TEST REPORT

Product Name	**:**	**MINI PC**
Model Number	**:**	**S15 Ultra, S15, F650, S**, S********, F***, F*****, S15**********, C**********, F********** ("*" may be alphanumeric characters, blank or other characters, which represent operating system or user serial number. But such changes do not concern those factors (such as hardware and the external structure) which might impact the security or electromagnetic compatibility of the device.)**
FCC ID	**:**	**2AN9R-S15ULTRA**

Prepared for	:	Fujian Centerm Information Co .,Ltd.
Address	:	#21 - #22 Buildings,No.618,Jinshan Road,Jinshan Industrial Park,Cangshan District,Fuzhou City,Fujian Province,China
Prepared by	:	EMTEK (SHENZHEN) CO., LTD.
Address	:	Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China Tel: (0755) 26954280 Fax: (0755) 26954282

Report Number	:	ENS2407150008W00103R
Date(s) of Tests	:	July 23, 2024 to August 19, 2024
Date of Issue	:	August 23, 2024

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Modified Information

Version	Report No.	Revision Date	Summary
Ver.1.0	ENS2407150008W00103R	/	Original Report

TEST RESULT CERTIFICATION

Applicant	:	Fujian Centerm Information Co .,Ltd.
Address	:	#21 - #22 Buildings,No.618,Jinshan Road,Jinshan Industrial Park,Cangshan District,Fuzhou City,Fujian Province,China
Manufacturer	:	Fujian Centerm Information Co .,Ltd.
Address	:	#21 - #22 Buildings,No.618,Jinshan Road,Jinshan Industrial Park,Cangshan District,Fuzhou City,Fujian Province,China
EUT	:	MINI PC
Model No.	:	S15 Ultra, S15, F650, S**, S********, F***, F*****, S15**********, C**********, F********** (“*” may be alphanumeric characters, blank or other characters, which represent operating system or user serial number. But such changes do not concern those factors (such as hardware and the external structure) which might impact the security or electromagnetic compatibility of the device.) (Note: Pre testing all models, and find the S15 Ultra is the worst, so only the worst data of S15 Ultra is shown in the report.)
Trade Mark	:	YKK

Measurement Procedure Used:

APPLICABLE STANDARDS	
STANDARD	**TEST RESULT**
FCC 47 CFR Part 2 , Subpart J FCC 47 CFR Part 15 , Subpart C	PASS

The above equipment was tested by EMTEK (SHENZHEN) CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with the above table standards requirement.
The test results of this report relate only to the tested sample identified in this report.

Date of Test : July 23, 2024 to August 19, 2024

Prepared by : Una Yu/Editor

Reviewer : Joe Xia/Supervisor

Approved & Authorized Signer : Lisa Wang/Manager

EMTEK (SHENZHEN) CO., LTD. TESTING

1 EUT TECHNICAL DESCRIPTION

Product Name:	MINI PC
Model Number:	S15 Ultra, S15, F650, S**, S********, F***, F*****, S15**********, C**********, F********** ("*" may be alphanumeric characters, blank or other characters, which represent operating system or user serial number. But such changes do not concern those factors (such as hardware and the external structure) which might impact the security or electromagnetic compatibility of the device.) (Note: Pre testing all models, and find the S15 Ultra is the worst, so only the worst data of S15 Ultra is shown in the report.)
IEEE 802.11 WLAN Mode Supported:	IEEE 802.11b IEEE 802.11g IEEE 802.11n(20MHz channel bandwidth) IEEE 802.11n(40MHz channel bandwidth) IEEE 802.11ax(20MHz channel bandwidth) IEEE 802.11ax(40MHz channel bandwidth)
Modulation:	DSSS with DBPSK/DQPSK/CCK for 802.11b OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n OFDMA with BPSK/QPSK/16QAM/64QAM/256QAM/1024QAM for 802.11ax
Operating Frequency Range:	2412-2462MHz
Channels Step:	5MHz
Number of Channels:	11 channels
Antenna Type:	Integrated Antenna
Antenna Gain:	Ant1: 3.89dBi, Ant2: 3.59dBi (NOTE: The antenna information is provided by the customers, which will have a certain impact on the test results.)
Power Supply:	AC 120V/60Hz by Adapter Adapter 1: Model: GM39-120300-1A Input: 100-240V~50/60Hz, 1.2A Output: 12V, 3A Adapter 2: Model: GQ36-120300-BU Input: 100-240V~50/60Hz, 1.5A Output: 12V, 3A (Note: The EUT has two adapters, all the adapters are tested, and find the adapter 2 is worst, so only the worst data is shown in the report.)
Temperature Range:	0°C ~ 40°C
Max Output Power:	24.88dBm (Note:The Max Output Power refer to the original module report: RFBBUI-WTW-P21040655)

Note: for more details, please refer to the User's manual of the EUT.

2 SUMMARY OF TEST RESULT

FCC Part Clause	Test Parameter	Verdict	Remark
15.247(a)(2)	DTS (6dB) Bandwidth	PASS	*
15.247(b)(3)	Maximum Peak Conducted Output Power	PASS	*
15.247(e)	Maximum Power Spectral Density Level	PASS	*
15.247(d)	Unwanted Emission Into Non-Restricted Frequency Bands	PASS	*
15.247(d) 15.209	Unwanted Emission Into Restricted Frequency Bands (conducted)	PASS	*
15.247(d) 15.209	Radiated Spurious Emission	PASS	
15.207	Conducted Emission Test	PASS	*
15.247(b)	Antenna Application	PASS	*
NOTE 1: N/A (Not Applicable). NOTE 2: According to FCC OET KDB 558074, the report use radiated measurements in the restricted frequency bands. In addition, the radiated test is also performed to ensure the emissions emanating from the device cabinet also comply with the applicable limits. NOTE 3:* means that these modules have been tested and comply with FCC requirements, according to technical characteristic and TR 102 070-2 guide, only spurious emissions need to be retested for this report, for all other items' test results please refer to original module's test report No.: RFBBUI-WTW-P21040655.			

RELATED SUBMITTAL(S) / GRANT(S):

This submittal(s) (test report) is intended for **FCC ID: 2AN9R-S15ULTRA** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

3 TEST METHODOLOGY

3.1 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to its specifications, the EUT must comply with the requirements of the following standards:
FCC 47 CFR Part 2, Subpart J
FCC 47 CFR Part 15, Subpart C
FCC KDB 558074 D01 15.247 Meas Guidance v05r02
FCC KDB 662911 D01 Multiple Transmitter Output v02r01

3.2 MEASUREMENT EQUIPMENT USED

For Spurious Emissions Test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
Pre-Amplifier	Bonn	BLMA 011001N	2213967A	2023/10/23	1Year
EMI Test Receiver	Rohde & Schwarz	ESR7	102551	2023/10/23	1Year
Bilog Antenna	Schwarzbeck	VULB9163	9163142	2024/7/8	2Year
Horn antenna	Schwarzbeck	BBHA9120D	9120D-1198	2023/6/2	2Year
Pre-Amplifier	Bonn	BLMA 0118-5G	2213967B-01	2023/10/23	1Year
Spectrum Analyzer	Rohde & Schwarz	FSV3044	101290	2023/10/23	1Year
Horn antenna	Schwarzbeck	BBHA9170	9170-399	2023/5/12	2Year
Pre-Amplifier	Lunar EM	LNA18G26-40	J1012131010001	2024/5/11	1Year
Pre-Amplifier	Lunar EM	LNA26G40-40	J1013131028001	2024/5/11	1Year
Loop Antenna	Schwarzbeck	FMZB1519	1519-012	2023/5/12	2Year
Wideband Radio Communication Tester	R&S	CMW500	171168	2023/9/14	1Year

