

FCC Test Report

FCC ID : YHI-EWF3210K

Equipment : Industrial IEEE 802.11a/b/g/n AP module

Model No. : EWF3210K

Brand Name : NEXCOM

Applicant : NEXCOM International Co., LTD.

Address : 9F, No. 920, Chung-Cheng Rd., Zhonghe Dist.,

New Taipei City, Taiwan 23586

Standard : 47 CFR FCC Part 15.247

Received Date : Nov. 08, 2014

Tested Date : Dec. 11, 2014 ~ Jan. 12, 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



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Release Record

Report No.	Version	Description	Issued Date
FR4N0801AC	Rev. 01	Initial issue	Feb. 10, 2015
FR4N0801AC	Rev. 02	Modified model name	Apr. 21, 2015

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Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.604MHz 34.71 (Margin -11.29dB) - AV	Pass
15.247(d)	Radiated Emissions	[dBuV/m at 3m]: 2483.50MHz	Pass
15.209	INdulated Liffissions	53.00 (Margin -1.00dB) - AV	rass
15.247(b)(3)	Maximum Output Power	Max Power [dBm]: 29.86	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]	1 NOTE 4	1-11 Mbps		
2400-2483.5	g	2412-2462	1-11 [11]	1 NOTE 4	6-54 Mbps		
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	1 NOTE 4	MCS 0-7		
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	2	MCS 8-15		
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	1 NOTE 4	MCS 0-7		
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	2	MCS 8-15		

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

Note 4: 802.11b/g/n supports diversity function.

Note 5: The conducted power of single chain is same for 1TX and 2TX operating mode.

1.1.2 Antenna Details

Ant. No.				Operating Frequencies (MHz) / Antenna Gain (dBi)		
	Model	Туре	Connector	2400~2483.5	5150~5250	5725~5850
1	UEN-203-RSMA	Dipole	R-SMA	5.7	4.35	5.06

1.1.3 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	12Vdc from adapter
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1.1.4 Accessories

No.	Equipment	Description

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1.1.5 Channel List

Frequenc	y 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-GUI, Version: 2.3					
	Mode	Duty cycle (%)	Duty factor (dB)			
	11b 100.00%		0.00			
Duty Cycle and Duty Factor	11g	98.03%	0.09			
	HT20	93.89%	0.27			
	HT40	90.81%	0.42			

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1.1.7 Power Setting

Modulation Mode	Test Frequency (MHz)	Power Set
11b	2412	22.5
11b	2437	23
11b	2462	21
11g	2412	19
11g	2437	23
11g	2462	19.5
HT20	2412	14.5
HT20	2437	17
HT20	2462	15.5
HT40	2422	10
HT40	2437	15.5
HT40	2452	10.5

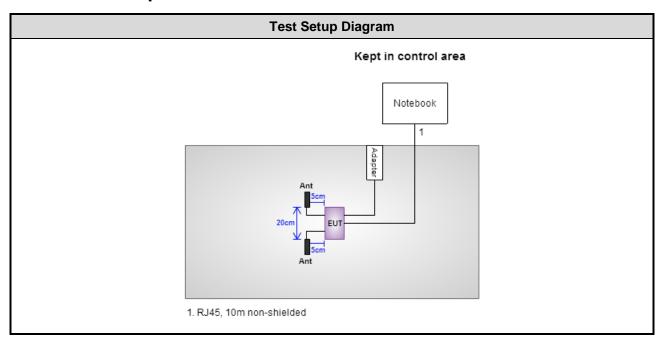
1.2 Local Support Equipment List

	Support Equipment List									
No.	Equipment	Brand	Model	FCC ID	Remark					
1	Notebook	DELL	Latitude E6430	DoC	RJ45, 10m non-shielded w/o core.					
2	Adapter	OEM	ADS0271-W 120200	DoC	Power Rating: I/P: 100-240Vac, 50-60Hz, 0.6A O/P: 12Vdc, 2.0A Power Line: 1.5m non-shielded cable w/o core					

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1.3 Test Setup Chart



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1.4 The Equipment List

Test Item	Conducted Emission							
Test Site	Conduction room 1 / (CO01-WS)							
Test date	Dec. 26, 2014							
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. 16, 2015			
LISN (Support Unit)	SCHWARZBECK	Schwarzbeck 8127	8127-666	Nov. 26, 2014	Nov. 25, 2015			
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Apr. 23, 2014	Apr. 22, 2015			
50 ohm terminal (Support Unit)	NA	50	04	Apr. 18, 2014	Apr. 17, 2015			
Measurement Software	AUDIX	e3	6.120210k	NA	NA			
Note: Calibration Inte	Note: Calibration Interval of instruments listed above is one year.							

Test Item	Radiated Emission								
Test Site	966 chamber 2 / (03CH02-WS)								
Test date	Dec. 11 ~ 12, 2014								
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until				
Spectrum Analyzer	R&S	FSV40	101499	Feb. 08, 2014	Feb. 07, 2015				
Receiver	R&S	ESR3	101657	Jan. 18, 2014	Jan. 17, 2015				
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	100330	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				
Preamplifier	EMC	EMC184045B	980192	Aug. 26, 2014	Aug. 25, 2015				
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16140/4	Dec. 17, 2013	Dec. 16, 2014				
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16018/4	Dec. 17, 2013	Dec. 16, 2014				
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16015/4	Dec. 17, 2013	Dec. 16, 2014				
LF cable 3M	Woken	CFD400NL-LW	CFD400NL-003	Dec. 17, 2013	Dec. 16, 2014				
LF cable 10M	Woken	CFD400NL-LW	CFD400NL-004	Dec. 17, 2013	Dec. 16, 2014				
Measurement Software	AUDIX	e3	6.120210g	NA	NA				
Note: Calibration Inter	rval of instruments listed	d above is one year.							

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Test Item	RF Conducted								
Test Site	(TH01-WS)	(TH01-WS)							
Test date	Jan. 12, 2015								
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until				
Spectrum Analyzer	R&S	FSV40	101063	Feb. 17, 2014	Feb. 16, 2015				
Power Meter	Anritsu	ML2495A	1241002	Sep. 29, 2014	Sep. 28, 2015				
Power Sensor	Anritsu	MA2411B	1207366	Sep. 29, 2014	Sep. 28, 2015				
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA				
Note: Calibration Inter	rval of instruments liste	d 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

FCC KDB 558074 D01 DTS Meas Guidance v03r02

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	18°C / 70%	Peter Lin
Radiated Emissions	03CH02-WS	18-23°C / 61-65%	Haru Yang
RF Conducted	TH01-WS	22°C / 64%	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 (Mbps) / MCS	Test Configuration
Conducted Emissions	HT20	2437	6 Mbps	
Radiated Emissions ≤1GHz	HT20	2437	6 Mbps	
Radiated Emissions >1GHz	11b	2412 / 2437 / 2462	1 Mbps	
Maximum Output Power	11g	2412 / 2437 / 2462	6 Mbps	
6dB bandwidth	HT20	2412 / 2437 / 2462	MCS 8	
Power spectral density	HT40	2422 / 2437 / 2452	MCS 8	

NOTE:

- 1. The device supports TX antenna diversity function. After pretest for radiated emission of antenna 1 and 2, antenna 2 was the worst configuration thus antenna 2 is selected to perform final test for 802.11b/g mode.
- 2. For 802.11n

The conducted power of single chain is same for 1TX and 2TX operating mode. Therefore, Ant1+Ant2 configuration is chosen for final testing.

3. 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.

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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



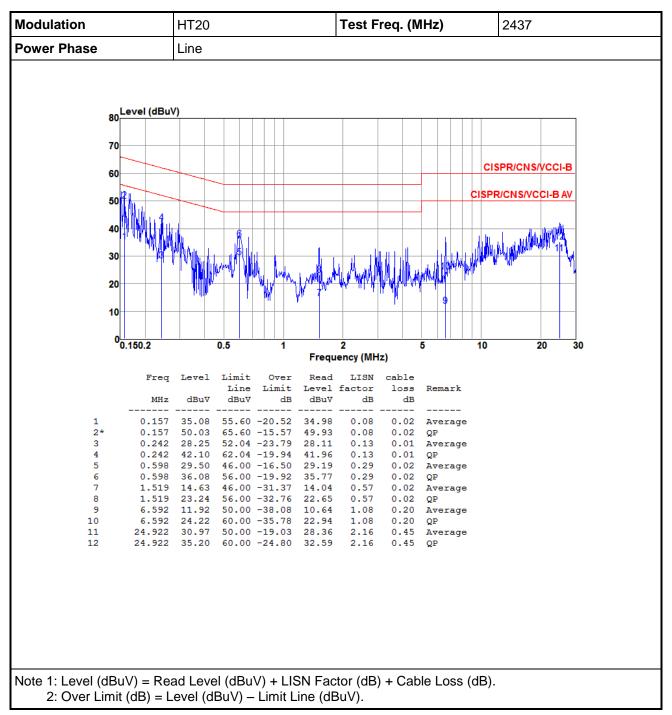
Note: 1. Support units were connected to second LISN.

