

FCC Test Report

FCC ID : XNAWPM05

Equipment : BPM Connect

Model No. : WPM05

Brand Name : Withings

Applicant : Withings SA

Address : 2 rue Maurice Hartmann

92130 Issy-Les-Moulineaux

France

Standard : 47 CFR FCC Part 15.247

Received Date : Apr. 18, 2019

Tested Date : May 02 ~ May 13, 2019

We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Reviewed by: Approved by:

Along Chen Assistant Manager Gary Chang / Manager

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TAF

Testing Laboratory

Report No.: FR941802AC Report Version: Rev. 02



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Release Record

Report No.	Version	Description	Issued Date
FR941802AC	Rev. 01	Initial issue	May 27, 2019
FR941802AC	Rev. 02	Added ANSI C63.4-2014 on P9.	Jun. 06, 2019

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Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.180MHz 54.35 (Margin -10.15dB) - QP	Pass
15.247(d)	Radiated Emissions	[dBuV/m at 3m]: 4824.00MHz	Pass
15.209	INdulated Emissions	53.87 (Margin -0.13dB) - AV	F 033
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: 25.69	Pass
15.247(a)(2)	6dB Bandwidth	Meet the requirement of limit	Pass
15.247(e)	Power Spectral Density	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

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1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

RF General Information						
Frequency Range (MHz) IEEE Std. Ch. Freq. (MHz) Channel Transmit Data Rate Number Chains (N _{TX}) MCS						
2400-2483.5	b	2412-2462	1-11 [11]	1	1-11 Mbps	
2400-2483.5	g	2412-2462	1-11 [11]	1	6-54 Mbps	
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	1	MCS 0-7	

Note 1: RF output power specifies that Maximum Peak Conducted Output Power.

1.1.2 Antenna Details

Ant. No.	Brand	Model	Туре	Connector	Gain (dBi)
1	BROADCOM	BCM9Fractal	PCB	NA	2.8

1.1.3 EUT Operational Condition

Power Supply Type	3.7Vdc from battery Brand: CEL Model: 652265-1000mAh 5Vdc from host
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1.1.4 Accessories

N/A

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Note 2: 802.11b uses a combination of DSSS-DBPSK, DQPSK, CCK modulation.

Note 3: 802.11g/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.



1.1.5 Channel List

Channel	Frequency(MHz)
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462

1.1.6 Test Tool and Duty Cycle

Test Tool	Tera term, V4.101					
	Mode	Duty Cycle (%)	Duty Factor (dB)			
Duty Cycle and Duty Footor	11b	100.00%	0.00			
Duty Cycle and Duty Factor	11g	99.28%	0.03			
	HT20	99.26%	0.03			

1.1.7 Power Index of Test Tool

Modulation Mode	Test Frequency (MHz)	Power Index
11b	2412	64
11b	2437	64
11b	2462	64
11g	2412	76
11g	2437	76
11g	2462	76
HT20	2412	76
HT20	2437	76
HT20	2462	76

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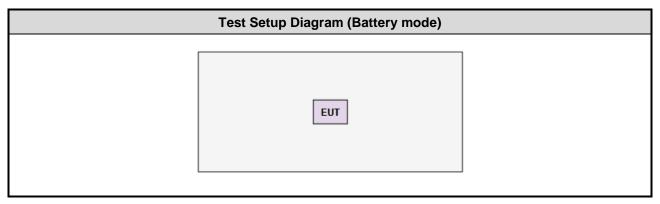
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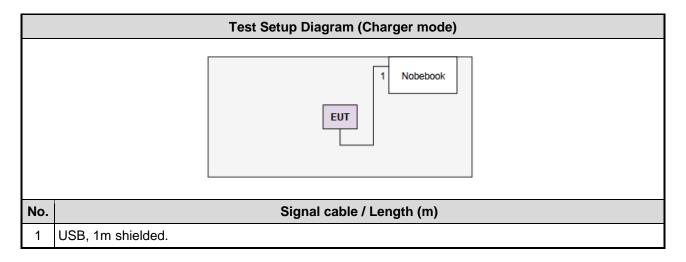
1.2 Local Support Equipment List

	Support Equipment List							
No.	No. Equipment Brand Model S/N Remarks							
1	Notebook	DELL	Latitude E6440	JPXMD12				

1.3 Test Setup Chart



Note: The support notebook is connected to fixture by console cable and is disconnected from EUT and removed from test table after sending command to control the EUT to transmit continuously.



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1.4 The Equipment List

Test Item	Conducted Emission	Conducted Emission					
Test Site	Conduction room 1 / (Conduction room 1 / (CO01-WS)					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until		
Receiver	R&S	ESR3	101657	Jan. 08, 2019	Jan. 07, 2020		
LISN	LISN SCHWARZBECK Schwarzbeck 8127 8127-667 Nov. 05, 2018 Nov						
RF Cable-CON Woken CFD200-NL CFD200-NL-001 Oct. 23, 2018 Oct. 23, 2							
Measurement Software AUDIX e3 6.120210k NA NA NA							
Note: Calibration Int	erval of instruments list	ed above is one year.	1				

Test Item	Radiated Emission						
Test Site	966 chamber1 / (03CH01-WS)						
Instrument	Manufacturer Model No. Serial No. Calibration Date Calib						
Spectrum Analyzer	R&S	FSV40	101498	Dec. 27, 2018	Dec. 26, 2019		
Receiver	R&S	ESR3	101658	Dec. 11, 2018	Dec. 10, 2019		
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jul. 18, 2018	Jul. 17, 2019		
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Dec. 18, 2018	Dec. 17, 2019		
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 15, 2018	Nov. 14, 2019		
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 09, 2018	Nov. 08, 2019		
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Oct. 08, 2018	Oct. 07, 2019		
Preamplifier	EMC	EMC02325	980225	Jul. 20, 2018	Jul. 19, 2019		
Preamplifier	Agilent	83017A	MY39501308	Oct. 04, 2018	Oct. 03, 2019		
Preamplifier	EMC	EMC184045B	980192	Aug. 09, 2018	Aug. 08, 2019		
RF Cable	EMC	EMC104-SM-SM-80 00	181106	Oct. 08, 2018	Oct. 07, 2019		
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Oct. 08, 2018	Oct. 07, 2019		
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Oct. 08, 2018	Oct. 07, 2019		
LF cable 1M	EMC	EMCCFD400-NM-N M-1000	160502	Oct. 08, 2018	Oct. 07, 2019		
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Oct. 08, 2018	Oct. 07, 2019		
LF cable 10M	Woken	CFD400NL-LW	CFD400NL-002	Oct. 08, 2018	Oct. 07, 2019		
Measurement Software	SENSE-15247_DTS	V5.10	NA	NA	NA		
Note: Calibration Interval of instruments listed above is one year.							

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Test Item	RF Conducted					
Test Site	(TH01-WS)					
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until	
Spectrum Analyzer	R&S	FSV40	101063	Apr. 17, 2019	Apr. 16, 2020	
Power Meter	Anritsu	ML2495A	1241002	Oct. 09, 2018	Oct. 08, 2019	
Power Sensor	Anritsu	MA2411B	1207366	Oct. 09, 2018	Oct. 08, 2019	
DC POWER SOURCE	GW INSTEK	GPC-6030D	EM892433	Oct. 25, 2018	Oct. 24, 2019	
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA	
Note: Calibration Inter	Note: Calibration Interval of instruments listed above is one year.					

1.5 Test Standards

According to the specification of EUT, the EUT must comply with following standards and KDB documents.

47 CFR FCC Part 15.247 ANSI C63.10-2013

ANSI C63.4-2014

FCC KDB 558074 D01 15.247 Meas Guidance v05r02

1.6 Deviation from Test Standard and Measurement Procedure

None

1.7 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Measurement Uncertainty					
Parameters	Uncertainty				
Bandwidth	±34.130 Hz				
Conducted power	±0.808 dB				
Power density	±0.583 dB				
Conducted emission	±2.715 dB				
AC conducted emission	±2.92 dB				
Radiated emission ≤ 1GHz	±3.41 dB				
Radiated emission > 1GHz	±4.59 dB				

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2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	24°C / 62%	Alex Tsai
Radiated Emissions	03CH01-WS	22-23°C / 62-63%	Akun Chung
RF Conducted	TH01-WS	20°C / 66%	Aska Huang

FCC Designation No.: TW2732FCC site registration No.: 181692

➤ ISED#: 10807A

> CAB identifier: TW2732

2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode	Test Frequency (MHz)	Data Rate	Test Configuration
Conducted Emissions	HT20	2462	MCS 0	2
Radiated Emissions ≤1GHz	HT20	2462	MCS 0	1, 2
Radiated Emissions >1GHz Maximum Output Power 6dB bandwidth Power spectral density	11b 11g HT20	2412 / 2437 / 2462 2412 / 2437 / 2462 2412 / 2437 / 2462	1 Mbps 6 Mbps MCS 0	1

NOTE:

- 1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement X, Y, and Z-plane. The **X-plane** results were found as the worst case and were shown in this report.
- 2. Test configurations are listed as below:
 - 1) Test Configuration 1: Battery mode
 - 2) Test Configuration 2: Charger mode

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3 Transmitter Test Results

3.1 Conducted Emissions

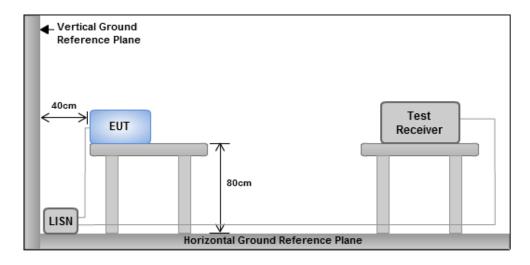
3.1.1 Limit of Conducted Emissions

Conducted Emissions Limit					
Frequency Emission (MHz) Quasi-Peak Average					
0.15-0.5 66 - 56 * 56 - 46 *					
0.5-5 56 46					
5-30 60 50					
Note 1: * Decreases with the logarithm of the frequency.					

