



Test Report No.: RF2008WDG0008-2



# TEST REPORT

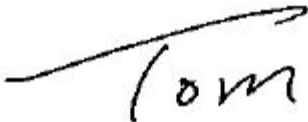

Applicant	Consumer Lighting (U.S.) LLC dba GE Lighting, a Savant company.
Address	1975 Noble Road, Cleveland, Ohio 44112, United States.

Manufacturer or Supplier	Consumer Lighting (U.S.) LLC dba GE Lighting, a Savant company.
Address	1975 Noble Road, Cleveland, Ohio 44112, United States.
Product	C-Start Smart Switch Motion Sensing + Dimmer
Additional Product	C-Start Smart Switch Dimmer
Brand Name	GE
Model	CSWDMOCBWF1NN
Additional Model & Model Difference	CSWDMBLBWF1NN, see items 3.1
Date of tests	Aug. 21, 2020 ~ Aug. 27, 2020

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

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

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

Tested by Tom Chen Project Engineer / EMC Department	Approved by Glyn He Assistant Manager / EMC Department
	  Date: Sep. 07, 2020

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## TABLE OF CONTENTS

<b>RELEASE CONTROL RECORD .....</b>	<b>4</b>
<b>1 SUMMARY OF TEST RESULTS.....</b>	<b>5</b>
2 MEASUREMENT UNCERTAINTY .....	5
<b>3 GENERAL INFORMATION .....</b>	<b>6</b>
3.1 GENERAL DESCRIPTION OF EUT.....	6
3.2 DESCRIPTION OF TEST MODES.....	7
3.2.1 CONFIGURATION OF SYSTEM UNDER TEST .....	8
3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL.....	8
3.3 DUTY CYCLE OF TEST SIGNAL .....	10
3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS.....	11
3.5 DESCRIPTION OF SUPPORT UNITS.....	11
<b>4 TEST TYPES AND RESULTS.....</b>	<b>12</b>
4.1. CONDUCTED EMISSION MEASUREMENT .....	12
4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT .....	12
4.1.2 TEST INSTRUMENTS.....	12
4.1.3 TEST PROCEDURES .....	13
4.1.4 DEVIATION FROM TEST STANDARD .....	13
4.1.5 TEST SETUP.....	14
4.1.6 EUT OPERATING CONDITIONS .....	14
4.1.7 TEST RESULTS .....	15
4.2. RADIATED EMISSION MEASUREMENT .....	17
4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT .....	17
4.2.2 TEST INSTRUMENTS.....	18
4.2.3 TEST PROCEDURES .....	19
4.2.4 DEVIATION FROM TEST STANDARD .....	20
4.2.5 TEST SETUP.....	20
4.2.6 EUT OPERATING CONDITIONS .....	21
4.2.7 TEST RESULTS .....	22
4.3 6DB BANDWIDTH MEASUREMENT.....	36
4.3.1 LIMITS OF 6DB BANDWIDTH MEASUREMENT .....	36
4.3.2 TEST INSTRUMENTS.....	36
4.3.3 TEST PROCEDURE.....	36
4.3.4 DEVIATION FROM TEST STANDARD .....	36
4.3.5 TEST SETUP.....	37
4.3.6 EUT OPERATING CONDITIONS .....	37



## Test Report No.: RF2008WDG0008-2

4.3.7	TEST RESULTS .....	38
4.4	CONDUCTED OUTPUT POWER .....	43
4.4.1	LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT .....	43
4.4.2	TEST SETUP .....	43
4.4.3	TEST INSTRUMENTS .....	43
4.4.4	TEST PROCEDURES .....	44
4.4.5	DEVIATION FROM TEST STANDARD .....	44
4.4.6	EUT OPERATING CONDITIONS .....	44
4.4.7	TEST RESULTS .....	45
4.5	POWER SPECTRAL DENSITY MEASUREMENT .....	47
4.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT .....	47
4.5.2	TEST SETUP .....	47
4.5.3	TEST INSTRUMENTS .....	47
4.5.4	TEST PROCEDURE .....	47
4.5.5	DEVIATION FROM TEST STANDARD .....	47
4.5.6	EUT OPERATING CONDITION .....	48
4.5.7	TEST RESULTS .....	48
4.6	OUT OF BAND EMISSION MEASUREMENT .....	50
4.6.1	LIMITS OF OUT OF BAND EMISSION MEASUREMENT .....	50
4.6.2	TEST SETUP .....	50
4.6.3	TEST INSTRUMENTS .....	50
4.6.4	TEST PROCEDURE .....	50
4.6.5	DEVIATION FROM TEST STANDARD .....	51
4.6.6	EUT OPERATING CONDITION .....	51
4.6.7	TEST RESULTS .....	52
<b>5</b>	<b>PHOTOGRAPHS OF THE TEST CONFIGURATION .....</b>	<b>58</b>
<b>6</b>	<b>APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB .....</b>	<b>59</b>



Test Report No.: RF2008WDG0008-2

## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF2008WDG0008-2	Original release	Sep. 07, 2020

## 1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted Output power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is i-pex not a standard connector.

## 2 MEASUREMENT UNCERTAINTY

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.70dB
Radiated emissions	9KHz ~ 30MHz	2.16dB
	30MHz ~ 1GMHz	3.60dB
	1GHz ~ 18GHz	4.82dB
	18GHz ~ 40GHz	5.00dB

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>	C-Start Smart Switch Motion Sensing + Dimmer
<b>ADDITIONAL PRODUCT</b>	C-Start Smart Switch Dimmer
<b>BRAND</b>	GE
<b>MODEL NO.</b>	CSWDMOCBWF1NN
<b>ADDITIONAL NO.</b>	CSWDMBLBWF1NN
<b>FCC ID</b>	PUU-CSWDMXXBWF2NN
<b>NOMINAL VOLTAGE</b>	AC 120V 60Hz
<b>MODULATION TECHNOLOGY</b>	DSSS, OFDM
<b>MODULATION TYPE</b>	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
<b>OPERATING FREQUENCY</b>	2412-2462MHz for 11b/g/n(HT20) 2422-2452MHz for 11n(HT40)
<b>PEAK OUTPUT POWER</b>	130.017mW (Maximum)
<b>ANTENNA TYPE</b>	PIFA Antenna, with 2dBi gain
<b>I/O PORTS</b>	Refer to user's manual
<b>CABLE SUPPLIED</b>	N/A

#### NOTES:

1. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.
2. Please refer to the EUT photo document (Reference No.: 2008WDG0008) for detailed product photo.
3. Additional model CSWDMBLBWF1NN is identical with the test model CSWDMOCBWF1NN except the PIR sensor and light sensor for marketing purpose
4. The EUT provides completed transmitters and receivers:

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

### 3.2 DESCRIPTION OF TEST MODES

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

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

7 channels are provided for 802.11n (HT40):

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

### 3.2.1 CONFIGURATION OF SYSTEM UNDER TEST

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

### 3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports.

The worst case was found when positioned on X axis for radiated emission. Following test modes were selected for the final test, and the final worst case is marked in boldface and recorded in the report:

EUT CONFIGURE MODE	APPLICABLE TO				MODE
	RE<1G	RE≥1G	PLC	APCM	
<b>A</b>	√	√	√	√	<b>AC 120V 60Hz with WIFI function</b>

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

#### POWER LINE CONDUCTED EMISSION TEST:

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

EUT CONFIGURE MODE	TESTED CONDITION
A	WIFI (2.4G) Link

#### 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)
A	802.11b	1 to 11	1	DSSS	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.

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

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER(POE)	TESTED BY
RE<1G	25deg. C, 53%RH	AC 120V 60Hz	Hu
RE≥1G	25deg. C, 53%RH	AC 120V 60Hz	Hu
PLC	20deg. C, 56%RH	AC 120V 60Hz	Ming Bai
APCM	25deg. C, 60%RH	AC 120V 60Hz	Daniel

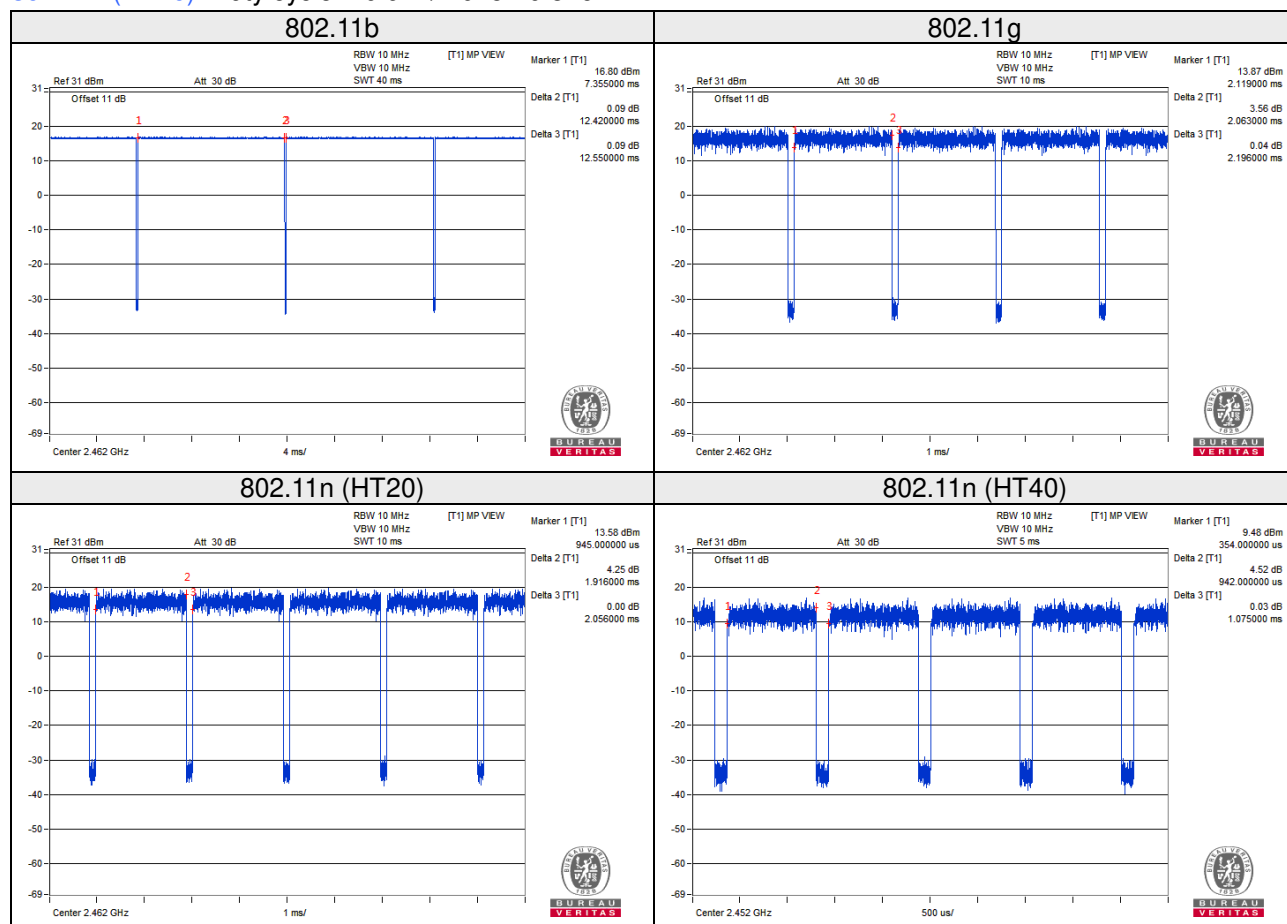
### 3.3 DUTY CYCLE OF TEST SIGNAL

802.11b: Duty cycle =  $12.420/12.550 = 0.990$

802.11g: Duty cycle =  $2.063/2.196 = 0.939$

802.11n (HT20): Duty cycle =  $1.916/2.056 = 0.932$

802.11n (HT40): Duty cycle =  $0.942/1.075 = 0.876$





Test Report No.: RF2008WDG0008-2

### 3.4 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 15.247 Meas Guidance v05r02**

**ANSI C63.10-2013**

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

### 3.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit without any other necessary accessory or support units.

## 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

- NOTES:**
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	ESR7	101494	Mar. 18,20	Mar. 17,21
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	Mar. 18,20	Mar. 17,21
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	Mar. 18,20	Mar. 17,21
Voltage probe	SCHWARZBECK	TK 9421	TK 9421-176	Sep. 24,19	Sep. 23,20
Test software	ADT	ADT_Cond_V7.3.7	N/A	N/A	N/A

