


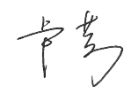


TEST REPORT

Report Number: C21T00056-SRD05-V02

Applicant	Toast, Incorporated
Product Name	Data Processing machine
Model Name	TT204W, TT204, TT202W, TT203, TK200, TT203W
Brand Name	Toast
FCC ID	2AMNG-TT200B
IC ID	23177-TT200B

Industrial Internet Innovation Center (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in FCC Part15, ANSI 63.10, KDB 789033, KDB 905462, RSS-Gen Issue 5, RSS-247 Issue 2.

Prepared by		Reviewed by	
Approved by		Issue Date	2021-08-16

Industrial Internet Innovation Center (Shanghai) Co., Ltd.



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Test Laboratory:

Industrial Internet Innovation Center (Shanghai) Co., Ltd.

Add: Building 4, No. 766 Jingang Rd, Pudong, Shanghai, China

Tel: +86 21 68866880



Revision Version

Report Number	Revision	Date	Memo
C21T00056-SRD05-V00	00	2021-07-26	Initial creation of test report
C21T00056-SRD05-V01	01	2021-08-10	Add test setup pictures
C21T00056-SRD05-V02	02	2021-08-16	Amendment test setup pictures



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1. Test Laboratory

1.1. Testing Location

Primary Lab:

Company Name	Industrial Internet Innovation Center (Shanghai) Co., Ltd.
Address	Building 4, No. 766 Jingang Rd, Pudong, Shanghai, China
FCC Registration No.	958356
FCC Designation No.	CN1177
IC designation No.	CN0067

Subcontracting Lab #1:

Company Name	N/A
Address	N/A

1.2. Testing Environment

Normal Temperature	15°C~35°C
Relative Humidity	30%RH~60%RH
Supply Voltage	120V/60Hz

1.3. Project Information

Project Leader	Lu Fang
Testing Start Date	2021-05-31
Testing End Date	2021-07-26



2. Client Information

2.1. Applicant Information

Company Name	Toast, Incorporated
Address	401 Park Drive, Suite 801, Boston, MA 02215, USA
Telephone	5625462272

2.2. Manufacturer Information

Company Name	Toast, Incorporated
Address	401 Park Drive, Suite 801, Boston, MA 02215, USA
Telephone	5625462272

3. Equipment under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Product Name	Data Processing machine
Model name	TT204W, TT204, TT202W, TT203, TK200, TT203W
WLAN(5.8G)	802.11 a/n20/n40/ac20/ac40/ac80
Supported Radio Technology and Bands	BT4.2 WLAN 802.11b,g,n WLAN 802.11a, n, ac
Hardware Version	CT541MB80C 20210226
Software Version	Sunmi-ct541-v2.1.59p69
FCC ID	CT541MB80C 20210226
IC ID	Sunmi-ct541-v2.1.59p69

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of Receipt
N05 (Mainly Supply)	N/A	CT541MB80C 20210226	Sunmi-ct541-v2.1.59p69	2021/5/31
N02 (Mainly Supply)	N/A	CT541MB80C 20210226	Sunmi-ct541-v2.1.59p69	2021/5/31
N01 (Secondary Supply)	N/A	CT541MB80C 20210226	Sunmi-ct541-v2.1.59p69	2021/5/31
N03 (Thirdly Supply)	N/A	CT541MB80C 20210226	Sunmi-ct541-v2.1.59p69	2021/5/31

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

3.3. Internal Identification of AE used during the test

AE ID*	Description	Model	SN/Remark
CA01	Adapter	SOY-2400400	N/A
CB02	Adapter	WTA96-2400400-T	N/A
CA05	Adapter	SOY-2400400	N/A
UA01	Adapter Cable	N/A	N/A
UB02	Adapter Cable	N/A	N/A
UA05	Adapter Cable	N/A	N/A
AE1	RF Cable	N/A	N/A

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

*The AE is provided by the client.

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part15	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices	2018-10-01
ANSI 63.10	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2013
KDB 789033	Information Infrastructure (U-NII) Devices - Part 15, Subpart E	2017
KDB 905462	COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-NATIONAL INFORMATION INFRASTRUCTURE DEVICES OPERATING IN THE 5250-5350 MHz AND 5470-5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION	2016
RSS-247 Issue 2	Digital Transmission Systems (DTSSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices	2017
RSS-Gen Issue 5	General Requirements for Compliance of Radio Apparatus	2019

4.2. Reference Information from client

Antenna gain Information of the test sample provided by Shanghai Sunmi Technology Co., Ltd.

Maximum of Antenna Gain: 2.04 dBi

5. Test Summary

5.1. Summary of Test Results

Measurement Items	Sub-clause of Part15	Sub-clause of IC	Verdict
Maximum Output Power	15.407(a)	RSS-247 6.2	Pass
Power Spectral Density	15.407(a)	RSS-247 6.2	Pass
6dB Occupied Bandwidth	15.407(e)	RSS-247 6.2	Pass
99% Occupied Bandwidth	N/A	RSS-GEN 6.7	Pass
Band edge compliance	15.407(b)	RSS-247 6.2	Pass
Transmitter Spurious Emission- Conducted	15.407	RSS-247 6.2	Pass
Transmitter Spurious Emission - Radiated	15.407,15.205,15.209	RSS-247 6.2 RSS-Gen 8.9,8.10	Pass
AC Powerline Conducted Emission	15.207	RSS-GEN 8.8	Pass

Test Conditions

Tnom	Normal Temperature
Tmin	Low Temperature
Tmax	High Temperature
Vnom	Normal Voltage
Vmin	Low Voltage
Vmax	High Voltage
Hnom	Norm Humidity
Anom	Norm Air Pressure

For this report, all the test case listed above are tested under Normal Temperature and Normal Voltage, and also under norm humidity, the specific conditions as following:

Temperature	Tnom	25°C
Voltage	Vnom	24 V
Humidity	Hnom	48%
Air Pressure	Anom	1010hPa

5.2. Statements

The TT204W, TT204, TT202W, TT203, TK200, TT203W supporting BT/WLAN, manufactured by Toast, Incorporated are new products for testing.

This project have three sets of configured sample N05(N02)/N01/N03, and we mainly tested sample N05(N02) tested the worst mode N01/N03, the main difference is as below:

Mainly Supply	TT204	Main LCD panel Terminal + Sub LCD panel Terminal + Attached base support
	TT204W	The same with TT204, just the color is White
Secondary Supply	TT203	Main LCD panel Terminal + Attached base support
	TT202W, TT203W	The same with TT203, just the color is White
Thirdly Supply	TK200	Main LCD panel Terminal + Add POE module + Add one speaker

Industrial Internet Innovation Center (Shanghai) Co., Ltd. only performed test cases which identified with Pass/Fail/Inc result in section 5.1.

Industrial Internet Innovation Center (Shanghai) Co., Ltd. has verified that the compliance of the tested device specified in section 3 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 4 of this test report.

6. Measurement Results

Shielding Room1 (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Ground system resistance	< 0.5 Ω
Temperature	Min. = 15 °C, Max. = 35 °C

Control room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. =30 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber1 (6.9 meters×10.9 meters×5.4 meters) did not exceed following limits along the EMC testing:

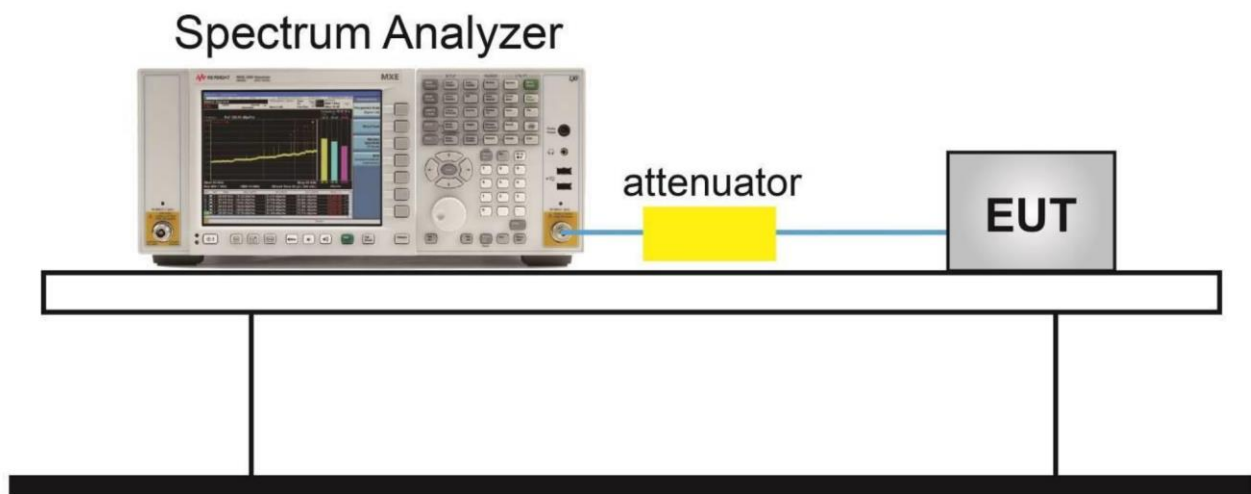
Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 25 %, Max. = 75 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
VSWR	Between 0 and 6 dB, from 1GHz to 18GHz
Site Attenuation Deviation	Between -4 and 4 dB,30MHz to 1GHz
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

6.1. Maximum Average Output Power

6.1.1. Measurement Limit and Method

Standard	Limit (dBm)
FCC CRF Part 15.407(a)	< 30
RSS-247 6.2.4.1	< 30

6.1.2. Test Setup



6.1.3. Method of Measurement: See ANSI C63.10-clause 12.3.2.2 Method SA-1

Set the spectrum analyzer in the following:

Detector: RMS.

RBW=1MHz.

VBW=3MHz.

Sweep time = AUTO.

Span: 30MHz (for 20MHz); 50MHz (for 40MHz).

Method AVGPM-G (Measurement using a gated RF average-reading power meter)

Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since this measurement is made only during the ON time of the transmitter, no duty cycle correction is required

Measurement Results

802.11a mode

Mode	Data Rate(Mbps)	Reading Power (dBm)		
		5745MHz(Ch149)	5785MHz(Ch157)	5825MHz(Ch165)
802.11a	6	7.13	6.98	6.45
Mode	Data Rate(Mbps)	Max Power (dBm)		
		5745MHz(Ch149)	5785MHz(Ch157)	5825MHz(Ch165)
802.11a	6	7.13	6.98	6.45
Mode	Data Rate(Mbps)	EIRP(dBm)		
		5745MHz(Ch149)	5785MHz(Ch157)	5825MHz(Ch149)
802.11a	6	9.17	9.02	8.49
Mode	Data Rate(Mbps)	Duty Cycle Factor (dB)		
		5745MHz(Ch149)	5785MHz(Ch157)	5825MHz(Ch149)
802.11a	6	0.00	0.00	0.00

Note: Max power(dBm)= Reading Power (dBm)+ Duty Cycle Factor (dB)

E.I.R.P (dBm) = Max Power (dBm) + Antenna Gain (dBi), Antenna Gain = 1.92 dBi.