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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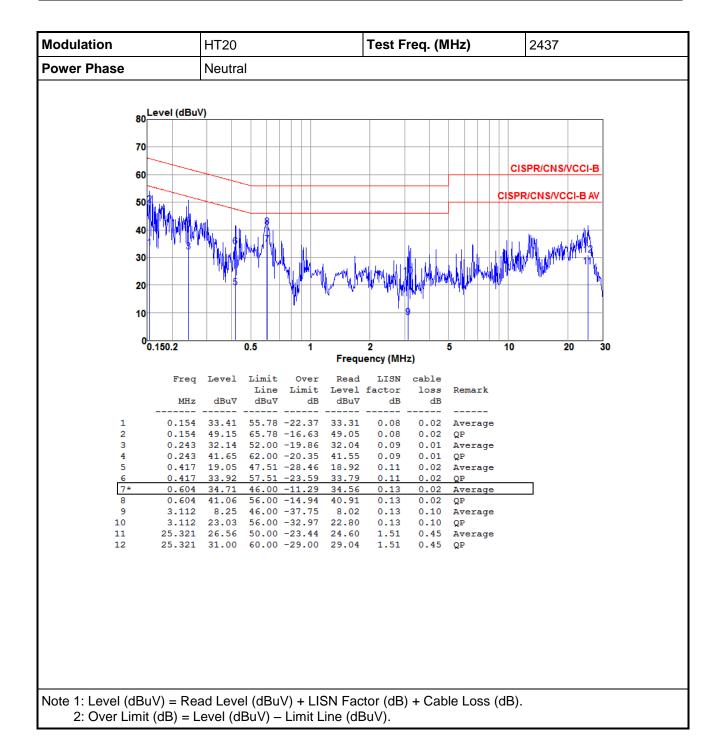


3.1.4 Test Result of Conducted Emissions



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3.2 6dB and Occupied Bandwidth

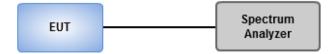
3.2.1 Limit of 6dB Bandwidth

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

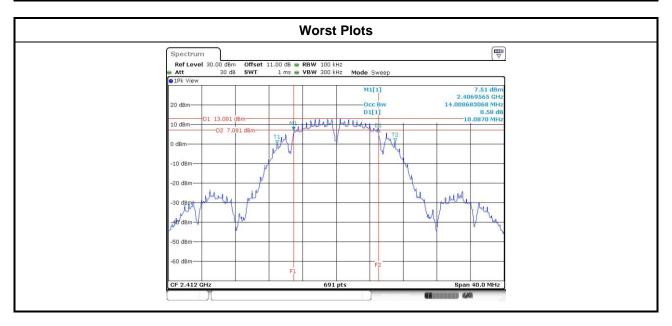


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3.2.4 Test Result of 6dB and Occupied Bandwidth

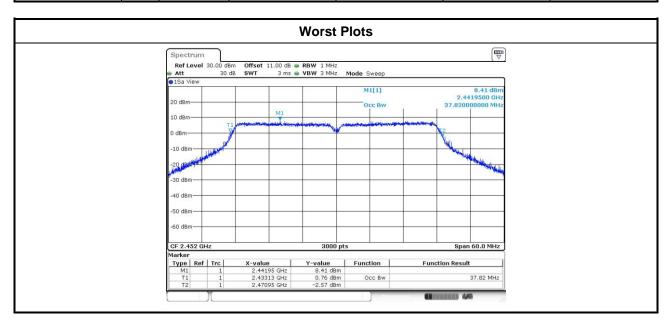
Modulation	NI	6dB Bandwidth				dth (MHz)		
Mode	N _{TX}	Freq. (MHz)	Chain 0	Chain 1	Chain 2	Chain 3	Limit (kHz)	
11b	1	2412		10.09			500	
11b	1	2437		10.09			500	
11b	1	2462		10.09			500	
11g	1	2412		16.35			500	
11g	1	2437		16.35			500	
11g	1	2462		16.35			500	
HT20	2	2412	17.80	17.62			500	
HT20	2	2437	17.80	17.68			500	
HT20	2	2462	17.80	17.62			500	
HT40	2	2422	36.41	36.41			500	
HT40	2	2437	36.41	36.41			500	
HT40	2	2452	36.41	36.29			500	



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Modulation	N.	Freq.	99% Occupied Bandwidth (MHz)				
Mode	N _{TX}	(MHz)	Chain 0	Chain 1	Chain 2	Chain 3	
11b	1	2412		14.00			
11b	1	2437		14.00			
11b	1	2462		13.98			
11g	1	2412		17.00			
11g	1	2437		17.06			
11g	1	2462		17.02			
HT20	2	2412	18.00	17.94			
HT20	2	2437	17.98	17.96			
HT20	2	2462	17.98	17.94			
HT40	2	2422	37.76	37.56			
HT40	2	2437	37.74	37.52			
HT40	2	2452	37.82	37.44			



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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.

Antenna 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	Peak conducted output power (dBm)		ower	Total Power	Total Power	Limit
Wode		(IVITIZ)	Chain 0	Chain 1	Chain 2	Chain 3	(mW)	(dBm)	(dBm)
11b	1	2412		24.08			255.859	24.08	30.00
11b	1	2437		24.87			306.902	24.87	30.00
11b	1	2462		22.94			196.789	22.94	30.00
11g	1	2412		27.13			516.416	27.13	30.00
11g	1	2437		29.85			966.051	29.85	30.00
11g	1	2462		27.35			543.250	27.35	30.00
HT20	2	2412	24.48	23.87			524.324	27.20	30.00
HT20	2	2437	26.91	26.78			967.339	29.86	30.00
HT20	2	2462	25.41	24.93			658.708	28.19	30.00
HT40	2	2422	20.32	19.81			203.366	23.08	30.00
HT40	2	2437	24.97	24.45			592.663	27.73	30.00
HT40	2	2452	20.26	19.97			205.481	23.13	30.00

Modulation Mode	N _{TX}	Freq.	Conduc	Conducted (average) output power (dBm)			Total Power	Total Power	Limit
Wiode		(MHz)	Chain 0	Chain 1	Chain 2	Chain 3	(mW)	(dBm)	(dBm)
11b	1	2412		21.86			153.462	21.86	NA
11b	1	2437		22.58			181.134	22.58	NA
11b	1	2462		20.71			117.761	20.71	NA
11g	1	2412		19.01			79.616	19.01	NA
11g	1	2437		22.68			185.353	22.68	NA
11g	1	2462		19.23			83.753	19.23	NA
HT20	2	2412	15.56	15.08			68.186	18.34	NA
HT20	2	2437	18.03	17.79			123.650	20.92	NA
HT20	2	2462	16.69	16.25			88.836	19.49	NA
HT40	2	2422	11.54	11.07			27.050	14.32	NA
HT40	2	2437	16.83	16.57			93.589	19.71	NA
HT40	2	2452	12.08	11.91			31.667	15.01	NA

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.
 - 1. 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



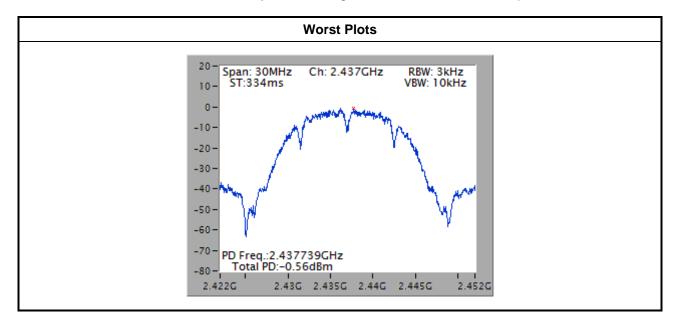
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3.4.4 Test Result of Power Spectral Density

Modulation Mode	N _{TX}	Freq. (MHz)	Total Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
11b	1	2412	-1.59	8.00
11b	1	2437	-0.56	8.00
11b	1	2462	-2.97	8.00
11g	1	2412	-5.35	8.00
11g	1	2437	-1.18	8.00
11g	1	2462	-5.40	8.00
HT20	2	2412	-7.76	8.00
HT20	2	2437	-5.99	8.00
HT20	2	2462	-6.33	8.00
HT40	2	2422	-13.72	8.00
HT40	2	2437	-9.14	8.00
HT40	2	2452	-14.29	8.00

Note: Test result for HT20 / HT40 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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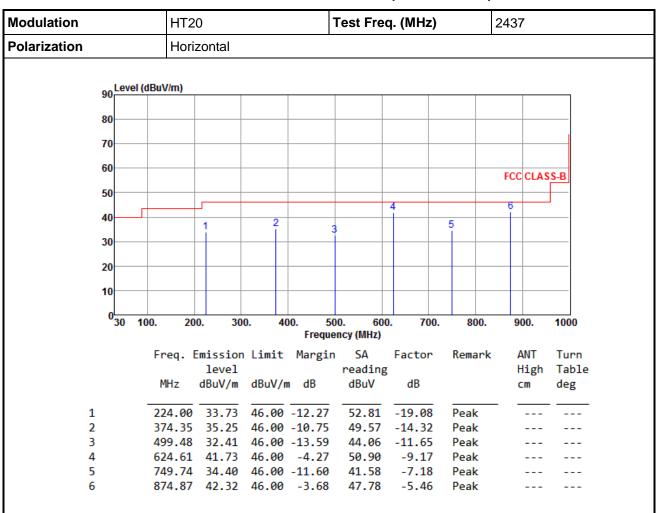
3.5.3 Test Setup



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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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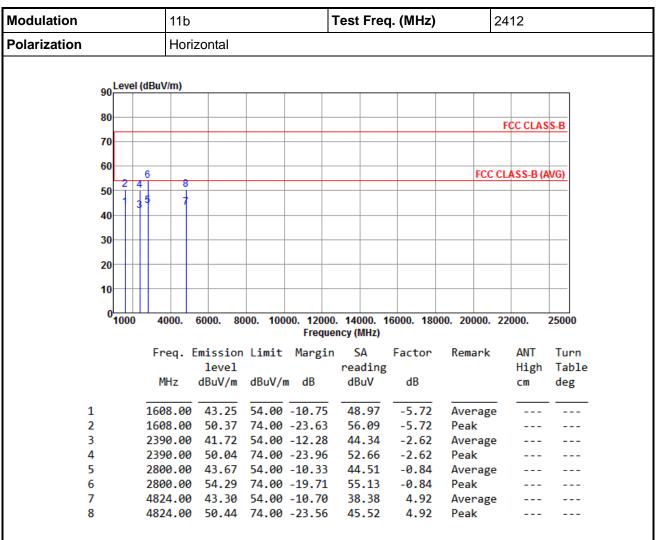
Modulation	HT20	-	Гest Freq	2437				
Polarization	Vertical							
90 Level (dE	suV/m)							
80								
00								
70								
60								
50						FCC CLAS	S-B	
50				4		_		
40	2	3			5	6		
30								
20								
10								
0 <mark></mark> 30 100	200 2	00. 400. 50	0. 600.	700	000	000	4000	
30 100	. 200. 3		ncy (MHz)	. 700.	800.	900.	1000	
	Freq. Emissio	n Limit Margin	SA	Factor	Remark	ANT	Turn	
	level		reading			High	Table	
	MHz dBuV/m	dBuV/m dB	dBuV	dB		cm	deg	
1	47.09 31.70	40.00 -8.30	48.40	-16.70	QP			
	224.00 32.64		51.72	-19.08	Peak			
	374.35 34.19		48.51	-14.32	Peak			
	624.61 41.98		51.15	-9.17	Peak			
		46.00 -10.90 46.00 -7.15	41.52 44.31	-6.42 -5.46	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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3.5.5 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11b



