

FCC Test Report

FCC ID : 2AAO2MICRODOG

Equipment : Microdog

Model No. : DHQDH-W02

Brand Name : dog hunter

Applicant : dog hunter LLC

Address : 8 Faneuil Hall Boston, MA 02109 USA

Standard : 47 CFR FCC Part 15.247

Received Date : Dec. 06, 2013

Tested Date : Dec. 25, 2013 ~ Jan. 02, 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

ilac MRA



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Release Record

Report No.	Version	Description	Issued Date
FR3D0604	Rev. 01	Initial issue	Feb. 05, 2014

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Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.157MHz 51.60 (Margin -14.00dB) - QP	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 2483.50MHz 73.00 (Margin -1.00dB) - PK	Pass
15.247(b)(3)	Fundamental Emission Output Power	Power [dBm]: 11b: 16.52 11g: 23.59 HT20: 23.59 HT40: 21.27	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	1-11 Mbps		
2400-2483.5	g	2412-2462	1-11 [11]	1	6-54 Mbps		
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	1	MCS 0-7		
2400-2483.5	n (HT40)	2422-2452	3-9 [7]	1	MCS 0-7		

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, 6QAM, 64QAM modulation.

1.1.2 Antenna Details

Ant. No.	Model	Туре	Gain (dBi)	Connector	Remark
1	AA055	Chip	-0.24	N/A	

1.1.3 EUT Operational Condition

-	
Power Supply Type	5Vdc 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-GUI, Version: 2.3				
	Mode	Duty cycle (%)	Duty factor (dB)		
	11b	99.88%	0.01		
Duty Cycle and Duty Factor	11g	98.26%	0.08		
	HT20	98.13%	0.08		
	HT40	97.37%	0.12		

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1.1.7 Power Setting

Modulation Mode	Test Frequency (MHz)	Power Set
11b	2412	0
11b	2437	0
11b	2462	0
11g	2412	0
11g	2437	0
11g	2462	0
HT20	2412	0
HT20	2437	0
HT20	2462	0
HT40	2422	0
HT40	2437	0
HT40	2452	0

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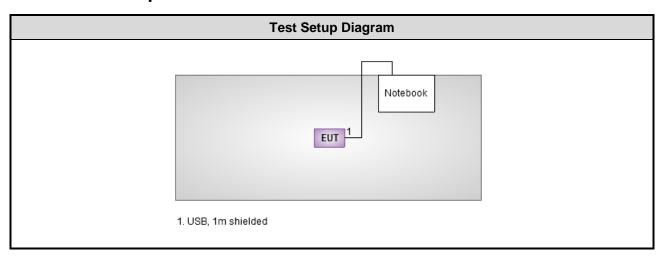
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1.2 Local Support Equipment List

	Support Equipment List							
No.	Equipment	Brand	Model	S/N	FCC ID	Signal cable / Length (m)		
1	Notebook	DELL	E6430		DoC	USB, 1m shielded cable w/o core.		

1.3 Test Setup Chart



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1.4 The Equipment List

Test Item	Conducted Emission Conduction room 1 / (CO01-WS)						
Test Site							
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until		
EMC Receiver	R&S	ESCS 30	100169	Oct. 15, 2013	Oct. 14, 2014		
LISN	SCHWARZBECK MESS-ELEKTRONIK	Schwarzbeck 8127	8127-667	Nov. 23, 2013	Nov. 22, 2014		
LISN (Support Unit)	SCHWARZBECK MESS-ELEKTRONIK	Schwarzbeck 8127	8127-666	Dec. 04, 2013	Dec. 03, 2014		
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Apr. 24, 2013	Apr. 23, 2014		
50 ohm terminal (Support Unit)	NA	50	04	Apr. 22, 2013	Apr. 21, 2014		

Test Item	Radiated Emission above 1GHz 966 chamber 2 / (03CH02-WS)							
Test Site								
Instrument	Manufacturer Model No. Serial No. Calibration Date Calibration U							
Spectrum Analyzer	R&S	FSV40	101499	Jan. 28, 2013	Jan. 27, 2014			
Receiver	R&S	ESR3	101657	Jan. 30,2013	Jan. 29, 2014			
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-524	Jan. 11, 2013	Jan. 10, 2014			
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120D	BBHA 9120 D 1095	Jan. 29, 2013	Jan. 28,2014			
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Dec. 27, 2013	Dec. 26, 2014			
Amplifier	Burgeon	BPA-530	100218	Dec. 09, 2013	Dec. 08, 2014			
Amplifier	Agilent	83017A	MY39501309	Dec. 09, 2013	Dec. 08, 2014			
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			
RF Cable-R03m	Woken	CFD400NL-LW	CFD400NL-003	Dec. 17, 2013	Dec. 16, 2014			
RF Cable-R10m	Woken	CFD400NL-LW	CFD400NL-004	Dec. 17, 2013	Dec. 16, 2014			
control	EM Electronics	EM1000	060608	N/A	N/A			

Loop Antenna	R&S	HFH2-Z2	100330	Nov. 15, 2012	Nov. 14, 2014				
Amplifier	Amplifier EM		060572	Jun. 20, 2013	Jun. 19, 2015				
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	Model No.	Serial No.	Calibration Date	Calibration Until				
Spectrum Analyzer	R&S	FSV 40	101063	Feb. 18, 2013	Feb. 17, 2014				
TEMP&HUMIDITY CHAMBER	GIANT FORCE	GCT-225-40-SP-SD	MAF1212-002	Dec. 11, 2013	Dec. 10, 2014				
Power Meter	Anritsu	ML2495A	1241002	Oct. 24, 2013	Oct. 23, 2014				
Power Sensor	Anritsu	MA2411B	1027366	Oct. 24, 2013	Oct. 23, 2014				
Signal Generator	R&S	SMB100A	175727	Jan. 14, 2013	Jan. 13, 2014				
Note: Calibration Inter	Note: Calibration Interval of instruments listed above is one year.								

1.5 Test Standards

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

47 CFR FCC Part 15.247

ANSI C63.10-2009

FCC KDB 558074 D01 DTS Meas Guidance v03r01

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	19°C / 65%	Skys Huang
Radiated Emissions	03CH02-WS	19°C / 63-67%	Aska Huang
RF Conducted	TH01-WS	21°C / 61%	Mark Liao

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	11g	2437	6 Mbps	
Radiated Emissions ≤1GHz	11g	2437	6 Mbps	
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:

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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 **Z-plane** results were found as the worst case and were shown in this report.



3 Transmitter Test Results

3.1 Conducted Emissions

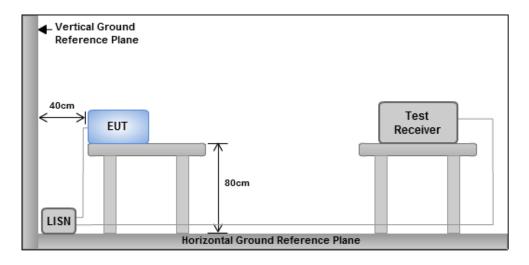
3.1.1 Limit of Conducted Emissions

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



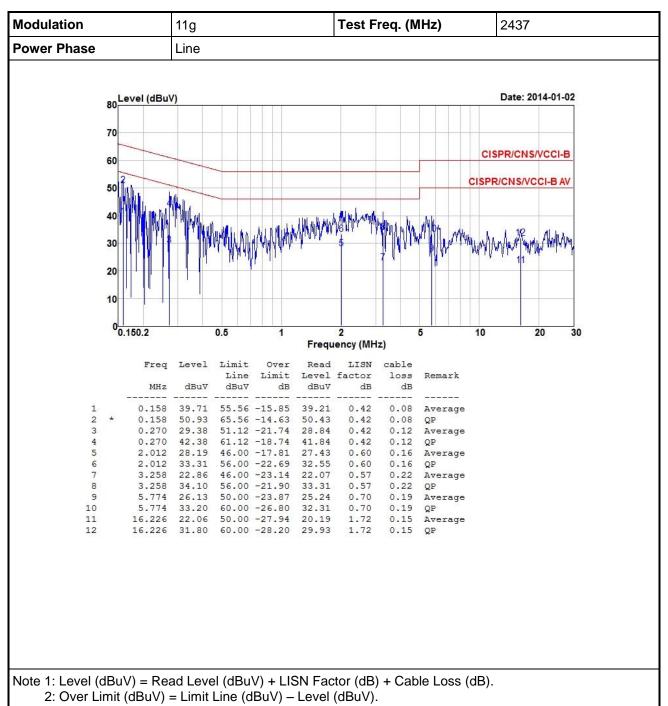
Note: 1. Support units were connected to second LISN.

