

TEST REPORT

Applicant	TP-Link Technologies Co., Ltd.
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Manufacturer or Supplier	TP-Link Technologies Co., Ltd.
Address	Building 24(floors1,3,4,5) and 28(floors1-4) Central Science and Technology Park, Shennan Rd, Nanshan, Shenzhen, China
Product	150Mbps High Gain Wireless USB Adapter
Brand Name	TP-Link
Model	TL-WN722N
Additional Model & Model Difference	N/A
Date of tests	Oct. 15, 2016 ~ Nov. 02, 2016

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

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

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

Tested by Harry Li Project Engineer/ EMC Department	Approved by Glyn He Supervisor / EMC Department
	 Date: Nov. 23, 2016

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Test Report No.: RF160919N046

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF160919N046	Original release	Nov. 23, 2016

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted Output power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Unique antenna connector is used

2 MEASUREMENT UNCERTAINTY

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.70dB
Radiated emissions	9KHz ~ 30MHz	2.90dB
	30MHz ~ 1GMHz	3.83dB
	1GHz ~ 18GHz	4.93dB
	18GHz ~ 40GHz	4.80dB

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	150Mbps High Gain Wireless USB Adapter
MODEL NO.	TL-WN722N
FCC ID	TE7WN722NV2
NOMINAL VOLTAGE	DC 5V From USB
MODULATION TYPE	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
MODULATION TECHNOLOGY	DSSS, OFDM
OPERATING FREQUENCY	2412-2462MHz for 11b/g/n(HT20) 2422-2452MHz for 11n(HT40)
OUTPUT POWER	WLAN: 19.69dBm (Maximum Average Power)
ANTENNA TYPE	Dipole Antenna; 4.71dBi gain
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	USB extended cable, 1m, shielding

NOTE:

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

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

2. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
4. Please refer to the EUT photo document (Reference No.: 160919N046) for detailed product photo.

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	
A	√	√	√	√	Powered by USB 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
-	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.

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

RADIATED EMISSION TEST (ABOVE 1GHz):

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

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

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

BANDEDGE MEASUREMENT:

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

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

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

ANTENNA PORT CONDUCTED MEASUREMENT:

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

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

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE	TESTED BY
RE<1G	25deg. C, 53%RH	DC 5V From USB	Eric Fang
RE≥1G	25deg. C, 53%RH	DC 5V From USB	Eric Fang
PLC	20deg. C, 56%RH	DC 5V From USB	Harry Li
APCM	20deg. C, 55%RH	DC 5V From USB	Harry Li

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart C, Section 15.247

558074 D01 DTS Meas Guidance v03r05

ANSI C63.10-2013

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

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

3.4 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	DELL	5P2PM2X	12400120329	N/A
2	Printer	Lenovo	LJ2200L	LP02857415	N/A
3	Mouse	DELL	MS111-L	CN-09RRC7-44751-0C6-04TR	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	AC Line: Unshielded, Detachable 1.8m; DC Line: Unshielded, Detachable 1.8m;
2	AC Line: Unshielded, Detachable 1.8m, USB Line: Unshielded, Detachable 1.8m.
3	AC Line: Unshielded, Detachable 1.5m, USB Line: Unshielded, Detachable 1.5m.

4 TEST TYPES AND RESULTS

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

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

4.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101588	Jan. 22,16	Jan. 21,17
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	Mar. 04,16	Mar. 03,17
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	Apr. 05,16	Apr. 04,17
Voltage probe	SCHWARZBEC K	TK 9421	TK 9421-176	Jan. 08,16	Jan. 07,17
Test software	ADT	ADT_Conc_V 7.3.7	N/A	N/A	N/A

- NOTE:**
1. The test was performed in shielded room 553.
2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

4.1.3 TEST PROCEDURES

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

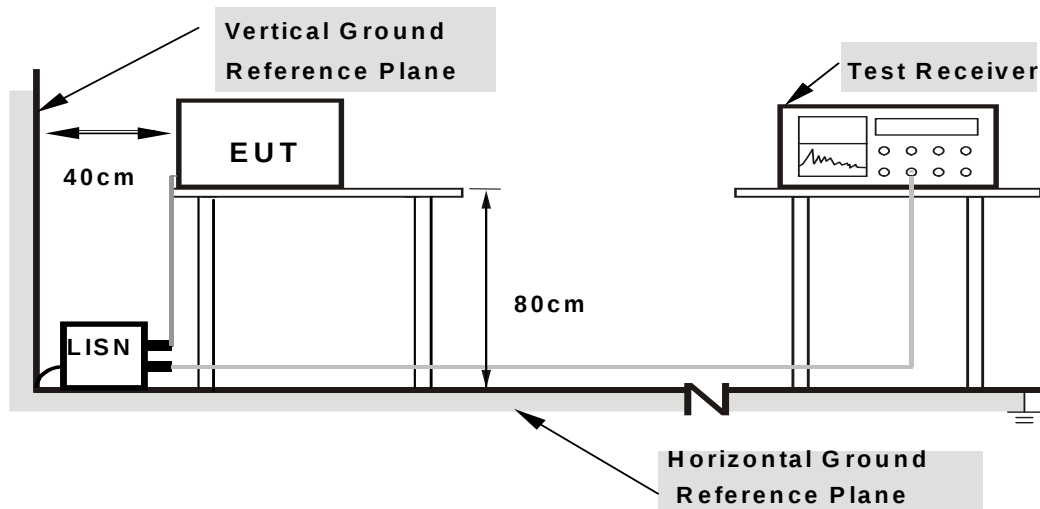
NOTE: All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.



4.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.

**2.Both of LISNs (AMN) are 80 cm from EUT and at least 80
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.

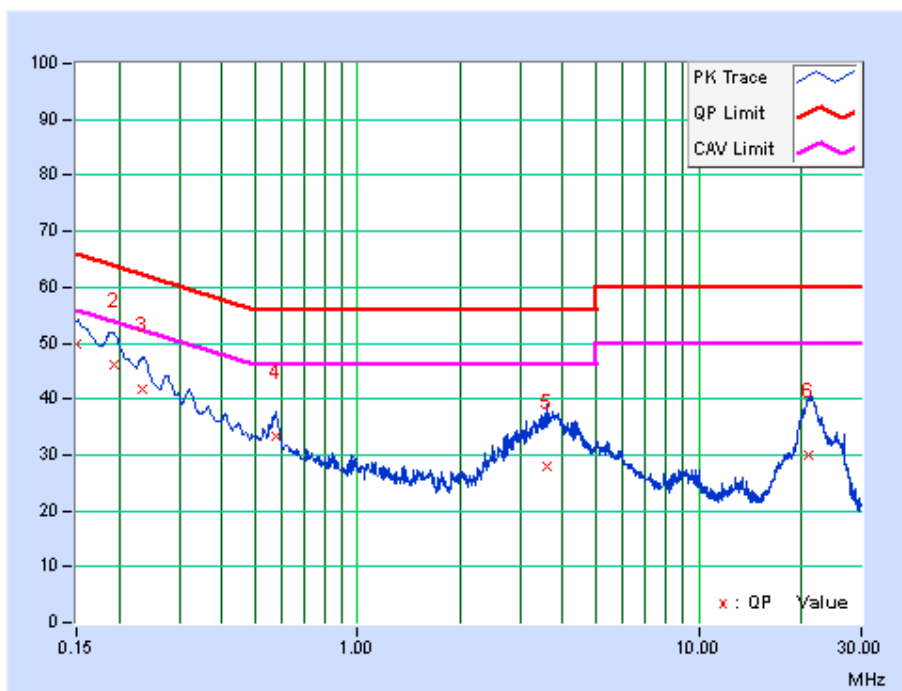
4.1.7 TEST RESULTS

CONDUCTED WORST-CASE DATA: WIFI LINK

PHASE	Line	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.04	39.86	21.41	49.90	31.45	66.00	56.00	-16.10	-24.55
2	0.19275	10.04	36.07	17.47	46.11	27.51	63.92	53.92	-17.81	-26.41
3	0.23352	10.05	31.62	18.17	41.67	28.22	62.32	52.32	-20.65	-24.10
4	0.57750	10.14	23.13	19.82	33.27	29.96	56.00	46.00	-22.73	-16.04
5	3.61050	10.15	17.88	12.33	28.03	22.48	56.00	46.00	-27.97	-23.52
6	21.05700	10.33	19.69	9.30	30.02	19.63	60.00	50.00	-29.98	-30.37

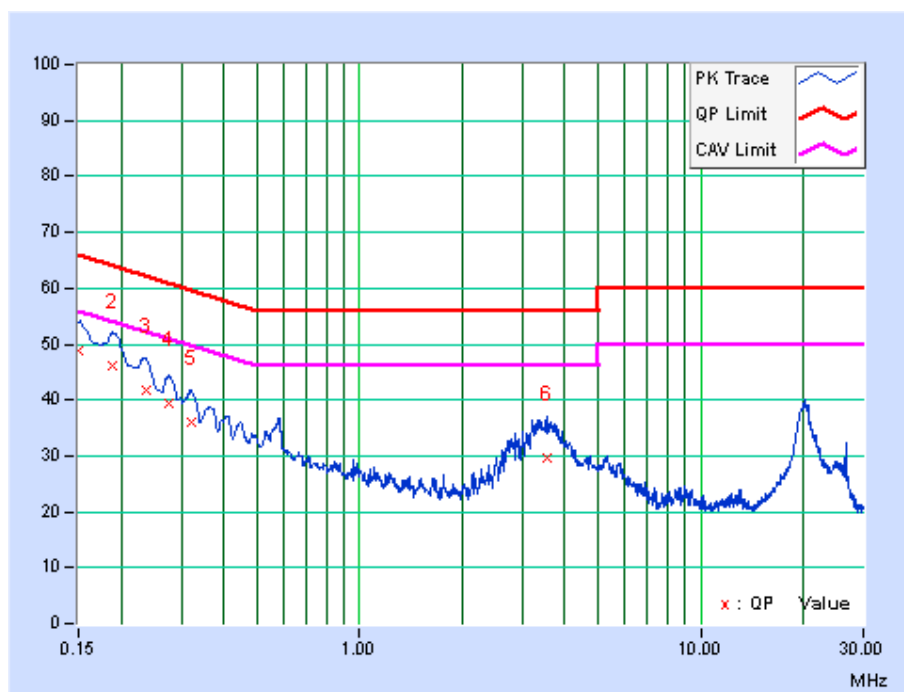
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value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



