Report No.: ER/2015/20009 **Issue Date: Mar. 12, 2015**

Page: 1 of 159

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

Product Name: Vehicle Mount Computer

Honeywell **Brand Name:**

Thor VM3 Marketing Name:

Model No.: VM3WLAN

Model Difference: N/A

FCC ID: HD5-VM3WLANA

ER/2015/20009 **Report No.:**

Issue Date: Mar. 12, 2015

FCC Rule Part: §15.247, Cat: DTS

Honeywell International Inc.,

Honeywell Scanning and Mobility

Prepared for: 9680 Old Bailes Road, Fort Mill, SC 29707,

USA

SGS Taiwan Ltd.

Electronics & Communication Laboratory

No.134, Wu Kung Road, New Taipei Industrial Prepared by:

Park, Wuku District, New Taipei City, Taiwan

24803





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VERIFICATION OF COMPLIANCE

Honeywell International Inc., **Applicant:**

Honeywell Scanning and Mobility

9680 Old Bailes Road, Fort Mill, SC 29707, USA

Vehicle Mount Computer **Product Name:**

Brand Name: Honeywell

Marketing Name: Thor VM3

VM3WLAN **Model No.:**

Model Difference: N/A

FCC ID: HD5-VM3WLANA

File Number: ER/2015/20009

Date of test: Feb. 03, 2015 ~ Mar. 12, 2015

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Date of EUT Received: Feb. 03, 2015

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits.

The test results of this report relate only to the tested sample identified in this report.

Test By:	Marcus Iseng	Date	Mar. 12, 2015
Prepared By:	Marcus Tseng / Engineer Karen Huang	Date	Mar. 12, 2015
Approved By:	Karen Huang / Clerk Jim Chang / Asst. Manager	Date	Mar. 12, 2015

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Revision History

Report Number	Revision	Description	Issue Date
ER/2015/20009	Rev.00	Initial creation of document	Mar. 12, 2015

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GENERAL INFORMATION

Product description

General:

Jeneral.			
Product Name:	Vehicle Mount Computer		
Brand Name:	Honeywel	1	
Marketing Name:	Thor VM3	}	
Model No.:	VM3WLA	ΔN	
Model Difference:	N/A		
Product SW/HW version:	(a)Win7: 99.01.00.0002 (b)Win8: 99.01.00.0004 / ALXH48		
Radio SW/HW version:	10.0.0.27450 / V.1		
Test SW Version:	10.0.0.27450		
RF power setting in TEST SW:	Please foll	ow conducted power file	
	7.3Vdc for	rm Rechargeable Li-ion Battery or 15Vdc from adapter	
Power Supply:	Battery:	Part No.:L3-52301624-R / OVT270L1R00 / 50121692-001, Supplier: TOTEX	
	Adapter:	Model No.:GT-81081-6015-T3 Supplier: GlobTek, Inc.	

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WLAN 2.4GHz:

Wi-Fi	Frequency Range	Channels	Rated Power	Modulation Technology		
11b/g	2412-2462	11	b: 22.05dBm g: 23.35dBm	DSSS, OFDM		
11n	HT20 2412-2462	11	n: 22.81dBm (MIMO Chain0) n: 23.10dBm (MIMO Chain 1) n: 25.96dBm (MIMO Chain0+1)	OFDM		
11n	HT40 2422-2452	7	n: 22.26dBm (MIMO Chain0) n: 22.34dBm (MIMO Chain 1) n: 25.31dBm (MIMO Chain 0+1)	OFDM		
			Internal: PIFA Antenna Part No.: FIT-VM3-ANT-21Y, FIT-VM3-ANT-028 2.4GHz: 4.25dBi			
Antenna Designation:		External: Dipole Antenna 1. Model No.: R380500314, Supplier: LARSEN 2.4GHz: 1.6dBi 2. Model No.: WTS2450, Supplier: Laird Technologies 2.4GHz: 2.1dBi				
Modulation type:		CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM				
Transition Ra	ate:	802.11 b: up to 11 Mbps; 802.11 g: up to 54 Mbps 802.11 n_20MHz: up to 144Mbps 802.11 n_40MHz: up to 300Mbps				

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Product Feature of Equipment Under Test

The equipment under Test (Hereafter Called: EUT) is Vehicle Mount Computer supporting, Wi-Fi 802 11abon and Bluetooth features, and below is details of information

	Product Feature			
Product Name: Vehicle Mount Computer				
Brand Name:	Honeywell			
Marketing Name:	Thor VM3			
Model No.:	VM3WLAN			
Model Difference:	N/A			
FCC ID	HD5-VM3WLANA			
Wi-Fi Specification 802.11a/b/g/n				
Bluetooth Version	V4.0 dual mode			

Note: The above EUT information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

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1.3 **Test Methodology of Applied Standards**

FCC Part 15, Subpart C §15.247

FCC KDB 558074 D01 DTS Meas. Guidance V03r02

FCC KDB 662311 D01 Multiple Transmitter Output V02r01

ANSI C63.10:2013

Note:

- 1. All test items have been performed and record as per the above standards.
- The composite system is compliance with FCC Subpart B is authorized under the certification procedure.
- The EUT was placed 1.5m height for frequency above 1GHz in accordance with ANSI C63. 10:2013

Test Facility 1.4

SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan. (TAF code 0513)

FCC Registration Numbers are: 990257

Canada Registration Number: 4620A-4.

1.5 **Special Accessories**

There are no special accessories used while test was conducted.

1.6 **Equipment Modifications**

There was no modification incorporated into the EUT.

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SYSTEM TEST CONFIGURATION

EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 **EUT Exercise**

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

2.3 **Test Procedure**

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz,. The CISPR Ouasi-Peak and Average detector mode is employed according to \$15.107. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.

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Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

Note:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Following shows an offset computation example with cable loss 1 dB and 10 dB attenuator.

Single mode offset

= RF cable loss (dB)+ attenuation factor(dB)=11(dB)

N20 MIMO mode offset

= RF cable loss (dB)+ attenuation factor(dB)+ 10 log(NANT) dB+ duty factor=14(dB)

N40 MIMO mode offset

= RF cable loss (dB)+ attenuation factor(dB)+ 10 log(NANT) dB+ duty factor=14(dB)

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Configuration of Tested System

Fig. 2-1 Radiated Emission



Fig. 2-2 Conducted (Antenna Port) Configuration



Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	Qualcomm Atheros	10.0.0.27450	N/A	N/A	N/A
2.	DC Power Supply	HP	E3640A	KR93300208	N/A	N/A

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Fig. 2-3 AC Power Line Conducted Emission



Table 2-2 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	Qualcomm Atheros	10.0.0.27450	N/A	N/A	N/A

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SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207(a)	AC Power Line Conducted Emission	Compliant
§15.247(b) (3)	Peak Output Power	Compliant
§15.247(a)(2)	6dB Bandwidth	Compliant
§15.247(d)	Conducted Band Edge and Spurious Emission	Compliant
§15.247(d)	Radiated Band Edge and Spurious Emission	Compliant
§15.247(e)	Power Spectral Density	Compliant
§15.203 §15.247(b)	Antenna Requirement	Compliant

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DESCRIPTION OF TEST MODES

Operated in 2400 ~ 2483.5MHz Band

11 channels are provided for 802.11b, 802.11g and 802.11n HT20

0 vided 101 002:110, 002:11g and 002:11n_11120						
CHANNEL	FREQUENCY	CHANNEL	FREQUENCY			
1	2412 MHz	7	2442 MHz			
2	2417 MHz	8	2447 MHz			
3	2422 MHz	9	2452 MHz			
4	2427 MHz	10	2457 MHz			
5	2432 MHz	11	2462 MHz			
6	2437 MHz					

9 channels are provided for 802.11n_HT40

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz		
5	2432 MHz		
6	2437 MHz		

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The Worst Test Modes and Channel Details

- 1. The EUT has been tested under operating condition.
- 2. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.
- 3. Investigation has been done on all the possible configurations for searching the worst case.

Pre-scanned was done on external antenna: R38050031 and antenna WTS2450, and antenna WTS2450 results higher emission at 2.4GHz. Therefore, the completed set of measurement was done on antenna: WTS2450 to presented on this test repot.

RADIATED EMISSION TEST:

	RADIATED EMISSION TEST (BELOW 1 GHz)						
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT		
802.11g	1 to 11	1,6,11	OFDM	6	MAIN		
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	MCS 8	MIMO		
	RADIATED EMISSION TEST (ABOVE 1 GHz)						
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT		
802.11b	1 to 11	1, 6, 11	DSSS	1	MAIN		
802.11g	1 to 11	1, 6, 11	OFDM	6	MAIN		
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	MCS 8	MIMO		
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	MCS 8	MIMO		

Note:

The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for 802.11b/g/n WLAN Transmitter for channel Low, Mid and High, the worst case H position was reported.

ANTENNA PORT CONDUCTED MEASUREMENT:

	CONDUCTED TEST							
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT			
802.11b	1 to 11	1, 6, 11	DSSS	1	MAIN			
802.11g	1 to 11	1, 6, 11	OFDM	6	MAIN			
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	MCS 8	MIMO			
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	MCS 8	MIMO			

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MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
Peak Output Power	+/- 0.84 dB
6dB Bandwidth	+/- 51.33 Hz
100 KHz Bandwidth Of Frequency Band Edges	+/- 1.55 dB
Peak Power Density	+/- 1.3 dB
Temperature	+/- 0.65 °C
Humidity	+/- 4.6 %
DC / AC Power Source	DC= +/- 0.13%, AC= +/- 0.2%

Radiated Spurious Emission:

	_			
	30MHz - 180MHz: +/- 3.37dB			
Measurement uncertainty (Polarization : Vertical)	180MHz -417MHz: +/- 3.19dB			
	0.417GHz-1GHz: +/- 3.19dB			
(1 oftanzation : Vertical)	1GHz - 18GHz: +/- 4.04dB			
	18GHz - 40GHz: +/- 4.04dB			
	30MHz - 167MHz: +/- 4.22dB			
Measurement uncertainty	167MHz -500MHz: +/- 3.44dB			
(Polarization : Horizontal)	0.5GHz-1GHz: +/- 3.39dB			
	1GHz - 18GHz: +/- 4.08dB			
	18GHz - 40GHz: +/- 4.08dB			

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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CONDUCTED EMISSION TEST

6.1 Standard Applicable

Frequency range within 150kHz to 30MHz shall not exceed the Limit table as below.

Frequency range	Limits dB(uV)		
MHz	Quasi-peak	Average	
0.15 to 0.50	66 to 56	56 to 46	
0.50 to 5	56	46	
5 to 30	60	50	

Note

Measurement Equipment Used 6.2

Conducted Emission Test Site							
EQUIPMENT	MFR MODEL SERIAL		LAST	CAL DUE.			
TYPE		NUMBER	NUMBER	CAL.			
EMI Test Receiver	R&S	ESCI7	100760	05/26/2014	05/25/2015		
LISN	Rolf-Heine	NNB-2/16Z	99012	03/26/2014	03/25/2015		
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	03/19/2014	03/18/2015		
Coaxial Cables	N/A	WK CE Cable	N/A	11/26/2014	11/25/2015		

EUT Setup

- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI 63.10:2013.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
- 3. The LISN was connected with 120Vac/60Hz power source.

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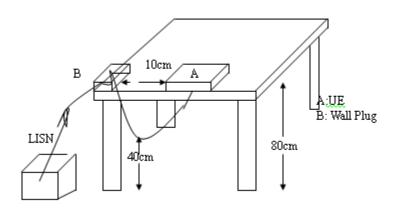
^{1.} The lower limit shall apply at the transition frequencies

^{2.} The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

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6.4 Test SET-UP (Block Diagram of Configuration)



Measurement Procedure

- 1. The EUT was placed on a table which is 0.8m above ground plane.
- 2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 3. Repeat above procedures until all phases of power being supplied by given UE are completed

6.6 **Measurement Result**

Note: Refer to next page for measurement data and plots.

Note2: The * reveals the worst-case results that closet to the limit

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AC POWER LINE CONDUCTED EMISSION TEST DATA

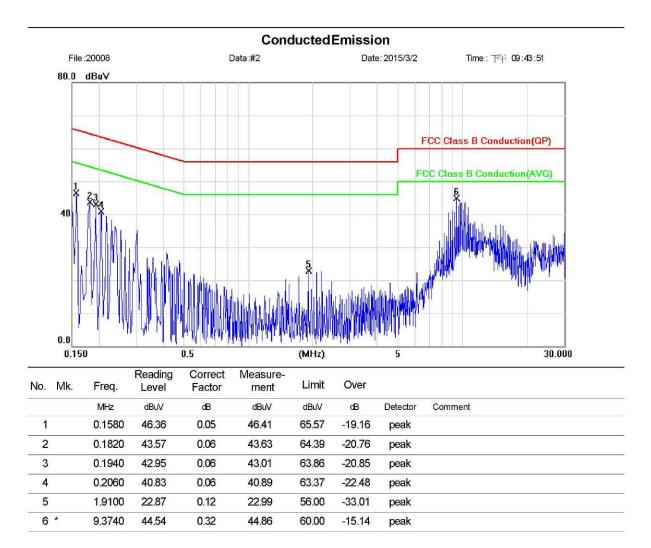
Operation Mode:	Operation mode			Test Date:	Mar. 02, 2015
Temperature:	24 °C	Humidity:	66 %	Test By:	Tin
Model No.:	VM3WLAN				

Site ConductionRoom Phase: L1 Temperature: Power: AC 120V/60Hz Humidity:

Limit: FCC Class B Conduction(QP)

Mode: Operation

Note: Adapter:GT-81081-6015-T3



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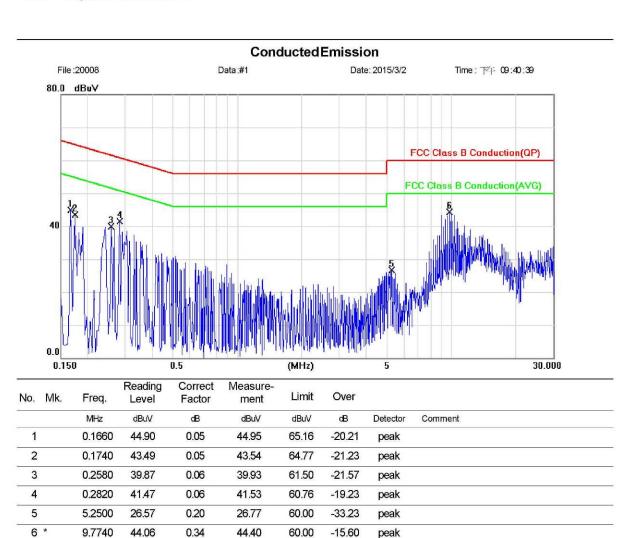
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Site ConductionRoom Phase: N Temperature: 24 °C AC 120V/60Hz Humidity: Limit: FCC Class B Conduction(QP) Power:

Mode: Operation

Note: Adapter:GT-81081-6015-T3



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DUTY CYCLE OF TEST SIGNAL

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle. All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

Formula:

Duty Cycle = Ton / (Ton+Toff)

Measurement Procedure:

- Set span = Zero
- 2. RBW = 8MHz
- 3. VBW = 8MHz,
- 4. Detector = Peak

Duty Cycle:

	Duty Cycle	Duty Fator (dB)
802.11b	99.00%	0.04
802.11g	97.57%	0.11
802.11n_20	96.01%	0.18
802.11n_40	92.98%	0.32

Duty Cycle Factor: $10 * \log (1/0.99) = 0.04$ Duty Cycle Factor: $10 * \log (1/0.9757) = 0.11$ Duty Cycle Factor: $10 * \log (1/0.9601) = 0.18$ Duty Cycle Factor: $10 * \log (1/0.9298) = 0.32$

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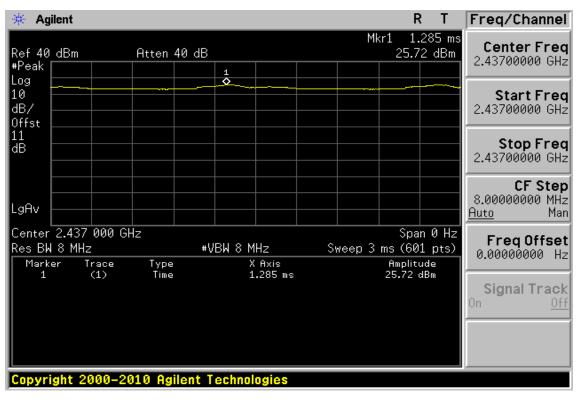
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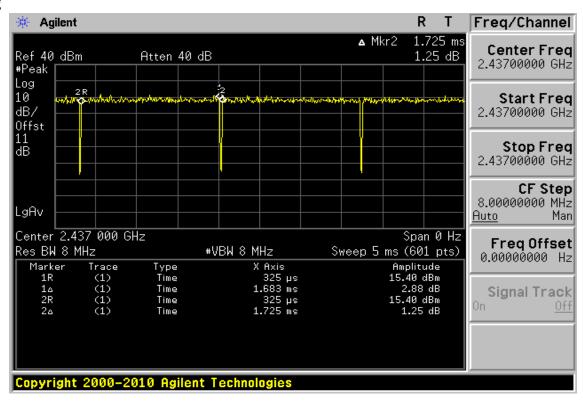
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DUTY CYCLE TEST SIGNAL Measurement Result

802.11 b



802.11 g



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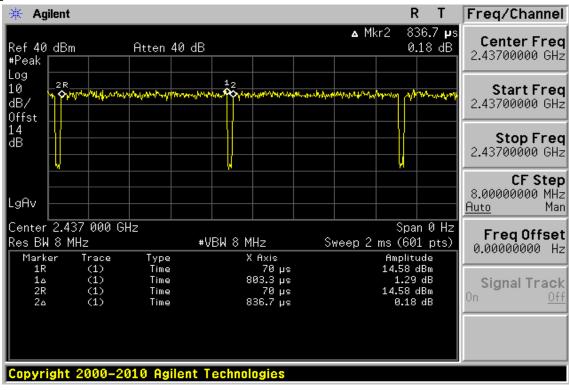
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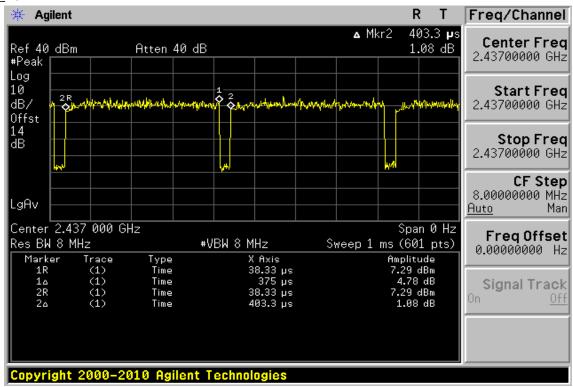


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802.11 n 20 MHz



802.11 n 40 MHz



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PEAK OUTPUT POWER MEASUREMENT

8.1 **Standard Applicable**

For systems using digital modulation in the 2400-2483.5 MHz bands, the limit for peak output power is 1Watt.

If the transmitting antenna of directional gain greater than 6dBi are used the peak output power form the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the Antenna exceeds 6dBi.

In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of Antenna exceeds 6dBi.

Note: The antenna gain is granter than 6 dBi in MIMO mode the limit reduce as below:

Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

Effective Legacy Gain (dBi) = 4.25 + 3.01 = 7.26 dBi

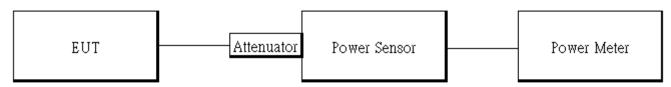
Limit: 30 dBm - (7.26-6 dBi) = 28.74 dBm

8.2 **Measurement Equipment Used**

Conducted Emission Test Site								
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.			
ТҮРЕ		NUMBER	NUMBER	CAL.				
Power Meter	Anritsu	ML2495A	1005007	12/20/2014	12/19/2015			
Power Sensor	Anritsu	MA2411B	917032	12/20/2014	12/19/2015			
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2015	01/01/2016			
Attenuator	Mini-Circuit	BW-S10W2+	002	01/02/2015	01/01/2016			

8.3 **Test Set-up**

Power Meter:



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Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance V03r02.
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter.

Power Meter:

It is used as the auxiliary test equipment to conduct the output power measurement.

- 4. Record the max. Reading as observed from Spectrum or Power Meter.
- 5. Repeat above procedures until all frequency of interest measured was complete.

8.5 **Measurement Result**

802.11b

			Peak Out	put Power			
СН	Frequency (MHz)	DATA RATE	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT	
1	2412	1	21.45	139.637	1 W = 30 dBm	PASS	
6	2437	1	21.88	154.170	1 W = 30 dBm	PASS	
11	2462	1	22.05	160.325	1 W = 30 dBm	PASS	

			Avg. Out	out Power			
СН	Frequency (MHz)	DATA RATE	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT	
1	2412	1	19.10	81.283	1 W = 30 dBm	PASS	
6	2437	1	19.63	91.833	1 W = 30 dBm	PASS	
11	2462	1	19.92	98.175	1 W = 30 dBm	PASS	

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802.11g

			Peak Out	put Power			
СН	Frequency (MHz)	DATA RATE	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT	
1	2412	6	21.31	135.207	1 W = 30 dBm	PASS	
6	2437	6	23.35	216.272	1 W = 30 dBm	PASS	
11	2462	6	23.25	211.349	1 W = 30 dBm	PASS	

			Avg. Out	put Power			
СН	Frequency (MHz)	DATA RATE	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)	RESULT	
1	2412	6	14.35	27.227	1 W = 30 dBm	PASS	
6	2437	6	14.38	27.416	1 W = 30 dBm	PASS	
11	2462	6	14.22	26.424	1 W = 30 dBm	PASS	

802.11n HT20

	E	ВАТА	Peak Outout Power (dBm)		TOTAL	TOTAL	REQUIRED	
СН	Frequency (MHz)	DATA RATE	CHAIN 0	CHAIN 1	POWER (dBm)	POWER (mW)	LIMIT (dBm)	RESULT
1	2412	MCS8	21.73	22.31	25.04	319.152	28.74 dBm	PASS
6	2437	MCS8	22.81	22.93	25.88	387.321	28.74 dBm	PASS
11	2462	MCS8	22.79	23.10	25.96	394.282	28.74 dBm	PASS

	Fraguenav	DATA	Avg. Outout Power (dBm)		TOTAL	TOTAL	REQUIRED	
СН	Frequency (MHz)	RATE	CHAIN 0	CHAIN 1	POWER (dBm)	POWER (mW)	LIMIT (dBm)	RESULT
1	2412	MCS8	11.71	12.27	15.01	31.691	28.74 dBm	PASS
6	2437	MCS8	13.13	13.29	16.22	41.889	28.74 dBm	PASS
11	2462	MCS8	13.12	13.69	16.42	43.900	28.74 dBm	PASS

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802.11n HT40

Enggrange		DATA	Peak Outout Power (dBm)		TOTAL	TOTAL	REQUIRED	
СН	Frequency (MHz)	RATE	CHAIN 0	CHAIN 1	POWER (dBm)	POWER (mW)	LIMIT (dBm)	RESULT
3	2422	MCS8	21.37	21.98	24.70	294.849	28.74 dBm	PASS
6	2437	MCS8	22.26	22.34	25.31	339.663	28.74 dBm	PASS
9	2452	MCS8	21.89	22.07	24.99	315.590	28.74 dBm	PASS

	E	БАТА	Avg. Outout Power (dBm)		TOTAL	TOTAL	REQUIRED	
СН	Frequency (MHz)	DATA RATE	CHAIN 0	CHAIN 1	POWER (dBm)	POWER (mW)	LIMIT (dBm)	RESULT
3	2422	MCS8	10.86	11.41	14.15	26.026	28.74 dBm	PASS
6	2437	MCS8	12.16	12.24	15.21	33.193	28.74 dBm	PASS
9	2452	MCS8	11.47	11.58	14.54	28.416	28.74 dBm	PASS

^{*} Note: The duty cycle factor is compensated to obtain the maximum value of measurement in average.