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

802.11n-HT20 mode

Mode	Data Rate(Index)	Reading Power (dBm)		
		5745MHz(Ch149)	5785MHz(Ch157)	5825MHz(Ch165)
802.11n(20MHz)	MCS0	6.33	6.11	5.53
Mode	Data Rate(Index)	Max Power (dBm)		
		5745MHz(Ch149)	5785MHz(Ch157)	5825MHz(Ch165)
802.11n(20MHz)	MCS0	6.68	6.46	5.88
Mode	Data Rate(Index)	EIRP(dBm)		
		5745MHz(Ch149)	5785MHz(Ch157)	5825MHz(Ch165)
802.11n(20MHz)	MCS0	8.72	8.5	7.92
Mode	Data Rate(Index)	Duty Cycle Factor (dB)		
		5745MHz(Ch149)	5785MHz(Ch157)	5825MHz(Ch165)
802.11n(20MHz)	MCS0	0.35	0.35	0.35

Note: Max power(dBm)= Reading Power (dBm)+ Duty Cycle Factor (dB)

E.I.R.P (dBm) = Max Power (dBm) + Antenna Gain (dBi), Antenna Gain = 1.92 dBi.

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

802.11n-HT40 mode

Mode	Data Rate(Index)	Reading Power (dBm)		
		5755MHz(Ch151)	/	5795MHz(Ch159)
802.11n(40MHz)	MCS0	9.50	/	9.44
Mode	Data Rate(Index)	Max Power (dBm)		
		5755MHz(Ch151)	/	5795MHz(Ch159)
802.11n(40MHz)	MCS0	9.99	/	9.93
Mode	Data Rate(Index)	EIRP(dBm)		
		5755MHz(Ch151)	/	5795MHz(Ch159)
802.11n(40MHz)	MCS0	12.03	/	11.97
Mode	Data Rate(Index)	Duty Cycle Factor (dB)		
		5755MHz(Ch151)	/	5795MHz(Ch159)
802.11n(40MHz)	MCS0	0.49	/	0.49

Note: Max power(dBm)= Reading Power (dBm)+ Duty Cycle Factor (dB)

E.I.R.P (dBm) = Max Power (dBm) + Antenna Gain (dBi), Antenna Gain = 1.92 dBi.

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

802.11ac-HT20 mode

Mode	Data Rate(Index)	Reading Power (dBm)		
		5745MHz(Ch149)	5785MHz(Ch157)	5825MHz(Ch165)
802.11 ac (20MHz)	6	9.98	9.81	9.31
Mode	Data Rate(Index)	Max Power (dBm)		
		5745MHz(Ch149)	5785MHz(Ch157)	5825MHz(Ch165)
802.11 ac (20MHz)	6	10.28	10.11	9.61
Mode	Data Rate(Index)	EIRP(dBm)		
		5745MHz(Ch149)	5785MHz(Ch157)	5825MHz(Ch165)
802.11 ac (20MHz)	6	12.32	12.15	11.65
Mode	Data Rate(Index)	Duty Cycle Factor (dB)		
		5745MHz(Ch149)	5785MHz(Ch157)	5825MHz(Ch165)
802.11 ac (20MHz)	6	0.30	0.30	0.30

Note: Max power(dBm)= Reading Power (dBm)+ Duty Cycle Factor (dB)

E.I.R.P (dBm) = Max Power (dBm) + Antenna Gain (dBi), Antenna Gain = 1.92 dBi.

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

802.11ac-HT40 mode

Mode	Data Rate(Index)	Reading Power (dBm)		
		5755MHz(Ch151)	/	5795MHz(Ch159)
802.11ac(40MHz)	MCS0	10.40	/	10.30
Mode	Data Rate(Index)	Max Power (dBm)		
		5755MHz(Ch151)	/	5795MHz(Ch159)
802.11ac(40MHz)	MCS0	10.91	/	10.81
Mode	Data Rate(Index)	EIRP(dBm)		
		5755MHz(Ch151)	/	5795MHz(Ch159)
802.11ac(40MHz)	MCS0	12.95	/	12.85
Mode	Data Rate(Index)	Duty Cycle Factor (dB)		
		5755MHz(Ch151)	/	5795MHz(Ch159)
802.11ac(40MHz)	MCS0	0.51	/	0.51

Note: Max power(dBm)= Reading Power (dBm)+ Duty Cycle Factor (dB)

E.I.R.P (dBm) = Max Power (dBm) + Antenna Gain (dBi), Antenna Gain = 1.92 dBi.

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

802.11ac-HT80 mode

Mode	Data Rate(Index)	Reading Power (dBm)		
		/	5755MHz(Ch155)	/
802.11ac(80MHz)	MCS0	/	10.60	/
Mode	Data Rate(Index)	Max Power (dBm)		
		/	5755MHz(Ch155)	/
802.11ac(80MHz)	MCS0	/	12.26	/
Mode	Data Rate(Index)	EIRP(dBm)		
		/	5755MHz(Ch155)	/
802.11ac(80MHz)	MCS0	/	14.3	/
Mode	Data Rate(Index)	Duty Cycle Factor (dB)		
		/	5755MHz(Ch155)	/
802.11ac(80MHz)	MCS0	/	1.66	/

Note: Max power(dBm)= Reading Power (dBm)+ Duty Cycle Factor (dB)

E.I.R.P (dBm) = Max Power (dBm) + Antenna Gain (dBi), Antenna Gain = 1.92 dBi.

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

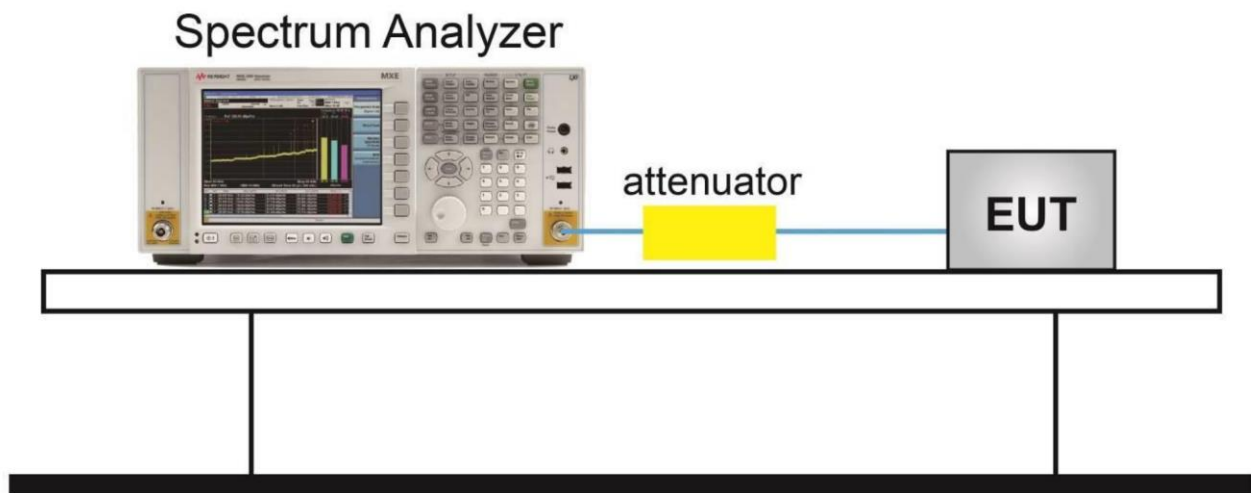
Conclusion: PASS

6.2. Peak Power Spectral Density

6.2.1. Measurement Limit

Standard	Limit
FCC 47 CFR Part 15.407(a)	< 30 dBm/500 kHz
RSS-247 6.2.4.1	< 30 dBm/500 kHz

6.2.2. Test Setup



6.2.3. The measurement is made according to ANSI C63.10 and KDB789033 D02

Measurement Results

Mode	Channel	Power Spectral Density (dBm/500kHz)	Conclusion
802.11a	149	2.407	P
	157	1.619	P
	165	-0.539	P
802.11n HT20	149	0.972	P
	157	0.082	P
	165	0.320	P
802.11n HT40	151	-1.535	P
	159	-0.503	P
802.11ac HT20	149	2.582	P
	157	2.135	P
	165	-0.178	P
802.11ac HT40	151	-0.490	P
	159	-0.787	P
802.11ac HT80	155	-1.025	P

Test graphs as below

<p>Power Spectral Density(dBm/500kHz) (802.11a, 5745MHz)</p>	<p>2.407</p>	<p>Power Spectral Density(dBm/500kHz) (802.11a, 5785MHz)</p>	<p>1.619</p>
<p>Ref: 15 dBm, Att: 15 dB, RBW: 500 kHz, VSW: 3 MHz, SWT: 35 ms, Marker 1 (T1): 2.41 dBm, Center: 5.745 GHz, Span: 24.525 MHz</p> <p>Date: 9 JUN 2021 12:11:57</p>	<p>Ref: 15 dBm, Att: 15 dB, RBW: 500 kHz, VSW: 3 MHz, SWT: 35 ms, Marker 1 (T1): 1.62 dBm, Center: 5.785 GHz, Span: 24.525 MHz</p> <p>Date: 9 JUN 2021 12:12:22</p>		
<p>Power Spectral Density (dBm/500kHz) (802.11a, 5825MHz)</p>	<p>-0.539</p>	<p>Power Spectral Density(dBm/500kHz) (802.11n-HT20), 5745MHz)</p>	<p>0.972</p>
<p>Ref: 15 dBm, Att: 15 dB, RBW: 500 kHz, VSW: 3 MHz, SWT: 35 ms, Marker 1 (T1): -0.54 dBm, Center: 5.825 GHz, Span: 24.525 MHz</p> <p>Date: 9 JUN 2021 12:14:17</p>	<p>Ref: 15 dBm, Att: 15 dB, RBW: 500 kHz, VSW: 3 MHz, SWT: 35 ms, Marker 1 (T1): 0.62 dBm, Center: 5.745 GHz, Span: 25.605 MHz</p> <p>Date: 9 JUN 2021 12:15:16</p>		

<p>Power Spectral Density (dBm/500kHz) (802.11n-HT20, 5785MHz)</p>	<p>0.082</p>	<p>Power Spectral Density(dBm/500kHz) (802.11n-HT20), 5825MHz)</p>	<p>0.320</p>
<p>Date: 9 JUN 2021 13:16:05</p>	<p>Date: 9 JUN 2021 13:16:56</p>		
<p>Power Spectral Density (dBm/500kHz) (802.11n-HT40, 5755MHz)</p>	<p>-1.535</p>	<p>Power Spectral Density(dBm/500kHz) (802.11n-HT40), 5795MHz)</p>	<p>-0.503</p>
<p>Date: 9 JUN 2021 13:19:08</p>	<p>Date: 9 JUN 2021 13:21:03</p>		
<p>Power Spectral Density(dBm/500kHz) (802.11ac-HT20, 5745MHz)</p>	<p>2.582</p>	<p>Power Spectral Density(dBm/500kHz) (802.11ac-HT20, 5785MHz)</p>	<p>2.135</p>
<p>Date: 9 JUN 2021 13:22:09</p>	<p>Date: 9 JUN 2021 13:23:19</p>		

