

FCC TEST REPORT

(Part 15, Subpart C)

Applicant:	MUNIC
Address:	39 Avenue de Paris 94800 Villejuif – France

Manufacturer or Supplier:	MUNIC
Address:	39 Avenue de Paris 94800 Villejuif – France
Product:	telematics embedded system ALARM.COM CAR CONNECTOR
Brand Name:	MUNIC ALARM.COM
Model Name:	C4D-4MUSAC_V8 ADC-CC110
FCC ID:	A6GC4D-4MUSACV8
Date of tests:	Aug. 23, 2024 ~ Sep. 20, 2024

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: Sep. 20, 2024	Date: Sep. 20, 2024

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

RELEASE CONTROL RECORD	5
1 SUMMARY OF TEST RESULTS	6
1.1 MEASUREMENT UNCERTAINTY	7
2 GENERAL INFORMATION	8
2.2 GENERAL DESCRIPTION OF EUT	8
2.3 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
2.4 DUTY CYCLE OF TEST SIGNAL	15
2.5 GENERAL DESCRIPTION OF APPLIED STANDARDS	16
2.6 DESCRIPTION OF SUPPORT UNITS	16
3 TEST TYPES AND RESULTS	17
3.1 RADIATED EMISSION MEASUREMENT	17
3.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT	17
3.1.2 TEST INSTRUMENTS	18
3.1.3 TEST PROCEDURES	20
3.1.4 DEVIATION FROM TEST STANDARD	20
3.1.5 TEST SETUP	21
3.1.6 EUT OPERATING CONDITIONS	22
3.1.7 TEST RESULTS	23
3.2 6 DB BANDWIDTH MEASUREMENT	77
3.2.1 LIMITS OF 6DB BANDWIDTH MEASUREMENT	77
3.2.2 TEST INSTRUMENTS	77
3.2.3 TEST PROCEDURE	78
3.2.4 DEVIATION FROM TEST STANDARD	79
3.2.5 TEST SETUP	79
3.2.6 EUT OPERATING CONDITIONS	79
3.2.7 TEST RESULTS	80
3.3 CONDUCTED OUTPUT POWER	81
3.3.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT	81
3.3.2 TEST SETUP	81
3.3.3 TEST INSTRUMENTS	81
3.3.4 TEST PROCEDURES	81
3.3.5 DEVIATION FROM TEST STANDARD	81
3.3.6 EUT OPERATING CONDITIONS	81



3.3.7	TEST RESULTS	82
3.4.7.1	MAXIMUM PEAK OUTPUT POWER	82
3.4.7.2	AVERAGE OUTPUT POWER (FOR REFERENCE).....	83
3.4	POWER SPECTRAL DENSITY MEASUREMENT	84
3.4.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT	84
3.4.2	TEST SETUP	84
3.4.3	TEST INSTRUMENTS.....	84
3.4.4	TEST PROCEDURE.....	84
3.4.5	DEVIATION FROM TEST STANDARD	84
3.4.6	EUT OPERATING CONDITION	84
3.4.7	TEST RESULTS	85
3.5	OUT OF BAND EMISSION MEASUREMENT	86
3.5.1	LIMITS OF OUT OF BAND EMISSION MEASUREMENT	86
3.5.2	TEST SETUP	86
3.5.3	TEST INSTRUMENTS.....	86
3.5.4	TEST PROCEDURE.....	86
3.5.5	DEVIATION FROM TEST STANDARD	87
3.5.6	EUT OPERATING CONDITION	87
3.5.7	TEST RESULTS	87
3.6	ANTENNA REQUIREMENTS	88
3.6.1	STANDARD APPLICABLE	88
3.6.2	ANTENNA CONNECTED CONSTRUCTION	88
3.6.3	ANTENNA GAIN	88
4	PHOTOGRAPHS OF THE TEST CONFIGURATION	89
5	MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB ..	90
6	APPENDIX.....	91
	WLAN.....	91
	DTS BANDWIDTH	91
	TEST RESULT	91
	TEST GRAPHS.....	92
	OCCUPIED CHANNEL BANDWIDTH.....	98
	TEST RESULT	98
	TEST GRAPHS.....	99
	MAXIMUM CONDUCTED OUTPUT POWER.....	105
	TEST RESULT	105
	MAXIMUM POWER SPECTRAL DENSITY	105



TEST RESULT	105
TEST GRAPHS.....	107
BAND EDGE MEASUREMENTS	114
TEST RESULT	114
TEST GRAPHS.....	115
CONDUCTED SPURIOUS EMISSION	119
TEST RESULT	119
TEST GRAPHS.....	121
DUTY CYCLE	139
TEST RESULT	139
TEST GRAPHS.....	140
BLE 146	
DTS BANDWIDTH	146
TEST RESULT	146
TEST GRAPHS.....	146
OCCUPIED CHANNEL BANDWIDTH.....	148
TEST RESULT	148
TEST GRAPHS.....	148
MAXIMUM CONDUCTED OUTPUT POWER	150
TEST RESULT	150
MAXIMUM POWER SPECTRAL DENSITY	151
TEST RESULT	151
TEST GRAPHS.....	151
BAND EDGE MEASUREMENTS	153
TEST RESULT	153
TEST GRAPHS.....	153
CONDUCTED SPURIOUS EMISSION	154
TEST RESULT	154
TEST GRAPHS.....	154
DUTY CYCLE	158
TEST RESULT	158
TEST GRAPHS.....	159



Test Report No.: PSU-QBJ2408220111RF05

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
PSU-QBJ2408220111RF05	Original release	Sep. 20, 2024



**BUREAU
VERITAS**

Test Report No.: PSU-QBJ2408220111RF05

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	TEST LAB*
15.207	AC Power Conducted Emission	Compliance	A
15.205 15.209	Radiated Emissions	Compliance	A
15.247(d)	Out of band Emission Measurement	Compliance	A
15.247(a)(2)	6dB bandwidth	Compliance	A
15.247(b)	Conducted Output power	Compliance	A
15.247(e)	Power Spectral Density	Compliance	A
15.203	Antenna Requirement	Compliance	A

Note : 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

Accredited Test Lab Cert 6613.01

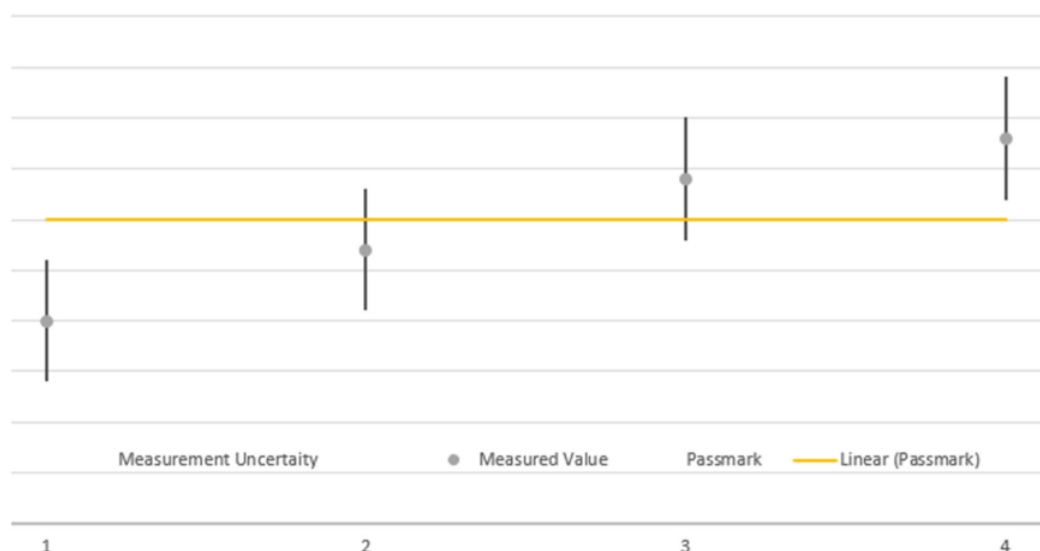
The FCC Site Registration No. is 434559; The Designation No. is CN1325.

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

2.2 GENERAL DESCRIPTION OF EUT

PRODUCT*	telematics embedded system ALARM.COM CAR CONNECTOR
BRAND NAME*	MUNIC ALARM.COM
MODEL NAME*	C4D-4MUSAC_V8 ADC-CC110
NOMINAL VOLTAGE*	DC 13.5V/27V
MODULATION *	DSSS, OFDM, GFSK
TRANSMISSION RATE*	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 72.2 Mbps 802.11n(HT40): up to 150 Mbps BT_LE: 1 Mbps
OPERATING FREQUENCY	2412-2462MHz for 11b/g/n(HT20/40) 2402-2480MHz for BT-LE(GFSK)
MAX. OUTPUT POWER	WLAN: 106.91mW (Maximum) BT-LE: 5.83mW (Maximum)
ANTENNA TYPE*	Stamped metal antenna, SMD with 0.17dBi gain for WIFI/ BLE
HW VERSION*	HC4D-4MUSAC_V8.01
SW VERSION*	SC4D-4MUSAC_V8.01
I/O PORTS*	Refer to user's manual
CABLE SUPPLIED*	N/A



BUREAU VERITAS Test Report No.: PSU-QBJ2408220111RF05

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. EUT operating function.:

MODULATION MODE	TX/RX FUNCTION
802.11b	1TX /1RX
802.11g	1TX /1RX
802.11n(HT20)	1TX /1RX
802.11n(HT40)	1TX /1RX
BT_LE(1MHz)	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.
6. The differences between model C4D-4MUSAC_V8 and ADC-CC110 are as following.

Description	1st	2rd
Product name	Telematic Embedded System	ALARM.COM CAR CONNECTOR
Brand Name	MUNIC	ALARM.COM
Model Name	C4D-4MUSAC_V8	ADC-CC110
Differences	/	Use of a different product name (ALARM.COM CAR CONNECTOR), model name (ADC-CC110) and a different trademark (ALARM.COM) for marketing and client requirements.

7. List of Accessory:

ACCESSORIES	BRAND	MODEL	SPECIFICATION
Battery	Howell	Li-polymer 552535H	Capacity : Li-ion, 450mAh



2.3 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		

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	
-	√	√	√	√	-

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)
802.11g	1 to 11	6	OFDM	6.0
BT-LE	0 to 39	19	GFSK	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
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
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

**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
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
802.11n HT40	3 to 9	3,6,9	OFDM	MCS0
BT-LE	0 to 39	0,19, 39	GFSK	1.0

TEST CONDITION:



Test Report No.: PSU-QBJ2408220111RF05

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE	TESTED BY
RE<1G	23deg. C, 70%RH	DC 13.5V/27V By DC Source	Hanwen Xu
RE≥1G	23deg. C, 70%RH	DC 13.5V/27V By DC Source	Hanwen Xu
PLC	25deg. C, 52%RH	DC 13.5V/27V By DC Source	Hanwen Xu
APCM	25deg. C, 60%RH	DC 13.5V/27V By DC Source	Hanwen Xu



2.4 DUTY CYCLE OF TEST SIGNAL

Please Refer to Appendix Of this test report.

2.5 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.

2.6 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	DC Source	HYELEC	HY3010B	551016	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable, 1.0m;



3 TEST TYPES AND RESULTS

3.1 RADIATED EMISSION MEASUREMENT

3.1.1 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.



3.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Pre-Amplifier	R&S	SCU18F1	100815	Aug.30,22	Aug.29,24
Pre-Amplifier	R&S	SCU18F1	100815	Aug.29,24	Aug.28,26
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.22,22	Aug.21,24
Horn Antenna	ETS-LINDGREN	3117	227836	Aug.21,24	Aug.20,26
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.22,22	Aug.21,24
Horn Antenna	Steatite Q-par Antennas	QMS 00208	23485	Aug.21,24	Aug.20,26
Loop Antenna	SCHWARZ	HFH2-Z2/Z2E	100976	Feb.22,24	Feb.21,26
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.31,22	Aug.30,24
DC Source	HYELEC	HY3010B	551016	Aug.30,24	Aug.29,26
Hygrothermograph	DELI	20210528	SZ014	Sep.06,22	Sep.05,24
Hygrothermograph	DELI	20210528	SZ014	Sep.05,24	Sep.04,26
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-	N/A	N/A	N/A

**Test Report No.: PSU-QBJ2408220111RF05**

		4.00M			
CABLE	R&S	W13.02	N/A	Apr.27,24	Apr.26,25
CABLE	R&S	W12.14	N/A	Apr.27,24	Apr.26,25

- 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.

3.1.3 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.

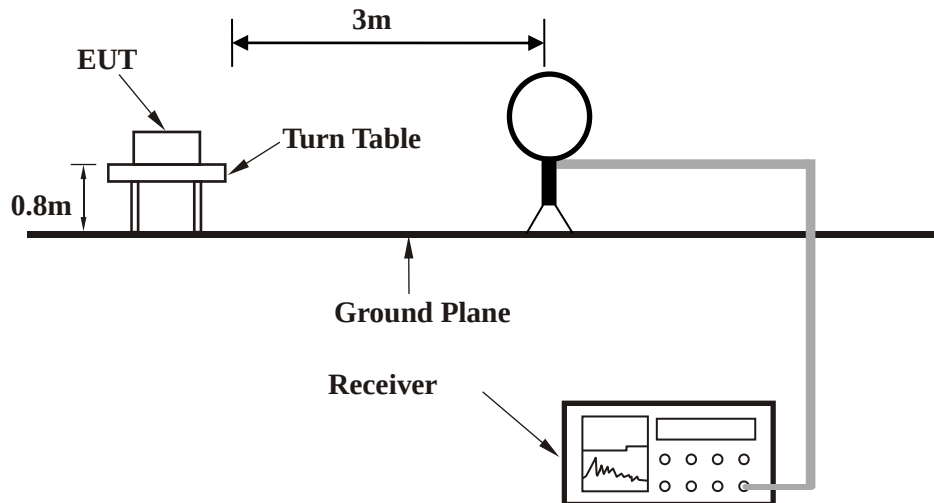
3.1.4 DEVIATION FROM TEST STANDARD

No deviation

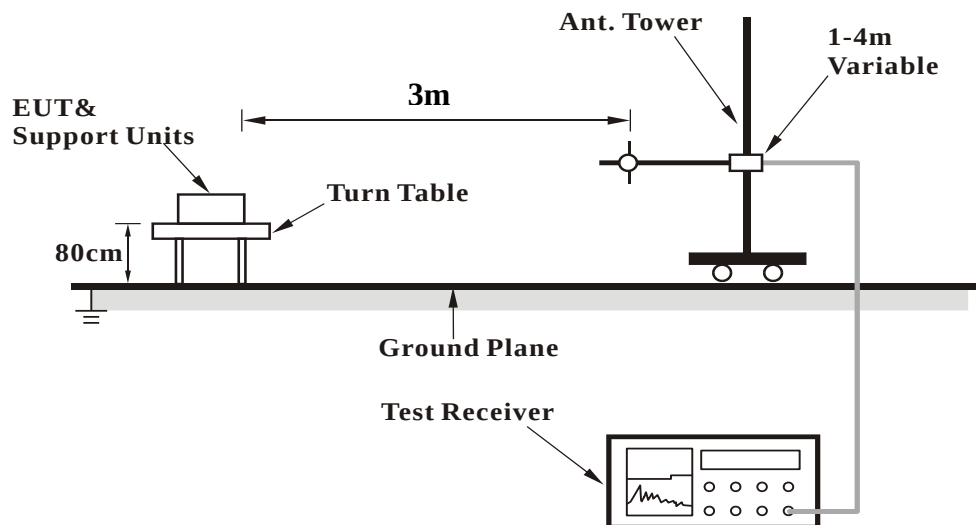


3.1.5 TEST SETUP

<Frequency Range 9KHz~30MHz >

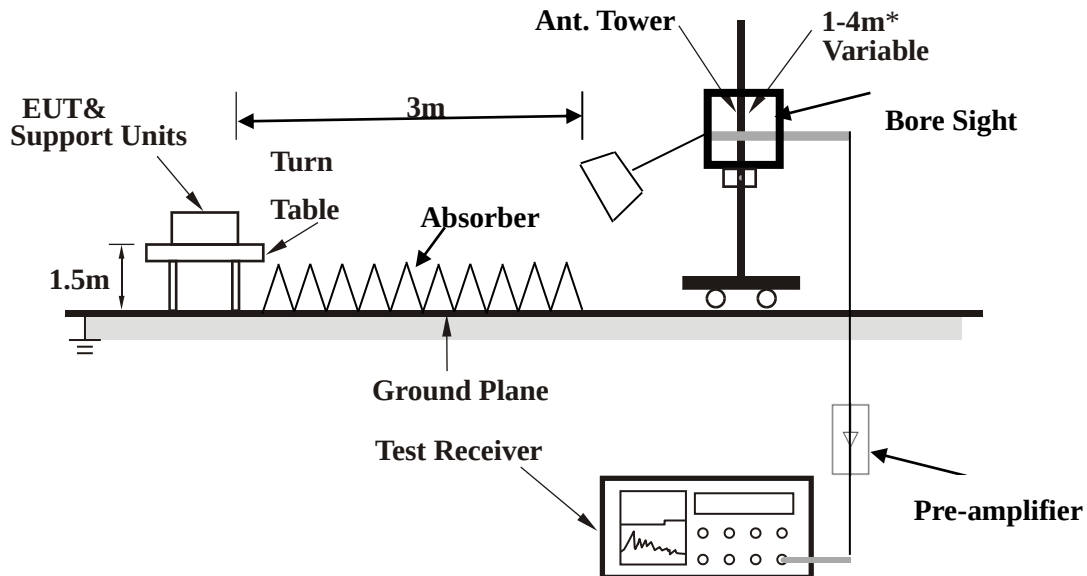


< Frequency Range 30MHz~1GHz >





<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).

3.1.6 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.



