

FCC RF TEST REPORT

APPLICANT	:	Xiamen Candour Co.,Ltd
PRODUCT NAME	:	TVBOX
MODEL NAME	:	R92
TRADE NAME	:	SAMMIX
BRAND NAME	:	SAMMIX
FCC ID	:	2ALOI-R92
STANDARD(S)	:	47 CFR Part 15 Subpart E
ISSUE DATE	:	2017-06-01

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DIRECTORY

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Change History				
Issue	Date	Reason for change		
1.0	2017-06-01	First edition		

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TEST REPORT DECLARATION

Applicant	Xiamen Candour Co.,Ltd
Applicant Address	19/F,C&D International Building.,No.1699 East Huandao Road, Xiamen 361008, China
Manufacturer	Xiamen Candour Co.,Ltd
Manufacturer Address	19/F,C&D International Building.,No.1699 East Huandao Road, Xiamen 361008, China
Product Name	TVBOX
Model Name	R92
Brand Name	SAMMIX
HW Version	MYROPE_S_V2.0
SW Version	V01_160301_CTA
Test Standards	47 CFR Part 15 Subpart E
Test Date	2017-05-10 to 2017-05-20
Test Result	PASS

: _____ Tested by Su Hang (Test Engineer) : Qiu Xiaoju

Approved by

Qiu Xiaojun (Supervisor)

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1. GENERAL INFORMATION

1.1 EUT Description

Product Name:	Xiamen Candour Co.,Ltd				
Serial No:	(n.a, marked #1 by test site)				
Hardware Version:	MYROPE_S_V2.0				
Software Version:	V01_160301_CTA				
Applicant:	Xiamen Candour Co.,Ltd				
	19/F,C&D International Building.,No.1699 East Huandao Road,				
	Xiamen 361008, China				
Manufacturer:	Xiamen Candour Co.,Ltd				
	19/F,C&D International Building.,No.1699 East Huandao Road,				
	Xiamen 361008, China				
Frequency Range:	802.11b/g/n: 2.400GHz - 2.4835GHz				
	802.11ac/n: 5.150GHz- 5.250GHz				
	5.25 GHz -5.35 GHz				
	5.47 GHz -5.725 GHz				
	5.725GHz- 5.850GHz				
Channel Number:	Refer Note(2)				
Modulation Type:	DSSS, OFDM				
Antenna Type:	FPCAntenna				
Antenna Gain:	1.6 dBi				

Note 1: The U-NII band is applicable to this report, another bands of operation (2.4GHz) is documented in a separate report.

Note 2 : The following tables are the channel number and frequency of the EUT, the black bold channels were selected for test.

20MHz Bandwidth:

Frequency Range	5150~5250MHz				5250~5	350MHz		
Channel Number	36	40	44	48	52	56	60	64
Frequency (MHz)	5180	5200	5220	5240	5260	5280	5300	5320

Frequency Range		5470~5725MHz									
Channel Number	100	105	108	112	116	120	124	128	132	136	140
Frequency (MHz)	5500	5520	5540	5560	5580	5600	5620	5640	5660	5680	5700

Frequency Range	5725~5850MHz					
Channel Number	149 153 157 161 16					
Frequency (MHz)	5745	5765	5785	5805	5825	

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40MHz Bandwidth:

Frequency Range	5150~52	50 MHz	5250~5350 MHz		
Channel Number	38 46		54	62	
Frequency (MHz)	5190	5230	5270	5310	

Frequency Range	5470~5725MHz					
Channel Number	102 110 118 126 134 142					
Frequency (MHz)	5510	5550	5590	5630	5670	5710

Frequency Range	5725~5850 MHz			
Channel Number	151	159		
Frequency (MHz)	5755	5795		

80MHz Bandwidth:

Frequency Range	5150~5250MHz	5250~5350MHz
Channel Number	42	58
Frequency (MHz)	5210	5290

Frequency Range	54	70~5725	MHz	5725~5850MHz
Channel Number	106	122	138	155
Frequency (MHz)	5530	5610	5690	5775

Note 3: During test, the duty cycle of the EUT was setting to 100%.

Note 4: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

Note 5: The antenna connector of EUT is designed with permanent attachment and no consideration of replacement.

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1.2 **Test Standards and Results**

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart E (UNII band) for the EUT FCC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15	Radio Frequency Devices
	(5-1-14 Edition)	

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Result
1	15.203	Antenna Requirement	PASS
2	15.407(a) (e)	Emission Bandwidth	PASS
3	15.407(a)	Maximum conducted output Power	PASS
4	15.407(a)	Peak Power spectral density	PASS
5	15.407(b)	Restricted Frequency Bands	PASS
6	15.407(g)	Frequency Stability	PASS
7	15.407(h)	TPC and DFS	PASS (Note)
8	15.207	Conducted Emission	PASS
9	15.407(b)	Radiated Emission	PASS
10	15.407(f)	RF exposure evaluation	PASS
Note:	WIFI hotspot does no	ot support U-NII band; A TPC mechanism is	s not required for

systems with an e.i.r.p. of less than 500 mW.

