



Test Report No.: RF200407N032-3



TEST REPORT

Applicant	Lenovo (Shanghai) Electronics Technology Co., Ltd.
Address	Section 304-305, Building No. 4, # 222, Meiyue Road, China (Shanghai) Pilot Free Trade Zone

Manufacturer or Supplier	Lenovo PC HK Limited
Address	23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong, P.R.China
Product	Lenovo Smart Frame
Brand Name	Lenovo
Model	Lenovo CD-3L501F
Additional Model & Model Difference	N/A
Date of tests	Apr. 07, 2020 ~ Apr. 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 Andy Zhu Project Engineer / EMC Department	Approved by Glyn He Assistant Manager / EMC Department
	 Date: May 13, 2020

This report is governed by, and incorporates by reference, CPS Conditions of Service as posted at the date of issuance of this report at <http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/> and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.



TABLE OF CONTENTS

RELEASE CONTROL RECORD	4
1 SUMMARY OF TEST RESULTS	5
2 MEASUREMENT UNCERTAINTY	5
3 GENERAL INFORMATION.....	6
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 GENERAL DESCRIPTION OF APPLIED STANDARDS	10
3.4 DESCRIPTION OF SUPPORT UNITS	10
4 TEST TYPES AND RESULTS	11
4.1. CONDUCTED EMISSION MEASUREMENT	11
4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT	11
4.1.2 TEST INSTRUMENTS	11
4.1.3 TEST PROCEDURES.....	12
4.1.4 DEVIATION FROM TEST STANDARD	12
4.1.5 TEST SETUP.....	13
4.1.6 EUT OPERATING CONDITIONS	13
4.1.7 TEST RESULTS.....	14
4.2. RADIATED EMISSION MEASUREMENT	16
4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT	16
4.2.2 TEST INSTRUMENTS	17
4.2.3 TEST PROCEDURES.....	18
4.2.4 DEVIATION FROM TEST STANDARD	19
4.2.5 TEST SETUP.....	19
4.2.6 EUT OPERATING CONDITIONS	20
4.2.7 TEST RESULTS.....	21
4.3 6DB BANDWIDTH MEASUREMENT	35
4.3.1 LIMITS OF 6DB BANDWIDTH MEASUREMENT	35
4.3.2 TEST INSTRUMENTS	35
4.3.3 TEST PROCEDURE	35
4.3.4 DEVIATION FROM TEST STANDARD	35
4.3.5 TEST SETUP.....	36
4.3.6 EUT OPERATING CONDITIONS	36
4.3.7 TEST RESULTS.....	37



4.4	CONDUCTED OUTPUT POWER	42
4.4.1	LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT.....	42
4.4.2	TEST SETUP.....	42
4.4.3	TEST INSTRUMENTS	42
4.4.4	TEST PROCEDURES.....	43
4.4.5	DEVIATION FROM TEST STANDARD.....	43
4.4.6	EUT OPERATING CONDITIONS	43
4.4.7	TEST RESULTS.....	44
4.5	POWER SPECTRAL DENSITY MEASUREMENT	46
4.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT	46
4.5.2	TEST SETUP.....	46
4.5.3	TEST INSTRUMENTS	46
4.5.4	TEST PROCEDURE	46
4.5.5	DEVIATION FROM TEST STANDARD.....	46
4.5.6	EUT OPERATING CONDITION.....	47
4.5.7	TEST RESULTS.....	47
4.6	OUT OF BAND EMISSION MEASUREMENT	49
4.6.1	LIMITS OF OUT OF BAND EMISSION MEASUREMENT.....	49
4.6.2	TEST SETUP.....	49
4.6.3	TEST INSTRUMENTS	49
4.6.4	TEST PROCEDURE	49
4.6.5	DEVIATION FROM TEST STANDARD.....	50
4.6.6	EUT OPERATING CONDITION.....	50
4.6.7	TEST RESULTS.....	51
5	PHOTOGRAPHS OF THE TEST CONFIGURATION	57
6	APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	58



Test Report No.: RF200407N032-3

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF200407N032-3	Original release	May 13, 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

PRODUCT	Lenovo Smart Frame
BRAND	Lenovo
MODEL NO.	Lenovo CD-3L501F
ADDITIONAL NO.	N/A
FCC ID	O57CD3L501F
NOMINAL VOLTAGE	DC 20V from Adapter
MODULATION TECHNOLOGY	DSSS, OFDM
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
OPERATING FREQUENCY	2412MHz ~ 2462MHz for 11b/g/n(HT20) 2422MHz ~ 2452MHz for 11n(HT40)
PEAK OUTPUT POWER	264.241mW(Maximum)
ANTENNA TYPE	PIFA Antenna, with 3.84dBi gain
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	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.: 200407N032) for detailed product photo.
3. The EUT have SISO function, provides 1 completed transmitter and 1 receiver.

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

4. The EUT were powered by the following Adapter:

ADAPTER	
BRAND:	N/A
MODEL:	PA-1300-42
INPUT:	AC 100-240V, 50/60Hz 1.4A Max
OUTPUT:	DC 20V, 1.5A
DC CABLE	Unshielded, Non-detachable, 180cm.

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

EUT CONFIGURE MODE	APPLICABLE TO				MODE
	RE<1G	RE≥1G	PLC	APCM	
A	√	√	√	√	Powered by Adapter with WIFI function

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

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, 6, 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(ADAPTER)	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	Robert Cheng
APCM	25deg. C, 60%RH	AC 120V/60Hz	Robert Cheng



3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C, Section 15.247
KDB 558074 D01 15.247 Meas Guidance v05r02
ANSI C63.10-2013

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

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	N/A	N/A	N/A	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A

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

- 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. 12,20	Mar. 11,21
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	Mar. 12,20	Mar. 11,21
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	Mar. 12,20	Mar. 11,21
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

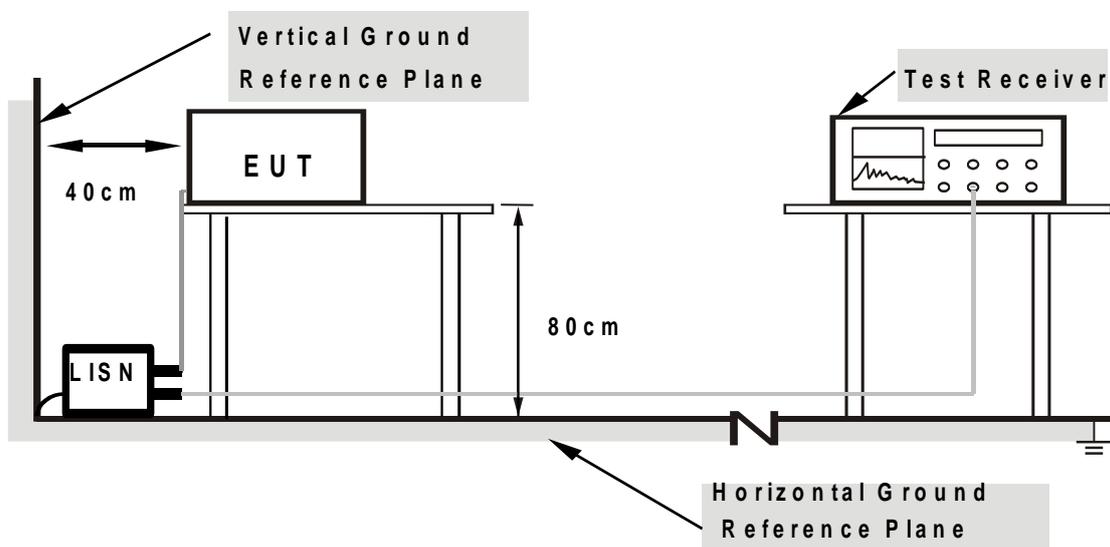
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

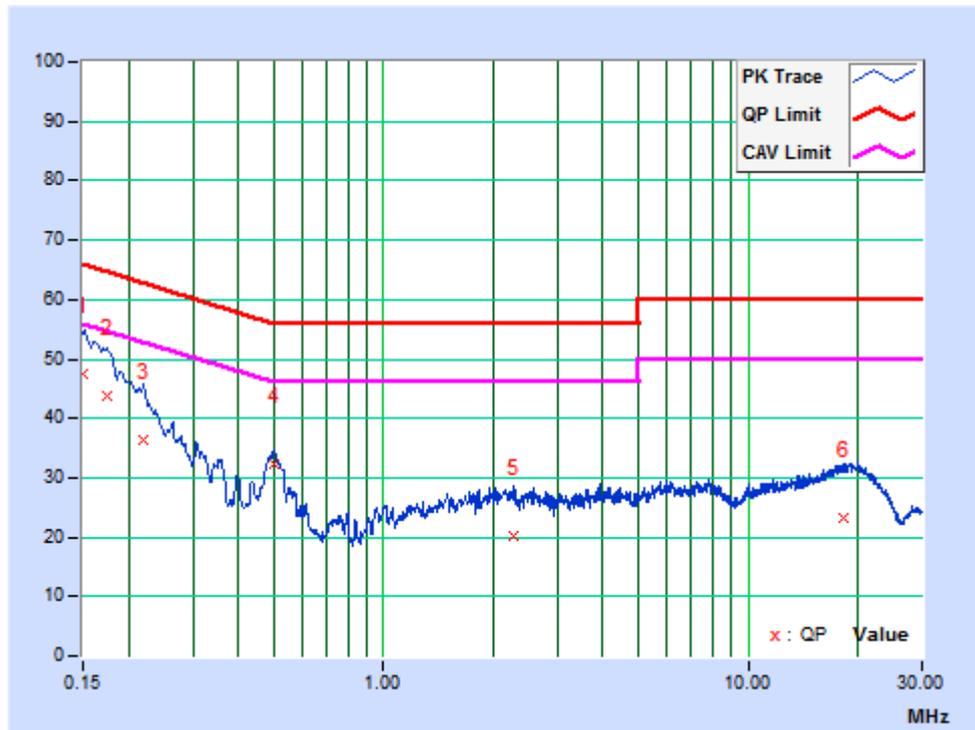
4.1.7 TEST RESULTS

CONDUCTED WORST-CASE DATA: WIFI

PHASE	Line	6dB BANDWIDTH	9kHz
-------	------	---------------	------

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	10.21	37.33	16.34	47.54	26.55	66.00	56.00	-18.46	-29.45
2	0.17466	10.21	33.43	13.22	43.64	23.43	64.74	54.74	-21.10	-31.31
3	0.21976	10.21	26.15	7.65	36.36	17.86	62.83	52.83	-26.47	-34.97
4	0.49953	10.22	22.05	15.91	32.27	26.13	56.01	46.01	-23.74	-19.88
5	2.26050	10.22	9.95	3.13	20.17	13.35	56.00	46.00	-35.83	-32.65
6	18.35475	10.33	13.06	2.68	23.39	13.01	60.00	50.00	-36.61	-36.99

