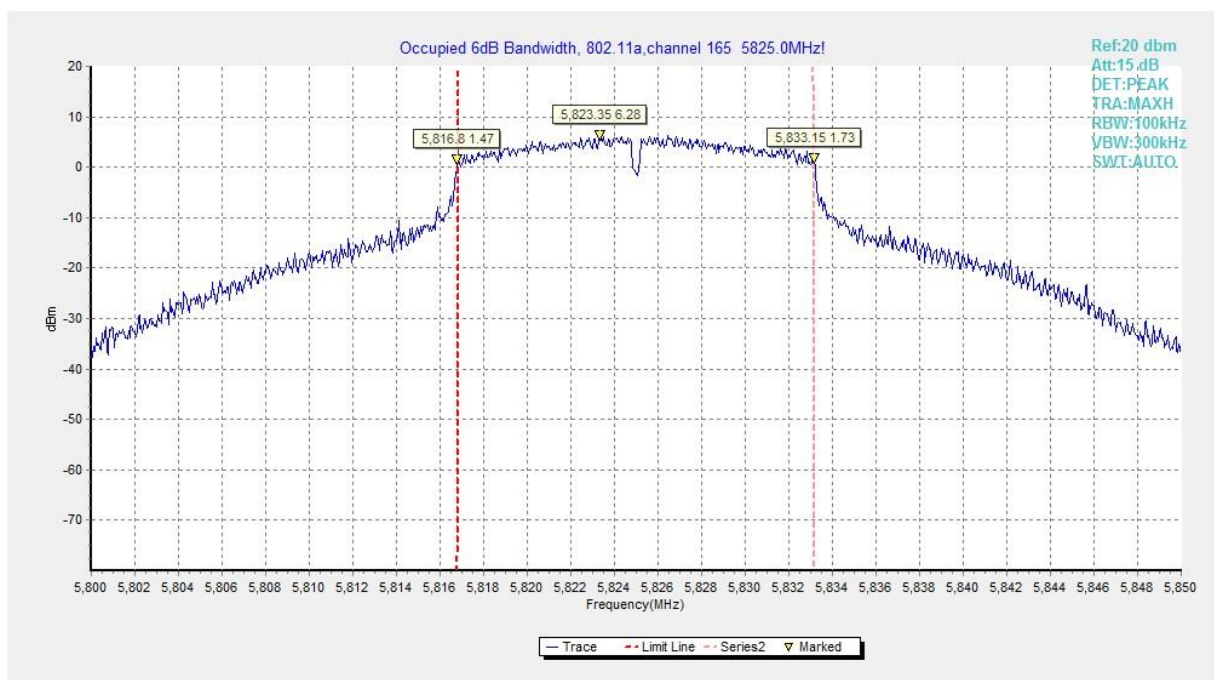


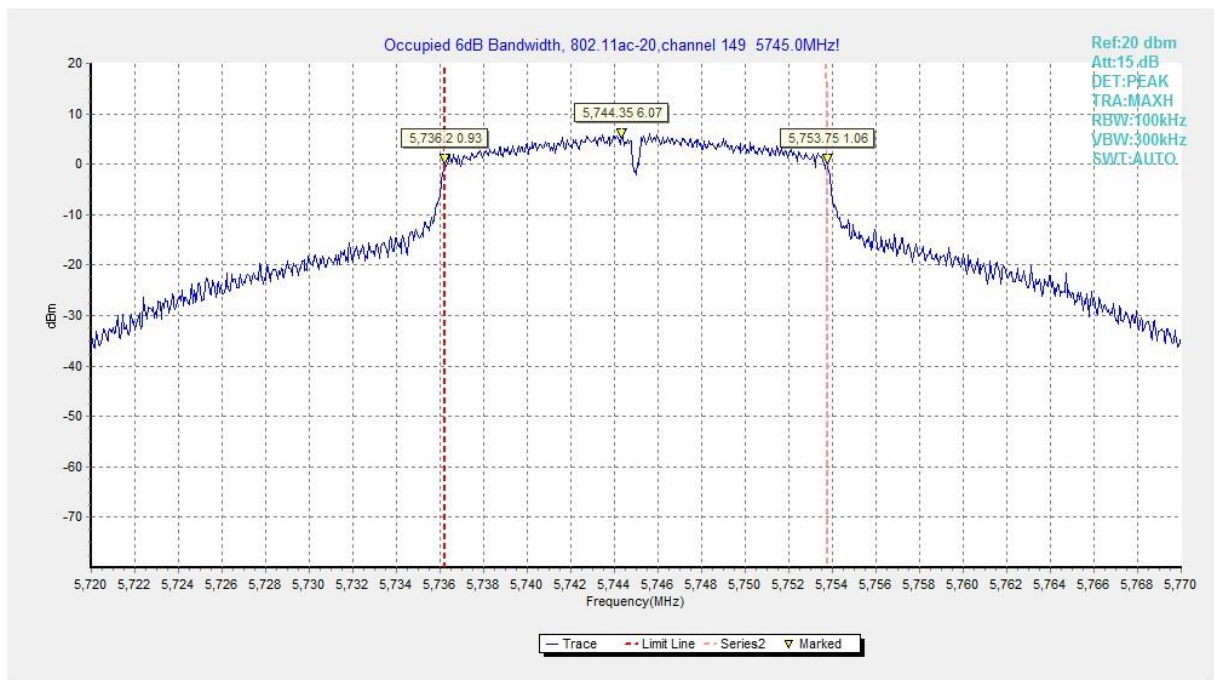
Fig. 1 Occupied 6dB Bandwidth (802.11a, Ch 149)



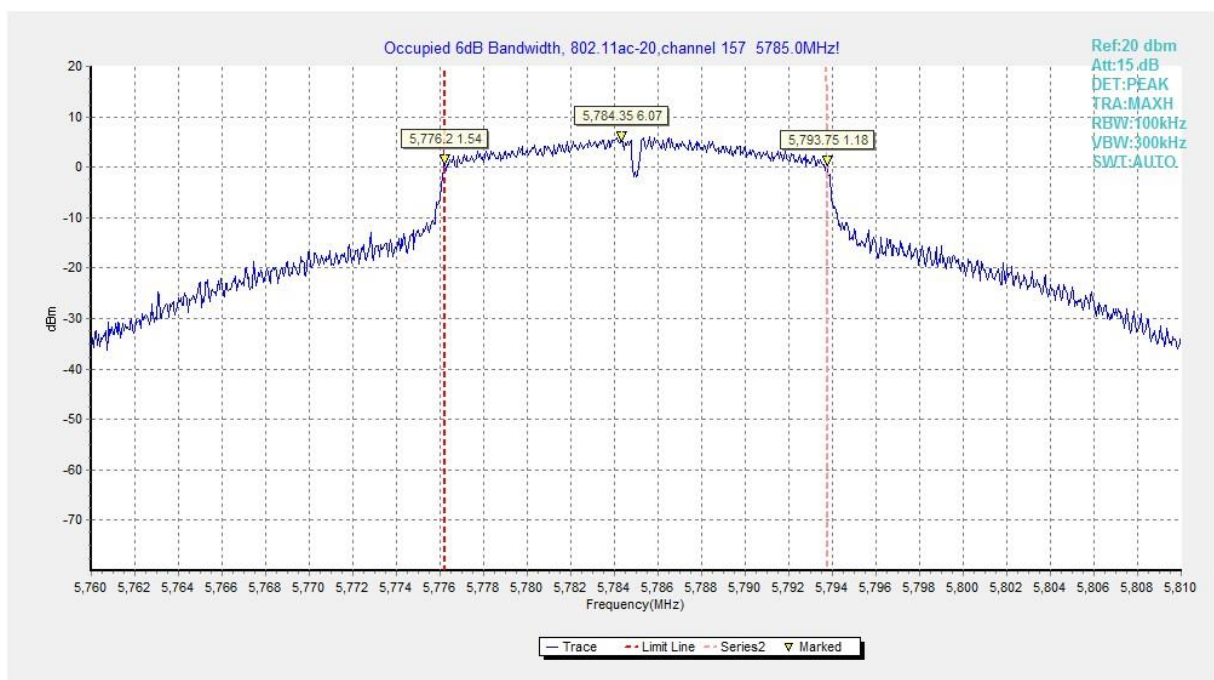
**Fig. 2 Occupied 6dB Bandwidth (802.11a, Ch 157)**



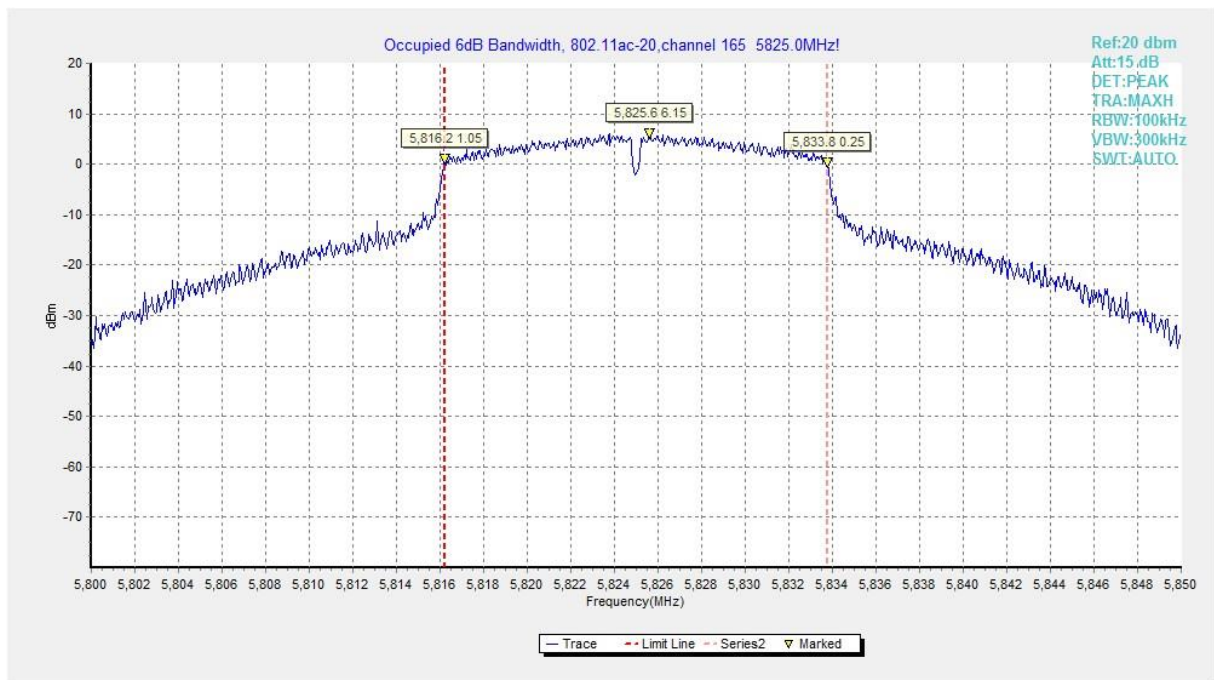
**Fig. 3 Occupied 6dB Bandwidth (802.11a, Ch 165)**