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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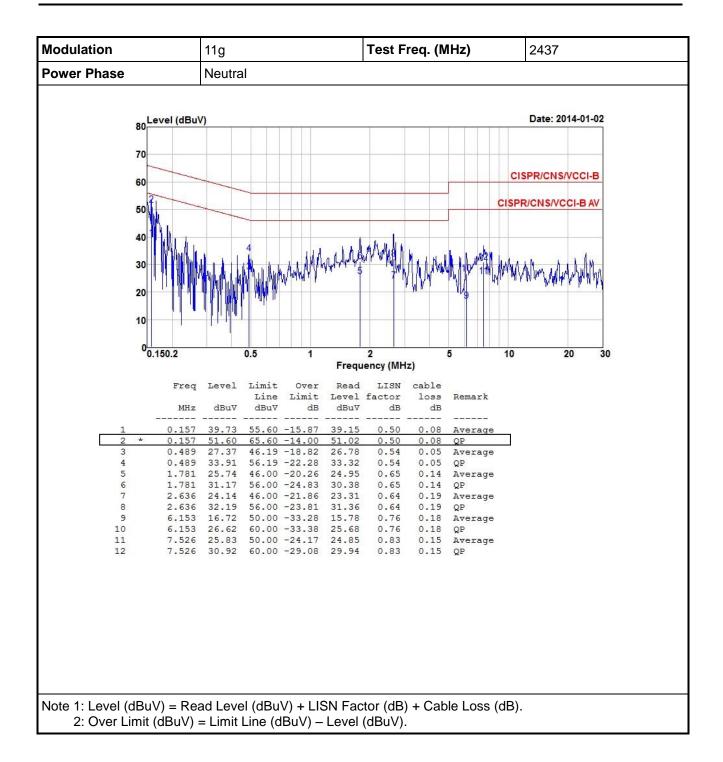


3.1.4 Test Result of Conducted Emissions



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3.2 6dB and Occupied Bandwidth

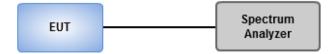
3.2.1 Limit of 6dB Bandwidth

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

3.2.2 Test Procedures

- 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

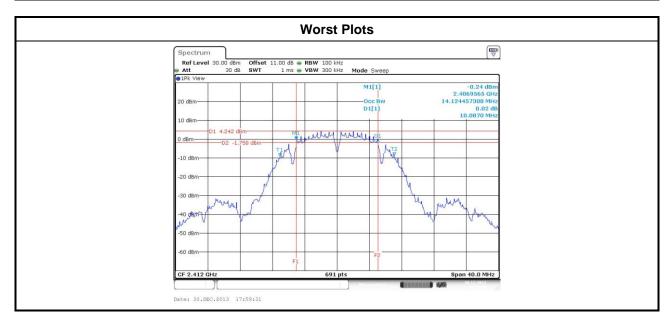


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3.2.4 Test Result of 6dB and Occupied Bandwidth

Modulation	N.	Eron (MU=)	6dB Bandwidth (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	1	2412	17.57				500	
HT20	1	2437	17.62				500	
HT20	1	2462	17.62				500	
HT40	1	2422	36.41				500	
HT40	1	2437	36.41				500	
HT40	1	2452	36.41				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	14.18					
11b	1	2437	14.18					
11b	1	2462	14.24					
11g	1	2412	19.22					
11g	1	2437	29.52					
11g	1	2462	20.43					
HT20	1	2412	19.16					
HT20	1	2437	30.33					
HT20	1	2462	19.51					
HT40	1	2422	39.02					
HT40	1	2437	40.64					
HT40	1	2452	39.13					



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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. (MHz)	Peak		d output p 3m)	ower	Total Power		
Wode		(IVITIZ)	Chain 0	Chain 1	Chain 2	Chain 3	(mW)	(dBm)	(dBm)
11b	1	2412	16.52				44.875	16.52	30
11b	1	2437	16.37				43.351	16.37	30
11b	1	2462	16.39				43.551	16.39	30
11g	1	2412	21.26				133.660	21.26	30
11g	1	2437	23.59				228.560	23.59	30
11g	1	2462	21.89				154.525	21.89	30
HT20	1	2412	20.97				125.026	20.97	30
HT20	1	2437	23.59				228.560	23.59	30
HT20	1	2462	21.34				136.144	21.34	30
HT40	1	2422	19.63				91.833	19.63	30
HT40	1	2437	21.27				133.968	21.27	30
HT40	1	2452	19.95				98.855	19.95	30

Modulation Mode	N _{TX}	Freq. (MHz)	Conduc		age) outpu Bm)	it power	Total Power	POWAR	Limit (dBm)
Wiode		(IVITIZ)	Chain 0	Chain 1	Chain 2	Chain 3	(mW)	(dBm)	(ubili)
11b	1	2412	14.31				26.977	14.31	30
11b	1	2437	14.15				26.002	14.15	30
11b	1	2462	14.22				26.424	14.22	30
11g	1	2412	15.82				38.194	15.82	30
11g	1	2437	20.05				101.158	20.05	30
11g	1	2462	16.58				45.499	16.58	30
HT20	1	2412	14.95				31.261	14.95	30
HT20	1	2437	20.07				101.625	20.07	30
HT20	1	2462	15.61				36.392	15.61	30
HT40	1	2422	12.80				19.055	12.80	30
HT40	1	2437	15.73				37.411	15.73	30
HT40	1	2452	13.24				21.086	13.24	30

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

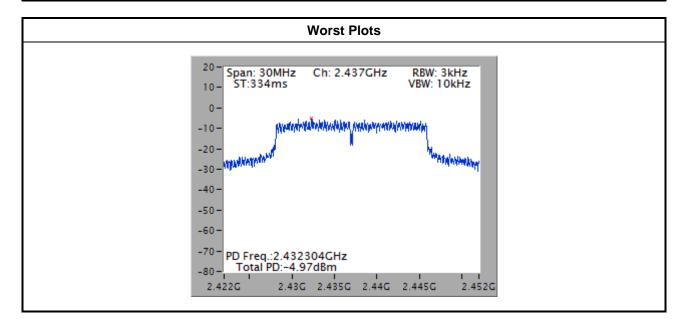


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3.4.4 Test Result of Power Spectral Density

Modulation Mode	N _{TX}	Freq. (MHz)	Total Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
11b	1	2412	-9.36	8
11b	1	2437	-8.99	8
11b	1	2462	-9.40	8
11g	1	2412	-8.86	8
11g	1	2437	-5.40	8
11g	1	2462	-7.75	8
HT20	1	2412	-10.33	8
HT20	1	2437	-4.97	8
HT20	1	2462	-8.84	8
HT40	1	2422	-14.19	8
HT40	1	2437	-11.76	8
HT40	1	2452	-15.36	8



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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.