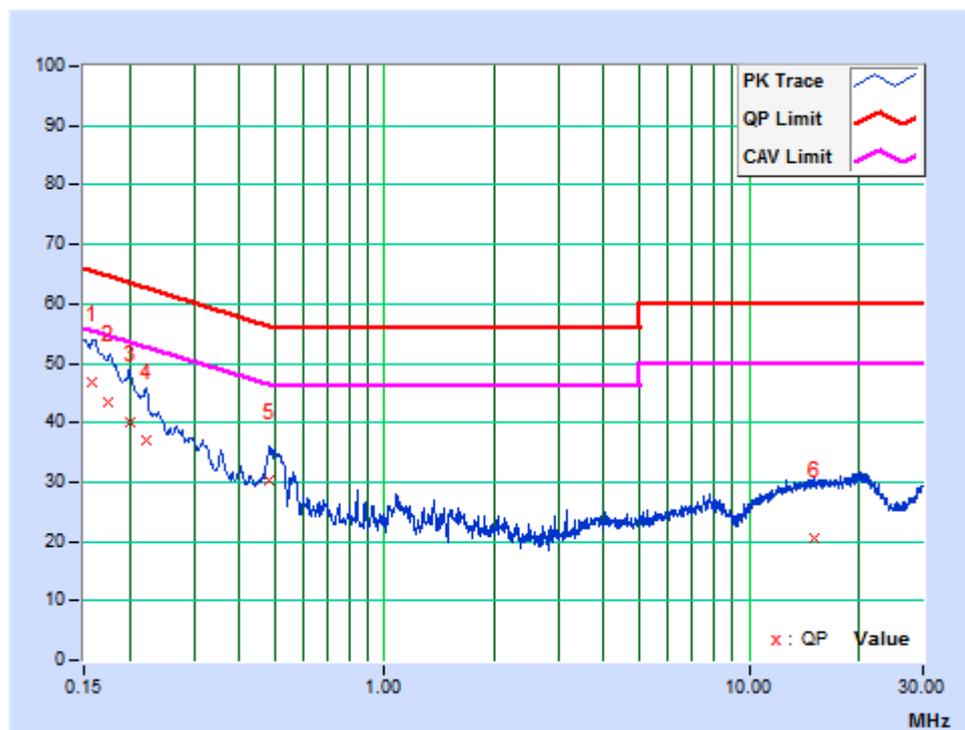
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



PHASE	Neutral	6dB BANDWIDTH	9kHz
--------------	---------	----------------------	------

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	0.15882	10.01	36.68	16.42	46.69	26.43	65.53	55.53	-18.84	-29.10
2	0.17374	10.00	33.45	13.12	43.45	23.12	64.78	54.78	-21.33	-31.66
3	0.19983	10.00	30.14	10.58	40.14	20.58	63.62	53.62	-23.48	-33.04
4	0.22200	10.00	27.05	7.78	37.05	17.78	62.74	52.74	-25.69	-34.96
5	0.48525	10.02	20.40	6.30	30.42	16.32	56.25	46.25	-25.83	-29.93
6	15.05625	10.20	10.28	0.86	20.48	11.06	60.00	50.00	-39.52	-38.94

- 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

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESU40	100449	Mar. 12,20	Mar. 11,21
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV7	102331	May 22,19	May 21,20
Active Loop Antenna (9KHz -30MHz)	SCHWARZBECK	FMZB 1519B	1519B-045	May 28,19	May 27,20
Amplifier (9KHz -1GHz)	Burgeon	BPA-530	100210	Apr. 21,20	Apr. 20,21
Bilog Antenna (20MHz -2GHz)	Teseq	CBL 6111D	30643	Jun. 23,19	Jun. 22,20
Horn Antenna (1GHz -18GHz)	ETS -Lindgren	3117	00062558	Jun. 23,19	Jun. 22,20
Horn Antenna (18GHz -40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170242	May 05,19	May 04,20
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	Apr. 21,20	Apr. 20,21
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
Broadband Preamplifier (1GHz~18GHz)	SCHWARZBECK	BBV9718	305	Apr. 21,20	Apr. 20,21
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 09,19	Nov. 08,20
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:

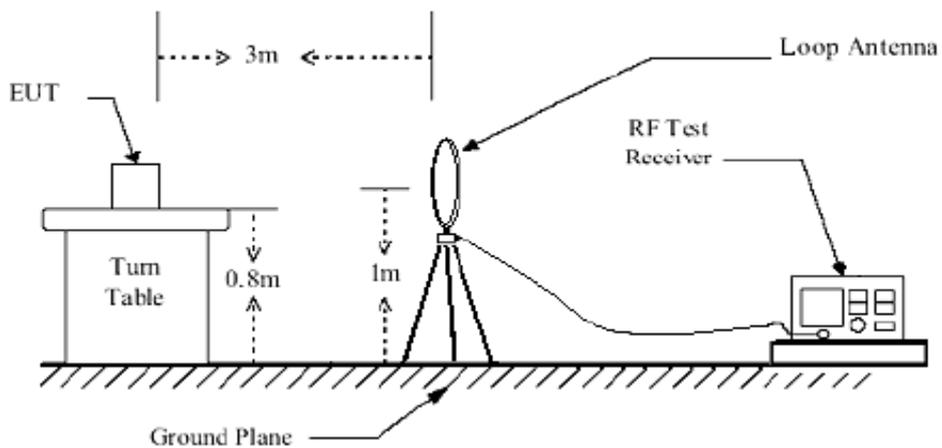
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution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

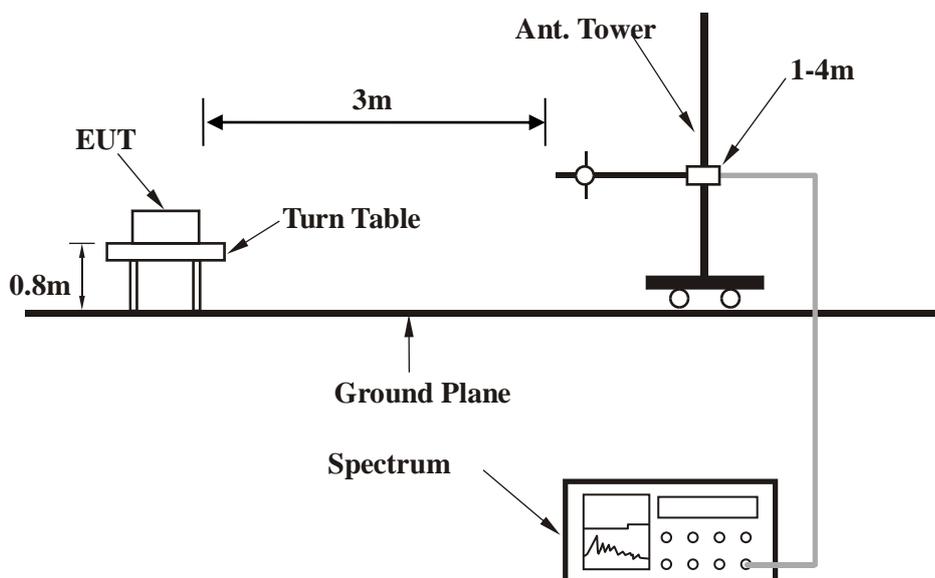
No deviation.

4.2.5 TEST SETUP

Below 30MHz test setup

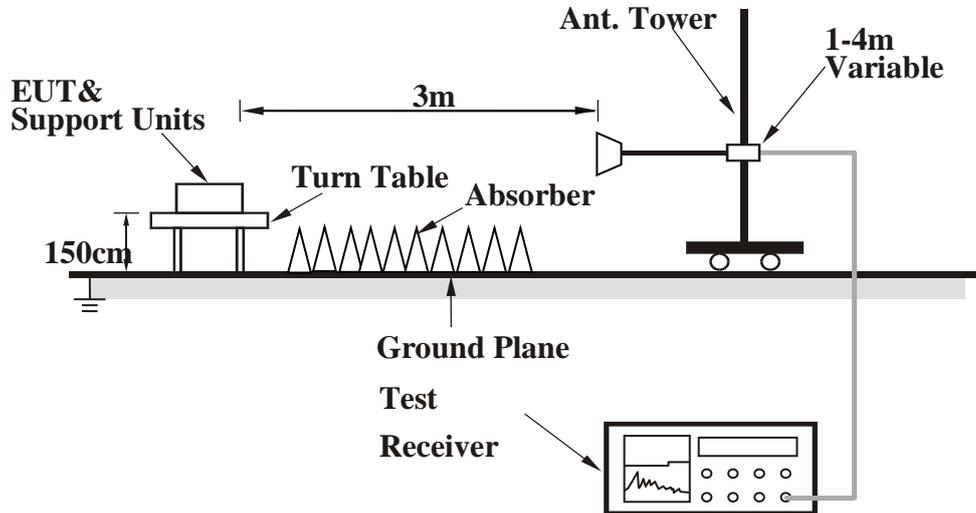


Below 1GHz test setup



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:

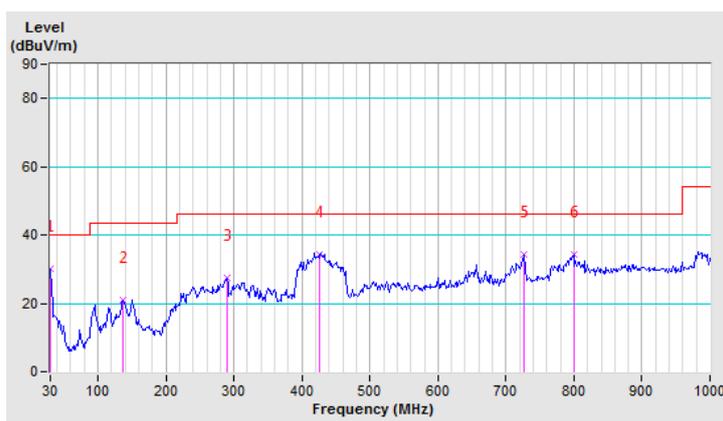
802.11b

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	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	30.00	30.16 QP	40.00	-9.84	1.00 H	152	41.16	-11.00
2	137.26	20.87 QP	43.50	-22.63	1.00 H	303	37.06	-16.19
3	289.60	27.54 QP	46.00	-18.46	1.00 H	179	40.56	-13.02
4	426.39	34.28 QP	46.00	-11.72	1.00 H	204	42.54	-8.26
5	726.41	34.26 QP	46.00	-11.74	1.00 H	82	36.40	-2.14
6	799.47	34.28 QP	46.00	-11.72	1.00 H	77	34.71	-0.43

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.

