



BUREAU  
VERITAS

Test Report No.: RF160217N002



Test Lab  
Cert 2951.01

# TEST REPORT



Applicant	MTRLC LLC
Address	PO Box 121147 Boston, MA 02112-1147

Manufacturer or Supplier	MTRLC LLC
Address	PO Box 121147 Boston, MA 02112-1147
Product	8x4 DOCSIS 3.0 Cable Modem plus N450 Router
Brand Name	Motorola
Model	MG7315
Additional Model & Model Difference	MG7315XY (Where X can be A, B, C, D or blank, and Y can be A, B, C, D or blank), See item 3.1 Note.
Date of tests	Feb. 17, 2016 ~ Mar. 15, 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 Chris Chen Manager / EMC Department
	
	Date: Mar. 15, 2016

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**BUREAU  
VERITAS**

Test Report No.: RF160217N002

## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF160217N002	Original release	Mar. 15, 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	PASS	Meet the requirement of limit.
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
Conducted emissions	9kHz~30MHz	2.70dB
Radiated emissions	9KHz ~ 30MHz	2.90dB
	30MHz ~ 1GMHz	3.67dB
	1GHz ~ 18GHz	4.84dB
	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>	8x4 DOCSIS 3.0 Cable Modem plus N450 Router
<b>MODEL NO.</b>	MG7315
<b>ADDITIONAL MODEL</b>	MG7315XY
<b>FCC ID</b>	2AF5PMG7315
<b>NOMINAL VOLTAGE</b>	DC 12V from Adapter
<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) 2422-2452MHz for 11n(HT40)
<b>PEAK POWER</b>	WLAN: 27.76dBm (Maximum Average Power)
<b>ANTENNA TYPE</b>	Wire Antenna, 3dBi Gain
<b>I/O PORTS</b>	Refer to user's manual
<b>CABLE SUPPLIED</b>	RJ 45 Cable: Unshielded, Detachable, 1.50m

**NOTE:**

1. The EUT incorporates a MIMO function. Physically, the EUT provides transmitters and receivers listed as attach.

<b>MODULATION MODE</b>	<b>FUNCTION</b>
<b>802.11b</b>	1TX/1RX
<b>802.11g</b>	1TX/1RX
<b>802.11n (20MHz)</b>	3TX/3RX
<b>802.11n (40MHz)</b>	3TX/3RX

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.: 160217N002) for detailed product photo.
5. MG7315XY (Where X can be A, B, C, D or blank, and Y can be A, B, C, D or blank) are identical with each other except the model no. for trading purpose.



6. The EUT was powered by the following adapters:

ADAPTER	
BRAND:	Gongjin
MODEL:	S24B72-120A200-C4
INPUT:	AC 100-240V, 50/60Hz, 0.8A Max
OUTPUT:	DC 12.0V, 2A
CABLE:	Unshielded, Non-detachable, 1.50m



### 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		

7 channels are provided for 802.11n (HT40):

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





### 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	
<b>A</b>	√	√	√	√	<b>Powered by adapter with WIFI function</b>

Where **RE<1G**: Radiated Emission below 1GHz      **RE≥1G**: Radiated Emission above 1GHz  
**PLC**: Power Line Conducted Emission      **APCM**: Antenna Port Conducted Measurement

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

#### **POWER LINE CONDUCTED EMISSION TEST:**

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

EUT CONFIGURE MODE	TESTED CONDITION
-	WIFI (2.4G) Link + Adapter

#### **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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	AXIS
A	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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)	AXIS
A	802.11b	1 to 11	1, 6, 11	CCK	DBPSK	1.0	X
A	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	X
A	802.11n HT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5	X
A	802.11n HT40	3 to 9	3, 6, 9	OFDM	BPSK	13.5	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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
B	802.11b	1 to 11	1, 11	CCK	DBPSK	1.0
B	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
B	802.11n HT20	1 to 11	1, 11	OFDM	BPSK	6.5
B	802.11n HT40	3 to 9	3, 9	OFDM	BPSK	13.5



**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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
B	802.11b	1 to 11	1, 6, 11	CCK	DBPSK	1.0
B	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
B	802.11n HT20	1 to 11	1,6, 11	OFDM	BPSK	6.5
B	802.11n HT40	3 to 9	3,6, 9	OFDM	BPSK	13.5

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE	TESTED BY
RE<1G	25deg. C, 55%RH	DC 12.0V from Adapter	Sen He
RE≥1G	25deg. C, 55%RH	DC 12.0V from Adapter	Sen He
PLC	20deg. C, 56%RH	DC 12.0V from Adapter	Breeze Jiang
APCM	20deg. C, 55%RH	DC 12.0V from Adapter	Breeze Jiang



### **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**
- 558074 D01 DTS Meas Guidance v03r04**
- ANSI C63.10-2013**

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

**NOTE:** It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B(DoC). The test report has been issued separately.

### **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.

<b>NO.</b>	<b>PRODUCT</b>	<b>BRAND</b>	<b>MODEL NO.</b>	<b>SERIAL NO.</b>	<b>FCC ID</b>
1	Notebook PC	hp	4431s	CNU238944Z	N/A

<b>NO.</b>	<b>SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS</b>
1	AC Line:Unshielded, Detachable 1.0m, Unshielded, Undetachable 1.5m



## 4 TEST TYPES AND RESULTS

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBµV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

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

#### 4.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCI	100962	Mar. 05,16	Mar. 04,17
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	Apr. 25,15	Apr. 24,16
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	Apr. 25,15	Apr. 24,16
Voltage probe	SCHWARZBECK	TK 9421	TK 9421-176	Jan. 08,16	Jan. 07,17
Test software	ADT	ADT_Cond_V7.3.7	N/A	N/A	N/A

- NOTE:**
1. The test was performed in shielded room 553.
  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.



#### 4.1.3 TEST PROCEDURES

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

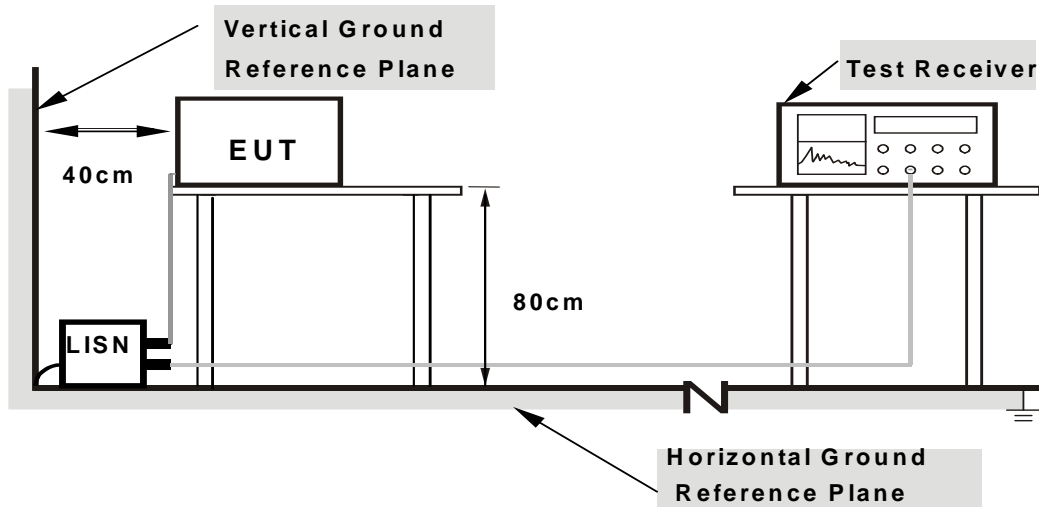
**NOTE:** All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation.



#### 4.1.5 TEST SETUP



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

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

#### 4.1.6 EUT OPERATING CONDITIONS

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



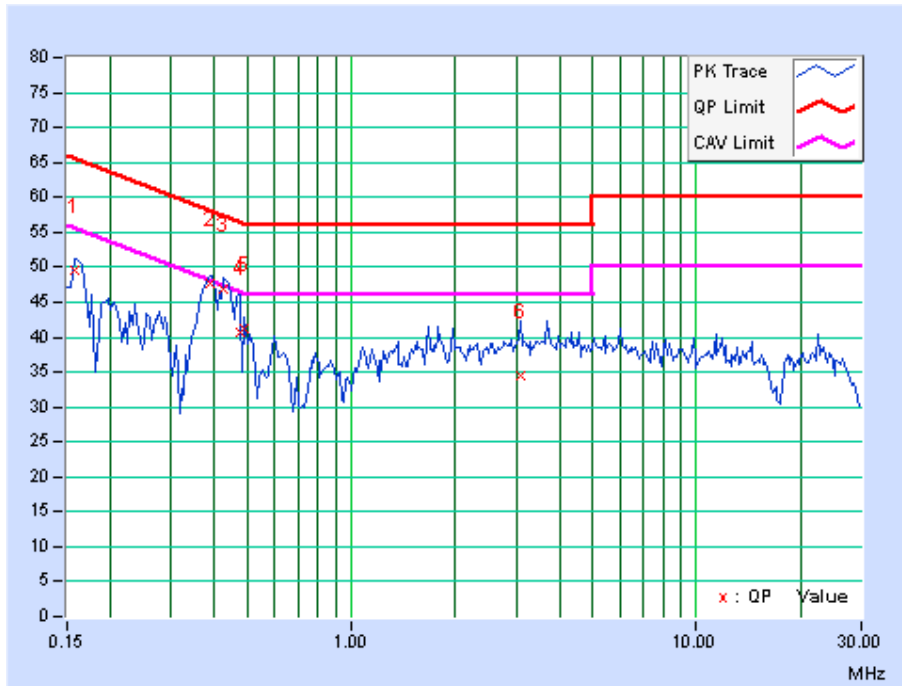
4.1.7 TEST RESULTS

CONDUCTED WORST-CASE DATA: WIFI LINK

PHASE	Line	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	9.74	39.80	31.20	49.54	40.94	65.58	55.58	-16.03	-14.63
2	0.38828	9.76	37.88	31.80	47.64	41.56	58.10	48.10	-10.47	-6.55
<b>3</b>	<b>0.42734</b>	<b>9.77</b>	<b>37.14</b>	<b>31.38</b>	<b>46.91</b>	<b>41.15</b>	<b>57.30</b>	<b>47.30</b>	<b>-10.40</b>	<b>-6.16</b>
4	0.47422	9.77	30.96	18.10	40.73	27.87	56.44	46.44	-15.70	-18.56
5	0.48984	9.78	31.30	17.94	41.08	27.72	56.17	46.17	-15.09	-18.45
6	3.09375	9.77	24.64	16.72	34.41	26.49	56.00	46.00	-21.59	-19.51

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.



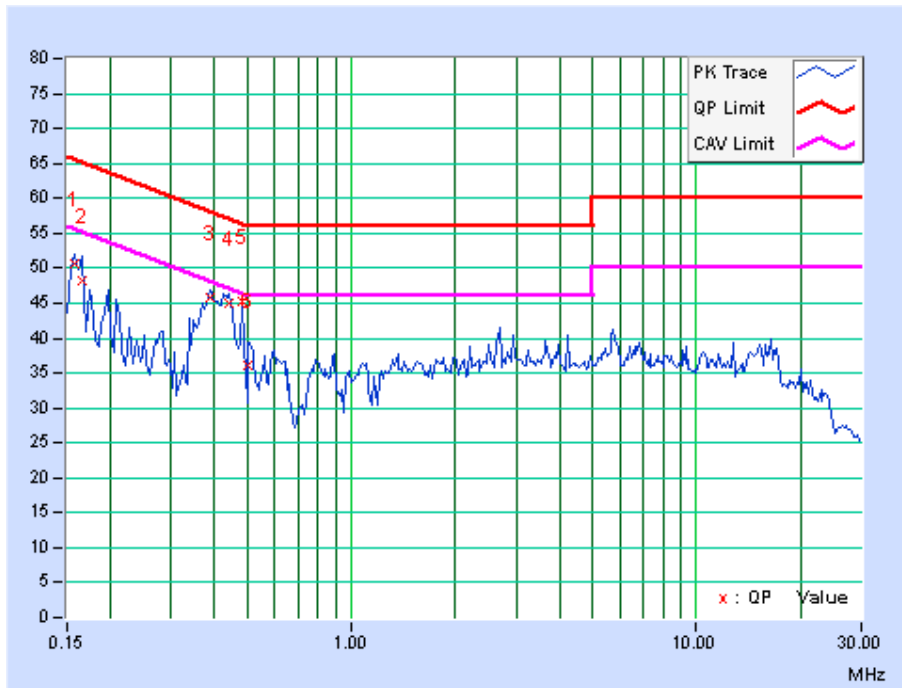




<b>PHASE</b>	Neutral	<b>6dB BANDWIDTH</b>	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15781	9.47	41.08	31.14	50.55	40.61	65.58	55.58	-15.03	-14.97
2	0.16562	9.47	38.72	25.24	48.19	34.71	65.18	55.18	-16.98	-20.46
3	0.38828	9.48	36.32	28.90	45.80	38.38	58.10	48.10	-12.31	-9.73
4	0.43906	9.47	35.50	28.38	44.97	37.85	57.08	47.08	-12.11	-9.23
5	0.48203	9.47	35.68	22.80	45.15	32.27	56.30	46.30	-11.15	-14.03
6	0.50000	9.47	26.66	25.08	36.13	34.55	56.00	46.00	-19.87	-11.45

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. Emission Level = Correction Factor + Reading Value.





## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

**NOTE:**

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

**4.2.2 TEST INSTRUMENTS**

<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Last Cal.</b>	<b>Next Cal.</b>
EMI Test Receiver	Rohde&Schwarz	ESR7	101494	Apr. 27,15	Apr. 26,16
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101094	Apr. 23,15	Apr. 22,16
Bilog Antenna	Teseq	CBL 6111D	30643	Jul. 16, 15	Jul. 15, 16
Horn Antenna	ETS-Lindgren	3117	00062558	May 30,14	May 29,16
GPS Generator+ Antenna	TOJOIN	GNSS-5000A	E1-010119	Aug. 08, 14	Aug. 07,16
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	Apr. 19,14	Apr. 18,16
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
Horn Antenna (15GHz-40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170147	Jan. 21,14	Jan. 20,17
Amplifier (9kHz-1GHz)	SONOMA	310D	186955	Mar. 04,16	Mar. 03, 17
Pre-Amplifier(1-18G)	HP	8449B	3008A00409	Apr. 25,15	Apr. 24,16
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	Sep. 01,15	Aug. 31,16

**NOTE:**

1. The test was performed in 966 Chamber.
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.
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.



#### 4.2.3 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:**

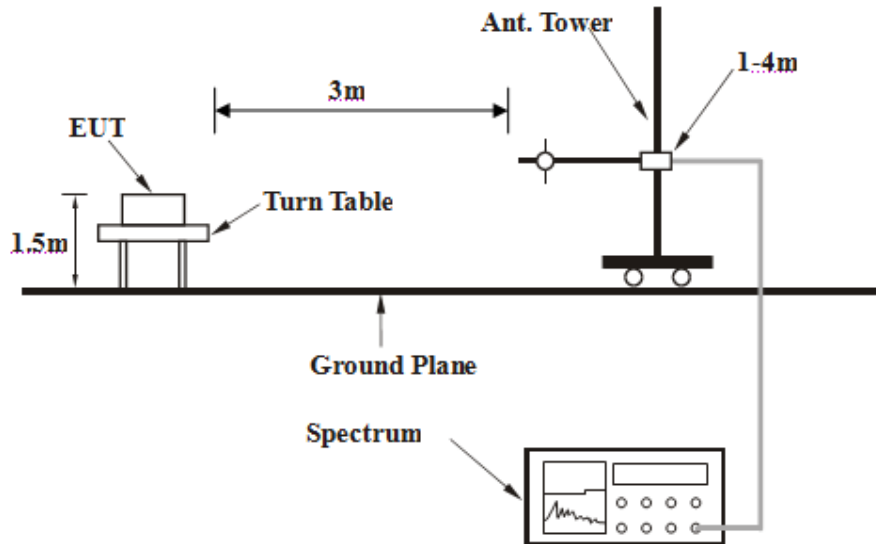
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution 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.

#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation.



#### 4.2.5 TEST SETUP



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

#### 4.2.6 EUT OPERATING CONDITIONS

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



**4.2.7 TEST RESULTS**

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

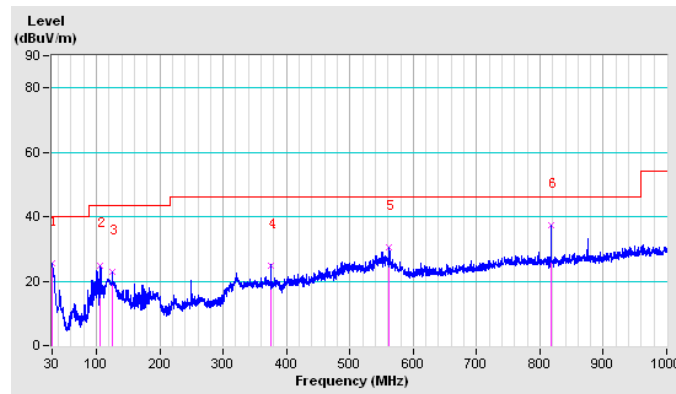
**802.11b**

<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 (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.00	25.55	40.00	-14.45	100	0	37.86	-12.31
2	105.69	24.96	43.50	-18.54	100	0	43.97	-19.01
3	124.77	22.92	43.50	-20.58	100	0	40.69	-17.77
4	374.79	24.87	46.00	-21.13	100	0	36.67	-11.80
5	561.09	30.40	46.00	-15.60	100	0	35.64	-5.24
6	817.58	37.28	46.00	-8.72	100	0	38.97	-1.69

**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.



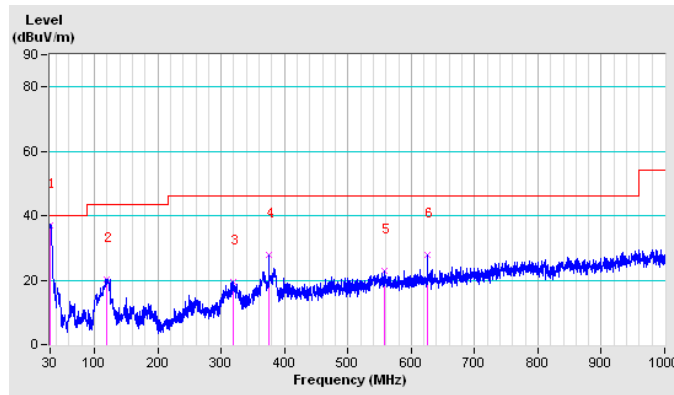


<b>CHANNEL</b>	Channel 1	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.00	37.00	40.00	-3.00	100	0	49.31	-12.31
2	119.92	20.15	43.50	-23.35	100	0	38.03	-17.88
3	319.48	19.56	46.00	-26.44	100	0	32.94	-13.38
4	375.11	27.73	46.00	-18.27	100	0	39.51	-11.78
5	558.50	22.71	46.00	-23.29	100	0	27.97	-5.26
6	625.13	27.90	46.00	-18.10	100	0	32.65	-4.75

**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	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz	FUNCTION	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	47.3 PK	74.0	-26.7	1.08 H	74	43.63	3.67
2	2390.00	36.5 AV	54.0	-17.5	1.08 H	74	32.83	3.67
3	*2412.00	95.2 PK			1.62 H	315	91.44	3.76
4	*2412.00	92.6 AV			1.62 H	315	88.84	3.76
5	4824.00	49.8 PK	74.0	-24.2	1.03 H	62	41.34	8.46
6	4824.00	41.2 AV	54.0	-12.8	1.03 H	62	32.74	8.46
7	#7236.00	51.2 PK	65.2	-14.0	1.00 H	77	38.04	13.16
8	#7236.00	38.1 AV	62.6	-24.5	1.00 H	77	24.94	13.16

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	53.4 PK	74.0	-20.6	1.22 V	152	49.73	3.67
2	2390.00	46.1 AV	54.0	-7.9	1.22 V	152	42.43	3.67
3	*2412.00	106.8 PK			1.15 V	95	103.04	3.76
4	*2412.00	103.7 AV			1.15 V	95	99.94	3.76
5	4824.00	55.6 PK	74.0	-18.4	1.24 V	8	47.14	8.46
6	4824.00	53.2 AV	54.0	-0.8	1.24 V	8	44.73	8.46
7	#7236.00	50.6 PK	76.8	-26.2	1.02 V	211	37.44	13.16
8	#7236.00	38.6 AV	73.7	-35.1	1.02 V	211	25.44	13.16

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	100.2 PK			1.42 H	217	96.33	3.87
2	*2437.00	97.6 AV			1.42 H	217	93.73	3.87
3	4874.00	50.1 PK	74.0	-23.9	1.02 H	2	41.60	8.50
4	4874.00	42.6 AV	54.0	-11.4	1.02 H	2	34.10	8.50
5	7311.00	50.4 PK	74.0	-23.6	1.00 H	77	37.16	13.24
6	7311.00	37.9 AV	54.0	-16.1	1.00 H	77	24.66	13.24

**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	109.4 PK			1.46 V	62	105.53	3.87
2	*2437.00	107.6 AV			1.46 V	62	103.73	3.87
3	4874.00	58.4 PK	74.0	-15.6	1.21 V	222	49.90	8.50
4	4874.00	53.3 AV	54.0	-0.7	1.21 V	222	44.76	8.50
5	7311.00	51.6 PK	74.0	-22.4	1.02 V	211	38.36	13.24
6	7311.00	43.8 AV	54.0	-10.2	1.02 V	211	30.56	13.24

**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	96.8 PK			1.31 H	7	92.84	3.96
2	*2462.00	94.2 AV			1.31 H	7	90.24	3.96
3	2483.50	47.6 PK	74.0	-26.4	1.00 H	192	43.55	4.05
4	2483.50	38.2 AV	54.0	-15.8	1.00 H	192	34.15	4.05
5	4924.00	48.6 PK	74.0	-25.4	1.04 H	42	40.05	8.55
6	4924.00	43.6 AV	54.0	-10.4	1.04 H	42	35.05	8.55
7	7386.00	51.9 PK	74.0	-22.1	1.01 H	188	38.56	13.34
8	7386.00	38.4 AV	54.0	-15.6	1.01 H	188	25.06	13.34

**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	108.6 PK			1.28 V	9	104.64	3.96
2	*2462.00	104.3 AV			1.28 V	9	100.34	3.96
3	2483.50	53.4 PK	74.0	-20.6	1.02 V	163	49.35	4.05
4	2483.50	44.2 AV	54.0	-9.8	1.02 V	163	40.15	4.05
5	4924.00	55.6 PK	74.0	-18.4	1.04 V	156	47.05	8.55
6	4924.00	53.3 AV	54.0	-0.7	1.04 V	156	44.79	8.55
7	7386.00	52.3 PK	74.0	-21.7	1.00 V	168	38.96	13.34
8	7386.00	39.1 AV	54.0	-14.9	1.00 V	168	25.76	13.34

**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

<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	55.5 PK	74.0	-18.5	1.25 H	213	51.83	3.67
2	2390.00	39.1 AV	54.0	-14.9	1.25 H	213	35.43	3.67
3	*2412.00	95.2 PK			1.62 H	267	91.44	3.76
4	*2412.00	89.1 AV			1.62 H	267	85.34	3.76
5	4824.00	50.1 PK	74.0	-23.9	1.01 H	7	41.64	8.46
6	4824.00	41.8 AV	54.0	-12.2	1.01 H	7	33.34	8.46
7	#7236.00	51.4 PK	65.2	-13.8	1.00 H	196	38.24	13.16
8	#7236.00	39.3 AV	59.1	-19.8	1.00 H	196	26.14	13.16

**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	68.2 PK	74.0	-5.8	1.02 V	212	64.53	3.67
2	2390.00	53.4 AV	54.0	-0.6	1.02 V	212	49.74	3.67
3	*2412.00	104.9 PK			1.02 V	222	101.14	3.76
4	*2412.00	96.8 AV			1.02 V	222	93.04	3.76
5	4824.00	50.2 PK	74.0	-23.8	1.02 V	211	41.74	8.46
6	4824.00	42.1 AV	54.0	-11.9	1.02 V	211	33.64	8.46
7	#7236.00	52.3 PK	74.9	-22.6	1.00 V	14	39.14	13.16
8	#7236.00	38.6 AV	66.8	-28.2	1.00 V	14	25.44	13.16

**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	98.6 PK			1.42 H	249	94.73	3.87
2	*2437.00	91.2 AV			1.42 H	249	87.33	3.87
3	4874.00	48.2 PK	74.0	-25.8	1.06 H	91	39.70	8.50
4	4874.00	40.7 AV	54.0	-13.3	1.06 H	91	32.20	8.50
5	7311.00	50.1 PK	74.0	-23.9	1.14 H	52	36.86	13.24
6	7311.00	37.9 AV	54.0	-16.1	1.14 H	52	24.66	13.24

**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	109.6 PK			1.00 V	25	105.73	3.87
2	*2437.00	105.6 AV			1.00 V	25	101.73	3.87
3	4874.00	58.4 PK	74.0	-15.6	1.02 V	242	49.90	8.50
4	4874.00	53.1 AV	54.0	-0.9	1.02 V	242	44.62	8.50
5	7311.00	52.3 PK	74.0	-21.7	1.02 V	76	39.06	13.24
6	7311.00	41.6 AV	54.0	-12.4	1.02 V	76	28.36	13.24

**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	93.9 PK			1.25 H	51	89.94	3.96
2	*2462.00	88.4 AV			1.25 H	51	84.44	3.96
3	2483.50	59.2 PK	74.0	-14.8	1.36 H	92	55.15	4.05
4	2483.50	48.2 AV	54.0	-5.8	1.36 H	92	44.15	4.05
5	4924.00	51.2 PK	74.0	-22.8	1.52 H	2	42.65	8.55
6	4924.00	40.6 AV	54.0	-13.4	1.52 H	2	32.05	8.55
7	7386.00	51.6 PK	74.0	-22.4	1.00 H	76	38.26	13.34
8	7386.00	38.4 AV	54.0	-15.6	1.00 H	76	25.06	13.34
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	106.2 PK			1.84 V	89	102.24	3.96
2	*2462.00	99.1 AV			1.84 V	89	95.14	3.96
3	2483.50	69.3 PK	74.0	-4.7	1.81 V	142	65.25	4.05
4	2483.50	53.3 AV	54.0	-0.7	1.81 V	142	49.21	4.05
5	4924.00	50.1 PK	74.0	-23.9	1.02 V	13	41.55	8.55
6	4924.00	41.3 AV	54.0	-12.7	1.02 V	13	32.75	8.55
7	7386.00	51.6 PK	74.0	-22.4	1.00 V	125	38.26	13.34
8	7386.00	38.4 AV	54.0	-15.6	1.00 V	125	25.06	13.34