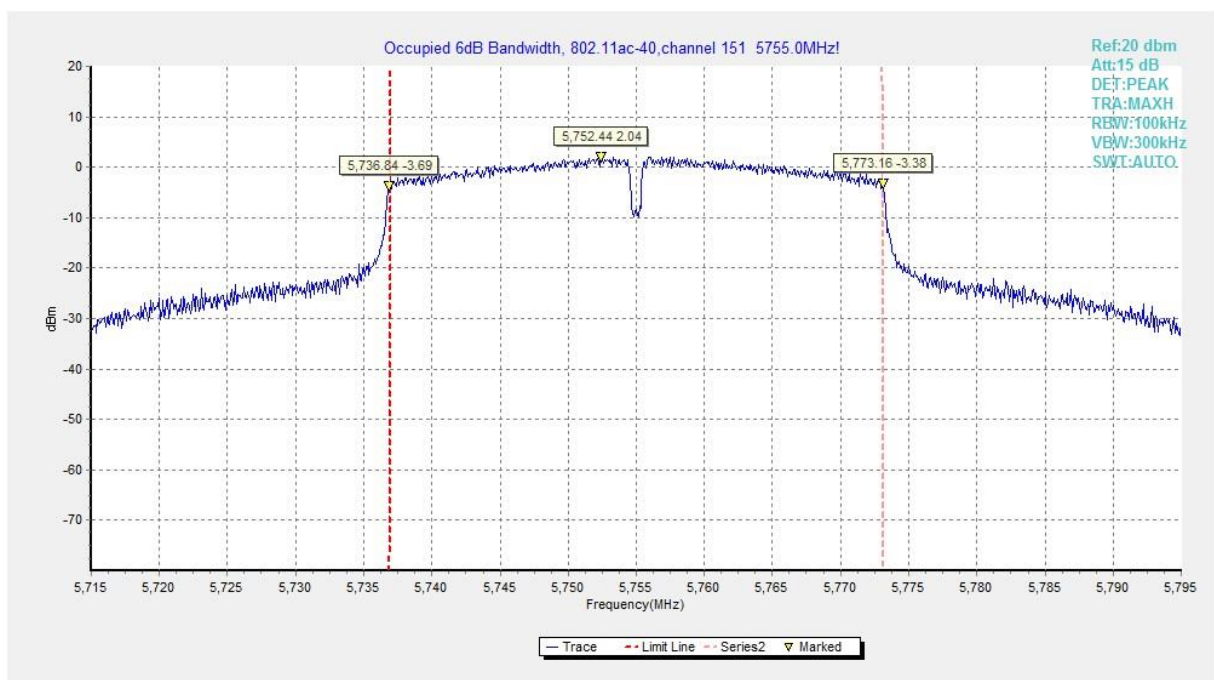
**Fig. 4 Occupied 6dB Bandwidth (802.11ac-HT20, Ch 149)**



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

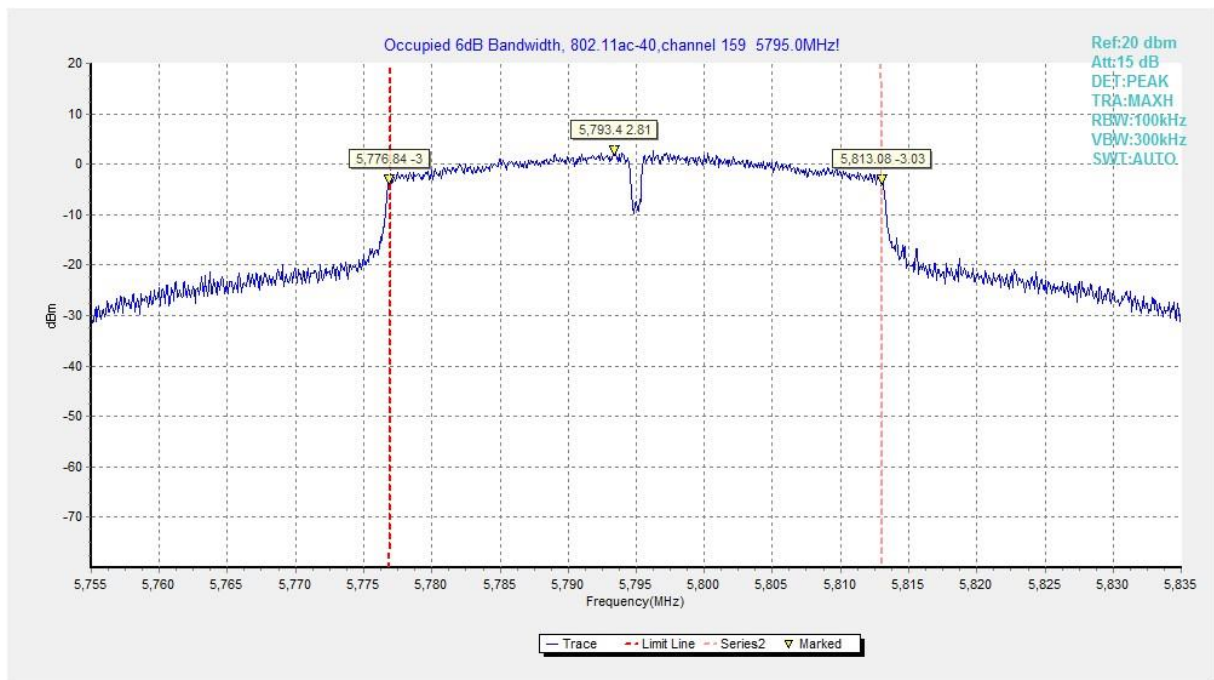


**Fig. 6 Occupied 6dB Bandwidth (802.11ac-HT20, Ch 165)**

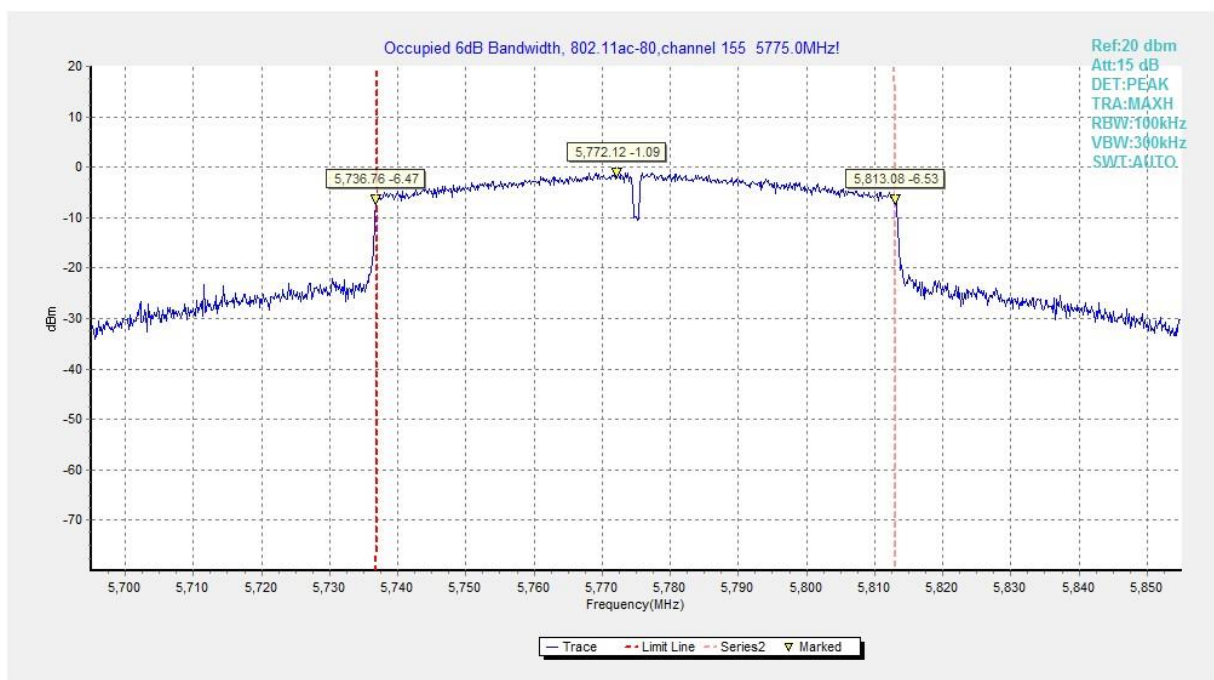


**Fig. 7 Occupied 6dB Bandwidth (802.11ac-HT40, Ch 151)**





**Fig. 8 Occupied 6dB Bandwidth (802.11ac-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<br>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 KDB 789033

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( $\mu$ 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 ( $\mu$ V/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                        |

#### 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            |
| 18000-40000                 | 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     | 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          |
|         | 165     | 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<br>(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          |
|                   |         | 26.5 GHz~ 40 GHz  | ---          | P          |
|                   | 165     | 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<br>(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<br>(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          |
|                    |         | 26.5 GHz~ 40 GHz  | ---          | P          |
|                    | 165     | 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<br>(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<br>(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          |

**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.

The measurement results are obtained as described below:

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

### 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17990.100       | 46.22                       | -25.50          | 46.66                 | 25.06                   | 54.00          | 7.78        | V                  |
| 17991.200       | 46.14                       | -25.50          | 46.66                 | 24.98                   | 54.00          | 7.86        | H                  |
| 14478.900       | 39.47                       | -28.59          | 42.46                 | 25.60                   | 54.00          | 14.53       | H                  |
| 14497.000       | 39.28                       | -28.59          | 42.46                 | 25.41                   | 54.00          | 14.72       | V                  |
| 11831.800       | 34.93                       | -31.85          | 39.05                 | 27.73                   | 54.00          | 19.07       | V                  |
| 11821.300       | 34.76                       | -31.85          | 39.05                 | 27.56                   | 54.00          | 19.24       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17982.400       | 46.35                       | -25.50          | 46.66                 | 25.19                   | 54.00          | 7.65        | H                  |
| 17980.800       | 46.18                       | -25.50          | 46.66                 | 25.02                   | 54.00          | 7.82        | V                  |
| 14471.200       | 39.15                       | -28.59          | 42.46                 | 25.28                   | 54.00          | 14.85       | V                  |
| 14488.200       | 39.12                       | -28.59          | 42.46                 | 25.25                   | 54.00          | 14.88       | V                  |
| 11835.600       | 34.89                       | -31.85          | 39.05                 | 27.69                   | 54.00          | 19.11       | V                  |
| 11934.600       | 34.84                       | -31.48          | 39.09                 | 27.23                   | 54.00          | 19.16       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17994.000       | 46.36                       | -25.50          | 46.66                 | 25.20                   | 54.00          | 7.64        | H                  |
| 17985.200       | 46.14                       | -25.50          | 46.66                 | 24.98                   | 54.00          | 7.86        | H                  |
| 14487.100       | 39.27                       | -28.59          | 42.46                 | 25.40                   | 54.00          | 14.73       | V                  |
| 14489.900       | 39.21                       | -28.59          | 42.46                 | 25.34                   | 54.00          | 14.79       | H                  |
| 11820.200       | 34.76                       | -31.85          | 39.05                 | 27.56                   | 54.00          | 19.24       | V                  |
| 11834.500       | 34.72                       | -31.85          | 39.05                 | 27.52                   | 54.00          | 19.28       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17997.800       | 46.27                       | -25.50          | 46.66                 | 25.11                   | 54.00          | 7.73        | V                  |
| 17989.500       | 46.23                       | -25.50          | 46.66                 | 25.07                   | 54.00          | 7.77        | H                  |
| 14499.200       | 39.37                       | -28.59          | 42.46                 | 25.50                   | 54.00          | 14.63       | V                  |
| 14479.500       | 39.21                       | -28.59          | 42.46                 | 25.34                   | 54.00          | 14.79       | H                  |
| 11846.600       | 34.97                       | -31.85          | 39.05                 | 27.77                   | 54.00          | 19.03       | V                  |
| 11818.000       | 34.90                       | -31.85          | 39.05                 | 27.70                   | 54.00          | 19.10       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17981.300       | 46.10                       | -25.50          | 46.66                 | 24.94                   | 54.00          | 7.90        | V                  |
| 17995.600       | 46.07                       | -25.50          | 46.66                 | 24.91                   | 54.00          | 7.93        | H                  |
| 14472.300       | 39.26                       | -28.59          | 42.46                 | 25.39                   | 54.00          | 14.74       | V                  |
| 14493.200       | 39.18                       | -28.59          | 42.46                 | 25.31                   | 54.00          | 14.82       | H                  |
| 11863.600       | 34.83                       | -31.85          | 39.05                 | 27.63                   | 54.00          | 19.17       | V                  |
| 11922.000       | 34.82                       | -31.48          | 39.09                 | 27.21                   | 54.00          | 19.18       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17989.500       | 46.23                       | -25.50          | 46.66                 | 25.07                   | 54.00          | 7.77        | V                  |
| 17986.200       | 46.05                       | -25.50          | 46.66                 | 24.89                   | 54.00          | 7.95        | H                  |
| 14499.800       | 39.27                       | -28.59          | 42.46                 | 25.40                   | 54.00          | 14.73       | V                  |
| 14488.200       | 39.18                       | -28.59          | 42.46                 | 25.31                   | 54.00          | 14.82       | H                  |
| 11818.000       | 34.80                       | -31.85          | 39.05                 | 27.60                   | 54.00          | 19.20       | H                  |
| 11827.900       | 34.79                       | -31.85          | 39.05                 | 27.59                   | 54.00          | 19.21       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17994.000       | 46.02                       | -25.50          | 46.66                 | 24.86                   | 54.00          | 7.98        | H                  |
| 17987.900       | 46.01                       | -25.50          | 46.66                 | 24.85                   | 54.00          | 7.99        | V                  |
| 14475.000       | 39.17                       | -28.59          | 42.46                 | 25.30                   | 54.00          | 14.83       | H                  |
| 14482.800       | 39.09                       | -28.59          | 42.46                 | 25.22                   | 54.00          | 14.91       | H                  |
| 11902.700       | 34.62                       | -31.85          | 39.05                 | 27.42                   | 54.00          | 19.38       | H                  |
| 11600.800       | 34.60                       | -32.31          | 38.91                 | 28.01                   | 54.00          | 19.40       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17997.200       | 46.07                       | -25.50          | 46.66                 | 24.91                   | 54.00          | 7.93        | V                  |
| 17998.900       | 45.97                       | -25.50          | 46.66                 | 24.81                   | 54.00          | 8.03        | H                  |
| 14479.500       | 39.21                       | -28.59          | 42.46                 | 25.34                   | 54.00          | 14.79       | H                  |
| 14496.000       | 39.06                       | -28.59          | 42.46                 | 25.19                   | 54.00          | 14.94       | V                  |
| 11817.500       | 34.70                       | -31.85          | 39.05                 | 27.50                   | 54.00          | 19.30       | H                  |
| 11835.600       | 34.68                       | -31.85          | 39.05                 | 27.48                   | 54.00          | 19.32       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17994.500       | 46.27                       | -25.50          | 46.66                 | 25.11                   | 54.00          | 7.73        | V                  |
| 17998.300       | 46.23                       | -25.50          | 46.66                 | 25.07                   | 54.00          | 7.77        | V                  |
| 14499.200       | 39.34                       | -28.59          | 42.46                 | 25.47                   | 54.00          | 14.66       | H                  |
| 14477.200       | 39.26                       | -28.59          | 42.46                 | 25.39                   | 54.00          | 14.74       | V                  |
| 11810.900       | 34.99                       | -31.85          | 39.05                 | 27.79                   | 54.00          | 19.01       | V                  |
| 11818.000       | 34.90                       | -31.85          | 39.05                 | 27.70                   | 54.00          | 19.10       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17994.500       | 46.32                       | -25.50          | 46.66                 | 25.16                   | 54.00          | 7.68        | V                  |
| 17985.200       | 46.19                       | -25.50          | 46.66                 | 25.03                   | 54.00          | 7.81        | H                  |
| 14493.800       | 39.15                       | -28.59          | 42.46                 | 25.28                   | 54.00          | 14.85       | H                  |
| 14488.200       | 39.12                       | -28.59          | 42.46                 | 25.25                   | 54.00          | 14.88       | H                  |
| 11828.500       | 34.73                       | -31.85          | 39.05                 | 27.53                   | 54.00          | 19.27       | H                  |
| 11831.800       | 34.70                       | -31.85          | 39.05                 | 27.50                   | 54.00          | 19.30       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17996.200       | 46.33                       | -25.50          | 46.66                 | 25.17                   | 54.00          | 7.67        | V                  |
| 17998.900       | 46.24                       | -25.50          | 46.66                 | 25.08                   | 54.00          | 7.76        | H                  |
| 14479.500       | 39.20                       | -28.59          | 42.46                 | 25.33                   | 54.00          | 14.80       | V                  |
| 14470.600       | 39.14                       | -28.59          | 42.46                 | 25.27                   | 54.00          | 14.86       | H                  |
| 11848.800       | 34.84                       | -31.85          | 39.05                 | 27.64                   | 54.00          | 19.16       | H                  |
| 11843.900       | 34.82                       | -31.85          | 39.05                 | 27.62                   | 54.00          | 19.18       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17989.500       | 46.08                       | -25.50          | 46.66                 | 24.92                   | 54.00          | 7.92        | V                  |
| 17997.200       | 46.07                       | -25.50          | 46.66                 | 24.91                   | 54.00          | 7.93        | V                  |
| 14496.500       | 39.09                       | -28.59          | 42.46                 | 25.22                   | 54.00          | 14.91       | H                  |
| 14489.400       | 39.03                       | -28.59          | 42.46                 | 25.16                   | 54.00          | 14.97       | V                  |
| 11852.600       | 34.69                       | -31.85          | 39.05                 | 27.49                   | 54.00          | 19.31       | H                  |
| 11900.000       | 34.67                       | -31.85          | 39.05                 | 27.47                   | 54.00          | 19.33       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17983.500       | 46.16                       | -25.50          | 46.66                 | 25.00                   | 54.00          | 7.84        | V                  |
| 17994.500       | 46.09                       | -25.50          | 46.66                 | 24.93                   | 54.00          | 7.91        | H                  |
| 14476.100       | 39.17                       | -28.59          | 42.46                 | 25.30                   | 54.00          | 14.83       | V                  |
| 14482.800       | 39.13                       | -28.59          | 42.46                 | 25.26                   | 54.00          | 14.87       | V                  |
| 11816.900       | 34.74                       | -31.85          | 39.05                 | 27.54                   | 54.00          | 19.26       | H                  |
| 11838.400       | 34.66                       | -31.85          | 39.05                 | 27.46                   | 54.00          | 19.34       | V                  |

