



BUREAU
VERITAS

Test Report No.: RF160412W003-1



Test Lab
Cert 2951.01

FCC TEST REPORT

(WIFI 2.4GHz)

Product: Indoor CPE

Model Name: WF821E

FCC ID: SRQ-WF821E

Applicant: ZTE Corporation

Address: ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, P.R.China

Manufacturer: ZTE Corporation

Address: ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, P.R.China

Prepared by: Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch

Lab Location: No. 34, Chenwulu Section, Guantai Rd., Houjie Town, Dongguan City, Guangdong 523942, China

TEL: +86 769 8593 5656

FAX: +86 769 8593 1080

E-MAIL: customerservice.dg@cn.bureauveritas.com

Report No.: RF160412W003-1

Received Date: Apr. 12, 2016

Test Date: Apr. 13, 2016 ~ Apr. 25, 2016

Issued Date: Apr. 26, 2016

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF160412W003-1	Original release	Apr. 26, 2016



Test Report No.: RF160412W003-1

1 CERTIFICATION

PRODUCT: Indoor CPE
BRAND NAME: ZTE
MODEL NAME: WF821E
APPLICANT: ZTE Corporation
TESTED: Apr. 13, 2016 ~ Apr. 25, 2016
TEST SAMPLE: Production unit
STANDARDS: **FCC Part 15, Subpart C. Section 15.247**
ANSI C63.10-2013

The above equipment has been tested by **Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch** and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY :  , **DATE:** Apr. 26, 2016
(Amyee Qian / Engineer)

APPROVED BY :  , **DATE:** Apr. 26, 2016
(William Chung / Manager)



2 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 -4.39dB at 12.104000MHz.
15.205 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.4dB at 2390.00MHz.
15.247(d)	Out of band Emission Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted Output power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.66dB
Radiated emissions	9KHz ~ 30MHz	2.74dB
	30MHz ~ 1GMHz	3.55dB
	1GHz ~ 18GHz	4.84dB
	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

PRODUCT	Indoor CPE
MODEL NAME	WF821E
PRODUCT TYPE	Fixed Station
NOMINAL VOLTAGE	12Vdc (adapter)
MODULATION TECHNOLOGY	DSSS, OFDM, DTS
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
TRANSMISSION RATE	802.11b: 11/ 5.5/ 2.0 / 1.0 Mbps 802.11g: 54/ 48/ 36 / 24 / 18 / 9/ 6 Mbps 802.11n: up to 135 Mbps
OPERATING FREQUENCY	2412-2462MHz for 11b/g/n(HT20) 2422-2452MHz for 11b/g/n(HT40)
MAX. OUTPUT POWER	180.844mW (Maximum)
ANTENNA TYPE	PCB Antenna with 1dBi gain
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	N/A

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. The EUT was powered by the following adapters:

POE ADAPTER 1	
BRAND:	N/A
MODEL:	RD1201000-C55-26MG
INPUT:	AC 100-240V, 600mA
OUTPUT:	DC 12V, 1000mA

POE ADAPTER 2	
BRAND:	N/A
MODEL:	RD1201500-C55-24MG
INPUT:	AC 100-240V, 600mA
OUTPUT:	DC 12V, 1500mA

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



MODULATION MODE	TX/RX FUNCTION
802.11b	1TX /1RX
802.11g	1TX /1RX
802.11n (20MHz)	2TX /2RX
802.11n (40MHz)	2TX /2RX

4. For the test results, the EUT had been tested with all conditions. But only the worst case was shown 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

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 Y axis for radiated emission. Following test modes were selected for the final test, and the final worst case is marked in boldface and recorded in the report:

EUT CONFIGURE MODE	APPLICABLE TO				MODE
	RE<1G	RE≥1G	PLC	APCM	
-	√	√	√	√	-

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

RE≥1G: Radiated Emission above 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

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

RADIATED EMISSION TEST (BELOW 1GHz):

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 11	1	CCK	DBPSK	1.0

For the test results, only the worst case was shown in test report.

**RADIATED EMISSION TEST (ABOVE 1GHz):**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports (if EUT with antenna diversity architecture).

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
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

POWER LINE CONDUCTED EMISSION TEST:

The EUT was tested with the following mode

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

BANDEDGE MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

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

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

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	TEST VOLTAGE	TESTED BY
RE<1G	22deg. C, 54%RH	12Vdc (adapter)	Alex Chen
RE≥1G	22deg. C, 54%RH	12Vdc (adapter)	Alex Chen
PLC	25deg. C, 60%RH	12Vdc (adapter)	Yuqiang Yin
APCM	25deg. C, 60%RH	12Vdc (adapter)	Yuqiang Yin



3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C, Section 15.247

KDB 558074 D01 DTS Meas Guidance v03r05

ANSI C63.10-2013

Note:

1. All test items have been performed and recorded as per the above standards.
2. The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (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	DC source	LONG WEI	PS-6403D	010934269	N/A
2	PC	HP	A6608CN	3CR83825X3	N/A

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

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR3 +ENV216	101900	Apr. 08, 15	Apr. 07, 16
EMC32 test software	Rohde&Schwarz	EMC32	NA	NA	NA
LISN network	Rohde&Schwarz	ENV216	101922	Oct. 12, 15	Oct. 11, 16

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) was not recorded.

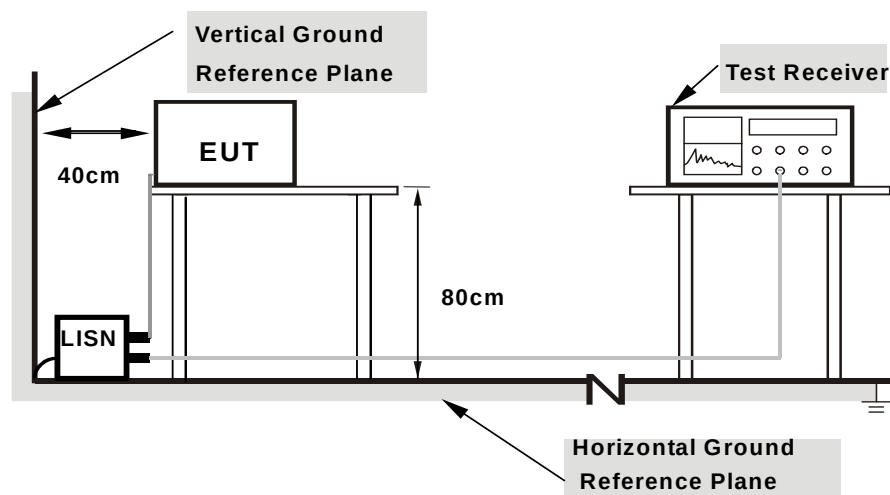
NOTE: All modes of operation were investigated and the worst-case emissions are reported.

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



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4.1.7 TEST RESULTS

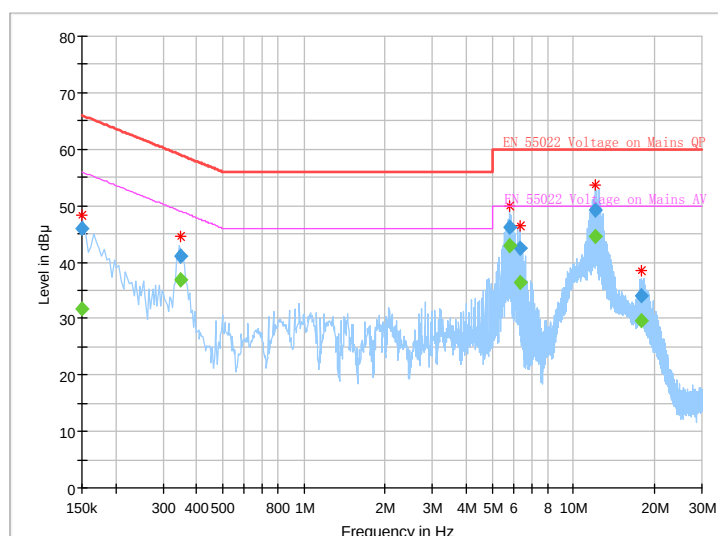
CONDUCTED WORST-CASE DATA:

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	----------	-------------------	--------------------------------

Frequency (MHz)	QuasiPeak (dB μ V)	CAverage (dB μ V)	Limit (dB μ V)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	---	31.63	56.00	-24.37	L	ON	9.6
0.150000	45.90	---	66.00	-20.10	L	ON	9.6
0.348000	---	36.88	49.01	-12.13	L	ON	9.7
0.348000	40.94	---	59.01	-18.07	L	ON	9.7
5.788000	---	42.93	50.00	-7.07	L	ON	9.8
5.788000	46.19	---	60.00	-13.81	L	ON	9.8
6.320000	---	36.47	50.00	-13.53	L	ON	9.8
6.320000	42.55	---	60.00	-17.45	L	ON	9.8
12.104000	---	44.66	50.00	-5.34	L	ON	9.9
12.104000	49.27	---	60.00	-10.73	L	ON	9.9
17.968000	---	29.68	50.00	-20.32	L	ON	9.9
17.968000	33.97	---	60.00	-26.03	L	ON	9.9

- 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.

Full Spectrum



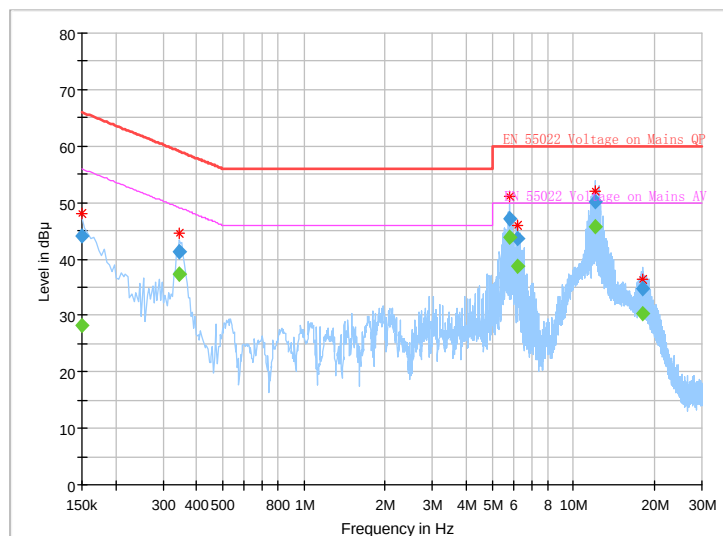


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	-----------------------------------

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	---	28.30	56.00	-27.70	N	ON	9.8
0.150000	44.07	---	66.00	-21.93	N	ON	9.8
0.344000	---	37.37	49.11	-11.74	N	ON	10.0
0.344000	41.27	---	59.11	-17.84	N	ON	10.0
5.780000	---	43.75	50.00	-6.25	N	ON	9.8
5.780000	47.19	---	60.00	-12.81	N	ON	9.8
6.240000	---	38.75	50.00	-11.25	N	ON	9.8
6.240000	43.62	---	60.00	-16.38	N	ON	9.8
12.104000	---	45.61	50.00	-4.39	N	ON	9.9
12.104000	50.05	---	60.00	-9.95	N	ON	9.9
18.124000	---	30.25	50.00	-19.75	N	ON	10.0
18.124000	34.75	---	60.00	-25.25	N	ON	10.0

- 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.

