

# TEST REPORT

FCC UNII Test for DA351I6MG  
Certification

**APPLICANT**

Hyundai Mobis Co., Ltd

**REPORT NO.**

HCT-RF-2503-FC051-R1

**DATE OF ISSUE**

April 8, 2025

Tested by  
Kyung Jun Woo



Technical Manager  
Jong Seok Lee



Accredited by KOLAS, Republic of KOREA

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# TEST REPORT

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April 08, 2025

**Additional Model**  
DA350I6NG, DA351I6NG, DA350I6GG, DA351I6GG, DA352I6GG, DA350I6GN,  
DA350I6GP, DA350I6MG, DA360I6GG, DA361I6GG, DA360I6GN, DA360I6GP

**Applicant** **Hyundai Mobis Co., Ltd**  
203, Teheran-ro, Gangnam-gu, Seoul, Republic of Korea

<b>Product Name</b>	DISPLAY CAR SYSTEM
<b>Model Name</b>	DA351I6MG
<b>FCC ID</b>	TQ8-DA351I6MG
<b>Date of Test</b>	February 14, 2025 ~ March 13, 2025
<b>FCC Classification</b>	Unlicensed National Information Infrastructure(NII)
<b>Test Standard Used</b>	FCC Rule Part(s): Part 15.407
<b>Test Results</b>	PASS
<b>Location of Test</b>	<input checked="" type="checkbox"/> Permanent Testing Lab <input type="checkbox"/> On Site Testing Lab (Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea)

## REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	March 13, 2025	Initial Release
1	April 08, 2025	Page 26, Revised the Worst case configuration and mode

## Notice

### Content

Engineering Statement:

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance.

The laboratory is not accredited for the test results marked \*.

Information provided by the applicant is marked \*\*.

Test results provided by external providers are marked \*\*\*.

The results shown in this test report only apply to the sample(s), as received, provided by the applicant, unless otherwise stated.

The test results have only been applied with the test methods required by the standard(s).

When confirmation of authenticity of this test report is required, please contact [www.hct.co.kr](http://www.hct.co.kr)

This test report provides test result(s) under the scope accredited by the Korea Laboratory Accreditation Scheme (KOLAS), which signed the ILAC-MRA.  
(KOLAS (KS Q ISO/IEC 17025) Accreditation No. KT197)

This test report provides test result(s) under the lab's valid Scope of Accreditation by A2LA (American Association for Laboratory Accreditation), signatory of the ILAC-MRA.  
(A2LA (ISO/IEC 17025) Certificate No. 4114.01)

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## 1. GENERAL INFORMATION

### EUT DESCRIPTION

<b>Model</b>	DA351I6MG		
<b>Additional Model</b>	DA350I6NG, DA351I6NG, DA350I6GG, DA351I6GG, DA352I6GG, DA350I6GN, DA350I6GP, DA350I6MG, DA360I6GG, DA361I6GG, DA360I6GN, DA360I6GP		
<b>EUT Type</b>	DISPLAY CAR SYSTEM		
<b>Power Supply</b>	DC 14.4 V		
<b>Modulation Type</b>	OFDM : 802.11a, 802.11n, 802.11ac		
<b>Frequency Range (MHz)</b>	U-NII-1	20 MHz BW : 5180 - 5240	
		40 MHz BW : 5190 - 5230	
		80 MHz BW : 5210	
	U-NII-2A	20 MHz BW : 5260 - 5320	
		40 MHz BW : 5270 - 5310	
		80 MHz BW : 5290	
	U-NII-2C	20 MHz BW : 5500 - 5720	
		40 MHz BW : 5510 - 5710	
		80 MHz BW : 5530 - 5690	
	U-NII-3	20 MHz BW : 5745 - 5825	
		40 MHz BW : 5755 - 5795	
		80 MHz BW : 5775	
<b>Straddle channel</b>	Supported		
<b>TDWR Band</b>	Supported		
<b>Dynamic Frequency Selection</b>	Slave without radar detection		
<b>Antenna Specification</b>	Type: Pattern Antenna U-NII-1: -0.61 dBi, U-NII-2A: -0.18 dBi , U-NII-2C: -0.77 dBi, U-NII-3: -0.18 dBi		
<b>Serial number</b>	Conducted : MMA240730050 Radiated : MMA240730045		

This device supports simultaneous transmission operation.

Simultaneous transmission Scenario	2.4 GHz WiFi	5 GHz WiFi	BT	Test Case
Bluetooth + 2.4 GHz WiFi	on	-	on	Scenario1
Bluetooth + 5 GHz WiFi	-	on	on	Scenario2

## 2. MAXIMUM OUTPUT POWER

The transmitter has a maximum total conducted average output power as follows:

Band	Mode	RF Output Power (dBm)	RF Output Power (W)
U-NII-1	802.11a	7.68	0.006
	802.11n (HT20)	7.81	0.006
	802.11n (HT40)	3.76	0.002
	802.11ac (VHT20)	7.85	0.006
	802.11ac (VHT40)	3.80	0.002
	802.11ac (VHT80)	4.48	0.003
U-NII-2A	802.11a	7.95	0.006
	802.11n (HT20)	7.65	0.006
	802.11n (HT40)	6.26	0.004
	802.11ac (VHT20)	7.96	0.006
	802.11ac (VHT40)	6.63	0.005
	802.11ac (VHT80)	6.75	0.005
U-NII-2C	802.11a	5.44	0.004
	802.11n (HT20)	5.46	0.004
	802.11n (HT40)	4.96	0.003
	802.11ac (VHT20)	5.40	0.003
	802.11ac (VHT40)	5.24	0.003
	802.11ac (VHT80)	5.19	0.003
U-NII-3	802.11a	2.89	0.002
	802.11n (HT20)	2.74	0.002
	802.11n (HT40)	2.30	0.002
	802.11ac (VHT20)	2.64	0.002
	802.11ac (VHT40)	2.21	0.002
	802.11ac (VHT80)	2.36	0.002

### 3. TEST METHODOLOGY

The measurement procedure described in FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01 dated December 14, 2017 entitled “Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part15, Subpart E” and ANSI C63.10(Version : 2013) ‘the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices’ were used in the measurement.

#### EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

#### EUT EXERCISE

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.407 under the FCC Rules Part 15 Subpart E.

#### GENERAL TEST PROCEDURES

##### Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10. (Version :2013) Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-peak and average Measurement Typeor modes.

##### Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1 GHz. Above 1 GHz with 1.5 m using absorbers between the EUT and receive antenna. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3 m away from the receiving antenna, which varied from 1 m to 4 m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 6.6.5 of ANSI C63.10. (Version: 2013)

## DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

## 4. INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment's, which is traceable to recognized national standards. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

## 5. FACILITIES AND ACCREDITATIONS

### 5.1 FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.

Detailed description of test facility was submitted to the Commission and accepted dated March 11, 2024 (Registration Number: KR0032).

### 5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak Measurement Typeors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

## 6. ANTENNA REQUIREMENTS

According to FCC 47 CFR § 15.203, § 15.407:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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.”

- (1) The antennas of this E.U.T are permanently attached.
- (2) The E.U.T Complies with the requirement of § 15.203, § 15.407

## 7. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013.

All measurement uncertainty values are shown with a coverage factor of  $k=2$  to indicate a 95 % level of confidence.

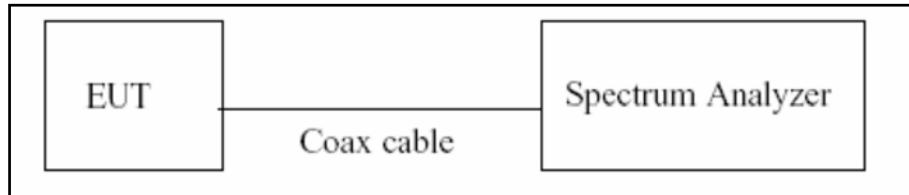
The measurement data shown herein meets or exceeds the  $U_{\text{CISPR}}$  measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty ( $\pm$ kHz)
X dB, 99% Bandwidth	95 (Confidence level about 95 %, $k=2$ )
Frequency stability	28 (Confidence level about 95 %, $k=2$ )
Parameter	Expanded Uncertainty ( $\pm$ dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.98 (Confidence level about 95 %, $k=2$ )
Conducted Output Power(Power Meter)	0.54 (Confidence level about 95 %, $k=2$ )
Conducted Output Power(Signal Analyzer)	0.68 (Confidence level about 95 %, $k=2$ )
Power Spectral Density	1.03 (Confidence level about 95 %, $k=2$ )
Radiated Disturbance (9 kHz ~ 30 MHz)	4.36 (Confidence level about 95 %, $k=2$ )
Radiated Disturbance (30 MHz ~ 1 GHz)	5.70 (Confidence level about 95 %, $k=2$ )
Radiated Disturbance (1 GHz ~ 18 GHz)	5.52 (Confidence level about 95 %, $k=2$ )
Radiated Disturbance (18 GHz ~ 40 GHz)	5.66 (Confidence level about 95 %, $k=2$ )
Radiated Disturbance (Above 40 GHz)	5.58 (Confidence level about 95 %, $k=2$ )

## 8. DESCRIPTION OF TESTS

### 8.1. Duty Cycle

#### Test Configuration



#### Test Procedure

The transmitter output is connected to the Spectrum Analyzer.

We tested according to Procedure B.2 in KDB 789033 D02 v02r01.

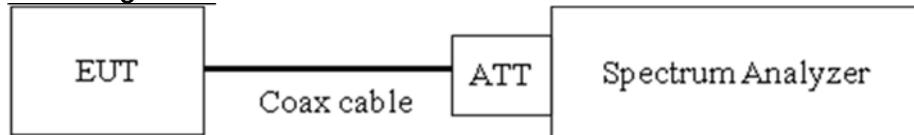
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz ( $\geq$  RBW)
3. SPAN = 0 Hz
4. Measurement Type or = Peak
5. Number of points in sweep  $> 100$
6. Trace mode = Clear write
7. Measure  $T_{\text{total}}$  and  $T_{\text{on}}$
8. Calculate Duty Cycle =  $T_{\text{on}} / T_{\text{total}}$  and Duty Cycle Factor =  $10\log(1/\text{Duty Cycle})$

## 8.2. 6 dB Bandwidth & 26 dB Bandwidth

### Limit

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

### Test Configuration



### Test Procedure(26 dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

We tested according to Procedure C.1 in KDB 789033 D02 v02r01.

1. RBW = approximately 1 % of the emission bandwidth
2. VBW > RBW
3. Measurement Type = Peak
4. Trace mode = max hold
5. Measure the maximum width of the emission that is 26 dB down from the maximum 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 %.

### Test Procedure (6 dB Bandwidth)

The transmitter output is connected to the Spectrum Analyzer.

We tested according to Procedure C.2 in KDB 789033 D02 v02r01.

1. RBW = 100 kHz
2. VBW  $\geq$  3 x RBW
3. Measurement Type = Peak
4. Trace mode = max hold
5. Allow the trace to stabilize
6. 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 lever measured in the fundamental emission.

### Note:

1. We tested X dB bandwidth using the automatic bandwidth measurement capability of a spectrum analyzer.
2. DFS test channels should be defined. So, We performed the OBW test to prove that no part of the fundamental emissions of any channels belong to UNII1 and UNII3 band for DFS.
3. The 99 % Bandwidth is used to determine the conducted power limits.

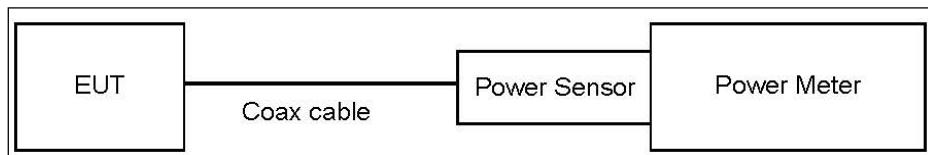
### 8.3. Output Power Measurement

#### Limit

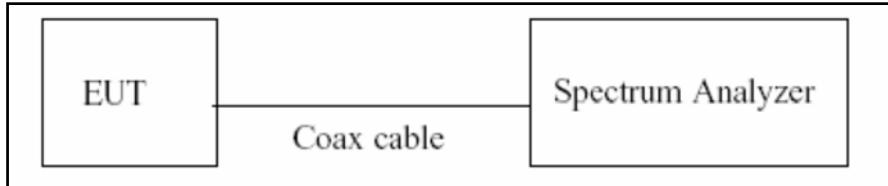
Band	Limit
UNII 1	- Master : Not exceed 1 W(=30 dBm) - Slave : Not exceed 250 mW(=23.98 dBm)
UNII 2A, 2C	Not exceed the lesser of 250 mW or 11 dBm + 10 log B, (where B is the 26 dB emission bandwidth in megahertz.)
UNII 3	Not exceed 1 W(=30 dBm)

#### Test Configuration

Power Meter



Spectrum Analyzer(Only Straddle Channel)



#### Test Procedure(Power Meter)

We tested according to Procedure E.3.a in KDB 789033 D02 v02r01.

1. Measure the duty cycle.
2. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
3. Add  $10 \log (1/x)$ , where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

**Test Procedure (Spectrum Analyzer)**

The transmitter output is connected to the Spectrum Analyzer.

We use the spectrum analyzer's integrated band power measurement function.

We tested according to Procedure E.2.d) in KDB 789033 D02 v02r01.

1. Measure the duty cycle.
2. Set span to encompass the 26 dB EBW of the signal.
3. RBW = 1 MHz.
4. VBW  $\geq$  3 MHz.
5. Number of points in sweep  $\geq$  2 x span/RBW.
6. Sweep time = auto.
7. Measurement Type or = RMS.
8. Do not use sweep triggering. Allow the sweep to “free run”.
9. Trace average at least 100 traces in power averaging(RMS) mode
10. Integrated bandwidth = OBW
11. Add  $10\log(1/x)$ , where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

**Sample Calculation**

Total Power(dBm) = Measured Value(dBm) + ATT loss(dB) + Cable loss(dB) + Duty Cycle Factor(dB)

**Note**

1. Spectrum Measured Values are not plot data.

The power results in plot is already including the actual values of loss for the attenuator and cable combination.

2. Actual value of loss for the attenuator and cable combination is below table.

Band	Loss(dB)
UNII 1	12.66
U-NII-2A	12.66
U-NII-2C	12.66
UNII 3	12.66

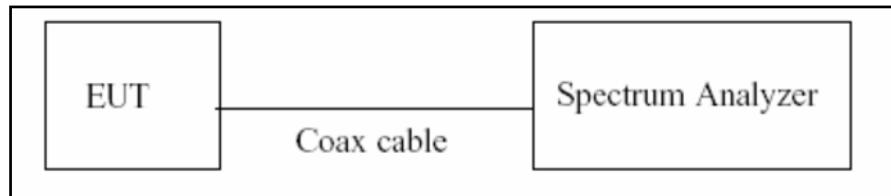
(Actual value of loss for the attenuator and cable combination)

#### 8.4. Power Spectral Density

##### Limit

Band	Limit
UNII 1	11 dBm/MHz
UNII 2A, 2C	11 dBm/MHz
UNII 3	30 dBm/500 kHz

##### Test Configuration



##### Test Procedure

We tested according to Procedure F in KDB 789033 D02 v02r01.

1. Set span to encompass the entire emission bandwidth(EBW) of the signal.
2. RBW = 1 MHz(510 kHz for UNII 3)  
→ For portion within the NII-3 be used RBW 510kHz
3. VBW  $\geq$  3 MHz
4. Number of points in sweep  $\geq$  2 x span/RBW.
5. Sweep time = auto.
6. Measurement Type or = RMS(i.e., power averaging), if available. Otherwise, use sample Measurement Type or mode.
7. Do not use sweep triggering. Allow the sweep to “free run”.
8. Trace average at least 100 traces in power averaging(RMS) mode
9. Use the peak search function on the spectrum analyzer to find the peak of the spectrum.
10. If Method SA-2 was used, add  $10 \log(1/x)$ , where x is the duty cycle, to the peak of the spectrum.

**Sample Calculation**

Total PSD(dBm) = Measured Value(dBm) + ATT loss(dB) + Cable loss(dB) + Duty Cycle Factor(dB)

**Note**

1. Spectrum Measured Levels are not plot data.

The PSD results in plot is already including the actual values of loss for the attenuator and cable combination.

2. Actual value of loss for the attenuator and cable combination is below table.

Band	Loss(dB)
UNII 1	12.66
U-NII-2A	12.66
U-NII-2C	12.66
UNII 3	12.66

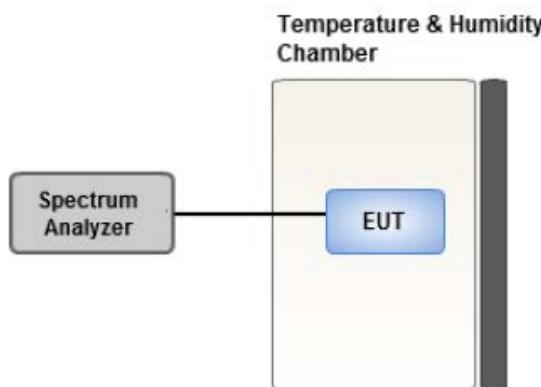
(Actual value of loss for the attenuator and cable combination)

## 8.5. Frequency Stability

### Limit

Maintained within the band

### Test Configuration



### Test Procedure

1. The EUT was placed inside an environmental chamber as the temperature in the chamber was varied between -30 °C and 50 °C.
2. The temperature was incremented by 10 °C intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.
3. The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.
4. While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total are made.

