

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

	OF	
Product Name:	WIRELESS LAN + BLUETOOTH MODULE	
Brand Name:	MITSUMI	
Model No.:	DWM-W314K	
Model Difference:	N/A	
FCC ID:	EW4DWMW314K	
Report No.:	E2/2016/A0091	
Issue Date:	Nov. 24, 2016	
FCC Rule Part:	§15.247, Cat: DTS	
Prepared for:	MITSUMI ELECTRIC CO., LTD. 2-11-2, Tsurumaki, Tama-shi, Tokyo, 206-8567, JAPAN	
Prepared by:	SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333	
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VERIFICATION OF COMPLIANCE

Applicant:	MITSUMI ELECTRIC CO., LTD. 2-11-2, Tsurumaki, Tama-shi, Tokyo, 206-8567, JAPAN		
Product Name:	WIRELESS LAN + BLUETOOTH MODULE		
Brand Name:	MITSUMI		
Model No.:	DWM-W314K		
Model Difference:	N/A		
FCC ID:	EW4DWMW314K		
File Number:	E2/2016/A0091		
Date of Test:	Oct. 29, 2016 ~ Nov. 16, 2016		
Date of EUT Received:	Oct. 29, 2016		

We hereby certify that:

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

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

Test By:	Jerry Lu	Date:	Nov. 24, 2016
Prepared By:	Jerry Lu/Sr. Engineer Uroletta Tang	Date:	Nov. 24, 2016
_ Approved By: _	Violetta Tang / Clerk Jim Chang Jim Chang / Asst. Manager	Date:	Nov. 24, 2016

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Revision History

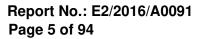
Report Number	Revision	Description	Issue Date
E2/2016/A0091	Rev.00	Initial creation of document	Nov. 24, 2016

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GENERAL INFORMATION 1

1.1 Product description

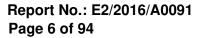
General:

Product Name:	WIRELESS LAN + BLUETOOTH MODULE
Brand Name:	MITSUMI
Model No.:	DWM-W314K
Model Difference:	N/A
Hardware Version:	V1.0
Software Version:	V1.0
Power Supply:	3.3V from DC Power Supply

WLAN 2.4GHz:

Wi-Fi	Frequency Range	Channels	Rated Power (Peak)	Modulation Technology	
11b/g	2412-2462	11	b: 15.34dBm g: 15.42dBm	DSSS, OFDM	
11n	HT20 2412-2462	11	11 15.54dBm OFDM		
Antenna	enna Designation: PCB Printed Antenna, Gain: -4.7dBi				
Modulati	on type:	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM			
Transitio	n Rate:	802.11 b: 1/2/5.5/11 Mbps 802.11 g: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 – 65Mbps			

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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

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.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333 (TAF code 0513)

FCC Registration Numbers are: 735305

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

2.1 EUT Configuration

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

2.2 EUT Exercise

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

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz, The CISPR Quasi-Peak and Average detector mode is employed according to §15.207. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.

2.4 Measurement Results Explanation Example

For all conducted test items:

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

Note:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor. Following shows an offset computation example with cable loss 0.7dB and 10dB attenuator.

Offset:

= RF cable loss (dB)+ attenuation factor(dB) dB =10.70dB

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2.5 Configuration of Tested System

Fig. 2-1 Radiated Emission & Conducted (Antenna Port) Configuration

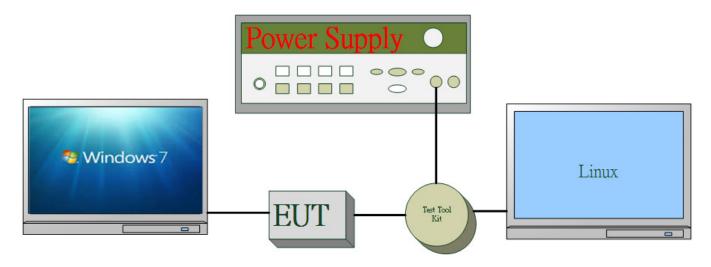


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
2.	Notebook	Lenovo	L440	R9-007LAZ	N/A	Un-shield
3.	DC Power Supply	Agilent	E3640A	MY53140006	N/A	N/A
4.	Test Tool Kit	N/A	N/A	N/A	N/A	N/A

