

BUREAU  
VERITAS

Test Report No.: PSU-NQN2505120312RF06



Certificate #6613.01

# FCC TEST REPORT

## (Part 15, Subpart C)

Applicant:	InHand Networks, Inc.
Address:	43671 Trade Center Place, Suite 100, Dulles, VA 20166 United States


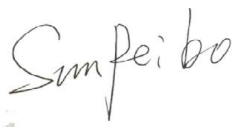
Manufacturer or Supplier:	InHand Networks, Inc.
Address:	43671 Trade Center Place, Suite 100, Dulles, VA 20166 United States
Product:	Industrial Cellular Router
Brand Name:	inhand
Model Name:	IR302-FQ38-WLAN v2, IR352-FQ38-WLAN v2, IR392-FQ38-WLAN v2
FCC ID:	2BPWU-IR302
Date of tests:	Apr. 28, 2025 ~ May. 21, 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: May. 21, 2025	 Date: May. 21, 2025

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Test Report No.: PSU-NQN2505120312RF06

## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
PSU-NQN2505120312RF06	Original release	May. 21, 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	Compliance
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 and AC Power Conducted Emission, other data please refer to Appendix.

### \*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, China

**Accredited Test Lab Cert 6613.01**

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

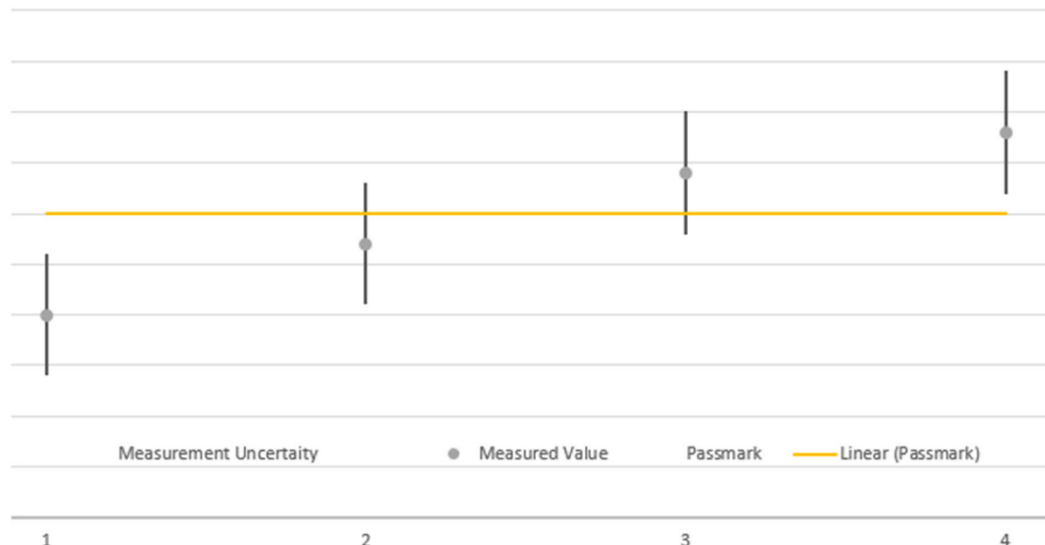


## 1.1 MEASUREMENT UNCERTAINTY

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	$\pm 2.70\text{dB}$
Radiated emissions (9KHz~30MHz)	$\pm 2.68\text{dB}$
Radiated emissions (30MHz~1GHz)	$\pm 4.98\text{dB}$
Radiated emissions (1GHz ~6GHz)	$\pm 4.70\text{dB}$
Radiated emissions (6GHz ~18GHz)	$\pm 4.60\text{dB}$
Radiated emissions (18GHz ~40GHz)	$\pm 4.12\text{dB}$
Conducted emissions	$\pm 4.01\text{dB}$
Occupied Channel Bandwidth	$\pm 43.58\text{KHz}$
Conducted Output power	$\pm 2.06\text{dB}$
Power Spectral Density	$\pm 0.85\text{ dB}$

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>	Industrial Cellular Router
<b>BRAND NAME*</b>	inhand
<b>MODEL NAME*</b>	IR302-FQ38-WLAN v2, IR352-FQ38-WLAN v2, IR392-FQ38-WLAN v2
<b>NOMINAL VOLTAGE*</b>	12.0Vdc(adapter or host equipment)
<b>MODULATION *</b>	DSSS ,OFDM
<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 802.11n(HT40): up to 300 Mbps
<b>OPERATING FREQUENCY</b>	2412-2462MHz for 11b/g/n(HT20/40)
<b>MAX. OUTPUT POWER</b>	WLAN: 269.15 mW (Maximum)
<b>ANTENNA TYPE*</b>	ANT: External Antenna with 2.69dBi gain for WIFI
<b>HW VERSION*</b>	V2.0
<b>SW VERSION*</b>	V3.5
<b>I/O PORTS*</b>	Refer to user's manual



**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
802.11b	1TX /1RX
802.11g	1TX /1RX
802.11n(HT20)	1TX /1RX
802.11n(HT40)	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		

7 channels are provided for 802.11n (HT40):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422 MHz	7	2442 MHz
4	2427 MHz	8	2447 MHz
5	2432 MHz	9	2452 MHz
6	2437 MHz		



## 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	
-	√	√	√	√	-

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

**RE≥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

**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
802.11n HT40	3 to 9	3,6,9	OFDM	MCS0

**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, 11	DSSS	1.0

**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
802.11n HT40	3 to 9	3,6,9	OFDM	MCS0

**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
802.11n HT40	3 to 9	3,6,9	OFDM	MCS0

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE	TESTED BY
RE<1G	23deg. C, 70%RH	DC 12V DC Supply	Hanwen Xu
RE≥1G	23deg. C, 70%RH	DC 12V DC Supply	Hanwen Xu
PLC	25deg. C, 52%RH	DC 12V DC Supply	Hanwen Xu
APCM	25deg. C, 60%RH	DC36V By DC Supply	Hanwen Xu

**2.3 DUTY CYCLE OF TEST SIGNAL**

Please Refer to Appendix 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, GRGT/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.

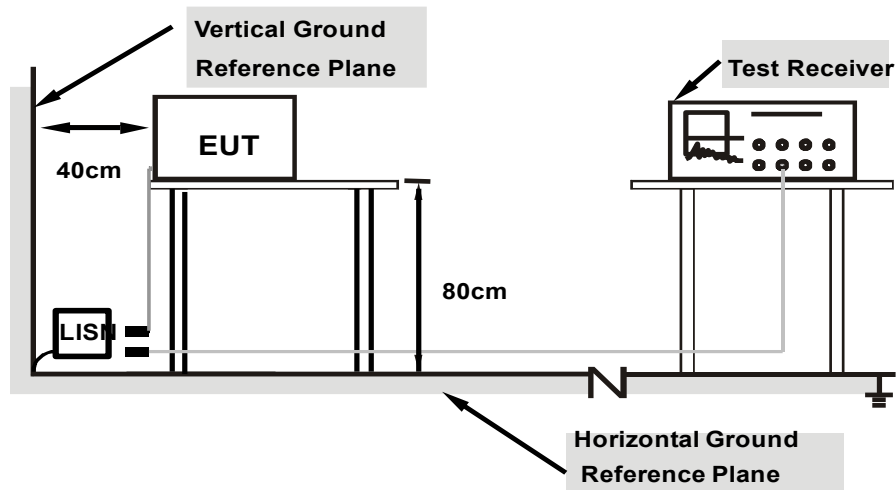
**NOTE:** All modes of operation were investigated and the worst-case emissions are reported.

### 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

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



### 3.1.7 TEST RESULTS

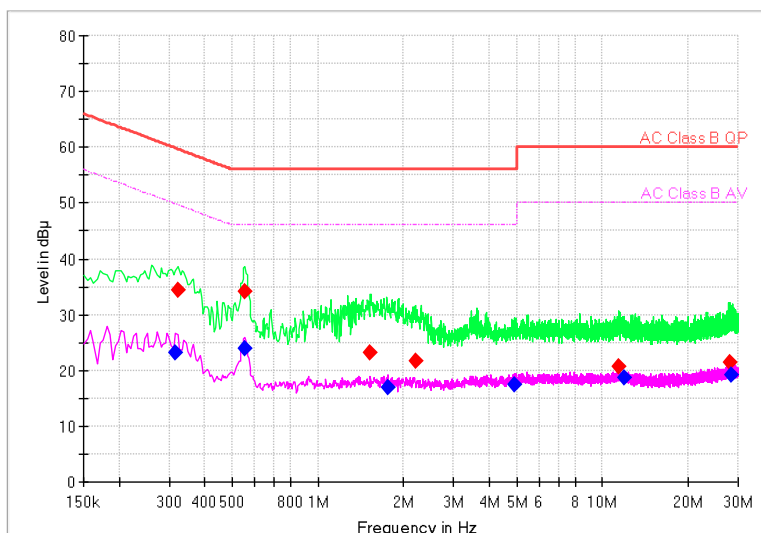
A “reference path loss” Corr.(dB) is established and the  $L_{\text{cable}} + \text{ATT} + \text{VDF}$  is the attenuation of “reference path loss”, and including the cable loss, the attenuation of the attenuator, the voltage division factor of AMN.

The measurement results are obtained as described below:

$$P_{\text{result}} = P_{\text{mea}} + \text{Corr. (dB)}$$

Sample calculation:  $(23.12\text{dB}\mu\text{V}) = (-6.48\text{dB}\mu\text{V}) + (29.6\text{dB})$ , the corresponding frequency is 0.15MHz.

Full Spectrum



L+N Line



**BUREAU VERITAS** Test Report No.: PSU-NQN2505120312RF06

**MEASUREMENT RESULT:**

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)	PmeaQuasiPeak (dBμV)	PmeaAverage (dBμV)
0.316809	---	23.12	49.79	26.67	L1	29.6	---	-6.48
0.321199	34.31	---	59.68	25.37	L1	29.6	4.71	---
0.553853	---	23.81	46	22.19	L1	29.6	---	-5.79
0.553853	34.03	---	56	21.97	L1	29.6	4.43	---
1.528368	23.15	---	56	32.85	L1	29.6	-6.45	---
1.756632	---	17.01	46	28.99	L1	29.6	---	-12.59
2.195603	21.74	---	56	34.26	L1	29.6	-7.86	---
4.895272	---	17.57	46	28.43	L1	29.7	---	-12.13
11.44471	20.62	---	60	39.38	L1	29.9	-9.28	---
11.94952	---	18.58	50	31.42	L1	29.9	---	-11.32
28.18266	21.36	---	60	38.64	L1	30.6	-9.24	---
28.26606	---	19.19	50	30.81	L1	30.6	---	-11.41



### 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 (dBuV/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.



## 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	SCHWARZBECK	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
Loop Antenna	SCHWARZ	HFH2-Z2/Z2E	100976	Feb.22,25	Feb.21,27
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(CABLE)	R&S	HF290-NMNM-7.00M	N/A	N/A	N/A
TMC-AMI18843A(CABLE)	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, GRGT/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

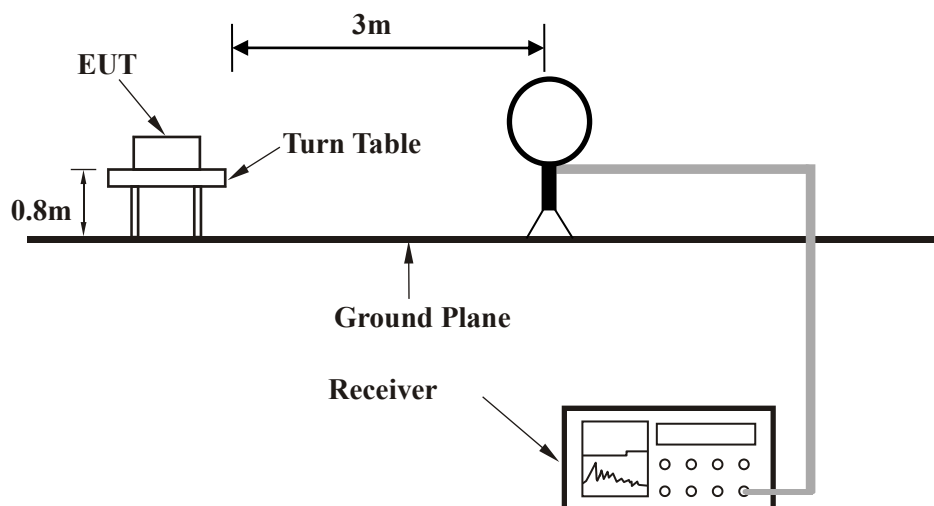


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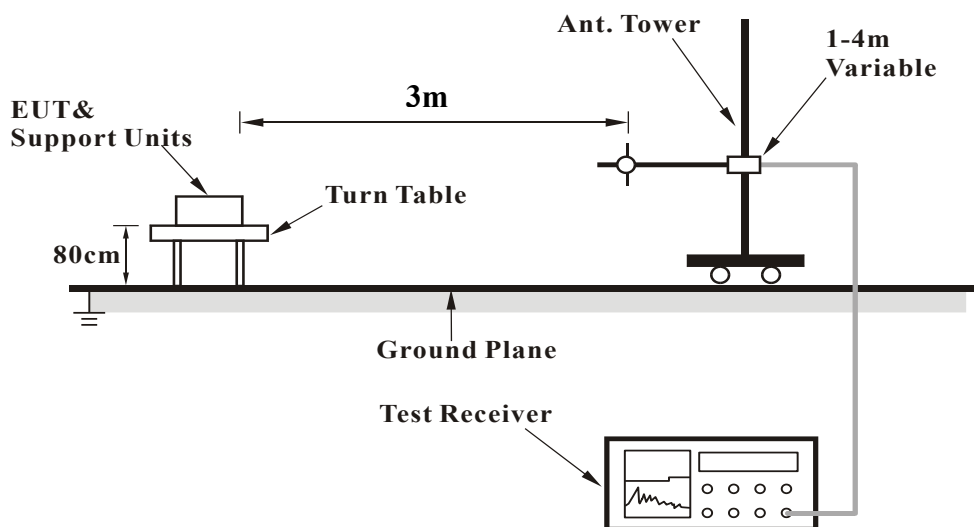
Test Report No.: PSU-NQN2505120312RF06

### 3.2.5 TEST SETUP

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

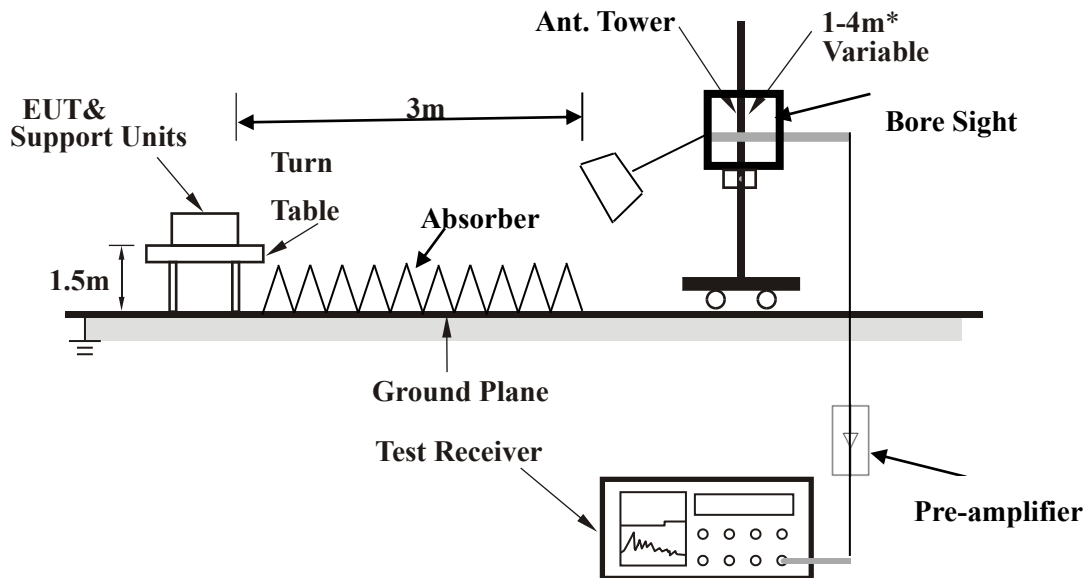


#### < Frequency Range 30MHz~1GHz >





### <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...).

For WIFI2.4g:

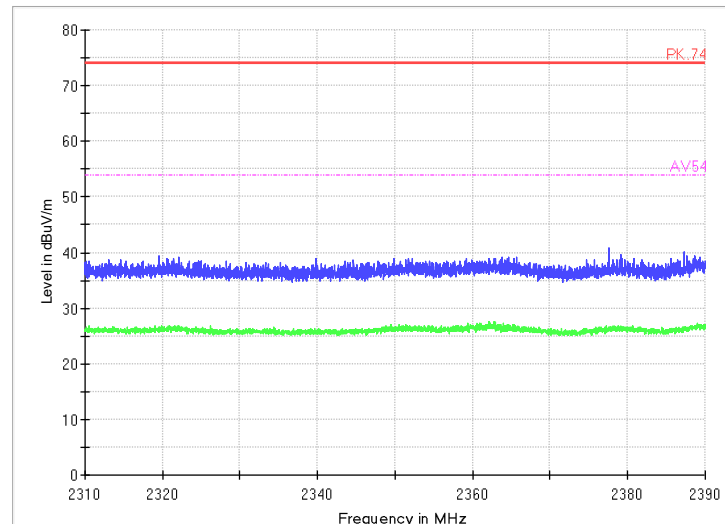
Nominal bandwidth (MHz)	Max OBW (MHz)	Transmission frequency (MHz)	Transmission frequency- ( Max OWB / 2 ) (MHz)	Bandedge (MHz)	Distance edge strip (MHz)	Conclusion
20	17.7	2472	2480.85	2483.5	2.65	Closer to the edge, worst
40	36.0	2462	2480.0	2483.5	3.50	

Note 4:

For the above results, the worst case is 802.11n (HT20), so it just shows the worst test plots in the report.