3.3 DESCRIPTION OF TEST MODES

The EUT has been tested under its typical operating condition.
The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.
The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.
Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.
Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Frequency and Channels list for 802.11b/g/n(20)/ax(20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	6	2437	11	2462
2	2417	7	2442		
3	2422	8	2447		
4	2427	9	2452		
5	2432	10	2457		

Frequency and Channels list for 802.11n(40)/ax(40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	6	2437	9	2452
4	2427	7	2442	10	2457
5	2432	8	2447	11	2462

Test Frequency and Channels for 802.11b/g/n(20)/ax(20):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	6	2437	11	2462

Test Frequency and channels for 802.11n(40)/ax(40):

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	6	2437	11	2462

4 FACILITIES AND ACCREDITATIONS

4.1 FACILITIES

All measurement facilities used to collect the measurement data are located at:

EMTEK (Shenzhen) Co., Ltd.
Building 69, Majialong Industry Zone District, Nanshan District, Shenzhen, China.
The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

4.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, 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 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description

EMC Lab. : **Accredited by CNAS**
The Certificate Registration Number is L2291
The Laboratory has been assessed and proved to be in compliance with CNAS-CL01 (identical to ISO/IEC 17025:2017)

Accredited by FCC
Designation Number: CN1204
Test Firm Registration Number: 882943

Accredited by A2LA
The Certificate Number is 4321.01

Accredited by Industry Canada
The Conformity Assessment Body Identifier is CN0008

Name of Firm : EMTEK (SHENZHEN) CO., LTD.
Site Location : Building 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China

5 TEST SYSTEM UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

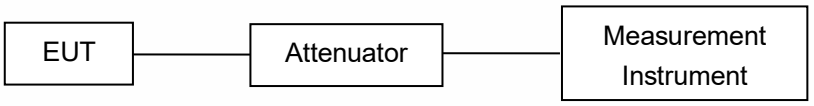
Parameter	Uncertainty
Radiated Emission Test	±2.0dB
Temperature	±0.5℃
Humidity	±3%

Measurement Uncertainty for a level of Confidence of 95%.

6 SETUP OF EQUIPMENT UNDER TEST

6.1 RADIO FREQUENCY TEST SETUP 1

The WLAN component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



6.2 RADIO FREQUENCY TEST SETUP 2

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10. The test distance is 3m.The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.
The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

Below 30MHz：
The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna (loop antenna). The Antenna should be positioned with its plane vertical at the specified distance from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. The center of the loop shall be 1 m above the ground. For certain applications, the loop antenna plane may also need to be positioned horizontally at the specified distance from the EUT.

Above 30MHz：
The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

Above 1GHz:
The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

Measurements shall be taken, using the following steps, at a test site that has been validated using the procedures of ANSI C63.4 or the latest CISPR 16-1-4 for measurements above 1 GHz, so as to simulate a near free-space environment (see RSS-Gen for applicable versions of ANSI and CISPR standards).
(1) Line the ground plane with absorbers between the transmitter and the receive antenna to minimize reflections. The absorbers used should have a minimum-rated attenuation of 20 dB through the measurement frequency range of interest. The absorbers shall be positioned to replicate the layout used when compliance with the applicable acceptability criterion was achieved, as set forth in the aforementioned standards on site validation.
(2) Set the height of the receive antenna to 1.5 m. The receive antenna must be one that was designed and fabricated to operate over the entire frequency range of interest, for example, an appropriate standard gain horn.
(3) The distance between the receive antenna and the radiating source shall be sufficient in order to ensure far-field conditions.
(4) Mount the transmitter at a height of 1.5 m.
(5) Configure the device under test (DUT) to produce the maximum power spectral density as measured while assessing compliance with Section 6.2.2 (i.e. channel frequency, modulation type and data rate). If the DUT is equipped with a detachable antenna and the antenna is intended for remote installation (i.e.

tower-mounted), the DUT may be substituted with a suitable signal generator. The level and frequency settings on the generator shall be set so as to reproduce the maximum power spectral density, measured within a 1 MHz bandwidth, obtained while assessing compliance to Section 6.2.2.
(6) Position the transmitter or the radiating antenna so that elevation pattern measurements can be taken.
(7) Find the 0° reference point in the horizontal plane.
(8) Care should be taken when positioning the receive antenna to avoid cross-polarization. Antennas of known mounting polarization should be assessed with the receive antenna oriented in the same polarity. If the polarization of the transmit antenna is unknown or the transmit antenna can be mounted in either polarization, e.i.r.p. measurements should be performed to find which mounting polarity provides the highest e.i.r.p. value. Testing shall be carried out with the receive antenna and the DUT mounted in each polarity.
(9) The emission shall be centred on the display of the spectrum analyzer with the following settings:
i. If the power spectral density of the DUT was assessed with a peak detector and the antenna cannot be detached from the DUT, the spectrum analyzer shall be set to a peak detector with a resolution bandwidth and video bandwidth of 1 MHz.
ii. If the power spectral density of the DUT was assessed using a sample detector with power averaging and the antenna cannot be detached from the DUT, the spectrum analyzer shall be set to a sample detector, configured to produce 100 power averages and set with a resolution bandwidth, as well as a video bandwidth of 1 MHz.
iii. If the antenna can be detached from the DUT, a continuous wave (CW) signal equal to that of the power spectral density measurement may be used, the spectrum analyzer shall be set to peak detector with a resolution bandwidth and video bandwidth of 1 MHz.

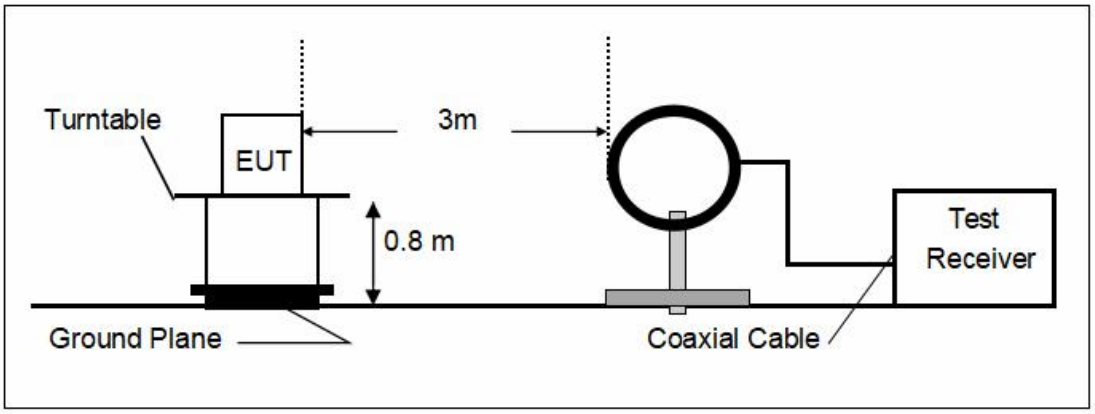
(10) Rotate the turntable 360° recording the field strength at each step. Throughout the main beam of the antenna, the step size shall be kept to a maximum of 1°.
Once outside the main beam of the antenna, the maximum step size shall be as follows, when compared to the requirements of Section 6.2.2:
i. Between 0° and 8°, maximum step size of 2°;
ii. Between 8° and 40°, maximum step size of 4°;
iii. Between 40° and 45°, maximum step size of 1°;
iv. Between 45° and 90°, maximum step size of 5°.
Once the mask reaches 90°, the mask will be inverted and the step size will follow in the same manner as above.
For the purpose of this procedure, the main beam of the antenna is defined as the 3 dB beamwidth.
(11) Convert the measured field strength values in terms of e.i.r.p. density (dBW/1 MHz) using the following equation:

$$e.i.r.p\ density(dBW/MHz)=10\log((E*r)^2/30)$$

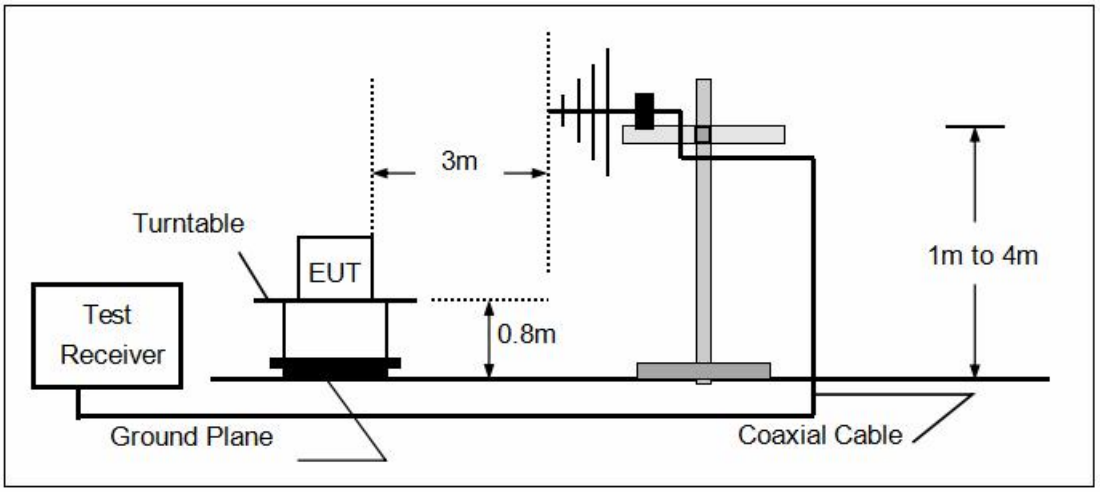
E = field strength in V/m
r = measurement distance in metres

(12) Plot the results against the emission mask with reference to the horizontal plane.
(13) Using the plot, the 0° can be rotated to determine the worst-case installation tilt angle.
(14) Testing shall be performed using the highest gain antenna for every antenna type, if applicable.
(15) Antenna type(s), antenna model number(s), and worst-case tilt angle(s) necessary to remain compliant with the elevation mask requirement set forth in Section 6.2.2(3) of RSS-247 shall be clearly indicated in the user manual.
The following figure is an example of a polar elevation mask measured using the Method 1 reference to dBµV/m at 3 m.

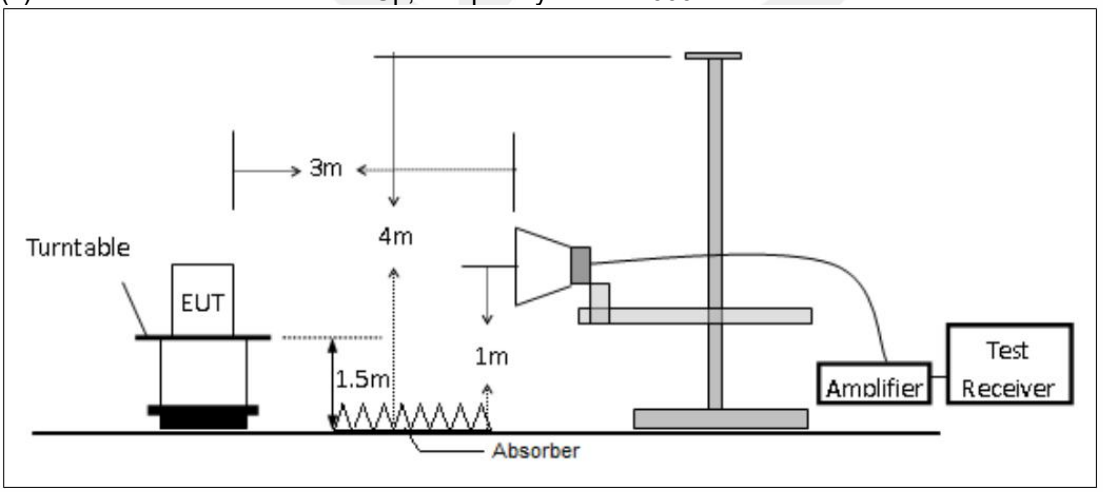
(a) Radiated Emission Test Set-Up, Frequency Below 30MHz



