

# **ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT**

# INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C AND RSS 247 REQUIREMENT

OF

**Product Name: Mobile Computer** 

**Brand Name:** Honeywell FCC Model No.: **EDA50-011** 

**Model Difference:** N/A

FCC ID: HD5-EDA50011

IC: 1693B-EDA50011

Report No.: ER/2016/A0147

**Issue Date:** Jan. 10, 2017

**FCC Rule Part:** §15.247, Cat: DTS

IC Rule: RSS-247 issue 2 Feb 2017

**FCC Prepared for: Honeywell International Inc** 

**Honeywell Sensing & Productivity Solutions** 

9680 OLD BAILES RD FORT MILL SC 29707 UNITED

**STATES** 

SGS Taiwan Ltd. Prepared by:

**Electronics & Communication Laboratory** 

No.134, Wu Kung Road, New Taipei Industrial Park,

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# VERIFICATION OF COMPLIANCE

**FCC Applicant:** Honeywell International Inc

Honeywell Sensing & Productivity Solutions

9680 OLD BAILES RD FORT MILL SC 29707 UNITED STATES

**Product Name:** Mobile Computer

**Brand Name:** Honeywell Model No.: EDA50-011

**Model Difference:** N/A

FCC ID: HD5-EDA50011 IC: 1693B-EDA50011 **Report Number:** ER/2016/A0147 Nov. 02, 2016 Date of test:

Mar. 22, 2016 (Conduction)

Date of EUT Received: Dec. 04, 2015

# We hereby certify that:

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

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

Test By:	Curry Chen	Date:	Jan. 10, 2017	
Prepared By:	Curry Chen / Engineer  Allen (sai	Date:	Jan. 10, 2017	
Approved By:	Allen Tsai / Engineer  Lim Chang / Asst Manager	Date:	Jan. 10, 2017	

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# **Revision History**

Report Number	Revision	Description	Issue Date
ER/2016/A0147	Rev.00	Initial creation of document	Jan. 10, 2017

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# **GENERAL INFORMATION**

#### 1.1 Product description

#### General:

general.			
Product Name:	Mobile Computer		
Brand Name:	Honeywell		
Model No.:	EDA50-011		
Model Difference:	N/A		
Product SW/HW version:	N/A / N/A		
Radio SW/HW version:	N/A / N/A		
Test SW Version:	N/A		
RF power setting in TEST SW:	/: N/A		
Data Cable (USB):	Model No.:CBL-500-120-S00-03; Supplier: PRiMAX		
Cradle (Optional):	Model No.:EDA50-HB; Supplier: N/A		
	3.8Vdc from Rechargeable Li-ion Battery or 5Vdc from AC/DC Adapter		
Power Supply:	Battery: Model No.: BAT-DEA50US; Supplier: SCUD		
	Adapter: Model No.: ADS-12B-06 05010E; Supplier: HOHOR		

#### WLAN 2.4GHz:

Wi-Fi	Frequency Range	Channels	Rated Power	Type of Emission 99%	Modulation Technology		
11b/g	2412-2462	11	b: 14.46dBm g: 18.26dBm	b:14M3G1D g:16M6D1D	DSSS, OFDM		
11n	HT20 2412-2462	11	HT20:19.07dBm	HT20:17M8D1D	OFDM		
11n	HT40 2422-2452	9	HT40:19.34dBm	HT40:36M5D1D	OFDM		
Antenna Designation:		PIFA Antenna, Antenna Gain: 2.55dBi					
Modulati	on type:		CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM				
802.11 b: 1/2/5.5/11 Mbps 802.11 g: 6/9/12/18/24/36/48/54 Mb 802.11 n_20MHz: 6.5 - 72.2Mbps 802.11 n_40MHz: 13.5 - 150.0Mbps			s				

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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 2 Feb 2017

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-5

#### 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

### 2.1 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.

#### **Radiated Emissions** 2.3.2

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 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 and attenuator. offset = RF cable loss (0.5dB)+ attenuation factor(10dB)=10.5dB)

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# 2.5 Configuration of Tested System Fig. 2-1 Radiated Emission Conducted (Antenna Port) Configuration



Fig 2-2 Conducted (AC power line) Configuration

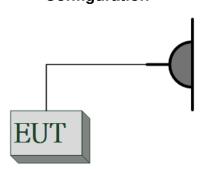


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
2	Notebook	Lenovo	L412	LR-957X7	Shielded	Un-shielded

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#### SUMMARY OF TEST RESULTS

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 §8.3	Antenna Requirement	Compliant

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#### **DESCRIPTION OF TEST MODES**

#### 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		

#### 7 channels are provided for 802.11n HT40

	<del>-</del>		
CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422 MHz	7	2442 MHz
4	2427 MHz	8	2447 MHz
5	2432 MHz	9	2452 MHz
6	2437 MHz		

#### 4.2 The Worst Test Modes and Channel Details

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

#### **RADIATED EMISSION TEST:**

	RADIATED EMISSION TEST (BELOW 1 GHz)							
MODE	MODE AVAILABLE TESTED MODULATION DATA RATE (Mbps)							
802.11g	1 to 11	1,6,11	OFDM	6				

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

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#### 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)			
802.11b	1 to 11	1, 6, 11	DSSS	1			
802.11g	1 to 11	1, 6, 11	OFDM	6			
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	MCS 0			

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#### **MEASUREMENT UNCERTAINTY**

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

#### Radiated Spurious Emission:

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

	9kHz – 30MHz: +/- 2.87 dB
	30MHz - 167MHz: +/- 4.22dB
Measurement uncertainty	167MHz -500MHz: +/- 3.44dB
(Polarization : <b>Horizontal</b> )	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

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

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#### CONDUCTED EMISSION TEST

### 6.1 Standard Applicable

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

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

#### Note

### 6.2 Measurement Equipment Used

Conducted Emission Test Site								
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.			
EMI Test Receiver	R&S	ESCI7	100760	05/04/2015	05/03/2016			
LISN	SCHWARZB ECK	NSLK 8127	8127-649	05/15/2015	05/14/2016			
LISN	FCC	FCC-LISN-50/250-2 5-2-01	4034	03/12/2016	03/11/2017			
Coaxial Cables	N/A	WK CE Cable	N/A	11/26/2015	11/25/2016			

#### 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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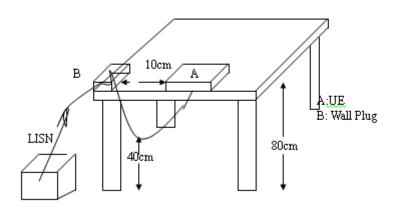
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<sup>1.</sup> The lower limit shall apply at the transition frequencies

<sup>2.</sup> The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.



### 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

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

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

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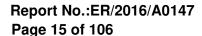
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#### AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation mode	Test By:	Tin
Temperature:	20		

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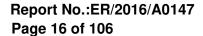
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Site Conduction Room

Limit: FCC Class B Conduction(QP)

Mode: Operation

Note: Adapter: ADS-12B-06

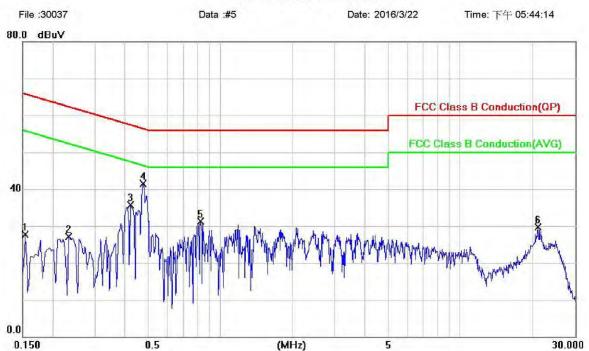
Phase: Power: AC 120V/60Hz

Temperature:

20 ℃

Humidity:

# Conducted Emission



Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
	0.1540	27.54	0.07	27.61	65.78	-38.17	peak	
1	0.2340	27.07	0.08	27.15	62.31	-35.16	peak	. —
	0.4220	35.67	0.10	35.77	57.41	-21.64	peak	
*	0.4780	41.47	0.10	41.57	56.37	-14.80	peak	1 ==
-	0.8300	31.10	0.11	31.21	56.00	-24.79	peak	
	20.9860	29.23	0.46	29.69	60.00	-30.31	peak	1
		MHz 0.1540 0.2340 0.4220 * 0.4780 0.8300	Mk. Freq. Level  MHz dBuV  0.1540 27.54  0.2340 27.07  0.4220 35.67  * 0.4780 41.47  0.8300 31.10	Mk.         Freq.         Level         Factor           MHz         dBuV         dB           0.1540         27.54         0.07           0.2340         27.07         0.08           0.4220         35.67         0.10           *         0.4780         41.47         0.10           0.8300         31.10         0.11	Mk.         Freq.         Level         Factor         ment           MHz         dBuV         dB         dBuV           0.1540         27.54         0.07         27.61           0.2340         27.07         0.08         27.15           0.4220         35.67         0.10         35.77           *         0.4780         41.47         0.10         41.57           0.8300         31.10         0.11         31.21	Mk.         Freq.         Level         Factor         ment         Limit           MHz         dBuV         dB dBuV         dBuV         dBuV           0.1540         27.54         0.07         27.61         65.78           0.2340         27.07         0.08         27.15         62.31           0.4220         35.67         0.10         35.77         57.41           *         0.4780         41.47         0.10         41.57         56.37           0.8300         31.10         0.11         31.21         56.00	Mk.         Freq.         Level         Factor         ment         Limit         Over           MHz         dBuV         dB         dBuV         dBuV         dB           0.1540         27.54         0.07         27.61         65.78         -38.17           0.2340         27.07         0.08         27.15         62.31         -35.16           0.4220         35.67         0.10         35.77         57.41         -21.64           *         0.4780         41.47         0.10         41.57         56.37         -14.80           0.8300         31.10         0.11         31.21         56.00         -24.79	Mk.         Freq.         Level         Factor         ment         Limit         Over           MHz         dBuV         dB         dBuV         dBuV         dB         Detector           0.1540         27.54         0.07         27.61         65.78         -38.17         peak           0.2340         27.07         0.08         27.15         62.31         -35.16         peak           0.4220         35.67         0.10         35.77         57.41         -21.64         peak           *         0.4780         41.47         0.10         41.57         56.37         -14.80         peak           0.8300         31.10         0.11         31.21         56.00         -24.79         peak

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#### **DUTY CYCLE OF TEST SIGNAL**

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle.

All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

#### Formula:

Duty Cycle = Ton / (Ton+Toff)

#### **Measurement Procedure:**

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

# **Duty Cycle:**

	Duty Cycle (%)	Duty Factor (dB)
802.11b	98.00	0.09
802.11g	89.12	0.50
802.11n_20	88.29	0.54
802.11n_40	79.29	1.01

Duty Cycle Factor:  $10 * \log(1/0.98) = 0.09$ Duty Cycle Factor:  $10 * \log(1/0.8912) = 0.5$ Duty Cycle Factor:  $10 * \log(1/0.8829) = 0.54$ Duty Cycle Factor:  $10 * \log(1/0.7929) = 1.01$ 

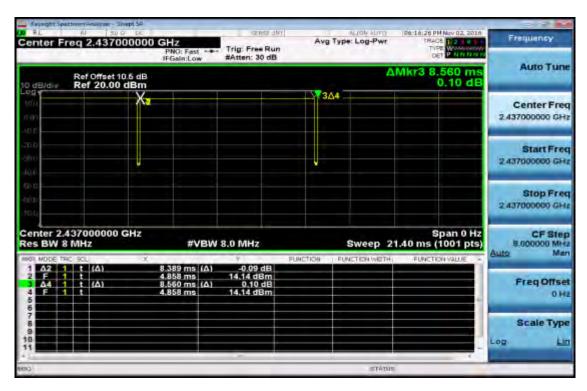
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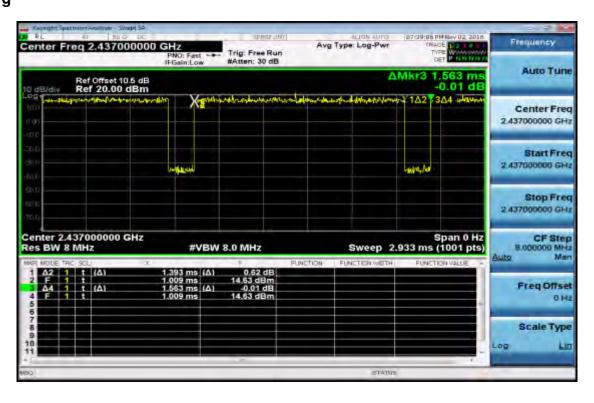
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# 7.1 DUTY CYCLE TEST SIGNAL Measurement Result 802.11 b



### 802.11 g



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### 802.11 n\_20 MHz



802.11 n 40 MHz

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#### PEAK OUTPUT POWER MEASUREMENT

#### 8.1 Standard Applicable

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

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

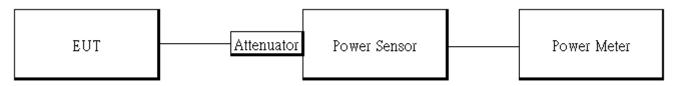
In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of Antenna exceeds 6dBi.

