

## TEST REPORT



Applicant	SHIFT INNOVATION LIMITED
Address	Flat 1.4/F. Kai Fuk Ind.ctr..1Wang Tung Street Kowloon Bay. Kowloon. HK.

Manufacturer or Supplier	SHIFT INNOVATION LIMITED
Address	Flat 1.4/F. Kai Fuk Ind.ctr..1Wang Tung Street Kowloon Bay. Kowloon. HK.
Product	Drone Pro Racers
Brand Name	N/A
Model	DPR14001
Additional Model & Model Difference	DPR14015, DPR14029, DPR14043, etc., See items 3.1
Date of tests	Sep. 29, 2016 ~ Oct. 28, 2016

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

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

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

Tested by Breeze Jiang Project Engineer / EMC Department	Approved by Glyn He Supervisor / EMC Department
	 Date: Nov. 11, 2016

This report is 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. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, 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. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification

## TABLE OF CONTENTS

<b>RELEASE CONTROL RECORD .....</b>	<b>4</b>
<b>1 SUMMARY OF TEST RESULTS.....</b>	<b>5</b>
<b>2 MEASUREMENT UNCERTAINTY .....</b>	<b>5</b>
<b>3 GENERAL INFORMATION .....</b>	<b>6</b>
3.1 GENERAL DESCRIPTION OF EUT.....	6
3.2 DESCRIPTION OF TEST MODES.....	8
3.2.1 CONFIGURATION OF SYSTEM UNDER TEST .....	9
3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL.....	9
3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS.....	12
3.4 DESCRIPTION OF SUPPORT UNITS.....	12
<b>4 TEST TYPES AND RESULTS.....</b>	<b>13</b>
4.1 RADIATED EMISSION MEASUREMENT .....	13
4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT .....	13
4.1.2 TEST INSTRUMENTS.....	14
4.1.3 TEST PROCEDURES .....	15
4.1.4 DEVIATION FROM TEST STANDARD .....	15
4.1.5 TEST SETUP.....	16
4.1.6 EUT OPERATING CONDITIONS .....	16
4.1.7 TEST RESULTS .....	17
4.2 6dB BANDWIDTH MEASUREMENT .....	28
4.2.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT .....	28
4.2.2 TEST INSTRUMENTS.....	28
4.2.3 TEST PROCEDURE .....	28
4.2.4 DEVIATION FROM TEST STANDARD .....	29
4.2.5 TEST SETUP.....	29
4.2.6 EUT OPERATING CONDITIONS .....	29
4.2.7 TEST RESULTS .....	30
4.3 CONDUCTED OUTPUT POWER .....	33
4.3.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT .....	33
4.3.2 TEST SETUP.....	33
4.3.3 TEST INSTRUMENTS.....	33
4.3.4 TEST PROCEDURES .....	34
4.3.5 DEVIATION FROM TEST STANDARD .....	34



4.3.6	EUT OPERATING CONDITIONS .....	34
4.3.7	TEST RESULTS .....	35
4.3.7.1	MAXIMUM PEAK OUTPUT POWER .....	35
4.3.7.2	AVERAGE OUTPUT POWER (FOR REFERENCE).....	36
4.4	POWER SPECTRAL DENSITY MEASUREMENT .....	37
4.4.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT .....	37
4.4.2	TEST SETUP .....	37
4.4.3	TEST INSTRUMENTS.....	37
4.4.4	TEST PROCEDURE .....	37
4.4.5	DEVIATION FROM TEST STANDARD .....	37
4.4.6	EUT OPERATING CONDITION .....	38
4.4.7	TEST RESULTS .....	38
4.5	OUT OF BAND EMISSION MEASUREMENT .....	41
4.5.1	LIMITS OF OUT OF BAND EMISSION MEASUREMENT .....	41
4.5.2	TEST SETUP .....	41
4.5.3	TEST INSTRUMENTS.....	41
4.5.4	TEST PROCEDURE .....	41
4.5.5	DEVIATION FROM TEST STANDARD .....	42
4.5.6	EUT OPERATING CONDITION .....	42
4.5.7	TEST RESULTS .....	43
5	PHOTOGRAPHS OF THE TEST CONFIGURATION .....	48
6	APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB .....	49



Test Report No.: RF160928N045-2

## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF160928N045-2	Original release	Nov. 11, 2016



## 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	REMARK
15.207	AC Power Conducted Emission	N/A	Powered by Battery
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted Output power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used

## 2 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	FREQUENCY	UNCERTAINTY
Radiated emissions	9KHz ~ 30MHz	2.90dB
	30MHz ~ 1GMHz	3.83dB
	1GHz ~ 18GHz	4.93dB
	18GHz ~ 40GHz	4.80dB

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



### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	Drone Pro Racers
<b>MODEL NO.</b>	DPR14001
<b>ADDITIONAL MODELS</b>	DPR14015, DPR14029, DPR14043, DPR14057, DPR14071, DPR14085, DPR14002, DPR14016, DPR14030, DPR14044, DPR14058, DPR14072, DPR14086, DPR14003, DPR14017, DPR14031, DPR14045, DPR14059, DPR14073, DPR14087, DPR14004, DPR14018, DPR14032, DPR14046, DPR14060, DPR14074, DPR14088, DPR14005, DPR14019, DPR14033, DPR14047, DPR14061, DPR14075, DPR14089, DPR14006, DPR14020 DPR14034, DPR14048, DPR14062, DPR14076 DPR14090, DPR14007, DPR14021, DPR14035, DPR14049, DPR14063, DPR14077, DPR14091, DPR14008, DPR14022, DPR14036, DPR14050, DPR14064, DPR14078, DPR14092, DPR14009 DPR14023, DPR14037, DPR14051, DPR14065, DPR14079, DPR14093, DPR14010, DPR14024 DPR14038, DPR14052, DPR14066, DPR14080 DPR14094, DPR14011, DPR14025, DPR14039, DPR14053, DPR14067, DPR14081, DPR14095, DPR14012, DPR14026, DPR14040, DPR14054, DPR14068, DPR14082, DPR14096, DPR14013, DPR14027, DPR14041, DPR14055, DPR14069 DPR14083, DPR14097, DPR14014, DPR14028, DPR14042, DPR14056, DPR14070, DPR14084, DPR14098, DRP14099, DRP14100
<b>FCC ID</b>	2AJ4E-DRONERACERSRX
<b>NOMINAL VOLTAGE</b>	DC 3.7V From Plane, Plane: DC 3.7V From Li-ion Battery
<b>MODULATION TYPE</b>	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
<b>MODULATION TECHNOLOGY</b>	DSSS, OFDM
<b>OPERATING FREQUENCY</b>	2412-2462MHz for 11b/g/n(HT20)
<b>PEAK POWER</b>	155.597mW (Maximum peak Power)
<b>ANTENNA TYPE</b>	Wire antenna, 2.0dBi Gain
<b>I/O PORTS</b>	Refer to user's manual
<b>CABLE SUPPLIED</b>	N/A



**Test Report No.: RF160928N045-2**

**NOTE:**

1. The EUT incorporates a SISO function. Physically, the EUT provides one transmitter and one receiver.

MODULATION MODE	FUNCTION
802.11b	1TX/1RX
802.11g	1TX/1RX
802.11n (HT20)	1TX/1RX

2. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
4. Please refer to the EUT photo document (Reference No.: 160928N045-2) for detailed product photo.
5. Additional models (see above table) are identical in circuitry and electrical, mechanical and physical construction with the test model DPR14001 except the appearance and model no. for trading purpose.



### 3.2 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		





## 3.2.1 CONFIGURATION OF SYSTEM UNDER TEST

Please see section 5 photographs of the test configuration for reference.

