

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

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INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT **AND INDUSTRY CANADA RSS 247**

	OF		
Product Name:	Wireless LAN Module		
Brand Name:	FUJIFILM		
Model No.:	FZ00010935-700		
Model Difference:	N/A		
FCC ID:	W2Z-0200003		
IC:	7736B-02000003		
Report No.:	ER/2016/80068		
Issue Date:	Sep. 02, 2016		
FCC Rule Part:	§15.247, Cat: DTS		
IC Rule Part:	RSS-247 issue 1 :2015		
Prepared for:	FUJIFILM Corporation 9-7-3 Akasaka, Minato-ku, 107-0052, Japan SGS Taiwan Ltd.		
Prepared by:	Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803		
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VERIFICATION OF COMPLIANCE

Applicant:	FUJIFILM Corporation		
	9-7-3 Akasaka, Minato-ku, 107-0052, Japan		
Product Name:	Wireless LAN Module		
Brand Name:	FUJIFILM		
Model No.:	FZ00010935-700		
Model Difference:	N/A		
FCC ID:	W2Z-02000003		
IC:	7736B-02000003		
File Number:	ER/2016/80068		
Date of Test:	Aug. 08, 2016 ~ Aug. 31, 2016		
Date of EUT Received:	Aug. 08, 2016		

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 Tseng	Date:	Sep. 02, 2016
Prepared By:	Marcus Tseng / Sr. Engineer Tiffany Kao	Date:	Sep. 02, 2016
Approved By:	Tiffany Kao / Clerk Tim Chang Jim Chang / Asst. Manager	Date:	Sep. 02, 2016

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Revision History

Report Number	Revision	Description	Issue Date
ER/2016/80068	Rev.00	Initial creation of document	Sep. 02, 2016

SGS Taiwan Ltd. No.134,WuKungRoad,NewTaipeiIndustrialPark,WukuDistrict,NewTaipeiCity,Taiwan24803/新北市五股區新北產業園區五工路 134 號



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GENERAL INFORMATION 1

1.1 Product description

General:

Product Name:	Wireless LAN Module
Brand Name:	FUJIFILM
Model No.:	FZ00010935-700
Model Difference:	N/A
Product SW/HW version:	V1.0 / V1.0
Radio SW/HW version:	V1.0 / V1.0
Test SW Version:	N/A
RF power setting in TEST SW:	N/A
Power Supply:	3.3Vdc from Power Supply

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WLAN 2.4GHz:

Wi-Fi	Frequency Range	Channels	Rated Power / (EIRP)	Type of Emission	Modulation Technology	
11b/g	2412-2462	11	b: 17.92dBm b: 10.65dBm (EIRP) g: 21.69dBm g: 9.62dBm (EIRP)	b: 12M0G1D g:16M7D1D	DSSS, OFDM	
11n	HT 20 2412-2462	11	HT20:21.58dBm HT20:9.61dBm	HT20:17M7D1D	OFDM	
11n	HT 40 2422-2452	7	HT40: 21.21dBm HT40: 9.62dBm	HT40:36M2D1D	OFDM	
Antenna	Designation	PCB Printed Invert-F antenna, Gain: -4.14dBi				
			PSK, DBPSK for DSSS 16QAM, QPSK, BPSK for O	FDM		
Transitio	n Rate:	802.11 b: 1/2/5.5/11 Mbps 802.11 g: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 – 65Mbps 802.11 n_40MHz: 13.5 – 135Mbps				

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1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.247 FCC KDB 558074 D01 DTS Meas. Guidance Canada RSS-247 issue 1 May 2015 Canada RSS-Gen issue 4 Nov. 2014 ANSI C63.10:2013 Note: All test items have been performed and record as per the above standards.

1.3 Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803

(TAF code 0513)

FCC Registration Numbers are: 509634

Canada Registration Number: 4620A-4.

1.4 Special Accessories

There are no special accessories used while test was conducted.

1.5 Equipment Modifications

There was no modification incorporated into the EUT.

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SYSTEM TEST CONFIGURATION 2

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 §15.207. 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 testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. 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.

2.4 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 1.9dB and 10dB attenuator.

Offset:

= RF cable loss (dB)+ attenuation factor(dB) dB =11.9dB)

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2.5 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

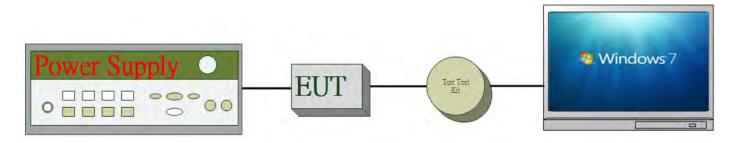


Table 2-1 Equipment Used in Tested System

ltem	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
2.	DC Power Supply	Agilent	E3640A	MY53140006	N/A	Unshielded
3.	Notebook	Lenovo	L420	LR-7HXZA	Shielded	Unshielded
4.	Test Kit	N/A	N/A	N/A	N/A	N/A

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SUMMARY OF TEST RESULTS 3

FCC Rules / IC Rules	Description Of Test	Result
§15.207(a) RSS-Gen §8.8	AC Power Line Conducted Emission	Compliant
§15.247(b) (3) RSS-247 §5.4(4)	Peak Output Power	Compliant
§15.247(a)(2) RSS-247 §5.2 (1) RSS-Gen §6.6	6dB & 99% Emission Bandwidth	Compliant
§15.247(d) RSS-247 §5.5	Conducted Band Edge and Spurious Emission	Compliant
§15.247(d) RSS-247 §5.5	Radiated Band Edge and Spurious Emission	Compliant
§15.247(e) RSS-247 §5.2(2)	Power Spectral Density	Compliant
§15.203 §15.247(b) RSS- Gen §6.7 RSS- Gen §8.3	Antenna Requirement	Compliant

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DESCRIPTION OF TEST MODES 4

4.1 Operated in 2400 ~ 2483.5MHz Band

11 channels are provided for 802.11b, 802.11g and 802.11n_HT20

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		

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RADIATED EMISSION TEST (ABOVE 1 GHz) DATA								
MODE	MODE AVAILABLE CHANNEL		TESTED MODULATION		ANTENNA PORT			
802.11b	1 to 11	1, 6, 11	DSSS	11	Main			
802.11g	1 to 11	1, 6, 11	OFDM	54	Main			
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	MCS 0	Main			
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	MCS 0	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	11	Main				
802.11g	1 to 11	1, 6, 11	OFDM	54	Main				
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	MCS 0	Main				
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	MCS 0	Main				

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MEASUREMENT UNCERTAINTY 5

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:

	9kHz-30MHz: +/-2.87dB
	30MHz - 180MHz: +/- 3.37dB
Measurement uncertainty	180MHz -417MHz: +/- 3.19dB
(Polarization : Vertical)	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB

	9kHz-30MHz: +/-2.87dB
	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

6.1 Standard Applicable

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

Limits dB(uV)							
Quasi-peak	Average						
66 to 56	56 to 46						
56	46						
60	50						
Note 1.The lower limit shall apply at the transition frequencies							
	Quasi-peak 66 to 56 56 60						

MHz.

6.2 Measurement Equipment Used

Conducted Emission Test Site									
EQUIPMENT	MFR	MFR MODEL SERIAL		LAST	CAL DUE.				
TYPE		NUMBER	NUMBER	CAL.					
EMI Test Receiver	R&S	ESCI 7	100950	12/12/2015	12/11/2016				
Coaxial Cables	N/A	N30N30-1042-150c m	N/A	02/07/2016	02/06/2017				
LISN	Schwarzbeck	NSLK 8127	8127-648	03/11/2016	03/10/2017				
Test Software	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.				

6.3 EUT Setup

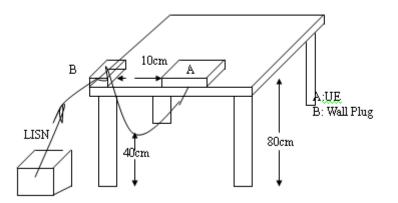
- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI 63.10:2013.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
- 3. The LISN was connected with 120Vac/60Hz power source.

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6.4 Test SET-UP (Block Diagram of Configuration)



6.5 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

N/A, Owing to the DC operation of EUT, this test item is not performed.

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DUTY CYCLE OF TEST SIGNAL 7

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	98.61	0.06
802.11g	92.90	0.32
802.11n_20	92.15	0.36
802.11n_40	85.68	0.67

b = 98.61%, g = 92.9%, n_ht_20 = 92.15%, n_ht40 = 85.68%

Duty Cycle Factor: $10 * \log(1/0.9861) = 0.06$ Duty Cycle Factor: $10 * \log(1/0.929) = 0.32$ Duty Cycle Factor: $10 * \log(1/0.9215) = 0.36$ Duty Cycle Factor: $10 * \log(1/0.8568) = 0.67$

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7.1 DUTY CYCLE TEST SIGNAL Measurement Result

802.11 b



802.11 q

enter		and the second se	00000 GH	Z VO: Fast				ALION AUTO	TRAC	Aug 18, 2016	Frequency
0 dB/div	Ref 0ffset 11.9 dB								Auto Tun		
	the second	n statter.	mometerise	untryand	uins-ne ⁿ e,welleby	14	3∆4 4e/n444=+*	arthystol. Malach	nanna	unchelappin	Center Fre 2.437000000 GH
100 2011 301											Start Fre 2.437000000 GF
40 D											Stop Fre 2.437009000 GH
Res BW	8 MH		GHz	#VBV	V 8.0 MHz			the second second	.800 ms (CF Ste 8.000000 Mit
1 A2	1 1	(4)		92 ms (A)		B	NCTION 1	FUNCTION WOTH	FUNCTI	SN VALUE	
2 E 3 A4 4 E 5 6 7		(A)	1.4	0.8 μs 98 ms (Δ) 0.8 μs	15.61 dB -0.06 d 16.61 dB	E				-	Freq Offs 01
8		+									

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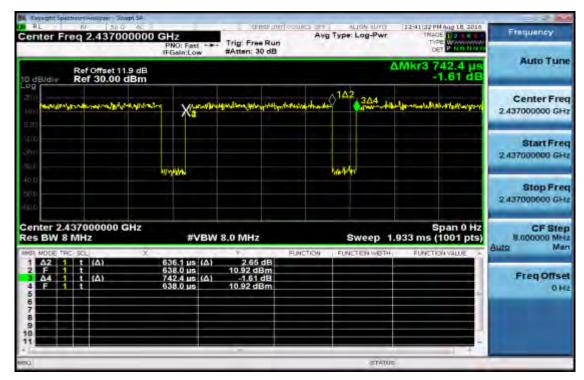
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802.11 n 20 MHz

Center Freq 2.437		ast Trig: Free	Run	Type: Log-Pwr	12:10:13 PM Aug 10, 2016 TRECE 12:14 19 TVPE 000 0 PM R 10 10 10	Frequency	
O dE/div Ref 30.0	Ref Offset 11.9 dB AMkr3 1.396 ms						
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60						Start Fre 2.437000000 GH	
00 500 00	UNINA					Stop Fre 2.437000000 GH	
enter 2.43700000 es BW 8 MHz		#VBW 8.0 MHz			Span 0 Hz 533 ms (1001 pts)		
MR MODE TRC SCL 1 Δ2 1 1 (Δ) 2 F 1 1 1 3 Δ4 1 1 (Δ) 4 F 1 1 1 6 6 6 6 6	× 1,286 r 929,3 1,396 r 929,3	μs 17.21 dE ns (Δ) -0.01 (dB 3m dB	FUNCTION WOTH	FUNCTION VALUE	Freq Offse 0 H	
				gránus			

802.11 n 40 MHz



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PEAK OUTPUT POWER MEASUREMENT 8

8.1 Standard Applicable

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

Per RSS-247

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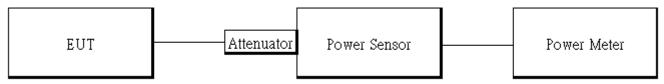


8.2 Measurement Equipment Used

Conducted Emission Test Site										
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.					
ТҮРЕ		NUMBER	NUMBER	CAL.						
Power Meter	Anritsu	ML2495A	1005007	12/09/2015	12/08/2016					
Power Sensor	Anritsu	MA2411B	917032	12/09/2015	12/08/2016					
EXA Spectrum										
Analyzer	Agilent	N9030A	MY53120760	02/26/2016	02/25/2017					
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2016	01/01/2017					
Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102	23670/2	01/02/2016	01/01/2017					
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2016	01/01/2017					
Splitter	Agilent	11636B	N/A	01/02/2016	01/01/2017					
DC Power Supply	Agilent	E3640A	MY52410006	11/05/2015	11/04/2016					
Temperature Chamber	TERCHY	MHG-120LF	911009	05/17/2016	05/16/2017					

8.3 Test Set-up

Power Meter:



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.
- 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.



8.5 Measurement Result

802.11	b Main							
СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit		RESULT	
1	2412	1	17.73	59.29	1 Watt =	30.00	dBm	PASS
6	2437	1	17.83	60.67	1 Watt =	30.00	dBm	PASS
11	2462	1	17.92	61.94	1 Watt =	30.00	dBm	PASS
802.11	b Main							
сн	Frequency (MHz)	Data Rate	Avg. Ou tput Power (dBm)	Avg. Output Power (mW)	Limit			RESULT
1	2412	1	14.72	29.65	1 Watt =	30.00	dBm	PASS
6	2437	1	14.76	29.92	1 Watt =	30.00	dBm	PASS
11	2462	1	14.79	30.13	1 Watt =	30.00	dBm	PASS
802.11 CH	g Main Frequency	Data	Peak Output Power	Peak Output Power		Limit		RESULT
	(MHz)	Rate	(dBm)	(mW)				
1	2412	6	21.69	147.57	1 Watt =	30.00	dBm	PASS
6	2437	6	21.56	143.22	1 Watt =	30.00	dBm	PASS
11	2462	6	21.47	140.28	1 Watt =	30.00	dBm	PASS
802.11	g Main							
СН	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit		RESULT	
1	2412	6	13.76	23.77	1 Watt =	30.00	dBm	PASS
6	2437	6	13.70	23.44	1 Watt =	30.00	dBm	PASS
11	2462	6	13.09	20.37	1 Watt =	30.00	dBm	PASS

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802.11	n_HT20M Main								
СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit		RESULT		
1	2412	MCS0	21.58	143.88	1 Watt =	30.00	dBm	PASS	
6	2437	MCS0	20.78	119.67	1 Watt =	30.00	dBm	PASS	
11	2462	MCS0	20.84	121.34	1 Watt =	30.00	dBm	PASS	
802.11	802.11n_HT20M Main								
СН	Frequency (MHz)	Data Rate	Avg. Ou tput Power (dBm)	Avg. Output Power (mW)		Limit		RESULT	
1	2412	MCS0	13.75	23.71	1 Watt =	30.00	dBm	PASS	
6	2437	MCS0	13.72	23.55	1 Watt =	30.00	dBm	PASS	
11	2462	MCS0	12.89	19.45	1 Watt =	30.00	dBm	PASS	

802.11	n_HT40M Main							
СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit		RESULT	
3	2422	MCS0	21.05	127.35	1 Watt =	30.00	dBm	PASS
6	2437	MCS0	21.21	132.13	1 Watt =	30.00	dBm	PASS
9	2452	MCS0	21.11	129.12	1 Watt =	30.00	dBm	PASS
802.11n_HT40M Main								
сн	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)		_imit		RESULT
3	2422	MCS0	13.76	23.77	1 Watt =	30.00	dBm	PASS
6	2437	MCS0	13.74	23.66	1 Watt =	30.00	dBm	PASS
9	2452	MCS0	13.16	20.70	1 Watt =	30.00	dBm	PASS

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

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EIRP

802.1	802.11b Main								
СН	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)		Limit		RESULT
1	2412	1	14.72	-4.14	10.58	4W=	36	dBm	PASS
6	2437	1	14.76	-4.14	10.62	4W=	36	dBm	PASS
11	2462	1	14.79	-4.14	10.65	4W=	36	dBm	PASS

802.1	802.11g Main								
сн	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)		Limit		RESULT
1	2412	6	13.76	-4.14	9.62	4W=	36	dBm	PASS
6	2437	6	13.70	-4.14	9.56	4W=	36	dBm	PASS
11	2462	6	13.09	-4.14	8.95	4W=	36	dBm	PASS

802.1	802.11n_HT20M Main								
СН	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)		Limit	:	RESULT
1	2412	MCS0	13.75	-4.14	9.61	4W=	36	dBm	PASS
6	2437	MCS0	13.72	-4.14	9.58	4W=	36	dBm	PASS
11	2462	MCS0	12.89	-4.14	8.75	4W=	36	dBm	PASS

802.1 ⁻	802.11n_HT40M Main								
СН	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)		Limit	:	RESULT
3	2422	MCS0	13.76	-4.14	9.62	4W=	36	dBm	PASS
6	2437	MCS0	13.74	-4.14	9.60	4W=	36	dBm	PASS
9	2452	MCS0	13.16	-4.14	9.02	4W=	36	dBm	PASS

* Note: EIRP = Average Power + Gain



6DB & 99% BANDWIDTH MEASUREMENT 9

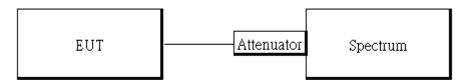
9.1 Standard Applicable

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.			
ТҮРЕ		NUMBER	NUMBER	CAL.				
EXA Spectrum								
Analyzer	Agilent	N9030A	MY53120760	02/26/2016	02/25/2017			
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2016	01/01/2017			
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2016	01/01/2017			

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.
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 4. For 6dB Bandwidth:

Set the spectrum analyzer as RBW = 100 kHz, VBW = 3*RBW, Span = 30M/50MHz, Detector=peak, Sweep=auto.