PHASE	Neutral	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.84	38.88	21.20	48.72	31.04	66.00	56.00	-17.28	-24.96
2	0.18856	9.84	36.36	21.17	46.20	31.01	64.10	54.10	-17.90	-23.09
3	0.23550	9.84	32.02	16.40	41.86	26.24	62.25	52.25	-20.39	-26.01
4	0.27505	9.84	29.55	18.37	39.39	28.21	60.96	50.96	-21.57	-22.75
5	0.32100	9.84	26.21	16.52	36.05	26.36	59.68	49.68	-23.63	-23.32
6	3.53175	9.90	19.65	15.51	29.55	25.41	56.00	46.00	-26.45	-20.59

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



4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

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

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

NOTE:

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



4.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101494	Apr. 05,16	Apr. 04,17
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV7	102331	Nov. 09,15	Nov. 08,16
Bilog Antenna	Teseq	CBL 6111D	30643	Jul. 14, 16	Jul. 13, 17
Horn Antenna (1GHz -18GHz)	ETS -Lindgren	3117	00062558	May 18,16	May 17,17
GPS Generator+ Antenna	TOJOIN	GNSS-5000A	E1-010119	Aug. 08, 16	Aug. 07, 17
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	Mar. 12,16	Mar. 11,18
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170242	Mar. 12,16	Mar. 11,17
Amplifier (9kHz-1GHz)	SONOMA	310D	186955	Mar. 04,16	Mar. 03, 17
Pre-Amplifier(1-18G)	HP	8449B	3008A00409	Apr. 25,16	Apr. 24,17
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 20,15	Nov. 19,16
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	Aug. 08,16	Aug. 07,17

NOTE:

1. The test was performed in 966 Chamber.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 494399.

4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 1.5 meters(above 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. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

NOTE:

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

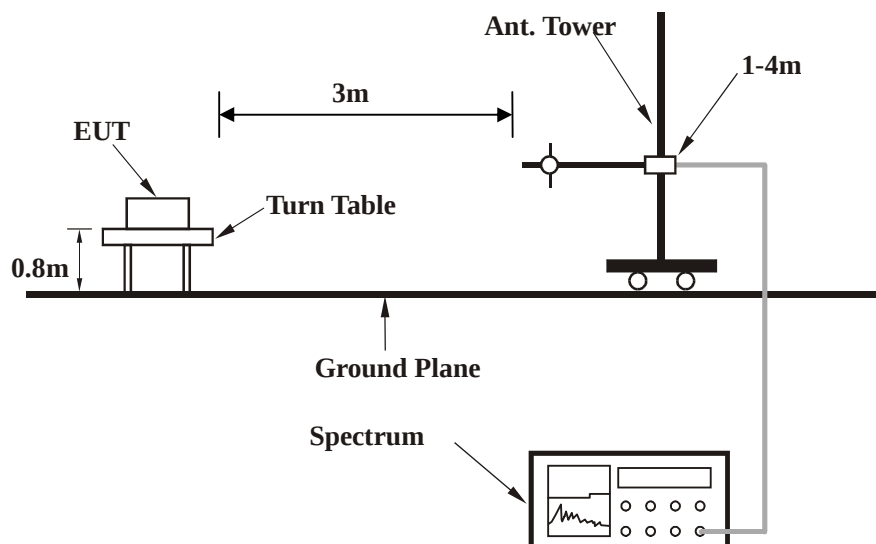
4.2.4 DEVIATION FROM TEST STANDARD

No deviation.



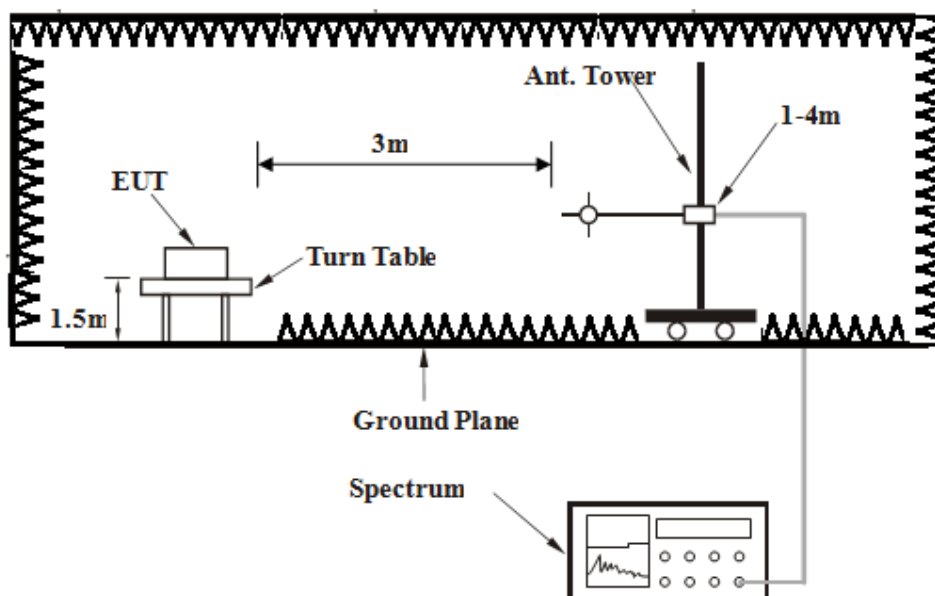
4.2.5 TEST SETUP

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).



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4.2.6 EUT OPERATING CONDITIONS

- a. Set the EUT placed 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:

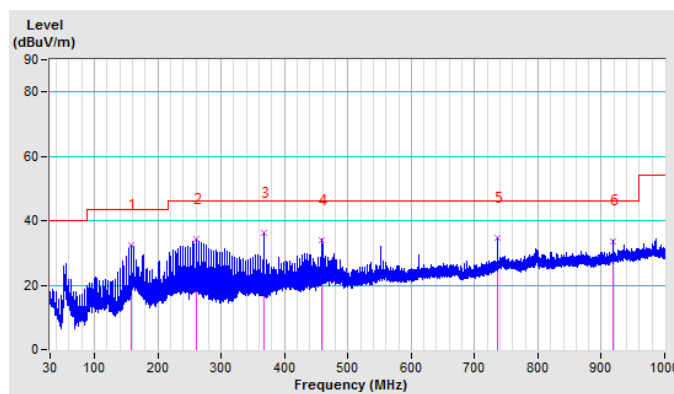
802.11b

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	157.67	32.39	43.50	-11.11	200	0	49.27	-16.88
2	260.09	34.37	46.00	-11.63	200	0	46.89	-12.52
3	367.66	36.30	46.00	-9.70	200	0	47.47	-11.17
4	459.71	33.89	46.00	-12.11	200	0	41.43	-7.54
5	735.36	34.77	46.00	-11.23	200	0	35.59	-0.82
6	919.18	33.74	46.00	-12.26	200	0	32.47	1.27

REMARKS:

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

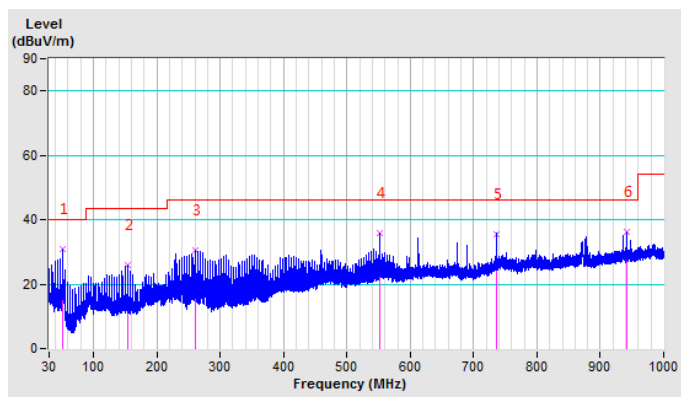


CHANNEL	Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	51.18	30.97	40.00	-9.03	100	0	53.20	-22.23
2	153.59	25.78	43.50	-17.72	100	0	42.37	-16.59
3	260.09	30.58	46.00	-15.42	100	0	43.10	-12.52
4	551.51	35.87	46.00	-10.13	100	0	40.09	-4.22
5	735.32	35.45	46.00	-10.55	100	0	36.27	-0.82
6	941.63	36.17	46.00	-9.83	100	0	34.12	2.05

REMARKS:

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



ABOVE 1GHz DATA

802.11b

CHANNEL	TX Channel 1	DETECTOR 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	54.23 PK	74.00	-19.77	1.00 H	243	50.36	3.87
2	2390.00	42.82 AV	54.00	-11.18	1.00 H	243	38.95	3.87
3	*2412.00	100.07 PK			1.00 H	243	96.13	3.94
4	*2412.00	97.13 AV			1.00 H	243	93.19	3.94
5	4824.00	51.55 PK	74.00	-22.45	1.65 H	237	43.54	8.01
6	4824.00	41.66 AV	54.00	-12.34	1.65 H	237	33.65	8.01
7	#7236.00	51.55 PK	70.07	-18.52	1.49 H	204	37.55	14.00
8	#7236.00	41.23 AV	67.13	-25.90	1.49 H	204	27.23	14.00
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	59.23 PK	74.00	-14.77	1.79 V	233	55.36	3.87
2	2390.00	49.90 AV	54.00	-4.10	1.79 V	233	46.03	3.87
3	*2412.00	110.89 PK			1.79 V	233	106.95	3.94
4	*2412.00	107.89 AV			1.79 V	233	103.95	3.94
5	4824.00	51.36 PK	74.00	-22.64	1.24 V	235	43.35	8.01
6	4824.00	49.60 AV	54.00	-4.40	1.24 V	235	41.59	8.01
7	#7236.00	50.96 PK	80.89	-29.93	1.98 V	246	36.96	14.00
8	#7236.00	41.02 AV	77.89	-36.87	1.98 V	246	27.02	14.00

REMARKS:

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



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	55.41 PK	74.00	-18.59	1.49 H	201	16.69	38.72
2	2390.00	41.38 AV	54.00	-12.62	1.49 H	201	2.66	38.72
3	*2437.00	101.13 PK			1.49 H	201	62.24	38.89
4	*2437.00	98.36 AV			1.49 H	201	59.47	38.89
5	2483.50	55.27 PK	74.00	-18.73	1.49 H	201	16.21	39.06
6	2483.50	42.07 AV	54.00	-11.93	1.49 H	201	3.01	39.06
7	4874.00	51.23 PK	74.00	-22.77	1.96 H	203	8.08	43.15
8	4874.00	49.32 AV	54.00	-4.68	1.96 H	203	6.17	43.15
9	7311.00	50.32 PK	74.00	-23.68	1.47 H	205	2.80	47.52
10	7311.00	41.23 AV	54.00	-12.77	1.47 H	205	-6.29	47.52
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	55.49 PK	74.00	-18.51	1.69 V	230	16.77	38.72
2	2390.00	45.44 AV	54.00	-8.56	1.69 V	230	6.72	38.72
3	*2437.00	112.11 PK			1.69 V	230	73.22	38.89
4	*2437.00	109.30 AV			1.69 V	230	70.41	38.89
5	2483.50	57.39 PK	74.00	-16.61	1.69 V	230	18.33	39.06
6	2483.50	43.36 AV	54.00	-10.64	1.69 V	230	4.30	39.06
7	4874.00	49.22 PK	74.00	-24.78	1.59 V	235	6.07	43.15
8	4874.00	38.42 AV	54.00	-15.58	1.59 V	235	-4.73	43.15
9	7311.00	51.36 PK	74.00	-22.64	2.01 V	184	3.84	47.52
10	7311.00	41.26 AV	54.00	-12.74	2.01 V	184	-6.26	47.52

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.



CHANNEL	TX Channel 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	101.57 PK			1.16 H	205	62.59	38.98
2	*2462.00	98.83 AV			1.16 H	205	59.85	38.98
3	2483.50	56.89 PK	74.00	-17.11	1.16 H	205	17.83	39.06
4	2483.50	44.88 AV	54.00	-9.12	1.16 H	205	5.82	39.06
5	4924.00	51.26 PK	74.00	-22.74	1.03 H	221	8.04	43.22
6	4924.00	48.32 AV	54.00	-5.68	1.03 H	221	5.10	43.22
7	7386.00	50.26 PK	74.00	-23.74	1.95 H	302	2.66	47.60
8	7386.00	41.32 AV	54.00	-12.68	1.95 H	302	-6.28	47.60
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	112.00 PK			1.72 V	230	73.02	38.98
2	*2462.00	109.10 AV			1.72 V	230	70.12	38.98
3	2483.50	61.54 PK	74.00	-12.46	1.72 V	230	22.48	39.06
4	2483.50	53.52 AV	54.00	-0.48	1.72 V	230	14.46	39.06
5	4924.00	52.10 PK	74.00	-21.90	1.85 V	187	8.88	43.22
6	4924.00	47.99 AV	54.00	-6.01	1.85 V	187	4.77	43.22
7	7386.00	51.26 PK	74.00	-22.74	1.44 V	302	3.66	47.60
8	7386.00	40.35 AV	54.00	-13.65	1.44 V	302	-7.25	47.60

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

802.11g

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	54.60 PK	74.00	-19.40	2.08 H	327	15.88	38.72
2	2390.00	41.42 AV	54.00	-12.58	2.08 H	327	2.70	38.72
3	*2412.00	95.21 PK			2.08 H	327	56.41	38.80
4	*2412.00	85.94 AV			2.08 H	327	47.14	38.80
5	4824.00	52.66 PK	74.00	-21.34	1.66 H	255	9.58	43.08
6	4824.00	46.93 AV	54.00	-7.07	1.66 H	255	3.85	43.08
7	#7236.00	53.49 PK	65.21	-11.72	1.44 H	24	6.06	47.43
8	#7236.00	46.88 AV	55.94	-9.06	1.44 H	24	-0.55	47.43
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	56.51 PK	74.00	-17.49	2.32 V	118	17.79	38.72
2	2390.00	43.82 AV	54.00	-10.18	2.32 V	118	5.10	38.72
3	*2412.00	105.45 PK			2.32 V	118	66.65	38.80
4	*2412.00	96.01 AV			2.32 V	118	57.21	38.80
5	4824.00	51.25 PK	74.00	-22.75	1.50 V	210	8.17	43.08
6	4824.00	48.59 AV	54.00	-5.41	1.50 V	210	5.51	43.08
7	#7236.00	52.26 PK	75.45	-23.19	1.58 V	210	4.83	47.43
8	#7236.00	48.99 AV	66.01	-17.02	1.58 V	210	1.56	47.43

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 other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	54.47 PK	74.00	-19.53	2.75 H	242	15.75	38.72
2	2390.00	41.04 AV	54.00	-12.96	2.75 H	242	2.32	38.72
3	*2437.00	96.52 PK			2.75 H	242	57.63	38.89
4	*2437.00	87.25 AV			2.75 H	242	48.36	38.89
5	2483.50	55.72 PK	74.00	-18.28	2.75 H	242	16.66	39.06
6	2483.50	41.97 AV	54.00	-12.03	2.75 H	242	2.91	39.06
7	4874.00	51.25 PK	74.00	-22.75	1.20 H	210	8.10	43.15
8	4874.00	46.89 AV	54.00	-7.11	1.20 H	210	3.74	43.15
9	7311.00	52.15 PK	74.00	-21.85	1.45 H	48	4.63	47.52
10	7311.00	49.64 AV	54.00	-4.36	1.45 H	48	2.12	47.52
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	59.83 PK	74.00	-14.17	1.94 V	157	21.11	38.72
2	2390.00	46.94 AV	54.00	-7.06	1.94 V	157	8.22	38.72
3	*2437.00	109.76 PK			1.94 V	157	70.87	38.89
4	*2437.00	100.31 AV			1.94 V	157	61.42	38.89
5	2483.50	62.18 PK	74.00	-11.82	1.94 V	157	23.12	39.06
6	2483.50	44.62 AV	54.00	-9.38	1.94 V	157	5.56	39.06
7	4874.00	52.26 PK	74.00	-21.74	1.50 V	120	9.11	43.15
8	4874.00	48.77 AV	54.00	-5.23	1.50 V	120	5.62	43.15
9	7311.00	51.47 PK	74.00	-22.53	1.50 V	210	3.95	47.52
10	7311.00	45.68 AV	54.00	-8.32	1.50 V	210	-1.84	47.52

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.



**BUREAU
VERITAS**

Test Report No.: RF160919N046

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	94.94 PK			1.00 H	243	55.96	38.98
2	*2462.00	86.17 AV			1.00 H	243	47.19	38.98
3	2483.50	55.99 PK	74.00	-18.01	1.00 H	243	16.93	39.06
4	2483.50	41.92 AV	54.00	-12.08	1.00 H	243	2.86	39.06
5	4924.00	58.45 PK	74.00	-15.55	1.55 H	241	15.23	43.22
6	4924.00	47.99 AV	54.00	-6.01	1.55 H	241	4.77	43.22
7	7386.00	55.68 PK	74.00	-18.32	1.20 H	221	8.08	47.60
8	7386.00	46.74 AV	54.00	-7.26	1.20 H	221	-0.86	47.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	106.56 PK			1.84 V	186	67.58	38.98
2	*2462.00	97.56 AV			1.84 V	186	58.58	38.98
3	2483.50	61.37 PK	74.00	-12.63	1.84 V	186	22.31	39.06
4	2483.50	43.34 AV	54.00	-10.66	1.84 V	186	4.28	39.06
5	4924.00	59.80 PK	74.00	-14.20	1.52 V	214	16.58	43.22
6	4924.00	48.77 AV	54.00	-5.23	1.52 V	214	5.55	43.22
7	7386.00	56.55 PK	74.00	-17.45	1.20 V	144	8.95	47.60
8	7386.00	46.94 AV	54.00	-7.06	1.20 V	144	-0.66	47.60

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

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802.11n (20MHz)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	55.46 PK	74.00	-18.54	1.01 H	241	16.74	38.72
2	2390.00	41.91 AV	54.00	-12.09	1.01 H	241	3.19	38.72
3	*2412.00	96.38 PK			1.01 H	241	57.58	38.80
4	*2412.00	87.06 AV			1.01 H	241	48.26	38.80
5	4824.00	57.88 PK	74.00	-16.12	1.52 H	21	14.80	43.08
6	4824.00	49.68 AV	54.00	-4.32	1.52 H	21	6.60	43.08
7	#7236.00	55.26 PK	66.38	-11.12	1.50 H	251	7.83	47.43
8	#7236.00	46.63 AV	57.06	-10.43	1.50 H	251	-0.80	47.43
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	66.61 PK	74.00	-7.39	1.87 V	98	27.89	38.72
2	2390.00	51.76 AV	54.00	-2.24	1.87 V	98	13.04	38.72
3	*2412.00	107.79 PK			1.87 V	98	68.99	38.80
4	*2412.00	98.21 AV			1.87 V	98	59.41	38.80
5	4824.00	57.88 PK	74.00	-16.12	1.52 V	251	14.80	43.08
6	4824.00	45.66 AV	54.00	-8.34	1.52 V	251	2.58	43.08
7	#7236.00	56.66 PK	77.79	-21.13	1.00 V	120	9.23	47.43
8	#7236.00	43.56 AV	68.21	-24.65	1.00 V	120	-3.87	47.43

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 other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	55.04 PK	74.00	-18.96	2.84 H	244	16.32	38.72
2	2390.00	41.50 AV	54.00	-12.50	2.84 H	244	2.78	38.72
3	*2437.00	96.93 PK			2.84 H	244	58.04	38.89
4	*2437.00	86.50 AV			2.84 H	244	47.61	38.89
5	2483.50	56.62 PK	74.00	-17.38	2.84 H	244	17.56	39.06
6	2483.50	41.84 AV	54.00	-12.16	2.84 H	244	2.78	39.06
7	4874.00	55.15 PK	74.00	-18.85	1.88 H	40	12.00	43.15
8	4874.00	43.94 AV	54.00	-10.06	1.88 H	40	0.79	43.15
9	7311.00	57.12 PK	74.00	-16.88	1.00 H	29	9.60	47.52
10	7311.00	44.88 AV	54.00	-9.12	1.00 H	29	-2.64	47.52
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	57.34 PK	74.00	-16.66	1.94 V	155	18.62	38.72
2	2390.00	44.81 AV	54.00	-9.19	1.94 V	155	6.09	38.72
3	*2437.00	105.91 PK			1.94 V	155	67.02	38.89
4	*2437.00	96.51 AV			1.94 V	155	57.62	38.89
5	2483.50	55.76 PK	74.00	-18.24	1.94 V	155	16.70	39.06
6	2483.50	42.33 AV	54.00	-11.67	1.94 V	155	3.27	39.06
7	4874.00	59.66 PK	74.00	-14.34	1.66 V	360	16.51	43.15
8	4874.00	50.12 AV	54.00	-3.88	1.66 V	360	6.97	43.15
9	7311.00	58.87 PK	74.00	-15.13	1.52 V	251	11.35	47.52
10	7311.00	48.96 AV	54.00	-5.04	1.52 V	251	1.44	47.52