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6dB BANDWIDTH

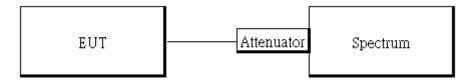
Standard Applicable

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

9.2 **Measurement Equipment Used**

Conducted Emission Test Site								
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.			
TYPE		NUMBER	NUMBER	CAL.				
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015			
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2015	01/01/2016			
Attenuator	Mini-Circuit	BW-S10W2+	002	01/02/2015	01/01/2016			

9.3 **Test Set-up**



9.4 **Measurement Procedure**

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance V03r02.
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set the spectrum analyzer as RBW = 100 kHz, VBW = 3*RBW, Span = 30M/50MHz, Detector=Peak, Sweep=auto.
- 4. Mark the peak frequency and –6dB (upper and lower) frequency.
- 5. Repeat above procedures until all frequency of interest measured was complete.

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9.5 **Measurement Result**

Frequency	Bandwidth	Limit	Result					
(MHz)	(kHz)	(kHz)	Result					
802.11b								
2412	10095	> 500	PASS					
2437	10148	> 500	PASS					
2462	10117	> 500	PASS					
	802	.11g						
2412	16441	> 500	PASS					
2437	16417	> 500	PASS					
2462	16400	> 500	PASS					
	802.11n_H	T20 (Main)						
2412	17668	> 500	PASS					
2437	17681	> 500	PASS					
2462	17678	> 500	PASS					
	802.11n_H	T20 (Aux)						
2412	17690	> 500	PASS					
2437	17695	> 500	PASS					
2462	17654	> 500	PASS					
	802.11n_H	T40 (Main)						
2422	36046	> 500	PASS					
2437	36353	> 500	PASS					
2452	36375	> 500	PASS					
	802.11n_H	T40 (Aux)						
2422	36205	> 500	PASS					
2437	36420	> 500	PASS					
2452	36322	> 500	PASS					

^{*} Note: The arrow "->" reveals X decibel level

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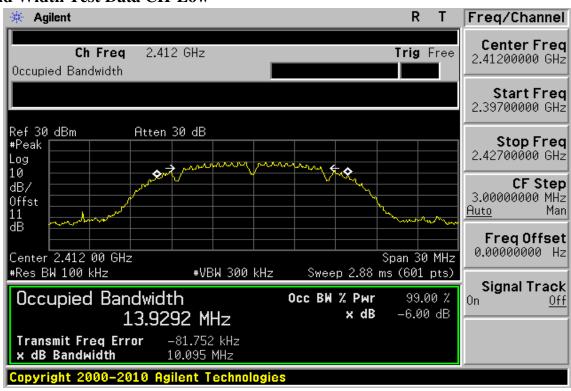
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^{*}Refer to next page for plots

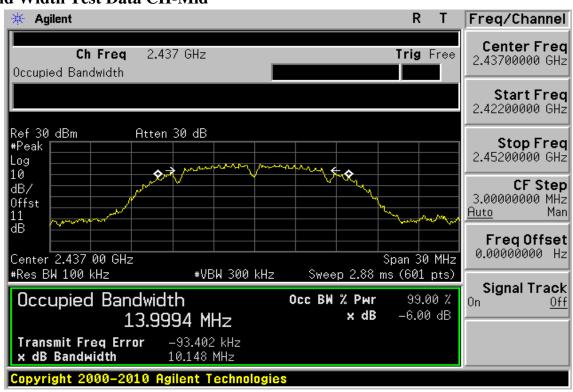


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802.11b 6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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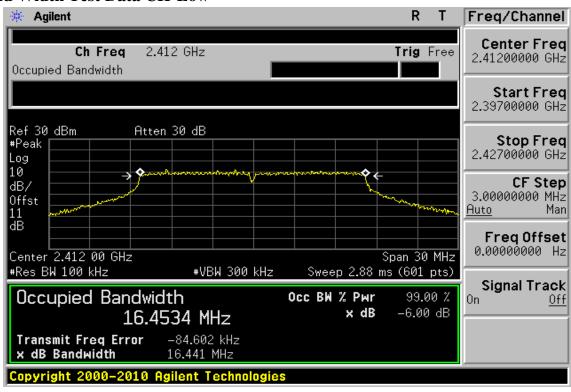
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6dB Band Width Test Data CH-High



802.11g

6dB Band Width Test Data CH-Low



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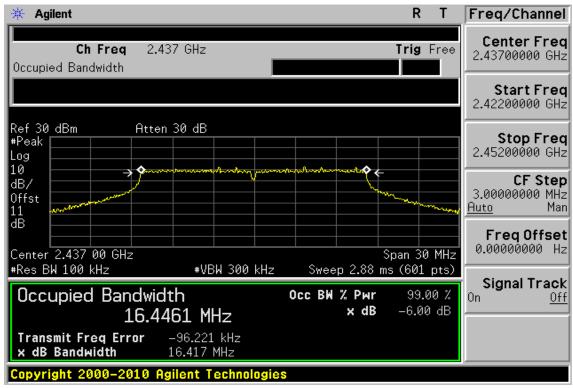
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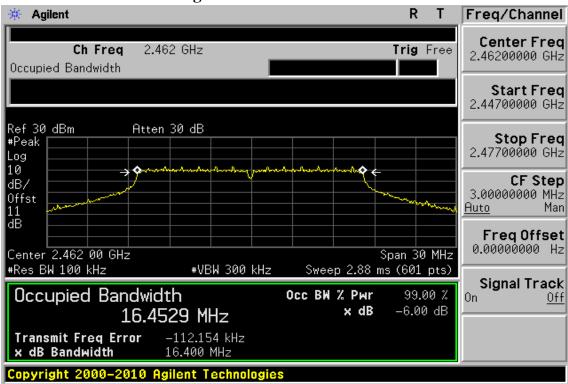


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6dB Band Width Test Data CH-Mid



6dB Band Width Test Data CH-High



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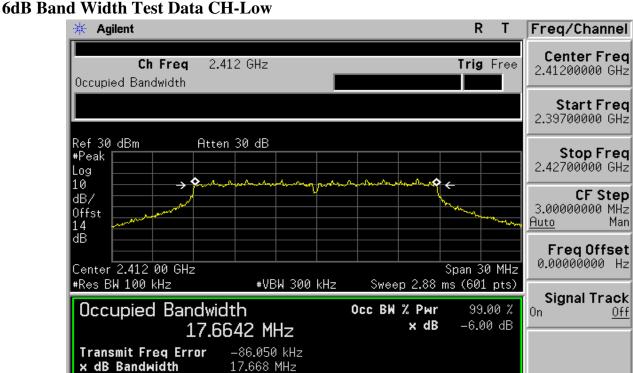
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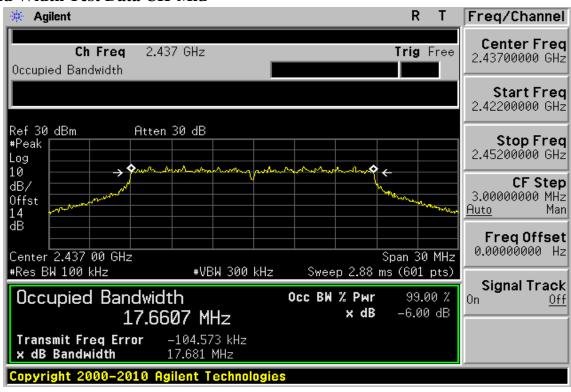
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802.11n 20M (Main)



6dB Band Width Test Data CH-Mid

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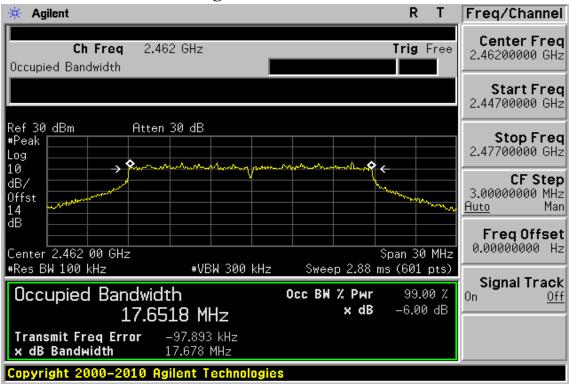
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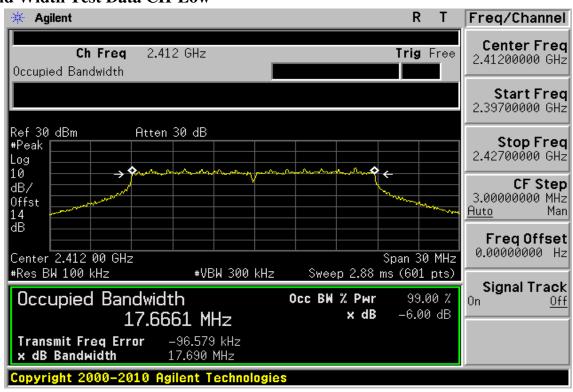
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6dB Band Width Test Data CH-High



802.11n 20M (Aux)

6dB Band Width Test Data CH-Low



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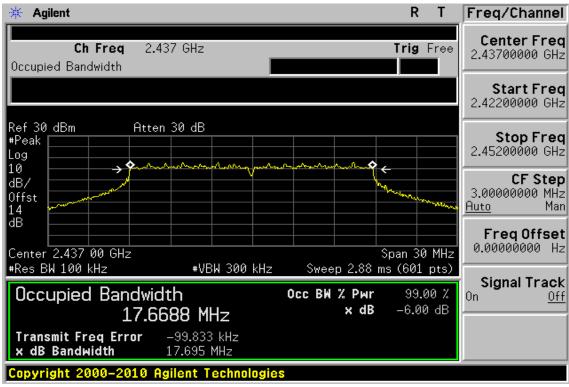
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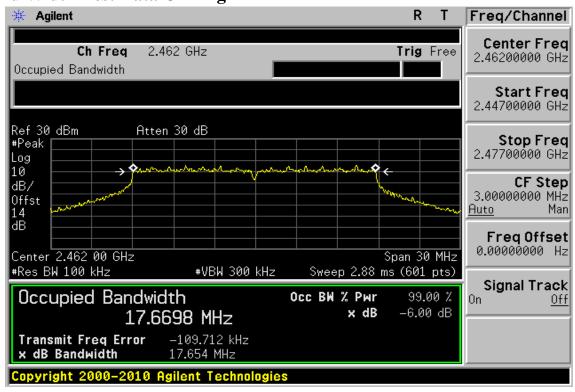


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6dB Band Width Test Data CH-Mid



6dB Band Width Test Data CH-High



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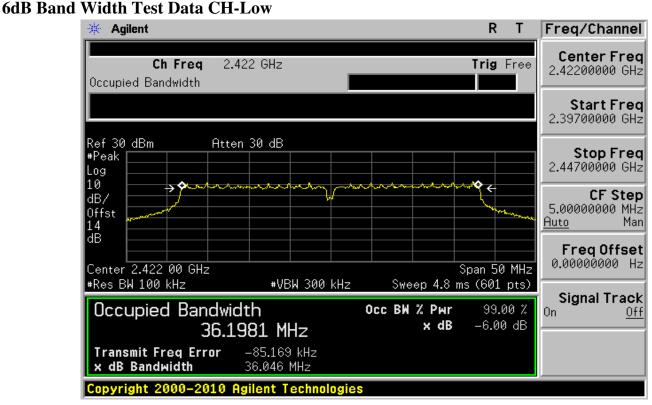
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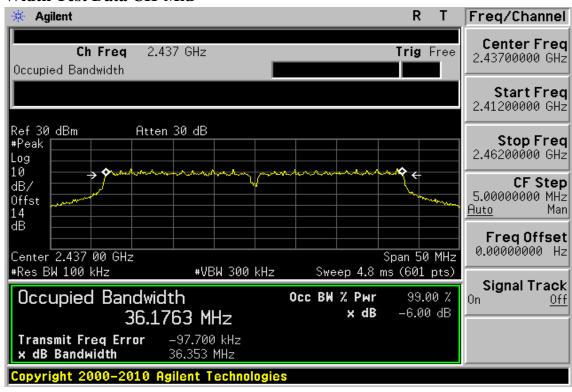


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802.11 n 40M (Main)



6dB Band Width Test Data CH-Mid



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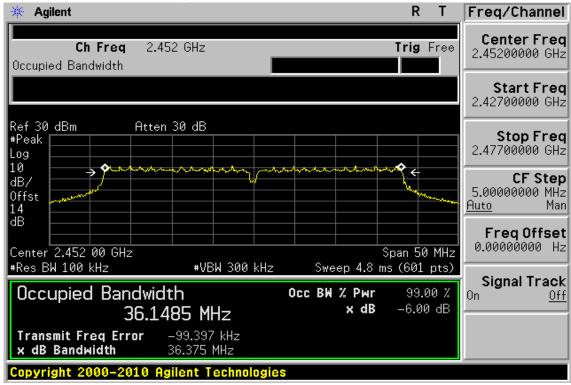
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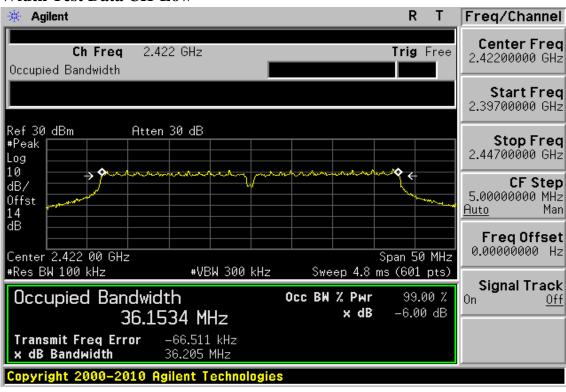
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6dB Band Width Test Data CH-High



802.11 n 40M (Aux)

6dB Band Width Test Data CH-Low



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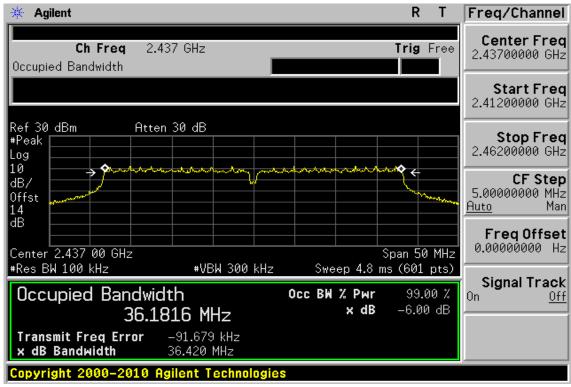
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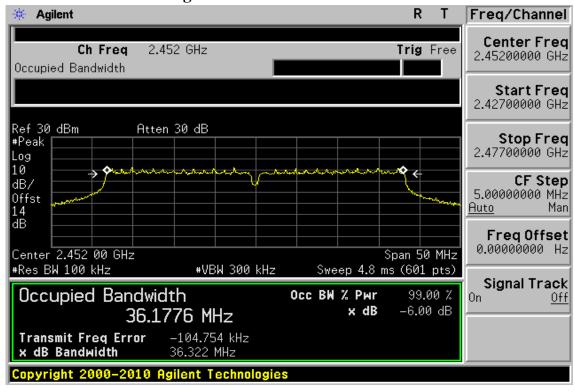


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6dB Band Width Test Data CH-Mid



6dB Band Width Test Data CH-High



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10 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

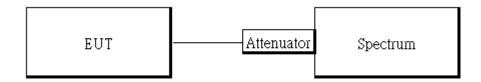
10.1 Standard Applicable

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

10.2 Measurement Equipment Used

Conducted Emission Test Site									
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.				
TYPE		NUMBER	NUMBER	CAL.					
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015				
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2015	01/01/2016				
Attenuator	Mini-Circuit	BW-S10W2+	002	01/02/2015	01/01/2016				

10.3 Test SET-UP



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10.3.1 Measurement Procedure

Conducted Band Edge:

- 1. To connect Antenna Port of EUT to Spectrum.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance V03r02.
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 4. Set start to edge frequency, and stop frequency of spectrum analyzer so as to encompass the spectrum to be examined.
- 5. Set the spectrum analyzer as RBW, VBW=300KHz, Detector = Peak, Sweep = auto
- 6. Mark the highest reading of the emission as the reference level measurement.
- 7. Set DL as the limit = reading on marker 1 20dBm
- 8. Marker on frequency, 2.3999GHz and 2.4836GHz, and examine shall 100 KHz immediately outside the authorized (2400~2483.5) be attenuated by 20dB at least relative to the maximum emission of power.
- 9. Repeat above procedures until all default test channel (low, middle, and high) was complete.

Conducted Spurious Emission:

- 1. To connect Antenna Port of EUT to Spectrum
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance V03r02.
- 3. Set RBW = $100K \& VBW \ge 300K$, Detector = Peak, Sweep = Auto.
- 4. Allow trace to fully stabilize.
- 5. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
- 6. Repeat above procedures until all default test channel measured were complete.

10.4 Measurement Result

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

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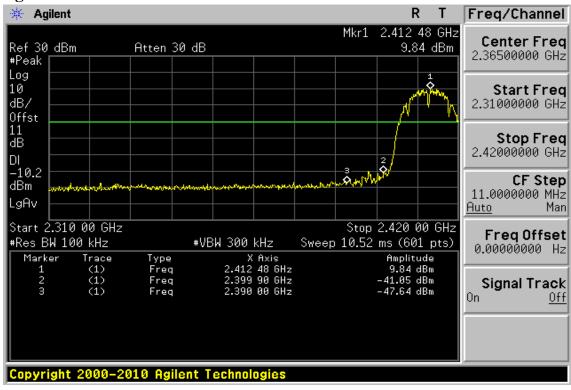
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802.11b **Band Edges Test Data CH-Low**



Band Edges Test Data CH-High



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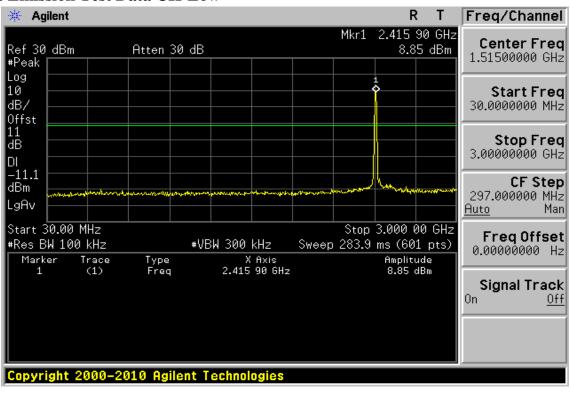
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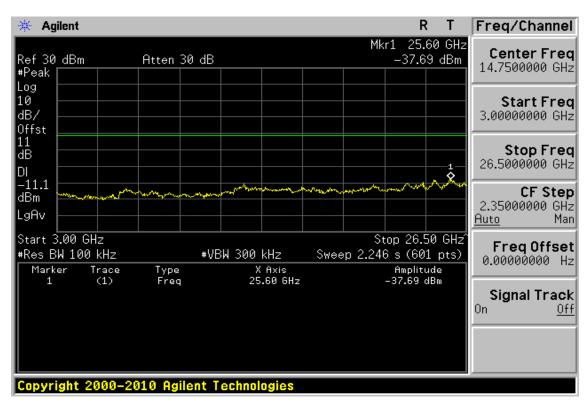
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802.11b **Spurious Emission Test Data CH-Low**





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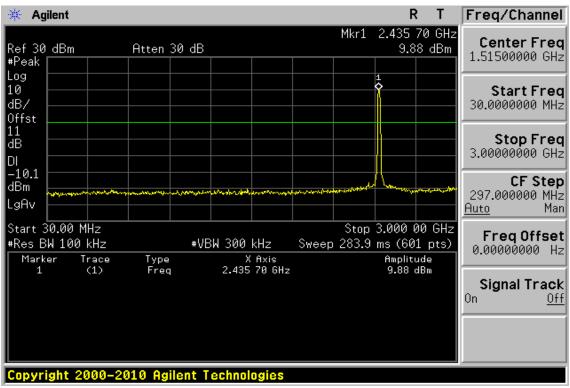
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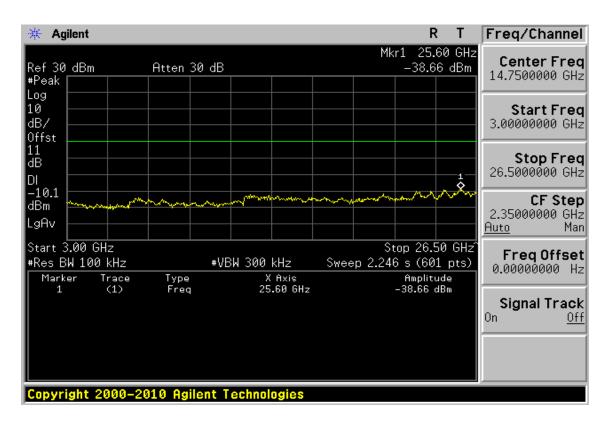
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Spurious Emission Test Data CH-Mid





