

FCC TEST REPORT

(WIFI 5G)

Product: Digital projector

Model Name: i500

FCC ID: JVPI500

Applicant: BENQ corporation

Address: 16 Jihu Road, Neihu, Taipei 114, Taiwan

Manufacturer: BENQ corporation

Address: 16 Jihu Road, Neihu, Taipei 114, Taiwan

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Report No.: RF160314W002-3

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Test Report No.: RF160314W002-3

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF160314W002-3	Original release	May 03, 2016



Test Report No.: RF160314W002-3

1 CERTIFICATION

PRODUCT: Digital projector
BRAND NAME: BENQ
MODEL NAME: i500
APPLICANT: BENQ corporation
TESTED: Mar. 15, 2016 ~ May 02, 2016
TEST SAMPLE: Identical Prototype
STANDARDS: **FCC Part 15, Subpart E (15.407), Section 15.407**
ANSI C63.10-2013
FCC 15.247 (d)

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

PREPARED BY : , **DATE:** May 03, 2016
(Amyee Qian / Engineer)

APPROVED BY : , **DATE:** May 03, 2016
(William Chung / Manager)



2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART E (SECTION 15.407)			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -19.02dB at 21.104000MHz.
15.407(b)(1/2/3) (b)(5)	Electric Field Strength Spurious Emissions, 30MHz ~ 40000MHz	PASS	Meet the requirement of limit. Minimum passing margin is -1.1dB at 11490.00MHz.
15.247(d)	Out of band Emission Measurement	PASS	Meet the requirement of limit.
15.407(a)(1/2/3)	Maximum conducted output Power	PASS	Meet the requirement of limit.
15.407(a)(1/2/3)	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.

2.1 MEASUREMENT UNCERTAINTY

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

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted Emissions at mains	150kHz ~ 30MHz	2.44 dB
Radiated emissions	9KHz ~ 30MHz	2.74dB
	30MHz ~ 1GMHz	3.55dB
	1GHz ~ 18GHz	4.84dB
	18GHz ~ 40GHz	1.94dB

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



3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Digital projector
MODEL NAME	i500
ADDITIONAL MODELS	i500v, i0319, i0519, i490H, RW0519, i501JD, i500ST, i500P, i500E, i500H, i500F, i500N, i500J
POWER SUPPLY	19Vdc (adapter)
MODULATION TYPE	64QAM, 16QAM, QPSK, BPSK
MODULATION TECHNOLOGY	OFDM
TRANSFER RATE	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to MCS7
OPERATING FREQUENCY	5180 ~ 5240MHz, 5725 ~ 5850MHz
NUMBER OF CHANNEL	5180 ~ 5240MHz: 4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) 5725 ~ 5850MHz: 5 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz)
AVERAGE POWER	16.817mW for 5180 ~ 5240MHz 18.180mW for 5725 ~ 5850MHz
ANTENNA 0 TYPE	5180 ~ 5240MHz: PIFA Antenna with 3.4dBi gain 5725 ~ 5850MHz: PIFA Antenna with 2.5dBi gain
ANTENNA 1 TYPE	5180 ~ 5240MHz: PIFA Antenna with 2.5dBi gain 5725 ~ 5850MHz: PIFA Antenna with 3.5dBi gain
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	N/A

NOTE:

- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitters and one receivers.

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

- The EUT was powered by the following adapter:

ADAPTER	
BRAND:	Ktec
MODEL:	KSAS1201900631M3
INPUT:	AC 100-240V, 1600mA
OUTPUT:	DC 19V, 6310mA



4. The above additional models are identical with the test model i500, and the only difference is the model name for marketing purpose.
5. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

3.2 DESCRIPTION OF TEST MODES

FOR 5180 ~ 5240MHz

4 channels are provided for 802.11a, 802.11n (20MHz):

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

2 channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	46	5230 MHz

FOR 5725 ~ 5850MHz

5 channels are provided for 802.11a, 802.11n (20MHz):

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

2 channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz



3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE $\geq$ 1G	RE<1G	PLC	APCM	
A	√	√	-	√	Powered by Adapter with wifi(5G) link
B	-	-	-	-	Powered by Battery with wifi(5G) link

Where

RE $\geq$ 1G: Radiated Emission above 1GHz**RE<1G:** Radiated Emission below 1GHz**PLC:** Power Line Conducted Emission**APCM:** Antenna Port Conducted Measurement**NOTE:**The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.**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)
A	802.11a	5180-5240	36 to 48	36, 44, 48	OFDM	BPSK	6.0
A	802.11n (20MHz)		36 to 48	36, 44, 48	OFDM	BPSK	MCS0
A	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	MCS0
A	802.11a	5725-5850	149 to 165	149, 157, 165	OFDM	BPSK	6.0
A	802.11n (20MHz)		149 to 165	149, 157, 165	OFDM	BPSK	MCS0
A	802.11n (40MHz)		151 to 159	151, 159	OFDM	BPSK	MCS0

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)
A	802.11a	5180-5240	36 to 48	36	OFDM	BPSK	6.0



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)
A	802.11a	5180-5240	36 to 48	36	OFDM	BPSK	6.0

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.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11a	5180-5240	36 to 48	36, 48	OFDM	BPSK	6.0
A	802.11n (20MHz)		36 to 48	36, 48	OFDM	BPSK	MCS0
A	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	MCS0
A	802.11a	5725-5850	149 to 165	149, 157, 165	OFDM	BPSK	6.0
A	802.11n (20MHz)		149 to 165	149, 157, 165	OFDM	BPSK	MCS0
A	802.11n (40MHz)		151 to 159	151, 159	OFDM	BPSK	MCS0



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)
A	802.11a	5180-5240	36 to 48	36, 44, 48	OFDM	BPSK	6.0
A	802.11n (20MHz)		36 to 48	36, 44, 48	OFDM	BPSK	MCS0
A	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	MCS0
A	802.11a	5725-5850	149 to 165	149, 157, 165	OFDM	BPSK	6.0
A	802.11n (20MHz)		149 to 165	149, 157, 165	OFDM	BPSK	MCS0
A	802.11n (40MHz)		151 to 159	151, 159	OFDM	BPSK	MCS0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE<1G	23deg. C, 62%RH	19Vdc (adapter)	Alex Chen
RE≥1G	23deg. C, 62%RH	19Vdc (adapter)	Alex Chen
PLC	24deg. C, 61%RH	19Vdc (adapter)	Yuqiang Yin
APCM	23.5deg. C, 60%RH	19Vdc (adapter)	Yuqiang Yin



3.3 DUTY CYCLE OF TEST SIGNAL

Duty cycle of test signal is < 98%, duty factor shall be considered.

802.11a: Duty cycle = $1.440/1.638 = 0.879$, Duty factor = $10 * \log(1/0.879) = 0.56$

802.11n (20MHz): Duty cycle = $1.696/1.897 = 0.894$, Duty factor = $10 * \log(1/0.894) = 0.49$

802.11n (40MHz): Duty cycle = $1.354/1.556 = 0.870$, Duty factor = $10 * \log(1/0.870) = 0.60$





3.4 DESCRIPTION OF SUPPORT UNITS

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

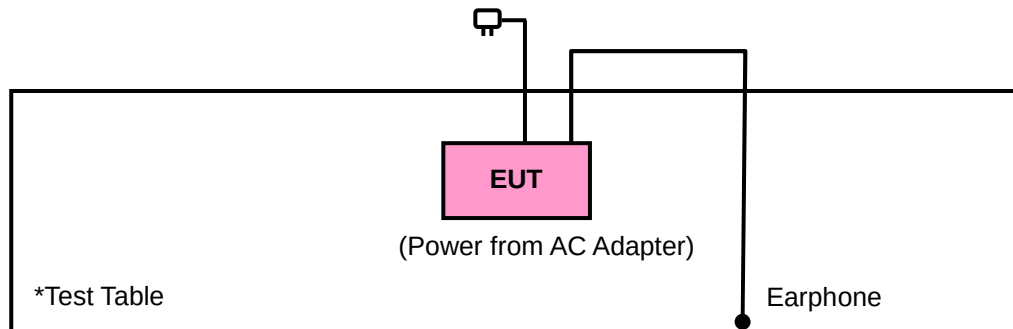
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	DC source	LONG WEI	PS-6403D	010934269	N/A
2	PC	HP	A6608CN	3CR83825X3	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable 1.0m
2	AC Line: Unshielded, Detachable 1.5m

NOTE:

1. All power cords of the above support units are non shielded (1.8m).

3.4.1 CONFIGURATION OF SYSTEM UNDER TEST



3.5 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 E (15.407)

KDB 789033 D02_v01_General UNII Test Procedures New Rules

KDB 926956 D01_v01_U-NII Transition Plan v01r05

ANSI C63.10-2013

NOTE:

1. All test items have been performed and recorded as per the above standards. Due to the EUT is through the DC power supply, there was no need for Conducted Emission test.
2. The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

4 TEST TYPES AND RESULTS

4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.1.1 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

NOTE:

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 20dB under any condition of modulation.

4.1.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

APPLICABLE TO	LIMIT	
	FIELD STRENGTH AT 3m (dBuV/m)	
	PK	AV
	74	54
√	EIRP LIMIT (dBm)	EQUIVALENT FIELD STRENGTH AT 3m (dBuV/m)
	PK	PK
	-27	68.3

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

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



4.1.3 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
Bilog Antenna	Teseq	CBL 6111D	30643	Jul. 16, 15	Jul. 15, 16
Loop Antenna	Daze	ZN30900A	0708	Dec. 30, 15	Dec. 29, 16
Horn Antenna (1GHz -18GHz)	ETS -Lindgren	3117	00062558	May 30, 15	May 29, 17
Amplifier	Burgeon	BPA-530	100220	Apr. 05,16	Apr. 04,17
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 20,15	Nov. 19,17
Pre-Amplifier	HP	8449B	3008A00409	Apr. 25,15	Apr. 24,17
GPS Generator+ Antenna	TOJOIN	GNSS-5000A	E1-010119	Aug. 08, 14	Aug. 07, 16
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

NOTE:

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

4.1.4 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters (Below 1G) / 1.5 meters (Above 1G) above the ground at a 3 meter 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.