# 8.2 Measurement Equipment Used

Conducted Emission Test Site									
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.				
Power Meter	Anritsu	ML2495A	1005007	12/09/2015	12/08/2016				
Power Sensor	Anritsu	MA2411B	917032	12/09/2015	12/08/2016				
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				

#### 8.3 Test Set-up

Power Meter:



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#### 8.4 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 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	14.46	27.93	1 Watt =	30.00	dBm	PASS
6	2437	1	14.42	27.67	1 Watt =	30.00	dBm	PASS
11	2462	1	14.37	27.35	1 Watt =	30.00	dBm	PASS
802.11	b Main							
СН	Frequency (MHz)	Data Rate	Max. Output include tune up tolerance Power (dBm)	Max. Output include tune up tolerance Power (mW)	I LIMIT I		RESULT	
1	2412	1	11.81	15.17	1 Watt =	30.00	dBm	PASS
6	2437	1	11.79	15.10	1 Watt =	30.00	dBm	PASS
11	2462	1	11.92	15.56	1 Watt =	30.00	dBm	PASS

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802.11	802.11g Main										
СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit			RESULT			
1	2412	6	18.23	66.53	1 Watt =	30.00	dBm	PASS			
6	2437	6	18.26	66.99	1 Watt =	30.00	dBm	PASS			
11	2462	6	17.29	53.58	1 Watt =	30.00	dBm	PASS			
802.11	g Main										
СН	Frequency (MHz)	Data Rate	Max. Output include tune up tolerance Power (dBm)	Max. Output include tune up tolerance Power (mW)	Limit			RESULT			
1	2412	6	11.91	15.52	1 Watt =	30.00	dBm	PASS			
6	2437	6	11.84	15.28	1 Watt =	30.00	dBm	PASS			
11	2462	6	9.08	8.09	1 Watt =	30.00	dBm	PASS			

802.11	n_HT20M Main							
СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	l	_imit		RESULT
1	2412	MCS0	18.16	65.46	1 Watt =	30.00	dBm	PASS
6	2437	MCS0	19.07	80.72	1 Watt =	30.00	dBm	PASS
11	2462	MCS0	16.41	43.75	1 Watt =	30.00	dBm	PASS
802.11	n_HT20M Main		_					
			Max. Output	Max. Output				
СН	Frequency	Data	include tune up	include tune up	ı	_imit		RESULT
0	(MHz)	Rate	tolerance Power	tolerance Power	•			IILOOL I
			(dBm)	(mW)				
1	2412	MCS0	10.58	11.43	1 Watt =	30.00	dBm	PASS
6	2437	MCS0	11.82	15.21	1 Watt =	30.00	dBm	PASS
11	2462	MCS0	7.85	6.10	1 Watt =	30.00	dBm	PASS

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802.11	n_HT40M Main							
СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit		RESULT	
3	2422	MCS0	18.76	75.16	1 Watt =	30.00	dBm	PASS
6	2437	MCS0	19.34	85.90	1 Watt =	30.00	dBm	PASS
9	2452	MCS0	17.98	62.81	1 Watt =	30.00	dBm	PASS
802.11	n_HT40M Main							
СН	Frequency (MHz)	Data Rate	Max. Output include tune up tolerance Power (dBm)	Max. Output include tune up tolerance Power (mW)	ı	_imit		RESULT
3	2422	MCS0	10.5	11.22	1 Watt =	30.00	dBm	PASS
6	2437	MCS0	11.85	15.31	1 Watt =	30.00	dBm	PASS
9	2452	MCS0	9.33	8.57	1 Watt =	30.00	dBm	PASS

#### Note:

dB for SISO mode offset 10.50

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<sup>\*</sup> Note: The duty cycle factor is compensated to obtain the maximum value of measurement in average.



#### 6dB & 99% BANDWIDTH MEASUREMENT

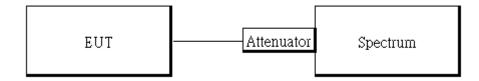
#### 9.1 Standard Applicable

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

#### 9.2 Measurement Equipment Used

Conducted Emission Test Site							
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.		
Spectrum Analyzer	Agilent	N9010A	MY50420195	12/21/2015	12/20/2016		
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		

#### 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

#### 802 11h Main

802 11a Main

OUZ.11D Walli							
Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result	Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2412	9587	> 500	PASS	2412	15330	> 500	PASS
2437	10110	> 500	PASS	2437	16030	> 500	PASS
2462	9553	> 500	PASS	2462	16320	> 500	PASS

#### 802.11 n HT20 Main

### 802.11 n HT40 Main

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result	Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2412	16360	> 500	PASS	2422	35050	> 500	PASS
2437	16660	> 500	PASS	2437	35680	> 500	PASS
2462	17560	> 500	PASS	2452	35720	> 500	PASS

802.11b Main		802.11g Main	
Frequency	99%Bandwidth	Frequency	99%Bandwidth
(MHz)	(MHz)	(MHz)	(MHz)
2412	14.072	2412	16.579
2437	14.336	2437	16.419
2462	13.856	2462	16.486
802.11n_HT20	M Main	802.11n_HT40	M Main
802.11n_HT20 Frequency	M Main 99%Bandwidth	802.11n_HT40 Frequency	M Main 99%Bandwidth
	1	_	
Frequency	99%Bandwidth	Frequency	99%Bandwidth
Frequency (MHz)	99%Bandwidth (MHz)	Frequency (MHz)	99%Bandwidth (MHz)

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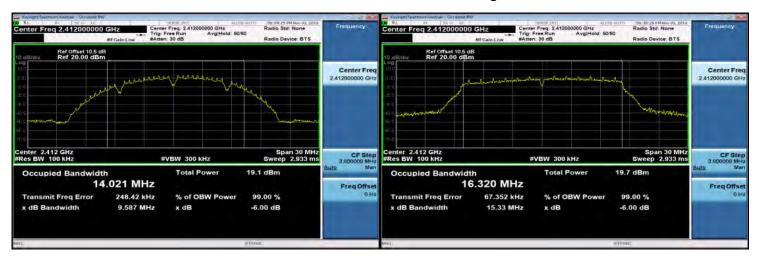
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<sup>\*</sup>Refer to next page for plots



#### 6dB BW 802.11b CH-Low

# 6dB BW 802.11g CH-Low



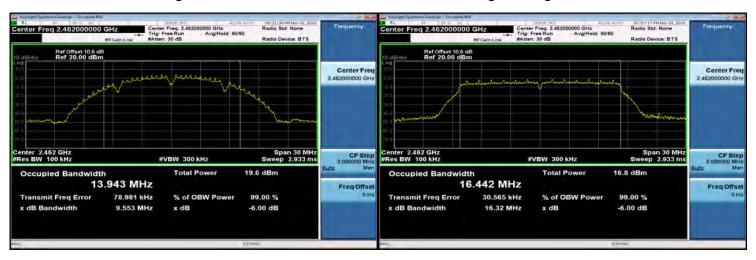
### 6dB BW 802.11b CH-Mid

# 6dB BW 802.11g CH-Mid



#### 6dB BW 802.11b CH-High

# 6dB BW 802.11g CH-High

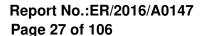


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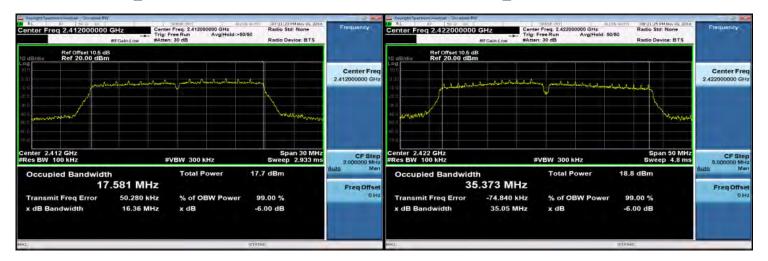
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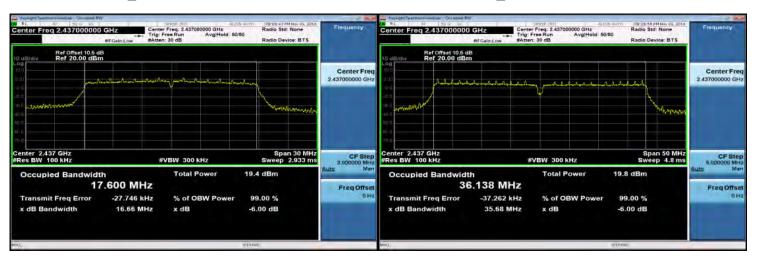
# 6dB BW 802.11n HT20M CH-Low

# 6dB BW 802.11n HT40M CH-Low



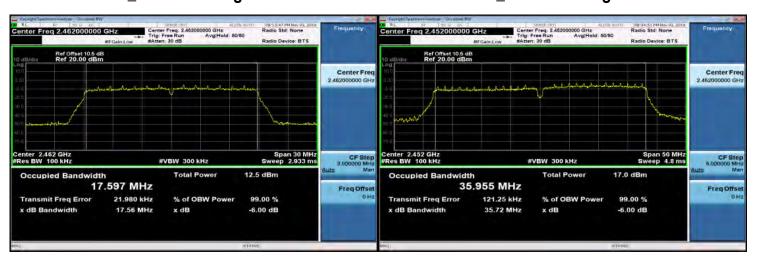
# 6dB BW 802.11n HT20M CH-Mid

# 6dB BW 802.11n HT40M CH-Mid



#### 6dB BW 802.11n HT20M CH-High

## 6dB BW 802.11n HT40M CH-High



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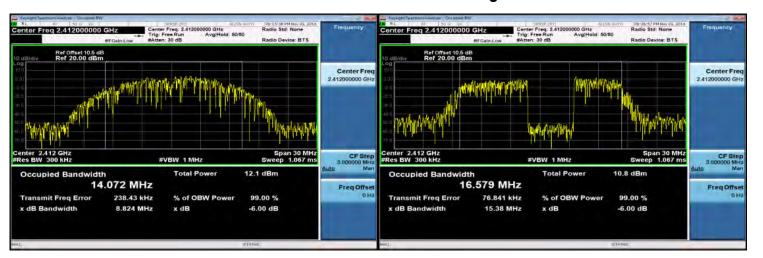
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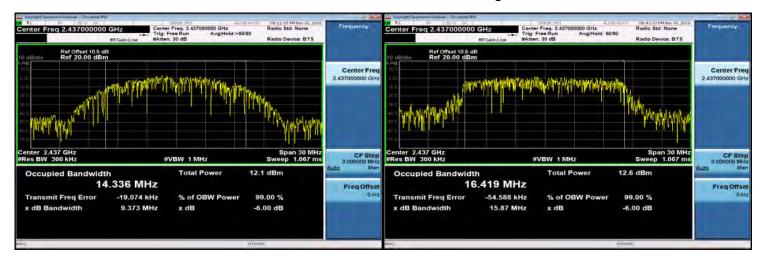
#### 99% BW 802.11b CH-Low

# 99% BW 802.11g CH-Low



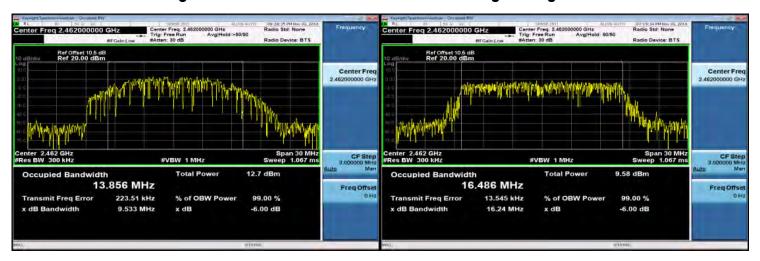
#### 99% BW 802.11b CH-Mid

# 99% BW 802.11g CH-Mid



# 99% BW 802.11b CH-High

# 99% BW 802.11g CH-High

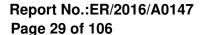


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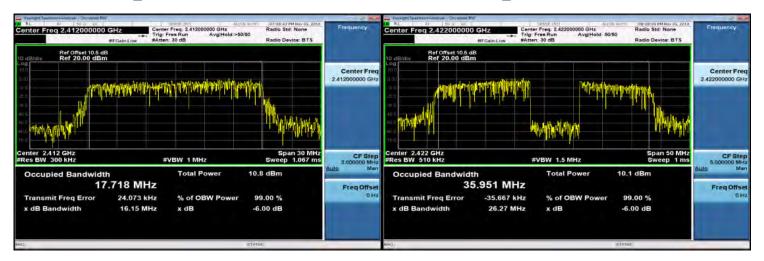
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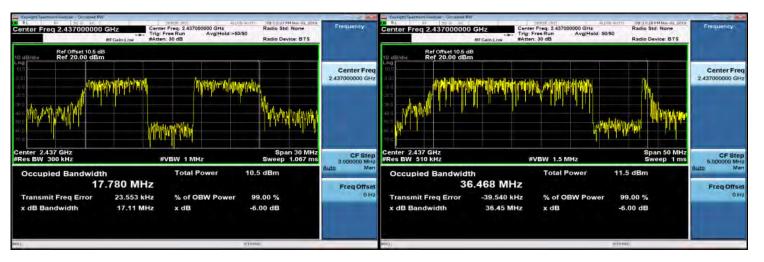
# 99% BW 802.11n HT20M CH-Low

### 99% BW 802.11n HT40M CH-Low



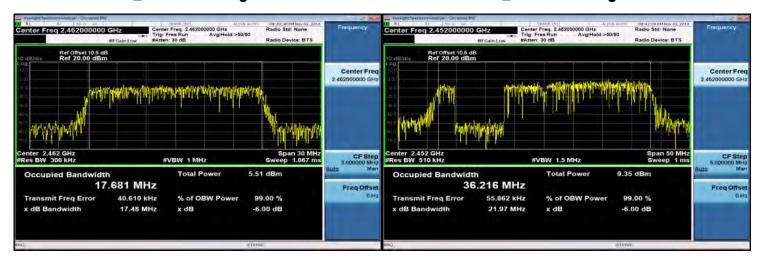
# 99% BW 802.11n HT20M CH-Mid

# 99% BW 802.11n HT40M CH-Mid



#### 99% BW 802.11n HT20M CH-High

# 99% BW 802.11n HT40M CH-High



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#### CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

#### 10.1 **Standard Applicable**

As per KDB 558074 D01 11.1 a)

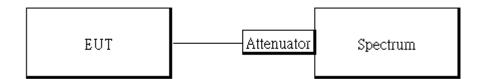
If the maximum peak conducted output power procedure was used to demonstrate compliance as described in 9.1, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz (i.e., 20 dBc).

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 Table 6, must also comply with the radiated emission limits specified in §15.209(a) & RSS-Gen §8.9 Table4 &5.

#### 10.2 **Measurement Equipment Used**

Conducted Emission Test Site								
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.			
Spectrum Analyzer	Agilent	N9010A	MY50420195	12/21/2015	12/20/2016			
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			

#### **Test SET-UP** 10.3



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#### 10.4 Measurement Procedure

#### **Band Edge Limit Calculation:**

- 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 = 100kHz & VBW = 300 kHz.
- 5. Detector = peak.
- 6. Sweep time = auto couple.
- 7. Trace mode = max hold.
- 8. Allow trace to fully stabilize.
- 9. Use the peak marker function to determine the maximum amplitude level.

### **Conducted Band Edge:**

- 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.

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#### 10.5 **Measurement Result**

Banded	ge Limit 802	.11b MODE	Bandedge Limit 802.11g MODE			
Frequency (MHz)	RF Power Density (dBm)	Bandedge Limit (dBm)	Frequency (MHz)	RF Power Density (dBm)	Bandedge Limit (dBm)	
2412 2462	3.33 4.00	-16.67 -16.00	2412 2462	2.63 -1.44	-17.37 -21.44	
Bandedg	e Limit 802.	11n20 MODE	Bandedge Limit 802.11n40 MODE			
Frequency (MHz)	RF Power Density (dBm)	Bandedge Limit (dBm)	Frequency (MHz)	RF Power Density (dBm)	Bandedge Limit (dBm)	
0.410	0.50	-19.50	2422	-0.34	-20.34	
2412	0.50	10.00		0.0.		

