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Test Report No.: PSU-NQN2507020111RF01



Certificate #6613.01

# FCC TEST REPORT

## (Part 15, Subpart C)

Applicant:	Qingdao Intelligent & Precise Electronics Co., Ltd.
Address:	No.218 Qianwangang Road, Qingdao Economic & Technological Development Zone, Qingdao City, Shandong Province, P. R. China

Manufacturer or Supplier:	Qingdao Intelligent & Precise Electronics Co., Ltd.
Address:	No.218 Qianwangang Road, Qingdao Economic & Technological Development Zone, Qingdao City, Shandong Province, P. R. China
Product:	WiFi/BT Module
Model Name:	MW15S
FCC ID:	2AJVQ-MW15S
Date of tests:	Jun.23, 2025 ~ Jun.30, 2025

The tests have been carried out according to the requirements of the following standard:

- FCC Part 15, Subpart C, Section 15.247**
- ANSI C63.10-2020**

**CONCLUSION: The submitted sample was found to COMPLY with the test requirement**

Prepared by Hanwen Xu Engineer / Mobile Department	Approved by Peibo Sun Manager / Mobile Department

Date: Jun.30, 2025      Date: Jun.30, 2025

This report is governed by, and incorporates by reference, the Conditions of Testing as posted at the date of issuance of this report at <http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/> and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. Statements of conformity are based on simple acceptance criteria without taking measurement uncertainty into account, unless otherwise requested in writing. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.



## TABLE OF CONTENTS

<b>RELEASE CONTROL RECORD .....</b>	<b>5</b>
<b>1 SUMMARY OF TEST RESULTS .....</b>	<b>6</b>
1.1 MEASUREMENT UNCERTAINTY .....	7
<b>2 GENERAL INFORMATION .....</b>	<b>8</b>
2.1 GENERAL DESCRIPTION OF EUT .....	8
2.2 DESCRIPTION OF TEST MODES .....	10
2.2.1 CONFIGURATION OF SYSTEM UNDER TEST .....	11
2.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL .....	11
2.3 DUTY CYCLE OF TEST SIGNAL .....	15
2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS .....	15
2.5 DESCRIPTION OF SUPPORT UNITS .....	15
<b>3 TEST TYPES AND RESULTS .....</b>	<b>16</b>
3.1 CONDUCTED EMISSION MEASUREMENT .....	16
3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT .....	16
3.1.2 TEST INSTRUMENTS .....	16
3.1.3 TEST PROCEDURES .....	17
3.1.4 DEVIATION FROM TEST STANDARD .....	17
3.1.5 TEST SETUP .....	18
3.1.6 EUT OPERATING CONDITIONS .....	18
3.1.7 TEST RESULTS .....	18
3.2 RADIATED EMISSION MEASUREMENT .....	19
3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT .....	19
3.2.2 TEST INSTRUMENTS .....	20
3.2.3 TEST PROCEDURES .....	21
3.2.4 DEVIATION FROM TEST STANDARD .....	21
3.2.5 TEST SETUP .....	22
3.2.6 EUT OPERATING CONDITIONS .....	23
3.2.7 TEST RESULTS .....	24
3.3 6 dB BANDWIDTH MEASUREMENT .....	63
3.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT .....	63
3.3.2 TEST INSTRUMENTS .....	63
3.3.3 TEST PROCEDURE .....	64
3.3.4 DEVIATION FROM TEST STANDARD .....	64



BUREAU  
VERITAS

**Test Report No.: PSU-NQN2507020111RF01**

3.3.5	TEST SETUP .....	64
3.3.6	EUT OPERATING CONDITIONS .....	64
3.3.7	TEST RESULTS .....	64
3.4	CONDUCTED OUTPUT POWER .....	65
3.4.1	LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT .....	65
3.4.2	TEST SETUP .....	65
3.4.3	TEST INSTRUMENTS .....	65
3.4.4	TEST PROCEDURES .....	65
3.4.5	DEVIATION FROM TEST STANDARD .....	65
3.4.6	EUT OPERATING CONDITIONS .....	65
3.4.7	TEST RESULTS .....	65
3.4.7.1	MAXIMUM PEAK OUTPUT POWER .....	65
3.4.7.2	AVERAGE OUTPUT POWER (FOR REFERENCE) .....	66
3.5	POWER SPECTRAL DENSITY MEASUREMENT .....	66
3.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT .....	66
3.5.2	TEST SETUP .....	66
3.5.3	TEST INSTRUMENTS .....	66
3.5.4	TEST PROCEDURE .....	66
3.5.5	DEVIATION FROM TEST STANDARD .....	66
3.5.6	EUT OPERATING CONDITION .....	67
3.5.7	TEST RESULTS .....	67
3.6	OUT OF BAND EMISSION MEASUREMENT .....	68
3.6.1	LIMITS OF OUT OF BAND EMISSION MEASUREMENT .....	68
3.6.2	TEST SETUP .....	68
3.6.3	TEST INSTRUMENTS .....	68
3.6.4	TEST PROCEDURE .....	68
3.6.5	DEVIATION FROM TEST STANDARD .....	69
3.6.6	EUT OPERATING CONDITION .....	69
3.6.7	TEST RESULTS .....	69
3.7	ANTENNA REQUIREMENTS .....	70
3.7.1	STANDARD APPLICABLE .....	70
3.7.2	ANTENNA CONNECTED CONSTRUCTION .....	70
3.7.3	ANTENNA GAIN .....	70
4	PHOTOGRAPHS OF THE TEST CONFIGURATION .....	70
5	MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	70
6	APPENDIX 1 .....	71



**Test Report No.: PSU-NQN2507020111RF01**

<b>WLAN 2.4G .....</b>	<b>71</b>
<b>7 APPENDIX 2 BLE .....</b>	<b>91</b>



**BUREAU  
VERITAS** Test Report No.: PSU-NQN2507020111RF01

## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
PSU-NQN2507020111RF01	Original release	Jun.30, 2025



## 1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)		
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT
15.207	AC Power Conducted Emission	N/A
15.205 15.209	Radiated Emissions	Compliance
15.247(d)	Out of band Emission Measurement	Compliance
15.247(a)(2)	6dB bandwidth	Compliance
15.247(b)	Conducted Output power	Compliance
15.247(e)	Power Spectral Density	Compliance
15.203	Antenna Requirement	Compliance

Note: 1.Except RSE, other data please refer to Appendix 1 (for WIFI-2.4G) and Appendix 2 (for BLE).

Note: 2. EUT power supply by battery

### \*Test Lab Information Reference

#### Lab A:

Huarui 7Layers High Technology (Suzhou) Co., Ltd.

#### Lab Address:

Tower N, Innovation Center, 88 Zuyi Road, High-tech District, Suzhou City, Anhui Province

#### Accredited Test Lab Cert 6613.01

The FCC Site Registration No. is 434559; The Designation No. is CN1325.

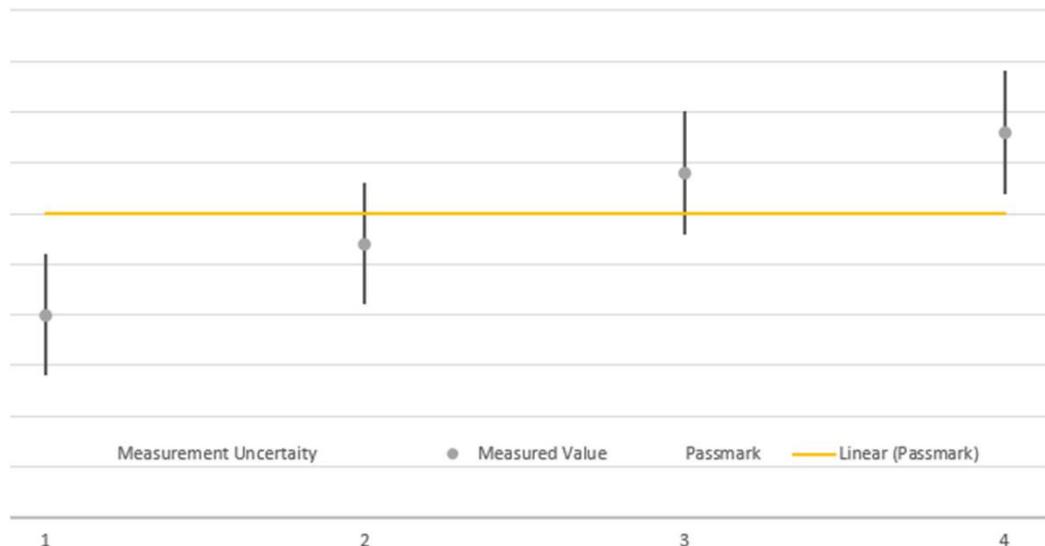


## 1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	UNCERTAINTY
AC Power Conducted emissions	±2.70dB
Radiated emissions (9KHz~30MHz)	±2.68dB
Radiated emissions (30MHz~1GHz)	±4.98dB
Radiated emissions (1GHz ~6GHz)	±4.70dB
Radiated emissions (6GHz ~18GHz)	±4.60dB
Radiated emissions (18GHz ~40GHz)	±4.12dB
Conducted emissions	±4.01dB
Occupied Channel Bandwidth	±43.58KHz
Conducted Output power	±2.06dB
Power Spectral Density	±0.85 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k = 2$ .



The verdicts in this test report are given according the above diagram:

Case	Measured Value	Uncertainty Range	Verdict
1	below pass mark	below pass mark	Passed
2	below pass mark	within pass mark	Passed
3	above pass mark	within pass mark	Failed
4	above pass mark	above pass mark	Failed

That means, the laboratory applies, as decision rule (see ISO/IEC 17025:2017), the so-called shared risk principle.



## 2 GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT*</b>	WiFi/BT Module
<b>BRAND NAME*</b>	MW15S
<b>NOMINAL VOLTAGE*</b>	3.3Vdc (DC supply)
<b>MODULATION *</b>	DSSS, OFDM, OFDMA, GFSK
<b>TRANSMISSION RATE</b>	802.11b: 11/ 5.5/ 2.0 / 1.0 Mbps 802.11g: 54/ 48/ 36 / 24 / 18 / 9/ 6 Mbps 802.11n(HT20): up to 144.4 Mbps BT_ LE: 1 Mbps
<b>OPERATING FREQUENCY</b>	2412-2462MHz for 11b/g/n(HT20/40) 2402-2480MHz for BT-LE(GFSK)
<b>MAX. OUTPUT POWER</b>	WLAN: 168.267mW (Maximum) BT-LE:4.932mW (Maximum)
<b>ANTENNA TYPE</b>	PCB Antenna with 0.3dBi gain for WIFI PCB Antenna with 0.3dBi gain for BLE
<b>Directional Gain:</b>	N/A
<b>Beamforming Directional Gain:</b>	N/A
<b>HW VERSION</b>	V1.00
<b>SW VERSION</b>	2.00.12
<b>I/O PORTS</b>	Refer to user's manual
<b>CABLE SUPPLIED</b>	N/A



**BUREAU  
VERITAS** Test Report No.: PSU-NQN2507020111RF01

**NOTE:**

1. \*Since the above data and/or information is provided by the client relevant results or conclusions of this report are only made for these data and/or information, Test Lab is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.
2. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
3. The EUT incorporates a MIMO function. Physically, the EUT provides one transmitter and one receiver.

MODULATION MODE	TX/RX FUNCTION
<b>802.11b</b>	1TX /1RX
<b>802.11g</b>	1TX /1RX
<b>802.11n(HT20)</b>	1TX /1RX
<b>BT_LE(1MHz)</b>	1TX /1RX

4. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
5. Antenna gain and EUT conducted cable loss are provided by the customer, and the laboratory will record the results based on these items that involve these two parameters.



## 2.2 DESCRIPTION OF TEST MODES

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

40 channels are provided for BT-LE (GFSK):

CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480



## 2.2.1 CONFIGURATION OF SYSTEM UNDER TEST

Please see section 4 photographs of the test configuration for reference.

## 2.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports.

The worst case was found when positioned on Y axis for radiated emission. Following test modes were selected for the final test, and the final worst case is marked in boldface and recorded in the report:

EUT CONFIGURE MODE	APPLICABLE TO				MODE
	RE<1G	RE 1G	PLC	APCM	
-	√	√	N/A	√	-

Where

**RE<1G:** Radiated Emission below 1GHz

**RE<sup>3</sup>1G:** Radiated Emission above 1GHz

**PLC:** Power Line Conducted Emission

**APCM:** Antenna Port Conducted Measurement

**NOTE:** No need to concern of Conducted Emission due to the EUT is powered by battery.

### RADIATED EMISSION TEST (BELOW 1GHz):

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- The following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	1.0
802.11g	1 to 11	1, 6, 11	OFDM	6.0
802.11n HT20	1 to 11	1, 6, 11	OFDM	MCS0
BT-LE	0 to 39	0,19, 39	GFSK	1.0



BUREAU  
VERITAS

Test Report No.: PSU-NQN2507020111RF01

**RADIATED EMISSION TEST (ABOVE 1GHz):**

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

The following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	1.0
802.11g	1 to 11	1, 6, 11	OFDM	6.0
802.11n HT20	1 to 11	1, 6, 11	OFDM	MCS0
BT-LE	0 to 39	0,19, 39	GFSK	1.0

**POWER LINE CONDUCTED EMISSION TEST**

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

The following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	1.0



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VERITAS

Test Report No.: PSU-NQN2507020111RF01

**BANDEdge MEASUREMENT:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- The following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	1.0
802.11g	1 to 11	1, 6, 11	OFDM	6.0
802.11n HT20	1 to 11	1, 6, 11	OFDM	MCS0
BT-LE	0 to 39	0,19,39	GFSK	1.0



**ANTENNA PORT CONDUCTED MEASUREMENT:**

- This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- The following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	1.0
802.11g	1 to 11	1, 6, 11	OFDM	6.0
802.11n HT20	1 to 11	1, 6, 11	OFDM	MCS0
BT-LE	0 to 39	0,19,39	GFSK	1.0

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE	TESTED BY
<b>RE&lt;1G</b>	23deg. C, 70%RH	DC 3.3V By DC Supply	Hanwen Xu
<b>RE<sup>3</sup>1G</b>	23deg. C, 70%RH	DC 3.3V By DC Supply	Hanwen Xu
<b>PLC</b>	25deg. C, 52%RH	DC 3.3V By DC Supply	Hanwen Xu
<b>APCM</b>	25deg. C, 60%RH	DC 3.6V By DC Supply	Hanwen Xu



## 2.3 DUTY CYCLE OF TEST SIGNAL

Please Refer to Appendix1/2 Of this test report.

## 2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC Part 15, Subpart C, Section 15.247**

**KDB 558074 D01 DTS Meas Guidance v05r02**

**ANSI C63.10-2020**

Note:

1. All test items have been performed and recorded as per the above standards.
2. The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (Certification). The test report has been issued separately.

## 2.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Laptop	Lenovo	Thinkpad E14	SL10W47313	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	AC Line: Unshielded, Detachable 1.5m
2	AC Line: Unshielded, Detachable 1.5m
3	AC Line: Unshielded, Detachable 1.5m



### 3 TEST TYPES AND RESULTS

#### 3.1 CONDUCTED EMISSION MEASUREMENT

##### 3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB $\mu$ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

**NOTE:** 1. The lower limit shall apply at the transition frequencies.  
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.  
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

##### 3.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR3	102749	Mar.28,24	Mar.27,26
ELEKTRA test software	Rohde&Schwarz	ELEKTRA	NA	N/A	N/A
LISN network	Rohde&Schwarz	ENV216	102640	Mar.28,24	Mar.27,26
CABLE	Rohde&Schwarz	W61.01	N/A	Apr.27,25	Apr.26,26
CABLE	Rohde&Schwarz	W601	N/A	Apr.27,25	Apr.26,26

**NOTE:**

1. The test was performed in CE shielded room.
2. The calibration interval of the above test instruments is 12 /24months and the calibrations are traceable to CEPREI/CHINA, GRRG/CHINA and NIM/CHINA.



### 3.1.3 TEST PROCEDURES

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

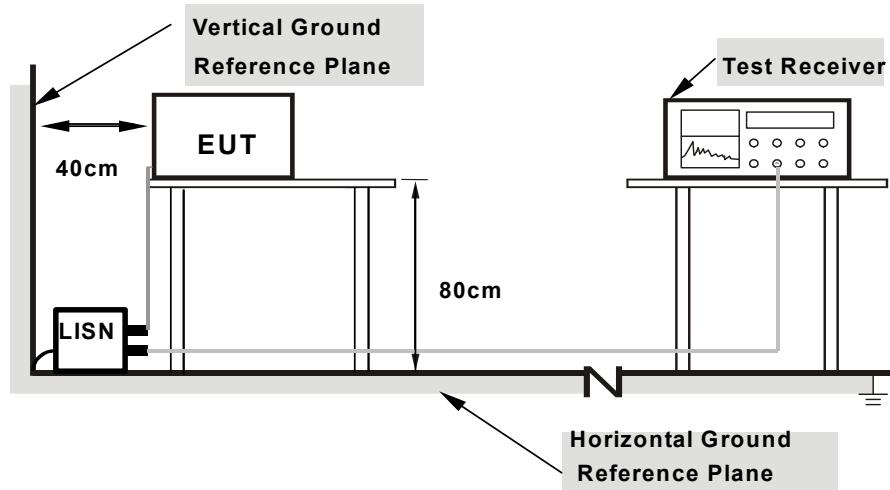
**NOTE:** All modes of operation were investigated and the worst-case emissions are reported.

### 3.1.4 DEVIATION FROM TEST STANDARD

No deviation.



### 3.1.5 TEST SETUP



**Note:**

1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

### 3.1.6 EUT OPERATING CONDITIONS

- Turned on the power and connected of all equipment.
- EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.

### 3.1.7 TEST RESULTS

N/A



## 3.2 RADIATED EMISSION MEASUREMENT

### 3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/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

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dB<sub>u</sub>V/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



BUREAU  
VERITAS

Test Report No.: PSU-NQN2507020111RF01

### 3.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Pre-Amplifier	R&S	SCU18F1	100815	Aug.30,23	Aug.29,25
Pre-Amplifier	R&S	SCU08F1	101028	Jan.22,24	Jan.21,26
Signal Generator	R&S	SMB100A	182185	Mar.29,24	Mar.28,26
3m Fully-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-01Chamber	Nov.25,22	Nov.24,25
3m Semi-anechoic Chamber	TDK	9m*6m*6m	HRSW-SZ-EMC-02Chamber	Nov.25,22	Nov.24,25
EMI TEST Receiver	R&S	ESW44	101973	Mar.28,24	Mar.27,26
Bilog Antenna	SCHWARZBEC K	VULB 9163	1264	Dec.26,23	Dec.25,25
Horn Antenna	ETS-LINDGREN	3117	227836	Aug.22,23	Aug.21,25
Horn Antenna (18GHz-40GHz)	Steatite Q-par Antennas	QMS 00880	23486	Jul.15,24	Jul.14,26
Horn Antenna	Steatite Q-par Antennas	QMS 00208	23485	Aug.22,23	Aug.21,25
Loop Antenna	SCHWARZ	HFH2-Z2/Z2E	100976	Feb.23,25	Feb.22,27
WIDEBANDRADIO COMMUNICATION TESTER	R&S	CMW500	169399	Jun.19,24	Jun.18,26
Test Software	ELEKTRA	ELEKTRA4.32	N/A	N/A	N/A
Open Switch and Control Unit	R&S	OSP220	101964	N/A	N/A
DC Source	HYELEC	HY3010B	551016	Aug.31,23	Aug.30,25
Hygrothermograph	DELI	20210528	SZ014	Sep.06,23	Sep.05,25
6dB attenuator	Tonscend Technology Co., Ltd	N/A	23062787	N/A	N/A
PC	LENOVO	E14	HRSW0024	N/A	N/A
TMC-AMI18843A(CA BLE)	R&S	HF290-NMNM-7.00M	N/A	N/A	N/A
TMC-AMI18843A(CA BLE)	R&S	HF290-NMNM-4.00M	N/A	N/A	N/A
CABLE	R&S	W13.02	N/A	Apr.27,25	Apr.26,26
CABLE	R&S	W12.14	N/A	Apr.27,25	Apr.26,26

**NOTE:**

1. The calibration interval of the above test instruments is 12/ 24/ 36 months and the calibrations are traceable to CEPREI/CHINA, GRRG/CHINA and NIM/CHINA.
2. The test was performed in 3m Chamber.
3. The FCC Site Registration No. is 434559; The Designation No. is CN1325.