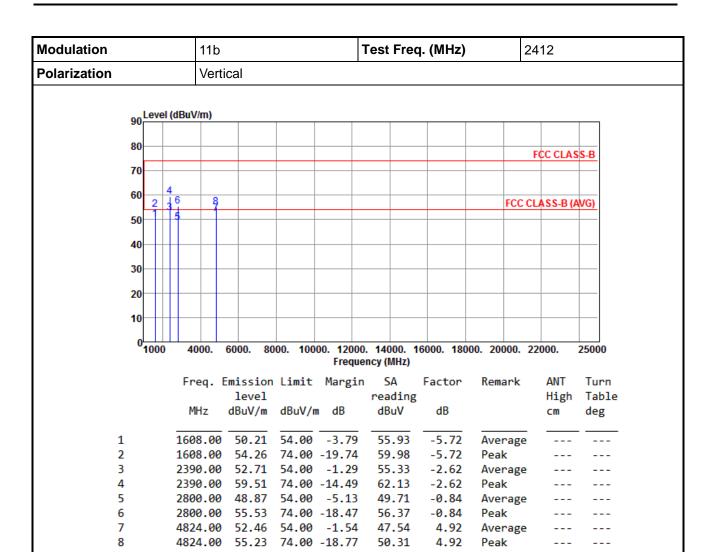
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

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

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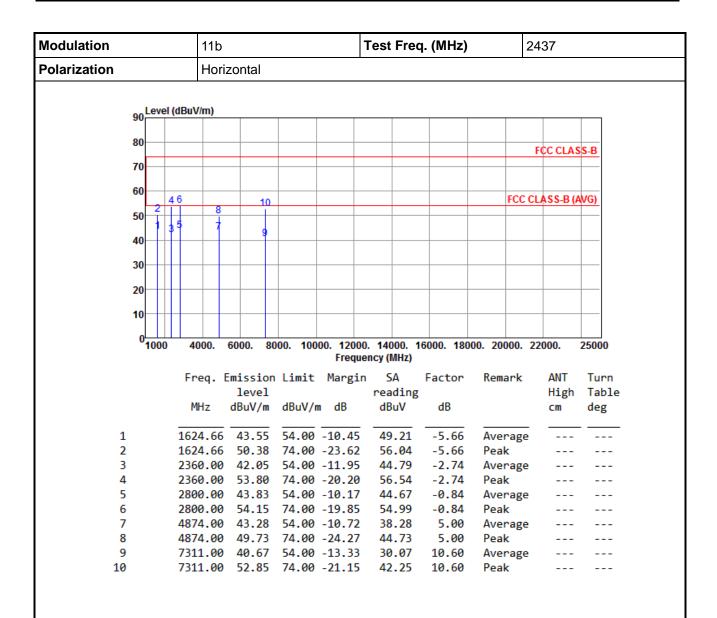


*Factor includes antenna factor, cable loss and amplifier gain

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

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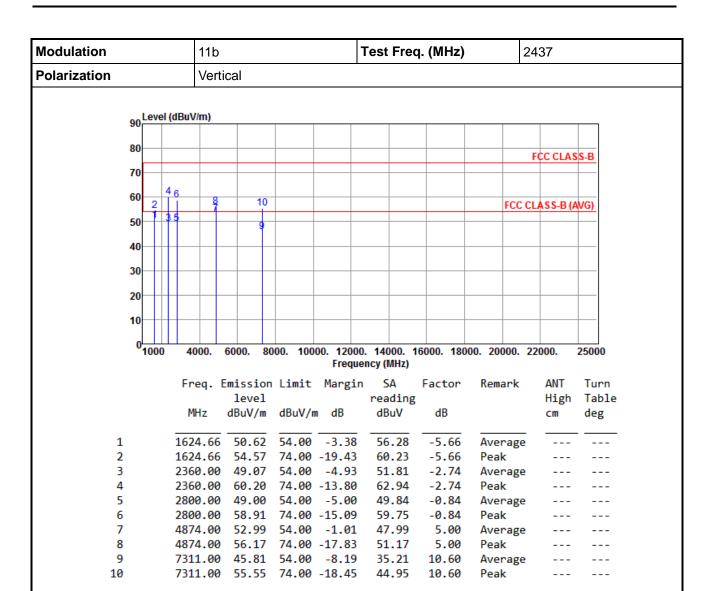


*Factor includes antenna factor, cable loss and amplifier gain

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

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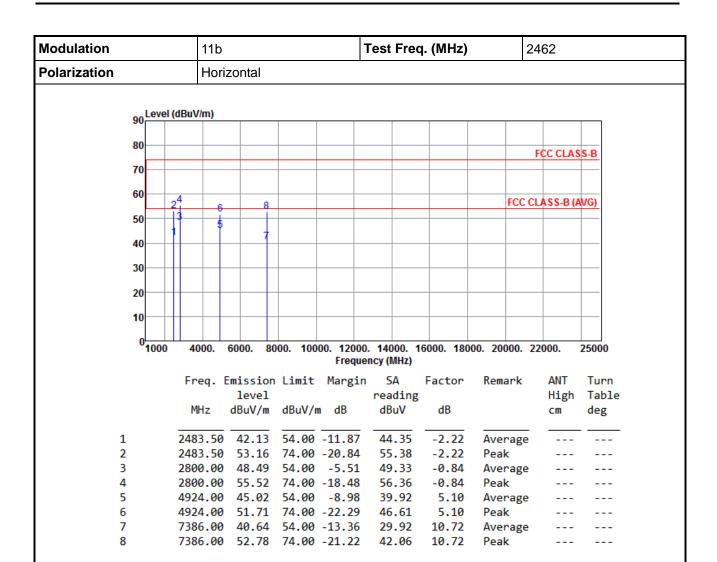


*Factor includes antenna factor, cable loss and amplifier gain

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

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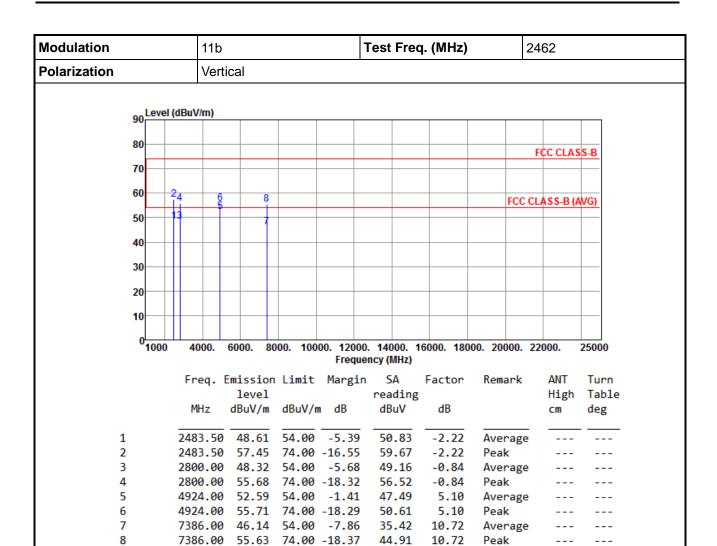


*Factor includes antenna factor, cable loss and amplifier gain

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

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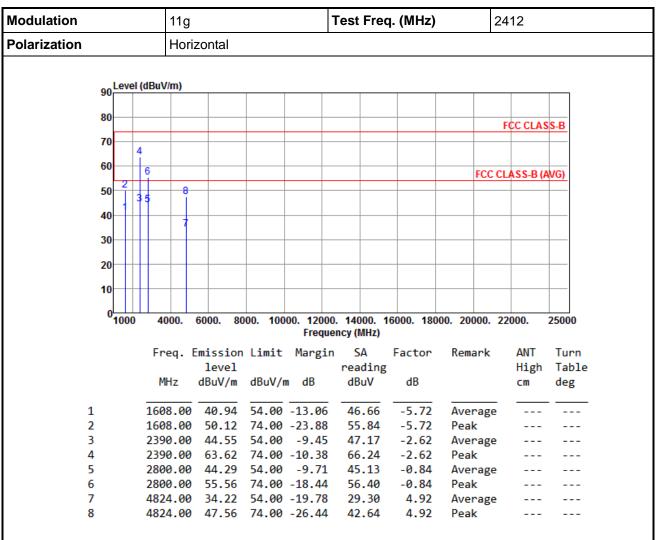
*Factor includes antenna factor, cable loss and amplifier gain

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)

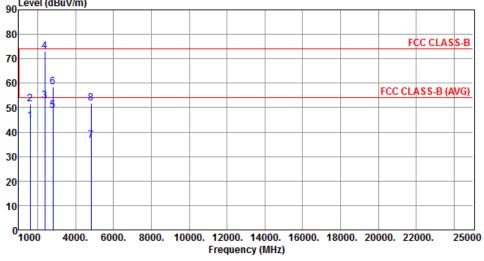
*Factor includes antenna factor, cable loss and amplifier gain

