



*Full*

# TEST REPORT

No. I18D00141-SRD07

*For*

**Client : Shanghai Sunmi Technology Co.,Ltd.**

**Production : Handheld Wireless Terminal**

**Model Name : T8900/T8901**

**FCC ID : 2AH25L2**

**Hardware Version: 2DD021\_V2.01**

**Software Version: L2\_V2.6\_20180621**

**Issued date: 2018-09-26**

**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 ECIT Shanghai.

**Test Laboratory:**

ECIT Shanghai, East China Institute of Telecommunications

Add: 7-8F, G Area, No.668, Beijing East Road, Huangpu District, Shanghai, P. R. China

Tel: (+86)-021-63843300, E-Mail: [welcome@ecit.org.cn](mailto:welcome@ecit.org.cn)



# RF Test Report

Report No.: I18D00141-SRD07

## Revision Version

Report Number	Revision	Date	Memo
I18D00141-SRD07	00	2018-09-26	Initial creation of test report

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## 1. Test Laboratory

### 1.1. Testing Location

Company Name:	ECIT Shanghai, East China Institute of Telecommunications
Address:	7-8F, G Area, No. 668, Beijing East Road, Huangpu District, Shanghai, P. R. China
Postal Code:	200001
Telephone:	(+86)-021-63843300
Fax:	(+86)-021-63843301

### 1.2. Testing Environment

Normal Temperature:	15-35°C
Extreme Temperature:	-30/+50°C
Relative Humidity:	20-75%

### 1.3. Project data

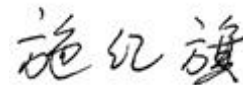
Project Leader:	Yu Anlu
Testing Start Date:	2018-08-08
Testing End Date:	2018-08-26

### 1.4. Signature



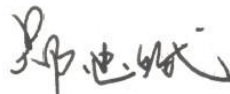
Yang Dejun

(Prepared this test report)



Shi Hongqi

(Reviewed this test report)



Zheng Zhongbin

Director of the laboratory

(Approved this test report)

## 2. Client Information

### 2.1. Applicant Information

Company Name: Shanghai Sunmi Technology Co.,Ltd.  
Address: Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai,  
China  
Postcode: 200433  
Telephone: 18721763396

### 2.2. Manufacturer Information

Company Name: Shanghai Sunmi Technology Co.,Ltd.  
Address: Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai,  
China  
Postcode: 200433  
Telephone: 18721763396

### 3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

#### 3.1. About EUT

EUT Description	Handheld Wireless Terminal
Model name	T8900/T8901
WLAN Frequency Range	ISM Bands: 5150MHz~5250MHz
WLAN type of modulation	OFDM
Extreme Temperature	-30/+50°C
Nominal Voltage	3.85V
Extreme High Voltage	4.35V
Extreme Low Voltage	3.5V

Note: Photographs of EUT are shown in ANNEX A of this test report.

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

EUT ID*	Model Name	SN or IMEI	HW Version	SW Version	Date of receipt
N01	T8900/T8901	NA	2DD021_V2. 01	L2_V2.6_2018062 1	2018-07-25
N07	T8900/T8901	NA	2DD021_V2. 01	L2_V2.6_2018062 1	2018-07-25

\*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
AE1	RF cable	---
AE2	---	---

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

## 4. Reference Documents

### 4.1. Reference Documents for testing

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

Reference	Title	Version
FCC Part15	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices	2017
ANSI 63.10	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	Information Infrastructure (U-NII) Devices - Part 15, Subpart E	2017
KDB905462	COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-NATIONAL INFORMATION INFRASTRUCTURE DEVICES OPERATING IN THE 5250-5350 MHz AND 5470-5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION	2016



## 5. Summary of Test Results

A brief summary of the tests carried out is shown as following.

<b>SUMMARY OF MEASUREMENT RESULTS</b>	<b>Sub-clause of Part15E</b>	<b>Sub-clause of IC</b>	<b>Verdict</b>
Maximum Output Power	15.407	/	<b>P</b>
Power Spectral Density	15.407	/	<b>P</b>
Occupied 26dB Bandwidth	15.403	/	<b>P</b>
Band edge compliance	15.407	/	<b>P</b>
Transmitter spurious emissions radiated	15.407	/	<b>P</b>
Spurious emissions radiated < 30 MHz	15.407	/	<b>P</b>
Spurious emissions conducted < 30 MHz	15.407	/	<b>P</b>
Peak Excursion	15.407	/	<b>P</b>
Frequency Stability	15.407	/	<b>NA</b>
Transmit Power Control	15.407	/	<b>NA</b>

Please refer to section 6 for detail.

Terms used in Verdict column

P	Pass, the EUT complies with the essential requirements in the standard.
NP	Not Perform, the test was not performed by ECIT.
NA	Not Applicable, the test was not applicable.
F	Fail, the EUT does not comply with the essential requirements in the standard.

Test Conditions

Tnom	Normal temperature
Tmin	Low Temperature
Tmax	High Temperature
Vnom	Normal Voltage
Vmin	Low Voltage
Vmax	High Voltage
Hnom	Norm Humidity
Anom	Norm Air Pressure

For this report, all the test case listed above are tested under Normal Temperature and Normal Voltage, and also under norm humidity, the specific conditions as following:

Temperature	Tnom	25°C
Voltage	Vnom	3.8V
Humidity	Hnom	47%

### 5.1. Notes

All reported tests were carried out on a sample equipment to demonstrate limited compliance with section 3.

The test results of this test report relate exclusively to the item(s) tested as specified in section 5.

### 5.2. Statements

The T8900/T8901, supporting GPRS/EDGE/WCDMA/CDMA/LTE/BT/BLE/WLAN/NFC, manufactured by Shanghai Sunmi Technology Co.,Ltd., which is a new product for testing.

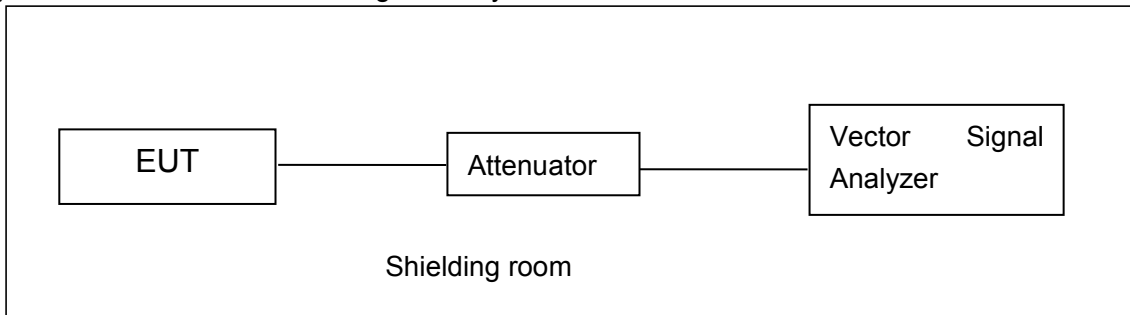
ECIT has verified that the compliance of the tested device specified in section 5 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 5 of this test report.

## 6. Test result

### 6.1. Measurement Method

#### 6.1.1. 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

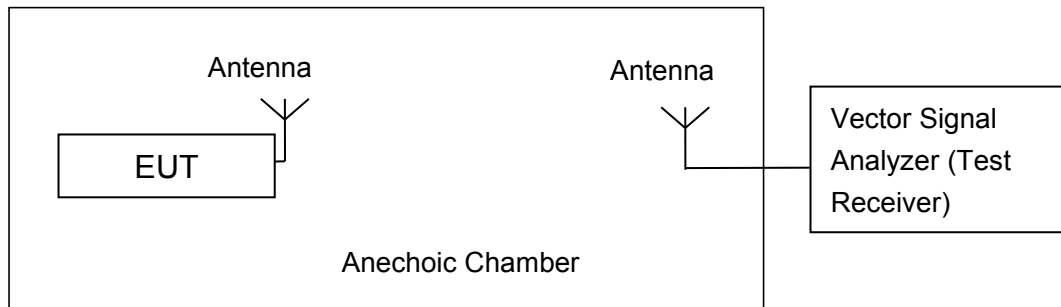


#### 6.1.2. Radiated Emission Measurements

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

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

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



The measurement is made according to KDB 789033

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

## 6.2. Maximum output Power

### Measurement Limit and Method:

Standard	Frequency (MHz)	Limit (dBm)
FCC CRF Part 15.407(a)	5150MHz~5250MHz	24dBm

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

The measurement method SA-1 is made according to KDB 789033

### Measurement Results:

#### 802.11a mode

##### U-NII-1

Mode	Data Rate(Mbps)	Teat Result(dBm)		
		5180MHz	5200MHz	5240MHz
802.11a	6	9.4	9.81	7.69

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

#### 802.11n-HT20 mode

##### U-NII-1

Mode	Data Rate(Index)	Teat Result(dBm)		
		5180MHz	5200MHz	5240MHz
802.11n(20MHz)	MCS0	7.51	7.92	5.76

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

#### 802.11n-HT40 mode

##### U-NII-1

Mode	Data Rate(Index)	Teat Result(dBm)		
		5190MHz	/	5230MHz
802.11n(40MHz)	MCS0	8.14	/	7.47

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

**6.3. Peak Power Spectral Density (conducted)**
**Measurement Limit:**

Standard	Frequency (MHz)	Limit (dBm/MHz)
FCC CRF Part 15.407(a)	5150MHz~5250MHz	11

The output power measurement method SA-1 is made according to KDB 789033

**Measurement Results:**

Mode	Channel	Power Spectral Density (dBm/MHz)	Conclusion
802.11a	5180 MHz	-8.304	P
	5200 MHz	-8.108	P
	5240 MHz	-9.302	P
802.11n HT20	5180 MHz	-10.706	P
	5200 MHz	-10.299	P
	5240 MHz	-11.933	P
802.11n HT40	5190 MHz	-14.164	P
	5230 MHz	-9.055	P

**Conclusion: PASS**

**6.4. Occupied 26dB Bandwidth(conducted)**

**Measurement Limit:**

Standard	Limit (MHz)
FCC 47 CFR Part 15.403 (i)	/

The measurement is made according to KDB 789033

**Measurement Uncertainty:**

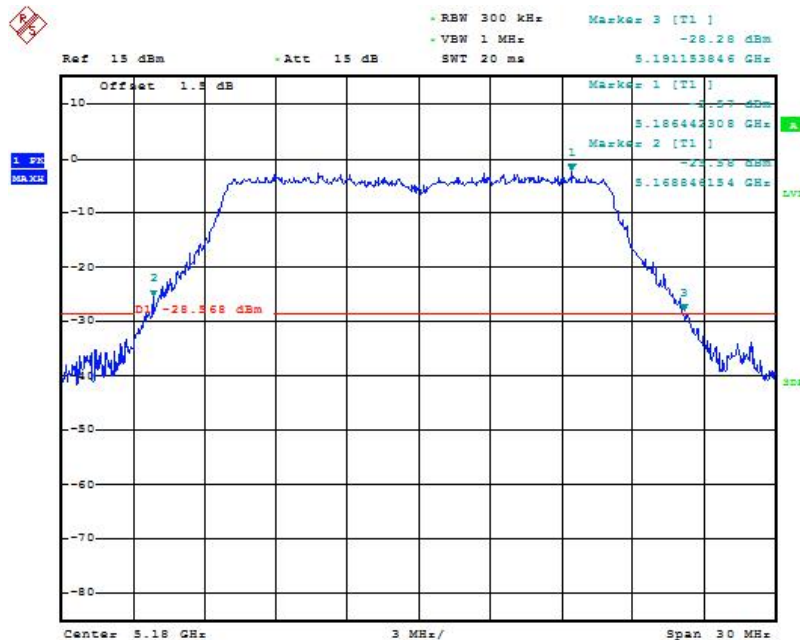
Measurement Uncertainty	60.80Hz
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**Measurement Result:**

Mode	Channel	Occupied 26dB Bandwidth ( MHz)		conclusion
802.11a	5180 MHz	Fig.1	22.31	P
	5200 MHz	Fig.2	22.88	P
	5240 MHz	Fig.3	22.69	P
802.11n HT20	5180 MHz	Fig.4	22.93	P
	5200 MHz	Fig.5	22.93	P
	5240 MHz	Fig.6	22.84	P
802.11n HT40	5190 MHz	Fig.7	43.51	P
	5230 MHz	Fig.8	42.79	P