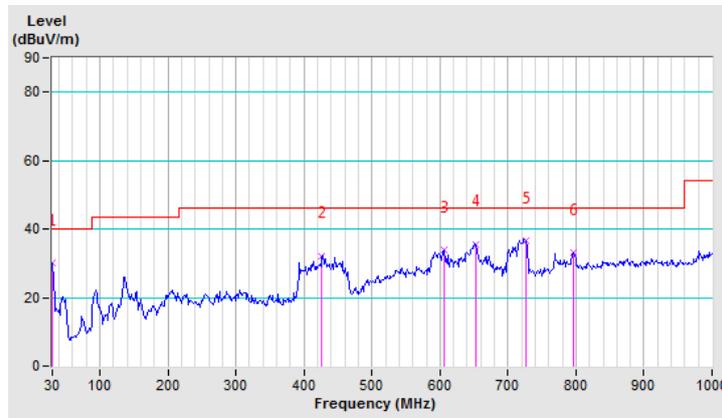


CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9KHz ~ 1GHz		

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	30.00	29.99 QP	40.00	-10.01	1.00 V	61	40.99	-11.00
2	426.39	32.19 QP	46.00	-13.81	1.00 V	46	40.45	-8.26
3	606.71	33.75 QP	46.00	-12.25	1.00 V	34	37.52	-3.77
4	651.79	35.63 QP	46.00	-10.37	1.00 V	23	38.91	-3.28
5	726.41	36.63 QP	46.00	-9.37	1.00 V	12	38.77	-2.14
6	796.36	33.20 QP	46.00	-12.80	1.00 V	2	33.75	-0.55

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

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	48.03 PK	74.00	-25.97	1.05 H	11	43.88	4.15
2	2390.00	36.10 AV	54.00	-17.90	1.05 H	11	31.95	4.15
3	*2412.00	103.93 PK			1.05 H	11	99.70	4.23
4	*2412.00	99.91 AV			1.05 H	11	95.68	4.23
5	4824.00	49.09 PK	74.00	-24.91	1.00 H	34	41.52	7.57
6	4824.00	37.16 AV	54.00	-16.84	1.00 H	34	29.59	7.57
7	#7236.00	53.83 PK	74.00	-20.17	1.00 H	57	41.44	12.39
8	#7236.00	41.20 AV	54.00	-12.80	1.00 H	57	28.81	12.39
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	46.02 PK	74.00	-27.98	1.00 V	258	41.87	4.15
2	2390.00	34.32 AV	54.00	-19.68	1.00 V	258	30.17	4.15
3	*2412.00	98.83 PK			1.00 V	258	94.60	4.23
4	*2412.00	94.06 AV			1.00 V	258	89.83	4.23
5	4824.00	49.62 PK	74.00	-24.38	1.00 V	120	42.05	7.57
6	4824.00	37.19 AV	54.00	-16.81	1.00 V	120	29.62	7.57
7	#7236.00	54.88 PK	74.00	-19.12	1.00 V	360	42.49	12.39
8	#7236.00	42.03 AV	54.00	-11.97	1.00 V	360	29.64	12.39

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.

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	106.91 PK			1.81 H	14	102.57	4.34
2	*2437.00	101.45 AV			1.81 H	14	97.11	4.34
3	4874.00	49.89 PK	74.00	-24.11	1.00 H	177	42.23	7.66
4	4874.00	37.22 AV	54.00	-16.78	1.00 H	177	29.56	7.66
5	7311.00	54.03 PK	74.00	-19.97	1.00 H	153	41.55	12.48
6	7311.00	41.19 AV	54.00	-12.81	1.00 H	153	28.71	12.48
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	98.31 PK			1.00 V	283	93.97	4.34
2	*2437.00	93.89 AV			1.00 V	283	89.55	4.34
3	4874.00	49.06 PK	74.00	-24.94	1.10 V	27	41.40	7.66
4	4874.00	36.47 AV	54.00	-17.53	1.10 V	27	28.81	7.66
5	7311.00	53.89 PK	74.00	-20.11	1.00 V	93	41.41	12.48
6	7311.00	40.85 AV	54.00	-13.15	1.00 V	93	28.37	12.48

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.

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	106.92 PK			1.97 H	9	102.47	4.45
2	*2462.00	101.93 AV			1.97 H	9	97.48	4.45
3	2483.50	46.18 PK	74.00	-27.82	1.97 H	10	41.64	4.54
4	2483.50	36.12 AV	54.00	-17.88	1.97 H	10	31.58	4.54
5	4924.00	50.03 PK	74.00	-23.97	1.00 H	133	42.26	7.77
6	4924.00	37.66 AV	54.00	-16.34	1.00 H	133	29.89	7.77
7	7386.00	53.73 PK	74.00	-20.27	1.00 H	149	41.17	12.56
8	7386.00	41.12 AV	54.00	-12.88	1.00 H	149	28.56	12.56
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	100.54 PK			1.00 V	238	96.09	4.45
2	*2462.00	94.85 AV			1.00 V	238	90.40	4.45
3	2483.50	46.82 PK	74.00	-27.18	1.00 V	238	42.28	4.54
4	2483.50	33.94 AV	54.00	-20.06	1.00 V	238	29.40	4.54
5	4924.00	49.16 PK	74.00	-24.84	1.00 V	115	41.39	7.77
6	4924.00	36.28 AV	54.00	-17.72	1.00 V	115	28.51	7.77
7	7386.00	53.87 PK	74.00	-20.13	1.00 V	315	41.31	12.56
8	7386.00	41.44 AV	54.00	-12.56	1.00 V	315	28.88	12.56

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

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	70.32 PK	74.00	-3.68	2.00 H	18	66.17	4.15
2	2390.00	50.51 AV	54.00	-3.49	2.00 H	18	46.36	4.15
3	*2412.00	110.44 PK			2.00 H	18	106.21	4.23
4	*2412.00	95.45 AV			2.00 H	18	91.22	4.23
5	4824.00	49.83 PK	74.00	-24.17	1.00 H	77	42.26	7.57
6	4824.00	37.05 AV	54.00	-16.95	1.00 H	77	29.48	7.57
7	#7236.00	54.12 PK	74.00	-19.88	1.00 H	85	41.73	12.39
8	#7236.00	41.05 AV	54.00	-12.95	1.00 H	85	28.66	12.39
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	57.46 PK	74.00	-16.54	1.00 V	257	53.31	4.15
2	2390.00	40.65 AV	54.00	-13.35	1.00 V	257	36.50	4.15
3	*2412.00	103.93 PK			1.00 V	257	99.70	4.23
4	*2412.00	89.76 AV			1.00 V	257	85.53	4.23
5	4824.00	50.44 PK	74.00	-23.56	1.00 V	17	42.87	7.57
6	4824.00	37.82 AV	54.00	-16.18	1.00 V	17	30.25	7.57
7	#7236.00	53.46 PK	74.00	-20.54	1.00 V	221	41.07	12.39
8	#7236.00	41.08 AV	54.00	-12.92	1.00 V	221	28.69	12.39

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.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	110.65 PK			2.00 H	14	106.31	4.34
2	*2437.00	96.85 AV			2.00 H	14	92.51	4.34
3	4874.00	49.55 PK	74.00	-24.45	1.00 H	170	41.89	7.66
4	4874.00	37.15 AV	54.00	-16.85	1.00 H	170	29.49	7.66
5	7311.00	54.02 PK	74.00	-19.98	1.00 H	0	41.54	12.48
6	7311.00	40.89 AV	54.00	-13.11	1.00 H	0	28.41	12.48
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	102.69 PK			1.00 V	282	98.35	4.34
2	*2437.00	89.20 AV			1.00 V	282	84.86	4.34
3	4874.00	49.73 PK	74.00	-24.27	1.00 V	0	42.07	7.66
4	4874.00	37.41 AV	54.00	-16.59	1.00 V	0	29.75	7.66
5	7311.00	53.66 PK	74.00	-20.34	1.00 V	73	41.18	12.48
6	7311.00	41.12 AV	54.00	-12.88	1.00 V	73	28.64	12.48

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.

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	110.49 PK			2.00 H	18	106.04	4.45
2	*2462.00	96.15 AV			2.00 H	18	91.70	4.45
3	2483.50	71.36 PK	74.00	-2.64	2.00 H	18	66.82	4.54
4	2483.50	51.42 AV	54.00	-2.58	2.00 H	18	46.88	4.54
5	4924.00	50.22 PK	74.00	-23.78	1.00 H	176	42.45	7.77
6	4924.00	37.85 AV	54.00	-16.15	1.00 H	176	30.08	7.77
7	7386.00	53.73 PK	74.00	-20.27	1.00 H	88	41.17	12.56
8	7386.00	41.32 AV	54.00	-12.68	1.00 H	88	28.76	12.56
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	103.34 PK			1.00 V	239	98.89	4.45
2	*2462.00	90.13 AV			1.00 V	239	85.68	4.45
3	4924.00	50.03 PK	74.00	-23.97	1.00 V	174	42.26	7.77
4	4924.00	37.65 AV	54.00	-16.35	1.00 V	174	29.88	7.77
5	7386.00	53.05 PK	74.00	-20.95	1.00 V	92	40.49	12.56
6	7386.00	40.58 AV	54.00	-13.42	1.00 V	92	28.02	12.56

