


BUREAU  
VERITAS

Test Report No.: FC120618N039

## TEST REPORT



Applicant:	SHUOYING INDUSTRIAL (SHENZHEN) CO.,LTD
Address:	Shuoying Road, Hebei Industry Area, Dalang, Longhua Town, Baoan, Shenzhen, China

Manufacturer or Supplier	SHUOYING INDUSTRIAL (SHENZHEN) CO.,LTD	
Address	Shuoying Road, Hebei Industry Area, Dalang, Longhua Town, Baoan, Shenzhen, China	
Product:	MID	
Brand Name:	N/A	
Model:	PA0750	
Additional Model & Model Difference:	See Section 3.1	
Date of tests:	June 19 ~ July 18 , 2012	

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

☒ FCC Part 15, Subpart C (Section 15.247)

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

Prepared by Glyn He Project Engineer / EMC Department	Approved by Sam Tung Manager / EMC Department
	  Date: July 18, 2012

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification



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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	N/A	July 18, 2012



## 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. Minimum passing margin is -12.98dB at 0.18MHz.
15.205 15.209	Restricted bands of operation. & Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -3.13dB at 4824.00MHz.
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.
15.247(d)	Out of Band Emission Measurement	PASS	Meet the requirement of limit.

## 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	2.44dB
Radiated emissions	30MHz ~ 200MHz	3.19dB
	200MHz ~1000MHz	3.21dB
	1GHz ~ 18GHz	2.26dB
	18GHz ~ 40GHz	1.94dB

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>	MID
<b>MODEL NO.</b>	PA0750, PA0751
<b>FCC ID</b>	XJN-PA0750X
<b>NOMINAL VOLTAGE</b>	DC 3.7V By Battery or DC 5V From USB
<b>MODULATION TYPE</b>	DSSS
<b>OPERATING FREQUENCY</b>	2412-2462MHz for 11b/g/n(HT20) 2422-2452MHz for 11n(HT40)
<b>PEAK POWER</b>	10.42dBm (Measured Max.)
<b>ANTENNA TYPE</b>	Integral Antenna; 3.0dBi gain
<b>I/O PORTS</b>	USB Port
<b>DATA CABLE SUPPLIED</b>	USB Cable: Shielded, Undetachable, has a core, 1.5m

**NOTE:**

1. The EUT was powered by the following adapters:

ADAPTER	
BRAND:	N/A
MODEL:	N/A
INPUT:	N/A
OUTPUT:	N/A
DC LINE:	N/A

2. The EUT provides one completed transmitter and one receiver.

MODULATION MODE	TX FUNCTION
802.11b	1TX
802.11g	1TX
802.11n (HT20)	1TX
802.11n (HT40)	1TX

- 3 Additional model PA0751 is identical with the test model PA0750 except the model number for marketing purpose.
- 4 For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- 5 For the test results, the EUT had been tested with all conditions. But only the worst case was showed in test report.



### 3.2 DESCRIPTION OF TEST MODES

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

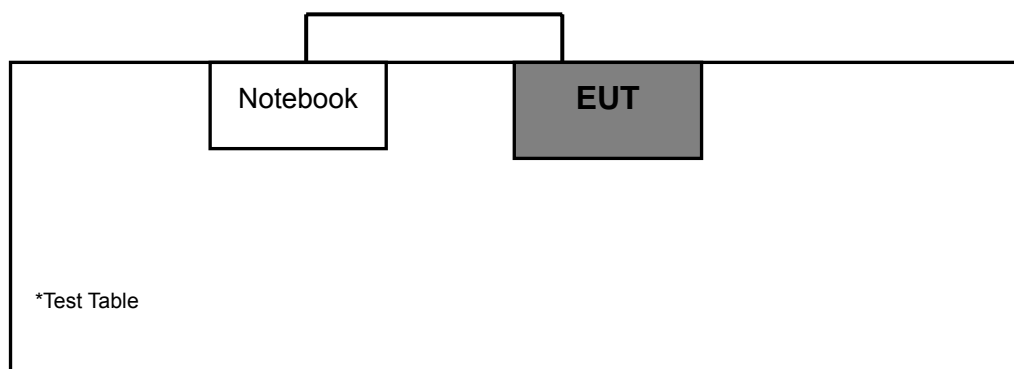
CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

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

##### TEST MODE





## 3.2.2. TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO					DESCRIPTION
	RE $\geq$ 1G	RE<1G	PLC	BM	APCM	
-	√	√	√	√	√	

Where **RE $\geq$ 1G**: Radiated Emission above 1GHz  
**RE<1G**: Radiated Emission below 1GHz  
**PLC**: Power Line Conducted Emission  
**APCM**: Antenna Port Conducted Measurement  
**BM**: BANDEDGE MEASUREMENT

**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
-	802.11b	1 to 11	1, 6, 11	CCK	DBPSK	1.0	Z
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	Z
-	802.11n HT20	1 to 11	1, 6, 11	OFDM	BPSK	6.5	Z
-	802.11n HT40	3 to 9	3, 6, 9	OFDM	BPSK	13.5	Z

**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
-	802.11b	1 to 11	6	CCK	DBPSK	1.0	Z



**AC POWER 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	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11g	1 to 11	6	CCK	DBPSK	1.0

**BANDEDGE MEASUREMENT:**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ 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)
-	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
-	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)
-	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
-	802.11n HT40	3 to 9	3, 6, 9	OFDM	BPSK	13.5

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	28deg. C, 55%RH	5V DC By USB	Glyn He
RE<1G	28deg. C, 55%RH	5V DC By USB	Glyn He
PLC	25deg. C, 56%RH	5V DC By USB	Glyn He
APCM	25deg. C, 56%RH	5V DC By USB	Glyn He

**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 (15.247)**

**ANSI C63.4-2003**

**ANSI C63.10-2009**

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 (Verification). 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.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	DELL	D531	CN-0XM006-48643-81U-2610	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	AC Line :Unshielded, Detachable 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 (dB $\mu$ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

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

#### 4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
EMI Test Receiver Rohde&Schwarz	ESU 26	100005	May 15,12	May 14,13
Artificial Mains Network Rohde&Schwarz	ENV216	101173	May 15,12	May 14,13
Artificial Mains Network Rohde&Schwarz	ESH2-Z5	100071	May 15,12	May 14,13
Test software	ADT_Cond_V7.3.7	N/A	N/A	N/A

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA and NIM/CHINA
2. The test was performed in Dongguan Shielded Room 553.



#### 4.1.3 TEST PROCEDURES

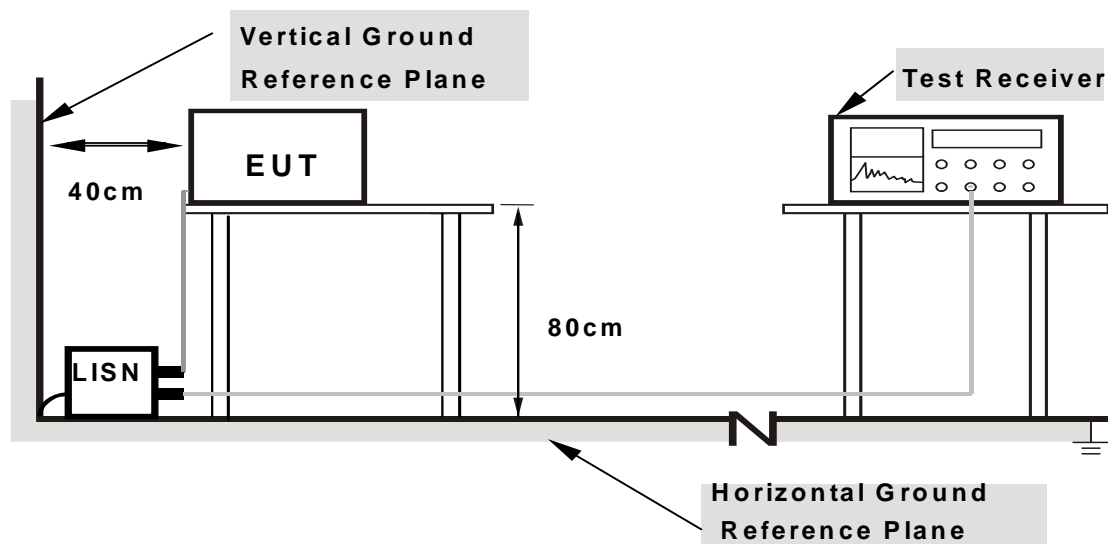
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling 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) was 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

- 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.