- 5. Mark the peak frequency and –6dB (upper and lower) frequency.
- 6. For 99% Bandwidth:

Set the spectrum analyzer as RBW = 1%, VBW = 3*RBW, Span = 30M/50MHz, Detector=Sample, Sweep=auto.

- 7. Turn on the 99% bandwidth function, max reading.
- 8. Repeat above procedures until all frequency of interest measured was complete.

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9.5 Measurement Result

6dB Bandwidth

802.11b Main

Frequency (MHz)	6d B Bandwid th (kHz)	Limit (kHz)	Result
2412	9125	> 500	PASS
2437	9125	> 500	PASS
2462	9126	> 500	PASS

802.11g Main

Frequency (MHz)	6d B Bandwid th (kHz)	Limit (kHz)	Result
2412	16620	> 500	PASS
2437	16630	> 500	PASS
2462	16620	> 500	PASS

802.11_n_HT20 Main

Frequency (MHz)	6d B Bandwid th (kHz)	Limit (kHz)	Result
2412	17710	> 500	PASS
2437	17650	> 500	PASS
2462	17850	> 500	PASS

802.11_n_HT40 Main

Frequency (MHz)	6d B Bandwid th (kHz)	Limit (kHz)	Result
2422	36510	> 500	PASS
2437	36520	> 500	PASS
2452	36510	> 500	PASS

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99% Bandwidth

802.11b Main				
Frequency	99%Bandwidth			
(MHz)	(MHz)			
2412	11.986			
2437	11.976			
2462	11.929			

802.11g Main

Frequency	99%Bandwidth
(MHz)	(MHz)
2412	16.605
2437	16.565
2462	16.705

802.11n_HT20M Main		
Frequency	99%Bandwidth	
(MHz)	(MHz)	
2412	17.638	
2437	17.653	
2462	17.745	

802.11n_HT40M Main		
Frequency	99%Bandwidth	
(MHz)	(MHz)	
2422	36.153	
2437	36.213	
2452	36.220	

*Refer to next page for plots

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802.11b (Main) 6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid

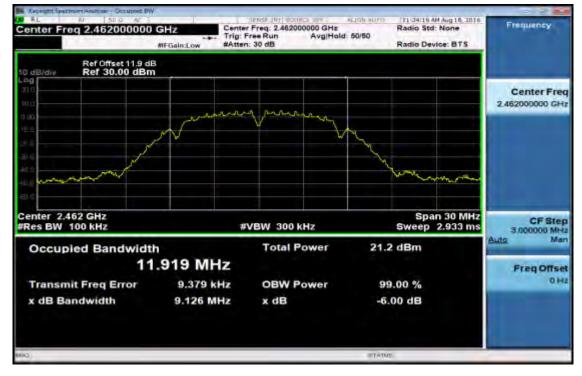


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6dB Band Width Test Data CH-High



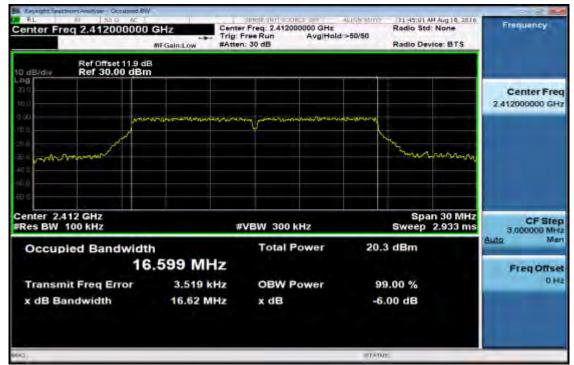
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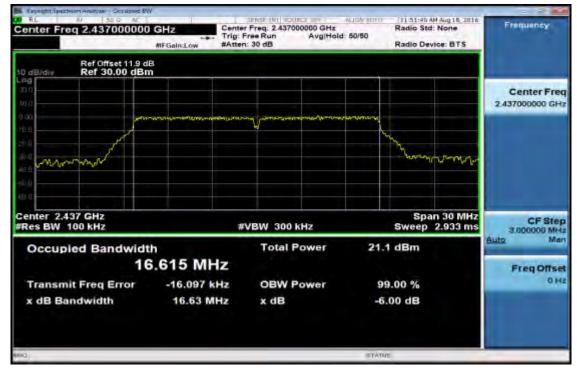
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802.11g (Main) 6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid

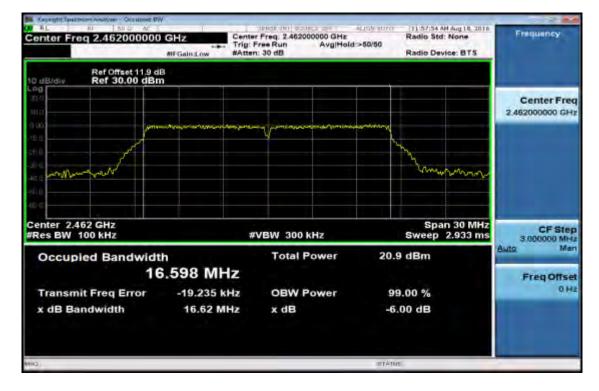


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6dB Band Width Test Data CH-High

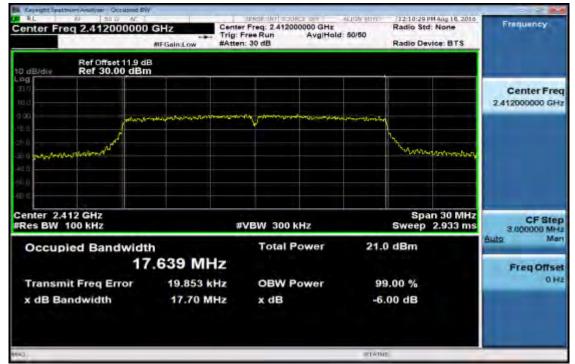


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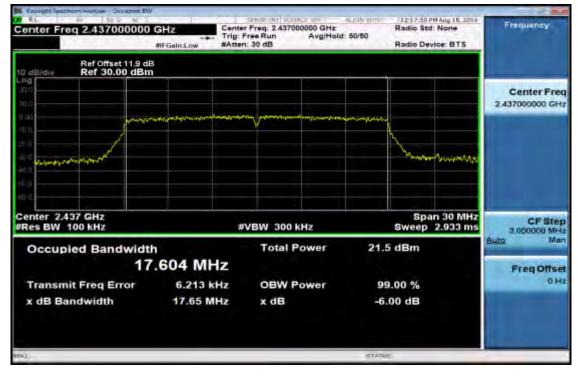
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802.11n 20M (Main) 6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid

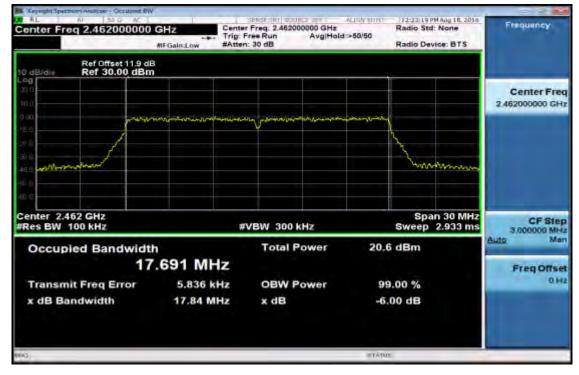


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6dB Band Width Test Data CH-High



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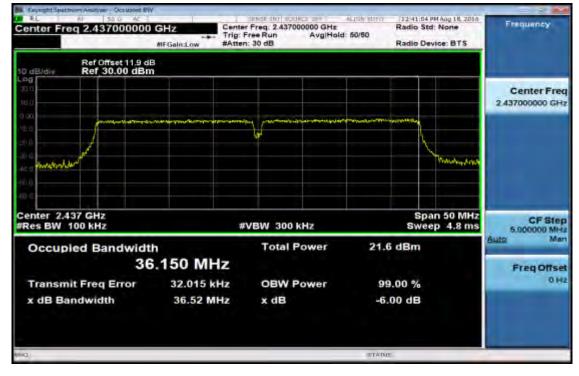
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802.11n 40M (Main) 6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid

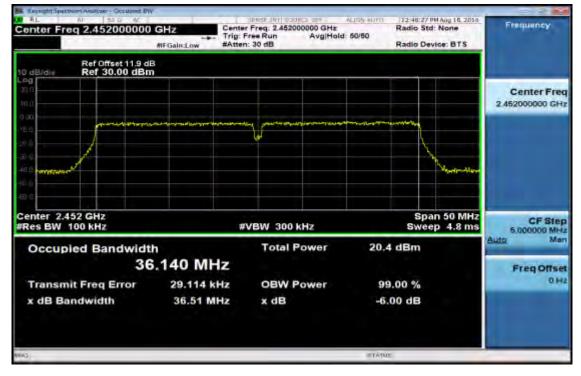


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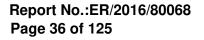
6dB Band Width Test Data CH-High



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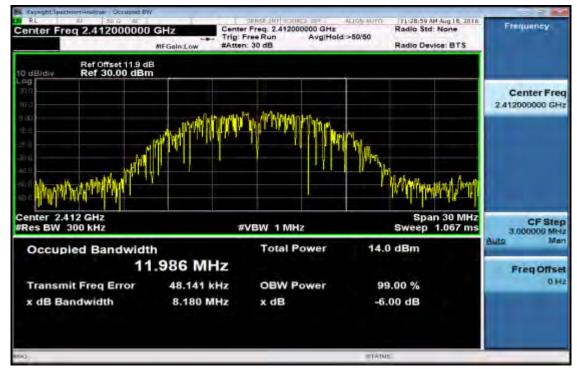
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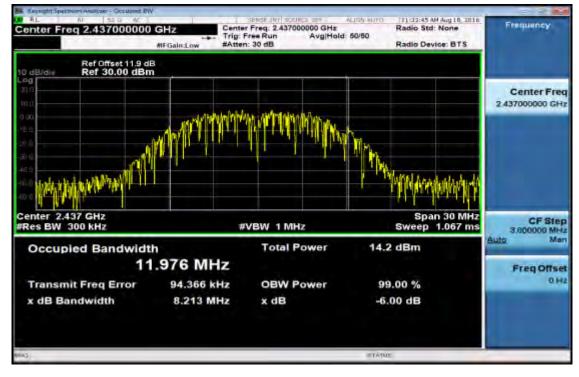




802.11b (Main) 99% Band Width Test Data CH-Low



99% Band Width Test Data CH-Mid

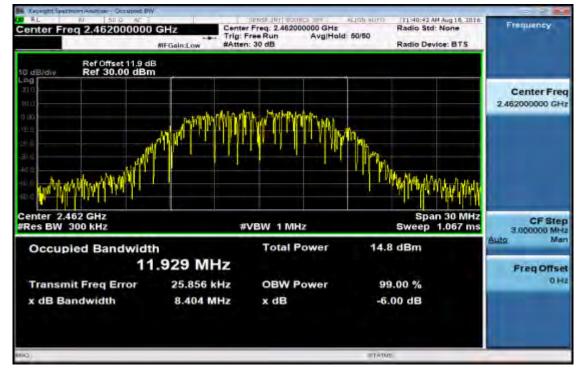


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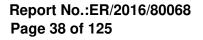


99% Band Width Test Data CH-High



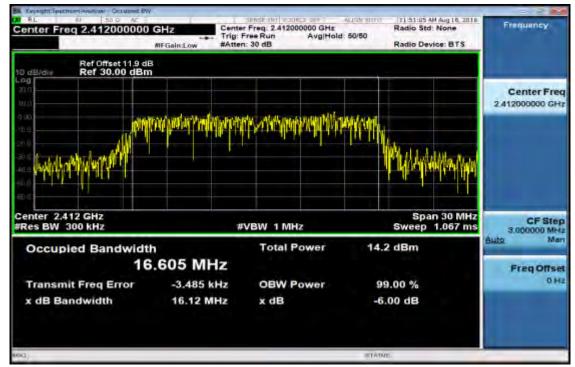
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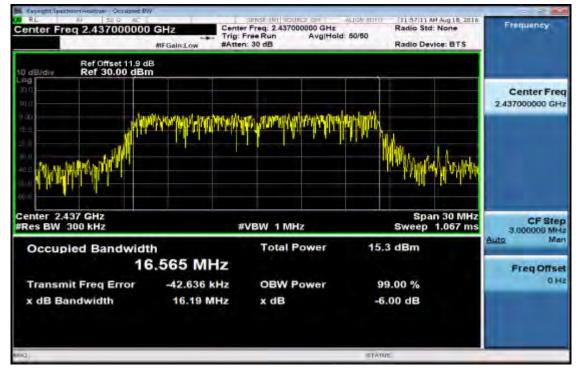




802.11g (Main) 99% Band Width Test Data CH-Low



99% Band Width Test Data CH-Mid

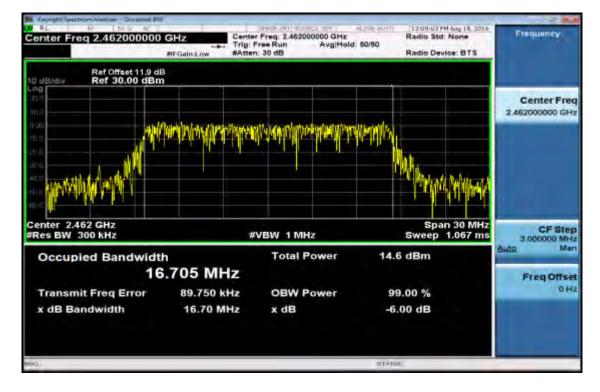


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99% Band Width Test Data CH-High

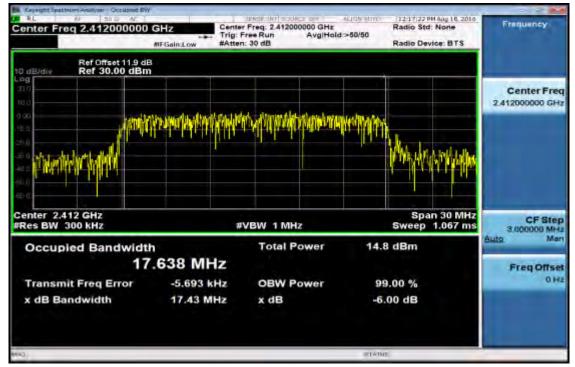


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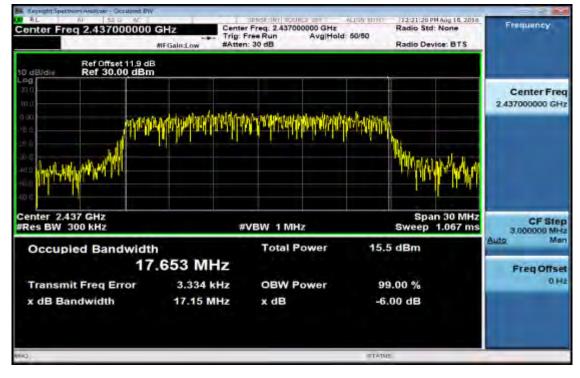
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802.11n 20M (Main) 99% Band Width Test Data CH-Low



