

**FCC 15.247  
(Class II Permissive Change)  
2.4 GHz Test Report**

**for**

**Texas Instruments Incorporated**

**12500 TI Boulevard Dallas, TX 75243-4136 USA**

**Product Name : TI-nspire CX Wireless  
Network Adapter v2**  
**Model Name : TINAVWNA2**  
**Brand : TEXAS INSTRUMENTS**  
**FCC ID : V7R-TINAVWNA2**

**Prepared by: : AUDIX Technology Corporation,  
EMC Department**



## TABLE OF CONTENTS

Description	Page
TEST REPORT CERTIFICATION.....	3
<b>1. REVISION RECORD OF TEST REPORT.....</b>	<b>4</b>
<b>2. SUMMARY OF TEST RESULTS.....</b>	<b>5</b>
<b>3. GENERAL INFORMATION.....</b>	<b>6</b>
3.1. Description of Application.....	6
3.2. Description of EUT.....	7
3.3. Information for Class II Permissive Change.....	7
3.4. Antenna Information.....	8
3.5. EUT Specifications Assessed in Current Report.....	9
3.6. Descriptions of Key Components.....	9
3.7. Test Configuration.....	10
3.8. Tested Supporting System List.....	11
3.9. Setup Configuration.....	11
3.10. Operating Condition of EUT.....	11
3.11. Description of Test Facility.....	12
3.12. Measurement Uncertainty.....	12
<b>4. MEASUREMENT EQUIPMENT LIST.....</b>	<b>13</b>
4.1. Radiated Emission Measurement.....	13
4.2. RF Conducted Measurement.....	13
<b>5. RADIATED EMISSION.....</b>	<b>14</b>
5.1. Block Diagram of Test Setup.....	14
5.2. Radiated Emission Limits.....	15
5.3. Test Procedure.....	16
5.4. Measurement Result Explanation.....	17
5.5. Test Results.....	17
<b>6. MAXIMUM PEAK OUTPUT POWER.....</b>	<b>18</b>
6.1. Block Diagram of Test Setup.....	18
6.2. Specification Limits.....	18
6.3. Test Procedure.....	18
6.4. Test Results.....	18
<b>7. DEVIATION TO TEST SPECIFICATIONS.....</b>	<b>19</b>

APPENDIX A TEST DATA AND PLOTS

APPENDIX B TEST PHOTOGRAPHS

APPENDIX C EUT PHOTOGRAPHS

## TEST REPORT CERTIFICATION (Class II Permissive Change)

Applicant : Texas Instruments Incorporated  
Manufacturer : Inventec Appliances(JiangNing) Corporation  
EUT Description  
(1) Product : TI-nspire CX Wireless Network Adapter v2  
(2) Model : TINAVWNA2  
(3) Brand : TEXAS INSTRUMENTS  
(4) Rating : DC 3.0-5.9V

Applicable Standards:

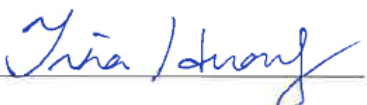
47 CFR FCC Part 15 Subpart C  
ANSI C63.10:2013  
KDB 558074 D01 DTS Meas Guidance v04

**Audix Technology Corp.** tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.

**Audix Technology Corp.** does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens and samples.

Date of Report: 2017. 11. 14

Reviewed by:

  
\_\_\_\_\_  
(Tina Huang/Administrator)

Approved by:

  
\_\_\_\_\_  
(Ben Cheng/Manager)

## 1. REVISION RECORD OF TEST REPORT

Edition No	Issued Data	Revision Summary	Report Number
0	2017. 11. 14	Original Report	EM-F170712

## 2. SUMMARY OF TEST RESULTS

<b>Rule</b>	<b>Description</b>	<b>Results</b>
15.207	Conducted Emission	<b>N/A</b> Note
15.247(d)/15.205	Radiated Band Edge and Radiated Spurious Emission	<b>PASS</b>
15.247(a)(2)	6dB Bandwidth	<b>N/A</b> Note
15.247(b)(3)	Maximum Peak Output	<b>PASS</b>
15.247(d)	Conducted Band Edges and Conducted Spurious Emission	<b>N/A</b> Note
15.247 (e)	Peak Power Spectral Density	<b>N/A</b> Note
15.203	Antenna Requirement	<b>Compliance</b>
<b>Note: The Class II Permissive Change is not influence on this report.</b>		

### 3. GENERAL INFORMATION

#### 3.1. Description of Application

Applicant	Texas Instruments Incorporated 12500 TI Boulevard Dallas, TX 75243-4136 USA
Manufacturer	Inventec Appliances(JiangNing) Corporation No.133, Jiang-Jun Road, Jiangning Economic and Technological Development Zone, Nanjing 211153, P.R.C.
Product	TI-nspire CX Wireless Network Adapter v2
Model	TINAVWNA2
Brand	TEXAS INSTRUMENTS

### 3.2. Description of EUT

Test Model	TINAVWNA2
Serial Number	N/A
Power Rating	DC 3.0-5.9V
RF Features	WLAN:802.11a/b/g/n
Transmit Type	1T1R
Sample Status	Production
Date of Receipt	2017. 10. 18
Date of Test	2017. 11. 10
I/O Ports List	<ul style="list-style-type: none"> <li>• USB Port x1</li> </ul>
Accessories Supplied	None

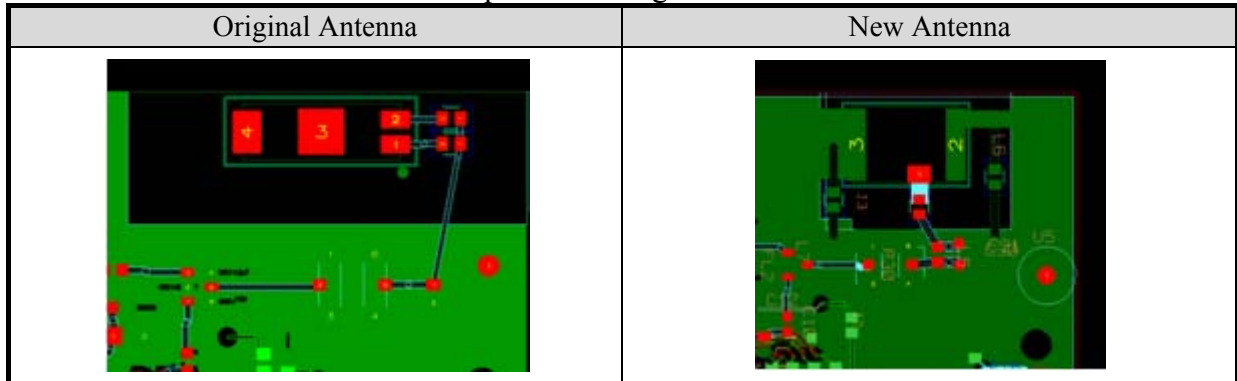
### 3.3. Information for Class II Permissive Change

The difference with original FCC ID: V7R-TINAVWNA2 is to updated information include manufacturer of ANT, matching circuit and attached location & components which changed on PCB. The Radiated Band Edge, Radiated Spurious Emission and Maximum Peak Output should be re-test.

● Antenna Information

	Manufacturer	Type	Antenna Gain	Different
Original Antenna	MURATA	Chip Dielectric Antenna	1.5dBi at 2.4GHz band 1.5dBi at 5GHz band	<b>1.Frequency range:</b> 2403 ~2518MHz 5125 ~5695MHz <b>2. Size:</b> 7x2.5x1.2mm <b>3. Matching circuit:</b> L5=2.7nH, L6=DNP, C24=1pF
New Antenna	ACON	Coupling Ceramics Chip Antenna	3.79dBi at 2.4GHz band 2.24dBi for 5GHz band I 3.29dBi for 5GHz Band III	<b>1.Frequency range:</b> 2400 ~2500MHz 5000 ~6000MHz <b>2. Size:</b> 5.2x3.7x0.7mm <b>3. Matching circuit:</b> L5=1nH, L6=2.7nH, L7=0ohm, R30=0.3Nf, C31=DNP

- Antenna location and components change



### 3.4. Antenna Information

No.	Antenna Part Number	Manufacture	Antenna Type	Frequency (MHz)	Max Gain (dBi)
1	ACM3-5036-A1-CC-S	ACON	Coupling Ceramics Chip Antenna	2400	2.24
				2442	3.58
				2450	3.79
				2484	4.10
				2500	3.90
				5150	1.80
				5250	2.24
				5350	3.16
				5500	3.30
				5600	3.20
				5725	3.02
				5785	3.29
				5850	2.45



### 3.5. EUT Specifications Assessed in Current Report

Mode	Fundamental Range (MHz)	Channel Number
802.11b	2412-2462	11
802.11g		11
802.11n-HT20		11

Mode	Modulation	Data Rate (Mbps)
802.11b	DSSS (DBPSK/DQPSK/CCK)	Up to 11
802.11g	OFDM (BPSK/QPSK/16QAM/64QAM)	Up to 54
802.11n-HT20		Up to 72.2

Channel List (802.11 b/g/n-HT20)	
Channel Number	Frequency (MHz)
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462

### 3.6. Descriptions of Key Components

None

### 3.7. Test Configuration

Mode	Duty Cycle (x)	T (ms)	Duty Cycle Factor (dB)
802.11b	1.00	---	0
802.11g	1.00	---	0
802.11n-HT20	1.00	---	0

Note: When duty cycle is less than 98% (0.98) that duty cycle factor  $10\log(1/x)$  is needed to add in conducted test items measured in average detector.