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	96.23 PK			1.01 H	347	57.25	38.98
2	*2462.00	86.77 AV			1.01 H	347	47.79	38.98
3	2483.50	55.77 PK	74.00	-18.23	1.01 H	347	16.71	39.06
4	2483.50	41.68 AV	54.00	-12.32	1.01 H	347	2.62	39.06
5	4924.00	57.88 PK	74.00	-16.12	2.51 H	121	14.66	43.22
6	4924.00	46.25 AV	54.00	-7.75	2.51 H	121	3.03	43.22
7	7386.00	59.19 PK	74.00	-14.81	1.50 H	221	11.59	47.60
8	7386.00	48.62 AV	54.00	-5.38	1.50 H	221	1.02	47.60
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	107.97 PK			1.84 V	161	68.99	38.98
2	*2462.00	97.61 AV			1.84 V	161	58.63	38.98
3	2483.50	69.18 PK	74.00	-4.82	1.84 V	161	30.12	39.06
4	2483.50	43.58 AV	54.00	-10.42	1.84 V	161	4.52	39.06
5	4924.00	57.77 PK	74.00	-16.23	1.50 V	220	14.55	43.22
6	4924.00	42.25 AV	54.00	-11.75	1.50 V	220	-0.97	43.22
7	7386.00	61.99 PK	74.00	-12.01	1.20 V	25	14.39	47.60
8	7386.00	44.55 AV	54.00	-9.45	1.20 V	25	-3.05	47.60

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

802.11n (40MHz)

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	54.70 PK	74.00	-19.30	2.37 H	327	15.98	38.72
2	2390.00	41.37 AV	54.00	-12.63	2.37 H	327	2.65	38.72
3	*2422.00	93.95 PK			2.37 H	327	55.12	38.83
4	*2422.00	84.29 AV			2.37 H	327	45.46	38.83
5	4844.00	58.25 PK	74.00	-15.75	1.52 H	210	15.14	43.11
6	4844.00	43.26 AV	54.00	-10.74	1.52 H	210	0.15	43.11
7	7266.00	57.25 PK	74.00	-16.75	1.50 H	221	9.78	47.47
8	7266.00	41.66 AV	54.00	-12.34	1.50 H	221	-5.81	47.47
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	58.47 PK	74.00	-15.53	2.05 V	146	19.75	38.72
2	2390.00	44.74 AV	54.00	-9.26	2.05 V	146	6.02	38.72
3	*2422.00	104.29 PK			2.05 V	146	65.46	38.83
4	*2422.00	94.39 AV			2.05 V	146	55.56	38.83
5	4844.00	59.09 PK	74.00	-14.91	1.52 V	220	15.98	43.11
6	4844.00	44.66 AV	54.00	-9.34	1.52 V	220	1.55	43.11
7	7266.00	58.58 PK	74.00	-15.42	1.50 V	221	11.11	47.47
8	7266.00	44.12 AV	54.00	-9.88	1.50 V	221	-3.35	47.47

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

CHANNEL	TX Channel 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	2390.00	54.78 PK	74.00	-19.22	3.04 H	324	16.06	38.72
2	2390.00	41.20 AV	54.00	-12.80	3.04 H	324	2.48	38.72
3	*2437.00	95.34 PK			3.04 H	324	56.45	38.89
4	*2437.00	84.34 AV			3.04 H	324	45.45	38.89
5	2483.50	55.71 PK	74.00	-18.29	3.04 H	324	16.65	39.06
6	2483.50	41.70 AV	54.00	-12.30	3.04 H	324	2.64	39.06
7	4874.00	58.60 PK	74.00	-15.40	1.20 H	22	15.45	43.15
8	4874.00	39.48 AV	54.00	-14.52	1.20 H	22	-3.67	43.15
9	7311.00	59.66 PK	74.00	-14.34	1.88 H	51	12.14	47.52
10	7311.00	39.06 AV	54.00	-14.94	1.88 H	51	-8.46	47.52
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	56.22 PK	74.00	-17.78	1.96 V	148	17.50	38.72
2	2390.00	42.94 AV	54.00	-11.06	1.96 V	148	4.22	38.72
3	*2437.00	101.89 PK			1.96 V	148	63.00	38.89
4	*2437.00	93.28 AV			1.96 V	148	54.39	38.89
5	2483.50	58.41 PK	74.00	-15.59	1.96 V	148	19.35	39.06
6	2483.50	41.73 AV	54.00	-12.27	1.96 V	148	2.67	39.06
7	4874.00	57.66 PK	74.00	-16.34	1.55 V	210	14.51	43.15
8	4874.00	36.58 AV	54.00	-17.42	1.55 V	210	-6.57	43.15
9	7311.00	59.16 PK	74.00	-14.84	1.88 V	341	11.64	47.52
10	7311.00	38.25 AV	54.00	-15.75	1.88 V	341	-9.27	47.52

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	95.22 PK			1.00 H	345	56.28	38.94
2	*2452.00	85.32 AV			1.00 H	345	46.38	38.94
3	#2483.25	59.64 PK	74.00	-14.36	1.00 H	346	20.58	39.06
4	#2483.25	42.31 AV	54.00	-11.69	1.00 H	346	3.25	39.06
5	4904.00	58.55 PK	74.00	-15.45	1.52 H	20	15.36	43.19
6	4904.00	37.84 AV	54.00	-16.16	1.52 H	20	-5.35	43.19
7	7356.00	59.69 PK	74.00	-14.31	1.44 H	100	12.12	47.57
8	7356.00	38.99 AV	54.00	-15.01	1.44 H	100	-8.58	47.57
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	*2452.00	104.23 PK			1.83 V	175	65.29	38.94
2	*2452.00	94.43 AV			1.83 V	175	55.49	38.94
3	2483.50	69.21 PK	74.00	-4.79	1.83 V	175	30.15	39.06
4	2483.50	47.27 AV	54.00	-6.73	1.83 V	175	8.21	39.06
5	4904.00	58.49 PK	74.00	-15.51	1.55 V	241	15.30	43.19
6	4904.00	37.66 AV	54.00	-16.34	1.55 V	241	-5.53	43.19
7	7356.00	59.48 PK	74.00	-14.52	1.44 V	250	11.91	47.57
8	7356.00	38.99 AV	54.00	-15.01	1.44 V	250	-8.58	47.57

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 other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

4.3 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 04,16	May 03,17
Power Sensor	Keysight	U2021XA	MY55060018	May 04,16	May 03,17
Digital Multimeter	FLUKE	15B	A1220010DG	Oct. 13, 16	Oct.12, 17
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Sep.05, 16	Sep. 04,17
Oscilloscope	Agilent	DSO9254A	MY51260160	Nov. 28,15	Nov. 27,16
Signal Analyzer	Rohde & Schwarz	FSV7	102331	Nov. 09,15	Nov. 08,16
Signal Generator	Agilent	N5183A	MY50140980	Nov. 09,15	Nov. 08,16
Agile Signal Generator	Agilent	8645A	Agilent	Aug.08, 16	Aug.07, 17
ESG Vector Signal Generator	Agilent	E4438C	MY49072505	Apr. 22, 16	Apr. 21, 17
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	Aug.08, 16	Aug.07, 17

NOTE:

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

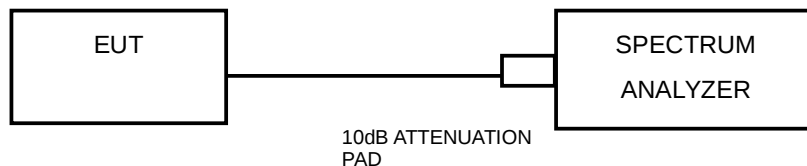
4.3.3 TEST PROCEDURE

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.



