

FCC Test Report

FCC ID : NKR-SY75

Equipment : WiFi module Model No. : DNUA-SY75

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 : Aug. 03, 2015

Tested Date : Aug. 25 ~ Sep. 03, 2015

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

ilac MRA

Testing Laboratory

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Release Record

Report No.	Version	Description	Issued Date
FR580301AC	Rev. 01	Initial issue	Sep. 17, 2015

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Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207 Conducted Emissions		[dBuV]: 0.159MHz 44.77 (Margin -10.75dB) - AV	Pass
15.247(d)	Radiated Emissions	[dBuV/m at 3m]: 2390.00MHz	Pass
15.209	INdulated Emissions	53.30 (Margin -0.70dB) - AV	rass
15.247(b)(3) Maximum Output Power		Max Power [dBm]: 27.38	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]	2	1-11 Mbps
2400-2483.5	g	2412-2462	1-11 [11]	2	6-54 Mbps
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	2	MCS 0-15

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

1.1.2 Antenna Details

Ant.	Model	Type	Connector	Opera	ting Frequen	cies (MHz) / A	ntenna Gain	(dBi)
No.	model	Турс	Connector	2400~2483.5	5150~5250	5250~5350	5470~5725	5725~5850
1	DNUA-SY75 ANT0	Printed	in-line switch	0.39	2.57	3.11	4.13	4.13
2	DNUA-SY75 ANT1	Printed	in-line switch	-0.2	1.1	1.64	2.32	2.19

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type 3.3Vdc from host

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	ART2-GUI, Version 2.3		
	Mode	Duty cycle (%)	Duty factor (dB)
Duty Cycle and Duty Footor	11b	100.00%	0.00
Duty Cycle and Duty Factor	11g	98.76%	0.05
	HT20	98.13%	0.08

1.1.7 Power Setting

Modulation Mode	Test Frequency (MHz)	Power Set
11b	2412	17
11b	2437	20.5
11b	2462	20
11g	2412	11
11g	2437	22
11g	2462	15.5
HT20	2412	10
HT20	2437	22
HT20	2462	14.5

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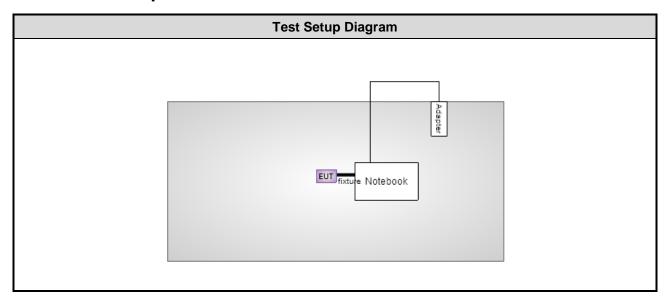


1.2 Local Support Equipment List

Support Equipment List						
No.	Equipment	Brand	Model	S/N	FCC ID	Signal cable / Length (m)
1	Notebook	DELL	Latitude E6440	DPXMD12	DoC	
2	Fixture					

Note: The Fixture was provided by applicant.

1.3 Test Setup Chart



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1.4 The Equipment List

Test Item	Conducted Emission								
Test Site	Test Site Conduction room 1 / (CO01-WS)								
Instrument Manufacturer Model No. Serial No. Calibration Date Calibration Until									
EMC Receiver	R&S	ESCS 30	100169	Oct. 17, 2014	Oct. 16, 2015				
LISN SCHWARZBECK Schwarzbeck 8127 8127-667 Nov. 17, 2014 Nov. 1									
RF Cable-CON Woken CFD200-NL CFD200-NL-001 Dec. 31, 2014 Dec									
Measurement Software	AUDIX	e3	6.120210k	NA	NA				
Note: Calibration Interval of instruments listed above is one year.									

Test Item	Radiated Emission above 1GHz							
Test Site	966 chamber 2 / (03Cl	H02-WS)						
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until			
Spectrum Analyzer	R&S	FSV40	101499	Dec. 31, 2014	Dec. 30, 2015			
Receiver	R&S	ESR3	101657	Jan. 15, 2015	Jan. 14, 2016			
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-524	Oct. 16, 2014	Oct. 15, 2015			
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1095	Oct. 14, 2014	Oct. 13, 2015			
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Nov. 10, 2014	Nov. 09, 2015			
Loop Antenna	R&S	HFH2-Z2	11900	Nov. 10, 2014	Nov. 09, 2015			
Preamplifier	Burgeon	BPA-530	100218	Nov. 10, 2014	Nov. 09, 2015			
Preamplifier	Agilent	83017A	MY39501309	Sep. 29, 2014	Sep. 28, 2015			
Pre-Amplifier	WM	TF-130N-R1	923365	Feb. 10, 2015	Feb. 09, 2016			
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16140/4	Dec. 16, 2014	Dec. 15, 2015			
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16018/4	Dec. 16, 2014	Dec. 15, 2015			
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16015/4	Dec. 16, 2014	Dec. 15, 2015			
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-003	Dec. 16, 2014	Dec. 15, 2015			
LF cable 10M	Woken	CFD400NL-LW	CFD400NL-004	Dec. 16, 2014	Dec. 15, 2015			
Measurement Software	AUDIX	e3	6.120210g	NA	NA			
Note: Calibration Inter	rval of instruments listed	d above is one year.		_				

Test Item	RF Conducted							
Test Site	(TH01-WS)							
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until			
Spectrum Analyzer	R&S	FSV40	101063	Feb. 03, 2015	Feb. 02, 2016			
Power Meter	Anritsu	ML2495A	1241002	Sep. 29, 2014	Sep. 28, 2015			
Power Sensor	Anritsu	MA2411B	1207366	Sep. 29, 2014	Sep. 28, 2015			
Note: Calibration Interval of instruments listed above is one year.								

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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
FCC KDB 558074 D01 DTS Meas Guidance v03r03
FCC KDB 662911 D01 Multiple Transmitter Output v02r01

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	±34.134 Hz					
Conducted power	±0.808 dB					
Power density	±0.463 dB					
Conducted emission	±2.670 dB					
AC conducted emission	±2.92 dB					
Radiated emission ≤ 1GHz	±3.62 dB					
Radiated emission > 1GHz	±5.60 dB					

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2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	22°C / 58%	Kevin Ma
Radiated Emissions	03CH02-WS	23-26°C / 65-69%	Anderson Hung
RF Conducted	TH01-WS	22°C / 63%	Felix Sung

FCC site registration No.: 657002IC site registration No.: 10807A-2

2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode	Test Frequency (MHz)	Data Rate	Test Configuration
Conducted Emissions	HT20	2437	MCS 0	
Radiated Emissions ≤1GHz	HT20	2437	MCS 0	
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	

NOTE:

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^{1.} 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.



3 Transmitter Test Results

3.1 Conducted Emissions

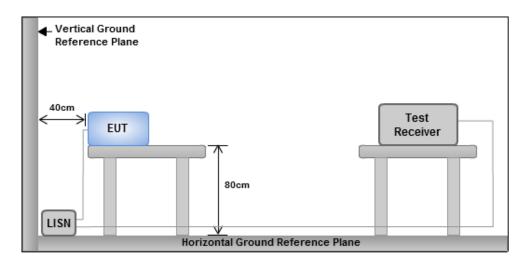
3.1.1 Limit of Conducted Emissions

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



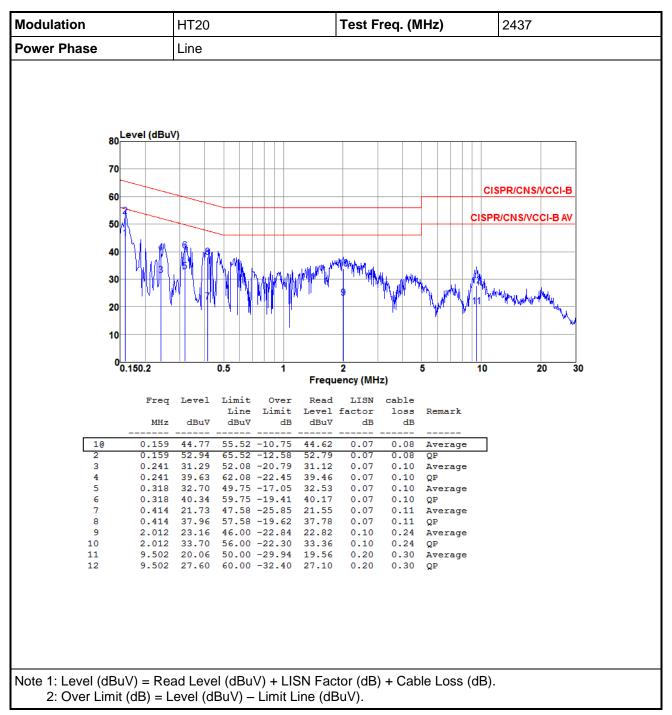
Note: 1. Support units were connected to second LISN.