## 3.2.2 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 X 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	
A	√	√	-	√	Powered by DC 3.7V from fully battery with WIFI Link

Where

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

**RE≥1G:** Radiated Emission above 1GHz

**PLC:** Power Line Conducted Emission

**APCM:** Antenna Port Conducted Measurement

**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, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	AXIS
802.11b	1 to 11	1	OFDM	BPSK	6.0	X

**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, XYZ axis and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	AXIS
802.11b	1 to 11	1, 6, 11	CCK	DBPSK	1.0	X
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	X
802.11n HT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5	X

**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).

☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 11	CCK	DBPSK	1.0
802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
802.11n HT20	1 to 11	1, 11	OFDM	BPSK	6.5

**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).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	CCK	DBPSK	1.0
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
802.11n HT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE	TESTED BY
RE<1G	25deg. C, 60%RH	DC 3.7V from fully battery	Eric Fang
RE≥1G	25deg. C, 60%RH	DC 3.7V from fully battery	Eric Fang
PLC	N/A	N/A	N/A
APCM	20deg. C, 55%RH	DC 3.7V from fully battery	Robert Cheng



### **3.3 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 v03r05**

**ANSI C63.10-2013**

All test items have been performed and recorded as per the above standards.

### **3.4 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	N/A	N/A	N/A	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A



## **4 TEST TYPES AND RESULTS**

### **4.1 RADIATED EMISSION MEASUREMENT**

#### **4.1.1 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).

<b>FREQUENCIES (MHz)</b>	<b>FIELD STRENGTH (microvolts/meter)</b>	<b>MEASUREMENT DISTANCE (meters)</b>
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.



## 4.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101494	Apr. 05,16	Apr. 04,17
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV7	102331	Nov. 09,15	Nov. 08,16
Bilog Antenna	Teseq	CBL 6111D	30643	Jul. 14, 16	Jul. 13, 17
Horn Antenna (1GHz -18GHz)	ETS -Lindgren	3117	00062558	May 18,16	May 17,17
GPS Generator+ Antenna	TOJOIN	GNSS-5000A	E1-010119	Aug. 08, 16	Aug. 07, 17
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	Mar. 12,16	Mar. 11,18
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170242	Mar. 12,16	Mar. 11,17
Amplifier (9kHz-1GHz)	SONOMA	310D	186955	Mar. 04,16	Mar. 03, 17
Pre-Amplifier(1-18G)	HP	8449B	3008A00409	Apr. 25,16	Apr. 24,17
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 20,15	Nov. 19,16
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	Aug. 08,16	Aug. 07,17

**NOTE:**

1. The test was performed in 966 Chamber.
2. The calibration interval of the above test instruments is 12 or 24 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 494399.



#### 4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meters semi-anechoic chamber. 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:**

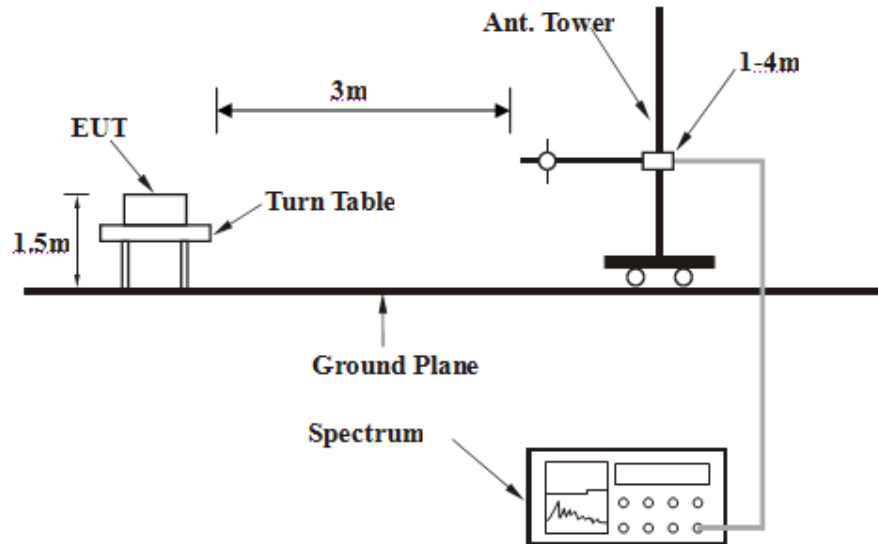
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. The testing of the EUT was performed on all 3 orthogonal axes, the worst-case test configuration was reported on the file test setup photo.

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation.



#### 4.1.5 TEST SETUP



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

#### 4.1.6 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.





## 4.1.7 TEST RESULTS

## BELOW 1GHz WORST-CASE DATA:

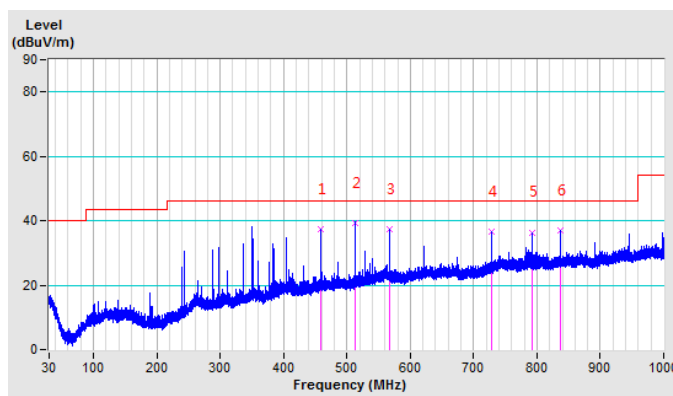
## 802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	458.98	37.45	46.00	-8.55	200	0	45.04	-7.59
2	512.97	39.38	46.00	-6.62	200	0	45.71	-6.33
3	566.99	37.32	46.00	-8.68	200	0	41.55	-4.23
4	729.01	36.51	46.00	-9.49	200	0	37.90	-1.39
5	792.00	36.40	46.00	-9.60	200	0	36.68	-0.28
6	837.01	37.08	46.00	-8.92	200	0	37.23	-0.15

## 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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.





**BUREAU  
VERITAS**

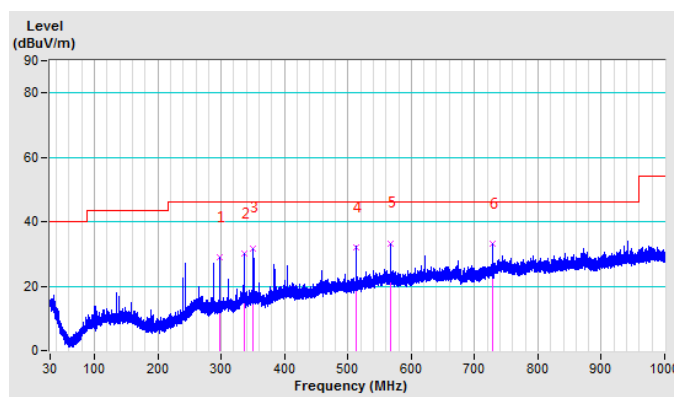
**Test Report No.: RF160928N045-2**

<b>CHANNEL</b>	Channel 1	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	296.96	28.89	46.00	-17.11	100	0	42.24	-13.35
2	335.97	30.10	46.00	-15.90	100	0	42.71	-12.61
3	350.98	31.83	46.00	-14.17	100	0	42.71	-10.88
4	513.03	32.01	46.00	-13.99	100	0	38.34	-6.33
5	566.99	33.33	46.00	-12.67	100	0	37.56	-4.23
6	729.01	33.12	46.00	-12.88	100	0	34.51	-1.39

**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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.





## ABOVE 1GHz DATA

## 802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.92 PK	74.00	-15.08	1.63 H	259	55.05	3.87
2	2390.00	30.43 AV	54.00	-23.57	1.63 H	259	26.56	3.87
3	*2412.00	108.90 PK			1.63 H	259	104.96	3.94
4	*2412.00	66.94 AV			1.63 H	259	63.00	3.94
5	4824.00	43.56 PK	74.00	-30.44	1.49 H	238	35.55	8.01
6	4824.00	35.51 AV	54.00	-18.49	1.49 H	238	27.50	8.01
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	53.97 PK	74.00	-20.03	1.24 V	315	50.10	3.87
2	2390.00	27.78 AV	54.00	-26.22	1.24 V	315	23.91	3.87
3	*2412.00	103.97 PK			1.24 V	315	100.03	3.94
4	*2412.00	64.23 AV			1.24 V	315	60.29	3.94
5	4824.00	45.69 PK	74.00	-28.31	1.95 V	210	37.68	8.01
6	4824.00	38.59 AV	54.00	-15.41	1.95 V	210	30.58	8.01