**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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17985.700       | 46.10                       | -25.50          | 46.66                 | 24.94                   | 54.00          | 7.90        | H                  |
| 17997.800       | 46.10                       | -25.50          | 46.66                 | 24.94                   | 54.00          | 7.90        | H                  |
| 14482.200       | 39.46                       | -28.59          | 42.46                 | 25.59                   | 54.00          | 14.54       | V                  |
| 14487.100       | 39.22                       | -28.59          | 42.46                 | 25.35                   | 54.00          | 14.78       | H                  |
| 11909.900       | 34.66                       | -31.85          | 39.05                 | 27.46                   | 54.00          | 19.34       | V                  |
| 11823.500       | 34.61                       | -31.85          | 39.05                 | 27.41                   | 54.00          | 19.39       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17964.800       | 57.76                       | -25.50          | 46.66                 | 36.60                   | 74.00          | 16.24       | H                  |
| 17992.300       | 57.17                       | -25.50          | 46.66                 | 36.01                   | 74.00          | 16.83       | H                  |
| 14678.500       | 51.41                       | -27.29          | 41.90                 | 36.80                   | 68.30          | 16.89       | V                  |
| 14366.700       | 51.25                       | -28.42          | 42.34                 | 37.33                   | 68.30          | 17.05       | H                  |
| 11524.300       | 46.80                       | -32.26          | 38.84                 | 40.23                   | 74.00          | 27.20       | V                  |
| 11413.200       | 46.52                       | -32.42          | 38.79                 | 40.15                   | 74.00          | 27.48       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17883.400       | 57.91                       | -25.50          | 46.66                 | 36.75                   | 74.00          | 16.09       | H                  |
| 17992.300       | 57.62                       | -25.50          | 46.66                 | 36.46                   | 74.00          | 16.38       | V                  |
| 14342.500       | 51.35                       | -28.42          | 42.34                 | 37.43                   | 68.30          | 16.95       | V                  |
| 14515.800       | 51.27                       | -28.59          | 42.46                 | 37.40                   | 68.30          | 17.03       | H                  |
| 11816.400       | 46.91                       | -31.85          | 39.05                 | 39.71                   | 74.00          | 27.09       | V                  |
| 11134.900       | 46.74                       | -32.60          | 38.75                 | 40.60                   | 74.00          | 27.26       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17978.500       | 57.31                       | -25.50          | 46.66                 | 36.15                   | 74.00          | 16.69       | V                  |
| 17969.800       | 57.04                       | -25.50          | 46.66                 | 35.88                   | 74.00          | 16.96       | V                  |
| 14494.300       | 51.69                       | -28.59          | 42.46                 | 37.82                   | 74.00          | 22.31       | V                  |
| 14399.100       | 51.59                       | -28.59          | 42.46                 | 37.72                   | 68.30          | 16.71       | V                  |
| 11832.900       | 46.64                       | -31.85          | 39.05                 | 39.44                   | 74.00          | 27.36       | V                  |
| 11624.400       | 46.51                       | -32.31          | 38.91                 | 39.92                   | 74.00          | 27.49       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17976.300       | 57.85                       | -25.50          | 46.66                 | 36.69                   | 74.00          | 16.15       | V                  |
| 17973.000       | 57.66                       | -25.50          | 46.66                 | 36.50                   | 74.00          | 16.34       | H                  |
| 14359.500       | 52.37                       | -28.42          | 42.34                 | 38.45                   | 68.30          | 15.93       | V                  |
| 14312.200       | 51.29                       | -28.42          | 42.34                 | 37.37                   | 68.30          | 17.01       | H                  |
| 11823.000       | 46.93                       | -31.85          | 39.05                 | 39.73                   | 74.00          | 27.07       | V                  |
| 11433.000       | 46.41                       | -32.42          | 38.79                 | 40.04                   | 74.00          | 27.59       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17971.400       | 57.67                       | -25.50          | 46.66                 | 36.51                   | 74.00          | 16.33       | V                  |
| 17982.400       | 57.39                       | -25.50          | 46.66                 | 36.23                   | 74.00          | 16.61       | H                  |
| 14398.000       | 51.87                       | -28.59          | 42.46                 | 38.00                   | 68.30          | 16.43       | V                  |
| 14402.500       | 51.42                       | -28.59          | 42.46                 | 37.55                   | 68.30          | 16.88       | H                  |
| 11927.500       | 47.18                       | -31.48          | 39.09                 | 39.57                   | 74.00          | 26.82       | V                  |
| 10734.500       | 46.51                       | -32.77          | 38.49                 | 40.79                   | 74.00          | 27.49       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17976.900       | 57.83                       | -25.50          | 46.66                 | 36.67                   | 74.00          | 16.17       | H                  |
| 17994.500       | 57.45                       | -25.50          | 46.66                 | 36.29                   | 74.00          | 16.55       | H                  |
| 14364.000       | 51.64                       | -28.42          | 42.34                 | 37.72                   | 68.30          | 16.66       | V                  |
| 14379.400       | 51.15                       | -28.42          | 42.34                 | 37.23                   | 68.30          | 17.15       | H                  |
| 11919.800       | 46.36                       | -31.48          | 39.09                 | 38.75                   | 74.00          | 27.64       | V                  |
| 11808.100       | 46.27                       | -31.85          | 39.05                 | 39.07                   | 74.00          | 27.73       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17983.500       | 57.46                       | -25.50          | 46.66                 | 36.30                   | 74.00          | 16.54       | V                  |
| 17990.100       | 57.36                       | -25.50          | 46.66                 | 36.20                   | 74.00          | 16.64       | V                  |
| 14795.100       | 51.08                       | -28.32          | 41.35                 | 38.06                   | 68.30          | 17.22       | H                  |
| 14425.500       | 50.92                       | -28.59          | 42.46                 | 37.05                   | 68.30          | 17.38       | V                  |
| 11825.700       | 46.67                       | -31.85          | 39.05                 | 39.47                   | 74.00          | 27.33       | V                  |
| 11929.100       | 46.57                       | -31.48          | 39.09                 | 38.96                   | 74.00          | 27.43       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17984.600       | 58.07                       | -25.50          | 46.66                 | 36.91                   | 74.00          | 15.93       | H                  |
| 17974.200       | 57.37                       | -25.50          | 46.66                 | 36.21                   | 74.00          | 16.63       | H                  |
| 14543.800       | 51.56                       | -27.29          | 41.90                 | 36.95                   | 68.30          | 16.74       | H                  |
| 14400.800       | 51.50                       | -28.59          | 42.46                 | 37.63                   | 68.30          | 16.80       | H                  |
| 11848.200       | 46.85                       | -31.85          | 39.05                 | 39.65                   | 74.00          | 27.15       | V                  |
| 11878.000       | 46.46                       | -31.85          | 39.05                 | 39.26                   | 74.00          | 27.54       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17974.700       | 57.24                       | -25.50          | 46.66                 | 36.08                   | 74.00          | 16.76       | V                  |
| 17979.100       | 57.10                       | -25.50          | 46.66                 | 35.94                   | 74.00          | 16.90       | H                  |
| 14456.400       | 51.73                       | -28.59          | 42.46                 | 37.86                   | 68.30          | 16.57       | V                  |
| 14463.000       | 51.46                       | -28.59          | 42.46                 | 37.59                   | 68.30          | 16.84       | H                  |
| 11895.500       | 47.02                       | -31.85          | 39.05                 | 39.82                   | 74.00          | 26.98       | V                  |
| 11955.500       | 46.98                       | -31.48          | 39.09                 | 39.37                   | 74.00          | 27.02       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17991.800       | 58.21                       | -25.50          | 46.66                 | 37.05                   | 74.00          | 15.79       | H                  |
| 17994.000       | 57.92                       | -25.50          | 46.66                 | 36.76                   | 74.00          | 16.08       | H                  |
| 14413.500       | 51.47                       | -28.59          | 42.46                 | 37.60                   | 68.30          | 16.83       | V                  |
| 14636.200       | 51.12                       | -27.29          | 41.90                 | 36.51                   | 68.30          | 17.18       | V                  |
| 11898.900       | 46.64                       | -31.85          | 39.05                 | 39.44                   | 74.00          | 27.36       | V                  |
| 11849.400       | 46.55                       | -31.85          | 39.05                 | 39.35                   | 74.00          | 27.45       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17978.000       | 57.74                       | -25.50          | 46.66                 | 36.58                   | 74.00          | 16.26       | V                  |
| 17991.800       | 57.59                       | -25.50          | 46.66                 | 36.43                   | 74.00          | 16.41       | V                  |
| 14475.600       | 51.42                       | -28.59          | 42.46                 | 37.55                   | 74.00          | 22.58       | V                  |
| 14741.200       | 51.27                       | -28.32          | 41.35                 | 38.25                   | 68.30          | 17.03       | H                  |
| 11945.000       | 47.30                       | -31.48          | 39.09                 | 39.69                   | 74.00          | 26.70       | H                  |
| 11816.400       | 46.71                       | -31.85          | 39.05                 | 39.51                   | 74.00          | 27.29       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17986.800       | 57.43                       | -25.50          | 46.66                 | 36.27                   | 74.00          | 16.57       | H                  |
| 17993.400       | 56.92                       | -25.50          | 46.66                 | 35.76                   | 74.00          | 17.08       | V                  |
| 15004.100       | 50.87                       | -27.85          | 40.21                 | 38.51                   | 68.30          | 17.43       | V                  |
| 14878.800       | 50.84                       | -28.59          | 40.79                 | 38.64                   | 68.30          | 17.46       | V                  |
| 11844.400       | 47.00                       | -31.85          | 39.05                 | 39.80                   | 74.00          | 27.00       | V                  |
| 11950.500       | 46.98                       | -31.48          | 39.09                 | 39.37                   | 74.00          | 27.02       | 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17962.000       | 57.24                       | -25.50          | 46.66                 | 36.08                   | 74.00          | 16.76       | V                  |
| 17973.600       | 57.23                       | -25.50          | 46.66                 | 36.07                   | 74.00          | 16.77       | V                  |
| 14804.500       | 51.12                       | -28.32          | 41.35                 | 38.10                   | 68.30          | 17.18       | V                  |
| 14475.600       | 50.87                       | -28.59          | 42.46                 | 37.00                   | 74.00          | 23.13       | H                  |
| 11852.100       | 48.01                       | -31.85          | 39.05                 | 40.81                   | 74.00          | 25.99       | H                  |
| 11898.900       | 46.77                       | -31.85          | 39.05                 | 39.57                   | 74.00          | 27.23       | V                  |

### 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) |
|-----------------|-----------------------------|-----------------|-----------------------|-------------------------|----------------|-------------|--------------------|
| 17968.700       | 57.47                       | -25.50          | 46.66                 | 36.31                   | 74.00          | 16.53       | V                  |
| 17987.300       | 57.31                       | -25.50          | 46.66                 | 36.15                   | 74.00          | 16.69       | V                  |
| 14415.600       | 51.59                       | -28.59          | 42.46                 | 37.72                   | 68.30          | 16.71       | H                  |
| 14371.600       | 51.19                       | -28.42          | 42.34                 | 37.27                   | 68.30          | 17.11       | H                  |
| 11312.500       | 46.30                       | -32.36          | 38.77                 | 39.90                   | 74.00          | 27.70       | H                  |
| 11847.100       | 46.20                       | -31.85          | 39.05                 | 39.00                   | 74.00          | 27.80       | V                  |