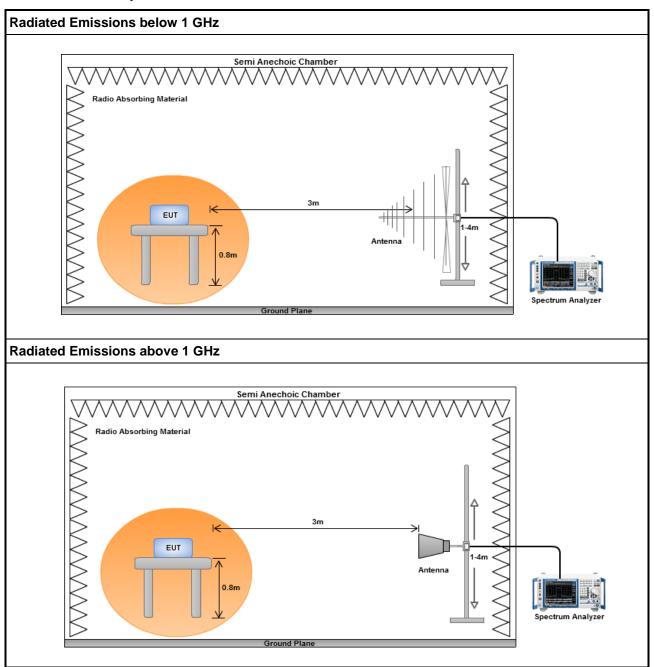
Note:

- 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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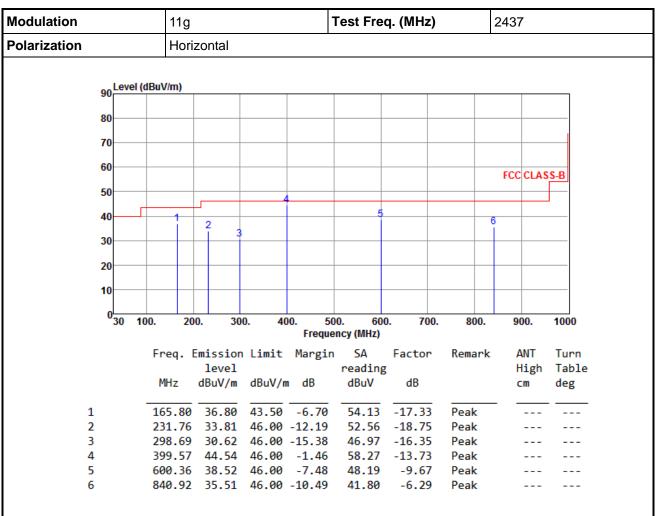
3.5.3 Test Setup



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3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)



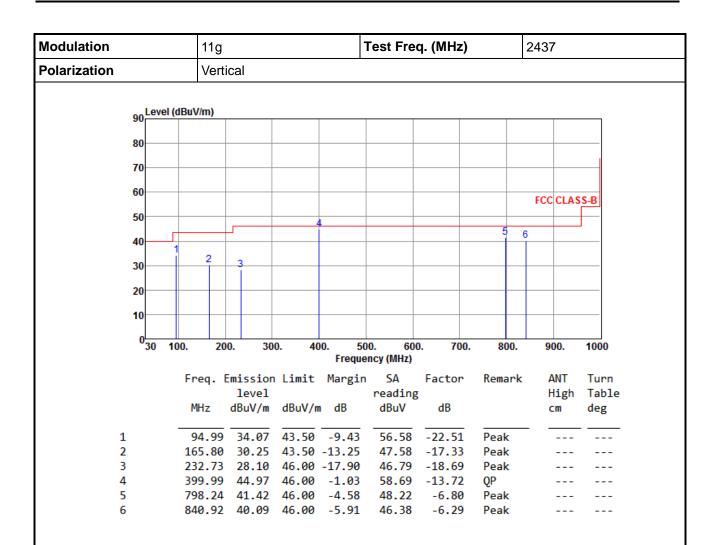
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

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

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

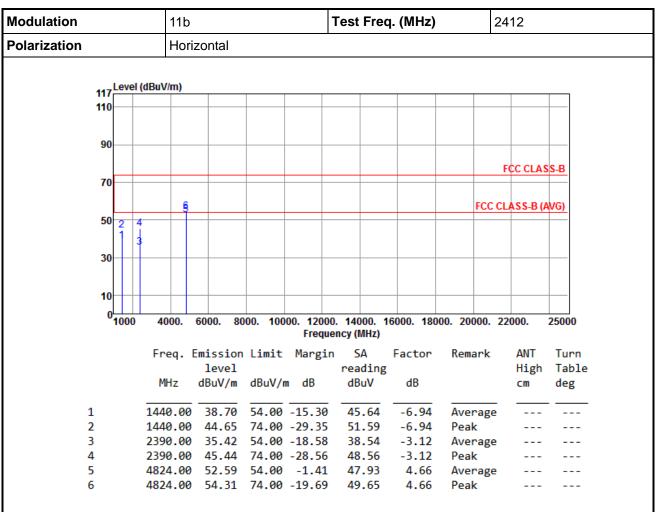
*Factor includes antenna factor, cable loss and amplifier gain

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

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3.5.5 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	Free	q. (MHz)		24	12	
Polarizatio	1			Vert	ical								•		
	117	Lev	el (dBu	ıV/m)											
	110	<u> </u>		_		_									
	90														
	70	\vdash											F	CC CLAS	S-B
	70	"													
		L		- 9									FCC CL	ASS-B (A	VG)
	50	2	4												
		11	3												
	30	+		+											
	10														
		Ш													
		100	0 4	4000.	6000.	8000.	100		0. 140 iency (16000. 180	000. 20	000. 22	2000.	25000
			F	rea.	Emissio	on Li	mit	Margi	n 9	A	Factor	Rem	ark	ANT	Turn
					leve					ding				High	Table
				MHz	dBuV/ı	n dB	uV/r	n dB	dE	luV	dB			cm	deg
			_									_			
	1			40.00				-15.69		.25	-6.94		rage		
	2			40.00 90.00				-29.25 -15.66		.69	-6.94 -3.12	Pea			
	4			90.00 90.00				-15.00		.35	-3.12		rage k		
	5							-1.09		3.25	4.66		rage		
	6				54.99					.33	4.66	Pea	_		

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	111)		7	Test Fred	ղ. (MHz)	2	2437	
Polarization	Но	rizontal		•			•		
117 Lev	el (dBuV/m)								
110									
90—									
								FCC CLAS	S-B
70									
							FCC (CLASS-B (A	WG)
50 ₂		6						, ,	
l ī		5							
30									
10									
10									
100	00 4000.	6000. 8	000. 100		. 14000. 1 ncy (MHz)	6000. 180	00. 20000.	22000.	25000
	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	1440.0	38.59	54.00	-15.41	45.53	-6.94	Average		
2	1440.0			-29.25	51.69	-6.94	Peak		
3		51.94			47.21	4.73	Average		
4		54.26			49.53	4.73	Peak		
5		38.19			28.08	10.11	Average		
6	/311.0	0 50.82	74.00	-23.18	40.71	10.11	Peak		

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

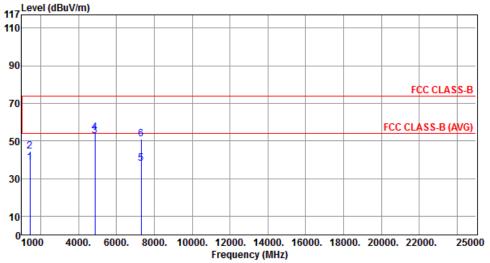
*Factor includes antenna factor, cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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Modulation		11b			Test	Freq.	(MHz)	24	37	
Polarization		Vertica	al							
117	Level (dBu	V/m)								
110	I I									
110										