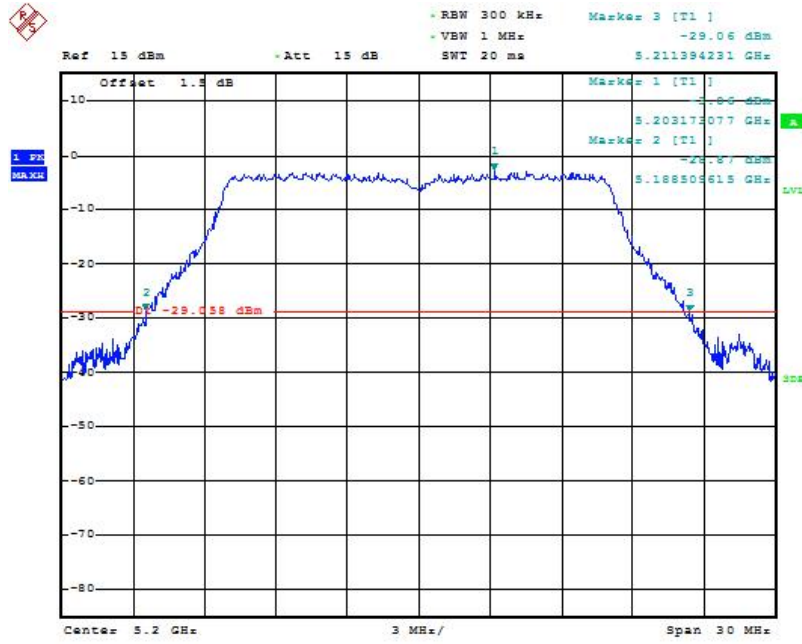
**Conclusion: PASS**

**Test graphs as below:**



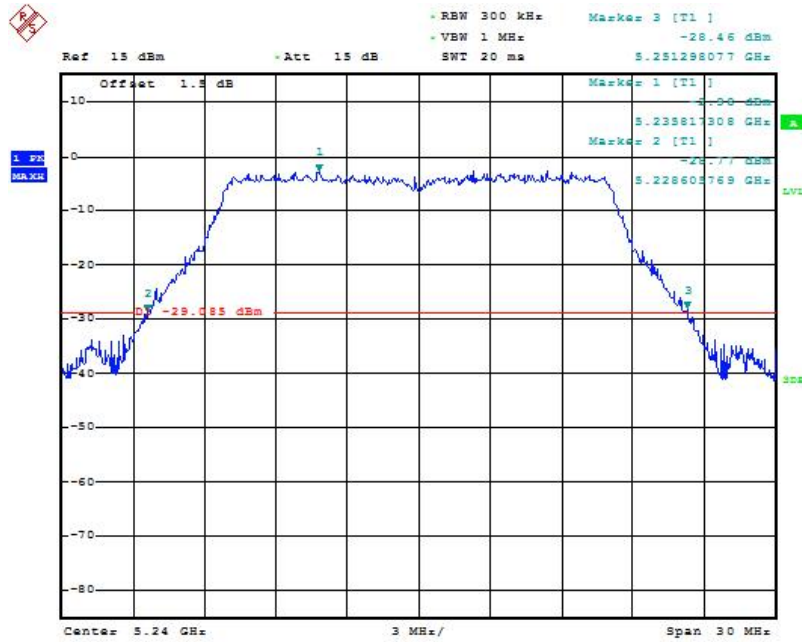
Date: 8.AUG.2018 13:53:32

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



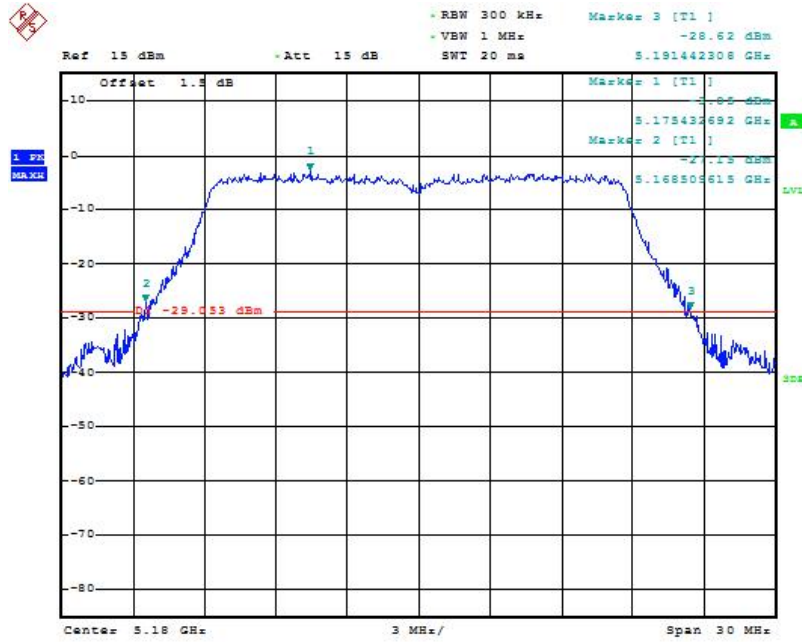
Date: 8.AUG.2018 13:54:13

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



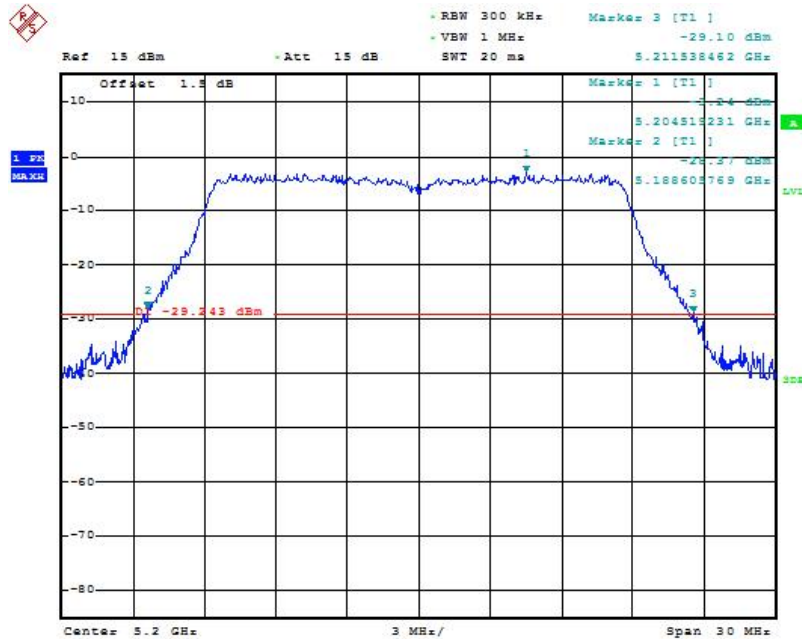
Date: 8.AUG.2018 13:54:57

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



Date: 8.AUG.2018 13:56:08

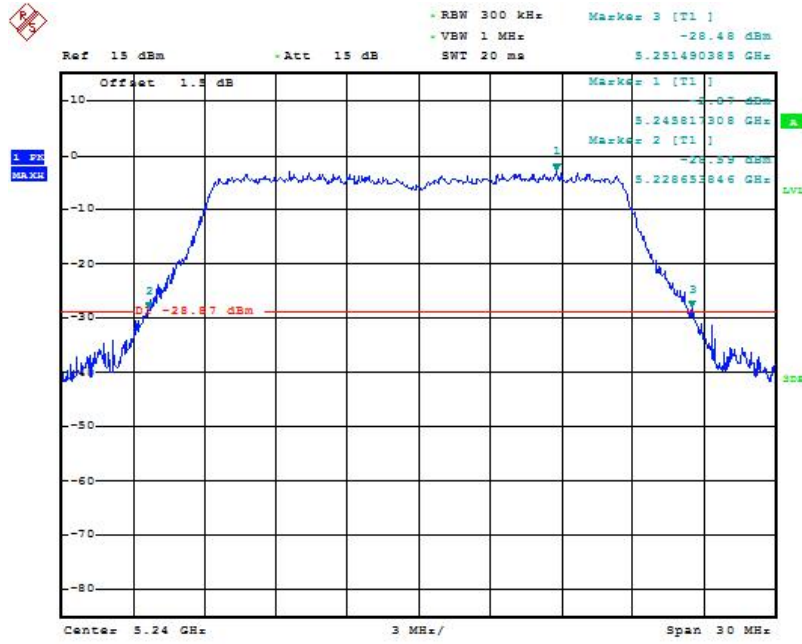
**Fig. 4 Occupied 26dB Bandwidth (802.11n-HT20, 5180MHz)**



Date: 8.AUG.2018 13:57:01

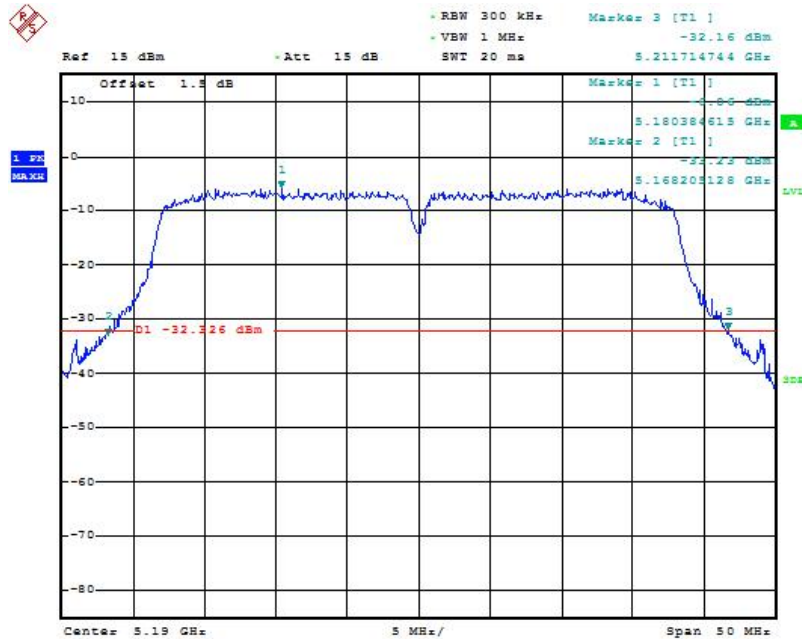
**Fig. 5 Occupied 26dB Bandwidth (802.11n-HT20, 5200MHz)**





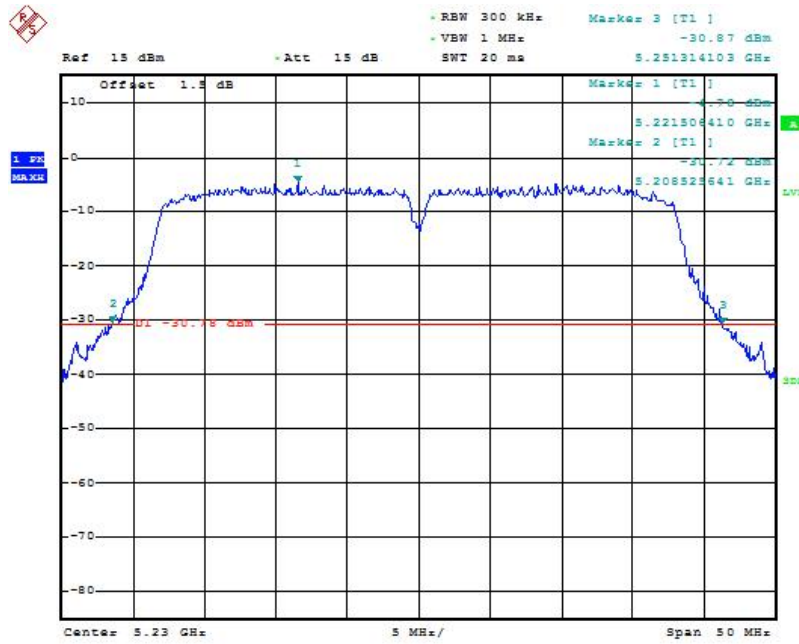
Date: 8.AUG.2018 13:57:46

**Fig. 6 Occupied 26dB Bandwidth (802.11n-HT20, 5240MHz)**



Date: 8.AUG.2018 13:58:56

**Fig. 7 Occupied 26dB Bandwidth (802.11n-HT40, 5190MHz)**



Date: 8.AUG.2018 13:59:44

**Fig. 8 Occupied 26dB Bandwidth (802.11n-HT40, 5230MHz)**

## 6.5. 99% Occupied Bandwidth(conducted)

### Measurement Limit:

Standard	Limit (MHz)
FCC 47 CFR Part 15.407 (e)	/

The measurement is made according to KDB 789033

### Measurement Uncertainty:

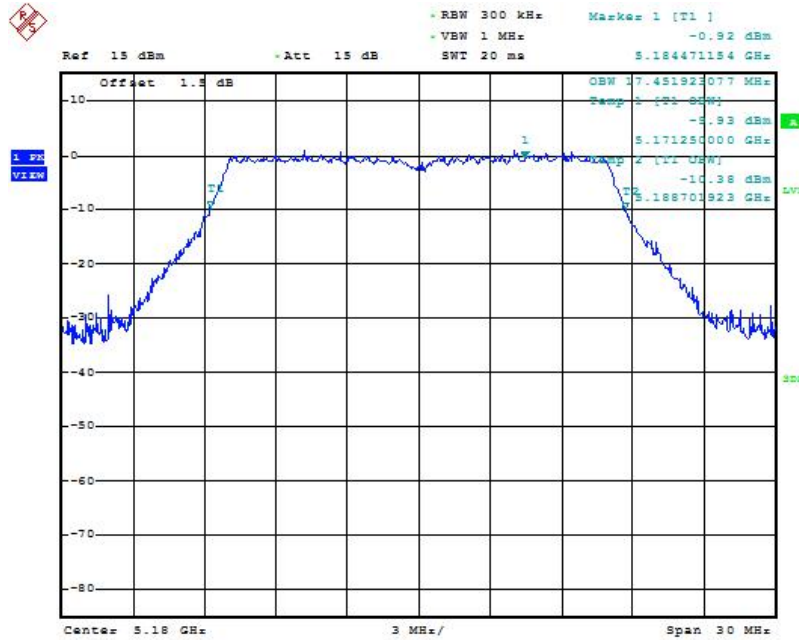
Measurement Uncertainty	60.80Hz
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### Measurement Result:

Mode	Channel	99% Occupied Bandwidth ( MHz)		conclusion
802.11a	5180 MHz	Fig.9	17.452	P
	5200 MHz	Fig.10	17.404	P
	5240 MHz	Fig.11	17.404	P
802.11n HT20	5180 MHz	Fig.12	18.317	P
	5200 MHz	Fig.13	18.317	P
	5240 MHz	Fig.14	18.317	P
802.11n HT40	5190 MHz	Fig.15	36.218	P
	5230 MHz	Fig.16	36.218	P

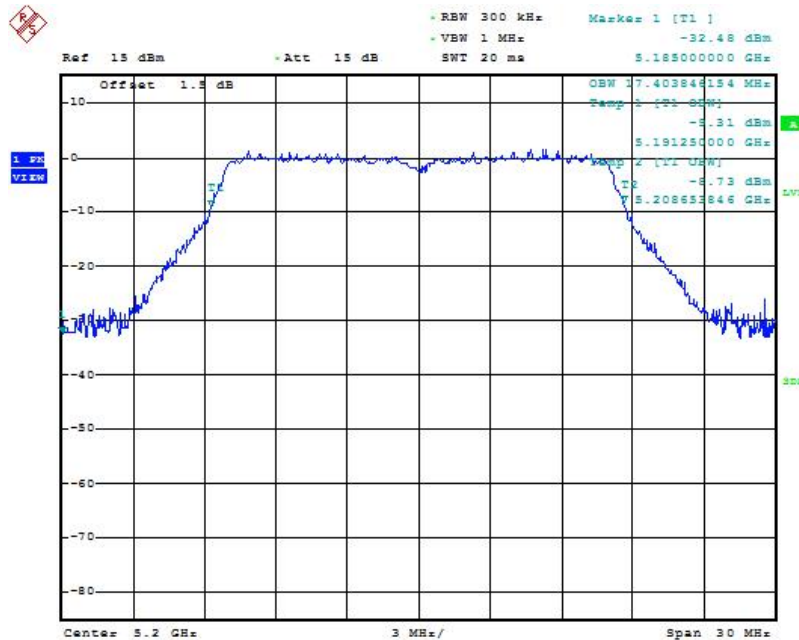
Conclusion: PASS

Test graphs as below:



Date: 8.AUG.2018 14:01:09

Fig. 9 99% Occupied Bandwidth (802.11a, 5180MHz)



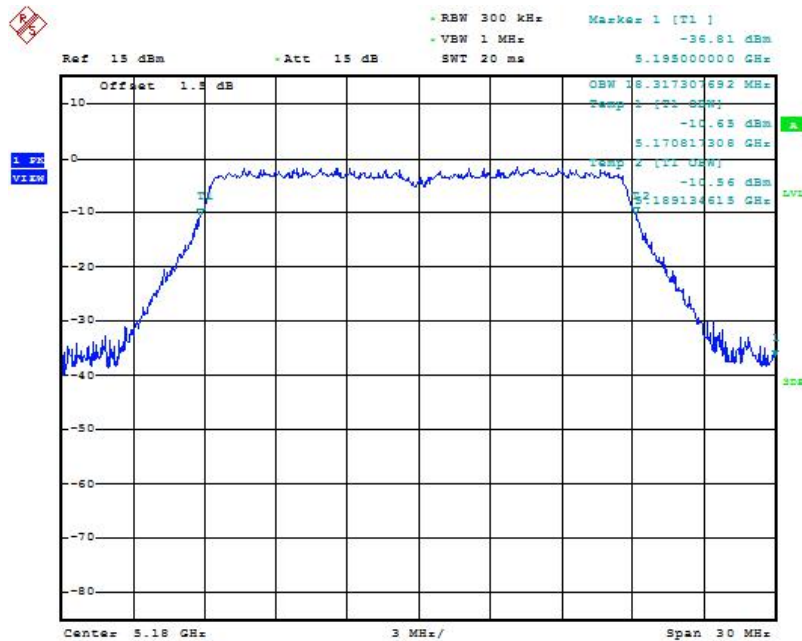
Date: 8.AUG.2018 14:02:06

Fig. 10 99% Occupied Bandwidth (802.11a, 5200MHz)