## A.6. Band Edges Compliance

### A6.1 Band Edges - Radiated

#### Measurement Limit:

| Standard                  | Limit (dBm/MHz)                                |      |
|---------------------------|------------------------------------------------|------|
| FCC 47 CFR<br>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. |      |

#### 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.

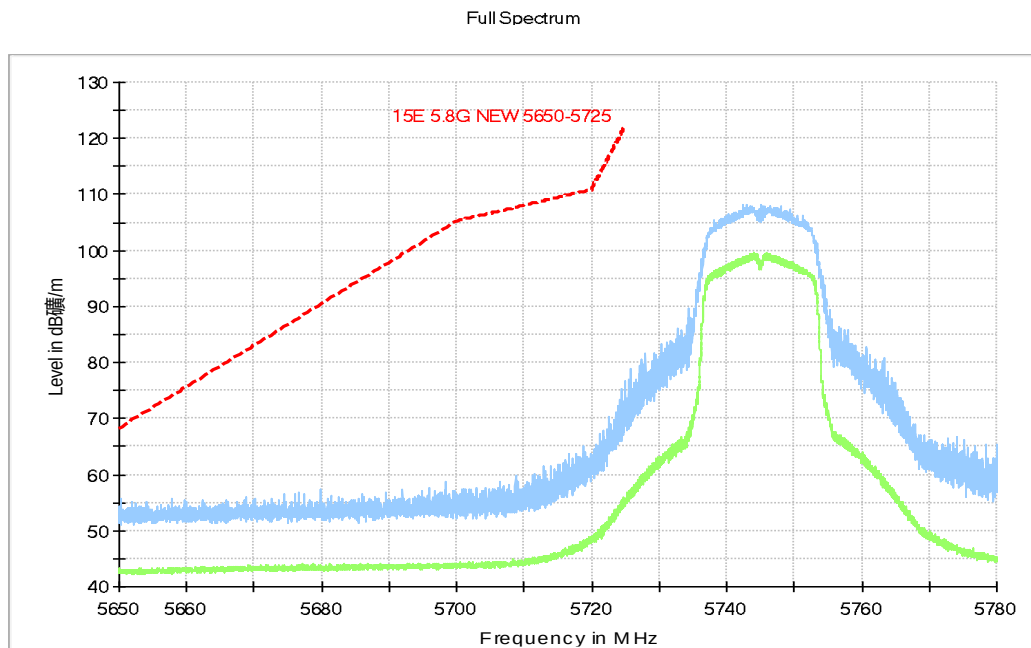
#### The receiver references:

| 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            |

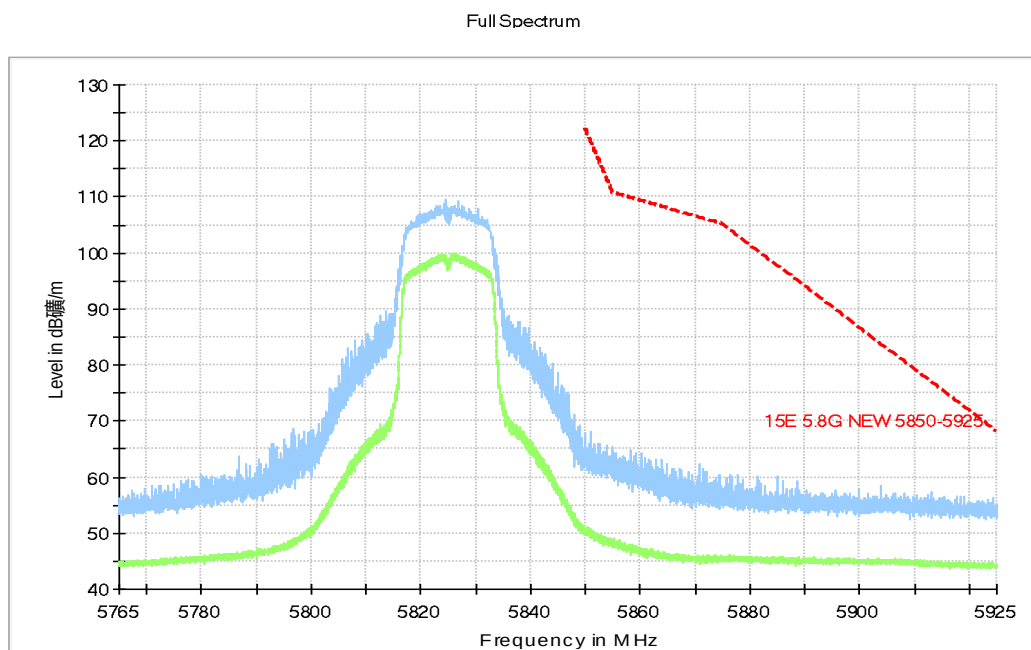
**Measurement Result:**

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

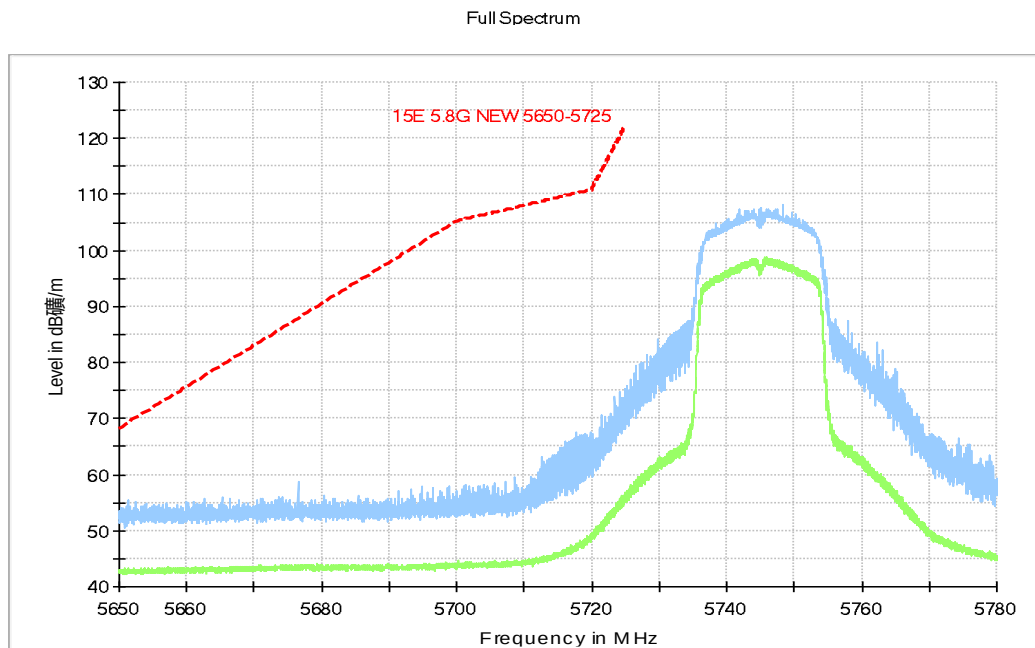
**Conclusion: PASS**
**Test graphs as below:**



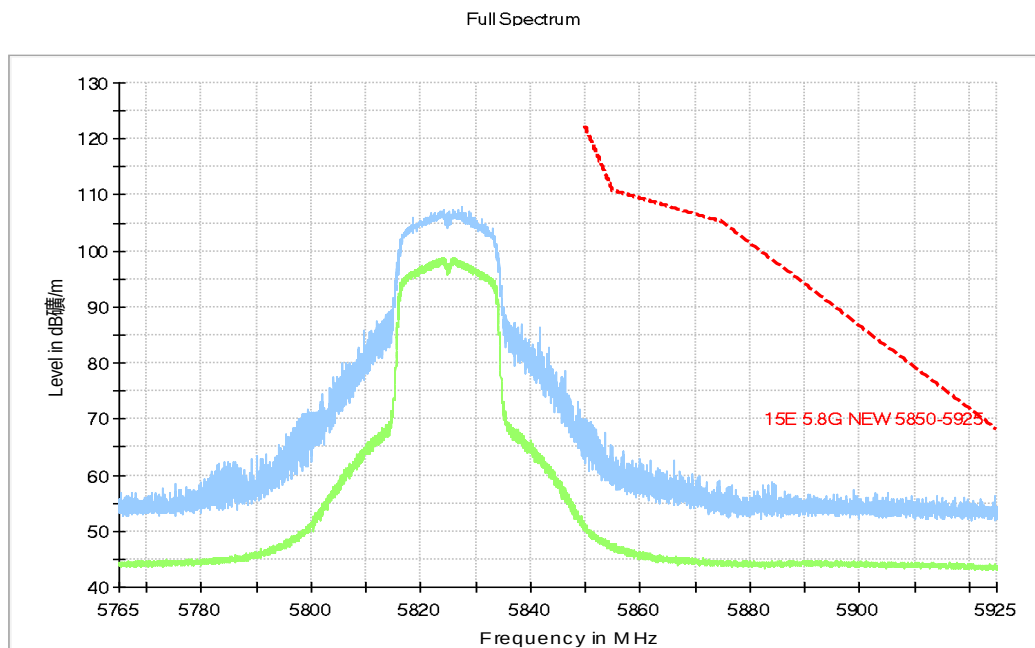
**Fig. 10 Band Edges (802.11a Ch149,5745MHz)**



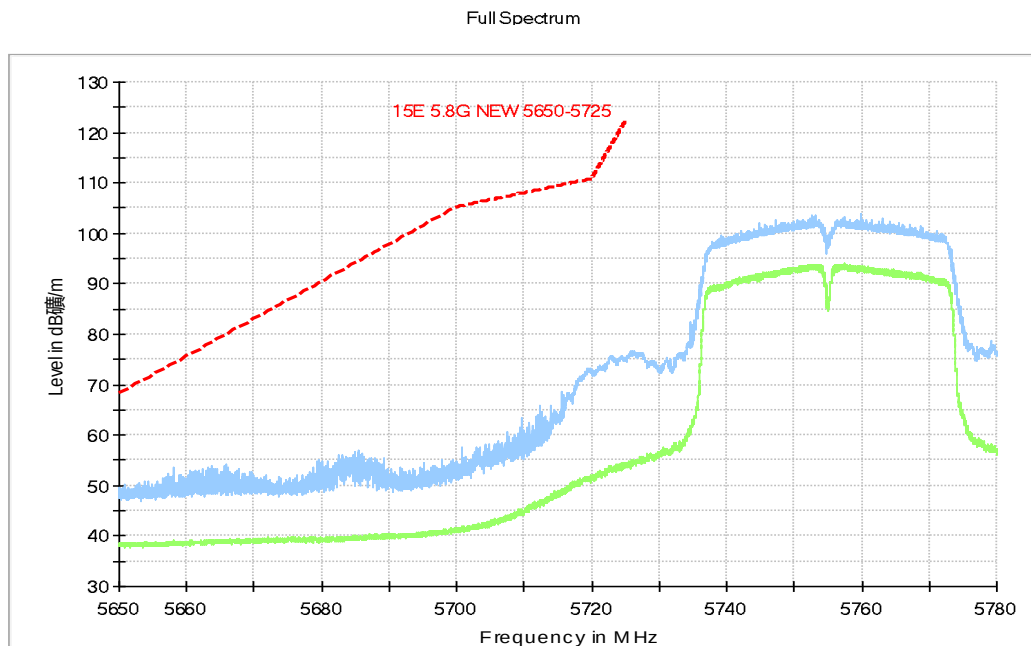
**Fig. 11 Band Edges (802.11a Ch165, 5825MHz)**



