

FCC Test Report

FCC ID : NKRDNXA-GO1

Equipment : 802.11 b/g/n 3*3 PCIe module

Model No. : DNXA-GO1

Brand Name : WNC

Applicant : Wistron NeWeb Corporation

Address : 20 Park Avenue II, Hsinchu Science Park,

Hsinchu 308, Taiwan, R.O.C.

Standard : 47 CFR FCC Part 15.247

Received Date : Feb. 11, 2014

Tested Date : Feb. 11 ~ Feb. 21, 2014

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.

Approved & Reviewed by:

Gary Chang / Manager

Iac-MRA



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Release Record

Report No.	Version	Description	Issued Date
FR421101	Rev. 01	Initial issue	Mar. 06, 2014

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Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.154MHz 45.80 (Margin -9.98dB) - AV	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 2350.00MHz 53.00 (Margin -1.00dB) - AV	Pass
15.247(b)(3)	Fundamental Emission Output Power	Power [dBm]: 11b: 24.99 11g: 28.36 HT20: 28.44 HT40: 22.96	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

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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. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (N _{TX})	Data Rate / MCS		
2400-2483.5	b	2412-2462	1-11 [11]	3	1-11 Mbps		
2400-2483.5	g	2412-2462	1-11 [11]	3	6-54 Mbps		
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	3	MCS 0-23		
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	3	MCS 0-23		

Note 1: RF output power specifies that Maximum Conducted (Average) Output Power.

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.

1.1.2 Antenna Details

Set No.	Brand	Ant. No.	Model	Туре	Gain (dBi)	Connector
		1	NA	Printed	2	UFL
Α	WNC	2	NA	Printed	2	UFL
		3	NA	Printed	2	UFL
		1	1002302	Printed	2.19	UFL
В	ethertronics	2	1002303	Printed	3.33	UFL
		3	1002304	Printed	4.21	UFL

Note: 2 sets of antenna are used for this device, the set with highest gain antenna (**set B**) is selected to perform tests in this test report.

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	3.3 Vdc from host

1.1.4 Accessories

N/A

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1.1.5 Channel List

Frequency	band (MHz)	2400~2483.5		
802.11 b /	g / n HT20	802.11n HT40		
Channel	Frequency(MHz)	Channel	Frequency(MHz)	
1	2412	3	2422	
2	2417	4	2427	
3	2422	5	2432	
4	2427	6	2437	
5	2432	7	2442	
6	2437	8	2447	
7	2442	9	2452	
8	2447			
9	2452			
10	2457			
11	2462			

1.1.6 Test Tool and Duty Cycle

Test Tool	art2, ver_2_28_7				
	Mode	Duty cycle (%)	Duty factor (dB)		
	11b	100.00%	0.00		
Duty Cycle and Duty Factor	11g	98.46%	0.07		
	HT20	98.35%	0.07		
	HT40	95.26%	0.21		

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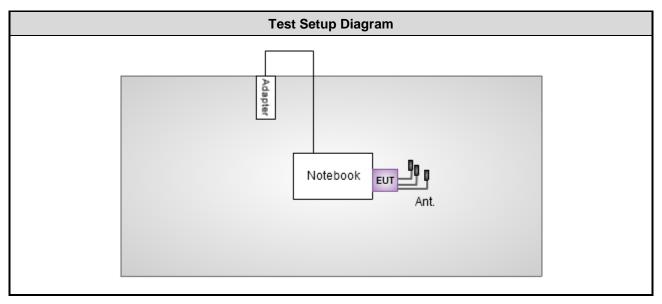
1.1.7 Power Setting

Modulation Mode	Test Frequency (MHz)	Power Set
11b	2412	20
11b	2437	20
11b	2462	20
11g	2412	17
11g	2437	24
11g	2462	17.5
HT20	2412	17
HT20	2437	24
HT20	2462	17
HT40	2422	15
HT40	2437	17.5
HT40	2452	14.5

1.2 Local Support Equipment List

	Support Equipment List						
No.	No. Equipment Brand Model S/N FCC ID Signal cable / Length (m)						
1	Notebook	DELL	E6420		DoC		

1.3 Test Setup Chart



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1.4 The Equipment List

Conducted Emission							
Conduction room 1 / (CO01-WS)							
ent Manufacturer Model No. Serial No. Calibration Date Calibration Until							
R&S	ESCS 30	100169	Oct. 15, 2013	Oct. 14, 2014			
SCHWARZBECK MESS-ELEKTRONIK	Schwarzbeck 8127	8127-667	Nov. 23, 2013	Nov. 22, 2014			
SCHWARZBECK MESS-ELEKTRONIK	Schwarzbeck 8127	8127-666	Dec. 04, 2013	Dec. 03, 2014			
Woken	CFD200-NL	CFD200-NL-001	Apr. 24, 2013	Apr. 23, 2014			
NA	50	04	Apr. 22, 2013	Apr. 21, 2014			
	Manufacturer R&S SCHWARZBECK MESS-ELEKTRONIK SCHWARZBECK MESS-ELEKTRONIK Woken	Conduction room 1 / (CO01-WS) Manufacturer Model No. R&S ESCS 30 SCHWARZBECK MESS-ELEKTRONIK Schwarzbeck 8127 SCHWARZBECK MESS-ELEKTRONIK Schwarzbeck 8127 Woken CFD200-NL	Manufacturer Model No. Serial No. R&S ESCS 30 100169 SCHWARZBECK MESS-ELEKTRONIK Schwarzbeck 8127 8127-667 SCHWARZBECK MESS-ELEKTRONIK Schwarzbeck 8127 8127-666 Woken CFD200-NL CFD200-NL-001	Conduction room 1 / (CO01-WS) Manufacturer Model No. Serial No. Calibration Date R&S ESCS 30 100169 Oct. 15, 2013 SCHWARZBECK MESS-ELEKTRONIK Schwarzbeck 8127 8127-667 Nov. 23, 2013 SCHWARZBECK MESS-ELEKTRONIK Schwarzbeck 8127 8127-666 Dec. 04, 2013 Woken CFD200-NL CFD200-NL-001 Apr. 24, 2013			

Test Item	Radiated Emission							
Test Site	966 chamber1 / (03CH01-WS)							
Instrument	Manufacturer Model No. Serial No. Calibration Date Calibration Until							
Spectrum Analyzer	R&S	FSV40	101498	Jan. 25, 2014	Jan. 24, 2015			
Receiver	R&S	ESR3	101658	Jan. 10, 2014	Jan. 09, 2015			
Bilog Antenna	ScHwarzbeck	VULB9168	VULB9168-522	Jan. 02, 2014	Jan. 01, 2015			
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120D	BBHA 9120 D 1095	Jan. 07, 2014	Jan. 06, 2015			
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Dec. 27, 2013	Dec. 26, 2014			
Preamplifier	Burgeon	BPA-530	SN:100219	Nov. 22, 2013	Nov. 21, 2014			
Preamplifier	Agilent	83017A	MY39501308	Dec. 16, 2013	Dec. 15, 2014			
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Dec. 16, 2013	Dec. 15, 2014			
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Dec. 16, 2013	Dec. 15, 2014			
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16139/4	Dec. 16, 2013	Dec. 15, 2014			
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-001	Dec. 16, 2013	Dec. 15, 2014			
LF cable 10M	Woken	CFD400NL-LW	CFD400NL-002	Dec. 16, 2013	Dec. 15, 2014			
Note: Calibration Inter	rval of instruments liste	d above is one year.						

Test Item	Radiated Emission	Radiated Emission							
Test Site	966 chamber 2 / (03C	966 chamber 2 / (03CH01-WS)							
Instrument	Manufacturer	Manufacturer Model No. Serial No. Calibration Date Calibration Until							
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 15, 2012	Nov. 14, 2014				
Preamplifier	Preamplifier EM EM18G40G 060572 Jun. 20, 2013 Jun. 19, 20								
Note: Calibration Interval of instruments listed above is two year.									

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Test Item	RF Conducted								
Test Site	(TH01-WS)	(TH01-WS)							
Instrument	Manufacturer	anufacturer Model No. Serial No. Calibration Date Calibration Until							
Spectrum Analyzer	R&S	FSV40	101499	Feb. 08, 2014	Feb. 07, 2015				
Power Meter	Anritsu	ML2495A	1241002	Oct. 24, 2013	Oct. 23, 2014				
Power Sensor	r Anritsu MA2411B 1207366 Oct. 24, 2013 Oct. 23, 20								
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 C63.10-2009

FCC KDB 558074 D01 DTS Meas Guidance v03r01

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

Note: The EUT has been tested and complied with FCC part 15B requirement. FCC Part 15B test results are issued to another report.

1.6 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	±35.286 Hz			
Conducted power	±0.536 dB			
Frequency error	±35.286 Hz			
Temperature	±0.3 °C			
Conducted emission	±2.946 dB			
AC conducted emission	±2.43 dB			
Radiated emission	±2.49 dB			

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2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	15°C / 70%	Skys Huang
Radiated Emissions	03CH01-WS	20°C / 62%	Haru Yang Brad Wu
RF Conducted	TH01-WS	21°C / 61%	Felix Sung

FCC site registration No.: 657002IC site registration No.: 10807A-1

2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode	Test Frequency (MHz)	Data Rate (Mbps) / MCS	Test Configuration
Conducted Emissions	HT20	2437	MCS 0	
Radiated Emissions ≤1GHz	HT20	2437	MCS 0	
Radiated Emissions >1GHz	11b	2412 / 2437 / 2462	1 Mbps	
Fundamental Emission Output Power	11g	2412 / 2437 / 2462	6 Mbps	
6dB bandwidth	HT20	2412 / 2437 / 2462	MCS 0	
Power spectral density	HT40	2422 / 2437 / 2452	MCS 0	

NOTE: The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement -X, Y, and Z-plane. The Y-plane results were found as the worst case and were shown in this report.

