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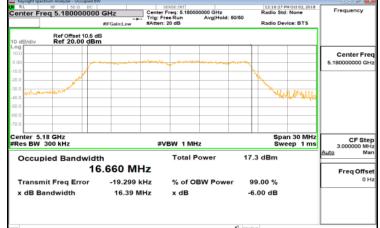
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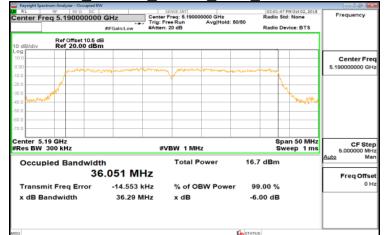
## FCC 802.11ac 80MHz Chain1 5690MHz



#### SISO IC 802.11n 20MHz Main 5700MHz



#### IC\_802.11n\_40MHz\_Main\_5190MHz



#### IC 802.11n 40MHz Main 5310MHz 03:04:07 PM Oct 02, Radio Std: None Center Freq 5.310000000 GHz Center Freq Trig: Free R 000 GHz Radio Device: BTS Ref Offset 10.5 dB Ref 20.00 dBm Center Fre CF Step 5.000000 ML Center 5.31 GHz #Res BW 300 kHz Span 50 MH Sweep 1 m #VBW 1 MHz Occupied Bandwidth Total Power 17.5 dBm 36.048 MHz Freq Offse oн Transmit Freq Error -46.453 kHz % of OBW Power 99.00 % x dB Bandwidth 36.25 MHz x dB -6.00 dB

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# IC 802.11a 20MHz Main 5260MHz

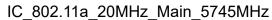


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# IC 802.11n 20MHz Main 5260MHz

#### IC 802.11n 20MHz Main 5500MHz englight Spectrum Analyzer - Occupied BW LL BV SO D C C hter Freq 5.260000000 GHz Center Freq: 5.26 Trig: Free Run Trig: Free Run Trig: Spectrum 20 dB 04:15:20 PM Oct 01 Radio Std: None Center Freq: 5.50 Trig: Free Run Center Freq 5.500000000 GHz 00 GHz 00 GHz Radio Device: BTS Radio Device: BTS Ref Offset 10.5 dB Ref 20.00 dBm Ref Offset 10.5 dB Ref 20.00 dBm Center Fre Center Free white w enter 5.5 GHz Res BW 300 kHz enter 5.26 GHz Res BW 300 kHz Span 30 MHz Sweep 1 ms Span 30 MHz Sweep 1 ms CF Step 3.000000 MH-CF Step 3.000000 MH #VBW 1 MHz #VBW 1 MHz Total Power 17.2 dBm Total Power 17.4 dBm **Occupied Bandwidth Occupied Bandwidth** 17.672 MHz 17.635 MHz Freq Offse 0 H Freq Offs % of OBW Power % of OBW Power Transmit Freg Error -42.509 kHz 99 00 % Transmit Freg Error -16 470 kHz 99.00 % x dB Bandwidth 17.38 MHz x dB -6.00 dB x dB Bandwidth 17.62 MHz x dB -6.00 dB IC 802.11n 20MHz Main 5300MHz IC\_802.11n\_20MHz\_Main\_5580MHz 04:17:36 PM Oct 01, Radio Std: None 04:24:49 PM Oct 01, Radio Std: None Frequency enter Freq 5.30000000 GHz enter Freq 5.580000000 GHz Center Freq: 5. Trig: Free Run 000 GHz Avg|Hold: 50/50 Frequency Center Freq: 5. Trig: Free Run Radio Device: BTS Radio Device: BTS Ref Offset 10.5 dB Ref 20.00 dBm Ref Offset 10.5 dB Center Free Center Free 5.300000000 GH 5.580000000 GH Matter er 5.3 GHz BW 300 kHz Span 30 MHz Span 30 MHz CF Step 3.000000 M Center 5.58 GHz #Res BW 300 kHz CF Step 3.000000 MP BW 1 MH Ma Occupied Bandwidth Total Power 17.3 dBm **Occupied Bandwidth** Total Power 17.4 dBm 17.666 MHz 17.696 MHz Freq Offse Freq Offse 0 H 0 H -34.907 kHz -32.656 kHz Transmit Freq Error % of OBW Power 99.00 % Transmit Freq Error 99.00 % % of OBW Power 17.59 MHz x dB Bandwidth 17.55 MHz x dB Bandwidth -6.00 dB x dB -6.00 dB x dB (h) IC 802.11n 20MHz Main 5320MHz IC 802.11n 20MHz Main 5700MHz Radio Std: None Center Freq 5.320000000 GHz Center Freq: 6.32 000 GHz Radio Device: BTS Radio Device: BTS #EGain:Lo Ref Offset 10.5 dB Ref 20.00 dBm Ref Offset 10.5 dB Ref 20.00 dBm Center Fre Center Free Willy MUN Span 30 MHz r 5.32 GHz 57 GH Span 30 MH CF Step 3.000000 MHz CF Step 3.000000 MHz Man s B #VBW 1 MHz B kHz #VBW 1 MHz 17.3 dBm 16.5 dBm **Occupied Bandwidth** Total Power **Occupied Bandwidth** Total Power 17.687 MHz 17.661 MHz Freq Offse Freq Offs Transmit Freq Error -54.015 kHz % of OBW Pov 99 00 % 0 F Transmit Freq Error -42.195 kHz % of OBW Po 99.00 % x dB Bandwidth 17.58 MHz x dB -6.00 dB x dB Bandwidth 17.54 MHz x dB -6.00 dB