(b) Radiated Emission Test Set-Up, Frequency Below 1000MHz

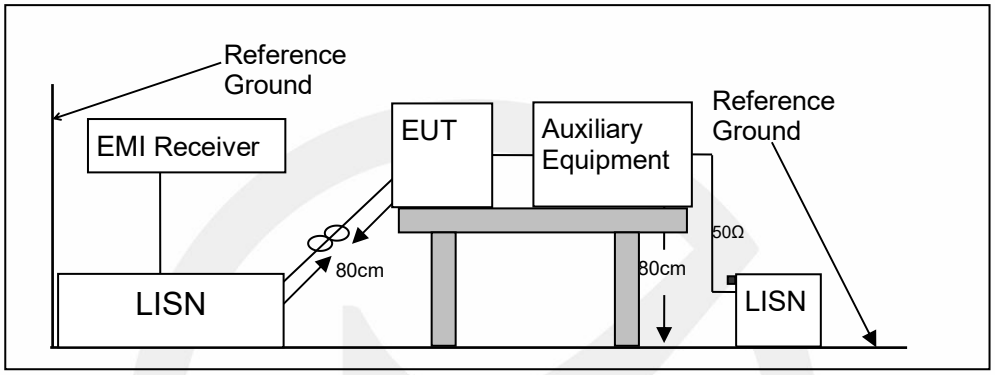


(c) Radiated Emission Test Set-Up, Frequency above 1000MHz

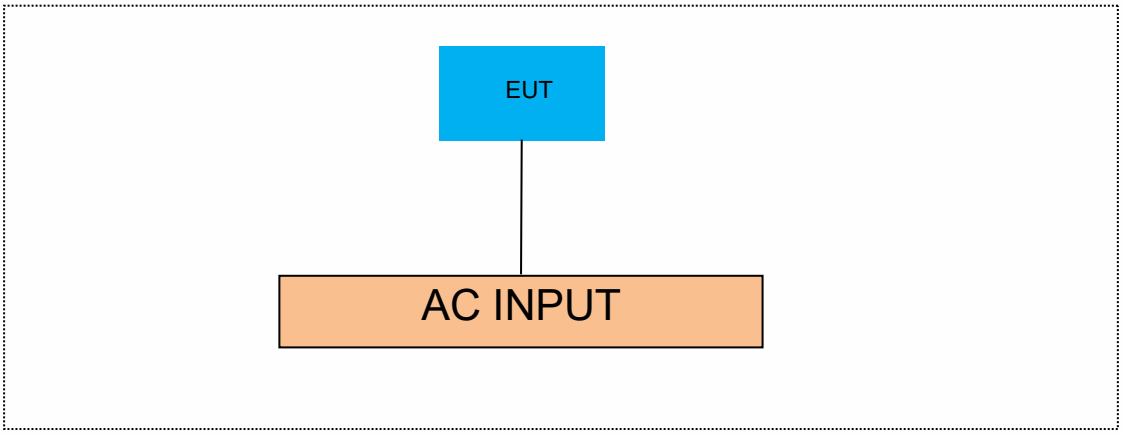


6.3 CONDUCTED EMISSION TEST SETUP

The mains cable of the EUT (maybe per AC/DC Adapter) must be connected to LISN. The LISN shall be placed 0.8 m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.
Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.8 m.
According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.



6.4 BLOCK DIAGRAM CONFIGURATION OF TEST SYSTEM



6.5 SUPPORT EQUIPMENT

N/A

Notes:

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.

7 TEST REQUIREMENTS

7.1 RADIATED EMISSION

7.1.1 Applicable Standard

According to FCC Part 15.247(d) and 15.209 and KDB 558074 D01 15.247 Meas Guidance v05r02.

7.1.2 Conformance Limit

According to FCC Part 15.247(d): radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

According to FCC Part15.205, Restricted bands:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

According to FCC Part15.205 the level of any transmitter spurious emission in Restricted bands shall not exceed the level of the emission specified in the following table.

Restricted Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance
0.009-0.490	2400/F(KHz)	20 log (uV/m)	300
0.490-1.705	24000/F(KHz)	20 log (uV/m)	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

7.1.3 Test Configuration

Test according to clause 6.2 radio frequency test setup 2.

7.1.4 Test Procedure

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:

For Above 1GHz:
The EUT was placed on a turn table which is 1.5m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Span = wide enough to fully capture the emission being measured.
RBW = 1 MHz.

VBW ≥ RBW.
Sweep = auto.
Detector function = peak.
Trace = max hold.

For Below 1GHz:
The EUT was placed on a turn table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Span = wide enough to fully capture the emission being measured.
RBW = 100 kHz.
VBW ≥ RBW.
Sweep = auto.
Detector function = peak.
Trace = max hold.

For Below 30MHz:
The EUT was placed on a turn table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Span = wide enough to fully capture the emission being measured.
RBW = 9kHz.
VBW ≥ RBW.
Sweep = auto.
Detector function = peak.
Trace = max hold.

For Below 150KHz:
The EUT was placed on a turn table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Span = wide enough to fully capture the emission being measured.
RBW = 200Hz.
VBW ≥ RBW.
Sweep = auto.
Detector function = peak.
Trace = max hold.

Follow the guidelines in ANSI C63.10 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit. Submit this data.
Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from 20log(dwell time/100 ms), in an effort to demonstrate compliance with the limit. Submit this data.
Repeat above procedures until all frequency measured was complete.

7.1.5 Test Results

Temperature:	25°C
Relative Humidity:	60%
ATM Pressure:	1011 mbar

■ Spurious Emission below 30MHz(9KHz to 30MHz)

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
--	--	--	--	--	--	--	--

Note: Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

■ Spurious Emission Above 1GHz(1GHz to 25GHz)

All the modulation modes are tested, the data of the worst mode are described in the table.
Highest gain of each antenna and highest output power is ANT1 and MIMO as below.

ANT1:

Test mode: 802.11n(20) Frequency: Channel 1: 2412MHz

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)	Limit 3m(dBuV/m)	Over(dB)	Detector
7987.5	V	59.54	74.00	14.46	Peak
9918.75	V	63.14	74.00	10.86	Peak
17169.375	V	65.23	74.00	8.77	Peak
7987.5	V	39.91	54.00	14.09	Avg
9918.75	V	41.33	54.00	12.67	Avg
17169.375	V	46.08	54.00	7.92	Avg
7991.25	H	58.89	74.00	15.11	Peak
9903.75	H	63.48	74.00	10.52	Peak
17814.375	H	65.25	74.00	8.75	Peak
7991.25	H	40.04	54.00	13.96	Avg
9903.75	H	41.49	54.00	12.51	Avg
17814.375	H	46.02	54.00	7.98	Avg

Test mode: 802.11n(20) Frequency: Channel 6: 2437MHz

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)	Limit 3m(dBuV/m)	Over(dB)	Detector
8010	V	59.03	74.00	14.97	Peak
9885	V	63.65	74.00	10.35	Peak
16156.875	V	65.56	74.00	8.44	Peak
8010	V	40.23	54.00	13.77	Avg
9885	V	40.97	54.00	13.03	Avg
16156.875	V	44.07	54.00	9.93	Avg
8013.75	H	58.99	74.00	15.01	Peak
9950.625	H	62.80	74.00	11.20	Peak
17829.375	H	64.86	74.00	9.14	Peak
8013.75	H	39.99	54.00	14.01	Avg
9950.625	H	40.99	54.00	13.01	Avg
17829.375	H	46.10	54.00	7.90	Avg

Test mode:	802.11n(20)	Frequency:	Channel 11: 2462MHz		
Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)	Limit 3m(dBuV/m)	Over(dB)	Detector
7968.75	V	59.38	74.00	14.62	Peak
9885	V	62.84	74.00	11.16	Peak
17160	V	65.45	74.00	8.55	Peak
7968.75	V	39.43	54.00	14.57	Avg
9885	V	40.98	54.00	13.02	Avg
17160	V	46.44	54.00	7.56	Avg
8028.75	H	59.06	74.00	14.94	Peak
9930	H	62.72	74.00	11.28	Peak
17163.75	H	64.61	74.00	9.39	Peak
8028.75	H	39.61	54.00	14.39	Avg
9930	H	41.17	54.00	12.83	Avg
17163.75	H	46.31	54.00	7.69	Avg

MIMO:

Test mode:	802.11n(20)	Frequency:	Channel 1: 2412MHz		
Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)	Limit 3m(dBuV/m)	Over(dB)	Detector
7986.110	V	59.41	74.00	14.59	Peak
9917.360	V	62.98	74.00	11.02	Peak
17170.655	V	65.2	74.00	8.8	Peak
7988.780	V	39.89	54.00	14.11	Avg
9916.500	V	41.07	54.00	12.93	Avg
17167.125	V	45.89	54.00	8.11	Avg
8002.940	H	58.81	74.00	15.19	Peak
9915.440	H	63.27	74.00	10.73	Peak
17826.065	H	65.09	74.00	8.91	Peak
8002.940	H	39.9	54.00	14.1	Avg
9900.440	H	41.31	54.00	12.69	Avg
17811.065	H	45.89	54.00	8.11	Avg