Item		Mode	Data Rate	Test Channel
Radiated Test Case	Radiated Band Edge <small>Note1</small>	802.11b	1Mbps	1/11
		802.11g	6Mbps	1/11
		802.11n-HT20	MCS0	1/11
	Radiated Spurious Emission <small>Note1 &amp; 2</small>	802.11b	1Mbps	1
		802.11g	6Mbps	11
		802.11n-HT20	MCS0	1
Conducted Test Case	Peak Output Power	802.11b	1Mbps	1/6/11
		802.11g	6Mbps	1/6/11
		802.11n-HT20	MCS0	1/6/11

Note 1:

- Mobile Device,
- Portable Device, and 3 axis were assessed.
  - Lie
  - Side
  - Stand

Note 2: Low, mid, and high channels were measured, only the worst channel of each modulation was presented in this report.

### 3.8. Tested Supporting System List

#### 3.8.1. Support Peripheral Unit

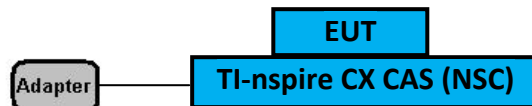
No.	Product	Brand	Model No.	Serial No.	Approval
1.	TI-nspire CX CAS (NSC)	TEXAS INSTRUMENTS	T1	N/A	N/A

#### 3.8.2. Cable Lists

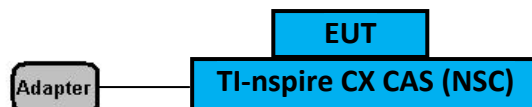
No.	Cable Description Of The Above Support Units
1.	AC/DC Power Adapter: Texas Instruments, Model: AC9212U-US USB Cable: Unshielded, Detachable, 1.5m

### 3.9. Setup Configuration

#### 3.9.1. EUT Configuration for Radiated Emission



#### 3.9.2. EUT Configuration for RF Conducted Test Items



### 3.10. Operating Condition of EUT

Test program “TINspireComputerLink-3.9.0.455” is used for enabling WLAN function under continues transmitting and choosing data rate/ channel.

### 3.11. Description of Test Facility

Name of Test Firm	Audix Technology Corporation / EMC Department No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan Tel: +886-2-26092133 Fax: +886-2-26099303 Website : www.audixtech.com Contact e-mail: sales@audixtech.com
Accreditations	The laboratory is accredited by following organizations under ISO/IEC 17025:2005 (1) NVLAP(USA) NVLAP Lab Code 200077-0 (2) TAF(Taiwan) No. 1724 (3) FCC OET Designation No. TW1004 & TW1090 & TW1724
Test Facilities	(1) Semi-Anechoic Chamber (IC Test Site Registration No.: 5183B-1) (2) Fully Anechoic Chamber (IC Test Site Registration No.: 5183B-4)

### 3.12. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Radiation Test (Distance: 3m)	30MHz~1000MHz	± 3.68dB
	Above 1GHz	± 5.82dB

Remark : Uncertainty =  $ku_c(y)$

Test Item	Uncertainty
Maximum peak output power	± 0.33dB

## 4. MEASUREMENT EQUIPMENT LIST

### 4.1. Radiated Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A-526	MY53400071	2017. 09. 13	1 Year
2.	Spectrum Analyzer	Agilent	N9010A-526	MY52220368	2016. 12. 01	1 Year
3.	Test Receiver	R & S	ESCS30	100338	2017. 06. 19	1 Year
4.	Amplifier	HP	8447D	2944A06305	2017. 02. 16	1 Year
5.	Amplifier	Sonoma	310N	187161	2017. 06. 08	1 Year
6.	Bilog Antenna	CHASE	CBL6112D	33821	2017. 01. 21	1 Year
7.	Loop Antenna	R&S	HFH2-Z2	891847/27	2016. 12. 23	1 Year
8.	Double-Ridged Waveguide Horn	ETS-Lindgren	3117	00135902	2017. 03. 08	1 Year
9.	2.4GHz Notch Filter	K&L	7NSL10-244 1.5E130.5-00	1	2017. 07. 26	1 Year
10.	3GHz Notch Filter	Microwave	H3G018G1	484798	2017. 08. 25	1 Year
11.	Test Software	Audix	e3	V.6.110601	N.C.R.	N.C.R.

### 4.2. RF Conducted Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
1.	Power Meter	Anritsu	ML2495A	1145008	2017. 11. 03	1 Year
2.	Power Sensor	Anritsu	MA2411B	1126096	2017. 11. 03	1 Year