	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	1440.00	38.31	54.00	-15.69	45.25	-6.94	Average		
2	1440.00	44.45	74.00	-29.55	51.39	-6.94	Peak		
3	4874.00	52.58	54.00	-1.42	47.85	4.73	Average		
4	4874.00	54.26	74.00	-19.74	49.53	4.73	Peak		
5	7311.00	38.08	54.00	-15.92	27.97	10.11	Average		
6	7311.00	51.02	74.00	-22.98	40.91	10.11	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	q. (MHz)]	2462	
Polarization		Hori	zontal		•			1		
₄₄₇ Le	vel (dBu	ıV/m)								
110										
90—										
70									FCC CLAS	S-B
70		4	6					FCC	CLASS-B (A	(VG)
50	2		5							
30										
10										
0 10	00 4	4000.	6000. 80	000. 100		. 14000. 1 ncy (MHz)	16000. 1800	00. 20000.	22000.	25000
	F	req. [Limit	Margin	SA	Factor	Remark	ANT	Turn
		MHz	level dBuV/m	dBuV/ı	m dB	reading dBuV	dB		High cm	Table deg
1			35.94			38.63	-2.69	Average		
2		83.50 24.00	45.84 51.87		-28.16 -2.13	48.53 47.06	-2.69 4.81	Peak Average		
4			54.34			49.53	4.81	Peak		

10.22

10.22

Average

Peak

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

7386.00 38.18 54.00 -15.82 27.96 7386.00 51.02 74.00 -22.98 40.80

*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	7	Γest Freq.	(MHz)	24	62	
Polarization	Vertical						
117 Level (dB	uV/m)						
110							
90							_
70					F	CC CLASS-	В
70	4				FCC CL	ASS-B (AVG	5)
50 2	5						
30							_
10							_
01000	4000. 6000. 80	000. 10000. 12000	. 14000. 160 ncy (MHz)	00. 18000	20000. 22	000. 25	000
F	req. Emission	Limit Margin	SA F	actor	Remark		Turn
		dBuV/m dB	reading dBuV	dB		_	Table deg
		54.00 -18.72			Average		
	183.50 47.04 024.00 52.83	74.00 -26.96	49.73 48.02		Peak Average		

50.04

4.81

10.22

10.22

Peak

Peak

Average

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

4924.00 54.85 74.00 -19.15

7386.00 38.23 54.00 -15.77 28.01 7386.00 50.54 74.00 -23.46 40.32

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

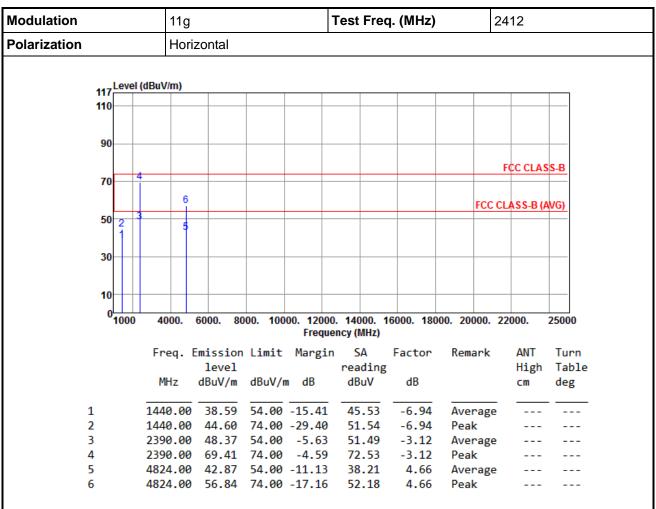
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3.5.6 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11g



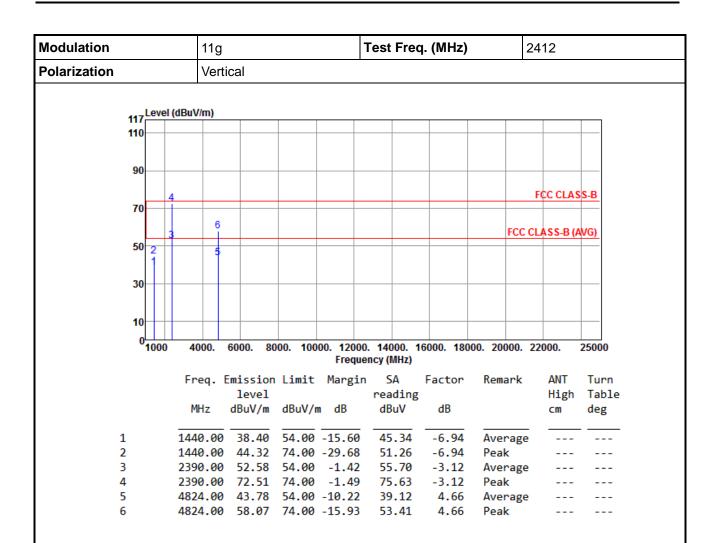
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor , cable loss and amplifier gain

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

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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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6

7

8

Modulation		11	g				Test Fre	eq. (MHz)	2	2437	
Polarization		Но	orizontal								
117	Leve	el (dBuV/m)									
110											
•••	1										
90	—										
										FCC CLAS	S-B
70	—		6								
		4									
			\$	8					FCC (CLASS-B (A	WG)
50	2			1							
	11	3		1							
30) 										
4/											
10	7										
(1000	4000.	6000.	800	0. 100	000. 1200	0. 14000.	16000. 180	00. 20000.	22000.	25000
						Frequ	ency (MHz))			
		Freq.	Emissi	ion	Limit	Margin	n SA	Factor	Remark	ANT	Turn
			leve				readin			High	Table
		MHz	dBuV/	/m	dBuV/ı	m dB	dBuV	dB		cm	deg
1		1440.0	10 38.6	50	54.00	-15.40	45.54	-6.94	Average		
2						-29.30	51.64		Peak		
3						-15.56	41.56		Average		
4						-14.53	62.59		Peak		
5						-2.63	46.64		Average		
6		1971 0	10 67 S	2.2	74 00	6 19	63 00	1 72	Dook		

4.73

10.11

10.11

63.09

Peak

Peak

Average

7311.00 39.04 54.00 -14.96 28.93

7311.00 51.78 74.00 -22.22 41.67

4874.00 51.37 54.00 -2.63 4874.00 67.82 74.00 -6.18

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

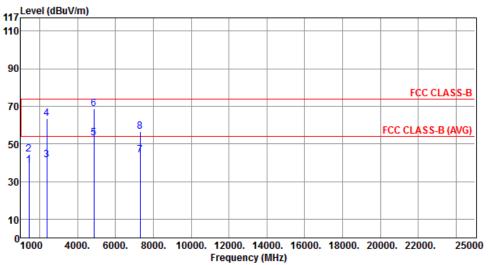
*Factor includes antenna factor, cable loss and amplifier gain

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

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Modulation	11g	Test Freq.	(MHz)	2437	
Polarization	Vertical				
117 Level (dBu	V/m)				7



	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	1440.00	38.29	54.00	-15.71	45.23	-6.94	Average		
2	1440.00	44.49	74.00	-29.51	51.43	-6.94	Peak		
3	2390.00	41.45	54.00	-12.55	44.57	-3.12	Average		
4	2390.00	63.56	74.00	-10.44	66.68	-3.12	Peak		
5	4874.00	52.93	54.00	-1.07	48.20	4.73	Average		
6	4874.00	68.83	74.00	-5.17	64.10	4.73	Peak		
7	7311.00	43.96	54.00	-10.04	33.85	10.11	Average		
8	7311.00	56.63	74.00	-17.37	46.52	10.11	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	11g		Т	est Freq.	(MHz)	:	2462	
Polarization	Horizo	ntal	1					
117 Level	(dBuV/m)							$\overline{}$
110								
90								
							FCC CLAS	S-B
70	2							
	4	6				FCC	CLASS-B (A	WG)
50	2							
		5						
30								
10								
01000	4000. 60	00. 8000. 1000		14000. 16	000. 1800	00. 20000.	22000.	25000
	Frea. Emi	ission Limit			Factor	Remark	ANT	Turn
		level		reading			High	Table
	MHz dE	BuV/m dBuV/m	dB	dBuV	dB		cm	deg
1	2483.50	48.86 54.00	-5.14	51.55	-2.69	Average		
2		58.59 74.00		71.28	-2.69	Peak		
3		42.05 54.00		37.24	4.81	Average		
4		56.39 74.00		51.58	4.81	Peak		
5 6		38.74 54.00 · 52.46 74.00 ·		28.52 42.24	10.22 10.22	Average Peak		

