



# FCC PART 15C TEST REPORT No.I22Z61849-IOT05

for

**HMD Global Oy**

**Smart Phone**

**TA-1515**

With

**FCC ID: 2AJOTTA-1515**

**Hardware Version: V1.0**

**Software Version: 00US\_0\_060**

**Issued Date: 2022-12-15**

**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**

<b>Report Number</b>	<b>Revision</b>	<b>Description</b>	<b>Issue Date</b>
I22Z61849-IOT05	Rev.0	1st edition	2022-12-10
I22Z61849-IOT05	Rev.1	Update IMEI of UT03b; Update the information of section 3.3.	2022-12-15

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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

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

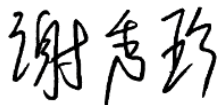
Relative Humidity: 20-75%

### 1.4. Project date

Testing Start Date: 2022-09-26

Testing End Date: 2022-12-10

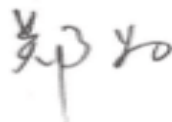
### 1.5. Signature



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Xie Xiuzhen

( Prepared this test report )



---

Zheng Wei

(Reviewed this test report)



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Pang Shuai

(Approved this test report)



## **2. CLIENT INFORMATION**

### **2.1. Applicant Information**

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### **2.2. Manufacturer Information**

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Email: reza.serafat@hmdglobal.com  
Telephone: +491735287964  
Fax: /

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

#### EQUIPMENT(AE)

##### 3.1. About EUT

Description	Smart Phone
Model name	TA-1515
FCC ID	2AJOTTA-1515
WLAN Frequency Band	ISM Band: 5725MHz~5850MHz
Type of modulation	OFDM
Voltage	3.85V

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

EUT ID*	IMEI	HW Version	SW Version
UT03b	357433970004604	V1.0	00US_0_060
UT26a	357433970001162	V1.0	00US_0_060

\*EUT ID: is used to identify the test sample in the lab internally.  
 UT03b is used for Conduction test, UT26a is used for Radiation test.

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

AE ID*	Description	SN
AE1	Battery	/
AE2	Battery	/
AE3	USB Cable	/
AE4	Charger	/

###### AE1

Model	TN-BP4000N2
Manufacturer	Guangdong Fenghua new energy co.,ltd.
Capacity	3900
Nominal Voltage	3.85

###### AE2

Model	TN-BP4000N2
Manufacturer	Dongguan Ganfeng Electronics Co., Ltd
Capacity	3900
Nominal Voltage	3.85

###### AE3

Model	TN-TC2A1MFB
Manufacturer	Saibao(Jiangxi) Communication Industrial Co., Ltd
Length of cable	/

###### AE4

Model	AD-010U
Manufacturer	SHENZHEN BAIJUNDA ELECTRONIC 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 Smart 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; 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

## 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 - Radiated	15.407 (b)	/	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/matrix manufacturer as listed in section 6.1 of this report for the EUT specified in section 3 according to the standards or reference documents listed in section 4.1.

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

### 6.3. Test Conditions

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

Temperature	26°C
Voltage	3.85V
Humidity	44%

## 7. TEST EQUIPMENTS UTILIZED

### Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Vector Signal Analyzer	FSQ40	200089	Rohde & Schwarz	1 year	2023-05-15
2	Test Receiver	ESCI	100344	R&S	1 year	2023-03-21
3	LISN	ENV216	101200	R&S	1 year	2023-06-29
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	R&S	1 year	2023-03-08
2	EMI Antenna	VULB 9163	01223	SCHWARZBECK	1 year	2023-07-25
3	EMI Antenna	3117	00167250	ETS-Lindgren	1 year	2023-06-20
4	EMI Antenna	3116	2661	ETS-Lindgren	1 year	2023-02-08

## 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	4.92
$30\text{MHz} \leq f \leq 1\text{GHz}$	5.18
$1\text{GHz} \leq f \leq 18\text{GHz}$	5.54
$18\text{GHz} \leq f \leq 40\text{GHz}$	5.26

### 8.6. AC Power-line Conducted Emission

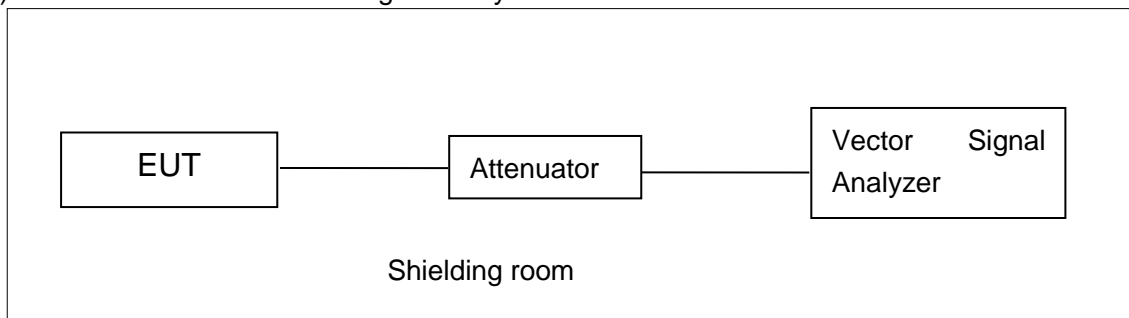
Measurement Uncertainty : 3.08dB,k=2

## 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

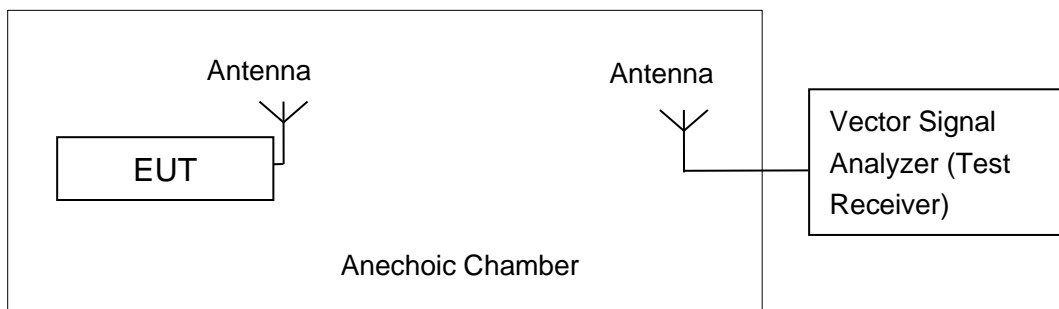


#### A.1.2. Radiated Emission Measurements

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 0.42dBi and the value is supplied by the applicant or manufacturer.

### A.2.2. Maximum Average Output Power-Conducted

Antenna gain: 0.42dBi

### Measurement Results:

#### 802.11a mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11a	6	17.95	18.08	18.36

The data rate 6Mbps is selected as worst 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	18.39	18.40	18.41

The data rate MCS0 is selected as worst 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	17.28	17.48	17.47

The data rate MCS0 is selected as worst 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	16.47	16.74

The data rate MCS0 is selected as worst 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	15.09	14.92

The data rate MCS0 is selected as worst 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	14.55

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

The duty cycle of all mode are 98%.

**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
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### Measurement Results:

Mode	Channel	Power Spectral Density ( dBm/500kHz )	Conclusion
802.11a	149	5.05	P
	157	4.98	P
	165	4.97	P
802.11n HT20	149	4.58	P
	157	4.54	P
	165	4.50	P
802.11n HT40	151	-0.49	P
	159	-0.13	P
802.11ac HT80	155	-5.66	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:

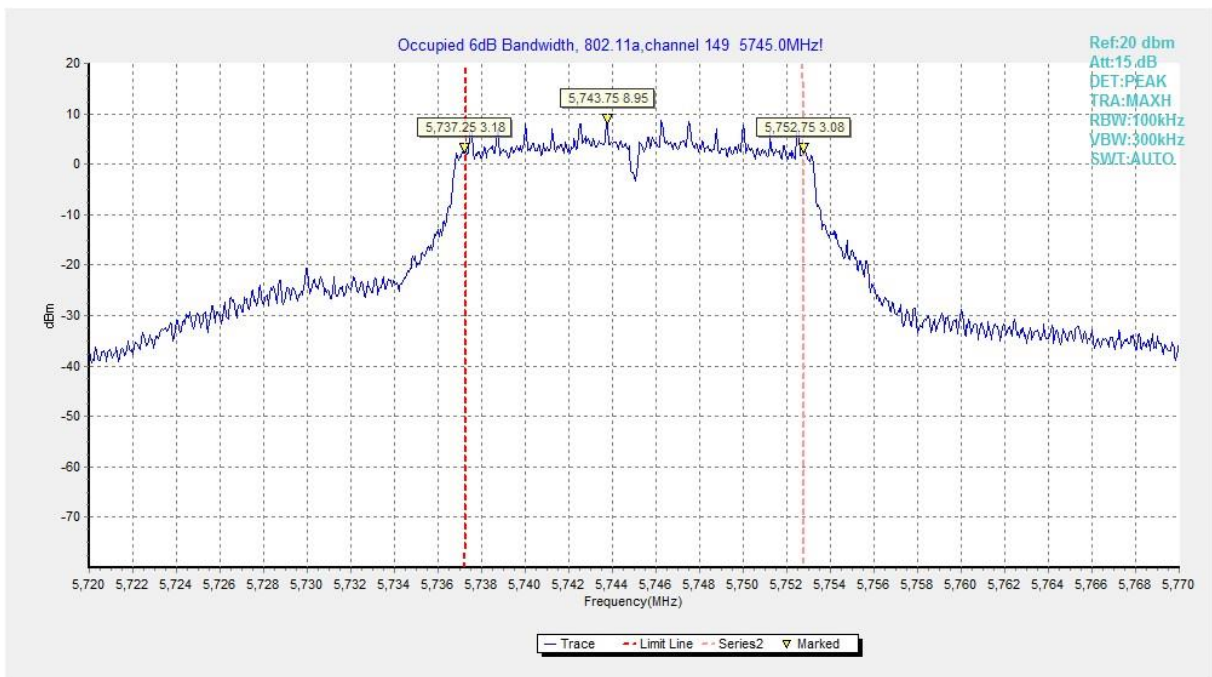
Measurement Uncertainty	60.80Hz
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#### Measurement Result:

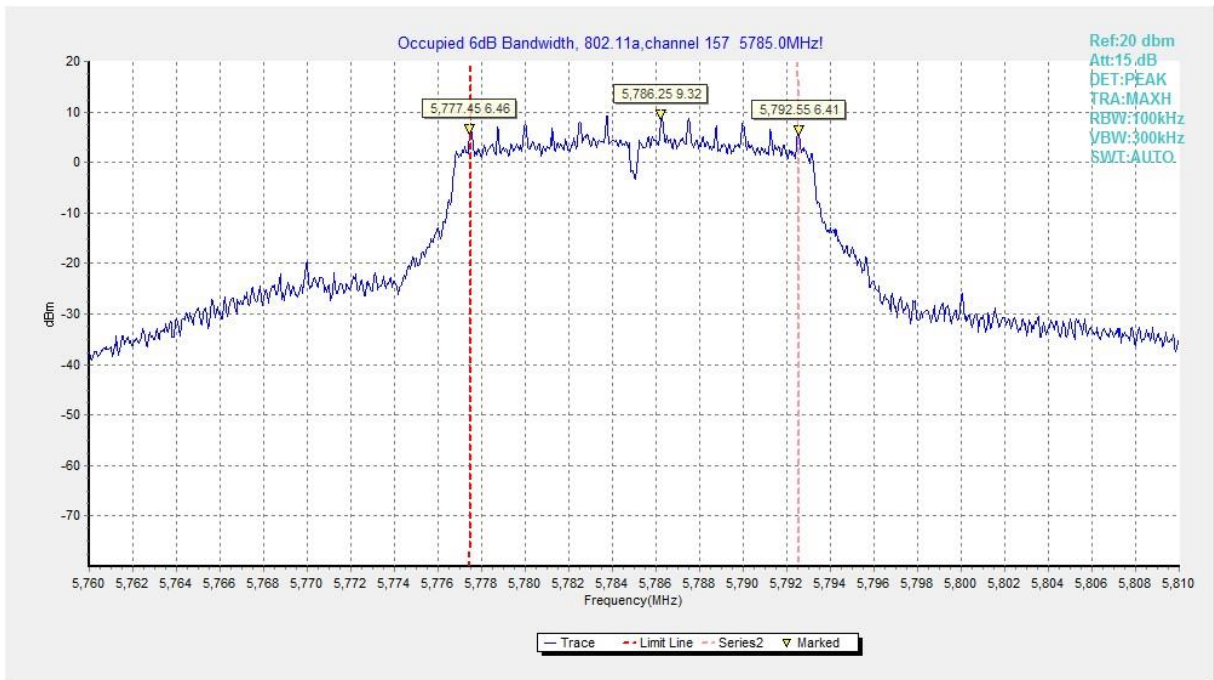
Mode	Channel	Occupied 6dB Bandwidth ( MHz)		conclusion
802.11a	149	Fig.1	15.50	P
	157	Fig.2	15.10	P
	165	Fig.3	15.35	P
802.11n HT20	149	Fig.4	16.00	P
	157	Fig.5	15.70	P
	165	Fig.6	15.95	P
802.11n HT40	151	Fig.7	35.76	P
	159	Fig.8	35.76	P
802.11ac HT80	155	Fig.9	75.36	P

### Conclusion: PASS

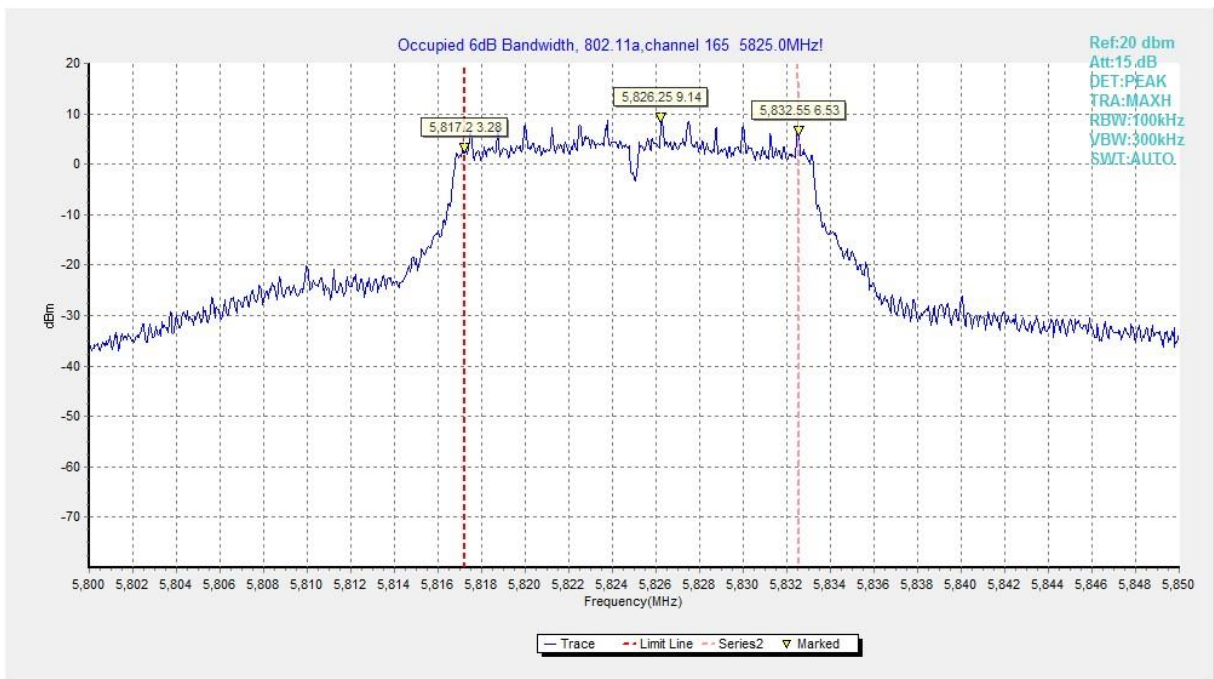
#### Test graphs as below:



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

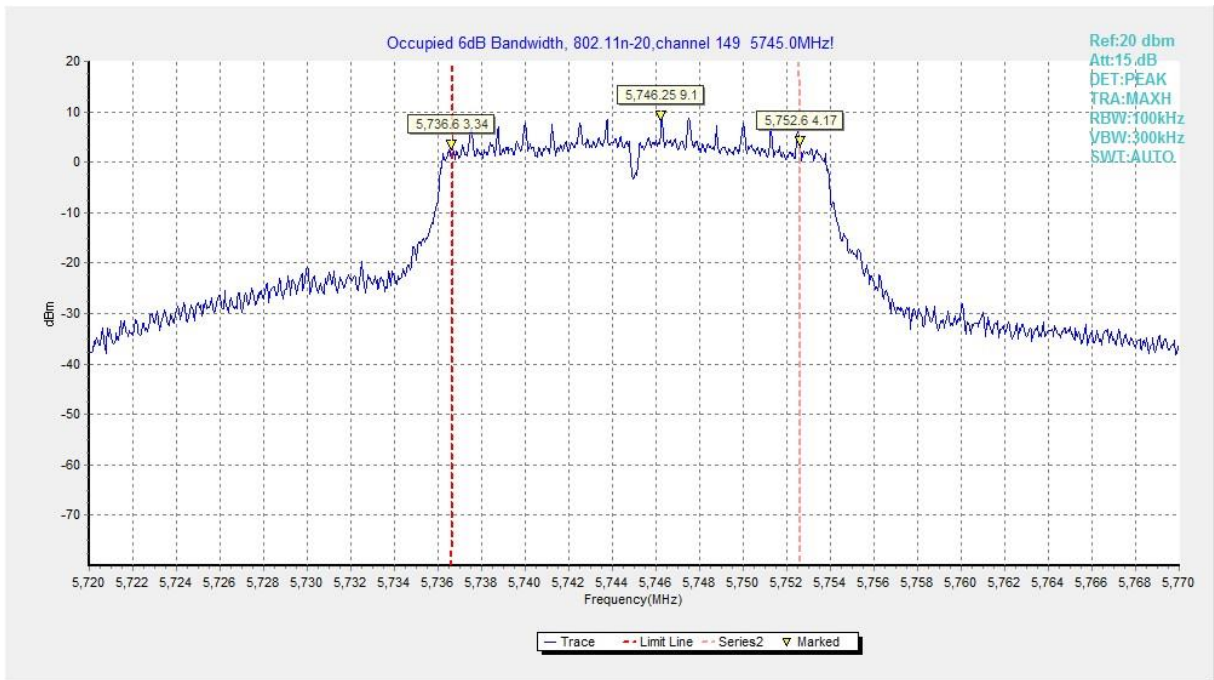


**Fig. 2 Occupied 6dB Bandwidth (802.11a, Ch 157)**

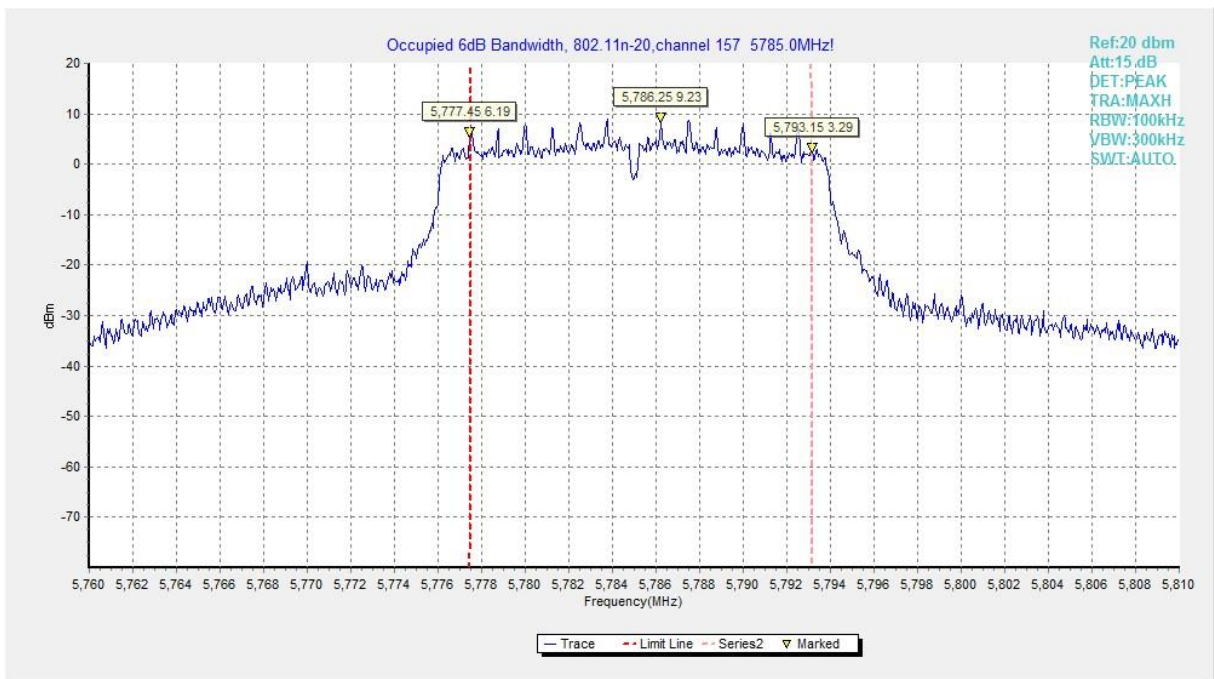


**Fig. 3 Occupied 6dB Bandwidth (802.11a, Ch 165)**

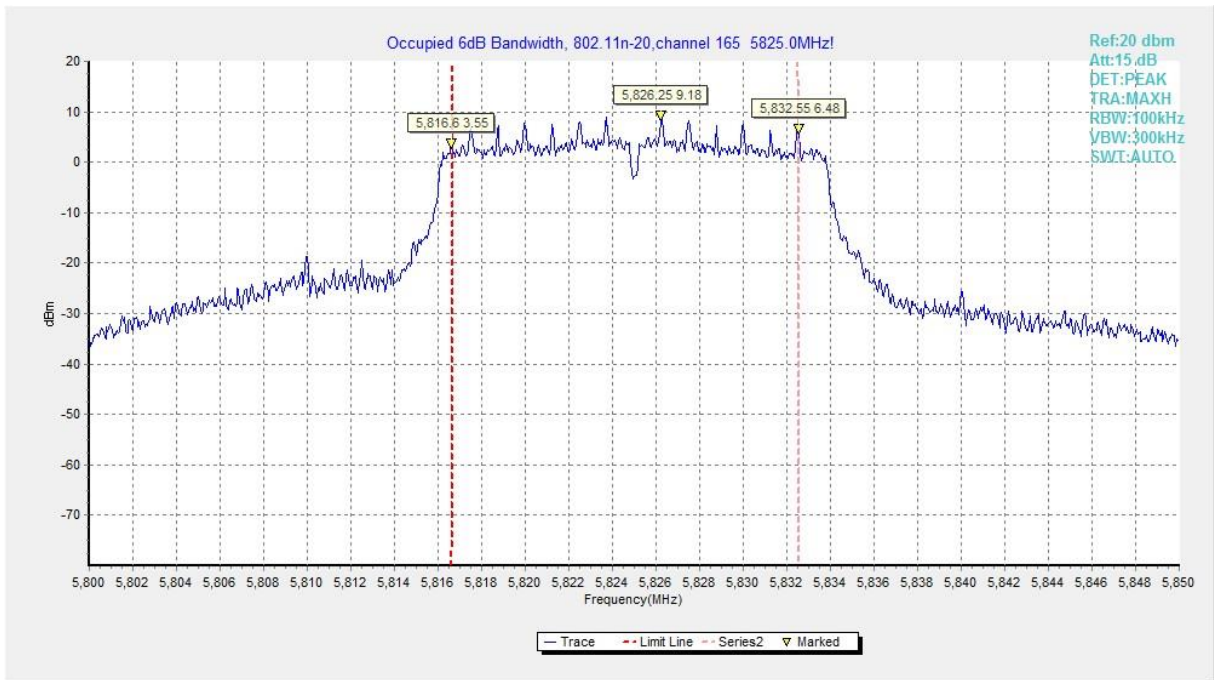




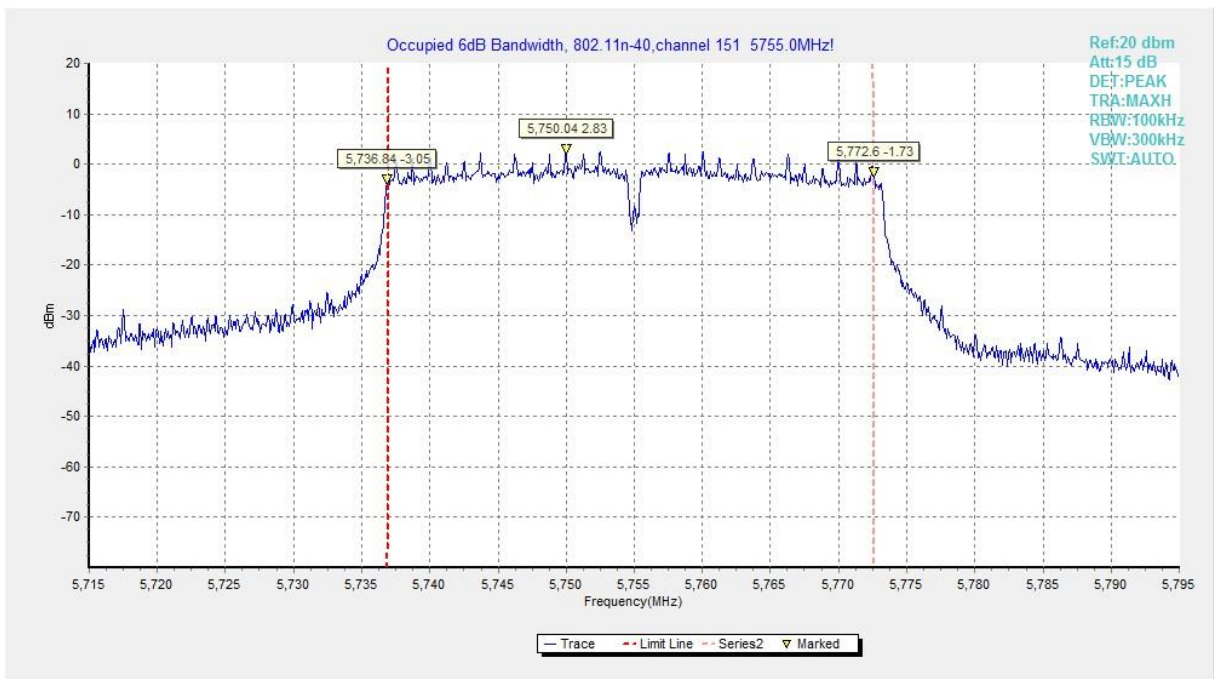
**Fig. 4 Occupied 6dB Bandwidth (802.11n-HT20, Ch 149)**



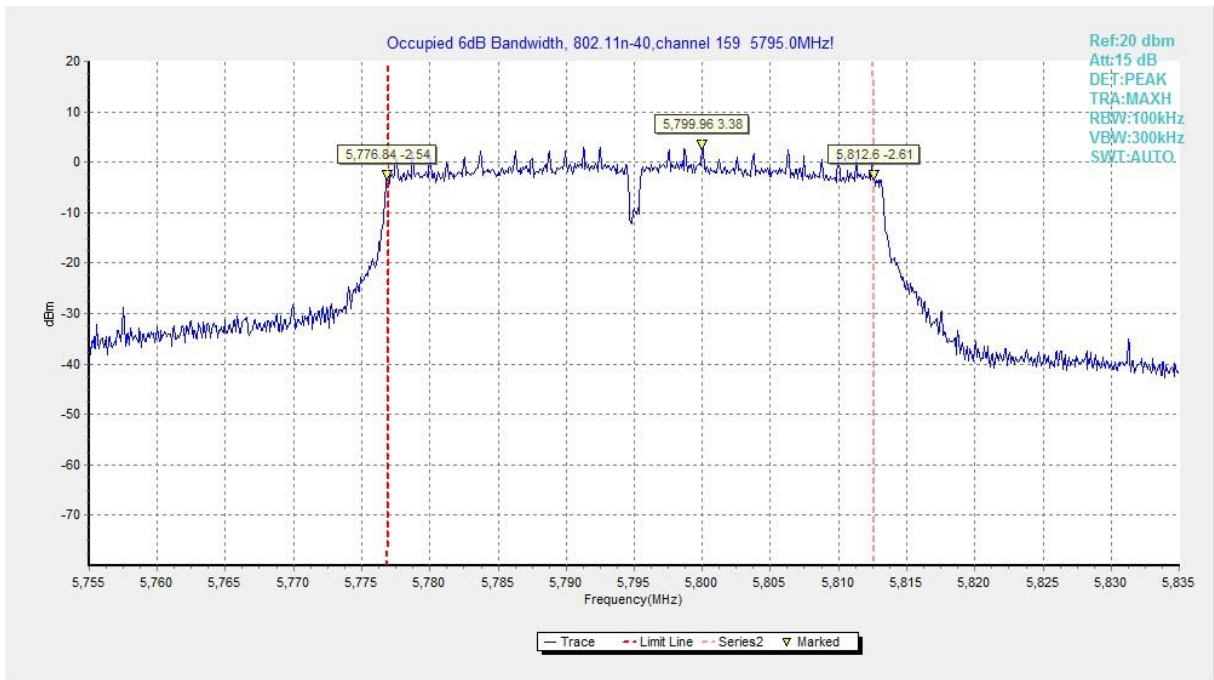
**Fig. 5 Occupied 6dB Bandwidth (802.11n-HT20, Ch 157)**



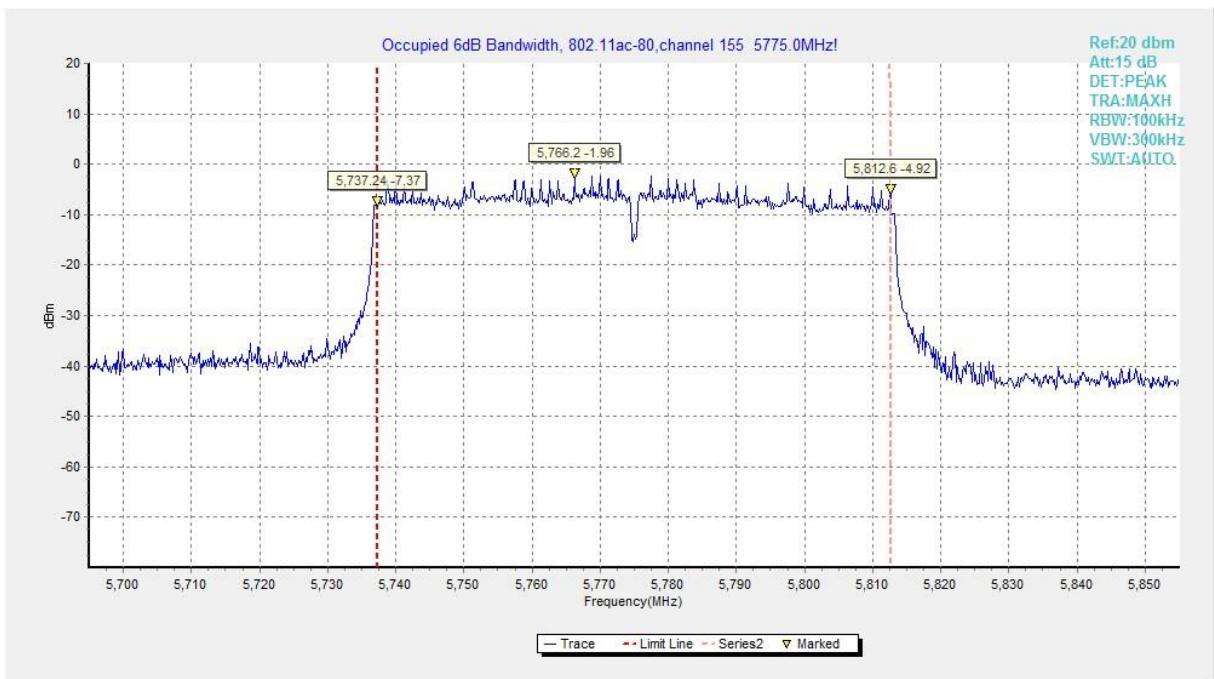
**Fig. 6 Occupied 6dB Bandwidth (802.11n-HT20, Ch 165)**