**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	68.4 PK	74.0	-5.6	1.26 H	354	64.73	3.67
2	2390.00	51.6 AV	54.0	-2.4	1.26 H	354	47.93	3.67
3	*2412.00	106.8 PK			1.08 H	351	103.04	3.76
4	*2412.00	96.2 AV			1.08 H	351	92.44	3.76
5	4824.00	50.2 PK	74.0	-23.8	1.01 H	112	41.74	8.46
6	4824.00	41.6 AV	54.0	-12.4	1.01 H	112	33.14	8.46
7	#7236.00	50.8 PK	76.8	-26.0	1.00 H	176	37.64	13.16
8	#7236.00	38.4 AV	66.2	-27.8	1.00 H	176	25.24	13.16

**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	71.8 PK	74.0	-2.2	1.06 V	172	68.13	3.67
2	2390.00	53.1 AV	54.0	-0.9	1.06 V	172	49.47	3.67
3	*2412.00	106.6 PK			1.05 V	83	102.84	3.76
4	*2412.00	98.2 AV			1.05 V	83	94.44	3.76
5	4824.00	54.6 PK	74.0	-19.4	1.01 V	142	46.14	8.46
6	4824.00	41.2 AV	54.0	-12.8	1.01 V	142	32.74	8.46
7	#7236.00	52.6 PK	76.6	-24.0	1.00 V	13	39.44	13.16
8	#7236.00	39.1 AV	68.2	-29.1	1.00 V	13	25.94	13.16

**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	110.2 PK			1.25 H	46	106.35	3.87
2	*2437.00	104.6 AV			1.25 H	46	100.73	3.87
3	4874.00	61.4 PK	74.0	-12.6	1.02 H	21	52.90	8.50
4	4874.00	48.5 AV	54.0	-5.5	1.02 H	21	40.00	8.50
5	7311.00	50.2 PK	74.0	-23.8	1.02 H	11	36.96	13.24
6	7311.00	39.1 AV	54.0	-14.9	1.02 H	11	25.86	13.24

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	109.2 PK			1.02 V	62	105.33	3.87
2	*2437.00	102.6 AV			1.02 V	62	98.73	3.87
3	4874.00	62.3 PK	74.0	-11.7	1.03 V	322	53.80	8.50
4	4874.00	53.5 AV	54.0	-0.6	1.03 V	322	44.95	8.50
5	7311.00	53.4 PK	74.0	-20.6	2.01 V	36	40.16	13.24
6	7311.00	40.2 AV	54.0	-13.8	2.01 V	36	26.96	13.24

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	107.6 PK			1.05 H	82	103.64	3.96
2	*2462.00	101.9 AV			1.05 H	82	97.94	3.96
3	2483.50	66.2 PK	74.0	-7.8	1.12 H	54	62.15	4.05
4	2483.50	50.1 AV	54.0	-3.9	1.12 H	54	46.05	4.05
5	4924.00	48.6 PK	74.0	-25.4	1.02 H	136	40.05	8.55
6	4924.00	39.5 AV	54.0	-14.5	1.02 H	136	30.95	8.55
7	7386.00	50.1 PK	74.0	-23.9	1.01 H	188	36.76	13.34
8	7386.00	38.4 AV	54.0	-15.6	1.01 H	188	25.06	13.34

**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	108.5 PK			1.28 V	91	104.54	3.96
2	*2462.00	103.4 AV			1.28 V	91	99.44	3.96
3	2483.50	68.9 PK	74.0	-5.1	1.01 V	142	64.85	4.05
4	2483.50	53.4 AV	54.0	-0.6	1.01 V	142	49.33	4.05
5	4924.00	51.2 PK	74.0	-22.8	1.02 V	216	42.65	8.55
6	4924.00	40.7 AV	54.0	-13.3	1.02 V	216	32.15	8.55
7	7386.00	52.3 PK	74.0	-21.7	1.00 V	2	38.96	13.34
8	7386.00	40.1 AV	54.0	-13.9	1.00 V	2	26.76	13.34

**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 (40MHz)

<b>CHANNEL</b>	TX Channel 3	<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	66.8 PK	74.0	-7.2	1.32 H	5	63.13	3.67
2	2390.00	51.6 AV	54.0	-2.4	1.32 H	5	47.93	3.67
3	*2422.00	103.3 PK			1.82 H	8	99.50	3.80
4	*2422.00	94.2 AV			1.82 H	8	90.40	3.80
5	4844.00	50.1 PK	74.0	-23.9	1.01 H	77	41.63	8.47
6	4844.00	39.4 AV	54.0	-14.6	1.01 H	77	30.93	8.47
7	7266.00	50.1 PK	74.0	-23.9	1.02 H	46	36.90	13.20
8	7266.00	38.4 AV	54.0	-15.6	1.02 H	46	25.20	13.20

**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	67.6 PK	74.0	-6.4	1.06 V	266	63.93	3.67
2	2390.00	53.2 AV	54.0	-0.8	1.06 V	266	49.54	3.67
3	*2422.00	102.9 PK			1.11 V	144	99.10	3.80
4	*2422.00	93.5 AV			1.11 V	144	89.70	3.80
5	4844.00	52.6 PK	74.0	-21.4	1.03 V	81	44.13	8.47
6	4844.00	40.1 AV	54.0	-13.9	1.03 V	81	31.63	8.47
7	7266.00	52.1 PK	74.0	-21.9	1.01 V	7	38.90	13.20
8	7266.00	39.9 AV	54.0	-14.1	1.01 V	7	26.70	13.20

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 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	106.4 PK			1.02 H	88	102.53	3.87
2	*2437.00	98.6 AV			1.02 H	88	94.73	3.87
3	4874.00	54.2 PK	74.0	-19.8	1.02 H	216	45.70	8.50
4	4874.00	48.1 AV	54.0	-5.9	1.02 H	216	39.60	8.50
5	7311.00	50.1 PK	74.0	-23.9	1.02 H	44	36.86	13.24
6	7311.00	37.9 AV	54.0	-16.1	1.02 H	44	24.66	13.24

**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	109.6 PK			1.06 V	8	105.73	3.87
2	*2437.00	101.2 AV			1.06 V	8	97.33	3.87
3	4874.00	57.5 PK	74.0	-16.5	1.04 V	74	49.00	8.50
4	<b>4874.00</b>	<b>53.5 AV</b>	<b>54.0</b>	<b>-0.5</b>	<b>1.04 V</b>	<b>74</b>	<b>45.03</b>	<b>8.50</b>
5	7311.00	52.2 PK	74.0	-21.8	1.00 V	133	38.96	13.24
6	7311.00	40.1 AV	54.0	-13.9	1.00 V	133	26.86	13.24

**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 9	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	*2452.00	104.9 PK			1.28 H	88	100.98	3.92
2	*2452.00	93.8 AV			1.28 H	88	89.88	3.92
3	2483.50	64.2 PK	74.0	-9.8	1.04 H	78	60.15	4.05
4	2483.50	51.9 AV	54.0	-2.1	1.04 H	78	47.85	4.05
5	4904.00	50.1 PK	74.0	-23.9	1.02 H	44	41.57	8.53
6	4904.00	41.1 AV	54.0	-12.9	1.02 H	44	32.57	8.53
7	7356.00	52.2 PK	74.0	-21.8	2.01 H	63	38.90	13.30
8	7356.00	40.2 AV	54.0	-13.8	2.01 H	63	26.90	13.30

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	*2452.00	105.1 PK			1.62 V	237	101.18	3.92
2	*2452.00	95.6 AV			1.62 V	237	91.68	3.92
3	2483.50	65.5 PK	74.0	-8.5	1.51 V	203	61.45	4.05
4	2483.50	53.4 AV	54.0	-0.6	1.51 V	203	49.34	4.05
5	4904.00	50.1 PK	74.0	-23.9	1.02 V	5	41.57	8.53
6	4904.00	42.3 AV	54.0	-11.7	1.02 V	5	33.77	8.53
7	7356.00	51.9 PK	74.0	-22.1	1.00 V	166	38.60	13.30
8	7356.00	39.9 AV	54.0	-14.1	1.00 V	166	26.60	13.30

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.



### 4.3 6dB BANDWIDTH MEASUREMENT

#### 4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 4.3.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Power Sensor	Keysight	U2021XA	MY55060016	Feb. 18,16	Feb. 17,17
Power Sensor	Keysight	U2021XA	MY55060018	Feb. 18,16	Feb. 17,17
Digital Multimeter	FLUKE	15B	A1220010DG	Oct. 12, 15	Oct.11, 16
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Sep.07,15	Sep. 06,16
Oscilloscope	Agilent	DSO9254A	MY51260160	Nov. 28,15	Nov. 27,16
Signal Analyzer	Rohde & Schwarz	FSV7	102331	Nov. 05,15	Nov. 04,16
Signal Generator	Agilent	N5183A	MY50140980	Nov. 05,15	Nov. 04,16
ESG Vector Signal Generator	Agilent	E4438C	MY49072505	Apr. 22, 15	Apr. 21, 16
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	Sep. 01,15	Aug. 31,16

**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.

#### 4.3.3 TEST PROCEDURE

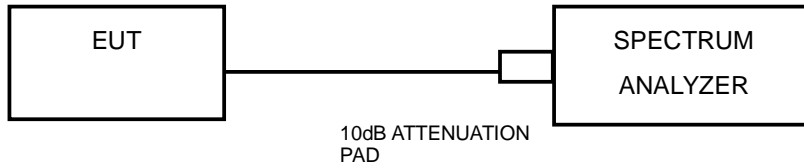
1. Set resolution bandwidth (RBW) = 100KHz
2. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that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

#### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation.



#### 4.3.5 TEST SETUP



#### 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.



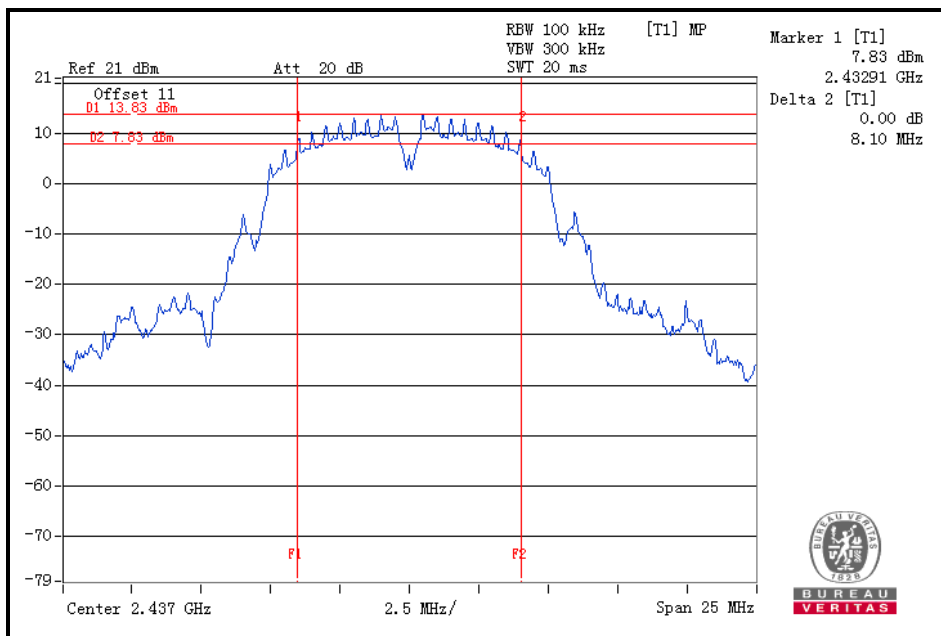
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### 4.3.7 TEST RESULTS

#### 802.11b

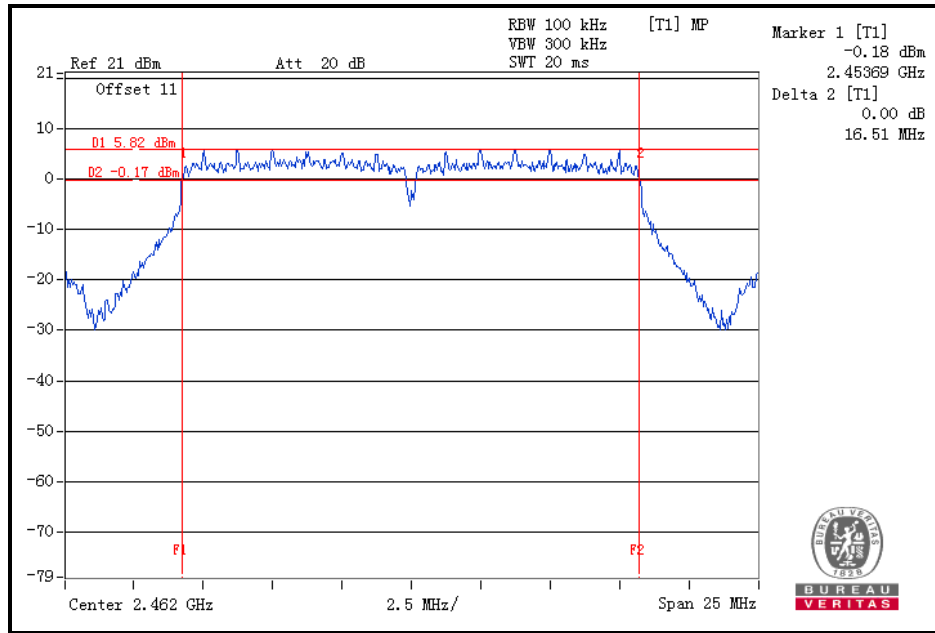
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	8.07	0.5	PASS
6	2437	8.10	0.5	PASS
11	2462	8.09	0.5	PASS





**802.11g**

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.50	0.5	PASS
6	2437	16.42	0.5	PASS
11	2462	16.51	0.5	PASS