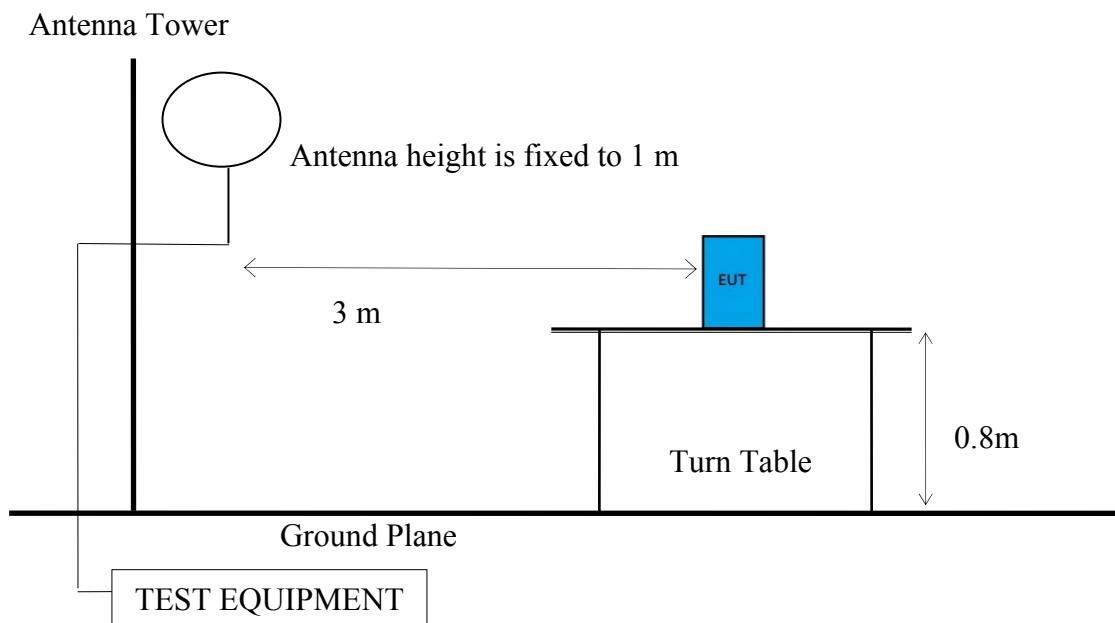
## 5. RADIATED EMISSION

### 5.1. Block Diagram of Test Setup

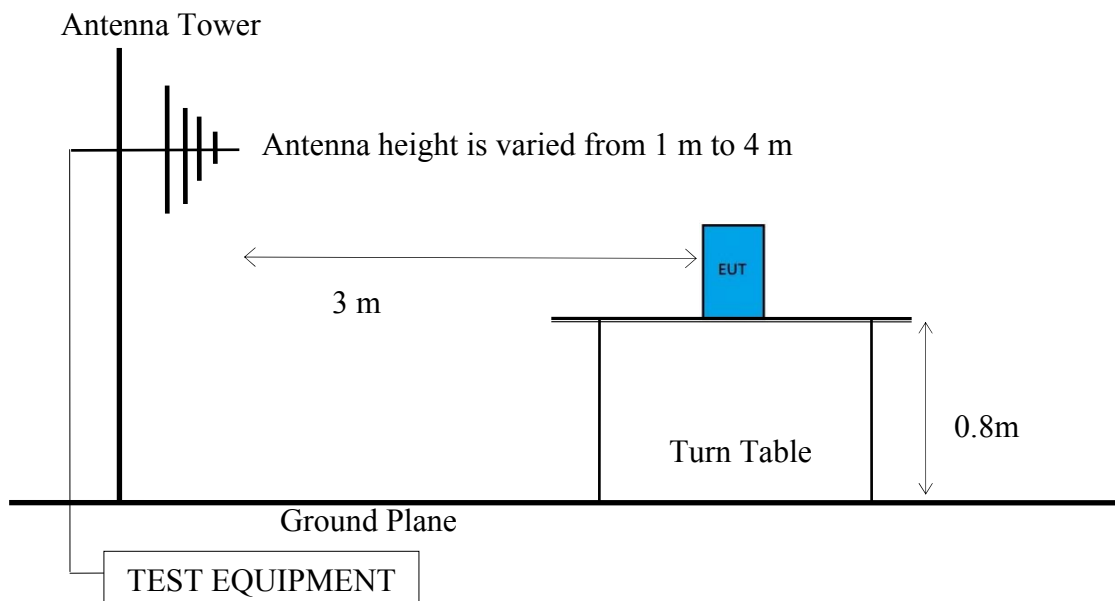
#### 5.1.1. Block Diagram of EUT

Indicated as section 3.10

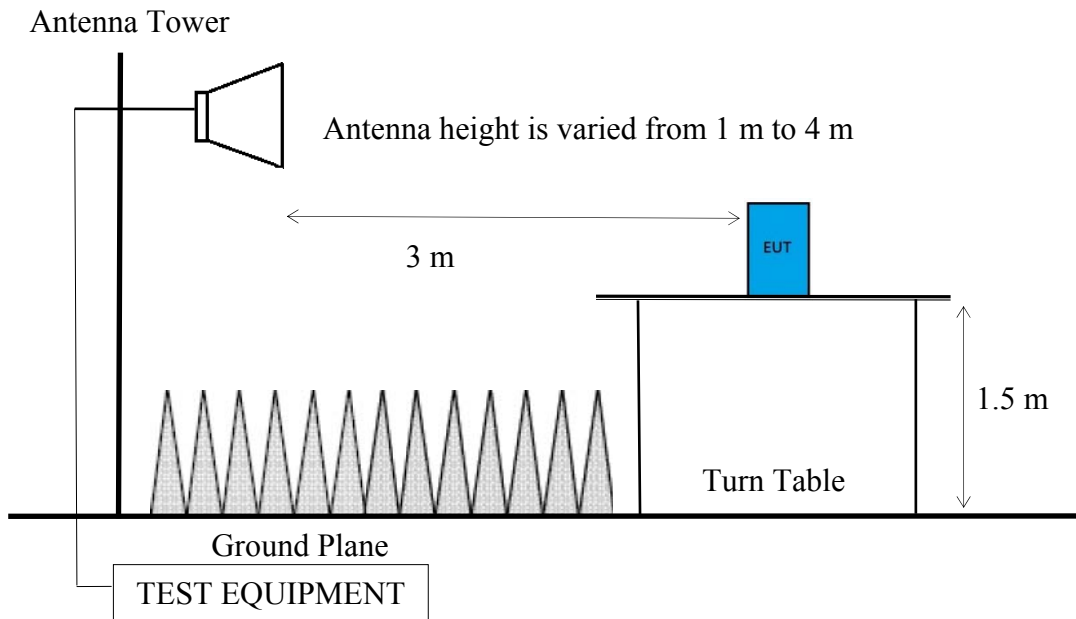
#### 5.1.2. Setup Diagram for 9kHz-30MHz



#### 5.1.3. Setup Diagram for 30-1000 MHz



5.1.4. Setup Diagram for above 1GHz



5.2. Radiated Emission Limits

In any 100kHz bandwidth outside the frequency band, the radio frequency power produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified as below.

Frequency (MHz)	Distance (m)	Limits	
		dB $\mu$ V/m	$\mu$ V/m
0.009 - 0.490	300	67.6	2400/kHz
0.490 - 1.705	30	87.6	24000/kHz
1.705 - 30	30	29.5	30
30 - 88	3	40.0	100
88- 216	3	43.5	150
216- 960	3	46.0	200
Above 960	3	54.0	500
Above 1000	3	74.0 dB $\mu$ V/m (Peak) 54.0 dB $\mu$ V/m (Average)	

Remark : (1) dB $\mu$ V/m = 20 log ( $\mu$ V/m)

- (2) The tighter limit applies to the edge between two frequency bands.
- (3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
- (4) Fundamental and emission fall within operation band are exempted from this section.
- (5) Pursuant to ANSI C63.10: 6.6.4.3, if the maximized peak measured value complies with the average limit, then it is unnecessary to perform an average measurement.

### 5.3. Test Procedure

#### **Frequency Range 9kHz~30MHz:**

The EUT setup on the turn table which has 0.8 m height to the ground. The turn table rotated 360 degrees and antenna fixed to 1 m to find the maximum emission level. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

- (1) RBW = 9kHz with peak and average detector.
- (2) Detector: average and peak (9kHz-490kHz)  
Q.P. (490kHz-30MHz)

#### **Frequency Range 30MHz ~ 25GHz:**

The EUT setup on the turn find table which has 80 cm (for 30-1000 MHz) and 1.5m (for above 1GHz) height to the ground. The turn table rotated 360 degrees and antenna varied from 1 m to 4 m to find the maximum emission level. Both horizontal and vertical polarization are required. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

#### **Frequency below 1 GHz:**

Spectrum Analyzer is used for pre-testing with following setting:

- (1)RBW = 120KHz
- (2)VBW  $\geq 3 \times$  RBW.
- (3)Detector = Peak.
- (4)Sweep time = auto.
- (5)Trace mode = max hold.
- (6)Allow sweeps to continue until the trace stabilizes.
- (7)When peak-detected value is lower than limit that the measurement using the Q.P. detector is not required. Otherwise using Q.P. for finally measurement.

#### **Frequency above 1GHz to 10th harmonic (up to 25 GHz):**

##### **Peak Detector:**

- (1)RBW = 1MHz
- (2)VBW  $\geq 3 \times$  RBW.
- (3)Detector = Peak.
- (4)Sweep time = auto.
- (5)Trace mode = max hold.
- (6)Allow sweeps to continue until the trace stabilizes.
- (7)When peak-detected value is lower than limit that the measurement using the average detector is not required. Otherwise using average detector for finally measurement.



**Average Detector:****■ Option 1:**

(1) RBW = 1MHz

(2) VBW  $\geq$  1/ T.

Modulation Type	T (ms)	1/ T (kHz)	VBW Setting
802.11b	---	---	10Hz
802.11g	---	---	10Hz
802.11n-HT20	---	---	10Hz

N/A: 1/ T is not implemented when duty cycle presented in section 3.9 is  $\geq$ 98 %.

(1) Detector = Peak.

(2) Sweep time = auto.

(3) Trace mode = max hold.

(4) Allow sweeps to continue until the trace stabilizes.

**□ Option 2:**

Average Emission Level = Peak Emission Level + D.C.C.F.

**5.4. Measurement Result Explanation****■** Peak Emission Level = Antenna Factor + Cable Loss + Meter Reading**■** Average Emission Level = Antenna Factor + Cable Loss + Meter Reading**□** Average Emission Level = Peak Emission Level + DCCFDuty Cycle Correction Factor (DCCF) =  $20\log(TX_{on}/TX_{on+off})$  presented in section 3.8**□** ERP = Peak Emission Level - 95.2dB - 2.14dB**5.5. Test Results**

Please refer to Appendix A.

## 6. MAXIMUM PEAK OUTPUT POWER

### 6.1. Block Diagram of Test Setup



### 6.2. Specification Limits

The Limits of maximum Peak Output Power for digital modulation in 2400-2483.5MHz is : 1Watt. (30dBm), and E.I.R.P.: 4Watt (36dBm)

### 6.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v04:

#### ■ PKPM1 Peak power meter method:

EUT is connected to power sensor and record the maximum output power.

#### Method AVGPM (Measurement using an RF average power meter):

EUT is connected to power sensor and record the maximum average output power and duty cycle factor is added when duty cycle presented in section 3.7 is < 98%.

#### Method AVGSA-2 (Spectrum channel power)

- (1) Set span to at least 1.5 times the OBW
- (2) Set RBW = 1 -5% of OBW
- (3) Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
- (4) Detector = RMS.
- (5) Trace mode = trace average at least 100 traces
- (6) Sweep = auto couple.
- (7) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges.
- (8) Duty cycle factor is added when duty cycle presented in section 3.7 is < 98%.

### 6.4. Test Results

Please refer to Appendix A

## **7. DEVIATION TO TEST SPECIFICATIONS**

**【NONE】**



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# APPDNDIX A

## TEST DATA AND PLOTS

(Model: TINAVWNA2)

## TABLE OF CONTENTS

<b>A.1 RADIATED EMISSION .....</b>	<b>2</b>
A.1.1 Emissions within Restricted Frequency Bands.....	2
A.1.2 Emissions outside the frequency band:.....	15
A.1.3 Emissions in Non-restricted Frequency Bands:.....	15
<b>A.2 MAXIMUM PEAK OUTPUT POWER .....</b>	<b>16</b>
A.2.1 Peak Output Power .....	16
A.2.2 Average Output Power .....	16

## A.1 RADIATED EMISSION

Test Date	2017/11/10	Temp./Hum.	25°C/52%
Test Voltage	DC 5V (Via AC/DC Power Adapter)		

### A.1.1 Emissions within Restricted Frequency Bands

#### A.1.1.1 Frequency 9kHz~30MHz

**The emissions (9kHz~30MHz) not reported for there is no emission be found.**

#### A.2.1.2 Frequency Below 1 GHz

Mode	802.11g	Frequency	TX 2437MHz
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#### Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector
101.78	17.60	2.29	4.04	23.93	43.50	19.57	Peak
312.27	19.84	4.48	6.13	30.45	46.00	15.55	Peak
569.32	24.21	6.65	2.68	33.54	46.00	12.46	Peak
741.98	25.34	7.31	3.09	35.74	46.00	10.26	Peak
779.81	25.72	7.50	4.91	38.13	46.00	7.87	Peak
935.98	27.18	8.41	3.89	39.48	46.00	6.52	Peak