99% Band Width Test Data CH-Mid

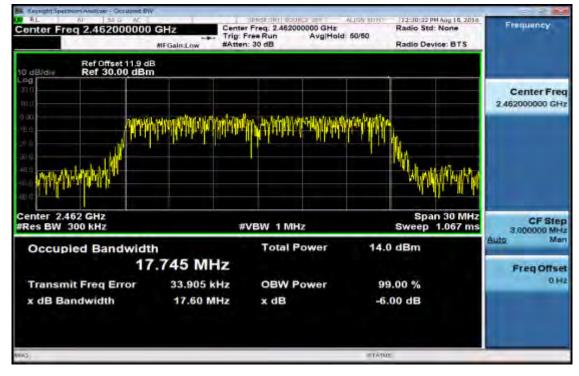


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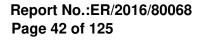


99% Band Width Test Data CH-High



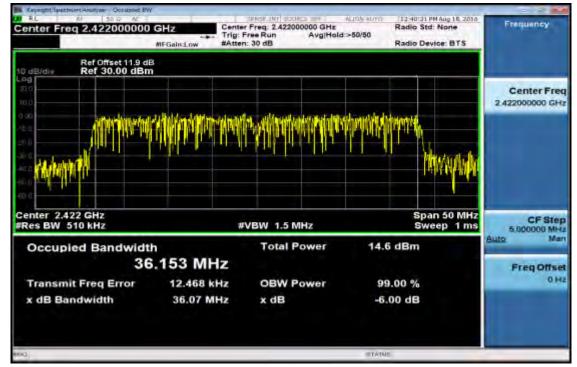
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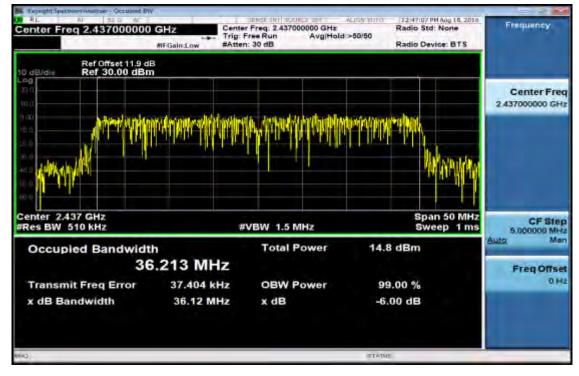




802.11n_40M (Main) 99% Band Width Test Data CH-Low



99% Band Width Test Data CH-Mid

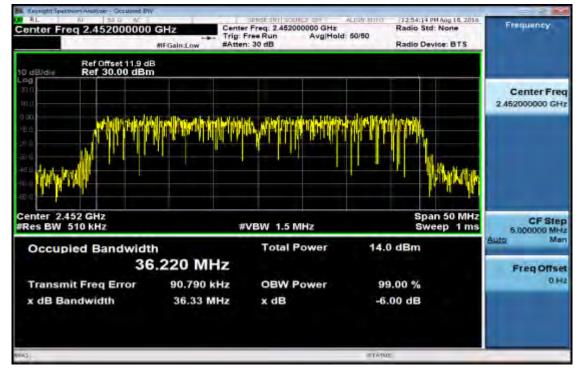


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99% Band Width Test Data CH-High



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CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT 10

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.

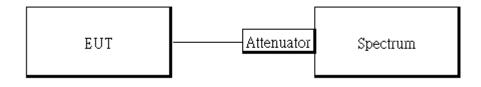
In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a) & RSS-Gen §8.10, must also comply with the radiated emission limits specified in §15.209(a) & RSS-Gen §8.8.

If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

	Conducto	ed Emission ⁻	Test Site		_
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
TYPE		NUMBER	NUMBER	CAL.	
EXA Spectrum					
Analyzer	Agilent	N9030A	MY53120760	02/26/2016	02/25/2017
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2016	01/01/2017
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2016	01/01/2017

10.2 Measurement Equipment Used

10.3 Test SET-UP



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10.4 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.
- 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:

- To connect Antenna Port of EUT to Spectrum
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 3. Set RBW = 100 kHz & VBW= 300 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.

10.5 Measurement Result

Note:

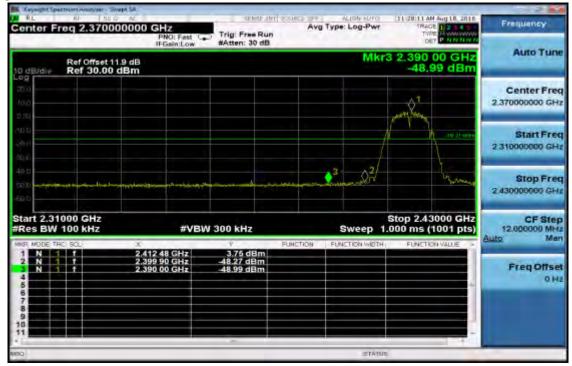
- 1. Refer to next page spectrum analyzer data chart and tabular data sheets.
- 2. For Restricted Band Edge Limit, please refer to section 12.5 of this report for measurement result.

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



Band Edges Test Data CH-High



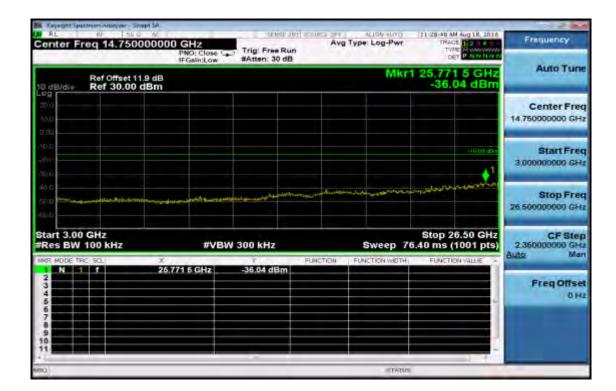
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802.11b **Spurious Emission Test Data CH-Low**

the second se	MI 50.02		STREET THE DO	URC2 2PT ALION NUTO	[31:28:23 AM Aug 18, 2016	Frequency
enter Fre	eq 1.515000	PNO: Close C	Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr	TRACE 1 2 3 4 5 TYPE IN COMPANY	
0 dB/div	Ref Offset 11.9 Ref 30.00 dB	dB	#ALLEN. 30 00	M	(r1 2.411 9 GHz 3.92 dBm	Auto Tune
0.a					• ¹	Center Freq 1.515000000 GHz
4) (0) (1) (1)					.1003 424	Start Freq 30,000000 MHz
0 D	an a	an managerik kan an a	Sylamon and some of the proceed	ويستعدونه والمعرفة والمستعربة والمستعربة	وهجر مريطين فليرافؤ المراجع فروافه	Stop Freq 3,00000000 GHz
art 30 Mi les BW 1 R MODE TRO	00 kHz	#VB/	/ 300 kHz	Sweep 9	Stop 3.000 GHz 0.667 ms (1001 pts)	CF Step 297.000000 MHz Auto Men
1 N 1 2 3 4 5 6		2.411 9 GHz	3.92 dBm			Freq Offset 0 Hz
89						
				ETÁTU		



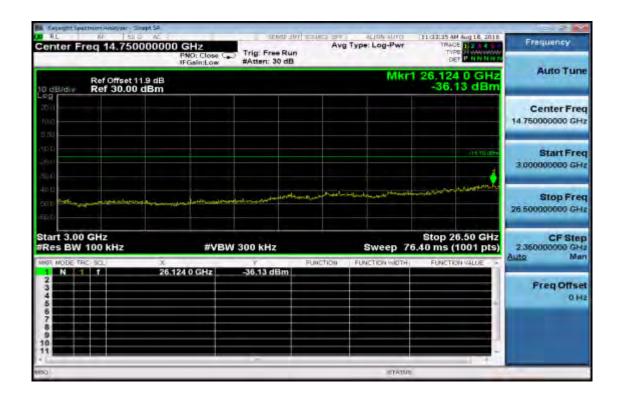
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Spurious Emission Test Data CH-Mid

Keyeight Spectrum Analyzer - Skept SA		-	North Contractory Contractory		
enter Freg 1.515000000	GHz PNO: Close C+		Avg Type: Log-Pwr	11:03:23 AM Aug 18, 2816 TRACE 1 2 3 4 TYPE MUNICIPAL	Frequency
Ref Offset 11.9 dB	IT COMILON		M	4.30 dBm	Auto Tune
200 200 100				<u></u>	Center Free 1.515000000 GH
00 00 00				-14 TO 401	Start Fre 30,000000 MH
ou do nantana ang ang ang ang ang ang	-)				Stop Fre 3,00000000 GH
tart 30 MHz Res BW 100 kHz	#VBW	300 kHz	the last state was been deeper to be a second	Stop 3.000 GHz .667 ms (1001 pts)	CF Ste 297.000000 MH Auto Ma
2 3 4 5 6 7 8 9	435 7 GHz	4.30 dBm	FUNCTION WOTH	FUNCTION VALUE	Freq Offse 0 H
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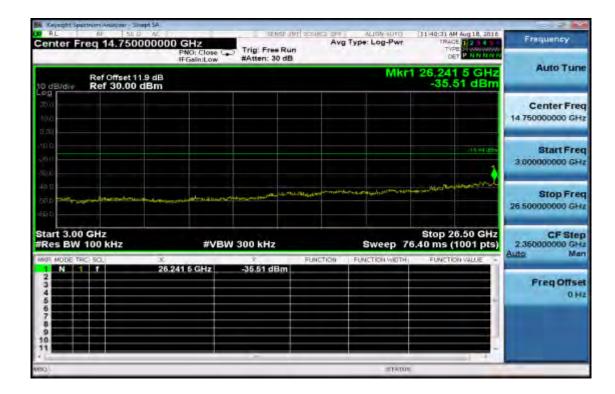
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Spurious Emission Test Data CH-High

RL III (510000000 RL IIII (51000000000000000000000000000000000000		Avg Type: Log-Pwr TR4CE TO THE OF THE	Frequency
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100 100 200		-thield day	Start Fre 30,000000 MH
40.0 60.0	an a	land the second s	Stop Fre 3.000000000 GH
Start 30 MHz #Res BW 100 kHz	#VBW 300 kHz	Stop 3.000 GH: Sweep 9.667 ms (1001 pts	CF Ste 297.000000 MH Auto Me
	462 4 GHz 4.56 dBm		Freq Offse 0 H
9 10 11		státus	



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



Band Edges Test Data CH-High



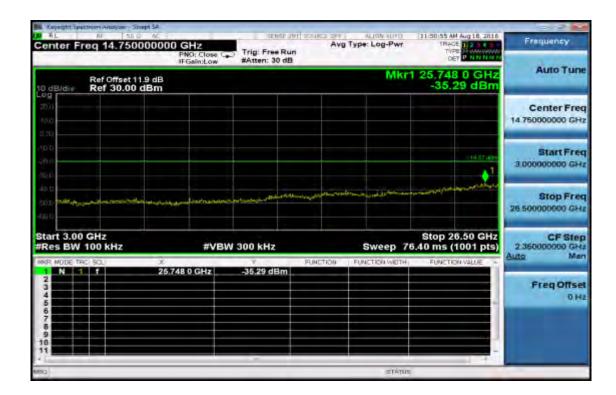
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802.11g **Spurious Emission Test Data CH-Low**

Keynight Spectrum Analyzer - Skrept SA R.L. RJ SU G AC		SENSE JUT SOURCE		31:50:10 AM Aug 18, 2016	
enter Freg 1.515000000	PNO: Close C Trig: I	Free Run	Avg Type: Log-Pwr	TRACE 12349	Frequency
Ref Offset 11.9 dB	I CONTROL		MK	r1 2.414 9 GHz 0.43 dBm	Auto Tune
00 00 10				1	Center Free 1.515000000 GH
				- 14 f7 abr	Start Free 30,000000 MH
D D <mark>propublic to contract of the second sec</mark>	espiram carater al and	، مون کر کر کر اور اور اور اور اور اور اور اور اور او	the second s	Content of the second	Stop Fre 3.000000000 GH
art 30 MHz Res BW 100 kHz	#VBW 300 k		the second s	Stop 3.000 GHz 667 ms (1001 pts)	CF Step 297.000000 MH Auto Me
	114 9 GHz 0.4	FUNCTI 3 dBm	DN FUNCTION WIDTH:	FUNCTION VALUE .	L
				-	Freq Offse 0 H
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Spurious Emission Test Data CH-Mid

Keynight Spectrum Anutyper - Skrept SA					100 P
Center Freq 1.5150000		Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr	11:56:44 AM Aug 18, 2016 TMAGE 1 2 4 4 4 TVPE PLANAGE	Frequency
Ref Offset 11.9 d 10 dB/div Ref 30.00 dBr	в		M	r1 2.441 6 GHz 1.23 dBm	Auto Tune
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100 200					Start Free 30.000000 MH
40 D 50 D	ayaa ya dhaalaa aa aha		in a star i se a desert an second est dettern d	Roman Constructions	Stop Free 3.000000000 GH
Start 30 MHz #Res BW 100 kHz	#VBW	300 kHz	Sweep 9	Stop 3.000 GHz .667 ms (1001 pts)	CF Step 297,000000 MH Auto Mar
1 N 1 f 2 3 4 5	2.441 6 GHz	1.23 dBm		-	Freq Offse 0 H
7 8 9 10 11					
(PRI)			STATU	¢.	



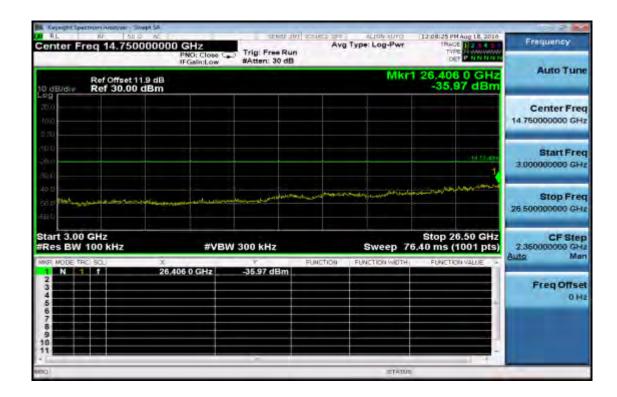
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Spurious Emission Test Data CH-High

Keynight Spectrum Anusyser - S/rept SA			2 P P
Center Freq 1.51500000	PNO: Close Trig: Free Run FGaint ow #Atten: 30 dB	Avg Type: Log-Pwr TRACE TO TYPE TO CET P	Frequency
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100		•	Center Free 1.515000000 GH
ND D 			Start Free 30,000000 MH
40 D 60 D 60 D	المراجعة والمراجعة والمراجعة والمراجعة والمحافظ المراجعة والمراجعة والمراجعة والمراجعة والمراجعة والمراجعة وال	hind all an an appropriate property of the other states of the second days and the second days are set of the second days are second days are set of the second days are second days are set of the second days are set of the second days are second are second days are second	Stop Free 3.00000000 GH
Start 30 MHz #Res BW 100 kHz	#VBW 300 kHz	Stop 3.000 Sweep 9.667 ms (1001	pts) 297,000000 MH
1 N 1 f 2 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	2.465 4 GHz 0.27 dBm		Freq Offse 0 H
		status	



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802.11n HT20 **Band Edges Test Data CH-Low**



Band Edges Test Data CH-High



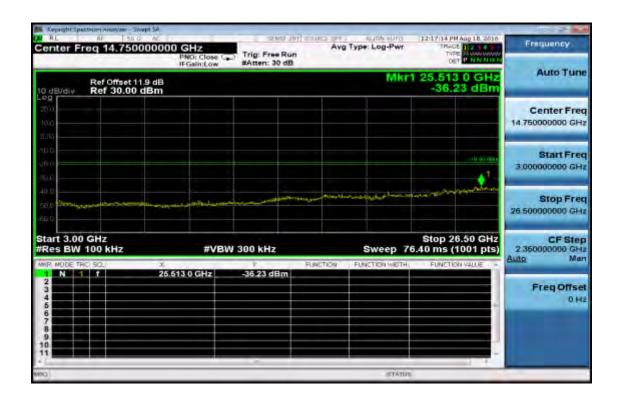
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802.11n HT20 **Spurious Emission Test Data CH-Low**