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3 Transmitter Test Results

3.1 Conducted Emissions

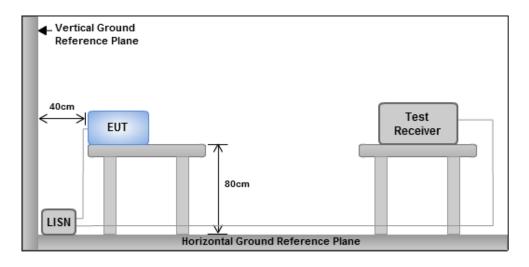
3.1.1 Limit of Conducted Emissions

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



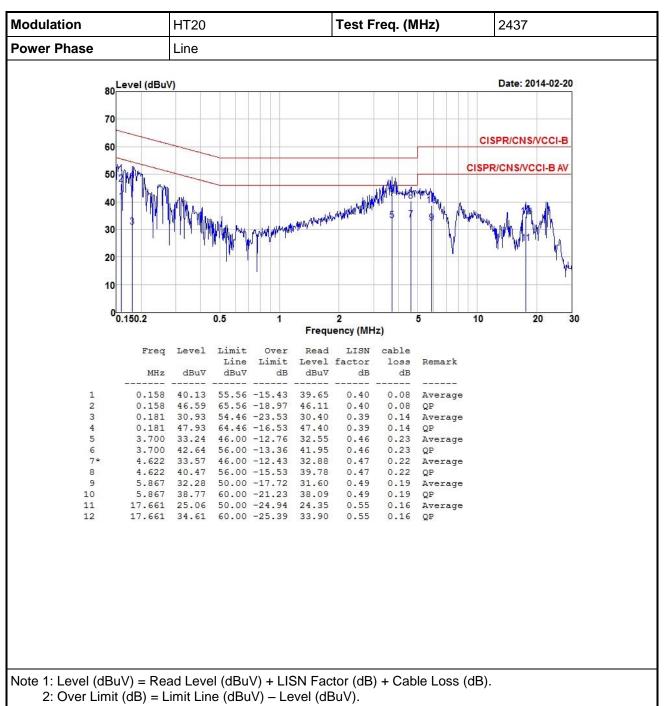
Note: 1. Support units were connected to second LISN.

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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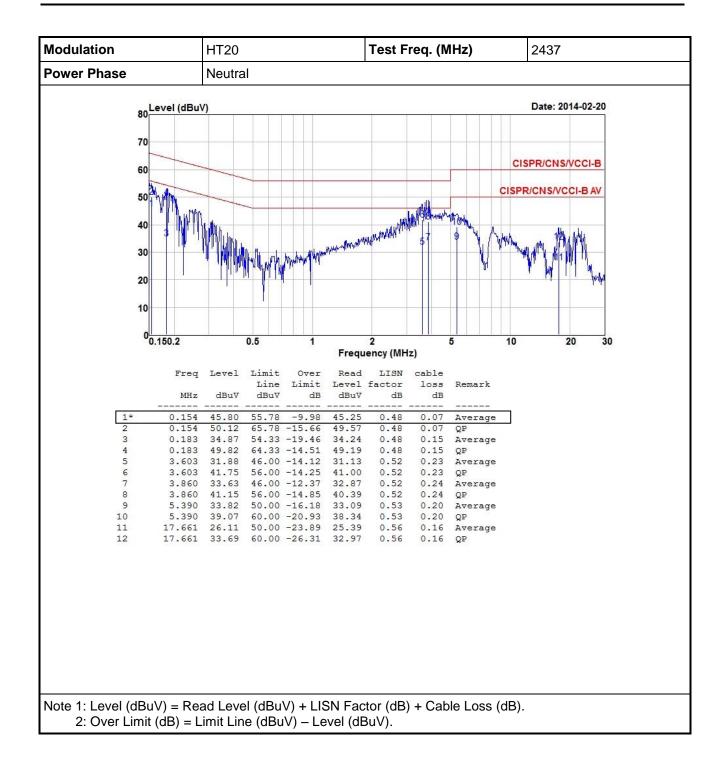


3.1.4 Test Result of Conducted Emissions



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3.2 6dB and Occupied Bandwidth

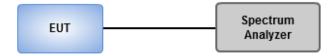
3.2.1 Limit of 6dB Bandwidth

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

3.2.2 Test Procedures

- 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.

3.2.3 Test Setup

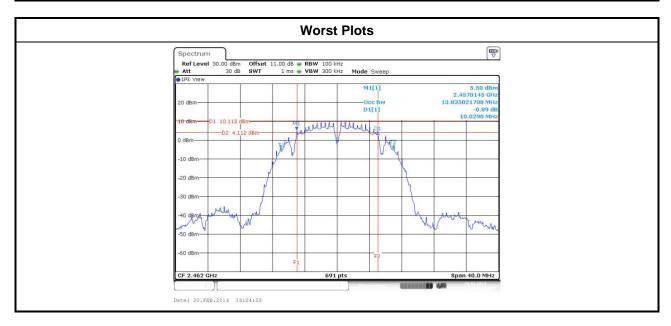


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3.2.4 Test Result of 6dB and Occupied Bandwidth

Modulation	N	Eros (MU=)	6dB Bandwidth (MHz)				Limit (ItU=)
Mode	N _{TX}	Freq. (MHz)	Chain 0	Chain 1	Chain 2	Chain 3	Limit (kHz)
11b	3	2412	10.09	10.09	10.09		500
11b	3	2437	10.09	10.09	10.09		500
11b	3	2462	10.09	10.03	10.09		500
11g	3	2412	16.35	16.35	16.35		500
11g	3	2437	16.29	16.29	16.29		500
11g	3	2462	16.29	16.29	16.35		500
HT20	3	2412	17.57	17.33	17.33		500
HT20	3	2437	16.93	16.87	17.57		500
HT20	3	2462	17.57	17.57	17.57		500
HT40	3	2422	36.29	36.29	36.29		500
HT40	3	2437	36.29	36.06	36.29		500
HT40	3	2452	36.29	36.29	36.29		500



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Modulation N		Freq.		99% Occupied E	Bandwidth (MHz)	
Mode	N _{TX}	(MHz)	Chain 0	Chain 1	Chain 2	Chain 3
11b	3	2412	13.89	13.86	13.89	
11b	3	2437	13.89	13.82	13.86	
11b	3	2462	13.89	13.82	13.86	
11g	3	2412	17.08	16.86	16.82	
11g	3	2437	17.40	17.33	17.08	
11g	3	2462	17.04	16.90	16.82	
HT20	3	2412	18.16	18.09	17.98	
HT20	3	2437	18.38	18.27	18.16	
HT20	3	2462	18.09	18.05	17.98	
HT40	3	2422	38.03	37.77	37.71	
HT40	3	2437	37.97 37.71		37.51	
HT40	3	2452	38.03	37.84	37.71	



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3.3 RF Output Power

3.3.1 Limit of RF Output Power

Con	duct	ed po	ower shall not exceed 1Watt.						
\boxtimes	Ante	enna	gain <= 6dBi, no any corresponding reduction is in output power limit.						
	Ante	renna gain > 6dBi							
		The	Fixed, point to point operations. conducted output power from the intentional radiator shall be reduced by the amount in dB the directional gain of the antenna exceeds 6 dB						
		Sys [°] Ope	ed, point to point operations tems operations tems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point rations, maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 that the directional gain of the antenna exceeds 6 dBi.						
			tems operating in the 5725–5850 MHz band that are used exclusively for fixed, point-to-point rations ,no any corresponding reduction is in transmitter peak output power						
3.3.	2	Test	Procedures						
	Max	kimur	n Peak Conducted Output Power						
		Spe	ctrum analyzer						
		1.	Set RBW = 1MHz, VBW = 3MHz, Detector = Peak.						
		2.	Sweep time = auto, Trace mode = max hold, Allow trace to fully stabilize.						
		3.	Use the spectrum analyzer channel power measurement function with the band limits set equal to the DTS bandwidth edges.						
		Pov	ver meter						
		1.	A broadband Peak 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.						
\boxtimes	Max	kimur	n Conducted Output Power						
	\boxtimes	Pov	ver meter						
		1.	A broadband Average 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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Power Sensor

Power Meter

Report Version: Rev. 01

EUT



3.3.4 Test Result of Maximum Output Power

Modulation Mode	N _{TX}	Freq.	Conduc		age) outpu Bm)	t power	Total Power	Total Power	Limit
Wode		(IVITIZ)	Chain 0	Chain 1	Chain 2	Chain 3	(mW)	(dBm)	(dBm)
11b	3	2412	20.25	20.22	20.18		315.353	24.99	30
11b	3	2437	20.10	20.15	19.48		294.559	24.69	30
11b	3	2462	19.85	20.35	19.45		293.103	24.67	30
11g	3	2412	17.59	17.21	17.55		166.899	22.22	30
11g	3	2437	23.59	23.75	23.43		685.990	28.36	30
11g	3	2462	18.05	17.67	17.66		180.650	22.57	30
HT20	3	2412	17.34	17.52	17.38		165.395	22.19	30
HT20	3	2437	23.50	24.14	23.31		697.579	28.44	30
HT20	3	2462	16.59	16.83	16.59		139.402	21.44	30
HT40	3	2422	15.88	15.72	16.18		117.546	20.70	30
HT40	3	2437	18.51	18.11	17.94		197.902	22.96	30
HT40	3	2452	15.08	15.80	14.70		99.742	19.99	30

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3.4 Power Spectral Density

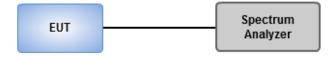
3.4.1 Limit of Power Spectral Density

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

3.4.2 Test Procedures

- Maximum (average) conducted output power was used to demonstrate compliance to the fundamental output power limit. (For 802.11b/g/n HT20 mode)
 - 1. Set the RBW = 30kHz, VBW = 100 kHz, Detector = RMS
 - 2. Set the sweep time=auto couple
 - 3. Employ trace averaging mode over a minimum of 100 traces.
 - 4. Use the peak marker function to determine the maximum amplitude level.
- Maximum (average) conducted output power was used to demonstrate compliance to the fundamental output power limit. (For 802.11n HT40 mode)
 - 1. Set the RBW = 30kHz, VBW = 100 kHz, Detector = RMS
 - 2. Set the sweep time to: ≥ 10 x (number of measurement points in sweep) x (maximum data rate per stream).
 - 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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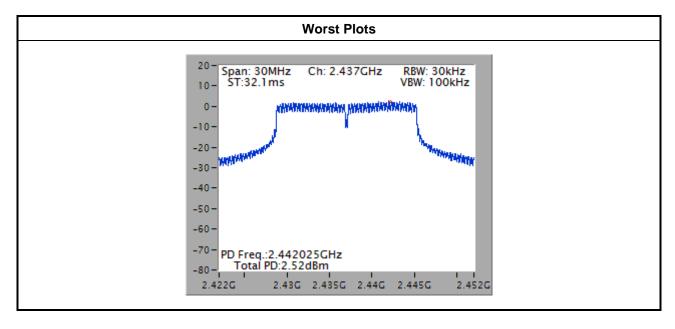


Test Result of Power Spectral Density 3.4.4

Modulation Mode	N _{TX}	Freq. (MHz)	Total Power Spectral Density (dBm/30kHz)	Limit (dBm/3kHz)
11b	3	2412	1.13	5.95
11b	3	2437	0.52	5.95
11b	3	2462	1.12	5.95
11g	3	2412	-3.51	5.95
11g	3	2437	2.52	5.95
11g	3	2462	-3.03	5.95
HT20	3	2412	-3.88	5.95
HT20	3	2437	1.79	5.95
HT20	3	2462	-4.45	5.95
HT40	3	2422	-8.13	5.95
HT40	3	2437	-6.02	5.95
HT40	3	2452	-8.55	5.95

Note:

- Test result is bin-by-bin summing measured value of each TX port. Directional gain = $10*log[(10^{2.19/20}+10^{3.33/20}+10^{4.21/20})/3] = 8.05$ dBi > 6 dBi Limit shall be reduced to 8dBm (8.05 dBi 6 dBi) dB = 5.95 dBm



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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

- 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 a height of 0.8 m test table above the ground plane.
- 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.

