



# FCC PART 15C TEST REPORT No.I20Z70178-IOT05

for

**Client name: Samsung Electronics. Co., Ltd.**

**Product name: Tablet with Bluetooth, WLAN**

**Model name: SM-T500**

With

**FCC ID: ZCASMT500**

**Hardware Version: REV1.0**

**Software Version: T500.001**

**Issued Date: 2020-07-24**

**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.

**Test Laboratory:**

**CTTL-Telecommunication Technology Labs, CAICT**

No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191.

Tel:+86(0)10-62304633-2512, Fax:+86(0)10-62304633-2504

Email: [ctl\\_terminals@caict.ac.cn](mailto:ctl_terminals@caict.ac.cn), website: [www.caict.ac.cn](http://www.caict.ac.cn)



## **REPORT HISTORY**

<b>Report Number</b>	<b>Revision</b>	<b>Description</b>	<b>Issue Date</b>
I20Z70178-IOT05	Rev.0	1st edition	2020-07-24

## **CONTENTS**

<b>CONTENTS .....</b>	<b>3</b>
<b>1. TEST LATORATORY.....</b>	<b>5</b>
1.1. INTRODUCTION & ACCREDITATION .....	5
1.2. TESTING LOCATION .....	5
1.3. TESTING ENVIRONMENT .....	5
1.4. PROJECT DATE .....	5
1.5. SIGNATURE .....	5
<b>2. CLIENT INFORMATION.....</b>	<b>6</b>
2.1. APPLICANT INFORMATION .....	6
2.2. MANUFACTURER INFORMATION .....	6
<b>3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT(AE) .....</b>	<b>7</b>
3.1. ABOUT EUT .....	7
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST .....	7
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST .....	7
3.4. GENERAL DESCRIPTION.....	9
<b>4. REFERENCE DOCUMENTS .....</b>	<b>9</b>
4.1. DOCUMENTS SUPPLIED BY APPLICANT .....	9
4.2. REFERENCE DOCUMENTS FOR TESTING.....	9
<b>5. LABORATORY ENVIRONMENT.....</b>	<b>9</b>
<b>6. SUMMARY OF TEST RESULTS .....</b>	<b>10</b>
6.1. SUMMARY OF TEST RESULTS.....	10
6.2. STATEMENTS.....	10
6.3. E XPLANATION OF RE-USE OF TEST DATA .....	10
<b>7. TEST EQUIPMENTS UTILIZED .....</b>	<b>11</b>
<b>8. MEASUREMENT UNCERTAINTY .....</b>	<b>12</b>
8.1. TRANSMITTER OUTPUT POWER .....	12
8.2. PEAK POWER SPECTRAL DENSITY.....	12
8.3. OCCUPIED 6DB BANDWIDTH.....	12
8.4. BAND EDGES COMPLIANCE .....	12
8.5. SPURIOUS EMISSIONS .....	12
8.6. AC POWER-LINE CONDUCTED EMISSION .....	12
<b>ANNEX A: MEASUREMENT RESULTS.....</b>	<b>13</b>
A.1. MEASUREMENT METHOD .....	13
A.2. MAXIMUM AVERAGE OUTPUT POWER-CONDUCTED .....	14
A.2.1 ANTENNA GAIN .....	14
A.2.2. MAXIMUM PEAK OUTPUT POWER-CONDUCTED .....	14

A.3. PEAK POWER SPECTRAL DENSITY .....	17
A.4. OCCUPIED 6DB BANDWIDTH .....	18
A.5. TRANSMITTER SPURIOUS EMISSION .....	26
A.5.1 TRANSMITTER SPURIOUS EMISSION - RADIATED .....	26
A.6. BAND EDGES COMPLIANCE .....	39
A6.1 BAND EDGES - RADIATED .....	39
FIG. 15 BAND EDGES (802.11A, 5745MHZ) .....	40
FIG. 16 BAND EDGES (802.11A, 5825MHZ) .....	40
FIG. 17 BAND EDGES (802.11N-HT20, 5745MHZ) .....	41
FIG. 18 BAND EDGES (802.11N-HT20, 5825MHZ) .....	41
FIG. 19 BAND EDGES (802.11N-HT40, 5755MHZ) .....	42
FIG. 20 BAND EDGES (802.11N-HT40, 5795MHZ) .....	42
FIG. 21 BAND EDGES (802.11AC-HT20, 5745MHZ) .....	43
FIG. 22 BAND EDGES (802.11AC-HT20, 5825MHZ) .....	43
FIG. 23 BAND EDGES (802.11AC-HT40, 5755MHZ) .....	44
FIG. 24 BAND EDGES (802.11AC-HT40, 5795MHZ) .....	44
FIG. 25 BAND EDGES (802.11AC-HT80, 5775MHZ) .....	45
FIG. 26 BAND EDGES (802.11AC-HT80, 5775MHZ) .....	45
A.7. AC POWERLINE CONDUCTED EMISSION .....	46
FIG. 27 AC POWER LINE CONDUCTED EMISSION-802.11A .....	47
FIG. 28 AC POWER LINE CONDUCTED EMISSION-IDLE .....	48
<b>ANNEX B: ACCREDITATION CERTIFICATE.....</b>	<b>49</b>

## 1. TEST LATORATORY

### 1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2005 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 (CN0066). The detail accreditation scope can be found on NVLAP website.

### 1.2. Testing Location

Conducted testing Location: CTTL(huayuan North Road)

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

Radiated testing Location: CTTL(Shouxiang)

Address: No. 51 Shouxiang Science Building, Xueyuan Road,  
Haidian District, Beijing, P. R. China100191

### 1.3. TestingEnvironment

Normal Temperature: 15-35°C

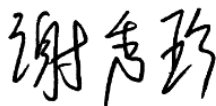
Relative Humidity: 20-75%

### 1.4. Project date

Testing Start Date: 2020-05-27

Testing End Date: 2020-07-24

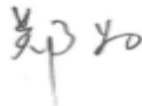
### 1.5. Signature



---

Xie Xiuzhen

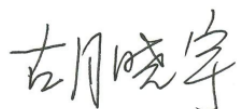
( Prepared this test report )



---

Zheng Wei

(Reviewed this test report)



---

Hu Xiaoyu

(Approved this test report)



## **2. CLIENT INFORMATION**

### **2.1. Applicant Information**

Company Name: Samsung Electronics. Co., Ltd.  
Address /Post: 19 Chapin Road, Building D, Pine Brook New Jersey United States,  
07058  
Contact: Jenni Chun  
Email: j1.chun@samsung.com  
Telephone: 1-973-808-6375

### **2.2. Manufacturer Information**

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

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

#### EQUIPMENT(AE)

##### 3.1. About EUT

Description	Tablet with Bluetooth, WLAN
Model name	SM-T500
FCC ID	ZCASMT500
WLAN Frequency Band	ISM Band: 5725MHz~5850MHz
Type of modulation	OFDM
Voltage	3.8V

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

EUT ID*	IMEI	HW Version	SW Version
UT13a	2070178UT13a	REV1.0	T500.001
UT36a	/	REV1.0	T500.001

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

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

AE ID*	Description	SN	Remarks
AE1	Battery	/	/
AE2	Charger	/	/
AE3	Charger	/	/
AE4	Charger	/	/
AE5	USB Cable	/	/
AE6	USB Cable	/	/
AE7	Charger	/	/
AE8	Charger	/	/
AE9	Charger	/	/
AE10	Charger	/	/
AE11	Charger	/	/
AE12	Charger	/	/
AE13	USB Cable	/	/
AE14	USB Cable	/	/

##### AE1

Model	SCUD-WT-N19
Manufacturer	SCUD(Fujian) Electronics Co., Ltd
Capacitance	/
Nominal voltage	/

##### AE2

Model	EP-TA50JWE
Manufacturer	R.F.Tech
Length of cable	/



AE3		
Model	EP-TA50JWE	
Manufacturer	DONGWON	
Length of cable	/	
AE4		
Model	EP-TA50RWS	
Manufacturer	DONG YANG	
Length of cable	/	
AE5		
Model	EP-DT725BWE	
Manufacturer	R.F.Tech	
Length of cable	/	
AE6		
Model	EP-DT725BWE	
Manufacturer	KSD	
Length of cable	/	
AE7		
Model	EP-TA50JWS	
Manufacturer	R.F.Tech	
Length of cable	/	
AE8		
Model	EP-TA50EWE	
Manufacturer	R.F.Tech	
Length of cable	/	
AE9		
Model	EP-TA50JWS	
Manufacturer	DONGWON	
Length of cable	/	
AE10		
Model	EP-TA50EWE	
Manufacturer	DONGWON	
Length of cable	/	
AE11		
Model	EP-TA50EWE(Chile)	
Manufacturer	DONGWON	
Length of cable	/	
AE12		
Model	EP-TA50EWE(Chile)	
Manufacturer	DONG YANG	
Length of cable	/	
AE13		
Model	EP-DT725BWZ	
Manufacturer	R.F.Tech	
Length of cable	/	



AE14

Model	EP-DT725BWZ
Manufacturer	KSD
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 Tablet with Bluetooth, WLAN with integrated antenna. It consists of normal options: Battery and Charger.

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

Samples undergoing test were selected by the Client.

## 4. REFERENCE DOCUMENTS

### 4.1. Documents supplied by applicant

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

### 4.2. Reference Documents for testing

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

FCC Part15	FCC CFR 47, Part 15, Subpart C and E: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.407 General technical requirements	2018
ANSI C63.10	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2013
UNII: KDB 789033 D02	General U-NII Test Procedures New Rules v02r01	2017-12
KDB 558074 D01	Federal Communications Commission Office of Engineering and Technology Laboratory Division GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES	2019

## 5. LABORATORY ENVIRONMENT

Conducted RF performance testing is performed in shielding room.

EMC performance testing is performed in Semi-anechoic chamber.

## 6. SUMMARY OF TEST RESULTS

### 6.1. Summary of Test Results

SUMMARY OF MEASUREMENT RESULTS	Sub-clause of Part15C	Sub-clause of IC	Verdict
Maximum Peak Output Power	15.407 (a)	/	BR
Peak Power Spectral Density	15.407 (a)	/	BR
Occupied 6dB Bandwidth	15.407 (e)	/	BR
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
BR	Re-use test data from basic model report.
NA	Not Applicable, The test was not applicable
F	Fail, The EUT does not comply with the essential requirements in the standard

### 6.2. Statements

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

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

### 6.3. E xplanation of re-use of test data

The Equipment Under Test (EUT) model SM-T500 (FCC ID: ZCASMT500) is a variant product of SM-T505 (FCC ID: ZCASMT505), according to the declaration of changes provided by the applicant and FCC KDB publication 484596 D01, spot check measurements were performed on this device, all the test results are derived from test report No.I20Z70165-IOT07, except the radiated result.

For detail differences between two models please refer the Declaration of Changes document.

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	3.8V
Humidity	44%

## 7. TEST EQUIPMENTS UTILIZED

### Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Vector Signal Analyzer	FSQ40	200089	Rohde & Schwarz	1 year	2021-05-06
2	LISN	ENV216	825562/028	R&S	1 year	2020-09-05
3	Test Receiver	ESCI	100766	R&S	1 year	2021-03-11
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	100376	Rohde & Schwarz	1 year	2020-10-30
2	BiLog Antenna	VULB9163	9163-482	Schwarzbeck	1 year	2020-09-16
3	Dual-Ridge Waveguide Horn Antenna	3117	00139065	ETS-Lindgren	1 year	2020-11-10
4	Dual-Ridge Waveguide Horn Antenna	3116	2661	ETS-Lindgren	1 year	2020-10-18
5	Vector Signal Analyzer	FSV40	101047	Rohde & Schwarz	1 year	2021-05-18

## 8. Measurement Uncertainty

### 8.1. Transmitter Output Power

Measurement Uncertainty: 0.387dB,k=1.96

### 8.2. Peak Power Spectral Density

Measurement Uncertainty: 0.705dB,k=1.96

### 8.3. Occupied 6dB Bandwidth

Measurement Uncertainty: 60.80Hz,k=1.96

### 8.4. Band Edges Compliance

Measurement Uncertainty : 0.62dB,k=1.96

### 8.5. Spurious Emissions

#### Conducted (k=1.96)

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

#### Radiated (k=2)

Frequency Range	Uncertainty(dB)
9kHz-30MHz	/
$30\text{MHz} \leq f \leq 1\text{GHz}$	5.40
$1\text{GHz} \leq f \leq 18\text{GHz}$	4.32
$18\text{GHz} \leq f \leq 40\text{GHz}$	5.26

### 8.6. AC Power-line Conducted Emission

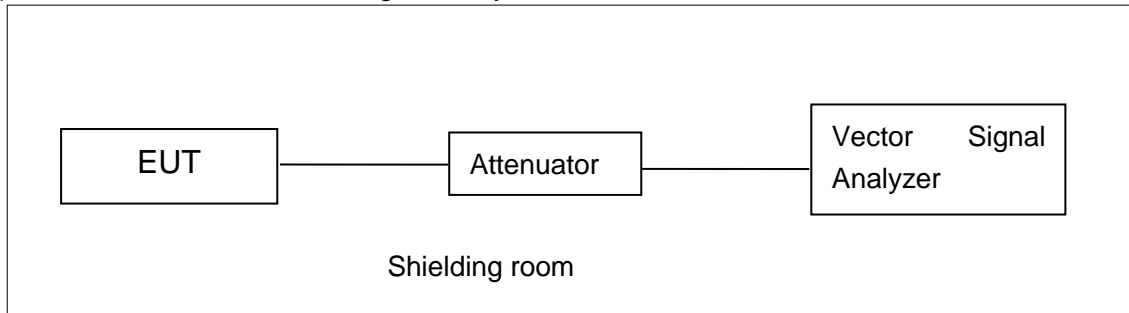
Measurement Uncertainty : 3.10dB,k=2

## 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

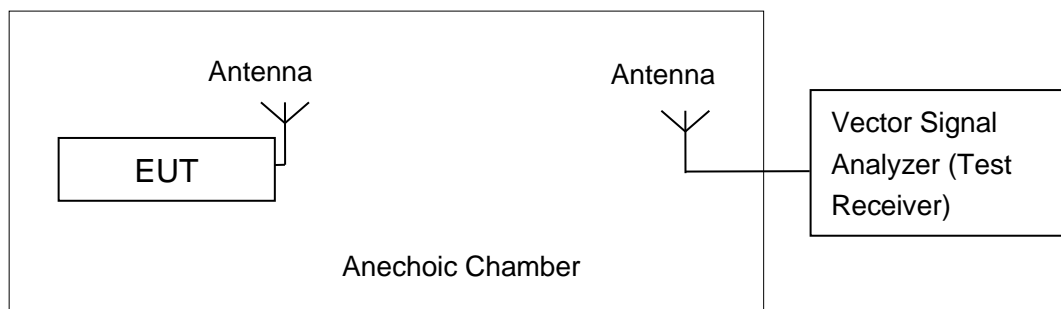


#### A.1.2. Radiated Emission Measurements

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 Average Output Power-Conducted

### Measurement Limit and Method:

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

### A.2.1 Antenna Gain

Antenna gain is -2.047dBi and the value is supplied by the applicant or manufacturer.

