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TEST REPORT

FCC/ISED UNII Test for LAMWBD1
Certification

APPLICANT
LG Electronics Inc.

REPORT NO.
HCT-RF-2212-FI002

DATE OF ISSUE
December 8, 2022

Tested by
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Accredited by KOLAS, Republic of KOREA

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고객비밀
CUSTOMER SECRET



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Additional Model
-

Applicant **LG Electronics Inc.**
170, Seongsanpaechong-ro, Seongsan-gu, Changwon-si, Gyeongsangnam-do,
51533, Republic of Korea

Eut Type RF Module
Model Name LAMWBD1

FCC ID BEJ-LAMWBD1
IC 2703N-LAMWBD1

Modulation type OFDM

FCC Classification Unlicensed National Information Infrastructure(NII)

FCC Rule Part(s) Part 15.407

ISED Rule Part(s) RSS-247 Issue 2 (February 2017)
RSS-Gen Issue 5_Amendment 2 (February 2021)

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.

This test results were applied only to the test methods required by the standard.



REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	November 08, 2022	Initial Release

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 / ISED Rules under normal use and maintenance.

KOLAS Statement:

The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (KOLAS Accreditation No. KT197)

If this report is required to confirmation of authenticity, please contact to www.hct.co.kr



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1. GENERAL INFORMATION

EUT DESCRIPTION

Model	LAMWBD1	
Additional Model	-	
EUT Type	RF Module	
Power Supply	DC 12.0 V / DC 19.0 V	
Modulation Type	OFDM : 802.11a, 802.11n, 802.11ac	
Frequency Range (MHz)	U-NII-1	20MHz BW : 5180 - 5240 40MHz BW : 5190 - 5230 80MHz BW : 5210
	U-NII-2A	20MHz BW : 5260 - 5320 40MHz BW : 5270 - 5310 80MHz BW : 5290
	U-NII-2C	20MHz BW : 5500 - 5720 40MHz BW : 5510 - 5710 80MHz BW : 5530 - 5690
	U-NII-3	20MHz BW : 5745 - 5825 40MHz BW : 5755 - 5795 80MHz BW : 5775
Antenna type	Pattern Antenna	
Antenna Peak Gain	Peak Gain : -2.45 dBi(UNII 1, UNII 2A)/ 0.74 dBi(UNII 2C)/ 1.40 dBi(UNII 3)	
Straddle channel	Supported	
TDWR Band	Not Supported	
Dynamic Frequency Selection	Slave without radar detection	
Date(s) of Tests	November 21, 2022 ~ December 07, 2022	
PMN (Product Marketing Number)	RF Module	
HVIN (Hardware Version Identification Number)	LAMWBD1	
FVIN (Firmware Version Identification Number)	V1.0	
HMN (Host Marketing Name)	N/A	
EUT serial numbers	Radiated : 010000000000 Conducted : 060000000000	
Factory	BEACON I&C Co., Ltd. 82-1 Anyangcheondong-ro, Dongan-gu, Anyang-si, Gyeonggi-do, Republic of Korea	



2. MAXIMUM OUTPUT POWER

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

Band	Mode	Output Power	
		(dBm)	(W)
UNII1	802.11a	12.65	0.018
	802.11n (HT20)	12.75	0.019
	802.11n (HT40)	11.65	0.015
	802.11ac (VHT20)	11.60	0.014
	802.11ac (VHT40)	10.76	0.012
	802.11ac (VHT80)	10.71	0.012
UNII2A	802.11a	13.07	0.020
	802.11n (HT20)	12.87	0.019
	802.11n (HT40)	11.97	0.016
	802.11ac (VHT20)	11.60	0.014
	802.11ac (VHT40)	11.02	0.013
	802.11ac (VHT80)	11.14	0.013
UNII2C	802.11a	13.13	0.021
	802.11n (HT20)	13.21	0.021
	802.11n (HT40)	12.06	0.016
	802.11ac (VHT20)	11.97	0.016
	802.11ac (VHT40)	11.10	0.013
	802.11ac (VHT80)	10.56	0.011
UNII3	802.11a	11.77	0.015
	802.11n (HT20)	11.83	0.015
	802.11n (HT40)	11.14	0.013
	802.11ac (VHT20)	11.68	0.015
	802.11ac (VHT40)	10.33	0.011
	802.11ac (VHT80)	10.27	0.011

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. / RSS-Gen issue 5, RSS-247 issue 2.

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 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane below 1GHz. Above 1GHz with 1.5m 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, 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 April 02, 2018 (Registration Number: KR0032).

For ISED, test facility was accepted dated January 26, 2021 (CAB identifier: 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 detectors 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 / RSS-Gen (Issue 5) Section 8:

“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.

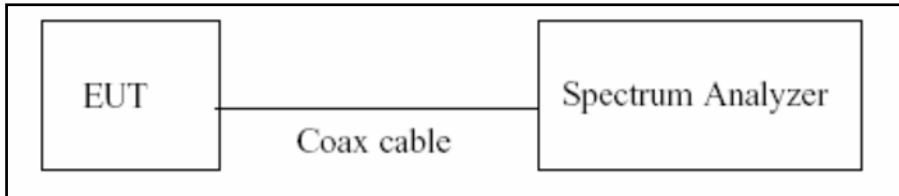
The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance

Parameter	Expanded Uncertainty (dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	2.00 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.40 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.74 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.51 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.92 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (Above 40 GHz)	5.48 (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.

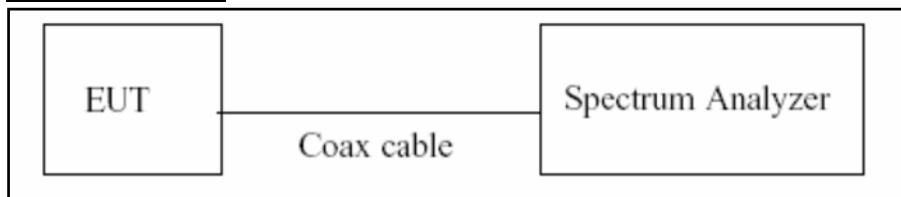
1. RBW = 8 MHz (the largest available value)
2. VBW = 8 MHz (\geq RBW)
3. SPAN = 0 Hz
4. Detector = Peak
5. Number of points in sweep > 100
6. Trace mode = Clear write
7. Measure T_{total} and T_{on}
8. Calculate Duty Cycle = T_{on} / T_{total} and Duty Cycle Factor = $10\log(1/\text{Duty Cycle})$

8.2. 6 dB Bandwidth & 26 dB Bandwidth & 99 % 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. Detector = 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. Detector = 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 level 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 26 dB bandwidth is used to determine the conducted power limits.

Test Procedure (99 % Bandwidth for ISED)

The transmitter output is connected to the spectrum analyzer.

RBW = 1% ~ 5% of the occupied bandwidth

VBW \doteq 3 x RBW

Detector = Peak

Trace mode = max hold

Sweep = auto couple

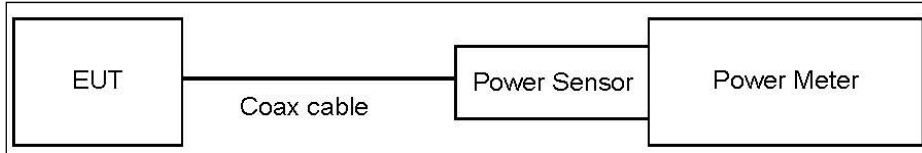
Allow the trace to stabilize

Note : We tested OBW using the automatic bandwidth measurement capability of a spectrum analyzer.

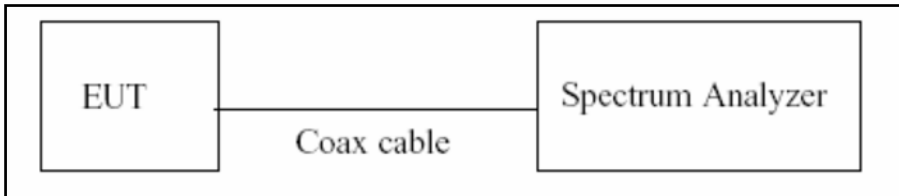
8.3. Output Power Measurement

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 ≥ 3 MHz.
5. Number of points in sweep ≥ 2 x span/RBW.
6. Sweep time = auto.
7. Detector = 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 Level(dBm) + ATT loss(dB) + Cable loss(dB)

Note

1. Spectrum Measured Level are not plot data.

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

2. Spectrum offset = Attenuator loss + Cable loss

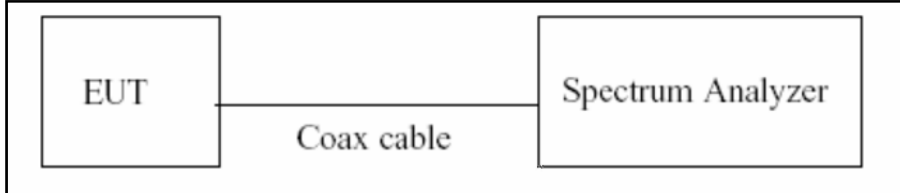
3. Actual value of loss for the attenuator and cable combination is below table.

Band	Loss(dB)
UNII 1	12.85
UNII 2A	12.85
UNII 2C	12.98
UNII 3	12.95

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

8.4. Power Spectral Density

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)
3. VBW \geq 3 MHz
4. Number of points in sweep \geq 2 x span/RBW.
5. Sweep time = auto.
6. Detector = RMS(i.e., power averaging), if available. Otherwise, use sample detector 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 Level (dBm) + ATT loss(dB) + Cable loss(dB) + Duty Cycle Factor(dB)

Note

1. Spectrum Measured Level are not plot data.

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

2. Spectrum offset = Attenuator loss + Cable loss

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

Band	Loss(dB)
UNII 1	12.85
UNII 2A	12.85
UNII 2C	12.98
UNII 3	12.95

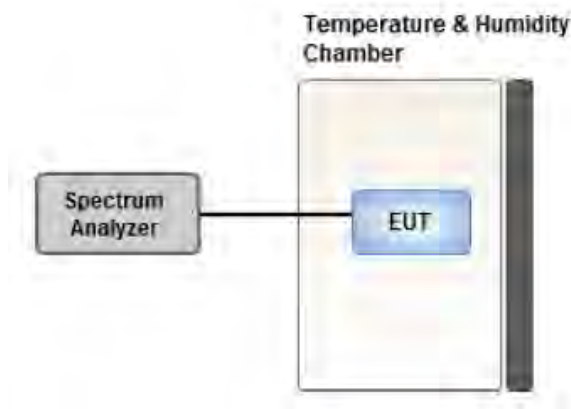
(Actual value of loss for the attenuator and cable combination)

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 μH/50 ohms line impedance stabilization network (LISN).

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50
5 to 30	60	50

^(a)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. Detectors : Quasi Peak and Average Detector.

Sample Calculation

Quasi-peak(Final Result) = Measured Level + 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 dBm/MHz.

2. UNII 2A, 2C: All emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz.

3. UNII 3: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 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 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 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.

FCC

Frequency (MHz)	Field Strength (uV/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

ISED

Frequency (MHz)	Field Strength (uA/m)	Measurement Distance (m)
0.009 – 0.490	$6.37/F(\text{kHz})$	300
0.490 – 1.705	$63.7/F(\text{kHz})$	30
1.705 – 30	0.08	30

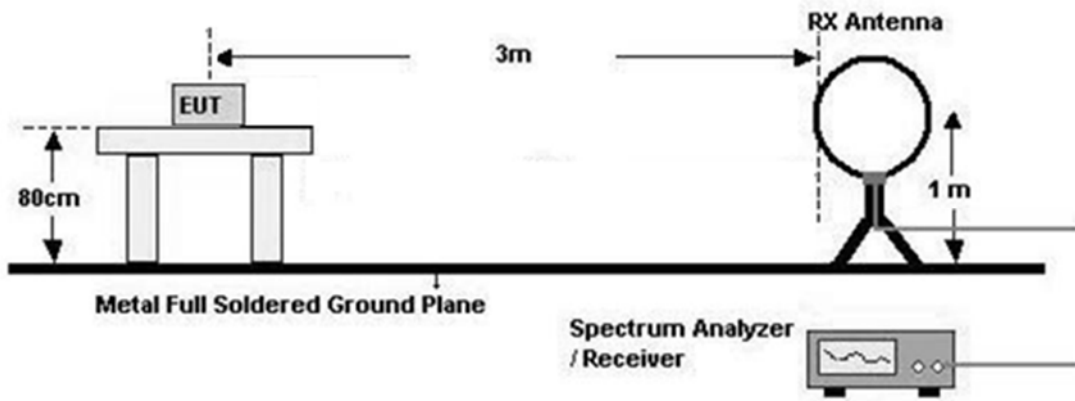


FCC&ISED

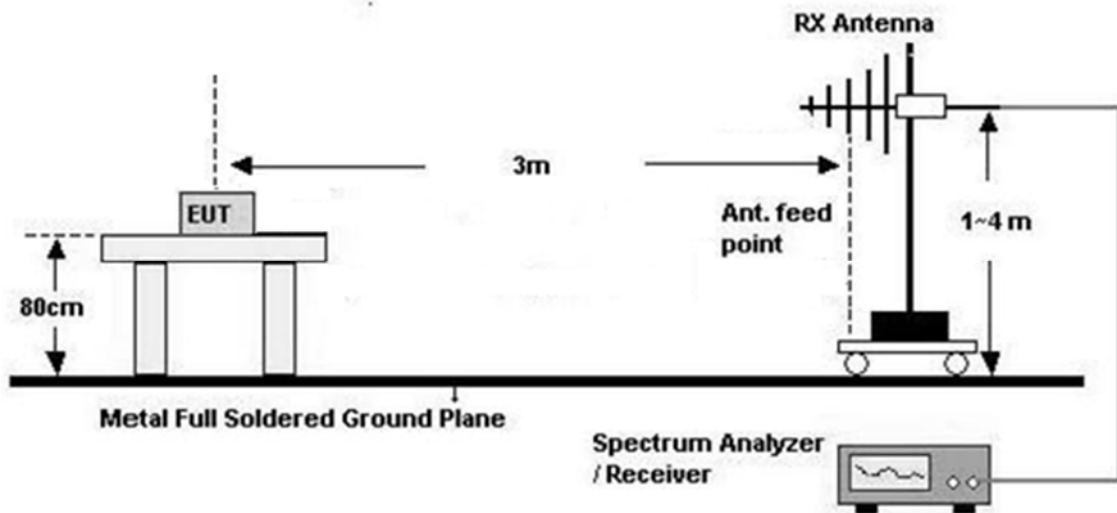
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

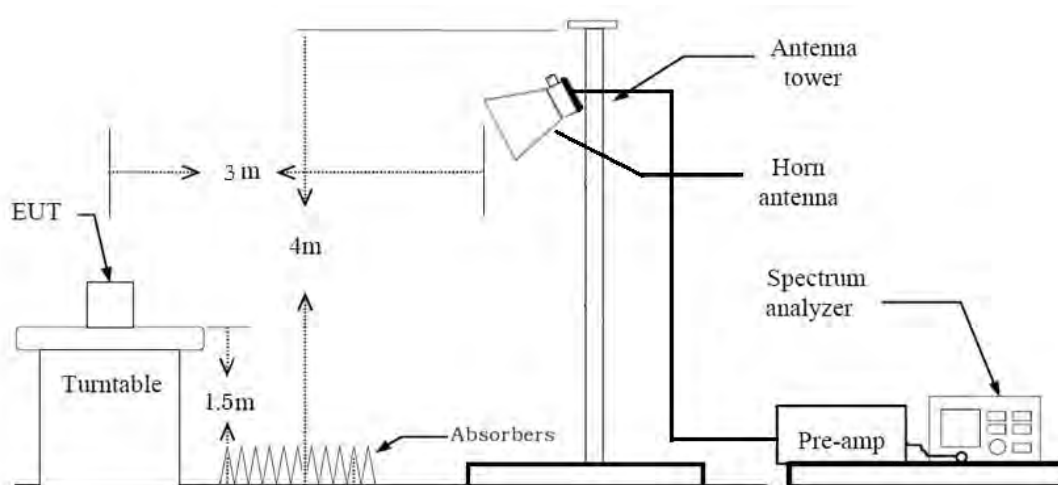
Below 30 MHz



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 3m 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 MHz – 0.490 MHz) = $40\log(3\text{ m}/300\text{ m}) = -80\text{ dB}$
Measurement Distance : 3 m
7. Distance Correction Factor(0.490 MHz – 30 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 = Maxhold
 - RBW = 9 kHz
 - VBW $\geq 3 \times$ RBW
9. Total = Measured Level + 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 1GHz)

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 3m from the EUT, which is varied from 1m to 4m 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 = Maxhold
- 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 Level + 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 1m to 4m 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 %) = VBW \leq RBW/100(i.e., 10 kHz) but not less than 10 Hz.
- VBW(Duty cycle is < 98 %) = 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 % 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 Level + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(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 1m to 4m 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 %) = $VBW \leq RBW/100$ (i.e., 10 kHz) but not less than 10 Hz.
- VBW(Duty cycle is < 98 %) = $VBW \geq 1/T$, 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 % 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 :

- 4500MHz ~ 5150MHz
- 5350MHz ~ 5460MHz
- 5460MHz ~ 5470MHz
- (75 MHz or more below the 5725MHz) ~ 5725MHz
- 5850MHz ~ (75 MHz or more above the 5850MHz)

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

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

8.8. Receiver Spurious Emissions

Limit

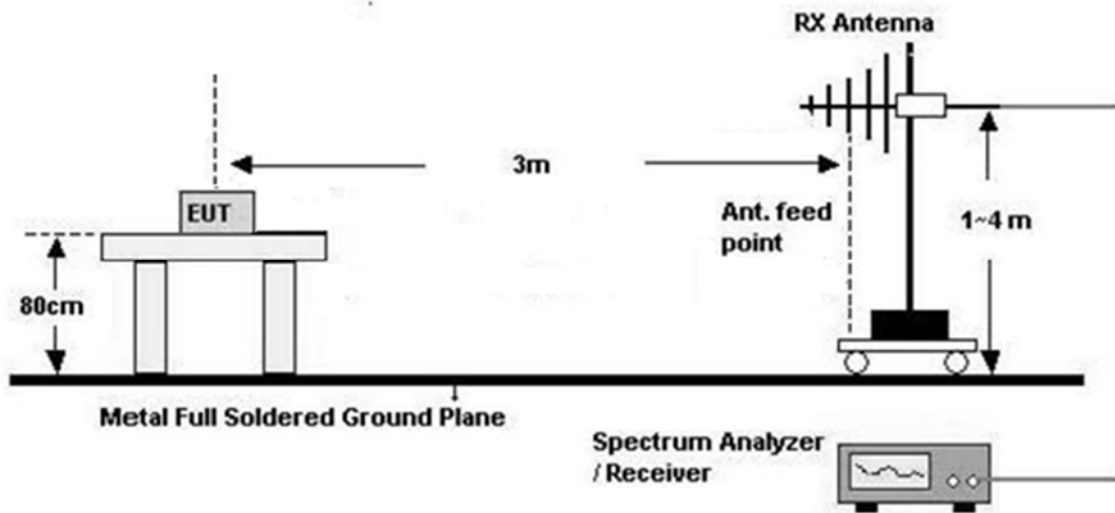
Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:

Measurements for compliance with the limits in table may be performed at distances other than 3 metres.