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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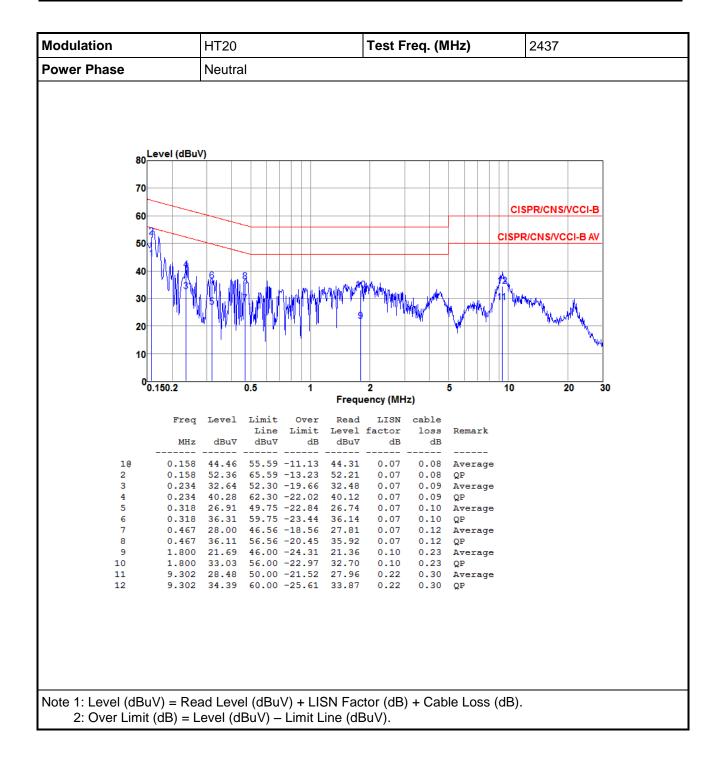


3.1.4 Test Result of Conducted Emissions



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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

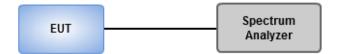
6dB Bandwidth

- 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

- 1. Set resolution bandwidth (RBW) = 300 kHz, Video bandwidth = 1 MHz.
- 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

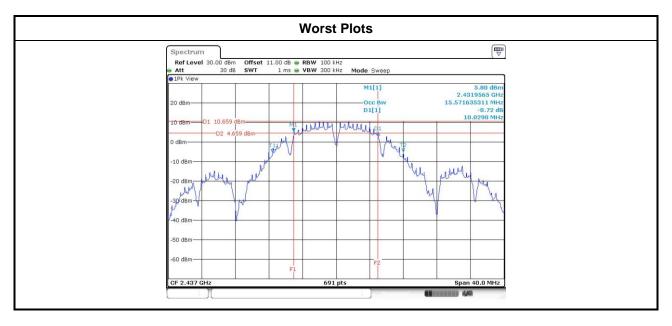


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3.2.4 Test Result of 6dB and Occupied Bandwidth

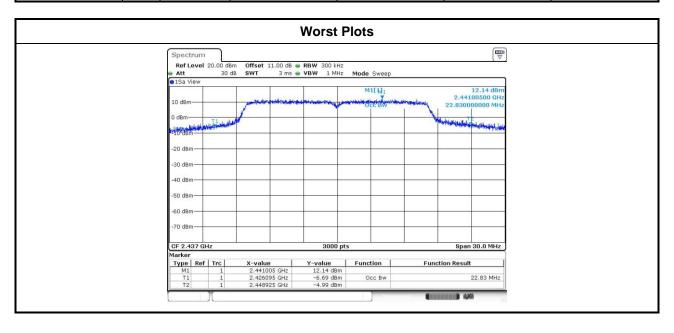
Modulation	N	Erog (MUz)		6dB Bandv	vidth (MHz)		Limit (kUz)
Mode	N _{TX}	Freq. (MHz)	Chain 0	Chain 1	Chain 2	Chain 3	Limit (kHz)
11b	2	2412	10.09	10.09			500
11b	2	2437	10.03	10.09			500
11b	2	2462	10.09	10.09			500
11g	2	2412	16.35	16.35			500
11g	2	2437	16.35	16.35			500
11g	2	2462	16.35	16.35			500
HT20	2	2412	17.57	17.62			500
HT20	2	2437	16.70	15.77			500
HT20	2	2462	17.22	17.22			500



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Modulation	N Freq.			Bandwidth (MHz)		
Mode	N _{TX}	(MHz)	Chain 0	Chain 1	Chain 2	Chain 3
11b	2	2412	13.98	14.09		
11b	2	2437	15.21	14.47		
11b	2	2462	14.92	14.27		
11g	2	2412	16.95	16.79		
11g	2	2437	22.83	19.61		
11g	2	2462	17.23	16.89		
HT20	2	2412	18.03	17.98		
HT20	2	2437	22.72	22.82		
HT20	2	2462	18.11	18.03		



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3.3 RF Output Power

3.3.1 Limit of RF Output Power

Cor	duct	ed power shall not exceed 1Watt.
\boxtimes	Ante	enna gain <= 6dBi, no any corresponding reduction is in output power limit.
	Ante	enna gain > 6dBi
		Non Fixed, point to point operations. The conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB
		Fixed, point to point operations Systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point Operations, maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.
		Systems operating in the 5725–5850 MHz band that are used exclusively for fixed, point-to-point operations ,no any corresponding reduction is in transmitter peak output power

3.3.2 Test Procedures

Maximum Peak Conducted Output Power

- 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.

Nower meter

- 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.
- Maximum Conducted Output Power (For reference only)

Nower meter

 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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3.3.4 Test Result of Maximum Output Power

Modulation Mode	N _{TX}	Freq.	Peak conducted output power (dBm)			Total Power	Total Power	Limit		
Wode		(IVITIZ)	Chain 0	Chain 1	Chain 2	Chain 3	(mW)	(dBm)	(dBm)	
11b	2	2412	19.15	19.02			162.024	22.10	30.00	
11b	2	2437	21.86	21.96			310.498	24.92	30.00	
11b	2	2462	21.22	21.58			276.314	24.41	30.00	
11g	2	2412	19.83	19.69			189.272	22.77	30.00	
11g	2	2437	24.03	24.57			539.348	27.32	30.00	
11g	2	2462	22.21	22.63			349.573	25.44	30.00	
HT20	2	2412	18.82	18.36			144.757	21.61	30.00	
HT20	2	2437	24.04	24.68			547.278	27.38	30.00	
HT20	2	2462	21.63	21.78			296.207	24.72	30.00	

Modulation Mode	N _{TX} Freq.		Conducted (average) output power (dBm)			Total Power	Total Power	Limit	
Wode		(MHz)	Chain 0	Chain 1	Chain 2	Chain 3	(mW)	(dBm)	(dBm)
11b	2	2412	17.04	16.95			100.127	20.01	30.00
11b	2	2437	20.18	20.08			206.091	23.14	30.00
11b	2	2462	19.61	19.66			183.881	22.65	30.00
11g	2	2412	11.51	11.58			28.546	14.56	30.00
11g	2	2437	20.50	20.52			224.922	23.52	30.00
11g	2	2462	15.72	15.67			74.223	18.71	30.00
HT20	2	2412	10.32	10.38			21.679	13.36	30.00
HT20	2	2437	20.53	20.58			227.267	23.57	30.00
HT20	2	2462	14.64	14.52			57.421	17.59	30.00

Note: Conducted average output power is for reference only.

