

Report No.: E2/2015/50045 Issue Date: Jun. 23, 2015

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ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

Product Name: Digital Signage Media Appliance

IAdea Corporation Brand Name:

XMP7 series **Marketing Name:**

Model No.: IAD-16001

Model Difference: N/A

FCC ID: **Y9E-IAD16001**

E2/2015/50045 **Report No.:**

Issue Date: Jun. 23, 2015

FCC Rule Part: §15.247, Cat: DTS

IAdea Corporation

3F., No. 33, Lane 77, Xing-ai Road., Neihu **Prepared for:**

Dist., Taipei City 11469, Taiwan. R.O.C.

SGS Taiwan Ltd.

Electronics & Communication Laboratory Prepared by:

No.2, Keji 1st Rd., Guishan District, Taoyuan

City, Taiwan 333





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VERIFICATION OF COMPLIANCE

IAdea Corporation Applicant:

3F., No. 33, Lane 77, Xing-ai Road., Neihu Dist., Taipei City 11469,

Taiwan. R.O.C.

Digital Signage Media Appliance **Product Name:**

IAdea Corporation **Brand Name:**

XMP7 series **Marketing Name:**

IAD-16001 **Model No.:**

Model Difference: N/A

FCC ID: Y9E-IAD16001

File Number: E2/2015/50045

Date of test: May. 18, 2015 ~ Jun. 23, 2015

Date of EUT Received: May. 18, 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 C63.10:2009 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:	Aken Huang	Date	Jun. 23, 2015	
Prepared By:	Aken Huang/Engineer Allen Tsai	Date	Jun. 23, 2015	
Approved By:	Allen Tsai / Engineer Jim Chang / Asst. Manager	Date	Jun. 23, 2015	

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Revision History

Report Number	Revision	Description	Issue Date
E2/2015/50045	Rev.00	Initial creation of document	Jun. 23, 2015

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GENERAL INFORMATION

Product description

General:

Product Name:	Digital Signage Media Appliance		
Brand Name:	IAdea Corporation		
Marketing Name:	XMP7 seri	es	
Model No.:	IAD-1600	1	
Model Difference:	N/A		
Product SW/HW version:	xmp-7300_v0.0.1.3 / 7300-2A		
Radio SW/HW version:	N/A		
Test SW Version:	N/A		
RF power setting in TEST SW:	N/A		
	12Vdc from DC Adapter		
Power Supply:	Adapter:	Model No.: WB-18D12R, Supplier: APD Model No.: KSASB0241200150D5, Supplier: Ktec	

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WLAN 2.4GHz:

Wi-Fi	Frequency Range	Channels	Rated Power	Modulation Technology		
11b/g	2412-2462	11	b: 16.51dBm g: 15.49dBm	DSSS, OFDM		
11n	HT20 2412-2462	11	HT20: 14.84dBm	OFDM		
11n	HT40 2422-2452	7	HT40: 14.82dBm	OFDM		
Antenna Des	ignation:	Dipole Antenna, Gain: 3.92dBi				
Modulation type:		CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM				
Transition Rate:		802.11 b: up to 11 Mbps; 802.11 g: up to 54 Mbps 802.11 n_20MHz: up to 72.2Mbps 802.11 n_40MHz: up to 135Mbps				

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Product Feature of Equipment Under Test

The equipment under Test (Hereafter Called: EUT) is mobile phone supporting, Wi-Fi 802.11bgn, Bluetooth features, and below is details of information

Product Feature				
Product Name:	Digital Signage Media Appliance			
Brand Name:	IAdea Corporation			
Marketing Name:	XMP7 series			
Model No.:	IAD-16001			
Model Difference:	N/A			
FCC ID	Y9E-IAD16001			
Wi-Fi Specification	802.11b/g/n			
Bluetooth Version	V4.0 dual mode + HS			

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 V03r03

ANSI C63.10:2009

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.

1.4 **Test Facility**

SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan. (TAF code 0513)

FCC Registration Numbers are: 628985

Canada Registration Number: 4620A-5.

1.5 **Special Accessories**

There are no special accessories used while test was conducted.

Equipment Modifications 1.6

There was no modification incorporated into the EUT.

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SYSTEM TEST CONFIGURATION

2.1 **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 Quasi-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. For emissions testin, the table height shall be 80 cm above the reference 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.

Measurement Results Explanation Example 2.4

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 0.6 dB and 10 dB attenuator.

Offset = RF cable loss (dB)+ attenuation factor(dB) = 0.6 + 10 = 10.6(dB)

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Configuration of Tested System

Fig. 2-1 Radiated Emission



Fig. 2-2 Conducted (Antenna Port) Configuration

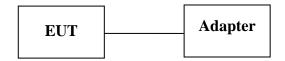


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	N/A	N/A	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 002:11ii_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					

7 channels are provided for 802.11n_HT40

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY		
3	2422 MHz	7	2442 MHz		
4	2427 MHz	8	2447 MHz		
5	2432 MHz	9	2452 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
- 3. Investigation has been done on all the possible configurations for searching the worst case.

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		
	RADIATED	EMISSION TE	ST (ABOVE 1 GH	(z)			
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	6.5	MAIN		
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	13.5	MAIN		

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 E2 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		DSSS	1	MAIN						
802.11g	1 to 11	1 1, 6, 11 OFDM		6	MAIN						
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	6.5	MAIN						
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	13.5	MAIN						

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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	+/- 0.84 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			
Massaurantungsutsintu	180MHz -417MHz: +/- 3.19dB			
Measurement uncertainty (Polarization : Vertical)	0.417GHz-1GHz: +/- 3.19dB			
(1 oranzation : 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**

According to §15.207, frequency range within 150kHz to 30MHz shall not exceed the Limit table as below.

Frequency range		mits (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

6.2 **Measurement Equipment Used**

Conducted Emission Test Site												
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.							
ТҮРЕ		NUMBER	NUMBER	CAL.								
EMI Test Receiver	R&S	ESCI 3	101311	06/20/2014	06/19/2015							
Coaxial Cables	N/A	N30N30-1042-150c m	N/A	01/06/2015	01/07/2016							
LISN	Schwarzbeck	NSLK 8127	8127-648	06/09/2015	06/08/2016							
LISN	Rolf-Heine	NNB-2/16Z	99012	03/04/2015	03/03/2016							
Test Software	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.							

6.3 EUT Setup

- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI 63.10:2009.
- 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

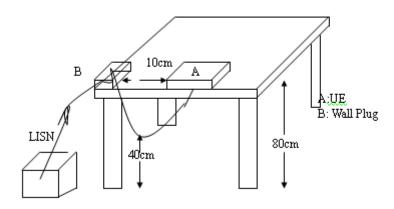
^{2.} The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.



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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

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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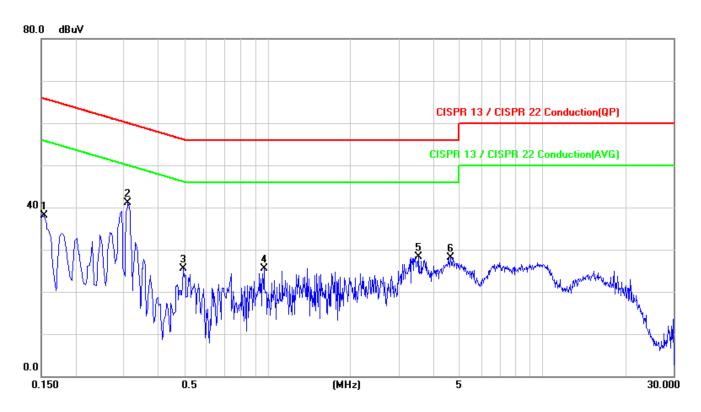


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AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation mode			Test Date:	May. 30, 2015
Temperature:	24	Humidity:	59 %	Test By:	Ashton
Model No.:	WB-18D12R			Phase:	L1



No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Comment
		(MHz)	dBuV	(dB)	(dBuV)	(dBuV)	(dB)		
1		0.1540	37.93	0.09	38.02	65.78	-27.76	peak	
2	*	0.3100	40.92	0.13	41.05	59.97	-18.92	peak	
3		0.4940	25.32	0.23	25.55	56.10	-30.55	peak	
4		0.9700	25.11	0.42	25.53	56.00	-30.47	peak	
5		3.5500	27.75	0.60	28.35	56.00	-27.65	peak	
6		4.6460	27.43	0.62	28.05	56.00	-27.95	peak	

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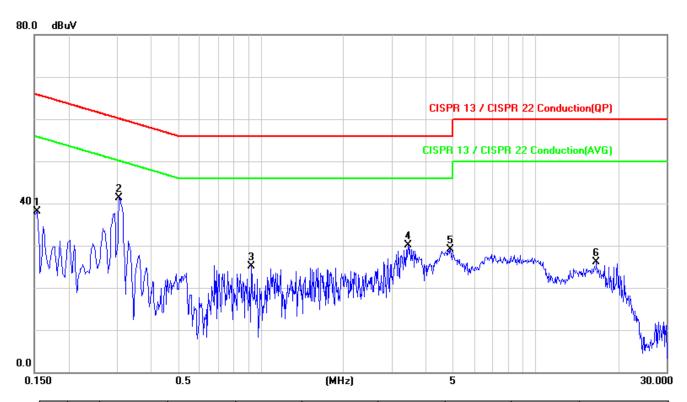
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Operation Mode:	Operation mode			Test Date:	May. 30, 2015
Temperature:	24	Humidity:	59 %	Test By:	Ashton
Model No.:	WB-18D12RU-FA	AAA		Phase:	N



No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Comment
		(MHz)	dBuV	(dB)	(dBuV)	(dBuV)	(dB)		
1		0.1540	37.93	0.09	38.02	65.78	-27.76	peak	
2	*	0.3060	41.15	0.14	41.29	60.08	-18.79	peak	
3		0.9260	24.69	0.40	25.09	56.00	-30.91	peak	
4		3.4420	29.56	0.60	30.16	56.00	-25.84	peak	
5		4.9140	28.40	0.62	29.02	56.00	-26.98	peak	
6		16.7420	25.56	0.58	26.14	60.00	-33.86	peak	

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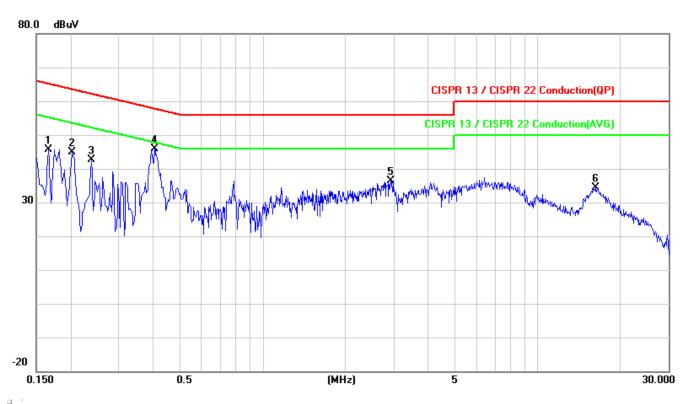
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Operation Mode:	Operation mode			Test Date:	May. 30, 2015
Temperature:	24	Humidity:	59 %	Test By:	Ashton
Model No.:	KSASB02412001:	50D5		Phase:	L1



No.	Mk	Freq.↔	Reading←	Factor+	Measurement-	Limit+ ³	Over⊄	Detector∗ ³	Comment€
4J	47	(MHz)₄□	dBuV↔	(dB)€	(dBuV)⊕	(dBuV)+3	(dB)€ ³	₽	₽
14□	٠	0.1660₽	45.61₽	0.08₽	45.69₽	65.16₽	-19.47₽	peak⊕	₽
2↔	٦	0.2020₽	44.76₽	0.07₽	44.83₽	63.53₽	-18.70₽	peak↔	₽
34□	٦	0.2380₽	42.53₽	0.09₽	42.62₽	62.17₽	-19.55₽	peak∉	₽
442	*47	0.4060₽	45.72₽	0.17₽	45.89₽	57.73₽	-11.84∻	peak↔	₽
54□	٦	2.9420₽	35.80₽	0.59₽	36.39₽	56.00₽	-19.61₽	peak↔	47
64□	٦	16.2300₽	33.68₽	0.60₽	34.28₽	60.00₽	-25.72₽	peak∢	47

