



**FCC PART 15  
TEST REPORT  
No. I17Z60314-SRD04**

**for**

**HMD Global Oy**

**Smart Phone**

**TA-1033**

**With**

**FCC ID: 2AJOTTA-1033**

**Hardware Version: 3**

**Software Version: 000C\_3\_110**

**Issued Date: 2017-04-17**



**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

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## **REPORT HISTORY**

<b>Report Number</b>	<b>Revision</b>	<b>Description</b>	<b>Issue Date</b>
I17Z60314-SRD04	Rev.0	1st edition	2017-04-17

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## **1. TEST LATORATORY**

### **1.1. 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(BDA)

Address: No. 18 Jia Kangding Street, BDA District, Beijing, P. R.  
China 100191

### **1.2. Testing Environment**

Normal Temperature: 15-35°C

Extreme Temperature: -10/+55°C

Relative Humidity: 20-75%

### **1.3. Project data**

Testing Start Date: 2017-02-20

Testing End Date: 2017-04-14

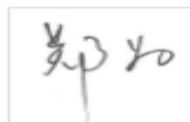
### **1.4. Signature**



---

Jiang Xue

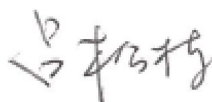
( Prepared this test report )



---

Zheng Wei

(Reviewed this test report)



---

Lv Songdong

(Approved this test report)





## **2. CLIENT INFORMATION**

### **2.1. Applicant Information**

Company Name: HMD Global Oy  
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City: Espoo  
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Country: Finland  
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### **2.2. Manufacturer Information**

Company Name: HMD Global Oy  
Address: Karaportti 2, 02610 Espoo, Finland  
City: Espoo  
Postal Code: 201203  
Country: Finland  
Contact: Mikko Kahlos  
Telephone: +358-408036126  
Fax: /

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

#### EQUIPMENT(AE)

##### 3.1. About EUT

Description	Smart Phone
Model name	TA-1033
FCC ID	2AJOTTA-1033
IC ID	/
WLAN Frequency Range	ISM Bands: -5150MHz~5350MHz -5470MHz~5725MHz -5725MHz~5850MHz
Type of modulation	OFDM
Antenna	Integral Antenna
Voltage	3.84 V DC by Battery

Note: Photographs of EUT are shown in ANNEX C of this test report. Components list, please refer to documents of the manufacturer.

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

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	/	3	000C_3_110
EUT2	/	3	000C_3_050

\*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	Battery	INBUILT
AE2	Battery	INBUILT
AE3	Travel charger	/
AE4	Travel charger	/
AE5	USB cable	/
AE6	Headset	/

##### AE1

Model	HE316
Manufacturer	SCUD(FUJIAN) ELECTRONICS CO LTD
Capacitance	3000mAh
Nominal voltage	3.82V

##### AE2



Model HE317  
Manufacturer SCUD(FUJIAN) ELECTRONICS CO LTD  
Capacitance 3000mAh  
Nominal voltage 3.84V

AE3/AE4

Model FC0102  
Manufacturer Salcomp  
Length of cable /

AE5

Model CUBB01M-FA010-DH  
Manufacturer FOXCONN  
Length of cable 99cm

AE6

Model 5CAB5422B-N01-DG  
Manufacturer FOXCONN  
Length of cable /

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

### 3.4. General Description

The Equipment under Test (EUT) is a model of Smart Phone with integrated antenna and inbuilt battery.

It has Bluetooth (EDR) function.

It consists of normal options: travel charger, USB cable and Phone.

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

Samples undergoing test were selected by the client.

### 3.5. Interpretation of the Test Environment

For the test methods, the test environment uncertainty figures correspond to an expansion factor  $k=2$ .

#### Measurement Uncertainty

Parameter	Uncertainty
temperature	0.48°C
humidity	2 %
DC voltages	0.003V



#### **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	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices	2015
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	2014
UNII: KDB 789033	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E	2014-06

#### **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 Part15E	Sub-clause of IC	Verdict
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>
Frequency Stability	15.407	/	<b>P</b>
Transmit Power Control	15.407	/	<b>NA</b>

Please refer to **ANNEX A** for detail.

Terms used in Verdict column

P	Pass, The EUT complies with the essential requirements in the standard.
NM	Not measured, The test was not measured by CTTL
NA	Not Applicable, The test was not applicable
F	Fail, The EUT does not comply with the essential requirements in the standard

### 6.2. Statements

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

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

This model is a variant product which model name is TA-1021; all the test result has been derived from test report of TA-1021.

### 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	3.84V
Humidity	44%

## 7. TEST EQUIPMENTS UTILIZED

### Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration date	Calibration Due date
1	Vector Signal Analyzer	FSQ40	200089	Rohde & Schwarz	2016-06-07	2017-06-06
2	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	2017-11-30
2	BiLog Antenna	VULB9163	514	Schwarzbeck	3 years	2017-11-24
3	Dual-Ridge Waveguide Horn Antenna	3116	2661	ETS-Lindgren	3 years	2017-06-17
4	Dual-Ridge Waveguide Horn Antenna	3115	6914	ETS-Lindgren	3 years	2017-09-21
5	Vector Signal Analyzer	FSV	101047	Rohde & Schwarz	1 year	2017-06-28
6	Test Receiver	ESCI7	100948	Rohde & Schwarz	1 year	2017-07-05
7	AMN	ESH3-Z5	825562/028	Rohde & Schwarz	1 year	2017-07-06

## 8. Measurement Uncertainty

### 8.1. Transmitter Output Power

Measurement Uncertainty: 0.339dB,k=1.96

### 8.2. Peak Power Spectral Density

Measurement Uncertainty: 0.705dBm/MHz,k=1.96

### 8.3. Occupied Channel Bandwidth

Measurement Uncertainty: 60.80Hz,k=1.96

### 8.4. Band Edges Compliance

Measurement Uncertainty : 0.62dBm,k=1.96

### 8.5. Spurious Emissions

#### Conducted (k=1.96)

Frequency Range	Uncertainty(dBm)
$30\text{MHz} \leq f \leq 2\text{GHz}$	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)

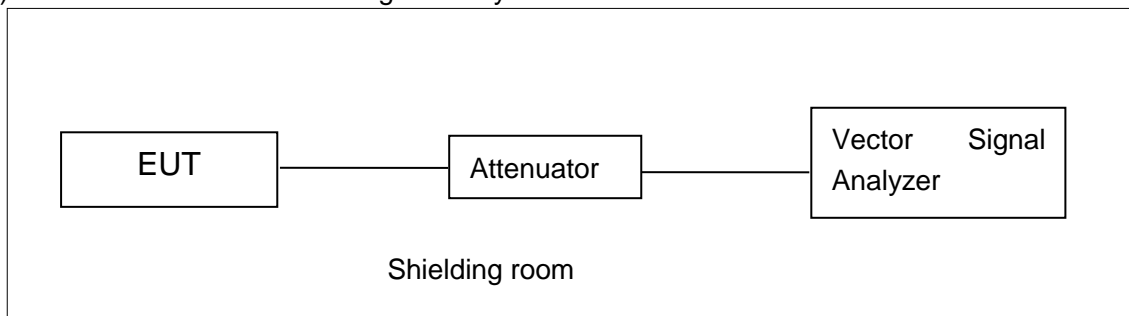
Frequency Range	Uncertainty(dBm)
9kHz-30MHz	
$30\text{MHz} \leq f \leq 1\text{GHz}$	4.86
$1\text{GHz} \leq f \leq 18\text{GHz}$	5.26
$18\text{GHz} \leq f \leq 40\text{GHz}$	5.28

