FCC Test Report

Test report
On Behalf of
Winner Wave Limited
For
Pocket
Model No.: BC-1

FCC ID: 2ADFS-POCKET-BC-1

Prepared For :	**Winner Wave Limited** **Unit 2003 Cheong Tai Commercial Building 287-289 Reclamation Street Kowloon, Hong Kong**
Prepared By :	**Shenzhen HUAK Testing Technology Co., Ltd.** **1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China**
Date of Test:	**Oct. 26, 2024 ~ Nov. 18, 2024**
Date of Report:	**Nov. 18, 2024**
Report Number:	**HK2410306426-2E**

Test Result Certification

Applicant's name.....:	Winner Wave Limited
Address .....:	Unit 2003 Cheong Tai Commercial Building 287-289 Reclamation Street Kowloon, Hong Kong
Manufacturer's Name .....:	Actions Microelectronics Co., Ltd.
Address .....:	201, No.9 Building, Software Park, KeJiZhongEr Road, GaoXinQu, NanShan, Shenzhen, China

Product description

Trade Mark:	EZCast
Product name .....:	Pocket
Model and/or type reference .:	BC-1
Standards.....:	FCC 47 CFR Part 15 Subpart E

Date of Test .....:	
Date (s) of performance of tests .....:	**Oct. 26, 2024 ~ Nov. 18, 2024**
Date of Issue .....:	**Nov. 18, 2024**
Test Result.....:	**Pass**

Testing Engineer : Len Liao

(Len Liao)

Technical Manager : Sliver Wan

(Sliver Wan)

Authorized Signatory : Jason Zhou

(Jason Zhou)

TABLE OF CONTENTS

** Modified History **

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	Nov. 18, 2024	Jason Zhou

TEL : +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail : service@cer-mark.com
Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

1. EUT Description

Product Name:	Pocket			
Trade Mark:	EZCast			
Model Name:	BC-1			
Series Model:	N/A			
Model Difference:	N/A			
Power Rating	DC 5V From Type-C			
Frequency Range :	Band	Mode	Frequency Range(MHz)	Number of Channels
	Band II UNII-2A	IEEE802.11a mode mode	5250 MHz ~5350 MHz	4
		IEEE802.11 n HT20 mode		4
		IEEE802.11 n HT40 mode		2
	Band II UNII-2C	IEEE802.11a mode mode	5470 MHz ~5725 MHz	4
		IEEE802.11 n HT20 mode		4
		IEEE802.11 n HT40 mode		3
Modulation Technique:	IEEE802.11a mode: OFDM (6,9,12,18,24,36,48 and 54 Mbps) IEEE802.11 n HT20 mode: OFDM (MCS0~MCS7) IEEE802.11 n HT40 mode: OFDM (MCS0~MCS7)			
Antenna Specification:	**Iron sheet antenna** Band II UNII-2A Antenna 2.22dBi Band II UNII-2C Antenna 2.12dBi			
Operating Mode:	**Client Without Radar Detection**			

Note:
1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. Antenna gain Refer to the antenna specifications.
3. The cable loss data is obtained from the supplier.
4. The test results in the report only apply to the tested sample.

Remark:

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for ***FCCID: 2ADFS-POCKET-BC-1*** filing to comply with FCC Part 15, Subpart E Rules.

2. Test Methodology

The tests documented in this report were performed in accordance with ANSI C63.10:2013 and FCC CFR 47 15.207, 15.209 and 15.407.

2.1 EUT Configuration

The EUT configuration for testing is installed for RF field strength measurement to meet the Commissions requirement, and is operated in a manner intended to generate the maximum emission in a continuous normal application.

2.2 EUT Exercise

The EUT is operated in the engineering mode to fix the Tx frequency for the purposes of measurement.

According to its specifications, the EUT must comply with the requirements of Section 15.407 under the FCC Rules Part 15 Subpart E.

2.3 General Test Procedures

Conducted Emissions

The EUT is placed on the turn table, which is positioned at 0.8 m above the ground plane. According to the requirements in Section 13.3 of ANSI C63.10:2013, the conducted emission from the EUT is measured in the frequency range between 0.15MHz and 30MHz, using the CISPR Quasi-Peak detector mode.

Radiated Emissions

Under 1GHz

The EUT is placed on a turn table, which is 0.8m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m 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 maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.10:2013.

Above 1GHz

The EUT is placed on a turn table, which is 1.5m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m 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 maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.10:2013.

2.4 FCC Part 15.205 Restricted Bands of Operations

Except as shown in paragraph (d)of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.50 - 5.15
0.495 - 0.505 [1]	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960.0 - 1240	7.25 - 7.75
4.125 - 4.128	25.50 - 25.67	1300 - 1427	8.025 - 8.500
4.17725 - 4.17775	37.50 - 38.25	1435.0 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73.00 - 74.60	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.80 - 75.20	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108.00 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.90 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -156.52525	2483.5 – 2500.0	17.7 - 21.4
8.37625 - 8.38675	156.70 - 156.90	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.1700	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.20	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358.0	36.43 - 36.5([2])
12.57675 - 12.57725	322.0- 335.4	3600 - 4400	
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510MHz.
[2] Above 38.6

Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section15.209.Atfrequenciesequaltoor less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

2.5 Description of Test Modes

Description	Modulation Technology	Modulation Type
26dB Bandwidth and 99% bandwidth	OFDM	BPSK
Maximum conducted output power	OFDM	BPSK
Band edges measurement	OFDM	BPSK
Peak Power Spectral Density	OFDM	BPSK
Radiated undesirable emission	OFDM	BPSK
Power line conducted emission	OFDM	BPSK

IEEE802.11amode:

Channel (5260MHz), Channel (5280MHz), Channel (5320MHz), Channel (5500MHz), Channel (5580MHz)and Channel (5700MHz) with 6Mbps data rate were chosen for full testing.

IEEE802.11nHT20mode:

Channel (5260MHz), Channel (5280MHz), Channel (5320MHz), Channel (5500MHz), Channel (5580MHz)and Channel (5700MHz) with 6Mbps data rate were chosen for full testing.

IEEE802.11nHT40mode:

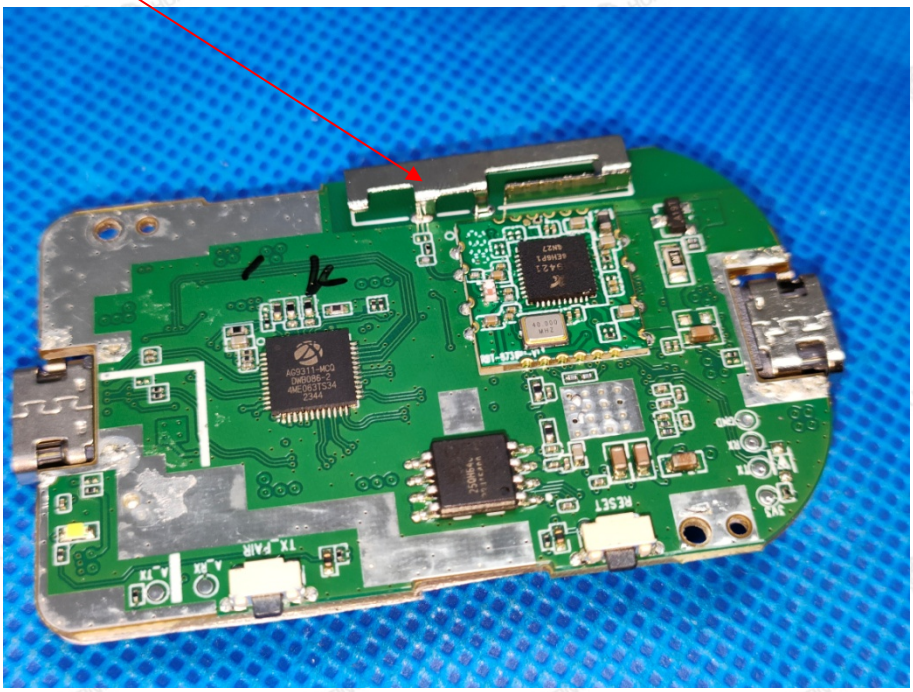
Channel (5270MHz), Channel (5310MHz), Channel (5510MHz), Channel (5550MHz)and Channel (5670MHz) with 6Mbps data rate were chosen for full testing.

2.6 Antenna Description

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 oran antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section"

* the antenna of this EUT is a unique(Iron sheet antenna for WiFi).
* the EUT complies with the requirement of 15.203.

WIFI ANTENNA



3. Instrument Calibration

The measuring equipment, which was utilized in performing the tests documented here in, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

3.1 Measurement Equipment Used

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	L.I.S.N.	R&S	ENV216	HKE-002	2024/02/20	1 Year
2	L.I.S.N.	R&S	ENV216	HKE-059	2024/02/20	1 Year
3	EMI Test Receiver	R&S	ESR	HKE-005	2024/02/20	1 Year
4	Spectrum analyzer	Agilent	N9020A	HKE-025	2024/02/20	1 Year
5	Spectrum analyzer	R&S	FSV3044	HKE-126	2024/02/20	1 Year
6	Preamplifier	EMCI	EMC051845 S	HKE-006	2024/02/20	1 Year
7	Preamplifier	Schwarzbeck	BBV 9743	HKE-016	2024/02/20	1 Year
8	Preamplifier	A.H. Systems	SAS-574	HKE-182	2024/02/20	1 Year
9	6d Attenuator	Pasternack	6db	HKE-184	2024/02/20	1 Year
10	EMI Test Receiver	Rohde & Schwarz	ESR-7	HKE-010	2024/02/20	1 Year
11	Broadband Antenna	Schwarzbeck	VULB9168	HKE-167	2024/02/21	2 Year
12	Loop Antenna	COM-POWER	AL-130R	HKE-014	2024/02/21	2 Year
13	Horn Antenna	Schwarzbeck	9120D	HKE-013	2024/02/21	2 Year
14	EMI Test Software	Tonscend	JS32-CE 2.5.0.6	HKE-081	/	/
15	EMI Test Software	Tonscend	JS32-RE 5.0.0	HKE-082	/	/
16	RF Automatic control unit	Tonscend	JS0806-2	HKE-060	2024/02/20	1 Year
17	High pass filter unit	Tonscend	JS0806-F	HKE-055	2024/02/20	1 Year
18	Wireless Communication Test Set	R&S	CMU200	HKE-026	2024/02/20	1 Year
19	Wireless Communication Test Set	R&S	CMW500	HKE-027	2024/02/20	1 Year
20	High-low temperature chamber	Guangke	HT-80L	HKE-118	2024/06/10	1 Year
21	Temperature and humidity meter	Boyang	HTC-1	HKE-075	2024/06/10	1 Year
22	RF Test Software	Tonscend	JS1120-3 Version 3.3.23	HKE-083	/	/
23	10dB Attenuator	Schwarzbeck	VTSD9561F	HKE-153	2024/02/20	1 Year
24	RSE Test Software	Tonscend	JS36-RSE 5.0.0	HKE-184	/	/

3.2 Measurement Uncertainty

For the test methods, according to the present document, the measurement uncertainty figures shall be calculated in accordance with TR 100 028-1 [2] and shall correspond to an expansion factor(coverage factor) k = 1,96 or k = 2 (which provide confidence levels of respectively 95% and 95,45% in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

Table 6 is based on such expansion factors.

Table6: Maximum measurement uncertainty

Parameter	UNCERTAINTY
Radio frequency	±0.8 × 10-7
RF power, conducted	±3.35dB
Maximum frequency deviation: -within 300Hz and 6 kHz of audio frequency	1.3%
-within 6 kHz and 25 kHz of audio frequency	0.65 dB
Adjacent channel power	0.2054
Conducted spurious emission of transmitter, valid up to 6 GHz	±2.20dB
Conducted emission of receivers	±0.37dB
Radiated emission of transmitter, valid up to 6 GHz	±3.94 dB
Radiated emission of receiver, valid up to 6 GHz	±3.94 dB
RF level uncertainty for a given BER	±0.3 dB
Temperature	±0.1°C
Humidity	±1.0%

4. Facilities and Accreditations

4.1 Facilities

All measurement facilities used to collect the measurement data are located at
☒ 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
The sites are constructed in conformance with the requirements of ANSI C63.10:2013 and CISPR Publication 22.All receiving equipment conforms to CISPR Publication16 1, "RadioInterference Measuring Apparatus and Measurement Methods."

Testing Laboratory Authorization：

A2LA Accreditation Code is 4781.01.
FCC Designation Number is CN1229.
Canada IC CAB identifier is CN0045.
CNAS Registration Number is L9589.

4.2 Equipment

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, bucolical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors 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."

4.3 Table of Accreditations and Listings

The test facilities used toper form radiated and conducted emissions tests are accredited by American Association for Laboratory Accreditation Program for the specific scope accreditation under Lab Code: 200581-0 to perform Electromagnetic Interference tests according to FCC Part 15 and CISPR 22 requirements. In addition, the test facilities are listed with USA, Certification and Engineering Bureau, 424105 for 10m chamber, 238958 for 3m chamber.

5. Setup of Equipment Under TEST

5.1 Setup Configuration of EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

5.2 Support Equipment

Item	Equipment	Trade Mark	Model/Type No.	Specification	Remark
1	Pocket	EZCast	BC-1	N/A	EUT
2	USB Cable	N/A	N/A	Length:1.2m	Accessory
3	Laptop	N/A	TP00096A	Input: DC 20V, 2.25A/3.25A	Peripheral
4	Adapter	N/A	N/A	Input: 100-240V, 50/60Hz, 0.5A Output: 5VDC, 2A	Peripheral

Remark:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

3. For conducted measurements (Output Power, 26dB Bandwidth and 99% Occupied Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.

6. FCC Part 15 Requirements

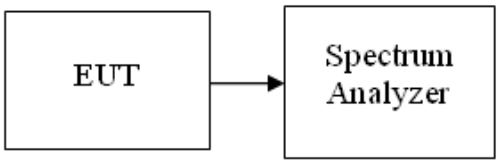
6.1 26 db Emission Bandwidth

LIMIT

According to§15.403(i),for purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Compliance with the emissions limits is based on the use of measurement instrumentation employing a peak detector function with an instrument resolutions bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

Test Configuration

TESTPROCEDURE



1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low-loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzers RBW = approximately 1% of the emission bandwidth, VBW >RBW, Detector = Peak, Span>26dB bandwidth, and Sweep = auto, Trace mode = max hold.
4. Measure the maximum width of the emission that is 26dB 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%.
5. Repeat until all the rest channels were investigated.

TESTRESULTS

No non-compliance noted

Test Data

Testmode:IEEE802.11a mode

5250~5350MHz

Channel	Frequency (MHz)	Bandwidth(B) (MHz)
Low	5260	25.80
Mid	5280	26.16
High	5320	24.76

5470~5725MHz

Channel	Frequency (MHz)	Bandwidth(B) (MHz)
Low	5500	26.76
Mid	5580	25.00
High	5700	21.88

Testmode:IEEE802.11n HT20 mode

5250~5350MHz

Channel	Frequency (MHz)	Bandwidth(B) (MHz)
Low	5260	22.64
Mid	5280	23.36
High	5320	28.84

5470~5725MHz

Channel	Frequency (MHz)	Bandwidth(B) (MHz)
Low	5500	23.20
Mid	5580	23.64
High	5700	21.40

Testmode:IEEE802.11n HT40 mode

5250~5350MHz

Channel	Frequency (MHz)	Bandwidth(B) (MHz)
Low	5270	44.00
High	5310	45.04

5470~5725MHz

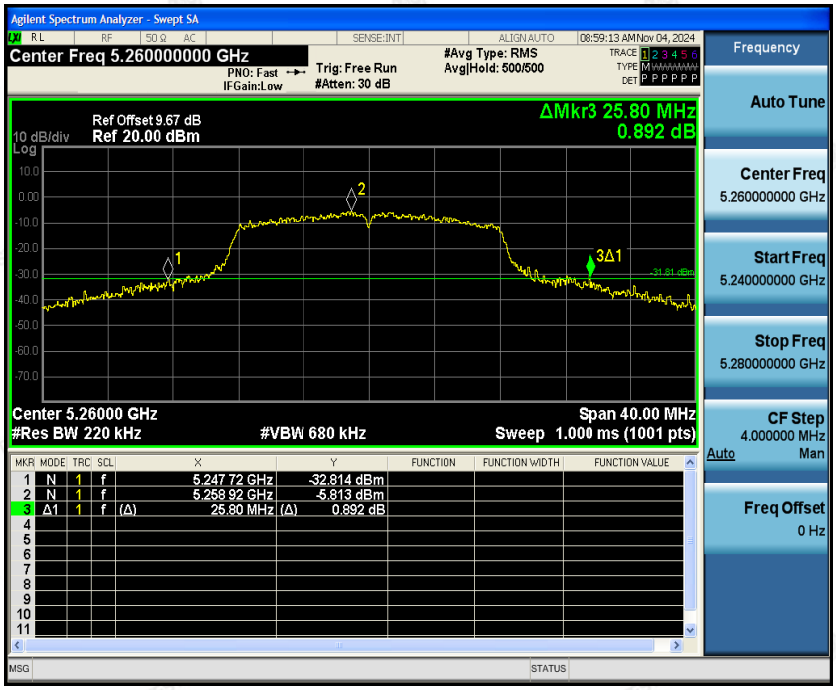
Channel	Frequency (MHz)	Bandwidth(B) (MHz)
Low	5510	38.24
Mid	5550	52.32
High	5670	42.80

Test Plot

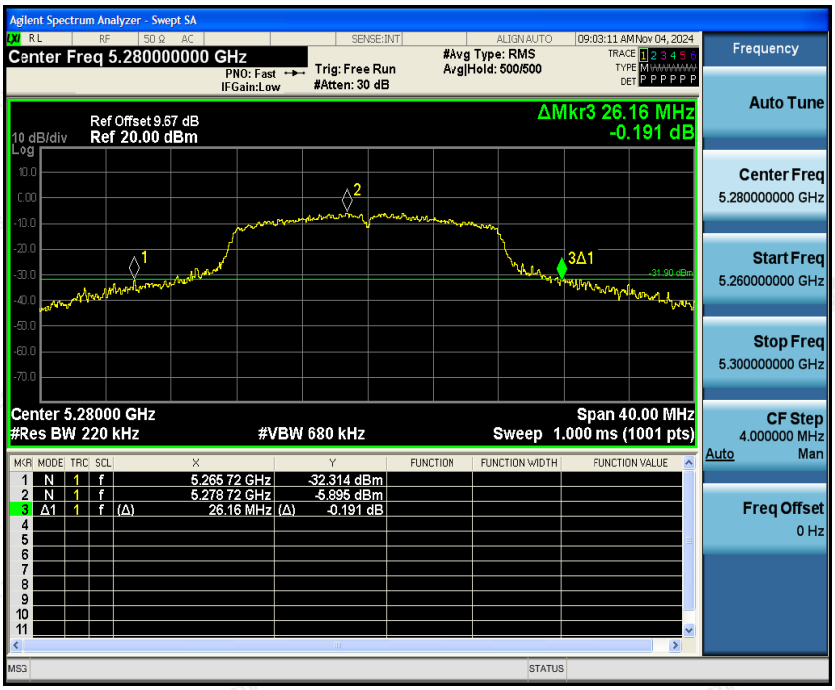
IEEE802.11a mode:

5250~5350MHz

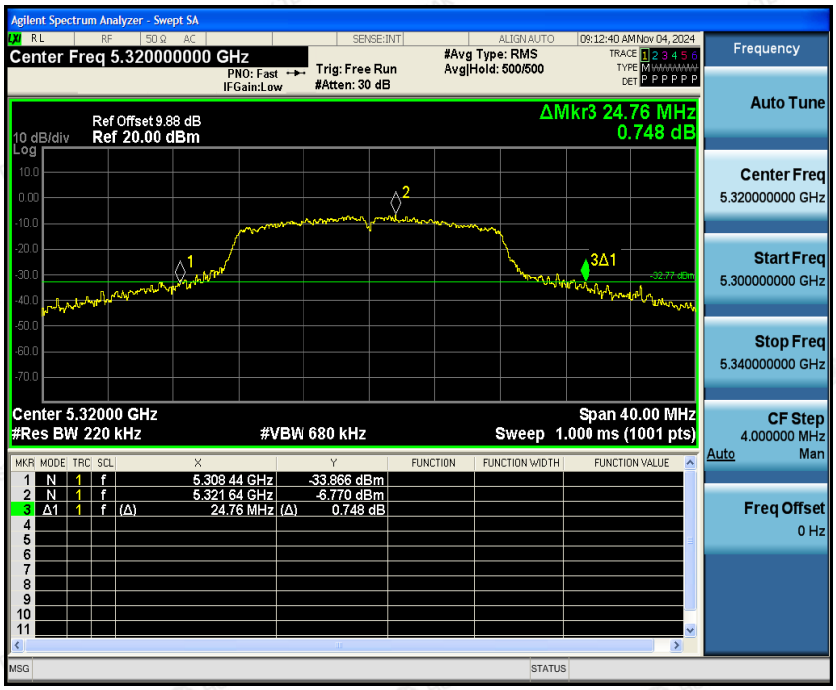
Low Channel



Mid Channel

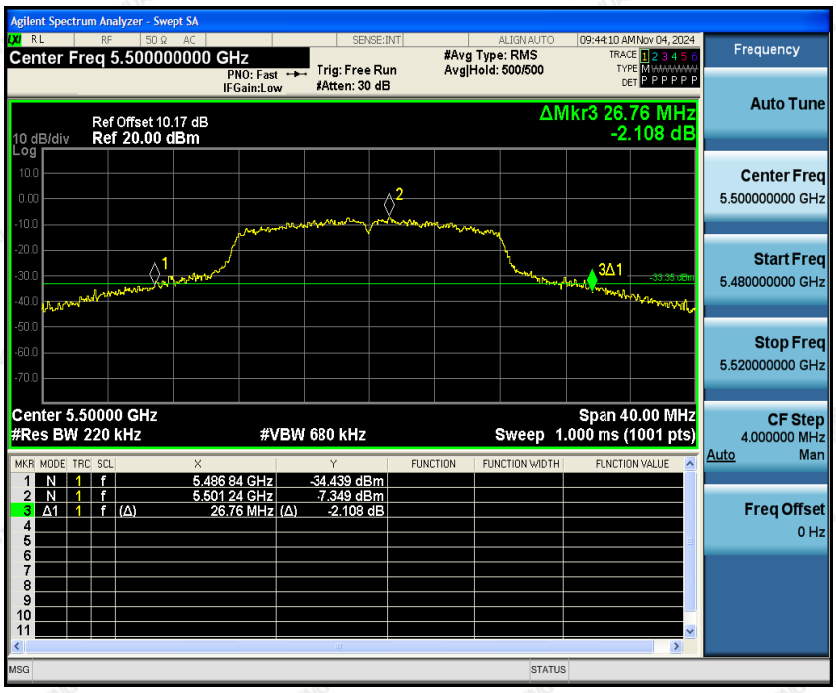


High Channel

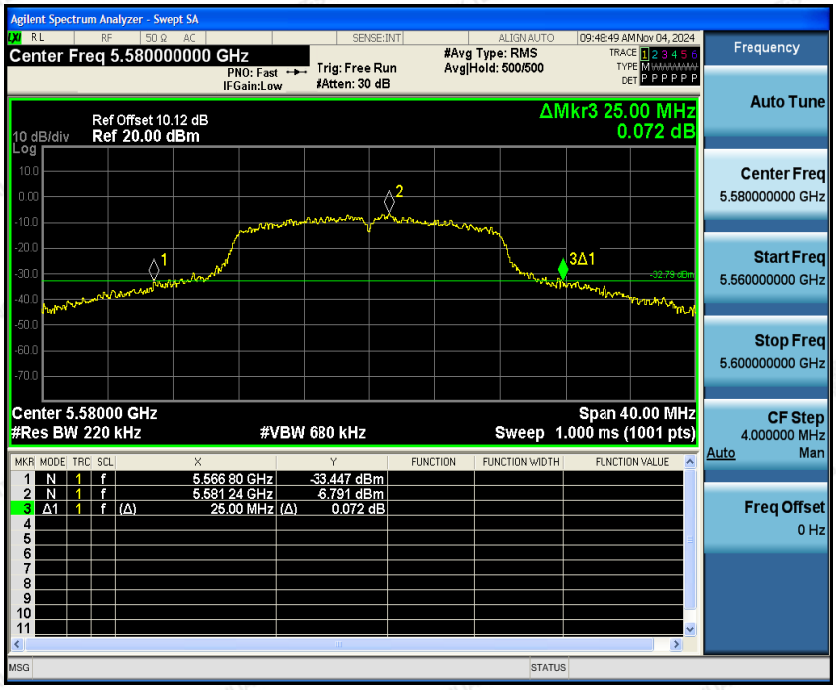


5470~5725MHz

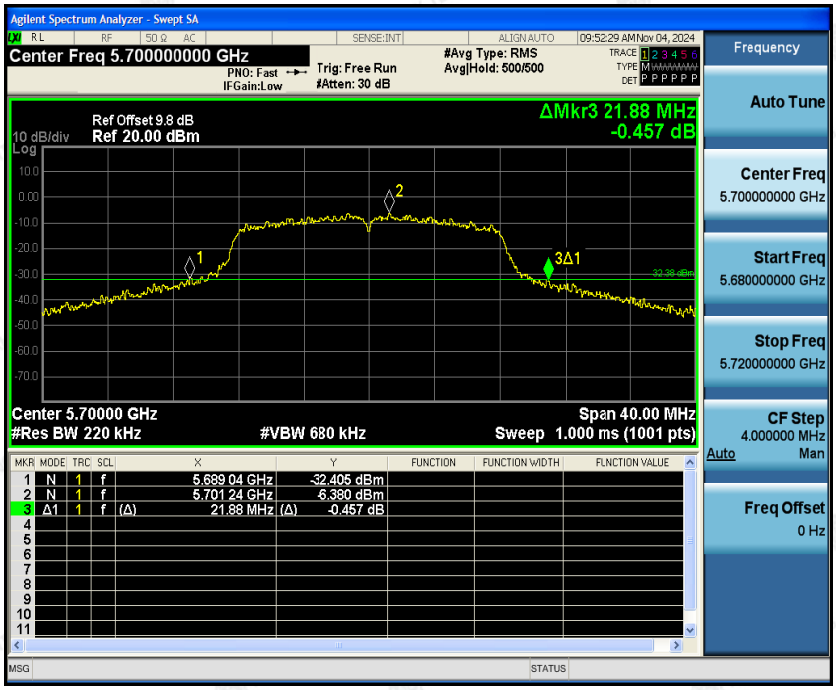
Low Channel



Mid Channel



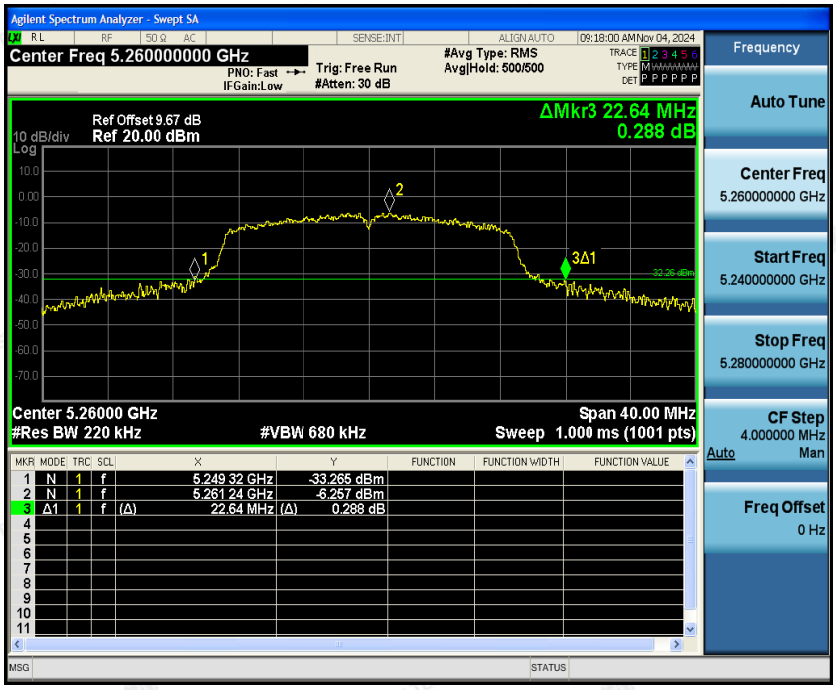
High Channel



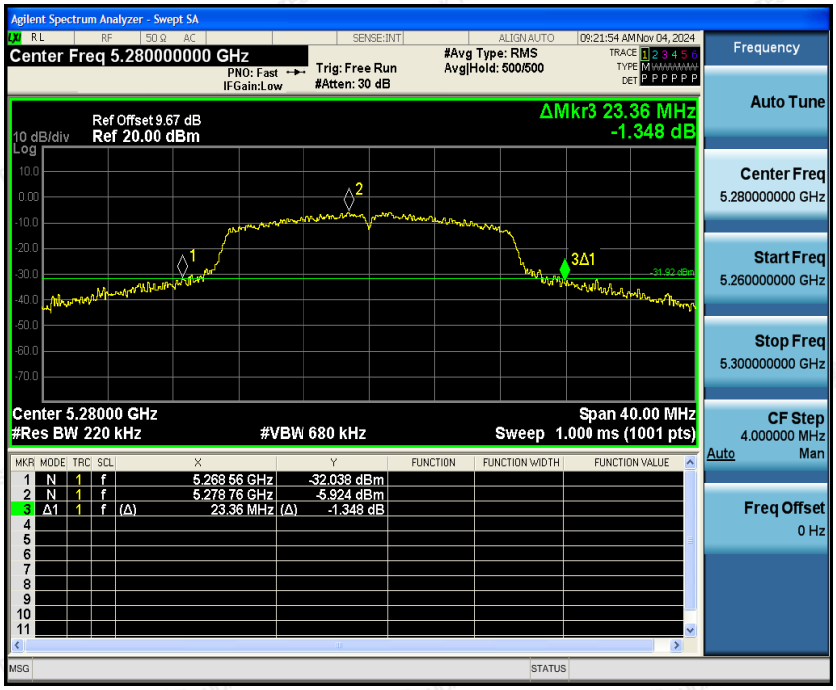
IEEE802.11n HT20 mode

5250~5350MHz

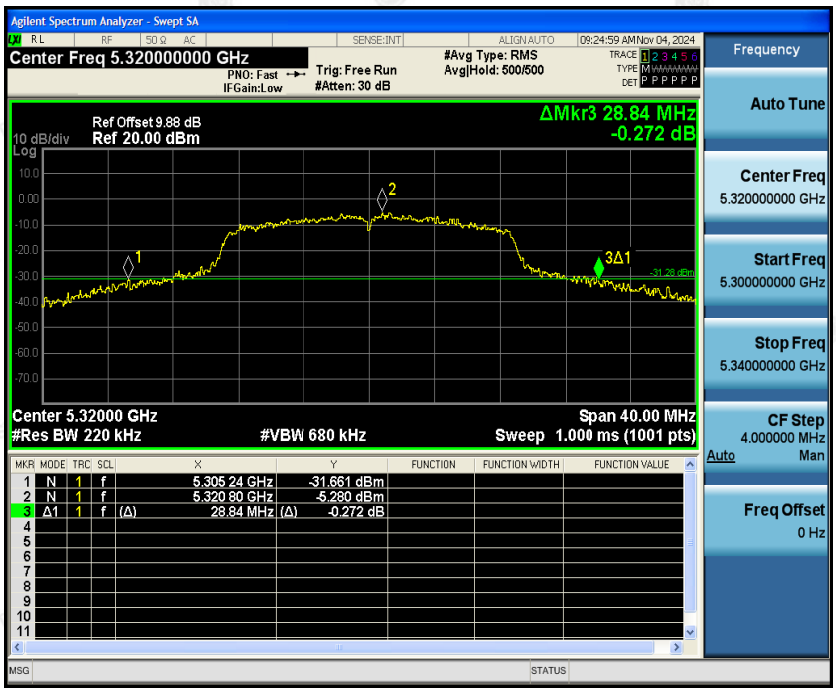
Low Channel



Mid Channel

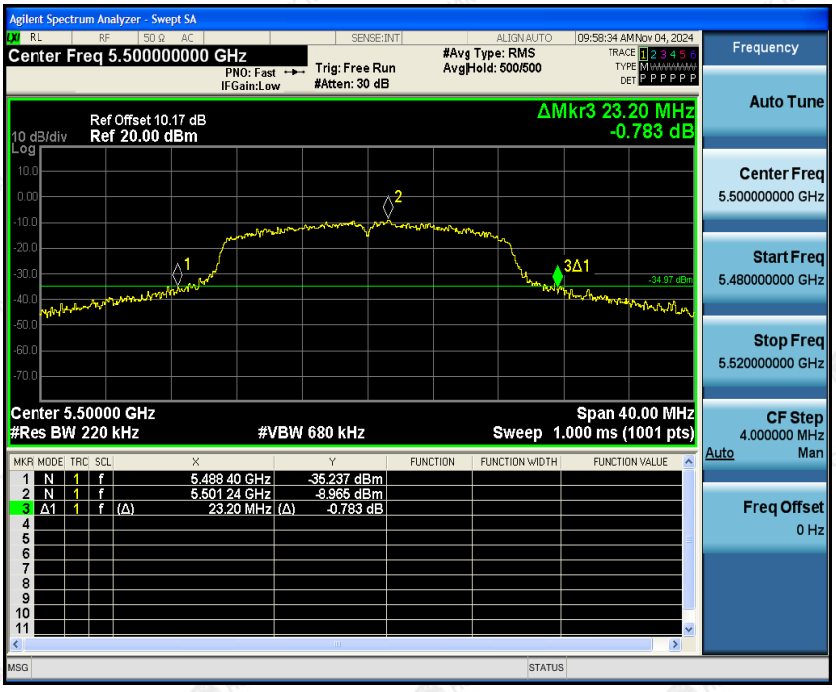


High Channel

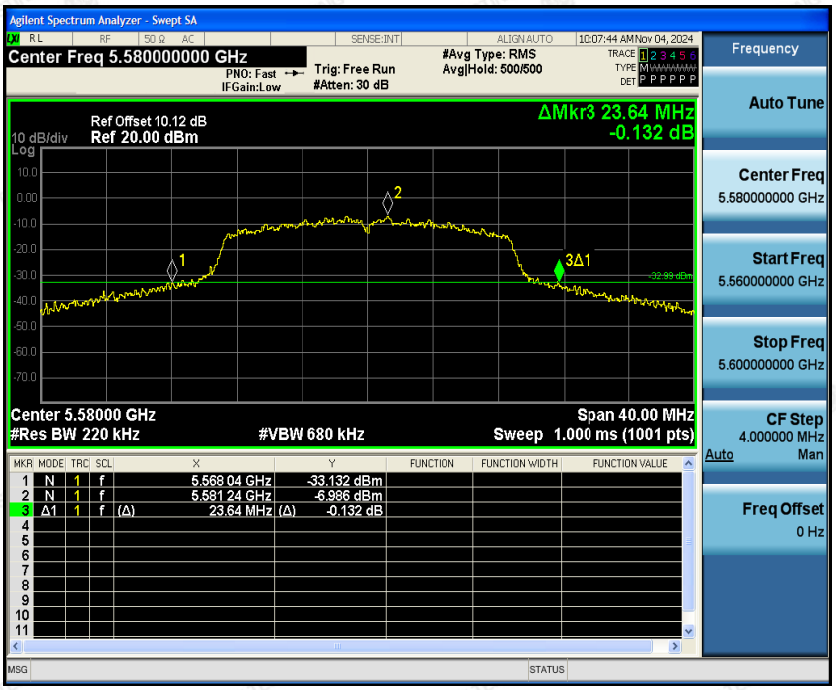


5470~5725MHz

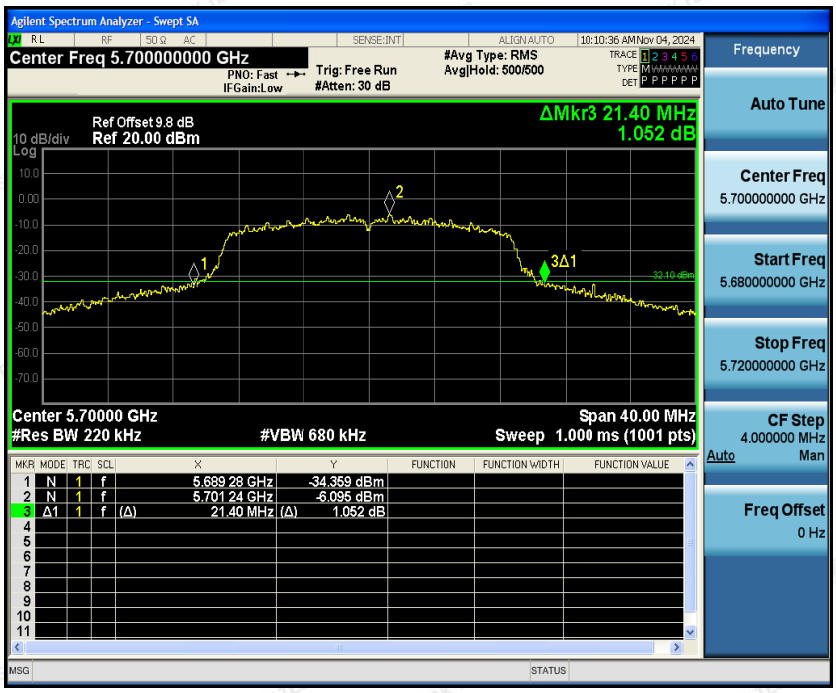
Low Channel



Mid Channel



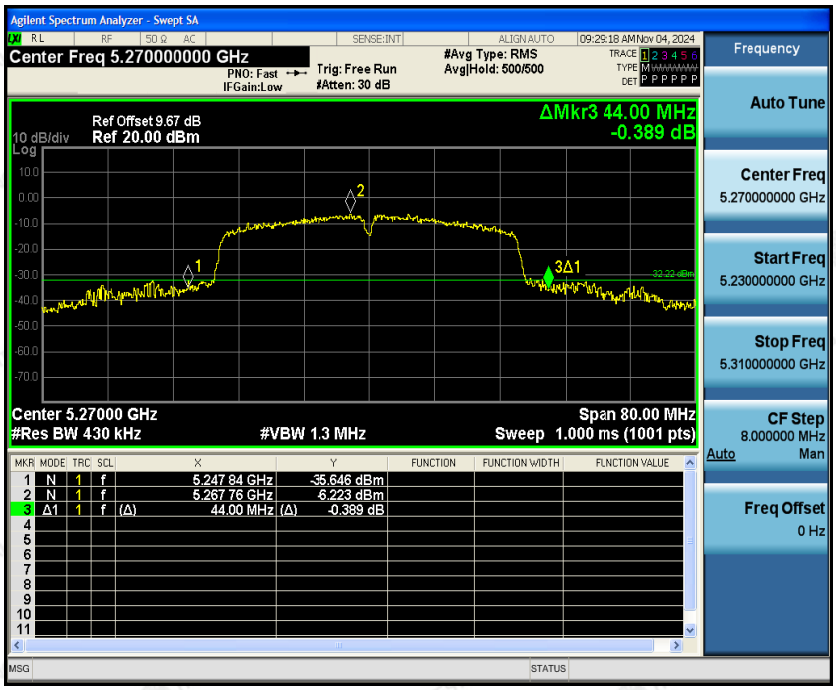
High Channel



IEEE802.11n HT40 mode

5250~5350MHz

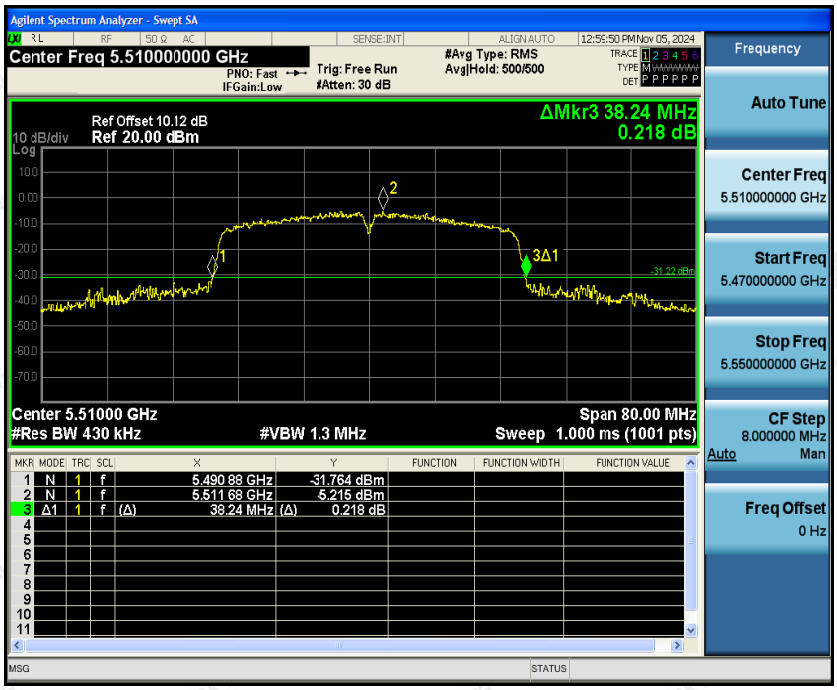
Low Channel



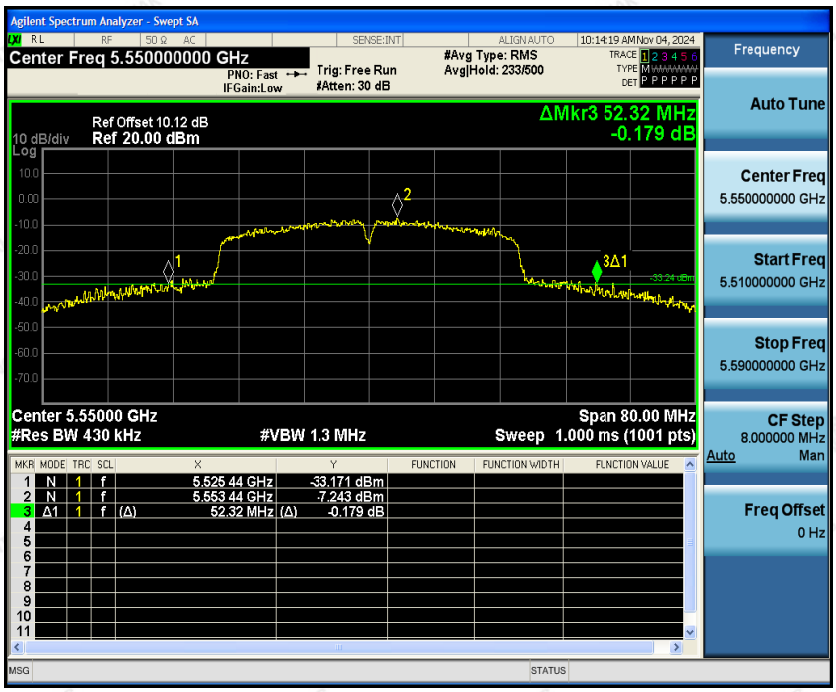
High Channel

5470~5725MHz

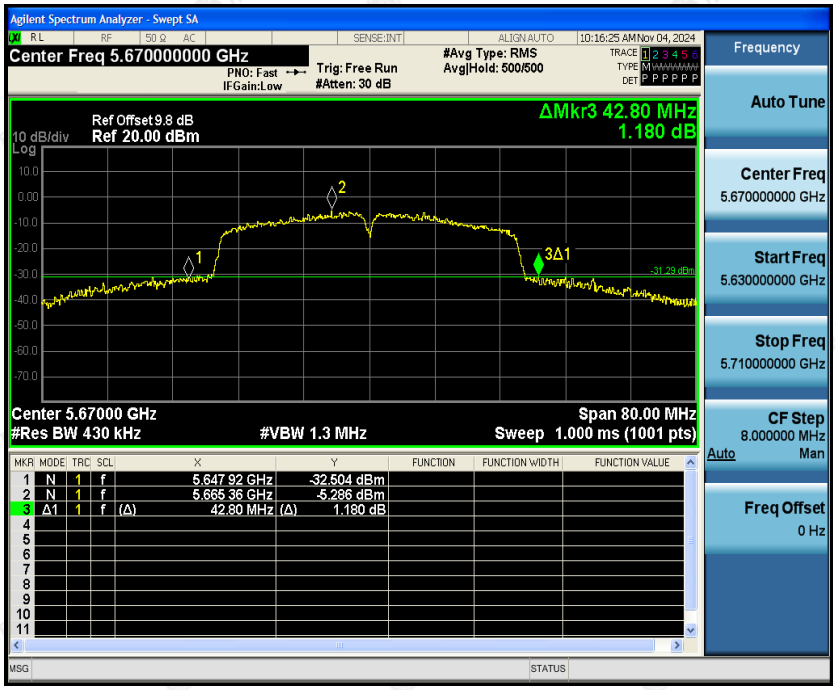
Low Channel



Mid Channel



High Channel

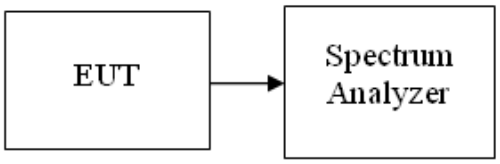


6.2 99% db Emission Bandwidth

LIMIT

None; for reporting purposes only.