Test Configuration

30 MHz - 1 GHz



Test Procedure of Receiver Spurious Emissions (Below 1GHz)

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 3m from the EUT, which is varied from 1m to 4m 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):

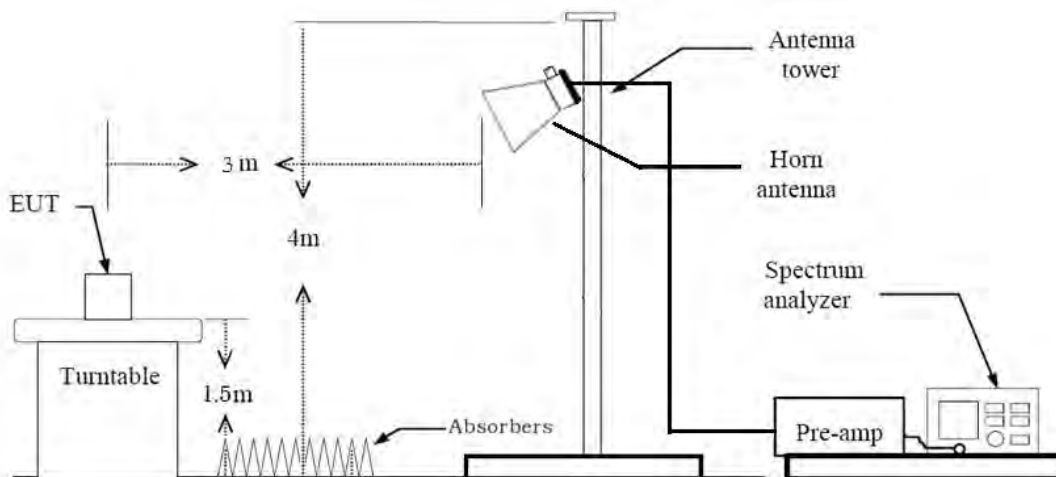
- Measured Frequency Range : 30 MHz – 1 GHz
- Detector = Peak
- Trace = Maxhold
- RBW = 100 kHz
- VBW \geq 3 x RBW

(2) Measurement Type(Quasi-peak):

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

7. Total = Measured Level + Antenna Factor(A.F) + Cable Loss(C.L)

Above 1 GHz



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 1m to 4m 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):
 - Measured Frequency Range : 1 GHz – 25 GHz
 - Detector = Peak
 - Trace = Maxhold
 - RBW = 1 MHz
 - VBW \geq 3 x RBW
 - (2) Measurement Type(Average):
 - We performed using a reduced video BW method was done with the analyzer in linear mode
 - Measured Frequency Range : 1 GHz – 25 GHz
 - Detector = Peak
 - Trace = Maxhold
 - RBW = 1 MHz
 - VBW \geq 1/ τ Hz, where τ = pulse width in seconds
 - The actual setting value of VBW = 1 kHz
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. Distance extrapolation factor = $20\log(\text{test distance} / \text{specific distance})$ (dB)
11. Total = Measured Level + Antenna Factor(A.F) + Cable Loss(C.L) - Amp Gain(G) + Distance Factor(D.F)

8.9. Worst case configuration and mode

Radiated test

1. All modes of operation were investigated and the worst case configuration results are reported.
2. All configurations of antenna were investigated and the worst case configuration results are reported.
 - Mode : Stand alone
3. EUT Axis
 - Radiated Spurious Emissions : Y
 - Radiated Restricted Band Edge : X
4. All data rate of operation were investigated and the worst case data rate results are reported
 - 802.11a : 6 Mbps
 - 802.11n : MCS0
 - 802.11ac : MCS0
5. Radiated Spurious Emission
 - All modulation of operation were investigated and the worst case modulation results are reported.
 - (Worstcase : 802.11a_6 Mbps)
6. 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
7. All input power(DC) were investigated and the worst case configuration results are reported.
 - Mode : DC 19 V, 12V
 - Worstcase : DC 19 V

Radiated test(Non-DBS)

1. All modes of operation were investigated and the worst case configuration results are reported.
 - Mode : Stand alone
2. EUT Axis
 - Radiated Spurious Emissions : Y
3. The following tables show the worst case configurations determined during testing.

Description	Bluetooth Emission	5 GHz Emission
Antenna	WIFI/BT	WIFI/BT
Channel	78	165
Data Rate	1 Mbps	6 Mbps
Mode	GFSK : DH5	802.11a



AC Power line Conducted Emissions

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

- Mode : Stand alone

Conducted test

1. All data rate of operation were investigated and the worst case data rate results are reported.

- 802.11a : 6 Mbps

- 802.11n : MCS0

- 802.11ac : MCS0



9. SUMMARY OF TEST RESULTS

FCC

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
26dB Bandwidth	§ 15.407 (for Power Measurement)	N/A	Conducted	PASS
6 dB Bandwidth	§ 15.407(e)	>500 kHz (5725-5850 MHz)		PASS
Maximum Conducted Output Power	§ 15.407(a)(1),(2),(3)	< 250 mW(5150-5250 MHz) < 250 mW or 11+10 log ₁₀ (BW) dBm (5250-5350 MHz) < 250 mW or 11+10log ₁₀ (BW) dBm (5470-5725 MHz) <1 W(5725-5850 MHz)		PASS
Peak 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		PASS
Undesirable Emissions	§ 15.407(b) (1),(2),(3),(4)	<-27 dBm/MHz EIRP (UNII1, 2A, 2C) cf. Section 8.7 (UNII 3)		Radiated
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	PASS	



ISED

Test Description	ISED Part Section(s)	Test Limit	Test Condition	Test Result
99% Bandwidth	RSS-GEN, 6.7	N/A	CONDUCTED	PASS
6 dB Bandwidth	RSS-247, 6.2.4.1	> 500 kHz (5725~5850 MHz)		PASS
Maximum Conducted Output Power,	RSS-247, 6.2	< 250 mW or 11+10 log ₁₀ (BW) dBm (5470-5600, 5650-5725 MHz) Whichever power is less		PASS
	RSS-247, 6.2.4.1	<1 W (5725-5850 MHz)		
Maximum e.i.r.p	RSS-247, 6.2	< 200 mW or 10+10 log ₁₀ (BW) dBm (5150-5250 MHz)		PASS
		< 1 W or 17+10 log ₁₀ (BW) dBm (5250-5350 MHz)		
		< 1 W or 17+10 log ₁₀ (BW) dBm (5470-5725 MHz) Whichever power is less		
Power Spectral Density	RSS-247 6.2	<10 dBm/ MHz(e.i.r.p.) (5150-5250 MHz) <11 dBm/MHz(Conducted) (5250-5350 MHz, 5470-5600 MHz, 5650-5725 MHz)		PASS
	RSS-247, 6.2.4.1	<30 dBm/500 kHz(Conducted) (5725-5850 MHz)		
Frequency Stability	RSS-GEN 8.11	should be kept within at least the central 80 % of its permitted operating frequency band in order to minimize the possibility of out-of-band operation.		PASS
AC Conducted Emissions 150 kHz-30 MHz	RSS-GEN, 8.8	RSS-GEN section 8.8 table 4	PASS	
Undesirable Emissions	RSS-247, 6.2.1.2	26 dBc at 5250~5350 MHz (5150~5350 MHz)	PASS	
	RSS-247, 6.2	<-27 dBm/ MHz EIRP (5150-5350 MHz, 5470-5725 MHz)	PASS	
	RSS-247, 6.2.4.2	cf. Section 9.8.1 (UNII 3)		
General Field Strength Limits(Restricted Bands and Radiated Emission Limits)	RSS-Gen, 8.9 RSS-Gen, 8.10	RSS-Gen section 8.9 table 5, 6 section 8.10 table 7	RADIATED	PASS
Receiver Spurious Emissions	RSS-GEN, 5 RSS-GEN, 7.3	RSS-GEN section 7.3 table 3	PASS	



10. TEST RESULT

10.1 26DB BANDWIDTH & 99 % BANDWIDTH

802.11a Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	19.97	16.457
5200	40	20.25	16.492
5240	48	20.01	16.582
5260	52	20.02	16.544
5300	60	20.36	16.644
5320	64	20.23	16.561
5500	100	20.31	16.634
5580	116	20.01	16.605
5720	144	20.46	16.615
5745	149	20.26	16.695
5785	157	19.82	16.648
5825	165	20.22	16.644

802.11n(HT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	20.21	17.581
5200	40	20.23	17.641
5240	48	20.16	17.575
5260	52	20.44	17.575
5300	60	20.33	17.590
5320	64	20.02	17.633
5500	100	20.31	17.580
5580	116	20.22	17.598
5720	144	20.33	17.604
5745	149	20.23	17.627
5785	157	20.56	17.624
5825	165	20.30	17.672



802.11n(HT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	39.98	35.945
5230	46	40.43	35.942
5270	54	39.95	35.956
5310	62	40.37	35.932
5510	102	40.04	36.015
5550	110	40.05	35.865
5710	142	40.13	36.003
5755	151	40.47	36.034
5795	159	40.52	36.048

802.11ac(VHT20) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5180	36	20.31	17.580
5200	40	20.30	17.560
5240	48	20.37	17.557
5260	52	20.31	17.571
5300	60	20.19	17.588
5320	64	20.07	17.610
5500	100	20.30	17.577
5580	116	20.40	17.598
5720	144	20.38	17.606
5745	149	20.36	17.631
5785	157	20.63	17.614
5825	165	20.58	17.650



802.11ac(VHT40) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5190	38	40.54	35.996
5230	46	40.17	35.910
5270	54	40.19	35.980
5310	62	40.24	35.945
5510	102	40.75	35.964
5590	118	39.92	35.947
5710	142	40.09	35.903
5755	151	40.27	36.048
5795	159	40.42	35.984

802.11ac(VHT80) Mode		26dB Bandwidth [MHz]	99% bandwidth [MHz]
Frequency [MHz]	Channel No.		
5210	42	81.60	75.491
5290	58	81.62	75.556
5530	106	81.61	75.628
5690	138	81.23	75.764
5775	155	82.00	75.738

□ Test Plots(802.11a)

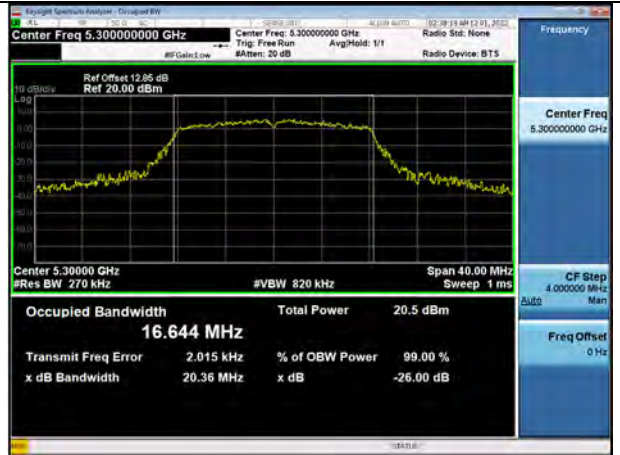
Note:

In order to simplify the report, attached plots were only the most wide channel.

802.11a UNII 1 BAND 26dB Bandwidth (CH 40)



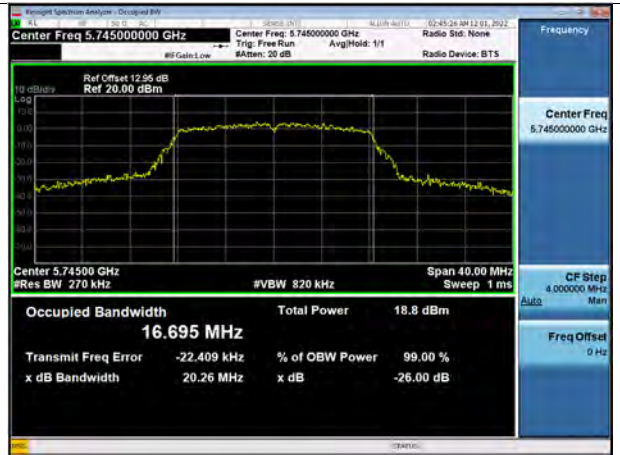
802.11a UNII 2A BAND 26dB Bandwidth (CH 60)



802.11a UNII 2C BAND 26dB Bandwidth (CH 144)



802.11a UNII 3 BAND 26dB Bandwidth (CH 149)





▣ Test Plots(802.11n(HT20))

802.11n_HT20 UNII 1 BAND 26dB Bandwidth(CH 40)



802.11n_HT20 UNII 2A BAND 26dB Bandwidth(CH 52)



802.11n_HT20 UNII 2C BAND 26dB Bandwidth(CH 144)



802.11n_HT20 UNII 3 BAND 26dB Bandwidth(CH 157)



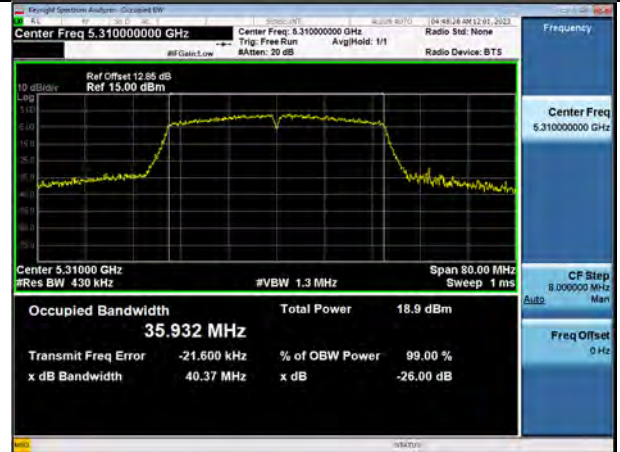


Test Plots(802.11n(HT40))

802.11n_HT40 UNII 1 BAND 26dB Bandwidth(CH 46)



802.11n_HT40 UNII 2A BAND 26dB Bandwidth (CH 62)



802.11n_HT40 UNII 2C BAND 26dB Bandwidth(CH 142)



802.11n_HT40 UNII 3 BAND 26dB Bandwidth (CH 159)



Test Plots(802.11ac(VHT20))

802.11ac_VHT20 UNII 1 BAND 26dB Bandwidth(CH 40)



802.11ac_VHT20 UNII 2A BAND 26dB Bandwidth(CH 48)



802.11ac_VHT20 UNII 2C BAND 26dB Bandwidth(CH 116)



802.11ac_VHT20 UNII 3 BAND 26dB Bandwidth(CH 157)

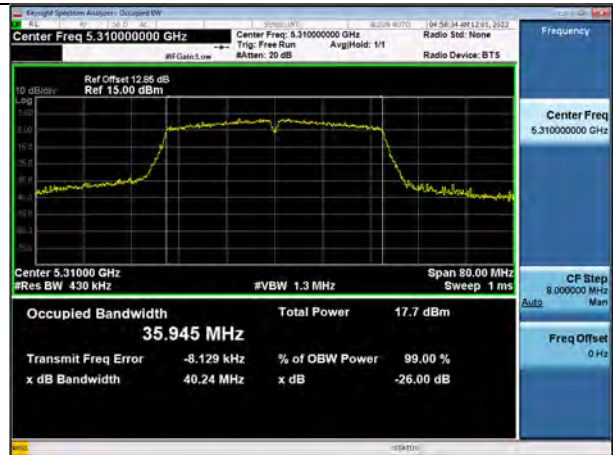


Test Plots(802.11ac(VHT40))

802.11ac_VHT40 UNII 1 BAND 26dB Bandwidth(CH 38)



802.11ac_VHT40 UNII 2A BAND 26dB Bandwidth (CH 62)



802.11ac_VHT40 UNII 2C BAND 26dB Bandwidth(CH 102)

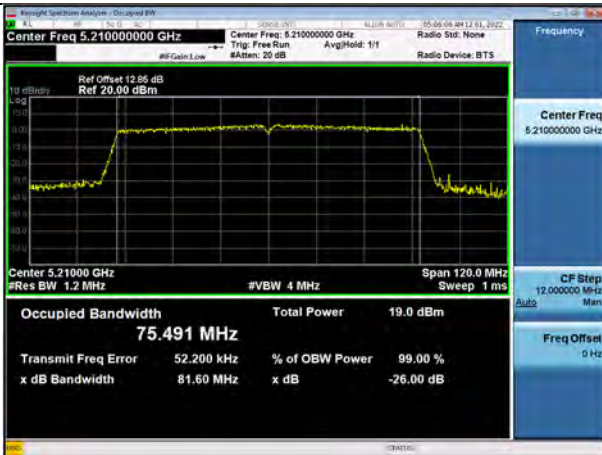


802.11ac_VHT40 UNII 3 BAND 26dB Bandwidth (CH 159)

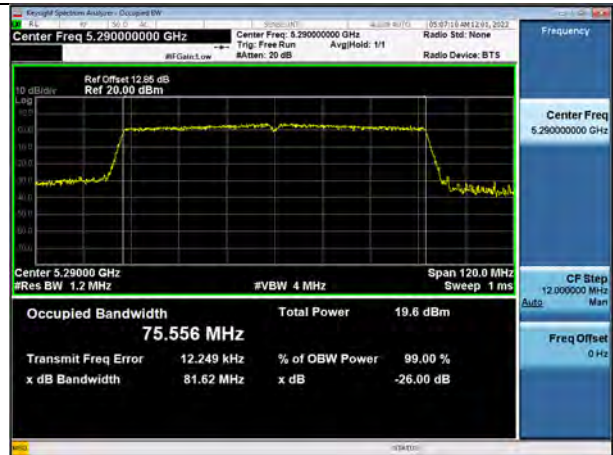


Test Plots(802.11ac(VHT80))

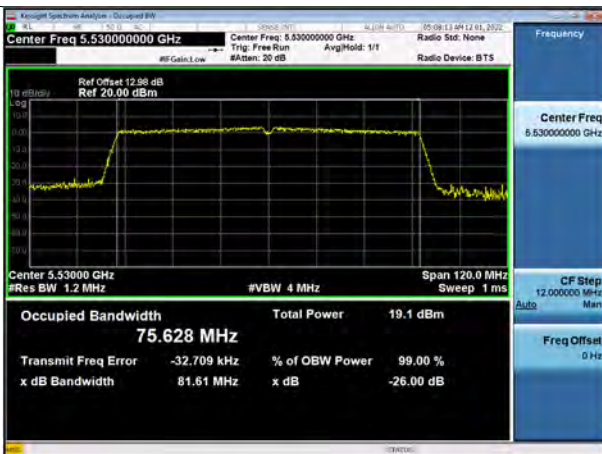
802.11ac_VHT80 UNII 1 BAND 26dB Bandwidth(CH 42)



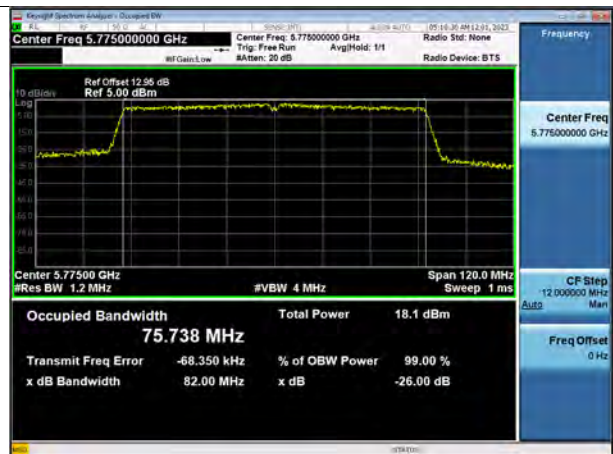
802.11ac_VHT80 UNII 2A BAND 26dB Bandwidth (CH 58)



802.11ac_VHT80 UNII 2C BAND 26dB Bandwidth(CH 106)



802.11ac_VHT80 UNII 3 BAND 26dB Bandwidth (CH 155)





10.2 6DB BANDWIDTH

802.11a Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	15.14	> 0.5	Pass
5785	157	14.71	> 0.5	Pass
5825	165	13.90	> 0.5	Pass

802.11n(HT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.57	> 0.5	Pass
5785	157	17.59	> 0.5	Pass
5825	165	17.33	> 0.5	Pass

802.11n(HT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.44	> 0.5	Pass
5795	159	35.69	> 0.5	Pass

802.11ac(VHT20) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5745	149	17.56	> 0.5	Pass
5785	157	17.57	> 0.5	Pass
5825	165	17.57	> 0.5	Pass

802.11ac(VHT40) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5755	151	35.61	> 0.5	Pass
5795	159	35.89	> 0.5	Pass

802.11ac(VHT80) Mode		Measured Bandwidth [MHz]	Limit [MHz]	Pass / Fail
Frequency [MHz]	Channel No.			
5775	155	76.55	> 0.5	Pass

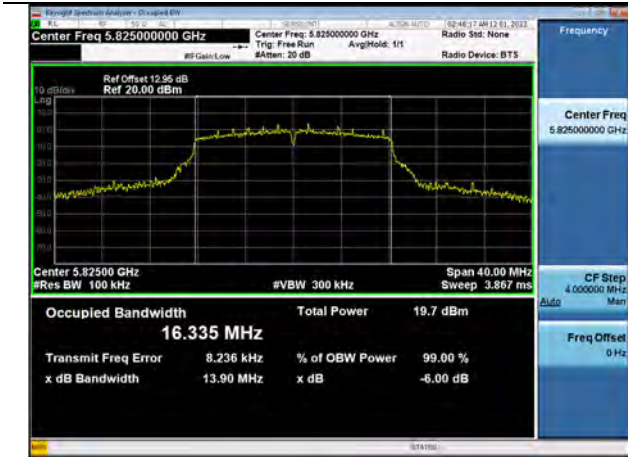


Test Plots

Note

In order to simplify the report, attached plots were only the most narrow channel.