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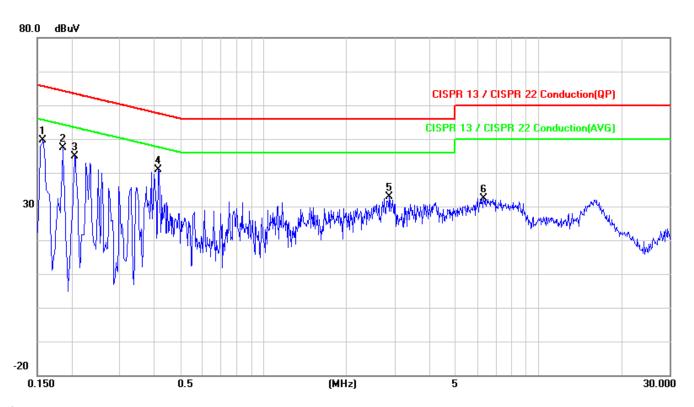
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Operation Mode:	Operation mode			Test Date:	May. 30, 2015
Temperature:	24	Humidity:	59 %	Test By:	Ashton
Model No.:	KSASB02412001:	50D5		Phase:	N



No.	Mk	Freq.€	Reading₽	Factor₽	Measurement₽	Limit₽	Over↔	Detector₽	Comment₽
43	42	(MHz)₄□	dBuV₽	(dB)€ [□]	(dBuV)₽	(dBuV)↔	(dB)← ³	₽	42
142	*4	0.1580₽	49.40₽	0.14₽	49.54₽	65.57₽	-16.03₽	peak∉	47
2∻	₽	0.1860₽	47.25₽	0.13₽	47.38₽	64.21₽	-16.83₽	peak∉³	4
34□	÷,	0.2060₽	44.84₽	0.13∜	44.97₽	63.37₽	-18.40₽	peak∉³	ė,
4+2	٠	0.4140₽	40.55₽	0.22₽	40.77₽	57.57₽	-16.80₽	peak∉	47
540	÷,	2.8820₽	32.30₽	0.64₽	32.94₽	56.00₽	-23.06₽	peak∉	÷.
64□	₽ ³	6.3420₽	31.58₽	0.69₽	32.27₽	60.00₽	-27.73₽	peak₽	đ

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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:

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

Duty Cycle:

	Duty Cycle	Duty Factor (dB)
802.11b	99.10	0.04
802.11g	89.00	0.51
802.11n_20	89.21	0.50
802.11n_40	81.56	0.89

Duty Cycle Factor: 10 * log (1/Duty cycle)

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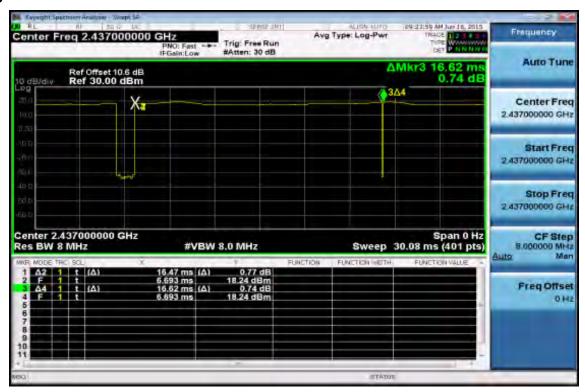
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7.1 DUTY CYCLE TEST SIGNAL Measurement Result

802.11 b



802.11 g



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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 from 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.

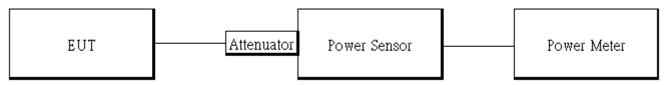
In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of Antenna exceeds 6dBi.

8.2 **Measurement Equipment Used**

	Conducted Emission Test Site											
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.							
TYPE		NUMBER	NUMBER	CAL.								
Spectrum Analyzer	Agilent	N9010A	MY53400256	10/15/2014	10/14/2015							
DC Block	PASTERNACK	PE8210	RF29	12/19/2014	12/18/2015							
Attenuator	WOKEN	218FS-10	RF23	12/19/2014	12/18/2015							

8.3 **Test Set-up**

Power Meter:



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8.4 **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 V03r03.
- 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

СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit
1	2412	1	16.51	44.77	1 Watt = 30 dBm
6	2437	1	16.26	42.27	1 Watt = 30 dBm
11	2462	1	16.45	44.16	1 Watt = 30 dBm

Max. Rated Avg. Power + Max. Tolerance (± 0.92dBm): 15 dBm

СН	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit
1	2412	1	14.06	25.47	1 Watt = 30 dBm
6	2437	1	14.08	25.59	1 Watt = 30 dBm
11	2462	1	14.07	25.53	1 Watt = 30 dBm

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802.11g

СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit
1	2412	6	15.32	34.04	1 Watt = 30 dBm
6	2437	6	15.49	35.40	1 Watt = 30 dBm
11	2462	6	15.22	33.27	1 Watt = 30 dBm

Max. Rated Avg. Power + Max. Tolerance (± 0.09dBm): 13 dBm

СН	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit
1	2412	6	12.91	19.54	1 Watt = 30 dBm
6	2437	6	12.89	19.45	1 Watt = 30 dBm
11	2462	6	12.75	18.84	1 Watt = 30 dBm

802.11n HT20

СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit
1	2412	MCS0	14.80	30.20	1 Watt = 30 dBm
6	2437	MCS0	14.82	30.34	1 Watt = 30 dBm
11	2462	MCS0	14.84	30.48	1 Watt = 30 dBm

Max. Rated Avg. Power + Max. Tolerance (± 0.02dBm): 12 dBm

СН	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit
1	2412	MCS0	11.94	15.63	1 Watt = 30 dBm
6	2437	MCS0	11.98	15.78	1 Watt = 30 dBm
11	2462	MCS0	11.92	15.56	1 Watt = 30 dBm

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802.11n_HT40

СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit
1	2422	MCS0	14.40	27.54	1 Watt = 30 dBm
6	2437	MCS0	14.71	29.58	1 Watt = 30 dBm
11	2452	MCS0	14.82	30.34	1 Watt = 30 dBm

Max. Rated Avg. Power + Max. Tolerance (± 0.02dBm): 12 dBm

СН	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit
1	2422	MCS0	11.95	15.67	1 Watt = 30 dBm
6	2437	MCS0	11.98	15.78	1 Watt = 30 dBm
11	2452	MCS0	11.98	15.78	1 Watt = 30 dBm

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

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6dB BANDWIDTH

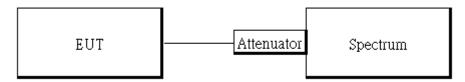
Standard Applicable 9.1

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

9.2 **Measurement Equipment Used**

Conducted Emission Test Site											
EQUIPMENT	LAST	CAL DUE.									
TYPE		NUMBER	NUMBER	CAL.							
Spectrum Analyzer	Agilent	N9010A	MY53400256	10/15/2014	10/14/2015						
DC Block	PASTERNACK	PE8210	RF29	12/19/2014	12/18/2015						
Attenuator	WOKEN	218FS-10	RF23	12/19/2014	12/18/2015						

Test Set-up 9.3



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 V03r03.
- 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)	
802.11b			
2412	9093	> 500	PASS
2437	9573	> 500	PASS
2462	10090	> 500	PASS
802.11g			
2412	16370	> 500	PASS
2437	16370	> 500	PASS
2462	16390	> 500	PASS
802.11n_HT20			
2412	17610	> 500	PASS
2437	17650	> 500	PASS
2462	17630	> 500	PASS
802.11n_HT40			
2412	35540	> 500	PASS
2437	35790	> 500	PASS
2462	35180	> 500	PASS

^{*}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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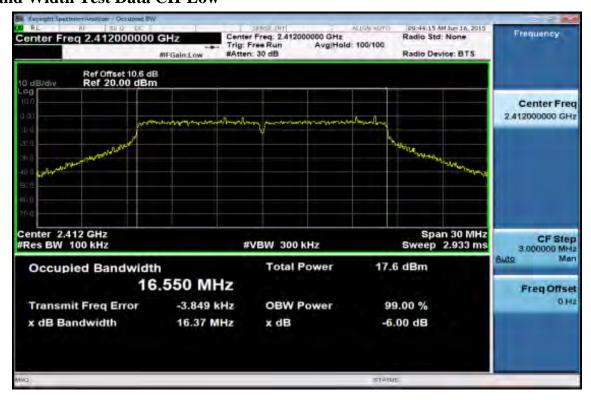
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6dB Band Width Test Data CH-High



802.11g

6dB Band Width Test Data CH-Low



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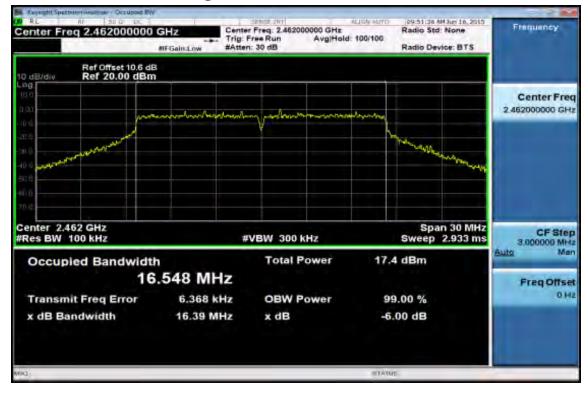
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6dB Band Width Test Data CH-Mid



6dB Band Width Test Data CH-High



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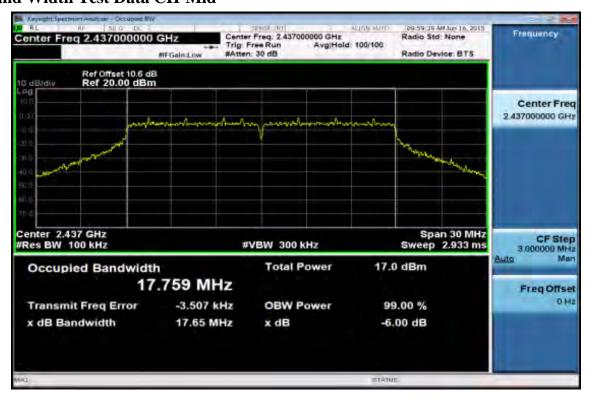
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802.11n 20M

6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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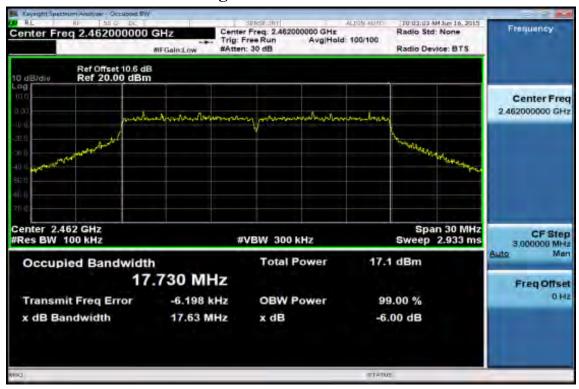
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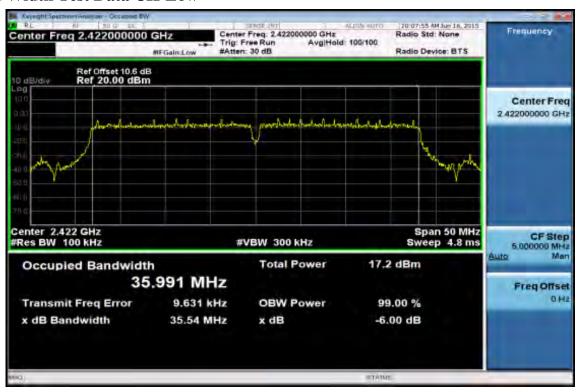
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6dB Band Width Test Data CH-High



802.11 n 40M

6dB Band Width Test Data CH-Low



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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