3.1.2 Test Procedures

- 1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
- 2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50 Ω LISN port.
- 3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
- 4. This measurement was performed with AC 120V / 60Hz.

3.1.3 Test Setup



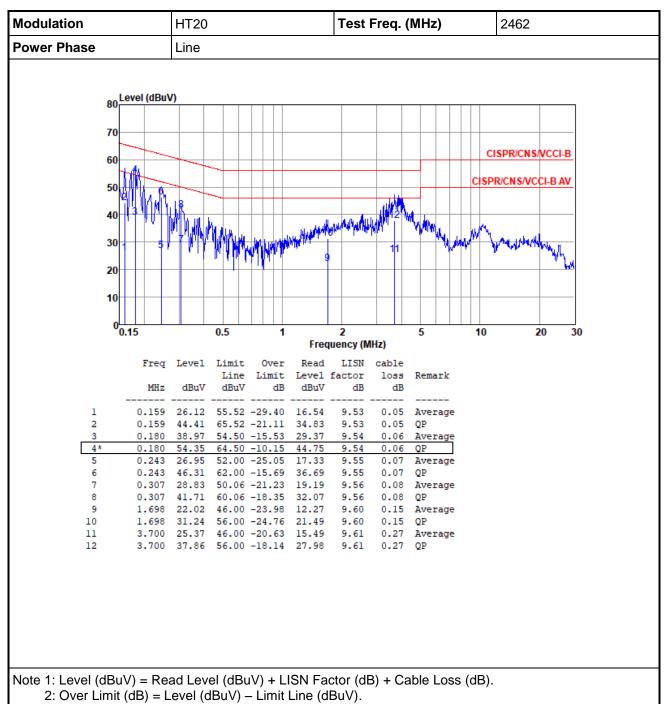
Note: 1. Support units were connected to second LISN.

Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

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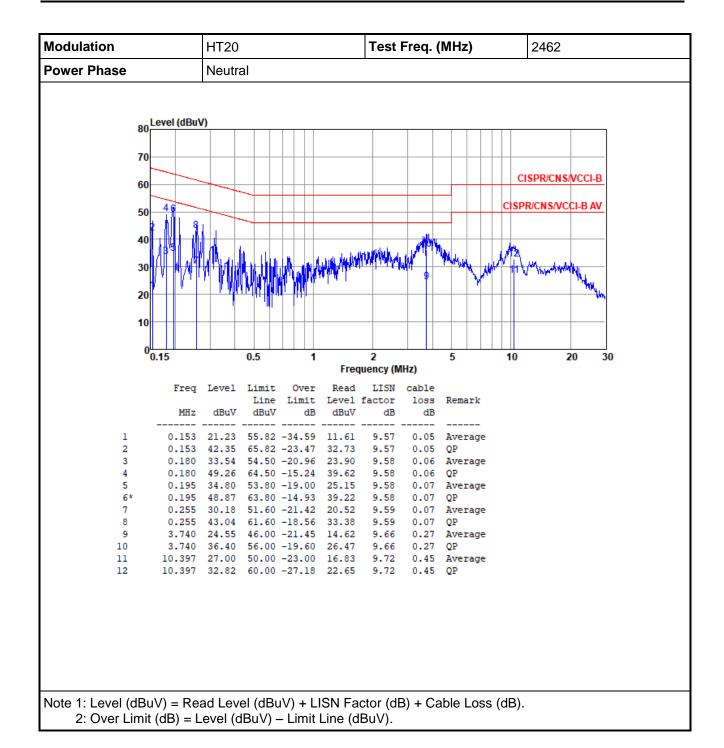
3.1.4 Test Result of Conducted Emissions



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3.2 6dB and Occupied Bandwidth

3.2.1 Limit of 6dB Bandwidth

The minimum 6dB bandwidth shall be at least 500 kHz.

3.2.2 Test Procedures

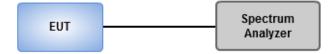
6dB Bandwidth

- 1. Set resolution bandwidth (RBW) = 100 kHz, Video bandwidth = 300 kHz.
- 2. Detector = Peak, Trace mode = max hold.
- 3. Sweep = auto couple, Allow the trace to stabilize.
- 4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6dB relative to the maximum level measured in the fundamental emission.

Occupied Bandwidth

- Set resolution bandwidth (RBW) = 1% ~ 5 % of OBW, Video bandwidth = 3 x RBW
- 2. Detector = Sample, Trace mode = max hold.
- 3 Sweep = auto couple, Allow the trace to stabilize.
- 4. Use the OBW measurement function of spectrum analyzer to measure the occupied bandwidth.

3.2.3 Test Setup



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3.2.4 Test Result of 6dB and Occupied Bandwidth

Summary

Mode	Max-N dB	Max-OBW	ITU-Code	Min-N dB	Min-OBW
	(Hz)	(Hz)		(Hz)	(Hz)
2.4-2.4835GHz	-	-	-	-	-
802.11b_Nss1,(1Mbps)_1TX	9.058M	14.038M	14M0G1D	8.116M	13.965M
802.11g_Nss1,(6Mbps)_1TX	15.29M	16.425M	16M4D1D	13.768M	16.353M
802.11n HT20_Nss1,(MCS0)_1TX	15.145M	17.511M	17M5D1D	13.768M	17.438M

Max-N dB = Maximum 6dB down bandwidth; **Max-OBW** = Maximum 99% occupied bandwidth; **Min-N dB** = Minimum 6dB down bandwidth; **Min-OBW** = Minimum 99% occupied bandwidth;

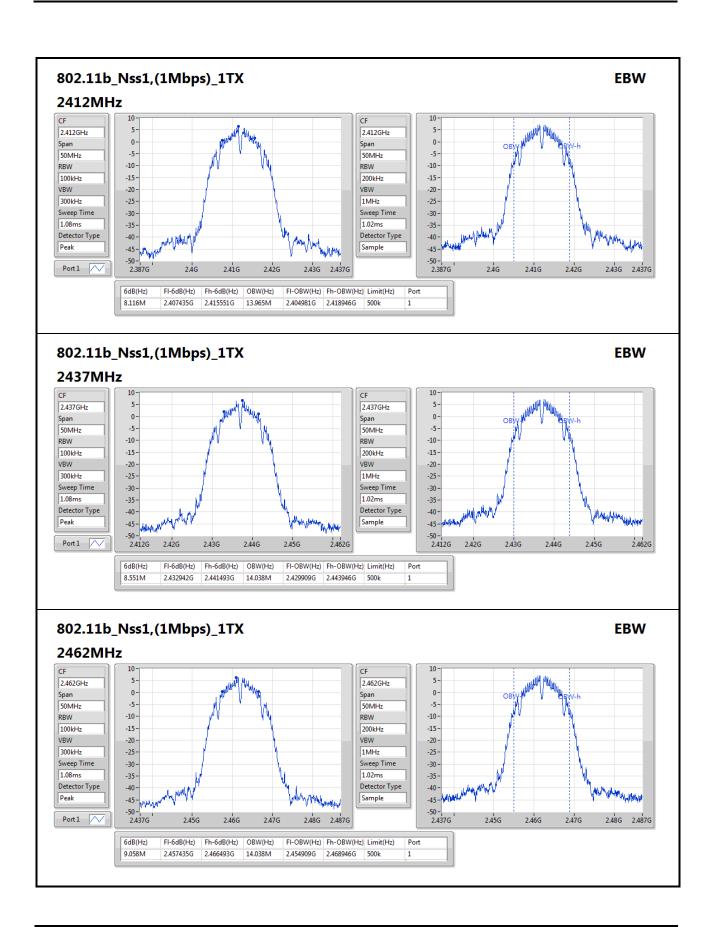
Result

Mode	Result	Limit	Port 1-N dB	Port 1-OBW
		(Hz)	(Hz)	(Hz)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-
2412MHz	Pass	500k	8.116M	13.965M
2437MHz	Pass	500k	8.551M	14.038M
2462MHz	Pass	500k	9.058M	14.038M
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-
2412MHz	Pass	500k	15.29M	16.425M
2437MHz	Pass	500k	13.768M	16.353M
2462MHz	Pass	500k	14.13M	16.353M
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-
2412MHz	Pass	500k	15M	17.438M
2437MHz	Pass	500k	13.768M	17.511M
2462MHz	Pass	500k	15.145M	17.511M