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# IC 802.11n 20MHz Main 5745MHz

## IC 802.11n 20MHz AUX1 5180MHz



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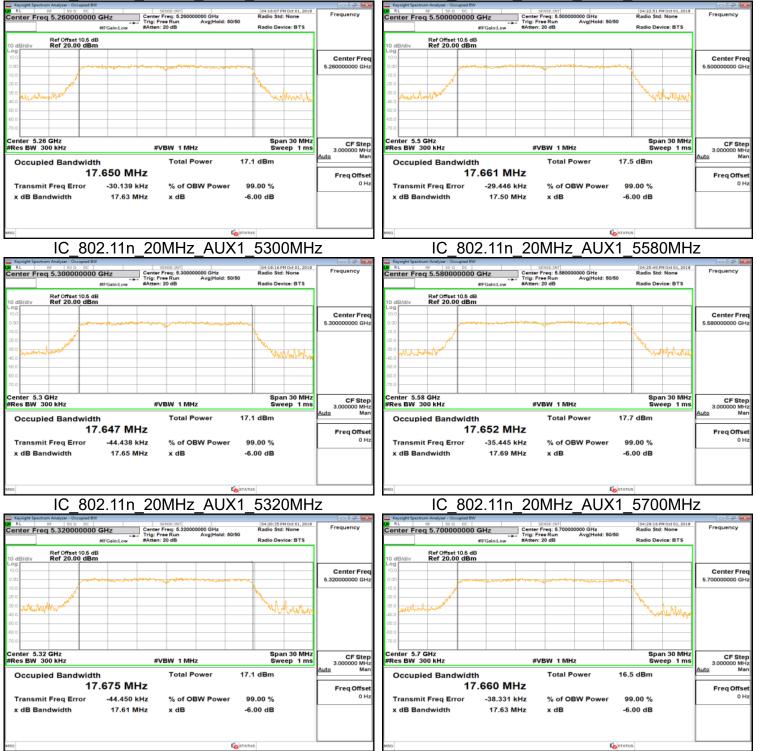
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## IC 802.11n 20MHz AUX1 5500MHz



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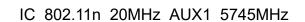
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IC 802.11n 40MHz Main 5670MHz

# IC 802.11n 40MHz Main 5310MHz



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# IC 802.11n 40MHz AUX1 5190MHz

#### IC 802.11n 40MHz AUX1 5310MHz yright Spectrum Analyzer - Decupies BW L RF 50 D DC SENCE:INT ter Freq 5.190000000 GHz Center Freq: 5.190 Trig: Free Run Trig: Free Run Trig: Free Run Reynght Spectrum Reinger DC SERSE:INT RL NF 50 02 DC SERSE:INT Center Freq 5.310000000 GHz Center Freq: 5.3100 Trig: Free Run 04:39:20 PM Oct 01, Radio Std: None 04:47:46 PM Oct 01, Radio Std: None 000 GHz AvgiHold: 50/50 000 GHz AvalHold: 50/50 Radio Device: BTS Radio Device: BTS Ref Offset 10.5 dB Ref\_20.00 dBm Ref Offset 10.5 dB Ref\_20.00 dBm Center Fre Center Free enter 5.19 GHz Res BW 300 kHz Span 50 MHz Sweep 1 ms er 5.31 GH Span 50 MH Sweep 1 m CF Step 5.000000 MH CF Step 5.000000 MHz Res BW #VBW 1 MHz 0 kHz #VBW 1 MHz Total Power 14.8 dBm Total Power 16.7 dBm **Occupied Bandwidth Occupied Bandwidth** 36.057 MHz 36.072 MHz Freq Offse 0 H Freq Offs Transmit Freq Error % of OBW Power -47 156 kHz % of OBW Power 99.00 % Transmit Freq Error -36 542 kHz 99.00 % x dB Bandwidth 35.70 MHz x dB -6.00 dB x dB Bandwidth 36.26 MHz x dB -6.00 dB IC\_802.11n\_40MHz AUX1 5510MHz IC 802.11n 40MHz AUX1 5230MHz 04:42:28 PM Oct 01, Radio Std: None 04:50:18 PM Oct 01, 2010 nter Freq 5.230000000 GHz Frequency enter Freq 5.510000000 GHz Center Freq: 5.51000 Trig: Free Run #Atten: 20 dB Center Freq: 5.23 Trig: Free Run #Atten: 20 dB 000 GHz Avg|Hold: 50/50 Frequency 000 GHz Avg|Hold: 50/50 Radio Device: BTS Radio Device: BTS Ref Offset 10.5 dB Ref Offset 10.5 dB Ref 20.00 dBm Center Free Center Free 5.51000000 GH 5.230000000 GH er 5.23 GHz Center 5.51 GHz Span 50 MHz Span 50 MHz CF Step 5.000000 ML CF Step 5.000000 ML BW 1 MH Ma Occupied Bandwidth Total Power 17.9 dBm **Occupied Bandwidth** Total Power 14.3 dBm 36.085 MHz 36.040 MHz Freq Offse Freq Offse 0 H 0 H -31.375 kHz -40.456 kHz 99.00 % Transmit Freq Error % of OBW Power 99.00 % % of OBW Power Transmit Freq Error 36.29 MHz 36.23 MHz x dB Bandwidth -6.00 dB x dB Bandwidth x dB -6.00 dB x dB IC 802.11n 40MHz AUX1 5270MHz IC 802.11n 40MHz AUX1 5550MHz Radio Std: None RL IV SO R DC DRMmart Center Freq 5.270000000 GHz Center Freq 5.270000000 GHz Center Freq 5.270000000 GHz 04:52:26 PM Oct 01, Radio Std: None Center Freq 5.550000000 GHz Center Freq: 5. Trig: Free Run 000 GHz Avg|Hold: 50/50 Radio Device: BTS Radio Device: BTS Ref Offset 10.5 dB Ref\_20.00 dBm Ref Offset 10.5 dB Ref 20.00 dBm Center Fre Center Fre an 50 MH r 5.27 GH CF Step 5.000000 MP nter 5.55 GHz es BW 300 kHz Span 50 MH Sweep 1 m CF Step 5.000000 MHz Man s B #VBW 1 MHz #VBW 1 MHz 18.3 dBm **Occupied Bandwidth** Total Power Occupied Bandwidth Total Power 17.8 dBm 36.007 MHz 36.044 MHz Freq Offs Freq Offse Transmit Freq Error -39.468 kHz % of OBW Pov 99 00 % 0 F oн Transmit Freq Error -12.816 kHz % of OBW Power 99.00 % x dB Bandwidth 36.24 MHz x dB -6.00 dB x dB Bandwidth 36.17 MHz x dB -6.00 dE