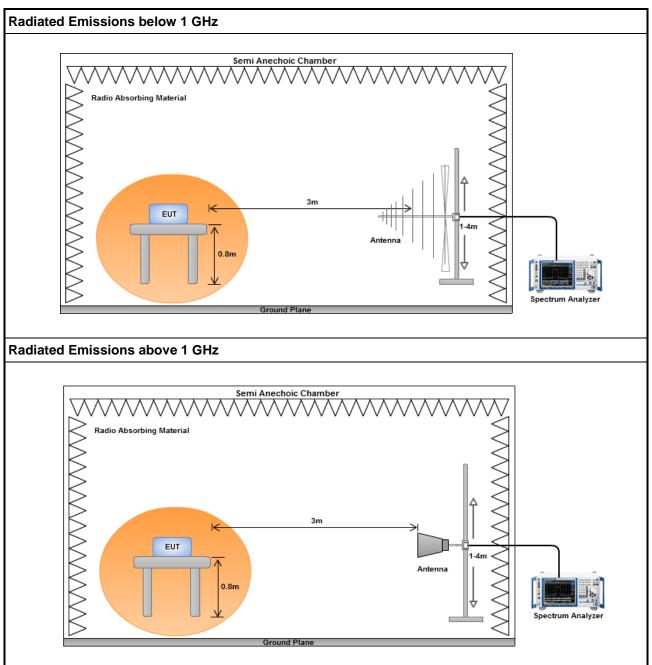
Note:

- 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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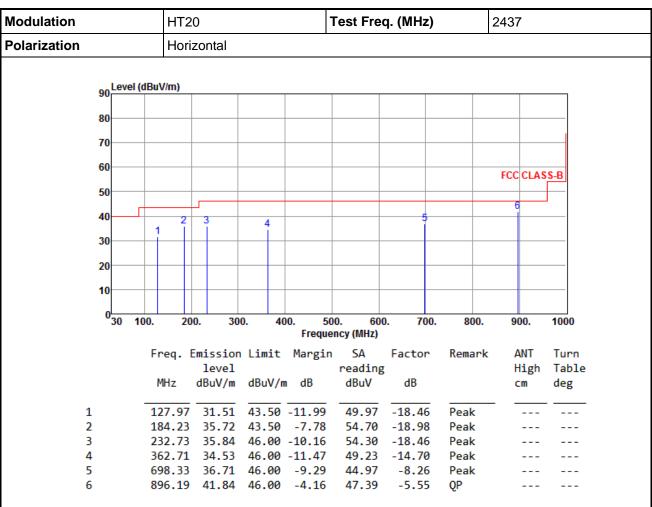
3.5.3 Test Setup



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3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)



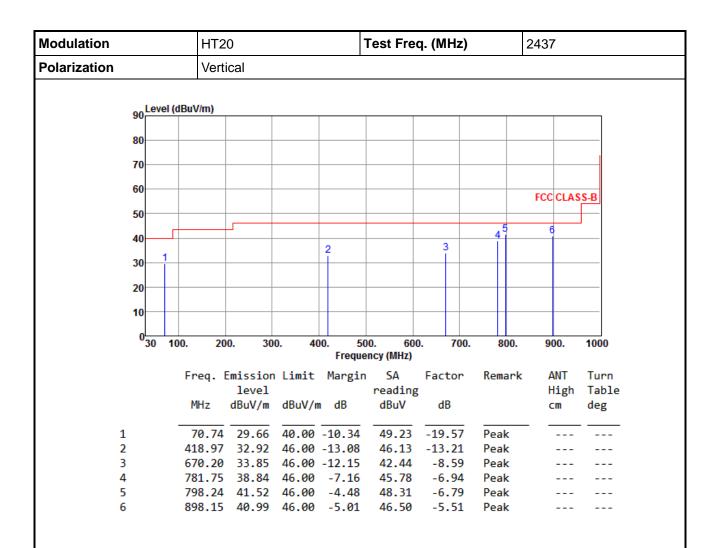
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

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

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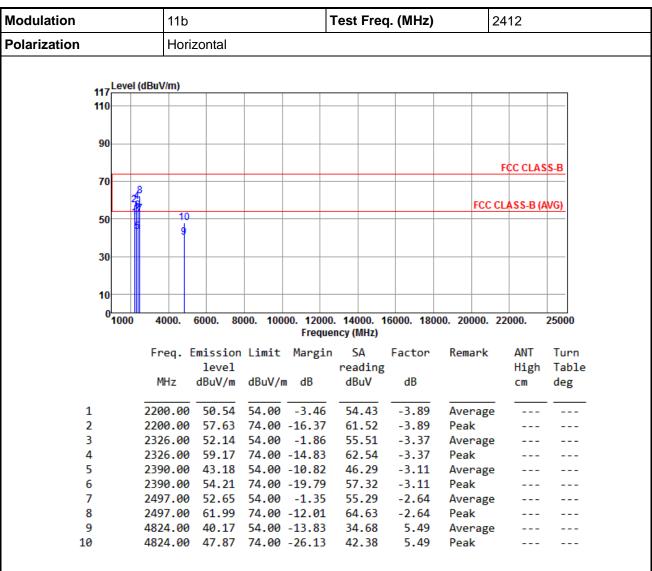
*Factor includes antenna factor, cable loss and amplifier gain

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

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3.5.5 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	11b			Test Fr	eq. (MHz)	2412				
Polarization	Verti	Vertical									
11	7 Level (dBuV/m)	/m)								
11											
0	00										
	~										
									FCC CLAS	S-B	
7	0										
	24	10						FCC (CLASS-B (A	VG)	
5	0	9									
3	so										
·											
1	0										
	1000	4000.	6000. 80	00. 100	00. 1200	0. 14000.	16000. 180	00. 20000.	22000.	25000	
					Frequ	ency (MHz)				
		Freq. E	mission	Limit	Margi	n SA	Factor	Remark	ANT	Turn	
			level			readir	_		High	Table	
		MHz	dBuV/m	dBuV/r	n dB	dBuV	dB		cm	deg	
1		2200.00	47.15	54.00	-6.85	51.04	-3.89	Average			
2		2200.00	54.47		-19.53	58.36		Peak			
3		2326.00	46.16	54.00				Average			
4		2326.00	54.16		-19.84			Peak			
5		2390.00	42.11	54.00	-11.89			Average			
6		2390.00	53.93		-20.07			Peak			
7		2497.00	50.39	54.00	-3.61	53.03	-2.64	Average			
8		2497.00	58.93		-15.07			Peak			
9		4824.00	48.09	54.00	-5.91	42.60	5.49	Average			

5.49

Peak

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

4824.00 52.01 74.00 -21.99 46.52

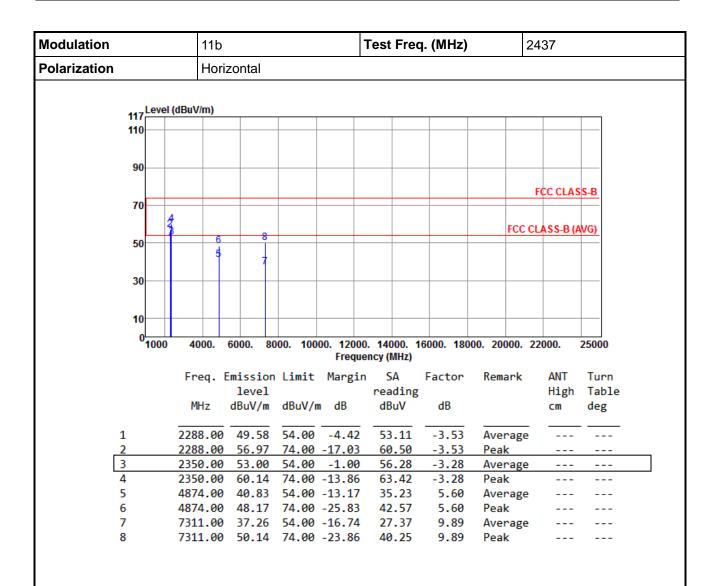
*Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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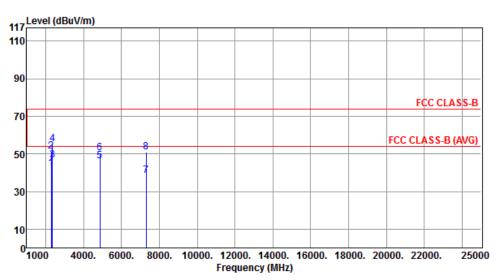
*Factor includes antenna factor, cable loss and amplifier gain

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	2288.00	42.52	54.00	-11.48	46.05	-3.53	Average		
2	2288.00	51.48	74.00	-22.52	55.01	-3.53	Peak		
3	2350.00	46.68	54.00	-7.32	49.96	-3.28	Average		
4	2350.00	55.47	74.00	-18.53	58.75	-3.28	Peak		
5	4874.00	46.31	54.00	-7.69	40.71	5.60	Average		
6	4874.00	50.61	74.00	-23.39	45.01	5.60	Peak		
7	7311.00	38.41	54.00	-15.59	28.52	9.89	Average		
8	7311.00	51.13	74.00	-22.87	41.24	9.89	Peak		

*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)				2462	2462		
Polarization	Horizontal											
117 Level (dBuV/m)											
110												
90												
									FCC	CLAS	S-B	
70												
2								FC	C CLAS	S-B (AV	/G)	
50	6											
	5											
30												
40												
10												
01000	4000.	6000. 80	00. 100	00. 1200			18000	. 20000	. 22000	0. 2	5000	
					ency (MHz							
	Freq. E	mission	Limit	Margi		Fact	or	Remark			Turn	
	MII-	level	JD. 377		readi					_	Table	
	MHz	dBuV/m	abuv/	т ав	dBuV	dB			C	m	deg	
1	2376.00	52.35	54.00	-1.65	55.5	-3.	16	Averag	– –			
2	2376.00			-14.06	63.1			Peak	,-			
3	2483.50	49.45	54.00	-4.55	52.1	5 -2.	70	Averag	ge			
4	2483.50							Peak				
5	4924.00							Averag	ge			
6	4924.00	48.26	74.00	-25.74	42.5	5.	70	Peak				