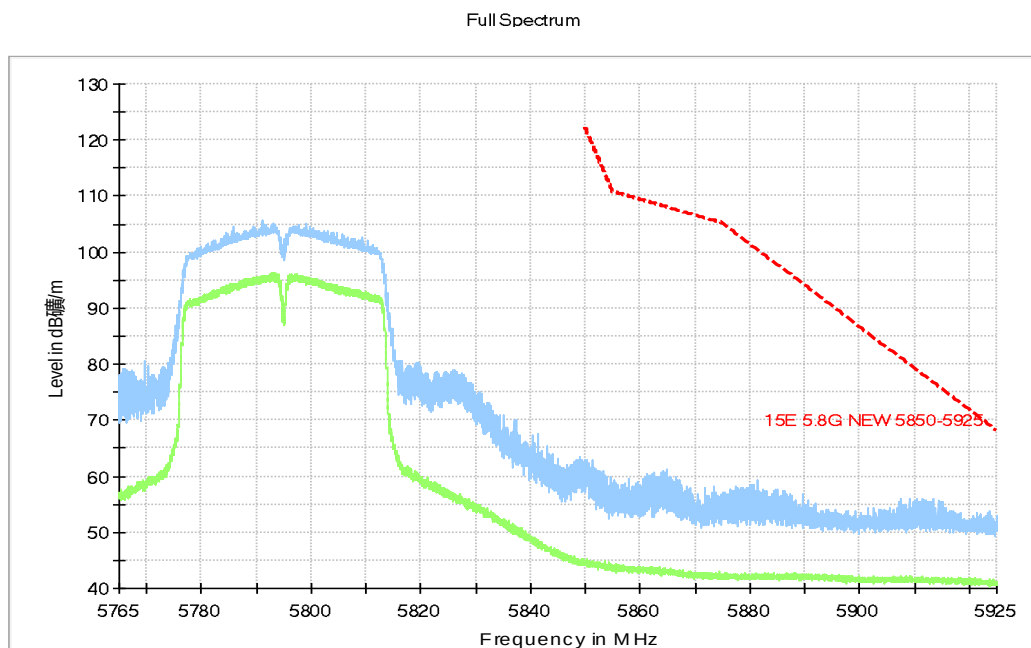
**Fig. 12 Band Edges (802.11n-HT20 Ch149, 5745MHz)**



