

# FCC 15.407 2015

## DUT Information

### Frequencies

WLAN CH 36 (5180 MHz)

WLAN CH 44 (5220 MHz)

WLAN CH 48 (5240 MHz)

### Gain Tables

0.000 dBm (0 dBm)

Port 1: 3.6dBi;

### DUT Settings

No. of transmission chains

1

DFS capability

No

Equipment Type

Indoor

TPC

No

## Hardware Setup: WMS Measurements\Hardware Setup

### Spectrum Analyzer:

SA FSV 40 (SA FSV 40) @ VISA (ADR  
TCPIP::192.168.48.148::INST0::INSTR), SN 1307.9002K40/101076,  
FW 3.10 SP1

### Vector Generator:

VG SMBV100A (VG SMBV100A) @ VISA (ADR  
TCPIP::192.168.48.149::INST0::INSTR), SN 260451, FW 5.4.0

### Generator:

SMB100A (SMB100A) @ VISA (ADR  
TCPIP::192.168.48.144::INST0::INSTR), SN 107790, FW Rev  
2.20.1, 08/2012, CVI 2009

### OSP:

OSP (OSP) @ VISA (ADR TCPIP::192.168.48.147::INST0::INSTR),  
SN OSP120 V02, 101258, FW 2.53.140911

### Power Meter:

OSP-B157 Power Meter (OSP-B157 Power Meter) @ USB (ADR 20),  
SN 26591983, FW 3.1

## Summary

Test	Frequency (MHz)	Nominal Bandwidth (MHz)	Result
Emission Bandwidth 26 dB	5180.000	20.000000	PASS
RF output power	5180.000	20.000000	PASS
Power Spectral Density	5180.000	20.000000	PASS
Occupied Channel Bandwidth 99%	5180.000	20.000000	PASS
Band Edge low	5180.000	20.000000	PASS
Emission Bandwidth 26 dB	5220.000	20.000000	PASS
RF output power	5220.000	20.000000	PASS
Power Spectral Density	5220.000	20.000000	PASS
Occupied Channel Bandwidth 99%	5220.000	20.000000	PASS
Emission Bandwidth 26 dB	5240.000	20.000000	PASS
RF output power	5240.000	20.000000	PASS
Power Spectral Density	5240.000	20.000000	PASS
Occupied Channel Bandwidth 99%	5240.000	20.000000	PASS
Band Edge high	5240.000	20.000000	PASS

## Emission Bandwidth 26 dB (5180 MHz)

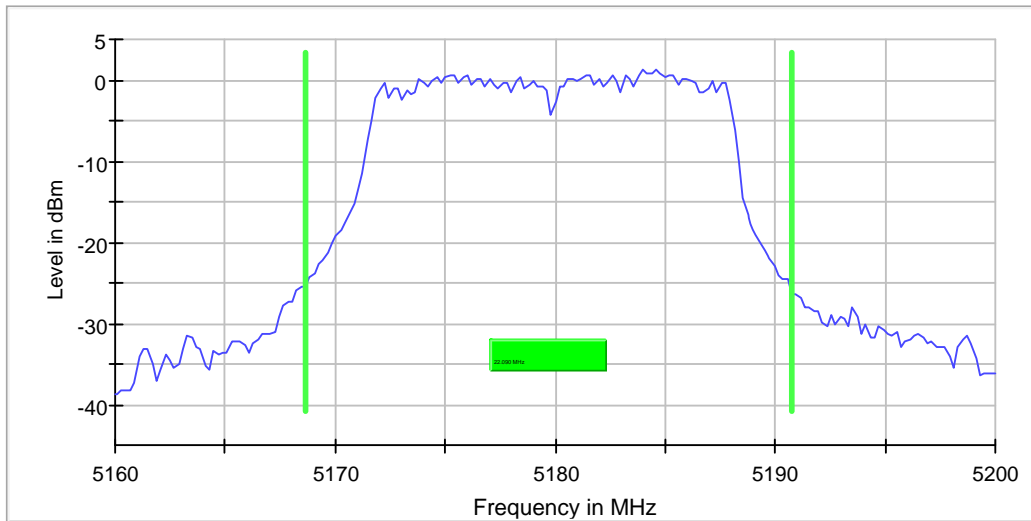
Test according to FCC title 47 part 15 §15.407(a),(e), KDB 789033 D02 General U-NII Test Procedures New Rules v01r03 and ANSI C63.10

### 26 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)
5180.000000	22.089553	5168.656716	5190.746269	1.3

(continuation of the "26 dB Bandwidth" table from column 7 ...)