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

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	69.90 PK	74.00	-4.10	1.55 H	10	65.75	4.15
2	2390.00	50.89 AV	54.00	-3.11	1.55 H	10	46.74	4.15
3	*2412.00	107.96 PK			1.55 H	10	103.73	4.23
4	*2412.00	94.50 AV			1.55 H	10	90.27	4.23
5	4824.00	49.16 PK	74.00	-24.84	1.00 H	241	41.59	7.57
6	4824.00	36.83 AV	54.00	-17.17	1.00 H	241	29.26	7.57
7	#7236.00	53.52 PK	74.00	-20.48	1.00 H	33	41.13	12.39
8	#7236.00	40.26 AV	54.00	-13.74	1.00 H	33	27.87	12.39
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	57.70 PK	74.00	-16.30	1.00 V	257	53.55	4.15
2	2390.00	41.29 AV	54.00	-12.71	1.00 V	257	37.14	4.15
3	*2412.00	101.66 PK			1.00 V	257	97.43	4.23
4	*2412.00	88.51 AV			1.00 V	257	84.28	4.23
5	4824.00	48.77 PK	74.00	-25.23	1.00 V	17	41.20	7.57
6	4824.00	36.01 AV	54.00	-17.99	1.00 V	17	28.44	7.57
7	#7236.00	52.62 PK	74.00	-21.38	1.00 V	41	40.23	12.39
8	#7236.00	40.31 AV	54.00	-13.69	1.00 V	41	27.92	12.39

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.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	110.71 PK			2.00 H	13	106.37	4.34
2	*2437.00	96.95 AV			2.00 H	13	92.61	4.34
3	4874.00	49.52 PK	74.00	-24.48	1.00 H	14	41.86	7.66
4	4874.00	36.87 AV	54.00	-17.13	1.00 H	14	29.21	7.66
5	7311.00	53.16 PK	74.00	-20.84	1.00 H	73	40.68	12.48
6	7311.00	40.98 AV	54.00	-13.02	1.00 H	73	28.50	12.48
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	104.28 PK			1.00 V	283	99.94	4.34
2	*2437.00	89.78 AV			1.00 V	283	85.44	4.34
3	4874.00	48.92 PK	74.00	-25.08	1.00 V	105	41.26	7.66
4	4874.00	36.27 AV	54.00	-17.73	1.00 V	105	28.61	7.66
5	7311.00	53.26 PK	74.00	-20.74	1.00 V	0	40.78	12.48
6	7311.00	41.03 AV	54.00	-12.97	1.00 V	0	28.55	12.48

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.

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	109.08 PK			1.98 H	10	104.63	4.45
2	*2462.00	94.33 AV			1.98 H	10	89.88	4.45
3	2483.50	70.46 PK	74.00	-3.54	1.98 H	10	65.92	4.54
4	2483.50	50.42 AV	54.00	-3.58	1.98 H	10	45.88	4.54
5	4924.00	49.27 PK	74.00	-24.73	1.00 H	174	41.50	7.77
6	4924.00	36.43 AV	54.00	-17.57	1.00 H	174	28.66	7.77
7	7386.00	52.79 PK	74.00	-21.21	1.00 H	0	40.23	12.56
8	7386.00	40.83 AV	54.00	-13.17	1.00 H	0	28.27	12.56
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	102.22 PK			1.00 V	241	97.77	4.45
2	*2462.00	87.50 AV			1.00 V	241	83.05	4.45
3	2483.50	58.22 PK	74.00	-15.78	1.00 V	241	53.68	4.54
4	2483.50	40.96 AV	54.00	-13.04	1.00 V	241	36.42	4.54
5	4924.00	48.93 PK	74.00	-25.07	1.00 V	105	41.16	7.77
6	4924.00	36.13 AV	54.00	-17.87	1.00 V	105	28.36	7.77
7	7386.00	52.89 PK	74.00	-21.11	1.00 V	172	40.33	12.56
8	7386.00	40.72 AV	54.00	-13.28	1.00 V	172	28.16	12.56

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

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	70.30 PK	74.00	-3.70	1.78 H	13	66.15	4.15
2	2390.00	47.41 AV	54.00	-6.59	1.78 H	13	43.26	4.15
3	*2422.00	101.78 PK			1.78 H	13	97.50	4.28
4	*2422.00	84.94 AV			1.78 H	13	80.66	4.28
5	4844.00	49.05 PK	74.00	-24.95	1.00 H	145	41.44	7.61
6	4844.00	36.84 AV	54.00	-17.16	1.00 H	145	29.23	7.61
7	7266.00	53.01 PK	74.00	-20.99	1.00 H	24	40.58	12.43
8	7266.00	40.75 AV	54.00	-13.25	1.00 H	24	28.32	12.43
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	58.51 PK	74.00	-15.49	1.00 V	254	54.36	4.15
2	2390.00	38.77 AV	54.00	-15.23	1.00 V	254	34.62	4.15
3	*2422.00	90.75 PK			1.00 V	254	86.47	4.28
4	*2422.00	74.79 AV			1.00 V	254	70.51	4.28
5	4844.00	49.09 PK	74.00	-24.91	1.00 V	217	41.48	7.61
6	4844.00	36.17 AV	54.00	-17.83	1.00 V	217	28.56	7.61
7	7266.00	53.46 PK	74.00	-20.54	1.00 V	0	41.03	12.43
8	7266.00	40.82 AV	54.00	-13.18	1.00 V	0	28.39	12.43

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.

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	107.87 PK			2.00 H	13	103.53	4.34
2	*2437.00	89.42 AV			2.00 H	13	85.08	4.34
3	4874.00	49.69 PK	74.00	-24.31	1.00 H	152	42.03	7.66
4	4874.00	36.63 AV	54.00	-17.37	1.00 H	152	28.97	7.66
5	7311.00	53.12 PK	74.00	-20.88	1.00 H	114	40.64	12.48
6	7311.00	40.88 AV	54.00	-13.12	1.00 H	114	28.40	12.48
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	99.95 PK			1.00 V	284	95.61	4.34
2	*2437.00	83.46 AV			1.00 V	284	79.12	4.34
3	4874.00	49.03 PK	74.00	-24.97	1.00 V	0	41.37	7.66
4	4874.00	36.25 AV	54.00	-17.75	1.00 V	0	28.59	7.66
5	7311.00	52.87 PK	74.00	-21.13	1.00 V	171	40.39	12.48
6	7311.00	40.92 AV	54.00	-13.08	1.00 V	171	28.44	12.48

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.

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	101.97 PK			1.74 H	10	97.56	4.41
2	*2452.00	84.16 AV			1.74 H	10	79.75	4.41
3	2483.50	70.49 PK	74.00	-3.51	1.74 H	10	65.95	4.54
4	2483.50	45.13 AV	54.00	-8.87	1.74 H	10	40.59	4.54
5	4904.00	49.20 PK	74.00	-24.80	1.00 H	71	41.47	7.73
6	4904.00	36.45 AV	54.00	-17.55	1.00 H	71	28.72	7.73
7	7356.00	52.36 PK	74.00	-21.64	1.00 H	152	39.83	12.53
8	7356.00	40.30 AV	54.00	-13.70	1.00 H	152	27.77	12.53
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	93.57 PK			1.00 V	241	89.16	4.41
2	*2452.00	77.01 AV			1.00 V	241	72.60	4.41
3	2483.50	58.81 PK	74.00	-15.19	1.00 V	241	54.27	4.54
4	2483.50	36.92 AV	54.00	-17.08	1.00 V	241	32.38	4.54
5	4904.00	48.76 PK	74.00	-25.24	1.00 V	125	41.03	7.73
6	4904.00	36.21 AV	54.00	-17.79	1.00 V	125	28.48	7.73
7	7356.00	53.05 PK	74.00	-20.95	1.00 V	0	40.52	12.53
8	7356.00	40.89 AV	54.00	-13.11	1.00 V	0	28.36	12.53

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	May 22,19	May 21,20
Power Sensor	Keysight	U2021XA	MY55060018	May 22,19	May 21,20
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	Oct. 17, 19	Oct.16, 20
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	9.05	0.5	PASS
6	2437	9.05	0.5	PASS
11	2462	8.09	0.5	PASS

802.11g

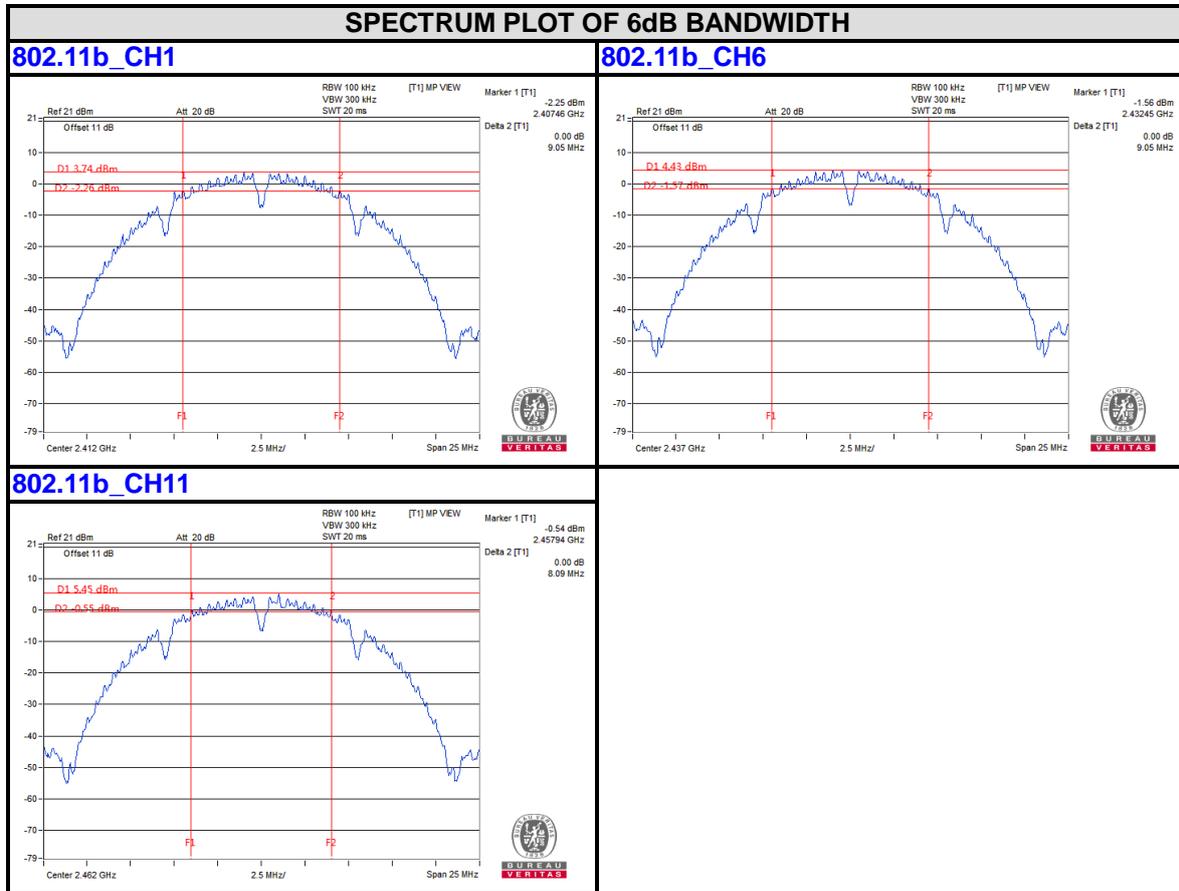
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	15.17	0.5	PASS
6	2437	15.18	0.5	PASS
11	2462	15.17	0.5	PASS