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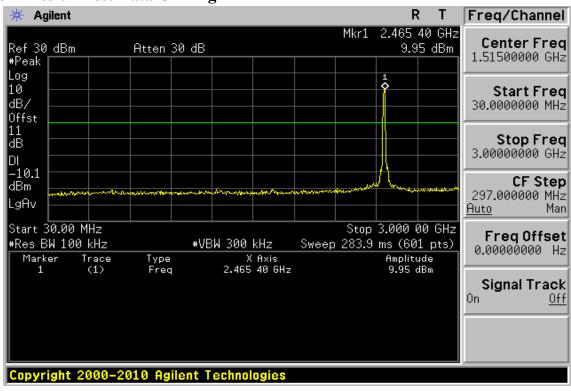
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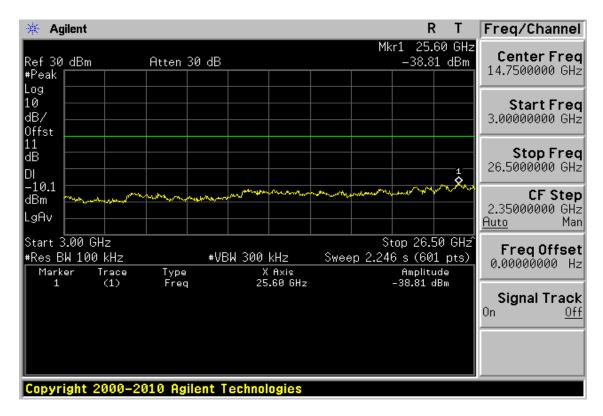
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Spurious Emission Test Data CH-High





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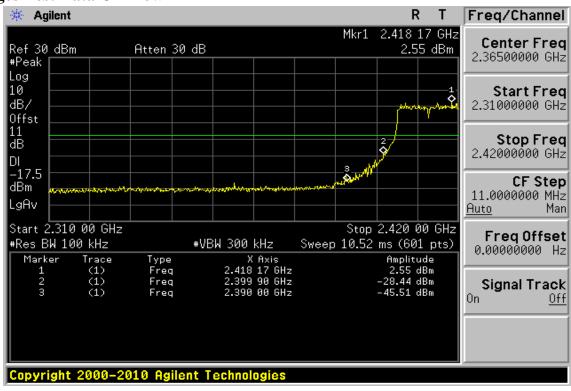
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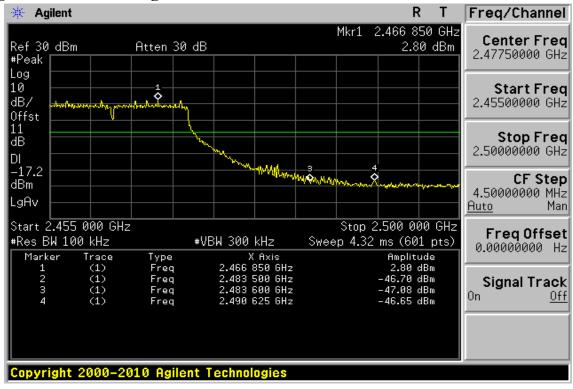


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802.11g **Band Edges Test Data CH-Low**



Band Edges Test Data CH-High



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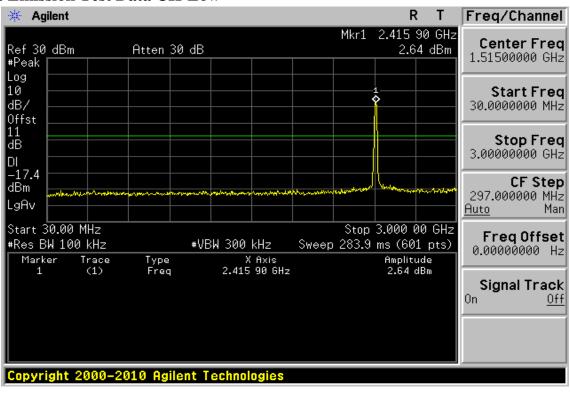
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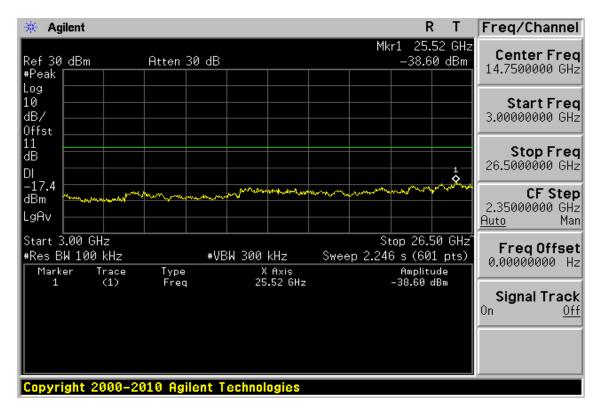
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802.11g **Spurious Emission Test Data CH-Low**





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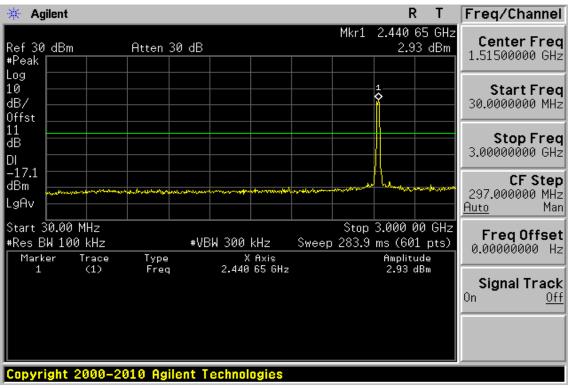
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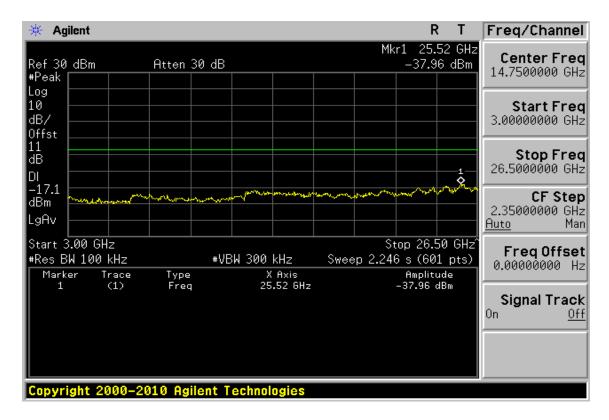
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Spurious Emission Test Data CH-Mid





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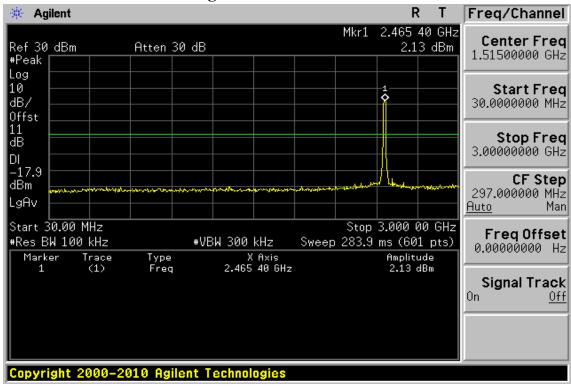
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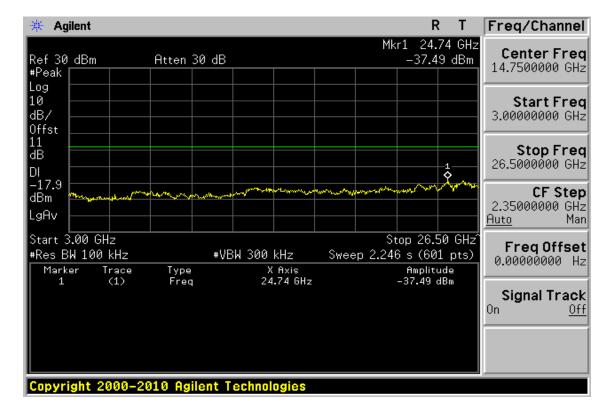
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Spurious Emission Test Data CH-High





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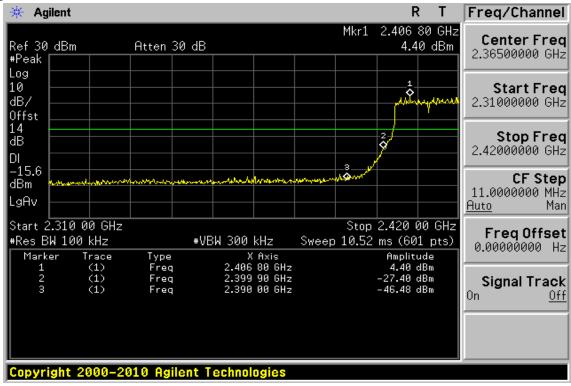
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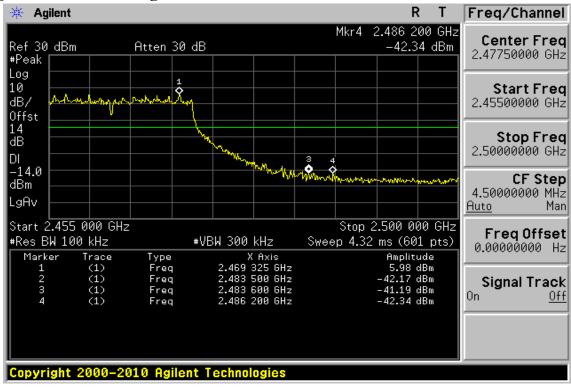
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802.11n_HT20

Band Edges Test Data CH-Low



Band Edges Test Data CH-High



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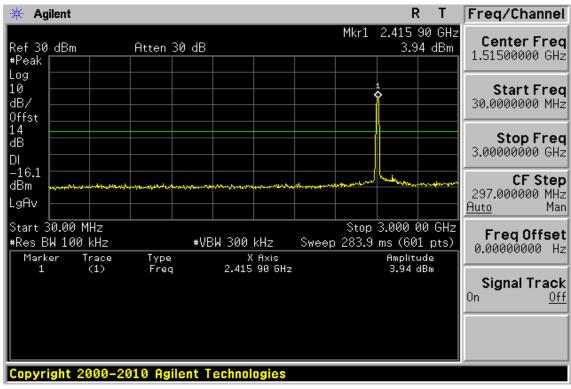
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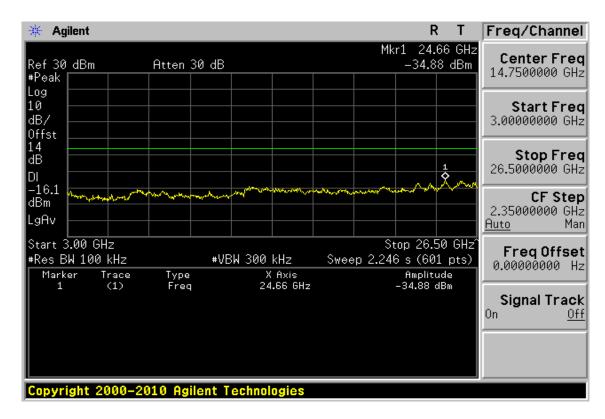


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802.11n HT20

Spurious Emission Test Data CH-Low





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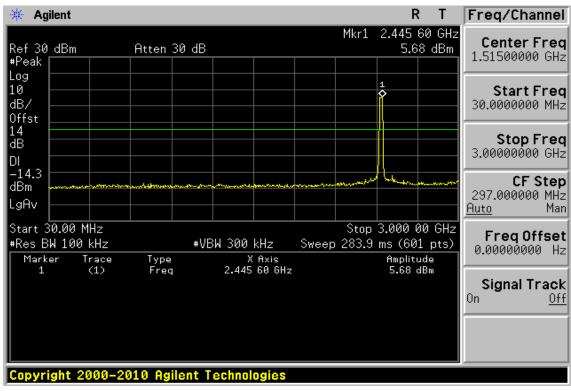
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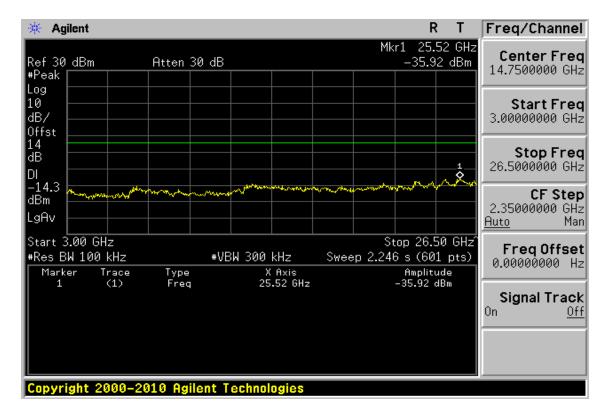
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Spurious Emission Test Data CH-Mid





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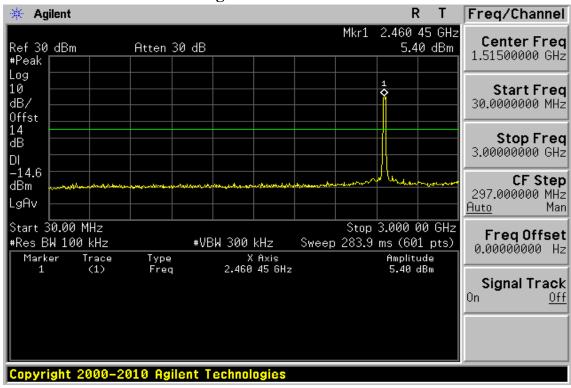
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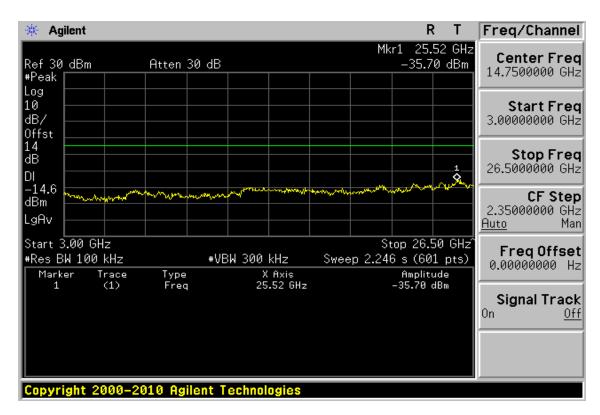
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Spurious Emission Test Data CH-High





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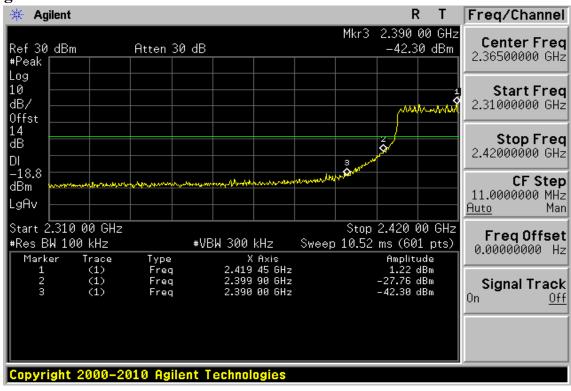
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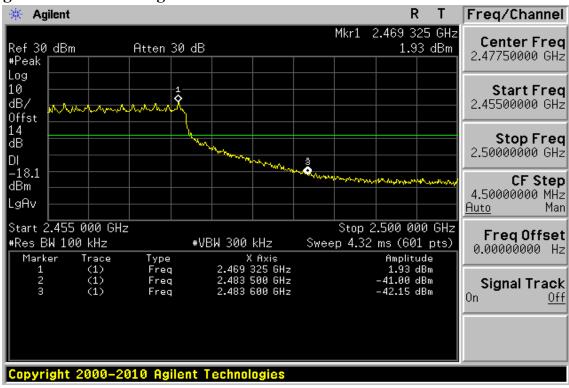
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802.11n HT40

Band Edges Test Data CH-Low



Band Edges Test Data CH-High



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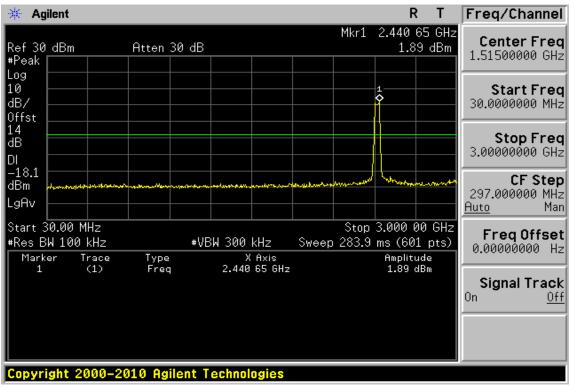
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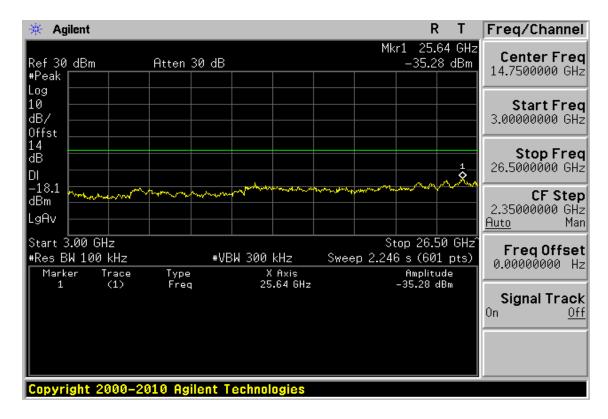


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802.11n HT40

Spurious Emission Test Data CH-Low





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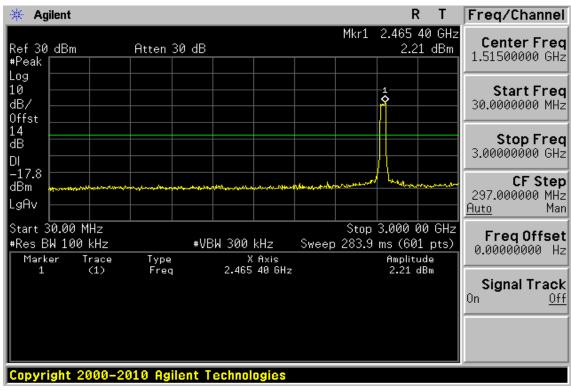
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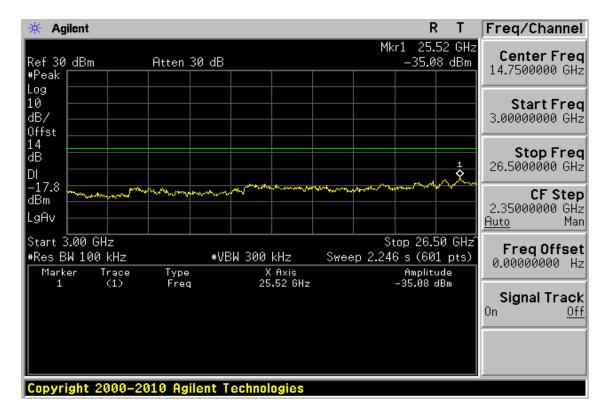
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Spurious Emission Test Data CH-Mid





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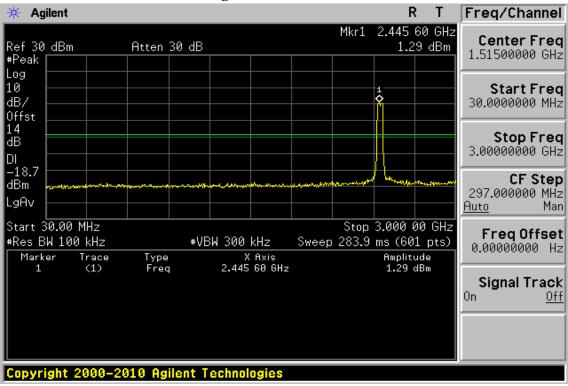
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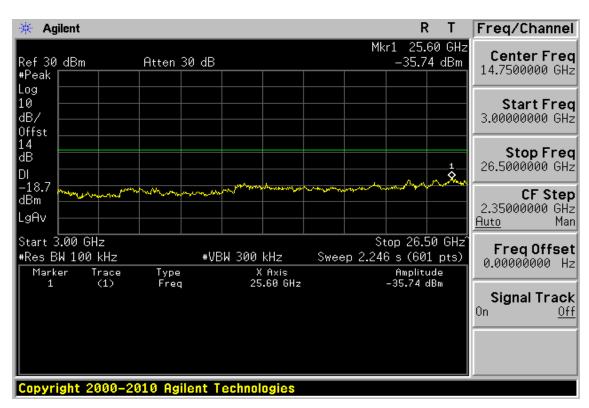
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Spurious Emission Test Data CH-High





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11 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT

11.1 Standard Applicable

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands must also comply with the §15.209 limit as below.

And according to §15.33(a) (1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

Frequency (MHz)	Field strength (microvolts/meter)	Distance (meters)
0.009-0.490	2400/F(KHz)	300
0.490-1.705	24000/F(KHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:

- The lower limit shall apply at the transition frequencies.
- 2. Emission level $(dB\mu V/m) = 20 \log Emission level (dB\mu V/m)$

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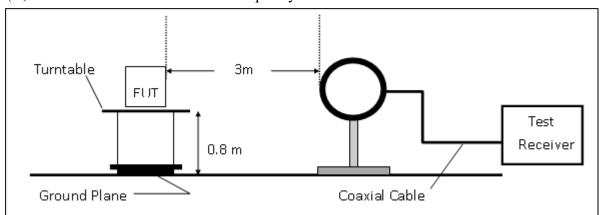
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11.2 Measurement Equipment Used:

	966 Chamber										
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.						
TYPE		NUMBER	NUMBER	CAL.							
EMI Test Receiver	R&S	ESCI7	100760	05/26/2014	05/25/2015						
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	12/22/2014	12/21/2015						
Spectrum Analyzer	R&S	FSV-30	101398	10/07/2014	10/06/2015						
Loop Antenna	ETS.LINDGREN	6502	00148045	07/03/2014	07/02/2015						
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/23/2014	12/22/2015						
Horn antenna	ETS.LINDGREN	3117	123995	05/19/2014	05/18/2015						
Horn Antenna	Schwarzbeck	BBHA9170	184	12/25/2014	12/24/2015						
Pre-Amplifier	Agilent	8447D	2944A07676	01/02/2015	01/01/2016						
Pre-Amplifier	Agilent	8449B	8449B 3008A00578		01/01/2016						
Pre-Amplifier	EMC Instruments Corp.	EMC184045	980135	01/02/2015	01/01/2016						
Filter 2400-2483.5 MHz	EWT	EWT-14-0166	M2	01/02/2015	01/01/2016						
Attenuator	Mini-Circuit	BW-S10W2+	004	01/02/2015	01/01/2016						
Turn Table	HD	DT420	N/A	N.C.R	N.C.R						
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R						
Controller	HD	HD100	N/A	N.C.R	N.C.R						
Low Loss Cable	Huber Suhner	966_Rx	9	01/02/2015	01/01/2016						

11.3 Test SET-UP

(A) Radiated Emission Test Set-UP Frequency Below 30MHz.

