



Test Report No.: RF190730N062



TEST REPORT

Applicant	Benq Corporation
Address	16 Jihu Road, Neihu, Taipei 114, Taiwan

Manufacturer or Supplier	Benq Corporation
Address	16 Jihu Road, Neihu, Taipei 114, Taiwan
Product Name	InstaShow S Button
Brand Name	BenQ
Model	WDC20TH
Additional Model & Model Difference	N/A
Date of tests	Jul. 30, 2019 ~ Oct. 10, 2019

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

FCC Part 15, Subpart E, Section 15.407

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: Nov. 01, 2019

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF190730N062	Original release.	Nov. 01, 2019

1. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART E (SECTION 15.407 UNDER NEW RULE)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.407(b)(6)	AC Power Conducted Emissions	PASS	Meet the requirement of limit.
15.407(b)(1/4/6)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit.
15.407(a)(1/3)	Max Average Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(1/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used

1.1 MEASUREMENT UNCERTAINTY

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.70dB
Radiated emissions	9KHz ~ 30MHz	2.16dB
	30MHz ~ 1GMHz	3.83dB
	1GHz ~ 18GHz	4.66dB
	18GHz ~ 40GHz	4.67dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT NAME	InstaShow S Button
MODEL NO.	WDC20TH
FCC ID	JVPWDC20TH
POWER SUPPLY	DC 5V From Laptop
MODULATION TECHNOLOGY	OFDM
MODULATION TYPE	256QAM, 64QAM, 16QAM, QPSK, BPSK
TRANSFER RATE	802.11ac up to 400Mbps
OPERATING FREQUENCY	5150 ~ 5250MHz, 5725 ~ 5850MHz
NUMBER OF CHANNEL	Refer to 2.2 section
CONDUCTED OUTPUT POWER	10.94dBm for 5150 ~ 5250MHz (Maximum AVG Power) 11.85 dBm for 5725 ~ 5850MHz (Maximum AVG Power)
ANTENNA TYPE	5180 ~ 5240MHz: FPCB antenna with 2.15dBi gain 5745 ~ 5825MHz: FPCB antenna with 2.11dBi gain
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	USB Line: Shielded, Detachable 19cm HDMI Line: Shielded, Detachable 8.5cm

NOTES:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
3. The EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitters and 2 receivers.

MODULATION MODE	TX FUNCTION
802.11n (HT20) 802.11ac (VHT20)	2TX
802.11n (HT40) 802.11ac (VHT40)	2TX

* The modulation and bandwidth are similar for 802.11n mode for HT20 / HT40 and 802.11ac mode for VHT20 / VHT40, therefore investigated worst case for final test were chosen 802.11n (HT20/HT40) and record in the report

4. Please refer to the EUT photo document (Reference No.: 190730N062) for detailed product photo.

2.2 DESCRIPTION OF TEST MODES

FOR 5150 ~ 5250MHz

4 channels are provided for 802.11n (HT20), 802.11ac (VHT20):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	46	5230 MHz

FOR 5725 ~ 5850MHz

5 channels are provided for 802.11n (HT20), 802.11ac (VHT20):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745MHz	153	5765MHz
157	5785MHz	161	5805MHz
165	5825MHz	--	--

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz



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2.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	Powered by Laptop with wifi(5G) link

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

NOTE: "-" means no effect.

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 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	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (20MHz)	5150-5250	36 to 48	36, 40, 48	OFDM	BPSK	6.5
-	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	13.5
-	802.11n (20MHz)	5725-5850	149 to 165	149, 157, 165	OFDM	BPSK	6.5
-	802.11n (40MHz)		151 to 159	151, 159	OFDM	BPSK	13.5

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 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	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (HT20)	5150-5250 5725-5850	36 to 48 140 to 165	36	OFDM	BPSK	6.5



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	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (HT20)	5180-5240 5725-5850	36 to 48 149 to 165	36	OFDM	BPSK	6.5

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	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (20MHz)	5150-5250	36 to 48	36, 40, 48	OFDM	BPSK	6.5
-	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	13.5
-	802.11n (20MHz)	5725-5850	149 to 165	149, 157, 165	OFDM	BPSK	6.5
-	802.11n (40MHz)		151 to 159	151, 159	OFDM	BPSK	13.5

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE<1G	25deg. C, 51%RH	DC 5V from Laptop	Walker
RE≥1G	25deg. C, 51%RH	DC 5V from Laptop	Walker
PLC	20deg. C, 56%RH	DC 5V from Laptop	Dragon
APCM	20deg. C, 55%RH	DC 5V from Laptop	Robert Cheng



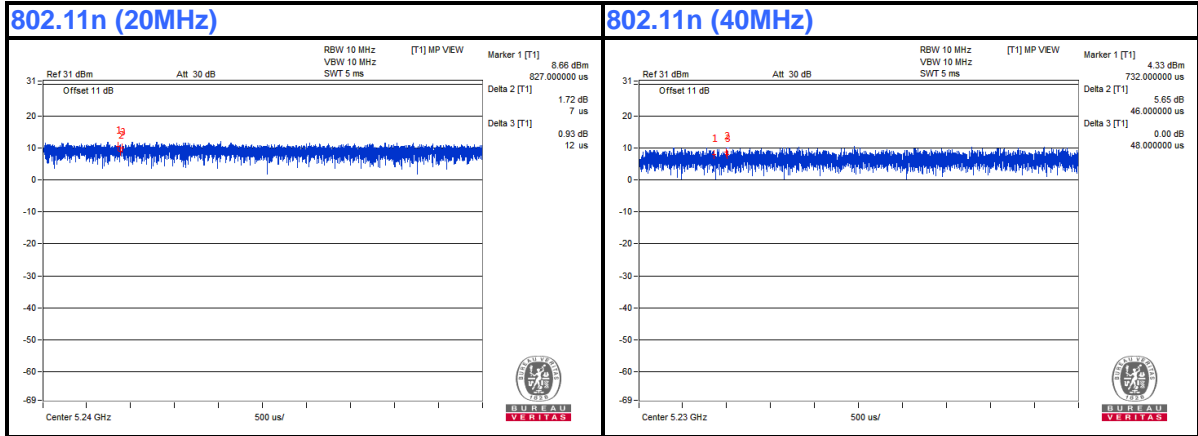
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2.3 DUTY CYCLE OF TEST SIGNAL

802.11n (20MHz): Duty cycle =100 %

802.11n (40MHz): Duty cycle =100 %





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2.4 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	Laptop	DELL	Latitude 5280	CZFTNH2	N/A

NO.	DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	AC: Unshielded, Detachable 0.8m; DC: Unshielded, Detachable 1.8m

2.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart E (15.407)

789033 D02 General UNII Test Procedures New Rules v01r03

KDB 662911 D01 v02r01

ANSI C63.10-2013

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

3. TEST TYPES AND RESULTS

3.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

3.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table:

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. 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 30dB under any condition of modulation.



3.1.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

APPLICABLE TO	LIMIT	
789033 D02 General UNII Test Procedures New Rules v01r03	FIELD STRENGTH AT 3m	
	PK: 74 (dBµV/m)	AV: 54 (dBµV/m)
APPLICABLE TO	EIRP LIMIT	EQUIVALENT FIELD STRENGTH AT 3m
15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.2 (dBµV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)	Note	Note

NOTE: For transmitters operating in the 5.725-5.85 GHz band:

Section 15.407(b)(4) specifies the unwanted emissions limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). An alternative to the band emissions mask is specified in Section 15.407(b)(4)(ii). The alternative limits are based on the highest antenna gain specified in the filing. There are also marketing and importation restrictions for the alternative limit.

15.407(b)(4)(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \quad \mu\text{V/m, where } P \text{ is the eirp (Watts).}$$



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3.1.3 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESU40	100449	Mar. 12,19	Mar. 11,20
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 04,19	May 03,20
Amplifier (9KHz -1GHz)	Burgeon	BPA-530	100210	Apr. 21,19	Apr. 20,20
Bilog Antenna (20MHz -2GHz)	Teseq	CBL 6111D	30643	Aug. 11, 19	Aug. 10, 20
Horn Antenna (1GHz -18GHz)	ETS -Lindgren	3117	00062558	Jul. 21, 19	Jul. 20, 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. 21,19	Apr. 20,20
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
Broadband Preamplifier (1GHz~18GHz)	SCHWARZBECK	BBV9718	305	Apr. 21,19	Apr. 20,20
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 09,18	Nov. 08,19
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.



