



# TEST REPORT



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Manufacturer or Supplier	GLOBALTRONIC - Electrónica e Telecomunicações, SA.
Address	Raso de Paredes - 3750-909 Águeda PORTUGAL
Product	Wireless module
Brand Name	N/A
Model	QINO
Additional Model & Model Difference	N/A
Date of tests	Jan. 22, 2017 ~ Feb. 07, 2017

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 Chris Chen Manager / EMC Department
	
Date: Mar. 21, 2017	

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**BUREAU**  
**VERITAS** Test Report No.: RF170110N015

## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF170110N015	Original release	Mar. 21, 2017



## 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 DC 12V
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	Unique 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	4.84dB

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>	Wireless module
<b>MODEL NO.</b>	QINO
<b>FCC ID</b>	2ALAR-QINO
<b>NOMINAL VOLTAGE</b>	DC 12V from Host Unit
<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>	WLAN: 19.81dBm (Maximum peak Power)
<b>ANTENNA TYPE</b>	PCB Antenna, 2dBi Gain
<b>I/O PORTS</b>	Refer to user's manual
<b>CABLE SUPPLIED</b>	N/A

**NOTE:**

1. The EUT provides completed transmitters and receivers.

<b>MODULATION MODE</b>	<b>FUNCTION</b>
<b>802.11b</b>	2TX/2RX
<b>802.11g</b>	2TX/2RX
<b>802.11n (HT20)</b>	2TX/2RX

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.: 170110N015) for detailed product photo.



### 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 12V with WIFI function

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 host unit.

### 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, 53%RH	DC 12V	Eric Fang
RE≥1G	25deg. C, 53%RH	DC 12V	Eric Fang
PLC	N/A	N/A	N/A
APCM	20deg. C, 55%RH	DC 12V	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**
- KDB 662911 D01 v02r01**
- 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	DC Source	Guwei	234501	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).

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.



#### 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. 04,16	Nov. 03,17
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. 04,16	Nov. 03,17
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 are 12, 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 502831.



#### 4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 1.5 meters (above 1GHz) and 0.8 meters (below 1GHz) 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  $\geq 1/T$  (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) 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.

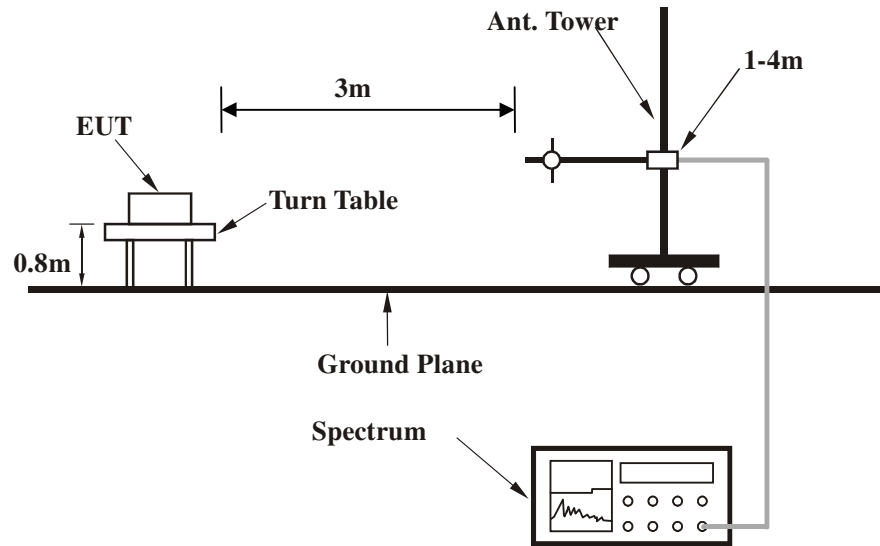
#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation.



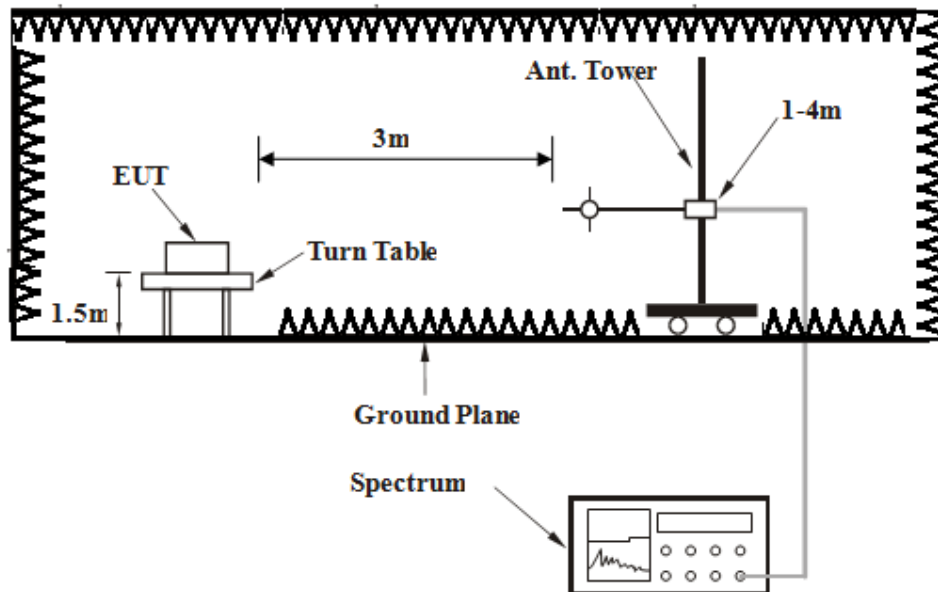
#### 4.1.5 TEST SETUP

##### Below 1GHz test setup



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

##### Above 1GHz test setup



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



#### 4.1.6 EUT OPERATING CONDITIONS

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





### 4.1.7 TEST RESULTS

#### BELOW 1GHz WORST-CASE DATA:

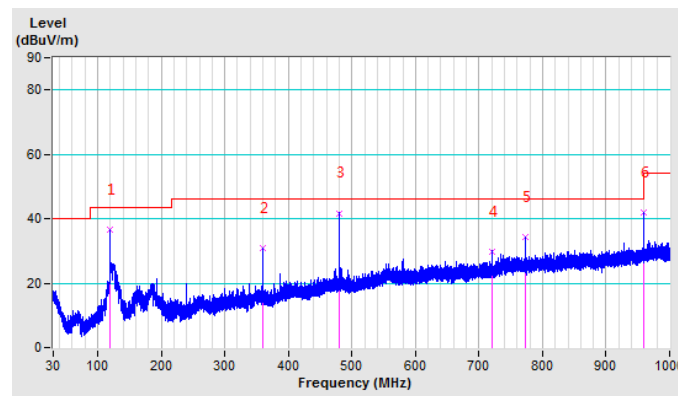
#### 802.11b

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

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	119.98	36.67 QP	43.50	-6.83	1.00 H	0	53.16	-16.49
2	359.99	30.93 QP	46.00	-15.07	1.00 H	0	41.17	-10.24
3	479.98	41.73 QP	46.00	-4.27	1.00 H	0	48.41	-6.68
4	720.06	29.80 QP	46.00	-16.20	1.00 H	0	31.28	-1.48
5	773.34	34.38 QP	46.00	-11.62	1.00 H	0	35.07	-0.69
6	960.07	41.89 QP	54.00	-12.11	1.00 H	0	38.95	2.94

#### 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.



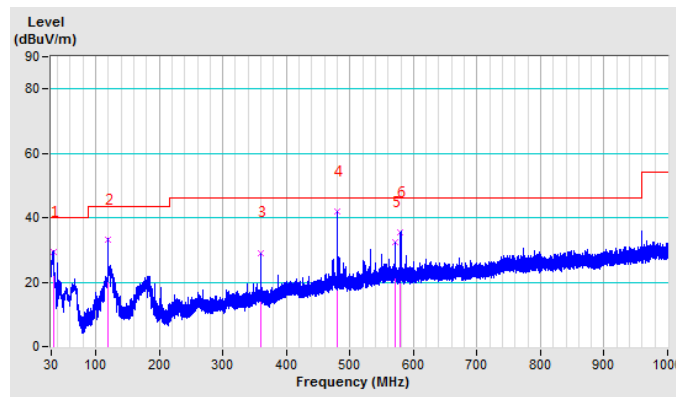


<b>CHANNEL</b>	Channel 1	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	32.97	29.45 QP	40.00	-10.55	1.00 V	0	42.21	-12.76
2	119.95	33.24 QP	43.50	-10.26	1.00 V	0	49.73	-16.49
3	359.99	29.15 QP	46.00	-16.85	1.00 V	0	39.39	-10.24
<b>4</b>	<b>479.98</b>	<b>41.90 QP</b>	<b>46.00</b>	<b>-4.10</b>	<b>1.00 V</b>	<b>0</b>	<b>48.58</b>	<b>-6.68</b>
5	570.74	32.37 QP	46.00	-13.63	1.00 V	0	36.45	-4.08
6	579.99	35.45 QP	46.00	-10.55	1.00 V	0	39.56	-4.11

**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**

<b>CHANNEL</b>	TX Channel 1	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	55.90 PK	74.00	-18.10	3.11 H	84	52.76	3.14
2	2390.00	45.79 AV	54.00	-8.21	3.11 H	84	42.65	3.14
3	*2412.00	102.59 PK			3.11 H	84	99.42	3.17
4	*2412.00	97.56 AV			3.11 H	84	94.39	3.17
5	4824.00	46.06 PK	74.00	-27.94	1.00 H	215	39.59	6.47
6	4824.00	36.20 AV	54.00	-17.80	1.00 H	215	29.73	6.47
7	#7236.00	50.06 PK	74.00	-23.94	1.00 H	360	37.93	12.13
8	#7236.00	39.16 AV	54.00	-14.84	1.00 H	360	27.03	12.13