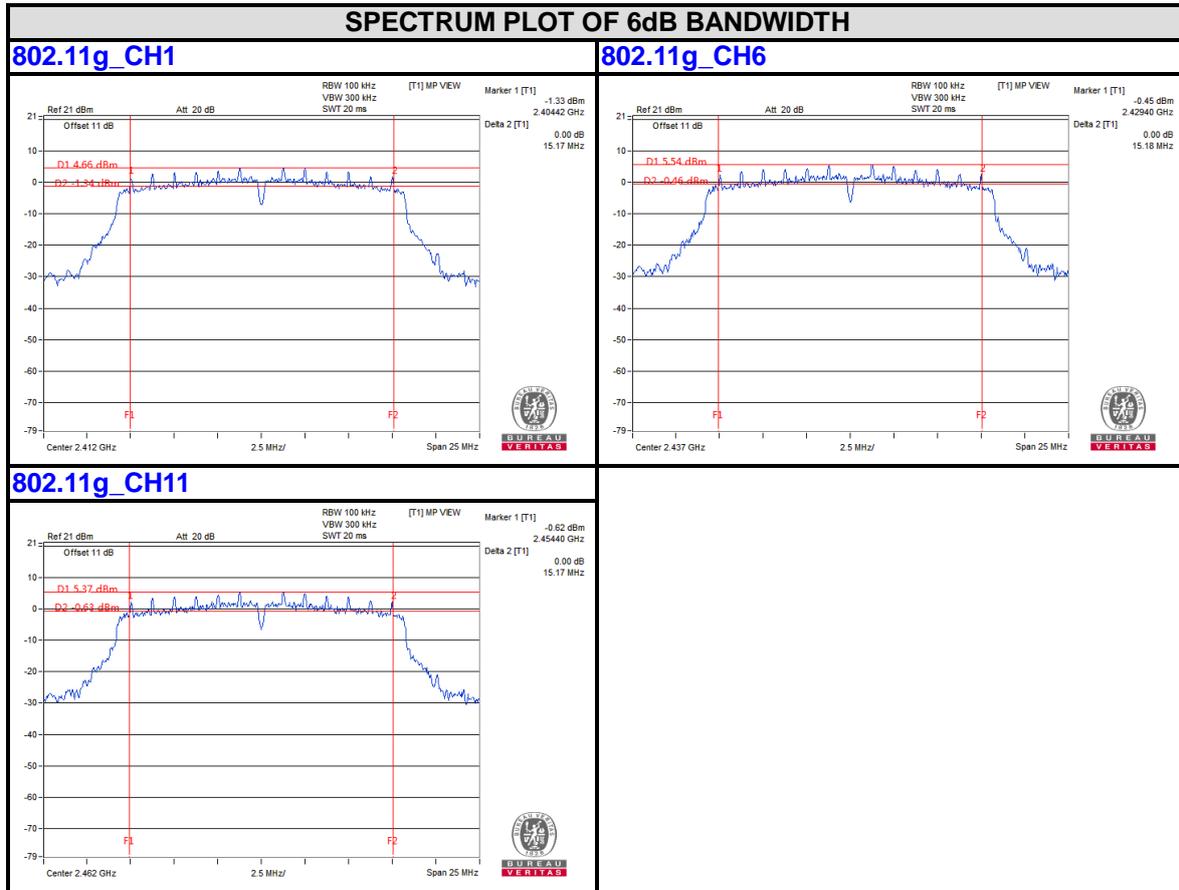
802.11n HT20

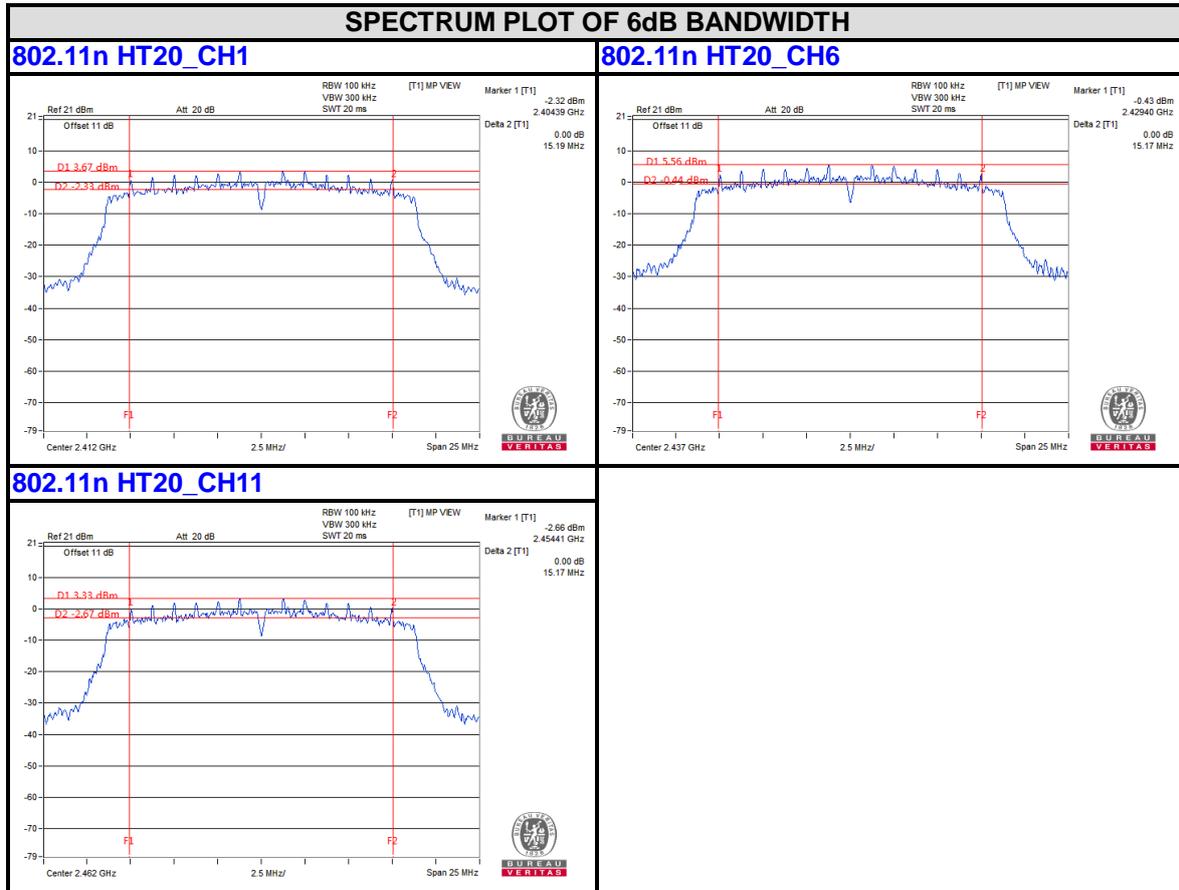
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	15.19	0.5	PASS
6	2437	15.17	0.5	PASS
11	2462	15.17	0.5	PASS

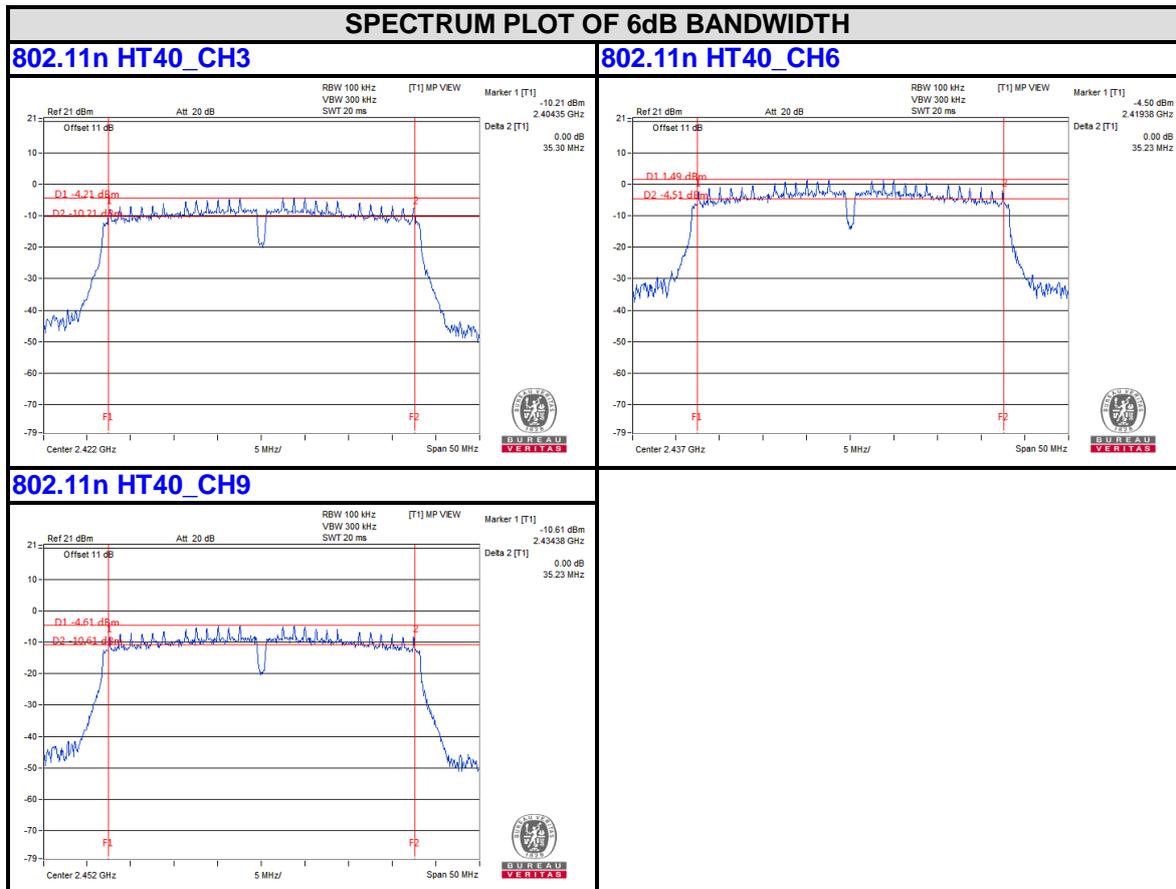
802.11n HT40

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
3	2422	35.30	0.5	PASS
6	2437	35.23	0.5	PASS
9	2452	35.23	0.5	PASS