Keyaight Spectrum Analyzer - Strept SA	contraction of the second s	112 OFF ALLON AUTO 112	17:00 PM Aug 18, 2016	
Center Freq 1.515000000		Avg Type: Log-Pwr	TRACE 1 2 3 4 9 1 TYPE PROVIDENT	Frequency
Ref Offset 11.9 dB	POSITION WRITER OF US	Mkr1	2.411 9 GHz 1.05 dBm	Auto Tuni
200 200 100		1-		Center Free 1.515000000 GH
200 200			- tit dië offer	Start Free 30.000000 MH
40 0 60 0	10000 - 11 - 11 - 11 - 11 - 11 - 11 - 1	here and the second	Angelin and a state	Stop Free 3.000000000 GH
Start 30 MHz #Res BW 100 kHz	#VBW 300 kHz	Sweep 9.667	stop 3.000 GHz 7 ms (1001 pts)	CF Step 297.000000 MH Auto Mar
1 N 1 f 2. 2 3 3 3 5 3 5 5 6 6 6 7 7 8 9 9 9 9 10	411 9 GHz 1.05 dBm			Freq Offse OH
11	-	státus	141	



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Spurious Emission Test Data CH-Mid

ter Freq 1.515000000	GHz PNO: Close C	Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr	12-20:55 PM Aug 18, 2010 TRADE 12 3 4 3 4 TYPE Noncommune OET 7 R 10 1000	Frequency
Ref Offset 11.9 dB Bidly Ref 30.00 dBm			Mkr	1 2.432 7 GHz 1.35 dBm	Auto Tuni
				1	Center Fre 1.515000000 GH
				10 Ki dim	Start Fre 30,000000 MH
and a state of the second s	n com a submarrian	مەربىيە ئېرىرى بەرسەر مەربى	and a second second second	harmine and a second second	Stop Fre 3.000000000 GH
rt 30 MHz s BW 100 kHz	#VBW :	300 kHz	the set of	Stop 3.000 GHz 67 ms (1001 pts)	CF Ste 297.000000 MH Auto Ma
NODE TRC SCL X	432 7 GHz	Y FU	NCTION FUNCTION WIBTH	FUNCTION VALUE	Freq Offse 0 H



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Spurious Emission Test Data CH-High

Konjengtit Spectreen Anseyver - Skrept SA RL RA 55 G AC	and the second se	SURGE SPECIAL ALLON ALLON	12-29:02 PM Aug 18, 2016	
Center Freq 1.515000000		Avg Type: Log-Pwr	TRACE 1 2 4 4 9 TYPE IN WARWARK DET P NIN MINT	Frequency
Ref Offset 11.9 dB		Mk	r1 2.459 5 GHz -0.22 dBm	Auto Tune
99 2010 1010			¢1	Center Free 1.515000000 GH
011 011			2) 22 apre	Start Free 30.000000 MH
40 D 60 D 60 D	استا فيعار المراجع والمراجع والمراجع والمراجع والمراجع	and the state of the	Mindennann	Stop Free 3.000000000 GH
Start 30 MHz #Res BW 100 kHz	#VBW 300 kHz	Sweep 9.	Stop 3.000 GHz 667 ms (1001 pts) FUNCTION VALUE	CF Stej 297,000000 MH Auto Ma
1 N 1 f 2/ 2 3 4 5 6 7	459 5 GHz0.22 dBm		-	Freq Offse 0 H
	-	eratus		

Frequency	12-29:54 PM Aug 18, 2016 THACE 1 2 3 4 3 1 TYPE PLOTODOUTOUT DET PLOTODOUTOUT	g Type: Log-Pwr	in		GHZ	0000000		er Fre
Auto Tur	25.818 5 GHz -36.20 dBm	Mkr1					Ref Offset	
Center Fre 14.750000000 GP								
Start Fre 3.000000000 Gi	a) il nhe							
Stop Fre 26 50000000 Gi		ىلېرلىرلى ^{لىرى} بىرىلىر خا ^{لىر} بىرانىك	and the second	and and the second	نور میروند میروند. ایرو میروند میروند میروند می		a.d.a.station.d.e	
CF Ste 2.350000000 GH Auto Mi	Stop 26.50 GHz 5.40 ms (1001 pts)	Sweep 76	FLANCTION	300 kHz	#VBW	x	00 kHz	3.00 C
Freq Offs 01				-36.20 dB	6 GHz			



802.11n HT40 **Band Edges Test Data CH-Low**



Band Edges Test Data CH-High



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802.11n HT40 **Spurious Emission Test Data CH-Low**

	AC. SENSE JUT COL		12:39:53 PM Aug 18, 2010	Frequency
ter Freq 1.51500	PNO: Close () Trig: Free Run	Avg Type: Log-Pwr	TRACE TYPE	
	IFGain:Low #Atten: 30 dB		DET BENERALDER	Auto Tu
Ref Offset 11	9 dB	Mkr	1 2.435 7 GHz	Huito Ti
B/div Ref 30.00 c	1Bm		-3.01 dBm	
				Center Fr
				1.515000000 0
				Start Fi
			0101001	30.000000 M
		1	Lucie mint man	Stop F
-	and the second state of th	and the second descent of the	and the second second	3.000000000 (
				and the second second
t 30 MHz			Stop 3.000 GHz	CFS
s BW 100 kHz	#VBW 300 kHz	Sweep 9.6	67 ms (1001 pts)	297,000000 N
MODE TRC SOL		ICTIONFUNCTION WIDTH	FUNCTION VALUE	Auto N
N_1 1	2.435 7 GHz -3.01 dBm			Sector Sector
				FreqOff
			+	0
			1 40	
wy night Spacebarri Anunywe - Silv AL AF AS G	AC 1 SENSE JUL SOL		12-40:19 PM Aug 18, 2010	Frequency
L NI SA O	AC 1 SENSE JUL SOL	Avg Type: Log-Pwr		Frequency
Ref Offset 11	000000 GHz PNO: Close IFGain:Low #Atten: 30 dB	Avg Type: Log-Pwr	TRACE TRACE	Frequency Auto Ti
Ref Offset 11 Bl/div Ref 30.00 o	000000 GHz PNO: Close IFGain:Low #Atten: 30 dB	Avg Type: Log-Pwr	25.724 5 GHz	Auto Ti
Ref Offset 11 B/div Ref 30.00	000000 GHz PNO: Close IFGain:Low #Atten: 30 dB	Avg Type: Log-Pwr	25.724 5 GHz	
Ref Offset 11 B/div Ref 30.00	000000 GHz PNO: Close IFGain:Low #Atten: 30 dB	Avg Type: Log-Pwr	25.724 5 GHz	Auto Tu Center F
Ref Offset 11 B/div Ref 30.00 d	000000 GHz PNO: Close IFGain:Low #Atten: 30 dB	Avg Type: Log-Pwr	25.724 5 GHz	Auto Tr Center F 14.750000000 (
ter Freq 14.7500 Ref Offset 11	000000 GHz PNO: Close IFGain:Low #Atten: 30 dB	Avg Type: Log-Pwr	11/2 12 14 1 THE NUMBER OF PRIME	Auto Tu Center F
ter Freq 14.7500 Ref Offset 11	000000 GHz PNO: Close IFGain:Low #Atten: 30 dB	Avg Type: Log-Pwr	11/2 12 14 1 THE NUMBER OF PRIME	Auto Tr Center F 14.750000000 Start F
Ref Offset 11 B/div Ref 30.00	2000000 GHz PMO: Close IFGain:Low 4Atten: 30 dB	Avg Type: Log-Pwr	11/2 12 14 1 THE NUMBER OF PRIME	Auto Tr Center F 14.750000000 0 Start F 3.000000000 0
ter Freq 14.7500 Ref Offset 11	2000000 GHz PNO: Close IFGain:Low 29 dB dBm	Avg Type: Log-Pwr	25.724 5 GHz -35.59 dBm	Auto Tr Center F 14.750000000 0 Start F 3.000000000 0 Stop F
Ref Offset 11	92 GENERALINE CONCURSION OF THE STATE OF THE	Avg Type: Log-Pwr	25.724 5 GHz -35.59 dBm	Auto Tr Center F 14.750000000 0 Start F 3.000000000 0
Ref Offset 11 B/div Ref 30.00 (92 GENERALINE CONCURSION OF THE STATE OF THE	Avg Type: Log-Pwr	25.724.5 GHz -35.59 dBm	Auto Tr Center F 14.750000000 0 Start F 3.000000000 0 Stop F 26.500000000 0
Ref Offset 11 Brdw Ref 30.00 (92 GENERALINE CONCURSION OF THE STATE OF THE	Avg Type: Log-Pwr	25.724 5 GHz -35.59 dBm	Auto Tr Center F 14.750000000 0 Start F 3.000000000 0 Stop F
Ref Offset 11 EVdiv Ref 30.00 (AC CONCENTRATION OF THE STATE O	Avg Type: Log-Pwr	25.724.5 GHz -35.59 dBm	Auto Tr Center F 14.750000000 0 Start F 3.000000000 0 Stop F 26 500000000 0
Ref Offset 11 EVdiv Ref 30.00 (AC CONCENTRATION OF THE STATE O	Avg Type: Log-Pwr	25.724.5 GHz -35.59 dBm	Auto Tr Center F 14.750000000 0 Start F 3.000900000 0 Stop F 26.50000000 0 CF S 2.350000000 0
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Ref Offset 11 Ref 30.00 of State 30.00 of State 30.00 of State 30.00 of State 30.00 of State 30.00 of State 30.00 of State 30.	A A A A A A A A A A A A A A A A A A A	Avg Type: Log-Pwr	25.724.5 GHz -35.59 dBm	Auto Tr Center F 14.750000000 0 Start F 3.000000000 0 Stop F 26.500000000 0 CF S 2.350000000 0 Auto 1 Freq Off
Ref Offset 11 Ref 30.00 of State 30.00 of State 30.00 of State 30.00 of State 30.00 of State 30.00 of State 30.00 of State 30.	A A A A A A A A A A A A A A A A A A A	Avg Type: Log-Pwr	25.724.5 GHz -35.59 dBm	Auto Tr Center F 14.750000000 0 Start F 3.000000000 0 Stop F 26.500000000 0 CF S 2.350000000 0 Auto 1 Freq Off
Ref Offset 11 Ref 30.00 d	A A A A A A A A A A A A A A A A A A A	Avg Type: Log-Pwr	25.724.5 GHz -35.59 dBm	Auto Tr Center F 14.750000000 0 Start F 3.000000000 0 Stop F 26.500000000 0 CF S 2.350000000 0 Auto 1 Freq Off
Ref Offset 11 Ref 30.00 of State 30.00 of State 30.00 of State 30.00 of State 30.00 of State 30.00 of State 30.00 of State 30.	A A A A A A A A A A A A A A A A A A A	Avg Type: Log-Pwr	25.724.5 GHz -35.59 dBm	Auto Tr Center F 14.750000000 0 Start F 3.000000000 0 Stop F 26.500000000 0 CF S 2.350000000 0 Auto 1 Freq Off

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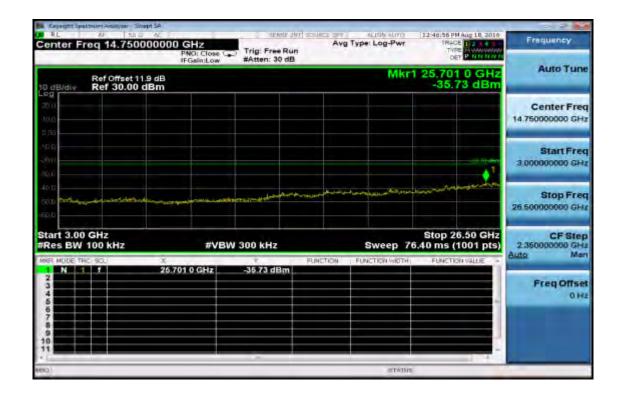
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Spurious Emission Test Data CH-Mid

RL R/ Sharthard Analyse - Skapt SA		The cauce free test	4104 auro (12	-40:11 PM Aug 18, 2010	
enter Freg 1.515000000		Avg Typ	e: Log-Pwr		Frequency
Ref Offset 11.9 dB Ref 30.00 dBm			Mkr1	2.447 6 GHz -2.70 dBm	Auto Tun
200 10.0 2.10			•1		Center Fre 1.515000000 GH
100 					Start Fre 30,000000 MH
40 D 50 D 50 D	namphassion and a start of the start inter-	لەرو <u>مىر بەرمىيە بەرمىيە بەرمىيە بەرمىيە بەرمىيە</u>		Managara an di kanagara na gar	Stop Fre 3,000000000 GH
start 30 MHz Res BW 100 kHz	#VBW 300 kH		Sweep 9.667	top 3.000 GHz 7 ms (1001 pts)	CF Ste 297.000000 MH Auto Ma
2 3 4 5	447 6 GHz -2.70 c		NCTION WIDTH :	FUNCTION VALUE ×	Freq Offse 0 H
6 7 8 9 9 10 11					
0.0			STATUS	1.4	



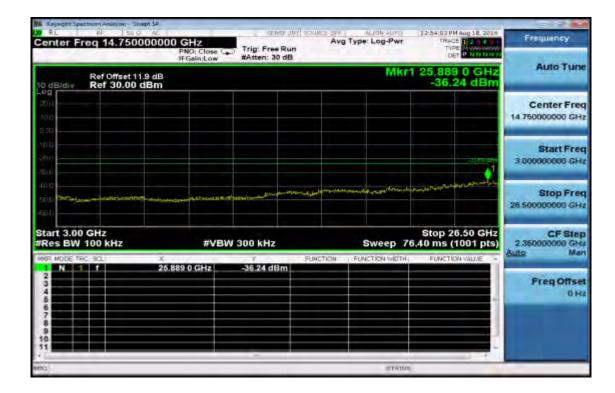
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Spurious Emission Test Data CH-High

Keynight Spectrum Analyzer - Skrept SA		-	A CONTRACTOR OF		
Center Freq 1.515000000	GHz PNO: Close	Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr	12:53;46 PM Aug 18, 2016 TRACE 1 2 3 4 5 TYPE PLOTON AUG DET P N.W.M.W.W.	Frequency
Ref Offset 11.9 dB			Mk	r1 2.468 4 GHz -3.58 dBm	Auto Tun
200 100				A	Center Fre 1.515000000 GH
1000 				2 30000	Start Fre 30 000000 MH
40 0 GO D 60 D	***************************		and and the second s	Angeler Parent Species	Stop Fre 3.000000000 GH
Start 30 MHz #Res BW 100 kHz	#VBW	300 kHz	Sweep 9	Stop 3.000 GHz .667 ms (1001 pts)	CF Ste 297,000000 Mit Auto Ma
1 N 1 f 2.	458 4 GHz	-3.58 dBm		FORCHOWNEDE	Freq Offse 0 F
6 7 8 9 10					
• ()			STATUS	14	



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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 & RSS-Gen §8.8, 8.9 limit as below.

And according to §15.33(a) (1) & RSS-Gen §6.13(a), 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:

966 Chamber									
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.				
TYPE		NUMBER	NUMBER	CAL.					
EMI Test Receiver	R&S	ESCI7	100760	05/10/2016	05/09/2017				
Spectrum Analyzer	Agilent	E4446A	MY51100003	01/29/2016	01/28/2017				
Loop Antenna	ETS.LINDGREN	6502	148045	09/07/2015	09/06/2016				
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/14/2015	12/13/2016				
Horn Antenna	Schwarzbeck	BBHA9120D	1441	08/01/2016	07/31/2017				
Pre-Amplifier	Agilent	8447D	2944A07676	01/02/2016	01/01/2017				
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	980038	01/02/2016	01/01/2017				
Turn Table	HD	DT420	N/A	N.C.R	N.C.R				
Antenna Tower	ChamPro	AM-BS-4500-B	060776-ABS	N.C.R	N.C.R				
Controller	ChamPro	EM1000	60776	N.C.R	N.C.R				
Low Loss Cable	Huber Suhner	966_RX	9	01/02/2016	01/01/2017				
3m Site NSA	SGS	966 chamber	N/A	07/01/2016	06/30/2017				
Low Loss Cable	Huber Suhner	966 TX	1	01/02/2016	01/01/2017				
Horn Antenna	Schwarzbeck	BBHA9170	184	12/12/2015	12/11/2016				
Pre-Amplifier	EMC Instruments Corp.	EMC184045	980135	01/02/2016	01/01/2017				

NOTE: N.C.R refers to Not Calibrated Required.