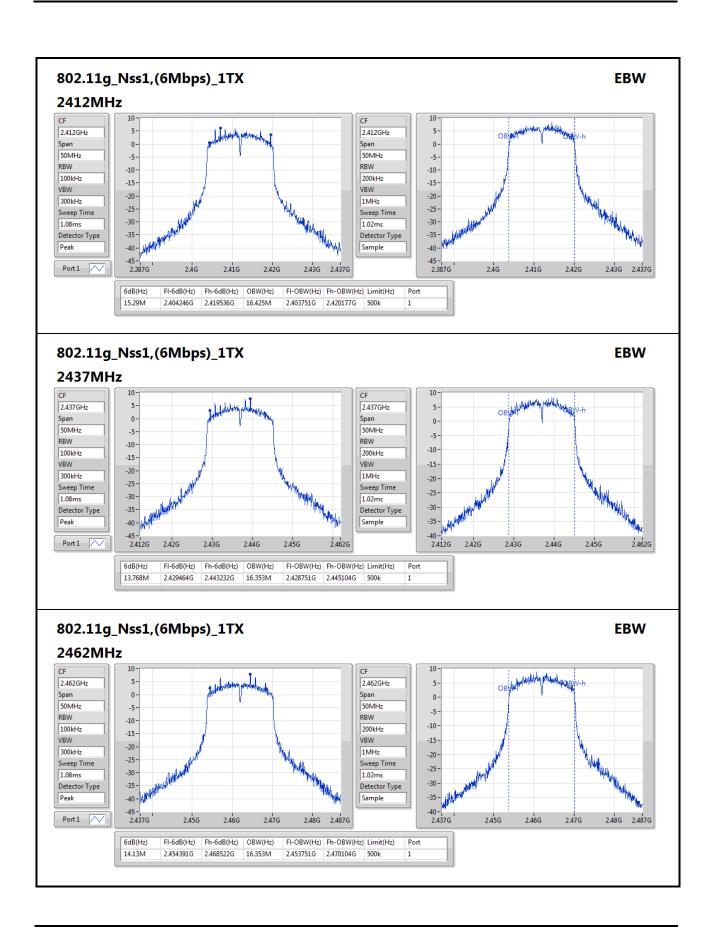
Port X-N dB = Port X 6dB down bandwidth; Port X-OBW = Port X 99% occupied bandwidth;

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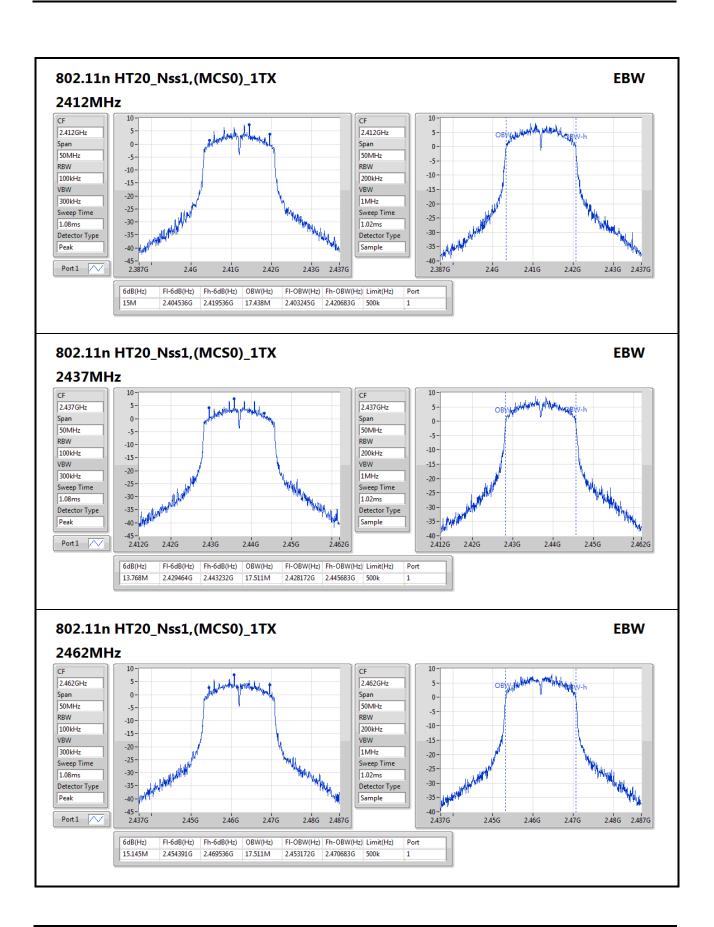














3.3 RF Output Power

3.3.1 Limit of RF Output Power

Conducted power shall not exceed 1Watt.

Antenna gain <= 6dBi, no any corresponding reduction is in output power limit.

3.3.2 Test Procedures

A broadband RF power meter is used for output power measurement. The video bandwidth of power meter is greater than DTS bandwidth of EUT. If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission burst for measuring output power.

3.3.3 Test Setup



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3.3.4 Test Result of Maximum Output Power

Summary of Peak Conducted Output Power

Mode	Total Power	Total Power
	(dBm)	(W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_1TX	17.42	0.05521
802.11g_Nss1,(6Mbps)_1TX	25.59	0.36224
802.11n HT20_Nss1,(MCS0)_1TX	25.69	0.37068

Result

Mode	Result	DG	Port 1	Total Power	Power Limit	EIRP	EIRP Limit
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	2.80	17.33	17.33	30.00	20.13	36.00
2437MHz	Pass	2.80	17.42	17.42	30.00	20.22	36.00
2462MHz	Pass	2.80	17.35	17.35	30.00	20.15	36.00
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	2.80	25.38	25.38	30.00	28.18	36.00
2437MHz	Pass	2.80	25.46	25.46	30.00	28.26	36.00
2462MHz	Pass	2.80	25.59	25.59	30.00	28.39	36.00
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	2.80	25.12	25.12	30.00	27.92	36.00
2437MHz	Pass	2.80	25.50	25.50	30.00	28.30	36.00
2462MHz	Pass	2.80	25.69	25.69	30.00	28.49	36.00

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DG = Directional Gain; **Port X** = Port X output power

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Summary of Conducted (Average) Output Power

Mode	Total Power	Total Power
	(dBm)	(W)
2.4-2.4835GHz	-	-
802.11b_Nss1,(1Mbps)_1TX	15.17	0.03289
802.11g_Nss1,(6Mbps)_1TX	18.21	0.06622
802.11n HT20_Nss1,(MCS0)_1TX	18.17	0.06561

Result

Mode	Result	DG	Port 1	Total Power	Power Limit	EIRP	EIRP Limit
		(dBi)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	2.80	15.03	15.03	-	17.83	-
2437MHz	Pass	2.80	15.17	15.17	-	17.97	-
2462MHz	Pass	2.80	15.16	15.16	-	17.96	-
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	2.80	17.91	17.91	-	20.71	-
2437MHz	Pass	2.80	18.05	18.05	-	20.85	-
2462MHz	Pass	2.80	18.21	18.21	-	21.01	-
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-	-	-	-
2412MHz	Pass	2.80	17.77	17.77	-	20.57	-
2437MHz	Pass	2.80	18.01	18.01	-	20.81	-
2462MHz	Pass	2.80	18.17	18.17	-	20.97	-

DG = Directional Gain; **Port X** = Port X output power **Note : Conducted average output power is for reference only**

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3.4 Power Spectral Density

3.4.1 Limit of Power Spectral Density

Power spectral density shall not be greater than 8 dBm in any 3 kHz band.

3.4.2 Test Procedures

Peak PSD

- 1. Set the RBW = 3 kHz, VBW = 10 kHz.
- Detector = Peak, Sweep time = auto couple.
- 3. Trace mode = max hold, allow trace to fully stabilize.
- 4. Use the peak marker function to determine the maximum amplitude level.

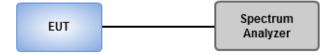
Average PSD, duty cycle ≥ 98%

- 1. Set the RBW = 30 kHz, VBW = 100 kHz.
- 2. Detector = RMS, Sweep time = auto couple.
- 3. Sweep time = auto couple.
- 4. Employ trace averaging (RMS) mode over a minimum of 100 traces.
- 5. Use the peak marker function to determine the maximum amplitude level.