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3.1.4 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. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTES:

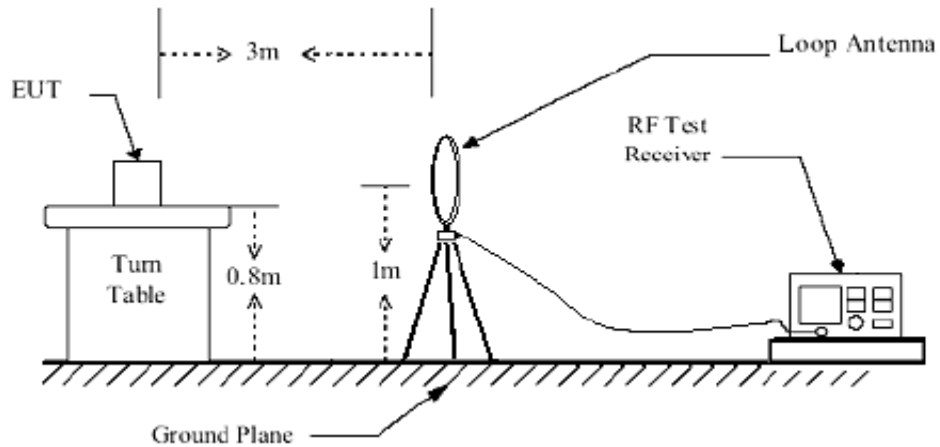
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution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

3.1.5 DEVIATION FROM TEST STANDARD

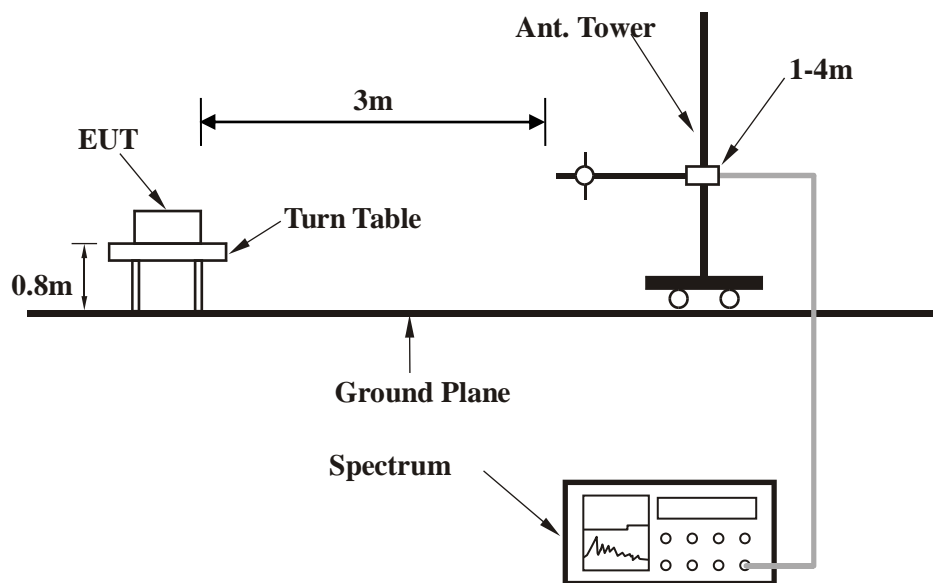
No deviation.

3.1.6 TEST SETUP

Below 30MHz test setup

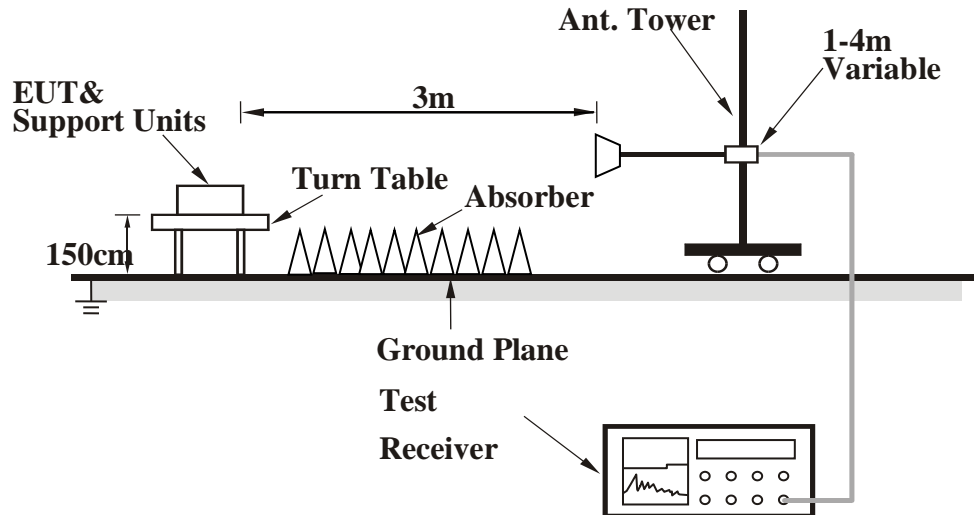


Below 1GHz test setup



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).

3.1.7 EUT OPERATING CONDITION

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



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3.1.8 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

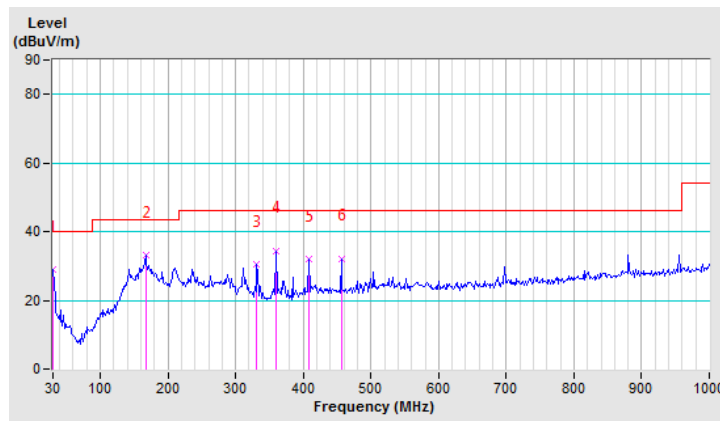
802.11n (HT 20)

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.00	28.96 QP	40.00	-11.04	1.00 H	12	39.09	-10.13
2	166.79	33.29 QP	43.50	-10.21	1.00 H	0	50.17	-16.88
3	331.57	30.50 QP	46.00	-15.50	1.00 H	211	41.87	-11.37
4	359.55	34.48 QP	46.00	-11.52	1.00 H	23	44.87	-10.39
5	407.74	31.94 QP	46.00	-14.06	1.00 H	134	41.13	-9.19
6	455.93	32.20 QP	46.00	-13.80	1.00 H	48	40.63	-8.43

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 less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.

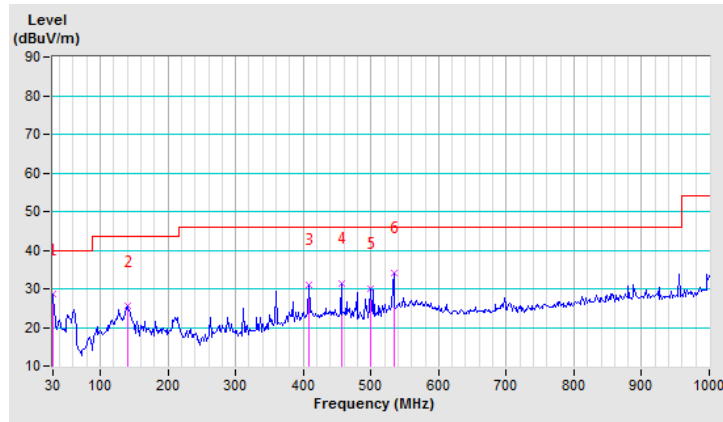


CHANNEL	TX Channel 36	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.00	28.52 QP	40.00	-11.48	1.00 V	117	38.65	-10.13
2	140.37	25.45 QP	43.50	-18.05	1.00 V	242	41.43	-15.98
3	407.74	31.10 QP	46.00	-14.90	1.00 V	183	40.29	-9.19
4	455.93	31.40 QP	46.00	-14.60	1.00 V	159	39.83	-8.43
5	499.46	30.02 QP	46.00	-15.98	1.00 V	194	37.66	-7.64
6	533.65	34.22 QP	46.00	-11.78	1.00 V	302	40.71	-6.49

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 less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.