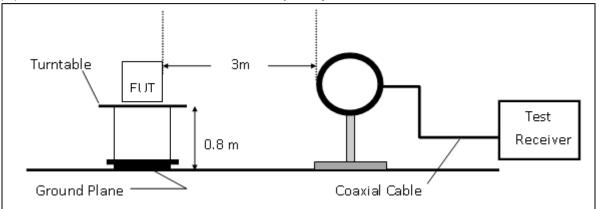
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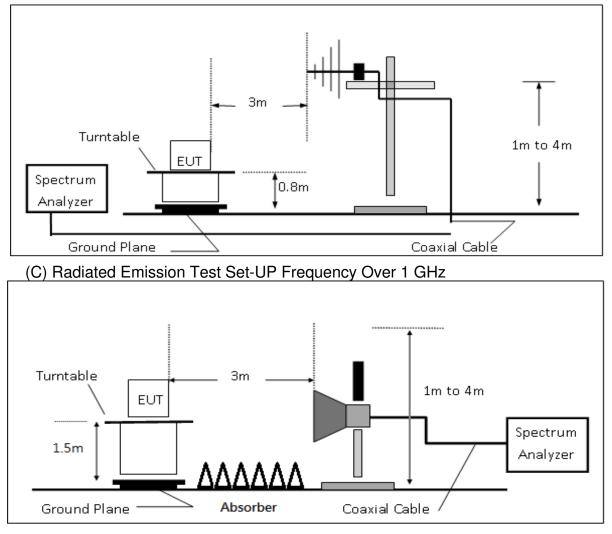


11.3 Test SET-UP

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



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



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11.4 Measurement Procedure

- 1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 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 \geq 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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11.5 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	6	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

Actual FS(dB μ V/m) = SPA. Reading level(dB μ 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.

11.6 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.

11.7 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 Mode : 802.11b Test Date : 08/15/2016 Fundamental Frequency : 2412 MHz Temp. / Humi. : 21 deg_C / 62							
Operation	•	•		Test Engineer :		Edward	021111
EUT Pol. :		E2 Plar	•	Measurement Ant	enna Pol. :		
Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Leve	el FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµ V/m	dB	dBu V/m	dB
2390.00	Е	Average	27.85	29.59	-1.74	54.00	-26.15
2390.00	E	Peak	40.93	42.68	-1.74	74.00	-33.07
Operation	Mode :	802.11	o	Test Date :		08/15/2016	
Fundamer	ntal Freque	ncy : 2412 M	Hz	Temp. / Humi. :		21 deg_C /	62 RH
Operation	Band :	Bandeo	lge CH LOW	Test Engineer:	st Engineer : Edward		
EUT Pol. :		E2 Plar	ne	Measurement Ant	enna Pol. :	HORIZONT	AL
Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Leve	el FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµ V/m	dB	dBu V/m	dB
2390.00	E	Average	28.74	30.48	-1.74	54.00	-25.26
2390.00	Е	Peak	45.56	47.30	-1.74	74.00	-28.44



Fundamental Frequency : 2462 MHz Temp. / Humi. : 21 deg_C / 62 RH Operation Band : Bandedge CH HIGH Test Engineer : Edward EUT Pol. : E2 Plane Measurement Antenna Pol. : VERTICAL Freq. Note Decetor Actual Spectrum Factor Limit Margin Mode Reading Level FS @3m
EUT Pol. :E2 PlaneMeasurement Antenna Pol. : VERTICALFreq.NoteDecetorActualSpectrumFactorLimitMargin
Mode Reading Level FS @3m
MHz F/H/E/S QP/AV/PK dBµV/m dBµV/m dB dBuV/m dB
2483.50 E Average 37.37 38.99 -1.62 54.00 -16.63
2483.50 E Peak 44.11 45.72 -1.62 74.00 -29.89
Operation Mode: 802.11b Test Date: 08/15/2016
Fundamental Frequency : 2462 MHz Temp. / Humi. : 21 deg_C / 62 RH
Operation Band : Bandedge CH HIGH Test Engineer : Edward
EUT Pol.: E2 Plane Measurement Antenna Pol.: HORIZONTAL
Freq. Note Decetor Actual Spectrum Factor Limit Margin
Mode Reading Level FS @3m
MHz F/H/E/S QP/AV/PK dBµV/m dBµV/m dB dBuV/m dB
2483.50 E Average 44.34 45.96 -1.62 54.00 -9.66
2483.50 E Peak 50.45 52.07 -1.62 74.00 -23.55

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Radiated Band Edge Measurement Result (802.11g)

62 RH
Margin
dB
-11.51
-15.50
-17.94
-17.49
6
62 RH
02111
ΓAL
Margin
dB
dB -11.72
-11.72



Operation Mode : 802.11g Fundamental Frequency : 2462 MH			Test Date :		08/15/2016		
Fundamei	ntal Freque	ncy : 2462 MF	HZ	Temp. / Humi. :		21 deg_C /	62 RH
Operation	Band :	Banded	lge CH HIGH Test Engineer :		Edward		
EUT Pol. :	EUT Pol.: E2 Plane Measurement Antenna Pol.			enna Pol.	: VERTICAL		
Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Lev	el FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµ V/m	dB	dBu V/m	dB
2483.50	E	Average	46.43	48.05	-1.62	54.00	-7.57
2483.50	E	Peak	63.00	64.62	-1.62	74.00	-11.00

Operation Mode :	802.11g	Test Date :	08/15/2016
Fundamental Frequency	: 2462 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Bandedge CH HIGH	HTest Engineer :	Edward
EUT Pol. :	E2 Plane	Measurement Antenna Pol.	: HORIZONTAL

Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµ V/m	dB	dBu V/m	dB
2483.50	Е	Average	52.95	54.57	-1.62	54.00	-1.05
2483.50	Е	Peak	69.57	71.19	-1.62	74.00	-4.43
2484.80	S	Average	51.57	53.19	-1.62	54.00	-2.43
2484.80	S	Peak	69.79	71.40	-1.62	74.00	-4.21

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Radiated Band Edge Measurement Result (802.11_HT20)

Operation Fundame Operation EUT Pol.	ntal Freque Band :	802.11r ncy : 2412 M Bandec E2 Plar	Hz lge CH LOW	Test Date : Temp. / Humi. : Test Engineer : Measurement Ant	enna Pol. :	08/15/2016 21 deg_C / Edward VERTICAL	
Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Lev	rel FS		@3m	Ū
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµ V/m	dB	dBu V/m	dB
2389.20	S	Average	43.50	45.24	-1.74	54.00	-10.50
2389.20	S	Peak	61.50	63.24	-1.74	74.00	-12.50
2390.00	Е	Average	44.54	46.28	-1.74	54.00	-9.46
2390.00	Е	Peak	60.46	62.20	-1.74	74.00	-13.54
Fundame Operation	Operation Mode : 802.11n20 Fundamental Frequency : 2412 MHz Operation Band : Bandedge CH LOW EUT Pol. : E2 Plane		Test Date :08/15/2016Temp. / Humi. :21 deg_C / 62 RHTest Engineer :EdwardMeasurement Antenna Pol. : HORIZONTAL			62 RH	
Freq.	Note	Decetor Mode	Actual Reading Lev	Spectrum rel FS	Factor	Limit @3m	Margin
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµ V/m	dB	dBu V/m	dB
2389.56	S	Average	45.03	46.77	-1.74	54.00	-8.97
2389.56	S	Peak	67.21	68.95	-1.74	74.00	-6.79
2390.00	E	Average	45.46	47.20	-1.74	54.00	-8.54
2390.00	Е	Peak	66.60	68.34	-1.74	74.00	-7.40



Operation Mode : Fundamental Frequer Operation Band : EUT Pol. :		802.11n20 ncy : 2462 MHz Bandedge CH HIGF E2 Plane		Test Date : Temp. / Humi. : Test Engineer : Measurement Antenna Pol.		08/15/2016 21 deg_C / 62 RH Edward : VERTICAL	
Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
-		Mode	Reading Lev	el FS		@3m	-
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµ V/m	dB	dBu V/m	dB
2483.50	E	Average	45.97	47.59	-1.62	54.00	-8.03
2483.50	Е	Peak	64.71	66.33	-1.62	74.00	-9.29
Operation Mode :		802.11n20		Test Date :	: 08/15/201		
Fundamental Frequer		ncy : 2462 MHz		Temp. / Humi. :		21 deg_C / 62 RH	
Operation Band :		Bandedge CH HIGH		Test Engineer:	st Engineer: Edward		
EUT Pol. :		E2 Plane		Measurement Antenna Pol. : HORIZONTAL			AL
Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Lev	el FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµ V/m	dB	dBu V/m	dB
2483.50	E	Average	52.93	54.55	-1.62	54.00	-1.07
2483.50	Е	Peak	72.16	73.77	-1.62	74.00	-1.84

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Radiated Band Edge Measurement Result (802.11_HT40)

Operation Fundamer Operation EUT Pol. :	ntal Freque Band :	802.11r ncy : 2422 M Bandec E2 Plar	Hz - lge CH LOW ⁻	Test Date : Temp. / Humi. : Test Engineer : Measurement Ant	enna Pol. :	08/15/2016 21 deg_C / Edward VERTICAL	
Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
-		Mode	Reading Leve	el FS		@3m	-
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµ V/m	dB	dBu V/m	dB
2385.60	S	Average	39.48	41.21	-1.73	54.00	-14.52
2385.60	S	Peak	62.67	64.40	-1.73	74.00	-11.33
2390.00	Е	Average	40.03	41.77	-1.74	54.00	-13.97
2390.00	Е	Peak	58.72	60.46	-1.74	74.00	-15.28
Operation Mode : 802.11n40 Fundamental Frequency : 2422 MHz Operation Band : Bandedge Cl			Test Date : 08/15/2016 Temp. / Humi. : 21 deg_C / 62 RH / Test Engineer : Edward				
EUT Pol. :		E2 Plar	-	Measurement Ant	enna Pol. :	HORIZONT	AL
Freq.	Note	Decetor Mode	Actual Reading Leve	Spectrum el FS	Factor	Limit @3m	Margin
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBu V/m	dB
2385.84	S	Average	44.19	45.92	-1.73	54.00	-9.81
2385.84	S	Peak	67.48	69.21	-1.73	74.00	-6.52
2390.00	Е	Average	45.49	47.23	-1.74	54.00	-8.51

Peak

64.64

Е

2390.00

66.38

-1.74

74.00

-9.36



Operation Mode :	802.11n40	Test Date :	08/15/2016
Fundamental Frequency	: 2452 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Bandedge CH HIGI	HTest Engineer :	Edward
EUT Pol. :	E2 Plane	Measurement Antenna Pol.	: VERTICAL

Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµ V/m	dB	dBu V/m	dB
2483.50	Е	Average	45.90	47.52	-1.62	54.00	-8.10
2483.50	Е	Peak	66.37	67.99	-1.62	74.00	-7.63
2484.20	S	Average	45.98	47.60	-1.62	54.00	-8.02
2484.20	S	Peak	67.16	68.77	-1.62	74.00	-6.84

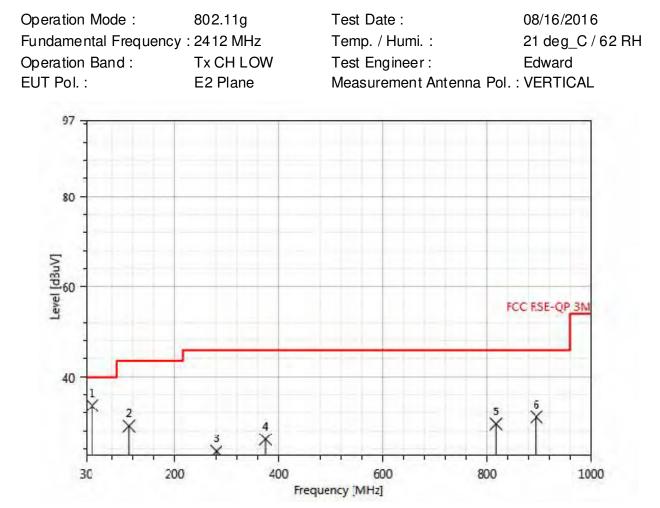
Operation Mode :	802.11n40	Test Date :	08/15/2016
Fundamental Frequency	: 2452 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Bandedge CH HIGH	Test Engineer:	Edward
EUT Pol. :	E2 Plane	Measurement Antenna Pol.	: HORIZONTAL

Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµ V/m	dB	dBu V/m	dB
2483.50	E	Average	51.27	52.89	-1.62	54.00	-2.73
2483.50	Е	Peak	71.62	73.24	-1.62	74.00	-2.38
2485.70	S	Average	50.61	52.23	-1.62	54.00	-3.39
2485.70	S	Peak	73.39	75.01	-1.62	74.00	-0.61

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



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBu V/m	dB
41.64	S	Peak	33.67	42.05	-8.38	40.00	-6.33
112.45	S	Peak	29.16	40.17	-11.01	43.50	-14.34
280.26	S	Peak	23.58	29.94	-6.35	46.00	-22.42
374.35	S	Peak	26.18	30.71	-4.53	46.00	-19.82
817.64	S	Peak	29.62	26.21	3.41	46.00	-16.38
895.24	S	Peak	31.13	26.57	4.56	46.00	-14.87

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Operation Mode : 802.11g Test Date : 08/16/2016 Fundamental Frequency : 2412 MHz Temp. / Humi. : 21 deg_C / 62 RH **Operation Band : Tx CH LOW** Edward Test Engineer: EUT Pol. : E2 Plane Measurement Antenna Pol. : HORIZONTAL 97 80 Level [dBuV] FCC ESE-QP 3N 40 5 3 4 Ж 400 600 1000 30 200 800 Frequency [MHz]

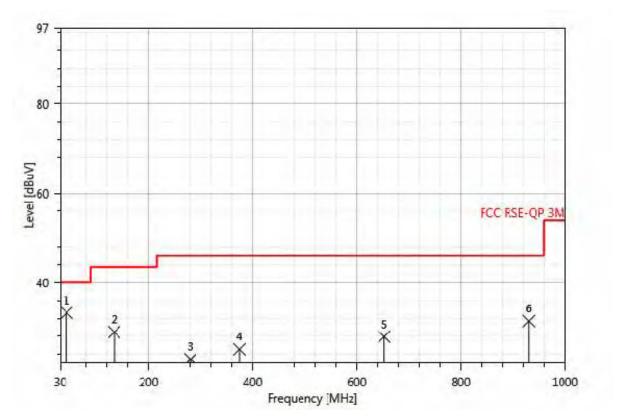
Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBu V/m	dB
124.09	S	Peak	24.19	34.25	-10.06	43.50	-19.31
280.26	S	Peak	26.07	32.42	-6.35	46.00	-19.93
374.35	S	Peak	27.65	32.18	-4.53	46.00	-18.35
624.61	S	Peak	27.24	27.09	0.15	46.00	-18.76
864.20	S	Peak	31.14	26.09	5.05	46.00	-14.86
992.24	S	Peak	32.81	26.86	5.95	54.00	-21.19

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



Operation Mode : 802.11g Fundamental Frequency : 2437 MHz **Operation Band :** Tx CH MID EUT Pol. : E2 Plane

Test Date : 08/16/2016 Temp. / Humi. : 21 deg C/62 RH Test Engineer: Edward Measurement Antenna Pol. : VERTICAL