## 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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	109.94 PK			1.65 H	203	105.93	4.01
2	*2437.00	66.97 AV			1.65 H	203	62.96	4.01
3	4874.00	56.75 PK	74.00	-17.25	1.65 H	203	48.67	8.08
4	4874.00	42.60 AV	54.00	-11.40	1.65 H	203	34.52	8.08
5	7311.00	58.24 PK	74.00	-15.76	1.15 H	249	44.11	14.13
6	7311.00	44.68 AV	54.00	-9.32	1.15 H	249	30.55	14.13
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	103.87 PK			1.64 V	213	99.86	4.01
2	*2437.00	62.92 AV			1.64 V	213	58.91	4.01
3	4874.00	57.63 PK	74.00	-16.37	1.94 V	235	49.55	8.08
4	4874.00	41.54 AV	54.00	-12.46	1.94 V	235	33.46	8.08
5	7311.00	57.35 PK	74.00	-16.65	1.49 V	213	43.22	14.13
6	7311.00	44.67 AV	54.00	-9.33	1.49 V	213	30.54	14.13

**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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	110.97 PK			1.98 H	203	106.88	4.09
2	*2462.00	67.05 AV			1.98 H	203	62.96	4.09
3	2483.50	60.44 PK	74.00	-13.56	1.98 H	203	56.28	4.16
4	2483.50	31.44 AV	54.00	-22.56	1.98 H	203	27.28	4.16
5	4924.00	45.33 PK	74.00	-28.67	1.85 H	253	37.19	8.14
6	4924.00	32.52 AV	54.00	-21.48	1.85 H	253	24.38	8.14
7	7386.00	47.85 PK	74.00	-26.15	1.49 H	231	33.60	14.25
8	7386.00	35.84 AV	54.00	-18.16	1.49 H	231	21.59	14.25
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	104.97 PK			1.85 V	122	100.88	4.09
2	*2462.00	65.18 AV			1.85 V	122	61.09	4.09
3	2483.50	54.70 PK	74.00	-19.30	1.85 V	122	50.54	4.16
4	2483.50	29.02 AV	54.00	-24.98	1.85 V	122	24.86	4.16
5	4924.00	43.05 PK	74.00	-30.95	1.26 V	302	34.91	8.14
6	4924.00	34.30 AV	54.00	-19.70	1.26 V	302	26.16	8.14
7	7386.00	48.42 PK	74.00	-25.58	1.65 V	203	34.17	14.25
8	7386.00	35.20 AV	54.00	-18.80	1.65 V	203	20.95	14.25

**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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.



## 802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	69.36 PK	74.00	-4.64	1.85 H	140	65.49	3.87
2	2390.00	31.32 AV	54.00	-22.68	1.85 H	140	27.45	3.87
3	*2412.00	107.15 PK			1.85 H	140	103.21	3.94
4	*2412.00	58.11 AV			1.85 H	140	54.17	3.94
5	4824.00	41.80 PK	74.00	-32.20	1.66 H	275	33.79	8.01
6	4824.00	30.25 AV	54.00	-23.75	1.66 H	275	22.24	8.01
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.77 PK	74.00	-11.23	2.51 V	231	58.90	3.87
2	2390.00	30.01 AV	54.00	-23.99	2.51 V	231	26.14	3.87
3	*2412.00	102.41 PK			2.51 V	231	98.47	3.94
4	*2412.00	56.77 AV			2.51 V	231	52.83	3.94
5	4824.00	41.64 PK	74.00	-32.36	1.96 V	231	33.63	8.01
6	4824.00	29.22 AV	54.00	-24.78	1.96 V	231	21.21	8.01

## 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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	108.59 PK			1.49 H	253	104.58	4.01
2	*2437.00	65.40 AV			1.49 H	253	61.39	4.01
3	4874.00	41.52 PK	74.00	-32.48	1.95 H	234	33.44	8.08
4	4874.00	29.36 AV	54.00	-24.64	1.95 H	234	21.28	8.08
5	7311.00	47.48 PK	74.00	-26.52	1.49 H	326	33.35	14.13
6	7311.00	34.37 AV	54.00	-19.63	1.49 H	326	20.24	14.13
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	101.27 PK			1.53 V	201	97.26	4.01
2	*2437.00	62.07 AV			1.53 V	201	58.06	4.01
3	4874.00	44.35 PK	74.00	-29.65	1.96 V	237	36.27	8.08
4	4874.00	30.26 AV	54.00	-23.74	1.96 V	237	22.18	8.08
5	7311.00	47.43 PK	74.00	-26.57	1.49 V	221	33.30	14.13
6	7311.00	34.80 AV	54.00	-19.20	1.49 V	221	20.67	14.13

**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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	109.83 PK			2.34 H	114	105.74	4.09
2	*2462.00	49.06 AV			2.34 H	114	44.97	4.09
3	2483.50	67.99 PK	74.00	-6.01	2.34 H	114	63.83	4.16
4	2483.50	32.03 AV	54.00	-21.97	2.34 H	114	27.87	4.16
5	4924.00	43.12 PK	74.00	-30.88	1.75 H	108	34.98	8.14
6	4924.00	28.84 AV	54.00	-25.16	1.75 H	108	20.70	8.14
7	7386.00	45.89 PK	74.00	-28.11	1.16 H	243	31.64	14.25
8	7386.00	34.12 AV	54.00	-19.88	1.16 H	243	19.87	14.25
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	103.10 PK			1.95 V	124	99.01	4.09
2	*2462.00	47.45 AV			1.95 V	124	43.36	4.09
3	2483.50	64.13 PK	74.00	-9.87	1.95 V	0	59.97	4.16
4	2483.50	30.05 AV	54.00	-23.95	1.95 V	0	25.89	4.16
5	4924.00	43.52 PK	74.00	-30.48	1.48 V	285	35.38	8.14
6	4924.00	30.15 AV	54.00	-23.85	1.48 V	285	22.01	8.14
7	7386.00	47.42 PK	74.00	-26.58	1.49 V	263	33.17	14.25
8	7386.00	34.81 AV	54.00	-19.19	1.49 V	263	20.56	14.25

**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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.





## 802.11n (HT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	68.09 PK	74.00	-5.91	1.95 H	234	64.22	3.87
2	2390.00	28.45 AV	54.00	-25.55	1.95 H	234	24.58	3.87
3	*2412.00	108.07 PK			1.95 H	234	104.13	3.94
4	*2412.00	57.86 AV			1.95 H	234	53.92	3.94
5	4824.00	41.09 PK	74.00	-32.91	1.72 H	142	33.08	8.01
6	4824.00	30.11 AV	54.00	-23.89	1.72 H	142	22.10	8.01
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.59 PK	74.00	-11.41	2.29 V	360	58.72	3.87
2	2390.00	28.12 AV	54.00	-25.88	2.29 V	360	24.25	3.87
3	*2412.00	104.25 PK			2.29 V	360	100.31	3.94
4	*2412.00	58.53 AV			2.29 V	360	54.59	3.94
5	4824.00	59.44 PK	74.00	-14.56	1.35 V	263	51.43	8.01
6	4824.00	48.31 AV	54.00	-5.69	1.35 V	263	40.30	8.01