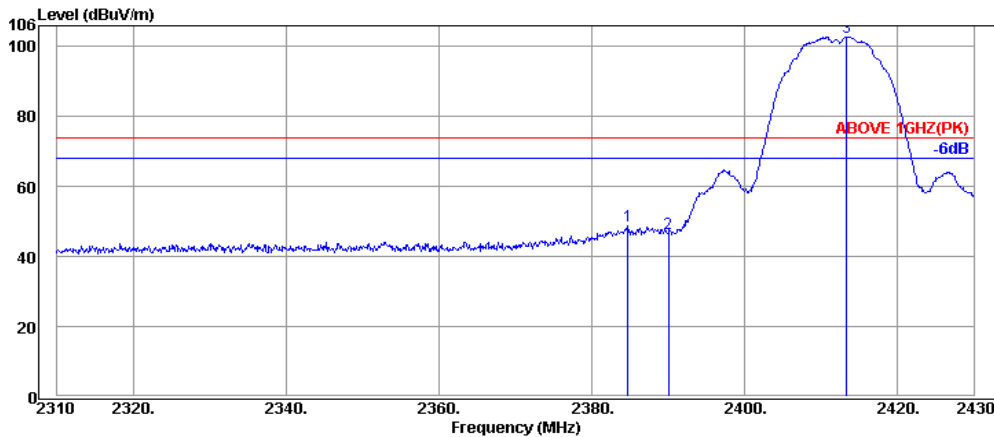
#### Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dB $\mu$ V)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector
101.78	17.60	2.29	2.64	22.53	43.50	20.97	Peak
331.67	20.37	4.74	4.23	29.34	46.00	16.66	Peak
544.10	23.83	6.57	1.72	32.12	46.00	13.88	Peak
845.77	26.33	7.87	2.59	36.79	46.00	9.21	Peak
899.12	26.81	8.17	2.77	37.75	46.00	8.25	Peak
994.18	27.76	8.79	1.50	38.05	54.00	15.95	Peak

A.1.1.2 Frequency Above 1 GHz to 10<sup>th</sup> harmonics

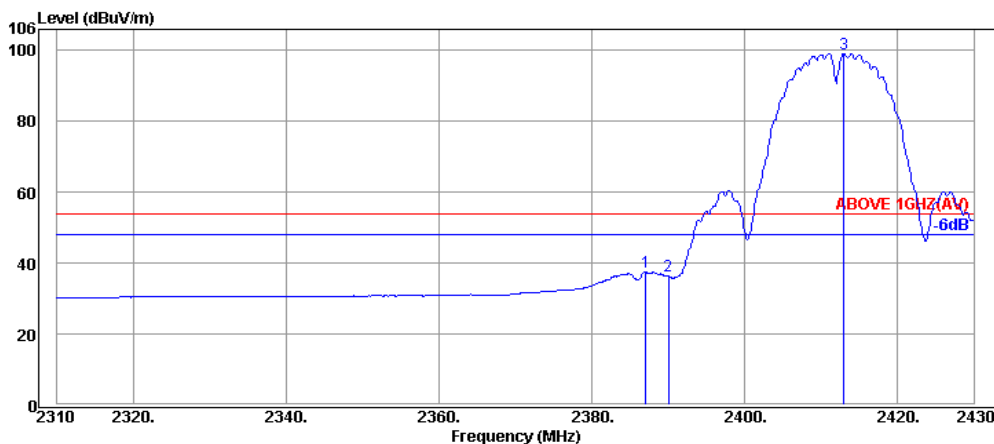
**Band Edge:**

Mode	802.11b	Frequency	TX 2412MHz
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**Antenna at Horizontal Polarization**

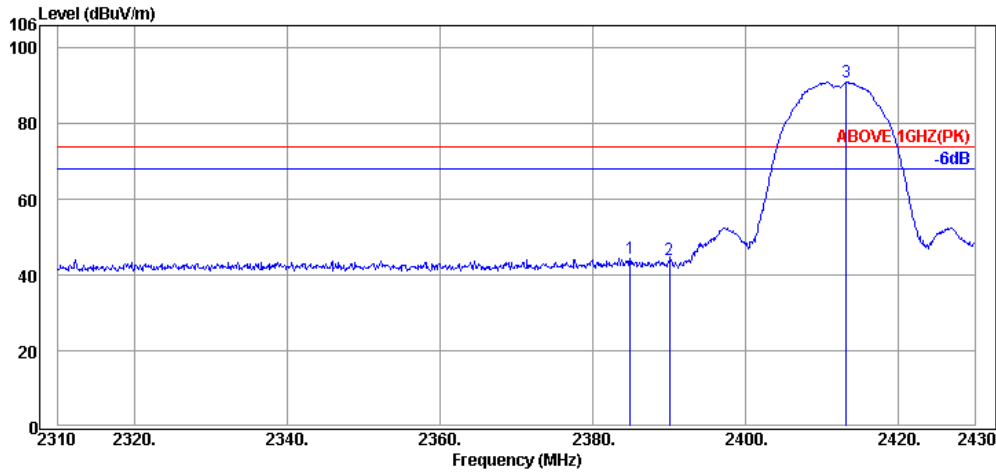
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2384.76	32.13	6.55	10.28	48.96	74.00	25.04	Peak
2390.04	32.16	6.57	8.06	46.79	74.00	27.21	Peak
2413.32	32.18	6.59	64.13	102.90	---	---	Peak



**Antenna at Horizontal Polarization**

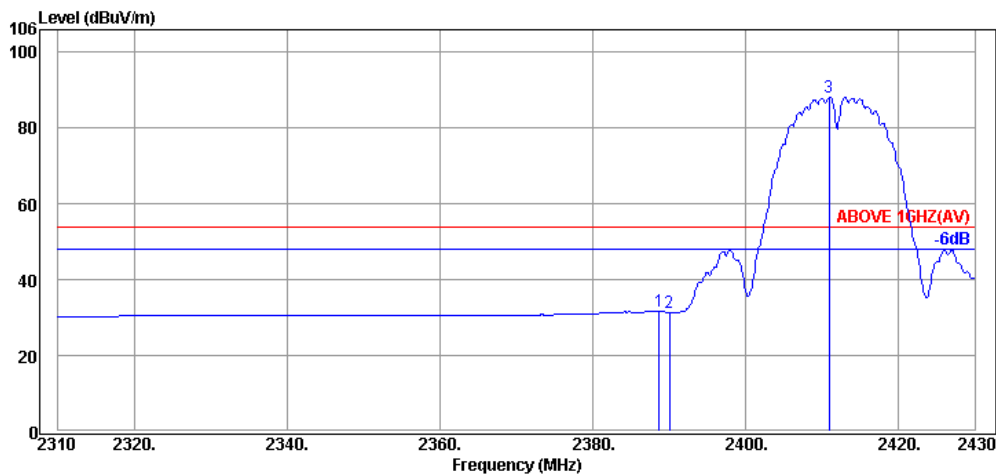
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2387.04	32.16	6.57	-1.16	37.57	54.00	16.43	Average
2390.04	32.16	6.57	-2.44	36.29	54.00	17.71	Average
2412.96	32.18	6.59	60.37	99.14	---	---	Average

Mode	802.11b	Frequency	TX 2412MHz
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**Antenna at Vertical Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2384.88	32.13	6.55	5.79	44.47	74.00	29.53	Peak
2390.04	32.16	6.57	5.29	44.02	74.00	29.98	Peak
2413.20	32.18	6.59	52.20	90.97	---	---	Peak

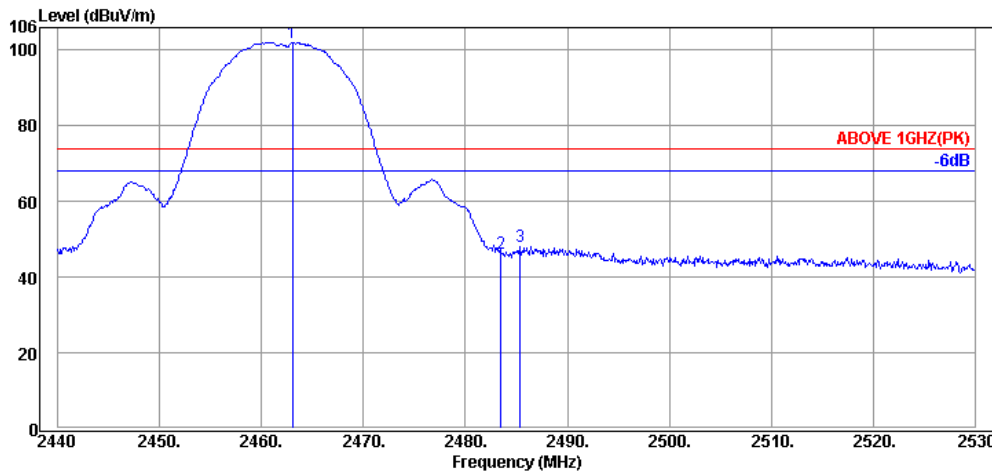


**Antenna at Vertical Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2388.72	32.16	6.57	-7.13	31.60	54.00	22.40	Average
2390.04	32.16	6.57	-7.28	31.45	54.00	22.55	Average
2410.92	32.18	6.59	49.37	88.14	---	---	Average