802.11a (CH.165)



802.11n(HT20) (CH.165)



802.11n(HT40) (CH.151)



802.11ac(VHT20) (CH.149)



802.11ac(VHT40) (CH.151)



802.11ac(VHT80) (CH.155)





10.3 OUTPUT POWER MEASUREMENT

[Limit]

FCC

802.11a, 802.11n, 802.11ac			
UNII_1/2A/2C	: Power <	23.98	dBm
UNII_3	: Power <	30	dBm

ISED

802.11a, 802.11n_HT20, 802.11ac_VHT20			
UNII_1	:E.I.R.P <	22.16	dBm
UNII_2A	:Power <	23.19	dBm
UNII_2A	:E.I.R.P <	29.19	dBm
UNII_2C	: Power <	23.20	dBm
UNII_2C	:E.I.R.P <	29.20	dBm
UNII_3	: Power <	30	dBm

802.11n_HT40, 802.11n_VHT40, 802.11ac_VHT80			
UNII_1	:E.I.R.P <	23.01	dBm
UNII_2A/2C	:Power <	23.98	dBm
UNII_2A/2C	:E.I.R.P <	30	dBm
UNII_3	: Power <	23.98	dBm



[Power & EIRP]

Straddle channel data in the table below are for reporting purposes only.
 Straddle channel data were added in section 10.7.3.

802.11a Mode		Max. Average Output Power [dBm]	Peak Ant Gain [dBi]	Max. E.I.R.P. Power [dBm]
Frequency [MHz]	Channel No.			
5180	36	12.04	-2.45	9.59
5200	40	12.65		10.20
5240	48	12.62		10.17
5260	52	12.89	-2.45	10.44
5300	60	13.07		10.62
5320	64	12.87		10.42
5500	100	12.94	0.74	13.68
5580	116	13.13		13.87
5720	144	12.31		13.05
5745	149	11.03	-	-
5785	157	11.41		-
5825	165	11.77		-

802.11n(20MHz) Mode		Max. Average Output Power [dBm]	Peak Ant Gain [dBi]	Max. E.I.R.P. Power [dBm]
Frequency [MHz]	Channel No.			
5180	36	12.14	-2.45	9.69
5200	40	12.34		9.89
5240	48	12.75		10.30
5260	52	12.70	-2.45	10.25
5300	60	12.87		10.42
5320	64	12.84		10.39
5500	100	12.79	0.74	13.53
5580	116	13.21		13.95
5720	144	12.06		12.80
5745	149	10.98	-	-
5785	157	11.43		-
5825	165	11.83		-



802.11ac(20MHz) Mode		Max. Average Output Power [dBm]	Peak Ant Gain [dBi]	Max. E.I.R.P. Power [dBm]
Frequency [MHz]	Channel No.			
5180	36	11.10	-2.45	8.65
5200	40	11.25		8.80
5240	48	11.60		9.15
5260	52	11.74	-2.45	9.29
5300	60	11.97		9.52
5320	64	11.70		9.25
5500	100	11.85	0.74	12.59
5580	116	12.22		12.96
5720	144	11.11		11.85
5745	149	10.92	-	-
5785	157	11.41		-
5825	165	11.68		-

802.11n(40MHz) Mode		Max. Average Output Power [dBm]	Peak Ant Gain [dBi]	Max. E.I.R.P. Power [dBm]
Frequency [MHz]	Channel No.			
5190	38	11.19	-2.45	8.74
5230	46	11.65		9.20
5270	54	11.97		9.52
5310	62	11.95	-2.45	9.50
5510	102	11.88		12.62
5550	110	12.06		12.80
5710	142	11.24	0.74	11.98
5755	151	11.14		-
5795	159	11.07		-



802.11ac(40MHz) Mode		Max. Average Output Power [dBm]	Peak Ant Gain [dBi]	Max. E.I.R.P. Power [dBm]
Frequency [MHz]	Channel No.			
5190	38	10.41	-2.45	7.96
5230	46	10.76		8.31
5270	54	11.02	-2.45	8.57
5310	62	11.01		8.56
5510	102	10.85	0.74	11.59
5550	110	11.10		11.84
5710	142	10.51		11.25
5755	151	10.33	-	-
5795	159	10.25		

802.11ac(80MHz) Mode		Max. Average Output Power [dBm]	Peak Ant Gain [dBi]	Max. E.I.R.P. Power [dBm]
Frequency [MHz]	Channel No.			
5210	42	10.71	-2.45	8.26
5290	58	11.14	-2.45	8.69
5530	106	10.11	0.74	10.85
5690	138	10.56		11.30
5775	155	10.27	-	-



10.4 FREQUENCY STABILITY.

10.4.1 80 MHz BW

[12 V]

Startup after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	12.0 VDC

Voltage	Power	Temp.	Frequency	Frequency
(%)	(VDC)	(°C)	(kHz)	Error (kHz)
100%	12.0	+20(Ref)	5210012.82	12.82
100%		-30	5210049.78	49.78
100%		-20	5210091.90	91.90
100%		-10	5210093.09	93.09
100%		0	5210092.29	92.29
100%		+10	5210074.38	74.38
100%		+30	5210031.76	31.76
100%		+40	5210049.45	49.45
100%		+50	5210057.49	57.49
High		13.2	+20	5210080.71
Low	10.8	+20	5210086.55	86.55

Note:

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.



OPERATING BAND:	UNII Band 2A
OPERATING FREQUENCY:	5,290,000,000 Hz
CHANNEL:	58
REFERENCE VOLTAGE:	12.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	12.0	+20(Ref)	5290085.64	85.64
100%		-30	5290078.49	78.49
100%		-20	5290058.58	58.58
100%		-10	5290090.17	90.17
100%		0	5290046.55	46.55
100%		+10	5290027.72	27.72
100%		+30	5290053.14	53.14
100%		+40	5290088.50	88.5
100%		+50	5290066.35	66.35
High		13.2	+20	5290012.44
Low	10.8	+20	5290093.70	93.7

Note:

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.



OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,530,000,000 Hz
CHANNEL:	106
REFERENCE VOLTAGE:	12.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	12.0	+20(Ref)	5530080.89	80.89
100%		-30	5530051.08	51.08
100%		-20	5530077.81	77.81
100%		-10	5530024.70	24.7
100%		0	5530039.85	39.85
100%		+10	5530029.56	29.56
100%		+30	5530084.60	84.6
100%		+40	5530094.78	94.78
100%		+50	5530086.11	86.11
High		13.2	+20	5530060.09
Low	10.8	+20	5530040.03	40.03

Note:

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.



OPERATING BAND:	UNII Band 3
OPERATING FREQUENCY:	5,775,000,000 Hz
CHANNEL:	155
REFERENCE VOLTAGE:	12.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	12.0	+20(Ref)	5775065.76	65.76
100%		-30	5775061.34	61.34
100%		-20	5775024.38	24.38
100%		-10	5775013.91	13.91
100%		0	5775063.57	63.57
100%		+10	5775081.21	81.21
100%		+30	5775099.59	99.59
100%		+40	5775088.39	88.39
100%		+50	5775003.54	3.54
High		13.2	+20	5775053.26
Low	10.8	+20	5775082.16	82.16

Note:

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.



2 minutes after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	12.0 VDC

Voltage	Power	Temp.	Frequency	Frequency
(%)	(VDC)	(°C)	(kHz)	Error (kHz)
100%	12.0	+20(Ref)	5210069.07	69.07
100%		-30	5210037.51	37.51
100%		-20	5210091.45	91.45
100%		-10	5210042.05	42.05
100%		0	5210076.68	76.68
100%		+10	5210086.18	86.18
100%		+30	5210088.57	88.57
100%		+40	5210019.35	19.35
100%		+50	5210061.07	61.07
High		13.2	+20	5210041.27
Low	10.8	+20	5210075.56	75.56

Note:

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.



OPERATING BAND:	UNII Band 2A
OPERATING FREQUENCY:	5,290,000,000 Hz
CHANNEL:	58
REFERENCE VOLTAGE:	12.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	12.0	+20(Ref)	5290036.61	36.61
100%		-30	5290047.54	47.54
100%		-20	5290047.21	47.21
100%		-10	5290068.38	68.38
100%		0	5290072.17	72.17
100%		+10	5290099.19	99.19
100%		+30	5290040.60	40.6
100%		+40	5290051.03	51.03
100%		+50	5290078.09	78.09
High		13.2	+20	5290055.72
Low	10.8	+20	5290032.44	32.44

Note:

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.



OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,530,000,000 Hz
CHANNEL:	106
REFERENCE VOLTAGE:	12.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	12.0	+20(Ref)	5530096.80	96.80
100%		-30	5530077.44	77.44
100%		-20	5530058.95	58.95
100%		-10	5530094.44	94.44
100%		0	5530037.28	37.28
100%		+10	5530094.20	94.2
100%		+30	5530045.75	45.75
100%		+40	5530024.16	24.16
100%		+50	5530016.43	16.43
High		13.2	+20	5530013.15
Low	10.8	+20	5530051.56	51.56

Note:

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.



OPERATING BAND:	UNII Band 3
OPERATING FREQUENCY:	5,775,000,000 Hz
CHANNEL:	155
REFERENCE VOLTAGE:	12.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	12.0	+20(Ref)	5775099.29	99.29
100%		-30	5775020.21	20.21
100%		-20	5775053.32	53.32
100%		-10	5775003.27	3.27
100%		0	5775013.73	13.73
100%		+10	5775034.67	34.67
100%		+30	5775084.32	84.32
100%		+40	5775040.51	40.51
100%		+50	5775051.61	51.61
High		13.2	+20	5775068.32
Low	10.8	+20	5775008.11	8.11

Note:

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.



5 minutes after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	12.0 VDC

Voltage	Power	Temp.	Frequency	Frequency
(%)	(VDC)	(°C)	(kHz)	Error (kHz)
100%	12.0	+20(Ref)	5210053.58	53.58
100%		-30	5210054.78	54.78
100%		-20	5210066.33	66.33
100%		-10	5210031.27	31.27
100%		0	5210052.17	52.17
100%		+10	5210028.86	28.86
100%		+30	5210092.41	92.41
100%		+40	5210036.40	36.40
100%		+50	5210017.17	17.17
High		13.2	+20	5210060.71
Low	10.8	+20	5210036.41	36.41

Note:

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.



OPERATING BAND:	UNII Band 2A
OPERATING FREQUENCY:	5,290,000,000 Hz
CHANNEL:	58
REFERENCE VOLTAGE:	12.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	12.0	+20(Ref)	5290020.73	20.73
100%		-30	5290064.39	64.39
100%		-20	5290013.24	13.24
100%		-10	5290090.55	90.55
100%		0	5290031.84	31.84
100%		+10	5290077.33	77.33
100%		+30	5290075.55	75.55
100%		+40	5290078.85	78.85
100%		+50	5290035.96	35.96
High		13.2	+20	5290043.74
Low	10.8	+20	5290028.53	28.53

Note:

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.



OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,530,000,000 Hz
CHANNEL:	106
REFERENCE VOLTAGE:	12.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	12.0	+20(Ref)	5530035.90	35.90
100%		-30	5530048.18	48.18
100%		-20	5530081.61	81.61
100%		-10	5530089.23	89.23
100%		0	5530025.43	25.43
100%		+10	5530035.06	35.06
100%		+30	5530017.94	17.94
100%		+40	5530033.76	33.76
100%		+50	5530088.93	88.93
High		13.2	+20	5530058.98
Low	10.8	+20	5530025.55	25.55

Note:

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.



OPERATING BAND:	UNII Band 3
OPERATING FREQUENCY:	5,775,000,000 Hz
CHANNEL:	155
REFERENCE VOLTAGE:	12.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	12.0	+20(Ref)	5775055.26	55.26
100%		-30	5775029.18	29.18
100%		-20	5775010.76	10.76
100%		-10	5775088.10	88.1
100%		0	5775062.82	62.82
100%		+10	5775036.32	36.32
100%		+30	5775039.61	39.61
100%		+40	5775063.25	63.25
100%		+50	5775064.24	64.24
High		13.2	+20	5775075.80
Low	10.8	+20	5775027.93	27.93

Note:

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 minutes after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	12.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	12.0	+20(Ref)	93.93	93.93
100%		-30	86.49	86.49
100%		-20	50.78	50.78
100%		-10	79.28	79.28
100%		0	76.78	76.78
100%		+10	82.90	82.90
100%		+30	14.58	14.58
100%		+40	92.66	92.66
100%		+50	87.22	87.22
High		13.2	+20	33.97
Low	10.8	+20	51.92	51.92

Note:

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.



OPERATING BAND:	UNII Band 2A
OPERATING FREQUENCY:	5,290,000,000 Hz
CHANNEL:	58
REFERENCE VOLTAGE:	12.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	12.0	+20(Ref)	36.31	36.31
100%		-30	24.36	24.36
100%		-20	23.16	23.16
100%		-10	58.70	58.7
100%		0	74.36	74.36
100%		+10	54.18	54.18
100%		+30	24.14	24.14
100%		+40	71.97	71.97
100%		+50	18.89	18.89
High		13.2	+20	60.54
Low	10.8	+20	57.39	57.39

Note:

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.



OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,530,000,000 Hz
CHANNEL:	106
REFERENCE VOLTAGE:	12.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	12.0	+20(Ref)	94.05	94.05
100%		-30	2.37	2.37
100%		-20	56.99	56.99
100%		-10	80.07	80.07
100%		0	48.45	48.45
100%		+10	7.98	7.98
100%		+30	54.31	54.31
100%		+40	34.53	34.53
100%		+50	3.15	3.15
High		13.2	+20	24.51
Low	10.8	+20	51.80	51.8

Note:

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.



OPERATING BAND:	UNII Band 3
OPERATING FREQUENCY:	5,775,000,000 Hz
CHANNEL:	155
REFERENCE VOLTAGE:	12.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	12.0	+20(Ref)	8.75	8.75
100%		-30	8.68	8.68
100%		-20	90.62	90.62
100%		-10	45.79	45.79
100%		0	33.83	33.83
100%		+10	31.48	31.48
100%		+30	67.97	67.97
100%		+40	99.69	99.69
100%		+50	15.19	15.19
High		13.2	+20	83.25
Low	10.8	+20	53.12	53.12

Note:

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.



[19 V]

Startup after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	19.0 VDC

Voltage	Power	Temp.	Frequency	Frequency
(%)	(VDC)	(°C)	(kHz)	Error (kHz)
100%	19.0	+20(Ref)	5210015.54	15.54
100%		-30	5210028.10	28.10
100%		-20	5210081.57	81.57
100%		-10	5210034.69	34.69
100%		0	5210068.57	68.57
100%		+10	5210003.71	3.71
100%		+30	5210022.73	22.73
100%		+40	5210040.02	40.02
100%		+50	5210023.36	23.36
High		20.9	+20	5210020.28
Low	17.1	+20	5210089.98	89.98

Note:

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.



OPERATING BAND:	UNII Band 2A
OPERATING FREQUENCY:	5,290,000,000 Hz
CHANNEL:	58
REFERENCE VOLTAGE:	19.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	19.0	+20(Ref)	5290099.05	99.05
100%		-30	5290097.88	97.88
100%		-20	5290014.60	14.6
100%		-10	5290038.60	38.6
100%		0	5290013.61	13.61
100%		+10	5290013.18	13.18
100%		+30	5290030.62	30.62
100%		+40	5290002.79	2.79
100%		+50	5290029.67	29.67
High		20.9	+20	5290051.41
Low	17.1	+20	5290054.40	54.4

Note:

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.



OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,530,000,000 Hz
CHANNEL:	106
REFERENCE VOLTAGE:	19.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	19.0	+20(Ref)	5530090.80	90.80
100%		-30	5530066.63	66.63
100%		-20	5530071.70	71.7
100%		-10	5530042.52	42.52
100%		0	5530053.26	53.26
100%		+10	5530084.21	84.21
100%		+30	5530002.34	2.34
100%		+40	5530093.72	93.72
100%		+50	5530042.50	42.50
High		20.9	+20	5530037.30
Low	17.1	+20	5530049.57	49.57

Note:

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.



OPERATING BAND:	UNII Band 3
OPERATING FREQUENCY:	5,775,000,000 Hz
CHANNEL:	155
REFERENCE VOLTAGE:	19.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	19.0	+20(Ref)	5775065.64	65.64
100%		-30	5775059.72	59.72
100%		-20	5775097.35	97.35
100%		-10	5775039.67	39.67
100%		0	5775047.47	47.47
100%		+10	5775096.17	96.17
100%		+30	5775012.59	12.59
100%		+40	5775098.19	98.19
100%		+50	5775012.66	12.66
High		20.9	+20	5775018.52
Low	17.1	+20	5775086.98	86.98

Note:

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.



2 minutes after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	19.0 VDC

Voltage	Power	Temp.	Frequency	Frequency
(%)	(VDC)	(°C)	(kHz)	Error (kHz)
100%	19.0	+20(Ref)	5210095.50	95.50
100%		-30	5210051.24	51.24
100%		-20	5210039.71	39.71
100%		-10	5210050.55	50.55
100%		0	5210024.45	24.45
100%		+10	5210070.88	70.88
100%		+30	5210051.53	51.53
100%		+40	5210082.07	82.07
100%		+50	5210057.63	57.63
High		20.9	+20	5210016.97
Low	17.1	+20	5210015.61	15.61

Note:

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.



OPERATING BAND:	UNII Band 2A
OPERATING FREQUENCY:	5,290,000,000 Hz
CHANNEL:	58
REFERENCE VOLTAGE:	19.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	19.0	+20(Ref)	5290081.97	81.97
100%		-30	5290028.93	28.93
100%		-20	5290037.81	37.81
100%		-10	5290081.11	81.11
100%		0	5290032.24	32.24
100%		+10	5290048.96	48.96
100%		+30	5290022.35	22.35
100%		+40	5290051.74	51.74
100%		+50	5290024.38	24.38
High		20.9	+20	5290090.68
Low	17.1	+20	5290019.90	19.9

Note:

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.



OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,530,000,000 Hz
CHANNEL:	106
REFERENCE VOLTAGE:	19.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	19.0	+20(Ref)	5530015.71	15.71
100%		-30	5530072.55	72.55
100%		-20	5530064.44	64.44
100%		-10	5530014.24	14.24
100%		0	5530055.42	55.42
100%		+10	5530025.87	25.87
100%		+30	5530012.58	12.58
100%		+40	5530099.56	99.56
100%		+50	5530031.87	31.87
High		20.9	+20	5530005.72
Low	17.1	+20	5530048.59	48.59

Note:

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.