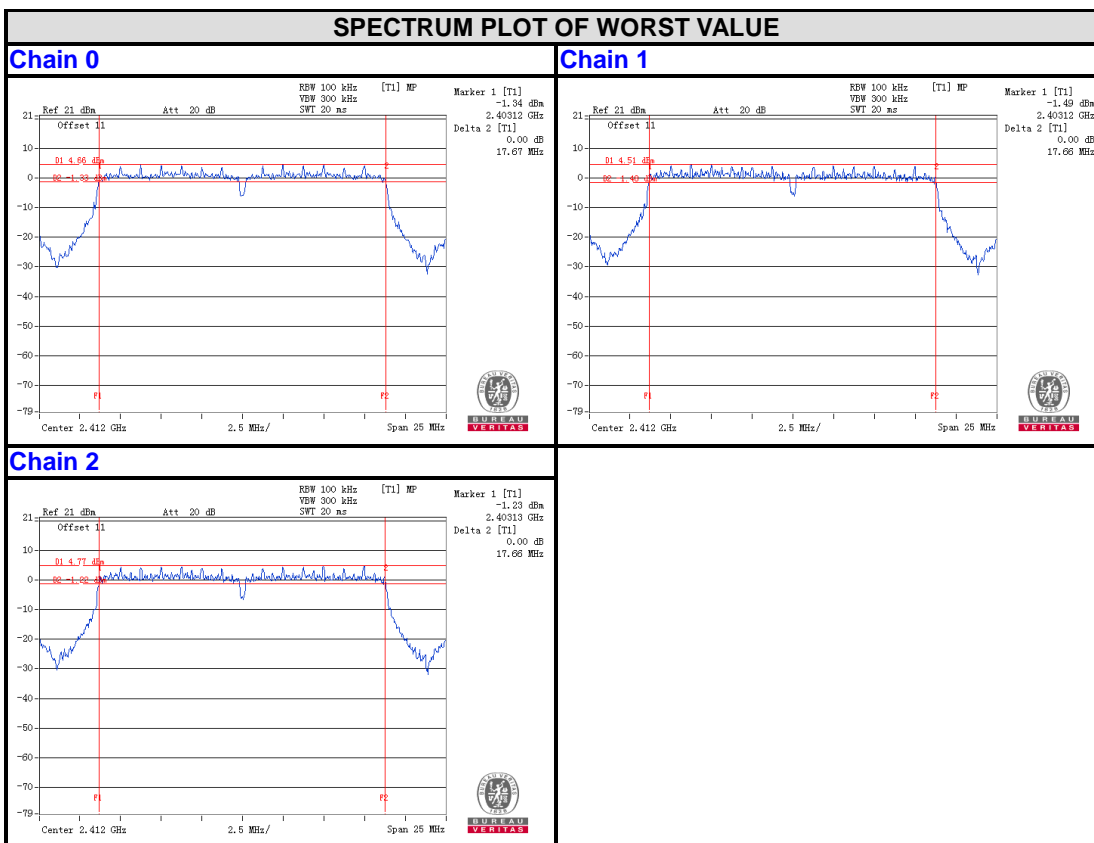


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802.11n 20MHz

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
1	2412	17.67	17.66	17.66	0.5	PASS
6	2437	17.63	17.64	17.65	0.5	PASS
11	2462	17.64	17.64	17.65	0.5	PASS



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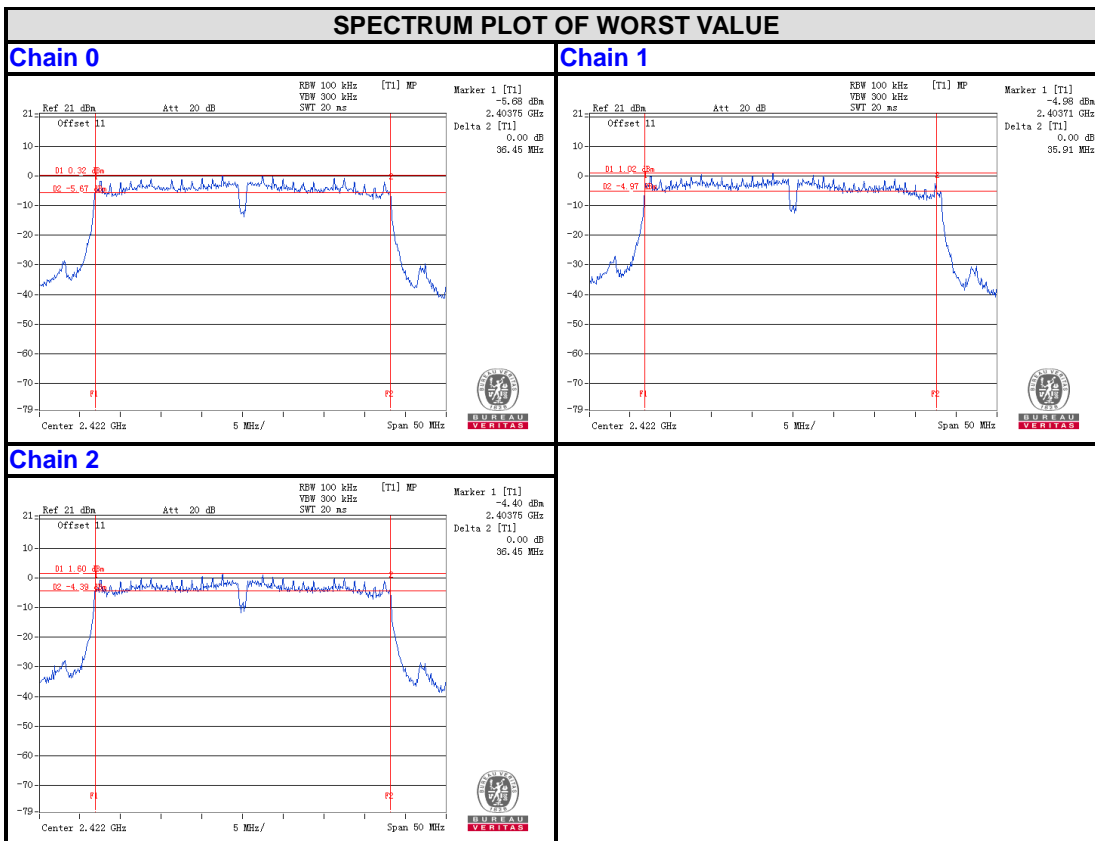
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802.11n 40MHz

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)			MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2		
3	2422	36.45	35.91	36.45	0.5	PASS
6	2437	36.42	35.88	36.41	0.5	PASS
9	2452	36.18	35.89	36.45	0.5	PASS



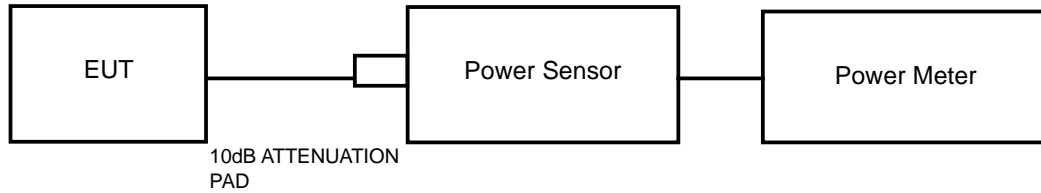


### 4.4 CONDUCTED OUTPUT POWER

#### 4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

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

#### 4.4.2 TEST SETUP



#### 4.4.3 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Power Sensor	Keysight	U2021XA	MY55060016	Feb. 18,16	Feb. 17,17
Power Sensor	Keysight	U2021XA	MY55060018	Feb. 18,16	Feb. 17,17
Digital Multimeter	FLUKE	15B	A1220010DG	Oct. 12, 15	Oct.11, 16
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Sep.07,15	Sep. 06,16
Oscilloscope	Agilent	DSO9254A	MY51260160	Nov. 28,15	Nov. 27,16
Signal Analyzer	Rohde & Schwarz	FSV7	102331	Nov. 05,15	Nov. 04,16
Signal Generator	Agilent	N5183A	MY50140980	Nov. 05,15	Nov. 04,16
ESG Vector Signal Generator	Agilent	E4438C	MY49072505	Apr. 22, 15	Apr. 21, 16
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	Sep. 01,15	Aug. 31,16

**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.



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#### 4.4.4 TEST PROCEDURES

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

#### 4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.4.6 EUT OPERATING CONDITIONS

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



#### 4.4.7 TEST RESULTS

##### 4.4.7.1 AVERAGE OUTPUT POWER

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)	AVG. POWER LIMIT (dBm)
1	2412	20.63	30
6	2437	21.69	30
11	2462	20.56	30

##### 802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVG. POWER LIMIT (dBm)
1	2412	17.63	30
6	2437	22.88	30
11	2462	17.93	30



802.11n 20MHz

CHAN.	FREQ. (MHz)	AVG. POWER (dBm)			AVG. POWER (mW)			TOTAL POWER (mW)	TOTAL POWER (dBm)	AVG. POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 0	CHAIN 1	CHAIN 2				
1	2412	17.01	16.88	17.11	50.234	48.753	51.404	150.391	21.77	30	PASS
6	2437	22.80	23.05	23.12	190.546	201.837	205.12	<b>597.499</b>	<b>27.76</b>	30	PASS
11	2462	16.98	17.08	17.13	49.888	51.050	51.642	152.580	21.83	30	PASS

802.11n 40MHz

CHAN.	FREQ. (MHz)	AVG. POWER (dBm)			AVG. POWER (mW)			TOTAL POWER (mW)	TOTAL POWER (dBm)	AVG. POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1	CHAIN 2	CHAIN 0	CHAIN 1	CHAIN 2				
3	2422	15.00	15.19	15.43	31.623	33.037	34.914	99.574	19.98	30	PASS
6	2437	22.09	22.12	22.38	161.808	162.93	172.98	497.72	26.97	30	PASS
9	2452	15.82	16.03	16.32	38.194	40.087	42.855	121.136	20.83	30	PASS

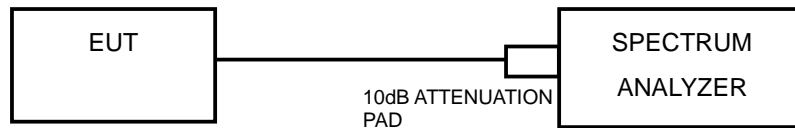


## 4.5 POWER SPECTRAL DENSITY MEASUREMENT

### 4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

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

### 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

- 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.
- g) Sweep time = auto couple.
- h) Use the peak marker function to determine the maximum amplitude level.

### 4.5.5 DEVIATION FROM TEST STANDARD

No deviation.



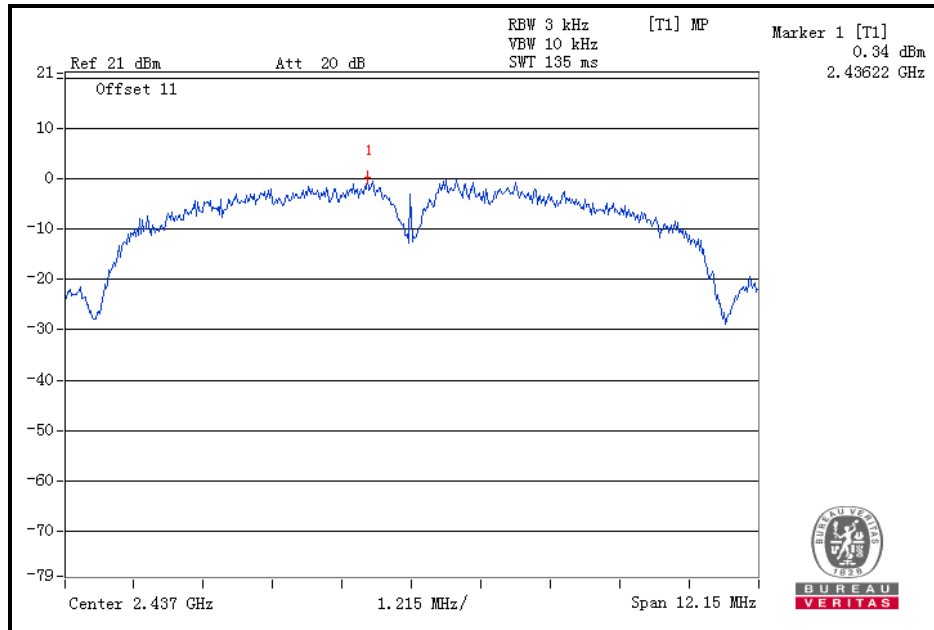
### 4.5.6 EUT OPERATING CONDITION

Same as item 4.3.6

### 4.5.7 TEST RESULTS

#### 802.11b

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-1.07	8	PASS
6	2437	0.34	8	PASS
11	2462	-1.40	8	PASS



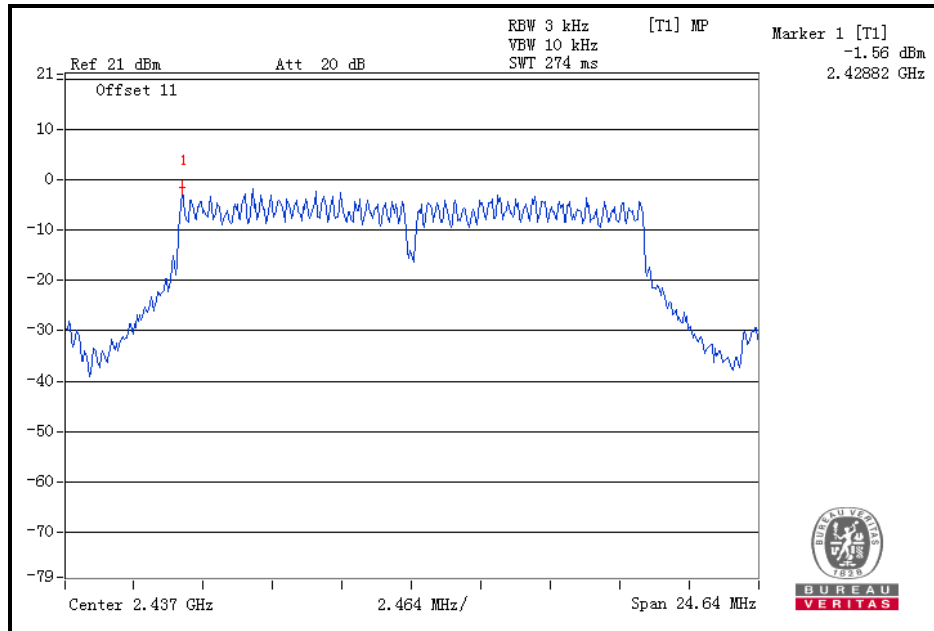


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802.11g

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-7.05	8	PASS
6	2437	-1.56	8	PASS
11	2462	-7.63	8	PASS