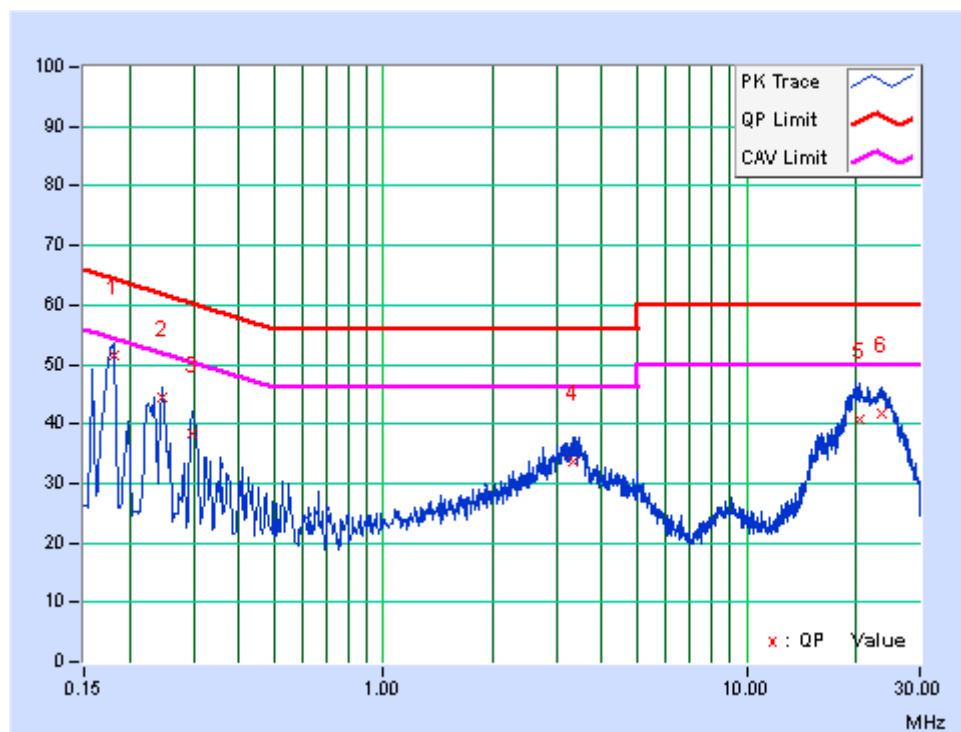
#### 4.1.7 TEST RESULTS

##### CONDUCTED WORST-CASE DATA

PHASE	Line 1	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	0.18	9.78	41.65	26.04	51.43	35.82	64.40	54.40	-12.98	-18.59
2	0.25	9.75	34.57	17.04	44.32	26.79	61.89	51.89	-17.56	-25.09
3	0.30	9.75	28.64	14.22	38.39	23.97	60.29	50.29	-21.90	-26.32
4	3.33	9.84	23.92	17.87	33.76	27.71	56.00	46.00	-22.24	-18.29
5	20.61	10.04	30.62	22.99	40.66	33.03	60.00	50.00	-19.34	-16.97
6	23.60	10.07	31.58	24.27	41.65	34.34	60.00	50.00	-18.35	-15.66

- 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.

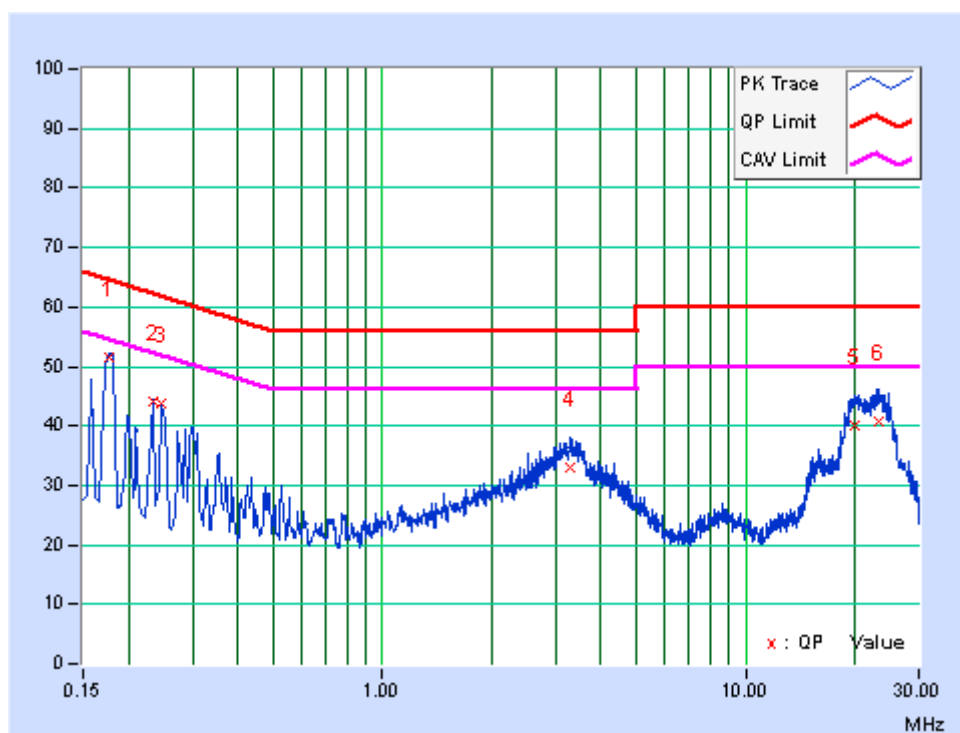




PHASE	Neutral	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18	9.84	41.76	24.12	51.60	33.96	64.64	54.64	-13.05	-20.69
2	0.23	9.77	34.28	16.11	44.05	25.88	62.31	52.31	-18.26	-26.43
3	0.25	9.77	34.08	16.82	43.85	26.59	61.89	51.89	-18.03	-25.29
4	3.29	9.83	23.05	16.88	32.88	26.71	56.00	46.00	-23.12	-19.29
5	20.06	10.16	29.93	23.54	40.09	33.70	60.00	50.00	-19.91	-16.30
6	23.25	10.16	30.70	23.77	40.86	33.93	60.00	50.00	-19.14	-16.07

- 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**

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Spectrum Analyzer ROHDE & SCHWARZ	E4446A	MY46180622	May 02, 12	May 01, 13
Test Receiver ROHDE & SCHWARZ	ESVD	847398/004	May 15,12	May 14,13
Bilog Antenna TESEQ	CBL 6111D	27089	July 16,12	July 15,13
Horn Antenna EMCO	3117	00062558	Oct.19,11	Oct.19,12
10m Semi-anechoic Chamber ETS-LINDGREN	21.4m*12.1m*8.8m	NSEMC006	Mar 24,12	Mar 23,13
RF Cable IMRO	IMRO-400	10m Cable 1#10m	May 16,12	May 15,13
RF Cable IMRO	IMRO-400	10m Cable 2#3m	May 16,12	May 15,13
Signal Amplifier SONOMA	310N	186955	Mar. 14,12	Mar. 13,13
Signal Amplifier HP	8449B	3008A00409	May 31,12	May 30,13
RF Cable DRAKA	M06/25-RG102	10m Cable 2#	May 16,12	May 15,13
Test software ADT	ADT_Radiated_V7. 6.15	N/A	N/A	N/A

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA and NIM/CHINA.
  2. The test was performed in Dongguan Chamber 10m.
  3. The horn antenna are used only for the measurement of emission frequency above 1GHz if tested.