**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.	

The measurement is made according to KDB 789033

#### Measurement Results:

EUT ID: UT26a

#### 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	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

#### 802.11n-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	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

**802.11n-HT40 mode**

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n (HT40)	151	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	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 (HT40)	151	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	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)
17938.000	41.04	-25.50	46.66	19.88	54.00	12.96	V
17930.300	41.03	-25.50	46.66	19.87	54.00	12.97	V
12331.000	38.07	-31.10	38.94	30.23	54.00	15.93	H
12260.200	37.42	-31.43	38.99	29.86	54.00	16.58	V
8215.500	34.19	-35.19	37.45	31.94	54.00	19.81	H
9083.000	34.16	-33.76	38.13	29.79	54.00	19.84	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)
17936.600	41.21	-25.50	46.66	20.05	54.00	12.79	V
17976.500	41.21	-25.50	46.66	20.05	54.00	12.79	V
12332.800	37.25	-31.10	38.94	29.41	54.00	16.75	H
12225.400	37.24	-31.43	38.99	29.68	54.00	16.76	V
9063.200	33.81	-33.76	38.13	29.44	54.00	20.19	H
8497.800	33.68	-34.13	37.86	29.94	54.00	20.32	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)
17975.100	41.07	-25.50	46.66	19.91	54.00	12.93	V
17969.200	40.96	-25.50	46.66	19.80	54.00	13.04	V
12331.000	37.48	-31.10	38.94	29.64	54.00	16.52	H
12290.600	37.38	-31.10	38.94	29.54	54.00	16.62	V
8348.200	33.84	-34.50	37.68	30.66	54.00	20.16	V
9135.500	33.76	-33.85	38.08	29.53	54.00	20.24	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)
17935.500	41.25	-25.50	46.66	20.09	54.00	12.75	H
17934.000	41.19	-25.50	46.66	20.03	54.00	12.81	V
12221.700	37.37	-31.43	38.99	29.81	54.00	16.63	V
12266.400	37.34	-31.43	38.99	29.78	54.00	16.66	V
9053.000	34.01	-33.76	38.13	29.64	54.00	19.99	V
9100.600	34.01	-33.76	38.13	29.64	54.00	19.99	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)
17980.600	40.72	-25.50	46.66	19.56	54.00	13.28	H
17934.700	40.63	-25.50	46.66	19.47	54.00	13.37	H
12333.200	37.71	-31.10	38.94	29.87	54.00	16.29	H
12332.800	37.47	-31.10	38.94	29.63	54.00	16.53	H
9044.200	34.14	-33.76	38.13	29.77	54.00	19.86	V
9063.200	33.72	-33.76	38.13	29.35	54.00	20.28	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)
17937.300	41.05	-25.50	46.66	19.89	54.00	12.95	V
17936.200	40.83	-25.50	46.66	19.67	54.00	13.17	H
12332.400	37.63	-31.10	38.94	29.79	54.00	16.37	V
12261.700	37.37	-31.43	38.99	29.81	54.00	16.63	H
9426.600	33.81	-32.95	37.91	28.84	54.00	20.19	V
8354.100	33.79	-34.50	37.68	30.61	54.00	20.21	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)
17930.700	40.69	-25.50	46.66	19.53	54.00	13.31	V
17974.300	40.46	-25.50	46.66	19.30	54.00	13.54	H
12330.600	37.46	-31.10	38.94	29.62	54.00	16.54	V
11766.700	37.39	-31.99	38.98	30.40	54.00	16.61	H
9194.900	34.11	-33.85	38.08	29.88	54.00	19.89	H
8264.600	33.85	-34.97	37.56	31.25	54.00	20.15	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)
17942.100	41.27	-25.50	46.66	20.11	54.00	12.73	V
17888.900	40.81	-25.50	46.66	19.65	54.00	13.19	V
12332.800	37.88	-31.10	38.94	30.04	54.00	16.12	V
12262.800	37.17	-31.43	38.99	29.61	54.00	16.83	V
9064.700	34.11	-33.76	38.13	29.74	54.00	19.89	V
9457.400	33.80	-32.95	37.91	28.83	54.00	20.20	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)
17936.200	40.76	-25.50	46.66	19.60	54.00	13.24	V
17869.100	40.70	-25.50	46.66	19.54	54.00	13.30	H
12332.800	37.79	-31.10	38.94	29.95	54.00	16.21	V
12266.400	37.36	-31.43	38.99	29.80	54.00	16.64	H
9116.000	33.80	-33.85	38.08	29.57	54.00	20.20	V
8361.400	33.77	-34.50	37.68	30.59	54.00	20.23	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)
17901.700	40.77	-25.50	46.66	19.61	54.00	13.23	H
17928.100	40.76	-25.50	46.66	19.60	54.00	13.24	V
12330.200	37.47	-31.10	38.94	29.63	54.00	16.53	V
12303.500	37.25	-31.10	38.94	29.41	54.00	16.75	H
9014.500	34.04	-33.28	38.19	29.13	54.00	19.96	V
9061.800	33.69	-33.76	38.13	29.32	54.00	20.31	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)
17888.200	41.59	-25.50	46.66	20.43	54.00	12.41	H
17942.100	41.04	-25.50	46.66	19.88	54.00	12.96	H
12332.800	38.00	-31.10	38.94	30.16	54.00	16.00	H
12262.800	37.21	-31.43	38.99	29.65	54.00	16.79	V
8354.100	34.13	-34.50	37.68	30.95	54.00	19.87	V
9077.500	33.96	-33.76	38.13	29.59	54.00	20.04	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)
17958.200	40.94	-25.50	46.66	19.78	54.00	13.06	V
17869.800	40.85	-25.50	46.66	19.69	54.00	13.15	H
12262.000	37.43	-31.43	38.99	29.87	54.00	16.57	H
12331.000	37.39	-31.10	38.94	29.55	54.00	16.61	H
9051.500	33.89	-33.76	38.13	29.52	54.00	20.11	V
8348.600	33.88	-34.50	37.68	30.70	54.00	20.12	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)
17905.800	40.92	-25.50	46.66	19.76	54.00	13.08	V
17975.100	40.72	-25.50	46.66	19.56	54.00	13.28	V
12331.700	37.53	-31.10	38.94	29.69	54.00	16.47	H
12307.500	37.15	-31.10	38.94	29.31	54.00	16.85	V
8211.800	33.88	-35.19	37.45	31.63	54.00	20.12	H
8494.900	33.81	-34.13	37.86	30.07	54.00	20.19	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)
17866.500	40.53	-25.50	46.66	19.37	54.00	13.47	V
17961.900	40.48	-25.50	46.66	19.32	54.00	13.52	H
12300.200	37.21	-31.10	38.94	29.37	54.00	16.79	H
12332.100	37.21	-31.10	38.94	29.37	54.00	16.79	H
9408.600	34.08	-32.95	37.91	29.11	54.00	19.92	V
9126.300	33.62	-33.85	38.08	29.39	54.00	20.38	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)
17239.200	52.72	-25.95	44.35	34.31	68.30	15.58	H
17241.000	52.66	-25.95	44.35	34.25	68.30	15.64	H
12221.700	46.04	-31.43	38.99	38.48	74.00	27.96	V
12015.300	45.77	-31.48	39.09	38.16	74.00	28.23	V
8917.700	43.43	-33.54	38.14	38.82	68.30	24.87	V
9656.100	43.26	-33.06	37.97	38.35	68.30	25.04	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)
17351.000	53.54	-25.95	44.35	35.13	68.30	14.76	H
17354.300	53.43	-25.95	44.35	35.02	68.30	14.87	H
12329.900	45.67	-31.10	38.94	37.83	74.00	28.33	V
12289.900	45.63	-31.10	38.94	37.79	74.00	28.37	V
10038.600	44.35	-33.63	38.11	39.87	68.30	23.95	V
10224.800	43.57	-33.33	38.15	38.75	68.30	24.73	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)
17469.800	54.91	-26.85	45.25	36.51	68.30	13.39	H
17474.600	54.02	-26.85	45.25	35.62	68.30	14.28	H
12290.600	46.28	-31.10	38.94	38.44	74.00	27.72	V
12196.800	46.11	-31.43	38.99	38.55	74.00	27.89	V
10172.000	43.27	-33.33	38.15	38.45	68.30	25.03	H
10175.000	43.09	-33.33	38.15	38.27	68.30	25.21	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)
17236.600	51.69	-25.95	44.35	33.28	68.30	16.61	H
17241.000	51.53	-25.95	44.35	33.12	68.30	16.77	H
12297.600	45.90	-31.10	38.94	38.06	74.00	28.10	V
12329.900	45.90	-31.10	38.94	38.06	74.00	28.10	V
9993.800	43.78	-33.63	38.11	39.30	68.30	24.52	H
8886.100	43.52	-33.54	38.14	38.91	68.30	24.78	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)
17356.500	54.65	-25.95	44.35	36.24	68.30	13.65	H
17342.200	54.12	-25.95	44.35	35.71	68.30	14.18	H
11738.400	45.83	-31.99	38.98	38.84	74.00	28.17	V
12214.000	45.73	-31.43	38.99	38.17	74.00	28.27	H
10295.200	43.81	-33.68	38.17	39.31	68.30	24.49	V
10275.400	43.63	-33.68	38.17	39.13	68.30	24.67	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)
17472.700	56.13	-26.85	45.25	37.73	68.30	12.17	H
17471.300	54.50	-26.85	45.25	36.10	68.30	13.80	H
12261.700	45.65	-31.43	38.99	38.09	74.00	28.35	H
12216.200	45.58	-31.43	38.99	38.02	74.00	28.42	V
10269.600	43.93	-33.68	38.17	39.43	68.30	24.37	H
10221.900	43.37	-33.33	38.15	38.55	68.30	24.93	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)
16813.800	49.63	-26.62	41.49	34.76	68.30	18.67	V
16842.100	49.39	-26.62	41.49	34.52	68.30	18.91	H
12008.300	46.00	-31.48	39.09	38.39	74.00	28.00	H
12265.000	45.64	-31.43	38.99	38.08	74.00	28.36	H
10257.500	43.72	-33.33	38.15	38.90	68.30	24.58	H
10261.900	43.27	-33.68	38.17	38.77	68.30	25.03	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)
16870.700	50.03	-26.62	41.49	35.16	68.30	18.27	V
17001.200	49.50	-26.32	42.36	33.45	68.30	18.80	V
11503.400	45.91	-32.26	38.84	39.34	74.00	28.09	V
12326.200	45.80	-31.10	38.94	37.96	74.00	28.20	H
9836.200	43.44	-33.52	38.05	38.91	68.30	24.86	V
10282.400	43.34	-33.68	38.17	38.84	68.30	24.96	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)
17238.800	50.02	-25.95	44.35	31.61	68.30	18.28	H
17934.400	50.00	-25.50	46.66	28.84	74.00	24.00	V
12332.800	46.27	-31.10	38.94	38.43	74.00	27.73	V
12221.700	46.19	-31.43	38.99	38.63	74.00	27.81	V
10219.300	43.14	-33.33	38.15	38.32	68.30	25.16	H
10000.100	43.11	-33.63	38.11	38.63	68.30	25.19	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)
17360.500	50.10	-25.95	44.35	31.69	68.30	18.20	H
17364.200	50.00	-25.95	44.35	31.59	68.30	18.30	V
12295.000	45.79	-31.10	38.94	37.95	74.00	28.21	V
12223.500	45.17	-31.43	38.99	37.61	74.00	28.83	H
8806.600	43.47	-33.90	38.07	39.30	68.30	24.83	V
9780.800	43.09	-33.52	38.05	38.56	68.30	25.21	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)
17470.900	52.38	-26.85	45.25	33.98	68.30	15.92	H
17473.100	51.18	-26.85	45.25	32.78	68.30	17.12	H
12239.700	46.25	-31.43	38.99	38.69	74.00	27.75	V
12331.000	46.04	-31.10	38.94	38.20	74.00	27.96	V
9975.500	44.20	-33.63	38.11	39.72	68.30	24.10	H
9975.100	43.45	-33.63	38.11	38.97	68.30	24.85	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)
17954.200	49.46	-25.50	46.66	28.30	74.00	24.54	H
17968.100	49.39	-25.50	46.66	28.23	74.00	24.61	V
12331.700	45.85	-31.10	38.94	38.01	74.00	28.15	H
12325.800	45.84	-31.10	38.94	38.00	74.00	28.16	V
9612.500	43.23	-33.06	37.97	38.32	68.30	25.07	V
10253.800	43.17	-33.33	38.15	38.35	68.30	25.13	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)
17970.700	49.39	-25.50	46.66	28.23	74.00	24.61	V
17963.700	49.23	-25.50	46.66	28.07	74.00	24.77	V
12220.600	47.01	-31.43	38.99	39.45	74.00	26.99	H
12331.300	45.61	-31.10	38.94	37.77	74.00	28.39	V
10155.900	43.34	-33.45	38.13	38.66	68.30	24.96	H
9893.000	43.24	-33.48	38.08	38.64	68.30	25.06	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)
17966.600	50.22	-25.50	46.66	29.06	74.00	23.78	V
17336.700	49.44	-25.95	44.35	31.03	68.30	18.86	H
12262.000	46.09	-31.43	38.99	38.53	74.00	27.91	H
12304.200	45.71	-31.10	38.94	37.87	74.00	28.29	V
10247.900	43.14	-33.33	38.15	38.32	68.30	25.16	V
10218.600	43.05	-33.33	38.15	38.23	68.30	25.25	V