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

#### Duty Cycle

11a	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps		
Duty Cycle	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98		
11n-20	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7		
Duty Cycle	0.99	0.99	0.99	0.98	0.98	0.98	0.98	0.97		
11n-40	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7		
Duty Cycle	0.99	0.99	0.99	0.98	0.98	0.97	0.96	0.96		
11ac-20	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	
Duty Cycle	0.99	0.99	0.99	0.99	0.98	0.98	0.98	0.98	0.97	
11ac-40	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
Duty Cycle	0.99	0.99	0.98	0.98	0.98	0.97	0.97	0.96	0.95	0.95
11ac-80	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
Duty Cycle	0.99	0.98	0.97	0.96	0.95	0.93	0.93	0.93	0.91	0.91

### Measurement Results:

#### 802.11a mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11a	6	17.42	17.49	17.95
	9	16.85	/	/
	12	16.34	/	/
	18	15.75	/	/
	24	15.21	/	/
	36	14.74	/	/
	48	14.10	/	/
	54	13.67	/	/

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

**802.11n-HT20 mode**

Mode	Data Rate (Index)	Test Result (dBm)		
		5745MHz (Ch149)	5785MHz (Ch157)	5825MHz (Ch165)
802.11n (20MHz)	MCS0	16.00	15.96	16.60
	MCS1	15.59	/	/
	MCS2	15.07	/	/
	MCS3	15.11	/	/
	MCS4	15.25	/	/
	MCS5	14.71	/	/
	MCS6	14.15	/	/
	MCS7	13.72	/	/

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	16.12	16.02	16.49
	MCS1	15.60	/	/
	MCS2	15.10	/	/
	MCS3	15.08	/	/
	MCS4	14.72	/	/
	MCS5	14.19	/	/
	MCS6	14.14	/	/
	MCS7	13.66	/	/
	MCS8	13.25	/	/

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

**802.11n-HT40 mode**

Mode	Data Rate (Index)	Test Result (dBm)	
		5755MHz (Ch151)	5795MHz (Ch159)
802.11n (40MHz)	MCS0	15.34	15.21
	MCS1	15.24	/
	MCS2	15.27	/
	MCS3	15.23	/
	MCS4	14.40	/
	MCS5	14.43	/
	MCS6	14.40	/
	MCS7	14.39	/

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	15.31	/
	MCS1	15.26	/
	MCS2	15.32	15.07
	MCS3	15.25	/
	MCS4	14.42	/
	MCS5	14.42	/
	MCS6	13.89	/
	MCS7	13.33	/
	MCS8	13.40	/
	MCS9	12.96	/

The data rate MCS2 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	15.59
	MCS1	15.74
	MCS2	14.60
	MCS3	14.36
	MCS4	14.20
	MCS5	13.30
	MCS6	13.33
	MCS7	12.86
	MCS8	12.25
	MCS9	11.71

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

The spot check result of average output power is 18.51dBm (802.11a 6Mbps ch165 prototype result: 17.95dBm)

**Conclusion: PASS**



### A.3. Peak Power Spectral Density

#### Measurement Limit:

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

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

#### Measurement Uncertainty:

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

#### Measurement Results:

Mode	Channel	Power Spectral Density ( dBm/500kHz )	Conclusion
802.11a	149	0.86	P
	157	0.82	P
	165	1.24	P
802.11n HT20	149	-0.58	P
	157	-0.79	P
	165	-0.33	P
802.11ac HT20	149	-0.50	P
	157	-0.79	P
	165	-0.29	P
802.11n HT40	151	-4.41	P
	159	-4.36	P
802.11ac HT40	151	-4.77	P
	159	-4.77	P
802.11ac HT80	155	-8.49	P

**Conclusion: PASS**

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

##### Measurement Limit:

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

The measurement is made according to KDB789033 D02 .

##### Measurement Uncertainty:

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

##### Measurement Result:

Mode	Channel	Occupied 6dB Bandwidth ( MHz)		conclusion
		Fig.	Value	
802.11a	149	Fig.1	15.55	P
	157	Fig.2	15.65	P
	165	Fig.3	15.55	P
802.11n HT20	149	Fig.4	15.90	P
	157	Fig.5	15.70	P
	165	Fig.6	16.25	P
802.11ac HT20	149	Fig.7	15.95	P
	157	Fig.8	15.85	P
	165	Fig.9	15.90	P
802.11n HT40	151	Fig.10	36.00	P
	159	Fig.11	36.32	P
802.11ac HT40	151	Fig.12	36.00	P
	159	Fig.13	36.08	P
802.11ac HT80	155	Fig.14	75.20	P

**Conclusion: PASS**

Test graphs as below:

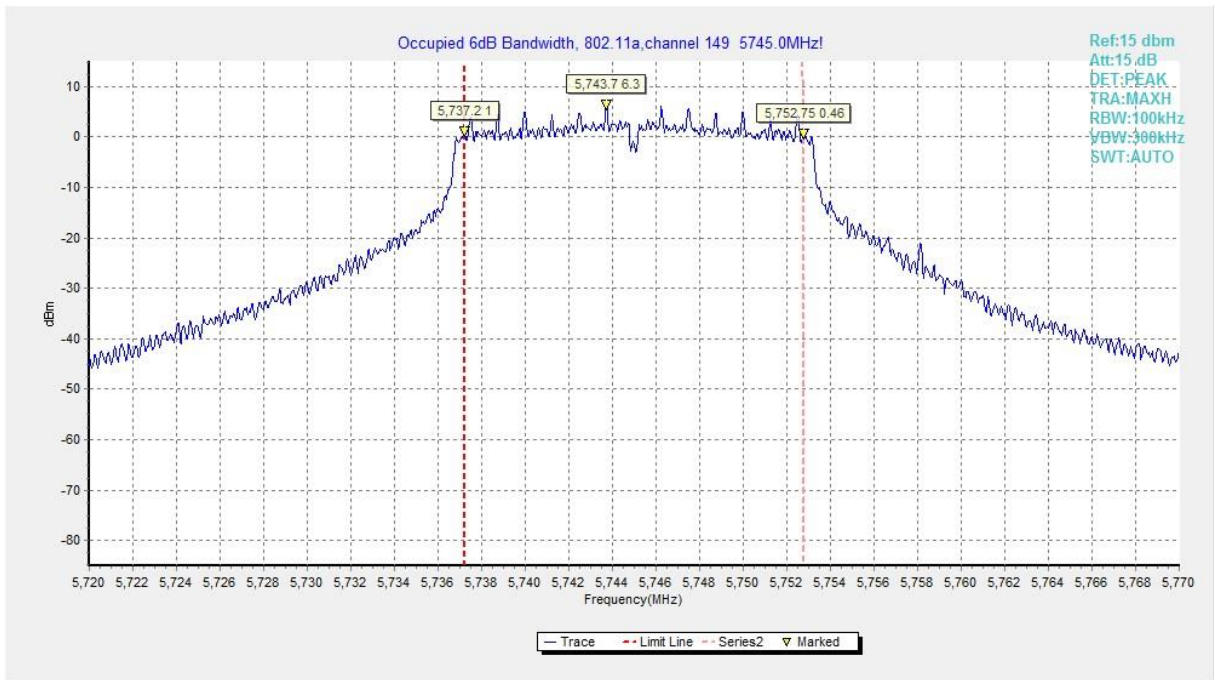


Fig. 1 Occupied 6dB Bandwidth (802.11a, Ch 149)

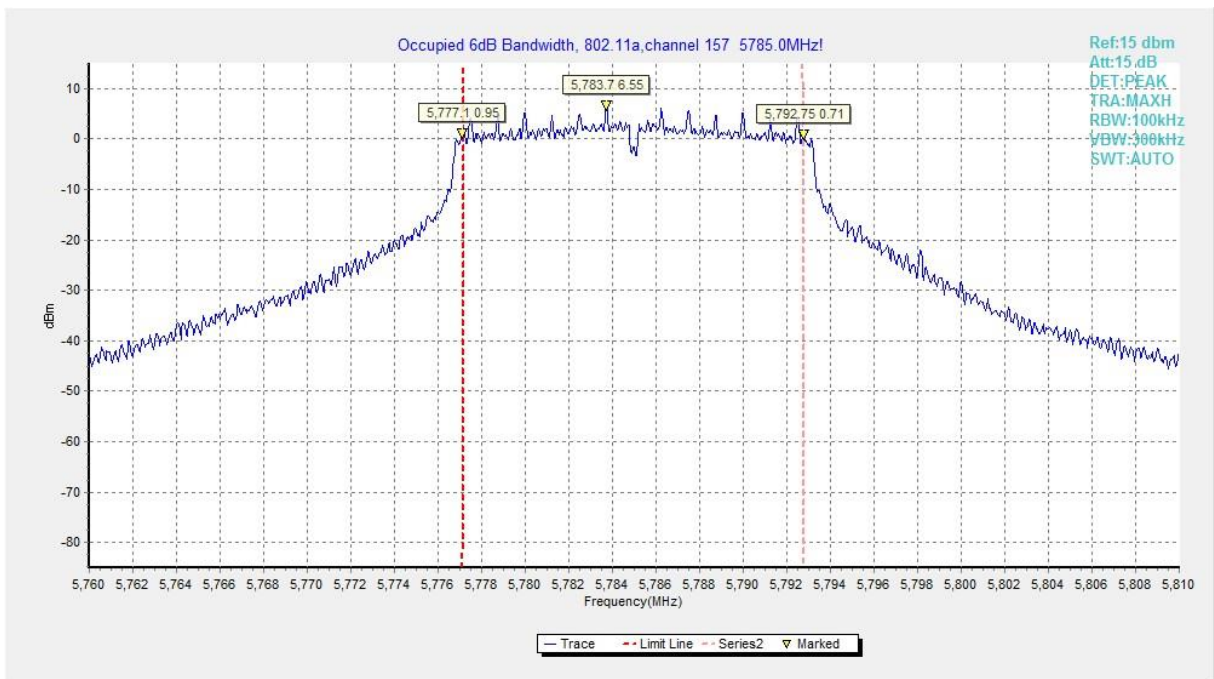


Fig. 2 Occupied 6dB Bandwidth (802.11a, Ch 157)

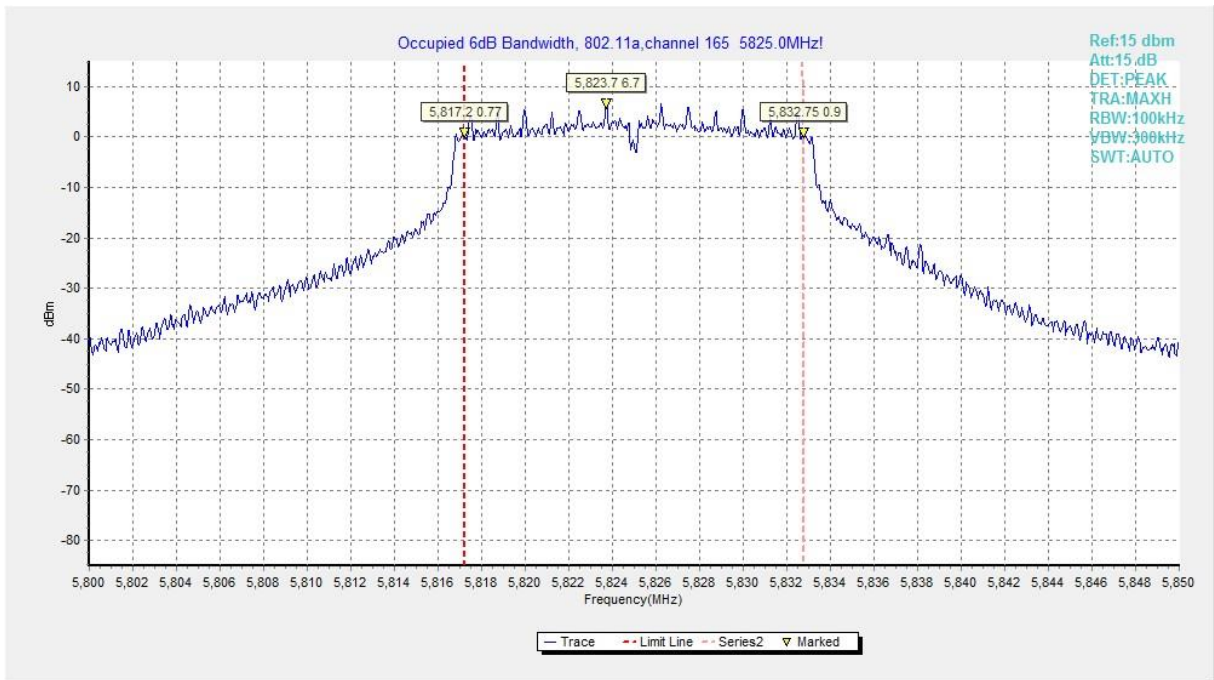


Fig. 3 Occupied 6dB Bandwidth (802.11a, Ch 165)