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

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Modulation	11g				Test	Test Freq. (MHz)				2412		
Polarization	Vertical											
000	V/m)											
90	Level (dBu											
80												

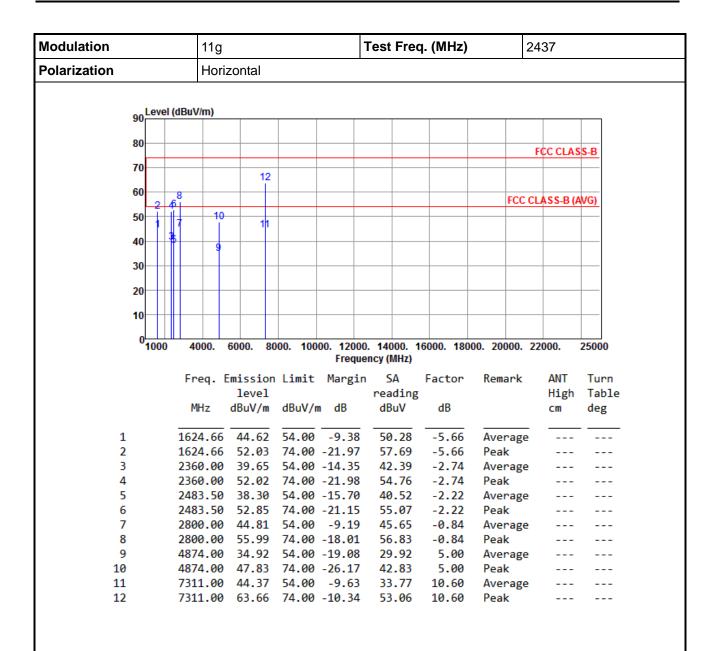


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Ū	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1608.00	44.47	54.00	-9.53	50.19	-5.72	Average		
2	1608.00	51.39	74.00	-22.61	57.11	-5.72	Peak		
3	2390.00	52.93	54.00	-1.07	55.55	-2.62	Average		
4	2390.00	72.90	74.00	-1.10	75.52	-2.62	Peak		
5	2800.00	48.98	54.00	-5.02	49.82	-0.84	Average		
6	2800.00	58.29	74.00	-15.71	59.13	-0.84	Peak		
7	4824.00	36.48	54.00	-17.52	31.56	4.92	Average		
8	4824.00	51.96	74.00	-22.04	47.04	4.92	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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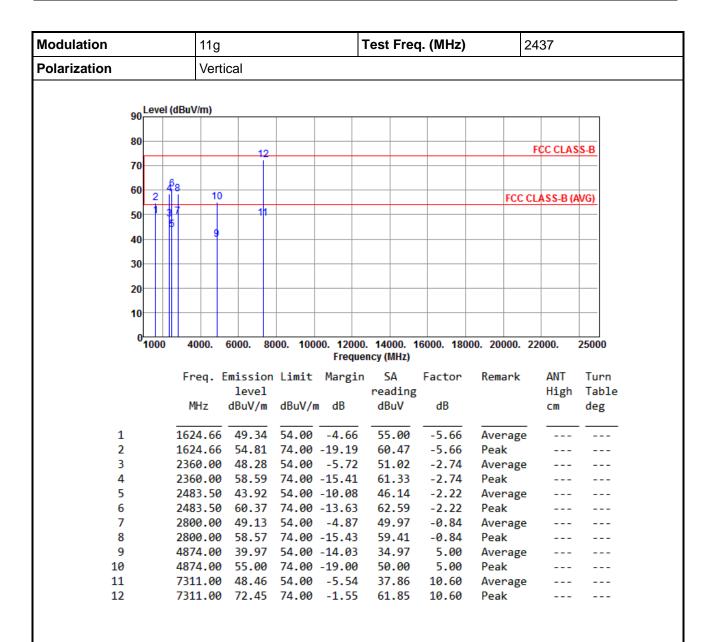


*Factor includes antenna factor, cable loss and amplifier gain

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

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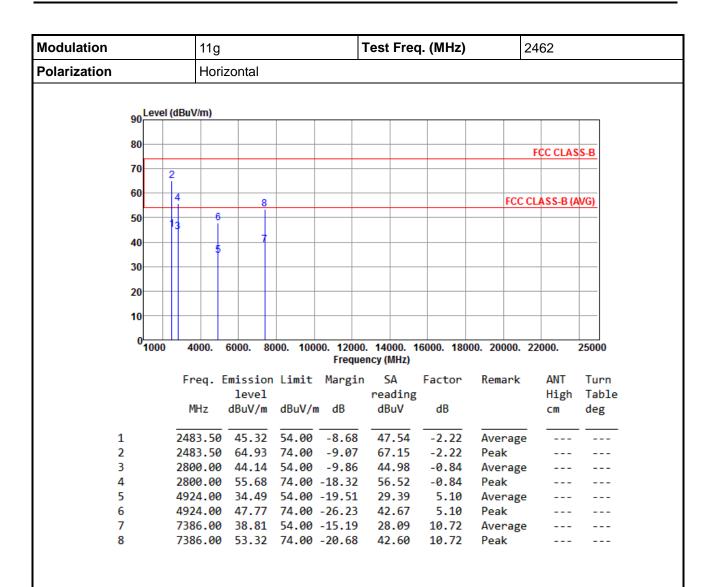


*Factor includes antenna factor, cable loss and amplifier gain

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

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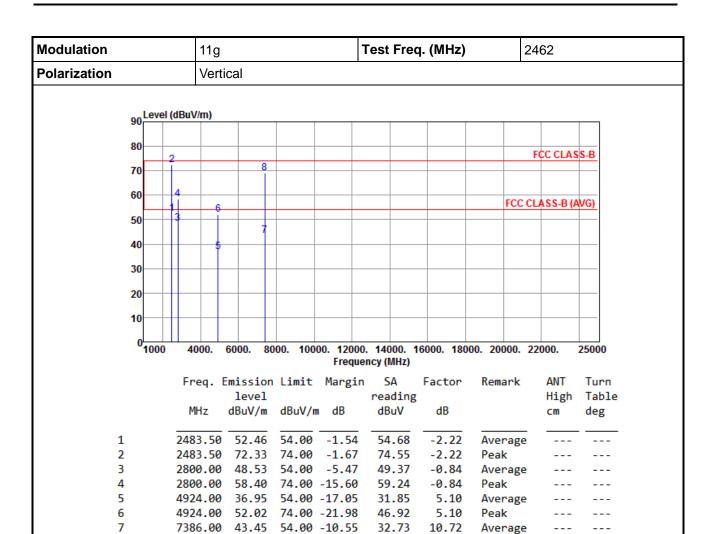


*Factor includes antenna factor, cable loss and amplifier gain

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

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58.26

10.72

Peak

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

7386.00 68.98 74.00 -5.02

*Factor includes antenna factor, cable loss and amplifier gain

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

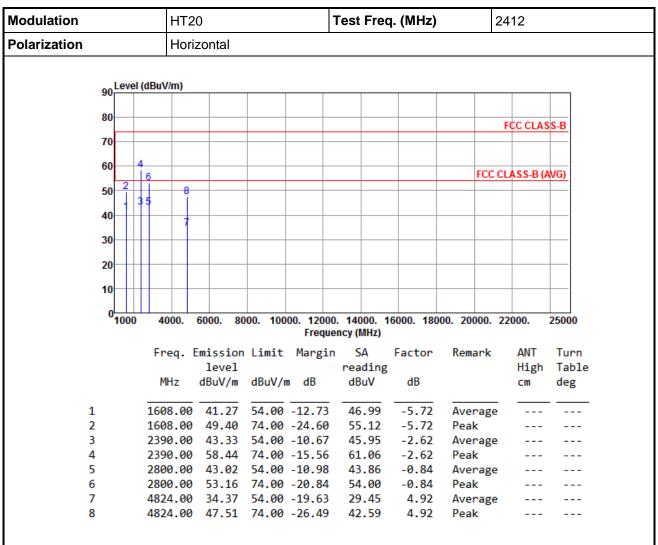
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3.5.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for HT20



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			ŀ	HT20					q. (MHz)	2412			
Polarization			V	Vertical									
	90	Level	(dBuV/n	n)									
	80										FCC CLAS	S-B	
	70		4										
	60		6							FCC	CLASS-B (A	WG)	
	50	4	5	8									
	40			+									
	30												
	20												
	10												
	0	1000	400	0. (6000. 80	00. 100	00. 12000). 14000. ·	16000. 180	00. 20000.	22000.	25000	
							Freque	ency (MHz)					
			Fred	q. E	mission	Limit	Margir	n SA	Factor	Remark	ANT	Turn	
					level			reading			High	Table	
			MHz	Z	dBuV/m	dBuV/ı	n dB	dBuV	dB		cm	deg	
	1		1600	00	46.26	E4 00	7.74	E1 00		A			
	1 2		1608. 1608.		46.26 51.97		-7.74 -22.03	51.98 57.69	-5.72 -5.72	Average Peak			
	3				52.94		-1.06	55.56	-2.62	Average			
	4					74.00		70.42	-2.62	Peak			
	5				47.63			48.47	-0.84	Average			
	_												