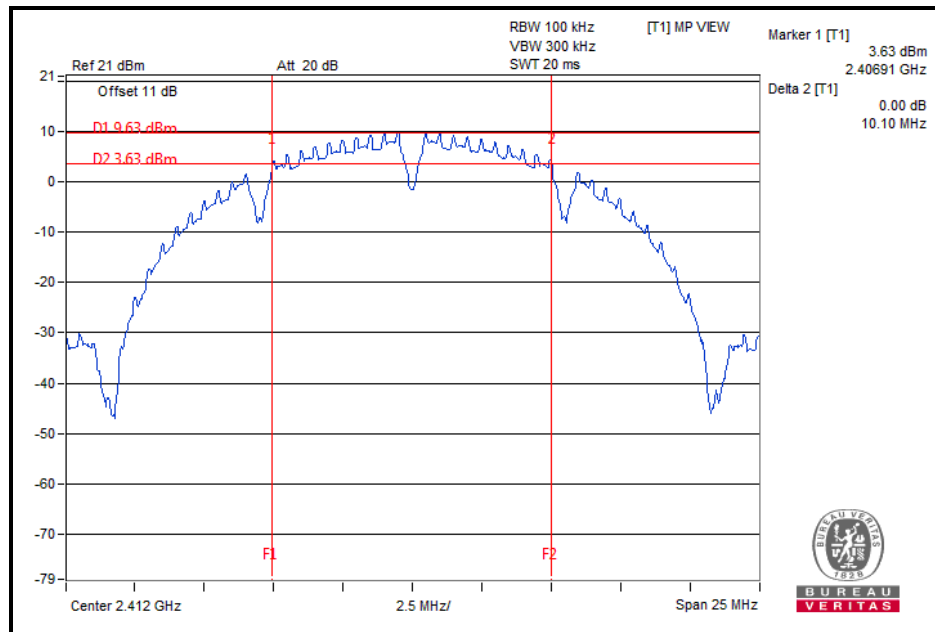
**BUREAU
VERITAS**

Test Report No.: RF160919N046

4.3.7 TEST RESULTS

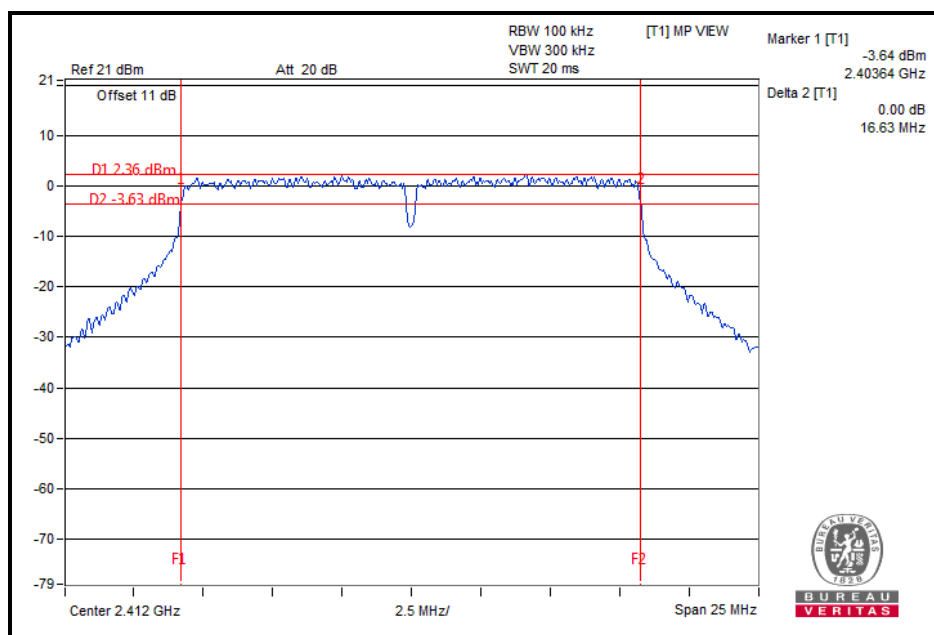
802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	10.10	0.5	PASS
6	2437	10.10	0.5	PASS
11	2462	10.10	0.5	PASS



802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.63	0.5	PASS
6	2437	16.61	0.5	PASS
11	2462	16.61	0.5	PASS



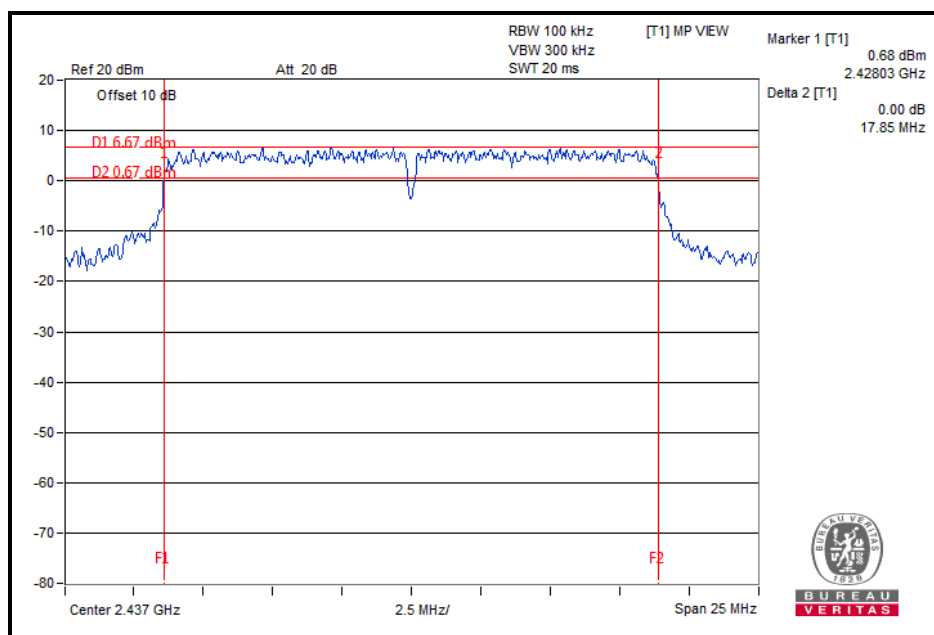


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VERITAS

Test Report No.: RF160919N046

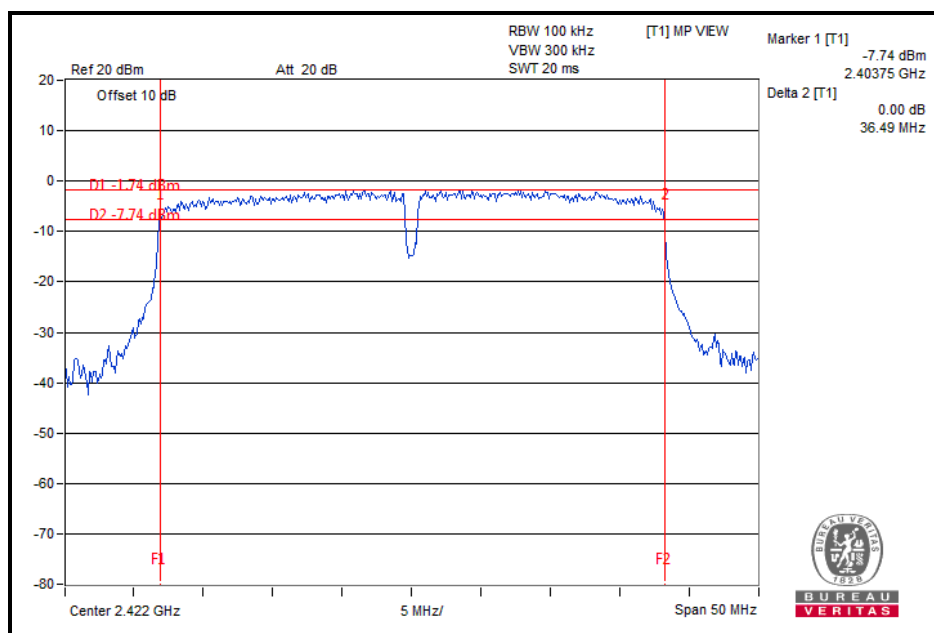
802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.83	0.5	PASS
6	2437	17.85	0.5	PASS
11	2462	17.85	0.5	PASS



802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
3	2422	36.49	0.5	PASS
6	2437	36.48	0.5	PASS
9	2452	36.49	0.5	PASS

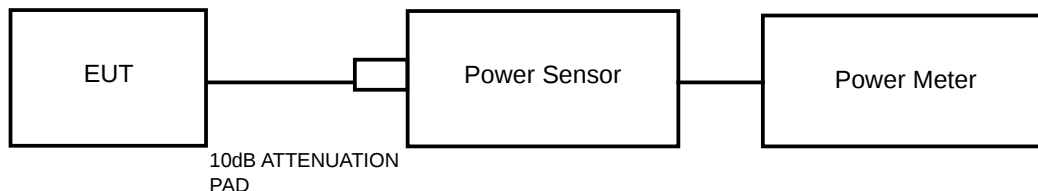


4.4 CONDUCTED OUTPUT POWER

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 04,16	May 03,17
Power Sensor	Keysight	U2021XA	MY55060018	May 04,16	May 03,17
Digital Multimeter	FLUKE	15B	A1220010DG	Oct. 13, 16	Oct.12, 17
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Sep.05, 16	Sep. 04,17
Oscilloscope	Agilent	DSO9254A	MY51260160	Nov. 28,15	Nov. 27,16
Signal Analyzer	Rohde & Schwarz	FSV7	102331	Nov. 09,15	Nov. 08,16
Signal Generator	Agilent	N5183A	MY50140980	Nov. 09,15	Nov. 08,16
Agile Signal Generator	Agilent	8645A	Agilent	Aug.08, 16	Aug.07, 17
ESG Vector Signal Generator	Agilent	E4438C	MY49072505	Apr. 22, 16	Apr. 21, 17
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	Aug.08, 16	Aug.07, 17

NOTE:

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



4.4.4 TEST PROCEDURES

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

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

4.4.6 EUT OPERATING CONDITIONS

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

4.4.7 TEST RESULTS

802.11b

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVERAGE POWER (mW)
1	2412	19.14	82.035
6	2437	19.69	93.111
11	2462	19.68	92.897

802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVERAGE POWER (mW)
1	2412	16.95	49.545
6	2437	19.50	89.125
11	2462	15.37	34.435

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVERAGE POWER (mW)
1	2412	15.23	33.343
6	2437	19.50	89.125
11	2462	14.47	27.990

802.11n (40MHz)

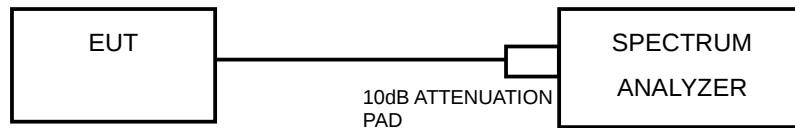
CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVERAGE POWER (mW)
1	2412	14.50	28.184
6	2437	15.23	33.343
11	2462	14.07	25.527

4.5 POWER SPECTRAL DENSITY MEASUREMENT

4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

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

4.5.2 TEST SETUP



4.5.3 TEST INSTRUMENTS

Refer to section 4.3.2 to get information of above instrument.

4.5.4 TEST PROCEDURE

- a) Set instrument center frequency to DTS channel center frequency.
- b) Set span to at least 1.5 times the OBW.
- c) Set RBW to: 3 kHz.
- d) Set VBW $\geq 3 \times$ RBW.
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Use the peak marker function to determine the maximum amplitude level.