**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	2390.00	55.21 PK	74.00	-18.79	3.35 V	0	52.07	3.14
2	2390.00	42.70 AV	54.00	-11.30	3.35 V	0	39.56	3.14
3	*2412.00	100.79 PK			3.35 V	0	97.62	3.17
4	*2412.00	96.39 AV			3.35 V	0	93.22	3.17
5	4824.00	51.87 PK	74.00	-22.13	3.81 V	73	45.40	6.47
6	4824.00	45.25 AV	54.00	-8.75	3.81 V	73	38.78	6.47
7	#7236.00	51.36 PK	74.00	-22.64	1.00 V	214	39.23	12.13
8	#7236.00	44.65 AV	54.00	-9.35	1.00 V	214	32.52	12.13

**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.
6. " # ": The radiated frequency is out of the restricted band.



<b>CHANNEL</b>	TX Channel 6	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	100.45 PK			3.59 H	120	97.24	3.21
2	*2437.00	94.84 AV			3.59 H	120	91.63	3.21
3	4874.00	44.89 PK	74.00	-29.11	3.55 H	100	38.41	6.48
4	4874.00	36.13 AV	54.00	-17.87	3.55 H	100	29.65	6.48
5	7311.00	51.26 PK	74.00	-22.74	2.55 H	151	39.05	12.21
6	7311.00	39.89 AV	54.00	-14.11	2.55 H	151	27.68	12.21

**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	101.87 PK			3.82 V	210	98.66	3.21
2	*2437.00	96.12 AV			3.82 V	210	92.91	3.21
3	4874.00	49.35 PK	74.00	-24.65	3.72 V	60	42.87	6.48
4	4874.00	43.31 AV	54.00	-10.69	3.72 V	60	36.83	6.48
5	7311.00	48.21 PK	74.00	-25.79	1.00 V	214	36.00	12.21
6	7311.00	39.64 AV	54.00	-14.36	1.00 V	214	27.43	12.21

**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.



<b>CHANNEL</b>	TX Channel 11	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	102.84 PK			3.84 H	285	99.58	3.26
2	*2462.00	98.30 AV			3.84 H	285	95.04	3.26
3	2483.50	55.99 PK	74.00	-18.01	3.84 H	205	52.70	3.29
4	2483.50	47.86 AV	54.00	-6.14	3.84 H	205	44.57	3.29
5	4924.00	50.79 PK	74.00	-23.21	3.79 H	75	44.30	6.49
6	4924.00	45.31 AV	54.00	-8.69	3.79 H	75	38.82	6.49
7	7386.00	57.45 PK	74.00	-16.55	3.96 H	221	45.15	12.30
8	7386.00	50.50 AV	54.00	-3.50	3.96 H	221	38.20	12.30

**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	101.68 PK			1.00 V	2	98.42	3.26
2	*2462.00	96.93 AV			1.00 V	2	93.67	3.26
3	2483.50	53.10 PK	74.00	-20.90	1.00 V	2	49.81	3.29
4	2483.50	48.17 AV	54.00	-5.83	1.00 V	2	44.88	3.29
5	4924.00	51.19 PK	74.00	-22.81	1.00 V	59	44.70	6.49
6	4924.00	49.71 AV	54.00	-4.29	1.00 V	59	43.22	6.49
7	7386.00	56.89 PK	74.00	-17.11	3.89 V	233	44.59	12.30
8	7386.00	50.54 AV	54.00	-3.46	3.89 V	233	38.24	12.30

**REMARKS:**

- Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
- Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
- The other emission levels were very low against the limit.
- Margin value = Emission level – Limit value.
- " \* ": Fundamental frequency.



802.11g

<b>CHANNEL</b>	TX Channel 1	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	53.51 PK	74.00	-20.49	3.66 H	80	50.37	3.14
2	2390.00	38.94 AV	54.00	-15.06	3.66 H	80	35.80	3.14
3	*2412.00	99.45 PK			3.66 H	80	96.28	3.17
4	*2412.00	95.63 AV			3.66 H	80	92.46	3.17
5	4824.00	46.69 PK	74.00	-27.31	1.00 H	360	40.22	6.47
6	4824.00	37.94 AV	54.00	-16.06	1.00 H	360	31.47	6.47
7	#7236.00	51.22 PK	74.00	-22.78	3.50 H	210	39.09	12.13
8	#7236.00	41.26 AV	54.00	-12.74	3.50 H	210	29.13	12.13

**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	2390.00	54.69 PK	74.00	-19.31	3.95 V	210	51.55	3.14
2	2390.00	44.70 AV	54.00	-9.30	3.95 V	210	41.56	3.14
3	*2412.00	100.30 PK			3.95 V	320	97.13	3.17
4	*2412.00	95.89 AV			3.95 V	320	92.72	3.17
5	4824.00	50.12 PK	74.00	-23.88	3.55 V	150	43.65	6.47
6	4824.00	41.25 AV	54.00	-12.75	3.55 V	150	34.78	6.47
7	#7236.00	51.15 PK	74.00	-22.85	3.55 V	215	39.02	12.13
8	#7236.00	41.45 AV	54.00	-12.55	3.55 V	215	29.32	12.13

**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.
6. " # ": The radiated frequency is out of the restricted band.



<b>CHANNEL</b>	TX Channel 6	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	100.54 PK			1.00 H	82	97.33	3.21
2	*2437.00	95.10 AV			1.00 H	82	91.89	3.21
3	4874.00	49.26 PK	74.00	-24.74	1.00 H	154	42.78	6.48
4	4874.00	40.15 AV	54.00	-13.85	1.00 H	154	33.67	6.48
5	7311.00	50.19 PK	74.00	-23.81	1.00 H	155	37.98	12.21
6	7311.00	39.86 AV	54.00	-14.14	1.00 H	155	27.65	12.21

**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	100.75 PK			3.80 V	266	97.54	3.21
2	*2437.00	95.58 AV			3.80 V	266	92.37	3.21
3	4874.00	49.59 PK	74.00	-24.41	4.00 V	255	43.11	6.48
4	4874.00	42.59 AV	54.00	-11.41	4.00 V	255	36.11	6.48
5	7311.00	51.50 PK	74.00	-22.50	2.55 V	360	39.29	12.21
6	7311.00	39.49 AV	54.00	-14.51	2.55 V	360	27.28	12.21

**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.



<b>CHANNEL</b>	TX Channel 11	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	97.65 PK			1.00 H	175	94.39	3.26
2	*2462.00	93.44 AV			1.00 H	175	90.18	3.26
3	2483.50	50.19 PK	74.00	-23.81	1.00 H	175	46.90	3.29
4	2483.50	42.16 AV	54.00	-11.84	1.00 H	175	38.87	3.29
5	4924.00	47.12 PK	74.00	-26.88	1.00 H	360	40.63	6.49
6	4924.00	38.48 AV	54.00	-15.52	1.00 H	360	31.99	6.49
7	7386.00	49.96 PK	74.00	-24.04	1.00 H	255	37.66	12.30
8	7386.00	39.61 AV	54.00	-14.39	1.00 H	255	27.31	12.30

**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	99.83 PK			3.10 V	122	96.57	3.26
2	*2462.00	93.94 AV			3.10 V	122	90.68	3.26
3	2483.50	55.16 PK	74.00	-18.84	3.10 V	122	51.87	3.29
4	2483.50	44.84 AV	54.00	-9.16	3.10 V	122	41.55	3.29
5	4924.00	48.66 PK	74.00	-25.34	1.00 V	155	42.17	6.49
6	4924.00	36.98 AV	54.00	-17.02	1.00 V	155	30.49	6.49
7	7386.00	50.14 PK	74.00	-23.86	1.00 V	360	37.84	12.30
8	7386.00	39.74 AV	54.00	-14.26	1.00 V	360	27.44	12.30

**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 (20MHz)

<b>CHANNEL</b>	TX Channel 1	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	55.98 PK	74.00	-18.02	3.13 H	83	52.84	3.14
2	2390.00	45.44 AV	54.00	-8.56	3.13 H	83	42.30	3.14
3	*2412.00	100.85 PK			3.13 H	83	97.68	3.17
4	*2412.00	95.80 AV			3.13 H	83	92.63	3.17
5	4824.00	45.96 PK	74.00	-28.04	1.00 H	360	39.49	6.47
6	4824.00	38.56 AV	54.00	-15.44	1.00 H	360	32.09	6.47
7	#7236.00	51.05 PK	74.00	-22.95	3.11 H	210	38.92	12.13
8	#7236.00	43.22 AV	54.00	-10.78	3.11 H	210	31.09	12.13

**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	2390.00	55.21 PK	74.00	-18.79	3.95 V	355	52.07	3.14
2	2390.00	43.21 AV	54.00	-10.79	3.95 V	355	40.07	3.14
3	*2412.00	100.14 PK			3.95 V	355	96.97	3.17
4	*2412.00	94.97 AV			3.95 V	355	91.80	3.17
5	4824.00	48.44 PK	74.00	-25.56	3.55 V	140	41.97	6.47
6	4824.00	38.46 AV	54.00	-15.54	3.55 V	140	31.99	6.47
7	#7236.00	51.18 PK	74.00	-22.82	1.00 V	244	39.05	12.13
8	#7236.00	40.15 AV	54.00	-13.85	1.00 V	244	28.02	12.13