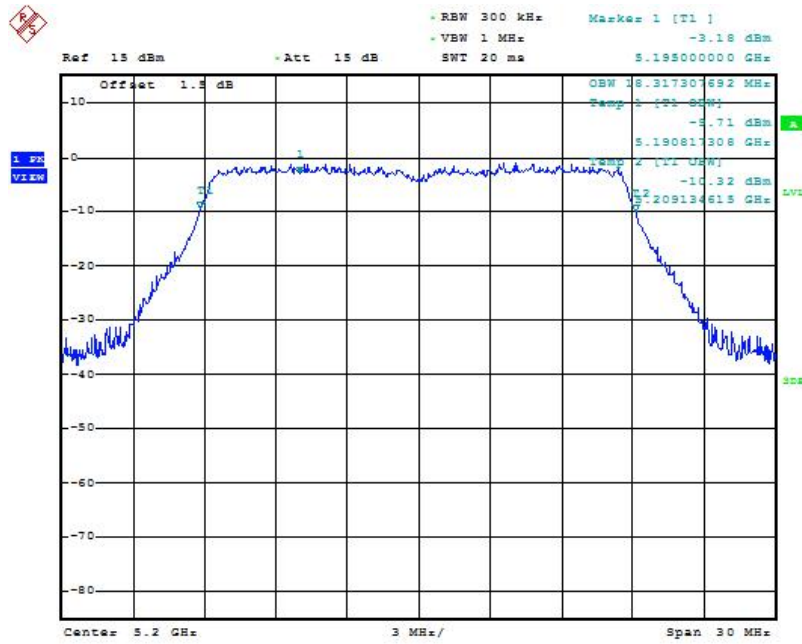
Date: 8.AUG.2018 14:03:02

**Fig. 11 99% Occupied Bandwidth (802.11a, 5240MHz)**



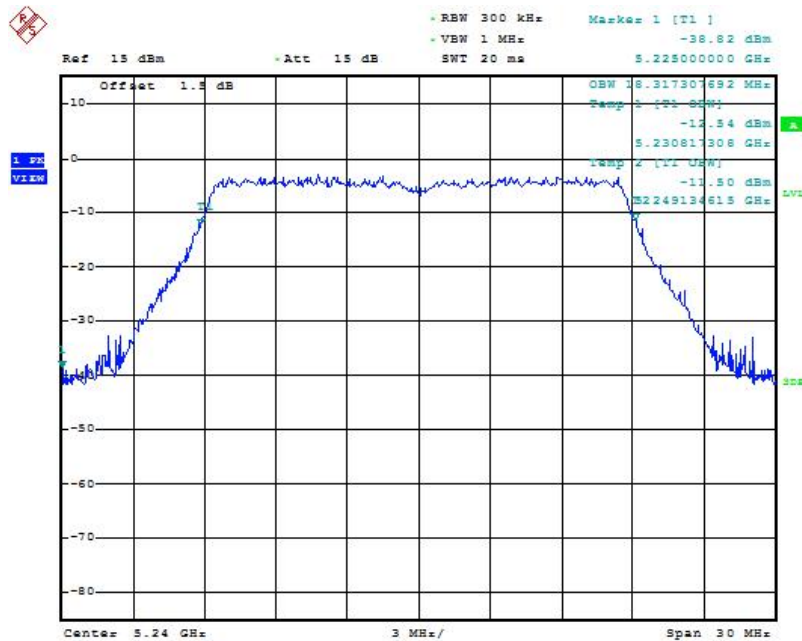
Date: 8.AUG.2018 14:04:21

**Fig. 12 99% Occupied Bandwidth (802.11n-HT20, 5180MHz)**



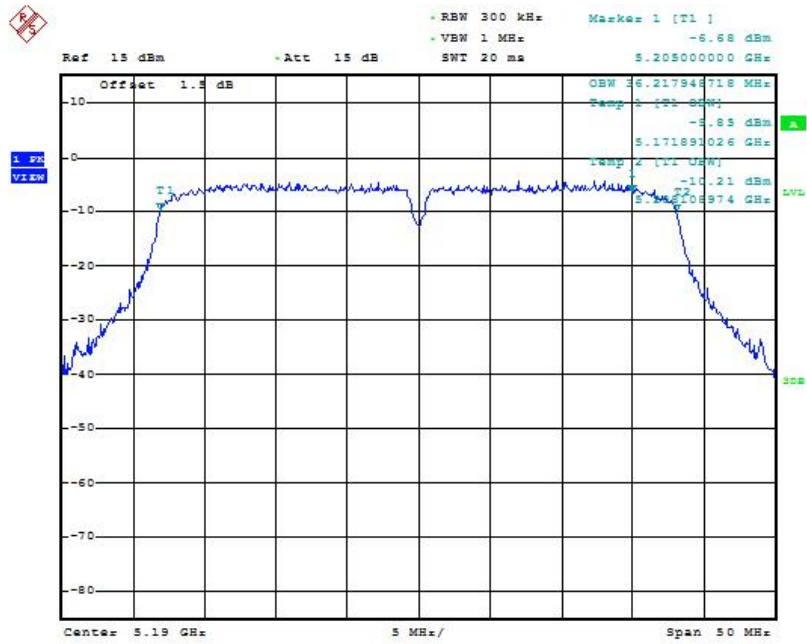
Date: 8.AUG.2018 14:05:19

**Fig. 13 99% Occupied Bandwidth (802.11n-HT20, 5200MHz)**



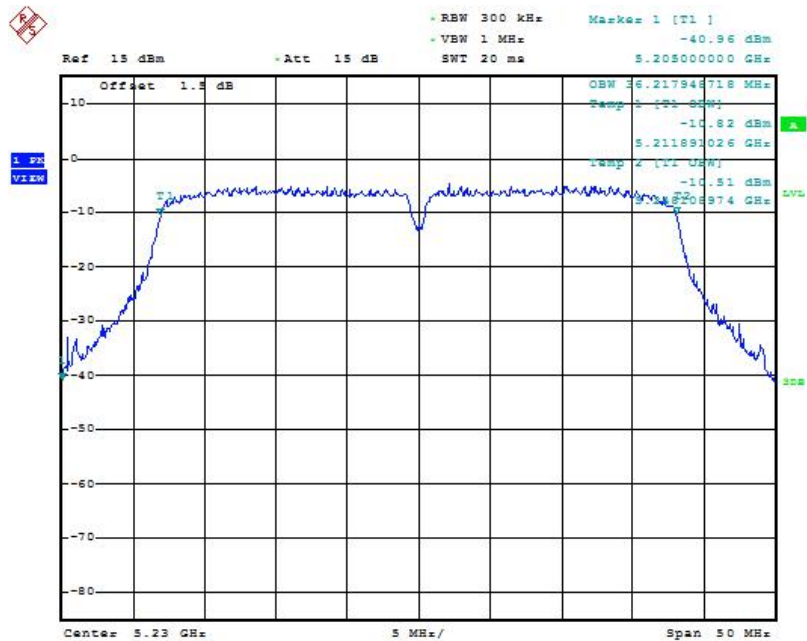
Date: 8.AUG.2018 14:06:22

**Fig. 14 99% Occupied Bandwidth (802.11n-HT20, 5240MHz)**



Date: 8.AUG.2018 14:07:33

**Fig. 15 99% Occupied Bandwidth (802.11n-HT40, 5190MHz)**



Date: 8.AUG.2018 14:08:40

**Fig. 16 99% Occupied Bandwidth (802.11n-HT40, 5230MHz)**

**6.6. Band Edges Compliance**

**6.6.1 Band Edges - conducted**

**Measurement Limit:**

Standard	Limit (dBm/MHz)
FCC 47 CFR Part 15.407	< -27

The measurement is made according to KDB 789033

**Measurement Uncertainty:**

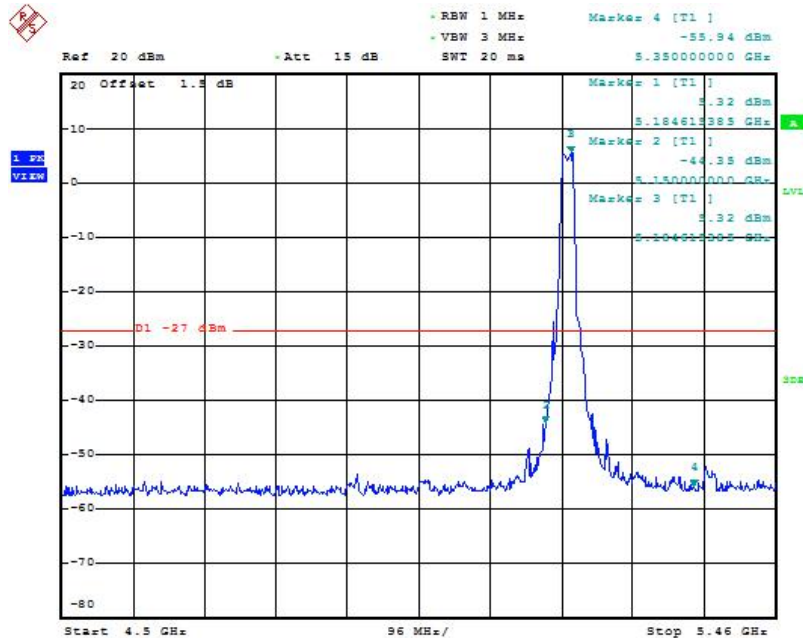
Measurement Uncertainty	0.75dB
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**Measurement Result:**

Mode	Channel	Test Results	Conclusion
802.11a	5180 MHz	Fig.17	P
	5240 MHz	Fig.18	P
802.11n HT20	5180 MHz	Fig.19	P
	5240 MHz	Fig.20	P
802.11n HT40	5190 MHz	Fig.21	P
	5230 MHz	Fig.22	P

**Conclusion: PASS**

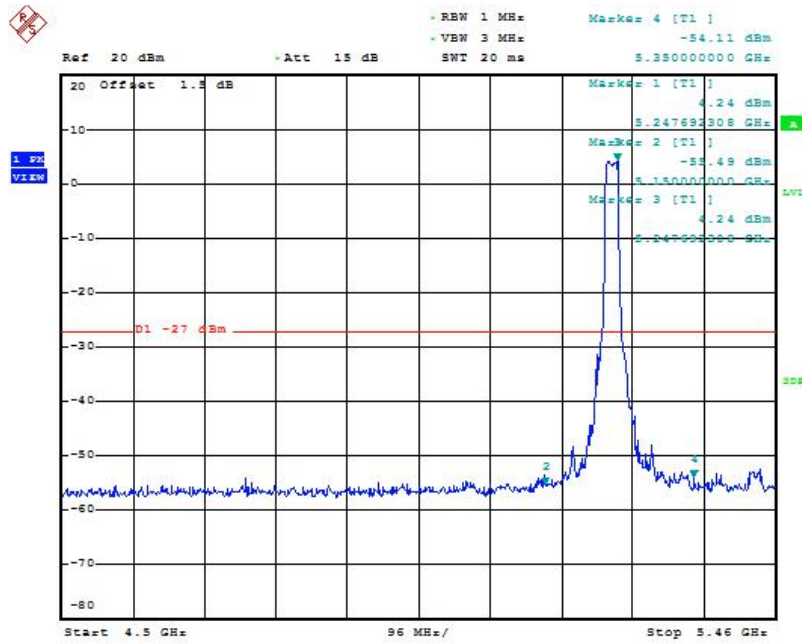
**Test graphs as below:**



Date: 8.AUG.2018 15:11:36

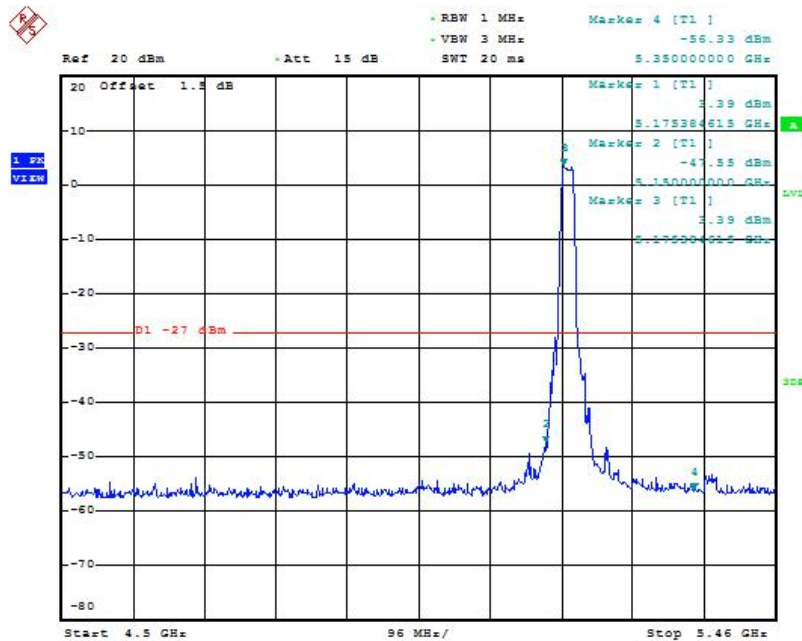
**Fig. 17 Band Edges (802.11a, 5180MHz)**





Date: 8.AUG.2018 15:20:31

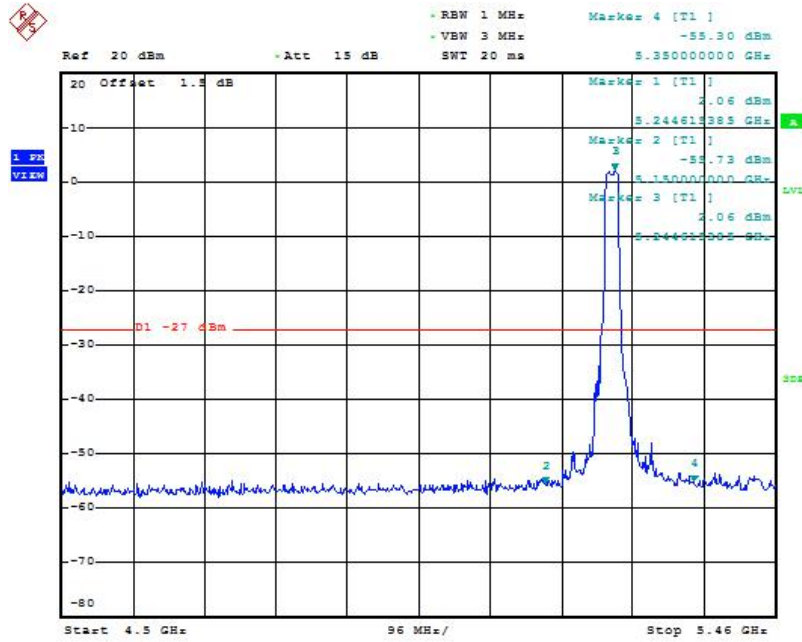
**Fig. 18 Band Edges (802.11a, 5240MHz)**



Date: 8.AUG.2018 15:23:17

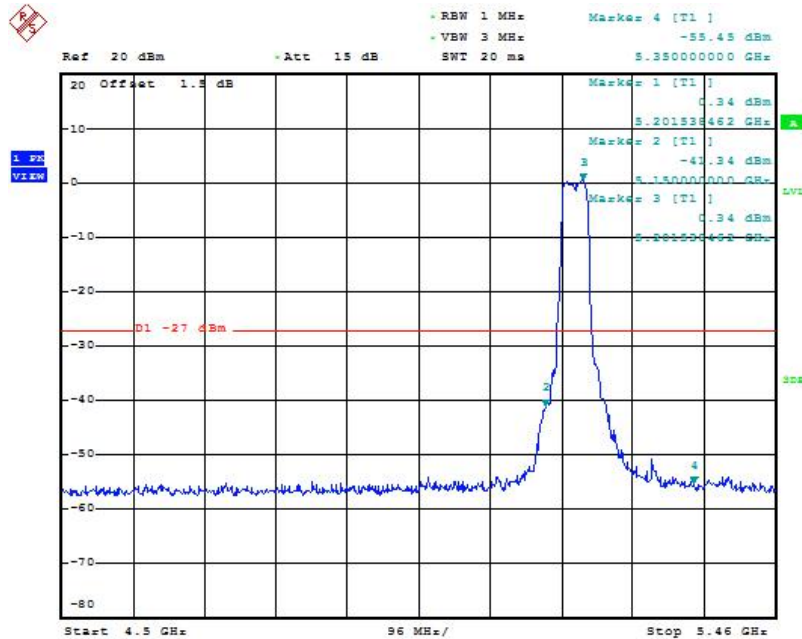
**Fig. 19 Band Edges (802.11n-HT20, 5180MHz)**