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Band 1 (5150-5250MHz):

ABOVE 1GHz DATA

802.11n (HT 20)

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	5140.96	61.89 PK	74.00	-12.11	1.28 H	85	56.12	5.77
2	5140.96	44.21 AV	54.00	-9.79	1.28 H	85	38.44	5.77
3	5150.00	63.94 PK	74.00	-10.06	1.28 H	85	58.14	5.80
4	5150.00	48.75 AV	54.00	-5.25	1.28 H	85	42.95	5.80
5	*5180.00	110.66 PK			1.28 H	85	104.75	5.91
6	*5180.00	95.12 AV			1.28 H	85	89.21	5.91
7	#10360.00	57.55 PK	68.20	-10.65	2.00 H	0	43.50	14.05
8	15540.00	64.62 PK	74.00	-9.38	2.00 H	0	43.73	20.89
9	15540.00	50.06 AV	54.00	-3.94	2.00 H	0	29.17	20.89
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	4981.29	50.76 PK	74.00	-23.24	1.00 V	231	45.54	5.22
2	4981.29	33.49 AV	54.00	-20.51	1.00 V	231	28.27	5.22
3	5150.00	57.71 PK	74.00	-16.29	1.00 V	231	51.91	5.80
4	5150.00	40.72 AV	54.00	-13.28	1.00 V	231	34.92	5.80
5	*5180.00	104.13 PK			1.00 V	231	98.22	5.91
6	*5180.00	88.56 AV			1.00 V	231	82.65	5.91
7	#10360.00	56.32 PK	68.20	-11.88	1.00 V	0	42.27	14.05
8	15540.00	64.31 PK	74.00	-9.69	1.00 V	0	43.42	20.89
9	15540.00	50.15 AV	54.00	-3.85	1.00 V	0	29.26	20.89

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 less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Bureau Veritas Shenzhen Co., Ltd.
Dongguan Branch

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

Tel: +86 769 8998 2098
Fax: +86 769 8593 1080
Email: customerservice.dg@cn.bureauveritas.com



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Test Report No.: RF190730N062

CHANNEL	TX Channel 40	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	5139.51	52.43 PK	74.00	-21.57	1.31 H	79	46.66	5.77
2	5139.51	40.13 AV	54.00	-13.87	1.31 H	79	34.36	5.77
3	5150.00	55.95 PK	74.00	-18.05	1.31 H	79	50.15	5.80
4	5150.00	42.36 AV	54.00	-11.64	1.31 H	79	36.56	5.80
5	*5200.00	110.18 PK			1.31 H	79	104.20	5.98
6	*5200.00	95.71 AV			1.31 H	79	89.73	5.98
7	#10400.00	57.15 PK	68.20	-11.05	2.00 H	0	43.02	14.13
8	15600.00	65.74 PK	74.00	-8.26	2.00 H	0	44.71	21.03
9	15600.00	50.11 AV	54.00	-3.89	2.00 H	0	29.08	21.03

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	4927.98	52.48 PK	74.00	-21.52	1.00 V	171	47.39	5.09
2	4927.98	37.98 AV	54.00	-16.02	1.00 V	171	32.89	5.09
3	5150.00	49.43 PK	74.00	-24.57	1.00 V	171	43.63	5.80
4	5150.00	39.06 AV	54.00	-14.94	1.00 V	171	33.26	5.80
5	*5200.00	104.87 PK			1.00 V	171	98.89	5.98
6	*5200.00	89.69 AV			1.00 V	171	83.71	5.98
7	#10400.00	55.77 PK	68.20	-12.43	1.00 V	0	41.64	14.13
8	15600.00	63.79 PK	74.00	-10.21	1.00 V	0	42.76	21.03
9	15600.00	50.07 AV	54.00	-3.93	1.00 V	0	29.04	21.03

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



BUREAU VERITAS

Test Report No.: RF190730N062

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	5097.28	50.41 PK	74.00	-23.59	1.28 H	87	44.80	5.61
2	5097.28	39.10 AV	54.00	-14.90	1.28 H	87	33.49	5.61
3	5150.00	50.72 PK	74.00	-23.28	1.28 H	87	44.92	5.80
4	5150.00	39.48 AV	54.00	-14.52	1.28 H	87	33.68	5.80
5	*5240.00	111.96 PK			1.28 H	87	105.84	6.12
6	*5240.00	96.67 AV			1.28 H	87	90.55	6.12
7	5350.00	52.00 PK	74.00	-22.00	1.28 H	87	45.47	6.53
8	5350.00	40.69 AV	54.00	-13.31	1.28 H	87	34.16	6.53
9	5453.84	54.75 PK	74.00	-19.25	1.28 H	87	47.85	6.90
10	5453.84	41.82 AV	54.00	-12.18	1.28 H	87	34.92	6.90
11	#10480.00	56.14 PK	68.20	-12.06	2.00 H	0	41.85	14.29
12	15720.00	64.47 PK	74.00	-9.53	2.00 H	0	43.16	21.31
13	15720.00	50.12 AV	54.00	-3.88	2.00 H	0	28.81	21.31

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	5100.96	50.18 PK	74.00	-23.82	1.02 V	328	44.55	5.63
2	5100.96	38.74 AV	54.00	-15.26	1.02 V	328	33.11	5.63
3	5150.00	48.96 PK	74.00	-25.04	1.02 V	328	43.16	5.80
4	5150.00	38.74 AV	54.00	-15.26	1.02 V	328	32.94	5.80
5	*5240.00	105.06 PK			1.02 V	328	98.94	6.12
6	*5240.00	90.04 AV			1.02 V	328	83.92	6.12
7	5350.00	49.78 PK	74.00	-24.22	1.02 V	328	43.25	6.53
8	5350.00	40.09 AV	54.00	-13.91	1.02 V	328	33.56	6.53
9	5452.08	53.39 PK	74.00	-20.61	1.02 V	328	46.49	6.90
10	5452.08	41.42 AV	54.00	-12.58	1.02 V	328	34.52	6.90
11	#10480.00	55.89 PK	68.20	-12.31	1.00 V	0	41.60	14.29
12	15720.00	63.77 PK	74.00	-10.23	1.00 V	0	42.46	21.31
13	15720.00	49.14 AV	54.00	-4.86	1.00 V	0	27.83	21.31

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 less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Bureau Veritas Shenzhen Co., Ltd.
Dongguan Branch

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

Tel: +86 769 8998 2098
Fax: +86 769 8593 1080
Email: customerservice.dg@cn.bureauveritas.com



802.11n (40MHz)

CHANNEL	TX Channel 38	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	5145.41	68.00 PK	74.00	-6.00	1.29 H	76	62.21	5.79
2	5145.41	50.94 AV	54.00	-3.06	1.29 H	76	45.15	5.79
3	5150.00	69.82 PK	74.00	-4.18	1.29 H	76	64.02	5.80
4	5150.00	52.53 AV	54.00	-1.47	1.29 H	76	46.73	5.80
5	*5190.00	107.29 PK			1.29 H	76	101.34	5.95
6	*5190.00	88.77 AV			1.29 H	76	82.82	5.95
7	#10380.00	55.98 PK	68.20	-12.22	2.00 H	0	41.89	14.09
8	15570.00	63.78 PK	74.00	-10.22	2.00 H	0	42.82	20.96
9	15570.00	50.02 AV	54.00	-3.98	2.00 H	0	29.06	20.96

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	4984.46	52.53 PK	74.00	-21.47	1.00 V	173	47.30	5.23
2	4984.46	38.06 AV	54.00	-15.94	1.00 V	173	32.83	5.23
3	5150.00	60.39 PK	74.00	-13.61	1.00 V	173	54.59	5.80
4	5150.00	44.12 AV	54.00	-9.88	1.00 V	173	38.32	5.80
5	*5190.00	100.51 PK			1.00 V	173	94.56	5.95
6	*5190.00	82.89 AV			1.00 V	173	76.94	5.95
7	#10380.00	56.01 PK	68.20	-12.19	1.00 V	0	41.92	14.09
8	15570.00	62.78 PK	74.00	-11.22	1.00 V	0	41.82	20.96
9	15570.00	49.54 AV	54.00	-4.46	1.00 V	0	28.58	20.96

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 less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



BUREAU VERITAS

Test Report No.: RF190730N062

CHANNEL	TX Channel 46	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	5140.32	52.56 PK	74.00	-21.44	2.00 H	83	46.79	5.77
2	5140.32	40.28 AV	54.00	-13.72	2.00 H	83	34.51	5.77
3	5150.00	54.24 PK	74.00	-19.76	2.00 H	83	48.44	5.80
4	5150.00	41.09 AV	54.00	-12.91	2.00 H	83	35.29	5.80
5	*5230.00	106.85 PK			2.00 H	83	100.76	6.09
6	*5230.00	88.96 AV			2.00 H	83	82.87	6.09
7	#10460.00	55.99 PK	68.20	-12.21	2.00 H	0	41.74	14.25
8	15690.00	63.97 PK	74.00	-10.03	2.00 H	0	42.73	21.24
9	15690.00	49.18 AV	54.00	-4.82	2.00 H	0	27.94	21.24

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	5146.37	50.65 PK	74.00	-23.35	1.03 V	326	44.86	5.79
2	5146.37	39.25 AV	54.00	-14.75	1.03 V	326	33.46	5.79
3	5150.00	50.09 PK	74.00	-23.91	1.03 V	326	44.29	5.80
4	5150.00	39.77 AV	54.00	-14.23	1.03 V	326	33.97	5.80
5	*5230.00	102.38 PK			1.03 V	326	96.29	6.09
6	*5230.00	84.00 AV			1.03 V	326	77.91	6.09
7	#10460.00	55.79 PK	68.20	-12.41	1.00 V	0	41.54	14.25
8	15690.00	63.47 PK	74.00	-10.53	1.00 V	0	42.23	21.24
9	15690.00	49.28 AV	54.00	-4.72	1.00 V	0	28.04	21.24

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 less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



Test Report No.: RF190730N062

Band 4 (5725-5850MHz):

ABOVE 1GHz DATA

802.11n (20MHz)