Full Spectrum





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.



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4.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	May 12,15	May 12,16
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Oct. 23,15	Oct. 22,16
Horn Antenna	ETS-LINDGREN	3117	00168728	Dec. 10,14	Dec. 10,16
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Mar. 14,15	Mar. 14,17
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Aug. 18,15	Aug. 17,16
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Aug. 20,15	Aug. 19,16
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Aug. 18,15	Aug. 17,16

NOTE:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in 966 Chamber.
3. The FCC Site Registration No. is 502831.



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:

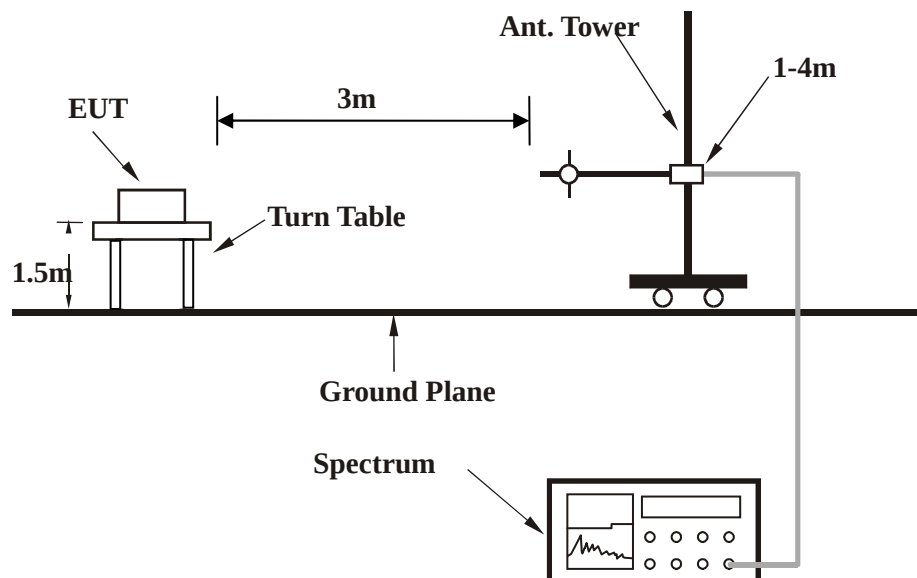
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution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

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:

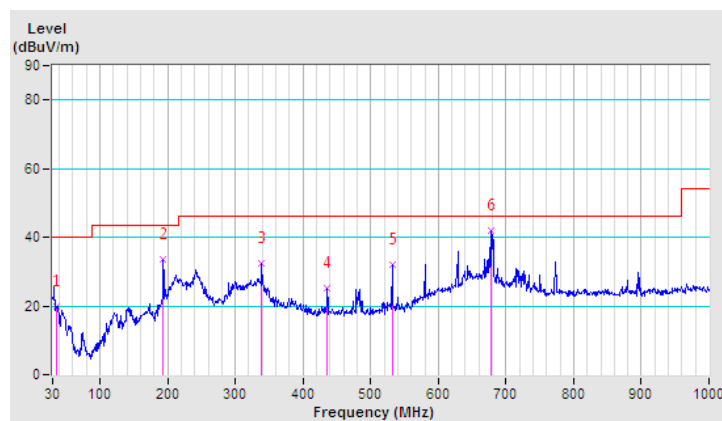
802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	35.82	19.9 QP	40.0	-20.1	1.00 H	0	42.07	-22.16
2	192.96	33.6 QP	43.5	-9.9	1.00 H	0	57.45	-23.88
3	338.46	32.4 QP	46.0	-13.6	1.00 H	0	51.16	-18.77
4	435.46	25.0 QP	46.0	-21.0	1.00 H	0	40.64	-15.60
5	531.49	32.0 QP	46.0	-14.1	1.00 H	0	46.10	-14.15
6	676.99	41.8 QP	46.0	-4.2	1.00 H	0	52.18	-10.38

REMARKS:

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



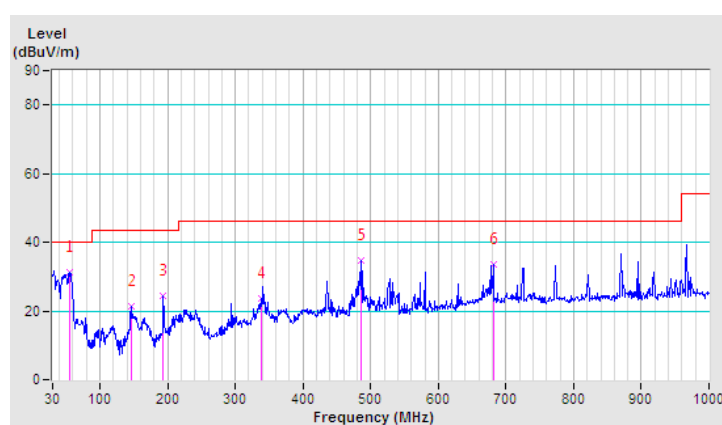


CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	54.25	31.2 QP	40.0	-8.8	1.00 V	0	59.74	-28.53
2	145.43	21.4 QP	43.5	-22.1	1.00 V	0	46.92	-25.50
3	192.96	24.3 QP	43.5	-19.2	1.00 V	0	48.17	-23.88
4	337.49	23.8 QP	46.0	-22.2	1.00 V	0	42.61	-18.82
5	485.90	34.7 QP	46.0	-11.3	1.00 V	0	49.65	-14.99
6	680.87	33.4 QP	46.0	-12.6	1.00 V	0	43.64	-10.27

REMARKS:

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





ABOVE 1GHz DATA

802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#2390.00	60.9 PK	74.0	-13.1	1.00 H	160	68.76	-7.87
2	#2390.00	50.8 AV	54.0	-3.2	1.00 H	160	58.66	-7.87
3	#2400.00	77.8 PK	85.9	-8.1	1.00 H	160	85.65	-7.84
4	#2400.00	70.3 AV	81.5	-11.2	1.00 H	160	78.13	-7.84
5	*2412.00	105.9 PK			1.00 H	160	113.72	-7.81
6	*2412.00	101.5 AV			1.00 H	160	109.28	-7.81
7	#4824.00	54.6 PK	74.0	-19.4	1.00 H	172	56.56	-1.97
8	#4824.00	43.6 AV	54.0	-10.5	1.00 H	172	45.52	-1.97
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	57.2 PK	74.0	-16.8	1.00 V	292	65.03	-7.87
2	#2390.00	47.7 AV	54.0	-6.4	1.00 V	292	55.52	-7.87
3	#2400.00	74.1 PK	85.9	-11.8	1.00 V	292	81.96	-7.84
4	#2400.00	67.6 AV	81.1	-13.5	1.00 V	292	75.43	-7.84
5	*2412.00	105.9 PK			1.00 V	292	113.67	-7.81
6	*2412.00	101.1 AV			1.00 V	292	108.94	-7.81
7	#4824.00	55.3 PK	74.0	-18.7	1.00 V	260	57.23	-1.97
8	#4824.00	46.6 AV	54.0	-7.4	1.00 V	260	48.56	-1.97

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	105.9 PK			1.00 H	158	113.62	-7.73
2	*2437.00	101.6 AV			1.00 H	158	109.34	-7.73
3	#4874.00	55.7 PK	74.0	-18.3	1.00 H	189	57.49	-1.81
4	#4874.00	43.7 AV	54.0	-10.3	1.00 H	189	45.55	-1.81
5	#7311.00	59.7 PK	74.0	-14.3	1.00 H	234	56.94	2.75
6	#7311.00	46.2 AV	54.0	-7.8	1.00 H	234	43.48	2.75
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	105.7 PK			1.00 V	290	113.38	-7.73
2	*2437.00	101.1 AV			1.00 V	290	108.81	-7.73
3	#4874.00	54.9 PK	74.0	-19.1	1.00 V	172	56.75	-1.81
4	#4874.00	43.0 AV	54.0	-11.0	1.00 V	172	44.84	-1.81
5	#7311.00	59.0 PK	74.0	-15.0	1.00 V	87	56.29	2.75
6	#7311.00	46.4 AV	54.0	-7.6	1.00 V	87	43.61	2.75

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) – Pre-Amplifier 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 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	105.8 PK			1.00 H	162	113.42	-7.66
2	*2462.00	58.3 PK			1.00 H	162	65.92	-7.66
3	#2483.50	59.8 PK	74.0	-14.2	1.00 H	162	67.4	-7.60
4	#2483.50	51.9 AV	54.0	-2.1	1.00 H	162	59.5	-7.60
5	#4924.00	54.9 PK	74.0	-19.1	1.00 H	63	56.56	-1.64
6	#4924.00	44.2 AV	54.0	-9.9	1.00 H	63	45.79	-1.64
7	#7386.00	58.0 PK	74.0	-16.1	1.00 H	256	55.08	2.87
8	#7386.00	44.9 AV	54.0	-9.1	1.00 H	256	42.07	2.87
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	106.4 PK			1.00 V	295	114.10	-7.66
2	*2462.00	101.7 AV			1.00 V	295	109.34	-7.66
3	#2483.50	58.7 PK	74.0	-15.3	1.00 V	295	66.34	-7.60
4	#2483.50	50.9 AV	54.0	-3.1	1.00 V	295	58.48	-7.60
5	#4924.00	54.7 PK	74.0	-19.3	1.00 V	308	56.38	-1.64
6	#4924.00	41.9 AV	54.0	-12.2	1.00 V	308	43.49	-1.64
7	#7386.00	59.3 PK	74.0	-14.7	1.00 V	148	56.45	2.87
8	#7386.00	45.0 AV	54.0	-9.0	1.00 V	148	42.17	2.87