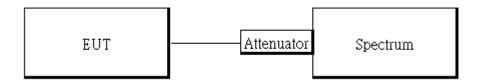
10.1 Standard Applicable

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	PE		NUMBER	CAL.						
Spectrum Analyzer	Agilent	N9010A	MY53400256	10/15/2014	10/14/2015					
DC Block	PASTERNACK	PE8210	RF29	12/19/2014	12/18/2015					
Attenuator	WOKEN	218FS-10	RF23	12/19/2014	12/18/2015					

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 V03r03.
- 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=100 kHz, VBW=300 kHz, 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 V03r03.
- 3. Set RBW = $100 \text{ kHz } \& \text{ VBW} \ge 300 \text{ kHz}$, 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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802.11b **Band Edges Test Data CH-Low**



Band Edges Test Data CH-High



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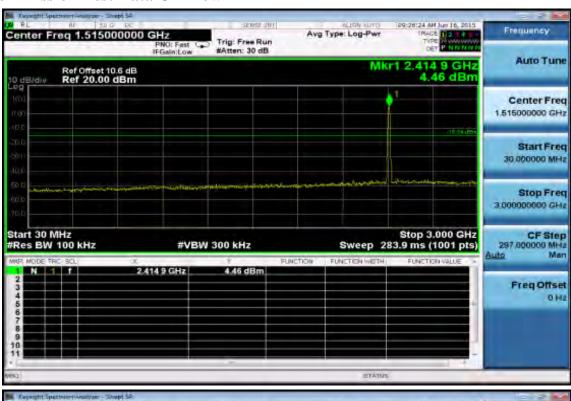


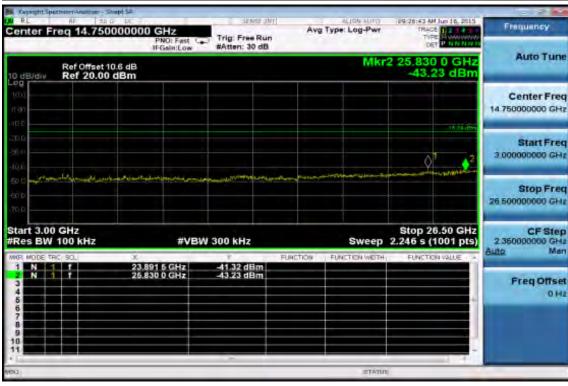
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802.11b

Spurious Emission Test Data CH-Low





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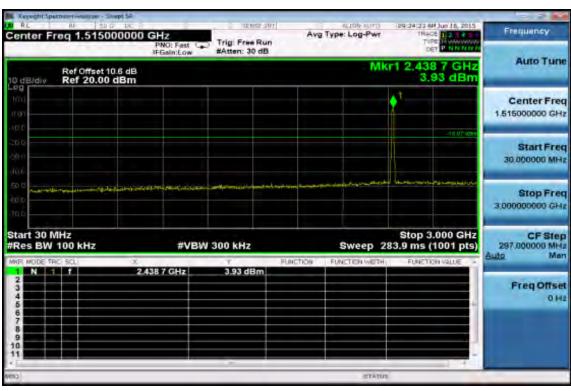
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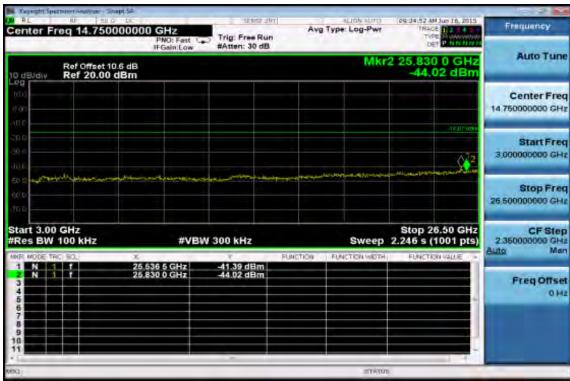
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Spurious Emission Test Data CH-Mid





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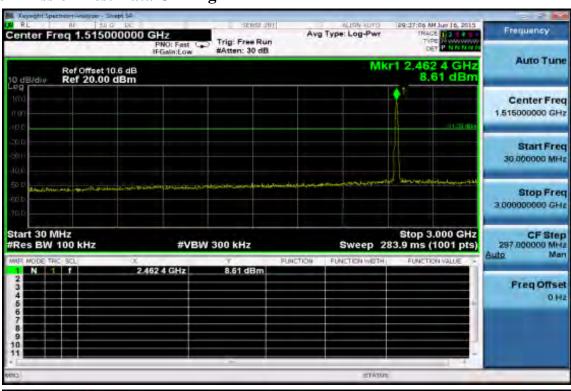
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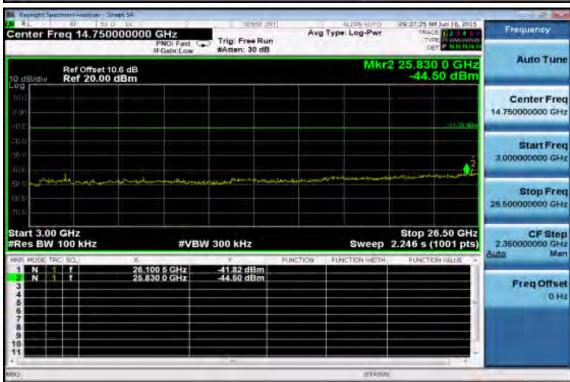
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Spurious Emission Test Data CH-High





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



Band Edges Test Data CH-High



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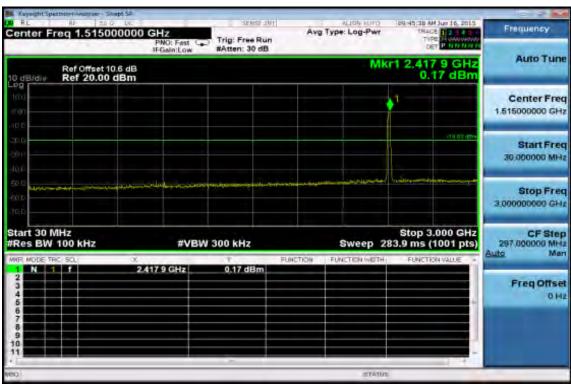


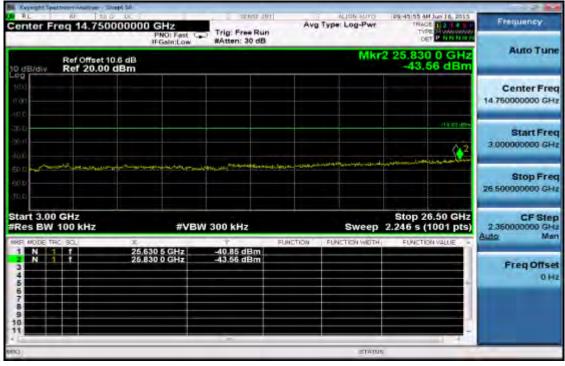
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802.11g

Spurious Emission Test Data CH-Low





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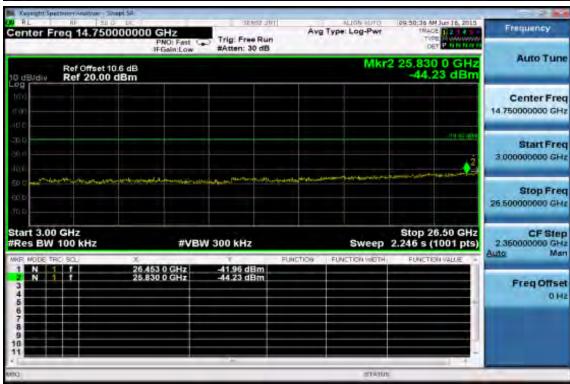
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Spurious Emission Test Data CH-Mid





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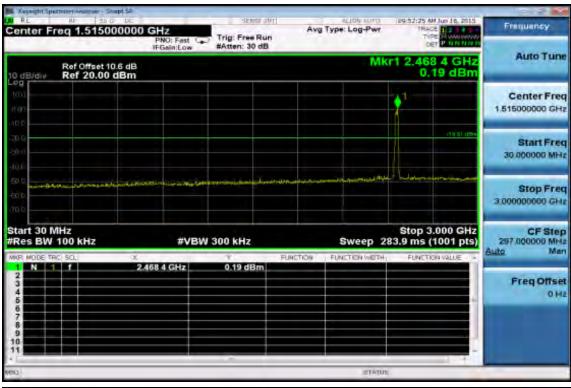
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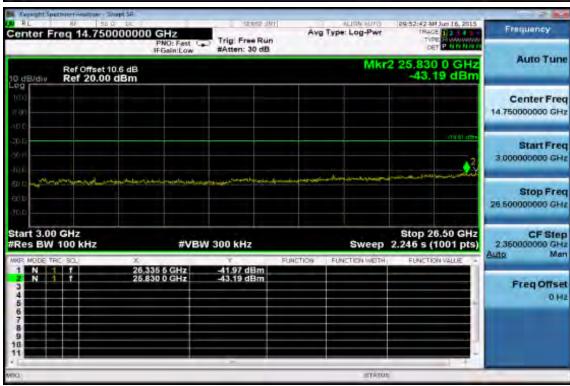
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Spurious Emission Test Data CH-High





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802.11n_HT20

Band Edges Test Data CH-Low



Band Edges Test Data CH-High



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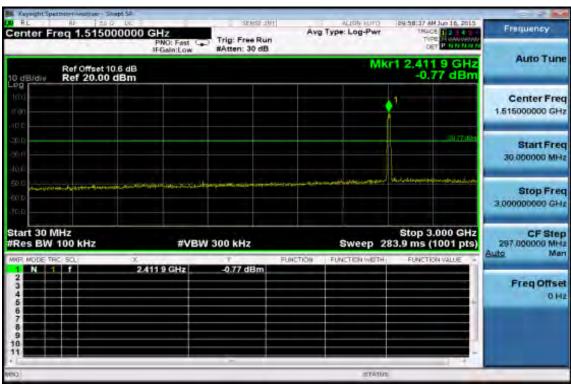
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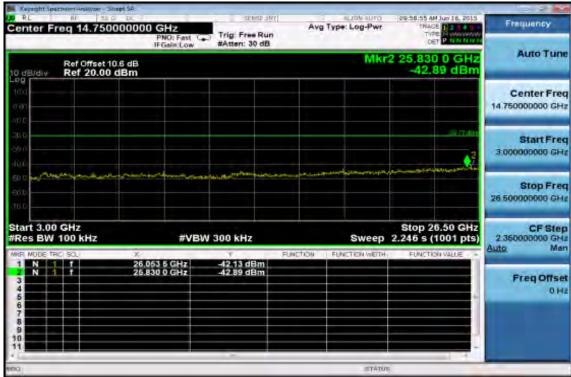
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802.11n HT20

Spurious Emission Test Data CH-Low





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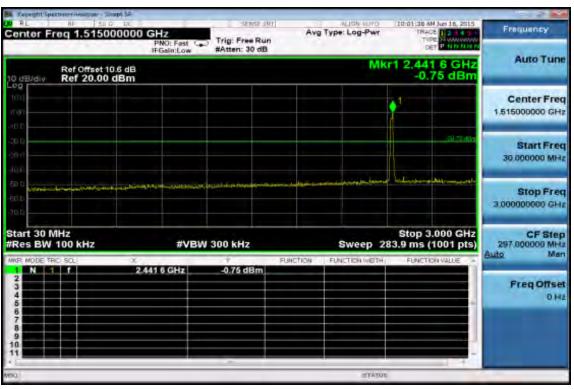
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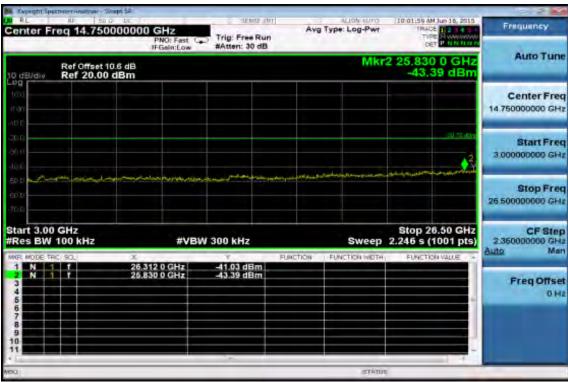
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Spurious Emission Test Data CH-Mid