**BUREAU
VERITAS**

Test Report No.: PSU-QBJ2408220111RF05

3.1.7 TEST RESULTS

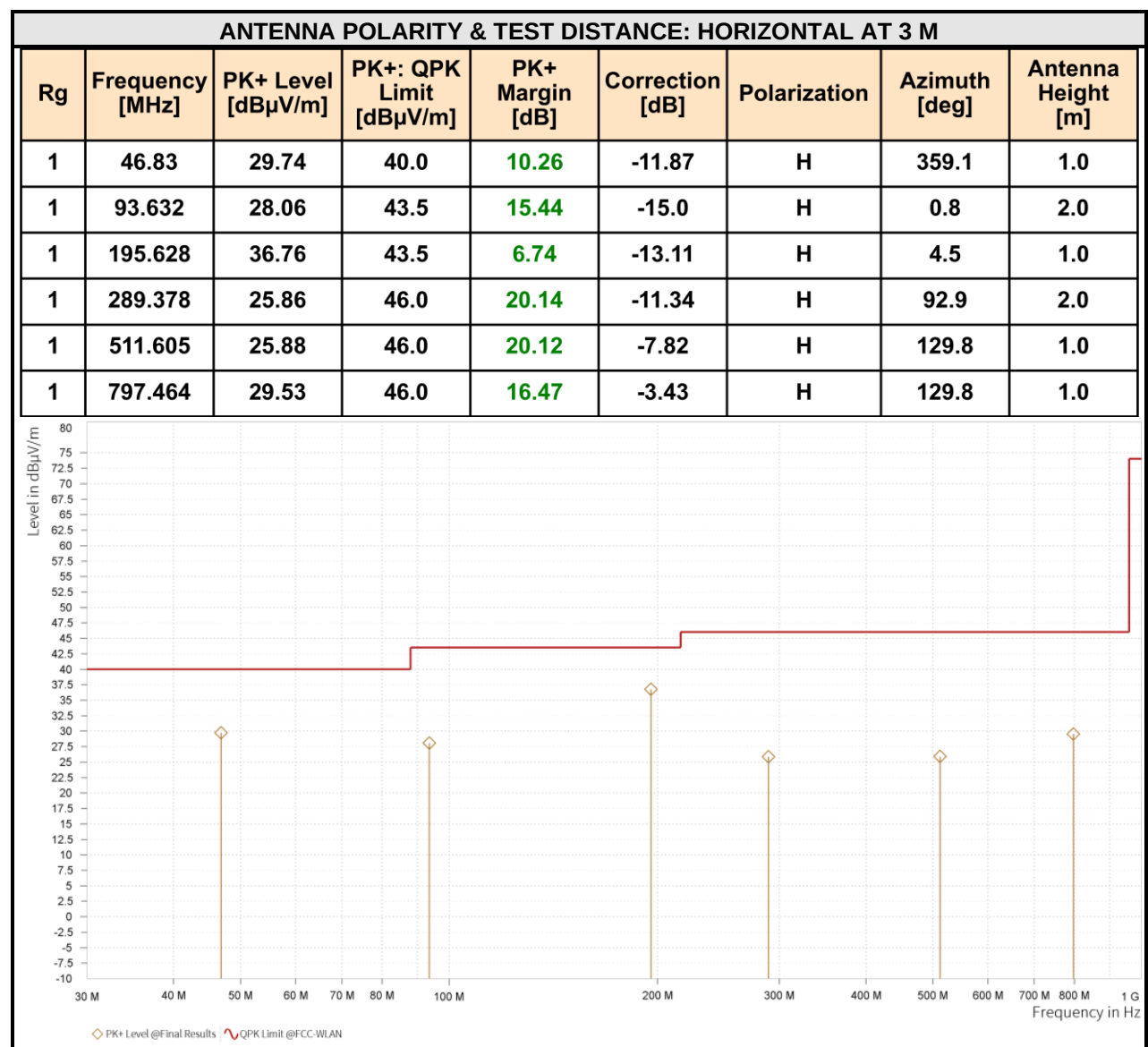
NOTE : The 9K~30MHz amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

BELOW 1GHz WORST-CASE DATA:

30 MHz – 1GHz data:

802.11g:

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		



REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Limit value- Emission level.

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



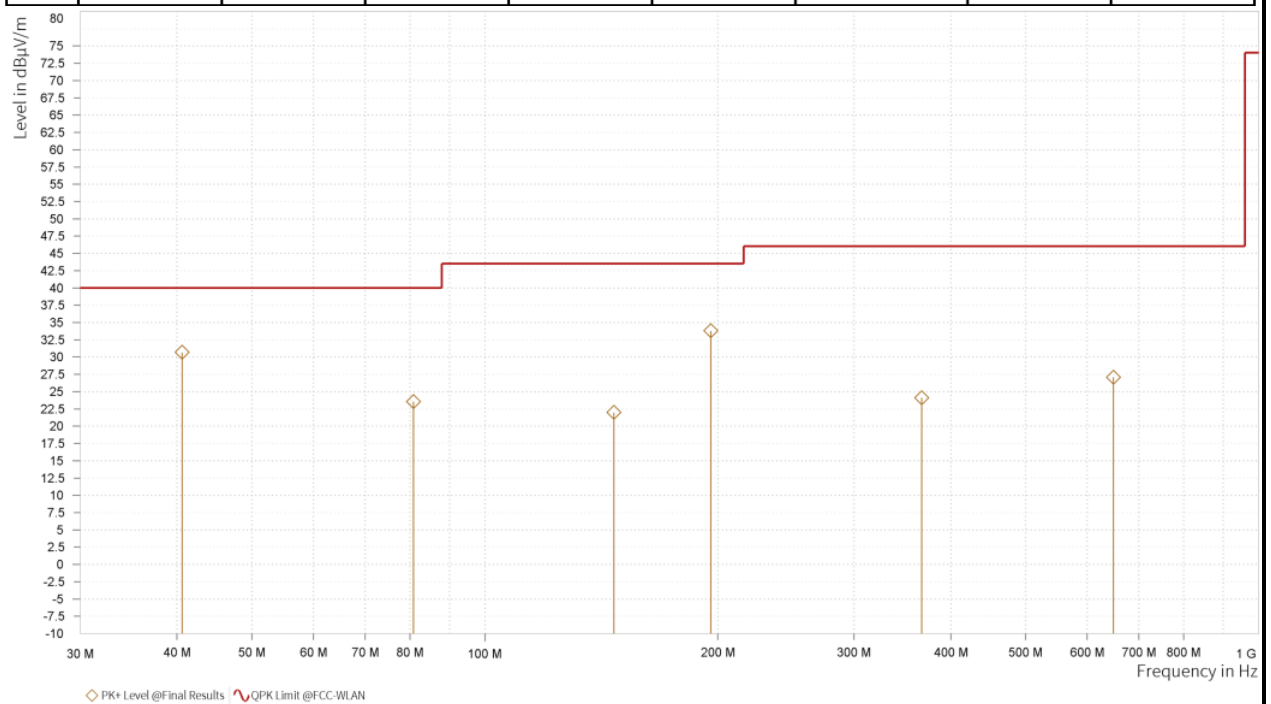
BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+: QPK Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	40.622	30.67	40.0	9.33	-12.57	V	132.1	1.0
1	80.877	23.54	40.0	16.46	-17.68	V	132.1	1.0
1	146.74	21.97	43.5	21.53	-16.68	V	91.7	2.0
1	195.822	33.78	43.5	9.72	-13.09	V	91.7	2.0
1	366.833	24.1	46.0	21.9	-10.31	V	226.7	2.0
1	648.909	27.06	46.0	18.94	-5.3	V	0.9	2.0



REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Limit value- Emission level.

**ABOVE 1GHz WORST-CASE DATA:**

Note: 1. For radiated emissions testing , the full testing range of different modes have been scanned , only the worst case harmonic data is reported in the sheet.

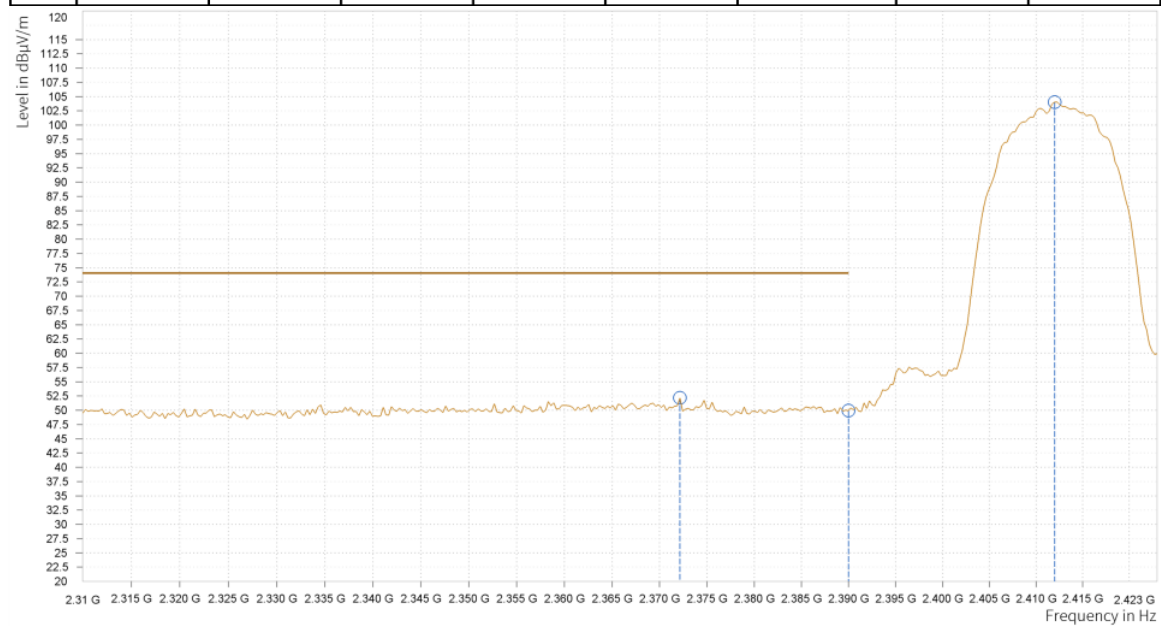
2. All other emissions were greater than 20dB below the limit was not recorded

802.11B:

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	2,372.150	52.16	74.0	21.84	9.44	H	194.3	1.0
1	2,390.000	49.93	74.0	24.07	9.34	H	291.2	1.0
1	2,411.980	104.02			9.23	H	84.4	2.0



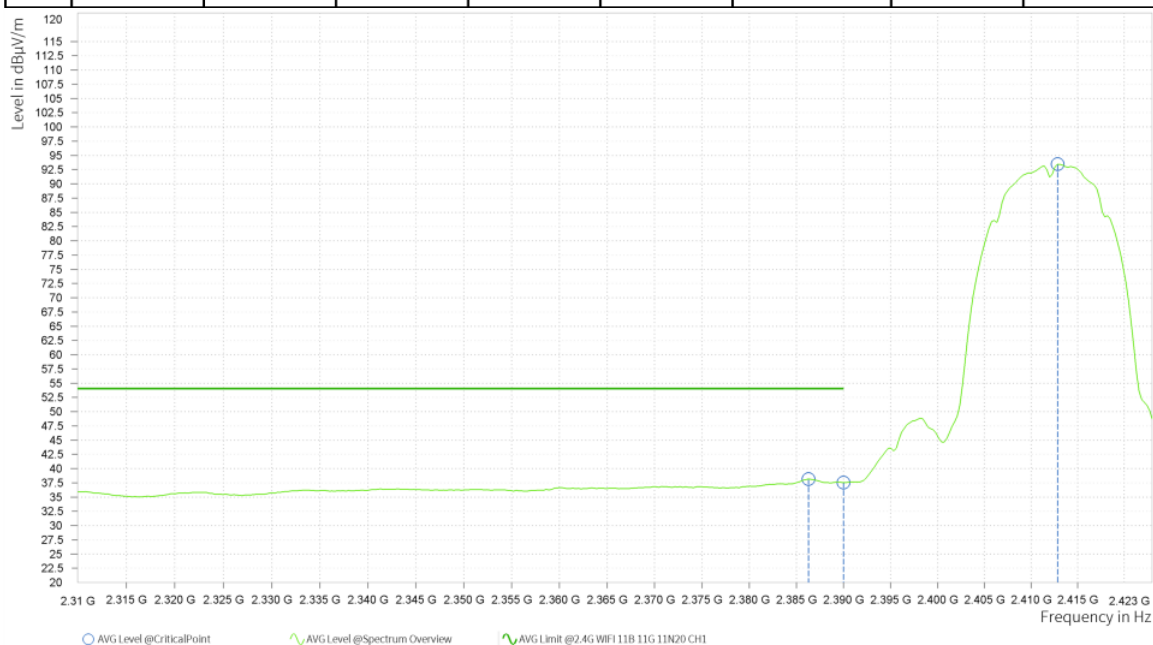


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	2,386.275	38.17	54.0	15.83	9.36	H	5.0	1.0
1	2,390.000	37.55	54.0	16.45	9.34	H	5.0	1.0
1	2,412.830	93.44			9.23	H	266.2	2.0



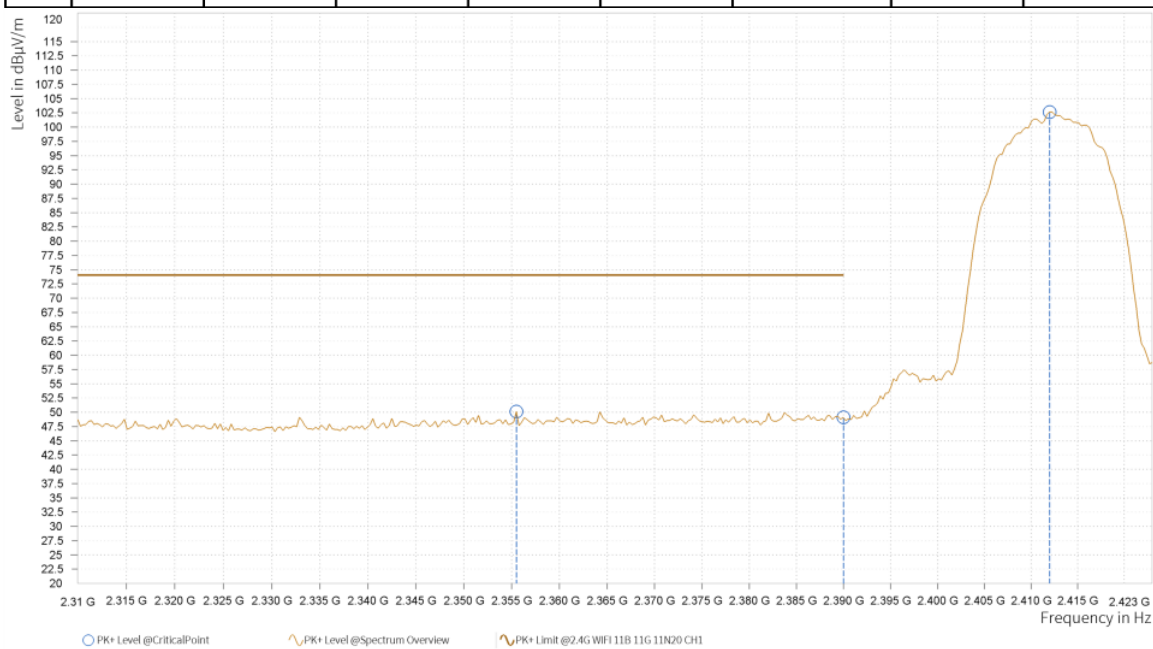


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	2,355.483	50.13	74.0	23.87	9.3	V	219.4	2.0
1	2,390.000	49.11	74.0	24.89	9.34	V	0.9	2.0
1	2,411.983	102.63			9.23	V	355.6	2.0



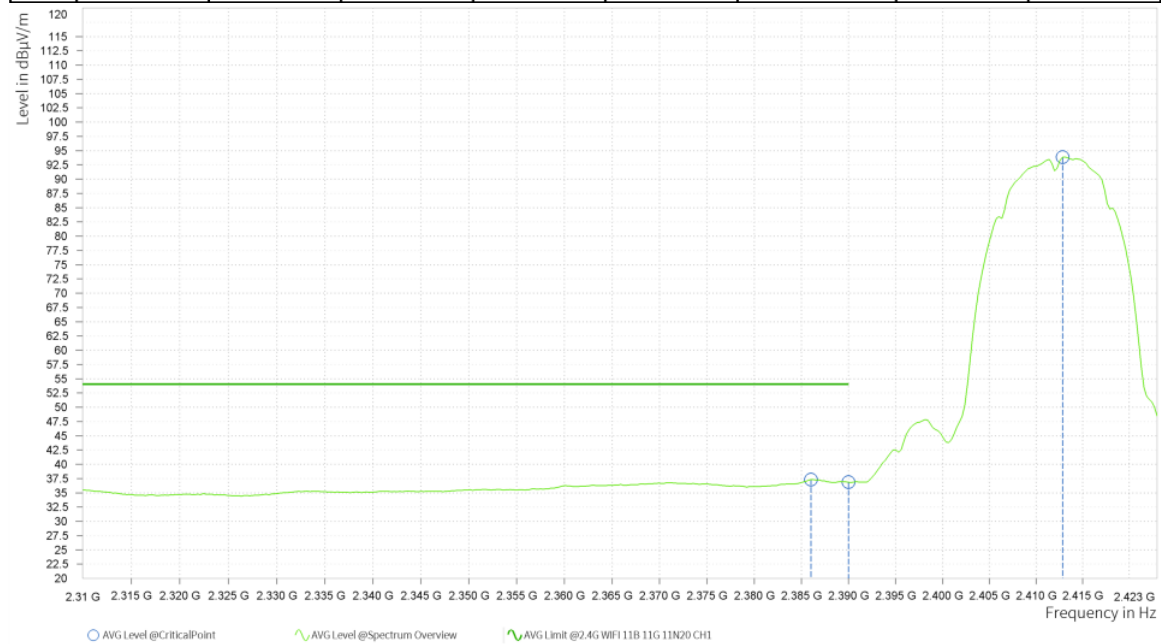


**BUREAU
VERITAS**

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	2,385.993	37.34	54.0	16.66	9.36	V	72.5	2.0
1	2,390.000	36.86	54.0	17.14	9.34	V	72.5	2.0
1	2,412.830	93.83			9.23	V	121.5	2.0



REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor Margin value = Limit value- Emission level.
2. 2412MHz: Fundamental frequency.