<p>Power Spectral Density (dBm/500kHz) (802.11ac-HT20, 5825MHz)</p>	<p>-0.178</p>	<p>Power Spectral Density (dBm/500kHz) (802.11ac-HT40, 5755MHz)</p>	<p>-0.490</p>
<p>Power Spectral Density (dBm/500kHz) (802.11ac-HT40, 5795MHz)</p>	<p>-0.787</p>	<p>Power Spectral Density (dBm/500kHz) (802.11ac-HT80, 5775MHz)</p>	<p>-1.025</p>

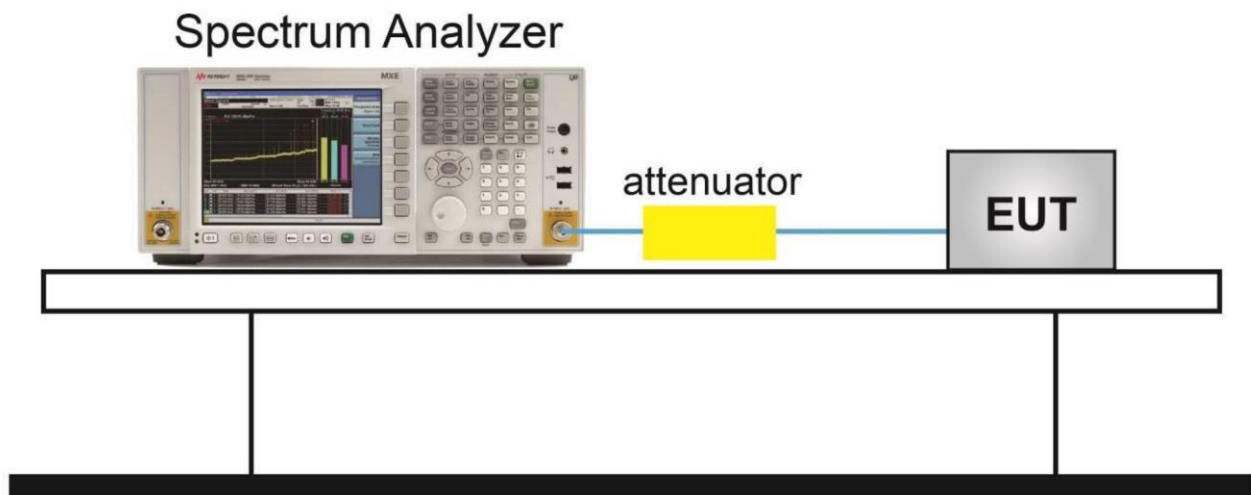
6.3. 6dB Occupied Bandwidth

6.3.1. Measurement Limit

Measurement Limit

Standard	Limit (kHz)
FCC 47 CFR Part 15.407 (e)	≥500
RSS-247 6.2.4.1	≥500

6.3.2. Test Setup



6.3.3. The measurement is made according to KDB 789033

Measurement Result

Mode	Channel	Occupied 6dB Bandwidth (MHz)	Conclusion
802.11a	149	16.35	P
	157	16.35	P
	165	16.35	P
802.11n HT20	149	17.07	P
	157	17.15	P
	165	16.99	P
802.11n HT40	151	35.58	P
	159	35.90	P
802.11ac HT20	149	17.07	P
	157	17.23	P
	165	17.07	P
802.11ac HT40	151	35.58	P
	159	35.74	P
802.11ac HT80	155	74.04	P

Test graphs as below

<p>Occupied 6dB Bandwidth (MHz) (802.11a, 5745MHz)</p>	<p>16.35</p>	<p>Occupied 6dB Bandwidth (MHz) (802.11a, 5785MHz)</p>	<p>16.35</p>
<p>Date: 8.JUN.2021 18:15:50</p>		<p>Date: 8.JUN.2021 18:16:51</p>	
<p>Occupied 6dB Bandwidth (MHz) (802.11a, 5825MHz)</p>	<p>16.35</p>	<p>Occupied 6dB Bandwidth (MHz) (802.11n-HT20, 5745MHz)</p>	<p>17.07</p>
<p>Date: 8.JUN.2021 18:18:00</p>		<p>Date: 8.JUN.2021 18:19:12</p>	

<p>Occupied 6dB Bandwidth (MHz) (802.11n-HT20, 5785MHz)</p>	<p>17.15</p>	<p>Occupied 6dB Bandwidth (MHz) (802.11n-HT20), 5825MHz)</p>	<p>16.99</p>
<p>Date: 8.JUN.2021 18:20:08</p>		<p>Date: 8.JUN.2021 18:21:16</p>	
<p>Occupied 6dB Bandwidth (MHz) (802.11n-HT40, 5755MHz)</p>	<p>35.58</p>	<p>Occupied 6dB Bandwidth (MHz) (802.11n-HT40), 5795MHz)</p>	<p>35.90</p>
<p>Date: 8.JUN.2021 18:22:26</p>		<p>Date: 8.JUN.2021 18:22:46</p>	

<p>Occupied 6dB Bandwidth (MHz) (802.11ac-HT20, 5745MHz)</p>	<p>17.07</p>	<p>Occupied 6dB Bandwidth (MHz) (802.11ac-HT20, 5785MHz)</p>	<p>17.23</p>
<p>Date: 8 JUN 2021 18:28:09</p>		<p>Date: 8 JUN 2021 18:26:10</p>	
<p>Occupied 6dB Bandwidth (MHz) (802.11ac-HT20, 5825MHz)</p>	<p>17.07</p>	<p>Occupied 6dB Bandwidth (MHz) (802.11ac-HT40), 5775MHz)</p>	<p>35.58</p>
<p>Date: 8 JUN 2021 18:26:59</p>		<p>Date: 8 JUN 2021 18:28:10</p>	
<p>Occupied 6dB Bandwidth (MHz) (802.11ac-HT40), 5795MHz)</p>	<p>35.74</p>	<p>Occupied 6dB Bandwidth (MHz) (802.11ac-HT80), 5775MHz)</p>	<p>74.04</p>
<p>Date: 8 JUN 2021 18:29:02</p>		<p>Date: 8 JUN 2021 18:30:08</p>	

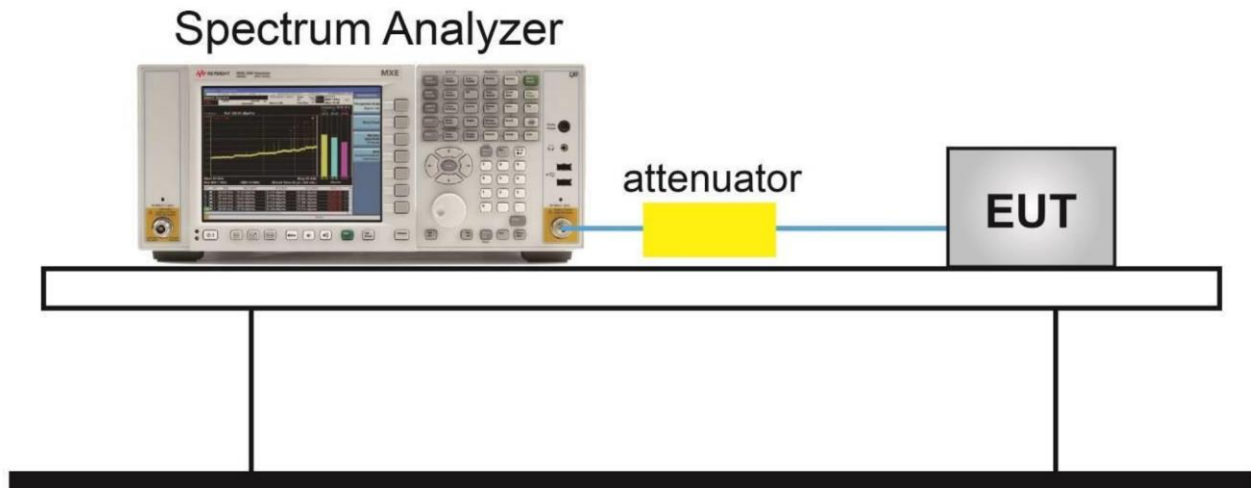
6.4. 99% Occupied Bandwidth

6.4.1. Measurement Limit

Measurement Limit

Standard	Limit (kHz)
RSS-GEN 6.7	N/A

6.4.2. Test Setup



6.4.3. The measurement is made according to KDB 789033

Measurement Result

Mode	Channel	99% Occupied Bandwidth (MHz)	Conclusion
802.11a	149	17.147	P
	157	17.228	P
	165	17.067	P
802.11n HT20	149	18.109	P
	157	18.189	P
	165	18.029	P
802.11n HT40	151	37.019	P
	159	37.340	P
802.11ac HT20	149	18.189	P
	157	18.269	P
	165	18.109	P
802.11ac HT40	151	36.699	P
	159	37.019	P
802.11ac HT80	155	75.962	P



Test graphs as below

<p>99% Occupied Bandwidth (MHz) (802.11a, 5745MHz)</p>	<p>17.147</p>	<p>99% Occupied Bandwidth (MHz) (802.11a, 5785MHz)</p>	<p>17.228</p>
<p>Date: 8 JUN 2021 18:31:45</p>		<p>Date: 8 JUN 2021 18:32:59</p>	
<p>99% Occupied Bandwidth (MHz) (802.11a, 5825MHz)</p>	<p>17.067</p>	<p>99% Occupied Bandwidth (MHz) (802.11n-HT20, 5745MHz)</p>	<p>18.109</p>
<p>Date: 8 JUN 2021 18:32:58</p>		<p>Date: 8 JUN 2021 18:35:17</p>	
<p>99% Occupied Bandwidth (MHz) (802.11n-HT20, 5785MHz)</p>	<p>18.189</p>	<p>99% Occupied Bandwidth (MHz) (802.11n-HT20), 5825MHz)</p>	<p>18.029</p>
<p>Date: 8 JUN 2021 18:36:19</p>		<p>Date: 8 JUN 2021 18:37:31</p>	
<p>99% Occupied Bandwidth</p>	<p>37.019</p>	<p>99% Occupied Bandwidth</p>	<p>37.340</p>