**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.
6. " # ": The radiated frequency is out of the restricted band.



<b>CHANNEL</b>	TX Channel 6	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	100.51 PK			3.06 H	85	97.30	3.21
2	*2437.00	95.36 AV			3.06 H	85	92.15	3.21
3	4874.00	46.33 PK	74.00	-27.67	1.00 H	255	39.85	6.48
4	4874.00	36.88 AV	54.00	-17.12	1.00 H	255	30.40	6.48
5	7311.00	51.89 PK	74.00	-22.11	2.66 H	51	39.68	12.21
6	7311.00	40.02 AV	54.00	-13.98	2.66 H	51	27.81	12.21

**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	98.90 PK			3.96 V	10	95.69	3.21
2	*2437.00	94.76 AV			3.96 V	10	91.55	3.21
3	4874.00	47.58 PK	74.00	-26.42	1.00 V	360	41.10	6.48
4	4874.00	35.66 AV	54.00	-18.34	1.00 V	360	29.18	6.48
5	7311.00	51.45 PK	74.00	-22.55	3.26 V	155	39.24	12.21
6	7311.00	40.59 AV	54.00	-13.41	3.26 V	155	28.38	12.21

**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.



<b>CHANNEL</b>	TX Channel 11	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	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	98.61 PK			1.00 H	172	95.35	3.26
2	*2462.00	94.17 AV			1.00 H	172	90.91	3.26
3	2483.50	49.84 PK	74.00	-24.16	1.00 H	172	46.55	3.29
4	2483.50	39.94 AV	54.00	-14.06	1.00 H	172	36.65	3.29
5	4924.00	48.88 PK	74.00	-25.12	2.55 H	150	42.39	6.49
6	4924.00	37.81 AV	54.00	-16.19	2.55 H	150	31.32	6.49
7	7386.00	51.45 PK	74.00	-22.55	1.00 H	154	39.15	12.30
8	7386.00	39.84 AV	54.00	-14.16	1.00 H	154	27.54	12.30

**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	99.82 PK			2.39 V	358	96.56	3.26
2	*2462.00	94.37 AV			2.39 V	358	91.11	3.26
3	2483.50	55.26 PK	74.00	-18.74	2.39 V	358	51.97	3.29
4	2483.50	42.95 AV	54.00	-11.05	2.39 V	358	39.66	3.29
5	4924.00	50.63 PK	74.00	-23.37	1.55 V	225	44.14	6.49
6	4924.00	40.12 AV	54.00	-13.88	1.55 V	225	33.63	6.49
7	7386.00	52.12 PK	74.00	-21.88	2.95 V	125	39.82	12.30
8	7386.00	39.48 AV	54.00	-14.52	2.95 V	125	27.18	12.30

**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. 04,16	Nov. 03,17
Signal Analyzer	Rohde & Schwarz	FSV7	102331	Nov. 04,16	Nov. 03,17
Signal Generator	Agilent	N5183A	MY50140980	Nov. 04,16	Nov. 03,17
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

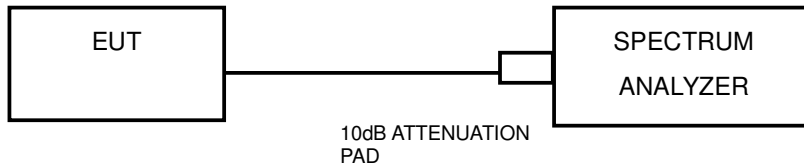
1. Set resolution bandwidth (RBW) = 100KHz
2. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that 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	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	9.09	10.01	0.5	PASS
6	2437	9.55	9.55	0.5	PASS
11	2462	10.01	9.11	0.5	PASS

##### 802.11g

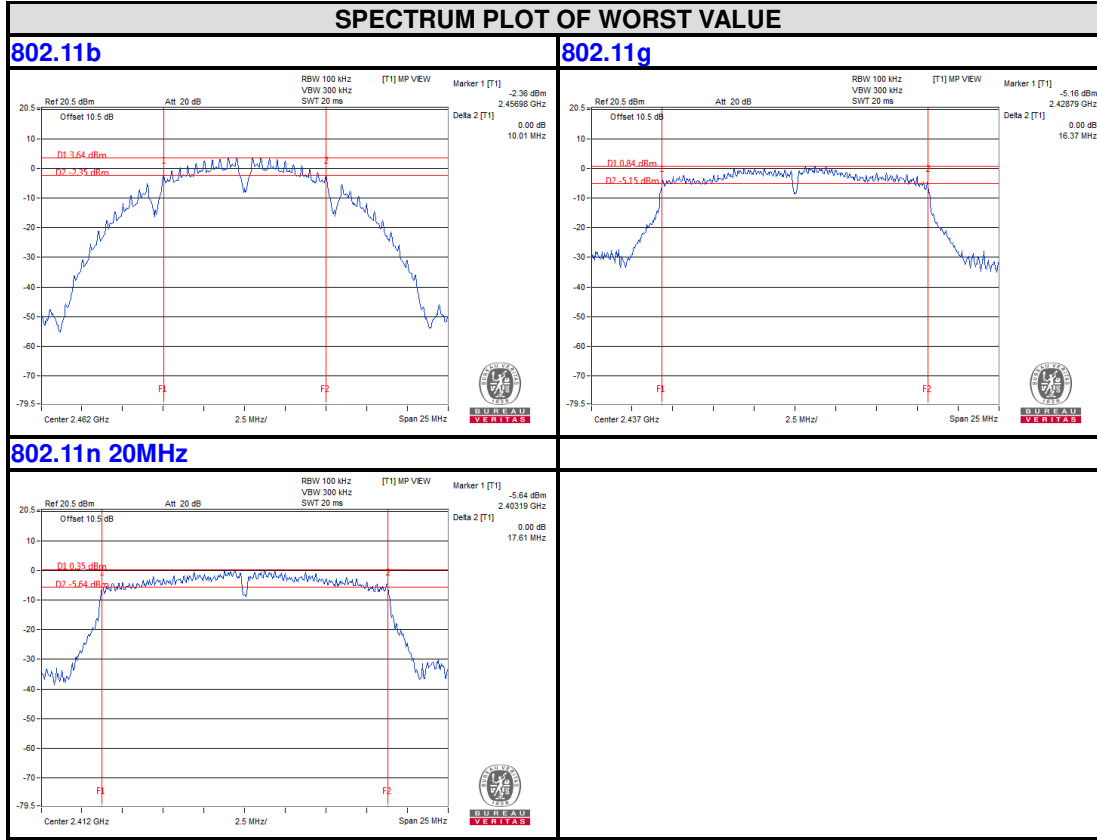
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	16.36	16.36	0.5	PASS
6	2437	16.37	16.11	0.5	PASS
11	2462	15.74	15.93	0.5	PASS

##### 802.11n 20MHz

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	17.61	16.99	0.5	PASS
6	2437	17.61	17.56	0.5	PASS
11	2462	17.59	15.73	0.5	PASS

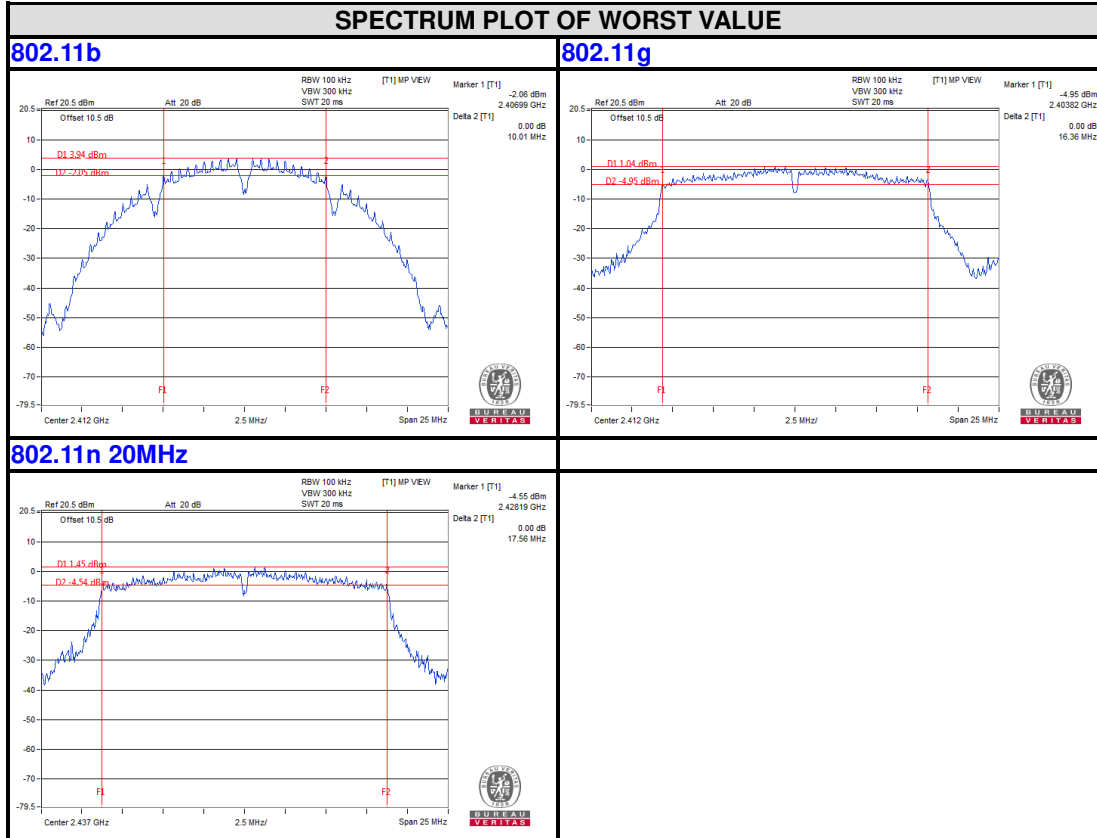


**CHAIN 0**





**CHAIN 1**





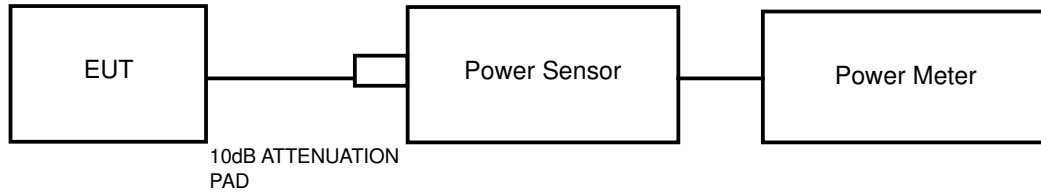


### 4.3 CONDUCTED OUTPUT POWER

#### 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. 04,16	Nov. 03,17
Signal Analyzer	Rohde & Schwarz	FSV7	102331	Nov. 04,16	Nov. 03,17
Signal Generator	Agilent	N5183A	MY50140980	Nov. 04,16	Nov. 03,17
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