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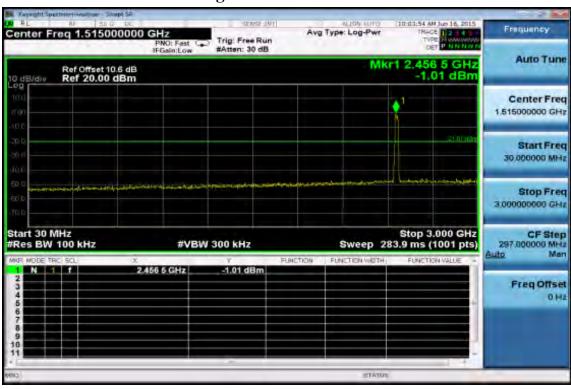
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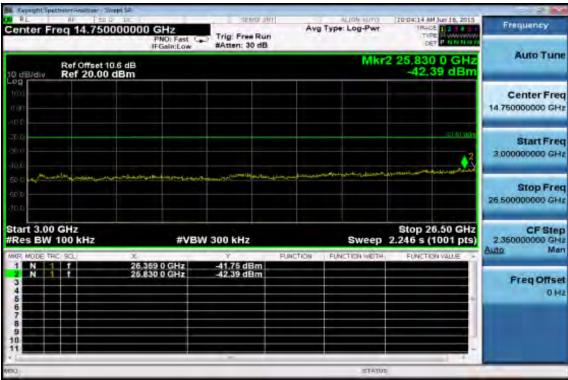
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Spurious Emission Test Data CH-High





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802.11n HT40

Band Edges Test Data CH-Low



Band Edges Test Data CH-High



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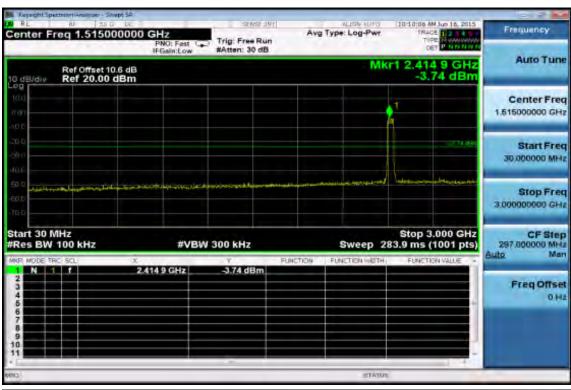
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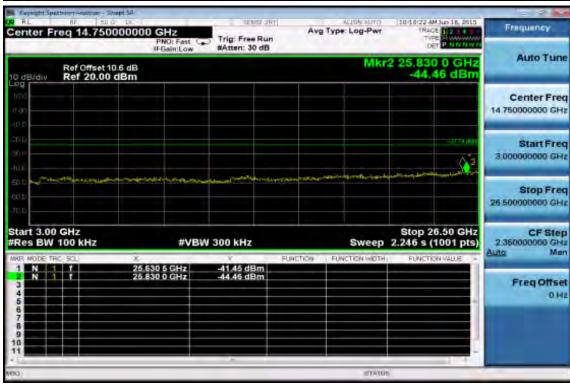
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802.11n HT40

Spurious Emission Test Data CH-Low





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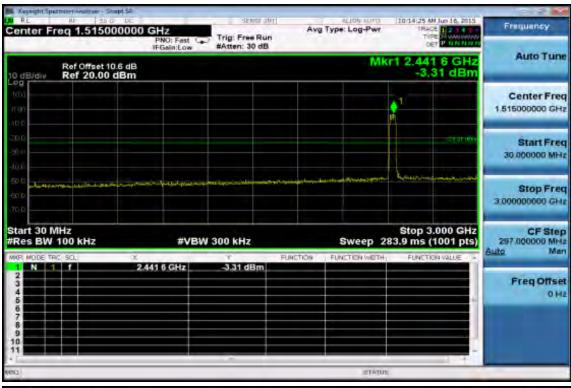
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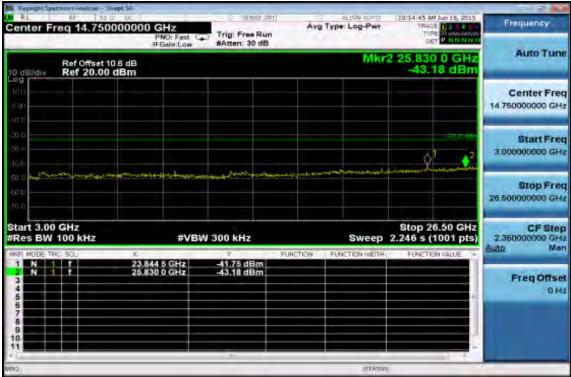
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Spurious Emission Test Data CH-Mid





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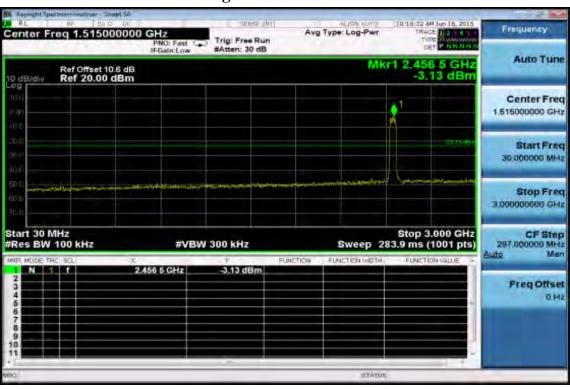
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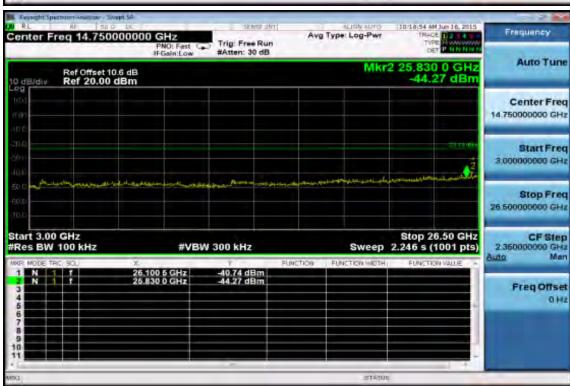
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Spurious Emission Test Data CH-High





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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:

- 1. 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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11.2 Measurement Equipment Used:

2 Measurement Ed	quipment Oscu.	066 61-			
		966 Chamb	er	T	
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
TYPE		NUMBER	NUMBER	CAL.	
EMI Test Receiver	R&S	ESU 40	100363	04/09/2015	04/08/2016
Loop Antenna	ETS-Lindgren	6502	00143303	12/09/2014	12/08/2015
Broadband Antenna	TESEQ	CBL 6112D	35240	12/05/2014	12/04/2015
Horn Antenna	ETS-Lindgren	3117	00143272	12/08/2014	12/07/2015
Horn Antenna	ETS-Lindgren	3160-09	00117911	11/13/2014	11/12/2015
Pre Amplifier	EMC Instruments	EMC330	980096	12/19/2014	12/18/2015
Pre Amplifier	EMC Instruments	EMC0011830	980199	12/19/2014	12/18/2015
Pre Amplifier	R&S	SCU-18	10204	12/19/2014	12/18/2015
Pre Amplifier	R&S SCU-26 10078		100780	12/19/2014	12/18/2015
Coaxial Cable	Huber+Suhner	RG 214/U	966Rx 9K-30M	12/19/2014	12/18/2015
Coaxial Cable	Huber+Suhner	RG 214/U SUCOFLEX 104	966Rx 30M-3G	12/19/2014	12/18/2015
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Rx 1G-18G	12/19/2014	12/18/2015
Coaxial Cable	Huber+Suhner	mini 141-12 SUCOFLEX 104	966Rx 18G-40G	12/19/2014	12/18/2015
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Tx 30M-18G	12/19/2014	12/18/2015
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	966Tx 18G-40G	12/19/2014	12/18/2015
Attenuator	WOKEN	218FS-10	RF27	12/19/2014	12/18/2015
Site NSA	SGS	966 Chamber C	SAC-C	03/04/2015	03/03/2016
Site VSWR	SGS	966 Chamber C	SAC-C	03/04/2015	03/03/2016
DC Power Supply	HOLA	DP-3003	D7070035	05/04/2015	05/03/2016
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.
Test Software	World-Pallas	Dr. E	V 3.0 Lite	N.C.R.	N.C.R.

11.3 Test SET-UP

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

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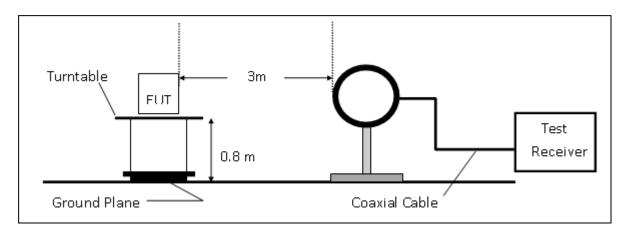
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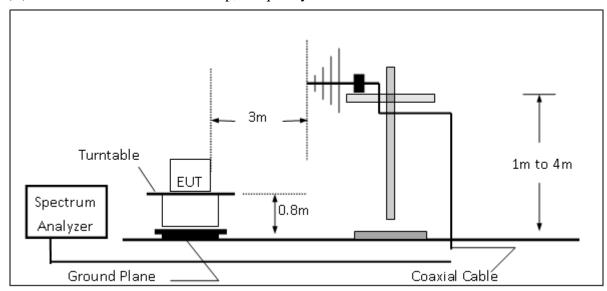
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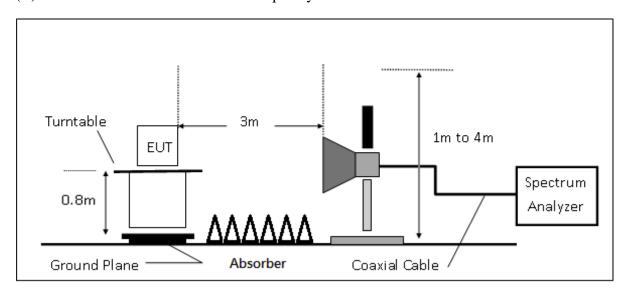
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(B) Radiated Emission Test Set-Up, Frequency from 30MHz to 1000MHz



(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 V03r03.
- 2. The EUT was placed on a turn table with 0.8m 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 emis-
- 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 $(dB\mu V) + Factor(dB)$

 $Factor(dB) = Antenna Factor(dB\mu V/m) + Cable Loss(dB) - Pre_Amplifier Gain(dB)$

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 from 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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Radiated Band Edge Measurement Result (802.11b)

Operation Band :802.11 b Test Date :2015-06-16

Fundamental Frequency :2412 MHz Temp./Humi. :24.5 deg_C/56RH Operation Mode :Band Edge LOW Engineer :Ashton

EUT Pol. :E2 Plane :VERTICAL Measurement Antenna Pol.