### 3.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

**Note:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ( $10 \log(1/\text{duty cycle})$ ).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle  $\geq 98\%$ ) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

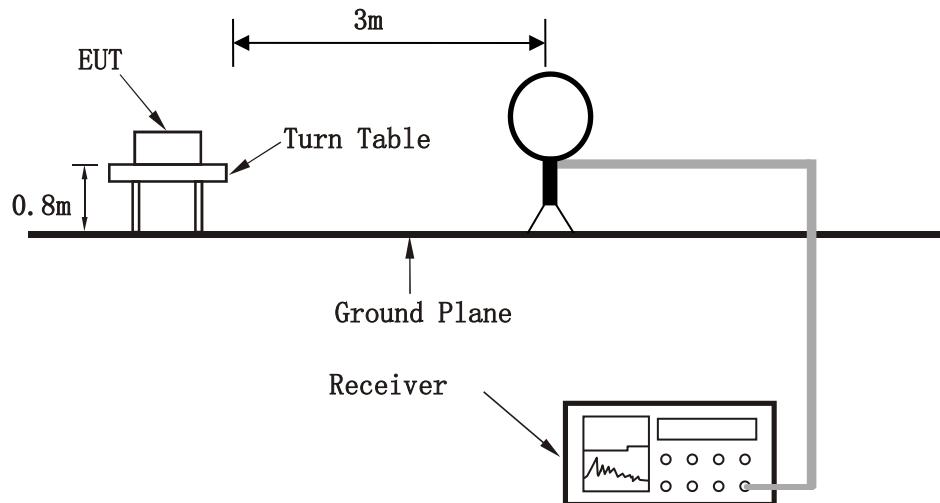
### 3.2.4 DEVIATION FROM TEST STANDARD

No deviation

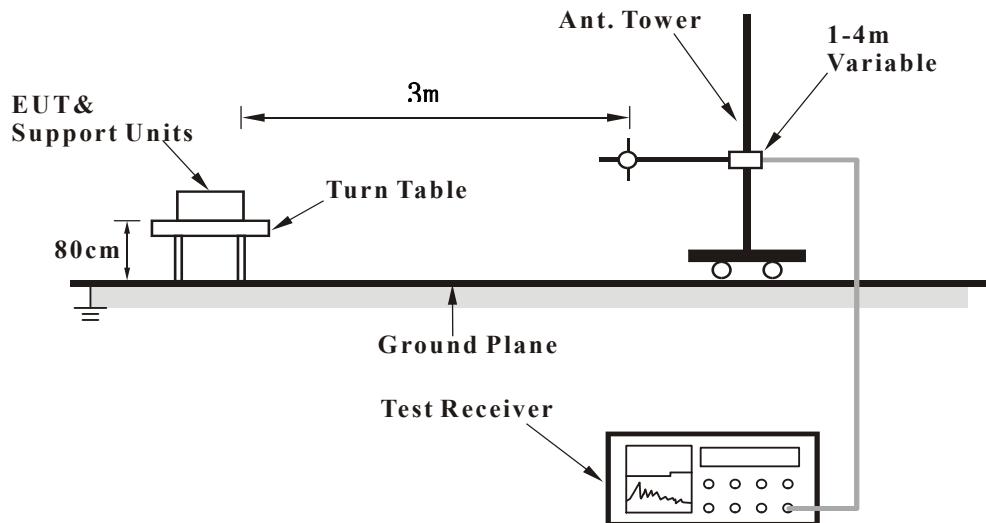


### 3.2.5 TEST SETUP

**<Frequency Range 9KHz~30MHz >**

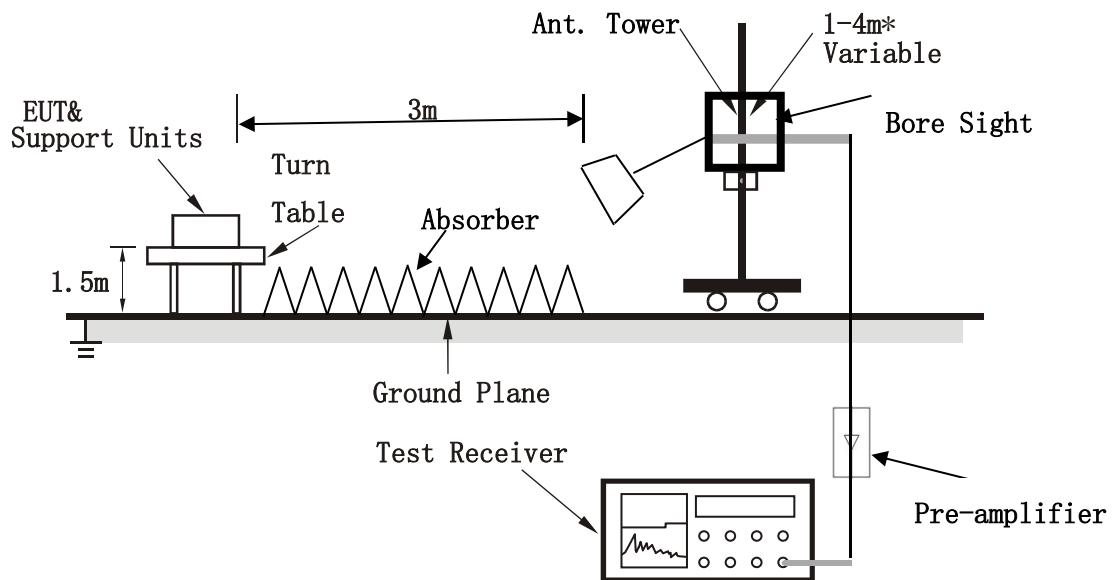


**< Frequency Range 30MHz~1GHz >**





**<Frequency Range above 1GHz>**



**Note:** Above 1G is a directional antenna

Depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

### 3.2.6 EUT OPERATING CONDITIONS

- Set the EUT under full load condition and placed them on a testing table.
- Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.
- The necessary accessories enable the EUT in full functions.



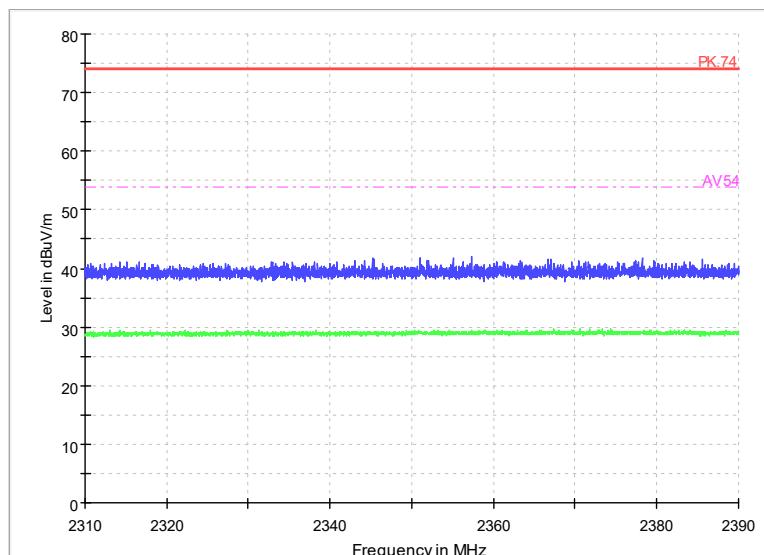
### 3.2.7 TEST RESULTS

Note 1: Both horizontal and vertical polarizations of the antenna are set to make the measurement.

Note 2: Three-axis equipment has been evaluated in test.

Note 3: The relevant tests have been performed in order to verify in which mode would have the worst features, the result show above is the worst case (Channel, Mode, Rate, Chain...).

#### Radiated Emission Band Edge for BLE



Carrier frequency (MHz): 2402

Channel No.:0

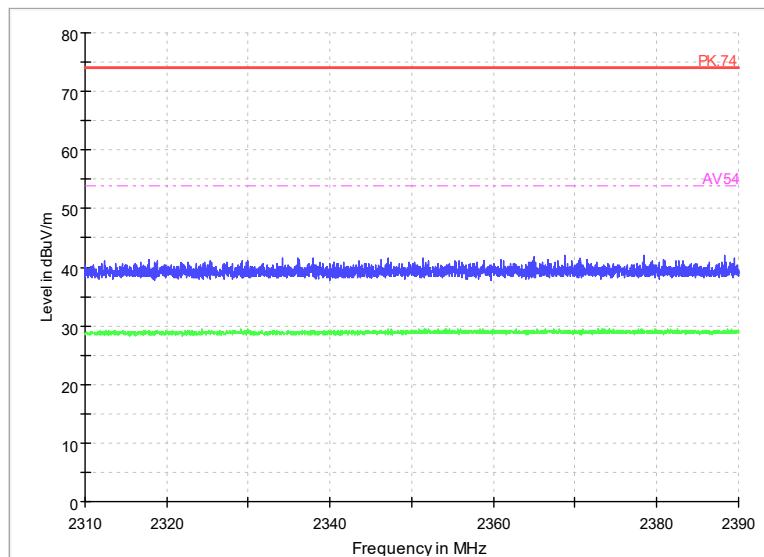
Test Mode: GFSK (LE 1Mbps)

Polarity: Vertical



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Test Report No.: PSU-NQN2507020111RF01



Carrier frequency (MHz): 2402

Channel No.:0

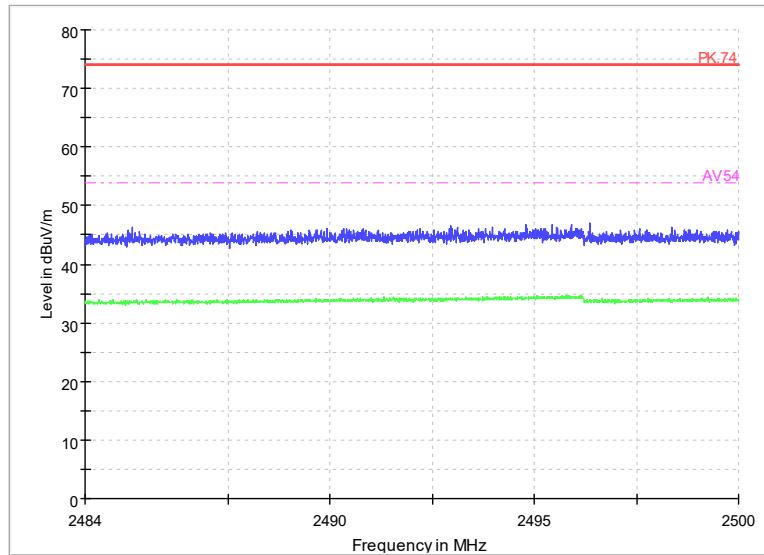
Test Mode: GFSK (LE 1Mbps)

Polarity: Horizontal



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VERITAS

Test Report No.: PSU-NQN2507020111RF01

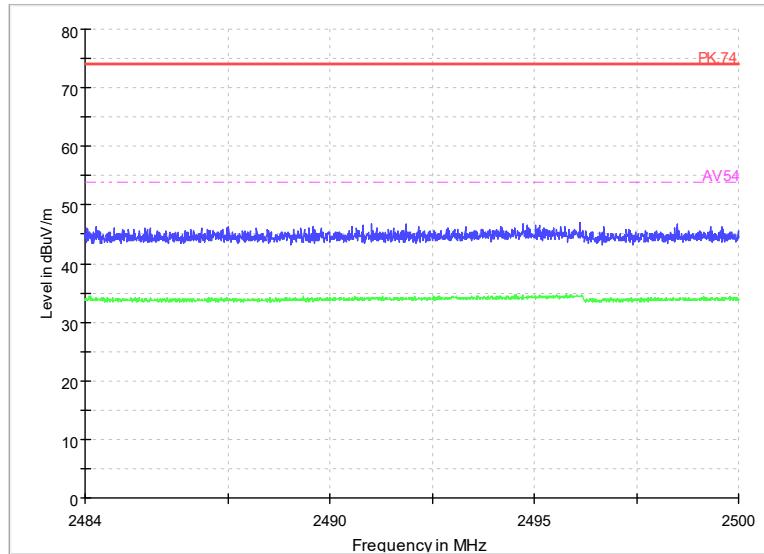


Carrier frequency (MHz): 2480

Channel No.:39

Test Mode: GFSK (LE 1Mbps)

Polarity: Vertical



Carrier frequency (MHz): 2480

Channel No.:39

Test Mode: GFSK (LE 1Mbps)

Polarity: Horizontal



## Radiated Emission for BLE

After comparison, the worst case attitude is EUT lay down.

### Determining Spurious Emissions Levels

A “reference path loss” is established and the  $A_{Rpl}$  is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

The measurement results are obtained as described below:

$$\text{Result} = P_{\text{mea}} + A_{\text{Rpl}}$$

Sample calculation:  $(26.35 \text{ dB}\mu\text{V/m}) = (41.85 \text{ dB}\mu\text{V}) + (-15.5 \text{ dB/m})$ , the corresponding frequency is 53.1345MHz.

For GFSK (LE 1Mbps)

Channel No.:0

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	Pmea (dB $\mu$ V/m)	Polarity	Limit (dB $\mu$ V/m)	Margin (dB)
53.1345	26.35	-15.5	41.85	Vertical	40	13.65
75.1535	30.06	-21.3	51.36	Vertical	40	9.94
150.28	29.68	-20.6	50.28	Vertical	43.5	13.82
180.35	35.07	-18.8	53.87	Vertical	43.5	8.43
399.958	25.12	-11.4	36.52	Vertical	46	20.88
948.493	34.43	-2.1	36.53	Vertical	46	11.57

Channel No.:19

Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	Pmea (dB $\mu$ V/m)	Polarity	Limit (dB $\mu$ V/m)	Margin (dB)
53.2315	26.3	-15.5	41.8	Vertical	40	13.7
72.098	29.74	-20	49.74	Vertical	40	10.26
107.891	30.06	-17.3	47.36	Vertical	43.5	13.44
180.35	35.08	-18.8	53.88	Vertical	43.5	8.42
399.958	25.1	-11.4	36.5	Vertical	46	20.9
799.986	33.11	-4	37.11	Vertical	46	12.89

Channel No.:39

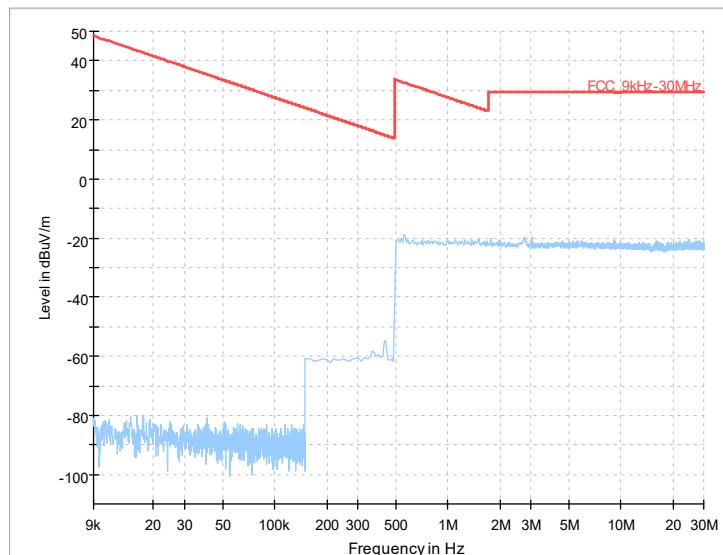
Frequency (MHz)	Result (dB $\mu$ V/m)	ARpl (dB)	Pmea (dB $\mu$ V/m)	Polarity	Limit (dB $\mu$ V/m)	Margin (dB)



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VERITAS

Test Report No.: PSU-NQN2507020111RF01

53.2315	26.28	-15.5	41.78	Vertical	40	13.72
84.126	28.28	-21.6	49.88	Vertical	40	11.72
107.8425	29.23	-17.3	46.53	Vertical	43.5	14.27
180.35	35.06	-18.8	53.86	Vertical	43.5	8.44
400.0065	25.83	-11.4	37.23	Vertical	46	20.17
948.493	34.61	-2.1	36.71	Vertical	46	11.39



Frequency Range: 9kHz -30MHz

Detector: QP mode

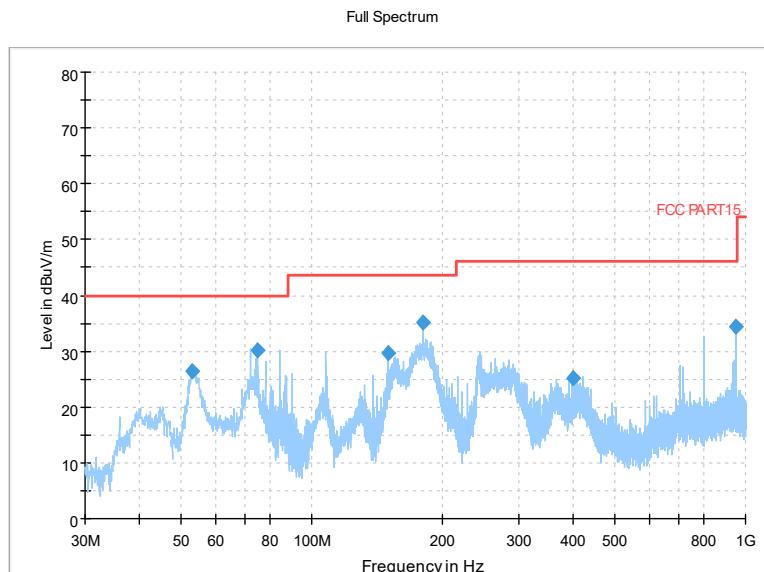
Note: The relevant tests have been performed in order to verify in which mode would have the worst features, the result show above is the worst case.



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VERITAS** Test Report No.: PSU-NQN2507020111RF01

**LE 1Mbps**

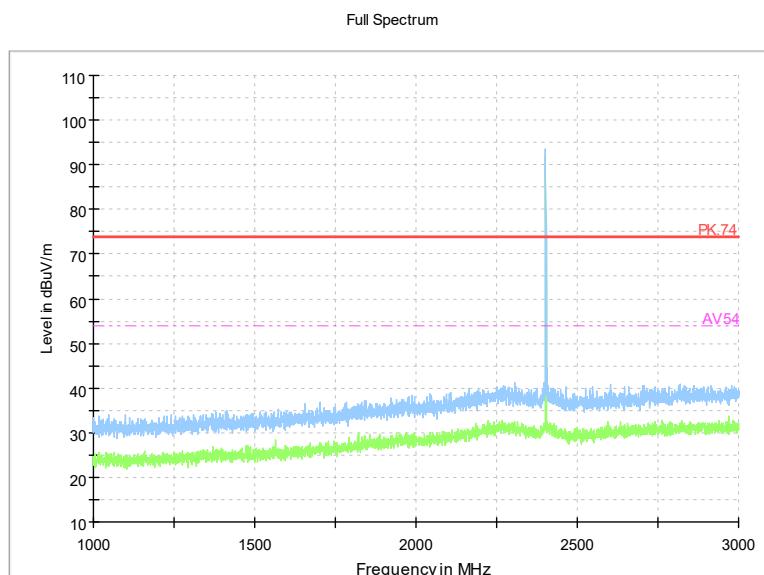
Channel No.:0



Frequency Range: 30MHz-1GHz

Detector: QP mode

Modulation type: GFSK (LE 1Mbps)



Frequency Range: 1GHz-3GHz

Detector: Av mode and PK mode

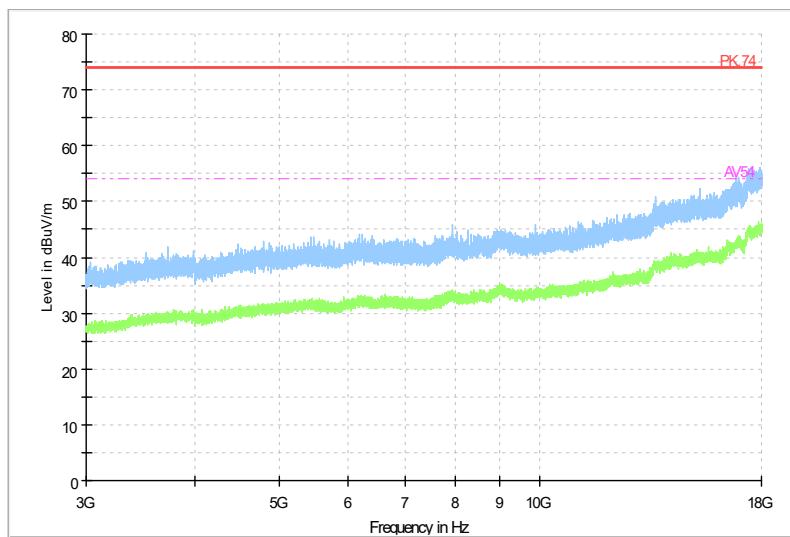
Modulation type: GFSK (LE 1Mbps)