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



BUREAU VERITAS Test Report No.: RF160412W003-1

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#2390.00	72.6 PK	74.0	-1.4	1.80 H	28	80.48	-7.87
2	#2390.00	51.8 AV	54.0	-2.2	1.80 H	28	59.63	-7.87
3	#2400.00	81.7 PK	86.1	-4.4	1.80 H	28	89.58	-7.84
4	#2400.00	63.8 AV	68.7	-4.9	1.80 H	28	71.66	-7.84
5	*2412.00	106.1 PK			1.00 H	215	113.92	-7.81
6	*2412.00	88.7 AV			1.00 H	215	96.54	-7.81
7	#4824.00	55.8 PK	74.0	-18.2	1.00 H	159	57.74	-1.97
8	#4824.00	44.6 AV	54.0	-9.4	1.00 H	159	46.55	-1.97
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	65.3 PK	74.0	-8.7	1.60 V	106	73.13	-7.87
2	#2390.00	46.3 AV	54.0	-7.7	1.60 V	106	54.14	-7.87
3	#2400.00	75.4 PK	84.5	-9.1	1.60 V	106	83.27	-7.84
4	#2400.00	56.9 AV	65.5	-8.6	1.60 V	106	64.69	-7.84
5	*2412.00	104.5 PK			1.60 V	106	112.33	-7.81
6	*2412.00	85.5 AV			1.60 V	106	93.26	-7.81
7	#4824.00	57.5 PK	74.0	-16.5	1.00 V	225	59.51	-1.97
8	#4824.00	44.0 AV	54.0	-10.1	1.00 V	225	45.92	-1.97

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	106.6 PK			1.80 H	25	114.34	-7.73
2	*2437.00	88.2 AV			1.80 H	25	95.94	-7.73
3	#4874.00	59.3 PK	74.0	-14.7	1.00 H	62	61.08	-1.81
4	#4874.00	46.4 AV	54.0	-7.6	1.00 H	62	48.20	-1.81
5	#7311.00	61.7 PK	74.0	-12.3	1.00 H	263	58.97	2.75
6	#7311.00	48.5 AV	54.0	-5.6	1.00 H	263	45.70	2.75
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	104.0 PK			1.30 V	105	111.72	-7.73
2	*2437.00	85.7 AV			1.30 V	105	93.39	-7.73
3	#4874.00	58.5 PK	74.0	-15.5	1.30 V	216	60.28	-1.81
4	#4874.00	45.9 AV	54.0	-8.1	1.30 V	216	47.72	-1.81
5	#7311.00	61.6 PK	74.0	-12.4	1.30 V	88	58.86	2.75
6	#7311.00	48.4 AV	54.0	-5.6	1.30 V	88	45.66	2.75

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) – Pre-Amplifier 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 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	106.2 PK			1.80 H	30	113.87	-7.66
2	*2462.00	87.9 AV			1.80 H	30	95.57	-7.66
3	#2483.50	67.9 PK	74.0	-6.1	1.80 H	30	75.51	-7.60
4	#2483.50	49.7 AV	54.0	-4.3	1.80 H	30	57.29	-7.60
5	#4924.00	56.9 PK	74.0	-17.1	1.00 H	167	58.50	-1.64
6	#4924.00	44.1 AV	54.0	-10.0	1.00 H	167	45.69	-1.64
7	#7386.00	60.7 PK	74.0	-13.3	1.00 H	58	57.79	2.87
8	#7386.00	48.2 AV	54.0	-5.8	1.00 H	58	45.35	2.87
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	101.6 PK			1.00 V	105	109.25	-7.66
2	*2462.00	83.5 AV			1.00 V	105	91.17	-7.66
3	#2483.50	60.4 PK	74.0	-13.7	1.00 V	105	67.95	-7.60
4	#2483.50	45.1 AV	54.0	-8.9	1.00 V	105	52.67	-7.60
5	#4924.00	57.7 PK	74.0	-16.3	1.30 V	112	59.31	-1.64
6	#4924.00	44.3 AV	54.0	-9.7	1.30 V	112	45.95	-1.64
7	#7386.00	60.7 PK	74.0	-13.3	1.30 V	228	57.87	2.87
8	#7386.00	48.2 AV	54.0	-5.8	1.30 V	228	45.34	2.87

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



BUREAU VERITAS Test Report No.: RF160412W003-1

802.11n (20MHz)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
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	72.4 PK	74.0	-1.6	1.80 H	25	80.23	-7.87
2	#2390.00	52.0 AV	54.0	-2.0	1.80 H	25	59.88	-7.87
3	#2400.00	78.9 PK	86.3	-7.4	1.80 H	25	86.75	-7.84
4	#2400.00	59.4 AV	62.3	-2.9	1.80 H	25	67.25	-7.84
5	*2412.00	106.3 PK			1.80 H	25	114.07	-7.81
6	*2412.00	82.3 AV			1.80 H	25	90.09	-7.81
7	#4824.00	56.3 PK	74.0	-17.7	1.00 H	197	58.24	-1.97
8	#4824.00	44.7 AV	54.0	-9.3	1.00 H	197	46.69	-1.97
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	69.8 PK	74.0	-4.2	1.30 V	105	77.66	-7.87
2	#2390.00	46.2 AV	54.0	-7.8	1.30 V	105	54.09	-7.87
3	#2400.00	72.8 PK	83.0	-10.2	1.30 V	105	80.67	-7.84
4	#2400.00	53.8 AV	59.4	-5.6	1.30 V	105	61.65	-7.84
5	*2412.00	103.0 PK			1.30 V	105	110.83	-7.81
6	*2412.00	79.4 AV			1.30 V	105	87.19	-7.81
7	#4874.00	57.2 PK	74.0	-16.8	1.30 V	223	59.04	-1.81
8	#4874.00	44.9 AV	54.0	-9.1	1.30 V	223	46.67	-1.81

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	105.6 PK			1.80 H	30	113.31	-7.73
2	*2437.00	81.9 AV			1.80 H	30	89.58	-7.73
3	#4874.00	56.8 PK	74.0	-17.2	1.00 H	147	58.65	-1.81
4	#4874.00	44.4 AV	54.0	-9.6	1.00 H	147	46.24	-1.81
5	#7311.00	60.3 PK	74.0	-13.7	1.00 H	234	57.54	2.75
6	#7311.00	47.5 AV	54.0	-6.5	1.00 H	234	44.71	2.75
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	103.6 PK			1.25 V	108	111.32	-7.73
2	*2437.00	90.9 AV			1.25 V	108	98.67	-7.73
3	#4874.00	58.8 PK	74.0	-15.2	1.30 V	76	60.62	-1.81
4	#4874.00	45.6 AV	54.0	-8.4	1.30 V	76	47.39	-1.81
5	#7311.00	60.3 PK	74.0	-13.8	1.30 V	231	57.50	2.75
6	#7311.00	48.5 AV	54.0	-5.5	1.30 V	231	45.76	2.75

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) – Pre-Amplifier 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 11	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	105.8 PK			1.80 H	25	113.41	-7.66
2	*2462.00	81.9 AV			1.80 H	25	89.54	-7.66
3	#2483.50	69.7 PK	74.0	-4.3	1.80 H	25	77.32	-7.60
4	#2483.50	50.3 AV	54.0	-3.7	1.80 H	25	57.93	-7.60
5	#4924.00	57.2 PK	74.0	-16.8	1.00 H	111	58.83	-1.64
6	#4924.00	44.2 AV	54.0	-9.8	1.00 H	111	45.83	-1.64
7	#7386.00	60.7 PK	74.0	-13.3	1.00 H	215	57.87	2.87
8	#7386.00	47.2 AV	54.0	-6.9	1.00 H	215	44.28	2.87
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	102.4 PK			1.25 V	110	110.04	-7.66
2	*2462.00	79.9 AV			1.25 V	110	87.51	-7.66
3	#2483.50	62.7 PK	74.0	-11.3	1.25 V	110	70.26	-7.60
4	#2483.50	45.0 AV	54.0	-9.1	1.25 V	110	52.55	-7.60
5	#4924.00	58.4 PK	74.0	-15.6	1.25 V	236	60.02	-1.64
6	#4924.00	44.7 AV	54.0	-9.3	1.25 V	236	46.38	-1.64
7	#7386.00	60.9 PK	74.0	-13.1	1.25 V	72	57.99	2.87
8	#7386.00	47.2 AV	54.0	-6.8	1.25 V	72	44.31	2.87

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



BUREAU VERITAS Test Report No.: RF160412W003-1

802.11n (40MHz)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
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	71.5 PK	74.0	-2.6	1.80 H	30	79.32	-7.87
2	#2390.00	51.1 AV	54.0	-2.9	1.80 H	30	59.00	-7.87
3	#2400.00	78.1 PK	83.0	-4.9	1.80 H	25	85.95	-7.84
4	#2400.00	54.2 AV	59.7	-5.5	1.80 H	25	62.08	-7.84
5	*2422.00	103.0 PK			1.80 H	30	110.82	-7.78
6	*2422.00	79.7 AV			1.80 H	30	80.47	-7.78
7	#4844.00	55.3 PK	74.0	-18.7	1.00 H	236	57.23	-1.91
8	#4844.00	43.4 AV	54.0	-10.6	1.00 H	236	45.30	-1.91
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	68.9 PK	74.0	-5.1	1.25 V	100	76.75	-7.87
2	#2390.00	46.0 AV	54.0	-8.0	1.25 V	100	53.89	-7.87
3	#2400.00	69.6 PK	80.3	-10.7	1.25 V	100	77.43	-7.84
4	#2400.00	49.9 AV	52.3	-2.4	1.25 V	100	57.77	-7.84
5	*2422.00	100.3 PK			1.25 V	100	108.12	-7.78
6	*2422.00	72.3 AV			1.25 V	100	80.09	-7.78
7	#4844.00	61.2 PK	74.0	-12.8	1.25 V	236	63.15	-1.91
8	#4844.00	44.7 AV	54.0	-9.3	1.25 V	236	46.59	-1.91