## 8.6. AC Power line Conducted Emissions

### Limit

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dB $\mu$ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56 <sup>(a)</sup>	56 to 46 <sup>(a)</sup>
0.50 to 5	56	46
5 to 30	60	50

<sup>(a)</sup>Decreases with the logarithm of the frequency.

Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line (LINE and NEUTRAL) and ground at the power terminals.

### Test Configuration

See test photographs attached in Annex A for the actual connections between EUT and support equipment.

### Test Procedure

1. The EUT is placed on a wooden table 80 cm above the reference ground plane.
2. The EUT is connected via LISN to a test power supply.
3. The measurement results are obtained as described below:
4. Measurement Typeors : Quasi Peak and Average Measurement Typeor.

### Sample Calculation

Quasi-peak(Final Result) = Measured Value + Correction Factor

## 8.7. Radiated Test

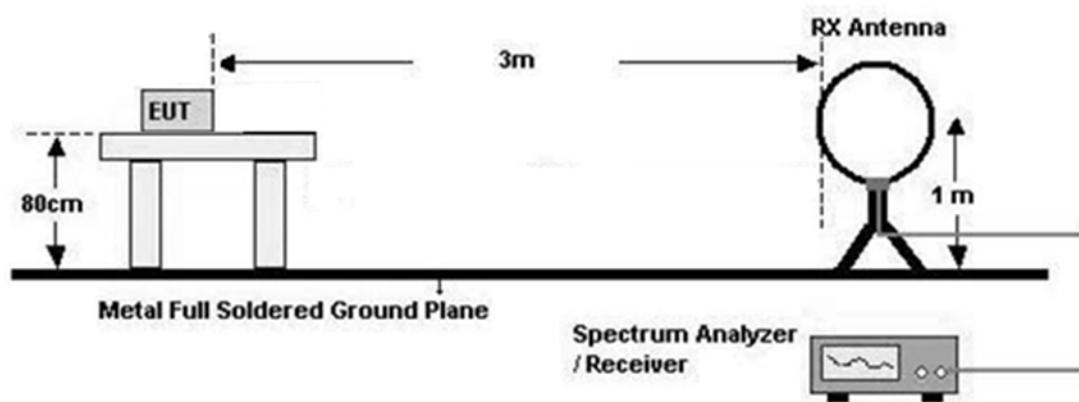
### Limit

1. UNII 1: All emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of  $-27 \text{ dBm/MHz}$ .
2. UNII 2A, 2C: All emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of  $-27 \text{ dBm/MHz}$ .
3. UNII 3: All emissions shall be limited to a level of  $-27 \text{ dBm/MHz}$  at 75 MHz or more above or below the band edge increasing linearly to  $10 \text{ dBm/MHz}$  at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of  $15.6 \text{ dBm/MHz}$  at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of  $27 \text{ dBm/MHz}$  at the band edge.
4. All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Section 15.209.

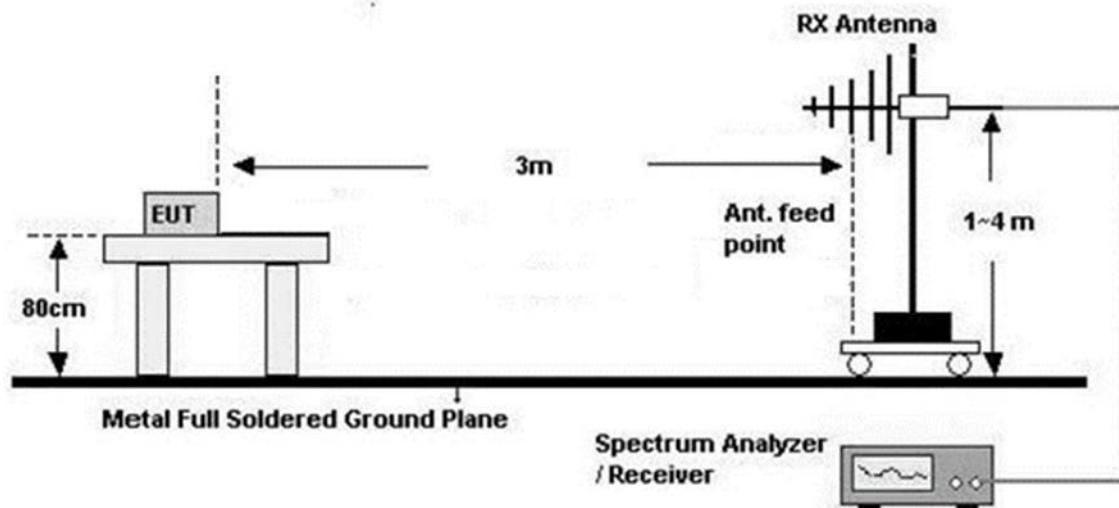
Frequency (MHz)	Field Strength ( $\mu\text{V/m}$ )	Measurement Distance (m)
0.009 – 0.490	$2400/F(\text{kHz})$	300
0.490 – 1.705	$24000/F(\text{kHz})$	30
1.705 – 30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

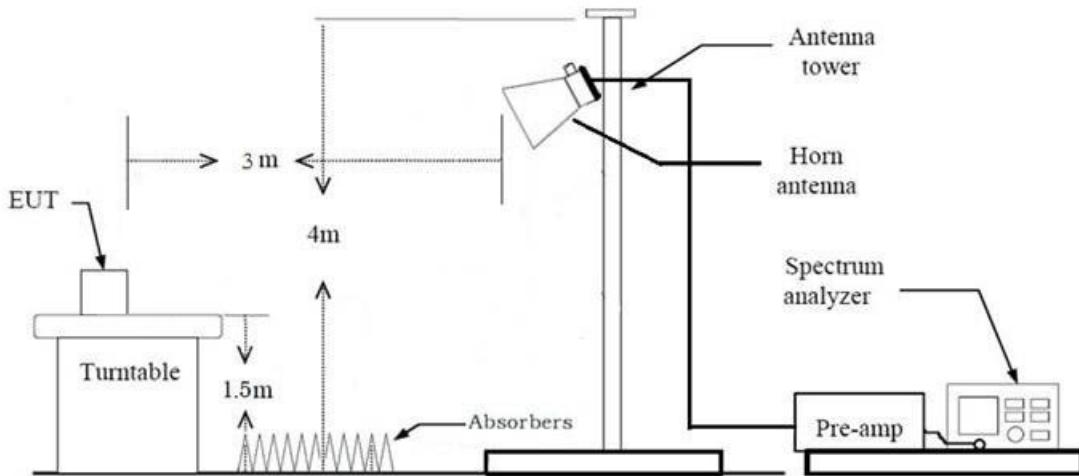
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz

**Test Procedure of Radiated spurious emissions (Below 30 MHz)**

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The loop antenna was placed at a location 3 m from the EUT
3. The EUT is placed on a turntable, which is 0.8m above ground plane.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Distance Correction Factor( $0.009 \text{ MHz} - 0.490 \text{ MHz}$ ) =  $40\log(3 \text{ m}/300 \text{ m}) = -80 \text{ dB}$   
Measurement Distance : 3 m
7. Distance Correction Factor( $0.490 \text{ MHz} - 30 \text{ MHz}$ ) =  $40\log(3 \text{ m}/30 \text{ m}) = -40 \text{ dB}$   
Measurement Distance : 3 m
8. Spectrum Setting
  - Frequency Range = 9 kHz ~ 30 MHz
  - Detector = Peak
  - Trace = Max Hold
  - RBW = 9 kHz
  - VBW  $\geq 3 \times \text{RBW}$
9. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
10. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

**KDB 414788 OFS and Chamber Correlation Justification**

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in

the regulations; however, an attempt should be made to avoid making measurements in the near field.

OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

#### **Test Procedure of Radiated spurious emissions (Below 1 GHz)**

1. The EUT was placed on a non-conductive table located on semi-anechoic chamber.
2. The EUT is placed on a turntable, which is 0.8m above ground plane.
3. The Hybrid antenna was placed at a location 3 m from the EUT, which is varied from 1 m to 4 m to find out the highest emissions.
4. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
5. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
6. Spectrum Setting

##### **(1) Measurement Type(Peak):**

- Measured Frequency Range : 30 MHz – 1 GHz
- Detector = Peak
- Trace = Max Hold
- RBW = 100 kHz
- VBW  $\geq$  3 x RBW

##### **(2) Measurement Type(Quasi-peak):**

- Measured Frequency Range : 30 MHz – 1 GHz
- Detector = Quasi-Peak
- RBW = 120 kHz

※In general, (1) is used mainly

7. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L)
8. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.

#### **Test Procedure of Radiated spurious emissions (Above 1 GHz)**

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

7. The unit was tested with its standard battery.

#### 8. Spectrum Setting

(1) Measurement Type (Peak, G.5 in KDB 789033 v02r01):

- RBW = 1 MHz
- VBW  $\geq$  3 MHz
- Detector = Peak
- Sweep Time = auto
- Trace mode = Max Hold
- Allow sweeps to continue until the trace stabilizes.

Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately  $1/x$ , where  $x$  is the duty cycle.

(2) Measurement Type (Average, G.6.d in KDB 789033 v02r01):

- RBW = 1 MHz
- VBW(Duty cycle  $\geq$  98 percent) = VBW  $\leq$  RBW/100(i.e., 10 kHz) but not less than 10 Hz.
- VBW(Duty cycle is < 98 percent) = VBW  $\geq$  1/T, where T is the minimum transmission duration.
- The analyzer is set to linear detector mode.
- Detector = Peak.
- Sweep time = auto.
- Trace mode = Max Hold.
- Allow Max Hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98 percent duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of  $1/x$ , where  $x$  is the duty cycle.

9. Measurement value only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor

10. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency

11. Distance extrapolation factor =  $20\log(\text{test distance} / \text{specific distance})$  (dB)

12. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(A.G) + Distance Factor(D.F)

**Test Procedure of Radiated Restricted Band Edge**

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. The unit was tested with its standard battery.

**8. Spectrum Setting**

- (1) Measurement Type(Peak, G.5 in KDB 789033 v02r01):

- RBW = 1 MHz
- VBW  $\geq$  3 MHz
- Detector = Peak
- Sweep Time = auto
- Trace mode = Max Hold
- Allow sweeps to continue until the trace stabilizes.

Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately  $1/x$ , where x is the duty cycle.

- (2) Measurement Type(Average, G.6.d in KDB 789033 v02r01):

- RBW = 1 MHz
- VBW(Duty cycle  $\geq$  98 percent) = VBW  $\leq$  RBW/100(i.e., 10 kHz) but not less than 10 Hz.
- VBW(Duty cycle is < 98 percent) = VBW  $\geq$  1/T, where T is the minimum transmission duration.
- The analyzer is set to linear detector mode.
- Detector = Peak.
- Sweep time = auto.
- Trace mode = Max Hold.
- Allow Max Hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98 percent duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of  $1/x$ , where x is the duty cycle.

**9. Measured Frequency Range :**

- 4 500 MHz ~ 5 150 MHz
- 5 350 MHz ~ 5 460 MHz
- 5 460 MHz ~ 5 470 MHz
- (75 MHz or more below the 5 725 MHz) ~ 5 725 MHz
- 5 850 MHz ~ (75 MHz or more above the 5 850 MHz)

**10. Distance extrapolation factor =  $20\log(\text{test distance} / \text{specific distance})$  (dB)****11. Total**

- (1)Measurement(Peak)

- = Measured Value(Peak)

- (2)Measurement(Avg)

- = Measured Value (Avg)

- We apply to the offset in the range 1 GHz - 18 GHz.

- The offset = Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F) - Amp. Gain(A.G) + Attenuator (ATT)

The actual setting value of VBW

Mode	Worst Data rate (Mbps)	Duty Cycle	Duty Cycle Factor (dB)	The actual setting value of VBW (Hz)
802.11a	6	0.952	0.212	1 000
802.11n(HT20)	MCS0	0.950	0.225	1 000
802.11n(HT40)	MCS0	0.903	0.441	2 000
802.11ac(VHT20)	MCS0	0.950	0.224	1 000
802.11ac(VHT40)	MCS0	0.904	0.436	2 000
802.11ac(VHT80)	MCS0	0.820	0.859	3 000

## 8.8. Worst case configuration and mode

### Conducted test

1. All modes of operation were investigated and the worst case configuration results are reported.
2. DA351I6MG, Additional Models were tested and the worst case results are reported.

(Worst case : DA351I6MG)

### Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.
  - Mode : Stand alone , Stand alone + Shark Antenna
  - Mode : Stand alone + Shark Antenna
- 2 EUT Axis
  - Radiated Spurious Emissions : X
  - Radiated Restricted Band Edge : X
3. All datarate of operation were investigated and the worst case datarate results are reported.
  - 802.11a : 6 Mbps
  - 802.11n: MCS 0
  - 802.11ac: MCS 0
4. Radiated Spurious Emission
  - All modulation of operation were investigated and the worst case modulation results are reported.
    - Worst-case : 802.11a
5. All position of loop antenna were investigated and the test result is a no critical peak found at all positions.
  - Position: Horizontal, Vertical, Parallel to the ground plane
6. DA351I6MG, Additional Models were tested and the worst case results are reported.

(Worst case : DA351I6MG)

### AC Power line Conducted Emissions

1. We don't perform powerline conducted emission test. The device only employ battery power for operation.

**Radiated test(Simultaneous transmission Scenario)**

1. All modes of operation were investigated and the worst case configuration results are reported.

- Mode : Stand alone

2. EUT Axis

- Radiated Spurious Emissions : X

3. All of Simultaneous transmission Scenario were investigated and the worst case configuration results are reported.

Simultaneous transmission Scenario	2.4 GHz WiFi	5 GHz WiFi	BT	Test Case
Bluetooth + 2.4 GHz WiFi	on	-	on	Scenario1
Bluetooth + 5 GHz WiFi	-	on	on	Scenario2

4. The Simultaneous transmission mode test investigated both intermodulation and radiated spurious emissions. And the worst results were reported.

- Worst result: Radiated spurious emissions

- Intermodulation: No signals are generated.

- Radiated spurious emissions: cf. Section 10.8.

Scenario	Description	Bluetooth Emission	5 GHz Emission
2	Antenna	BT ANT	WLAN ANT
	Channel	78	100
	Data Rate	1 Mbps	6 Mbps
	Mode	GFSK	802.11a

Note : BT Simultaneous transmission Scenario Data refer to [BT] Test Report

**9. SUMMARY OF TEST RESULTS**

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
26 dB Bandwidth	§ 15.407 (for Power Measurement)	N/A		PASS
6 dB Bandwidth	§ 15.407(e)	>500 kHz (5725-5850 MHz)(UNII-3)		PASS
Maximum Conducted Output Power	§ 15.407(a)(1),(2),(3)	< 250 mW(5150-5250 MHz)  < 250 mW or $11+10\log_{10}(\text{BW})$ dBm (5250-5350 MHz)  < 250 mW or $11+10\log_{10}(\text{BW})$ dBm (5470-5725 MHz)  <1 W (5725-5850 MHz)	Conducted	PASS
Maximum Power Spectral Density	§ 15.407(a)(1),(2),(3)	<11 dBm/ MHz (5150-5250 MHz)  <11 dBm/ MHz (5250-5350 MHz)  <11 dBm/ MHz (5470-5725 MHz)  <30 dBm/500 kHz(5725-5850 MHz)		PASS
Frequency Stability	§ 15.407(g) § 2.1055	Maintained within the band		PASS
AC Conducted Emissions 150 kHz-30 MHz	15.207 15.407(b)(8)	<FCC 15.207 limits		N/A (Note1)
Undesirable Emissions	§ 15.407(b)(1),(2),(3),(4) § 15.407(b)(5)(ii),(iii) § 15.35(b)	<-27 dBm/MHz EIRP (UNII1, 2A, 2C) cf. Section 8.6 (UNII 3)		PASS
General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	15.205, 15.407(b)(9),(10)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	Radiated	PASS

**Note**

1. The device only employ battery power for operation.
2. The decision rule applies 'simple acceptance'

## 10. TEST RESULT

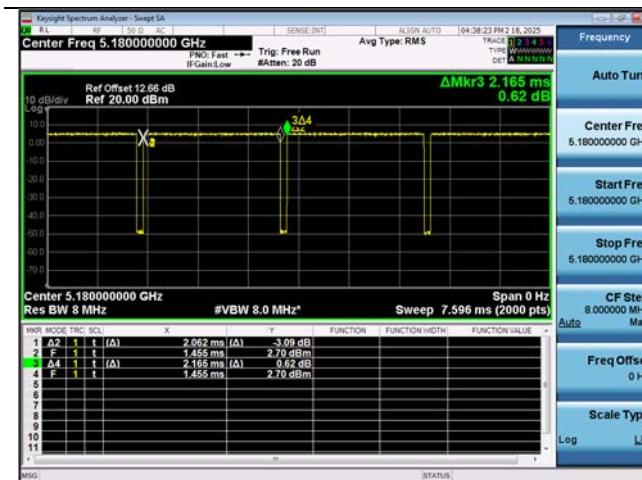
### 10.1 DUTY CYCLE

Mode	Data Rate	T <sub>on</sub> (ms)	T <sub>total</sub> (ms)	Duty Cycle	Duty Cycle Factor (dB)
802.11a	6M	2.062	2.165	0.952	0.212
802.11n(HT20)	MCS0	1.918	2.020	0.950	0.225
802.11n(HT40)	MCS0	0.944	1.045	0.903	0.441
802.11ac(VHT20)	MCS0	1.930	2.032	0.950	0.224
802.11ac(VHT40)	MCS0	0.953	1.054	0.904	0.436
802.11ac(VHT80)	MCS0	0.461	0.561	0.820	0.859

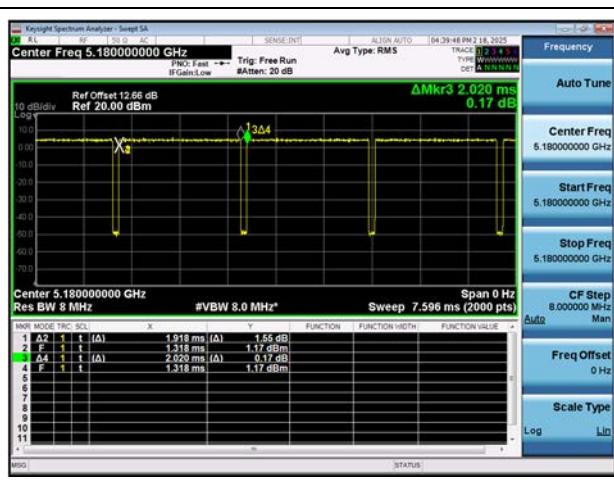
**Note:**

In order to simplify the report, attached plots were only the lowest data rate.