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	#5624.50	49.62 PK	68.20	-18.58	1.00 H	277	42.88	6.74
2	#5725.00	55.69 PK	122.20	-66.51	1.00 H	277	48.75	6.94
3	*5745.00	105.06 PK			1.00 H	277	98.08	6.98
4	*5745.00	89.49 AV			1.00 H	277	82.51	6.98
5	#5885.50	47.99 PK	97.40	-49.41	1.00 H	277	40.71	7.28
6	11490.00	58.64 PK	74.00	-15.36	1.00 H	254	42.69	15.95
7	11490.00	45.17 AV	54.00	-8.83	1.00 H	254	29.22	15.95
8	#17235.00	64.82 PK	68.20	-3.38	1.00 H	148	40.73	24.09
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	#5634.25	48.23 PK	68.20	-19.97	1.00 V	259	41.48	6.75
2	#5725.00	55.79 PK	122.20	-66.41	1.00 V	259	48.85	6.94
3	*5745.00	99.50 PK			1.00 V	259	92.52	6.98
4	*5745.00	85.37 AV			1.00 V	259	78.39	6.98
5	#5959.75	49.53 PK	68.20	-18.67	1.00 V	259	42.10	7.43
6	11490.00	56.36 PK	74.00	-17.64	1.00 V	263	40.41	15.95
7	11490.00	42.54 AV	54.00	-11.46	1.00 V	263	26.59	15.95
8	#17235.00	63.68 PK	68.20	-4.52	1.00 V	311	39.59	24.09

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 less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



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Test Report No.: RF190730N062

CHANNEL		TX Channel 157			DETECTOR FUNCTION		Peak (PK)	
FREQUENCY RANGE		1GHz ~ 40GHz			DETECTOR 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	#5626.00	49.15 PK	68.20	-19.05	1.00 H	277	42.42	6.73
2	#5674.00	50.27 PK	86.00	-35.73	1.00 H	277	43.43	6.84
3	*5785.00	104.34 PK			1.00 H	277	97.27	7.07
4	*5785.00	88.94 AV			1.00 H	277	81.87	7.07
5	#5926.00	49.41 PK	68.20	-18.79	1.00 H	277	42.04	7.37
6	11570.00	58.32 PK	74.00	-15.68	1.00 H	284	42.15	16.17
7	11570.00	44.57 AV	54.00	-9.43	1.00 H	284	28.40	16.17
8	#17355.00	64.47 PK	68.20	-3.73	1.00 H	25	40.29	24.18
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	#5621.50	48.29 PK	68.20	-19.91	1.00 V	259	41.56	6.73
2	#5656.00	48.75 PK	72.66	-23.91	1.00 V	259	41.95	6.80
3	*5785.00	99.50 PK			1.00 V	259	92.43	7.07
4	*5785.00	85.63 AV			1.00 V	259	78.56	7.07
5	#5884.75	47.77 PK	97.96	-50.19	1.00 V	259	40.49	7.28
6	11570.00	57.02 PK	74.00	-16.98	1.00 V	266	40.85	16.17
7	11570.00	43.96 AV	54.00	-10.04	1.00 V	266	27.79	16.17
8	#17355.00	63.75 PK	68.20	-4.45	1.00 V	148	39.57	24.18

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 less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Bureau Veritas Shenzhen Co., Ltd.
Dongguan Branch

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

Tel: +86 769 8998 2098
Fax: +86 769 8593 1080
Email: customerservice.dg@cn.bureauveritas.com



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Test Report No.: RF190730N062

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	#5652.25	51.05 PK	69.87	-18.82	1.14 H	277	44.26	6.79
2	*5825.00	103.79 PK			1.14 H	277	96.64	7.15
3	*5825.00	88.79 AV			1.14 H	277	81.64	7.15
4	#5850.00	51.84 PK	122.20	-70.36	1.14 H	277	44.64	7.20
5	#5934.25	49.04 PK	68.20	-19.16	1.14 H	277	41.66	7.38
6	11650.00	58.25 PK	74.00	-15.75	1.00 H	153	41.85	16.40
7	11650.00	45.11 AV	54.00	-8.89	1.00 H	153	28.71	16.40
8	#17475.00	64.35 PK	68.20	-3.85	1.00 H	83	40.08	24.27
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	#5642.50	49.34 PK	68.20	-18.86	1.00 V	307	42.57	6.77
2	*5825.00	99.77 PK			1.00 V	307	92.62	7.15
3	*5825.00	83.53 AV			1.00 V	307	76.38	7.15
4	#5850.00	48.80 PK	122.20	-73.40	1.00 V	307	41.60	7.20
5	#5969.50	49.57 PK	68.20	-18.63	1.00 V	307	42.12	7.45
6	11650.00	53.85 PK	74.00	-20.15	1.00 V	59	37.45	16.40
7	11650.00	43.14 AV	54.00	-10.86	1.00 V	59	26.74	16.40
8	#17475.00	63.23 PK	68.20	-4.97	1.00 V	255	38.96	24.27

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

Bureau Veritas Shenzhen Co., Ltd.
Dongguan Branch

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

Tel: +86 769 8998 2098
Fax: +86 769 8593 1080
Email: customerservice.dg@cn.bureauveritas.com



Test Report No.: RF190730N062

802.11n (40MHz)

CHANNEL	TX Channel 151	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	#5714.50	64.28 PK	109.26	-44.98	2.00 H	43	57.36	6.92
2	#5725.00	67.05 PK	122.20	-55.15	2.00 H	43	60.11	6.94
3	*5755.00	100.73 PK			1.00 H	43	93.72	7.01
4	*5755.00	83.58 AV			1.00 H	43	76.57	7.01
5	#5874.25	47.64 PK	105.41	-57.77	2.00 H	43	40.38	7.26
6	11510.00	57.17 PK	74.00	-16.83	1.00 H	211	41.17	16.00
7	11510.00	43.07 AV	54.00	-10.93	1.00 H	211	27.07	16.00
8	#17265.00	64.57 PK	68.20	-3.63	1.00 H	310	40.46	24.11
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	#5713.75	60.12 PK	109.05	-48.93	1.29 V	125	53.20	6.92
2	#5725.00	56.33 PK	122.20	-65.87	1.29 V	125	49.39	6.94
3	*5755.00	97.89 PK			1.00 V	125	90.88	7.01
4	*5755.00	81.31 AV			1.00 V	125	74.30	7.01
5	#5890.75	47.68 PK	93.51	-45.83	1.29 V	125	40.39	7.29
6	11510.00	56.77 PK	74.00	-17.23	1.00 V	300	40.77	16.00
7	11510.00	43.76 AV	54.00	-10.24	1.00 V	300	27.76	16.00
8	#17265.00	64.28 PK	68.20	-3.92	1.00 V	254	40.17	24.11

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 less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.



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Test Report No.: RF190730N062

CHANNEL	TX Channel 159	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	#5627.50	49.70 PK	68.20	-18.50	1.00 H	0	42.97	6.73
2	*5795.00	100.64 PK			1.00 H	360	93.55	7.09
3	*5795.00	83.02 AV			1.00 H	360	75.93	7.09
4	#5850.00	49.44 PK	122.20	-72.76	1.00 H	0	42.24	7.20
5	#5952.25	49.21 PK	68.20	-18.99	1.00 H	0	41.79	7.42
6	11590.00	58.12 PK	74.00	-15.88	1.00 H	264	41.90	16.22
7	11590.00	44.02 AV	54.00	-9.98	1.00 H	264	27.80	16.22
8	#17385.00	64.75 PK	68.20	-3.45	1.00 H	193	40.54	24.21
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	#5647.00	48.51 PK	68.20	-19.69	1.00 V	271	41.73	6.78
2	*5795.00	98.20 PK			1.00 V	271	91.11	7.09
3	*5795.00	80.03 AV			1.00 V	271	72.94	7.09
4	#5850.00	48.24 PK	122.20	-73.96	1.00 V	271	41.04	7.20
5	#5865.25	48.86 PK	107.93	-59.07	1.00 V	271	41.63	7.23
6	11590.00	56.74 PK	74.00	-17.26	1.00 V	155	40.52	16.22
7	11590.00	43.12 AV	54.00	-10.88	1.00 V	155	26.90	16.22
8	#17385.00	63.94 PK	68.20	-4.26	1.00 V	123	39.73	24.21

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 less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Bureau Veritas Shenzhen Co., Ltd.
Dongguan Branch

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

Tel: +86 769 8998 2098
Fax: +86 769 8593 1080
Email: customerservice.dg@cn.bureauveritas.com

3.2 CONDUCTED EMISSION MEASUREMENT

3.2.1 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:**
- The lower limit shall apply at the transition frequencies.
 - The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
 - 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.