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

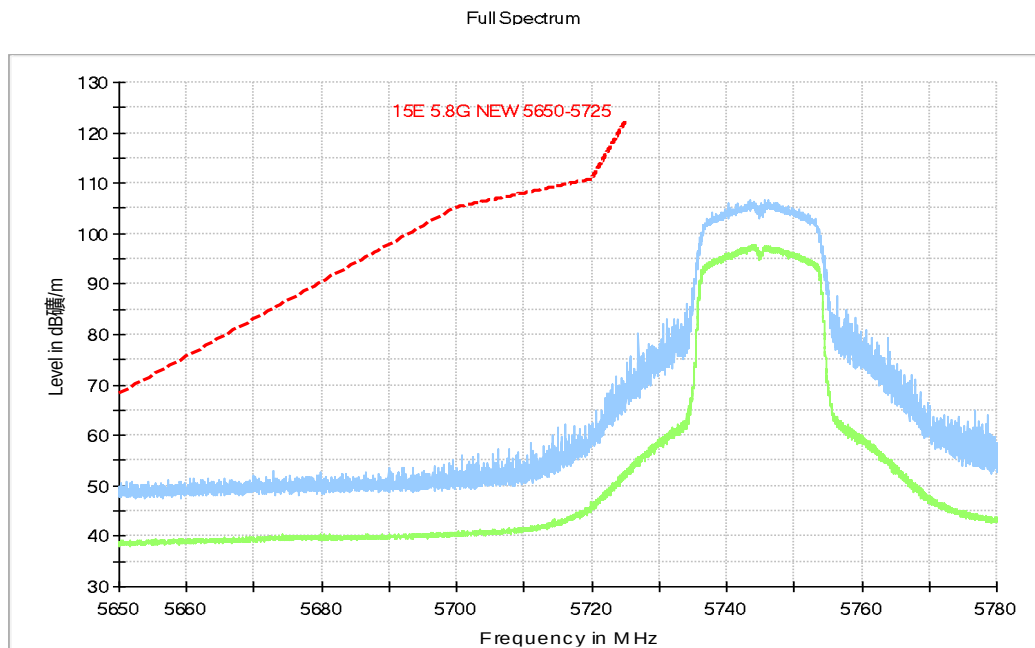


**Fig. 14 Band Edges (802.11n-HT40 Ch151, 5755MHz)**

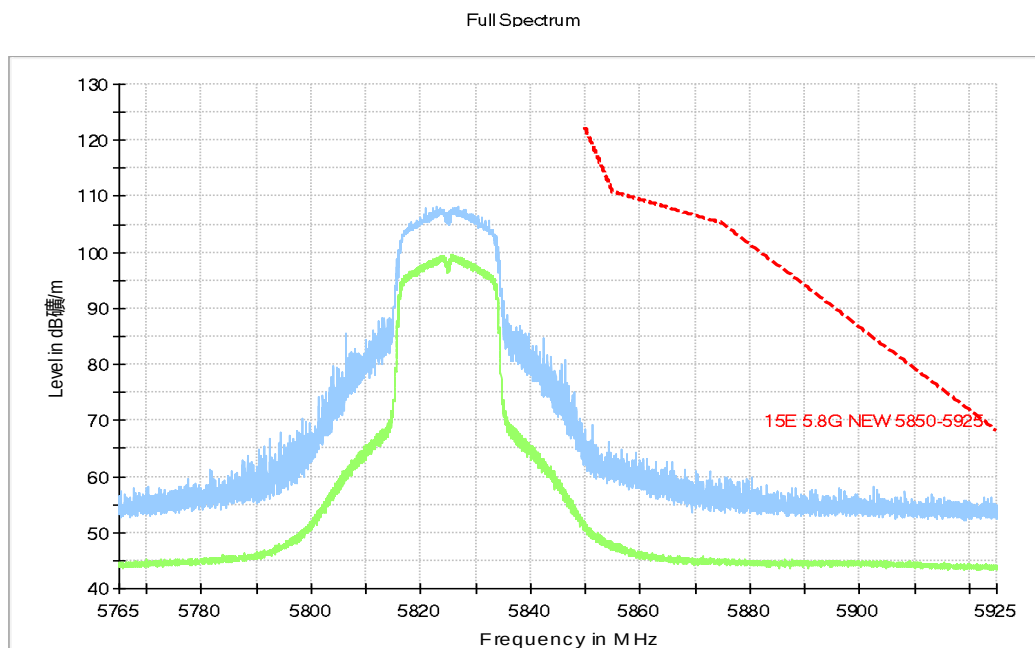


**Fig. 15 Band Edges (802.11n-HT40 Ch159, 5795MHz)**

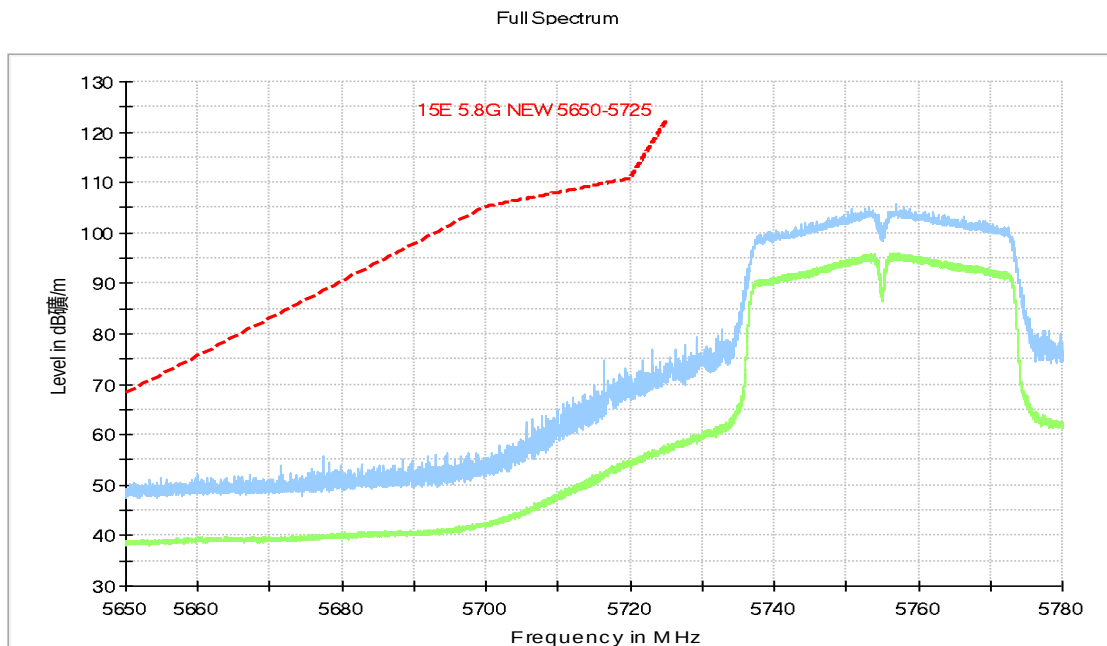




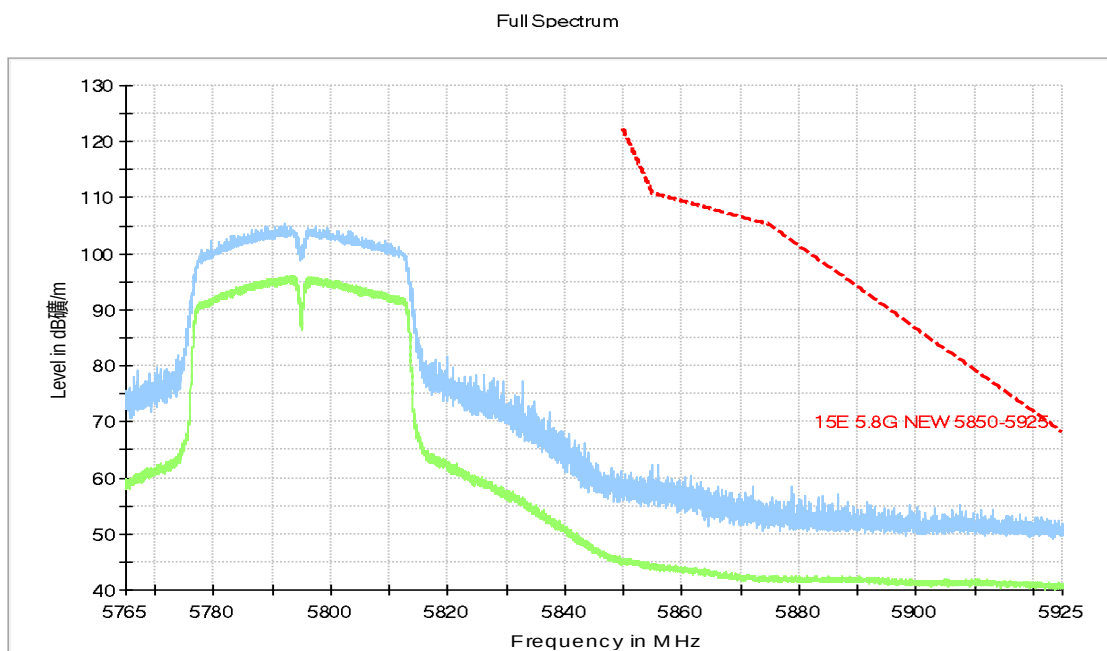
**Fig. 16 Band Edges (802.11ac-HT20 Ch149, 5745MHz)**



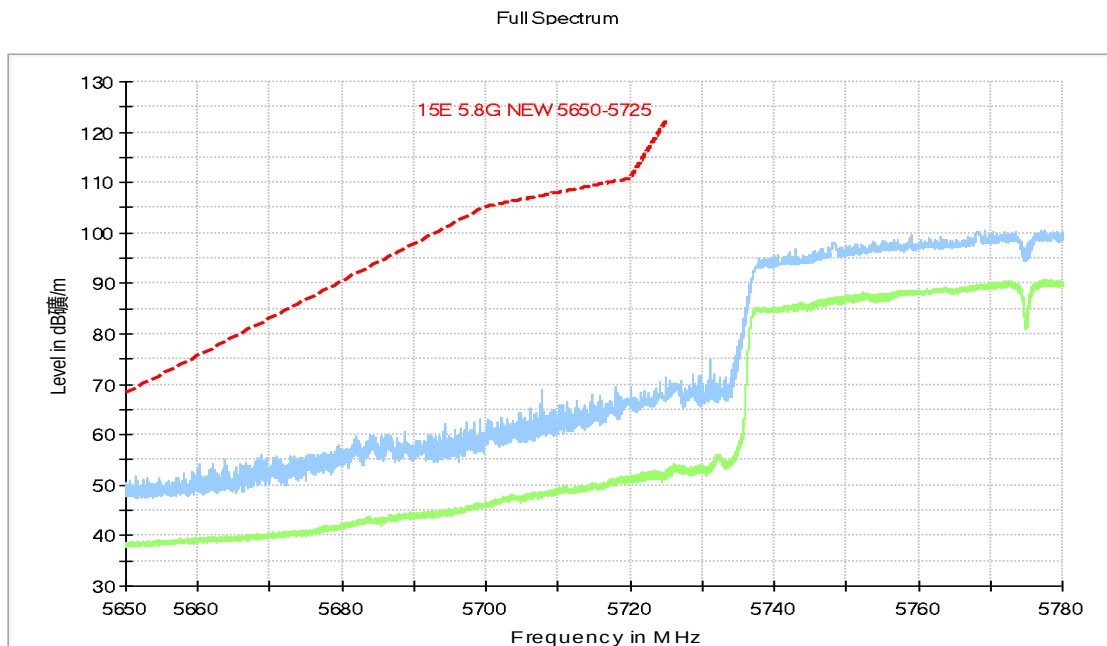
**Fig. 17 Band Edges (802.11ac-HT20 Ch165, 5825MHz)**



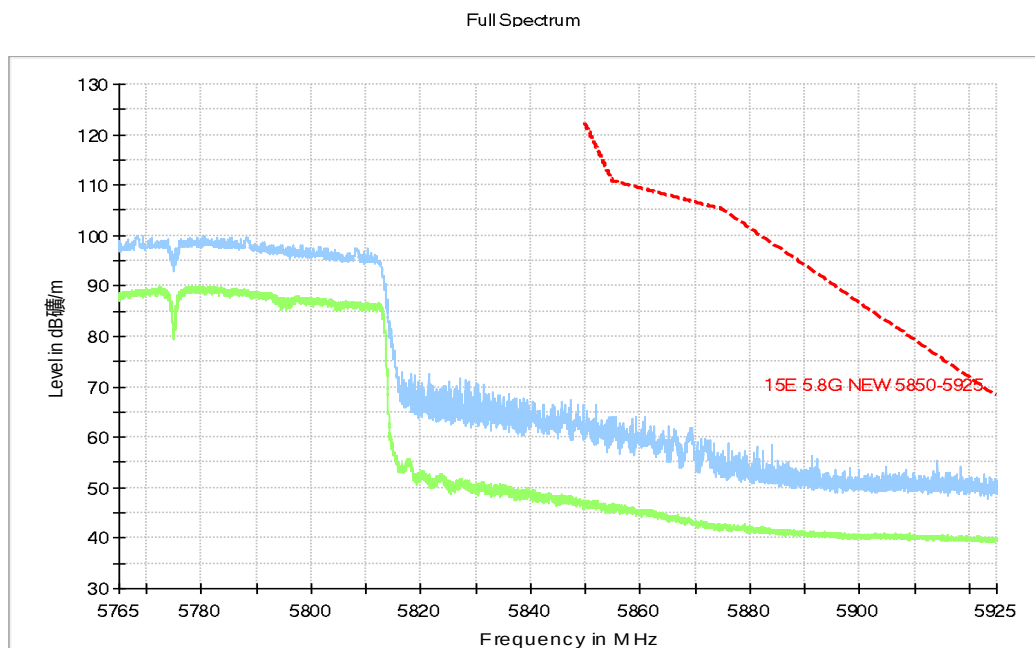
**Fig. 18 Band Edges (802.11ac-HT40 Ch151, 5755MHz)**



**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 Ch156, 5775MHz)**

## A.7. AC Powerline Conducted Emission

### Method of Measurement:

See Clause 6.2 of ANSI C63.10-2013 specifically.

See Clause 4 and Clause 5 of ANSI C63.10-2013 generally.

The conducted emissions from the AC port of the EUT are measured in a shielding room. The EUT is connected to a Line Impedance Stabilization Network (LISN). An overview sweep with peak detection was performed. The measurements were performed with a quasi-peak detector and if required, an average detector.

The conducted emission measurements were made with the following detector of the test receiver:  
Quasi-Peak / Average Detector.

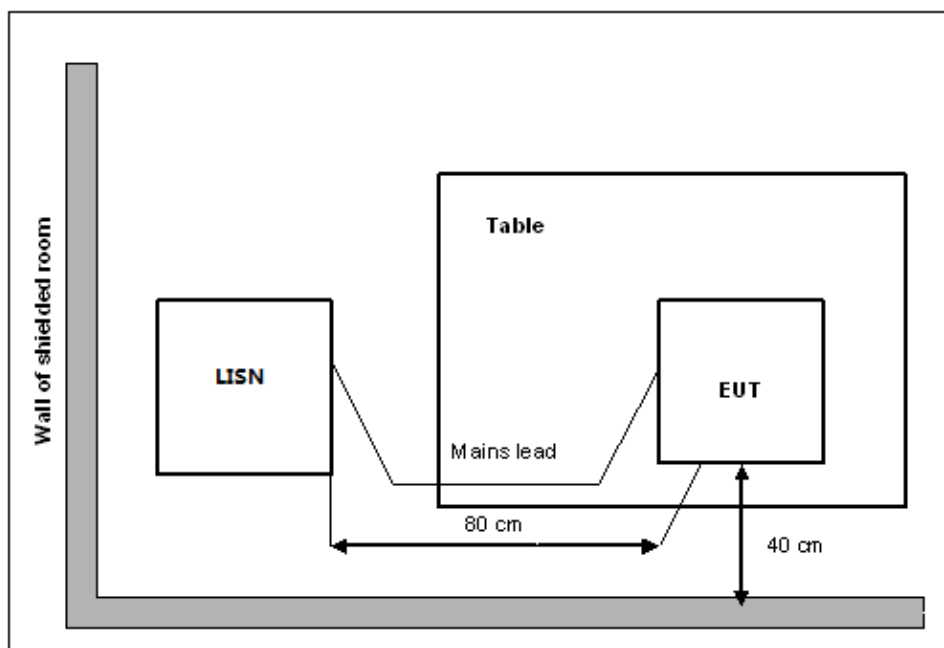
The measurement bandwidth is:

| Frequency of Emission (MHz) | RBW/IF bandwidth |
|-----------------------------|------------------|
| 0.15-30                     | 9kHz             |

### Test Condition:

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

### Measurement Setup



**Measurement Result and limit:**
**WLAN (Quasi-peak Limit)**

| Frequency range<br>(MHz)                                                                                 | Quasi-peak<br>Limit (dBμV) | Result (dBμV) |        | 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)**