## Radiated Emission Band Edge for WIFI

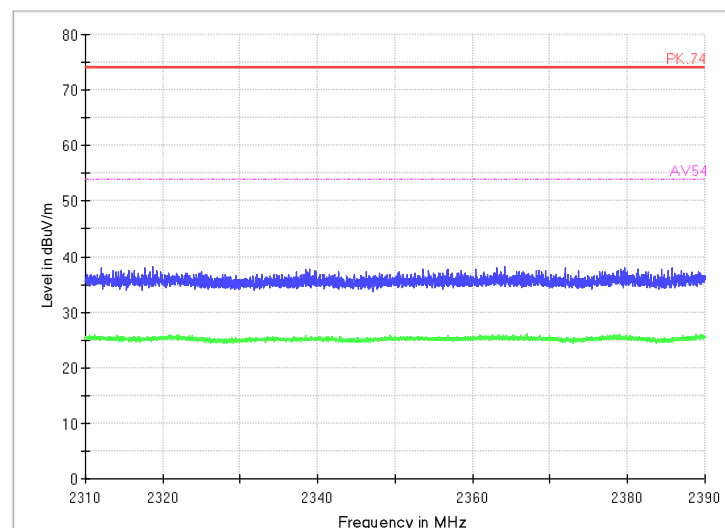


### Radiated Emission Band Edge

Channel No.:1

Test Mode: 802.11b

Polarization: V



### Radiated Emission Band Edge

Channel No.:1

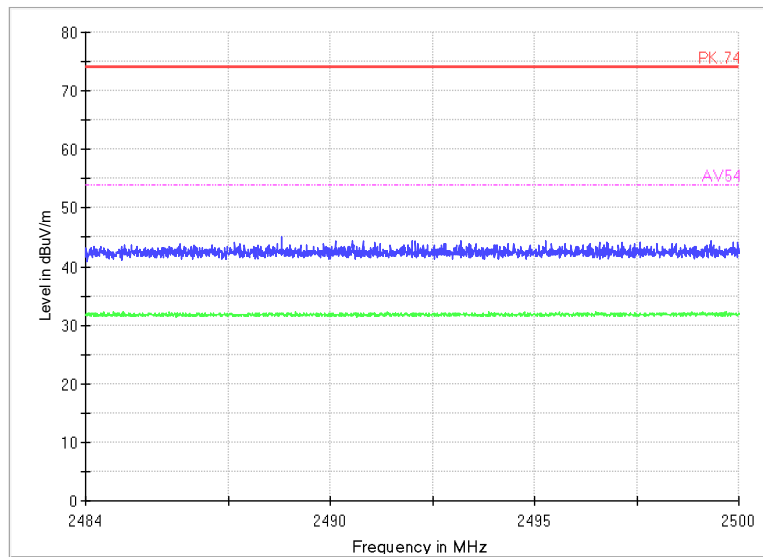
Test Mode: 802.11b

Polarization: H



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Test Report No.: PSU-NQN2505120312RF06

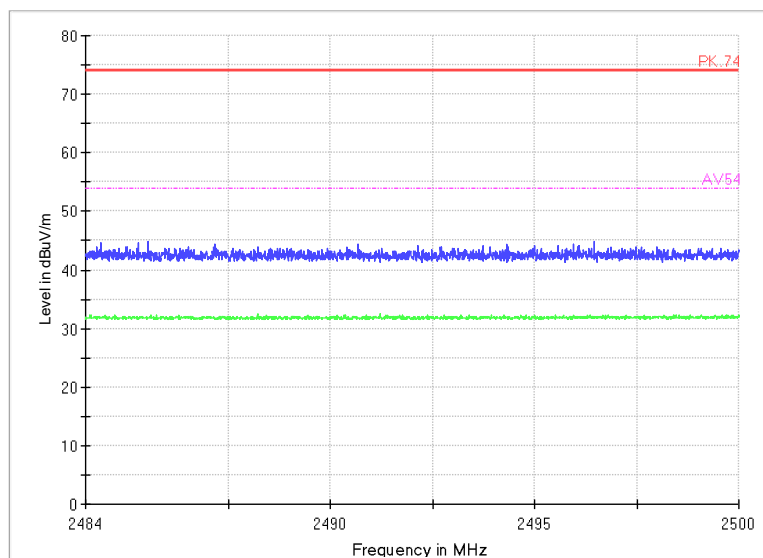


Radiated Emission Band Edge

Channel No.:11

Test Mode: 802.11b

Polarization: V



Radiated Emission Band Edge

Channel No.:11

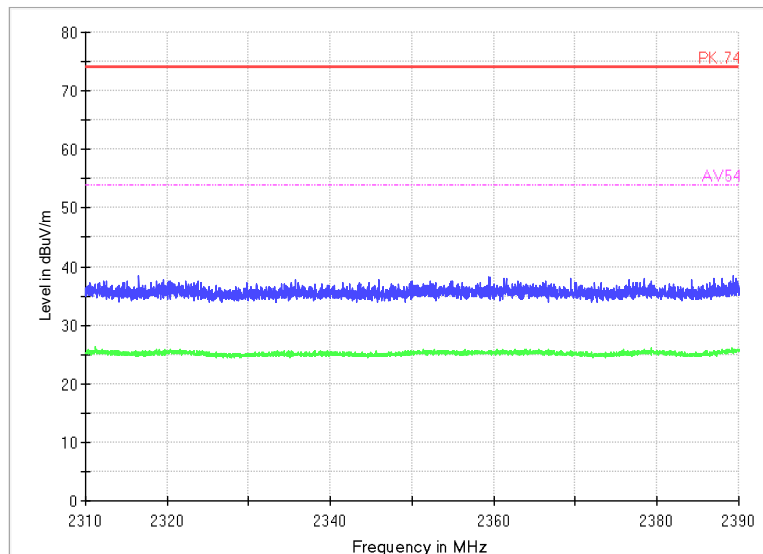
Test Mode: 802.11b

Polarization: H



BUREAU  
VERITAS

Test Report No.: PSU-NQN2505120312RF06

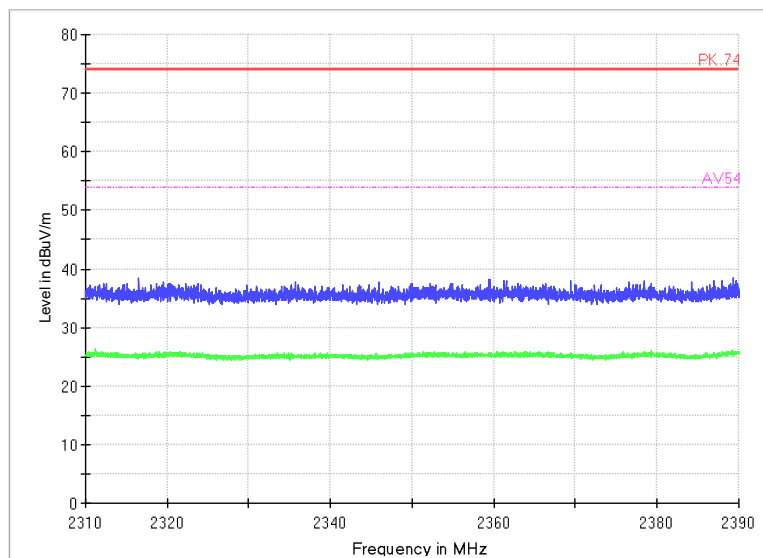


Radiated Emission Band Edge

Channel No.:1

Test Mode: 802.11g

Polarization: V

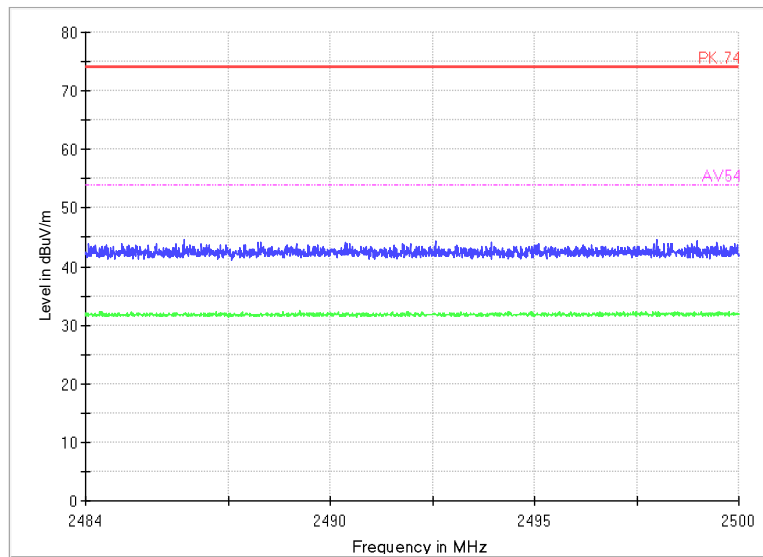


Radiated Emission Band Edge

Channel No.:1

Test Mode: 802.11g

Polarization: H

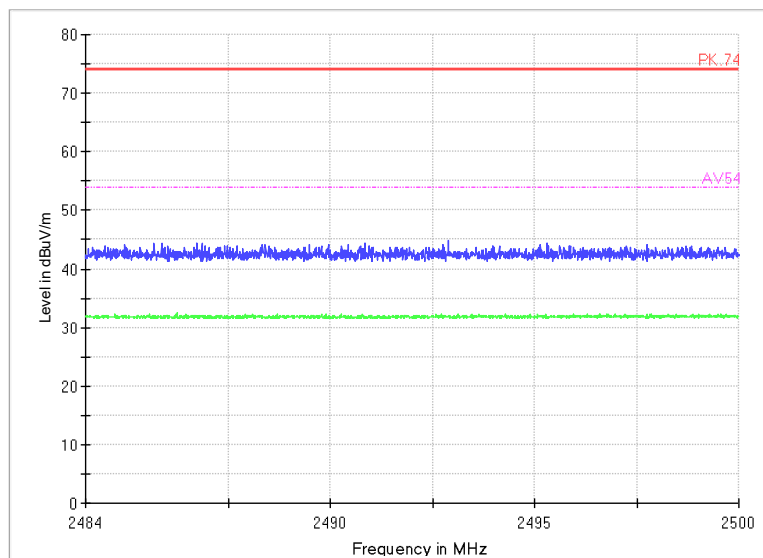


### Radiated Emission Band Edge

Channel No.:11

Test Mode: 802.11g

Polarization: V



### Radiated Emission Band Edge

Channel No.:11

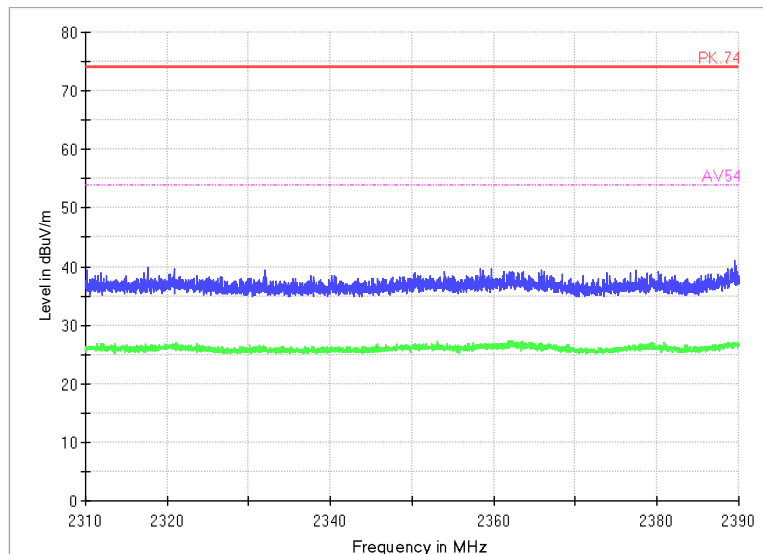
Test Mode: 802.11g

Polarization: H



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VERITAS

Test Report No.: PSU-NQN2505120312RF06

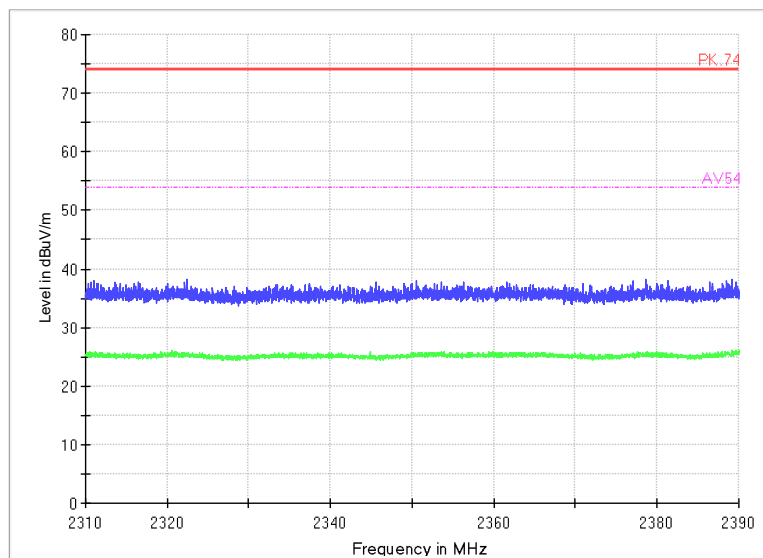


Radiated Emission Band Edge

Channel No.:1

Test Mode: 802.11n (HT20)

Polarization: V



Radiated Emission Band Edge

Channel No.:1

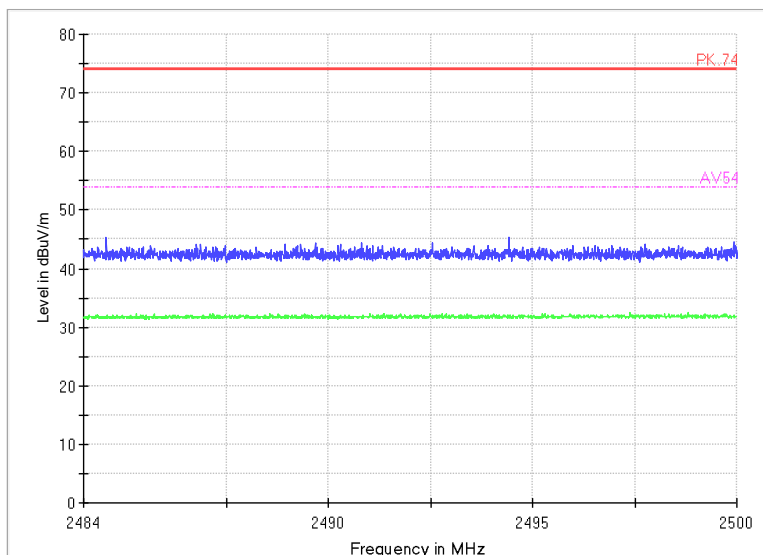
Test Mode: 802.11n (HT20)

Polarization: H



BUREAU  
VERITAS

Test Report No.: PSU-NQN2505120312RF06

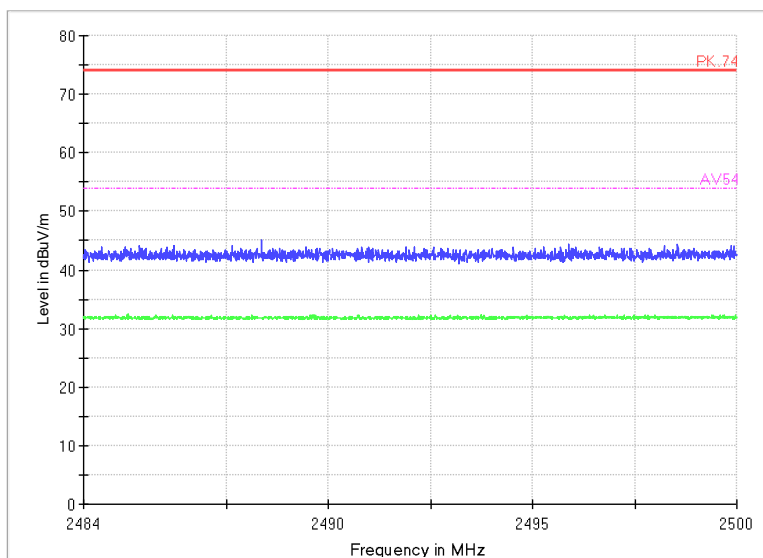


Radiated Emission Band Edge

Channel No.:11

Test Mode: 802.11n (HT20)

Polarization: V



Radiated Emission Band Edge

Channel No.:11

Test Mode: 802.11n(HT20)

Polarization: H





## 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:  $(25.09 \text{ dB}\mu\text{V/m}) = (40.69 \text{ dB}\mu\text{V}) + (-15.6 \text{ dB/m})$ , the corresponding frequency is 47.1205 MHz.

For 802.11b Channel No.:1

Frequency(MHz)	Result(dBuV/m)	$A_{Rpl}$ (dB)	$P_{mea}$ (dBuV/m)	Polarity	Limit (dBuV/m)	Margin (dB)
47.1205	25.09	-15.6	40.69	Vertical	40	14.91
58.13	22.29	-16	38.29	Vertical	40	17.71
119.919	25.96	-19	44.96	Vertical	43.5	17.54
189.3225	23.81	-17.8	41.61	Vertical	43.5	19.69
414.702	13.15	-10.8	23.95	Vertical	46	32.85
958.3385	24.35	-2	26.35	Vertical	46	21.65

For 802.11g Channel No.:1

Frequency(MHz)	Result(dBuV/m)	$A_{Rpl}$ (dB)	$P_{mea}$ (dBuV/m)	Polarity	Limit (dBuV/m)	Margin (dB)
46.975	24.97	-15.7	40.67	Vertical	40	15.03
58.1785	23.43	-16	39.43	Vertical	40	16.57
126.418	25.48	-20	45.48	Vertical	43.5	18.02
190.826	24.22	-17.5	41.72	Vertical	43.5	19.28
383.3225	18.08	-11.8	29.88	Vertical	46	27.92
958.387	21.56	-2	23.56	Vertical	46	24.44

For 802.11n(HT20) Channel No.:1



**BUREAU VERITAS** Test Report No.: PSU-NQN2505120312RF06

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)	Margin (dB)
37.8085	23.46	-17.7	41.16	Vertical	40	16.54
60.3125	22.15	-16.4	38.55	Vertical	40	17.85
118.7065	25.81	-18.9	44.71	Vertical	43.5	17.69
196.064	22.27	-16.5	38.77	Vertical	43.5	21.23
413.4895	18.17	-10.8	28.97	Vertical	46	27.83
958.3385	24.46	-2	26.46	Vertical	46	21.54

For 802.11b Channel No.:6

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)	Margin (dB)
37.663	23.5	-17.7	41.2	Vertical	40	16.5
57.6935	23.1	-15.9	39	Vertical	40	16.9
115.5055	24.76	-18.3	43.06	Vertical	43.5	18.74
191.796	23.53	-17.3	40.83	Vertical	43.5	19.97
403.838	17.75	-11.2	28.95	Vertical	46	28.25
958.387	22.33	-2	24.33	Vertical	46	23.67

For 802.11g Channel No.:6

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)	Margin (dB)
46.7325	24.73	-15.7	40.43	Vertical	40	15.27
59.1485	22.46	-16.2	38.66	Vertical	40	17.54
118.2215	25.89	-18.9	44.79	Vertical	43.5	17.61
190.729	22.5	-17.5	40	Vertical	43.5	21
415.381	18.71	-10.8	29.51	Vertical	46	27.29
958.3385	24.23	-2	26.23	Vertical	46	21.77

For 802.11n(HT20) Channel No.:6

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)	Margin (dB)
47.169	25.09	-15.6	40.69	Vertical	40	14.91
55.802	22.67	-15.7	38.37	Vertical	40	17.33
118.8035	25.82	-18.9	44.72	Vertical	43.5	17.68



**BUREAU VERITAS** Test Report No.: PSU-NQN2505120312RF06

201.787	22.16	-16.8	38.96	Vertical	43.5	21.34
423.0925	17.43	-10.7	28.13	Vertical	46	28.57
862.066	18.42	-2.6	21.02	Vertical	46	27.58

For 802.11b Channel No.:11

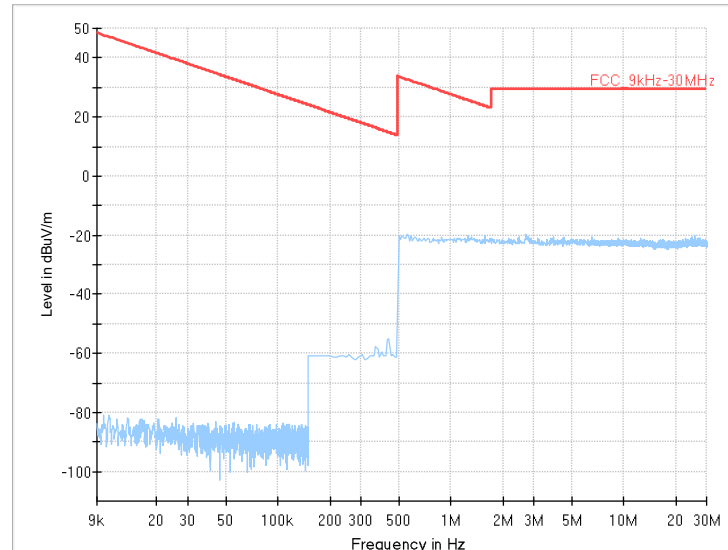
Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)	Margin (dB)
46.296	24.17	-15.7	39.87	Vertical	40	15.83
58.6635	23.16	-16.1	39.26	Vertical	40	16.84
117.7365	25.99	-18.8	44.79	Vertical	43.5	17.51
189.8075	24.51	-17.6	42.11	Vertical	43.5	18.99
422.365	13.03	-10.7	23.73	Vertical	46	32.97
958.387	21.93	-2	23.93	Vertical	46	24.07

For 802.11g Channel No.:11

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)	Margin (dB)
46.296	24.2	-15.7	39.9	Vertical	40	15.8
56.7235	22.6	-15.8	38.4	Vertical	40	17.41
116.3785	25.53	-18.4	43.93	Vertical	43.5	17.97
196.9855	22.68	-16.5	39.18	Vertical	43.5	20.82
415.381	18.81	-10.8	29.61	Vertical	46	27.19
958.3385	25.4	-2	27.4	Vertical	46	20.6

For 802.11n(HT20) Channel No.:11

Frequency(MHz)	Result(dBuV/m)	ARpl (dB)	Pmea (dBuV/m)	Polarity	Limit (dBuV/m)	Margin (dB)
47.7025	24.6	-15.5	40.1	Vertical	40	15.4
58.13	22.19	-16	38.19	Vertical	40	17.81
104.496	23.11	-17	40.11	Vertical	43.5	20.39
199.7985	21.13	-16.6	37.73	Vertical	43.5	22.37
417.2725	17.28	-10.8	28.08	Vertical	46	28.72
958.3385	24.55	-2	26.55	Vertical	46	21.45



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.