Average PSD, duty cycle < 98%

- 1 Set the RBW = 30 kHz, VBW = 100 kHz. Detector = RMS.
- Set the sweep time to: \geq 10 (number of measurement points in sweep) x (total on/off period of the transmitted signal).
- 3 Perform the measurement over a single sweep.
- 4 Use the peak marker function to determine the maximum amplitude level.
- 5 Add 10 log (1/x), where x is the duty cycle.

3.4.3 Test Setup



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3.4.4 Test Result of Power Spectral Density

Summary

Mode	PD
	(dBm/RBW)
2.4-2.4835GHz	-
802.11b_Nss1,(1Mbps)_1TX	-7.28
802.11g_Nss1,(6Mbps)_1TX	-6.52
802.11n HT20_Nss1,(MCS0)_1TX	-6.71

RBW=3kHz.

Result

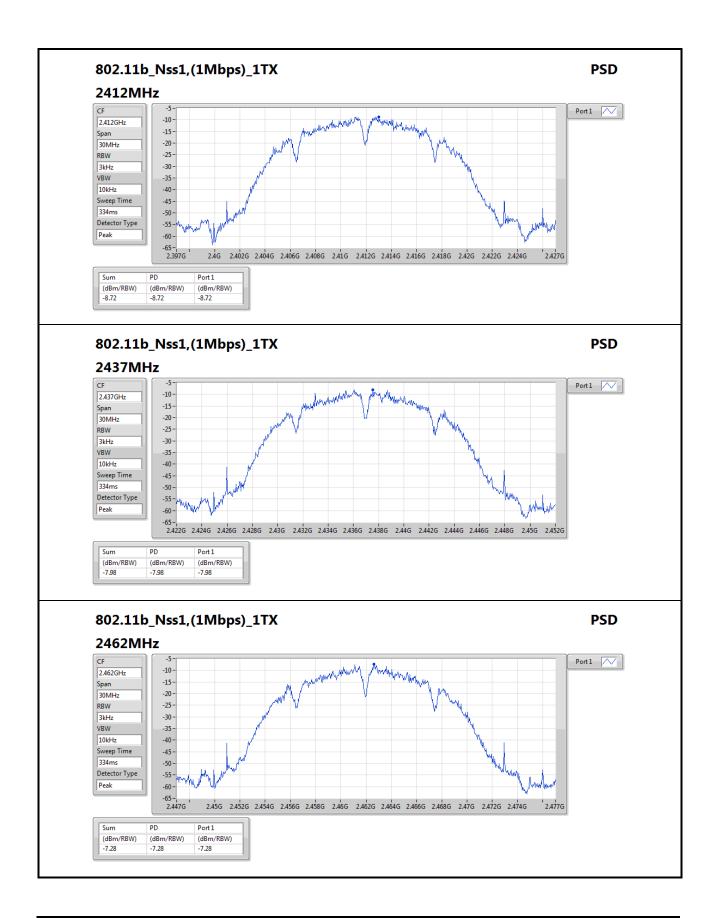
Mode	Result	DG	Port 1	PD	PD Limit
		(dBi)	(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
802.11b_Nss1,(1Mbps)_1TX	-	-	-	-	-
2412MHz	Pass	2.80	-8.72	-8.72	8.00
2437MHz	Pass	2.80	-7.98	-7.98	8.00
2462MHz	Pass	2.80	-7.28	-7.28	8.00
802.11g_Nss1,(6Mbps)_1TX	-	-	-	-	-
2412MHz	Pass	2.80	-6.60	-6.60	8.00
2437MHz	Pass	2.80	-7.19	-7.19	8.00
2462MHz	Pass	2.80	-6.52	-6.52	8.00
802.11n HT20_Nss1,(MCS0)_1TX	-	-	-	-	-
2412MHz	Pass	2.80	-6.71	-6.71	8.00
2437MHz	Pass	2.80	-7.01	-7.01	8.00
2462MHz	Pass	2.80	-6.71	-6.71	8.00

DG = Directional Gain; **PD** = trace bin-by-bin of each transmits port summing can be performed maximum power density; **Port X** = Port X power density;

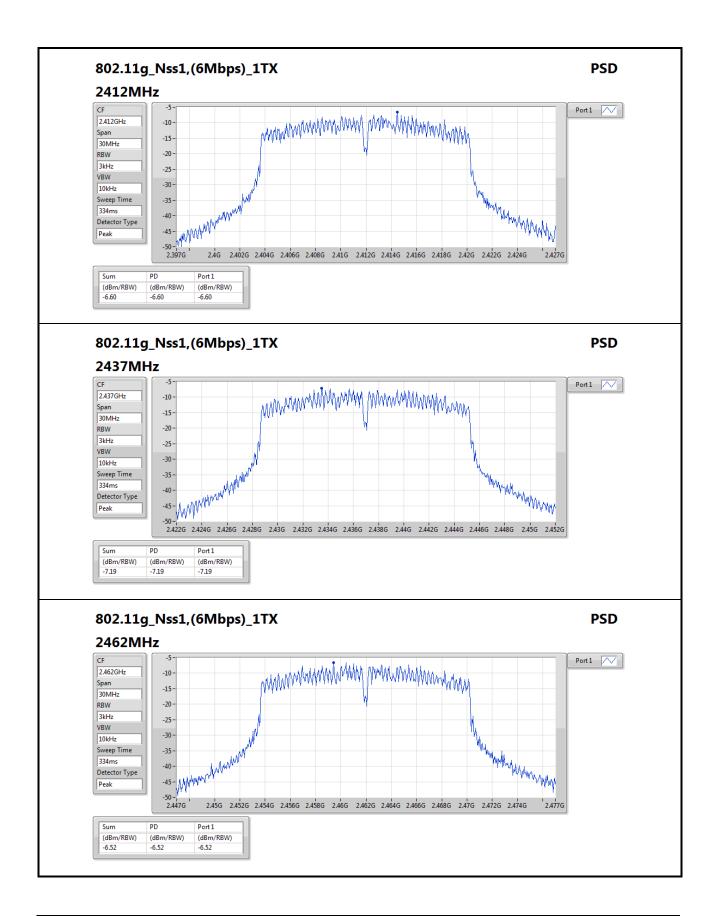
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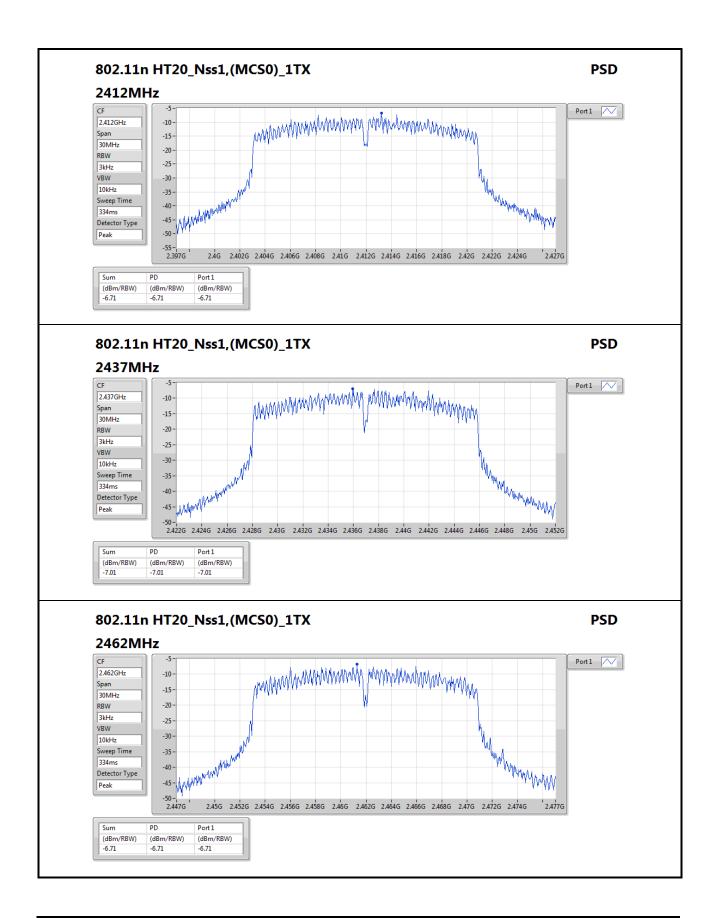














3.5 Unwanted Emissions into Restricted Frequency Bands

3.5.1 Limit of Unwanted Emissions into Restricted Frequency Bands

	Restricted Band	Emissions Limit	
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1:

Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit **Note 2:**

Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

3.5.2 Test Procedures

- 1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
- 2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
- 3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