- NOTES:**
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

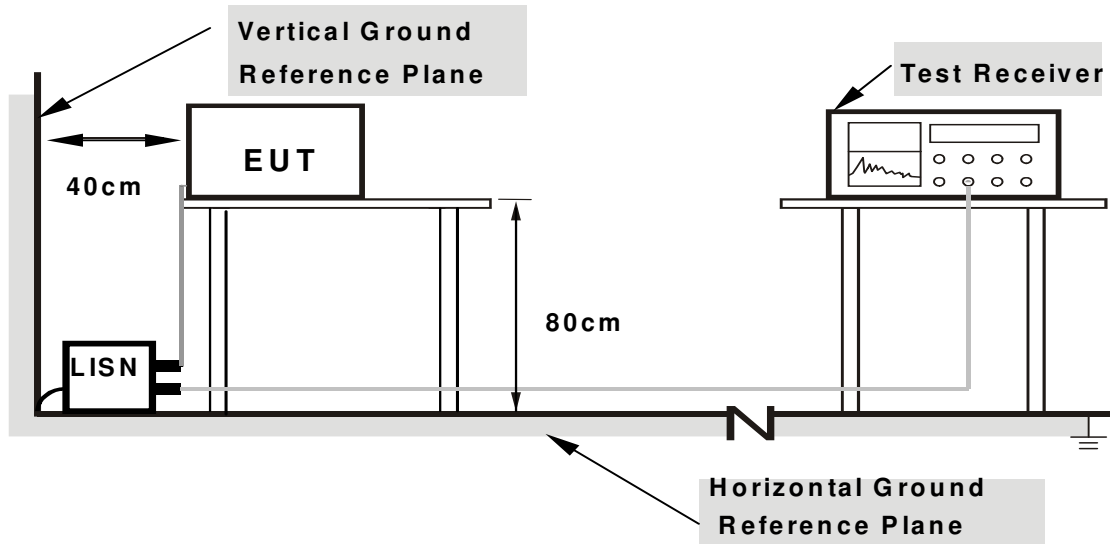
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

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

#### 4.1.6 EUT OPERATING CONDITIONS

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

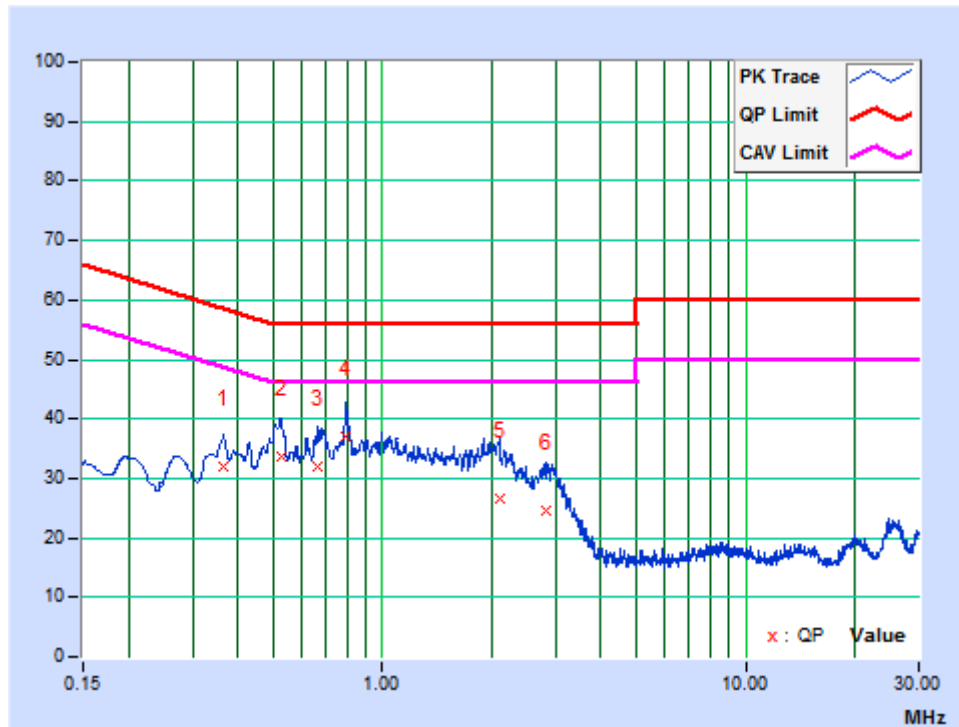
### 4.1.7 TEST RESULTS

#### CONDUCTED WORST-CASE DATA: WIFI

<b>PHASE</b>	Line	<b>6dB BANDWIDTH</b>	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.36388	9.79	22.34	9.46	32.13	19.25	58.64	48.64	-26.51	-29.39
2	0.52575	9.79	23.93	16.51	33.72	26.30	56.00	46.00	-22.28	-19.70
3	0.66750	9.81	22.32	8.12	32.13	17.93	56.00	46.00	-23.87	-28.07
4	0.79502	9.81	27.32	16.79	37.13	26.60	56.00	46.00	-18.87	-19.40
5	2.10300	9.82	16.92	4.54	26.74	14.36	56.00	46.00	-29.26	-31.64
6	2.81605	9.84	14.85	1.98	24.69	11.82	56.00	46.00	-31.31	-34.18

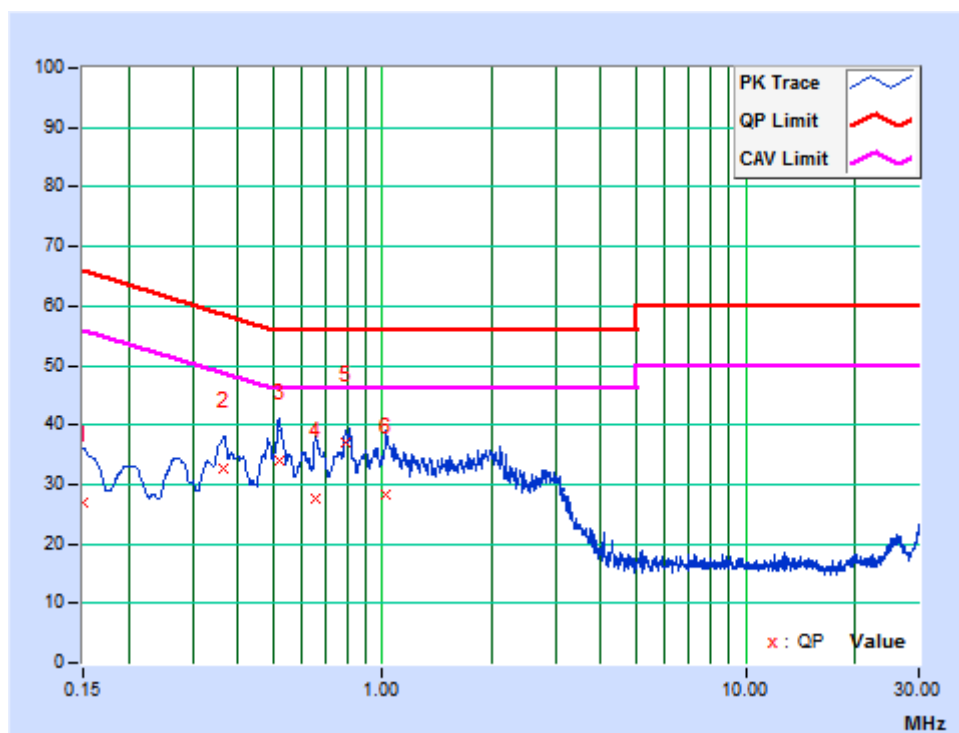
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>PHASE</b>	Neutral	<b>6dB BANDWIDTH</b>	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.72	17.34	4.71	27.06	14.43	66.00	56.00	-38.94	-41.57
2	0.36581	9.73	22.82	10.54	32.55	20.27	58.60	48.60	-26.05	-28.33
<b>3</b>	<b>0.51834</b>	<b>9.74</b>	<b>24.33</b>	<b>18.21</b>	<b>34.07</b>	<b>27.95</b>	<b>56.00</b>	<b>46.00</b>	<b>-21.93</b>	<b>-18.05</b>
4	0.65625	9.75	17.96	6.65	27.71	16.40	56.00	46.00	-28.29	-29.60
5	0.79575	9.76	27.30	16.90	37.06	26.66	56.00	46.00	-18.94	-19.34
6	1.02525	9.77	18.44	11.21	28.21	20.98	56.00	46.00	-27.79	-25.02

- 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

#### NOTES:

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



**4.2.2 TEST INSTRUMENTS**

<b>Equipment</b>	<b>Manufacturer</b>	<b>Model No.</b>	<b>Serial No.</b>	<b>Last Cal.</b>	<b>Next Cal.</b>
EMI Test Receiver	Rohde&Schwarz	ESU40	100449	Mar. 18,20	Mar. 17,21
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV7	102331	May 14, 20	May 13, 21
Active Loop Antenna (9KHz -30MHz)	SCHWARZBECK	FMZB 1519B	1519B-045	May 30,20	May 29,21
Amplifier (9KHz -1GHz)	Burgeon	BPA-530	100210	Mar. 15,20	Mar. 14,21
Bilog Antenna (20MHz -2GHz)	Teseq	CBL 6111D	30643	May 30,20	May 29,21
Horn Antenna (1GHz -18GHz)	ETS -Lindgren	3117	00062558	May 30,20	May 29,21
Horn Antenna (18GHz -40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170147	May 10, 20	May 09, 21
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	May 23,20	May 22,21
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
Broadband Preamplifier (1GHz~18GHz)	SCHWARZBECK	BBV9718	305	May 09,20	May 08,21
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Mar. 04,20	Mar. 03,21
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A

**NOTES:**

1. The test was performed in 966 Chamber.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 749762.

### 4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 1.5 meters (above 1GHz) and 0.8 meters (below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. For below 1GHz was used bilog antenna, and above 1GHz was used horn 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. For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.
- g. 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.

#### NOTES:

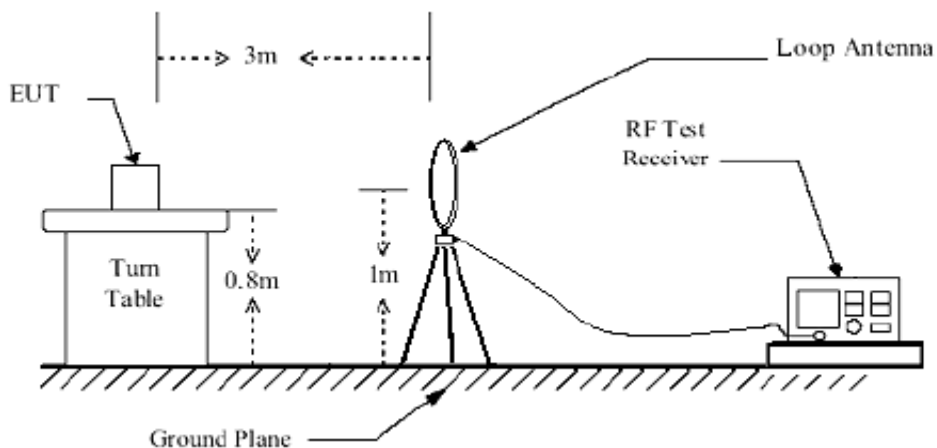
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is  $\geq 1/T$  (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. The testing of the EUT was performed on all 3 orthogonal axes, the worst-case test configuration was reported on the file test setup photo.