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3.4 Power Spectral Density

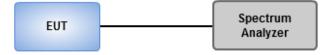
3.4.1 Limit of Power Spectral Density

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

3.4.2 Test Procedures

- Maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit.
 - Set the RBW = 3kHz, VBW = 10kHz.
 - 2. 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.
- Maximum (average) conducted output power was used to demonstrate compliance to the fundamental output power limit.
 - Set the RBW = 100kHz, VBW = 300 kHz.
 - 2. Detector = RMS, Sweep time = auto couple.
 - 3. Set the sweep time to: ≥ 10 x (number of measurement points in sweep) x (maximum data rate per stream).
 - 4. Perform the measurement over a single sweep.
 - 5. Use the peak marker function to determine the maximum amplitude level.

3.4.3 Test Setup



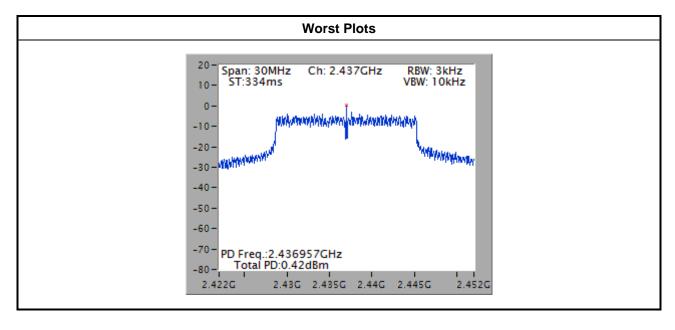
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3.4.4 Test Result of Power Spectral Density

Modulation Mode	N _{TX}	Freq. (MHz)	Total Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
11b	2	2412	-5.61	8.00
11b	2	2437	-2.45	8.00
11b	2	2462	-3.68	8.00
11g	2	2412	-12.97	8.00
11g	2	2437	0.42	8.00
11g	2	2462	-7.37	8.00
HT20	2	2412	-14.64	8.00
HT20	2	2437	-0.18	8.00
HT20	2	2462	-9.14	8.00

Note: Test result is bin-by-bin summing measured value of each TX port



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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.

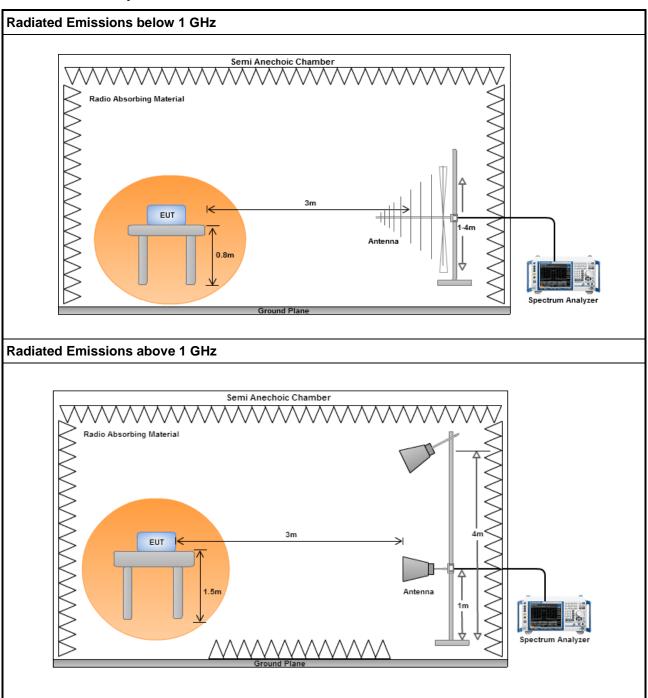
Note:

- 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.
- RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

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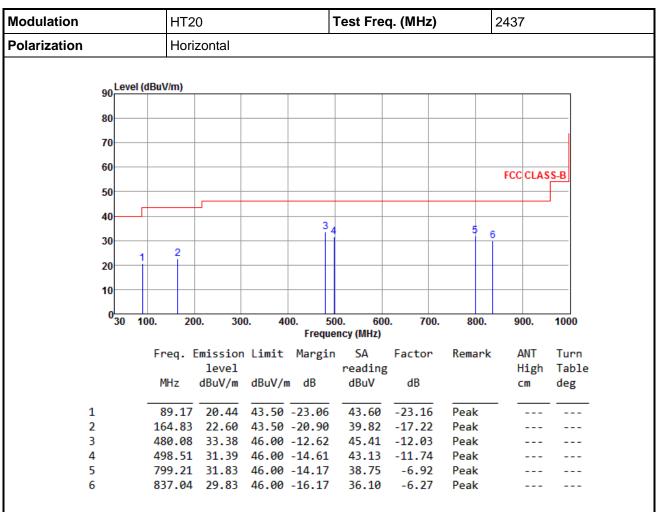
3.5.3 Test Setup



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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)

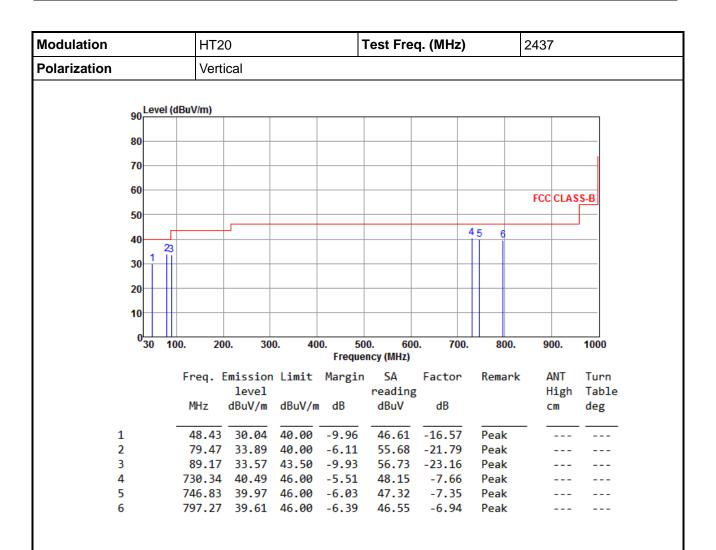
*Factor includes antenna factor, cable loss and amplifier gain

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

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

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*Factor includes antenna factor, cable loss and amplifier gain

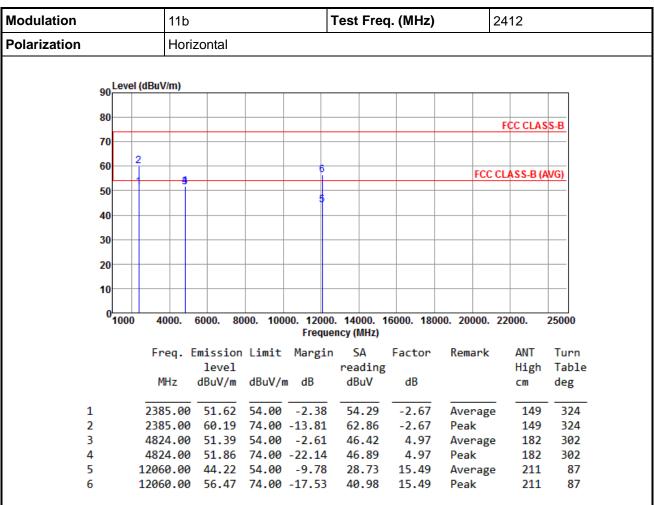
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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)