## 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

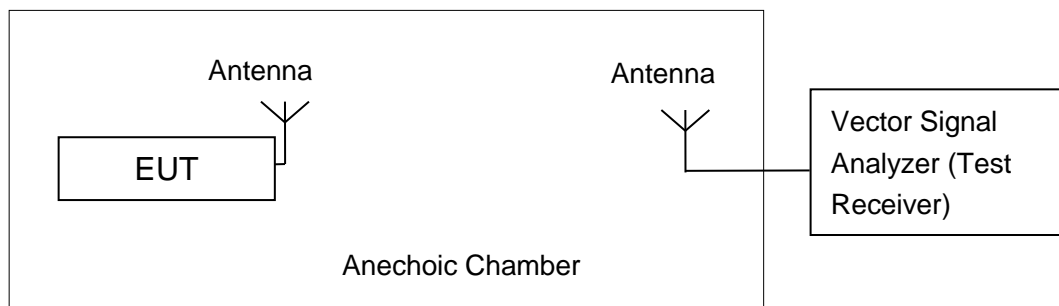


#### A.1.2. Radiated Emission Measurements

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 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.



## A.2. Maximum output Power

### Measurement Limit and Method:

Standard	Frequency (MHz)	Limit (dBm)
FCC CRF Part 15.407(a)	5150MHz~5250MHz	24dBm
	5250MHz~5350MHz	24dBm or 11+10logB
	5470MHz~5725MHz	24dBm or 11+10logB

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

Mode	Channel	Test Result (dBm)							
		Data Rate (Mbps)							
		6	9	12	18	24	36	48	54
802.11a	5180MHz (Ch36)	12.63	12.36	12.14	11.61	11.13	10.6	10.06	9.85
	5200MHz (Ch40)	12.39	/	/	/	/	/	/	/
	5240MHz(Ch48)	12.59	/	/	/	/	/	/	/
	5260MHz(Ch52)	12.62	/	/	/	/	/	/	/
	5280MHz(Ch56)	12.63	/	/	/	/	/	/	/
	5320MHz(Ch64)	12.87	/	/	/	/	/	/	/
	5500MHz(Ch100)	12.81	/	/	/	/	/	/	/
	5580MHz(Ch116)	12.80	/	/	/	/	/	/	/
	5700MHz(Ch140)	12.04	/	/	/	/	/	/	/

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

#### 802.11n-HT20 mode

Mode	Channel	Test Result (dBm)							
		Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11n (HT20)	5180MHz (Ch36)	11.47	11.07	10.73	10.15	9.6	9.15	9	8.73
	5200MHz (Ch40)	11.40	/	/	/	/	/	/	/
	5240MHz(Ch48)	11.53	/	/	/	/	/	/	/
	5260MHz(Ch52)	11.75	/	/	/	/	/	/	/
	5280MHz(Ch56)	11.49	/	/	/	/	/	/	/
	5320MHz(Ch64)	11.98	/	/	/	/	/	/	/
	5500MHz(Ch100)	11.56	/	/	/	/	/	/	/
	5580MHz(Ch116)	11.62	/	/	/	/	/	/	/
	5700MHz(Ch140)	11.14	/	/	/	/	/	/	/

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

**802.11n-HT40 mode**

Mode	Channel	Test Result (dBm)							
		Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11n (HT40)	5190MHz (Ch38)	11.07	10.27	9.7	9.02	8.32	7.84	7.62	7.39
	5230MHz(Ch46)	11.05	/	/	/	/	/	/	/
	5270MHz(Ch54)	11.35	/	/	/	/	/	/	/
	5310MHz(Ch62)	11.34	/	/	/	/	/	/	/
	5510MHz(Ch102)	11.44	/	/	/	/	/	/	/
	5550MHz(Ch110)	11.58	/	/	/	/	/	/	/
	5670MHz(Ch134)	11.12	/	/	/	/	/	/	/

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

### A.3. Peak Power Spectral Density (conducted)

**Measurement Limit:**

Standard	Frequency (MHz)	Limit (dBm/MHz)
FCC CRF Part 15.407(a)	5150MHz~5250MHz	11
	5250MHz~5350MHz	11
	5470MHz~5725MHz	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	9.08	P
	5200 MHz	9.10	P
	5240 MHz	9.44	P
	5260 MHz	8.96	P
	5280 MHz	9.96	P
	5320 MHz	9.41	P
	5500 MHz	9.76	P
	5580 MHz	8.88	P
802.11n HT20	5180 MHz	8.36	P
	5200 MHz	9.09	P
	5240 MHz	8.39	P
	5260 MHz	8.41	P
	5280 MHz	9.65	P
	5320 MHz	9.60	P
	5500 MHz	9.18	P
	5580 MHz	8.52	P
802.11n HT40	5190 MHz	5.01	P
	5230 MHz	5.31	P
	5270 MHz	6.01	P
	5310 MHz	5.48	P
	5510 MHz	6.03	P
	5550 MHz	4.80	P
	5670 MHz	4.96	P

**Conclusion: PASS**

#### A.4. Occupied 26dB Bandwidth(conducted)

##### Measurement Limit:

Standard	Limit (kHz)
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 ( kHz)		conclusion
		Fig.	Value	
802.11a	5180 MHz	Fig.1	23.00	P
	5200 MHz	Fig.2	23.00	P
	5240 MHz	Fig.3	23.45	P
	5260 MHz	Fig.4	22.80	P
	5280 MHz	Fig.5	23.00	P
	5320 MHz	Fig.6	22.80	P
	5500 MHz	Fig.7	22.70	P
	5580 MHz	Fig.8	22.70	P
802.11n HT20	5180 MHz	Fig.10	23.15	P
	5200 MHz	Fig.11	22.90	P
	5240 MHz	Fig.12	23.30	P
	5260 MHz	Fig.13	22.60	P
	5280 MHz	Fig.14	22.90	P
	5320 MHz	Fig.15	22.80	P
	5500 MHz	Fig.16	22.75	P
	5580 MHz	Fig.17	22.75	P
802.11n HT40	5190 MHz	Fig.19	44.32	P
	5230 MHz	Fig.20	43.76	P
	5270 MHz	Fig.21	43.84	P
	5310 MHz	Fig.22	43.76	P
	5510 MHz	Fig.23	42.48	P
	5550 MHz	Fig.24	43.36	P
	5670 MHz	Fig.25	42.88	P

**Conclusion: PASS**

Test graphs as below:



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

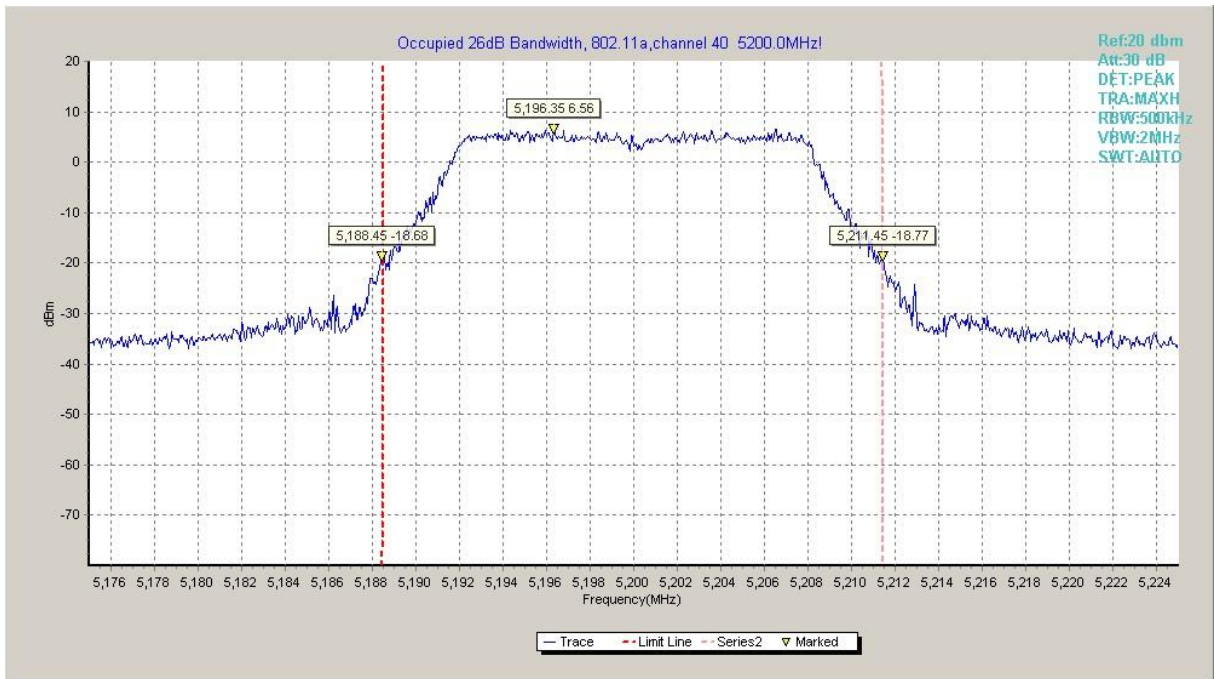
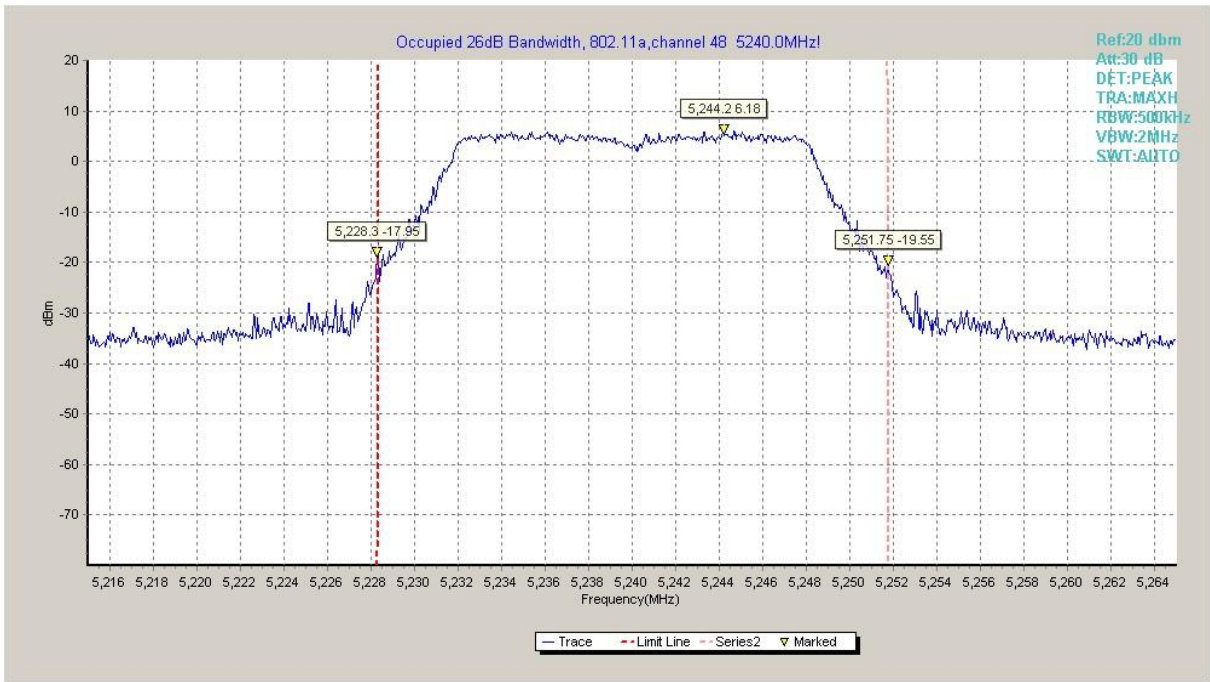
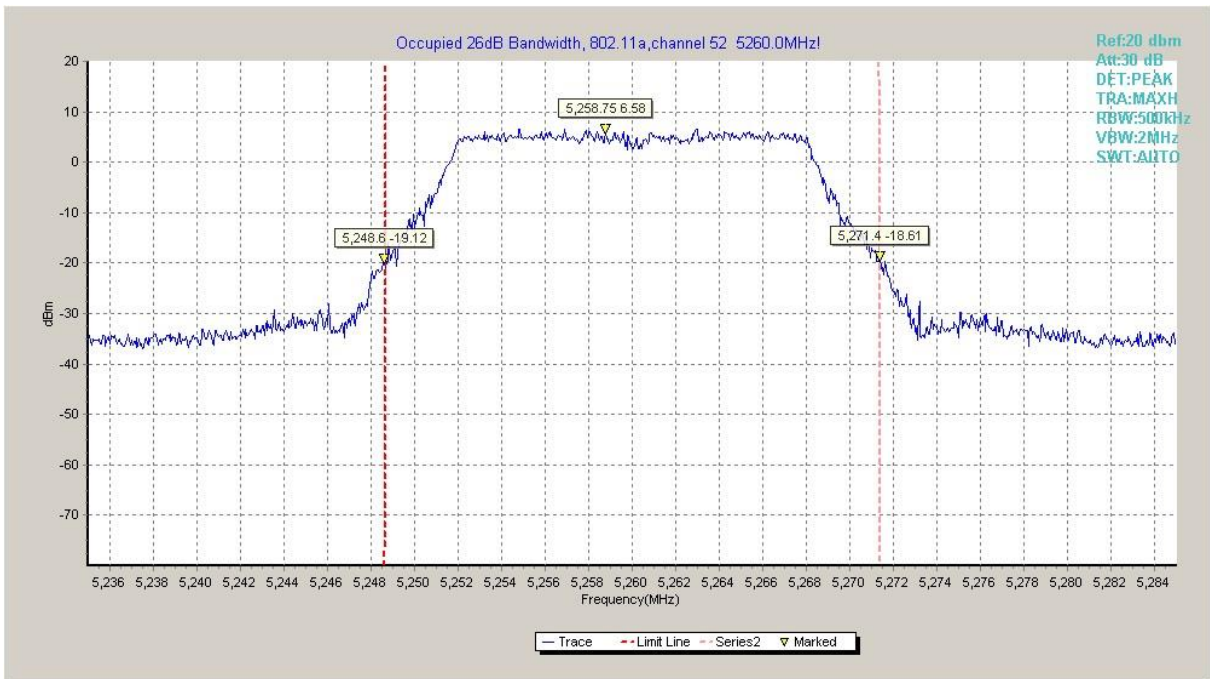


Fig. 2 Occupied 26dB Bandwidth (802.11a, 5200MHz)