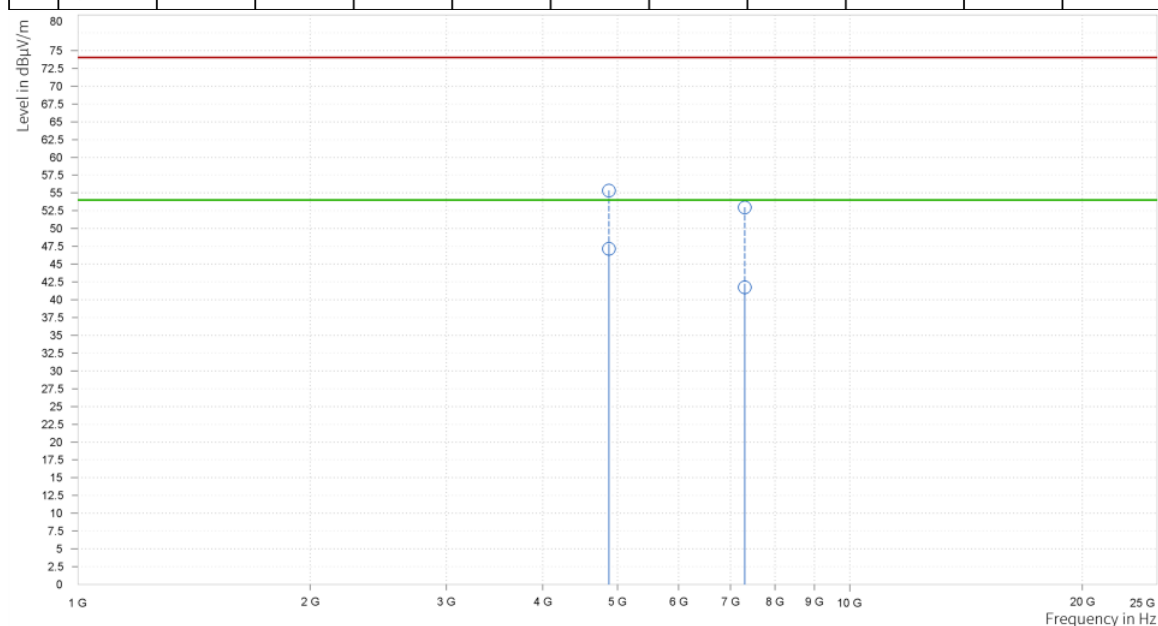
BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+: QPK Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
3	4,874.000	55.33	74.0	18.67	47.15	54.0	6.85	13.74	H	1	1.0
3	7,311.000	52.98	74.0	21.02	41.75	54.0	12.25	17.81	H	359	2.0



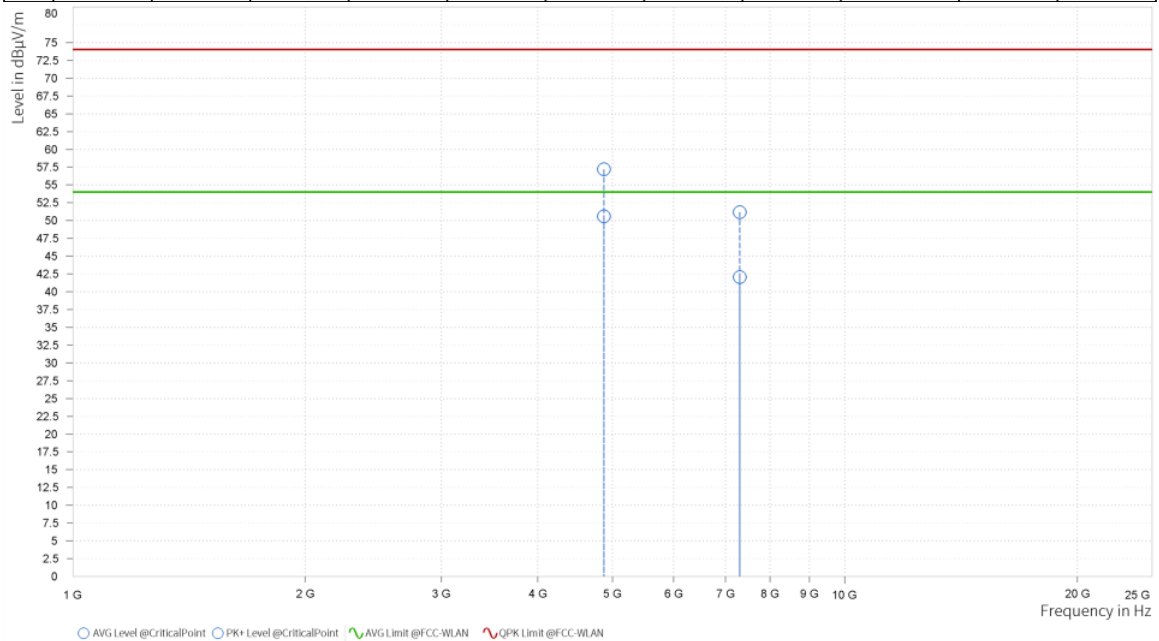


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+: QPK Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
3	4,874.000	57.19	74.0	16.81	50.6	54.0	3.4	13.74	V	359.1	1.0
3	7,311.000	51.19	74.0	22.81	42.07	54.0	11.93	17.81	V	359.0	2.0



REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor Margin value = Limit value- Emission level.
- 2437MHz: Fundamental frequency.



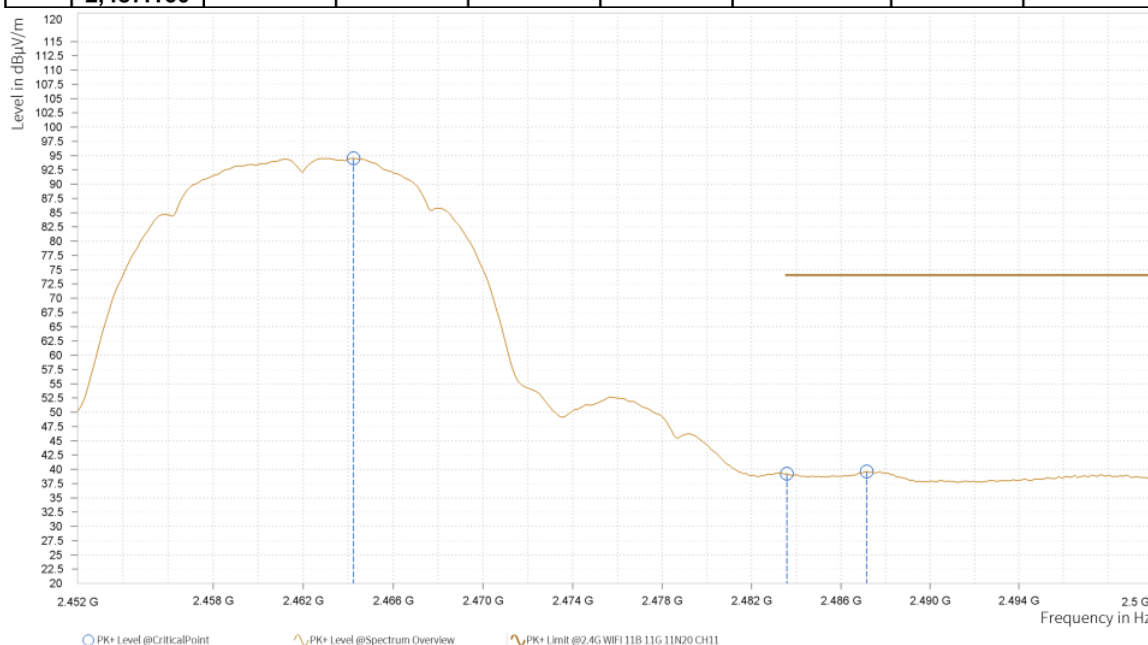
**BUREAU
VERITAS**

Test Report No.: PSU-QBJ2408220111RF05

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	2,464.240	94.51			8.91	H	354.9	2.0
2	2,483.50	39.21	74.0	34.79	9.11	H	116.6	2.0
2	2,487.160	39.6	74.0	34.4	9.16	H	116.6	2.0



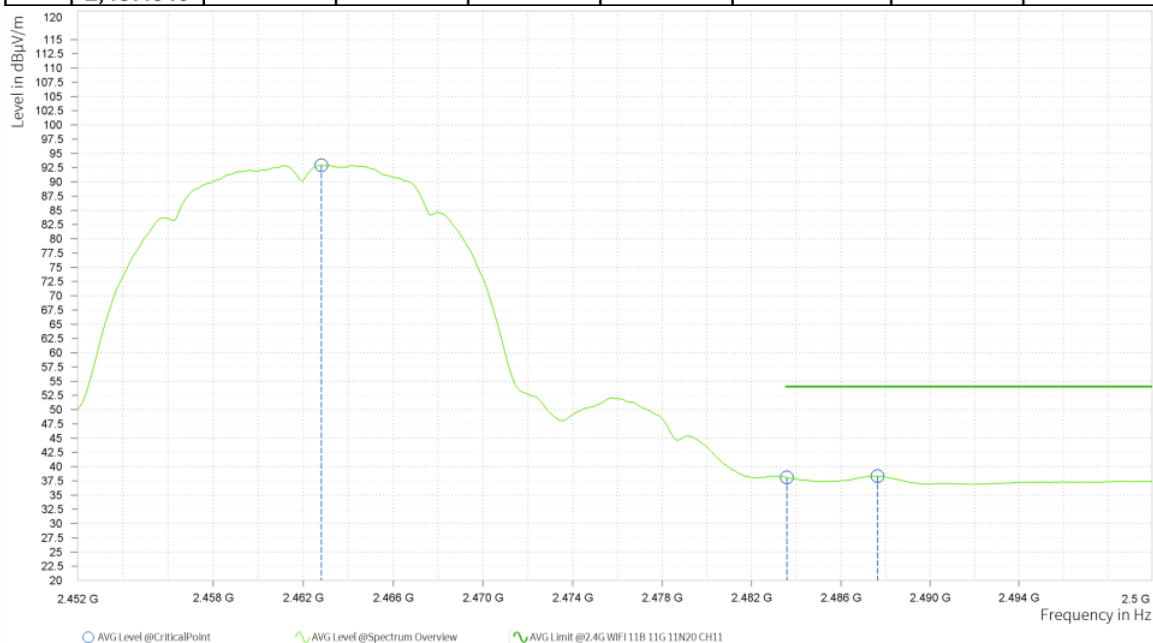


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	2,462.800	92.91			8.92	H	1	1.0
2	2,483.500	38.1	54.0	15.9	9.11	H	82	2.0
2	2,487.640	38.31	54.0	15.69	9.16	H	1	2.0



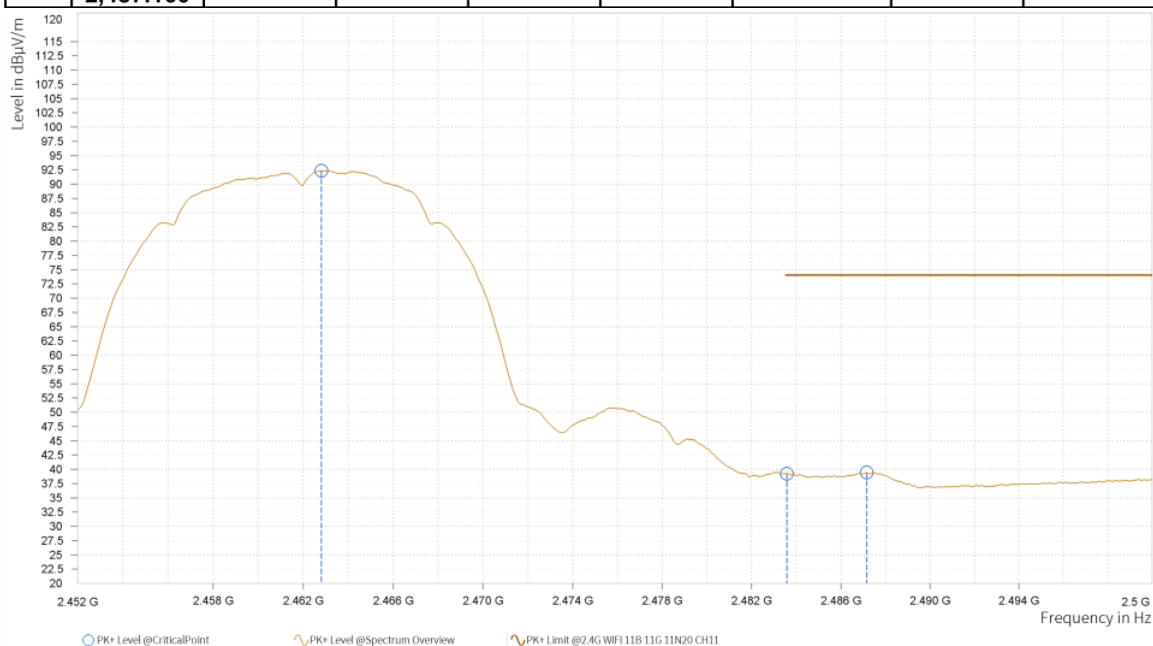


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	2,462.800	92.32			8.92	V	355.0	2.0
2	2,483.50	39.23	74.0	34.77	9.11	V	68.9	2.0
2	2,487.160	39.42	74.0	34.58	9.16	V	68.9	2.0





BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	2,462.800	92.09			8.92	V	359.0	2.0
2	2,483.50	38.74	54.0	15.26	9.11	V	104.8	2.0
2	2,487.640	40.22	54.0	13.78	9.16	V	104.8	2.0



REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor Margin value = Limit value- Emission level.
2. 2462MHz: Fundamental frequency.



BUREAU
VERITAS

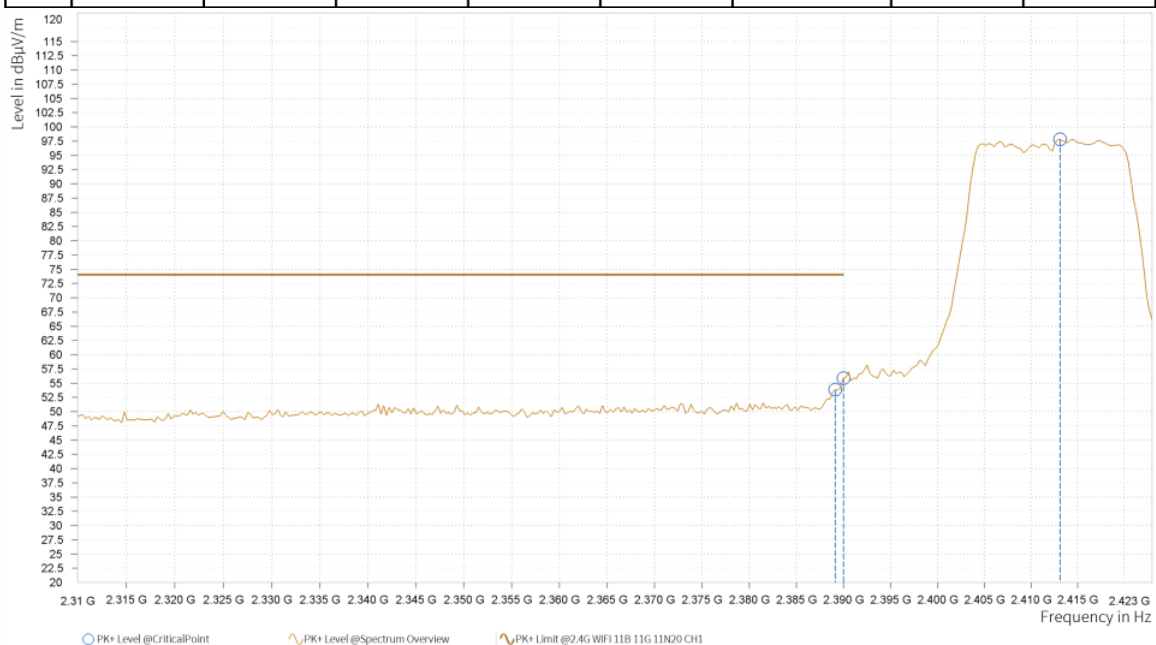
Test Report No.: PSU-QBJ2408220111RF05

802.11g

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	2,389.100	53.84	74.0	20.16	9.35	H	0.9	2.0
1	2,390.000	55.87	74.0	18.13	9.34	H	262.5	2.0
1	2,413.113	97.8			9.22	H	0.9	2.0



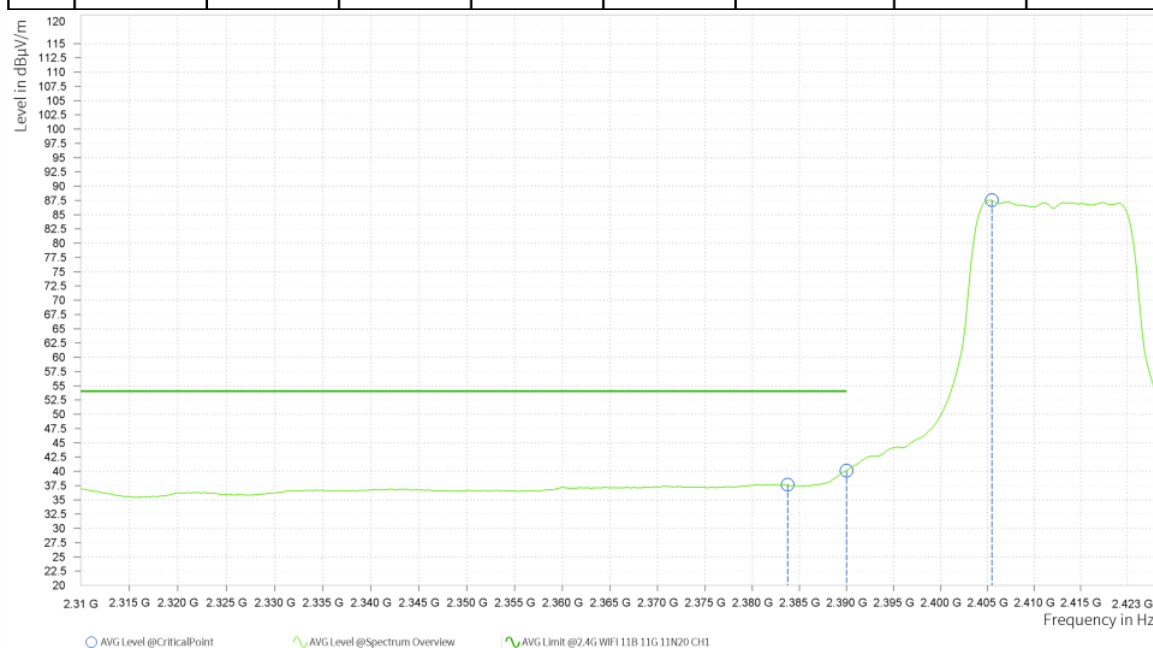


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	2,383.733	37.67	54.0	16.33	9.38	H	359.0	2.0
1	2,390.000	40.12	54.0	13.88	9.34	H	14.0	1.0
1	2,405.485	87.52			9.26	H	311.6	1.0



