

### <u>5600 MHz</u>

Modulation: QPSK

Peak Power Spectral Density (dBm) 0.02 Keysight Spectrum Analyzer - Swept SA Peak Search Mkr1 5.595 56 GHz 0.02 dBm Next Peak Ref Offset 12.8 dB Ref 20.00 dBm 10 dB/div Next Pk Right 0 Next Pk Left Marker Delta Mkr→CF Mkr→Ref Lvl More 1 of 2 Span 40.00 MHz #Sweep 10.00 s (1001 pts) Center 5.60000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz\*



### <u>5700 MHz</u>

Modulation: QPSK



The test was performed on the worst case data rate for 802.11(a) modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was 9 Mbps.

#### Limit

Frequency Band (MHz)	FCC Limit	IC Limit
5150 to 5250	<4 dBm / 1 MHz	<10 dBm / 1 MHz
5250 to 5350	<11 dBm / 1 MHz	<11 dBm / 1 MHz
5470 to 5725	<11 dBm / 1 MHz	<11 dBm / 1 MHz
5725 to 5825	<17 dBm / 1 MHz	<17 dBm / 1 MHz



# 802.11(ac) - 5 GHz 20 MHz BW

Frequency Band 1

<u>5180 MHz</u>

Modulation: QPSK

Peak Power Spectral Density (dBm)

-0.67

🚺 Keysight Spe	ctrum Analyzer - Swept SA							
Marker 1	RF 50 Ω DC 5.17272000000		SENSE:INT	ALIG Avg Type: RM	N AUTO MS	04:55:52 PM TRACE TYPE	Dec 11, 2014	Peak Search
10 dB/div	Ref Offset 12.8 dB Ref 20.00 dBm	IFGain:Low	Atten: 18 dB		Mkr1	5.172 7 -0.6	2 GHz 7 dBm	NextPeak
10.0							*	Next Pk Right
0.00 -10.0								Next Pk Left
-20.0							ť	Marker Delta
-40.0								Mkr→CF
-50.0								Mkr→RefLvl
-70.0	2000 CH-					Spap 50	00 MHz	More 1 of 2
#Res BW	1.0 MHz	#VBW 3	3.0 MHz*	#S	weep	10.00 s (1	001 pts)	
MSG					STATUS			



### <u>5200 MHz</u>

Modulation: QPSK

Keysight Spectrum Analyzer - Swept SA           RF         50 Ω         C           arker 1 5.195000000000 C		ALIGN AUTO Avg Type: RMS	04:57:03 PM Dec 11, 2014 TRACE 2 3 4 5 0	Peak Search	
Ref Offset 12.8 dB	FGain:Low Atten: 18 dB	Mkr	1 5.195 00 GHz	Next Peak	
				Next Pk Right	
D				Next Pk Left	
				Marker Delta	
20				Mkr→CF	
0.0				Mkr→RefLvl	
				More 1 of 2	
nter 5.20000 GHz es BW 1.0 MHz	#VBW 3.0 MHz*	#Sweep	Span 50.00 MHz 10.00 s (1001 pts)		



### <u>5240 MHz</u>

Modulation: QPSK



The test was performed on the worst case data rate for 802.11(ac) - 20 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was MCS0.



# <u>5260 MHz</u>

Modulation: QPSK

Peak Power Spectral Density (dBm) -1.43 Keysight Spectrum Analyzer - Swept SA 04:19:11 PM Dec 11, 2014 TRACE 1 2 3 4 5 6 TYPE WHATTANN N DET A N N N N N 04 RF 50 Ω DC Marker 1 5.263880000000 GHz PNO: Wide ↔ IFGain:Low ALIGN AUTO Avg Type: RMS Peak Search Trig: Free Run Atten: 10 dB Mkr1 5.263 88 GHz -1.43 dBm **NextPeak** Ref Offset 12.13 dB Ref 12.13 dBm I0 dB/div Next Pk Right 1 Next Pk Left Marker Delta MUMUM Witten Mkr→CF Mkr→RefLvl More 1 of 2 Center 5.26000 GHz #Res BW 1.0 MHz Span 40.00 MHz #Sweep 10.00 s (1001 pts) #VBW 3.0 MHz\* SInput Overload;ADC over range



### 5300 MHz

Modulation: QPSK

Peak Power Spectral De	nsity (dBm)	-0.	79		
Keysight Spectrum Analyzer - Swept SA	Hz NO: Fast ++ Trig: Free Ru Atten: 18 dB	NT ALIGN AUTO Avg Type: RMS n	05:00:59 PM Dec 11, 2014 TRACE 2 3 4 5 6 TYPE DET A NNNNN	Peak Search	
Ref Offset 12.8 dB dB/div Ref 20.00 dBm	Ganteow	Mkr	1 5.307 80 GHz -0.79 dBm	Next Peak	
				Next Pk Right	
0				Next Pk Left	
				Marker Delta	
				Mkr→CF	
				Mkr→RefLvl	
enter 5.30000 GHz	#VBM 3.0 MHz*	#Sween	Span 50.00 MHz	More 1 of 2	
3G	# 4 B 44 3.0 WH2	STATUS			



### 5320 MHz

Modulation: QPSK



The test was performed on the worst case data rate for 802.11(ac) - 20 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was MCS0.