The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.10 2013.

These RF tests were performed according to the method of measurements prescribed in KDB789033 D02 v01r04 (05/02/2017), KDB905462 D02 v02 (04/08/2016) and KDB644545 D03 v01 (08/14/2014).

Test Environment Conditions 1.3

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86-106

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2. 47 CFR PART 15E REQUIREMENTS

2.1 Antenna requirement

2.1.1 Applicable Standard

According to FCC 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

2.1.2 Result: Compliant

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

2.2 **Emission Bandwidth**

2.2.1 Requirement

For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Determination of the emissions bandwidth is based on the use of measurement instrumentation employing a peak detector function with an instrument resolution bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement. Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

2.2.2 Test Description

A. Test Set:



The EUT which is powered by the battery, is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 500hm; the path loss as the factor is calibrated to correct the reading.

B. Test Procedure

- 1. KDB 789033 Section C) 1) Emission Bandwidth was used in order to prove compliance
- 1) Set RBW = approximately 1% of the emission bandwidth.
- 2) Set the VBW > RBW.

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- 3) Detector = Peak.
- 4) Trace mode = max hold.
- 5) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
- 2. KDB 789033 Section C) 2) minimum emission bandwidth for the band 5.725-5.85GHz was used in order to prove compliance.

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) \ge 3 × RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

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2.2.3 Test Result

The lowest, middle and highest channels are selected to perform testing to record the 26 dB bandwidth of the Module.

2.2.3.1 802.11ac-20MHz Test mode

A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth	
Onamier		(MHz)	
36	5180	25.28	
44	5220	21.58	
48	5240	21.63	
52	5260	21.63	
60	5300	21.80	
64	5320	21.62	
100	5500	21.68	
116	5600	21.38	
140	5700	21.92	
Channel	Frequency (MHz)	6dB Bandwidth	
Channel		(MHz)	
149	5745	17.65	
157	5785	17.65	
165	5825	17.65	

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B. Test Plots

Agilent Spectrum Analyzer - Occupied BW 1.0 SENSE:INT ALIGN AUTO Center Freq: 5.180000000 GHz Trig: Free Run Avg|Hold:>10/10 #AffGain:Low 10:18:18 PM May 18, 2017 Radio Std: None Trace/Detector Ref Value 20.00 dBm Radio Device: BTS Ref Offset 11 dB Ref 20.00 dBm **Clear Write** Average Max Hold Center 5.18 GHz #Res BW 200 kHz Span 50 MHz Sweep 1.2 ms #VBW 620 kHz **Min Hold Total Power** 14.5 dBm **Occupied Bandwidth** 18.096 MHz Detector Peak **Transmit Freq Error** -121.65 kHz **OBW Power** 99.00 % Auto Man x dB Bandwidth 25.28 MHz -26.00 dB x dB STATUS

(Channel 36: 5180MHz @ 802.11ac)



(Channel 44: 5220 MHz @ 802.11ac)

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(Channel 48: 5240MHz @ 802.11ac)



(Channel 52: 5260MHz @ 802.11ac)

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(Channel 60: 5300MHz @ 802.11ac)





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(Channel 120: 5600MHz @ 802.11ac)

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(Channel 149: 5745MHz @ 802.11ac)

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(Channel 157: 5785MHz @ 802.11ac)



(Channel 165: 5825MHz @ 802.11ac)

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2.2.3.2 802.11ac-40MHz Test mode

A. Test Verdict:

Channel		26 dB Bandwidth	
Channel	Frequency (IVITZ)	(MHz)	
38	5190	49.84	
46	5230	40.02	
54	5270	39.94	
62	5310	40.21	
102	5510	40.09	
126	5630	40.21	
142	5710	40.17	
Channel	Frequency (MHz)	6dB Bandwidth	
Channel		(MHz)	
151	5755	36.42	
159	5795	36.40	

B. Test Plots



(Channel 38: 5190MHz @ 802.11ac)