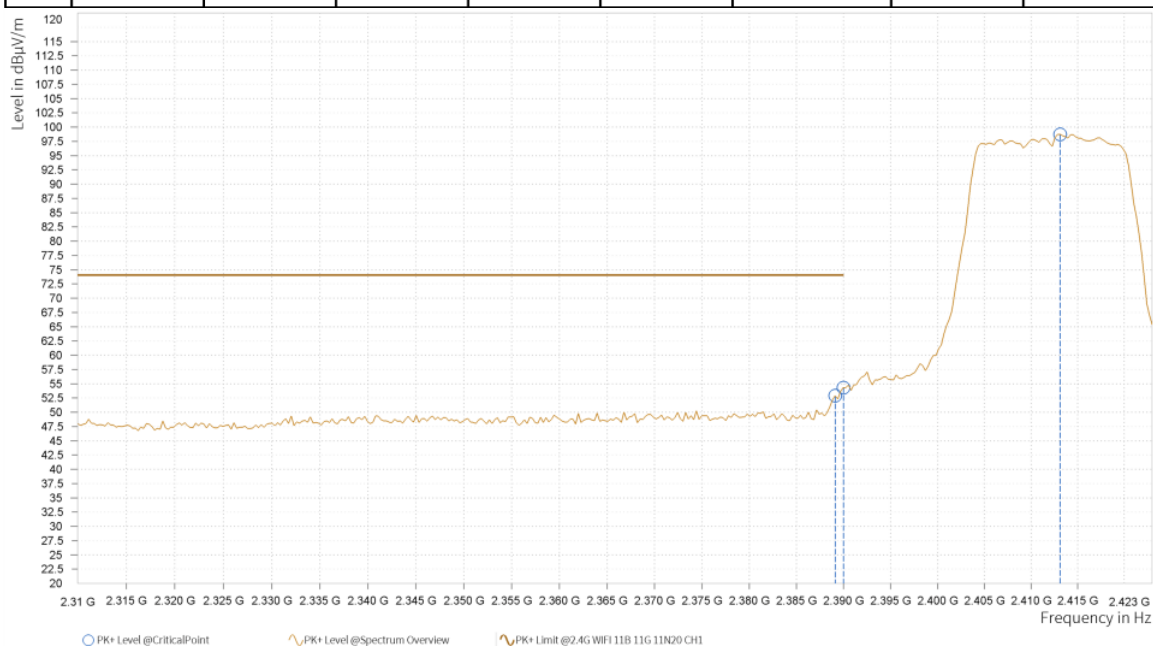


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dB μ V/m]	PK+ Limit [dB μ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	2,389.100	52.9	74.0	21.1	9.35	V	30.7	2.0
1	2,390.000	54.32	74.0	19.68	9.34	V	30.7	2.0
1	2,413.113	98.74			9.22	V	5.1	1.0



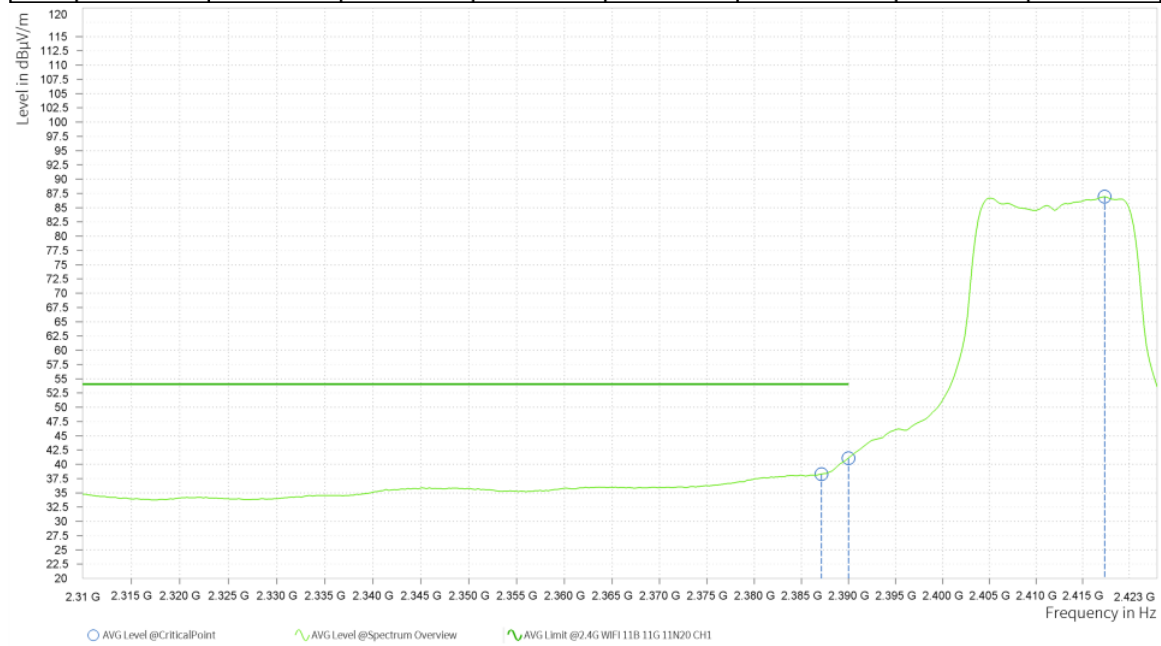


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	2,387.123	38.29	54.0	15.71	9.36	V	102.3	2.0
1	2,390.000	41.06	54.0	12.94	9.34	V	102.3	2.0
1	2,417.350	86.93			9.2	V	157.3	2.0



REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor Margin value = Limit value- Emission level.
2. 2412MHz: Fundamental frequency.



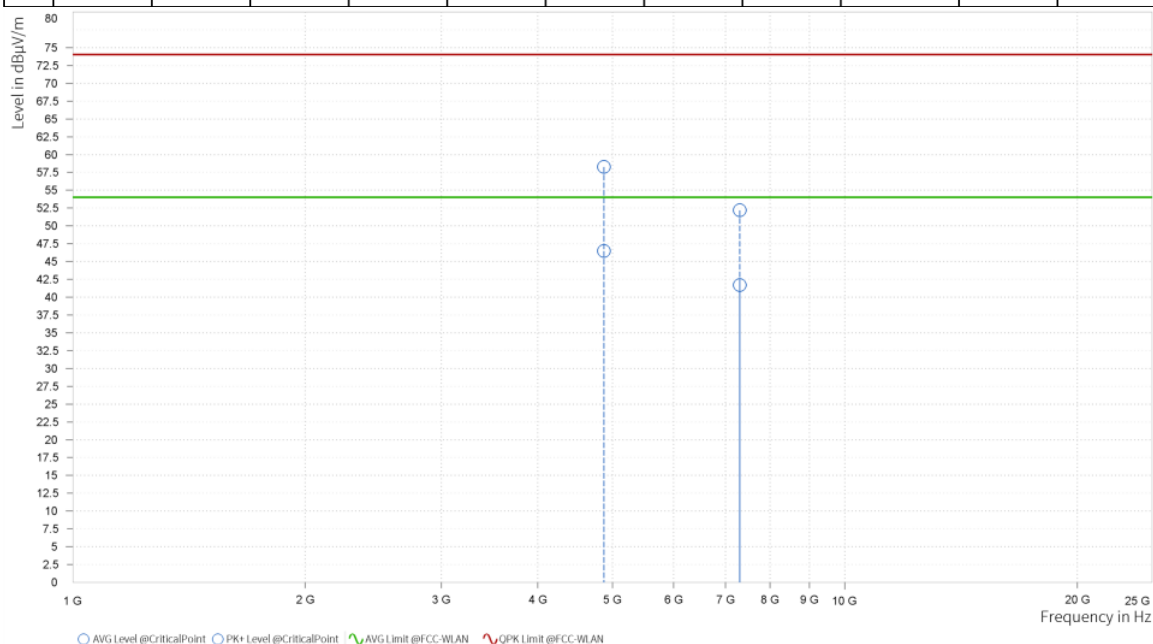
BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+: QPK Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
3	4,874.000	58.26	74.0	15.74	46.47	54.0	7.53	13.74	H	0.9	2.0
3	7,311.000	52.18	74.0	21.82	41.72	54.0	12.28	17.81	H	359.0	2.0



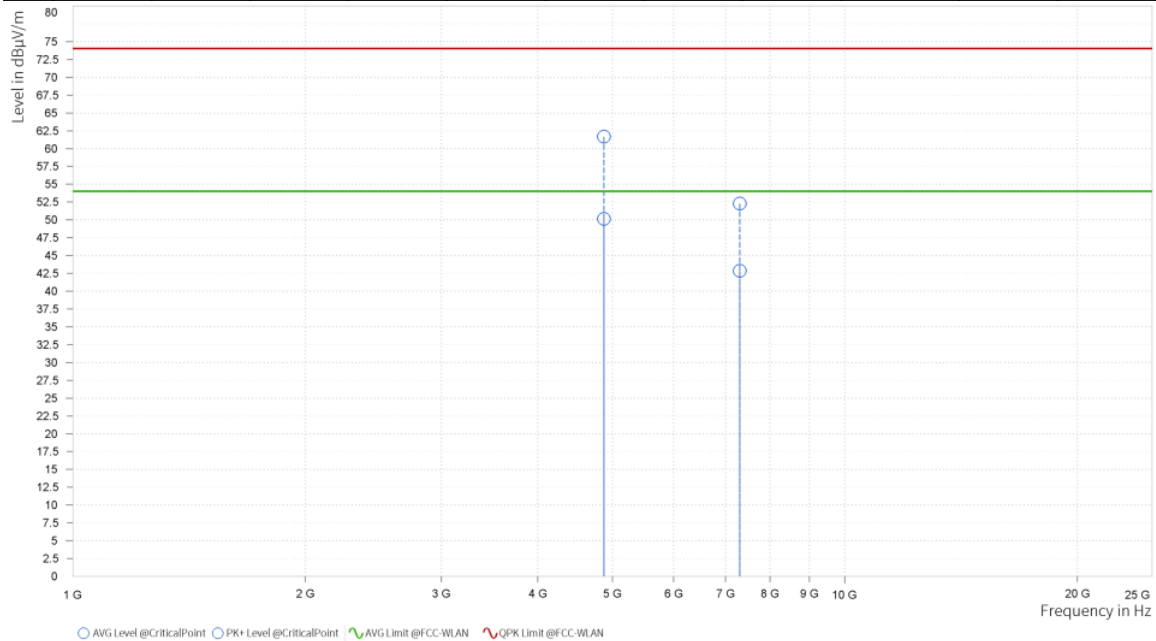


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+: QPK Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
3	4,874.000	61.66	74.0	12.34	50.15	54.0	3.85	13.74	V	359.1	1.0
3	7,311.000	52.29	74.0	21.71	42.85	54.0	11.15	17.81	V	128.6	2.0



REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor Margin value = Limit value- Emission level.
- 2437MHz: Fundamental frequency.



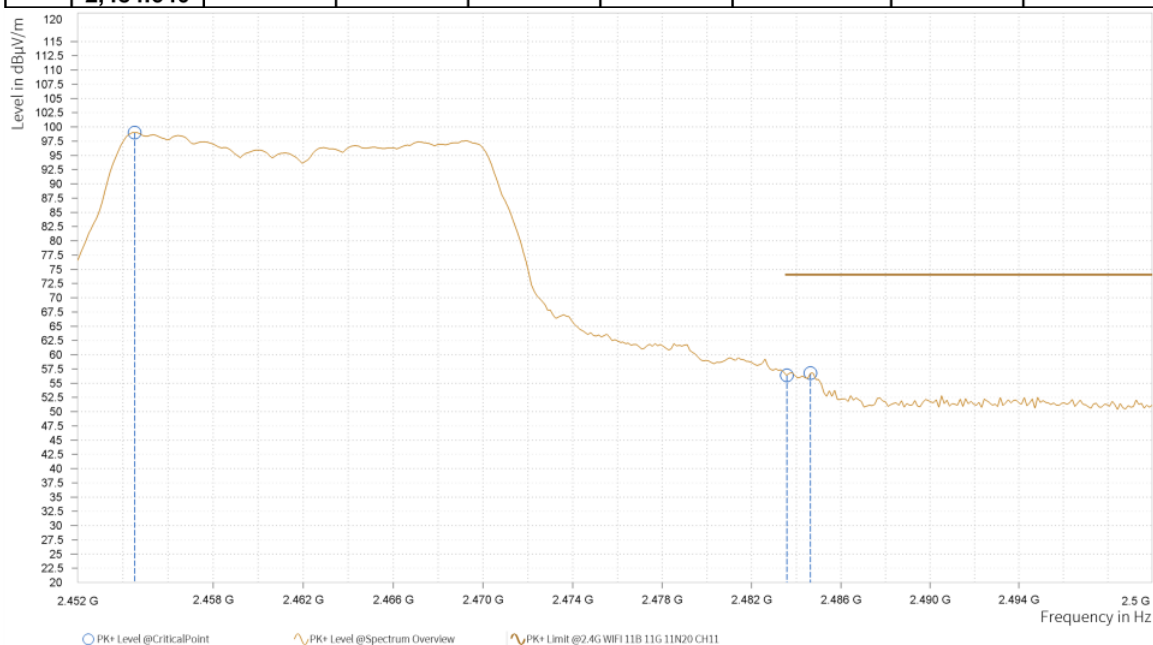
BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	2,454.520	98.99			8.99	H	58.1	2.0
2	2,483.500	56.36	74.0	17.64	9.11	H	58.1	2.0
2	2,484.640	56.76	74.0	17.24	9.13	H	58.1	2.0



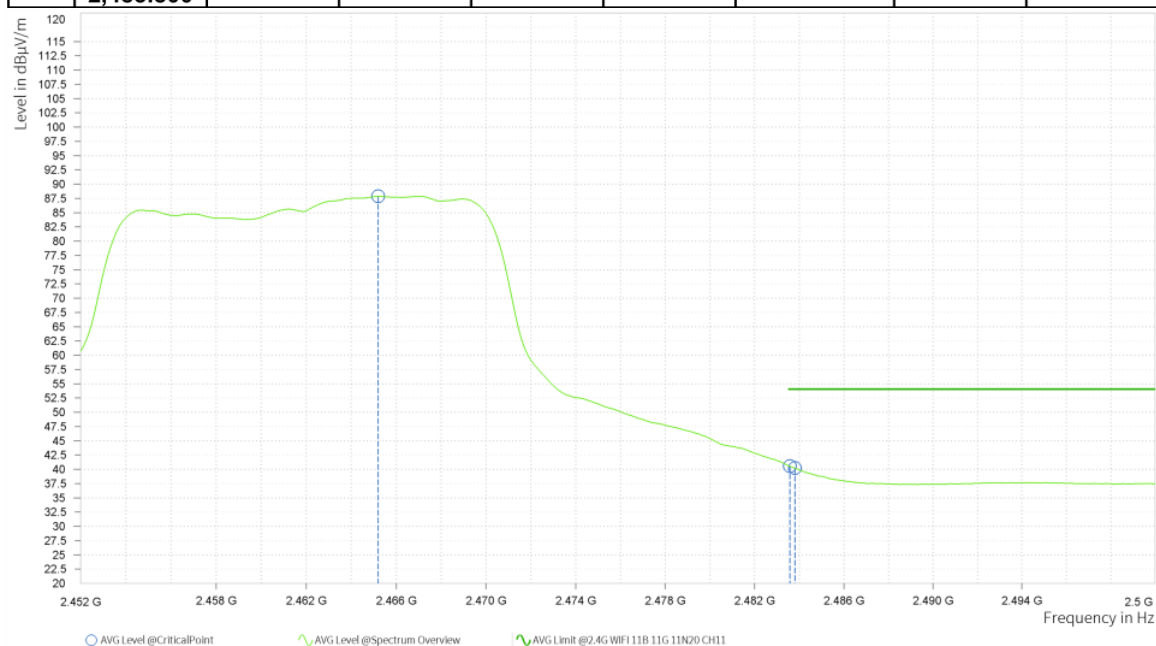


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	2,465.200	87.86			8.9	H	355.0	2.0
2	2,483.500	40.57	54.0	13.43	9.11	H	107.2	2.0
2	2,483.800	40.21	54.0	13.79	9.12	H	107.2	2.0