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

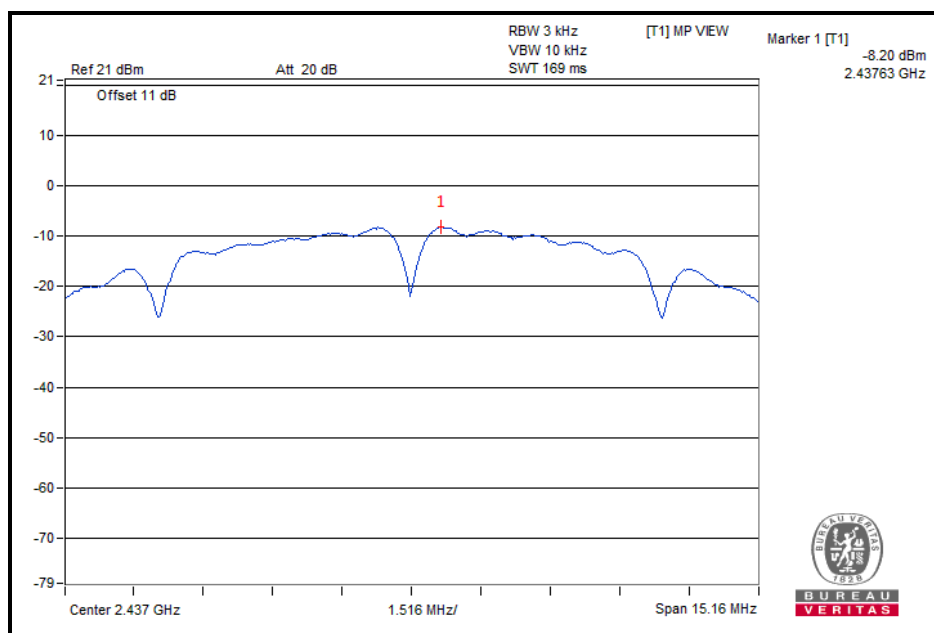
4.5.6 EUT OPERATING CONDITION

Same as item 4.3.6

4.5.7 TEST RESULTS

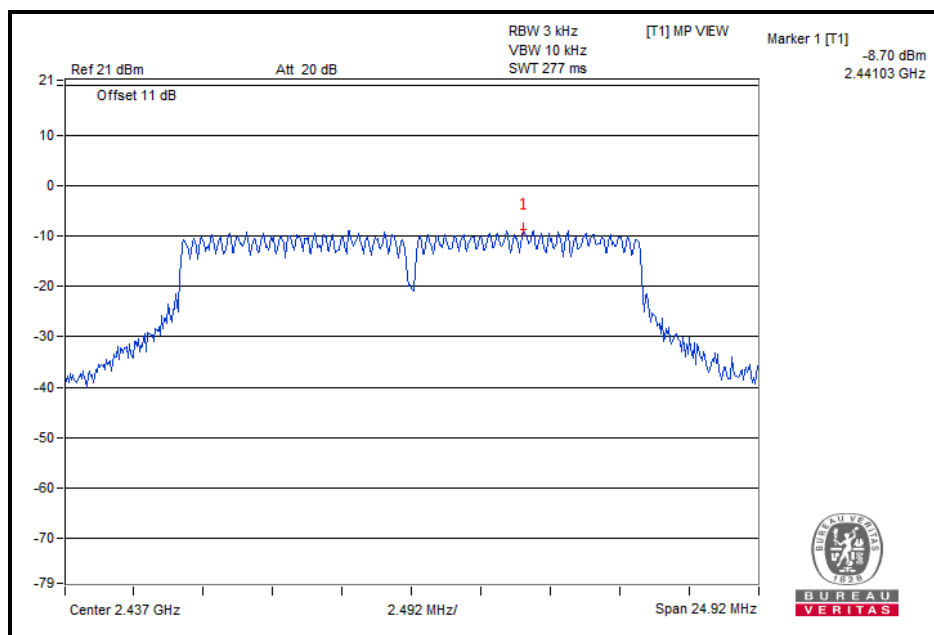
802.11b

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-10.56	8	PASS
6	2437	-8.20	8	PASS
11	2462	-10.41	8	PASS



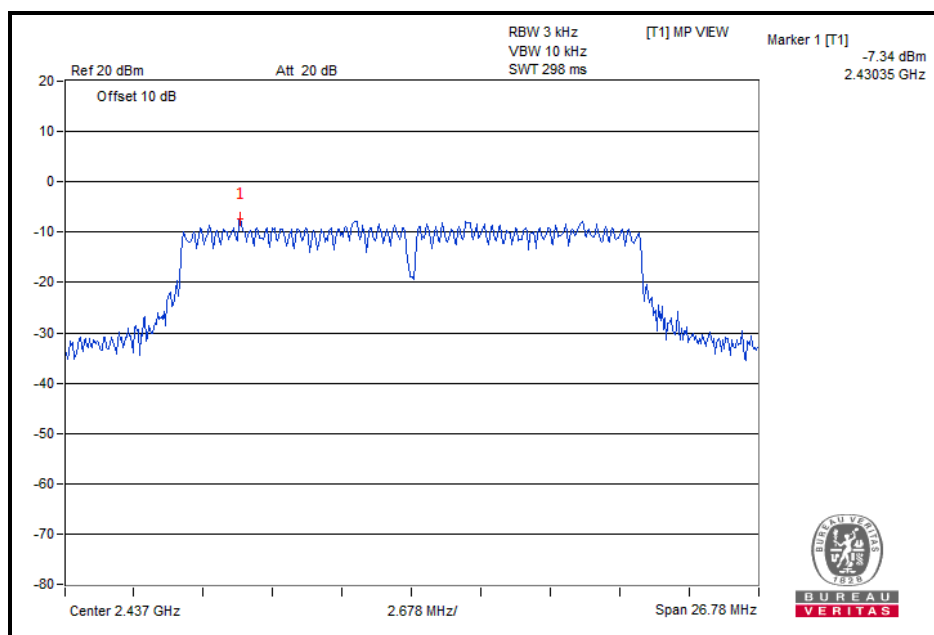
802.11g

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-12.25	8	PASS
6	2437	-8.70	8	PASS
11	2462	-13.68	8	PASS



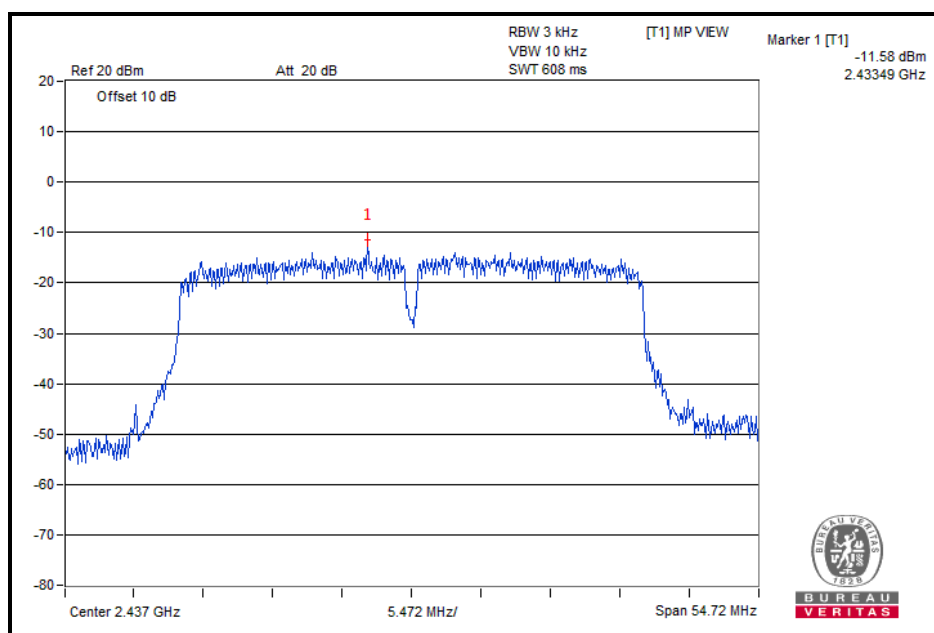
802.11n (20MHz)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	-11.94	8	PASS
6	2437	-7.34	8	PASS
11	2462	-13.01	8	PASS



802.11n (40MHz)

Channel	FREQ. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
3	2422	-15.36	8	PASS
6	2437	-11.58	8	PASS
9	2452	-14.88	8	PASS

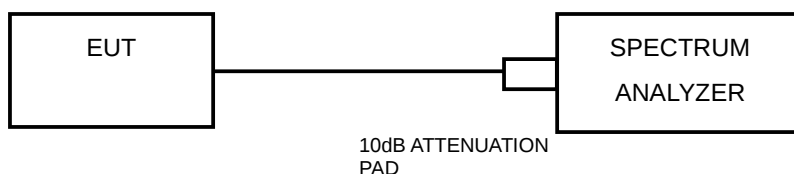


4.6 OUT OF BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

Below -20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2 TEST SETUP



4.6.3 TEST INSTRUMENTS

Refer to section 4.3.2 to get information of above instrument.

4.6.4 TEST PROCEDURE

Measurement Procedure - 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.



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Measurement Procedure –Unwanted Emission Level