## <u>5500 MHz</u>

Modulation: QPSK

Keysight Spectrum Analyzer - Swept SA		8		X
arker 1 5.504000000000 GF	Sense:INT IZ NO: Wide ↔ Trig: Free Run Sain:Low Atten: 10 dB	Avg Type: RMS	04:22:11 PM Dec 11, 2014 TRACE 2 3 4 5 6 TYPE DET A NNNNN	Peak Search
Ref Offset 12.13 dB 0 dB/div Ref 12.13 dBm		Mkı	1 5.504 00 GHz -2.34 dBm	Next Peak
13		1		Next Pk Right
87 7.9				Next Pk Left
7.9				Marker Delta
7.9				Mkr→CF
7.9				Mkr→RefLvl
77.9				More
Center 5.50000 GHz #Res BW 1.0 MHz	#VBW 3.0 MHz*	#Sweep	Span 40.00 MHz 10.00 s (1001 pts)	



### <u>5600 MHz</u>

Modulation: QPSK

-1.91 Peak Power Spectral Density (dBm) oht Spectrum Analyzer - Swept SA ALIGN AUTO 05:04:21 PM Dec 11, 2014 Avg Type: RMS TRACE 2.2.3.4 TYPE W 
 Ø
 RF
 50.9.
 DC
 DC
 DE

 Marker 1 5.603700000000 GHz IFGain:Low
 PN0: Fast ↔ IFGain:Low
 Trig: Free Run Atten: 18 dB
 Peak Search Mkr1 5.603 70 GHz -1.91 dBm Next Peak Ref Offset 12.8 dB Ref 20.00 dBm 10 dB/div Next Pk Right ▲1 Next Pk Left Marker Delta Mkr→CF Mkr→Ref Lvl More 1 of 2 Center 5.60000 GHz #Res BW 1.0 MHz Span 50.00 MHz #Sweep 10.00 s (1001 pts) #VBW 3.0 MHz\*



### <u>5700 MHz</u>

Modulation: QPSK



The test was performed on the worst case data rate for 802.11(ac) - 20 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was MCS0.

#### <u>Limit</u>

Frequency Band (MHz)	FCC Limit	IC Limit
5150 to 5250	<4 dBm / 1 MHz	<10 dBm / 1 MHz
5250 to 5350	<11 dBm / 1 MHz	<11 dBm / 1 MHz
5470 to 5725	<11 dBm / 1 MHz	<11 dBm / 1 MHz
5725 to 5825	<17 dBm / 1 MHz	<17 dBm / 1 MHz



# 802.11(ac) - 5 GHz 40 MHz BW

Frequency Band 1

<u>5190 MHz</u>

Modulation: QPSK

Peak Power Spectral Density (dBm)

-4.61

Keysight Spectrum Analyzer - Swept SA							
Marker 1 5.17880000000	OGHz PNO: Fast →→ T	rig: Free Run	Avg Type:	ILIGN AUTO RMS	03:40:01 PM TRAC TYP	E 1 2 3 4 5 6	Peak Search
Ref Offset 12.13 dB 10 dB/div Ref 12.13 dBm	IFGain:Low	Atten: 10 dB		Mkr	1 5.178 -4.	80 GHz 61 dBm	Next Peak
2.13						*	Next Pk Right
-7.87							Next Pk Left
-27.9							Marker Delta
-47.9				S	-		Mkr→CF
-67.9							Mkr→RefLvl
-77.9					Snan 1	00.0 MHz	More 1 of 2
#Res BW 1.0 MHz	#VBW 3.	0 MHz*		#Sweep	10.00 s (	1001 pts)	
MSG				STATUS			



### 5230 MHz

Modulation: QPSK



The test was performed on the worst case data rate for 802.11(n) - 40 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was MCS1.



# <u>5270 MHz</u>

Modulation: QPSK

Peak Power Spectral Density (dBm) -4.68 Keysight Spectrum Analyzer - Swept SA ALIGN AUTO 03:44:33 PM Dec 11, 2014 Avg Type: RMS TRACE 23 4 5 TYPE WHAT AND N N DET A NNNN N Marker 1 5.258900000000 GHz PN0: Fast → IFGain:Low Peak Search Trig: Free Run Atten: 10 dB Next Peak Mkr1 5.258 9 GHz -4.68 dBm Ref Offset 12.13 dB Ref 12.13 dBm 10 dB/div Next Pk Right 0 Next Pk Left Marker Delta Mkr→CF Mkr→RefLvl More 1 of 2 Center 5.27000 GHz #Res BW 1.0 MHz Span 100.0 MHz #Sweep 10.00 s (1001 pts) #VBW 3.0 MHz\*



### <u>5310 MHz</u>

Modulation: QPSK



The test was performed on the worst case data rate for 802.11(n) - 40 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was MCS1.