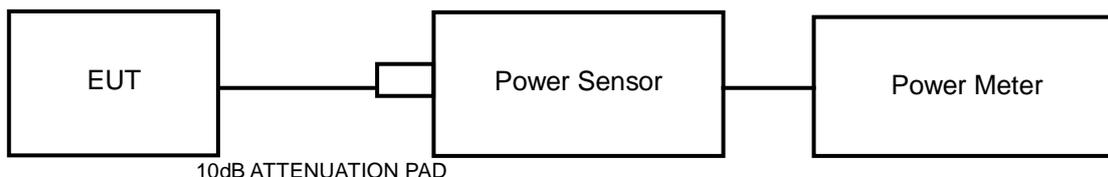


4.4 CONDUCTED OUTPUT POWER

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	May 22,19	May 21,20
Power Sensor	Keysight	U2021XA	MY55060018	May 22,19	May 21,20
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	Oct. 17, 19	Oct.16, 20
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	15.94	39.264	1	PASS
6	2437	16.61	45.814	1	PASS
11	2462	16.69	46.666	1	PASS

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
1	2412	23.35	216.272	1	PASS
6	2437	23.98	250.035	1	PASS
11	2462	23.86	243.22	1	PASS

802.11n HT20

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
1	2412	24.22	264.241	1	PASS
6	2437	23.73	236.048	1	PASS
11	2462	23.83	241.546	1	PASS

802.11n HT40

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
3	2422	22.36	172.187	1	PASS
6	2437	23.01	199.986	1	PASS
9	2452	23.02	200.447	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	12.96	19.77
6	2437	13.67	23.281
11	2462	13.74	23.659

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVG. POWER (mW)
1	2412	14.92	31.046
6	2437	15.62	36.475
11	2462	15.68	36.983

802.11n HT20

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVG. POWER (mW)
1	2412	15.88	38.726
6	2437	15.42	34.834
11	2462	15.53	35.727

802.11n HT40

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVG. POWER (mW)
3	2422	13.76	23.768
6	2437	14.37	27.353
9	2452	14.39	27.479

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	-12.48	8.00	PASS
6	2437	-14.27	8.00	PASS
11	2462	-14.44	8.00	PASS

802.11g

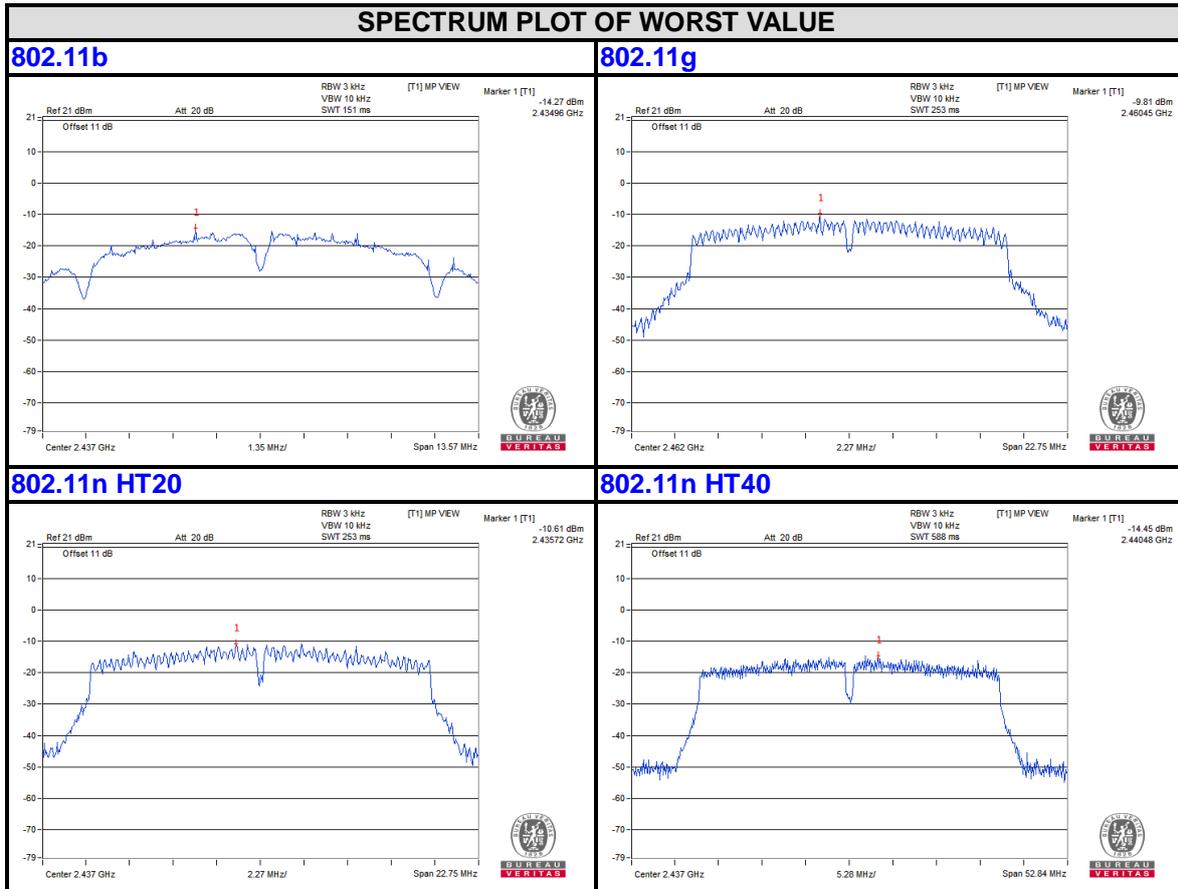
Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-10.16	8.00	PASS
6	2437	-10.49	8.00	PASS
11	2462	-9.81	8.00	PASS

802.11n HT20

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-12.35	8.00	PASS
6	2437	-10.61	8.00	PASS
11	2462	-12.67	8.00	PASS

802.11n HT40

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
3	2422	-20.22	8.00	PASS
6	2437	-14.45	8.00	PASS
9	2452	-21.29	8.00	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 - 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.