<p>(MHz) (802.11n-HT40, 5755MHz)</p>		<p>(MHz) (802.11n-HT40), 5795MHz)</p>	
<p>Ref 20 dBm Att 15 dB RBW 500 kHz VBW 1 MHz SWT 20 ms Marker 1 [T1] -22.35 dBm 5.78000000 GHz</p> <p>ORW 7.01923769 MHz Temp 1 [T1] 0dB -4.92 dBm 5.73607513 GHz</p> <p>Temp 2 [T1] 0dB -6.61 dBm 5.77358744 GHz</p> <p>Center 5.755 GHz 10 MHz/ Span 100 MHz</p> <p>Date: 8.JUN.2021 18:39:05</p>		<p>Ref 20 dBm Att 15 dB RBW 500 kHz VBW 1 MHz SWT 20 ms Marker 1 [T1] 1.03 dBm 5.78000000 GHz</p> <p>ORW 7.33974090 MHz Temp 1 [T1] 0dB -4.75 dBm 5.77641225 GHz</p> <p>Temp 2 [T1] 0dB -6.61 dBm 5.81375000 GHz</p> <p>Center 5.795 GHz 10 MHz/ Span 100 MHz</p> <p>Date: 8.JUN.2021 18:40:03</p>	
<p>99% Occupied Bandwidth (MHz) (802.11ac-HT20, 5745MHz)</p>	<p>18.189</p>	<p>99% Occupied Bandwidth (MHz) (802.11ac-HT20, 5785MHz)</p>	<p>18.269</p>
<p>Ref 20 dBm Att 15 dB RBW 300 kHz VBW 1 MHz SWT 20 ms Marker 1 [T1] -37.09 dBm 5.77000000 GHz</p> <p>ORW 8.18910364 MHz Temp 1 [T1] 0dB -4.80 dBm 5.73594513 GHz</p> <p>Temp 2 [T1] 0dB -6.61 dBm 5.75413461 GHz</p> <p>Center 5.745 GHz 5 MHz/ Span 50 MHz</p> <p>Date: 8.JUN.2021 18:41:18</p>		<p>Ref 20 dBm Att 15 dB RBW 300 kHz VBW 1 MHz SWT 20 ms Marker 1 [T1] -24.08 dBm 5.77000000 GHz</p> <p>ORW 8.26923769 MHz Temp 1 [T1] 0dB -4.60 dBm 5.77586385 GHz</p> <p>Temp 2 [T1] 0dB -6.61 dBm 5.79413461 GHz</p> <p>Center 5.785 GHz 5 MHz/ Span 50 MHz</p> <p>Date: 8.JUN.2021 18:42:41</p>	

<p>99% Occupied Bandwidth (MHz) (802.11ac-HT20, 5825MHz)</p>	<p>18.109</p>	<p>99% Occupied Bandwidth (MHz) (802.11ac-HT40, 5775MHz)</p>	<p>36.699</p>
<p>Date: 8 JUN.2021 18:48:54</p>		<p>Date: 8 JUN.2021 18:48:07</p>	
<p>99% Occupied Bandwidth (MHz) (802.11ac-HT40, 5795MHz)</p>	<p>37.019</p>	<p>99% Occupied Bandwidth (MHz) (802.11ac-HT80, 5775MHz)</p>	<p>75.962</p>
<p>Date: 8 JUN.2021 18:46:05</p>		<p>Date: 8 JUN.2021 18:47:18</p>	

6.5. Frequency Stability

Manufacturers ensured the EUT meet the requirement of frequency stability, such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

6.6. Transmitter Spurious Emission

Measurement Limit

Standard	Limit
FCC 47 Part 15.407, 15.205, 15.209	< -27
RSS-247 6.2.4.2 RSS-Gen 8.9, 8.10	< -27

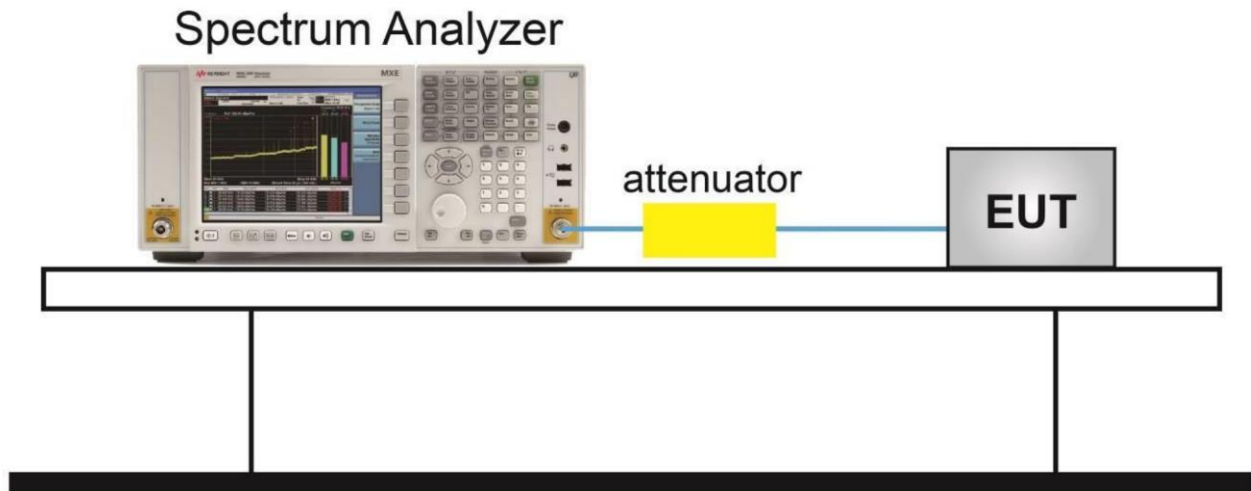
The measurement is made according to ANSI C63.10.

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
0.009-0.490	2400/F(kHz)	/
0.490-1.705	24000/F(kHz)	/
1.705-30	30	/
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

6.6.1. Transmitter Spurious Emission – Conducted

Modulation type and data rate tested (Only worst case result is given below):

Mode	Data rate	Channel
802.11a	6Mbps	149
802.11n-HT20	6Mbps	149
802.11n-HT40	MCS0	151
802.11ac-HT20	6Mbps	149
802.11ac-HT40	MCS0	151
802.11ac-HT80	MCS0	155



6.6.1.2 Measurement Results

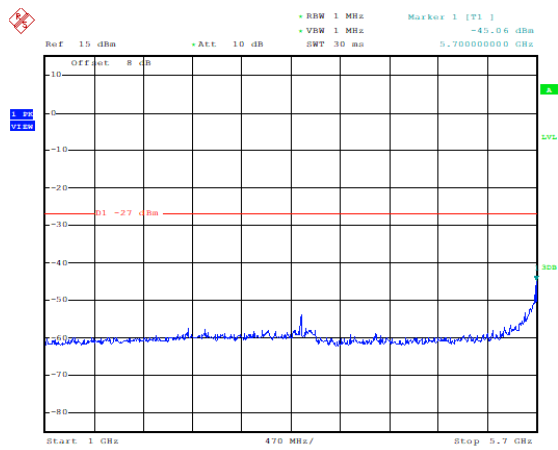
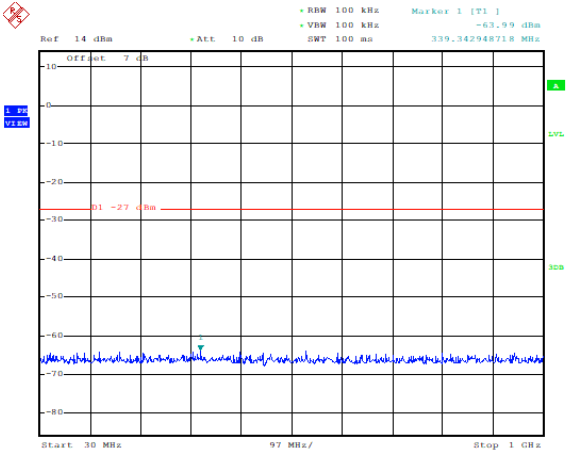
MODE	Channel	Frequency Range	Conclusion
802.11a	149(5745MHz)	30 MHz ~ 1 GHz	P
		1 GHz ~ 5.7 GHz	P
		5.9 GHz ~ 40 GHz	P
802.11n-HT20	149	30 MHz ~ 1 GHz	P
		1 GHz ~ 5.7 GHz	P
		5.9 GHz ~ 40 GHz	P
802.11n-HT40	151(5755MHz)	30 MHz ~ 1 GHz	P
		1 GHz ~ 5.7 GHz	P
		5.9 GHz ~ 40 GHz	P
802.11ac-HT20	149	30 MHz ~ 1 GHz	P
		1 GHz ~ 5.7 GHz	P
		5.9 GHz ~ 40 GHz	P
802.11ac-HT40	151(5755MHz)	30 MHz ~ 1 GHz	P
		1 GHz ~ 5.7 GHz	P
		5.9 GHz ~ 40 GHz	P
802.11ac-HT80	155(5775MHz)	30 MHz ~ 1 GHz	P
		1 GHz ~ 5.7 GHz	P
		5.9 GHz ~ 40 GHz	P

Test graphs as below

<p style="text-align: center;">Conducted Spurious Emission (802.11a, ch149, 30MHz-1GHz)</p>	<p style="text-align: center;">Conducted Spurious Emission (802.11a, ch149, 1GHz-5.7GHz)</p>
<p style="text-align: center;">Conducted Spurious Emission (802.11a, ch149, 5.7GHz -40GHz)</p>	Empty plot area

Conducted Spurious Emission
(802.11n-HT20, ch149, 30MHz-1GHz)

Conducted Spurious Emission
(802.11n-HT20, ch149, 1GHz-5.7GHz)

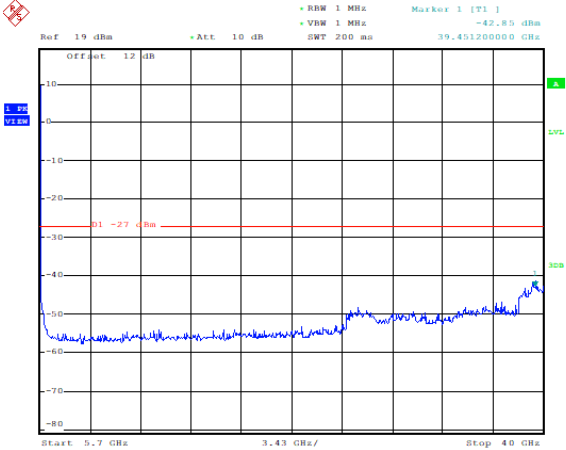


Date: 22.JUL.2021 16:28:44

Date: 22.JUL.2021 16:24:00

Conducted Spurious Emission
(802.11n-HT20, ch149, 5.7GHz -40GHz)