Test Configuration



Test Procedure

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1%to 5 % of the OBW
4. Set VBW≥3 · RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
6. Use the 99 % power bandwidth function of the instrument (if available).

TESTRESULTS

No non-compliance noted

Test Data

Testmode:IEEE802.11a mode

5250~5350MHz

Channel	Frequency (MHz)	Bandwidth (MHz)
Low	5260	16.799
Mid	5280	16.878
High	5320	16.902

5470~5725MHz

Channel	Frequency (MHz)	Bandwidth (MHz)
Low	5500	16.796
Mid	5580	16.867
High	5700	16.686

Testmode:IEEE802.11n HT20 mode

5250~5350MHz

Channel	Frequency (MHz)	Bandwidth (MHz)
Low	5260	17.693
Mid	5280	17.736
High	5320	17.784

5470~5725MHz

Channel	Frequency (MHz)	Bandwidth (MHz)
Low	5500	17.800
Mid	5580	17.795
High	5700	17.718

Testmode:IEEE802.11n HT40 mode

5250~5350MHz

Channel	Frequency (MHz)	Bandwidth (MHz)
Low	5270	35.520
High	5310	35.586

5470~5725MHz

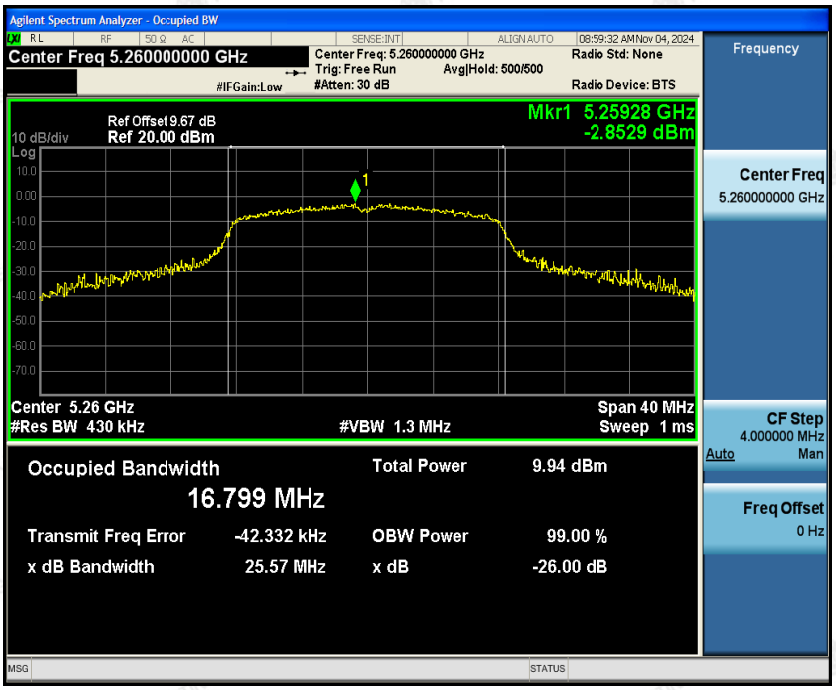
Channel	Frequency (MHz)	Bandwidth (MHz)
Low	5510	35.365
Mid	5550	35.927
High	5670	35.597

Test Plot

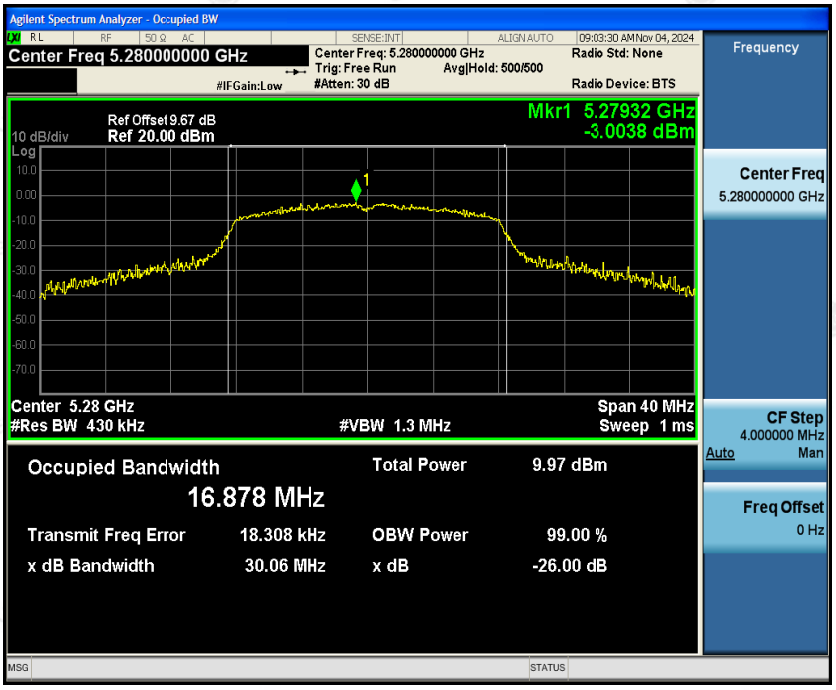
IEEE802.11a mode:

5250~5350MHz

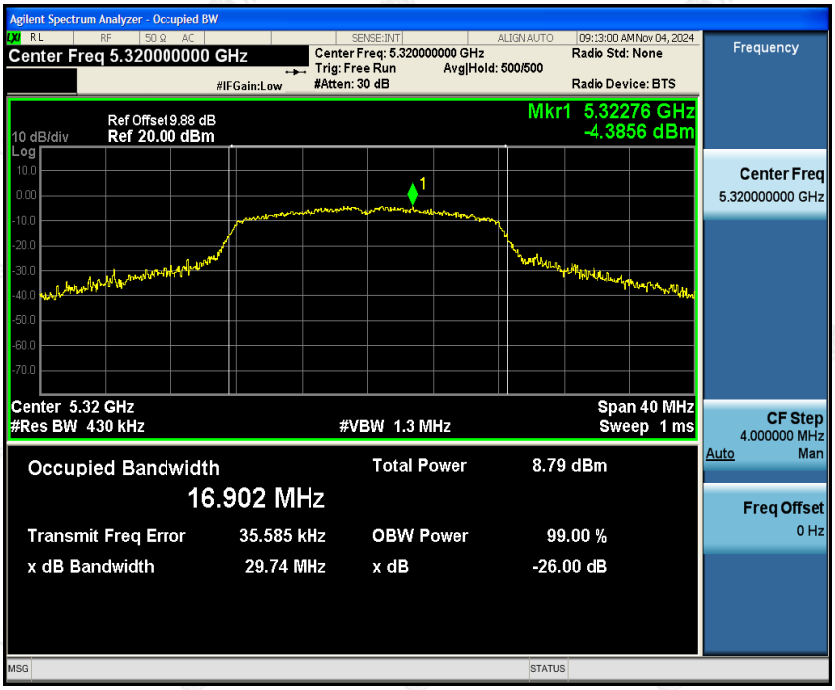
Low Channel



Mid Channel



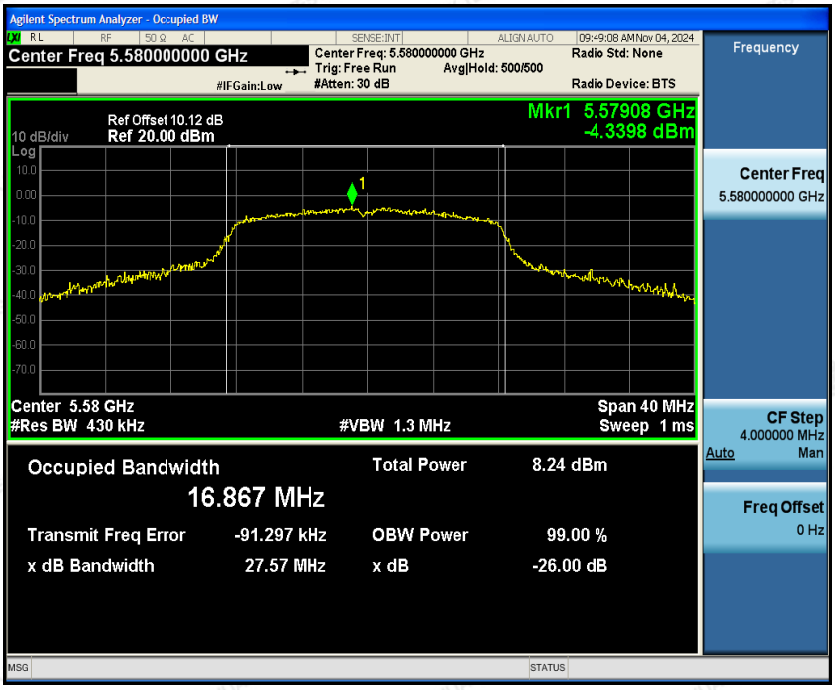
High Channel



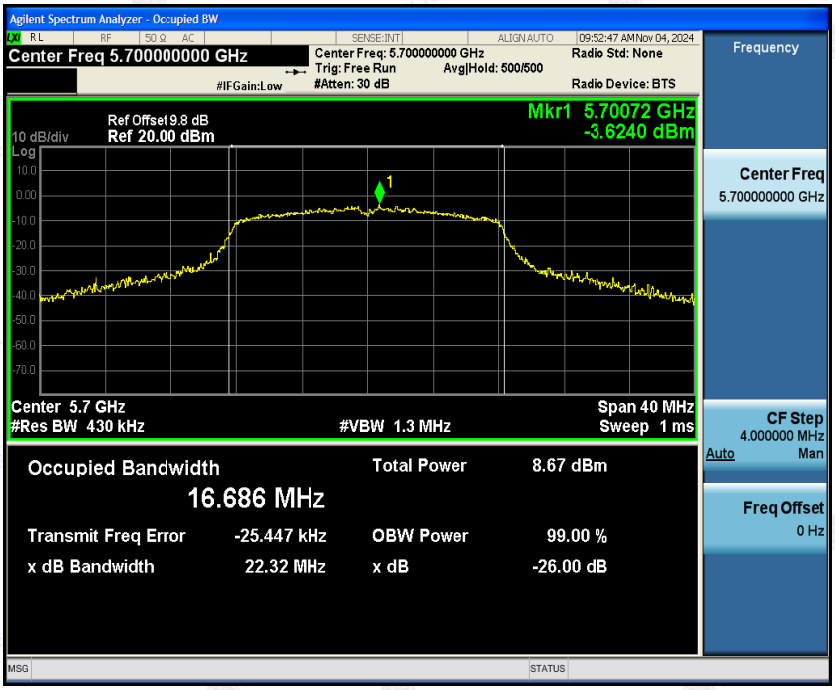
5470~5725MHz

Low Channel

Mid Channel



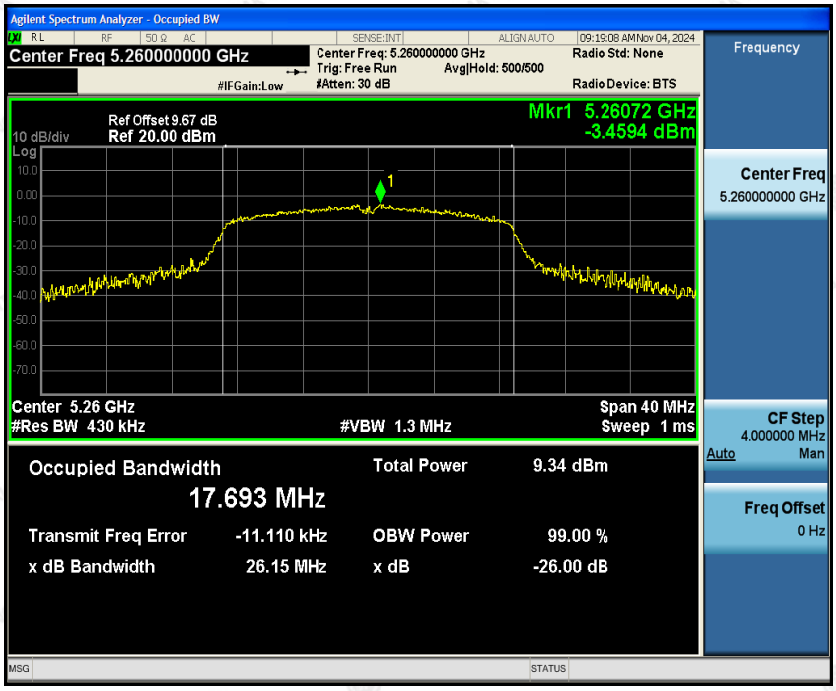
High Channel



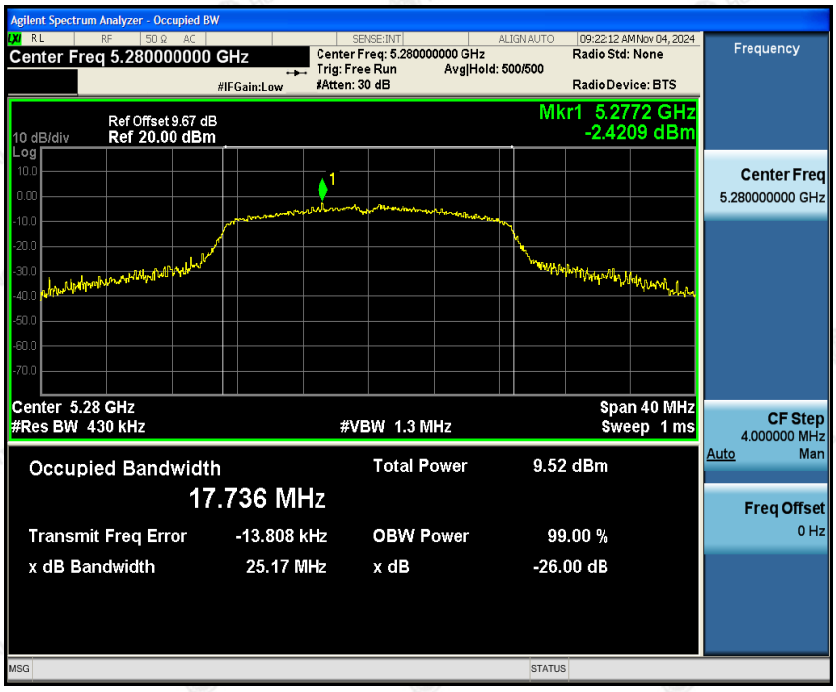
IEEE802.11n HT20 mode

5250~5350MHz

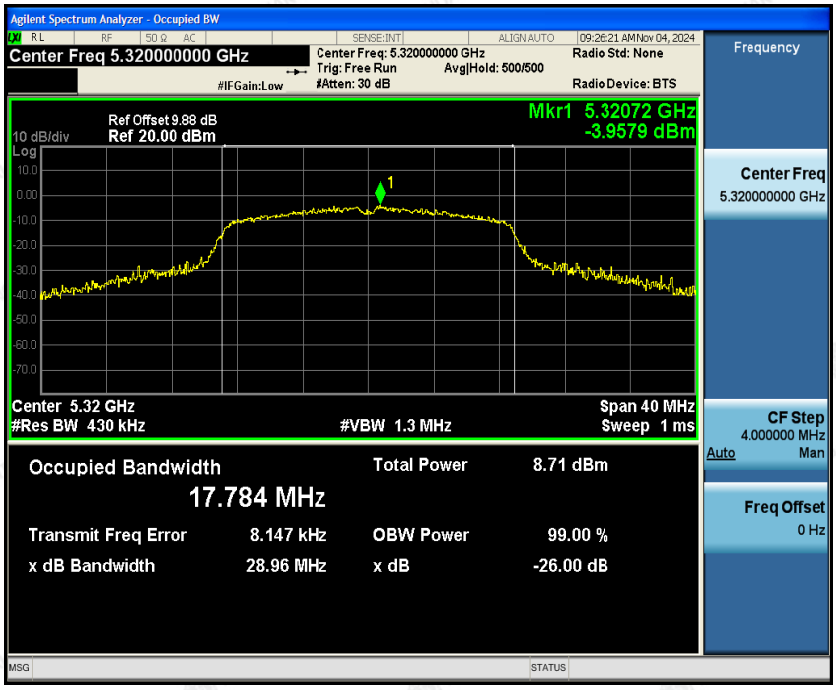
Low Channel



Mid Channel



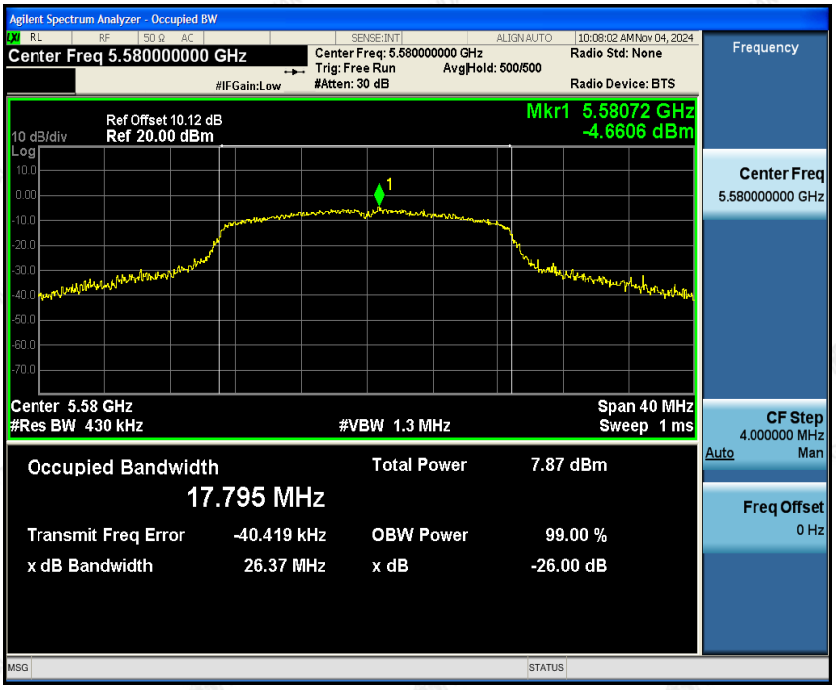
High Channel



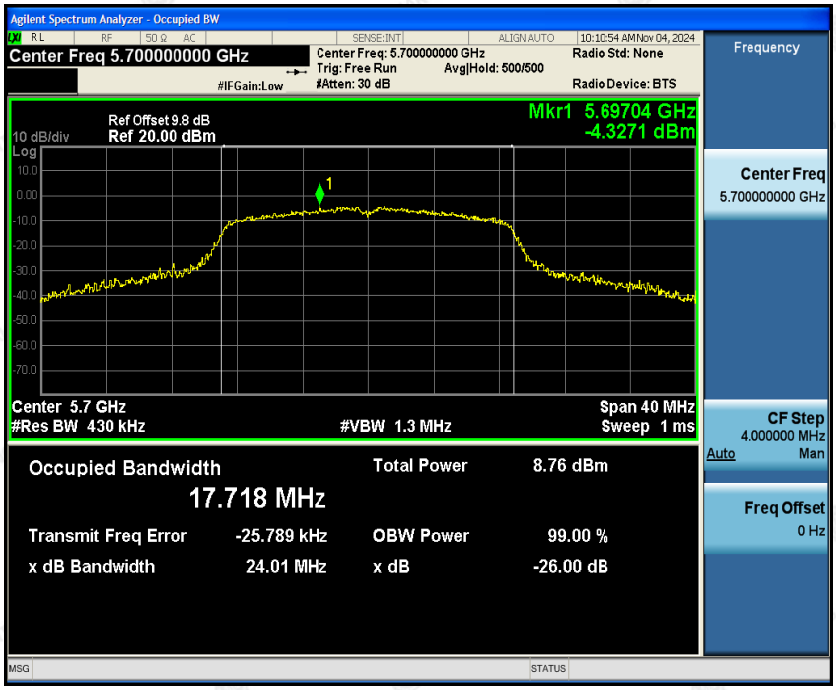
5470~5725MHz

Low Channel

Mid Channel



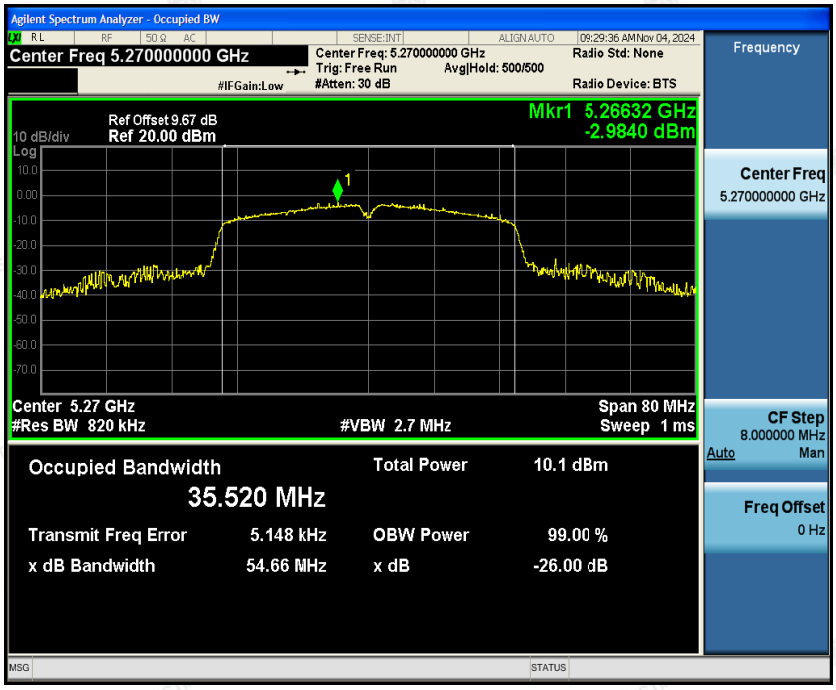
High Channel



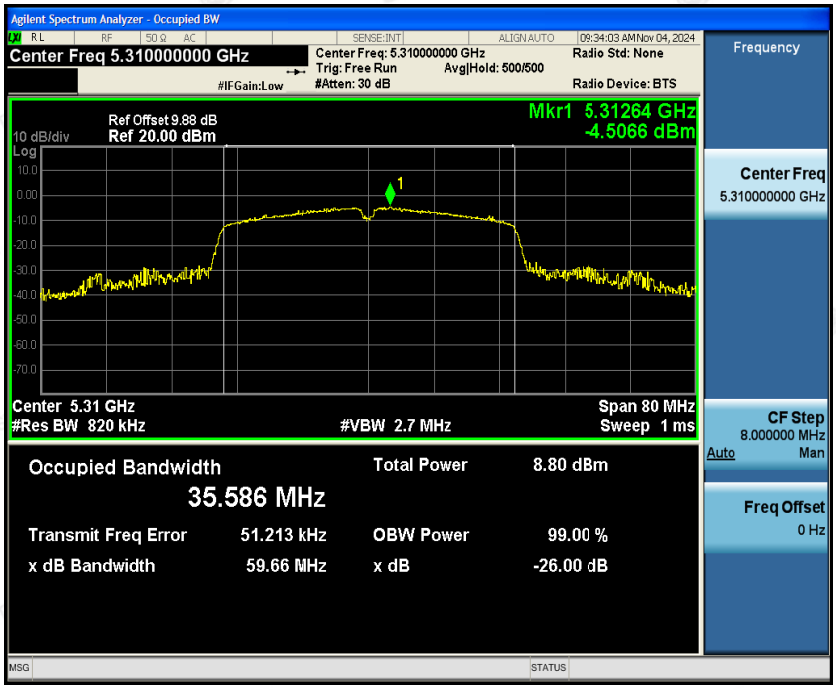
IEEE802.11n HT40 mode

5250~5350MHz

Low Channel

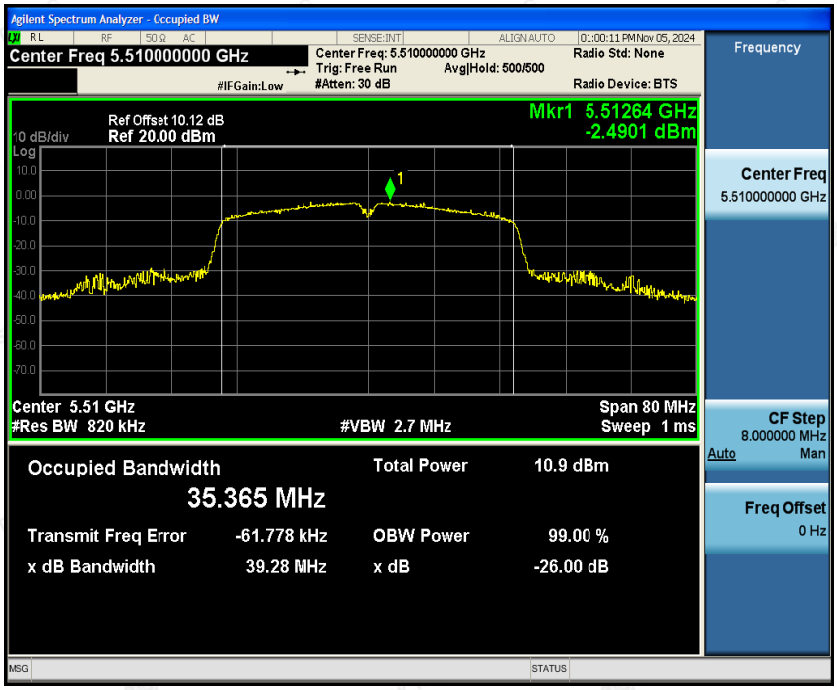


High Channel

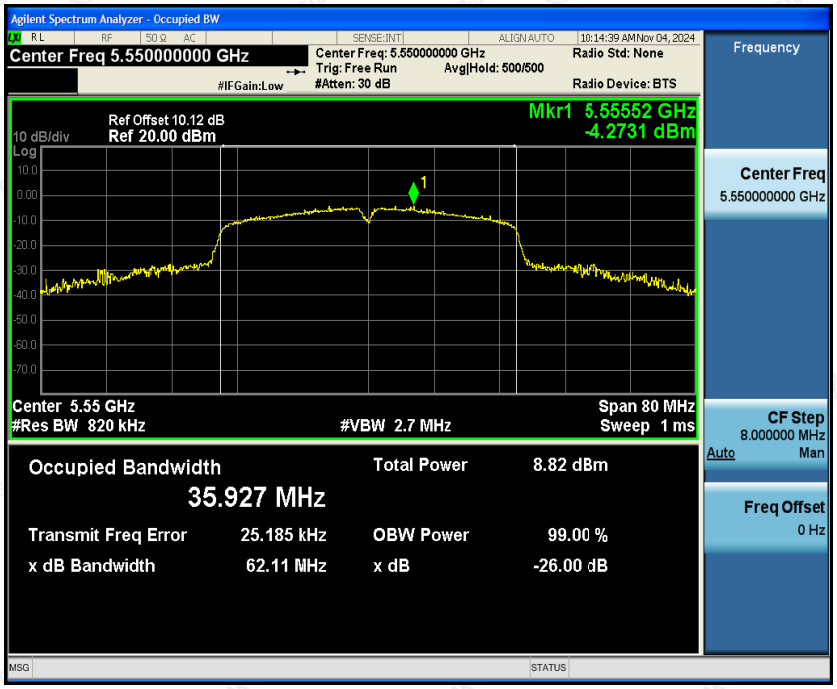


5470~5725MHz

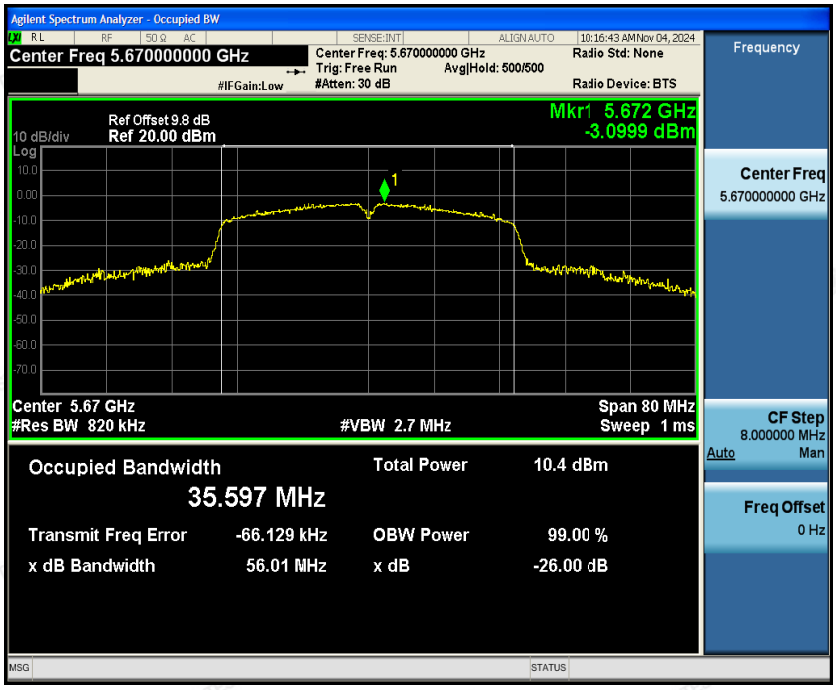
Low Channel



Mid Channel



High Channel



6.3 Maximum Conducted Output Power

LIMIT

According to §15.407(a),

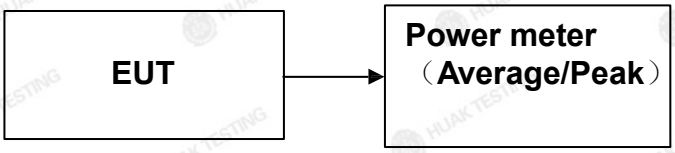
(iv) For the 5.25-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250mW or 11dBm+10 log B, where B is the 26 dB emission bandwidth in megahertz.

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

Note that U-NII-2 band, devices with a maximum e.i.r.p. greater than 500mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W

The peak power shall not exceed the limit as follow:

Test Configuration



The EUT was connected to a spectrum analyzer through a 50Ω RF cable.

TES TPROCEDURE

The testing follows Method PM of FCCKDB789033 D02General UNII Test Procedures New Rules v02r01.

Method PM (Measurement using an RF peak power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.

TEST RESULTS

No non-compliance noted

TEST RESULTS

No non-compliance noted

Test Data

Testmode:IEEE802.11a mode

5250~5350MHz

Channel	Frequency (MHz)	Peak Output Power (dBm)	Limit(dBm)
Low	5260	8.01	24
Mid	5280	6.19	24
High	5320	5.16	24

5470~5725MHz

Channel	Frequency (MHz)	Peak Output Power (dBm)	Limit(dBm)
Low	5500	6.27	24
Mid	5580	5.30	24
High	5700	5.42	24

Testmode:IEEE802.11n HT20 mode

5250~5350MHz

Channel	Frequency(MHz)	Peak Output Power (dBm)	Limit(dBm)
Low	5260	6.59	24
Mid	5280	5.06	24
High	5320	6.28	24

5470~5725MHz

Channel	Frequency (MHz)	Peak Output Power (dBm)	Limit(dBm)
Low	5500	5.71	24
Mid	5580	6.26	24
High	5700	6.11	24

Testmode:IEEE802.11n HT40 mode

5250~5350MHz

Channel	Frequency (MHz)	Peak Output Power (dBm)	Limit(dBm)
Low	5270	6.77	24
Mid	5310	5.47	24

5470~5725MHz

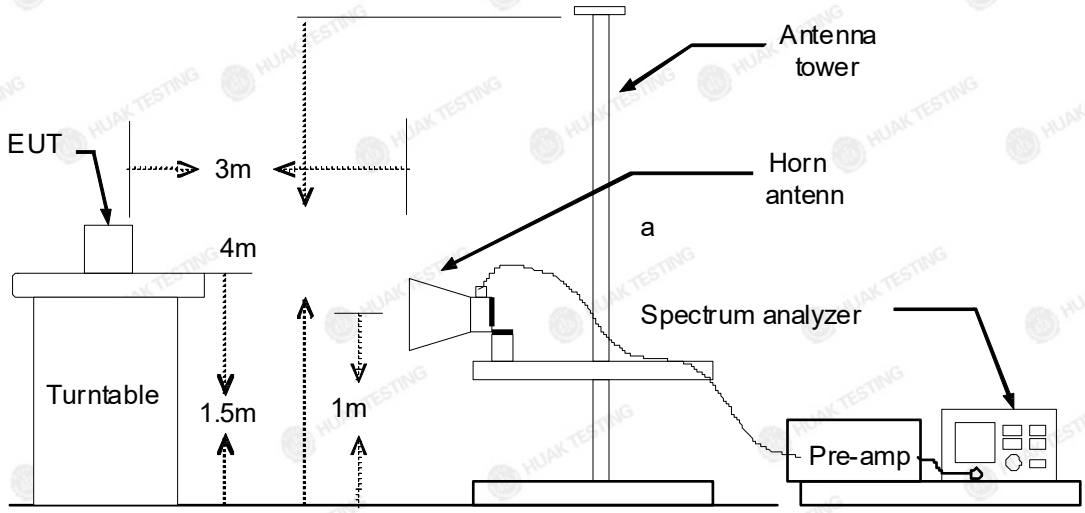
Channel	Frequency (MHz)	Peak Output Power (dBm)	Limit(dBm)
Low	5510	6.10	24
Mid	5550	6.10	24
High	5670	5.26	24

6.4 Band Edges Measurement

LIMIT

According to §15.407(b),
(1) The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.
(2) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency block edges as the design of the equipment permits.

Test Configuration



TESTPROCEDURE

1. The EUT is placed on a turntable, which is 1.5m above the ground plane.
2. The turntable shall be rotated for 360degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
   (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
   (b) AVERAGE: RBW=1MHz / Sweep=AUTO

   VBW=10Hz, when duty cycle is no less than 98 percent.

   VBW≧1/T, when duty cycle is less than98 percent, where is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

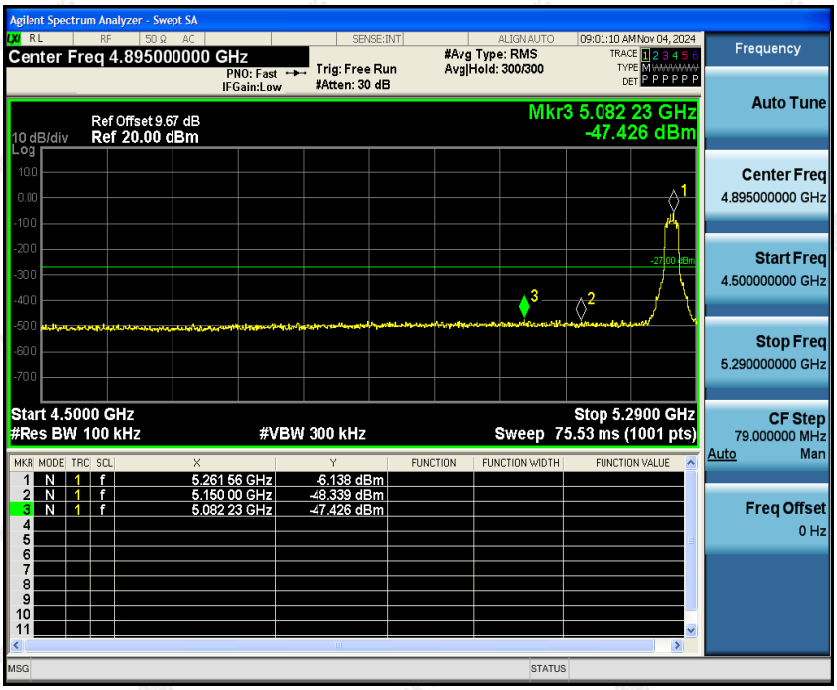
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
IEEE 802.11 a	100	-	-	10Hz
IEEE 802.11n HT20	100	-	-	10Hz
IEEE 802.11n HT40	100	-	-	10Hz

TESTRESULTS

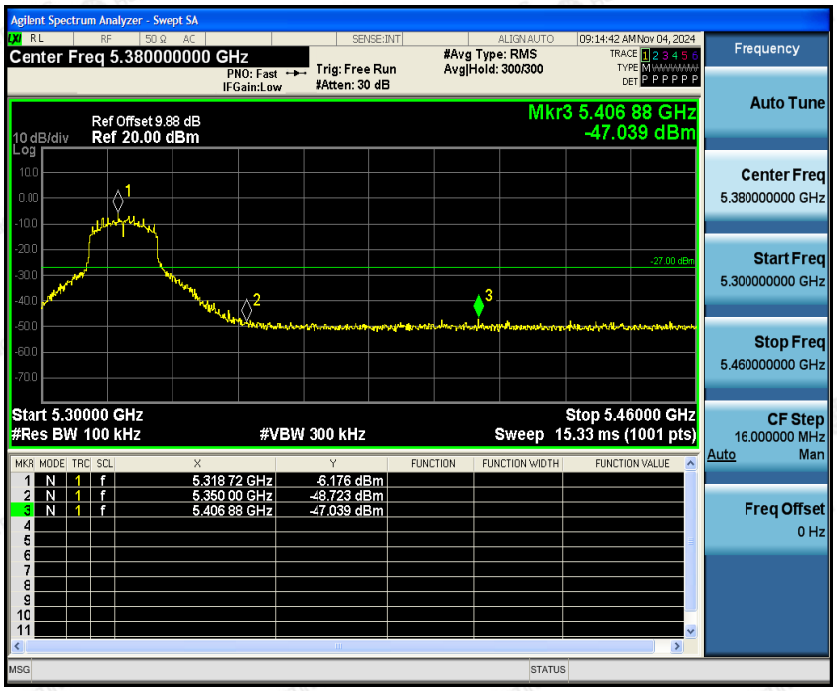
Refer to attach spectrum analyzer data chart.

Band Edges(IEEE802.11a mode)

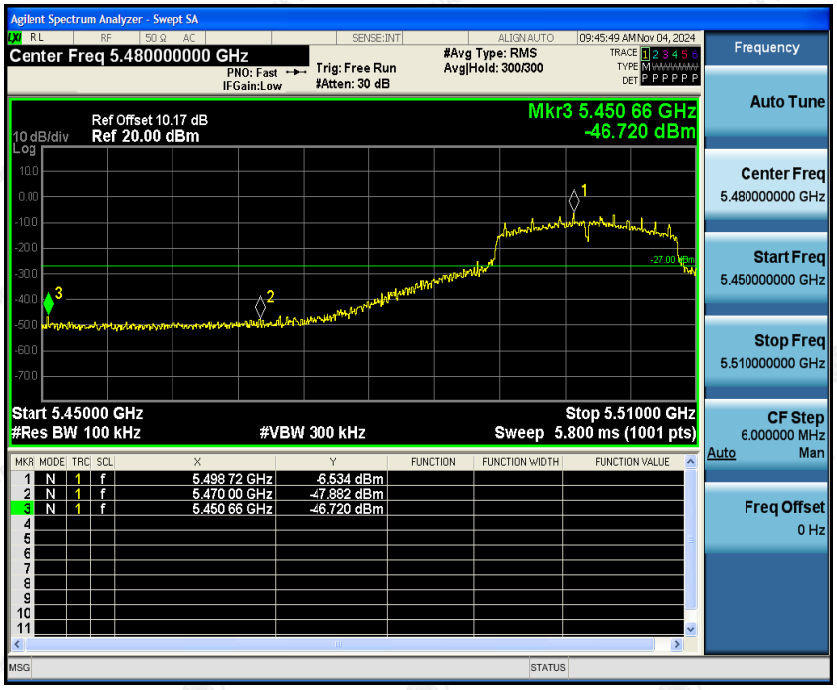
5260MHz



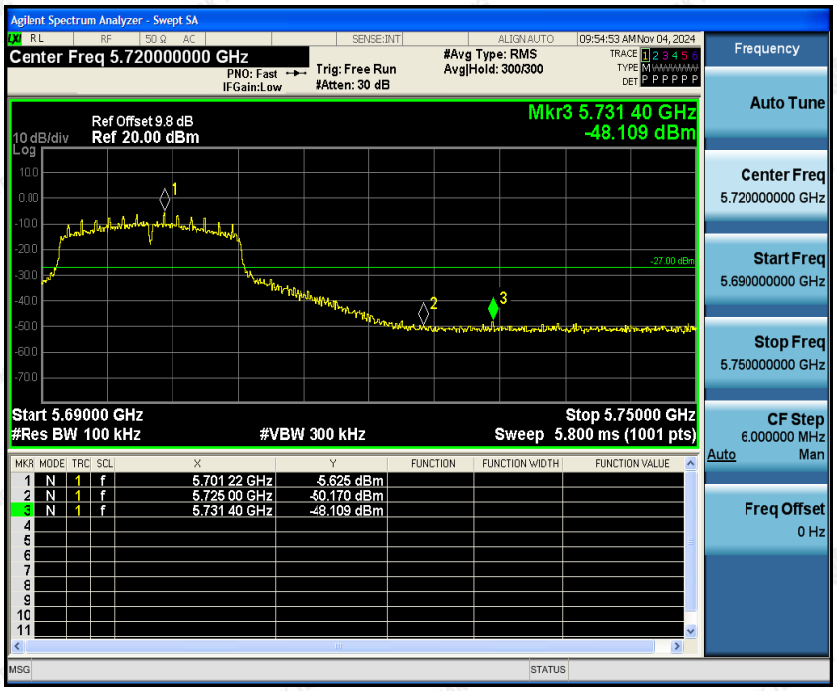
5320MHz



5500MHz

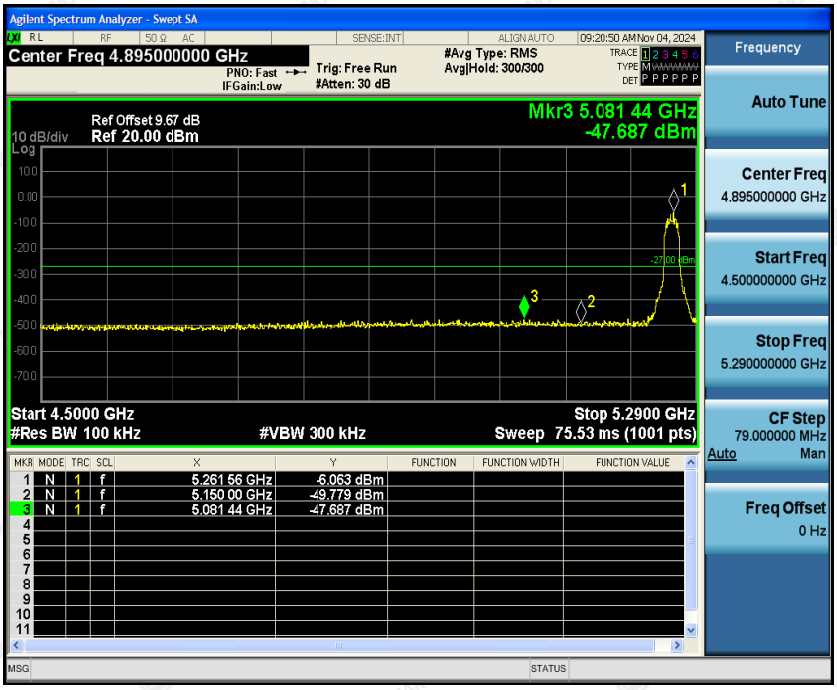


5700MHz

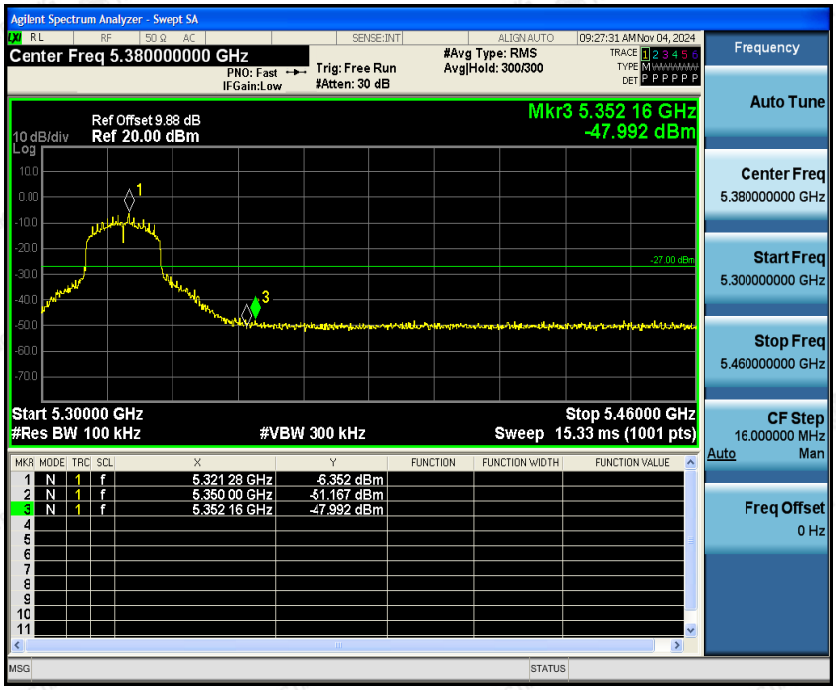


Band Edges(IEEE802.11n HT20 mode)