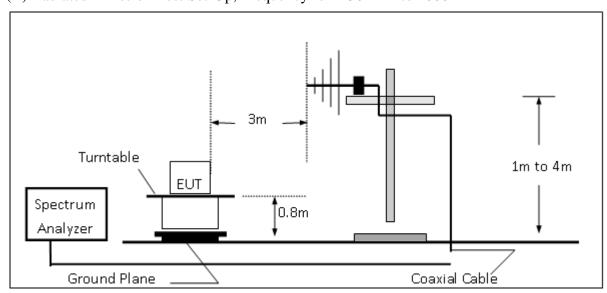


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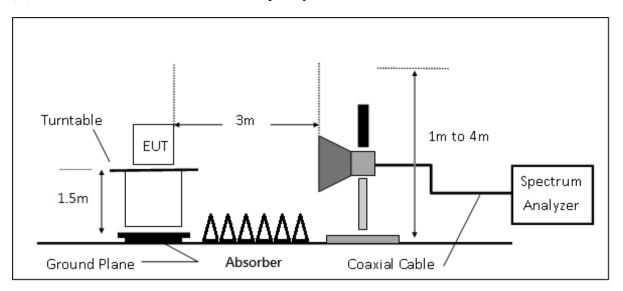
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(B) Radiated Emission Test Set-Up, Frequency form 30MHz to 1000MHz



(C) Radiated Emission Test Set-UP Frequency Over 1 GHz



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11.3.1 Measurement Procedure

- 1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance V03r02.
- 2. The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequency> 1GHz above ground plane.
- 3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
- 4. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
- 5. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.
- 6. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
- 7. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
- 8. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
- 9. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- 10. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 11. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. On spectrum, change spectrum mode in linear display mode, and reduce VBW = 10Hz if average reading is measured.
- 12. Repeat above procedures until all default test channel measured were complete.

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11.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

Actual $FS(dB\mu V/m) = SPA$. Reading level $(dB\mu V) + Factor(dB)$

Factor(dB) = Antenna Factor(dB μ V/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

Note:

"F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E": denotes Band Edge Frequency.; "S": denotes Spurious Frequency.

11.5 Test Results of Radiated Spurious Emissions form 9 KHz to 30 MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) was not reported.

11.6 Measurement Result

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

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Fundamental Frequency

FCC ID: HD5-VM3WLANA

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:21 deg_C / 61 RH

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Radiated Band Edge Measurement Result (802.11b) **Internal Antenna**

:2412 MHz

Operation Band :802.11 b Test Date :2015-02-24

Temp./Humi.

Operation Mode :Band Edge LOW Engineer :Curry

EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	44.11	5.16	49.27	54.00	-4.73
2390.00	E	Peak	54.72	5.16	59.88	74.00	-14.12

Operation Band :802.11 b Test Date :2015-02-24

Fundamental Frequency :2412 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :Band Edge LOW Engineer :Curry

EUT Pol. :HORIZONTAL :H Plane Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	44.88	5.16	50.04	54.00	-3.96
2390.00	E	Peak	55.72	5.16	60.88	74.00	-13.12

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Operation Band :802.11 b Test Date :2015-02-24

Fundamental Frequency :2462 MHz Temp./Humi. :21 deg_C / 61 RH Operation Mode :Band Edge HIGH Engineer :Curry

EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	44.19	6.01	50.20	54.00	-3.80
2483.50	E	Peak	54.92	6.01	60.93	74.00	-13.07
2486.50	S	Average	45.17	6.05	51.22	54.00	-2.78
2486.50	S	Peak	56.55	6.05	62.60	74.00	-11.40

Operation Band :802.11 b Test Date :2015-02-24

Fundamental Frequency :2462 MHz Temp./Humi. :21 deg_C / 61 RH

Engineer Operation Mode :Band Edge HIGH :Curry

:HORIZONTAL EUT Pol. :H Plane Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	45.02	6.01	51.03	54.00	-2.97
2483.50	E	Peak	55.46	6.01	61.47	74.00	-12.53

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Radiated Band Edge Measurement Result (802.11g)

Operation Band :802.11 g Test Date :2015-02-24

Fundamental Frequency :2412 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :Band Edge LOW Engineer :Curry EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	45.30	5.16	50.46	54.00	-3.54
2390.00	E	Peak	65.60	5.16	70.76	74.00	-3.24

Operation Band :802.11 g Test Date :2015-02-24

Fundamental Frequency :2412 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :Band Edge LOW Engineer :Curry

EUT Pol. :H Plane :HORIZONTAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	46.11	5.16	51.27	54.00	-2.73
2390.00	E	Peak	65.88	5.16	71.04	74.00	-2.96

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:Curry

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Operation Band :802.11 g Test Date :2015-02-24

Fundamental Frequency :2462 MHz Temp./Humi. :21 deg_C / 61 RH Operation Mode :Band Edge HIGH

Engineer

:H Plane EUT Pol. :VERTICAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	44.63	6.01	50.64	54.00	-3.36
2483.50	E	Peak	62.48	6.01	68.49	74.00	-5.51
2484.50	S	Average	44.46	6.02	50.48	54.00	-3.52
2484.50	S	Peak	64.78	6.02	70.80	74.00	-3.20

Operation Band :802.11 g Test Date :2015-02-24

Fundamental Frequency :2462 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :Band Edge HIGH Engineer :Curry

:HORIZONTAL EUT Pol. :H Plane Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	44.57	6.01	50.58	54.00	-3.42
2483.50	E	Peak	64.88	6.01	70.89	74.00	-3.11

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Radiated Band Edge Measurement Result (802.11 HT20)

Operation Band :802.11 n20M Test Date :2015-02-24

Fundamental Frequency :2412 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :Band Edge LOW Engineer :Curry

EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	44.48	5.16	49.64	54.00	-4.36
2390.00	E	Peak	59.94	5.16	65.10	74.00	-8.90

Operation Band :802.11 n20M Test Date :2015-02-24

Fundamental Frequency :2412 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :Band Edge LOW Engineer :Curry

EUT Pol. :H Plane :HORIZONTAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	44.90	5.16	50.06	54.00	-3.94
2390.00	E	Peak	64.42	5.16	69.58	74.00	-4.42

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Operation Band :802.11 n20M Test Date :2015-02-24

Fundamental Frequency :2462 MHz Temp./Humi. :21 deg_C / 61 RH Operation Mode :Band Edge HIGH Engineer :Curry

:H Plane EUT Pol. :VERTICAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	45.16	6.01	51.17	54.00	-2.83
2483.50	E	Peak	64.90	6.01	70.91	74.00	-3.09

Operation Band :802.11 n20M Test Date :2015-02-24

Fundamental Frequency :2462 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :Band Edge HIGH Engineer :Curry

EUT Pol. :H Plane :HORIZONTAL Measurement Antenna Pol.

	Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
			Mode	Reading Level		FS	@3m	
_	MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
	2483.50	E	Average	45.52	6.01	51.53	54.00	-2.47
	2483.50	E	Peak	65.18	6.01	71.19	74.00	-2.81

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Radiated Band Edge Measurement Result (802.11 HT40)

Operation Band :802.11 n40M Test Date :2015-02-24

Fundamental Frequency :2422 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :Band Edge LOW Engineer :Curry

EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	46.97	5.16	52.13	54.00	-1.87
2390.00	E	Peak	66.03	5.16	71.19	74.00	-2.81

Operation Band :802.11 n40M Test Date :2015-02-24

Fundamental Frequency :2422 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :Band Edge LOW Engineer :Curry

EUT Pol. :H Plane :HORIZONTAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	48.15	5.16	53.31	54.00	-0.69
2390.00	E	Peak	66.30	5.16	71.46	74.00	-2.54

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Operation Band :802.11 n40M Test Date :2015-02-24

Fundamental Frequency :2452 MHz Temp./Humi. :21 deg_C / 61 RH :Band Edge HIGH Operation Mode Engineer :Curry

EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	46.39	6.01	52.40	54.00	-1.60
2483.50	E	Peak	66.41	6.01	72.42	74.00	-1.58

Operation Band :802.11 n40M Test Date :2015-02-24

Fundamental Frequency :2452 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :Band Edge HIGH Engineer :Curry

EUT Pol. :H Plane :HORIZONTAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	46.20	6.01	52.21	54.00	-1.79
2483.50	E	Peak	67.26	6.01	73.27	74.00	-0.73

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Radiated Band Edge Measurement Result (802.11b) **External Antenna**

Operation Band :802.11 b Test Date :2015-02-24 Fundamental Frequency :2412 MHz Temp./Humi. :21 deg C / 61 RH

Operation Mode :Band Edge LOW Engineer :Curry

EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	47.01	5.16	52.17	54.00	-1.83
2390.00	E	Peak	57.49	5.16	62.65	74.00	-11.35

Operation Band :802.11 b Test Date :2015-02-24

Fundamental Frequency :2412 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :Band Edge LOW Engineer :Curry

EUT Pol. :H Plane :HORIZONTAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	42.36	5.16	47.52	54.00	-6.48
2390.00	E	Peak	54.17	5.16	59.33	74.00	-14.67

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Operation Band :802.11 b Test Date :2015-02-24

Fundamental Frequency :2462 MHz Temp./Humi. :21 deg_C / 61 RH Operation Mode :Band Edge HIGH Engineer :Curry

:H Plane EUT Pol. :VERTICAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	46.52	6.01	52.53	54.00	-1.47
2483.50	E	Peak	56.89	6.01	62.90	74.00	-11.10

Operation Band :802.11 b Test Date :2015-02-24

Fundamental Frequency :2462 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :Band Edge HIGH Engineer :Curry

EUT Pol. :H Plane :HORIZONTAL Measurement Antenna Pol.

	Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
			Mode	Reading Level		FS	@3m	
_	MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
	2483.50	E	Average	42.96	6.01	48.97	54.00	-5.03
	2483.50	E	Peak	54.56	6.01	60.57	74.00	-13.43

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Radiated Band Edge Measurement Result (802.11g)

Operation Band :802.11 g Test Date :2015-02-24

Fundamental Frequency :2412 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :Band Edge LOW Engineer :Curry EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	46.77	5.16	51.93	54.00	-2.07
2390.00	E	Peak	68.12	5.16	73.28	74.00	-0.72

Operation Band :802.11 g Test Date :2015-02-24

Fundamental Frequency :2412 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :Band Edge LOW Engineer :Curry

EUT Pol. :H Plane :HORIZONTAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2389.32	S	Average	42.60	5.16	47.76	54.00	-6.24
2389.32	S	Peak	64.05	5.16	69.21	74.00	-4.79
2390.00	E	Average	42.87	5.16	48.03	54.00	-5.97
2390.00	E	Peak	62.58	5.16	67.74	74.00	-6.26

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Operation Band :802.11 g Test Date :2015-02-24

Fundamental Frequency :2462 MHz Temp./Humi. :21 deg_C / 61 RH Operation Mode :Band Edge HIGH Engineer :Curry

EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	44.04	6.01	50.05	54.00	-3.95
2483.50	E	Peak	67.07	6.01	73.08	74.00	-0.92

Operation Band Test Date :2015-02-24 :802.11 g

Fundamental Frequency :2462 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :Band Edge HIGH Engineer :Curry

EUT Pol. :H Plane :HORIZONTAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	43.66	6.01	49.67	54.00	-4.33
2483.50	E	Peak	66.64	6.01	72.65	74.00	-1.35

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Radiated Band Edge Measurement Result (802.11 HT20)

Operation Band :802.11 n20M Test Date :2015-02-24

Fundamental Frequency :2412 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :Band Edge LOW Engineer :Curry

EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	45.79	5.16	50.95	54.00	-3.05
2390.00	E	Peak	67.07	5.16	72.23	74.00	-1.77

Operation Band :802.11 n20M Test Date :2015-02-24

Fundamental Frequency :2412 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :Band Edge LOW Engineer :Curry

EUT Pol. :H Plane :HORIZONTAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	42.09	5.16	47.25	54.00	-6.75
2390.00	E	Peak	58.91	5.16	64.07	74.00	-9.93

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Operation Band :802.11 n20M Test Date :2015-02-24

Fundamental Frequency :2462 MHz Temp./Humi. :21 deg_C / 61 RH Operation Mode :Band Edge HIGH Engineer :Curry

:H Plane EUT Pol. :VERTICAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	45.79	6.01	51.80	54.00	-2.20
2483.50	E	Peak	67.43	6.01	73.44	74.00	-0.56

Operation Band :802.11 n20M Test Date :2015-02-24

Fundamental Frequency :2462 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :Band Edge HIGH Engineer :Curry

EUT Pol. :H Plane :HORIZONTAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	42.58	6.01	48.59	54.00	-5.41
2483.50	E	Peak	62.11	6.01	68.12	74.00	-5.88

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Radiated Band Edge Measurement Result (802.11 HT40)

Operation Band :802.11 n40M Test Date :2015-02-24

Fundamental Frequency :2422 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :Band Edge LOW Engineer :Curry

EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	47.87	5.16	53.03	54.00	-0.97
2390.00	E	Peak	67.23	5.16	72.39	74.00	-1.61

Operation Band :802.11 n40M Test Date :2015-02-24

Fundamental Frequency :2422 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :Band Edge LOW Engineer :Curry

EUT Pol. :H Plane :HORIZONTAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2390.00	E	Average	43.62	5.16	48.78	54.00	-5.22
2390.00	E	Peak	60.46	5.16	65.62	74.00	-8.38

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Operation Band :802.11 n40M Test Date :2015-02-24

Fundamental Frequency :2452 MHz Temp./Humi. :21 deg_C / 61 RH :Band Edge HIGH Operation Mode Engineer :Curry

EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	47.35	6.01	53.36	54.00	-0.64
2483.50	E	Peak	67.02	6.01	73.03	74.00	-0.97

Operation Band :802.11 n40M Test Date :2015-02-24

Fundamental Frequency :2452 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :Band Edge HIGH Engineer :Curry

EUT Pol. :H Plane :HORIZONTAL Measurement Antenna Pol.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	43.97	6.01	49.98	54.00	-4.02
2483.50	E	Peak	61.08	6.01	67.09	74.00	-6.91

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Radiated Spurious Emission Measurement Result (802.11 g) **Below 1GHz Worst-Case Data: Internal Antenna**

Operation Band Fundamental Frequency

:802.11 g :2412 MHz Test Date :2015-02-24 Temp./Humi. :21 deg_C / 61 RH

Operation Mode

:TX LOW

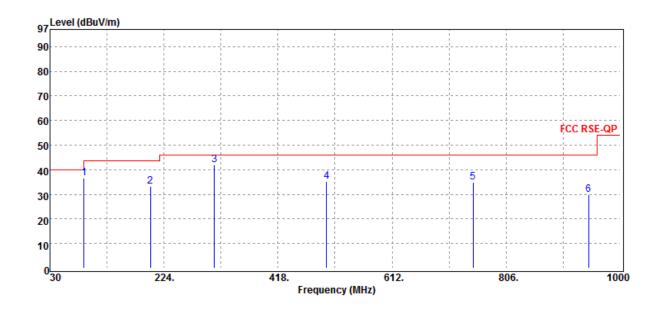
Engineer :Curry

EUT Pol.

:H Plane

Measurement Antenna Pol.

:VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
88.20	S	Peak	51.84	-15.13	36.71	43.50	-6.79
200.72	S	Peak	44.92	-11.77	33.15	43.50	-10.35
309.36	S	Peak	49.57	-7.67	41.90	46.00	-4.10
500.45	S	Peak	39.57	-4.34	35.23	46.00	-10.77
749.74	S	Peak	34.61	0.27	34.88	46.00	-11.12
946.65	S	Peak	26.64	3.16	29.80	46.00	-16.20

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

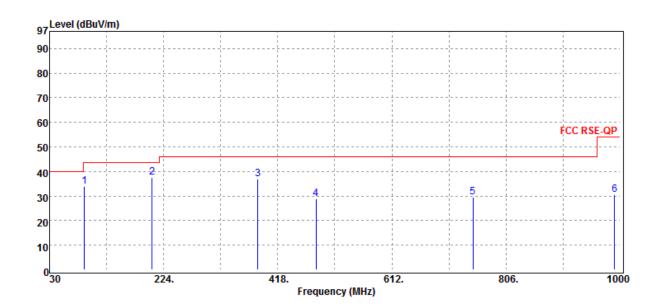
:802.11 g :2412 MHz :TX LOW :H Plane

Test Date Temp./Humi. Engineer

:2015-02-24 :21 deg_C / 61 RH

:Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
89.17	S	Peak	49.16	-15.33	33.83	43.50	-9.67
204.60	S	Peak	48.94	-11.51	37.43	43.50	-6.07
384.05	S	Peak	43.07	-6.28	36.79	46.00	-9.21
482.99	S	Peak	33.39	-4.46	28.93	46.00	-17.07
749.74	S	Peak	29.26	0.27	29.53	46.00	-16.47
990.30	S	Peak	27.02	3.42	30.44	54.00	-23.56

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

:802.11 g :2437 MHz :TX MID :H Plane

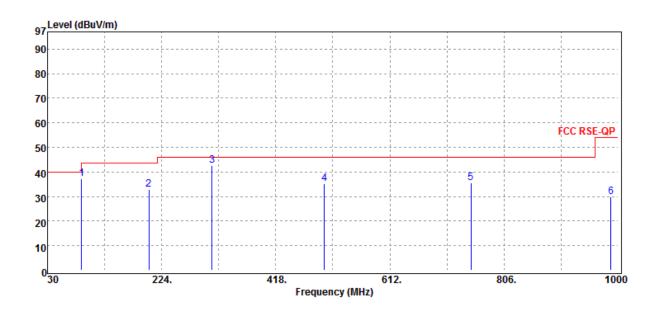
Test Date Temp./Humi. Engineer

:2015-02-24 :21 deg_C / 61 RH

:Curry

Measurement Antenna Pol.

:VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB	_
88.20	S	Peak	52.52	-15.13	37.39	43.50	-6.11	
202.66	S	Peak	44.39	-11.63	32.76	43.50	-10.74	
309.36	S	Peak	50.18	-7.67	42.51	46.00	-3.49	
500.45	S	Peak	39.51	-4.34	35.17	46.00	-10.83	
749.74	S	Peak	35.39	0.27	35.66	46.00	-10.34	
987.39	S	Peak	26.41	3.38	29.79	54.00	-24.21	

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

:802.11 g :2437 MHz :TX MID :H Plane

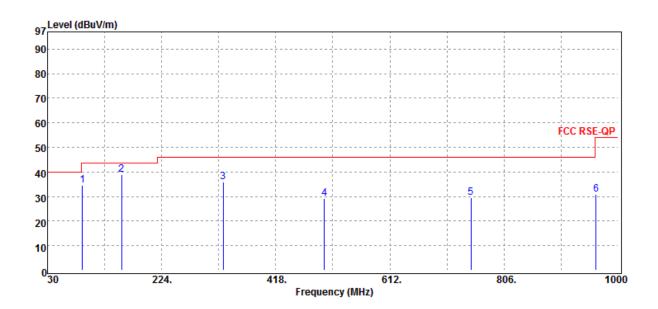
Test Date Temp./Humi. Engineer

:2015-02-24 :21 deg_C / 61 RH

:Curry

Measurement Antenna Pol.

:HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB	
89.17	S	Peak	49.75	-15.33	34.42	43.50	-9.08	
156.10	S	Peak	47.76	-8.98	38.78	43.50	-4.72	
328.76	S	Peak	43.75	-7.70	36.05	46.00	-9.95	
500.45	S	Peak	33.47	-4.34	29.13	46.00	-16.87	
749.74	S	Peak	29.40	0.27	29.67	46.00	-16.33	
962.17	S	Peak	27.28	3.69	30.97	54.00	-23.03	

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Operation Band Fundamental Frequency Operation Mode EUT Pol.