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#### 802.11b PSD for Bandedge limit(CH-Low)



### 802.11b PSD FOR BANDEDGE LIMIT (CH-High)



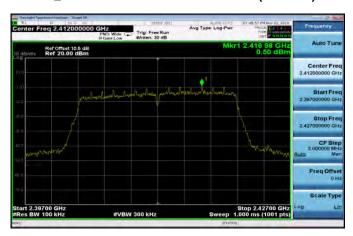
## 802.11g PSD FOR BANDEDGE LIMIT(CH-Low)



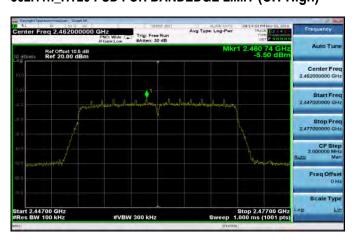
# 802.11g PSD FOR BANDEDGE LIMIT (CH-High)



#### 802.11n\_HT20 PSD FOR BANDEDGE LIMIT (CH-Low)



#### 802.11n\_HT20 PSD FOR BANDEDGE LIMIT (CH-High)



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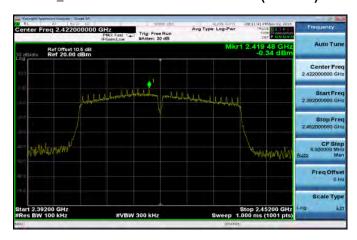
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#### 802.11n\_HT40 PSD FOR BANDEDGE LIMIT (CH-Low)



#### 802.11n\_HT40 PSD FOR BANDEDGE LIMIT (CH-High)



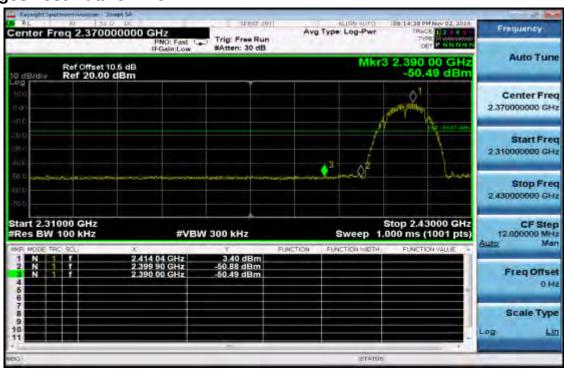
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# 802.11b **Band Edges Test Data CH-Low**



# **Band Edges Test Data CH-High**



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# 802.11q **Band Edges Test Data CH-Low**



# **Band Edges Test Data CH-High**



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



**Band Edges Test Data CH-High** 

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



### **Band Edges Test Data CH-High**



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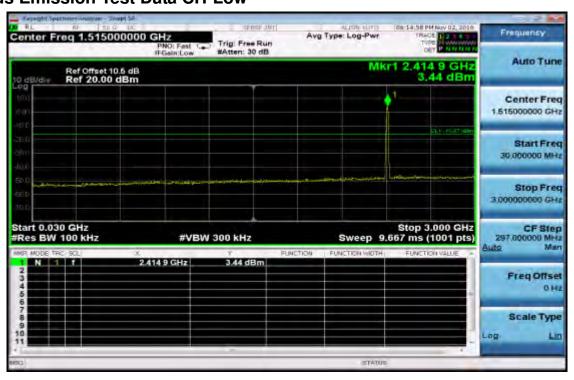
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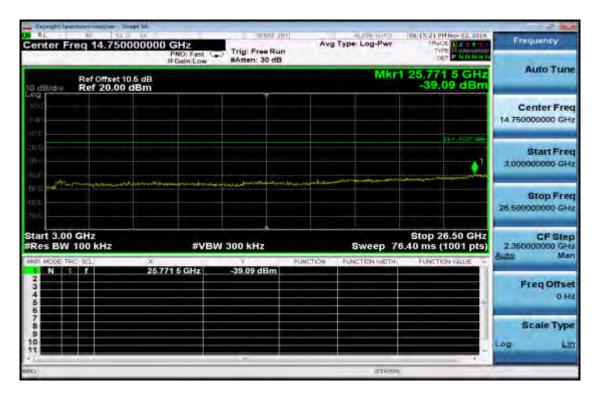
f (886-2) 2298-0488

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



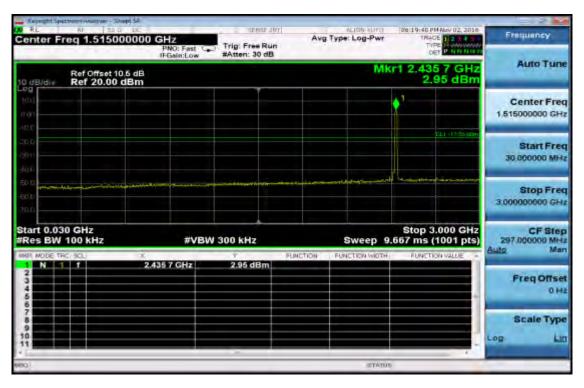


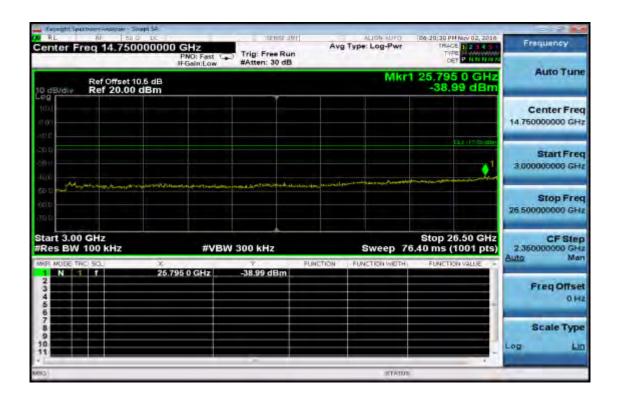
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### **Spurious Emission Test Data CH-Mid**





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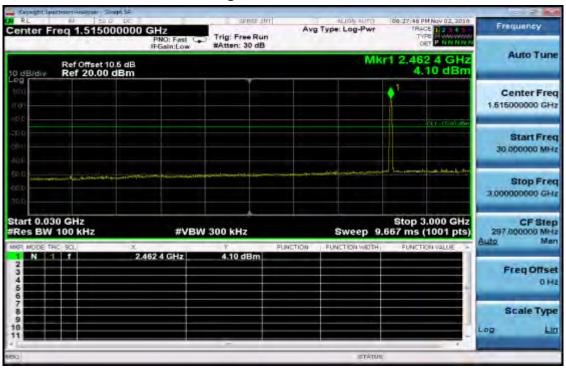
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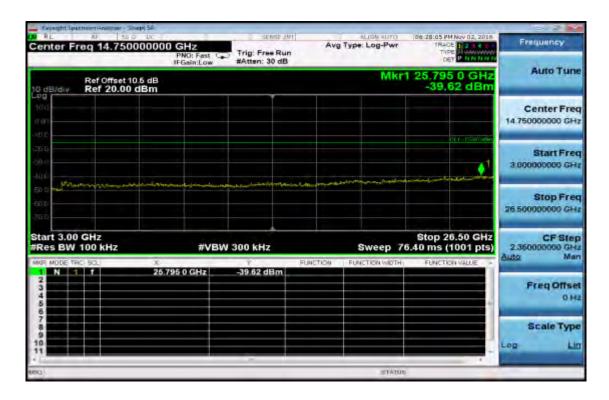
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### **Spurious Emission Test Data CH-High**



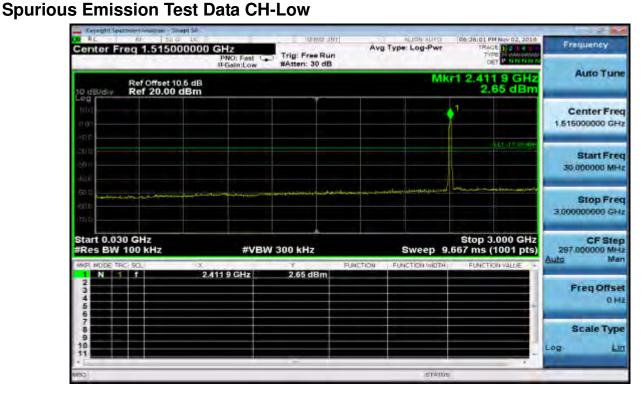


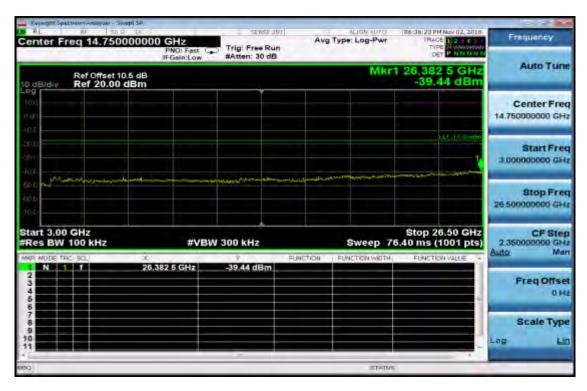
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# 802.11g





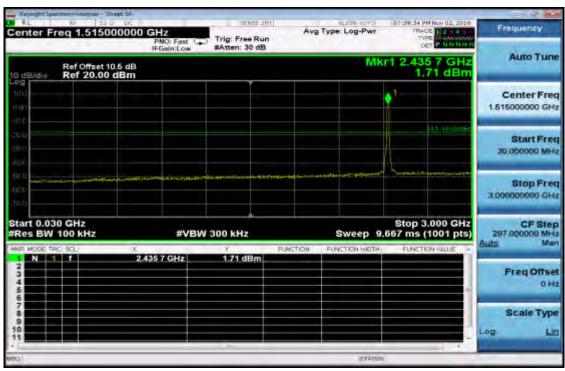
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

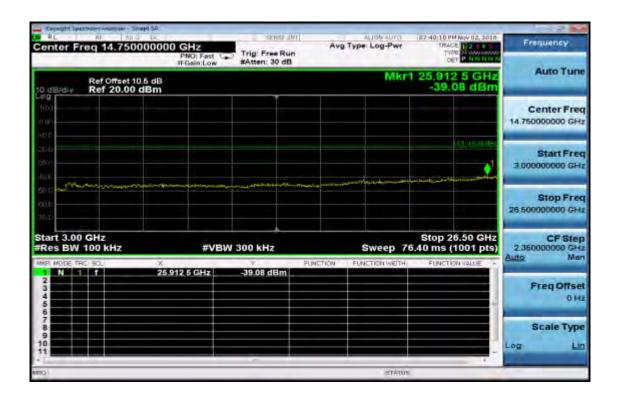
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### **Spurious Emission Test Data CH-Mid**



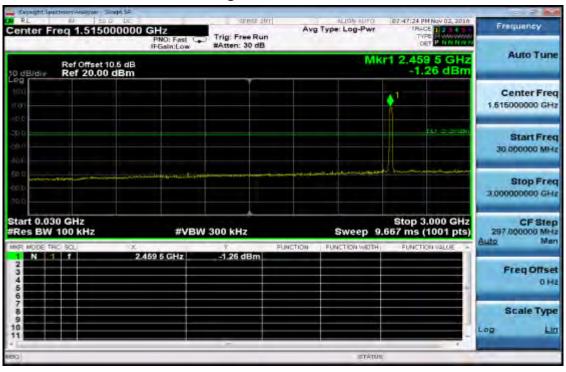


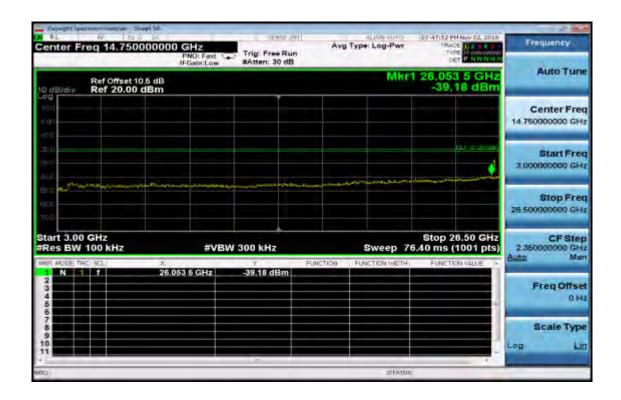
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### **Spurious Emission Test Data CH-High**





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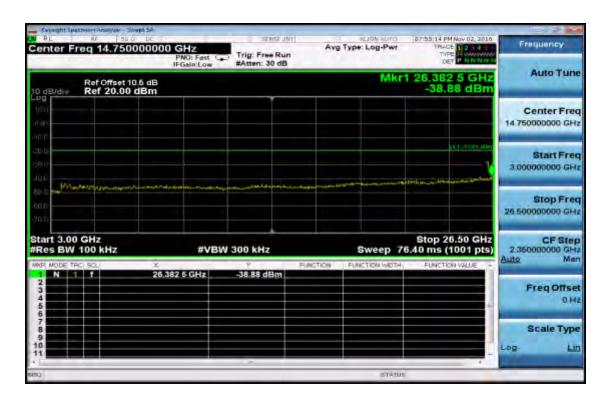
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### 802.11n HT20

### **Spurious Emission Test Data CH-Low**





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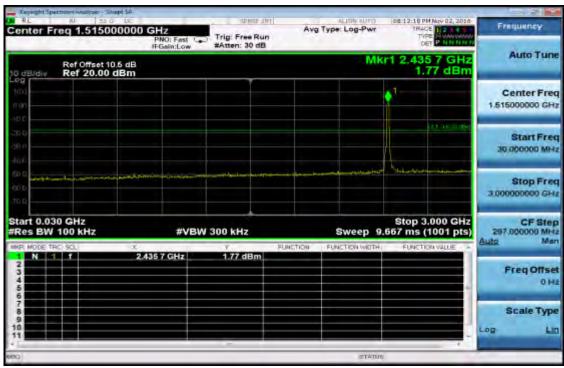
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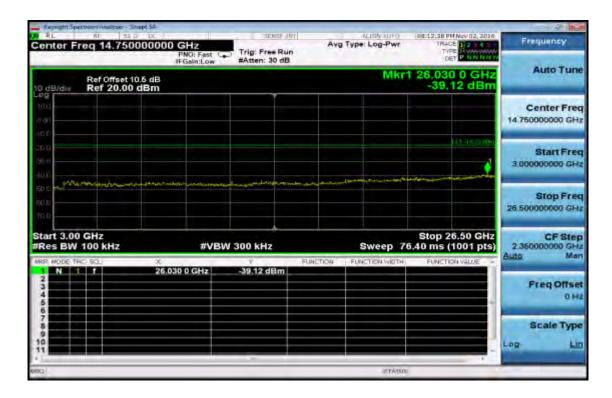
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### **Spurious Emission Test Data CH-Mid**