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 Fred	ą. (MHz)	2	2462	
Polarization		Vertical									
	4471	_evel	(dBuV/m)								
	110										
	90										
	70									FCC CLAS	S-B
	_	1	4 1 6						FCC C	CLASS-B (A	(VG)
	50										
	30										
	10										
	0,	1000	4000.	6000. 80	00. 100		. 14000. 1 ncy (MHz)	6000. 180	00. 20000. 2	22000.	25000
			Freq. I	mission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
			MHz	dBuV/m	dBuV/r	n dB	dBuV	dB		cm	deg
1			2376.00				54.41	-3.16	Average		
2			2376.00 2483.50			-14.87 -5.76	62.29 50.94	-3.16 -2.70	Peak Average		
_											

-2.70

5.70

5.70

Peak

Peak

Average

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

*Factor includes antenna factor , cable loss and amplifier gain

2483.50 57.80 74.00 -16.20 60.50 4924.00 48.35 54.00 -5.65 42.65 4924.00 52.13 74.00 -21.87 46.43

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

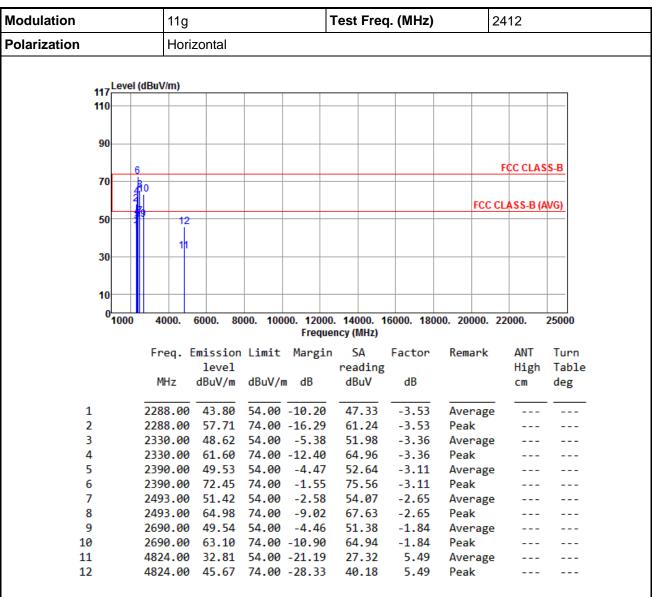
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3.5.6 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11g



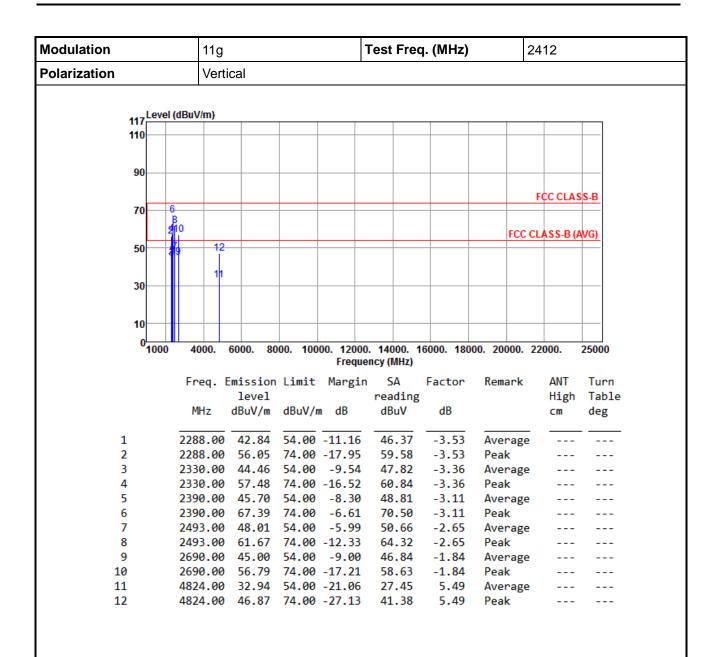
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

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

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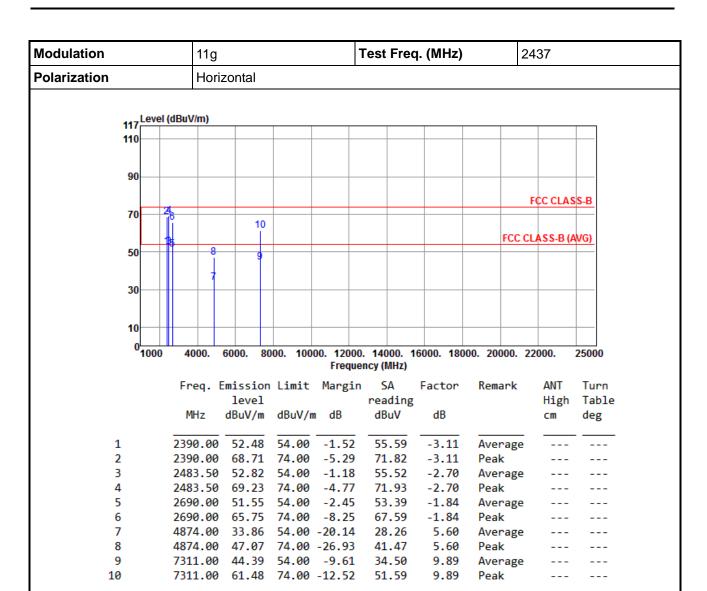


Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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^{*}Factor includes antenna factor, cable loss and amplifier gain



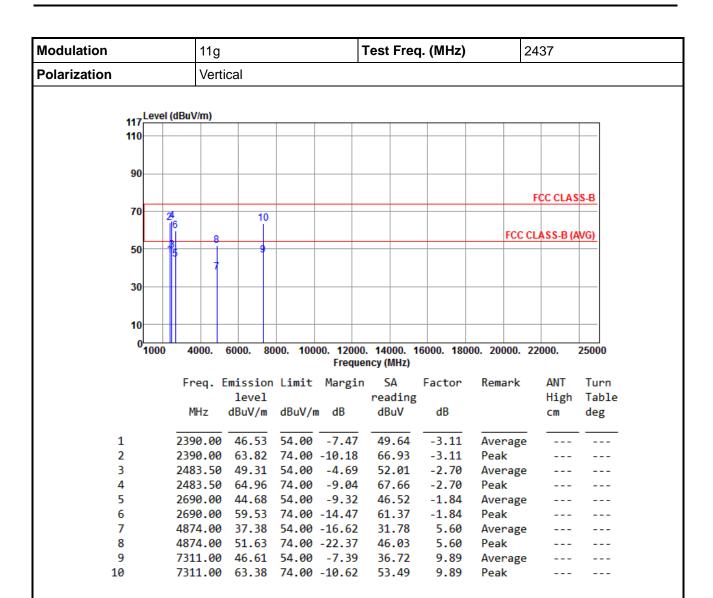


*Factor includes antenna factor, cable loss and amplifier gain

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

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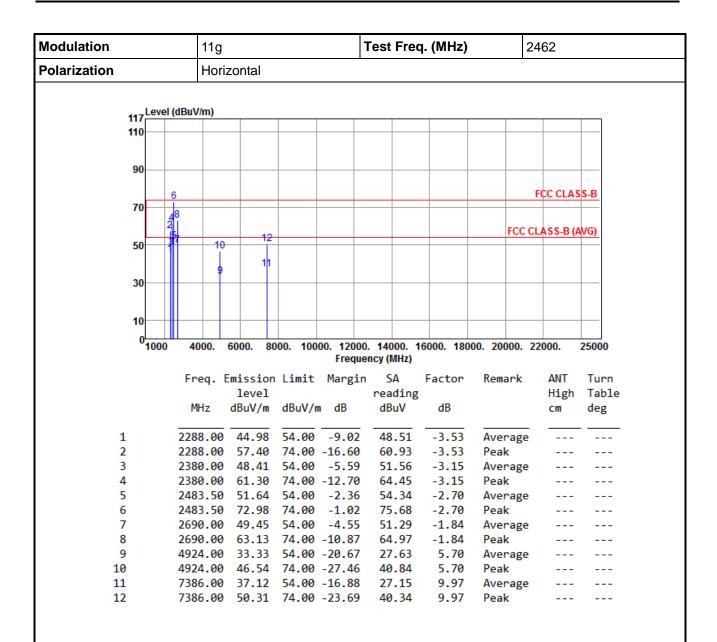


*Factor includes antenna factor, cable loss and amplifier gain

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

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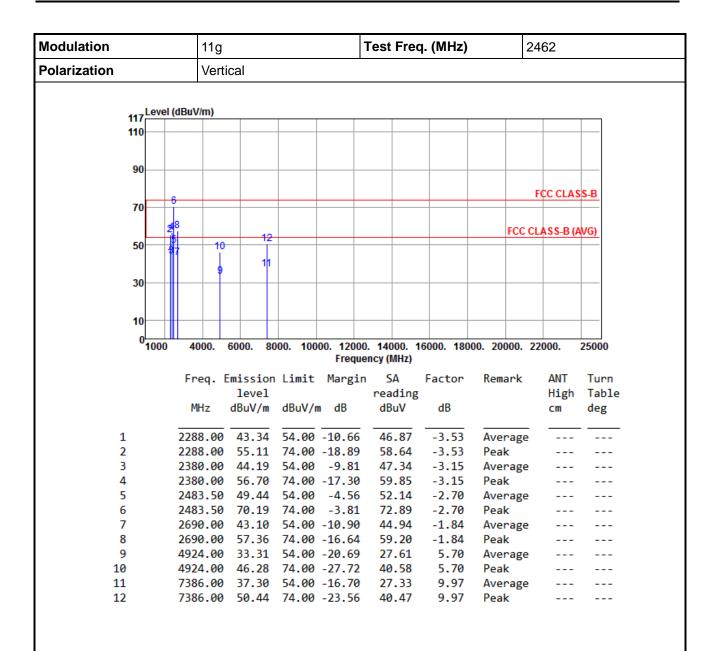


*Factor includes antenna factor, cable loss and amplifier gain

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

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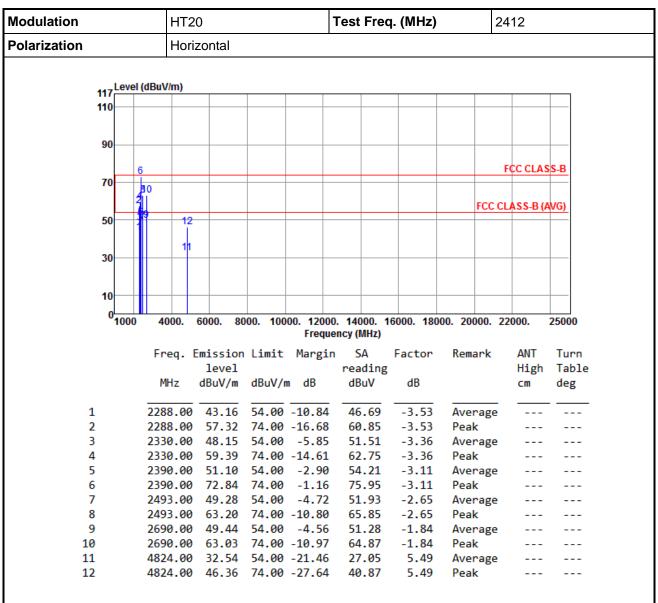
*Factor includes antenna factor, cable loss and amplifier gain

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).