NOTE:

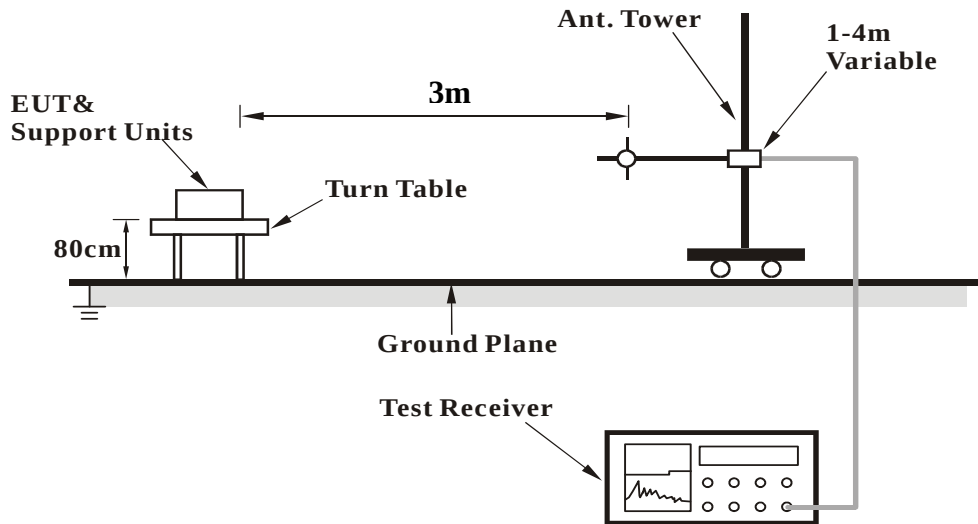
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.5 DEVIATION FROM TEST STANDARD

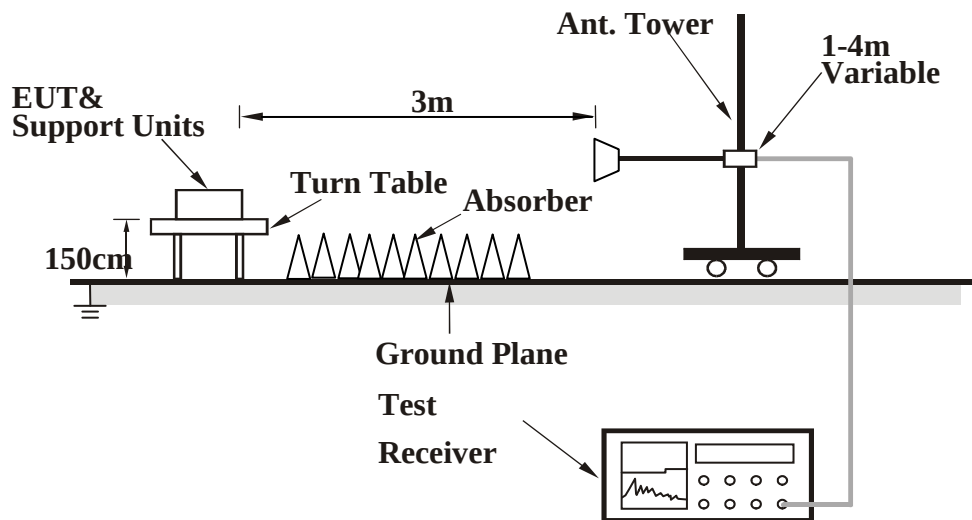
No deviation.

4.1.6 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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



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4.1.7 EUT OPERATING CONDITION

- a. Set the EUT under full load condition and placed them 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.



4.1.8 TEST RESULTS

BELOW 1GHz WORST-CASE DATA:

9 KHz – 30 KHz data: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

30 MHz – 1GHz data:

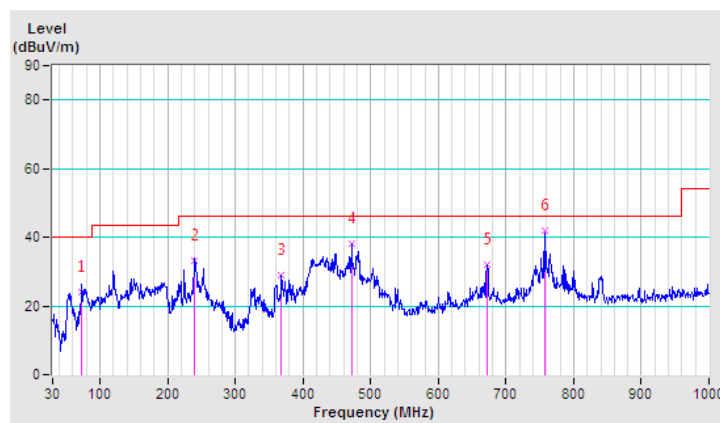
802.11a

CHANNEL	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	71.71	24.0	40.0	-16.0	1.00 H	0	51.88	-27.92
2	239.52	33.3	46.0	-12.7	1.00 H	0	55.05	-21.79
3	368.53	29.1	46.0	-16.9	1.00 H	0	46.55	-17.44
4	471.35	38.3	46.0	-7.7	1.00 H	0	53.45	-15.16
5	671.17	31.9	46.0	-14.1	1.00 H	0	42.42	-10.56
6	756.53	42.1	46.0	-3.9	1.00 H	0	51.82	-9.74

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.



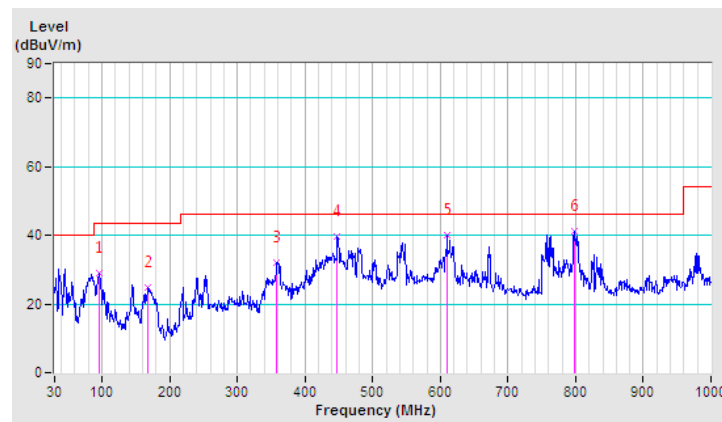


CHANNEL	Channel 36	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

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	94.99	29.0	43.5	-14.5	1.00 V	0	56.15	-27.15
2	167.74	24.9	43.5	-18.6	1.00 V	0	48.81	-23.92
3	357.86	32.0	46.0	-14.0	1.00 V	0	49.90	-17.91
4	447.10	39.6	46.0	-6.5	1.00 V	0	55.01	-15.46
5	610.06	40.1	46.0	-5.9	1.00 V	0	52.52	-12.41
6	797.27	41.3	46.0	-4.7	1.00 V	0	51.11	-9.77

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 WORST-CASE DATA: Band 1

802.11a

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	5150.00	60.9 PK	74.0	-13.1	1.00 H	0	61.75	-0.83
2	5150.00	48.2 AV	54.0	-5.8	1.00 H	0	49.02	-0.83
3	*5180.00	108.8 PK			1.00 H	0	109.48	-0.71
4	*5180.00	98.7 AV			1.00 H	0	99.39	-0.71
5	#10360.00	64.6 PK	68.3	-3.7	1.00 H	159	55.88	8.69
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	5150.00	60.4 PK	74.0	-13.6	1.00 V	52	61.22	-0.83
2	5150.00	50.3 AV	54.0	-3.7	1.00 V	52	51.09	-0.83
3	*5180.00	106.0 PK			1.00 V	52	106.69	-0.71
4	*5180.00	96.2 AV			1.00 V	52	96.95	-0.71
5	#10360.00	64.8 PK	68.3	-3.5	1.00 V	216	56.15	8.69

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 44	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	*5220.00	109.4 PK			1.00 H	355	109.95	-0.57
2	*5220.00	98.8 AV			1.00 H	355	99.38	-0.57
3	#10440.00	64.5 PK	68.3	-3.8	1.00 H	268	55.68	8.83
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	*5220.00	105.1 PK			1.00 V	50	105.66	-0.57
2	*5220.00	93.9 AV			1.00 V	50	94.49	-0.57
3	#10440.00	64.6 PK	68.3	-3.7	1.00 V	178	55.80	8.83

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 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	*5240.00	108.4 PK			1.00 H	0	108.88	-0.48
2	*5240.00	98.9 AV			1.00 H	0	99.33	-0.48
3	5350.00	54.46 PK	74.0	-19.54	1.00 H	0	54.53	-0.07
4	5350.00	42.34 AV	54.0	-11.66	1.00 H	0	42.41	-0.07
5	#10480.00	65.4 PK	68.3	-2.9	1.00 H	297	56.55	8.89
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	*5240.00	106.2 PK			1.00 V	35	106.67	-0.48
2	*5240.00	95.5 AV			1.00 V	35	95.99	-0.48
3	5350.00	53.08 PK	74.0	-20.92	1.00 V	35	53.15	-0.07
4	5350.00	42.64 AV	54.0	-11.36	1.00 V	35	42.71	-0.07
5	#10480.00	64.5 PK	68.3	-3.8	1.00 V	251	55.63	8.89

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 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.



802.11n (20MHz)

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	5150.00	61.6 PK	74.0	-12.4	1.00 H	355	62.41	-0.83
2	5150.00	46.7 AV	54.0	-7.3	1.00 H	355	47.56	-0.83
3	*5180.00	108.1 PK			1.00 H	355	108.84	-0.71
4	*5180.00	97.2 AV			1.00 H	355	97.92	-0.71
5	#10360.00	63.5 PK	68.3	-4.8	1.00 H	355	54.82	8.69
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	5150.00	62.2 PK	74.0	-11.8	1.00 V	50	62.99	-0.83
2	5150.00	51.9 AV	54.0	-2.1	1.00 V	50	52.69	-0.83
3	*5180.00	106.8 PK			1.00 V	50	107.50	-0.71
4	*5180.00	97.6 AV			1.00 V	50	98.29	-0.71
5	#10360.00	63.7 PK	68.3	-4.6	1.00 V	230	55.03	8.69

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 44	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	*5220.00	108.5 PK			1.00 H	355	109.03	-0.57
2	*5220.00	96.8 AV			1.00 H	355	97.41	-0.57
3	#10440.00	63.3 PK	68.3	-5.0	1.00 H	147	54.42	8.83
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	*5220.00	107.4 PK			1.00 V	50	107.99	-0.57
2	*5220.00	95.6 AV			1.00 V	50	96.15	-0.57
3	#10440.00	63.9 PK	68.3	-4.4	1.00 V	154	55.05	8.83

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 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	*5240.00	107.5 PK			1.00 H	5	108.00	-0.48
2	*5240.00	96.8 AV			1.00 H	5	97.26	-0.48
3	5350.00	52.16 PK	74.0	-21.84	1.00 H	5	52.23	-0.07
4	5350.00	42.28 AV	54.0	-11.72	1.00 H	5	42.35	-0.07
5	#10480.00	64.3 PK	68.3	-4.0	1.00 H	186	55.36	8.89
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	*5240.00	106.5 PK			1.00 V	30	106.95	-0.48
2	*5240.00	96.1 AV			1.00 V	30	96.60	-0.48
3	5350.00	52.89 PK	74.0	-21.11	1.00 V	30	52.96	-0.07
4	5350.00	43.69 AV	54.0	-10.31	1.00 V	30	43.76	-0.07
5	#10480.00	63.6 PK	68.3	-4.7	1.00 V	294	54.68	8.89

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 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.



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	5150.00	60.9 PK	74.0	-13.1	1.00 H	350	61.70	-0.83
2	5150.00	48.8 AV	54.0	-5.2	1.00 H	350	49.59	-0.83
3	*5190.00	107.5 PK			1.00 H	350	108.16	-0.68
4	*5190.00	96.9 AV			1.00 H	350	97.53	-0.68
5	#10380.00	62.5 PK	68.3	-5.8	1.00 H	256	53.74	8.72
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	5150.00	62.4 PK	74.0	-11.6	1.00 V	55	63.25	-0.83
2	5150.00	51.7 AV	54.0	-2.3	1.00 V	55	52.51	-0.83
3	*5190.00	107.1 PK			1.00 V	55	107.80	-0.68
4	*5190.00	96.5 AV			1.00 V	55	97.16	-0.68
5	#10380.00	62.9 PK	68.3	-5.4	1.00 V	230	54.15	8.72

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 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	*5230.00	84.8 PK			1.05 H	139	74.48	10.33
2	*5230.00	72.9 AV			1.05 H	139	62.54	10.33
3	5350.00	54.02 PK	74.0	-19.98	1.00 H	350	54.09	-0.07
4	5350.00	42.89 AV	54.0	-11.11	1.00 H	350	42.96	-0.07
5	#10460.00	54.3 PK	68.3	-14.0	1.00 H	92	36.89	17.39
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	82.2 PK			1.06 V	119	71.87	10.33
2	*5230.00	69.7 AV			1.06 V	119	59.36	10.33
3	5350.00	53.41 PK	74.0	-20.59	1.00 V	35	53.48	-0.07
4	5350.00	42.36 AV	54.0	-11.64	1.00 V	35	42.43	-0.07
5	#10460.00	53.4 PK	68.3	-14.9	1.00 V	258	36.01	17.39

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The 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.