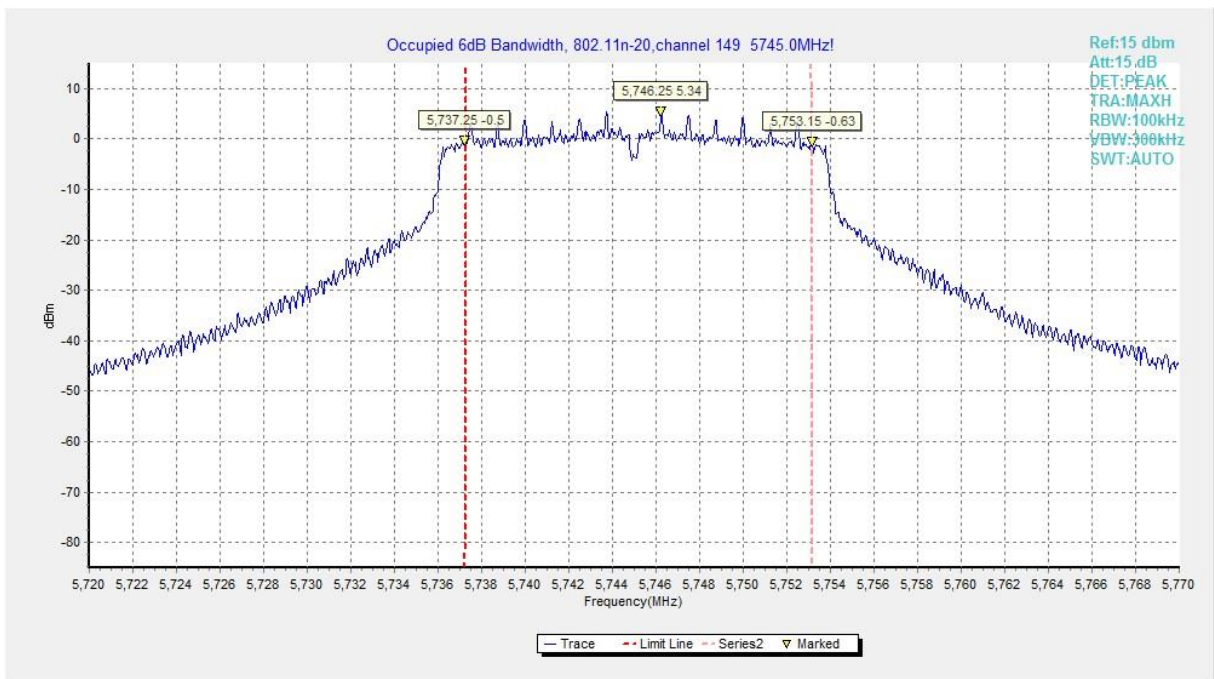
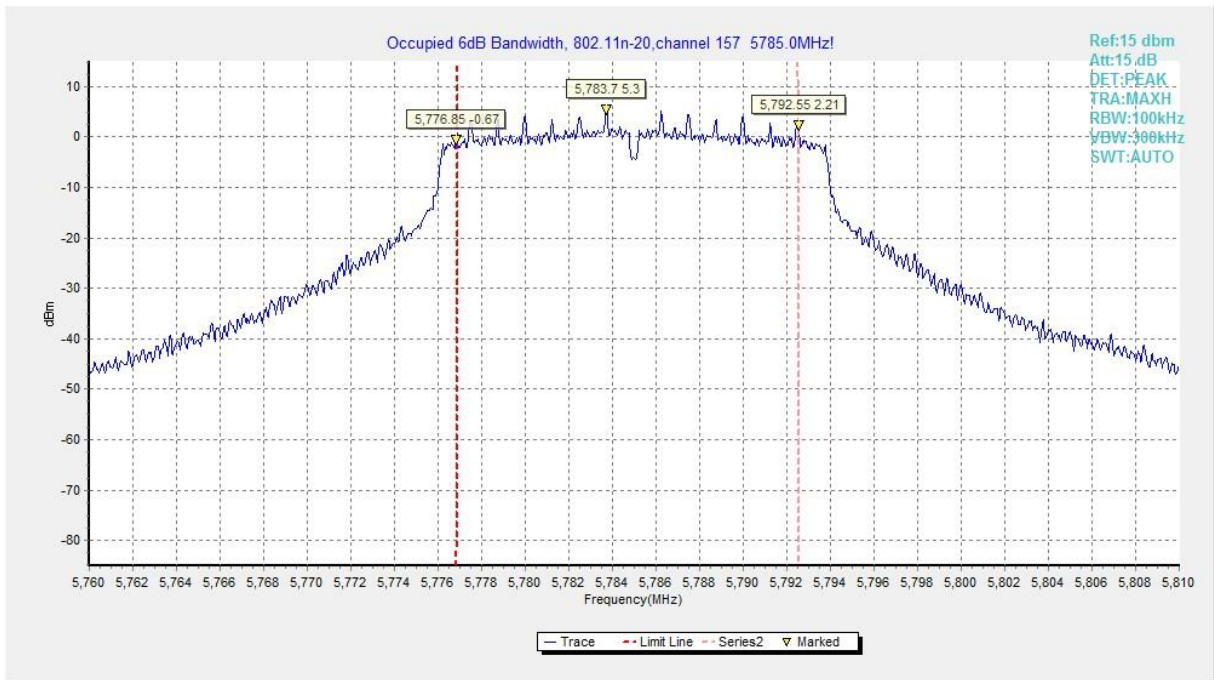
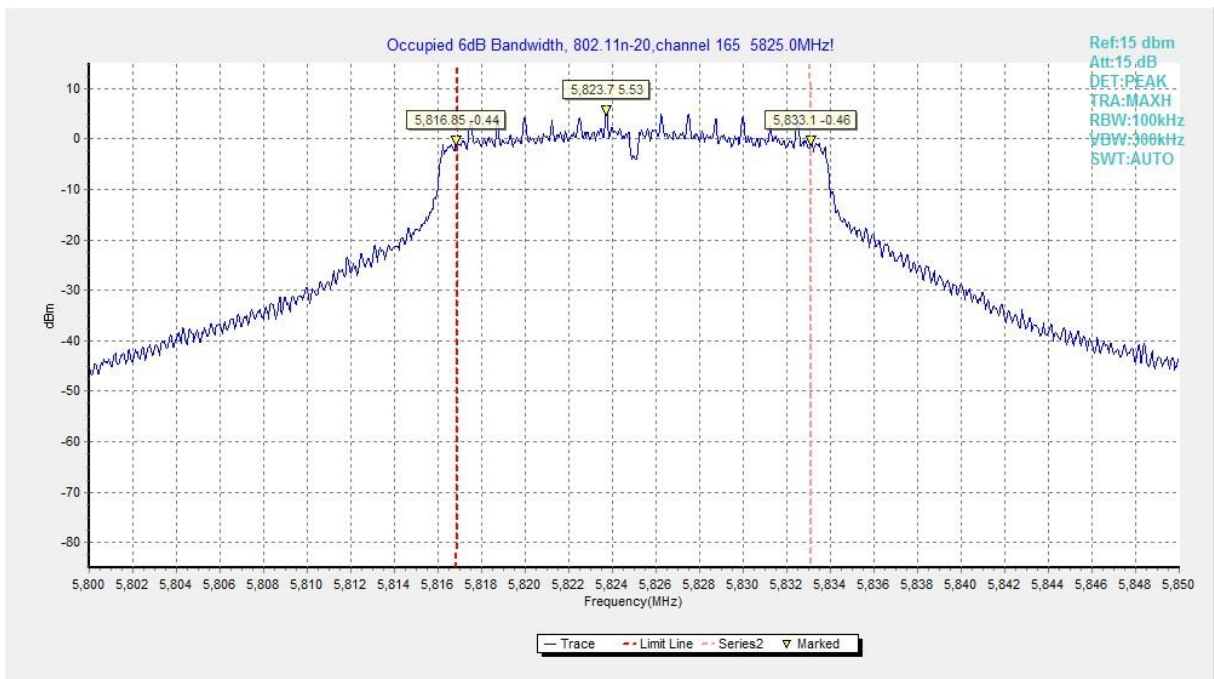


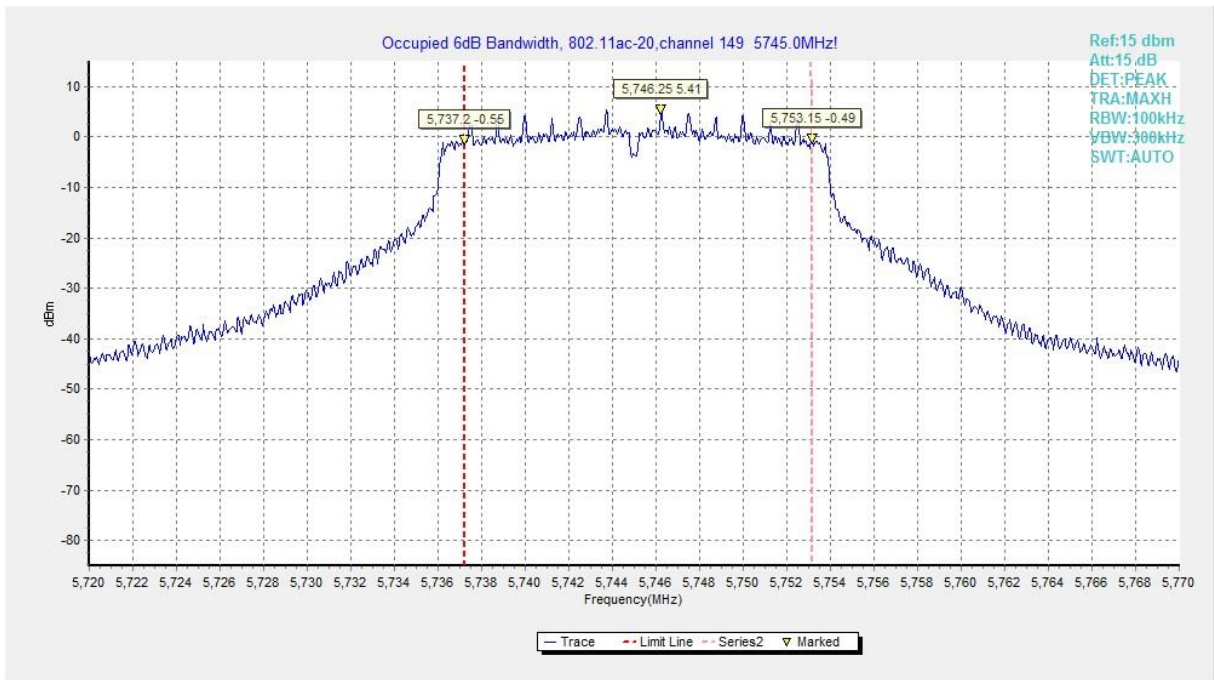
Fig. 4 Occupied 6dB Bandwidth (802.11n-HT20, Ch 149)



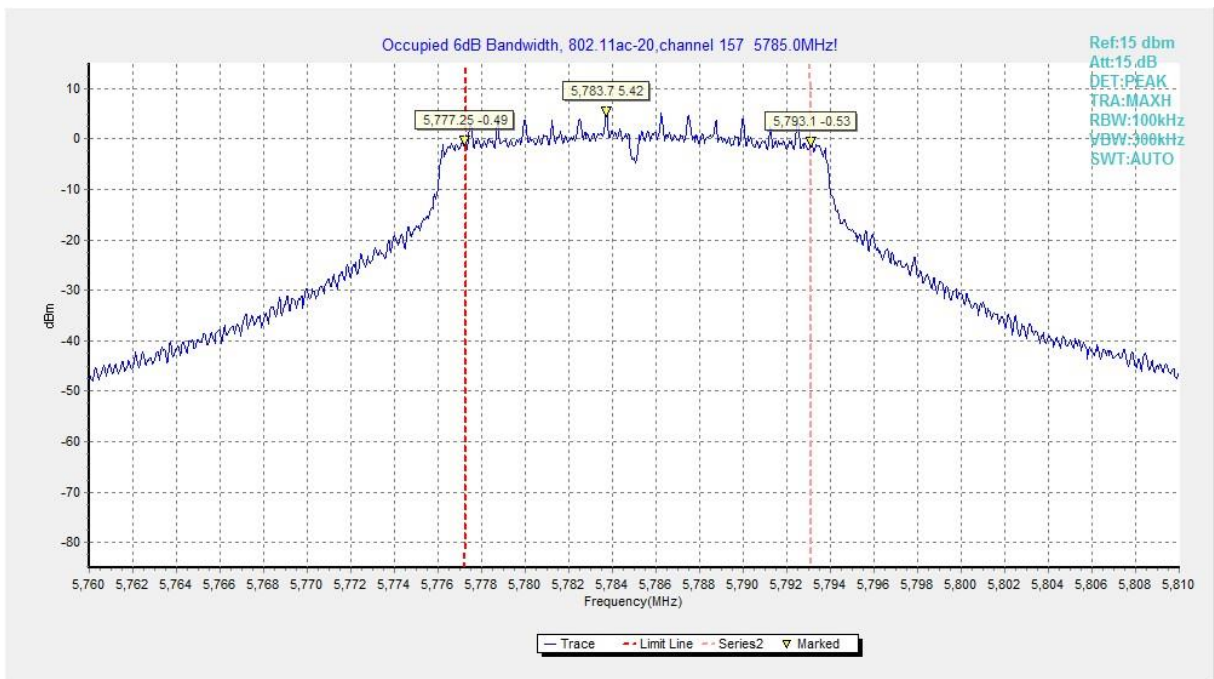
**Fig. 5 Occupied 6dB Bandwidth (802.11n-HT20, Ch 157)**