Test mode:	802.11n(20)	Frequency:	Channel 6: 2437MHz		
Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)	Limit 3m(dBuV/m)	Over(dB)	Detector
8008.610	V	58.9	74.00	15.1	Peak
9883.610	V	63.49	74.00	10.51	Peak
16158.155	V	65.53	74.00	8.47	Peak
8011.280	V	40.21	54.00	13.79	Avg
9882.750	V	40.71	54.00	13.29	Avg
16154.625	V	43.88	54.00	10.12	Avg
8025.440	H	58.91	74.00	15.09	Peak
9962.315	H	62.59	74.00	11.41	Peak
17841.065	H	64.7	74.00	9.3	Peak
8025.440	H	39.85	54.00	14.15	Avg
9947.315	H	40.81	54.00	13.19	Avg
17826.065	H	45.97	54.00	8.03	Avg

Test mode:	802.11n(20)	Frequency:	Channel 11: 2462MHz

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)	Limit 3m(dBuV/m)	Over(dB)	Detector
7967.360	V	59.25	74.00	14.75	Peak
9883.610	V	62.68	74.00	11.32	Peak
17161.280	V	65.42	74.00	8.58	Peak
7970.030	V	39.41	54.00	14.59	Avg
9882.750	V	40.72	54.00	13.28	Avg
17157.750	V	46.25	54.00	7.75	Avg
8040.440	H	58.98	74.00	15.02	Peak
9941.690	H	62.51	74.00	11.49	Peak
17175.440	H	64.45	74.00	9.55	Peak
8040.440	H	39.47	54.00	14.53	Avg
9926.690	H	40.99	54.00	13.01	Avg
17160.440	H	46.18	54.00	7.82	Avg

Note:
(1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3) The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
(4) The radiation measurements are performed in X, Y, Z axis positioning for transmitting mode, and found the X axis positioning which it is the worst case, only the worst data is recorded in the report.

■ Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz
NOTE: All the modulation modes are tested, the data of the worst mode are described in the table.

Test mode: 802.11n(20) Frequency: Channel 1: 2412MHz

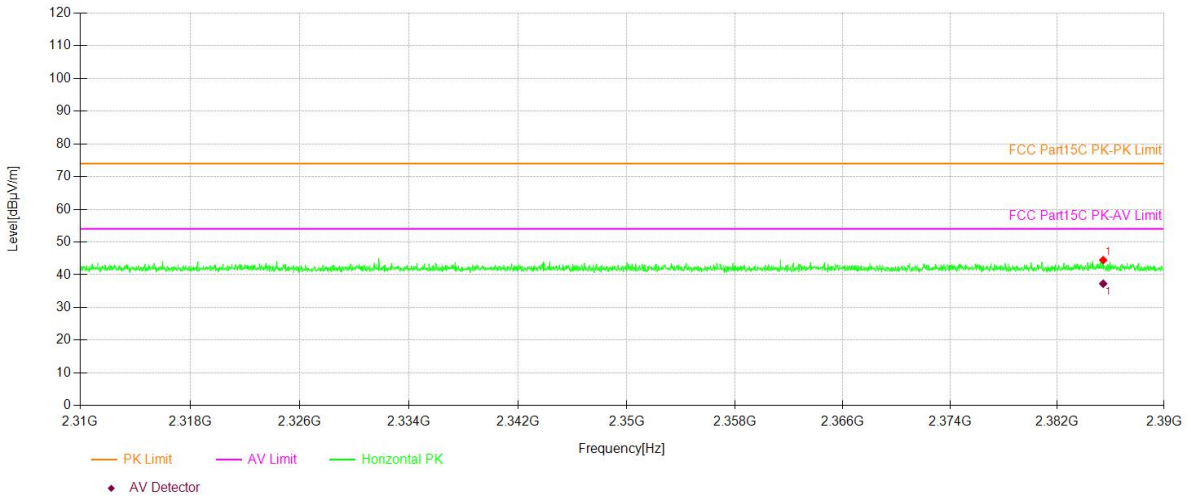
Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)	Limit 3m(dBuV/m)	Over(dB)	Detector
2389.67	V	43.78	74.00	30.22	Peak
2389.67	V	36.90	54.00	17.10	Avg
2385.43	H	44.48	74.00	29.52	Peak
2385.43	H	37.28	54.00	16.72	Avg

Test mode: 802.11n(20) Frequency: Channel 11: 2462MHz

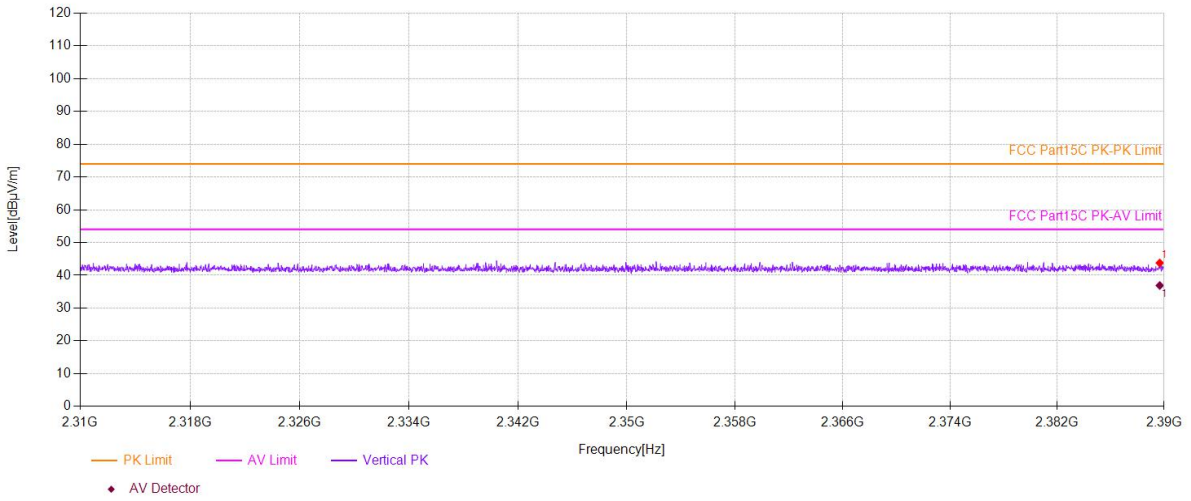
Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)	Limit 3m(dBuV/m)	Over(dB)	Detector
2485.01	V	43.59	74.00	30.41	Peak
2485.01	V	37.23	54.00	16.77	Avg
2483.59	H	43.78	74.00	30.22	Peak
2483.59	H	37.47	54.00	16.53	Avg

Note:
(1) All Readings are Peak Value (VBW=3MHz) and Peak Value (VBW=10Hz).
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3) The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