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
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	103.9 PK			1.80 H	35	111.60	-7.73
2	*2437.00	72.8 AV			1.80 H	35	80.54	-7.73
3	#4874.00	56.8 PK	74.0	-17.2	1.00 H	248	58.62	-1.81
4	#4874.00	44.2 AV	54.0	-9.8	1.00 H	248	46.04	-1.81
5	#7311.00	59.9 PK	74.0	-14.1	1.00 H	168	57.16	2.75
6	#7311.00	47.4 AV	54.0	-6.6	1.00 H	168	44.69	2.75
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	100.4 PK			1.25 V	105	108.17	-7.73
2	*2437.00	71.8 AV			1.25 V	105	79.50	-7.73
3	#4874.00	58.3 PK	74.0	-15.7	1.25 V	187	60.10	-1.81
4	#4874.00	44.8 AV	54.0	-9.2	1.25 V	187	46.62	-1.81
5	#7311.00	60.0 PK	74.0	-14.0	1.25 V	48	57.22	2.75
6	#7311.00	47.4 AV	54.0	-6.6	1.25 V	48	44.67	2.75

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) – Pre-Amplifier 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 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	104.0 PK			1.80 H	35	111.64	-7.69
2	*2452.00	73.1 AV			1.80 H	35	80.75	-7.69
3	#2483.50	72.6 PK	74.0	-1.4	1.80 H	35	80.18	-7.60
4	#2483.50	52.5 AV	54.0	-1.6	1.80 H	35	60.05	-7.60
5	#4904.00	56.9 PK	74.0	-17.1	1.00 H	248	58.60	-1.71
6	#4904.00	43.8 AV	54.0	-10.2	1.00 H	248	45.54	-1.71
7	#7356.00	60.0 PK	74.0	-14.0	1.00 H	78	57.17	2.81
8	#7356.00	47.2 AV	54.0	-6.8	1.00 H	78	44.38	2.81
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	100.4 PK			1.30 V	110	108.04	-7.69
2	*2452.00	70.7 AV			1.30 V	110	78.43	-7.69
3	#2483.50	62.3 PK	74.0	-11.7	1.30 V	110	69.86	-7.60
4	#2483.50	45.2 AV	54.0	-8.8	1.30 V	110	52.79	-7.60
5	#4904.00	57.5 PK	74.0	-16.5	1.25 V	75	59.20	-1.71
6	#4904.00	44.1 AV	54.0	-9.9	1.25 V	75	45.79	-1.71
7	#7356.00	60.1 PK	74.0	-14.0	1.25 V	242	57.24	2.81
8	#7356.00	47.2 AV	54.0	-6.9	1.25 V	242	44.34	2.81

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



4.3 6 dB 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.
Spectrum Analyzer (10Hz–40GHz)	Rohde&Schwarz	FSV40	101003	Apr. 05,16	Apr. 04,17
Power Meter	Anritsu	ML2495A	1139001	Feb.19,16	Feb. 18,17
Power Sensor	Anritsu	MA2411B	1126068	Feb.19,16	Feb. 18,17
Power Sensor	Keysight	U2021XA	MY55060016	May 27,15	May 26,16
Power Sensor	Keysight	U2021XA	MY55060018	May 27,15	May 26,16
Digital Multimeter	FLUKE	15B	A1220010DG	Oct. 12, 15	Oct.11, 16

NOTE:

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

4.3.3 TEST PROCEDURE

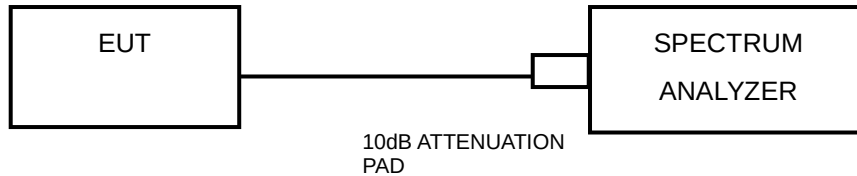
1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) 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

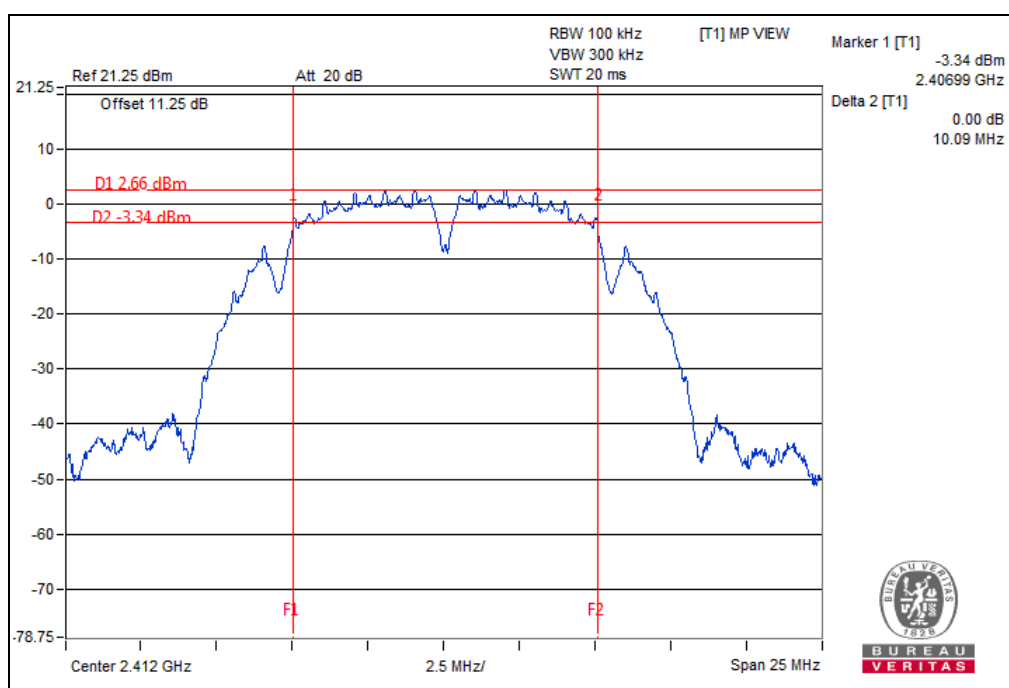
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



4.3.7 TEST RESULTS

802.11b

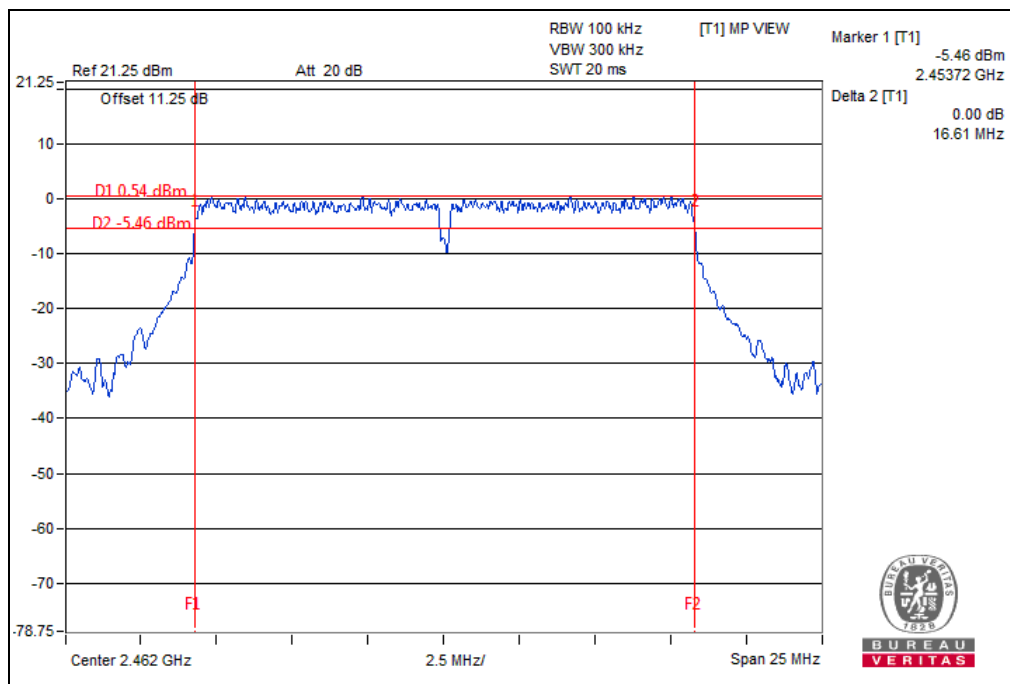
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	10.09	0.5	PASS
6	2437	10.09	0.5	PASS
11	2462	10.09	0.5	PASS





802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.60	0.5	PASS
6	2437	16.60	0.5	PASS
11	2462	16.61	0.5	PASS