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# IC 802.11n 40MHz AUX1 5670MHz

### IC 802.11ac 80MHz Main 5210MHz



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# IC 802.11ac 80MHz Main 5610MHz

# IC 802.11ac 80MHz AUX1 5210MHz



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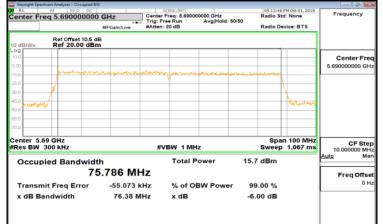
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## IC 802.11ac 80MHz AUX1 5610MHz

Kennight Spect	trum Analyzer - Occupied BV	v					
RL	RF 50 Ω DC		SENSE:INT		05:10:4	2 PM Oct 01, 2018	
Center Fre	eq 5.61000000	GHz	Center Freq: 5.610	000000 GHz		td: None	Frequency
		#IFGain:Low	Trig: Free Run #Atten: 20 dB	Avg Hold:		evice: BTS	
10 dB/div	Ref Offset 10.5 di Ref 20.00 dBn						
10.0							Center Freq
0.00			- Antonio arrama	-			5.610000000 GHz
-10.0	- Andrew - A	are wrong bringer	- Aller and a second	Pharman and the second	ananda ta yang bagi kata ba		
-30.0	1					1	
-40.0	N I					Winning	
-50.0							
-70.0							
Center 5.6	51 GHz				Spa	an 100 MHz	
#Res BW			#VBW 1M	Hz		0 1.067 ms	CF Step 10.000000 MHz
Occup	ied Bandwidt	h	Total	Power	15.5 dBm		Auto Man
	75	5.927 MH	z				Freq Offset
Transm	it Freq Error	-32.560 kł	lz % of C	BW Powe	r 99.00 %		0 Hz
x dB Ba	ndwidth	76.50 MH	lz xdB		-6.00 dB		
M9G					STATUS		

### IC\_802.11ac\_80MHz\_AUX1\_5690MHz



# IC 802.11ac 80MHz AUX1 5775MHz

				_	
	am Analyzer - Occupied BV	1			
RL	RJ 50 Ω DC	011-	sense:int ter Freg: 5.775000000 GHz	05:14:33 PM Oct 01, 3 Radio Std: None	Frequency
Center Free	q 5.775000000	Trip	: Free Run Avg Hold:		
		#FGain:Low #At	ten: 20 dB	Radio Device: BTS	
	Ref Offset 10.5 d				
10 dB/div	Ref 20.00 dBn				
Log					
10.0					Center Free
0.00					5.775000000 GH
-10.0	pomora	neg have been a start of the st	ment mercena	monorano	
-20.0	1		1	h	
-30.0	/			<u>\</u>	
40.0	1				
-50.0				Why why	LAN .
-60.0					
-70.0					
Center 5.77	5 CHz			Span 100 N	
#Res BW 3			#VBW 1 MHz	Sweep 1.067	
					Auto Mar
Occupie	ed Bandwidt	h	Total Power	15.2 dBm	
	75	5.816 MHz			
	1.				Freq Offse
Transmit	t Freq Error	-35.379 kHz	% of OBW Powe	r 99.00 %	0 H
x dB Ban	duidth	76.51 MHz	x dB	-6.00 dB	
X UD Dai	lawiaan	70.51 MHZ	X UB	-0.00 UB	
MBG				STATUS	

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#### MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT 9

# 9.1 Standard Applicable

### FCC

OPERZTION Band		EUT CATEGORY	LIMIT
		Access Point (Master device)	1 Watt(30dBm)
U-NII-1		Fixed point-to-point Access Ponit	1 Watt(30dBm)
		Mobile and portable client device	Point (Master device )1 Watt(30dBm)nt-to-point Access Ponit1 Watt(30dBm)nd portable client device250mW(23.98dBm)250mW(23.98dBm) or 11dBm+10 log E
U-NII-2A			250mW(23.98dBm) or 11dBm+10 log B
U-NII-2C			250mW(23.98dBm) or 11dBm+10 log B
U-NII-3			1 Watt(30dBm)
If transmitting	anter	nnas of directional gain greater than	6 dBi are used, the Maximum transmit

power shall be reduced by the amount in dB that the direction-al gain of the antenna exceeds 6 dBi.