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VERITAS

Test Report No.: PSU-NQN2507020111RF01

Full Spectrum

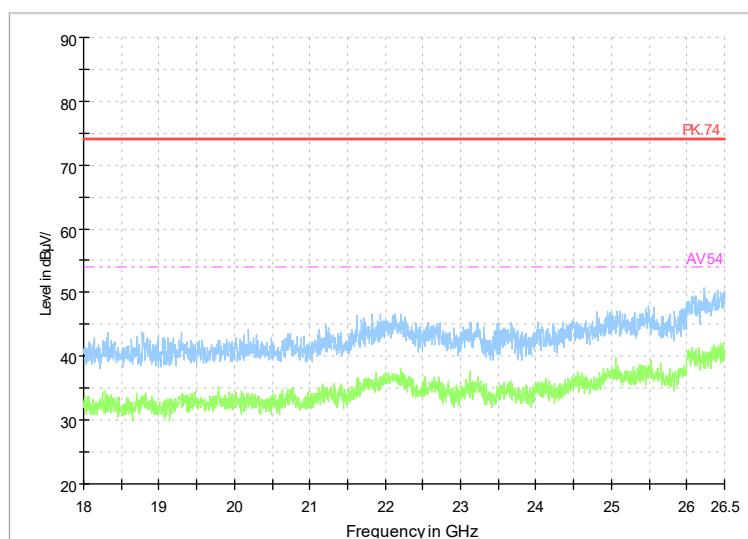


Frequency Range: 3GHz-18GHz

Detector: Av mode and PK mode

Modulation type: GFSK (LE 1Mbps)

Full Spectrum



Frequency Range: 18GHz-26GHz

Detector: Av mode and PK mode

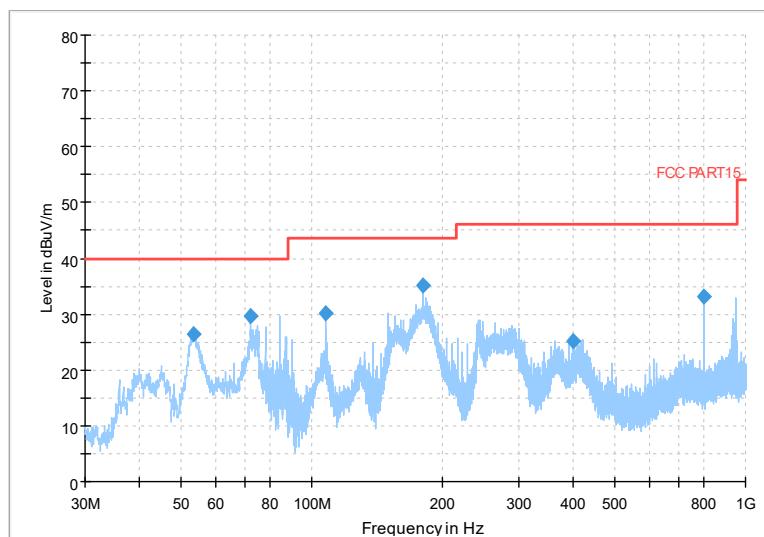
Modulation type: GFSK (LE 1Mbps)



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VERITAS** Test Report No.: PSU-NQN2507020111RF01

Channel No.:19

Full Spectrum

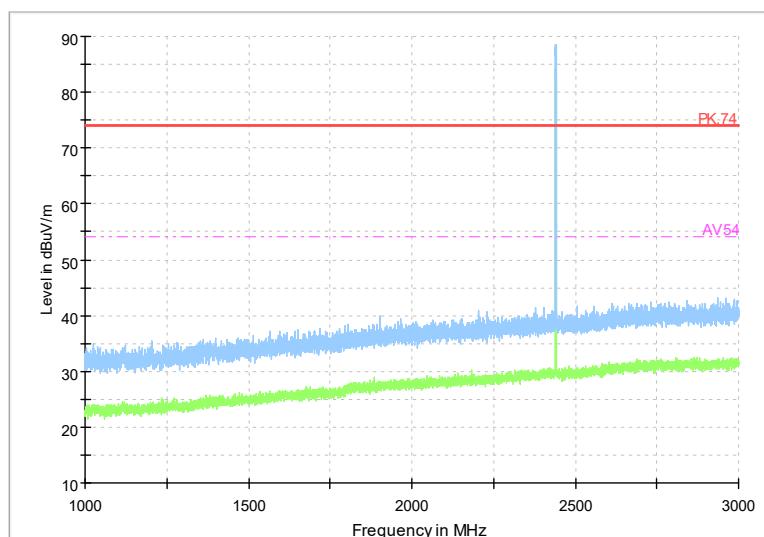


Frequency Range: 30MHz-1GHz

Detector: QP mode

Modulation type: GFSK (LE 1Mbps)

Full Spectrum



Frequency Range: 1GHz-3GHz

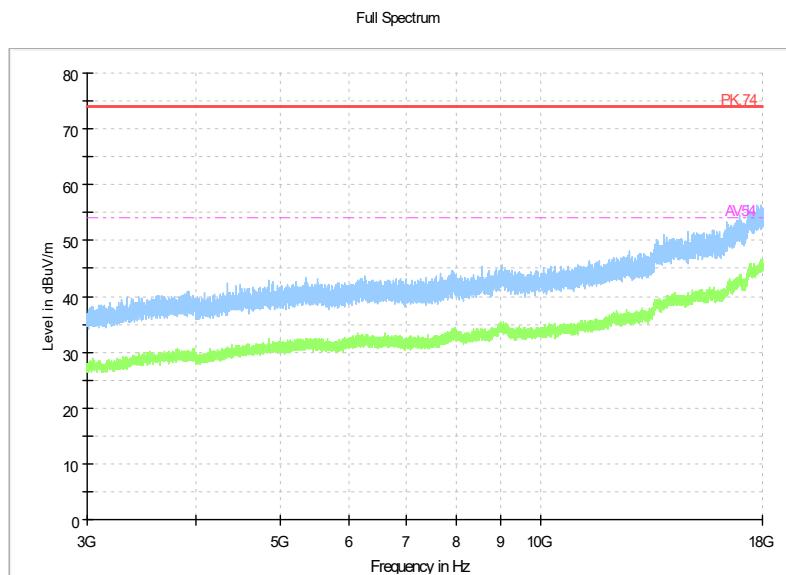
Detector: Av mode and PK mode

Modulation type: GFSK (LE 1Mbps)



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VERITAS

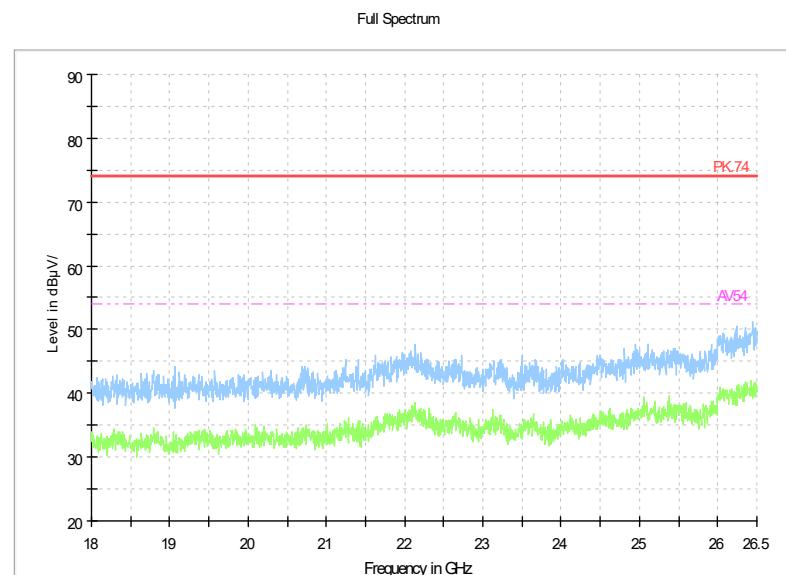
Test Report No.: PSU-NQN2507020111RF01



Frequency Range: 3GHz-18GHz

Detector: Av mode and PK mode

Modulation type: GFSK (LE 1Mbps)



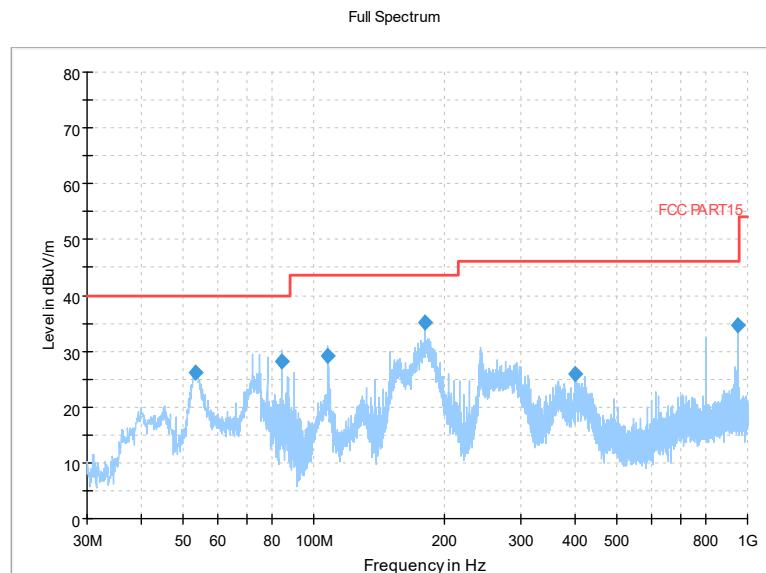
Frequency Range: 18GHz-26GHz

Detector: Av mode and PK mode

Modulation type: GFSK (LE 1Mbps)



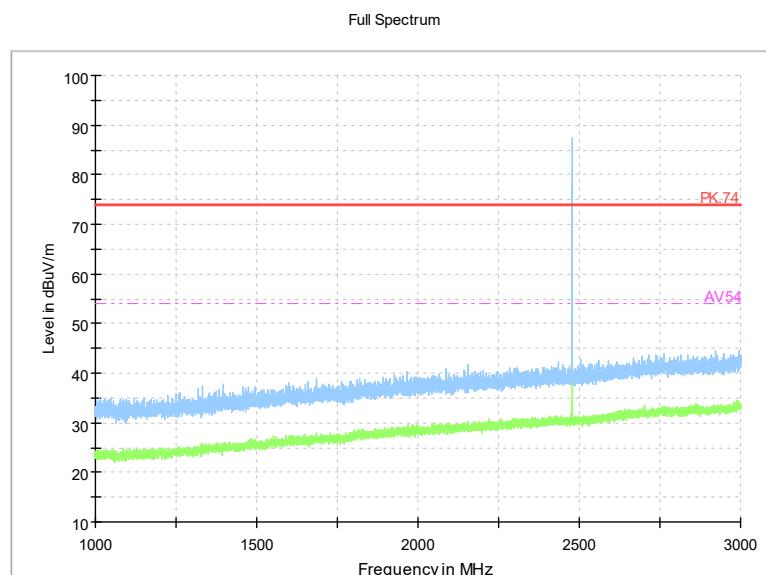
Channel No.:39



Frequency Range: 30MHz-1GHz

Detector: QP mode

Modulation type: GFSK (LE 1Mbps)



Frequency Range: 1GHz-3GHz

Detector: Av mode and PK mode

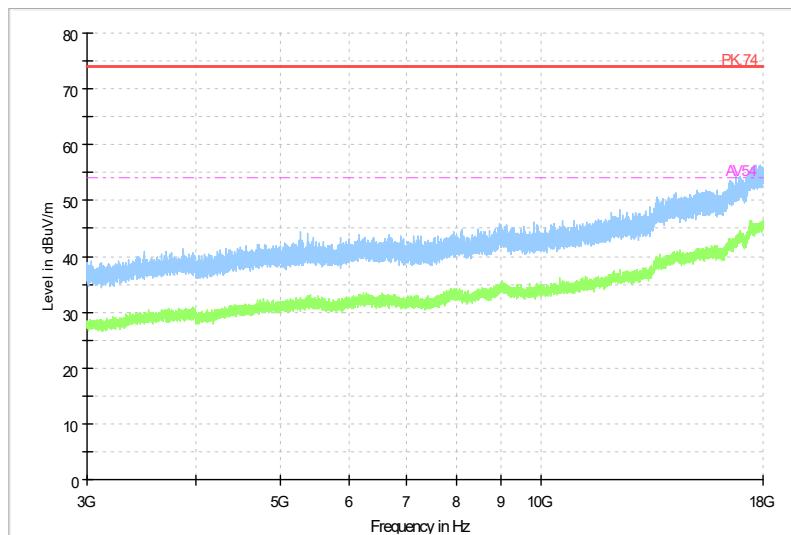
Modulation type: GFSK (LE 1Mbps)



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Test Report No.: PSU-NQN2507020111RF01

Full Spectrum

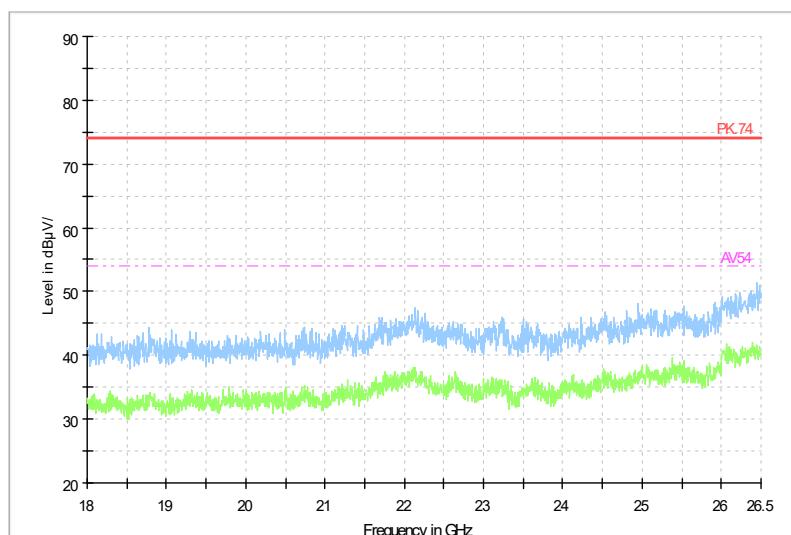


Frequency Range: 3GHz-18GHz

Detector: Av mode and PK mode

Modulation type: GFSK (LE 1Mbps)

Full Spectrum



Frequency Range: 18GHz-26GHz

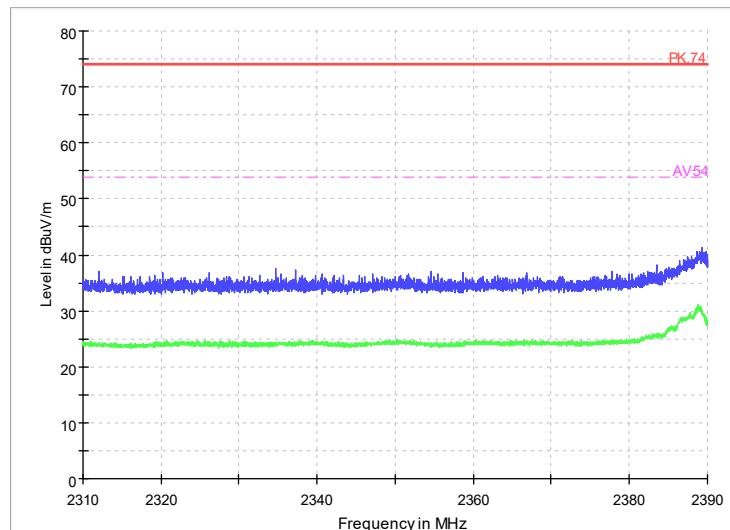
Detector: Av mode and PK mode

Modulation type: GFSK (LE 1Mbps)



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VERITAS** Test Report No.: PSU-NQN2507020111RF01

## Radiated Emission Band Edge for WIFI

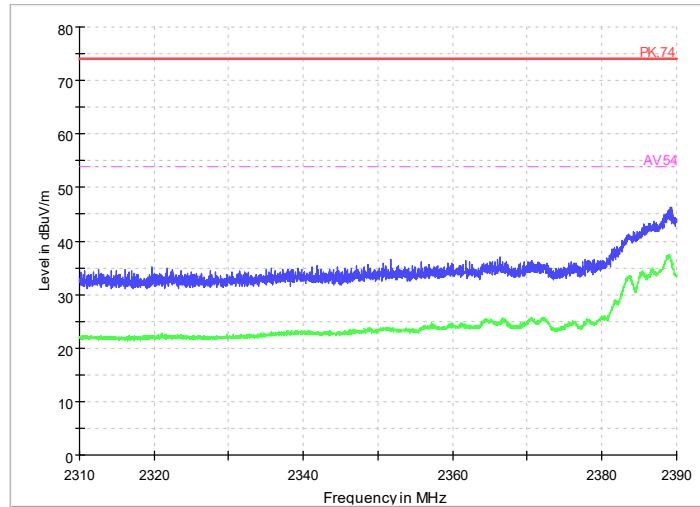


### Radiated Emission Band Edge

Channel No.:1

Test Mode: 802.11b

Polarization: V



### Radiated Emission Band Edge

Channel No.:1

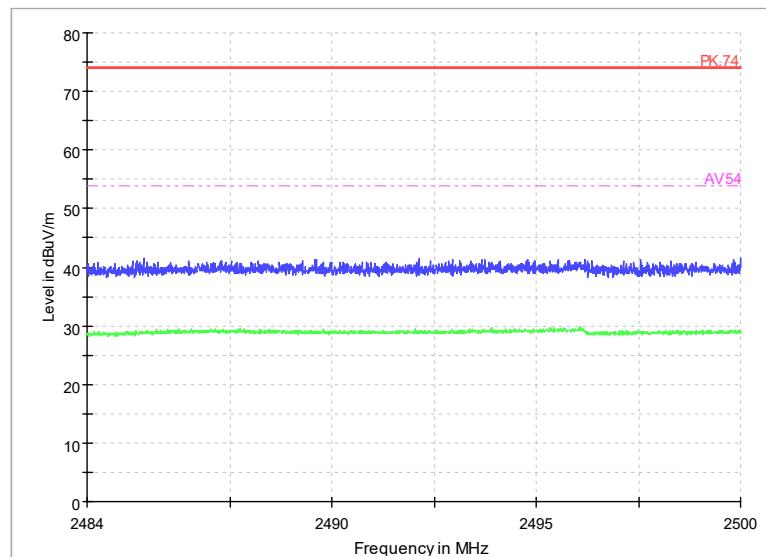
Test Mode: 802.11b

Polarization: H



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Test Report No.: PSU-NQN2507020111RF01

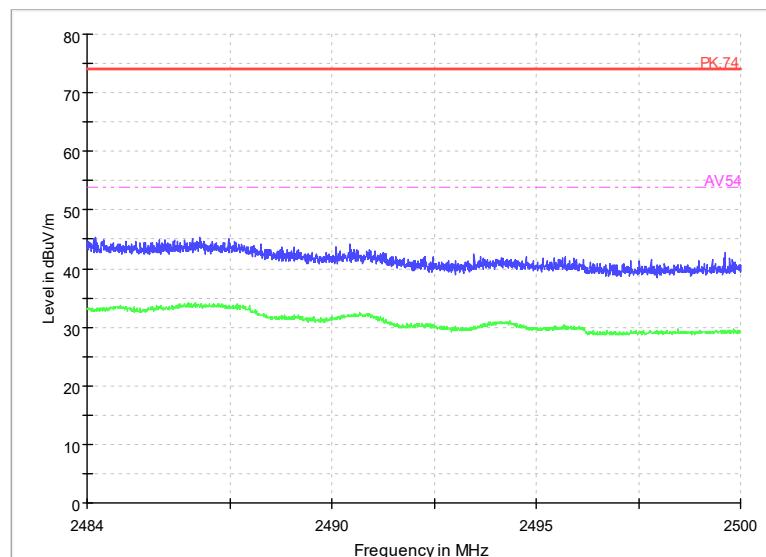


Radiated Emission Band Edge

Channel No.:11

Test Mode: 802.11b

Polarization: V



Radiated Emission Band Edge

Channel No.:11

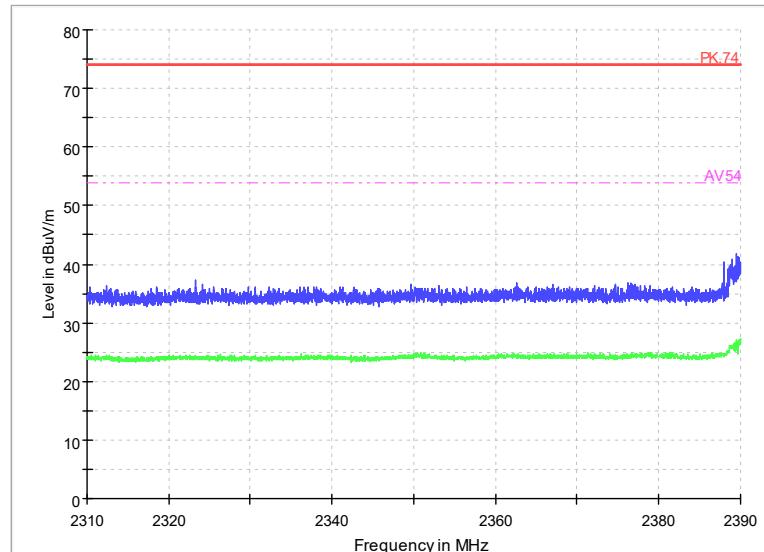
Test Mode: 802.11b

Polarization: H

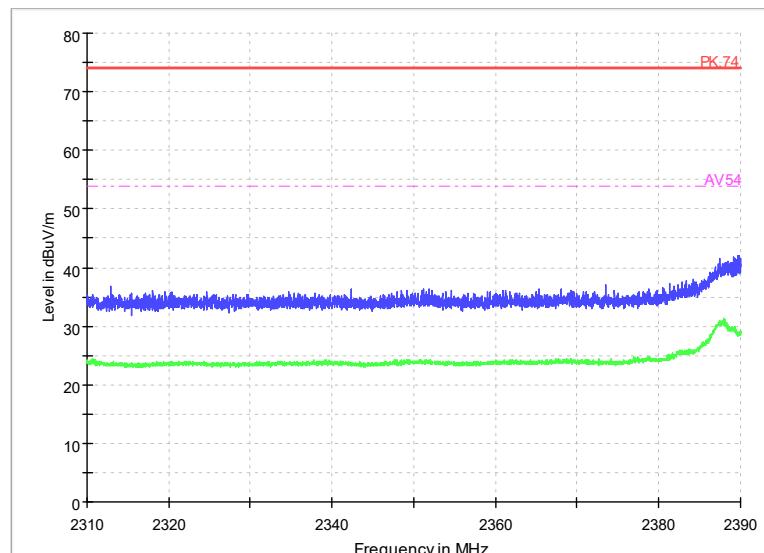


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Test Report No.: PSU-NQN2507020111RF01