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SUMMARY OF TEST RESULTS 3

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

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DESCRIPTION OF TEST MODES 4

4.1 Operated in 2400 ~ 2483.5MHz Band

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		· · ·

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MEASUREMENT UNCERTAINTY 5

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

Radiated Spurious Emission:

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

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

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

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CONDUCTED EMISSION TEST 6

6.1 Standard Applicable

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

	Limits					
Frequency range	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						

1. The lower limit shall apply at the transition frequencies

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

6.2 Measurement Equipment Used

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

6.3 EUT Setup

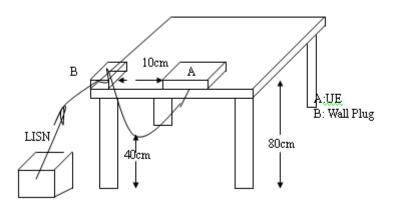
- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI 63.10:2013.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
- 3. The LISN was connected with 120Vac/60Hz power source.

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6.4 Test SET-UP (Block Diagram of Configuration)



6.5 Measurement Procedure

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

6.6 Measurement Result

N/A, the device is powered by DC 3.3V.

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DUTY CYCLE OF TEST SIGNAL 7

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

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

Formula:

Duty Cycle = Ton / (Ton+Toff)

Measurement Procedure:

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

Duty Cycle:

	Duty Cycle (%)	Duty Factor (dB)
802.11b	100.00	0.00
802.11g	100.00	0.00
802.11n_20	100.00	0.00

b = 100%, g = 100%, n ht 20 = 100%

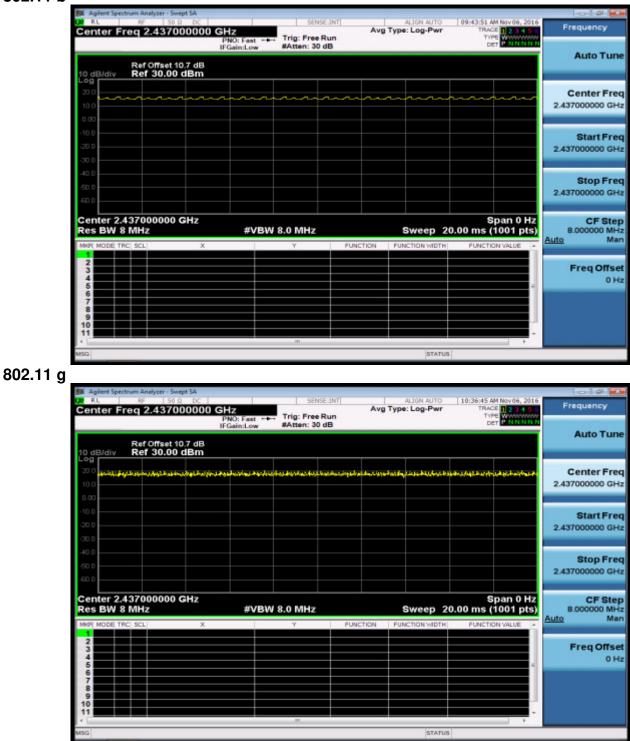
Duty Cycle Factor: $10 * \log(1/1) = 0$ Duty Cycle Factor: $10 * \log(1/1) = 0$ Duty Cycle Factor: $10 * \log(1/1) = 0$

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7.1 DUTY CYCLE TEST SIGNAL Measurement Result 802.11 b



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802.11 n_20 MHz

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-40.0 -50.0 -60.0										Stop Freq 2.437000000 GHz
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PEAK OUTPUT POWER MEASUREMENT 8