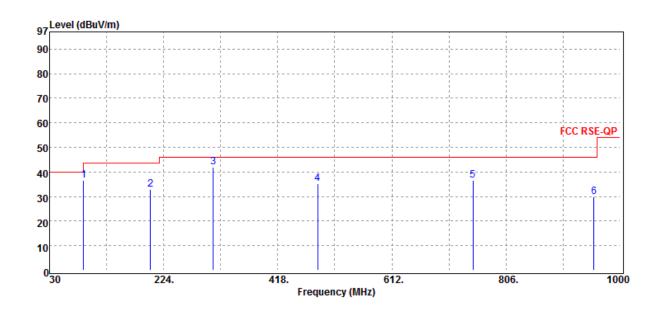
:802.11 g :2462 MHz :TX HIGH :H Plane

Test Date Temp./Humi. Engineer

:2015-02-24 :21 deg_C / 61 RH

:Curry

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB	_
88.20	S	Peak	51.76	-15.13	36.63	43.50	-6.87	
201.69	S	Peak	44.66	-11.69	32.97	43.50	-10.53	
308.39	S	Peak	49.80	-7.70	42.10	46.00	-3.90	
485.90	S	Peak	39.49	-4.37	35.12	46.00	-10.88	
749.74	S	Peak	36.16	0.27	36.43	46.00	-9.57	
955.38	S	Peak	26.28	3.52	29.80	46.00	-16.20	

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

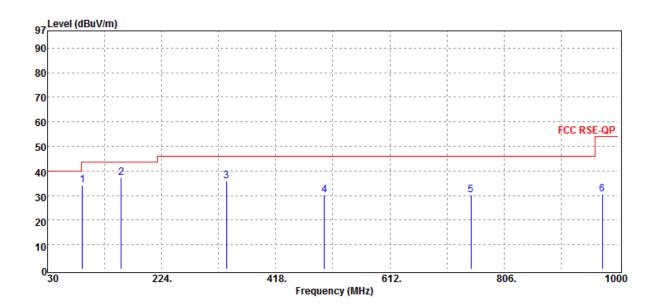
:802.11 g :2462 MHz :TX HIGH :H Plane

Test Date Temp./Humi. Engineer

:2015-02-24 :21 deg_C / 61 RH

:Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
89.17	S	Peak	49.48	-15.33	34.15	43.50	-9.35
155.13	S	Peak	46.13	-9.03	37.10	43.50	-6.40
334.58	S	Peak	43.56	-7.63	35.93	46.00	-10.07
500.45	S	Peak	34.44	-4.34	30.10	46.00	-15.90
749.74	S	Peak	29.84	0.27	30.11	46.00	-15.89
972.84	S	Peak	27.10	3.56	30.66	54.00	-23.34

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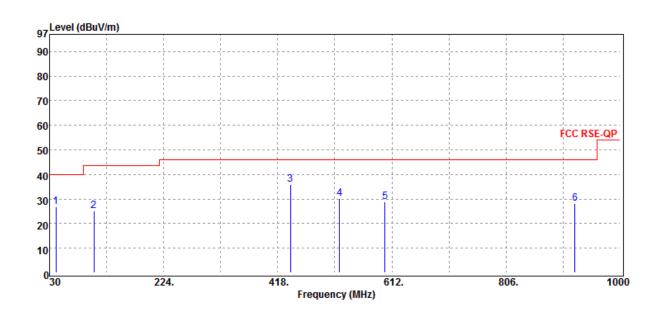
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Radiated Spurious Emission Measurement Result (802.11 HT40)

Operation Band : 802.11 n40M Test Date :2015-02-24 Fundamental Frequency :2422 MHz Temp./Humi. :21 deg C / 61 RH

Operation Mode :TX LOW Engineer :Curry

EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
40.67	S	Peak	36.64	-9.72	26.92	40.00	-13.08
105.66	S	Peak	38.08	-13.05	25.03	43.50	-18.47
439.34	S	Peak	41.92	-5.84	36.08	46.00	-9.92
522.76	S	Peak	34.37	-4.33	30.04	46.00	-15.96
600.36	S	Peak	30.92	-2.05	28.87	46.00	-17.13
923.37	S	Peak	25.76	2.54	28.30	46.00	-17.70

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

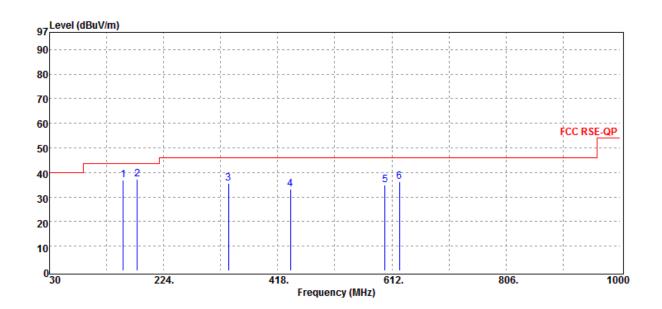
: 802.11 n40M :2422 MHz :TX LOW :H Plane

Test Date Temp./Humi. Engineer

:2015-02-24 :21 deg_C / 61 RH

:Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
155.13	S	Peak	45.79	-9.03	36.76	43.50	-6.74
179.38	S	Peak	47.60	-10.47	37.13	43.50	-6.37
334.58	S	Peak	43.33	-7.63	35.70	46.00	-10.30
439.34	S	Peak	39.08	-5.84	33.24	46.00	-12.76
600.36	S	Peak	37.07	-2.05	35.02	46.00	-10.98
624.61	S	Peak	39.46	-3.07	36.39	46.00	-9.61

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

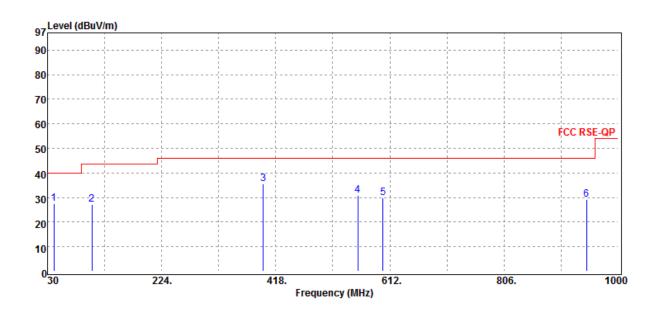
: 802.11 n40M :2437 MHz :TX MID :H Plane

Test Date Temp./Humi. Engineer

:2015-02-24 :21 deg_C / 61 RH

:Curry

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
40.67	S	Peak	37.32	-9.72	27.60	40.00	-12.40
105.66	S	Peak	40.32	-13.05	27.27	43.50	-16.23
396.66	S	Peak	41.61	-6.06	35.55	46.00	-10.45
557.68	S	Peak	34.68	-3.89	30.79	46.00	-15.21
600.36	S	Peak	31.82	-2.05	29.77	46.00	-16.23
946.65	S	Peak	26.20	3.16	29.36	46.00	-16.64

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Operation Band Fundamental Frequency Operation Mode

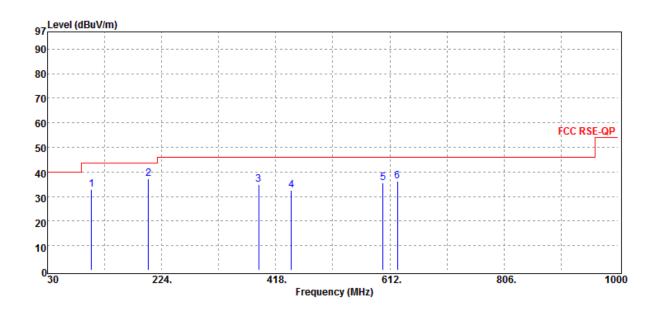
:2437 MHz :TX MID EUT Pol. :H Plane

: 802.11 n40M

Test Date Temp./Humi. Engineer

:2015-02-24 :21 deg_C / 61 RH :Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB	
104.69	S	Peak	46.13	-13.26	32.87	43.50	-10.63	
201.69	S	Peak	48.90	-11.69	37.21	43.50	-6.29	
388.90	S	Peak	41.21	-6.17	35.04	46.00	-10.96	
444.19	S	Peak	38.44	-5.78	32.66	46.00	-13.34	
600.36	S	Peak	37.58	-2.05	35.53	46.00	-10.47	
624.61	S	Peak	39.36	-3.07	36.29	46.00	-9.71	

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Operation Band Fundamental Frequency Operation Mode EUT Pol.

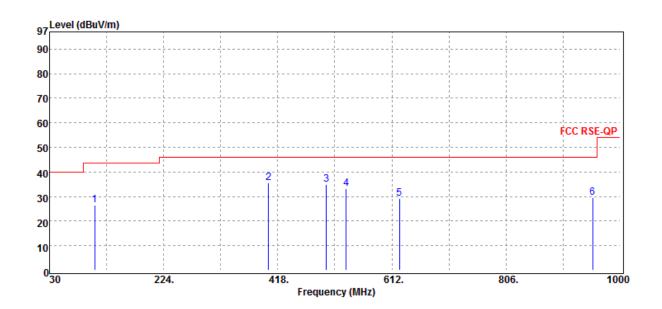
:802.11 n40M :2452 MHz :TX HIGH :H Plane

Test Date Temp./Humi. Engineer

:2015-02-24 :21 deg_C / 61 RH

:Curry

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB	
106.63	S	Peak	39.45	-12.83	26.62	43.50	-16.88	
402.48	S	Peak	41.40	-5.97	35.43	46.00	-10.57	
500.45	S	Peak	39.22	-4.34	34.88	46.00	-11.12	
534.40	S	Peak	37.16	-4.00	33.16	46.00	-12.84	
624.61	S	Peak	32.37	-3.07	29.30	46.00	-16.70	
953.44	S	Peak	26.00	3.45	29.45	46.00	-16.55	

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Operation Band Fundamental Frequency Operation Mode EUT Pol.

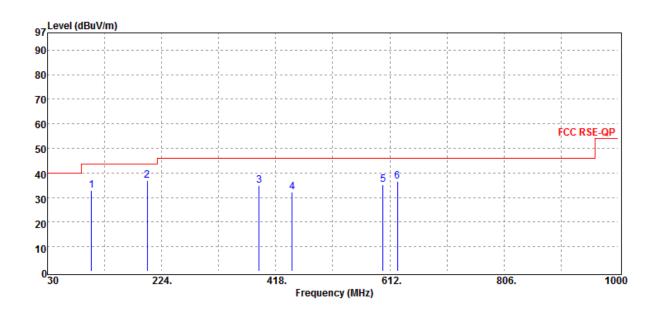
:802.11 n40M :2452 MHz :TX HIGH :H Plane

Test Date Temp./Humi. Engineer

:2015-02-24 :21 deg_C / 61 RH

:Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
104.69	S	Peak	46.21	-13.26	32.95	43.50	-10.55
199.75	S	Peak	48.85	-11.79	37.06	43.50	-6.44
389.87	S	Peak	41.22	-6.15	35.07	46.00	-10.93
446.13	S	Peak	38.13	-5.75	32.38	46.00	-13.62
600.36	S	Peak	37.15	-2.05	35.10	46.00	-10.90
624.61	S	Peak	39.76	-3.07	36.69	46.00	-9.31

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EUT Pol.

FCC ID: HD5-VM3WLANA

Report No.: ER/2015/20009 **Issue Date: Mar. 12, 2015**

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Radiated Spurious Emission Measurement Result (802.11 b) **Above 1GHz Worst-Case Data: Internal Antenna**

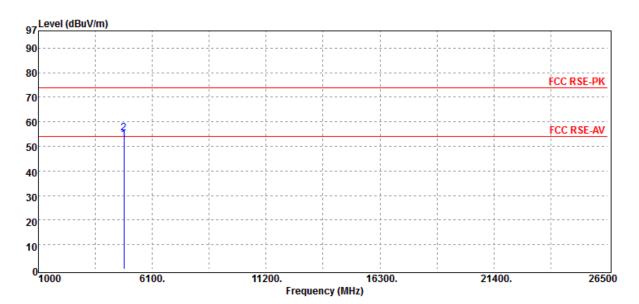
:H Plane

Operation Band :802.11 b Fundamental Frequency :2412 MHz Operation Mode :TX LOW

Test Date :2015-02-24 Temp./Humi. :21 deg_C / 61 RH

Engineer :Curry

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4824.00	Н	Average	43.16	9.63	52.79	54.00	-1.21
4824.00	Н	Peak	45.78	9.63	55.41	74.00	-18.59

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EUT Pol.

FCC ID: HD5-VM3WLANA

Report No.: ER/2015/20009 **Issue Date: Mar. 12, 2015**

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Operation Band :802.11 b Fundamental Frequency Operation Mode

:TX LOW :H Plane

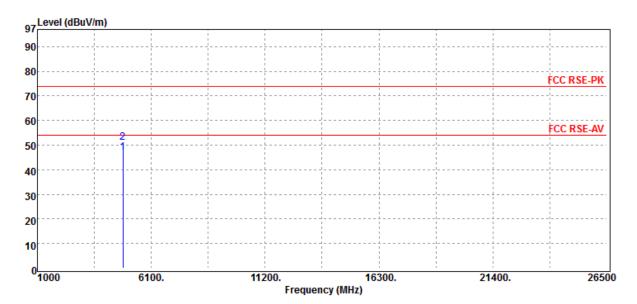
:2412 MHz

Test Date Temp./Humi. :2015-02-24

:21 deg_C / 61 RH

Engineer :Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4824.00	Н	Average	37.49	9.63	47.12	54.00	-6.88
4824.00	Н	Peak	41.55	9.63	51.18	74.00	-22.82

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Report No.: ER/2015/20009 **Issue Date: Mar. 12, 2015**

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Operation Band Fundamental Frequency Operation Mode

:802.11 b :2437 MHz :TX MID

Test Date Temp./Humi. :2015-02-24 :21 deg_C / 61 RH

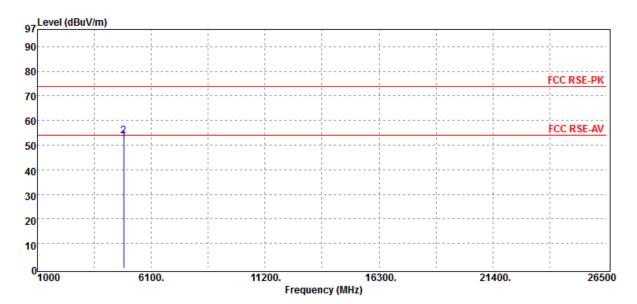
Engineer

:Curry

EUT Pol. :H Plane

Measurement Antenna Pol.

:VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4874.00	Н	Average	41.84	9.85	51.69	54.00	-2.31
4874.00	Н	Peak	43.70	9.85	53.55	74.00	-20.45

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Report No.: ER/2015/20009 **Issue Date: Mar. 12, 2015**

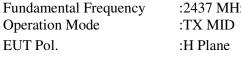
Page: 94 of 159

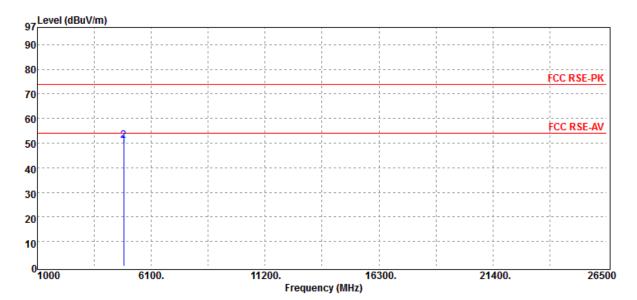
Operation Band Fundamental Frequency :802.11 b :2437 MHz :TX MID

Test Date Temp./Humi. :2015-02-24 :21 deg_C / 61 RH

Engineer :Curry

:HORIZONTAL Measurement Antenna Pol.





Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4874.00	Н	Average	39.08	9.85	48.93	54.00	-5.07
4874.00	Н	Peak	41.16	9.85	51.01	74.00	-22.99

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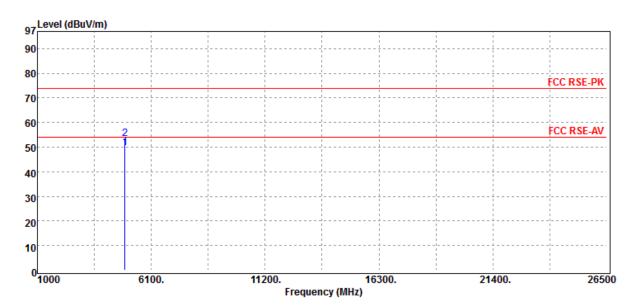
Operation Band :802.11 b Fundamental Frequency :2462 MHz

Operation Mode :TX HIGH EUT Pol. :H Plane

Test Date :2015-02-24 Temp./Humi. :21 deg_C / 61 RH

Engineer :Curry

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4924.00	Н	Average	39.84	9.86	49.70	54.00	-4.30
4924.00	Н	Peak	43.67	9.86	53.53	74.00	-20.47

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Operation Band Fundamental Frequency Operation Mode

1000

EUT Pol.

:802.11 b :2462 MHz :TX HIGH

:H Plane

6100.

Test Date Temp./Humi. :2015-02-24

Engineer

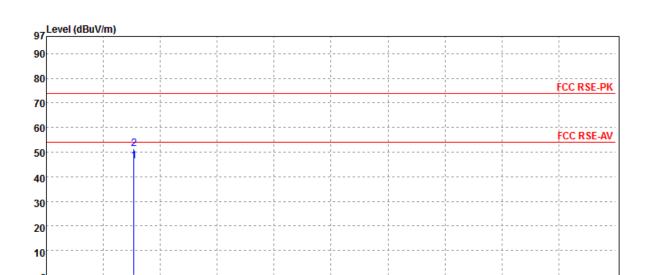
Measurement Antenna Pol.

:21 deg_C / 61 RH

26500

:Curry :HORIZONTAL

21400.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4924.00	Н	Average	36.31	9.86	46.17	54.00	-7.83
4924.00	Н	Peak	41.51	9.86	51.37	74.00	-22.63

Frequency (MHz)

16300.

11200.

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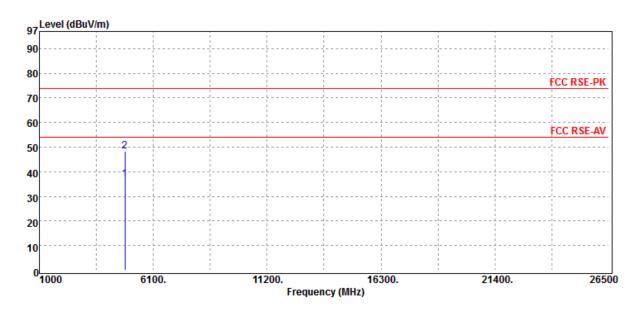
Radiated Spurious Emission Measurement Result (802.11 g)

Operation Band :2015-02-24 :802.11 g Test Date

Fundamental Frequency :2412 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :TX LOW Engineer :Curry

EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB	
4824.00	Н	Average	27.40	9.63	37.03	54.00	-16.97	
4824.00	Н	Peak	38.61	9.63	48.24	74.00	-25.76	

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Operation Band Fundamental Frequency Operation Mode

:802.11 g :2412 MHz :TX LOW

Test Date Temp./Humi. :2015-02-24

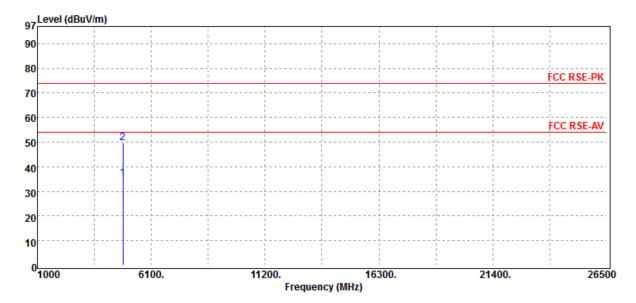
Engineer

:21 deg_C / 61 RH :Curry

EUT Pol. :H Plane

Measurement Antenna Pol.

:HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4824.00	Н	Average	25.53	9.63	35.16	54.00	-18.84
4824.00	Н	Peak	39.92	9.63	49.55	74.00	-24.45

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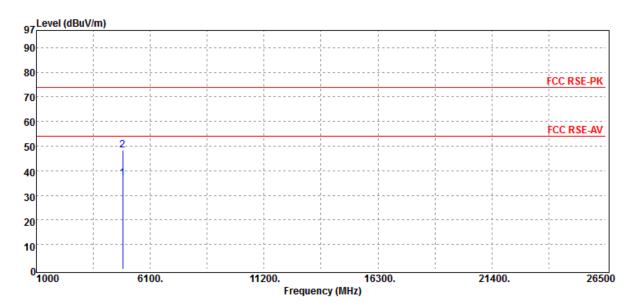
Operation Band :802.11 g Fundamental Frequency :2437 MHz Operation Mode

:TX MID

EUT Pol. :H Plane Test Date :2015-02-24 Temp./Humi. :21 deg_C / 61 RH

Engineer :Curry

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4874.00	Н	Average	27.20	9.85	37.05	54.00	-16.95
4874.00	Н	Peak	38.35	9.85	48.20	74.00	-25.80

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Operation Band Fundamental Frequency Operation Mode

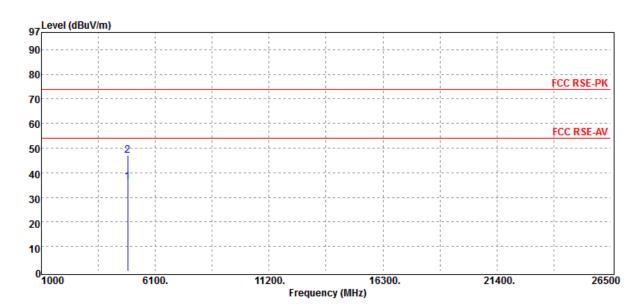
EUT Pol.

:802.11 g :2437 MHz :TX MID :H Plane

Test Date Temp./Humi. :2015-02-24

:21 deg_C / 61 RH Engineer :Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4874.00	Н	Average	26.24	9.85	36.09	54.00	-17.91
4874.00	Н	Peak	37.20	9.85	47.05	74.00	-26.95

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Operation Band Fundamental Frequency Operation Mode

:802.11 g :2462 MHz :TX HIGH

Test Date Temp./Humi. :2015-02-24 :21 deg_C / 61 RH

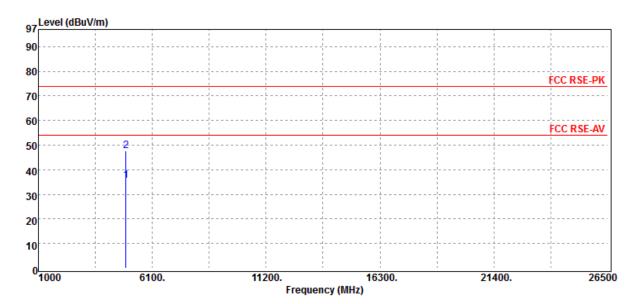
Engineer

:Curry

EUT Pol. :H Plane

Measurement Antenna Pol.

:VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4924.00	Н	Average	25.58	9.86	35.44	54.00	-18.56
4924.00	Н	Peak	37.68	9.86	47.54	74.00	-26.46

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Operation Band Fundamental Frequency Operation Mode

1000

EUT Pol.

:802.11 g :2462 MHz :TX HIGH

:H Plane

6100.

Test Date Temp./Humi. :2015-02-24 :21 deg_C / 61 RH

26500

Engineer :Curry

:HORIZONTAL Measurement Antenna Pol.

21400.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4924.00	Н	Average	24.33	9.86	34.19	54.00	-19.81
4924.00	Н	Peak	36.84	9.86	46.70	74.00	-27.30

Frequency (MHz)

16300.

11200.

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Report No.: ER/2015/20009 **Issue Date: Mar. 12, 2015**

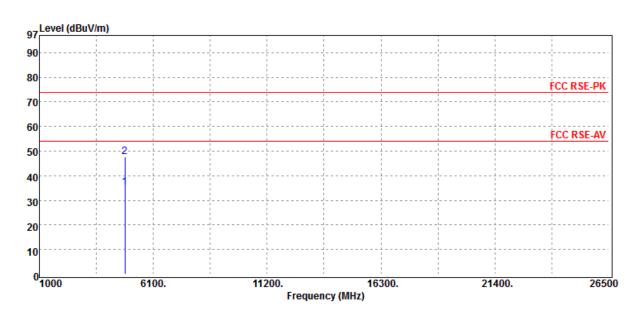
Page: 103 of 159

Radiated Spurious Emission Measurement Result (802.11_HT20)

Operation Band :2015-02-24 :802.11 n20M Test Date

Fundamental Frequency :2412 MHz Temp./Humi. :21 deg_C / 61 RH Operation Mode :TX LOW Engineer :Curry

EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB	
4824.00	Н	Average	25.70	9.63	35.33	54.00	-18.67	
4824.00	Н	Peak	37.99	9.63	47.62	74.00	-26.38	
4824.00	Н	Peak	37.99	9.63	47.62	74.00		-26.38

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Operation Band Fundamental Frequency Operation Mode

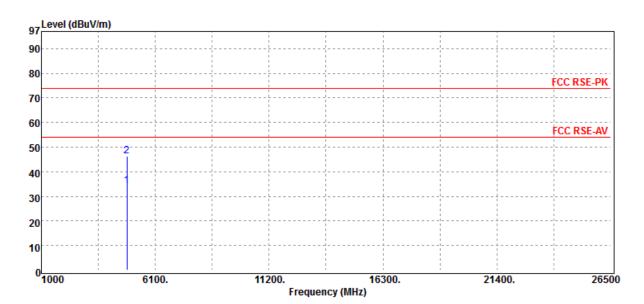
EUT Pol.