**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.



#### 4.3.4 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

CHAN.	FREQ (MHz)	PEAK POWER (dBm)		PEAK POWER (mW)		TOTAL POWER (mW)	TOTAL POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2412	16.32	16.28	42.855	42.462	85.317	19.31	30	PASS
6	2437	16.25	16.27	42.17	42.364	84.534	19.27	30	PASS
11	2462	15.39	15.41	34.594	34.754	69.348	18.41	30	PASS

##### 802.11g

CHAN.	FREQ (MHz)	PEAK POWER (dBm)		PEAK POWER (mW)		TOTAL POWER (mW)	TOTAL POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2412	16.85	16.74	48.417	47.206	<b>95.623</b>	<b>19.81</b>	30	PASS
6	2437	16.79	16.64	47.753	46.132	93.885	19.73	30	PASS
11	2462	15.87	15.92	38.637	39.084	77.721	18.91	30	PASS

##### 802.11n 20MHz

CHAN.	FREQ (MHz)	PEAK POWER (dBm)		PEAK POWER (mW)		TOTAL POWER (mW)	TOTAL POWER (dBm)	PEAK POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1				
1	2412	16.55	16.48	45.186	44.463	89.649	19.53	30	PASS
6	2437	16.43	16.41	43.954	43.752	87.706	19.43	30	PASS
11	2462	15.72	15.65	37.325	36.728	74.053	18.70	30	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

CHAN.	FREQ (MHz)	AVG. POWER (dBm)		AVG. POWER (mW)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1		
1	2412	13.34	13.36	21.577	21.677	43.254	16.36
6	2437	13.18	13.08	20.797	20.324	41.121	16.14
11	2462	12.38	12.35	17.298	17.179	34.477	15.38

802.11g

CHAN.	FREQ (MHz)	AVG. POWER (dBm)		AVG. POWER (mW)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1		
1	2412	13.60	13.58	22.909	22.803	<b>45.712</b>	<b>16.60</b>
6	2437	13.25	13.19	21.135	20.845	41.98	16.23
11	2462	12.43	12.55	17.498	17.989	35.487	15.50

802.11n 20MHz

CHAN.	FREQ (MHz)	AVG. POWER (dBm)		AVG. POWER (mW)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		CHAIN 0	CHAIN 1	CHAIN 0	CHAIN 1		
1	2412	13.51	13.46	22.439	22.182	44.621	16.50
6	2437	13.27	13.25	21.232	21.135	42.367	16.27
11	2462	12.46	12.48	17.62	17.701	35.321	15.48

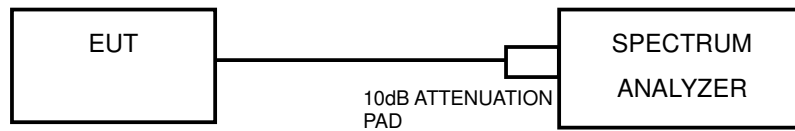


## 4.4 POWER SPECTRAL DENSITY MEASUREMENT

### 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

- a) Set instrument center frequency to DTS channel center frequency.
- b) Set span to at least 1.5 times the OBW.
- c) Set RBW to: 3 kHz
- d) Set VBW  $\geq 3 \times$  RBW.
- e) Detector = peak.
- f) Ensure that the number of measurement points in the sweep  $\geq 2 \times$  span/RBW.
- g) Sweep time = auto couple.
- h) 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

TX chain	Channel	Freq. (MHz)	PSD (dBm/3KHz)	10 log (N=2) dB	TOTAL PSD (dBm/3KHz)	Limit (dBm/3KHz)	PASS /FAIL
0	1	2412	-8.86	3.01	-5.85	8.00	PASS
	6	2437	-9.87	3.01	-6.86	8.00	PASS
	11	2462	-10.62	3.01	-7.61	8.00	PASS
1	1	2412	-10.17	3.01	-7.16	8.00	PASS
	6	2437	-10.11	3.01	-7.10	8.00	PASS
	11	2462	-9.97	3.01	-6.96	8.00	PASS

Remark: Due ANT gain less than 6dBi [ $2+10\log(N=2)=5.01 < 6$ ], so limit 8dBm does not need to be changed.

##### 802.11g

TX chain	Channel	Freq. (MHz)	PSD (dBm/3KHz)	10 log (N=2) dB	TOTAL PSD (dBm/3KHz)	Limit (dBm/3KHz)	PASS /FAIL
0	1	2412	-11.13	3.01	-8.12	8.00	PASS
	6	2437	-11.56	3.01	-8.55	8.00	PASS
	11	2462	-10.57	3.01	-7.50	8.00	PASS
1	1	2412	-10.56	3.01	-7.55	8.00	PASS
	6	2437	-11.14	3.01	-8.13	8.00	PASS
	11	2462	-11.10	3.01	-8.09	8.00	PASS

Remark: Due ANT gain less than 6dBi [ $2+10\log(N=2)=5.01 < 6$ ], so limit 8dBm does not need to be changed.



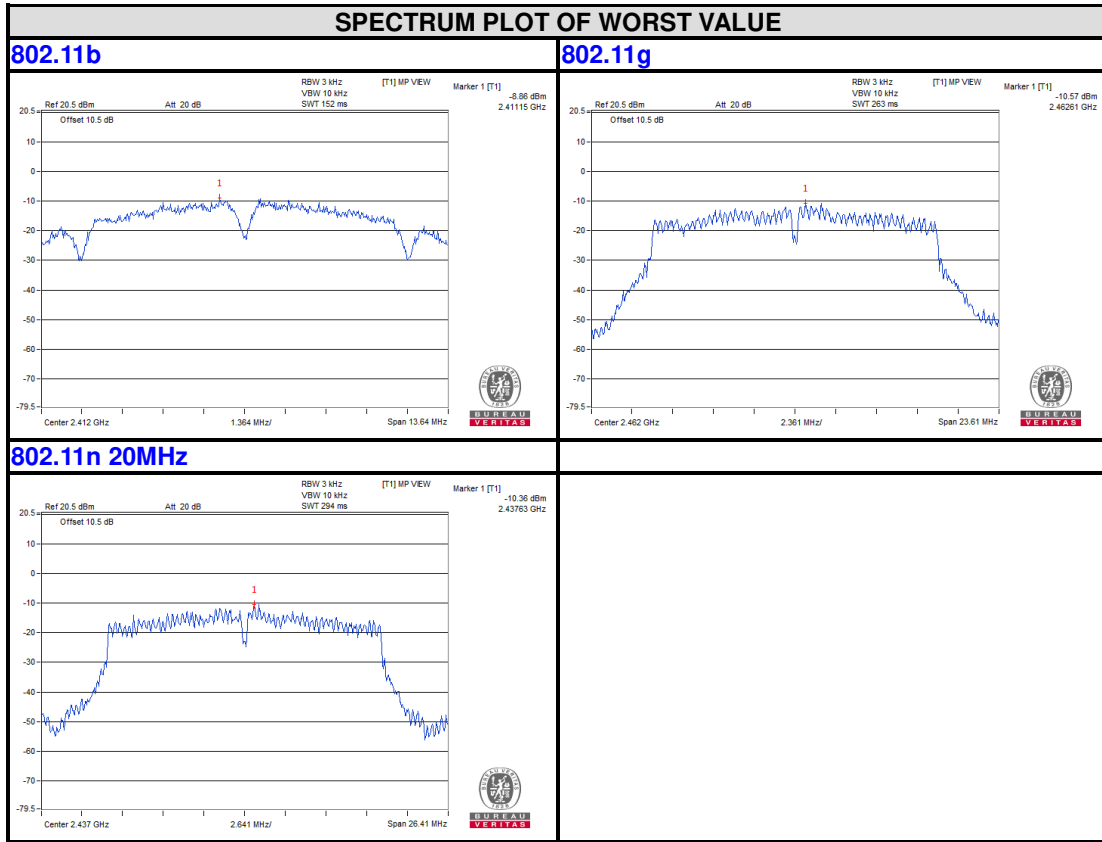
802.11n 20MHz

TX chain	Channel	Freq. (MHz)	PSD (dBm/3KHz)	10 log (N=2) dB	TOTAL PSD (dBm/3KHz)	Limit (dBm/3KHz)	PASS /FAIL
0	1	2412	-11.79	3.01	-8.78	8.00	PASS
	6	2437	-10.36	3.01	-7.35	8.00	PASS
	11	2462	-11.63	3.01	-8.62	8.00	PASS
1	1	2412	-12.13	3.01	-9.12	8.00	PASS
	6	2437	-11.88	3.01	-8.87	8.00	PASS
	11	2462	-11.02	3.01	-8.01	8.00	PASS

Remark: Due ANT gain less than 6dBi [ $2+10\log(N=2)=5.01<6$ ], so limit 8dBm does not need to be changed.