# <u>5510 MHz</u>

Modulation: QPSK

Peak Power Spectral Density (dBm) -5.31 Keysight Spectrum Analyzer - Swept SA ALIGN AUTO 03:46:54 PM Dec 11, 2014 Avg Type: RMS TRACE 23 4 5 TYPE WHAT AND N N DET A NNNN N 
 Marker 1 5.522700000000 GHz
 Sense:uni

 PN0: Fast → IFGain:Low
 Trig: Free Run Atten: 10 dB
 Peak Search Mkr1 5.522 7 GHz -5.31 dBm Next Peak Ref Offset 12.13 dB Ref 12.13 dBm 10 dB/div Next Pk Right <sup>1</sup> Next Pk Left Marker Delta Mkr→CF Mkr→RefLvl More 1 of 2 Center 5.51000 GHz #Res BW 1.0 MHz Span 100.0 MHz #Sweep 10.00 s (1001 pts) #VBW 3.0 MHz\*



### <u>5590 MHz</u>

Modulation: QPSK

-5.32 Peak Power Spectral Density (dBm) Keysight Spectrum Analyzer - Swept SA ALIGN AUTO 03:48:34 PM Dec 11, 2014 Avg Type: RMS TRACE 23:45 TYPE W 04 PF 50 0 DC State Marker 1 5.578700000000 GHz PR0: Fast →→ IFGain:Low IFGain:Low Peak Search Mkr1 5.578 7 GHz -5.32 dBm Next Peak Ref Offset 12.13 dB Ref 12.13 dBm 10 dB/div Next Pk Right ٠ Next Pk Left Marker Delta Mkr→CF Mkr→Ref Lvl More 1 of 2 Center 5.59000 GHz #Res BW 1.0 MHz Span 100.0 MHz #Sweep 10.00 s (1001 pts) #VBW 3.0 MHz\*



### <u>5670 MHz</u>

Modulation: QPSK



The test was performed on the worst case data rate for 802.11(n) - 40 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was MCS1.

#### <u>Limit</u>

Frequency Band (MHz)	FCC Limit	IC Limit
5150 to 5250	<4 dBm / 1 MHz	<10 dBm / 1 MHz
5250 to 5350	<11 dBm / 1 MHz	<11 dBm / 1 MHz
5470 to 5725	<11 dBm / 1 MHz	<11 dBm / 1 MHz
5725 to 5825	<17 dBm / 1 MHz	<17 dBm / 1 MHz



# 802.11(ac) - 5 GHz 80 MHz BW

Frequency Band 1

<u>5210 MHz</u>

Modulation: QPSK

Peak Power Spectral Density (dBm)

-7.39

🚺 Keysight Spectrum Analyzer - Swept SA				
Ref Offset 12.80 dB	SENSE:INT	ALIGN AUTO Avg Type: RMS	06:32:57 PM Dec 10, 2014 TRACE 1 2 3 4 5 6 TYPE W	Amplitude
Ref Offset 12.8 dB 10 dB/div Ref 12.80 dBm	Atten: 10 dB	Mkr	1 5.212 56 GHz -7.39 dBm	Y Axis Unit dBm
2.80	1			Ref Lvi Offset 12.80 dB
-7.20	Jun Marine			HW Path Ctrl Standard Path
-27.2				Internal Preamp► Off
-47.2				
-57.2				
-77.2				More 2 of 2
Center 5.21000 GHz #Res BW 1.0 MHz #VE	3W 3.0 MHz*	#Sweep	Span 160.0 MHz 10.00 s (1001 pts)	
MSG		STATUS	3	

The test was performed on the worst case data rate for 802.11(ac) - 80 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was MCS0.



<u>5290 MHz</u>

Modulation: QPSK



The test was performed on the worst case data rate for 802.11(ac) - 80 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was MCS0.



# <u>5530 MHz</u>

Modulation: QPSK

Peak Power Spectral Density (dBm) -6.76 Keysight Spectrum Analyzer - Swept SA ALIGN AUTO 01:47:23 PM Dec 11, 2014 Avg Type: RMS TRACE 23 4 5 6 Type Det ANNIN N 
 Marker 1 5.532400000000 GHz
 Sense:uni

 PN0: Fast → Irig: Free Run IFGain:Low
 Trig: Free Run Atten: 10 dB
 Peak Search Next Peak Mkr1 5.532 40 GHz -6.76 dBm Ref Offset 12.8 dB Ref 12.80 dBm 10 dB/div Next Pk Right ▲1 Next Pk Left Marker Delta Mkr→CF Mkr→RefLvl More 1 of 2 Center 5.53000 GHz #Res BW 1.0 MHz Span 160.0 MHz #Sweep 10.00 s (1001 pts) #VBW 3.0 MHz\*



### <u>5610 MHz</u>

Modulation: QPSK



The test was performed on the worst case data rate for 802.11(ac) - 80 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was MCS0.

#### <u>Limit</u>

Frequency Band (MHz)	FCC Limit	IC Limit
5150 to 5250	<4 dBm / 1 MHz	<10 dBm / 1 MHz
5250 to 5350	<11 dBm / 1 MHz	<11 dBm / 1 MHz
5470 to 5725	<11 dBm / 1 MHz	<11 dBm / 1 MHz
5725 to 5825	<17 dBm / 1 MHz	<17 dBm / 1 MHz



# 802.11(n) - 5 GHz 20 MHz BW

Frequency Band 1

<u>5180 MHz</u>

Modulation: QPSK

Peak Power Spectral Density (dBm)

-0.80

Keysight Spectrum Analyzer - Swept SA				
RF 50 Ω DC Marker 1 5.172640000000	GHz SENSE:INT	ALIGN AUTO Avg Type: RMS	05:41:22 PM Dec 11, 2014 TRACE 2 3 4 5 6	Peak Search
Ref Offset 12.8 dB	PNO: Fast Trig: Free Run IFGain:Low Atten: 18 dB	Mkr	1 5.172 64 GHz -0.80 dBm	NextPeak
10.0	.1		*	Next Pk Right
-10.0				Next Pk Left
-20.0				Marker Delta
-40.0				Mkr→CF
-60.0				Mkr→RefLvl
Center 5.18000 GHz #Res BW 1.0 MHz	#VBW 3.0 MHz*	#Sweep	Span 50.00 MHz 10.00 s (1001 pts)	More 1 of 2
MSG		STATUS	3	