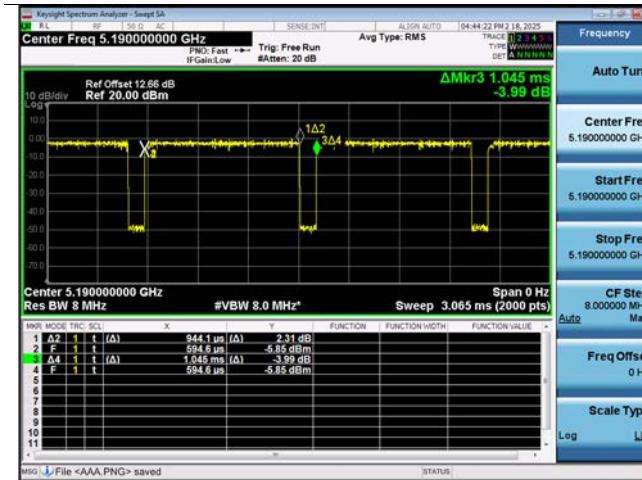
## 802.11a



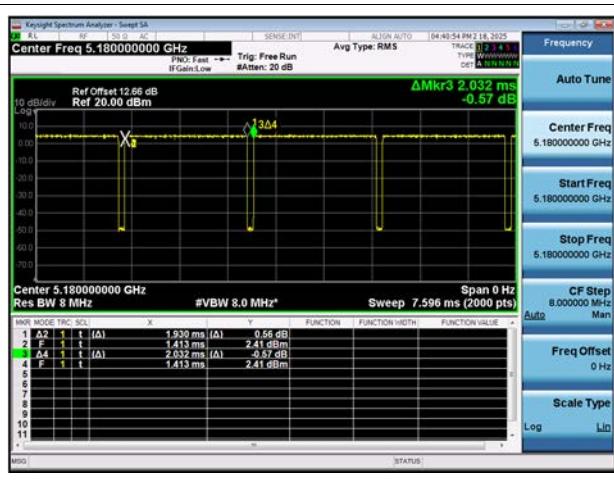
## 802.11n(HT20)



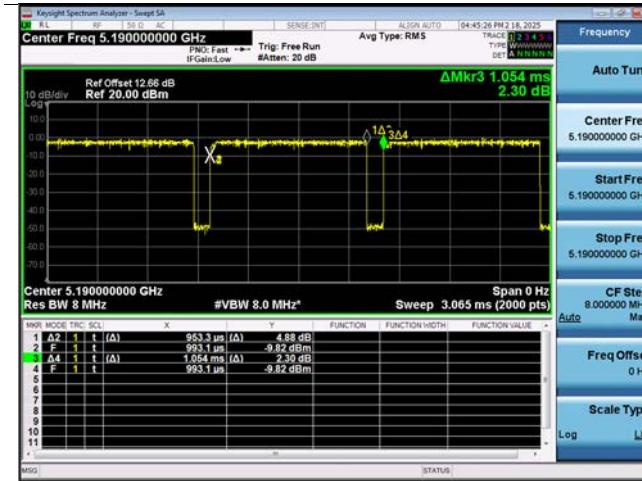
## 802.11n(HT40)



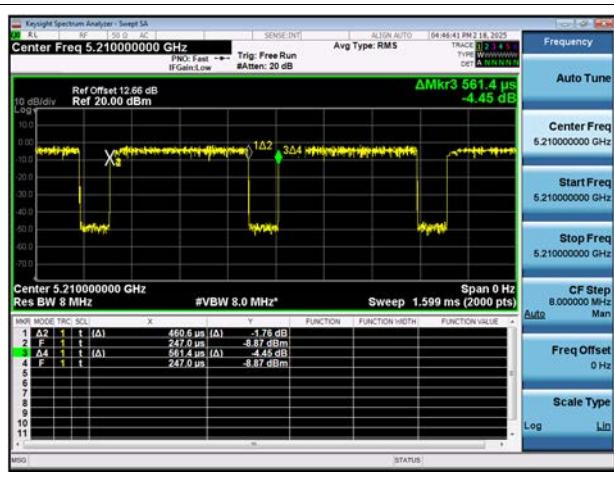
## 802.11ac(VHT20)



## 802.11ac(VHT40)



## 802.11ac(VHT80)



**10.2 26 dB Bandwidth****Note:**

Straddle channel data in the table below are for reporting purposes only. Straddle channel data were added in section 10.7.1.

Mode : 802.11a				
BAND	Freq. [MHz]	CH.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
UNII1	5180	36	20.91	16.618
	5200	40	21.12	16.603
	5240	48	21.12	16.651
UNII2A	5260	52	21.17	16.613
	5300	60	21.13	16.611
	5320	64	20.84	16.617
UNII2C	5500	100	21.09	16.628
	5580	116	20.93	16.621
	5720	144	20.89	16.629
UNII3	5745	149	20.97	16.622
	5785	157	20.99	16.632
	5825	165	21.05	16.662

Mode : 802.11n(HT20)				
BAND	Freq. [MHz]	CH.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
UNII1	5180	36	21.55	17.802
	5200	40	21.49	17.810
	5240	48	21.36	17.746
UNII2A	5260	52	21.39	17.771
	5300	60	21.30	17.753
	5320	64	21.25	17.769
UNII2C	5500	100	21.50	17.801
	5580	116	21.64	17.809
	5720	144	21.45	17.762
UNII3	5745	149	21.37	17.784
	5785	157	21.52	17.818
	5825	165	21.58	17.791

Mode : 802.11ac(VHT20)				
BAND	Freq. [MHz]	CH.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
UNII1	5180	36	21.60	17.789
	5200	40	21.19	17.782
	5240	48	21.35	17.784
UNII2A	5260	52	21.52	17.790
	5300	60	21.39	17.790
	5320	64	21.53	17.798
UNII2C	5500	100	21.45	17.822
	5580	116	21.20	17.779
	5720	144	21.48	17.798
UNII3	5745	149	21.75	17.777
	5785	157	21.40	17.793
	5825	165	21.36	17.778

Mode : 802.11n(HT40)				
BAND	Freq. [MHz]	CH.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
UNII1	5190	38	39.66	36.139
	5230	46	39.73	36.149
UNII2A	5270	54	39.57	36.138
	5310	62	39.50	36.131
UNII2C	5510	102	39.75	36.128
	5550	110	39.73	36.146
	5710	142	39.63	36.211
UNII3	5755	151	39.61	36.146
	5795	159	39.76	36.189

Mode : 802.11ac(VHT40)				
BAND	Freq. [MHz]	CH.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
UNII1	5190	38	39.80	36.143
	5230	46	39.72	36.139
UNII2A	5270	54	39.57	36.182
	5310	62	39.66	36.101
UNII2C	5510	102	39.65	36.182
	5550	110	39.68	36.138
	5710	142	39.58	36.172
UNII3	5755	151	39.63	36.182
	5795	159	39.93	36.207

Mode : 802.11ac(VHT80)				
BAND	Freq. [MHz]	CH.	26 dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
UNII1	5210	42	81.01	75.513
UNII2A	5290	58	81.05	75.578
UNII2C	5530	106	81.11	75.589
	5690	138	81.24	75.601
UNII3	5775	155	81.00	75.729

## Test Plots

Note: In order to simplify the report, attached plots were only the widest channel per channel bandwidth.

802.11a 26 dB Bandwidth (CH 52)



802.11n(HT20) 26 dB Bandwidth (CH 116)



802.11ac(VHT20) 26 dB Bandwidth (CH 149)



802.11n(HT40) 26 dB Bandwidth (CH 159)



802.11ac(VHT40) 26 dB Bandwidth (CH 159)



802.11ac(VHT80) 26 dB Bandwidth (CH 138)



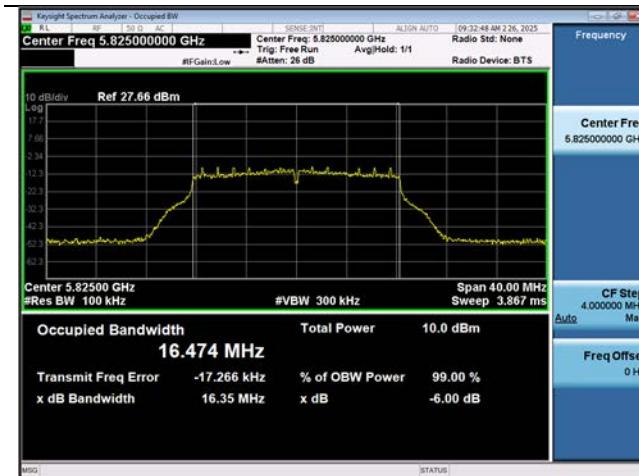
**10.3 6 dB BANDWIDTH**

Mode : 802.11a				
BAND	Freq. [MHz]	CH.	6 dB Bandwidth [MHz]	Limit [MHz]
UNII3	5745	149	16.36	> 0.5
	5785	157	16.37	> 0.5
	5825	165	16.35	> 0.5
Mode : 802.11n(HT20)				
BAND	Freq. [MHz]	CH.	6 dB Bandwidth [MHz]	Limit [MHz]
UNII3	5745	149	17.59	> 0.5
	5785	157	17.58	> 0.5
	5825	165	17.59	> 0.5
Mode : 802.11ac(VHT20)				
BAND	Freq. [MHz]	CH.	6 dB Bandwidth [MHz]	Limit [MHz]
UNII3	5745	149	17.57	> 0.5
	5785	157	17.56	> 0.5
	5825	165	17.62	> 0.5
Mode : 802.11n(HT40)				
BAND	Freq. [MHz]	CH.	6 dB Bandwidth [MHz]	Limit [MHz]
UNII3	5755	151	35.60	> 0.5
	5795	159	35.73	> 0.5
Mode : 802.11ac(VHT40)				
BAND	Freq. [MHz]	CH.	6 dB Bandwidth [MHz]	Limit [MHz]
UNII3	5755	151	35.75	> 0.5
	5795	159	35.75	> 0.5
Mode : 802.11ac(VHT80)				
BAND	Freq. [MHz]	CH.	6 dB Bandwidth [MHz]	Limit [MHz]
UNII3	5775	155	75.68	> 0.5

## Test Plots

**Note:** In order to simplify the report, attached plots were only the narrowest channel.

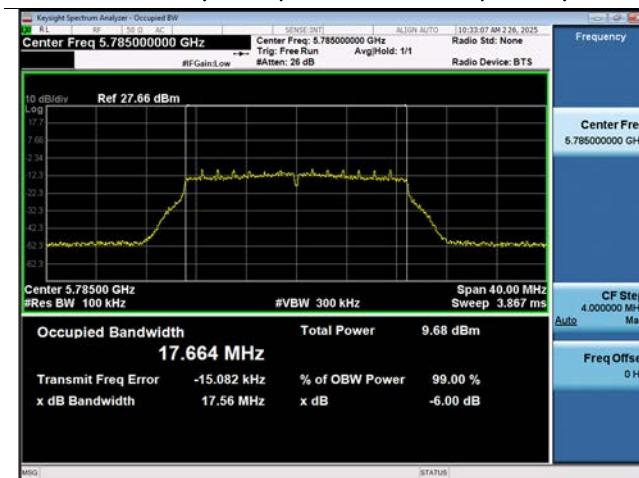
### 802.11a 6 dB Bandwidth (CH 165)



### 802.11n(HT20) 6 dB Bandwidth (CH 157)



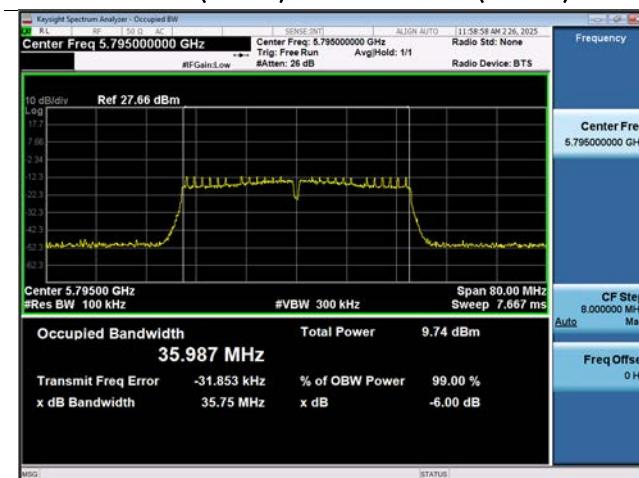
### 802.11ac(VHT20) 6 dB Bandwidth (CH 157)



### 802.11n(HT40) 6 dB Bandwidth (CH 151)



### 802.11ac(VHT40) 6 dB Bandwidth (CH 159)



### 802.11ac(VHT80) 6 dB Bandwidth (CH 155)



#### 10.4 OUTPUT POWER MEASUREMENT

Straddle channel data in the table below are for reporting purposes only.

Straddle channel data were added in section 10.7.3.

##### # Limit

(UNII 1) : 23.98 dBm

(UNII 2A, 2C) : 23.98 dBm or  $11 \text{ dBm} + 10 \log B$ , (where B is the 26 dB emission bandwidth in megahertz.)