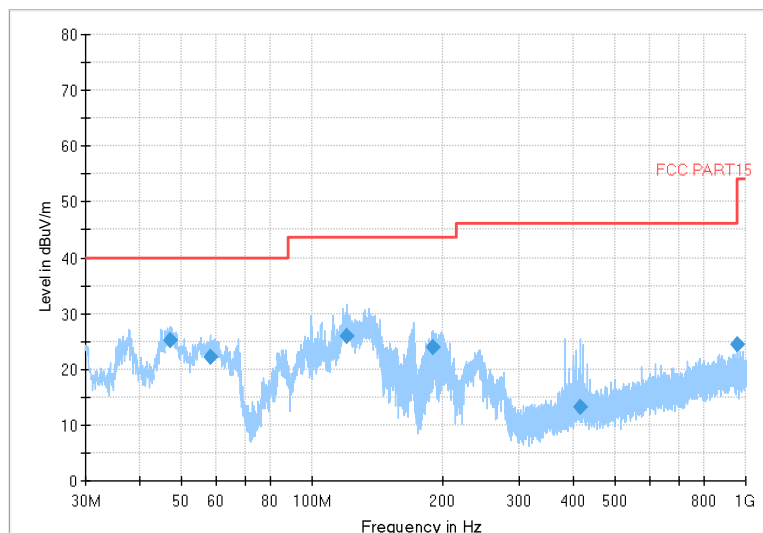


**BUREAU VERITAS** Test Report No.: PSU-NQN2505120312RF06

Carrier frequency (MHz): 2412

Channel No.:1

Full Spectrum

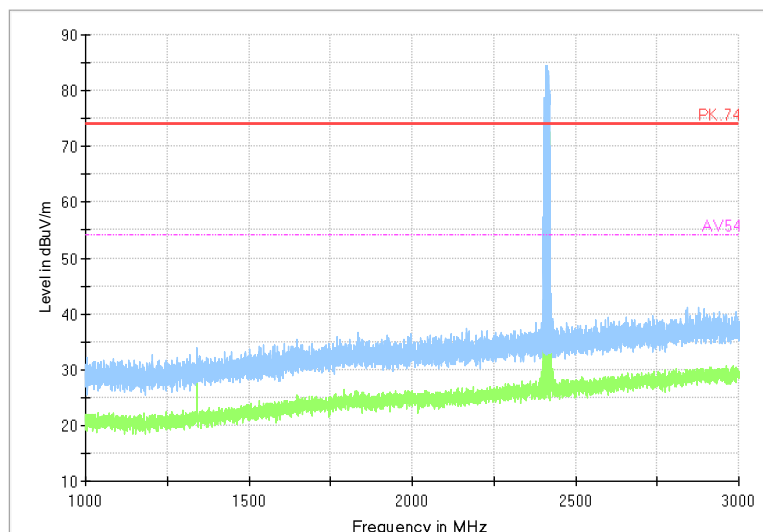


Frequency Range 30MHz -1GHz

Detector: QP mode

Modulation type: 802.11b

Full Spectrum



Frequency Range: 1GHz -3GHz

Detector: Av mode and PK mode

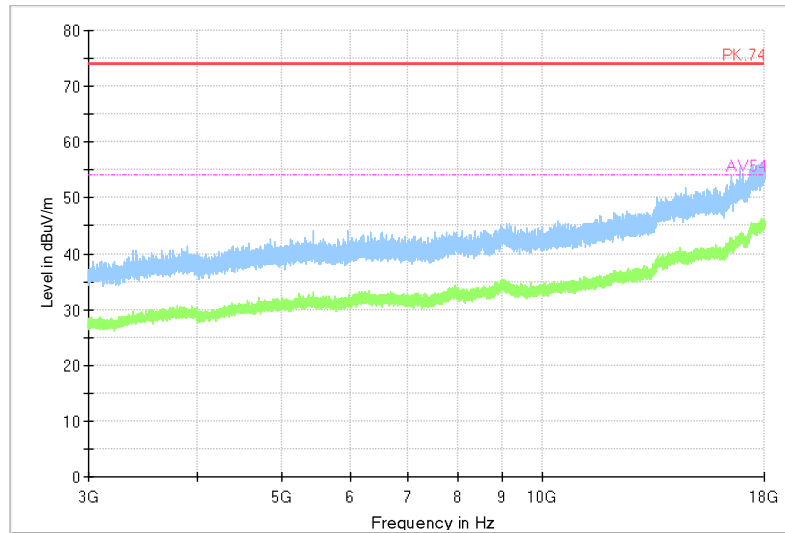
Modulation type: 802.11b



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Test Report No.: PSU-NQN2505120312RF06

Full Spectrum

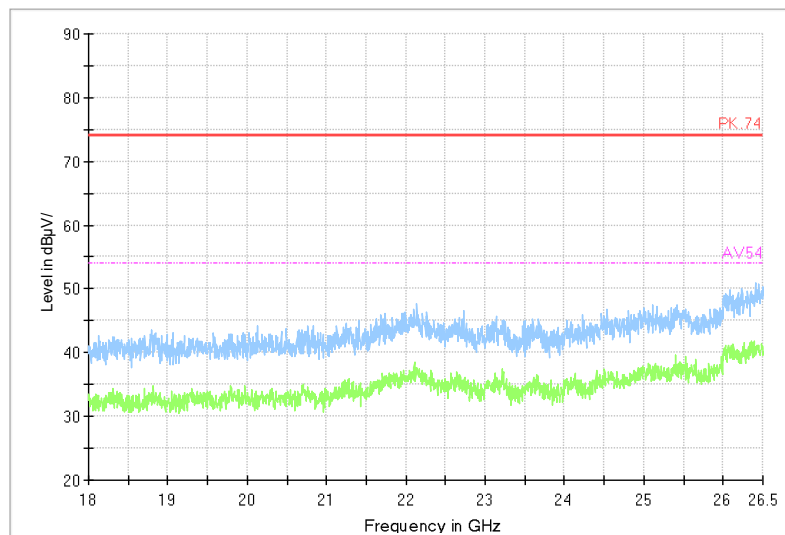


Frequency Range: 3GHz -18GHz

Detector: Av mode and PK mode

Modulation type: 802.11b

Full Spectrum



Frequency Range: 18GHz -26GHz

Detector: Av mode and PK mode

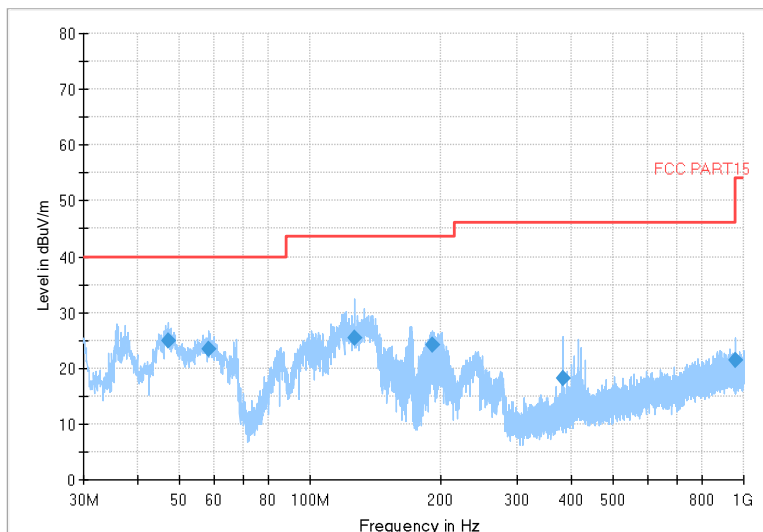
Modulation type: 802.11b



BUREAU  
VERITAS

Test Report No.: PSU-NQN2505120312RF06

Full Spectrum

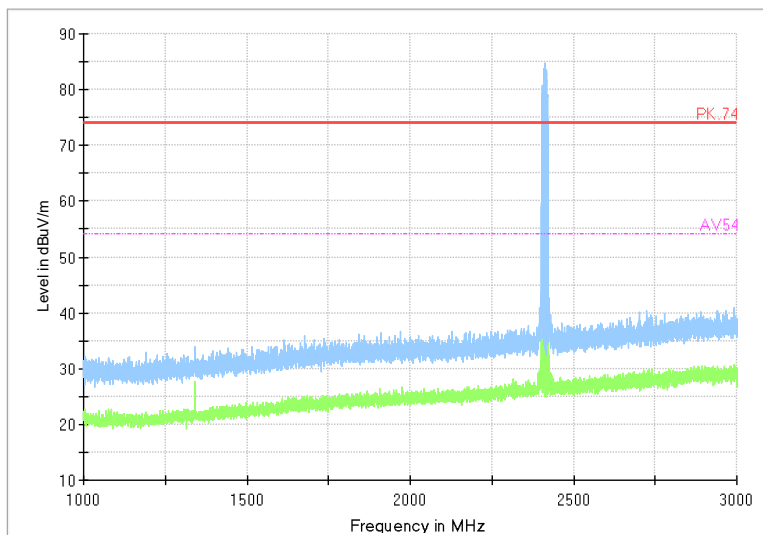


Frequency Range: 30MHz -1GHz

Detector: QP mode

Modulation type: 802.11g

Full Spectrum



Frequency Range: 1GHz -3GHz

Detector: Av mode and PK mode

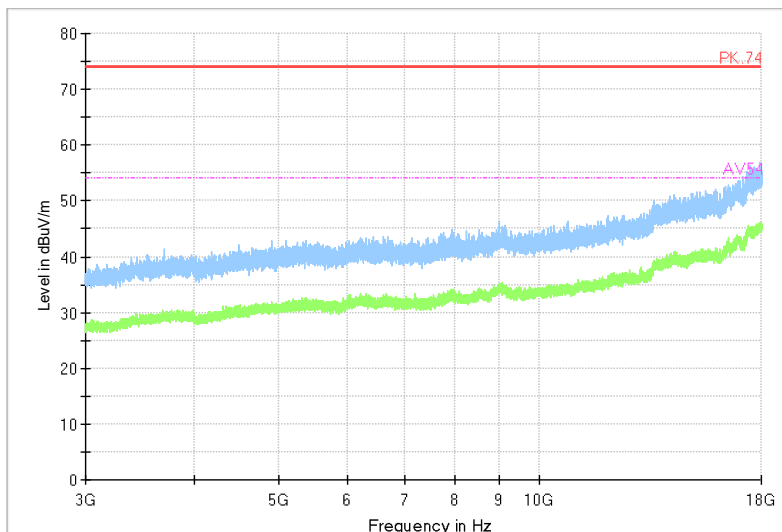
Modulation type: 802.11g



BUREAU  
VERITAS

Test Report No.: PSU-NQN2505120312RF06

Full Spectrum

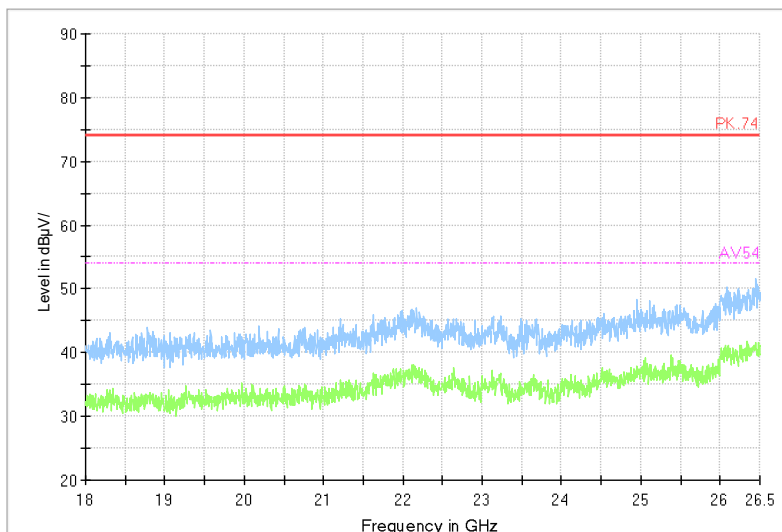


Frequency Range: 3GHz -18GHz

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

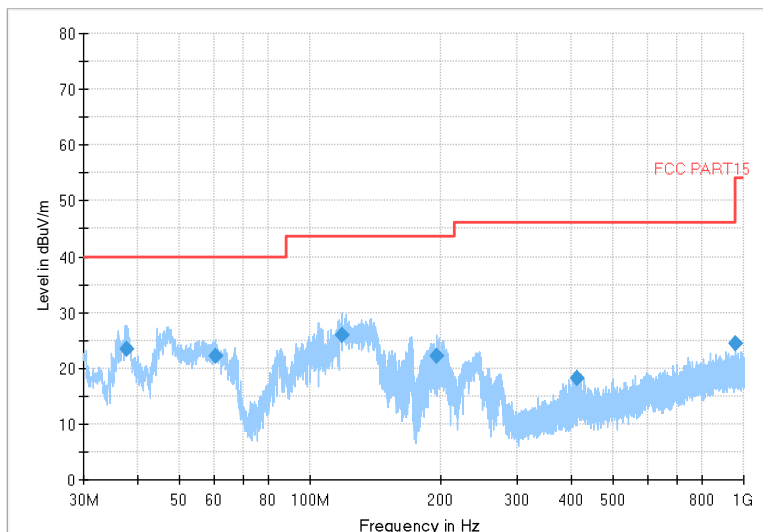




BUREAU  
VERITAS

Test Report No.: PSU-NQN2505120312RF06

Full Spectrum

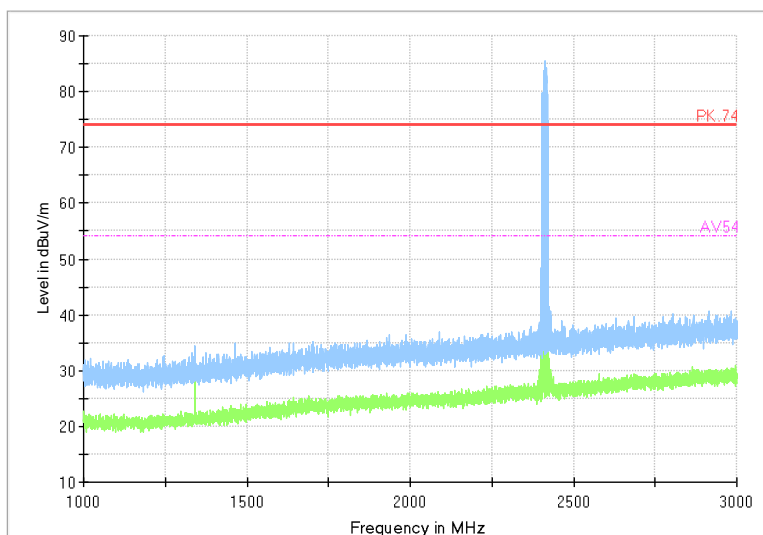


Frequency Range: 30MHz -1GHz

Detector: QP mode

Modulation type: 802.11n(HT20)

Full Spectrum



Frequency Range: 1GHz -3GHz

Detector: Av mode and PK mode

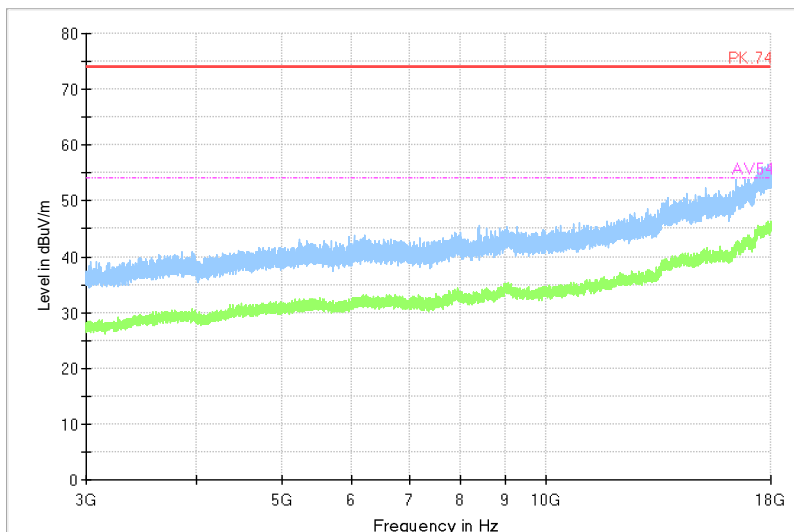
Modulation type: 802.11n(HT20)