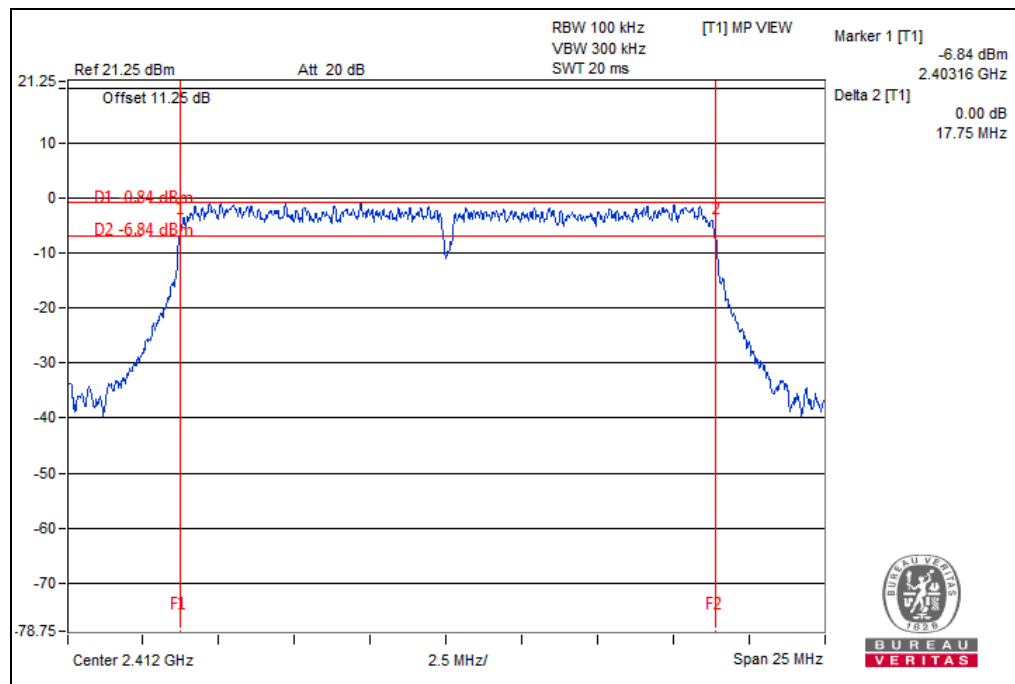
802.11n (20MHz)

CHAIN 0

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.75	0.5	PASS
6	2437	17.74	0.5	PASS
11	2462	17.70	0.5	PASS

CHAIN 1

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.72	0.5	PASS
6	2437	17.66	0.5	PASS
11	2462	17.69	0.5	PASS





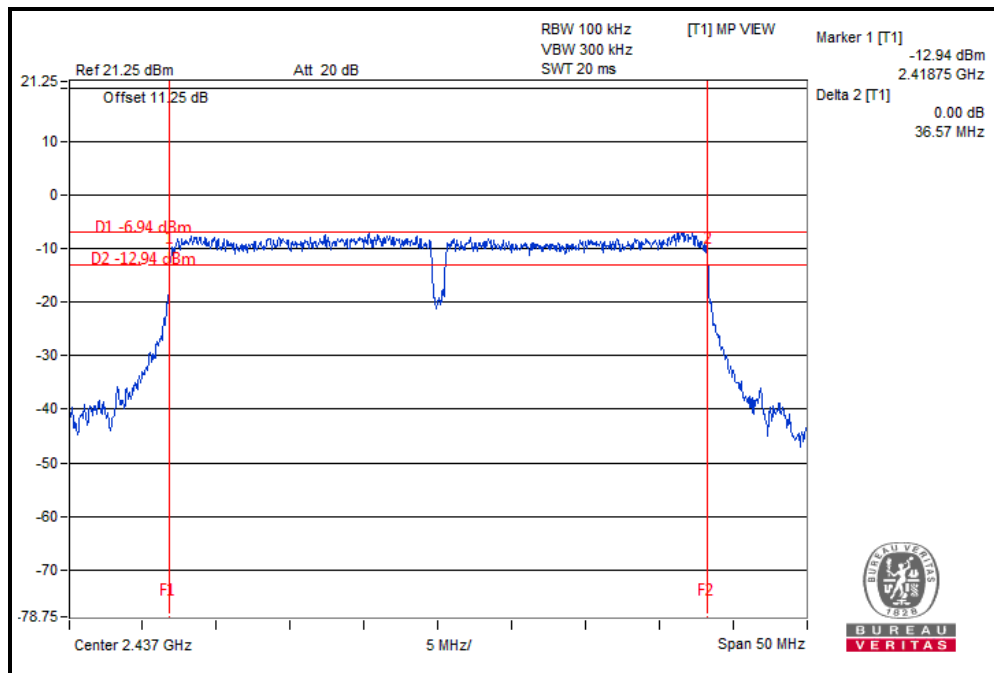
802.11n (40MHz)

CHAIN 0

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
3	2422	36.55	0.5	PASS
6	2437	36.53	0.5	PASS
9	2452	36.55	0.5	PASS

CHAIN 1

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
3	2422	36.50	0.5	PASS
6	2437	36.57	0.5	PASS
9	2452	36.53	0.5	PASS



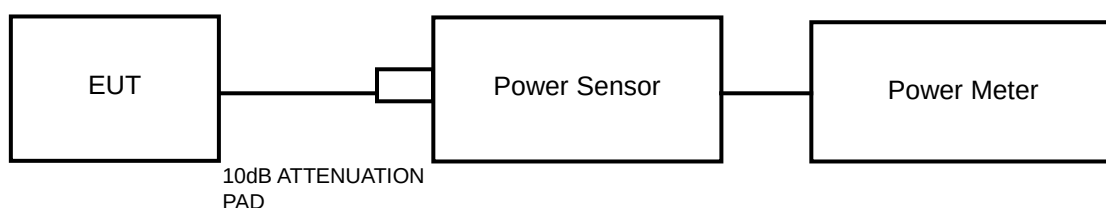


4.4 CONDUCTED OUTPUT POWER

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

Refer to section 4.3.3 to get information of above instrument.

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

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 MAXIMUM PEAK OUTPUT POWER

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT(W)	PASS/FAIL
1	2412	16.43	43.954	1	PASS
6	2437	17.01	50.234	1	PASS
11	2462	17.37	54.576	1	PASS

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT(W)	PASS/FAIL
1	2412	20.54	113.240	1	PASS
6	2437	20.21	104.954	1	PASS
11	2462	20.64	115.878	1	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	POWER LIMIT (W)	PASS/FAIL
		CHAIN 0	CHAIN 1				
1	2412	20.41	18.30	22.49	177.509	1	PASS
6	2437	20.24	18.76	22.57	180.844	1	PASS
11	2462	20.29	17.45	22.11	162.495	1	PASS

802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (dBm)	TOTAL POWER (mW)	POWER LIMIT (W)	PASS/FAIL
		CHAIN 0	CHAIN 1				
3	2422	19.47	17.42	21.58	143.720	1	PASS
6	2437	19.77	17.34	21.73	149.042	1	PASS
9	2452	19.40	17.18	21.44	139.336	1	PASS



4.4.7.2 AVERAGE OUTPUT POWER (FOR REFERENCE)

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

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	PASS/FAIL
1	2412	13.93	N/A
6	2437	14.11	N/A
11	2462	14.38	N/A

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	PASS/FAIL
1	2412	12.34	N/A
6	2437	12.39	N/A
11	2462	12.67	N/A

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (dBm)	PASS/FAIL
		CHAIN 0	CHAIN 1		
1	2412	10.34	10.44	13.40	N/A
6	2437	10.56	10.32	13.45	N/A
11	2462	10.66	10.45	13.57	N/A

802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (dBm)	PASS/FAIL
		CHAIN 0	CHAIN 1		
3	2422	9.69	9.91	12.81	N/A
6	2437	9.82	9.98	12.91	N/A
9	2452	9.93	10.01	12.98	N/A

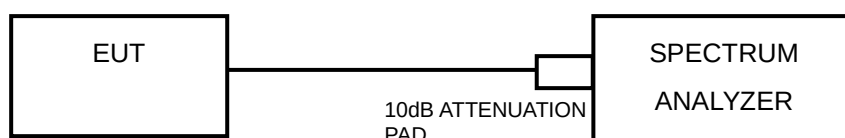


4.5 POWER SPECTRAL DENSITY MEASUREMENT

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 span to 1.5 times the DTS bandwidth
2. Set the RBW = 3 kHz, VBW $\geq 3 \times$ RBW, Detector = peak.
3. Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
4. 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

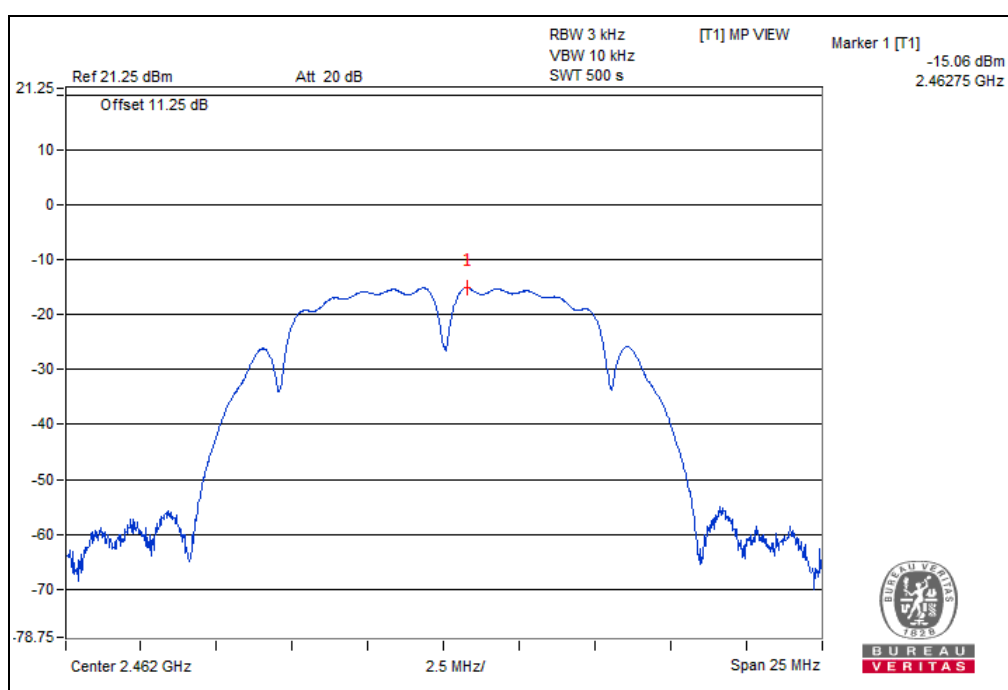
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