ABOVE 1GHz WORST-CASE DATA: Band 4

802.11a

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	#5715.00	59.0 PK	68.3	-9.3	1.00 H	60	56.83	2.13
2	#5725.00	66.7 PK	78.3	-11.6	1.00 H	60	64.51	2.21
3	*5745.00	107.9 PK			1.00 H	60	105.55	2.36
4	*5745.00	95.9 AV			1.00 H	60	93.57	2.36
5	11490.00	65.5 PK	74.0	-8.5	1.00 H	218	55.45	10.02
6	11490.00	52.5 AV	54.0	-1.5	1.00 H	218	42.45	10.02
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	#5715.00	58.1 PK	68.3	-10.2	1.00 V	168	55.99	2.13
2	#5725.00	66.1 PK	78.3	-12.2	1.00 V	168	63.87	2.21
3	*5745.00	106.3 PK			1.00 V	168	103.91	2.36
4	*5745.00	95.2 AV			1.00 V	168	92.79	2.36
5	11490.00	65.2 PK	74.0	-8.8	1.00 V	35	55.22	10.02
6	11490.00	52.3 AV	54.0	-1.7	1.00 V	35	42.24	10.02

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 157	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	*5785.00	105.9 PK			1.00 H	55	103.25	2.66
2	*5785.00	96.0 AV			1.00 H	55	93.33	2.66
3	#11570.00	65.5 PK	74.0	-8.5	1.00 H	137	55.40	10.11
4	#11570.00	52.0 AV	54.0	-2.0	1.00 H	137	41.91	10.11
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	*5785.00	106.1 PK			1.00 V	165	103.48	2.66
2	*5785.00	96.5 AV			1.00 V	165	93.82	2.66
3	#11570.00	64.8 PK	74.0	-9.2	1.00 V	272	54.70	10.11
4	#11570.00	52.1 AV	54.0	-1.9	1.00 V	272	42.02	10.11

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 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 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	*5825.00	103.2 PK			1.00 H	62	100.41	2.82
2	*5825.00	93.6 AV			1.00 H	62	90.77	2.82
3	#5850.00	66.5 PK	78.3	-11.8	1.00 H	62	63.32	3.15
4	#5860.00	57.6 PK	68.3	-10.7	1.00 H	62	54.39	3.23
5	11650.00	66.7 PK	74.0	-7.3	1.00 H	148	56.52	10.15
6	11650.00	52.3 AV	54.0	-1.7	1.00 H	148	42.19	10.15
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	*5825.00	105.3 PK			1.00 V	170	102.44	2.82
2	*5825.00	95.2 AV			1.00 V	170	92.42	2.82
3	#5850.00	67.1 PK	78.3	-11.2	1.00 V	170	63.99	3.15
4	#5860.00	57.7 PK	68.3	-10.6	1.00 V	170	54.46	3.23
5	11650.00	66.1 PK	74.0	-7.9	1.00 V	263	55.98	10.15
6	11650.00	52.4 AV	54.0	-1.6	1.00 V	263	42.27	10.15

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.



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	#5715.00	59.5 PK	68.3	-8.8	1.00 H	55	57.34	2.13
2	#5725.00	65.9 PK	78.3	-12.4	1.00 H	55	63.68	2.21
3	*5745.00	107.2 PK			1.00 H	55	104.85	2.36
4	*5745.00	97.2 AV			1.00 H	55	94.79	2.36
5	11490.00	65.4 PK	74.0	-8.6	1.00 H	159	55.34	10.02
6	11490.00	52.9 AV	54.0	-1.1	1.00 H	159	42.89	10.02
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	#5715.00	59.1 PK	68.3	-9.2	1.00 H	55	56.99	2.13
2	#5725.00	66.3 PK	78.3	-12.0	1.00 H	55	64.04	2.21
3	*5745.00	103.6 PK			1.00 V	160	101.22	2.36
4	*5745.00	92.8 AV			1.00 V	160	90.39	2.36
5	11490.00	65.9 PK	74.0	-8.2	1.00 V	321	55.83	10.02
6	11490.00	52.9 AV	54.0	-1.1	1.00 V	321	42.91	10.02

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 157	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	*5785.00	102.8 PK			1.00 H	60	100.18	2.66
2	*5785.00	91.9 AV			1.00 H	60	89.25	2.66
3	#11570.00	66.8 PK	74.0	-7.2	1.00 H	138	56.68	10.11
4	#11570.00	52.3 AV	54.0	-1.8	1.00 H	138	42.14	10.11
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	*5785.00	102.6 PK			1.00 V	170	99.93	2.66
2	*5785.00	91.4 AV			1.00 V	170	88.72	2.66
3	#11570.00	65.1 PK	74.0	-8.9	1.00 V	284	54.95	10.11
4	#11570.00	52.3 AV	54.0	-1.7	1.00 V	284	42.22	10.11

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 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 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	*5825.00	105.8 PK			1.00 H	60	102.96	2.82
2	*5825.00	95.1 AV			1.00 H	60	92.31	2.82
3	#5850.00	67.7 PK	78.3	-10.6	1.00 H	60	64.50	3.15
4	#5860.00	56.8 PK	68.3	-11.5	1.00 H	60	53.55	3.23
5	11650.00	65.6 PK	74.0	-8.4	1.00 H	60	55.47	10.15
6	11650.00	52.4 AV	54.0	-1.6	1.00 H	60	42.28	10.15
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	*5825.00	103.0 PK			1.00 V	158	100.17	2.82
2	*5825.00	91.8 AV			1.00 V	158	88.97	2.82
3	#5850.00	65.9 PK	78.3	-12.4	1.00 V	158	62.77	3.15
4	#5860.00	57.2 PK	68.3	-11.1	1.00 V	158	54.01	3.23
5	11650.00	66.7 PK	74.0	-7.3	1.00 V	170	56.56	10.15
6	11650.00	52.4 AV	54.0	-1.6	1.00 V	170	42.29	10.15

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. " # ": The radiated frequency is out of the restricted band.



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	#5715.00	56.9 PK	68.3	-11.4	1.00 H	55	54.75	2.13
2	#5725.00	66.3 PK	78.3	-12.0	1.00 H	55	64.05	2.21
3	*5755.00	107.1 PK			1.00 H	55	104.63	2.43
4	*5755.00	97.1 AV			1.00 H	55	94.64	2.43
5	11510.00	65.5 PK	74.0	-8.5	1.00 H	157	55.44	10.04
6	11510.00	52.7 AV	54.0	-1.3	1.00 H	157	42.64	10.04
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	#5715.00	57.6 PK	68.3	-10.7	1.00 V	168	55.51	2.13
2	#5725.00	67.2 PK	78.3	-11.1	1.00 V	168	65.02	2.21
3	*5755.00	103.2 PK			1.00 V	168	100.81	2.43
4	*5755.00	92.1 AV			1.00 V	168	89.68	2.43
5	11510.00	66.1 PK	74.0	-7.9	1.00 V	268	56.09	10.04
6	11510.00	52.5 AV	54.0	-1.5	1.00 V	268	42.44	10.04

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 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	*5795.00	104.3 PK			1.00 H	40	101.55	2.73
2	*5795.00	93.0 AV			1.00 H	40	90.25	2.73
3	#5850.00	66.8 PK	78.3	-11.5	1.00 H	40	63.67	3.15
4	#5860.00	59.0 PK	68.3	-9.3	1.00 H	40	55.79	3.23
5	11590.00	66.8 PK	74.0	-7.2	1.00 H	88	56.70	10.13
6	11590.00	52.8 AV	54.0	-1.2	1.00 H	88	42.65	10.13
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	*5795.00	104.2 PK			1.00 V	185	101.45	2.73
2	*5795.00	86.2 AV			1.00 V	185	83.46	2.73
3	#5850.00	68.2 PK	78.3	-10.1	1.00 V	185	65.06	3.15
4	#5860.00	58.5 PK	68.3	-9.8	1.00 V	185	55.22	3.23
5	11590.00	66.5 PK	74.0	-7.5	1.00 V	278	56.34	10.13
6	11590.00	52.4 AV	54.0	-1.7	1.00 V	278	42.22	10.13

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.

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 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

- 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.

4.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCS30	100340	May 11,15	May 10,16
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	SCHWARZBECK	TK 9421	TK 9421-176	Jan. 08,16	Jan. 07,17
Test software	ADT	ADT_Conc_ V7.3.7	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.

4.2.3 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) was not recorded.

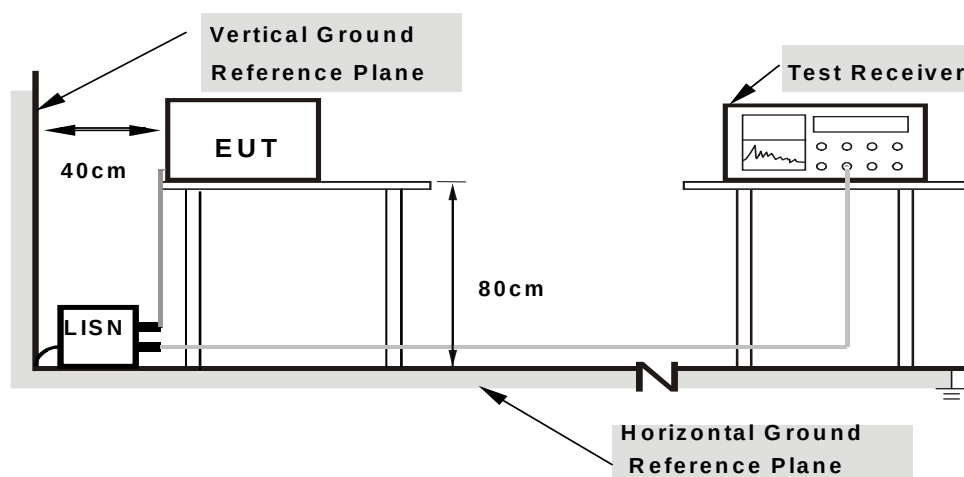
NOTE: All modes of operation were investigated and the worst-case emissions are reported.



4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



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).

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.



4.2.7 TEST RESULTS

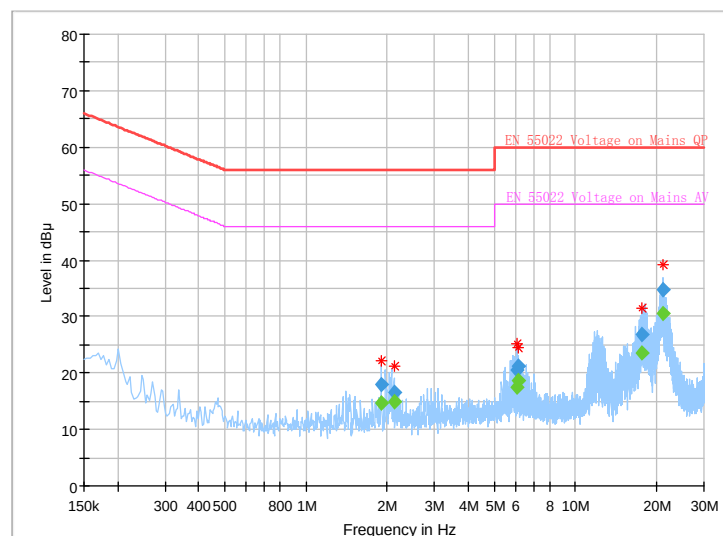
CONDUCTED WORST-CASE DATA:

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

Frequency (MHz)	QuasiPeak (dB μ V)	CAverage (dB μ V)	Limit (dB μ V)	Margin (dB)	Line	Filter	Corr. (dB)
1.904000	---	14.78	46.00	-31.22	L	ON	9.7
1.904000	17.89	---	56.00	-38.11	L	ON	9.7
2.124000	---	14.89	46.00	-31.11	L	ON	9.7
2.124000	16.50	---	56.00	-39.50	L	ON	9.7
6.096000	---	17.41	50.00	-32.59	L	ON	9.8
6.096000	20.43	---	60.00	-39.57	L	ON	9.8
6.172000	---	18.61	50.00	-31.39	L	ON	9.8
6.172000	21.30	---	60.00	-38.70	L	ON	9.8
17.604000	---	23.57	50.00	-26.43	L	ON	9.9
17.604000	26.90	---	60.00	-33.10	L	ON	9.9
21.108000	---	30.60	50.00	-19.40	L	ON	9.9
21.108000	34.84	---	60.00	-25.16	L	ON	9.9

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

Full Spectrum

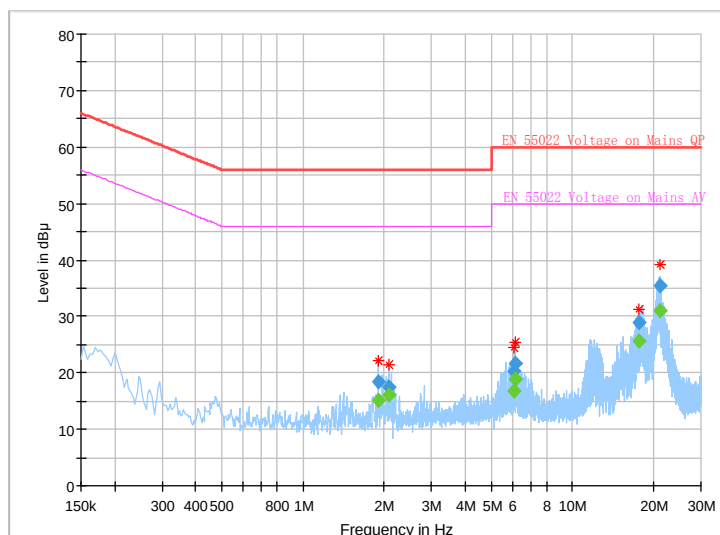


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	-----------------------------------

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
1.904000	---	15.11	46.00	-30.89	N	ON	9.8
1.904000	18.36	---	56.00	-37.64	N	ON	9.8
2.080000	---	16.03	46.00	-29.97	N	ON	9.8
2.080000	17.49	---	56.00	-38.51	N	ON	9.8
6.092000	---	16.77	50.00	-33.23	N	ON	9.8
6.092000	20.22	---	60.00	-39.78	N	ON	9.8
6.172000	---	18.95	50.00	-31.05	N	ON	9.8
6.172000	21.73	---	60.00	-38.27	N	ON	9.8
17.676000	---	25.62	50.00	-24.38	N	ON	10.0
17.676000	29.03	---	60.00	-30.97	N	ON	10.0
21.104000	---	30.98	50.00	-19.02	N	ON	10.0
21.104000	35.36	---	60.00	-24.64	N	ON	10.0

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

Full Spectrum





4.3 MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

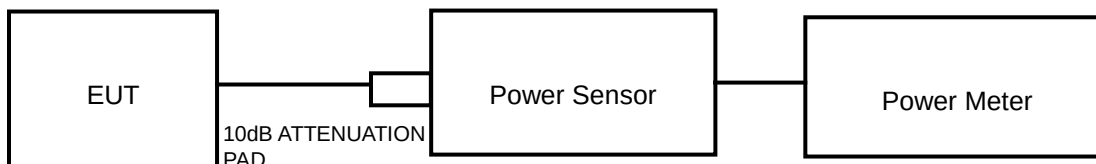
4.3.1 LIMITS OF MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

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 (24 dBm) or 11 dBm+10 log B*
U-NII-2C	--		250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3	√		1 Watt (30 dBm)

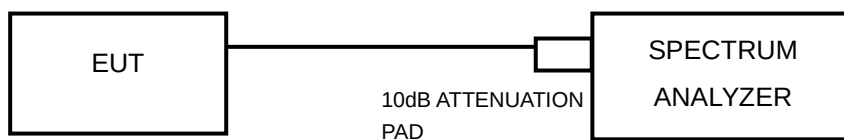
NOTE: Where B is the 26dB emission bandwidth in MHz.

4.3.2 TEST SETUP

FOR POWER OUTPUT MEASUREMENT



FOR 26dB BANDWIDTH





4.3.3 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Spectrum Analyzer (10Hz–40GHz)	Rohde&Schwarz	FSV40	101003	Apr. 05,16	Apr. 04,17
Power Meter	Anritsu	ML2495A	1139001	Feb.19,16	Feb. 18,17
Power Sensor	Anritsu	MA2411B	1126068	Feb.19,16	Feb. 18,17
Power Sensor	Keysight	U2021XA	MY55060016	May 27,15	May 26,16
Power Sensor	Keysight	U2021XA	MY55060018	May 27,15	May 26,16
Digital Multimeter	FLUKE	15B	A1220010DG	Oct. 12, 15	Oct.11, 16

NOTE:

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

4.3.4 TEST PROCEDURE

FOR 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 99 PERCENT OCCUPIED BANDWIDTH

The following procedure shall be used for measuring (99 %) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW $\geq 3 \cdot$ RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
6. Use the 99 % power bandwidth function of the instrument (if available).
7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper



frequency. The 99% occupied bandwidth is the difference between these two frequencies.

FOR 26dB BANDWIDTH

- 1) Set RBW = approximately 1% of the emission bandwidth.
- 2) Set the VBW > RBW.
- 3) Detector = Peak.
- 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%.

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.

4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

4.3.6 EUT OPERATING CONDITIONS

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



4.3.7 TEST RESULTS

OUTPUT POWER:

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
36	5180	15.596	11.93	24	PASS
44	5220	14.622	11.65	24	PASS
48	5240	14.093	11.49	24	PASS
149	5745	11.324	10.54	30	PASS
157	5785	11.858	10.74	30	PASS
165	5825	12.078	10.82	30	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (mW)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
		CHAIN0	CHAIN1				
36	5180	8.670	8.147	16.817	12.26	24	PASS
44	5220	8.492	7.980	16.472	12.17	24	PASS
48	5240	8.110	7.907	16.017	12.05	24	PASS
149	5745	8.318	8.166	16.484	12.17	30	PASS
157	5785	8.933	9.247	18.180	12.60	30	PASS
165	5825	8.453	8.710	17.163	12.35	30	PASS

802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (mW)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
		CHAIN0	CHAIN1				
38	5190	7.834	7.603	15.437	11.89	24	PASS
46	5230	7.516	7.328	14.844	11.72	24	PASS
151	5755	8.185	6.966	15.151	11.80	30	PASS
159	5795	8.433	6.622	15.055	11.78	30	PASS



99% OCCUPIED BANDWIDTH & 26dB BANDWIDTH/6dB BANDWIDTH:

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH	26dB BANDWIDTH (MHz)	PASS/FAIL
36	5180	16.50	24.78	PASS
44	5220	16.44	19.80	PASS
48	5240	16.44	22.44	PASS
CHANNEL	CHANNEL FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH	6dB BANDWIDTH (MHz)	PASS/FAIL
149	5745	16.56	16.45	PASS
157	5785	16.50	16.38	PASS
165	5825	16.56	16.36	PASS

**802.11n (20MHz)****CHAIN 0**

CHANNEL	CHANNEL FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH	26dB BANDWIDTH (MHz)	PASS/FAIL
36	5180	17.52	20.19	PASS
44	5220	17.40	20.17	PASS
48	5240	17.52	20.10	PASS
CHANNEL	CHANNEL FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH	6dB BANDWIDTH (MHz)	PASS/FAIL
149	5745	17.46	17.58	PASS
157	5785	17.52	17.58	PASS
165	5825	17.52	17.58	PASS

CHAIN 1

CHANNEL	CHANNEL FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH	26dB BANDWIDTH (MHz)	PASS/FAIL
36	5180	17.52	19.68	PASS
44	5220	17.46	19.64	PASS
48	5240	17.46	19.60	PASS
CHANNEL	CHANNEL FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH	6dB BANDWIDTH (MHz)	PASS/FAIL
149	5745	17.58	17.17	PASS
157	5785	17.52	17.56	PASS
165	5825	17.58	17.26	PASS

**802.11n (40MHz)****CHAIN 0**

CHANNEL	CHANNEL FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH	26dB BANDWIDTH (MHz)	PASS/FAIL
38	5190	36.36	40.98	PASS
46	5230	36.12	41.01	PASS
CHANNEL	CHANNEL FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH	6dB BANDWIDTH (MHz)	PASS/FAIL
151	5755	36.06	36.34	PASS
159	5795	36.12	36.34	PASS

CHAIN 1

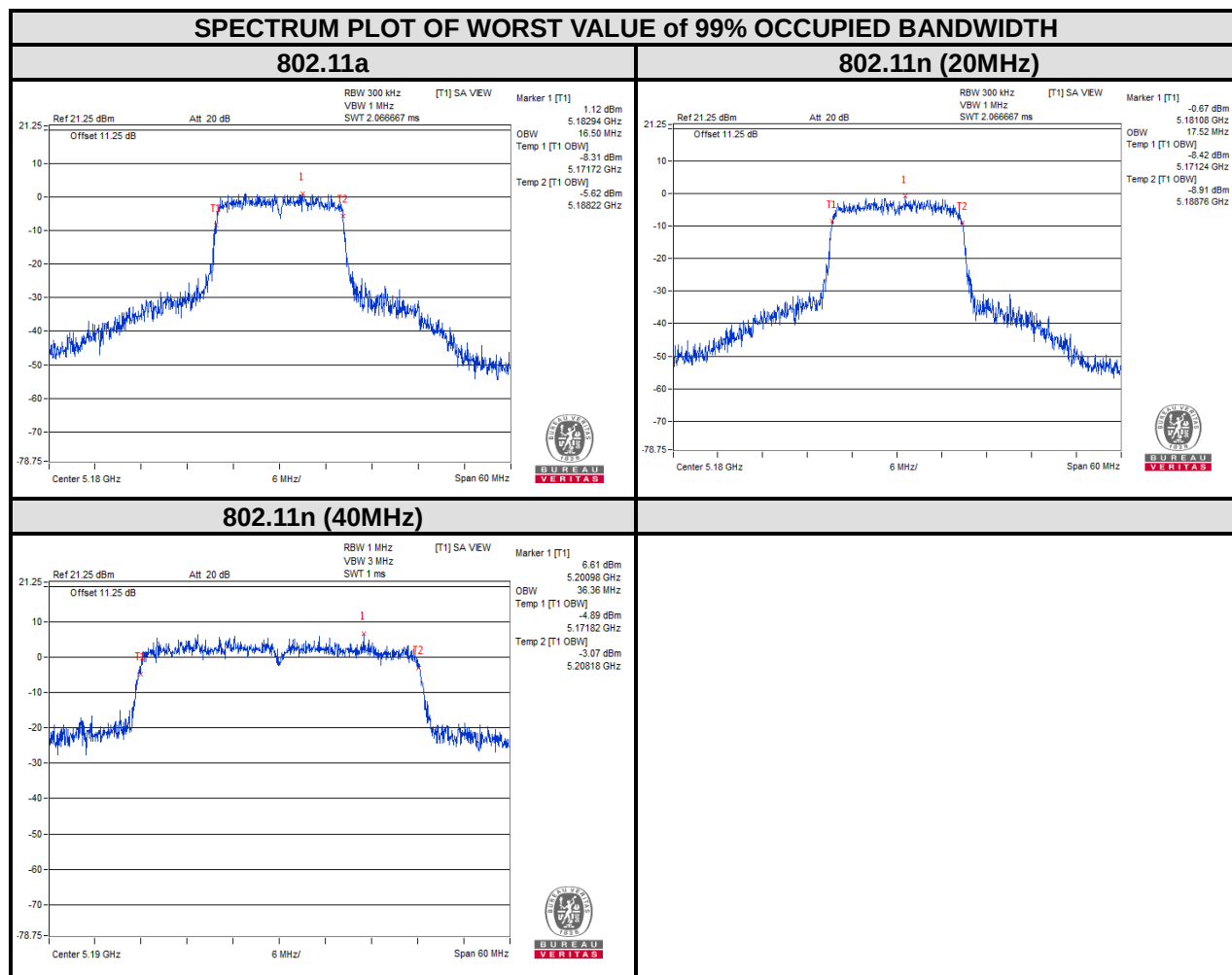
CHANNEL	CHANNEL FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH	26dB BANDWIDTH (MHz)	PASS/FAIL
38	5190	36.36	40.89	PASS
46	5230	36.18	40.87	PASS
CHANNEL	CHANNEL FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH	6dB BANDWIDTH (MHz)	PASS/FAIL
151	5755	36.18	35.75	PASS
159	5795	36.06	35.97	PASS