**Conclusion: PASS**

Sample calculation: 17966.600 MHz

$$\text{Peak ERP(dBm)} = P_{\text{Mea}}(29.06\text{dBuV/m}) + \text{Cable Loss}(-25.50) + \text{Antenna Factor}(46.66) = 50.22 \text{ dBuV/m}$$

## 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.	

#### Measurement Result:

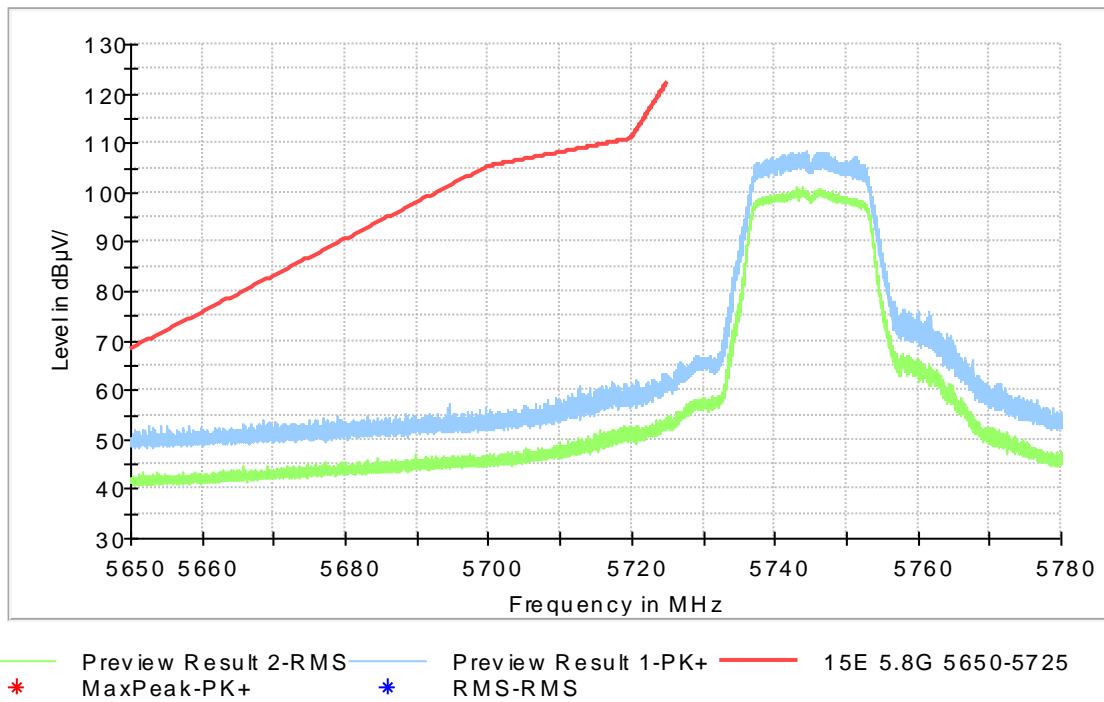
EUT ID: UT26a

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

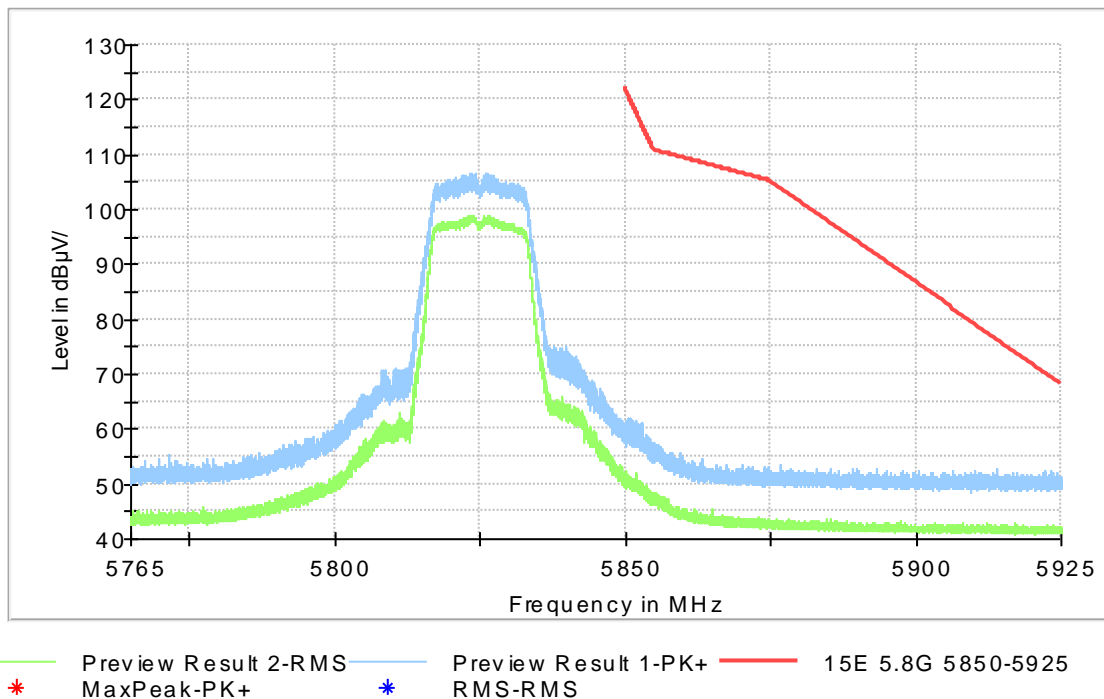
**Conclusion: PASS**

Test graphs as below:

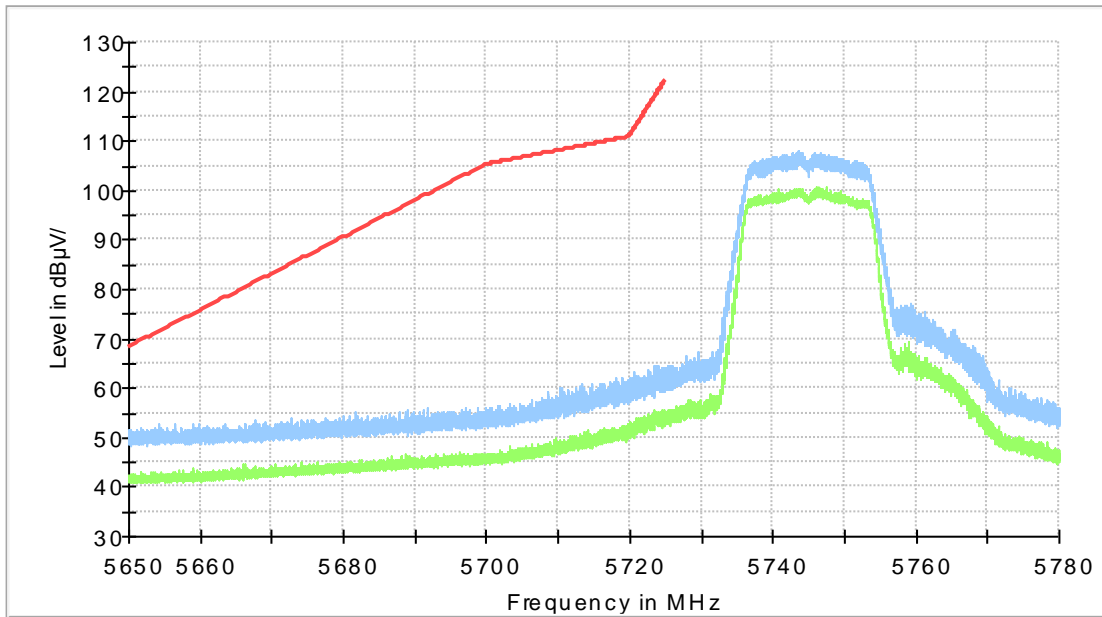




**Fig. 10 Band Edges (802.11a Ch149,5745MHz)**

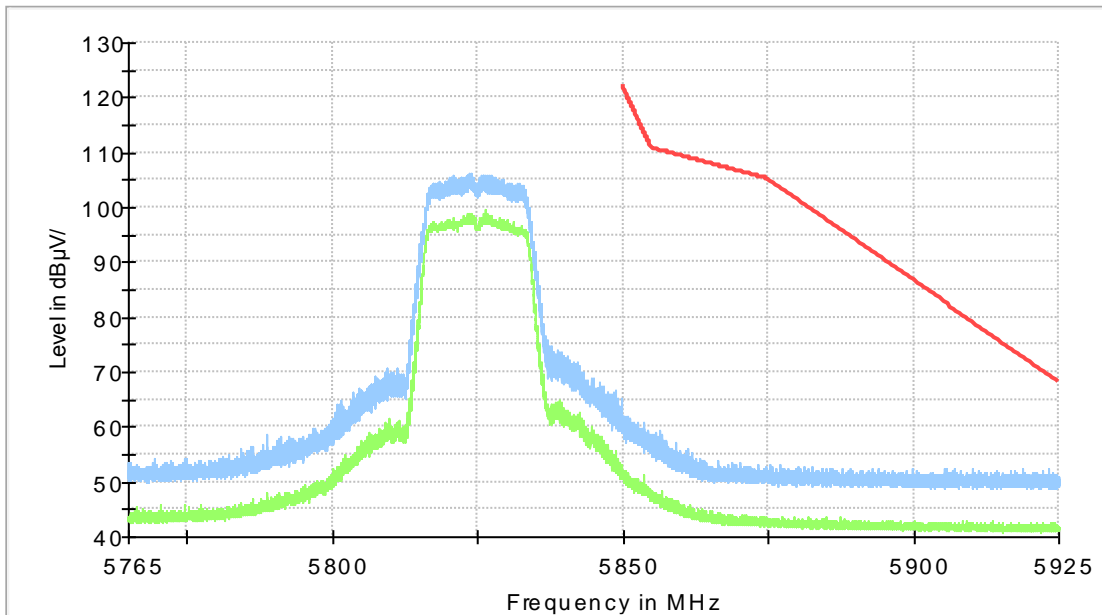


**Fig. 11 Band Edges (802.11a Ch165, 5825MHz)**



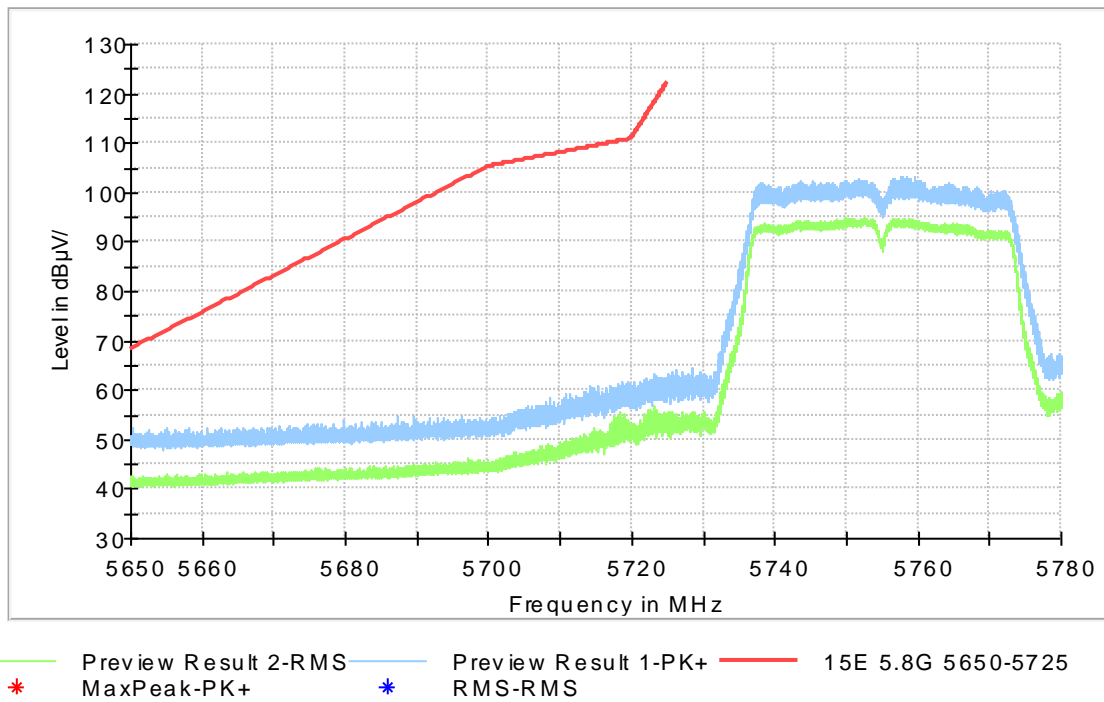
— Preview Result 2-RMS — Preview Result 1-PK+ — 15E 5.8G 5650-5725  
\* MaxPeak-PK+ \* RMS-RMS

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

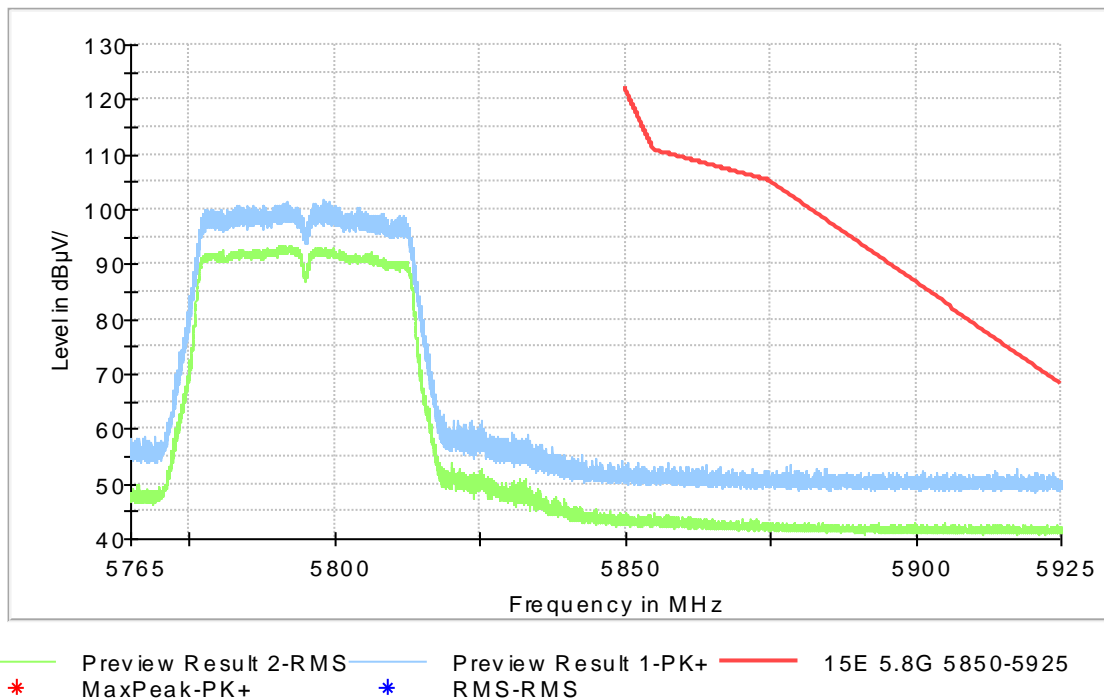


— Preview Result 2-RMS — Preview Result 1-PK+ — 15E 5.8G 5850-5925  
\* MaxPeak-PK+ \* RMS-RMS