## 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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	105.54 PK			1.63 H	221	101.53	4.01
2	*2437.00	39.75 AV			1.63 H	221	35.74	4.01
3	4874.00	40.92 PK	74.00	-33.08	1.42 H	302	32.84	8.08
4	4874.00	30.25 AV	54.00	-23.75	1.42 H	302	22.17	8.08
5	7311.00	48.74 PK	74.00	-25.26	1.45 H	263	34.61	14.13
6	7311.00	34.50 AV	54.00	-19.50	1.45 H	263	20.37	14.13
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	101.55 PK			1.16 V	203	97.54	4.01
2	*2437.00	33.28 AV			1.16 V	203	29.27	4.01
3	4874.00	42.21 PK	74.00	-31.79	1.62 V	234	34.13	8.08
4	4874.00	22.13 AV	54.00	-31.87	1.62 V	234	14.05	8.08
5	7311.00	47.03 PK	74.00	-26.97	1.52 V	201	32.90	14.13
6	7311.00	34.75 AV	54.00	-19.25	1.52 V	201	20.62	14.13

**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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	107.56 PK			1.96 H	210	103.47	4.09
2	*2462.00	38.62 AV			1.96 H	210	34.53	4.09
3	2483.50	72.50 PK	74.00	-1.50	1.96 H	210	68.34	4.16
4	2483.50	28.96 AV	54.00	-25.04	1.96 H	210	24.80	4.16
5	4924.00	42.62 PK	74.00	-31.38	1.74 H	235	34.48	8.14
6	4924.00	29.15 AV	54.00	-24.85	1.74 H	235	21.01	8.14
7	7386.00	45.03 PK	74.00	-28.97	1.95 H	242	30.78	14.25
8	7386.00	35.75 AV	54.00	-18.25	1.95 H	242	21.50	14.25
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	103.54 PK			1.85 V	178	99.45	4.09
2	*2462.00	38.66 AV			1.85 V	178	34.57	4.09
3	2483.50	71.20 PK	74.00	-2.80	1.85 V	178	67.04	4.16
4	2483.50	27.52 AV	54.00	-26.48	1.85 V	178	23.36	4.16
5	4924.00	40.52 PK	74.00	-33.48	1.74 V	236	32.38	8.14
6	4924.00	29.35 AV	54.00	-24.65	1.74 V	236	21.21	8.14
7	7386.00	49.63 PK	74.00	-24.37	1.19 V	243	35.38	14.25
8	7386.00	36.62 AV	54.00	-17.38	1.19 V	243	22.37	14.25

**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).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.



## 4.2 6dB BANDWIDTH MEASUREMENT

### 4.2.1 LIMITS OF 6DB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

### 4.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Power Sensor	Keysight	U2021XA	MY55060016	May 04,16	May 03,17
Power Sensor	Keysight	U2021XA	MY55060018	May 04,16	May 03,17
Digital Multimeter	FLUKE	15B	A1220010DG	Oct. 13, 16	Oct.12, 17
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Sep.05, 16	Sep. 04,17
Oscilloscope	Agilent	DSO9254A	MY51260160	Nov. 28,15	Nov. 27,16
Signal Analyzer	Rohde & Schwarz	FSV7	102331	Nov. 09,15	Nov. 08,16
Signal Generator	Agilent	N5183A	MY50140980	Nov. 09,15	Nov. 08,16
Agile Signal Generator	Agilent	8645A	Agilent	Aug.08, 16	Aug.07, 17
ESG Vector Signal Generator	Agilent	E4438C	MY49072505	Apr. 22, 16	Apr. 21, 17
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	Aug.08, 16	Aug.07, 17

#### NOTE:

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

### 4.2.3 TEST PROCEDURE

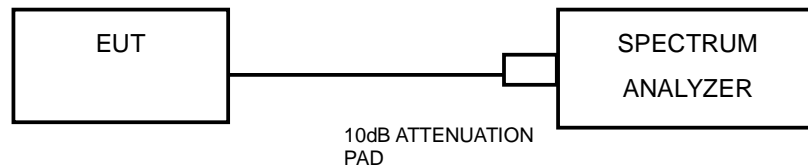
1. Set resolution bandwidth (RBW) = 100KHz
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and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



#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.2.5 TEST SETUP



#### 4.2.6 EUT OPERATING CONDITIONS

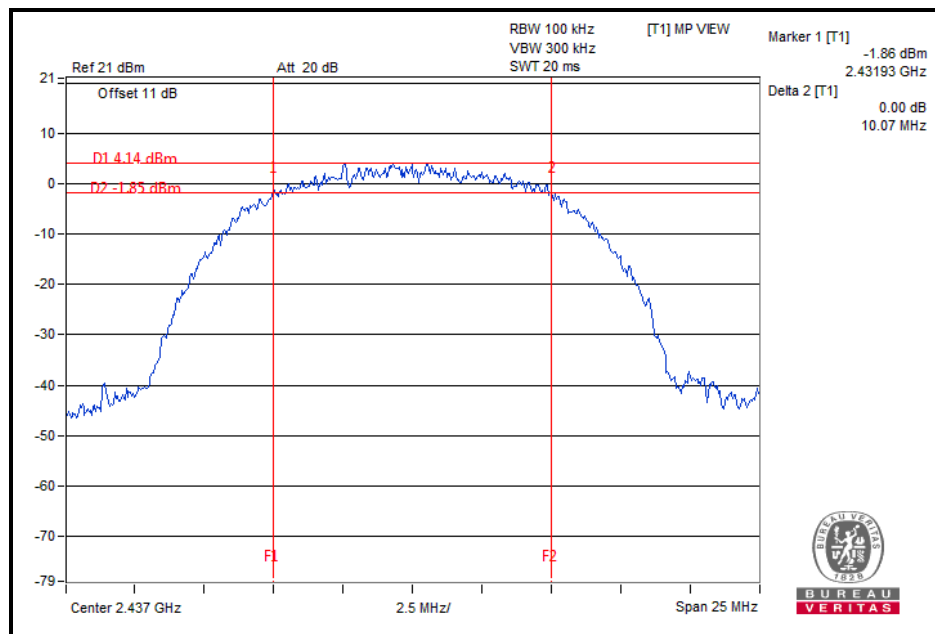
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



## 4.2.7 TEST RESULTS

## 802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	10.06	0.5	PASS
6	2437	10.07	0.5	PASS
11	2462	10.06	0.5	PASS



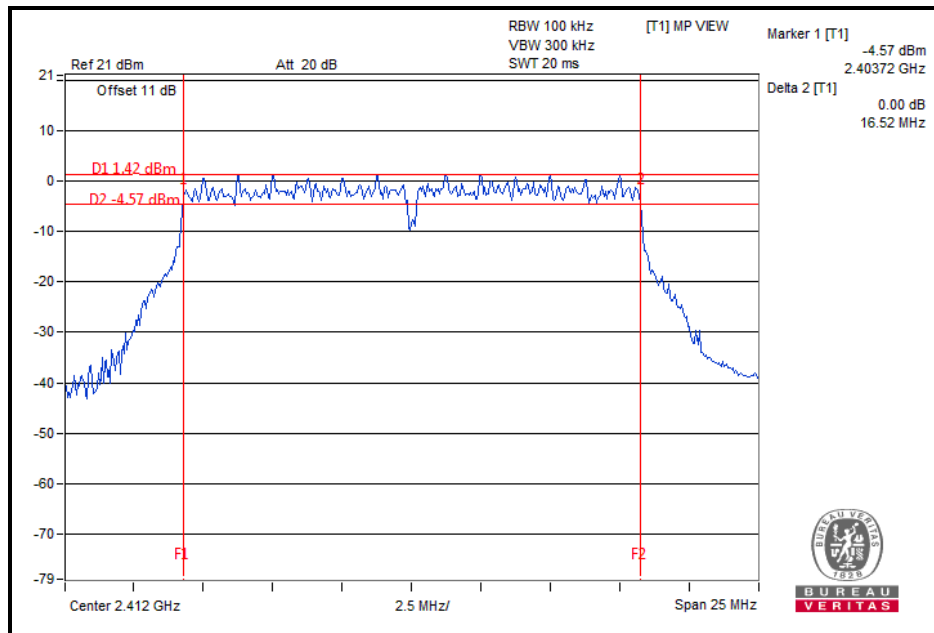


BUREAU  
VERITAS

Test Report No.: RF160928N045-2

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.52	0.5	PASS
6	2437	16.50	0.5	PASS
11	2462	16.47	0.5	PASS