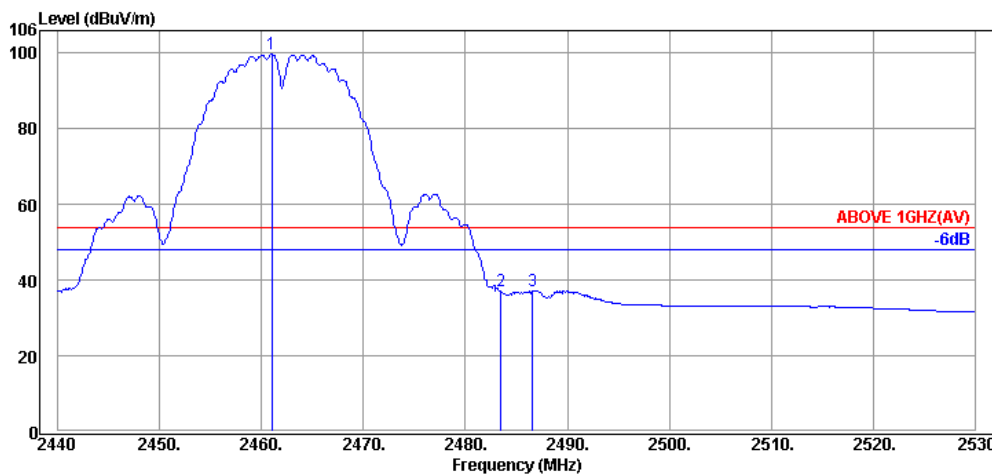


Mode	802.11b	Frequency	TX 2462MHz
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**Antenna at Horizontal Polarization**

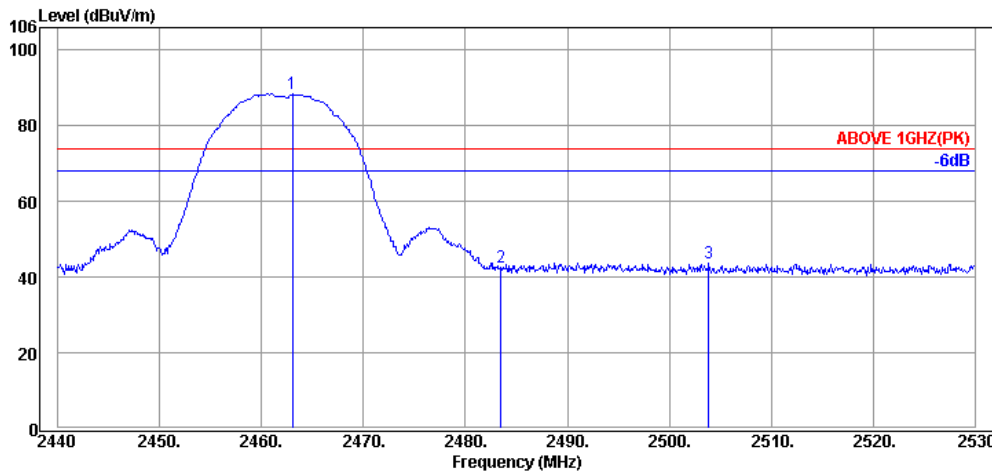
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2463.04	32.25	6.65	63.07	101.97	---	---	Peak
2483.47	32.28	6.67	7.32	46.27	74.00	27.73	Peak
2485.36	32.28	6.67	9.13	48.08	74.00	25.92	Peak



**Antenna at Horizontal Polarization**

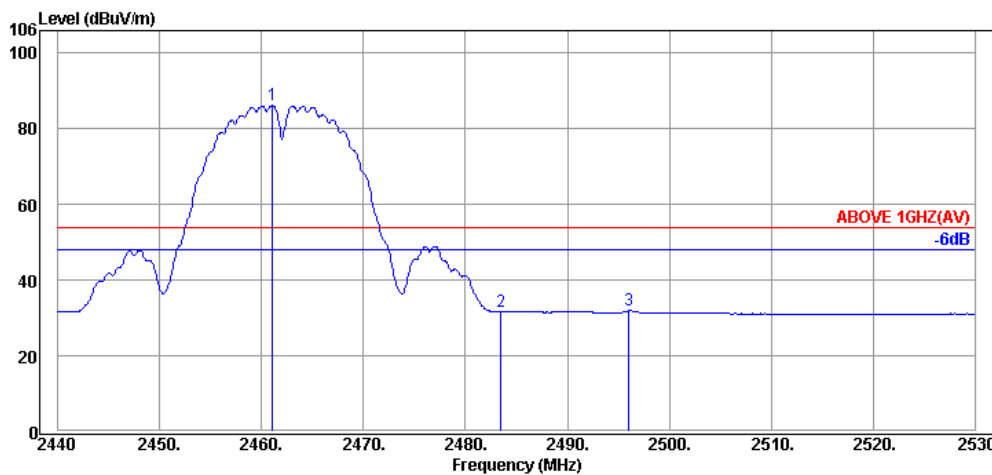
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2460.97	32.25	6.65	60.83	99.73	---	---	Average
2483.47	32.28	6.67	-1.92	37.03	54.00	16.97	Average
2486.62	32.28	6.67	-1.65	37.30	54.00	16.70	Average

Mode	802.11b	Frequency	TX 2462MHz
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**Antenna at Vertical Polarization**

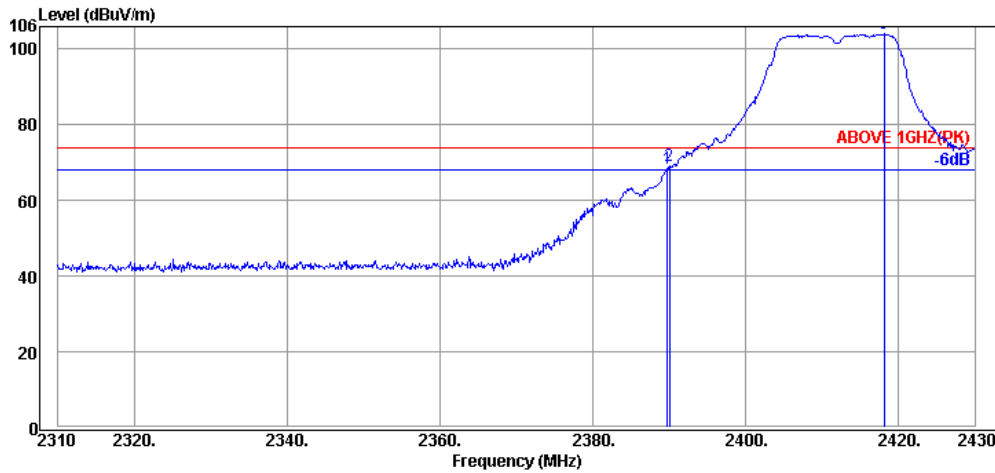
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2463.04	32.25	6.65	49.54	88.44	---	---	Peak
2483.47	32.28	6.67	3.82	42.77	74.00	31.23	Peak
2503.90	32.30	6.69	4.79	43.78	74.00	30.22	Peak



**Antenna at Vertical Polarization**

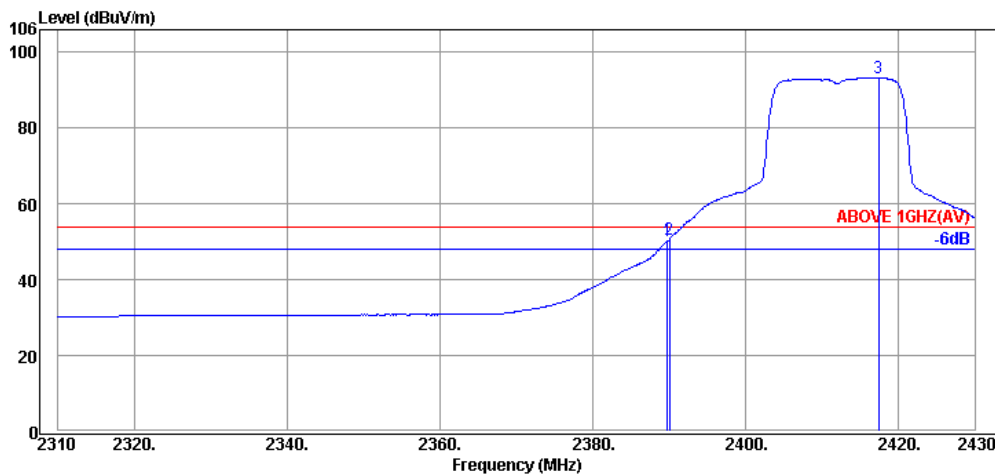
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2461.06	32.25	6.65	47.30	86.20	---	---	Average
2483.47	32.28	6.67	-7.31	31.64	54.00	22.36	Average
2496.07	32.30	6.69	-7.07	31.92	54.00	22.08	Average

Mode	802.11g	Frequency	TX 2412MHz
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**Antenna at Horizontal Polarization**