DUT Frequency (MHz)	Result
5180.000000	PASS



### Measurement

Setting	Instrument Value	Target Value
Start Frequency	5.16000 GHz	5.16000 GHz
Stop Frequency	5.20000 GHz	5.20000 GHz
Span	40.000 MHz	40.000 MHz
RBW	200.000 kHz	~ 200.000 kHz
VBW	1.000 MHz	>= 600.000 kHz
SweepPoints	200	~ 200
SweepTime	28.443 μs	AUTO
Reference Level	-10.000 dBm	-20.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	200	200
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30 dB	0.30 dB
Run	21 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.00 dB	0.30 dB

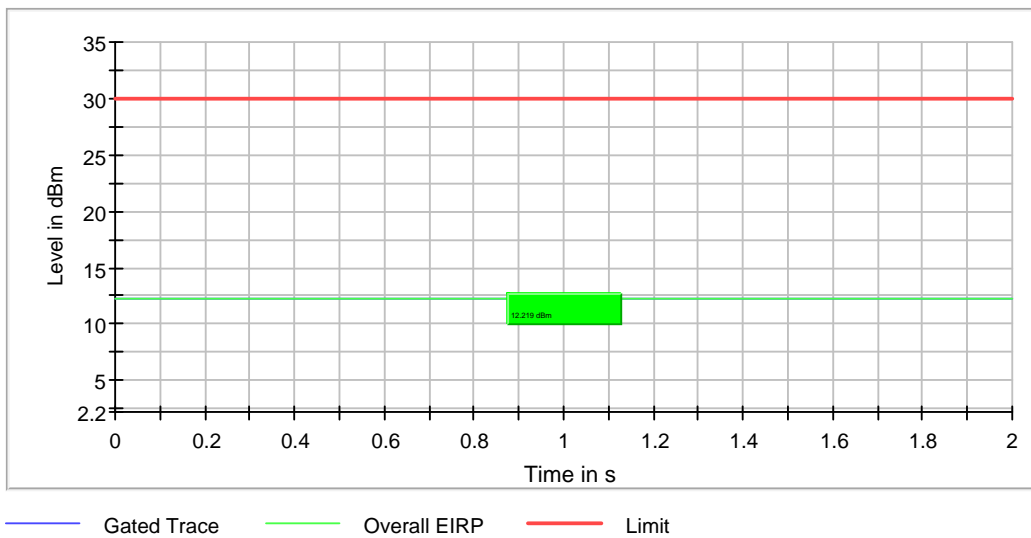
# RF output power (5180 MHz)

Customized settings.

Test according to FCC title 47 part 15 §15.407(a), KDB 789033 D02 General U-NII Test Procedures New Rules v01r03 and ANSI C63.10

## Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
5180.000000	9.2	30.0	12.2	100.000	PASS



# Power Spectral Density (5180 MHz)

Customized settings.

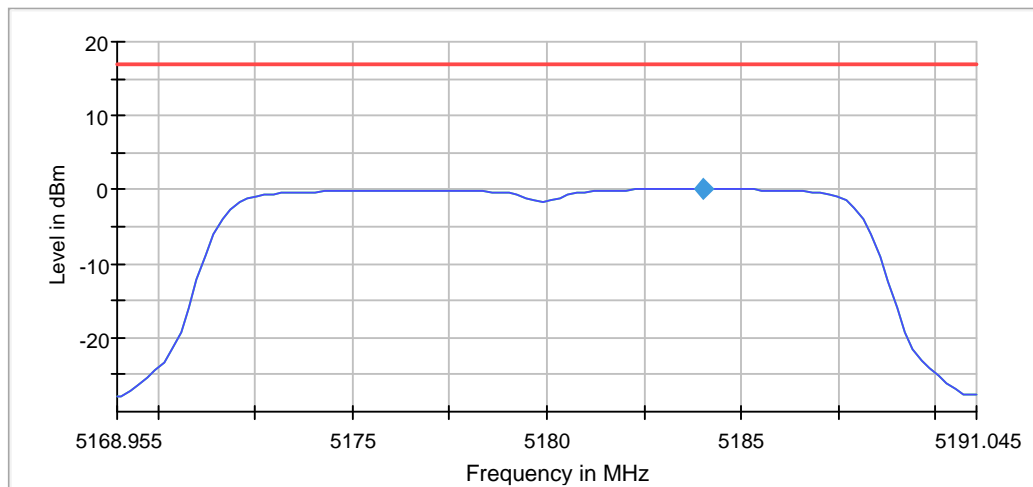
Test according to FCC title 47 part 15 §15.407(e), KDB 789033 D02 General U-NII Test Procedures New Rules v01r03 and ANSI C63.10

## Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
5180.000000	5184.006520	0.119	17.0	PASS

## Ports

Port	Duty Cycle (%)
1	100.000



Connector 1    Sum Level    Limit    PSD

## Measurement

Setting	Instrument Value	Target Value
Start Frequency	5.16896 GHz	5.16896 GHz
Stop Frequency	5.19105 GHz	5.19105 GHz
Span	22.090 MHz	22.090 MHz
RBW	1.000 MHz	<= 1.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	101	~ 44
Sweeptime	2.020 s	2.020 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	RMS	RMS
SweepCount	3	3
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace

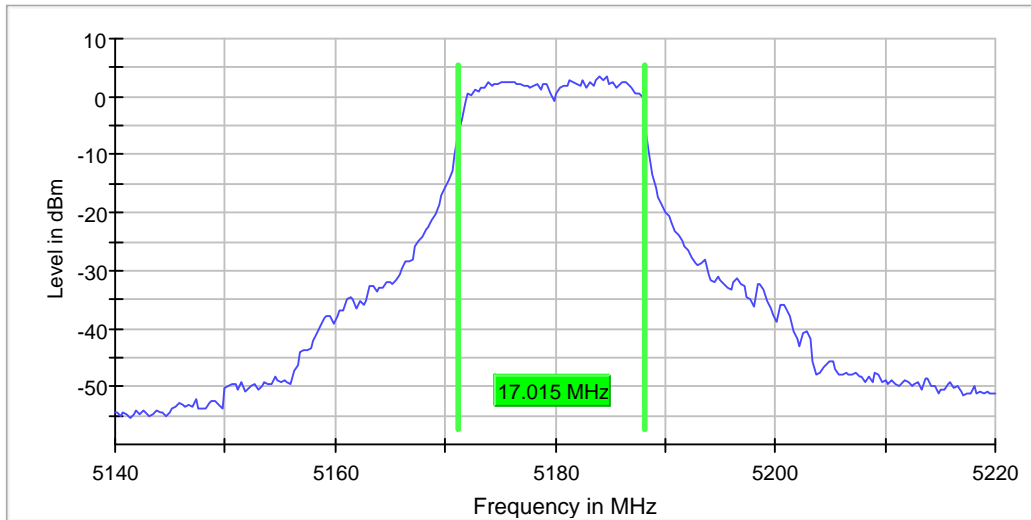
<b>Stablevalue</b>	<b>0.30 dB</b>	<b>0.30 dB</b>
<b>Run</b>	<b>4 / max. 15</b>	<b>max. 15</b>
<b>Stable</b>	<b>3 / 3</b>	<b>3</b>
<b>Max Stable Difference</b>	<b>0.00 dB</b>	<b>0.30 dB</b>

# Occupied Channel Bandwidth 99% (5180 MHz)

Test according to FCC title 47 part 15 §15.407(a),(e), KDB 789033 D02 General U-NII Test Procedures New Rules v01r03 and ANSI C63.10

## 99 % Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Result
5180.000000	17.014925	5171.194030	5188.208955	PASS



## Measurement

Setting	Instrument Value	Target Value
Start Frequency	5.14000 GHz	5.14000 GHz
Stop Frequency	5.22000 GHz	5.22000 GHz
Span	80.000 MHz	80.000 MHz
RBW	300.000 kHz	<= 400.000 kHz
VBW	1.000 MHz	>= 900.000 kHz
SweepPoints	267	~ 267
Sweeptime	31.603 µs	AUTO
Reference Level	-10.000 dBm	-20.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	200	200
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30 dB	0.30 dB
Run	20 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.00 dB	0.30 dB

## Band Edge low (5180 MHz)

Customized settings.

Test according to FCC title 47 part 15 §15.407(b), KDB 789033 D02 General U-NII Test Procedures New Rules v01r03 and ANSI C63.10

### Result

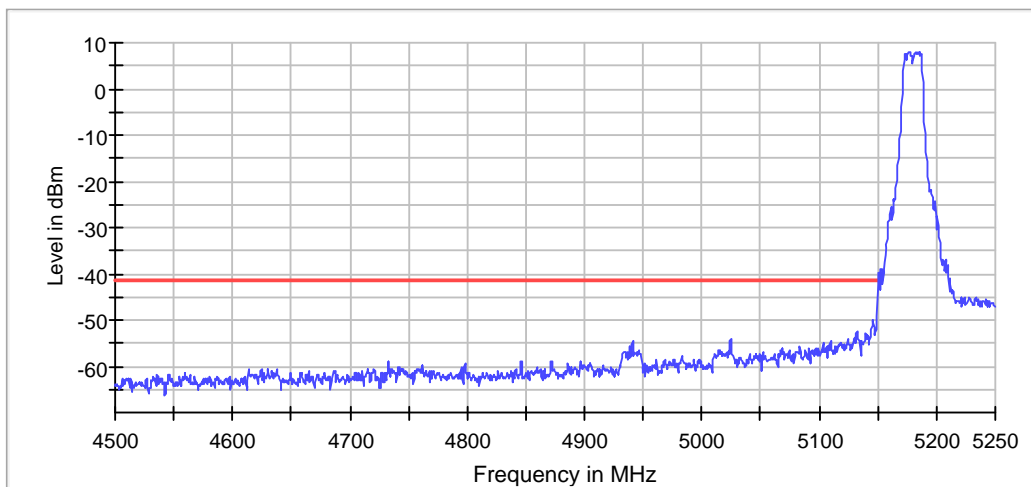
DUT Frequency (MHz)	Result
5180.000000	PASS

### Inband Peak

Frequency (MHz)	Level (dBm)
5184.079602	8.2

### Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
5149.250576	-49.1	7.9	-41.2	PASS
5145.753267	-50.1	8.9	-41.2	PASS
5146.252882	-50.4	9.2	-41.2	PASS
5148.750961	-51.1	9.9	-41.2	PASS
5145.253651	-51.1	9.9	-41.2	PASS
5146.752498	-51.6	10.4	-41.2	PASS
5144.754035	-51.9	10.6	-41.2	PASS
5144.254420	-51.9	10.7	-41.2	PASS
5148.251345	-51.9	10.7	-41.2	PASS
5132.263643	-52.5	11.3	-41.2	PASS
5131.764028	-52.8	11.5	-41.2	PASS
5139.757879	-52.8	11.6	-41.2	PASS
5147.751729	-52.9	11.7	-41.2	PASS
5147.252114	-53.1	11.9	-41.2	PASS
5143.754804	-53.1	11.9	-41.2	PASS