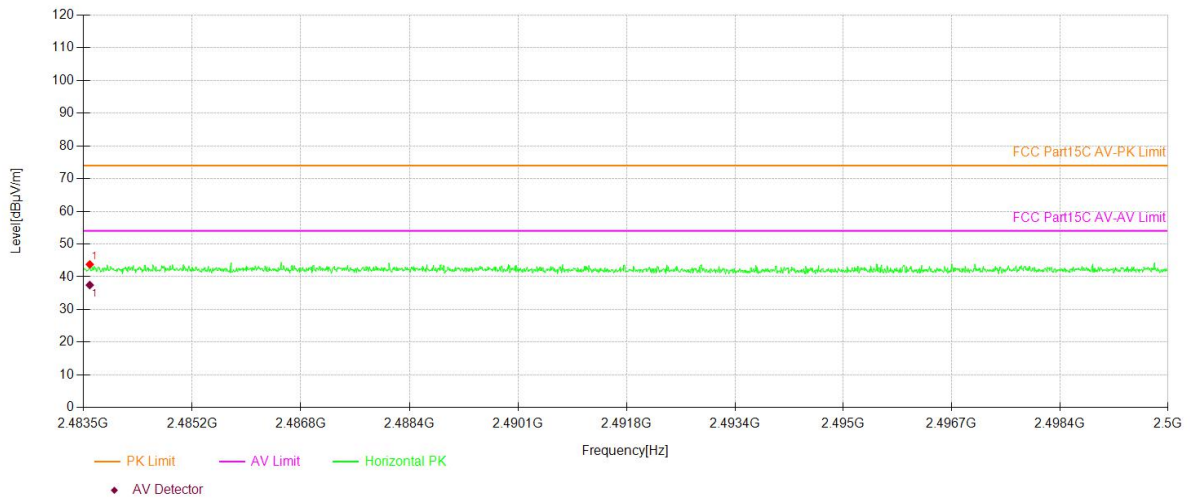
Test Model	Spurious Emission in Restricted Band 2310-2390MHz ☐802.11b ☐802.11g ☒802.11n(HT20) ☐802.11n(HT40) ☒Channel 1:2412MHz ☐Channel 3: 2422MHz Polarity: H VBW=3MHz



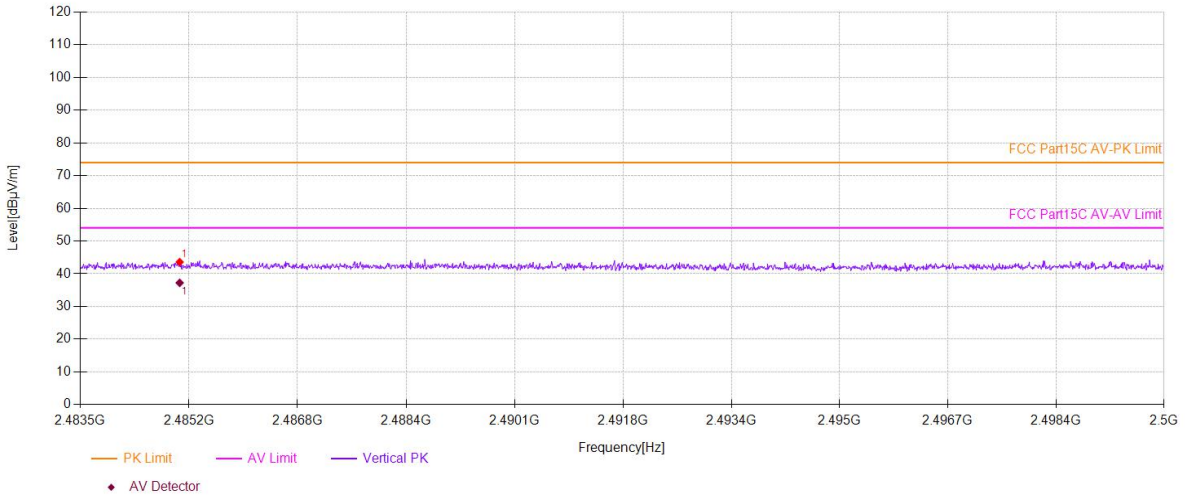
Test Model	Spurious Emission in Restricted Band 2310-2390MHz ☐802.11b ☐802.11g ☒802.11n(HT20) ☐802.11n(HT40) ☒Channel 1:2412MHz ☐Channel 3: 2422MHz Polarity:V VBW=3MHz



Test Model	Spurious Emission in Restricted Band 2483.5-2500MHz ☐802.11b ☐802.11g ☒802.11n(HT20) ☐802.11n(HT40) ☒Channel 11: 2462MHz ☐Channel 9: 2452MHz Polarity: H VBW=3MHz

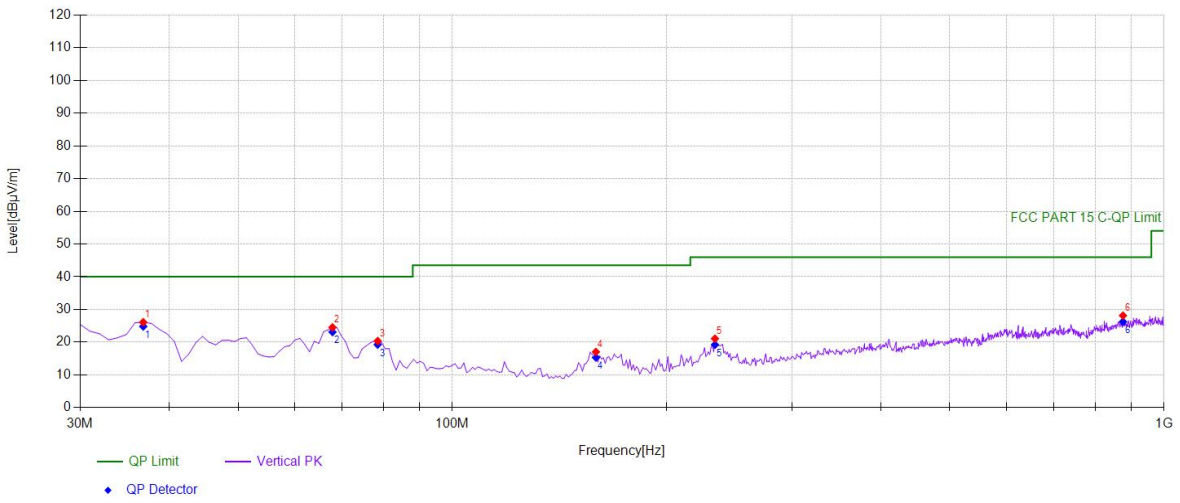


Test Model	Spurious Emission in Restricted Band2483.5-2500MHz ☐802.11b ☐802.11g ☒802.11n(HT20) ☐802.11n(HT40) ☒Channel 11: 2462MHz ☐Channel 9: 2452MHz Polarity: V VBW=3MHz