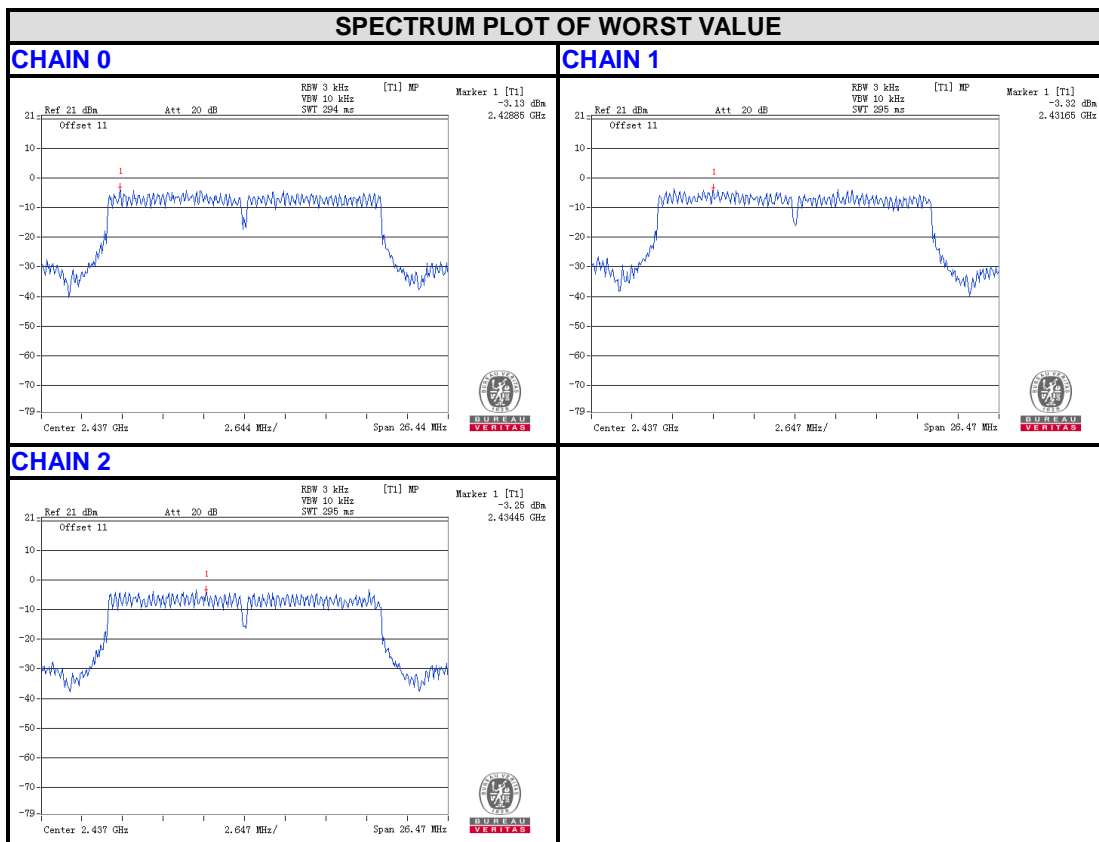




802.11n 20MHz

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	TOTAL PSD (dBm)	Limit (dBm)	PASS /FAIL
0	1	2412	-9.22	4.77	-4.45	6.23	PASS
	6	2437	-3.13	4.77	1.64	6.23	PASS
	11	2462	-9.84	4.77	-5.07	6.23	PASS
1	1	2412	-9.56	4.77	-4.79	6.23	PASS
	6	2437	-3.32	4.77	1.45	6.23	PASS
	11	2462	-6.91	4.77	-2.14	6.23	PASS
2	1	2412	-8.33	4.77	-3.56	6.23	PASS
	6	2437	-3.25	4.77	1.52	6.23	PASS
	11	2462	-9.32	4.77	-4.55	6.23	PASS

Remark: Due ANT gain more than 6dBi, so limit 8dBm change to:  
 $8 - ((3.0 + 4.77) - 6) = 6.23 \text{ dBm}$

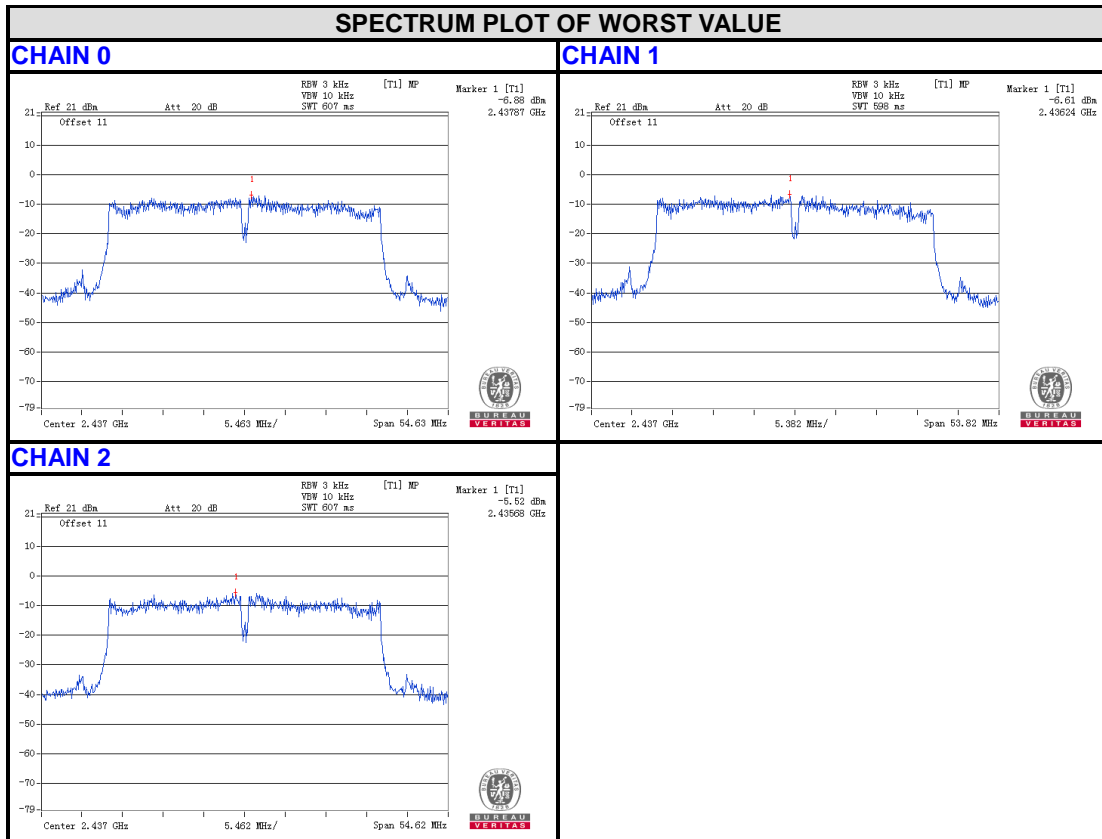




802.11n 40MHz

TX chain	Channel	Freq. (MHz)	PSD (dBm)	10 log (N=3) dB	TOTAL PSD (dBm)	Limit (dBm)	PASS /FAIL
0	3	2422	-13.66	4.77	-8.89	6.23	PASS
	6	2437	-6.88	4.77	-2.11	6.23	PASS
	9	2452	-12.86	4.77	-8.09	6.23	PASS
1	3	2422	-13.82	4.77	-9.05	6.23	PASS
	6	2437	-6.61	4.77	-1.84	6.23	PASS
	9	2452	-13.41	4.77	-8.64	6.23	PASS
2	3	2422	-12.07	4.77	-7.30	6.23	PASS
	6	2437	-5.52	4.77	-0.75	6.23	PASS
	9	2452	-11.90	4.77	-7.13	6.23	PASS

Remark: Due ANT gain more than 6dBi, so limit 8dBm change to:  
 $8 - ((3.0 + 4.77) - 6) = 6.23 \text{ dBm}$



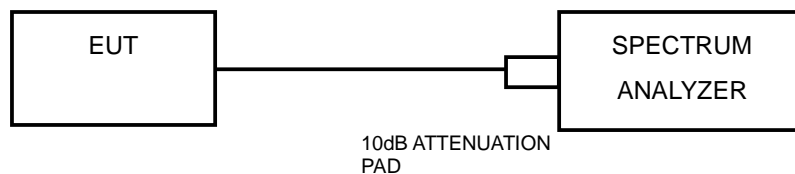


## 4.6 OUT OF BAND EMISSION MEASUREMENT

### 4.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

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

### 4.6.2 TEST SETUP



### 4.6.3 TEST INSTRUMENTS

Refer to section 4.3.2 to get information of above instrument.

### 4.6.4 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.

#### **4.6.5 DEVIATION FROM TEST STANDARD**

No deviation.

#### **4.6.6 EUT OPERATING CONDITION**

Same as item 4.3.6

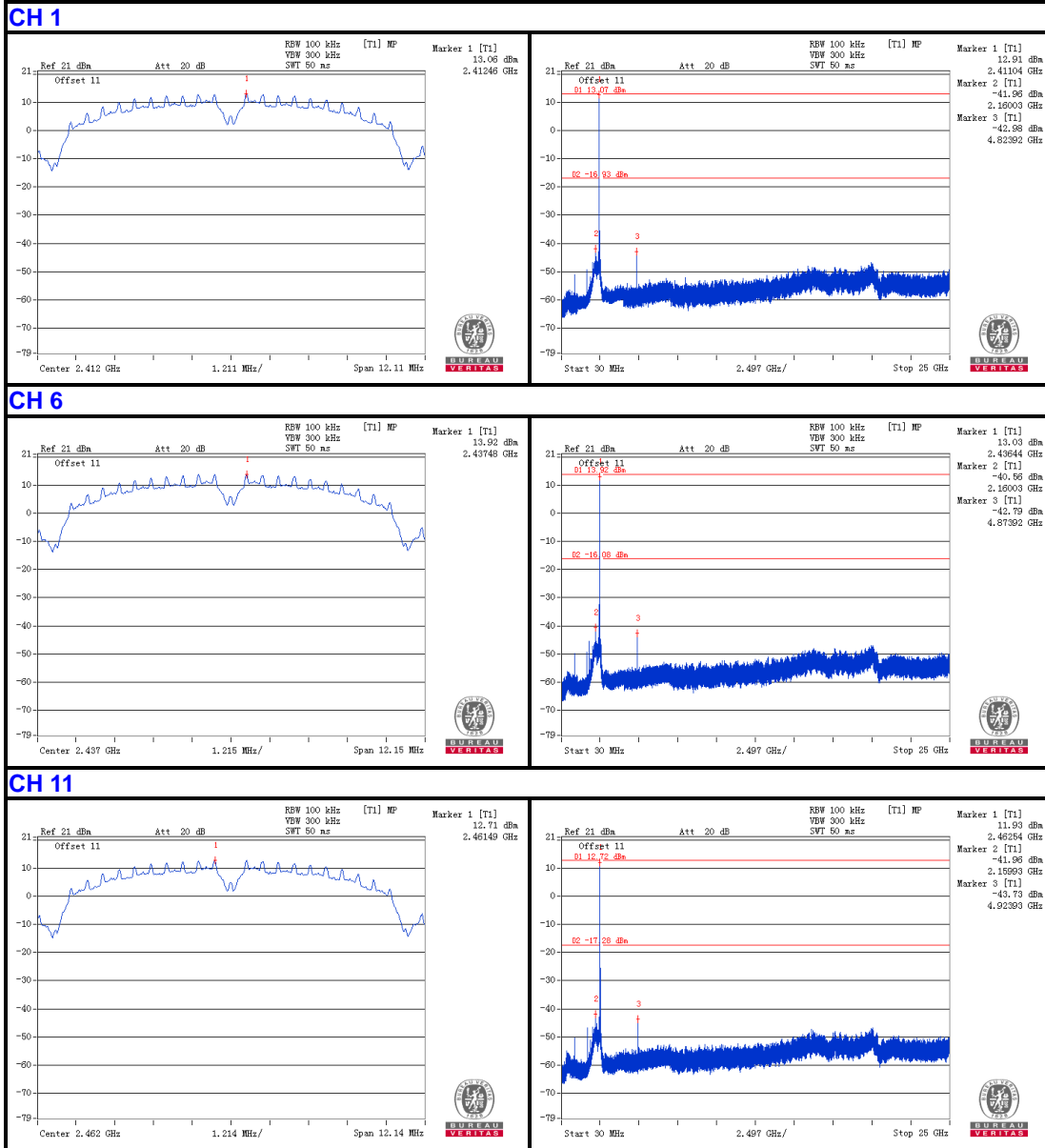


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### 4.6.7 TEST RESULTS

#### 802.11b



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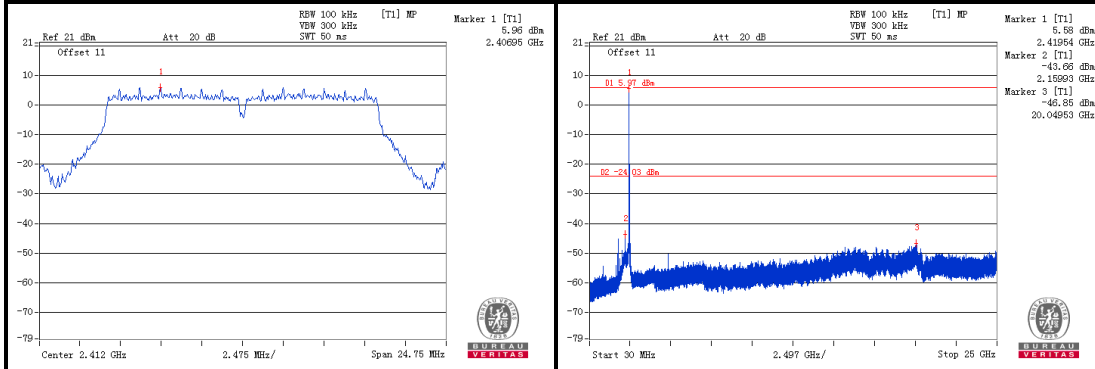