#### 4.2.4 DEVIATION FROM TEST STANDARD

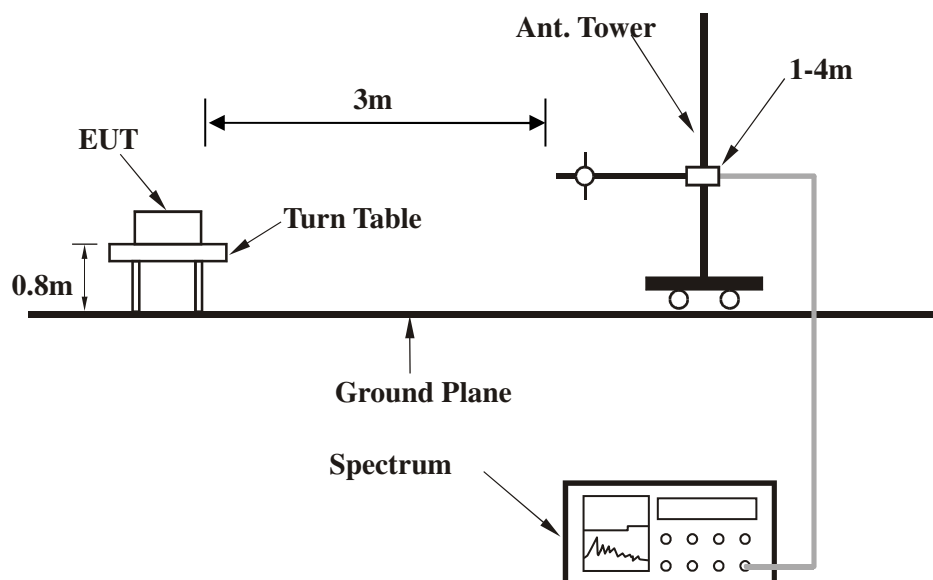
No deviation.

#### 4.2.5 TEST SETUP

##### Below 30MHz test setup

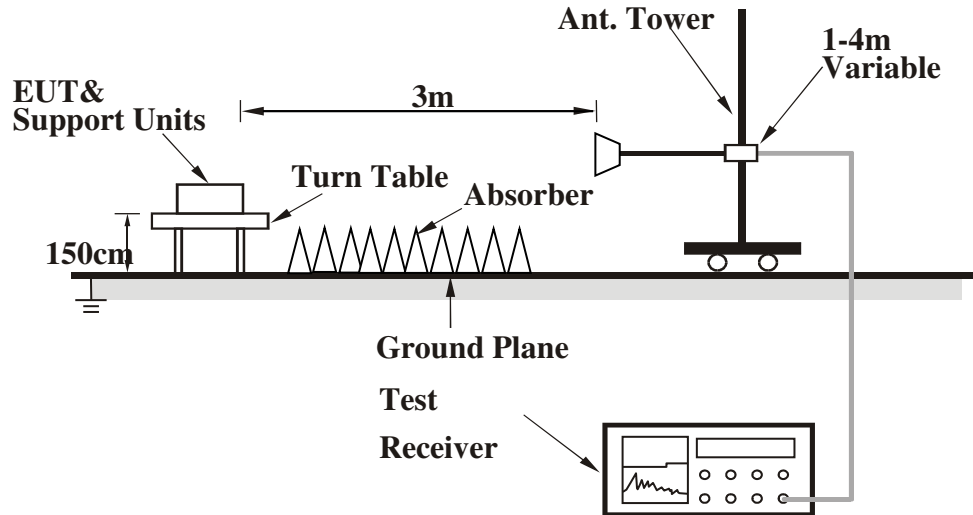


##### Below 1GHz test setup



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

### Above 1GHz test setup



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

#### 4.2.6 EUT OPERATING CONDITIONS

- a. Placed the EUT 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.

## 4.2.7 TEST RESULTS

### BELOW 1GHz WORST-CASE DATA:

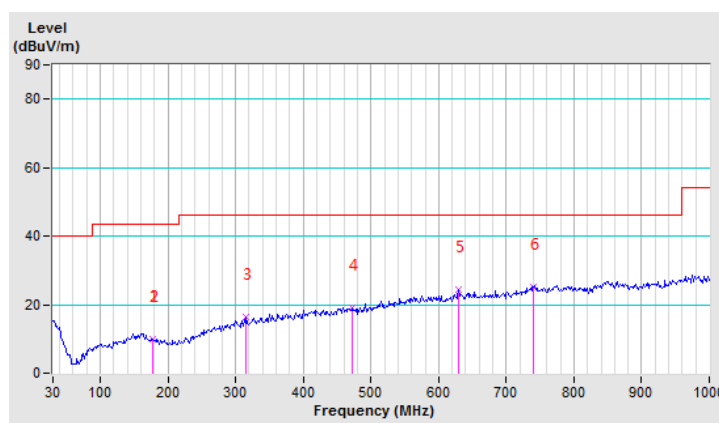
#### 802.11b

<b>CHANNEL</b>	TX Channel 1	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	9KHz ~ 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	177.68	9.96 QP	43.50	-33.54	1.00 H	102	28.77	-18.81
2	177.68	9.96 QP	43.50	-33.54	1.00 H	112	28.77	-18.81
3	316.03	16.45 QP	46.00	-29.55	1.00 H	121	30.24	-13.79
4	473.03	19.07 QP	46.00	-26.93	1.00 H	130	29.21	-10.14
5	630.03	24.25 QP	46.00	-21.75	1.00 H	139	30.51	-6.26
6	740.40	25.22 QP	46.00	-20.78	1.00 H	148	28.81	-3.59

#### 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 emission levels of other frequencies were greater than 20dB margin.
4. 9KHz~30MHz have been test and test data more than 20dB margin.
5. Margin value = Emission level – Limit value.

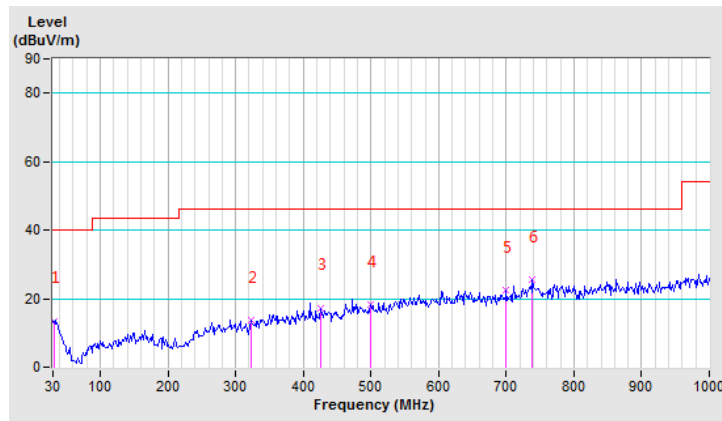


<b>CHANNEL</b>	TX Channel 1	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	9KHz ~ 1GHz		

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
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	31.55	13.50 QP	40.00	-26.50	1.00 V	293	26.22	-12.72
2	322.24	13.55 QP	46.00	-32.45	1.00 V	283	27.17	-13.62
3	426.39	17.31 QP	46.00	-28.69	1.00 V	275	28.30	-10.99
4	499.46	18.14 QP	46.00	-27.86	1.00 V	266	27.57	-9.43
5	699.98	22.42 QP	46.00	-23.58	1.00 V	257	27.97	-5.55
<b>6</b>	<b>738.85</b>	<b>25.56 QP</b>	<b>46.00</b>	<b>-20.44</b>	<b>1.00 V</b>	<b>247</b>	<b>29.21</b>	<b>-3.65</b>

**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 emission levels of other frequencies were greater than 20dB margin.
4. 9KHz~30MHz have been test and test data more than 20dB margin.
5. Margin value = Emission level – Limit value.



**ABOVE 1GHZ DATA**  
**802.11b**

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	49.70 PK	74.00	-24.30	1.00 H	222	46.17	3.53
2	2390.00	37.69 AV	54.00	-16.31	1.00 H	222	34.16	3.53
3	*2412.00	101.02 PK			1.00 H	222	97.37	3.65
4	*2412.00	95.90 AV			1.00 H	222	92.25	3.65
5	4824.00	50.11 PK	74.00	-23.89	1.00 H	0	42.06	8.05
6	4824.00	38.60 AV	54.00	-15.40	1.00 H	0	30.55	8.05
7	#7236.00	56.14 PK	74.00	-17.86	1.00 H	0	42.57	13.57
8	#7236.00	44.20 AV	54.00	-9.80	1.00 H	0	30.63	13.57
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	50.30 PK	74.00	-23.70	1.00 V	296	46.77	3.53
2	2390.00	38.12 AV	54.00	-15.88	1.00 V	296	34.59	3.53
3	*2412.00	100.08 PK			1.00 V	296	96.43	3.65
4	*2412.00	94.06 AV			1.00 V	296	90.41	3.65
5	4824.00	51.06 PK	74.00	-22.94	1.00 V	0	43.01	8.05
6	4824.00	39.90 AV	54.00	-14.10	1.00 V	0	31.85	8.05
7	#7236.00	57.40 PK	74.00	-16.60	1.00 V	0	43.83	13.57
8	#7236.00	45.60 AV	54.00	-8.40	1.00 V	0	32.03	13.57

**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 emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	102.34 PK			1.00 H	253	98.57	3.77
2	*2437.00	95.78 AV			1.00 H	253	92.01	3.77
3	4874.00	50.13 PK	74.00	-23.87	1.00 H	0	41.90	8.23
4	4874.00	39.60 AV	54.00	-14.40	1.00 H	0	31.37	8.23
5	7311.00	56.14 PK	74.00	-17.86	1.00 H	0	42.34	13.80
6	7311.00	44.20 AV	54.00	-9.80	1.00 H	0	30.40	13.80
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	100.34 PK			1.00 V	25	96.57	3.77
2	*2437.00	94.02 AV			1.00 V	25	90.25	3.77
3	4874.00	52.14 PK	74.00	-21.86	1.00 V	0	43.91	8.23
4	4874.00	39.00 AV	54.00	-15.00	1.00 V	0	30.77	8.23
5	7311.00	58.24 PK	74.00	-15.76	1.00 V	0	44.44	13.80
6	7311.00	45.70 AV	54.00	-8.30	1.00 V	0	31.90	13.80

**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 emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	104.38 PK			1.00 H	23	100.49	3.89
2	*2462.00	98.96 AV			1.00 H	23	95.07	3.89
3	2483.50	59.17 PK	74.00	-14.83	1.00 H	23	55.17	4.00
4	2483.50	38.54 AV	54.00	-15.46	1.00 H	23	34.54	4.00
5	4924.00	49.80 PK	74.00	-24.20	1.00 H	0	41.40	8.40
6	4924.00	37.24 AV	54.00	-16.76	1.00 H	0	28.84	8.40
7	7386.00	55.10 PK	74.00	-18.90	1.00 H	0	41.07	14.03
8	7386.00	43.11 AV	54.00	-10.89	1.00 H	0	29.08	14.03
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	98.33 PK			1.00 V	150	94.44	3.89
2	*2462.00	94.10 AV			1.00 V	150	90.21	3.89
3	2483.50	56.45 PK	74.00	-17.55	1.00 V	150	52.45	4.00
4	2483.50	37.60 AV	54.00	-16.40	1.00 V	150	33.60	4.00
5	4924.00	50.70 PK	74.00	-23.30	1.00 V	0	42.30	8.40
6	4924.00	38.60 AV	54.00	-15.40	1.00 V	0	30.20	8.40
7	7386.00	57.24 PK	74.00	-16.76	1.00 V	0	43.21	14.03
8	7386.00	44.70 AV	54.00	-9.30	1.00 V	0	30.67	14.03

**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 emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. "\*" : Fundamental frequency.