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Modulation			HT2	0		-	Test Fred	q. (MHz)	2	412	
Polarization			Verti	cal		1			•		
	Le	wol (d	Du\//m\								
		ever (u	BuV/m)								
	110										
	90										-
										FCC CLAS	S-B
	70	6									
		8 2¶0							FCC C	LASS-B (A	WG)
	50	- 49	12								
			11								
	30	$-\!$									
	10										
	010	000	4000.	6000. 80	00. 100). 14000. 1 ency (MHz)	6000. 180	00. 20000. 2	22000.	25000
			Freq. E	mission	Limit	Margin	s SA	Factor	Remark	ANT	Turn
				level			reading			High	Table
			MHz	dBuV/m	dBuV/r	n dB	dBuV	dB		cm	deg
	1	2	2288.00	42.99	54.00	-11.01	46.52	-3.53	Average		
	2	2	2288.00			-18.43	59.10	-3.53	Peak		
	3		2330.00			-9.80	47.56	-3.36	Average		
	4		2330.00			-16.68	60.68	-3.36	Peak		
	5		2390.00				49.26	-3.11	Average		
	6		2390.00				71.89	-3.11	Peak		
	7		2493.00		54.00		49.80	-2.65	Average		
	8		2493.00			-12.70 -9.18	63.95	-2.65	Peak		
1	9 a		2690.00 2690.00			-9.18	46.66 58.13	-1.84 -1.84	Average Peak		
1				33.13			27.64	5.49	Average		
	2			33.13			40.06	5.49	Average		

5.49

Peak

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

4824.00 46.45 74.00 -27.55 40.96

*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			HT2	0		-	Test Fred	q. (MHz)		2437				
Polarization			Hori	Horizontal										
			<u> </u>											
	117	Level	(dBuV/m)											
	110													
	90													
										FCC CLAS	S-B			
	70	2	6											
				10					FCC	CLASS D /A	VC)			
	50		8						FCC	CLASS-B (A	(VG)			
	30		ll i	9										
			7											
	30													
	10										<u> </u>			
	0													
	,	1000	4000.	6000. 80	00. 100). 14000. 1 ency (MHz)	16000. 180	00. 20000.	22000.	25000			
			Freq. I	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn			
				level			reading			High	Table			
			MHz	dBuV/m	dBuV/n	n dB	dBuV	dB		cm	deg			
	1		2390.00	52.70	54.00	-1.30	55.81	-3.11	Average					
	2		2390.00	69.23	74.00	-4.77	72.34	-3.11	Peak					
	3		2483.50	52.25	54.00	-1.75	54.95	-2.70	Average					
	4		2483.50	70.84	74.00	-3.16	73.54	-2.70	Peak					
	5 6		2690.00	51.20	54.00	-2.80	53.04	-1.84 -1.84	Average					
	6 7		2690.00 4874.00		74.00	-8.71 -20.48	67.13 27.92	-1.84 5.60	Peak Average					
	8		4874.00			-20.40	40.98	5.60	Peak					
	9		7311.00		54.00		34.29	9.89	Average					
_	_		,511.00	++.10	54.00	3.02	54.25	2.05	Average		_			

Peak

9.89

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

7311.00 61.09 74.00 -12.91 51.20

*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 Polarization		HT2	HT20				Test Freq. (MHz)				
		Vert	Vertical								
1	17 ^{L6}	evel (dBuV/m)								
_	10	_									
	90										
,	90										
	L									FCC CLAS	S-B
1	70	- 14		1	0						
			6						FC	C CLASS-B (A	VG)
!	50		5 1								
			7								
	30										
,	30										
	10										
	010	000	4000.	6000.	8000. 100	000. 12000). 14000. 1	16000. 180	00. 20000	. 22000.	 25000
							ency (MHz)				
			Freq. I	Emissi	on Limit	Margir	s SA	Factor	Remark	c ANT	Turn
			•	leve:		_	reading			High	Table
			MHz	dBuV/r	n dBuV/	m dB	dBuV	dB		cm	deg
			2200 65						•	_	
1 2			2390.00				50.40	-3.11	Averag	ge	
3			2390.00 2483.50				68.57 52.11	-3.11 -2.70	Peak Averag		
4			2483.50				70.54	-2.70	Peak	;e	
5			2690.00				47.18	-1.84	Averag	7e	
6			2690.00			-14.63	61.21	-1.84	Peak		
7			4874.00			-16.78	31.62	5.60	Averag	ge	
8			4874.00	50.17	74.00	-23.83	44.57	5.60	Peak		

7311.00 47.23 54.00 -6.77 37.34

7311.00 64.88 74.00 -9.12 54.99

9.89

9.89

Average

Peak

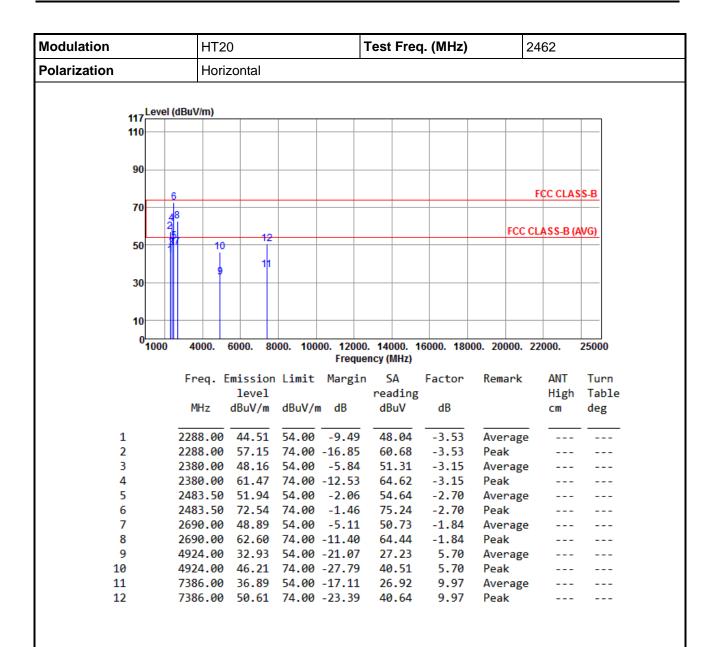
*Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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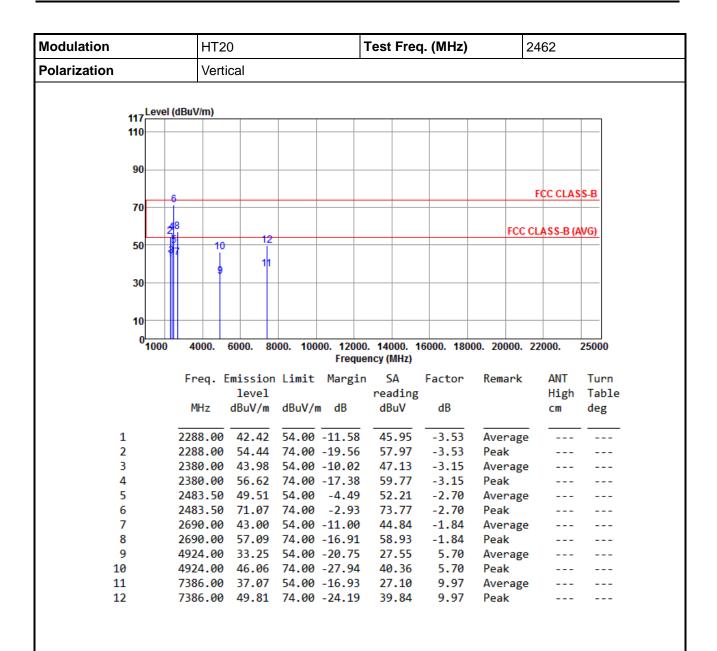


*Factor includes antenna factor, cable loss and amplifier gain

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

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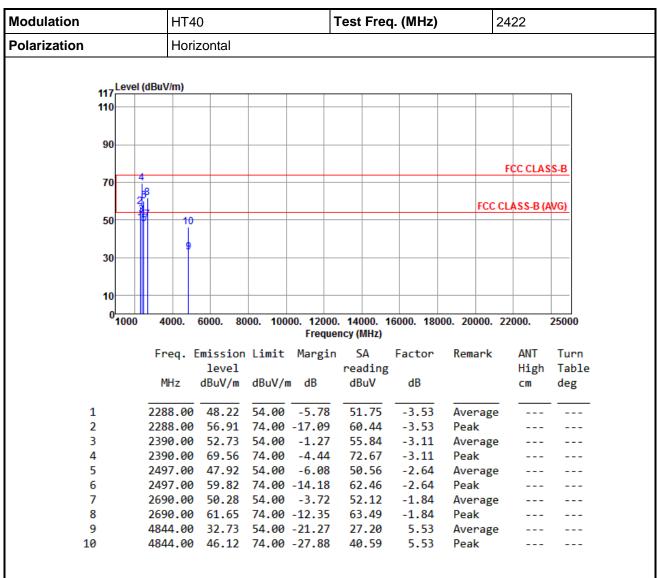
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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^{*}Factor includes antenna factor, cable loss and amplifier gain



3.5.8 Transmitter Radiated Unwanted Emissions (Above 1GHz) for HT40



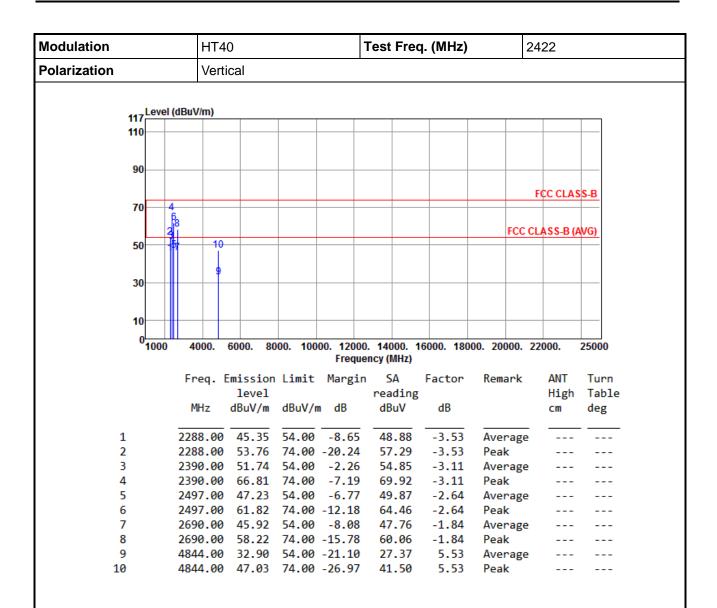
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