Radiated Emission Band Edge  
Channel No.:1  
Test Mode: 802.11g  
Polarization: V

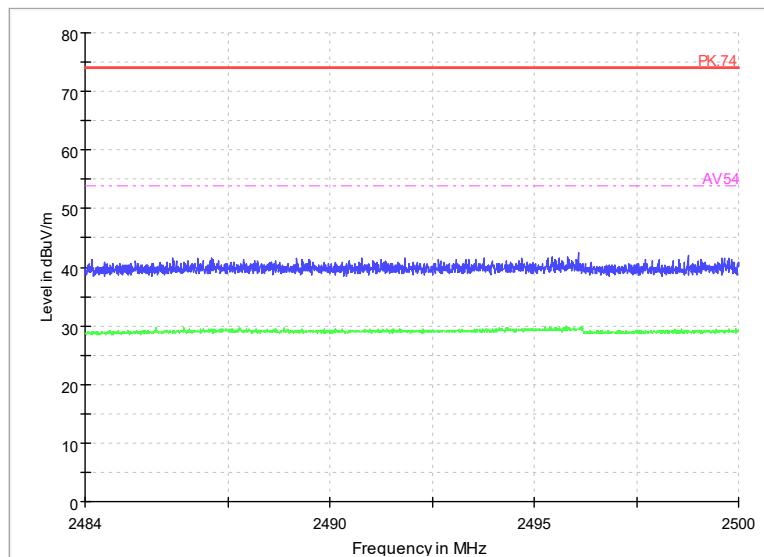


Radiated Emission Band Edge  
Channel No.:1  
Test Mode: 802.11g  
Polarization: H



BUREAU  
VERITAS

Test Report No.: PSU-NQN2507020111RF01

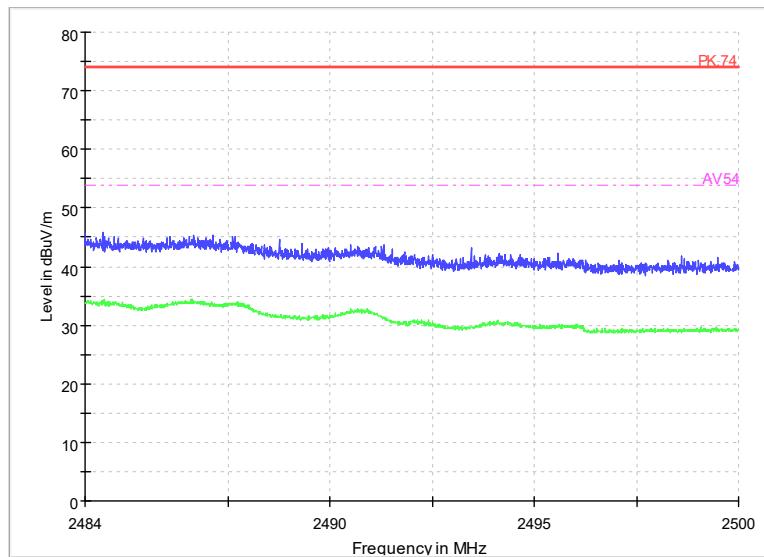


Radiated Emission Band Edge

Channel No.:11

Test Mode: 802.11g

Polarization: V



Radiated Emission Band Edge

Channel No.:11

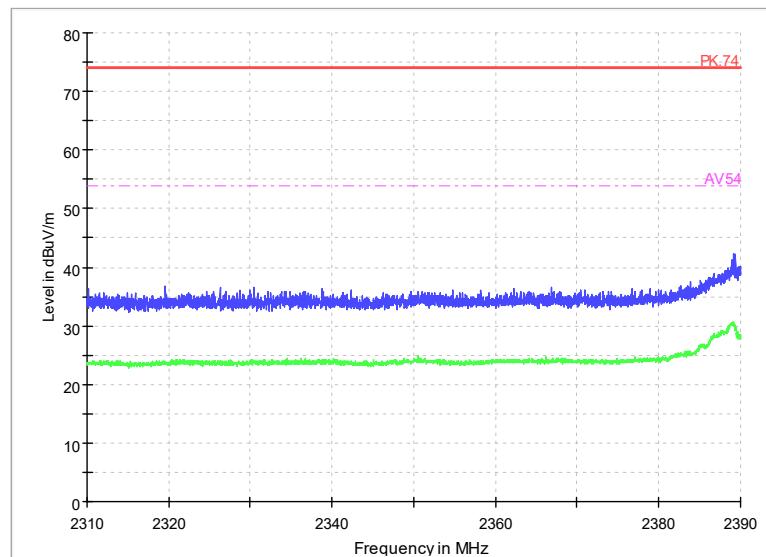
Test Mode: 802.11g

Polarization: H



BUREAU  
VERITAS

Test Report No.: PSU-NQN2507020111RF01

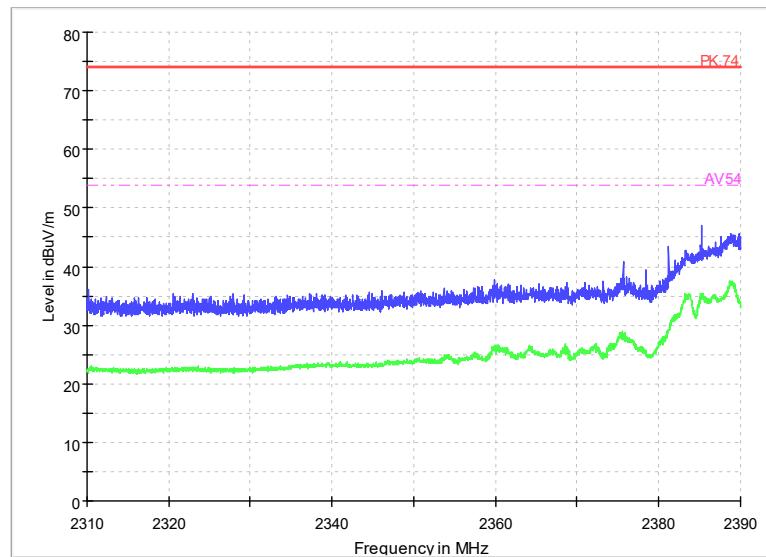


### Radiated Emission Band Edge

Channel No.:1

Test Mode: 802.11n(HT20)

Polarization: V



### Radiated Emission Band Edge

Channel No.:1

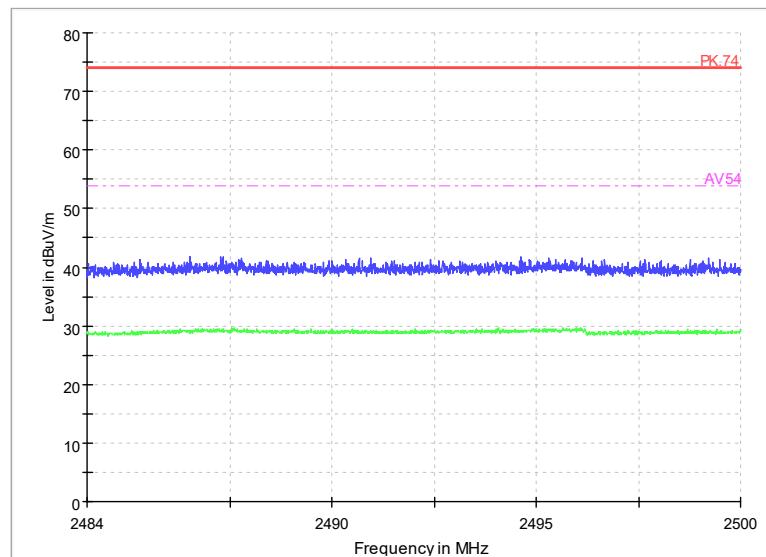
Test Mode: 802.11n(HT20)

Polarization: H



BUREAU  
VERITAS

Test Report No.: PSU-NQN2507020111RF01

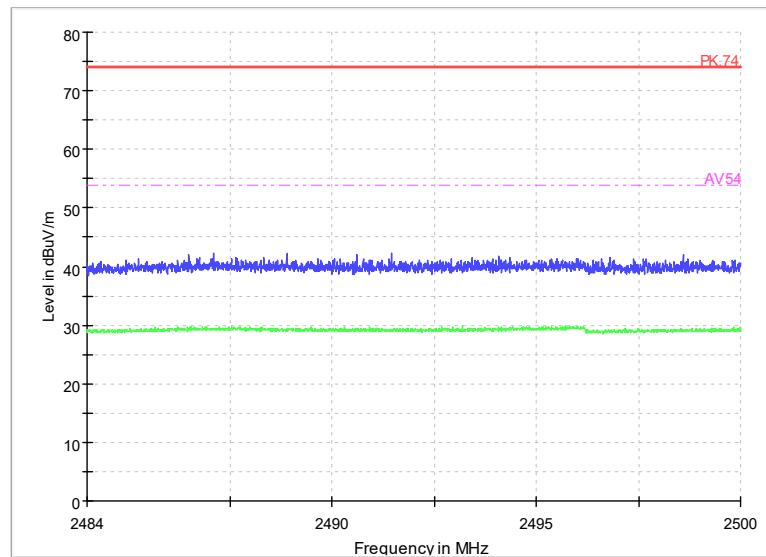


### Radiated Emission Band Edge

Channel No.:11

Test Mode: 802.11n(HT20)

Polarization: V



### Radiated Emission Band Edge

Channel No.:11

Test Mode: 802.11n(HT20)

Polarization: H



**BUREAU  
VERITAS** Test Report No.: PSU-NQN2507020111RF01

## Radiated Emission for WIFI

After comparison, the worst case attitude is EUT lay down.

### Determining Spurious Emissions Levels

A “reference path loss” is established and the  $A_{Rpl}$  is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

The measurement results are obtained as described below:

Result =  $P_{mea} + A_{Rpl}$

Sample calculation:  $(26.26 \text{ dB}\mu\text{V/m}) = (41.76 \text{ dB}\mu\text{V}) + (-15.5 \text{ dB/m})$ , the corresponding frequency is 53.571MHz.

#### For 802.11b Channel No.:1

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)	Margin (dB)
53.571	26.26	-15.5	41.76	Vertical	40	13.74
72.1465	30.67	-20.1	50.77	Vertical	40	9.33
172.4445	29.4	-19.5	48.9	Vertical	43.5	14.1
180.35	34.84	-18.8	53.64	Vertical	43.5	8.66
420.8615	25.49	-10.7	36.19	Vertical	46	20.51
948.5415	33.85	-2.1	35.95	Vertical	46	12.15

#### For 802.11g Channel No.:1

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)	Margin (dB)
53.6195	27	-15.5	42.5	Vertical	40	13
72.098	29.41	-20	49.41	Vertical	40	10.59
107.8425	29.24	-17.3	46.54	Vertical	43.5	14.26
180.35	35	-18.8	53.8	Vertical	43.5	8.5
400.0065	25.83	-11.4	37.23	Vertical	46	20.17
948.493	34.14	-2.1	36.24	Vertical	46	11.86

#### For 802.11n(HT20) Channel No.:1

Frequency(MHz)	Result(dBuV/m)	ARpl	Pmea	Polarity	Limit	Margin

**BUREAU  
VERITAS****Test Report No.: PSU-NQN2507020111RF01**

		(dB)	(dBuV/m)		(dBuV/m)	(dB)
53.1345	26.35	-15.5	41.85	Vertical	40	13.65
72.1465	31.11	-20.1	51.21	Vertical	40	8.89
150.28	29.6	-20.6	50.2	Vertical	43.5	13.9
180.35	35.03	-18.8	53.83	Vertical	43.5	8.47
414.799	23.56	-10.8	34.36	Vertical	46	22.44
948.5415	33.97	-2.1	36.07	Vertical	46	12.03

For 802.11b Channel No.:6

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)	Margin (dB)
53.571	26.56	-15.5	42.06	Vertical	40	13.44
75.105	27.71	-21.3	49.01	Vertical	40	12.29
171.523	29.59	-19.5	49.09	Vertical	43.5	13.91
180.35	35.03	-18.8	53.83	Vertical	43.5	8.47
420.8615	25.6	-10.7	36.3	Vertical	46	20.4
948.4445	33.88	-2.1	35.98	Vertical	46	12.12

For 802.11g Channel No.:6

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)	Margin (dB)
53.474	26.61	-15.5	42.11	Vertical	40	13.39
84.126	28.04	-21.6	49.64	Vertical	40	11.96
171.523	29.49	-19.5	48.99	Vertical	43.5	14.01
180.35	35.01	-18.8	53.81	Vertical	43.5	8.49
420.813	24.6	-10.7	35.3	Vertical	46	21.4
948.5415	33.61	-2.1	35.71	Vertical	46	12.39

For 802.11n(HT20) Channel No.:6

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)	Margin (dB)
52.989	24.81	-15.4	40.21	Vertical	40	15.19
72.098	29.14	-20	49.14	Vertical	40	10.86
172.5415	28.81	-19.5	48.31	Vertical	43.5	14.69
183.357	33.42	-18.5	51.92	Vertical	43.5	10.08



**BUREAU  
VERITAS** Test Report No.: PSU-NQN2507020111RF01

420.813	24.38	-10.7	35.08	Vertical	46	21.62
948.493	34.14	-2.1	36.24	Vertical	46	11.86

For 802.11b Channel No.:11

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)	Margin (dB)
53.377	26.57	-15.5	42.07	Vertical	40	13.43
75.105	27.47	-21.3	48.77	Vertical	40	12.53
150.28	29.48	-20.6	50.08	Vertical	43.5	14.02
180.35	34.96	-18.8	53.76	Vertical	43.5	8.54
414.605	21.55	-10.8	32.35	Vertical	46	24.45
948.493	34.45	-2.1	36.55	Vertical	46	11.55

For 802.11g Channel No.:11

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)	Margin (dB)
53.28	26.79	-15.5	42.29	Vertical	40	13.21
72.098	29.66	-20	49.66	Vertical	40	10.34
150.28	29.64	-20.6	50.24	Vertical	43.5	13.86
180.35	35.04	-18.8	53.84	Vertical	43.5	8.46
422.9955	20.95	-10.7	31.65	Vertical	46	25.05
799.986	33.07	-4	37.07	Vertical	46	12.93

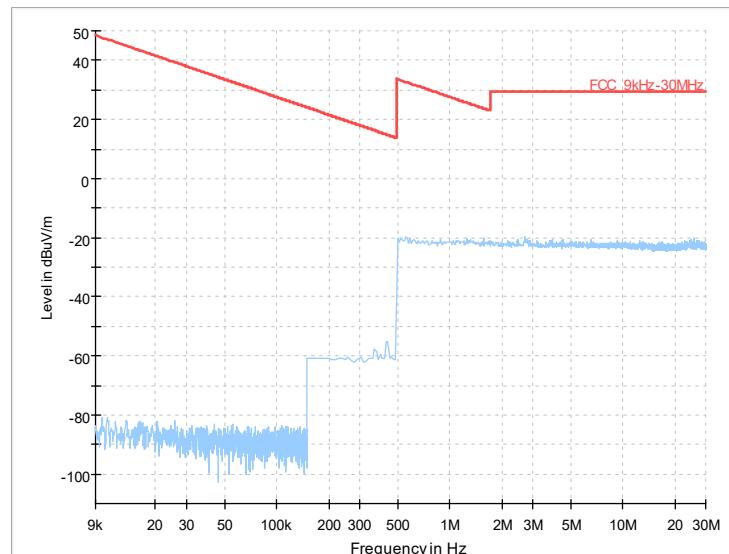
For 802.11n(HT20) Channel No.:11

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)	Margin (dB)
53.474	26.63	-15.5	42.13	Vertical	40	13.37
72.1465	31.43	-20.1	51.53	Vertical	40	8.57
107.891	29.92	-17.3	47.22	Vertical	43.5	13.58
180.35	35.05	-18.8	53.85	Vertical	43.5	8.45
399.958	25.09	-11.4	36.49	Vertical	46	20.91
948.5415	33.97	-2.1	36.07	Vertical	46	12.03



BUREAU  
VERITAS

Test Report No.: PSU-NQN2507020111RF01



Frequency Range: 9kHz -30MHz

Detector: QP mode

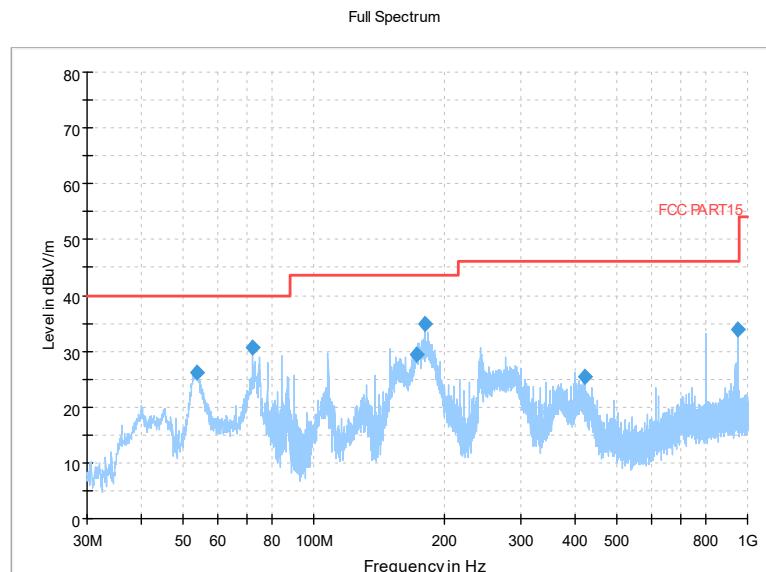
Note: The relevant tests have been performed in order to verify in which mode would have the worst features, the result show above is the worst case.



**BUREAU  
VERITAS** Test Report No.: PSU-NQN2507020111RF01

Carrier frequency (MHz): 2412

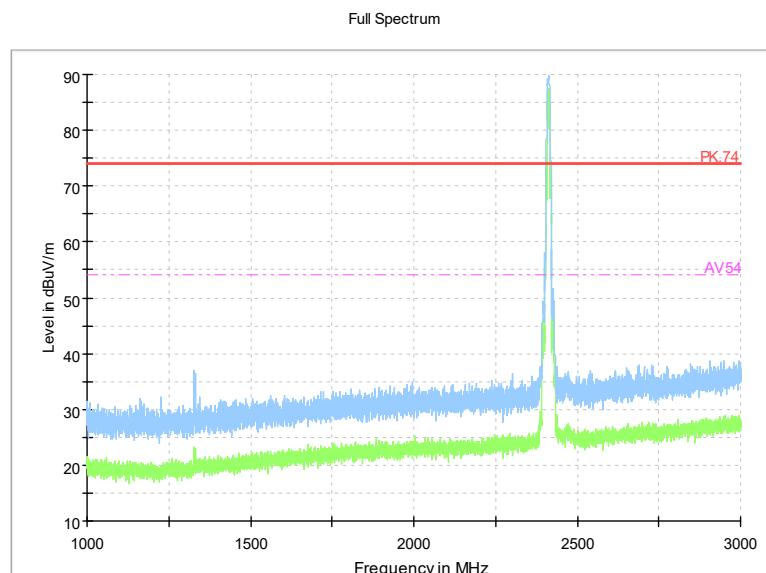
Channel No.:1



Frequency Range 30MHz -1GHz

Detector: QP mode

Modulation type: 802.11b



Frequency Range: 1GHz -3GHz

Detector: Av mode and PK mode

Huarui 7layers High Technology  
(Suzhou) Co., Ltd.