		11240 011 011 111 111 111 111 111 111 111 1						
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	
2331.84	S	Peak	52.18	6.43	58.61	74	-15.39	
2331.84	S	Average	41.62	6.43	48.05	54	-5.95	
2390.00	E	Peak	49.06	6.62	55.68	74	-18.32	
2390.00	E	Average	35.81	6.62	42.43	54	-11.57	

Operation Band :802.11 b Test Date :2015-06-16

Fundamental Frequency :2412 MHz Temp./Humi. :24.5 deg_C/56RH

Operation Mode :Band Edge LOW Engineer :Ashton

EUT Pol. :E2 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	Peak	45.50	6.62	52.12	74	-21.88
2390.00	E	Average	33.43	6.62	40.05	54	-13.95

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:Ashton

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Operation Band :802.11 b Test Date :2015-06-16

Fundamental Frequency :2462 MHz Temp./Humi. :24.5 deg_C/56RH

Operation Mode :Band Edge HIGH Engineer EUT Pol. :E2 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	Peak	51.18	6.96	58.15	74	-15.85	
2483.50	E	Average	36.66	6.96	43.62	54	-10.38	
2487.40	S	Peak	52.69	6.98	59.66	74	-14.34	
2487.40	S	Average	38.15	6.98	45.13	54	-8.87	

Operation Band Test Date :802.11 b :2015-06-16 Fundamental Frequency Temp./Humi. :24.5 deg_C/56RH :2462 MHz

Operation Mode :Band Edge HIGH Engineer :Ashton

EUT Pol. :E2 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	Peak	45.47	6.96	52.44	74	-21.56
2483.50	E	Average	33.41	6.96	40.37	54	-13.63

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Radiated Band Edge Measurement Result (802.11g)

Operation Band :802.11 g Test Date :2015-06-16

:2412 MHz Fundamental Frequency Temp./Humi. :24.5 deg_C/56RH Operation Mode Engineer :Band Edge LOW :Ashton

EUT Pol. :E2 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	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
2390.00	E	Peak	56.38	6.62	62.99	74.00	-11.01
2390.00	E	Average	37.85	6.62	44.47	54.00	-9.53

Operation Band :802.11 g Test Date :2015-06-16

Fundamental Frequency :2412 MHz Temp./Humi. :24.5 deg_C/56RH

Operation Mode :Band Edge LOW Engineer :Ashton

EUT Pol. :E2 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
2389.44	S	Peak	48.30	6.62	54.92	74.00	-19.08
2389.44	S	Average	33.93	6.62	40.55	54.00	-13.45
2390.00	E	Peak	48.01	6.62	54.63	74.00	-19.37
2390.00	E	Average	34.09	6.62	40.71	54.00	-13.29

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Operation Band Test Date :2015-06-16 :802.11 g

Fundamental Frequency :2462 MHz Temp./Humi. :24.5 deg_C/56RH

Operation Mode Engineer :Band Edge HIGH :Ashton

operation mode		Duna Bage III off		2.15.1	1001	ii isiitoii			
EUT Pol.		:E2 Plane		Meas	urement Anten	na Pol.	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	n dB		
2483.50	Е	Peak	56.77	6.96	63.73	74.00	-10.27		
2483.50	E	Average	38.39	6.96	45.35	54.00	-8.65		
Operation Band Fundamental Frequency Operation Mode		:802.11 g :2462 MHz :Band Edge HIGH		Test Date Temp./Humi. Engineer			:2015-06-16 :24.5 deg_C/56RH :Ashton		
EUT Pol.		:E2 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	$\mathrm{d}\mathrm{B}\mu\mathrm{V}$	dB	dBµV/m	dBµV/m	n dB		

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	Peak	48.11	6.96	55.07	74.00	-18.93
2483.50	Е	Average	34.38	6.96	41.34	54.00	-12.66

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Radiated Band Edge Measurement Result (802.11_HT20)

Operation Band :802.11 n20M Test Date :2015-06-16

Fundamental Frequency :2412 MHz Temp./Humi. :24.5 deg_C/56RH

Operation Mode Engineer :Band Edge LOW :Ashton

EUT Pol. :E2 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	Peak	60.89	6.62	67.50	74.00	-6.50
2390.00	E	Average	38.32	6.62	44.94	54.00	-9.06

Operation Band :802.11 n20M Test Date :2015-06-16

Fundamental Frequency Temp./Humi. :24.5 deg_C/56RH :2412 MHz

Operation Mode :Band Edge LOW Engineer :Ashton

EUT Pol. :E2 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	Peak	51.52	6.62	58.14	74.00	-15.86
2390.00	E	Average	34.14	6.62	40.76	54.00	-13.24

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Operation Band :802.11 n20M Test Date :2015-06-16

Fundamental Frequency Temp./Humi. :24.5 deg_C/56RH :2462 MHz

Operation Mode :Band Edge HIGH Engineer :Ashton

EUT Pol. :E2 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	Peak	58.87	6.96	65.83	74.00	-8.17
2483.50	E	Average	38.82	6.96	45.78	54.00	-8.22
Operation Band		:802.11 n20M	1	Test I	Date	:20	15-06-16

Fundamental Frequency Temp./Humi. :24.5 deg_C/56RH :2462 MHz

Operation Mode :Band Edge HIGH Engineer :Ashton

EUT Pol. :E2 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	Peak	50.89	6.96	57.85	74.00	-16.15
2483.50	E	Average	34.47	6.96	41.43	54.00	-12.57
2483.90	S	Peak	51.28	6.96	58.25	74.00	-15.75
2483.90	S	Average	34.30	6.96	41.26	54.00	-12.74

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Report No.: E2/2015/50045 Issue Date: Jun. 23, 2015

:Ashton

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Radiated Band Edge Measurement Result (802.11_HT40)

Operation Band :802.11 n40M Test Date :2015-06-16

Fundamental Frequency :2422 MHz Temp./Humi. :24.5 deg_C/56RH Operation Mode

:Band Edge LOW Engineer EUT Pol. :E2 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
2388.36	S	Peak	59.38	6.62	65.99	74.00	-8.01
2388.36	S	Average	40.15	6.62	46.77	54.00	-7.23
2390.00	E	Peak	57.54	6.62	64.15	74.00	-9.85
2390.00	E	Average	40.59	6.62	47.21	54.00	-6.79

Operation Band :802.11 n40M Test Date :2015-06-16

Fundamental Frequency :2422 MHz Temp./Humi. :24.5 deg_C/56RH

Operation Mode :Band Edge LOW Engineer :Ashton

EUT Pol. :E2 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
2388.60	S	Peak	50.84	6.62	57.46	74.00	-16.54
2388.60	S	Average	34.27	6.62	40.89	54.00	-13.11
2390.00	E	Peak	48.91	6.62	55.52	74.00	-18.48
2390.00	Е	Average	34.38	6.62	41.00	54.00	-13.00

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Operation Band :802.11 n40M Test Date :2015-06-16

Fundamental Frequency :2452 MHz Temp./Humi. :24.5 deg_C/56RH

Operation Mode :Band Edge HIGH Engineer :Ashton

EUT Pol. :E2 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	Peak	61.23	6.96	68.20	74.00	-5.80
2483.50	E	Average	43.33	6.96	50.29	54.00	-3.71
2488.10	S	Peak	62.83	6.98	69.81	74.00	-4.19
2488.10	S	Average	41.52	6.98	48.50	54.00	-5.50

Operation Band :802.11 n40M Test Date :2015-06-16

Fundamental Frequency :2452 MHz Temp./Humi. :24.5 deg_C/56RH

Operation Mode :Band Edge HIGH Engineer :Ashton

EUT Pol. :E2 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	Peak	51.49	6.96	58.46	74.00	-15.54
2483.50	E	Average	36.36	6.96	43.32	54.00	-10.68
2487.70	S	Peak	53.94	6.98	60.92	74.00	-13.08
2487.70	S	Average	35.26	6.98	42.24	54.00	-11.76

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Report No.: E2/2015/50045 Issue Date: Jun. 23, 2015

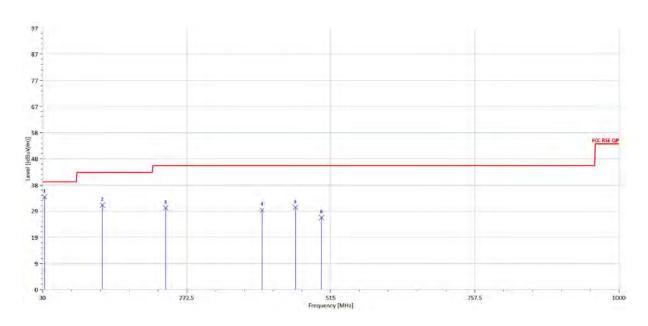
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Radiated Spurious Emission Measurement Result

Below 1GHz Worst-Case Data:

Operation Band :802.11 g Test Date :2015-06-16 Fundamental Frequency :2412 MHz Temp./Humi. :24.5 deg_C/56RH

Operation Mode :TX LOW Engineer :Ashton EUT Pol. :E2 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	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB
33.88	S	Peak	49.50	-15.22	34.28	40	-5.72
130.88	S	Peak	52.63	-21.37	31.26	43.5	-12.24
237.58	S	Peak	51.65	-21.41	30.24	46	-15.76
399.57	S	Peak	45.32	-15.88	29.44	46	-16.56
455.83	S	Peak	45.16	-14.75	30.41	46	-15.59
499.48	S	Peak	41.00	-14.36	26.64	46	-19.36

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Operation Band Fundamental Frequency Operation Mode

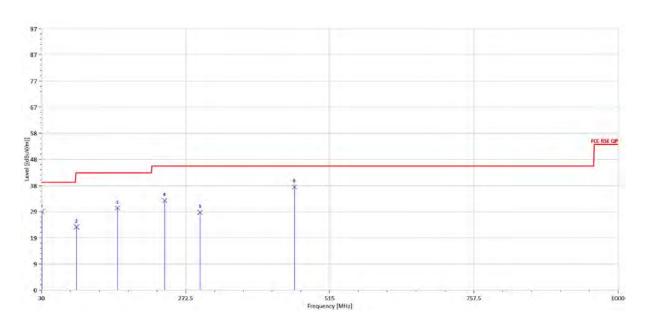
EUT Pol.

:802.11 g :2412 MHz :TX LOW :E2 Plane

Test Date Temp./Humi. :2015-06-16 :24.5 deg_C/56RH

Engineer : Ashton

: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
30.97	S	Peak	42.72	-13.64	29.08	40	-10.92
89.17	S	Peak	49.13	-25.74	23.39	43.5	-20.11
158.04	S	Peak	53.50	-23.05	30.45	43.5	-13.05
237.58	S	Peak	54.69	-21.41	33.29	46	-12.71
296.75	S	Peak	48.11	-19.29	28.83	46	-17.17
455.83	S	Peak	53.10	-14.75	38.35	46	-7.65

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Operation Band Fundamental Frequency Operation Mode

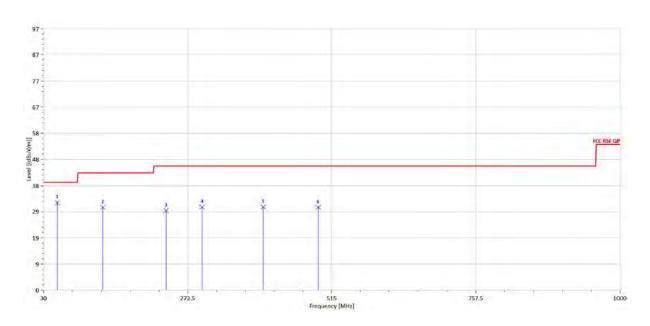
EUT Pol.