BUREAU  
VERITAS

Test Report No.: PSU-NQN2505120312RF06

Full Spectrum

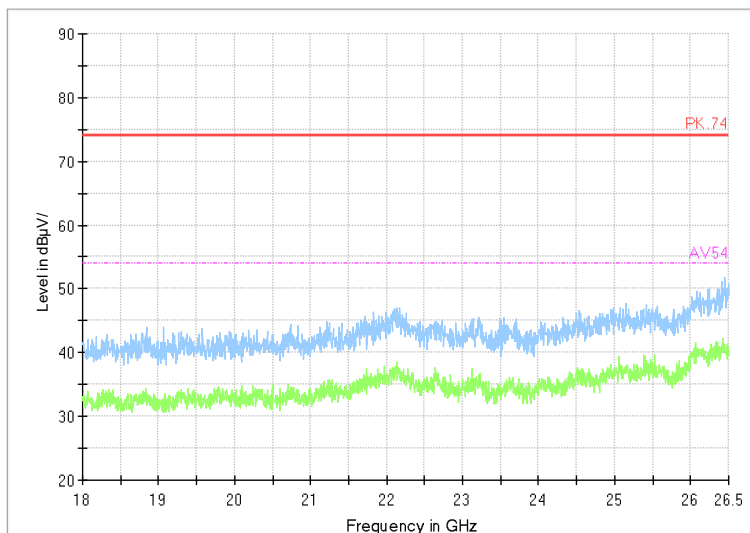


Frequency Range: 3GHz -18GHz

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)



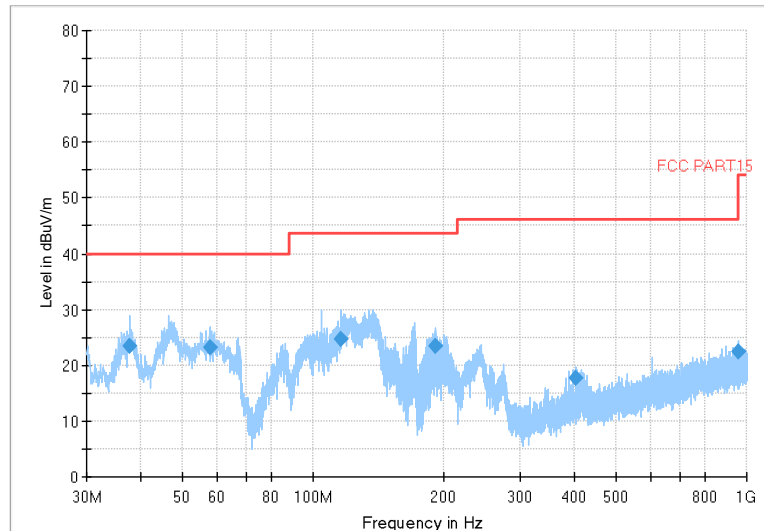
BUREAU  
VERITAS

Test Report No.: PSU-NQN2505120312RF06

Carrier frequency (MHz): 2437

Channel No.:6

Full Spectrum

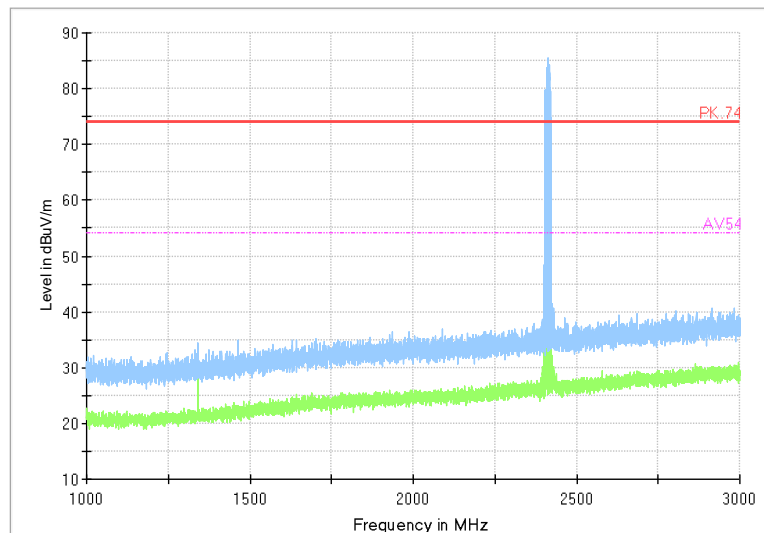


Frequency Range: 30MHz -1GHz

Detector: QP mode

Modulation type: 802.11b

Full Spectrum



Frequency Range: 1GHz -3GHz

Detector: Av mode and PK mode

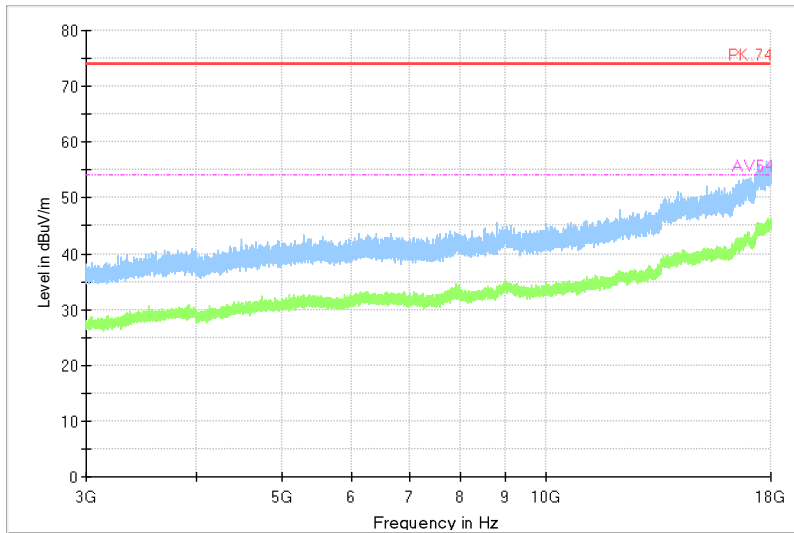
Modulation type: 802.11b



BUREAU  
VERITAS

Test Report No.: PSU-NQN2505120312RF06

Full Spectrum

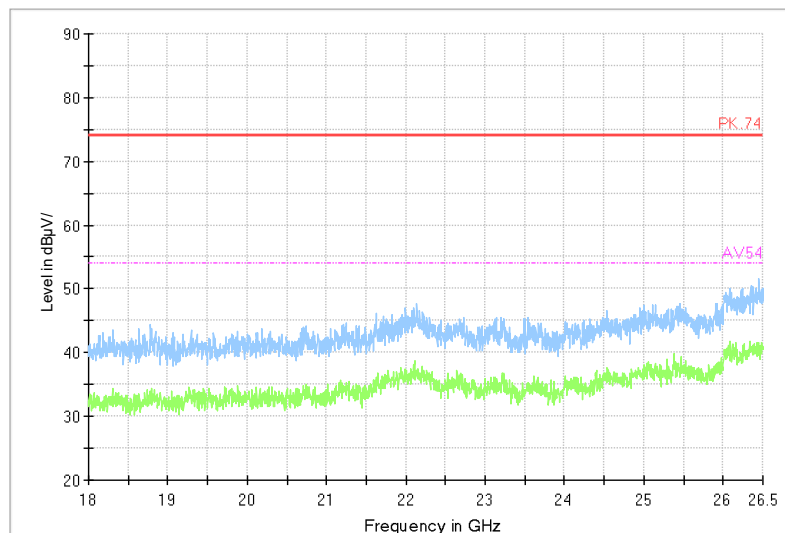


Frequency Range: 3GHz -18GHz

Detector: Av mode and PK mode

Modulation type: 802.11b

Full Spectrum



Frequency Range: 18GHz -26GHz

Detector: Av mode and PK mode

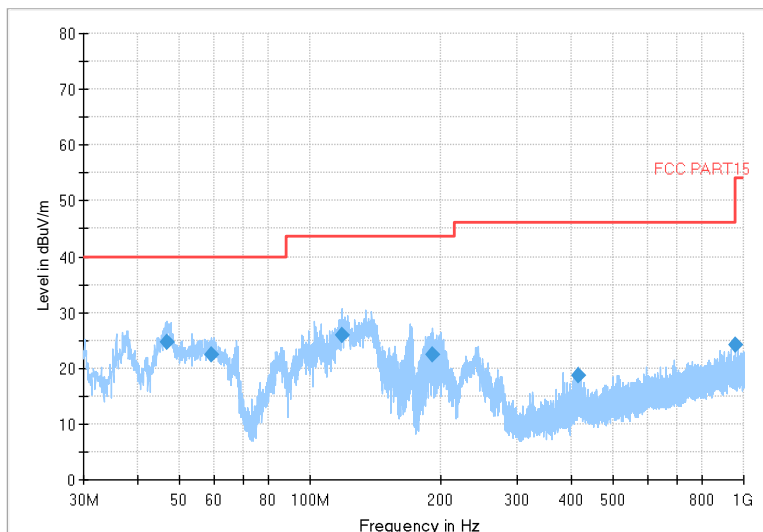
Modulation type: 802.11b



BUREAU  
VERITAS

Test Report No.: PSU-NQN2505120312RF06

Full Spectrum

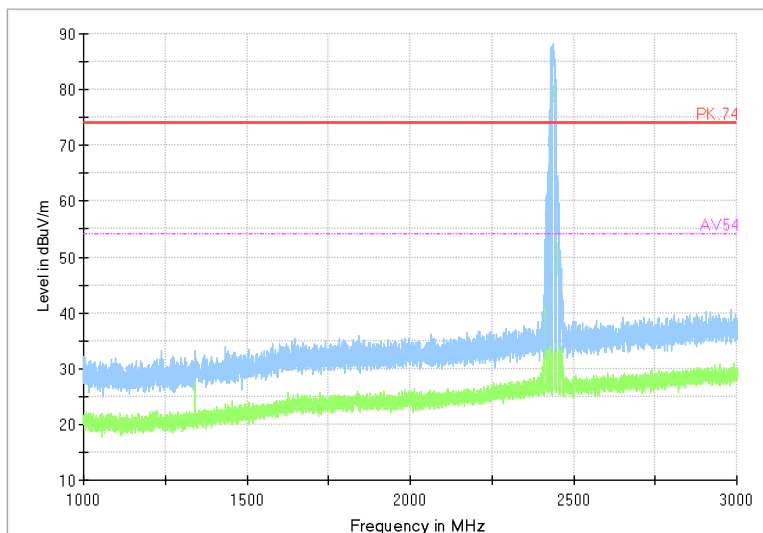


Frequency Range: 30MHz -1GHz

Detector: QP mode

Modulation type: 802.11g

Full Spectrum



Frequency Range: 1GHz -3GHz

Detector: Av mode and PK mode

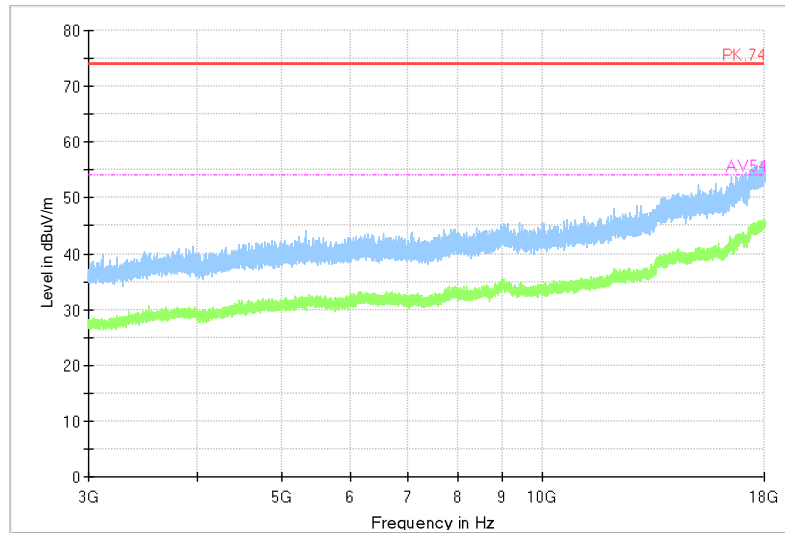
Modulation type: 802.11g



BUREAU  
VERITAS

Test Report No.: PSU-NQN2505120312RF06

Full Spectrum

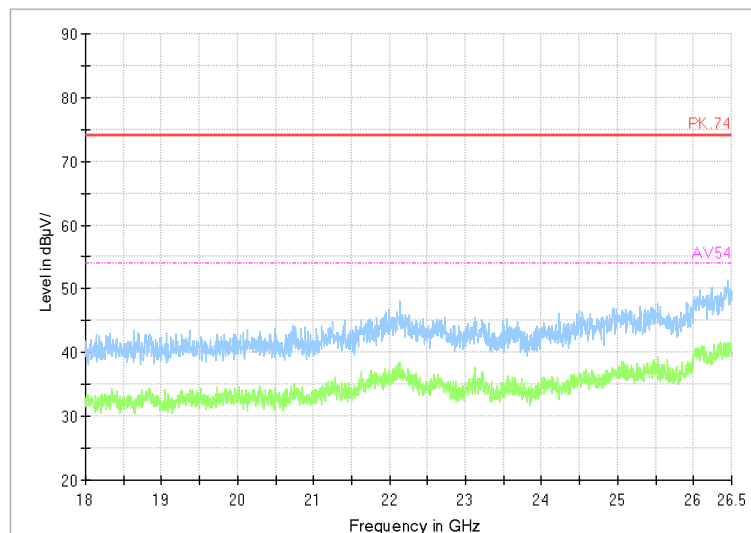


Frequency Range: 3GHz -18GHz

Detector: Av mode and PK mode

Modulation type: 802.11g

Full Spectrum



Frequency Range: 18GHz -26GHz

Detector: Av mode and PK mode

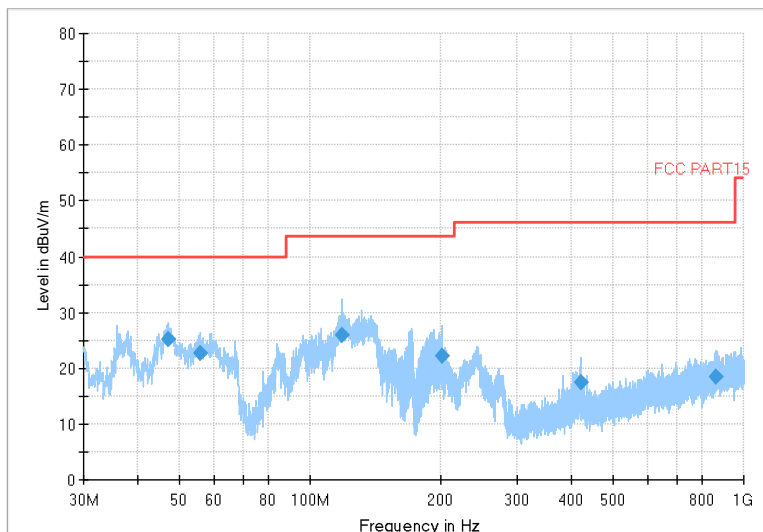
Modulation type: 802.11g



BUREAU  
VERITAS

Test Report No.: PSU-NQN2505120312RF06

Full Spectrum

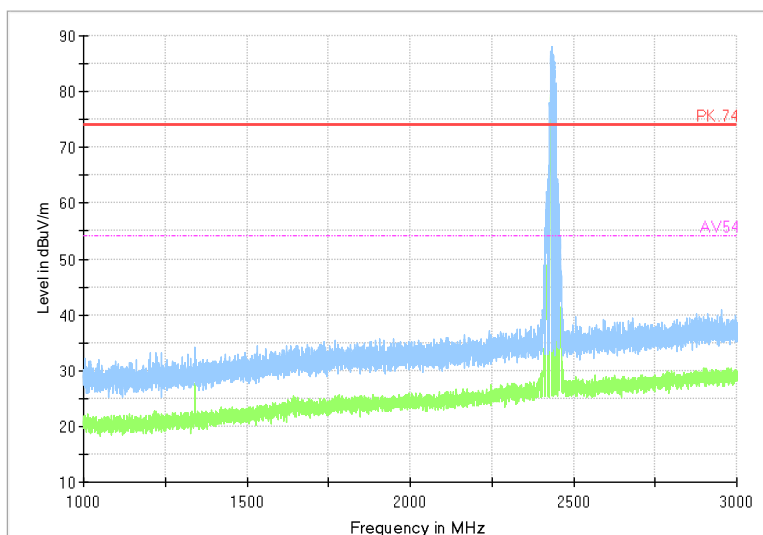


Frequency Range: 30MHz -1GHz

Detector: QP mode

Modulation type: 802.11n(HT20)

Full Spectrum



Frequency Range: 1GHz -3GHz

Detector: Av mode and PK mode

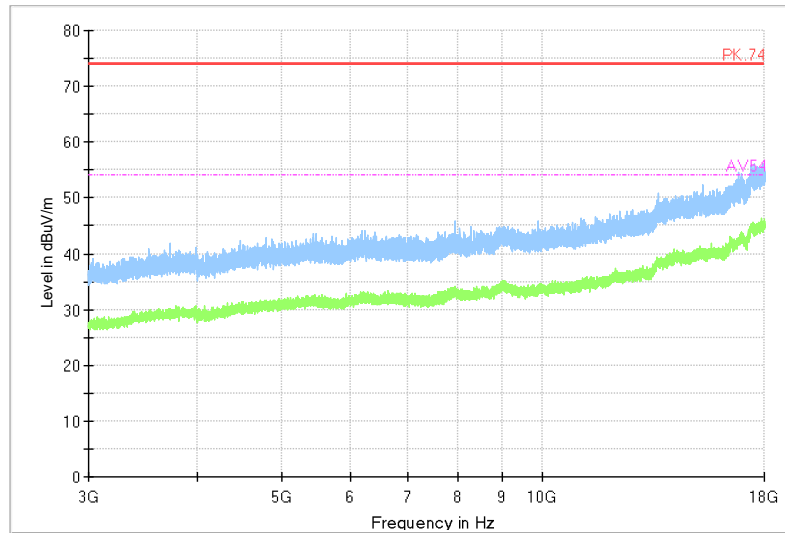
Modulation type: 802.11n(HT20)



BUREAU  
VERITAS

Test Report No.: PSU-NQN2505120312RF06

Full Spectrum

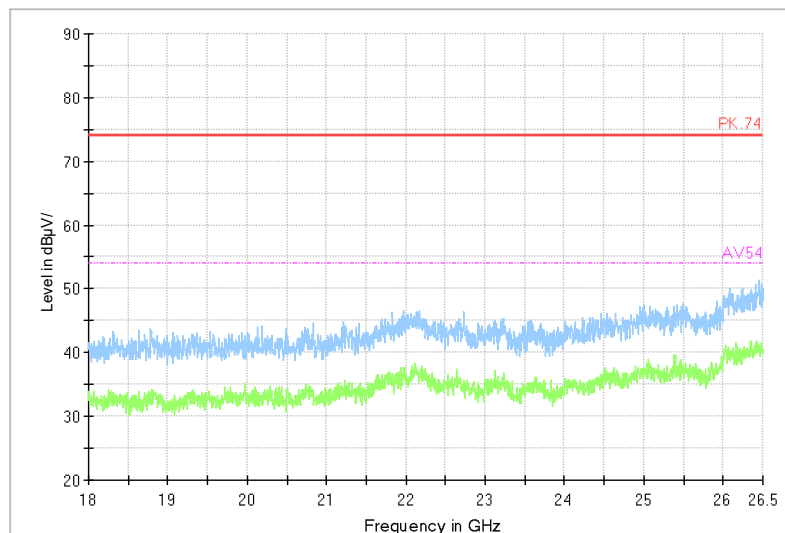


Frequency Range: 3GHz -18GHz

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)