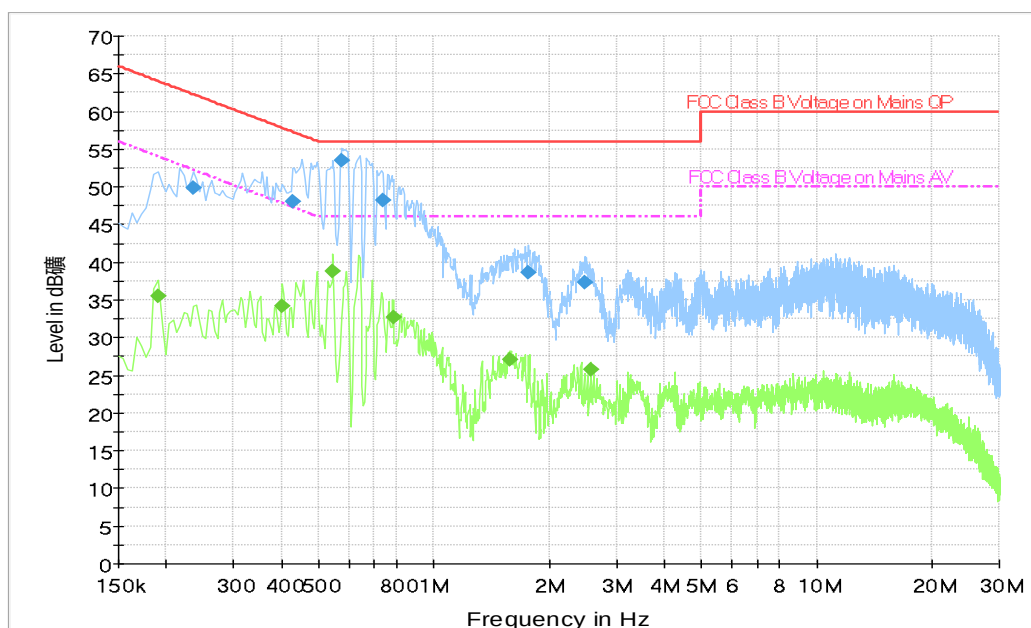
| Frequency range<br>(MHz)                                                                                 | Average Limit<br>(dBμV) | Result (dBμV) |        | Conclusion |
|----------------------------------------------------------------------------------------------------------|-------------------------|---------------|--------|------------|
|                                                                                                          |                         | 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:**

Traffic:



**Fig. 22 AC Power line Conducted Emission-802.11a**

Note1: The graphic result above is the maximum of the measurements for both phase line and neutral line.

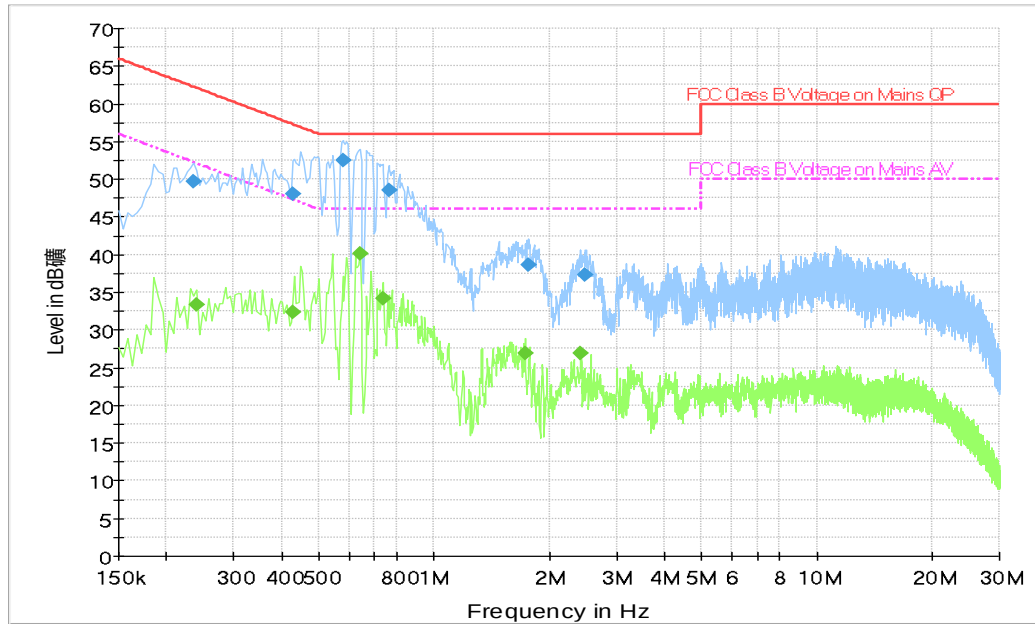
### Final Result 1

| Frequency<br>(MHz) | QuasiPeak<br>(dBμV) | Meas.<br>Time | Bandwidth<br>(kHz) | Filter | Line | Corr.<br>(dB) | Margin<br>(dB) | Limit<br>(dBμV) |
|--------------------|---------------------|---------------|--------------------|--------|------|---------------|----------------|-----------------|
| 0.235500           | 49.9                | 1000          | 9.000              | On     | L1   | 20.0          | 12.4           | 62.3            |
| 0.429000           | 48.1                | 1000          | 9.000              | On     | N    | 19.9          | 9.2            | 57.3            |
| 0.573000           | 53.4                | 1000          | 9.000              | On     | N    | 19.9          | 2.6            | 56.0            |
| 0.739500           | 48.1                | 1000          | 9.000              | On     | N    | 19.8          | 7.9            | 56.0            |
| 1.765500           | 38.7                | 1000          | 9.000              | On     | L1   | 19.5          | 17.3           | 56.0            |
| 2.490000           | 37.4                | 1000          | 9.000              | On     | L1   | 19.5          | 18.6           | 56.0            |

### Final Result 2

| Frequency<br>(MHz) | QuasiPeak<br>(dBμV) | Meas.<br>Time | Bandwidth<br>(kHz) | Filter | Line | Corr.<br>(dB) | Margin<br>(dB) | Limit<br>(dBμV) |
|--------------------|---------------------|---------------|--------------------|--------|------|---------------|----------------|-----------------|
| 0.190500           | 35.4                | 1000          | 9.000              | On     | L1   | 20.0          | 18.6           | 54.0            |
| 0.402000           | 34.2                | 1000          | 9.000              | On     | N    | 19.9          | 13.6           | 47.8            |
| 0.546000           | 38.9                | 1000          | 9.000              | On     | N    | 19.9          | 7.1            | 46.0            |
| 0.784500           | 32.7                | 1000          | 9.000              | On     | L1   | 19.7          | 13.3           | 46.0            |
| 1.581000           | 27.1                | 1000          | 9.000              | On     | N    | 19.8          | 18.9           | 46.0            |
| 2.566500           | 25.7                | 1000          | 9.000              | On     | N    | 19.7          | 20.3           | 46.0            |

Idle:



**Fig. 23 AC Power line Conducted Emission-Idle**

Note1: 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 | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|------------------|------------|-----------------|--------|------|------------|-------------|--------------|
| 0.235500        | 49.8             | 1000       | 9.000           | On     | L1   | 20.0       | 12.5        | 62.3         |
| 0.429000        | 48.0             | 1000       | 9.000           | On     | N    | 19.9       | 9.3         | 57.3         |
| 0.577500        | 52.5             | 1000       | 9.000           | On     | N    | 19.9       | 3.5         | 56.0         |
| 0.762000        | 48.5             | 1000       | 9.000           | On     | N    | 19.8       | 7.5         | 56.0         |
| 1.770000        | 38.7             | 1000       | 9.000           | On     | L1   | 19.5       | 17.3        | 56.0         |
| 2.490000        | 37.4             | 1000       | 9.000           | On     | L1   | 19.5       | 18.6        | 56.0         |

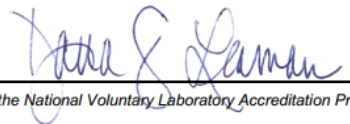
### Final Result 2

| Frequency (MHz) | QuasiPeak (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|------------------|-----------------|-----------------|--------|------|------------|-------------|--------------|
| 0.240000        | 33.4             | 1000.0          | 9.000           | On     | N    | 19.8       | 18.7        | 52.1         |
| 0.429000        | 32.4             | 1000.0          | 9.000           | On     | L1   | 19.9       | 14.9        | 47.3         |
| 0.640500        | 40.1             | 1000.0          | 9.000           | On     | N    | 19.8       | 5.9         | 46.0         |
| 0.739500        | 34.2             | 1000.0          | 9.000           | On     | N    | 19.8       | 11.8        | 46.0         |
| 1.734000        | 26.9             | 1000.0          | 9.000           | On     | L1   | 19.5       | 19.1        | 46.0         |
| 2.422500        | 26.9             | 1000.0          | 9.000           | On     | N    | 19.8       | 19.1        | 46.0         |

## ANNEX B: EUT parameters

Disclaimer: The worse case 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

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| <p>United States Department of Commerce<br/>National Institute of Standards and Technology</p> <div style="display: flex; justify-content: space-around; align-items: center;"><div style="font-size: 2em; font-weight: bold; letter-spacing: 0.5em;">NVLAP<sup>®</sup></div><div style="text-align: center;"></div></div> <hr style="border: 0.5px solid black;"/> <p style="font-size: 1.2em; font-weight: bold;">Certificate of Accreditation to ISO/IEC 17025:2017</p> <hr style="border: 0.5px solid black;"/> <p>NVLAP LAB CODE: 600118-0</p> <p style="font-weight: bold; font-size: 1.1em;">Telecommunication Technology Labs, CAICT</p> <p style="text-align: center;">Beijing<br/>China</p> <p style="font-size: 0.8em;"><i>is accredited by the National Voluntary Laboratory Accreditation Program for specific services,<br/>listed on the Scope of Accreditation, for:</i></p> <p style="font-weight: bold; font-size: 1.1em;">Electromagnetic Compatibility &amp; Telecommunications</p> <p style="font-size: 0.8em;"><i>This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.<br/>This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality<br/>management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).</i></p> <div style="display: flex; justify-content: space-between; align-items: flex-end; padding-top: 20px;"><div style="width: 30%; text-align: center;"><hr style="border: 0.5px solid black;"/><p style="font-size: 0.8em;">2020-09-29 through 2021-09-30<br/><i>Effective Dates</i></p></div><div style="width: 15%; text-align: center;"></div><div style="width: 40%; text-align: center;"><hr style="border: 0.5px solid black;"/><p style="font-size: 0.8em;">For the National Voluntary Laboratory Accreditation Program</p></div></div> |  |
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