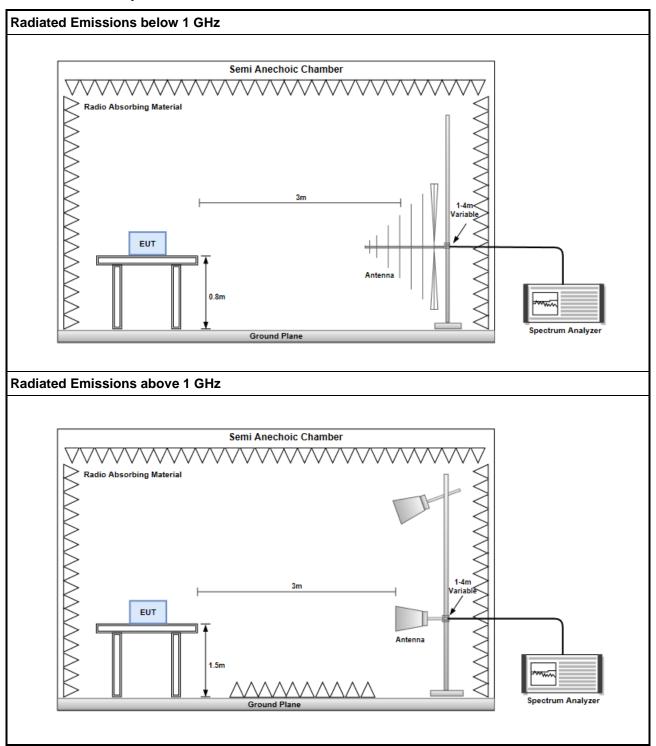
- 1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
- 2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
- 3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

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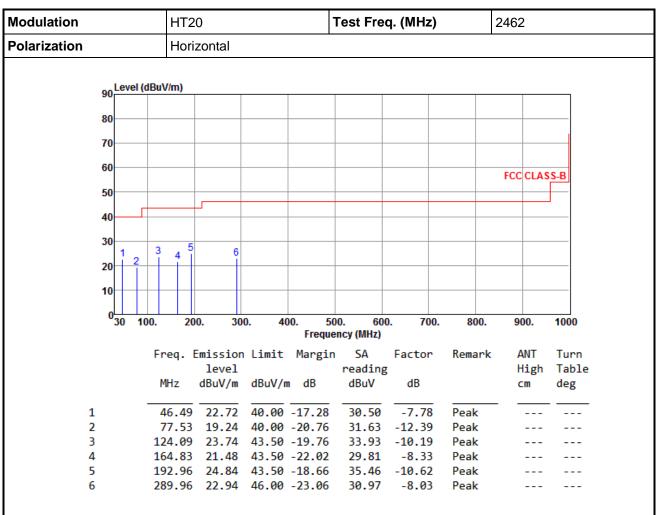
3.5.3 Test Setup





Test Configuration 1: Battery mode

3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)



Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) - Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

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Modulation		HT2	0		-	Test Fre	q. (MHz)		2462					
Polarization		Vert	Vertical											
	90 Leve	l (dBuV/m)												
	80													
	70													
	60								FCC CLA	SS-B				
	50													
	40													
	30 1 2	, 5												
	20	3 4	6											
	10													
	030	100. 20	0. 30	0. 40		0. 600 ncy (MHz)	0. 700.	800.	900.	1000				
			mission level		Margin	SA reading		Remark	ANT High					
		MHz	dBuV/m	abuv/n	1 ab	dBuV	dB		cm	deg				
1		32.91	29.30		-10.70	38.06	-8.76	Peak						
2		52.31	25.67		-14.33	33.56	-7.89	Peak						
3 4		105.66	20.43		-23.07	32.42 30.36	-11.99 -8.35	Peak Peak						
5			23.85			34.47		Peak						
6		245.34	20.92		-25.08	30.39	-9.47	Peak						

*Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

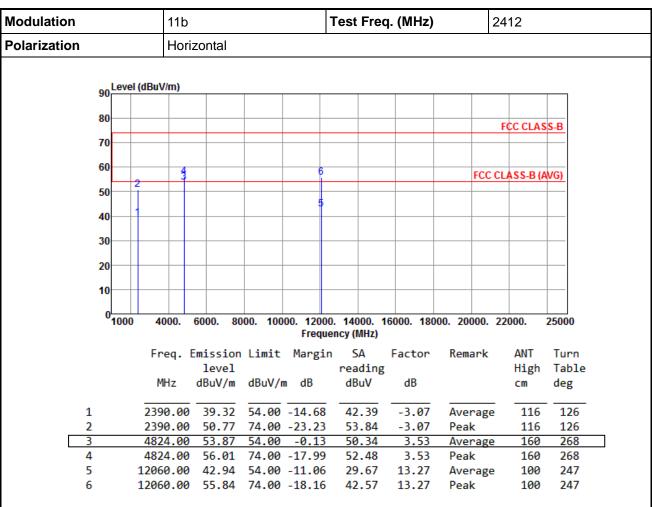
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3.5.5 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11b



Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

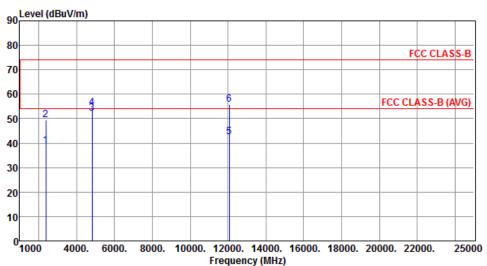
Note 2: Margin (dB) = Emission level (dBuV/m) - Limit (dBuV/m).

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Modulation	11b	Test Freq. (MHz)	2412
Polarization	Vertical		



		Emission level		Ū	SA reading		Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		CM	deg
4	2200 00	20.70	<u></u>	45 24	44 00	2.07	A	256	170
1	2390.00	38.79	54.00	-15.21	41.86	-3.07	Average	256	178
2	2390.00	49.50	74.00	-24.50	52.57	-3.07	Peak	256	178
3	4824.00	52.04	54.00	-1.96	48.51	3.53	Average	100	123
4	4824.00	54.62	74.00	-19.38	51.09	3.53	Peak	100	123
5	12060.00	42.54	54.00	-11.46	29.27	13.27	Average	100	21
6	12060.00	55.64	74.00	-18.36	42.37	13.27	Peak	100	21

*Factor includes antenna factor, cable loss and amplifier gain

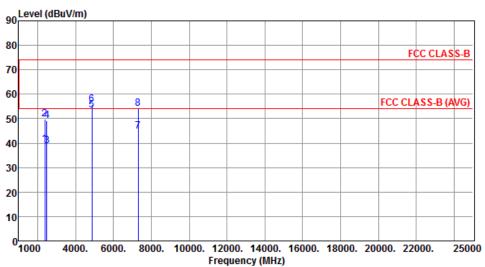
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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Modulation	11b	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2390.00	39.60	54.00	-14.40	42.67	-3.07	Average	100	126
2	2390.00	49.70	74.00	-24.30	52.77	-3.07	Peak	100	126
3	2483.50	38.72	54.00	-15.28	41.94	-3.22	Average	100	126
4	2483.50	49.25	74.00	-24.75	52.47	-3.22	Peak	100	126
5	4874.00	53.62	54.00	-0.38	50.02	3.60	Average	285	225
6	4874.00	55.67	74.00	-18.33	52.07	3.60	Peak	285	225
7	7311.00	44.78	54.00	-9.22	35.96	8.82	Average	100	49
8	7311.00	54.20	74.00	-19.80	45.38	8.82	Peak	100	49

*Factor includes antenna factor, cable loss and amplifier gain

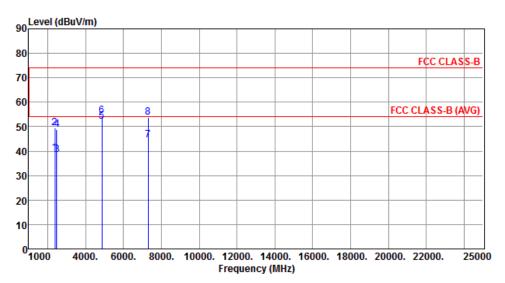
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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Modulation	11b	Test Freq. (MHz)	2437
Polarization	Vertical		



	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2390.00	39.20	54.00	-14.80	42.27	-3.07	Average	257	170
2	2390.00	49.47	74.00	-24.53	52.54	-3.07	Peak	257	170
3	2483.50	38.63	54.00	-15.37	41.85	-3.22	Average	257	170
4	2483.50	48.95	74.00	-25.05	52.17	-3.22	Peak	257	170
5	4874.00	52.11	54.00	-1.89	48.51	3.60	Average	100	118
6	4874.00	54.54	74.00	-19.46	50.94	3.60	Peak	100	118
7	7311.00	44.51	54.00	-9.49	35.69	8.82	Average	175	236
8	7311.00	53.64	74.00	-20.36	44.82	8.82	Peak	175	236

*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

The previous version of the test report has been cancelled and replaced by new version.