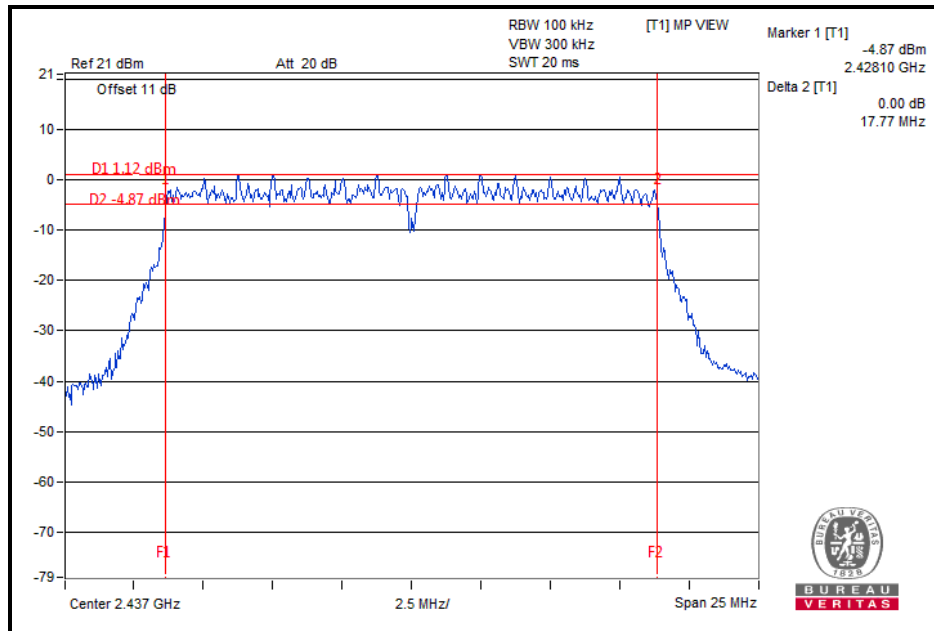


**BUREAU  
VERITAS**

Test Report No.: RF160928N045-2

**802.11n (20MHz)**

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.76	0.5	PASS
6	2437	17.77	0.5	PASS
11	2462	17.76	0.5	PASS





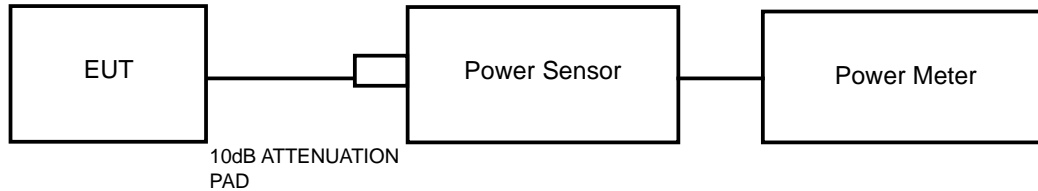


### 4.3 CONDUCTED OUTPUT POWER

#### 4.3.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

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

#### 4.3.2 TEST SETUP



#### 4.3.3 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Power Sensor	Keysight	U2021XA	MY55060016	May 04, 16	May 03, 17
Power Sensor	Keysight	U2021XA	MY55060018	May 04, 16	May 03, 17
Digital Multimeter	FLUKE	15B	A1220010DG	Oct. 13, 16	Oct. 12, 17
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Sep. 05, 16	Sep. 04, 17
Oscilloscope	Agilent	DSO9254A	MY51260160	Nov. 28, 15	Nov. 27, 16
Signal Analyzer	Rohde & Schwarz	FSV7	102331	Nov. 09, 15	Nov. 08, 16
Signal Generator	Agilent	N5183A	MY50140980	Nov. 09, 15	Nov. 08, 16
Agile Signal Generator	Agilent	8645A	Agilent	Aug. 08, 16	Aug. 07, 17
ESG Vector Signal Generator	Agilent	E4438C	MY49072505	Apr. 22, 16	Apr. 21, 17
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	Aug. 08, 16	Aug. 07, 17

**NOTE:**

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



**Test Report No.: RF160928N045-2**

#### 4.3.4 TEST PROCEDURES

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

#### 4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.3.6 EUT OPERATING CONDITIONS

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



#### 4.3.7 TEST RESULTS

##### 4.3.7.1 MAXIMUM PEAK OUTPUT POWER

###### 802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
1	2412	20.44	110.662	1	PASS
6	2437	20.16	103.753	1	PASS
11	2462	20.39	109.396	1	PASS

###### 802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
1	2412	<b>21.92</b>	<b>155.597</b>	1	PASS
6	2437	21.85	153.109	1	PASS
11	2462	21.76	149.968	1	PASS

###### 802.11n (HT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
1	2412	21.54	142.561	1	PASS
6	2437	21.49	140.929	1	PASS
11	2462	21.68	147.231	1	PASS

**4.3.7.2 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.

**802.11b**

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVERAGE POWER (mW)
1	2412	14.86	30.62
6	2437	14.47	27.99
11	2462	14.55	28.51

**802.11g**

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVERAGE POWER (mW)
1	2412	13.25	21.135
6	2437	13.39	21.827
11	2462	13.24	21.086

**802.11n (20MHz)**

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVERAGE POWER (mW)
1	2412	13.26	21.184
6	2437	13.35	21.627
11	2462	13.49	22.336

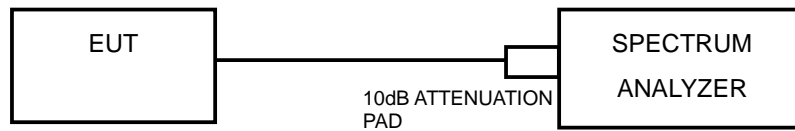


## 4.4 POWER SPECTRAL DENSITY MEASUREMENT

### 4.4.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

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

### 4.4.2 TEST SETUP



### 4.4.3 TEST INSTRUMENTS

Refer to section 4.3.2 to get information of above instrument.

### 4.4.4 TEST PROCEDURE

- Set instrument center frequency to DTS channel center frequency.
- Set span to at least 1.5 times the OBW.
- Set RBW to: 3 kHz
- Set VBW  $\geq 3 \times$  RBW.
- Detector = peak.
- Ensure that the number of measurement points in the sweep  $\geq 2 \times$  span/RBW.
- Sweep time = auto couple.
- Use the peak marker function to determine the maximum amplitude level.

### 4.4.5 DEVIATION FROM TEST STANDARD

No deviation.