OPERATING BAND:	UNII Band 3
OPERATING FREQUENCY:	5,775,000,000 Hz
CHANNEL:	155
REFERENCE VOLTAGE:	19.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	19.0	+20(Ref)	5775099.98	99.98
100%		-30	5775067.82	67.82
100%		-20	5775096.25	96.25
100%		-10	5775036.78	36.78
100%		0	5775062.90	62.9
100%		+10	5775013.82	13.82
100%		+30	5775072.83	72.83
100%		+40	5775099.43	99.43
100%		+50	5775034.92	34.92
High		20.9	+20	5775027.37
Low	17.1	+20	5775016.40	16.4

Note:

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.



5 minutes after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	19.0 VDC

Voltage	Power	Temp.	Frequency	Frequency
(%)	(VDC)	(°C)	(kHz)	Error (kHz)
100%	19.0	+20(Ref)	5210088.76	88.76
100%		-30	5210020.62	20.62
100%		-20	5210073.81	73.81
100%		-10	5210091.67	91.67
100%		0	5210004.77	4.77
100%		+10	5210084.52	84.52
100%		+30	5210011.08	11.08
100%		+40	5210047.77	47.77
100%		+50	5210071.98	71.98
High		20.9	+20	5210055.13
Low	17.1	+20	5210053.06	53.06

Note:

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.



OPERATING BAND:	UNII Band 2A
OPERATING FREQUENCY:	5,290,000,000 Hz
CHANNEL:	58
REFERENCE VOLTAGE:	19.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	19.0	+20(Ref)	5290029.79	29.79
100%		-30	5290008.91	8.91
100%		-20	5290040.08	40.08
100%		-10	5290068.25	68.25
100%		0	5290048.22	48.22
100%		+10	5290099.23	99.23
100%		+30	5290042.16	42.16
100%		+40	5290079.86	79.86
100%		+50	5290064.64	64.64
High		20.9	+20	5290077.12
Low	17.1	+20	5290088.84	88.84

Note:

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.



OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,530,000,000 Hz
CHANNEL:	106
REFERENCE VOLTAGE:	19.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	19.0	+20(Ref)	5530088.62	88.62
100%		-30	5530037.95	37.95
100%		-20	5530046.02	46.02
100%		-10	5530066.87	66.87
100%		0	5530050.26	50.26
100%		+10	5530029.31	29.31
100%		+30	5530052.47	52.47
100%		+40	5530033.33	33.33
100%		+50	5530046.23	46.23
High		20.9	+20	5530062.75
Low	17.1	+20	5530064.56	64.56

Note:

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.



OPERATING BAND:	UNII Band 3
OPERATING FREQUENCY:	5,775,000,000 Hz
CHANNEL:	155
REFERENCE VOLTAGE:	19.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	19.0	+20(Ref)	5775049.06	49.06
100%		-30	5775094.24	94.24
100%		-20	5775015.06	15.06
100%		-10	5775066.64	66.64
100%		0	5775044.50	44.5
100%		+10	5775078.03	78.03
100%		+30	5775049.98	49.98
100%		+40	5775070.49	70.49
100%		+50	5775055.89	55.89
High		20.9	+20	5775017.29
Low	17.1	+20	5775003.10	3.1

Note:

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 minutes after the EUT is energized

OPERATING BAND:	UNII Band 1
OPERATING FREQUENCY:	5,210,000,000 Hz
CHANNEL:	42
REFERENCE VOLTAGE:	19.0 VDC

Voltage	Power	Temp.	Frequency	Frequency
(%)	(VDC)	(°C)	(kHz)	Error (kHz)
100%	19.0	+20(Ref)	52.33	52.33
100%		-30	19.07	19.07
100%		-20	46.82	46.82
100%		-10	78.43	78.43
100%		0	27.08	27.08
100%		+10	85.04	85.04
100%		+30	56.91	56.91
100%		+40	32.14	32.14
100%		+50	13.46	13.46
High		20.9	+20	88.80
Low	17.1	+20	90.07	90.07

Note:

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.



OPERATING BAND:	UNII Band 2A
OPERATING FREQUENCY:	5,290,000,000 Hz
CHANNEL:	58
REFERENCE VOLTAGE:	19.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	19.0	+20(Ref)	21.11	21.11
100%		-30	66.35	66.35
100%		-20	83.75	83.75
100%		-10	9.26	9.26
100%		0	83.85	83.85
100%		+10	57.89	57.89
100%		+30	12.73	12.73
100%		+40	60.91	60.91
100%		+50	23.55	23.55
High		20.9	+20	63.19
Low	17.1	+20	8.66	8.66

Note:

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.



OPERATING BAND:	UNII Band 2C
OPERATING FREQUENCY:	5,530,000,000 Hz
CHANNEL:	106
REFERENCE VOLTAGE:	19.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	19.0	+20(Ref)	38.68	38.68
100%		-30	80.23	80.23
100%		-20	34.55	34.55
100%		-10	77.35	77.35
100%		0	66.92	66.92
100%		+10	9.23	9.23
100%		+30	53.47	53.47
100%		+40	10.11	10.11
100%		+50	51.70	51.70
High		20.9	+20	17.18
Low	17.1	+20	78.61	78.61

Note:

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.



OPERATING BAND:	UNII Band 3
OPERATING FREQUENCY:	5,775,000,000 Hz
CHANNEL:	155
REFERENCE VOLTAGE:	19.0 VDC

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (kHz)	Frequency Error (kHz)
100%	19.0	+20(Ref)	81.95	81.95
100%		-30	98.64	98.64
100%		-20	46.30	46.3
100%		-10	5.03	5.03
100%		0	43.94	43.94
100%		+10	12.47	12.47
100%		+30	21.25	21.25
100%		+40	90.81	90.81
100%		+50	2.03	2.03
High		20.9	+20	32.90
Low	17.1	+20	15.92	15.92

Note:

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.



10.5 POWER SPECTRAL DENSITY

FCC & ISED

802.11a Mode		Max. Power Spectral Density [dBm]	Limit
Frequency [MHz]	Channel No.		
5180	36	2.685	11 dBm/MHz
5200	40	2.897	
5240	48	3.151	
5260	52	3.337	
5300	60	3.537	
5320	64	3.341	
5500	100	3.609	
5580	116	4.120	
5720	144	2.889	
5745	149	-1.273	30 dBm/500 kHz
5785	157	-1.212	
5825	165	-0.660	

802.11n(20 MHz) Mode		Max. Power Spectral Density [dBm]	Limit
Frequency [MHz]	Channel No.		
5180	36	2.574	11 dBm/MHz
5200	40	2.583	
5240	48	3.166	
5260	52	3.103	
5300	60	3.202	
5320	64	2.999	
5500	100	3.000	
5580	116	3.807	
5720	144	2.410	
5745	149	-1.853	30 dBm/500 kHz
5785	157	-1.525	
5825	165	-1.148	



802.11n(40 MHz) Mode		Max. Power Spectral Density [dBm]	Limit
Frequency [MHz]	Channel No.		
5190	38	-1.686	11 dBm/MHz
5230	46	-0.849	
5270	54	-1.021	
5310	62	-0.802	
5510	102	-0.913	
5550	110	-0.867	
5710	142	-1.539	
5755	151	-4.721	30 dBm /500 kHz
5795	159	-4.808	

802.11ac(20 MHz) Mode		Max. Power Spectral Density [dBm]	Limit
Frequency [MHz]	Channel No.		
5180	36	1.924	11 dBm/MHz
5200	40	1.944	
5240	48	1.946	
5260	52	2.060	
5300	60	2.208	
5320	64	1.939	
5500	100	1.936	
5580	116	2.762	
5720	144	1.360	
5745	149	-1.773	30 dBm/500 kHz
5785	157	-1.682	
5825	165	-0.997	



802.11ac(40 MHz) Mode		Max. Power Spectral Density [dBm]	Limit
Frequency [MHz]	Channel No.		
5190	38	-2.431	11 dBm/MHz
5230	46	-2.017	
5270	54	-1.721	
5310	62	-1.837	
5510	102	-1.833	
5590	118	-1.761	
5710	142	-2.309	
5755	151	-5.813	30 dBm/500 kHz
5795	159	-5.935	

802.11ac(80 MHz) Mode		Max. Power Spectral Density [dBm]	Limit
Frequency [MHz]	Channel No.		
5210	42	-5.947	11 dBm/MHz
5290	58	-5.407	
5530	106	-6.859	
5690	138	-5.951	
5775	155	-10.155	30 dBm/500 kHz



ISED Only

Note:

Only UNII 1 band was calculated as EIRP.

802.11a Mode		Max. PSD [dBm/MHz]	Peak Ant. Gain (dBi)	Max. E.I.R.P PSD [dBm/MHz]	EIRP PSD Limit
Frequency [MHz]	Channel No.				
5180	36	2.685	-2.45	0.235	10 dBm/MHz
5200	40	2.897		0.447	
5240	48	3.151		0.701	

802.11n(HT20) Mode		Max. PSD [dBm/MHz]	Peak Ant. Gain (dBi)	Max. E.I.R.P PSD [dBm/MHz]	EIRP PSD Limit
Frequency [MHz]	Channel No.				
5180	36	2.574	-2.45	0.124	10 dBm/MHz
5200	40	2.583		0.133	
5240	48	3.166		0.716	

802.11n(HT40) Mode		Max. PSD [dBm/MHz]	Peak Ant. Gain (dBi)	Max. E.I.R.P PSD [dBm/MHz]	EIRP PSD Limit
Frequency [MHz]	Channel No.				
5190	38	-1.686	-2.45	-4.136	10 dBm/MHz
5230	46	-0.849		-3.299	

802.11ac(VHT20)Mode		Max. PSD [dBm/MHz]	Peak Ant. Gain (dBi)	Max. E.I.R.P PSD [dBm/MHz]	EIRP PSD Limit
Frequency [MHz]	Channel No.				
5180	36	1.924	-2.45	-0.526	10 dBm/MHz
5200	40	1.944		-0.506	
5240	48	1.946		-0.504	



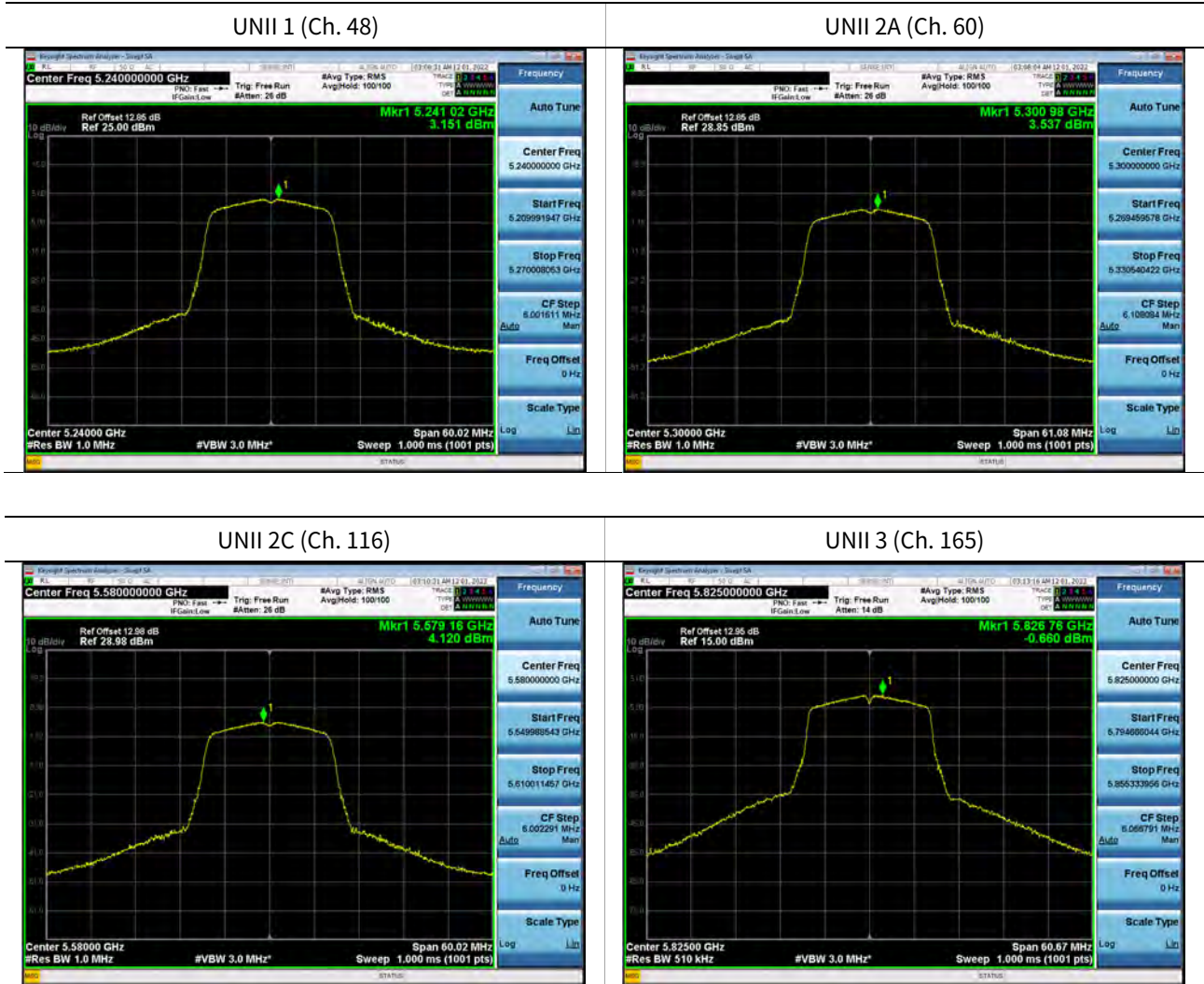
802.11ac(VHT40)Mode		Max. PSD [dBm/MHz]	Peak Ant. Gain (dBi)	Max. E.I.R.P PSD [dBm/MHz]	EIRP PSD Limit
Frequency [MHz]	Channel No.				
5190	38	-2.431	-2.45	-4.881	10 dBm/MHz
5230	46	-2.017		-4.467	

802.11ac(VHT80)Mode		Max. PSD [dBm/MHz]	Peak Ant. Gain (dBi)	Max. E.I.R.P PSD [dBm/MHz]	EIRP PSD Limit
Frequency [MHz]	Channel No.				
5210	42	-5.947	-2.45	-8.397	10 dBm/MHz

▣ Test Plots(802.11a)

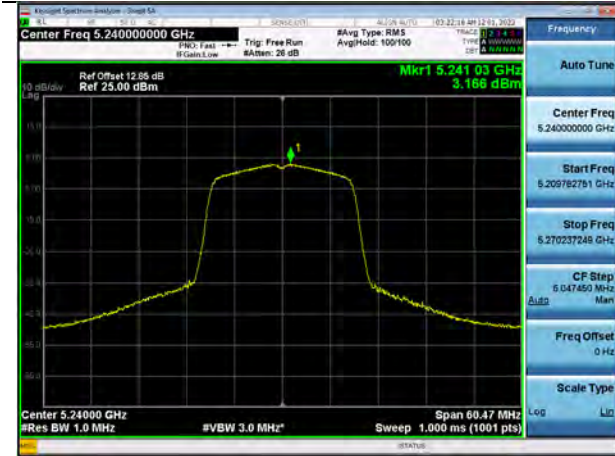
Note:

In order to simplify the report, attached plots were only the highest PSD Channel.

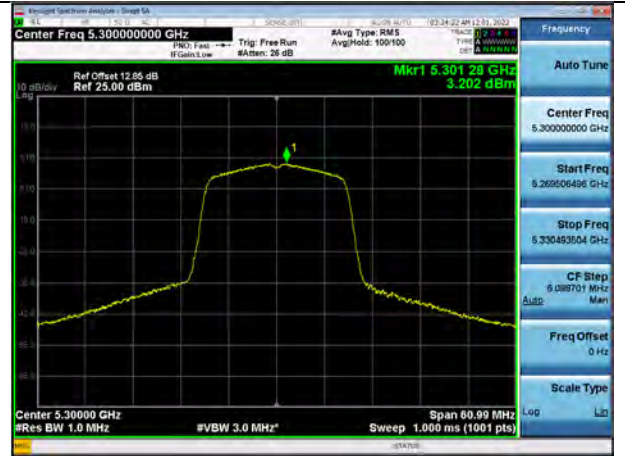


▣ Test Plots(802.11n(HT20))

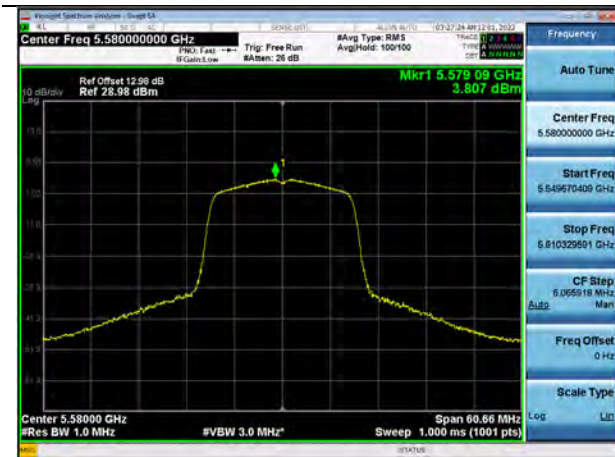
UNII 1 (Ch. 48)



UNII 2A (Ch. 60)



UNII 2C (Ch. 116)



UNII 3 (Ch. 165)



▣ Test Plots(802.11n(HT40))

UNII 1 (Ch. 46)



UNII 2A (Ch. 62)



UNII 2C (Ch. 110)

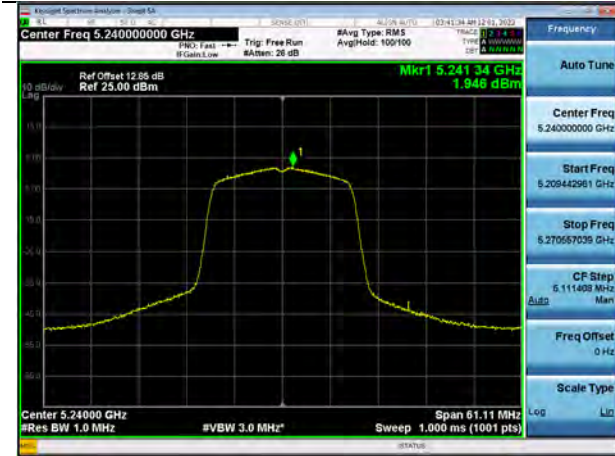


UNII 3 (Ch. 151)

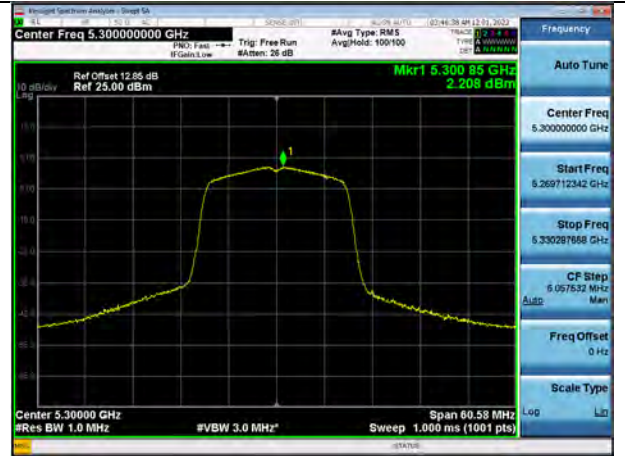


▣ Test Plots(802.11ac(VHT20))