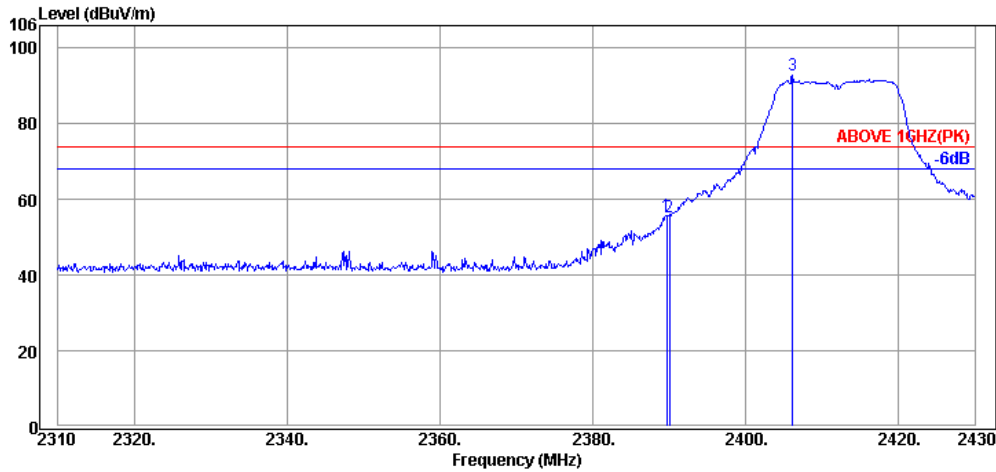
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.80	32.16	6.57	29.87	68.60	74.00	5.40	Peak
2390.04	32.16	6.57	30.39	69.12	74.00	4.88	Peak
2418.12	32.18	6.59	65.24	104.01	---	---	Peak



**Antenna at Horizontal Polarization**

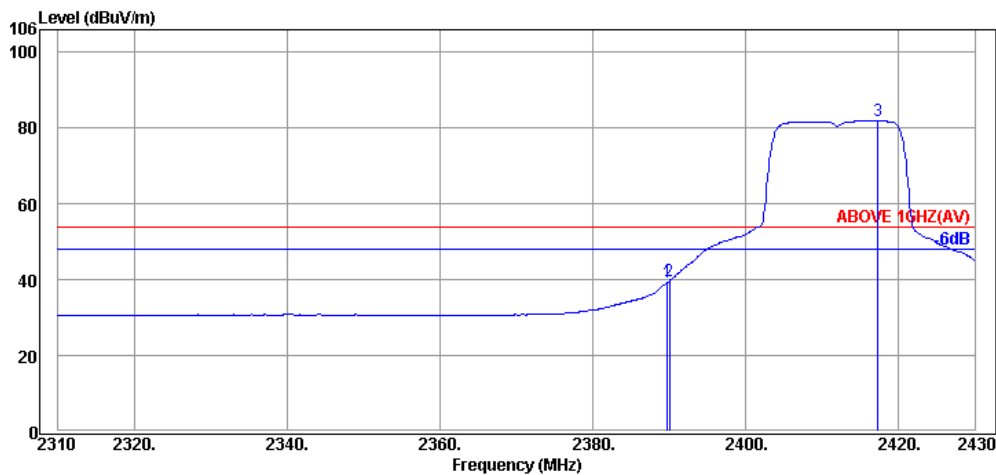
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.80	32.16	6.57	11.42	50.15	54.00	3.85	Average
2390.04	32.16	6.57	12.04	50.77	54.00	3.23	Average
2417.40	32.18	6.59	54.54	93.31	---	---	Average

Mode	802.11g	Frequency	TX 2412MHz
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**Antenna at Vertical Polarization**

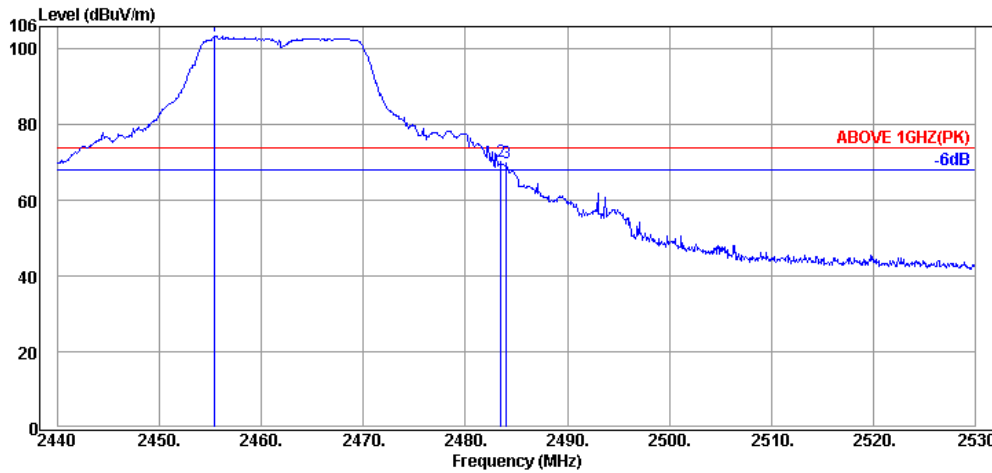
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.68	32.16	6.57	17.12	55.85	74.00	18.15	Peak
2390.04	32.16	6.57	16.67	55.40	74.00	18.60	Peak
2406.12	32.18	6.59	54.07	92.84	---	---	Peak



**Antenna at Vertical Polarization**

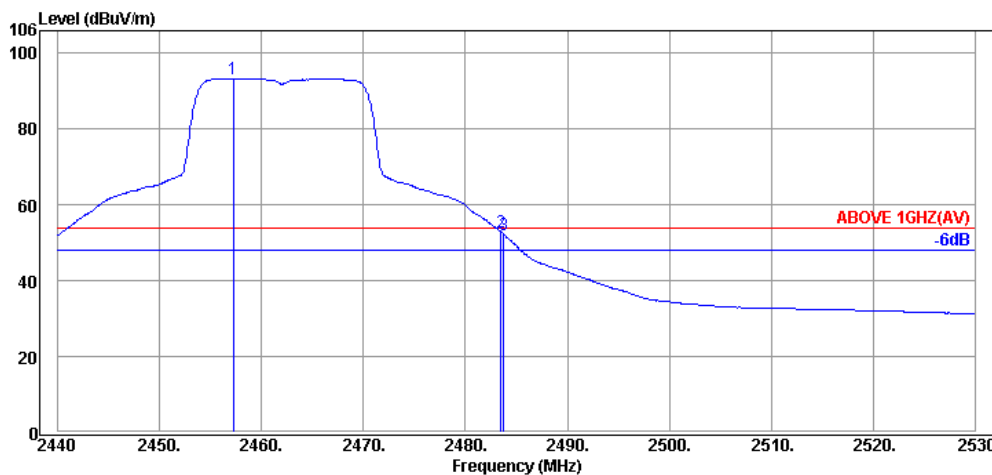
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.80	32.16	6.57	0.55	39.28	54.00	14.72	Average
2390.04	32.16	6.57	0.99	39.72	54.00	14.28	Average
2417.28	32.18	6.59	43.28	82.05	---	---	Average

Mode	802.11g	Frequency	TX 2462MHz
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**Antenna at Horizontal Polarization**

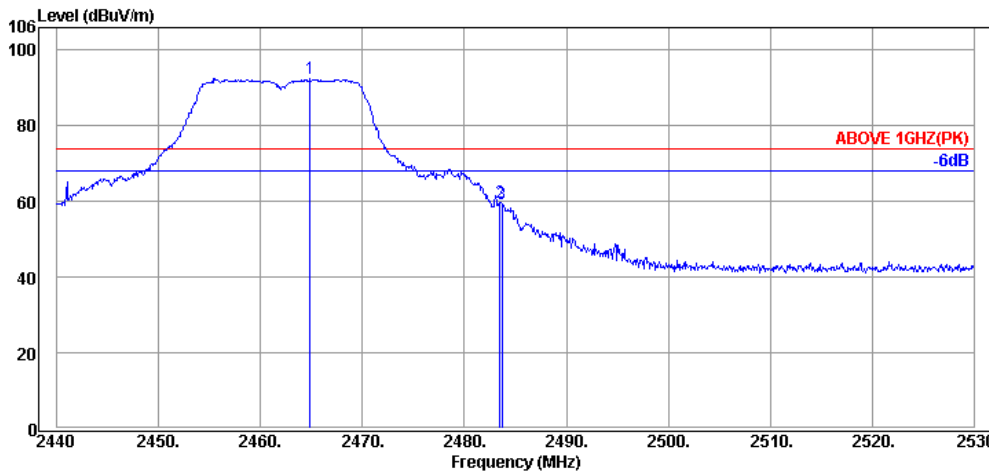
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2455.39	32.25	6.65	64.51	103.41	---	---	Peak
2483.47	32.28	6.67	31.19	70.14	74.00	3.86	Peak
2484.01	32.28	6.67	30.98	69.93	74.00	4.07	Peak