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

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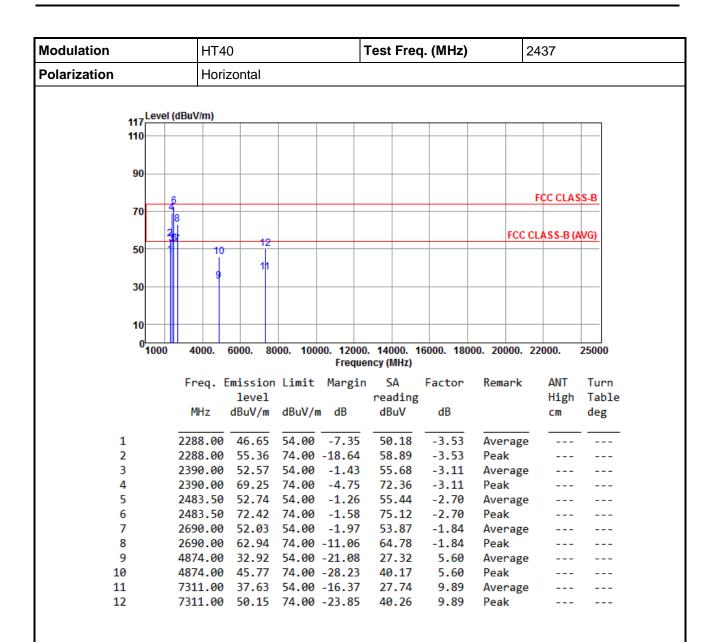


*Factor includes antenna factor , cable loss and amplifier gain

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

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*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	HT∠	10		Test Fre	q. (MHz)	:	2437					
Polarization	Vert	Vertical										
Le	vel (dBuV/m)											
110												
90—												
70	6						FCC CLAS	S-B				
70	18 21	12				FCC	CLASS-B (A	WG)				
50	10	11										
30—	9											
10												
0_100	00 4000.	6000. 80	00. 10000. 120	00. 14000. (MHz)	16000. 180	00. 20000.	22000.	25000				
	Freq.		Limit Marg	in SA	Factor	Remark	ANT	Turn				
	MHz	level dBuV/m	dBuV/m dB	reading dBuV	g dB		High cm	Table deg				
1	2288.00	44.92	54.00 -9.08	48.45	-3.53	Average						
2	2288.00		74.00 -20.37		-3.53	Peak						
3	2390.00		54.00 -5.14		-3.11	Average						
4	2390.00		74.00 -9.08		-3.11	Peak						
5	2483.50		54.00 -4.11		-2.70	Average						
6	2483.50		74.00 -7.72		-2.70	Peak						
7	2690.00		54.00 -7.72		-1.84	Average						
8	2690.00		74.00 -15.69		-1.84	Peak						
9	4874.00		54.00 -20.97		5.60	Average						
10	4874.00		74.00 -26.68		5.60	Peak						
11	/311.00	3/.52	54.00 -16.48	3 27.63	9.89	Average						

Peak

9.89

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

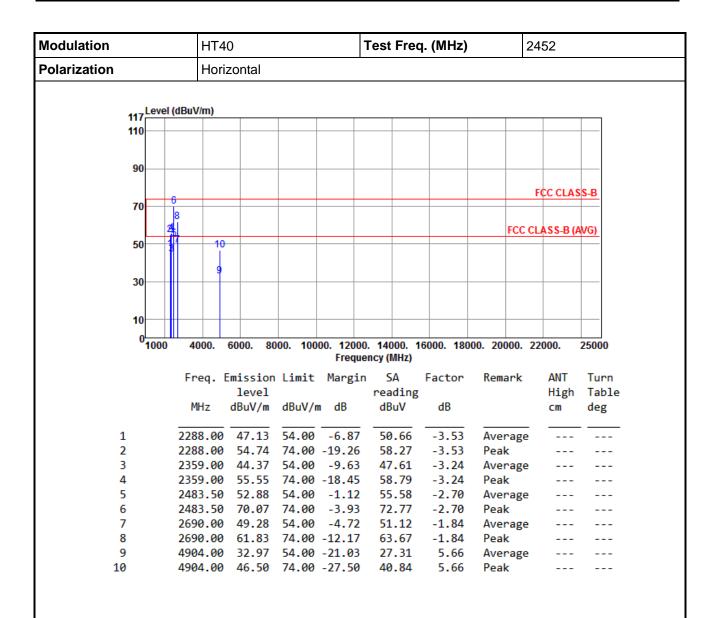
7311.00 51.04 74.00 -22.96 41.15

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

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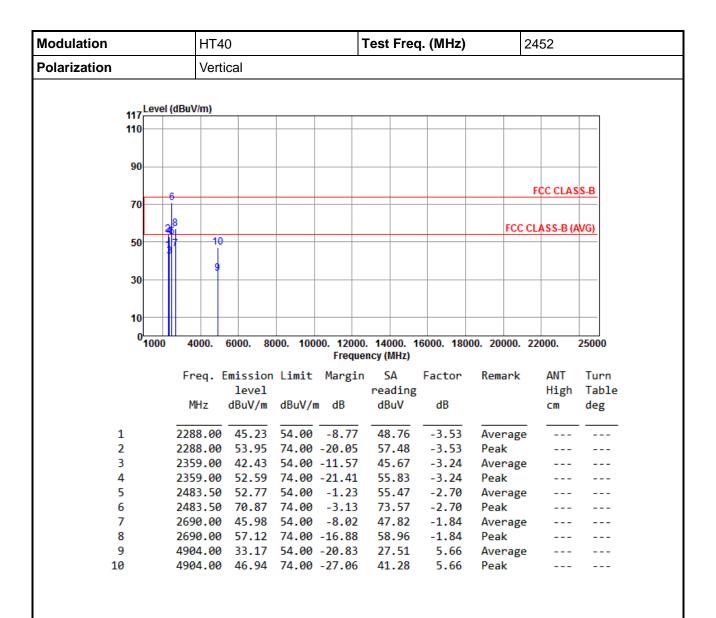


*Factor includes antenna factor , cable loss and amplifier gain

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

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*Factor includes antenna factor, cable loss and amplifier gain

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

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3.6 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 30 dB relative to the maximum in-band peak PSD level in 100 kHz

3.6.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.6.3 Test Procedures

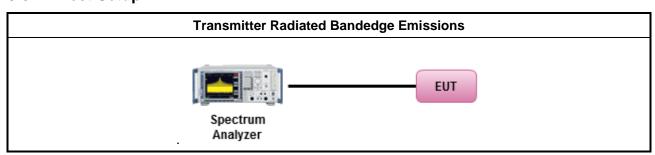
Reference level measurement

- 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

- 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

3.6.4 Test Setup



3.6.5 Test Result of Emissions in non-restricted frequency bands

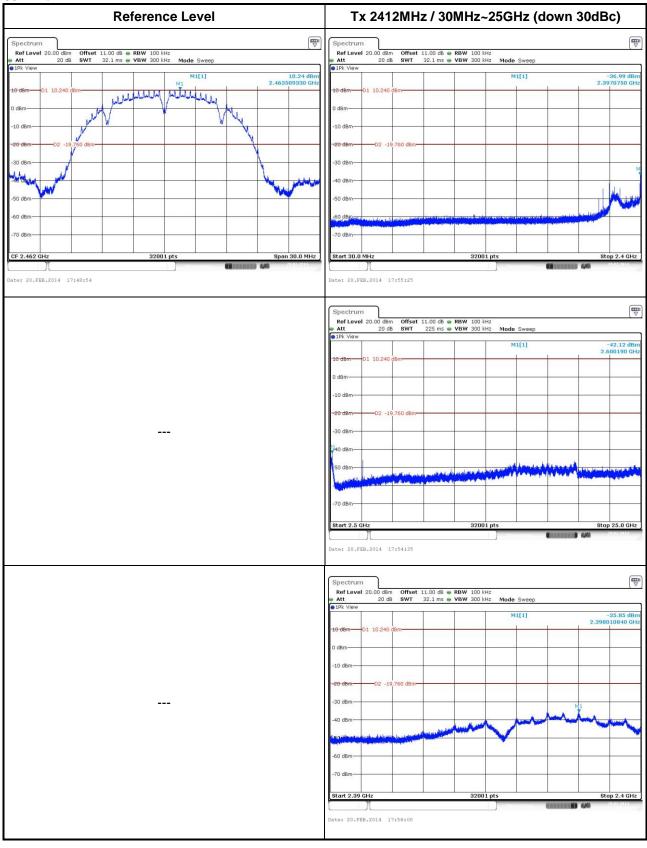
This test item is performed on each TX output individually without summing or adding 10 $log(N_{ANT})$ since measurements are made relative to the in-band emissions on the individual outputs. Only worst test result of each operating mode is presented.