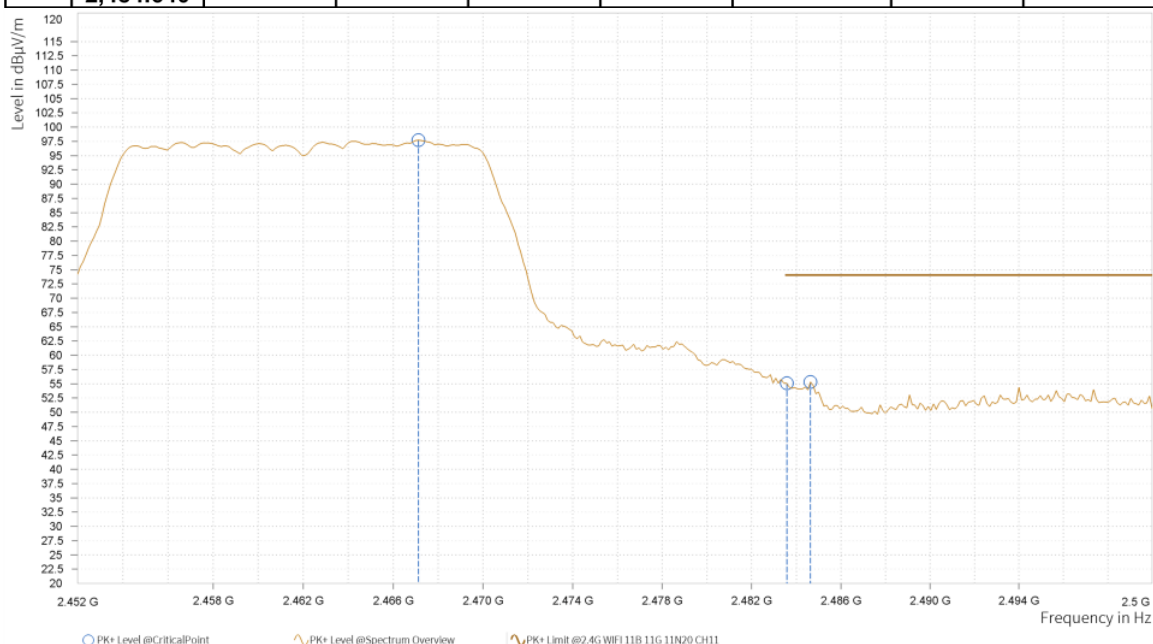


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

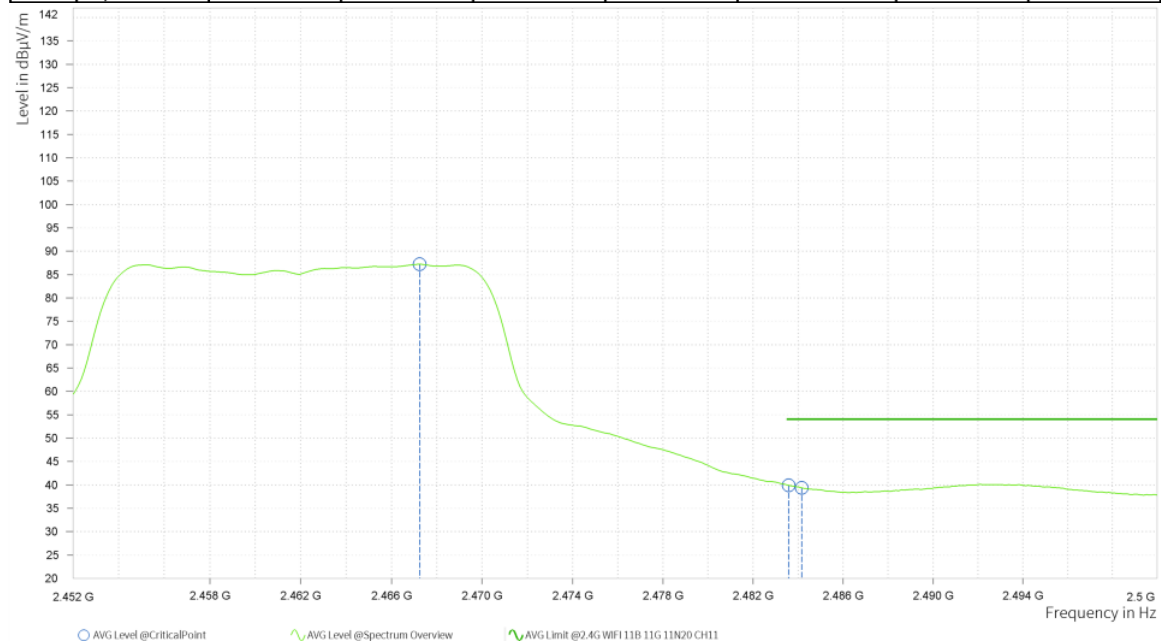
Rg	Frequency [MHz]	PK+ Level [dB μ V/m]	PK+ Limit [dB μ V/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	2,467.120	97.7			8.91	V	359.0	2.0
2	2,483.50	55.09	74.0	18.91	9.11	V	110.7	2.0
2	2,484.640	55.33	74.0	18.67	9.13	V	110.7	2.0





ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	2,467.240	87.23			8.92	V	359.0	2.0
2	2,483.50	39.92	54.0	14.08	9.11	V	109.5	2.0
2	2,484.160	39.37	54.0	14.63	9.12	V	109.5	2.0



REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor Margin value = Limit value- Emission level.
2. 2462MHz: Fundamental frequency.



BUREAU
VERITAS

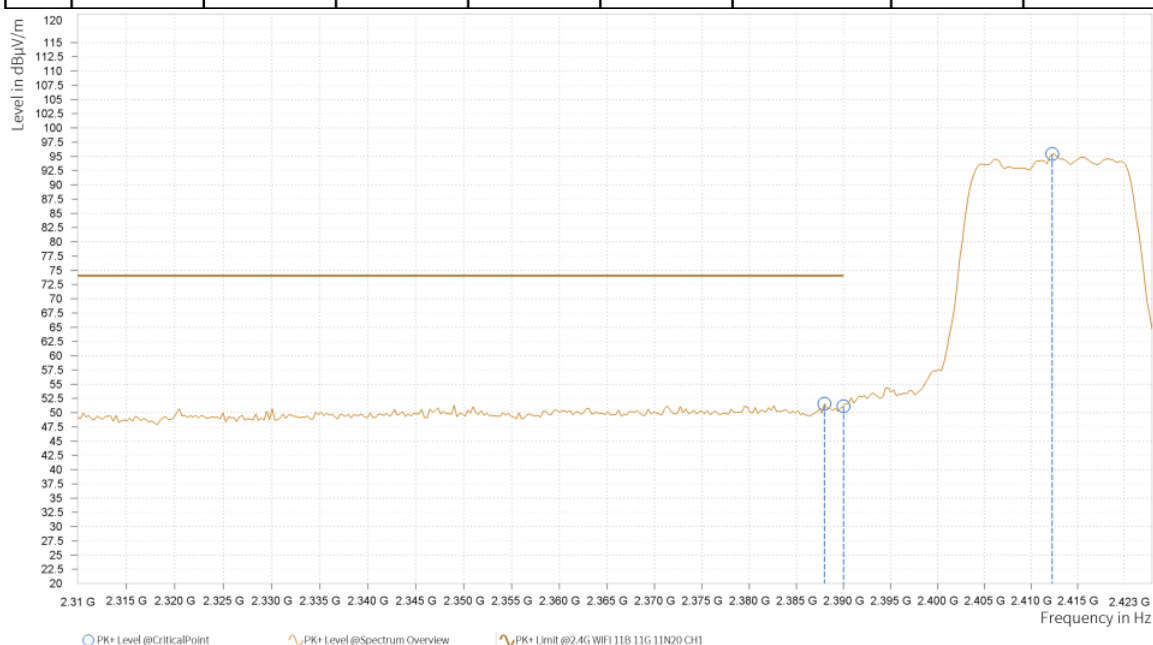
Test Report No.: PSU-QBJ2408220111RF05

802.11n (20MHz)

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	2,387.970	51.57	74.0	22.43	9.35	H	359.0	2.0
1	2,390.000	51.1	74.0	22.9	9.34	H	105.9	2.0
1	2,412.270	95.44			9.23	H	1.0	2.0



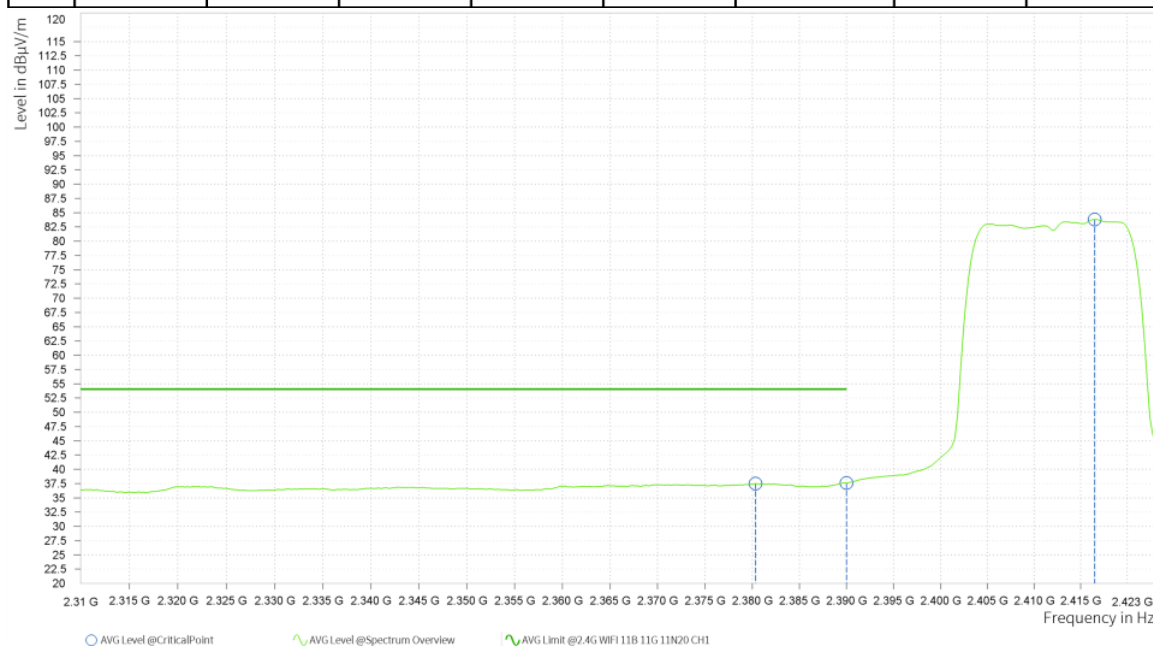


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	2,380.343	37.5	54.0	16.5	9.39	H	359	2.0
1	2,390.000	37.6	54.0	16.4	9.34	H	359	2.0
1	2,416.503	83.82			9.21	H	1	2.0



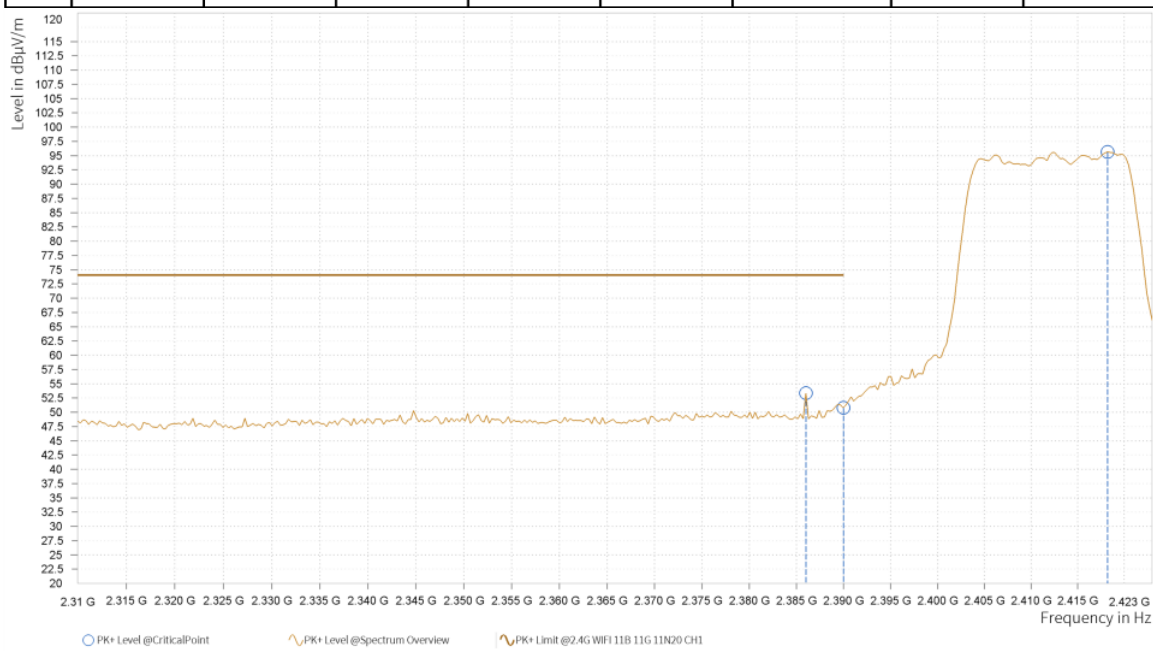


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	2,385.993	53.33	74.0	20.67	9.36	V	236.3	1.0
1	2,390.000	50.77	74.0	23.23	9.34	V	1.0	2.0
1	2,418.198	95.64			9.2	V	287.6	1.0



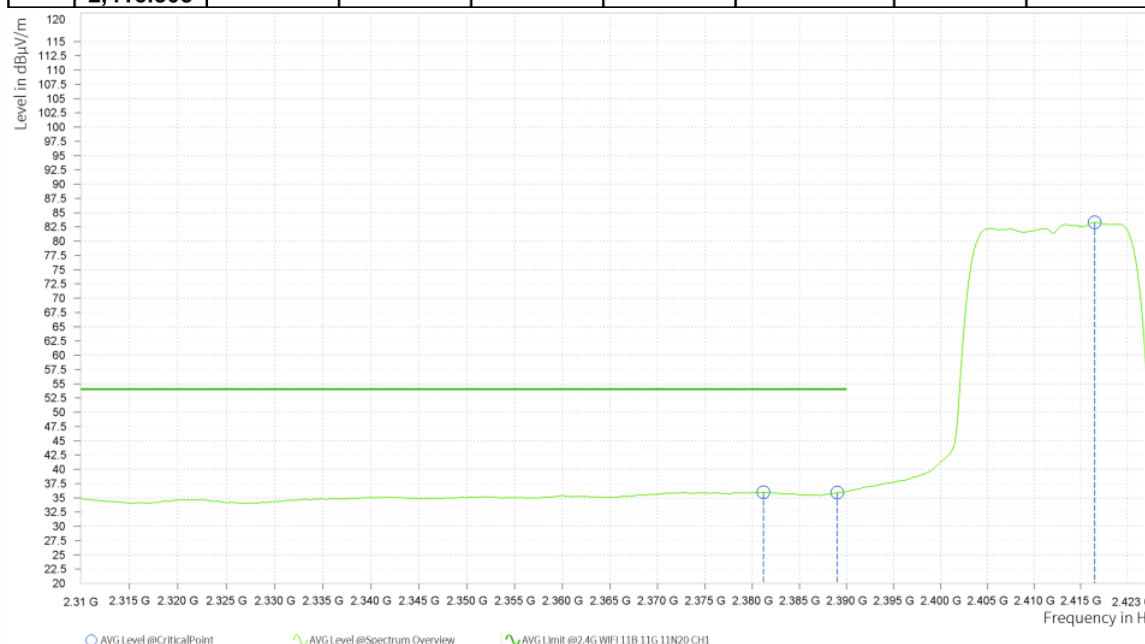


**BUREAU
VERITAS**

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
1	2,381.190	35.96	54.0	18.04	9.39	V	154.9	2.0
1	2,300.000	35.94	54.0	18.06	9.35	V	154.9	2.0
1	2,416.503	83.32			9.21	V	354.9	2.0



REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor Margin value = Limit value- Emission level.
- 2412MHz: Fundamental frequency.



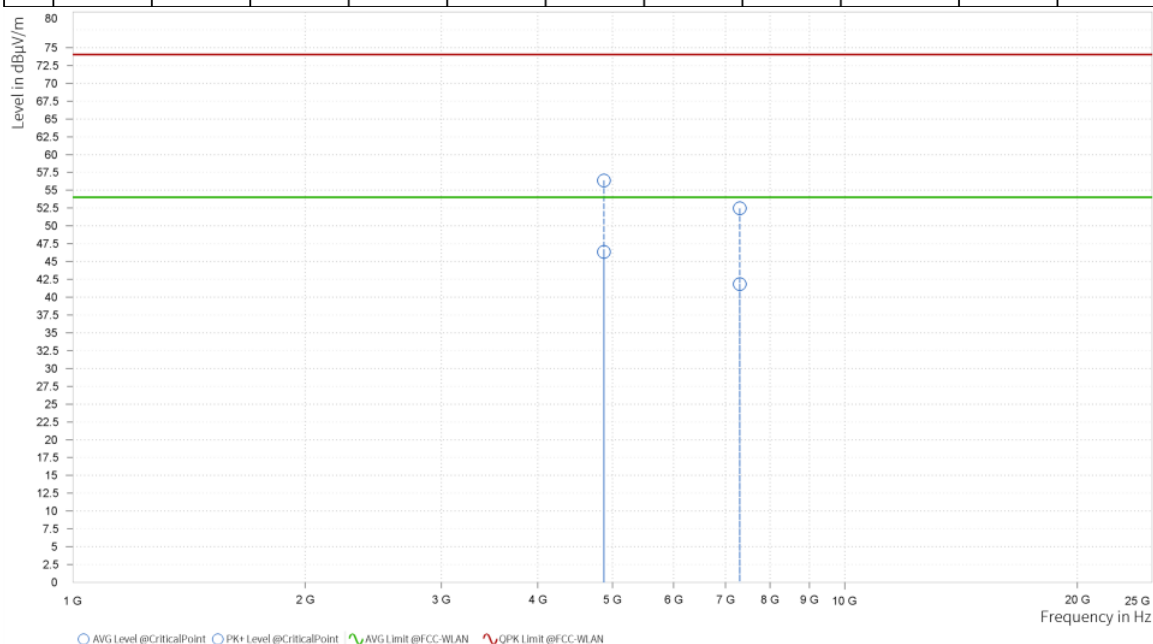
BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+: QPK Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
3	4,874.000	56.37	74.0	17.63	46.36	54.0	7.64	13.74	H	120.2	2.0
3	7,311.000	52.46	74.0	21.54	41.85	54.0	12.15	17.81	H	120.2	2.0



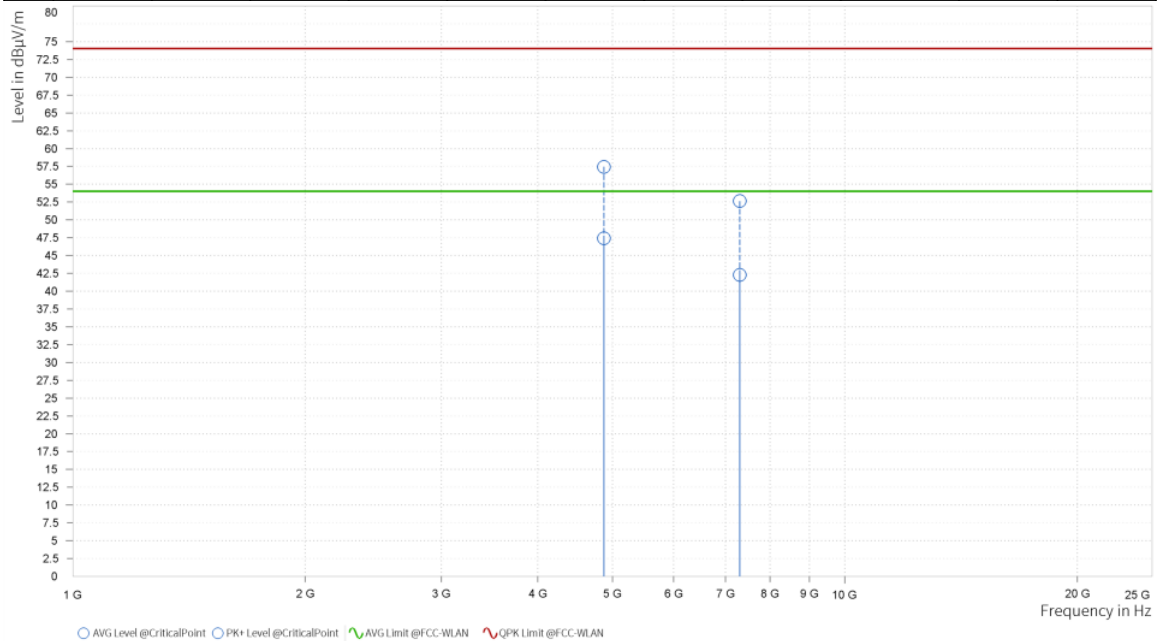


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+: QPK Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
3	4,874.000	57.43	74.0	16.57	47.44	54.0	6.56	13.74	V	0.9	2.0
3	7,311.000	52.63	74.0	21.37	42.3	54.0	11.7	17.81	V	359.0	2.0



REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor Margin value = Limit value- Emission level.
- 2437MHz: Fundamental frequency.