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Agilent Spectrum Analyzer - Occupied BW SENSE:INT ALIGN AUTO Center Freq: 5.23000000 GHz Trig: Free Run Avg|Hold:>10/10 #Atten: 10 dB 03:52:10 PM May 19, 2017 Radio Std: None Frequency Center Freq 5.230000000 GHz 9 Radio Device: BTS #IFGain:Low Ref Offset 11 dB Ref 20.00 dBm **Center Freq** 5.230000000 GHz -10.00 MAN CF Step 10.000000 MHz 0 Man Center 5.23 GHz #Res BW 390 kHz Span 100 MHz Sweep 1 ms #VBW 1.2 MHz Auto **Occupied Bandwidth** Total Power 14.8 dBm 36.377 MHz Freq Offset 0 Hz **Transmit Freq Error** -98.670 kHz **OBW Power** 99.00 % 40.02 MHz -26.00 dB x dB Bandwidth x dB





(Channel 54: 5270MHz @ 802.11ac)

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Agilent Spectrum Analyzer - Occupied BW SENSE:INT ALIGN AUTO Center Freq: 5.31000000 GHz □ Trig: Free Run Avg|Hold:>10/10 #Atten: 10 dB 03:55:16 PM May 19, 2017 Radio Std: None Frequency Center Freq 5.31000000 GHz 9 Radio Device: BTS #IFGain:Low Ref Offset 11 dB Ref 20.00 dBm **Center Freq** 5.310000000 GHz who and who have My the the states 1 mint CF Step 10.000000 MHz 0 Man Center 5.31 GHz #Res BW 390 kHz Span 100 MHz Sweep 1 ms #VBW 1.2 MHz Auto **Occupied Bandwidth** Total Power 16.2 dBm 36.371 MHz Freq Offset 0 Hz **Transmit Freq Error** -59.225 kHz **OBW Power** 99.00 % 40.21 MHz -26.00 dB x dB Bandwidth x dB → 诸 🎁 🕩 3:55 PM





(Channel 102: 5510MHz @ 802.11ac)

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Agilent Spectrum Analyzer - Occupied BW SENSE:INT ALIGN AUTO Center Freq: 5.63000000 GHz Trig: Free Run Avg|Hold:>10/10 #Atten: 10 dB 04:00:49 PM May 19, 2017 Radio Std: None Frequency Center Freq 5.630000000 GHz 9 Radio Device: BTS #IFGain:Low Ref Offset 11 dB Ref 20.00 dBm **Center Freq** 5.63000000 GHz Lanna water Als CF Step 10.000000 MHz 0 Man Center 5.63 GHz #Res BW 390 kHz Span 100 MHz Sweep 1 ms #VBW 1.2 MHz Auto **Occupied Bandwidth** Total Power 15.7 dBm 36.389 MHz Freq Offset 0 Hz **Transmit Freq Error** -128.64 kHz **OBW Power** 99.00 % 40.21 MHz -26.00 dB x dB Bandwidth x dB ▲ 100 PM 5/19/2017

(Channel 126: 5630MHz @ 802.11ac)

(Channel 142: 5710MHz @ 802.11ac)

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Agilent Spectrum Analyzer - Occupied BW Center Freq: 5.755000000 GHz Trig: Free Run Avg|Hold:>10/10 #Atten: 10 dB 04:06:32 PM May 19, 2017 Radio Std: None Frequency Center Freq 5.755000000 GHz #IFGain:Low Radio Device: BTS Ref Offset 11 dB Ref 20.00 dBm **Center Freq** 5.755000000 GHz . UUUU . Inthe half MARK LINK dulut. Mungh 1 when a when a Center 5.755 GHz #Res BW 100 kHz Span 100 MHz Sweep 9.6 ms CF Step 10.000000 MHz #VBW 300 kHz Auto Ma Occupied Bandwidth Total Power 17.2 dBm 36.237 MHz Freq Offset 0 Hz Transmit Freg Error -109.20 kHz **OBW Power** 99.00 % 36.42 MHz -6.00 dB x dB Bandwidth x dB

(Channel 151: 5755MHz @ 802.11ac)

(Channel 159: 5795MHz @ 802.11ac)

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2.2.3.3 802.11ac-80MHz Test mode

A. Test Verdict:

Channel		26 dB Bandwidth
Channel		(MHz)
42	5210	127.70
58	5290	156.10
106	5530	92.08
122	5610	94.34
138	5690	110.70
Channel	Frequency (MHz)	6dB Bandwidth
Channel		(MHz)
155	5775	76.60

B. Test Plots

(Channel 42: 5210MHz @ 802.11ac)