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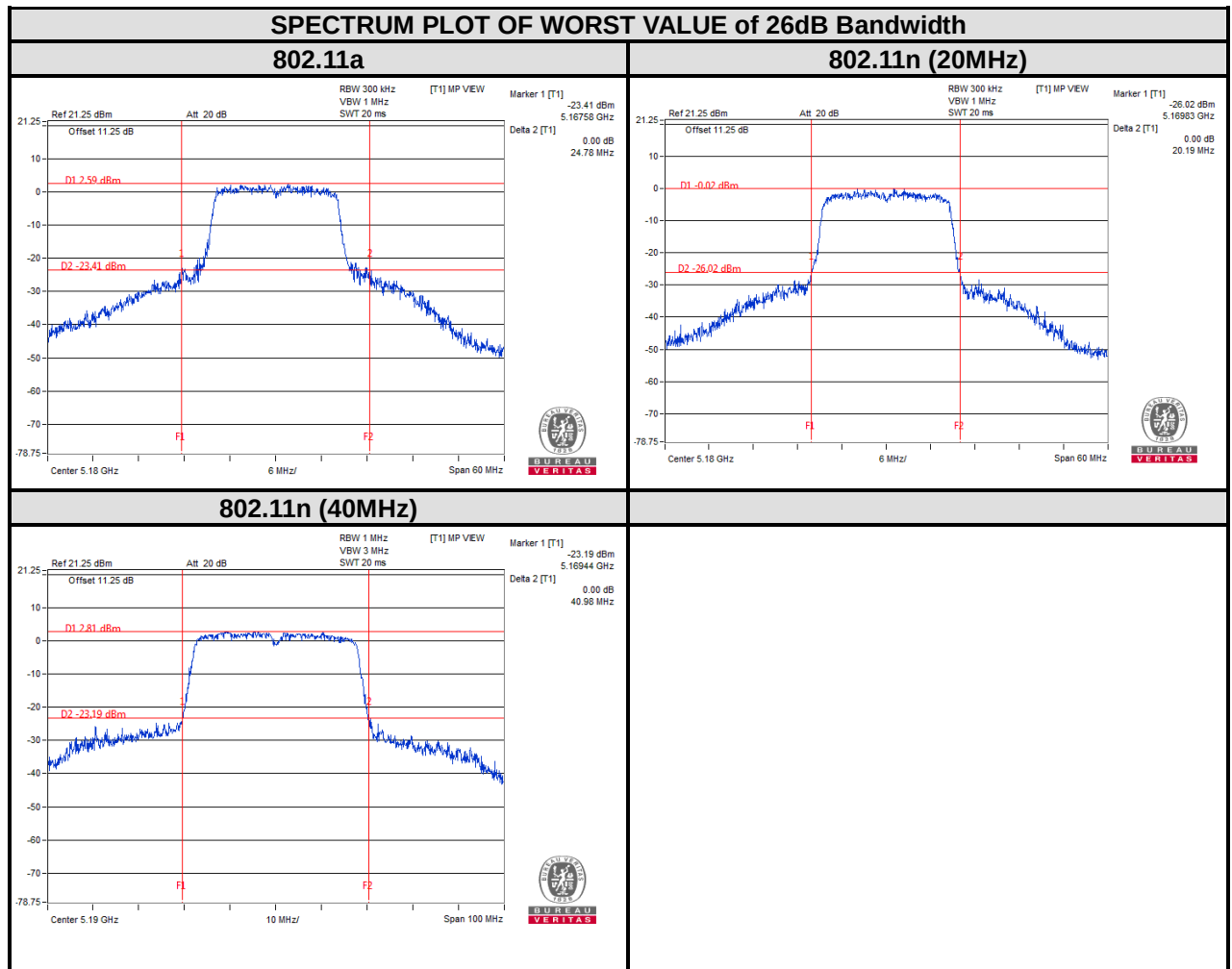
For U-NII-1:





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Test Report No.: RF160314W002-3

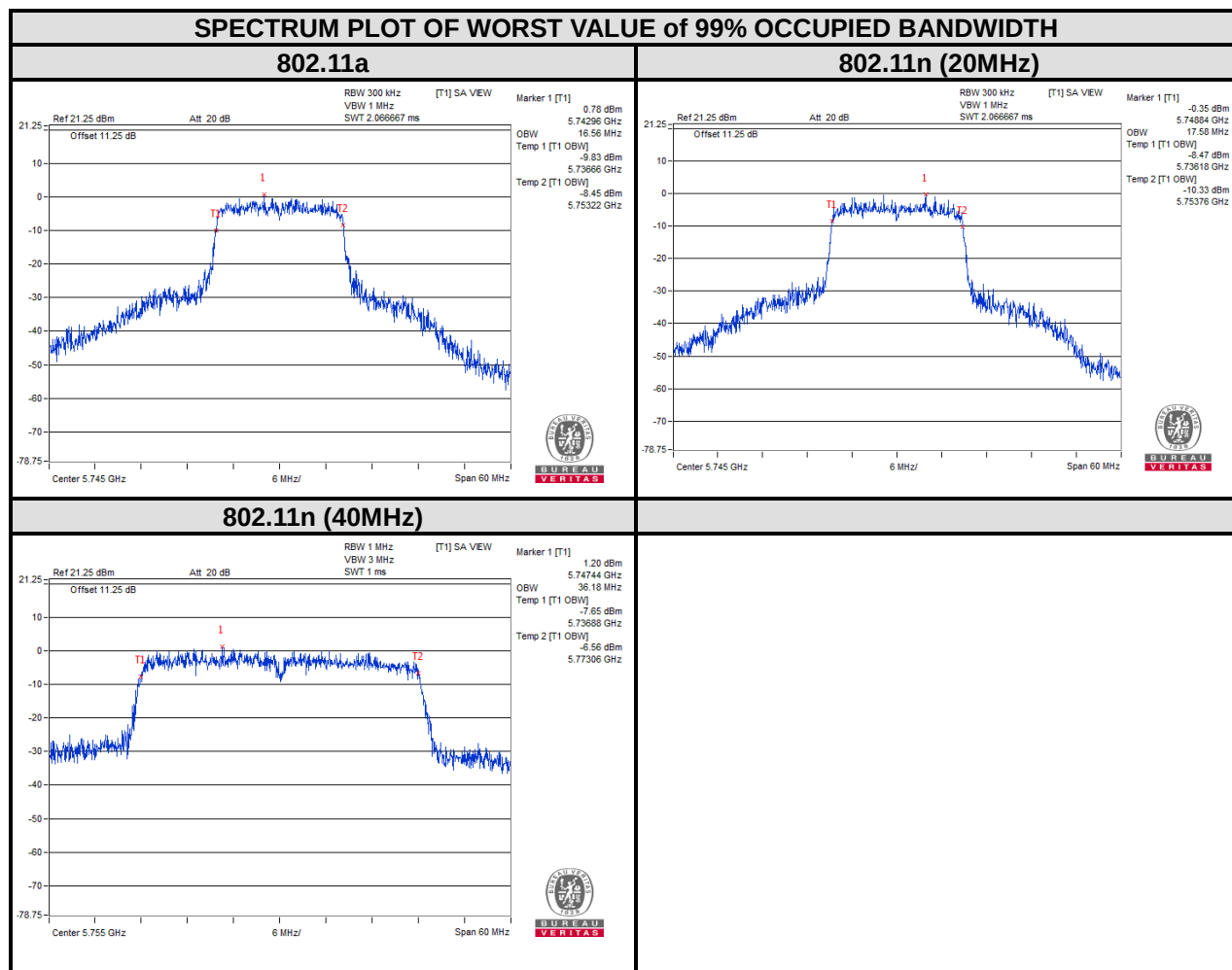




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Test Report No.: RF160314W002-3

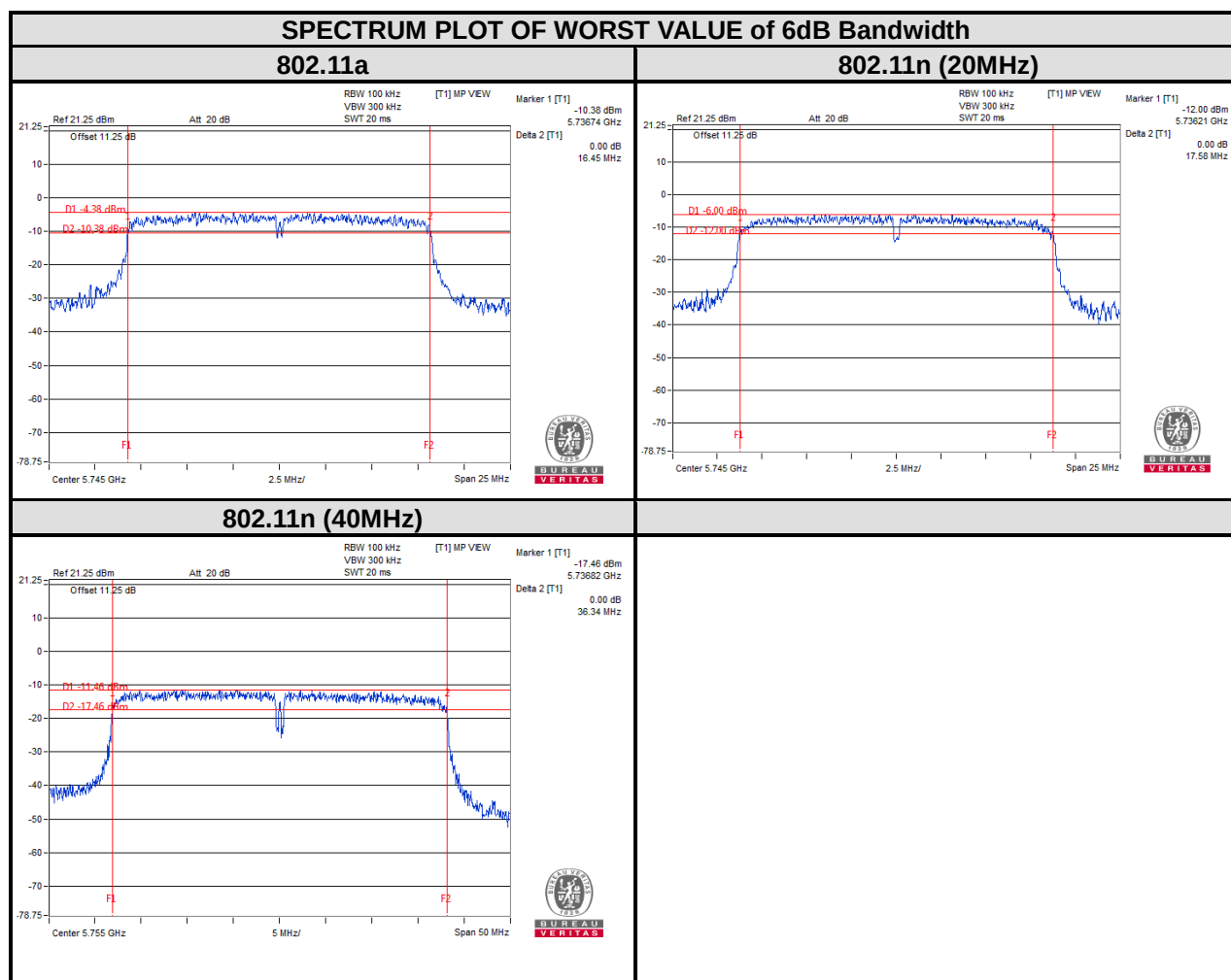
For U-NII-3:





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Test Report No.: RF160314W002-3



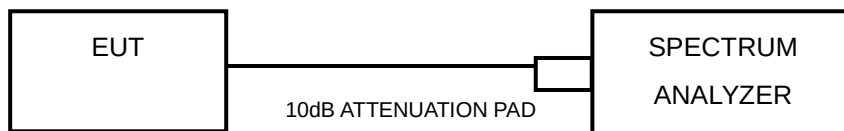


4.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT

4.4.1 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

4.4.2 TEST SETUP



4.4.3 TEST INSTRUMENTS

Refer to section 4.3.3 to get information of above instrument.