Tower N, Innovation Center, 88 Zuyi Road, High-tech  
District, Suzhou City, Anhui Province

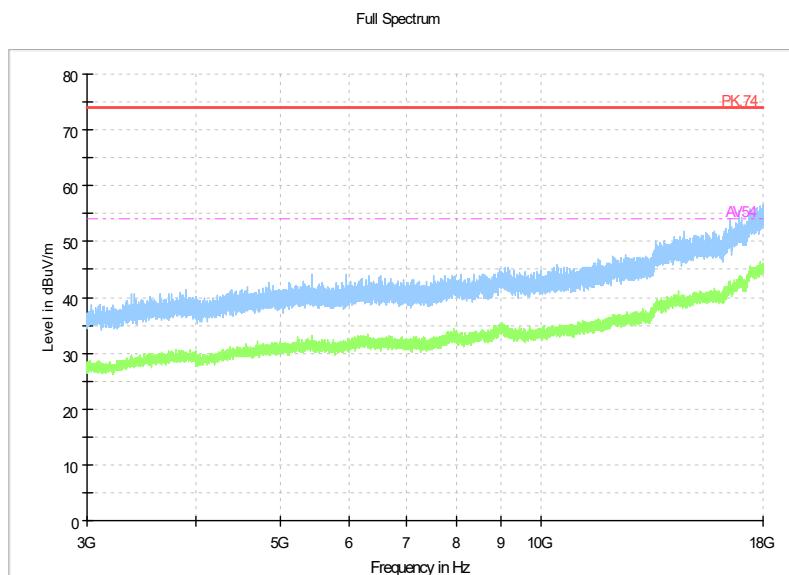
Tel: +86 (0557) 368 1008



BUREAU  
VERITAS

Test Report No.: PSU-NQN2507020111RF01

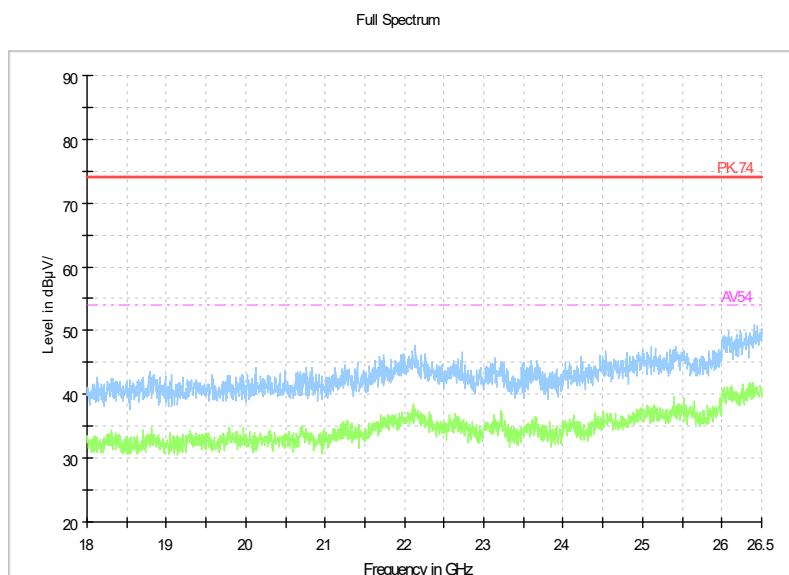
Modulation type: 802.11b



Frequency Range: 3GHz -18GHz

Detector: Av mode and PK mode

Modulation type: 802.11b



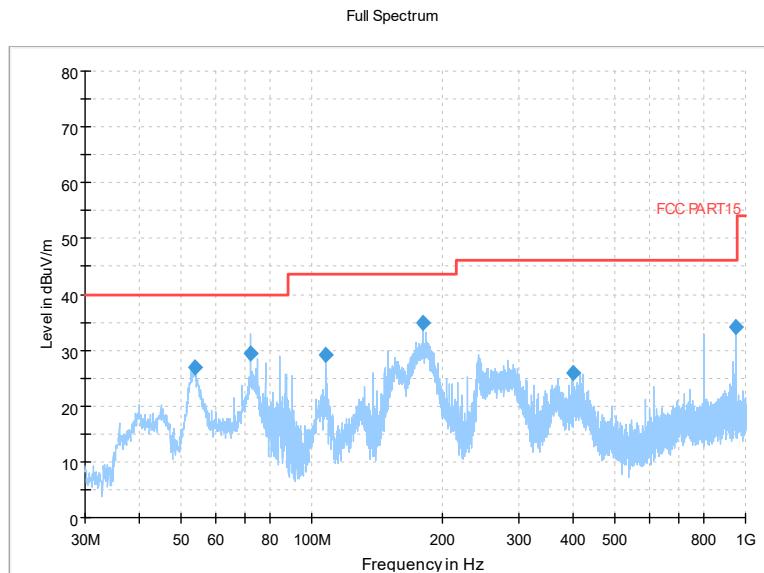
Frequency Range: 18GHz -26GHz

Detector: Av mode and PK mode

Modulation type: 802.11b



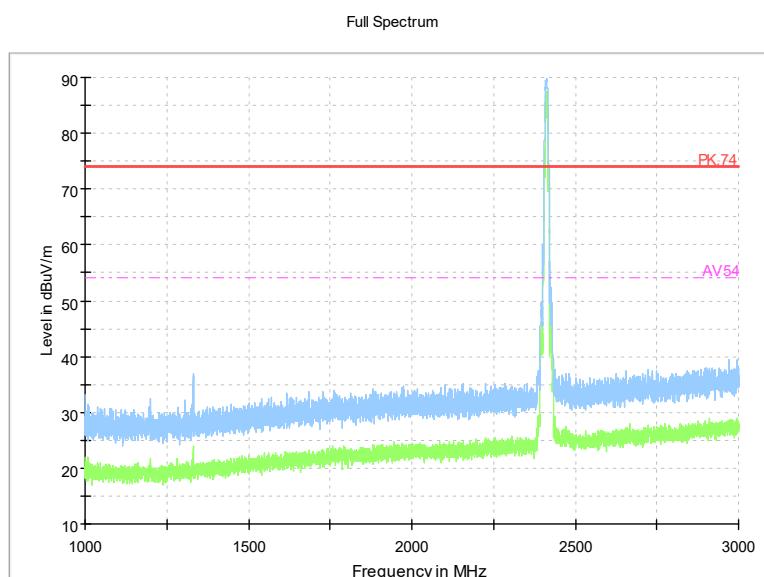
**BUREAU  
VERITAS** Test Report No.: PSU-NQN2507020111RF01



Frequency Range: 30MHz -1GHz

Detector: QP mode

Modulation type: 802.11g



Frequency Range: 1GHz -3GHz

Detector: Av mode and PK mode

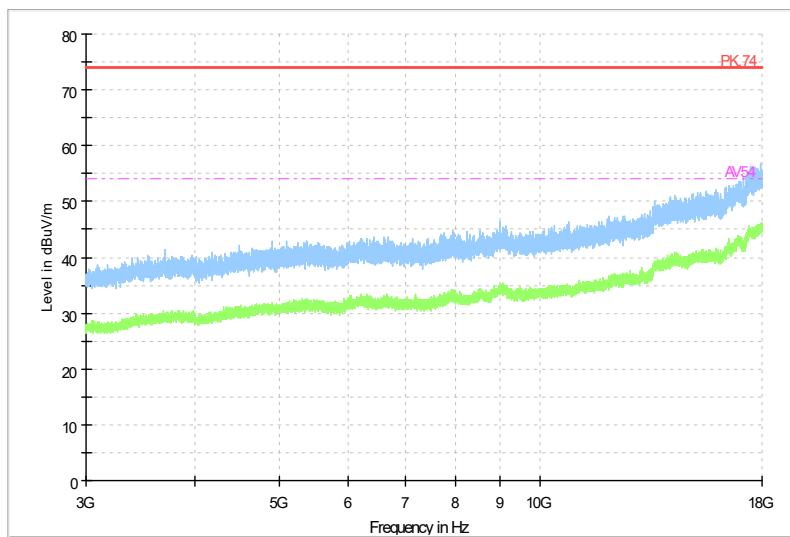
Modulation type: 802.11g



BUREAU  
VERITAS

Test Report No.: PSU-NQN2507020111RF01

Full Spectrum

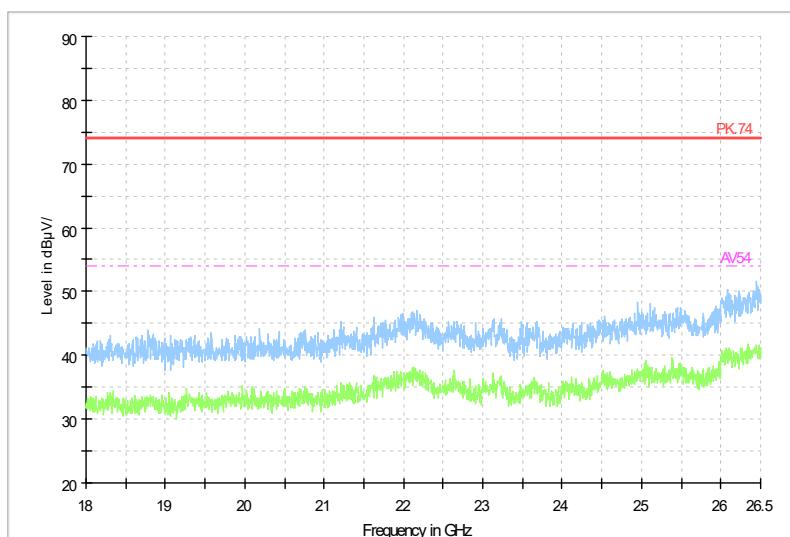


Frequency Range: 3GHz -18GHz

Detector: Av mode and PK mode

Modulation type: 802.11g

Full Spectrum



Frequency Range: 18GHz -26GHz

Detector: Av mode and PK mode

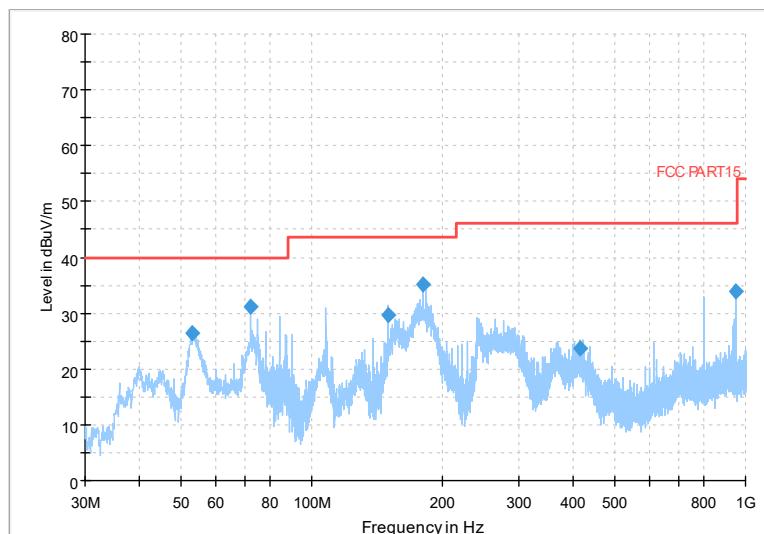
Modulation type: 802.11g



BUREAU  
VERITAS

Test Report No.: PSU-NQN2507020111RF01

Full Spectrum

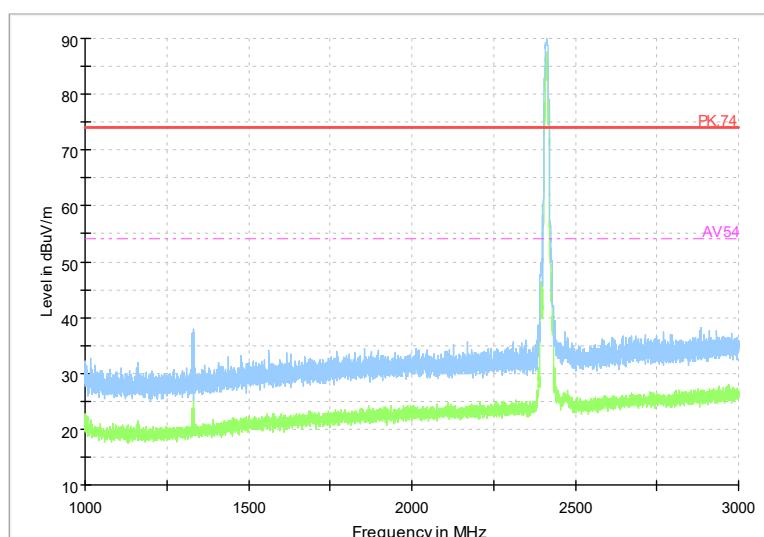


Frequency Range: 30MHz -1GHz

Detector: QP mode

Modulation type: 802.11n(HT20)

Full Spectrum



Frequency Range: 1GHz -3GHz

Detector: Av mode and PK mode

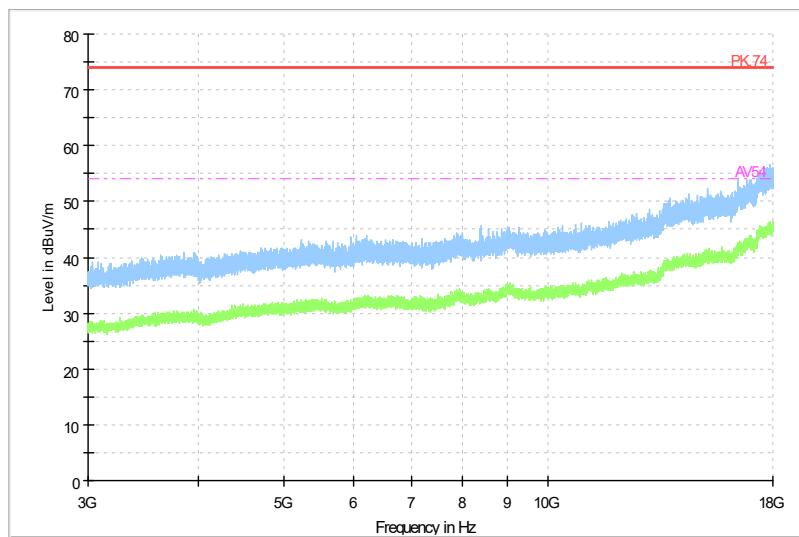
Modulation type: 802.11n(HT20)



BUREAU  
VERITAS

Test Report No.: PSU-NQN2507020111RF01

Full Spectrum

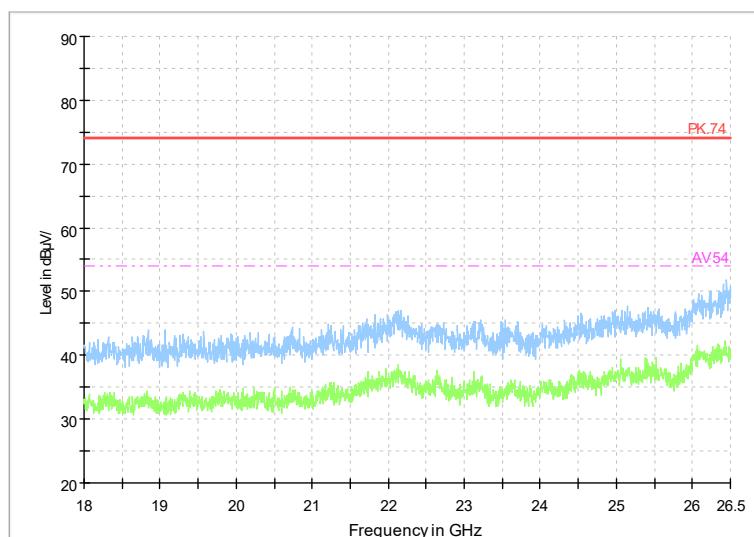


Frequency Range: 3GHz -18GHz

Detector: Av mode and PK mode

Modulation type: 802.11n(HT20)

Full Spectrum



Frequency Range: 18GHz -26GHz

Detector: Av mode and PK mode

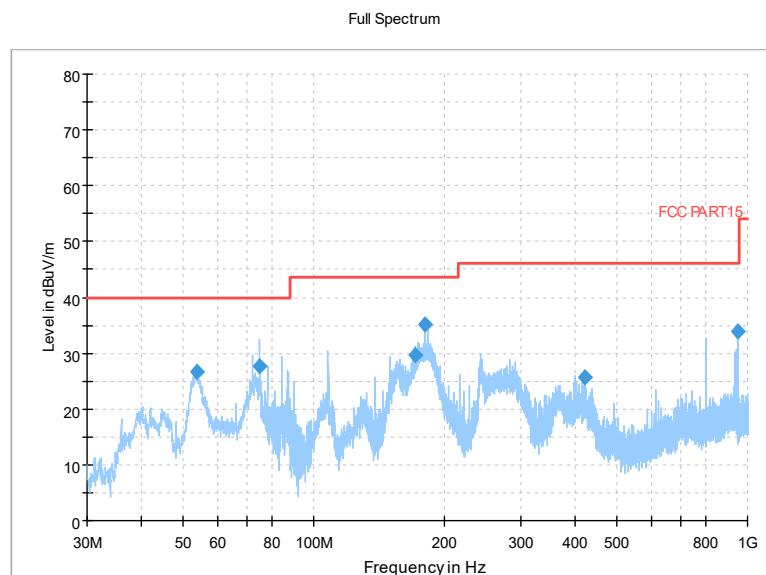
Modulation type: 802.11n(HT20)