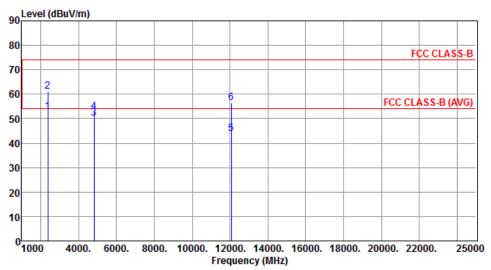
*Factor includes antenna factor, cable loss and amplifier gain

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

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



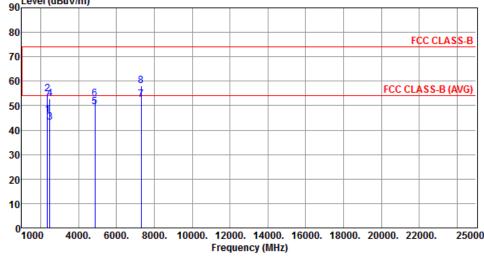
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2385.00	52.76	54.00	-1.24	55.43	-2.67	Average	214	273
2	2385.00	60.95	74.00	-13.05	63.62	-2.67	Peak	214	273
3	4824.00	50.22	54.00	-3.78	45.25	4.97	Average	134	25
4	4824.00	52.78	74.00	-21.22	47.81	4.97	Peak	134	25
5	12060.00	43.91	54.00	-10.09	28.42	15.49	Average	135	327
6	12060.00	56.57	74.00	-17.43	41.08	15.49	Peak	135	327

*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	Test Freq. (MHz)				2437		
Polarization	Horizo	ontal											
	00 Leve	el (dBu\	//m)			I		ı		I	I		
80										F	CC CLAS	S-B	
	70												



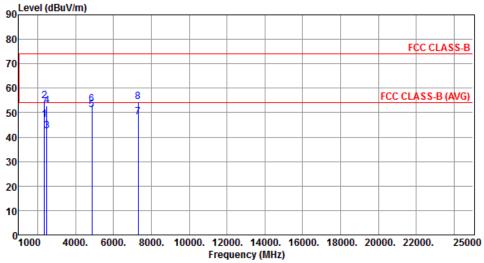
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Ū	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2355.00	46.15	54.00	-7.85	48.94	-2.79	Average	118	324
2	2355.00	54.63	74.00	-19.37	57.42	-2.79	Peak	118	324
3	2483.50	43.19	54.00	-10.81	45.53	-2.34	Average	118	324
4	2483.50	52.76	74.00	-21.24	55.10	-2.34	Peak	118	324
5	4874.00	49.54	54.00	-4.46	44.46	5.08	Average	131	308
6	4874.00	52.69	74.00	-21.31	47.61	5.08	Peak	131	308
7	7311.00	52.58	54.00	-1.42	42.47	10.11	Average	235	35
8	7311.00	58.08	74.00	-15.92	47.97	10.11	Peak	235	35

*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)	24	37	
Polarization		Vertical							
	Level (dBu	V/m)							



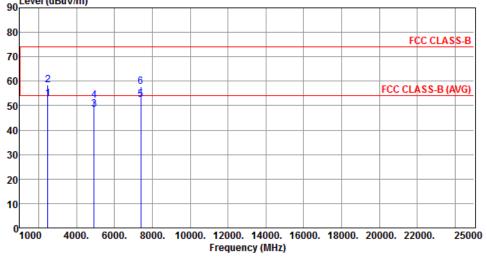
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Ū	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2355.00	47.01	54.00	-6.99	49.80	-2.79	Average	200	271
2	2355.00	54.96	74.00	-19.04	57.75	-2.79	Peak	200	271
3	2483.50	42.39	54.00	-11.61	44.73	-2.34	Average	200	271
4	2483.50	52.80	74.00	-21.20	55.14	-2.34	Peak	200	271
5	4874.00	51.26	54.00	-2.74	46.18	5.08	Average	100	118
6	4874.00	53.58	74.00	-20.42	48.50	5.08	Peak	100	118
7	7311.00	48.10	54.00	-5.90	37.99	10.11	Average	188	180
8	7311.00	54.61	74.00	-19.39	44.50	10.11	Peak	188	180

*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	Test Freq. (MHz)				2462		
Polarization			Horizo	ntal									
90 Level (dE			//m)										
80									F	CC CLAS	S-B		



	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2487.00	52.78	54.00	-1.22	55.11	-2.33	Average	110	325
2	2487.00	58.46	74.00	-15.54	60.79	-2.33	Peak	110	325
3	4924.00	48.55	54.00	-5.45	43.34	5.21	Average	105	310
4	4924.00	52.09	74.00	-21.91	46.88	5.21	Peak	105	310
5	7386.00	52.38	54.00	-1.62	42.07	10.31	Average	212	38
6	7386.00	57.82	74.00	-16.18	47.51	10.31	Peak	212	38

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

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2

3

4

5

6

2487.00

4924.00

4924.00

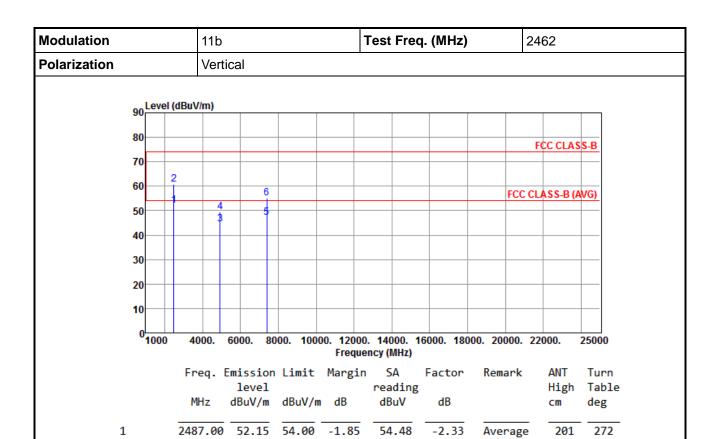
7386.00 47.03

60.69

44.51

49.45

7386.00 55.27 74.00 -18.73



74.00 -13.31

54.00 -9.49

74.00 -24.55

54.00 -6.97

63.02

39.30

44.24

36.72

44.96

Peak

Peak

Peak

Average

Average

201

222

222

190

190

272

47

47

186

186

-2.33

5.21

5.21

10.31

10.31

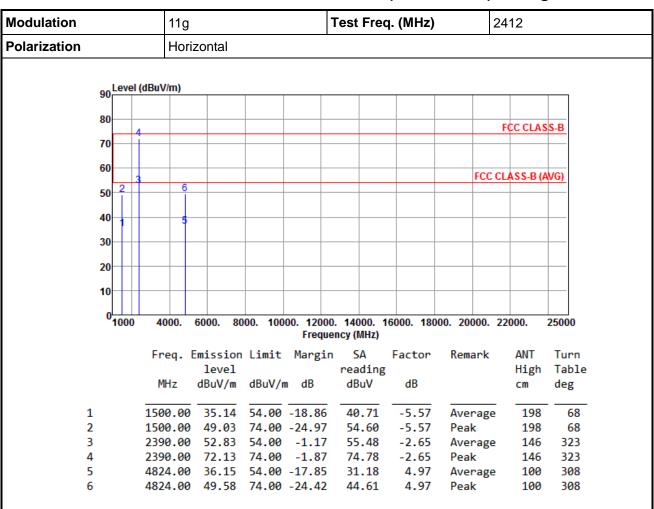
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB) *Factor includes antenna factor, cable loss and amplifier gain