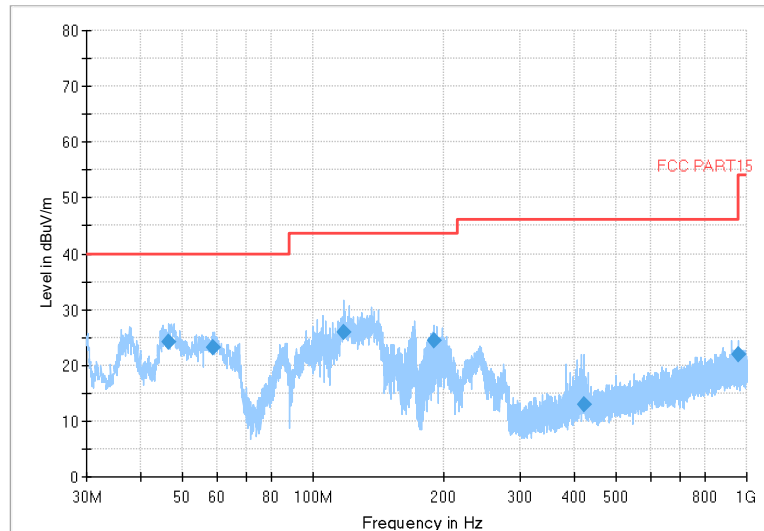
BUREAU  
VERITAS

Test Report No.: PSU-NQN2505120312RF06

Carrier frequency (MHz): 2462

Channel No.:11

Full Spectrum

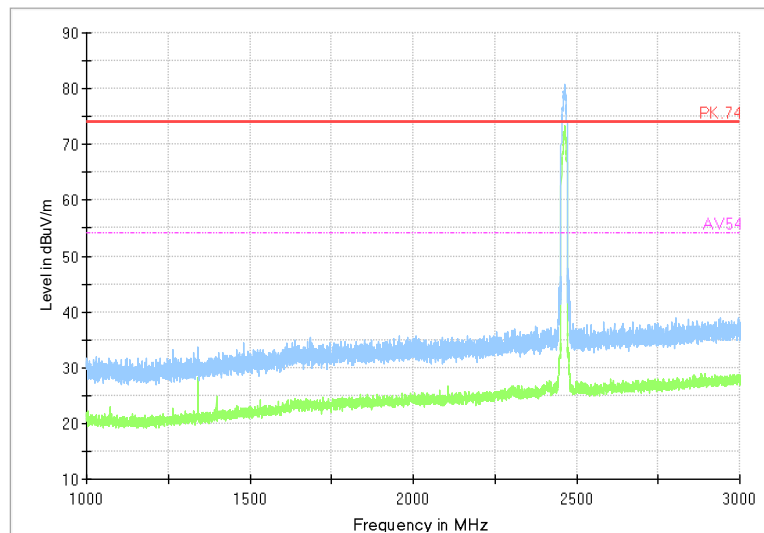


Frequency Range: 30MHz -1GHz

Detector: QP mode

Modulation type: 802.11b

Full Spectrum



Frequency Range: 1GHz -3GHz

Detector: Av mode and PK mode

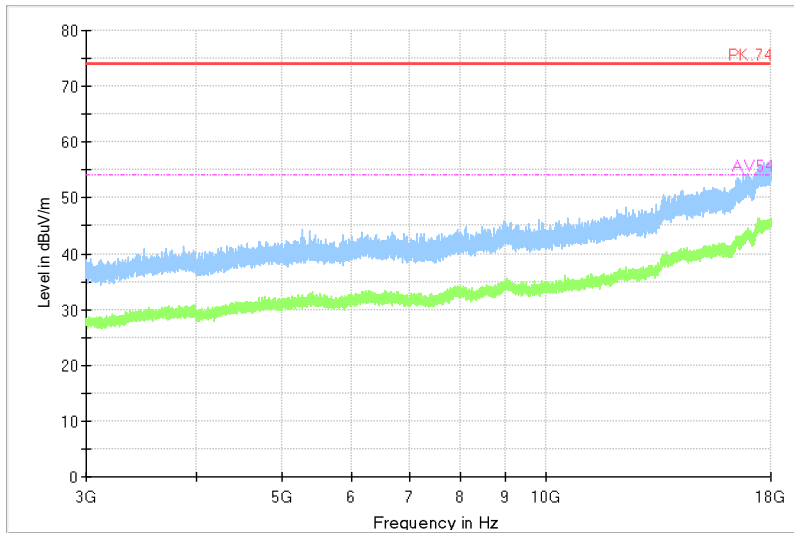
Modulation type: 802.11b



BUREAU  
VERITAS

Test Report No.: PSU-NQN2505120312RF06

Full Spectrum

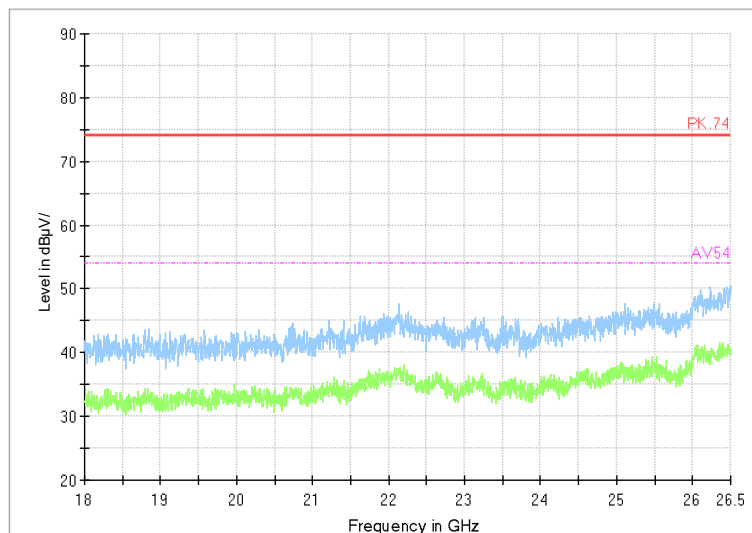


Frequency Range: 3GHz -18GHz

Detector: Av mode and PK mode

Modulation type: 802.11b

Full Spectrum



Frequency Range: 18GHz -26GHz

Detector: Av mode and PK mode

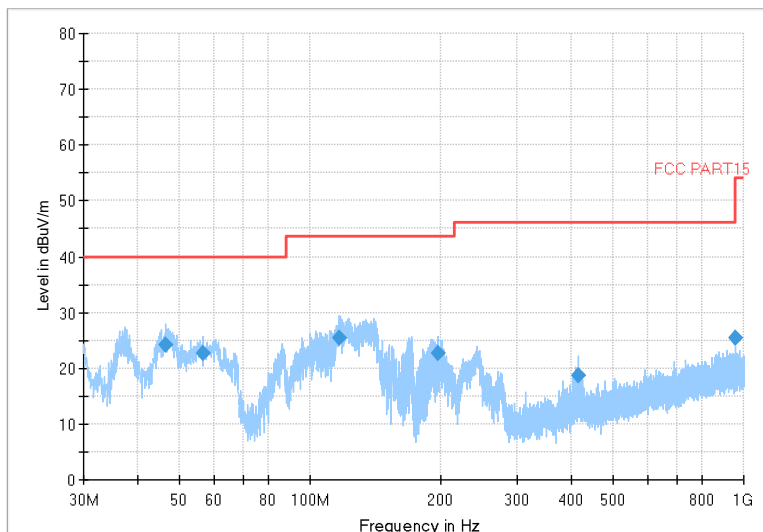
Modulation type: 802.11b



BUREAU  
VERITAS

Test Report No.: PSU-NQN2505120312RF06

Full Spectrum

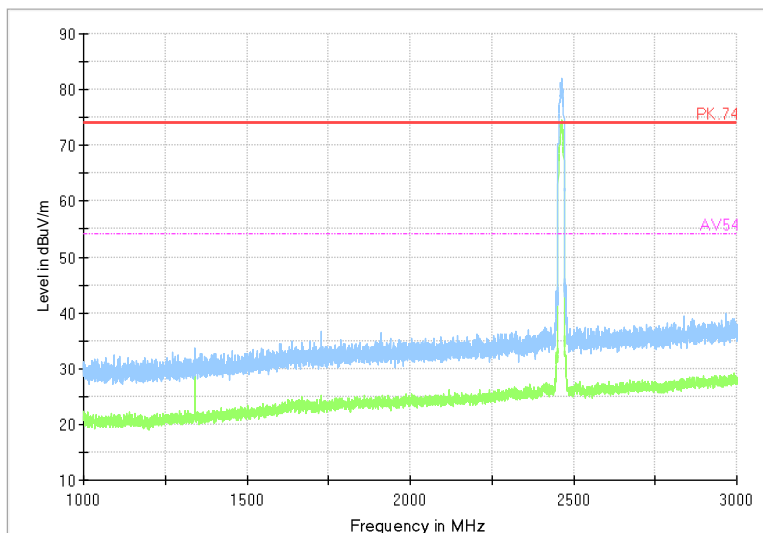


Frequency Range: 30MHz -1GHz

Detector: QP mode

Modulation type: 802.11g

Full Spectrum



Frequency Range: 1GHz -3GHz

Detector: Av mode and PK mode

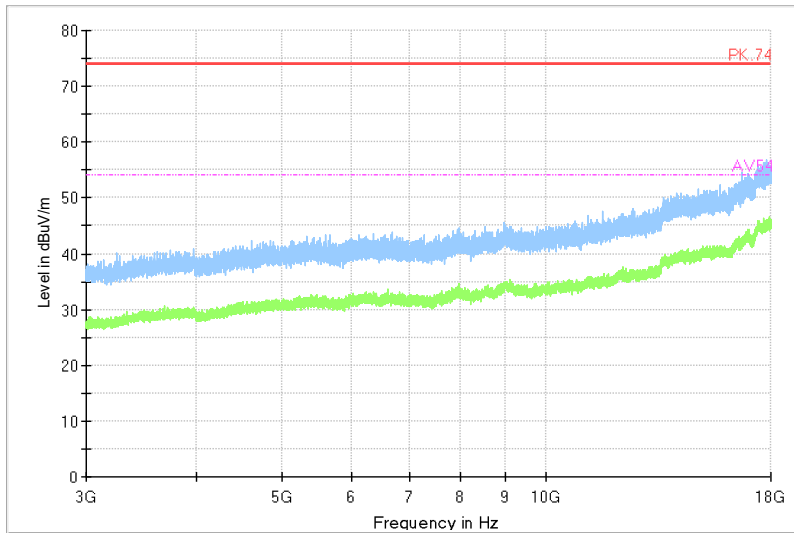
Modulation type: 802.11g



BUREAU  
VERITAS

Test Report No.: PSU-NQN2505120312RF06

Full Spectrum

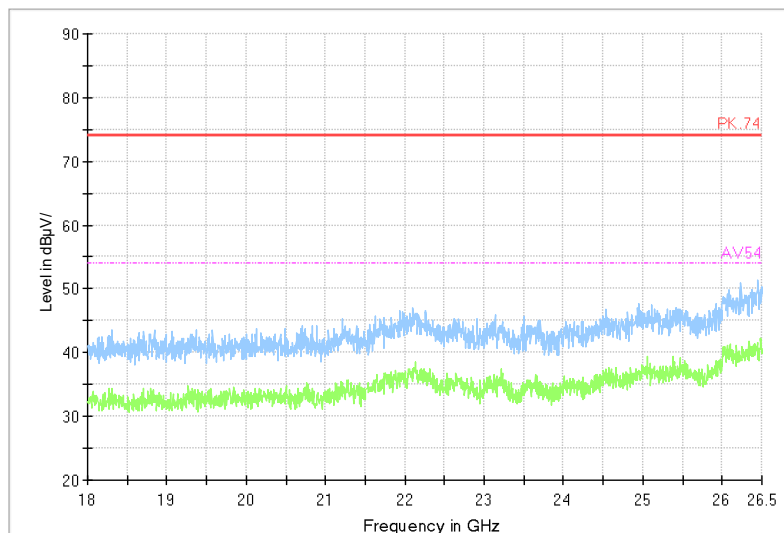


Frequency Range: 3GHz -18GHz

Detector: Av mode and PK mode

Modulation type: 802.11g

Full Spectrum



Frequency Range: 18GHz -26GHz

Detector: Av mode and PK mode

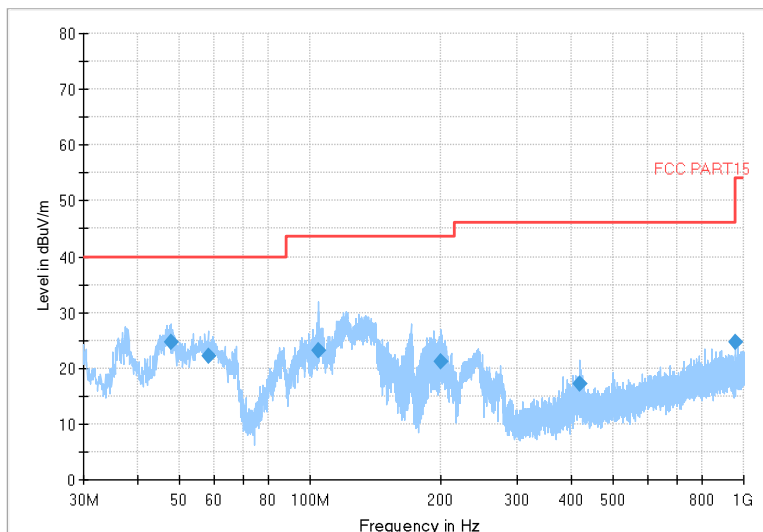
Modulation type: 802.11g



BUREAU  
VERITAS

Test Report No.: PSU-NQN2505120312RF06

Full Spectrum

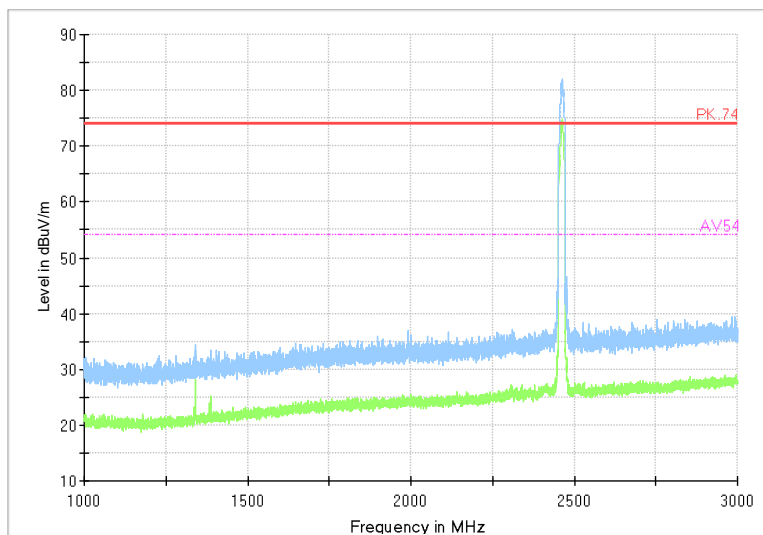


Frequency Range: 30MHz -1GHz

Detector: QP mode

Modulation type: 802.11n(HT20)

Full Spectrum



S

Frequency Range: 1GHz -3GHz

Detector: Av mode and PK mode

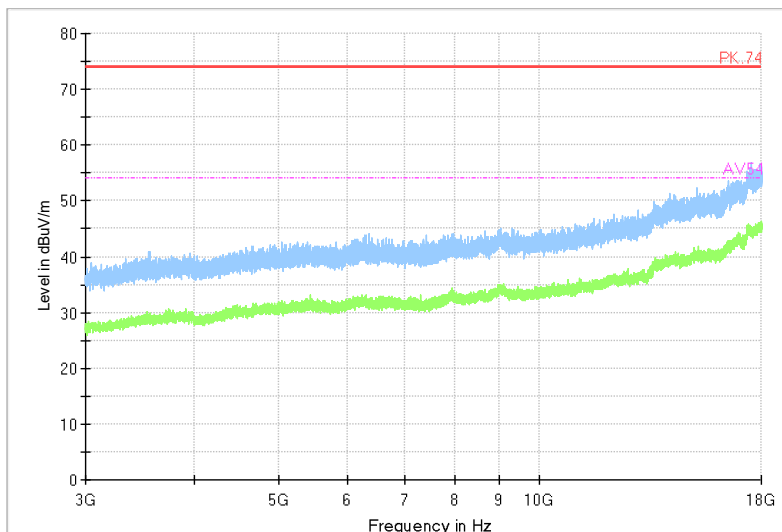
Modulation type: 802.11n(HT20)



BUREAU  
VERITAS

Test Report No.: PSU-NQN2505120312RF06

Full Spectrum

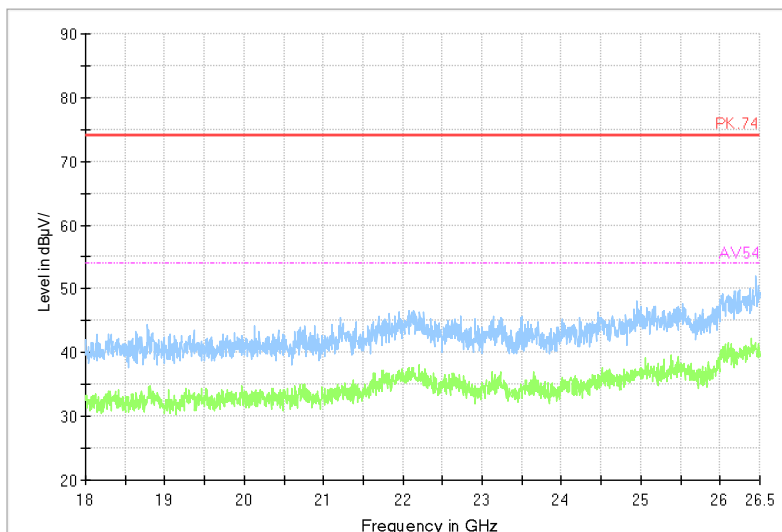


Frequency Range: 3GHz -18GHz

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.06,23	Sep.05,25
PC	LENOVO	E14	HRSW0024	N/A	N/A
CABLE	R&S	J12J103539-00-1	SEP-03-20-069	Apr.27,24	Apr.26,25
CABLE	R&S	J12J103539-00-1	SEP-03-20-070	Apr.27,24	Apr.26,25
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, GRGT/CHINA and NIM/CHINA.
2. The test was performed in RF Oven room.