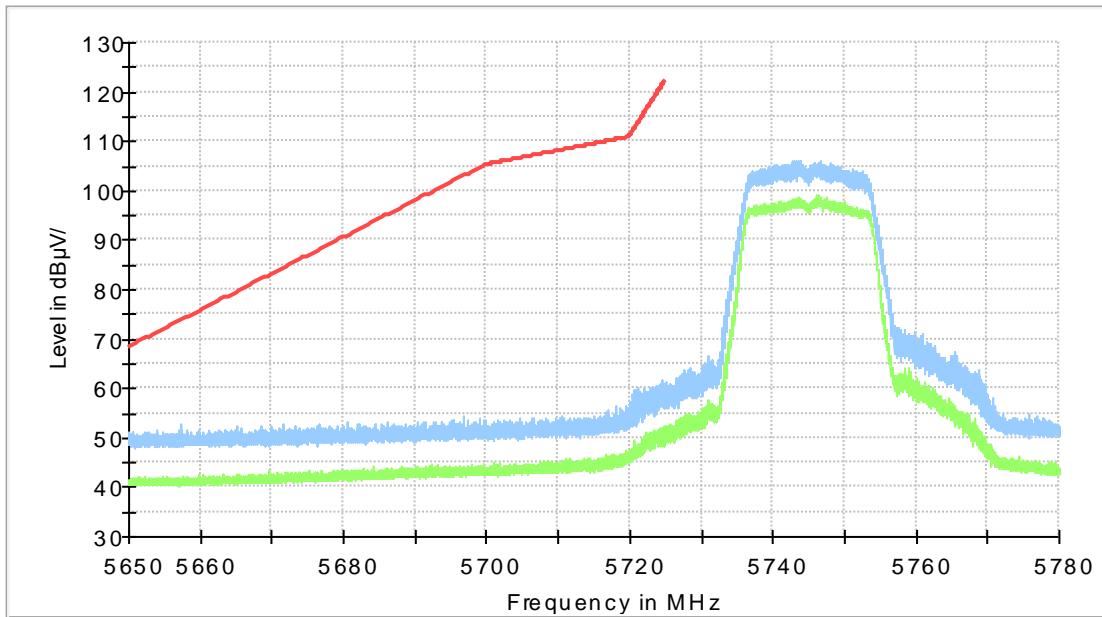
**Fig. 13 Band Edges (802.11n-HT20 Ch165, 5825MHz)**



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

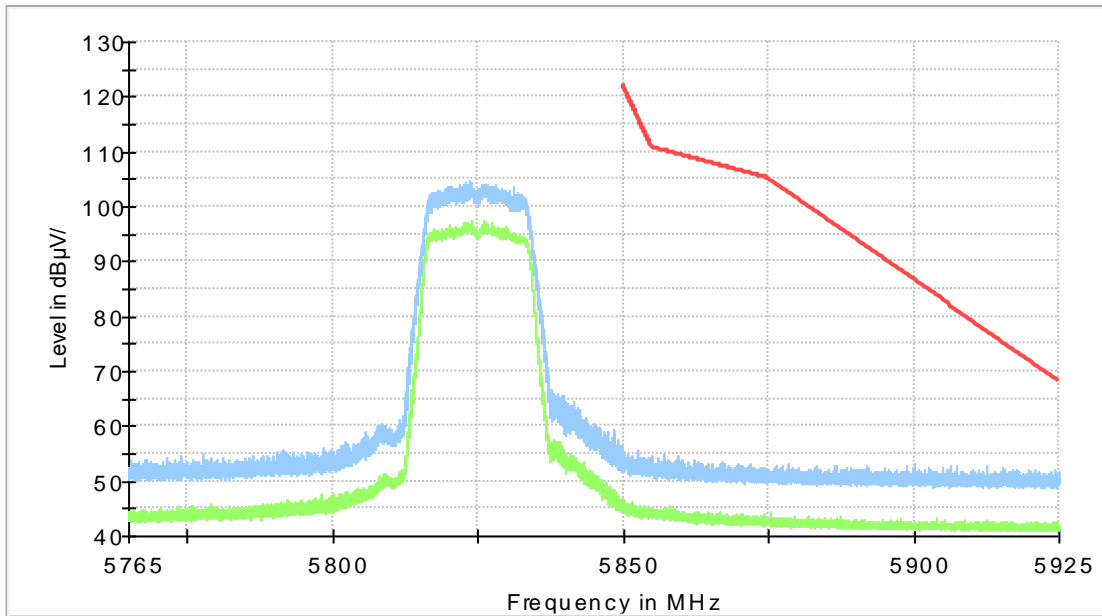


**Fig. 15 Band Edges (802.11n-HT40 Ch159, 5795MHz)**



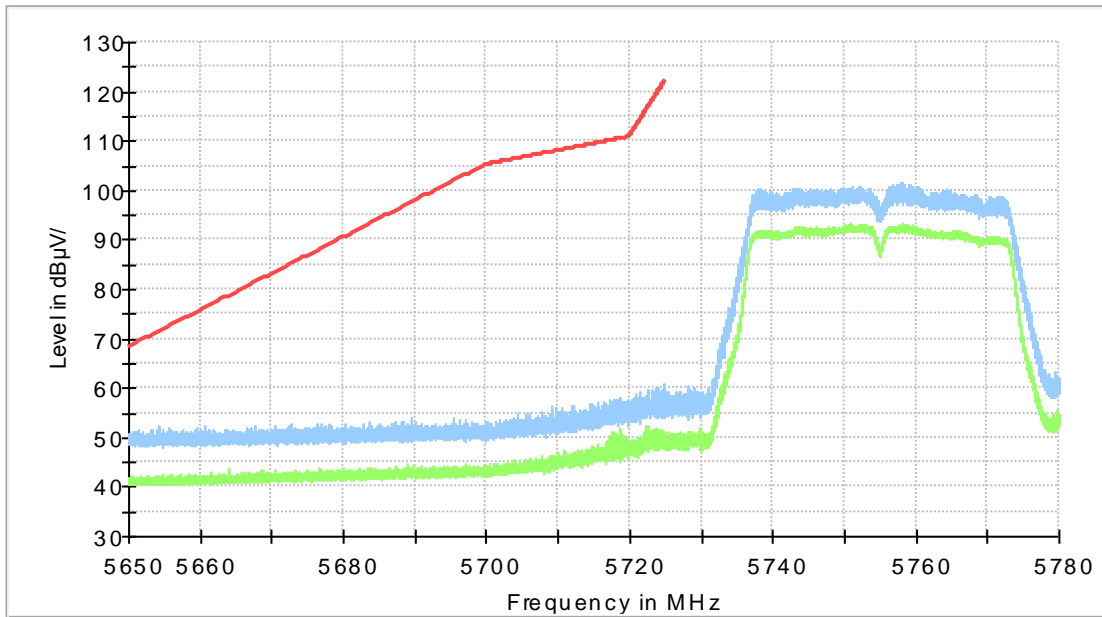
— Preview Result 2-RMS — Preview Result 1-PK+ — 15E 5.8G 5650-5725  
\* MaxPeak-PK+ \* RMS-RMS

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



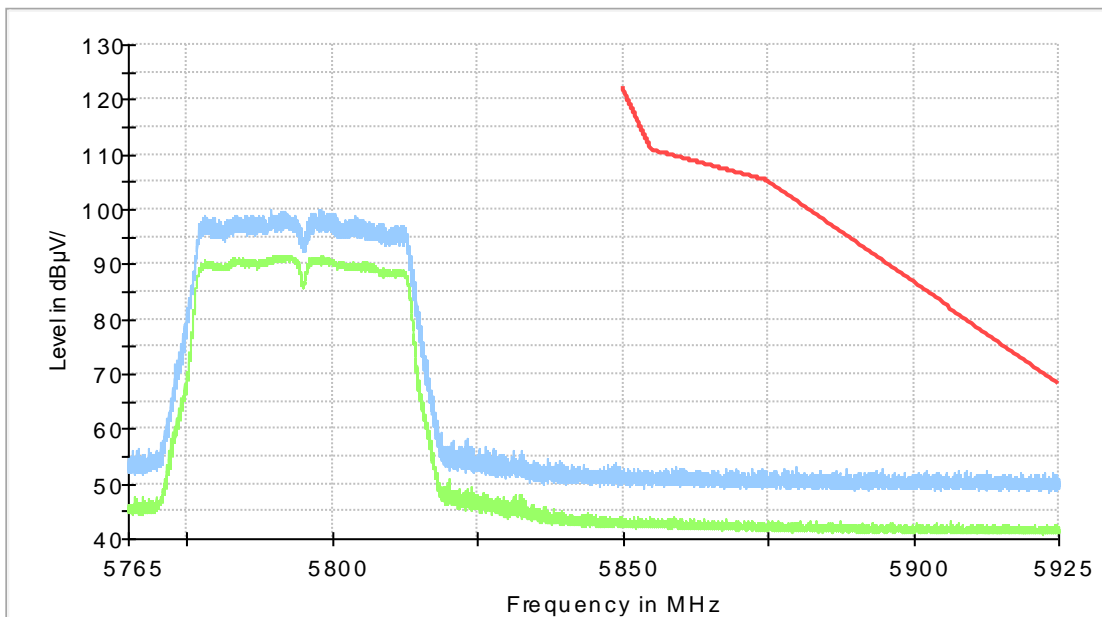
— Preview Result 2-RMS — Preview Result 1-PK+ — 15E 5.8G 5850-5925  
\* MaxPeak-PK+ \* RMS-RMS

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



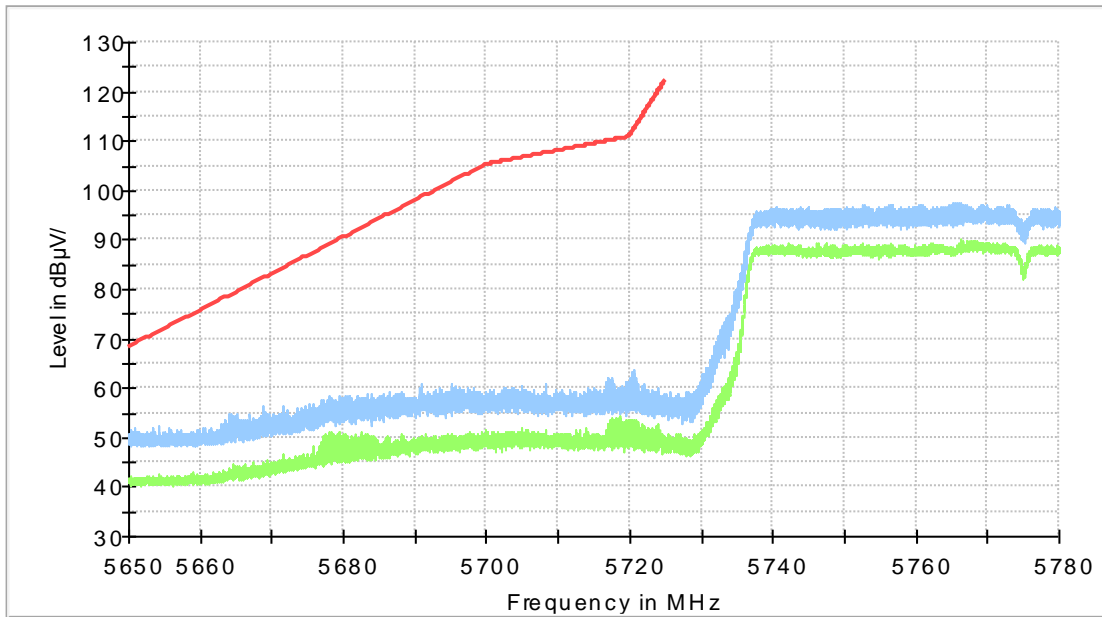
— Preview Result 2-RMS — Preview Result 1-PK+ — 15E 5.8G 5650-5725  
\* MaxPeak-PK+ \* RMS-RMS