-1.21



### <u>5200 MHz</u>

Modulation: QPSK

Peak Power Spectral Density (dBm)

Keysight Spectrum Analyz	er - Swept SA						Ø- 💌
/ Narker 1 5.1947	50 Ω DC 50000000	GHz PNO: Fast ↔	SENSE:INT Trig: Free Run Atten: 18 dB	Avg Type	ALIGN AUTO RMS	05:43:01 PM Dec 11 TRACE 1 2 TYPE WWW DET A N	,2014 94 5 6 NNNN
Ref Offs 0 dB/div Ref 20	et 12.8 dB .00 dBm				Mkr	1 5.194 75 ( -1.21 d	BHZ NextPeal Bm
10.0							Next Pk Righ
0.00							Next Pk Lef
0.0							Marker Delt
0.0							Mkr→C
0.0							Mkr→RefLv
enter 5.20000 G	Hz	#\/B3M	3.0 MUz*		#Sweep	Span 50.00	Mor 1 of
		#VDVV	5.0 WH2		STATU	10.00 5 (1001	



### <u>5240 MHz</u>

Modulation: QPSK



The test was performed on the worst case data rate for 802.11(n) - 20 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was MCS0.



# Frequency Band 2

## <u>5260 MHz</u>

Modulation: QPSK

 Peak Power Spectral Density (dBm)
 -1.06

 Keysight Spectrum Analyzer - Swept SA

arker 1	RF 50 Ω DC		SENSE:INT	ALIGN AUTO	05:45:18 PM TRAC	Dec 11, 2014	Peak Search
arker i	5.2551000000	PNO: Fast +++ T IFGain:Low	rig: Free Run Atten: 18 dB		TYP DE		
) dB/div	Ref Offset 12.8 dB Ref 20.00 dBm			Mkr	1 5.255 -1.0	10 GHz 06 dBm	NextPea
							Next Pk Righ
0.0		1					Hext F K Rigi
.00							Next Pk Le
0.0							
0.0							Marker Delt
0.0				$\left\langle \right\rangle$			
0.0		/		hull .			Mkr→C
0.0	مر المالي المراجع			10	man lithe an	<b>U</b> .	
0.0						Norman	Mkr→RefL
0.0							U
							Mor 1 of
enter 5.2 Res BW	26000 GHz 1.0 MHz	#VBW 3.	) MHz*	#Sweep	Span 5 10.00 s (	0.00 MHz 1001 pts)	
G				STATUS			



Mkr→Ref Lvl

Span 50.00 MHz #Sweep 10.00 s (1001 pts) More 1 of 2

### 5300 MHz

Modulation: QPSK

Center 5.30000 GHz #Res BW 1.0 MHz

Peak Power Spectral Density (dBm) -0.84 Keysight Spectrum Analyzer - Swept SA ALIGN AUTO 05:46:45 PM Dec 11, 2014 Avg Type: RMS TRACE 2 2 3 4 TYPE W Peak Search Mkr1 5.306 90 GHz -0.84 dBm Next Peak Ref Offset 12.8 dB Ref 20.00 dBm 10 dB/div Next Pk Right ♦1 Next Pk Left Marker Delta Mkr→CF

#VBW 3.0 MHz\*



### 5320 MHz

Modulation: QPSK



The test was performed on the worst case data rate for 802.11(n) - 20 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was MCS0.



## <u>5500 MHz</u>

Modulation: QPSK

Peak Power Spectral Density (dBm)

-1.82

Keysight Spect	rum Analyzer - Swept SA							
Marker 1 5	RF 50 Ω DC	CH2	SENSE:INT		ALIGN AUTO	05:48:58 PI TRAC	MDec 11, 2014	Peak Search
Marker 13		PNO: Fast	Trig: Free Run Atten: 18 dB			TYP		
10 dB/div	Ref Offset 12.8 dB Ref 20.00 dBm				Mkr	1 5.504 -1.	65 GHz 82 dBm	Next Peak
10.0								Next Pk Right
0.00				1				Next Pk Left
-10.0								
-30.0								Marker Delta
-40.0		/				/		Mkr→CF
-50.0								Mkr→RefLvl
-70.0								More
Center 5.50	0000 GHz	#\/B\M	3.0 MHz*		#Sween	Span 5	0.00 MHz	1 of 2
MSG	10 IVI112	#9099	0.010112		STATUS	10.00 S (	roor prs)	



### <u>5600 MHz</u>

Modulation: QPSK

-1.90 Peak Power Spectral Density (dBm) Keysight Spectrum Analyzer - Swept SA Peak Search Mkr1 5.592 90 GHz -1.90 dBm Next Peak Ref Offset 12.8 dB Ref 20.00 dBm 10 dB/div Next Pk Right **1** Next Pk Left Marker Delta Mkr→CF Mkr→Ref Lvl More 1 of 2 Center 5.60000 GHz #Res BW 1.0 MHz Span 50.00 MHz #Sweep 10.00 s (1001 pts) #VBW 3.0 MHz\*



### <u>5700 MHz</u>

Modulation: QPSK



The test was performed on the worst case data rate for 802.11(n) - 20 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was MCS0. Limit