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Agilent Spectrum Analyzer - Occupied BW SENSE:INT] ALIGN AUTO Center Freq: 5.29000000 GHz □ Trig: Free Run Avg|Hold:>10/10 #Atten: 10 dB 04:48:29 PM May 13, 2017 Radio Std: None Frequency Center Freg 5.290000000 GHz Ģ Radio Device: BTS #IFGain:Low Ref Offset 11 dB Ref 20.00 dBm **Center Freq** 5.290000000 GHz mill. march de la CF Step 18.000000 MHz to Man Center 5.29 GHz #Res BW 820 kHz Span 180 MHz Sweep 1 ms #VBW 2.4 MHz Auto **Occupied Bandwidth** Total Power 19.2 dBm 76.631 MHz Freq Offset 0 Hz **Transmit Freq Error** -353.38 kHz **OBW Power** 99.00 % 156.1 MHz -26.00 dB x dB Bandwidth x dB

(Channel 58: 5290MHz @ 802.11ac)

(Channel 106: 5530MHz @ 802.11ac)

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Agilent Spectrum Analyzer - Occupied BW SENSE:INT] ALIGN AUTO Center Freq: 5.61000000 GHz □ Trig: Free Run Avg|Hold:>10/10 #Atten: 10 dB 04:51:16 PM May 13, 2017 Radio Std: None Frequency Center Freq 5.610000000 GHz 9 Radio Device: BTS #IFGain:Low Ref Offset 11 dB Ref 20.00 dBm **Center Freq** 5.610000000 GHz un manut CF Step 18.000000 MHz to Man Center 5.61 GHz #Res BW 820 kHz Span 180 MHz Sweep 1 ms #VBW 2.4 MHz Auto **Occupied Bandwidth** Total Power 21.9 dBm 75.827 MHz Freq Offset 0 Hz **Transmit Freq Error** -82.630 kHz **OBW Power** 99.00 % 94.34 MHz -26.00 dB x dB Bandwidth x dB - 诸 📅 🕩 4:51 PM

(Channel 122: 5610MHz @ 802.11ac)

(Channel 138: 5690MHz @ 802.11ac)

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dB Center Freq: 5.7500000 GHz Radio Xizi None mire freq: 5.7500000 GHz Radio Device: BTS Ref Offset 11 dB #Freq: 10 dB Ref 20.00 dBm #Atten: 10 dB	Hacobotector	Average Max Hold	Min Hol	Detecto Peak Auto <u>Ma</u>
dB Center Freq: 5.7500000 GHz Radio Std: #IFGain:Low #IFGain:Low #Adio Std: Ref Offset 11 dB Ref 20.00 dBm Radio Dev Market 11 dB Market 11 dB Radio Dev Ref 20.00 dBm Market 11 dB Ref 20.00 dBm Market 11 dB Market 11 dB Radio Dev Ref 20.00 dBm Market 11 dB Radio Dev Market 11 dB Market 11 dB Radio Dev Market 11 dB Market 11 dB Radio Dev Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 11 dB Market 12 dB Market 11 dB Market 11 dB Market 12 dB Market 11 dB Market 11 dB	None ice: BTS	wooddawy Max	180 MHz ep 1 ms	
dB Center Freq: 6.775000000 GHz frig: Free Run Avg Hold:>10/10 #Atten: 10 dB Ref 20.00 dBm for production of the second sec	Radio Std: Radio Dev	e-tapes/utivelyk	Span Swe dBm	.00 %
dB Center Free: 5,75500000 GHz Trig: Free Run Avg Hold: #Atten: 10 dB Ref 20.00 dBm	>10/10	hardenjenjednjen 	20.7	99
dB Center Freq: 5.77500 Trig: Free Run #Atten: 10 dB Ref 20.00 dBm All and a state of the s	0000 GHz Avg Hold:		Hz	ower
dB Center Trig: Fr Ref Offset 11 dB Ref 20.00 dBm Center Trig: Fr Atten: Ref 20.00 dBm Center Trig: Fr Atten: Atten	Freq: 5.77500 ree Run 10 dB		/BW 2.4 N	OBW P
Ref Offset 11 dB Ref 20.00 dBm hyperstations where the second dBm hyperstations where	:Low Center Trig: Fi #Atten:		#\	0 MHz 19.38 kHz
c d l l l l l l l l l l l l l l l l l l	B #I	Manakal nabili niji stiquen	5 GHz 10 kHz 10 Bandwidth	76.2 Freq Error

(Channel 155: 5775MHz @ 802.11ac)

2.2.3.4 802.11n-20MHz Test mode

A. Test Verdict:

Channel	Frequency (MHz)	26 dB Bandwidth	
Channer	Frequency (MHZ)	(MHz)	
36	5180	35.32	
44	5220	32.13	
48	5240	30.85	
52	5260	34.44	
60	5300	32.31	
64	5320	26.81	
100	5500	24.87	
120	5600	26.11	
140	5700	26.86	
Channel	Frequency (MHz)	6dB Bandwidth	
Channel		(MHz)	
149	5745	17.65	
157	5785	17.63	
165	5825	17.64	