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



**Fig. 4 Occupied 26dB Bandwidth (802.11a, 5260MHz)**



Fig. 5 Occupied 26dB Bandwidth (802.11a, 5280MHz)

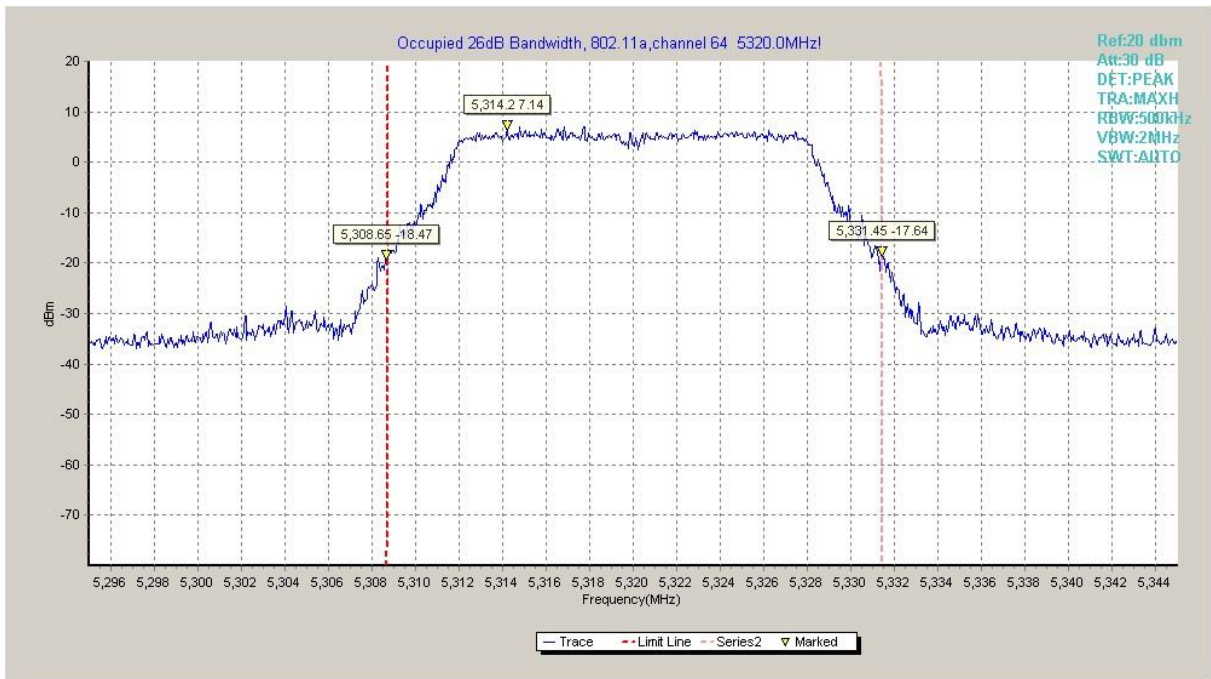


Fig. 6 Occupied 26dB Bandwidth (802.11a, 5320MHz)



Fig. 7 Occupied 26dB Bandwidth (802.11a, 5500MHz)

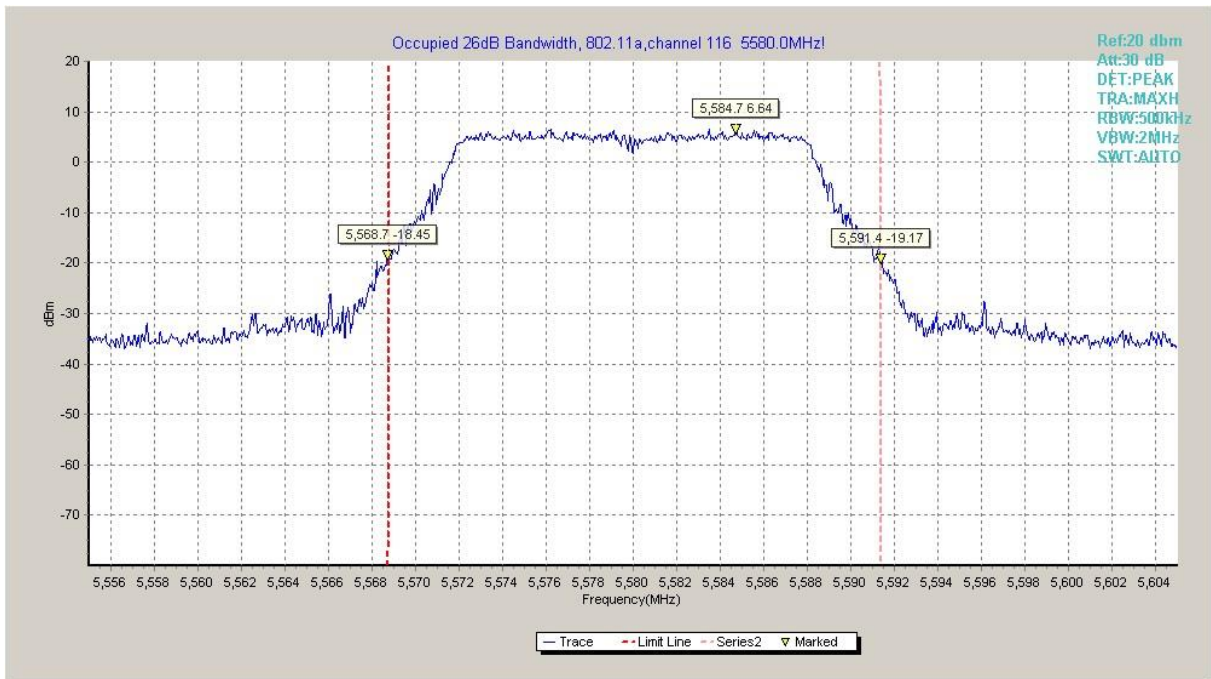


Fig. 8 Occupied 26dB Bandwidth (802.11a, 5580MHz)