(UNII 3) : 30.00 dBm

# Ant Total Power [dBm] = Measured Power [dBm] + Duty Cycle Factor [dB]

Mode : 802.11a							
Band	Freq. [MHz]	CH.	Worstcase Datarate	Measured Power [dBm]	Duty cycle Fcator [dB]	Total Power [dBm]	Limit [dBm]
UNII1	5180	36	6M	7.29	0.21	7.50	23.98
	5200	40	6M	7.18	0.21	7.39	23.98
	5240	48	6M	7.47	0.21	7.68	23.98
UNII2A	5260	52	6M	7.74	0.21	7.95	23.98
	5300	60	6M	7.38	0.21	7.59	23.98
	5320	64	6M	7.27	0.21	7.48	23.98
UNII2C	5500	100	6M	5.00	0.21	5.21	23.98
	5580	116	6M	4.80	0.21	5.01	23.98
	5720	144	6M	5.23	0.21	5.44	23.98
UNII3	5745	149	6M	2.17	0.21	2.38	30.00
	5785	157	6M	2.68	0.21	2.89	30.00
	5825	165	6M	2.34	0.21	2.55	30.00

Mode : 802.11n(HT20)							
Band	Freq. [MHz]	CH.	Worstcase Datarate	Measured Power [dBm]	Duty cycle Fcator [dB]	Total Power [dBm]	Limit [dBm]
UNII1	5180	36	MCS0	7.14	0.23	7.37	23.98
	5200	40	MCS0	7.34	0.23	7.57	23.98
	5240	48	MCS0	7.58	0.23	7.81	23.98
UNII2A	5260	52	MCS0	7.39	0.23	7.62	23.98
	5300	60	MCS0	7.42	0.23	7.65	23.98
	5320	64	MCS0	7.22	0.23	7.45	23.98
UNII2C	5500	100	MCS0	5.24	0.23	5.46	23.98
	5580	116	MCS0	4.85	0.23	5.08	23.98
	5720	144	MCS0	5.20	0.23	5.43	23.98
UNII3	5745	149	MCS0	2.45	0.23	2.68	30.00
	5785	157	MCS0	2.15	0.23	2.38	30.00
	5825	165	MCS0	2.51	0.23	2.74	30.00

Mode : 802.11ac(VHT20)							
Band	Freq. [MHz]	CH.	Worstcase Datarate	Measured Power [dBm]	Duty cycle Fcator [dB]	Total Power [dBm]	Limit [dBm]
UNII1	5180	36	MCS0	7.10	0.22	7.32	23.98
	5200	40	MCS0	7.35	0.22	7.57	23.98
	5240	48	MCS0	7.63	0.22	7.85	23.98
UNII2A	5260	52	MCS0	7.41	0.22	7.63	23.98
	5300	60	MCS0	7.37	0.22	7.59	23.98
	5320	64	MCS0	7.74	0.22	7.96	23.98
UNII2C	5500	100	MCS0	5.18	0.22	5.40	23.98
	5580	116	MCS0	4.86	0.22	5.08	23.98
	5720	144	MCS0	5.10	0.22	5.32	23.98
UNII3	5745	149	MCS0	2.35	0.22	2.57	30.00
	5785	157	MCS0	2.07	0.22	2.29	30.00
	5825	165	MCS0	2.42	0.22	2.64	30.00

Mode : 802.11n(HT40)							
Band	Freq. [MHz]	CH.	Worstcase Datarate	Measured Power [dBm]	Duty cycle Fcator [dB]	Total Power [dBm]	Limit [dBm]
UNII1	5190	38	MCS0	2.82	0.44	3.26	23.98
	5230	46	MCS0	3.32	0.44	3.76	23.98
UNII2A	5270	54	MCS0	5.67	0.44	6.11	23.98
	5310	62	MCS0	5.82	0.44	6.26	23.98
UNII2C	5510	102	MCS0	4.37	0.44	4.81	23.98
	5550	110	MCS0	4.32	0.44	4.76	23.98
	5710	142	MCS0	4.52	0.44	4.96	23.98
UNII3	5755	151	MCS0	1.19	0.44	1.63	30.00
	5795	159	MCS0	1.86	0.44	2.30	30.00

Mode : 802.11ac(VHT40)							
Band	Freq. [MHz]	CH.	Worstcase Datarate	Measured Power [dBm]	Duty cycle Fcator [dB]	Total Power [dBm]	Limit [dBm]
UNII1	5190	38	MCS0	3.03	0.44	3.47	23.98
	5230	46	MCS0	3.36	0.44	3.80	23.98
UNII2A	5270	54	MCS0	6.19	0.44	6.63	23.98
	5310	62	MCS0	5.90	0.44	6.34	23.98
UNII2C	5510	102	MCS0	4.80	0.44	5.24	23.98
	5550	110	MCS0	4.36	0.44	4.80	23.98
	5710	142	MCS0	4.28	0.44	4.72	23.98
UNII3	5755	151	MCS0	1.65	0.44	2.09	30.00
	5795	159	MCS0	1.77	0.44	2.21	30.00

Mode : 802.11ac(VHT80)							
Band	Freq. [MHz]	CH.	Worstcase Datarate	Measured Power [dBm]	Duty cycle Fcator [dB]	Total Power [dBm]	Limit [dBm]
UNII1	5210	42	MCS0	3.62	0.859	4.48	23.98
UNII2A	5290	58	MCS0	5.89	0.859	6.75	23.98
UNII2C	5530	106	MCS0	4.27	0.859	5.13	23.98
	5690	138	MCS0	4.33	0.859	5.19	23.98
UNII3	5775	155	MCS0	1.50	0.859	2.36	30.00

**10.5 POWER SPECTRAL DENSITY**

# Ant Total PSD [dBm/MHz] = Measured PSD [dBm/MHz] + Duty Cycle Factor [dB]

Mode : 802.11a							
Band	Freq. [MHz]	CH.	Worstcase Datarate	Measured PSD [dBm/MHz]	Duty cycle Fcator [dB]	Total PSD [dBm/MHz]	Limit [dBm/MHz]
UNII1	5180	36	6M	-2.996	0.212	-2.784	11
	5200	40	6M	-2.791	0.212	-2.579	11
	5240	48	6M	-3.092	0.212	-2.880	11
UNII2A	5260	52	6M	-2.917	0.212	-2.705	11
	5300	60	6M	-2.836	0.212	-2.624	11
	5320	64	6M	-2.462	0.212	-2.250	11
UNII2C	5500	100	6M	-5.002	0.212	-4.790	11
	5580	116	6M	-5.135	0.212	-4.923	11
	5720	144	6M	-4.883	0.212	-4.671	11
UNII3	5745	149	6M	-10.530	0.212	-10.318	30 dBm/500kHz
	5785	157	6M	-10.480	0.212	-10.268	30 dBm/500kHz
	5825	165	6M	-10.105	0.212	-9.893	30 dBm/500kHz

Mode : 802.11n(HT20)							
Band	Freq. [MHz]	CH.	Worstcase Datarate	Measured PSD [dBm/MHz]	Duty cycle Fcator [dB]	Total PSD [dBm/MHz]	Limit [dBm/MHz]
UNII1	5180	36	MCS0	-2.952	0.225	-2.727	11
	5200	40	MCS0	-2.960	0.225	-2.735	11
	5240	48	MCS0	-3.177	0.225	-2.952	11
UNII2A	5260	52	MCS0	-3.036	0.225	-2.811	11
	5300	60	MCS0	-3.172	0.225	-2.947	11
	5320	64	MCS0	-2.884	0.225	-2.659	11
UNII2C	5500	100	MCS0	-5.251	0.225	-5.026	11
	5580	116	MCS0	-5.455	0.225	-5.230	11
	5720	144	MCS0	-4.994	0.225	-4.769	11
UNII3	5745	149	MCS0	-10.885	0.225	-10.660	30 dBm/500kHz
	5785	157	MCS0	-10.776	0.225	-10.551	30 dBm/500kHz
	5825	165	MCS0	-10.329	0.225	-10.104	30 dBm/500kHz

Mode : 802.11ac(VHT20)							
Band	Freq. [MHz]	CH.	Worstcase Datarate	Measured PSD [dBm/MHz]	Duty cycle Fcator [dB]	Total PSD [dBm/MHz]	Limit [dBm/MHz]
UNII1	5180	36	MCS0	-3.073	0.224	-2.849	11
	5200	40	MCS0	-2.882	0.224	-2.658	11
	5240	48	MCS0	-2.701	0.224	-2.477	11
UNII2A	5260	52	MCS0	-3.046	0.224	-2.822	11
	5300	60	MCS0	-3.126	0.224	-2.902	11
	5320	64	MCS0	-2.777	0.224	-2.553	11
UNII2C	5500	100	MCS0	-5.230	0.224	-5.006	11
	5580	116	MCS0	-5.496	0.224	-5.272	11
	5720	144	MCS0	-5.114	0.224	-4.890	11
UNII3	5745	149	MCS0	-11.030	0.224	-10.806	30 dBm/500kHz
	5785	157	MCS0	-11.094	0.224	-10.870	30 dBm/500kHz
	5825	165	MCS0	-10.556	0.224	-10.332	30 dBm/500kHz

Mode : 802.11n(HT40)							
Band	Freq. [MHz]	CH.	Worstcase Datarate	Measured PSD [dBm/MHz]	Duty cycle Fcator [dB]	Total PSD [dBm/MHz]	Limit [dBm/MHz]
UNII1	5190	38	MCS0	-10.166	0.441	-9.725	11
	5230	46	MCS0	-10.230	0.441	-9.789	11
UNII2A	5270	54	MCS0	-7.640	0.441	-7.199	11
	5310	62	MCS0	-7.287	0.441	-6.846	11
UNII2C	5510	102	MCS0	-8.959	0.441	-8.518	11
	5550	110	MCS0	-8.863	0.441	-8.422	11
	5710	142	MCS0	-8.825	0.441	-8.384	11
UNII3	5755	151	MCS0	-14.570	0.441	-14.129	30 dBm/500kHz
	5795	159	MCS0	-14.628	0.441	-14.187	30 dBm/500kHz

Mode : 802.11ac(VHT40)							
Band	Freq. [MHz]	CH.	Worstcase Datarate	Measured PSD [dBm/MHz]	Duty cycle Fcator [dB]	Total PSD [dBm/MHz]	Limit [dBm/MHz]
UNII1	5190	38	MCS0	-10.502	0.436	-10.066	11
	5230	46	MCS0	-10.200	0.436	-9.764	11
UNII2A	5270	54	MCS0	-7.489	0.436	-7.053	11
	5310	62	MCS0	-7.495	0.436	-7.059	11
UNII2C	5510	102	MCS0	-9.033	0.436	-8.597	11
	5550	110	MCS0	-8.968	0.436	-8.532	11
	5710	142	MCS0	-9.107	0.436	-8.671	11
UNII3	5755	151	MCS0	-14.963	0.436	-14.527	30 dBm/500kHz
	5795	159	MCS0	-14.429	0.436	-13.993	30 dBm/500kHz

Mode : 802.11ac(VHT80)							
Band	Freq. [MHz]	CH.	Worstcase Datarate	Measured PSD [dBm/MHz]	Duty cycle Fcator [dB]	Total PSD [dBm/MHz]	Limit [dBm/MHz]
UNII1	5210	42	MCS0	-12.565	0.859	-11.706	11
UNII2A	5290	58	MCS0	-10.290	0.859	-9.431	11
UNII2C	5530	106	MCS0	-12.110	0.859	-11.251	11
UNII2C	5690	138	MCS0	-12.229	0.859	-11.370	11
UNII3	5775	155	MCS0	-17.716	0.859	-16.857	30 dBm/500kHz

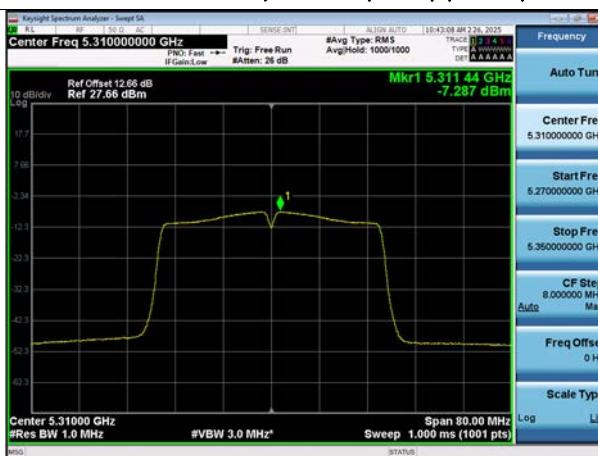
## □ Test Plots

**Note:** In order to simplify the report, attached plots were only channel of the highest PSD.

### Bandwidth 20M, 802.11a (Ch. 64)



### Bandwidth 40M, 802.11n(HT40) (Ch. 62)



### Bandwidth 80M, 802.11ac(VHT80) (Ch. 58)



## 10.6 FREQUENCY STABILITY

**Note:**

1. All modes of operation were investigated and the worst case configuration results are reported.
2. Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency error noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

**10.6.1 80 MHz BW**

REFERENCE VOLTAGE: 14.40 VDC

**Startup after the EUT is energized**

OPERATING BAND:			UNII Band 1		UNII Band 2A		UNII Band 2C	
OPERATING FREQUENCY:			5,210,000,000 Hz		5,290,000,000 Hz		5,530,000,000 Hz	
CHANNEL:			42		58		106	
Voltage	Power	Temp.	Frequency	Frequency Error	Frequency	Frequency Error	Frequency	Frequency Error
(%)	(VDC)	(°C)	(kHz)	(kHz)	(kHz)	(kHz)	(kHz)	(kHz)
100%	14.40	+20(Ref)	5210062.79	62.79	5290060.06	60.06	5530060.88	60.88
100%		-30	5210049.03	49.03	5290058.79	58.79	5530068.09	68.09
100%		-20	5210048.84	48.84	5290066.99	66.99	5530064.10	64.10
100%		-10	5210040.57	40.57	5290040.28	40.28	5530057.27	57.27
100%		0	5210046.36	46.36	5290045.24	45.24	5530059.10	59.10
100%		+10	5210054.32	54.32	5290063.77	63.77	5530050.28	50.28
100%		+30	5210063.58	63.58	5290044.81	44.81	5530048.65	48.65
100%		+40	5210067.77	67.77	5290041.98	41.98	5530049.99	49.99
100%		+50	5210041.90	41.90	5290040.83	40.83	5530059.65	59.65
Low	16.00	+20	5210046.12	46.12	5290047.93	47.93	5530048.74	48.74
High	9.00	+20	5210056.99	56.99	5290053.90	53.90	5530046.34	46.34

OPERATING BAND:			UNII Band 3	
OPERATING FREQUENCY:			5,775,000,000 Hz	
CHANNEL:			155	
Voltage	Power	Temp.	Frequency	Frequency Error
(%)	(VDC)	(°C)	(kHz)	(kHz)
100%	14.40	+20(Ref)	5775057.58	57.58
100%		-30	5775051.08	51.08
100%		-20	5775066.52	66.52
100%		-10	5775047.08	47.08
100%		0	5775067.18	67.18
100%		+10	5775066.39	66.39
100%		+30	5775069.93	69.93
100%		+40	5775067.82	67.82
100%		+50	5775045.34	45.34
Low	16.00	+20	5775059.03	59.03
High	9.00	+20	5775058.37	58.37

**2 minutes after the EUT is energized**

OPERATING BAND:			UNII Band 1		UNII Band 2A		UNII Band 2C	
OPERATING FREQUENCY:			5,210,000,000 Hz		5,290,000,000 Hz		5,530,000,000 Hz	
CHANNEL:			42		58		106	
Voltage	Power	Temp.	Frequency	Frequency Error	Frequency	Frequency Error	Frequency	Frequency Error
(%)	(VDC)	(°C)	(kHz)	(kHz)	(kHz)	(kHz)	(kHz)	(kHz)
100%	14.40	+20(Ref)	5210060.13	60.13	5290060.58	60.58	5530045.27	45.27
100%		-30	5210058.68	58.68	5290044.90	44.90	5530046.98	46.98
100%		-20	5210041.05	41.05	5290057.82	57.82	5530044.44	44.44
100%		-10	5210069.03	69.03	5290055.64	55.64	5530041.14	41.14
100%		0	5210040.87	40.87	5290059.34	59.34	5530046.43	46.43
100%		+10	5210066.22	66.22	5290043.27	43.27	5530061.63	61.63
100%		+30	5210044.93	44.93	5290063.57	63.57	5530064.92	64.92
100%		+40	5210055.53	55.53	5290049.78	49.78	5530063.88	63.88
100%		+50	5210065.71	65.71	5290064.44	64.44	5530057.19	57.19
Low	16.00	+20	5210067.14	67.14	5290067.80	67.80	5530045.38	45.38
High	9.00	+20	5210058.64	58.64	5290040.32	40.32	5530067.60	67.60

OPERATING BAND:			UNII Band 3	
OPERATING FREQUENCY:			5,775,000,000 Hz	
CHANNEL:			155	
Voltage	Power	Temp.	Frequency	Frequency Error
(%)	(VDC)	(°C)	(kHz)	(kHz)
100%	14.40	+20(Ref)	5775065.33	65.33
100%		-30	5775067.33	67.33
100%		-20	5775060.73	60.73
100%		-10	5775060.70	60.70
100%		0	5775069.63	69.63
100%		+10	5775069.38	69.38
100%		+30	5775044.66	44.66
100%		+40	5775055.52	55.52
100%		+50	5775053.14	53.14
Low	16.00	+20	5775049.87	49.87
High	9.00	+20	5775052.95	52.95

## 5 minutes after the EUT is energized

OPERATING BAND:			UNII Band 1		UNII Band 2A		UNII Band 2C	
OPERATING FREQUENCY:			5,210,000,000 Hz		5,290,000,000 Hz		5, 530,000,000 Hz	
CHANNEL:			42		58		106	
Voltage	Power	Temp.	Frequency	Frequency Error	Frequency	Frequency Error	Frequency	Frequency Error
(%)	(VDC)	(°C)	(kHz)	(kHz)	(kHz)	(kHz)	(kHz)	(kHz)
100%	14.40	+20(Ref)	5210066.54	66.54	5290044.75	44.75	5530058.04	58.04
100%		-30	5210054.04	54.04	5290068.55	68.55	5530060.00	60.00
100%		-20	5210046.34	46.34	5290068.12	68.12	5530045.43	45.43
100%		-10	5210054.86	54.86	5290043.67	43.67	5530068.98	68.98
100%		0	5210059.64	59.64	5290066.41	66.41	5530049.84	49.84
100%		+10	5210065.30	65.30	5290054.50	54.50	5530043.38	43.38
100%		+30	5210066.16	66.16	5290069.50	69.50	5530066.15	66.15
100%		+40	5210043.95	43.95	5290040.86	40.86	5530069.13	69.13
100%		+50	5210050.94	50.94	5290059.61	59.61	5530045.10	45.10
Low	16.00	+20	5210044.18	44.18	5290044.33	44.33	5530068.19	68.19
High	9.00	+20	5210063.83	63.83	5290062.24	62.24	5530061.27	61.27