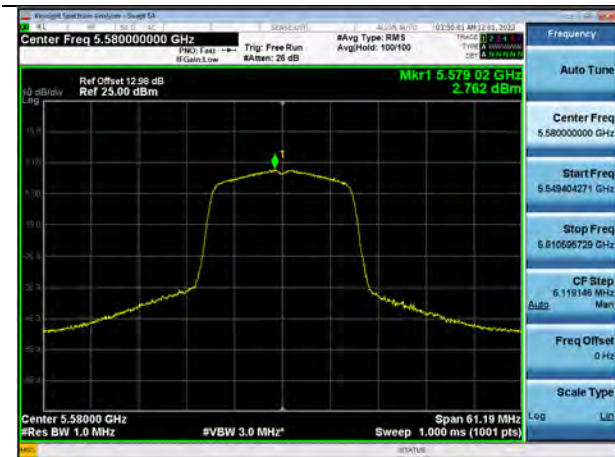
UNII 1 (Ch. 48)



UNII 2A (Ch. 60)



UNII 2C (Ch. 116)



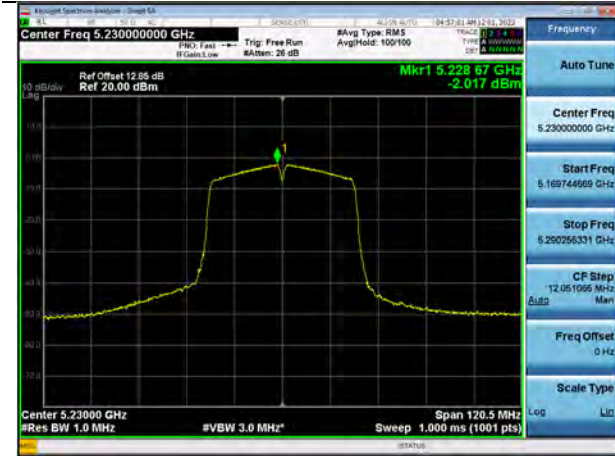
UNII 3 (Ch. 165)





Test Plots(802.11ac(VHT40))

UNII 1 (Ch. 46)



UNII 2A (Ch. 54)



UNII 2C (Ch. 118)



UNII 3 (Ch. 151)



▣ Test Plots(802.11ac(VHT80))

UNII 1 (Ch. 42)



UNII 2A (Ch. 58)



UNII 2C (Ch. 138)



UNII 3 (Ch. 155)



10.6 STRADDLE CHANNEL

10.6.1 26dB Bandwidth

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26 dB Bandwidth [MHz]
802.11a	UNII 2C	5 720	144	5709.96	15.04
802.11n(HT20)				5709.92	15.08
802.11ac(VHT20)				5709.84	15.16
802.11a	UNII 3	5 720	144	5729.88	4.88
802.11n(HT20)				5730.12	5.12
802.11ac(VHT20)				5730.08	5.08

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26 dB Bandwidth [MHz]
802.11n(HT40)	UNII 2C	5 710	142	5689.92	35.08
802.11ac(VHT40)				5689.68	35.32
802.11n(HT40)	UNII 3	5 710	142	5730.08	5.08
802.11ac(VHT40)				5730.16	5.16

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	26 dB Bandwidth [MHz]
802.11ac(VHT80)	UNII 2C	5 690	138	5648.84	76.16
	UNII 3	5 690	138	5730.68	5.68

Note:

[UNII 2C] 26 dB Bandwidth = 5725 MHz - Measured Frequency[MHz]

[UNII 3C] 26 dB Bandwidth = Measured Frequency[MHz] -5725 MHz

▣ Test Plots (26 dB Bandwidth)

802.11a UNII Band



802.11n(HT20) UNII Band



802.11ac(VHT20) UNII Band





Test Plots (26 dB Bandwidth)

802.11n(HT40) UNII Band



802.11ac(VHT40) UNII Band



802.11ac(VHT80) UNII Band



10.7.2 6 dB Bandwidth

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
802.11a	UNII 3	5 720	144	5728.16	3.16	> 0.5
802.11n(HT20)				5728.56	3.56	> 0.5
802.11ac(VHT20)				5727.60	2.60	> 0.5

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
802.11n(HT40)	UNII 3	5 710	142	5728.00	3.00	> 0.5
802.11ac(VHT40)				5728.00	3.00	> 0.5

Mode	Band	Frequency [MHz]	Channel	Measured Frequency [MHz]	6 dB Bandwidth [MHz]	Limit [MHz]
802.11ac(VHT80)	UNII 3	5 690	138	5728.28	3.28	> 0.5

Note:

6 dB Bandwidth = Measured Frequency[MHz] - 5725 MHz

▣ Test Plots(UNII 3 Band 6 dB Bandwidth)

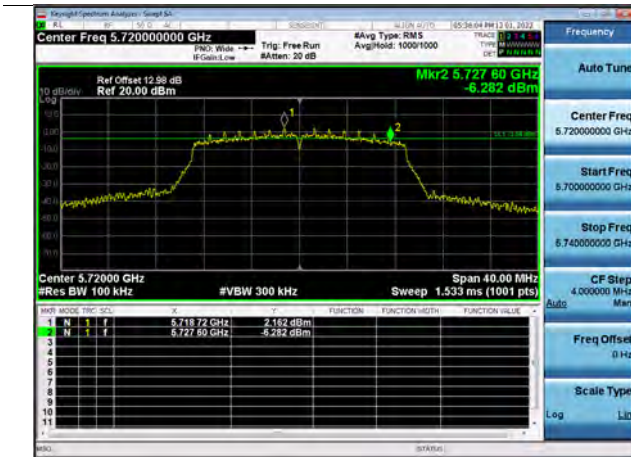
802.11a CH.144



802.11n_HT20 CH.144

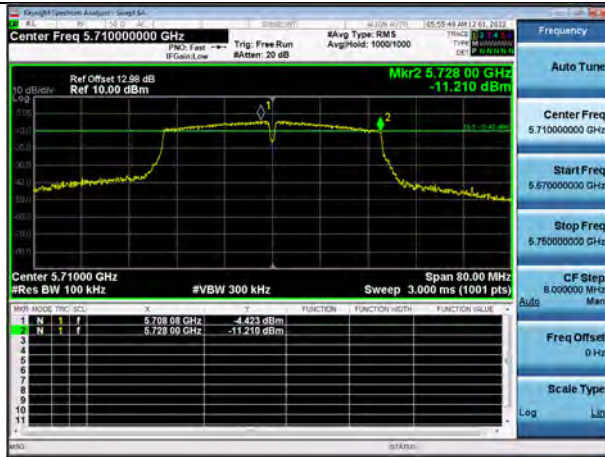


802.11ac_VHT20 CH.144





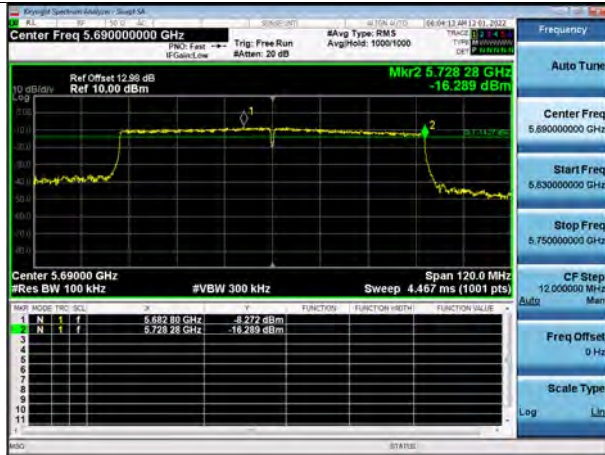
802.11n_HT40 CH.142



802.11ac_VHT40 CH.142



802.11ac_VHT80 CH.138



10.7.3 Output Power

Mode	Frequency [MHz]	Channel	Measured Power (dBm)	Limit (dBm)
802.11a	5 720 (UNII 2C Band)	144	11.69	22.77
802.11n(HT20)			11.62	22.78
802.11ac(VHT20)			10.87	22.81
802.11a	5 720 (UNII 3 Band)	144	3.62	30.00
802.11n(HT20)			4.02	30.00
802.11ac(VHT20)			3.28	30.00

Mode	Frequency [MHz]	Channel	Measured Power (dBm)	Limit (dBm)
802.11n(HT40)	5 710 (UNII 2C Band)	142	11.24	23.98
802.11ac(VHT40)			10.57	23.98
802.11n(HT40)	5 710 (UNII 3 Band)	142	-1.86	30.00
802.11ac(VHT40)			-2.58	30.00

Mode	Frequency [MHz]	Channel	Measured Power (dBm)	Limit (dBm)
802.11ac(VHT80)	5 690 (UNII 2C Band)	138	10.92	23.98
	5 690 (UNII 3 Band)	138	-4.56	30.00

Test Plots

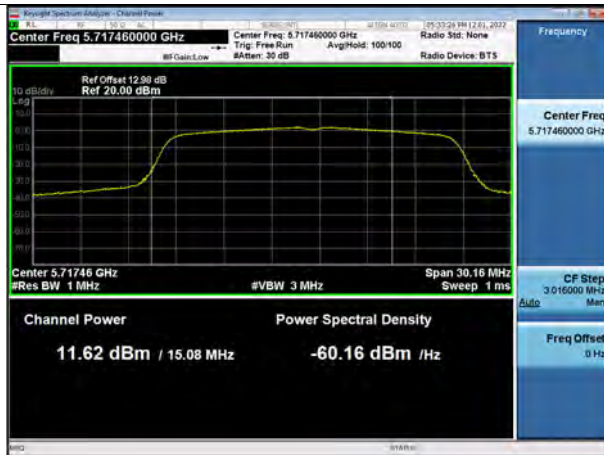
802.11a UNII 2C Band



802.11a UNII 3 Band



802.11n(HT20) UNII 2C Band



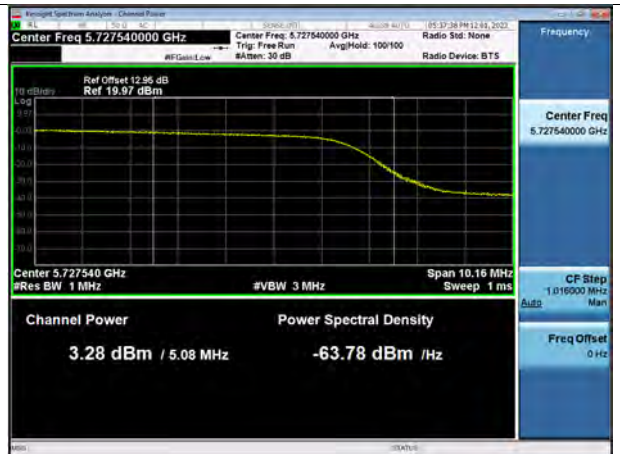
802.11n(HT20) UNII 3 Band



802.11ac(VHT20) UNII 2C Band



802.11ac(VHT20) UNII 3 Band

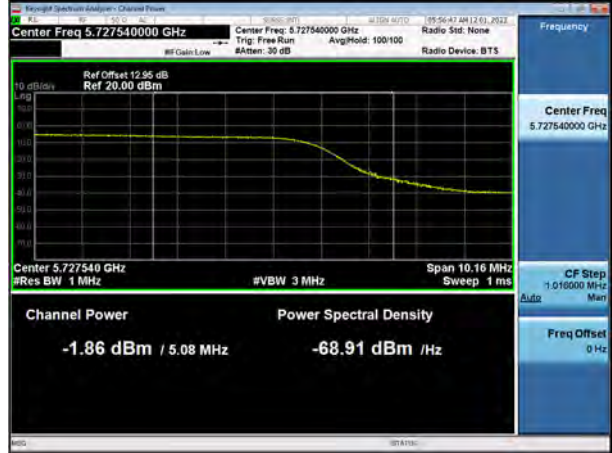




802.11n(HT40) UNII 2C Band



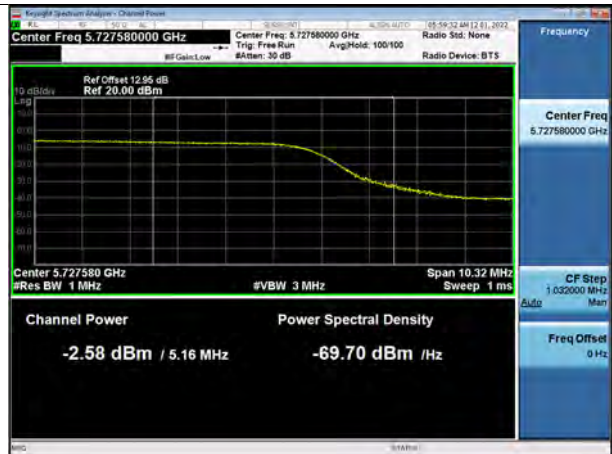
802.11n(HT40) UNII 3 Band



802.11ac(VHT40) UNII 2C Band



802.11ac(VHT40) UNII 3 Band



802.11ac(VHT80) UNII 2C Band



802.11ac(VHT80) UNII 3 Band



10.7.4 Power Spectral Density

Mode	Frequency [MHz]	Channel	Measured Density (dBm)	Limit (dBm)
802.11a	5 720 (UNII 2C Band)	144	2.291	11 dBm/ MHz
802.11n(HT20)			2.096	
802.11ac(VHT20)			1.442	
802.11a	5 720 (UNII 3 Band)	144	-2.812	30 dBm/ 500 kHz
802.11n(HT20)			-2.746	
802.11ac(VHT20)			-3.854	

Mode	Frequency [MHz]	Channel	Measured Density (dBm)	Limit (dBm)
802.11n(HT40)	5 710 (UNII 2C Band)	142	-1.617	11 dBm/ MHz
802.11ac(VHT40)			-2.262	
802.11n(HT40)	5 710 (UNII 3 Band)	142	-8.832	30 dBm/ 500 kHz
802.11ac(VHT40)			-9.399	

Mode	Frequency [MHz]	Channel	Measured Density (dBm)	Limit (dBm)
802.11ac(VHT80)	5 690 (UNII 2C Band)	138	-5.740	11 dBm/ MHz
	5 690 (UNII 3 Band)	138	-11.980	30 dBm/ 500 kHz

Test Plots

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





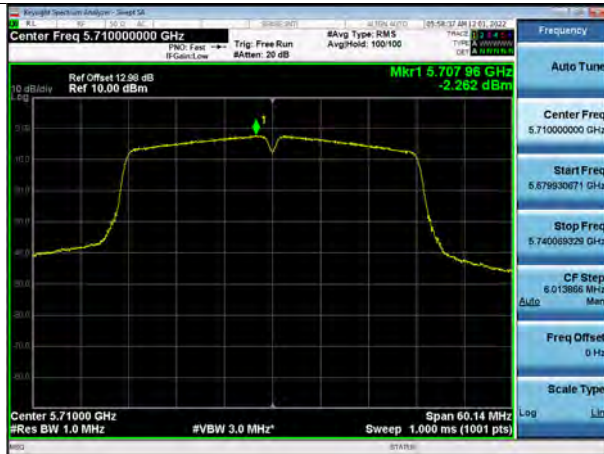
802.11n(HT40) UNII 2C Band



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





10.7 RADIATED SPURIOUS EMISSIONS

Frequency Range : 9 kHz – 30 MHz

Frequency	Measured Level	A.F+C.L+D.F	Ant. POL	Total	Limit	Margin
[MHz]	[dB μ V]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]
No Critical peaks found						

Note:

1. The Measured Level 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 = 40log (specific distance / test distance) (dB)
3. Limit line = specific Limits (dB μ V) + Distance extrapolation factor

Frequency Range : Below 1 GHz

Frequency	Measured Level	A.F+C.L	Ant. POL	Total	Limit	Margin
[MHz]	[dB μ V]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ 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

Band :	UNII 1
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
10360	51.64	4.05	V	55.69	68.20	12.51	PK
15540	52.81	5.45	V	58.26	73.98	15.72	PK
15540	37.75	5.45	V	43.20	53.98	10.78	AV
10360	51.52	4.05	H	55.57	68.20	12.63	PK
15540	54.04	5.45	H	59.49	73.98	14.49	PK
15540	37.46	5.45	H	42.91	53.98	11.07	AV

Band :	UNII 1
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5200 MHz
Channel No.	40 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
10400	51.43	4.24	V	55.67	68.20	12.53	PK
15600	51.48	4.10	V	55.58	73.98	18.40	PK
15600	35.88	4.10	V	39.98	53.98	14.00	AV
10400	50.99	4.24	H	55.23	68.20	12.97	PK
15600	53.35	4.10	H	57.45	73.98	16.53	PK
15600	37.04	4.10	H	41.14	53.98	12.84	AV



Band :	UNII 1
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5240 MHz
Channel No.	48 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
10480	52.44	3.81	V	56.25	68.20	11.95	PK
15720	51.92	3.78	V	55.70	73.98	18.28	PK
15720	36.37	3.78	V	40.15	53.98	13.83	AV
10480	52.26	3.81	H	56.07	68.20	12.13	PK
15720	54.14	3.78	H	57.92	73.98	16.06	PK
15720	37.91	3.78	H	41.69	53.98	12.29	AV

Band :	UNII 2A
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5260 MHz
Channel No.	52 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
10520	48.48	4.89	V	53.37	68.20	14.83	PK
15780	51.71	4.11	V	55.82	73.98	18.16	PK
15780	36.42	4.11	V	40.53	53.98	13.45	AV
10520	53.44	4.89	H	58.33	68.20	9.87	PK
15780	51.94	4.11	H	56.05	73.98	17.93	PK
15780	36.54	4.11	H	40.65	53.98	13.33	AV



Band :	UNII 2A
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5300 MHz
Channel No.	60 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
10600	53.45	4.79	V	58.24	73.98	15.74	PK
10600	39.48	4.79	V	44.27	53.98	9.71	AV
15900	51.66	5.90	V	57.56	73.98	16.42	PK
15900	36.28	5.90	V	42.18	53.98	11.80	AV
10600	53.12	4.79	H	57.91	73.98	16.07	PK
10600	38.61	4.79	H	43.40	53.98	10.58	AV
15900	52.01	5.90	H	57.91	73.98	16.07	PK
15900	36.46	5.90	H	42.36	53.98	11.62	AV

Band :	UNII 2A
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
10640	53.27	4.36	V	57.63	73.98	16.35	PK
10640	40.02	4.36	V	44.38	53.98	9.60	AV
15960	51.91	4.80	V	56.71	73.98	17.27	PK
15960	37.12	4.80	V	41.92	53.98	12.06	AV
10640	54.15	4.36	H	58.51	73.98	15.47	PK
10640	39.64	4.36	H	44.00	53.98	9.98	AV
15960	52.86	4.80	H	57.66	73.98	16.32	PK
15960	37.26	4.80	H	42.06	53.98	11.92	AV



Band : UNII 2C
 Operation Mode: 802.11 a
 Transfer Rate: 6 Mbps
 Operating Frequency 5500 MHz
 Channel No. 100 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dBμV/m]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
11000	51.10	4.35	V	55.45	73.98	18.53	PK
11000	37.77	4.35	V	42.12	53.98	11.86	AV
16500	50.11	7.38	V	57.49	68.20	10.71	PK
11000	49.44	4.35	H	53.79	73.98	20.19	PK
11000	36.45	4.35	H	40.80	53.98	13.18	AV
16500	50.86	7.38	H	58.24	68.20	9.96	PK

Band : UNII 2C
 Operation Mode: 802.11 a
 Transfer Rate: 6 Mbps
 Operating Frequency 5580 MHz
 Channel No. 116 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dBμV/m]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
11160	51.88	5.40	V	57.28	73.98	16.70	PK
11160	38.04	5.40	V	43.44	53.98	10.54	AV
16740	50.78	8.09	V	58.87	68.20	9.33	PK
11160	51.42	5.40	H	56.82	73.98	17.16	PK
11160	37.58	5.40	H	42.98	53.98	11.00	AV
16740	51.07	8.09	H	59.16	68.20	9.04	PK