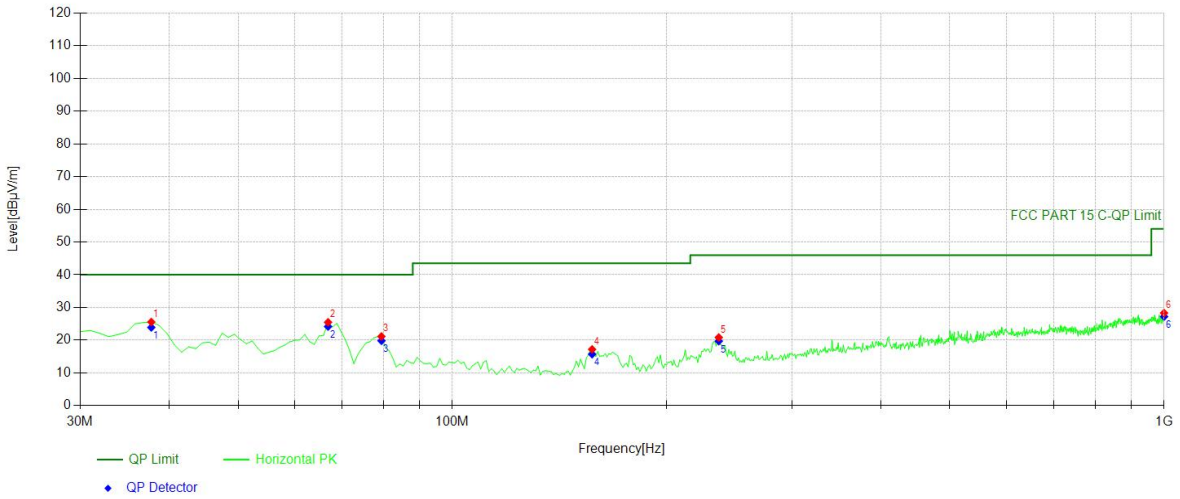


■ Spurious Emission below 1GHz (30MHz to 1GHz)
NOTE: All the modulation modes are tested, the data of the worst mode are described in the table.

Test mode:	802.11n(20)	Frequency:	Channel 1: 2412MHz

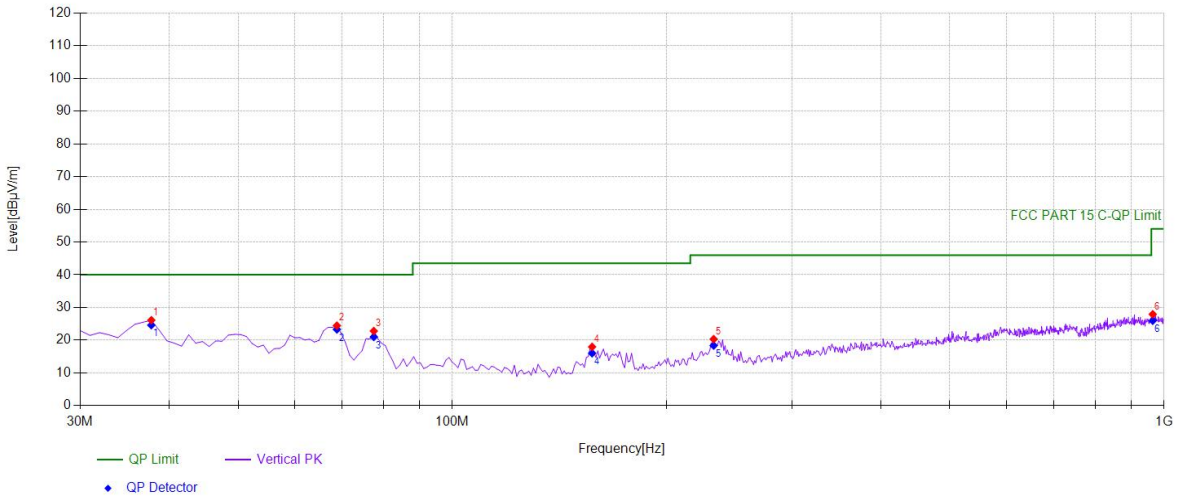


Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Detector	Limit [dBµV/m]	Margin [dB]	Polarity
1	36.7968	43.93	-17.83	26.10	PK	40.00	13.90	Vertical
2	67.8679	42.94	-18.40	24.54	PK	40.00	15.46	Vertical
3	78.5485	40.33	-19.98	20.35	PK	40.00	19.65	Vertical
4	159.139	36.46	-19.42	17.04	PK	43.50	26.46	Vertical
5	233.903	36.96	-15.87	21.09	PK	46.00	24.91	Vertical
6	875.715	31.85	-3.72	28.13	PK	46.00	17.87	Vertical



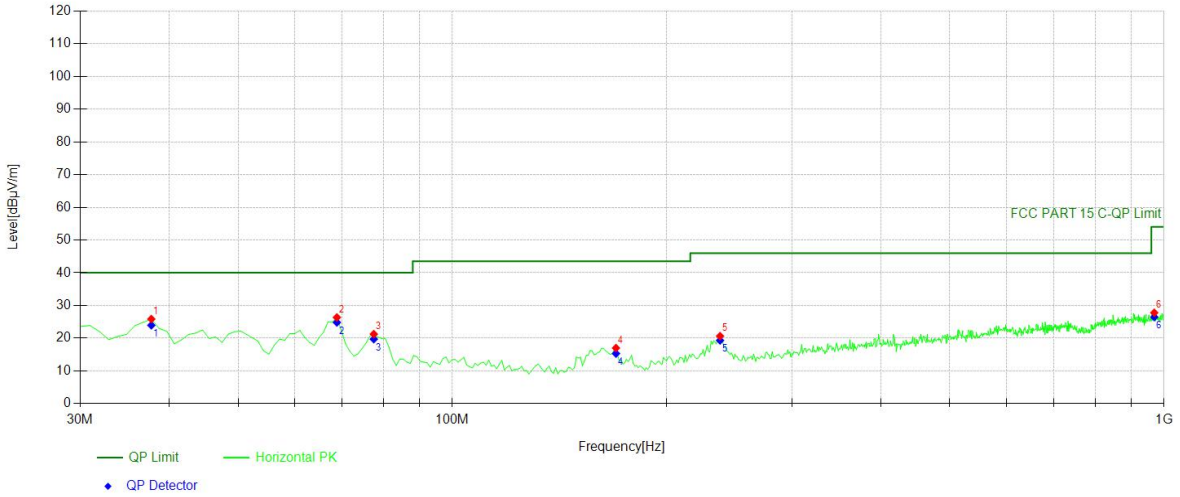
Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Detector	Limit [dBµV/m]	Margin [dB]	Polarity
1	37.7678	43.28	-17.71	25.57	PK	40.00	14.43	Horizontal
2	66.8969	43.76	-18.27	25.49	PK	40.00	14.51	Horizontal
3	79.5195	41.28	-20.12	21.16	PK	40.00	18.84	Horizontal
4	157.197	36.65	-19.44	17.21	PK	43.50	26.29	Horizontal
5	236.816	36.64	-15.79	20.85	PK	46.00	25.15	Horizontal
6	1000	30.74	-2.42	28.32	PK	54.00	25.68	Horizontal