802.11g

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	55.77 PK	74.00	-18.23	1.00 H	36	52.24	3.53
2	2390.00	41.60 AV	54.00	-12.40	1.00 H	36	38.07	3.53
3	*2412.00	102.39 PK			1.00 H	36	98.74	3.65
4	*2412.00	91.60 AV			1.00 H	36	87.95	3.65
5	4824.00	50.11 PK	74.00	-23.89	1.00 H	0	42.06	8.05
6	4824.00	38.33 AV	54.00	-15.67	1.00 H	0	30.28	8.05
7	#7236.00	56.15 PK	74.00	-17.85	1.00 H	0	42.58	13.57
8	#7236.00	44.01 AV	54.00	-9.99	1.00 H	0	30.44	13.57
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	55.43 PK	74.00	-18.57	1.00 V	20	51.90	3.53
2	2390.00	41.60 AV	54.00	-12.40	1.00 V	20	38.07	3.53
3	*2412.00	99.71 PK			1.00 V	20	96.06	3.65
4	*2412.00	88.50 AV			1.00 V	20	84.85	3.65
5	4824.00	50.39 PK	74.00	-23.61	1.00 V	0	42.34	8.05
6	4824.00	39.20 AV	54.00	-14.80	1.00 V	0	31.15	8.05
7	#7236.00	57.62 PK	74.00	-16.38	1.00 V	0	44.05	13.57
8	#7236.00	44.10 AV	54.00	-9.90	1.00 V	0	30.53	13.57

**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 emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
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	102.78 PK			1.00 H	50	99.01	3.77
2	*2437.00	91.70 AV			1.00 H	50	87.93	3.77
3	4874.00	50.12 PK	74.00	-23.88	1.00 H	0	41.89	8.23
4	4874.00	38.60 AV	54.00	-15.40	1.00 H	0	30.37	8.23
5	7311.00	56.18 PK	74.00	-17.82	1.00 H	0	42.38	13.80
6	7311.00	44.90 AV	54.00	-9.10	1.00 H	0	31.10	13.80
<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
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	100.68 PK			1.00 V	26	96.91	3.77
2	*2437.00	88.78 AV			1.00 V	26	85.01	3.77
3	4874.00	51.34 PK	74.00	-22.66	1.00 V	0	43.11	8.23
4	4874.00	39.30 AV	54.00	-14.70	1.00 V	0	31.07	8.23
5	7311.00	56.47 PK	74.00	-17.53	1.00 V	0	42.67	13.80
6	7311.00	44.20 AV	54.00	-9.80	1.00 V	0	30.40	13.80

**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 emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	103.15 PK			1.00 H	252	99.26	3.89
2	*2462.00	92.80 AV			1.00 H	252	88.91	3.89
3	2483.50	56.98 PK	74.00	-17.02	1.00 H	252	52.98	4.00
4	2483.50	40.10 AV	54.00	-13.90	1.00 H	252	36.10	4.00
5	4924.00	49.57 PK	74.00	-24.43	1.00 H	0	41.17	8.40
6	4924.00	38.10 AV	54.00	-15.90	1.00 H	0	29.70	8.40
7	7386.00	55.14 PK	74.00	-18.86	1.00 H	0	41.11	14.03
8	7386.00	44.00 AV	54.00	-10.00	1.00 H	0	29.97	14.03
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	100.49 PK			1.00 V	0	96.60	3.89
2	*2462.00	89.10 AV			1.00 V	0	85.21	3.89
3	2483.50	54.58 PK	74.00	-19.42	1.00 V	0	50.58	4.00
4	2483.50	38.96 AV	54.00	-15.04	1.00 V	0	34.96	4.00
5	4924.00	51.06 PK	74.00	-22.94	1.00 V	0	42.66	8.40
6	4924.00	39.00 AV	54.00	-15.00	1.00 V	0	30.60	8.40
7	7386.00	58.41 PK	74.00	-15.59	1.00 V	0	44.38	14.03
8	7386.00	44.60 AV	54.00	-9.40	1.00 V	0	30.57	14.03

**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 emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.

802.11n HT20

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	56.92 PK	74.00	-17.08	1.00 H	20	53.39	3.53
2	2390.00	40.10 AV	54.00	-13.90	1.00 H	20	36.57	3.53
3	*2412.00	102.36 PK			1.00 H	20	98.71	3.65
4	*2412.00	91.30 AV			1.00 H	20	87.65	3.65
5	4824.00	50.80 PK	74.00	-23.20	1.00 H	0	42.75	8.05
6	4824.00	38.42 AV	54.00	-15.58	1.00 H	0	30.37	8.05
7	#7236.00	56.11 PK	74.00	-17.89	1.00 H	0	42.54	13.57
8	#7236.00	44.24 AV	54.00	-9.76	1.00 H	0	30.67	13.57

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	55.12 PK	74.00	-18.88	1.00 V	0	51.59	3.53
2	2390.00	38.81 AV	54.00	-15.19	1.00 V	0	35.28	3.53
3	*2412.00	99.18 PK			1.00 V	0	95.53	3.65
4	*2412.00	88.60 AV			1.00 V	0	84.95	3.65
5	4824.00	51.36 PK	74.00	-22.64	1.00 V	0	43.31	8.05
6	4824.00	39.78 AV	54.00	-14.22	1.00 V	0	31.73	8.05
7	#7236.00	57.14 PK	74.00	-16.86	1.00 V	0	43.57	13.57
8	#7236.00	45.02 AV	54.00	-8.98	1.00 V	0	31.45	13.57

**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 emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	100.38 PK			1.00 H	14	96.61	3.77
2	*2437.00	90.48 AV			1.00 H	14	86.71	3.77
3	4874.00	52.03 PK	74.00	-21.97	1.00 H	0	43.80	8.23
4	4874.00	41.10 AV	54.00	-12.90	1.00 H	0	32.87	8.23
5	7311.00	56.34 PK	74.00	-17.66	1.00 H	0	42.54	13.80
6	7311.00	44.60 AV	54.00	-9.40	1.00 H	0	30.80	13.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	98.50 PK			1.00 V	0	94.73	3.77
2	*2437.00	89.07 AV			1.00 V	0	85.30	3.77
3	4874.00	51.76 PK	74.00	-22.24	1.00 V	0	43.53	8.23
4	4874.00	40.15 AV	54.00	-13.85	1.00 V	0	31.92	8.23
5	7311.00	57.29 PK	74.00	-16.71	1.00 V	0	43.49	13.80
6	7311.00	44.28 AV	54.00	-9.72	1.00 V	0	30.48	13.80

**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 emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	102.49 PK			1.00 H	250	98.60	3.89
2	*2462.00	91.60 AV			1.00 H	250	87.71	3.89
3	2483.50	53.64 PK	74.00	-20.36	1.00 H	250	49.64	4.00
4	2483.50	38.46 AV	54.00	-15.54	1.00 H	250	34.46	4.00
5	4924.00	50.13 PK	74.00	-23.87	1.00 H	0	41.73	8.40
6	4924.00	38.60 AV	54.00	-15.40	1.00 H	0	30.20	8.40
7	7386.00	56.14 PK	74.00	-17.86	1.00 H	0	42.11	14.03
8	7386.00	44.00 AV	54.00	-10.00	1.00 H	0	29.97	14.03
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	99.61 PK			1.00 V	140	95.72	3.89
2	*2462.00	89.02 AV			1.00 V	140	85.13	3.89
3	2483.50	53.59 PK	74.00	-20.41	1.00 V	140	49.59	4.00
4	2483.50	39.06 AV	54.00	-14.94	1.00 V	140	35.06	4.00
5	4924.00	51.40 PK	74.00	-22.60	1.00 V	0	43.00	8.40
6	4924.00	39.60 AV	54.00	-14.40	1.00 V	0	31.20	8.40
7	7386.00	57.77 PK	74.00	-16.23	1.00 V	0	43.74	14.03
8	7386.00	45.15 AV	54.00	-8.85	1.00 V	0	31.12	14.03

**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 emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. "\*" : Fundamental frequency.



802.11n HT40

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	65.17 PK	74.00	-8.83	1.41 H	311	61.64	3.53
2	2390.00	43.50 AV	54.00	-10.50	1.41 H	311	39.97	3.53
3	*2412.00	101.03 PK			1.41 H	311	97.38	3.65
4	*2412.00	89.17 AV			1.41 H	311	85.52	3.65
5	4824.00	50.67 PK	74.00	-23.33	1.00 H	0	42.62	8.05
6	4824.00	32.80 AV	54.00	-21.20	1.00 H	0	24.75	8.05
7	#7236.00	54.98 PK	74.00	-19.02	1.00 H	0	41.41	13.57
8	#7236.00	43.67 AV	54.00	-10.33	1.00 H	0	30.10	13.57

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	62.58 PK	74.00	-11.42	1.06 V	265	59.05	3.53
2	2390.00	41.84 AV	54.00	-12.16	1.06 V	265	38.31	3.53
3	*2412.00	98.93 PK			1.06 V	265	95.28	3.65
4	*2412.00	88.97 AV			1.06 V	265	85.32	3.65
5	4824.00	50.67 PK	74.00	-23.33	1.00 V	0	42.62	8.05
6	4824.00	35.78 AV	54.00	-18.22	1.00 V	0	27.73	8.05
7	#7236.00	56.34 PK	74.00	-17.66	1.00 V	0	42.77	13.57
8	#7236.00	43.67 AV	54.00	-10.33	1.00 V	0	30.10	13.57

**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 emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	101.39 PK			1.42 H	314	97.62	3.77
2	*2437.00	90.96 AV			1.42 H	314	87.19	3.77
3	4874.00	51.81 PK	74.00	-22.19	1.00 H	0	43.58	8.23
4	4874.00	37.95 AV	54.00	-16.05	1.00 H	0	29.72	8.23
5	7311.00	55.81 PK	74.00	-18.19	1.00 H	0	42.01	13.80
6	7311.00	42.58 AV	54.00	-11.42	1.00 H	0	28.78	13.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	101.67 PK			1.12 V	57	97.90	3.77
2	*2437.00	93.25 AV			1.12 V	57	89.48	3.77
3	4874.00	52.37 PK	74.00	-21.63	1.00 V	0	44.14	8.23
4	4874.00	36.91 AV	54.00	-17.09	1.00 V	0	28.68	8.23
5	7311.00	56.25 PK	74.00	-17.75	1.00 V	0	42.45	13.80
6	7311.00	43.61 AV	54.00	-10.39	1.00 V	0	29.81	13.80

**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 emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.

<b>CHANNEL</b>	TX Channel 9	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	101.24 PK			1.00 H	342	97.35	3.89
2	*2462.00	88.96 AV			1.00 H	342	85.07	3.89
3	2483.58	65.17 PK	74.00	-8.83	1.00 H	342	61.17	4.00
4	2483.58	41.29 AV	54.00	-12.71	1.00 H	342	37.29	4.00
5	4924.00	51.81 PK	74.00	-22.19	1.00 H	0	43.41	8.40
6	4924.00	35.70 AV	54.00	-18.30	1.00 H	0	27.30	8.40
7	7386.00	56.91 PK	74.00	-17.09	1.00 H	0	42.88	14.03
8	7386.00	42.87 AV	54.00	-11.13	1.00 H	0	28.84	14.03
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	98.42 PK			1.00 V	216	94.53	3.89
2	*2462.00	87.61 AV			1.00 V	216	83.72	3.89
3	2483.50	54.92 PK	74.00	-19.08	1.00 V	216	50.92	4.00
4	2483.50	41.73 AV	54.00	-12.27	1.00 V	216	37.73	4.00
5	4924.00	50.37 PK	74.00	-23.63	1.00 V	0	41.97	8.40
6	4924.00	37.91 AV	54.00	-16.09	1.00 V	0	29.51	8.40
7	7386.00	56.91 PK	74.00	-17.09	1.00 V	0	42.88	14.03
8	7386.00	43.82 AV	54.00	-10.18	1.00 V	0	29.79	14.03

**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 emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " \* ": Fundamental frequency.