Frequency Band (MHz)	FCC Limit	IC Limit	
5150 to 5250	<4 dBm / 1 MHz	<10 dBm / 1 MHz	
5250 to 5350	<11 dBm / 1 MHz	<11 dBm / 1 MHz	
5470 to 5725	<11 dBm / 1 MHz	<11 dBm / 1 MHz	
5725 to 5825	<17 dBm / 1 MHz	<17 dBm / 1 MHz	



# 802.11(n) - 5 GHz 40 MHz BW

Frequency Band 1

<u>5190 MHz</u>

Modulation: QPSK

Peak Power Spectral Density (dBm)

-3.80

🚺 Keysight Sp	pectrum Analyzer - Swept SA					
<mark>M</mark> arkor (	RF 50 Ω DC	CH-	SENSE:INT	ALIGN AUTO	05:18:13 PM Dec 11, 2014	Peak Search
Marker		PNO: Fast +++ IFGain:Low	Trig: Free Run Atten: 18 dB	Ang Type. Allo	TYPE WWWWWWW DET ANNNNN	
10 dB/div	Ref Offset 12.8 dB Ref 20.00 dBm			Mkı	1 5.178 72 GHz -3.80 dBm	Next Peak
10.0						Next Pk Right
0.00 -10.0						Next Pk Left
-20.0						Marker Delta
-40.0						Mkr→CF
-60.0						Mkr→RefLvl
Center 5	.19000 GHz				Span 80.00 MHz	More 1 of 2
#Res BW	/ 1.0 MHz	#VBW	3.0 MHz*	#Sweep	10.00 s (1001 pts)	
MSG				STATU	5	



### <u>5230 MHz</u>

Modulation: QPSK



The test was performed on the worst case data rate for 802.11(n) - 40 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was MCS0.



# <u>5270 MHz</u>

Modulation: QPSK

Peak Power Spectral Density (dBm) -3.08 Keysight Spectrum Analyzer - Swept SA 05:21:58 PM Dec 11, 2014 TRACE 1 2 3 4 5 6 TYPE WHAT HANNIN DET A NNNNN Marker 1 5.258880000000 GHz PN0: Fast → IFGain:Low ALIGN AUTO Avg Type: RMS Peak Search Trig: Free Run Atten: 18 dB Next Peak Mkr1 5.258 88 GHz -3.80 dBm Ref Offset 12.8 dB Ref 20.00 dBm 10 dB/div Next Pk Right **1** Next Pk Left Marker Delta Mkr→CF Mkr→RefLvl More 1 of 2 Center 5.27000 GHz #Res BW 1.0 MHz Span 80.00 MHz #Sweep 10.00 s (1001 pts) #VBW 3.0 MHz\*



### <u>5310 MHz</u>

Modulation: QPSK



The test was performed on the worst case data rate for 802.11(n) - 40 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was MCS0.



# <u>5510 MHz</u>

Modulation: QPSK

Peak Power Spectral Density (dBm)

-4.76

📕 Keysight Spe	ectrum Analyzer - Swept SA					
Worker 1	RF 50 Q DC	CHIT	SENSE:INT	ALIGN AL	TO 05:24:32 PM Dec 11, 201	4 Peak Search
Marker	5.52112000000	PNO: Fast ++ IFGain:Low	Trig: Free Run Atten: 18 dB	Avg Type. Kino	TYPE W	Nevt Peak
10 dB/div Log	Ref Offset 12.8 dB Ref 20.00 dBm				-4.76 dBr	n
10.0						Next Pk Right
0.00				1		Next Pk Left
-10.0			V			Marker Delta
-30.0	+					Marker Della
-40.0						Mkr→CF
-60.0						Mkr→RefLvl
-70.0						More
Center 5. #Res BW	51000 GHz 1.0 MHz	#VBW	( 3.0 MHz*	#Swe	Span 80.00 MH	Z
MSG				ST	TATUS	<u> </u>
# COMMERCIAL-IN-CONFIDENCE



# <u>5590 MHz</u>

Modulation: QPSK

Peak Power Spectral Density (dBm)	-4.48
í Keysight Spectrum Analyzer - Swept SA	
KF 50 Ω DC SENSEINT ALI Aug Type: R PN0: Fast Fig: Free Run PN0: Fast Fig: Free Run Composition PN0: Fast PN0: Fa	SN AUTO 05:25:33 PM Dec 11, 2014 MS TRACE 23456 TYPE WWWWWW DET A NNNNNN
Ref Offset 12.8 dB	Mkr1 5.578 32 GHz -4.48 dBm
9 .0	Next Pk Right
	Next Pk Left
0.0	Marker Delta
	Mkr→CF
	Mkr→RefLvl
0.0	More
enter 5.59000 GHz Res BW 1.0 MHz #VBW 3.0 MHz* #\$	Span 80.00 MHz 1 of 2 Sweep 10.00 s (1001 pts)
ISG	STATUS

# COMMERCIAL-IN-CONFIDENCE



## <u>5670 MHz</u>

Modulation: QPSK



The test was performed on the worst case data rate for 802.11(n) - 40 MHz BW modulation. The worst case was deemed as the data rate which produced the highest level of conducted average power. This data rate was MCS0.