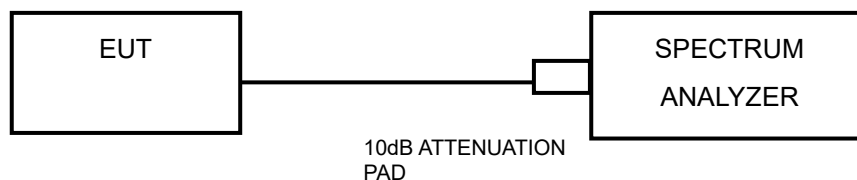
### 3.3.3 TEST PROCEDURE

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 Appendix Of this test report.



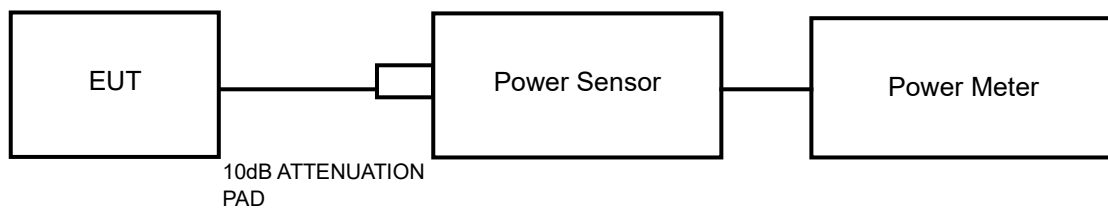


### 3.4 CONDUCTED OUTPUT POWER

#### 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 Appendix Of this test report.



**Test Report No.: PSU-NQN2505120312RF06**

#### 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 Appendix Of this test report.

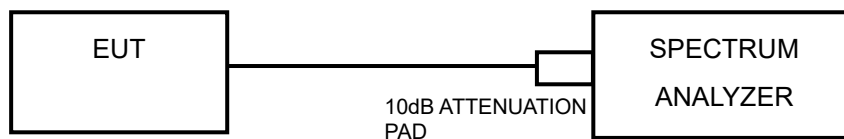


### 3.5 POWER SPECTRAL DENSITY MEASUREMENT

#### 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 to 1.5 times the DTS bandwidth
2. Set the RBW = 3 kHz, VBW  $\geq 3 \times$  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.



Test Report No.: PSU-NQN2505120312RF06

### 3.5.7 TEST RESULTS

Please Refer to Appendix Of this test report.

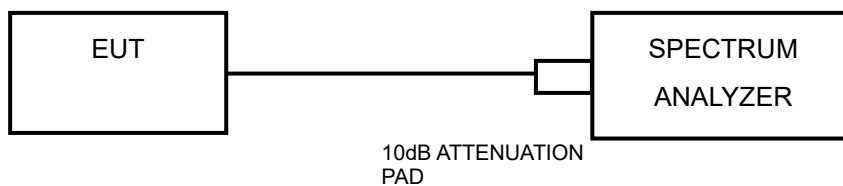


### 3.6 OUT OF BAND EMISSION MEASUREMENT

#### 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 Appendix 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

### 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	9.03	9.20	9.12
802.11g	Chain0	15.07	15.66	14.21
802.11n HT20	Chain0	16.65	17.25	17.60

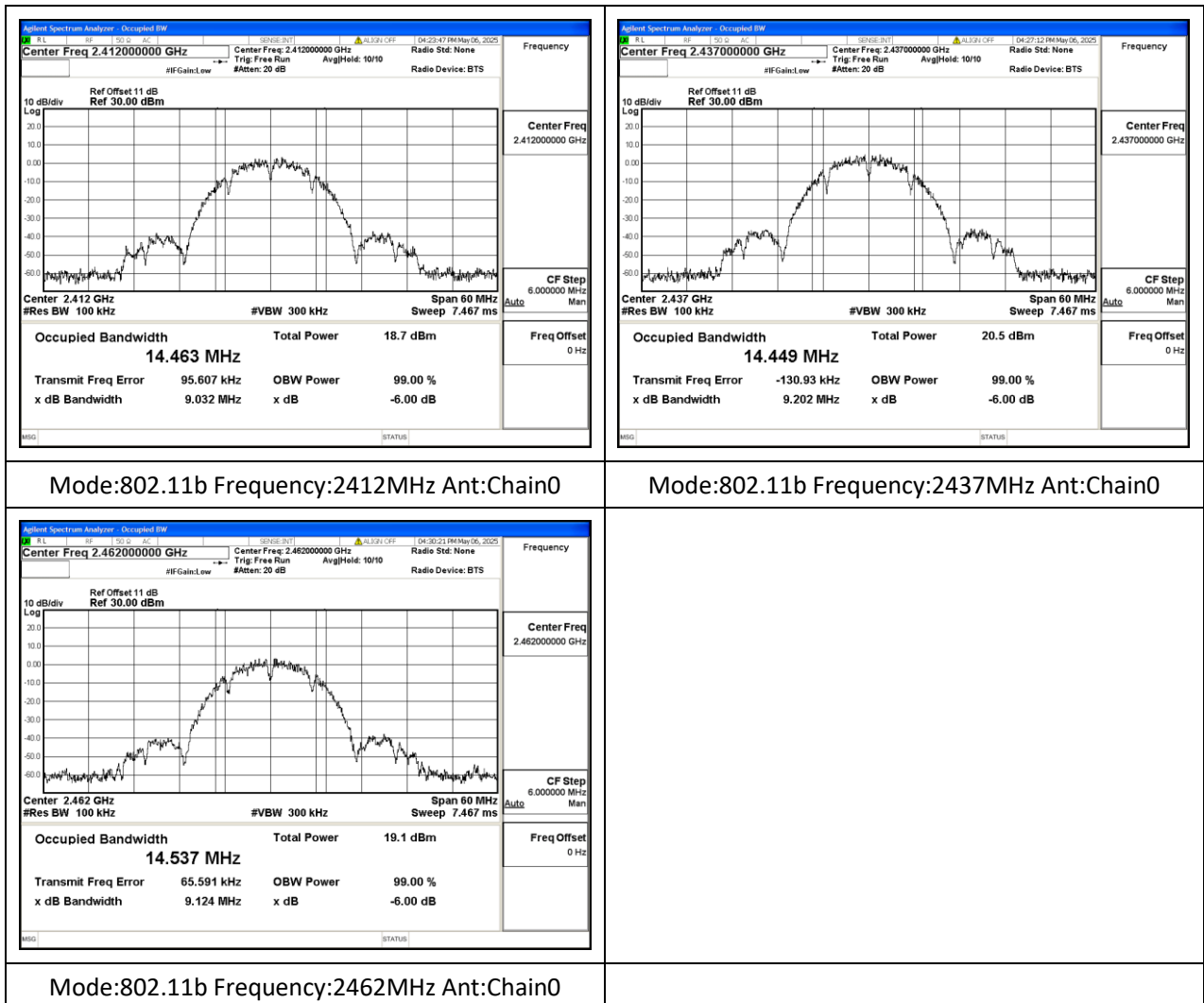
Test Mode	Antenna	6 dB bandwidth (MHz)		
		Channel No.3	Channel No.6	Channel No.9
		2422MHz	2437MHz	2452MHz
802.11n HT40	Chain0	33.27	28.82	36.01





## TEST GRAPHS

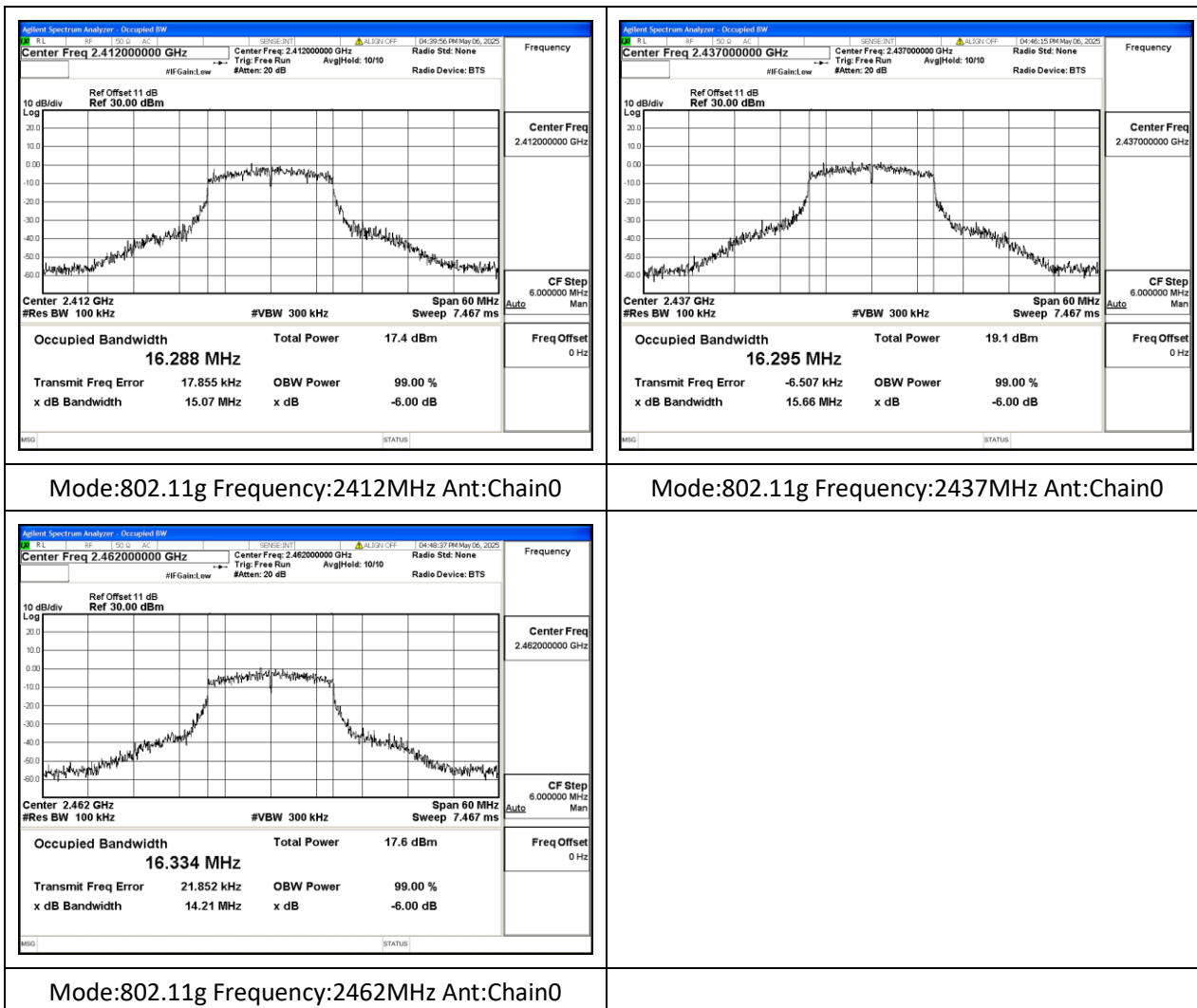
Test Mode: 802.11b



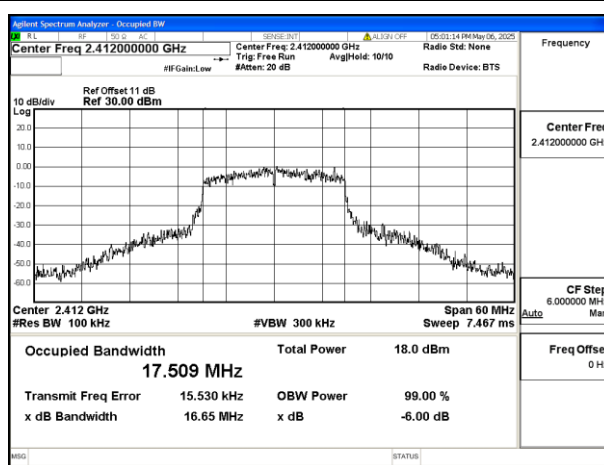


**BUREAU VERITAS** Test Report No.: PSU-NQN2505120312RF06

Test Mode: 802.11g

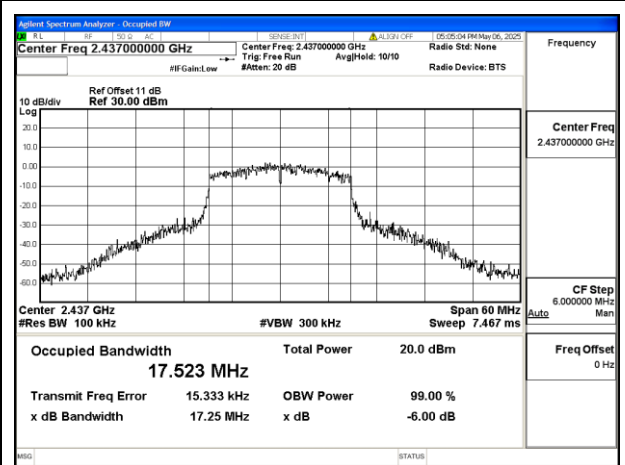


Test Mode: 802.11n HT20



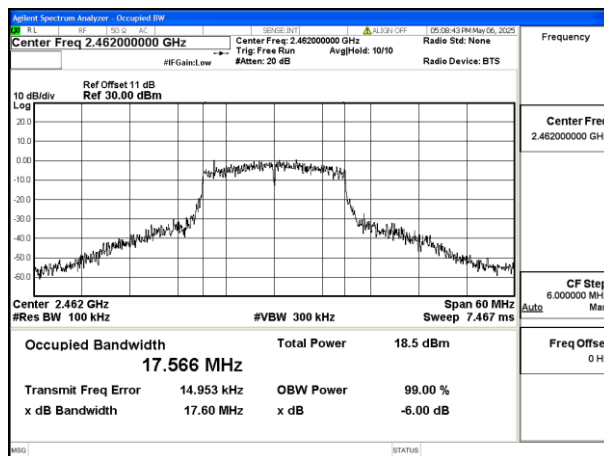
Mode:802.11n HT20 Frequency:2412MHz

Ant:Chain0



Mode:802.11n HT20 Frequency:2437MHz

Ant:Chain0



Mode:802.11n HT20 Frequency:2462MHz

Ant:Chain0



**BUREAU VERITAS** Test Report No.: PSU-NQN2505120312RF06

Test Mode: 802.11n HT40

<div><p>Adjust Spectrum Analyzer - Occupied BW</p><p>Center Freq 2.422000000 GHz</p><p>Ref Offset 11 dB Ref 30.00 dBm</p><p>Center Freq 2.422 GHz #Res BW 100 kHz #VBW 300 kHz Span 100 MHz Sweep 12.4 ms</p><p>Occupied Bandwidth 35.829 MHz</p><p>Total Power 18.0 dBm</p><p>Transmit Freq Error 79.607 kHz</p><p>x dB Bandwidth 33.27 MHz</p><p>OBW Power 99.00 %</p><p>x dB -6.00 dB</p></div>	<div><p>Adjust Spectrum Analyzer - Occupied BW</p><p>Center Freq 2.437000000 GHz</p><p>Ref Offset 11 dB Ref 30.00 dBm</p><p>Center Freq 2.437 GHz #Res BW 100 kHz #VBW 300 kHz Span 100 MHz Sweep 12.4 ms</p><p>Occupied Bandwidth 35.740 MHz</p><p>Total Power 19.7 dBm</p><p>Transmit Freq Error -43.779 kHz</p><p>x dB Bandwidth 28.82 MHz</p><p>OBW Power 99.00 %</p><p>x dB -6.00 dB</p></div>
Mode:802.11n HT40 Frequency:2422MHz Ant:Chain0	Mode:802.11n HT40 Frequency:2437MHz Ant:Chain0
<div><p>Adjust Spectrum Analyzer - Occupied BW</p><p>Center Freq 2.452000000 GHz</p><p>Ref Offset 11 dB Ref 30.00 dBm</p><p>Center Freq 2.452 GHz #Res BW 100 kHz #VBW 300 kHz Span 100 MHz Sweep 12.4 ms</p><p>Occupied Bandwidth 35.991 MHz</p><p>Total Power 19.3 dBm</p><p>Transmit Freq Error -88.063 kHz</p><p>x dB Bandwidth 36.01 MHz</p><p>OBW Power 99.00 %</p><p>x dB -6.00 dB</p></div>	
Mode:802.11n HT40 Frequency:2452MHz 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	14.471	14.343	14.424
802.11g	Chain0	16.501	16.614	16.642
802.11n HT20	Chain0	17.746	17.711	17.689

Test Mode	Antenna	99% bandwidth (MHz)		
		Channel No.3	Channel No.6	Channel No.9
		2422MHz	2437MHz	2452MHz
802.11n HT40	Chain0	35.805	35.782	36.024