### 4.3 6dB BANDWIDTH MEASUREMENT

#### 4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 4.3.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Power Sensor	Keysight	U2021XA	MY55060016	N/A	N/A
Power Sensor	Keysight	U2021XA	MY55060018	Jun. 04,20	Jun. 03,21
Power Meter	Anritsu	ML2495A	1139001	Mar. 18,20	Mar. 17,21
Power Sensor	Anritsu	MA2411B	1531155	Mar. 18,20	Mar. 17,21
Digital Multimeter	FLUKE	15B	A1220010DG	N/A	N/A
Humid & Temp Programmable Tester	Haida	HD-225T	110807201	Oct.31,19	Oct. 30,20
Oscilloscope	Agilent	DSO9254A	MY51260160	Sep. 18,19	Sep. 17,20
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101094	Mar. 18,20	Mar. 17,21
Signal Generator	Agilent	N5183A	MY50140980	Sep. 19,19	Sep. 18,20
MXG-B RF Vector Signal Generator	Keysight	N5182B	MY56200288	Sep. 12,19	Sep. 11,20
Attenuator	MINI	BW-S10W2+	S130129FGE2	N/A	N/A
DC Source	Keysight	E3642A	MY56146098	N/A	N/A

**NOTES:** 1. The test was performed in RF Oven room.

2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

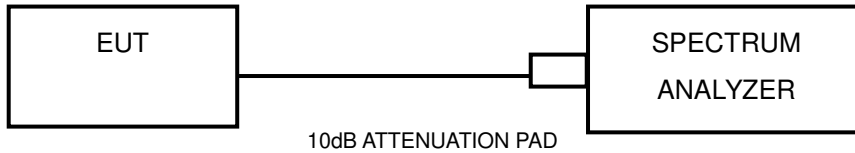
#### 4.3.3 TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 100KHz
2. Set the video bandwidth (VBW)  $\geq 3 \times$  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	10.08	0.5	PASS
6	2437	10.07	0.5	PASS
11	2462	10.06	0.5	PASS

##### 802.11g

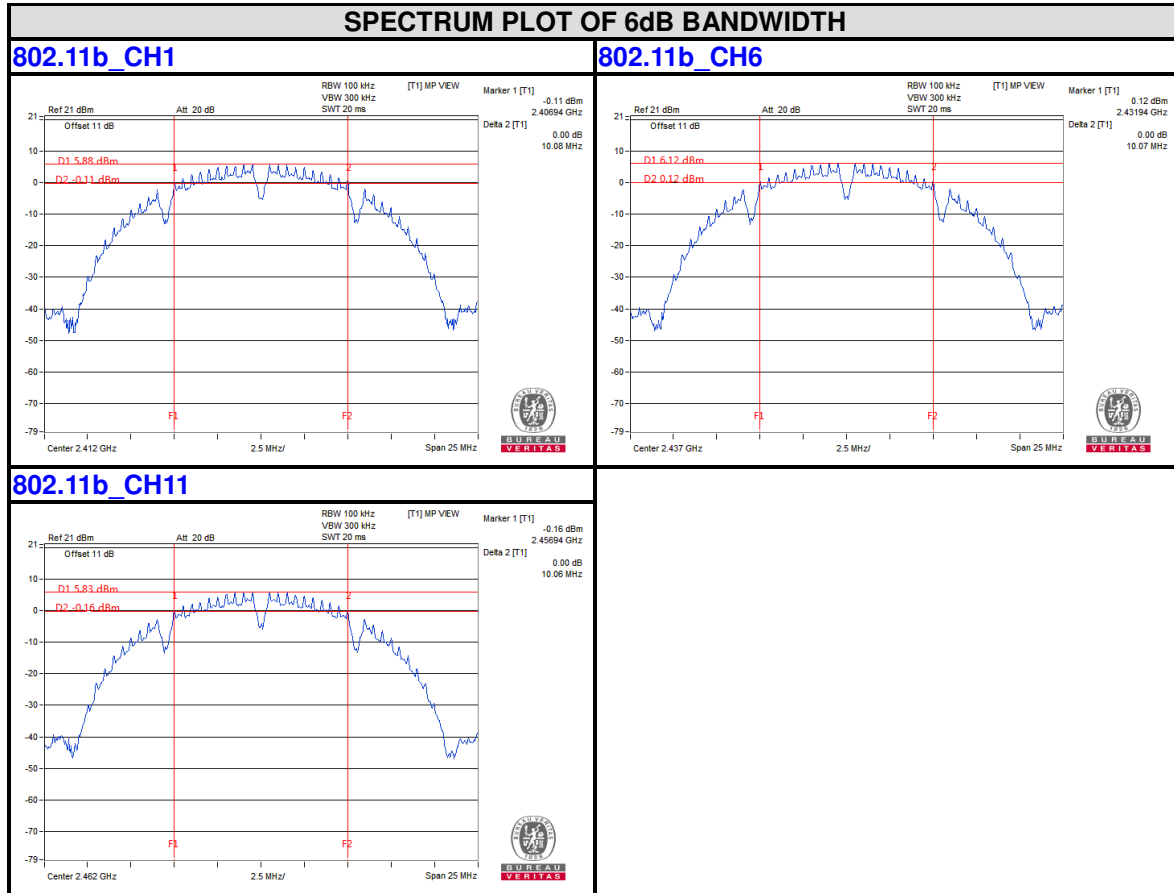
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.36	0.5	PASS
6	2437	16.36	0.5	PASS
11	2462	16.36	0.5	PASS

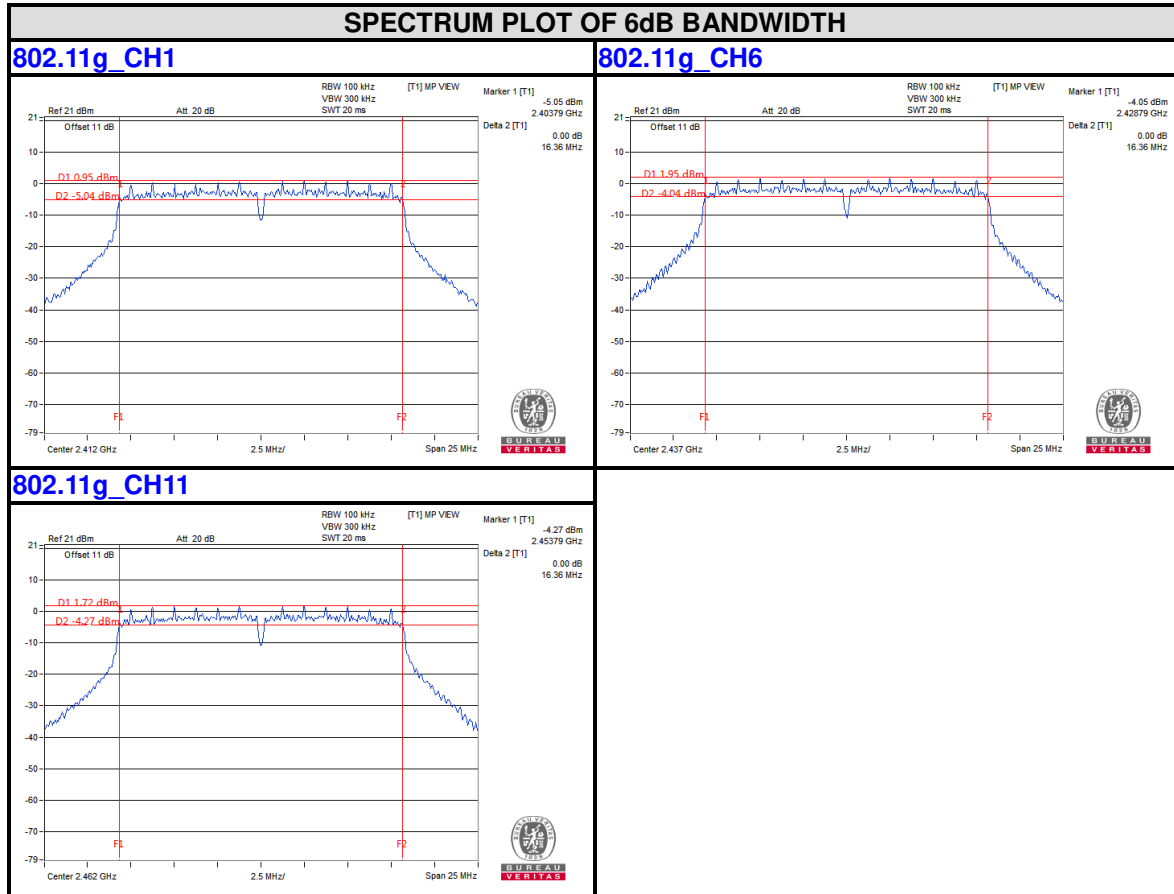
##### 802.11n HT20

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.12	0.5	PASS
6	2437	17.06	0.5	PASS
11	2462	17.07	0.5	PASS