#### <u>Limit</u>

Frequency Band (MHz)	FCC Limit	IC Limit
5150 to 5250	<4 dBm / 1 MHz	<10 dBm / 1 MHz
5250 to 5350	<11 dBm / 1 MHz	<11 dBm / 1 MHz
5470 to 5725	<11 dBm / 1 MHz	<11 dBm / 1 MHz
5725 to 5825	<17 dBm / 1 MHz	<17 dBm / 1 MHz



## 2.5 UNDESIRABLE EMISSION LIMITS

#### 2.5.1 Specification Reference

FCC CFR 47 Part 15E, Clause 15.407 (b)(1)(2)(3)(4)(6)(7)

## 2.5.2 Equipment Under Test and Modification State

SHV31 S/N: IMEI 004401115315992 - Modification State 0

## 2.5.3 Date of Test

18 November 2014, 7 December 2014, 9 December 2014, 10 December 2014, 14 December 2014, 15 December 2014, 16 December 2014, 17 December 2014 & 18 December 2014

## 2.5.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

#### 2.5.5 Test Procedure

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15.407 (b) and KDB 789033.

For conducted emissions, the EUT was set to operate at maximum power on the data rate predetermined to give the highest level of average output power. The analyser settings were configured with a peak detector and max hold trace; the measurement path loss in each relevant frequency band was measured and entered as a reference level offset. The test was performed on the bottom, middle and top channels of each sub-band. The. The test was performed over the frequency range 9 kHz to 40 GHz.

For radiated emissions, the test method described above was also used. However, the measurement was performed from 30 MHz to 40 GHz and the path loss is incorporated as a transducer factor and entered into the spectrum analyser. In each frequency span the level was maximised by rotating the EUT 360° and a height search of the measuring antenna.

Band edge measurements were performed in accordance with ANSI C63.10, Clause 6.9.3. The results were analysed to ensure compliance with restricted bands. The EUT was set to the lowest and highest operating frequencies.

# 2.5.6 Environmental Conditions

Ambient Temperature	18.3 - 29.0°C
Relative Humidity	30.0 - 48.0%



## 2.5.7 Test Results

<u>802.11(a)</u>

4.0 V DC Supply

Spurious Radiated Emissions

Frequency Band 1

<u>5180 MHz</u>



Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
30.678	29.6	30.2	40.0	100	-10.4	-69.8	350	1.00	Horizontal
35.676	27.4	23.4	40.0	100	-12.6	-76.6	0	3.85	Horizontal
103.822	20.1	10.1	43.5	150	-23.4	-139.9	102	1.00	Vertical
112.405	20.6	10.7	43.5	150	-22.9	-139.3	312	1.00	Vertical
762.775	33.1	45.2	46.0	200	-12.9	-154.8	278	3.19	Horizontal
924.041	33.6	47.9	46.0	200	-12.4	-152.1	304	1.00	Horizontal





Date: 7.DEC.2014 01:40:42

# 7 GHz to 8 GHz



Date: 18.NOV.2014 22:01:42





Date: 16.DEC.2014 20:54:33

#### 18 GHz to 40 GHz



Date: 25.NOV.2014 17:59:13



# <u>5200 MHz</u>



Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
31.309	29.8	30.9	40.0	100	-10.2	-69.1	19	3.97	Horizontal
35.288	27.6	24.0	40.0	100	-12.4	-76.0	215	3.93	Vertical
87.043	17.2	7.2	40.0	100	-22.8	-92.8	310	1.00	Vertical
128.295	20.8	11.0	43.5	150	-22.7	-139.0	153	1.93	Vertical
762.546	33.1	45.2	46.0	200	-12.9	-154.8	307	3.03	Vertical
913.801	33.8	49.0	46.0	200	-12.2	-151.0	319	3.30	Vertical





Date: 7.DEC.2014 01:56:37

# 7 GHz to 8 GHz



Date: 18.NOV.2014 21:59:10





Date: 16.DEC.2014 21:02:47

#### 18 GHz to 40 GHz



Date: 25.NOV.2014 18:36:55



# <u>5240 MHz</u>



Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
30.147	29.9	31.3	40.0	100	-10.1	-68.7	84	1.00	Horizontal
35.284	27.5	23.7	40.0	100	-12.5	-76.3	49	1.00	Horizontal
113.724	20.7	10.8	43.5	150	-22.8	-139.2	128	1.00	Vertical
122.437	20.8	11.0	43.5	150	-22.7	-139.0	305	1.00	Vertical
830.288	32.8	43.7	46.0	200	-13.2	-156.3	113	1.02	Horizontal
916.940	33.7	48.4	46.0	200	-12.3	-151.6	221	1.00	Horizontal





Date: 7.DEC.2014 02:01:46

# 7 GHz to 8 GHz



Date: 18.NOV.2014 22:04:47





Date: 16.DEC.2014 21:11:08

## 18 GHz to 40 GHz



Date: 25.NOV.2014 19:01:36



# Frequency Band 2

# <u>5260 MHz</u>



Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
31.224	29.9	31.3	40.0	100	-10.1	-68.7	90	3.50	Vertical
33.194	28.7	27.2	40.0	100	-11.3	-72.8	60	1.00	Vertical
37.030	26.8	21.9	40.0	100	-13.2	-78.1	321	1.00	Vertical
109.499	20.2	10.2	43.5	150	-23.3	-139.8	52	1.00	Vertical
847.843	32.9	44.2	46.0	200	-13.1	-155.8	110	1.00	Vertical
891.237	33.5	47.3	46.0	200	-12.5	-152.7	198	1.00	Vertical