:802.11 g :2437 MHz :TX MID :E2 Plane

Test Date Temp./Humi. :2015-06-16 :24.5 deg_C/56RH

Engineer :Ashton

: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
53.28	S	Peak	58.96	-26.52	32.44	40	-7.56
129.91	S	Peak	52.06	-21.34	30.72	43.5	-12.78
236.61	S	Peak	50.94	-21.50	29.43	46	-16.57
296.75	S	Peak	50.07	-19.29	30.78	46	-15.22
399.57	S	Peak	46.71	-15.88	30.83	46	-15.17
492.69	S	Peak	44.97	-14.26	30.71	46	-15.29

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Operation Band Fundamental Frequency Operation Mode

:802.11 g :2437 MHz :TX MID

Test Date Temp./Humi. :2015-06-16

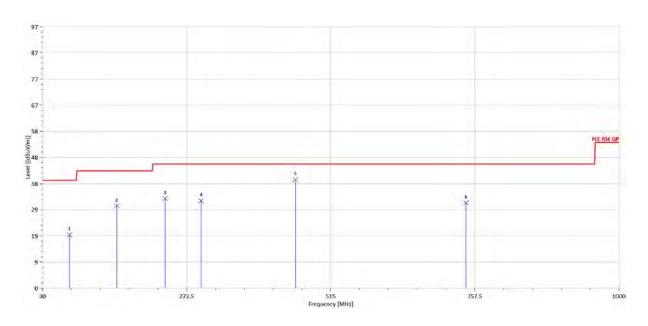
Engineer

:24.5 deg_C/56RH :Ashton

EUT Pol. :E2 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
75.59	S	Peak	47.06	-27.28	19.78	40	-20.22
155.13	S	Peak	53.40	-22.82	30.58	43.5	-12.92
236.61	S	Peak	54.79	-21.50	33.29	46	-12.71
296.75	S	Peak	51.72	-19.29	32.43	46	-13.57
455.83	S	Peak	55.00	-14.75	40.26	46	-5.74
742.95	S	Peak	41.92	-10.23	31.70	46	-14.30

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Operation Band Fundamental Frequency

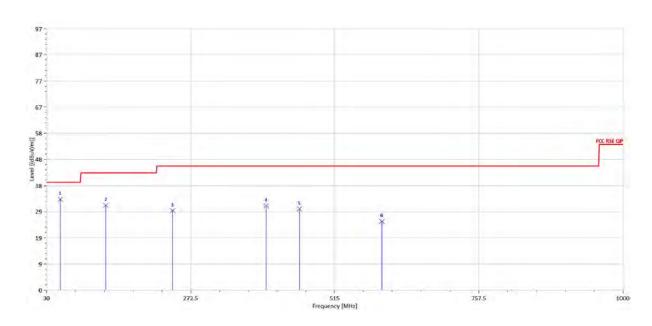
Operation Mode EUT Pol. :E2 Plane

:802.11 g :2462 MHz :TX HIGH

Test Date Temp./Humi. :2015-06-16

:24.5 deg_C/56RH Engineer :Ashton

: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
53.28	S	Peak	60.25	-26.52	33.74	40	-6.26
129.91	S	Peak	52.82	-21.34	31.48	43.5	-12.02
242.43	S	Peak	50.35	-20.94	29.41	46	-16.59
399.57	S	Peak	47.17	-15.88	31.30	46	-14.70
455.83	S	Peak	44.85	-14.75	30.11	46	-15.89
594.54	S	Peak	37.56	-12.13	25.43	46	-20.57

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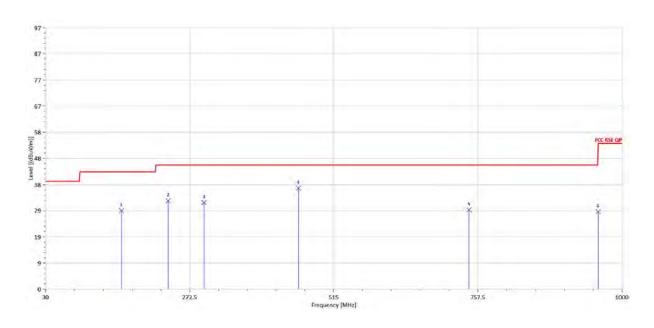
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Operation Band :802.11 g Test Date :2015-06-16 Fundamental Frequency :2462 MHz Temp./Humi. :24.5 deg_C/56RH

Operation Mode :TX HIGH Engineer :Ashton

EUT Pol. :E2 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	_
158.04	S	Peak	52.12	-23.05	29.07	43.5	-14.43	
236.61	S	Peak	54.33	-21.50	32.83	46	-13.17	
296.75	S	Peak	51.44	-19.29	32.15	46	-13.85	
455.83	S	Peak	52.23	-14.75	37.49	46	-8.51	
742.95	S	Peak	39.59	-10.23	29.36	46	-16.64	
960.23	S	Peak	36.29	-7.61	28.68	54	-25.32	

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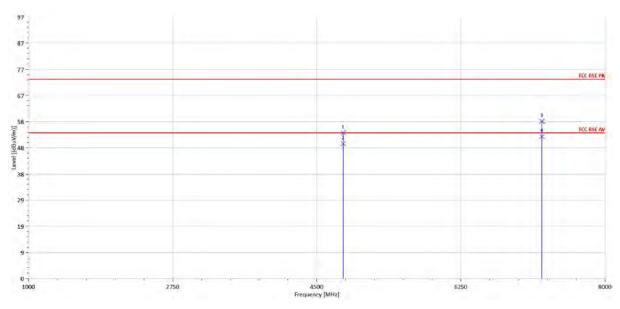
Radiated Spurious Emission Measurement Result

Above 1GHz Worst-Case Data:

Operation Band :802.11 b Test Date :2015-06-16

Fundamental Frequency :2412 MHz Temp./Humi. :24.5 deg_C/56RH

Operation Mode :TX LOW Engineer :Ashton EUT Pol. :E2 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	Peak	43.27	10.97	54.25	74	-19.75
4824.00	Н	Average	41.62	10.97	52.59	54	-1.41
7236.00	Н	Peak	38.85	15.27	54.13	74	-19.87
7236.00	Н	Average	33.60	15.27	48.87	54	-5.13

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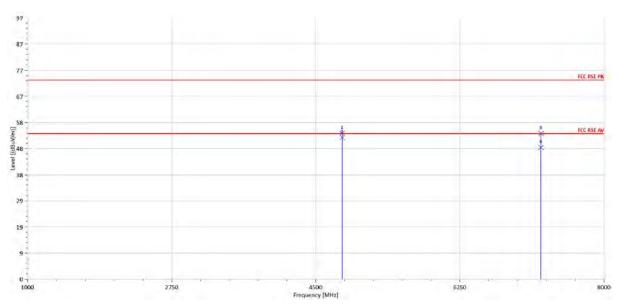
Report No.: E2/2015/50045 Issue Date: Jun. 23, 2015

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Operation Band :802.11 b Test Date :2015-06-16 Fundamental Frequency :2412 MHz Temp./Humi. :24.5 deg_C/56RH

Operation Mode :TX LOW Engineer

EUT Pol. :E2 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	${ m d} B \mu V$	dB	dBμV/m	$dB\mu V/m$	dB
4824.00	Н	Peak	43.10	10.97	54.07	74	-19.93
4824.00	Н	Average	39.08	10.97	50.05	54	-3.95
7236.00	H	Peak	43.04	15.27	58.31	74	-15.69
7236.00	Н	Average	37.38	15.27	52.65	54	-1.35

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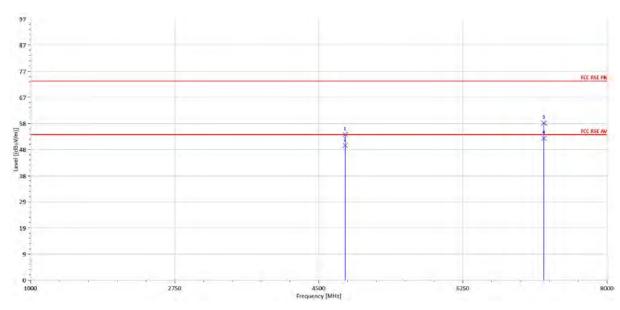
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Operation Band :802.11 b Test Date :2015-06-16

Fundamental Frequency :2437 MHz Temp./Humi. :24.5 deg_C/56RH Operation Mode :TX MID Engineer

EUT Pol. :E2 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	$dB\mu V/m$	$dB\mu V/m$	dB	
								_
4874.00	Н	Peak	39.25	10.89	50.14	74	-23.86	
4874.00	Н	Average	29.49	10.89	40.38	54	-13.62	
7311.00	Н	Peak	38.07	15.29	53.35	74	-20.65	
7311.00	Н	Average	30.59	15.29	45.88	54	-8.12	

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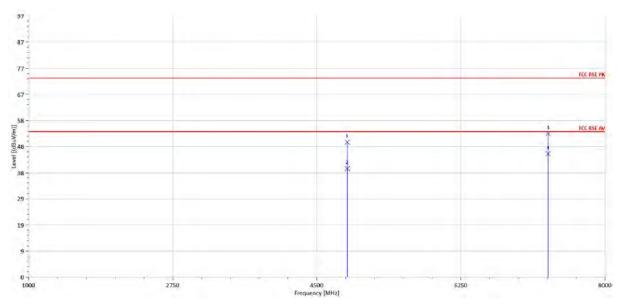
Report No.: E2/2015/50045 Issue Date: Jun. 23, 2015

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Operation Band :802.11 b Test Date :2015-06-16 Fundamental Frequency :2437 MHz Temp./Humi. :24.5 deg_C/56RH

Operation Mode :TX MID Engineer

EUT Pol. :E2 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	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
4874.00	Н	Peak	38.82	10.89	49.71	74	-24.29
4874.00	Н	Average	28.97	10.89	39.85	54	-14.15
7311.00	Н	Peak	38.28	15.29	53.56	74	-20.44
7311.00	Н	Average	29.59	15.29	44.88	54	-9.12

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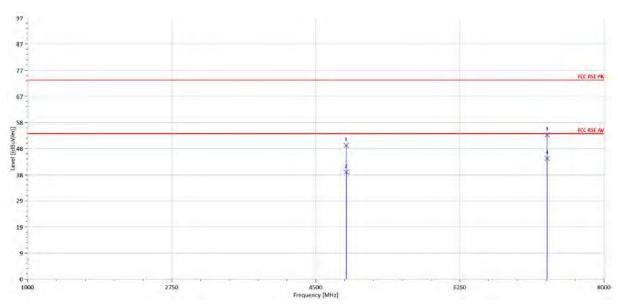
Operation Band :802.11 b Fundamental Frequency :2462 MHz

Operation Mode :TX HIGH EUT Pol. :E2 Plane

Test Date :2015-06-16 Temp./Humi. :24.5 deg_C/56RH

Engineer

: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	${ m d} B \mu V$	dB	$dB\mu V/m$	dBμV/m	dB
4924.00	Н	Peak	37.91	10.98	48.89	74	-25.11
4924.00	Н	Average	28.50	10.98	39.48	54	-14.52
7386.00	Н	Peak	36.54	15.53	52.07	74	-21.93
7386.00	Н	Average	27.22	15.53	42.75	54	-11.25

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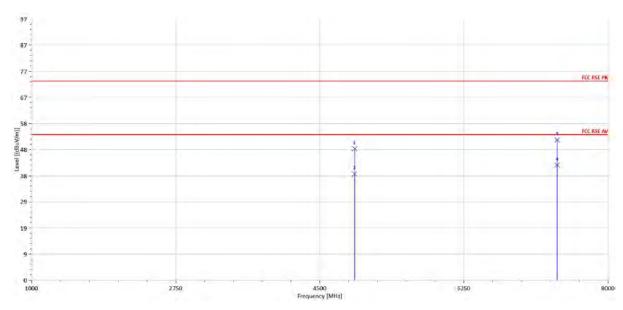
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Operation Band :802.11 b Test Date :2015-06-16 Fundamental Frequency :2462 MHz Temp./Humi. :24.5 deg_C/56RH

Operation Mode :TX HIGH Engineer

EUT Pol. :E2 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	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB
4924.00	Н	Peak	36.59	10.98	47.57	74	-26.43
4924.00	Н	Average	27.49	10.98	38.47	54	-15.53

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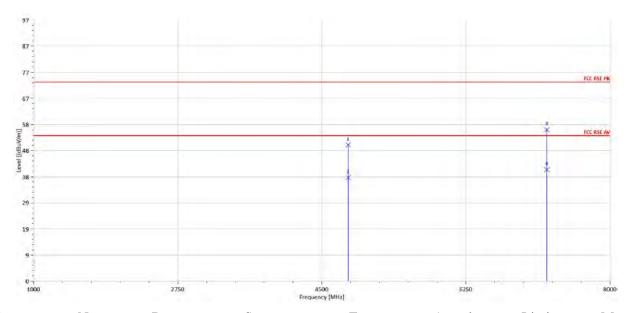
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Radiated Spurious Emission Measurement Result (802.11 g)

Operation Band :802.11 g Test Date :2015-06-16 Fundamental Frequency :2412 MHz Temp./Humi. :24.5 deg_C/56RH

Operation Mode :TX LOW Engineer :Ashton

EUT Pol. :E2 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	Peak	39.70	10.97	50.67	74	-23.33
4824.00	Н	Average	27.54	10.97	38.51	54	-15.49
7236.00	Н	Peak	40.98	15.27	56.26	74	-17.74
7236.00	Н	Average	26.16	15.27	41.43	54	-12.57