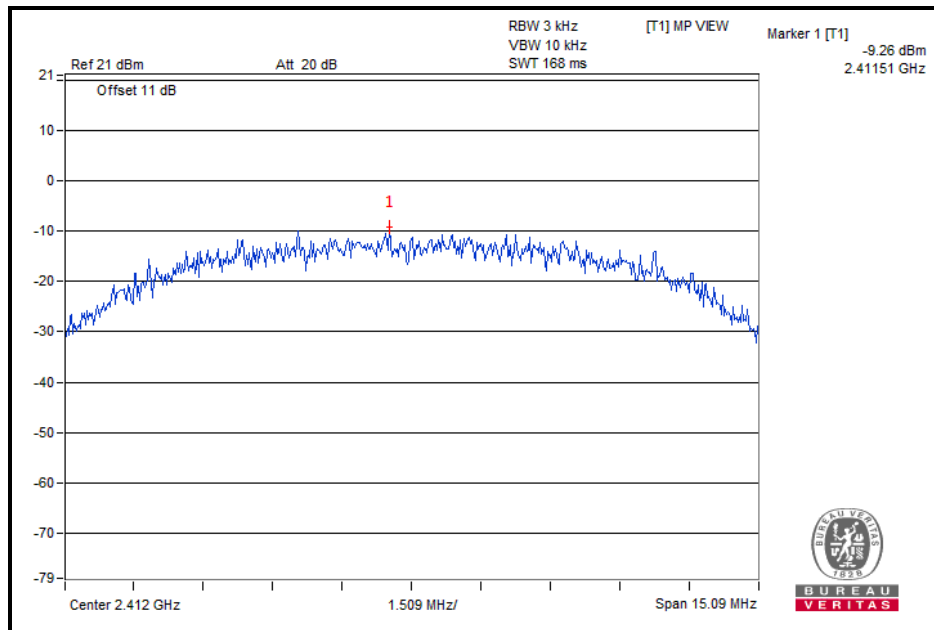
#### 4.4.6 EUT OPERATING CONDITION

Same as item 4.3.6

#### 4.4.7 TEST RESULTS

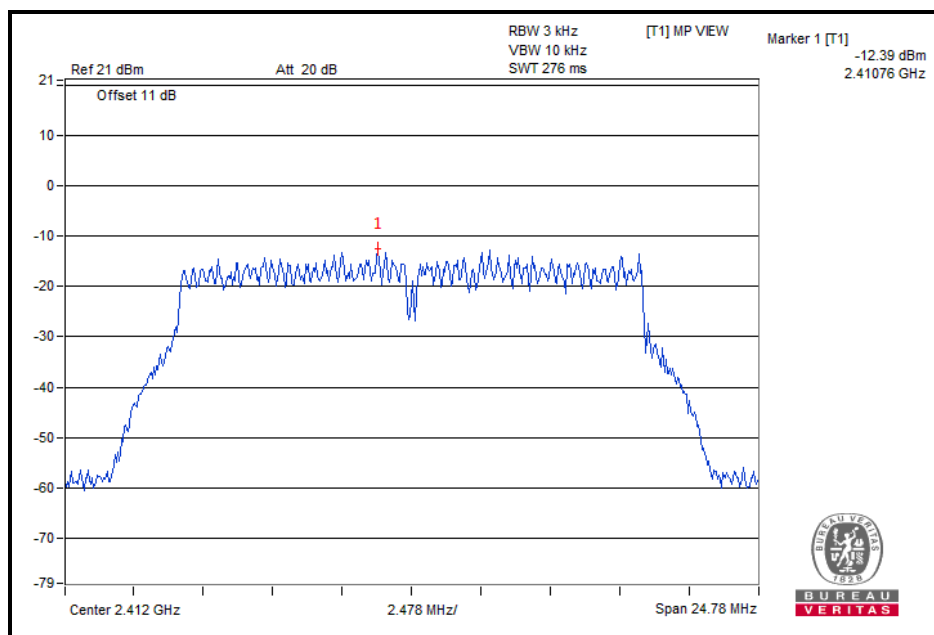
802.11b

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-9.26	8	PASS
6	2437	-9.40	8	PASS
11	2462	-9.62	8	PASS



802.11g

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-12.39	8	PASS
6	2437	-13.61	8	PASS
11	2462	-13.86	8	PASS



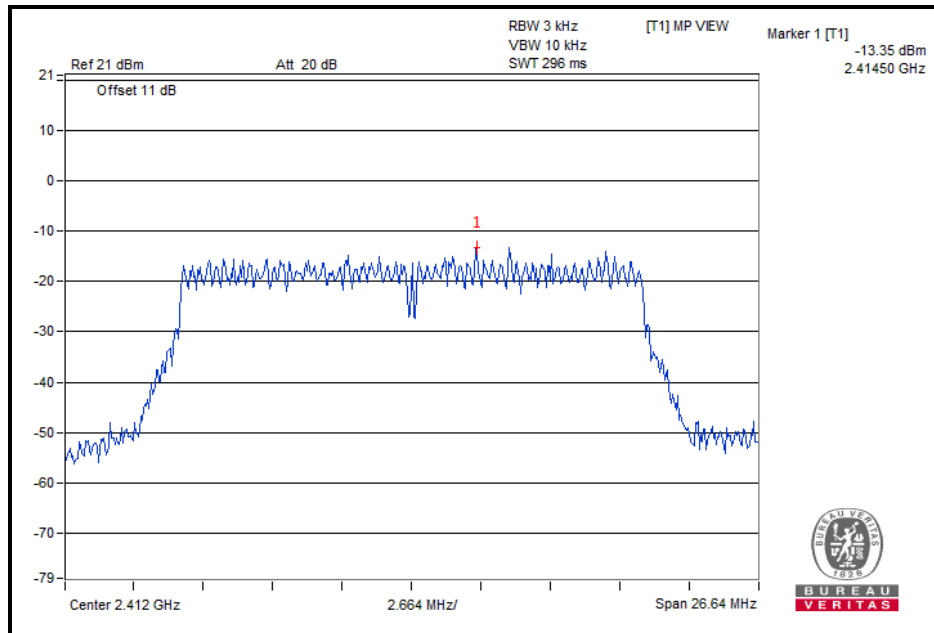


BUREAU  
VERITAS

Test Report No.: RF160928N045-2

802.11n (HT20)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-13.35	8	PASS
6	2437	-14.59	8	PASS
11	2462	-14.54	8	PASS





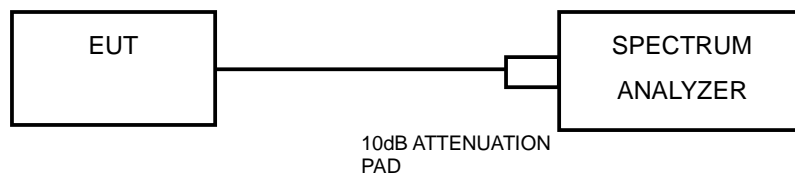


## 4.5 OUT OF BAND EMISSION MEASUREMENT

### 4.5.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

Below  $-20\text{dB}$  of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 4.5.2 TEST SETUP



### 4.5.3 TEST INSTRUMENTS

Refer to section 4.3.2 to get information of above instrument.

### 4.5.4 TEST PROCEDURE

#### Measurement Procedure - Reference Level

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.



Test Report No.: RF160928N045-2

#### Measurement Procedure –Unwanted Emission Level

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.