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B. Test Plots

Agilent Spectrum Analyzer - Occupied BW 10 GHz Center Freq: 5.18000000 GHz Trig: Free Run Avg[Hold:>10/10 #RFGain:Low #Atten: 10 dB 09:39:55 PM May 09, 2017 Radio Std: None Trace/Detector Center Freq 5.180000000 GHz Radio Device: BTS Ref Offset 11 dB Ref 20.00 dBm **Clear Write** 1. Average Max Hold Center 5.18 GHz #Res BW 200 kHz Span 50 MHz Sweep 1.6 ms #VBW 620 kHz **Min Hold Total Power** 18.8 dBm **Occupied Bandwidth** 18.699 MHz Detector Average Mar **Transmit Freq Error** 38.919 kHz **OBW Power** 99.00 % Auto x dB Bandwidth 35.32 MHz -26.00 dB x dB STATUS

(Channel 36: 5180MHz @ 802.11n-20MHz)

(Channel 44: 5220 MHz @ 802.11n-20MHz)

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Agilent Spectrum Analyzer - Occupied BW 1 GHZ SENSE:INT ALIGN AUTO Center Freq: 5.240000000 GHz Trig: Free Run Avg|Hold:>10/10 #Atten: 10 dB 09:42:05 PM May 09, 2017 Radio Std: None Trace/Detector Center Freq 5.240000000 GHz Radio Device: BTS Ref Offset 11 dB Ref 20.00 dBm **Clear Write** al shul Average Max Hold Center 5.24 GHz #Res BW 200 kHz Span 50 MHz Sweep 1.6 ms #VBW 620 kHz Min Hold **Occupied Bandwidth Total Power** 17.9 dBm 18.319 MHz Detector Average Man Transmit Freg Error -131.38 kHz **OBW Power** 99.00 % Auto 30.85 MHz -26.00 dB x dB Bandwidth x dB STATUS

(Channel 48: 5240MHz @ 802.11n-20MHz)

(Channel 52: 5260MHz @ 802.11n-20MHz)

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Agilent Spectrum Analyzer - Occupied BW GHZ Center Freq: 5.30000000 GHZ Trig: Freq Run Avg[Hold:>10/10 #FGain:Low 09:47:39 PM May 09, 2017 Radio Std: None Trace/Detecto Center Freq 5.300000000 GHz Radio Device: BTS Ref Offset 11 dB Ref 20.00 dBm **Clear Write** Average Max Hold Center 5.3 GHz #Res BW 200 kHz Span 50 MHz Sweep 1.6 ms #VBW 620 kHz Min Hold **Occupied Bandwidth** Total Power 18.8 dBm 18.297 MHz Detector Average Man Transmit Freq Error -171.17 kHz **OBW Power** 99.00 % Auto 32.31 MHz -26.00 dB x dB Bandwidth x dB STATUS

(Channel 60: 5300MHz @ 802.11n-20MHz)

(Channel 64: 5320MHz @ 802.11n-20MHz)

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(Channel 100: 5500MHz @ 802.11n-20MHz)

(Channel 120: 5600MHz @ 802.11n-20MHz)

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(Channel 140: 5700MHz @ 802.11n-20MHz)

(Channel 149: 5745MHz @ 802.11n-20MHz)

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(Channel 157: 5785MHz @802.11n-20MHz)

(Channel 165: 5825MHz @ 802.11n-20MHz)

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2.2.3.5 802.11n-40MHz Test mode

A. Test Verdict:

Channel	Fraguanay (MHz)	26 dB Bandwidth	
Channel		(MHz)	
38	5190	70.20	
46	5230	66.30	
54	5270	69.60	
62	5310	72.86	
102	5510	47.33	
126	5630	50.52	
142	5710	45.31	
Channel	Frequency (MHz)	6dB Bandwidth	
Channel		(MHz)	
151	5755	36.37	
159	5795	36.41	

B. Test Plots

(Channel 38: 5190MHz @ 802.11n-40MHz)

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Agilent Spectrum Analyzer - Occupied BW GHz Center Freq: 5.23000000 GHz Trig: Free Run Avg|Hold:>10/10 #IFGain:Low #Atten: 10 dB 04:09:18 PM May 13, 2017 Radio Std: None Frequency Center Freq 5.230000000 GHz Radio Device: BTS Ref Offset 11 dB Ref 20.00 dBm **Center Freq** 5.230000000 GHz Center 5.23 GHz #Res BW 390 kHz Span 100 MHz Sweep 1 ms CF Step 10.000000 MHz #VBW 1.2 MHz Auto Ma **Occupied Bandwidth** Total Power 19.3 dBm 36.966 MHz Freq Offset 0 Hz Transmit Freg Error -117.69 kHz **OBW Power** 99.00 % 66.30 MHz -26.00 dB x dB Bandwidth x dB