#### 4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 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. If the emission level of the EUT in peak mode was lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

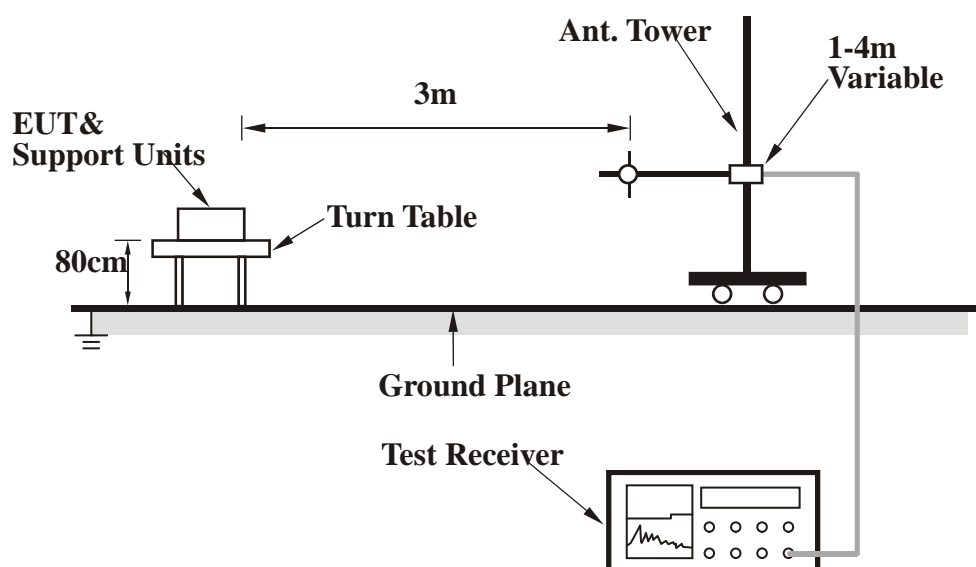
**NOTE:**

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.

#### 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

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

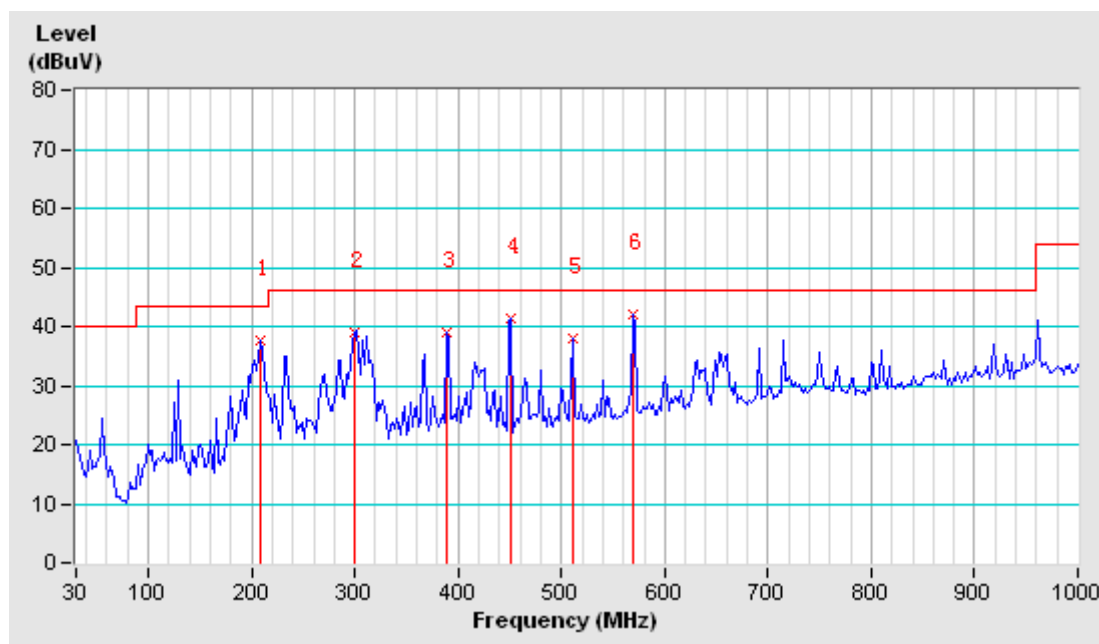


## 4.2.7 TEST RESULTS

### BELOW 1GHz WORST-CASE DATA: 802.11b- CH6

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	208.48	10.2	27.38	37.58	43.5	-5.92	330	191
2	299.66	15.82	23.20	39.03	46	-6.97	350	319
3	388.90	18.91	20.10	39.01	46	-6.99	300	0
4	450.98	21.04	20.24	41.28	46	-4.72	325	181
5	511.12	22.47	15.54	38.01	46	-7.99	300	264
6	569.32	23.80	18.16	41.96	46	-4.04	300	314

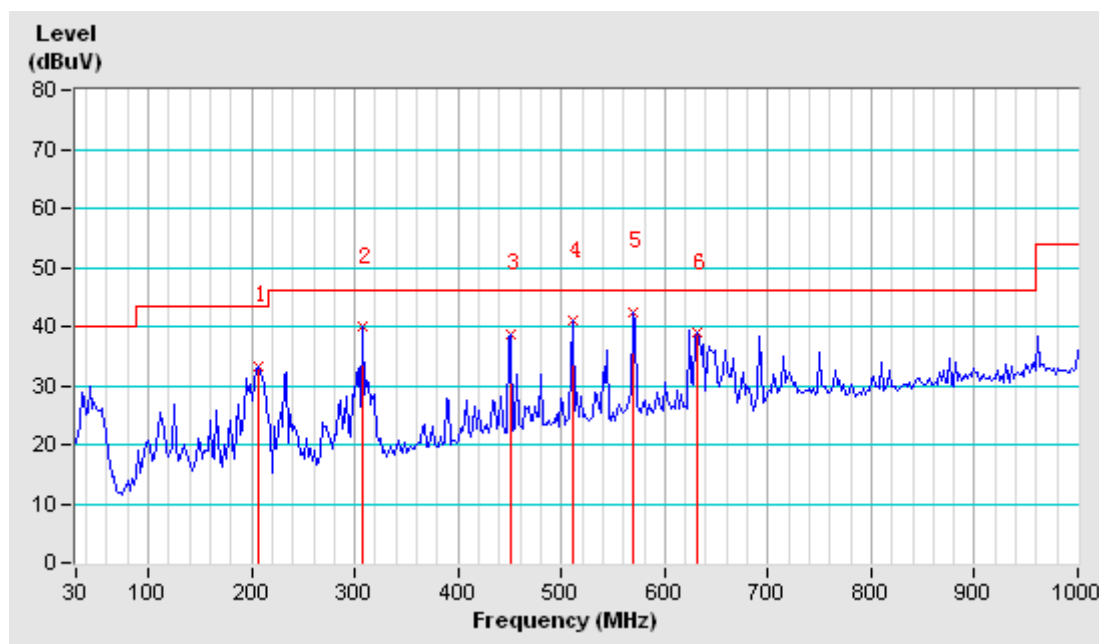
- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. All the readings were Quasi-Peak values.





ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	206.54	10.03	23.19	33.22	43.5	-10.28	100	335
2	307.42	15.96	23.88	39.85	46	-6.15	100	310
3	450.98	21.04	17.62	38.66	46	-7.34	100	265
4	511.12	22.47	18.39	40.86	46	-5.14	100	234
5	569.32	23.80	18.68	42.49	46	-3.51	100	196
6	631.4	25.07	13.75	38.82	46	-7.18	100	252

- 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. All the readings were Quasi-Peak values.





## 802.11b

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1, 6, 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	DC 5V By USB	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 55%RH	TESTED BY	Glyn He

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 PK	56.70	74	-17.3	3.15 H	45	20.29	36.41
#	2390.00 AV	43.35	54	-10.65	3.15 H	45	6.94	36.41
2#	2483.50 PK	58.78	74	-15.22	3.20 H	198	21.54	37.24
#	2483.50 AV	44.68	54	-9.32	3.20 H	198	7.44	37.24
3	4824.00 PK	60.59	74	-13.41	3.30 H	65	11.34	49.25
	4824.00 AV	50.87	54	-3.13	3.30 H	65	1.62	49.25
4	4874.00 PK	60.12	74	-13.88	2.50 H	75	10.88	49.24
	4874.00 AV	50.23	54	-3.77	2.50 H	75	0.99	49.24
5	4924.00 PK	59.12	74	-14.88	3.55 H	119	9.9	49.22
	4924.00 AV	49.89	54	-4.11	3.55 H	119	0.67	49.22
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 PK	57.24	74.0	-16.76	1.00 H	255	20.83	36.41
#	2390.00 AV	42.68	54.0	-11.32	1.00 H	255	6.27	36.41
2#	2483.50 PK	57.85	74.0	-16.15	1.20 H	35	20.61	37.24
#	2483.50 AV	44.58	54.0	-9.42	1.20 H	35	7.34	37.24
3	4824.00 PK	59.54	74.0	-14.46	1.15 H	138	10.29	49.25
	4824.00 AV	48.87	54.0	-5.13	1.15 H	138	-0.38	49.25
4	4874.00 PK	60.12	74.0	-13.88	1.25 H	295	10.88	49.24
	4874.00 AV	49.87	54.0	-4.13	1.25H	295	0.63	49.24
5	4924.00 PK	59.58	74.0	-14.42	1.25 H	335	10.36	49.22
	4924.00 AV	48.99	54.0	-5.01	1.25 H	3335	-0.23	49.22

- 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. "#": The radiated frequency is out the restricted band.

**802.11g**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1, 6, 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	DC 5V By USB	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 55%RH	TESTED BY	Glyn He

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 PK	57.56	74	-16.44	3.00 H	345	21.15	36.41
#	2390.00 AV	43.44	54	-10.56	3.00 H	345	7.03	36.41
2#	2483.50 PK	58.2	74	-15.8	3.38 H	22	20.96	37.24
#	2483.50 AV	45.48	54	-8.52	3.38 H	22	8.24	37.24
3	4824.00 PK	56.35	74	-17.65	3.25 H	53	7.1	49.25
	4824.00 AV	46.87	54	-7.13	3.25 H	53	-2.38	49.25
4	4874.00 PK	56.58	74	-17.42	3.00 H	118	7.34	49.24
	4874.00 AV	46.36	54	-7.64	3.00 H	118	-2.88	49.24
5	4924.00 PK	57.65	74	-16.35	3.00 H	16	8.43	49.22
	4924.00 AV	47.58	54	-6.42	3.00 H	16	-1.64	49.22
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 PK	58.27	74	-15.73	1.50V	235	21.86	36.41
#	2390.00 AV	44.26	54	-9.74	1.50V	235	7.85	36.41
2#	2483.50 PK	58.68	74	-15.32	1.35V	150	21.44	37.24
#	2483.50 AV	46.61	54	-7.39	1.35V	150	9.37	37.24
3	4824.00 PK	57.12	74	-16.88	1.55V	82	7.87	49.25
	4824.00 AV	45.88	54	-8.12	1.55V	82	-3.37	49.25
4	4874.00 PK	55.57	74	-18.43	1.50V	35	6.33	49.24
	4874.00 AV	46.85	54	-7.15	1.50V	35	-2.39	49.24
5	4924.00 PK	58.65	74	-15.35	1.50V	0	9.43	49.22
	4924.00 AV	46.35	54	-7.65	1.50V	0	-2.87	49.22

- 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. "#": The radiated frequency is out the restricted band.

**802.11n HT20**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1, 6, 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	DC 5V By USB	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 55%RH	TESTED BY	Glyn He

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 PK	56.30	74	-17.7	3.25 H	135	19.89	36.41
#	2390.00 AV	44.07	54	-9.93	3.25 H	135	7.66	36.41
2#	2483.50 PK	57.29	74	-16.71	3.55 H	113	20.05	37.24
#	2483.50 AV	44.99	54	-9.01	3.55 H	113	7.75	37.24
3	4824.00 PK	55.58	74	-18.42	3.65 H	314	6.33	49.25
	4824.00 AV	45.98	54	-8.02	3.65 H	314	-3.27	49.25
4	4874.00 PK	57.85	74	-16.15	3.00 H	58	8.61	49.24
	4874.00 AV	45.98	54	-8.02	3.00 H	58	-3.26	49.24
5	4924.00 PK	59.54	74	-14.46	3.35 H	252	10.32	49.22
	4924.00 AV	46.87	54	-7.13	3.35 H	252	-2.35	49.22
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 PK	56.72	74	-17.28	1.25V	15	20.31	36.41
#	2390.00 AV	42.88	54	-11.12	1.25V	15	6.47	36.41
2#	2483.50 PK	57.93	74	-16.07	1.50V	115	20.69	37.24
#	2483.50 AV	45.46	54	-8.54	1.50V	115	8.22	37.24
3	4824.00 PK	56.23	74	-17.77	1.25V	356	6.98	49.25
	4824.00 AV	46.23	54	-7.77	1.25V	356	-3.02	49.25
4	4874.00 PK	56.57	74	-17.43	1.25V	0	7.33	49.24
	4874.00 AV	45.88	54	-8.12	1.25V	0	-3.36	49.24
5	4924.00 PK	57.13	74	-16.87	1.25V	305	7.91	49.22
	4924.00 AV	47.59	54	-6.41	1.25V	305	-1.63	49.22

- 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. "#": The radiated frequency is out the restricted band.



**802.11n HT40**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 3, 6, 9	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	DC 5V By USB	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	28deg. C, 55%RH	TESTED BY	Glyn He

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 PK	56.44	74	-17.56	3.00 H	326	20.03	36.41
#	2390.00 AV	44.37	54	-9.63	3.00 H	326	7.96	36.41
2#	2483.50 PK	57.08	74	-16.92	3.25 H	315	19.84	37.24
#	2483.50 AV	45.41	54	-8.59	3.25 H	315	8.17	37.24
3	4844.00 PK	57.85	74	-16.15	3.50 H	310	8.61	49.24
	4844.00 AV	45.25	54	-8.75	3.50 H	310	-3.99	49.24
4	4874.00 PK	58.54	74	-15.46	3.10 H	185	9.30	49.24
	4874.00 AV	46.5	54	-7.5	3.10 H	185	-2.74	49.24
5	4904.00 PK	59.65	74	-14.35	3.55 H	117	10.42	49.23
	4904.00 AV	46.53	54	-7.47	3.55 H	117	-2.70	49.23
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 PK	57.65	74	-16.35	1.10V	0	21.24	36.41
#	2390.00 AV	44.92	54	-9.08	1.10V	0	8.51	36.41
2#	2483.50 PK	57.56	74	-16.44	1.00V	24	20.32	37.24
#	2483.50 AV	45.71	54	-8.29	1.00V	24	8.47	37.24
3	4844.00 PK	58.57	74	-15.43	1.25V	116	9.33	49.24
	4844.00 AV	45.2	54	-8.8	1.25V	116	-4.04	49.24
4	4874.00 PK	57.57	74	-16.43	1.38V	325	8.33	49.24
	4874.00 AV	46.38	54	-7.62	1.38V	325	-2.86	49.24
5	4904.00 PK	58.74	74	-15.26	1.38V	60	9.51	49.23
	4904.00 AV	46.20	54	-7.80	1.38V	60	-3.03	49.23

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

### 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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Spectrum Analyzer Agilent	E7405A	MY45118807	May 15,12	May 14,13

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA and NIM/CHINA
2. The test was performed in Dongguan RF Chamber.