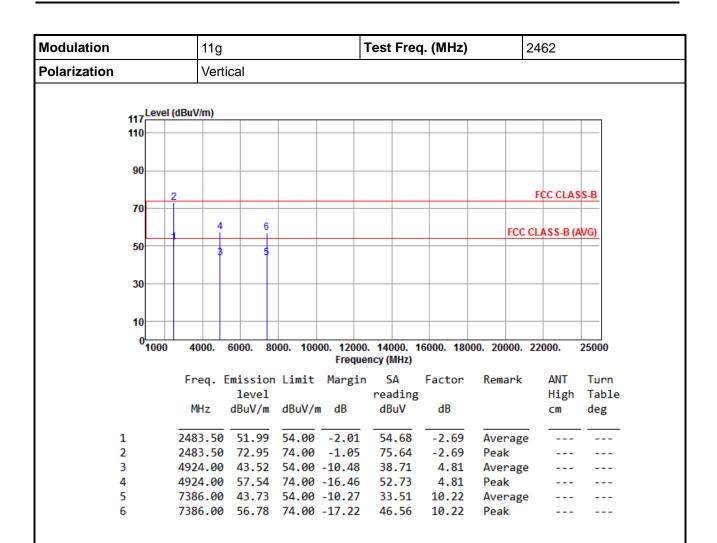
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

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

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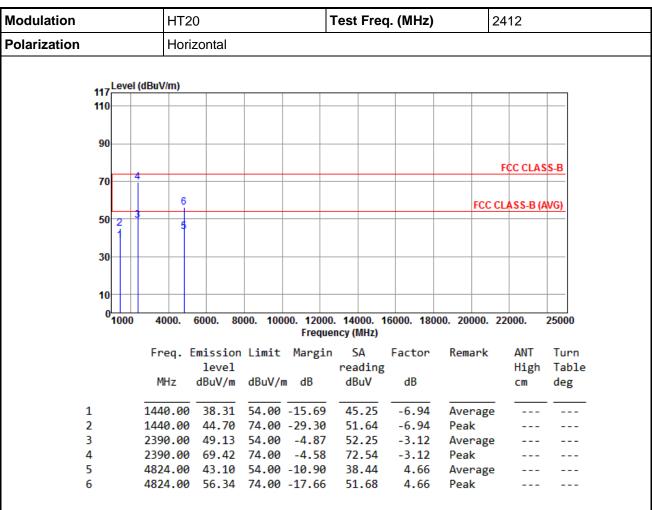
*Factor includes antenna factor, cable loss and amplifier gain

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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odulation	HT20	Test Freq. (MHz)	2412
olarization	Vertical		
117 Level (dB	uV/m)		
110			
90			
70			FCC CLASS-B
	6	FCC	CLASS-B (AVG)
50 2	5		
30			
10			
01000		0. 14000. 16000. 18000. 20000. ency (MHz)	22000. 2500

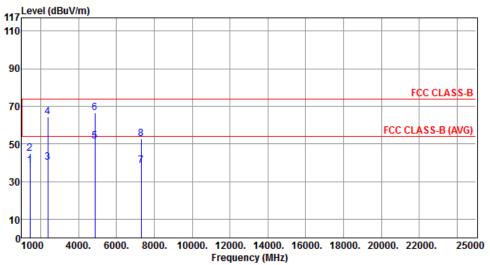
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Ū	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1440.00	38.59	54.00	-15.41	45.53	-6.94	Average		
2	1440.00	44.80	74.00	-29.20	51.74	-6.94	Peak		
3	2390.00	52.52	54.00	-1.48	55.64	-3.12	Average		
4	2390.00	71.78	74.00	-2.22	74.90	-3.12	Peak		
5	4824.00	44.19	54.00	-9.81	39.53	4.66	Average		
6	4824.00	57.91	74.00	-16.09	53.25	4.66	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	HT20	Test Freq. (MHz)	2437
Polarization	Horizontal		
117 Level (dBu\	//m)		
117			



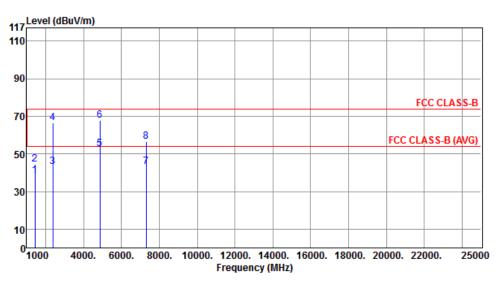
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	1440.00	38.45	54.00	-15.55	45.39	-6.94	Average		
2	1440.00	44.76	74.00	-29.24	51.70	-6.94	Peak		
3	2390.00	40.37	54.00	-13.63	43.49	-3.12	Average		
4	2390.00	64.37	74.00	-9.63	67.49	-3.12	Peak		
5	4874.00	51.26	54.00	-2.74	46.53	4.73	Average		
6	4874.00	66.28	74.00	-7.72	61.55	4.73	Peak		
7	7311.00	38.57	54.00	-15.43	28.46	10.11	Average		
8	7311.00	52.73	74.00	-21.27	42.62	10.11	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	HT20	Test Freq. (MHz)	2437
Polarization	Vertical		