### ISED

OPERZTION FREQUENCY BAND	LIMIT						
5150~5250 MHz	EIRP shall not exceed 200 mW or 10 + 10 log10B, dBm						
5250~5350 MHz	Conducted output power shall not exceed 250 mW or 11 +10 log10B EIRP shall not exceed 1.0 W or 17 + 10 log10B, dBm						
5470-5600 MHz and 5650-5725 MHz	Conducted output power shall not exceed 250 mW or 11 +10 log10 B EIRP shall not exceed 1.0 W or 17 + 10 log10B, dBm						
5725~5850 MHz	Conducted output power shall not exceed 1 W						
For equipment operating in the band <b>5725-5850</b> MHz, If transmitting antennas of directional gain greater than 6 dBi are used, the Maximum transmit power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.							

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# Note:

As per FCC KDB 662911 D01

Unequal antenna gains, with equal transmit powers. For antenna gains given by G1, G2, ..., GN dBi.

(i) If transmit signals are correlated, then Directional gain

=  $10 \log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N_{ANT}] dBi$ 

[Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

The antenna gain is not grater than 6 dBi. Therefore, reduction of power is not required.

# 9.2 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
- Remove the antenna from the EUT and then connect a low loss RF cable from the antenna 3. port to the power meter
- Power Meter is used as the auxiliary test equipment to conduct the output power measure-4. ment.
- Record the max. reading and add 10 log(1/duty cycle). 5.
- Repeat above procedures until all frequency (low, middle, and high channel) measured were 6. complete.

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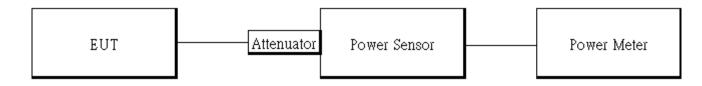
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# 9.3 Measurement Equipment Used

	SGS Conducted Room											
Name of Equip- ment	Manufacturer	Manufacturer Model		Calibration Date	Calibration Due							
Power Meter	Anritsu	ML2496A	1804001	2018/02/01	2019/01/31							
Power Sensor	Anritsu	MA2411B	1726104	2018/02/01	2019/01/31							
Power Sensor	Anritsu	MA2411B	1726107	2018/02/01	2019/01/31							
DC Power Supply	Anritsu	E3640A	MY52410006	2017/11/28	2018/11/27							
Attenuator	Mini-Circuit	BW-S10W2+	2	2018/01/02	2019/01/01							
DC Block	Mini-Circuits	BLK-18-S+	1	2018/01/02	2019/01/01							
Coaxial Cables	N/A	WK CE Cable	N/A	2018/01/02	2019/01/01							
Notebook	Lenovo	L430	R9-WGNK5	N/A	N/A							

## 9.4 Test Set-up



# 9.5 Measurement Result

Conducted output power (FCC) SISO

## 802.11n\_HT20\_Ch0

СН	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)		REQUIRED LIMIT (dBm)			
140	5700	MCS0	12.68	23.98	or 11+10log(B) =	23.85	PASS	

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#### 802.11n\_HT40\_Ch0

СН	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)		RESULT		
38	5190	MCS0	11.25		23.98		PASS
62	5310	MCS0	12.42	23.98	or 11+10log(B) =	26.81	PASS
102	5510	MCS0	10.31	23.98	or 11+10log(B) =	26.82	PASS

### 802.11ac\_VHT80\_Ch0

СН	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)		RESULT		
42	5210	MCS0	8.37		23.98		PASS
58	5290	MCS0	9.34	23.98	or 11+10log(B) =	29.98	PASS

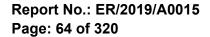
#### MIMO

#### 802.11a Ch0

СН	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)		RESULT		
36	5180	6	12.36		23.98		PASS
44	5220	6	12.48		23.98		PASS
48	5240	6	12.38		23.98		PASS
52	5260	6	12.47	23.98	or 11+10log(B) =	23.72	PASS
60	5300	6	12.51	23.98	or 11+10log(B) =	23.71	PASS
64	5320	6	12.29	23.98	or 11+10log(B) =	23.67	PASS
100	5500	6	12.17	23.98	or 11+10log(B) =	23.70	PASS
116	5580	6	12.20	23.98	or 11+10log(B) =	23.68	PASS
140	5700	6	12.35	23.98	or 11+10log(B) =	23.66	PASS
144	5720(U-NII 2C)	6	9.752532	23.98	or 11+10log(B) =	22.69	PASS
144	5720 (U-NII 3)	6	3.171555		30		PASS
149	5745	6	12.42		30		PASS
157	5785	6	12.05		30		PASS
165	5825	6	12.07		30		PASS

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#### 802.11n\_HT20\_MIMO

СН	Frequency	Data	A	/g. POV	/ER (dB	m)	TOTAL POWER		REQUIRED LIMIT		RESULT
Ch	(MHz)	Rate	СН 0	CH 1	CH 2	СНЗ	(dBm)		(dBm)		RESOLI
36	5180	MCS8	12.7	12.6	0	0	15.79		23.98		PASS
44	5220	MCS8	12.8	12.7	0	0	15.83		23.98		PASS
48	5240	MCS8	12.6	12.2	0	0	15.51		23.98		PASS
52	5260	MCS8	12.6	12.5	0	0	15.63	23.98	or 11+10log(B) =	24.01	PASS
60	5300	MCS8	12.4	12.3	0	0	15.42	23.98	or 11+10log(B) =	23.97	PASS
64	5320	MCS8	12.2	12.1	0	0	15.26	23.98	or 11+10log(B) =	23.86	PASS
100	5500	MCS8	12.4	12.2	0	0	15.40	23.98	or 11+10log(B) =	23.91	PASS
116	5580	MCS8	12.3	12.2	0	0	15.35	23.98	or 11+10log(B) =	23.95	PASS
140	5700	MCS8	11.4	11.4	0	0	14.49	23.98	or 11+10log(B) =	23.97	PASS
144	5720(U-NII 2C)	MCS8	9.5	8.93	####	####	11.61	23.98	or 11+10log(B) =	22.70	PASS
144	5720 (U-NII 3)	MCS8	3.05	2.96	####	####	3.73		30		PASS
149	5745	MCS8	12	12.3	0	0	15.27		30		PASS
157	5785	MCS8	12	12.3	0	0	15.26		30		PASS
165	5825	MCS8	12.1	12.3	0	0	15.32		30		PASS