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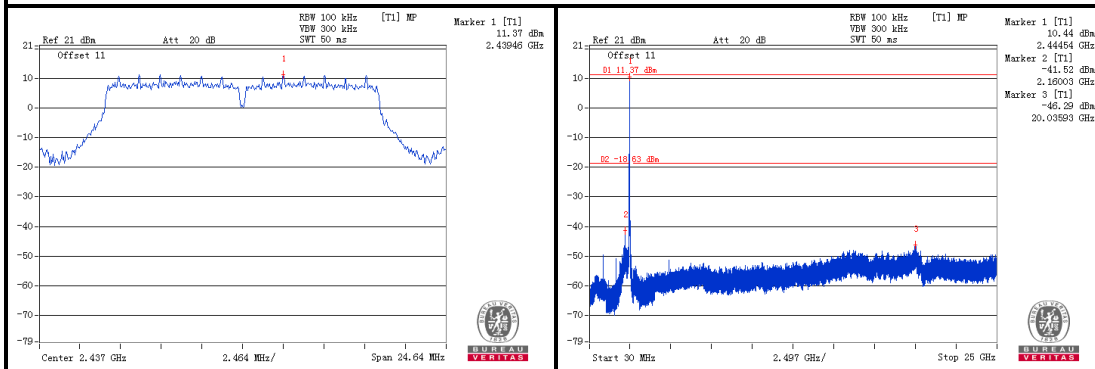
Test Report No.: RF160217N002

### 802.11g

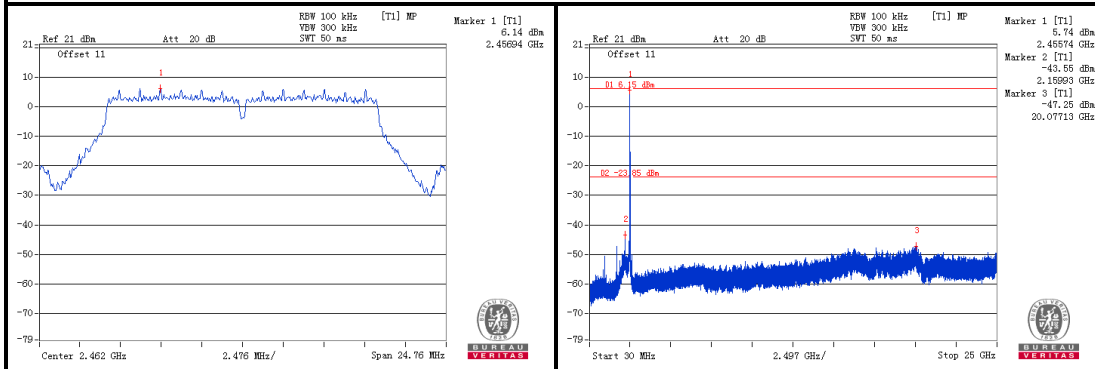
#### CH 1



#### CH 6



#### CH 11



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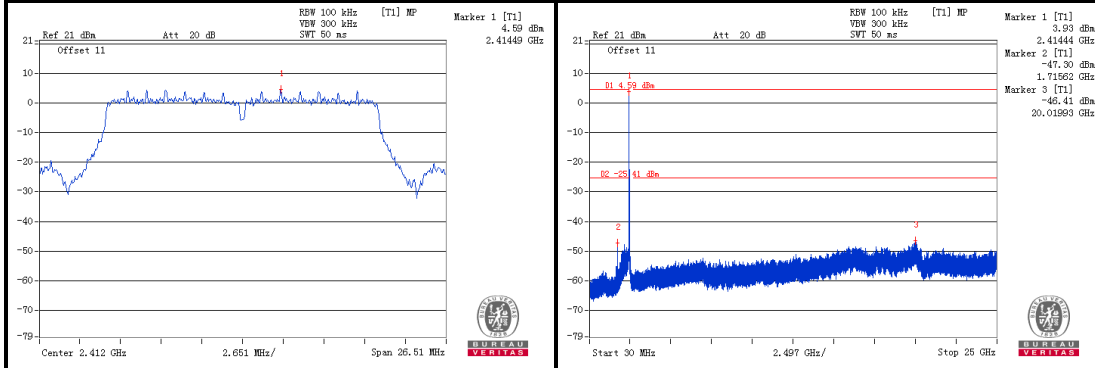
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Test Report No.: RF160217N002

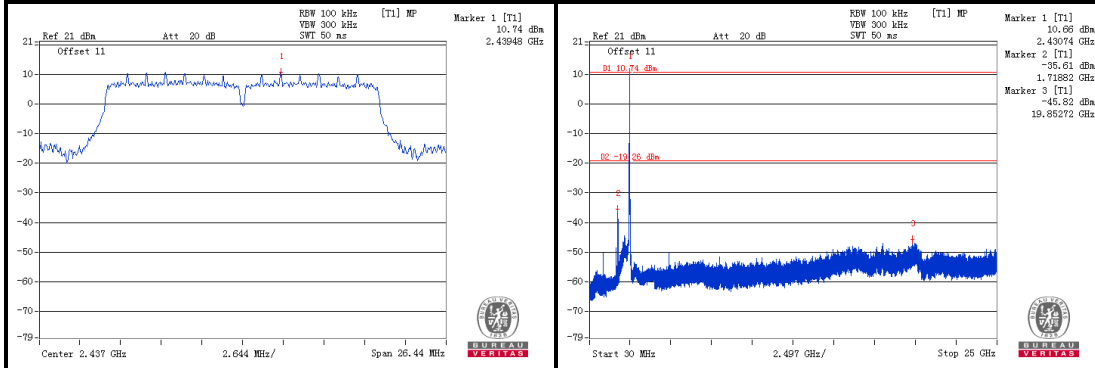
802.11n (20MHz)

CHAIN 0

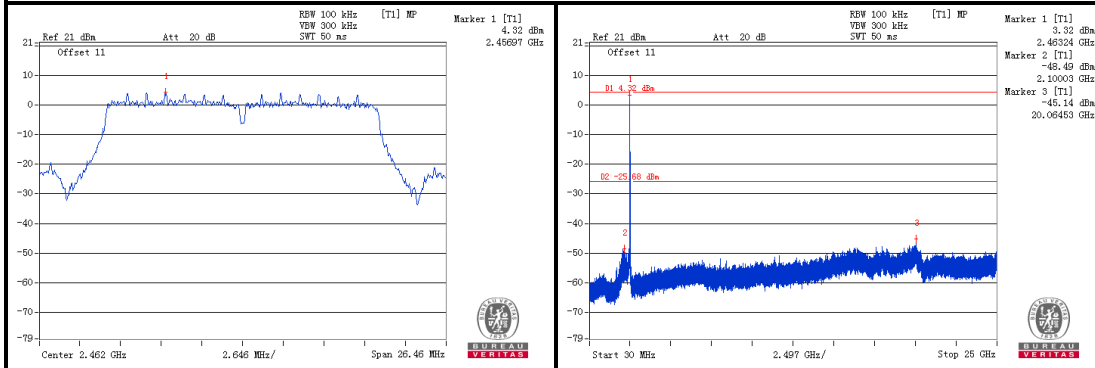
CH 1



CH 6



CH 11



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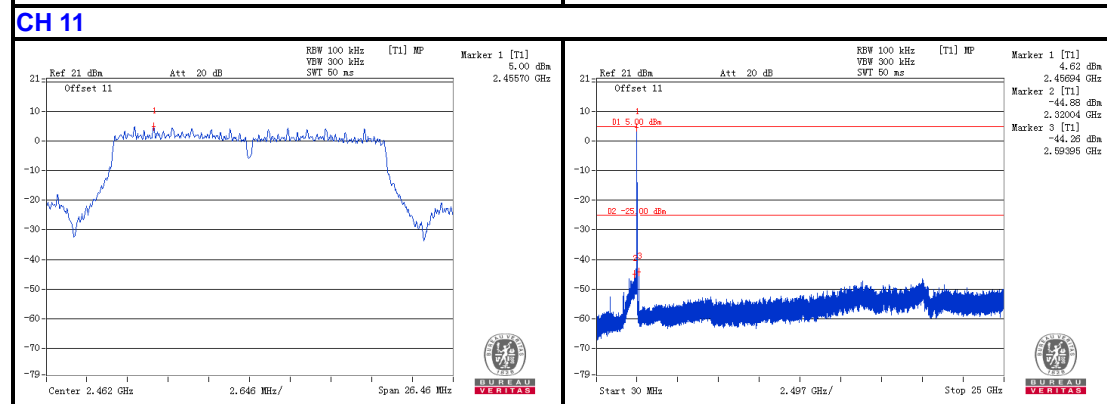
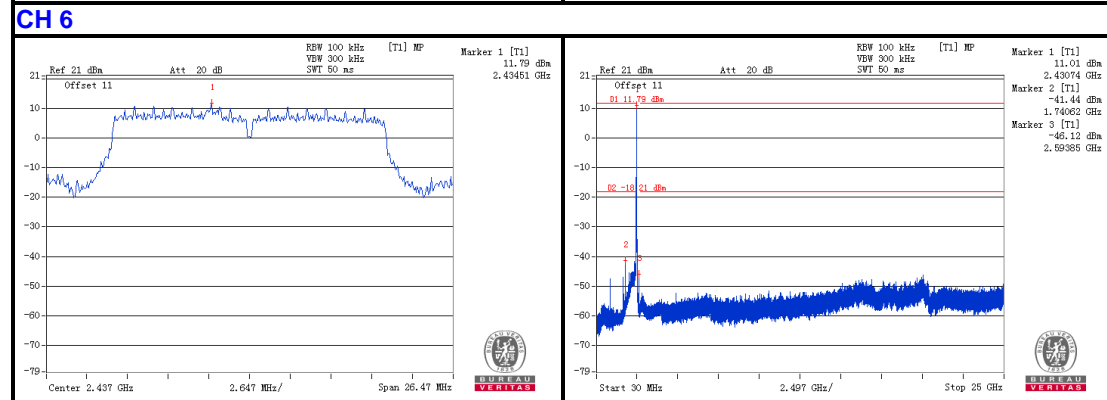
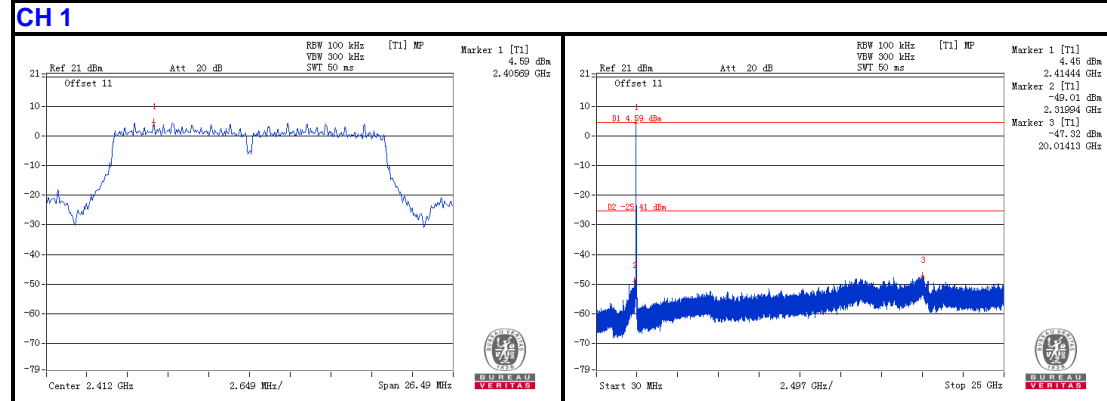
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Test Report No.: RF160217N002

CHAIN 1



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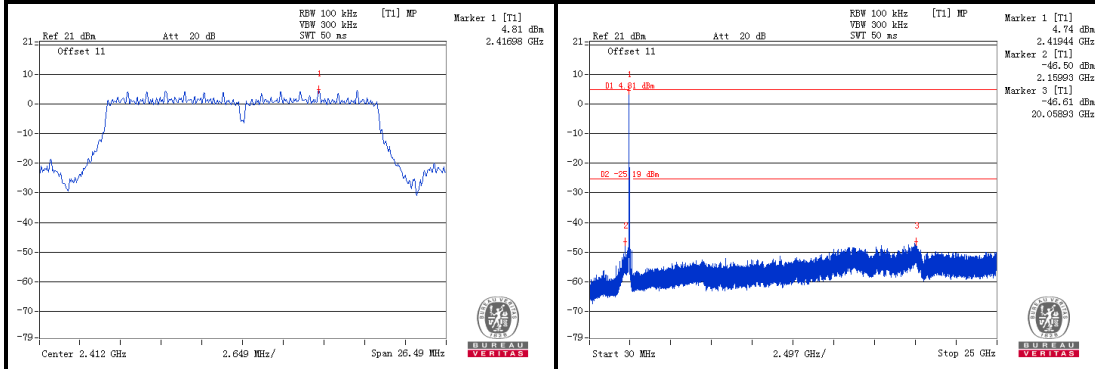