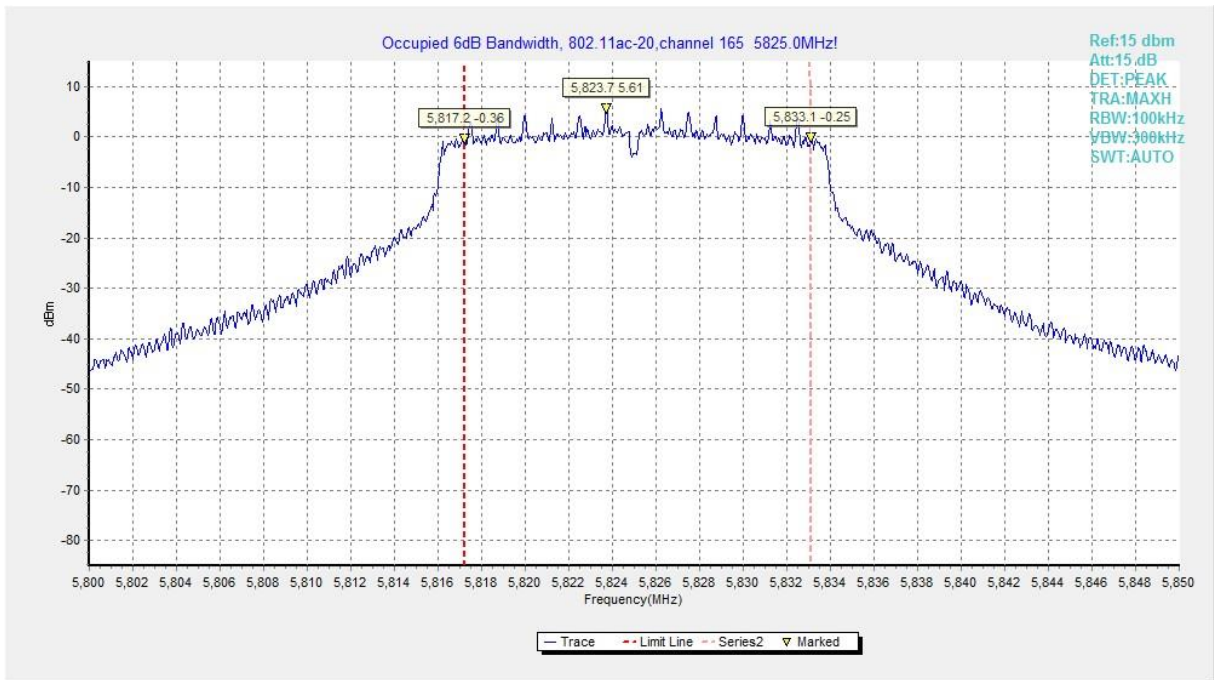
**Fig. 6 Occupied 6dB Bandwidth (802.11n-HT20, Ch 165)**



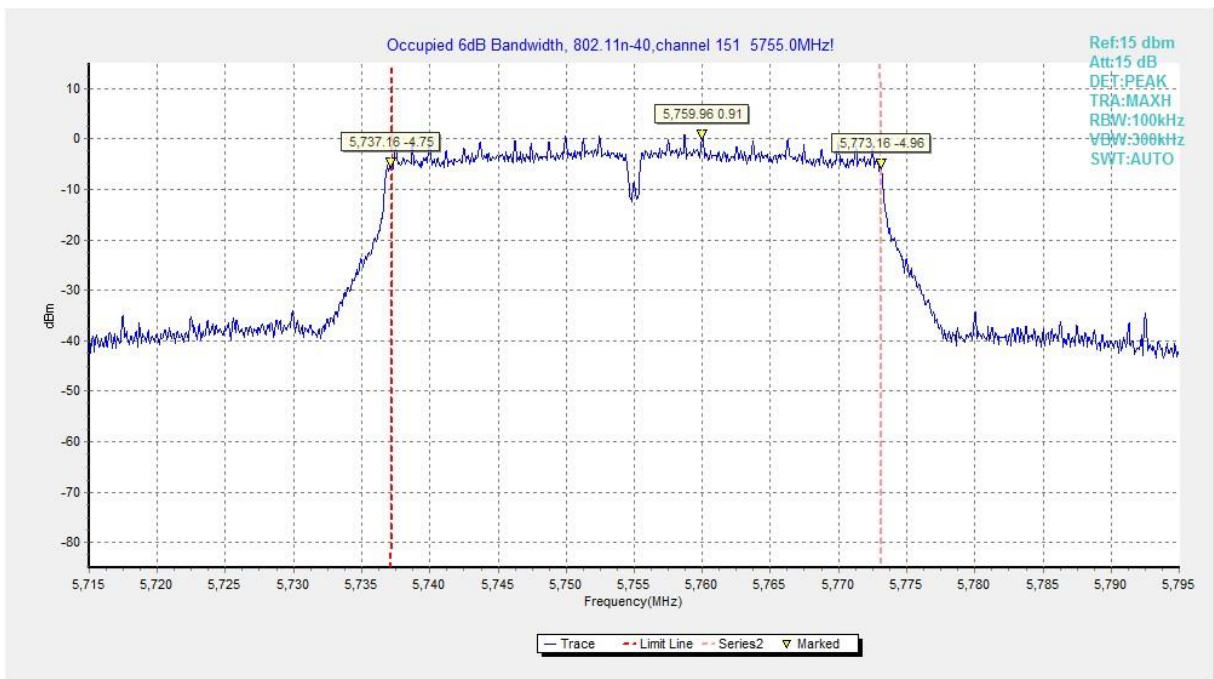
**Fig. 7 Occupied 6dB Bandwidth (802.11ac-HT20, Ch 149)**



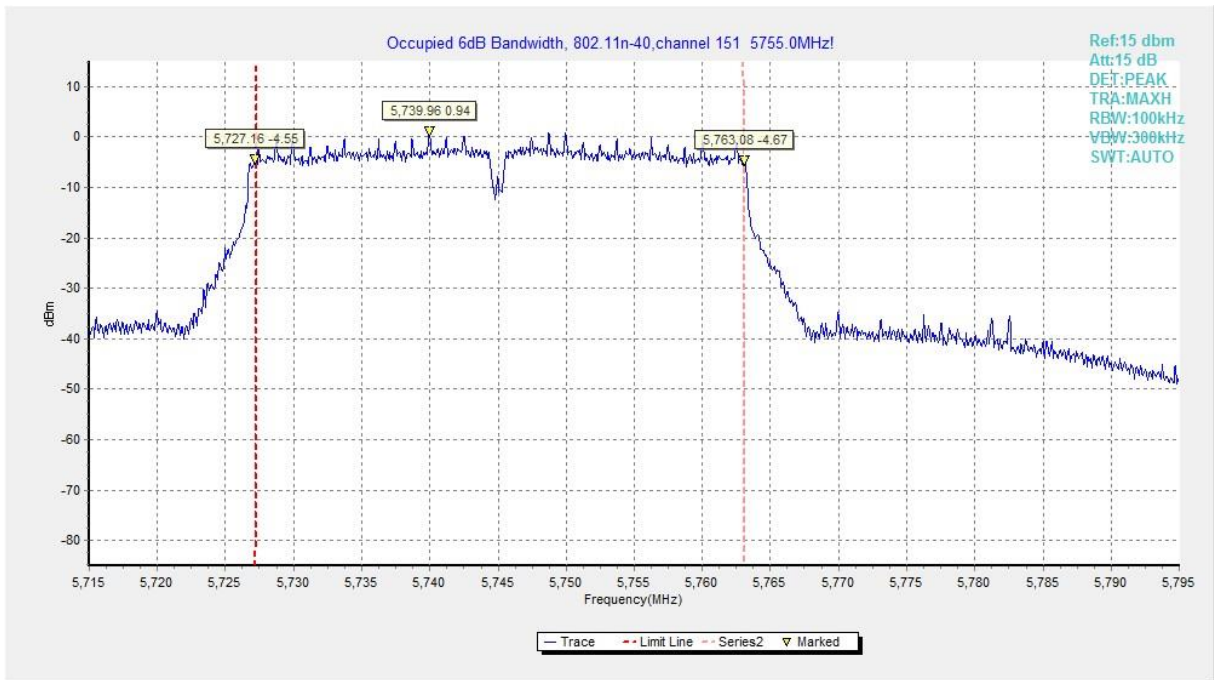
**Fig. 8 Occupied 6dB Bandwidth (802.11ac-HT20, Ch 157)**



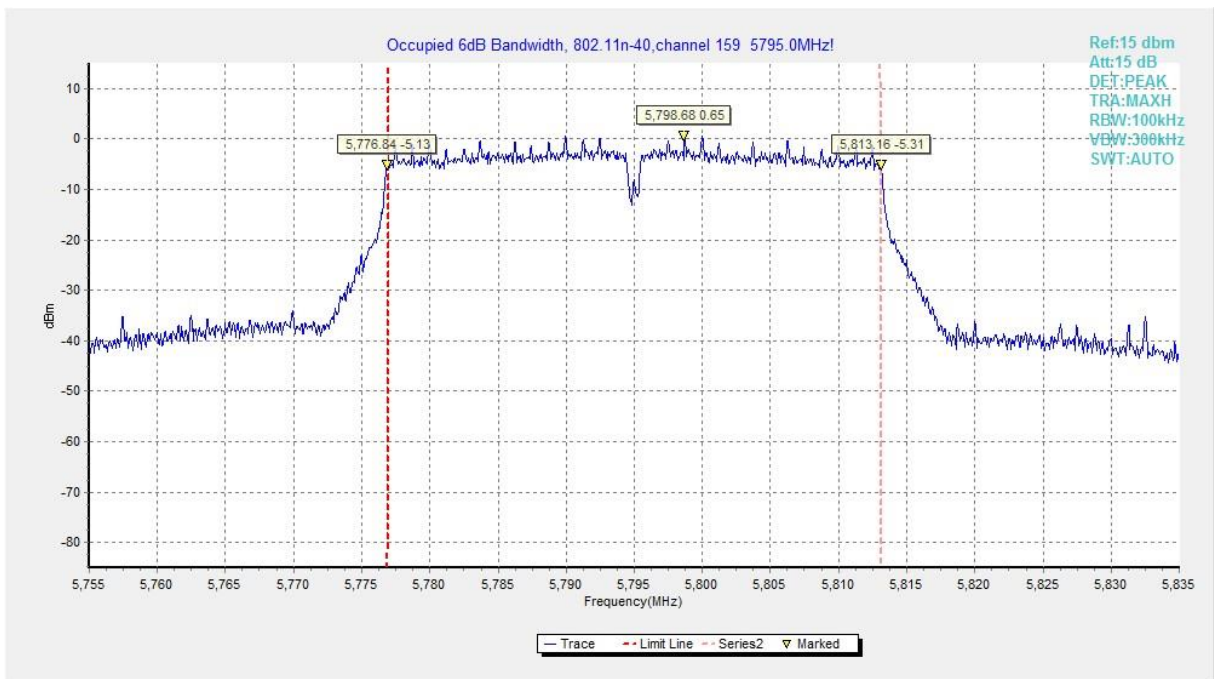
**Fig. 9 Occupied 6dB Bandwidth (802.11ac-HT20, Ch 165)**