OPERATING BAND:			UNII Band 3	
OPERATING FREQUENCY:			5,775,000,000 Hz	
CHANNEL:			155	
Voltage	Power	Temp.	Frequency	Frequency Error
(%)	(VDC)	(°C)	(kHz)	(kHz)
100%	14.40	+20(Ref)	5775040.58	40.58
100%		-30	5775046.54	46.54
100%		-20	5775056.96	56.96
100%		-10	5775068.64	68.64
100%		0	5775064.54	64.54
100%		+10	5775062.19	62.19
100%		+30	5775041.81	41.81
100%		+40	5775056.49	56.49
100%		+50	5775040.95	40.95
Low	16.00	+20	5775053.99	53.99
High	9.00	+20	5775061.25	61.25

**10 minutes after the EUT is energized**

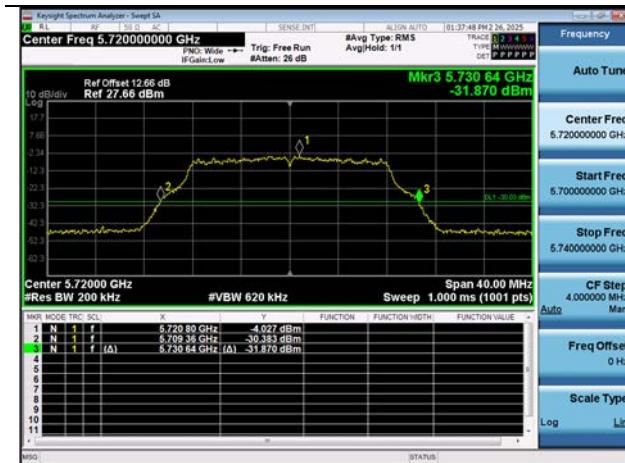
OPERATING BAND:			UNII Band 1		UNII Band 2A		UNII Band 2C	
OPERATING FREQUENCY:			5,210,000,000 Hz		5,290,000,000 Hz		5,530,000,000 Hz	
CHANNEL:			42		58		106	
Voltage	Power	Temp.	Frequency	Frequency Error	Frequency	Frequency Error	Frequency	Frequency Error
(%)	(VDC)	(°C)	(kHz)	(kHz)	(kHz)	(kHz)	(kHz)	(kHz)
100%	14.40	+20(Ref)	5210053.42	53.42	5290058.33	58.33	5530058.62	58.62
100%		-30	5210056.02	56.02	5290047.82	47.82	5530062.71	62.71
100%		-20	5210060.93	60.93	5290060.01	60.01	5530068.65	68.65
100%		-10	5210068.18	68.18	5290066.80	66.80	5530045.64	45.64
100%		0	5210063.24	63.24	5290057.48	57.48	5530068.89	68.89
100%		+10	5210066.20	66.20	5290063.40	63.40	5530058.47	58.47
100%		+30	5210045.84	45.84	5290042.86	42.86	5530065.98	65.98
100%		+40	5210063.52	63.52	5290054.87	54.87	5530047.06	47.06
100%		+50	5210043.67	43.67	5290062.49	62.49	5530069.61	69.61
Low	16.00	+20	5210059.35	59.35	5290067.14	67.14	5530046.75	46.75
High	9.00	+20	5210054.59	54.59	5290051.92	51.92	5530043.66	43.66

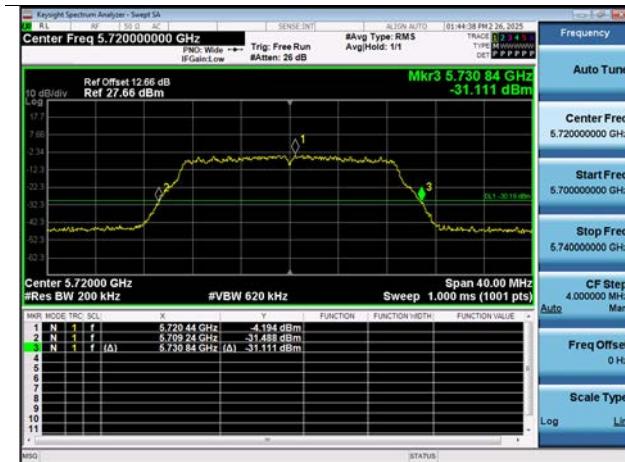
OPERATING BAND:			UNII Band 3	
OPERATING FREQUENCY:			5,775,000,000 Hz	
CHANNEL:			155	
Voltage	Power	Temp.	Frequency	Frequency Error
(%)	(VDC)	(°C)	(kHz)	(kHz)
100%	14.40	+20(Ref)	5775059.28	59.28
100%		-30	5775060.44	60.44
100%		-20	5775042.95	42.95
100%		-10	5775064.44	64.44
100%		0	5775041.07	41.07
100%		+10	5775042.73	42.73
100%		+30	5775044.61	44.61
100%		+40	5775065.52	65.52
100%		+50	5775041.60	41.60
Low	16.00	+20	5775045.17	45.17
High	9.00	+20	5775043.76	43.76

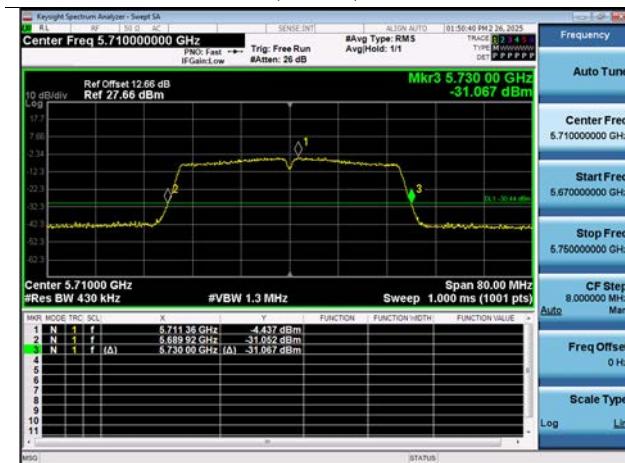
**10.7 STRADDLE CHANNEL**

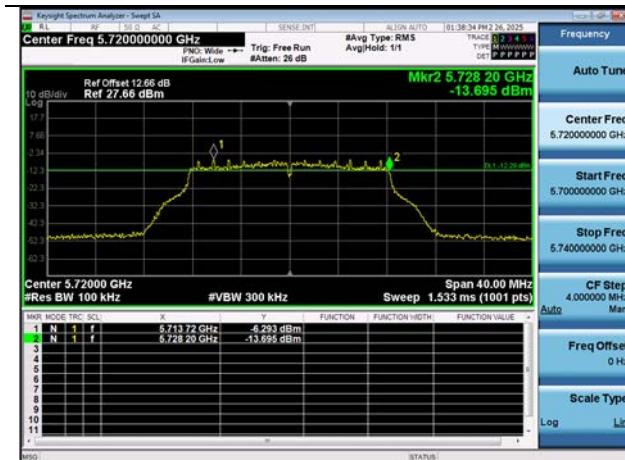
Test Description	Note
26 dB Bandwidth	1. [UNII 2C] 26 dB Bandwidth = 5725 MHz - Measured Frequency[MHz] 2. [UNII 3] 26 dB Bandwidth = Measured Frequency[MHz] -5725 MHz
6 dB Bandwidth	1. 6 dB Bandwidth = Measured Frequency[MHz] – 5725 MHz 2. Limit : > 0.5 MHz
Output Power	1. Limit(UNII2C) : 23.98 dBm or $11 \text{ dBm} + 10 \log B$ , (where B is the 26 dB emission bandwidth in megahertz.) 2. Limit(UNII 3) : 30.00 dBm 3. Total Power (dBm) = Measured Value (dBm) + Duty Cycle Factor (dB)
Power Spectral Density	1. Limit(UNII 2C) : 11.0 dBm/MHz 2. Limit(UNII 3) : 30.0 dBm/500kHz 3. Total PSD (dBm) = Measured Value (dBm) + Duty Cycle Factor (dB)

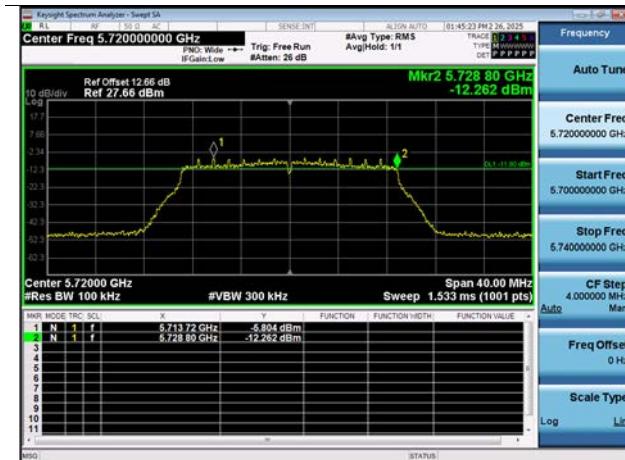
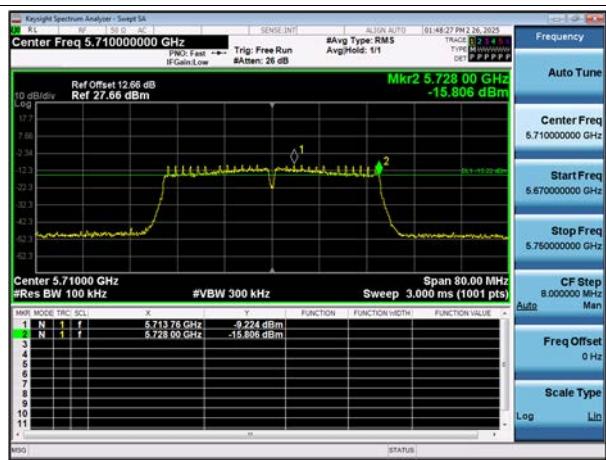
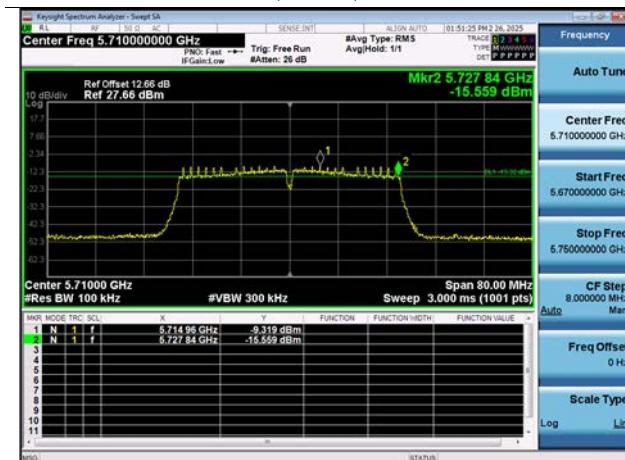
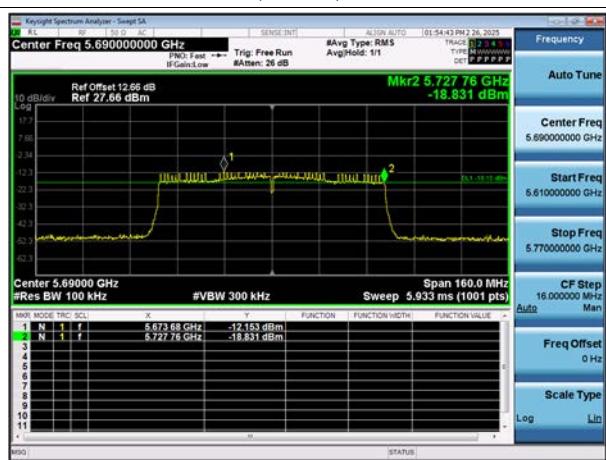
Mode	Band	Freq. [MHz]	CH.	26dB BW [MHz]	6dB BW [MHz]	Total Power [dBm]	Power Limit [dBm]	Total PSD [dBm]	PSD Limit [dBm/MHz]
802.11a	UNII2C	5720	144	15.64	-	4.9	22.94	-4.573	11
802.11n(HT20)				15.72	-	5.0	22.96	-4.627	11
802.11ac(VHT20)				15.76	-	5.0	22.98	-4.548	11
802.11a	UNII3	5720	144	5.64	3.20	-2.5	30.00	-9.838	30 dBm/500kHz
802.11n(HT20)				5.68	3.80	-1.8	30.00	-9.960	30 dBm/500kHz
802.11ac(VHT20)				5.84	3.80	-1.7	30.00	-9.695	30 dBm/500kHz
Mode	Band	Freq. [MHz]	Channel	26dB BW [MHz]	6dB BW [MHz]	Total Power [dBm]	Power Limit [dBm]	Total PSD [dBm]	PSD Limit [dBm/MHz]
802.11n(HT40)	UNII2C	5710	142	34.92	-	4.6	23.98	-8.397	11
802.11ac(VHT40)				35.08	-	4.6	23.98	-7.998	11
802.11n(HT40)	UNII3	5710	142	4.92	3.00	-7.2	30.00	-14.638	30 dBm/500kHz
802.11ac(VHT40)				5.00	2.84	-7.2	30.00	-14.500	30 dBm/500kHz
Mode	Band	Freq. [MHz]	Channel	26dB BW [MHz]	6dB BW [MHz]	Total Power [dBm]	Power Limit [dBm]	Total PSD [dBm]	PSD Limit [dBm/MHz]
802.11ac(VHT80)	UNII2C	5690	138	75.80	-	4.8	23.98	-11.452	11
802.11ac(VHT80)	UNII3	5690	138	5.48	2.76	-10.5	30.00	-17.529	30 dBm/500kHz