5260MHz

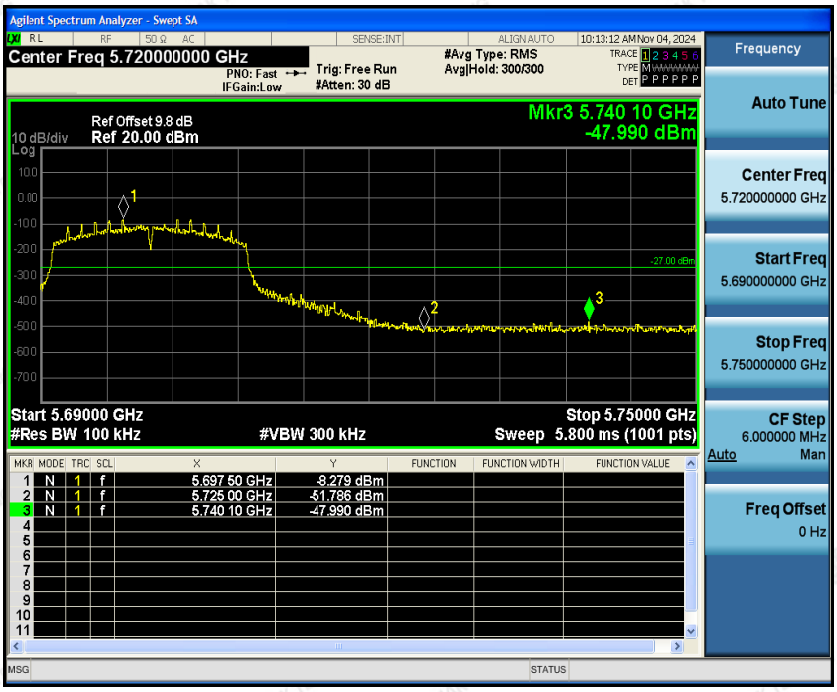


5320MHz



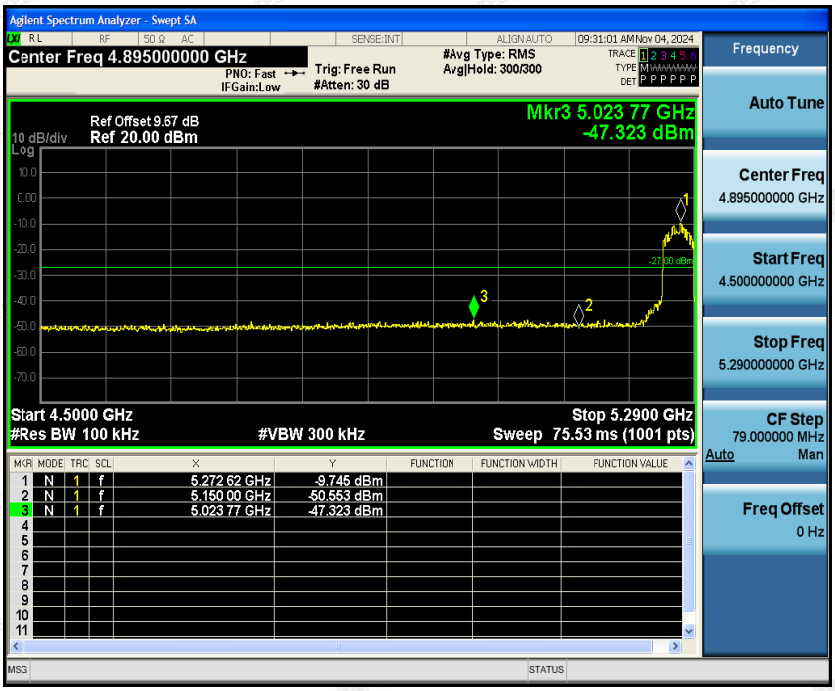
5500MHz

5700MHz



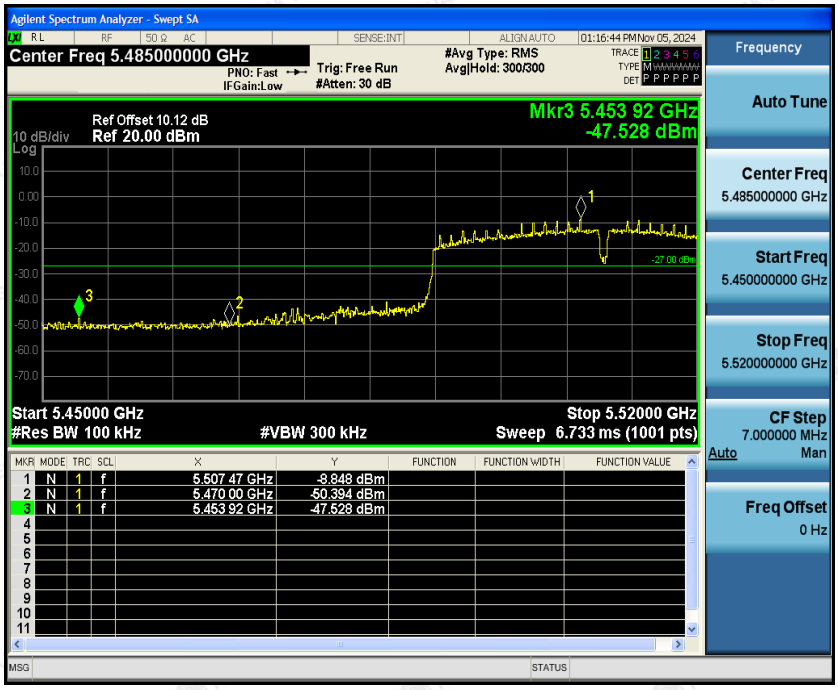
Band Edges(IEEE802.11n HT40 mode)

5270MHz

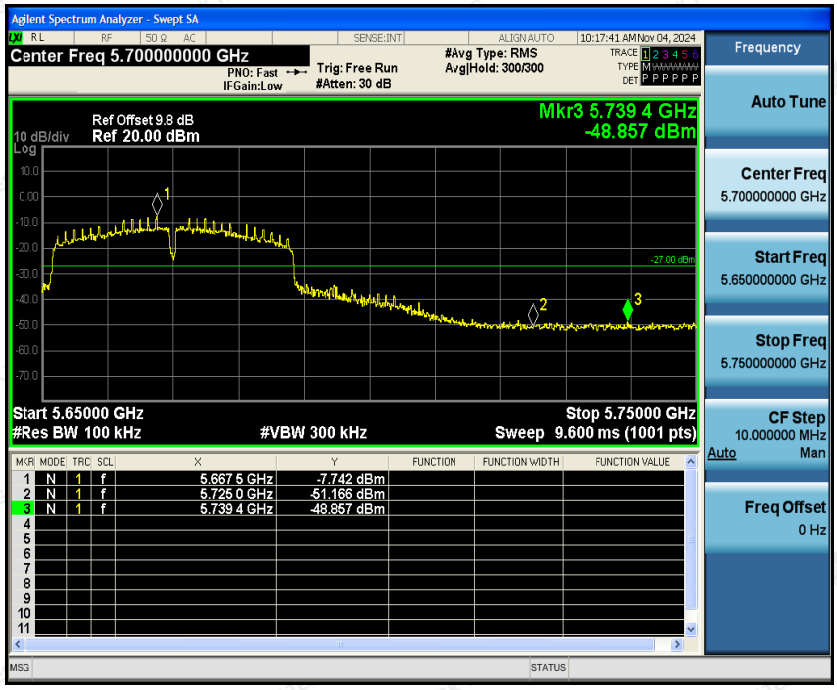


5310MHz

5510MHz



5670MHz



6.5 Maximum Power Spectral Density

LIMIT

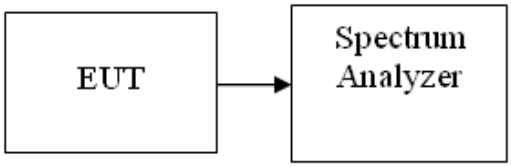
Accordingto§15.407(a),

For mobile and portable client devices in the 5.5-5.25 GHz band, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band.

For the 5.25-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any I megahertz band

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

Test Configuration



TESTPROCEDURE

7. Place the EUT on the table and set it in transmitting mode.
   Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
8. Set the spectrum analyzer as RBW = 1MHz, VBW = 3MHz, Span must be greater than 26dB bandwidth, adjust as necessary, Sweep= auto, Detector RMS
9. Record the max. reading.

TESTRESULTS

No non-compliance noted

Test Data

Testmode:IEEE802.11a mode

5250~5350MHz

Channel	Frequency (MHz)	PPSD (dBm)	Limit(dBm)	Result
Low	5260	-5.58	11	PASS
Mid	5280	-6.30	11	PASS
High	5320	-5.49	11	PASS

5470~5725MHz

Channel	Frequency (MHz)	PPSD (dBm)	Limit(dBm)	Result
Low	5500	-6.45	11	PASS
Mid	5580	-6.40	11	PASS
High	5700	-5.94	11	PASS

Testmode:IEEE802.11n HT20 mode

5250~5350MHz

Channel	Frequency (MHz)	PPSD (dBm)	Limit(dBm)	Result
Low	5260	-6.32	11	PASS
Mid	5280	-6.61	11	PASS
High	5320	-6.53	11	PASS

5470~5725MHz

Channel	Frequency (MHz)	PPSD (dBm)	Limit(dBm)	Result
Low	5500	-6.05	11	PASS
Mid	5580	-6.57	11	PASS
High	5700	-7.88	11	PASS

Testmode:IEEE802.11n HT40 mode

5250~5350MHz

Channel	Frequency (MHz)	PPSD (dBm)	Limit(dBm)	Result
Low	5270	-9.74	11	PASS
High	5310	-8.98	11	PASS

5470~5725MHz

Channel	Frequency (MHz)	PPSD (dBm)	Limit(dBm)	Result
Low	5510	-8.58	11	PASS
Mid	5550	-8.39	11	PASS
High	5670	-7.07	11	PASS

Note:

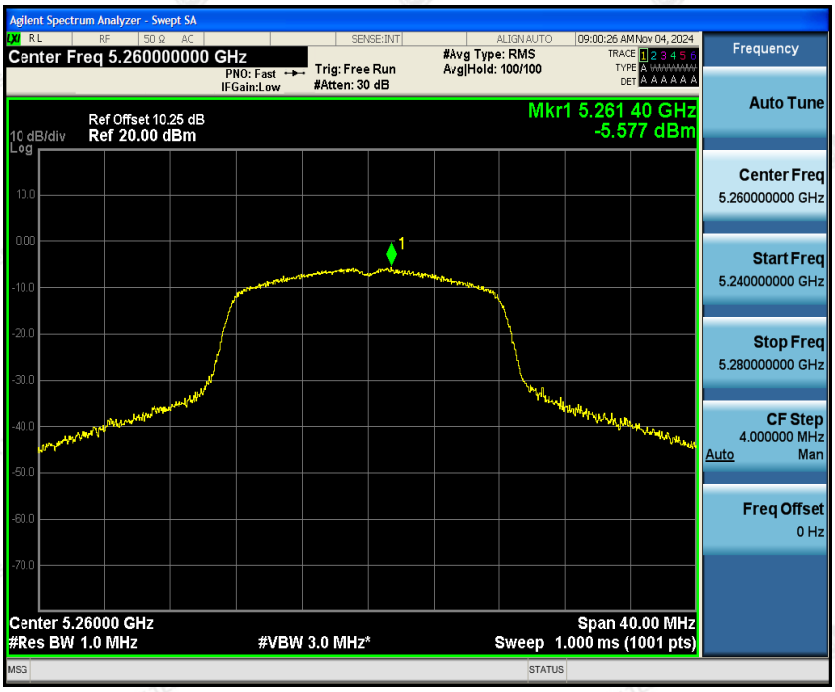
1.Duty factor has been off seted with cable loss

Test Plot

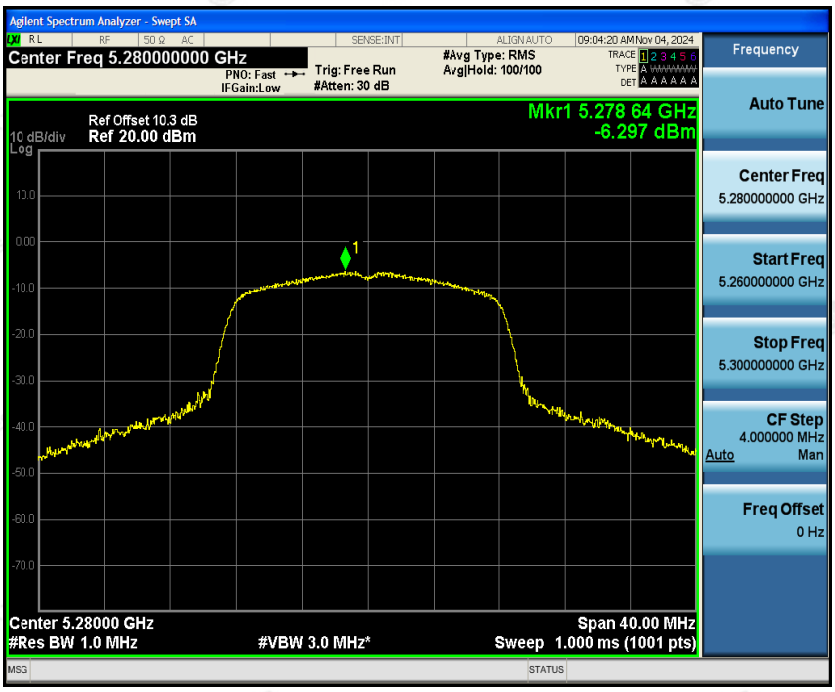
IEEE802.11a mode:

5250~5350MHz

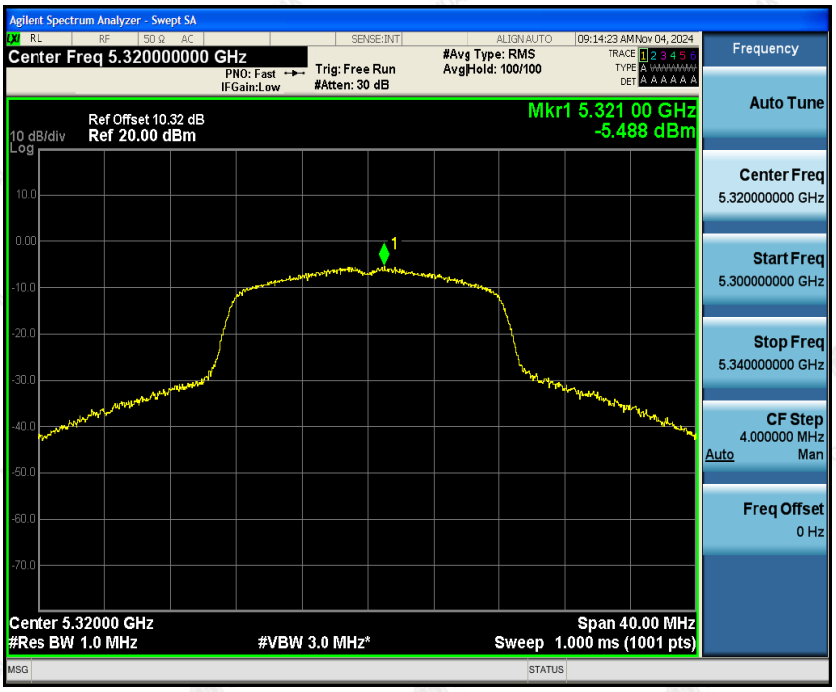
Low Channel



Mid Channel

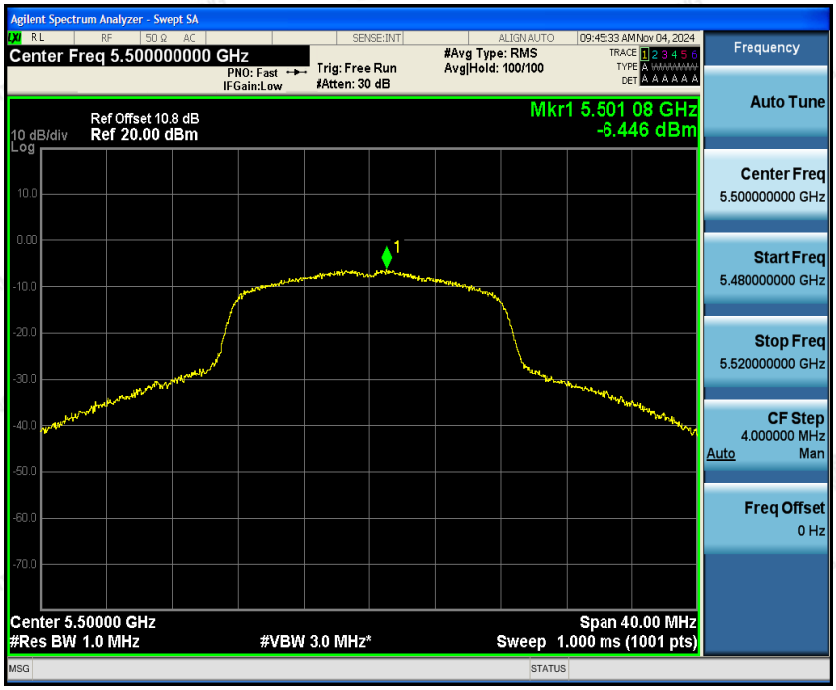


High Channel

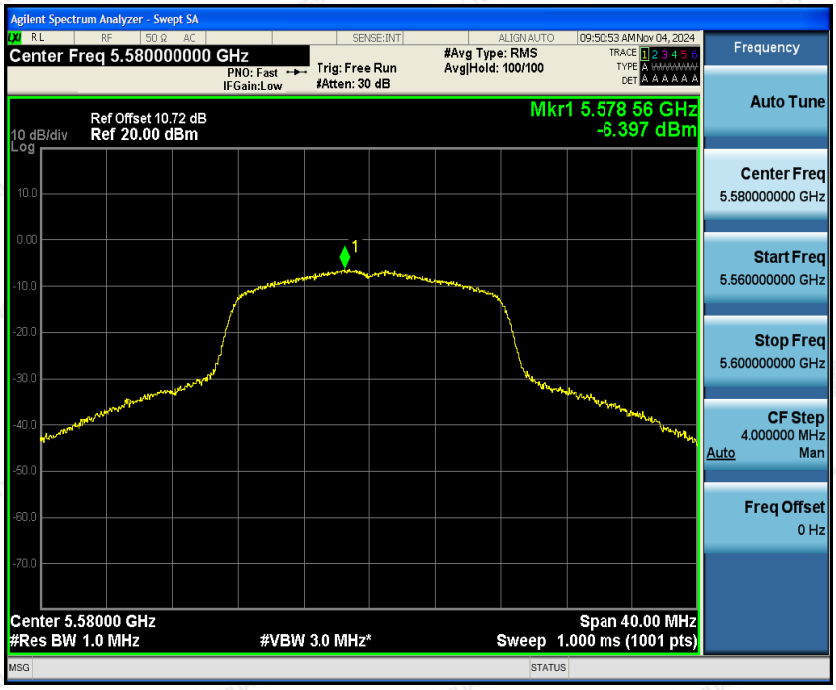


5470~5725MHz

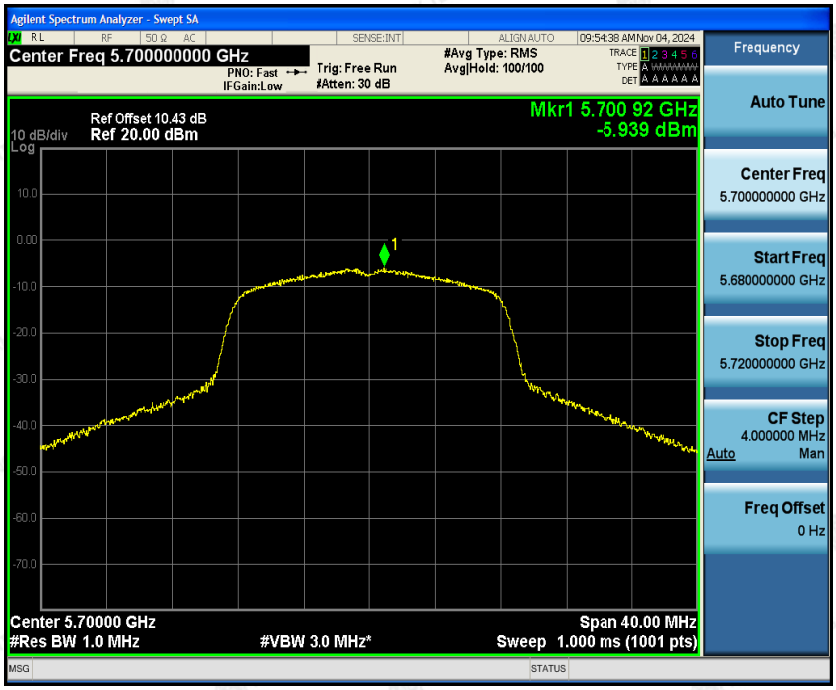
Low Channel



Mid Channel



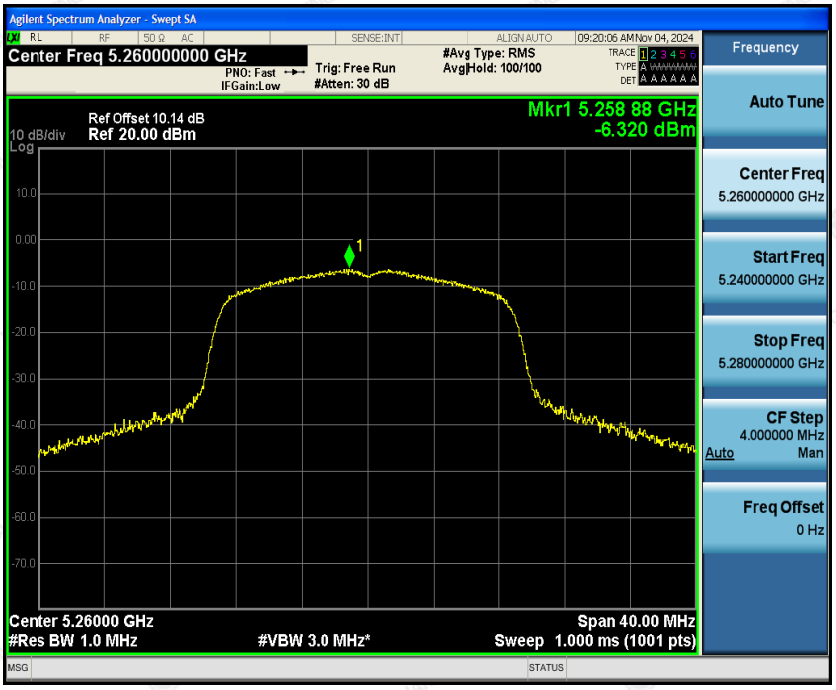
High Channel



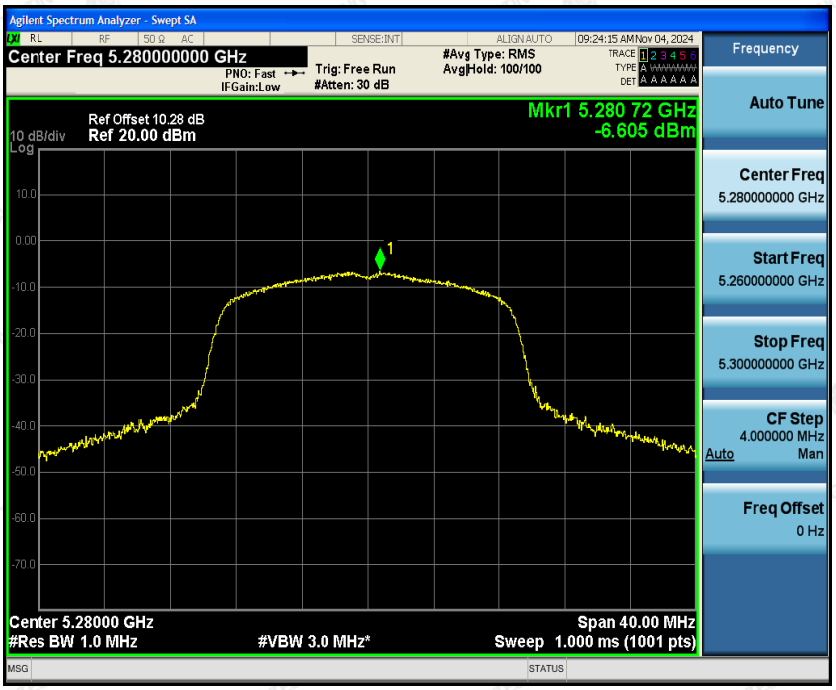
IEEE802.11n HT20 mode

5250~5350MHz

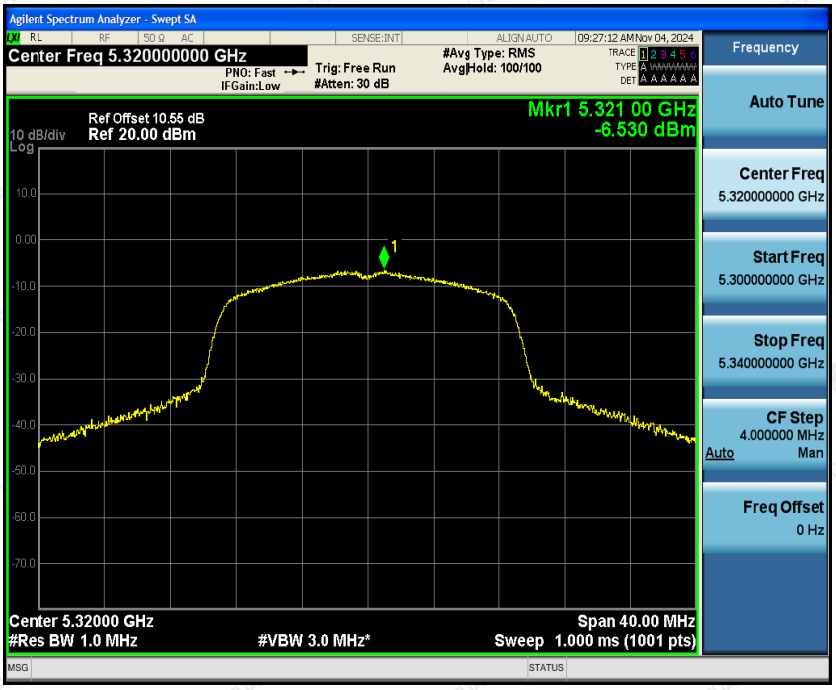
Low Channel



Mid Channel

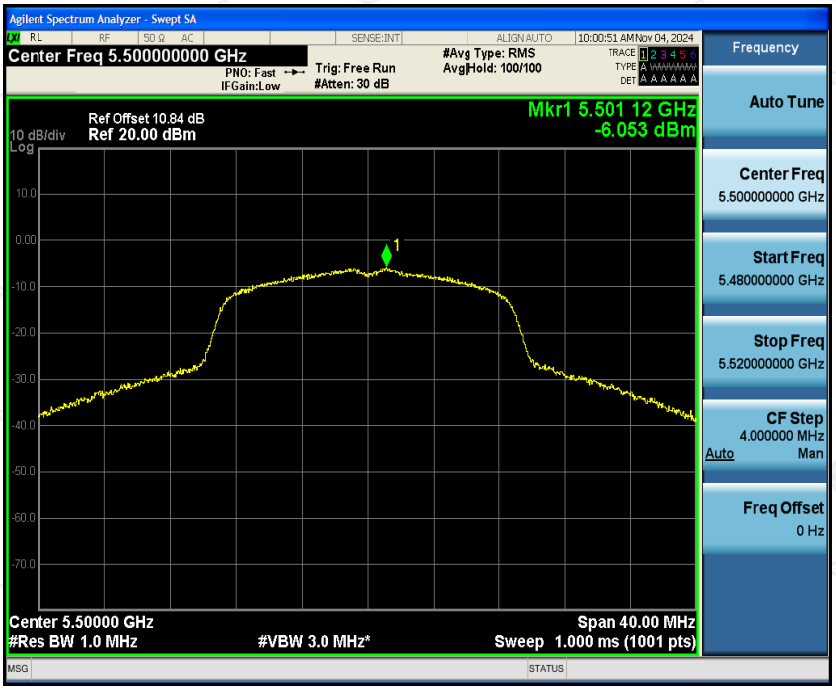


High Channel

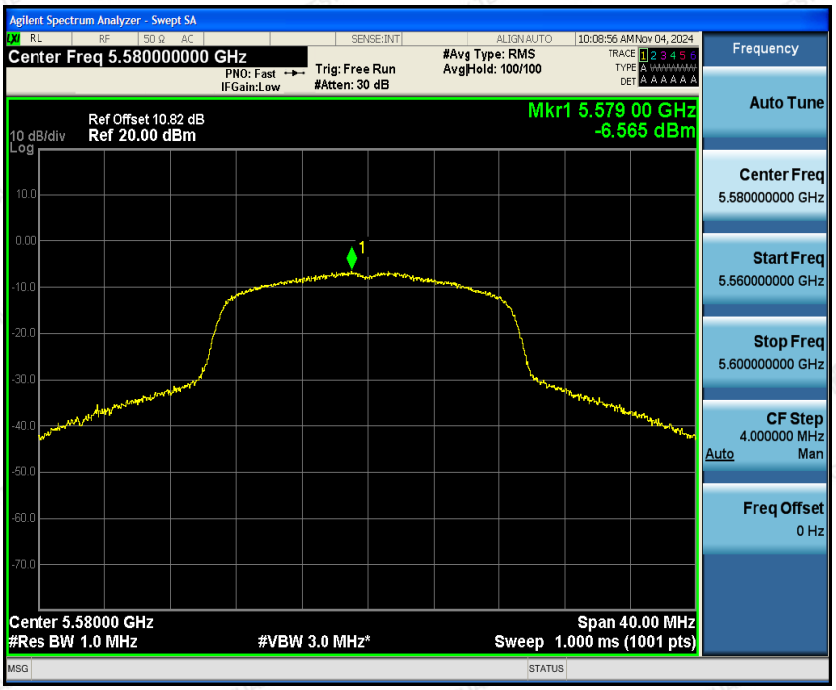


5470~5725MHz

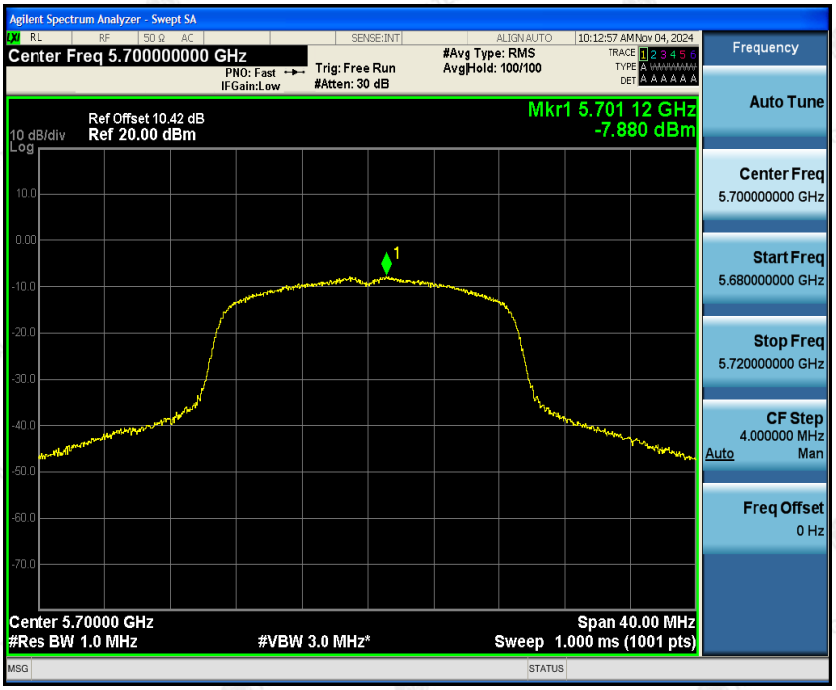
Low Channel



Mid Channel



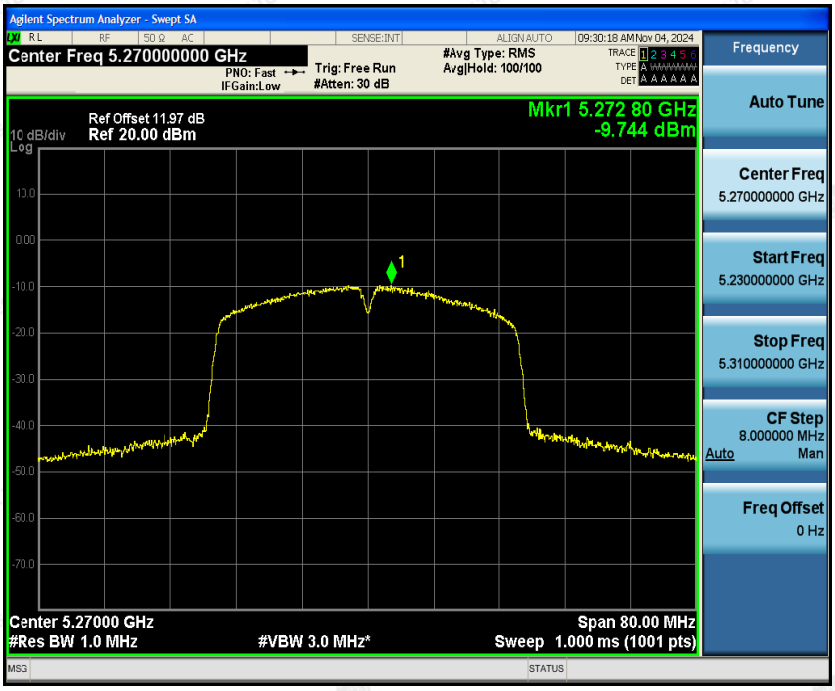
High Channel



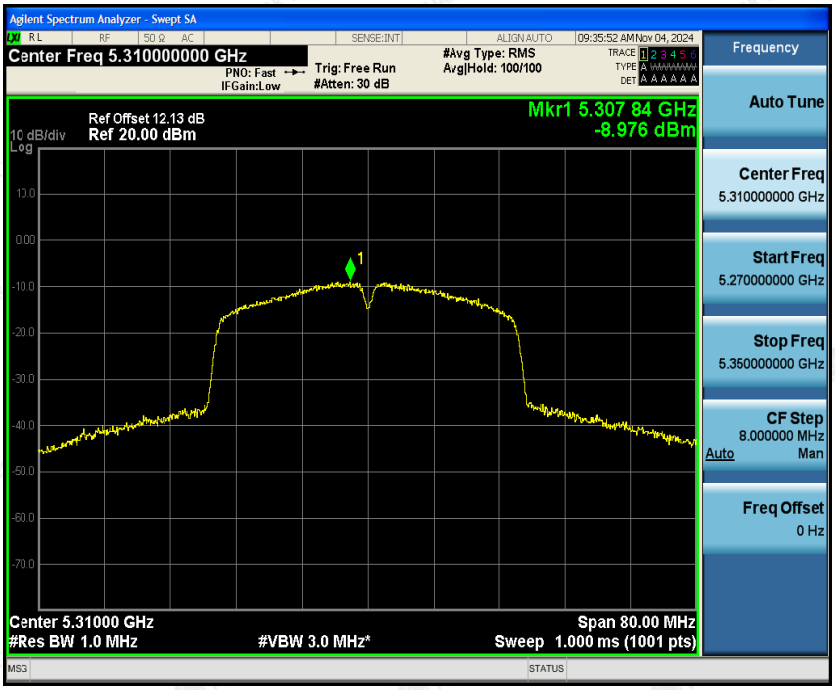
IEEE802.11n HT40 mode

5250~5350MHz

Low Channel

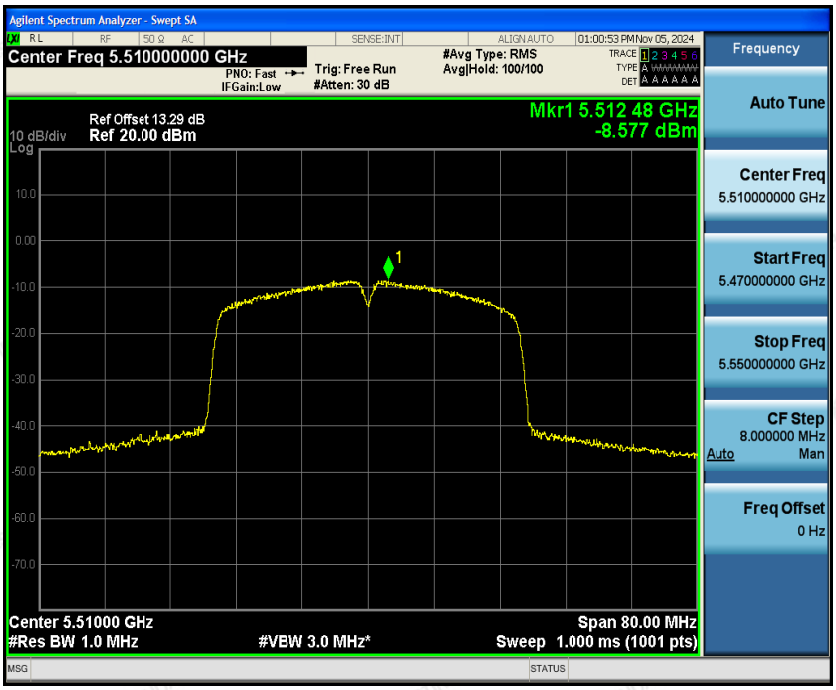


High Channel

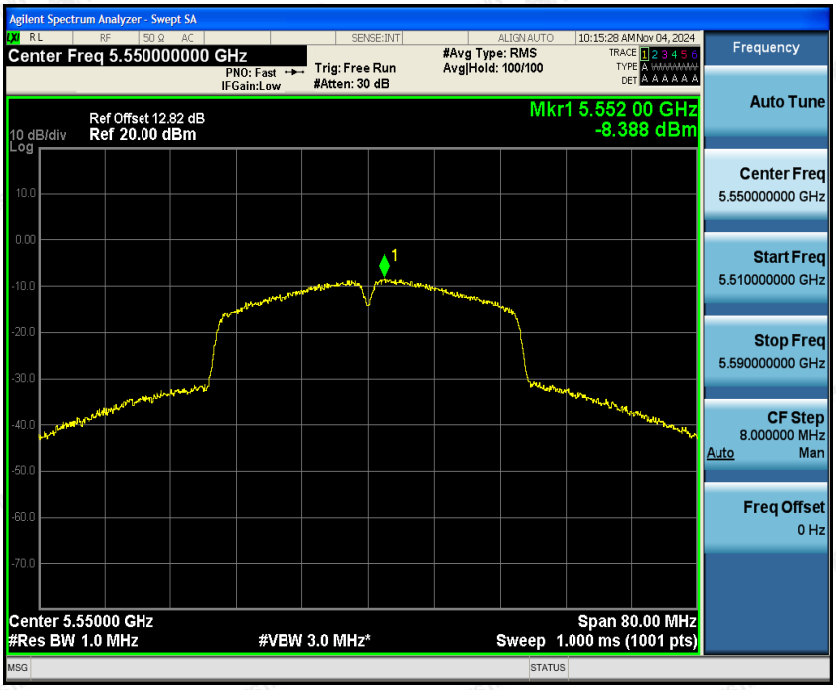


5470~5725MHz

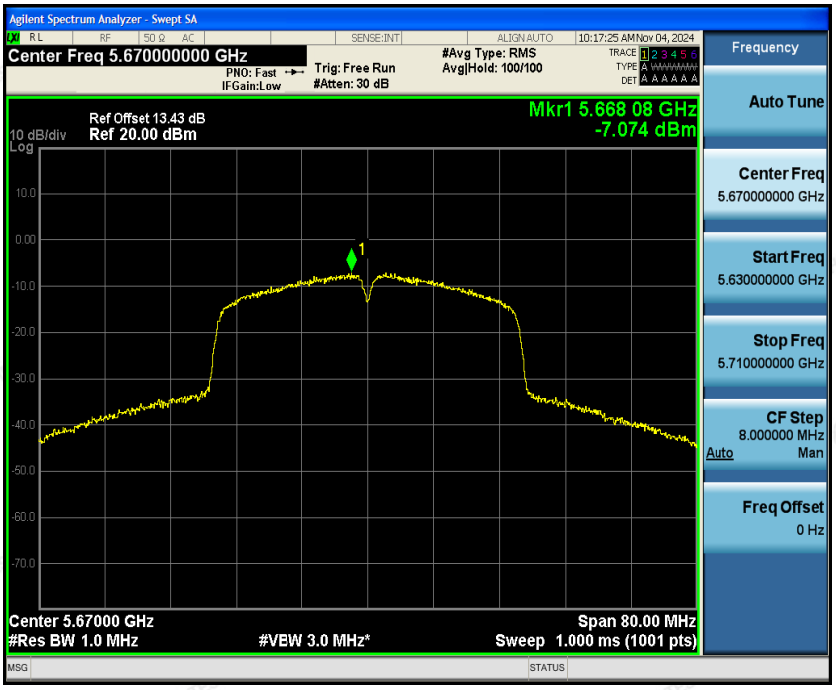
Low Channel



Mid Channel



High Channel

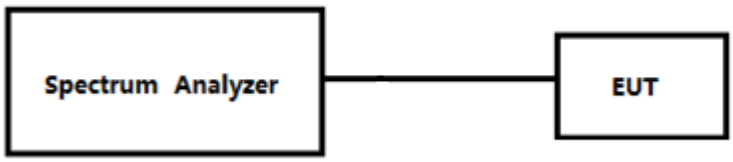


6.6 Duty Cycle

LIMIT

All measurements are to be performed with the EUT transmitting at 100% duty cycle at its maximum power control level; however, if 100% duty cycle cannot be achieved, measurements of duty cycle, x, and maximum-power transmission duration, *T*, are required for each tested mode of operation.
a) *T* refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
b) Duty cycle (x), as used in this document, refers to the fraction of time over which the transmitter is on and is transmitting at its maximum power control level.
c) The term “maximum power control level” is intended to distinguish between operating power levels of the EUT and differences in power levels of individual symbols that occur with some modulation types such as quadrature amplitude modulation (QAM). During testing, the EUT is not required to transmit continuously its highest possible *symbol* power level. Rather, it shall transmit all of the symbols and shall do so at the highest power control level (i.e., highest operating power level) of the EUT.

TESTCONFIGURATION



TEST METHOD

Measurements of duty cycle and transmission duration shall be performed using one of the following techniques:
a) A diode detector and an oscilloscope that together have sufficiently short response time to permit accurate measurements of the on and off times of the transmitted signal.
789033 D02 General UNII Test Procedures New Rules v02r01 Page 3 .
b) The zero-span mode on a spectrum analyzer or EMI receiver, if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW ≥ EBW if possible; otherwise, set RBW to the largest available value. Set VBW ≥ RBW. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are > 50/*T*, where *T* is defined in II.B.1.a), and the number of sweep points across duration *T* exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if *T* ≤ 16.7 microseconds.)