Band : UNII 2C
 Operation Mode: 802.11 a
 Transfer Rate: 6 Mbps
 Operating Frequency 5720 MHz
 Channel No. 144 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dBμV/m]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
11440	53.93	4.52	V	58.45	73.98	15.53	PK
11440	39.57	4.52	V	44.09	53.98	9.89	AV
17160	55.19	8.48	V	63.67	68.20	4.53	PK
11440	54.52	4.52	H	59.04	73.98	14.94	PK
11440	39.92	4.52	H	44.44	53.98	9.54	AV
17160	55.62	8.48	H	64.10	68.20	4.10	PK

Band : UNII 3
 Operation Mode: 802.11 a
 Transfer Rate: 6 Mbps
 Operating Frequency 5745MHz
 Channel No. 149 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dBμV/m]	[dB/m]	[H/V]	[dBμV/m]	[dBμV/m]	[dB]	
11490	53.70	4.48	V	58.18	73.98	15.80	PK
11490	39.11	4.48	V	43.59	53.98	10.39	AV
17235	51.67	9.67	V	61.34	68.20	6.86	PK
11490	54.20	4.48	H	58.68	73.98	15.30	PK
11490	39.36	4.48	H	43.84	53.98	10.14	AV
17235	52.39	9.67	H	62.06	68.20	6.14	PK



Band :	UNII 3
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5785 MHz
Channel No.	157 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
11570	53.87	5.01	V	58.88	73.98	15.10	PK
11570	38.93	5.01	V	43.94	53.98	10.04	AV
17355	51.49	9.97	V	61.46	68.20	6.74	PK
11570	54.28	5.01	H	59.29	73.98	14.69	PK
11570	39.17	5.01	H	44.18	53.98	9.80	AV
17355	51.72	9.97	H	61.69	68.20	6.51	PK

Band :	UNII 3
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5825 MHz
Channel No.	165 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
11650	54.12	4.94	V	59.06	73.98	14.92	PK
11650	39.57	4.94	V	44.51	53.98	9.47	AV
17475	54.09	10.07	V	64.16	68.20	4.04	PK
11650	54.34	4.94	H	59.28	73.98	14.70	PK
11650	40.37	4.94	H	45.31	53.98	8.67	AV
17475	54.62	10.07	H	64.69	68.20	3.51	PK

Note:

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

[Worst case]

UNII 1, 2A, 2C, 3 : 802.11a



[Non-DBS Mode]

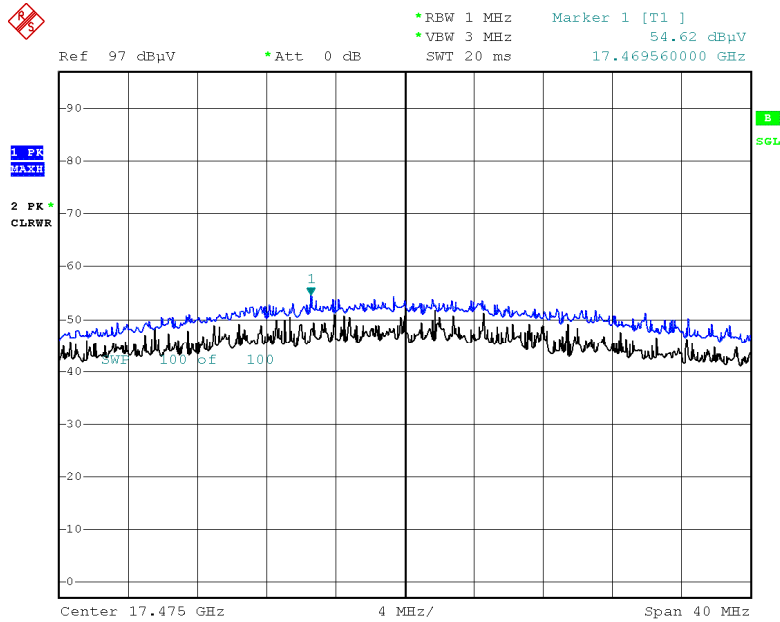
BT ch.78 (GFSK) & UNII 5 GHz 802.11a ch.165

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
17475	53.32	10.07	V	63.39	68.20	4.81	PK
17475	55.08	10.07	H	65.15	68.20	3.05	PK



Test Plots

Peak Measured Level (802.11a, Ch.165 3rd Harmonic, Y-H)

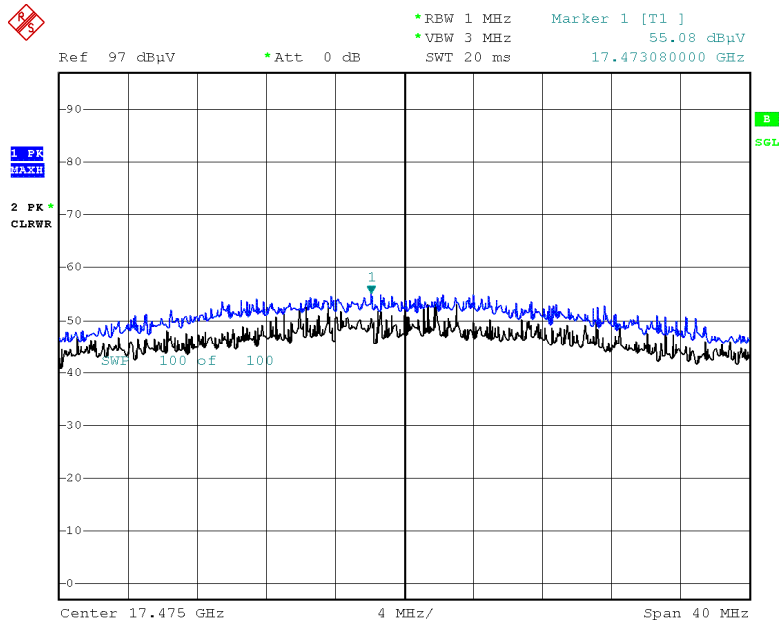


Date: 28.NOV.2022 16:11:13

[Non-DBS Mode]

BT ch.78 (GFSK) & UNII 5 GHz 802.11a ch.165

Peak Measured Level (3rd Harmonic, Z-H)



Date: 29.NOV.2022 14:30:47

Note:

Only the worst case plots for Radiated Spurious Emissions.



10.8 RADIATED RESTRICTED BAND EDGE

Band :	UNII 1
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5150	45.24	11.65	H	56.89	73.98	17.09	PK
5150	31.65	11.65	H	43.30	53.98	10.68	AV
5150	45.21	11.65	V	56.86	73.98	17.12	PK
5150	31.62	11.65	V	43.27	53.98	10.71	AV

Band :	UNII 2A
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5350	46.21	11.74	H	57.95	73.98	16.03	PK
5350	32.42	11.74	H	44.16	53.98	9.82	AV
5350	46.11	11.74	V	57.85	73.98	16.13	PK
5350	32.19	11.74	V	43.93	53.98	10.05	AV



Band :	UNII 2C
Operation Mode:	802.11 a
Transfer Rate:	6 Mbps
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5460	46.63	12.60	H	59.23	73.98	14.75	PK
5460	32.21	12.60	H	44.81	53.98	9.17	AV
5470	51.08	12.85	H	63.93	68.20	4.27	PK
5460	46.57	12.60	V	59.17	73.98	14.81	PK
5460	31.99	12.60	V	44.59	53.98	9.39	AV
5470	50.87	12.85	V	63.72	68.20	4.48	PK



Band :	UNII 1
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5150	44.52	11.65	H	56.17	73.98	17.81	PK
5150	31.76	11.65	H	43.41	53.98	10.57	AV
5150	43.94	11.65	V	55.59	73.98	18.39	PK
5150	31.29	11.65	V	42.94	53.98	11.04	AV

Band :	UNII 2A
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5350	50.47	11.74	H	62.21	73.98	11.77	PK
5350	33.08	11.74	H	44.82	53.98	9.16	AV
5350	49.63	11.74	V	61.37	73.98	12.61	PK
5350	32.79	11.74	V	44.53	53.98	9.45	AV



Band :	UNII 2C
Operation Mode:	802.11 n_HT20
Transfer MCS Index:	0
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5460	47.35	12.60	H	59.95	73.98	14.03	PK
5460	32.26	12.60	H	44.86	53.98	9.12	AV
5470	50.52	12.85	H	63.37	68.20	4.83	PK
5460	47.20	12.60	V	59.80	73.98	14.18	PK
5460	32.19	12.60	V	44.79	53.98	9.19	AV
5470	49.99	12.85	V	62.84	68.20	5.36	PK



Band :	UNII 1
Operation Mode:	802.11 ac_VHT20
Transfer MCS Index:	0
Operating Frequency	5180 MHz
Channel No.	36 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5150	44.53	11.65	H	56.18	73.98	17.80	PK
5150	31.55	11.65	H	43.20	53.98	10.78	AV
5150	44.26	11.65	V	55.91	73.98	18.07	PK
5150	31.15	11.65	V	42.80	53.98	11.18	AV

Band :	UNII 2A
Operation Mode:	802.11 ac_VHT20
Transfer MCS Index:	0
Operating Frequency	5320 MHz
Channel No.	64 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5350	46.30	11.74	H	58.04	73.98	15.94	PK
5350	32.93	11.74	H	44.67	53.98	9.31	AV
5350	46.23	11.74	V	57.97	73.98	16.01	PK
5350	32.18	11.74	V	43.92	53.98	10.06	AV



Band :	UNII 2C
Operation Mode:	802.11 ac_VHT20
Transfer MCS Index:	0
Operating Frequency	5500 MHz
Channel No.	100 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5460	44.56	12.60	H	57.16	73.98	16.82	PK
5460	32.02	12.60	H	44.62	53.98	9.36	AV
5470	48.69	12.85	H	61.54	68.20	6.66	PK
5460	44.29	12.60	V	56.89	73.98	17.09	PK
5460	31.77	12.60	V	44.37	53.98	9.61	AV
5470	48.64	12.85	V	61.49	68.20	6.71	PK



Band :	UNII 1
Operation Mode:	802.11 n_HT40
Transfer MCS Index:	0
Operating Frequency	5190 MHz
Channel No.	38 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5150	52.45	11.65	H	64.10	73.98	9.88	PK
5150	36.74	11.65	H	48.39	53.98	5.59	AV
5150	51.68	11.65	V	63.33	73.98	10.65	PK
5150	36.18	11.65	V	47.83	53.98	6.15	AV

Band :	UNII 1
Operation Mode:	802.11 n_HT40
Transfer MCS Index:	0
Operating Frequency	5310 MHz
Channel No.	62 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5350	52.04	11.74	H	63.78	73.98	10.20	PK
5350	33.73	11.74	H	45.47	53.98	8.51	AV
5350	51.24	11.74	V	62.98	73.98	11.00	PK
5350	33.59	11.74	V	45.33	53.98	8.65	AV



Band :	UNII 2C
Operation Mode:	802.11 n_HT40
Transfer MCS Index:	0
Operating Frequency	5510 MHz
Channel No.	102 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5460	47.55	12.60	H	60.15	73.98	13.83	PK
5460	32.73	12.60	H	45.33	53.98	8.65	AV
5470	52.32	12.85	H	65.17	68.20	3.03	PK
5460	47.19	12.60	V	59.79	73.98	14.19	PK
5460	32.54	12.60	V	45.14	53.98	8.84	AV
5470	51.94	12.85	V	64.79	68.20	3.41	PK



Band :	UNII 1
Operation Mode:	802.11 ac_VHT40
Transfer MCS Index:	0
Operating Frequency	5190 MHz
Channel No.	38 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5150	45.70	11.65	H	57.35	73.98	16.63	PK
5150	32.87	11.65	H	44.52	53.98	9.46	AV
5150	45.26	11.65	V	56.91	73.98	17.07	PK
5150	32.48	11.65	V	44.13	53.98	9.85	AV

Band :	UNII 1
Operation Mode:	802.11 ac_VHT40
Transfer MCS Index:	0
Operating Frequency	5310 MHz
Channel No.	62 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5350	49.47	11.74	H	61.21	73.98	12.77	PK
5350	32.86	11.74	H	44.60	53.98	9.38	AV
5350	49.37	11.74	V	61.11	73.98	12.87	PK
5350	31.57	11.74	V	43.31	53.98	10.67	AV



Band :	UNII 2C
Operation Mode:	802.11 ac_VHT40
Transfer MCS Index:	0
Operating Frequency	5510 MHz
Channel No.	102 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5460	46.34	12.60	H	58.94	73.98	15.04	PK
5460	31.78	12.60	H	44.38	53.98	9.60	AV
5470	51.54	12.85	H	64.39	68.20	3.81	PK
5460	46.28	12.60	V	58.88	73.98	15.10	PK
5460	31.29	12.60	V	43.89	53.98	10.09	AV
5470	50.97	12.85	V	63.82	68.20	4.38	PK



Band :	UNII 1
Operation Mode:	802.11 ac_VHT80
Transfer MCS Index:	0
Operating Frequency	5210 MHz
Channel No.	42 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5150	47.74	11.65	H	59.39	73.98	14.59	PK
5150	36.02	11.65	H	47.67	53.98	6.31	AV
5150	47.63	11.65	V	59.28	73.98	14.70	PK
5150	35.91	11.65	V	47.56	53.98	6.42	AV

Band :	UNII 2A
Operation Mode:	802.11 ac_VHT80
Transfer MCS Index:	0
Operating Frequency	5290 MHz
Channel No.	58 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5350	48.37	11.74	H	60.11	73.98	13.87	PK
5350	35.14	11.74	H	46.88	53.98	7.10	AV
5350	48.11	11.74	V	59.85	73.98	14.13	PK
5350	34.85	11.74	V	46.59	53.98	7.39	AV



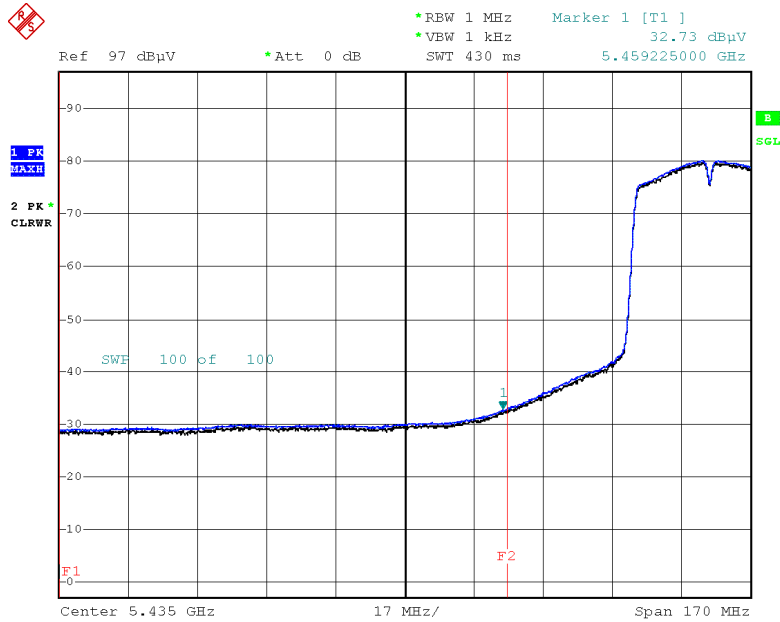
Band :	UNII 2C
Operation Mode:	802.11 ac_VHT80
Transfer MCS Index:	0
Operating Frequency	5530 MHz
Channel No.	106 Ch

Frequency	Measured Level	CL+AF+DF-AG	ANT. POL	Total	Limit	Margin	Detect
[MHz]	[dB μ V/m]	[dB/m]	[H/V]	[dB μ V/m]	[dB μ V/m]	[dB]	
5460	49.07	12.60	H	61.67	73.98	12.31	PK
5460	35.80	12.60	H	48.40	53.98	5.58	AV
5470	51.28	12.85	H	64.13	68.20	4.07	PK
5460	48.38	12.60	V	60.98	73.98	13.00	PK
5460	35.49	12.60	V	48.09	53.98	5.89	AV
5470	50.91	12.85	V	63.76	68.20	4.44	PK



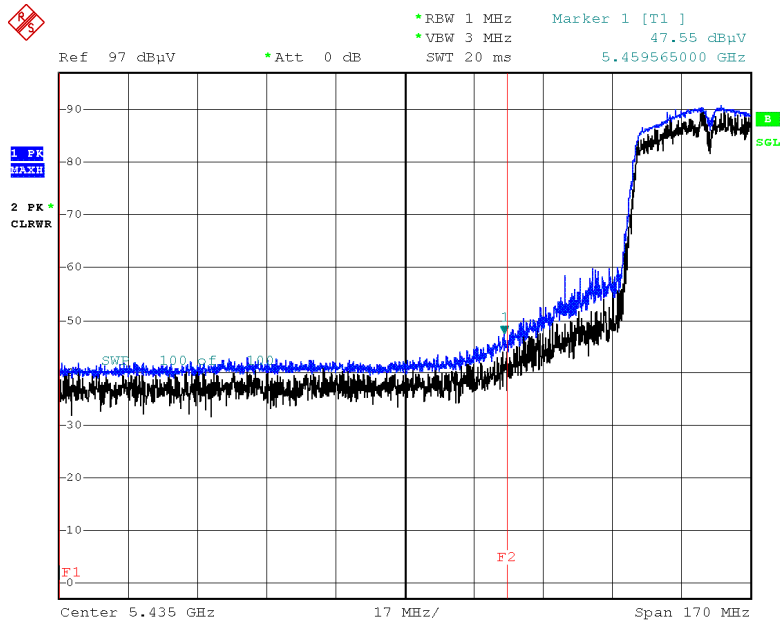
Test Plots(UNII 1, 2A, 2C)

Average Measured Level (802.11 n_HT40, Ch.102, X-H)



Date: 30.NOV.2022 15:52:29

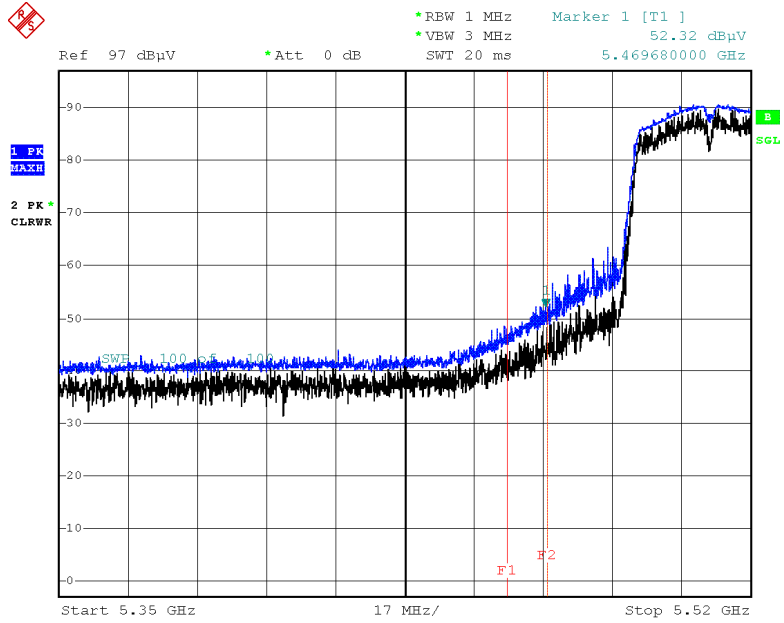
Peak Measured Level (802.11 n_HT40, Ch.102, X-H)



Date: 30.NOV.2022 15:52:50



Peak Measured Level (802.11 n_HT40, Ch.102, X-H)



Date: 30.NOV.2022 15:53:35

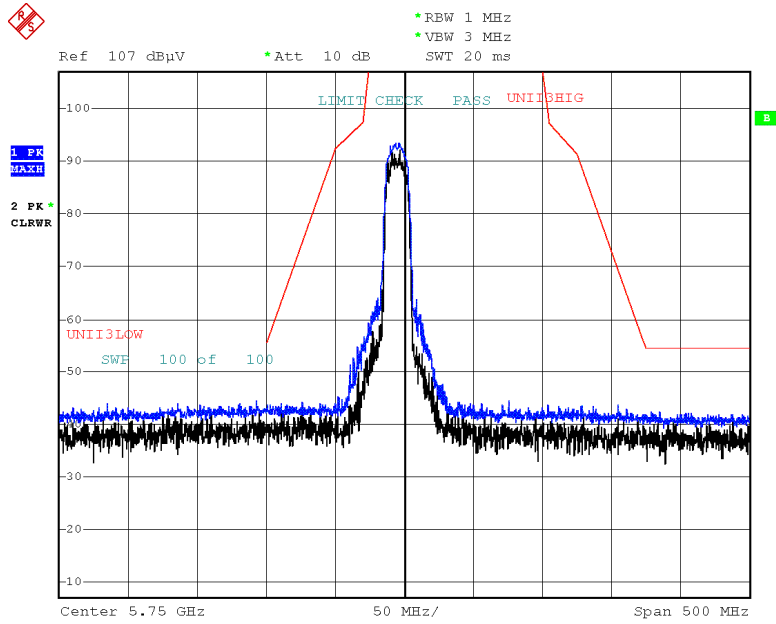
Note:

Only the worst case plots for Radiated Restricted Band Edge.