4.5.7 TEST RESULTS

802.11b

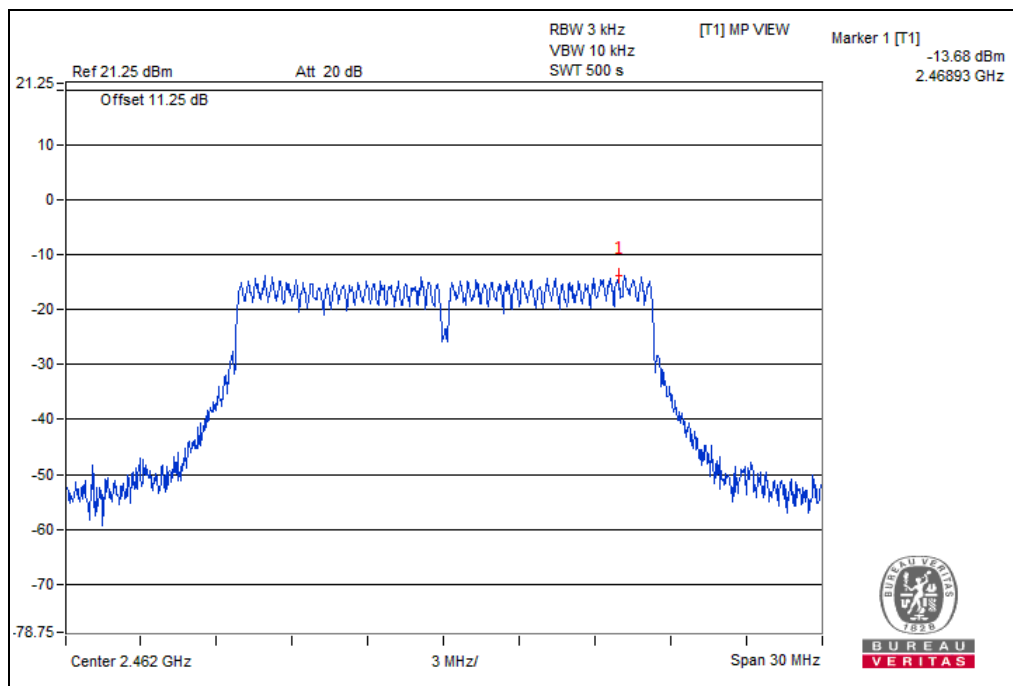
Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-15.74	8	PASS
6	2437	-15.70	8	PASS
11	2462	-15.06	8	PASS





802.11g

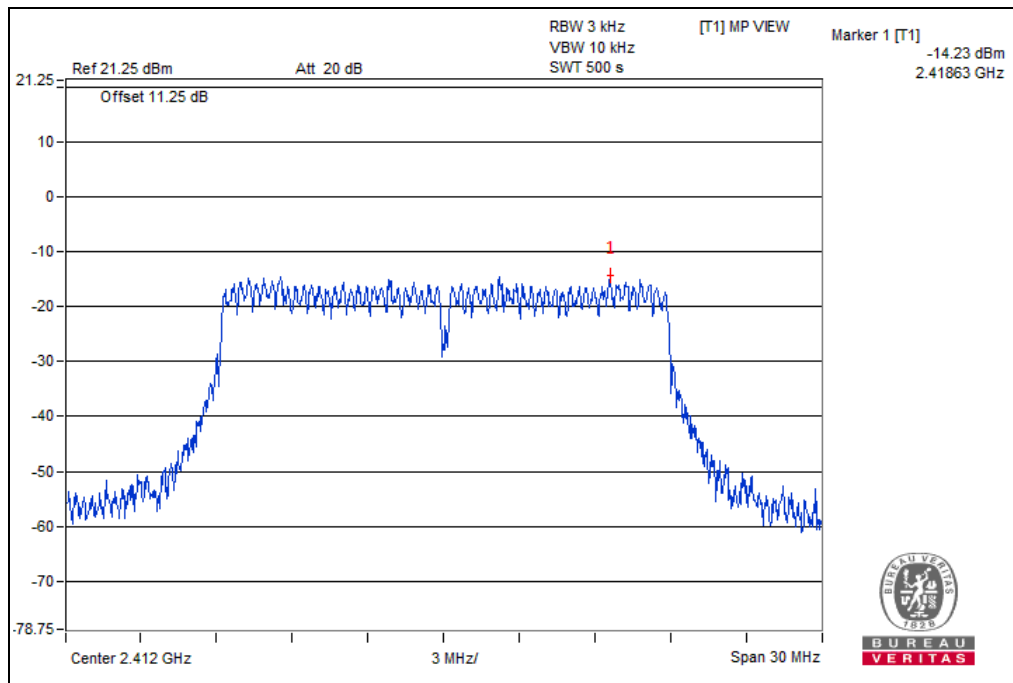
Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-13.81	8	PASS
6	2437	-14.22	8	PASS
11	2462	-13.68	8	PASS





802.11n (20MHz)

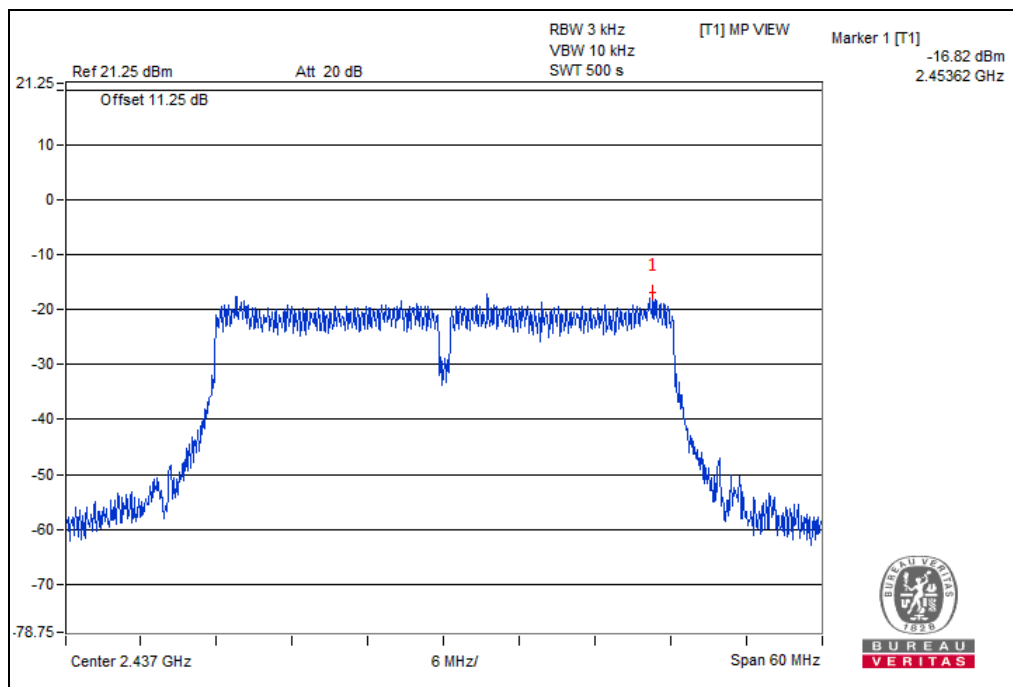
Channel	FREQ. (MHz)	PSD (dBm/3kHz)		Limit (dBm/3kHz)	PASS /FAIL
		Chain 0	Chain 1		
1	2412	-14.23	-16.02	8	PASS
6	2437	-14.88	-17.24	8	PASS
11	2462	-14.66	-17.05	8	PASS





802.11n (40MHz)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)		Limit (dBm/3kHz)	PASS /FAIL
		Chain 0	Chain 1		
3	2422	-17.93	-18.59	8	PASS
6	2437	-16.82	-18.02	8	PASS
9	2452	-17.92	-19.84	8	PASS



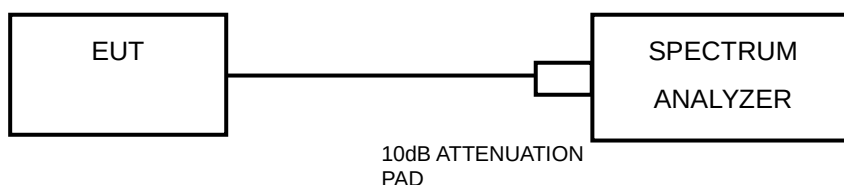


4.6 OUT OF BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

Below -20dB 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 REF

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 OOB

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

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

4.6.7 TEST RESULTS

The spectrum plots are attached on the following images. D1 line indicates the highest level. D2 line indicates the 20dB offset below D1. It shows compliance to the requirement.



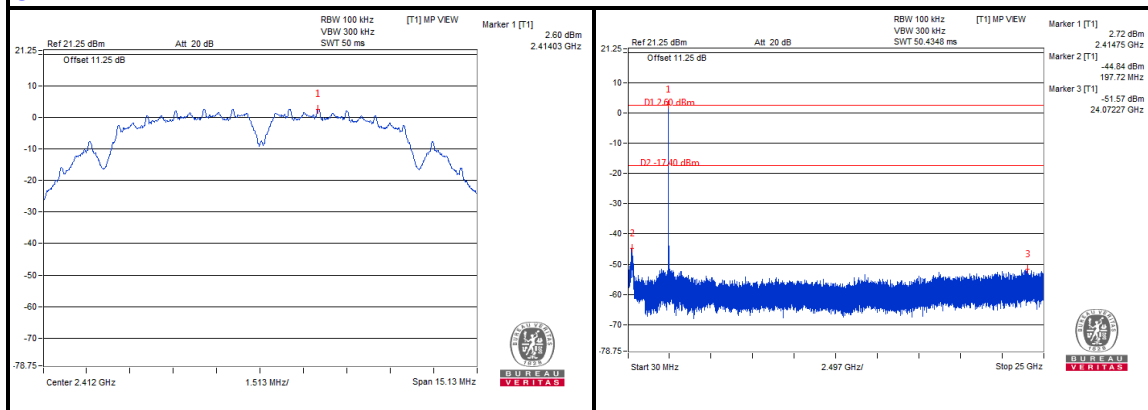
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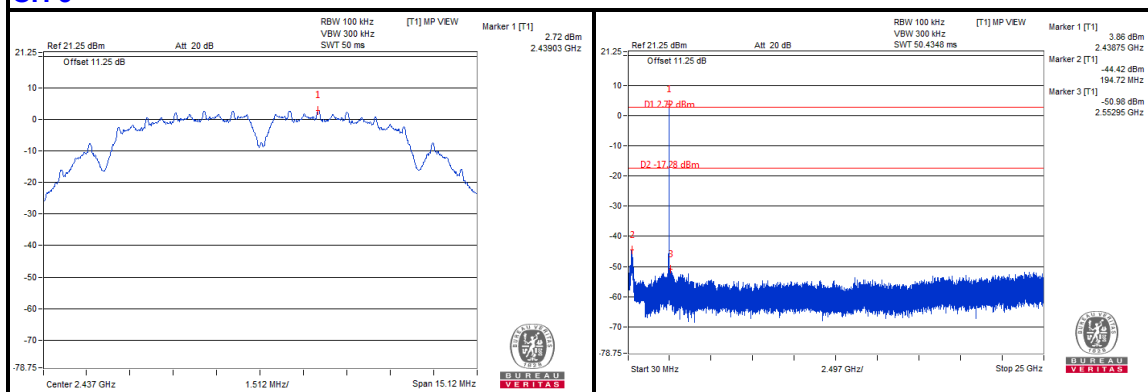
4.6.8 TEST RESULTS