— Limit    — Sum Level    × Fail

### Measurement 1

Setting	Instrument Value	Target Value
RBW	1.000 MHz	<= 1.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	200	~ 200
SweepTime	15.250 $\mu$ s	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	14 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.06 dB	0.50 dB

## Measurement 2

Setting	Instrument Value	Target Value
RBW	1.000 MHz	<= 1.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	1300	~ 1300
SweepTime	87.688 $\mu$ s	AUTO
Reference Level	-20.000 dBm	-20.000 dBm
Attenuation	0.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	5 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.50 dB

## Emission Bandwidth 26 dB (5220 MHz)

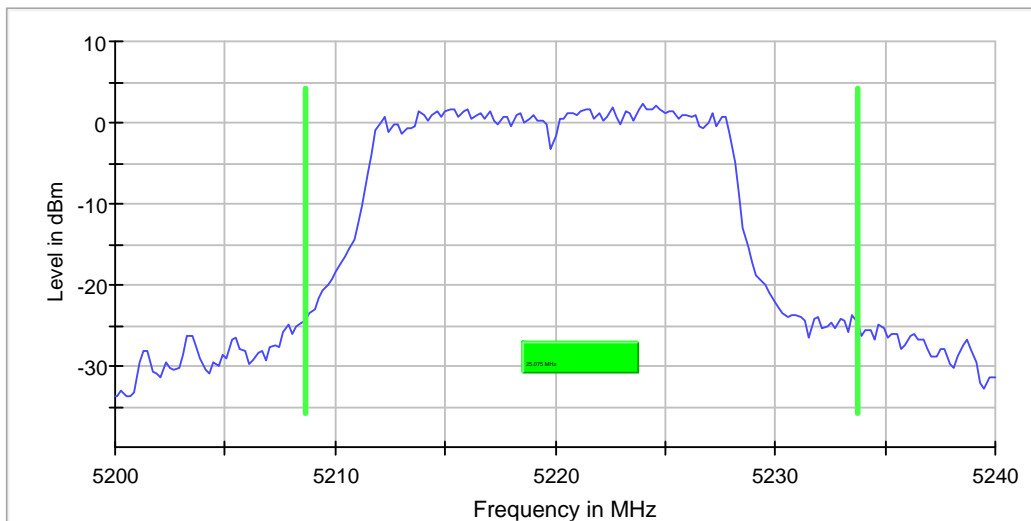
Test according to FCC title 47 part 15 §15.407(a),(e), KDB 789033 D02 General U-NII Test Procedures New Rules v01r03 and ANSI C63.10

### 26 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)
5220.000000	25.074627	5208.656716	5233.731343	2.2

(continuation of the "26 dB Bandwidth" table from column 7 ...)

DUT Frequency (MHz)	Result
5220.000000	PASS



### Measurement

Setting	Instrument Value	Target Value
Start Frequency	5.20000 GHz	5.20000 GHz
Stop Frequency	5.24000 GHz	5.24000 GHz
Span	40.000 MHz	40.000 MHz
RBW	200.000 kHz	~ 200.000 kHz
VBW	1.000 MHz	>= 600.000 kHz
SweepPoints	200	~ 200
Sweeptime	28.443 $\mu$ s	AUTO
Reference Level	-10.000 dBm	-20.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	200	200
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30 dB	0.30 dB
Run	16 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.08 dB	0.30 dB

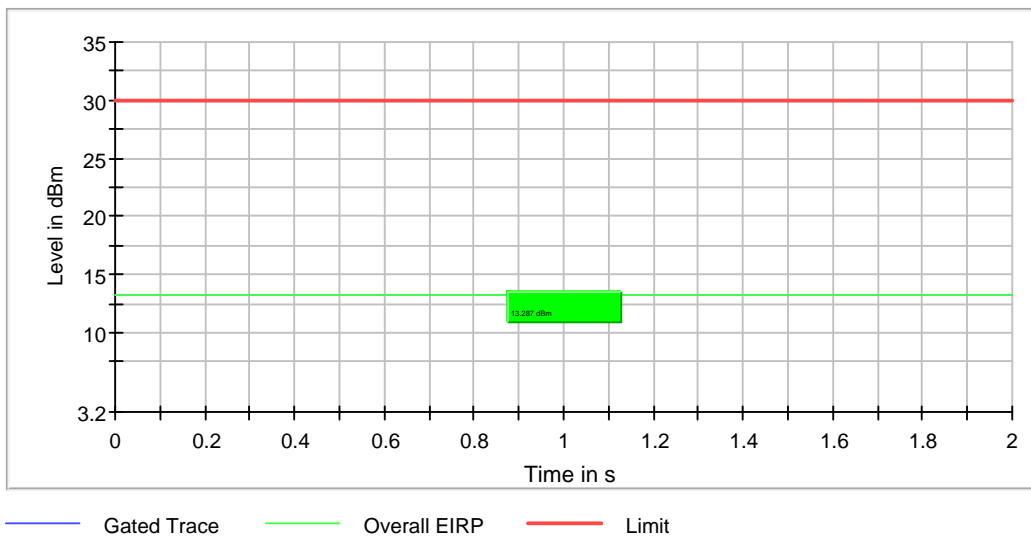
# RF output power (5220 MHz)

Customized settings.