**BUREAU  
VERITAS** Test Report No.: PSU-NQN2507020111RF01

Carrier frequency (MHz): 2437

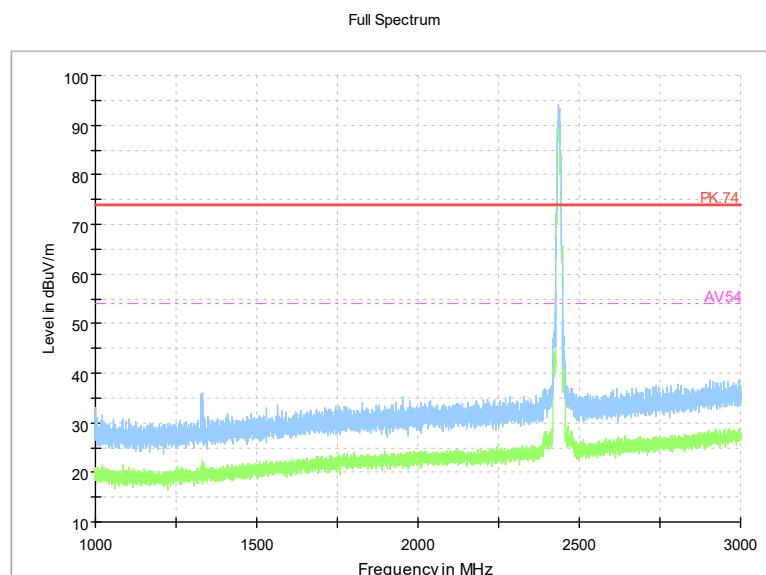
Channel No.:6



Frequency Range: 30MHz -1GHz

Detector: QP mode

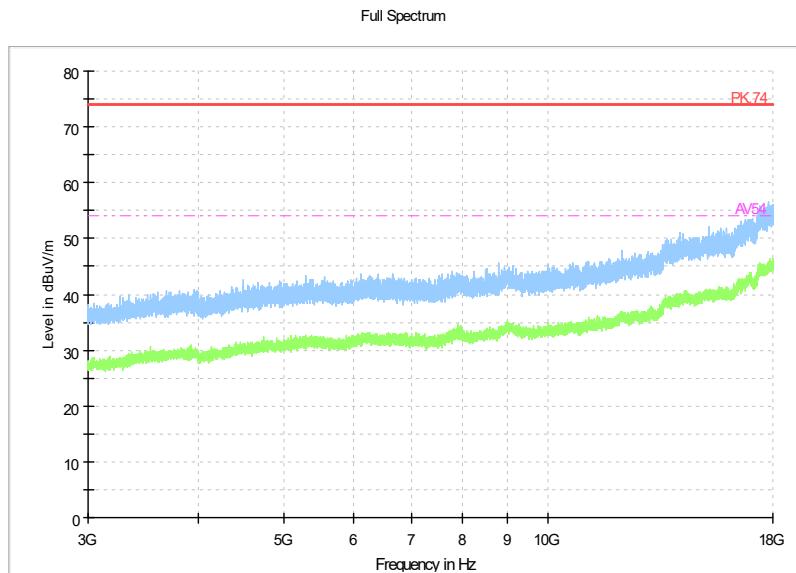
Modulation type: 802.11b



Frequency Range: 1GHz -3GHz

Detector: Av mode and PK mode

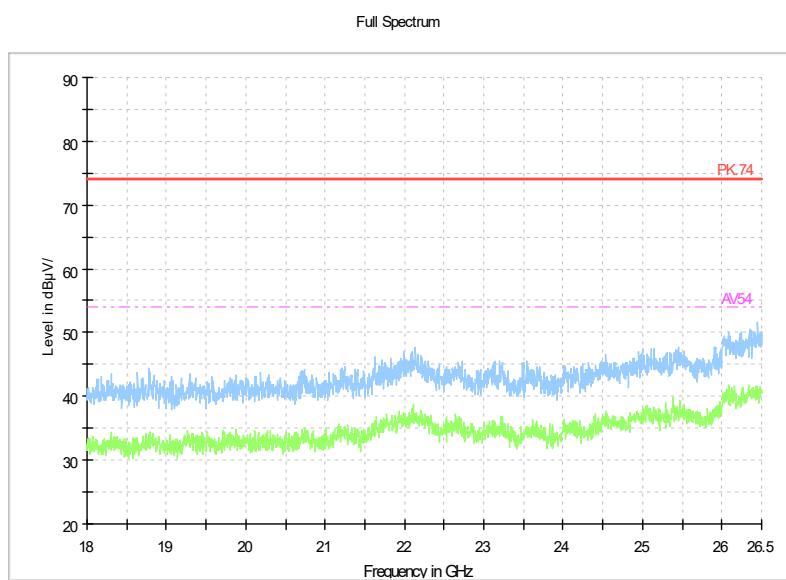
Modulation type: 802.11b



Frequency Range: 3GHz -18GHz

Detector: Av mode and PK mode

Modulation type: 802.11b



Frequency Range: 18GHz -26GHz

Detector: Av mode and PK mode

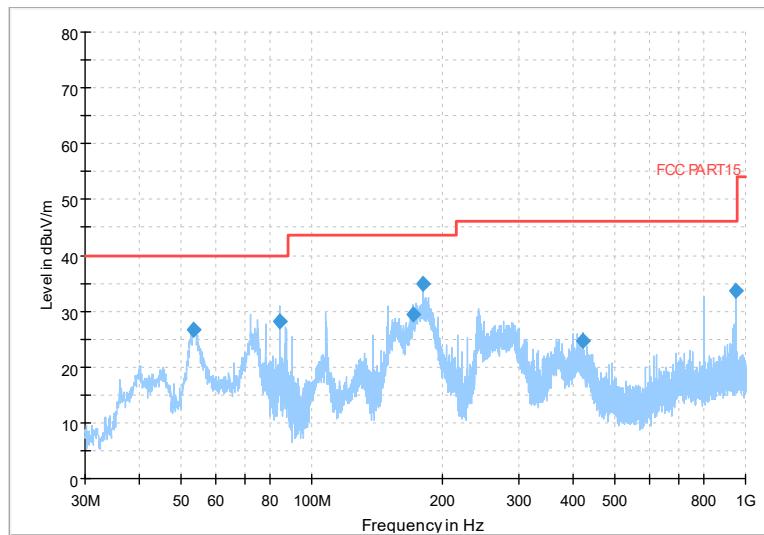
Modulation type: 802.11b



BUREAU  
VERITAS

Test Report No.: PSU-NQN2507020111RF01

Full Spectrum

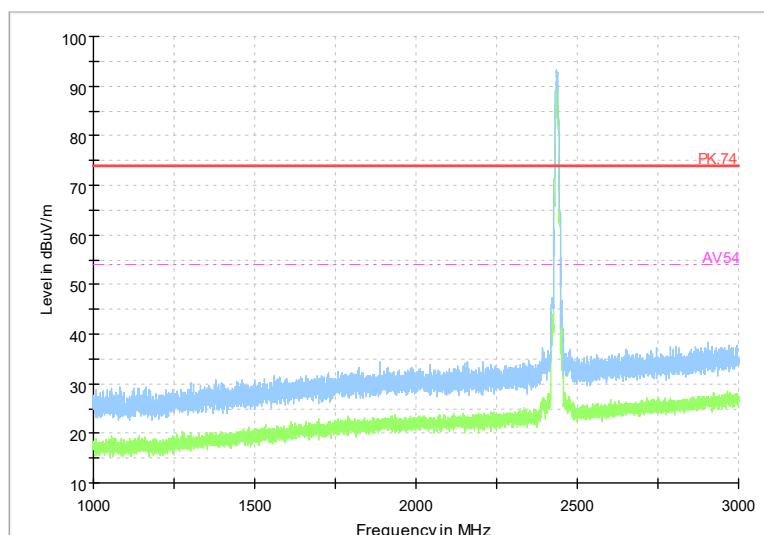


Frequency Range: 30MHz -1GHz

Detector: QP mode

Modulation type: 802.11g

Full Spectrum



Frequency Range: 1GHz -3GHz

Detector: Av mode and PK mode

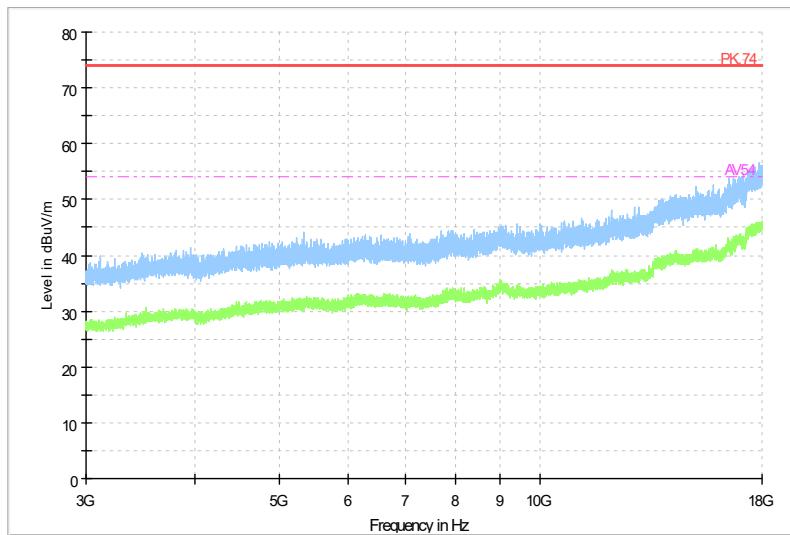
Modulation type: 802.11g



BUREAU  
VERITAS

Test Report No.: PSU-NQN2507020111RF01

Full Spectrum

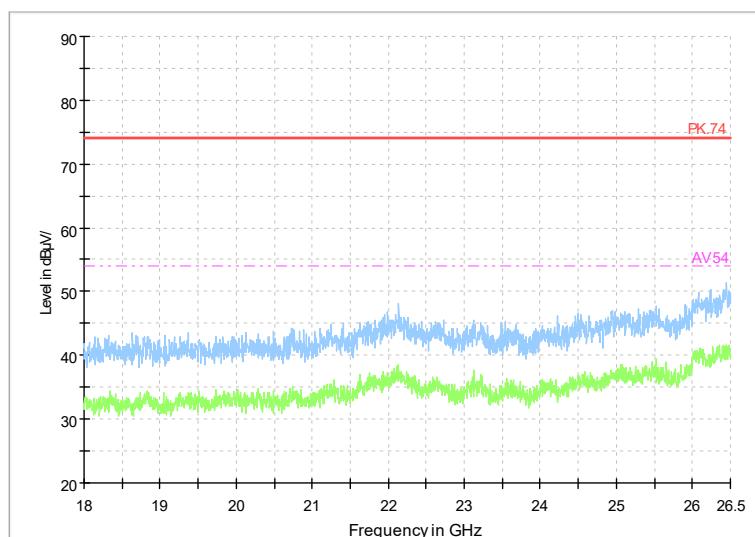


Frequency Range: 3GHz -18GHz

Detector: Av mode and PK mode

Modulation type: 802.11g

Full Spectrum



Frequency Range: 18GHz -26GHz

Detector: Av mode and PK mode

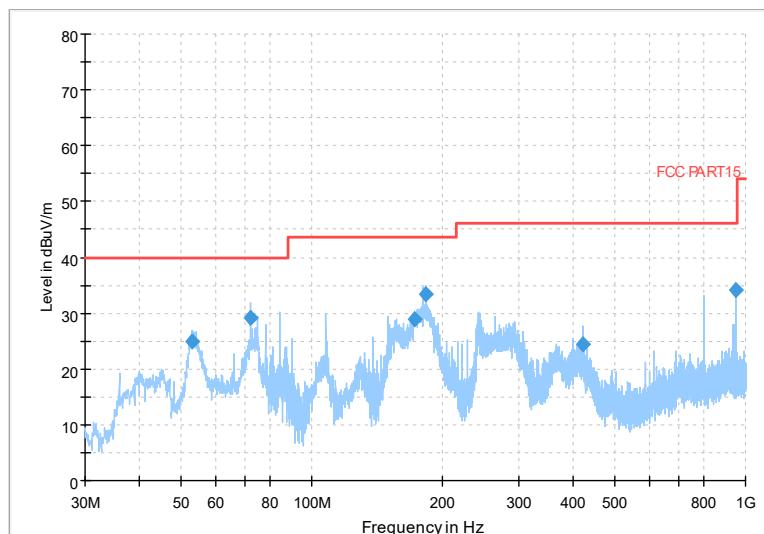
Modulation type: 802.11g



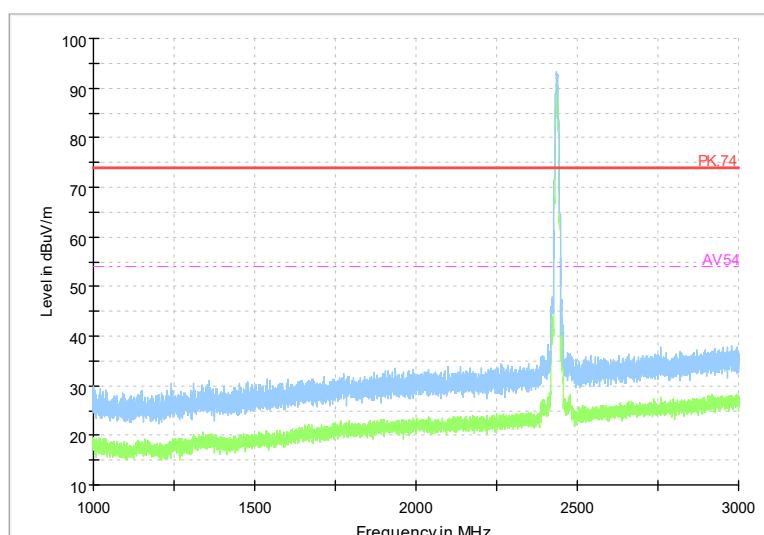
BUREAU  
VERITAS

Test Report No.: PSU-NQN2507020111RF01

Full Spectrum



Full Spectrum

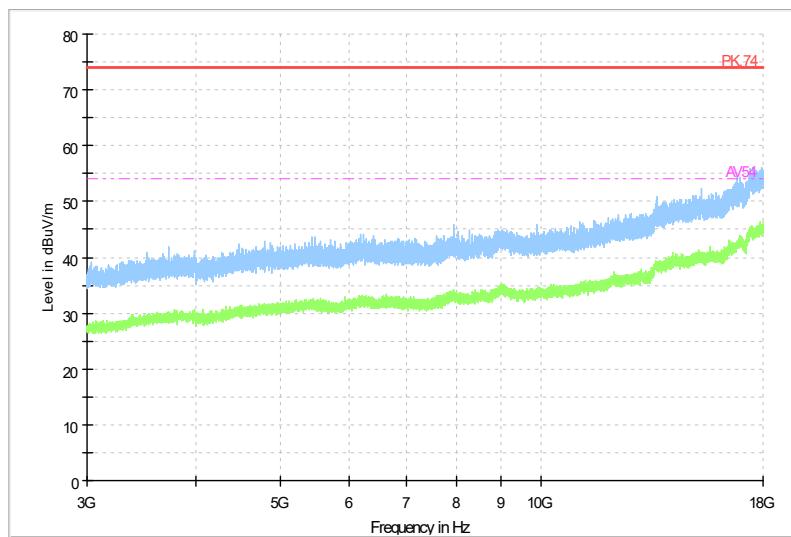




BUREAU  
VERITAS

Test Report No.: PSU-NQN2507020111RF01

Full Spectrum

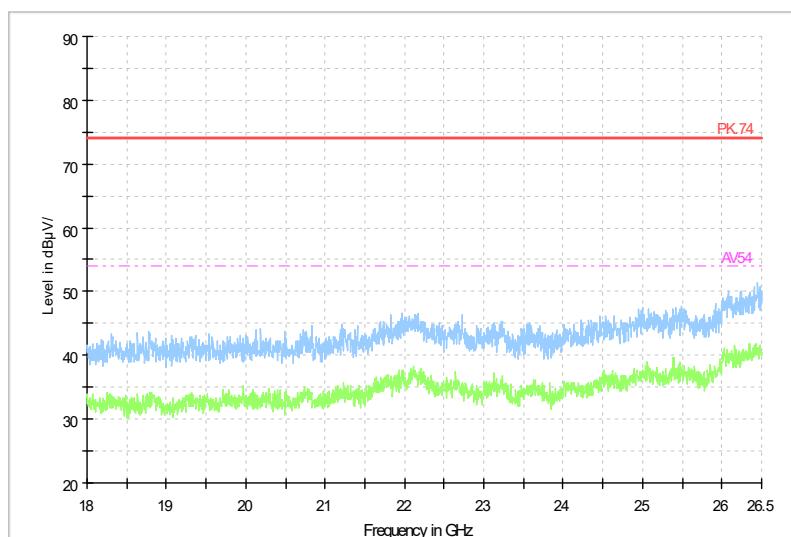


Frequency Range: 3GHz -18GHz

Detector: Av mode and PK mode

Modulation type: 802.11n(HT20)

Full Spectrum



Frequency Range: 18GHz -26GHz

Detector: Av mode and PK mode

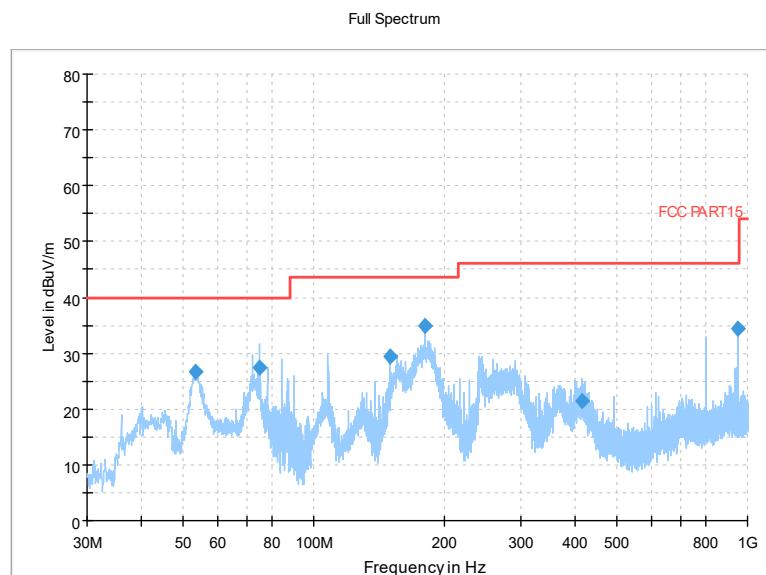
Modulation type: 802.11n(HT20)