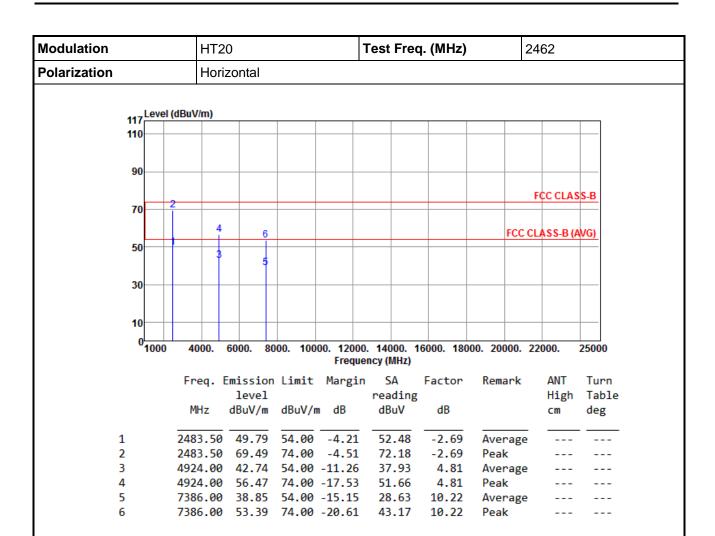


	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	1440.00	38.38	54.00	-15.62	45.32	-6.94	Average		
2	1440.00	44.61	74.00	-29.39	51.55	-6.94	Peak		
3	2390.00	43.12	54.00	-10.88	46.24	-3.12	Average		
4	2390.00	66.64	74.00	-7.36	69.76	-3.12	Peak		
5	4874.00	52.71	54.00	-1.29	47.98	4.73	Average		
6	4874.00	67.99	74.00	-6.01	63.26	4.73	Peak		
7	7311.00	43.37	54.00	-10.63	33.26	10.11	Average		
8	7311.00	56.67	74.00	-17.33	46.56	10.11	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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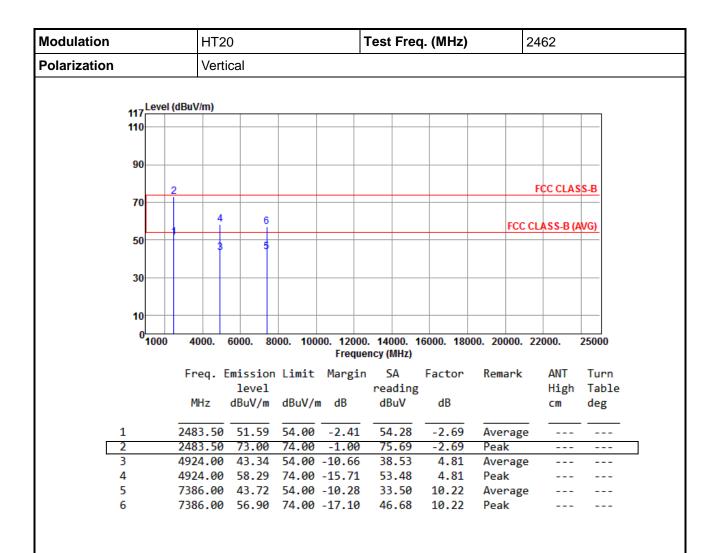


*Factor includes antenna factor , cable loss and amplifier gain

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

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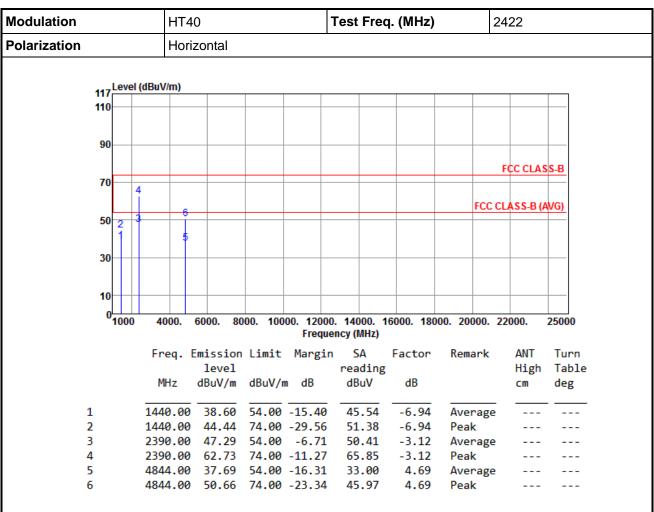
*Factor includes antenna factor , cable loss and amplifier gain

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

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



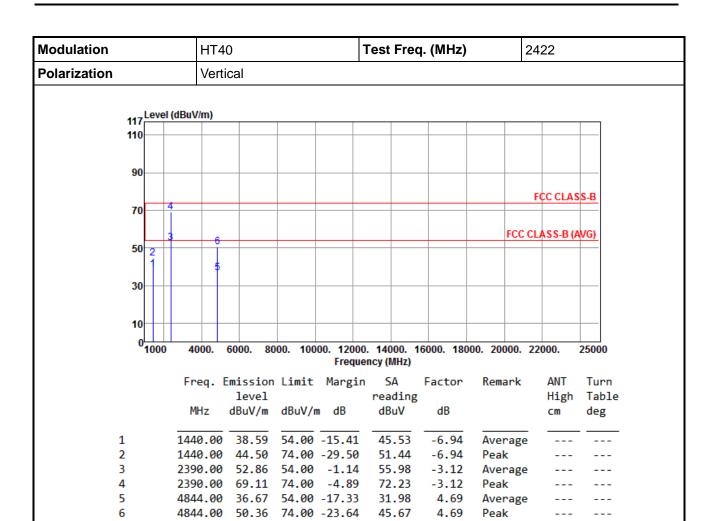
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor , cable loss and amplifier gain

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

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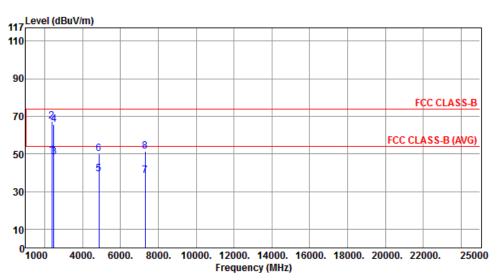
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB) *Factor includes antenna factor, cable loss and amplifier gain

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

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Modulation	HT40	Test Freq. (MHz)	2437
Polarization	Horizontal		



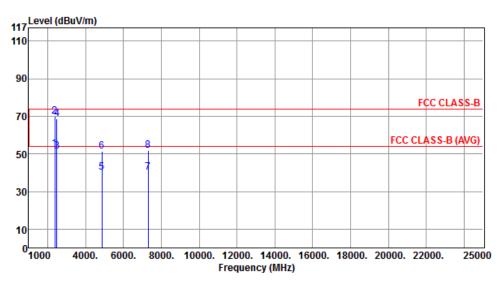
	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2390.00	49.33	54.00	-4.67	52.45	-3.12	Average		
2	2390.00	67.23	74.00	-6.77	70.35	-3.12	Peak		
3	2483.50	48.42	54.00	-5.58	51.11	-2.69	Average		
4	2483.50	65.74	74.00	-8.26	68.43	-2.69	Peak		
5	4874.00	39.28	54.00	-14.72	34.55	4.73	Average		
6	4874.00	50.26	74.00	-23.74	45.53	4.73	Peak		
7	7311.00	38.51	54.00	-15.49	28.40	10.11	Average		
8	7311.00	51.47	74.00	-22.53	41.36	10.11	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	HT40	Test Freq. (MHz)	2437
Polarization	Vertical		

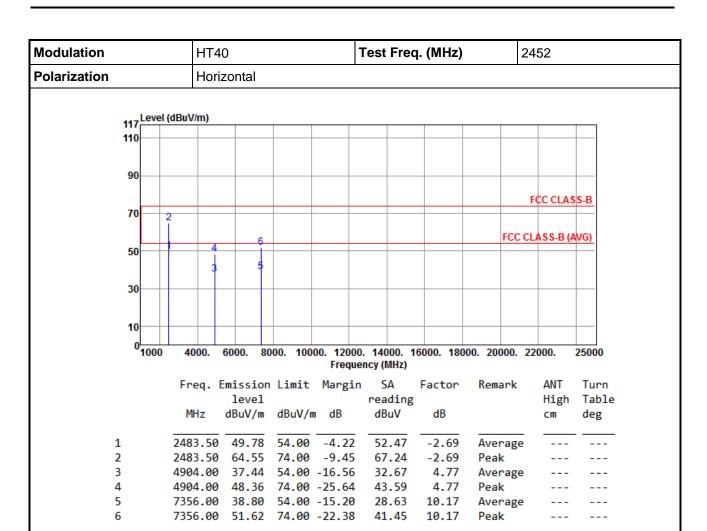


	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2390.00	52.81	54.00	-1.19	55.93	-3.12	Average		
2	2390.00	70.11	74.00	-3.89	73.23	-3.12	Peak		
3	2483.50	51.26	54.00	-2.74	53.95	-2.69	Average		
4	2483.50	68.45	74.00	-5.55	71.14	-2.69	Peak		
5	4874.00	40.20	54.00	-13.80	35.47	4.73	Average		
6	4874.00	51.39	74.00	-22.61	46.66	4.73	Peak		
7	7311.00	40.28	54.00	-13.72	30.17	10.11	Average		
8	7311.00	51.73	74.00	-22.27	41.62	10.11	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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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		HT	40				Tes	t Fre	q. (Mł	łz)		24	52	
Polarization		Ver	tical				•					•		
117 ^{Lev}	/el (dBu	IV/m)						_						
110														
90—														
												F	CC CLAS	SS-B
70	2													
				6								FCC CL	ASS-B (A	WG)
50				5										
30—														-
10														
0 <mark>100</mark>	00 4	4000.	6000.	800	00. 10	000. 120 Fred	000. 14 Juency		16000.	1800	00. 20	000. 22	2000.	2500
	F	rea	Fmissi	ion	limit	Marg			Fact	or	Rem	ark	ANT	Tui
			1			_							112 -1-	