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

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



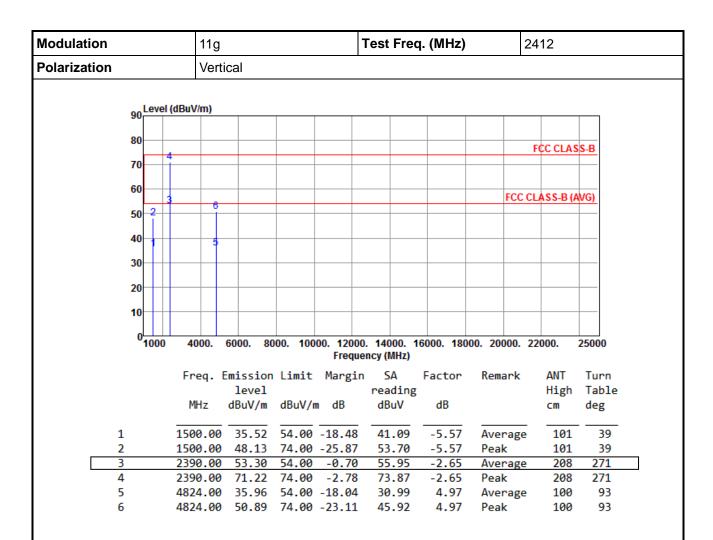
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

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

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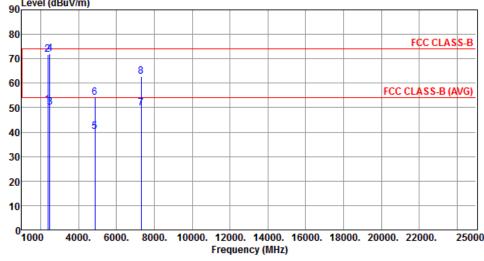
*Factor includes antenna factor, cable loss and amplifier gain

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

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Modulation Polarization			11g				Test	Test Freq. (MHz)				2437		
			Horizontal											
00	(dBuV/n	m)												
80														
	1						1				1			



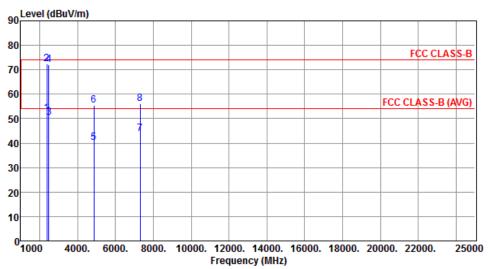
		Emission level		J	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2390.00	51.20	54.00	-2.80	53.85	-2.65	Average	186	298
2	2390.00	71.84	74.00	-2.16	74.49	-2.65	Peak	186	298
3	2483.50	50.18	54.00	-3.82	52.52	-2.34	Average	186	298
4	2483.50	71.96	74.00	-2.04	74.30	-2.34	Peak	186	298
5	4874.00	40.23	54.00	-13.77	35.15	5.08	Average	104	315
6	4874.00	54.03	74.00	-19.97	48.95	5.08	Peak	104	315
7	7311.00	49.68	54.00	-4.32	39.57	10.11	Average	213	13
8	7311.00	62.89	74.00	-11.11	52.78	10.11	Peak	213	13

*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		



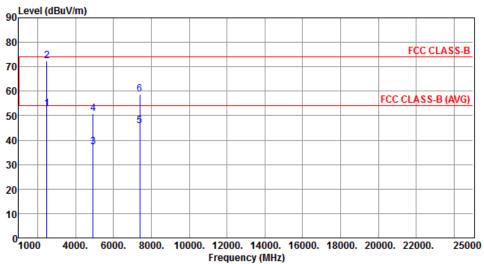
	·	Emission level		Ü	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		CM	deg
1	2390.00	52.19	54.00	-1.81	54.84	-2.65	Average	224	275
2	2390.00	72.26	74.00	-1.74	74.91	-2.65	Peak	224	275
3	2483.50	50.33	54.00	-3.67	52.67	-2.34	Average	200	273
4	2483.50	72.14	74.00	-1.86	74.48	-2.34	Peak	200	273
5	4874.00	40.29	54.00	-13.71	35.21	5.08	Average	100	87
6	4874.00	55.36	74.00	-18.64	50.28	5.08	Peak	100	87
7	7311.00	43.79	54.00	-10.21	33.68	10.11	Average	195	334
8	7311.00	56.12	74.00	-17.88	46.01	10.11	Peak	195	334

*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						
Lovel (dDvV/m)							



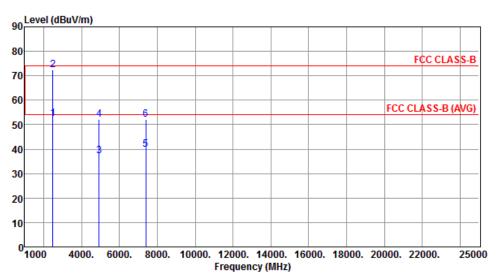
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2483.50	52.96	54.00	-1.04	55.30	-2.34	Average	182	295
2	2483.50	72.32	74.00	-1.68	74.66	-2.34	Peak	182	295
3	4924.00	37.12	54.00	-16.88	31.91	5.21	Average	106	319
4	4924.00	50.73	74.00	-23.27	45.52	5.21	Peak	106	319
5	7386.00	45.68	54.00	-8.32	35.37	10.31	Average	210	36
6	7386.00	58.94	74.00	-15.06	48.63	10.31	Peak	210	36

*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 11	l1g	Test Freq. (MHz)	2462
Polarization Vo	/ertical		



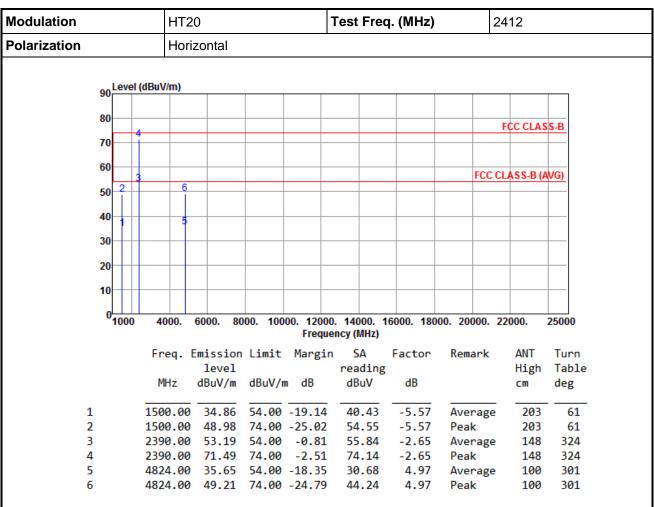
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2483.50	52.48	54.00	-1.52	54.82	-2.34	Average	252	251
2	2483.50	72.42	74.00	-1.58	74.76	-2.34	Peak	252	251
3	4924.00	37.11	54.00	-16.89	31.90	5.21	Average	102	93
4	4924.00	52.28	74.00	-21.72	47.07	5.21	Peak	102	93
5	7386.00	39.89	54.00	-14.11	29.58	10.31	Average	188	321
6	7386.00	52.15	74.00	-21.85	41.84	10.31	Peak	188	321

*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)

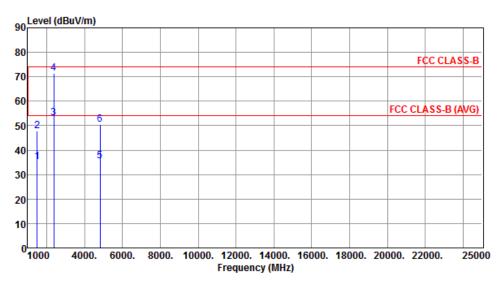
*Factor includes antenna factor, cable loss and amplifier gain

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

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Modulation	HT20	Test Freq. (MHz)	2412
Polarization	Vertical		



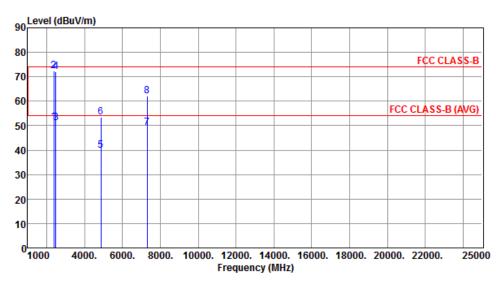
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	1500.00	35.11	54.00	-18.89	40.68	-5.57	Average	100	31
2	1500.00	47.76	74.00	-26.24	53.33	-5.57	Peak	100	31
3	2390.00	53.27	54.00	-0.73	55.92	-2.65	Average	267	250
4	2390.00	71.57	74.00	-2.43	74.22	-2.65	Peak	267	250
5	4824.00	35.58	54.00	-18.42	30.61	4.97	Average	100	85
6	4824.00	50.54	74.00	-23.46	45.57	4.97	Peak	100	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	HT20	Test Freq. (MHz)	2437
Polarization	Horizontal		