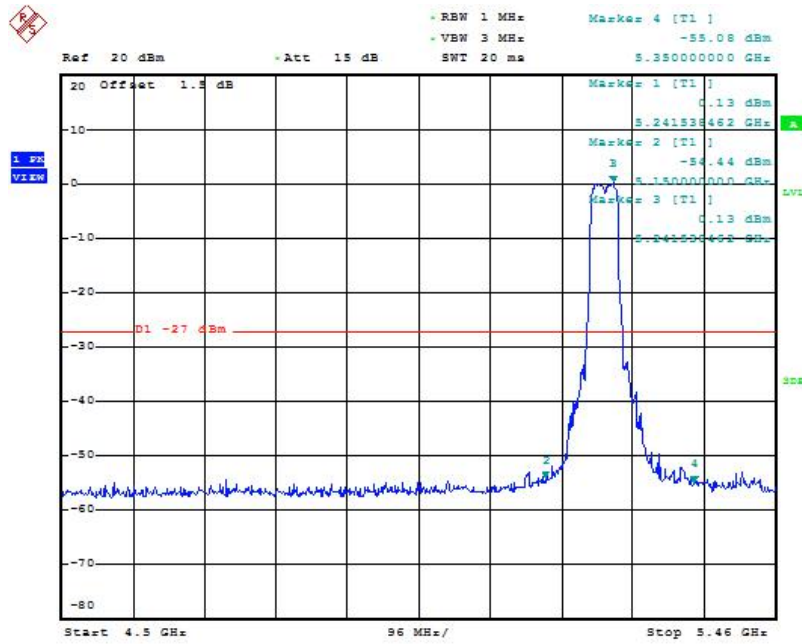
Date: 8.AUG.2018 15:29:30

**Fig. 20 Band Edges (802.11n-HT20, 5240MHz)**



Date: 8.AUG.2018 15:32:17

**Fig. 21 Band Edges (802.11n-HT40, 5190MHz)**



Date: 8.AUG.2018 15:34:56

**Fig. 22 Band Edges (802.11n-HT40, 5230MHz)**

### 6.6.2 Band Edges - Radiated

**Measurement Limit:**

Standard	Limit (dB $\mu$ V/m)	
	FCC 47 CFR Part 15.209	Peak
	Average	54

The measurement is made according to KDB 789033

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)).

**Measurement Uncertainty:**

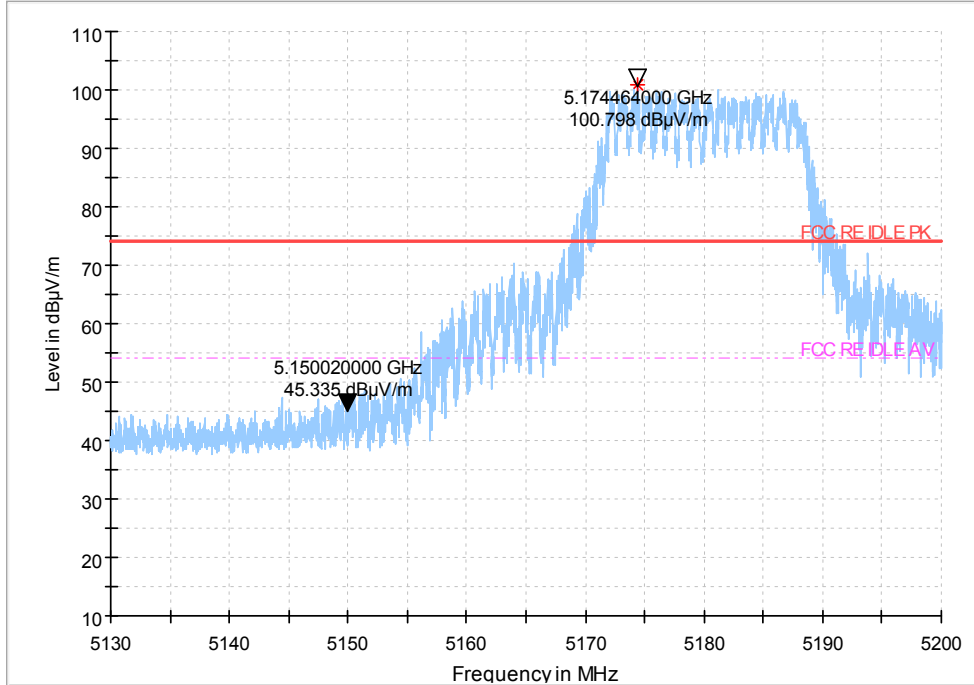
Measurement Uncertainty	0.75dB
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**Measurement Result:**

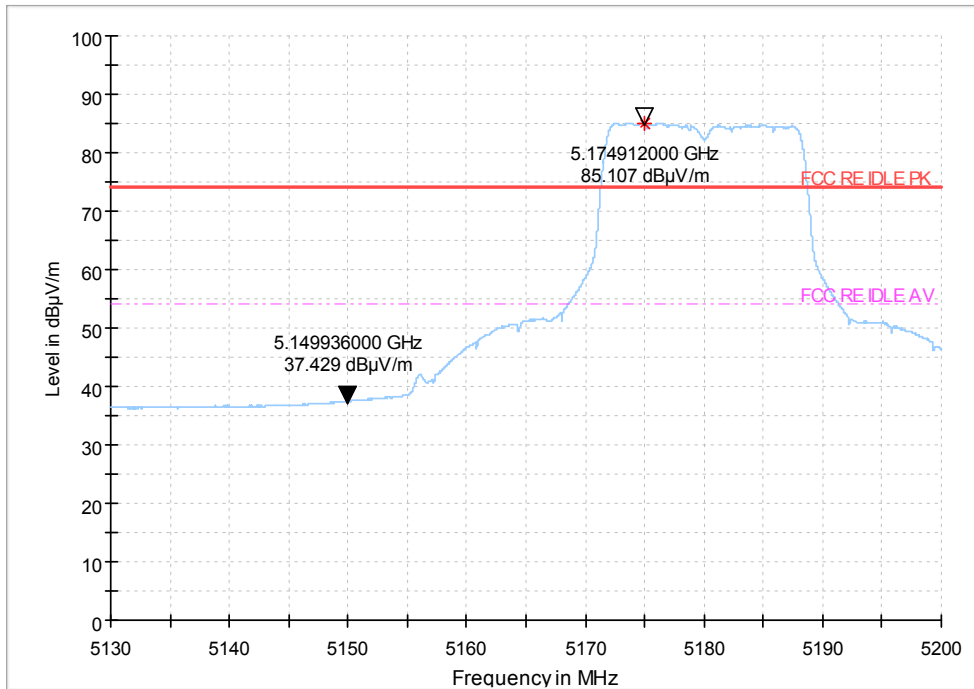
Mode	Channel	Test Results	Conclusion
802.11a	5180 MHz	Fig.23	P
	5240 MHz	Fig.24	P
802.11n HT20	5180 MHz	Fig.25	P
	5240 MHz	Fig.26	P
802.11n HT40	5190 MHz	Fig.27	P
	5230 MHz	Fig.28	P

Conclusion: **PASS**

Test graphs as below:

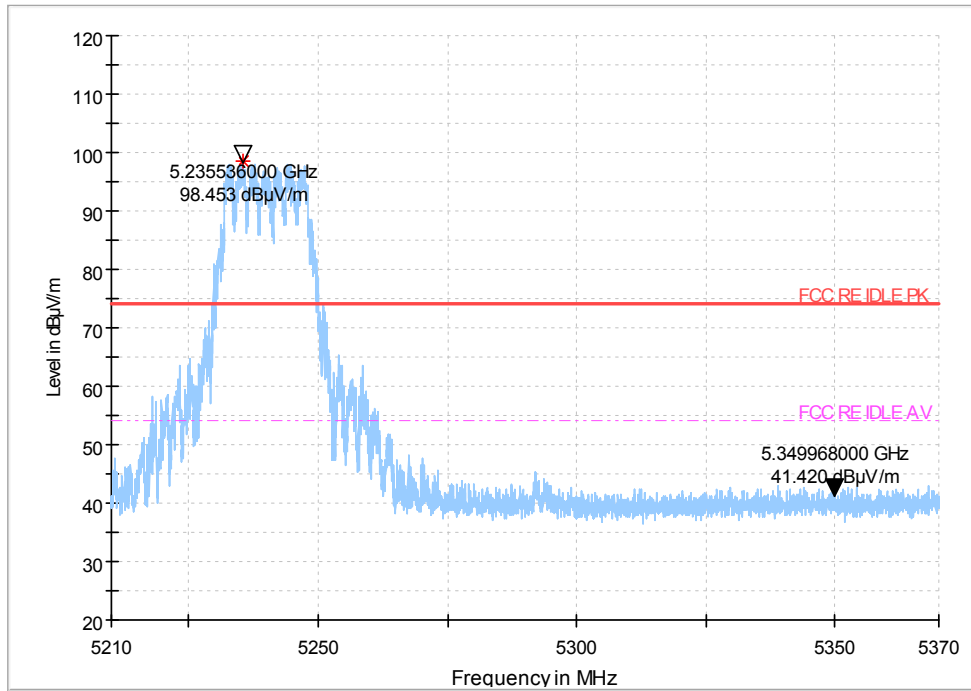


Peak

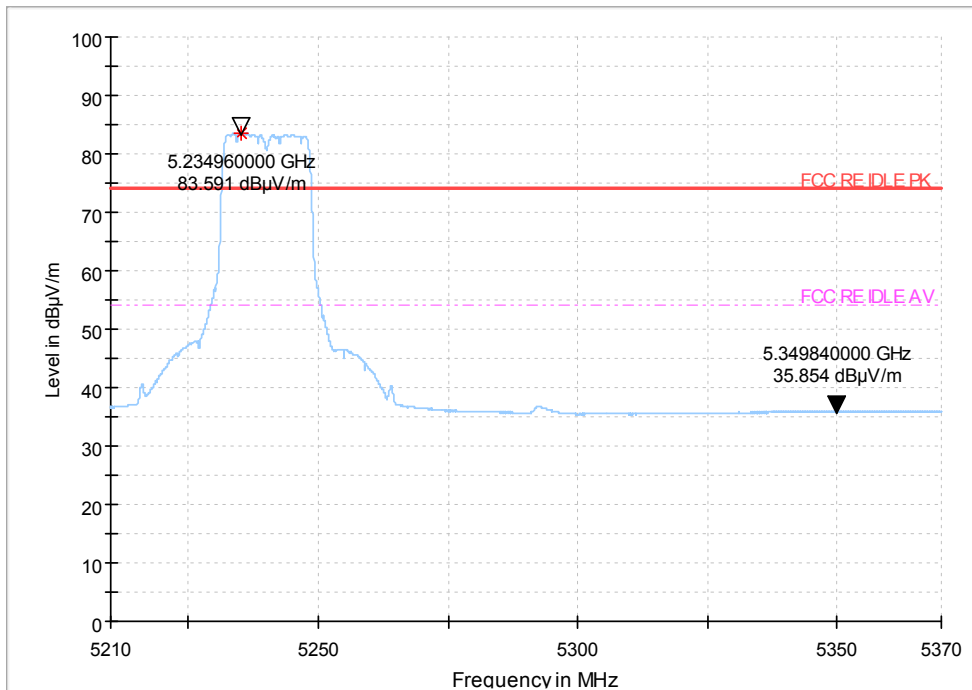


Average

**Fig. 23 Band Edges (802.11a, 5180MHz)**

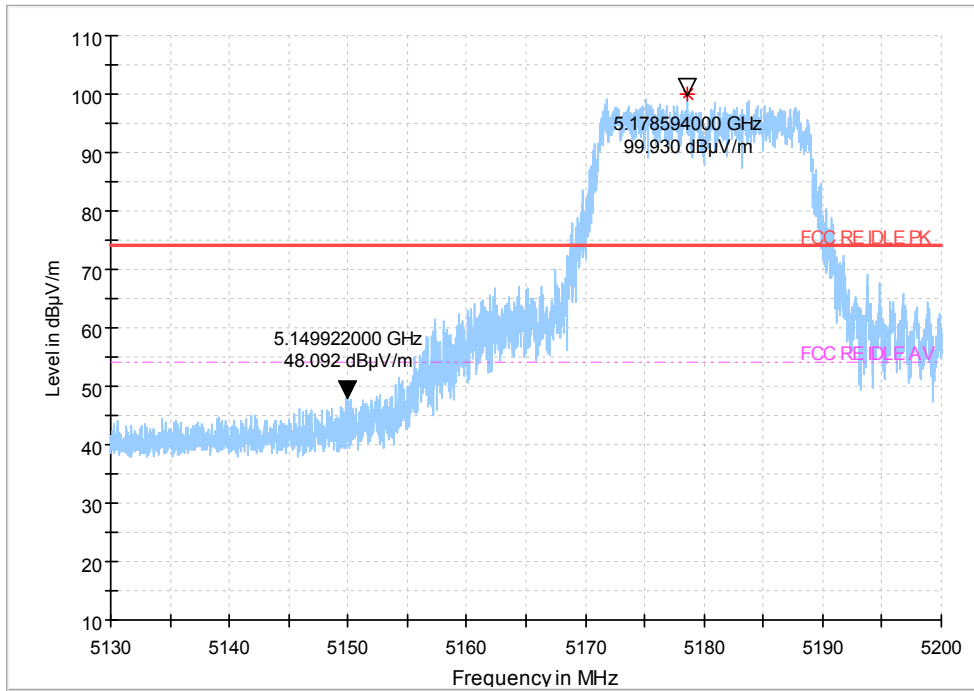


Peak

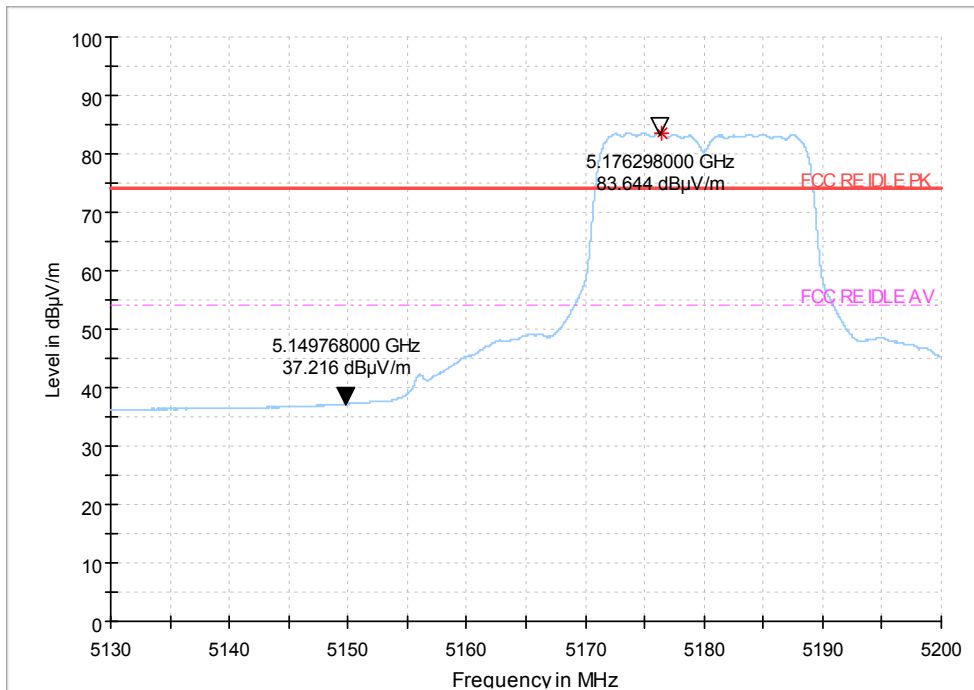


Average

**Fig. 24 Band Edges (802.11a, 5240MHz)**

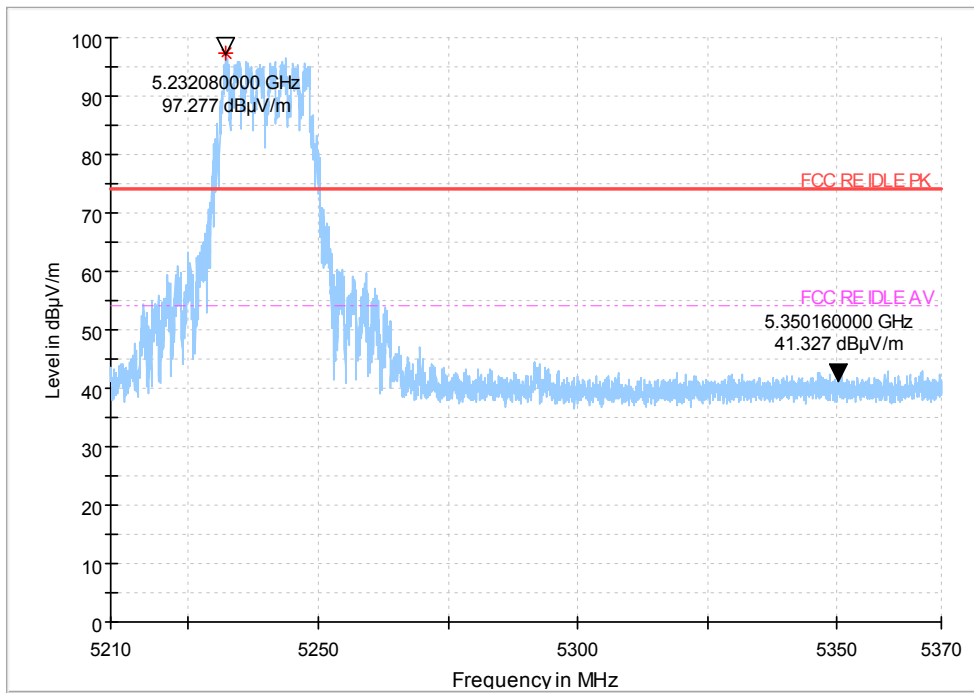


Peak

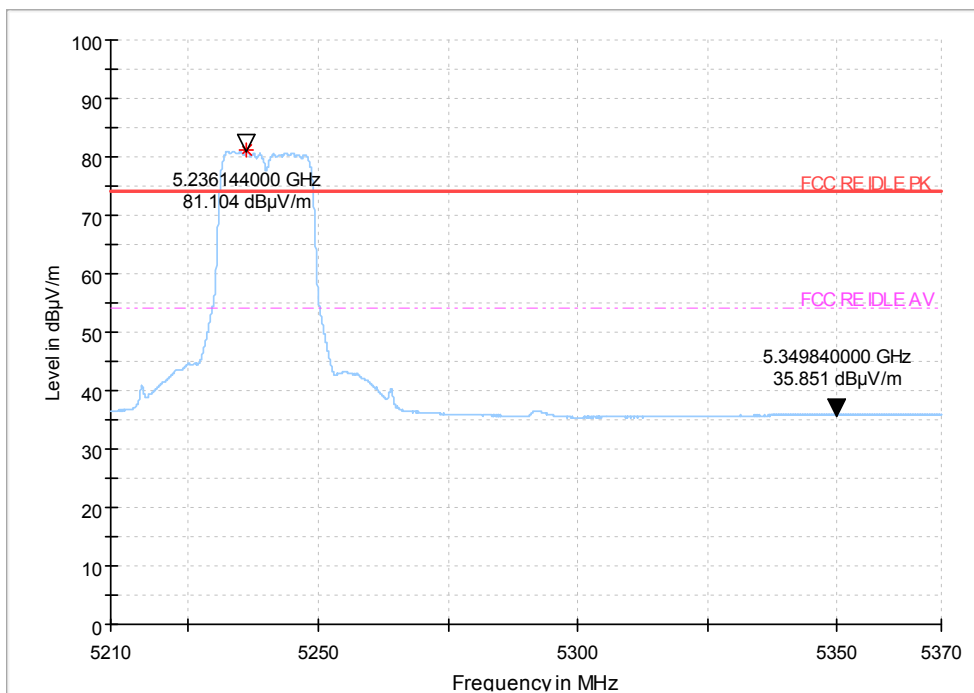


Average

**Fig. 25 Band Edges (802.11n-HT20, 5180MHz)**

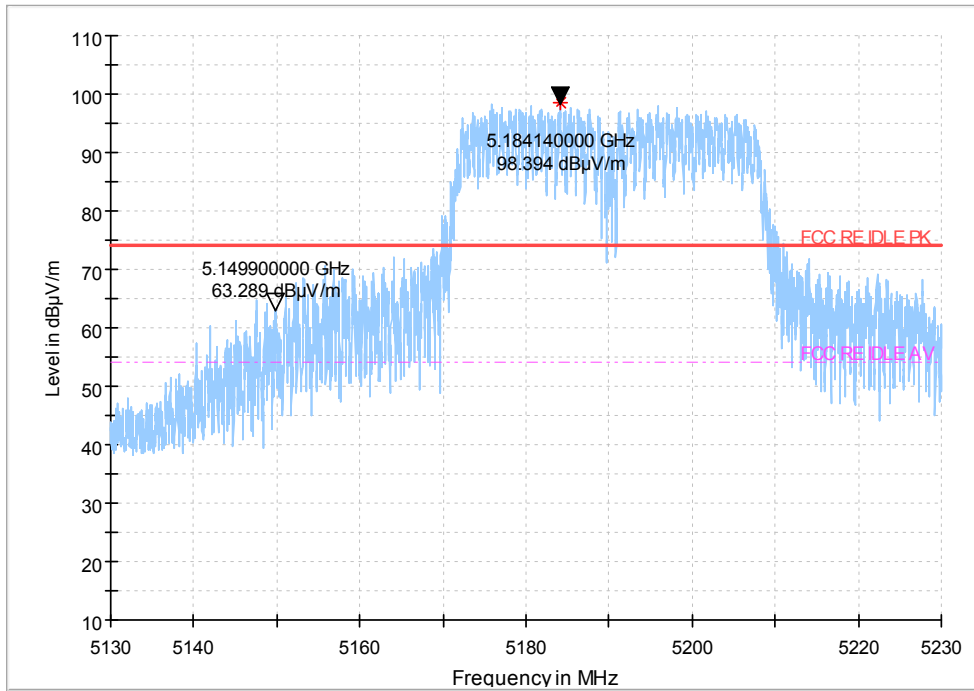


Peak

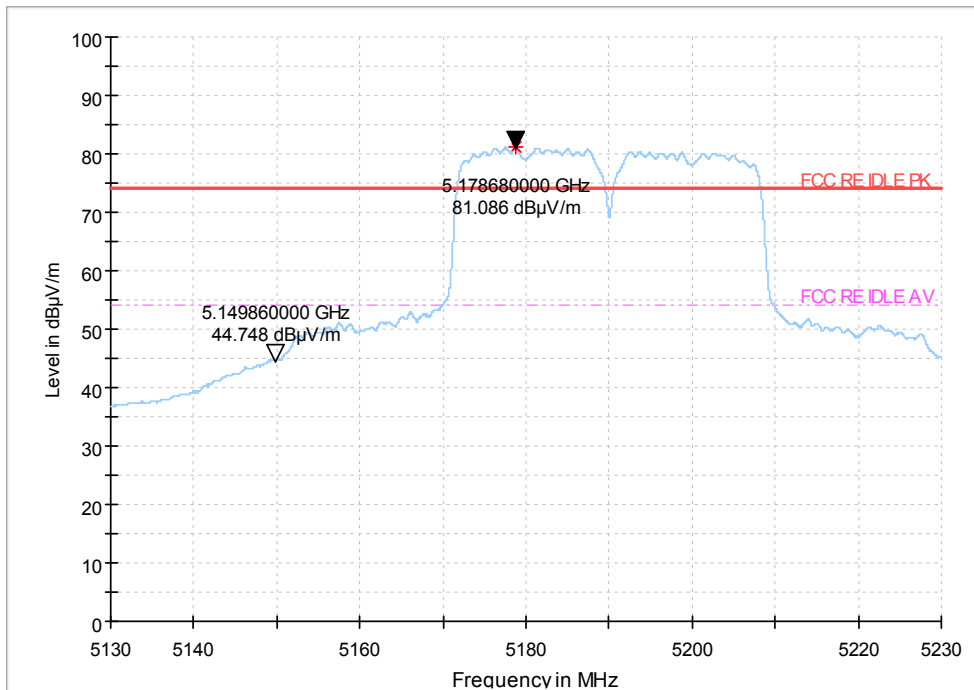


Average

**Fig. 26 Band Edges (802.11n-HT20, 5240MHz)**

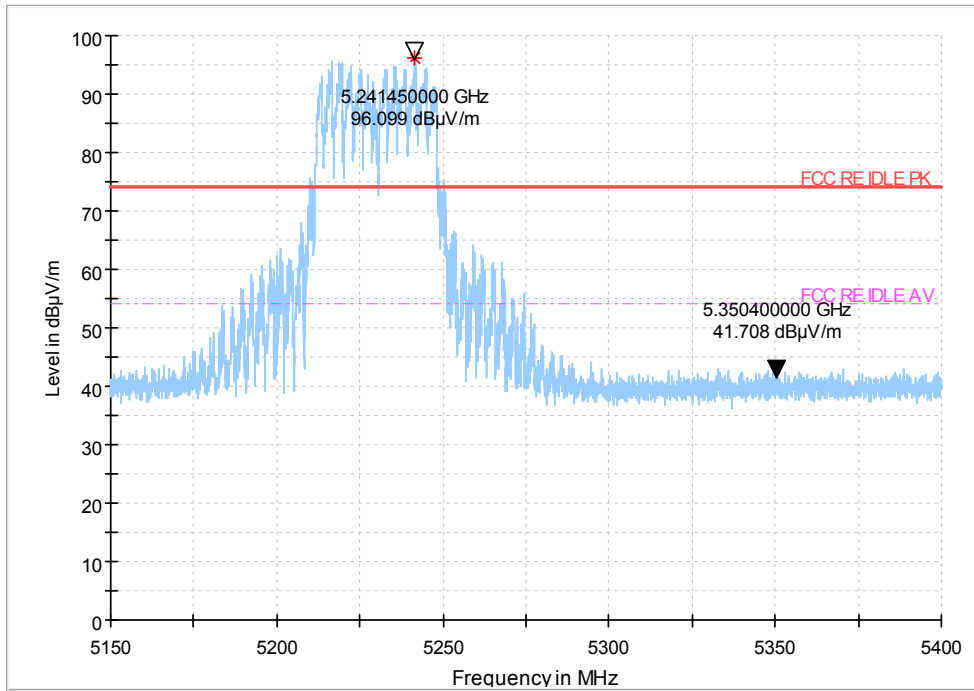


Peak

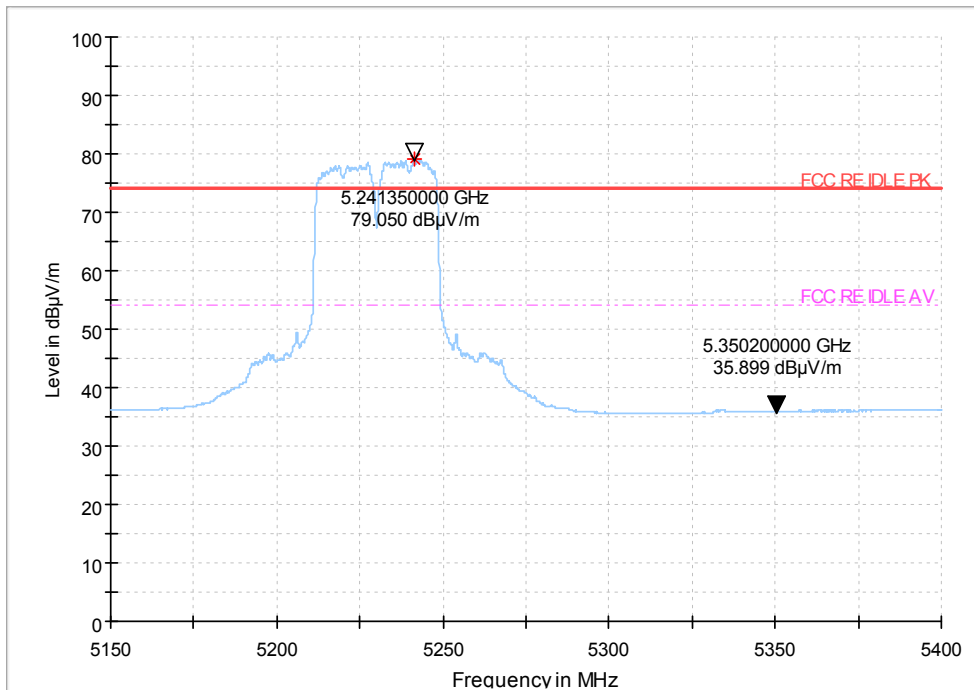


Average

**Fig. 27 Band Edges (802.11n-HT40, 5190MHz)**



Peak



Average

**Fig. 28 Band Edges (802.11n-HT40, 5230MHz)**



**6.7. Transmitter Spurious Emission**
**Measurement Limit:**

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

The measurement is made according to KDB 789033

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

**Limit in restricted band:**

Frequency of emission (MHz)	Field strength(dBμV/m)	Measurement distance(m)
30-88	40.0	3
88-216	43.5	3
216-960	46.0	3
Above 960	54.0	3

Note: for frequency range below 960MHz, the limit in 15.209 is defined in 10m test distance. The limit used above is calculated from 10m to 3m

**Measurement uncertainty:**

Expanded measurement uncertainty for this test item is U =3.9 dB, k=2.

Modulation type and data rate tested (worse case):

Mode	Data rate	Channel
802.11a	6Mbps	44(5200MHz)
802.11n-HT20	MCS0	44(5200MHz)
802.11n-HT40	MCS0	38(5190MHz)

**Measurement Results:**
**802.11a mode**

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11a	44(5200MHz)	30 MHz ~ 1 GHz	Fig.29	P
		1 GHz ~ 8 GHz	Fig.30	P
		8 GHz ~ 18 GHz	Fig.31	P
		18 GHz ~ 26.5 GHz	Fig.32	P
		26.5 GHz ~ 40 GHz	Fig.33	P

**802.11n-HT20 mode**

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n-HT20	44(5200MHz)	30 MHz ~ 1 GHz	Fig.34	P
		1 GHz ~ 8 GHz	Fig.35	P

		8 GHz ~ 18 GHz	Fig.36	P
		18 GHz ~ 26.5 GHz	Fig.37	P
		26.5 GHz ~ 40 GHz	Fig.38	P

### 802.11n-HT40 mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n HT40	38(5190MHz)	30 MHz ~ 1 GHz	Fig.39	P
		1 GHz ~ 8 GHz	Fig.40	P
		8 GHz ~ 18 GHz	Fig.41	P
		18 GHz ~ 26.5 GHz	Fig.42	P
		26.5 GHz ~ 40 GHz	Fig.43	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.