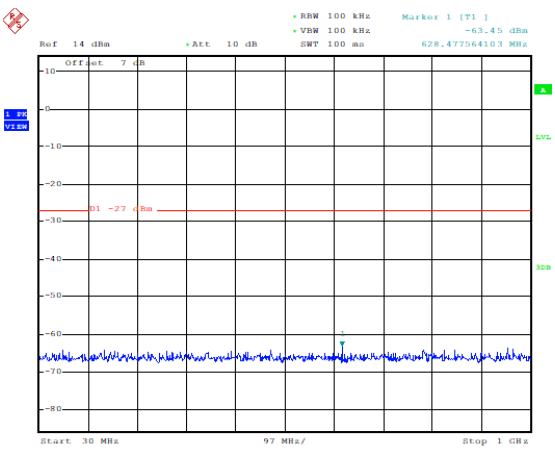
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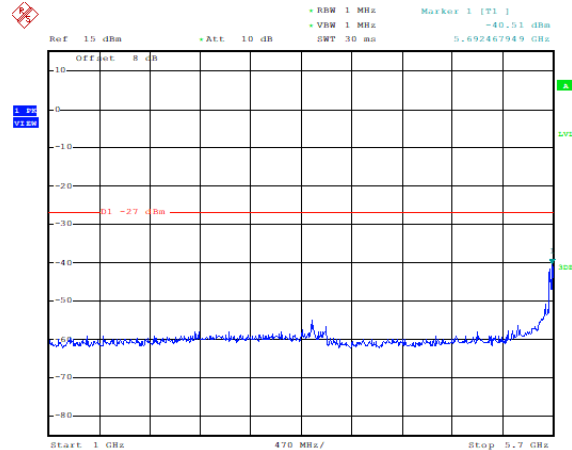
Date: 22.JUL.2021 16:24:16

Conducted Spurious Emission (802.11n-HT40, ch151, 30MHz-1GHz)



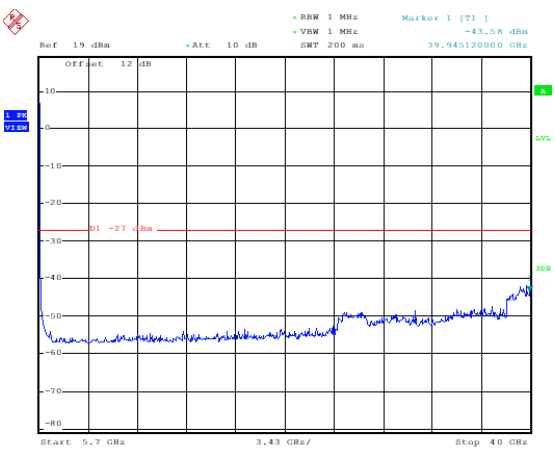
Date: 22.JUL.2021 16:25:29

Conducted Spurious Emission (802.11n-HT40, ch151, 1GHz-5.7GHz)



Date: 22.JUL.2021 16:25:55

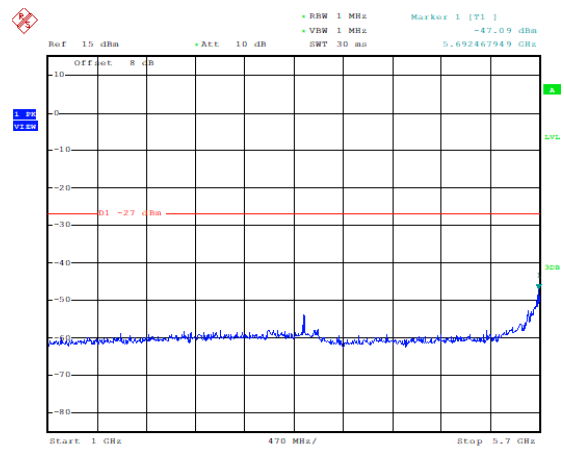
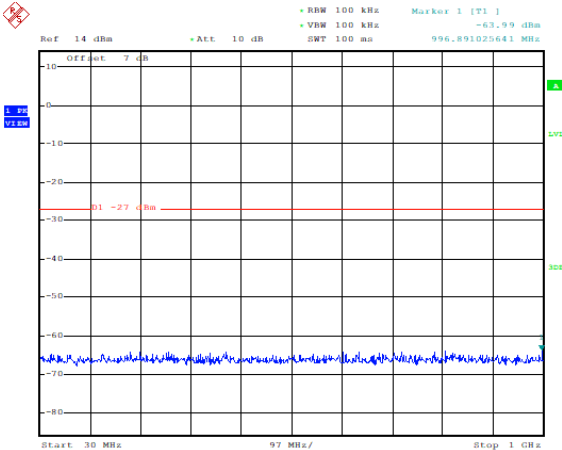
Conducted Spurious Emission (802.11n-HT40, ch151, 5.7GHz -40GHz)



Date: 22.JUL.2021 16:26:12

Conducted Spurious Emission
(802.11ac-HT20, ch149, 30MHz-1GHz)

Conducted Spurious Emission
(802.11ac-HT20, ch149, 1GHz-5.7GHz)

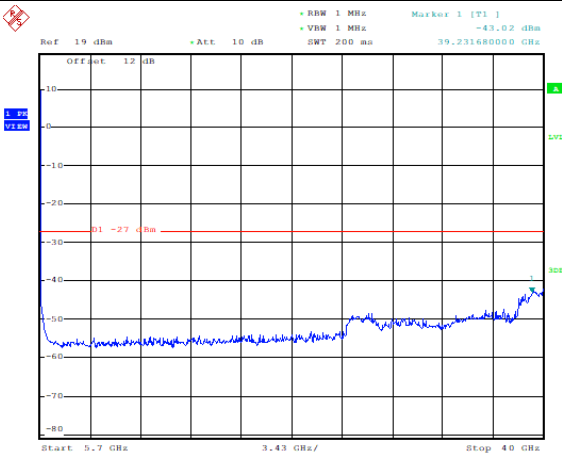


Date: 22. JUL. 2021 16:28:00

Date: 22. JUL. 2021 16:28:17

Conducted Spurious Emission
(802.11ac-HT20, ch149, 5.7GHz -40GHz)

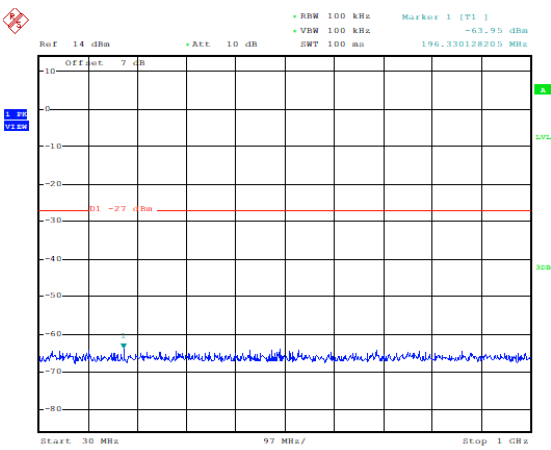
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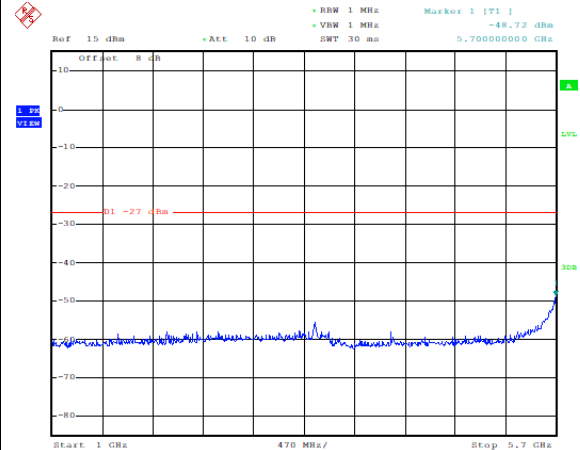
Date: 22. JUL. 2021 16:28:34

Conducted Spurious Emission (802.11ac-HT40, ch151, 30MHz-1GHz)



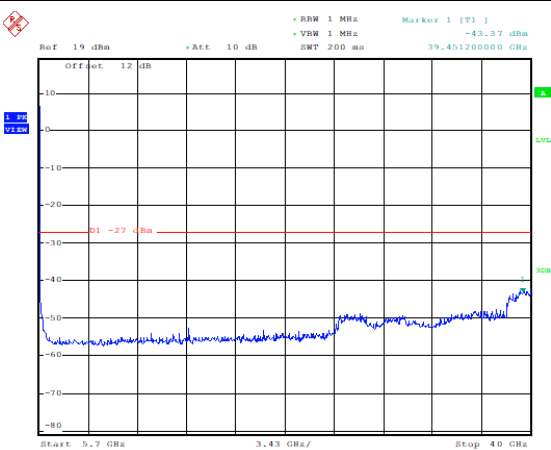
Date: 22.JUL.2021 16:29:58

Conducted Spurious Emission (802.11ac-HT40, ch151, 1GHz-5.7GHz)



Date: 22.JUL.2021 16:30:15

Conducted Spurious Emission (802.11ac-HT40, ch151, 5.7GHz -40GHz)



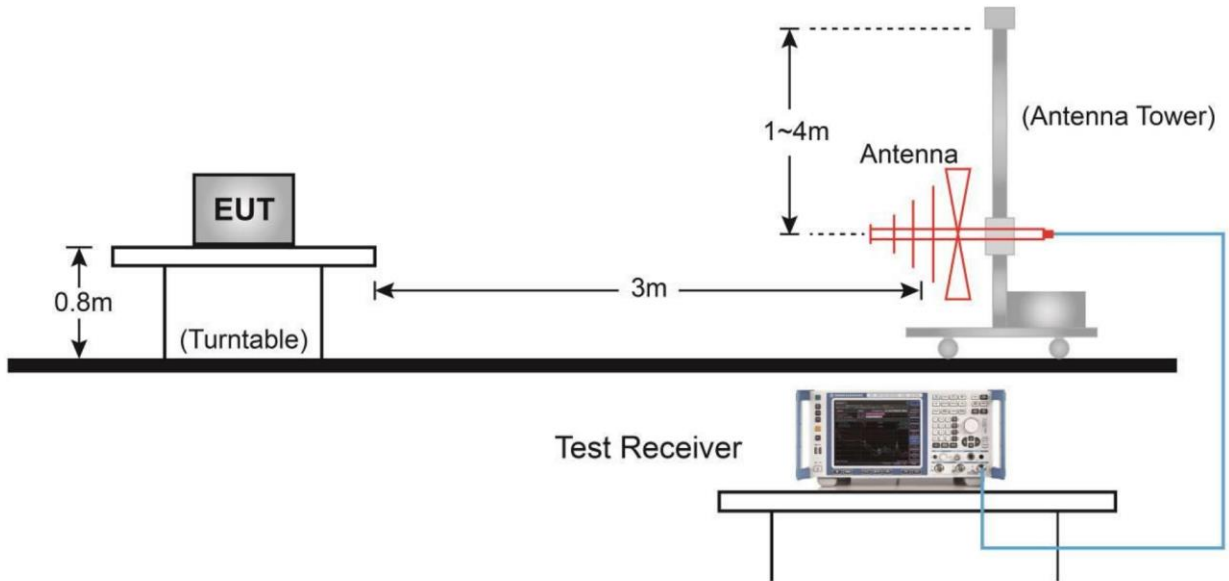
Date: 22.JUL.2021 16:30:21

<p align="center">Conducted Spurious Emission (802.11ac-HT80, ch155, 30MHz-1GHz)</p>	<p align="center">Conducted Spurious Emission (802.11ac-HT80, ch155, 1GHz-5.7GHz)</p>
<p>Date: 22.JUL.2021 16:32:26</p>	<p>Date: 22.JUL.2021 16:32:42</p>
<p align="center">Conducted Spurious Emission (802.11ac-HT80, ch155, 5.7GHz -40GHz)</p>	<p align="center">/</p>
<p>Date: 22.JUL.2021 16:32:59</p>	<p align="center">/</p>