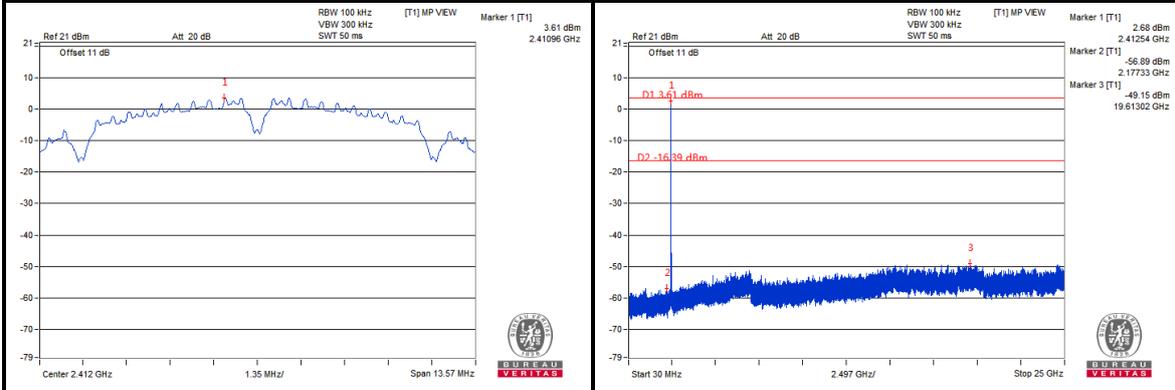
4.6.6 EUT OPERATING CONDITION

Same as item 4.3.6

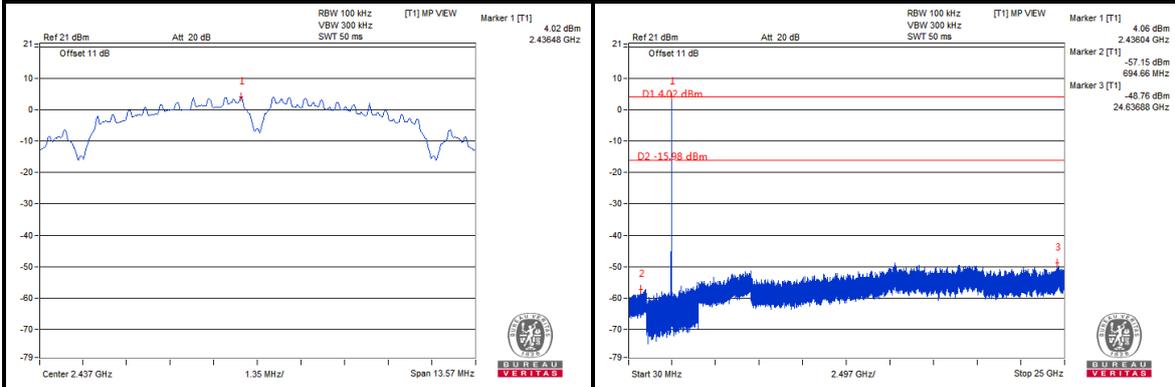
4.6.7 TEST RESULTS

802.11b

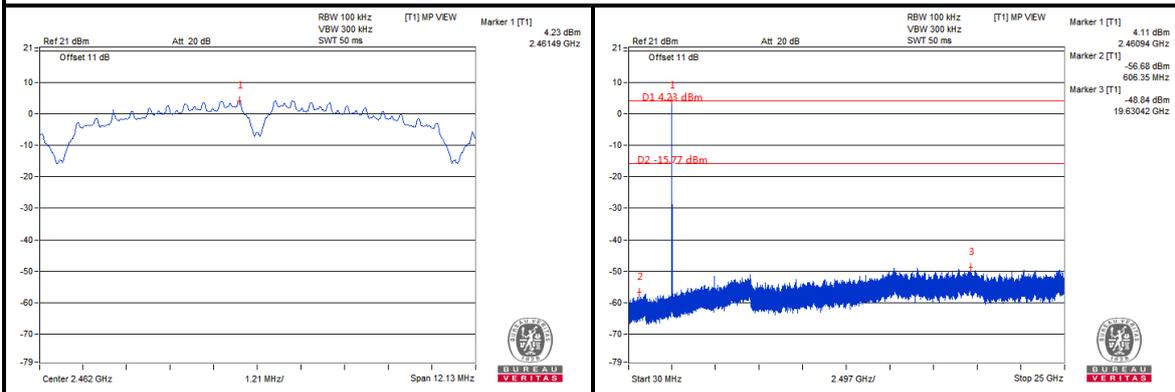
CH 1



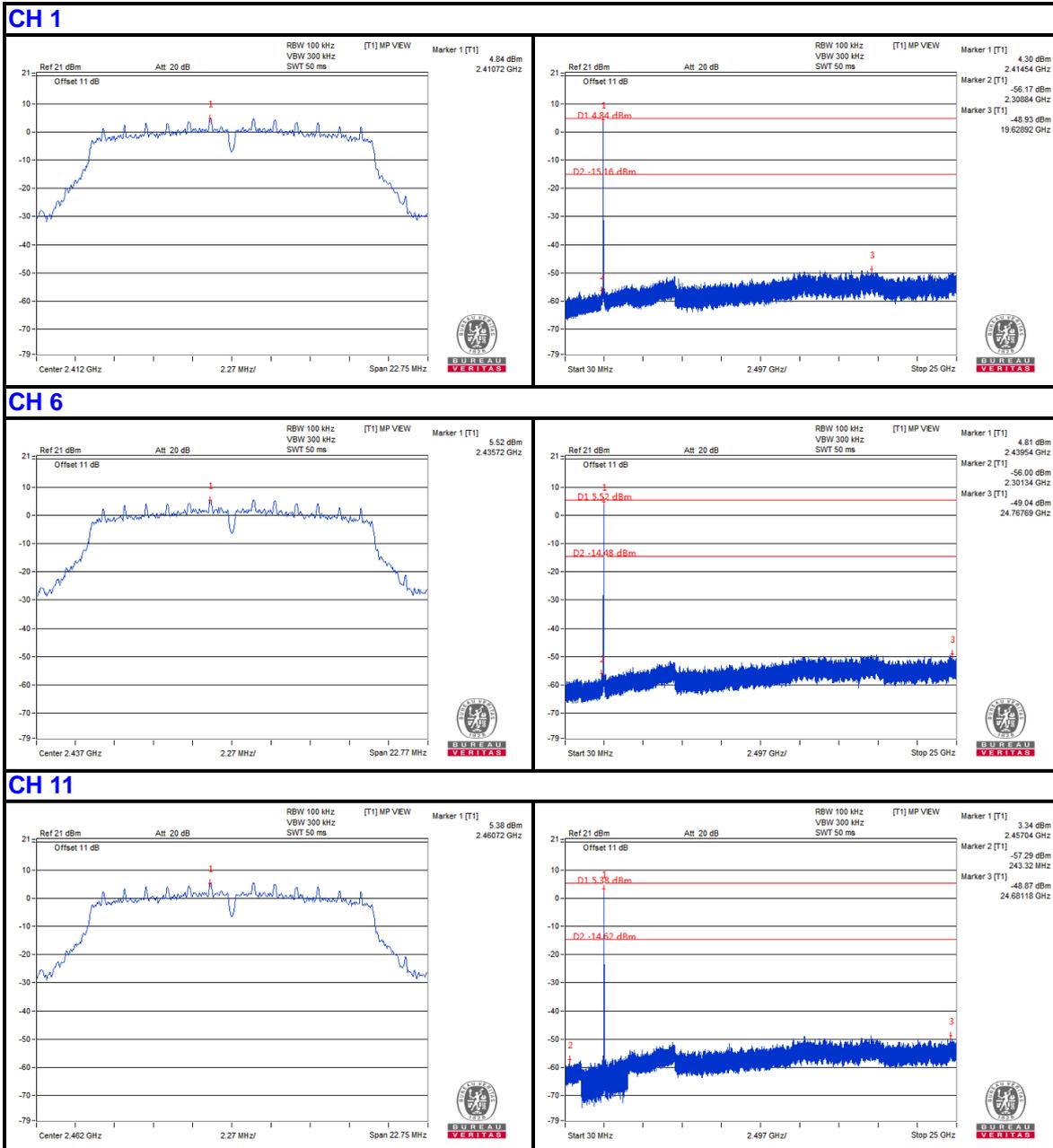
CH 6



CH 11

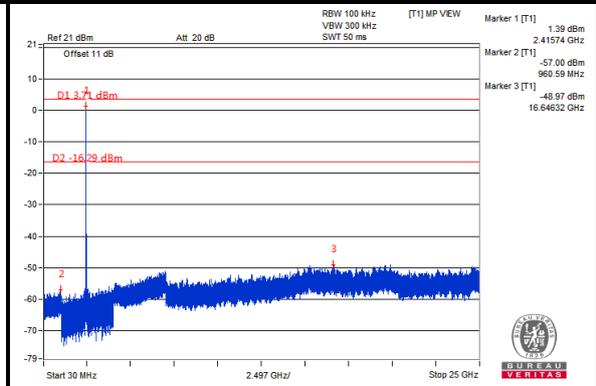
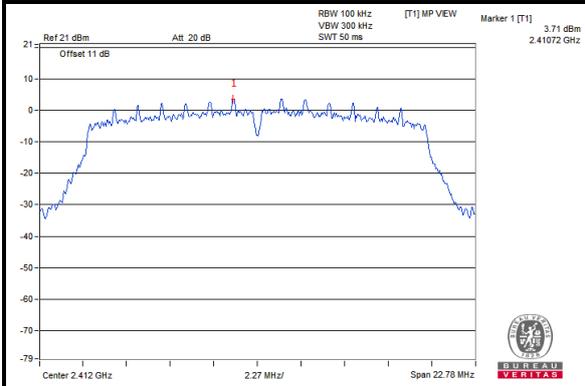


802.11g

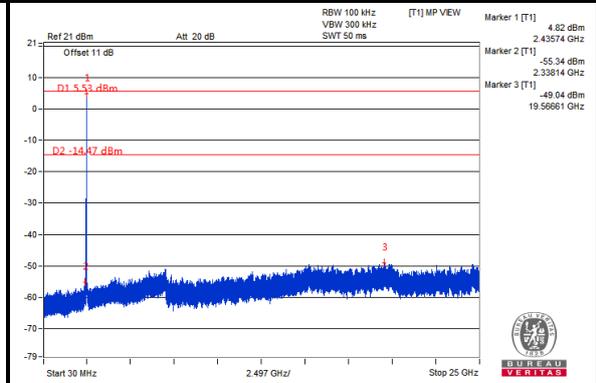
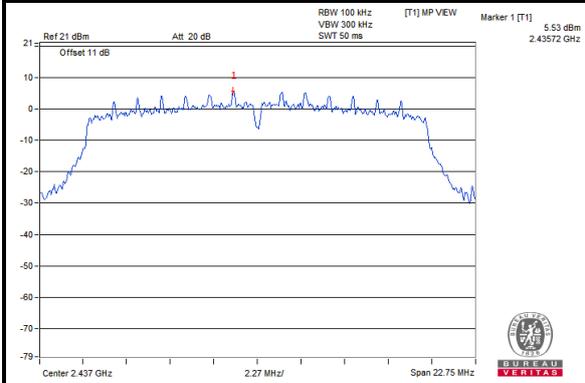


802.11n HT20

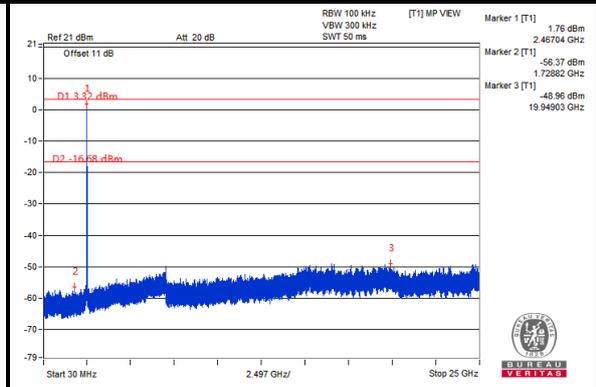
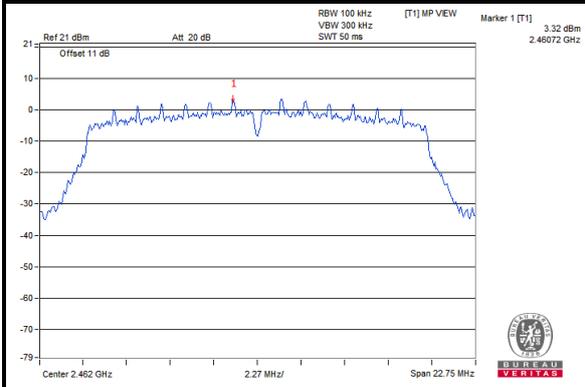
CH 1