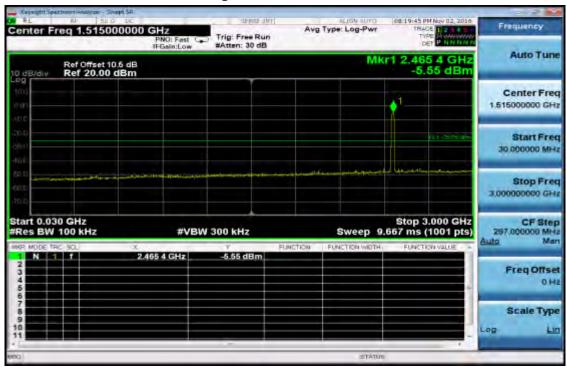
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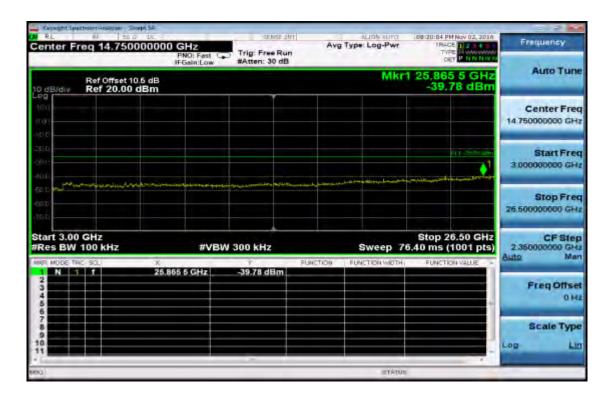
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### **Spurious Emission Test Data CH-High**





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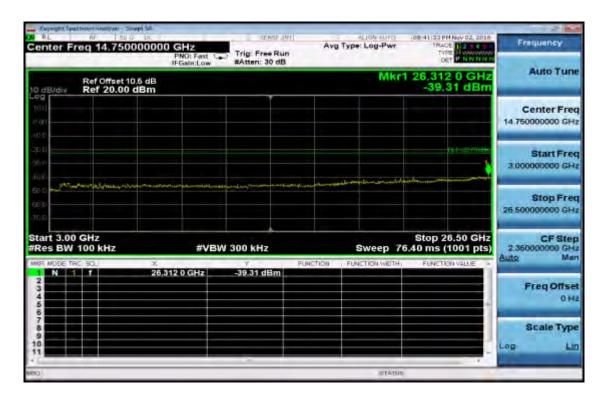
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## 802.11n HT40

### **Spurious Emission Test Data CH-Low**





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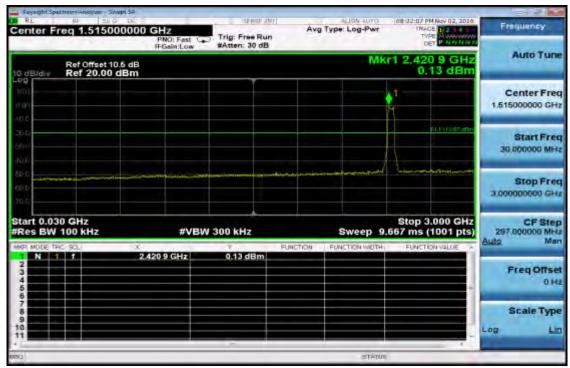
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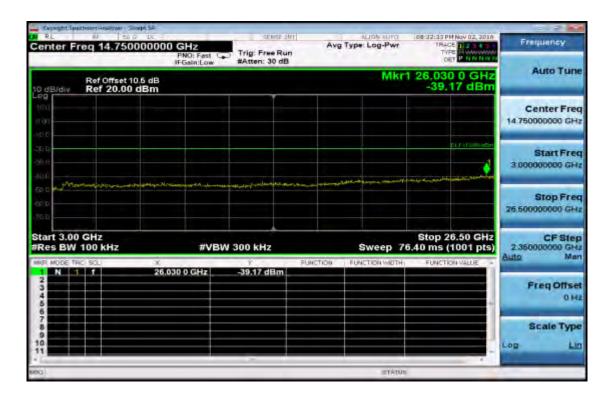
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### **Spurious Emission Test Data CH-Mid**



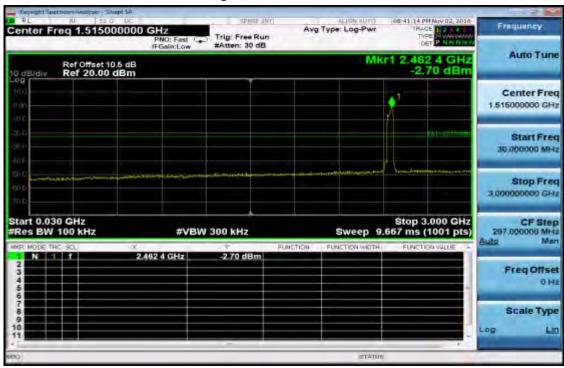


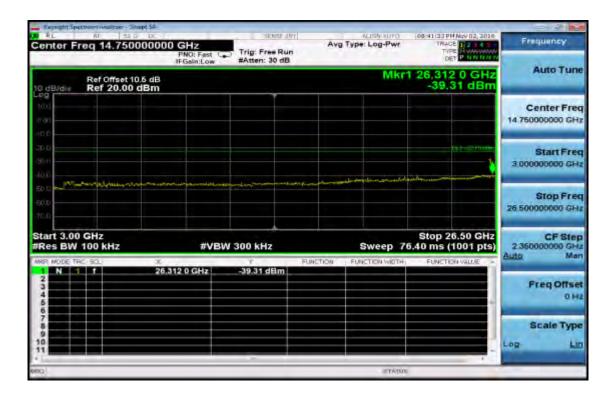
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### **Spurious Emission Test Data CH-High**





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### 11 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT

#### **Standard Applicable** 11.1

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 §8.10 Table 6 limit as below.

And according to §15.33(a) (1) & RSS-Gen §8.9 Table 4 & 5, 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 Chambe	r		
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
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	09/20/2016	09/19/2017
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/20/2015	12/19/2016
Horn Antenna	Schwarzbeck	BBHA9120D	1441	08/01/2016	07/31/2017
Pre-Amplifier	Agilent	8447D	2944A07676	01/06/2016	01/05/2017
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	980038	01/06/2016	01/05/2017
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	01/06/2016	01/05/2017
3m Site NSA	SGS	966 chamber	N/A	07/01/2016	06/30/2017
Low Loss Cable	Huber Suhner	966 TX	1	01/06/2016	01/05/2017
Horn Antenna	Schwarzbeck	BBHA9170	184	12/13/2015	12/12/2016
Pre-Amplifier	EMC Instruments Corp.	EMC184045	980135	01/06/2016	01/05/2017

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

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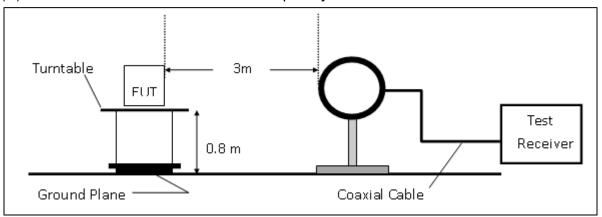
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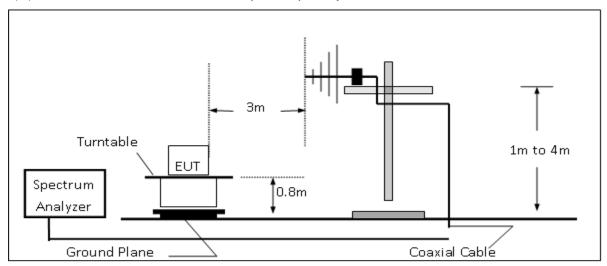


#### 11.3 **Test SET-UP**

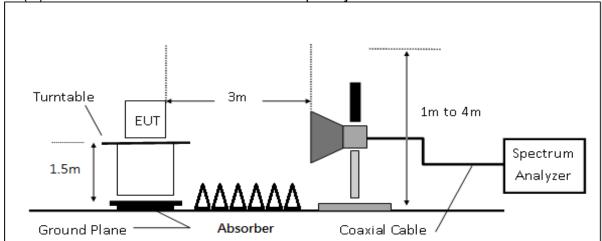
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



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



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



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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 ≥ 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	S .	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

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

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

### Note:

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

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

### 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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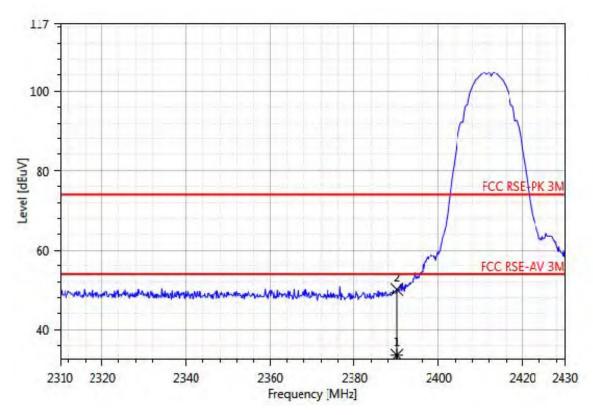


### Radiated Band Edge Measurement Result (802.11b)

Operation Mode: 802.11b Test Date: 11/02/2016

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

Operation Band: Bandedge CH LOW Test Engineer: Edward EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin	
		Mode	Reading Level	FS		@3m		
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB	
2390.00	Е	Average	33.60	35.34	-1.74	54.00	-20.40	
2390.00	Ε	Peak	50.02	51.76	-1.74	74.00	-23.98	

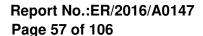
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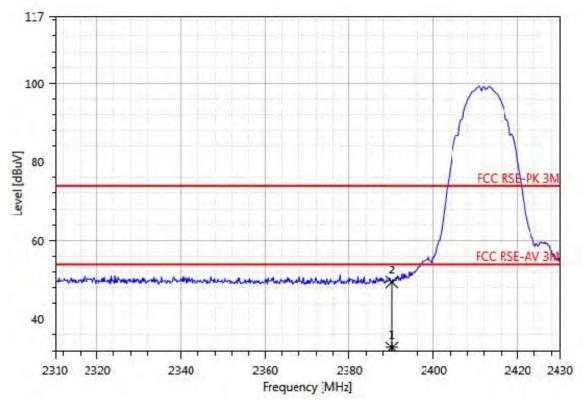


Operation Mode: Test Date: 802.11b 11/02/2016

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

Operation Band: Bandedge CH LOW Test Engineer: Edward

EUT Pol.: E1 Plane Measurement Antenna Pol.: HORIZONTAL

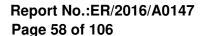


Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB
2390.00	Е	Average	32.75	34.50	-1.74	54.00	-21.25
2390.00	Е	Peak	49.46	51.20	-1.74	74.00	-24.54

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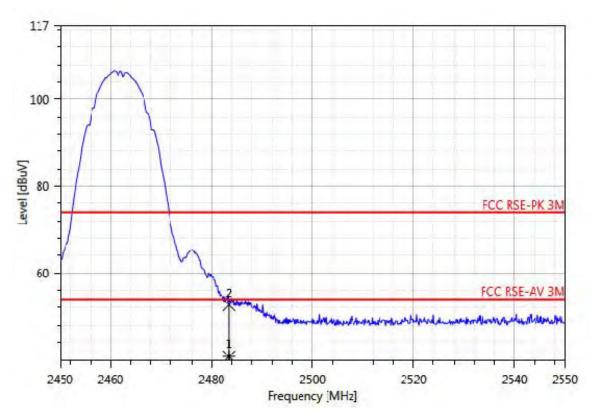




Operation Mode: Test Date: 802.11b 11/02/2016

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

Operation Band: Bandedge CH HIGH Test Engineer: Edward EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL

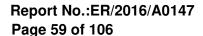


	Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin	
			Mode	Reading Level	FS		@3m		
_	MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB	
	2483.50	Е	Average	40.77	42.38	-1.62	54.00	-13.23	_
	2483.50	Е	Peak	52.63	54.25	-1.62	74.00	-21.37	

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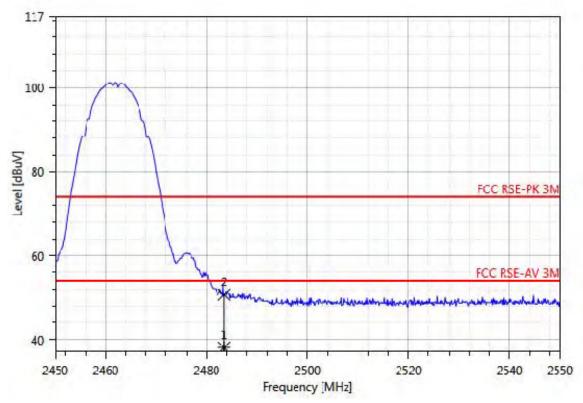


Operation Mode: Test Date: 802.11b 11/02/2016

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

Operation Band: Bandedge CH HIGH Test Engineer: Edward

EUT Pol.: E1 Plane Measurement Antenna Pol.: HORIZONTAL

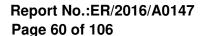


Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB
2483.50	Е	Average	38.09	39.71	-1.62	54.00	-15.91
2483.50	E	Peak	50.68	52.29	-1.62	74.00	-23.32

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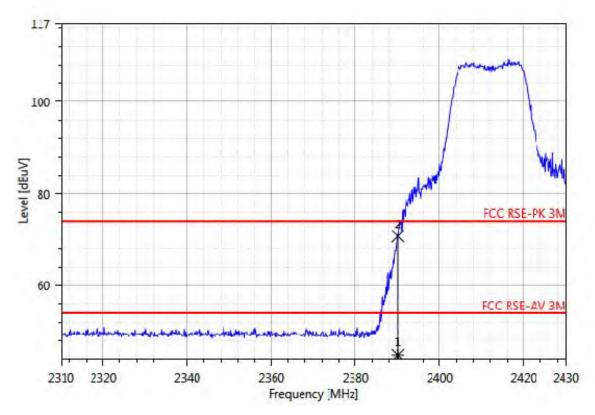


### Radiated Band Edge Measurement Result (802.11g)

Operation Mode: 802.11g Test Date: 11/02/2016

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

Operation Band: Bandedge CH LOW Test Engineer: Edward EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB
2390.00	Е	Average	44.91	46.66	-1.74	54.00	-9.09
2390.00	E	Peak	70.74	72.49	-1.74	74.00	-3.26