#### 4.3.3 TEST PROCEDURE

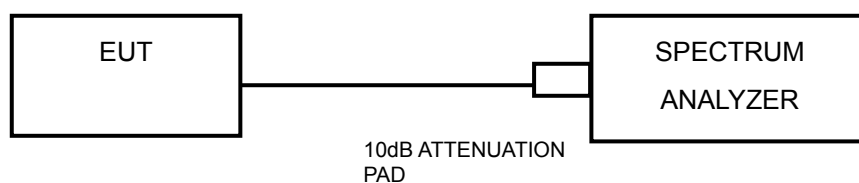
1. Set resolution bandwidth (RBW) = approximately 1% to 5% of the signal  
Bandwidth requirements
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. Measure the maximum width of the emission that is constrained by the frequencies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

#### 4.3.4 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.



#### 4.3.7 TEST RESULTS

##### 802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	10.203	0.5	PASS
6	2437	10.203	0.5	PASS
11	2462	10.203	0.5	PASS

##### 802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.57	0.5	PASS
6	2437	16.57	0.5	PASS
11	2462	16.57	0.5	PASS

##### 802.11n HT20

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.57	0.5	PASS
6	2437	16.57	0.5	PASS
11	2462	16.57	0.5	PASS

##### 802.11n HT40

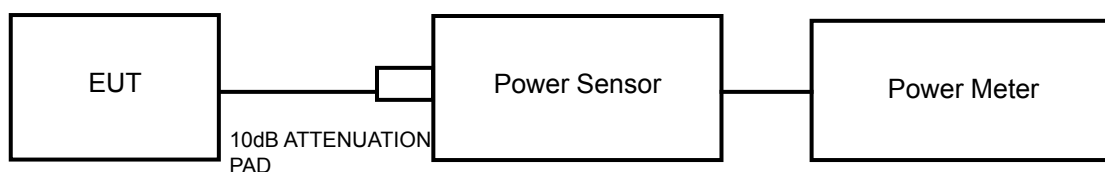
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
3	2422	36.76	0.5	PASS
6	2437	36.76	0.5	PASS
9	2452	36.76	0.5	PASS

## 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

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Power Meter Anritsu	ML2495A	1139001	Nov.07,11	Nov.07,12

### 4.4.4 TEST PROCEDURES

A 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.

### 4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

### 4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.

**4.4.7 TEST RESULTS****802.11b**

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	PEAK POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
1	2412	8.23	10.42	30	PASS
6	2437	8.20	10.24	30	PASS
11	2462	7.96	9.90	30	PASS

**802.11g**

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	PEAK POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
1	2412	6.42	9.51	30	PASS
6	2437	6.58	9.24	30	PASS
11	2462	6.68	8.90	30	PASS

**802.11n HT20**

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	PEAK POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
1	2412	6.43	8.90	30	PASS
6	2437	6.67	8.68	30	PASS
11	2462	6.50	8.34	30	PASS

**802.11n HT40**

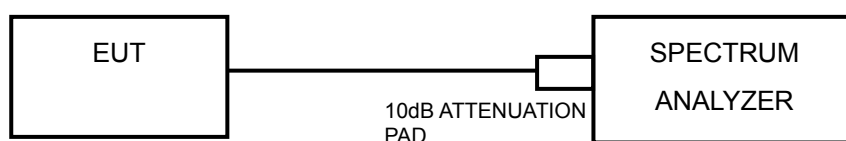
CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	PEAK POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
3	2422	6.58	9.25	30	PASS
6	2437	6.52	8.98	30	PASS
9	2452	6.60	8.72	30	PASS

## 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

1. Set the RBW = 100 kHz, VBW = 300 kHz, Detector = peak.
2. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
3. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
4. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where  $BWCF = 10\log(3 \text{ kHz}/100\text{kHz})$

### 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	-8.56	8	PASS
6	2437	-9.48	8	PASS
11	2462	-9.68	8	PASS

##### 802.11g

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-11.22	8	PASS
6	2437	-11.48	8	PASS
11	2462	-11.35	8	PASS

##### 802.11n HT20

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-11.28	8	PASS
6	2437	-11.68	8	PASS
11	2462	-11.88	8	PASS

##### 802.11n HT40

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
3	2422	-12.11	8	PASS
6	2437	-12.58	8	PASS
9	2452	-12.35	8	PASS



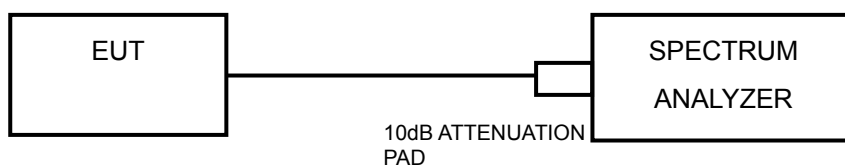


## 4.6 OUT OF BAND EMISSION MEASUREMENT

### 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

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

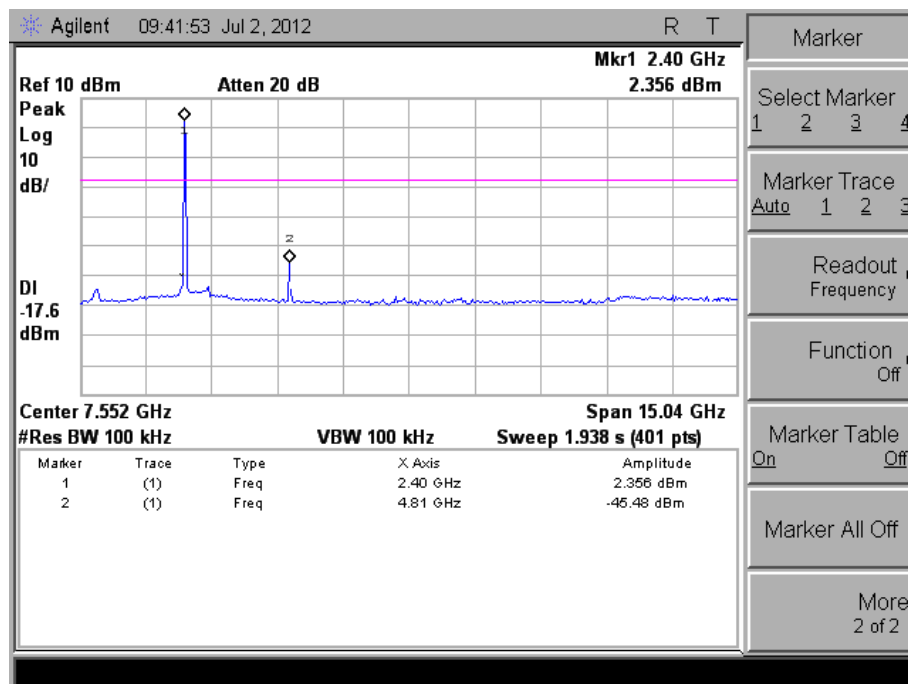
No deviation.