#### 4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.5.6 EUT OPERATING CONDITION

Same as item 4.2.6

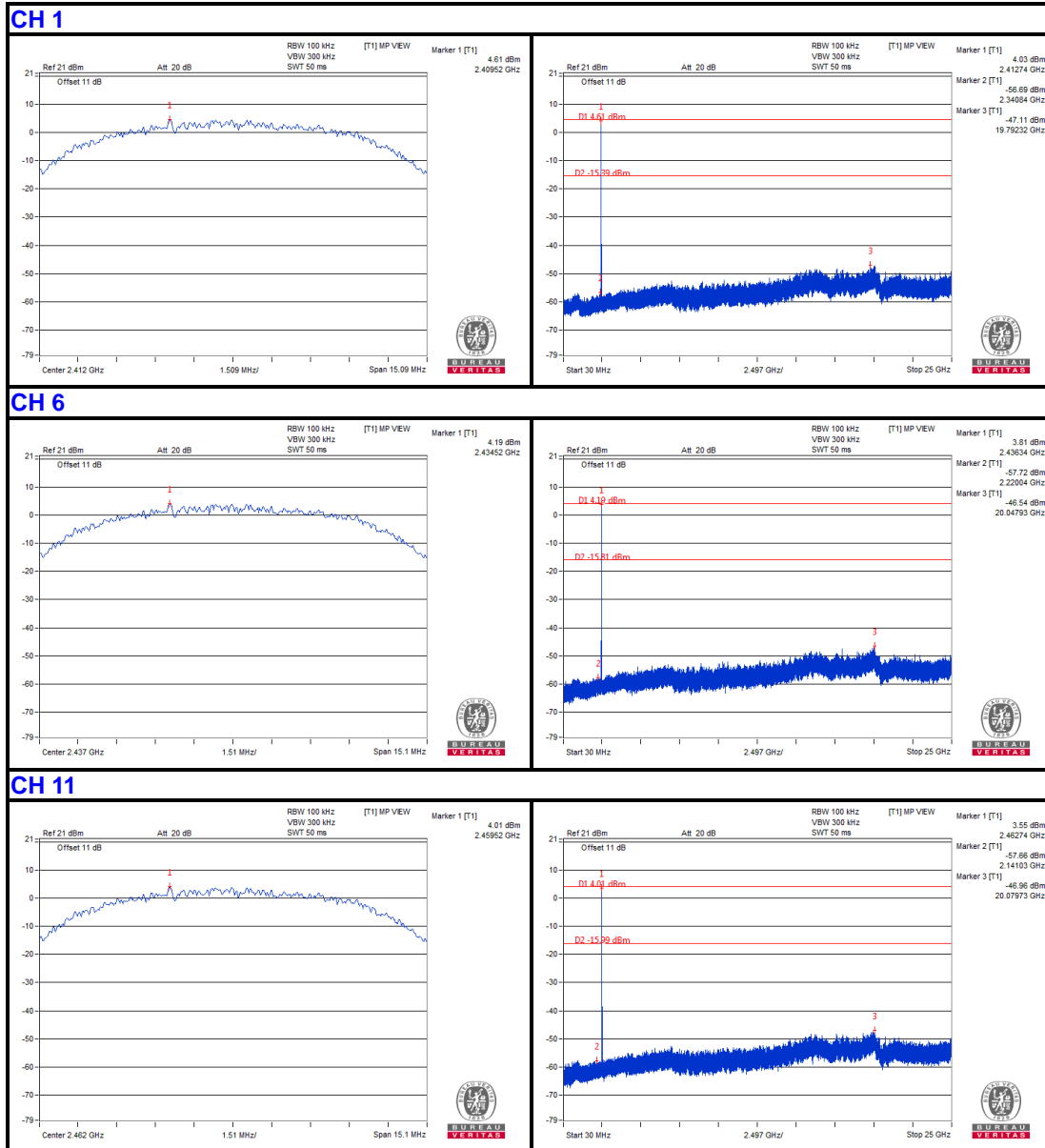


BUREAU  
VERITAS

Test Report No.: RF160928N045-2

## 4.5.7 TEST RESULTS

802.11b



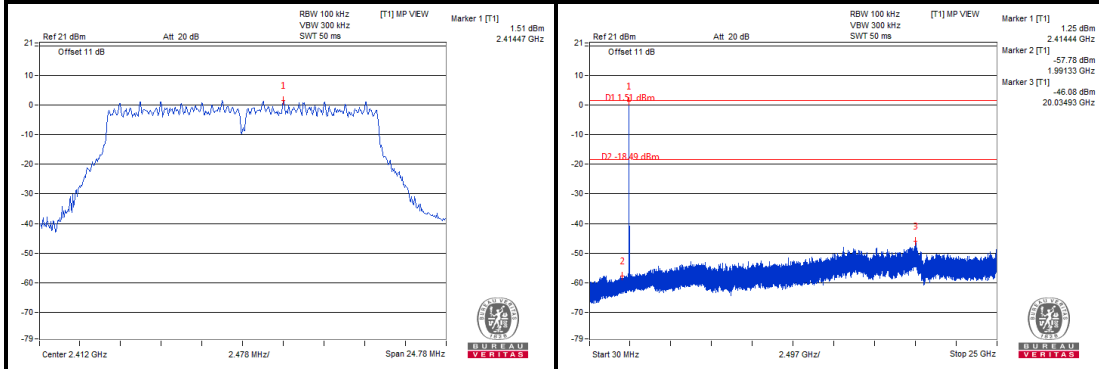


BUREAU  
VERITAS

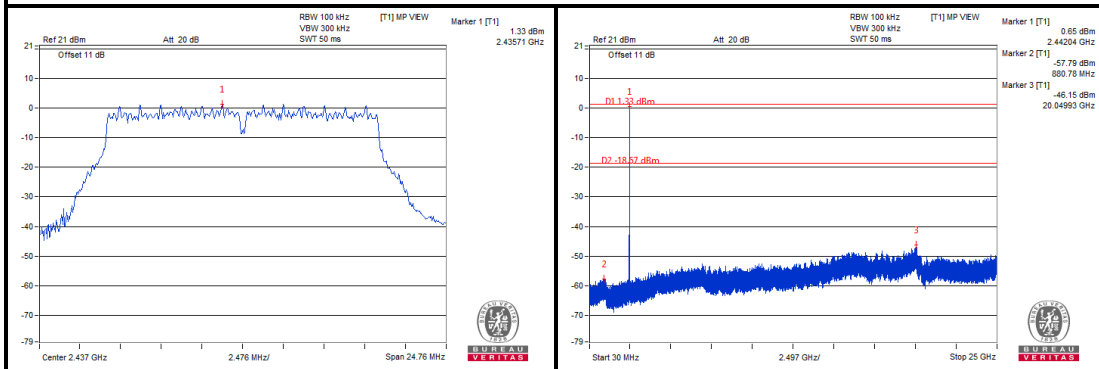
Test Report No.: RF160928N045-2

802.11g

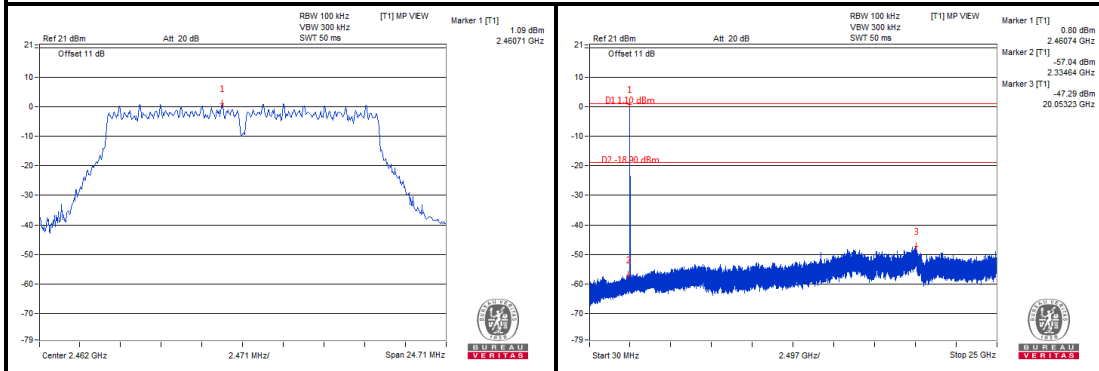
### CH 1



### CH 6



### CH 11



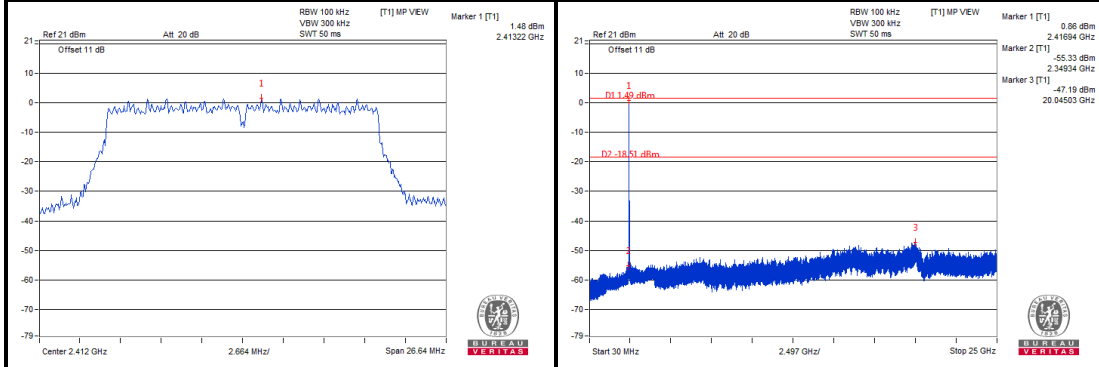


BUREAU  
VERITAS

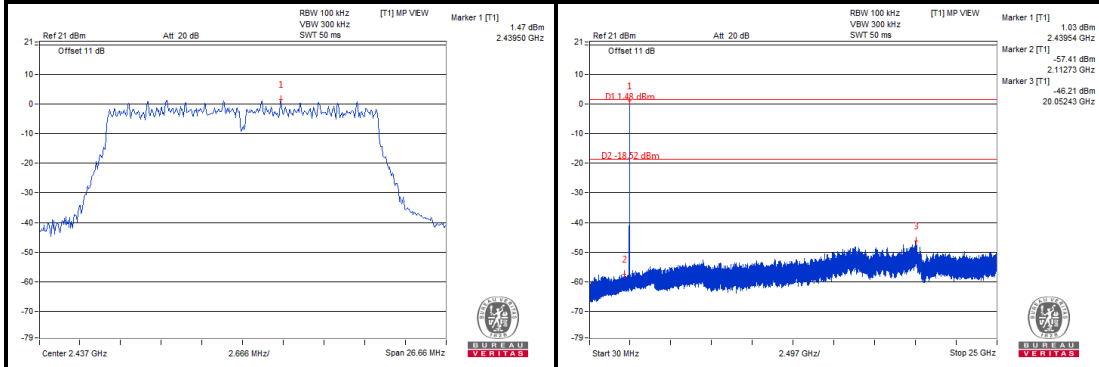
Test Report No.: RF160928N045-2

## 802.11n (HT20)

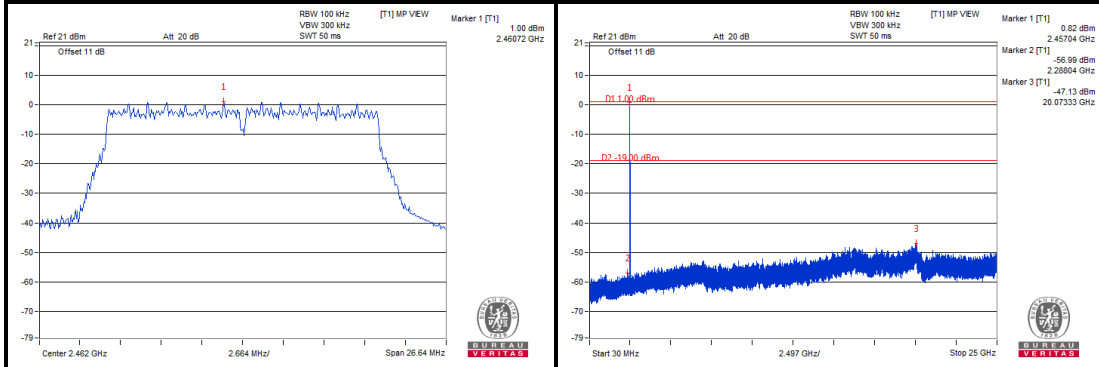
### CH 1



### CH 6



### CH 11



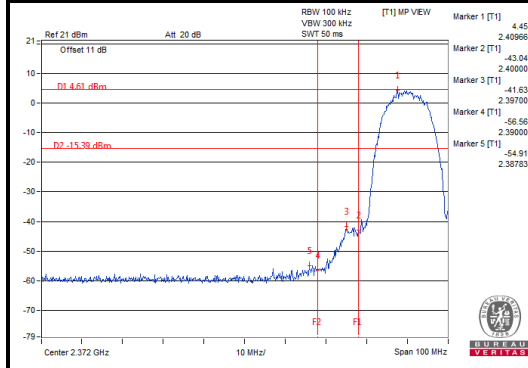