(Channel 46: 5230 MHz @ 802.11n-40MHz)

(Channel 54: 5270MHz @802.11n-40MHz)

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Agilent Spectrum Analyzer - Occupied BW GHz Center Freq: 5.31000000 GHz #IFGain:Low #Atten: 10 dB 04:25:11 PM May 13, 2017 Radio Std: None Frequency Center Freq 5.310000000 GHz Radio Device: BTS Ref Offset 11 dB Ref 20.00 dBm **Center Freq** 5.310000000 GHz ud Center 5.31 GHz #Res BW 390 kHz Span 100 MHz Sweep 1 ms CF Step 10.000000 MHz #VBW 1.2 MHz Auto Ma **Occupied Bandwidth** Total Power 19.5 dBm 36.904 MHz Freq Offset 0 Hz Transmit Freg Error -141.76 kHz **OBW Power** 99.00 % 72.86 MHz -26.00 dB x dB Bandwidth x dB

(Channel 62: 5310MHz @ 802.11n-40MHz)

(Channel 102: 5510MHz @802.11n-40MHz)

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(Channel 126: 5630MHz @ 802.11n-40MHz)

(Channel 142: 5710MHz @ 802.11n-40MHz)

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Agilent Spectrum Analyzer - Occupied BW 1 SENSE:INT ALIGN AUTO Center Freq: 5.755000000 GHz Trig: Free Run Avg|Hold:>10/10 #Atten: 10 dB 04:42:46 PM May 13, 2017 Radio Std: None Trace/Detector x dB -6.00 dB Radio Device: BTS Ref Offset 11 dB Ref 20.00 dBm **Clear Write** بالمسلولية المعاول alart phaneter his Average S'yuli Wilder Max Hold Center 5.755 GHz #Res BW 100 kHz Span 100 MHz Sweep 9.6 ms #VBW 300 kHz Min Hold Occupied Bandwidth Total Power 21.4 dBm 36.280 MHz Detector Peak► <u>Man</u> Transmit Freg Error -133.14 kHz **OBW Power** 99.00 % Auto 36.37 MHz -6.00 dB x dB Bandwidth x dB

(Channel 151: 5755MHz @ 802.11n-40MHz)

(Channel 159: 5795MHz @802.11n-40MHz)

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2.3 Maximum conducted output power

2.3.1 Requirement

(1) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

(2) For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250mW or 11dBm + 10log B, where B is the 26 dB emission bandwidth in megahertz.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

According FCC KDB644545 D03 D)1)b)3) requirement:

a) The maximum conducted output power within each band of operation shall comply with the limits for that band.

b) The limit on maximum conducted output power in each U-NII band is computed based on the portion of the emission bandwidth contained within that band

If transmitting antennas of directional gain greater than 6dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

2.3.2 Test Description

Section E) 3) of KDB 789033 defines a methodology using an RF average power meter.

A. Test Setup:

The EUT (Equipment under the test) which is powered by the Battery is coupled to the Power Meter; the RF load attached to the EUT antenna terminal is 500hm; the path loss as the factor is calibrated to correct the reading, all test result in power meter.

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2.3.3 Test Result

2.3.3.1 802.11ac-20MHz Test mode

Channel	Frequency	Measured Output	Limit	Verdict
	(MHz)	Power(dBm)	(dBm)	
36	5180	16.45		
44	5220	16.03		
48	5240	15.97		
52	5260	15.90	24	PASS
60	5300	15.96		
64	5320	16.17		
100	5500	19.82		
116	5600	20.57		
140	5700	19.87		
149	5745	19.46		
157	5785	19.50	30	
165	5825	18.71		

2.3.3.2 802.11ac-40MHz Test mode

Channel	Frequency (MHz)	Measured Output Power(dBm)	Limit (dBm)	Verdict
38	5190	15.81		
46	5230	14.44		
54	5270	14.76	24	PASS
62	5310	15.25	24	
102	5510	19.42		
126	5630	18.75		FA33
140	5710	10.00	U-NII-2C:24 &	
142	5710	10.23	U-NII-3:30	
151	5755	18.87	30	
159	5795	18.14		

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802.11ac-80MHz Test mode 2.3.3.3

Channel	Frequency (MHz)	Measured Output Power(dBm)	Limit (dBm)	Verdict
42	5210	14.00		
58	5290	14.35	24	
106	5530	17.82	24	
122	5610	17.77		PASS
120	5600	19.00	U-NII-2C:24 &	
138	18.99	5690 18:99	U-NII-3:30	
155	5775	16.69	30	