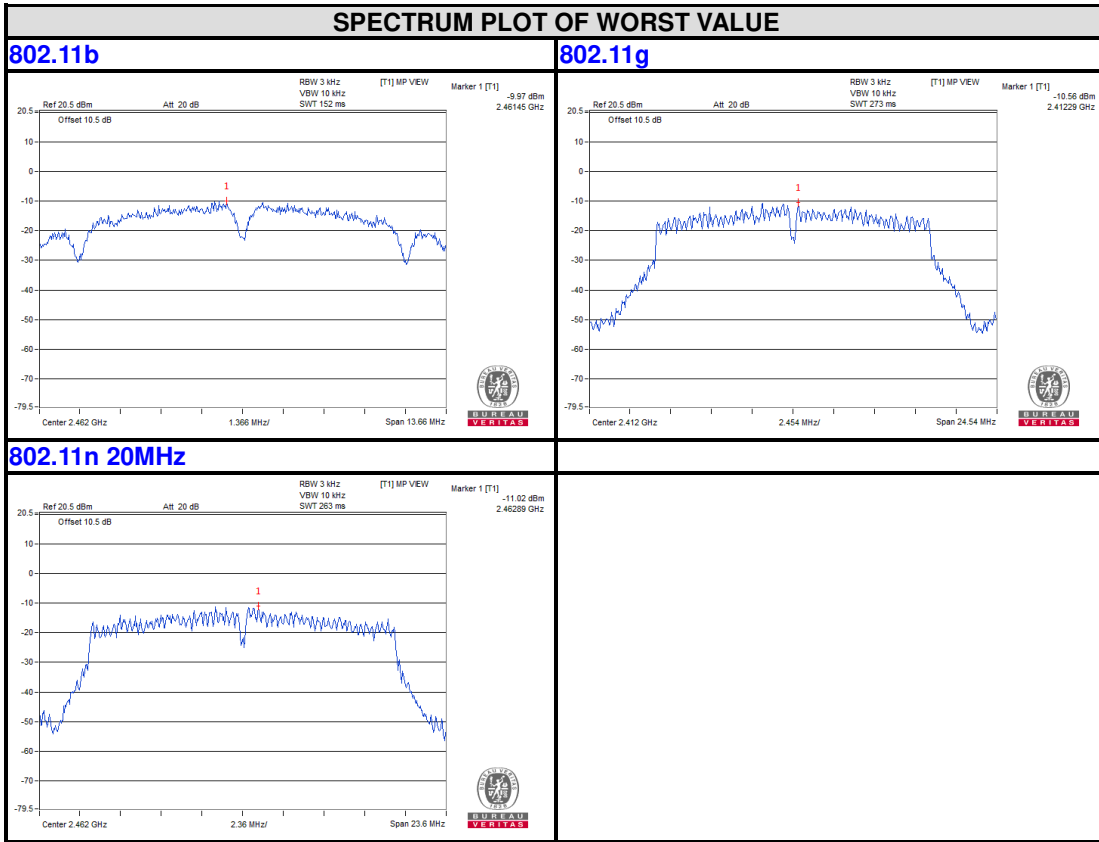
**CHAIN 0**







**CHAIN 1**



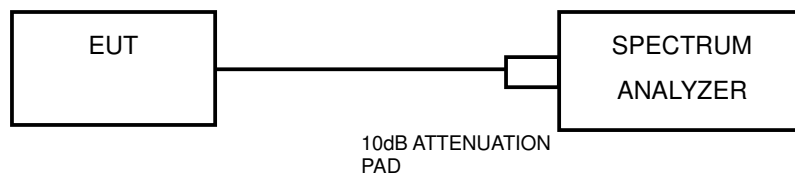


## 4.5 OUT OF BAND EMISSION MEASUREMENT

### 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.



### 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

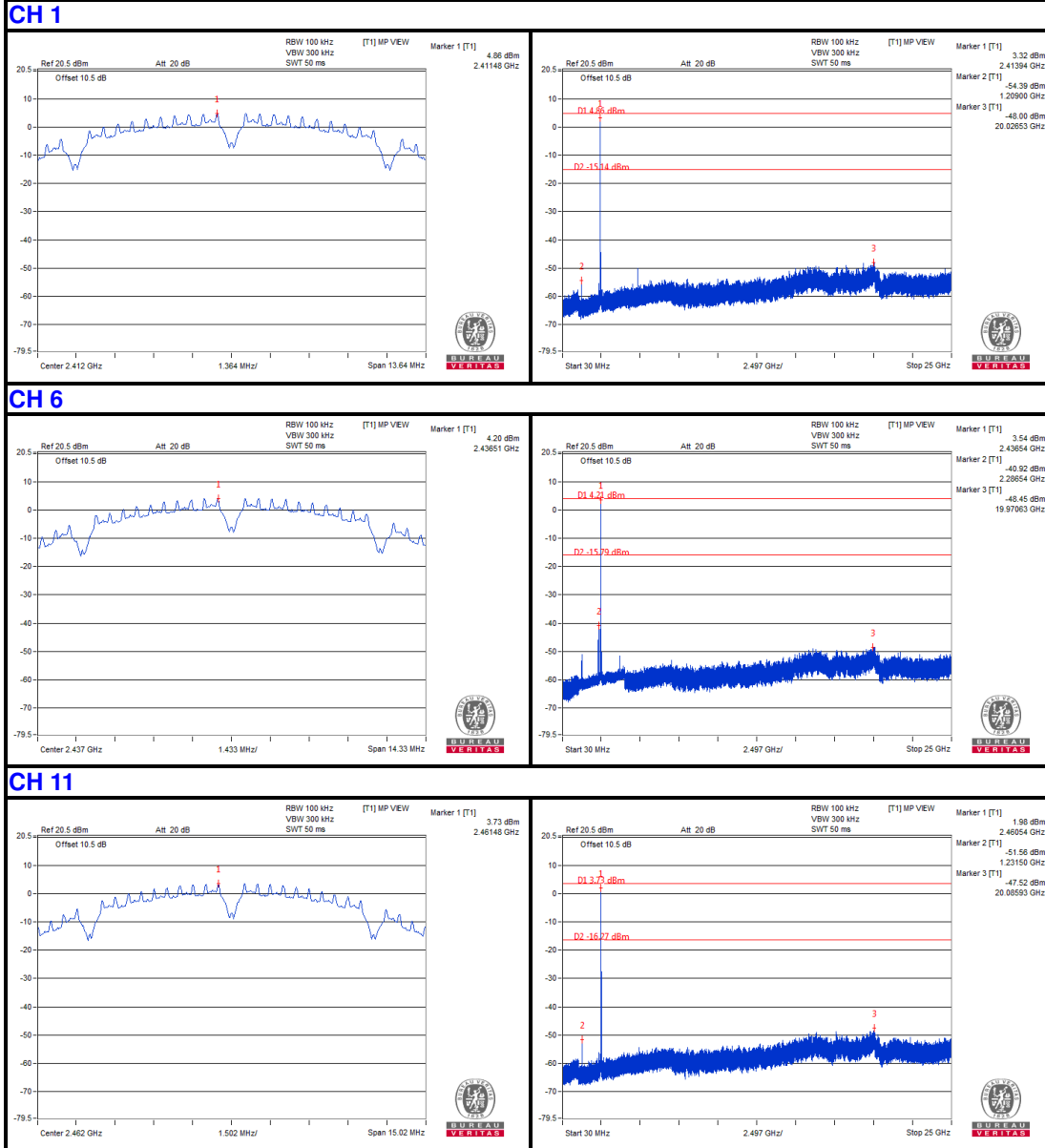
Same as item 4.2.6



### 4.5.7 TEST RESULTS

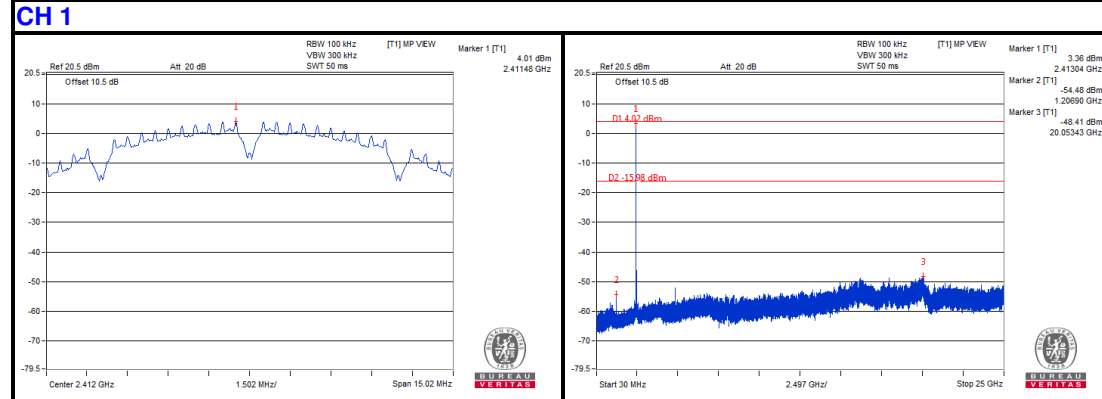
802.11b