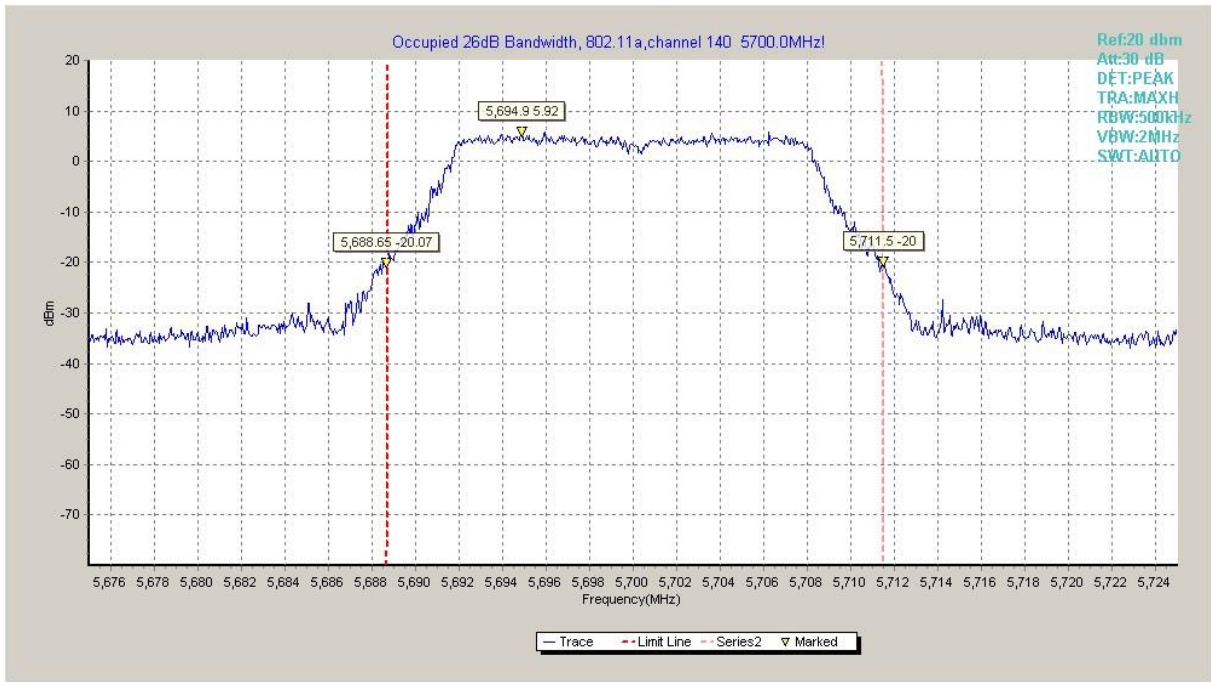


Fig. 9 Occupied 26dB Bandwidth (802.11a, 5700MHz)

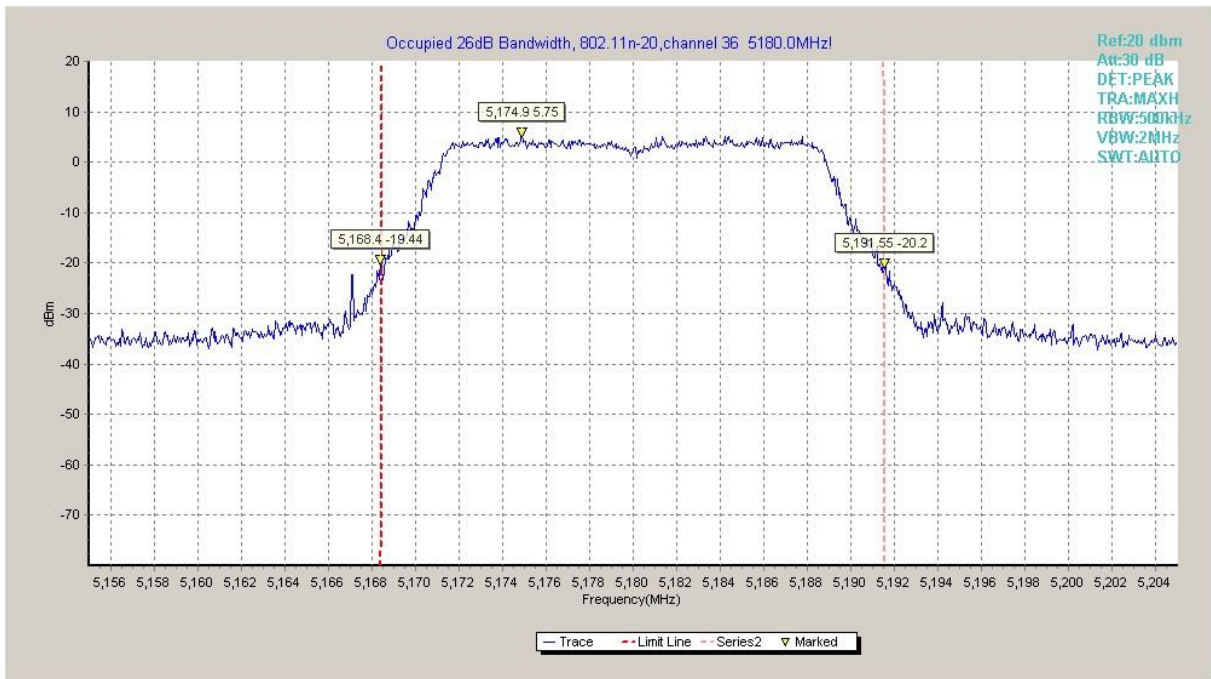


Fig. 10 Occupied 26dB Bandwidth (802.11n-HT20, 5180MHz)

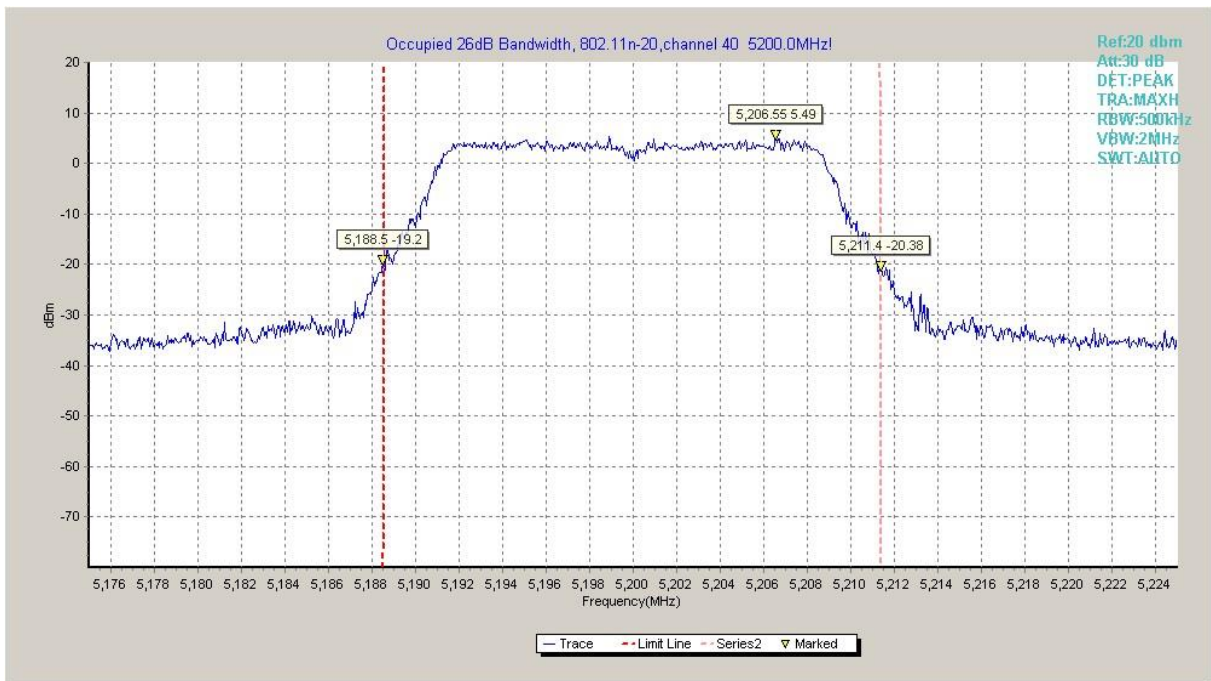


Fig. 11 Occupied 26dB Bandwidth (802.11n-HT20, 5200MHz)