2.3.3.4 802.11n-20MHz Test mode

Channel	Frequency Measured Output		Limit	Vardiat
Channel	(MHz)	Power(dBm)	(dBm)	verdict
36	5180	16.18		
44	5220	16.02		
48	5240	15.90		
52	5260	15.51		
60	5300	16.06	24	
64	5320	16.23		DASS
100	5500	19.97		FA33
120	5600	20.60		
140	5700	19.49		
149	5745	19.5		
157	5785	19.26	30	
165	5825	18.92		

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2.3.3.5 802.11n-40MHz Test mode

Channel	Frequency (MHz)	Measured Output Power(dBm)	Limit (dBm)	Verdict
38	5190	15.97		
46	5230	15.36		
54	5270	15.20	24	
62	5310	14.96	24	
102	5510	19.37		
126	5630	19.32		PASS
			U-NII-2C:24	
142	5710	18.78	&	
			U-NII-3:30	
151	5755	18.79	30	
159	5795	18.13	30	

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2.4 Peak Power spectral density

2.4.1 Requirement

(1) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

(2) For the 5.25–5.35 GHz and 5.47–5.725GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

(3) For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500KHz band.

According FCC KDB644545 D03 D)1)b)2) requirement:

Emissions in each band shall comply with the PSD limits applicable to that band under the appropriate rule section.

If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

2.4.2 Test Description

A. Test Set:

The EUT which is powered by the Battery, is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 500hm; the path loss as the factor is calibrated to correct the reading.

B. Test Procedure

KDB 789033 Section F) Maximum Power Spectral Density (PSD) Method SA-1 was used in order to prove compliance

- 1) Set span to encompass the entire 26-dB emission bandwidth
- 2) Set RBW = 1 MHz. Set VBW \geq 3 MHz.
- 3) Number of points in sweep ≥ 2 Span / RBW. Sweep time = auto.
- 4) Detector = RMS (i.e., power averaging)
- 5) Trace average at least 100 traces in power averaging (i.e., RMS) mode
- 6) Record the max value

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2.4.3 Test Result

2.4.3.1 802.11ac-20MHz Test mode

A. Test Verdict:

Channel	Frequency	Measured PPSD	Limit	Verdict
Channel	(MHz)	(dBm/MHz)	(dBm/MHz)	Vertuict
36	5180	4.03		
44	5220	4.97		
48	5240	6.06		
52	5260	5.97		
60	5300	7.10	11	PASS
64	5320	7.09		
100	5500	6.72		
120	5600	5.93		
140	5700	5.72		
Channel	Frequency	Measured PPSD	Limit	Vardiat
Channel	(MHz)	(dBm/500KHz)	(dBm/500KHz)	verdict
149	5745	3.52		
157	5785	3.18	30	PASS
165	5825	2.41		

B. Test Plots

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(Channel 44: 5220 MHz @ 802.11ac)

(Channel 48: 5240MHz @ 802.11ac)

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(Channel 52: 5260MHz @ 802.11ac)

(Channel 60: 5300MHz @ 802.11ac)

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(Channel 64: 5320MHz @ 802.11ac

(Channel 100: 5500MHz @ 802.11ac)

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(Channel 120: 5600MHz @ 802.11ac)

(Channel 140: 5700MHz @ 802.11ac)

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(Channel 149: 5745MHz @ 802.11ac)

(Channel 157: 5785MHz @ 802.11ac)

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(Channel 165: 5825MHz @ 802.11ac)

2.4.3.2 802.11ac-40MHz Test mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured PPSD (dBm/MHz)	Limit (dBm/MHz))	Verdict
38	5190	1.34		
46	5230	1.65		PASS
54	5270	2.65	11	
62	5310	3.64		
102	5510	2.83		
126	5630	2.96		
1 4 0	5710	2 97	U-NII-2C:11dBm/MHz	
142	5710	2.97	U-NII-3:30dBm/500KHz	
Channel	Frequency (MHz)	Measured PPSD (dBm/500KHz)	Limit (dBm/500KHz)	Verdict
151	5755	0.05	20	DASS
159	5795	-0.15	30	PASS

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B. Test Plots

ectrum Analyzer - Swept SA Marker 1 5.178120000000 GHz PN0: Fast |Foain:Low PM May 19, 2013 Peak Search Avg Type: Log-Pwr Avg|Hold:>100/100 RACE 1 2 3 4 TYPE MWWW Trig: Free Run Atten: 20 dB Next Peak Mkr1 5.178 12 GHz 1.339 dBm Ref Offset 11 dB Ref 20.00 dBm 0 dB/div Next Pk Right Next Pk Left Marker Delta Mkr-CF Mkr→RefLvl More 1 of 2 Center 5.19000 GHz #Res BW 1.0 MHz Span 60.00 MHz Sweep 1.000 ms (1001 pts) #VBW 3.0 MHz