CHAIN 0

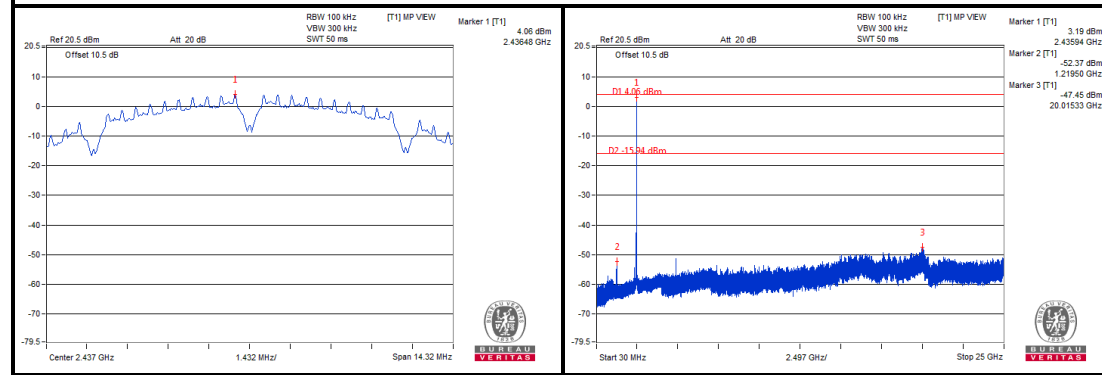




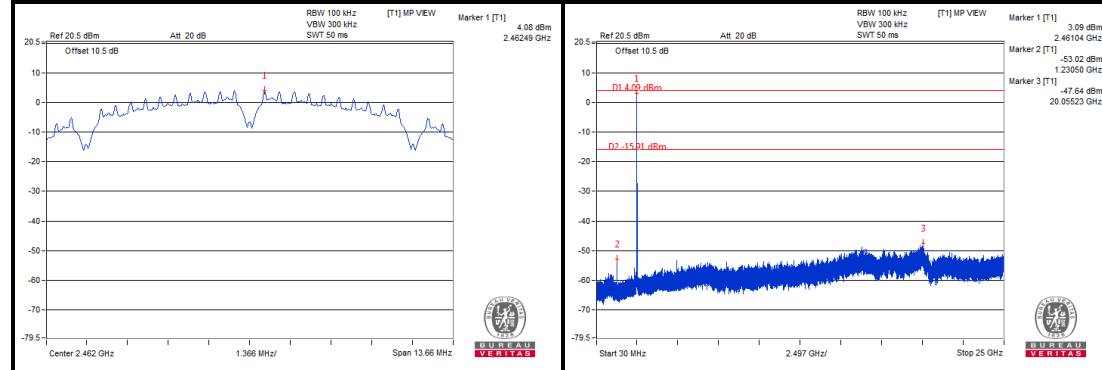
**CHAIN 1**



**CH 6**



**CH 11**

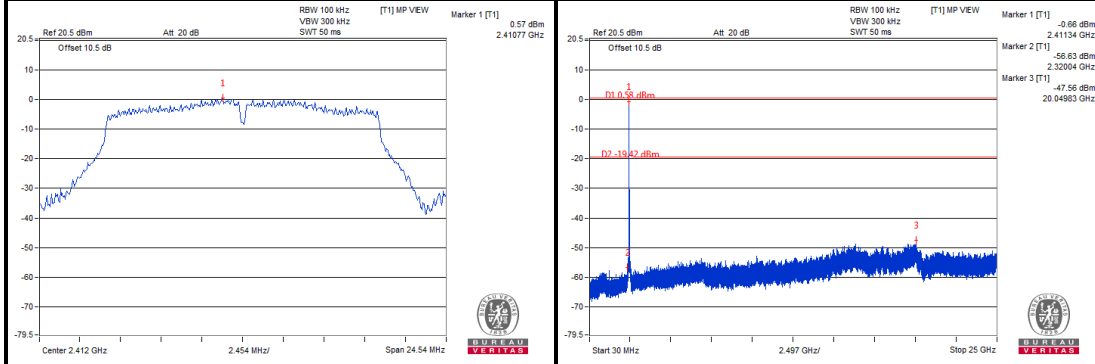




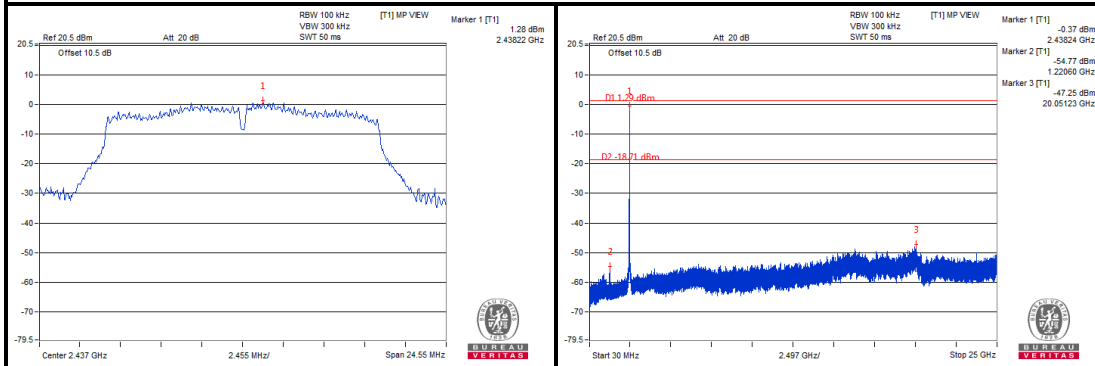
802.11g

CHAIN 0

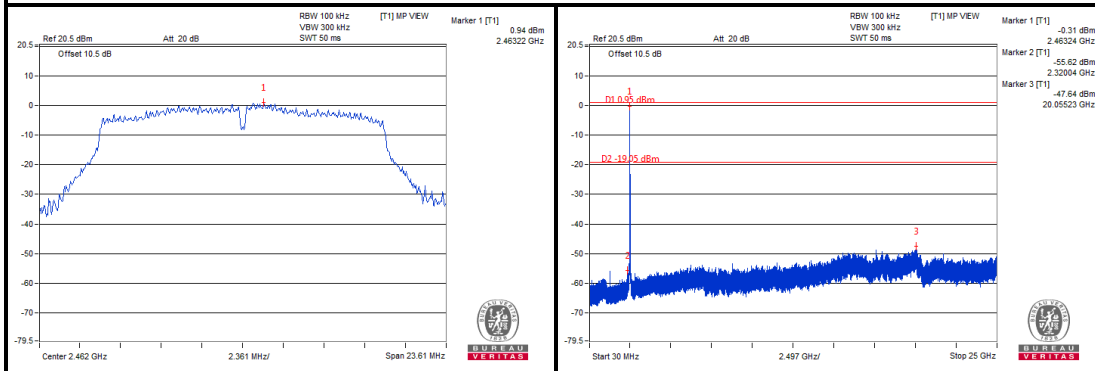
CH 1



CH 6

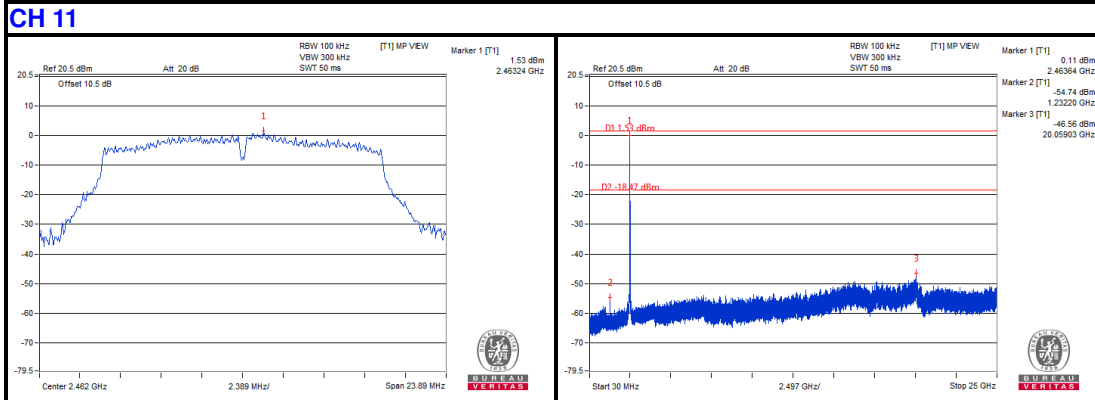
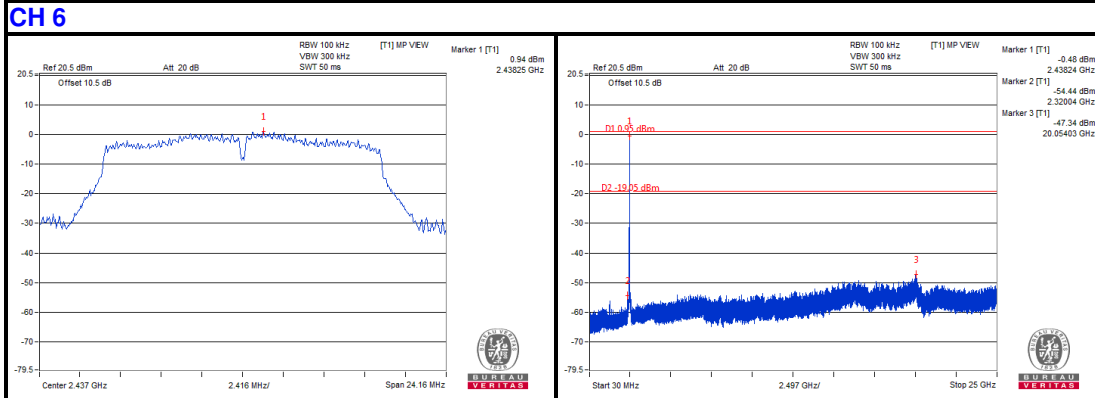
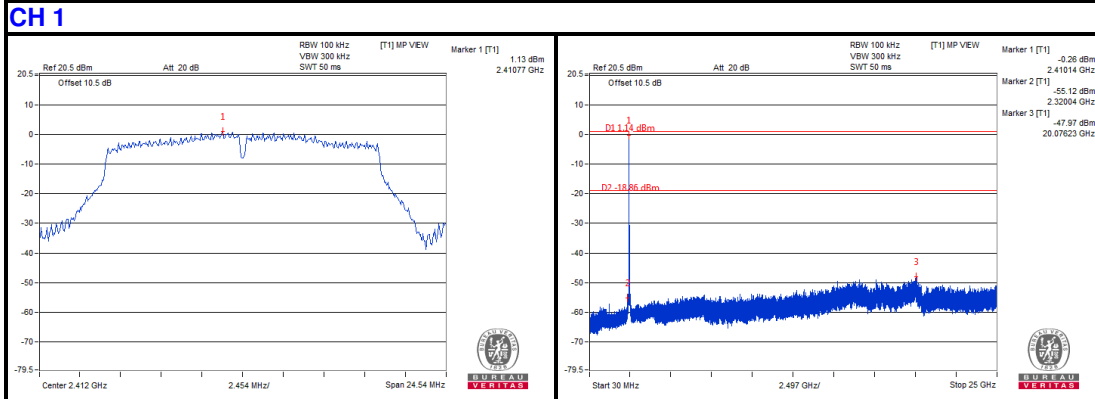