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Modulation			11b				Test Fred	q. (MHz)	2	2462			
Polarization			Horizontal										
	90 ^L	evel (dBuV/m)										
	80												
	70									FCC CLAS	SS-B		
	60	Ι,	4	(FCC (CLASS-B (A	WG)		
	50	2			;								
	40	_ 1											
	30												
	20												
	10												
	0 1	000	4000.	6000.	8000. 1). 14000. 1 ency (MHz)	16000. 180	00. 20000.	22000.	25000		
			Freq.	Emissio	n Limi	t Margin		Factor	Remark	ANT	Turn		
			MHz	level		// JD	reading dBuV	dB		High	Table		
			MHZ	abuv/n	ı abuv	//m dB	авич	ав		CM	deg		
1			2483.50			00 -15.01	42.21	-3.22	Average				
2			2483.50			0 -23.65	53.57	-3.22	Peak	117	129		
3			4924.00			0 -0.15	50.14 52.90	3.71 3.71	Average Peak	149 149	230 230		
5						0 -17.39	36.36	8.55			53		
6						0 -18.69	46.76	8.55	Peak	100	53		

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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3

4

5

Modulation			11b				Test	Freq	. (MHz)		24	62	
Polarization			Vert	ical							•		
	90 <mark>.</mark>	_evel (dBuV/m)										
	80												
	00										F	CC CLAS	S-B
	70												
	60												
			2 3	6						F	CC CL	ASS-B (A	(VG)
	50			5									
	40												
	30												
	20												
	10												
	0												
	0,	1000	4000.	6000. 80	000. 100		0. 1400 ency (M		6000. 180	00. 2000	0. 22	000.	25000
			Frea. I	Emission	Limit	Margi	n SA	4	Factor	Remar	·k	ANT	Turn
				level		0-	read					High	Table
			MHz	dBuV/m	dBuV/ı	n dB	dBu	V	dB			cm	deg
	1		2483.50	38 92	54 00	-15 08	42	14	-3.22	Avera		244	182
	2		2483.50					24	-3.22	Peak	8-	244	182

48.46

51.07

3.71

3.71

8.55

8.55

Average

Average

Peak

Peak

100

100

193

193

125

125

244

244

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Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

4924.00 52.17 54.00 -1.83

4924.00 54.78 74.00 -19.22 51.07 7386.00 44.21 54.00 -9.79 35.66 7386.00 53.21 74.00 -20.79 44.66

*Factor includes antenna factor, cable loss and amplifier gain

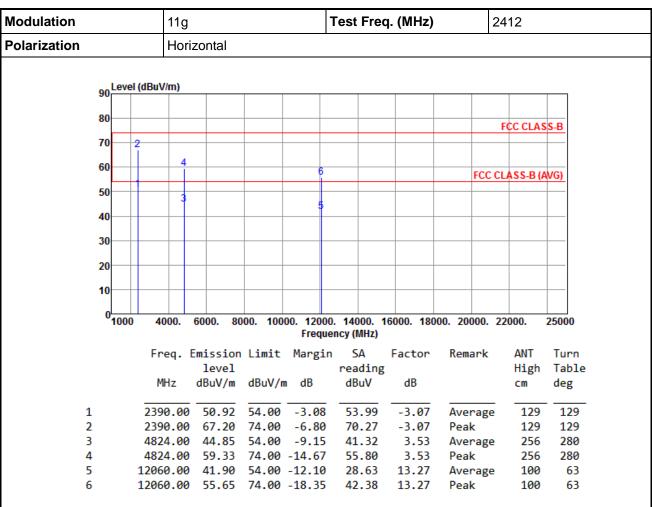
The previous version of the test report has been cancelled and replaced by new version.

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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3.5.6 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11g



Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

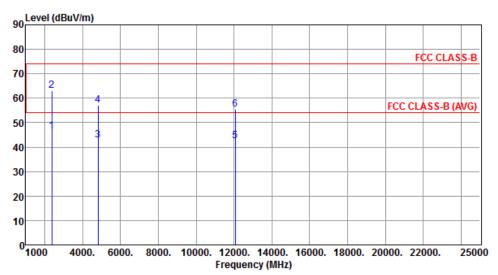
Note 2: Margin (dB) = Emission level (dBuV/m) - Limit (dBuV/m).

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Modulation	11g	Test Freq. (MHz)	2412
Polarization	Vertical		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Ü	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	46.52	54.00	-7.48	49.59	-3.07	Average	284	149
2	2390.00	63.21	74.00	-10.79	66.28	-3.07	Peak	284	149
3	4824.00	42.74	54.00	-11.26	39.21	3.53	Average	100	156
4	4824.00	57.03	74.00	-16.97	53.50	3.53	Peak	252	281
5	12060.00	42.61	54.00	-11.39	29.34	13.27	Average	100	53
6	12060.00	55.47	74.00	-18.53	42.20	13.27	Peak	100	53

*Factor includes antenna factor, cable loss and amplifier gain

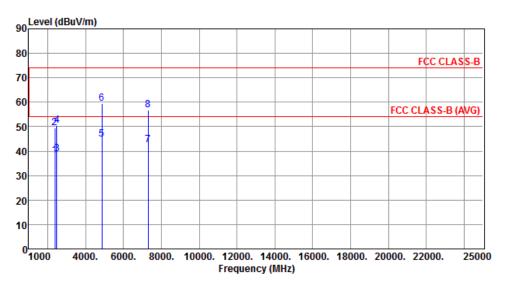
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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Modulation	11g	Test Freq. (MHz)	2437
Polarization	Horizontal		



	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2390.00	38.32	54.00	-15.68	41.39	-3.07	Average	135	133
2	2390.00	49.32	74.00	-24.68	52.39	-3.07	Peak	135	133
3	2483.50	38.88	54.00	-15.12	42.10	-3.22	Average	135	133
4	2483.50	50.40	74.00	-23.60	53.62	-3.22	Peak	135	133
5	4874.00	44.85	54.00	-9.15	41.25	3.60	Average	255	286
6	4874.00	59.46	74.00	-14.54	55.86	3.60	Peak	255	286
7	7311.00	42.51	54.00	-11.49	33.69	8.82	Average	284	85
8	7311.00	56.67	74.00	-17.33	47.85	8.82	Peak	284	85

*Factor includes antenna factor, cable loss and amplifier gain

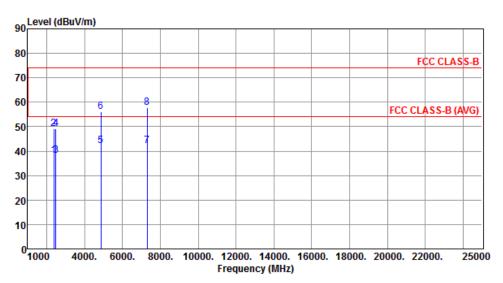
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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Modulation	11g	Test Freq. (MHz)	2437
Polarization	Vertical		



	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2390.00	38.31	54.00	-15.69	41.38	-3.07	Average	277	165
2	2390.00	49.30	74.00	-24.70	52.37	-3.07	Peak	277	165
3	2483.50	38.30	54.00	-15.70	41.52	-3.22	Average	277	165
4	2483.50	49.10	74.00	-24.90	52.32	-3.22	Peak	277	165
5	4874.00	42.19	54.00	-11.81	38.59	3.60	Average	100	114
6	4874.00	55.99	74.00	-18.01	52.39	3.60	Peak	100	114
7	7311.00	42.06	54.00	-11.94	33.24	8.82	Average	200	252
8	7311.00	57.78	74.00	-16.22	48.96	8.82	Peak	200	252

*Factor includes antenna factor, cable loss and amplifier gain

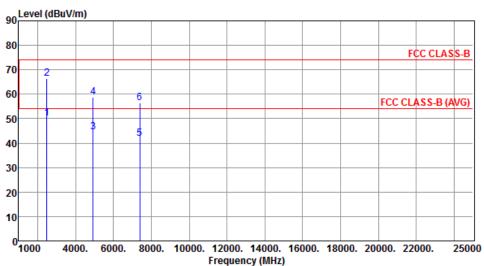
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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Modulation	11g	Test Freq. (MHz)	2462
Polarization	Horizontal		



	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2483.50	50.23	54.00	-3.77	53.45	-3.22	Average	111	129
2	2483.50	66.52	74.00	-7.48	69.74	-3.22	Peak	111	129
3	4924.00	44.61	54.00	-9.39	40.90	3.71	Average	256	283
4	4924.00	58.93	74.00	-15.07	55.22	3.71	Peak	256	283
5	7386.00	41.85	54.00	-12.15	33.30	8.55	Average	274	89
6	7386.00	56.37	74.00	-17.63	47.82	8.55	Peak	274	89

*Factor includes antenna factor, cable loss and amplifier gain

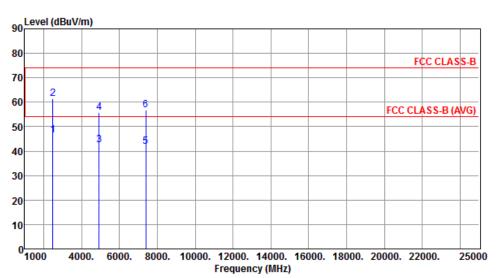
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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Modulation	11g	Test Freq. (MHz)	2462
Polarization	Vertical		