Freq.	Note	Decetor Mode	Actual	Spectrum FS	Factor	Limit @3m	Margin
			Reading Level	-		-	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµ V/m	dB	dBu V/m	dB
42.61	S	Peak	33.26	41.56	-8.30	40.00	-6.74
133.79	S	Peak	28.94	37.94	-8.99	43.50	-14.56
280.26	S	Peak	22.89	29.24	-6.35	46.00	-23.11
374.35	S	Peak	25.12	29.66	-4.53	46.00	-20.88
652.74	S	Peak	27.92	27.38	0.54	46.00	-18.08
930.16	S	Peak	31.41	26.14	5.27	46.00	-14.59

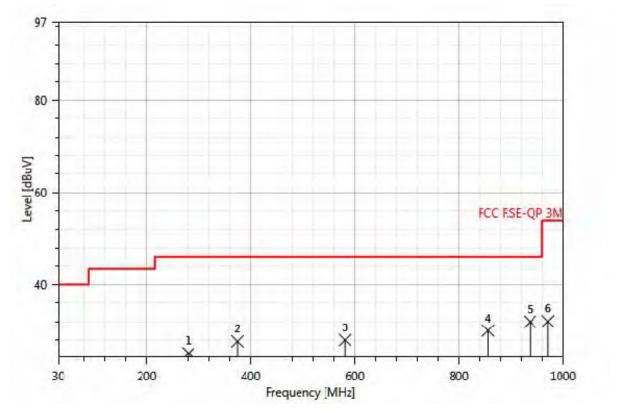
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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Operation Mode : 802.11g Fundamental Frequency : 2437 MHz **Operation Band :** Tx CH MID EUT Pol. : E2 Plane

Test Date : 08/16/2016 Temp. / Humi. : 21 deg C/62 RH Edward Test Engineer: Measurement Antenna Pol. : HORIZONTAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBu V/m	dB
280.26	S	Peak	25.14	31.49	-6.35	46.00	-20.86
374.35	S	Peak	27.70	32.23	-4.53	46.00	-18.30
580.96	S	Peak	28.01	28.39	-0.38	46.00	-17.99
856.44	S	Peak	30.06	25.58	4.48	46.00	-15.94
936.95	S	Peak	31.94	26.70	5.25	46.00	-14.06
970.90	S	Peak	32.03	25.75	6.28	54.00	-21.97

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Operation Mode : 802.11g Test Date : 08/16/2016 Fundamental Frequency : 2462 MHz Temp. / Humi. : 21 deg C/62 RH **Operation Band : Tx CH HIGH** Edward Test Engineer: EUT Pol. : E2 Plane Measurement Antenna Pol. : VERTICAL 97 80 Level [dBuV] FCC RSE-QP 3M 40 6 5 3 400 600 30 200 800 1000 Frequency [MHz] Note Actual Spectrum I imit Frea Decetor Factor Margin

	Freq.	note	Decelor	Actual	Spectrum	Factor		wargin	
			Mode	Reading Level	FS		@3m		
	MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBu V/m	dB	_
-	42.61	S	Peak	33.85	42.14	-8.30	40.00	-6.15	-
	122.15	S	Peak	29.30	39.55	-10.25	43.50	-14.20	
	374.35	S	Peak	26.40	30.93	-4.53	46.00	-19.60	
	590.66	S	Peak	27.13	27.31	-0.18	46.00	-18.87	
	864.20	S	Peak	31.30	26.25	5.05	46.00	-14.70	
	978.66	S	Peak	32.36	26.08	6.28	54.00	-21.64	

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Operation Mode : 802.11g Test Date : 08/16/2016 Fundamental Frequency : 2462 MHz Temp. / Humi. : 21 deg_C / 62 RH **Operation Band : Tx CH HIGH** Edward Test Engineer: EUT Pol. : E2 Plane Measurement Antenna Pol. : HORIZONTAL 97 80 Level [dBuV] FCC RSE-QP 3N 40 5 X 3 ж 400 600 1000 30 200 800 Frequency [MHz]

Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµ V/m	dB	dBu V/m	dB
125.06	S	Peak	23.98	33.96	-9.98	43.50	-19.52
280.26	S	Peak	24.00	30.35	-6.35	46.00	-22.00
374.35	S	Peak	27.86	32.39	-4.53	46.00	-18.14
636.25	S	Peak	27.85	27.33	0.52	46.00	-18.15
765.26	S	Peak	30.10	26.99	3.11	46.00	-15.90
993.21	S	Peak	31.40	25.42	5.98	54.00	-22.60

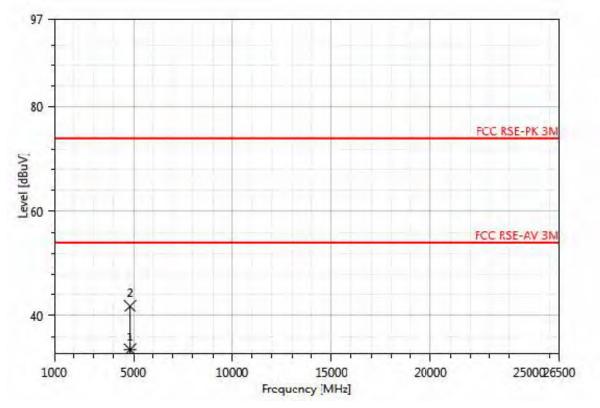
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



Above 1GHz Data:

Radiated Spurious Emission Measurement Result (802.11 b)

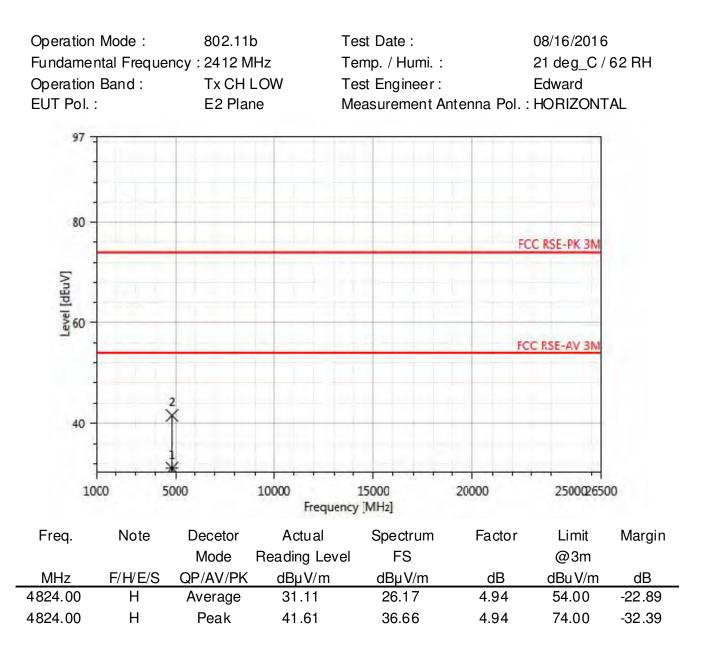
802.11b	Test Date :	08/16/2016
: 2412 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Tx CH LOW	Test Engineer:	Edward
E2 Plane	Measurement Antenna Pol.	: VERTICAL
	: 2412 MHz Tx CH LOW	: 2412 MHz Temp. / Humi. : Tx CH LOW Test Engineer :



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBu V/m	dB
4824.00	Н	Average	33.46	28.52	4.94	54.00	-20.54
4824.00	Н	Peak	41.86	36.92	4.94	74.00	-32.14

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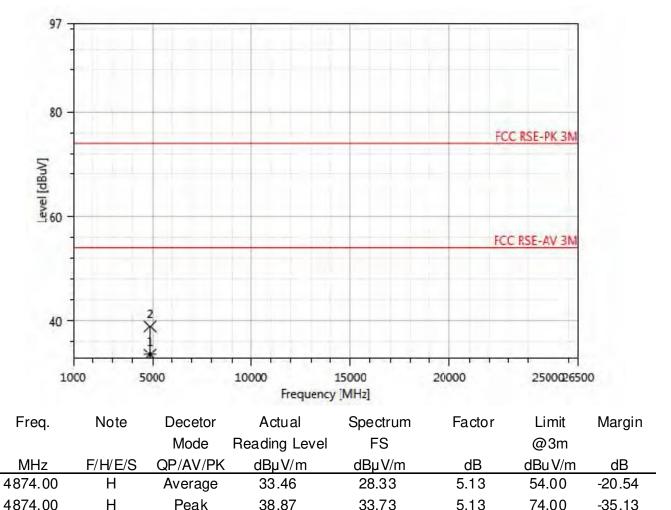


Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



Operation Mode : 802.11b Fundamental Frequency : 2437 MHz **Operation Band :** Tx CH MID EUT Pol. : E2 Plane

Test Date : 08/16/2016 Temp. / Humi. : 21 deg C / 62 RH Test Engineer: Edward Measurement Antenna Pol. : VERTICAL



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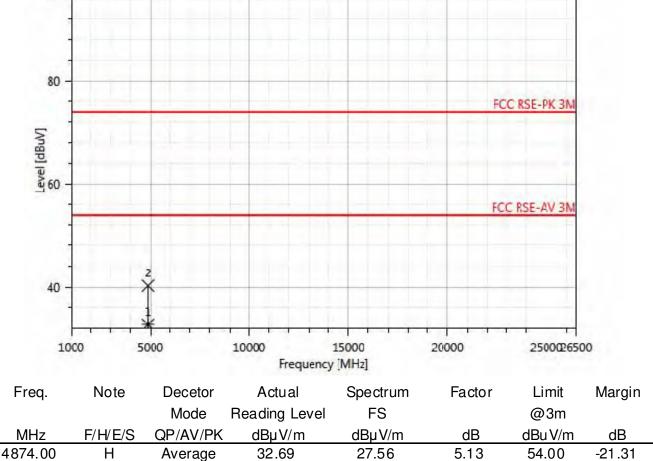


4874.00

Н

Test Date : **Operation Mode :** 802.11b Fundamental Frequency : 2437 MHz **Operation Band :** Tx CH MID Test Engineer: EUT Pol. : E2 Plane 97

08/16/2016 Temp. / Humi. : 21 deg C / 62 RH Edward Measurement Antenna Pol. : HORIZONTAL



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40.28

Peak

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35.15

5.13

74.00

-33.72



Test Date : **Operation Mode :** 802.11b 08/16/2016 Fundamental Frequency : 2462 MHz Temp. / Humi. : 21 deg C / 62 RH **Operation Band :** Test Engineer: **Tx CH HIGH** Edward EUT Pol. : Measurement Antenna Pol. : VERTICAL E2 Plane 97 90 80 FCC RSE-PK 3N Level [dBuV] 60 FCC RSE-AV 3N 50 2 10000 15000 20000 2500@6500 1000 5000 Frequency [MHz] Freq. Note Decetor Actual Spectrum Factor Limit Margin Mode **Reading Level** FS @3m F/H/E/S QP/AV/PK $dB\mu V/m$ dBµV/m dB dBu V/m dB MHz 4924.00 Н 43.18 37.93 5.25 54.00 -10.82 Average 4924.00 Н 46.16 40.90 5.25 74.00 -27.84 Peak

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



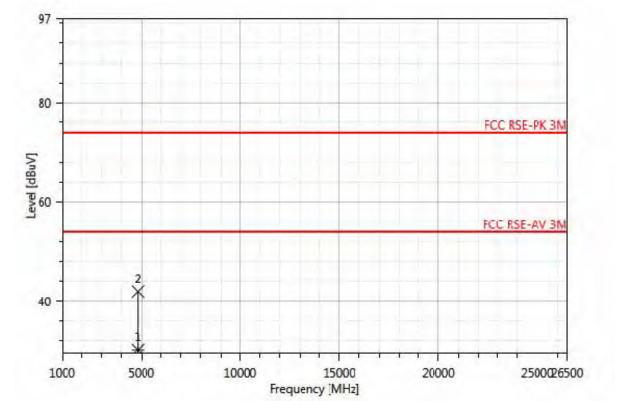
Test Date : **Operation Mode :** 802.11b 08/16/2016 Fundamental Frequency : 2462 MHz Temp. / Humi. : 21 deg C / 62 RH **Operation Band :** Test Engineer: **Tx CH HIGH** Edward EUT Pol. : E2 Plane Measurement Antenna Pol. : HORIZONTAL 97 90 80 FCC RSE-PK 3N Level [dBuV] 60 FCC RSE-AV JN 50 Э 10000 15000 20000 2500@6500 1000 5000 Frequency [MHz] Freq. Note Decetor Actual Spectrum Factor Limit Margin Mode **Reading Level** FS @3m F/H/E/S QP/AV/PK $dB\mu V/m$ dBµV/m dB dBu V/m dB MHz 4924.00 Н 41.95 36.70 5.25 54.00 -12.05 Average 4924.00 Н 45.27 40.02 5.25 74.00 -28.73 Peak

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Radiated Spurious Emission Measurement Result (802.11 g)

Operation Mode :	802.11g	Test Date :	08/16/2016
Fundamental Frequency	: 2412 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Operation Band :	Tx CH LOW	Test Engineer:	Edward
EUT Pol. :	E2 Plane	Measurement Antenna Pol.	: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBu V/m	dB
4824.00	Н	Average	30.19	25.25	4.94	54.00	-23.81
4824.00	Н	Peak	41.96	37.01	4.94	74.00	-32.04

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Operation Mode : 802.11g Test Date : 08/16/2016 Fundamental Frequency : 2412 MHz Temp. / Humi. : 21 deg C/62 RH **Operation Band : Tx CH LOW** Edward Test Engineer: EUT Pol. : E2 Plane Measurement Antenna Pol. : HORIZONTAL 97 80 FCC RSE-PK 3N Level [dBuV] FCC RSE-AV 3M 2 40 10000 15000 20000 1000 5000 2500@6500 Frequency [MHz] Freq. Note Decetor Actual Spectrum Factor Limit Margin

		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBu V/m	dB
4824.00	Н	Average	30.04	25.10	4.94	54.00	-23.96
4824.00	Н	Peak	42.99	38.05	4.94	74.00	-31.01

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



4874.00

4874.00

Η

Н

Operation Mode: 802.11g Test Date : 08/16/2016 Fundamental Frequency : 2437 MHz Temp. / Humi. : 21 deg C/62 RH **Operation Band :** Tx CH MID Test Engineer: Edward EUT Pol. : E2 Plane Measurement Antenna Pol. : VERTICAL 97 80 FCC RSE-PK 3N Level [dBuV] FCC RSE-AV 3N 2 X 40 10000 15000 20000 1000 5000 2500@6500 Frequency [MHz] Freq. Note Decetor Actual Spectrum Factor Limit Margin Mode **Reading Level** FS @3m F/H/E/S QP/AV/PK dBu V/m MHz $dB\mu V/m$ dBµV/m dB dB

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

29.96

44.27

Average

Peak

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24.83

39.13

5.13

5.13

-24.04

-29.73

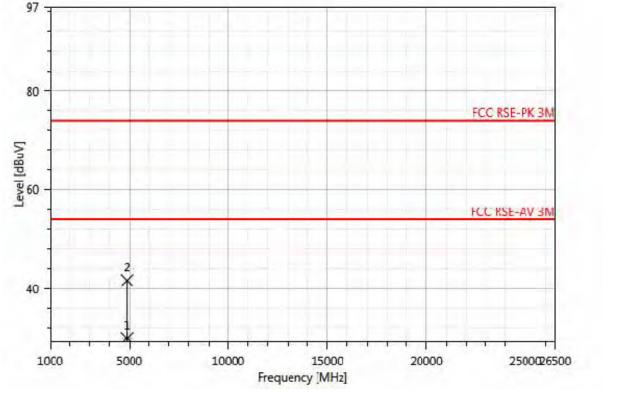
54.00

74.00



Operation Mode : 802.11g Fundamental Frequency : 2437 MHz **Operation Band :** Tx CH MID EUT Pol. : E2 Plane 97

Test Date : 08/16/2016 Temp. / Humi. : 21 deg_C / 62 RH Edward Test Engineer: Measurement Antenna Pol. : HORIZONTAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBu V/m	dB
4874.00	Н	Average	29.93	24.80	5.13	54.00	-24.07
4874.00	Н	Peak	41.63	36.50	5.13	74.00	-32.37