(Channel 38: 5190MHz @ 802.11ac)

(Channel 46: 5230 MHz @ 802.11ac)

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(Channel 54: 5270MHz @ 802.11ac)

(Channel 62: 5310MHz @ 802.11ac)

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(Channel 102: 5510MHz @ 802.11ac)

(Channel 126: 5630MHz @ 802.11ac)

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(Channel 142: 5710MHz @ 802.11ac)

(Channel 151: 5755MHz @ 802.11ac)

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(Channel 159: 5795MHz @ 802.11ac)

2.4.3.3 802.11ac-80MHz Test mode

A. Test Verdict:

Channel	Frequency (MHz)	Measured PPSD (dBm)	Limit (dBm/MHz)	Verdict
42	5210	-1.27		
58	5290	-2.12	11	
106	5530	1.60		DASS
122	5610	1.57		FA33
120	5600	1 5 4	U-NII-2C:11dBm/MHz	
130	5090	1.54	U-NII-3:30dBm/500KHz	
Channel	Frequency (MHz)	Measured PPSD (dBm/500KHz)	Limit (dBm/500KHz)	Verdict
155	5775	-2.85	30	PASS

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B. Test Plots

(Channel 42: 5210MHz @ 802.11ac)

(Channel 58: 5290MHz @ 802.11ac)

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(Channel 106: 5530MHz @ 802.11ac)

(Channel 122: 5610MHz @ 802.11ac)

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(Channel 138: 5690MHz @ 802.11ac)

(Channel 155: 5775MHz @ 802.11ac)

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2.4.3.4 802.11n-20MHz Test mode

Test Verdict: Α.

Channel	Frequency	Measured PPSD	Limit	Verdict
Channel	(MHz) (dBm/MHz)		(dBm/MHz)	Verticit
36	5180	5.84		
44	5220	4.36		
48	5240	4.04		
52	5260	4.21		
60	5300	4.33	11	PASS
64	5320	4.49		
100	5500	7.51		
120	5600	8.88		
140	5700	7.43		
Channel	Frequency	Measured PPSD	Limit	Vordiot
Channel	(MHz)	(dBm/500KHz)	(dBm/500KHz)	verdict
149	5745	4.20		
157	5785	5.01	30	PASS
165	5825	3.27		

B. Test Plots

(Channel 36: 5180MHz @ 802.11n-20MHz)

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Agilent Spectrum Analyzer - Swept SA 06:39:19 PM May 13, 2017 TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P N N N N N Marker 1 5.217930000000 GHz PNO: Fas IFGain:Loo ALIGN AUTO Avg Type: Log-Pwr Avg|Hold:>100/100 Peak Search 2): Fast low Atten: 20 dB Next Peak Mkr1 5.217 93 GHz 4.363 dBm Ref Offset 11 dB Ref 20.00 dBm dB/di Next Pk Right 0 Next Pk Left Marker Delta Mkr→CF Mkr→RefLvl More 1 of 2 Span 30.00 MHz Sweep 1.000 ms (1001 pts) Center 5.22000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz

(Channel 44: 5220 MHz @ 802.11n-20MHz)

(Channel 48: 5240MHz @ 802.11n-20MHz)

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Agilent Spectrum Analyzer - Swept SA 1 06:41:38 PM May 13, 2017 TRACE 1 2 3 4 5 6 TYPE M WWWWWW Marker 1 5.254780000000 GHz PN0: Fast C IFGain:Low Atten: 20 dB ALIGN AUTO Avg Type: Log-Pwr Avg|Hold:>100/100 Peak Search TYP Next Peak Mkr1 5.254 78 GHz 4.213 dBm Ref Offset 11 dB Ref 20.00 dBm dB/di Next Pk Right **?** Next Pk Left a sub Proposition Worklow Marker Delta Mkr→CF Mkr→RefLvl More 1 of 2 Center 5.26000 GHz #Res BW 1.0 MHz Span 30.00 MHz Sweep 1.000 ms (1001 pts) #VBW 3.0 MHz 6:41.PM 5/13/2017

(Channel 52: 5260MHz @ 802.11n-20MHz)

(Channel 60: 5300MHz @ 802.11n-20MHz)

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(Channel 64: 5320MHz @ 802.11n-20MHz)

(Channel 100: 5500MHz @ 802.11n-20MHz)

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