**BUREAU  
VERITAS** Test Report No.: PSU-NQN2507020111RF01

Carrier frequency (MHz): 2462

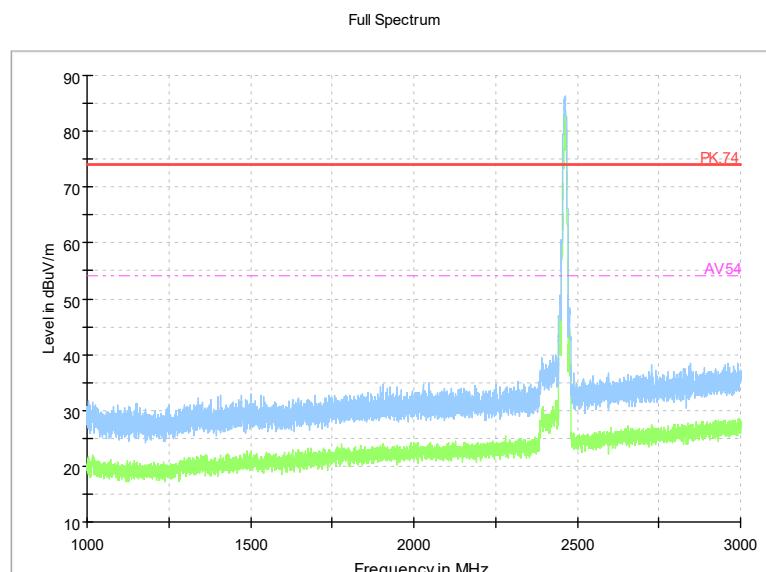
Channel No.:11



Frequency Range: 30MHz -1GHz

Detector: QP mode

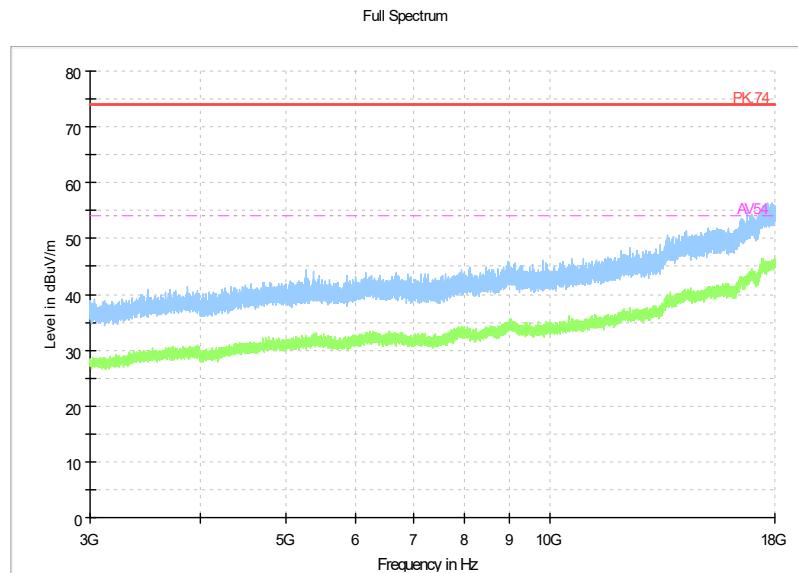
Modulation type: 802.11b



Frequency Range: 1GHz -3GHz

Detector: Av mode and PK mode

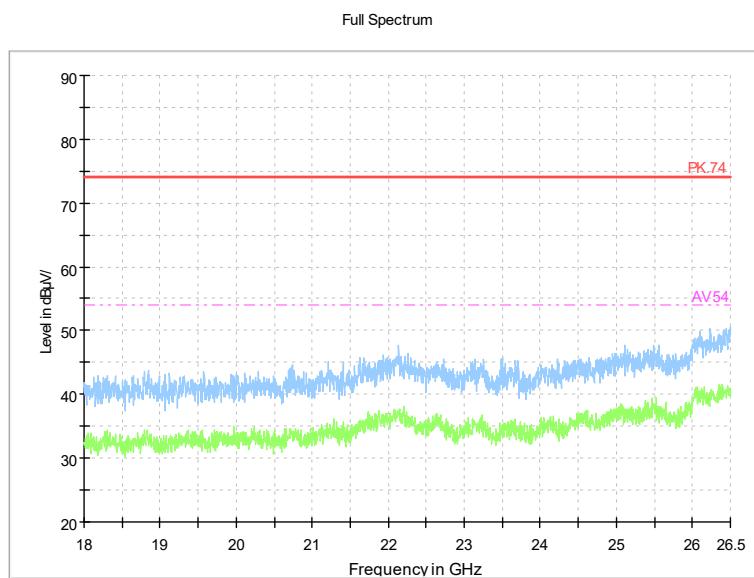
Modulation type: 802.11b



Frequency Range: 3GHz -18GHz

Detector: Av mode and PK mode

Modulation type: 802.11b



Frequency Range: 18GHz -26GHz

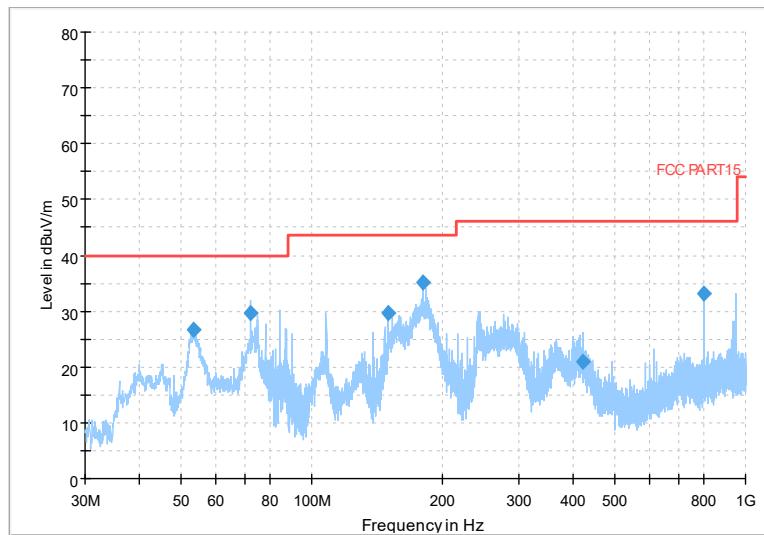
Detector: Av mode and PK mode

Modulation type: 802.11b



**BUREAU  
VERITAS** Test Report No.: PSU-NQN2507020111RF01

Full Spectrum

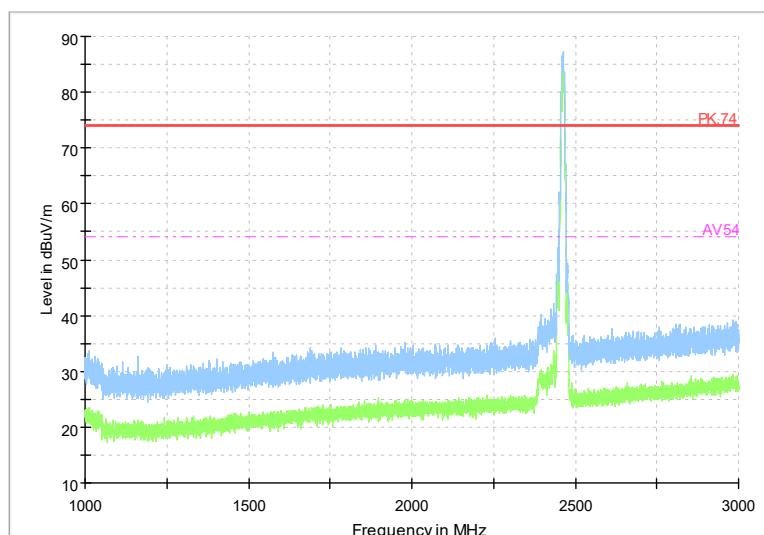


Frequency Range: 30MHz -1GHz

Detector: QP mode

Modulation type: 802.11g

Full Spectrum



Frequency Range: 1GHz -3GHz

Detector: Av mode and PK mode

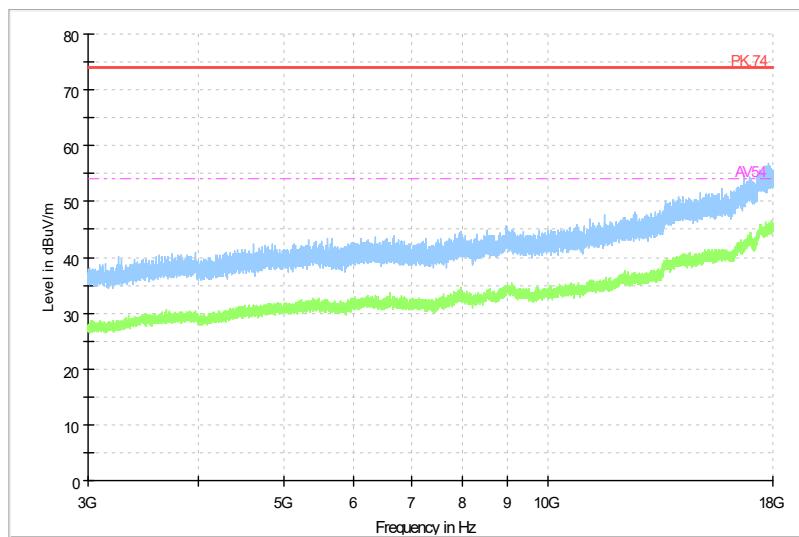
Modulation type: 802.11g



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Test Report No.: PSU-NQN2507020111RF01

Full Spectrum

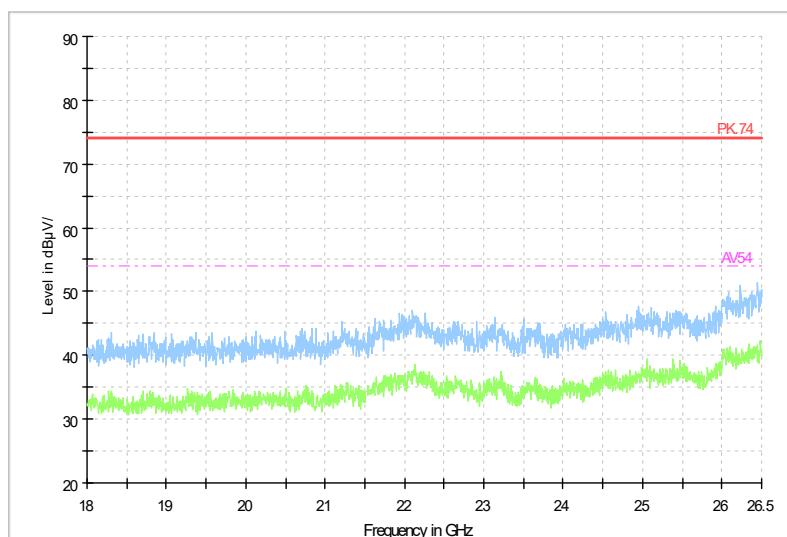


Frequency Range: 3GHz -18GHz

Detector: Av mode and PK mode

Modulation type: 802.11g

Full Spectrum



Frequency Range: 18GHz -26GHz

Detector: Av mode and PK mode

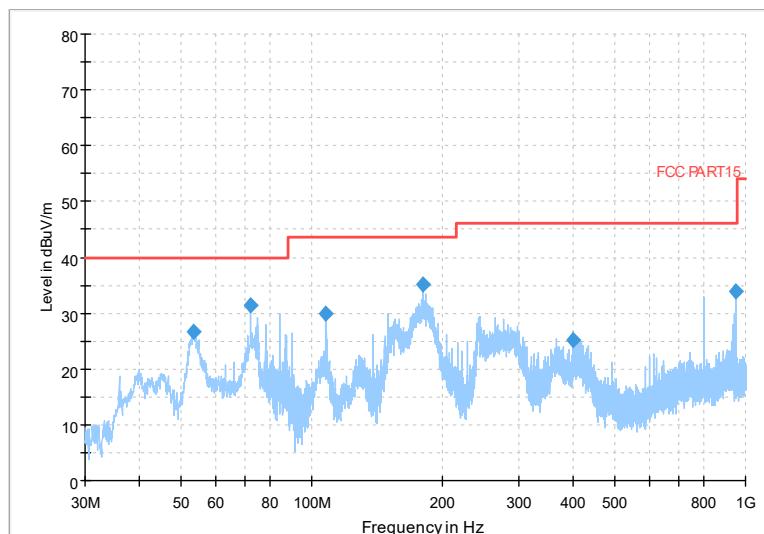
Modulation type: 802.11g



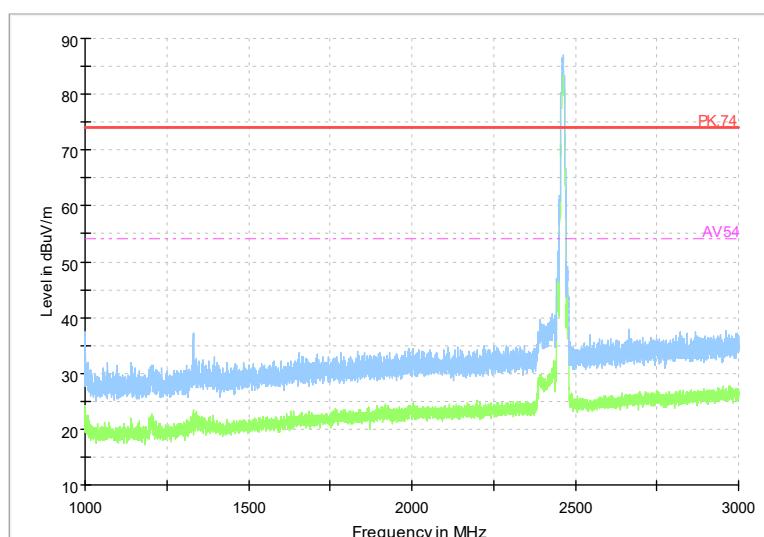
BUREAU  
VERITAS

Test Report No.: PSU-NQN2507020111RF01

Full Spectrum



Full Spectrum

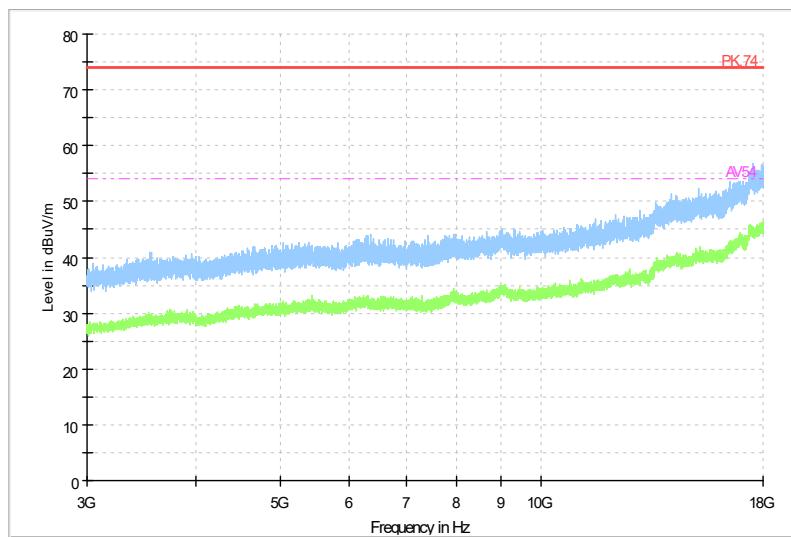




BUREAU  
VERITAS

Test Report No.: PSU-NQN2507020111RF01

Full Spectrum

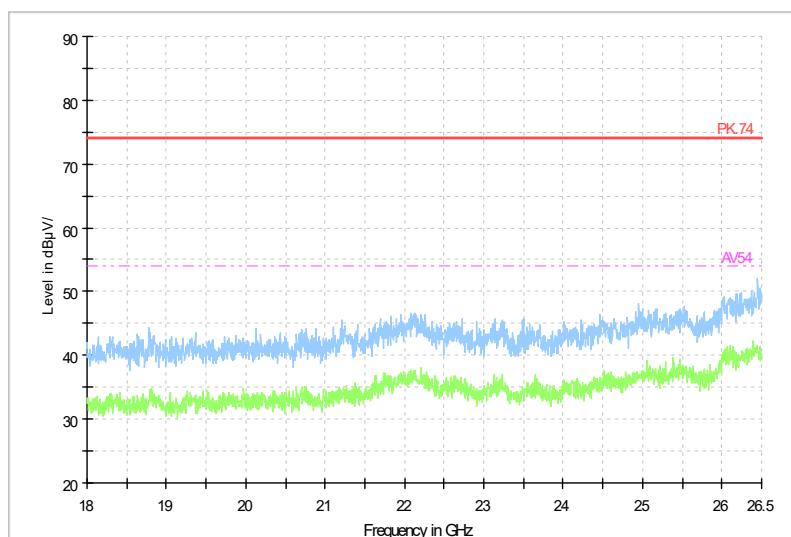


Frequency Range: 3GHz -18GHz

Detector: Av mode and PK mode

Modulation type: 802.11n(HT20)

Full Spectrum



Frequency Range: 18GHz -26GHz

Detector: Av mode and PK mode

Modulation type: 802.11n(HT20)



### 3.3 6 dB BANDWIDTH MEASUREMENT

#### 3.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 3.3.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	R&S	ESW 44	101973	Mar.28,24	Mar.27,26
Open Switch and Control Unit	R&S	OSP-B157W8	100836	N/A	N/A
Vector Signal Generator	R&S	SMBV100B	102176	Mar.29,24	Mar.28,26
Signal Generator	R&S	SMB100A03	182185	Mar.29,24	Mar.28,26
WIDEBANDRADIO COMMUNICATION TESTER	R&S	CMW500	169399	Jun.19,24	Jun.18,26
Hygrothermograph	DELI	20210528	SZ015	Sep.06,25	Sep.05,27
PC	LENOVO	E14	HRSW0024	N/A	N/A
CABLE	R&S	J12J103539-00-1	SEP-03-20-069	Apr.27,25	Apr.26,26
CABLE	R&S	J12J103539-00-1	SEP-03-20-070	Apr.27,25	Apr.26,26
Test Software	EMC32	EMC32	N/A	N/A	N/A
Temperature Chamber	votsch	VT4002	58566078100050	May.30,24	May.29,26
Power Meter	R&S	NRX	102380	Mar.28,24	Mar.27,26
Power Meter probe	R&S	NRP6A	102942	Mar.28,24	Mar.27,26

#### NOTE:

1. The calibration interval of the above test instruments is 12/ 24 months and the calibrations are traceable to CEPREI/CHINA, GRRG/CHINA and NIM/CHINA.
2. The test was performed in RF Oven room.



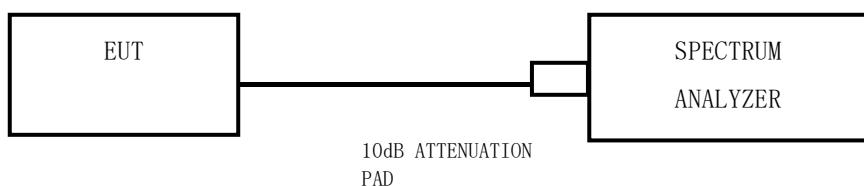
### 3.3.3 TEST PROCEDURE

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW)  $\geq$  3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 3.3.4 DEVIATION FROM TEST STANDARD

No deviation.

### 3.3.5 TEST SETUP



### 3.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

### 3.3.7 TEST RESULTS

Please Refer to Appendix1/2 Of this test report.

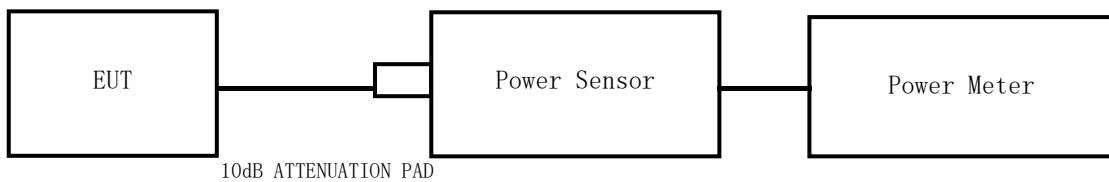


### **3.4 CONDUCTED OUTPUT POWER**

#### **3.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT**

For systems using digital modulation in the 2400–2483.5 MHz band: 1 Watt (30dBm)

#### **3.4.2 TEST SETUP**



#### **3.4.3 TEST INSTRUMENTS**

Refer to section 3.3.2 to get information of above instrument.

#### **3.4.4 TEST PROCEDURES**

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

#### **3.4.5 DEVIATION FROM TEST STANDARD**

No deviation.

#### **3.4.6 EUT OPERATING CONDITIONS**

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

#### **3.4.7 TEST RESULTS**

##### **3.4.7.1 MAXIMUM PEAK OUTPUT POWER**

Please Refer to Appendix1/2 Of this test report.



### 3.4.7.2 AVERAGE OUTPUT POWER (FOR REFERENCE)

The average power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

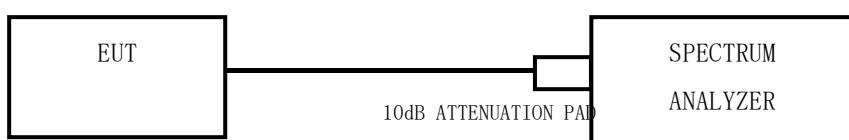
Please Refer to Appendix1/2 Of this test report.

## 3.5 POWER SPECTRAL DENSITY MEASUREMENT

### 3.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm/3KHz.

### 3.5.2 TEST SETUP



### 3.5.3 TEST INSTRUMENTS

Refer to section 3.3.2 to get information of above instrument.

### 3.5.4 TEST PROCEDURE

1. Set the span > 1.5 times the DTS bandwidth
2. Set the RBW = 3 kHz, VBW  $\geq$  3 x RBW, Detector = peak.
3. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
4. Use the peak marker function to determine the maximum amplitude level.

### 3.5.5 DEVIATION FROM TEST STANDARD

No deviation.



### 3.5.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

### 3.5.7 TEST RESULTS

Please Refer to Appendix1/2 Of this test report.

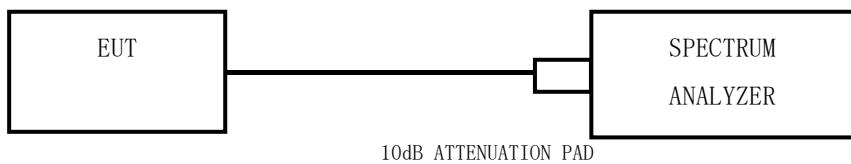


### **3.6 OUT OF BAND EMISSION MEASUREMENT**

#### **3.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT**

Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

#### **3.6.2 TEST SETUP**



#### **3.6.3 TEST INSTRUMENTS**

Refer to section 3.3.2 to get information of above instrument.

#### **3.6.4 TEST PROCEDURE**

##### **MEASUREMENT PROCEDURE REF**

1. Set the RBW = 100 kHz.
2. Set the VBW  $\geq$  300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.



## **MEASUREMENT PROCEDURE OOB**

1. Set RBW = 100 kHz.
2. Set VBW  $\geq$  300 kHz.
3. Set span to encompass the spectrum to be examined
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

### **3.6.5 DEVIATION FROM TEST STANDARD**

No deviation.

### **3.6.6 EUT OPERATING CONDITION**

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

### **3.6.7 TEST RESULTS**

The spectrum plots are attached on the following images. D1 line indicates the highest level. D2 line indicates the 20dB offset below D1. It shows compliance to the requirement.

Please Refer to Appendix1/2 Of this test report.



### **3.7 ANTENNA REQUIREMENTS**

#### **3.7.1 STANDARD APPLICABLE**

If transmitting antenna directional gain is greater than 6 dBi, 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 6 dBi.

#### **3.7.2 ANTENNA CONNECTED CONSTRUCTION**

An embedded-in antenna design is used.

#### **3.7.3 ANTENNA GAIN**

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit and PSD limit.

## **4 PHOTOGRAPHS OF THE TEST CONFIGURATION**

Please refer to the attached file (Test Setup Photo).

## **5 MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB**

No any modifications are made to the EUT by the lab during the test.