**□ Test Plots (26 dB Bandwidth)**
**802.11a UNII Band**

**802.11n(HT20) UNII Band**

**802.11ac(VHT20) UNII Band**

**802.11n(HT40) UNII Band**

**802.11ac(VHT40) UNII Band**

**802.11ac(VHT80) UNII Band**


**□ Test Plots (UNII 3 Band 6 dB Bandwidth)**
**802.11a UNII Band**

**802.11n(HT20) UNII Band**

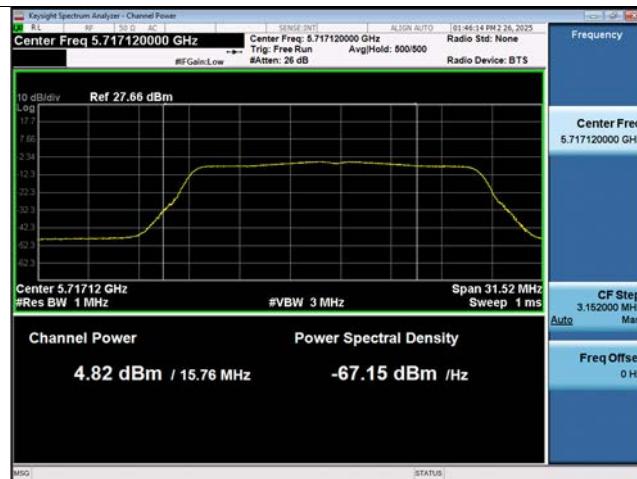
**802.11ac(VHT20) UNII Band**

**802.11n(HT40) UNII Band**

**802.11ac(VHT40) UNII Band**

**802.11ac(VHT80) UNII Band**


**□ Test Plots(Output Power)**
**802.11a UNII 2C Band**

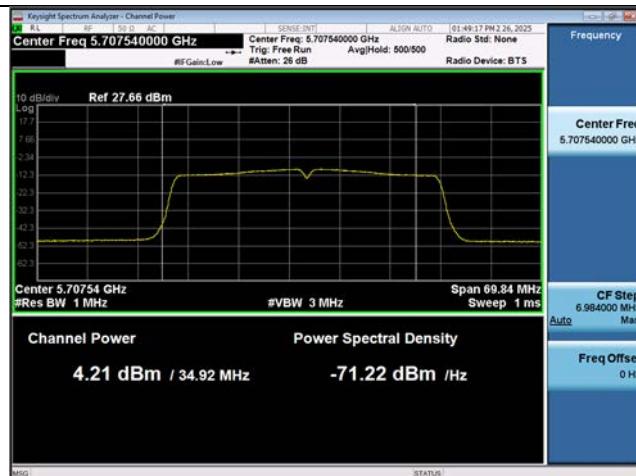
**802.11a UNII 3 Band**

**802.11n(HT20) UNII 2C Band**

**802.11n(HT20) UNII 3 Band**

**802.11ac(VHT20) UNII 2C Band**

**802.11ac(VHT20) UNII 3 Band**

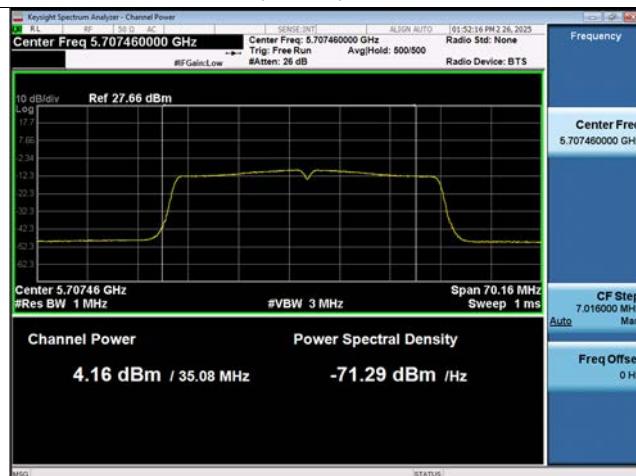

802.11n(HT40) UNII 2C Band



### 802.11n(HT40) UNII 3 Band



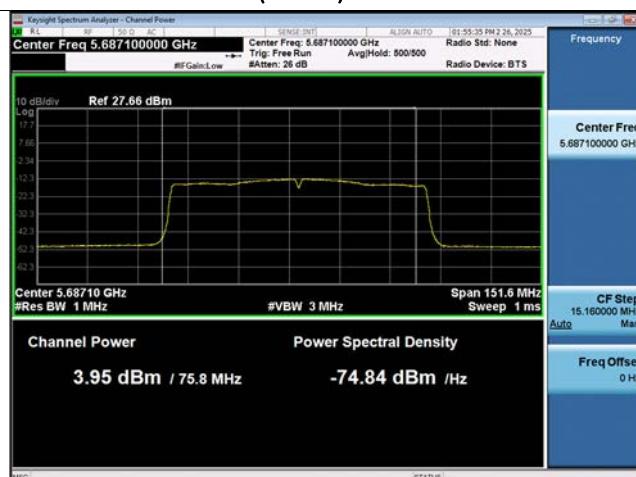
## 802.11ac(VHT40) UNII 2C Band



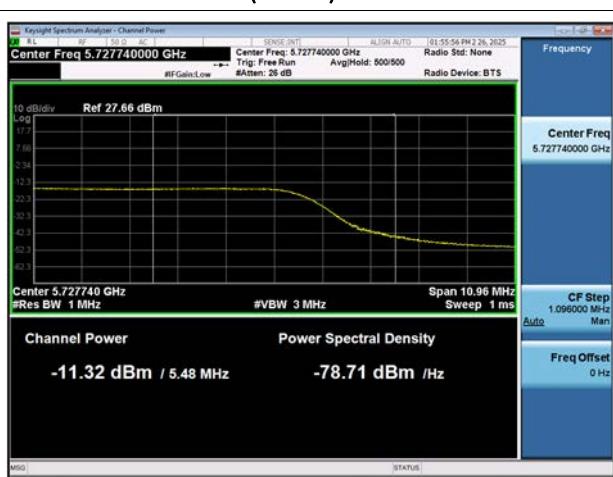
### 802.11ac(VHT40) UNII 3 Band



## 802.11ac(VHT80) UNII 2C Band



## 802.11ac(VHT80) UNII 3 Band



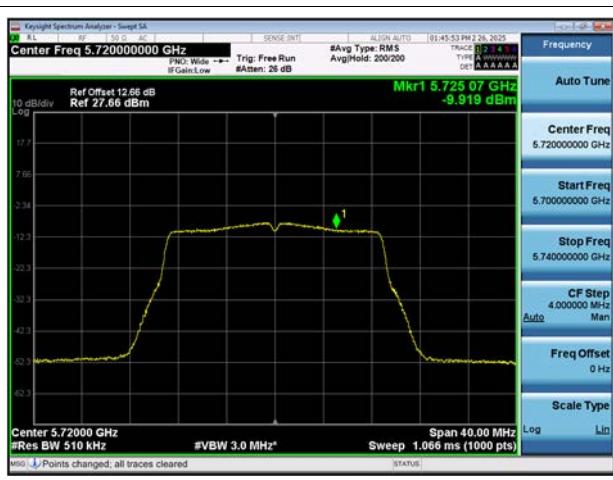
**□ Test Plots(Power Spectral Density)**
**802.11a UNII 2C Band**

**802.11a UNII 3 Band**

**802.11n(HT20) UNII 2C Band**

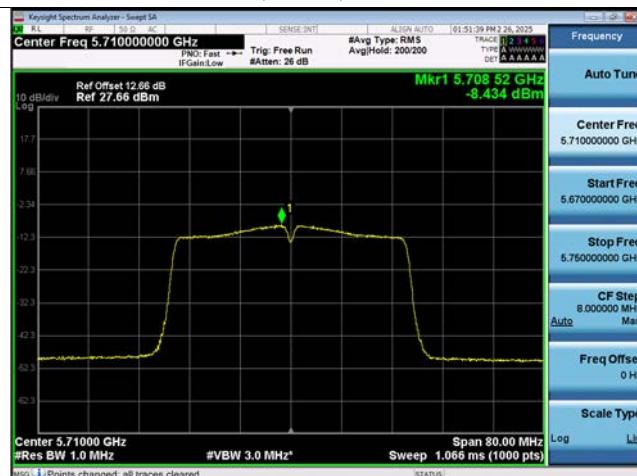
**802.11n(HT20) UNII 3 Band**

**802.11ac(VHT20) UNII 2C Band**

**802.11ac(VHT20) UNII 3 Band**


**802.11n(HT40) UNII 2C Band**

**802.11n(HT40) UNII 3 Band**

**802.11ac(VHT40) UNII 2C Band**

**802.11ac(VHT40) UNII 3 Band**

**802.11ac(VHT80) UNII 2C Band**

**802.11ac(VHT80) UNII 3 Band**


## 10.8 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30 MHz

Frequency	Measured Value	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin
[MHz]	[dB $\mu$ V]	[dB/m]	[H/V]	[dB $\mu$ V/m]	[dB $\mu$ V/m]	[dB]
No Critical peaks found						

**Note:**

1. The Measured Value of emissions are attenuated more than 20 dB below the permissible limits or the field strength is too small to be measured.
2. Distance extrapolation factor =  $40\log(\text{specific distance} / \text{test distance})$  (dB)
3. Limit line = specific Limits (dB $\mu$ V) + Distance extrapolation factor

Frequency Range : Below 1 GHz

Frequency	Measured Value	A.F+C.L	ANT. POL	Total	Limit	Margin
[MHz]	[dB $\mu$ V]	[dB/m]	[H/V]	[dB $\mu$ V/m]	[dB $\mu$ V/m]	[dB]
No Critical peaks found						

**Note:**

1. Radiated emissions measured in frequency range from 30 MHz to 1000 MHz were made with an instrument using Quasi peak detector mode

## Frequency Range : Above 1 GHz

802.11a_6Mbps							
Band : UNII 1			Operation Mode : 802.11a				
CH.36		5180 MHz	Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dB $\mu$ V]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Measurement Type
10360	49.64	5.79	V	55.43	68.20	12.77	PK
15540	51.74	6.58	V	58.32	73.98	15.66	PK
15540	34.86	6.58	V	41.44	53.98	12.54	AV
10360	49.27	5.79	H	55.06	68.20	13.14	PK
15540	52.56	6.58	H	59.14	73.98	14.84	PK
15540	35.15	6.58	H	41.73	53.98	12.25	AV

Band : UNII 1			Operation Mode : 802.11a				
CH.40		5200 MHz	Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dB $\mu$ V]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Measurement Type
10400	49.90	5.60	V	55.50	68.20	12.70	PK
15600	51.83	6.35	V	58.18	73.98	15.80	PK
15600	34.12	6.35	V	40.47	53.98	13.51	AV
10400	49.59	5.60	H	55.19	68.20	13.01	PK
15600	52.31	6.35	H	58.66	73.98	15.32	PK
15600	34.27	6.35	H	40.62	53.98	13.36	AV

Band : UNII 1			Operation Mode : 802.11a				
CH.48		5240 MHz	Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dB $\mu$ V]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Measurement Type
10480	50.93	6.05	V	56.98	68.20	11.22	PK
15720	49.26	5.76	V	55.02	73.98	18.96	PK
15720	34.15	5.76	V	39.91	53.98	14.07	AV
10480	50.56	6.05	H	56.61	68.20	11.59	PK
15720	49.72	5.76	H	55.48	73.98	18.50	PK
15720	34.38	5.76	H	40.14	53.98	13.84	AV

Band : UNII 2A			Operation Mode : 802.11a				
CH.52		5260 MHz	Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dB $\mu$ V]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Measurement Type
10520	50.55	6.25	V	56.80	68.20	11.40	PK
15780	49.25	6.05	V	55.30	73.98	18.68	PK
15780	34.20	6.05	V	40.25	53.98	13.73	AV
10520	50.28	6.25	H	56.53	68.20	11.67	PK
15780	49.48	6.05	H	55.53	73.98	18.45	PK
15780	34.33	6.05	H	40.38	53.98	13.60	AV

Band : UNII 2A			Operation Mode : 802.11a				
CH.60 5300 MHz			Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dB $\mu$ V]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Measurement Type
10600	50.45	6.31	V	56.76	73.98	17.22	PK
10600	41.36	6.31	V	47.67	53.98	6.31	AV
15900	51.11	7.24	V	58.35	73.98	15.63	PK
15900	34.53	7.24	V	41.77	53.98	12.21	AV
10600	50.31	6.31	H	56.62	73.98	17.36	PK
10600	41.27	6.31	H	47.58	53.98	6.40	AV
15900	51.13	7.24	H	58.37	73.98	15.61	PK
15900	34.81	7.24	H	42.05	53.98	11.93	AV
Band : UNII 2A			Operation Mode : 802.11a				
CH.64 5320 MHz			Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dB $\mu$ V]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Measurement Type
10640	50.14	5.89	V	56.03	73.98	17.95	PK
10640	41.33	5.89	V	47.22	53.98	6.76	AV
15960	50.26	6.54	V	56.80	73.98	17.18	PK
15960	34.06	6.54	V	40.60	53.98	13.38	AV
10640	49.27	5.89	H	55.16	73.98	18.82	PK
10640	41.15	5.89	H	47.04	53.98	6.94	AV
15960	50.98	6.54	H	57.52	73.98	16.46	PK
15960	34.31	6.54	H	40.85	53.98	13.13	AV
Band : UNII 2C			Operation Mode : 802.11a				
CH.100 5500 MHz			Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dB $\mu$ V]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Measurement Type
11000	51.08	6.36	V	57.44	73.98	16.54	PK
11000	44.55	6.36	V	50.91	53.98	3.07	AV
16500	46.53	8.54	V	55.07	68.20	13.13	PK
11000	50.92	6.36	H	57.28	73.98	16.70	PK
11000	44.19	6.36	H	50.55	53.98	3.43	AV
16500	46.97	8.54	H	55.51	68.20	12.69	PK
Band : UNII 2C			Operation Mode : 802.11a				
CH.116 5580 MHz			Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dB $\mu$ V]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Measurement Type
11160	50.99	5.70	V	56.69	73.98	17.29	PK
11160	42.96	5.70	V	48.66	53.98	5.32	AV
16740	46.50	9.99	V	56.49	68.20	11.71	PK
11160	50.72	5.70	H	56.42	73.98	17.56	PK
11160	42.89	5.70	H	48.59	53.98	5.39	AV
16740	46.57	9.99	H	56.56	68.20	11.64	PK

Band : UNII 2C			Operation Mode : 802.11a				
CH.144 5720 MHz			Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dB $\mu$ V]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Measurement Type
11440	51.70	5.92	V	57.62	73.98	16.36	PK
11440	44.94	5.92	V	50.86	53.98	3.12	AV
17160	51.96	9.69	V	61.65	68.20	6.55	PK
11440	51.57	5.92	H	57.49	73.98	16.49	PK
11440	44.92	5.92	H	50.84	53.98	3.14	AV
17160	52.33	9.69	H	62.02	68.20	6.18	PK

Band : UNII 3			Operation Mode : 802.11a				
CH.149 5745 MHz			Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dB $\mu$ V]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Measurement Type
11490	50.51	5.88	V	56.39	73.98	17.59	PK
11490	42.90	5.88	V	48.78	53.98	5.20	AV
17235	46.60	10.22	V	56.82	68.20	11.38	PK
11490	50.39	5.88	H	56.27	73.98	17.71	PK
11490	42.83	5.88	H	48.71	53.98	5.27	AV
17235	46.65	10.22	H	56.87	68.20	11.33	PK

Band : UNII 3			Operation Mode : 802.11a				
CH.157 5785 MHz			Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dB $\mu$ V]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Measurement Type
11570	51.03	6.03	V	57.06	73.98	16.92	PK
11570	43.34	6.03	V	49.37	53.98	4.61	AV
17355	46.27	11.36	V	57.63	68.20	10.57	PK
11570	51.00	6.03	H	57.03	73.98	16.95	PK
11570	42.96	6.03	H	48.99	53.98	4.99	AV
17355	46.33	11.36	H	57.69	68.20	10.51	PK

Band : UNII 3			Operation Mode : 802.11a				
CH.165 5825 MHz			Transfer Rate : 6Mbps				
Frequency [MHz]	Measured value [dB $\mu$ V]	CL+AF+DF-AG [dB/m]	ANT. POL [H/V]	Total [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Measurement Type
11650	51.74	5.42	V	57.16	73.98	16.82	PK
11650	44.59	5.42	V	50.01	53.98	3.97	AV
17475	47.26	11.65	V	58.91	68.20	9.29	PK
11650	51.57	5.42	H	56.99	73.98	16.99	PK
11650	44.50	5.42	H	49.92	53.98	4.06	AV
17475	47.45	11.65	H	59.10	68.20	9.10	PK

**[Simultaneous transmission Scenario]**Scenario 2

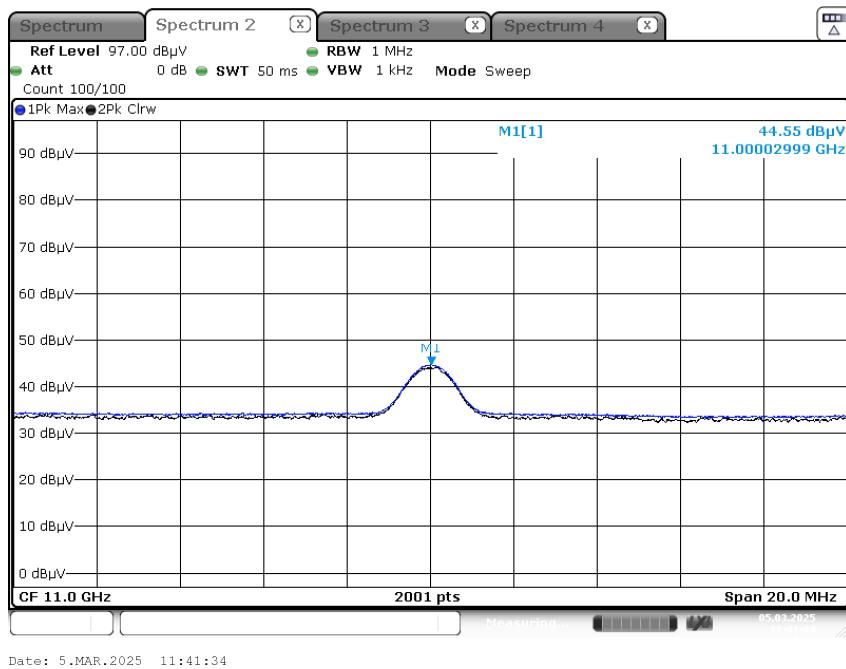
## Bluetooth DH5\_Ch.78 + WLAN 5 GHz 802.11a\_Ch. 100

Frequency [MHz]	Measured value [dB $\mu$ V]	CL+AF+DF-AG [dB/m]	ANT. POL	Total [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Measurement
							Type
11000	51.69	6.36	V	58.05	73.98	15.93	PK
11000	44.52	6.36	V	50.88	53.98	3.10	AV
16500	47.29	8.54	V	55.83	68.20	12.37	PK
11000	50.97	6.36	H	57.33	73.98	16.65	PK
11000	43.96	6.36	H	50.32	53.98	3.66	AV
16500	47.71	8.54	H	56.25	68.20	11.95	PK