57.76

-0.84

4.92

4.92

Peak

Peak

Average

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

2800.00 56.92 74.00 -17.08

4824.00 35.40 54.00 -18.60 30.48

4824.00 48.67 74.00 -25.33 43.75

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

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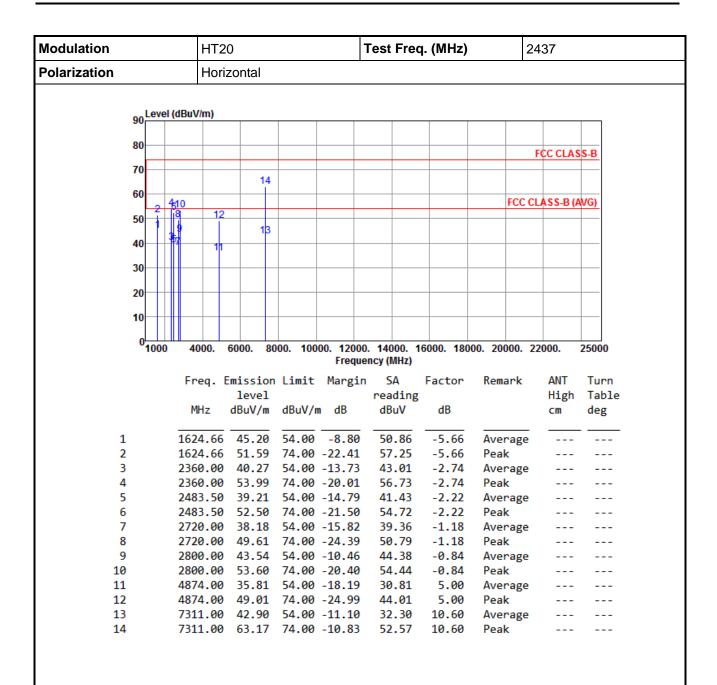
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7

8



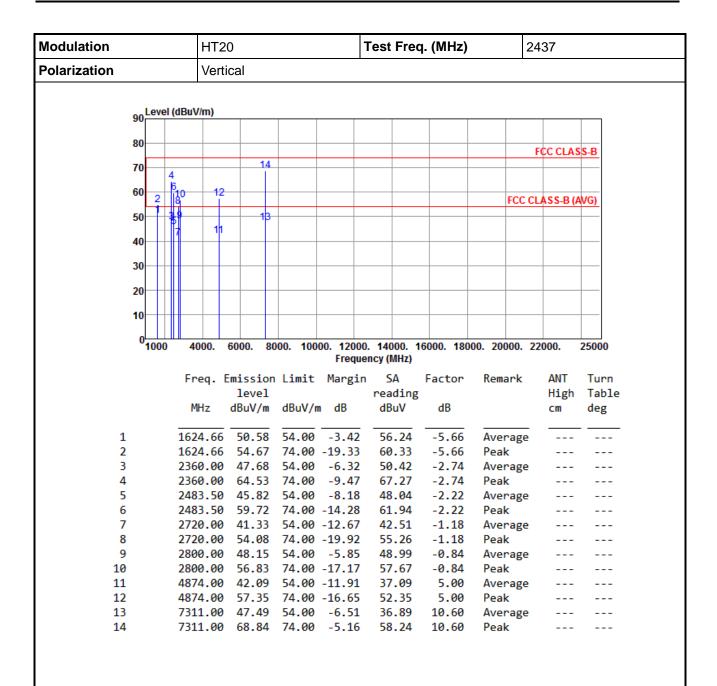


*Factor includes antenna factor, cable loss and amplifier gain

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

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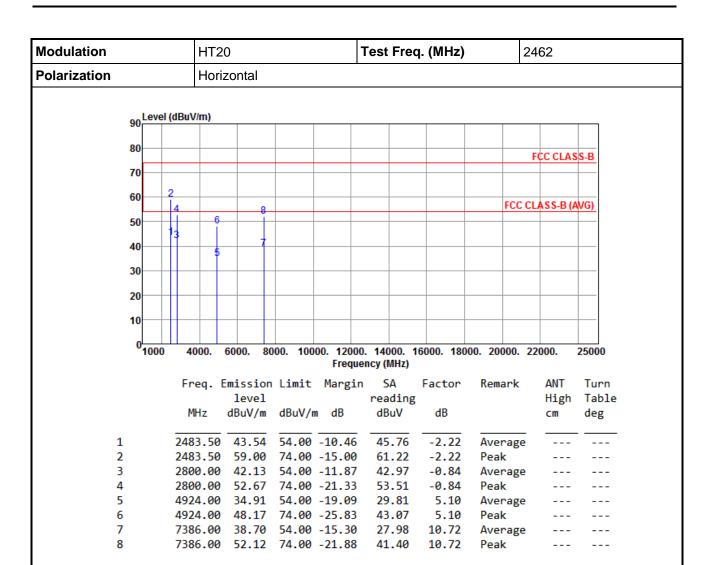


*Factor includes antenna factor, cable loss and amplifier gain

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			HT20					Test F	req.	2462			
Polarization			V	Vertical									
	90	Level	(dBuV/m	1)									
	80											FCC CLAS	SS-B
	70		2										
	-												
	60		14		8						FCC	CLASS-B (AVG)
	50	-	3	6									-
	40				1								
	40			5									
	30												+
	20												
	20												
	10												
	0	4000	400		2000	000 400	100 400		0 40	000 400	00 20000	22000	25000
		1000	4000	J. 0	000. 8	000. 100		iency (MH		000. 180	00. 20000.	22000.	25000
			Fred	ı. Fr	nissio	n Limit	Margi	n SA		Factor	Remark	ANT	Turn
					level		6-	read				High	
			MHz	: (dBuV/m	dBuV/	m dB	dBu\	٧ <u> </u>	dB		cm	deg
	1					54.00				-2.22	Averag	e	
	2 3				67.50 46.85		-6.50 -7.15			-2.22 -0.84	Peak		
	5 4					74.00				-0.84	Averag Peak	e	
	5					54.00				5.10	Averag	e	
	6					74.00				5.10	Peak		
	7		7386.	00	39.43	54.00	-14.57	28.7	71	10.72	Averag	e	
	-		7200	~~		74 00			-	40 70			

10.72 Peak

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

7386.00 53.58 74.00 -20.42 42.86

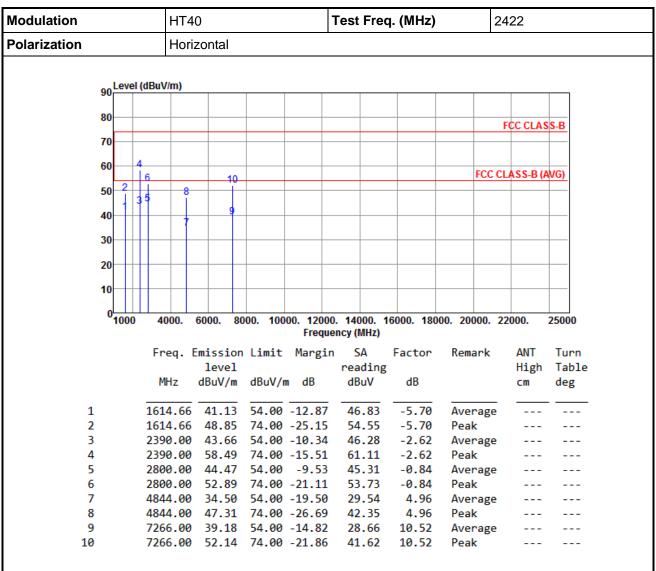
*Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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



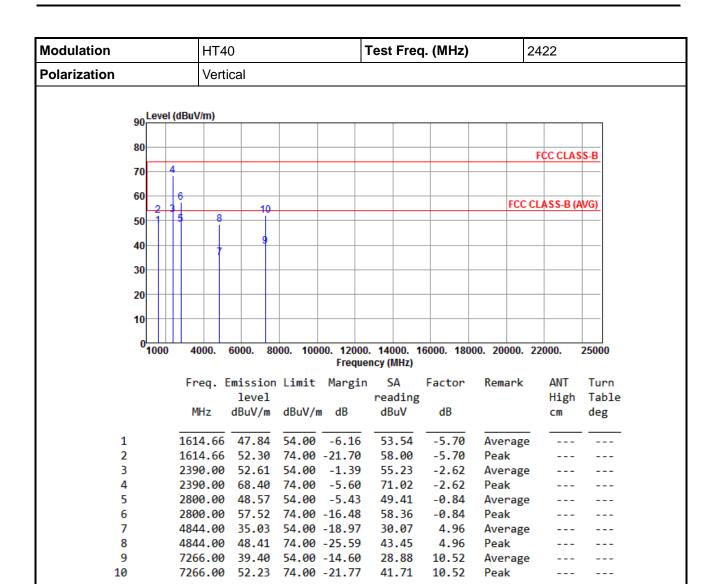
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

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

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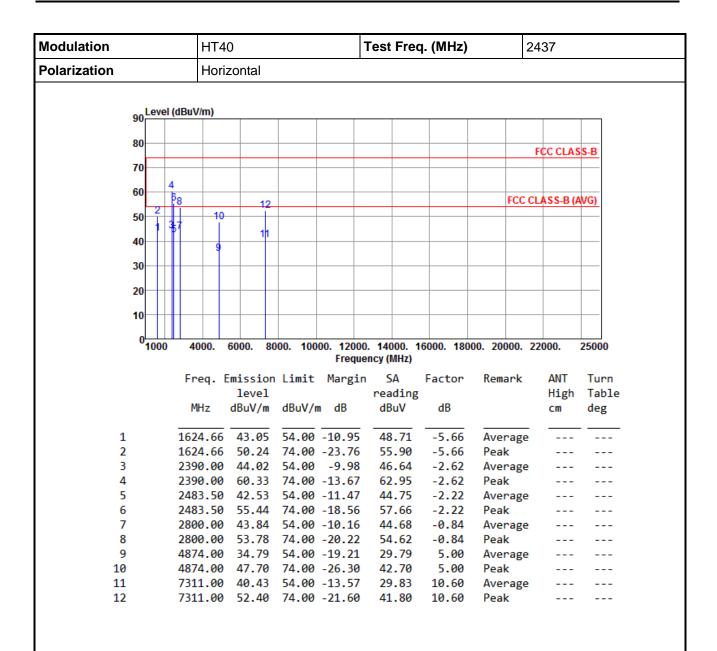