The measurement results are obtained as described below:

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

**802.11a**

Channel 44 ( 30MHz ~1GHz )

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
34.8	13.72	-22.1	35.82	V
36.3	13.13	-21.7	34.83	V
61.0	16.44	-22.6	39.04	V
130.1	19.21	-27.4	46.61	H
231.1	26.83	-23.6	50.43	V
370.1	19.95	-20.2	40.15	H

Channel 44 ( 1GHz ~ 8GHz )

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
5991.8	44.33	4.6	39.73	H
6620.6	47.54	6.4	41.14	V
6927.0	45.65	7	38.65	V
7288.0	46.11	7.4	38.71	H
7657.4	46.28	7.9	38.38	H
7884.8	49.03	8.7	40.33	H

Channel 44 ( 8GHz ~ 18GHz )

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
15183.6	55.2	20.7	34.5	V
15473.4	54.54	21.2	33.34	V
15707.6	55.81	21.8	34.01	V
16120.0	56.58	22.4	34.18	V
17144.2	56.67	24.1	32.57	V
17998.2	56.92	25	31.92	H

Channel 44 ( 8GHz ~ 18GHz )(Average)

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
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15183.6	42.5	20.7	21.8	V
15473.4	42.18	21.2	20.98	V
15707.6	43.64	21.8	21.84	V
16120.0	44.06	22.4	21.66	V
17144.2	44.96	24.1	20.86	V
17998.2	44.97	25	19.97	H

Channel 44 ( 18GHz ~ 26.5GHz )

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
18849.2	39.24	-5.5	44.74	V
20096.1	40.1	-4.8	44.9	V
21168.8	43.81	-4	47.81	V
22989.5	43.41	-3	46.41	V
24084.3	44.18	-2.8	46.98	V
25939.8	46.61	-2	48.61	H

Channel 44 ( 26.5GHz ~ 40GHz )

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
27877.0	43.82	-0.4	44.22	V
30766.0	45.4	0.2	45.2	H
32147.0	45.21	0.5	44.71	H
32876.0	44.05	0.8	43.25	H
34425.8	46.21	1.3	44.91	H
36854.5	46.84	2.1	44.74	H

**802.11n-HT20**

Channel 44 ( 30MHz ~1GHz )

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
34.2	16.83	-22	38.83	V
36.1	16.69	-21.7	38.39	V

64.6	18.44	-23.6	42.04	V
108.2	16.87	-23.7	40.57	H
240.0	26.31	-23.5	49.81	H
360.4	18.78	-20.5	39.28	H

Channel 44 ( 1GHz ~ 8GHz )

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
5540.4	45.96	4.6	41.36	V
5749.2	45.2	4.7	40.5	H
5997.6	44.41	4.6	39.81	H
6515.8	45.79	6.1	39.69	H
7060.4	47.05	7.3	39.75	V
7701.4	46.78	8.1	38.68	V

Channel 44 ( 8GHz ~ 18GHz )

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
15173.0	54.82	20.7	34.12	H
16014.6	56.41	22.4	34.01	H
16332.4	55.3	22.8	32.5	V
17116.2	57.14	24	33.14	V
17725.0	57.04	24.2	32.84	V
17999.6	58.81	25	33.81	H

Channel 44 ( 8GHz ~ 18GHz )(Average)

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
15173.0	42.34	20.7	21.64	H
16014.6	43.89	22.4	21.49	H
16332.4	43.33	22.8	20.53	V
17116.2	44.8	24	20.8	V
17725.0	44.94	24.2	20.74	V

17999.6	45	25	20	H
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Channel 44 ( 18GHz ~ 26.5GHz )

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
18835.6	39.45	-5.5	44.95	H
19940.6	40.37	-5	45.37	H
21663.5	43.38	-3.4	46.78	H
22527.1	44.45	-3	47.45	H
24147.2	43.93	-2.8	46.73	V
26007.0	46.7	-2	48.7	V

Channel 44 ( 26.5GHz ~ 40GHz )

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
27886.4	43.94	-0.4	44.34	H
30340.8	44.88	-0.7	45.58	V
32738.4	43.41	0.5	42.91	V
34415.0	46.35	1.3	45.05	H
35802.8	47.2	1.1	46.1	H
36926.0	46.42	1.7	44.72	V

**802.11n-HT40**

Channel 38( 30MHz ~ 1GHz )

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
34.4	13.53	-22	35.53	V
36.9	16.41	-21.6	38.01	V
64.5	19.34	-23.6	42.94	V
126.3	15.89	-26.7	42.59	H
234.7	25.04	-23.5	48.54	H
399.3	18.2	-19.4	37.6	H

Channel 38 (1GHz ~ 8GHz )

Frequency	Result	ARpl (dB)	PMea	Polarity
-----------	--------	-----------	------	----------

(MHz)	(dB $\mu$ V/m)		(dB $\mu$ V/m)	
2999.2	42.56	-1.3	43.86	H
5385.8	46.88	4.2	42.68	V
5990.4	44.33	4.6	39.73	V
6704.6	47.19	6.6	40.59	H
7227.2	46.6	7.3	39.3	V
7516.4	46.5	7.5	39	H

Channel 38 (8GHz ~ 18GHz )( Peak )

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
13712.4	53.98	18.8	35.18	H
15207.6	54.78	20.7	34.08	H
16000.6	55.84	22.3	33.54	H
16918.4	56.66	23.4	33.26	V
17220.2	57.65	24.2	33.45	V
17573.0	57.02	24.6	32.42	H

Channel 38 (8GHz ~ 18GHz )( Average )

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
15207.6	42.6	20.7	21.9	H
16000.6	43.88	22.3	21.58	H
16918.4	44.45	23.4	21.05	V
17220.2	45.19	24.2	20.99	V
17573.0	44.82	24.6	20.22	H

Channel 38 (18GHz ~ 26.5GHz )

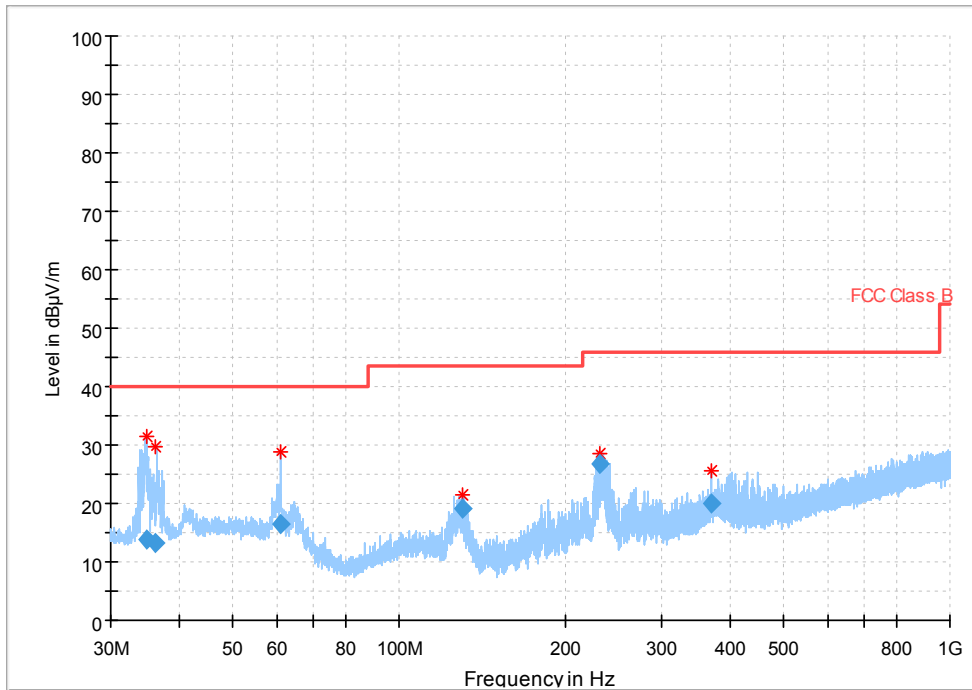
Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
18520.2	40.01	-5.8	45.81	H
19363.4	40.74	-5.7	46.44	H
21027.7	41.74	-4.1	45.84	V
21729.8	43.07	-3.4	46.47	V
22959.8	44.29	-3	47.29	V

26022.3	47.54	-2	49.54	V
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Channel 38 (26.5GHz ~ 40GHz)

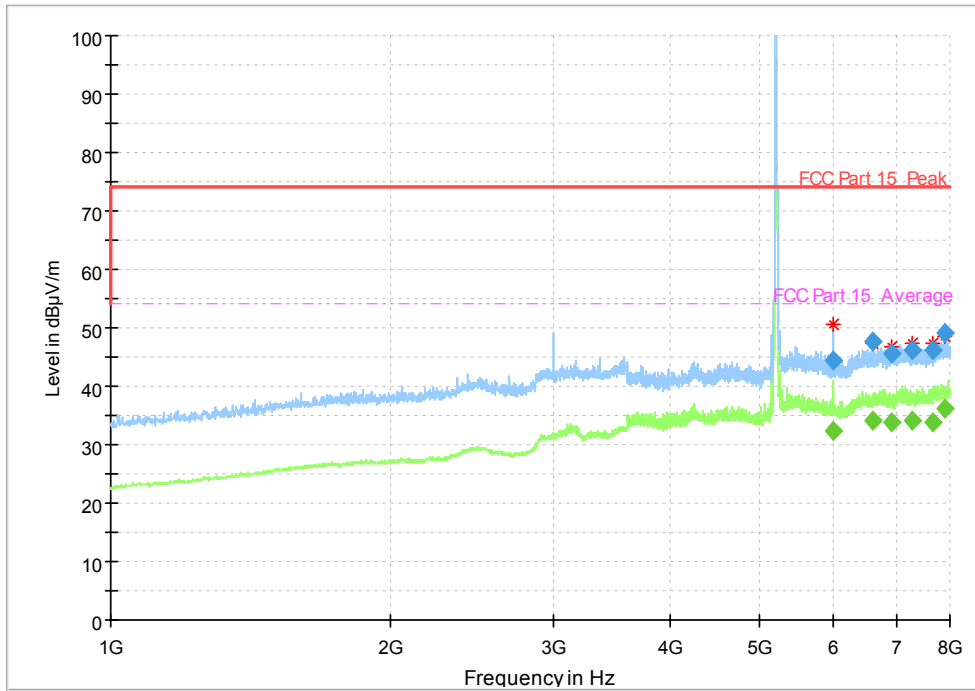
Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	PMea (dB $\mu$ V/m)	Polarity
27859.4	44.46	-0.4	44.86	H
29526.7	42.52	-0.6	43.12	V
31181.8	45.72	0.5	45.22	H
33993.8	45.78	1.5	44.28	H
34512.2	46.51	0.9	45.61	V
36932.8	46.39	1.7	44.69	H

**Test graphs as below:**

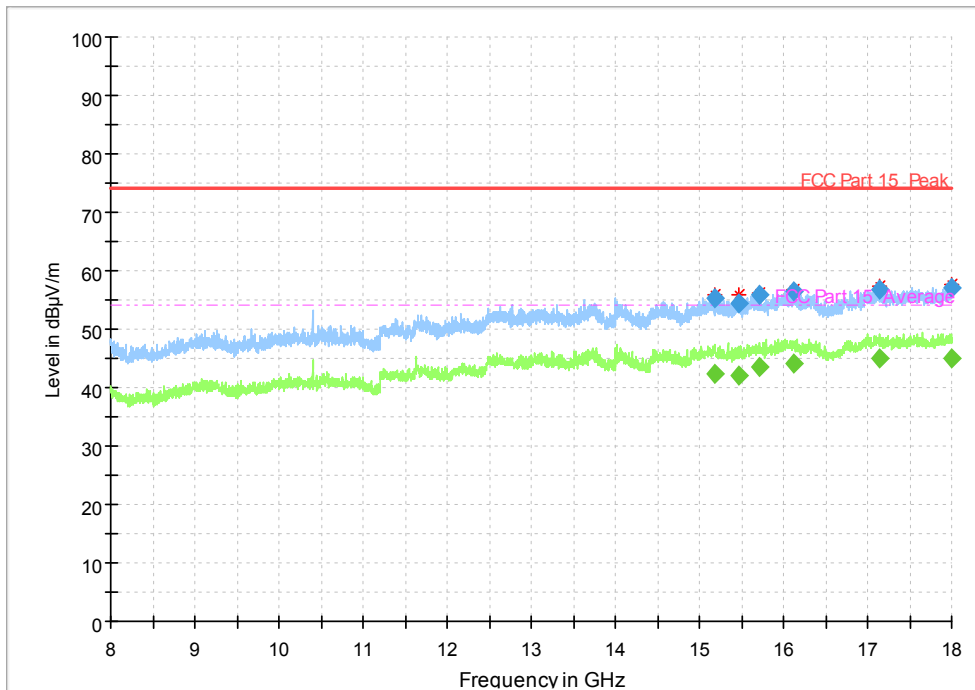


**Fig. 29 Radiated Spurious Emission (802.11a, ch44, 30 MHz-1 GHz)**

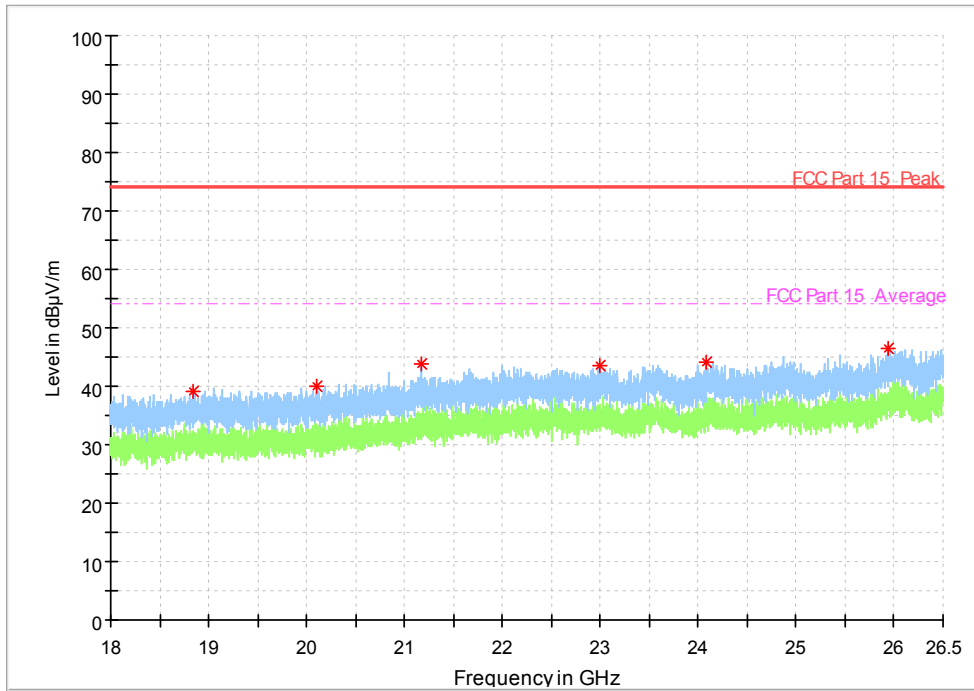




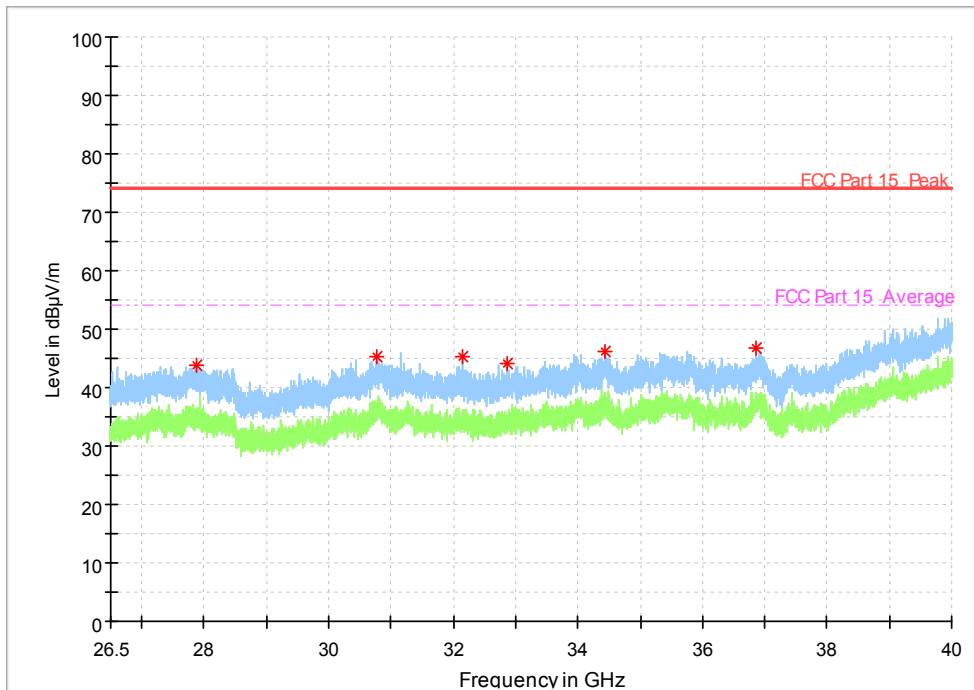
**Fig. 30 Radiated Spurious Emission (802.11a, ch44, 1 GHz-8 GHz)**