BUREAU VERITAS

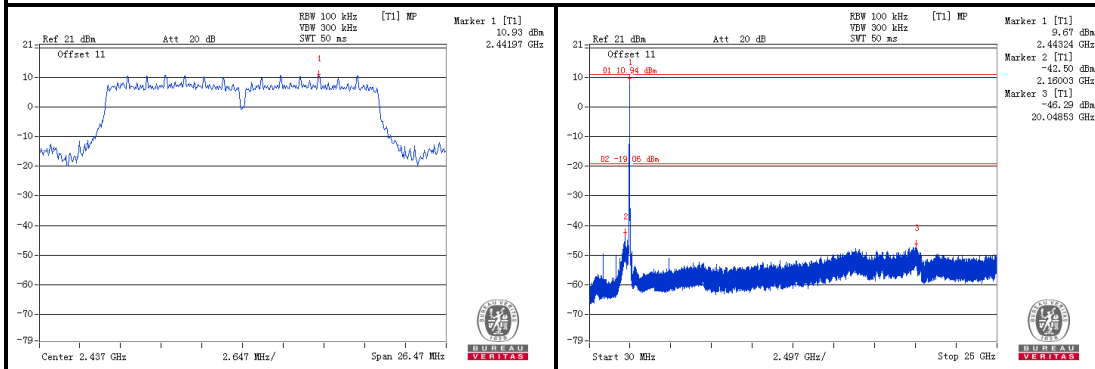
Test Report No.: RF160217N002

CHAIN 2

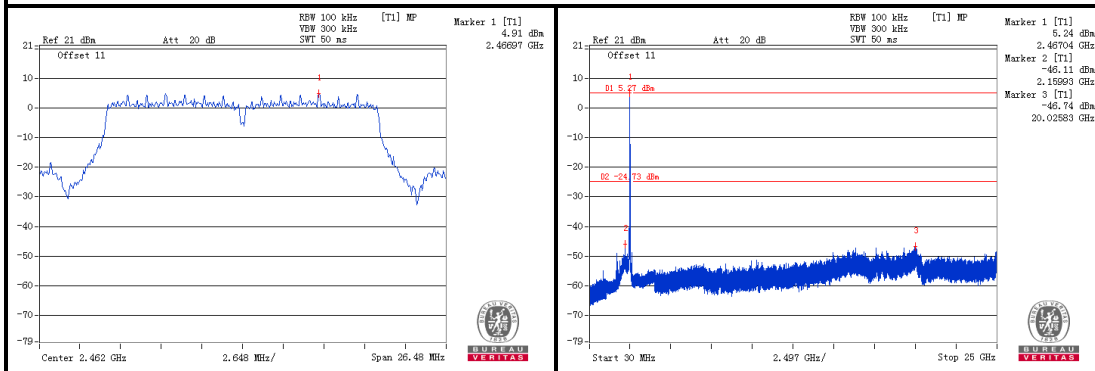
CH 1



CH 6



CH 11



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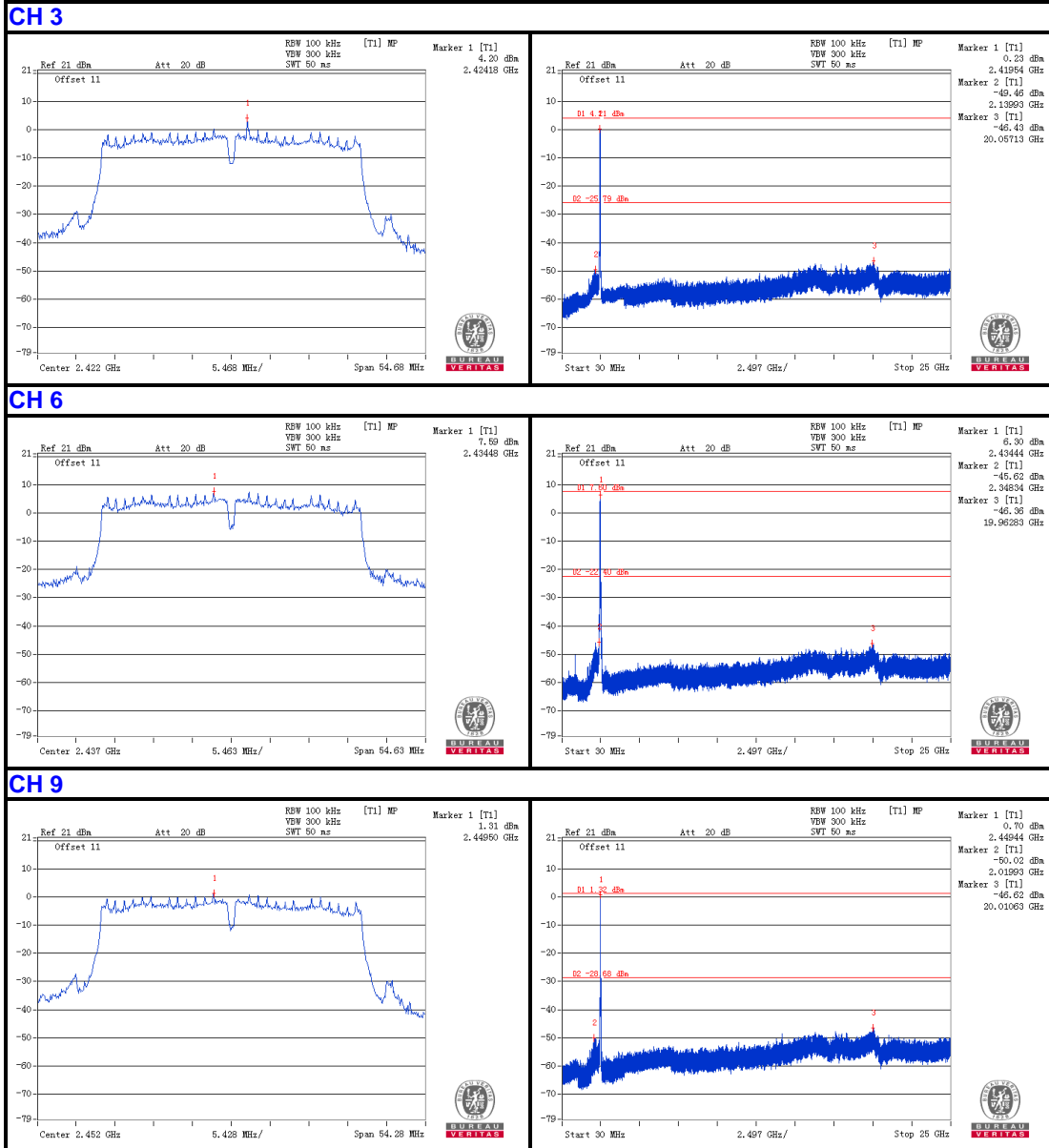
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802.11n (40MHz)  
Chain 0



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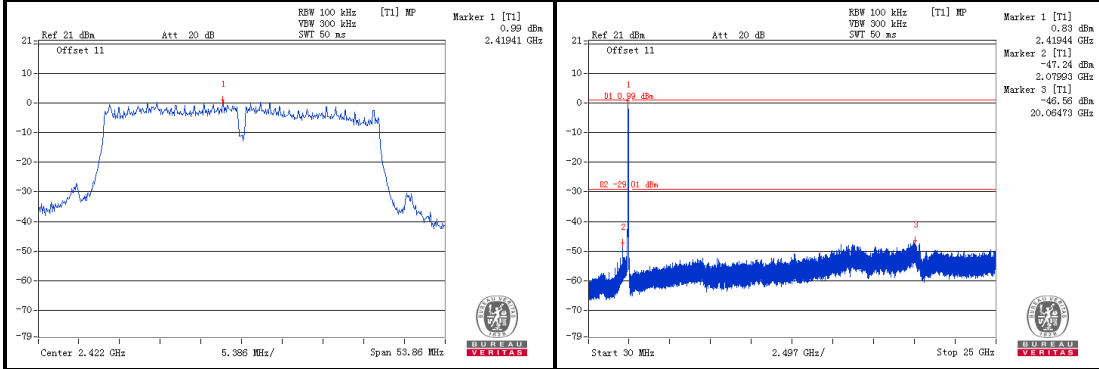


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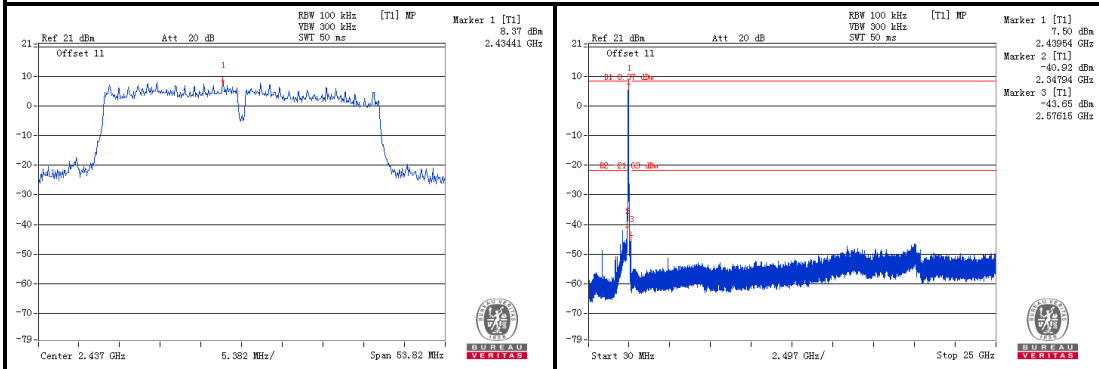
Test Report No.: RF160217N002

Chain 1

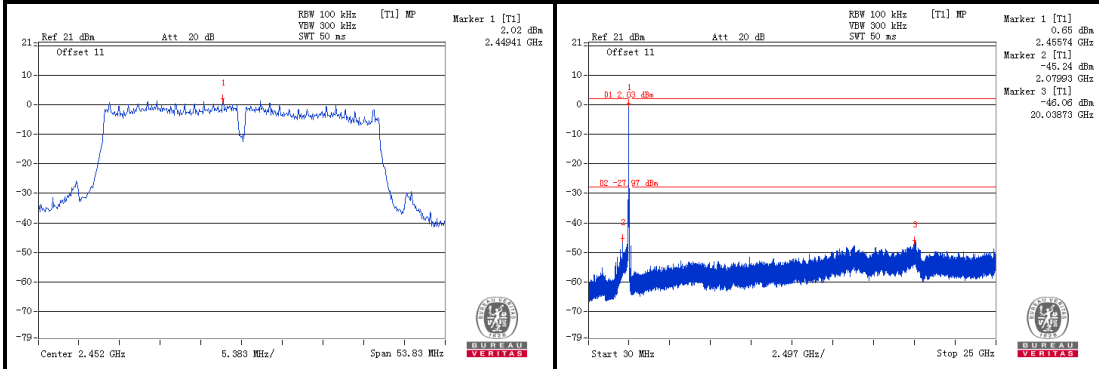
CH 3



CH 6



CH 9



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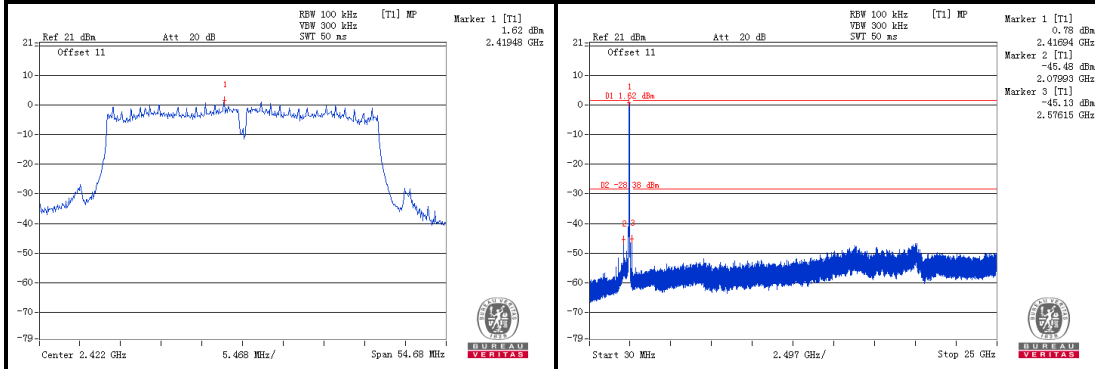