:802.11 n20M :2412 MHz :TX LOW :H Plane

Test Date Temp./Humi. :2015-02-24 :21 deg_C / 61 RH

Engineer :Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4824.00	Н	Average	24.55	9.63	34.18	54.00	-19.82
4824.00	Н	Peak	36.84	9.63	46.47	74.00	-27.53

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

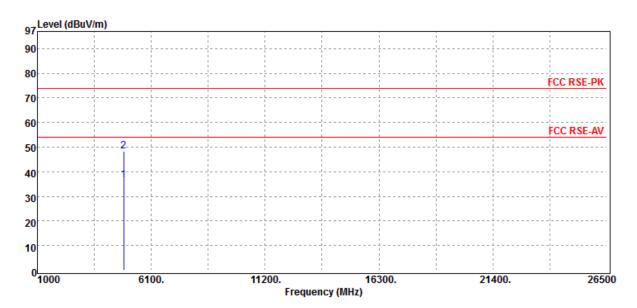
:802.11 n20M :2437 MHz :TX MID

:H Plane

Test Date :2015-02-24 Temp./Humi. :21 deg_C / 61 RH

Engineer :Curry

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4874.00	Н	Average	26.63	9.85	36.48	54.00	-17.52
4874.00	Н	Peak	38.55	9.85	48.40	74.00	-25.60

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Operation Band Fundamental Frequency Operation Mode

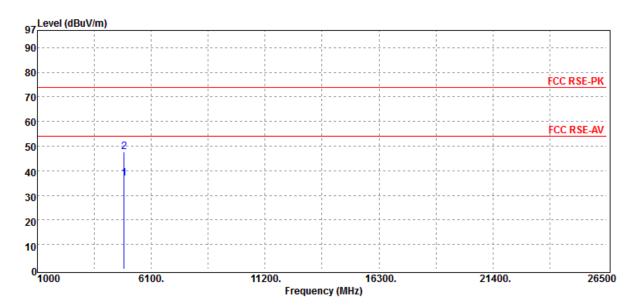
EUT Pol.

:802.11 n20M :2437 MHz :TX MID :H Plane

Test Date Temp./Humi. :2015-02-24 :21 deg_C / 61 RH

Engineer :Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4878.00	Н	Average	27.21	9.85	37.06	54.00	-16.94
4878.00	Н	Peak	37.78	9.85	47.63	74.00	-26.37

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Operation Band Fundamental Frequency Operation Mode

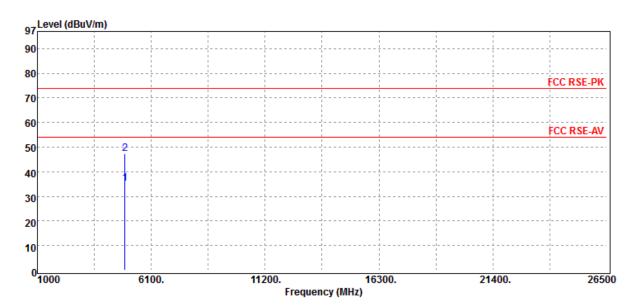
EUT Pol.

:802.11 n20M :2462 MHz :TX HIGH :H Plane

Test Date :2015-02-24 Temp./Humi. :21 deg_C / 61 RH

Engineer :Curry

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4924.00	Н	Average	25.53	9.86	35.39	54.00	-18.61
4924.00	Н	Peak	37.35	9.86	47.21	74.00	-26.79

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Operation Band Fundamental Frequency Operation Mode

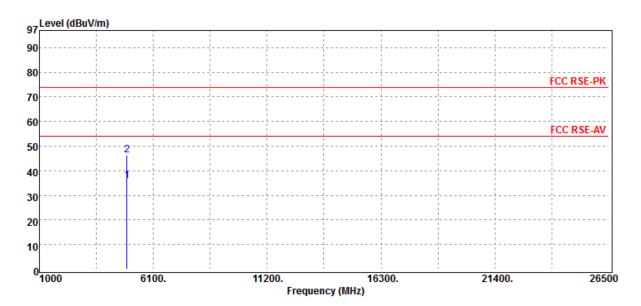
EUT Pol.

:802.11 n20M :2462 MHz :TX HIGH :H Plane

Test Date Temp./Humi. :2015-02-24 :21 deg_C / 61 RH

Engineer :Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4924.00	Н	Average	26.11	9.86	35.97	54.00	-18.03
4924.00	Н	Peak	36.50	9.86	46.36	74.00	-27.64

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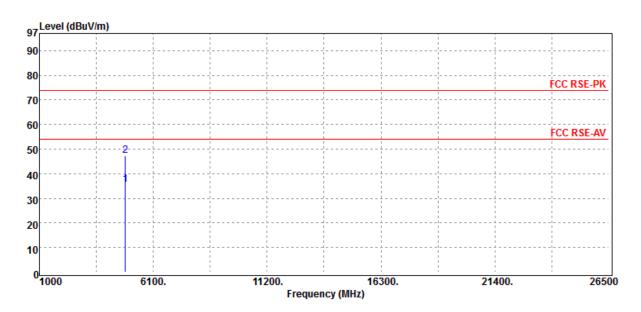
Radiated Spurious Emission Measurement Result (802.11_HT40)

Operation Band :2015-02-24 :802.11 n40M Test Date

Fundamental Frequency :2422 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :TX LOW Engineer :Curry

EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.



q. N	ote Det	tector Spect	rum Factor	Actual	Limit	Margin
	M	Iode Reading	Level	FS	@3m	
z F/F	I/E/S PK/(QP/AV dBµ	dB dB	dBμV/n	n dBμV/m	dB
.00	H Ave	erage 25.7	9.74	35.44	54.00	-18.56
.00	H P	eak 37.4	9.74	47.17	74.00	-26.83
	.00	.00 H Av	Mode Reading Iz F/H/E/S PK/QP/AV dBµ .00 H Average 25.7	Mode Reading Level Iz F/H/E/S PK/QP/AV dBμV dB .00 H Average 25.70 9.74	Mode Reading Level FS Iz F/H/E/S PK/QP/AV $dB\mu V$ dB $dB\mu V/n$.00 H Average 25.70 9.74 35.44	Mode Reading Level FS @3m Iz F/H/E/S PK/QP/AV dBμV dB dBμV/m dBμV/m .00 H Average 25.70 9.74 35.44 54.00

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Operation Band Fundamental Frequency Operation Mode

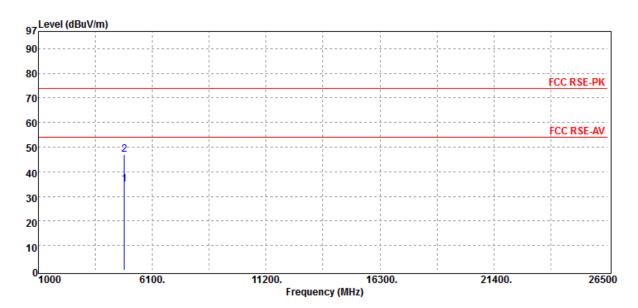
EUT Pol.

:802.11 n40M :2422 MHz :TX LOW :H Plane

Test Date :2015-02-24 Temp./Humi. :21 deg_C / 61 RH

Engineer :Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4844.00	Н	Average	25.15	9.74	34.89	54.00	-19.11
4844.00	Н	Peak	37.24	9.74	46.98	74.00	-27.02

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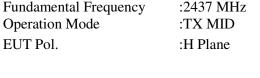
Operation Band Fundamental Frequency :802.11 n40M :2437 MHz :TX MID

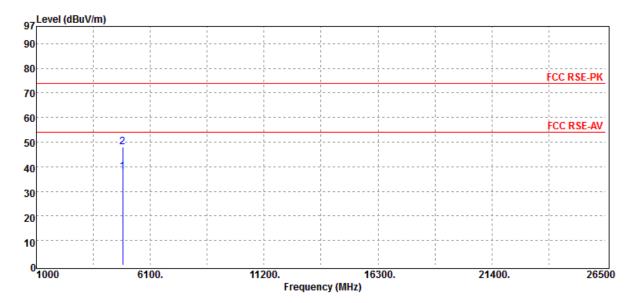
Test Date :2015-02-24 Temp./Humi.

Engineer

:21 deg_C / 61 RH :Curry

:VERTICAL Measurement Antenna Pol.





Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4874.00	Н	Average	28.24	9.85	38.09	54.00	-15.91
4874.00	Н	Peak	38.27	9.85	48.12	74.00	-25.88

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Report No.: ER/2015/20009 **Issue Date: Mar. 12, 2015**

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Operation Band Fundamental Frequency Operation Mode

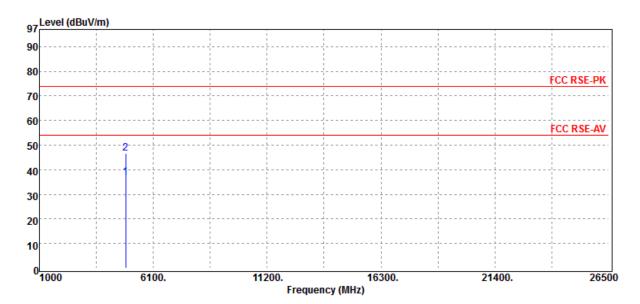
EUT Pol.

:802.11 n40M :2437 MHz :TX MID :H Plane

Test Date Temp./Humi. :2015-02-24 :21 deg_C / 61 RH

Engineer :Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4874.00	Н	Average	27.04	9.85	36.89	54.00	-17.11
4874.00	Н	Peak	36.66	9.85	46.51	74.00	-27.49

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Operation Band Fundamental Frequency Operation Mode

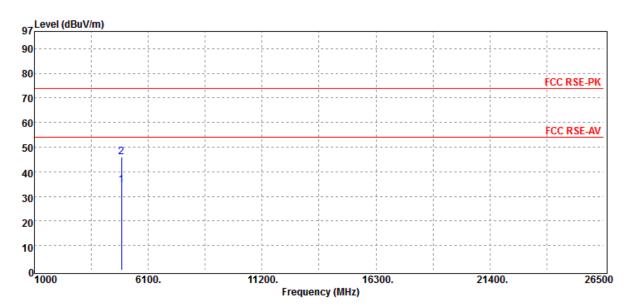
EUT Pol.

:802.11 n40M :2452 MHz :TX HIGH :H Plane

Test Date :2015-02-24 Temp./Humi. :21 deg_C / 61 RH

Engineer :Curry

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4904.00	Н	Average	24.72	9.84	34.56	54.00	-19.44
4904.00	Н	Peak	36.13	9.84	45.97	74.00	-28.03

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

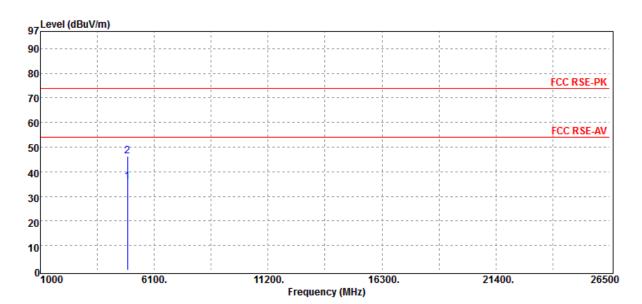
:802.11 n40M :2452 MHz :TX HIGH :H Plane

Test Date Temp./Humi. Engineer

:2015-02-24 :21 deg_C / 61 RH

:Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4904.00	Н	Average	26.16	9.84	36.00	54.00	-18.00
4904.00	Н	Peak	36.48	9.84	46.32	74.00	-27.68

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Radiated Spurious Emission Measurement Result (802.11 g) **Below 1GHz Worst-Case Data:**

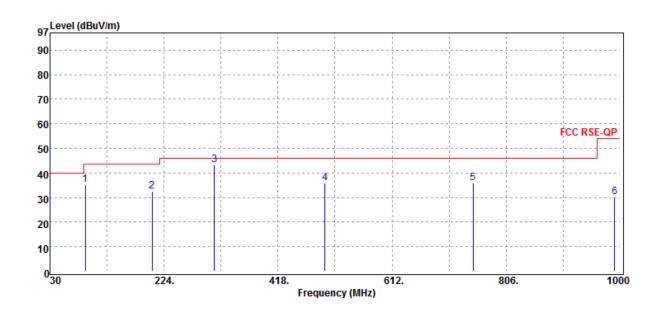
External Antenna

Operation Band :802.11 g Fundamental Frequency :2412 MHz Operation Mode :TX LOW EUT Pol. :H Plane

Test Date :2015-02-24 Temp./Humi. :21 deg_C / 61 RH

Engineer :Curry

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
90.14	S	Peak	50.70	-15.48	35.22	43.50	-8.28
203.63	S	Peak	44.12	-11.57	32.55	43.50	-10.95
309.36	S	Peak	51.08	-7.67	43.41	46.00	-2.59
497.54	S	Peak	40.34	-4.35	35.99	46.00	-10.01
749.74	S	Peak	35.53	0.27	35.80	46.00	-10.20
990.30	S	Peak	26.64	3.42	30.06	54.00	-23.94

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

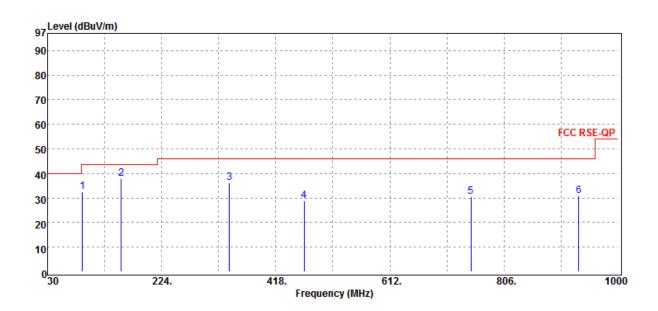
:802.11 g :2412 MHz :TX LOW :H Plane

Test Date Temp./Humi. Engineer

:2015-02-24 :21 deg_C / 61 RH

:Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
89.17	S	Peak	47.88	-15.33	32.55	43.50	-10.95
155.13	S	Peak	46.93	-9.03	37.90	43.50	-5.60
339.43	S	Peak	43.82	-7.51	36.31	46.00	-9.69
466.50	S	Peak	34.17	-5.26	28.91	46.00	-17.09
749.74	S	Peak	30.42	0.27	30.69	46.00	-15.31
933.07	S	Peak	28.10	2.79	30.89	46.00	-15.11

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

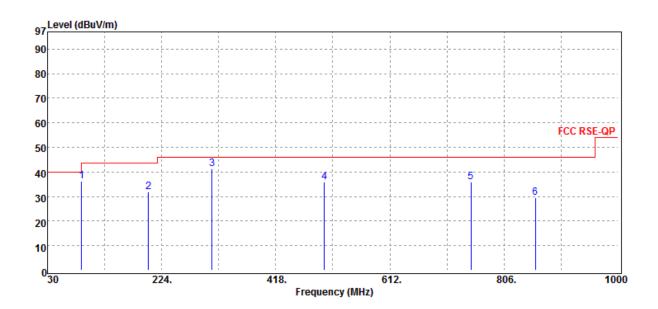
:802.11 g :2437 MHz :TX MID :H Plane

Test Date Temp./Humi. Engineer

:2015-02-24 :21 deg_C / 61 RH

:Curry

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
88.20	S	Peak	51.38	-15.13	36.25	43.50	-7.25
201.69	S	Peak	43.70	-11.69	32.01	43.50	-11.49
309.36	S	Peak	48.93	-7.67	41.26	46.00	-4.74
500.45	S	Peak	40.30	-4.34	35.96	46.00	-10.04
749.74	S	Peak	35.59	0.27	35.86	46.00	-10.14
859.35	S	Peak	27.60	1.96	29.56	46.00	-16.44

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

:802.11 g :2437 MHz :TX MID :H Plane

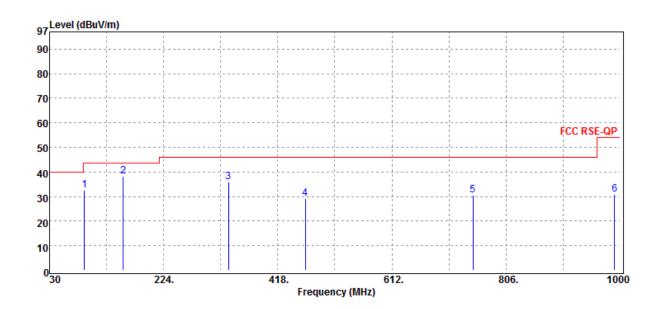
Test Date Temp./Humi. Engineer

:2015-02-24 :21 deg_C / 61 RH

:Curry

Measurement Antenna Pol.

:HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
89.17	S	Peak	47.84	-15.33	32.51	43.50	-10.99
155.13	S	Peak	47.40	-9.03	38.37	43.50	-5.13
334.58	S	Peak	43.53	-7.63	35.90	46.00	-10.10
464.56	S	Peak	34.59	-5.35	29.24	46.00	-16.76
749.74	S	Peak	30.33	0.27	30.60	46.00	-15.40
990.30	S	Peak	27.44	3.42	30.86	54.00	-23.14

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Operation Band Fundamental Frequency Operation Mode EUT Pol.

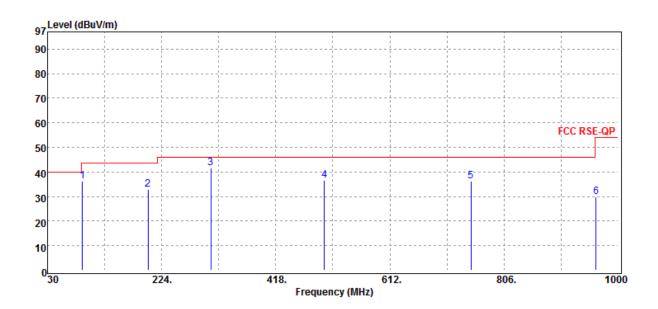
:802.11 g :2462 MHz :TX HIGH :H Plane

Test Date Temp./Humi. Engineer

:2015-02-24 :21 deg_C / 61 RH

:Curry

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB	
89.17	S	Peak	51.50	-15.33	36.17	43.50	-7.33	
200.72	S	Peak	44.74	-11.77	32.97	43.50	-10.53	
307.42	S	Peak	49.46	-7.72	41.74	46.00	-4.26	
500.45	S	Peak	40.80	-4.34	36.46	46.00	-9.54	
749.74	S	Peak	35.95	0.27	36.22	46.00	-9.78	
962.17	S	Peak	26.21	3.69	29.90	54.00	-24.10	

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Operation Band Fundamental Frequency Operation Mode EUT Pol.

:802.11 g :2462 MHz :TX HIGH :H Plane

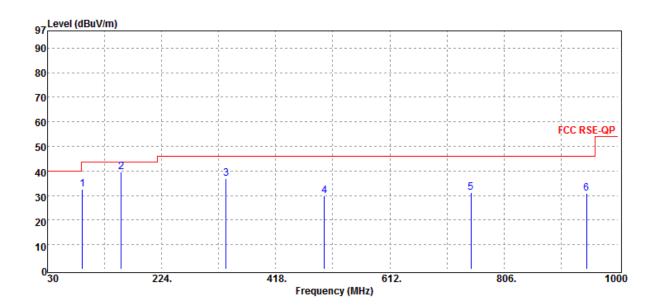
Test Date Temp./Humi. Engineer

:2015-02-24 :21 deg_C / 61 RH

:Curry

Measurement Antenna Pol.

:HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB	
89.17	S	Peak	47.98	-15.33	32.65	43.50	-10.85	
155.13	S	Peak	48.63	-9.03	39.60	43.50	-3.90	
333.61	S	Peak	44.49	-7.64	36.85	46.00	-9.15	
500.45	S	Peak	34.16	-4.34	29.82	46.00	-16.18	
749.74	S	Peak	30.83	0.27	31.10	46.00	-14.90	
946.65	S	Peak	27.58	3.16	30.74	46.00	-15.26	

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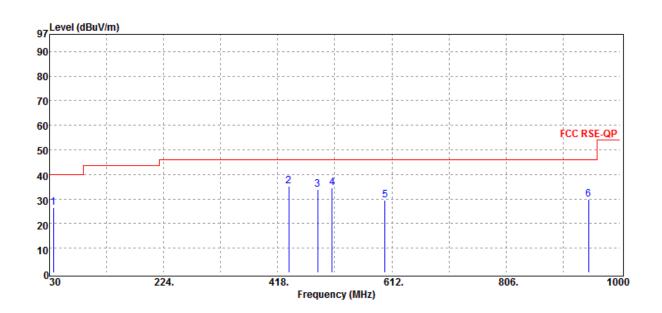
Page: 121 of 159

Radiated Spurious Emission Measurement Result (802.11 n40M)

Operation Band : 802.11 n40M Test Date :2015-02-24 Fundamental Frequency :2422 MHz Temp./Humi. :21 deg C / 61 RH

Operation Mode :TX LOW Engineer :Curry

EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
36.79	S	Peak	36.54	-10.03	26.51	40.00	-13.49
436.43	S	Peak	41.04	-5.85	35.19	46.00	-10.81
485.90	S	Peak	38.12	-4.37	33.75	46.00	-12.25
510.15	S	Peak	39.17	-4.49	34.68	46.00	-11.32
600.36	S	Peak	31.44	-2.05	29.39	46.00	-16.61
946.65	S	Peak	26.60	3.16	29.76	46.00	-16.24

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台灣檢驗科技股份有限公司

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Report No.: ER/2015/20009 **Issue Date: Mar. 12, 2015**

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

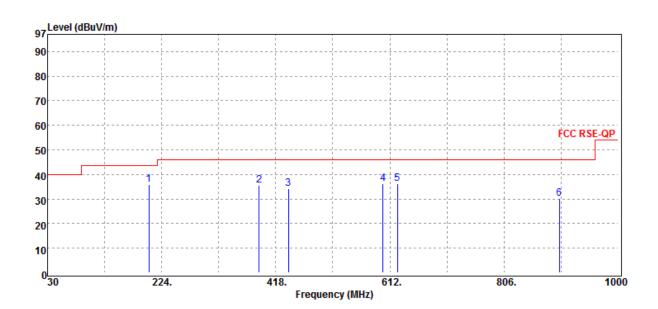
: 802.11 n40M :2422 MHz :TX LOW :H Plane

Test Date Temp./Humi. Engineer

:2015-02-24 :21 deg_C / 61 RH

:Curry

:HORIZONTAL Measurement Antenna Pol.



	Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
			Mode	Reading Level		FS	@3m		
_	MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB	_
	202.66	S	Peak	47.64	-11.63	36.01	43.50	-7.49	
	389.87	S	Peak	41.70	-6.15	35.55	46.00	-10.45	
	439.34	S	Peak	40.04	-5.84	34.20	46.00	-11.80	
	600.36	S	Peak	38.19	-2.05	36.14	46.00	-9.86	
	624.61	S	Peak	39.27	-3.07	36.20	46.00	-9.80	
	900.09	S	Peak	28.30	2.03	30.33	46.00	-15.67	

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

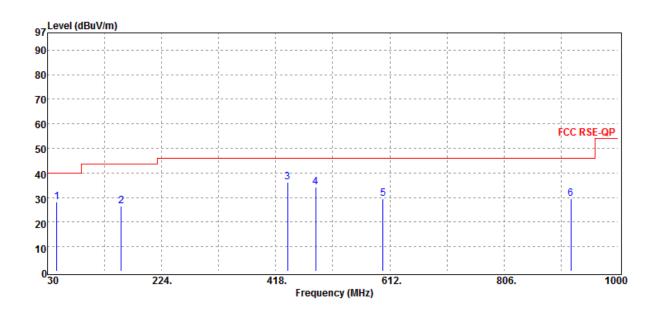
: 802.11 n40M :2437 MHz :TX MID :H Plane

Test Date Temp./Humi. Engineer

:2015-02-24 :21 deg_C / 61 RH

:Curry

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
45.52	S	Peak	37.51	-9.34	28.17	40.00	-11.83
155.13	S	Peak	35.45	-9.03	26.42	43.50	-17.08
438.37	S	Peak	41.99	-5.84	36.15	46.00	-9.85
485.90	S	Peak	38.44	-4.37	34.07	46.00	-11.93
600.36	S	Peak	31.65	-2.05	29.60	46.00	-16.40
919.49	S	Peak	27.03	2.39	29.42	46.00	-16.58

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Operation Band Fundamental Frequency Operation Mode

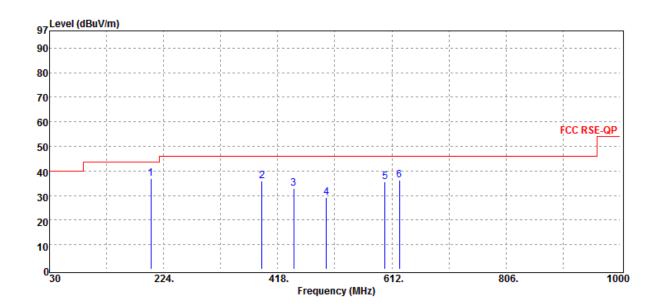
EUT Pol.

: 802.11 n40M :2437 MHz :TX MID :H Plane

Test Date Temp./Humi. Engineer

:2015-02-24 :21 deg_C / 61 RH :Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
202.66	S	Peak	48.43	-11.63	36.80	43.50	-6.70
390.84	S	Peak	41.96	-6.13	35.83	46.00	-10.17
445.16	S	Peak	38.79	-5.76	33.03	46.00	-12.97
500.45	S	Peak	33.39	-4.34	29.05	46.00	-16.95
600.36	S	Peak	37.70	-2.05	35.65	46.00	-10.35
624.61	S	Peak	39.48	-3.07	36.41	46.00	-9.59

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Operation Band Fundamental Frequency Operation Mode EUT Pol.

:802.11 n40M :2452 MHz :TX HIGH :H Plane

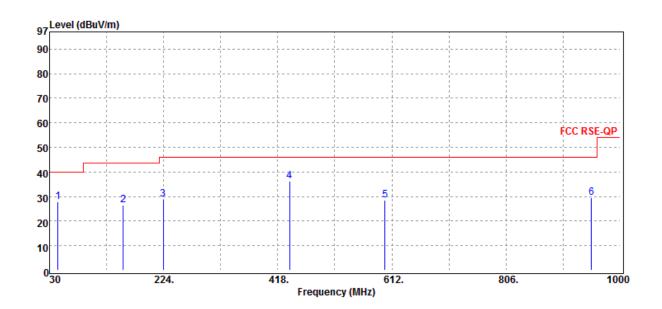
Test Date Temp./Humi. Engineer

:2015-02-24 :21 deg_C / 61 RH

:Curry

Measurement Antenna Pol.

:VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
44.55	S	Peak	37.36	-9.38	27.98	40.00	-12.02
155.13	S	Peak	35.70	-9.03	26.67	43.50	-16.83
223.03	S	Peak	40.01	-11.14	28.87	46.00	-17.13
438.37	S	Peak	41.95	-5.84	36.11	46.00	-9.89
600.36	S	Peak	30.51	-2.05	28.46	46.00	-17.54
951.50	S	Peak	26.22	3.36	29.58	46.00	-16.42

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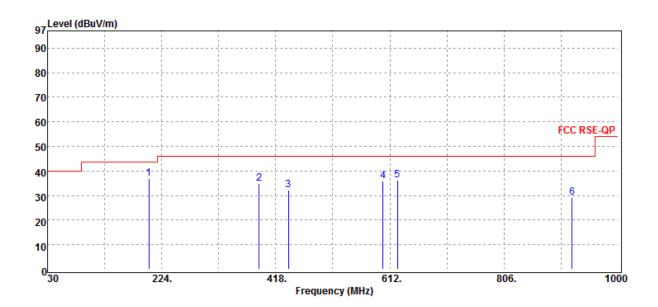
Operation Band Fundamental Frequency Operation Mode EUT Pol.

:802.11 n40M :2452 MHz :TX HIGH :H Plane

Test Date Temp./Humi. Engineer

:2015-02-24 :21 deg_C / 61 RH :Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB	
202.66	S	Peak	48.40	-11.63	36.77	43.50	-6.73	
389.87	S	Peak	40.94	-6.15	34.79	46.00	-11.21	
439.34	S	Peak	37.90	-5.84	32.06	46.00	-13.94	
600.36	S	Peak	37.91	-2.05	35.86	46.00	-10.14	
624.61	S	Peak	39.24	-3.07	36.17	46.00	-9.83	
921.43	S	Peak	26.65	2.46	29.11	46.00	-16.89	

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Radiated Spurious Emission Measurement Result (802.11b) **Above 1GHz Worst-Case Data:**

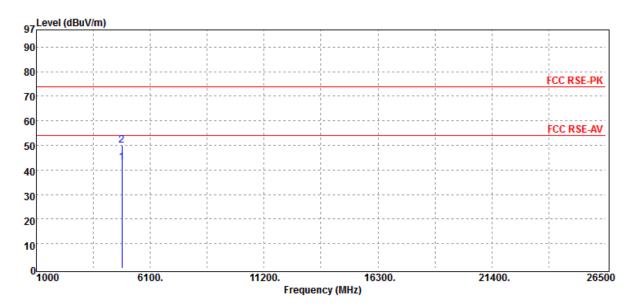
External Antenna

Operation Band :802.11 b Fundamental Frequency :2412 MHz Operation Mode :TX LOW EUT Pol. :H Plane

Test Date :2015-02-24 Temp./Humi. :21 deg_C / 61 RH

Engineer :Curry

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4824.00	Н	Average	33.44	9.63	43.07	54.00	-10.93
4824.00	Н	Peak	40.32	9.63	49.95	74.00	-24.05

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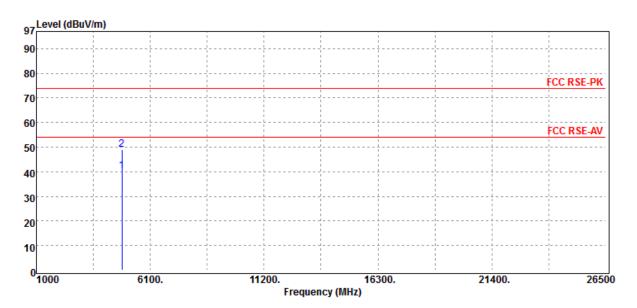
Operation Band :802.11 b Fundamental Frequency :2412 MHz

Operation Mode :TX LOW EUT Pol. :H Plane

Test Date :2015-02-24 Temp./Humi. :21 deg_C / 61 RH

Engineer :Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4824.00	Н	Average	30.53	9.63	40.16	54.00	-13.84
4824.00	Н	Peak	39.54	9.63	49.17	74.00	-24.83

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Report No.: ER/2015/20009 **Issue Date: Mar. 12, 2015**

:2015-02-24

:Curry

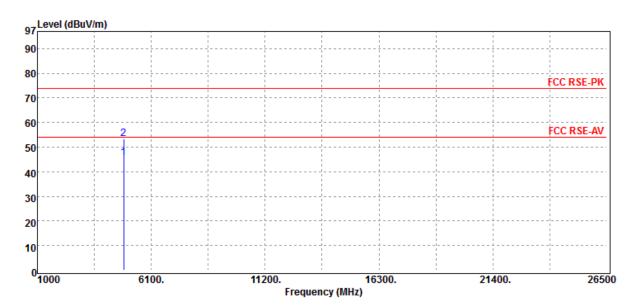
:21 deg_C / 61 RH

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Operation Band Test Date :802.11 b Fundamental Frequency :2437 MHz Temp./Humi.

Operation Mode :TX MID Engineer

EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4874.00	Н	Average	35.86	9.85	45.71	54.00	-8.29
4874.00	Н	Peak	43.52	9.85	53.37	74.00	-20.63

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Report No.: ER/2015/20009 **Issue Date: Mar. 12, 2015**

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

:802.11 b :2437 MHz :TX MID

:H Plane

Test Date Temp./Humi. :2015-02-24

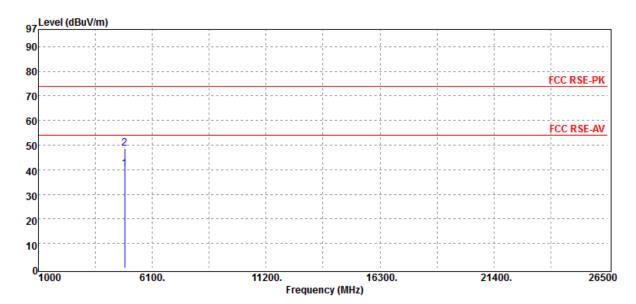
:21 deg_C / 61 RH

Engineer

:Curry

Measurement Antenna Pol.

:HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4874.00	Н	Average	30.54	9.85	40.39	54.00	-13.61
4874.00	Н	Peak	38.98	9.85	48.83	74.00	-25.17

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Operation Band :802.11 b Fundamental Frequency :2462 MHz

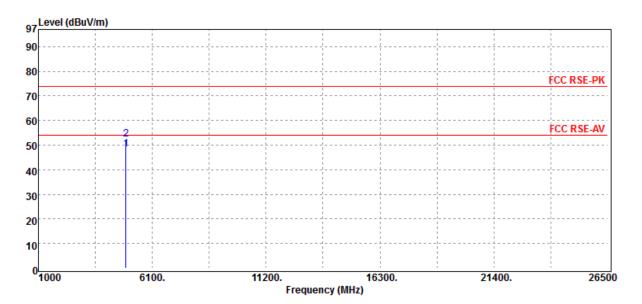
Operation Mode :TX HIGH

EUT Pol. :H Plane Test Date :2015-02-24

Temp./Humi. :21 deg_C / 61 RH

Engineer :Curry

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4924.00	Н	Average	38.60	9.86	48.46	54.00	-5.54
4924.00	Н	Peak	42.51	9.86	52.37	74.00	-21.63

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Operation Band Fundamental Frequency Operation Mode

:802.11 b :2462 MHz :TX HIGH

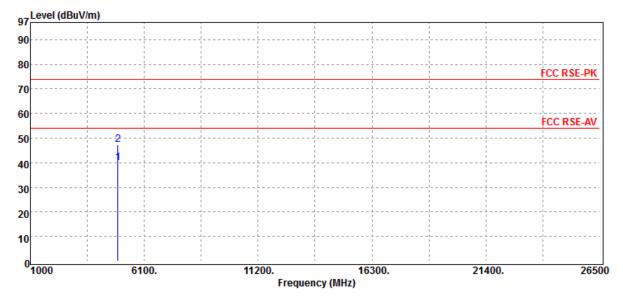
Test Date Temp./Humi. :2015-02-24

Engineer

:21 deg_C / 61 RH

:Curry :HORIZONTAL

EUT Pol. :H Plane Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4924.00	Н	Average	30.08	9.86	39.94	54.00	-14.06
4924.00	Н	Peak	37.57	9.86	47.43	74.00	-26.57

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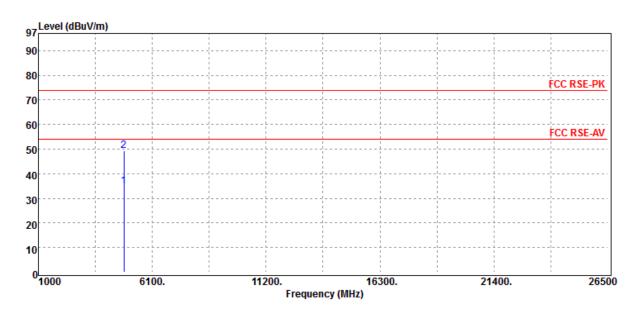
Radiated Spurious Emission Measurement Result (802.11 g)

Operation Band :2015-02-24 :802.11 g Test Date

Fundamental Frequency :2412 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :TX LOW Engineer :Curry

EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB	
4824.00	Н	Average	25.43	9.63	35.06	54.00	-18.94	
4824.00	Н	Peak	39.67	9.63	49.30	74.00	-24.70	
	MHz 4824.00	MHz F/H/E/S 4824.00 H	Mode MHz F/H/E/S PK/QP/AV 4824.00 H Average	MHz F/H/E/S PK/QP/AV dBμV 4824.00 H Average 25.43	MHz F/H/E/S PK/QP/AV dBμV dB 4824.00 H Average 25.43 9.63	MHz Mode F/H/E/S Reading Level PK/QP/AV FS dBμV FS dBμV/m 4824.00 H Average 25.43 9.63 35.06	MHz Mode PK/QP/AV Reading Level dBμV FS @3m dBμV/m 4824.00 H Average 25.43 9.63 35.06 54.00	Mode MHz Reading Level FS @3m MHz F/H/E/S PK/QP/AV dBμV dB dBμV/m dBμV/m dBμV/m dB 4824.00 H Average 25.43 9.63 35.06 54.00 -18.94

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Operation Band Fundamental Frequency Operation Mode

:802.11 g :2412 MHz :TX LOW

Test Date Temp./Humi. :2015-02-24 :21 deg_C / 61 RH

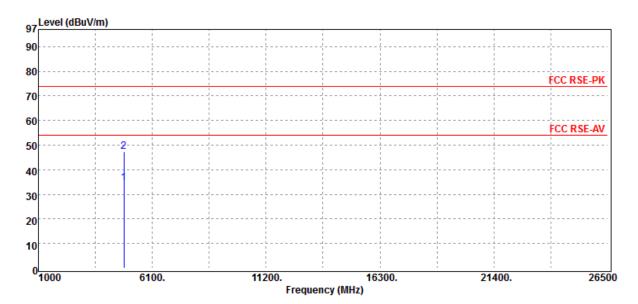
Engineer

:Curry

EUT Pol. :H Plane

Measurement Antenna Pol.

:HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4824.00	Н	Average	25.08	9.63	34.71	54.00	-19.29
4824.00	Н	Peak	37.63	9.63	47.26	74.00	-26.74

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

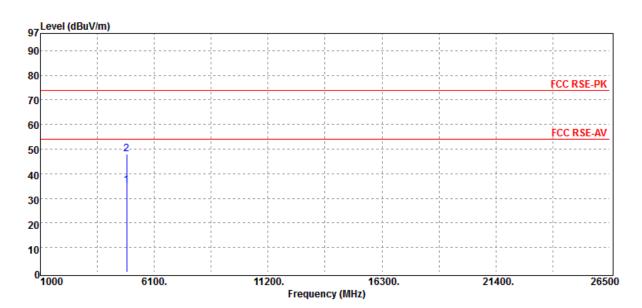
:802.11 g :2437 MHz :TX MID

:H Plane

Test Date :2015-02-24 Temp./Humi. :21 deg_C / 61 RH

Engineer :Curry

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4874.00	Н	Average	25.52	9.85	35.37	54.00	-18.63
4874.00	Н	Peak	38.18	9.85	48.03	74.00	-25.97

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Operation Band Fundamental Frequency Operation Mode

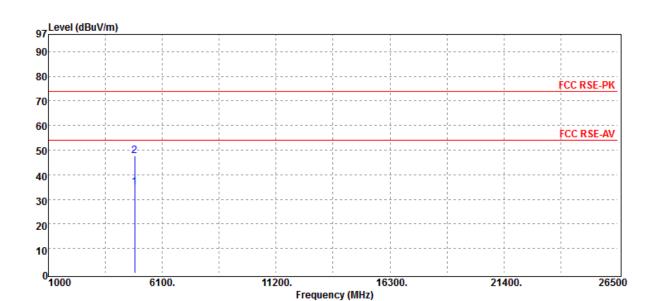
EUT Pol.

:802.11 g :2437 MHz :TX MID :H Plane

Test Date Temp./Humi. :2015-02-24 :21 deg_C / 61 RH

Engineer :Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4874.00	Н	Average	24.91	9.85	34.76	54.00	-19.24
4874.00	Н	Peak	37.68	9.85	47.53	74.00	-26.47

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Operation Band Fundamental Frequency Operation Mode

:802.11 g :2462 MHz :TX HIGH

Test Date Temp./Humi.

Measurement Antenna Pol.

:2015-02-24 :21 deg_C / 61 RH

Engineer

:Curry :VERTICAL

EUT Pol. :H Plane

> Level (dBuV/m) 80 60 50 40 30 20 10 1000 6100. 11200. 16300. 21400. 26500

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4924.00	Н	Average	24.99	9.86	34.85	54.00	-19.15
4924.00	Н	Peak	37.59	9.86	47.45	74.00	-26.55

Frequency (MHz)

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Report No.: ER/2015/20009 **Issue Date: Mar. 12, 2015**

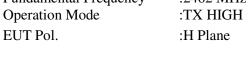
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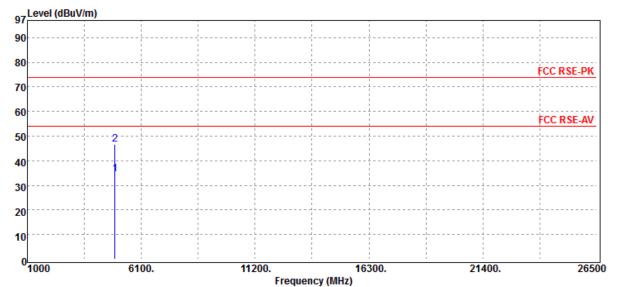
Operation Band Fundamental Frequency :802.11 g :2462 MHz Test Date Temp./Humi. :2015-02-24 :21 deg_C / 61 RH

Engineer :Curry

Measurement Antenna Pol.

:HORIZONTAL





Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4924.00	Н	Average	24.71	9.86	34.57	54.00	-19.43
4924.00	Н	Peak	36.95	9.86	46.81	74.00	-27.19

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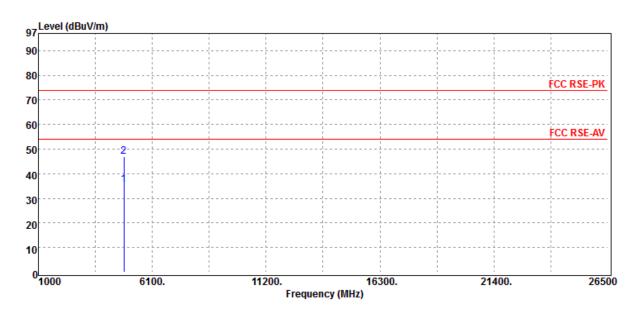
Radiated Spurious Emission Measurement Result (802.11_HT20)

Operation Band :2015-02-24 :802.11 n20M Test Date

Fundamental Frequency :2412 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :TX LOW Engineer :Curry

EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB	
4824.00	Н	Average	26.00	9.63	35.63	54.00	-18.37	
4824.00	Н	Peak	37.25	9.63	46.88	74.00	-27.12	

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Operation Band Fundamental Frequency Operation Mode

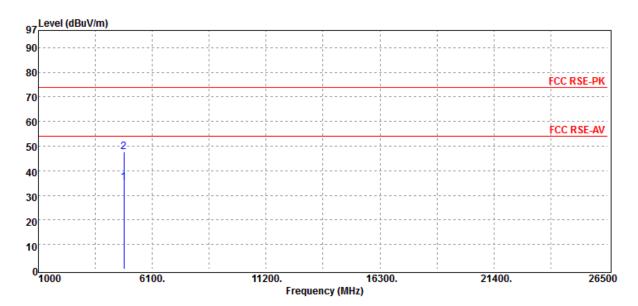
EUT Pol.

:802.11 n20M :2412 MHz :TX LOW :H Plane

Test Date Temp./Humi. :2015-02-24 :21 deg_C / 61 RH

Engineer :Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4824.00	Н	Average	25.76	9.63	35.39	54.00	-18.61
4824.00	Н	Peak	38.03	9.63	47.66	74.00	-26.34

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Operation Band Fundamental Frequency Operation Mode

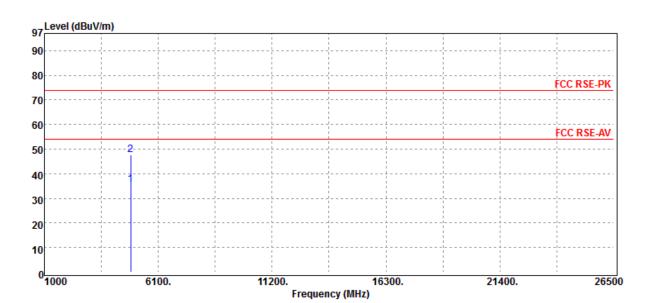
EUT Pol.