Test according to FCC title 47 part 15 §15.407(a), KDB 789033 D02 General U-NII Test Procedures New Rules v01r03 and ANSI C63.10

## Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
5220.000000	10.3	30.0	13.3	100.000	PASS



# Power Spectral Density (5220 MHz)

Customized settings.

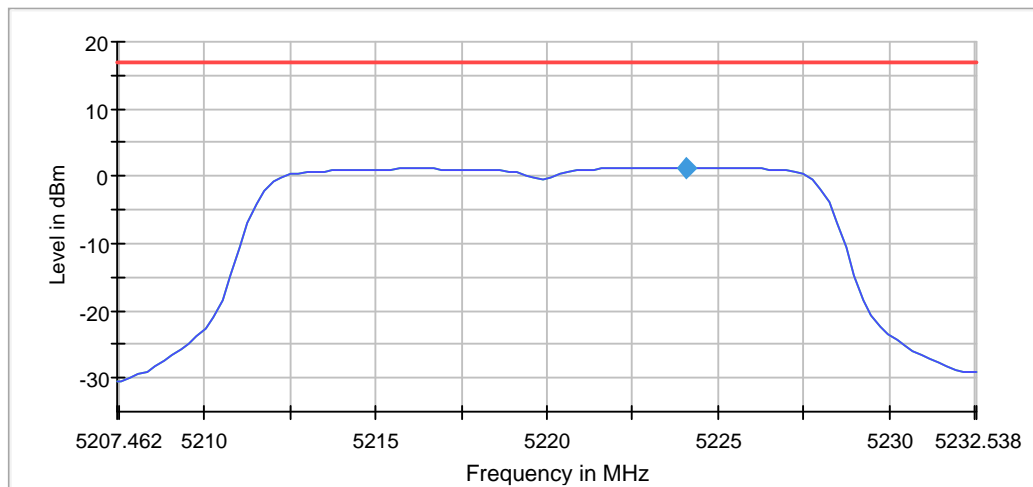
Test according to FCC title 47 part 15 §15.407(e), KDB 789033 D02 General U-NII Test Procedures New Rules v01r03 and ANSI C63.10

## Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
5220.000000	5224.056250	1.323	17.0	PASS

## Ports

Port	Duty Cycle (%)
1	100.000



Connector 1    Sum Level    Limit    PSD

## Measurement

Setting	Instrument Value	Target Value
Start Frequency	5.20746 GHz	5.20746 GHz
Stop Frequency	5.23254 GHz	5.23254 GHz
Span	25.075 MHz	25.075 MHz
RBW	1.000 MHz	<= 1.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	101	~ 50
Sweeptime	2.020 s	2.020 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	RMS	RMS
SweepCount	3	3
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace

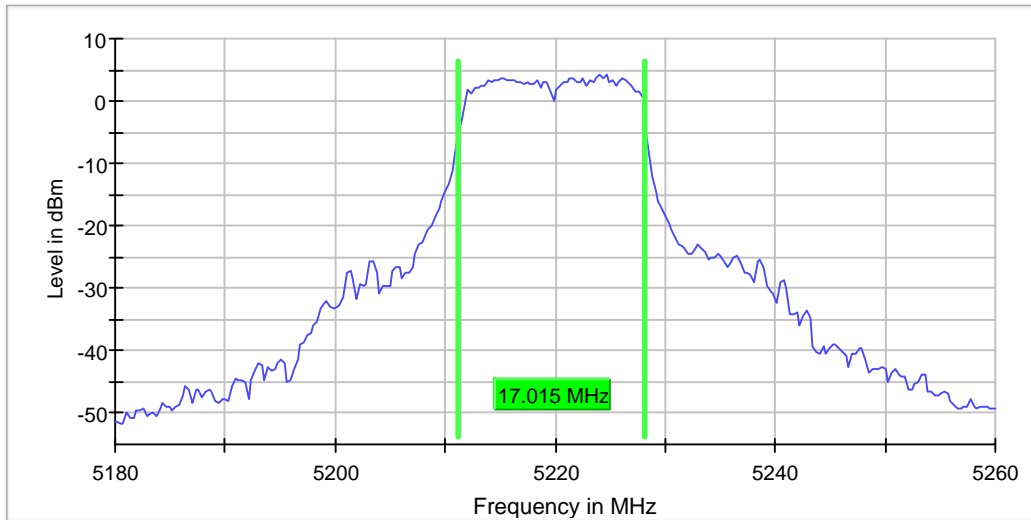
<b>Stablevalue</b>	<b>0.30 dB</b>	<b>0.30 dB</b>
<b>Run</b>	<b>4 / max. 15</b>	<b>max. 15</b>
<b>Stable</b>	<b>3 / 3</b>	<b>3</b>
<b>Max Stable Difference</b>	<b>0.02 dB</b>	<b>0.30 dB</b>

# Occupied Channel Bandwidth 99% (5220 MHz)

Test according to FCC title 47 part 15 §15.407(a),(e), KDB 789033 D02 General U-NII Test Procedures New Rules v01r03 and ANSI C63.10

## 99 % Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Result
5220.000000	17.014925	5211.194030	5228.208955	PASS



## Measurement

Setting	Instrument Value	Target Value
Start Frequency	5.18000 GHz	5.18000 GHz
Stop Frequency	5.26000 GHz	5.26000 GHz
Span	80.000 MHz	80.000 MHz
RBW	300.000 kHz	<= 400.000 kHz
VBW	1.000 MHz	>= 900.000 kHz
SweepPoints	267	~ 267
Sweeptime	31.603 µs	AUTO
Reference Level	-10.000 dBm	-20.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	200	200
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30 dB	0.30 dB
Run	18 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.04 dB	0.30 dB

# Emission Bandwidth 26 dB (5240 MHz)

Customized settings.