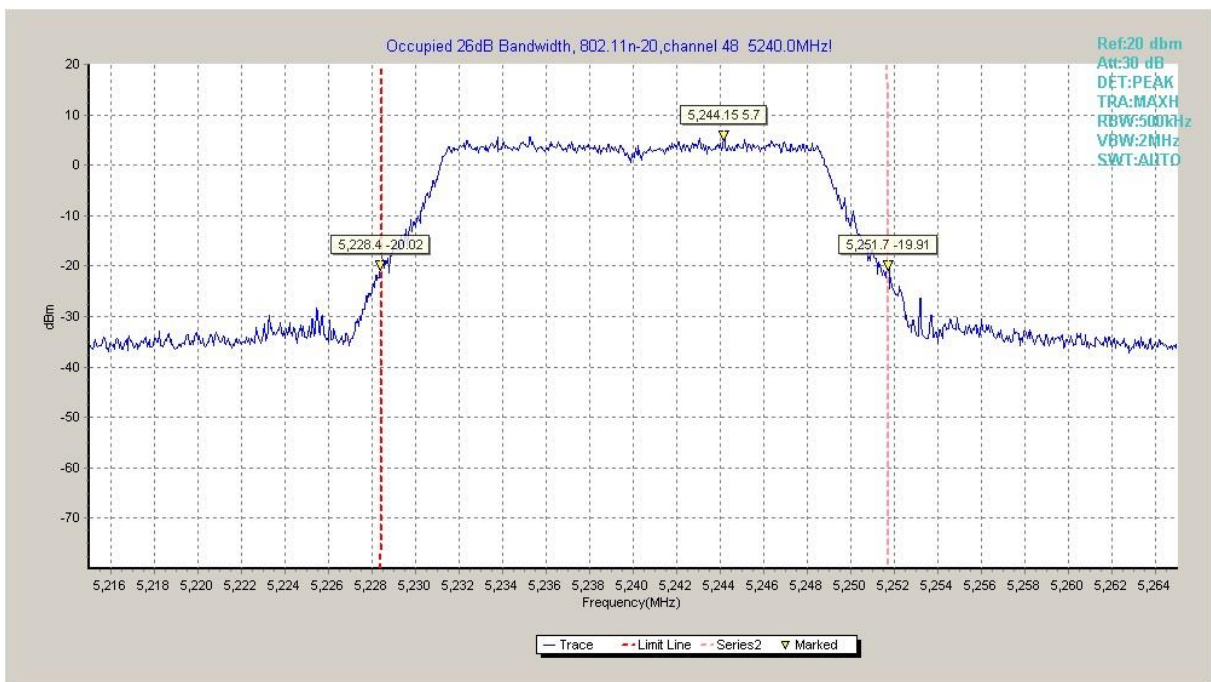
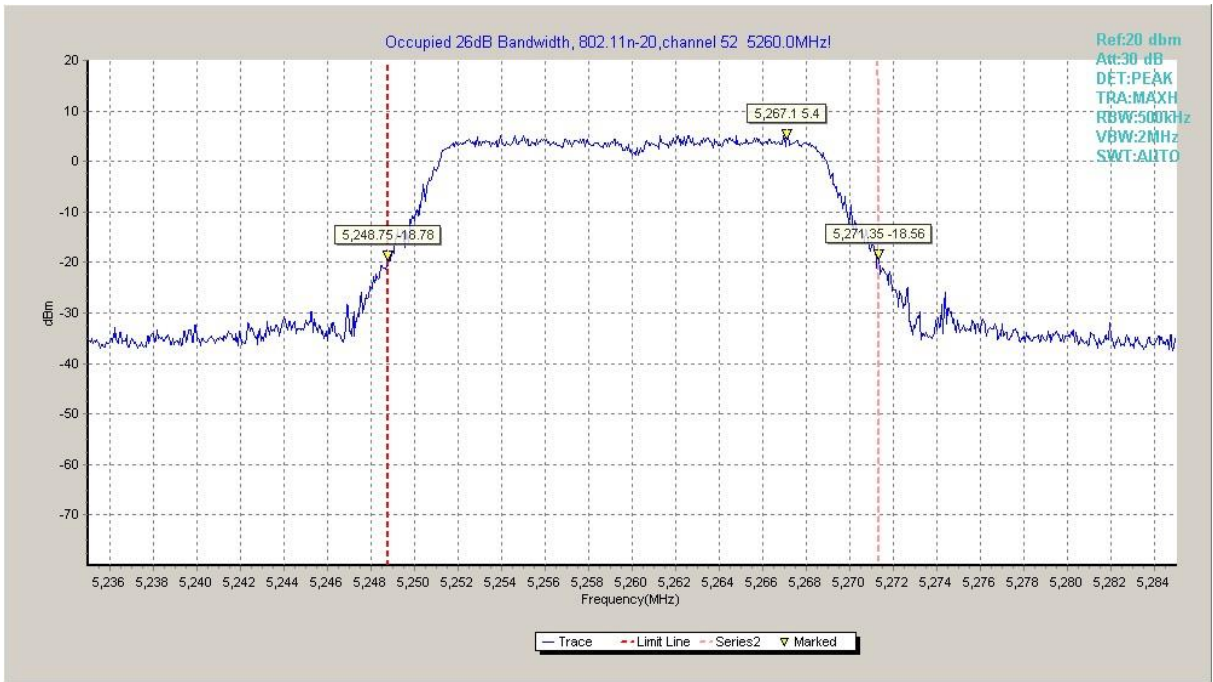
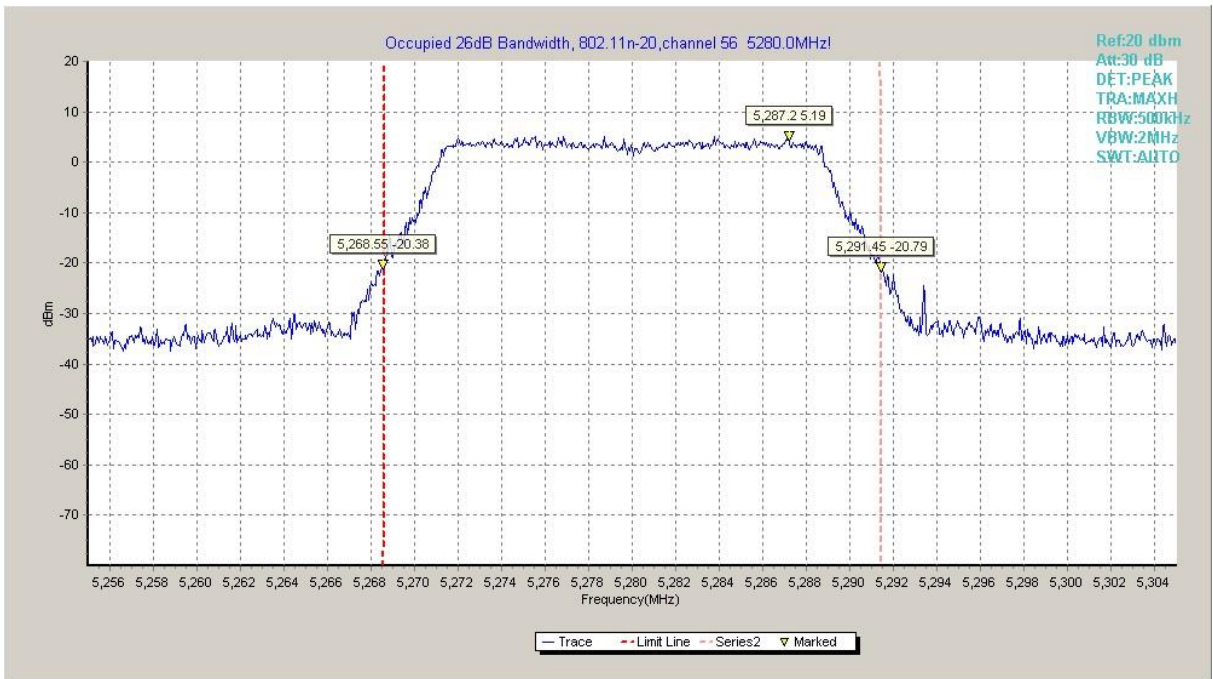