*Factor includes antenna factor, cable loss and amplifier gain

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

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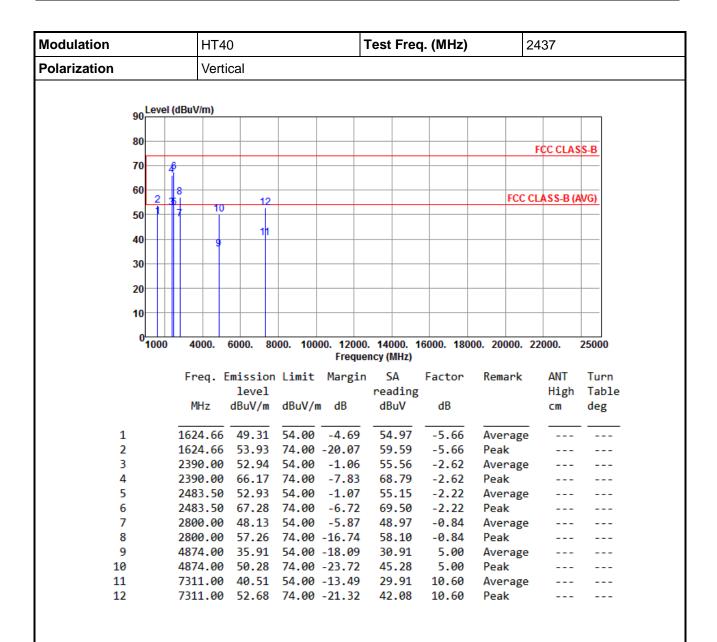


*Factor includes antenna factor, cable loss and amplifier gain

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

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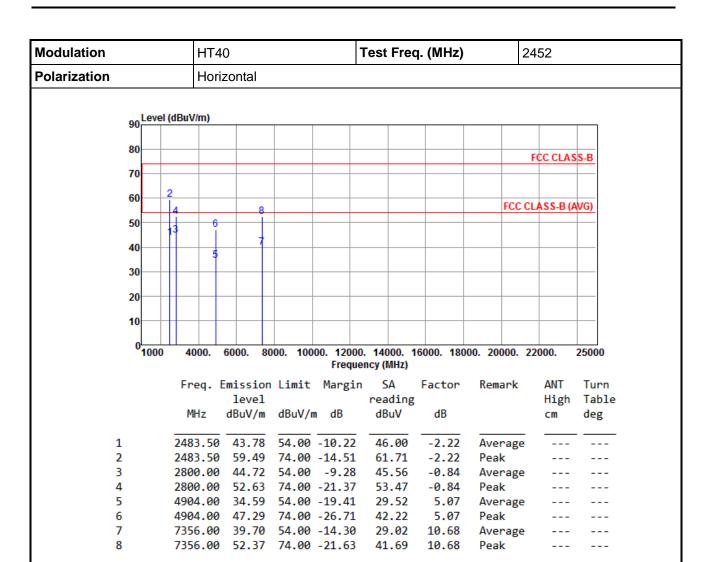


*Factor includes antenna factor, cable loss and amplifier gain

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

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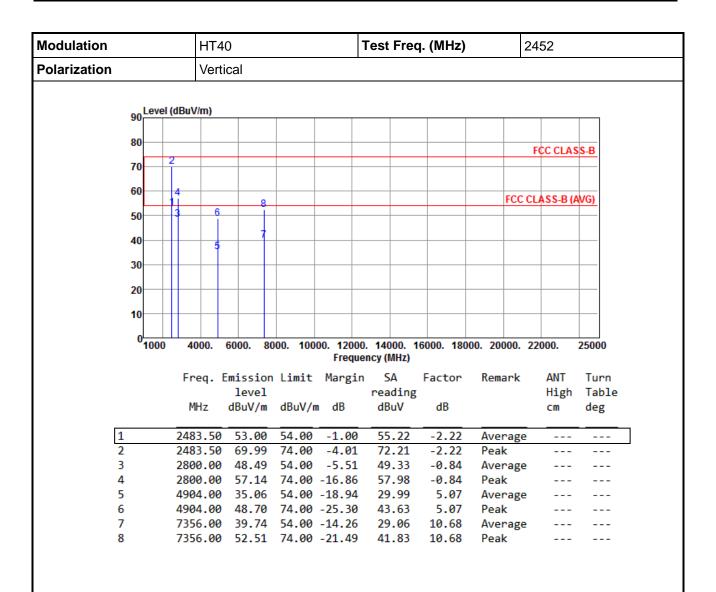


*Factor includes antenna factor, cable loss and amplifier gain

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 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

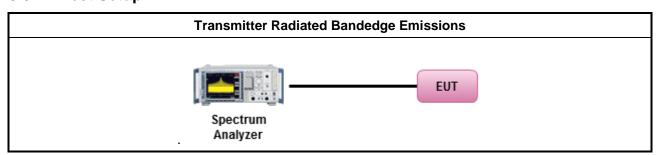
Reference level measurement

- 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



3.6.5 Test Result of Emissions in non-restricted frequency bands

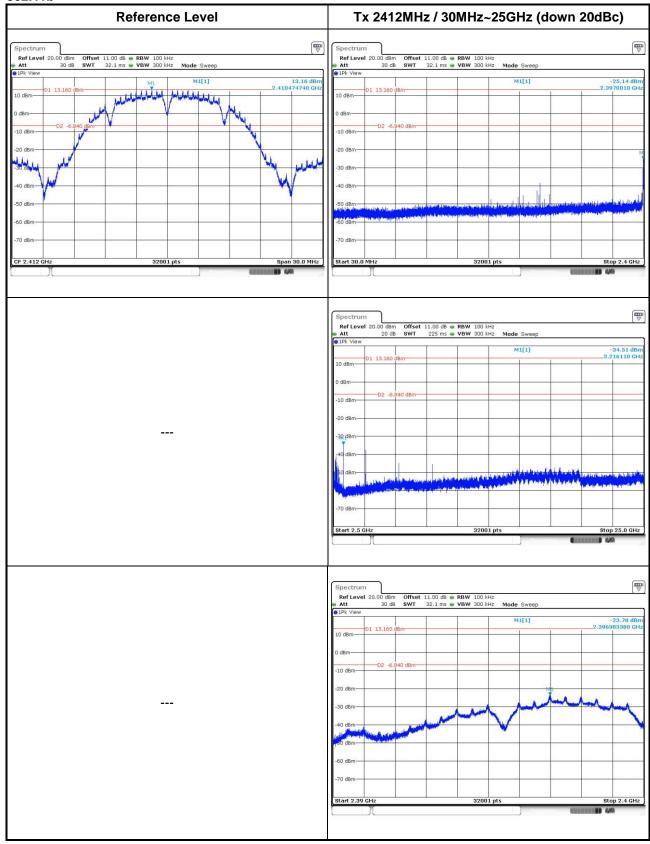
This test item is performed on each TX output individually without summing or adding 10 $log(N_{ANT})$ since measurements are made relative to the in-band emissions on the individual outputs. Only worst test result of each operating mode is presented.

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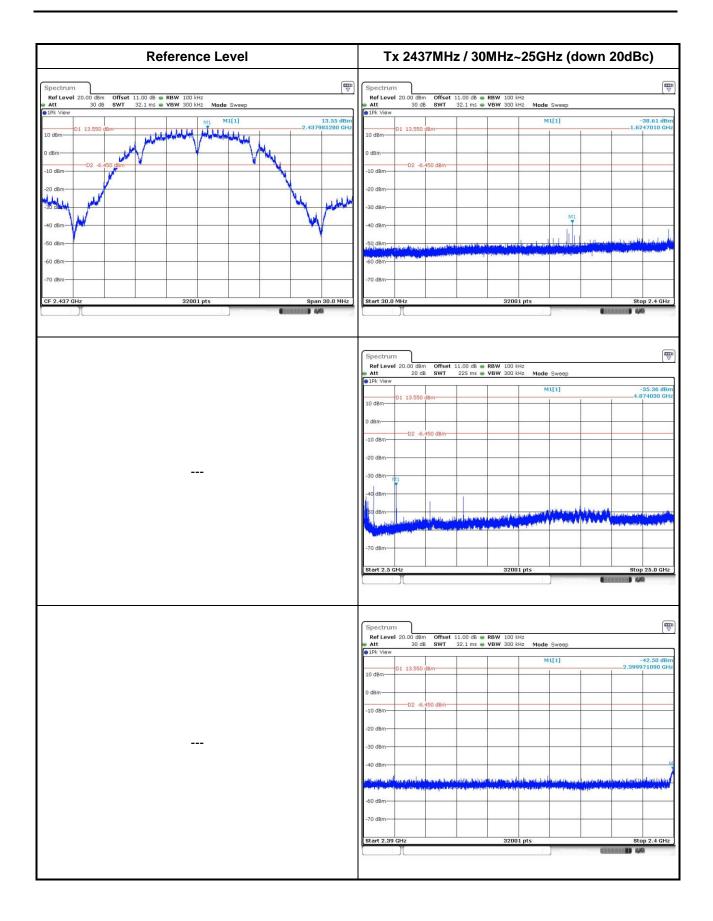
3.6.6 Unwanted Emissions into Non-Restricted Frequency Bands