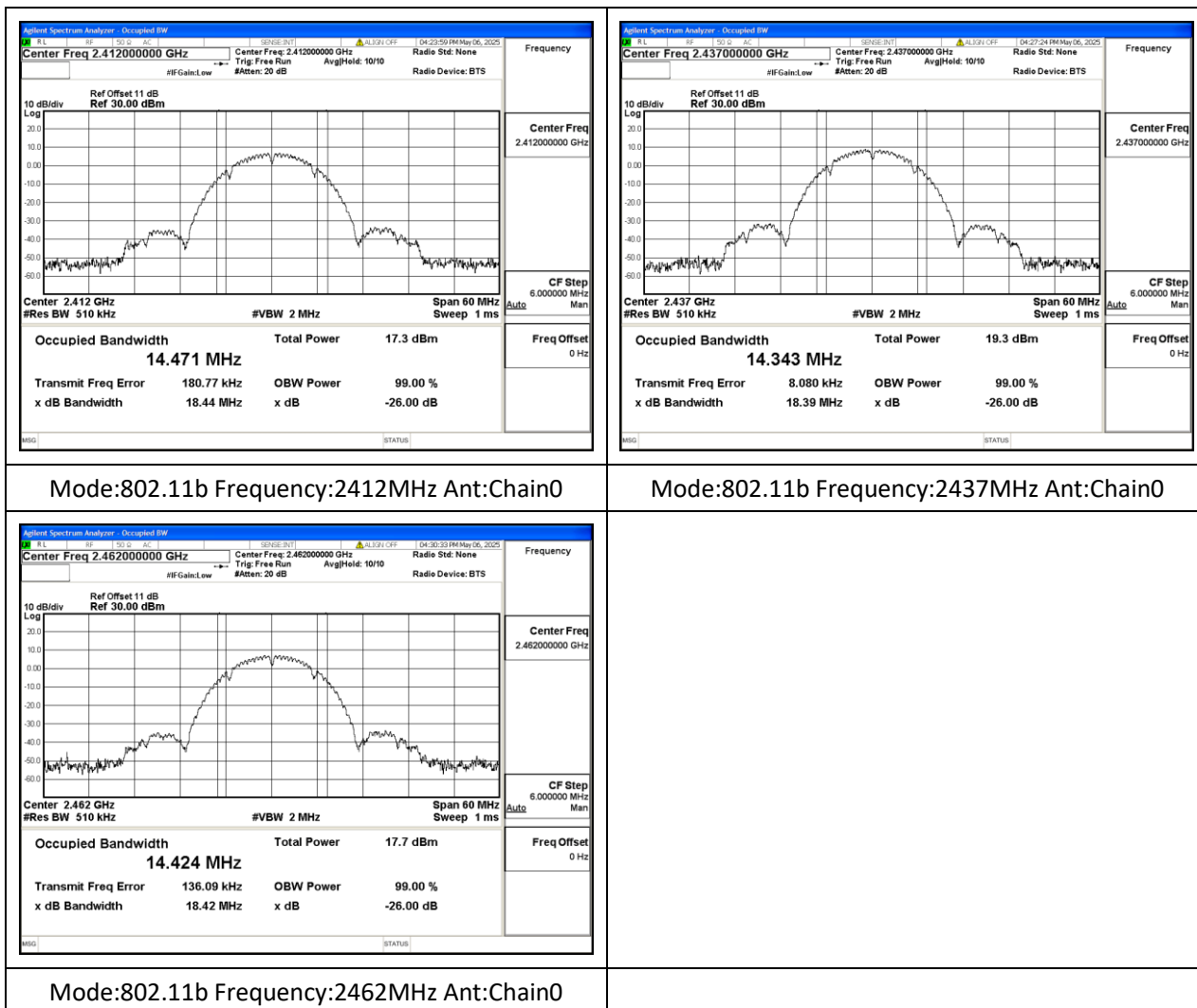


BUREAU  
VERITAS

Test Report No.: PSU-NQN2505120312RF06

## TEST GRAPHS

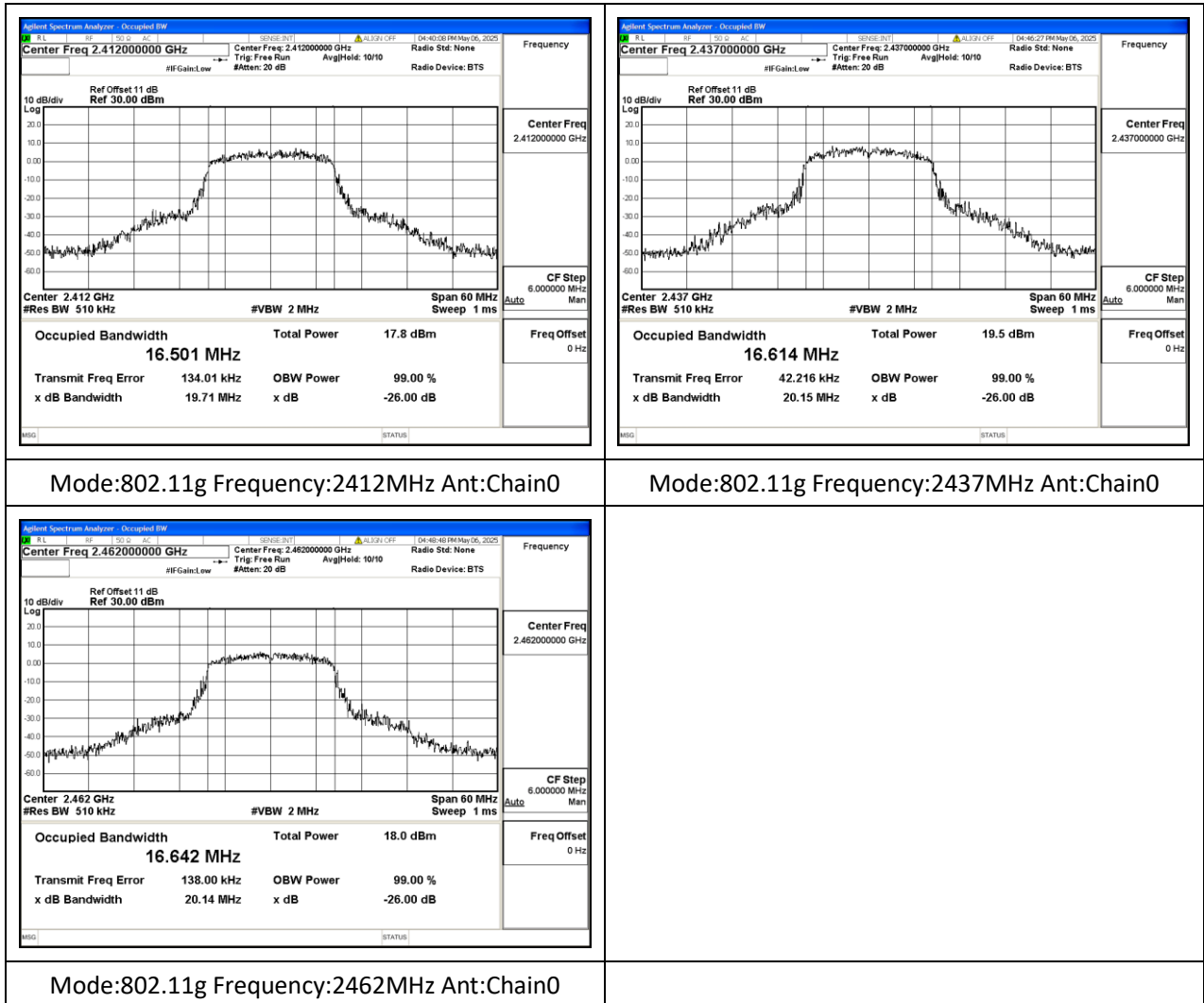
Test Mode: 802.11b





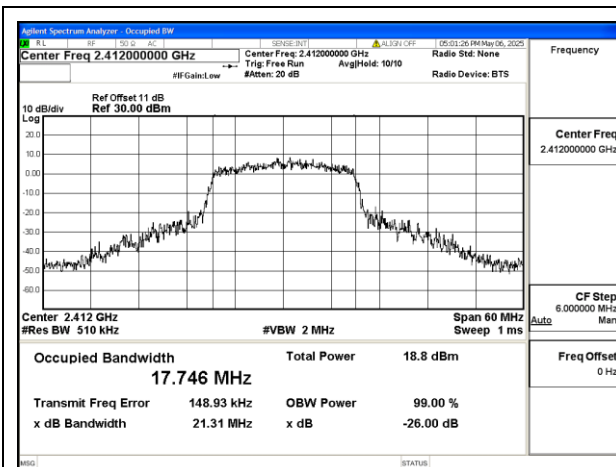
**BUREAU VERITAS** Test Report No.: PSU-NQN2505120312RF06

Test Mode: 802.11g

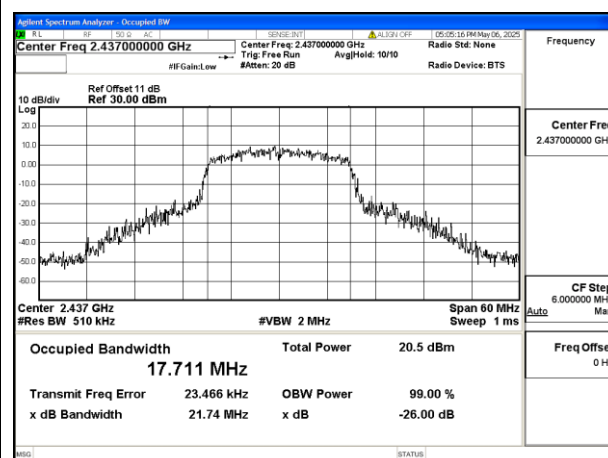




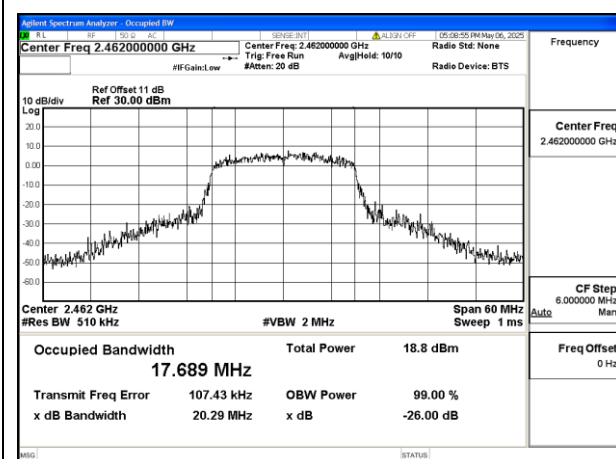
Test Mode: 802.11n HT20



Ant:Chain0



Ant:Chain0



Ant:Chain0





**BUREAU VERITAS** Test Report No.: PSU-NQN2505120312RF06

Test Mode: 802.11n HT40

<div><p>Adjust Spectrum Analyzer - Occupied BW</p><p>Center Freq 2.422000000 GHz</p><p>Center Freq: 2.422000000 GHz</p><p>Trig: Free Run</p><p>AvgHeld: 10/10</p><p>Radio Std: None</p><p>Radio Device: BTS</p><p>Frequency</p><p>10 dB/div</p><p>Ref Offset 11 dB</p><p>Ref 30.00 dBm</p><p>Center Freq 2.422000000 GHz</p><p>CF Step 10.000000 MHz</p><p>Man</p><p>Center 2.422 GHz</p><p>#Res BW 510 kHz</p><p>#VBW 2 MHz</p><p>Span 100 MHz</p><p>Sweep 1 ms</p><p>Occupied Bandwidth 35.805 MHz</p><p>Total Power 18.5 dBm</p><p>Transmit Freq Error 213.64 kHz</p><p>OBW Power 99.00 %</p><p>x dB Bandwidth 39.70 MHz</p><p>x dB -26.00 dB</p><p>Freq Offset 0 Hz</p><p>MSO</p><p>STATUS</p></div>	<div><p>Adjust Spectrum Analyzer - Occupied BW</p><p>Center Freq 2.437000000 GHz</p><p>Center Freq: 2.437000000 GHz</p><p>Trig: Free Run</p><p>AvgHeld: 10/10</p><p>Radio Std: None</p><p>Radio Device: BTS</p><p>Frequency</p><p>10 dB/div</p><p>Ref Offset 11 dB</p><p>Ref 30.00 dBm</p><p>Center Freq 2.437000000 GHz</p><p>CF Step 10.000000 MHz</p><p>Man</p><p>Center 2.437 GHz</p><p>#Res BW 510 kHz</p><p>#VBW 2 MHz</p><p>Span 100 MHz</p><p>Sweep 1 ms</p><p>Occupied Bandwidth 35.782 MHz</p><p>Total Power 20.1 dBm</p><p>Transmit Freq Error 185.06 kHz</p><p>OBW Power 99.00 %</p><p>x dB Bandwidth 38.79 MHz</p><p>x dB -26.00 dB</p><p>Freq Offset 0 Hz</p><p>MSO</p><p>STATUS</p></div>
Mode:802.11n HT40 Frequency:2422MHz Ant:Chain0	Mode:802.11n HT40 Frequency:2437MHz Ant:Chain0
<div><p>Adjust Spectrum Analyzer - Occupied BW</p><p>Center Freq 2.452000000 GHz</p><p>Center Freq: 2.452000000 GHz</p><p>Trig: Free Run</p><p>AvgHeld: 10/10</p><p>Radio Std: None</p><p>Radio Device: BTS</p><p>Frequency</p><p>10 dB/div</p><p>Ref Offset 11 dB</p><p>Ref 30.00 dBm</p><p>Center Freq 2.452000000 GHz</p><p>CF Step 10.000000 MHz</p><p>Man</p><p>Center 2.452 GHz</p><p>#Res BW 510 kHz</p><p>#VBW 2 MHz</p><p>Span 100 MHz</p><p>Sweep 1 ms</p><p>Occupied Bandwidth 36.024 MHz</p><p>Total Power 19.9 dBm</p><p>Transmit Freq Error 142.43 kHz</p><p>OBW Power 99.00 %</p><p>x dB Bandwidth 46.23 MHz</p><p>x dB -26.00 dB</p><p>Freq Offset 0 Hz</p><p>MSO</p><p>STATUS</p></div>	
Mode:802.11n HT40 Frequency:2452MHz Ant:Chain0	



**BUREAU VERITAS** Test Report No.: PSU-NQN2505120312RF06

## MAXIMUM CONDUCTED OUTPUT POWER

### TEST RESULT

Test Mode	Tones/ RU Index	Frequency (MHz)	Antenna	Peak power output (dBm)	Average power output (dBm)	EIRP (dBm)
802.11b	NA	2412	Chain0	18.33	15.23	17.92
802.11b	NA	2437	Chain0	19.26	16.24	18.93
802.11b	NA	2462	Chain0	18.68	15.64	18.33
802.11g	NA	2412	Chain0	22.69	15.15	17.84
802.11g	NA	2437	Chain0	23.58	15.88	18.57
802.11g	NA	2462	Chain0	22.95	15.32	18.01
802.11n HT20	NA	2412	Chain0	23.60	15.71	18.40
802.11n HT20	NA	2437	Chain0	24.30	16.29	18.98
802.11n HT20	NA	2462	Chain0	23.00	15.16	17.85
802.11n HT40	NA	2422	Chain0	23.42	15.46	18.15
802.11n HT40	NA	2437	Chain0	23.99	15.80	18.49
802.11n HT40	NA	2452	Chain0	23.83	15.11	17.80

**MAXIMUM POWER SPECTRAL DENSITY****TEST RESULT**

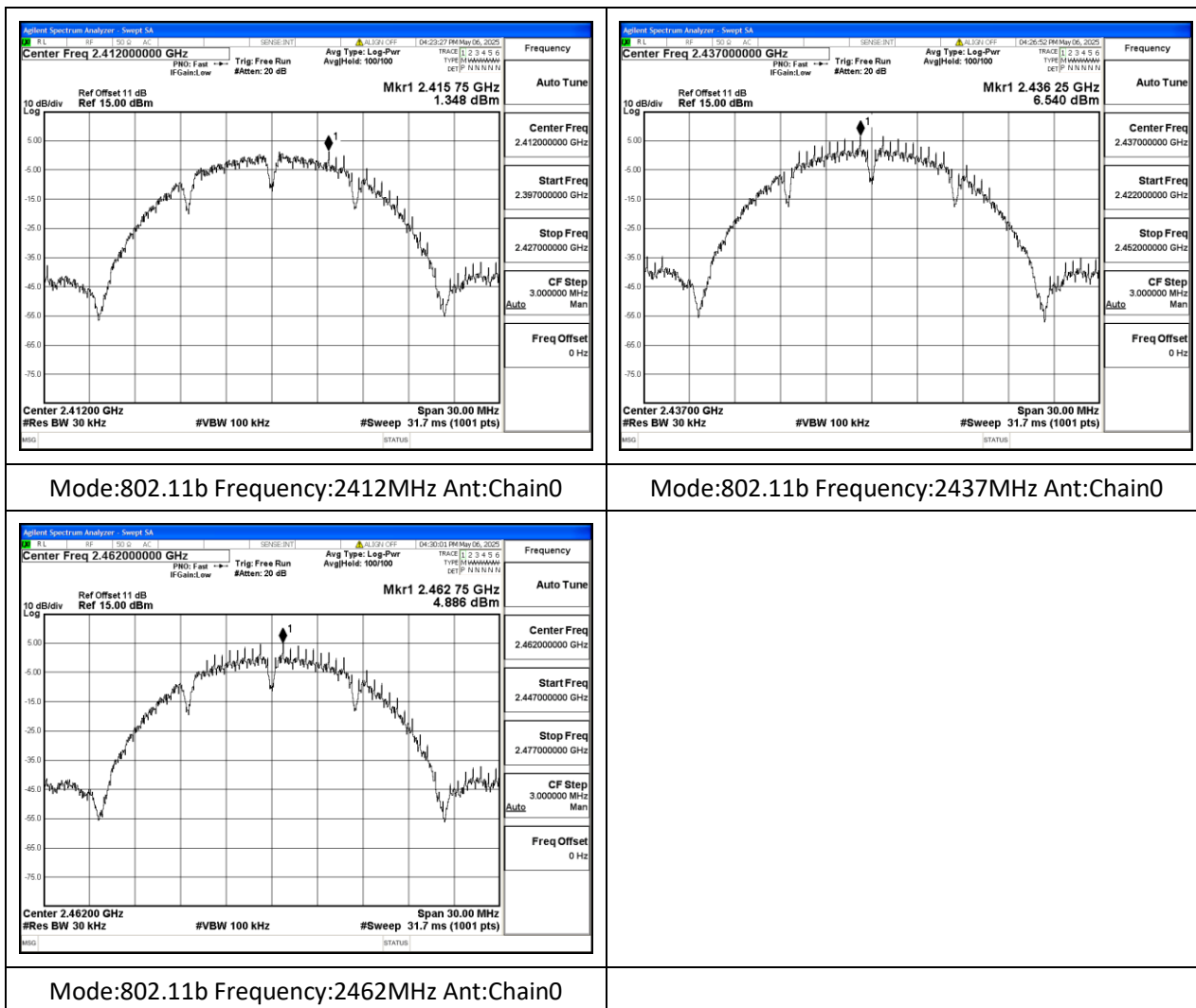
Test Mode	Antenna	Tones	Power Density(dBm/3KHz)		
			Channel No.1	Channel No.6	Channel No.11
			2412MHz	2437MHz	2462MHz
802.11b	Chain0	NA	-8.652	-3.460	-5.114
802.11g	Chain0	NA	-10.427	-9.460	-10.413
802.11n HT20	Chain0	NA	-9.502	-7.237	-8.754

Test Mode	Antenna	Tones	Power Density(dBm/3KHz)		
			Channel No.3	Channel No.6	Channel No.9
			2422MHz	2437MHz	2452MHz
802.11n HT40	Chain0	NA	-12.628	-10.658	-10.836