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

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITION

Same as item 4.3.6

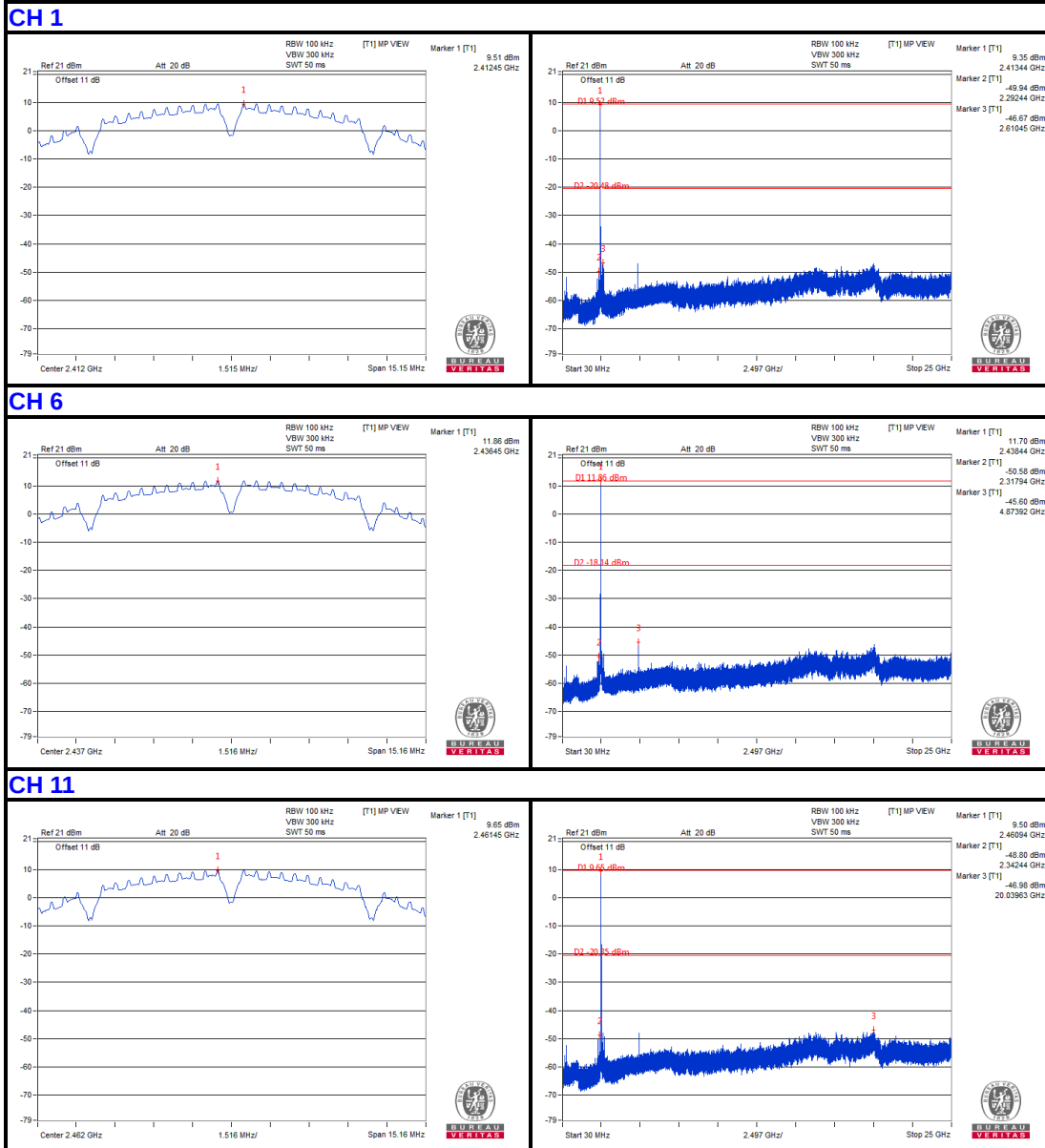


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4.6.7 TEST RESULTS

802.11b



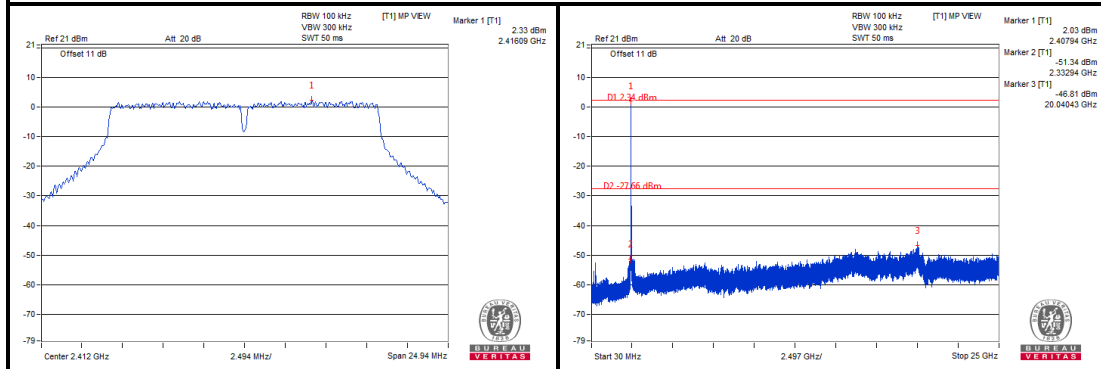


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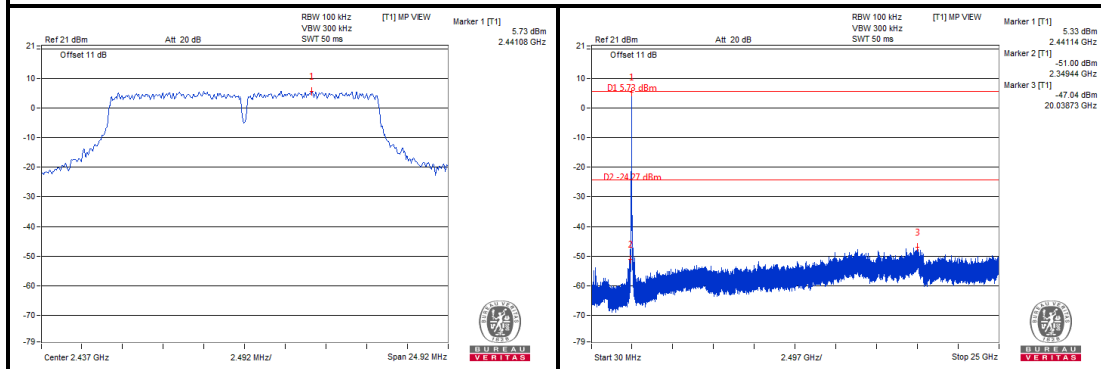
Test Report No.: RF160919N046

802.11g

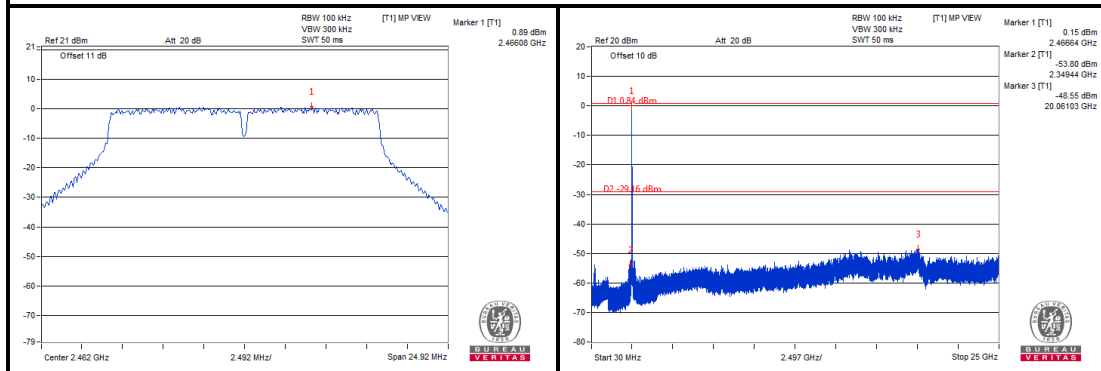
CH 1



CH 6



CH 11



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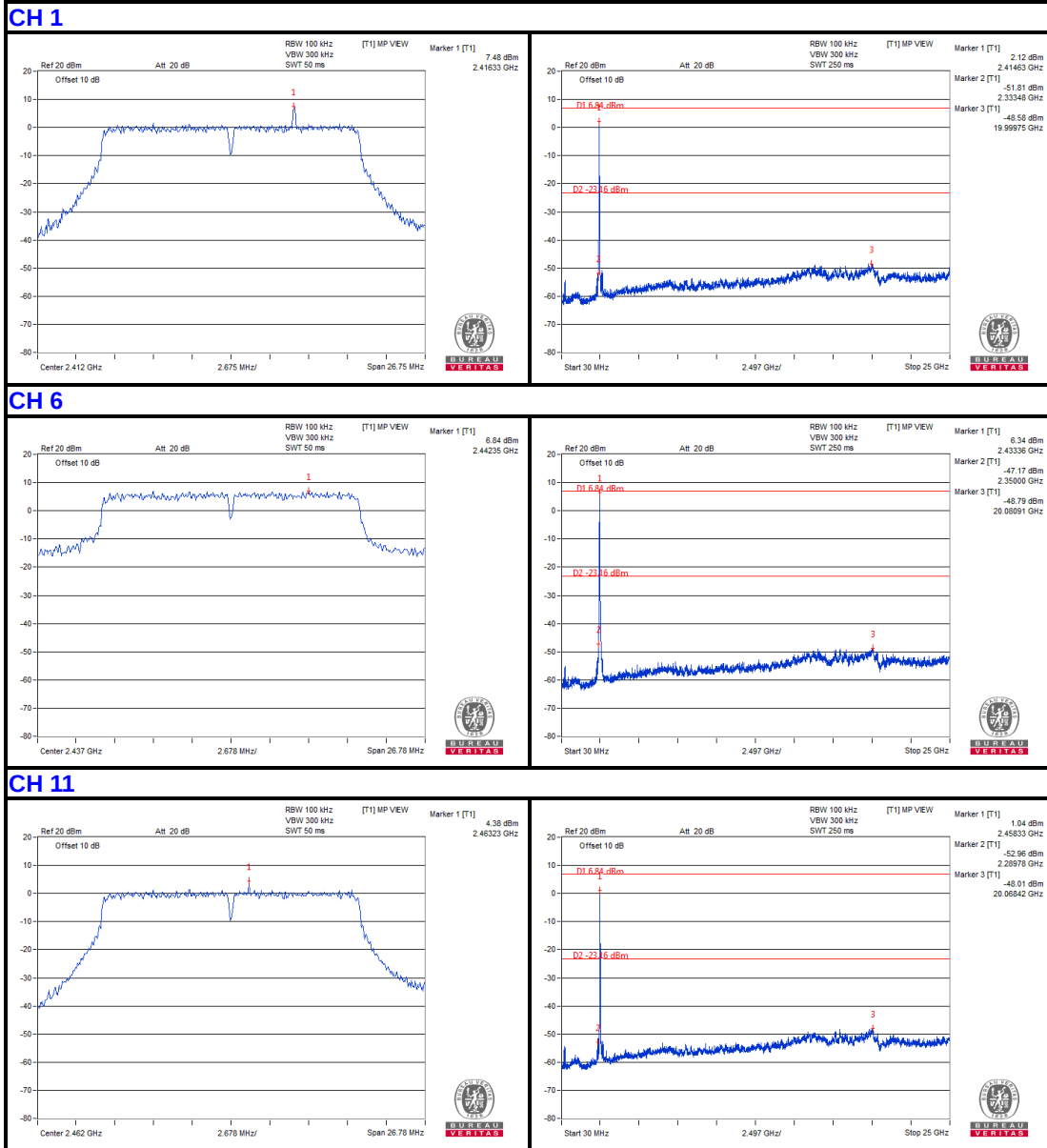
Tel: +86 769 8593 5656
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802.11n (20MHz)