### 4.6.6 EUT OPERATING CONDITION

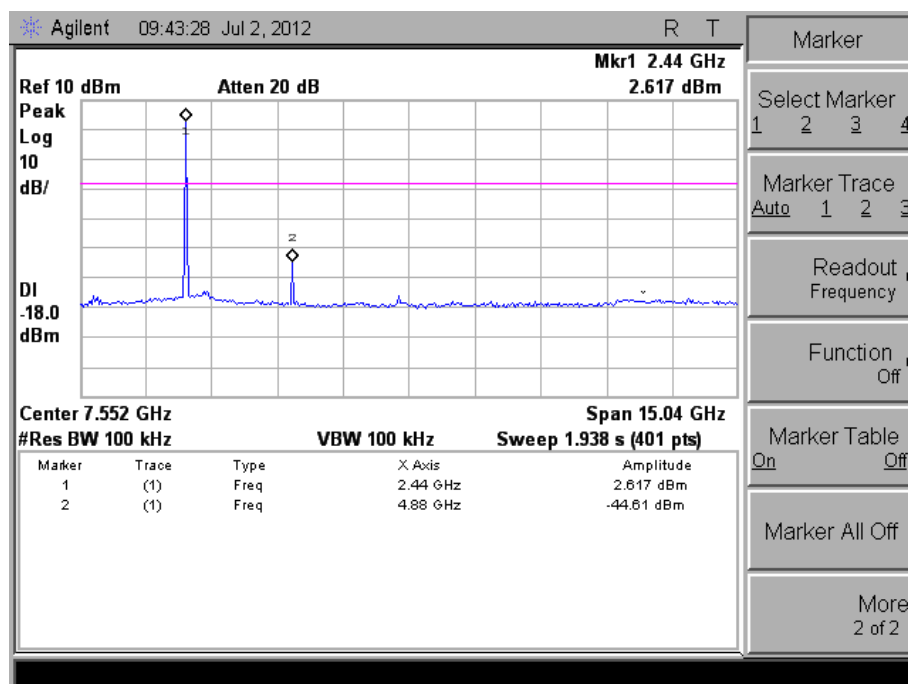
Same as Item 4.3.6

## 4.6.7 TEST RESULTS

### 802.11b- CH 1



### 802.11b- CH 6

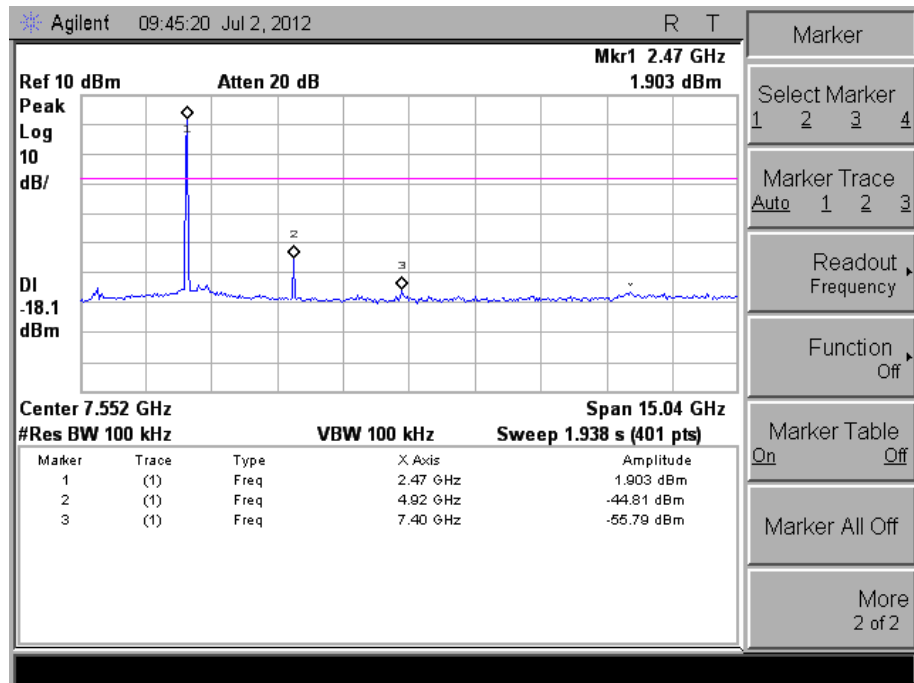




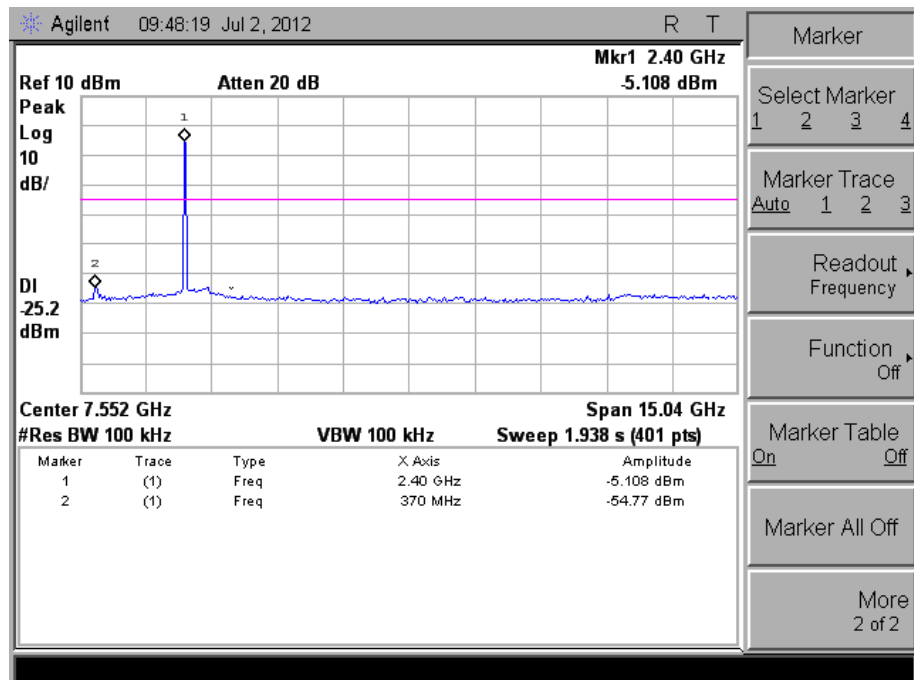
BUREAU  
VERITAS

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## 802.11b- CH 11



## 802.11g- CH 1

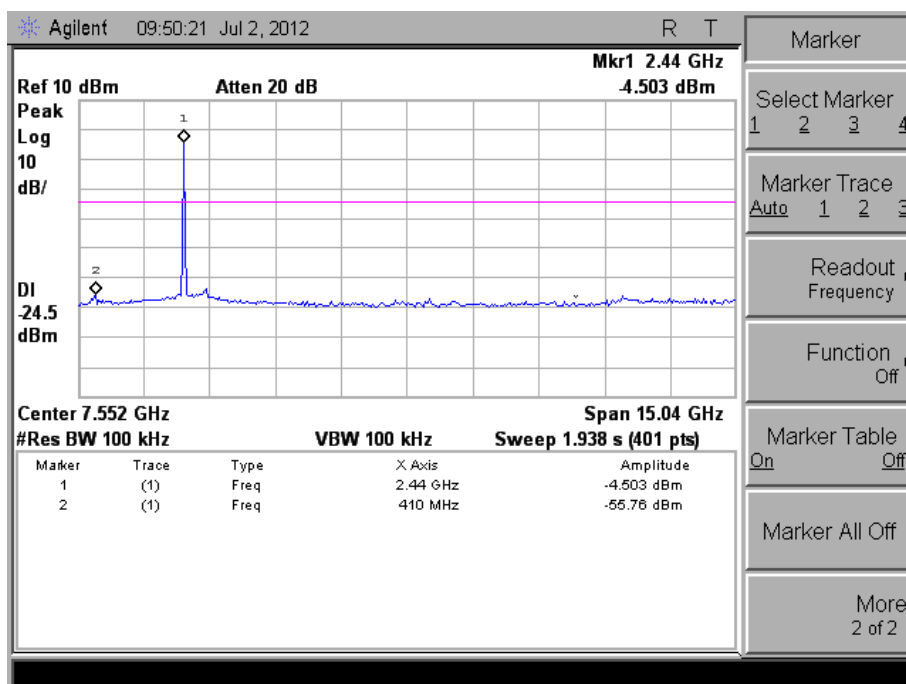




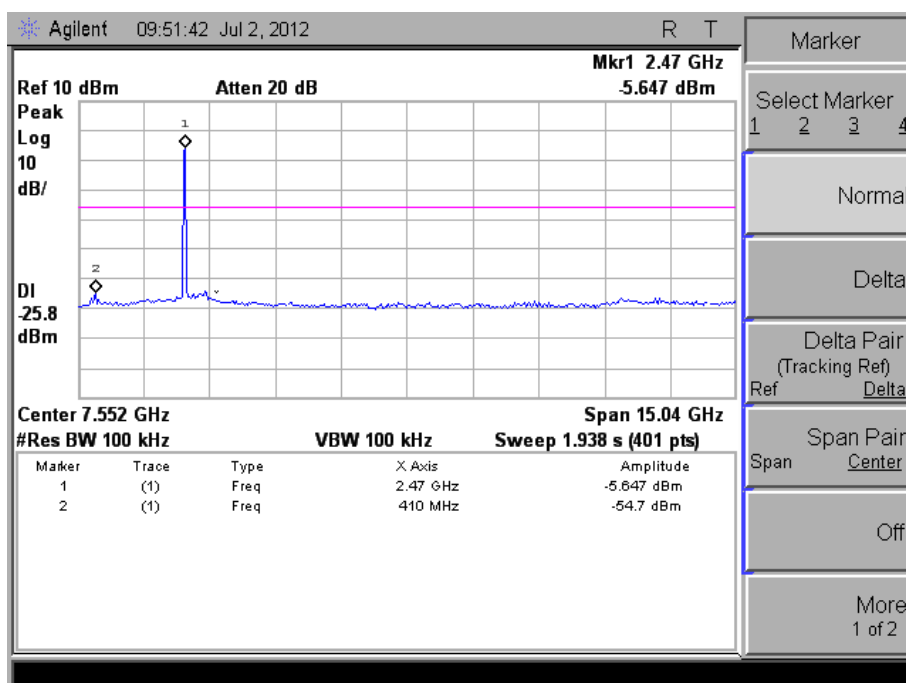