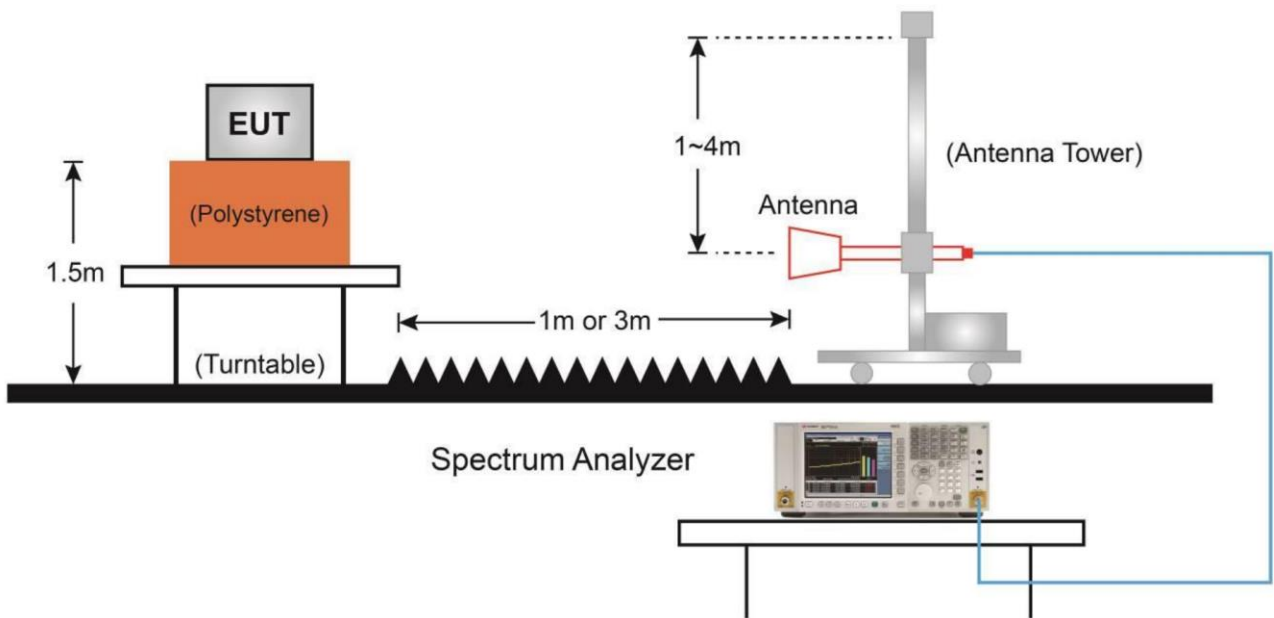
6.6.2. Transmitter Spurious Emission – Radiated

6.6.2.1 Test Setup

Below 1GHz Test Setup



Above 1GHz Test Setup:



6.6.2.2 Measurement Results

Modulation type and data rate tested (Only worst case result is given below):

Mainly Supply		
Mode	Data rate	Channel
802.11a	6Mbps	149(5745MHz)
802.11n-HT20	MCS0	157(5785MHz)
802.11n-HT40	MCS0	159(5795MHz)
802.11ac-HT20	MCS0	165(5825MHz)
802.11ac-HT40	MCS0	159(5795MHz)
802.11ac-HT80	MCS0	155(5775MHz)

Secondary Supply		
Mode	Data rate	Channel
802.11ac-HT80	MCS0	155(5775MHz)

Thirdly Supply		
Mode	Data rate	Channel
802.11ac-HT80	MCS0	155(5775MHz)

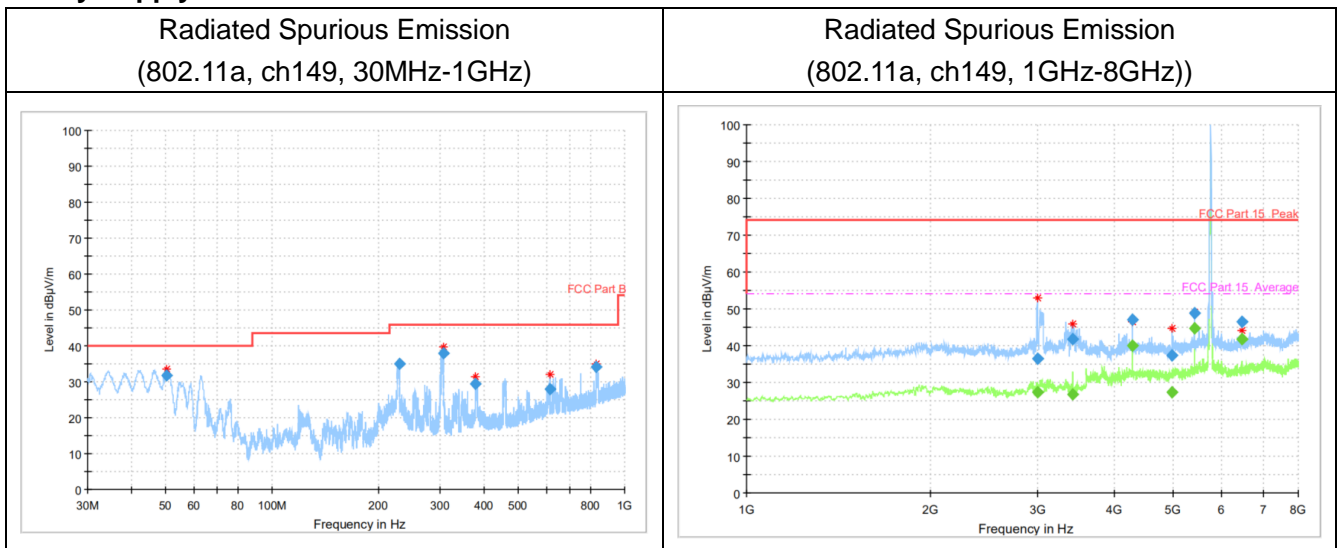
Mainly Supply			
Mode	Channel	Frequency Range	Conclusion
802.11a	149(5745MHz)	30 MHz ~1 GHz	P
		1 GHz ~ 8 GHz	P
		8 GHz ~ 18 GHz	P
		18 GHz ~ 26.5 GHz	P
		26.5 GHz~ 40 GHz	P
802.11n-HT20	157(5785MHz)	30 MHz ~1 GHz	P
		1 GHz ~ 8 GHz	P
		8 GHz ~ 18 GHz	P
		18 GHz ~ 26.5 GHz	P
		26.5 GHz~ 40 GHz	P
802.11n-HT40	159(5795MHz)	30 MHz ~1 GHz	P
		1 GHz ~ 8 GHz	P
		8 GHz ~ 18 GHz	P
		18 GHz ~ 26.5 GHz	P
		26.5 GHz~ 40 GHz	P
802.11ac-HT20	165(5825MHz)	30 MHz ~1 GHz	P
		1 GHz ~ 8 GHz	P
		8 GHz ~ 18 GHz	P
		18 GHz ~ 26.5 GHz	P
		26.5 GHz~ 40 GHz	P
802.11ac-HT40	159(5795MHz)	30 MHz ~1 GHz	P
		1 GHz ~ 8 GHz	P
		8 GHz ~ 18 GHz	P
		18 GHz ~ 26.5 GHz	P
		26.5 GHz~ 40 GHz	P
802.11ac-HT80	155(5775MHz)	30 MHz ~1 GHz	P
		1 GHz ~ 8 GHz	P
		8 GHz ~ 18 GHz	P
		18 GHz ~ 26.5 GHz	P
		26.5 GHz~ 40 GHz	P

Secondary Supply			
Mode	Channel	Frequency Range	Conclusion
802.11ac-HT80	155(5775MHz)	30 MHz ~1 GHz	P
		1 GHz ~ 8 GHz	P
		8 GHz ~ 18 GHz	P
		18 GHz ~ 26.5 GHz	P
		26.5 GHz~ 40 GHz	P

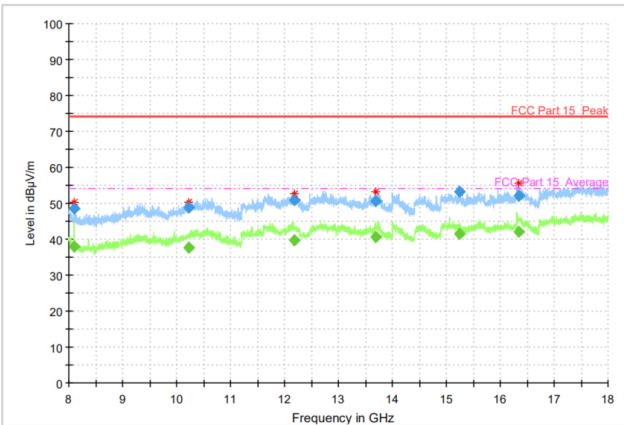
Thirdly Supply			
Mode	Channel	Frequency Range	Conclusion
802.11ac-HT80	155(5775MHz)	30 MHz ~1 GHz	P
		1 GHz ~ 8 GHz	P
		8 GHz ~ 18 GHz	P
		18 GHz ~ 26.5 GHz	P
		26.5 GHz~ 40 GHz	P

Test graphs as below

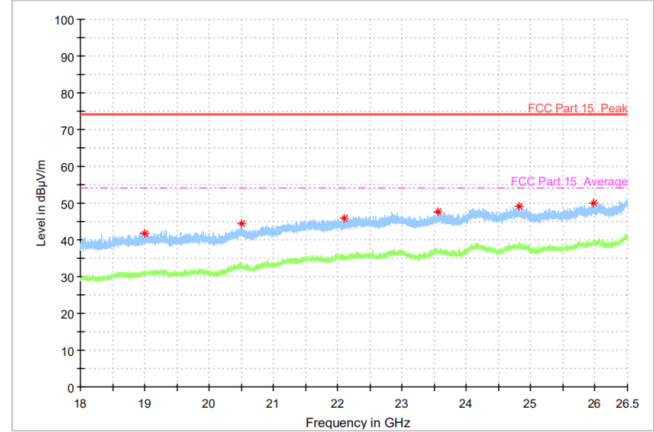
Mainly Supply



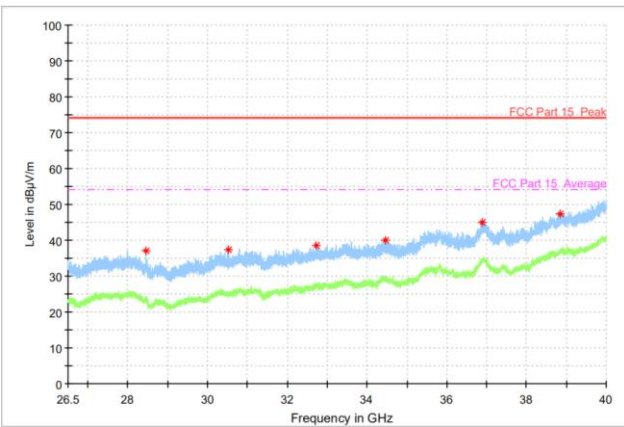
Radiated Spurious Emission
(802.11a, ch149, 8GHz-18GHz)