Date: 7.DEC.2014 02:08:01

# 7 GHz to 8 GHz



Date: 18.NOV.2014 22:08:09





Date: 16.DEC.2014 21:19:58

## 18 GHz to 40 GHz



Date: 25.NOV.2014 19:25:12



# <u>5300 MHz</u>



Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
30.825	29.6	30.2	40.0	100	-10.4	-69.8	90	1.00	Vertical
32.813	28.6	26.9	40.0	100	-11.4	-73.1	270	1.00	Vertical
34.608	27.8	24.5	40.0	100	-12.2	-75.5	270	1.00	Vertical
115.797	20.8	11.0	43.5	150	-22.7	-139.0	270	1.00	Vertical
843.345	32.9	44.2	46.0	200	-13.1	-155.8	180	1.00	Vertical
897.520	33.6	47.9	46.0	200	-12.4	-152.1	0	1.00	Vertical





Date: 7.DEC.2014 01:31:53

# 7 GHz to 8 GHz



Date: 18.NOV.2014 22:13:01





Date: 16.DEC.2014 21:33:01

## 18 GHz to 40 GHz



Date: 25.NOV.2014 19:44:51



# <u>5320 MHz</u>



Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
30.388	29.7	30.5	40.0	100	-10.3	-69.5	270	1.00	Horizontal
33.638	28.2	25.7	40.0	100	-11.8	-74.3	270	1.00	Vertical
35.675	27.4	23.4	40.0	100	-12.6	-76.6	0	1.00	Vertical
760.604	33.0	44.7	46.0	200	-13.0	-155.3	0	1.00	Vertical
847.516	32.9	44.2	46.0	200	-13.1	-155.8	180	1.00	Vertical
903.097	33.7	48.4	46.0	200	-12.3	-151.6	180	1.00	Vertical





Date: 7.DEC.2014 02:15:58

# 7 GHz to 8 GHz



Date: 18.NOV.2014 22:16:42





Date: 16.DEC.2014 21:45:02

## 18 GHz to 40 GHz



Date: 25.NOV.2014 19:57:39



# Frequency Band 3

# <u>5500 MHz</u>



Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
31.019	29.5	29.9	40.0	100	-10.5	-70.1	180	1.00	Vertical
33.056	28.4	26.3	40.0	100	-11.6	-73.7	90	1.00	Vertical
34.365	27.9	24.8	40.0	100	-12.1	-75.2	0	1.00	Vertical
107.018	19.7	9.7	43.5	150	-23.8	-140.3	90	1.00	Vertical
837.137	32.8	43.7	46.0	200	-13.2	-156.3	0	1.00	Vertical
869.535	33.2	45.7	46.0	200	-12.8	-154.3	90	1.00	Vertical





Date: 7.DEC.2014 02:24:17

# 7 GHz to 8 GHz



Date: 18.NOV.2014 22:21:38





Date: 16.DEC.2014 21:55:32

#### 18 GHz to 40 GHz



Date: 25.NOV.2014 20:13:24



# <u>5600 MHz</u>



Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
30.388	29.8	30.9	40.0	100	-10.2	-69.1	0	1.00	Vertical
32.813	28.5	26.6	40.0	100	-11.5	-73.4	0	1.00	Vertical
33.880	28.0	25.1	40.0	100	-12.0	-74.9	270	1.00	Vertical
858.914	33.0	44.7	46.0	200	-13.0	-155.3	90	1.00	Vertical
891.748	33.5	47.3	46.0	200	-12.5	-152.7	0	1.00	Vertical
933.361	33.6	47.9	46.0	200	-12.4	-152.1	90	1.00	Vertical





Date: 7.DEC.2014 02:30:53

# 7 GHz to 8 GHz



Date: 18.NOV.2014 22:25:22





Date: 16.DEC.2014 22:14:21

#### 18 GHz to 40 GHz



Date: 25.NOV.2014 20:24:17



# <u>5700 MHz</u>



Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
30.388	29.7	30.5	40.0	100	-10.3	-69.5	90	1.00	Horizontal
32.385	28.7	27.2	40.0	100	-11.3	-72.8	90	1.00	Horizontal
34.074	27.9	24.8	40.0	100	-12.1	-75.2	180	1.00	Horizontal
110.947	20.5	10.6	43.5	150	-23.0	-139.4	180	1.00	Vertical
869.130	33.1	45.2	46.0	200	-12.9	-154.8	180	1.00	Vertical
941.412	33.7	48.4	46.0	200	-12.3	-151.6	180	1.00	Vertical





Date: 7.DEC.2014 02:38:12

# 7 GHz to 8 GHz



Date: 18.NOV.2014 22:29:03





Date: 16.DEC.2014 22:22:56

## 18 GHz to 40 GHz



Date: 25.NOV.2014 20:38:22

## <u>Limit</u>

Peak (dBµV/m)	Average (dBµV/m)
74.0	54.0



# Band Edge

# Modulation/Data Rate: OFDM/9 Mbps

Restricted Bands of Operation		
Frequency (MHz)	Final Peak (dBµV/m)	Final Average (dBµV/m)
5150.00	60.05	48.38
5350.00	60.78	49.13
5460.00	60.69	49.03