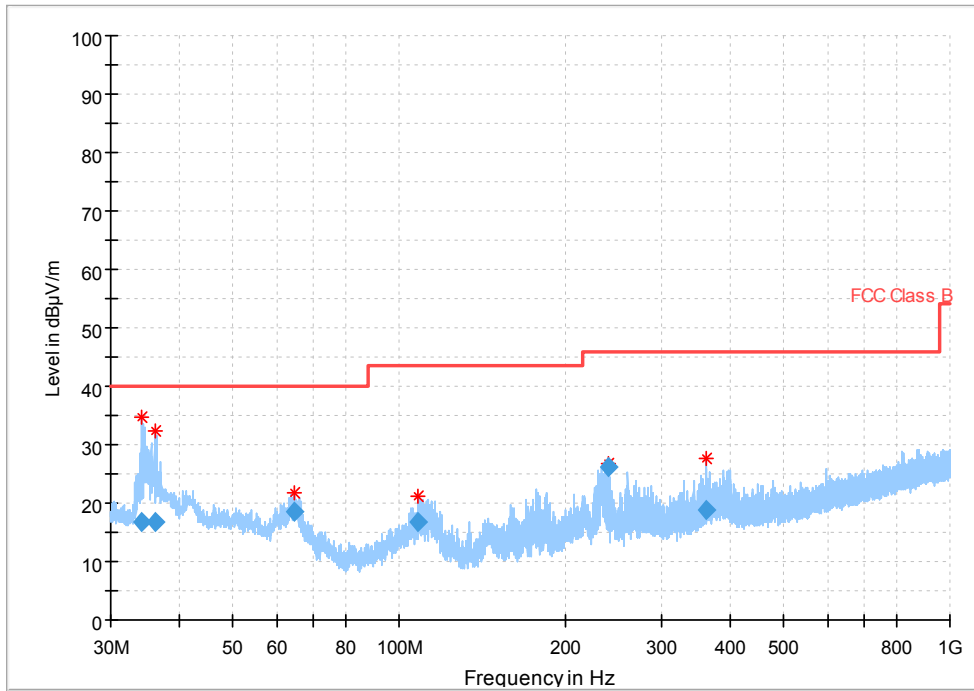
**Fig. 31 Radiated Spurious Emission (802.11a, ch44, 8 GHz-18 GHz)**



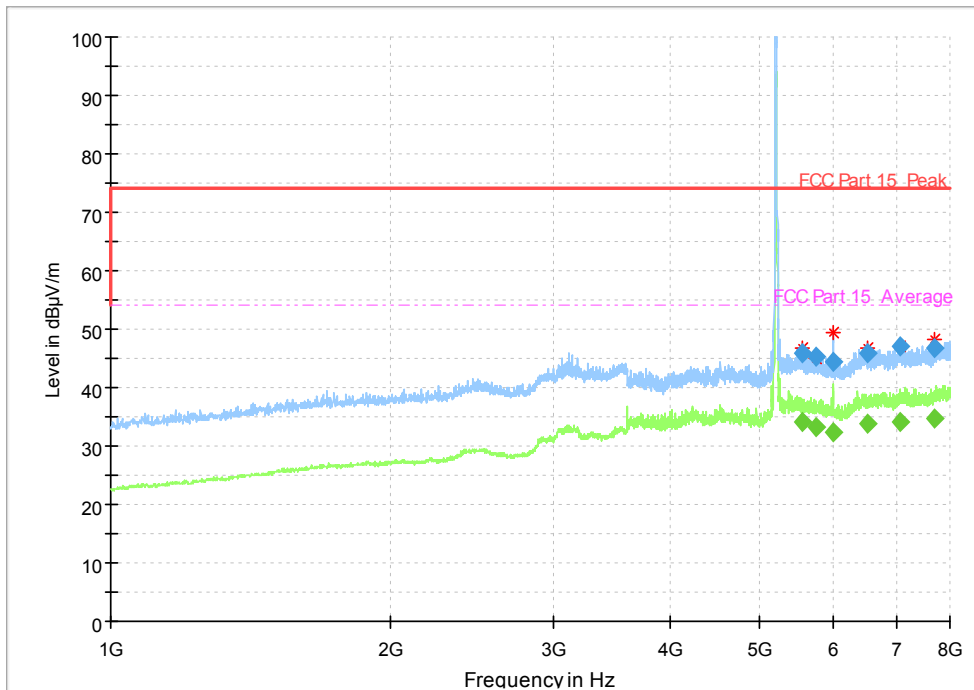
**Fig. 32 Radiated Spurious Emission (802.11a, ch44, 18 GHz-26.5 GHz)**



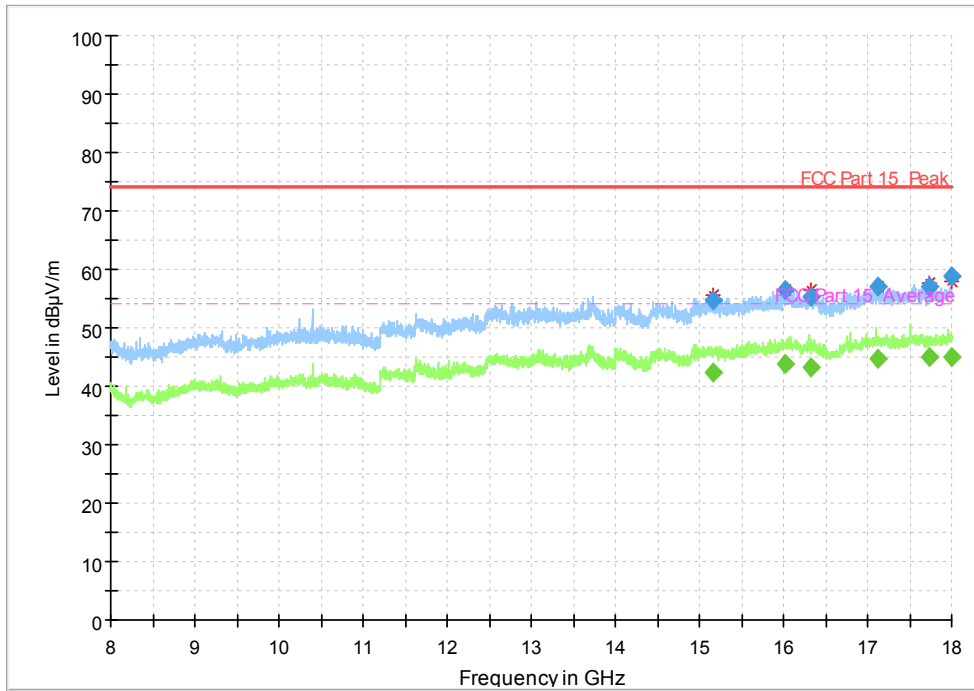
**Fig. 33 Radiated Spurious Emission (802.11a, ch44, 26.5 GHz-40 GHz)**



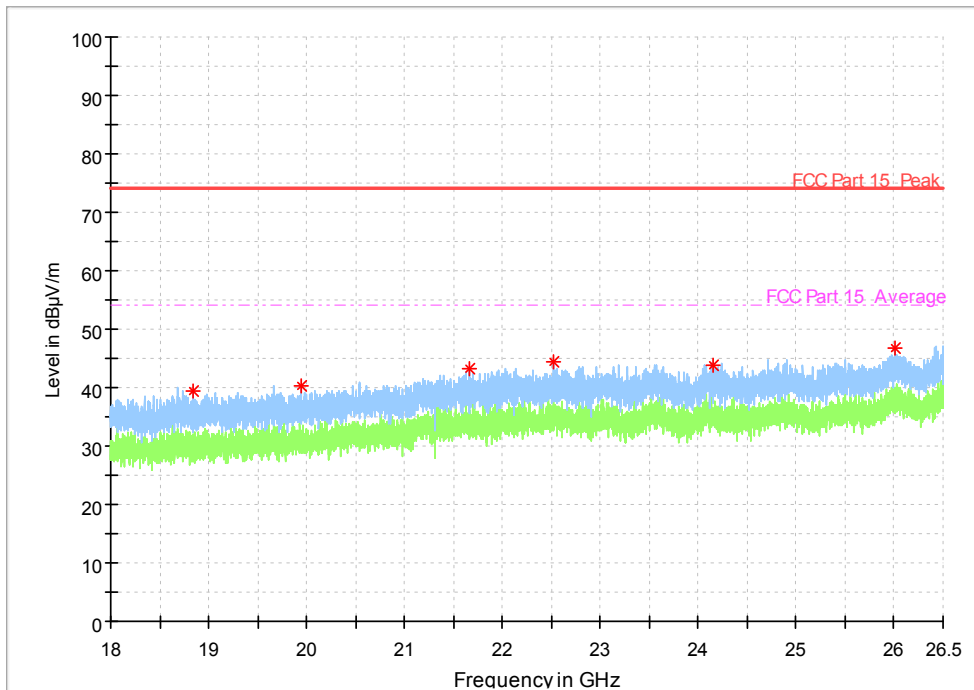
**Fig. 34 Radiated Spurious Emission (802.11n-HT20, ch44, 30 MHz-1 GHz)**



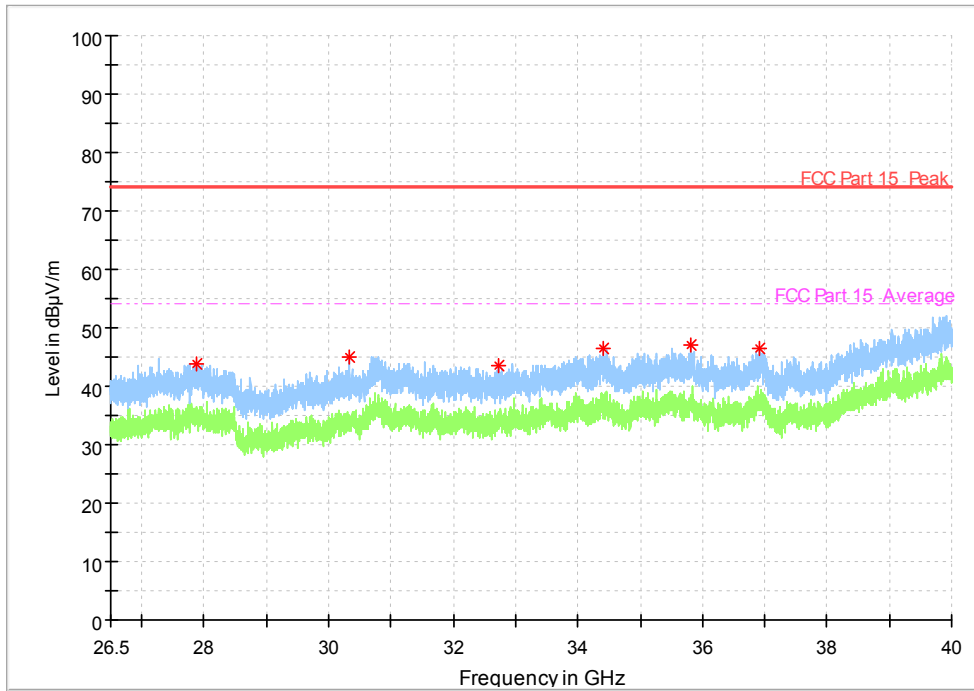
**Fig. 35 Radiated Spurious Emission (802.11n-HT20, ch44, 1 GHz-8 GHz)**



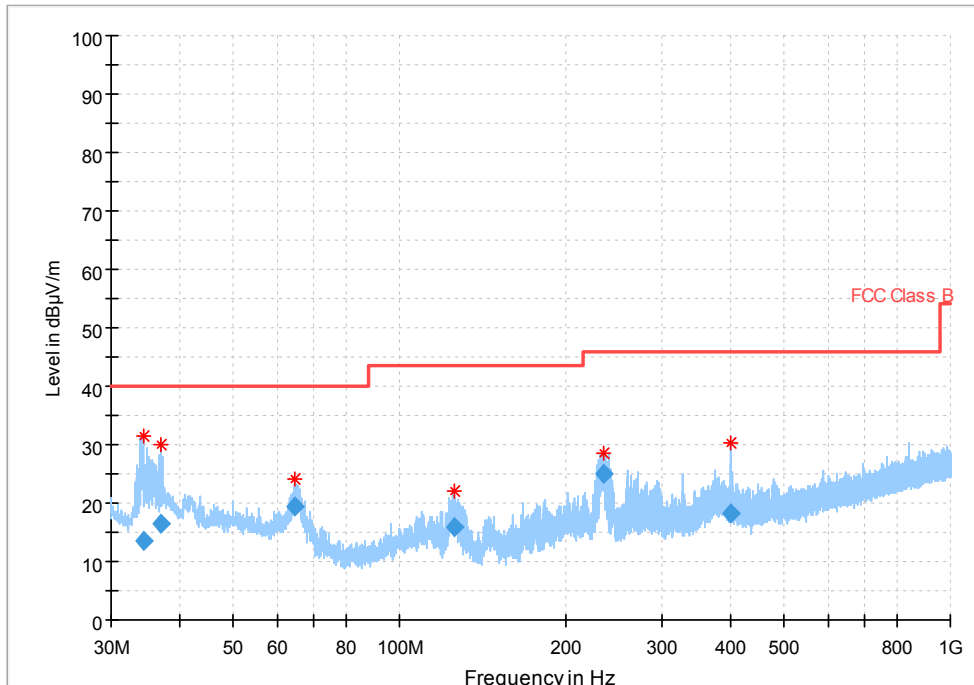
**Fig. 36 Radiated Spurious Emission (802.11n-HT20, ch44, 8 GHz-18 GHz)**