**Antenna at Horizontal Polarization**

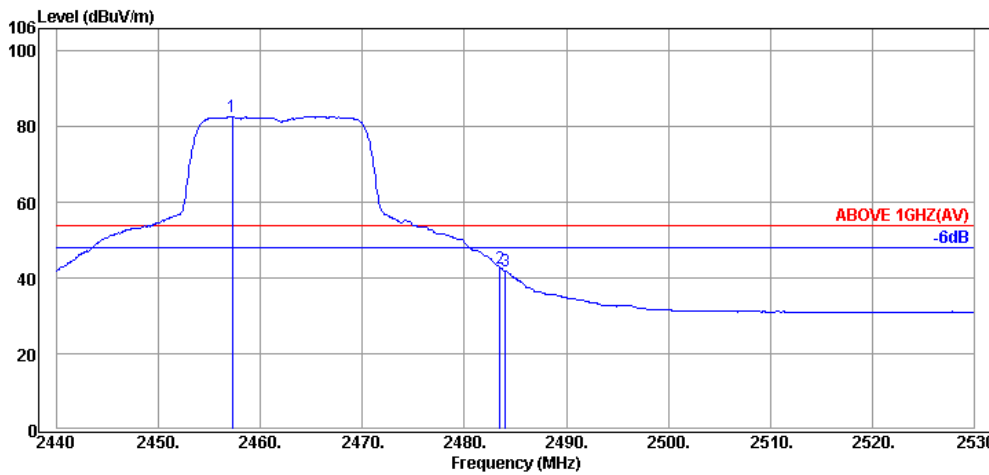
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2457.19	32.25	6.65	54.49	93.39	---	---	Average
2483.47	32.28	6.67	13.88	52.83	54.00	1.17	Average
2483.74	32.28	6.67	13.15	52.10	54.00	1.90	Average

Mode	802.11g	Frequency	TX 2462MHz
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**Antenna at Vertical Polarization**

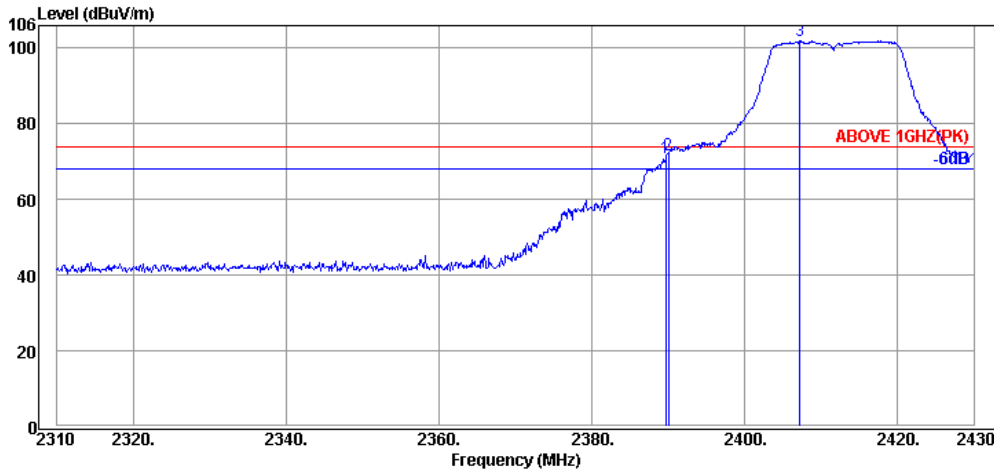
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2464.84	32.25	6.65	53.56	92.46	---	---	Peak
2483.47	32.28	6.67	20.66	59.61	74.00	14.39	Peak
2483.65	32.28	6.67	20.48	59.43	74.00	14.57	Peak



**Antenna at Vertical Polarization**

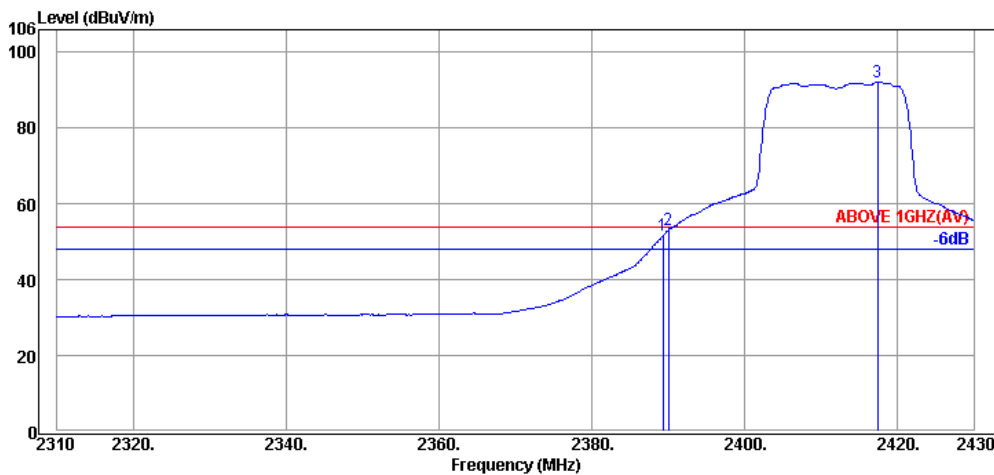
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2457.19	32.25	6.65	43.74	82.64	---	---	Average
2483.47	32.28	6.67	3.80	42.75	54.00	11.25	Average
2484.01	32.28	6.67	2.81	41.76	54.00	12.24	Average

Mode	802.11n-HT20	Frequency	TX 2412MHz
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**Antenna at Horizontal Polarization**

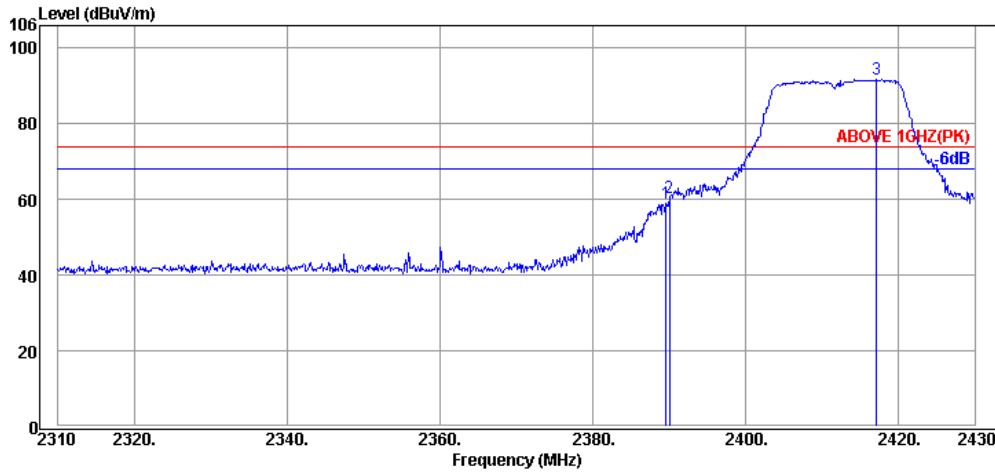
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.68	32.16	6.57	32.45	71.18	74.00	2.82	Peak
2390.04	32.16	6.57	33.07	71.80	74.00	2.20	Peak
2407.20	32.18	6.59	63.20	101.97	---	---	Peak



**Antenna at Horizontal Polarization**

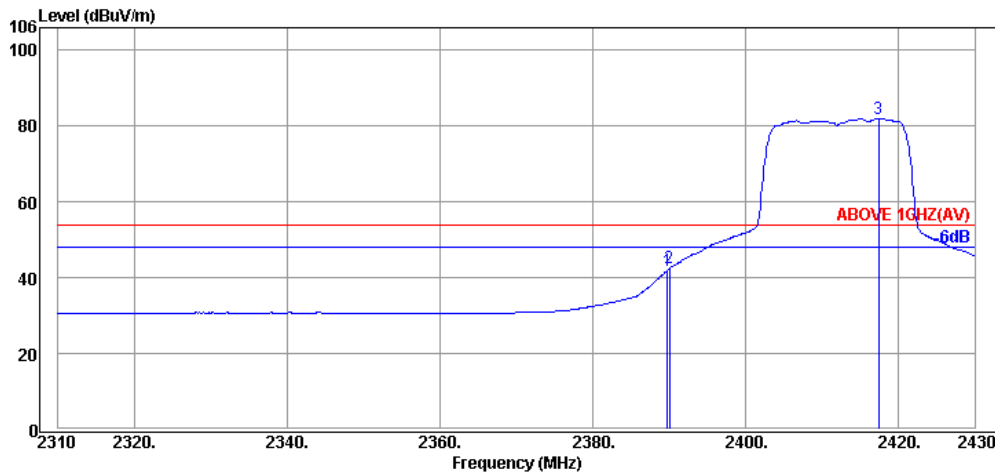
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.32	32.16	6.57	12.92	51.65	54.00	2.35	Average
2390.04	32.16	6.57	14.39	53.12	54.00	0.88	Average
2417.40	32.18	6.59	53.36	92.13	---	---	Average

Mode	802.11n-HT20	Frequency	TX 2412MHz
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**Antenna at Vertical Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.56	32.16	6.57	20.29	59.02	74.00	14.98	Peak
2390.04	32.16	6.57	21.75	60.48	74.00	13.52	Peak
2417.16	32.18	6.59	52.97	91.74	---	---	Peak