#### 802.11n\_HT40\_MIMO

CH	Frequency	Data	A	vg. POV	VER (dB	m)	TOTAL POWER		REQUIRED LIMIT		RESULT
СН	(MHz)	Rate	СН 0	CH 1	CH 2	CH3	(dBm)		(dBm)		RESULT
38	5190	MCS8	9.29	8.97	0	0	12.33		23.98		PASS
46	5230	MCS8	12.6	12.3	0	0	15.64		23.98		PASS
54	5270	MCS8	12.4	12.2	0	0	15.49	23.98	or 11+10log(B) =	27.03	PASS
62	5310	MCS8	11.2	11	0	0	14.29	23.98	or 11+10log(B) =	27.03	PASS
102	5510	MCS8	8.98	8.94	0	0	12.16	23.98	or 11+10log(B) =	27.01	PASS
110	5550	MCS8	12.3	12.3	0	0	15.49	23.98	or 11+10log(B) =	27.01	PASS
134	5670	MCS8	12.3	12.5	0	0	15.63	23.98	or 11+10log(B) =	27.01	PASS
142	5710(U-NII 2C)	MCS8	10.7	11	####	####	13.62	23.98	or 11+10log(B) =	26.42	PASS
142	5720 (U-NII 3)	MCS8	1.52	1.6	####	####	1.95		30		PASS
151	5755	MCS8	11.9	12.2	0	0	15.22		30		PASS
159	5795	MCS8	11.9	12.3	0	0	15.30		30		PASS

#### 802.11ac\_VHT80\_MIMO

СН	Frequency	Data	A	vg. POV	/ER (dB	m)	TOTAL POWER		REQUIRED LIMIT		RESULT
СП	(MHz)	Rate	СН 0	CH 1	CH 2	CH3	(dBm)		(dBm)		RESULI
42	5210	MCS0	7.21	7.13	0	0	10.38		23.98		PASS
58	5290	MCS0	7.43	7.28	0	0	10.56	23.98	or 11+10log(B) =	30.09	PASS
106	5530	MCS0	8.19	8.08	0	0	11.34	23.98	or 11+10log(B) =	30.09	PASS
122	5610	MCS0	9.07	9.39	0	0	12.44	23.98	or 11+10log(B) =	30.12	PASS
138	5690(U-NII 2C)	MCS0	8.47	8.58	####	####	11.58	23.98	or 11+10log(B) =	29.77	PASS
138	5690 (U-NII 3)	MCS0	0.56	0.66	####	####	0.77		30		PASS
155	5775	MCS0	8.89	9.21	0	0	12.26		30		PASS

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# Conducted output power (IC)

### SISO

### 802.11n HT20 Ch0

СН	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)		REQUIRED LIMIT (dBm)		RESULT
140	5700	12.68	18.519	23.98	or 11+10log(B) =	23.47	PASS

### 802.11n\_HT40\_Ch0

сн	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)		REQUIRED LIMIT (dBm)			
62	5310	12.42	17.453	23.98	or 11+10log(B) =	26.57	PASS	
102	5510	10.31	10.736	23.98	or 11+10log(B) =	26.57	PASS	

### 802.11ac VHT80 Ch0

сн	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT
58	5290	9.34	8.585	23.98 or 11+10log(B) = 29.80	PASS

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#### MIMO

## 802.11a\_Ch0

СН	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)			RESULT	
52	5260	12.47	17.677	23.98	or 11+10log(B) =	23.22	PASS
60	5300	12.51	17.841	23.98	or 11+10log(B) =	23.23	PASS
64	5320	12.29	16.959	23.98	or 11+10log(B) =	23.21	PASS
100	5500	12.17	16.497	23.98	or 11+10log(B) =	23.22	PASS
116	5580	12.20	16.611	23.98	or 11+10log(B) =	23.23	PASS
140	5700	12.35	17.195	23.98	or 11+10log(B) =	23.20	PASS
149	5745	12.42	17.475		30		PASS
157	5785	12.05	16.048		30		PASS
165	5825	12.07	16.122		30		PASS

### 802.11n HT20 MIMO

СН	Frequency		RAGE VER	TOTAL POWER	TOTAL POWER		REQUIRED LIMIT		RESULT
	(MHz)	СНО	CH 1	(dBm)	(mW)		(dBm)		NEODE1
52	5260	12.6	12.5	15.63	36.575	23.98	or 11+10log(B) =	23.47	PASS
60	5300	12.4	12.3	15.42	34.847	23.98	or 11+10log(B) =	23.47	PASS
64	5320	12.2	12.1	15.26	33.551	23.98	or 11+10log(B) =	23.47	PASS
100	5500	12.4	12.2	15.40	34.688	23.98	or 11+10log(B) =	23.46	PASS
116	5580	12.3	12.2	15.35	34.289	23.98	or 11+10log(B) =	23.47	PASS
140	5700	11.4	11.4	14.49	28.129	23.98	or 11+10log(B) =	23.47	PASS
149	5745	12	12.3	15.27	33.684		30		PASS
157	5785	12	12.3	15.26	33.559		30		PASS
165	5825	12.1	12.3	15.32	34.066		30		PASS