	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2483.50	46.58	54.00	-7.42	49.80	-3.22	Average	269	155
2	2483.50	61.52	74.00	-12.48	64.74	-3.22	Peak	269	155
3	4924.00	42.41	54.00	-11.59	38.70	3.71	Average	100	118
4	4924.00	55.96	74.00	-18.04	52.25	3.71	Peak	100	118
5	7386.00	41.83	54.00	-12.17	33.28	8.55	Average	199	244
6	7386.00	56.80	74.00	-17.20	48.25	8.55	Peak	199	244

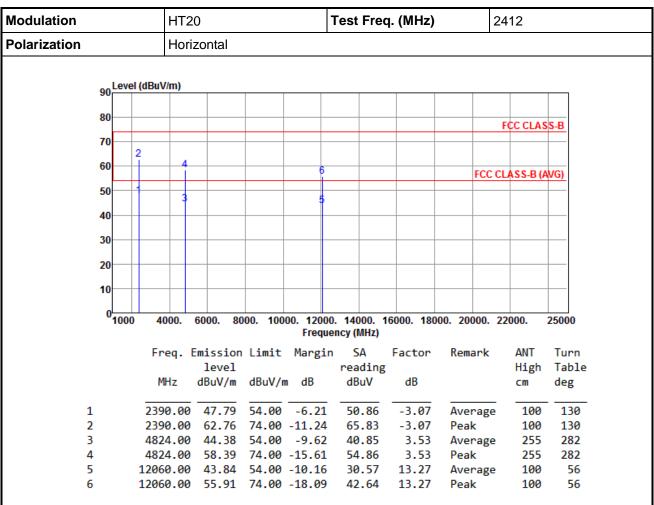
*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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3.5.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for HT20



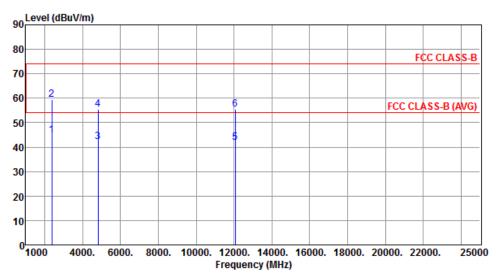
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) - Limit (dBuV/m).



Modulation	HT20	Test Freq. (MHz)	2412
Polarization	Vertical		



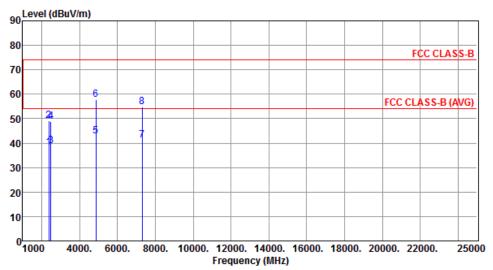
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Ū	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	44.00	<u></u> .	0.12	47.05		A	254	162
1	2590.00	44.88	54.00	-9.12	47.95	-3.07	Average	254	162
2	2390.00	59.54	74.00	-14.46	62.61	-3.07	Peak	254	162
3	4824.00	42.15	54.00	-11.85	38.62	3.53	Average	100	120
4	4824.00	55.49	74.00	-18.51	51.96	3.53	Peak	100	120
5	12060.00	41.96	54.00	-12.04	28.69	13.27	Average	100	63
6	12060.00	55.45	74.00	-18.55	42.18	13.27	Peak	100	63

*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Horizontal		



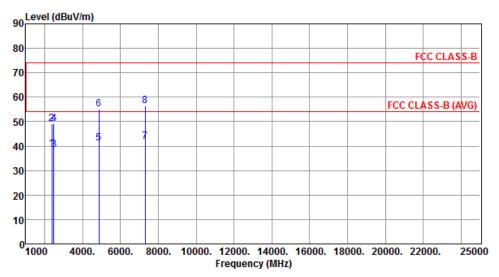
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2390.00	38.16	54.00	-15.84	41.23	-3.07	Average	132	127
2	2390.00	49.16	74.00	-24.84	52.23	-3.07	Peak	132	127
3	2483.50	38.95	54.00	-15.05	42.17	-3.22	Average	132	127
4	2483.50	48.88	74.00	-25.12	52.10	-3.22	Peak	132	127
5	4874.00	42.90	54.00	-11.10	39.30	3.60	Average	251	276
6	4874.00	57.93	74.00	-16.07	54.33	3.60	Peak	251	276
7	7311.00	41.33	54.00	-12.67	32.51	8.82	Average	288	81
8	7311.00	54.90	74.00	-19.10	46.08	8.82	Peak	288	81

*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Modulation	HT20	Test Freq. (MHz)	2437
Polarization	Vertical		



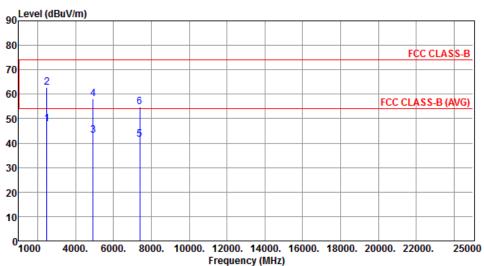
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2390.00	38.75	54.00	-15.25	41.82	-3.07	Average	288	167
2	2390.00	49.30	74.00	-24.70	52.37	-3.07	Peak	288	167
3	2483.50	38.67	54.00	-15.33	41.89	-3.22	Average	288	167
4	2483.50	49.15	74.00	-24.85	52.37	-3.22	Peak	288	167
5	4874.00	41.13	54.00	-12.87	37.53	3.60	Average	100	116
6	4874.00	55.04	74.00	-18.96	51.44	3.60	Peak	100	116
7	7311.00	41.70	54.00	-12.30	32.88	8.82	Average	200	249
8	7311.00	56.51	74.00	-17.49	47.69	8.82	Peak	200	249

*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Horizontal		



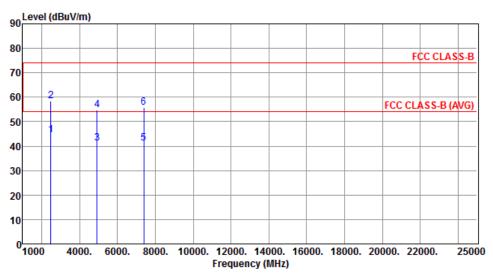
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2483.50	47.93	54.00	-6.07	51.15	-3.22	Average	100	133
2	2483.50	62.89	74.00	-11.11	66.11	-3.22	Peak	100	133
3	4924.00	43.26	54.00	-10.74	39.55	3.71	Average	252	265
4	4924.00	58.26	74.00	-15.74	54.55	3.71	Peak	252	265
5	7386.00	41.51	54.00	-12.49	32.96	8.55	Average	285	90
6	7386.00	54.91	74.00	-19.09	46.36	8.55	Peak	285	90

*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Modulation	HT20	Test Freq. (MHz)	2462
Polarization	Vertical		



	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2483.50	44.58	54.00	-9.42	47.80	-3.22	Average	254	168
2	2483.50	58.50	74.00	-15.50	61.72	-3.22	Peak	254	168
3	4924.00	41.26	54.00	-12.74	37.55	3.71	Average	100	115
4	4924.00	54.93	74.00	-19.07	51.22	3.71	Peak	100	115
5	7386.00	41.13	54.00	-12.87	32.58	8.55	Average	201	250
6	7386.00	55.80	74.00	-18.20	47.25	8.55	Peak	201	250

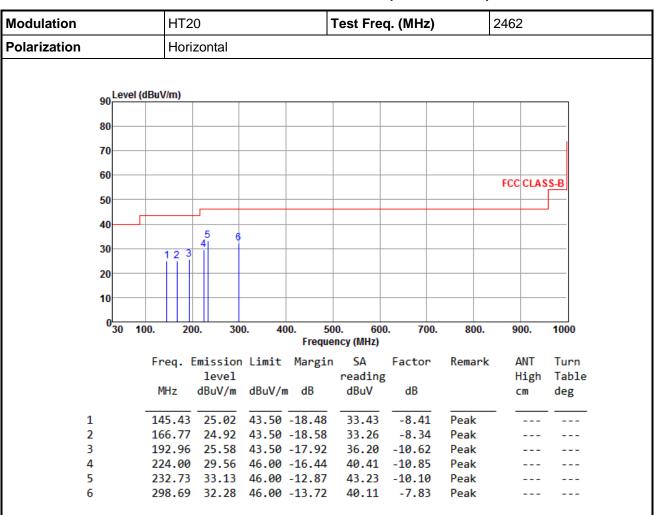
*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).