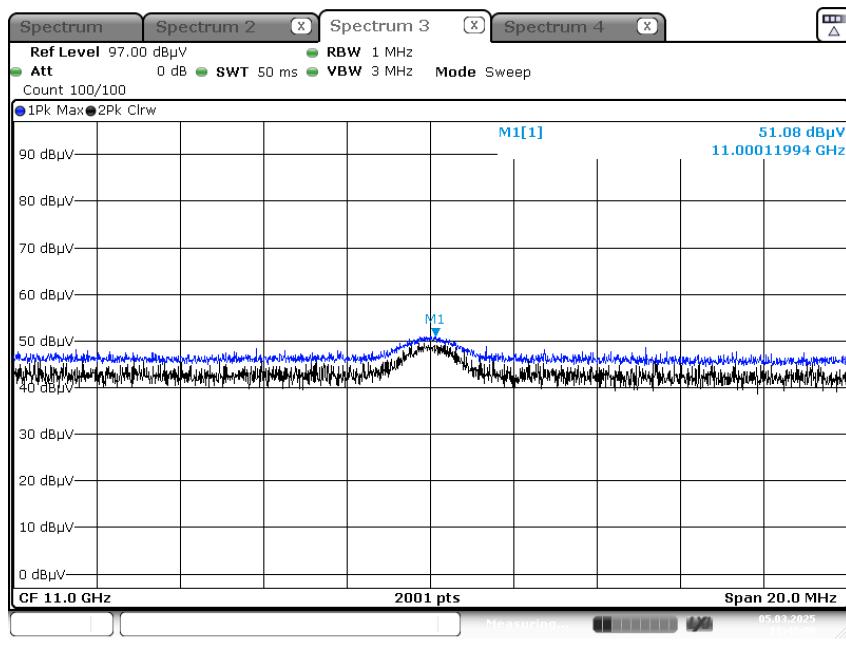
**Test Plots**

**Note:** Only the worst case plots for Radiated Spurious Emissions.

Radiated Spurious Emissions plot – Average Result (802.11a, Ch.100 Spurious Emissions, X-V)



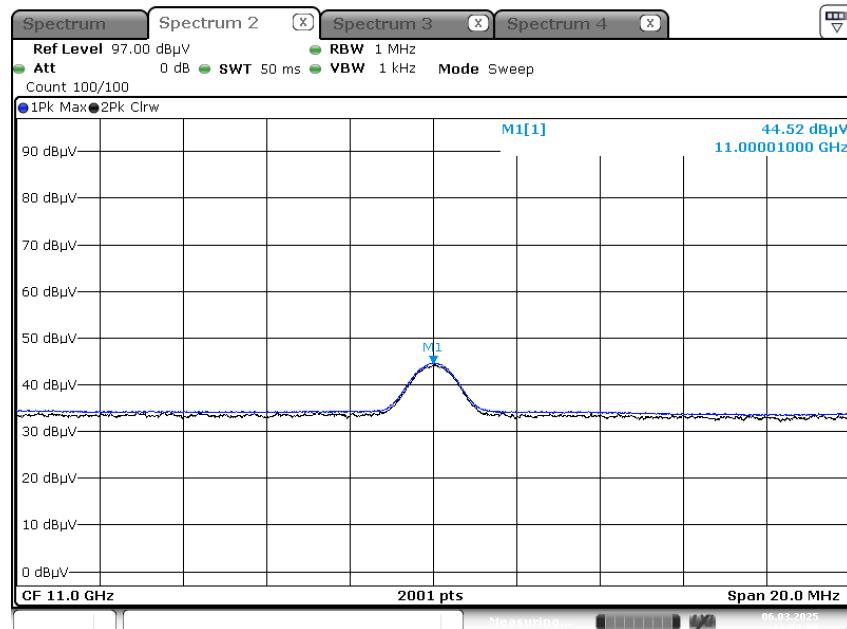
Radiated Spurious Emissions plot – Peak Result (802.11a, Ch.100 Spurious Emissions, X-V)



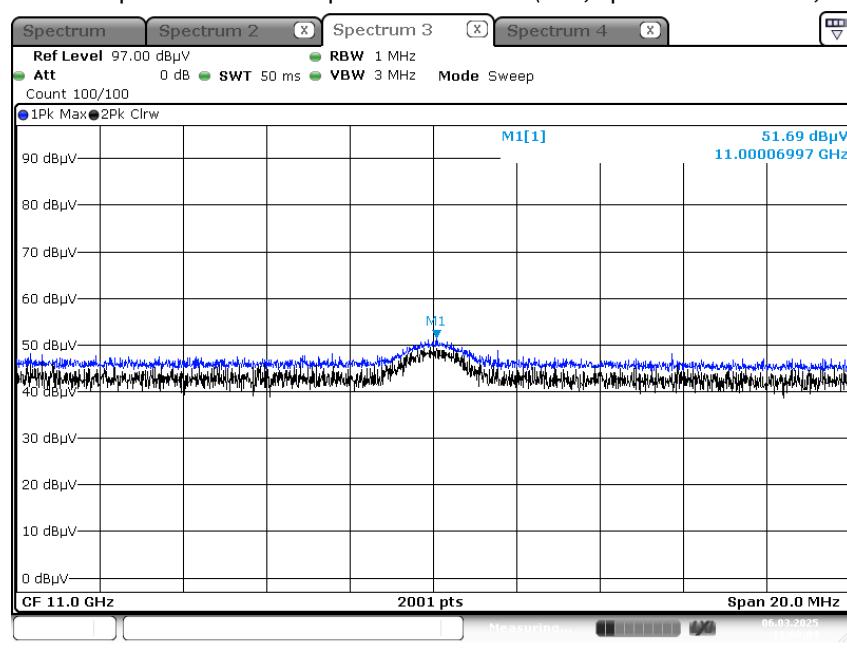
**[Simultaneous transmission Scenario]**Scenario 2

Bluetooth DH5\_Ch.78 + WLAN 5 GHz 802.11a\_Ch. 100

Radiated Spurious Emissions plot – Average Result (2nd, Spurious Emissions, X-V)



Radiated Spurious Emissions plot – Peak Result (2nd, Spurious Emissions, X-V)



## 10.9 RADIATED RESTRICTED BAND EDGE

802.11 a		Transfer Rate: 6 Mbps					
Channel	Ch.36	5180 MHz		UNII 1			
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dB $\mu$ V]	[dB/m]	[H/V]	[dB $\mu$ V/m]	[dB $\mu$ V/m]	[dB]	Type
5150	56.37	-	H	56.37	73.98	17.61	PK
5150	44.32	-	H	44.32	53.98	9.66	AV

802.11 a		Transfer Rate: 6 Mbps					
Channel	Ch. 64	5320 MHz		UNII 2A			
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dB $\mu$ V]	[dB/m]	[H/V]	[dB $\mu$ V/m]	[dB $\mu$ V/m]	[dB]	Type
5350	57.93	-	H	57.93	73.98	16.05	PK
5350	44.99	-	H	44.99	53.98	8.99	AV

802.11 a		Transfer Rate: 6 Mbps					
Channel	Ch. 100	5500 MHz		UNII 2C			
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dB $\mu$ V]	[dB/m]	[H/V]	[dB $\mu$ V/m]	[dB $\mu$ V/m]	[dB]	Type
5460	57.54	-	H	57.54	73.98	16.44	PK
5460	45.38	-	H	45.38	53.98	8.60	AV
5470	59.62	-	H	59.62	68.20	8.58	PK

802.11 n_HT20		Transfer MCS Index: MCS 0					
Channel	Ch. 36	5180 MHz		UNII 1			
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dB $\mu$ V]	[dB/m]	[H/V]	[dB $\mu$ V/m]	[dB $\mu$ V/m]	[dB]	Type
5150	56.29	-	H	56.29	73.98	17.69	PK
5150	44.44	-	H	44.44	53.98	9.54	AV

802.11 n_HT20		Transfer MCS Index: MCS 0					
Channel	Ch. 64	5320 MHz		UNII 2A			
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dB $\mu$ V]	[dB/m]	[H/V]	[dB $\mu$ V/m]	[dB $\mu$ V/m]	[dB]	Type
5350	57.86	-	H	57.86	73.98	16.12	PK
5350	44.89	-	H	44.89	53.98	9.09	AV

802.11 n_HT20		Transfer MCS Index: MCS 0					
Channel	Ch. 100	5500 MHz		UNII 2C			
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dB $\mu$ V]	[dB/m]	[H/V]	[dB $\mu$ V/m]	[dB $\mu$ V/m]	[dB]	Type
5460	58.57	-	H	58.57	73.98	15.41	PK
5460	44.90	-	H	44.90	53.98	9.08	AV
5470	59.05	-	H	59.05	68.20	9.15	PK

802.11 ac_VHT20		Transfer MCS Index: MCS 0					
Channel	Ch. 36	5180 MHz		UNII 1			
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dB $\mu$ V]	[dB/m]	[H/V]	[dB $\mu$ V/m]	[dB $\mu$ V/m]	[dB]	Type
5150	57.21	-	H	57.21	73.98	16.77	PK
5150	44.41	-	H	44.41	53.98	9.57	AV

802.11 ac_VHT20		Transfer MCS Index: MCS 0					
Channel	Ch. 64	5320 MHz		UNII 2A			
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dB $\mu$ V]	[dB/m]	[H/V]	[dB $\mu$ V/m]	[dB $\mu$ V/m]	[dB]	Type
5350	57.90	-	H	57.90	73.98	16.08	PK
5350	44.88	-	H	44.88	53.98	9.10	AV

802.11 ac_VHT20		Transfer MCS Index: MCS 0					
Channel	Ch. 100	5500 MHz		UNII 2C			
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dB $\mu$ V]	[dB/m]	[H/V]	[dB $\mu$ V/m]	[dB $\mu$ V/m]	[dB]	Type
5460	59.04	-	H	59.04	73.98	14.94	PK
5460	45.19	-	H	45.19	53.98	8.79	AV
5470	59.75	-	H	59.75	68.20	8.45	PK

802.11 n_HT40		Transfer MCS Index: MCS 0					
Channel	Ch. 38	5190 MHz		UNII 1			
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dB $\mu$ V]	[dB/m]	[H/V]	[dB $\mu$ V/m]	[dB $\mu$ V/m]	[dB]	Type
5150	56.47	-	H	56.47	73.98	17.51	PK
5150	44.06	-	H	44.06	53.98	9.92	AV

802.11 n_HT40		Transfer MCS Index: MCS 0					
Channel	Ch. 62	5310 MHz	UNII 2A				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dB $\mu$ V]	[dB/m]	[H/V]	[dB $\mu$ V/m]	[dB $\mu$ V/m]	[dB]	Type
5350	57.53	-	H	57.53	73.98	16.45	PK
5350	44.86	-	H	44.86	53.98	9.12	AV

802.11 n_HT40		Transfer MCS Index: MCS 0					
Channel	Ch. 102	5510 MHz	UNII 2C				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dB $\mu$ V]	[dB/m]	[H/V]	[dB $\mu$ V/m]	[dB $\mu$ V/m]	[dB]	Type
5460	58.00	-	H	58.00	73.98	15.98	PK
5460	45.42	-	H	45.42	53.98	8.56	AV
5470	58.41	-	H	58.41	68.20	9.79	PK

802.11 ac_VHT40		Transfer MCS Index: MCS 0					
Channel	Ch. 38	5190 MHz	UNII 1				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dB $\mu$ V]	[dB/m]	[H/V]	[dB $\mu$ V/m]	[dB $\mu$ V/m]	[dB]	Type
5150	56.58	-	H	56.58	73.98	17.40	PK
5150	44.13	-	H	44.13	53.98	9.85	AV

802.11 ac_VHT40		Transfer MCS Index: MCS 0					
Channel	Ch. 62	5310 MHz	UNII 2A				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dB $\mu$ V]	[dB/m]	[H/V]	[dB $\mu$ V/m]	[dB $\mu$ V/m]	[dB]	Type
5350	57.80	-	H	57.80	73.98	16.18	PK
5350	45.02	-	H	45.02	53.98	8.96	AV

802.11 ac_VHT40		Transfer MCS Index: MCS 0					
Channel	Ch. 102	5510 MHz	UNII 2C				
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dB $\mu$ V]	[dB/m]	[H/V]	[dB $\mu$ V/m]	[dB $\mu$ V/m]	[dB]	Type
5460	59.27	-	H	59.27	73.98	14.71	PK
5460	46.33	-	H	46.33	53.98	7.65	AV
5470	59.23	-	H	59.23	68.20	8.97	PK

802.11 ac_VHT80		Transfer MCS Index: MCS 0					
Channel	Ch. 42	5210 MHz		UNII 1			
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dB $\mu$ V]	[dB/m]	[H/V]	[dB $\mu$ V/m]	[dB $\mu$ V/m]	[dB]	Type
5150	56.19	-	H	56.19	73.98	17.79	PK
5150	44.80	-	H	44.80	53.98	9.18	AV

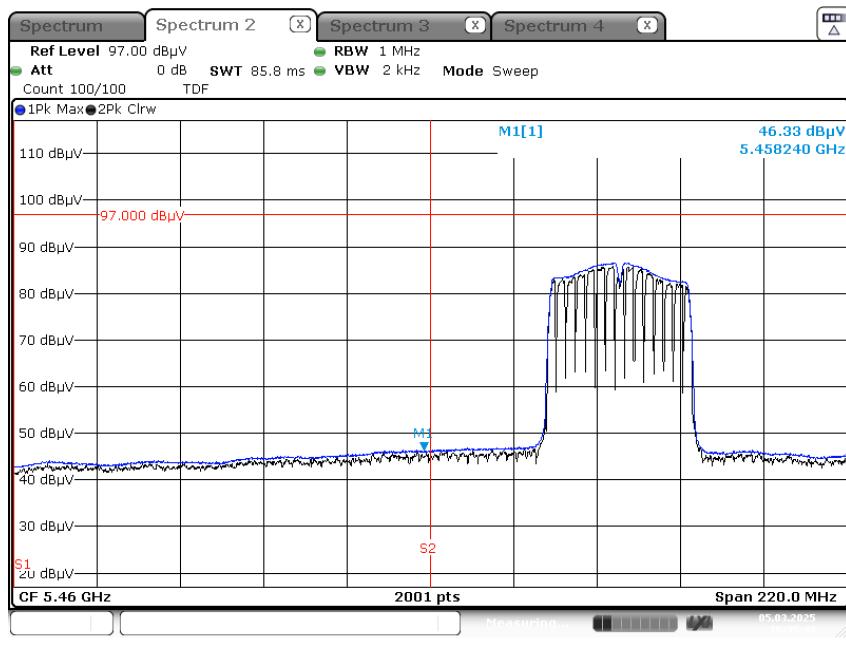
802.11 ac_VHT80		Transfer MCS Index: MCS 0					
Channel	Ch. 58	5290 MHz		UNII 2A			
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dB $\mu$ V]	[dB/m]	[H/V]	[dB $\mu$ V/m]	[dB $\mu$ V/m]	[dB]	Type
5350	57.99	-	H	57.99	73.98	15.99	PK
5350	45.57	-	H	45.57	53.98	8.41	AV

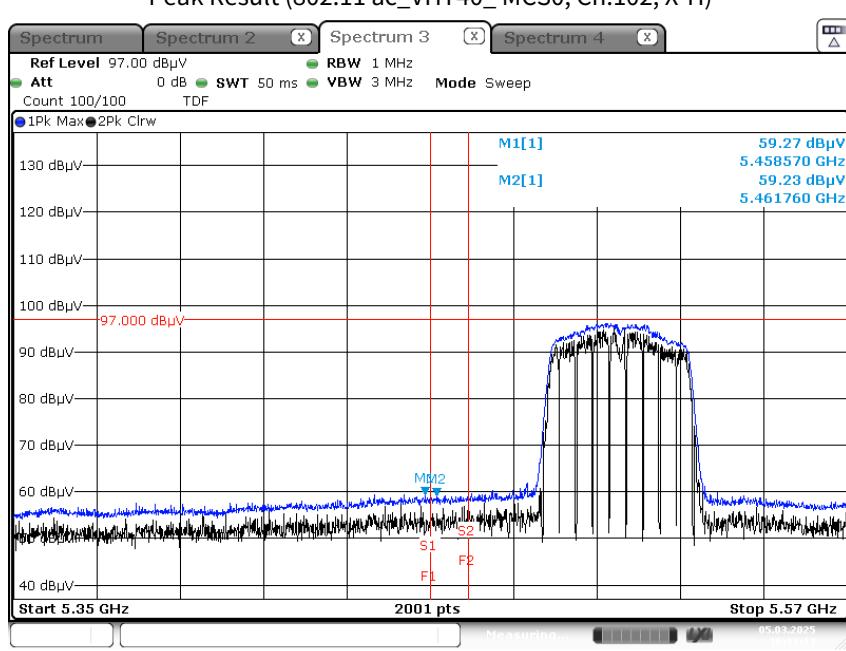
802.11 ac_VHT80		Transfer MCS Index: MCS 0					
Channel	Ch. 106	5530 MHz		UNII 2C			
Frequency	Measured Value	C.L+A.F+D.F-A.G+ATT	ANT. POL	Total	Limit	Margin	Measurement
[MHz]	[dB $\mu$ V]	[dB/m]	[H/V]	[dB $\mu$ V/m]	[dB $\mu$ V/m]	[dB]	Type
5460	57.45	-	H	57.45	73.98	16.53	PK
5460	45.88	-	H	45.88	53.98	8.10	AV
5470	58.30	-	H	58.30	68.20	9.90	PK

### Test Plots (UNII 1, 2A, 2C)

Average Result (802.11 ac\_VHT40\_ MCS0, Ch.102, X-H)