4.4.4 TEST PROCEDURES

Using method SA-1

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 30 KHz, Set VBW $\geq$ 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



4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

4.4.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

4.4.7 TEST RESULTS

For U-NII-1:

802.11a

CHANNEL	FREQUENCY (MHz)	PSD w/o Duty Factor (dBm/MHz)	Duty Factor	PSD with Duty Factor (dBm/MHz)	MAXIMUM LIMIT (dBm/MHz)	PASS/FAIL
36	5180	4.59	0.56	5.15	11	PASS
44	5220	3.93	0.56	4.49	11	PASS
48	5240	3.95	0.56	4.51	11	PASS

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	PSD w/o Duty Factor (dBm/MHz)		TOTAL PSD w/o Duty Factor (dBm/MHz)	Duty Factor	PSD with Duty Factor (dBm/MHz)	MAXIMUM LIMIT (dBm/MHz)	PASS/FAIL
		CHAIN0	CHAIN1					
36	5180	4.95	1.69	6.63	0.49	7.12	11	PASS
44	5220	3.68	1.59	5.77	0.49	6.26	11	PASS
48	5240	3.10	1.52	5.39	0.49	5.88	11	PASS

802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	PSD w/o Duty Factor (dBm/MHz)		TOTAL PSD w/o Duty Factor (dBm/MHz)	Duty Factor	PSD with Duty Factor (dBm/MHz)	MAXIMUM LIMIT (dBm/MHz)	PASS/FAIL
		CHAIN0	CHAIN1					
38	5190	-1.05	-0.87	2.05	0.60	2.65	11	PASS
46	5230	-0.72	-0.56	2.37	0.60	2.97	11	PASS



For U-NII-3:

802.11a

CHANNEL	FREQUENCY (MHz)	PSD w/o Duty Factor (dBm/MHz)	PSD w/o Duty Factor (dBm/500kHz)	Duty Factor	PSD with Duty Factor (dBm/500kHz)	LIMIT (dBm/500kHz)	PASS /FAIL
149	5745	6.73	3.72	0.56	4.28	30	PASS
157	5785	5.80	2.79	0.56	3.35	30	PASS
165	5825	6.16	3.15	0.56	3.71	30	PASS

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	PSD w/o Duty Factor (dBm/MHz)		TOTAL PSD w/o Duty Factor (dBm/MHz)	TOTAL PSD w/o Duty Factor (dBm/500kHz)	Duty Factor	PSD with Duty Factor (dBm/500kHz)	LIMIT (dBm/500kHz)	PASS /FAIL
		CHAIN0	CHAIN1						
149	5745	5.94	5.49	8.73	5.72	0.49	6.21	30	PASS
157	5785	4.26	5.68	8.04	5.03	0.49	5.52	30	PASS
165	5825	6.15	5.35	8.78	5.77	0.49	6.26	30	PASS

802.11n (40MHz)

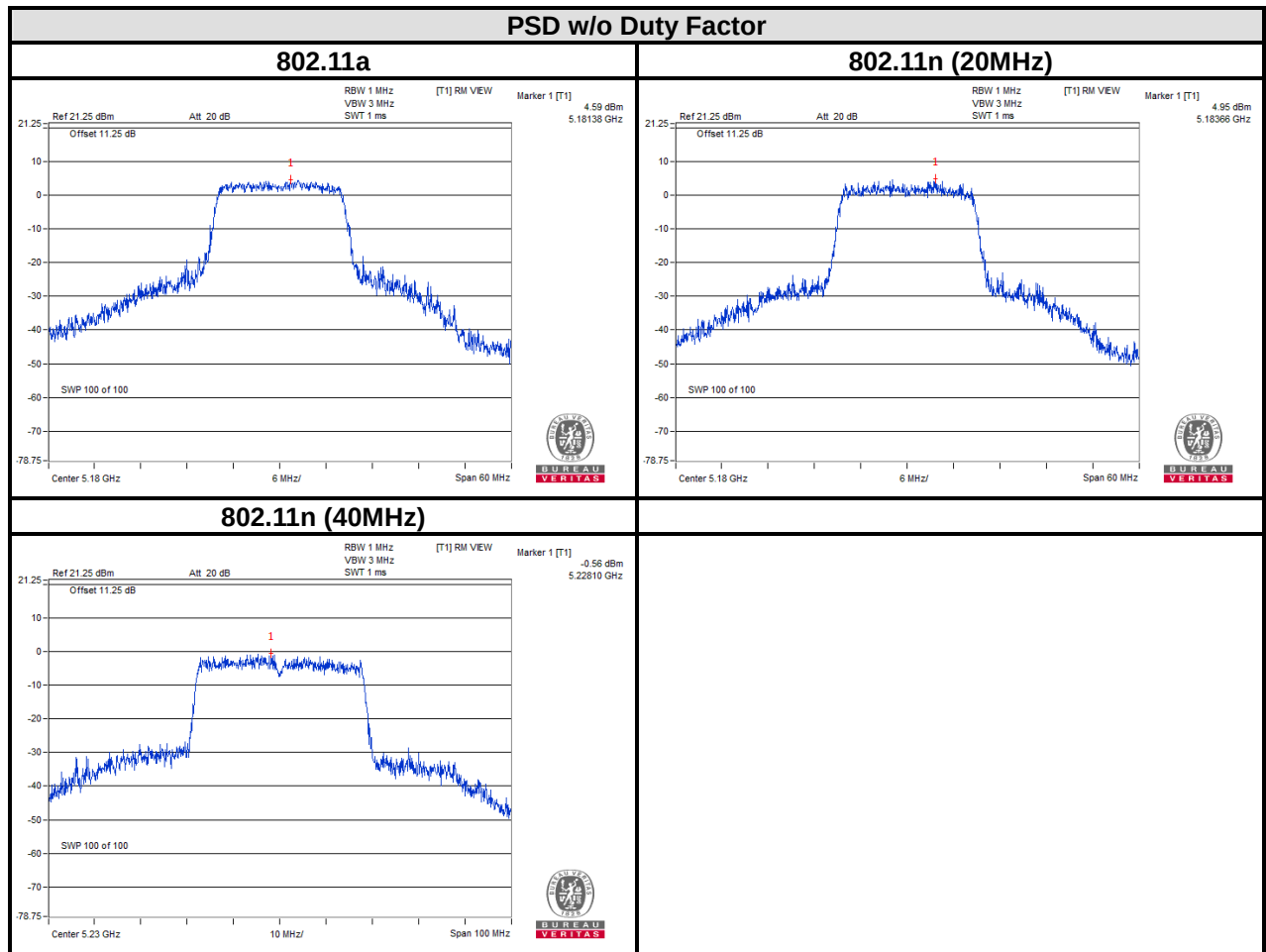
CHANNEL	FREQUENCY (MHz)	PSD w/o Duty Factor (dBm/MHz)		TOTAL PSD w/o Duty Factor (dBm/MHz)	PSD w/o Duty Factor (dBm/500kHz)	Duty Factor	PSD with Duty Factor (dBm/500kHz)	LIMIT (dBm/500kHz)	PASS /FAIL
		CHAIN0	CHAIN1						
151	5755	1.46	0.51	4.02	1.01	0.60	1.61	30	PASS
159	5795	0.03	0.11	3.08	0.07	0.60	0.67	30	PASS



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For 5180~5240MHz

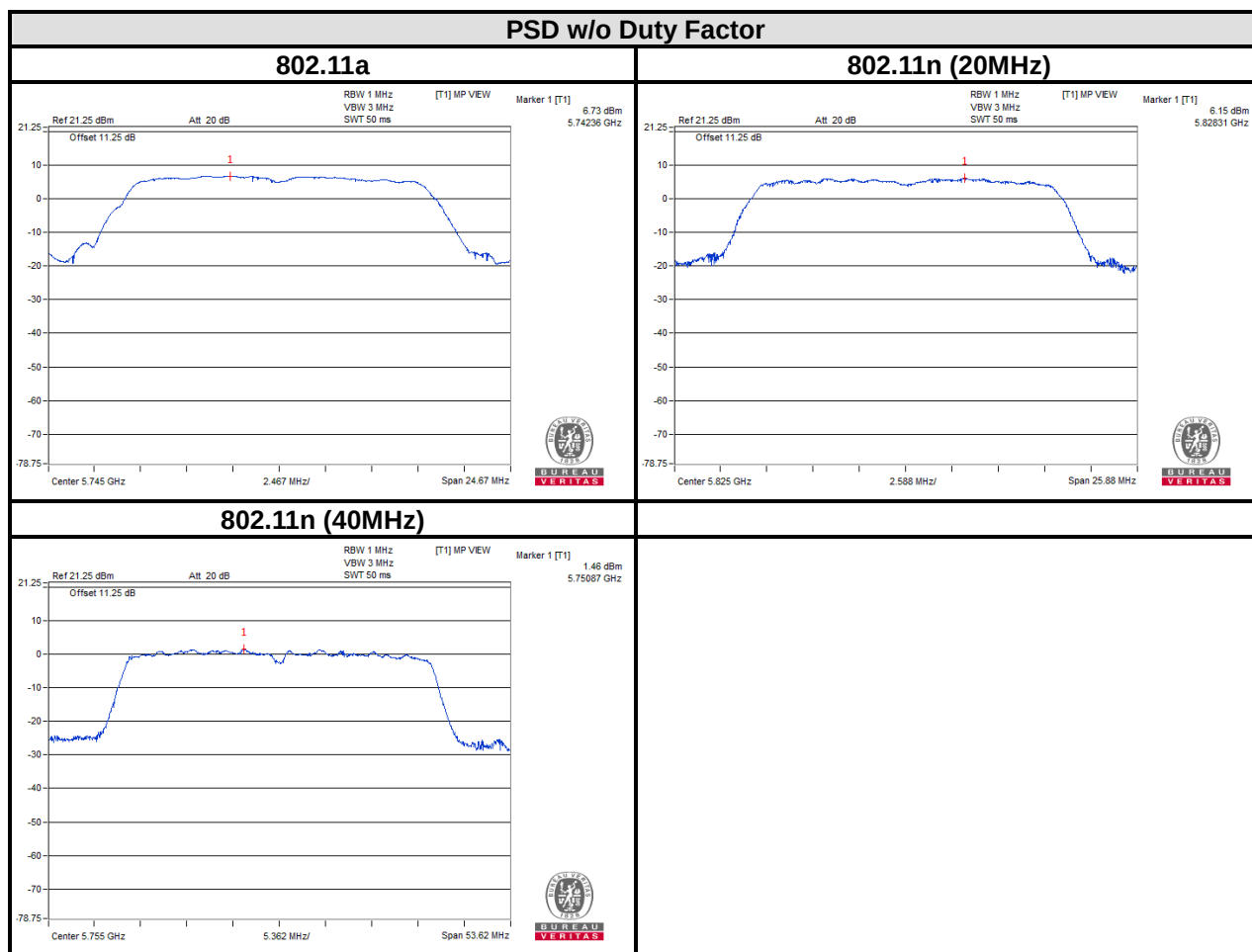




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VERITAS

Test Report No.: RF160314W002-3

For 5725~5825MHz



Note: There were CHAIN0 and CHAIN1 for PEAK POWER SPECTRAL DENSITY test. The plot is the worst case in all of their results.