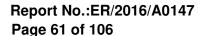
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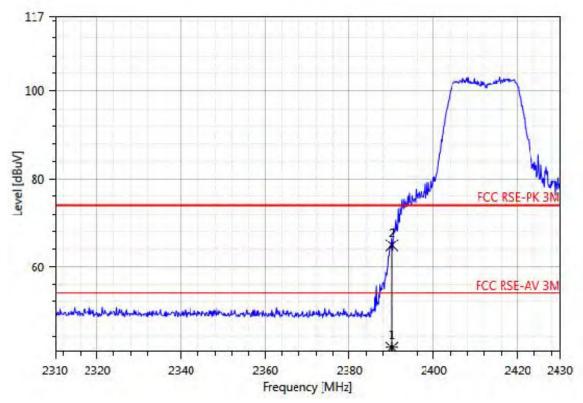


Operation Mode: Test Date: 802.11g 11/02/2016

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

Operation Band: Bandedge CH LOW Test Engineer: Edward

EUT Pol.: E1 Plane Measurement Antenna Pol.: HORIZONTAL

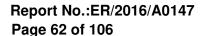


Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB
2390.00	Е	Average	41.55	43.29	-1.74	54.00	-12.45
2390.00	Ε	Peak	64.85	66.59	-1.74	74.00	-9.15

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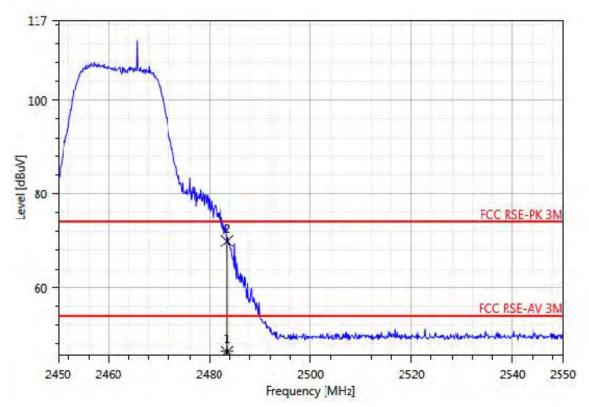




Operation Mode: Test Date: 802.11g 11/02/2016

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

Operation Band: Bandedge CH HIGH Test Engineer: Edward EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL

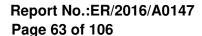


	Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
			Mode	Reading Level	FS		@3m	
_	MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBμV/m	dB	dBuV/m	dB
	2483.50	Е	Average	46.34	47.96	-1.62	54.00	-7.66
	2483.50	Е	Peak	69.93	71.55	-1.62	74.00	-4.07

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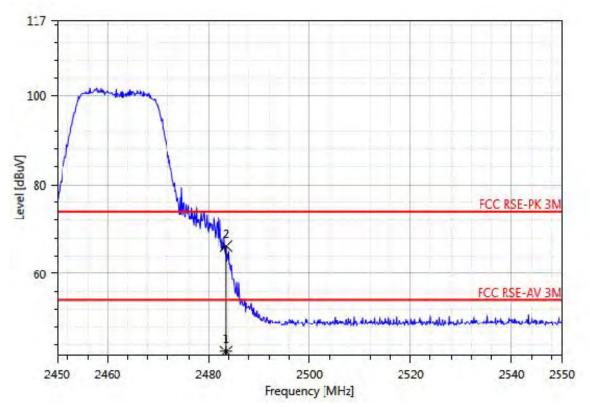


Operation Mode: Test Date: 802.11g 11/02/2016

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

Operation Band: Bandedge CH HIGH Test Engineer: Edward

EUT Pol.: E1 Plane Measurement Antenna Pol.: HORIZONTAL

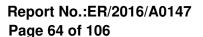


Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB
2483.50	Е	Average	42.46	44.08	-1.62	54.00	-11.54
2483.50	Е	Peak	66.22	67.83	-1.62	74.00	-7.78

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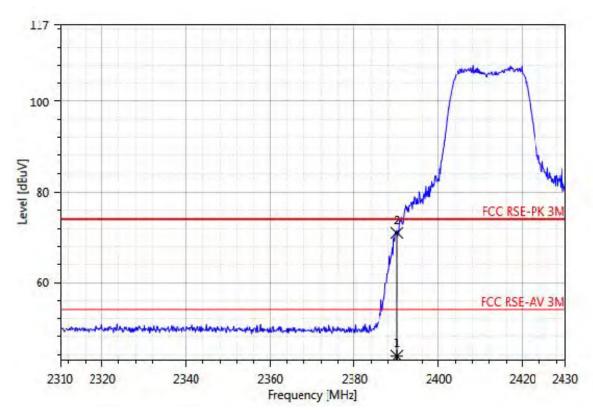


### Radiated Band Edge Measurement Result (802.11\_HT20)

Operation Mode: 802.11n20 Test Date: 11/02/2016

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

Operation Band: Bandedge CH LOW Test Engineer: Edward EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



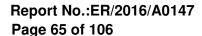
	Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin	
			Mode	Reading Level	FS		@3m		
	MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB	
•	2390.00	Е	Average	43.75	45.49	-1.74	54.00	-10.25	_
	2390.00	Ε	Peak	70.98	72.72	-1.74	74.00	-3.02	

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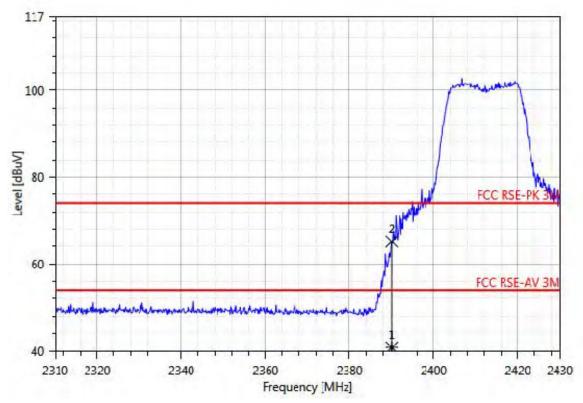


Operation Mode: Test Date: 802.11n20 11/02/2016

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

Operation Band: Bandedge CH LOW Test Engineer: Edward

EUT Pol.: E1 Plane Measurement Antenna Pol.: HORIZONTAL



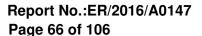
Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB
2390.00	Е	Average	40.71	42.45	-1.74	54.00	-13.29
2390.00	E	Peak	65.15	66.89	-1.74	74.00	-8.85

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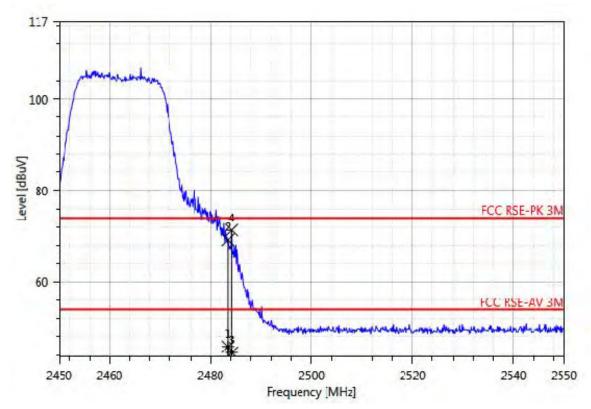




Operation Mode: Test Date: 802.11n20 11/02/2016

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

Operation Band: Bandedge CH HIGH Test Engineer: Edward EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL

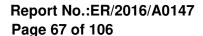


Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB
2483.50	Е	Average	45.85	47.47	-1.62	54.00	-8.15
2483.50	Е	Peak	69.26	70.87	-1.62	74.00	-4.74
2484.20	S	Average	44.55	46.17	-1.62	54.00	-9.45
2484.20	S	Peak	71.36	72.97	-1.62	74.00	-2.64

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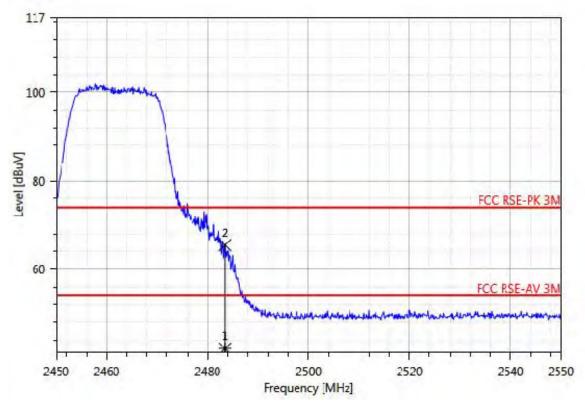


Operation Mode: Test Date: 802.11n20 11/02/2016

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

Operation Band: Bandedge CH HIGH Test Engineer: Edward

EUT Pol.: E1 Plane Measurement Antenna Pol.: HORIZONTAL

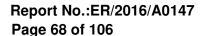


Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin	
		Mode	Reading Level	FS		@3m		
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB	
2483.50	Е	Average	42.03	43.65	-1.62	54.00	-11.97	
2483.50	Е	Peak	65.46	67.08	-1.62	74.00	-8.54	

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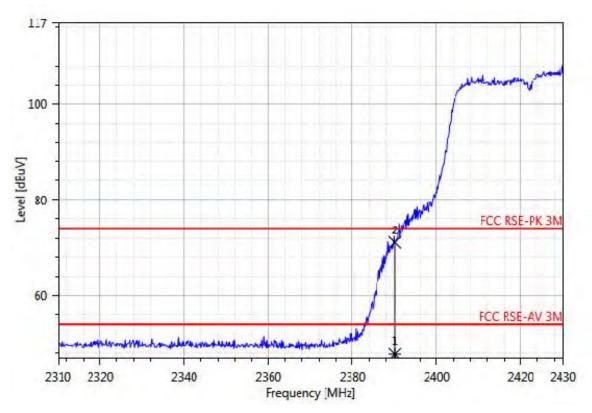


### Radiated Band Edge Measurement Result (802.11\_HT40)

Operation Mode: 802.11n40 Test Date: 11/02/2016

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

Operation Band: Bandedge CH LOW Test Engineer: Edward EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
2390.00	Е	Average	47.81	49.55	-1.74	54.00	-6.19
2390.00	Е	Peak	71.13	72.87	-1.74	74.00	-2.87

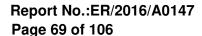
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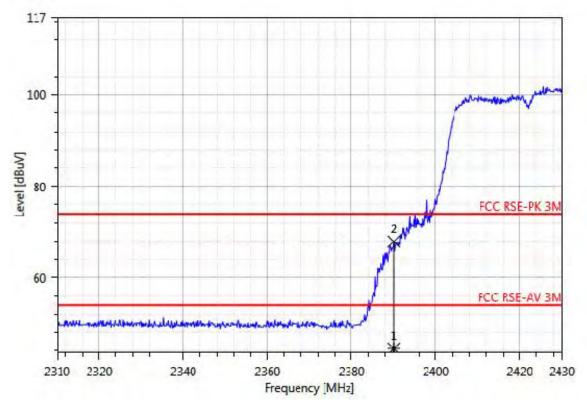


Operation Mode: Test Date: 802.11n40 11/02/2016

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

Operation Band: Bandedge CH LOW Test Engineer: Edward

EUT Pol.: E1 Plane Measurement Antenna Pol.: HORIZONTAL

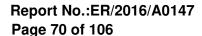


	Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin	
			Mode	Reading Level	FS		@3m		
_	MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB	_
	2390.00	Е	Average	44.49	46.23	-1.74	54.00	-9.51	
	2390.00	Е	Peak	67.93	69.67	-1.74	74.00	-6.07	

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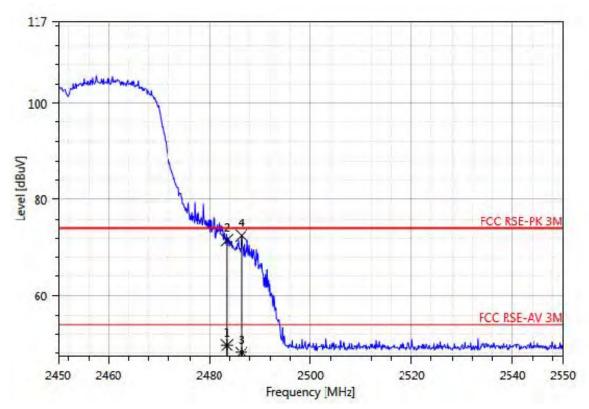




Operation Mode: Test Date: 802.11n40 11/02/2016

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

Operation Band: Bandedge CH HIGH Test Engineer: Edward EUT Pol.: E1 Plane Measurement Antenna Pol.: VERTICAL

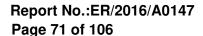


Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB
2483.50	Е	Average	49.75	51.37	-1.62	54.00	-4.25
2483.50	Е	Peak	71.59	73.20	-1.62	74.00	-2.41
2486.30	S	Average	48.18	49.80	-1.62	54.00	-5.82
2486.30	S	Peak	72.53	74.14	-1.62	74.00	-1.47

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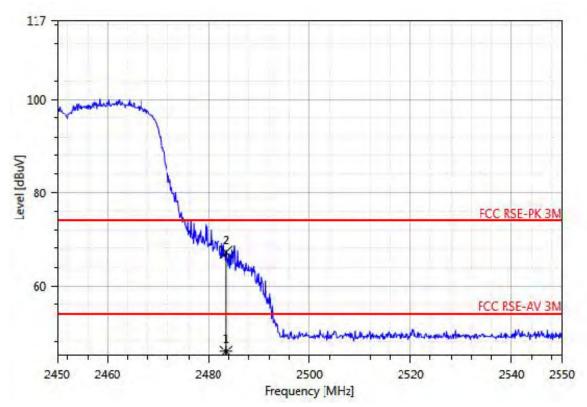


Operation Mode: Test Date: 802.11n40 11/02/2016

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

Operation Band: Bandedge CH HIGH Test Engineer: Edward

EUT Pol.: E1 Plane Measurement Antenna Pol.: HORIZONTAL

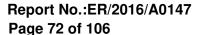


Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB
2483.50	Е	Average	45.88	47.50	-1.62	54.00	-8.12
2483.50	Е	Peak	67.18	68.80	-1.62	74.00	-6.82

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### **Below 1GHz Worst-Case Data:**

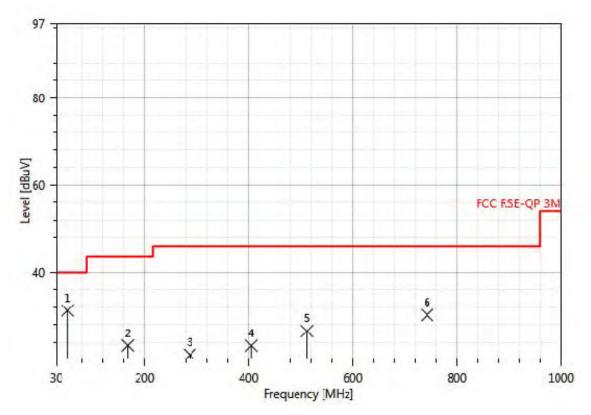
### Radiated Spurious Emission Measurement Result (802.11 g)