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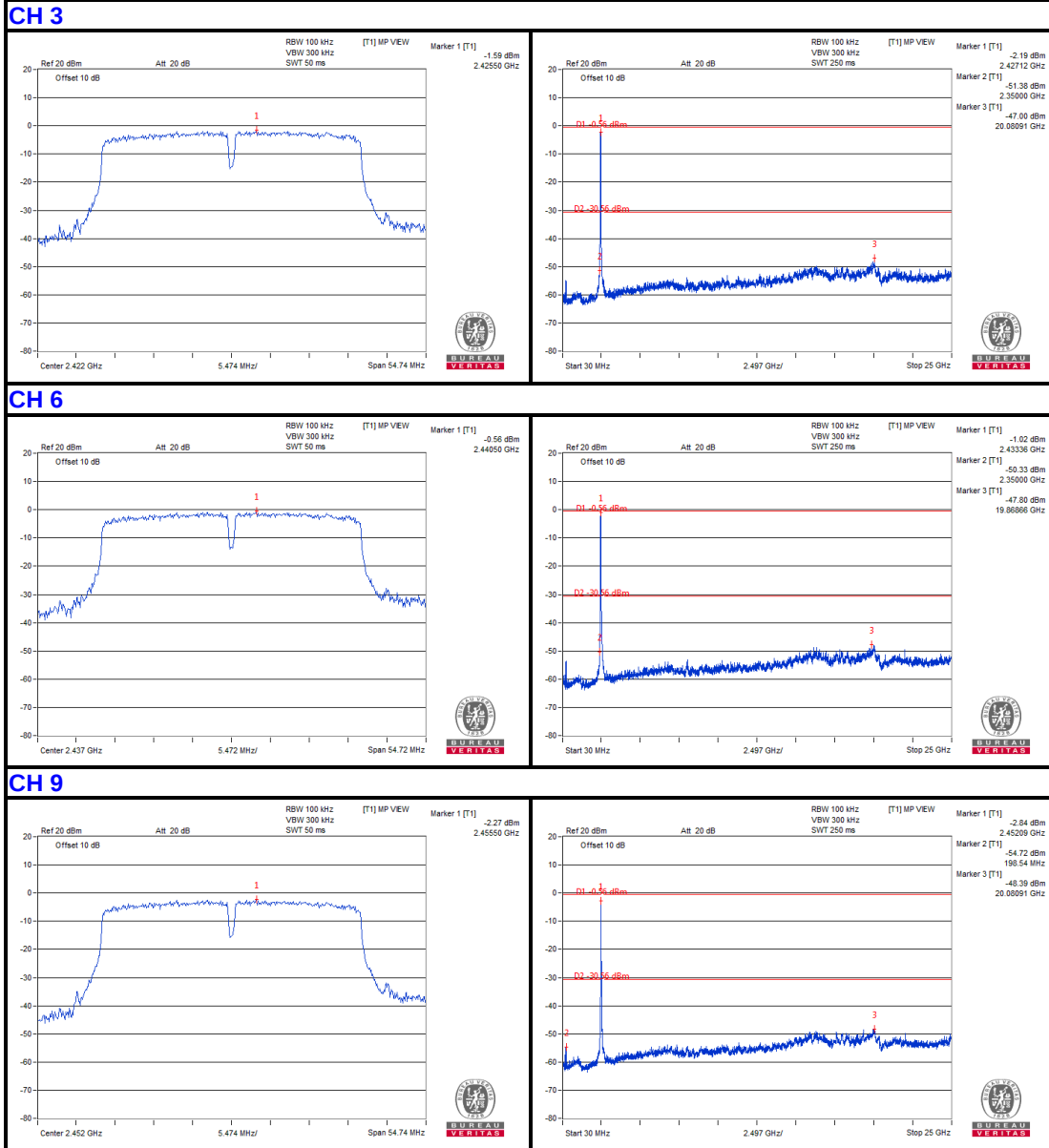
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802.11n (40MHz)



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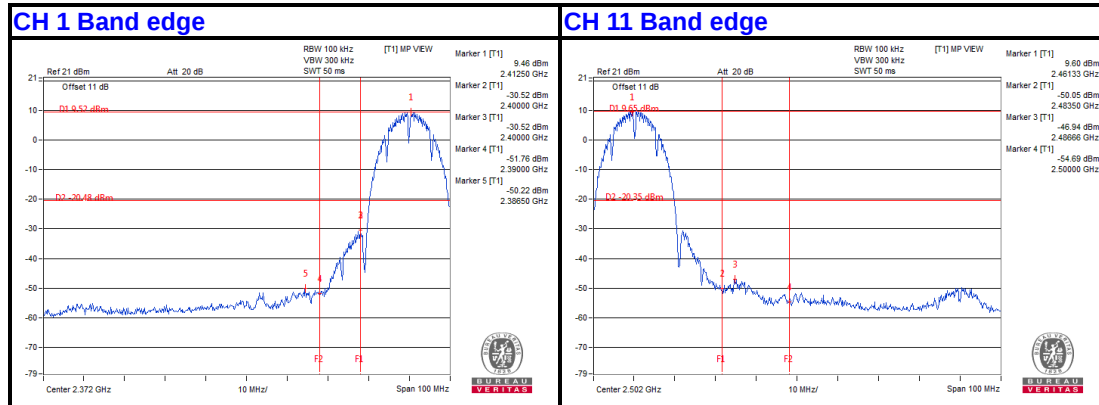
Tel: +86 769 8593 5656
Fax: +86 769 8593 1080
Email: customerservice.dg@cn.bureauveritas.com



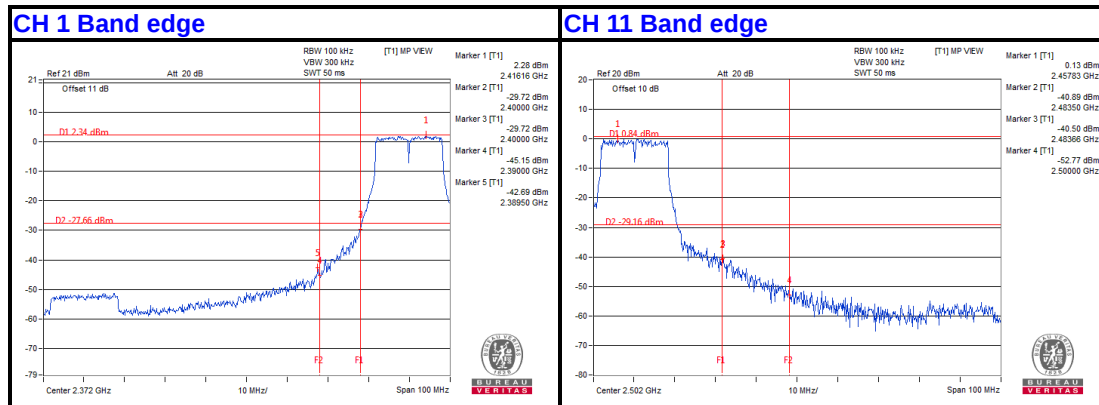
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802.11b



802.11g



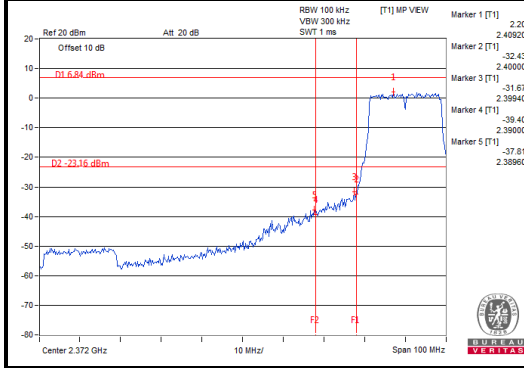


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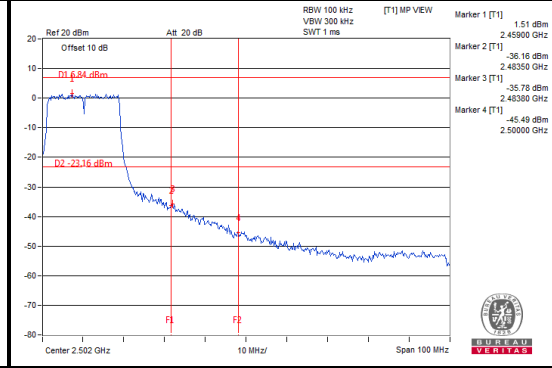
Test Report No.: RF160919N046

802.11n (20MHz)

CH 1 Band edge

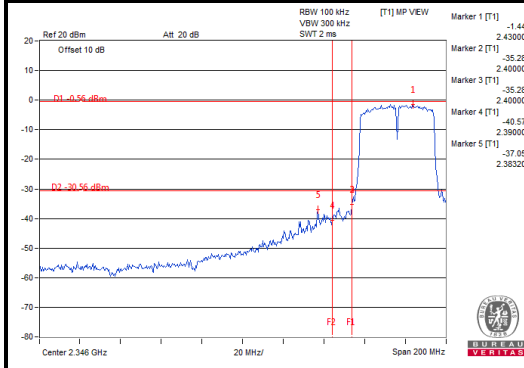


CH 11 Band edge

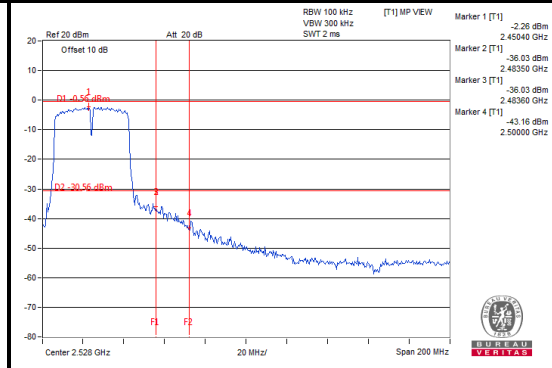


802.11n (40MHz)

CH 3 Band edge



CH 9 Band edge





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5 PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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

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

---END---