## 6 APPENDIX 1

### WLAN 2.4G DTS BANDWIDTH

#### TEST RESULT

Test Mode	Antenna	6 dB bandwidth (MHz)		
		Channel No.1	Channel No.6	Channel No.11
		2412MHz	2437MHz	2462MHz
802.11b	Chain0	7.23	9.41	8.18
802.11g	Chain0	16.52	16.39	16.45
802.11n HT20	Chain0	17.70	17.72	17.69

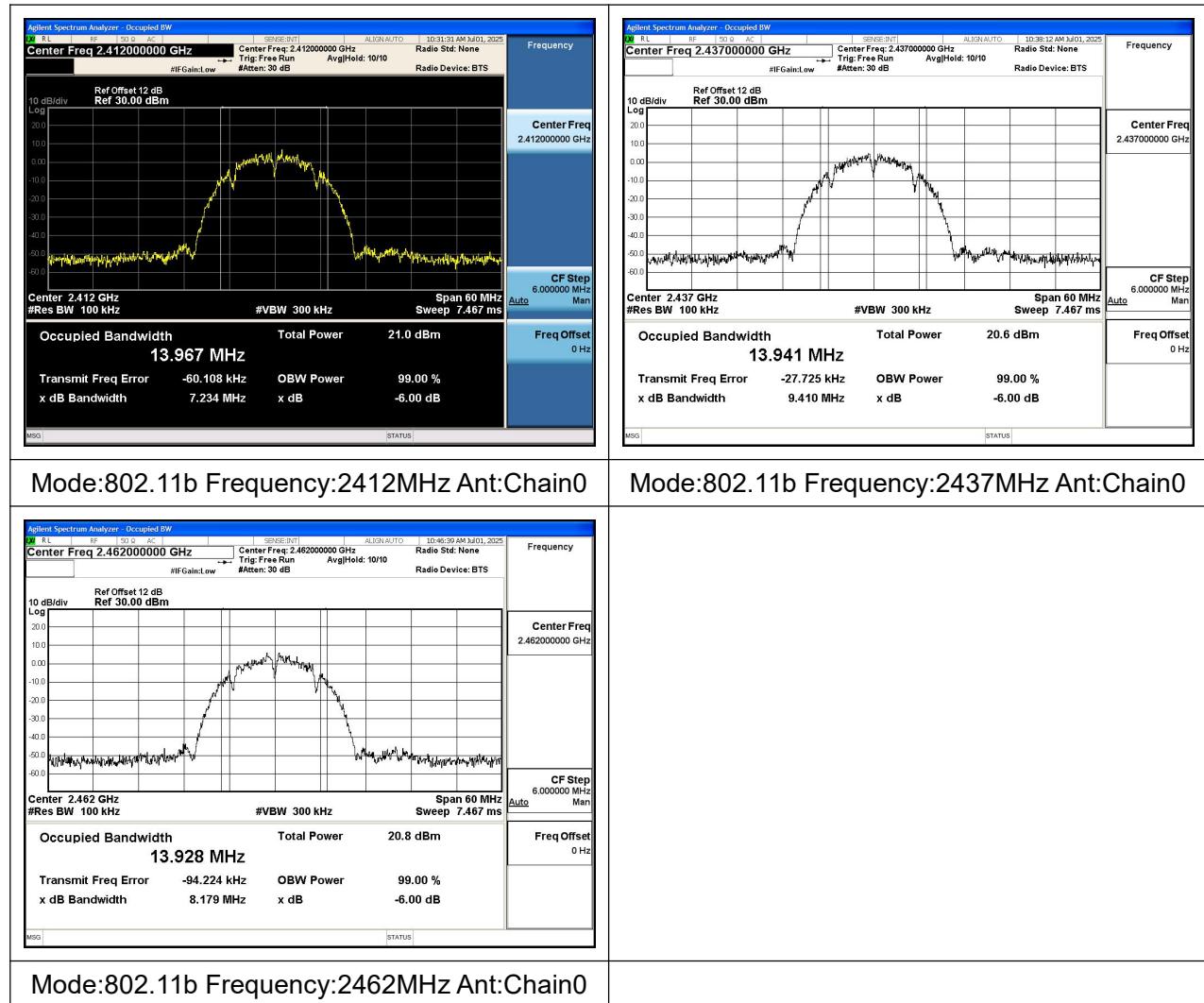


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Test Report No.: PSU-NQN2507020111RF01

## TEST GRAPHS

Test Mode: 802.11b

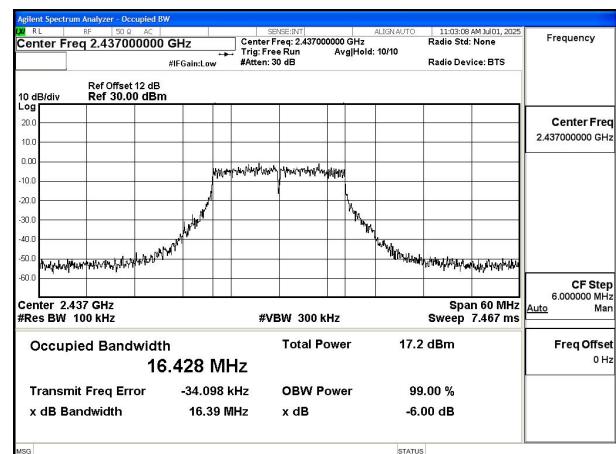
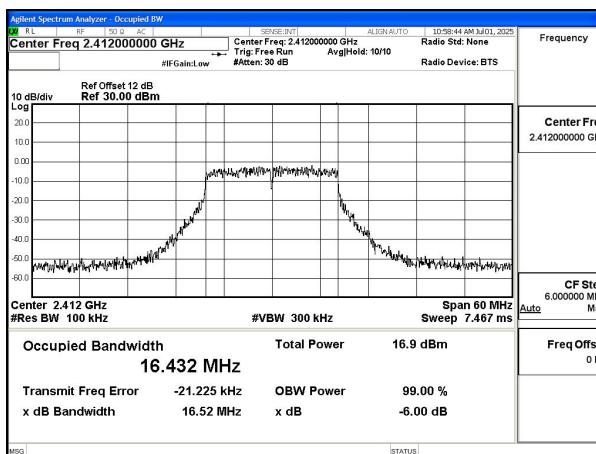




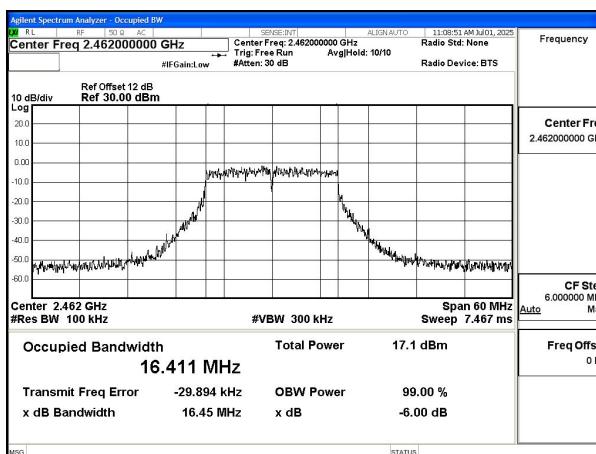
BUREAU  
VERITAS

Test Report No.: PSU-NQN2507020111RF01

Test Mode: 802.11g



Mode:802.11g Frequency:2412MHz Ant:Chain0



Mode:802.11g Frequency:2437MHz Ant:Chain0

Mode:802.11g Frequency:2462MHz Ant:Chain0



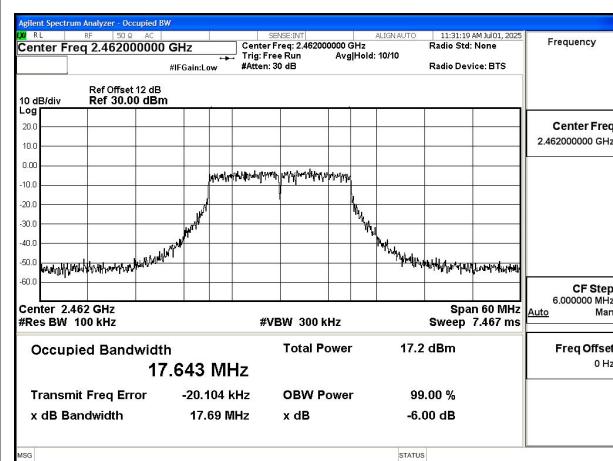
## BUREAU VERITAS Test Report No.: PSU-NQN2507020111RF01

### Test Mode: 802.11n HT20



Mode:802.11n HT20 Frequency:2412MHz

Ant:Chain0



Mode:802.11n HT20 Frequency:2462MHz

Ant:Chain0

Mode:802.11n HT20 Frequency:2437MHz

Ant:Chain0



## OCCUPIED CHANNEL BANDWIDTH

### TEST RESULT

Test Mode	Antenna	99% bandwidth (MHz)		
		Channel No.1	Channel No.6	Channel No.11
		2412MHz	2437MHz	2462MHz
802.11b	Chain0	13.998	13.990	13.983
802.11g	Chain0	16.808	16.780	16.785
802.11n HT20	Chain0	17.803	17.913	18.037

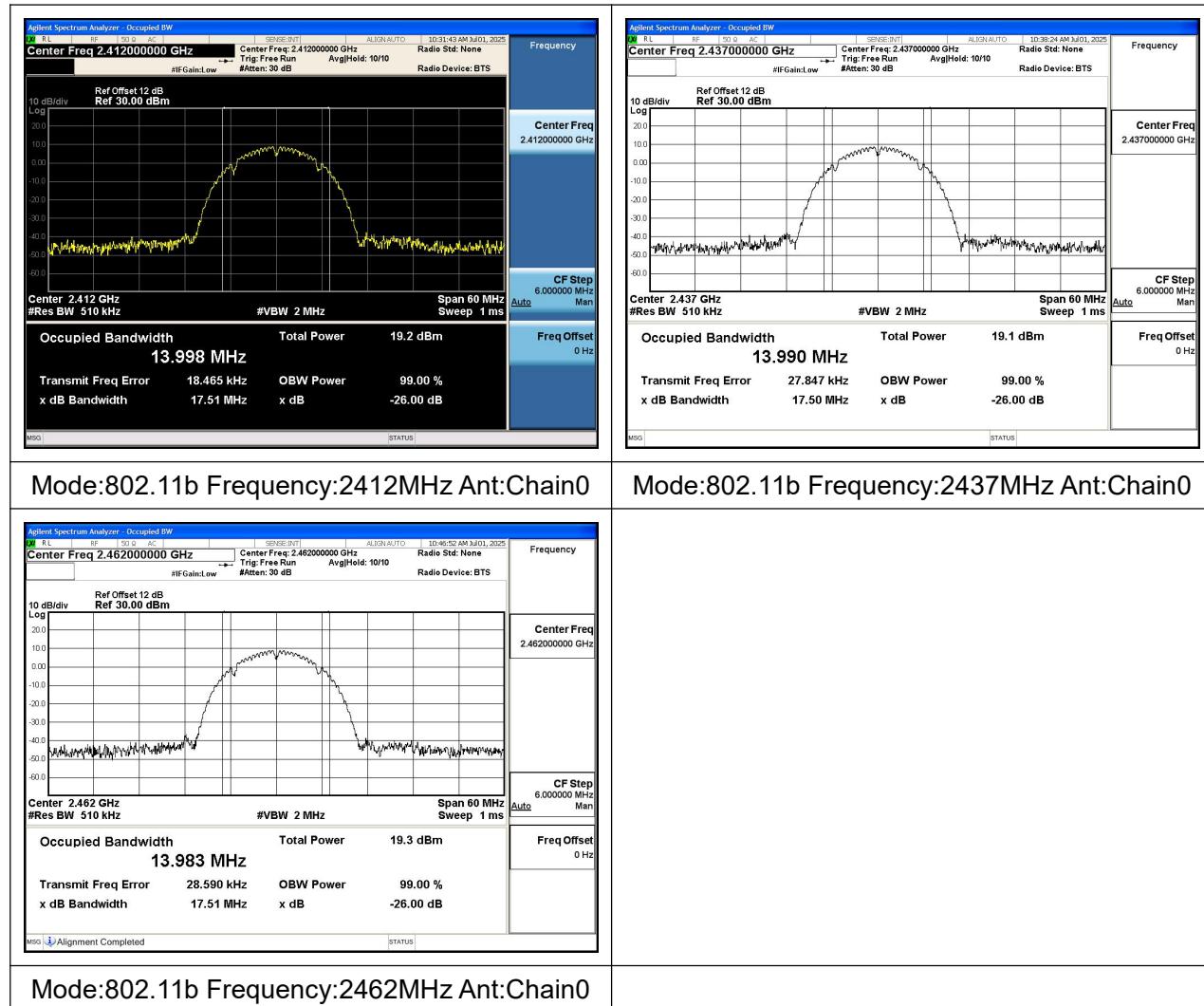


BUREAU  
VERITAS

Test Report No.: PSU-NQN2507020111RF01

## TEST GRAPHS

Test Mode: 802.11b

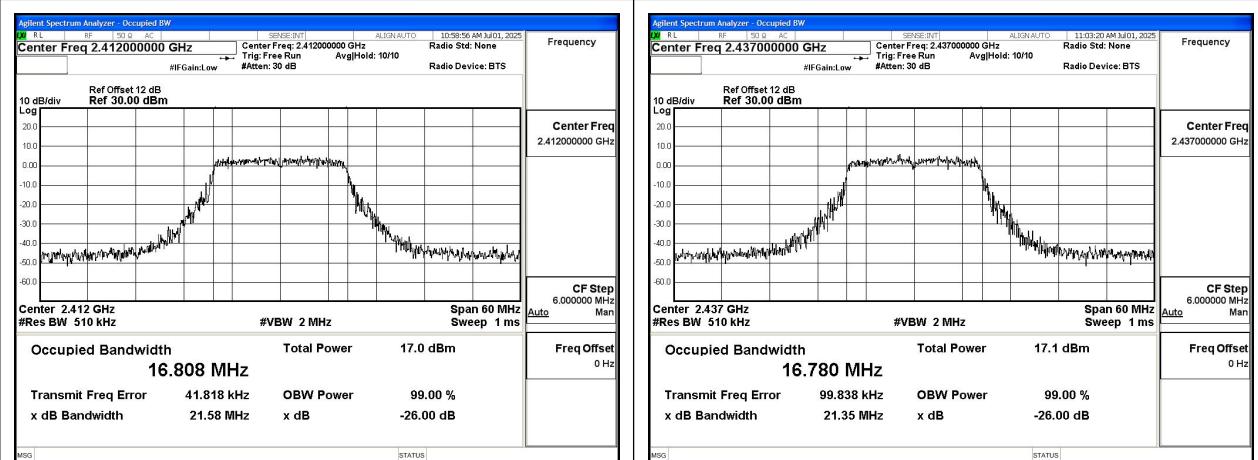




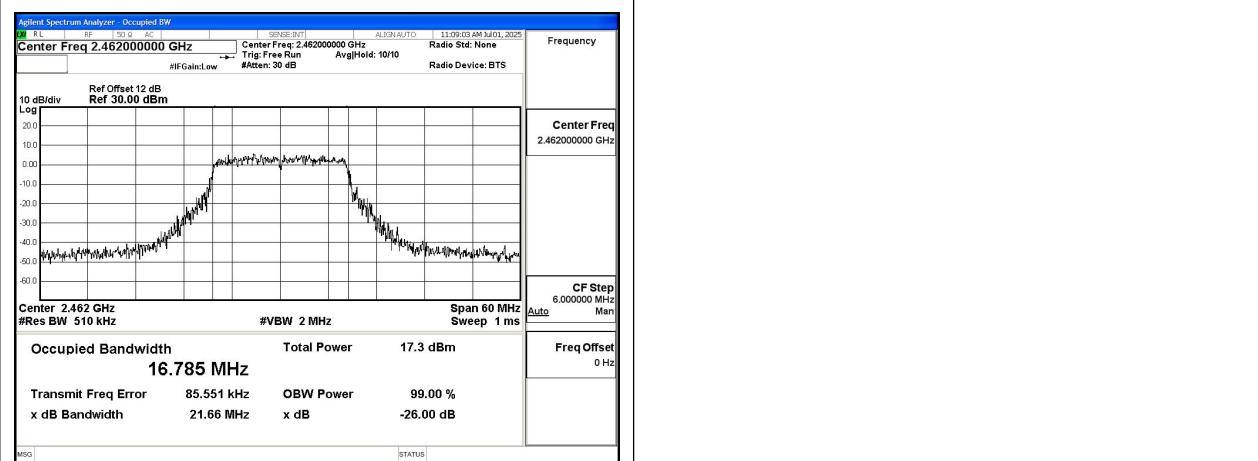
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Test Report No.: PSU-NQN2507020111RF01

Test Mode: 802.11g



Mode:802.11g Frequency:2412MHz Ant:Chain0

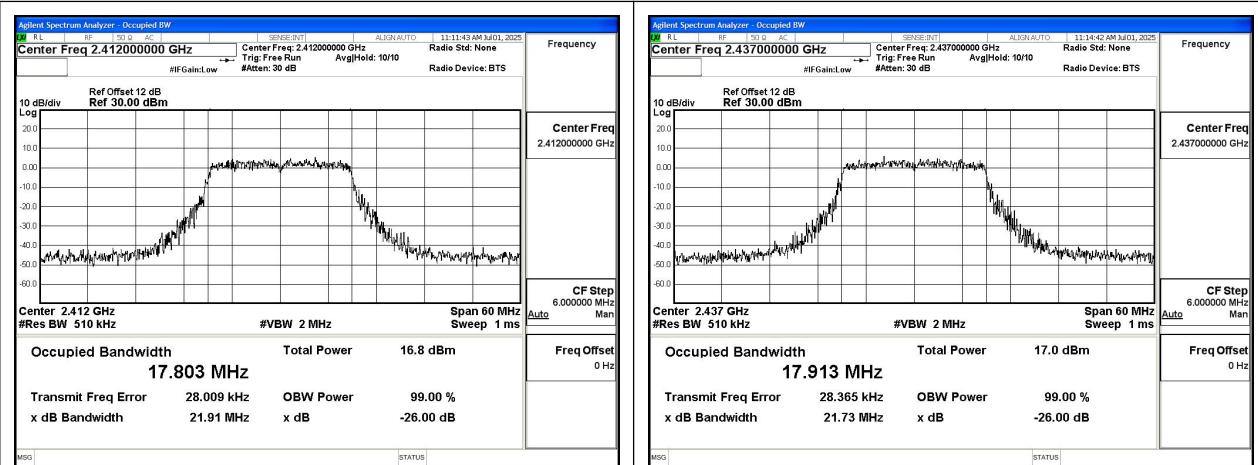


Mode:802.11g Frequency:2462MHz Ant:Chain0



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VERITAS** Test Report No.: PSU-NQN2507020111RF01

Test Mode: 802.11n HT20

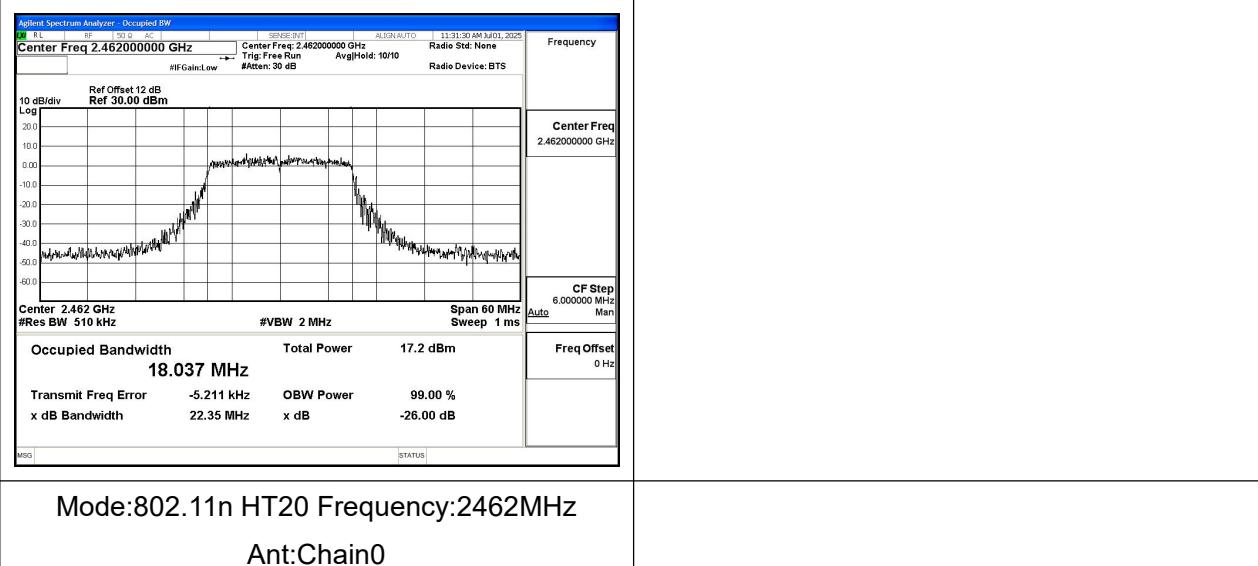


Mode:802.11n HT20 Frequency:2412MHz

Ant:Chain0

Mode:802.11n HT20 Frequency:2437MHz

Ant:Chain0



Mode:802.11n HT20 Frequency:2462MHz

Ant:Chain0



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VERITAS** Test Report No.: PSU-NQN2507020111RF01

## MAXIMUM CONDUCTED OUTPUT POWER

### TEST RESULT

NOTE: EIRP = Ave Power + Gain

Test Mode	Tones/ RU Index	Frequency (MHz)	Antenna	Peak power output (dBm)	Average power output (dBm)	EIRP (dBm)
802.11b	NA	2412	Chain0	21.08	17.66	17.96
802.11b	NA	2437	Chain0	20.28	17.08	17.38
802.11b	NA	2462	Chain0	20.51	17.27	17.57
802.11g	NA	2412	Chain0	21.80	13.54	13.84
802.11g	NA	2437	Chain0	22.06	13.78	14.08
802.11g	NA	2462	Chain0	22.26	13.97	14.27
802.11n HT20	NA	2412	Chain0	21.82	13.48	13.78
802.11n HT20	NA	2437	Chain0	22.04	13.70	14.00
802.11n HT20	NA	2462	Chain0	22.21	13.91	14.21



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## MAXIMUM POWER SPECTRAL DENSITY

### TEST RESULT

Test Mode	Antenna	Tones	Power Density(dBm/3KHz)		
			Channel No.1	Channel No.6	Channel No.11
			2412MHz	2437MHz	2462MHz
802.11b	Chain0	NA	-5.372	-5.462	-6.260
802.11g	Chain0	NA	-11.874	-12.346	-11.104
802.11n HT20	Chain0	NA	-12.352	-11.984	-11.923