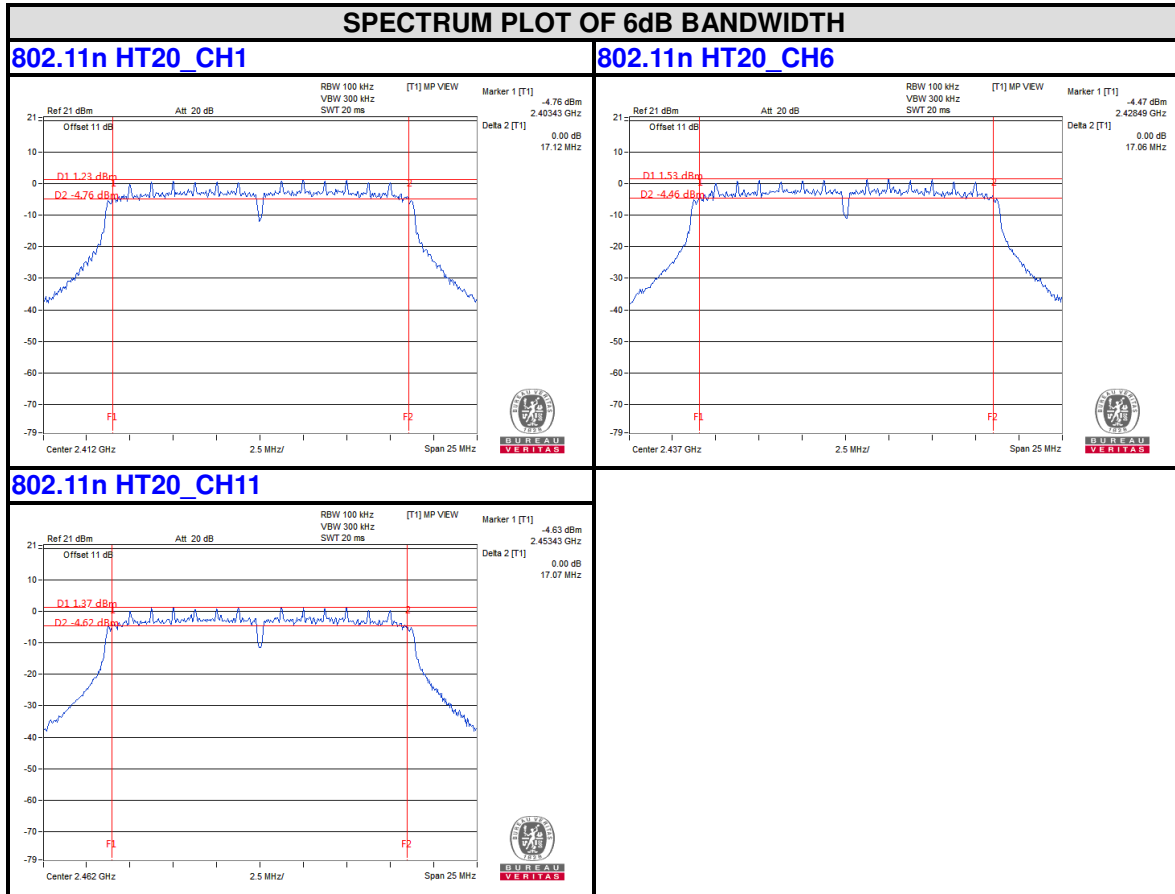
##### 802.11n HT40

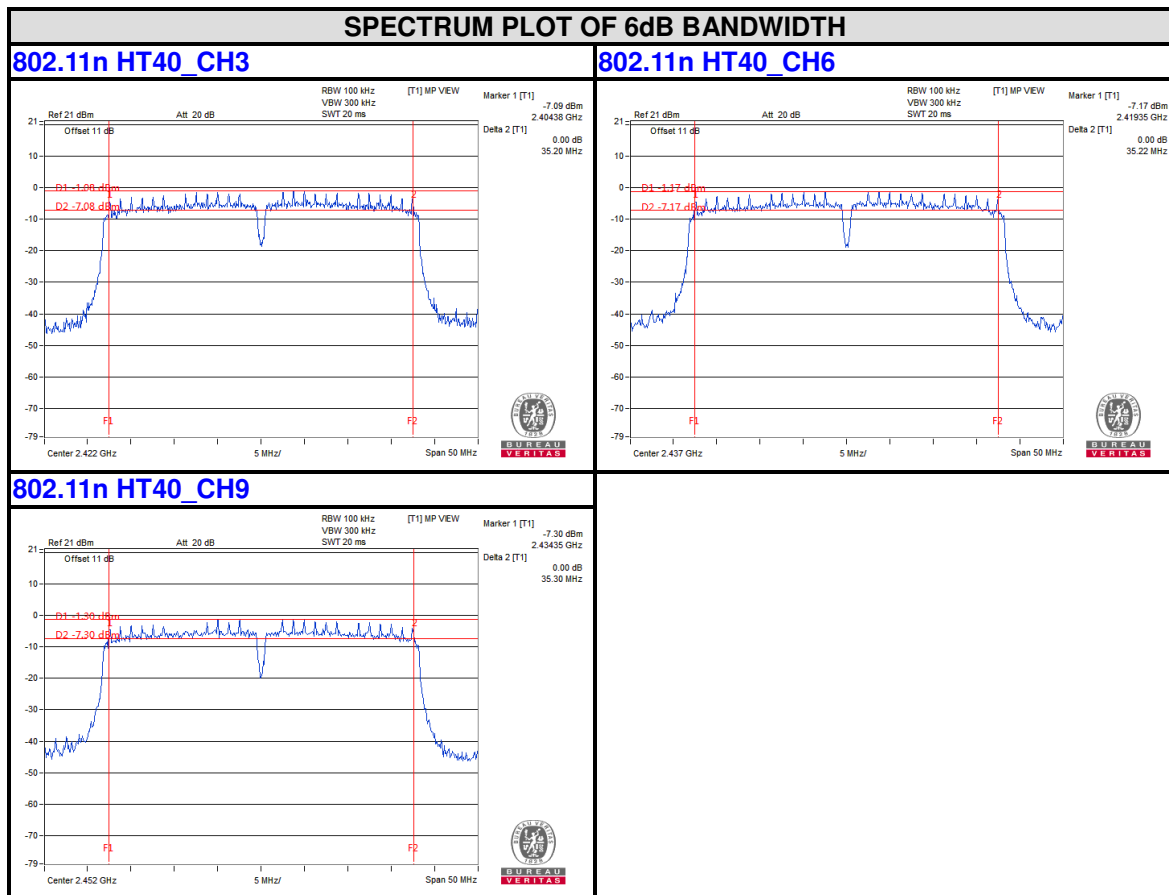
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
3	2422	35.20	0.5	PASS
6	2437	35.22	0.5	PASS
9	2452	35.30	0.5	PASS









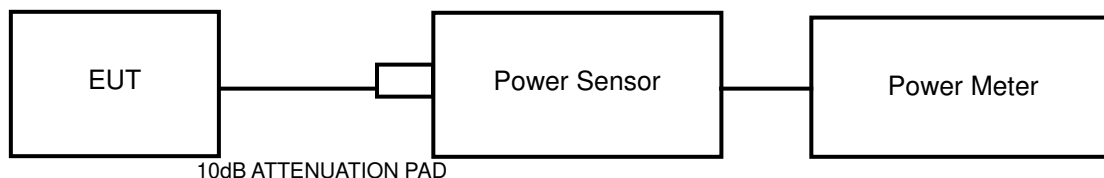


## 4.4 CONDUCTED OUTPUT POWER

### 4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

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

### 4.4.2 TEST SETUP



### 4.4.3 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Power Sensor	Keysight	U2021XA	MY55060016	N/A	N/A
Power Sensor	Keysight	U2021XA	MY55060018	Jun. 04,20	Jun. 03,21
Power Meter	Anritsu	ML2495A	1139001	Mar. 18,20	Mar. 17,21
Power Sensor	Anritsu	MA2411B	1531155	Mar. 18,20	Mar. 17,21
Digital Multimeter	FLUKE	15B	A1220010DG	N/A	N/A
Humid & Temp Programmable Tester	Haida	HD-225T	110807201	Oct.31,19	Oct. 30,20
Oscilloscope	Agilent	DSO9254A	MY51260160	Sep. 18,19	Sep. 17,20
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101094	Mar. 18,20	Mar. 17,21
Signal Generator	Agilent	N5183A	MY50140980	Sep. 19,19	Sep. 18,20
MXG-B RF Vector Signal Generator	Keysight	N5182B	MY56200288	Sep. 12,19	Sep. 11,20
Attenuator	MINI	BW-S10W2+	S130129FGE2	N/A	N/A
DC Source	Keysight	E3642A	MY56146098	N/A	N/A

#### NOTES:

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



#### 4.4.4 TEST PROCEDURES

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

#### 4.4.5 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

#### MAXIMUM PEAK OUTPUT POWER

##### 802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
1	2412	17.65	58.210	1	PASS
6	2437	17.92	61.944	1	PASS
11	2462	17.62	57.810	1	PASS

##### 802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
1	2412	20.97	125.026	1	PASS
6	2437	20.88	122.462	1	PASS
11	2462	20.99	125.603	1	<b>PASS</b>

##### 802.11n HT20

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
1	2412	20.46	111.173	1	PASS
6	2437	20.68	116.950	1	PASS
11	2462	20.43	110.408	1	PASS

##### 02.11n HT40

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
3	2422	21.02	126.474	1	PASS
6	2437	21.14	130.017	1	PASS
9	2452	20.96	124.738	1	PASS

**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)	AVG. POWER (mW)
1	2412	14.63	29.040
6	2437	14.82	30.339
11	2462	14.54	28.445

**802.11g**

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVG. POWER (mW)
1	2412	13.09	20.370
6	2437	13.04	20.137
11	2462	13.03	20.091

**802.11n HT20**

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVG. POWER (mW)
1	2412	12.54	17.947
6	2437	12.79	19.011
11	2462	12.52	17.865

**802.11n HT40**

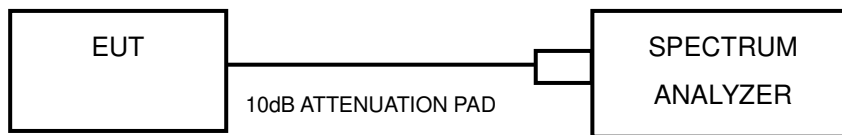
CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVG. POWER (mW)
3	2422	13.19	20.845
6	2437	13.21	20.941
9	2452	13.12	20.512

## 4.5 POWER SPECTRAL DENSITY MEASUREMENT

### 4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

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

### 4.5.2 TEST SETUP



### 4.5.3 TEST INSTRUMENTS

Refer to section 4.3.2 to get information of above instrument.

### 4.5.4 TEST PROCEDURE

- a) Set instrument center frequency to DTS channel center frequency.
- b) Set span to 1.5 times the DTS bandwidth.
- c) Set RBW to: 3KHz
- d) Set VBW  $\geq 3 \times$  RBW.
- e) Detector = peak
- f) Ensure that the number of measurement points in the sweep  $\geq 2 \times$  span/RBW.
- g) Sweep time = auto couple.
- h) Use the peak marker function to determine the maximum amplitude level.

### 4.5.5 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	-8.17	8.00	PASS
6	2437	-8.39	8.00	PASS
11	2462	-8.22	8.00	PASS

##### 802.11g

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-11.56	8.00	PASS
6	2437	-11.64	8.00	PASS
11	2462	-11.11	8.00	PASS

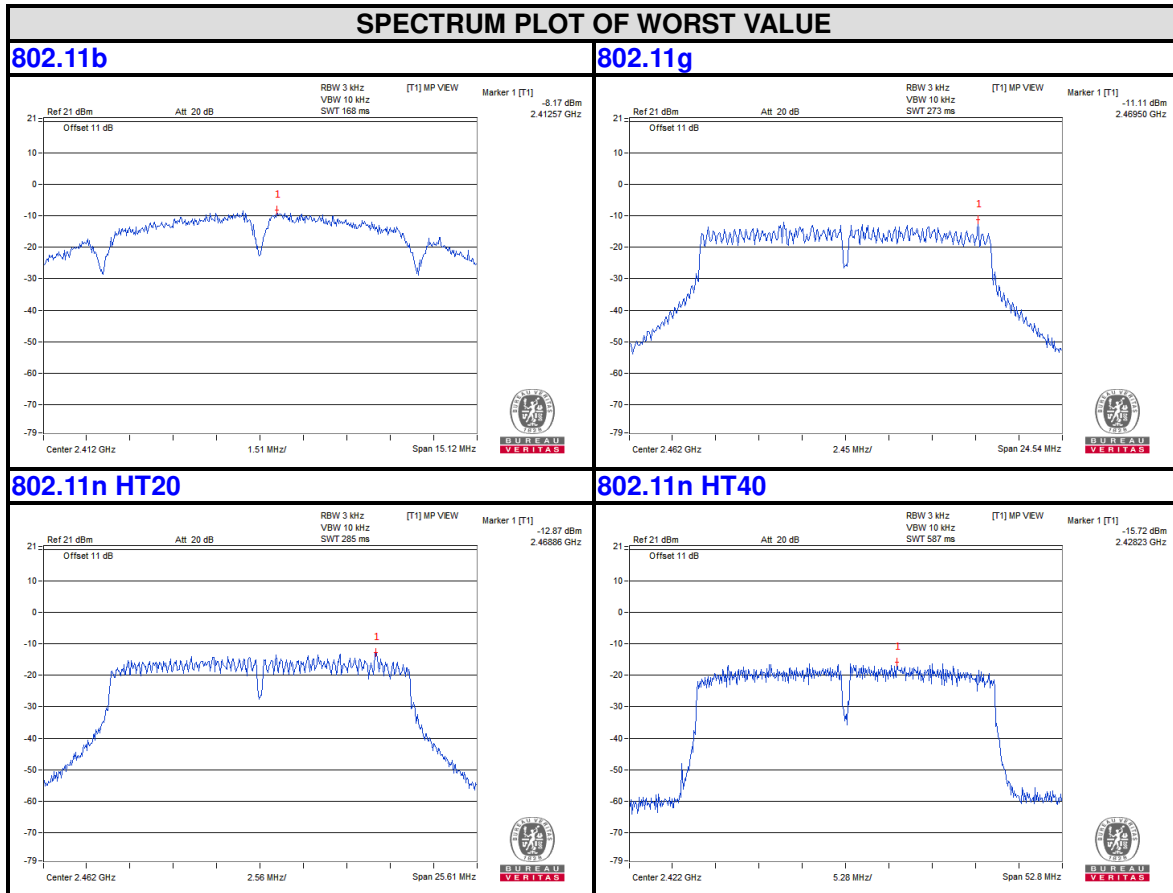
##### 802.11n HT20

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-13.07	8.00	PASS
6	2437	-13.02	8.00	PASS
11	2462	-12.87	8.00	PASS

##### 802.11n HT40

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
3	2422	-15.72	8.00	PASS
6	2437	-16.37	8.00	PASS
9	2452	-15.85	8.00	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

#### Measurement Procedure - Reference Level

1. Set the RBW = 100 kHz.
2. Set the VBW  $\geq$  300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

### **Measurement Procedure –Unwanted Emission Level**

1. Set RBW = 100 kHz.
2. Set VBW  $\geq$  300 kHz.
3. Set span to encompass the spectrum to be examined
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

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

No deviation.