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3.6.6 Unwanted Emissions into Non-Restricted Frequency Bands

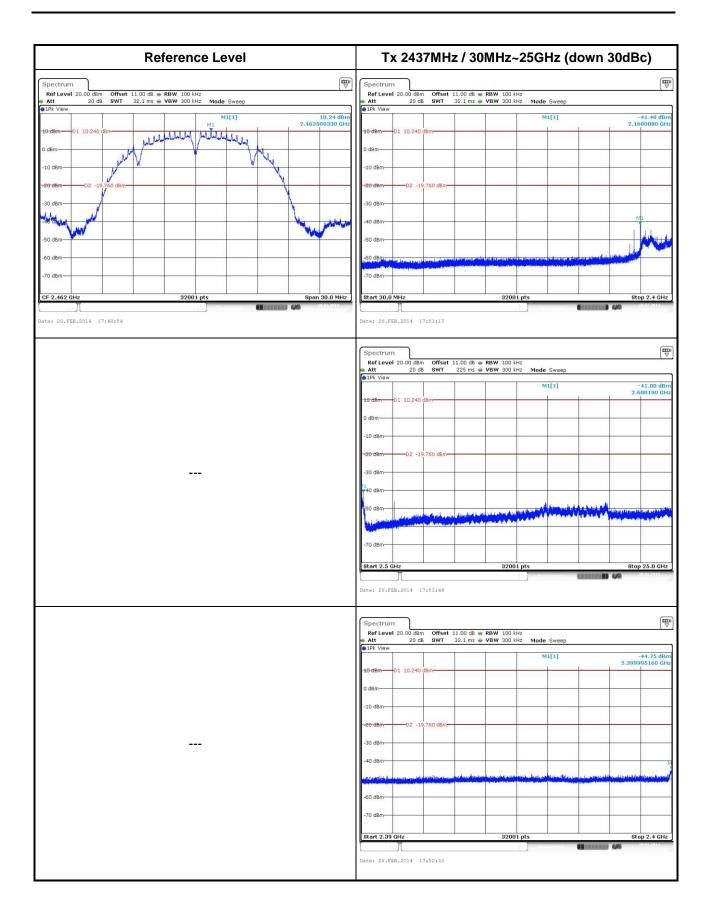
802.11b



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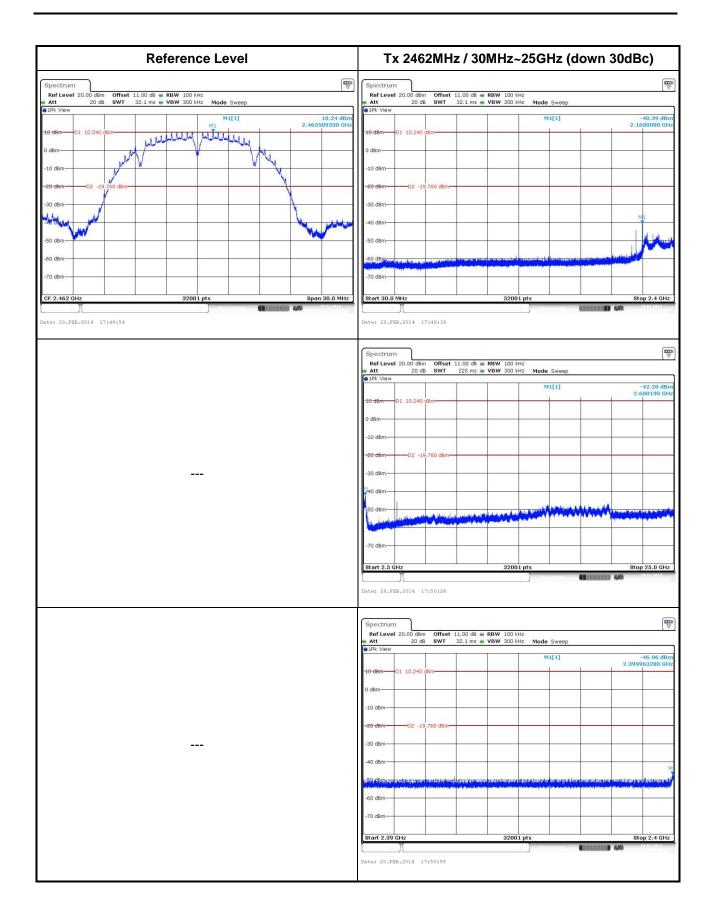
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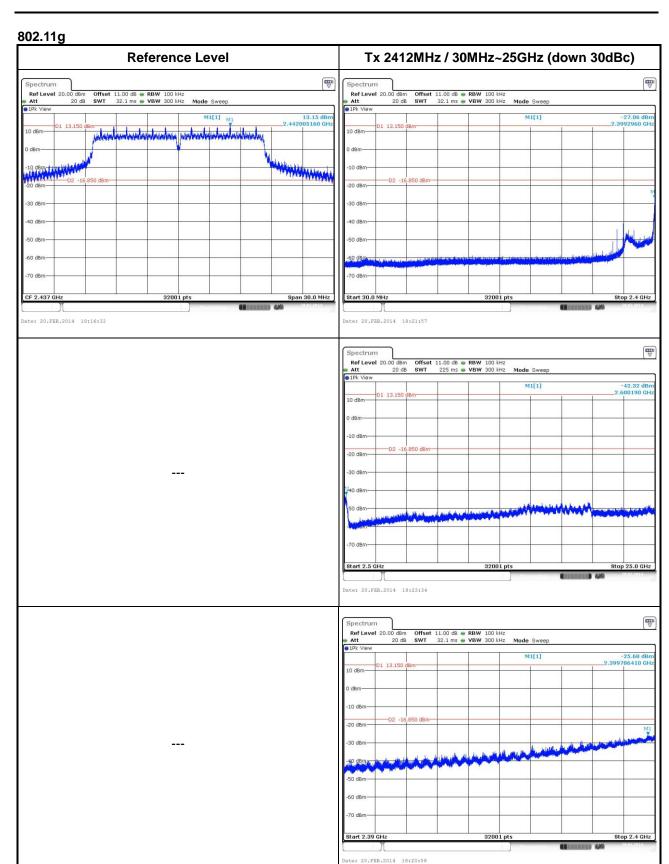
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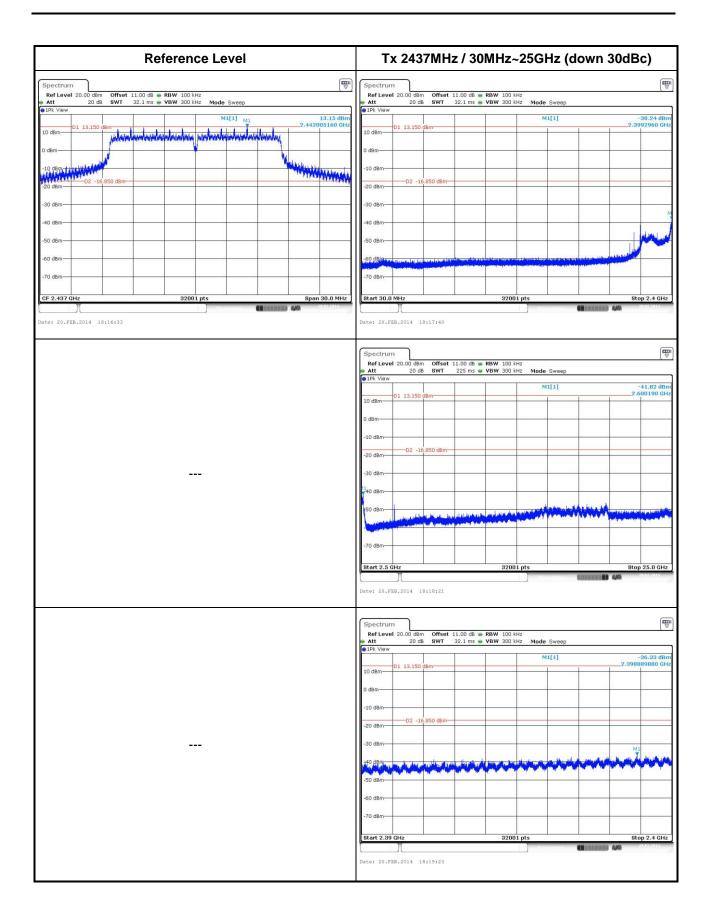
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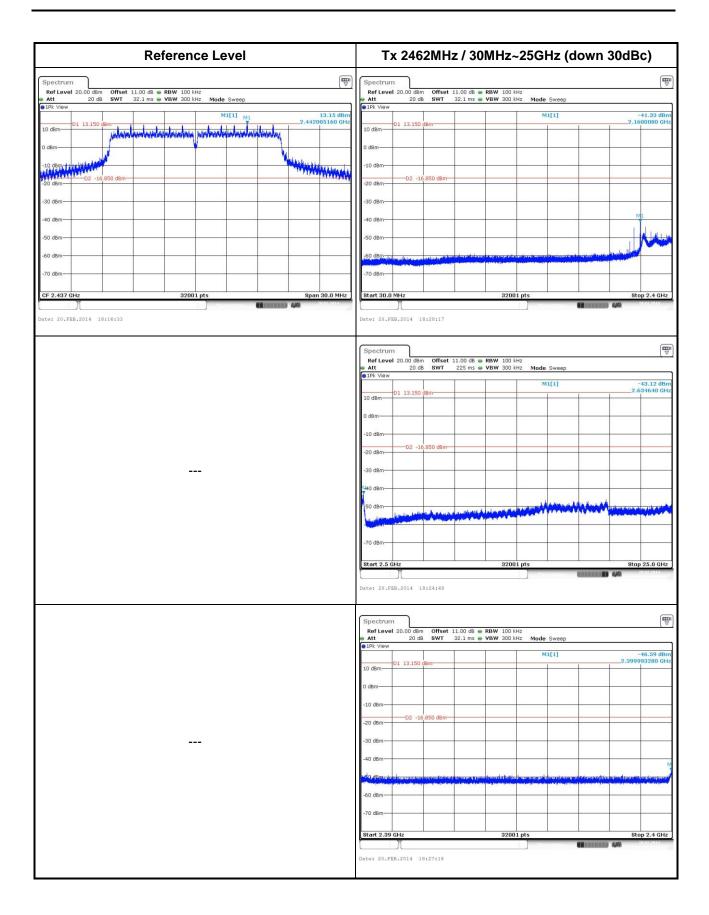
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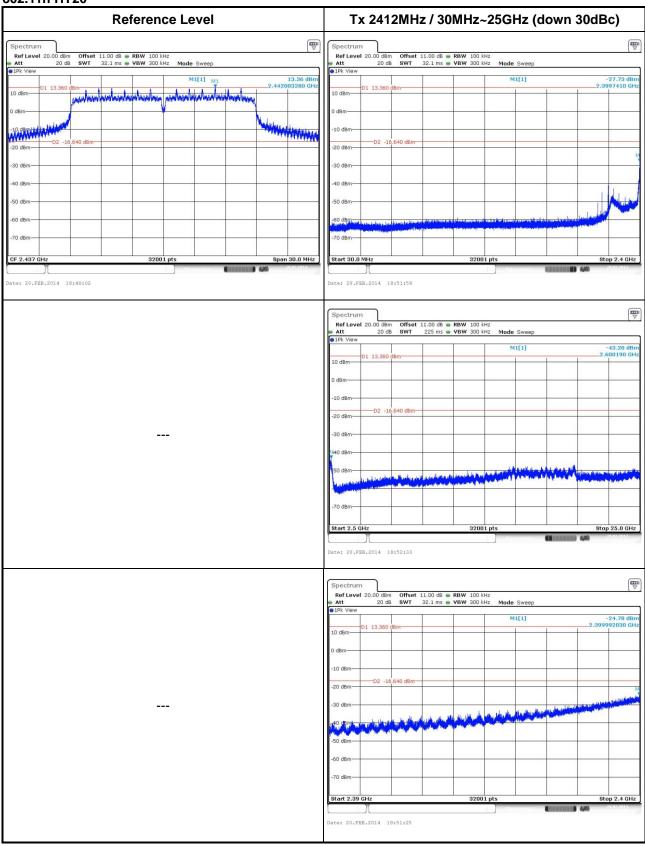