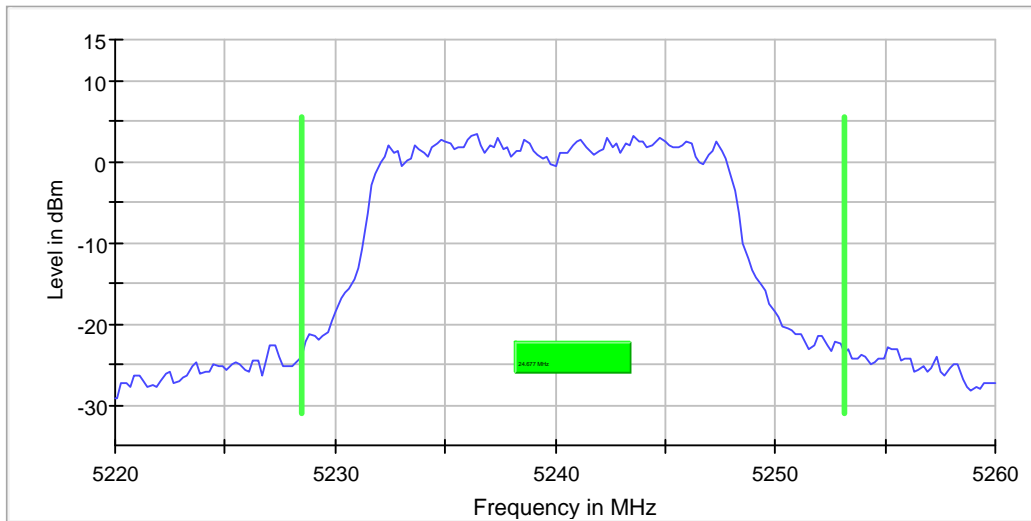
Test according to FCC title 47 part 15 §15.407(a),(e), KDB 789033 D02 General U-NII Test Procedures New Rules v01r03 and ANSI C63.10

## 26 dB Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Max Level (dBm)
5240.000000	24.676617	---	---	5228.457711	5253.134328	3.4

(continuation of the "26 dB Bandwidth" table from column 7 ...)

DUT Frequency (MHz)	Result
5240.000000	PASS



## Measurement

Setting	Instrument Value	Target Value
Start Frequency	5.22000 GHz	5.22000 GHz
Stop Frequency	5.26000 GHz	5.26000 GHz
Span	40.000 MHz	40.000 MHz
RBW	200.000 kHz	~ 200.000 kHz
VBW	1.000 MHz	>= 600.000 kHz
SweepPoints	200	~ 200
SweepTime	28.443 μs	AUTO
Reference Level	-10.000 dBm	-20.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	200	200
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30 dB	0.30 dB
Run	11 / max. 150	max. 150

<b>Stable</b>	<b>1 / 1</b>	<b>1</b>
<b>Max Stable Difference</b>	<b>0.30 dB</b>	<b>0.30 dB</b>

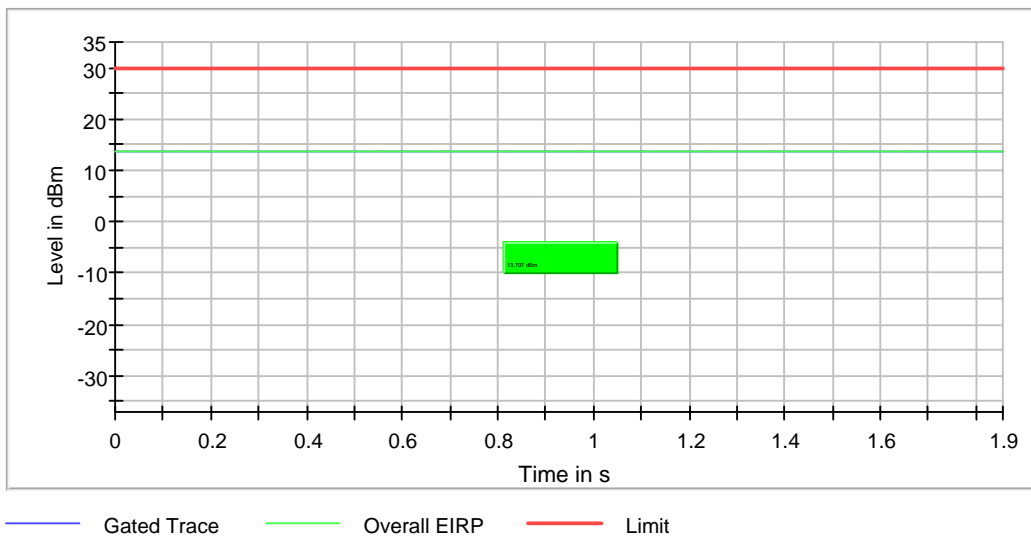
# RF output power (5240 MHz)

Customized settings.