802.11b



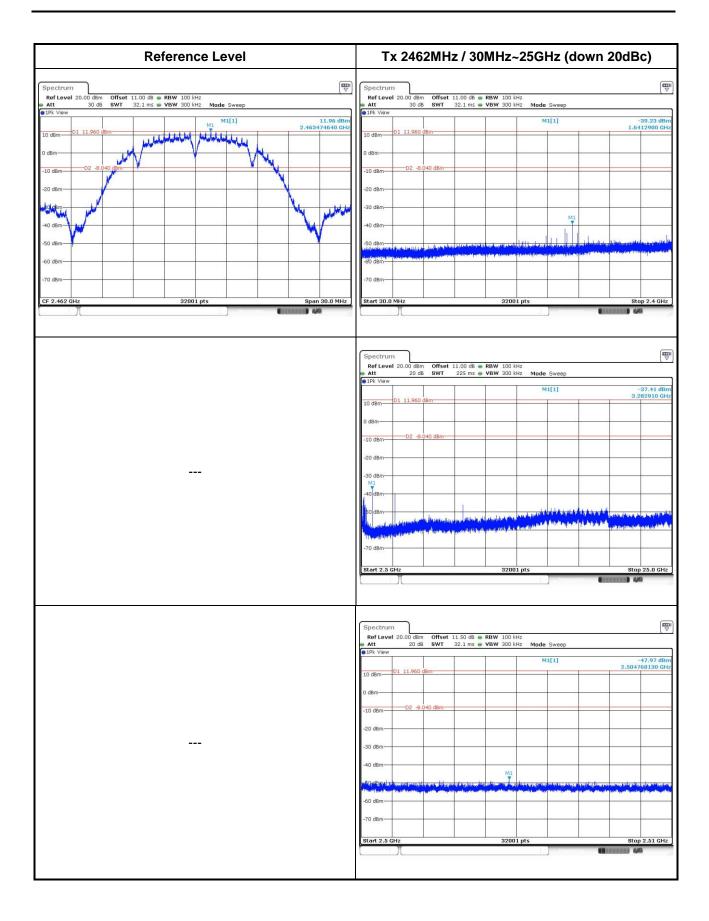
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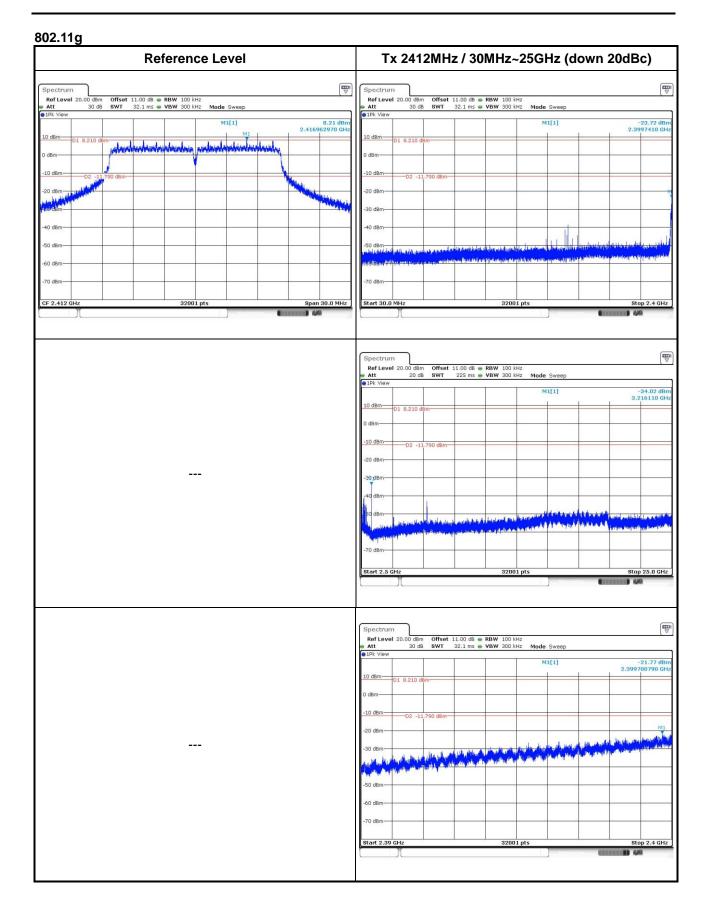
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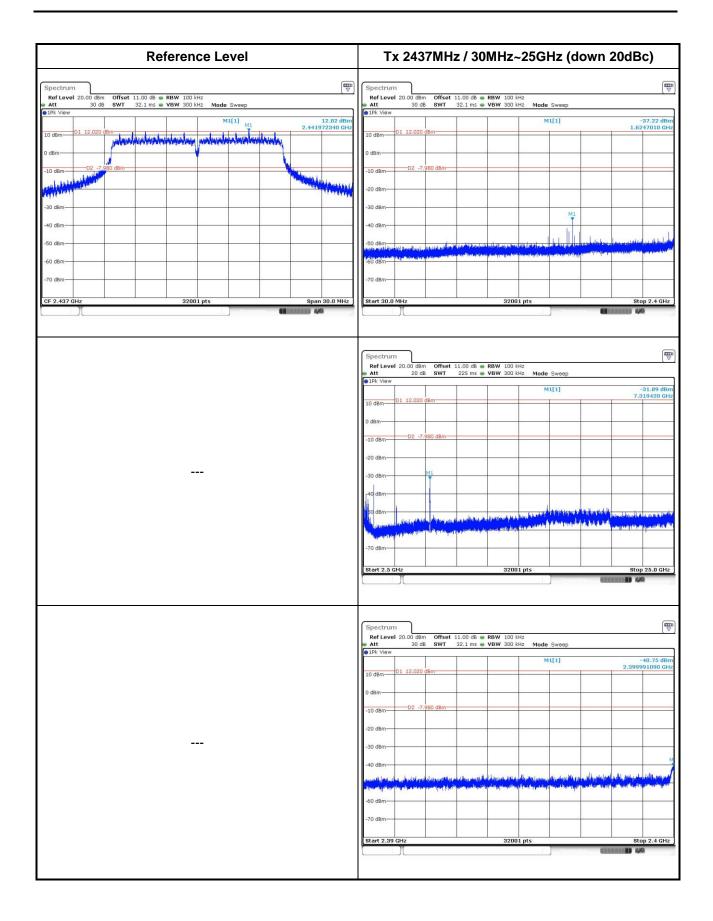
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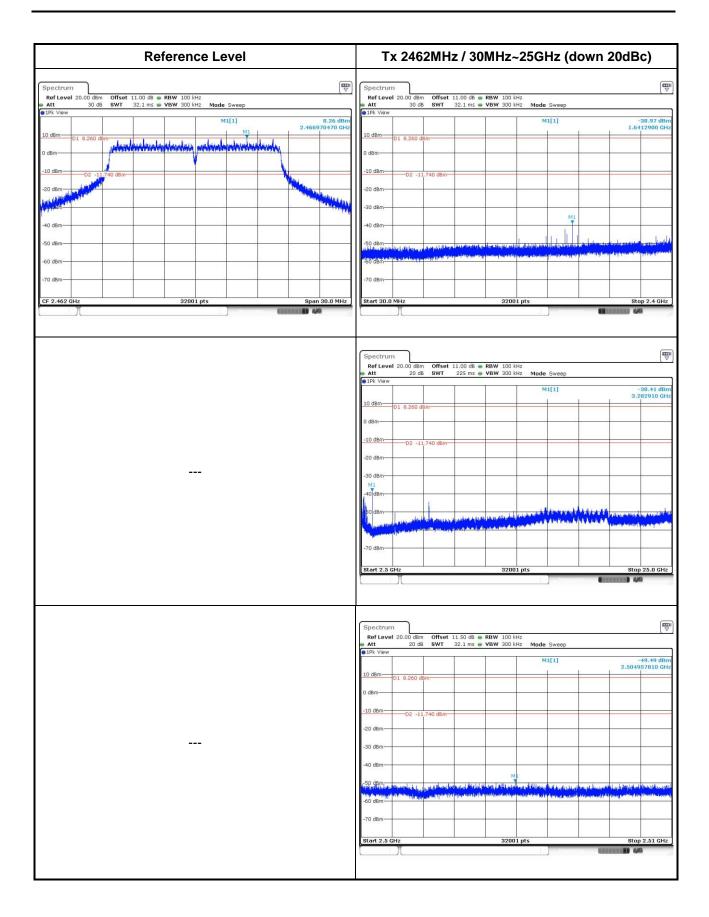
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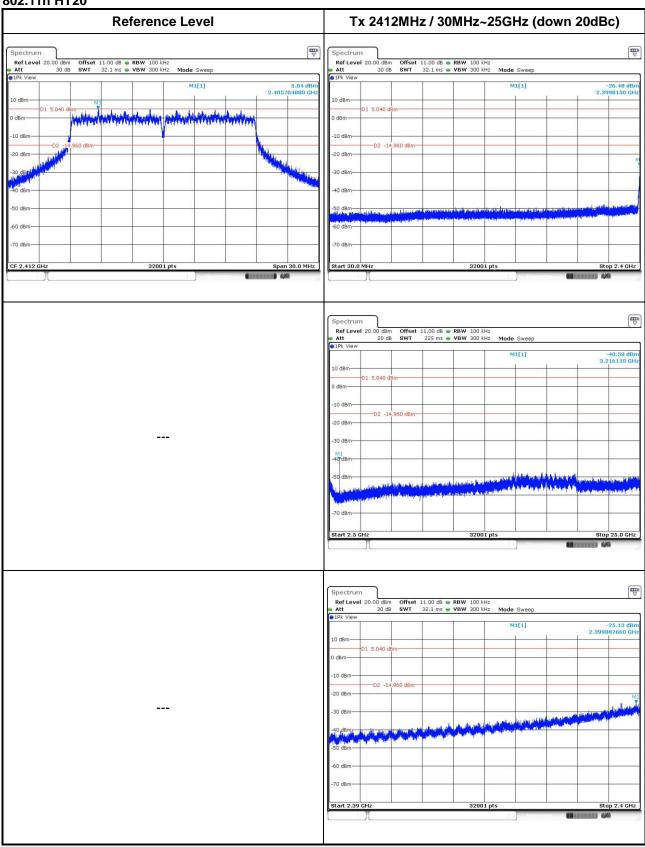