**Fig. 10 Occupied 6dB Bandwidth (802.11n-HT40, Ch 151)**

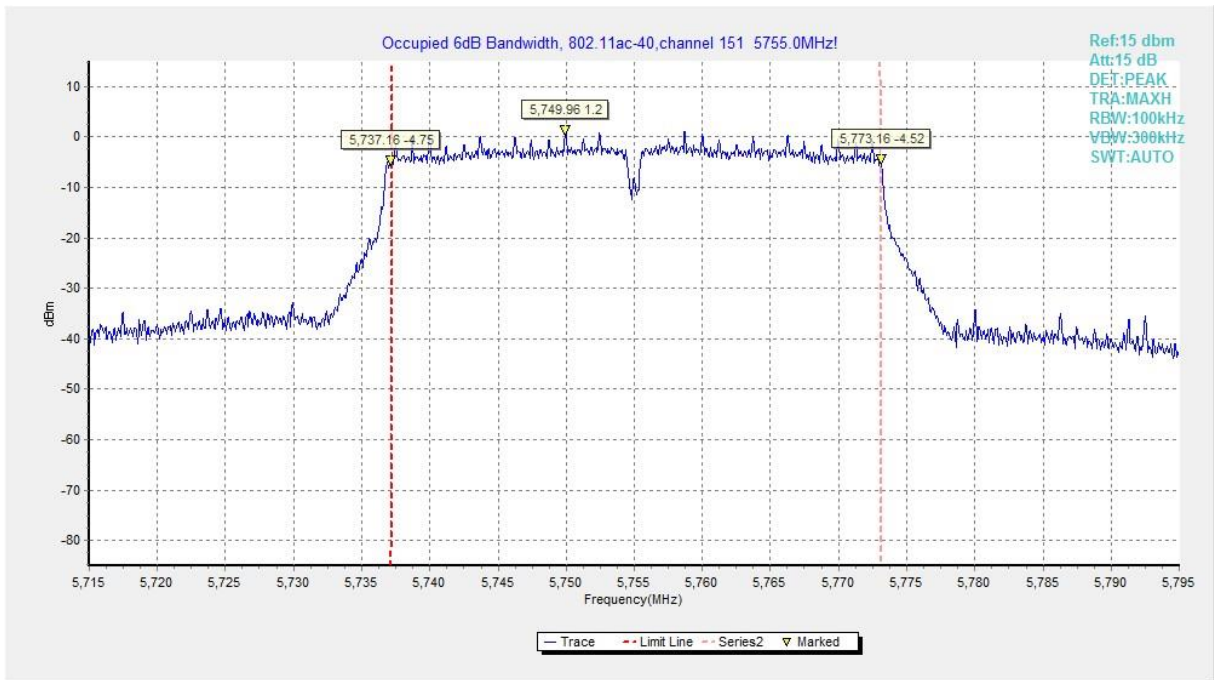


**Fig. 11 Occupied 6dB Bandwidth (802.11n-HT40, Ch 159)**

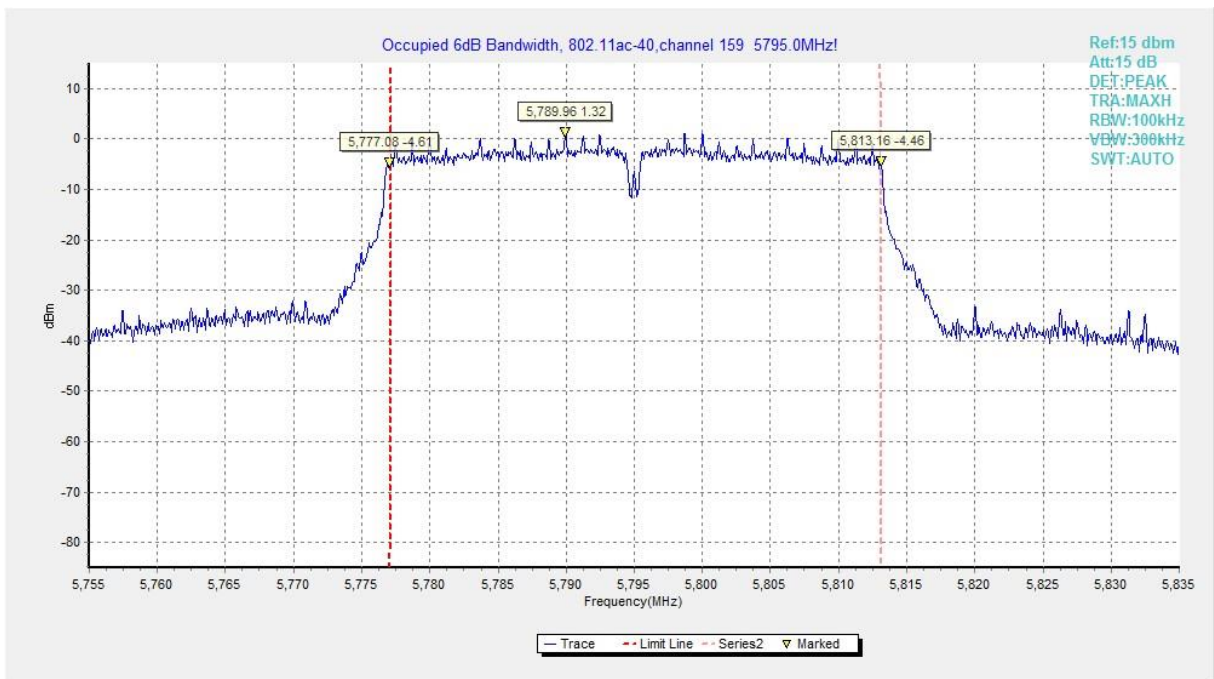


**Fig. 12 Occupied 6dB Bandwidth (802.11ac-HT40, Ch 151)**





**Fig. 13 Occupied 6dB Bandwidth (802.11ac-HT40, Ch 159)**



**Fig. 14 Occupied 6dB Bandwidth (802.11ac-HT80, Ch 155)**

## A.5. Transmitter Spurious Emission

### Measurement Limit:

Standard	Frequency (MHz)	Limit (dBm/MHz)
FCC 47 CFR Part 15.407	5725MHz~5850MHz	< -27

The measurement is made according to ANSI C63.10 .

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

### Measurement Uncertainty:

Frequency Range	Uncertainty(dB)
30MHz ≤ f ≤ 2GHz	0.63
2GHz ≤ f ≤ 3.6GHz	0.82
3.6GHz ≤ f ≤ 8GHz	1.55
8GHz ≤ f ≤ 20GHz	1.86
20GHz ≤ f ≤ 22GHz	1.90
22GHz ≤ f ≤ 26GHz	2.20

### 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

Frequency Range	Uncertainty(dB)
30MHz ≤ f ≤ 1GHz	5.40
1GHz ≤ f ≤ 18GHz	4.32
18GHz ≤ f ≤ 40GHz	5.26

#### 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	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
802.11n (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	---

**802.11ac-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-HT80 mode**

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n (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**

## Ch149

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5650.500	40.7	-22.8	34.8	28.74	54.0	13.3	H	46
5653.500	40.8	-22.8	34.8	28.81	54.0	13.2	H	70
11490.200	31.3	-29.1	38.5	21.94	54.0	22.7	H	92
12395.500	33.3	-28.1	39.0	22.40	54.0	20.7	H	268
16111.300	40.4	-23.4	40.9	22.86	54.0	13.6	H	292
17983.500	43.9	-22.8	41.3	25.36	54.0	10.1	H	316

## Ch157

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5429.500	40.5	-22.5	34.5	28.51	54.0	13.5	H	28
5385.600	40.6	-22.3	34.5	28.42	54.0	13.4	H	74
11570.500	31.2	-29.2	38.6	21.93	54.0	22.8	H	140
13334.900	34.5	-27.6	39.0	23.10	54.0	19.5	H	8
16204.800	40.8	-23.2	41.0	22.96	54.0	13.2	H	80
17899.900	43.8	-22.6	41.3	25.09	54.0	10.2	H	243

## Ch165

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5922.500	41.3	-22.2	35.1	28.44	54.0	12.7	H	8
5925.000	41.1	-22.2	35.1	28.21	54.0	12.9	H	52
11649.700	31.3	-29.4	38.6	22.08	54.0	22.7	H	18
12680.400	33.7	-27.9	39.1	22.56	54.0	20.3	H	6
16035.400	40.3	-23.6	40.8	23.05	54.0	13.7	H	48
17980.200	43.9	-22.8	41.3	25.36	54.0	10.1	H	128

**802.11n-HT20**
**Ch149**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5650.500	40.8	-22.8	34.8	28.83	54.0	13.2	H	20
5654.500	40.7	-22.8	34.8	28.72	54.0	13.3	H	248
11490.200	31.3	-29.1	38.5	21.96	54.0	22.7	H	49
12687.000	33.8	-27.9	39.1	22.60	54.0	20.2	H	82
16094.800	40.3	-23.4	40.9	22.83	54.0	13.7	H	168
17971.400	43.8	-22.8	41.3	25.25	54.0	10.2	H	8

**Ch157**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5435.500	40.9	-22.6	34.6	28.97	54.0	13.1	H	92
5389.550	40.9	-22.3	34.5	28.63	54.0	13.1	H	267
11570.500	31.2	-29.2	38.6	21.93	54.0	22.8	H	296
13314.000	34.7	-27.7	39.0	23.39	54.0	19.3	H	314
16149.800	40.6	-23.3	41.0	22.92	54.0	13.4	H	90
17869.100	43.5	-22.6	41.3	24.83	54.0	10.5	H	112

**Ch165**

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5924.500	41.3	-22.2	35.1	28.39	54.0	12.7	H	84
5925.000	41.2	-22.2	35.1	28.31	54.0	12.8	H	136
11649.700	31.3	-29.4	38.6	22.10	54.0	22.7	H	72
12398.800	33.3	-28.1	39.0	22.38	54.0	20.7	H	92
16033.200	40.3	-23.6	40.8	23.04	54.0	13.7	H	40
17942.800	43.7	-22.7	41.3	25.15	54.0	10.3	H	6

**802.11n-HT40**

## Ch151

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5390.200	40.7	-22.3	34.5	28.47	54.0	13.3	H	28
5430.400	40.6	-22.6	34.5	28.60	54.0	13.4	H	49
11510.000	31.3	-29.1	38.5	21.94	54.0	22.7	H	226
12673.800	33.8	-28.0	39.1	22.65	54.0	20.2	H	248
16191.600	40.6	-23.2	41.0	22.85	54.0	13.4	H	268
17963.700	43.9	-22.7	41.3	25.32	54.0	10.1	H	298

## Ch159

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5399.700	40.8	-22.3	34.5	28.58	54.0	13.2	H	170
5413.300	40.5	-22.4	34.5	28.38	54.0	13.5	H	150
11590.300	31.1	-29.3	38.6	21.82	54.0	22.9	H	20
13316.200	34.6	-27.7	39.0	23.30	54.0	19.4	H	180
16110.200	40.4	-23.4	40.9	22.87	54.0	13.6	H	202
17887.800	43.7	-22.6	41.3	24.97	54.0	10.3	H	8

**802.11ac-HT20**

## Ch149

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5450.650	40.5	-22.7	34.6	28.61	54.0	13.5	H	4
5420.460	40.5	-22.5	34.5	28.46	54.0	13.5	H	26
11490.200	31.4	-29.1	38.5	22.08	54.0	22.6	H	356
12655.100	33.6	-28.0	39.1	22.52	54.0	20.4	H	348
16152.000	40.6	-23.3	41.0	22.93	54.0	13.4	H	174
17945.000	43.8	-22.7	41.3	25.17	54.0	10.2	H	112

## Ch157

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5425.750	40.5	-22.5	34.5	28.50	54.0	13.5	H	6
5385.500	40.8	-22.3	34.5	28.60	54.0	13.2	H	48
11570.500	31.2	-29.2	38.6	21.87	54.0	22.8	H	92
13325.000	34.6	-27.6	39.0	23.23	54.0	19.4	H	48
16097.000	40.5	-23.4	40.9	22.96	54.0	13.5	H	68
17883.400	43.7	-22.6	41.3	24.97	54.0	10.3	H	92

## Ch165

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5404.900	40.7	-22.4	34.5	28.49	54.0	13.3	H	48
5441.500	40.5	-22.6	34.6	28.56	54.0	13.5	H	6
11649.700	31.3	-29.4	38.6	22.09	54.0	22.7	H	312
13384.400	34.5	-27.6	39.0	23.16	54.0	19.5	H	48
16039.800	40.3	-23.6	40.8	22.99	54.0	13.7	H	68
17914.200	43.6	-22.6	41.3	25.00	54.0	10.4	H	80

**802.11ac-HT40**

## Ch151

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5373.700	40.6	-22.3	34.5	28.40	54.0	13.4	H	92
5473.600	40.3	-22.7	34.6	28.38	54.0	13.7	H	26
11510.000	31.4	-29.1	38.5	22.03	54.0	22.6	H	222
13325.000	34.6	-27.6	39.0	23.26	54.0	19.4	H	248
16191.600	40.7	-23.2	41.0	22.89	54.0	13.3	H	46
17970.300	43.8	-22.8	41.3	25.23	54.0	10.2	H	68



## Ch159

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5356.900	40.7	-22.3	34.5	28.45	54.0	13.4	H	8
5454.150	40.3	-22.7	34.6	28.47	54.0	13.7	H	28
11590.300	31.3	-29.3	38.6	21.96	54.0	22.7	H	119
12674.900	33.8	-28.0	39.1	22.65	54.0	20.2	H	146
16111.300	40.4	-23.4	40.9	22.84	54.0	13.6	H	76
17905.400	43.6	-22.6	41.3	24.98	54.0	10.4	H	94

**802.11ac-HT80**

## Ch155

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5422.600	40.7	-22.5	34.5	28.66	54.0	13.3	H	20
5442.800	40.6	-22.6	34.6	28.72	54.0	13.4	H	45
11549.600	31.4	-29.2	38.5	22.02	54.0	22.6	H	240
13341.500	34.4	-27.6	39.0	23.01	54.0	19.6	H	180
16102.500	40.4	-23.4	40.9	22.87	54.0	13.6	H	85
17928.500	43.8	-22.7	41.3	25.18	54.0	10.2	H	25

**Peak Results:**
**802.11a**

## Ch149

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5650.874	54.4	-22.8	34.8	42.44	68.8	14.5	H	44
5651.771	54.1	-22.8	34.8	42.16	69.5	15.4	H	66
11490.200	45.8	-29.1	38.5	36.48	68.3	22.5	H	88
17234.950	56.7	-22.8	41.5	38.13	68.3	11.6	H	264
17469.800	58.9	-23.1	41.2	40.77	68.3	9.4	H	286
17811.900	59.6	-22.4	41.3	40.73	68.3	8.7	H	308