Operation Mode: 802.11g Test Date: 11/02/2016

Fundamental Frequency: 2412 MHz Temp. / Humi.: 21 deg\_C / 62 RH

Operation Band: Tx CH LOW Test Engineer:

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



Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB
52.31	S	Peak	31.25	39.02	-7.77	40.00	-8.75
167.74	S	Peak	23.25	30.72	-7.46	43.50	-20.25
287.05	S	Peak	21.10	27.29	-6.19	46.00	-24.90
405.39	S	Peak	23.22	26.92	-3.70	46.00	-22.78
512.09	S	Peak	26.53	28.51	-1.98	46.00	-19.47
742.95	S	Peak	30.21	27.93	2.28	46.00	-15.79

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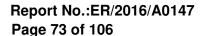
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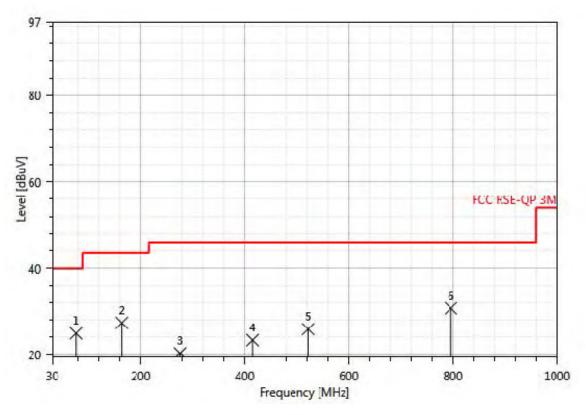




Fundamental Frequency: 2412 MHz Temp. / Humi.: 21 deg C / 62 RH

Operation Band: Tx CH LOW Test Engineer:

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

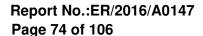


Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin	
		Mode	Reading Level	FS		@3m		
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBμV/m	dB	dBuV/m	dB	_
75.59	S	Peak	24.94	36.39	-11.45	40.00	-15.06	
163.86	S	Peak	27.36	34.80	-7.44	43.50	-16.14	
275.41	S	Peak	20.34	26.97	-6.63	46.00	-25.66	
415.09	S	Peak	23.37	26.58	-3.21	46.00	-22.63	
521.79	S	Peak	25.92	27.52	-1.60	46.00	-20.08	
796.30	S	Peak	30.71	27.71	3.01	46.00	-15.29	

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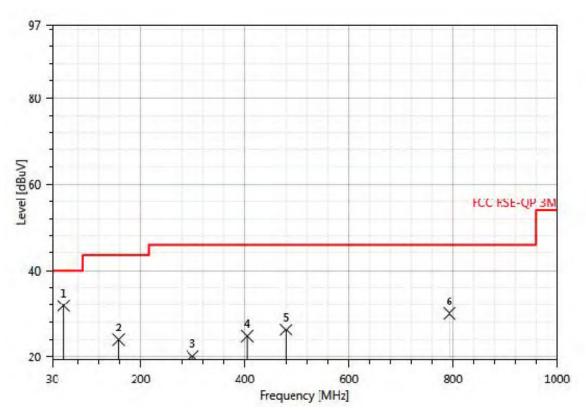




Fundamental Frequency: 2437 MHz Temp. / Humi.: 21 deg C / 62 RH

Operation Band: Tx CH MID Test Engineer:

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



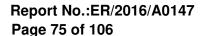
Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB
52.31	S	Peak	31.84	39.60	-7.77	40.00	-8.16
158.04	S	Peak	23.93	31.37	-7.45	43.50	-19.57
299.66	S	Peak	20.13	26.05	-5.93	46.00	-25.87
405.39	S	Peak	24.72	28.43	-3.70	46.00	-21.28
479.11	S	Peak	26.27	28.66	-2.39	46.00	-19.73
793.39	S	Peak	30.02	27.16	2.86	46.00	-15.98

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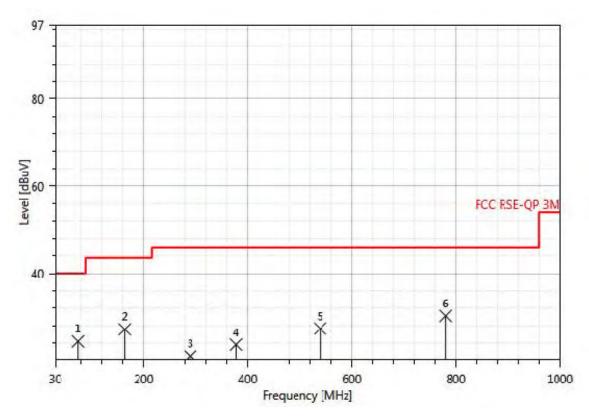




Fundamental Frequency: 2437 MHz Temp. / Humi.: 21 deg C / 62 RH

Operation Band: Tx CH MID Test Engineer:

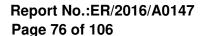
EUT Pol.: E2 Plane Measurement Antenna Pol.: HORIZONTAL



Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dΒμV/m	dB	dBuV/m	dB
73.65	S	Peak	24.39	35.41	-11.02	40.00	-15.61
163.86	S	Peak	27.15	34.59	-7.44	43.50	-16.35
289.96	S	Peak	21.00	27.07	-6.08	46.00	-25.00
377.26	S	Peak	23.67	28.14	-4.47	46.00	-22.33
539.25	S	Peak	27.32	28.90	-1.58	46.00	-18.68
779.81	S	Peak	30.22	27.64	2.58	46.00	-15.78

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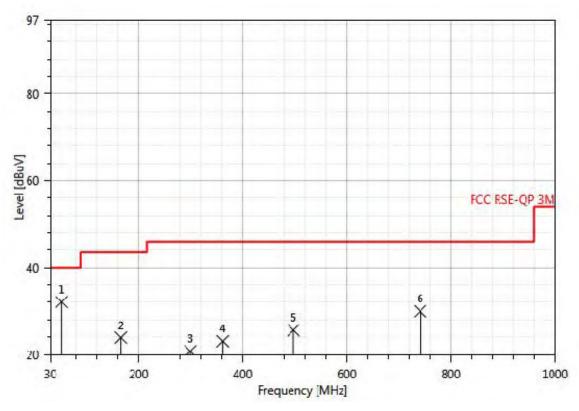




Fundamental Frequency: 2462 MHz Temp. / Humi.: 21 deg C / 62 RH

Operation Band: Tx CH HIGH Test Engineer:

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

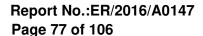


Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dΒμV/m	dB	dBuV/m	dB
52.31	S	Peak	32.08	39.84	-7.77	40.00	-7.92
165.80	S	Peak	23.88	31.27	-7.39	43.50	-19.62
299.66	S	Peak	20.76	26.69	-5.93	46.00	-25.24
361.74	S	Peak	23.07	27.87	-4.80	46.00	-22.93
497.54	S	Peak	25.59	27.97	-2.39	46.00	-20.41
741.01	S	Peak	29.95	27.79	2.16	46.00	-16.05

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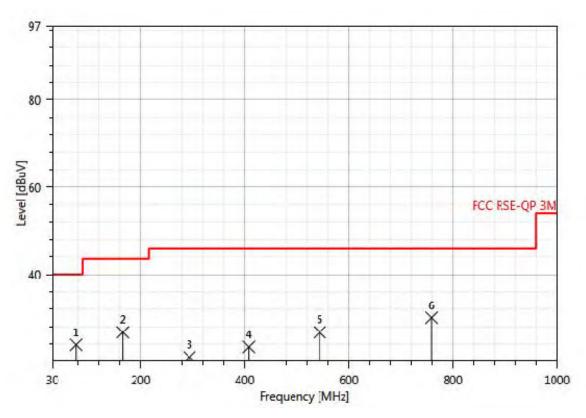




Fundamental Frequency: 2462 MHz Temp. / Humi.: 21 deg C / 62 RH

Operation Band: Tx CH HIGH Test Engineer:

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



Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin	
		Mode	Reading Level	FS		@3m		
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBμV/m	dB	dBuV/m	dB	
75.59	S	Peak	23.85	35.30	-11.45	40.00	-16.15	
165.80	S	Peak	26.72	34.11	-7.39	43.50	-16.78	
293.84	S	Peak	21.00	27.04	-6.05	46.00	-25.00	
408.30	S	Peak	23.36	26.90	-3.53	46.00	-22.64	
544.10	S	Peak	26.72	28.31	-1.60	46.00	-19.28	
759.44	S	Peak	30.04	27.03	3.01	46.00	-15.96	

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### **Above 1GHz Data:**

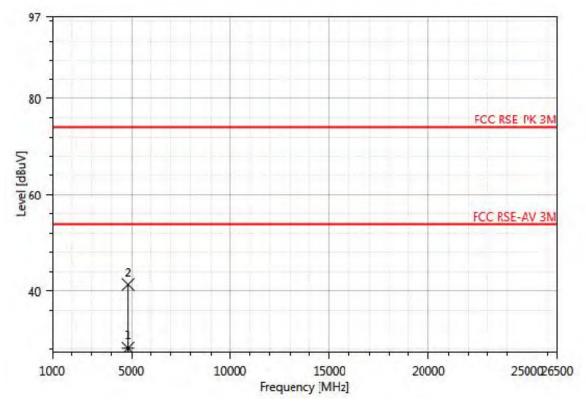
# Radiated Spurious Emission Measurement Result (802.11 b)

Operation Mode: 802.11b Test Date: 11/02/2016

Fundamental Frequency: 2412 MHz Temp. / Humi.: 22 deg C / 63 RH

Operation Band: Tx CH LOW Test Engineer:

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

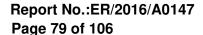


Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin	
		Mode	Reading Level	FS		@3m		
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBµV/m	dB	dBuV/m	dB	
4824.00	Н	Average	28.16	23.22	4.94	54.00	-25.84	_
4824.00	Н	Peak	41.31	36.36	4.94	74.00	-32.69	

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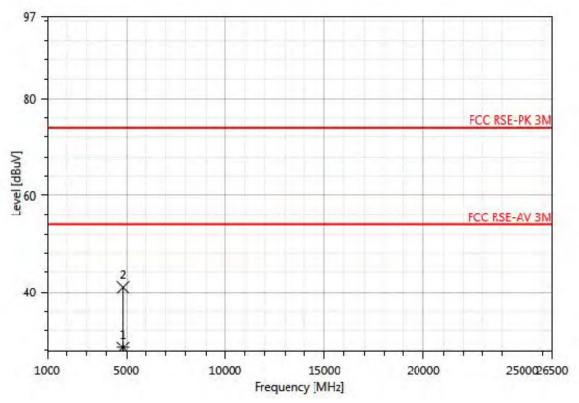


Operation Mode: Test Date: 802.11b 11/02/2016

Fundamental Frequency: 2412 MHz Temp. / Humi.: 22 deg C / 63 RH

Operation Band: Tx CH LOW Test Engineer: Tin

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



Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBμV/m	dB	dBuV/m	dB
4824.00	Н	Average	28.50	23.56	4.94	54.00	-25.50
4824.00	Н	Peak	41.02	36.07	4.94	74.00	-32.98

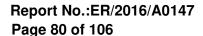
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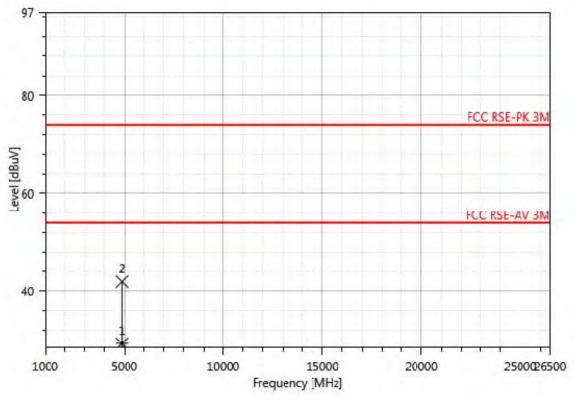


Operation Mode: Test Date: 802.11b 11/02/2016

Fundamental Frequency: 2437 MHz Temp. / Humi.: 22 deg C / 63 RH

Operation Band: Tx CH MID Test Engineer: Tin

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

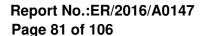


Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dΒμV/m	dB	dBuV/m	dB
4874.00	Н	Average	29.24	24.11	5.13	54.00	-24.76
4874.00	Н	Peak	41.97	36.83	5.13	74.00	-32.03

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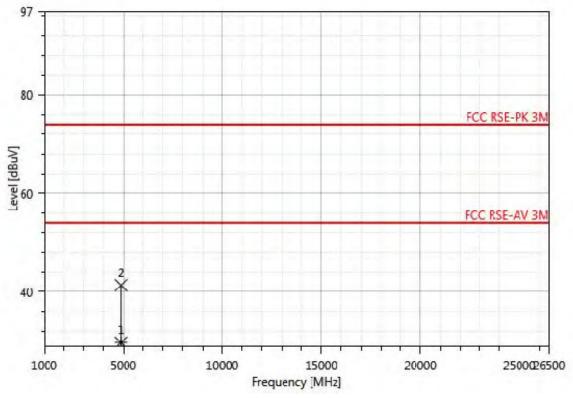


Test Date: Operation Mode: 802.11b 11/02/2016

Fundamental Frequency: 2437 MHz Temp. / Humi.: 22 deg C / 63 RH

Operation Band: Tx CH MID Test Engineer: Tin

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

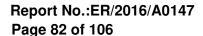


Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB
4874.00	Н	Average	29.64	24.51	5.13	54.00	-24.36
4874.00	Н	Peak	41.32	36.19	5.13	74.00	-32.68

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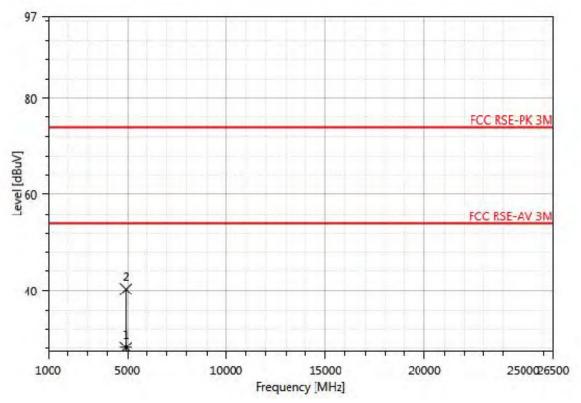