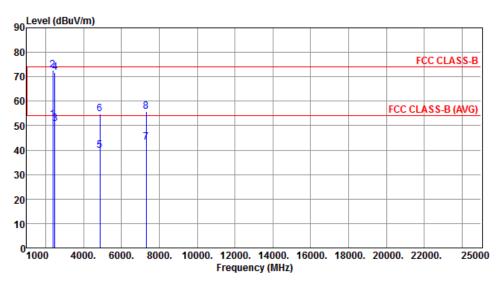
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2390.00	51.57	54.00	-2.43	54.22	-2.65	Average	181	296
2	2390.00	72.28	74.00	-1.72	74.93	-2.65	Peak	181	296
3	2483.50	51.04	54.00	-2.96	53.38	-2.34	Average	181	296
4	2483.50	72.17	74.00	-1.83	74.51	-2.34	Peak	181	296
5	4874.00	39.83	54.00	-14.17	34.75	5.08	Average	100	308
6	4874.00	53.45	74.00	-20.55	48.37	5.08	Peak	100	308
7	7311.00	49.03	54.00	-4.97	38.92	10.11	Average	217	20
8	7311.00	62.17	74.00	-11.83	52.06	10.11	Peak	217	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	HT20	Test Freq. (MHz)	2437
Polarization	Vertical		



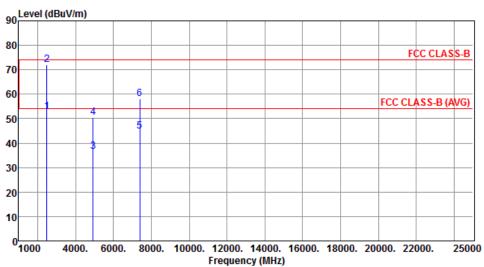
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2390.00	52.64	54.00	-1.36	55.29	-2.65	Average	286	253
2	2390.00	72.59	74.00	-1.41	75.24	-2.65	Peak	286	253
3	2483.50	50.71	54.00	-3.29	53.05	-2.34	Average	286	253
4	2483.50	71.59	74.00	-2.41	73.93	-2.34	Peak	286	253
5	4874.00	39.96	54.00	-14.04	34.88	5.08	Average	100	80
6	4874.00	54.87	74.00	-19.13	49.79	5.08	Peak	100	80
7	7311.00	43.31	54.00	-10.69	33.20	10.11	Average	196	337
8	7311.00	55.95	74.00	-18.05	45.84	10.11	Peak	196	337

*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	HT20	Test Freq. (MHz)	2462
Polarization	Horizontal		



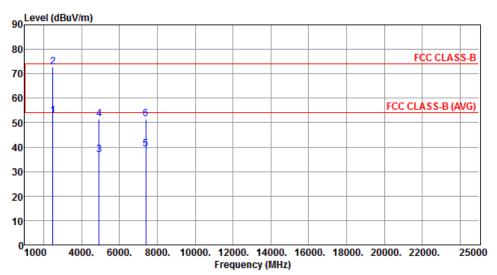
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2483.50	52.90	54.00	-1.10	55.24	-2.34	Average	188	297
2	2483.50	72.18	74.00	-1.82	74.52	-2.34	Peak	188	297
3	4924.00	36.68	54.00	-17.32	31.47	5.21	Average	102	311
4	4924.00	50.37	74.00	-23.63	45.16	5.21	Peak	102	311
5	7386.00	44.97	54.00	-9.03	34.66	10.31	Average	213	27
6	7386.00	58.02	74.00	-15.98	47.71	10.31	Peak	213	27

*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	HT20	Test Freq. (MHz)	2462
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	2483.50	52.82	54.00	-1.18	55.16	-2.34	Average	227	261
2	2483.50	72.68	74.00	-1.32	75.02	-2.34	Peak	227	261
3	4924.00	36.78	54.00	-17.22	31.57	5.21	Average	100	85
4	4924.00	51.63	74.00	-22.37	46.42	5.21	Peak	100	85
5	7386.00	39.15	54.00	-14.85	28.84	10.31	Average	192	329
6	7386.00	51.64	74.00	-22.36	41.33	10.31	Peak	192	329

*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 20 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

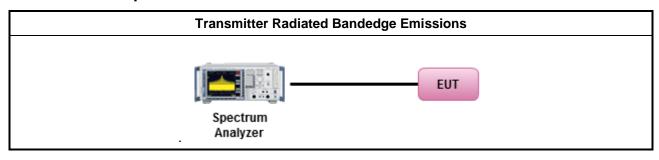
Reference level measurement

- 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

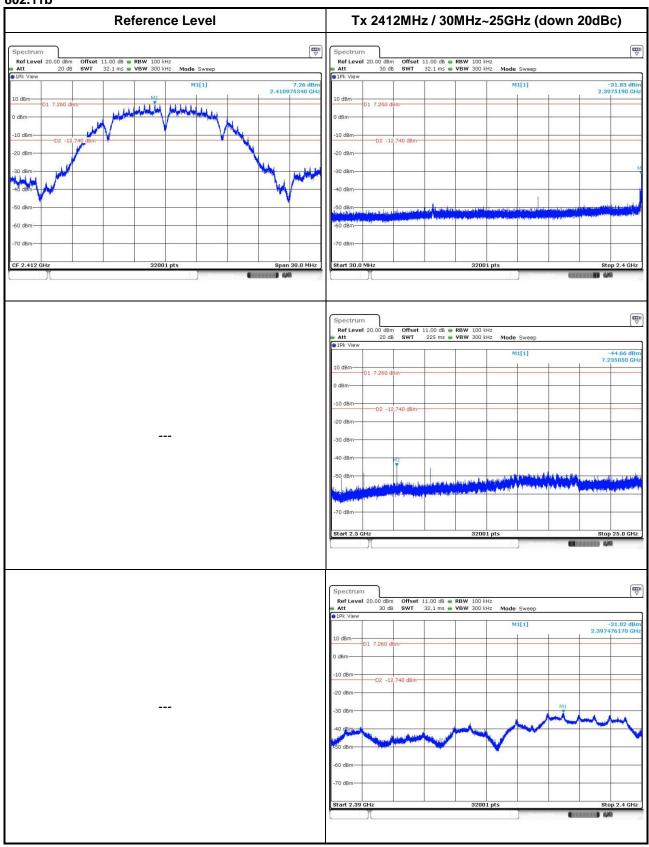


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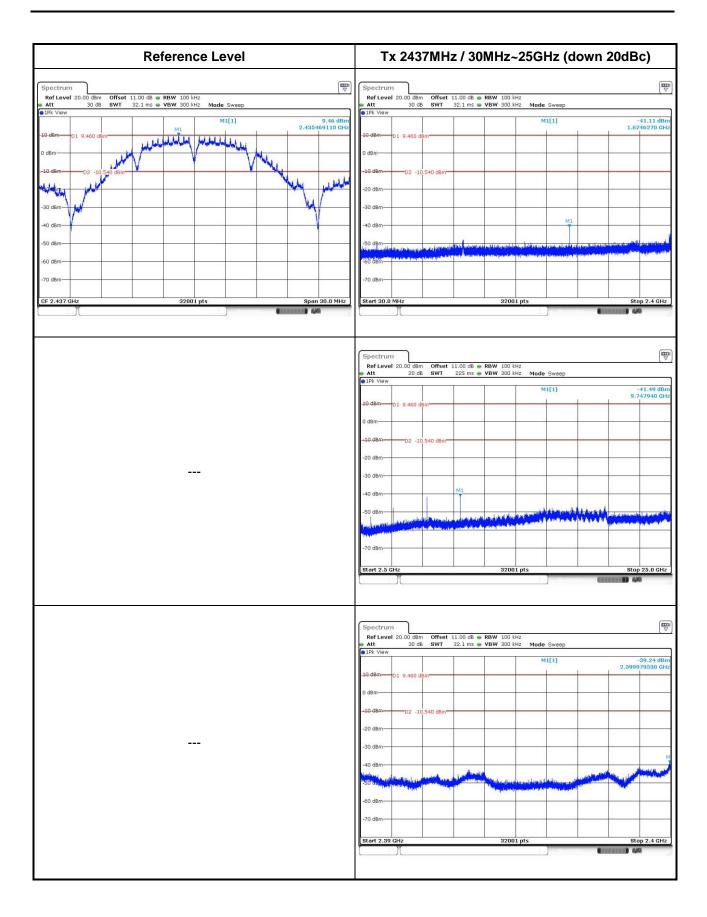
3.6.5 Unwanted Emissions into Non-Restricted Frequency Bands