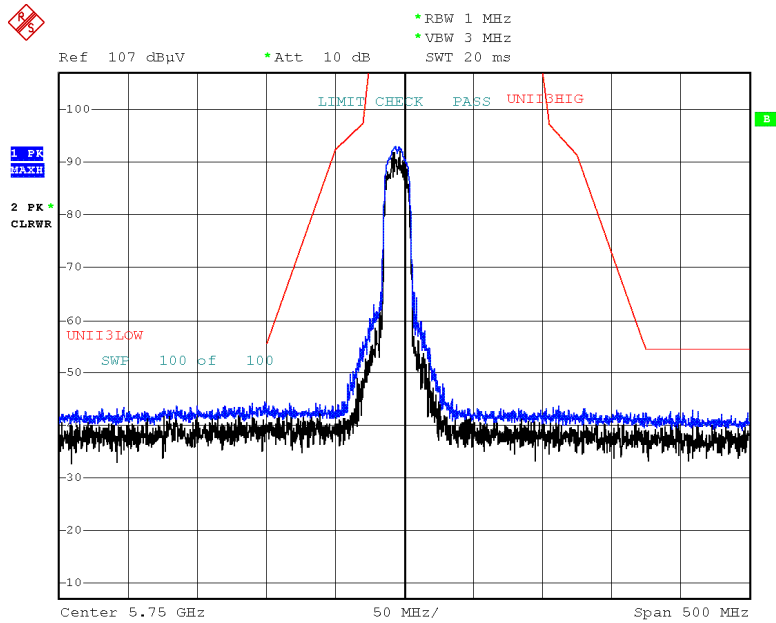
Test Plots(UNII 3)

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



Date: 30.NOV.2022 16:29:11

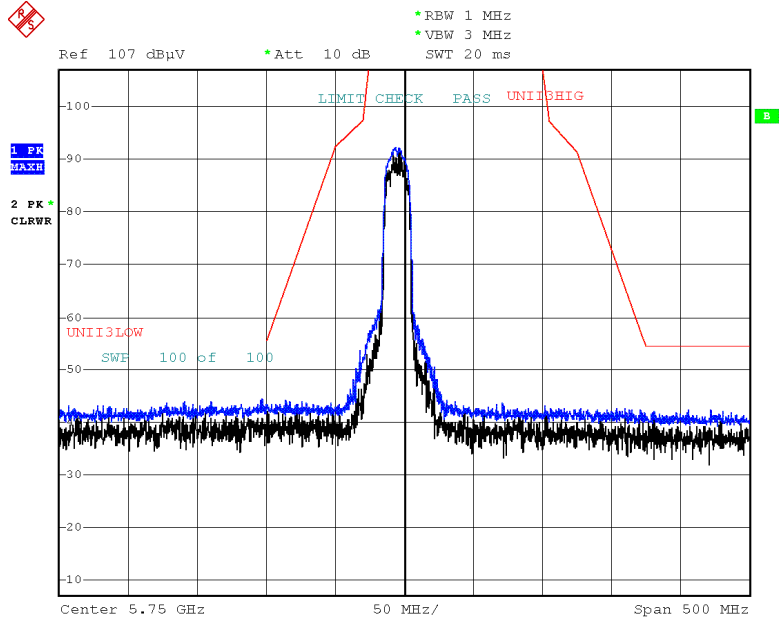
Peak Result (802.11n_HT20, Ch.149, X-H)



Date: 30.NOV.2022 16:28:27

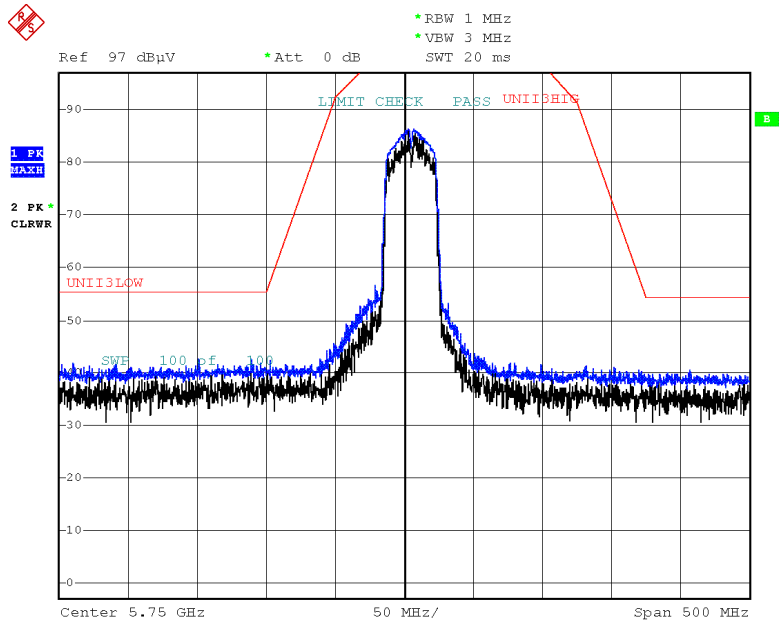


Peak Result (802.11ac_VHT20, Ch.149, X-H)



Date: 30.NOV.2022 16:29:54

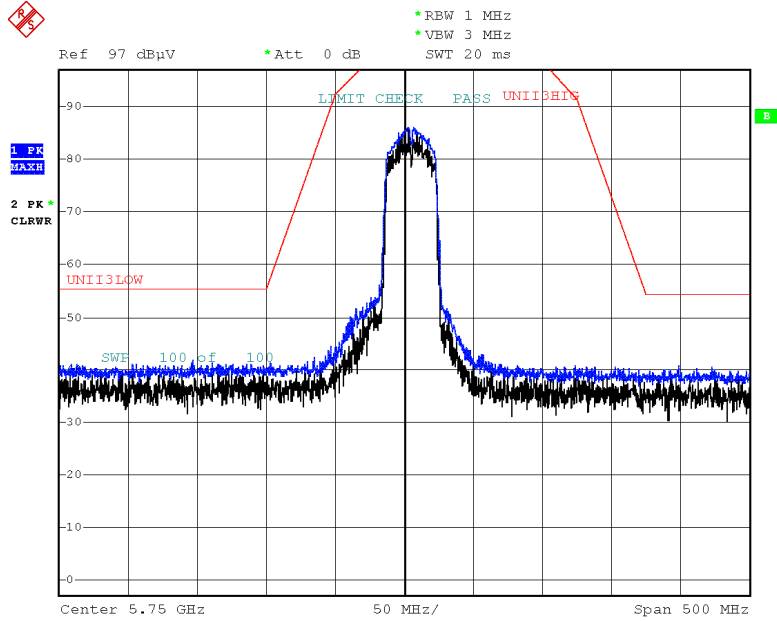
Peak Result (802.11n_HT40, Ch.151, X-H)



Date: 30.NOV.2022 17:28:03

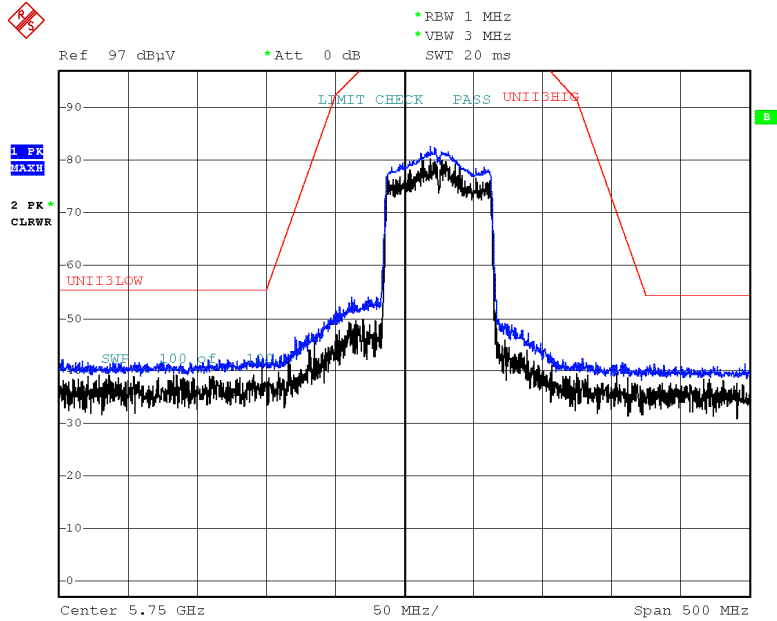


Peak Result (802.11ac_VHT40, Ch.151, X-H)



Date: 30.NOV.2022 17:28:50

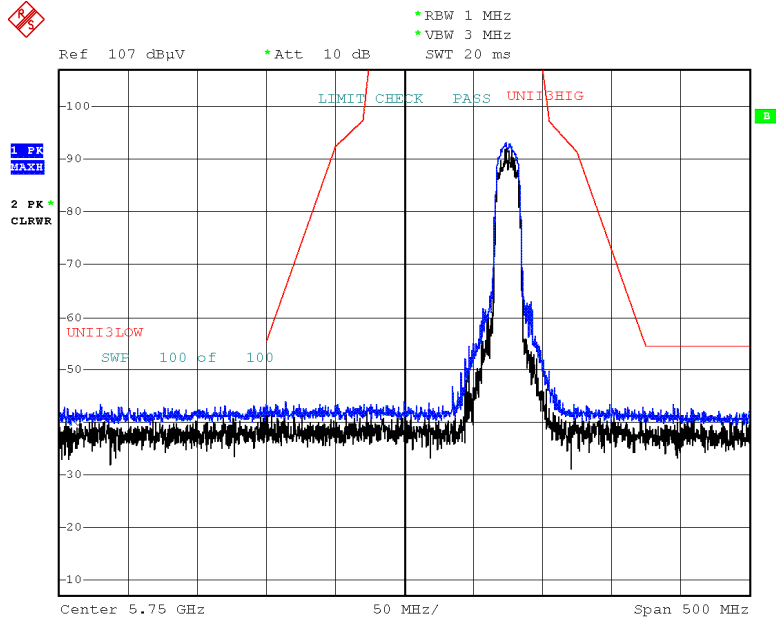
Peak Result (802.11ac_VHT80, Ch.155, X-H)



Date: 30.NOV.2022 17:40:49

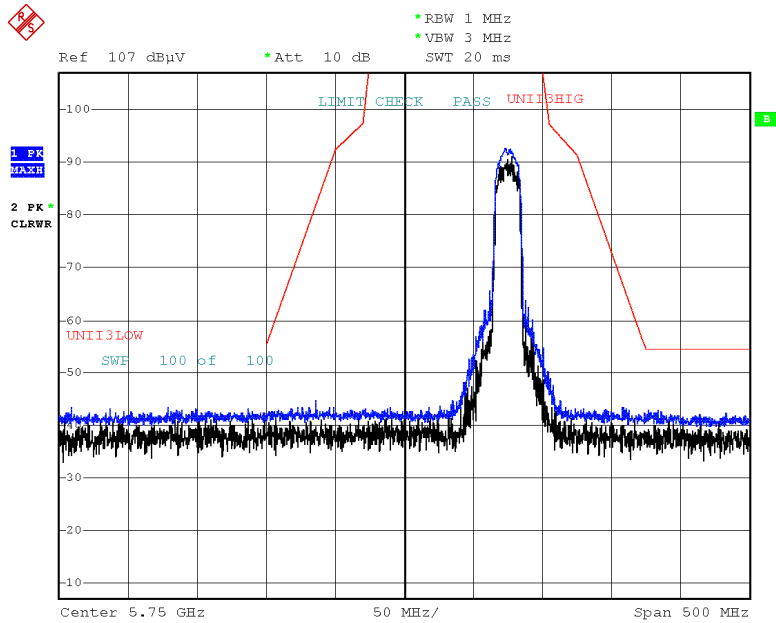


Peak Result (802.11a, Ch.165, X-H)



Date: 30.NOV.2022 16:36:50

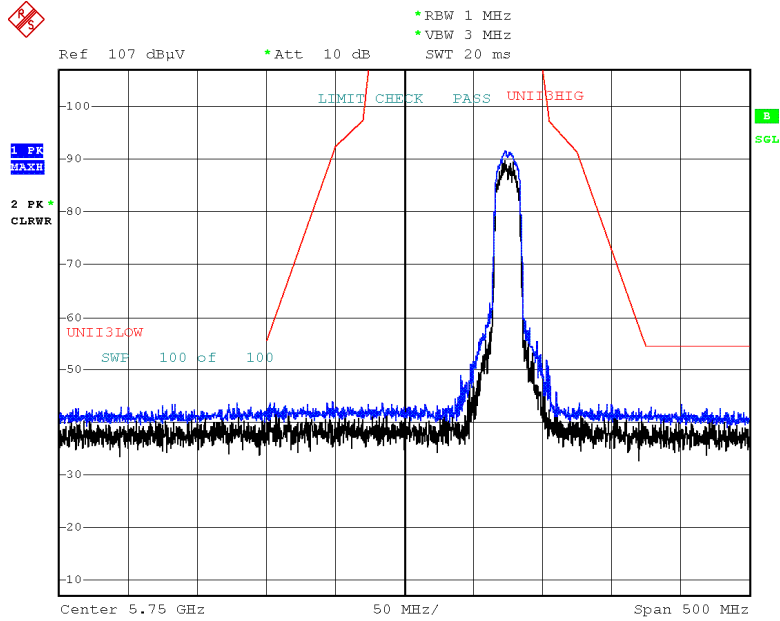
Peak Result (802.11n_HT20, Ch.165, X-H)



Date: 30.NOV.2022 16:38:04

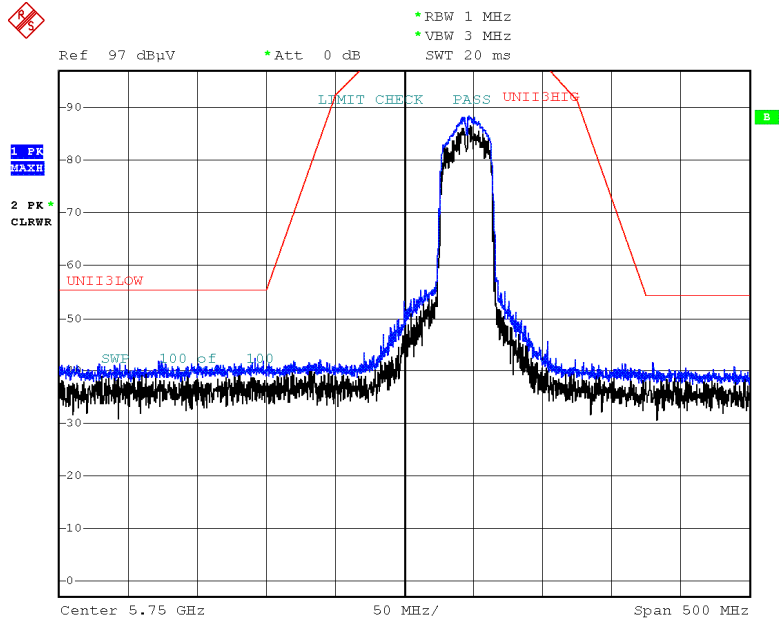


Peak Result (802.11ac_VHT20, Ch.165, X-H)



Date: 30.NOV.2022 16:38:52

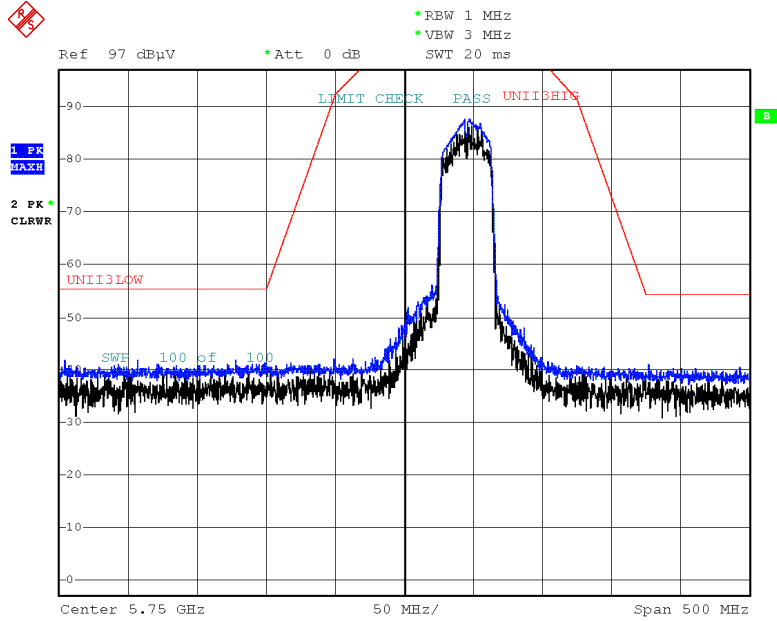
Peak Result (802.11n_HT40, Ch.159, X-H)



Date: 30.NOV.2022 17:33:47



Peak Result (802.11ac_VHT40, Ch.159, X-H)



Date: 30.NOV.2022 17:35:19

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.