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Operation Mode : 802.11g Test Date : 08/16/2016 Fundamental Frequency : 2462 MHz Temp. / Humi. : 21 deg C/62 RH **Operation Band : Tx CH HIGH** Edward Test Engineer: EUT Pol. : E2 Plane Measurement Antenna Pol. : VERTICAL 97 80 FCC RSE-PK 3M Level [dBuV] FCC RSE-AV 3M 2 Ж 40 10000 15000 20000 1000 5000 2500@6500 Frequency [MHz] Frea. Note Decetor Actual Spectrum Factor Limit Margin

					•			0
			Mode	Reading Level	FS		@3m	
	MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBu V/m	dB
-	4924.00	Н	Average	30.64	25.39	5.25	54.00	-23.36
	4924.00	Н	Peak	42.67	37.42	5.25	74.00	-31.33

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



4924.00

4924.00

Η

Н

Operation Mode: 802.11g Test Date : 08/16/2016 Fundamental Frequency : 2462 MHz Temp. / Humi. : 21 deg C/62 RH **Operation Band : Tx CH HIGH** Test Engineer: Edward EUT Pol. : E2 Plane Measurement Antenna Pol. : HORIZONTAL 97 80 FCC RSE-PK 3M Level [dBuV] FCC RSE-AV 3M 40 10000 15000 20000 1000 5000 2500@6500 Frequency [MHz] Freq. Note Decetor Actual Spectrum Factor Limit Margin Mode **Reading Level** FS @3m F/H/E/S QP/AV/PK dBµV/m dBu V/m MHz $dB\mu V/m$ dB dB

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

Average

Peak

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25.40

36.88

30.65

42.13

5.25

5.25

-23.35

-31.87

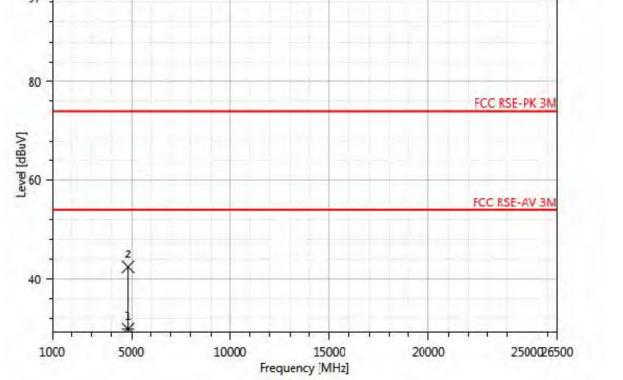
54.00

74.00



Radiated Spurious Emission Measurement Result (802.11_HT20)

802.11n20	Test Date :	08/16/2016
2412 MHz	Temp. / Humi. :	21 deg_C / 62 RH
Tx CH LOW	Test Engineer :	Edward
E2 Plane	Measurement Antenna Pol.	: VERTICAL
2	2412 MHz Fx CH LOW	2412 MHzTemp. / Humi. :Tx CH LOWTest Engineer :



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBu V/m	dB
4824.00	Н	Average	29.94	25.00	4.94	54.00	-24.06
4824.00	Н	Peak	42.49	37.54	4.94	74.00	-31.51

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Operation Mode: 802.11n20 Test Date : 08/16/2016 Fundamental Frequency : 2412 MHz Temp. / Humi. : 21 deg C/62 RH **Operation Band : Tx CH LOW** Test Engineer: Edward EUT Pol. : E2 Plane Measurement Antenna Pol. : HORIZONTAL 97 80 FCC RSE-PK 3N Level [dBuV] FCC RSE-AV 3N 2 40 10000 20000 1000 5000 15000 2500@6500 Frequency [MHz] Freq. Note Decetor Actual Spectrum Factor Limit Margin Mode **Reading Level** FS @3m

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

QP/AV/PK

Average

Peak

 $dB\mu V/m$

29.92

41.63

F/H/E/S

Η

Н

MHz

4824.00

4824.00

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dBµV/m

24.98

36.68

dBu V/m

54.00

74.00

dB

-24.08

-32.37

dB

4.94

4.94



Operation Mode : 802.11n20 Test Date : 08/16/2016 Fundamental Frequency : 2437 MHz Temp. / Humi. : 21 deg C/62 RH **Operation Band :** Tx CH MID Edward Test Engineer: EUT Pol. : E2 Plane Measurement Antenna Pol. : VERTICAL 97 80 FCC RSE-PK 3N Level [dBuV] FCC RSE-AV 3N 2 40 10000 15000 20000 1000 5000 2500@6500 Frequency [MHz] Freq. Note Decetor Actual Spectrum Factor Limit Margin

		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBu V/m	dB
4874.00	Н	Average	30.05	24.92	5.13	54.00	-23.95
4874.00	Н	Peak	41.92	36.79	5.13	74.00	-32.08

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Operation Mode: 802.11n20 Test Date : 08/16/2016 Fundamental Frequency : 2437 MHz Temp. / Humi. : 21 deg C/62 RH **Operation Band :** Tx CH MID Edward Test Engineer: EUT Pol. : E2 Plane Measurement Antenna Pol. : HORIZONTAL 97 80 FCC RSE-PK 3N Level [dBuV] FCC RSE-AV 3M 2 Ж 40 1000 10000 15000 20000 5000 2500@6500 Frequency [MHz] Freq. Note Decetor Actual Spectrum Factor Limit Margin Mode **Reading Level** FS @3m

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

QP/AV/PK

Average

Peak

 $dB\mu V/m$

30.00

42.58

F/H/E/S

Η

Н

MHz

4874.00

4874.00

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dBµV/m

24.87

37.45

dBu V/m

54.00

74.00

dB

-24.00

-31.42

dB

5.13

5.13



4924.00

4924.00

Η

Н

Operation Mode: 802.11n20 Test Date : 08/16/2016 Fundamental Frequency : 2462 MHz Temp. / Humi. : 21 deg C/62 RH **Operation Band : Tx CH HIGH** Test Engineer: Edward EUT Pol. : E2 Plane Measurement Antenna Pol. : VERTICAL 97 80 FCC RSE-PK 31 Level [dBuV] FCC RSE-AV 3N 2 Ж 40 10000 15000 20000 1000 5000 2500@6500 Frequency [MHz] Freq. Note Decetor Actual Spectrum Factor Limit Margin Mode **Reading Level** FS @3m F/H/E/S QP/AV/PK dBu V/m MHz $dB\mu V/m$ dBµV/m dB dB

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Average

Peak

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25.60

37.44

30.85

42.70

5.25

5.25

-23.15

-31.30

54.00

74.00



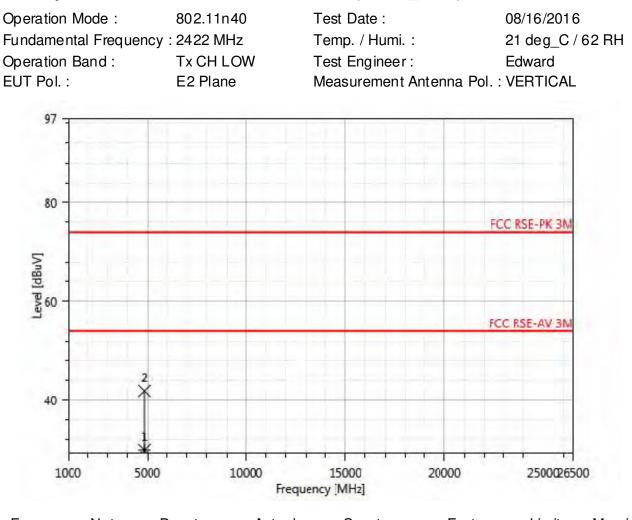
Operation Mode : 802.11n20 Test Date : 08/16/2016 Fundamental Frequency : 2462 MHz Temp. / Humi. : 21 deg C/62 RH **Operation Band : Tx CH HIGH** Test Engineer: Edward EUT Pol. : E2 Plane Measurement Antenna Pol. : HORIZONTAL 97 80 FCC RSE-PK 3N Level [dBuV] FCC RSE-AV 3N 2 Ж 40 10000 15000 20000 1000 5000 2500@6500 Frequency [MHz] Freq. Note Decetor Actual Spectrum Factor Limit Margin

		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBu V/m	dB
4924.00	Н	Average	30.93	25.68	5.25	54.00	-23.07
4924.00	Н	Peak	42.52	37.26	5.25	74.00	-31.48

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Radiated Spurious Emission Measurement Result (802.11_HT40)



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin	
		Mode	Reading Level	FS		@3m		
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµ V/m	dB	dBu V/m	dB	_
4844.00	Н	Average	29.98	25.01	4.97	54.00	-24.02	_
4844.00	Н	Peak	41.90	36.93	4.97	74.00	-32.10	

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Operation Mode : 802.11n40 Test Date : 08/16/2016 Fundamental Frequency : 2422 MHz Temp. / Humi. : 21 deg C/62 RH **Operation Band : Tx CH LOW** Edward Test Engineer: EUT Pol. : E2 Plane Measurement Antenna Pol. : HORIZONTAL 97 80 FCC RSE-PK 3N Level [dBuV] FCC RSE-AV 3N 2 40 10000 15000 20000 1000 5000 2500@6500 Frequency [MHz] Freq. Note Decetor Actual Spectrum Factor Limit Margin

		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBu V/m	dB
4844.00	Н	Average	29.87	24.90	4.97	54.00	-24.13
4844.00	Н	Peak	41.48	36.51	4.97	74.00	-32.52

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Operation Mode : 802.11n40 Test Date : 08/16/2016 Fundamental Frequency : 2437 MHz Temp. / Humi. : 21 deg C/62 RH **Operation Band :** Tx CH MID Edward Test Engineer: EUT Pol. : E2 Plane Measurement Antenna Pol. : VERTICAL 97 80 FCC RSE-PK 3N Level [dBuV] FCC RSE-AV 3N 2 40 1000 10000 15000 20000 5000 2500@6500 Frequency [MHz] Freq. Note Decetor Actual Spectrum Factor Limit Margin

		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBu V/m	dB
4874.00	Н	Average	29.83	24.70	5.13	54.00	-24.17
4874.00	Н	Peak	42.57	37.44	5.13	74.00	-31.43

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Operation Mode : 802.11n40 Test Date : 08/16/2016 Fundamental Frequency : 2437 MHz Temp. / Humi. : 21 deg_C / 62 RH **Operation Band :** Tx CH MID Edward Test Engineer: EUT Pol. : E2 Plane Measurement Antenna Pol. : HORIZONTAL 97 80 FCC RSE-PK 3N Level [dBuV] FCC RSE-AV 3N

	 '	1 ¥					
10	000 5	000	10000	15000	20000	2500@650	0
			Frequency	[MHz]			
Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµ V/m	dB	dBu V/m	dB
4874.00	Н	Average	29.84	24.71	5.13	54.00	-24.16
4874.00	Н	Peak	41.23	36.10	5.13	74.00	-32.77

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

2

40

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Operation Mode: 802.11n40 Test Date : 08/16/2016 Fundamental Frequency : 2452 MHz Temp. / Humi. : 21 deg C/62 RH **Operation Band : Tx CH HIGH** Test Engineer: Edward EUT Pol. : E2 Plane Measurement Antenna Pol. : VERTICAL 97 80 FCC RSE-PK 3M Level [dBuV] FCC RSE-AV 3N 2 40 10000 15000 20000 1000 5000 2500@6500 Frequency [MHz] Freq. Note Decetor Actual Spectrum Factor Limit Margin Mode **Reading Level** FS @3m

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

QP/AV/PK

Average

Peak

dBµV/m

30.72

41.81

F/H/E/S

Η

Н

MHz

4904.00

4904.00

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dBµV/m

25.49

36.58

dBu V/m

54.00

74.00

dB

-23.28

-32.19

dB

5.23

5.23



4904.00

4904.00

Η

Н

Operation Mode: 802.11n40 Test Date : 08/16/2016 Fundamental Frequency : 2452 MHz Temp. / Humi. : 21 deg C/62 RH **Operation Band : Tx CH HIGH** Test Engineer: Edward EUT Pol. : E2 Plane Measurement Antenna Pol. : HORIZONTAL 97 80 FCC RSE-PK 3N Level [dBuV] FCC RSE-AV 3N 2 40 10000 15000 20000 1000 5000 2500@6500 Frequency [MHz] Freq. Note Decetor Actual Spectrum Factor Limit Margin Mode **Reading Level** FS @3m F/H/E/S QP/AV/PK dBµV/m dBu V/m MHz $dB\mu V/m$ dB dB

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

30.71

42.18

Average

Peak

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25.48

36.95

5.23

5.23

-23.29

-31.82

54.00

74.00



12 PEAK POWER SPECTRAL DENSITY

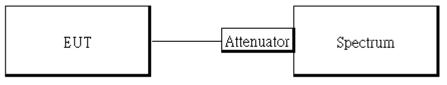
12.1 Standard Applicable

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

Conducted Emission Test Site							
EQUIPMENT MFR		MODEL	SERIAL	LAST	CAL DUE.		
TYPE		NUMBER	NUMBER	CAL.			
EXA Spectrum							
Analyzer	Agilent	N9030A	MY53120760	02/26/2016	02/25/2017		
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2016	01/01/2017		
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2016	01/01/2017		

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.
- 3. Set the span to 1.5 times the DTS channel bandwidth.
 - 4. Set the RBW = 3 kHz. & the VBW = 10 kHz
- 5. For defining Restricted Band Edge Limit: Set the RBW = 100kHz & VBW = 300 kHz.
- 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.

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12.5 Measurement Result

POWER DENSITY 802.11b MODE				POWER DENSITY 802.11g MODE			ODE
Frequency	RF Power	Maximum		Frequency	RF Power	Maximum	
(MHz)	Density	Limit	Result	(MHz)	Density	Limit	Result
(101112)	(dBm)	(dBm)		(101112)	(dBm)	(dBm)	
2412	-14.62	8.00	PASS	2412	-14.31	8.00	PASS
2437	-14.11	8.00	PASS	2437	-13.26	8.00	PASS
2462	-13.70	8.00	PASS	2462	-14.24	8.00	PASS
	POWER DENSITY 802.11n HT20 MODE POWER DENSITY 802.11n HT40 MODE						
POWER D			NODE	POWER DE		2.11h H I 40	MODE
Frequency	RF Power	Maximum		Frequency	RF Power	Maximum	
(MHz)	Density	Limit	Result	(MHz)	Density	Limit	Result
	(dBm)	(dBm)			(dBm)	(dBm)	
2412	-12.38	8.00	PASS	2422	-14.78	8.00	PASS
2437	-12.10	8.00	PASS	2437	-14.4	8.00	PASS
2462	-13.23	8.00	PASS	2452	-16.2	8.00	PASS

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Bandedge Limit

Bandedge Limit 802.11b MODE					
Frequency	RF Power	Bandedge			
(MHz)	Density	Limit			
(1011 12)	(dBm)	(dBm)			
2412	3.69	-16.31			
2462	4.66	-15.34			

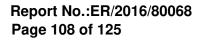
Bandedge Limit 802.11g MODE						
Frequency	RF Power	Bandedge				
(MHz)	Density	Limit				
(1011 12)	(dBm)	(dBm)				
2412	0.19	-19.81				
2462	0.45	-19.55				

Bandedge Limit 802.11 n20 MODE					
Frequency	RF Power	Bandedge			
(MHz)	Density	Limit			
(10172)	(dBm)	(dBm)			
2412	1.57	-18.43			
2462	-0.02	-20.02			

Bandedge Limit 802.11 n40 MODE						
Frequency	RF Power	Bandedge				
(MHz)	Density	Limit				
(10172)	(dBm)	(dBm)				
2422	-2.87	-22.87				
2452	-3.67	-23.67				

*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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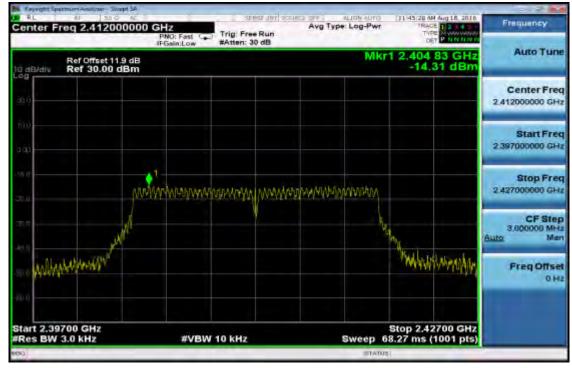