	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	52.37	54.00	-1.63	55.06	-2.69	Average		
2		67.02		-6.98	69.71	-2.69	Peak		
3	4904.00	38.31	54.00	-15.69	33.54	4.77	Average		
4	4904.00	50.41	74.00	-23.59	45.64	4.77	Peak		
5	7356.00	40.65	54.00	-13.35	30.48	10.17	Average		
6	7356.00	52.70	74.00	-21.30	42.53	10.17	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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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

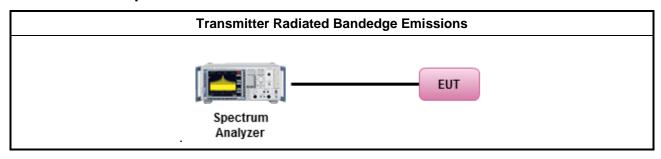
Reference level measurement

- 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

- 1. Set RBW=100kHz, VBW = 300kHz, Detector = Peak, Sweep time = Auto
- 2. Trace = max hold, Allow Trace to fully stabilize
- 3. Scan Frequency range is up to 26.5GHz
- 4. Use the peak marker function to determine the maximum amplitude level

3.6.4 Test Setup

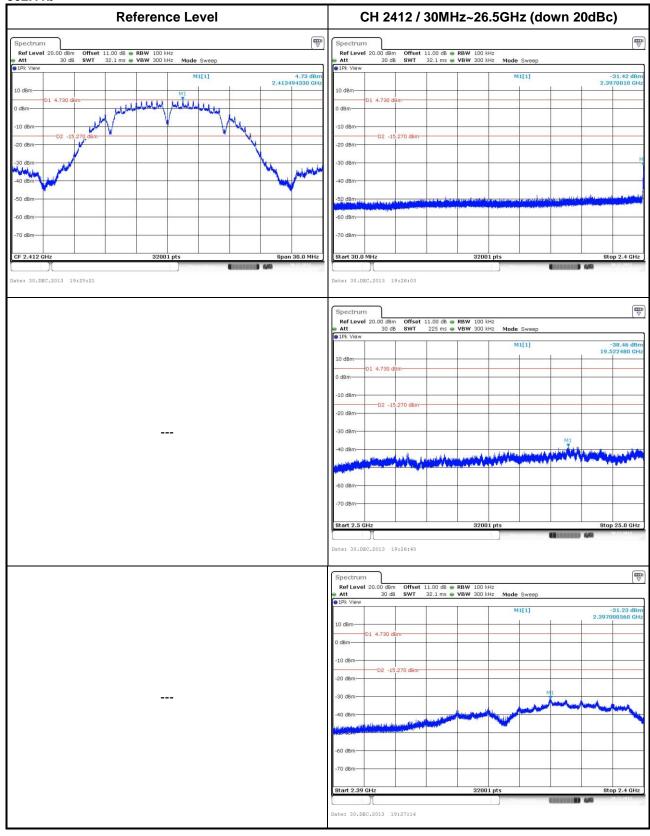


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3.6.5 Test Result of Emissions in non-restricted frequency bands

802.11b



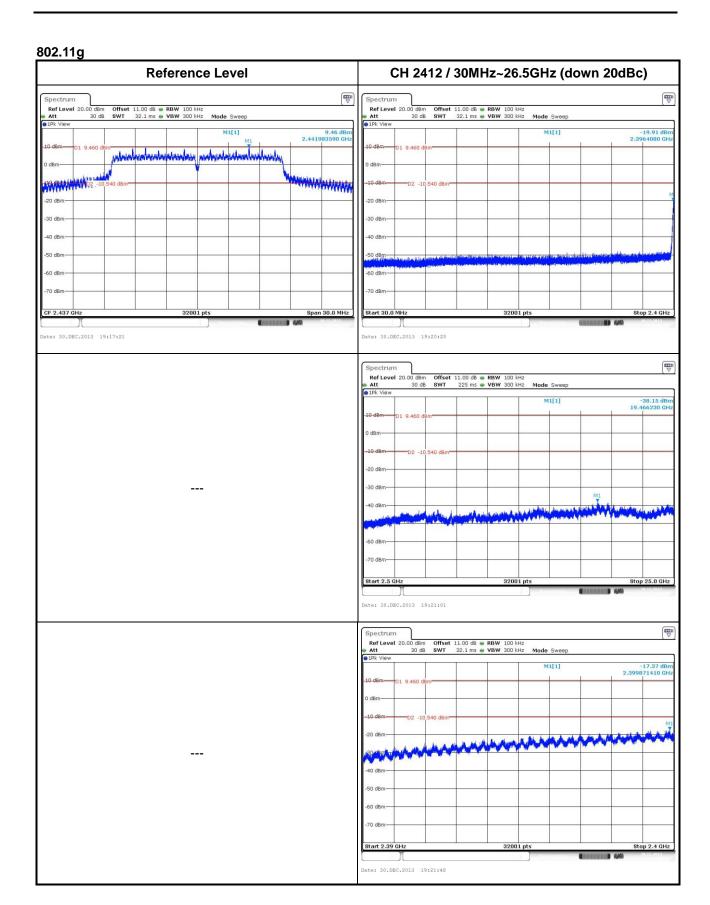
Report No.: FR3D0604 Report Version: Rev. 01





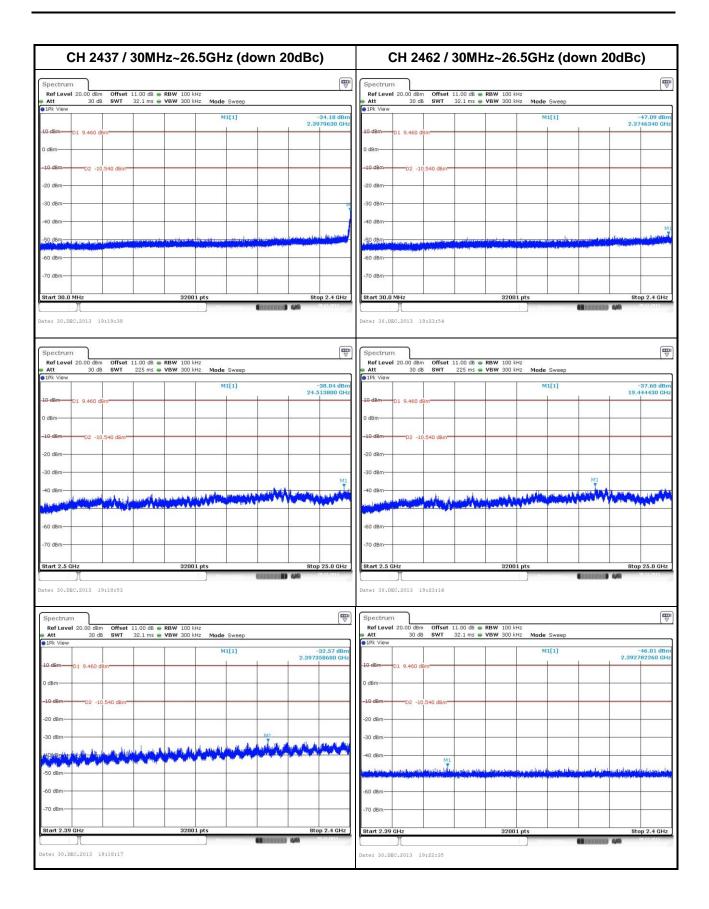
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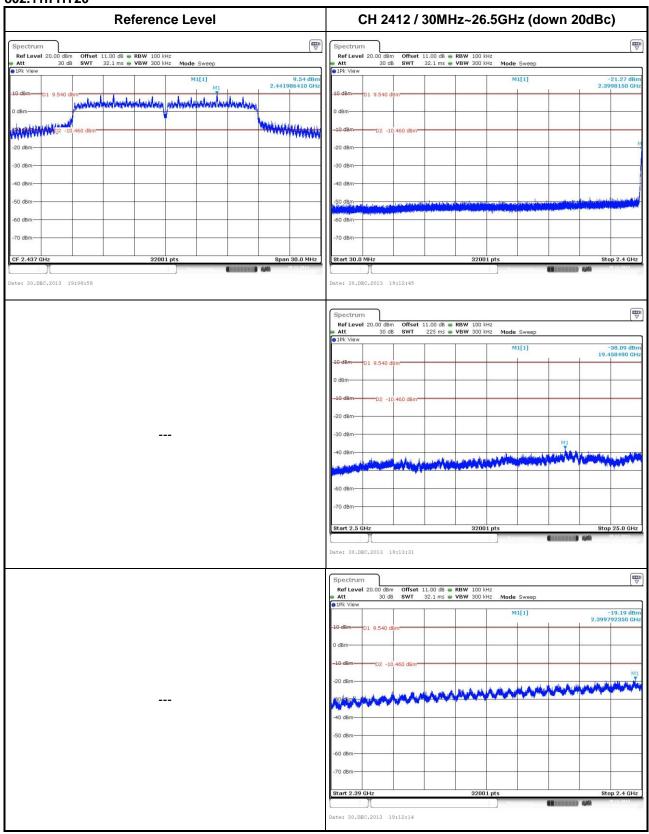