Test according to FCC title 47 part 15 §15.407(a), KDB 789033 D02 General U-NII Test Procedures New Rules v01r03 and ANSI C63.10

## Result

DUT Frequency (MHz)	Gated RMS (dBm)	Limit Max (dBm)	Gated EIRP (dBm)	DutyCycle (%)	Result
5240.000000	10.7	30.0	13.7	92.828	PASS



# Power Spectral Density (5240 MHz)

Customized settings.

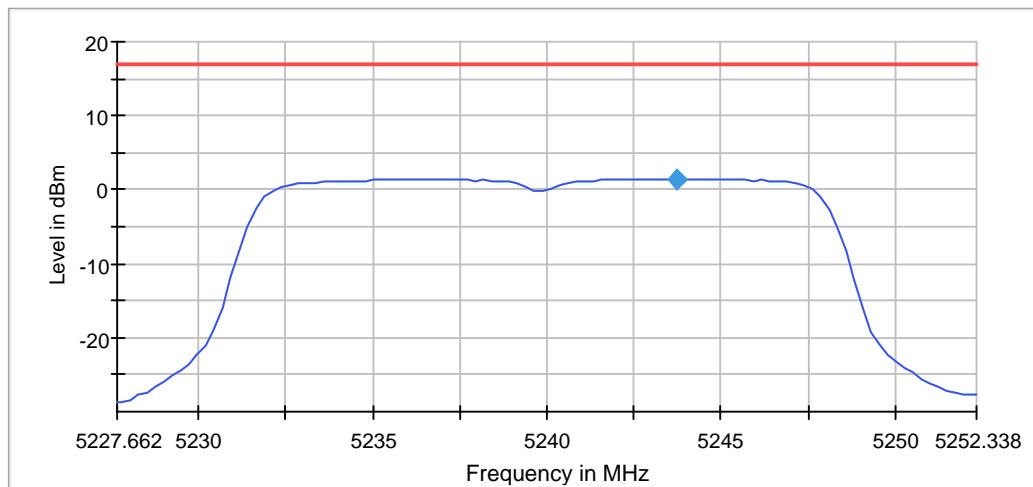
Test according to FCC title 47 part 15 §15.407(e), KDB 789033 D02 General U-NII Test Procedures New Rules v01r03 and ANSI C63.10

## Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
5240.000000	5243.749936	1.484	17.0	PASS

## Ports

Port	Duty Cycle (%)
1	93.240



— Connector 1    
 — Sum Level    
 — Limit    
 ◆ PSD

## Measurement

Setting	Instrument Value	Target Value
Start Frequency	5.22766 GHz	5.22766 GHz
Stop Frequency	5.25234 GHz	5.25234 GHz
Span	24.677 MHz	24.677 MHz
RBW	1.000 MHz	<= 1.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	101	~ 49
Sweeptime	2.020 s	2.020 s
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	RMS	RMS
SweepCount	3	3
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
Sweeptype	Sweep	AUTO
Preamp	off	off
Stablemode	Trace	Trace

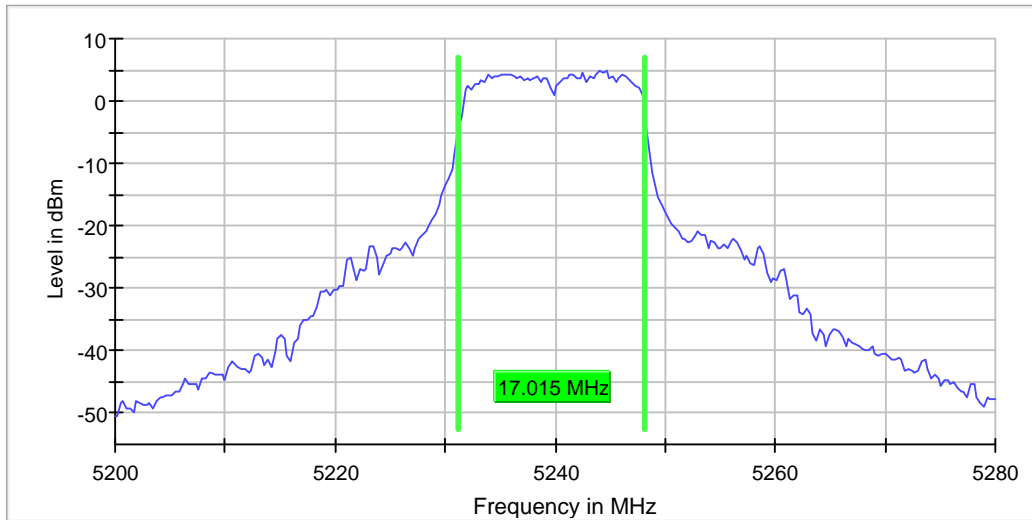
<b>Stablevalue</b>	<b>0.30 dB</b>	<b>0.30 dB</b>
<b>Run</b>	<b>4 / max. 15</b>	<b>max. 15</b>
<b>Stable</b>	<b>3 / 3</b>	<b>3</b>
<b>Max Stable Difference</b>	<b>0.07 dB</b>	<b>0.30 dB</b>