Power Spectral Density Test Plot (CH-High)



802.11g

Power Spectral Density Test Plot (CH-Low)

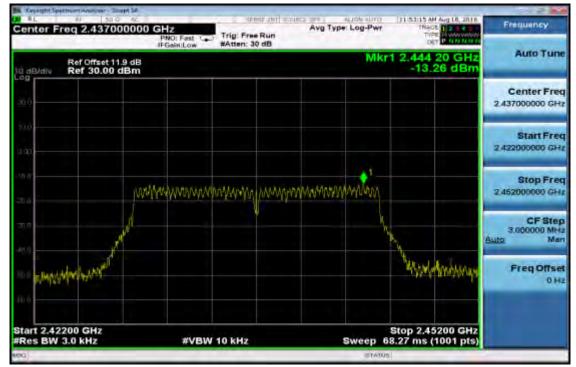


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Power Spectral Density Test Plot (CH-Mid)



Power Spectral Density Test Plot (CH-High)



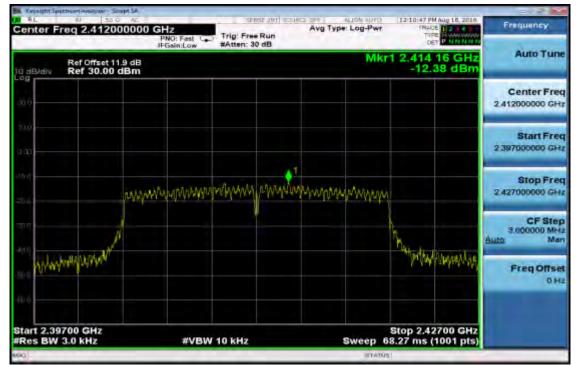
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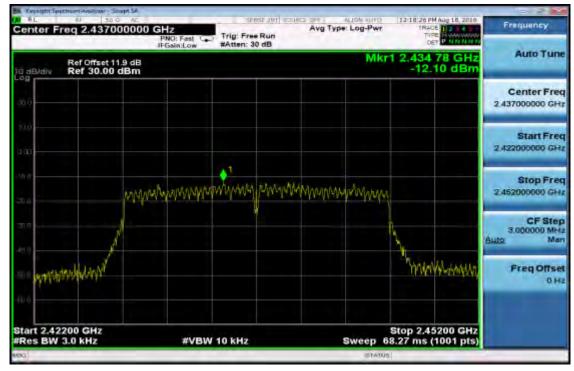
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802.11n HT20 Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)

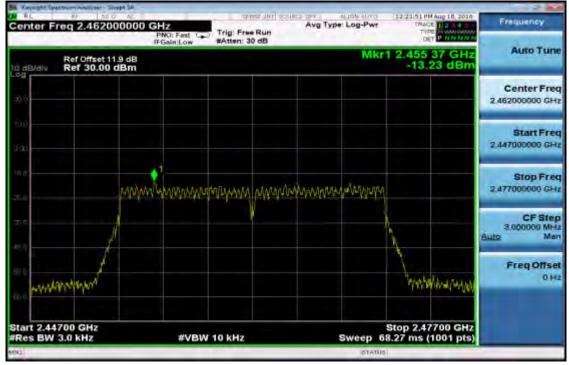


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Power Spectral Density Test Plot (CH-High)



802.11n HT40

Power Spectral Density Test Plot (CH-Low)

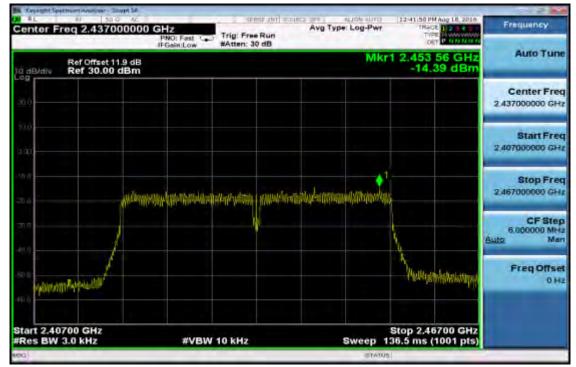


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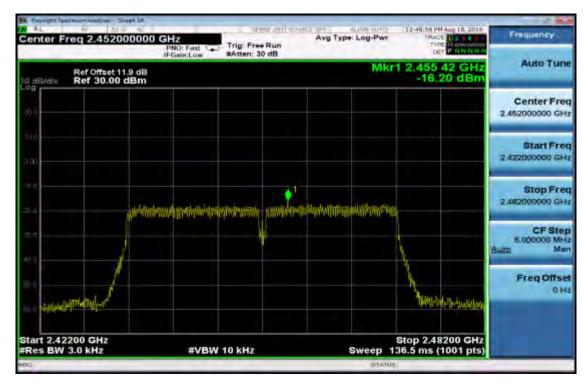
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Power Spectral Density Test Plot (CH-Mid)



Power Spectral Density Test Plot (CH-High)



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802.11b Power Spectral Density for Bandedge Limit (CH-Low)



Power Spectral Density for Bandedge Limit (CH-High)



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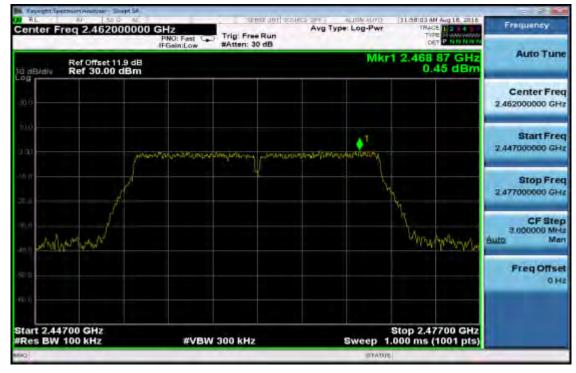
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802.11g Power Spectral Density for Bandedge Limit (CH-Low)

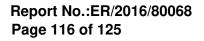


Power Spectral Density for Bandedge Limit (CH-High)



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802.11n HT20 Power Spectral Density for Bandedge Limit (CH-Low)

Center Freq 2.412000000	GHZ PNO: Fast Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr	12:10:41 PM Aug 18, 2016 TRADE 1 2 14 TYPE PURCEASE DET P NORTHERE	Frequency
Ref Offset 11.9 dB		Mkr1	2.409 12 GHz 1.57 dBm	Auto Tuni
a00				Center Free 2.412000000 GH
10.0 0.00	t and the second second second	word many maple and on the		Start Fre 2.397000000 GH
30.0			\	Stop Fre 2.427000000 GH
TT MANNALONA			Manufananan	CF Ste 3.000000 MH Auto Ma
-50 0				Freq Offse 0 H
Start 2.39700 GHz			Stop 2.42700 GHz	

Power Spectral Density for Bandedge Limit (CH-High)



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802.11n HT40 Power Spectral Density for Bandedge Limit (CH-Low)



Power Spectral Density for Bandedge Limit (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.

According to RSS-GEN 8.3

The applicant for equipment certification, as per RSP-100, must provide a list of all antenna types that may be used with the licence-exempt transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna.

Licence-exempt transmitters that have received equipment certification may operate with different types of antennas. However, it is not permissible to exceed the maximum equivalent isotropically radiated power (e.i.r.p.) limits specified in the applicable standard (RSS) for the licence-exempt apparatus.

Testing shall be performed using the highest gain antenna of each combination of licence-exempt transmitter and antenna type, with the transmitter output power set at the maximum level.9 When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna manufacturer.

13.2 Antenna Connected Construction

An embedded-in antenna design is used.

The antenna is designed as permanently attached and no consideration of replacement. Please see EUT photo and antenna spec. for details.

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14 MAXIMUM PERMISSIBLE EXPOSURE (MPE)

14.1 **Standard Applicable**

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

This is a Mobile device, the MPE is required.

According to §1.1310 and §2.1093 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

Frequency Range	Electric Field	Magnetic Field	Power Density	Averaging Time
(MHz)	Strength (V/m)	Strength (A/m)	(mW/cm ²)	(minute)
	Limits for Genera	al Population/Uncon	trolled Exposure	
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-15000	/	/	1.0	30

F = frequency in MHz

* = Plane-wave equipment power density

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Maximum Permissible Exposure (MPE) Evaluation

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802.11g Main								
СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit			RESULT
1	2412	6	21.69	147.57	1 Watt =	30.00	dBm	PASS
6	2437	6	21.56	143.22	1 Watt =	30.00	dBm	PASS
11	2462	6	21.47	140.28	1 Watt =	30.00	dBm	PASS
802.11	g Main							
СН	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	L	.imit		RESULT
1	2412	6	13.76	23.77	1 Watt =	30.00	dBm	PASS
6	2437	6	13.70	23.44	1 Watt =	30.00	dBm	PASS
11	2462	6	13.09	20.37	1 Watt =	30.00	dBm	PASS

MPE Prediction (802.11g 2412~2462)

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

 $S=PG/4\pi R^2$

Where: S = Power density P = Power input to antenna

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Distance to the center of radiation of the antenna

Max. output power including tune-up tolerancel:	13.76	(dBm)			
Max. output power including tune-up tolerancel:	23.768403	(mW)			
Duty cycle:	92.9	(%)			
Maximum Pav :	22.080846	(mW)			
Peak Antenna gain (Maximum):	-4.14	(dBi)			
Peak Antenna gain (linear):	0.3854784	(numeric)			
Prediction distance:	20	(cm)			
Prediction frequency:	2412	(MHz)			
MPE limit for uncontrolled exposure at prediction	1	(mW/cm^2)			
Power density at predication frequency at 20 (cm)	0.002	(mW/cm^2)			
Measurement Result					
The predicted power density level at 20 cm is 0.002 mW/cm2.					
This is below the uncontrolled exposure limit of 1	This is below the uncontrolled exposure limit of 1 mW/cm2 at 2412MHz.				

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802.11	n_HT20M Main							
СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit			RESULT
1	2412	MCS0	21.58	143.88	1 Watt =	30.00	dBm	PASS
6	2437	MCS0	20.78	1 19.67	1 Watt =	30.00	dBm	PASS
11	2462	MCS0	20.84	121.34	1 Watt =	30.00	dBm	PASS
802.11	n_HT20M Main							
сн	Frequency (MHz)	Data Rate	Avg. Ou tput Power (dBm)	Avg. Output Power (mW)	Limit			RESULT
1	2412	MCS0	13.75	23.71	1 Watt =	30.00	dBm	PASS
6	2437	MCS0	13.72	23.55	1 Watt =	30.00	dBm	PASS
11	2462	MCS0	12.89	19.45	1 Watt =	30.00	dBm	PASS

MPE Prediction (802.11n_HT20 2412~2462)

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

 $S=PG/4\pi R^2$

Where: S = Power density P = Power input to antenna

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Distance to the center of radiation of the antenna

Max. output power including tune-up tolerancel:	13.75	(dBm)			
Max. output power including tune-up tolerancel:	23.713737	(mW)			
Duty cycle:	92.15	(%)			
Maximum Pav :	21.852209	(mW)			
Peak Antenna gain (Maximum):	-4.14	(dBi)			
Peak Antenna gain (linear):	0.3854784	(numeric)			
Prediction distance:	20	(cm)			
Prediction frequency:	2412	(MHz)			
MPE limit for uncontrolled exposure at prediction	1	(mW/cm^2)			
Power density at predication frequency at 20 (cm)	0.002	(mW/cm^2)			
Measurement Result					
The predicted power density level at 20 cm is 0.002 mW/cm2.					
This is below the uncontrolled exposure limit of 1	mW/cm2 at	t 2412MHz.			

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802.11n_HT40M Main								
СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit		RESULT	
3	2422	MCS0	21.05	127.35	1 Watt =	30.00	dBm	PASS
6	2437	MCS0	21.21	132.13	1 Watt =	30.00	dBm	PASS
9	2452	MCS0	21.11	129.12	1 Watt =	30.00	dBm	PASS
802.11	n_HT40M Main							
СН	Frequency (MHz)	Data Rate	Avg. Ou tput Power (dBm)	Avg. Output Power (mW)	Limit			RESULT
3	2422	MCS0	13.76	23.77	1 Watt =	30.00	dBm	PASS
6	2437	MCS0	13.74	23.66	1 Watt =	30.00	dBm	PASS
9	2452	MCS0	13.16	20.70	1 Watt =	30.00	dBm	PASS

MPE Prediction (802.11n HT40 2422~2452)

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

 $S=PG/4\pi R^2$

Where: S = Power densityP = Power input to antenna

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Distance to the center of radiation of the antenna

Max. output power including tune-up tolerancel:	13.76	(dBm)			
Max. output power including tune-up tolerancel:	23.768403	(mW)			
Duty cycle:	85.68	(%)			
Maximum Pav :	20.364768	(mW)			
Peak Antenna gain (Maximum):	-4.14	(dBi)			
Peak Antenna gain (linear):	0.3854784	(numeric)			
Prediction distance:	20	(cm)			
Prediction frequency:	2422	(MHz)			
MPE limit for uncontrolled exposure at prediction	1	(mW/cm^2)			
Power density at predication frequency at 20 (cm)	0.002	(mW/cm^2)			
Measurement Result					
The predicted power density level at 20 cm is 0.002 mW/cm2.					
This is below the uncontrolled exposure limit of 1	mW/cm2 a	t 2422MHz.			

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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15 MAXIMUM PERMISSIBLE EXPOSURE (MPE)

15.1 Standard Applicable

According to RSS 102 March 19,2015 issue 5 §2.5.2 RF Exposure Evaluation

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

below 20 MHz₆ and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);

at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $22.48/f_{0.5}$ W (adjusted for tune-up tolerance), where *f* is in MHz; at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);

at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f_{0.6834}$ W (adjusted for tune-up tolerance), where *f* is in MHz;

This is a Mobile device, at which separation distance between the user and the device's antenna is 20cm. Therefore, section 2.5.2 shall be complied with

15.2 Maximum Permissible Exposure (MPE) Exemption

802.11 b:

Max. output power including tune-up tolerance:	14.79	(dBm)
Max. output power including tune-up tolerance:	30.13006	(mW)
Antenna gain (Peak):	-4.14	(dBi)
Maximum antenna gain:	0.3854784	(numeric)
Frenquency	2462	MHz
Limit	2.7219	W

Evaluation Result

The radiated power is 14.79 + -4.14 = 10.65 dBm(EIRP) = 11.614mW = 0.011614W that is less than or equal to 2.722W. Hence, following section 2.5.2 of RSS102 issue 5, RF exposure evaluation is no longer required.

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802.11 g:

Max. output power including tune-up tolerance:	13.76	(dBm)
Max. output power including tune-up tolerance:	23.768403	(mW)
Antenna gain (Peak):	-4.14	(dBi)
Maximum antenna gain:	0.3854784	(numeric)
Frenquency	2412	MHz
Limit	2.6840	W

Evaluation Result

The radiated power is 13.76 + -4.14 = 9.62 dBm(EIRP) = 9.162mW = 0.009162W that is less than or equal to 2.684W. Hence, following section 2.5.2 of RSS102 issue 5, RF exposure evaluation is no longer required.

802.11n HT20:

Max. output power including tune-up tolerance:	13.75	(dBm)
Max. output power including tune-up tolerance:	23.713737	(mW)
Antenna gain (Peak):	-4.14	(dBi)
Maximum antenna gain:	0.3854784	(numeric)
Frenquency	2412	MHz
Limit	2.6840	W

Evaluation Result

The radiated power is 13.75 + -4.14 = 9.61 dBm(EIRP) = 9.141mW = 0.009141W that is less than or equal to 2.684W. Hence, following section 2.5.2 of RSS102 issue 5, RF exposure evaluation is no longer required.

802.11 n HT40:

Max. output power including tune-up tolerance:	13.76	(dBm)
Max. output power including tune-up tolerance:	23.768403	(mW)
Antenna gain (Peak):	-4.14	(dBi)
Maximum antenna gain:	0.3854784	(numeric)
Frenquency		MHz
Limit	2.6916	W

Evaluation Result

The radiated power is 13.76 + -4.14 = 9.62 dBm(EIRP) = 9.162mW = 0.009162W that is less than or equal to 2.692W. Hence, following section 2.5.2 of RSS102 issue 5, RF exposure evaluation is no longer required.

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