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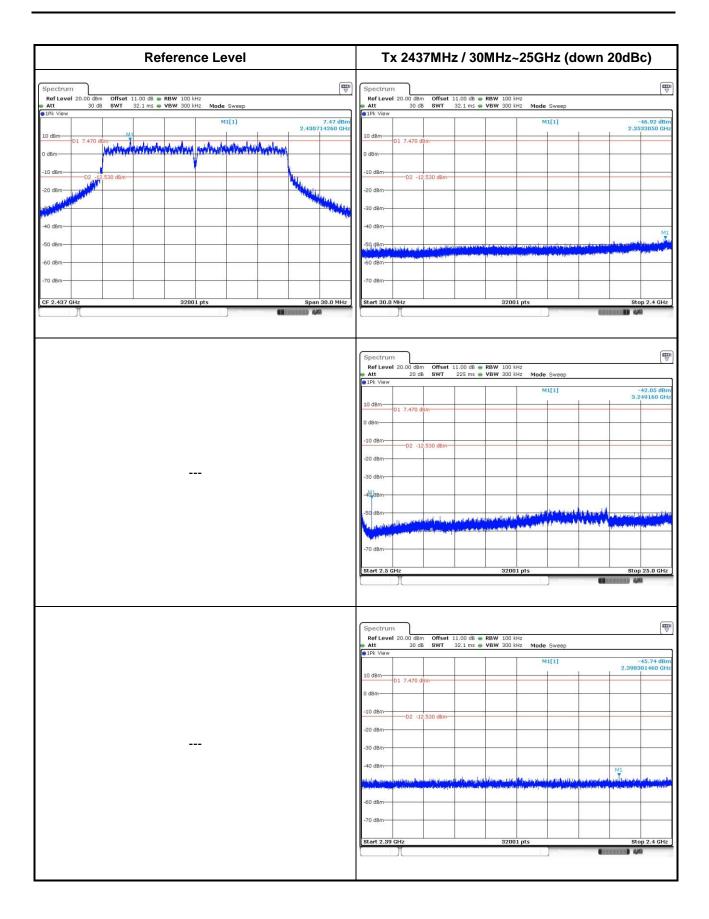


802.11n HT20



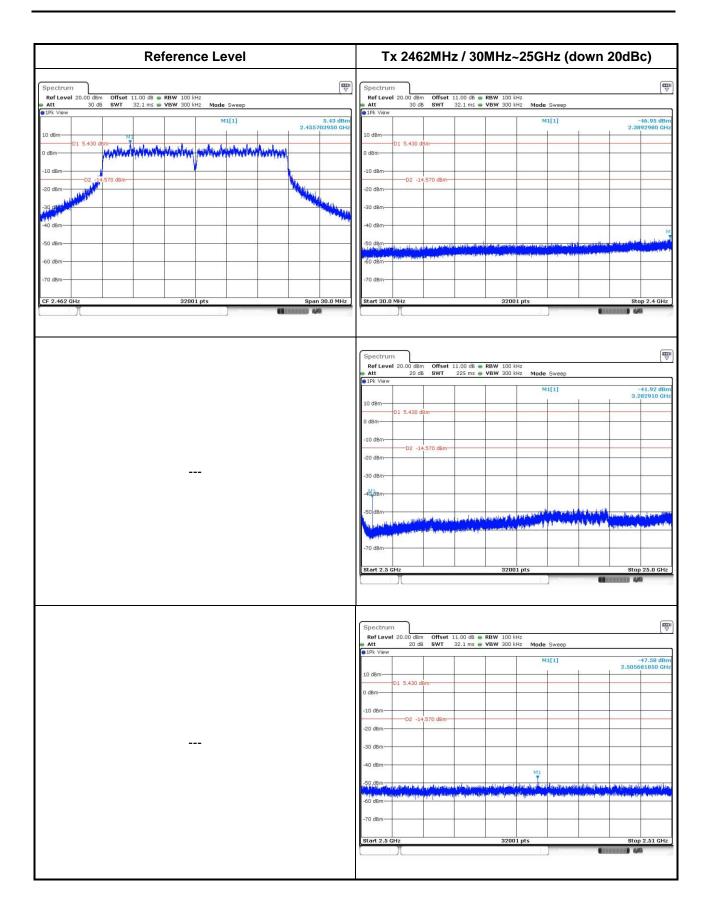
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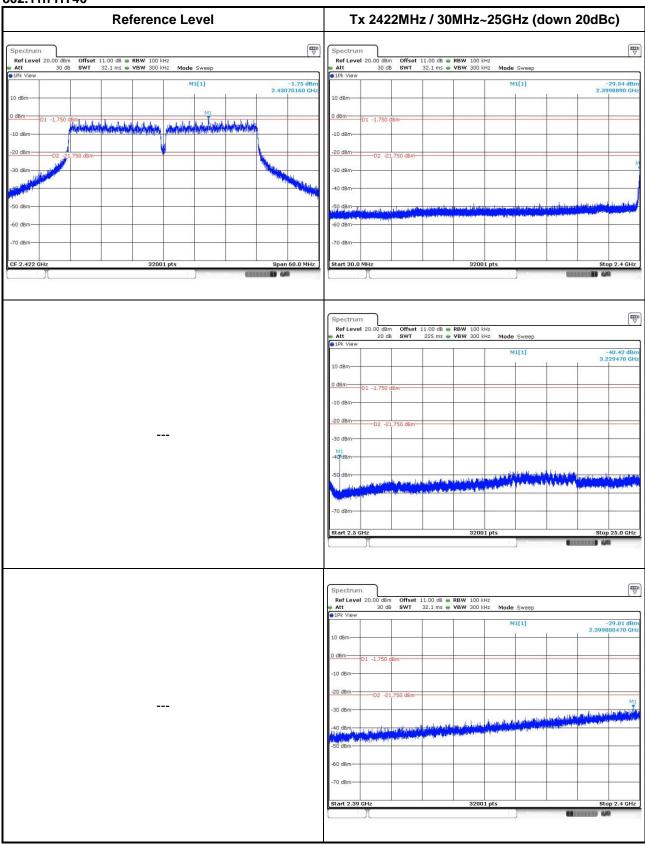




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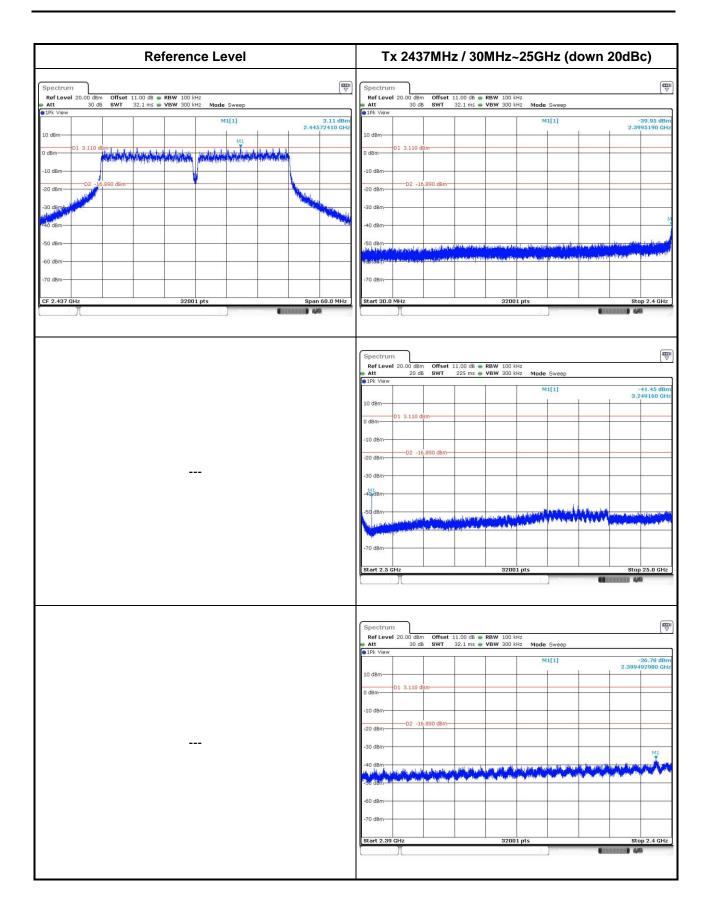


802.11n HT40



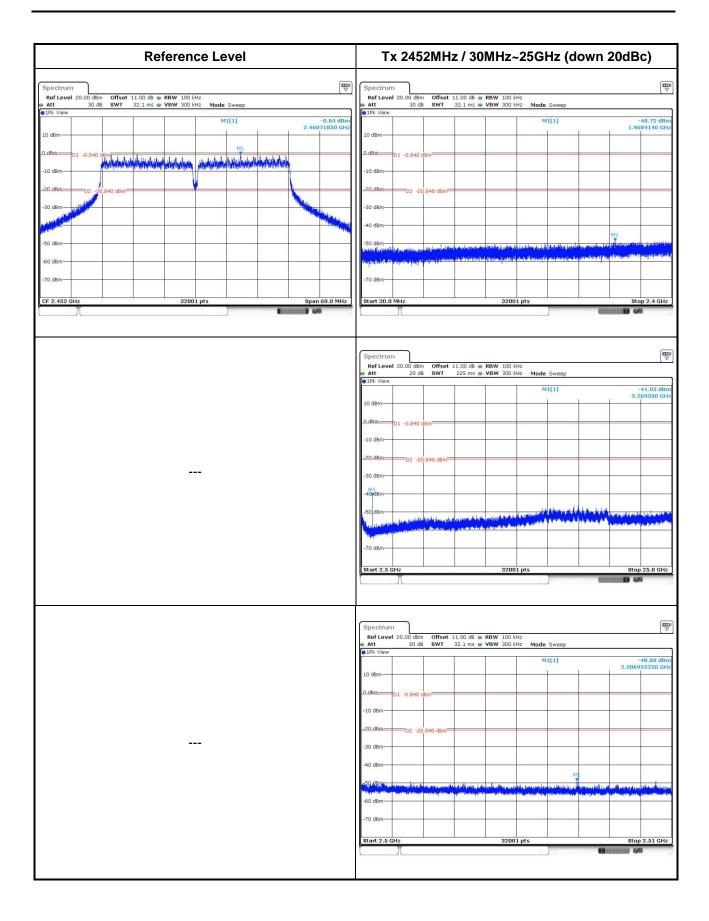
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4 Test laboratory information

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

==END==

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