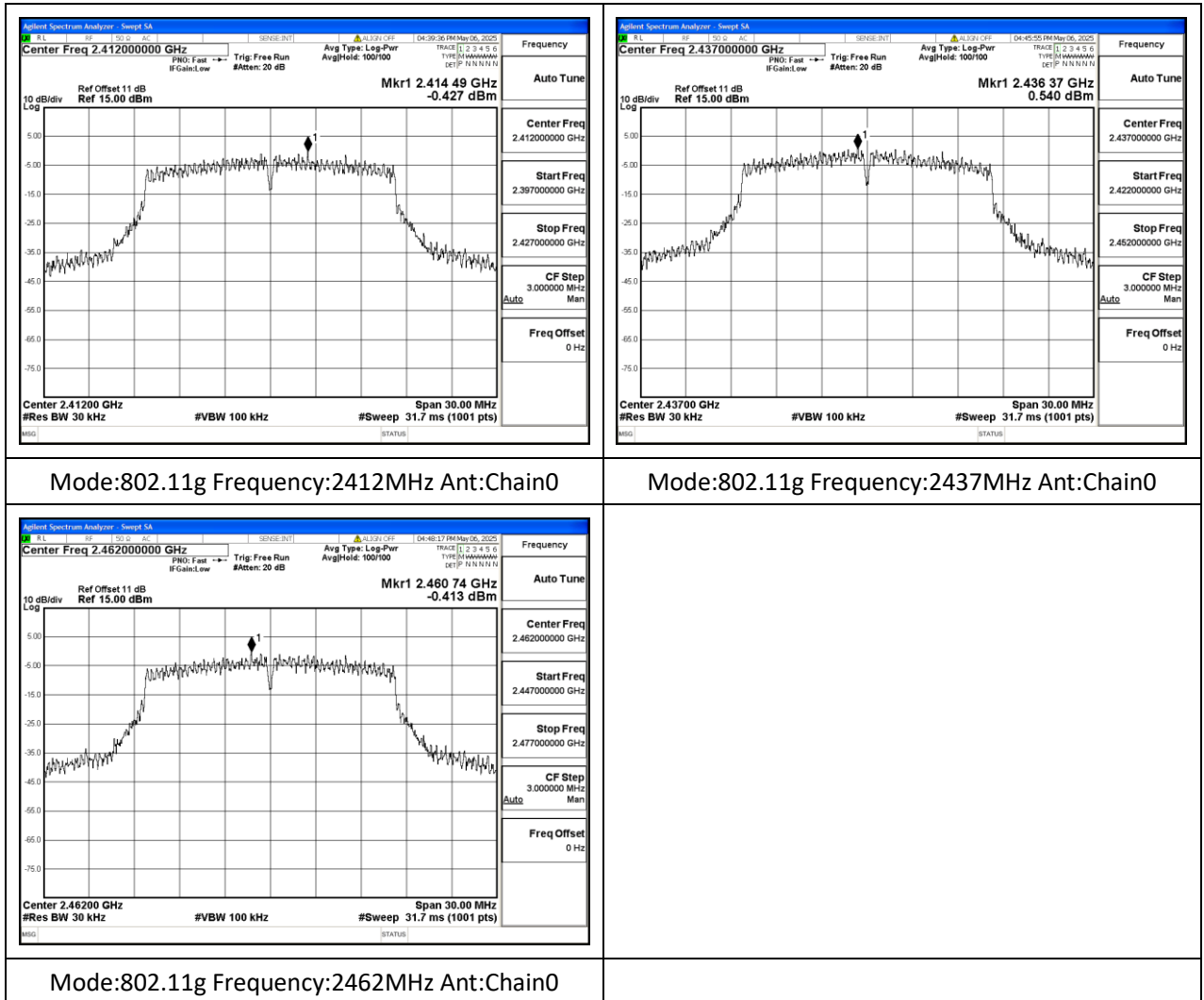
**BUREAU VERITAS** Test Report No.: PSU-NQN2505120312RF06  
**TEST GRAPHS**

Test Mode: 802.11b





Test Mode: 802.11g





**BUREAU VERITAS** Test Report No.: PSU-NQN2505120312RF06

Test Mode: 802.11n HT20

<div><p>Adjust Spectrum Analyzer - Sweep S4</p><p>Center Freq 2.412000000 GHz</p><p>Ref Offset 11 dB</p><p>Ref 15.00 dBm</p><p>Mkr1 2.410 74 GHz</p><p>0.498 dBm</p><p>10 dB/div</p><p>Log</p><p>5.00</p><p>-5.00</p><p>-15.0</p><p>-25.0</p><p>-35.0</p><p>-45.0</p><p>-55.0</p><p>-65.0</p><p>-75.0</p><p>Center 2.41200 GHz</p><p>#Res BW 30 kHz</p><p>#VBW 100 kHz</p><p>#Sweep 31.7 ms (1001 pts)</p><p>Frequency</p><p>Auto Tune</p><p>Center Freq 2.412000000 GHz</p><p>Start Freq 2.397000000 GHz</p><p>Stop Freq 2.427000000 GHz</p><p>CF Step 3.000000 MHz</p><p>Auto</p><p>Man</p><p>Freq Offset 0 Hz</p></div>	<div><p>Adjust Spectrum Analyzer - Sweep S4</p><p>Center Freq 2.437000000 GHz</p><p>Ref Offset 11 dB</p><p>Ref 15.00 dBm</p><p>Mkr1 2.435 74 GHz</p><p>2.763 dBm</p><p>10 dB/div</p><p>Log</p><p>5.00</p><p>-5.00</p><p>-15.0</p><p>-25.0</p><p>-35.0</p><p>-45.0</p><p>-55.0</p><p>-65.0</p><p>-75.0</p><p>Center 2.43700 GHz</p><p>#Res BW 30 kHz</p><p>#VBW 100 kHz</p><p>#Sweep 31.7 ms (1001 pts)</p><p>Frequency</p><p>Auto Tune</p><p>Center Freq 2.437000000 GHz</p><p>Start Freq 2.422000000 GHz</p><p>Stop Freq 2.452000000 GHz</p><p>CF Step 3.000000 MHz</p><p>Auto</p><p>Man</p><p>Freq Offset 0 Hz</p></div>
<div><p>Mode:802.11n HT20 Frequency:2412MHz</p><p>Ant:Chain0</p></div>	<div><p>Mode:802.11n HT20 Frequency:2437MHz</p><p>Ant:Chain0</p></div>
<div><p>Adjust Spectrum Analyzer - Sweep S4</p><p>Center Freq 2.462000000 GHz</p><p>Ref Offset 11 dB</p><p>Ref 15.00 dBm</p><p>Mkr1 2.460 74 GHz</p><p>1.246 dBm</p><p>10 dB/div</p><p>Log</p><p>5.00</p><p>-5.00</p><p>-15.0</p><p>-25.0</p><p>-35.0</p><p>-45.0</p><p>-55.0</p><p>-65.0</p><p>-75.0</p><p>Center 2.46200 GHz</p><p>#Res BW 30 kHz</p><p>#VBW 100 kHz</p><p>#Sweep 31.7 ms (1001 pts)</p><p>Frequency</p><p>Auto Tune</p><p>Center Freq 2.462000000 GHz</p><p>Start Freq 2.447000000 GHz</p><p>Stop Freq 2.477000000 GHz</p><p>CF Step 3.000000 MHz</p><p>Auto</p><p>Man</p><p>Freq Offset 0 Hz</p></div>	
<div><p>Mode:802.11n HT20 Frequency:2462MHz</p><p>Ant:Chain0</p></div>	



Test Mode: 802.11n HT40

Mode:802.11n HT40 Frequency:2422MHz Ant:Chain0	Mode:802.11n HT40 Frequency:2437MHz Ant:Chain0
Mode:802.11n HT40 Frequency:2452MHz Ant:Chain0	



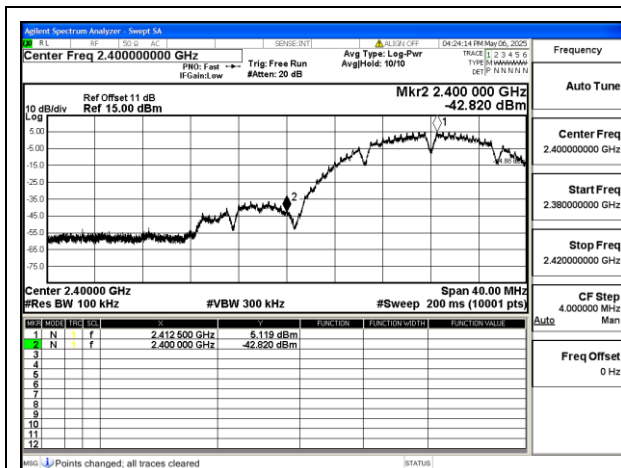
BUREAU  
VERITAS

Test Report No.: PSU-NQN2505120312RF06

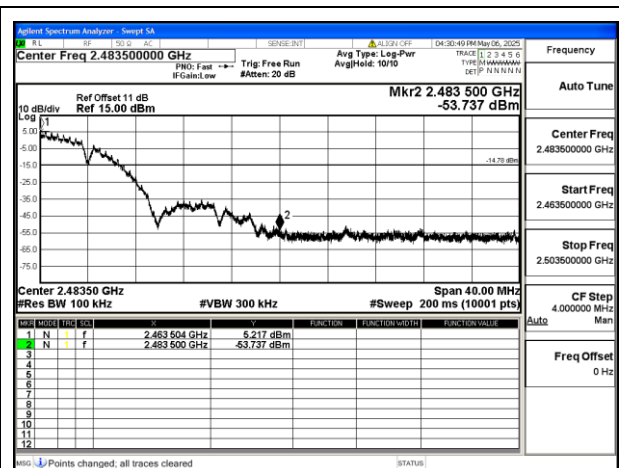
## BAND EDGE MEASUREMENTS

### TEST GRAPHS

Test Mode: 802.11b

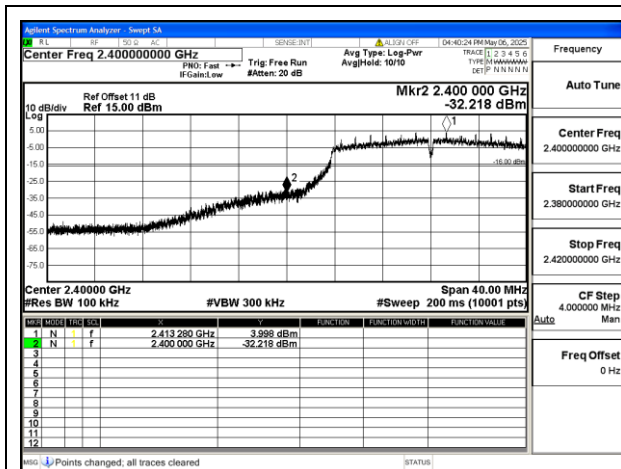


Mode:802.11b Frequency:2412MHz Ant:Chain0

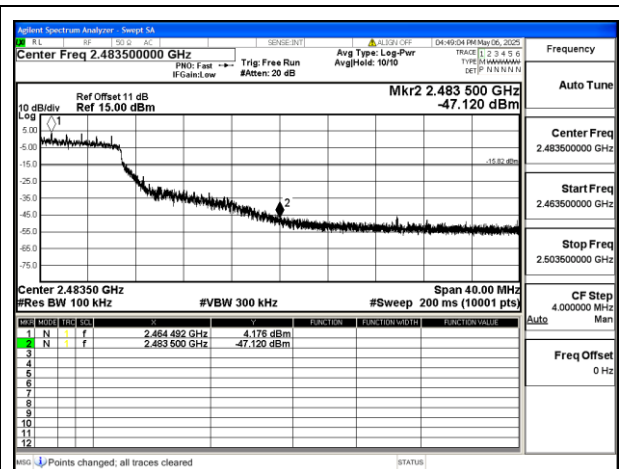


Mode:802.11b Frequency:2462MHz Ant:Chain0

Test Mode: 802.11g



Mode:802.11g Frequency:2412MHz Ant:Chain0

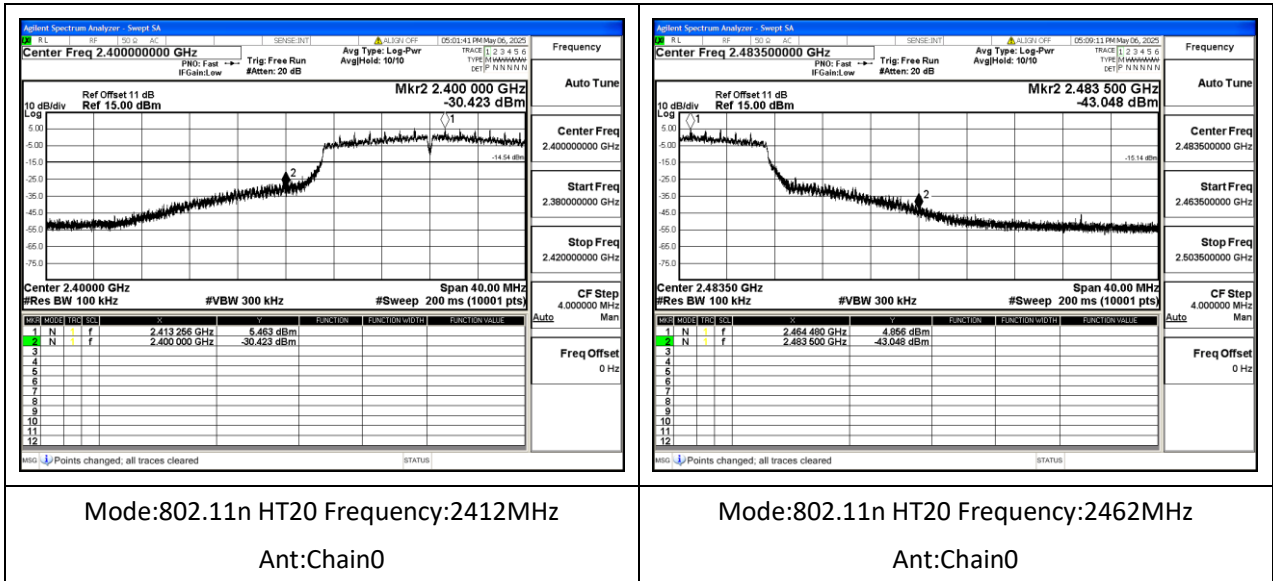


Mode:802.11g Frequency:2462MHz Ant:Chain0

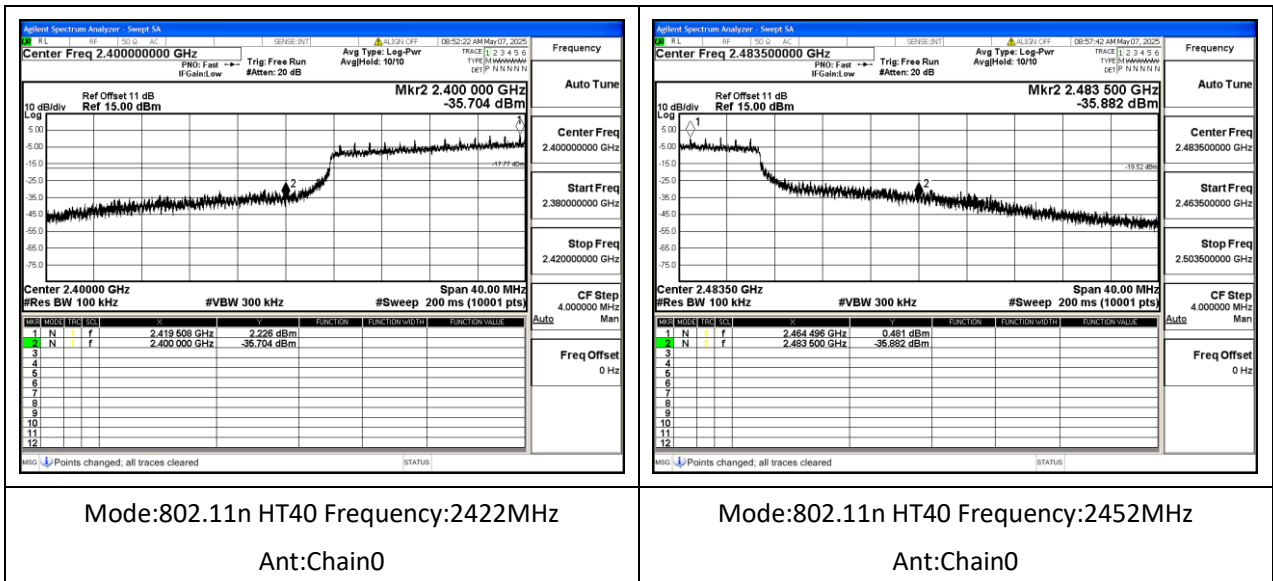




Test Mode: 802.11n HT20



Test Mode: 802.11n HT40





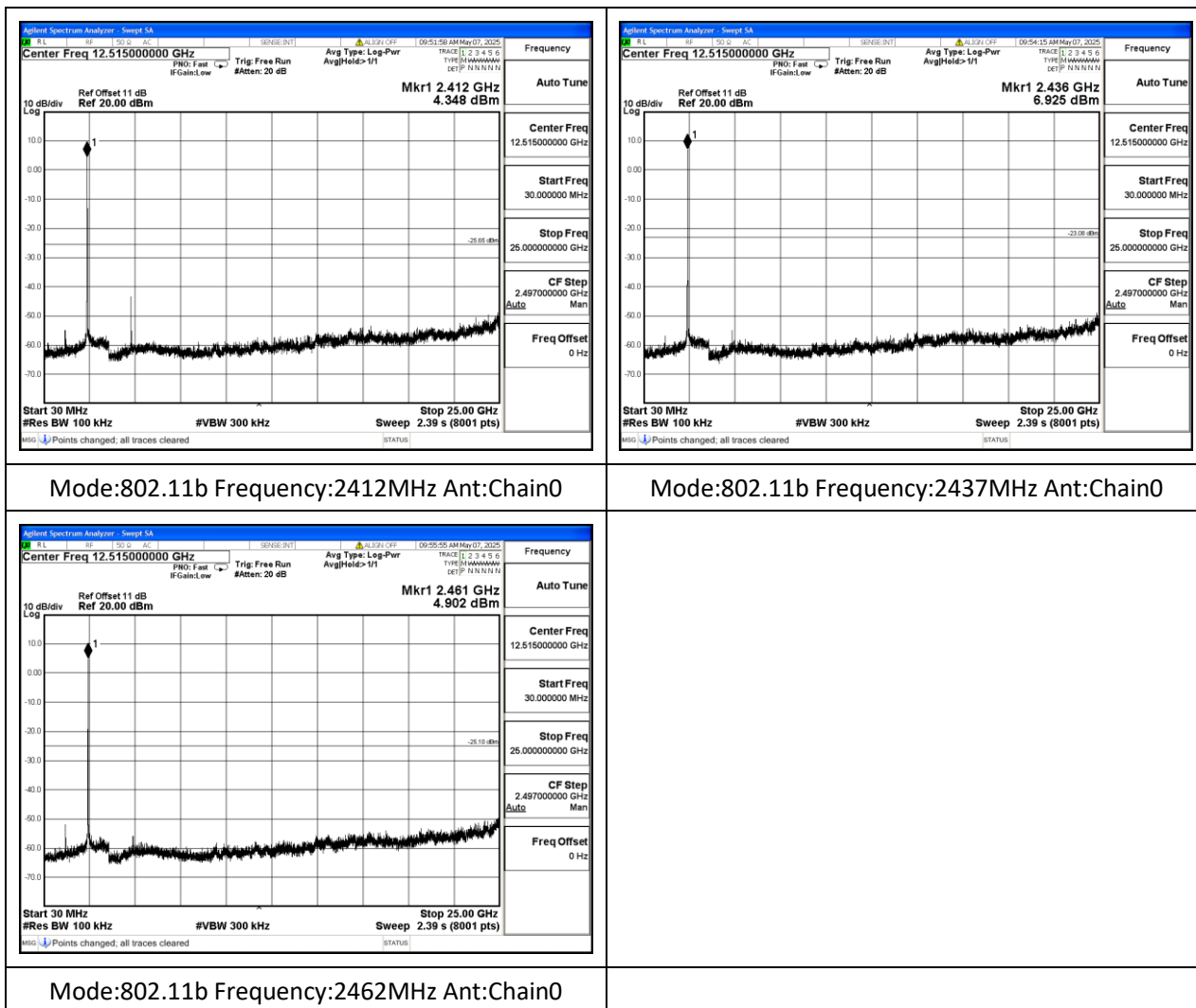
BUREAU  
VERITAS

Test Report No.: PSU-NQN2505120312RF06

## CONDUCTED SPURIOUS EMISSION

### TEST GRAPHS

Test Mode: 802.11b





Test Mode: 802.11g