10.9 RECEIVER SPURIOUS EMISSIONS

Frequency Range : Below 1 GHz

Frequency	Measured Level	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	[dB μ V/m]	dBm/m	dBm	(H/V)	[dB μ V/m]	[dB μ V/m]	dB

No Critical peaks found

Note:

- 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

Frequency	Measured Level	Ant. factor	Cable loss	Ant. POL	Total	Limit	Margin
MHz	[dB μ V/m]	dBm/m	dBm	(H/V)	[dB μ V/m]	[dB μ V/m]	dB

No Critical peaks found



10.10 POWERLINE CONDUCTED EMISSIONS

[12V]

Conducted Emissions (Line 1)

Test

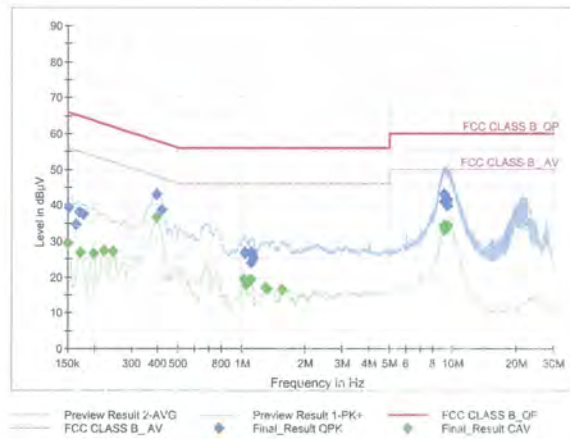
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Test Report

Common Information

EUT : LAMWBD1
 Operating Conditions : 5G WLAN Mode_L1
 Comment :

Full Spectrum



Final Result QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1523	39.24	65.88	25.64	1000.0	9.000	L1	OFF	9.7
0.1635	34.54	65.28	30.74	1000.0	9.000	L1	OFF	9.7
0.1703	38.01	64.95	26.94	1000.0	9.000	L1	OFF	9.7
0.1770	37.39	64.63	27.23	1000.0	9.000	L1	OFF	9.7
0.3953	43.06	57.95	14.89	1000.0	9.000	L1	OFF	9.7
0.4178	38.65	57.49	18.85	1000.0	9.000	L1	OFF	9.7
1.0355	26.90	56.00	29.10	1000.0	9.000	L1	OFF	9.7
1.0423	26.64	56.00	29.36	1000.0	9.000	L1	OFF	9.7
1.1098	24.01	56.00	31.99	1000.0	9.000	L1	OFF	9.7
1.1165	26.72	56.00	29.28	1000.0	9.000	L1	OFF	9.7
1.1210	26.13	56.00	29.87	1000.0	9.000	L1	OFF	9.7
1.1300	25.04	56.00	30.96	1000.0	9.000	L1	OFF	9.7
9.0725	42.85	60.00	17.15	1000.0	9.000	L1	OFF	10.0
9.1535	40.98	60.00	19.02	1000.0	9.000	L1	OFF	10.0
9.3673	41.49	60.00	18.51	1000.0	9.000	L1	OFF	10.0
9.3718	39.93	60.00	20.07	1000.0	9.000	L1	OFF	10.0
9.4213	41.64	60.00	18.36	1000.0	9.000	L1	OFF	10.0
9.4370	41.35	60.00	18.65	1000.0	9.000	L1	OFF	10.0

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Test

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Final Result CAV

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1500	29.31	56.00	26.69	1000.0	9.000	L1	OFF	9.7
0.1725	26.69	54.84	28.15	1000.0	9.000	L1	OFF	9.7
0.1995	26.41	53.63	27.22	1000.0	9.000	L1	OFF	9.7
0.2220	27.50	52.74	25.25	1000.0	9.000	L1	OFF	9.7
0.2468	27.02	51.87	24.85	1000.0	9.000	L1	OFF	9.7
0.3953	36.71	47.95	11.25	1000.0	9.000	L1	OFF	9.7
1.0288	19.20	46.00	26.80	1000.0	9.000	L1	OFF	9.7
1.0490	17.83	46.00	28.17	1000.0	9.000	L1	OFF	9.7
1.1053	19.23	46.00	26.77	1000.0	9.000	L1	OFF	9.7
1.3055	16.89	46.00	29.11	1000.0	9.000	L1	OFF	9.7
1.3123	16.76	46.00	29.24	1000.0	9.000	L1	OFF	9.7
1.5553	16.56	46.00	29.44	1000.0	9.000	L1	OFF	9.7
9.0703	34.38	50.00	15.62	1000.0	9.000	L1	OFF	10.0
9.1130	33.13	50.00	16.87	1000.0	9.000	L1	OFF	10.0
9.1468	33.40	50.00	16.60	1000.0	9.000	L1	OFF	10.0
9.3290	33.86	50.00	16.14	1000.0	9.000	L1	OFF	10.0
9.3628	33.44	50.00	16.56	1000.0	9.000	L1	OFF	10.0
9.4370	34.29	50.00	15.71	1000.0	9.000	L1	OFF	10.0

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Conducted Emissions (Line 2)

Test

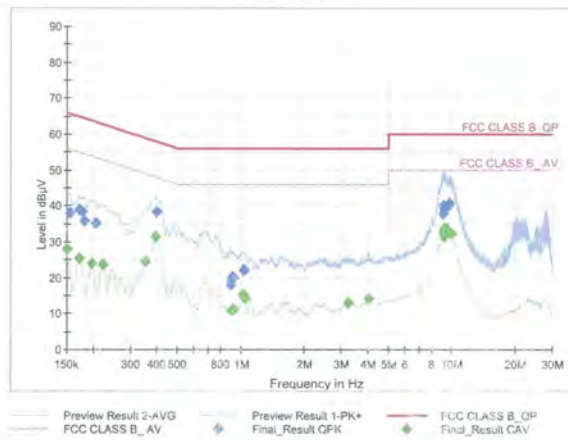
1 / 2

Test Report

Common Information

EUT : LAMWBD1
 Operating Conditions : 5G WLAN Mode_N
 Comment :

Full Spectrum



Final Result QPK

Frequency (MHz)	Quasi-Peak (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	37.95	65.75	27.81	1000.0	9.000	N	OFF	9.6
0.1725	35.99	64.94	28.95	1000.0	9.000	N	OFF	9.6
0.1770	38.50	64.63	26.12	1000.0	9.000	N	OFF	9.6
0.1815	35.73	64.42	28.69	1000.0	9.000	N	OFF	9.6
0.2063	35.24	63.36	28.12	1000.0	9.000	N	OFF	9.6
0.3975	38.41	57.91	19.50	1000.0	9.000	N	OFF	9.6
0.8960	17.85	56.00	38.15	1000.0	9.000	N	OFF	9.7
0.9118	19.39	56.00	36.61	1000.0	9.000	N	OFF	9.7
0.9208	20.09	56.00	35.91	1000.0	9.000	N	OFF	9.7
0.9298	19.89	56.00	36.11	1000.0	9.000	N	OFF	9.7
1.0333	22.00	56.00	34.00	1000.0	9.000	N	OFF	9.7
1.0400	22.17	56.00	33.83	1000.0	9.000	N	OFF	9.7
9.0880	37.80	60.00	22.20	1000.0	9.000	N	OFF	10.0
9.1310	39.96	60.00	20.04	1000.0	9.000	N	OFF	10.0
9.2570	38.94	60.00	21.06	1000.0	9.000	N	OFF	10.0
9.3223	39.68	60.00	20.32	1000.0	9.000	N	OFF	10.0
9.3763	39.62	60.00	20.38	1000.0	9.000	N	OFF	10.1
9.7610	40.61	60.00	19.39	1000.0	9.000	N	OFF	10.1

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오후 4:13:06



Test

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Final Result CAV

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1500	27.89	56.00	28.11	1000.0	9.000	N	OFF	9.6
0.1725	25.45	54.84	29.39	1000.0	9.000	N	OFF	9.6
0.1973	23.89	53.73	29.83	1000.0	9.000	N	OFF	9.6
0.2220	23.66	52.74	29.08	1000.0	9.000	N	OFF	9.6
0.3525	24.61	48.90	24.30	1000.0	9.000	N	OFF	9.6
0.3953	31.45	47.95	16.50	1000.0	9.000	N	OFF	9.6
0.9095	11.02	46.00	34.98	1000.0	9.000	N	OFF	9.7
0.9320	11.13	46.00	34.87	1000.0	9.000	N	OFF	9.7
1.0310	15.27	46.00	30.73	1000.0	9.000	N	OFF	9.7
1.0513	14.11	46.00	31.89	1000.0	9.000	N	OFF	9.7
3.2360	12.90	46.00	33.10	1000.0	9.000	N	OFF	9.8
4.0393	14.02	46.00	31.98	1000.0	9.000	N	OFF	9.8
9.1310	32.53	50.00	17.47	1000.0	9.000	N	OFF	10.0
9.1850	33.84	50.00	16.16	1000.0	9.000	N	OFF	10.0
9.2300	31.37	50.00	18.63	1000.0	9.000	N	OFF	10.0
9.2593	32.89	50.00	17.11	1000.0	9.000	N	OFF	10.0
9.4235	33.63	50.00	16.37	1000.0	9.000	N	OFF	10.1
9.9185	32.25	50.00	17.75	1000.0	9.000	N	OFF	10.1

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[19V]

Conducted Emissions (Line 1)

Test

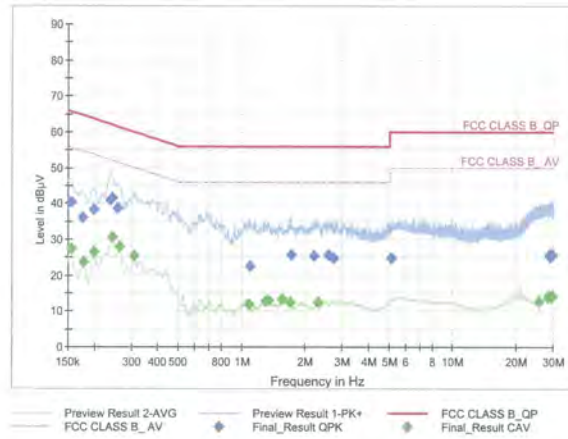
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Test Report

Common Information

EUT : LAMWBD1
 Operating Conditions : 5G WLAN Mode_L1
 Comment :

Full Spectrum



Final Result QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	40.33	65.75	25.42	1000.0	9.000	L1	OFF	9.6
0.1748	36.09	64.73	28.64	1000.0	9.000	L1	OFF	9.6
0.1995	38.49	63.63	25.14	1000.0	9.000	L1	OFF	9.6
0.2378	40.85	62.17	21.32	1000.0	9.000	L1	OFF	9.6
0.2445	41.44	61.94	20.50	1000.0	9.000	L1	OFF	9.6
0.2580	38.71	61.50	22.79	1000.0	9.000	L1	OFF	9.6
1.0985	22.44	56.00	33.56	1000.0	9.000	L1	OFF	9.6
1.7150	25.69	56.00	30.31	1000.0	9.000	L1	OFF	9.7
2.1988	25.45	56.00	30.55	1000.0	9.000	L1	OFF	9.7
2.5925	25.53	56.00	30.47	1000.0	9.000	L1	OFF	9.7
2.7433	24.71	56.00	31.29	1000.0	9.000	L1	OFF	9.7
5.1373	24.86	60.00	35.14	1000.0	9.000	L1	OFF	9.7
28.6430	25.72	60.00	34.28	1000.0	9.000	L1	OFF	9.9
28.6925	25.68	60.00	34.32	1000.0	9.000	L1	OFF	9.9
29.0885	25.04	60.00	34.96	1000.0	9.000	L1	OFF	9.9
29.3540	25.64	60.00	34.37	1000.0	9.000	L1	OFF	9.9
29.4800	25.90	60.00	34.10	1000.0	9.000	L1	OFF	9.9
29.7433	25.53	60.00	34.47	1000.0	9.000	L1	OFF	9.9

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Test

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Final Result CAV

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	27.49	55.75	28.27	1000.0	9.000	L1	OFF	9.6
0.1770	23.71	54.63	30.92	1000.0	9.000	L1	OFF	9.6
0.1995	26.64	53.63	27.00	1000.0	9.000	L1	OFF	9.6
0.2423	30.59	52.02	21.43	1000.0	9.000	L1	OFF	9.6
0.2625	27.90	51.35	23.46	1000.0	9.000	L1	OFF	9.6
0.3098	25.34	49.98	24.64	1000.0	9.000	L1	OFF	9.6
1.0805	11.78	46.00	34.22	1000.0	9.000	L1	OFF	9.6
1.3033	12.76	46.00	33.24	1000.0	9.000	L1	OFF	9.6
1.3483	12.87	46.00	33.13	1000.0	9.000	L1	OFF	9.7
1.5575	13.34	46.00	32.66	1000.0	9.000	L1	OFF	9.7
1.7105	12.36	46.00	33.64	1000.0	9.000	L1	OFF	9.7
2.2955	12.55	46.00	33.45	1000.0	9.000	L1	OFF	9.7
25.7113	12.75	50.00	37.25	1000.0	9.000	L1	OFF	9.9
28.2425	13.83	50.00	36.17	1000.0	9.000	L1	OFF	9.9
28.2943	13.91	50.00	36.09	1000.0	9.000	L1	OFF	9.9
28.6453	14.44	50.00	35.56	1000.0	9.000	L1	OFF	9.9
29.3068	13.89	50.00	36.11	1000.0	9.000	L1	OFF	9.9
29.7410	14.16	50.00	35.84	1000.0	9.000	L1	OFF	9.9

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Conducted Emissions (Line 2)

Test

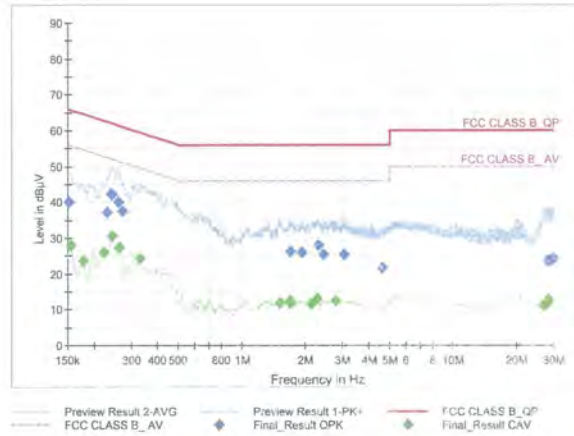
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Test Report

Common Information

EUT : LAMWBD1
 Operating Conditions : 5G WLAN Mode_N
 Comment :

Full Spectrum



Final Result QPK

Frequency (MHz)	QuasiPeak (dBuV)	Limit (dEμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1523	40.01	65.88	25.87	1000.0	9.000	N	OFF	9.5
0.2310	37.13	62.41	25.28	1000.0	9.000	N	OFF	9.6
0.2400	42.27	62.10	19.83	1000.0	9.000	N	OFF	9.6
0.2445	41.99	61.94	19.96	1000.0	9.000	N	OFF	9.6
0.2603	40.20	61.42	21.22	1000.0	9.000	N	OFF	9.6
0.2715	37.54	61.07	23.53	1000.0	9.000	N	OFF	9.6
1.7105	26.29	56.00	29.71	1000.0	9.000	N	OFF	9.6
1.9333	25.84	56.00	30.16	1000.0	9.000	N	OFF	9.6
2.2955	27.90	56.00	28.10	1000.0	9.000	N	OFF	9.7
2.4553	25.37	56.00	30.63	1000.0	9.000	N	OFF	9.7
3.0718	25.47	56.00	30.53	1000.0	9.000	N	OFF	9.7
4.6243	21.72	56.00	34.28	1000.0	9.000	N	OFF	9.7
28.1570	23.58	60.00	36.42	1000.0	9.000	N	OFF	9.9
28.5620	23.75	60.00	36.25	1000.0	9.000	N	OFF	9.9
29.0898	23.75	60.00	36.25	1000.0	9.000	N	OFF	9.9
29.2753	23.91	60.00	36.09	1000.0	9.000	N	OFF	9.9
29.7748	23.89	60.00	36.12	1000.0	9.000	N	OFF	9.9
29.9593	24.26	60.00	35.74	1000.0	9.000	N	OFF	9.9

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Test

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Final Result CAV

Frequency (MHz)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.1545	27.86	55.75	27.90	1000.0	9.000	N	OFF	9.5
0.1770	23.51	54.63	31.11	1000.0	9.000	N	OFF	9.6
0.2220	25.91	52.74	26.83	1000.0	9.000	N	OFF	9.6
0.2423	30.68	52.02	21.34	1000.0	9.000	N	OFF	9.6
0.2625	27.40	51.35	23.95	1000.0	9.000	N	OFF	9.6
0.3300	24.26	49.45	25.19	1000.0	9.000	N	OFF	9.6
1.5148	11.89	46.00	34.11	1000.0	9.000	N	OFF	9.6
1.6948	11.94	46.00	34.06	1000.0	9.000	N	OFF	9.6
1.7105	12.46	46.00	33.54	1000.0	9.000	N	OFF	9.6
2.1448	11.51	46.00	34.49	1000.0	9.000	N	OFF	9.6
2.2933	12.84	46.00	33.16	1000.0	9.000	N	OFF	9.7
2.7950	12.44	46.00	33.56	1000.0	9.000	N	OFF	9.7
26.9443	11.31	50.00	38.69	1000.0	9.000	N	OFF	9.9
27.3493	11.71	50.00	38.29	1000.0	9.000	N	OFF	9.9
27.6170	12.04	50.00	37.96	1000.0	9.000	N	OFF	9.9
27.6328	11.51	50.00	38.49	1000.0	9.000	N	OFF	9.9
28.3505	12.65	50.00	37.35	1000.0	9.000	N	OFF	9.9
28.4270	12.33	50.00	37.67	1000.0	9.000	N	OFF	9.9

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11. LIST OF TEST EQUIPMENT

Conducted Test

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
LISN	ENV216	Rohde & Schwarz	102245	08/22/2023	Annual
EMI Test Receiver	ESR	Rohde & Schwarz	101910	06/07/2023	Annual
Temperature Chamber	SU-642	ESPEC	0093008124	03/04/2023	Annual
Signal Analyzer	N9030A	Keysight	MY55410508	09/06/2023	Annual
Power Meter	N1911A	Agilent	MY45100523	03/24/2023	Annual
Power Sensor	N1921A	Agilent	MY57820067	03/24/2023	Annual
Directional Coupler	87300B	Agilent	3116A03621	11/02/2023	Annual
Power Splitter	11667B	Hewlett Packard	10545	02/03/2023	Annual
DC Power Supply	E3646A	Agilent	MY40002937	12/14/2022	Annual
Attenuator(10 dB) (DC-26.5 GHz)	8493C-010	Agilent	08285	06/21/2023	Annual
Attenuator(20 dB)	18N-20dB	Rohde & Schwarz	8	03/07/2023	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	100808	02/22/2023	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	N/A	N/A	N/A
Controller	EM2090	Emco	060520	N/A	N/A
Turn Table	N/A	Ets	N/A	N/A	N/A
Loop Antenna	FMZB 1513	Rohde & Schwarz	1513-333	03/17/2024	Biennial
Hybrid Antenna	VULB 9168	Schwarzbeck	9168-0895	08/16/2024	Biennial
Horn Antenna	BBHA 9120D	Schwarzbeck	9120D-1191	11/18/2023	Biennial
Horn Antenna (15 GHz ~ 40 GHz)	BBHA9170	Schwarzbeck	BBHA9170124	04/12/2023	Biennial
Amp & Filter Bank Switch Controller	FBSM-01A	TNM system	0	N/A	N/A
Band Reject Filter	WRCJV2400/2483.5- 2370/2520-60/12SS	Wainwright Instruments	2	01/06/2023	Annual
Band Reject Filter	WRCJV12-4900-5100- 5900-6100-50SS	Wainwright Instruments	5	06/13/2023	Annual
Band Reject Filter	WRCJV12-4900-5100- 5900-6100-50SS	Wainwright Instruments	6	06/13/2023	Annual
Band Reject Filter	WRCJV5100/5850- 40/50-8EEK	Wainwright Instruments	1	02/07/2023	Annual
ATT(3 dB) + LNA2(6~18 GHz)	18B-03, CBL06185030	WEINSCHEL CERNEX	N/A	12/05/2023	Annual
ATT(10 dB) + LNA1(0.1~18 GHz)	56-10, CBLU1183540B-01	Api tech, CERNEX	N/A	12/05/2023	Annual
High Pass Filter	WHKX10-2700-3000- 18000-40SS	Wainwright Instruments	N/A	12/05/2023	Annual
High Pass Filter	WHKX8-6090-7000- 18000-40SS	Wainwright Instruments	N/A	12/05/2023	Annual
Thru	COAXIAL ATTENUATOR	T&M SYSTEM	N/A	12/05/2023	Annual
Power Amplifier	CBL18265035	CERNEX	22966	12/01/2023	Annual
Power Amplifier	CBL26405040	CERNEX	25956	03/11/2023	Annual
Bluetooth Tester	TC-3000C	TESCOM	3000C000175	04/05/2023	Annual
Spectrum Analyzer	FSP(9 kHz ~ 30 GHz)	Rohde & Schwarz	836650/016	09/06/2023	Annual
Spectrum Analyzer	FSV40-N(9 kHz ~ 30 GHz)	Rohde & Schwarz	101068-SZ	09/07/2023	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-2212-FI002-P