# Occupied Channel Bandwidth 99% (5240 MHz)

Test according to FCC title 47 part 15 §15.407(a),(e), KDB 789033 D02 General U-NII Test Procedures New Rules v01r03 and ANSI C63.10

## 99 % Bandwidth

DUT Frequency (MHz)	Bandwidth (MHz)	Limit Min (MHz)	Limit Max (MHz)	Band Edge Left (MHz)	Band Edge Right (MHz)	Result
5240.000000	17.014925	---	---	5231.194030	5248.208955	PASS



## Measurement

Setting	Instrument Value	Target Value
Start Frequency	5.20000 GHz	5.20000 GHz
Stop Frequency	5.28000 GHz	5.28000 GHz
Span	80.000 MHz	80.000 MHz
RBW	300.000 kHz	<= 400.000 kHz
VBW	1.000 MHz	>= 900.000 kHz
SweepPoints	267	~ 267
Sweeptime	31.603 μs	AUTO
Reference Level	-10.000 dBm	-20.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	200	200
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.30 dB	0.30 dB
Run	24 / max. 150	max. 150
Stable	5 / 5	5
Max Stable Difference	0.02 dB	0.30 dB



## Band Edge high (5240 MHz)

Customized settings.

Test according to FCC title 47 part 15 §15.407(b), KDB 789033 D02 General U-NII Test Procedures New Rules v01r03 and ANSI C63.10

### Result

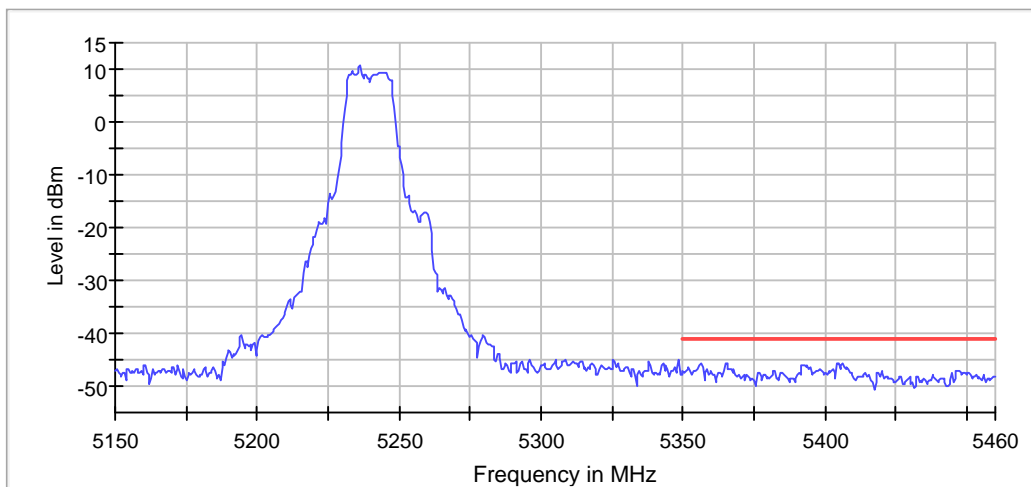
DUT Frequency (MHz)	Result
5240.000000	PASS

### Inband Peak

Frequency (MHz)	Level (dBm)
5236.318408	10.8

### Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
5356.496437	-45.6	4.3	-41.2	PASS
5404.382423	-45.6	4.3	-41.2	PASS
5404.881235	-45.6	4.4	-41.2	PASS
5406.377672	-45.7	4.5	-41.2	PASS
5364.976247	-45.9	4.6	-41.2	PASS
5365.475059	-45.9	4.6	-41.2	PASS
5392.410926	-45.9	4.7	-41.2	PASS
5355.997625	-46.0	4.7	-41.2	PASS
5392.909739	-46.0	4.8	-41.2	PASS
5391.912114	-46.1	4.9	-41.2	PASS
5393.907363	-46.1	4.9	-41.2	PASS
5355.498812	-46.2	5.0	-41.2	PASS
5405.878860	-46.2	5.0	-41.2	PASS
5352.007126	-46.3	5.0	-41.2	PASS
5393.408551	-46.3	5.1	-41.2	PASS



### Measurement 1

Setting	Instrument Value	Target Value
RBW	1.000 MHz	<= 1.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	200	~ 200
SweepTime	15.250 $\mu$ s	AUTO
Reference Level	-10.000 dBm	-10.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	17 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.50 dB

## Measurement 2

Setting	Instrument Value	Target Value
RBW	1.000 MHz	<= 1.000 MHz
VBW	3.000 MHz	>= 3.000 MHz
SweepPoints	420	~ 420
SweepTime	28.594 $\mu$ s	AUTO
Reference Level	-10.000 dBm	-20.000 dBm
Attenuation	10.000 dB	AUTO
Detector	MaxPeak	MaxPeak
SweepCount	100	100
Filter	3 dB	3 dB
Trace Mode	Max Hold	Max Hold
SweepType	FFT	AUTO
Preamp	off	off
Stablemode	Trace	Trace
Stablevalue	0.50 dB	0.50 dB
Run	8 / max. 150	max. 150
Stable	3 / 3	3
Max Stable Difference	0.00 dB	0.50 dB