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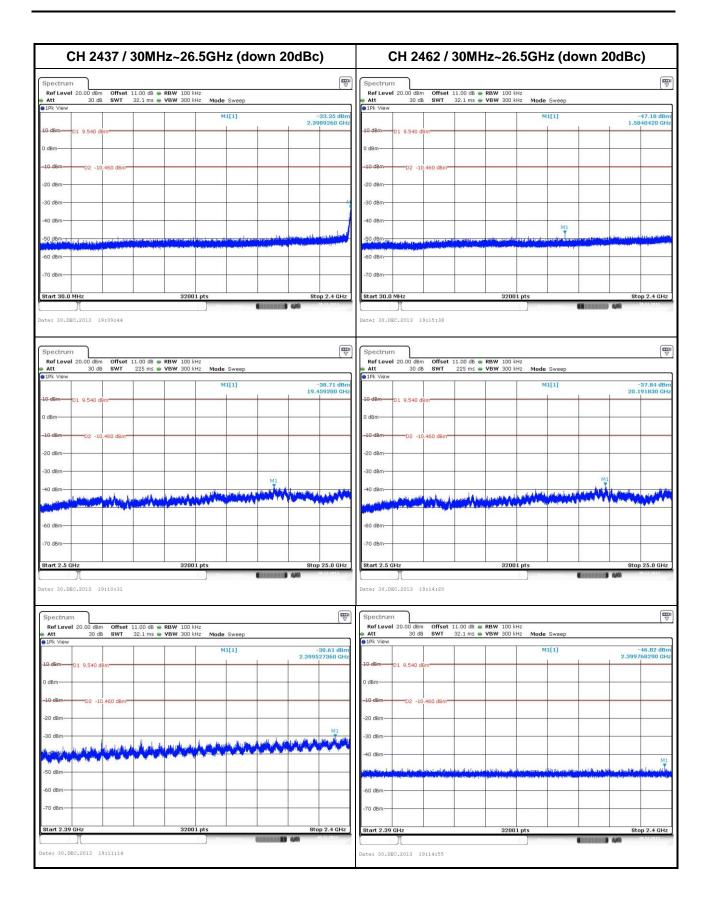


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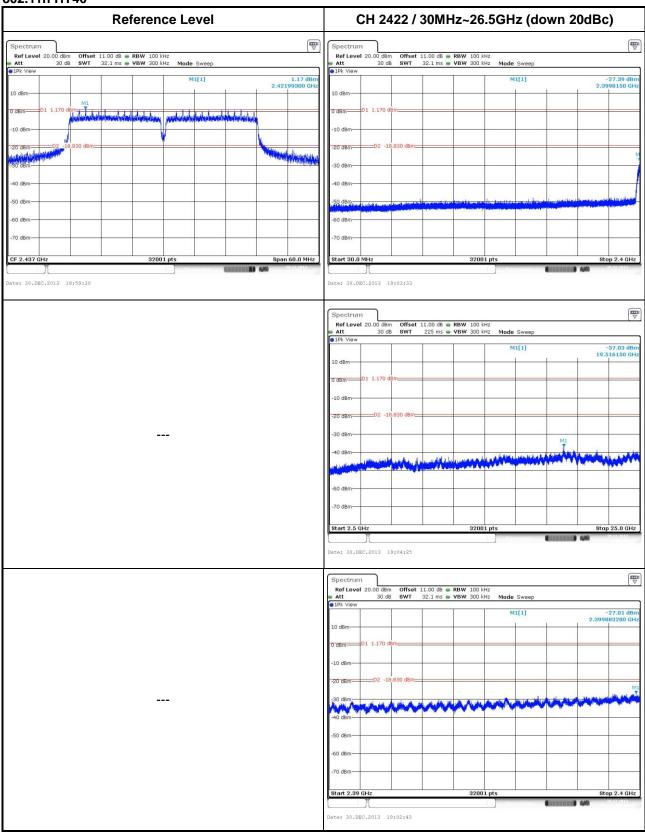




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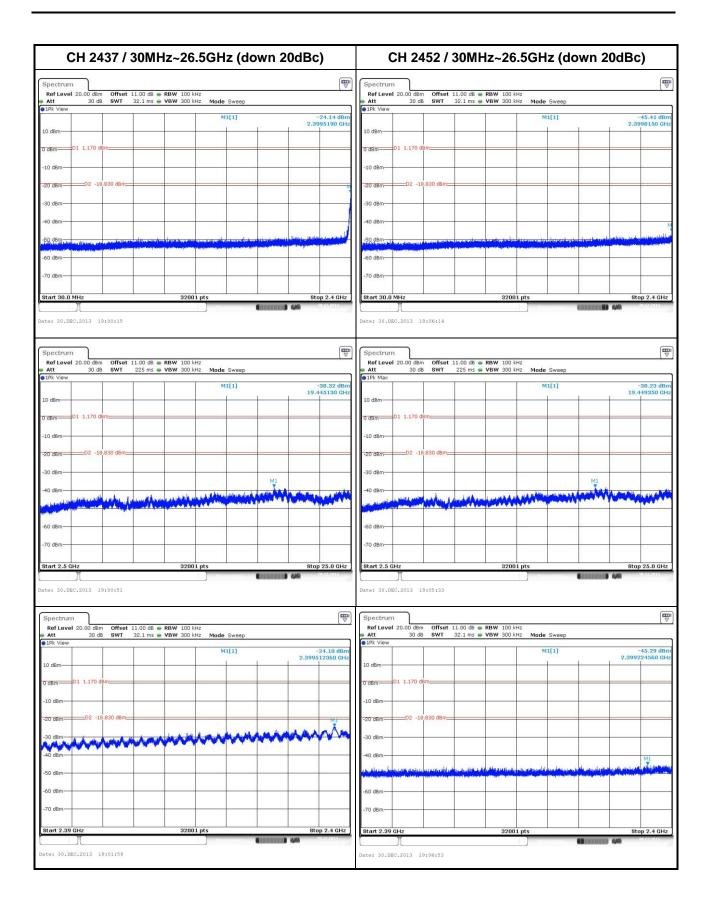


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4 Test laboratory information

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.

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.

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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