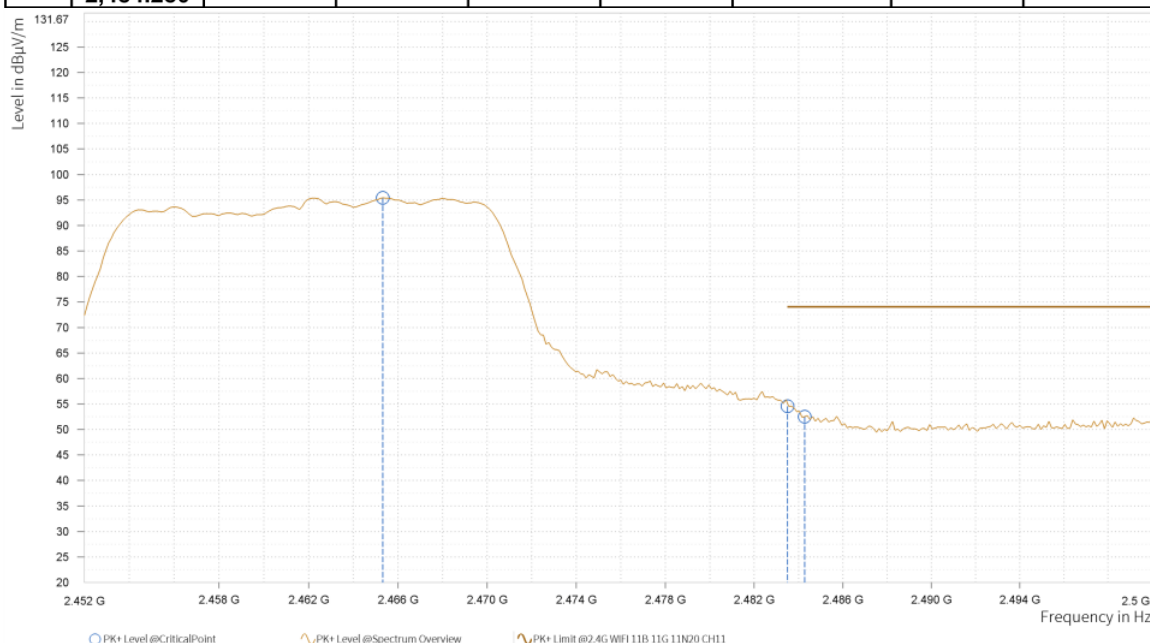
BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	2,465.320	95.44			8.9	H	54.6	2.0
2	2,483.50	54.56	74.0	19.44	9.11	H	54.6	2.0
2	2,484.280	52.51	74.0	21.49	9.12	H	54.6	2.0



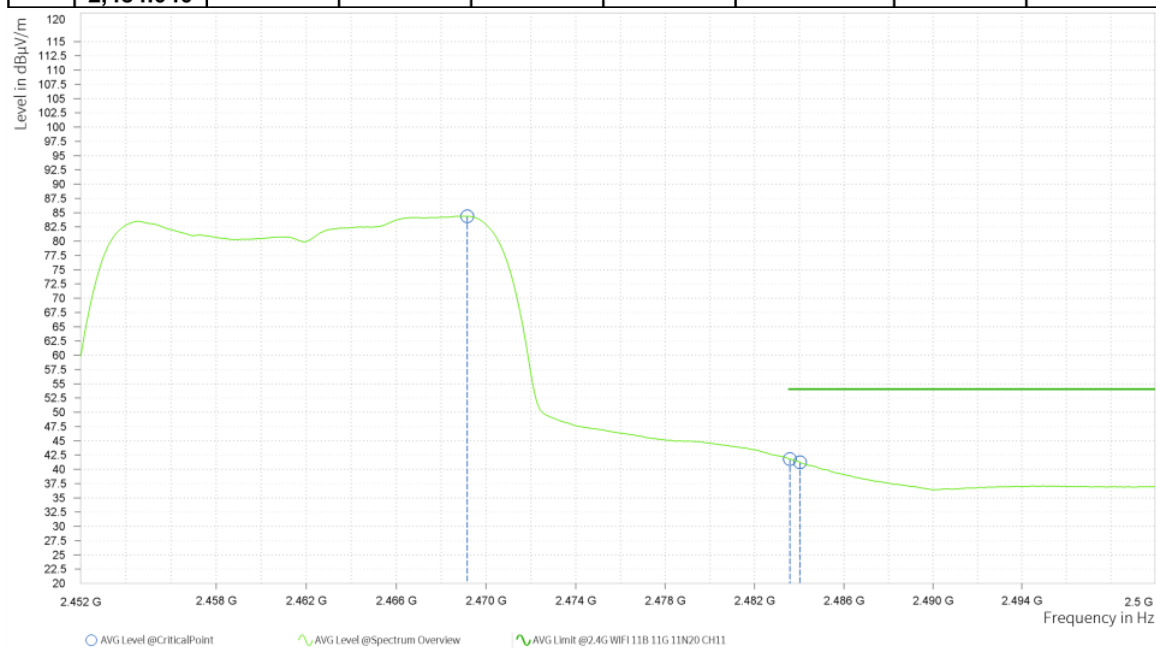


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	2,469.160	84.37			8.94	H	22.3	1.0
2	2,483.50	41.8	54.0	12.2	9.11	H	22.3	1.0
2	2,484.040	41.21	54.0	12.79	9.12	H	22.3	1.0



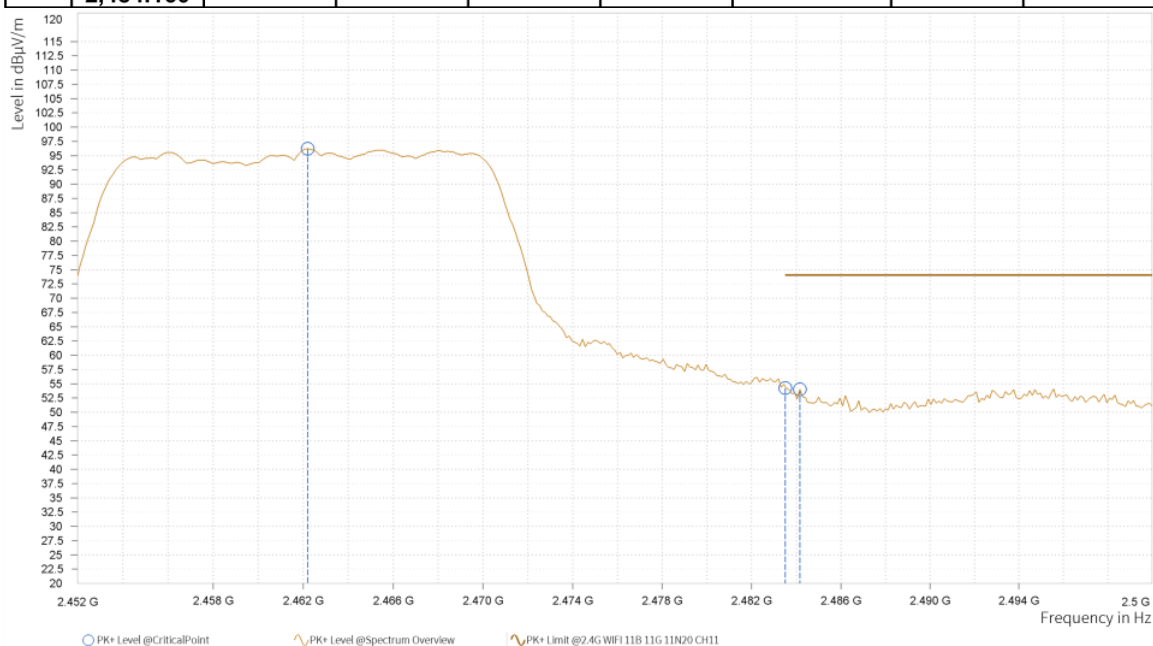


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	2,462.200	96.19			8.92	V	359.0	2.0
2	2,483.50	54.22	74.0	19.78	9.11	V	109.5	2.0
2	2,484.160	54.04	74.0	19.96	9.12	V	109.5	2.0



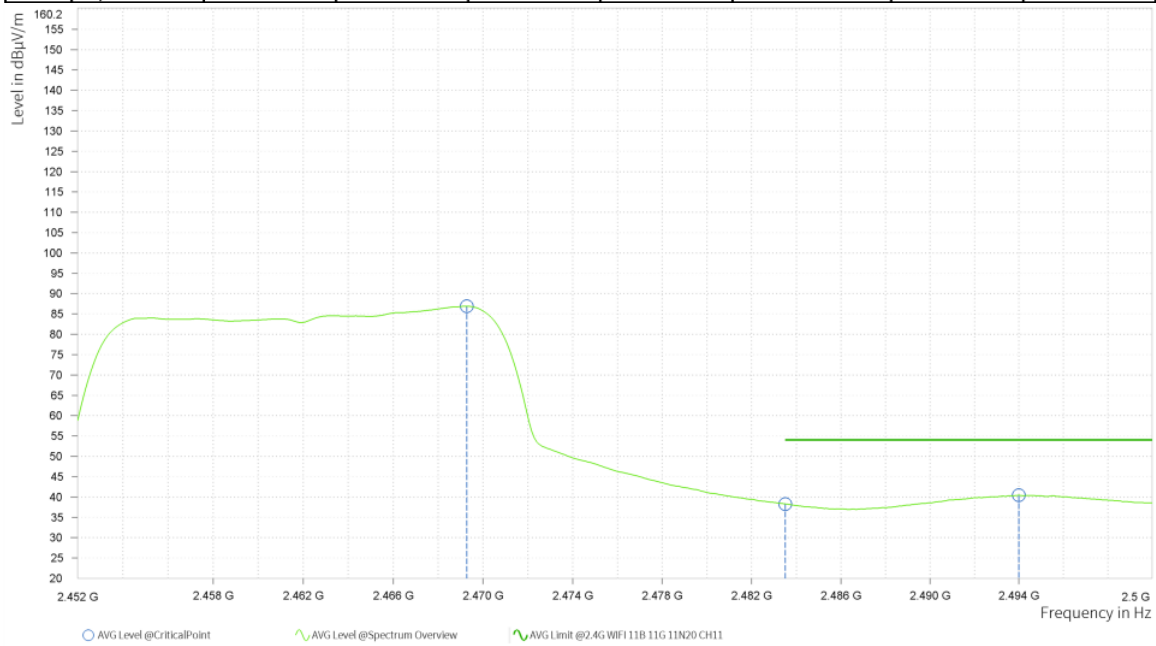


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
2	2,469.280	86.92			8.94	V	56.9	2.0
2	2,483.50	38.26	54.0	15.74	9.11	V	108.4	2.0
2	2,494.000	40.44	54.0	13.56	9.24	V	108.4	2.0



REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor Margin value = Limit value- Emission level.
- 2462MHz: Fundamental frequency.



BUREAU
VERITAS

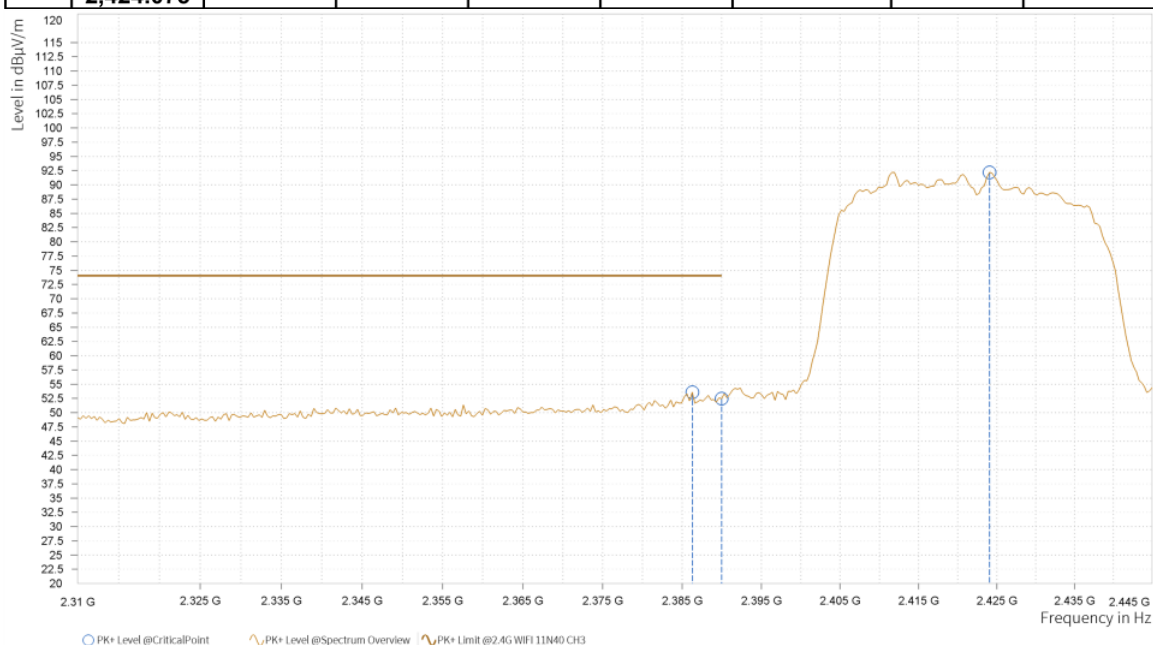
Test Report No.: PSU-QBJ2408220111RF05

802.11n (40MHz)

CHANNEL	TX Channel 3	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
3	2,386.275	53.58	74.0	20.42	9.36	H	359.0	2.0
3	2,3	52.44	74.0	21.56	9.34	H	359.0	2.0
3	90.000 2,424.075	92.2			9.17	H	5.8	1.0





BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
3	2,380.538	38.36	54.0	15.64	9.39	H	194.2	1.0
3	2,390.000	38.38	54.0	15.62	9.34	H	359.0	2.0
3	2,419.688	80.81			9.19	H	292.3	1.0



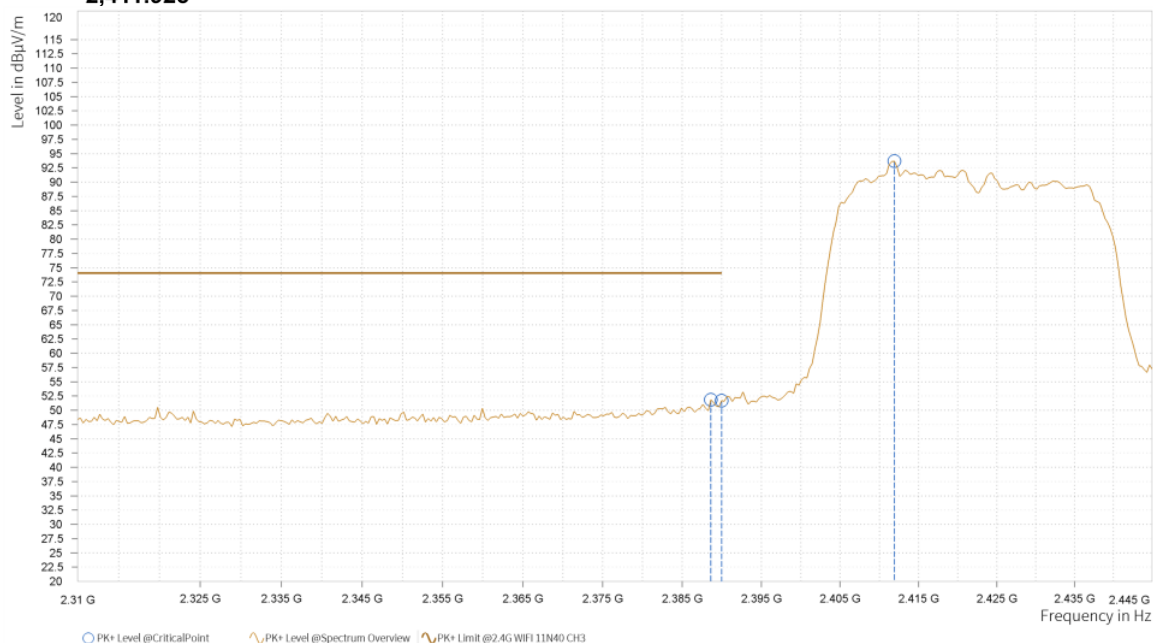


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
3	2,388.638	51.85	74.0	22.15	9.35	V	359.0	2.0
3	2,390.000	51.69	74.0	22.31	9.34	V	354.9	2.0
3	2,411.925	93.67			9.23	V	300.8	1.0



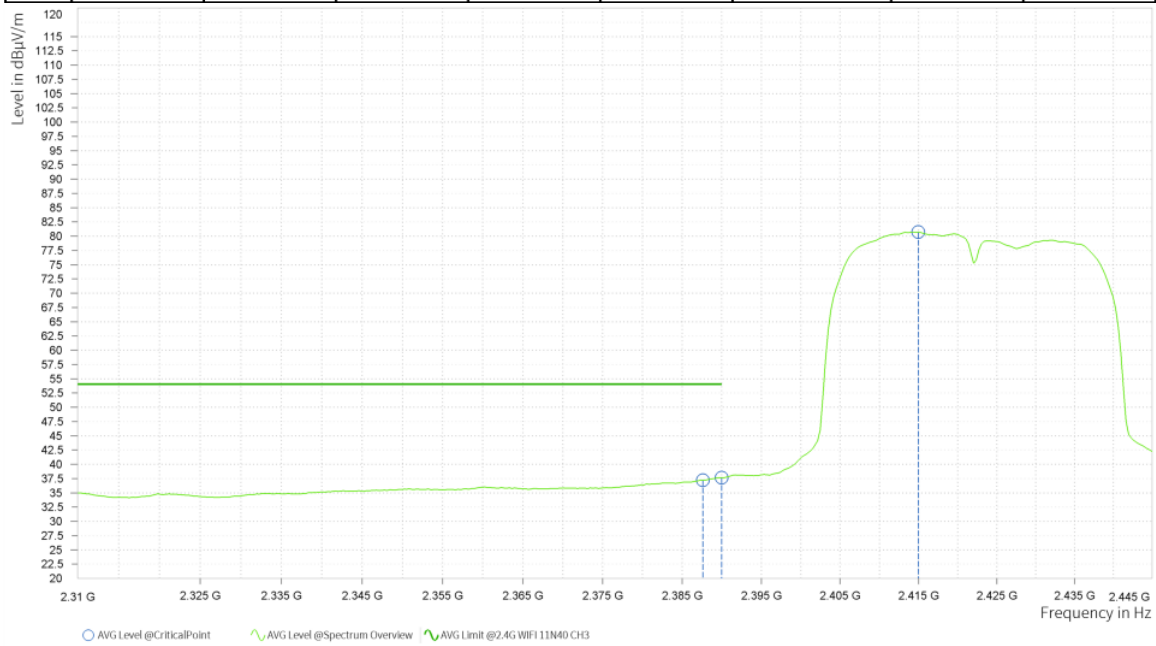


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
3	2,387.625	37.21	54.0	16.79	9.36	V	104.8	2.0
3	2,390.000	37.68	54.0	16.32	9.34	V	1.0	2.0
3	2,414.963	80.7			9.21	V	354.3	2.0



REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor Margin value = Limit value- Emission level.
- 2412MHz: Fundamental frequency.