CH 11





**CHAIN 1**

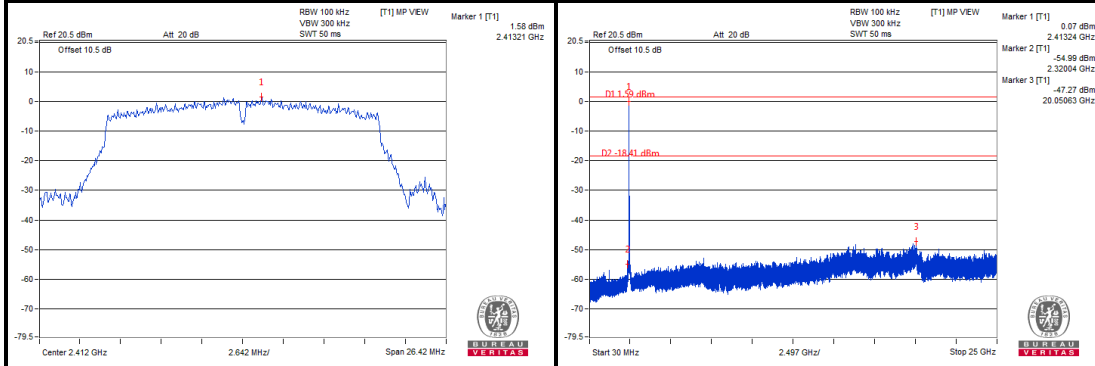




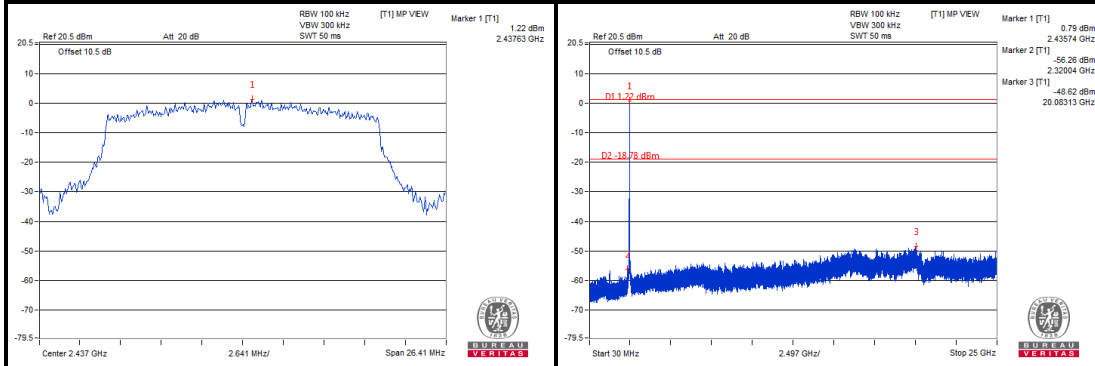
802.11n 20MHz

CHAIN 0

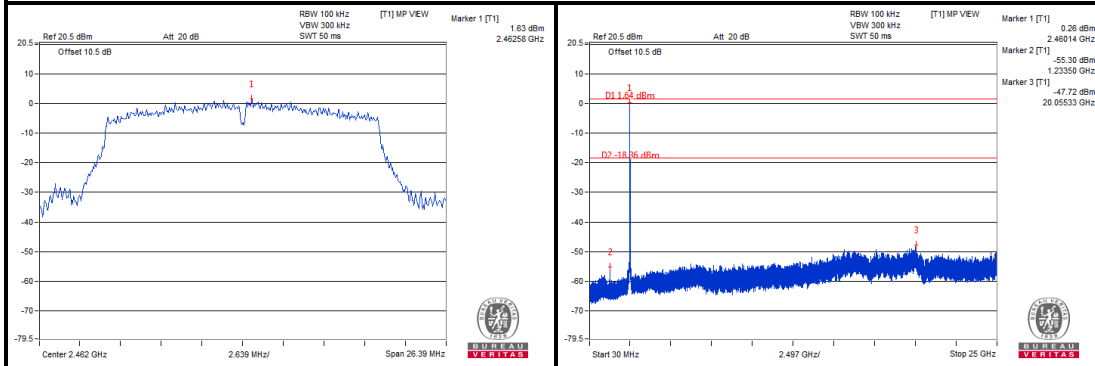
CH 1



CH 6



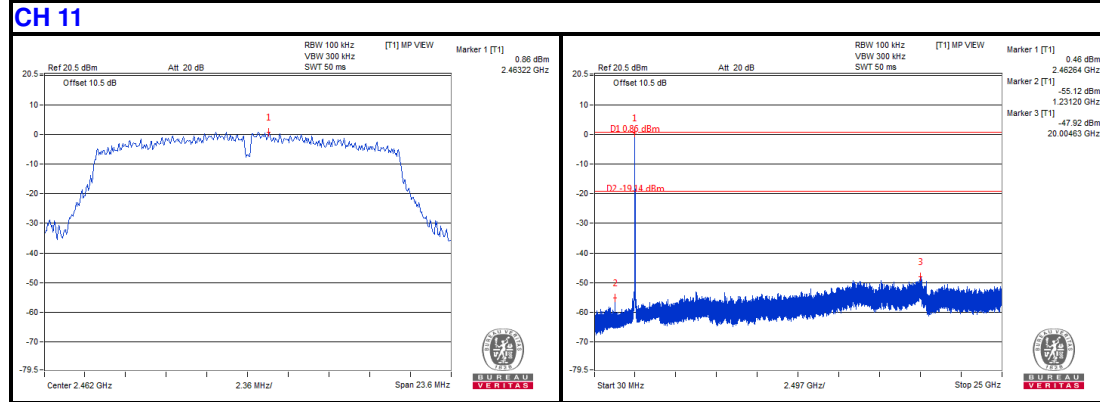
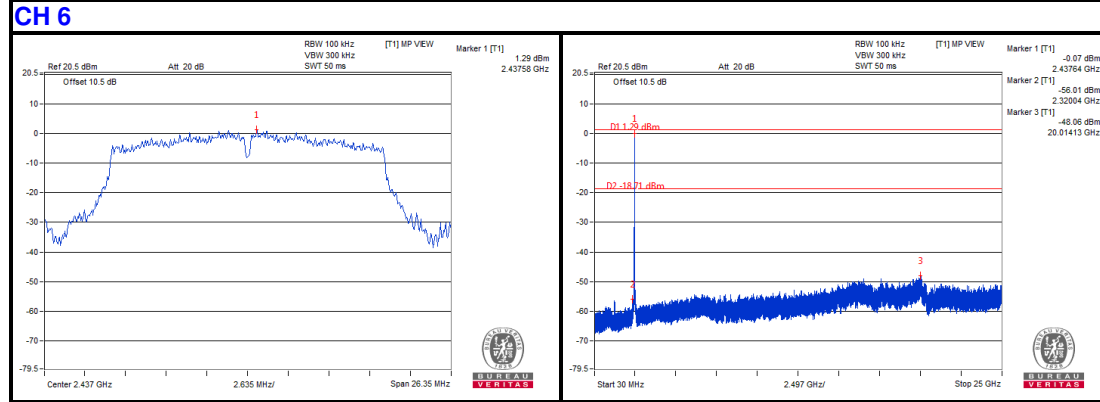
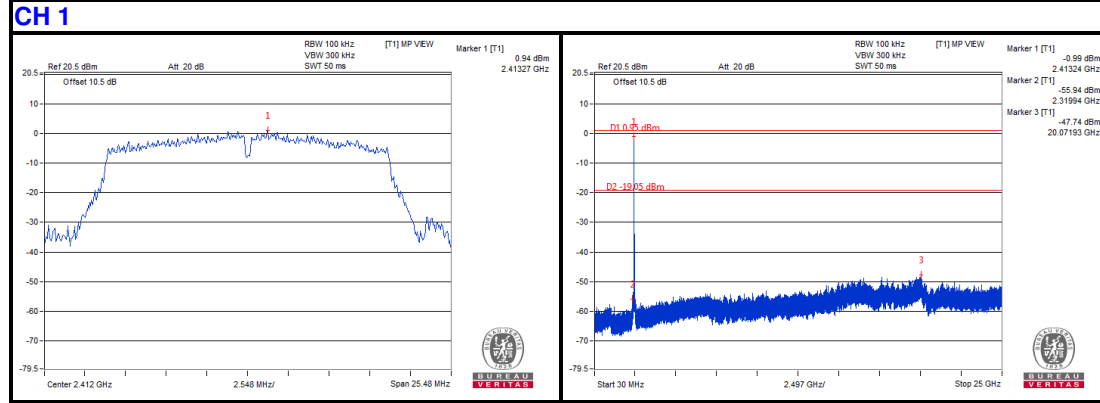
CH 11