Fig. 12 Occupied 26dB Bandwidth (802.11n-HT20, 5240MHz)



**Fig. 13 Occupied 26dB Bandwidth (802.11n-HT20, 5260MHz)**



**Fig. 14 Occupied 26dB Bandwidth (802.11n-HT20, 5280MHz)**

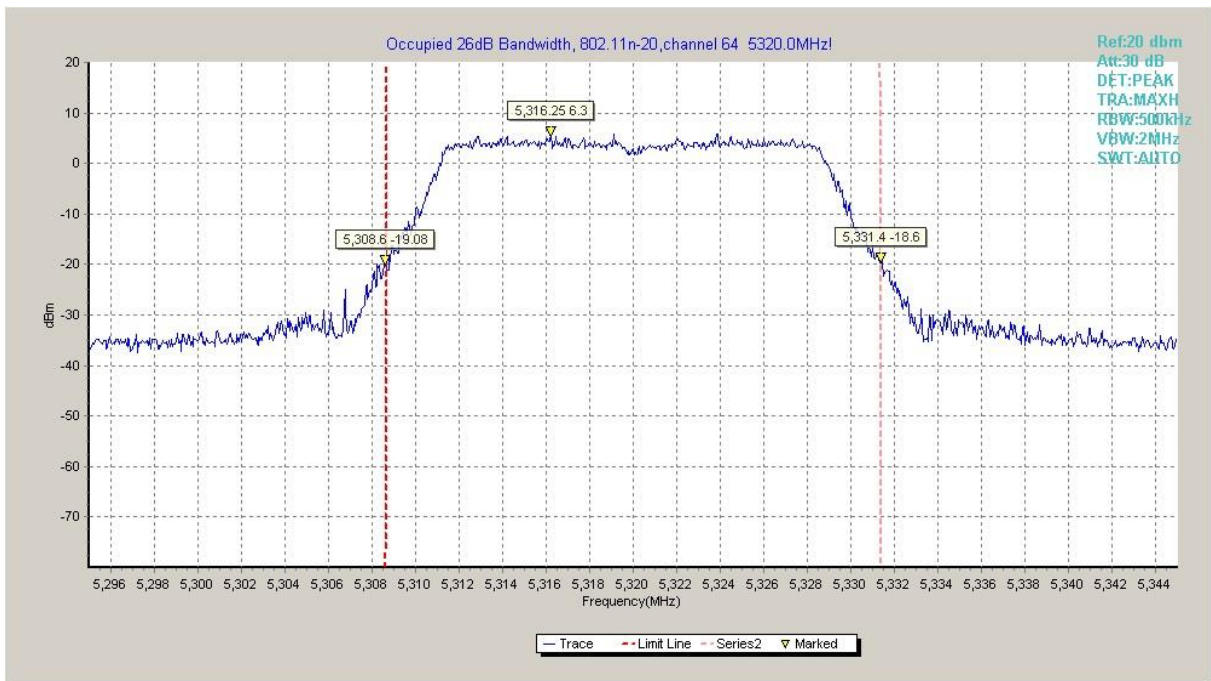


Fig. 15 Occupied 26dB Bandwidth (802.11n-HT20, 5320MHz)

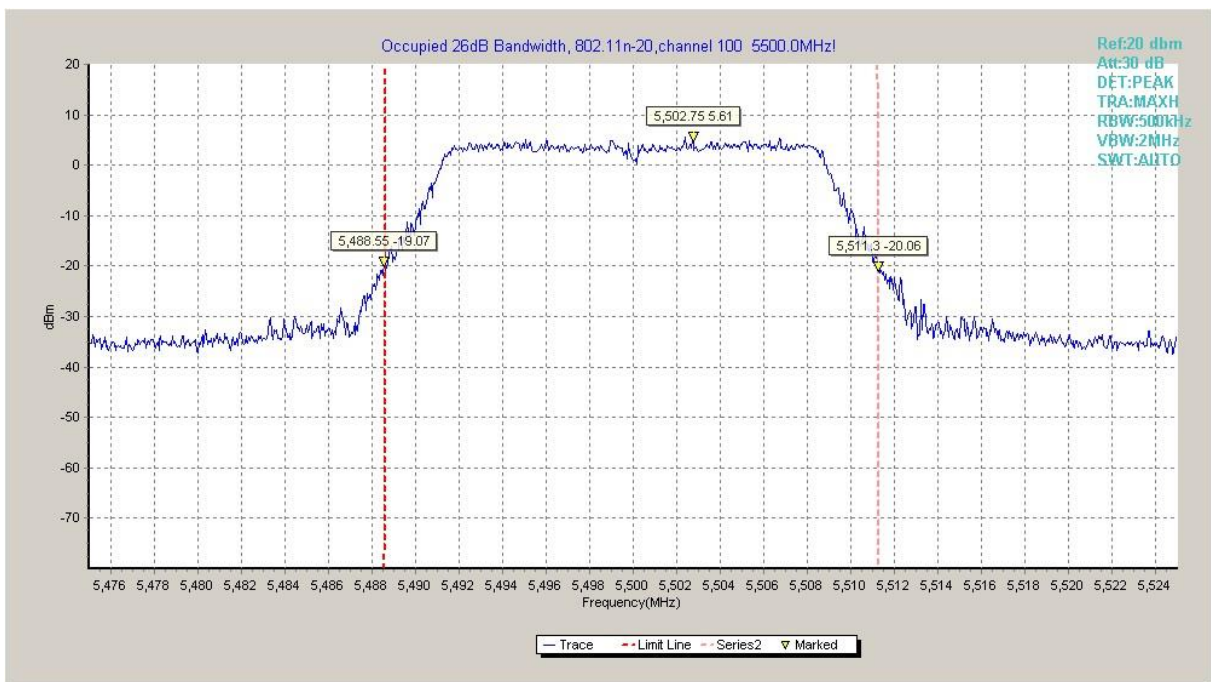


Fig. 16 Occupied 26dB Bandwidth (802.11n-HT20, 5500MHz)