BUREAU VERITAS

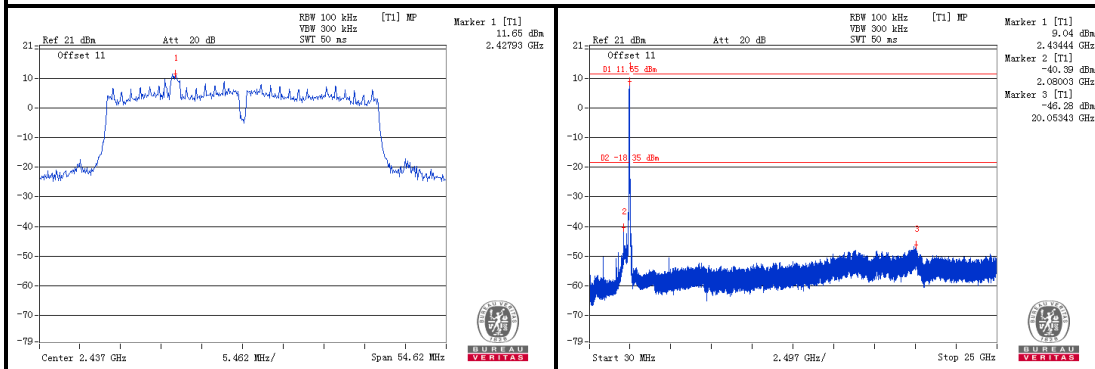
Test Report No.: RF160217N002

Chain 2

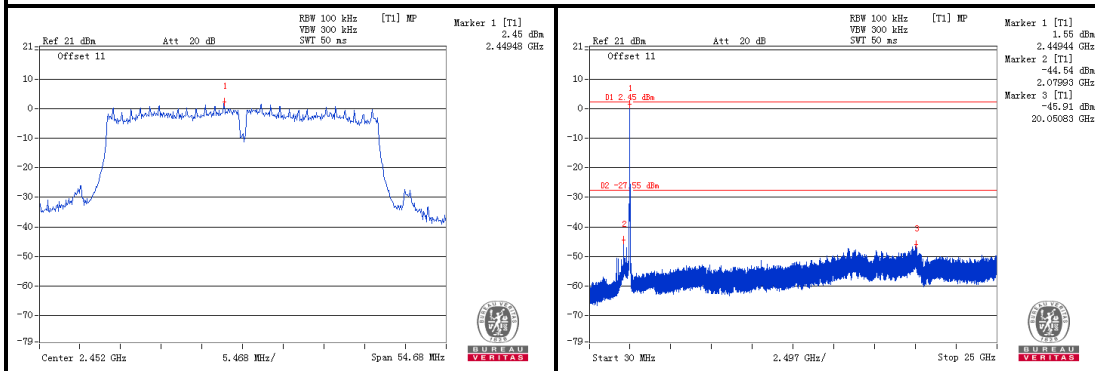
CH 3



CH 6



CH 9



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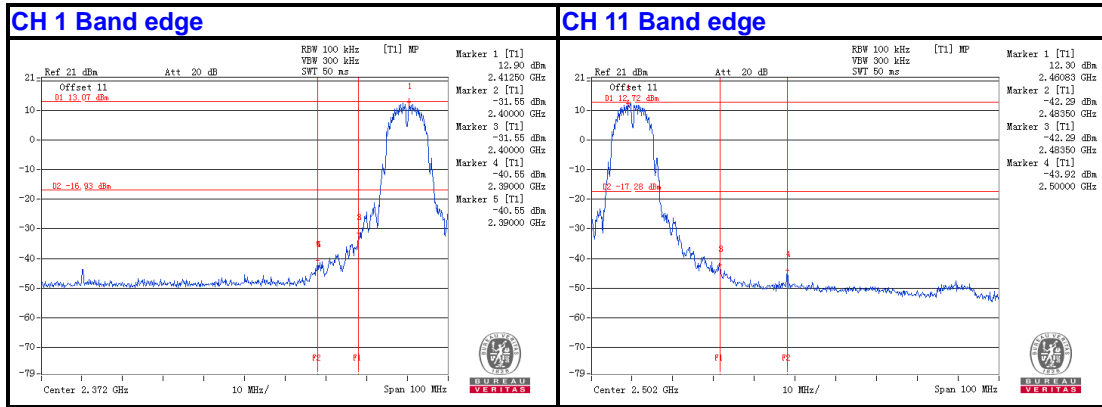
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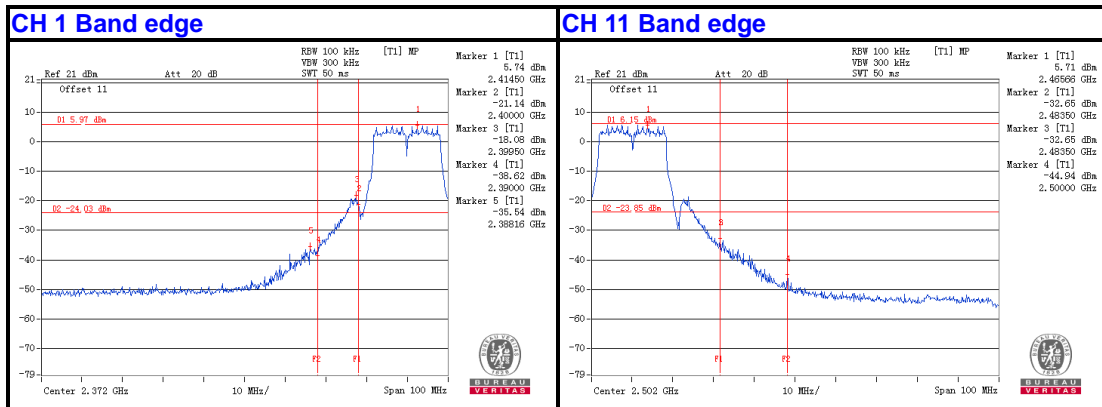
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Test Report No.: RF160217N002

802.11b



802.11g



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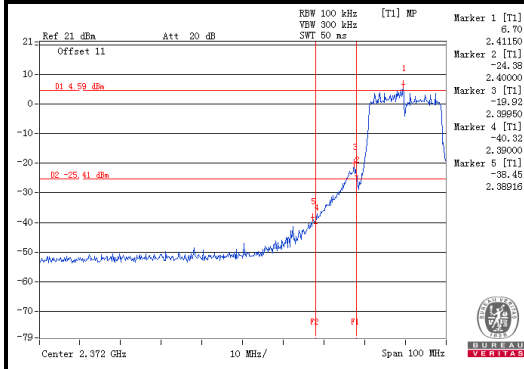
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Test Report No.: RF160217N002

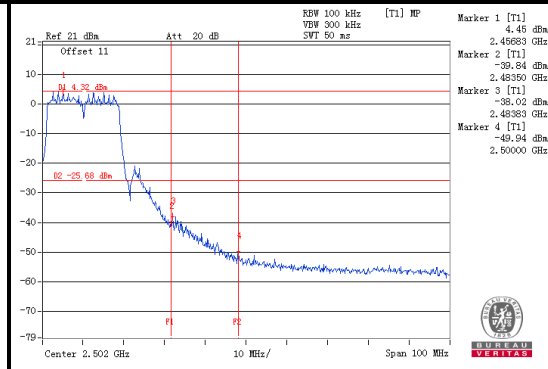
### 802.11n (20MHz)

### Chain 0

#### CH 1 Band edge

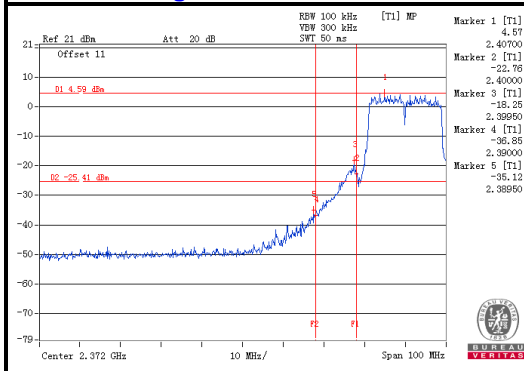


#### CH 11 Band edge

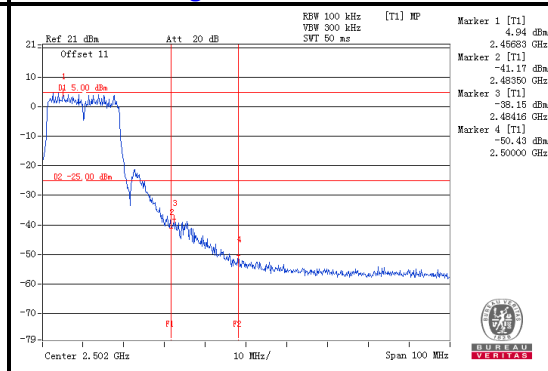


### Chain 1

#### CH 1 Band edge

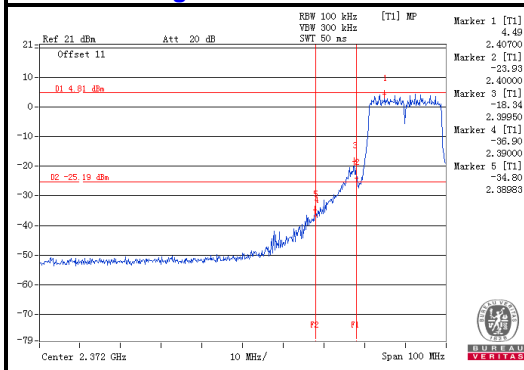


#### CH 11 Band edge

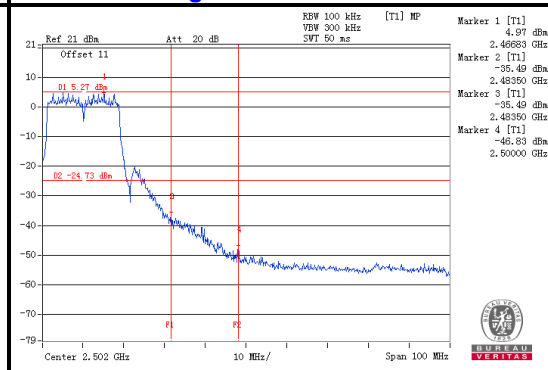


### Chain 2

#### CH 1 Band edge



#### CH 11 Band edge



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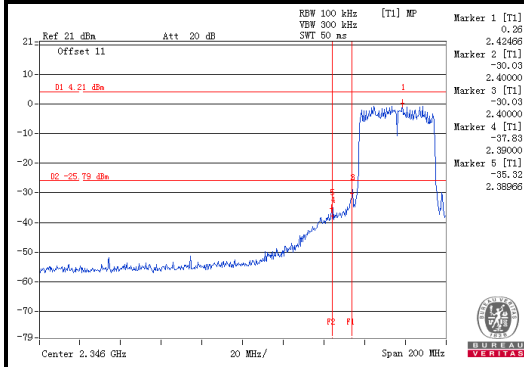
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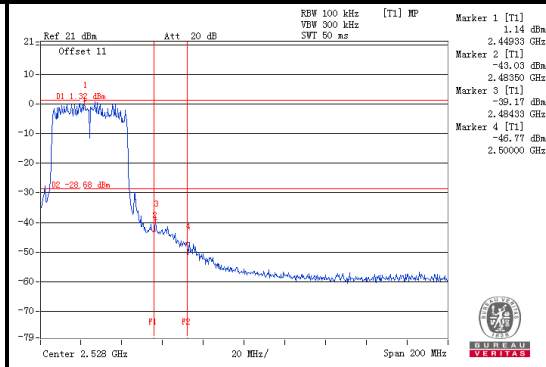
### 802.11n (40MHz)

### Chain 0

#### CH 3 Band edge

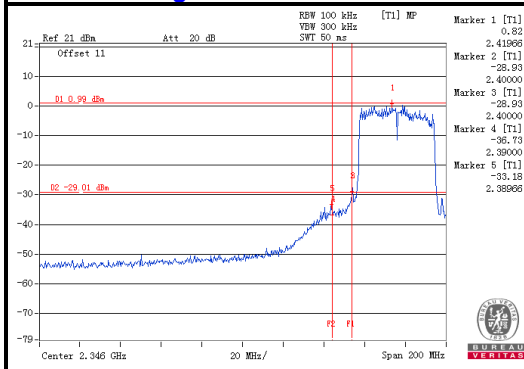


#### CH 9 Band edge

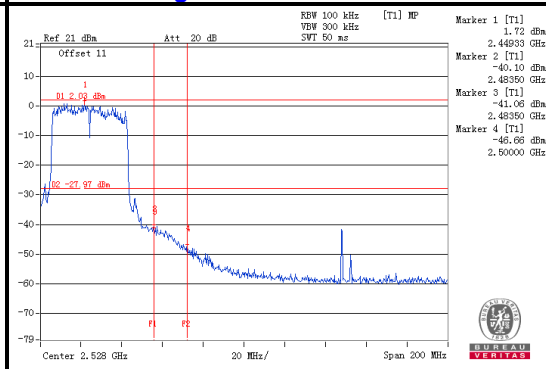


### Chain 1

#### CH 3 Band edge

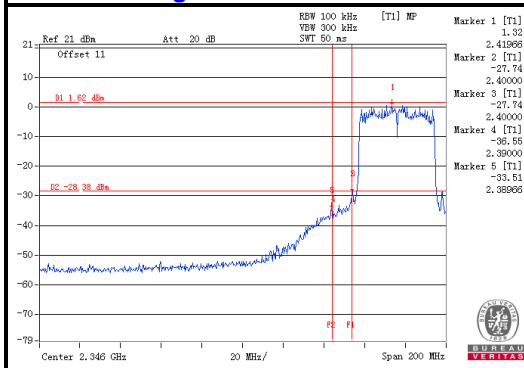


#### CH 9 Band edge

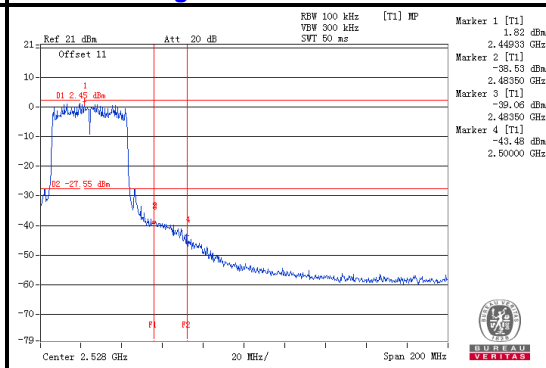


### Chain 2

#### CH 3 Band edge



#### CH 9 Band edge



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## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

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





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## **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---**