:802.11 n20M :2437 MHz :TX MID :H Plane

Test Date Temp./Humi. :2015-02-24 :21 deg_C / 61 RH

Engineer :Curry

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4874.00	Н	Average	25.77	9.85	35.62	54.00	-18.38
4874.00	Н	Peak	37.92	9.85	47.77	74.00	-26.23

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

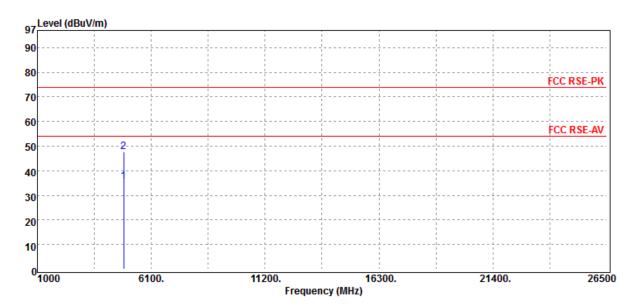
:802.11 n20M :2437 MHz :TX MID :H Plane

Test Date Temp./Humi. Engineer

:2015-02-24 :21 deg_C / 61 RH

:Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4874.00	Н	Average	25.56	9.85	35.41	54.00	-18.59
4874.00	Н	Peak	37.98	9.85	47.83	74.00	-26.17

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:2015-02-24

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Operation Band Fundamental Frequency Operation Mode

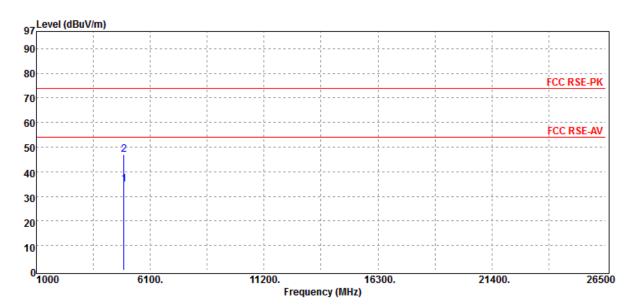
EUT Pol.

:802.11 n20M :2462 MHz :TX HIGH :H Plane

Test Date Temp./Humi.

:21 deg_C / 61 RH Engineer :Curry

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4924.00	Н	Average	25.05	9.86	34.91	54.00	-19.09
4924.00	Н	Peak	37.19	9.86	47.05	74.00	-26.95

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Operation Band Fundamental Frequency Operation Mode

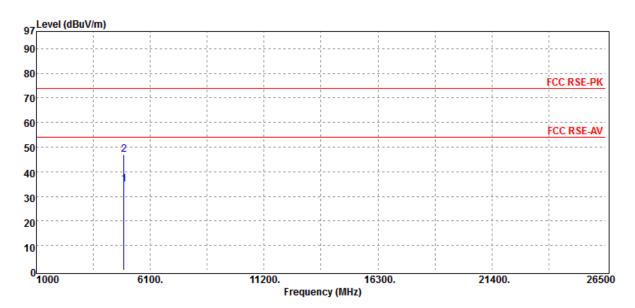
EUT Pol.

:802.11 n20M :2462 MHz :TX HIGH :H Plane

Test Date :2015-02-24 Temp./Humi. :21 deg_C / 61 RH

Engineer :Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4924.00	Н	Average	24.90	9.86	34.76	54.00	-19.24
4924.00	Н	Peak	37.05	9.86	46.91	74.00	-27.09

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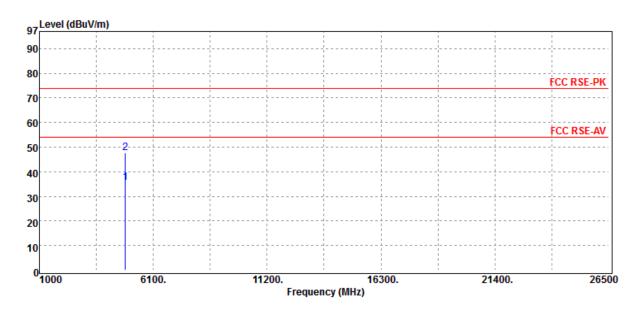
Radiated Spurious Emission Measurement Result (802.11_HT40)

Operation Band :802.11 n40M :2015-02-24 Test Date

Fundamental Frequency :2422 MHz Temp./Humi. :21 deg_C / 61 RH

Operation Mode :TX LOW Engineer :Curry

EUT Pol. :H Plane :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB	
4844.00	Н	Average	25.84	9.74	35.58	54.00	-18.42	
4844.00	Н	Peak	37.97	9.74	47.71	74.00	-26.29	
	MHz 4844.00	MHz F/H/E/S 4844.00 H	Mode MHz F/H/E/S PK/QP/AV 4844.00 H Average	MHz F/H/E/S PK/QP/AV dBμV 4844.00 H Average 25.84	MHz F/H/E/S PK/QP/AV dBμV dB 4844.00 H Average 25.84 9.74	MHz Mode F/H/E/S Reading Level PK/QP/AV FS dBμV FS dBμV/m 4844.00 H Average 25.84 9.74 35.58	MHz Mode PK/QP/AV Reading Level dBμV FS @3m dBμV/m 4844.00 H Average 25.84 9.74 35.58 54.00	Mode MHz Reading Level FS @3m MHz F/H/E/S PK/QP/AV dBμV dB dBμV/m dBμV/m dBμV/m dB 4844.00 H Average 25.84 9.74 35.58 54.00 -18.42

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Operation Band Fundamental Frequency Operation Mode

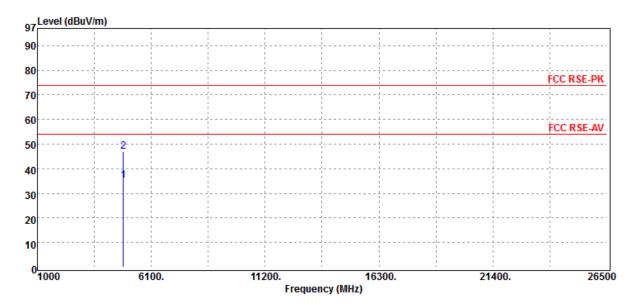
EUT Pol.

:802.11 n40M :2422 MHz :TX LOW :H Plane

Test Date :2015-02-24 Temp./Humi. :21 deg_C / 61 RH

Engineer :Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4844.00	Н	Average	25.56	9.74	35.30	54.00	-18.70
4844.00	Н	Peak	37.16	9.74	46.90	74.00	-27.10

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Operation Band Fundamental Frequency Operation Mode

EUT Pol.

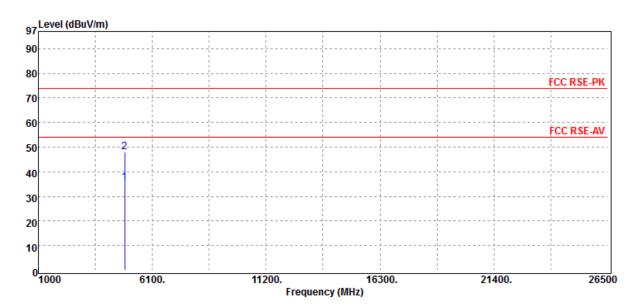
:802.11 n40M :2437 MHz :TX MID :H Plane

Test Date Temp./Humi.

:2015-02-24 :21 deg_C / 61 RH

Engineer :Curry

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4874.00	Н	Average	25.82	9.85	35.67	54.00	-18.33
4874.00	Н	Peak	38.11	9.85	47.96	74.00	-26.04

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Operation Band Fundamental Frequency Operation Mode

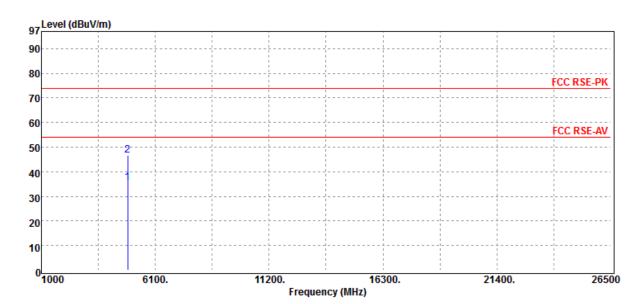
EUT Pol.

:802.11 n40M :2437 MHz :TX MID :H Plane

Test Date Temp./Humi. :2015-02-24 :21 deg_C / 61 RH

Engineer :Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4874.00	Н	Average	25.66	9.85	35.51	54.00	-18.49
4874.00	Н	Peak	36.65	9.85	46.50	74.00	-27.50

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Operation Band Fundamental Frequency

Operation Mode EUT Pol.

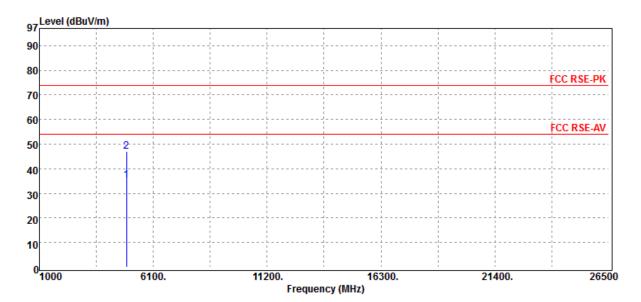
:802.11 n40M :2452 MHz :TX HIGH :H Plane

Test Date Temp./Humi.

:2015-02-24 :21 deg_C / 61 RH

Engineer :Curry

:VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4904.00	Н	Average	25.34	9.84	35.18	54.00	-18.82
4904.00	Н	Peak	37.09	9.84	46.93	74.00	-27.07

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Operation Band Fundamental Frequency Operation Mode

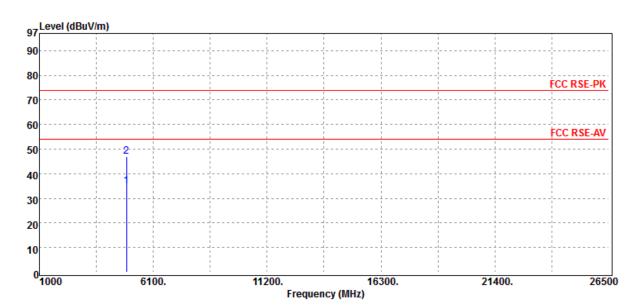
EUT Pol.

:802.11 n40M :2452 MHz :TX HIGH :H Plane

Test Date Temp./Humi. :2015-02-24 :21 deg_C / 61 RH

Engineer :Curry

:HORIZONTAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dΒμV	dB	dBμV/m	dBμV/m	dB
4904.00	Н	Average	25.19	9.84	35.03	54.00	-18.97
4904.00	Н	Peak	37.03	9.84	46.87	74.00	-27.13

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12 PEAK POWER SPECTRAL DENSITY

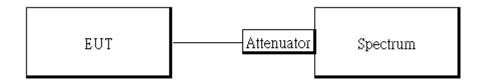
12.1 Standard Applicable

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

12.2 Measurement Equipment Used

Wiedsurement Equipment escu								
	Conducted Emission Test Site							
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.			
TYPE		NUMBER	NUMBER	CAL.				
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015			
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2015	01/01/2016			
Attenuator	Mini-Circuit	BW-S10W2+	002	01/02/2015	01/01/2016			

12.3 Test Set-up



12.4 Measurement Procedure

- 1. Set analyzer center frequency to DTS channel center frequency.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance V03r02.
- 3. Set the span to 1.5 times the DTS channel bandwidth.
- 4. Set the RBW \geq 3 kHz.
- 5. Set the VBW \geq 3 x RBW.
- 6. Detector = peak.
- 7. Sweep time = auto couple.
- 8. Trace mode = max hold.
- 9. Allow trace to fully stabilize.
- 10. Use the peak marker function to determine the maximum amplitude level.
- 11. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

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12.5 Measurement Result

Frequency	RF Power Density	Result							
(MHz)	(dBm)	(dBm)							
	802.11b								
2412	-4.86	8	PASS						
2437	-4.60	8	PASS						
2462	-3.63	8	PASS						
	802.11	g							
2412	-11.46	8	PASS						
2437	-10.61	8	PASS						
2462	-10.50	8	PASS						
	802.11n_H	IT20							
2412	-10.50	8	PASS						
2437	-10.19	8	PASS						
2462	-7.93	8	PASS						
802.11n_HT40									
2422	-13.66	8	PASS						
2437	-11.90	8	PASS						
2452	-13.20	8	PASS						

^{*}Refer to next page for plots

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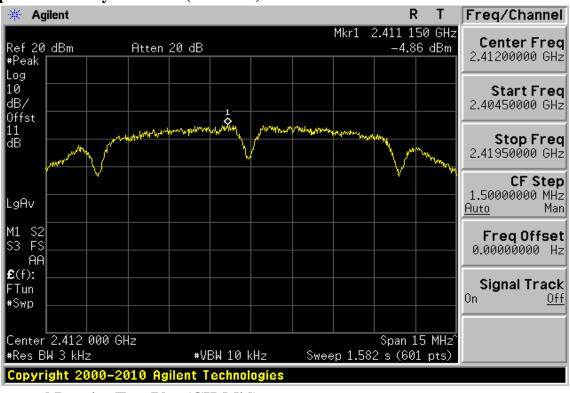
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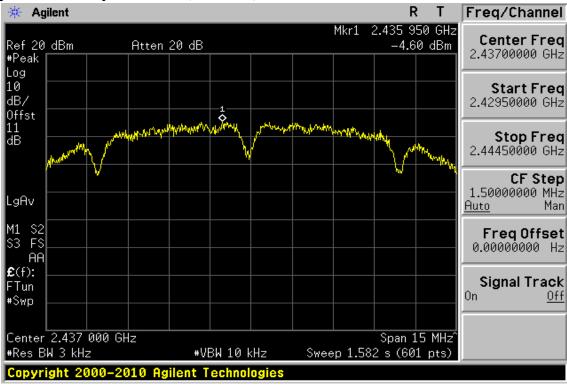


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802.11b **Power Spectral Density Test Plot (CH-Low)**



Power Spectral Density Test Plot (CH-Mid)



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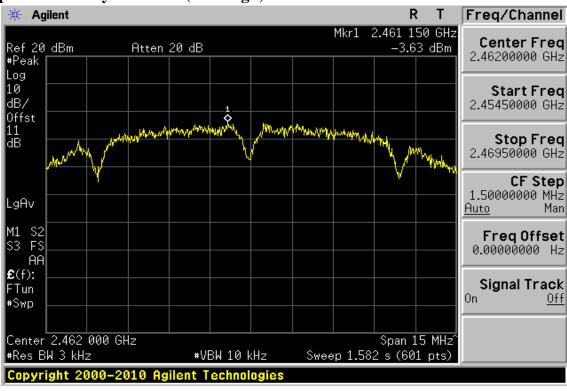
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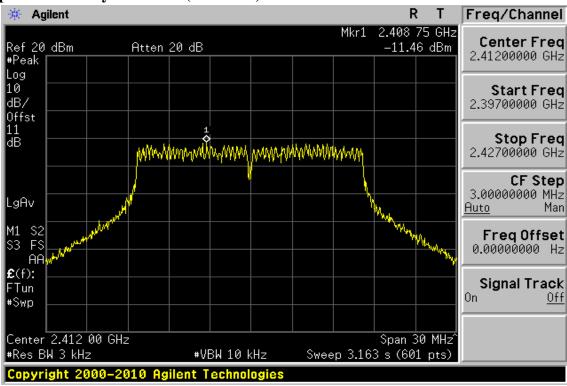


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Power Spectral Density Test Plot (CH-High)



802.11g **Power Spectral Density Test Plot (CH-Low)**



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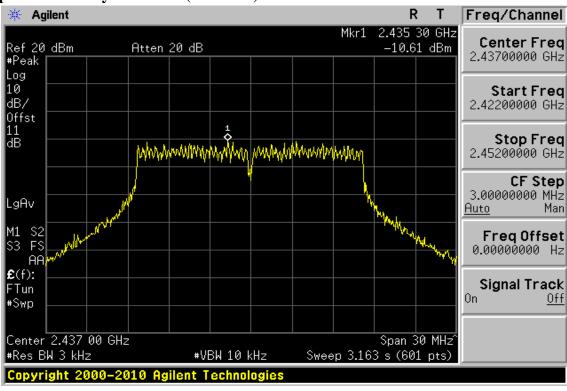
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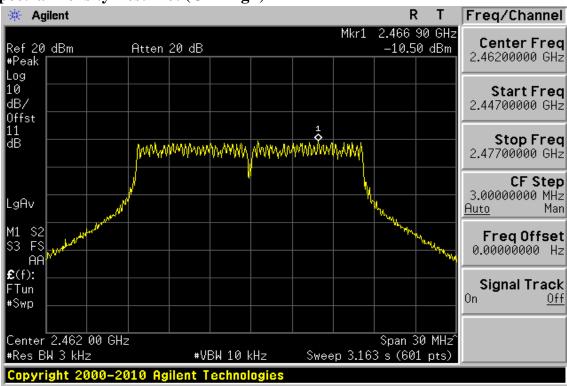


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Power Spectral Density Test Plot (CH-Mid)



Power Spectral Density Test Plot (CH-High)



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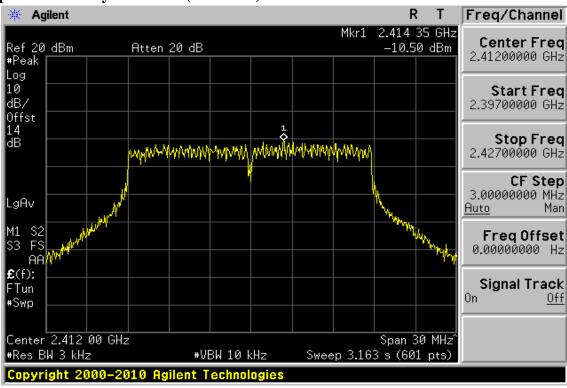
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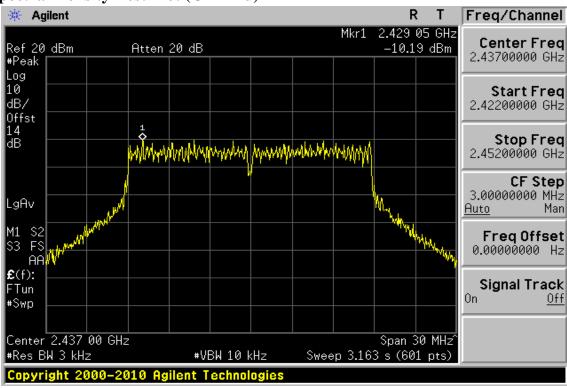
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802.11n HT20

Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)



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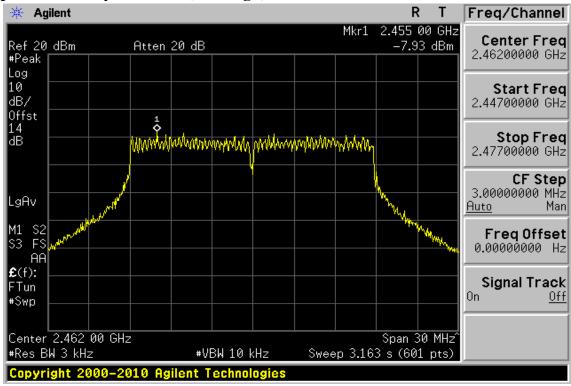
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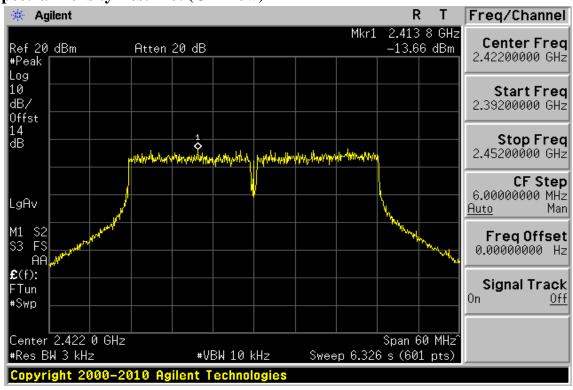
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Power Spectral Density Test Plot (CH-High)



802.11n HT40

Power Spectral Density Test Plot (CH-Low)



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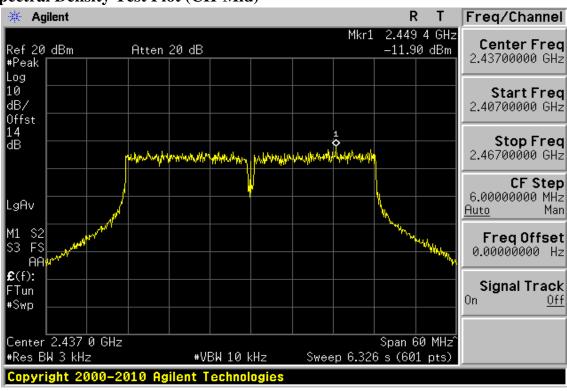
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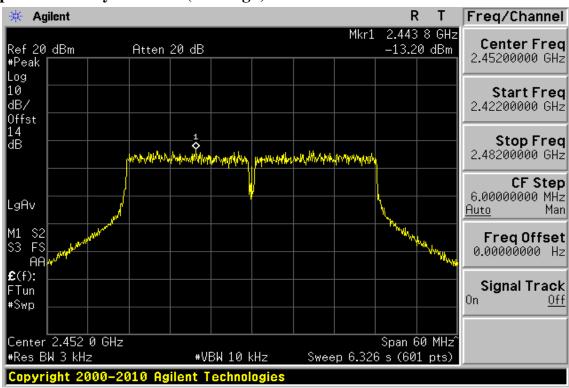
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Power Spectral Density Test Plot (CH-Mid)



Power Spectral Density Test Plot (CH-High)



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13 ANTENNA REQUIREMENT

13.1 Standard Applicable

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device.

If the transmitting antenna is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi.

In case of point-to-point operation, the power shall be reduced by the one dB for every 3 dB that the directional gain of antenna exceeds 6dBi.

13.2 Antenna Connected Construction

An embedded-in antenna design is used.

The antenna connector is designed with unique type RF connector and no consideration of replacement. Please see EUT photo and antenna spec. for details.

The antenna gain is less than 6dBi. Therefore, it is not necessary to reduce maximum output power limit.

~ End of Report ~

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