# 5150.00 MHz

## Final Peak



Date: 9.DEC.2014 19:29:10

#### COMMERCIAL-IN-CONFIDENCE





Date: 9.DEC.2014 19:30:20

# 5350.00 MHz

## Final Peak



Date: 9.DEC.2014 20:11:56



## Final Average



Date: 9.DEC.2014 20:30:55

#### 5460.00 MHz

## Final Peak



Date: 9.DEC.2014 20:21:48

# COMMERCIAL-IN-CONFIDENCE





Date: 9.DEC.2014 20:23:49



Band Edge		
Frequency (MHz)	Final Peak (dBm)	
5150.00	-35.44	
5350.00	-34.26	
5470.00	-35.06	
5725.00	-34.32	

# 5150.00 MHz

# Final Peak



Date: 9.DEC.2014 19:32:23



## 5350.00 MHz



Date: 9.DEC.2014 20:10:40

# 5470.00 MHz

# Final Peak



Date: 9.DEC.2014 20:26:08


# 5725.00 MHz

Final Peak



Date: 9.DEC.2014 20:54:48



# Modulation/Data Rate: OFDM/6 Mbps

Restricted Bands of Operation					
Frequency (MHz)	Frequency (MHz) Final Peak (dBµV/m) Final Avera				
5150.00	59.74	48.39			
5350.00	62.42	49.13			
5460.00	60.11	49.04			

# 5150.00 MHz

# Final Peak



Date: 9.DEC.2014 19:39:50





Date: 9.DEC.2014 19:40:48

# 5350.00 MHz

### Final Peak



Date: 9.DEC.2014 20:05:19





Date: 9.DEC.2014 20:03:30

#### 5460.00 MHz

### Final Peak



Date: 9.DEC.2014 20:43:22



# Final Average



Date: 9.DEC.2014 20:42:15



Band Edge			
Frequency (MHz)	Final Peak (dBm)		
5150.00	-34.26		
5350.00	-34.40		
5470.00	-34.30		
5725.00	-35.16		

# Final Peak



Date: 9.DEC.2014 19:38:25



## 5350.00 MHz

### Final Peak



Date: 9.DEC.2014 20:06:52

# 5470.00 MHz

### Final Peak



Date: 9.DEC.2014 20:44:14



# Final Peak



Date: 9.DEC.2014 20:49:12

#### Remark

The test was performed on 6 Mbps because this was deemed the worst case data rate for 26 dB Bandwidth.

The test was performed on 9 Mbps because this was deemed the worst case data rate for Conducted Output Power.

#### <u>Limit</u>

Peak (dBµV/m)	Average (dBµV/m)		
74.0	54.0		



# 802.11(ac) - 5 GHz 20 MHz BW

4.0 V DC Supply

Band Edge

### Modulation/Data Rate: OFDM/MCS0

Restricted Bands of Operation				
Frequency (MHz)	Final Average (dBµV/m)			
5150.00	60.49	48.12		
5350.00	60.19	48.81		
5460.00	60.22	48.76		

## 5150.00 MHz

#### Final Peak



Date: 10.DEC.2014 19:36:43





Date: 10.DEC.2014 19:37:15

# 5350.00 MHz

### Final Peak



Date: 10.DEC.2014 19:44:03





Date: 10.DEC.2014 19:44:32

#### 5460.00 MHz

### Final Peak



Date: 10.DEC.2014 19:51:43





Date: 10.DEC.2014 19:50:04



Band Edge			
Frequency (MHz)	Final Peak (dBm)		
5150.00	-35.09		
5350.00	-34.76		
5470.00	34.98		
5725.00	-34.20		

# Final Peak



Date: 10.DEC.2014 19:38:21







Date: 10.DEC.2014 19:42:42

# 5470.00 MHz

# Final Peak



Date: 10.DEC.2014 19:51:43



# Final Peak



Date: 10.DEC.2014 19:56:55

#### Remark

The test was performed on MCS0 because this was deemed the worst case data rate for 26 dB Bandwidth and Conducted Output Power.

<u>Limit</u>

Peak (dBµV/m)	Average (dBµV/m)		
74.0	54.0		



802.11(ac) - 5 GHz 40 MHz BW

4.0 V DC Supply

Spurious Radiated Emissions

Frequency Band 1

<u>5190 MHz</u>

30 MHz to 1 GHz



Frequency (MHz)	QP Level (dBµV/m)	QP Level (µV/m)	QP Limit (dBµV/m)	QP Limit (µV/m)	QP Margin (dBµV/m)	QP Margin (µV/m)	Angle (Deg)	Height (m)	Polarity
30.485	29.8	30.9	40.0	100	-10.2	-69.1	270	1.00	Vertical
32.183	28.9	27.9	40.0	100	-11.1	-72.1	270	1.00	Vertical
34.365	27.9	24.8	40.0	100	-12.1	-75.2	270	1.00	Vertical
810.365	33.0	44.7	46.0	200	-13.0	-155.3	90	1.00	Vertical
894.173	33.7	48.4	46.0	200	-12.3	-151.6	90	1.00	Vertical
914.689	33.7	48.4	46.0	200	-12.3	-151.6	90	1.00	Vertical



### 1 GHz to 7 GHz



Date: 15.DEC.2014 20:42:53

# 7 GHz to 8 GHz



Date: 18.NOV.2014 23:31:27



## 8 GHz to 18 GHz



Date: 16.DEC.2014 22:31:48

#### 18 GHz to 40 GHz



Date: 17.DEC.2014 23:14:58