3.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101494	Mar. 12,19	Mar. 11,20
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	Mar. 12,19	Mar. 11,20
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	Mar. 13,19	Mar. 12,20
Voltage probe	SCHWARZBEC K	TK 9421	TK 9421-176	Jan. 17,19	Jan. 16,20
Test software	ADT	ADT_Cond_ V7.3.7	N/A	N/A	N/A

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

3.2.3 TEST PROCEDURES

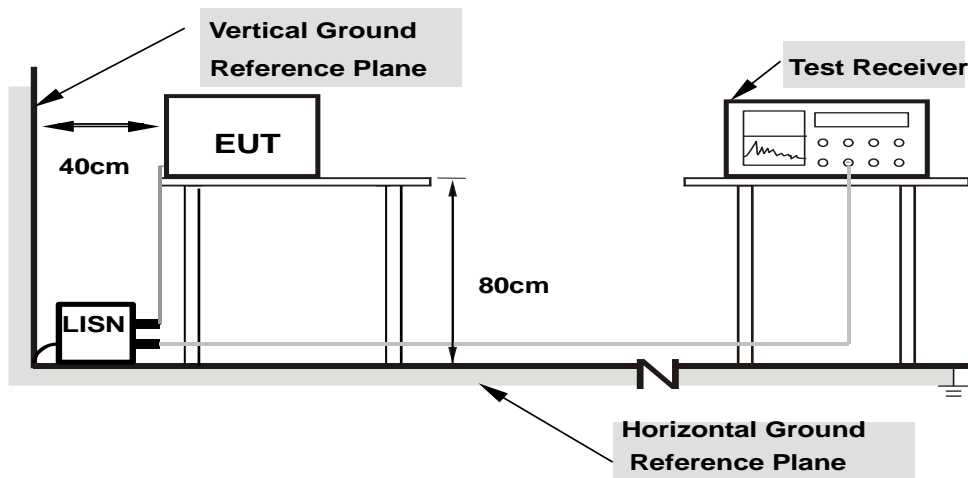
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

3.2.4 DEVIATION FROM TEST STANDARD

No deviation.

3.2.5 TEST SETUP



- Note:**
- Support units were connected to second LISN.
 - 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).

3.2.6 EUT OPERATING CONDITIONS

Same as 3.1.6

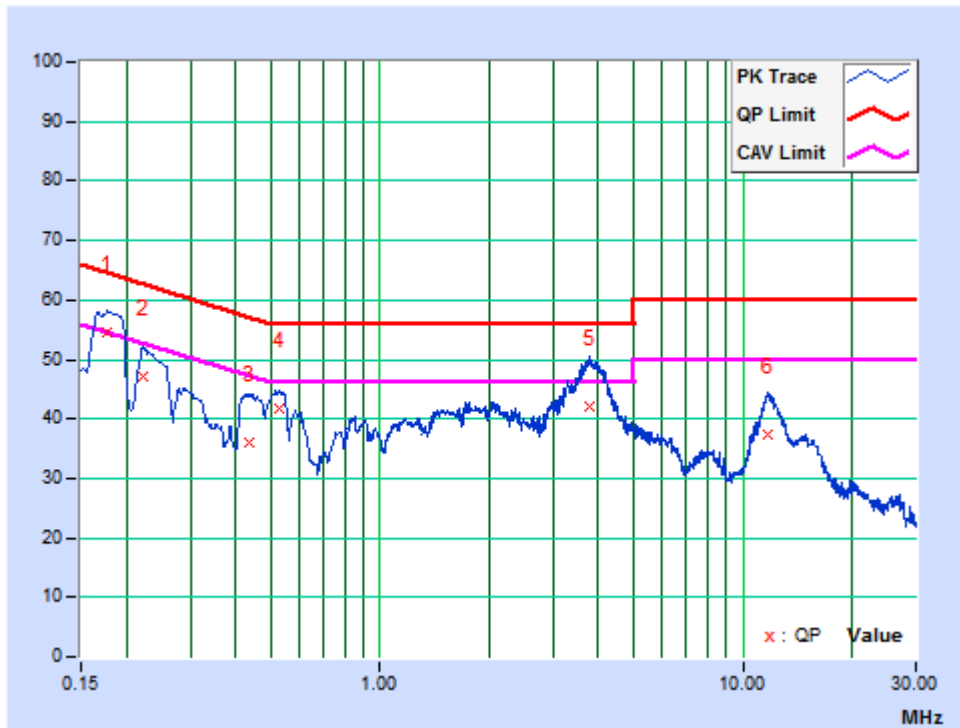
3.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA: 802.11n20

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

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17698	9.76	44.86	31.87	54.62	41.63	64.63	54.63	-10.00	-12.99
2	0.22209	10.29	36.99	20.02	47.28	30.31	62.74	52.74	-15.46	-22.43
3	0.43545	10.24	25.94	8.66	36.18	18.90	57.15	47.15	-20.96	-28.24
4	0.52801	10.39	31.46	18.78	41.85	29.17	56.00	46.00	-14.15	-16.83
5	3.77250	9.80	32.12	20.14	41.92	29.94	56.00	46.00	-14.08	-16.06
6	11.66775	9.77	27.73	20.64	37.50	30.41	60.00	50.00	-22.50	-19.59

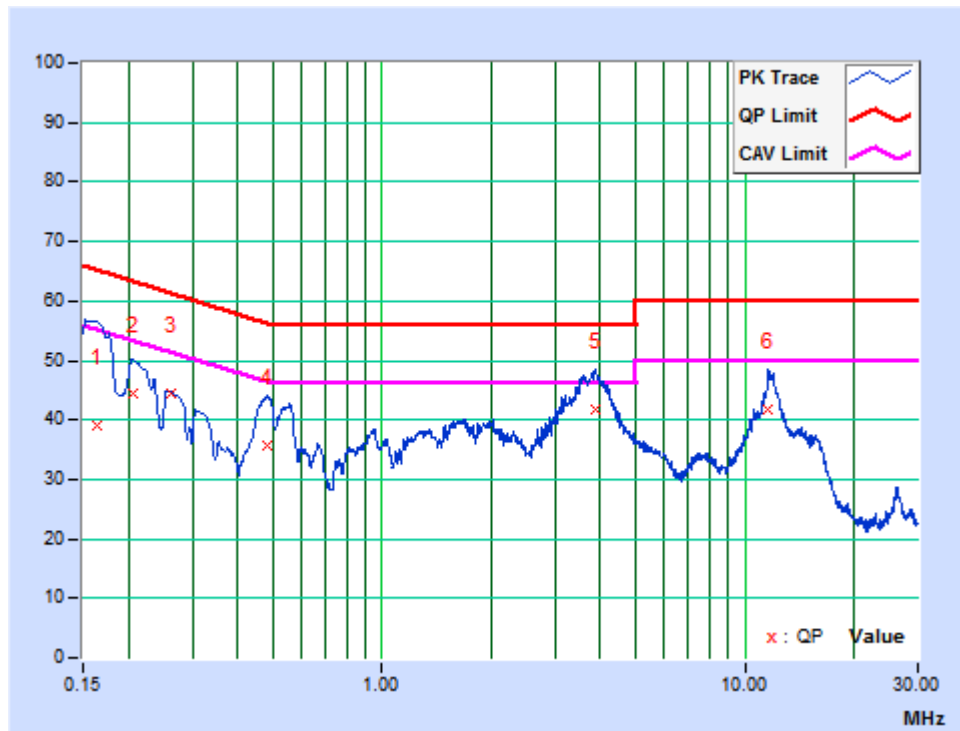
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. The emission levels of other frequencies were very low against the limit.
 3. Margin value = Emission level - Limit value
 4. Correction factor = Insertion loss + Cable loss
 5. Emission Level = Correction Factor + 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	0.16350	10.12	28.94	4.70	39.06	14.82	65.28
2	0.20625	9.76	34.69	9.96	44.45	19.72	63.35	53.35	-18.91	-33.64
3	0.26090	9.81	34.51	19.32	44.32	29.13	61.40	51.40	-17.09	-22.28
4	0.48140	9.80	25.98	12.11	35.78	21.91	56.31	46.31	-20.54	-24.41
5	3.89400	9.74	31.86	19.93	41.60	29.67	56.00	46.00	-14.40	-16.33
6	11.62725	9.90	31.90	24.81	41.80	34.71	60.00	50.00	-18.20	-15.29

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



3.3 TRANSMIT POWER MEASUREMENT

3.3.1 LIMITS OF TRANSMIT POWER MEASUREMENT

Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p \leq 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
		Indoor Access Point	1 Watt (30 dBm)
	√	Mobile and Portable client device	250mW (24 dBm)
U-NII-2A	-		250mW(24dBm) or 11 dBm+10LogB*
U-NII-2C	-		250mW(24dBm) or 11 dBm+10LogB*
U-NII-3	√		1 Watt (30 dBm)

NOTE: 1. Where B is the 26dB emission bandwidth in MHz.

Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

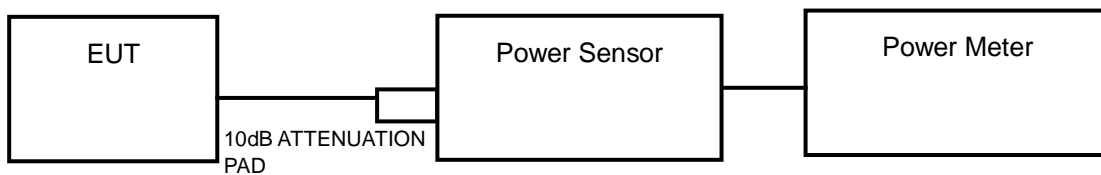
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

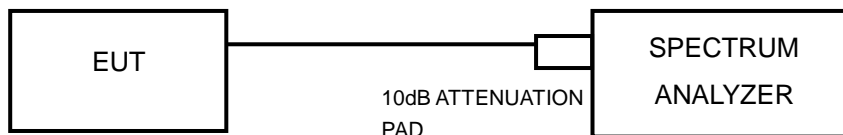
Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

3.3.2 TEST SETUP



FOR 6/26dB BANDWIDTH



3.3.3 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. 12,19	Mar. 11,20
Power Sensor	Anritsu	MA2411B	1531155	Mar. 12,19	Mar. 11,20
Digital Multimeter	FLUKE	15B	A1220010DG	Oct. 17, 18	Oct.16, 19
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Nov.15,18	Nov. 14,19
Oscilloscope	Agilent	DSO9254A	MY51260160	Nov. 09,18	Nov. 08,19
Signal Analyzer	Rohde & Schwarz	FSV7	102331	May 22,19	May 21,20
Signal Generator	Agilent	N5183A	MY50140980	Dec. 07,18	Dec. 06,19
Agile Signal Generator	Agilent	8645A	Agilent	Oct.27, 18	Oct.26, 19
Spectrum Analyzer	Keysight	N9020A	MY55400499	Mar. 12,19	Mar. 11,20
MXG-B RF Vector Signal Generator	Keysight	N5182B	MY56200288	Dec. 07, 18	Dec. 06, 19
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.

3.3.4 TEST PROCEDURE

FOR AVERAGE POWER MEASUREMENT

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

FOR 26dB BANDWIDTH

- 1) Set RBW = approximately 1% of the emission bandwidth.
- 2) Set the VBW > RBW.
- 3) Detector = RMS.
- 4) Trace mode = max hold.
- 5) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.



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FOR 6dB BANDWIDTH

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

3.3.5 DEVIATION FROM TEST STANDARD

No deviation.

3.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.



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3.3.7 TEST RESULTS

Power Output:

802.11n (20MHz)

CHAN.	FREQ. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		CHAIN 0	CHAIN 1				
36	5180	7.49	7.59	11.351	10.55	24	Pass
40	5200	7.84	7.78	12.079	10.82	24	Pass
48	5240	7.91	7.79	12.192	10.86	24	Pass
149	5745	8.77	8.50	14.613	11.65	30	Pass
157	5785	8.78	8.53	14.68	11.67	30	Pass
165	5825	8.89	8.79	15.313	11.85	30	Pass

802.11n (40MHz)

CHAN.	FREQ. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass/Fail
		CHAIN 0	CHAIN 1				
38	5190	7.64	7.99	12.103	10.83	24	Pass
46	5230	7.83	8.02	12.406	10.94	24	Pass
151	5755	8.90	8.72	15.209	11.82	30	Pass
159	5795	8.96	8.71	15.3	11.85	30	Pass



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Test Report No.: RF190730N062

26dB BANDWIDTH for 5150-5250MHz:

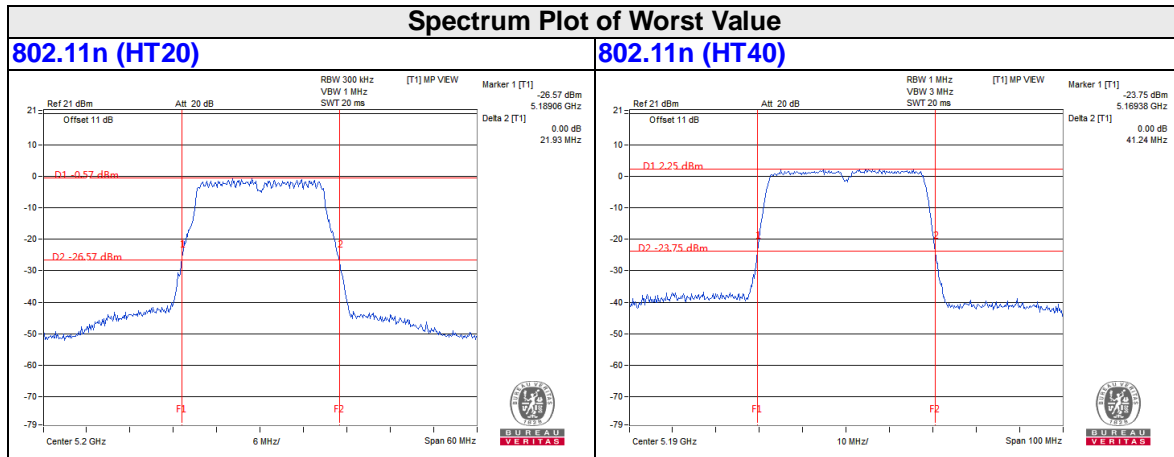
802.11n (20MHz)

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	21.83	21.89
40	5200	21.93	21.85
48	5240	21.79	21.96

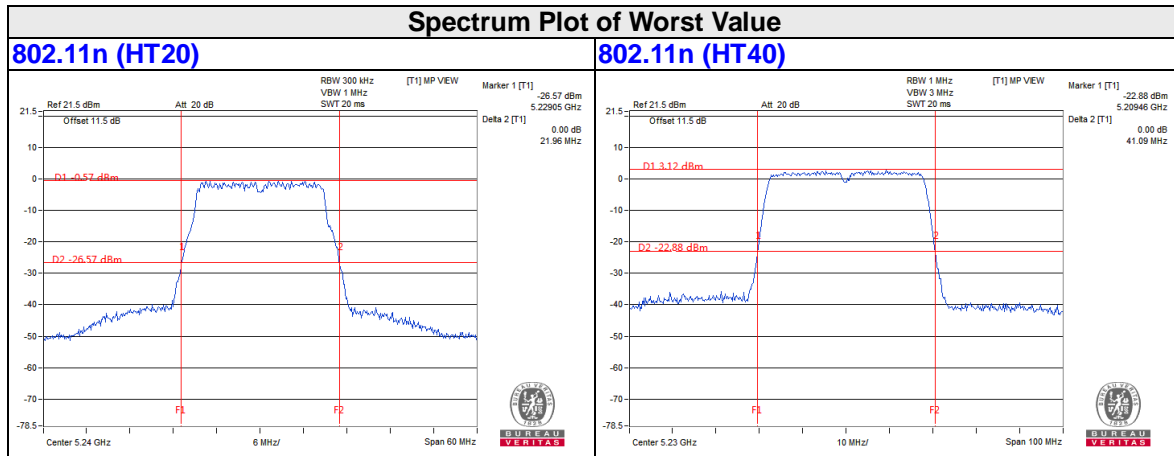
802.11n (40MHz)

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	41.24	40.98
46	5230	41.10	41.09

Chain 0



Chain 1



Bureau Veritas Shenzhen Co., Ltd.
Dongguan Branch

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

Tel: +86 769 8998 2098
Fax: +86 769 8593 1080
Email: customerservice.dg@cn.bureauveritas.com



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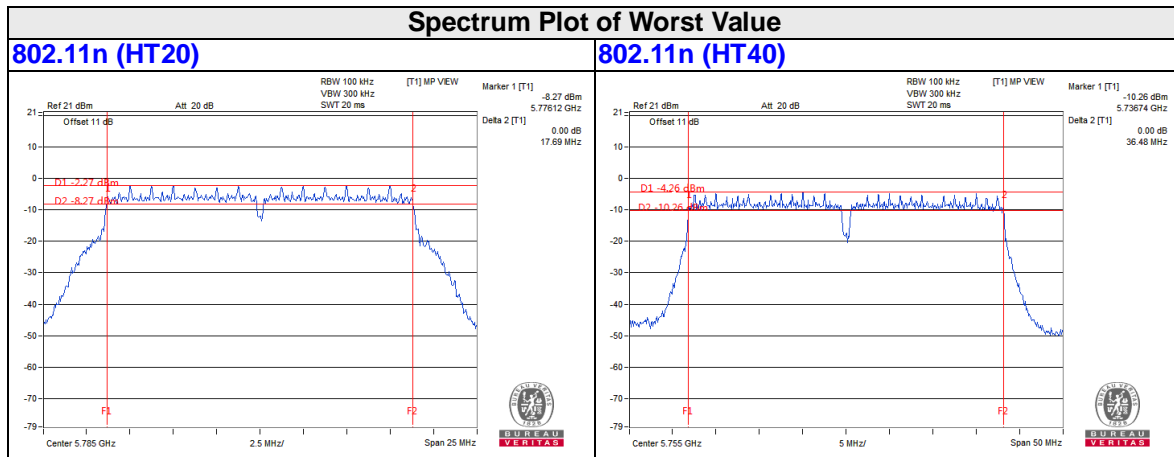
**6dB BANDWIDTH for 5725-5850MHz
802.11n (20M)**