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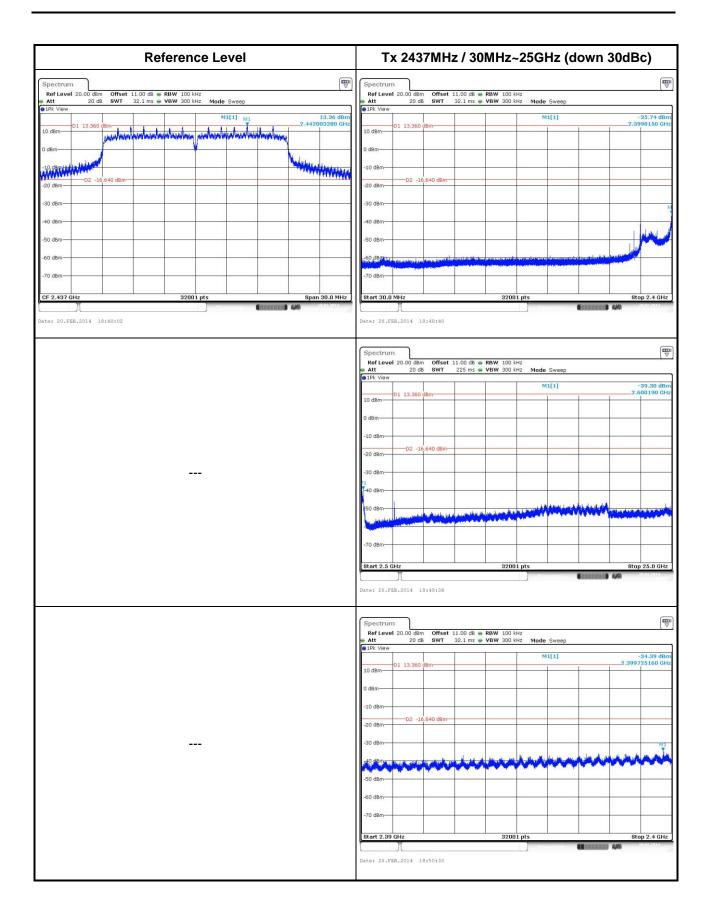


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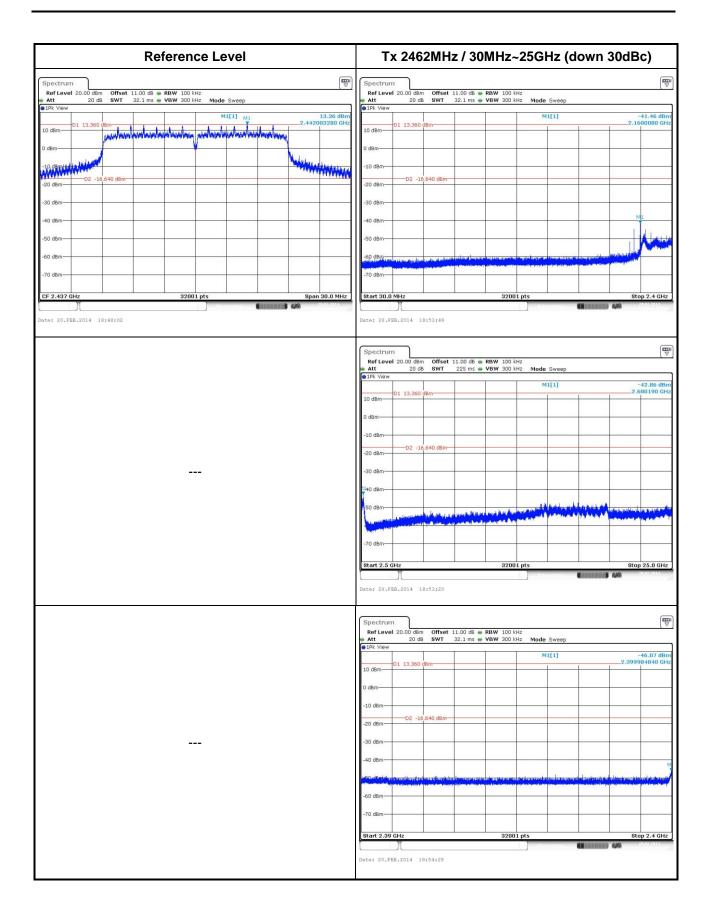
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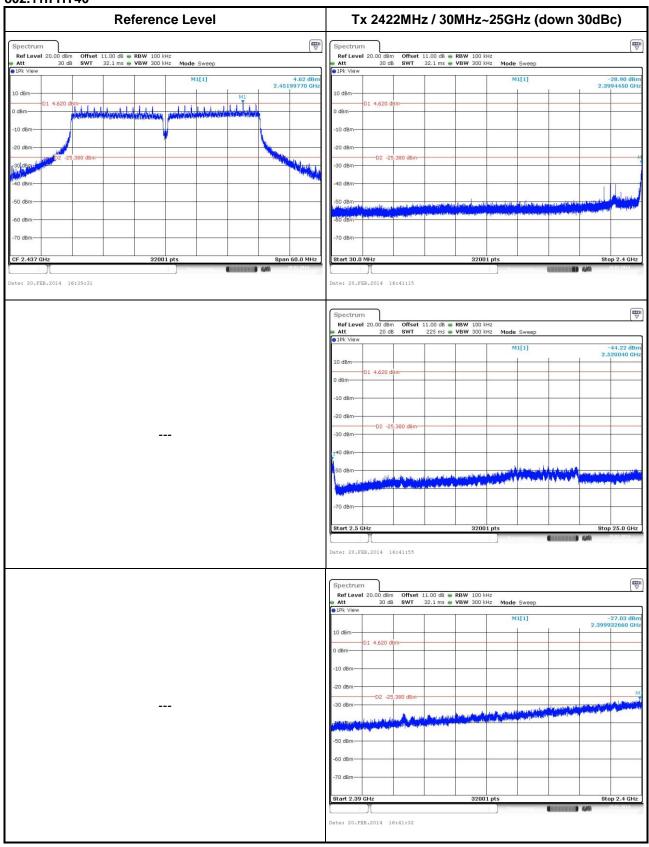




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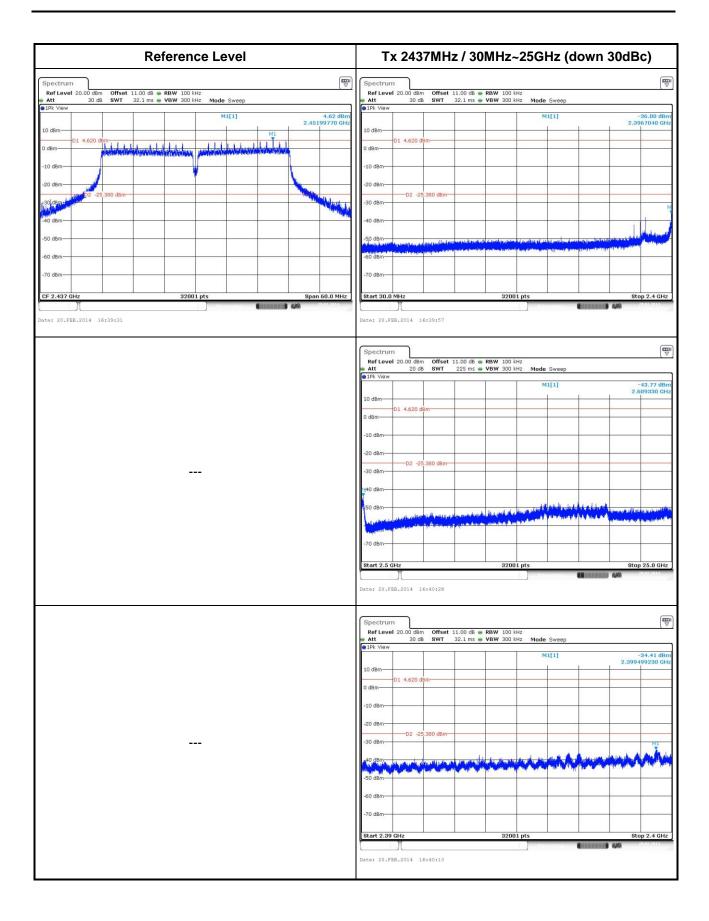


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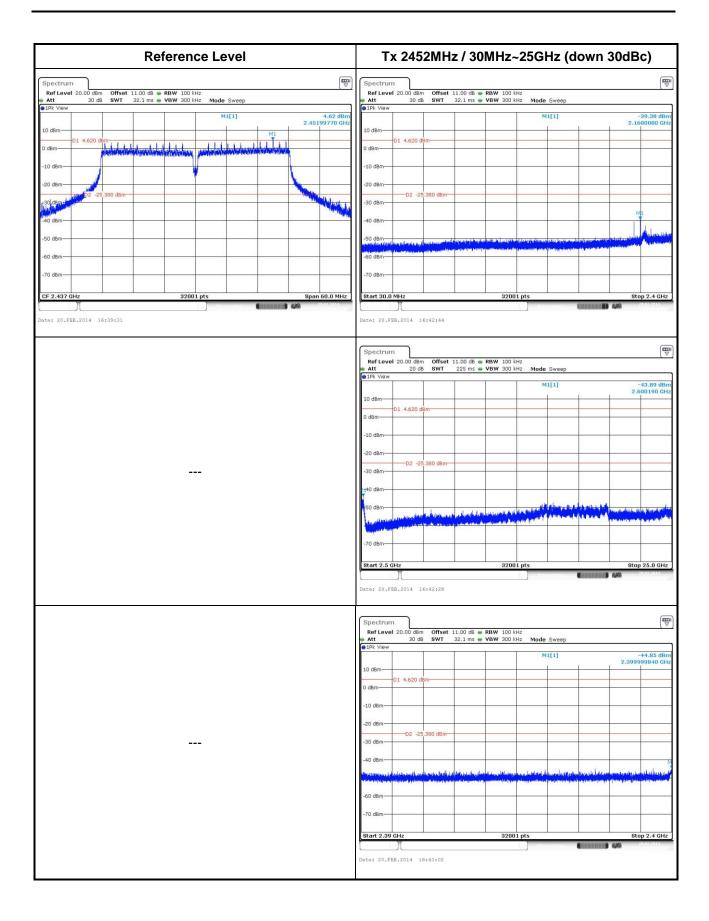
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4 Test laboratory information

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, 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 Hsiang. Location map can be found on our website http://www.icertifi.com.tw.

Linkou Kwei Shan

Tel: 886-2-2601-1640

No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei City, Taiwan, R.O.C.

No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan Hsiang, Tao Yuan Hsien 333, Taiwan, R.O.C.

Tel: 886-3-271-8666

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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