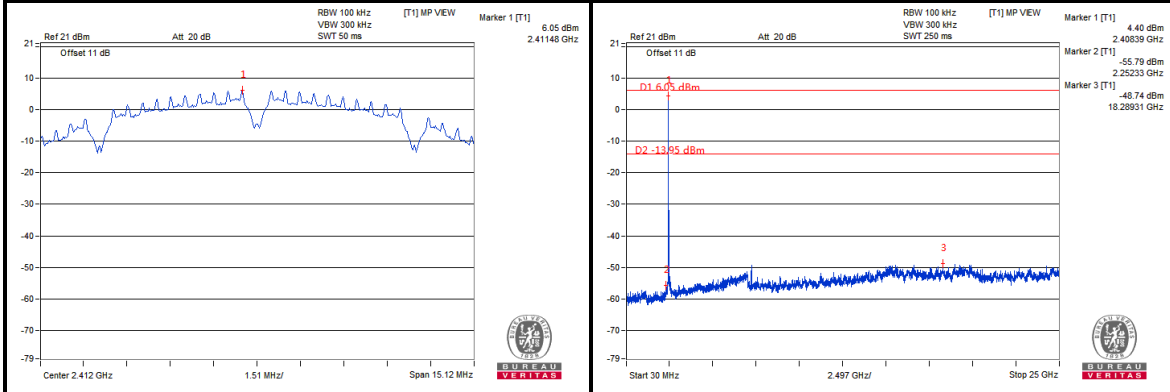
#### **4.6.6 EUT OPERATING CONDITION**

Same as item 4.3.6

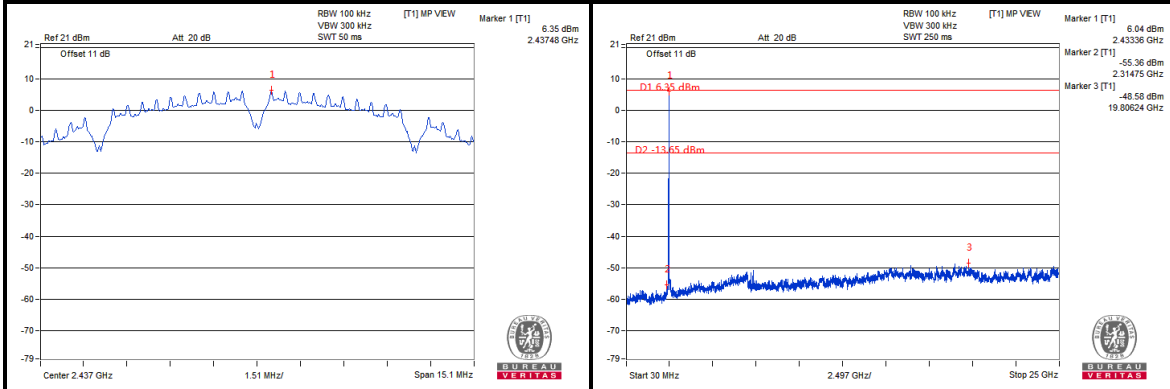
## 4.6.7 TEST RESULTS

### 802.11b

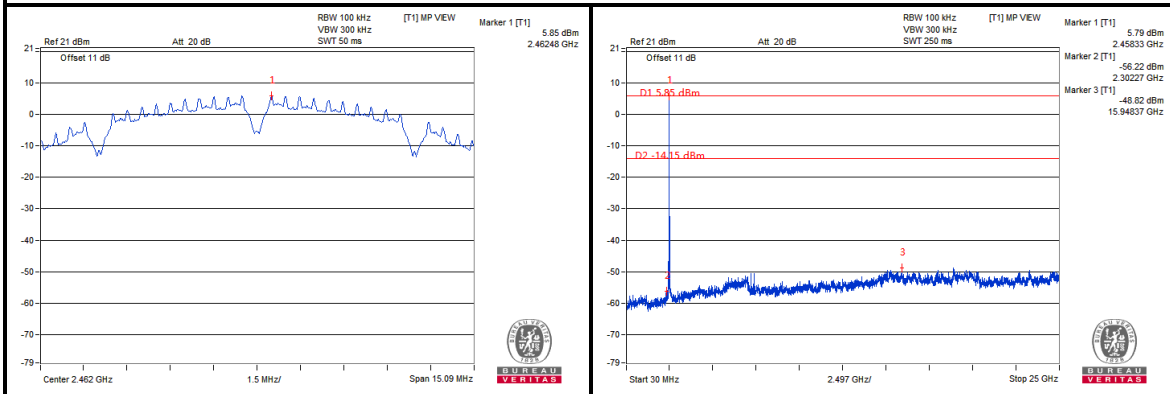
#### CH 1



#### CH 6

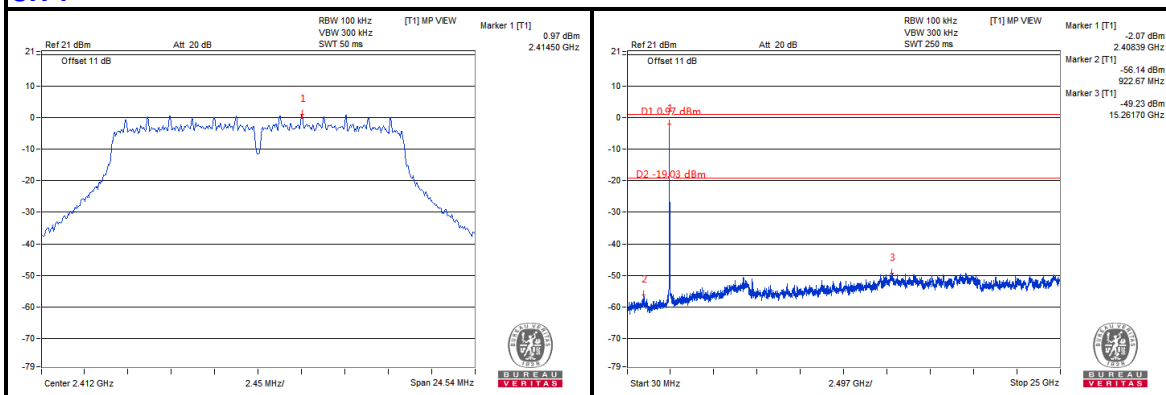


#### CH 11

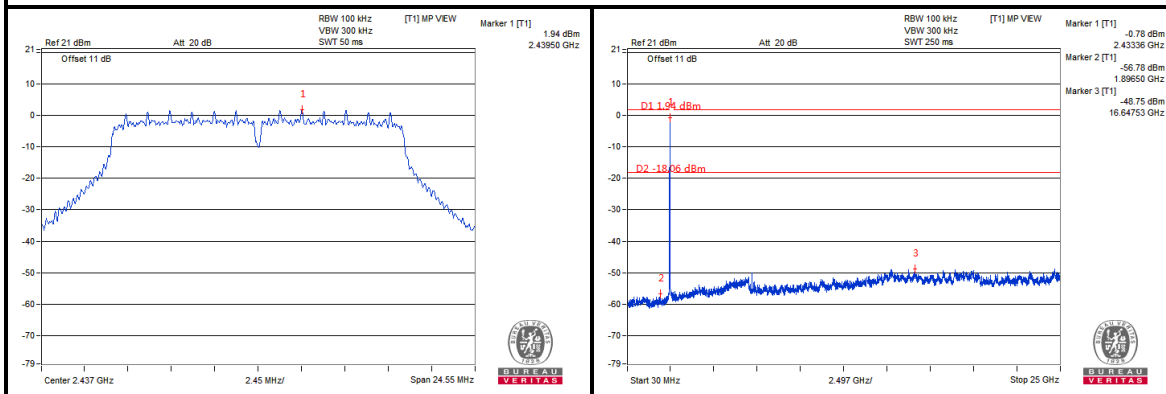


802.11g

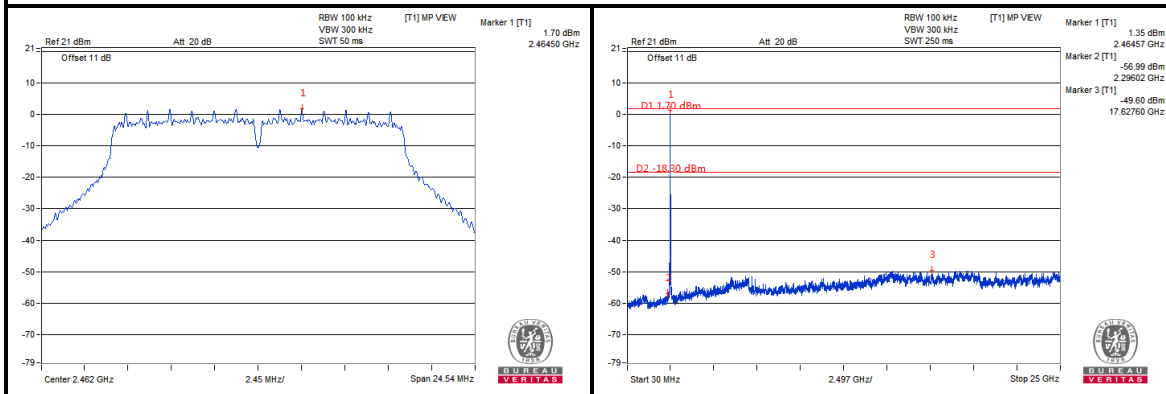
**CH 1**



**CH 6**

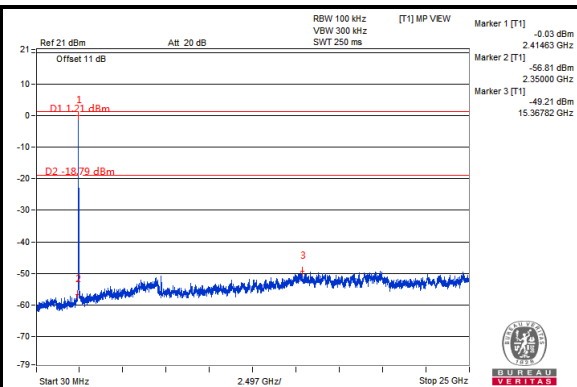
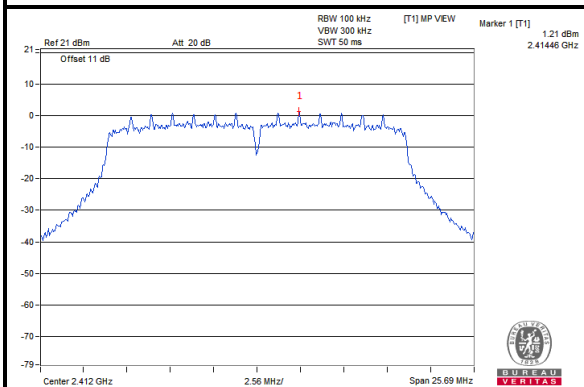


**CH 11**

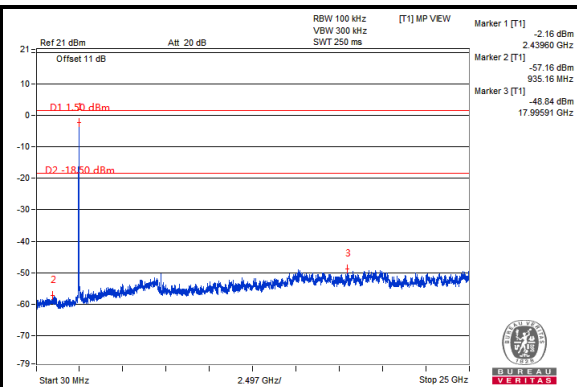
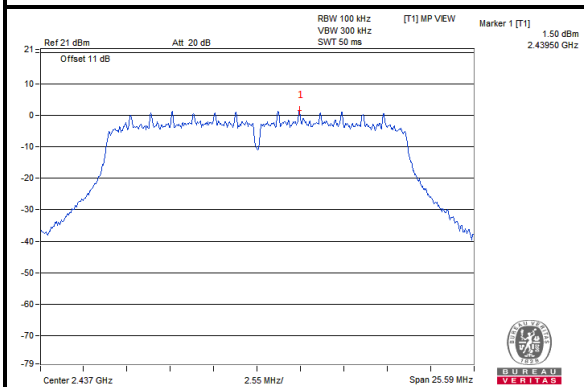


802.11n HT20

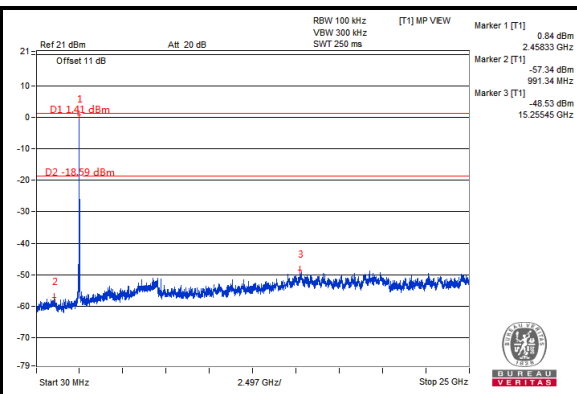
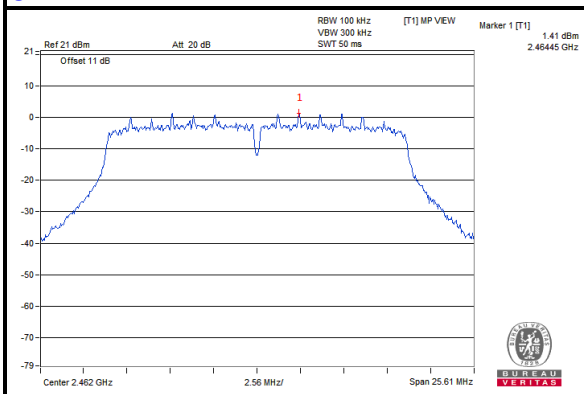
CH 1