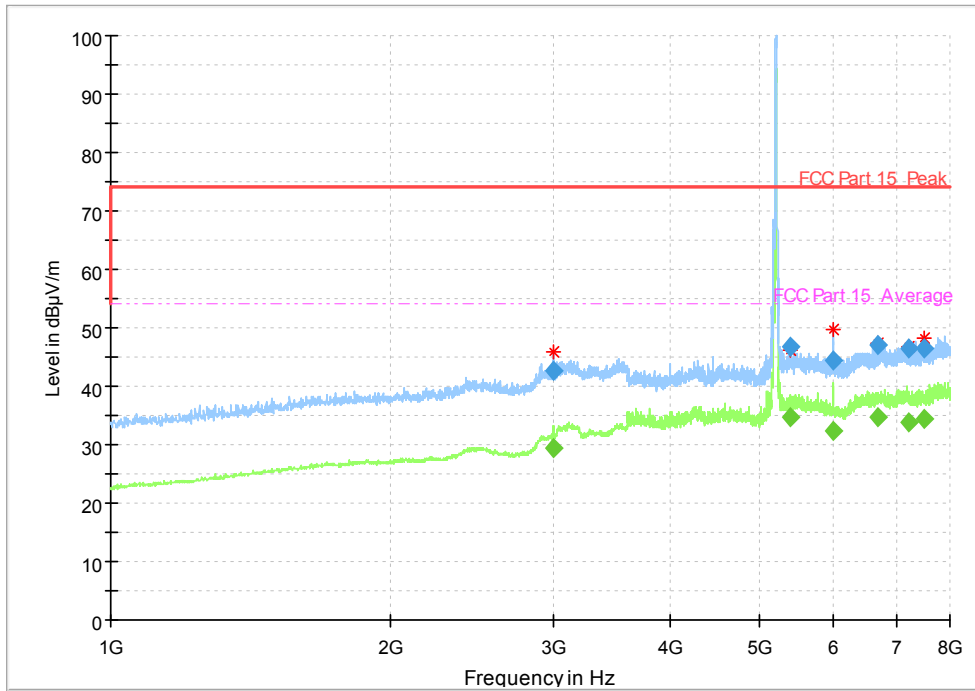
**Fig. 37 Radiated Spurious Emission (802.11n-HT20, ch44, 18 GHz-26.5 GHz)**



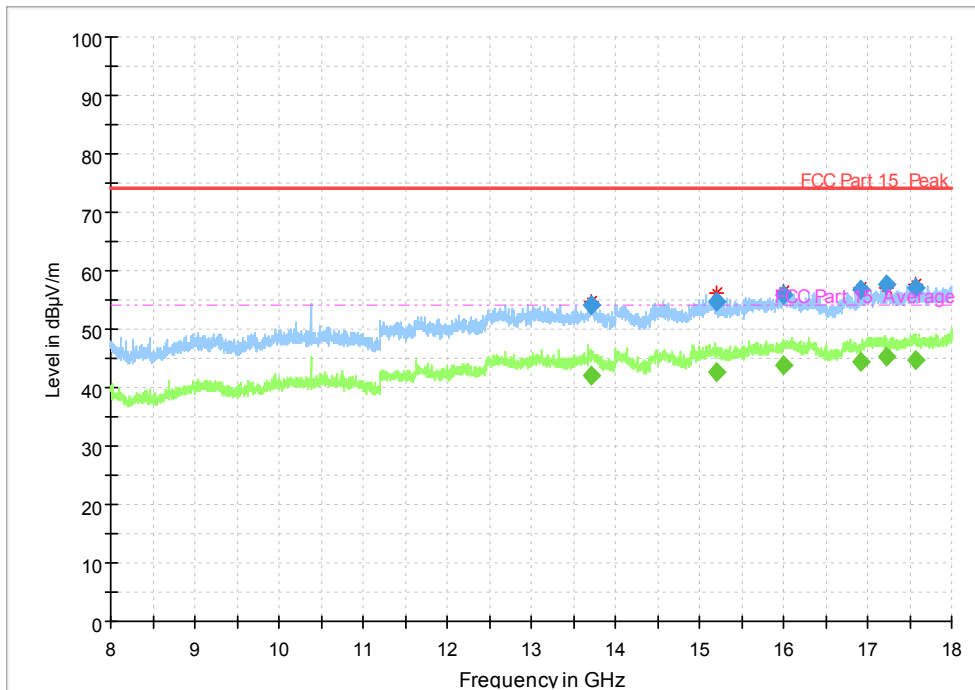
**Fig. 38 Radiated Spurious Emission (802.11n-HT20, ch44, 26.5 GHz-40 GHz)**



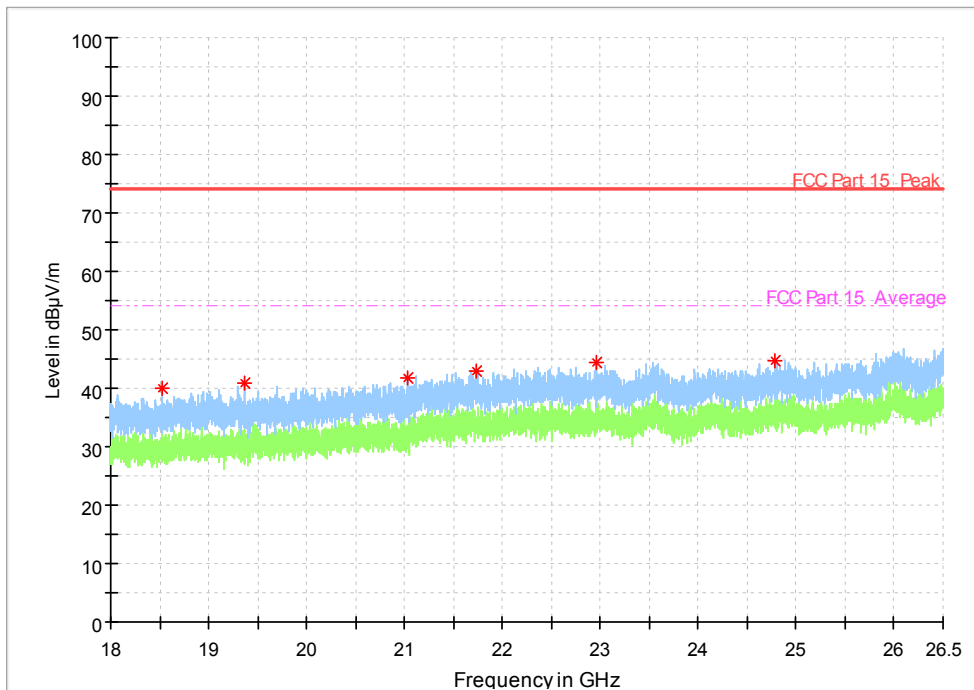
**Fig. 39 Radiated Spurious Emission (802.11n-HT40, ch38, 30 MHz-1 GHz)**



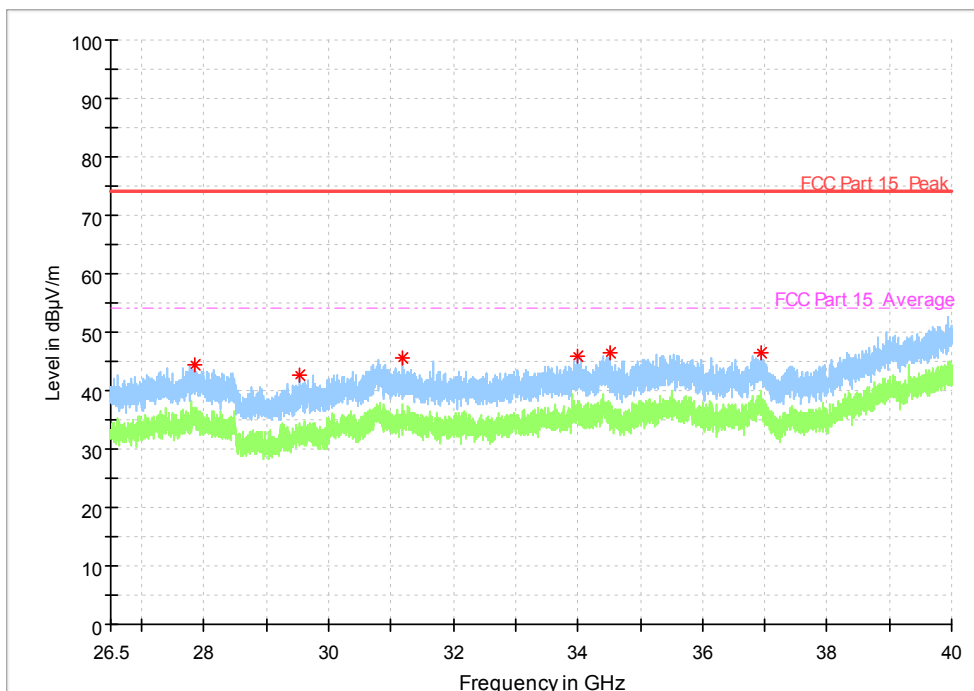
**Fig. 40 Radiated Spurious Emission (802.11n-HT40, ch38, 1 GHz-8 GHz)**



**Fig. 41 Radiated Spurious Emission (802.11n-HT40, ch38, 8 GHz-18 GHz)**



**Fig. 42 Radiated Spurious Emission (802.11n-HT40, ch38, 18 GHz-26.5 GHz)**



**Fig. 43 Radiated Spurious Emission (802.11n-HT40, ch38, 26.5 GHz-40 GHz)**

**6.8. Conducted Emission (150kHz- 30MHz)**
**Test Condition:**

Voltage (V)	Frequency (Hz)
110	60

**Measurement uncertainty:**

 Expanded measurement uncertainty for this test item is  $U = 3.2\text{dB}$ ,  $k=2$ .

**Measurement Result and limit:**

WLAN (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dB $\mu$ V)	Result (dB $\mu$ V)		Conclusion
		With charger		
		11a mode	Idle	
0.15 to 0.5	66 to 56	Fig.44		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.

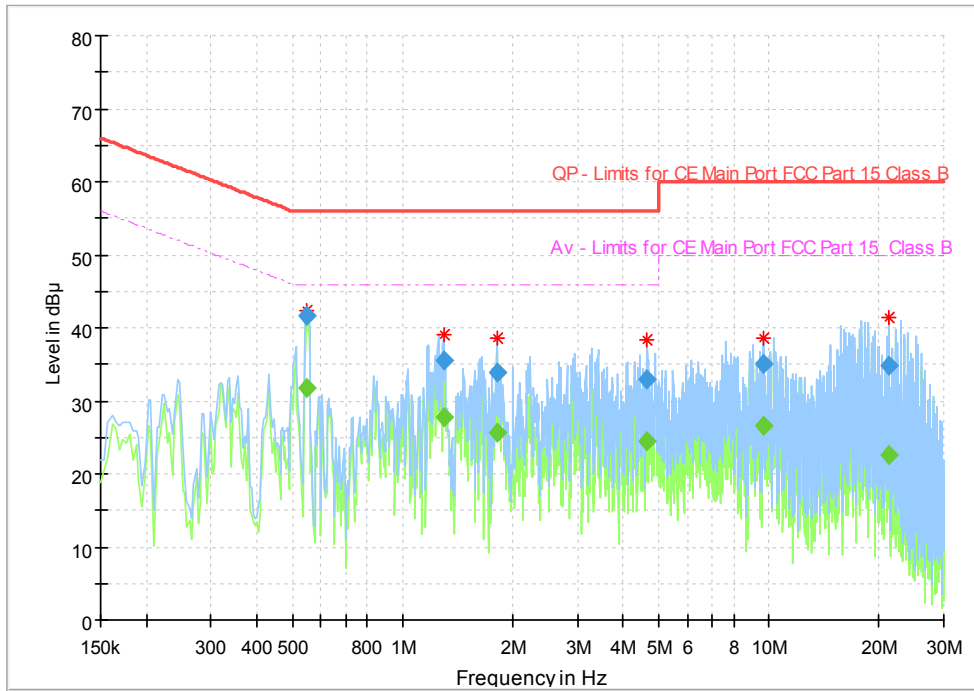
WLAN (Average Limit)

Frequency range (MHz)	Average Limit (dB $\mu$ V)	Result (dB $\mu$ V)		Conclusion
		With charger		
		11a mode	Idle	
0.15 to 0.5	56 to 46	Fig.44		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.

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





**Fig. 44 Conducted Emission(802.11a, TX)**

Measurement Result:

Frequency (MHz)	Quasi Peak (dBµV)	Average (dBµV)	Limit (dBµV)	Marg in (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.545512	---	31.85	46.00	14.15	1000.0	9.000	L1	ON	9.7
0.545512	41.68	---	56.00	14.32	1000.0	9.000	L1	ON	9.7
1.291762	---	27.74	46.00	18.26	1000.0	9.000	L1	ON	9.7
1.291762	35.43	---	56.00	20.57	1000.0	9.000	L1	ON	9.7
1.810406	---	25.64	46.00	20.36	1000.0	9.000	L1	ON	9.7
1.810406	34.00	---	56.00	22.00	1000.0	9.000	L1	ON	9.7
4.661081	---	24.46	46.00	21.54	1000.0	9.000	L1	ON	9.8
4.661081	32.92	---	56.00	23.08	1000.0	9.000	L1	ON	9.8
9.694538	---	26.48	50.00	23.52	1000.0	9.000	L1	ON	9.8
9.694538	35.02	---	60.00	24.98	1000.0	9.000	L1	ON	9.8
21.280069	---	22.60	50.00	27.40	1000.0	9.000	L1	ON	9.9
21.280069	34.73	---	60.00	25.27	1000.0	9.000	L1	ON	9.9

**6.9. Frequency Stability**

Manufacturers ensured the EUT meet the requirement of frequency stability, such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

**6.10. Power control**

A Transmission Power Control mechanism is not required for systems with an e.i.r.p. of less than 27dBm (500 mW).

## 7. Test Equipment and Ancillaries Used For Tests

The test equipment and ancillaries used are as follows.

### Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration date	Cal.interval
1	Vector Signal Analyzer	FSQ40	200063	Rohde&Schwarz	2017-12-17	1 Year
2	DC Power Supply	ZUP60-14	LOC-220Z006	TDL-Lambda	2018-05-11	1 Year
3	Universal Radio Communication Tester	CMW50	104178	R&S	2018-05-11	1 Year

### Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration date	Cal.interval
1	Universal Radio Communication Tester	CMU200	123123	R&S	2018-05-11	1 Year
2	EMI Test Receiver	ESU40	100307	R&S	2018-05-11	1 Year
3	TRILOG Broadband Antenna	VULB9163	VULB9163-515	Schwarzbeck	2017-02-25	3 Year
4	Double-ridged Waveguide Antenna	ETS-3117	00135890	ETS	2017-01-11	3 Year
5	2-Line V-Network	ENV216	101380	R&S	2018-05-11	1 Year

### Anechoic chamber

Fully anechoic chamber by Frankonia German.

## 8. Test Environment

**Shielding Room1** (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Ground system resistance	< 0.5

**Control room** did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 25 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 k
Ground system resistance	< 0.5

**Fully-anechoic chamber1** (6.9 meters×10.9 meters×5.4 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 25 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 k
Ground system resistance	< 0.5
VSWR	Between 0 and 6 dB, from 1GHz to 18GHz
Site Attenuation Deviation	Between -4 and 4 dB, 30MHz to 1GHz
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

**ANNEX A. Accreditation Certificate**



**Accredited Laboratory**

A2LA has accredited

**EAST CHINA INSTITUTE OF TELECOMMUNICATIONS**

*Shanghai, People's Republic of China*

for technical competence in the field of

**Electrical Testing**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).



Presented this 15<sup>th</sup> day of March 2017.

  
President and CEO  
For the Accreditation Council  
Certificate Number 3682.01  
Valid to February 28, 2019

*For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.*



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