802.11b



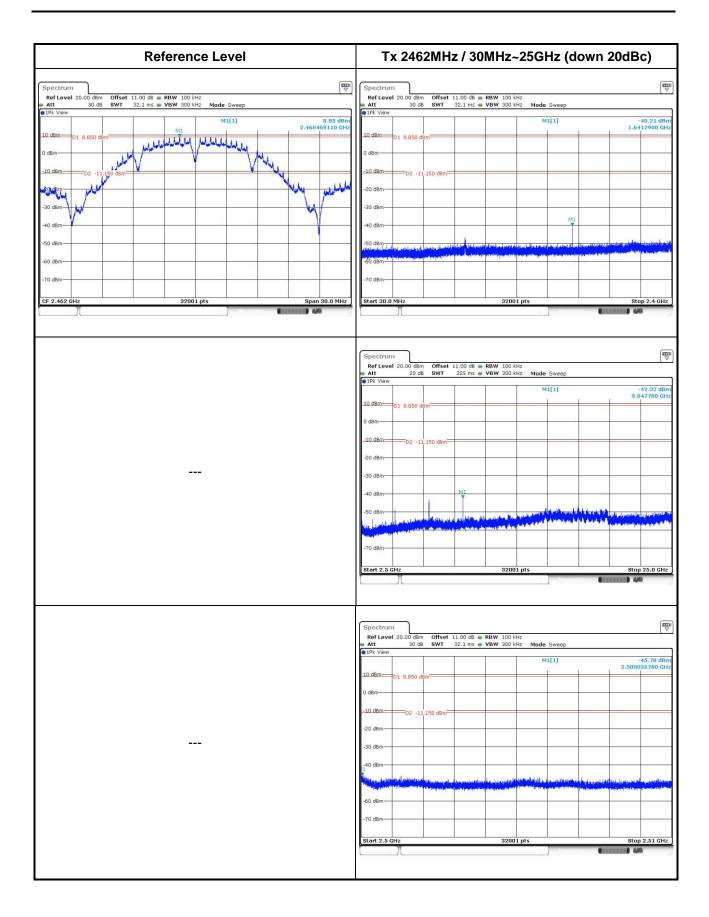
Report No.: FR580301AC Report Version: Rev. 01





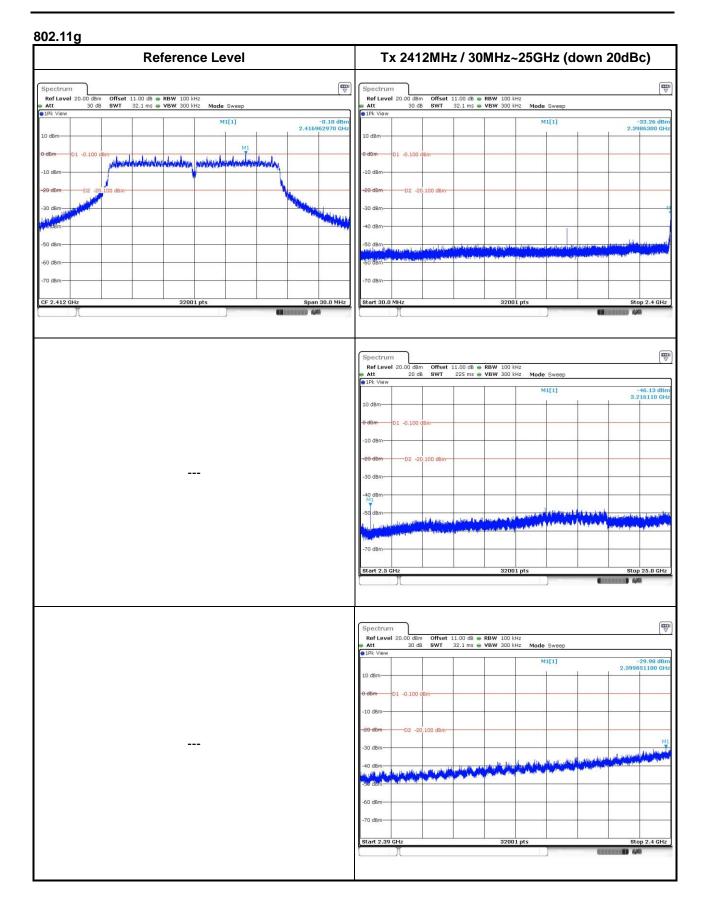
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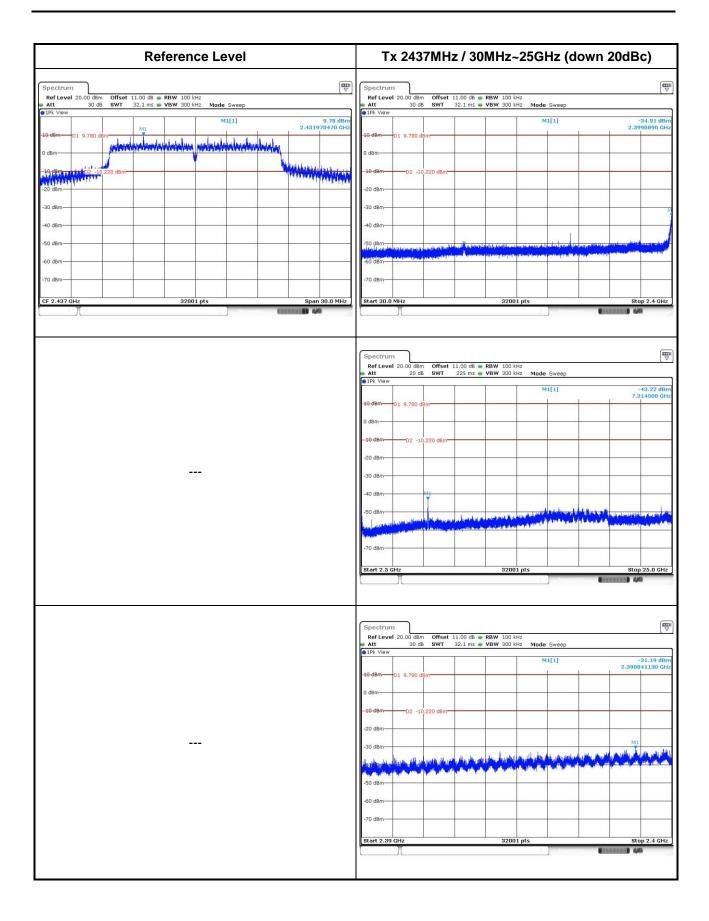
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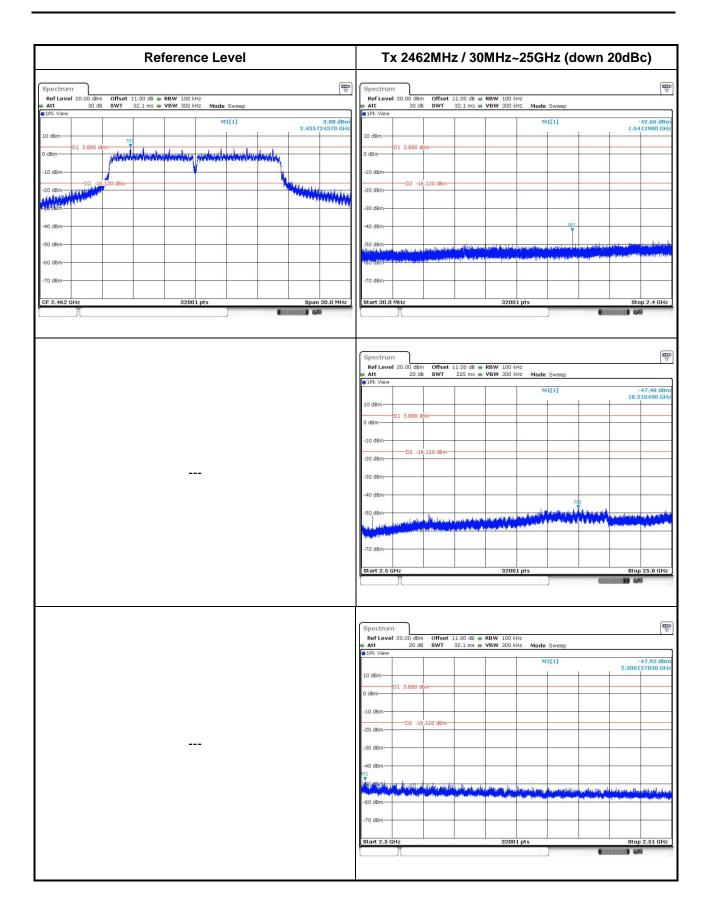
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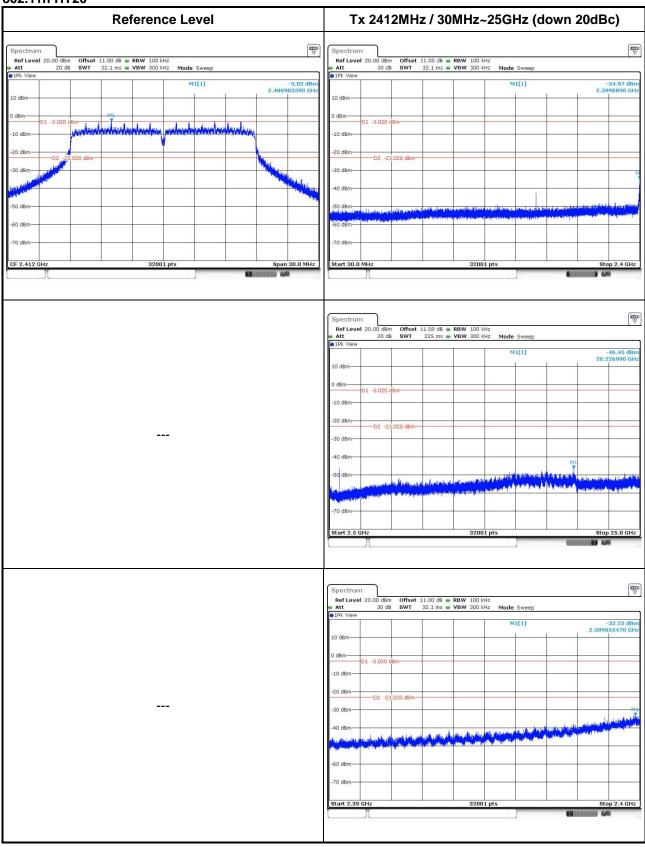