Operation Mode: Test Date: 802.11b 11/02/2016

Fundamental Frequency: 2462 MHz Temp. / Humi.: 22 deg C / 63 RH

Operation Band: Tx CH HIGH Test Engineer: Tin

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



Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB
4924.00	Н	Average	28.20	22.95	5.25	54.00	-25.80
4924.00	Н	Peak	40.36	35.10	5.25	74.00	-33.64

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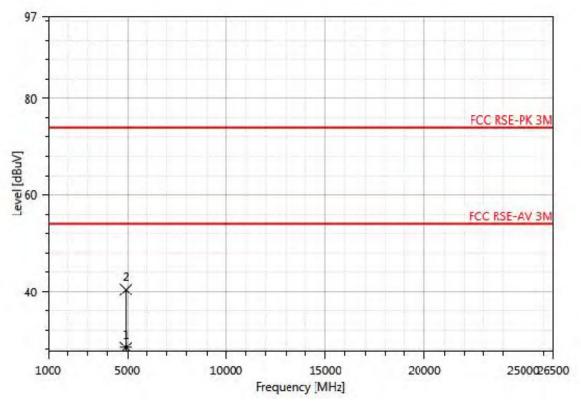


Test Date: Operation Mode: 802.11b 11/02/2016

Fundamental Frequency: 2462 MHz Temp. / Humi.: 22 deg C / 63 RH

Operation Band: Tx CH HIGH Test Engineer: Tin

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
4924.00	Н	Average	28.38	23.13	5.25	54.00	-25.62
4924.00	Н	Peak	40.40	35.15	5.25	74.00	-33.60

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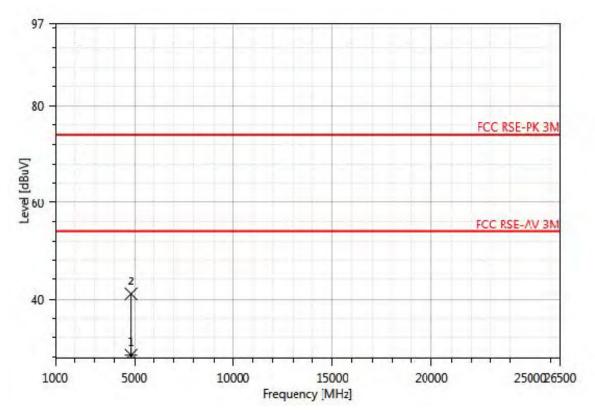
# Radiated Spurious Emission Measurement Result (802.11 g)

Operation Mode: 802.11g Test Date: 11/02/2016

Fundamental Frequency: 2412 MHz Temp. / Humi.: 22 deg\_C / 63 RH

Operation Band: Tx CH LOW Test Engineer: Tin

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

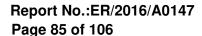


	Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin	
			Mode	Reading Level	FS		@3m		
_	MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB	
	4824.00	Н	Average	28.51	23.57	4.94	54.00	-25.49	
	4824.00	Н	Peak	41.13	36.18	4.94	74.00	-32.87	

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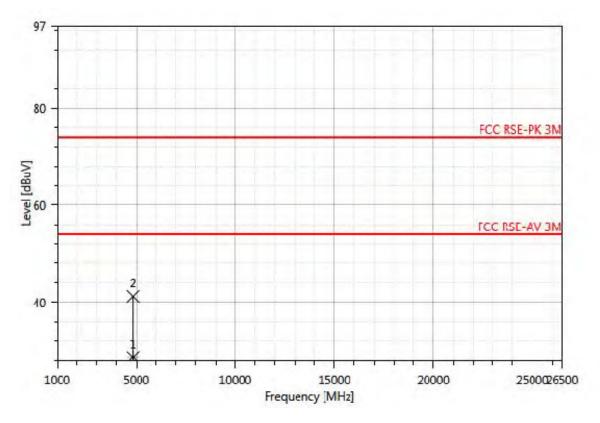




Fundamental Frequency: 2412 MHz Temp. / Humi.: 22 deg C / 63 RH

Operation Band: Tx CH LOW Test Engineer:

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

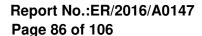


Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
4824.00	Н	Average	28.62	23.68	4.94	54.00	-25.38
4824.00	Н	Peak	41.19	36.25	4.94	74.00	-32.81

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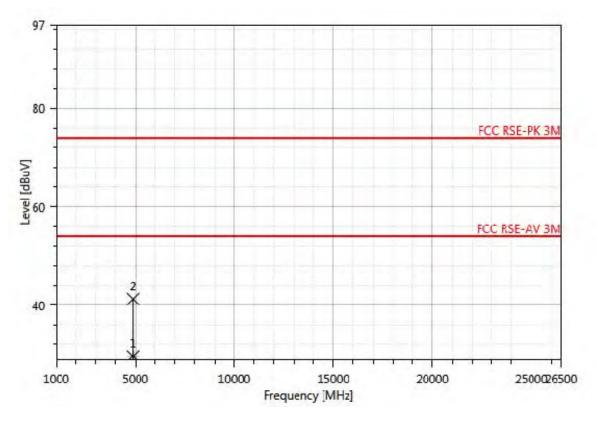




Fundamental Frequency: 2437 MHz Temp. / Humi.: 22 deg C / 63 RH

Operation Band: Tx CH MID Test Engineer:

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

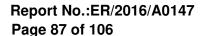


Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB
4874.00	Н	Average	29.60	24.47	5.13	54.00	-24.40
4874.00	Н	Peak	41.26	36.13	5.13	74.00	-32.74

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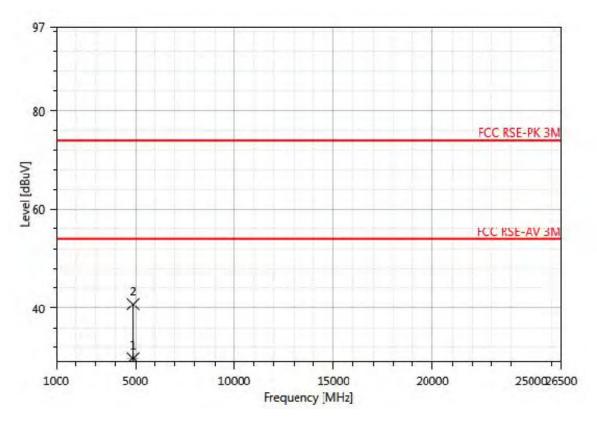




Fundamental Frequency: 2437 MHz Temp. / Humi.: 22 deg C / 63 RH

Operation Band: Tx CH MID Test Engineer:

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

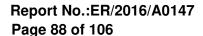


Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
4874.00	Н	Average	29.81	24.68	5.13	54.00	-24.19
4874.00	Н	Peak	40.77	35.63	5.13	74.00	-33.23

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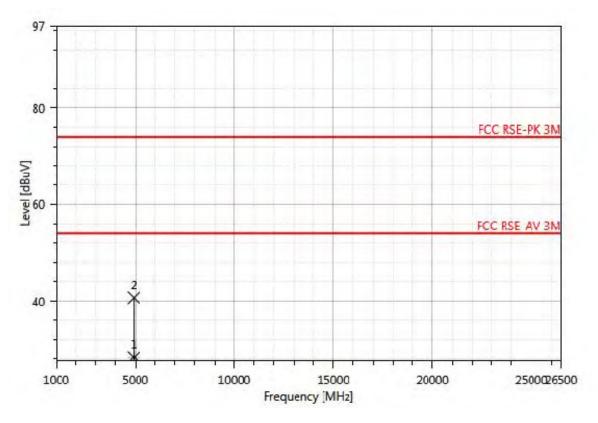




Fundamental Frequency: 2462 MHz Temp. / Humi.: 22 deg C / 63 RH

Operation Band: Tx CH HIGH Test Engineer:

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



Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
4924.00	Н	Average	28.36	23.11	5.25	54.00	-25.64
4924.00	Н	Peak	40.71	35.46	5.25	74.00	-33.29

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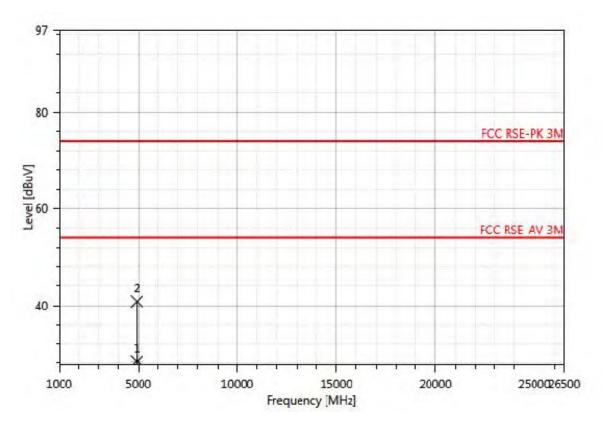




Fundamental Frequency: 2462 MHz Temp. / Humi.: 22 deg C / 63 RH

Operation Band: Tx CH HIGH Test Engineer:

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



Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
4924.00	Н	Average	28.46	23.21	5.25	54.00	-25.54
4924.00	Н	Peak	40.83	35.58	5.25	74.00	-33.17

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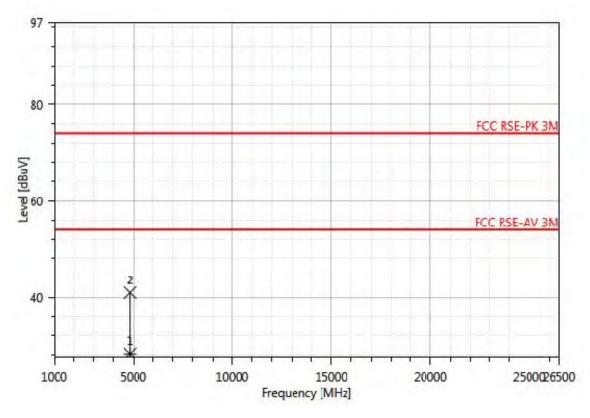
# Radiated Spurious Emission Measurement Result (802.11 HT20)

Operation Mode: 802.11n20 Test Date: 11/02/2016

Fundamental Frequency: 2412 MHz Temp. / Humi.: 22 deg\_C / 63 RH

Operation Band: Tx CH LOW Test Engineer: Tin

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

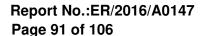


	Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin
			Mode	Reading Level	FS		@3m	
_	MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB
	4824.00	Н	Average	28.26	23.32	4.94	54.00	-25.74
	4824.00	Н	Peak	40.99	36.05	4.94	74.00	-33.01

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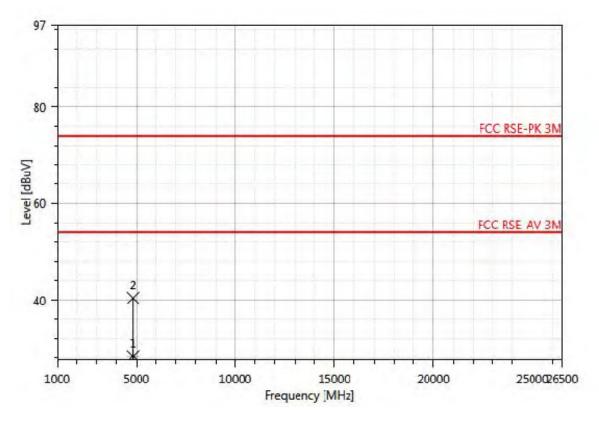




Fundamental Frequency: 2412 MHz Temp. / Humi.: 22 deg C / 63 RH

Operation Band: Tx CH LOW Test Engineer:

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



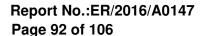
Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB
4824.00	Н	Average	28.35	23.41	4.94	54.00	-25.65
4824.00	Н	Peak	40.42	35.48	4.94	74.00	-33.58

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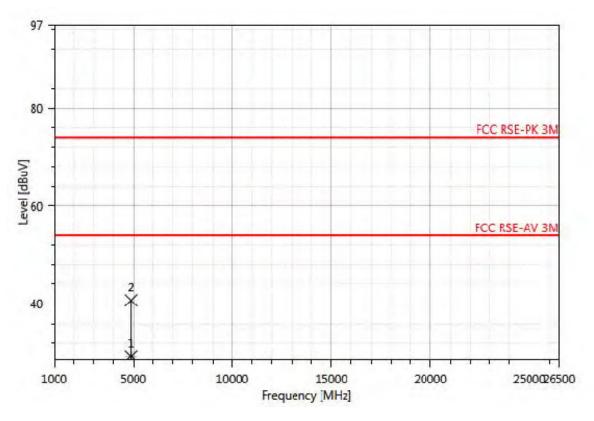




Temp. / Humi. : Fundamental Frequency: 2437 MHz 22 deg C / 63 RH

Operation Band: Tx CH MID Test Engineer:

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

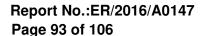


Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB
4874.00	Н	Average	29.31	24.18	5.13	54.00	-24.69
4874.00	Н	Peak	40.73	35.59	5.13	74.00	-33.27

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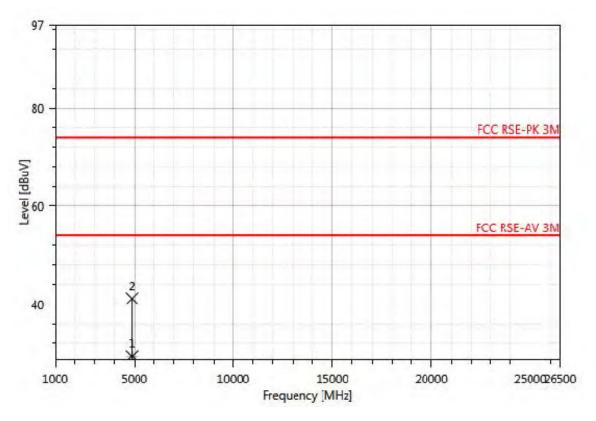




Fundamental Frequency: 2437 MHz Temp. / Humi.: 22 deg C / 63 RH

Operation Band: Tx CH MID Test Engineer:

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

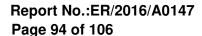


Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB
4874.00	Н	Average	29.33	24.20	5.13	54.00	-24.67
4874.00	Н	Peak	41.12	35.99	5.13	74.00	-32.88