Test mode:	802.11n(20)	Frequency:	Channel 6: 2437MHz



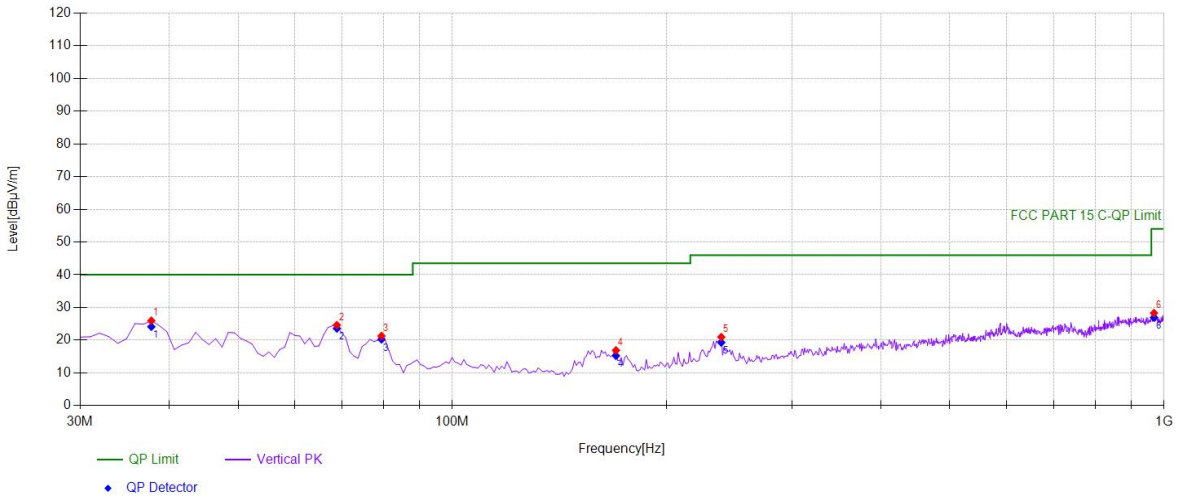
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Detector	Limit [dBµV/m]	Margin [dB]	Polarity
1	37.7678	43.83	-17.71	26.12	PK	40.00	13.88	Vertical
2	68.8388	43.00	-18.53	24.47	PK	40.00	15.53	Vertical
3	77.5776	42.64	-19.83	22.81	PK	40.00	17.19	Vertical
4	157.1970	37.42	-19.44	17.98	PK	43.50	25.52	Vertical
5	232.9320	36.25	-15.91	20.34	PK	46.00	25.66	Vertical
6	964.0741	30.31	-2.38	27.93	PK	54.00	26.07	Vertical



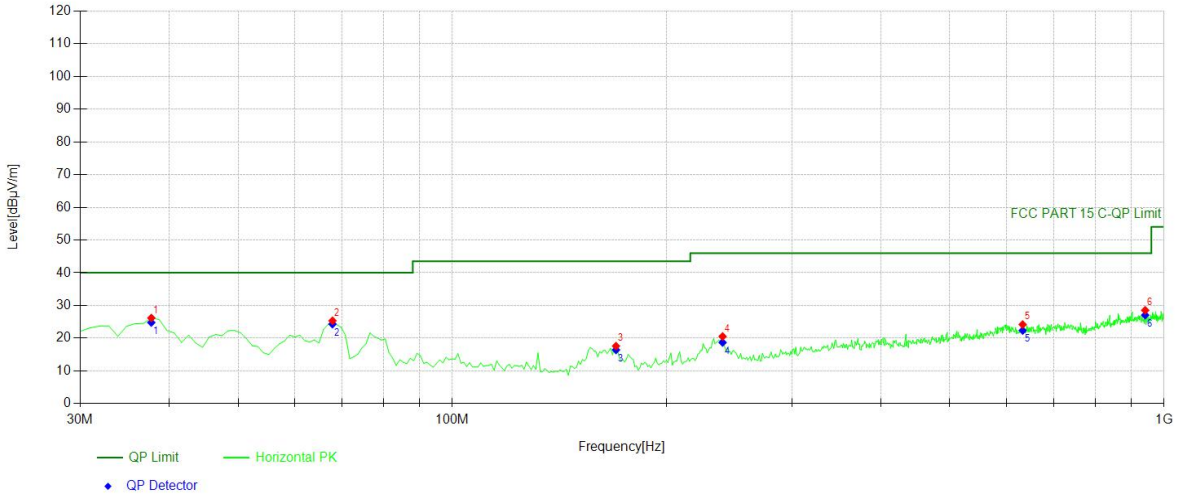
Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Detector	Limit [dBµV/m]	Margin [dB]	Polarity
1	37.7678	43.56	-17.71	25.85	PK	40.00	14.15	Horizontal
2	68.8388	44.89	-18.53	26.36	PK	40.00	13.64	Horizontal
3	77.5776	41.09	-19.83	21.26	PK	40.00	18.74	Horizontal
4	169.8190	35.93	-18.92	17.01	PK	43.50	26.49	Horizontal
5	237.7870	36.42	-15.76	20.66	PK	46.00	25.34	Horizontal
6	968.9280	30.17	-2.38	27.79	PK	54.00	26.21	Horizontal

Test mode:	802.11n(20)	Frequency:	Channel 11: 2462MHz



Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Detector	Limit [dBµV/m]	Margin [dB]	Polarity
1	37.7678	43.68	-17.71	25.97	PK	40.00	14.03	Vertical
2	68.8388	43.15	-18.53	24.62	PK	40.00	15.38	Vertical
3	79.5195	41.43	-20.12	21.31	PK	40.00	18.69	Vertical
4	169.8190	35.82	-18.92	16.90	PK	43.50	26.60	Vertical
5	238.7580	36.69	-15.73	20.96	PK	46.00	25.04	Vertical
6	967.958	30.68	-2.38	28.30	PK	54.00	25.70	Vertical



Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Detector	Limit [dBµV/m]	Margin [dB]	Polarity
1	37.7678	43.90	-17.71	26.19	PK	40.00	13.81	Horizontal
2	67.8679	43.75	-18.40	25.35	PK	40.00	14.65	Horizontal
3	169.8198	36.54	-18.92	17.62	PK	43.50	25.88	Horizontal
4	239.7297	36.24	-15.70	20.54	PK	46.00	25.46	Horizontal
5	632.973	31.74	-7.55	24.19	PK	46.00	21.81	Horizontal
6	940.7708	32.03	-3.49	28.54	PK	46.00	17.46	Horizontal

Detail of factor for radiated emission:

Frequency(MHz)	Ant_F(dB)	Cab_L(dB)	Preamp(dB)	Correct Factor(dB)
0.009	20.6	0.03	\	20.63
0.15	20.7	0.1	\	20.8
1	20.9	0.15	\	21.05
10	20.1	0.28	\	20.38
30	18.8	0.45	\	19.25
30	11.7	0.62	27.9	-15.58
100	12.5	1.02	27.8	-14.28
300	12.9	1.91	27.5	-12.69
600	19.2	2.92	27	-4.88
800	21.1	3.54	26.6	-1.96
1000	22.3	4.17	26.2	0.27
1000	25.6	1.76	41.4	-14.04
3000	28.9	3.27	43.2	-11.03
5000	31.1	4.2	44.6	-9.3
8000	36.2	5.95	44.7	-2.55
10000	38.4	6.3	43.9	0.8
12000	38.5	7.14	42.3	3.34
15000	40.2	8.15	41.4	6.95
18000	45.4	9.02	41.3	13.12
18000	37.9	1.81	47.9	-8.19
21000	37.9	1.95	48.7	-8.85
25000	39.3	2.01	42.8	-1.49
28000	39.6	2.16	46.0	-4.24
31000	41.2	2.24	44.5	-1.06
34000	41.5	2.29	46.6	-2.81
37000	43.8	2.30	46.4	-0.3
40000	43.2	2.50	42.2	3.5

--- End of Report ---

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