Test Configuration 2: Charger mode

3.5.8 Transmitter Radiated Unwanted Emissions (Below 1GHz)



Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

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Modulation			HT2	HT20			Test Freq. (MHz)				2462		
Polarization				Verti	cal								
	90	Leve	el (dBı	ıV/m)									
	90												
	80												
	70												
	60												
	00										FCC	CLAS	S-B
	50												
	40				_								
		١,											
	30	Ti	4	5	6								
	20	Н											
	10	Ш											
		ΙШ											
	0	30	100.	20	0. 30	0. 4		00. 600	0. 700.	800.	90	00.	1000
								ncy (MHz)					
			F	req. E		limit	Margin		Factor	Remark		NT.	Turn
				MHz	level dBuV/m	dRuV/i	m dR	reading dBuV	dB			ligh :m	Table deg
				11112	ubuv/iii	ubuv/i	ıı ub	abav	ub.				ueg
	1			30.97	31.80	40.00	-8.20	40.64	-8.84	Peak			
	2			54.25	29.67		-10.33	37.71	-8.04	Peak			
	3			63.95	27.64		-12.36	37.13	-9.49	Peak			
	4			71.71	25.98		-14.02	37.03	-11.05	Peak			
	5 6			92.96	25.45		-18.05 -20.22	36.07 35.88	-10.62 -10.10	Peak Peak			

*Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

Note 3: All spurious emissions below 30MHz are more than 20 dB below the limit.

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3.6 Emissions in Non-Restricted Frequency Bands

3.6.1 Emissions in Non-Restricted Frequency Bands Limit

Peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz.

3.6.2 Test Procedures

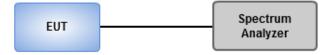
Reference level measurement

- 1. Set RBW=100kHz, VBW = 300kHz, Detector = Peak, Sweep time = Auto
- 2. Trace = max hold, Allow Trace to fully stabilize
- 3. Use the peak marker function to determine the maximum PSD level

Emission level measurement

- 1. Set RBW=100kHz, VBW = 300kHz, Detector = Peak, Sweep time = Auto
- 2. Trace = max hold, Allow Trace to fully stabilize
- 3. Scan Frequency range is up to 25GHz
- 4. Use the peak marker function to determine the maximum amplitude level

3.6.3 Test Setup

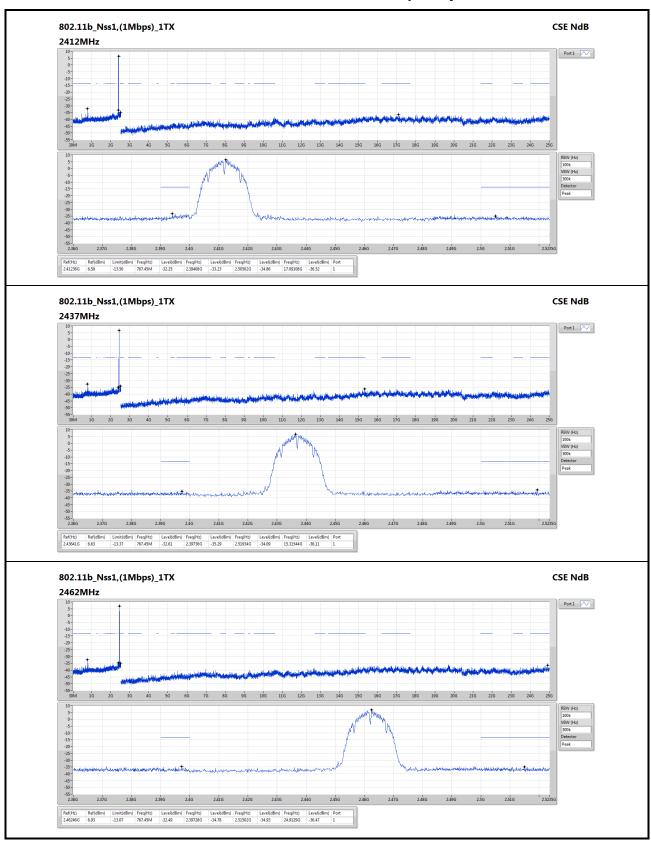


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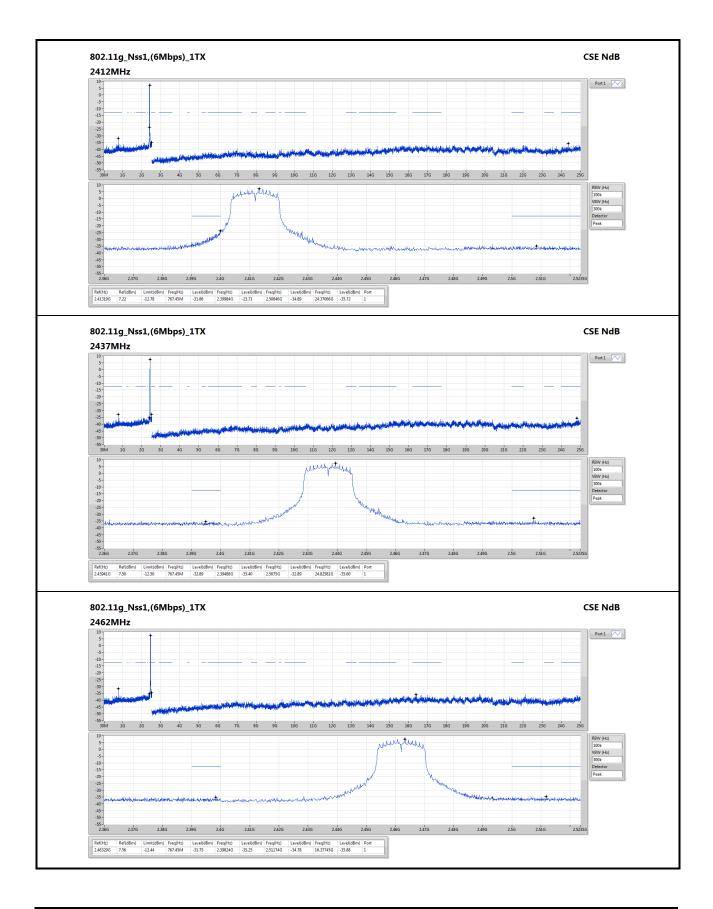
3.6.4 **Unwanted Emissions into Non-Restricted Frequency Bands**



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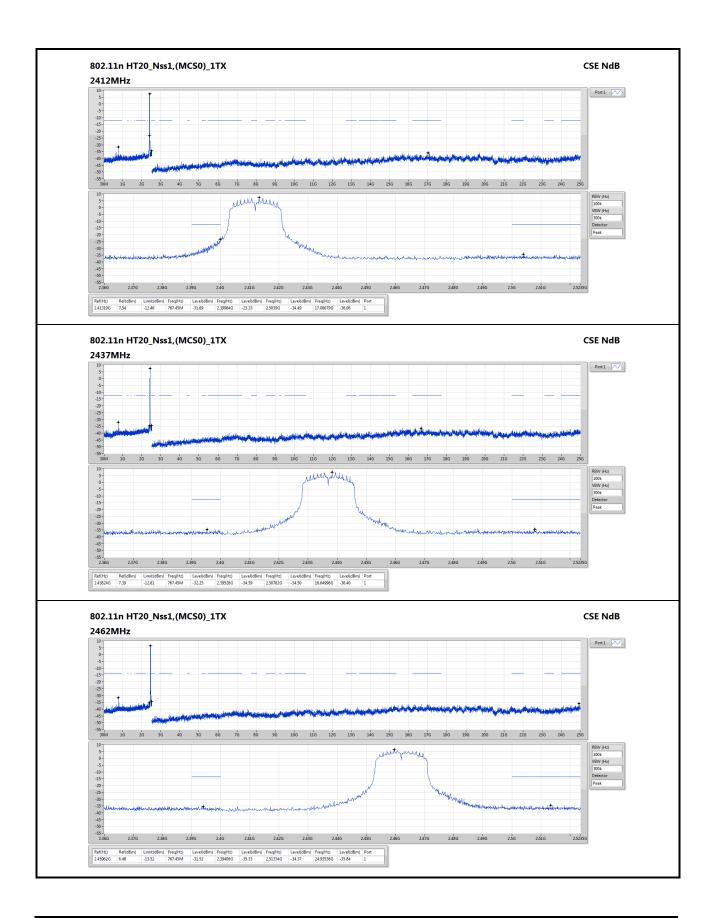
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4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp (EMC and Wireless Communication Laboratory), it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan District. Location map can be found on our website http://www.icertifi.com.tw.

Linkou

Tel: 886-2-2601-1640 No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City,

Taiwan, R.O.C.

Kwei Shan

Tel: 886-3-271-8666 No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.

Kwei Shan Site II

Tel: 886-3-271-8640

No. 14-1, Lane 19, Wen San 3rd St., Kwei Shan District, Tao Yuan City 333, Taiwan, R.O.C.

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If you have any suggestion, please feel free to contact us as below information.

Tel: 886-3-271-8666 Fax: 886-3-318-0155

Email: ICC_Service@icertifi.com.tw

==END==

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