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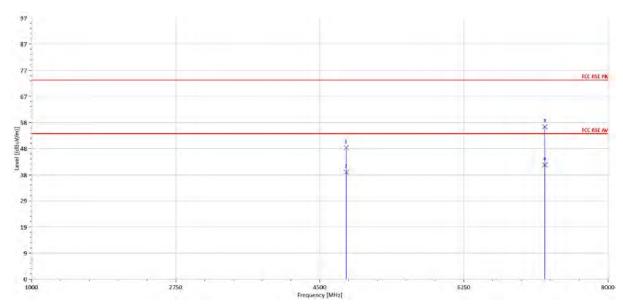
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Operation Band :802.11 g Test Date :2015-06-16 Fundamental Frequency :2412 MHz Temp./Humi. :24.5 deg_C/56RH

Operation Mode :TX LOW Engineer

EUT Pol. :E2 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	${ m d} B \mu V$	dB	$dB\mu V/m$	dBμV/m	dB
4824.00	Н	Peak	37.85	10.97	48.82	74	-25.18
4824.00	Н	Average	28.87	10.97	39.84	54	-14.16
7236.00	Н	Peak	41.36	15.27	56.64	74	-17.36
7236.00	Н	Average	27.20	15.27	42.47	54	-11.53

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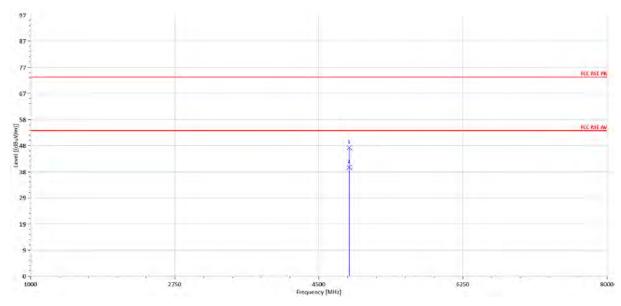
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Operation Band :802.11 g Test Date :2015-06-16 Fundamental Frequency :2437 MHz

Temp./Humi. :24.5 deg_C/56RH Operation Mode :TX MID Engineer

EUT Pol. :E2 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	Peak	36.82	10.89	47.71	74	-26.29	
4874.00	Н	Average	29.58	10.89	40.47	54	-13.53	

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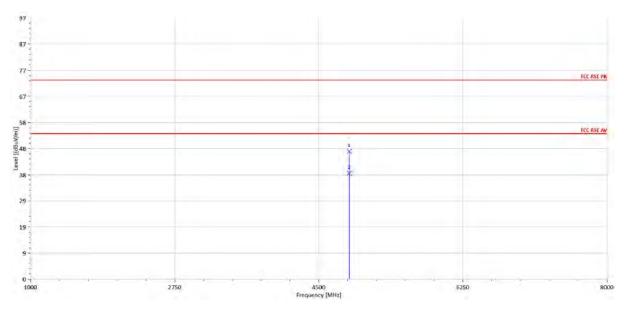
Operation Band :802.11 g Fundamental Frequency :2437 MHz

Operation Mode :TX MID

EUT Pol. :E2 Plane Test Date :2015-06-16 Temp./Humi. :24.5 deg_C/56RH

Engineer

: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	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB
4874.00	Н	Peak	36.60	10.89	47.49	74	-26.51
4874.00	Н	Average	28.51	10.89	39.40	54	-14.60

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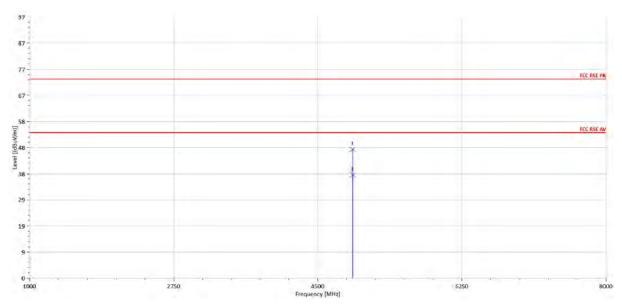
Operation Band :802.11 g Fundamental Frequency :2462 MHz

Operation Mode :TX HIGH EUT Pol. :E2 Plane

Test Date :2015-06-16 Temp./Humi. :24.5 deg_C/56RH

Engineer

: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	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB
4924.00	Н	Peak	36.88	10.98	47.86	74	-26.14
4924.00	Н	Average	27.43	10.98	38.41	54	-15.59

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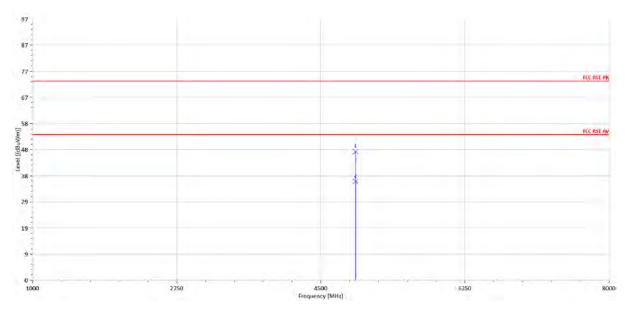
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Operation Band :802.11 g Test Date :2015-06-16 Fundamental Frequency :2462 MHz Temp./Humi. :24.5 deg_C/56RH

Operation Mode :TX HIGH Engineer

EUT Pol. :E2 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
4924.00	Н	Peak	36.76	10.98	47.74	74	-26.26
4924.00	Н	Average	25.64	10.98	36.62	54	-17.38

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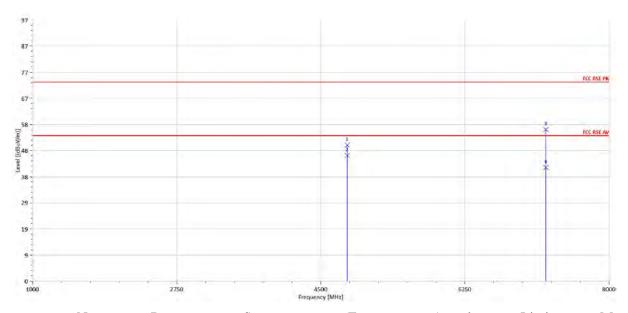
Radiated Spurious Emission Measurement Result (802.11_HT20)

Operation Band :802.11 n20M Test Date :2015-06-16

Fundamental Frequency :2412 MHz Temp./Humi. :24.5 deg_C/56RH

Operation Mode :TX LOW Engineer :Ashton

EUT Pol. :E2 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	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB
	4824.00	Н	Peak	39.57	10.97	50.54	74	-23.46
	4824.00	H	Average	35.74	10.97	46.71	54	-7.29
	7236.00	Н	Peak	41.03	15.27	56.31	74	-17.69
	7236.00	Н	Average	26.95	15.27	42.23	54	-11.77

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Operation Band Fundamental Frequency Operation Mode

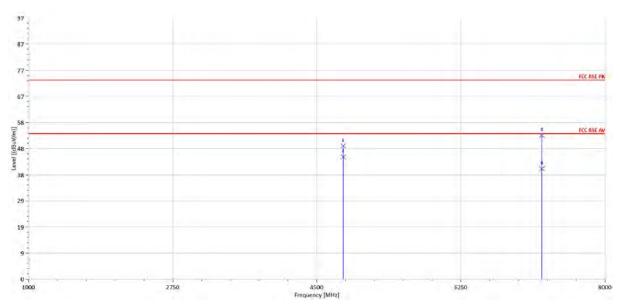
EUT Pol.

:802.11 n20M :2412 MHz :TX LOW :E2 Plane

Test Date Temp./Humi. :2015-06-16 :24.5 deg_C/56RH

Engineer

: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	Peak	38.55	10.97	49.52	74	-24.48
4824.00	Н	Average	34.47	10.97	45.44	54	-8.56
7236.00	Н	Peak	38.09	15.27	53.36	74	-20.64
7236.00	Н	Average	25.80	15.27	41.07	54	-12.93

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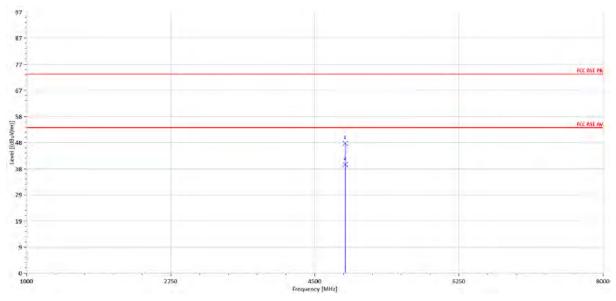
Operation Band Fundamental Frequency Operation Mode

:802.11 n20M :2437 MHz :TX MID EUT Pol. :E2 Plane

Test Date :2015-06-16 Temp./Humi. :24.5 deg_C/56RH

Engineer

: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	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB
4874.00	Н	Peak	37.37	10.89	48.26	74	-25.74
4874.00	Н	Average	29.52	10.89	40.41	54	-13.59

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Report No.: E2/2015/50045 Issue Date: Jun. 23, 2015

:2015-06-16

:24.5 deg_C/56RH

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Operation Band Fundamental Frequency

Operation Mode

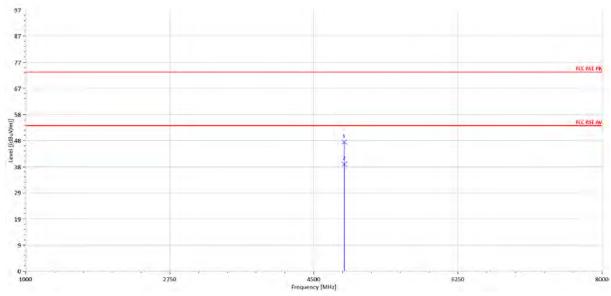
EUT Pol.

:802.11 n20M :2437 MHz :TX MID :E2 Plane

Test Date Temp./Humi.

Engineer

: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	${ m d} B \mu V$	dB	dBμV/m	dBμV/m	dB
4874.00	Н	Peak	37.08	10.89	47.96	74	-26.04
4874.00	Н	Average	28.93	10.89	39.82	54	-14.18

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Report No.: E2/2015/50045 Issue Date: Jun. 23, 2015

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Operation Band Fundamental Frequency Operation Mode

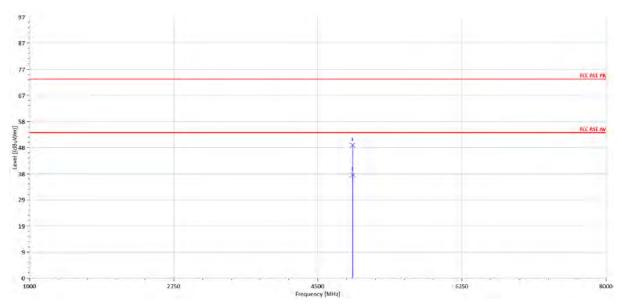
EUT Pol.

:802.11 n20M :2462 MHz :TX HIGH :E2 Plane

Test Date :2015-06-16 Temp./Humi. :24.5 deg_C/56RH

Engineer

: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	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB
4924.00	Н	Peak	38.46	10.98	49.43	74	-24.57
4924.00	Н	Average	27.41	10.98	38.39	54	-15.61

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Operation Band Fundamental Frequency Operation Mode

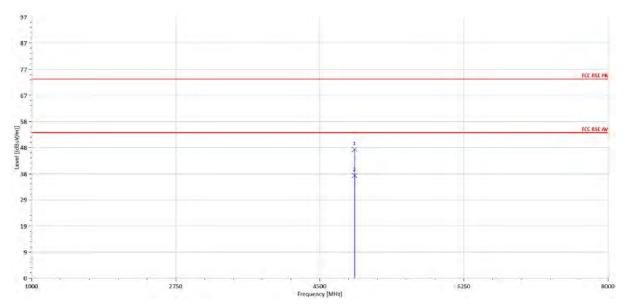
EUT Pol.