BUREAU  
VERITAS

Test Report No.: FC120618N039

## 802.11g- CH 6



## 802.11g- CH 11

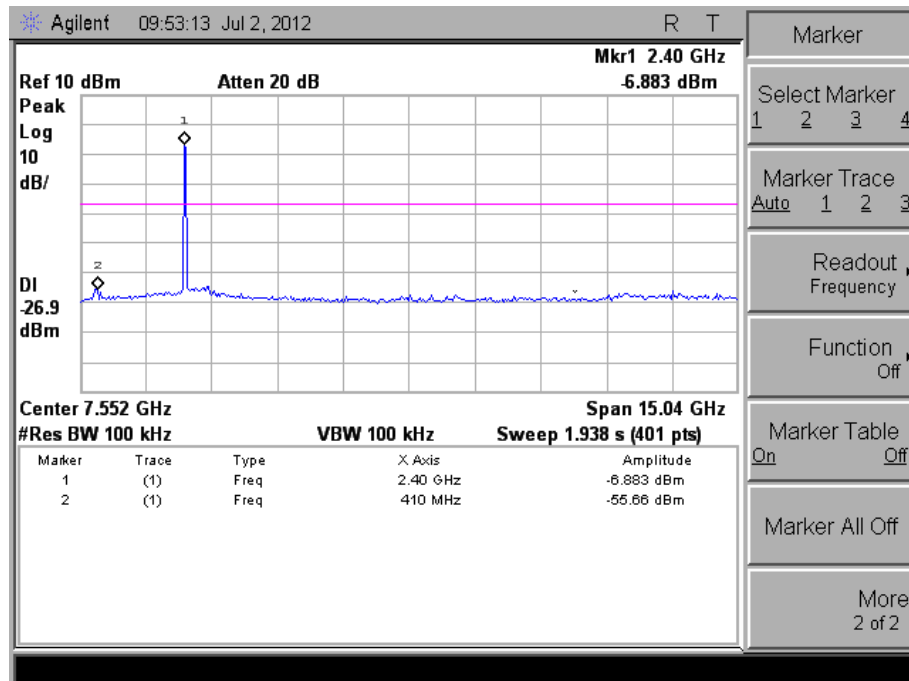




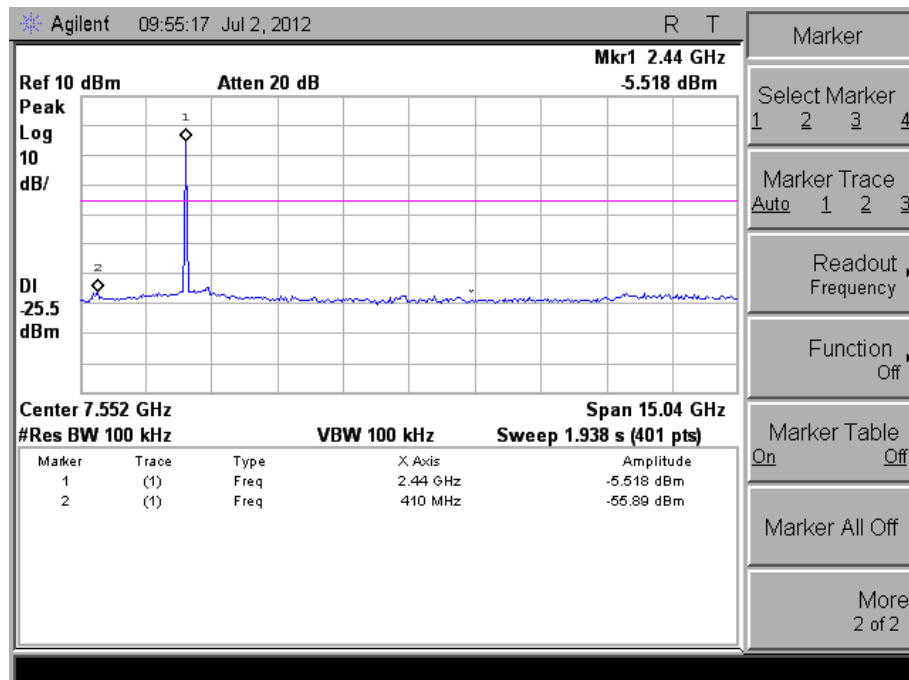
BUREAU  
VERITAS

Test Report No.: FC120618N039

### 802.11n HT20- CH 1



### 802.11n HT20- CH 6

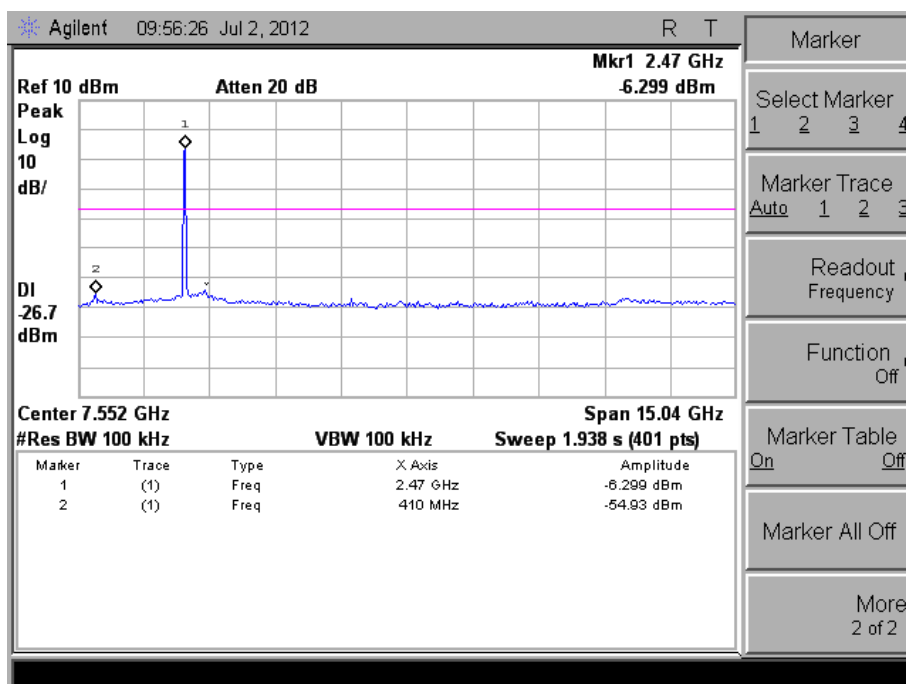




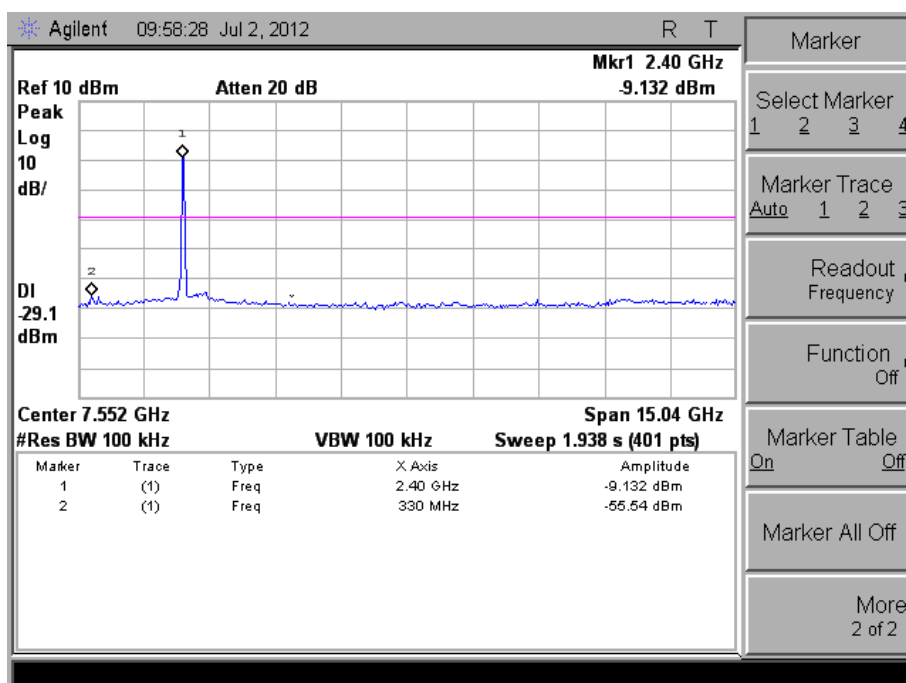
BUREAU  
VERITAS

Test Report No.: FC120618N039