CH 6

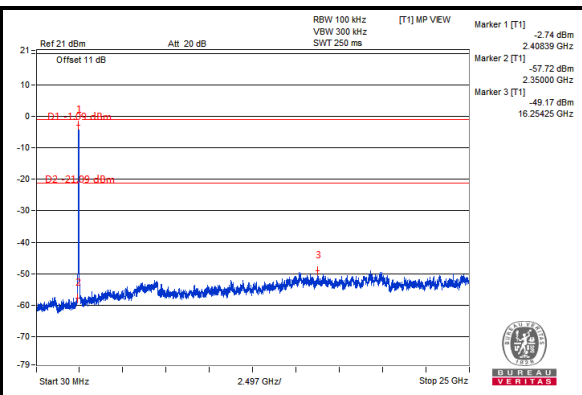
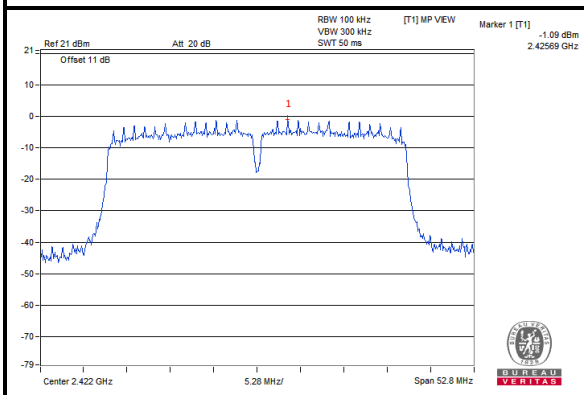


CH 11

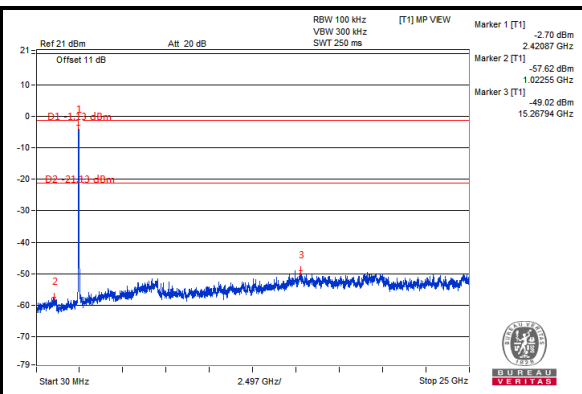
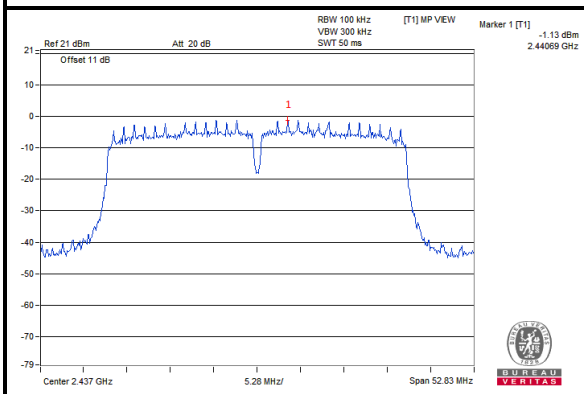


802.11n HT40

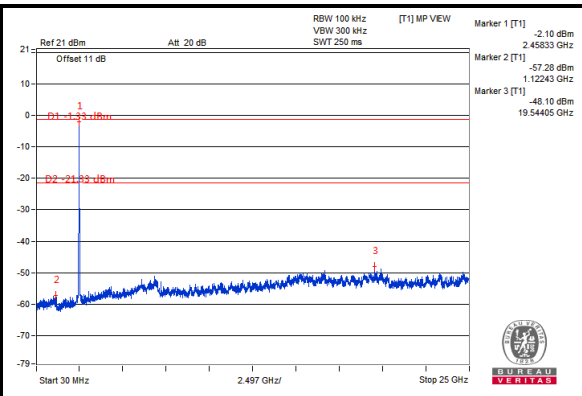
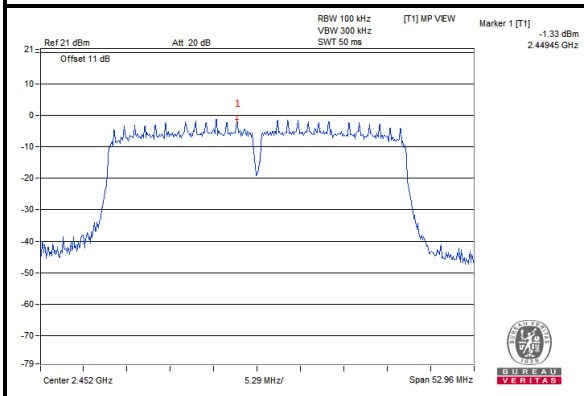
**CH 3**



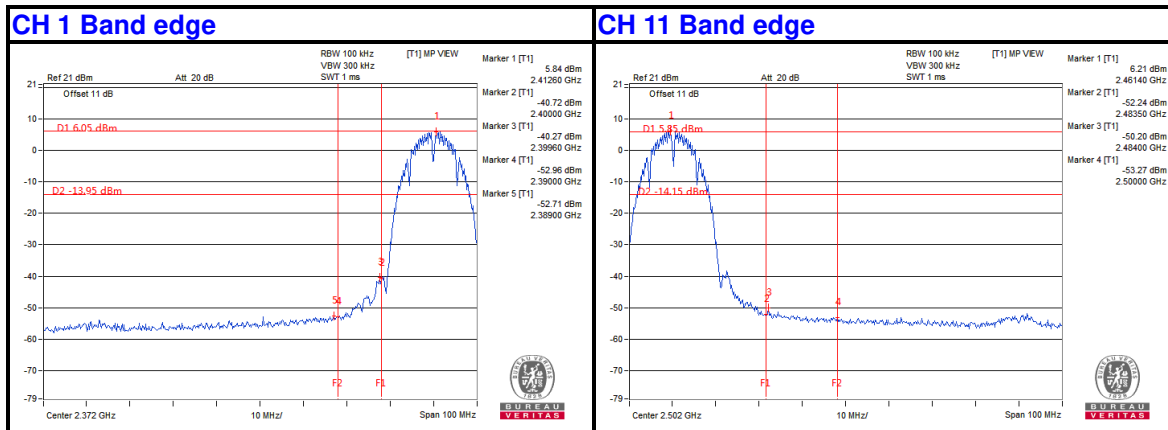
**CH 6**



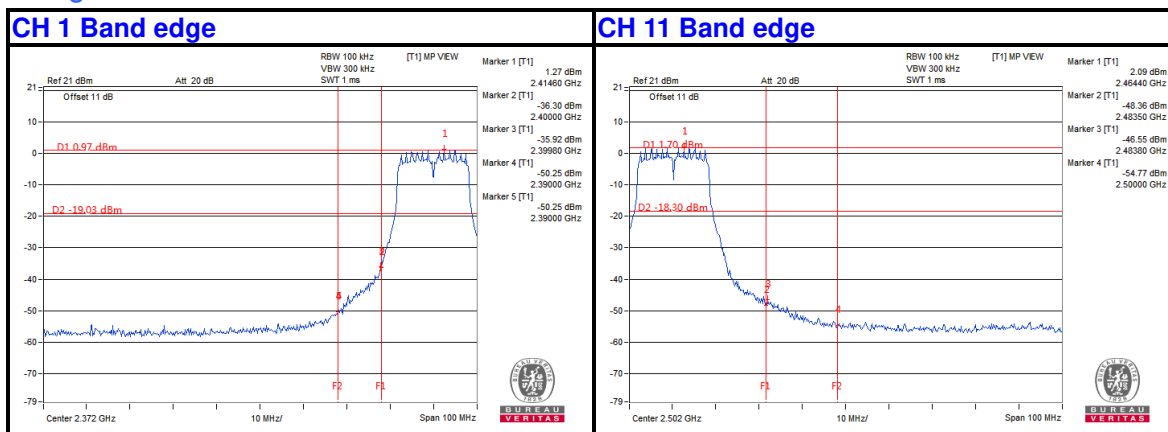
**CH 9**



802.11b

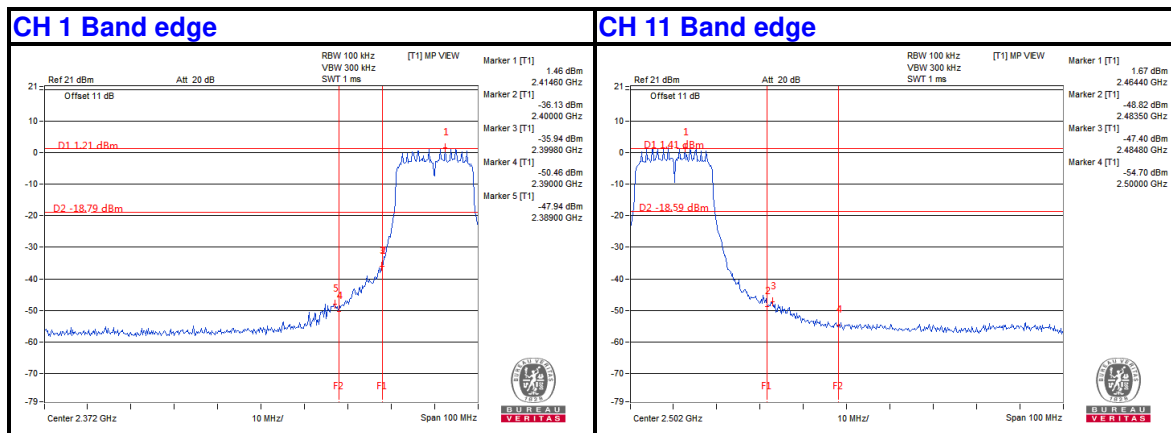


802.11g

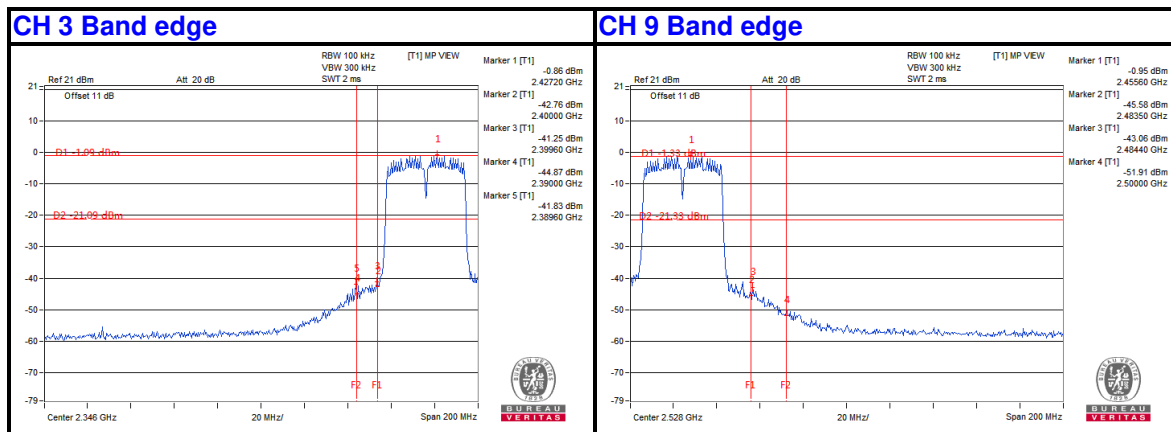




802.11n HT20



802.11n HT40





Test Report No.: RF2008WDG0008-2

## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

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



**BUREAU  
VERITAS**

Test Report No.: RF2008WDG0008-2

## **6 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB**

No any modifications are made to the EUT by the lab during the test.

**---END---**