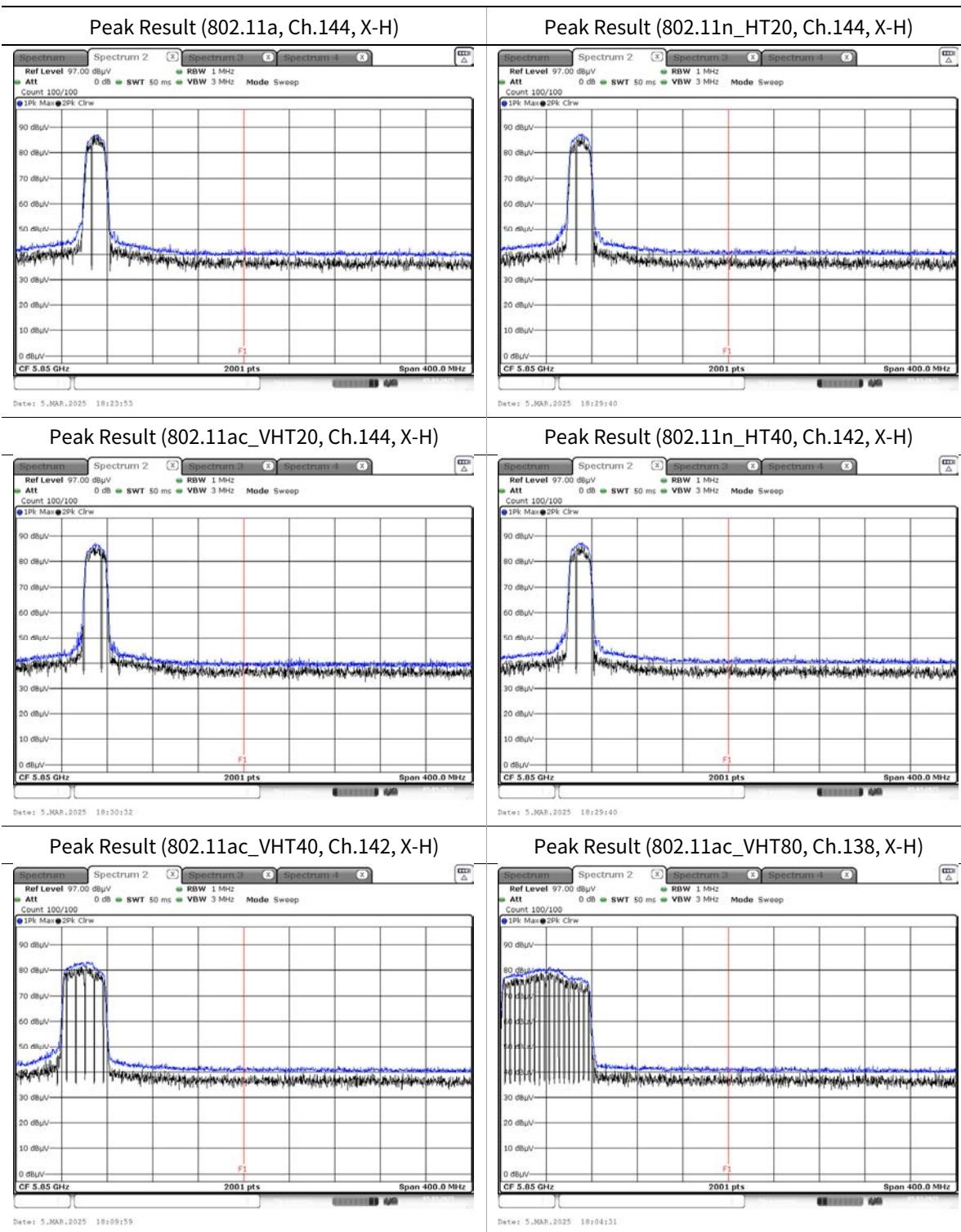


Peak Result (802.11 ac\_VHT40\_ MCS0, Ch.102, X-H)



### Note:

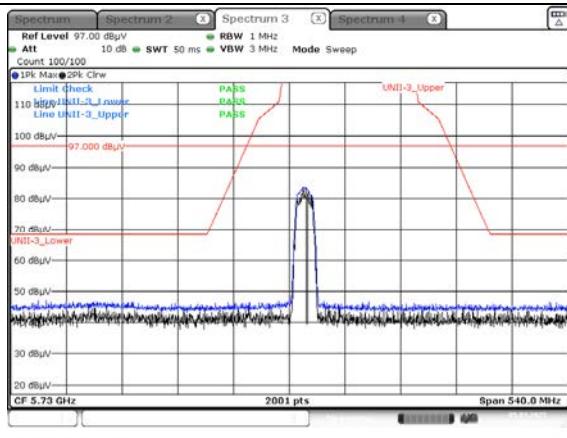
Only the worst case plots for Radiated Restricted Band Edge.

**□ Test Plots(Straddle Channel)**

**Note:**

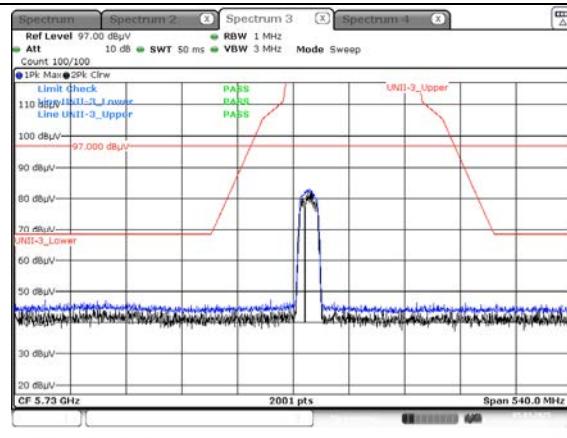
1. Only the worst case plots for Radiated Restricted Band Edge.
2. Red line : 5.850 MHz
3. Ambient Noise (Because of ambient noise, We attached only the worst plot without a data table)

**Test Plots (UNII 3)**

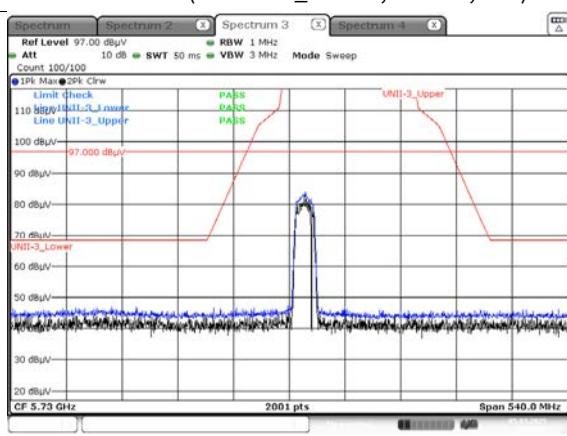
Peak Result (802.11a, Ch.149, X-H)



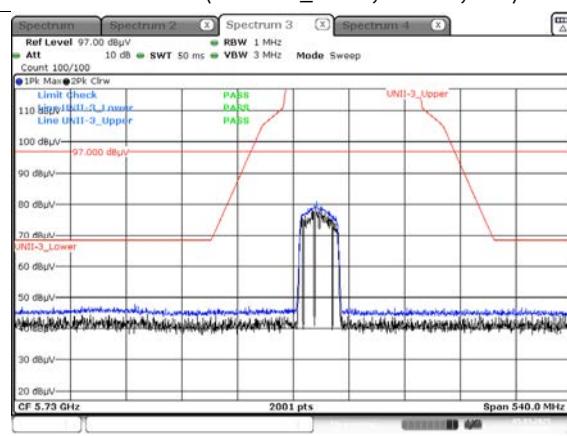
Peak Result (802.11n\_HT20, Ch.149, X-H)



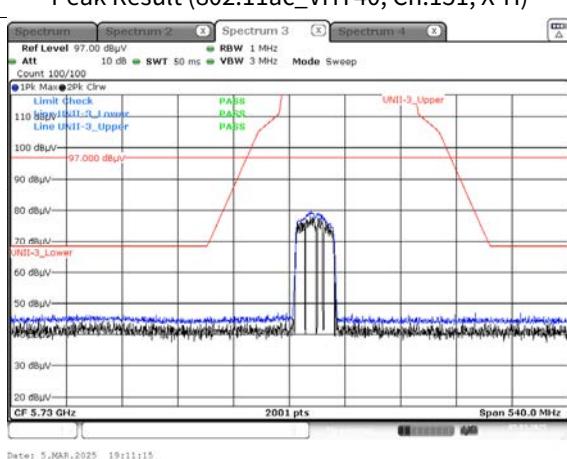
Peak Result (802.11ac\_VHT20, Ch.149, X-H)



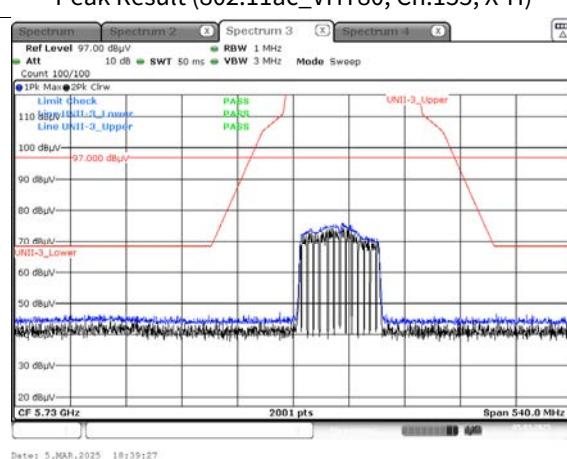
Peak Result (802.11n\_HT40, Ch.151, X-H)

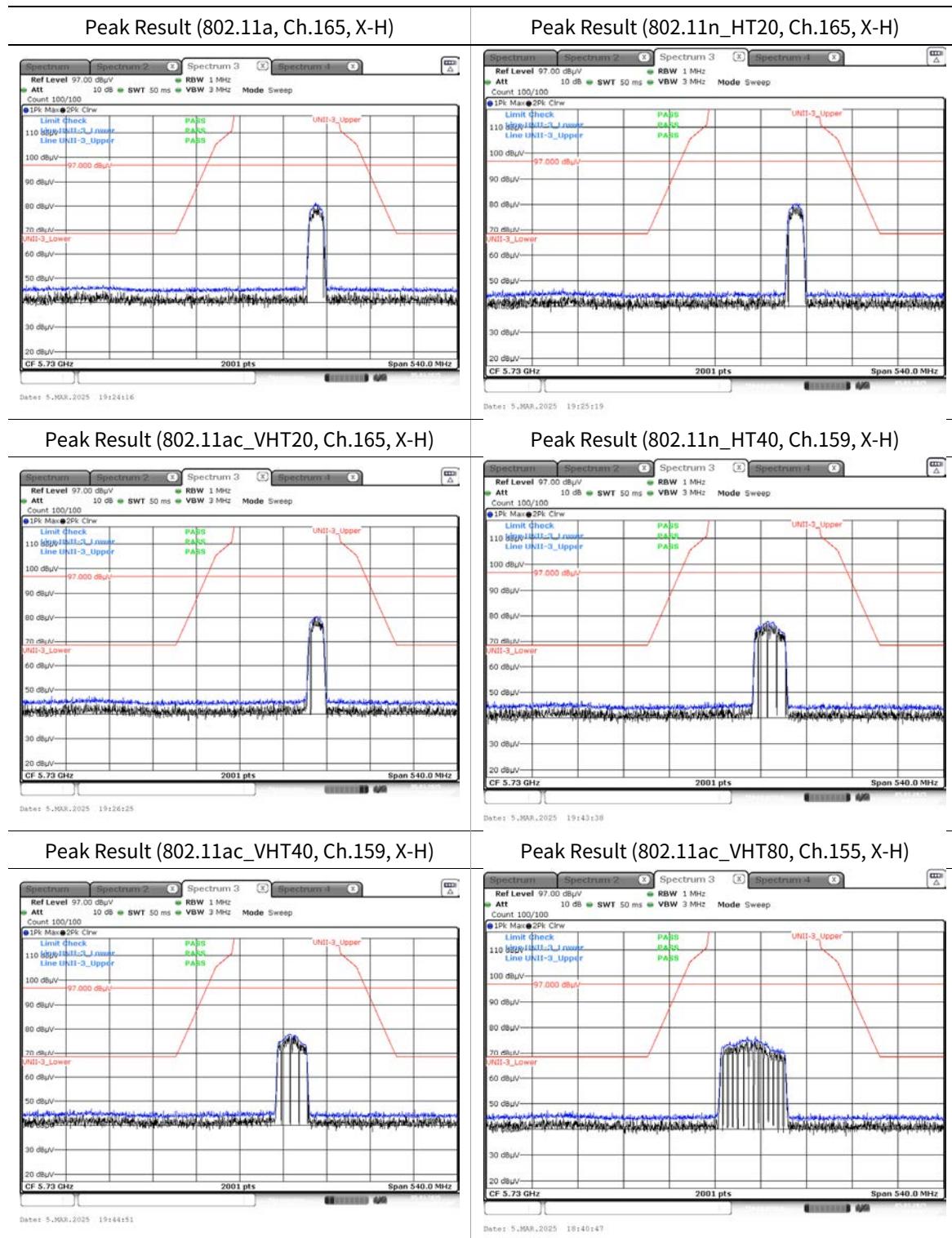


Peak Result (802.11ac\_VHT40, Ch.151, X-H)



Peak Result (802.11ac\_VHT80, Ch.155, X-H)





#### Note :

1. Only the worst case plots for U-NII-3 Out of Band e.i.r.p Emission.
2. U-NII-3 Low & High Band Edge RedLine is Final Test Limit about factor value compensation.

**11. LIST OF TEST EQUIPMENT****Conducted Test**

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	07/17/2025	Annual
EMI Test Receiver	ESR	Rohde & Schwarz	101910	07/02/2025	Annual
Temperature Chamber	SU-642	ESPEC	93022487	06/27/2025	Annual
Signal Analyzer	N9030A	Keysight	MY55410508	08/23/2025	Annual
Power Measurement Set	OSP 120	Rohde & Schwarz	100935	08/01/2025	Annual
Power Meter	N1911A	Agilent	MY45100523	02/21/2026	Annual
Power Sensor	N1921A	Agilent	MY57820067	02/04/2026	Annual
Directional Coupler	87300B	Agilent	3116A03621	10/21/2025	Annual
Power Splitter	11667B	Hewlett Packard	10545	01/23/2026	Annual
DC Power Supply	E3632A	Agilent	KR75305528	12/24/2025	Annual
Attenuator(10 dB)(DC-26.5 GHz)	8493C-010	Agilent	08285	05/28/2025	Annual
Attenuator(20 dB)	18N-20dB	Rohde & Schwarz	8	02/18/2026	Annual
Software	EMC32	Rohde & Schwarz	N/A	N/A	N/A
FCC WLAN&BT&BLE Conducted Test Software v3.0	N/A	HCT CO., LTD.	N/A	N/A	N/A
Bluetooth Tester	CBT	Rohde & Schwarz	100752	12/27/2025	Annual

**Note:**

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

**Radiated Test**

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Controller(Antenna mast)	CO3000	Innco system	CO3000-4p	N/A	N/A
Antenna Position Tower	MA4640/800-XP-EP	Innco system	S3AM	07/30/2025	Annual
Controller	EM2090	Emco	060520	N/A	N/A
Turn Table	N/A	Ets	N/A	N/A	N/A
Amp & Filter Bank Switch Controller	FBSM-01A	TNM system	0	N/A	N/A
Loop Antenna	FMZB 1513	Rohde & Schwarz	1513-333	03/07/2026	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	08/28/2026	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1191	11/07/2025	Biennial
Horn Antenna(15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170124	03/28/2025	Biennial
Band Reject Filter	WRCJV2400/2483.5-2370/2520-60/12SS	Wainwright Instruments	2	12/26/2025	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	5	06/04/2025	Annual
Band Reject Filter	WRCJV12-4900-5100-5900-6100-50SS	Wainwright Instruments	6	06/04/2025	Annual
Band Reject Filter	WRCJV5100/5850-40/50-8EEK	Wainwright Instruments	1	01/09/2026	Annual
RF Switching System	FBSR-03A (3G HPF+LNA)	T&M SYSTEM	S3L1	10/31/2025	Annual
RF Switching System	FBSR-03A (10dB ATT+LNA)	T&M SYSTEM	S3L2	10/31/2025	Annual
RF Switching System	FBSR-03A (7G HPF+LNA)	T&M SYSTEM	S3L3	10/31/2025	Annual
RF Switching System	FBSR-03A (3dB ATT+LNA)	T&M SYSTEM	S3L4	10/31/2025	Annual
Power Amplifier	CBL18265035	CERNEX	22966	11/07/2025	Annual
Power Amplifier	CBL26405040	CERNEX	25956	02/19/2026	Annual
Bluetooth Tester	TC-3000C	TESCOM	3000C000175	03/19/2025	Annual
Spectrum Analyzer	FSV40 (9 kHz ~ 40 GHz)	Rohde & Schwarz	100900	08/27/2025	Annual

**Note:**

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.
3. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5(Version : 2017).

**12. ANNEX A\_ TEST SETUP PHOTO**

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-2503-FC051-P