Radiated Spurious Emission
(802.11n, ch149, 18GHz-25.6GHz)



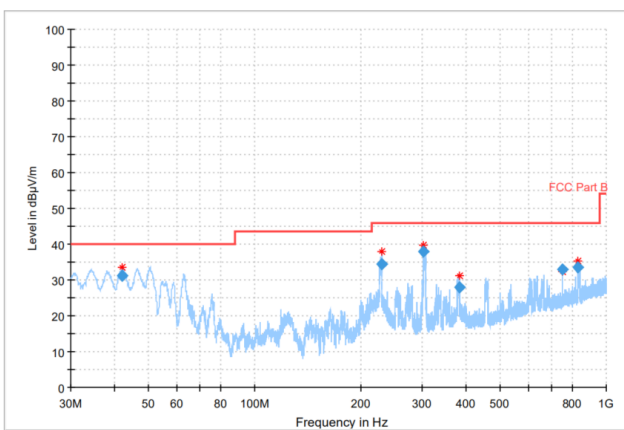
Radiated Spurious Emission
(802.11a, ch149, 26.5 GHz-40 GHz)



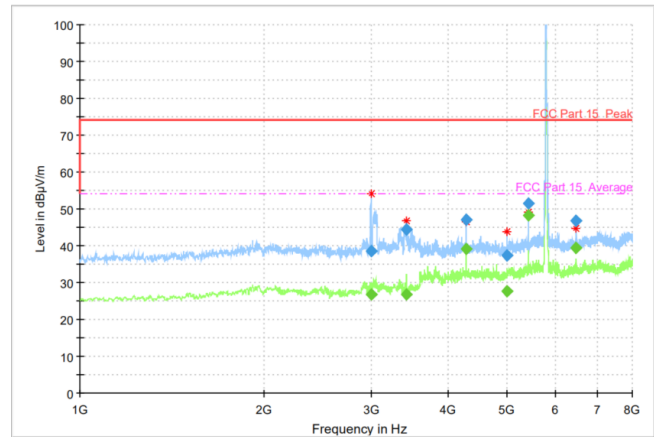
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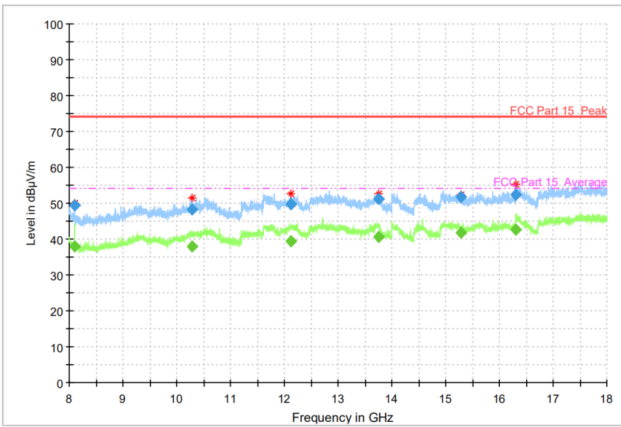
Radiated Spurious Emission
(802.11n-HT20, ch157, 30MHz-1GHz)



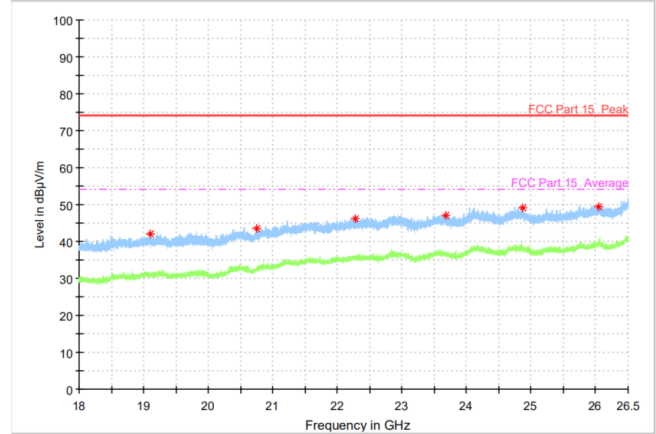
Radiated Spurious Emission
(802.11n-HT20, ch157, 1GHz-8GHz)



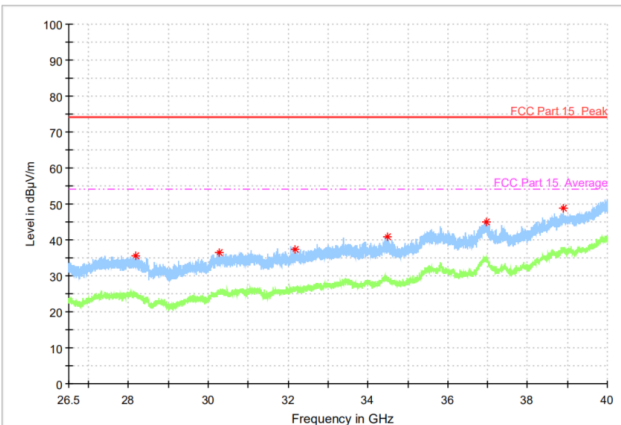
Radiated Spurious Emission
(802.11n-HT20, ch157, 8GHz-18GHz)



Radiated Spurious Emission
(802.11n-HT20, ch157, 18GHz-25.6GHz)



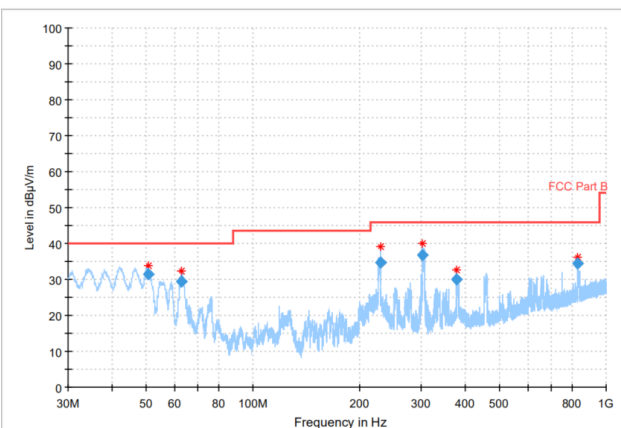
Radiated Spurious Emission
(802.11n-HT20, ch157, 25.6GHz-40GHz)



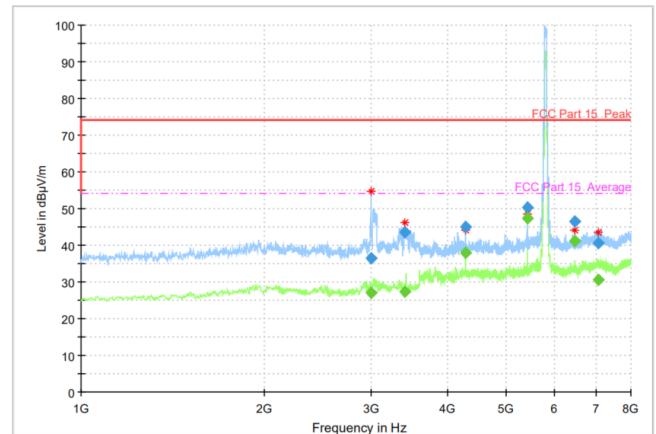
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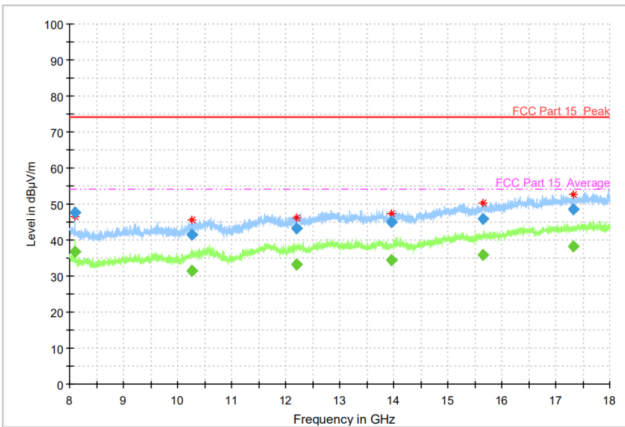
Radiated Spurious Emission
(802.11n-HT40, ch159, 30MHz-1GHz)



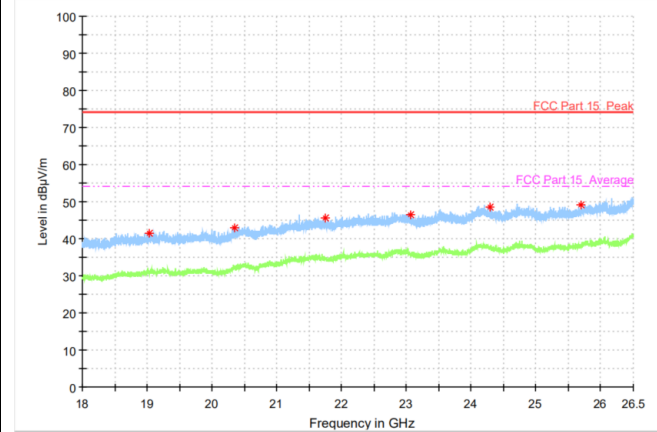
Radiated Spurious Emission
(802.11n-HT40, ch159, 1GHz-8GHz)



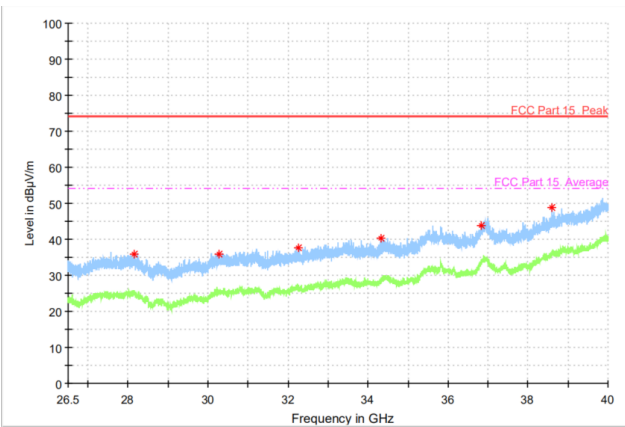
Radiated Spurious Emission
(802.11n-HT40, ch159, 8GHz-18GHz)



Radiated Spurious Emission
(802.11n-HT40, ch159, 18GHz-25.6GHz)