CH 6

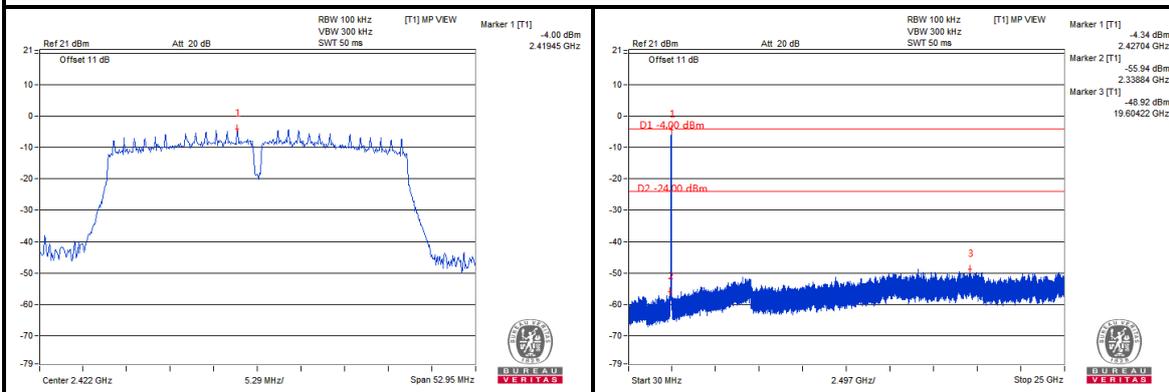


CH 11

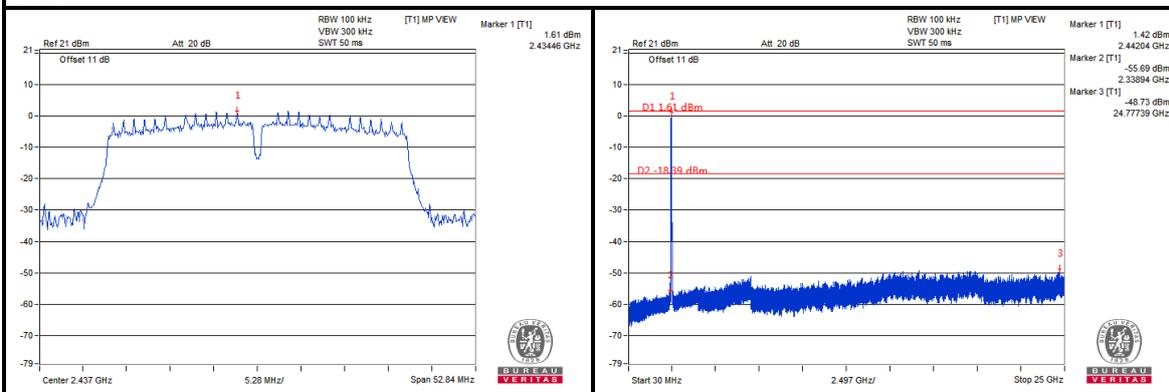


802.11n HT40

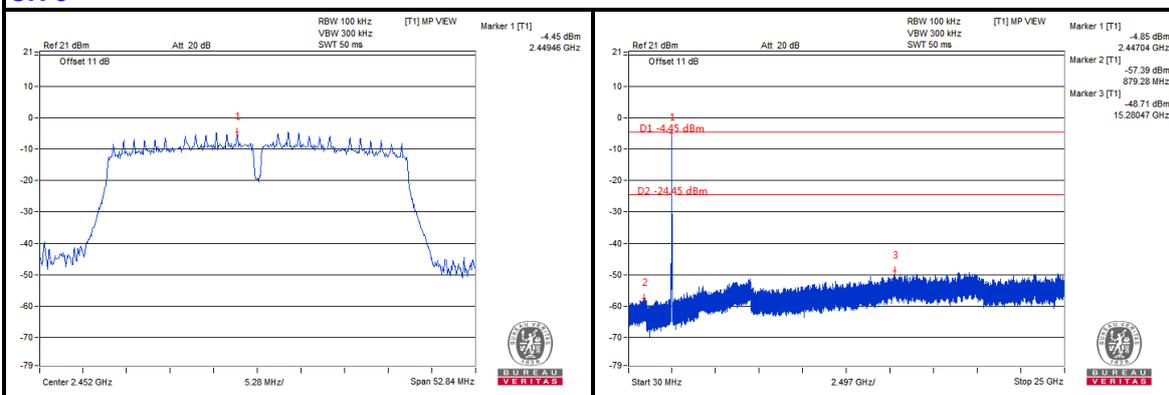
CH 3



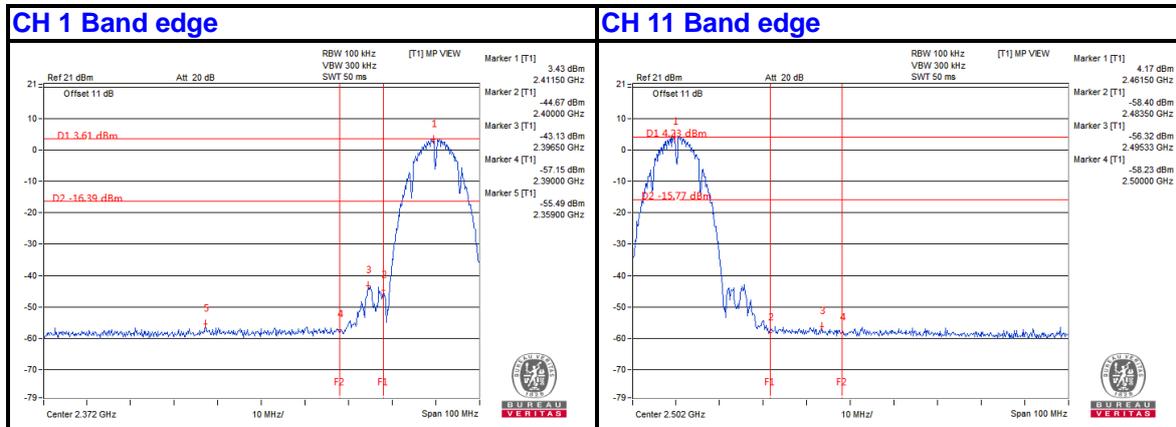
CH 6



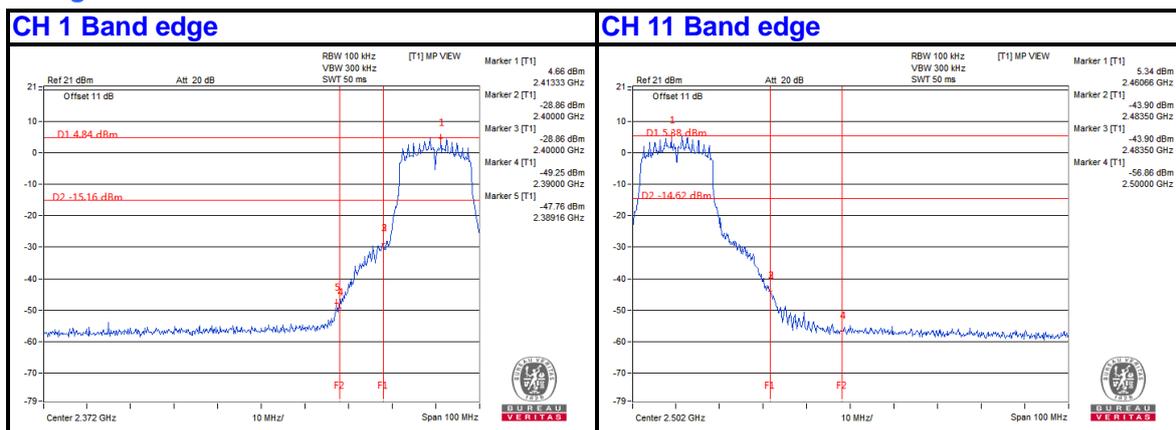
CH 9



802.11b

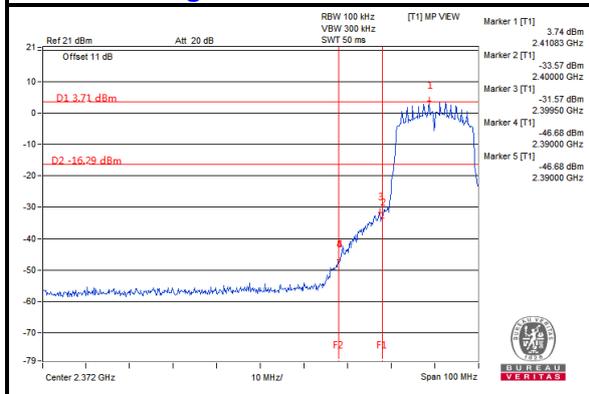


802.11g

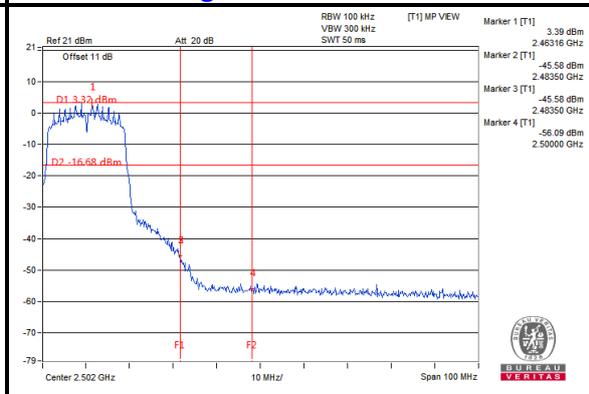


802.11n HT20

CH 1 Band edge

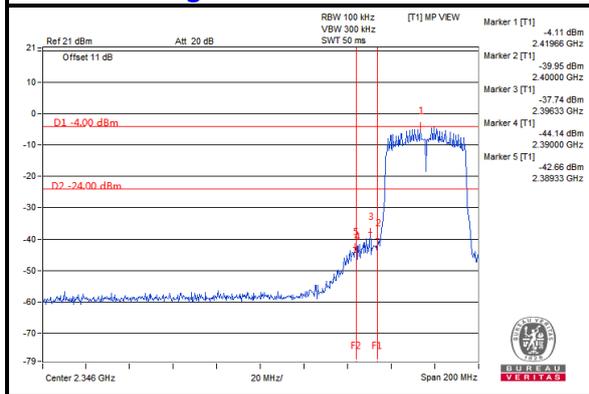


CH 11 Band edge

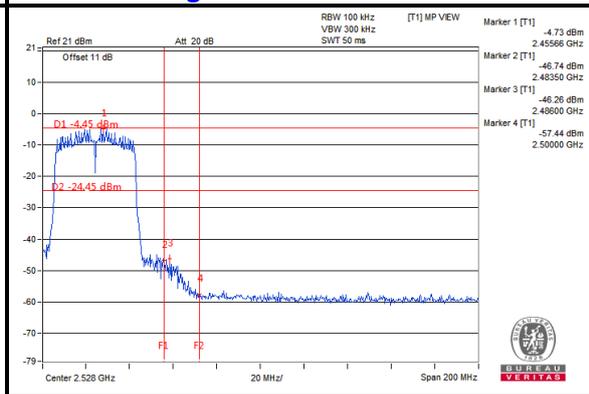


802.11n HT40

CH 3 Band edge



CH 9 Band edge





Test Report No.: RF200407N032-3

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

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



Test Report No.: RF200407N032-3

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---