## Ch157

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5683.600	54.8	-22.9	34.8	42.81	68.3	13.5	H	22
5842.400	56.9	-22.4	35.0	44.30	68.3	11.4	H	66
11569.950	47.4	-29.2	38.6	38.07	68.3	20.9	V	132
16559.550	58.8	-23.3	41.4	40.64	68.3	9.5	H	0
17354.850	56.9	-22.9	41.3	38.52	68.3	11.4	V	88
17885.600	60.0	-22.6	41.3	41.32	68.3	8.3	V	242

## Ch165

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5924.229	55.3	-22.2	35.1	42.43	68.8	13.4	V	0
5923.660	55.2	-22.2	35.1	42.26	69.2	14.0	H	44
11650.250	46.7	-29.4	38.6	37.52	68.3	21.6	V	22
16826.300	58.5	-23.0	41.6	39.89	68.3	9.8	H	0
17474.750	56.9	-23.1	41.2	38.71	68.3	11.4	H	44
17919.150	59.8	-22.7	41.3	41.22	68.3	8.5	V	132

**802.11n-HT20**
**Ch149**

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5651.898	54.6	-22.8	34.8	42.61	69.6	15.0	H	22
5650.207	54.6	-22.8	34.8	42.69	68.4	13.7	V	242
11490.200	45.8	-29.1	38.5	36.50	68.3	22.5	H	44
17234.950	55.8	-22.8	41.5	37.23	68.3	12.5	V	88
17464.850	58.8	-23.1	41.2	40.67	68.3	9.5	V	176
17916.400	60.0	-22.7	41.3	41.39	68.3	8.3	V	0

**Ch157**

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5729.600	56.5	-23.0	34.9	44.62	68.3	11.8	H	88
5893.200	56.0	-22.4	35.1	43.26	68.3	12.3	H	264
11569.950	47.1	-29.2	38.6	37.79	68.3	21.2	V	286
17354.850	56.0	-22.9	41.3	37.61	68.3	12.3	H	308
17684.850	59.2	-22.1	41.2	40.08	68.3	9.1	V	88
17930.700	59.5	-22.7	41.3	40.85	68.3	8.8	V	110

**Ch165**

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5923.309	54.3	-22.2	35.1	41.39	69.5	15.2	H	88
5924.770	54.5	-22.2	35.1	41.62	68.4	13.8	H	132
11650.250	46.0	-29.4	38.6	36.81	68.3	22.3	V	66
17474.750	56.1	-23.1	41.2	37.97	68.3	12.2	H	88
17579.800	59.5	-22.4	41.2	40.70	68.3	8.8	V	44
17950.500	59.9	-22.7	41.3	41.34	68.3	8.4	V	0

**802.11n-HT40**

## Ch151

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5651.437	56.1	-22.8	34.8	44.17	69.3	13.1	H	22
5651.921	56.0	-22.8	34.8	44.06	69.6	13.6	H	44
11510.000	46.5	-29.1	38.5	37.09	68.3	21.8	V	220
17265.200	56.4	-22.8	41.4	37.74	68.3	11.9	V	242
17567.150	58.8	-22.5	41.2	40.00	68.3	9.5	H	264
17887.250	59.5	-22.6	41.3	40.81	68.3	8.8	H	286

## Ch159

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5923.563	54.6	-22.2	35.1	41.71	69.3	14.7	H	176
5924.690	54.8	-22.2	35.1	41.86	68.4	13.7	H	154
11589.750	46.5	-29.3	38.6	37.20	68.3	21.8	V	22
17385.100	55.5	-23.0	41.3	37.20	68.3	12.8	V	176
17584.200	59.0	-22.3	41.2	40.10	68.3	9.3	H	198
17912.000	59.9	-22.6	41.3	41.28	68.3	8.4	H	0

**802.11ac-HT20**

## Ch149

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5651.615	54.5	-22.8	34.8	42.59	69.4	14.9	H	0
5652.058	54.2	-22.8	34.8	42.23	69.7	15.5	V	22
11490.200	45.1	-29.1	38.5	35.73	68.3	23.2	V	352
17234.950	56.7	-22.8	41.5	38.07	68.3	11.6	V	352
17678.800	59.2	-22.1	41.2	40.12	68.3	9.1	V	176
17836.100	59.6	-22.5	41.3	40.81	68.3	8.7	V	110

## Ch157

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5713.200	55.2	-22.9	34.9	43.26	68.3	13.1	H	0
5846.800	56.0	-22.4	35.0	43.38	68.3	12.3	H	44
11569.950	45.5	-29.2	38.6	36.18	68.3	22.8	V	88
17354.850	56.6	-22.9	41.3	38.21	68.3	11.7	V	44
17523.700	59.9	-22.7	41.2	41.48	68.3	8.4	V	66
17897.150	59.6	-22.6	41.3	40.89	68.3	8.7	H	88

## Ch165

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5923.873	54.9	-22.2	35.1	42.03	69.0	14.1	H	44
5924.620	55.0	-22.2	35.1	42.07	68.5	13.5	H	0
11650.250	46.3	-29.4	38.6	37.06	68.3	22.0	V	308
17474.750	56.8	-23.1	41.2	38.63	68.3	11.5	H	44
17671.100	59.2	-22.1	41.2	40.08	68.3	9.1	V	66
17891.650	58.9	-22.6	41.3	40.20	68.3	9.4	H	88

**802.11ac-HT40**

## Ch151

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5650.920	57.0	-22.8	34.8	45.01	68.9	11.9	H	88
5652.001	56.9	-22.8	34.8	44.99	69.7	12.7	H	22
11510.000	45.7	-29.1	38.5	36.31	68.3	22.6	V	220
17265.200	56.4	-22.8	41.4	37.77	68.3	11.9	V	242
17621.050	59.1	-22.1	41.2	39.95	68.3	9.2	V	44
17907.050	59.4	-22.6	41.3	40.71	68.3	8.9	V	66

## Ch159

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5923.770	55.3	-22.2	35.1	42.40	69.1	13.8	H	0
5924.640	55.0	-22.2	35.1	42.13	68.5	13.4	H	22
11589.750	45.7	-29.3	38.6	36.37	68.3	22.6	H	110
17385.100	57.7	-23.0	41.3	39.37	68.3	10.6	V	132
17702.450	59.0	-22.2	41.2	39.99	68.3	9.3	V	66
17909.800	59.5	-22.6	41.3	40.82	68.3	8.8	V	88

**802.11ac-HT80**

## Ch155

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)	Turntable angle (deg)
5652.047	55.2	-22.8	34.8	43.22	68.3	13.1	H	22
5651.045	54.7	-22.8	34.8	42.71	68.3	13.6	H	44
11550.150	46.4	-29.2	38.5	37.07	68.3	21.9	H	242
17325.150	57.2	-22.9	41.4	38.65	68.3	11.1	H	176
17804.750	59.9	-22.4	41.3	41.08	68.3	8.4	H	88
17926.850	60.1	-22.7	41.3	41.52	68.3	8.2	V	22

## 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 Uncertainty:

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

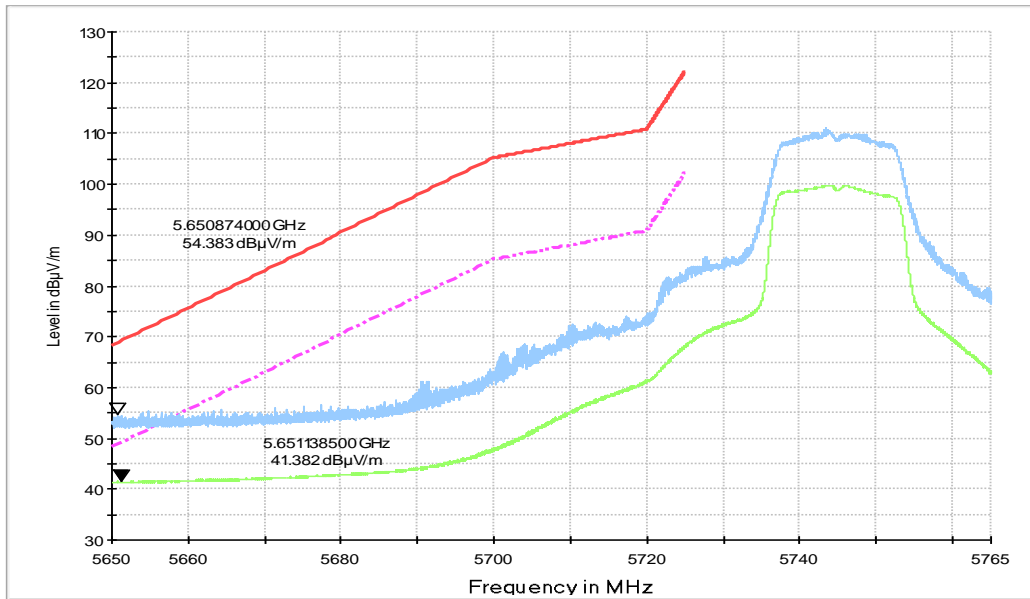
#### Measurement Result:

Mode	Channel	Test Results	Conclusion
802.11a	5745 MHz	Fig.15	P
	5825 MHz	Fig.16	P
802.11n HT20	5745 MHz	Fig.17	P
	5825 MHz	Fig.18	P
802.11n HT40	5755 MHz	Fig.19	P
	5795 MHz	Fig.20	P
802.11ac HT20	5745 MHz	Fig.21	P
	5825 MHz	Fig.22	P
802.11ac HT40	5755 MHz	Fig.23	P
	5795 MHz	Fig.24	P
802.11ac HT80	5775 MHz	Fig.25	P
		Fig.26	