### 802.11n HT20- CH 11



### 802.11n HT40- CH 3

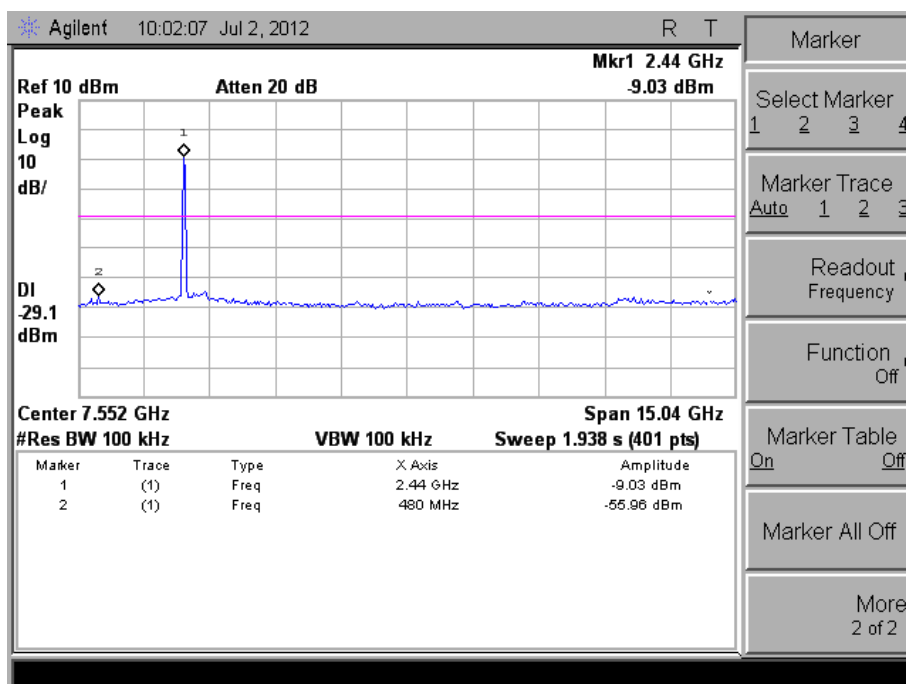




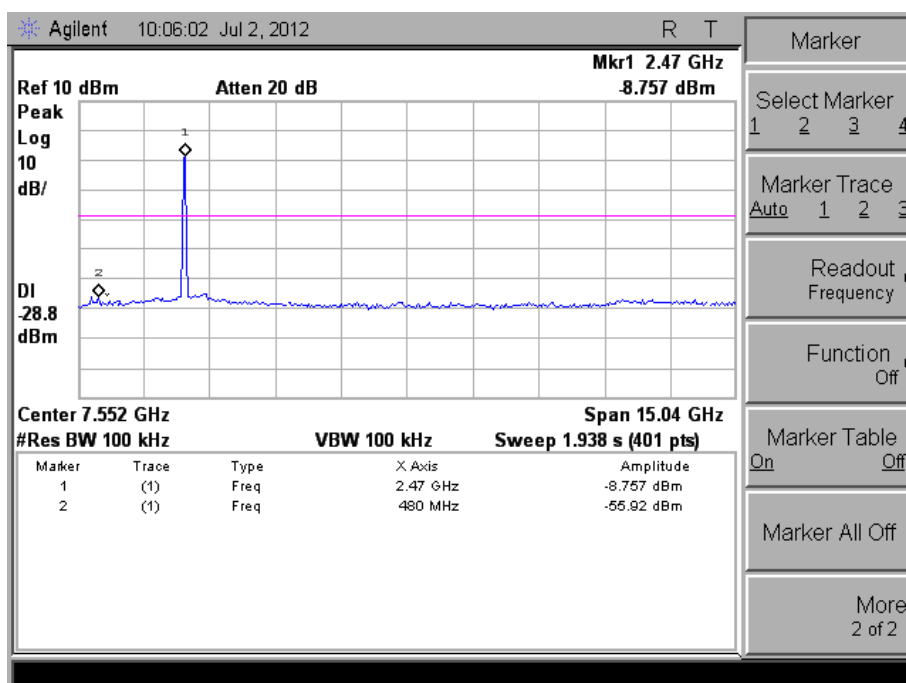
BUREAU  
VERITAS

Test Report No.: FC120618N039

## 802.11n HT40- CH 6



## 802.11n HT40- CH 9





Test Report No.: FC120618N039

## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

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





## **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---**