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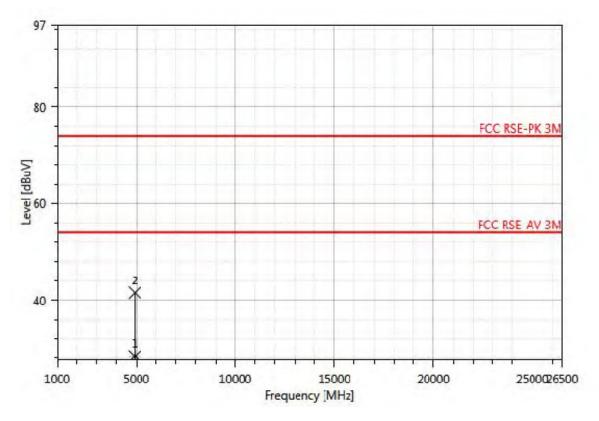




Fundamental Frequency: 2462 MHz Temp. / Humi.: 22 deg C / 63 RH

Operation Band: Tx CH HIGH Test Engineer:

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

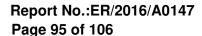


Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB
4924.00	Н	Average	28.39	23.14	5.25	54.00	-25.61
4924.00	Н	Peak	41.55	36.29	5.25	74.00	-32.45

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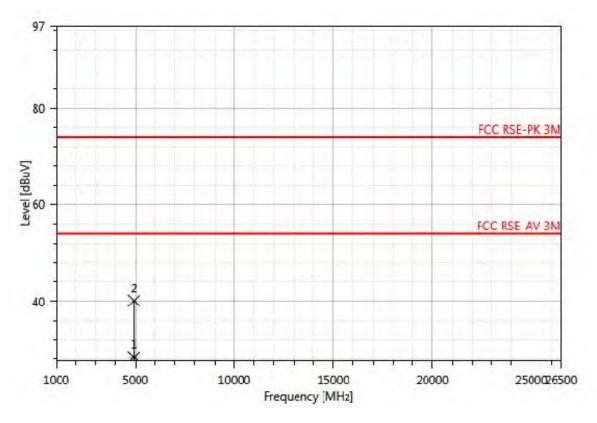




Fundamental Frequency: 2462 MHz Temp. / Humi.: 22 deg C / 63 RH

Operation Band: Tx CH HIGH Test Engineer:

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



Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
4924.00	Н	Average	28.44	23.19	5.25	54.00	-25.56
4924.00	Н	Peak	40.15	34.90	5.25	74.00	-33.85

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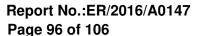
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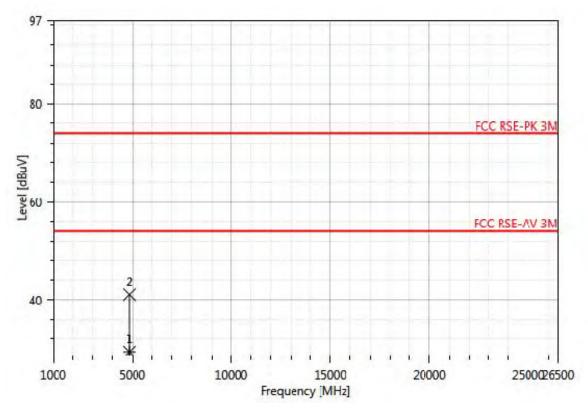
# Radiated Spurious Emission Measurement Result (802.11\_HT40)

Operation Mode: Test Date: 11/02/2016 802.11n40

Temp. / Humi.: Fundamental Frequency: 2422 MHz 22 deg\_C / 63 RH

Operation Band: Tx CH LOW Test Engineer:

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



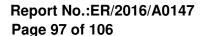
	Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin	
			Mode	Reading Level	FS		@3m		
_	MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB	
	4844.00	Н	Average	29.40	24.43	4.97	54.00	-24.60	_
	4844.00	Н	Peak	41.10	36.13	4.97	74.00	-32.90	

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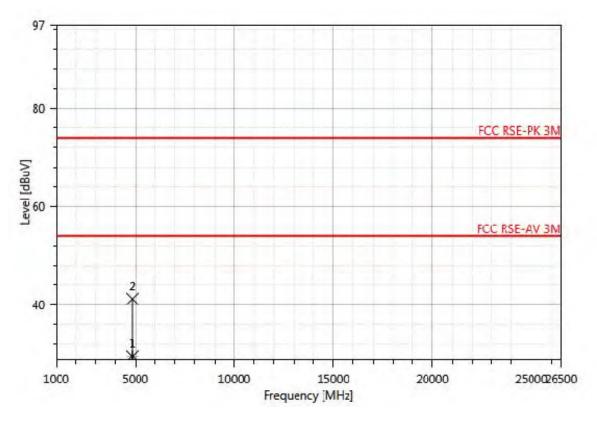




Fundamental Frequency: 2422 MHz Temp. / Humi.: 22 deg C / 63 RH

Operation Band: Tx CH LOW Test Engineer:

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

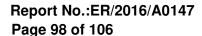


Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB
4844.00	Н	Average	29.52	24.55	4.97	54.00	-24.48
4844.00	Н	Peak	41.19	36.22	4.97	74.00	-32.81

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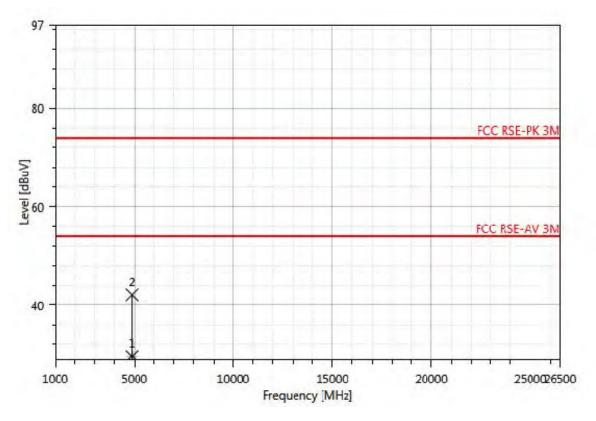




Fundamental Frequency: 2437 MHz Temp. / Humi.: 22 deg C / 63 RH

Operation Band: Tx CH MID Test Engineer:

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

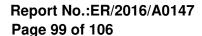


Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB
4874.00	Н	Average	29.60	24.47	5.13	54.00	-24.40
4874.00	Н	Peak	42.11	36.97	5.13	74.00	-31.89

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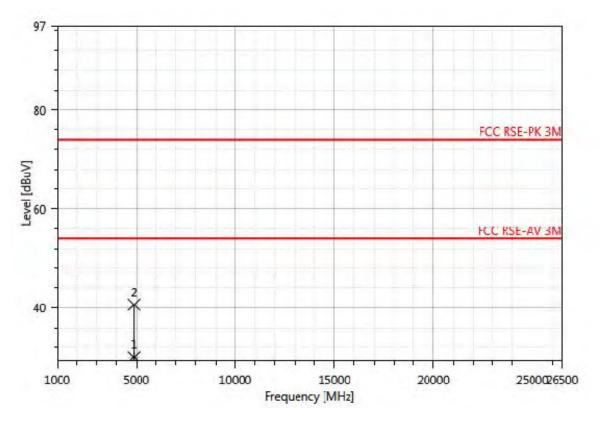




Fundamental Frequency: 2437 MHz Temp. / Humi.: 22 deg C / 63 RH

Operation Band: Tx CH MID Test Engineer:

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



Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBµV/m	dB	dBuV/m	dB
4874.00	Н	Average	29.98	24.85	5.13	54.00	-24.02
4874.00	Н	Peak	40.61	35.48	5.13	74.00	-33.39

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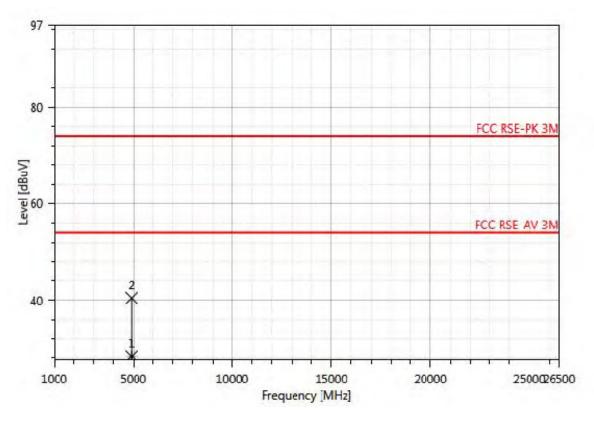




Fundamental Frequency: 2452 MHz Temp. / Humi.: 22 deg C / 63 RH

Operation Band: Tx CH HIGH Test Engineer:

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

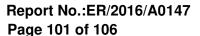


Freq.	Note	Decetor	Actual	Spectrum	Factor	Limit	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBμV/m	dBμV/m	dB	dBuV/m	dB
4904.00	Н	Average	28.45	23.22	5.23	54.00	-25.55
4904.00	Н	Peak	40.50	35.27	5.23	74.00	-33.50

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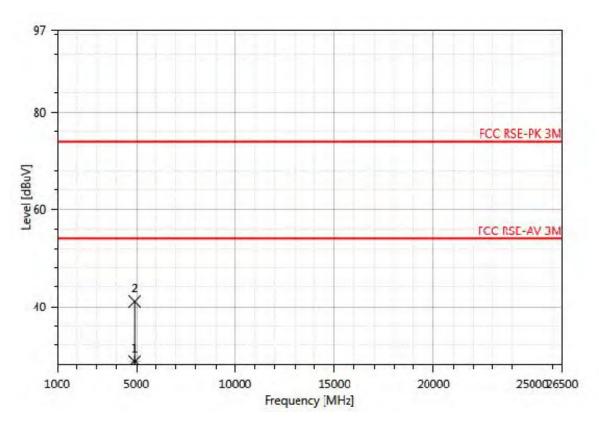




Fundamental Frequency: 2452 MHz Temp. / Humi.: 22 deg C / 63 RH

Operation Band: Tx CH HIGH Test Engineer:

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



Freq.	Note	Decetor	Actual	Spectrum	Factor	Lim it	Margin
		Mode	Reading Level	FS		@3m	
MHz	F/H/E/S	QP/AV/PK	dBµV/m	dBμV/m	dB	dBuV/m	dB
4904.00	Н	Average	28.75	23.52	5.23	54.00	-25.25
4904.00	Н	Peak	41.09	35.86	5.23	74.00	-32.91

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## 12 PEAK POWER SPECTRAL DENSITY

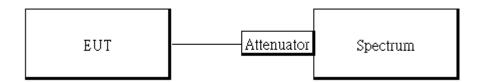
#### 12.1 **Standard Applicable**

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

#### 12.2 **Measurement Equipment Used**

Conducted Emission Test Site										
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.					
Spectrum Analyzer	Agilent	N9010A	MY50420195	12/21/2015	12/20/2016					
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					

#### 12.3 **Test Set-up**



#### 12.4 **Measurement Procedure**

- 10. Set analyzer center frequency to DTS channel center frequency.
- 11. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 12. Set the span to 1.5 times the DTS channel bandwidth.
- 13. Set the RBW = 3 kHz & VBW = 10 kHz.
- 14. For defining Restricted Band Edge Limit: Set the RBW = 100kHz & VBW = 300 kHz
- 15. Detector = peak.
- 16. Sweep time = auto couple.
- 17. Trace mode = max hold.
- 18. Allow trace to fully stabilize.
- 19. Use the peak marker function to determine the maximum amplitude level.

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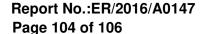
#### 12.5 **Measurement Result**

POWER	<b>PENSITY</b>	802.11b M		POWER	<b>DENSITY</b>	802.11g M	ODE				
Гиодиленам	RF Power	Maximum					Eroguenov	RF Power	Maximum		
Frequency (MHz)	Density	Limit			Frequency (MHz)	Density	Limit	Resi			
(1011 12)	(dBm)	(dBm)		(1011 12)	(dBm)	(dBm)					
2412	-10.33	8.00	PASS		2412	-10.77	8.00	PAS			
2437	-8.42	8.00	PASS		2437	-9.04	8.00	PAS			
2462	-9.45	8.00	PASS		2462	-13.94	8.00	PAS			

POWER DENSITY 802.11n HT20 MODE							
Eroguenev	RF Power	Maximum					
Frequency (MHz)	Density	Limit	Result				
(1011 12)	(dBm)	(dBm)					
2412	-13.26	8.00	PASS				
2437	-11.85	8.00	PASS				
2462	-19.37	8.00	PASS				

POWER DENSITY 802.11n HT40 MODE							
Frequency	RF Power	Maximum					
(MHz)	Density	Limit	Result				
(1011 12)	(dBm)	(dBm)					
2422	-13.85	8.00	PASS				
2437	-15.46	8.00	PASS				
2452	-17.12	8.00	PASS				

<sup>\*</sup>Refer to next page for plots

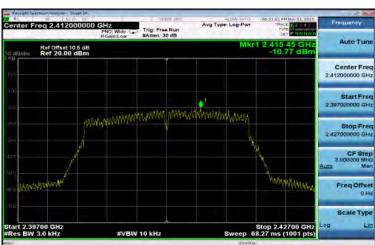




## 802.11b CH-Low

# ter Freq 2.412000000 GHz Ref Offset 10.5 dB Ref 20.00 dBm

# 802.11g CH-Low



#### 802.11b CH-Mid



# 802.11g CH-Mid



### 802.11b CH-High



# 802.11g CH-High



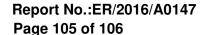
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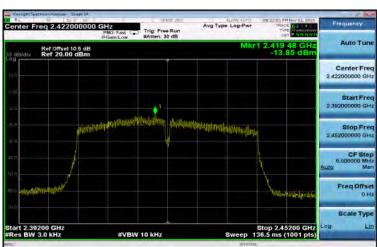




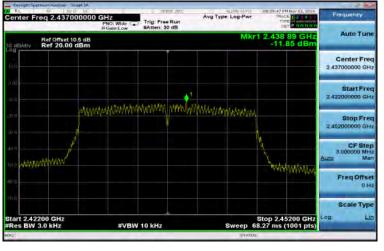
## 802.11n 20 CH-Low



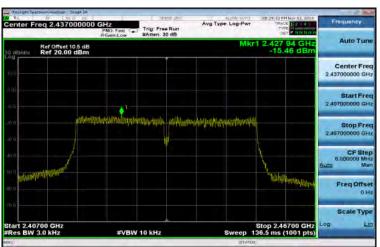
## 802.11n 40 CH-Low



## 802.11n 20 CH-Mid



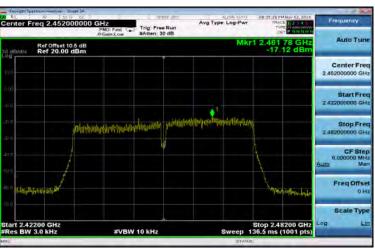
802.11n 40 CH-Mid



# 802.11n\_20 CH-High



802.11n 40 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.

#### 13.2 **Antenna Connected Construction**

An embedded-in antenna design is used.

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

~ End of Report ~

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