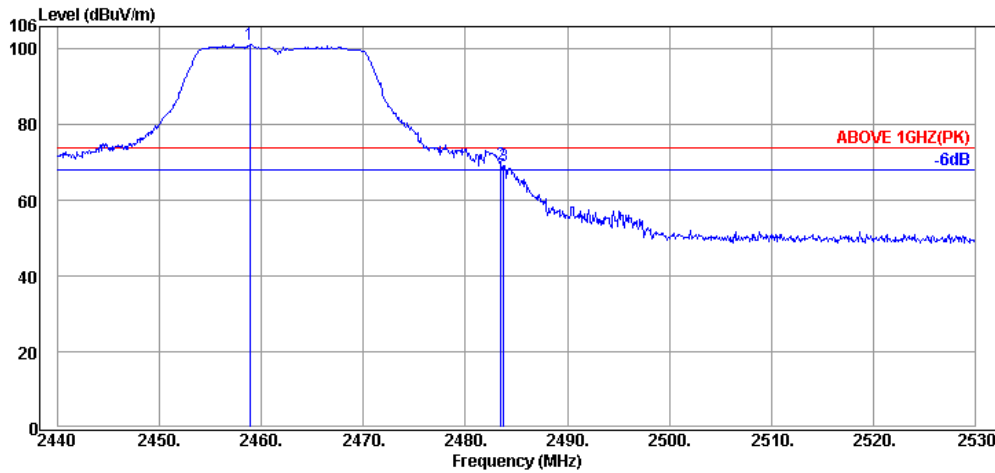


**Antenna at Vertical Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.80	32.16	6.57	3.34	42.07	54.00	11.93	Average
2390.04	32.16	6.57	3.77	42.50	54.00	11.50	Average
2417.40	32.18	6.59	43.31	82.08	---	---	Average

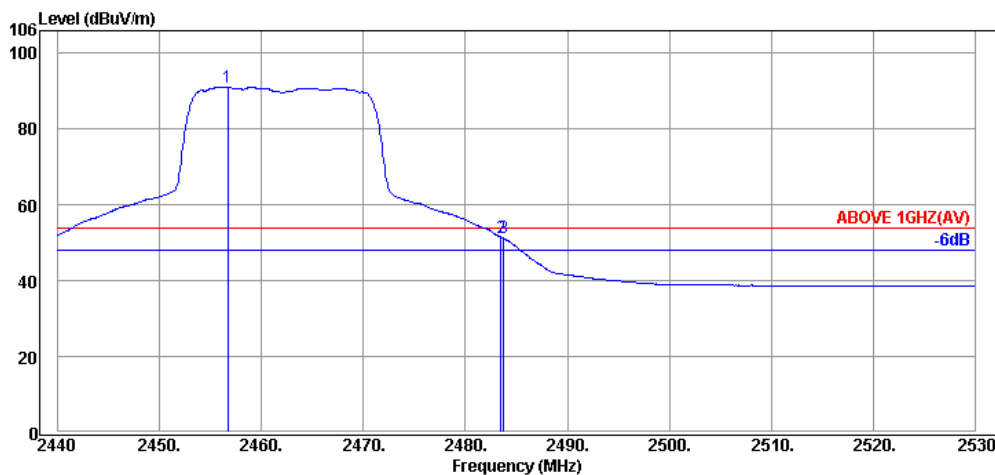


Mode	802.11n-HT20	Frequency	TX 2462MHz
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**Antenna at Horizontal Polarization**

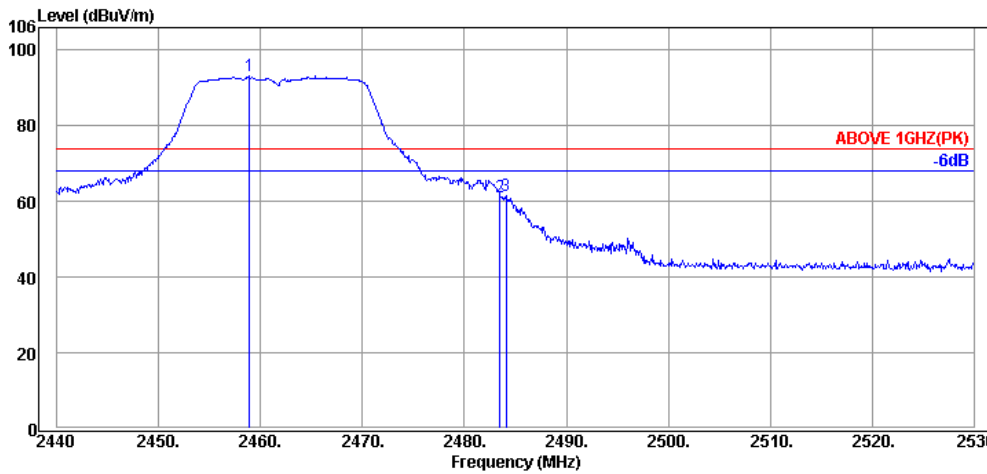
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2458.81	32.25	6.65	62.39	101.29	---	---	Peak
2483.47	32.28	6.67	30.61	69.56	74.00	4.44	Peak
2483.74	32.28	6.67	30.14	69.09	74.00	4.91	Peak



**Antenna at Horizontal Polarization**

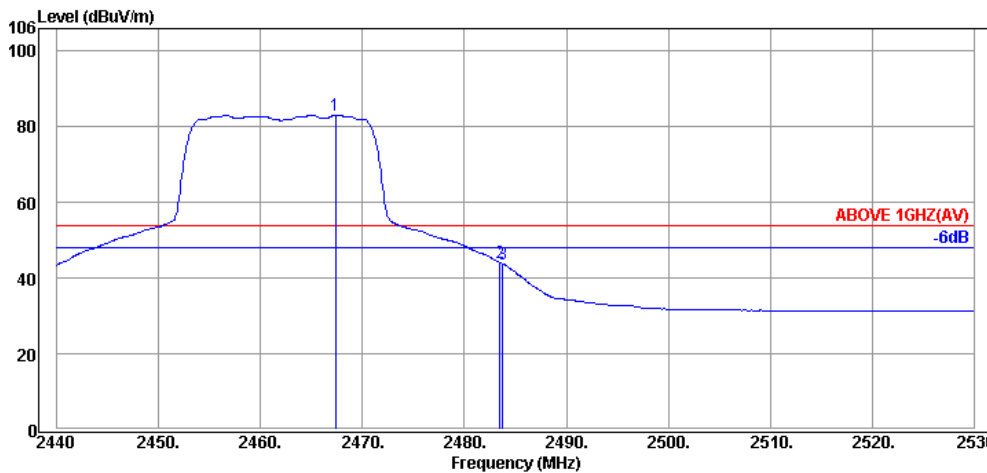
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2456.65	32.25	6.65	52.32	91.22	---	---	Average
2483.47	32.28	6.67	12.59	51.54	54.00	2.46	Average
2483.74	32.28	6.67	12.26	51.21	54.00	2.79	Average

Mode	802.11n-HT20	Frequency	TX 2462MHz
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**Antenna at Vertical Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2458.90	32.25	6.65	54.31	93.21	---	---	Peak
2483.47	32.28	6.67	22.42	61.37	74.00	12.63	Peak
2484.10	32.28	6.67	22.50	61.45	74.00	12.55	Peak



**Antenna at Vertical Polarization**

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2467.36	32.25	6.65	44.16	83.06	---	---	Average
2483.47	32.28	6.67	5.14	44.09	54.00	9.91	Average
2483.74	32.28	6.67	4.82	43.77	54.00	10.23	Average

A.1.2 Emissions outside the frequency band:

The emissions (up to 25GHz) not reported for there is no emission be found.

A.1.3 Emissions in Non-restricted Frequency Bands:

Pursuant to KDB 558074 D01 DTS Meas Guidance v04 that emission levels below the 15.209 general radiated emissions limits is not required.

## A.2 MAXIMUM PEAK OUTPUT POWER

Test Date	2017/11/10	Temp./Hum.	23°C/55%
Cable Loss	0.6dB	Test Voltage	DC 5V (Via AC/DC Power Adapter)

### A.2.1 Peak Output Power

Mode	Centre Frequency (MHz)	Peak Output Power		Limit
		(dBm)	(W)	
802.11b	2412	14.53	0.028379	< 30dBm (1W)
	2437	14.46	0.027925	
	2462	14.39	0.027479	
802.11g	2412	17.64	0.058076	
	2437	17.83	0.060674	
	2462	17.71	0.059020	
802.11n-HT20	2412	17.45	0.055590	
	2437	17.24	0.052966	
	2462	16.75	0.047315	

### A.2.2 Average Output Power

Mode	Centre Frequency (MHz)	Average Output Power (dBm)	10log (1/X)	Average Output Power		Limit
				(dBm)	(W)	
802.11b	2412	12.09	0	12.09	0.016181	< 30dBm (1W)
	2437	12.03		12.03	0.015959	
	2462	12.01		12.01	0.015885	
802.11g	2412	10.84	0	10.84	0.012134	
	2437	10.65		10.65	0.011614	
	2462	11.72		11.72	0.014859	
802.11n-HT20	2412	10.72	0	10.72	0.011803	
	2437	10.42		10.42	0.011015	
	2462	10.49		10.49	0.011194	

Note: The results have been included cable loss.



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**APPENDIX B**

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# APPDNDIX B

## TEST PHOTOGRAPHS

(Model: TINAVWNA2)



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*APPENDIX C*

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# APPDNDIX C

## EUT PHOTOGRAPHS

(Model: TINAVWNA2)