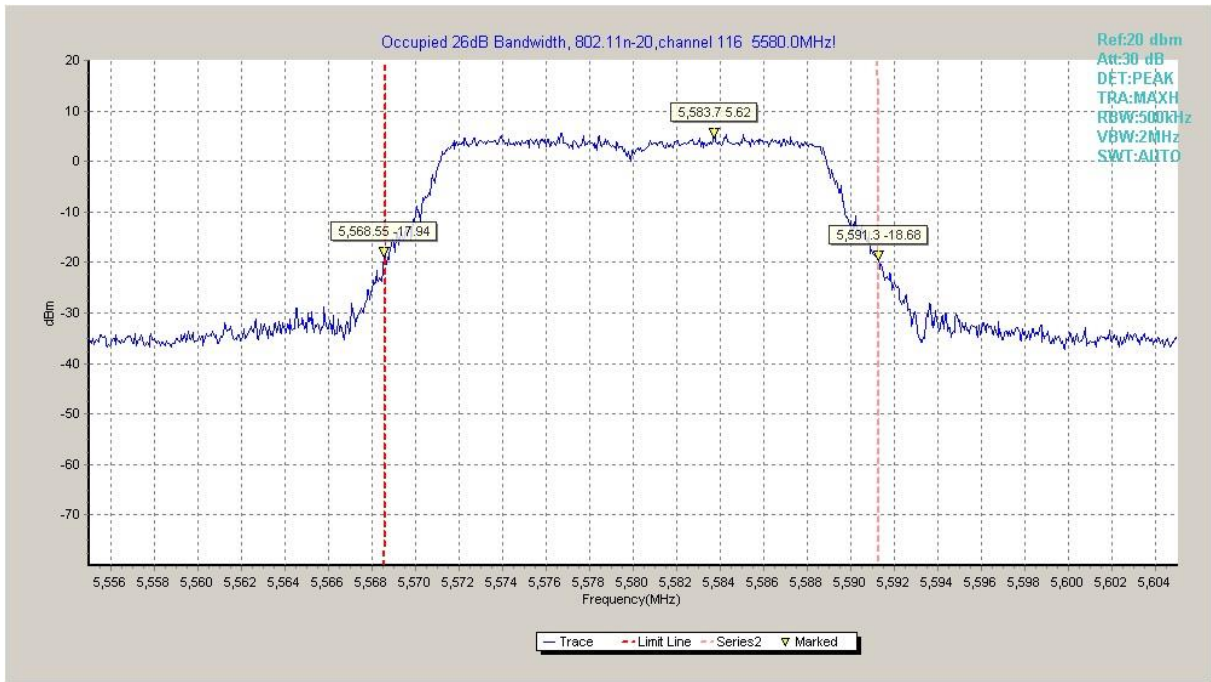


Fig. 17 Occupied 26dB Bandwidth (802. 11n-HT20, 5580MHz)

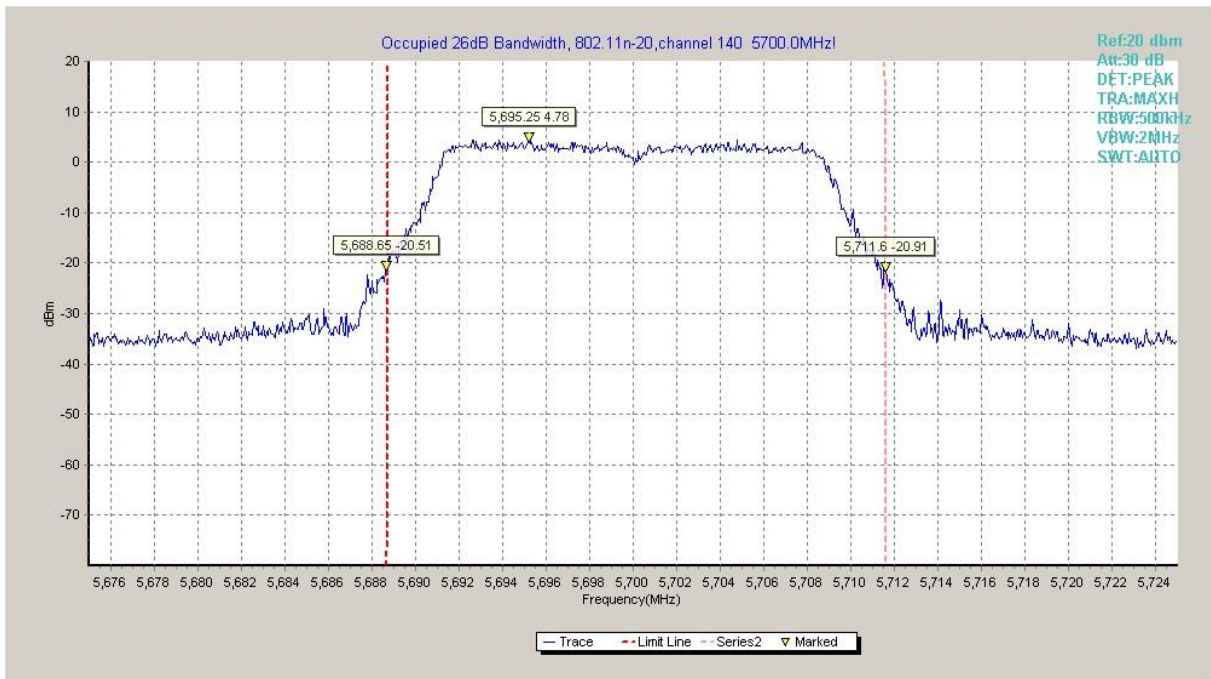


Fig. 18 Occupied 26dB Bandwidth (802. 11n-HT20, 5700MHz)



Fig. 19 Occupied 26dB Bandwidth (802.11n-HT40, 5190MHz)

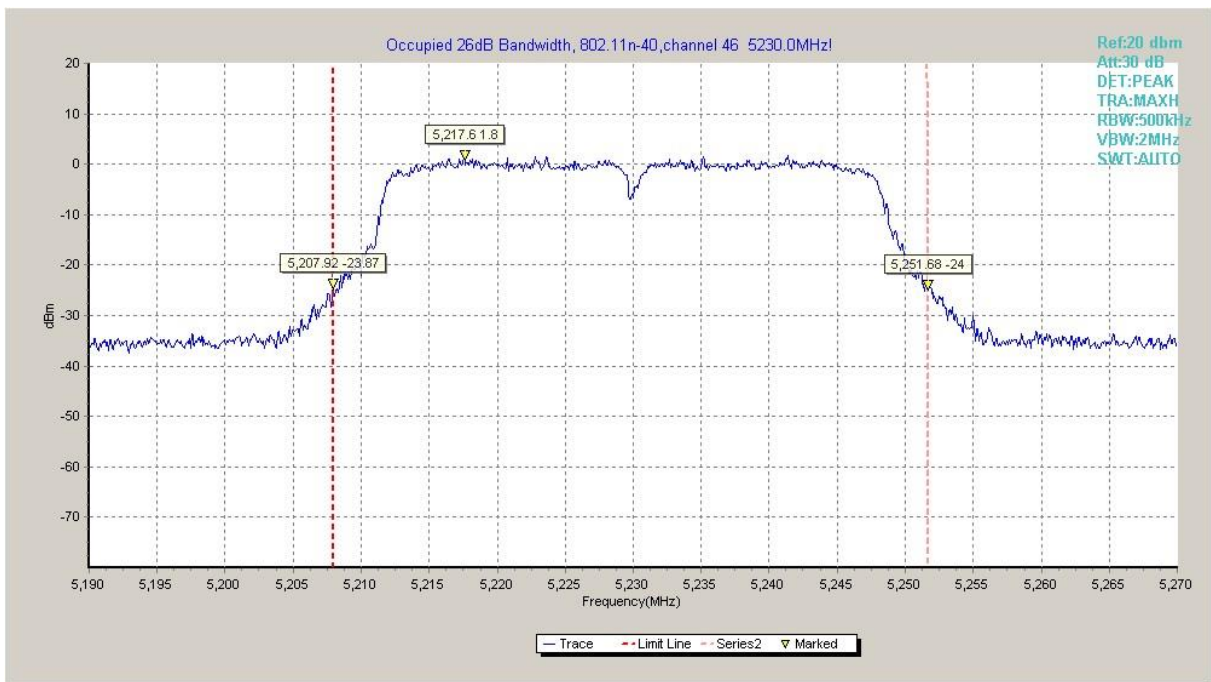


Fig. 20 Occupied 26dB Bandwidth (802.11n-HT40, 5230MHz)