**Conclusion: PASS**

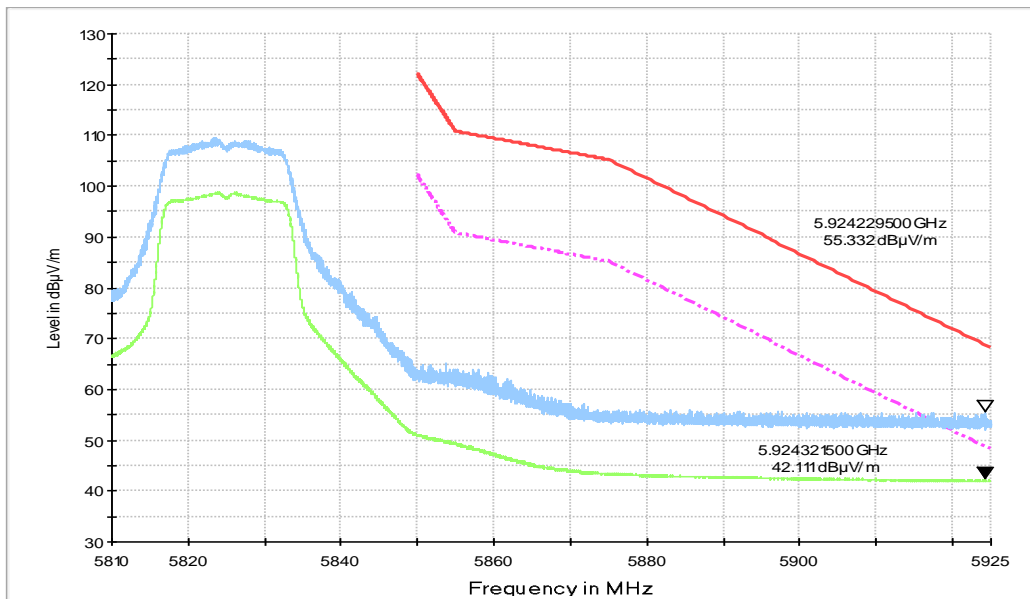
**Test graphs as below:**

RE - Power-5.650GHz-5.765GHz



**Fig. 15 Band Edges (802.11a, 5745MHz)**

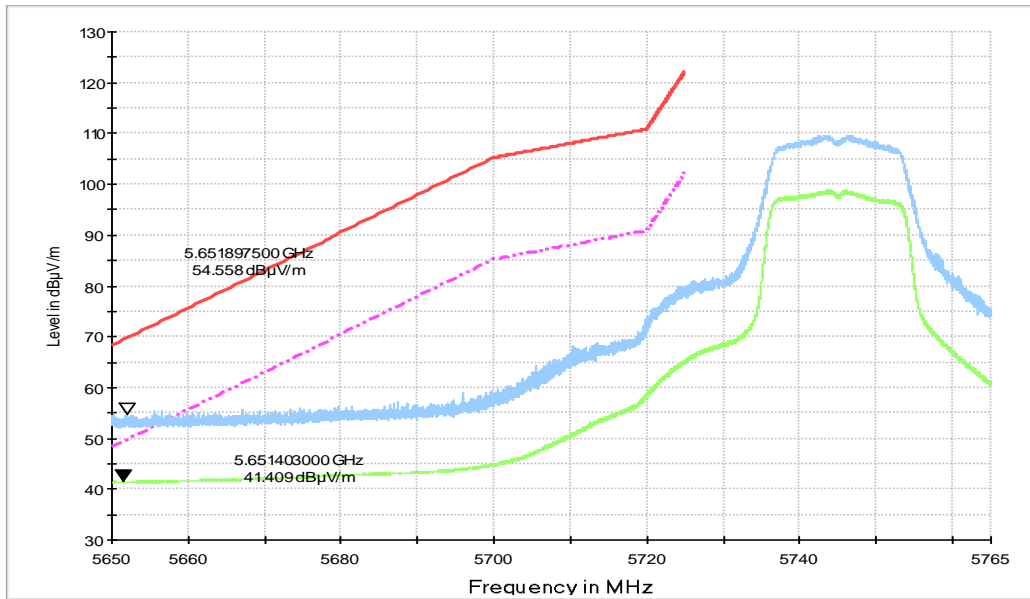
RE - Power-5.810GHz-5.925GHz



**Fig. 16 Band Edges (802.11a, 5825MHz)**

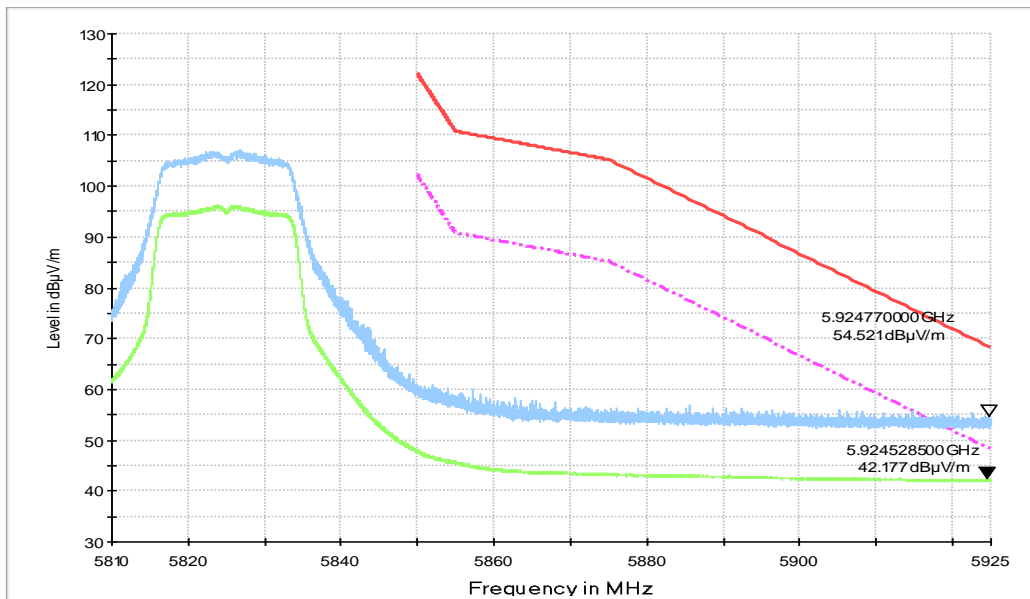


RE - Power-5.650GHz-5.765GHz



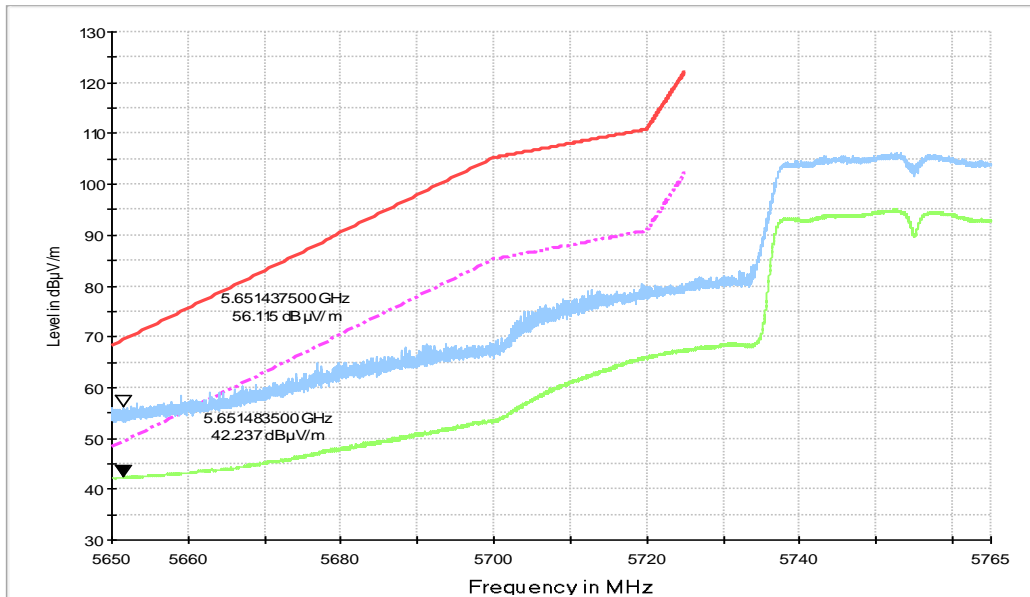
**Fig. 17 Band Edges (802.11n-HT20, 5745MHz)**

RE - Power-5.810GHz-5.925GHz



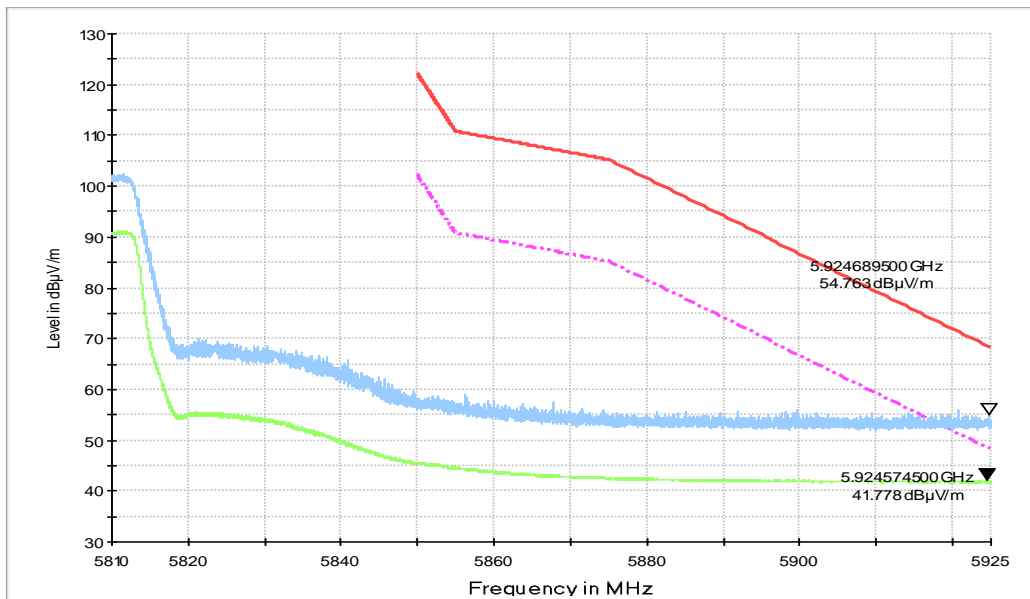
**Fig. 18 Band Edges (802.11n-HT20, 5825MHz)**

RE - Power-5.650GHz-5.765GHz



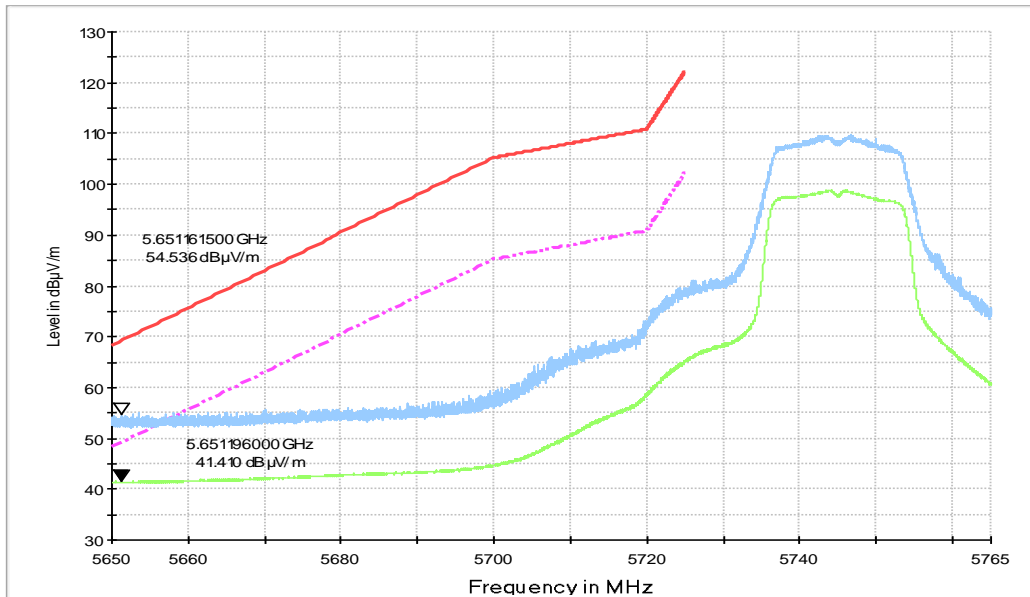
**Fig. 19 Band Edges (802.11n-HT40, 5755MHz)**

RE - Power-5.810GHz-5.925GHz



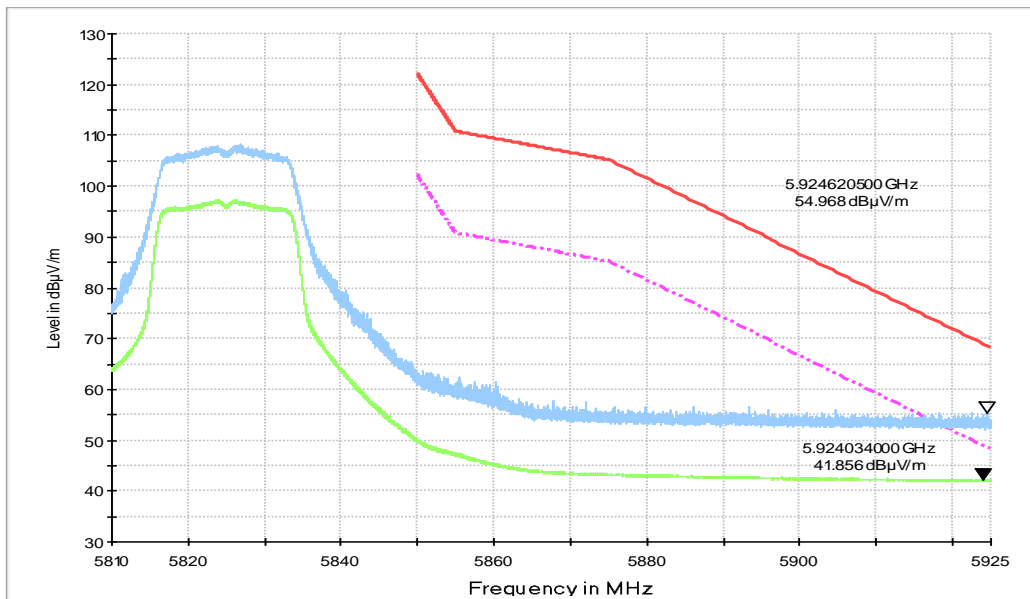
**Fig. 20 Band Edges (802.11n-HT40, 5795MHz)**

RE - Power-5.650GHz-5.765GHz



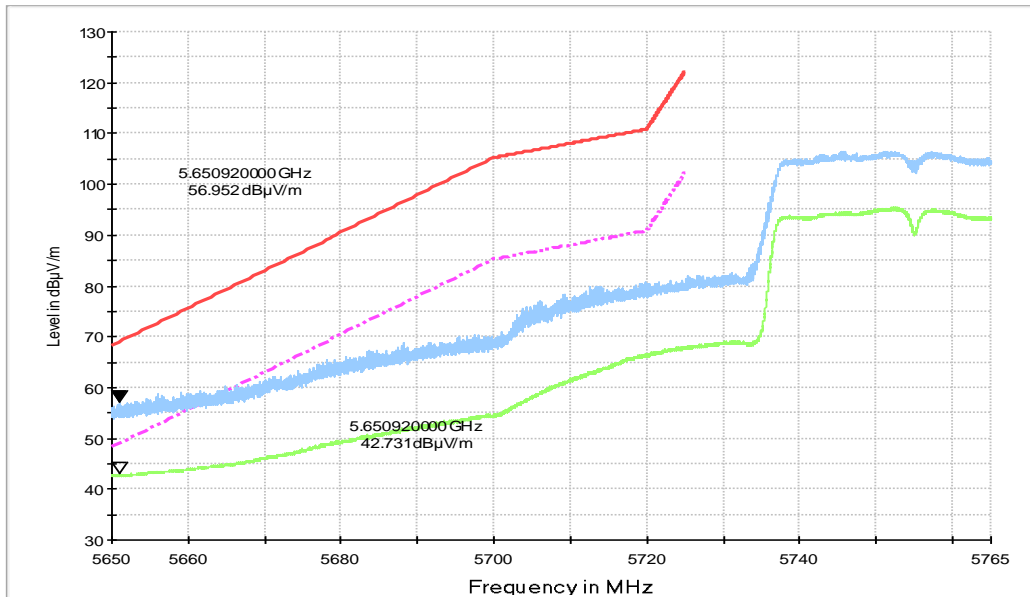
**Fig. 21 Band Edges (802.11ac-HT20, 5745MHz)**