802.11b

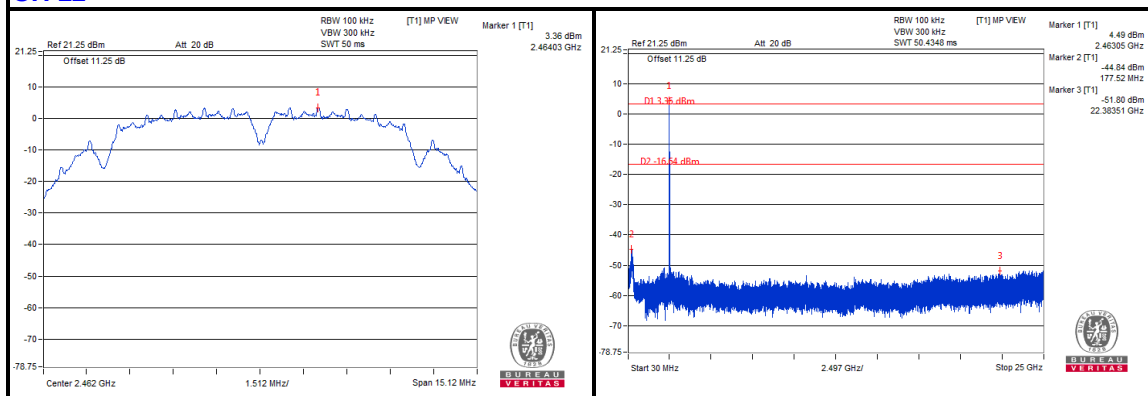
CH 1



CH 6



CH 11

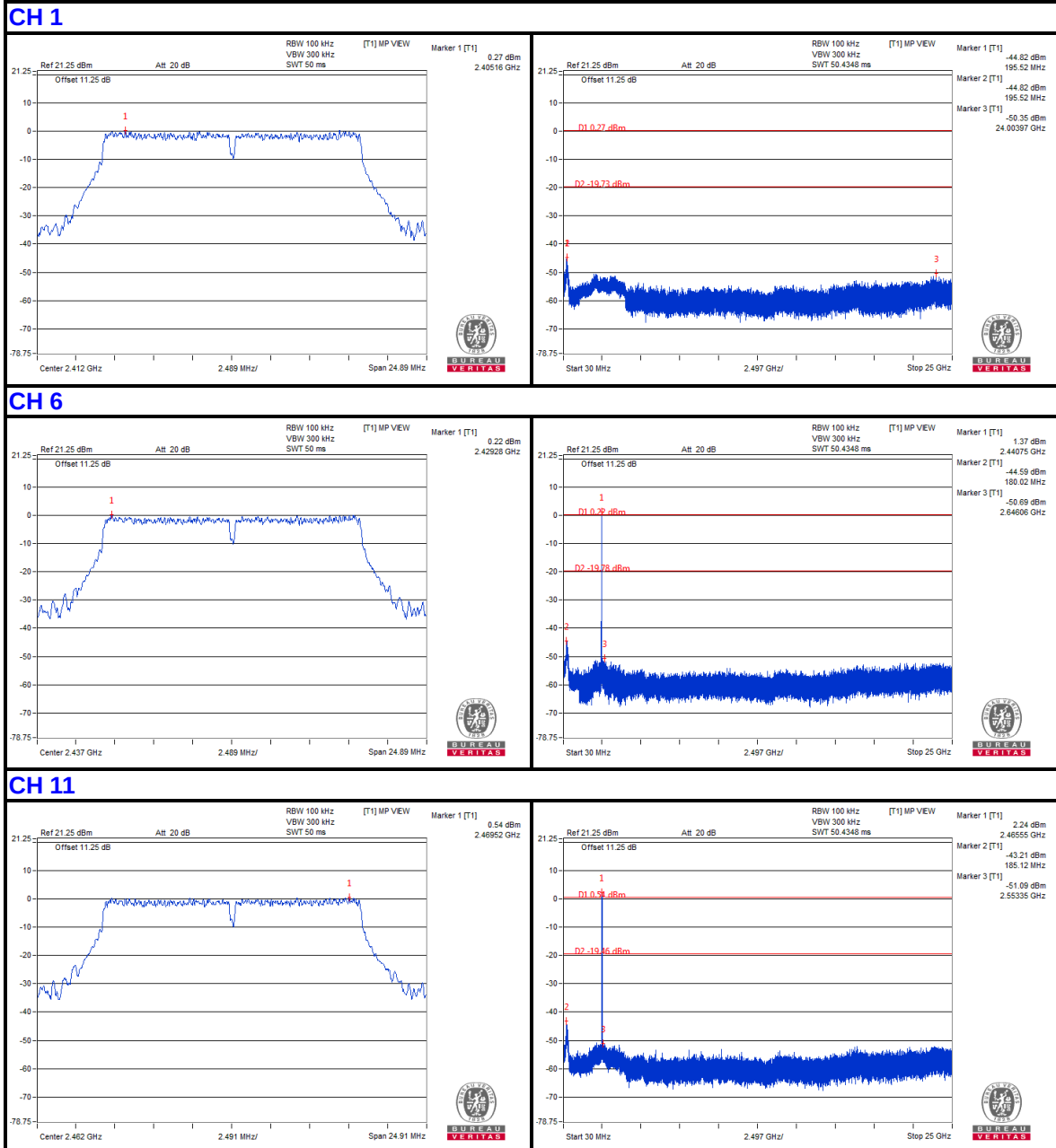




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802.11g



Bureau Veritas Shenzhen Co., Ltd.
Dongguan Branch

No. 34, Chenwulu Section, Guantai Rd., Houjie
Town, Dongguan City, Guangdong 523942, China

Tel: +86 769 8593 5656
Fax: +86 769 8593 1080
Email: customerservice.dg@cn.bureauveritas.com



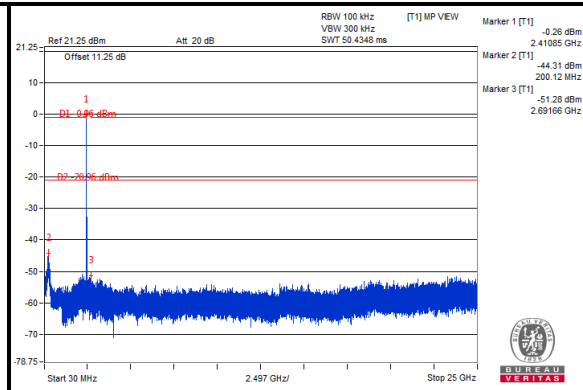
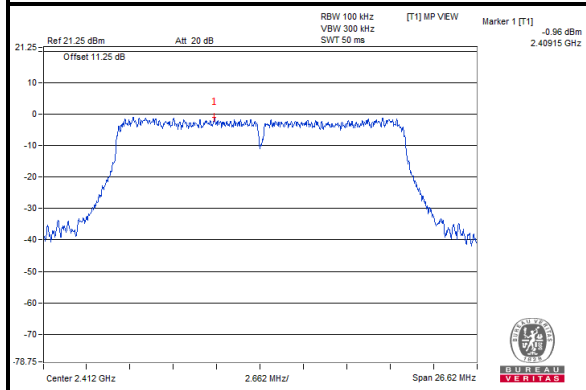
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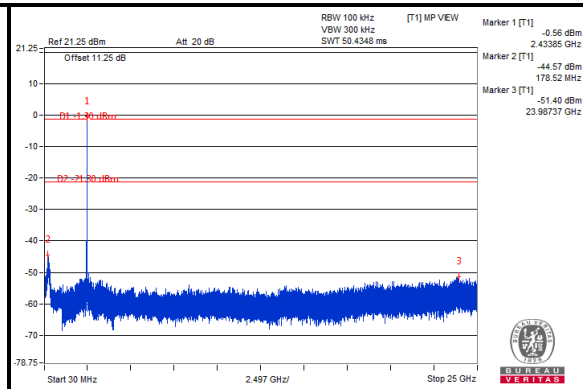
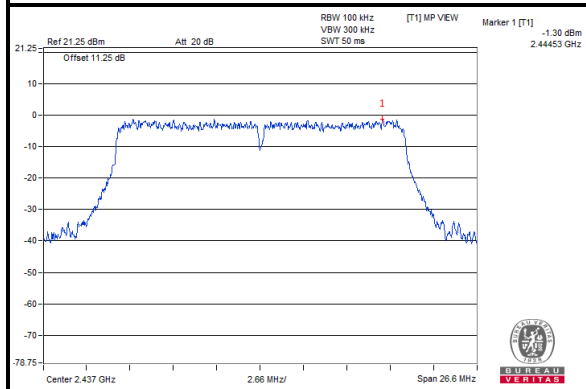
802.11n (20MHz)