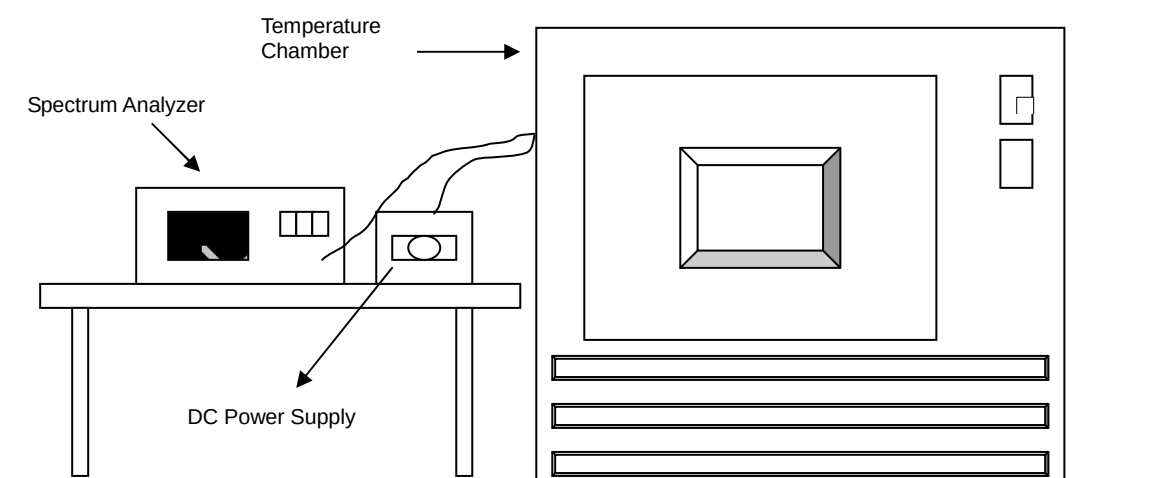


4.5 FREQUENCY STABILITY

4.5.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

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

4.5.2 TEST SETUP



4.5.3 TEST INSTRUMENTS

Refer to section 4.3.3 to get information of above instrument.

4.5.4 TEST PROCEDURE

- a. The EUT was placed inside the environmental test chamber and powered by nominal DC 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.

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

4.5.6 EUT OPERATING CONDITION

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



4.5.7 TEST RESULTS

FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5220MHz									
TEMP. (°C)	POWER SUPPLY (Vdc)	0 MINUTE		2 MINUTES		5 MINUTES		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
50	19.0	5219.9853	-2.8161	5219.9815	-3.5441	5219.9873	-2.4330	5219.9855	-2.7778
40	19.0	5219.9847	-2.9310	5219.9815	-3.5441	5219.9856	-2.7586	5219.9842	-3.0268
30	19.0	5219.9852	-2.8352	5219.9809	-3.6590	5219.987	-2.4904	5219.985	-2.8736
20	19.0	5219.9939	-1.1686	5219.9968	-0.6130	5219.9985	-0.2874	5219.9956	-0.8429
10	19.0	5220.0172	3.2950	5220.0257	4.9234	5220.0169	3.2375	5220.0161	3.0843
0	19.0	5220.0158	3.0268	5220.024	4.5977	5220.0165	3.1609	5220.0166	3.1801
-10	19.0	5219.9894	-2.0307	5219.9884	-2.2222	5219.9842	-3.0268	5219.9811	-3.6207
-20	19.0	5219.9894	-2.0307	5219.9873	-2.4330	5219.9853	-2.8161	5219.9804	-3.7548
-30	19.0	5219.9889	-2.1264	5219.9885	-2.2031	5219.9839	-3.0843	5219.9806	-3.7165

FREQUENCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5220MHz									
TEMP. (°C)	POWER SUPPLY (Vdc)	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	21.85	5219.9938	-1.1877	5219.9974	-0.4981	5219.9986	-0.2682	5219.9951	-0.9387
	19	5219.9939	-1.1686	5219.9968	-0.6130	5219.9985	-0.2874	5219.9956	-0.8429
	16.15	5219.9951	-0.9387	5219.996	-0.7663	5219.999	-0.1916	5219.9955	-0.8621



FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5785MHz									
TEMP. (°C)	POWER SUPPLY (Vdc)	0 MINUTE		2 MINUTES		5 MINUTES		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
50	19.0	5785.0013	0.2247	5785.0018	0.3111	5785.0071	1.2273	5785.0041	0.7087
40	19.0	5785.002	0.3457	5785.0021	0.3630	5785.0059	1.0199	5785.0032	0.5532
30	19.0	5785.001	0.1729	5785.0027	0.4667	5785.007	1.2100	5785.0035	0.6050
20	19.0	5784.9833	-2.8868	5784.9806	-3.3535	5784.9748	-4.3561	5784.9776	-3.8721
10	19.0	5784.9839	-2.7831	5784.9799	-3.4745	5784.9755	-4.2351	5784.9793	-3.5782
0	19.0	5784.984	-2.7658	5784.9809	-3.3016	5784.9755	-4.2351	5784.9782	-3.7684
-10	19.0	5785.0129	2.2299	5785.0133	2.2990	5785.0158	2.7312	5785.0113	1.9533
-20	19.0	5785.0122	2.1089	5785.0131	2.2645	5785.0151	2.6102	5785.0112	1.9360
-30	19.0	5785.0118	2.0398	5785.0118	2.0398	5785.0157	2.7139	5785.0101	1.7459

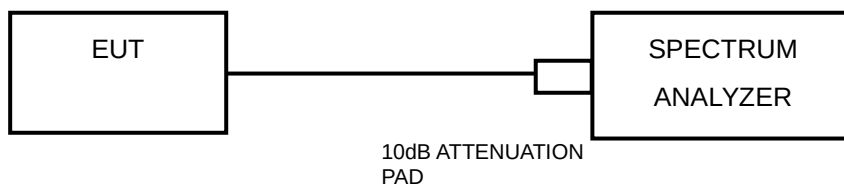
FREQUENCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5785MHz									
TEMP. (°C)	POWER SUPPLY (Vdc)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	21.85	5784.9861	-2.4028	5784.9793	-3.5782	5784.9759	-4.1659	5784.974	-4.4944
	19	5784.9863	-2.3682	5784.9812	-3.2498	5784.9762	-4.1141	5784.9748	-4.3561
	16.15	5784.9861	-2.4028	5784.9804	-3.3881	5784.9754	-4.2524	5784.9743	-4.4425

4.6 OUT OF BAND EMISSION MEASUREMENT

4.6.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

Below –30dB 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 4.3.3 to get information of above instrument.

4.6.4 TEST PROCEDURE

MEASUREMENT PROCEDURE REF

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

MEASUREMENT PROCEDURE OOB

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

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITION

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

4.6.7 TEST RESULTS

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



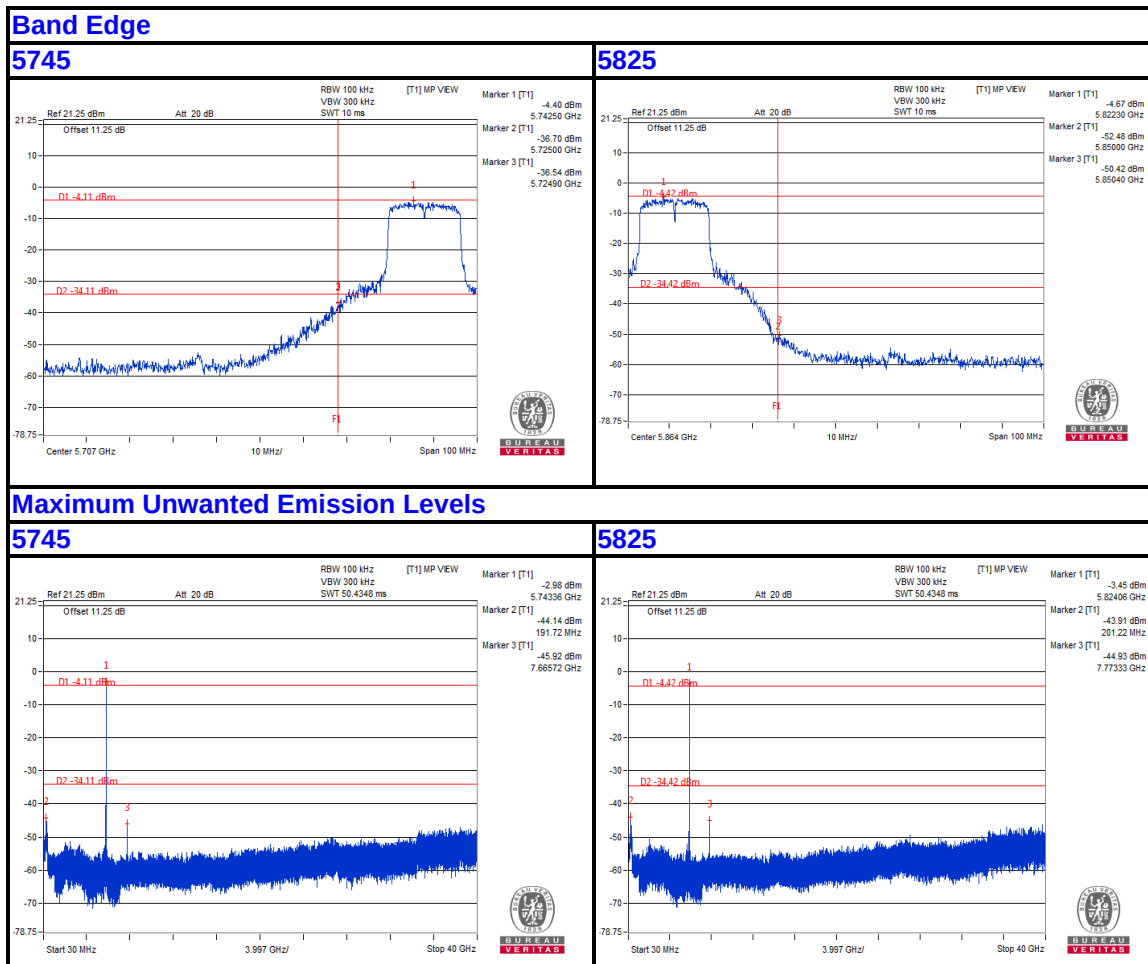
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Test Report No.: RF160314W002-3

4.6.8 TEST RESULTS

FOR U-NII-3

802.11a





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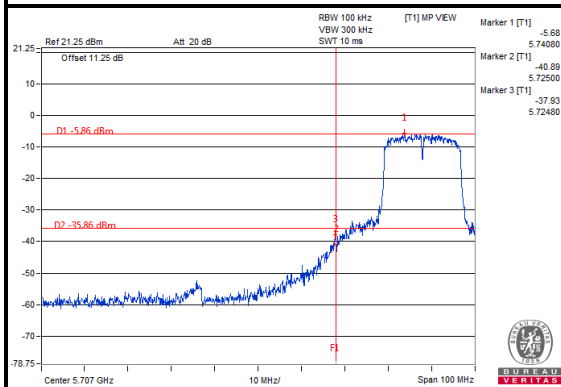
Test Report No.: RF160314W002-3

802.11n (20MHz)