RE - Power-5.810GHz-5.925GHz



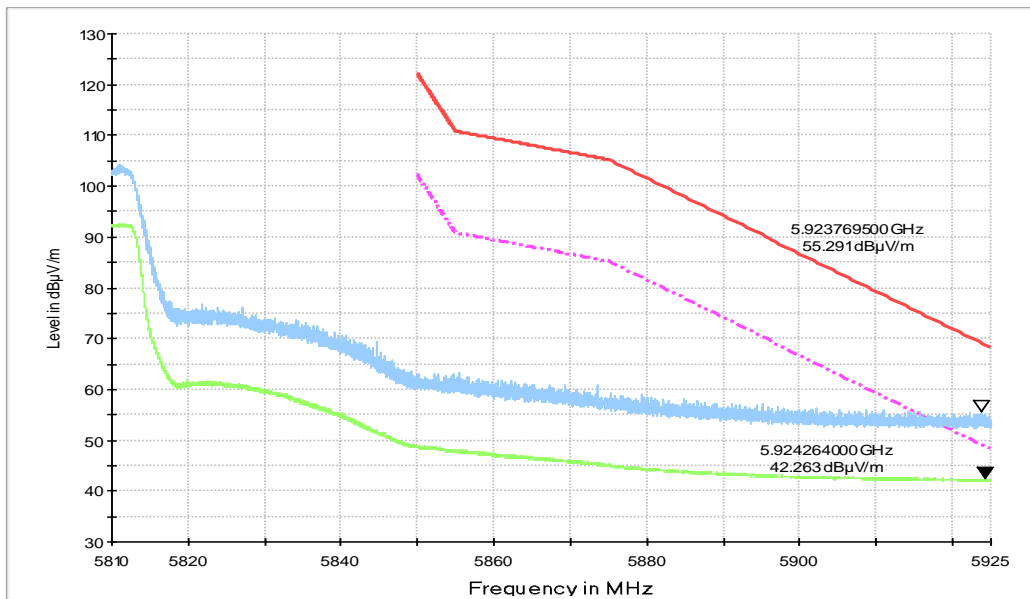
**Fig. 22 Band Edges (802.11ac-HT20, 5825MHz)**

RE - Power-5.650GHz-5.765GHz



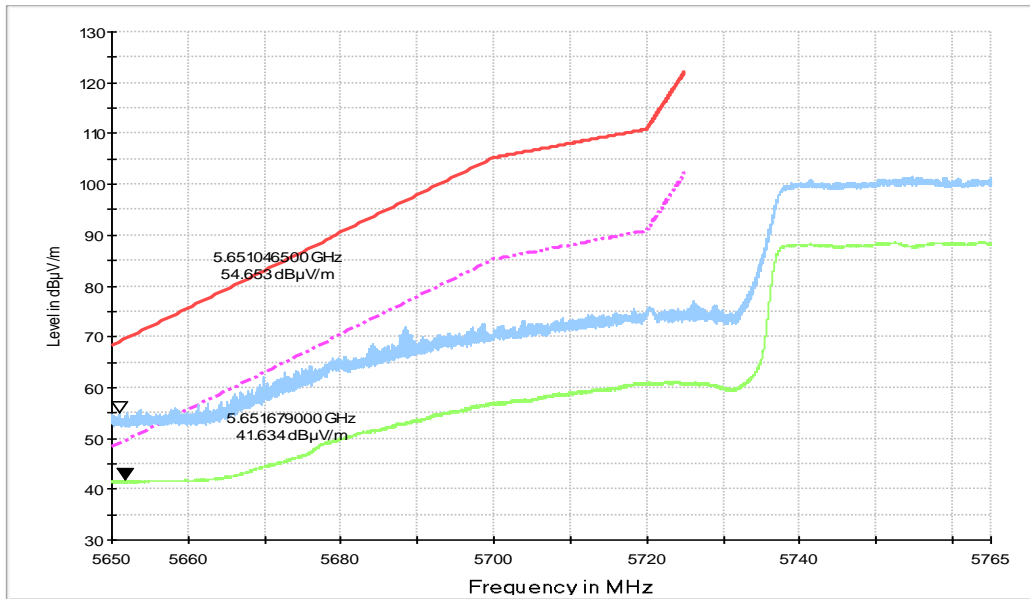
**Fig. 23 Band Edges (802.11ac-HT40, 5755MHz)**

RE - Power-5.810GHz-5.925GHz



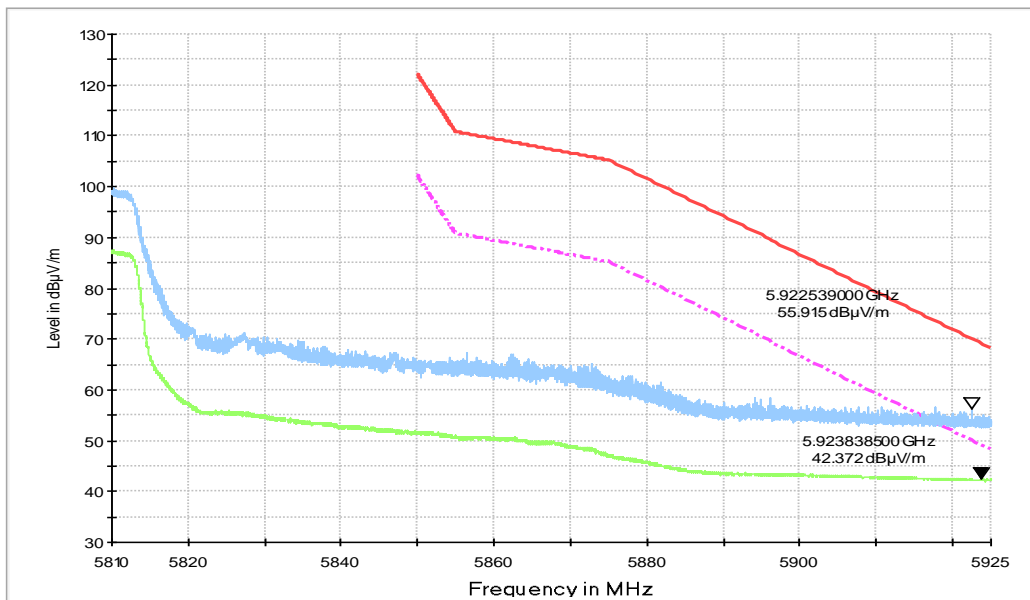
**Fig. 24 Band Edges (802.11ac-HT40, 5795MHz)**

RE - Power-5.650GHz-5.765GHz



**Fig. 25 Band Edges (802.11ac-HT80, 5775MHz)**

RE - Power-5.810GHz-5.925GHz



**Fig. 26 Band Edges (802.11ac-HT80, 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  $U = 3.10\text{dB}$ ,  $k=2$ .

### 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.27	Fig.28	P
0.5 to 5	56			
5 to 30	60			

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

WLAN (Average Limit)

Frequency range (MHz)	Average Limit (dB $\mu$ V)	Result (dB $\mu$ V)		Conclusion
		With charger		
		802.11a	Idle	
0.15 to 0.5	56 to 46	Fig.27	Fig.28	P
0.5 to 5	46			
5 to 30	50			

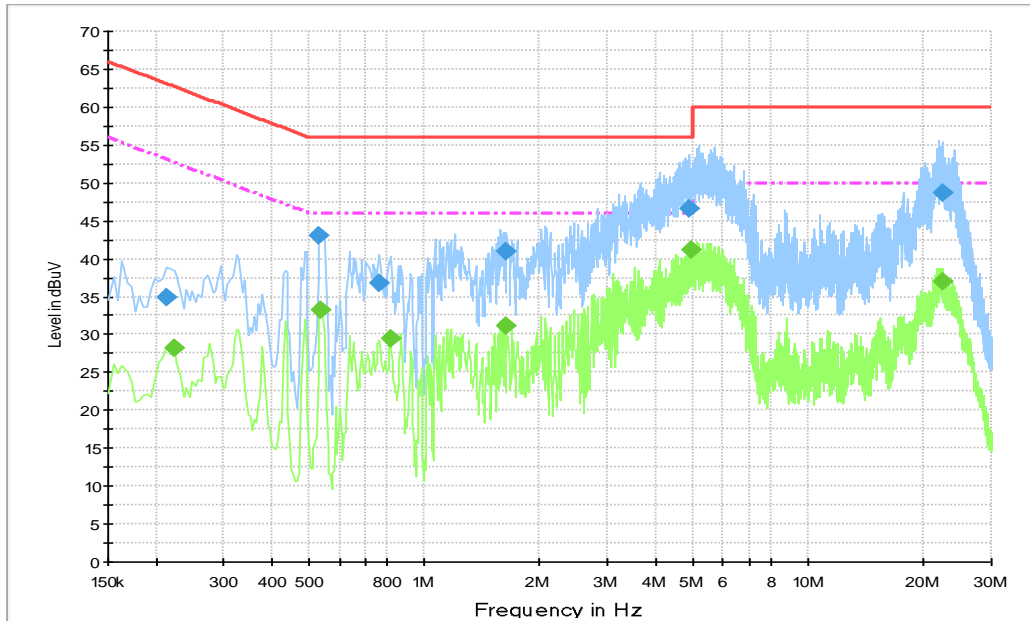
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

The measurement is made according to ANSI C63.10 .

**Conclusion: PASS**

**Test graphs as below:**

Traffic:



**Fig. 27 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**

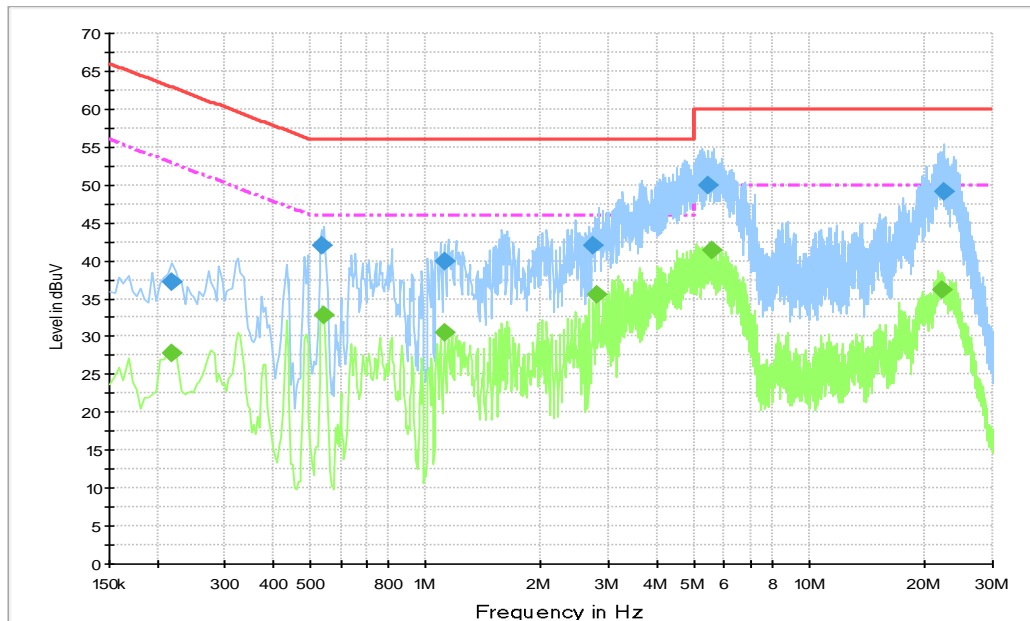
Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.213000	34.8	10000.0	9.000	L1	19.9	28.3	63.1
0.532500	43.0	10000.0	9.000	L1	20.0	13.0	56.0
0.766500	36.8	10000.0	9.000	L1	19.9	19.2	56.0
1.639500	41.0	10000.0	9.000	L1	19.8	15.0	56.0
4.915500	46.7	10000.0	9.000	L1	19.8	9.3	56.0
22.272000	48.8	10000.0	9.000	L1	20.0	11.2	60.0

**Final Result 2**

Frequency (MHz)	Average (dB $\mu$ V)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.222000	28.2	10000.0	9.000	L1	19.9	24.5	52.7
0.537000	33.2	10000.0	9.000	L1	20.0	12.8	46.0
0.816000	29.6	10000.0	9.000	L1	19.9	16.4	46.0
1.635000	31.1	10000.0	9.000	L1	19.8	14.9	46.0
4.956000	41.1	10000.0	9.000	L1	19.8	4.9	46.0
22.272000	37.0	10000.0	9.000	L1	20.0	13.0	50.0

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

Idle:



**Fig. 28 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 (dB $\mu$ V)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.217500	37.1	10000.0	9.000	L1	19.9	25.8	62.9
0.537000	41.9	10000.0	9.000	L1	20.0	14.1	56.0
1.117500	40.0	10000.0	9.000	L1	19.8	16.0	56.0
2.719500	41.9	10000.0	9.000	L1	19.8	14.1	56.0
5.446500	49.9	10000.0	9.000	L1	19.8	10.1	60.0
22.272000	49.0	10000.0	9.000	L1	20.0	11.0	60.0

**Final Result 2**

Frequency (MHz)	Average (dB $\mu$ V)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.217500	27.9	10000.0	9.000	L1	19.9	25.1	52.9
0.541500	32.7	10000.0	9.000	L1	20.0	13.3	46.0
1.122000	30.6	10000.0	9.000	L1	19.8	15.4	46.0
2.778000	35.6	10000.0	9.000	L1	19.8	10.4	46.0
5.554500	41.4	10000.0	9.000	L1	19.8	8.6	50.0
22.222500	36.2	10000.0	9.000	L1	20.0	13.8	50.0

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



## ANNEX B: Accreditation Certificate

<p>United States Department of Commerce National Institute of Standards and Technology</p> 	
<hr/> <p><b>Certificate of Accreditation to ISO/IEC 17025:2005</b></p> <hr/>	
<p>NVLAP LAB CODE: 600118-0</p>	
<p><b>Telecommunication Technology Labs, CAICT</b> Beijing China</p>	
<p><i>is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:</i></p>	
<p><b>Electromagnetic Compatibility &amp; Telecommunications</b></p>	
<p><i>This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).</i></p>	
<hr/> <p>2019-09-26 through 2020-09-30 <i>Effective Dates</i></p>	 <hr/> <p><i>[Signature]</i> For the National Voluntary Laboratory Accreditation Program</p>

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