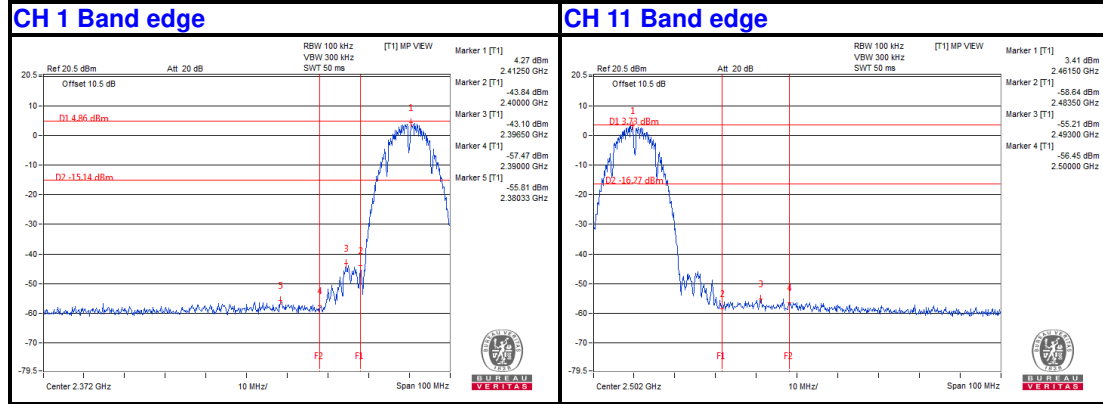
**CHAIN 1**



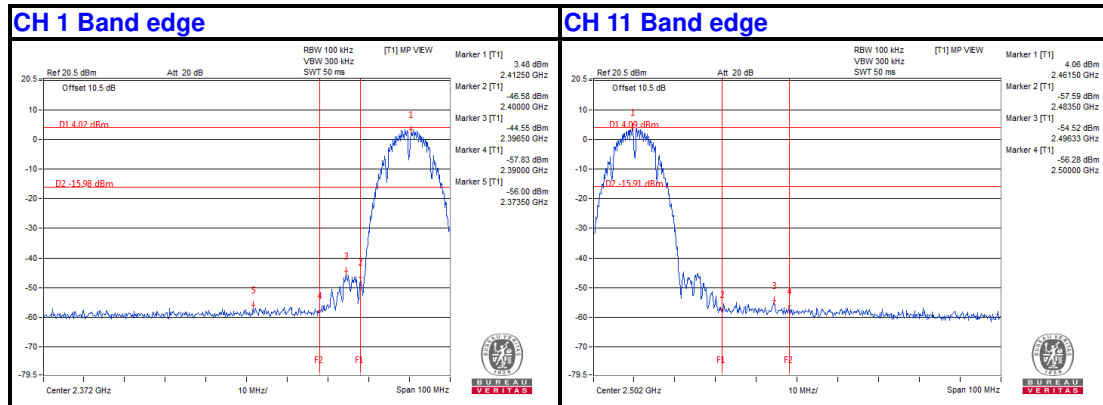


802.11b

CHAIN 0



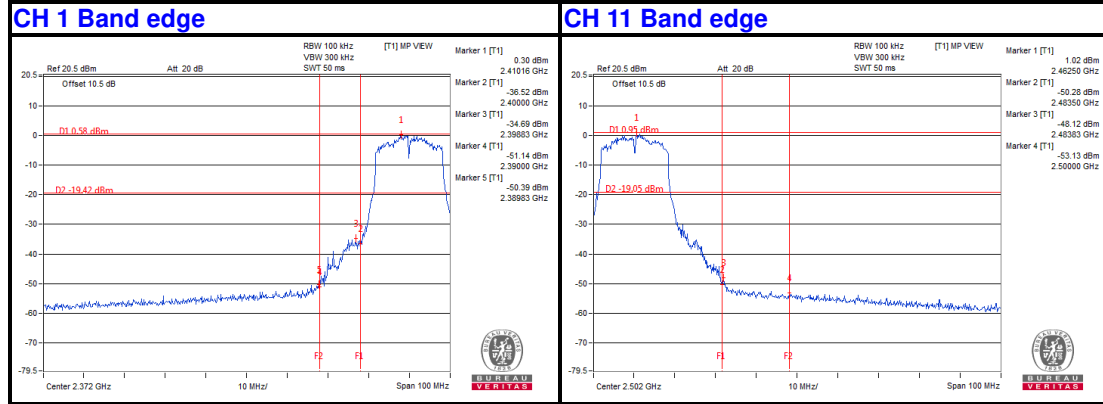
CHAIN 1



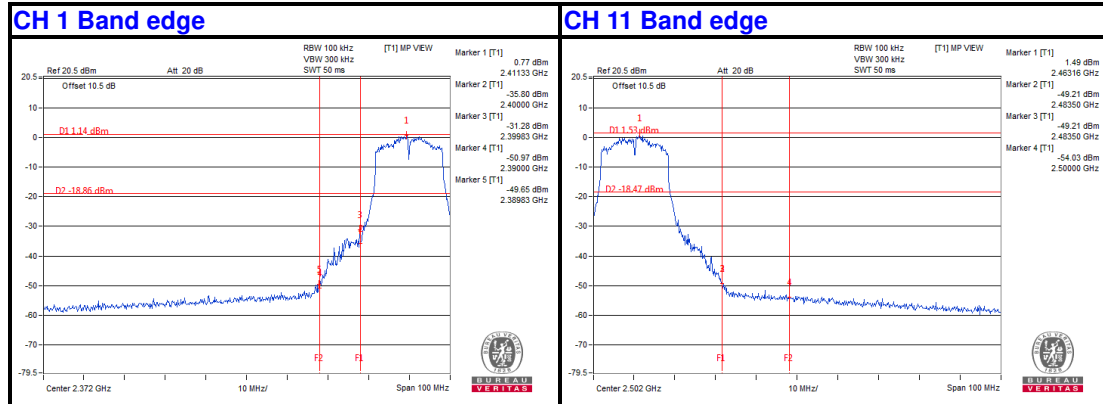


802.11g

CHAIN 0



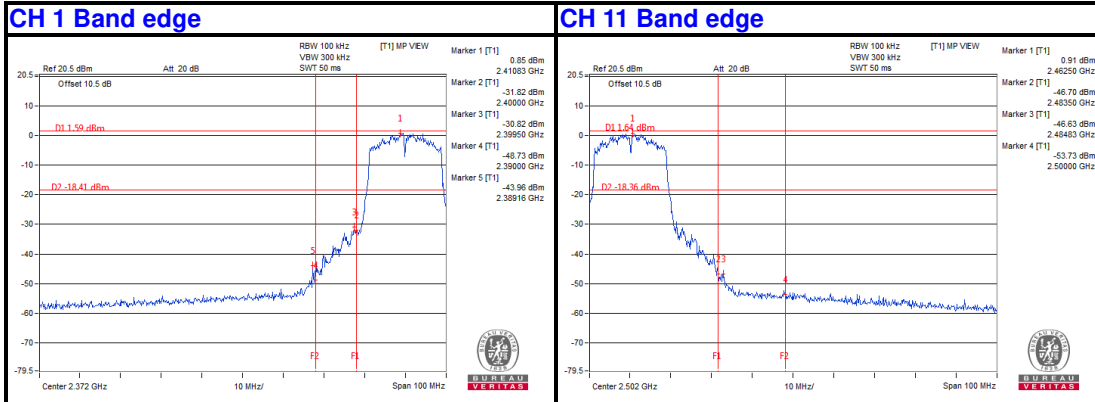
CHAIN 1



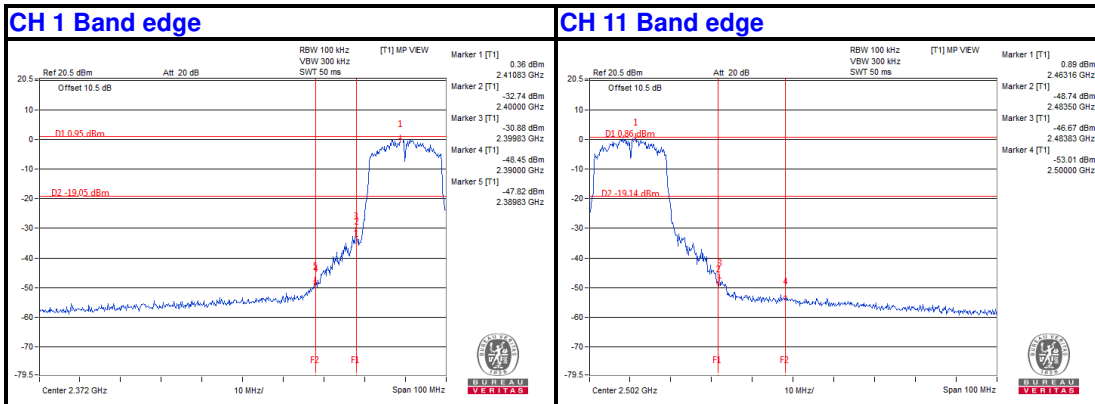


802.11n 20MHz

CHAIN 0



CHAIN 1





**BUREAU**  
**VERITAS** Test Report No.: RF170110N015

## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

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



**BUREAU**  
**VERITAS** Test Report No.: RF170110N015

## **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---**