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.65	17.63	0.5	Pass
157	5785	17.69	17.67	0.5	Pass
165	5825	17.68	17.67	0.5	Pass

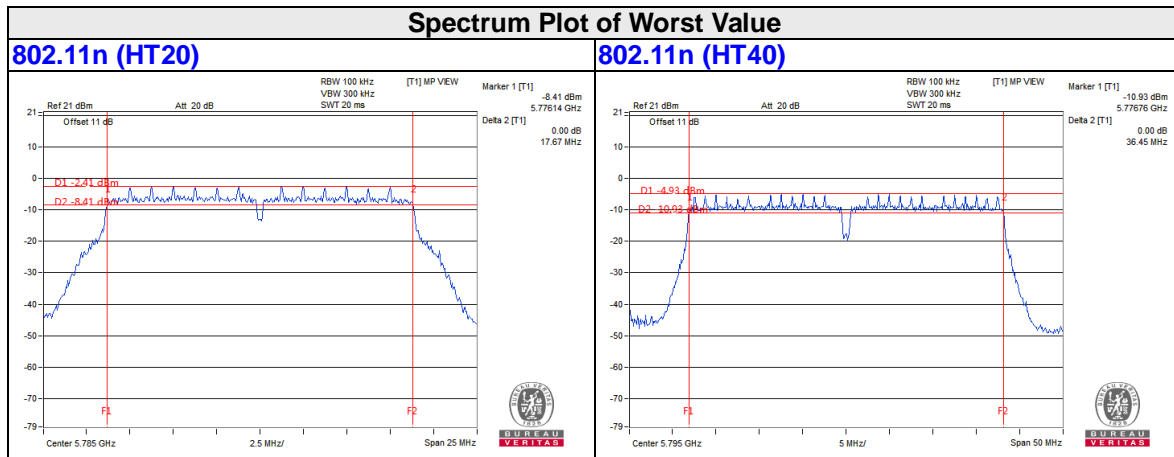
802.11n (40M)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	36.48	36.44	0.5	Pass
159	5795	36.45	36.45	0.5	Pass

Chain 0



Chain 1



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Dongguan Branch

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

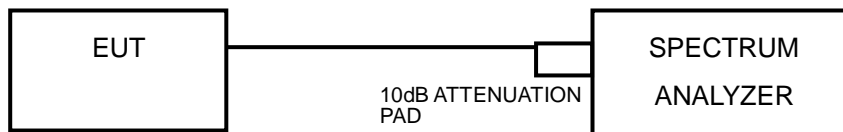
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Fax: +86 769 8593 1080
Email: customerservice.dg@cn.bureauveritas.com

3.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT

3.4.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
		Indoor Access Point	
	√	Mobile and Portable client device	11dBm/ MHz
U-NII-2A	-		11dBm/ MHz
U-NII-2C	-		11dBm/ MHz
U-NII-3	√		30dBm/ 500kHz

3.4.2 TEST SETUP



3.4.3 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

3.4.4 TEST PROCEDURES

For U-NII-1, U-NII-2A, U-NII-2C band:

Using method SA-2

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 1MHz, Set VBW = 3 MHz, Detector = RMS
- 3) Set Channel power measure = 1MHz
- 4) Sweep time = auto, trigger set to "free run".
- 5) Trace average at least 100 traces in power averaging mode.
- 6) Record the max value and add 10 log (1/duty cycle)



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For U-NII-3 band:

Using method SA-2

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 300 kHz, Set VBW = 1 MHz, Detector = RMS
- 3) Set Channel power measure = 1MHz
- 4) Sweep time = auto, trigger set to "free run".
- 5) Trace average at least 100 traces in power averaging mode.
- 6) Record the max value and add 10 log (1/duty cycle)

3.4.5 DEVIATION FROM TEST STANDARD

No deviation.

3.4.6 EUT OPERATING CONDITIONS

Same as 3.3.6

3.4.7 TEST RESULTS

**For 5.180~5.240GHz
802.11n (20MHz)**

Chan.	Chan. Freq. (MHz)	PSD (dBm)		Total PSD (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1			
36	5180	-6.48	-6.05	-2.87	11.00	Pass
40	5200	-6.59	-6.10	-2.95	11.00	Pass
48	5240	-6.69	-6.15	-3.02	11.00	Pass

Note: 1. Directional gain = $2.15\text{dBi} + 10\log(2) = 5.16\text{dBi} < 6\text{dBi}$, so the power density limit no need to reduce.

2. Refer to section 2.3 for duty cycle spectrum plot.

802.11n (40MHz)

Chan.	Chan. Freq. (MHz)	PSD (dBm)		Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1			
38	5190	-9.24	-8.79	-5.37	11.00	Pass
46	5230	-9.28	-8.97	-5.48	11.00	Pass

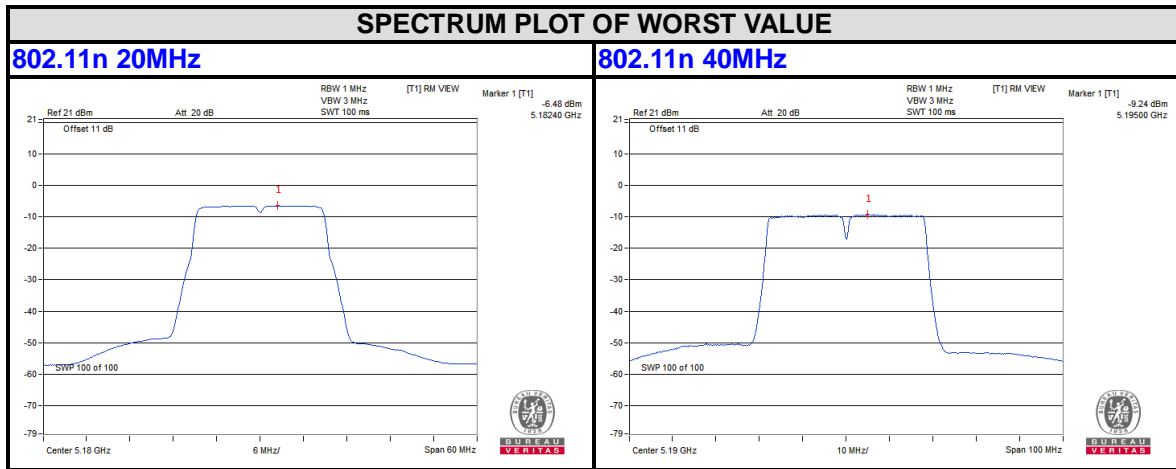
Note: 1. Directional gain = $2.15\text{dBi} + 10\log(2) = 5.16\text{dBi} < 6\text{dBi}$, so the power density limit no need to reduce.

2. Refer to section 2.3 for duty cycle spectrum plot.

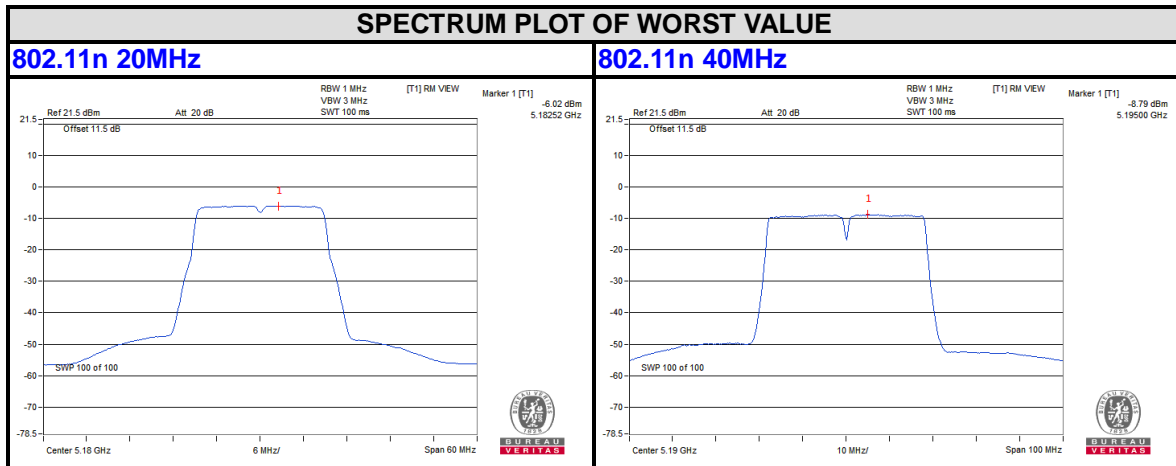


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Chain 0



Chain 1



**For 5.745~5.825GHz
802.11n (20MHz)**

TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	149	5745	-13.16	-10.94	3.01	-7.93	30.00	Pass
	157	5785	-13.03	-10.81	3.01	-7.80	30.00	Pass
	165	5825	-13.06	-10.84	3.01	-7.83	30.00	Pass
1	149	5745	-13.29	-11.07	3.01	-8.06	30.00	Pass
	157	5785	-13.26	-11.04	3.01	-8.03	30.00	Pass
	165	5825	-13.14	-10.92	3.01	-7.91	30.00	Pass

- Note:** 1. Directional gain = $2.11\text{dBi} + 10\log(2) = 5.12\text{dBi} < 6\text{dBi}$, so the power density limit no need to reduce.
2. Refer to section 2.3 for duty cycle spectrum plot.