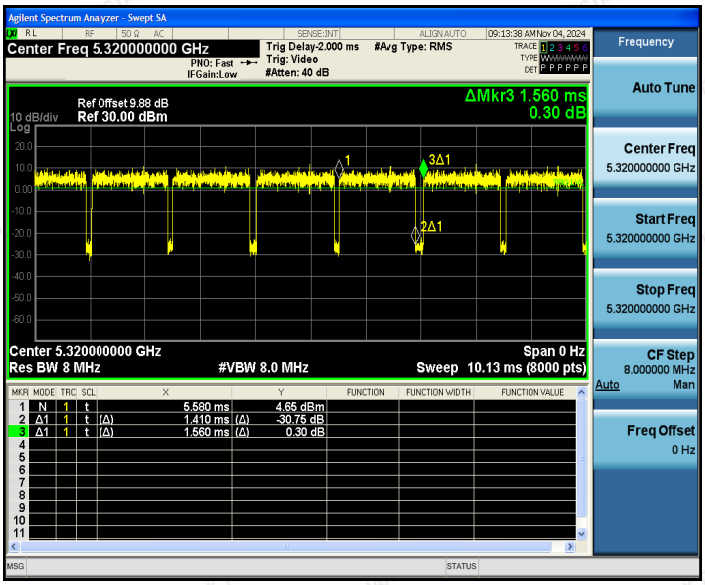
TEST RESULTS

PASS

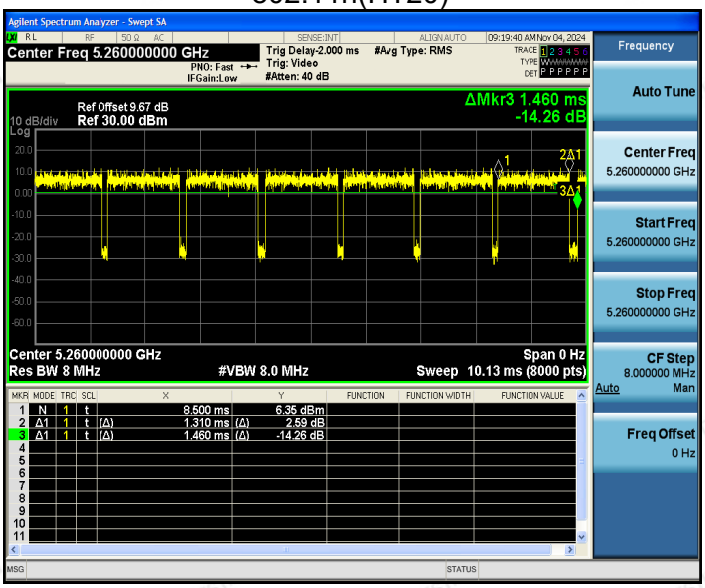
Mode Test Duty Cycle：5260-5320MHz

Mode	Duty Cycle	Duty Cycle Factor (dB)
802.11a	0.90	-0.46
802.11n(HT20)	0.90	-0.46
802.11n(HT40)	0.87	-0.60

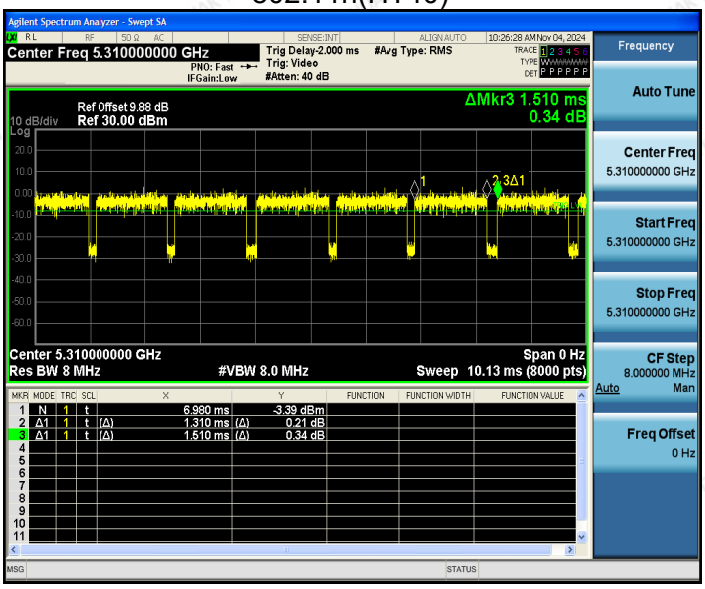
802.11a



802.11n(HT20)



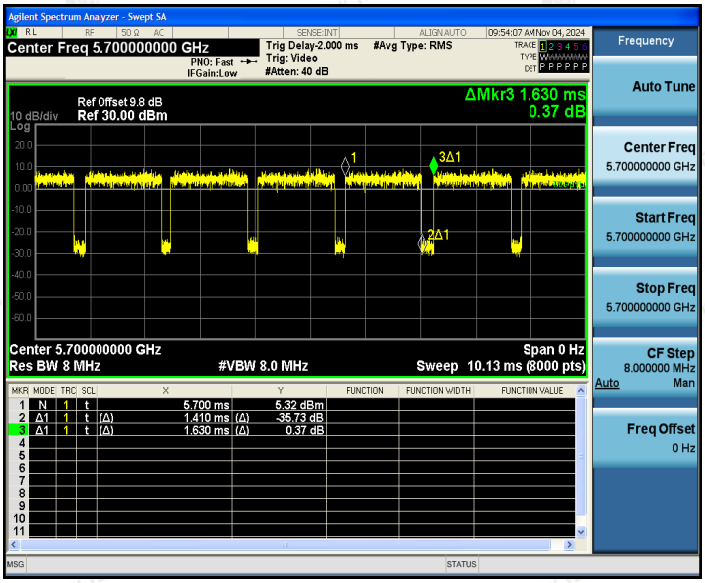
802.11n(HT40)



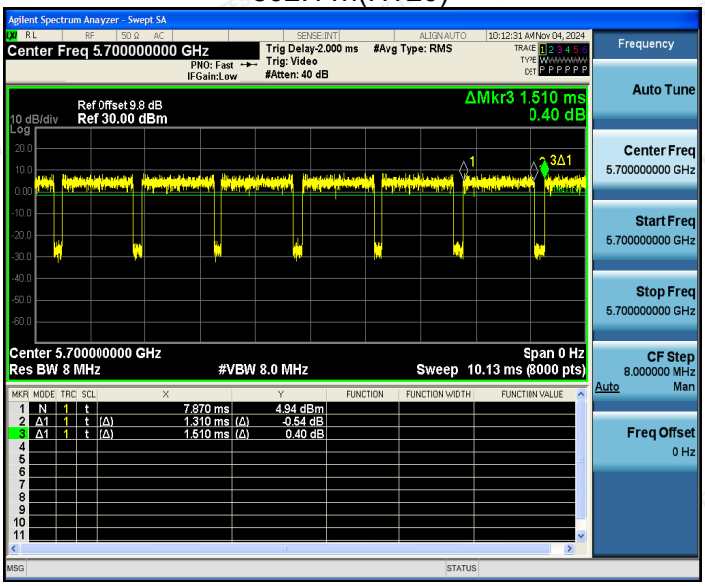
Mode Test Duty Cycle：5500-5700MHz

Mode	Duty Cycle	Duty Cycle Factor (dB)
802.11a	0.87	-0.60
802.11n(HT20)	0.87	-0.60
802.11n(HT40)	0.89	-0.51

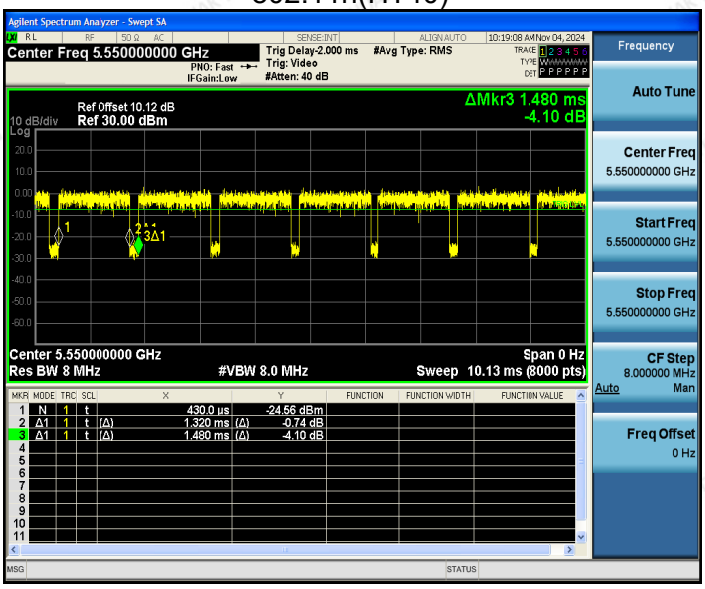
802.11a



802.11n(HT20)



802.11n(HT40)

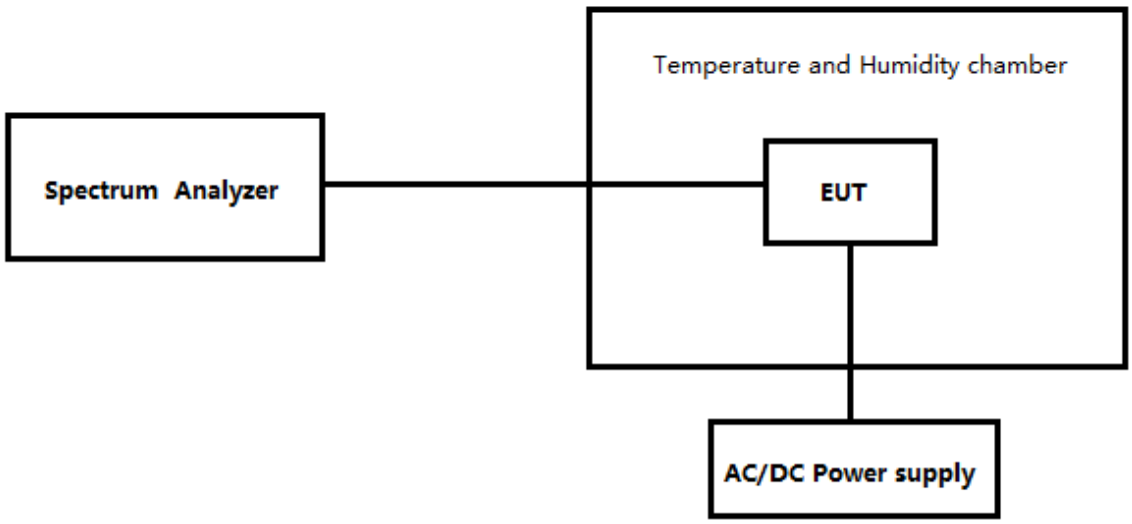


6.7 Frequency Stability Measurement

LIMIT

According to§15.407(g), Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

TESTCONFIGURATION



TESTPROCEDURE

1. To ensure emission at the band edge is main tainted within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
2. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.
3. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

TESTRESULTS

U-NII-1-(5250MHz-5350MHz)					
Freq.(MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)
5260	5259.981	-0.0190	-3.612	25	V_{min}
5260	5260.012	0.0120	2.281	25	V_{max}
5260	5259.979	-0.0210	-3.992	25	V_{nor}
5260	5259.944	-0.0560	-10.646	-10	V_{nor}
5260	5260.009	0.0090	1.711	40	V_{nor}

U-NII-1-(5470MHz-5725MHz)					
Freq.(MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)
5500	5499.978	-0.022	-4.000	25	V_{min}
5500	5500.011	0.011	2.000	25	V_{max}
5500	5499.985	-0.015	-2.727	25	V_{nor}
5500	5499.981	-0.019	-3.455	-10	V_{nor}
5500	5500.021	0.021	3.818	40	V_{nor}

6.8 Radiated Undesirable Emission

LIMIT

Radiated emissions from9 kHz to25 GHz were measured according to the methods defines in ANSI C63.10-2013.The EUT was placed above the ground plane, 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above1GHz.The inter face cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

1. For transmitters operating in the 5250-5350 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band must meet all applicable technical requirements for operation in the 5150-5250 MHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5150-5250 MHz band.

   For transmitters operating in the 5470-5600 MHz and 5650-5725MHz band: all emissions outside of the 5470-5600 MHz and 5650-5725MHz band shall not exceed an EIRPof -27 dBm/MHz.

2. KDB789033v02r01G)2)c)Asspecifiedin15.407(b), emissionsabove1000MHzthatareoutsideofthe restricted bands are subject to a peak emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in 15.407(b)(4)). However, an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit.

3. According to§15.209(a), except as provided else where in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

FREQUENCIES(MHz)	FIELDSTRENGTH (microvolt/meter)	MEASUREMENT DISTANCE(meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

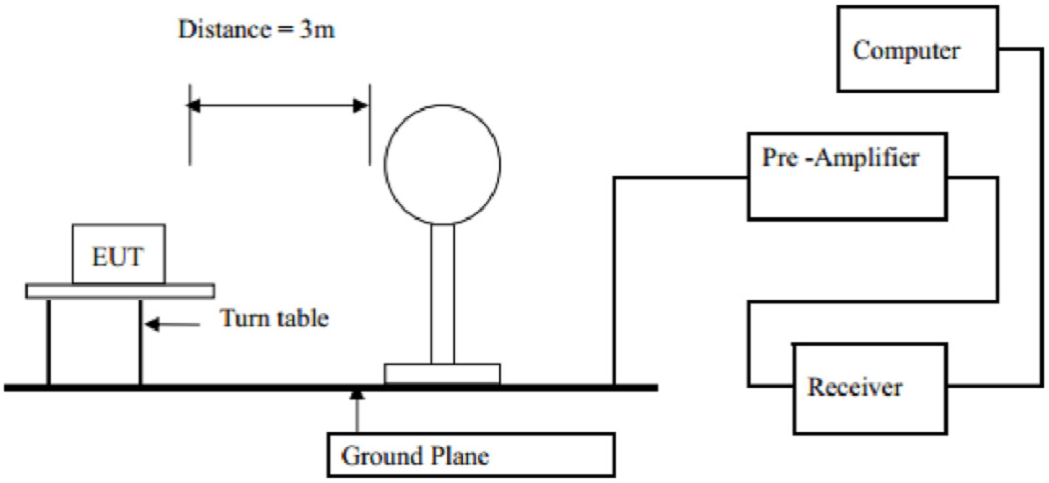
Remark: *Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806MHz.However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231and 15.241.*

4. In the emission table above, the tighter limit applies at the band edges.

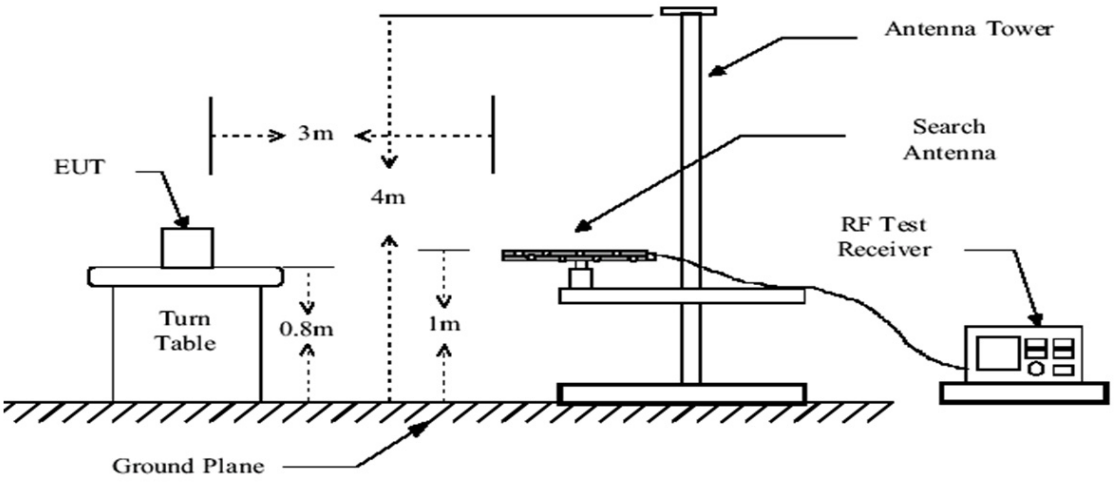
Frequency (MHz)	Field Strength(μV/mat	Field Strength(dBμV/mat
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Test Configuration

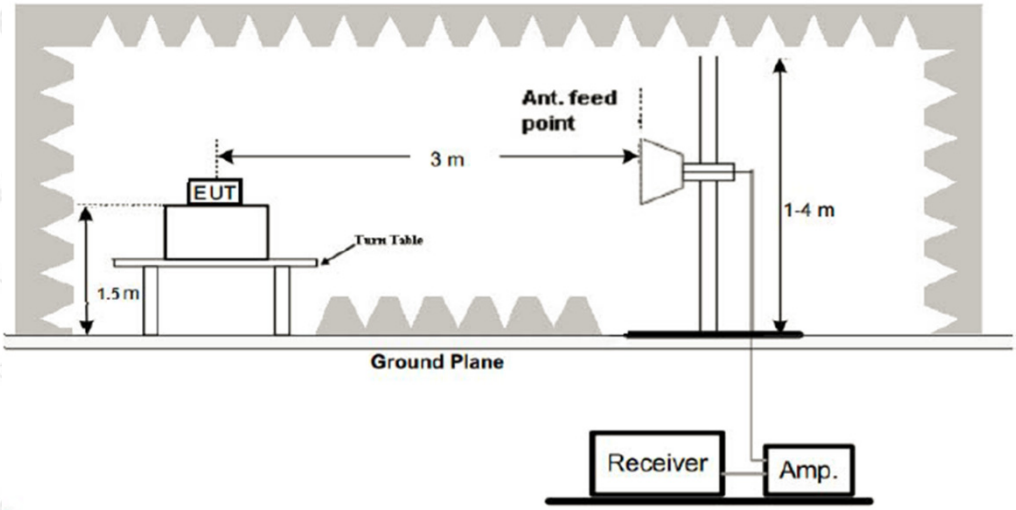
Below 30MHz



Below1GHz



Above 1 GHz



TESTPROCEDURE

1. The EUT is placed on a turntable above ground plane, which is 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

Below 1GHz:

RBW=100kHz/ VBW=300kHz / Sweep=AUTO

Above 1GHz:

(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO

(b) AVERAGE: RBW=1MHz / Sweep=AUTO

VBW=10Hz, whenduty cycle is no less than 98 percent.

VBW≧1/T, when duty cycle is less than 98 percent, where is the minimum transmissiondurationoverwhichthetransmitterisonandistransmittingatits maximum power control level for the tested mode of operation.

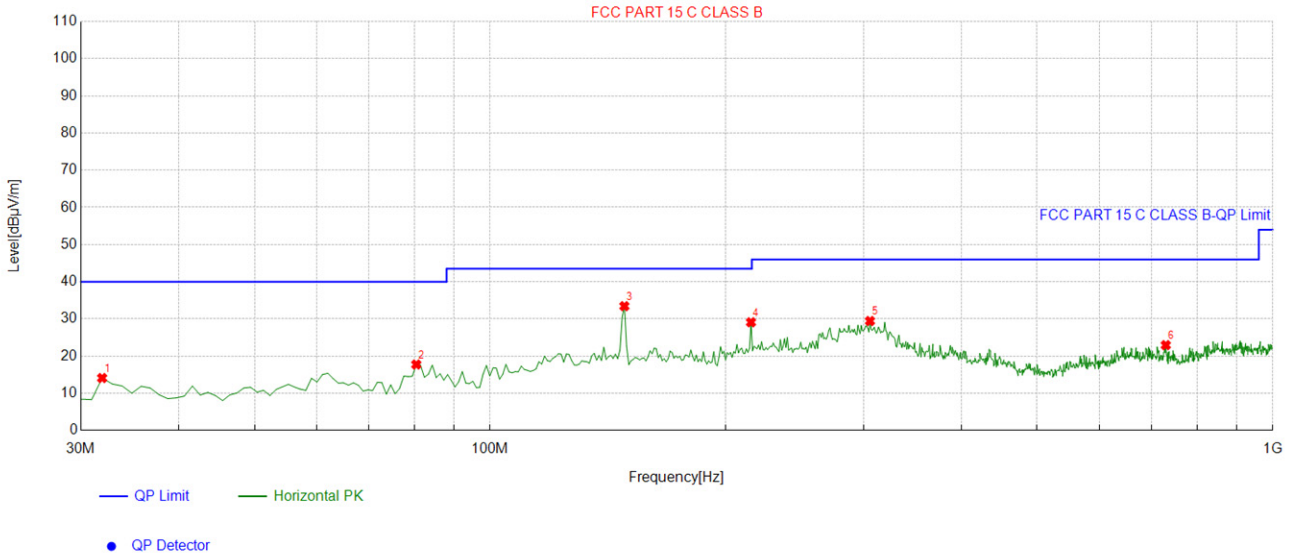
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
IEEE 802.11 a	100	--	--	10Hz
IEEE 802.11n HT20	100	--	--	10Hz
IEEE 802.11n HT40	100	--	--	10Hz

7. Repeat above procedures until the measurements for all frequencies are complete.

Please refer to following diagram for individual
Below 1GHz

All the test modes completed for test. only the worst result of reported as below:

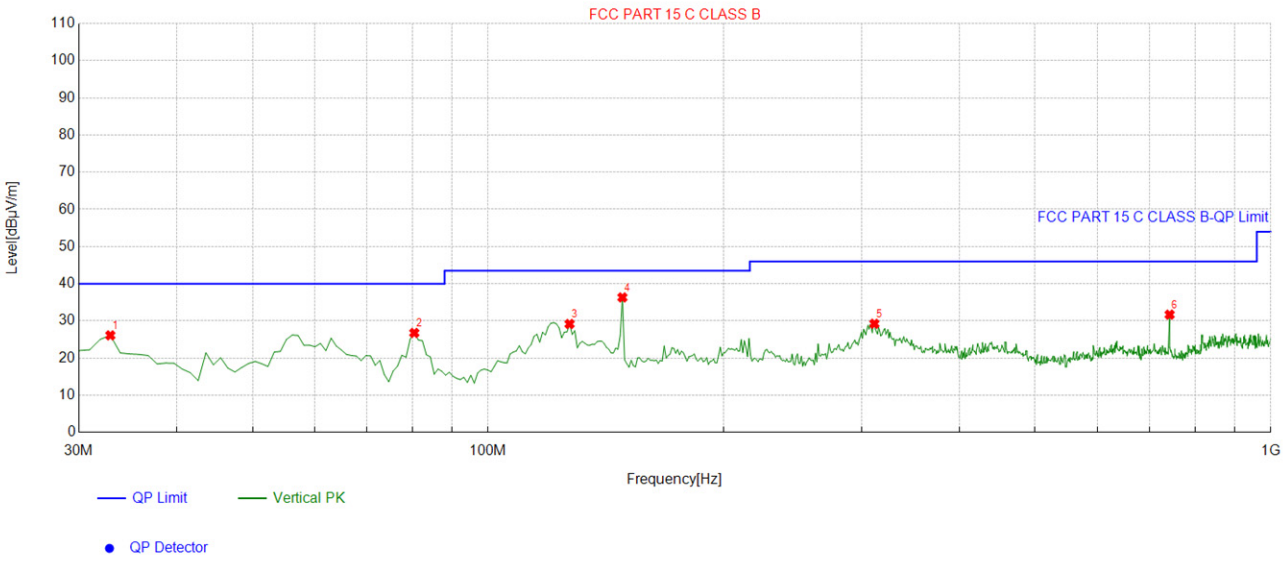
Horizontal



Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	31.941942	-15.76	29.86	14.10	40.00	25.90	100	50	Horizontal
2	80.49049	-18.34	36.07	17.73	40.00	22.27	100	323	Horizontal
3	148.45845	-18.14	51.57	33.43	43.50	10.07	100	299	Horizontal
4	215.45545	-14.72	43.81	29.09	43.50	14.41	100	100	Horizontal
5	305.75575	-11.90	41.34	29.44	46.00	16.56	100	299	Horizontal
6	730.07007	-3.46	26.41	22.95	46.00	23.05	100	240	Horizontal