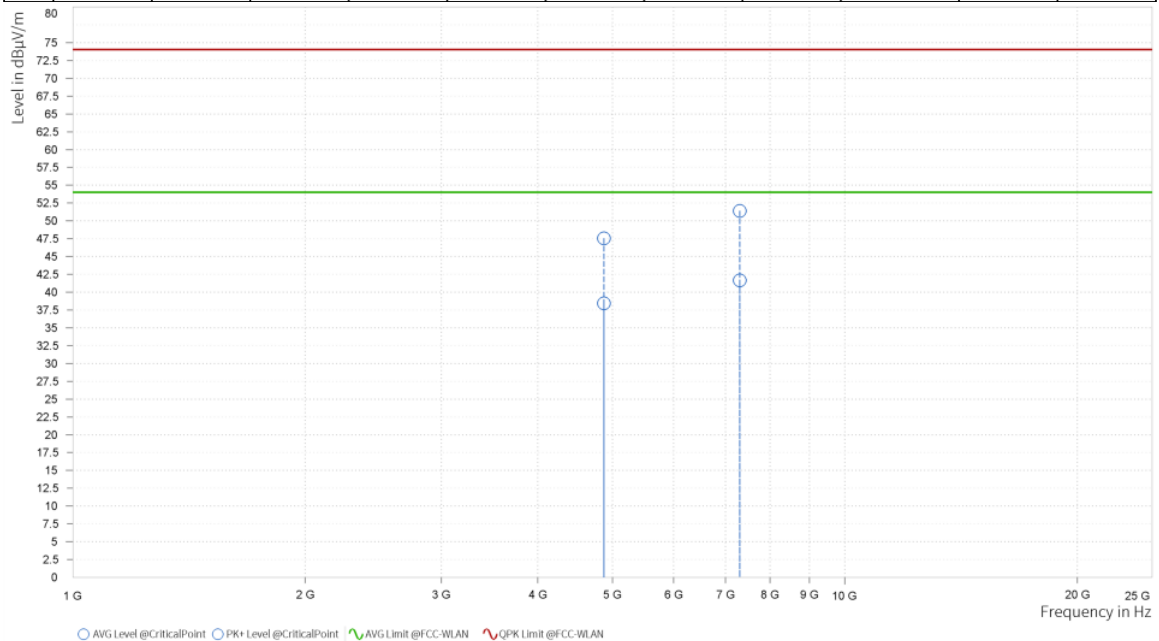
BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+: QPK Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
3	4,874.000	47.57	74.0	26.43	38.45	54.0	15.55	13.74	H	231.4	1.0
3	7,311.000	51.41	74.0	22.59	41.63	54.0	12.37	17.81	H	359.0	2.0



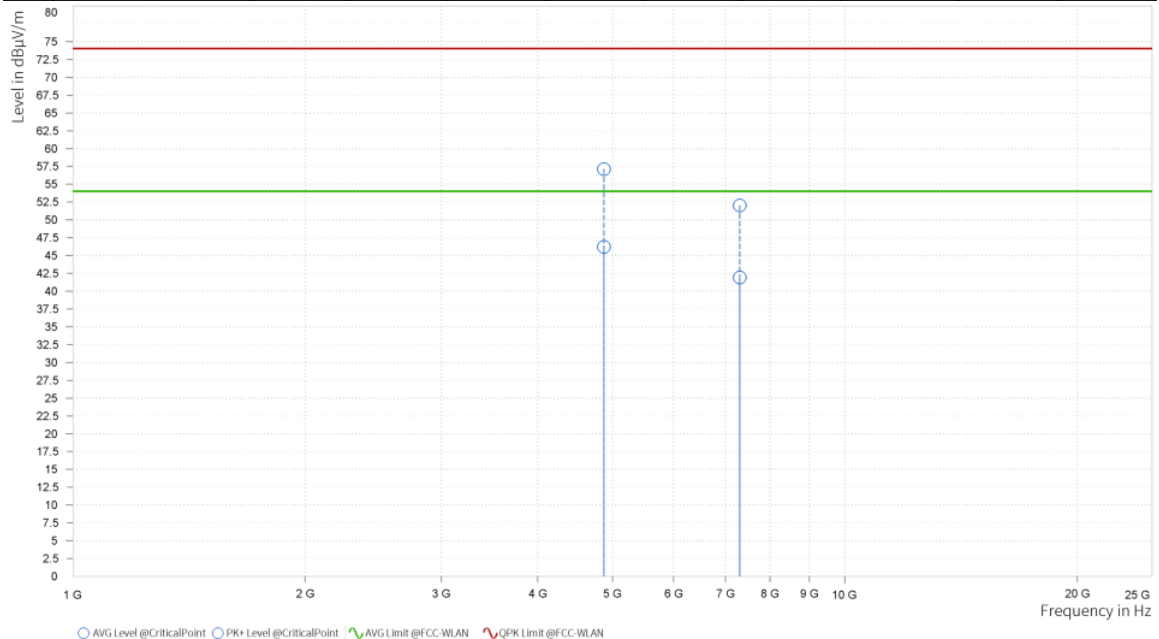


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+: QPK Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
3	4,874.000	57.13	74.0	16.87	46.21	54.0	7.79	13.74	V	0.9	2.0
3	7,311.000	52.03	74.0	21.97	41.9	54.0	12.1	17.81	V	359.1	1.0



REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor Margin value = Limit value- Emission level.
- 2437MHz: Fundamental frequency.



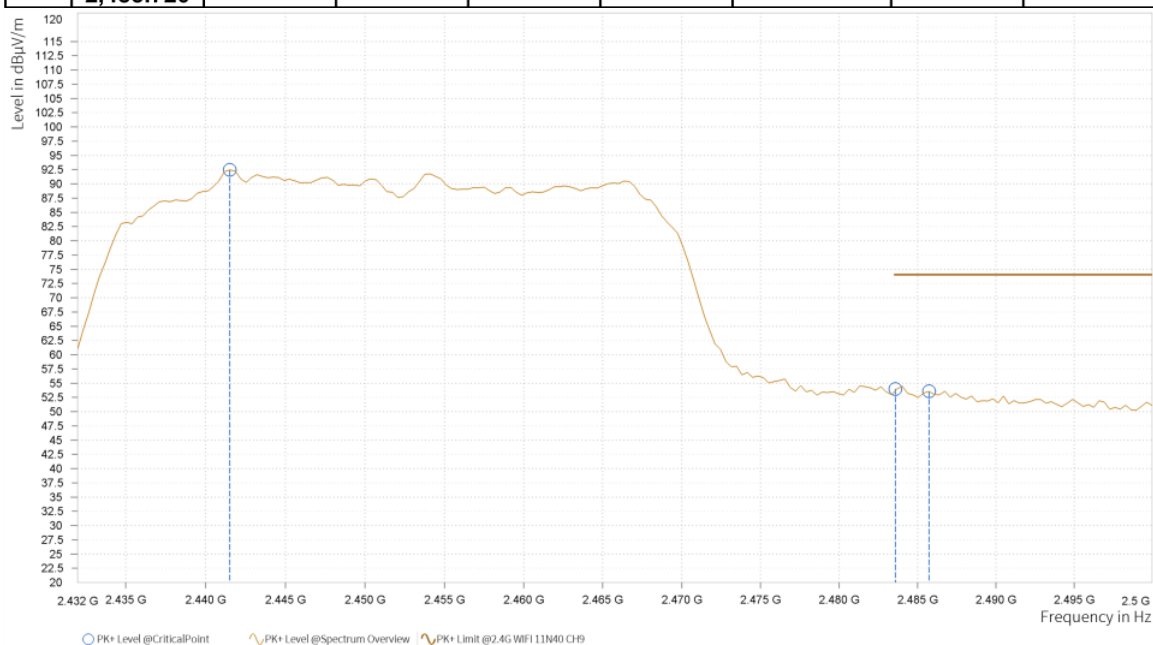
BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	2,441.520	92.45			9.08	H	354.2	2.0
4	2,483.500	53.97	74.0	20.03	9.12	H	347.9	1.0
4	2,485.720	53.55	74.0	20.45	9.14	H	359.1	1.0



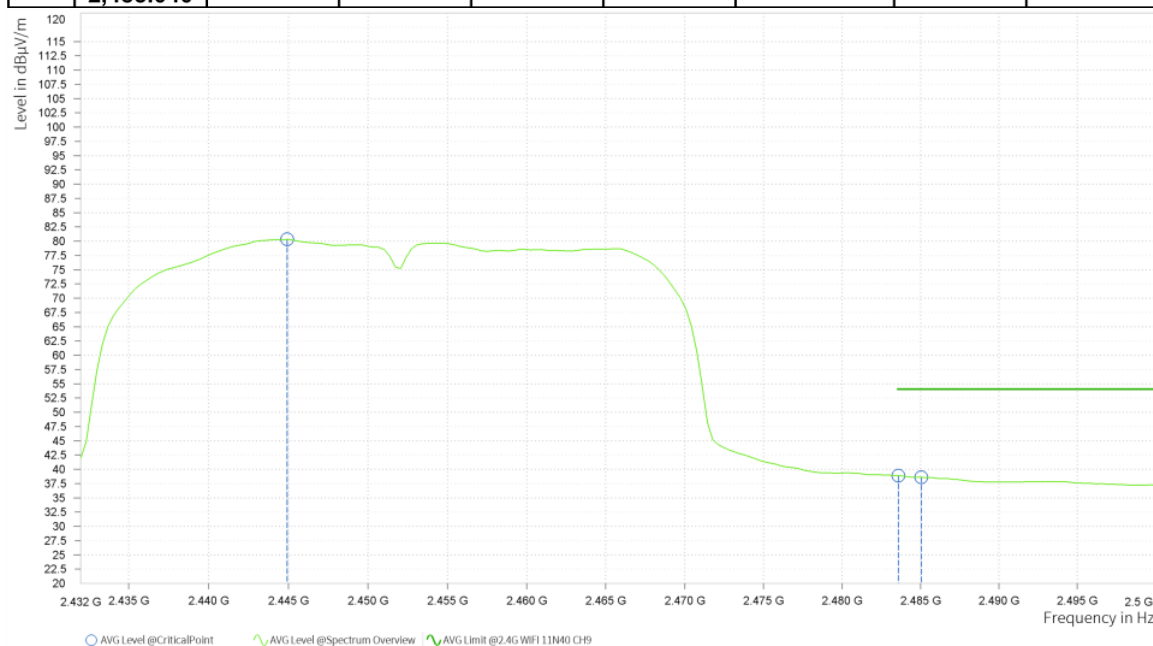


**BUREAU
VERITAS**

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	2,444.920	80.31			9.06	H	354.2	2.0
4	2,483.50	38.87	54.0	15.13	9.12	H	358.6	1.0
4	2,485.040	38.61	54.0	15.39	9.13	H	359.1	1.0



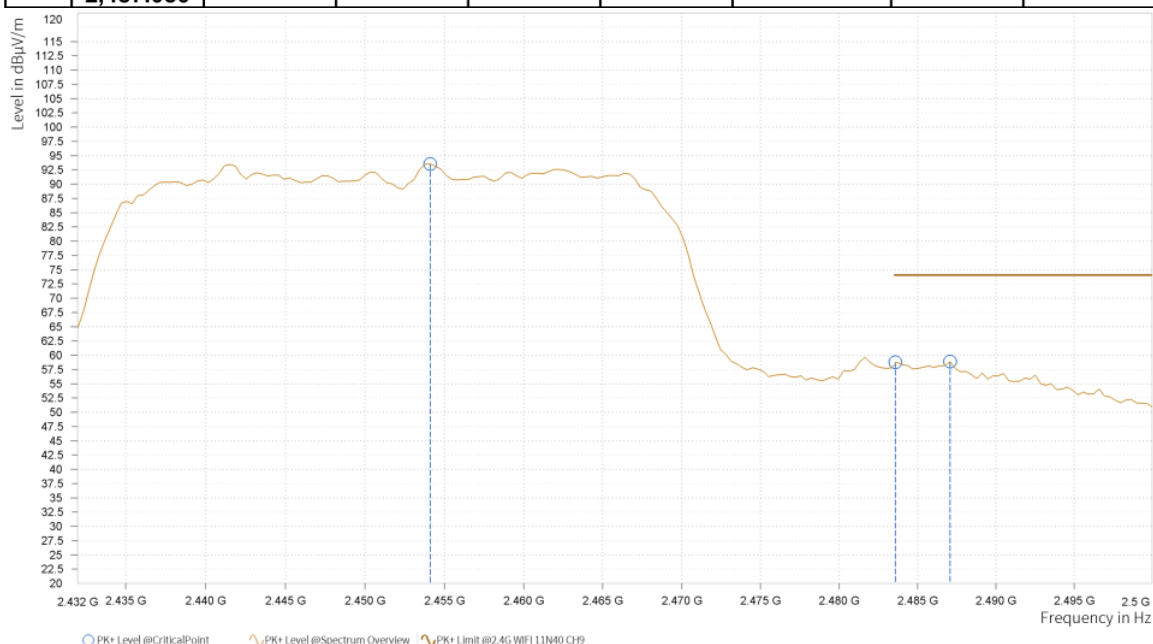


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	2,454.100	93.53			9.0	V	359.0	2.0
4	2,483.50	58.79	74.0	15.21	9.12	V	108.4	2.0
4	2,487.080	58.86	74.0	15.14	9.16	V	108.4	2.0



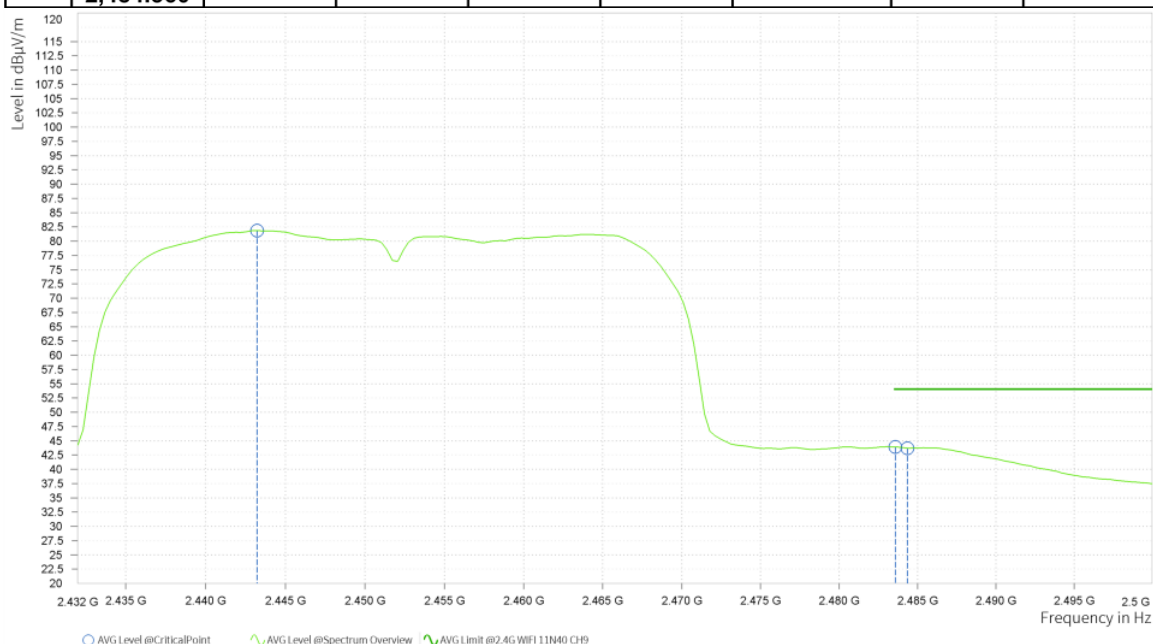


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
4	2,443.220	81.85			9.07	V	355.6	2.0
4	2,483.50	43.9	54.0	10.1	9.12	V	106.0	2.0
4	2,484.360	43.7	54.0	10.3	9.12	V	106.0	2.0



REMARKS:

- Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor Margin value = Limit value- Emission level.
- 2452MHz: Fundamental frequency.