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



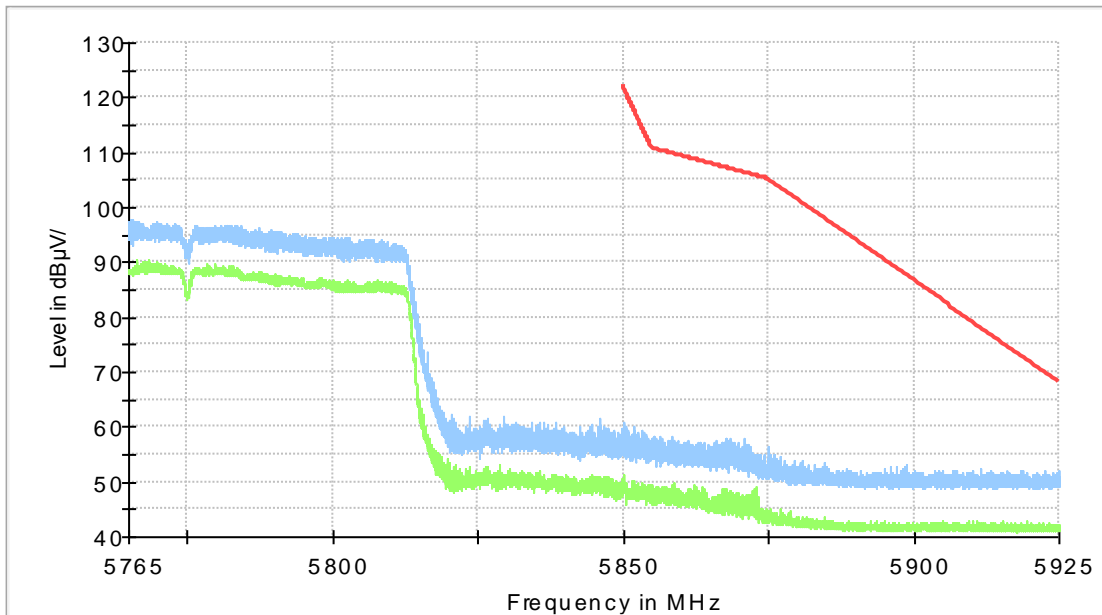
— Preview Result 2-RMS — Preview Result 1-PK+ — 15E 5.8G 5850-5925  
\* MaxPeak-PK+ \* RMS-RMS

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



— Preview Result 2-RMS — Preview Result 1-PK+ — 15E 5.8G 5650-5725  
\* MaxPeak-PK+ \* RMS-RMS

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



— Preview Result 2-RMS — Preview Result 1-PK+ — 15E 5.8G 5850-5925  
\* MaxPeak-PK+ \* RMS-RMS

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

## A.7. AC Powerline Conducted Emission

### 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 $\mu$ V)	Result (dB $\mu$ V)		Conclusion
		With charger		
		802.11a	Idle	
0.15 to 0.5	66 to 56	Fig.22	Fig.23	<b>P</b>
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 $\mu$ V)	Result (dB $\mu$ V)		Conclusion
		With charger		
		802.11a	Idle	
0.15 to 0.5	56 to 46	Fig.22	Fig.23	<b>P</b>
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.

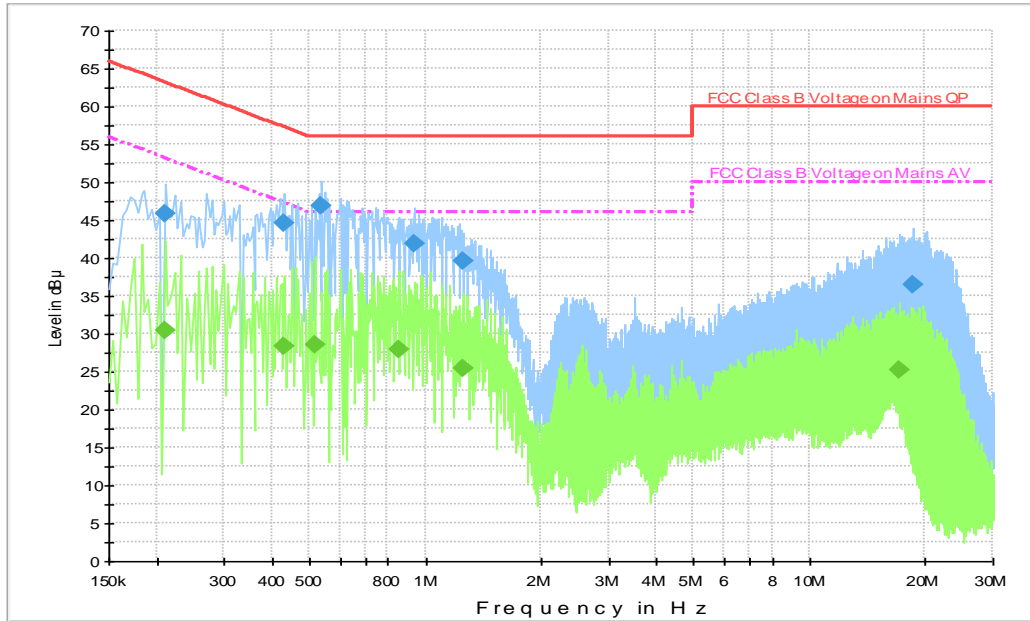
The measurement is made according to ANSI C63.10 .

EUT ID: UT26a

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 (MHz)	QuasiPeak (dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.210000	45.9	2000.	9.000	On	L1	19.7	17.3	63.2
0.430000	44.7	2000.	9.000	On	L1	19.7	12.6	57.3
0.538000	46.8	2000.	9.000	On	L1	19.7	9.2	56.0
0.934000	41.9	2000.	9.000	On	N	19.6	14.1	56.0
1.250000	39.6	2000.	9.000	On	N	19.6	16.4	56.0
18.678000	36.5	2000.	9.000	On	L1	19.7	23.5	60.0

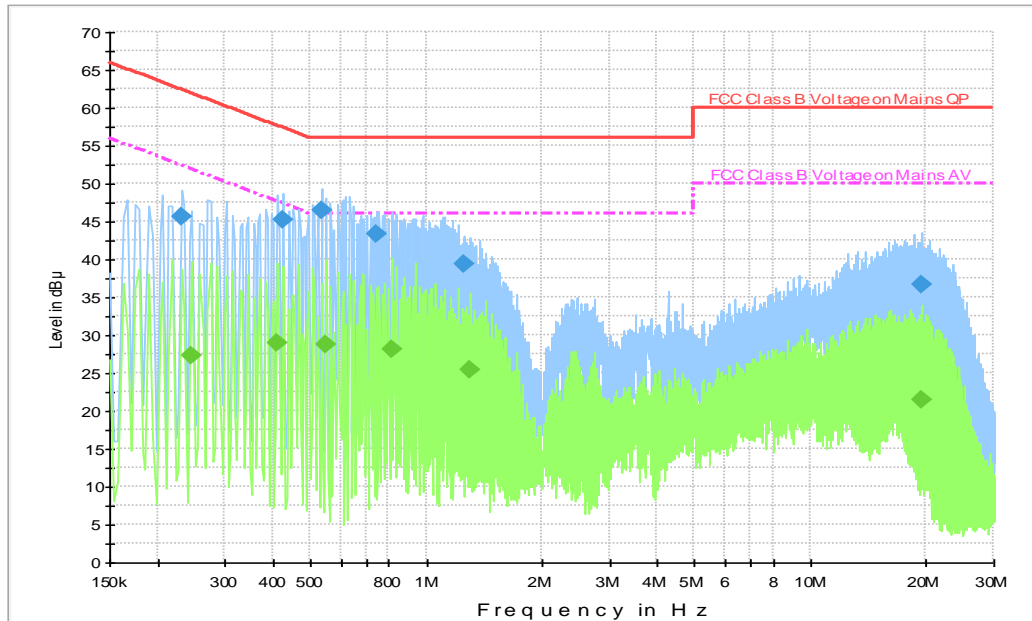
**Final Result 2**

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.210000	30.4	2000.	9.000	On	L1	19.7	22.8	53.2
0.430000	28.3	2000.	9.000	On	L1	19.7	19.0	47.3
0.514000	28.6	2000.	9.000	On	L1	19.7	17.4	46.0
0.850000	27.9	2000.	9.000	On	N	19.6	18.1	46.0
1.250000	25.5	2000.	9.000	On	N	19.6	20.5	46.0
17.042000	25.2	2000.	9.000	On	L1	19.7	24.8	50.0

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



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)
0.230000	45.7	2000.	9.000	On	N	19.7	16.7	62.4
0.426000	45.1	2000.	9.000	On	N	19.7	12.2	57.3
0.534000	46.4	2000.	9.000	On	L1	19.7	9.6	56.0
0.742000	43.4	2000.	9.000	On	N	19.7	12.6	56.0
1.250000	39.4	2000.	9.000	On	N	19.6	16.6	56.0
19.578000	36.6	2000.	9.000	On	L1	19.8	23.4	60.0

**Final Result 2**

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.246000	27.3	2000.0	9.000	On	L1	19.7	24.6	51.9
0.410000	29.1	2000.0	9.000	On	N	19.7	18.6	47.6
0.550000	28.8	2000.0	9.000	On	L1	19.7	17.2	46.0
0.810000	28.2	2000.0	9.000	On	N	19.7	17.8	46.0
1.306000	25.4	2000.0	9.000	On	N	19.6	20.6	46.0
19.578000	21.5	2000.0	9.000	On	L1	19.8	28.5	50.0

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

## ANNEX B: EUT parameters

Disclaimer: The antenna gain and 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

<p>United States Department of Commerce National Institute of Standards and Technology</p>  	
<hr/> <b>Certificate of Accreditation to ISO/IEC 17025:2017</b> <hr/>	
NVLAP LAB CODE: 600118-0	
<b>Telecommunication Technology Labs, CAICT</b> Beijing China	
<i>is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:</i>	
<b>Electromagnetic Compatibility &amp; Telecommunications</b>	
<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>	
<hr/> 2022-10-01 through 2023-09-30 <i>Effective Dates</i>	 <hr/> <i>[Signature]</i> For the National Voluntary Laboratory Accreditation Program

\*\*\* END OF REPORT BODY \*\*\*