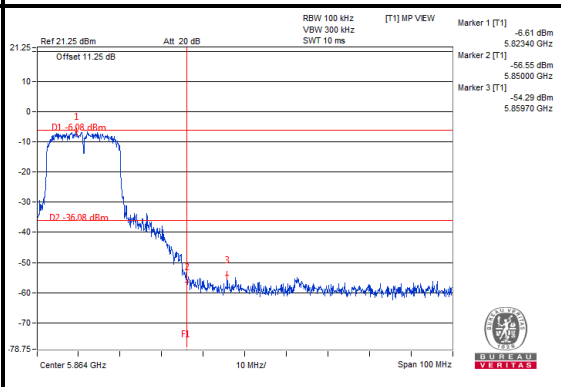
Chain 0

Band Edge

5745

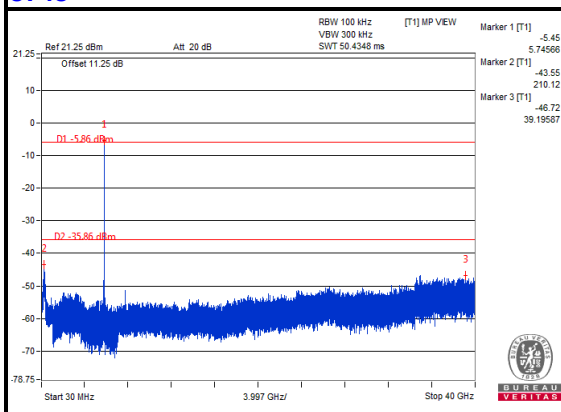


5825

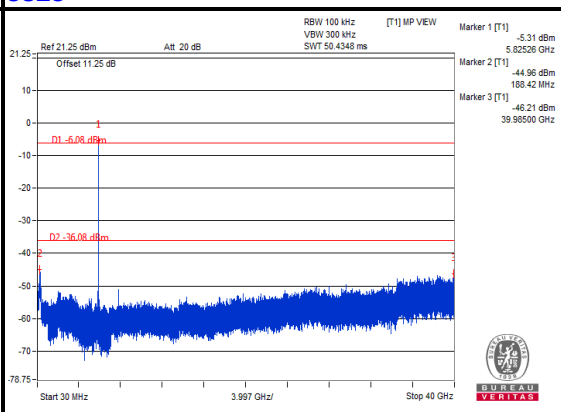


Maximum Unwanted Emission Levels

5745



5825





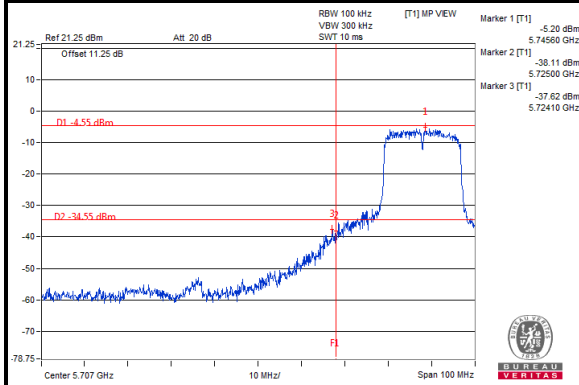
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Test Report No.: RF160314W002-3

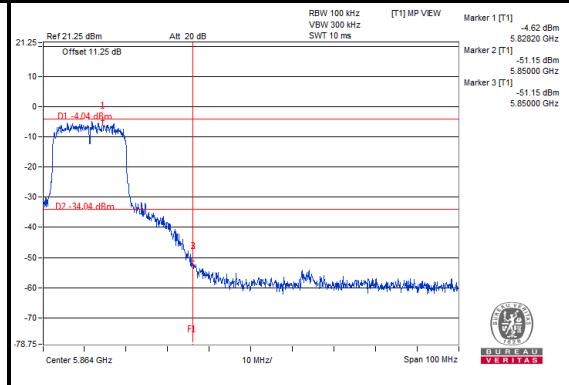
Chain 1

Band Edge

5745

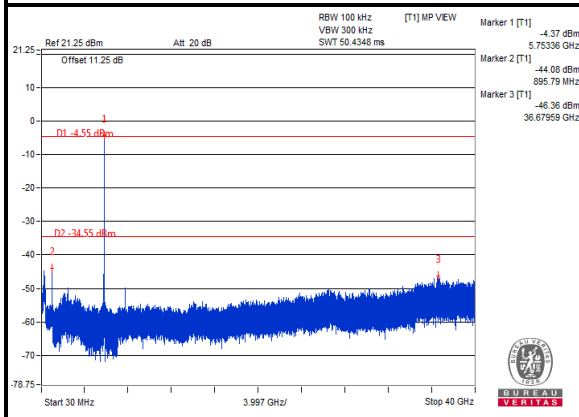


5825

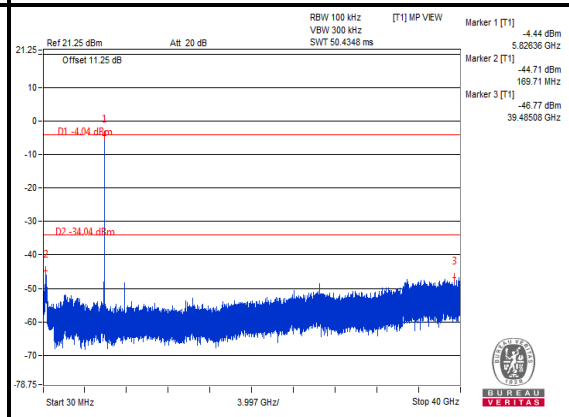


Maximum Unwanted Emission Levels

5745



5825





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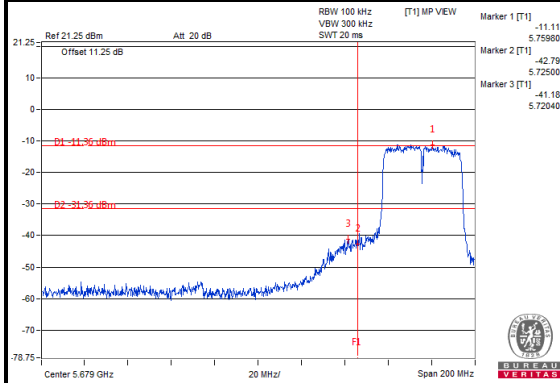
Test Report No.: RF160314W002-3

802.11n (40MHz)

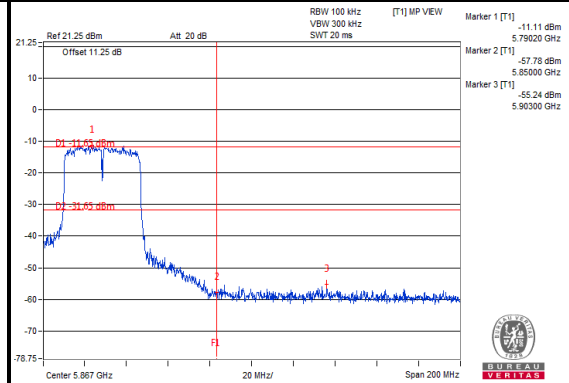
Chain 0

Band Edge

5755

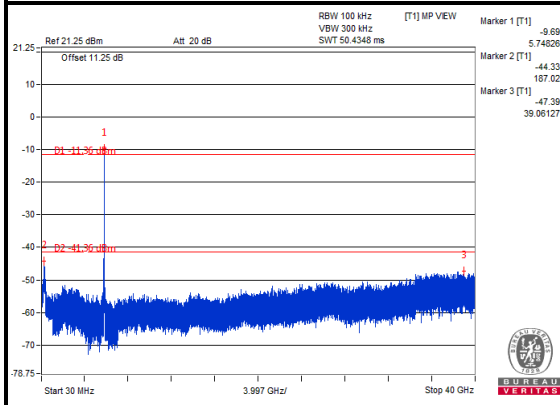


5795

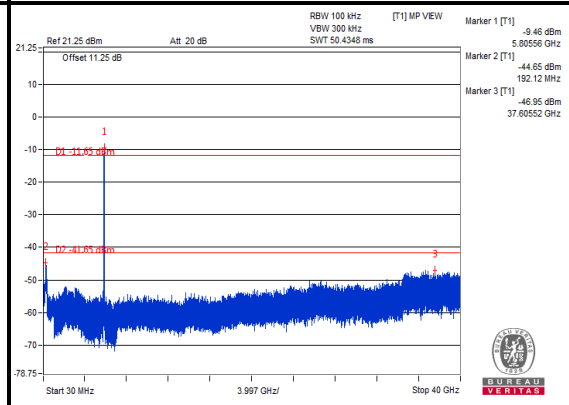


Maximum Unwanted Emission Levels

5755



5795





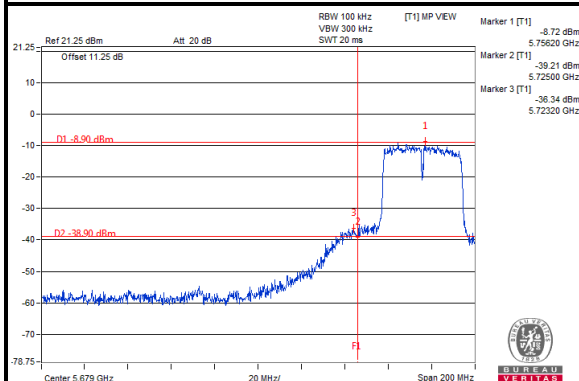
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Test Report No.: RF160314W002-3

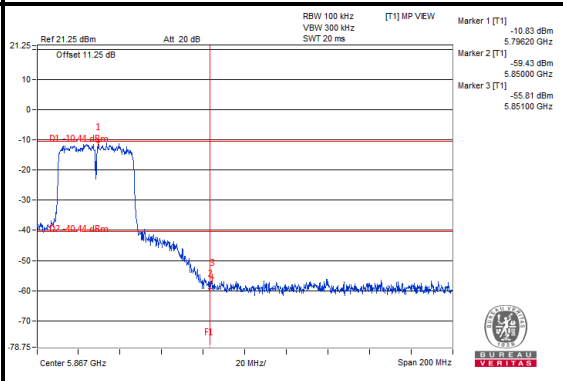
Chain 1

Band Edge

5755

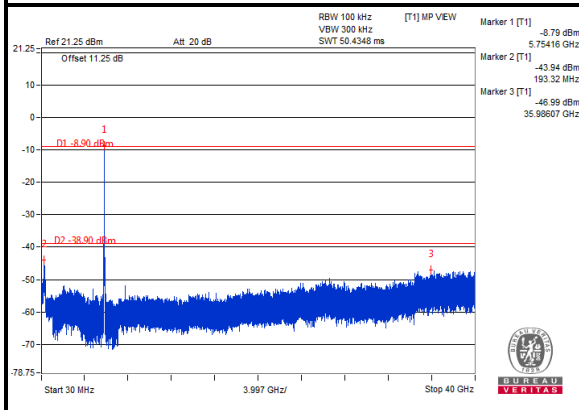


5795

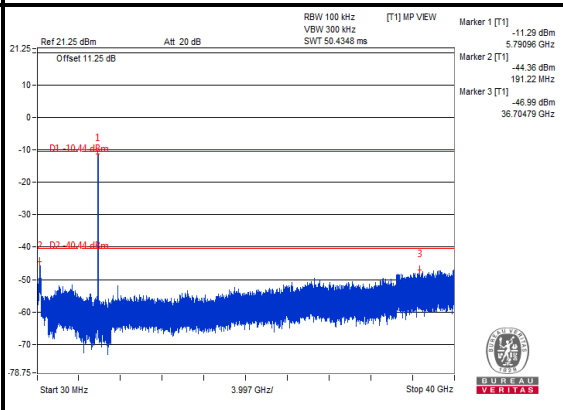


Maximum Unwanted Emission Levels

5755



5795





Test Report No.: RF160314W002-3

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

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



Test Report No.: RF160314W002-3

6 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---