### 802.11n\_HT40\_MIMO

СН	Frequency	AVERAGE POWER		TOTAL POWER	TOTAL POWER		REQUIRED LIMIT		RESULT
(MHz)		СН 0	CH 1	(dBm)	(mW)		(dBm)		RESOLI
54	5270	12.4	12.2	15.49	35.436	23.98	or 11+10log(B) =	26.56	PASS
62	5310	11.2	11	14.29	26.881	23.98	or 11+10log(B) =	26.56	PASS
102	5510	8.98	8.94	12.16	16.440	23.98	or 11+10log(B) =	26.57	PASS
110	5550	12.3	12.3	15.49	35.432	23.98	or 11+10log(B) =	26.57	PASS
134	5670	12.3	12.5	15.63	36.601	23.98	or 11+10log(B) =	26.57	PASS
151	5755	11.9	12.2	15.22	33.283		30		PASS
159	5795	11.9	12.3	15.30	33.868		30		PASS

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Report No.: ER/2019/A0015 Page: 67 of 320



#### 802.11ac\_VHT80\_MIMO

СН	Frequency (MHz)		RAGE VER CH 1	TOTAL POWER (dBm)	TOTAL POWER (mW)		REQUIRED LIMIT (dBm)		RESULT
58	5290	7.43	7.28	10.56	11.385	23.98	or 11+10log(B) =	29.80	PASS
106	5530	8.19	8.08	11.34	13.623	23.98	or 11+10log(B) =	29.79	PASS
122	5610	9.07	9.39	12.44	17.541	23.98	or 11+10log(B) =	29.79	PASS
155	5775	8.89	9.21	12.26	16.829		30		PASS

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### EIRP

#### SISO

#### 802.11n HT20 Ch0

СН	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)		REQUIRED LIMIT (dBm)		RESULT
140	5700	12.68	2.930	15.61	36.359	30	or 17+10log(B)=	29.47	PASS

#### 802.11n HT40 Ch0

СН	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)		REQUIRED LIMIT (dBm)		RESULT
38	5190	11.25	2.930	14.18	26.173	23.01	or 10+10log(B)=	25.57	PASS
62	5310	12.42	2.930	15.35	34.266	30	or 17+10log(B)=	32.57	PASS
102	5510	10.31	2.930	13.24	21.080	30	or 17+10log(B)=	32.57	PASS

#### 802.11ac VHT80 Ch0

СН	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)		REQUIRED LIMIT (dBm)		RESULT
42	5210	8.37	2.930	11.30	13.481	23.01	or 10+10log(B)=	28.80	PASS
58	5290	9.34	2.930	12.27	16.855	30	or 17+10log(B)=	35.80	PASS

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## MIMO

802.11a	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)		REQUIRED LIMIT (dBm)		RESULT
36	5180	12.36	2.930	15.29	33.838	23.01	or 10+10log(B)=	22.22	PASS
44	5220	12.48	2.930	15.41	34.786	23.01	or 10+10log(B)=	22.23	PASS
48	5240	12.38	2.930	15.31	33.995	23.01	or 10+10log(B)=	22.22	PASS
52	5260	12.47	2.930	15.40	34.706	30	or 17+10log(B)=	29.22	PASS
60	5300	12.51	2.930	15.44	35.027	30	or 17+10log(B)=	29.23	PASS
64	5320	12.29	2.930	15.22	33.297	30	or 17+10log(B)=	29.21	PASS
100	5500	12.17	2.930	15.10	32.390	30	or 17+10log(B)=	29.22	PASS
116	5580	12.20	2.930	15.13	32.614	30	or 17+10log(B)=	29.23	PASS
140	5700	12.35	2.930	15.28	33.760	30	or 17+10log(B)=	29.20	PASS

#### 802.11n HT20 MIMO

СН	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)		REQUIRED LIMIT (dBm)		RESULT
36	5180	15.79	5.940	21.73	148.832	23.01	or 10+10log(B)=	22.47	PASS
44	5220	15.83	5.940	21.77	150.392	23.01	or 10+10log(B)=	22.47	PASS
48	5240	15.51	5.940	21.45	139.666	23.01	or 10+10log(B)=	22.47	PASS
52	5260	15.63	5.940	21.57	143.619	30	or 17+10log(B)=	29.47	PASS
60	5300	15.42	5.940	21.36	136.833	30	or 17+10log(B)=	29.47	PASS
64	5320	15.26	5.940	21.20	131.745	30	or 17+10log(B)=	29.47	PASS
100	5500	15.40	5.940	21.34	136.211	30	or 17+10log(B)=	29.46	PASS
116	5580	15.35	5.940	21.29	134.643	30	or 17+10log(B)=	29.47	PASS
140	5700	14.49	5.940	20.43	110.453	30	or 17+10log(B)=	29.47	PASS