BUREAU  
VERITAS

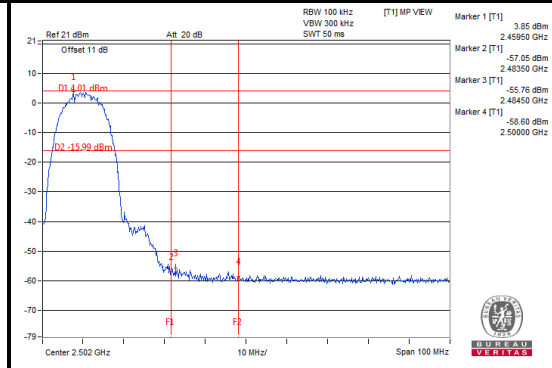
Test Report No.: RF160928N045-2

### 802.11b

#### CH 1 Band edge

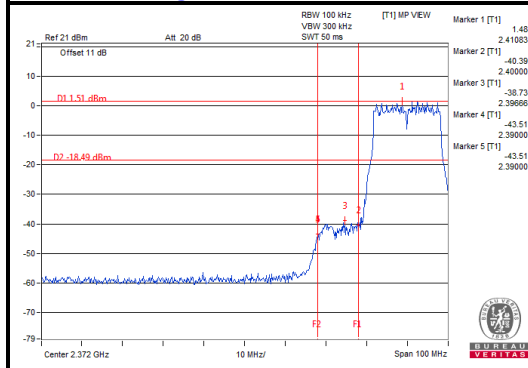


#### CH 11 Band edge

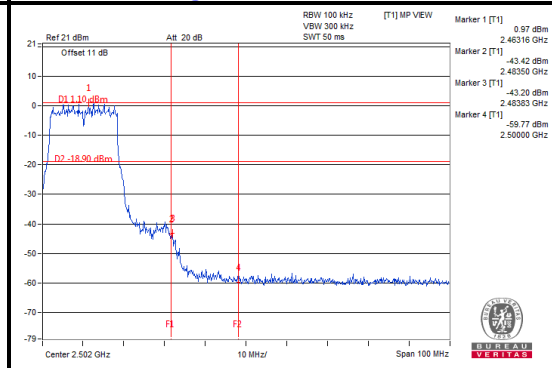


### 802.11g

#### CH 1 Band edge



#### CH 11 Band edge

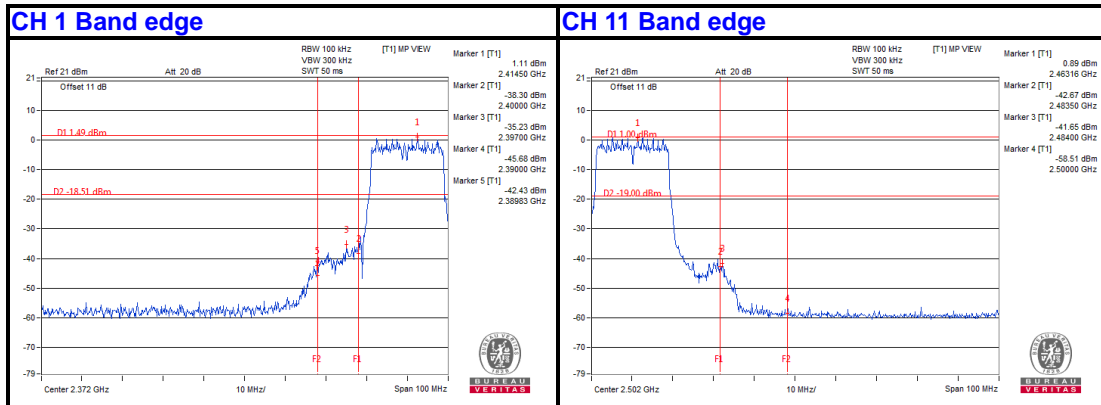




BUREAU  
VERITAS

Test Report No.: RF160928N045-2

## 802.11n (HT20)





Test Report No.: RF160928N045-2

## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

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





Test Report No.: RF160928N045-2

## 6 APPENDIX A - 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.

---END---