802.11n (40MHz)

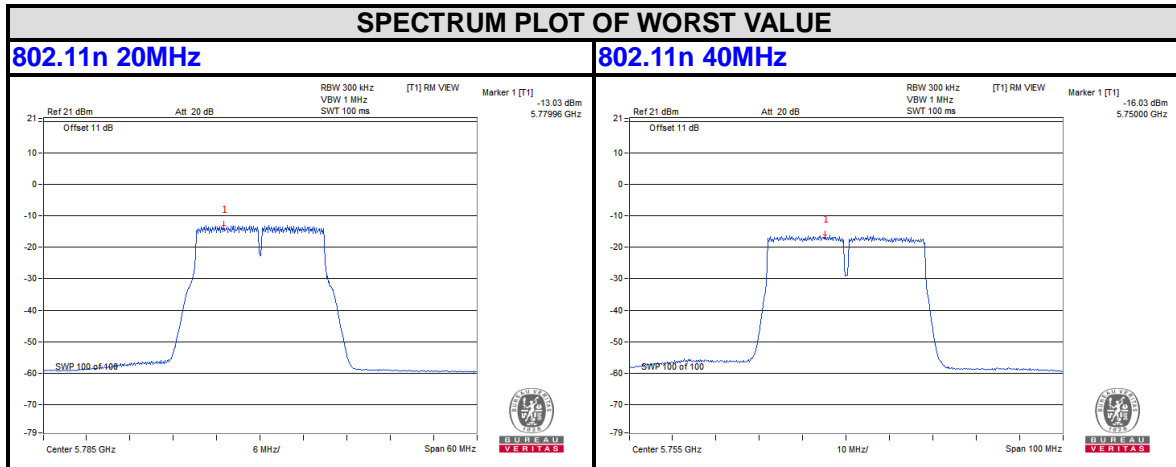
TX chain	Channel	Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
0	151	5755	-16.03	-13.81	3.01	-10.80	30.00	Pass
	159	5795	-16.15	-13.93	3.01	-10.92	30.00	Pass
1	151	5755	-16.31	-14.09	3.01	-11.08	30.00	Pass
	159	5795	-16.25	-14.03	3.01	-11.02	30.00	Pass

- Note:** 1. Directional gain = $2.11\text{dBi} + 10\log(2) = 5.12\text{dBi} < 6\text{dBi}$, so the power density limit no need to reduce.
2. Refer to section 2.3 for duty cycle spectrum plot.

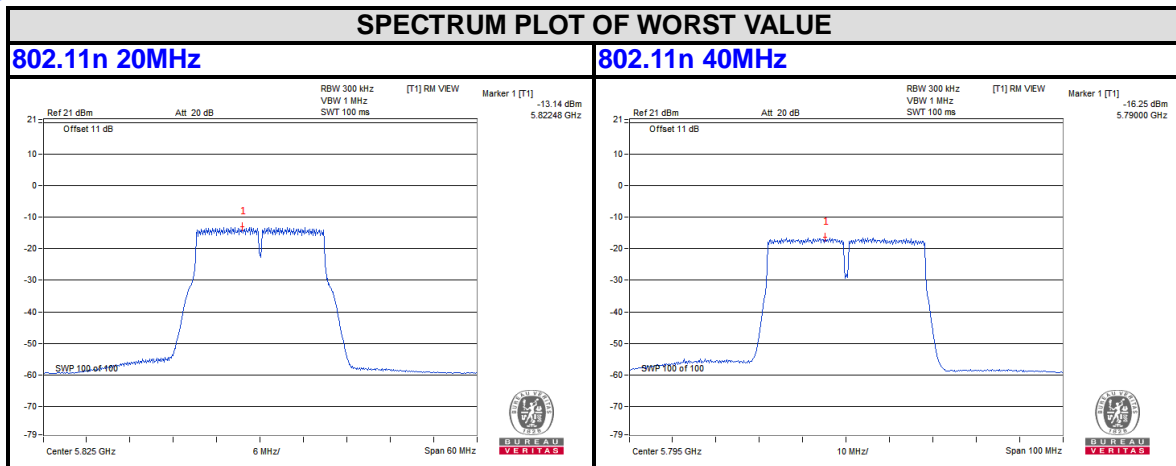


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CHAIN 0



CHAIN 1

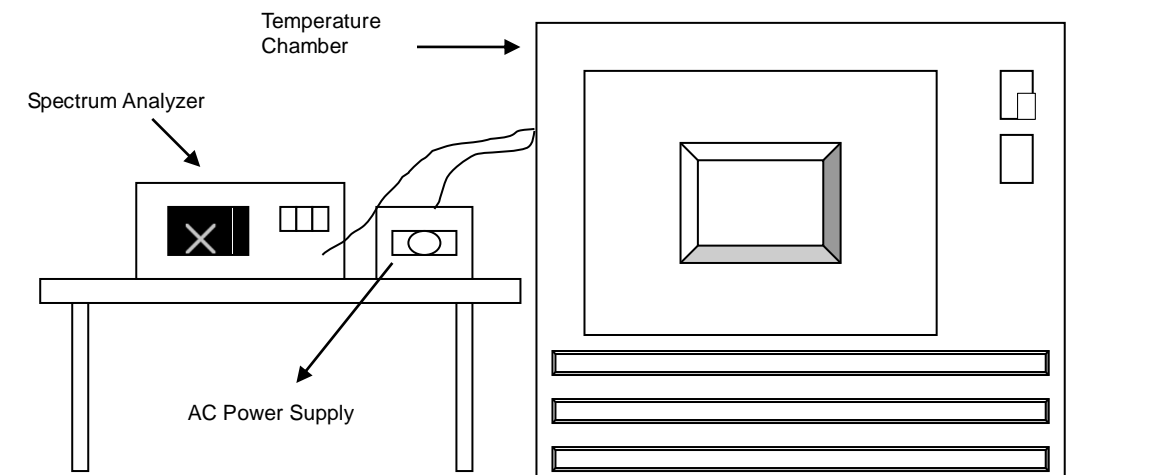


3.5 FREQUENCY STABILITY

3.5.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency of the carrier signal shall be maintained within band of operation.

3.5.2 TEST SETUP



3.5.3 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.



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3.5.4 TEST PROCEDURE

- a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- b. Turn the EUT on and couple its output to a spectrum analyzer.
- c. Turn the EUT off and set the chamber to the highest temperature specified.
- d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
- e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

3.5.5 DEVIATION FROM TEST STANDARD

No deviation.

3.5.6 EUT OPERATING CONDITION

Set the EUT transmit at un-modulation mode to test frequency stability.



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3.5.7 TEST RESULTS

FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5180MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift	Measured Frequency (MHz)	Frequency Drift	Measured Frequency (MHz)	Frequency Drift	Measured Frequency (MHz)	Frequency Drift
50	120	5744.9821	-0.00031	5744.9845	-0.00027	5744.9806	-0.00034	5744.9791	-0.00036
40	120	5744.9953	-0.00008	5744.9994	-0.00001	5744.9997	-0.00001	5744.9939	-0.00011
30	120	5744.9992	-0.00001	5744.9959	-0.00007	5744.9988	-0.00002	5744.999	-0.00002
20	120	5744.994	-0.00010	5744.9931	-0.00012	5744.9904	-0.00017	5744.9926	-0.00013
10	120	5745.0231	0.00040	5745.0252	0.00044	5745.0241	0.00042	5745.0253	0.00044
0	120	5744.9721	-0.00049	5744.9736	-0.00046	5744.9696	-0.00053	5744.9724	-0.00048
-10	120	5745.0211	0.00037	5745.0232	0.00040	5745.0219	0.00038	5745.0219	0.00038
-20	120	5745.0242	0.00042	5745.0242	0.00042	5745.0254	0.00044	5745.0249	0.00043
-30	120	5744.9958	-0.00007	5744.9923	-0.00013	5744.9978	-0.00004	5744.9925	-0.00013

FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5180MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift	Measured Frequency (MHz)	Frequency Drift	Measured Frequency (MHz)	Frequency Drift	Measured Frequency (MHz)	Frequency Drift
20	138	5744.9943	-0.00010	5744.9942	-0.00010	5744.9908	-0.00016	5744.993	-0.00012
	120	5744.994	-0.00010	5744.9931	-0.00012	5744.9904	-0.00017	5744.9926	-0.00013
	102	5744.9937	-0.00011	5744.9925	-0.00013	5744.9909	-0.00016	5744.9915	-0.00015



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4. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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5. APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

---END---