#### 802.11n HT40 MIMO

СН	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)		REQUIRED LIMIT (dBm)		RESULT
38	5190	12.33	5.940	18.27	67.176	23.01	or 10+10log(B)=	25.57	PASS
46	5230	15.64	5.940	21.58	143.768	23.01	or 10+10log(B)=	25.56	PASS
54	5270	15.49	5.940	21.43	139.146	30	or 17+10log(B)=	32.56	PASS
62	5310	14.29	5.940	20.23	105.553	30	or 17+10log(B)=	32.56	PASS
102	5510	12.16	5.940	18.10	64.554	30	or 17+10log(B)=	32.57	PASS
110	5550	15.49	5.940	21.43	139.131	30	or 17+10log(B)=	32.57	PASS
134	5670	15.63	5.940	21.58	143.723	30	or 17+10log(B)=	32.57	PASS

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#### 802.11ac VHT80 MIMO

сн	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	REQUIRED LIMIT (dBm)			RESULT
42	5210	10.38	5.940	16.32	42.835	23.01	or 10+10log(B)=	28.80	PASS
58	5290	10.56	5.940	16.50	44.704	30	or 17+10log(B)=	35.80	PASS
106	5530	11.34	5.940	17.28	53.496	30	or 17+10log(B)=	35.79	PASS

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# **10 MAXIMUM POWER SPECTRAL DENSITY**

#### 10.1 Standard Applicable

## FCC

OPERZTION Band		EUT CATEGORY	LIMIT						
		Access Point (Master device)	17dBm/ MHz						
U-NII-1		Fixed point-to-point Access Ponit							
	$\checkmark$	Mobile and portable client device	11dBm/ MHz						
U-NII-2A	$\checkmark$		11dBm/ MHz						
U-NII-2C	$\checkmark$		11dBm/ MHz						
U-NII-3	$\checkmark$		30dBm/ 500kHz						
spectral dens	If transmitting antennas of directional gain greater than 6 dBi are used, the Maximum power spectral density shall be reduced by the amount in dB that the directional gain of the anten- na exceeds 6 dBi.								

#### ISED

OPERZTION FREQUENCY BAND	LIMIT				
5150~5250 MHz	EIRP spectral density 10 dBm / MHz				
5250~5350 MHz	11dBm / MHz				
5470-5600 MHz and 5650-5725 MHz	11dBm / MHz				
5725~5850 MHz	30dBm / 500 kHz				
For equipment operating in the band <b>5725-5850</b> MHz, If transmitting antennas of directional gain greater than 6 dBi are used, the Maximum power spectral density shall be reduced by					

the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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# Note:

As per FCC KDB 662911 D01

Unequal antenna gains, with equal transmit powers. For antenna gains given by G1, G2, ..., GN dBi.

(i) If transmit signals are correlated, then Directional gain

=  $10 \log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/N_{ANT}] dBi$ 

[Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object

is to combine the signal levels coherently.]

The antenna gain is not grater than 6 dBi. Therefore, reduction of power is not required.

# 10.2 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.
- 4. For U-NII1, U-NII-2A, U-NII-2C Band:

Set RBW=1MHz, VBW=3MHz, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)

# For U-NII-3 Band:

Set RBW=500 kHz, VBW $\geq$  3RBW, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)

- 5. User the cursor on spectrum to peak search the highest level of trace
- Record the max. reading and add 10 log(1/duty cycle).
- 7. Repeat above procedures until all default test channel (low, middle, and high) was complete.

# Note: For the test of PSD at MIMO mode, the highest emission of worst case employing Measure and add 10 log (N) technical is reported on this report after the comparison between Main Antenna at single transmitting mode and Aux that yields the higher value. The MIMO transmitting mode produces higher value of outcome

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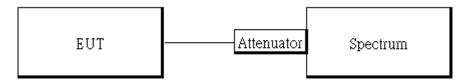
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#### 10.3 **Measurement Equipment Used**

	SG	S Conducted Ro	oom		
Name of Equip- ment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum Analyzer	R&S	FSV-30	101398	2017/10/19	2018/10/18
DC Power Supply	Anritsu	E3640A	MY52410006	2017/11/28	2018/11/27
Temperature Chamber	TERCHY	MHG-120LF	911009	2018/05/18	2019/05/17
Attenuator	Mini-Circuit	BW-S10W2+	2	2018/01/02	2019/01/01
DC Block	Mini-Circuits	BLK-18-S+	1	2018/01/02	2019/01/01
Coaxial Cables	N/A	WK CE Cable	N/A	2018/01/02	2019/01/01
Notebook	Lenovo	L430	R9-WGNK5	N/A	N/A

#### 10.4 Test Set-up



#### 10.5 **Measurement Result**

SISO

POWER DENSITY 802.11n HT20 MODE									
Frequency (MHz)	PSD W/O Duty Factor (dBm)	Offset	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)			
5700	1.28	10.50	0.10	1.38	11	-9.62			

	POWER DENSITY 802.11n HT40 MODE									
Frequency (MHz)	PSD W/O Duty Factor (dBm)	Offset	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)				
5190	-4.96	10.50	0.19	-4.77	11	-15.77				
5310	-3.25	10.50	0.19	-3.06	11	-14.06				
5510	-5.4	10.50	0.19	-5.21	11	-16.21				

POWER DENSITY 802.11ac VHT80 MODE									
Frequency (MHz)	PSD W/O Duty Factor (dBm)	Offset	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)			
5210	-10.90	10.50	0.20	-10.70	11	-21.70			
5290	-9.54	10.50	0.20	-9.34	11	-20.34			