**BUREAU
VERITAS**

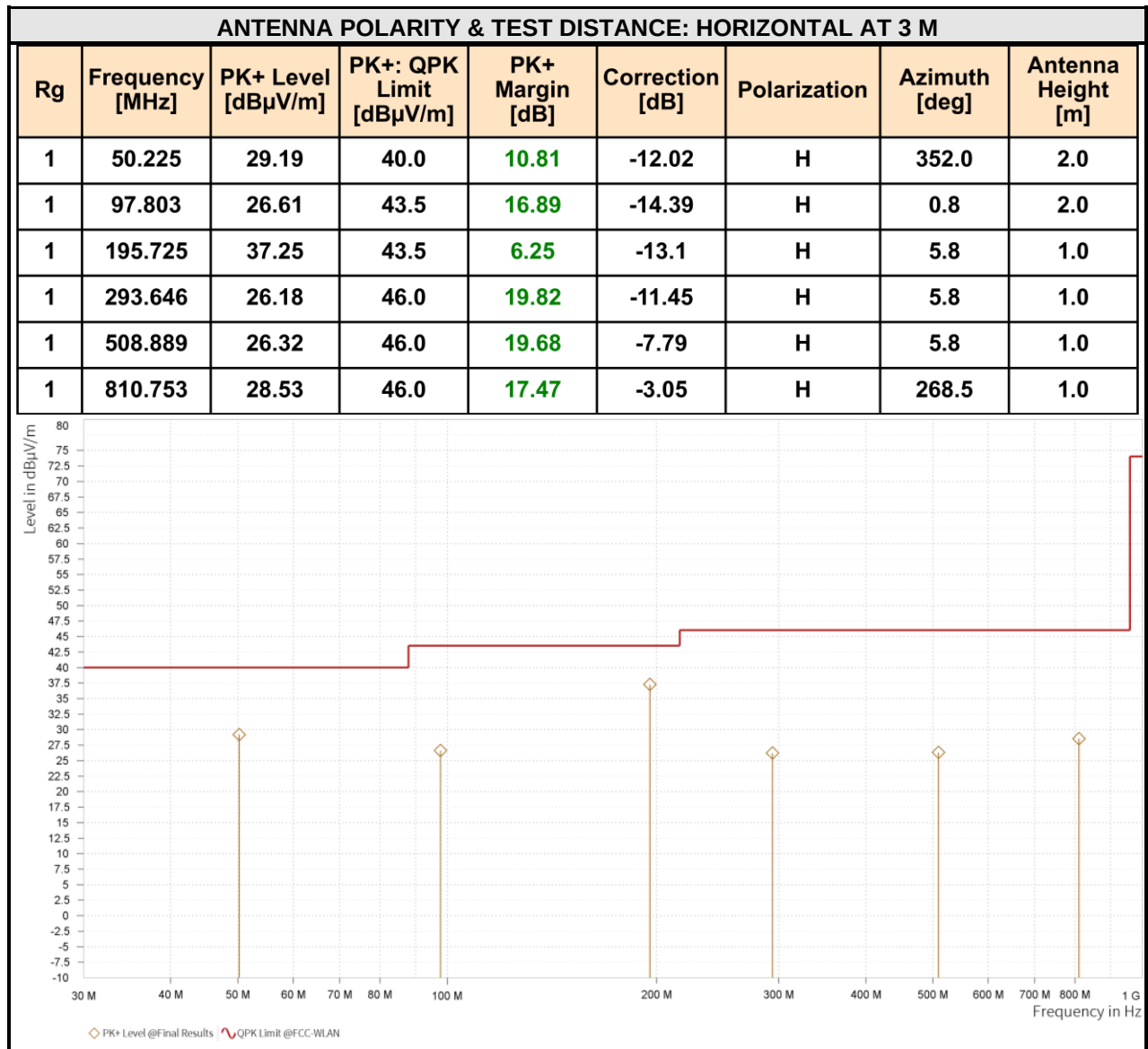
Test Report No.: PSU-QBJ2408220111RF05

BELOW 1GHz WORST-CASE DATA:

30 MHz – 1GHz data:

BT-LE_1M

CHANNEL	TX Channel 19	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		



REMARKS:

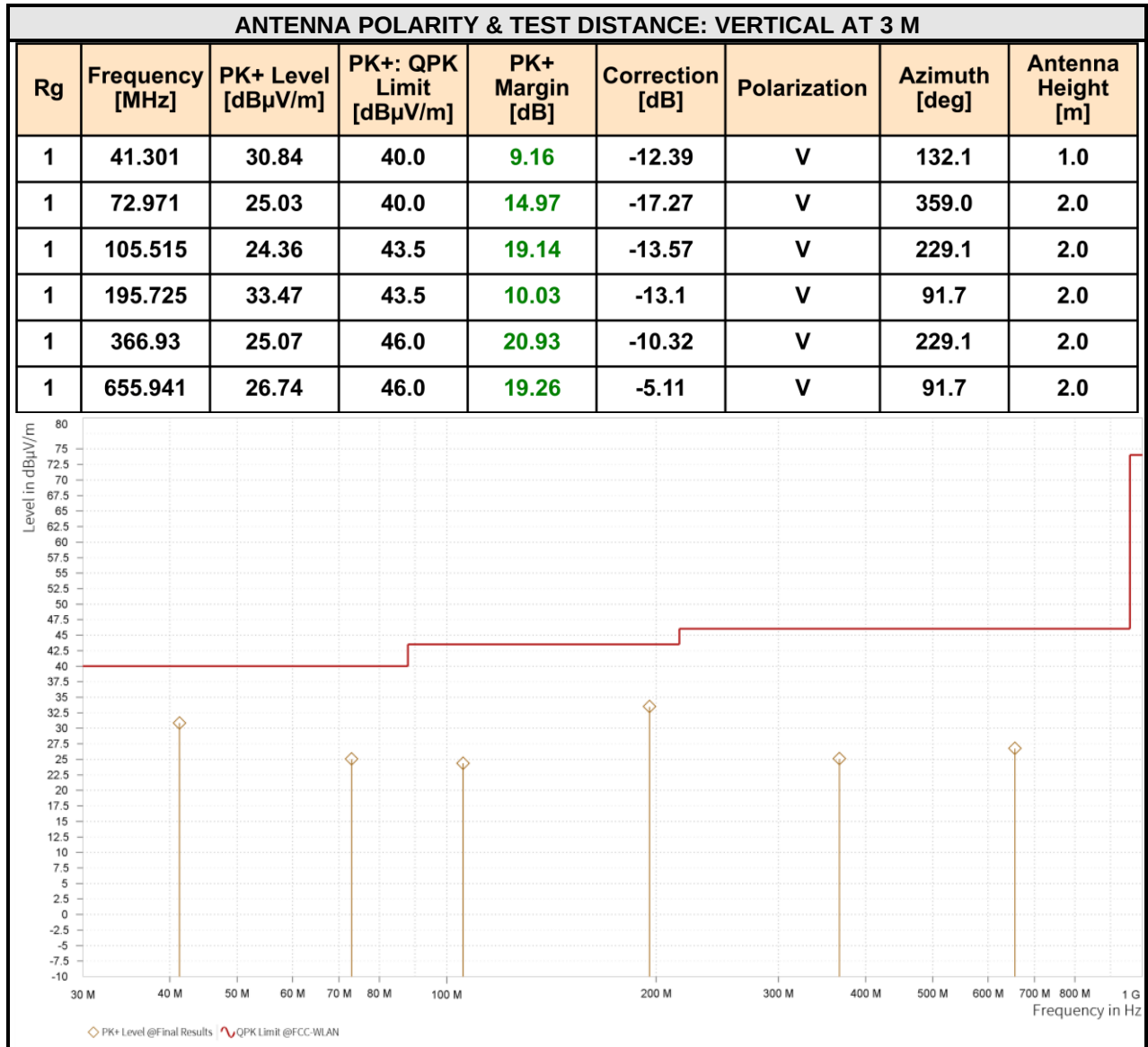
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



**BUREAU
VERITAS**

Test Report No.: PSU-QBJ2408220111RF05

CHANNEL	TX Channel 19	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		



REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value



**BUREAU
VERITAS**

Test Report No.: PSU-QBJ2408220111RF05

ABOVE 1GHz TEST DATA

Note: 1. For radiated emissions testing , the full testing range of different modes have been scanned , only the worst case harmonic data is reported in the sheet.

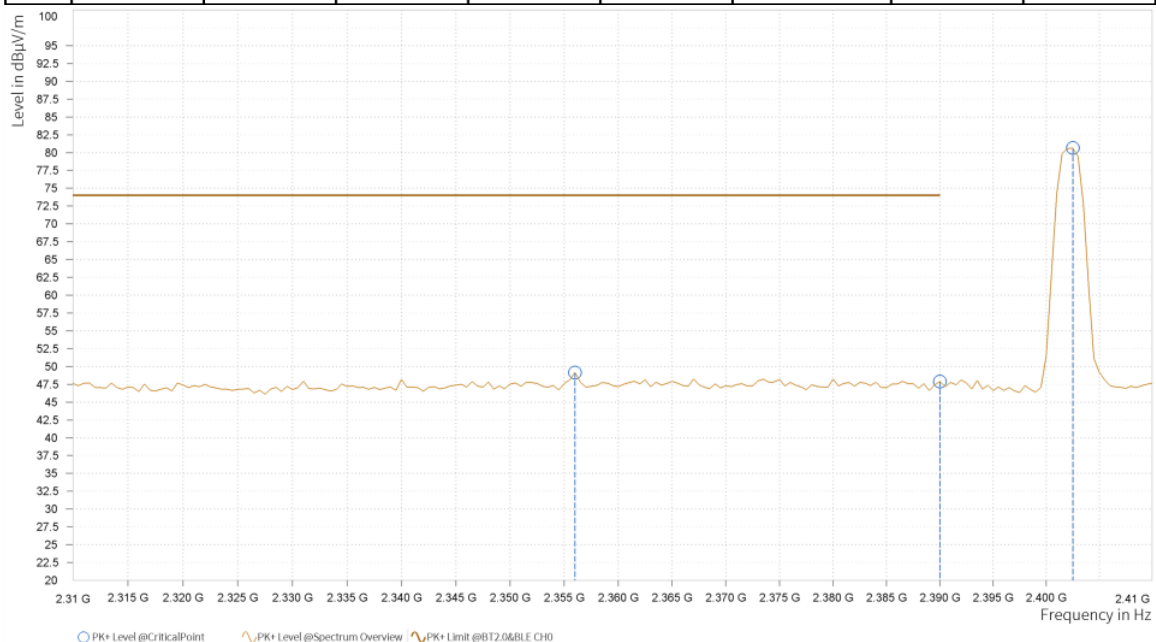
2. All other emissions were greater than 20dB below the limit was not recorded

BT-LE _1M

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	2,356.000	49.16	74.0	24.84	9.3	H	355.5	2.0
5	2,390.000	47.9	74.0	26.1	9.34	H	357.8	1.0
5	2,402.500	80.64			9.28	H	4.4	1.0



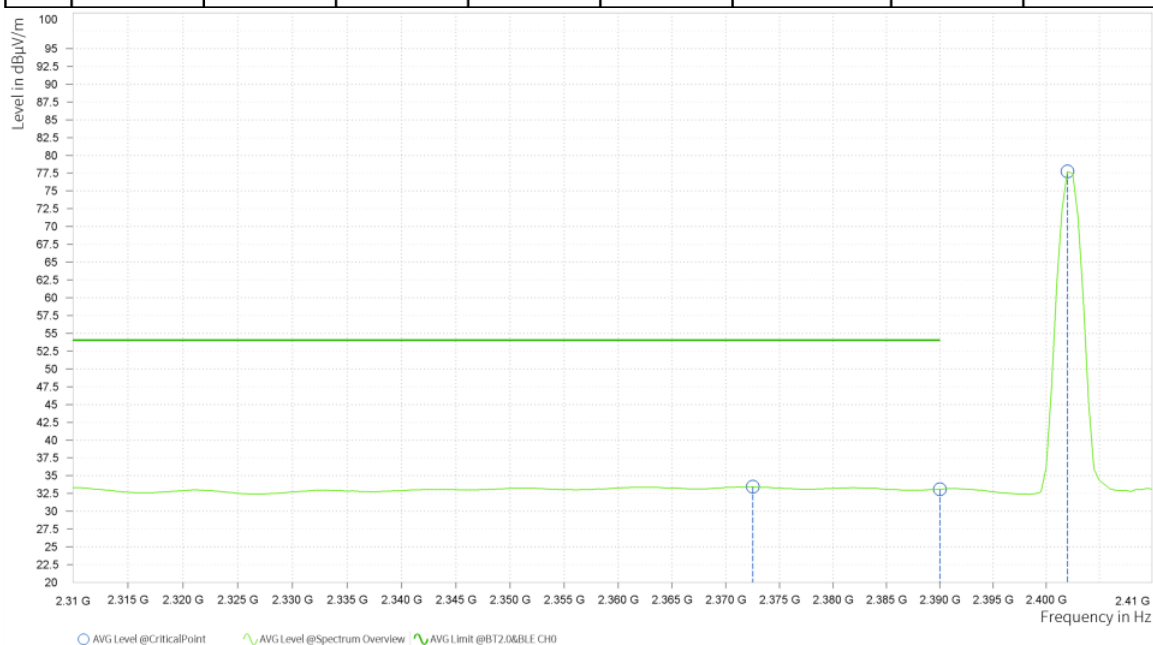


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	2,372.500	33.43	54.0	20.57	9.43	H	1	1.0
5	2,390.000	33.08	54.0	20.92	9.34	H	45	1.0
5	2,402.000	77.74			9.28	H	106	2.0



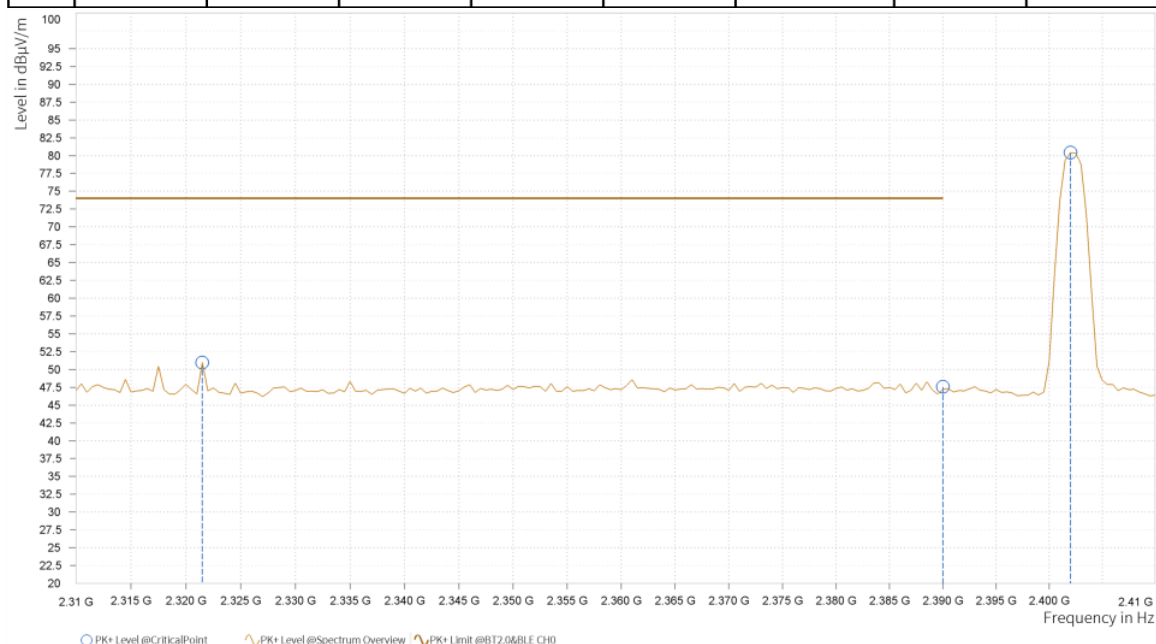


BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+ Limit [dBμV/m]	PK+ Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	2,321.500	50.98	74.0	23.02	9.08	V	1.0	1.0
5	2,390.000	47.56	74.0	26.44	9.34	V	1.0	2.0
5	2,402.000	80.41			9.28	V	94.1	1.0



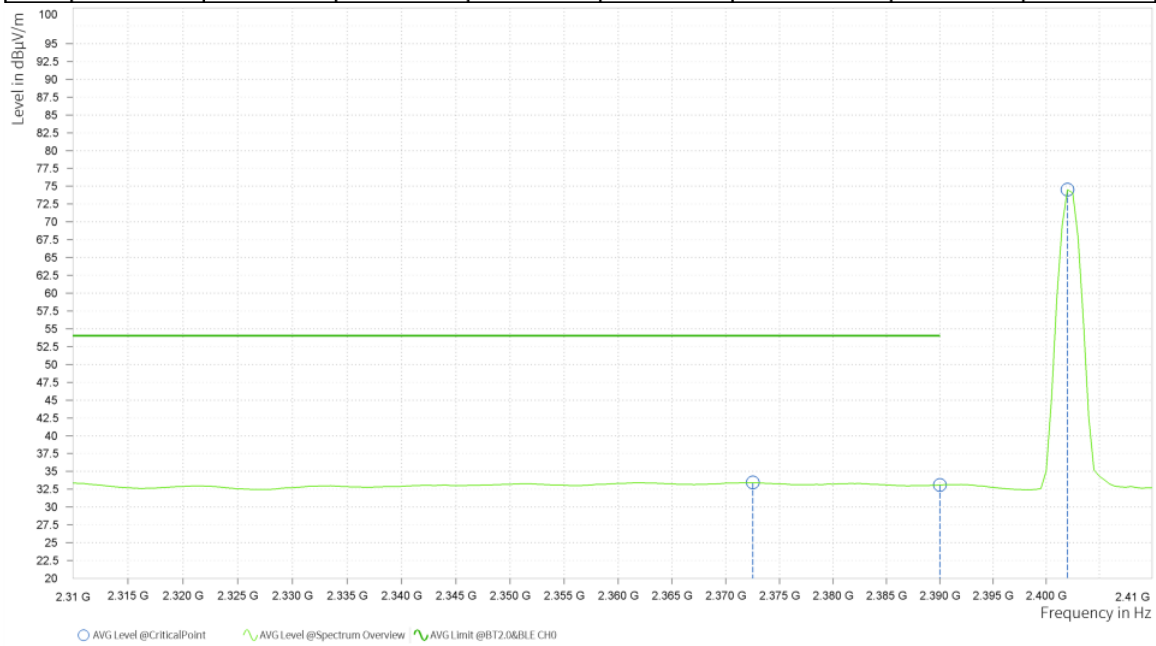


**BUREAU
VERITAS**

Test Report No.: PSU-QBJ2408220111RF05

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Rg	Frequency [MHz]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
5	2,372.500	33.43	54.0	20.57	9.43	V	117.9	2.0
5	2,390.000	33.09	54.0	20.91	9.34	V	67.7	2.0
5	2,402.000	74.51			9.28	V	67.7	2.0



REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
Margin value = Limit value–Emission level.
2. 2402MHz: Fundamental frequency.



BUREAU
VERITAS

Test Report No.: PSU-QBJ2408220111RF05

CHANNEL	TX Channel 19	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Rg	Frequency [MHz]	PK+ Level [dBμV/m]	PK+: QPK Limit [dBμV/m]	PK+ Margin [dB]	AVG Level [dBμV/m]	AVG Limit [dBμV/m]	AVG Margin [dB]	Correction [dB]	Polarization	Azimuth [deg]	Antenna Height [m]
3	4,880.000	49.3	74.0	24.7	38.63	54.0	15.37	13.72	H	127.4	2.0
3	7,320.000	51.28	74.0	22.72	41.72	54.0	12.28	17.86	H	127.4	2.0