Chain 0

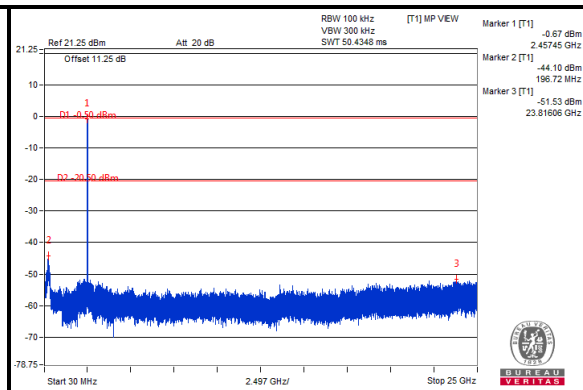
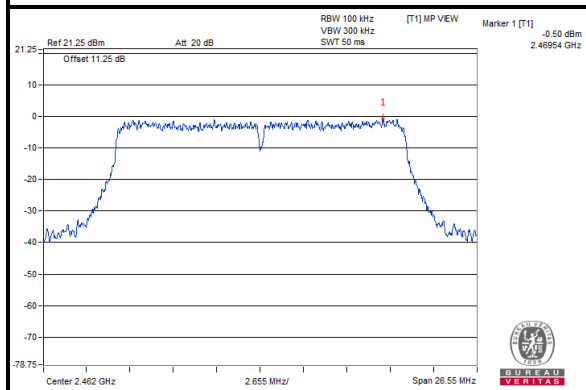
CH 1



CH 6



CH 11



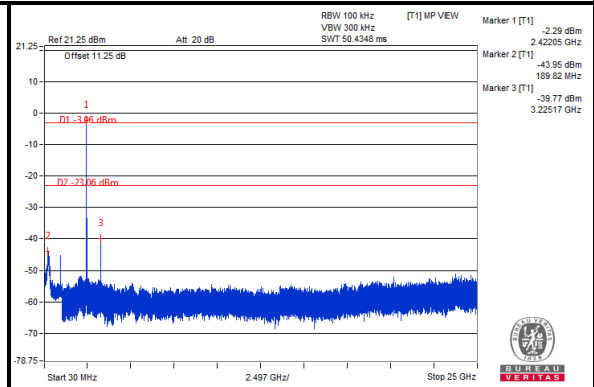
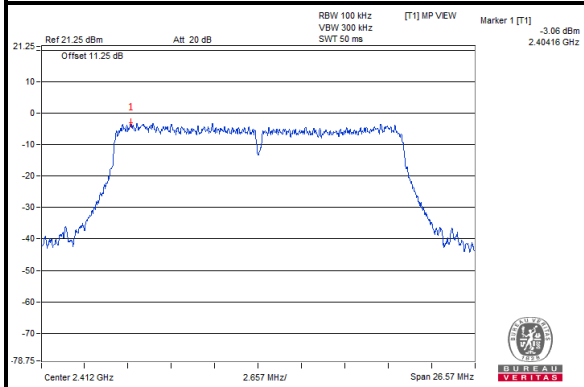


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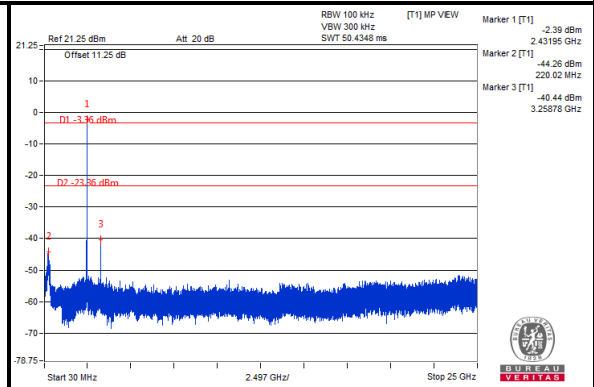
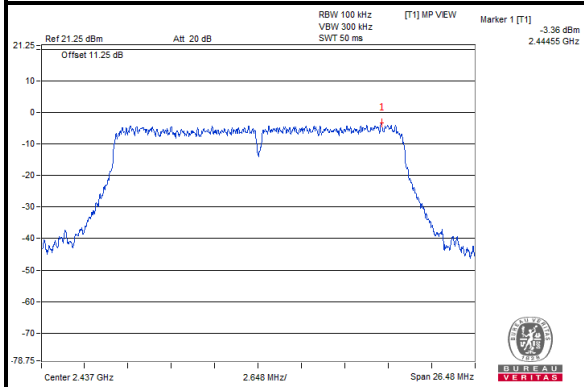
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Chain 1

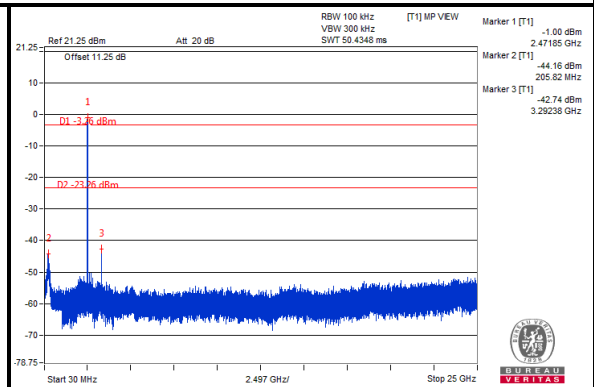
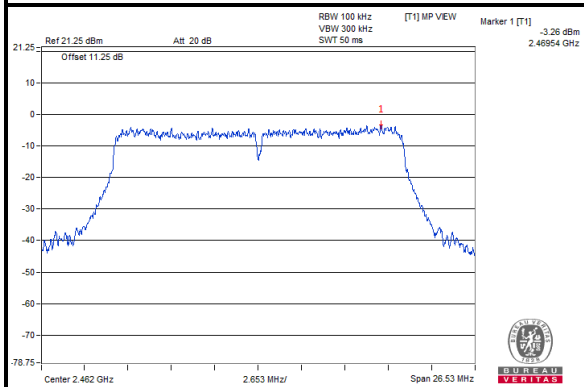
CH 1



CH 6



CH 11





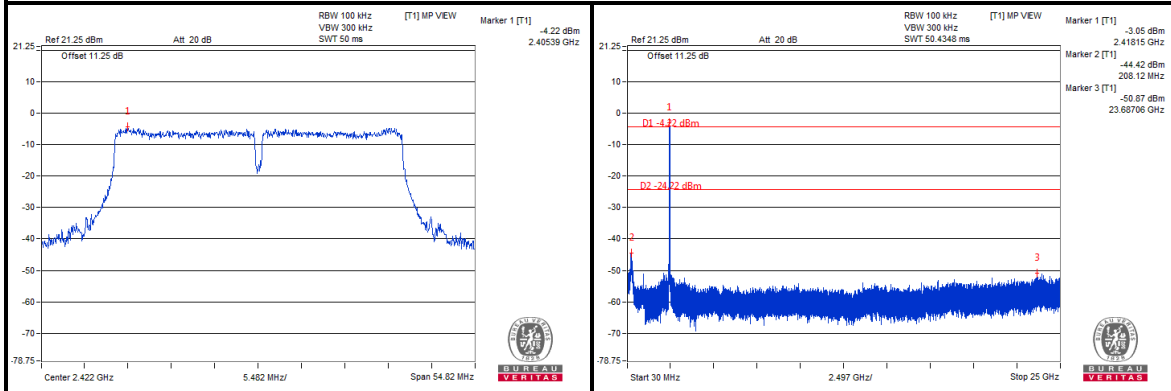
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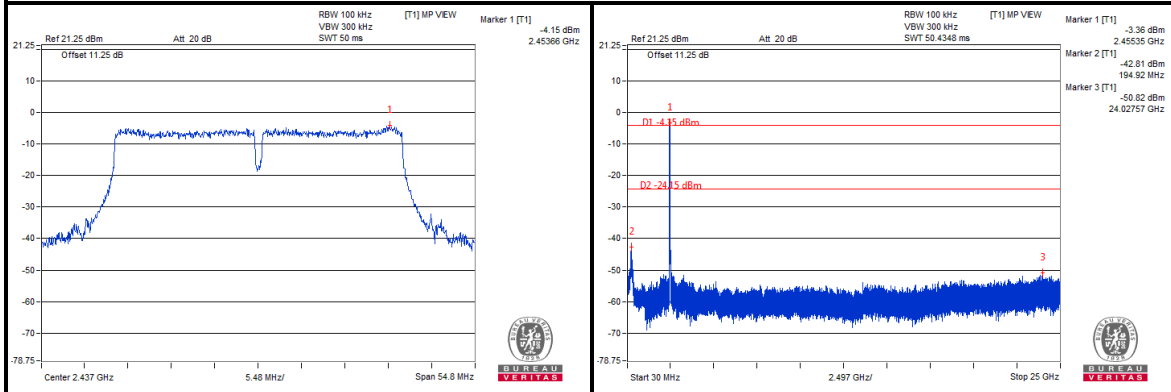
802.11n (40MHz)

Chain 0

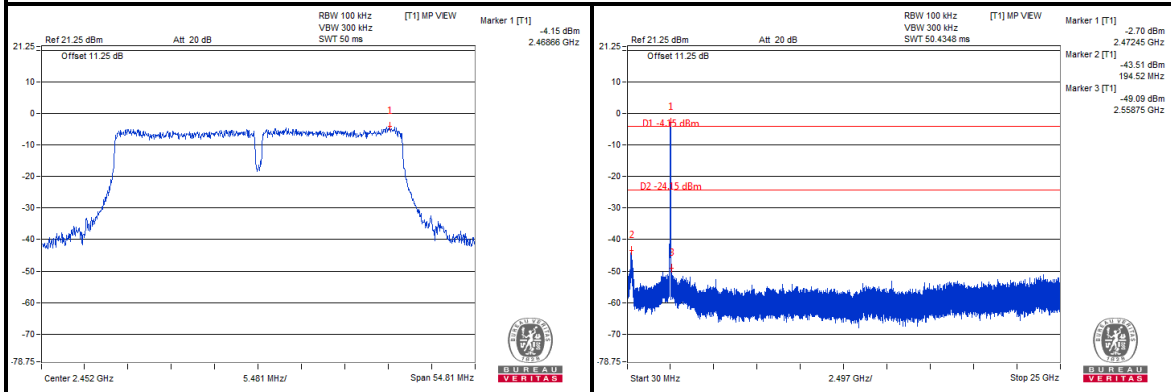
CH 3



CH 6



CH 9



Bureau Veritas Shenzhen Co., Ltd.
Dongguan Branch

No. 34, Chenwulu Section, Guantai Rd., Houjie
Town, Dongguan City, Guangdong 523942, China

Tel: +86 769 8593 5656
Fax: +86 769 8593 1080
Email: customerservice.dg@cn.bureauveritas.com



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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---