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#### MIMO

	POWER	R DENSIT	Y 802.11	a MODE		
Frequency (MHz)	PSD W/O Duty Factor (dBm)	Offset	Duty Factor	PSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5180	0.58	10.50	0.04	0.62	11	-10.38
5220	-0.20	10.50	0.04	-0.16	11	-11.16
5240	0.37	10.50	0.04	0.41	11	-10.59
5260	0.40	10.50	0.04	0.44	11	-10.56
5300	-0.03	10.50	0.04	0.01	11	-10.99
5320	-0.02	10.50	0.04	0.02	11	-10.98
5500	-0.40	10.50	0.04	-0.36	11	-11.36
5580	1.72	10.50	0.04	1.76	11	-9.24
5700	1.30	10.50	0.04	1.34	11	-9.66
5720 (U-NII 2C)	1.45	10.50	0.04	1.49	11	-9.51
5720 (U-NII 3)	0.28	10.50	0.04	0.33	30	-29.67
5745	5.04	10.50	-	5.04	30	-24.96
5785	5.08	10.50	-	5.08	30	-24.92
5825	5.33	10.50	-	5.33	30	-24.67

	POWER D	ENSITY 8	302.11n H	T20 MODE		
Frequency (MHz)	PSD W/O Duty Factor (dBm)	Offset	Duty Factor	PSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5180	3.59	10.50	0.10	3.69	11	-7.31
5220	3.74	10.50	0.10	3.84	11	-7.16
5240	3.04	10.50	0.10	3.14	11	-7.86
5260	2.71	10.50	0.10	2.81	11	-8.19
5300	2.69	10.50	0.10	2.79	11	-8.21
5320	2.51	10.50	0.10	2.61	11	-8.39
5500	2.28	10.50	0.10	2.38	11	-8.62
5580	2.97	10.50	0.10	3.07	11	-7.93
5700	2.17	10.50	0.10	2.27	11	-8.73
5720 (U-NII 2C)	3.89	10.50	0.10	3.99	11	-7.01
5720 (U-NII 3)	3.12	10.50	0.10	3.22	30	-26.78
5745	7.48	10.50	-	7.48	30	-22.52
5785	8.22	10.50	-	8.22	30	-21.78
5825	7.47	10.50	-	7.47	30	-22.53

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POWER DENSITY 802.11n HT40 MODE											
Frequency (MHz)	PSD W/O Duty Factor (dBm)			PSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)					
5190	-3.43	10.50	0.19	-3.24	11	-14.24					
5230	-0.94	10.50	0.19	-0.75	11	-11.75					
5270	-0.66	10.50	0.19	-0.47	11	-11.47					
5310	-1.13	10.50	0.19	-0.94	11	-11.94					
5510	-4	10.50	0.19	-3.81	11	-14.81					
5550	0.27	10.50	0.19	0.46	11	-10.54					
5670	0.50	10.50	0.19	0.69	11	-10.31					
5710 (U-NII 2C)	0.66	10.50	0.19	0.85	11	-10.15					
5710 (U-NII 3)	-1.01	10.50	0.19	-0.82	30	-30.82					
5755	5.21	10.50	-	5.21	30	-24.79					
5795	5.31	10.50	-	5.31	30	-24.69					

POWER DENSITY 802.11ac VHT80 MODE											
Frequency (MHz)	PSD W/O Duty Factor (dBm)	uty Factor Offset		PSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)					
5210	-8.78	10.50	0.20	-8.58	11	-19.58					
5290	-9.12	10.50	0.20	-8.92	11	-19.92					
5530	-8.35	10.50	0.20	-8.15	11	-19.15					
5610	-6.71	10.50	0.20	-6.51	11	-17.51					
5690 (U-NII 2C)	-5.05	10.50	0.20	-4.85	11	-15.85					
5690 (U-NII 3)	-13.95	10.50	0.20	-13.75	30	-43.75					
5775	-1.53	10.50	-	-1.53	30	-31.53					

SISO

EIRP spectral density 802.11ac VHT80 MODE									
Freq. PSD (MHz) (dBm)		Ant. Gain (dBi)	EIRP SD (dBm)	Limit (dBm)	Margin (dB)				
5210	-10.70	2.93	-7.77	10	-17.77				

#### MIMO

E	EIRP spectral density 802.11a MODE					Donostro	donoi	N/ 002 44	- UT20 I		
Freq. (MHz)	PSD (dBm)	Ant. Gain (dBi)	EIRP SD (dBm)	Limit (dBm)	Margin (dB)	Freq. (MHz)	P spectra PSD (dBm)	Ant. Gain	EIRP SD	Limit (dBm)	Margin (dB)
5180	0.62	2.93	3.55	10	-6.45	5180	3.69	(dBi) 5.94	(dBm) 9.63	10	-0.37
5220	-0.16	2.93	2.77	10	-7.23	5220	3.84	5.94	9.78	10	-0.22
5240	0.41	2.93	3.34	10	-6.66	5240	3.14	5.94	9.08	10	-0.92

EIRP spectral density 802.11n HT40 MODE					MODE								
Freq.	Freg. PSD Ant. EIRP Limit Margin						EIRP spectral density 802.11ac VHT80 MODE						
(MHz)	(dBm)	Gain (dBi)	SD (dBm)	(dBm)	(dB)	Freq. (MHz)	PSD (dBm)	Ant. Gain	EIRP SD	Limit	Margin		
5180	-3.24	5.94	2.70	10	-7.30	(IVIFIZ)	(авт)	(dBi)	(dBm)	(dBm)	(dB)		
5220	-0.75	5.94	5.19	10	-4.81	5210	-8.58	5.94	-2.64	10	-12.64		

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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## SISO 802.11n 20MHz 5700MHz



## 802.11n 40MHz 5190MHz



# 802.11n 40MHz 5310MHz



## 802.11n 40MHz\_5510MHz



# 802.11ac\_80MHz 5210MHz



# 802.11ac 80MHz 5290MHz



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