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level

Vertical



Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	32.912913	-15.12	41.24	26.12	40.00	13.88	100	307	Vertical
2	80.49049	-18.34	45.11	26.77	40.00	13.23	100	340	Vertical
3	127.09709	-17.13	46.31	29.18	43.50	14.32	100	116	Vertical
4	148.45845	-18.14	54.46	36.32	43.50	7.18	100	83	Vertical
5	311.58158	-11.70	40.94	29.24	46.00	16.76	100	185	Vertical
6	742.69269	-3.41	35.10	31.69	46.00	14.31	100	47	Vertical

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level

Harmonics and Spurious Emissions

Frequency Range (9 kHz-30MHz)

Frequency (MHz)	Level@3m (dBµV/m)	Limit@3m (dBµV/m)
--	--	--
--	--	--
--	--	--
--	--	--

Note: *1. Emission Level=Reading+ Cable loss-Antenna factor-Amp factor*

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement

Above 1 GHz

5250~5350MHz

Operation Mode:	Tx / IEEE 802.11a mode **Low Channel**

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Heigh (cm)	Degree (deg.)	Remark
1	10522.06	39.82	11.05	50.87	74.00	-23.13	100	125	peak
2	14649.01	37.41	16.53	53.94	74.00	-20.06	100	41	peak
N/A									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Heigh (cm)	Degree (deg.)	Remark
1	10644.75	38.76	11.53	50.29	74.00	-23.71	100	315	peak
2	15221.01	35.28	13.73	49.01	74.00	-24.99	100	258	peak
N/A									

Operation Mode:	Tx / IEEE 802.11a mode **Mid Channel**

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Heigh (cm)	Degree (deg.)	Remark
1	10563.26	41.82	11.21	53.03	74.00	-20.97	100	114	peak
2	14240.81	36.79	15.17	51.96	74.00	-22.04	100	127	peak
N/A									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Heigh (cm)	Degree (deg.)	Remark
1	11011.47	39.22	12.89	52.11	74.00	-21.89	100	214	peak
2	13258.76	36.81	14.10	50.91	74.00	-23.09	100	282	peak
N/A									

Operation Mode:	Tx / IEEE 802.11a mode **High Channel**

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	11012.01	38.51	12.89	51.4	74.00	-22.6	100	214	peak
2	16161.36	36.49	13.49	49.98	74.00	-24.02	100	210	peak
N/A									

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	12402.43	39.74	12.00	51.74	74.00	-22.26	100	152	peak
2	15466.33	35.41	10.77	46.18	74.00	-27.82	100	302	peak
N/A									

5470~5725MHz

Operation Mode:	Tx / IEEE 802.11a mode **Low Channel**

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	10522.11	41.32	11.05	52.37	74.00	-21.63	100	118	peak
2	14649.62	38.19	16.53	54.72	74.00	-19.28	100	53	peak
N/A									

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	10644.19	40.22	11.53	51.75	74.00	-22.25	100	304	peak
2	15220.84	33.19	13.73	46.92	74.00	-27.08	100	271	peak
N/A									

Operation Mode:	Tx / IEEE 802.11a mode **Mid Channel**

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	10562.27	39.11	11.21	50.32	74.00	-23.68	100	105	peak
2	14240.86	35.26	15.17	50.43	74.00	-23.57	100	149	peak
N/A									

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	11014.55	38.42	12.89	51.31	74.00	-22.69	100	152	peak
2	13259.18	36.71	14.10	50.81	74.00	-23.19	100	205	peak
N/A									

Operation Mode:	Tx / IEEE 802.11a mode **High Channel**

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	11022.69	38.06	12.89	50.95	74.00	-23.05	100	214	peak
2	16161.33	37.11	13.49	50.60	74.00	-23.40	100	210	peak
N/A									

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	12402.45	37.42	12.00	49.42	74.00	-24.58	100	142	peak
2	15465.92	35.19	10.77	45.96	74.00	-28.04	100	239	peak
N/A									

5250~5350MHz

Operation Mode:	TX / IEEE 802.11n HT20mode /**Low Channel**

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11134.72	39.71	12.54	52.25	74.00	-21.75	100	10	peak
2	13872.46	36.22	14.02	50.24	74.00	-23.76	100	183	peak
N/A									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	10971.33	38.12	12.81	50.93	74.00	-23.07	100	63	peak
2	13423.79	35.42	14.36	49.78	74.00	-24.22	100	112	peak
N/A									

Operation Mode:	TX / IEEE 802.11n HT20mode /**Mid Channel**

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	10563.35	40.61	11.21	51.82	74.00	-22.18	100	126	peak
2	16569.87	34.19	16.97	51.16	74.00	-22.84	100	339	peak
N/A									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11216.78	38.77	12.31	51.08	74.00	-22.92	100	327	peak
2	13299.61	35.69	14.16	49.85	74.00	-24.15	100	82	peak
N/A									

Operation Mode:	TX / IEEE 802.11n HT20mode /**High Channel**

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	10480.67	39.55	10.86	50.41	74.00	-23.59	100	305	peak
2	14689.83	34.06	16.51	50.57	74.00	-23.43	100	25	peak
N/A									

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	10848.02	38.14	12.33	50.47	74.00	-23.53	100	215	peak
2	16938.12	33.57	17.77	51.34	74.00	-22.66	100	328	peak
N/A									

5470~5725MHz

Operation Mode:	TX / IEEE 802.11n HT20mode /**Low Channel**

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11134.66	39.22	12.54	51.76	74.00	-22.24	100	26	peak
2	13871.63	36.49	14.02	50.51	74.00	-23.49	100	128	peak
N/A									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	10970.66	38.72	12.81	51.53	74.00	-22.47	100	71	peak
2	13424.38	35.12	14.36	49.48	74.00	-24.52	100	149	peak
N/A									

Operation Mode:	TX / IEEE 802.11n HT20mode /**Mid Channel**

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	10562.45	40.11	11.21	51.32	74.00	-22.68	100	148	peak
2	16570.34	35.79	16.97	52.76	74.00	-21.24	100	315	peak
N/A									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	11217.47	39.81	12.31	52.12	74.00	-21.88	100	352	peak
2	13300.22	35.44	14.16	49.6	74.00	-24.4	100	94	peak
N/A									

Operation Mode:	TX / IEEE 802.11n HT20mode /**High Channel**

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	10480.03	39.87	10.86	50.73	74.00	-23.27	100	152	peak
2	14689.61	35.64	16.51	52.15	74.00	-21.85	100	74	peak
N/A									

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	10848.11	37.94	12.33	50.27	74.00	-23.73	100	215	peak
2	16938.48	33.09	17.77	50.86	74.00	-23.14	100	301	peak
N/A									

5250~5350MHz

Operation Mode:	TX / IEEE 802.11n HT40mode /**Low Channel**

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	11256.39	38.22	12.19	50.41	74.00	-23.59	100	295	peak
2	14649.96	34.17	16.53	50.7	74.00	-23.30	100	217	peak
N/A									

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	11133.97	39.29	12.54	51.83	74.00	-22.17	100	77	peak
2	13872.66	35.42	14.02	49.44	74.00	-24.56	100	282	peak
N/A									

Operation Mode:	TX / IEEE 802.11n HT40mode /**High Channel**

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	11216.53	39.22	12.31	51.53	74.00	-22.47	100	309	peak
2	17142.68	36.08	18.68	54.76	74.00	-19.24	100	175	peak
N/A									

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	11093.19	37.18	12.66	49.84	74.00	-24.16	100	175	peak
2	13300.83	33.09	14.16	47.25	74.00	-26.75	100	205	peak
N/A									

5470~5725MHz

Operation Mode:	TX / IEEE 802.11n HT40mode /**Low Channel**

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	11257.12	38.42	12.19	50.61	74.00	-23.39	100	241	peak
2	14650.75	33.17	16.53	49.7	74.00	-24.30	100	269	peak
N/A									

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	11134.34	39.03	12.54	51.57	74.00	-22.43	100	75	peak
2	13872.82	35.78	14.02	49.8	74.00	-24.20	100	241	peak
N/A									

Operation Mode:	TX / IEEE 802.11n HT40mode /**Mid Channel**

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	11255.77	37.12	12.19	49.31	74.00	-24.69	100	282	peak
2	14650.67	33.67	16.53	50.2	74.00	-23.80	100	243	peak
N/A									

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	11134.89	39.42	12.54	51.96	74.00	-22.04	100	77	peak
2	13873.55	35.09	14.02	49.11	74.00	-24.89	100	282	peak
N/A									

Operation Mode:	TX / IEEE 802.11n HT40mode /**High Channel**

Horizontal

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	11215.61	40.58	12.31	52.89	74.00	-21.11	100	318	peak
2	17142.57	36.12	18.68	54.8	74.00	-19.20	100	194	peak
N/A									

Vertical

No.	Frequency	Reading	Correct	Result	Limit	Margin	Height	Degree	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(deg.)	
1	11092.48	39.78	12.66	52.44	74.00	-21.56	100	175	peak
2	13300.28	35.36	14.16	49.52	74.00	-24.48	100	205	peak
N/A									

Radiated Band Edge Test:

Operation Mode: 802.11a Mode with 5.3G TX CH High

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5350	53.29	-2.49	50.8	74	-23.2	peak
5350	/	-2.49	/	54	/	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5350	51.47	-2.49	48.98	74	-25.02	peak
5350	/	-2.49	/	54	/	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Operation Mode: 802.11n HT20 Mode with 5.3G TX CH High

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5350	53.66	-2.49	51.17	74	-22.83	peak
5350	/	-2.49	/	54	/	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5350	52.06	-2.49	49.57	74	-24.43	peak
5350	/	-2.49	/	54	/	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Operation Mode: 802.11 n HT40 Mode with 5.3G TX CH High

Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5150	54.17	-2.49	51.68	74	-22.32	peak
5150	/	-2.49	/	54	/	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical:

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
5350	52.91	-2.49	50.42	74	-23.58	peak
5350	/	-2.49	/	54	/	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Operation Mode: 802.11a Mode with 5.6G TX CH Low

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5470	55.03	-2.49	52.54	74	-21.46	peak
5470	/	-2.49	/	54	/	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5470	53.72	-2.49	51.23	74	-22.77	peak
5470	/	-2.49	/	54	/	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Operation Mode: 802.11n HT20 Mode with 5.6G TX CH Low

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5470	54.22	-2.49	51.73	74	-22.27	peak
5470	/	-2.49	/	54	/	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5470	52.17	-2.49	49.68	74	-24.32	peak
5470	/	-2.49	/	54	/	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Operation Mode: 802.11 n HT40 Mode with 5.6G TX CH Low

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5470	55.31	-2.49	52.82	74	-21.18	peak
5470	/	-2.49	/	54	/	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
5470	53.46	-2.49	50.97	74	-23.03	peak
5470	/	-2.49	/	54	/	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Remark:
1. If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.
2. In restricted bands of operation, the spurious emissions below the permissible value more than 20dB.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

6.9 Powerline Conducted Emissions

LIMIT

According to§15.207(a), except as shown in paragraphs (b) and(c) of this section, 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/50ohms line impedance stabilization network(LISN).Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

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

** Decreases with the logarithm of the frequency.*

TESTCONFIGURATION

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TESTPROCEDURE

10. The EUT was placed on a table, which is 0.8m above ground plane.

11. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.

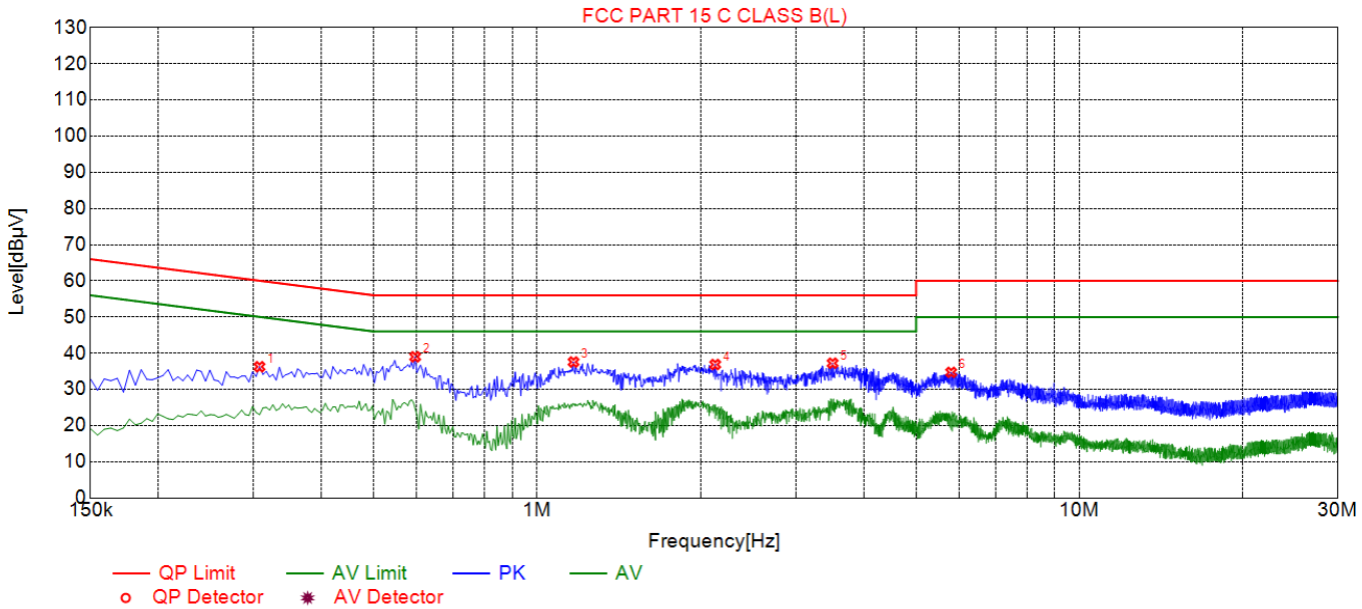
12. Repeat above procedures until all frequency measured were complete.

TESTRESULTS

The initial step in collecting conducted data is a spectrum analyzer peaks can of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Test Data

Test Specification: Line

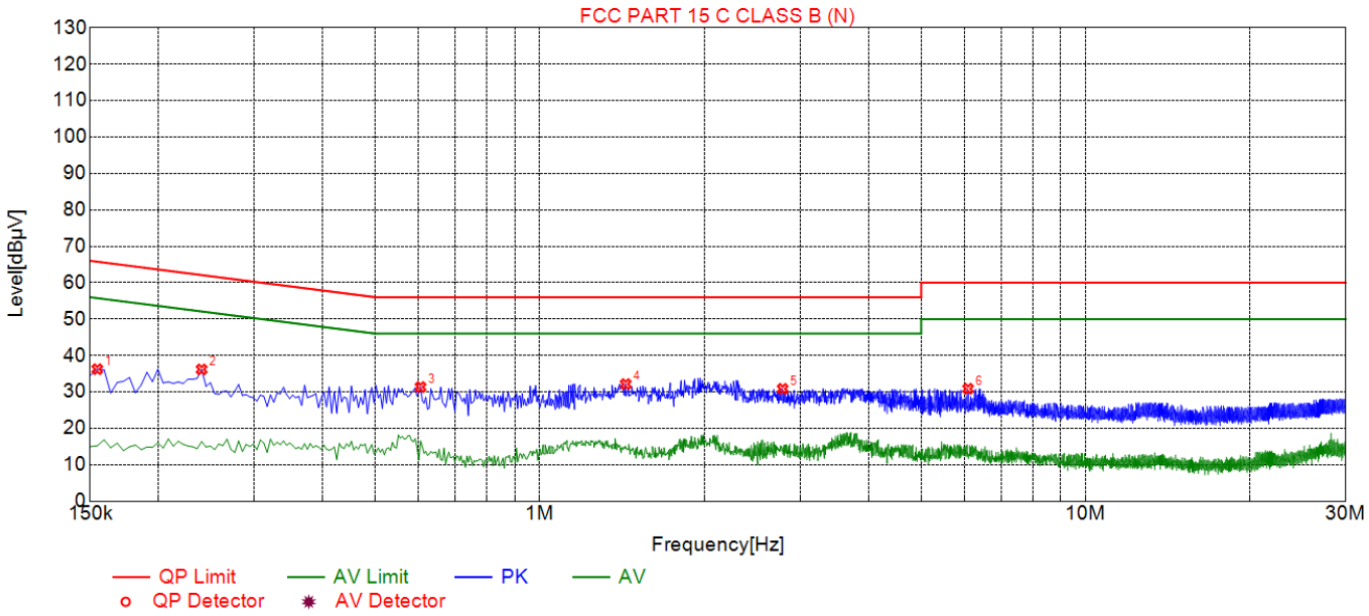


Suspected List								
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Type
1	0.3075	36.26	19.85	60.04	23.78	16.41	PK	L
2	0.5955	39.01	19.86	56.00	16.99	19.15	PK	L
3	1.1670	37.58	19.90	56.00	18.42	17.68	PK	L
4	2.1300	36.88	19.98	56.00	19.12	16.90	PK	L
5	3.5070	37.24	20.08	56.00	18.76	17.16	PK	L
6	5.8020	34.71	20.10	60.00	25.29	14.61	PK	L

Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss
Level=Test receiver reading + correction factor

Test Specification: Neutral



Suspected List

NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Type
1	0.1545	36.25	19.73	65.75	29.50	16.52	PK	N
2	0.2400	36.18	19.73	62.10	25.92	16.45	PK	N
3	0.6045	31.34	19.74	56.00	24.66	11.60	PK	N
4	1.4370	32.14	19.79	56.00	23.86	12.35	PK	N
5	2.7870	30.84	19.92	56.00	25.16	10.92	PK	N
6	6.0945	30.87	19.98	60.00	29.13	10.89	PK	N

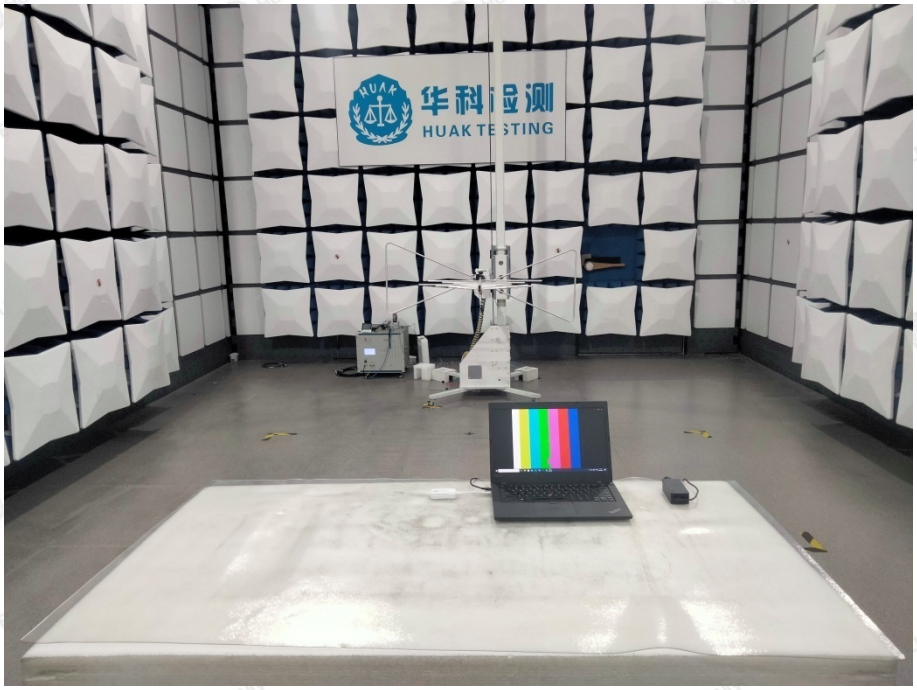
Remark: Margin = Limit – Level

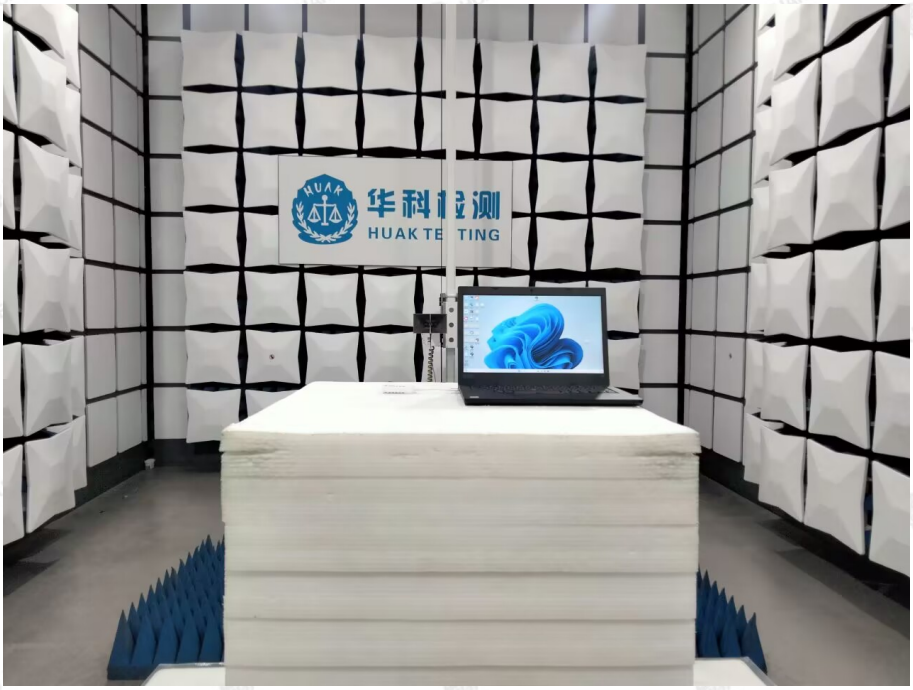
Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor

7. Test Setup Photos of the EUT

Radiated Emission





TEL : +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail : service@cer-mark.com
Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Conducted Emission

TEL : +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail : service@cer-mark.com
Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

8. Photos of the EUT

Reference to the report: ANNEX A of external photos and ANNEX B of internal photos.

---------End of test report---------

TEL : +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail : service@cer-mark.com
Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China