:802.11 n20M :2462 MHz :TX HIGH :E2 Plane

Test Date Temp./Humi. :2015-06-16 :24.5 deg_C/56RH

Engineer

: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	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB
4924.00	Н	Peak	36.80	10.98	47.77	74	-26.23
4924.00	Н	Average	27.19	10.98	38.16	54	-15.84

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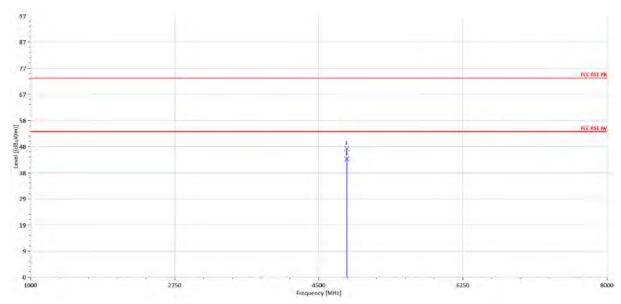
Radiated Spurious Emission Measurement Result (802.11_HT40)

Operation Band :802.11 n40M Test Date :2015-06-16

Fundamental Frequency :24.5 deg_C/56RH :2422 MHz Temp./Humi.

Operation Mode :TX LOW Engineer :Ashton

EUT Pol. :E2 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	${ m d} B \mu V$	dB	$dB\mu V/m$	dBμV/m	dB
4844.00	Н	Peak	36.82	10.93	47.75	74	-26.25
4844.00	Н	Average	32.93	10.93	43.86	54	-10.14

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:2015-06-16

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Operation Band Fundamental Frequency

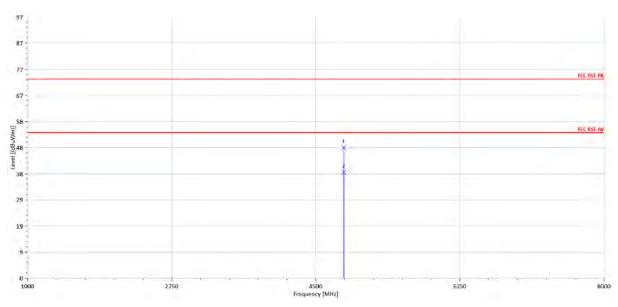
Operation Mode EUT Pol.

:802.11 n40M :2422 MHz :TX LOW :E2 Plane

Test Date Temp./Humi.

:24.5 deg_C/56RH Engineer

: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	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB
4844.00	Н	Peak	37.59	10.93	48.52	74	-25.48
4844.00	Н	Average	28.39	10.93	39.32	54	-14.68

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Operation Band Fundamental Frequency

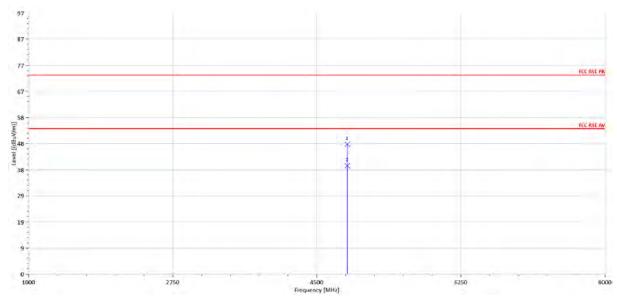
Operation Mode EUT Pol.

:802.11 n40M :2437 MHz :TX MID :E2 Plane

Test Date :2015-06-16 Temp./Humi. :24.5 deg_C/56RH

Engineer

: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	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB
4874.00	Н	Peak	37.44	10.89	48.32	74	-25.68
4874.00	Н	Average	29.44	10.89	40.33	54	-13.67

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Operation Band Fundamental Frequency

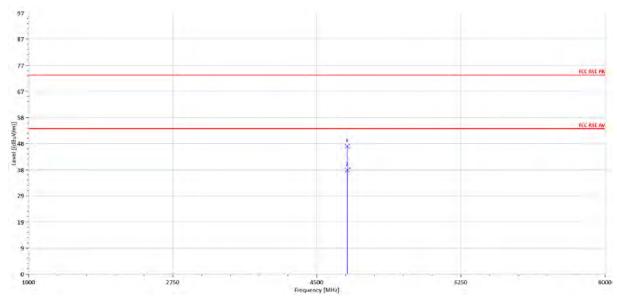
:2437 MHz Operation Mode :TX MID EUT Pol. :E2 Plane

:802.11 n40M

Test Date :2015-06-16 Temp./Humi. :24.5 deg_C/56RH

Engineer

: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	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB
4874.00	Н	Peak	36.60	10.89	47.49	74	-26.51
4874.00	Н	Average	27.82	10.89	38.71	54	-15.29

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Operation Band Fundamental Frequency

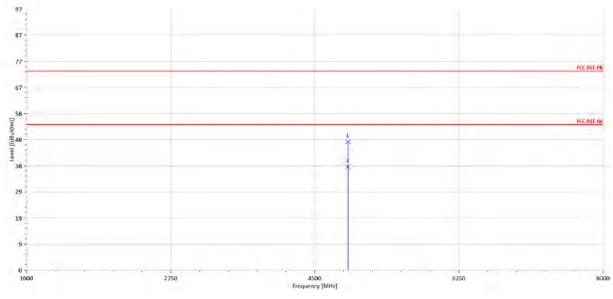
Operation Mode EUT Pol.

:802.11 n40M :2452 MHz :TX HIGH :E2 Plane

Test Date :2015-06-16 Temp./Humi. :24.5 deg_C/56RH

Engineer

: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	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB
4904.00	Н	Peak	36.71	10.98	47.69	74	-26.31
4904.00	Н	Average	27.54	10.98	38.52	54	-15.48

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Operation Band Fundamental Frequency

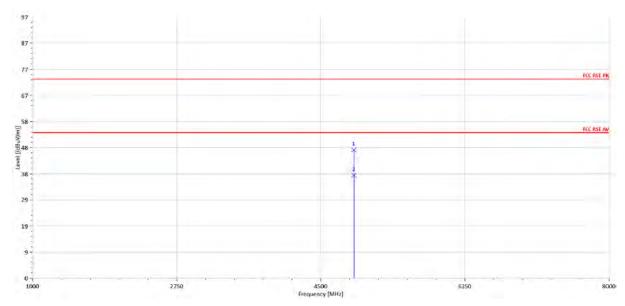
Operation Mode EUT Pol.

:802.11 n40M :2452 MHz :TX HIGH :E2 Plane

Test Date Temp./Humi. :2015-06-16 :24.5 deg_C/56RH

Engineer

: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	$\mathrm{d} B \mu V$	dB	dBμV/m	dBμV/m	dB
4904.00	Н	Peak	36.65	10.98	47.62	74	-26.38
4904.00	Н	Average	27.21	10.98	38.19	54	-15.81

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12 PEAK POWER SPECTRAL DENSITY

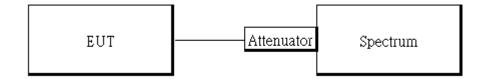
12.1 Standard Applicable

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 conAshtonuous transmission.

12.2 Measurement Equipment Used

Conducted Emission Test Site									
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.				
TYPE		NUMBER	NUMBER	CAL.					
Spectrum Analyzer	Agilent	N9010A	MY53400256	10/15/2014	10/14/2015				
DC Block	PASTERNACK	PE8210	RF29	12/19/2014	12/18/2015				
Attenuator	WOKEN	218FS-10	RF23	12/19/2014	12/18/2015				

12.3 Test Set-up



12.4 Measurement Procedure

- 1. Set analyzer center frequency to DTS channel center frequency.
- 2. The tesAshtong follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance V03r03.
- 3. Set the span to 1.5 times the DTS channel bandwidth.
- 4. Set the RBW > 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	Maximum Limit	Result					
(MHz)	(dBm)	(dBm)						
802.11b								
2412	-8.03	8	PASS					
2437	-8.39	8	PASS					
2462	-3.46	8	PASS					
802.11g								
2412	-13.48	8	PASS					
2437	-12.68	8	PASS					
2462	-14.45	8	PASS					
802.11n_HT20								
2412	-14.25	8	PASS					
2437	-15.18	8	PASS					
2462	-15.04	8	PASS					
802.11n_HT40								
2412	-18.25	8	PASS					
2437	-17.38	8	PASS					
2462	-17.97	8	PASS					

^{*}Refer to next page for plots

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802.11b

Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)



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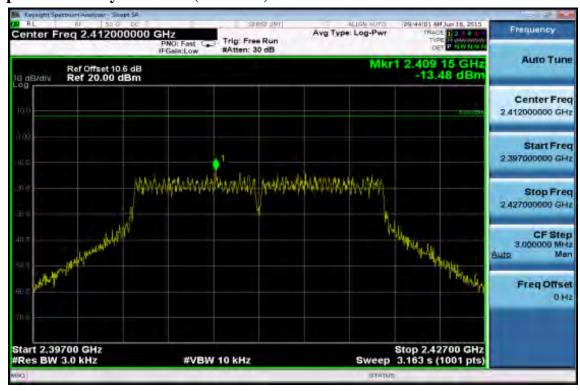
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Power Spectral Density Test Plot (CH-High)



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



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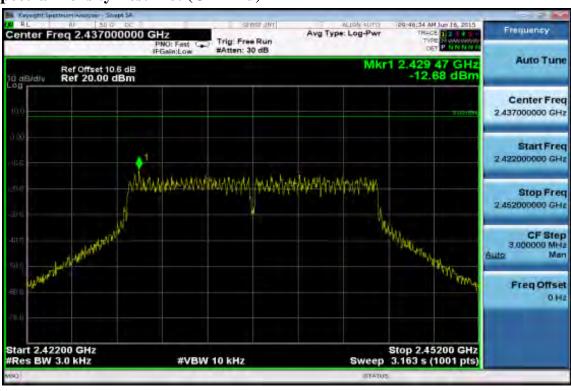
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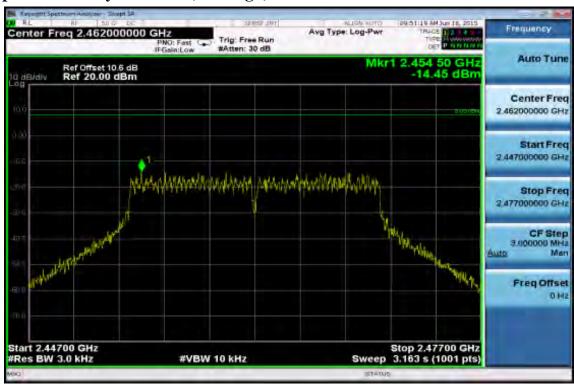
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Power Spectral Density Test Plot (CH-Mid)



Power Spectral Density Test Plot (CH-High)



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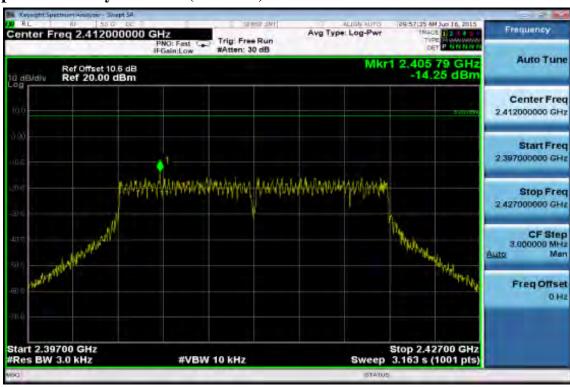
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802.11n HT20

Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)



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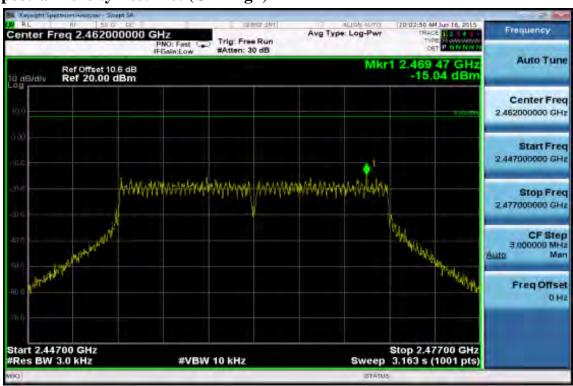
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Power Spectral Density Test Plot (CH-High)



802.11n_HT40

Power Spectral Density Test Plot (CH-Low)



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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 transmittingg 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 external 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.

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