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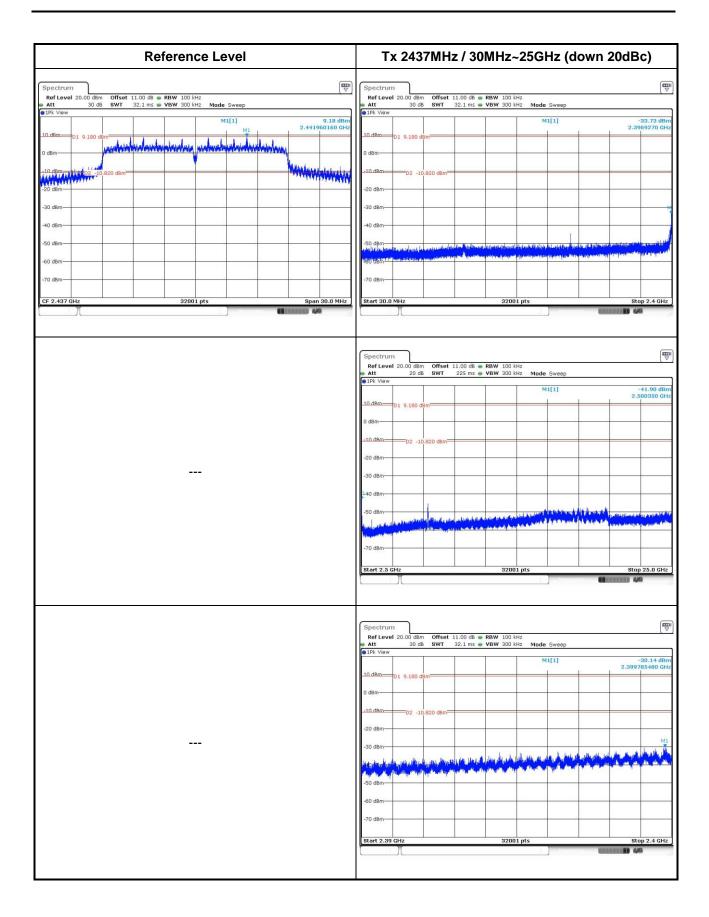


802.11n HT20



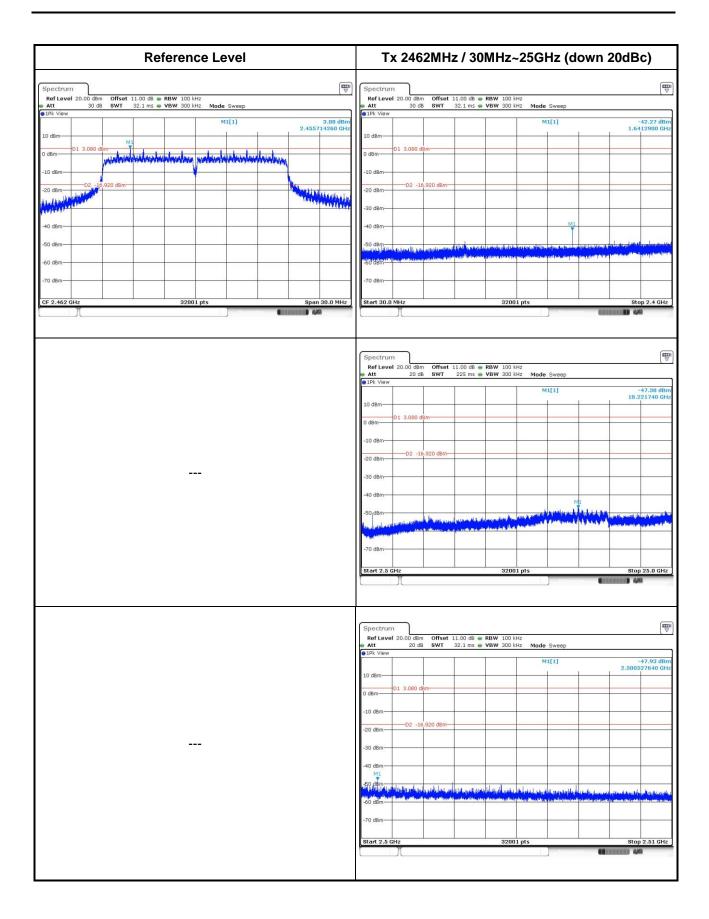
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4 Test laboratory information

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

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 Hsiang, Tao Yuan Hsien 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 Hsiang, Tao Yuan Hsien 333, Taiwan, R.O.C.

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

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