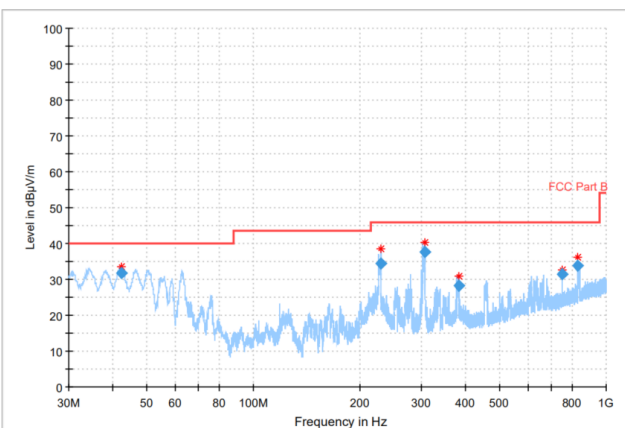
Radiated Spurious Emission
(802.11n-HT20, ch157, 25.6GHz-40GHz)



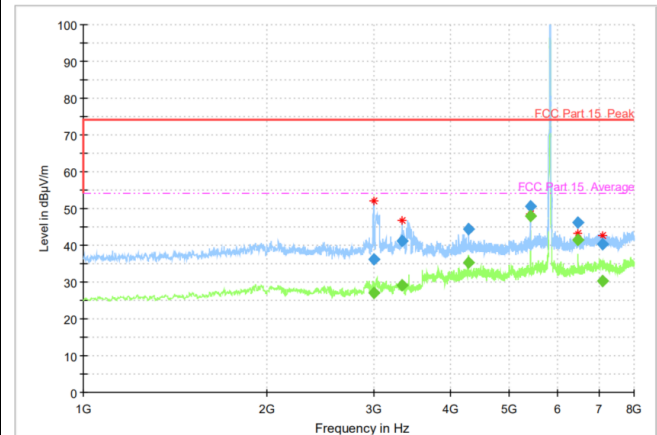
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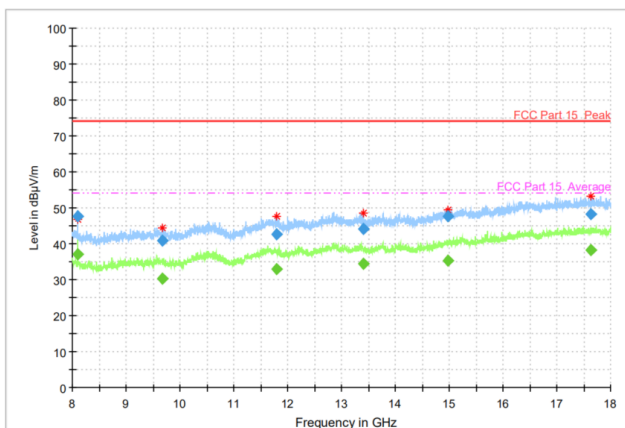
Radiated Spurious Emission
(802.11ac-HT20, ch165, 30MHz-1GHz)



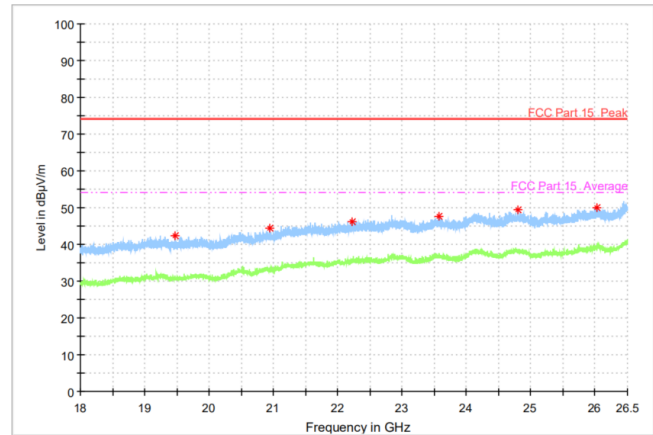
Radiated Spurious Emission
(802.11ac-HT20, ch165, 1GHz-8GHz)



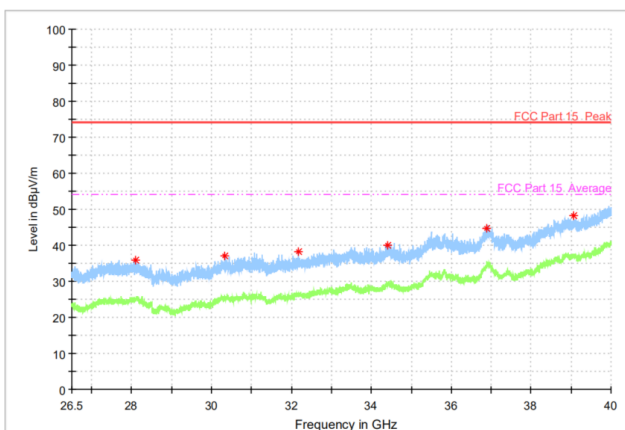
Radiated Spurious Emission
(802.11ac-HT20, ch165, 8GHz-18GHz)



Radiated Spurious Emission
(802.11ac-HT20, ch165, 18GHz-25.6GHz)



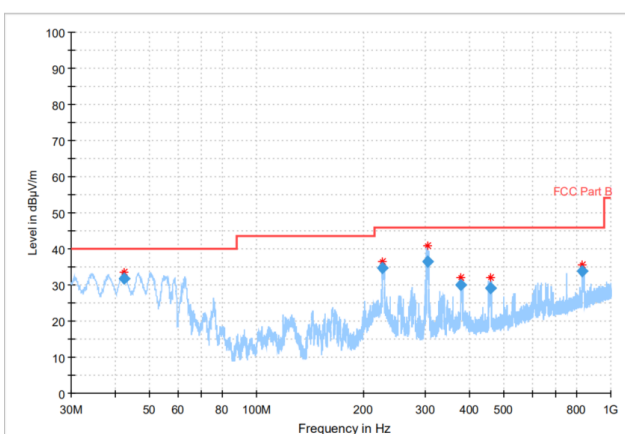
Radiated Spurious Emission
(802.11ac-HT20, ch165, 25.6GHz-40GHz)



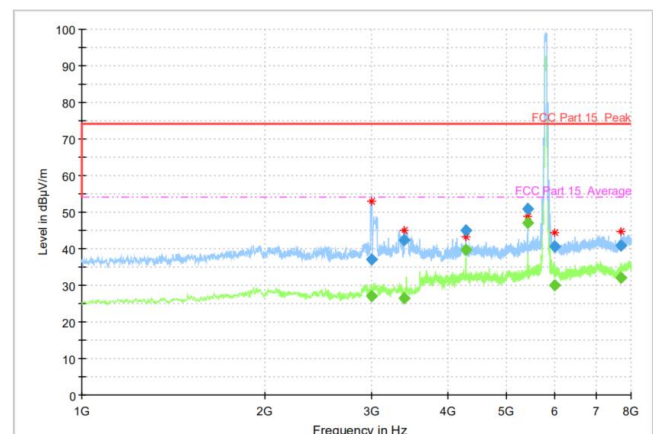
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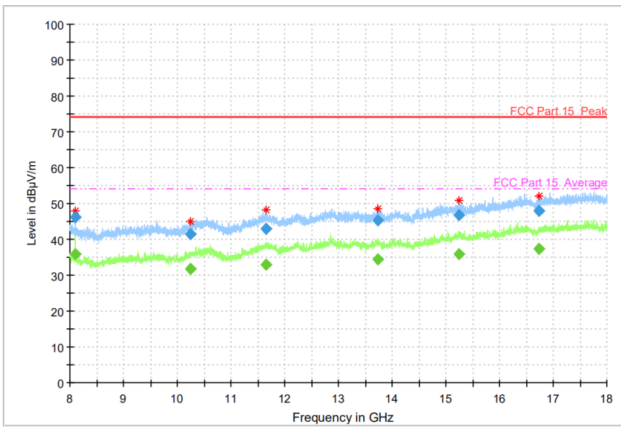
Radiated Spurious Emission
(802.11ac-HT40, ch159, 30MHz-1GHz)



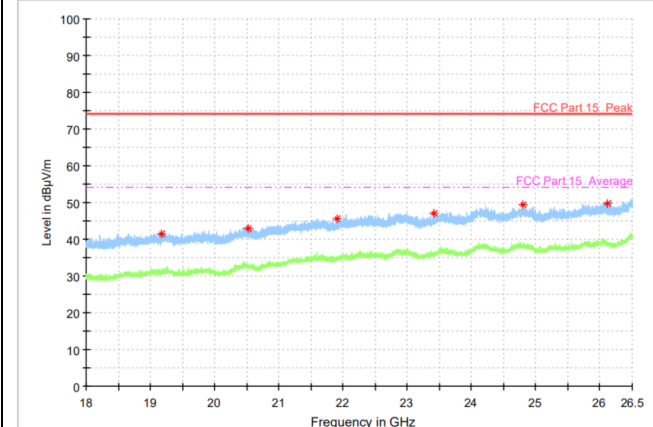
Radiated Spurious Emission
(802.11ac-HT40, ch159, 1GHz-8GHz)



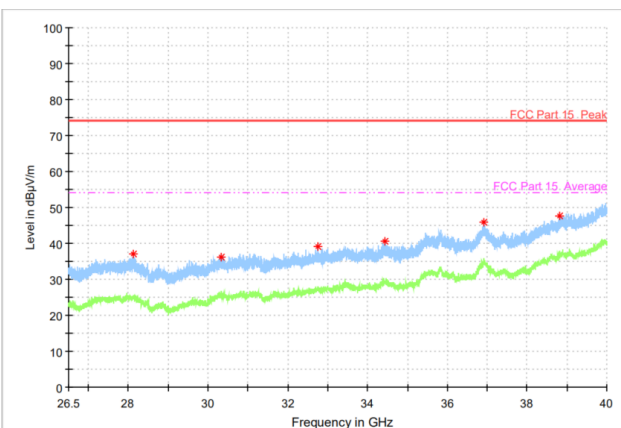
Radiated Spurious Emission
(802.11ac-HT40, ch159, 8GHz-18GHz)



Radiated Spurious Emission
(802.11ac-HT40, ch159, 18GHz-25.6GHz)



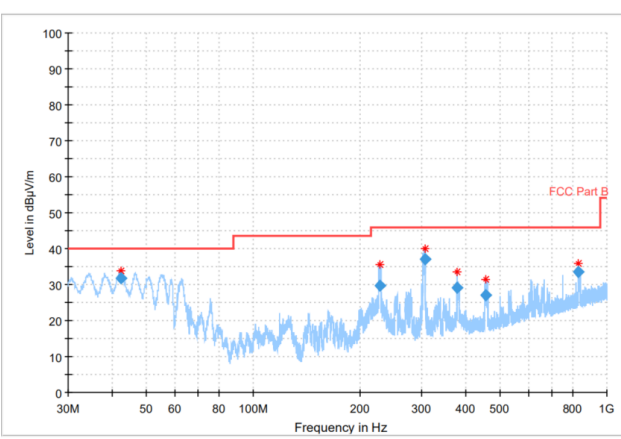
Radiated Spurious Emission
(802.11ac-HT40, ch159, 25.6GHz-40GHz)



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Radiated Spurious Emission
(802.11ac-HT80, ch155, 30MHz-1GHz)



Radiated Spurious Emission
(802.11ac-HT80, ch155, 1GHz-8GHz)