8.1 Standard Applicable

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

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	MFR	MODEL	SERIAL	LAST	CAL DUE.						
TYPE		NUMBER	NUMBER	CAL.							
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2016	04/13/2017						
Power Meter	Anritsu	ML2496A	1326001	06/23/2016	06/22/2017						
Power Sensor	Anritsu	MA2411B	1315048	06/23/2016	06/22/2017						
Power Sensor	Anritsu	MA2411B	1315049	06/23/2016	06/22/2017						
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	RF01	12/12/2015	12/11/2016						
DC Block	PASTERNACK	PE8210	RF29	12/12/2015	12/11/2016						
Splitter	RF-LAMBAD	RFLT2W1G18G	RF35	12/12/2015	12/11/2016						
Attenuator	WOKEN	218FS-10	RF23	12/12/2015	12/11/2016						
DC Power Supply	Agilent	E3640A	MY53140006	05/04/2016	05/03/2017						

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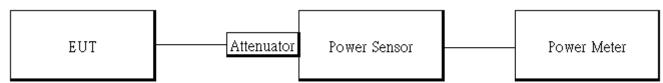
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8.3 Test Set-up

Power Meter:



8.4 Measurement Procedure

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

Power Meter:

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

4. Record the max. Reading as observed from Spectrum or Power Meter.

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8.5 Measurement Result

802.11	802.11b Main								
СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit		RESULT		
1	2412	1	15.21	33.19	1 W att =	30.00	dBm	PASS	
6	2437	1	15.31	33.96	1 W att =	30.00	dBm	PASS	
11	2462	1	15.34	34.20	1 W att =	30.00	dBm	PASS	
802.11	b Main								
сн	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit		RESULT		
1	2412	1	12.88	19.41	1 W att =	30.00	dBm	PASS	
6	2437	1	13.01	20.00	1 W att =	30.00	dBm	PASS	
11	2462	1	13.12	20.51	1 W att =	30.00	dBm	PASS	

802.11	g Main				_			
СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit		RESULT	
1	2412	6	15.15	32.73	1 W att =	30.00	dBm	PASS
6	2437	6	15.42	34.83	1 W att =	30.00	dBm	PASS
11	2462	6	15.41	34.75	1 W att =	30.00	dBm	PASS
802.11	g Main							
СН	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit		RESULT	
1	2412	6	12.85	19.28	1 W att =	30.00	dBm	PASS
6	2437	6	13.05	20.18	1 W att =	30.00	dBm	PASS
11	2462	6	13.03	20.09	1 W att =	30.00	dBm	PASS



802.11	802.11n_HT20M Main								
сн	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit		RESULT		
1	2412	MC S0	15.11	32.43	1 W att =	30.00	dBm	PASS	
6	2437	MC S0	15.54	35.81	1 W att =	30.00	dBm	PASS	
11	2462	MC S0	15.47	35.24	1 W att =	30.00	dBm	PASS	
802.11	n_HT20M Main								
СН	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit		RESULT		
1	2412	MC S0	12.79	19.01	1 W att =	30.00	dBm	PASS	
6	2437	MC S0	13.11	20.46	1 W att =	30.00	dBm	PASS	
11	2462	MC S0	13.15	20.65	1 W att =	30.00	dBm	PASS	

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

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6DB BANDWIDTH MEASUREMENT 9

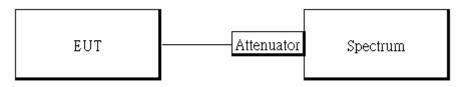
9.1 Standard Applicable

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

9.2 Measurement Equipment Used

Conducted Emission Test Site									
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.				
ТҮРЕ		NUMBER	NUMBER	CAL.					
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2016	04/13/2017				
Power Meter	Anritsu	ML2496A	1326001	06/23/2016	06/22/2017				
Power Sensor	Anritsu	MA2411B	1315048	06/23/2016	06/22/2017				
Power Sensor	Anritsu	MA2411B	1315049	06/23/2016	06/22/2017				
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	RF01	12/12/2015	12/11/2016				
DC Block	PASTERNACK	PE8210	RF29	12/12/2015	12/11/2016				
Splitter	RF-LAMBAD	RFLT2W1G18G	RF35	12/12/2015	12/11/2016				
Attenuator	WOKEN	218FS-10	RF23	12/12/2015	12/11/2016				
DC Power Supply	Agilent	E3640A	MY53140006	05/04/2016	05/03/2017				

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. Repeat above procedures until all frequency of interest measured was complete.

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9.5 Measurement Result

6dB Bandwidth

802.11b Main

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2412	10062	> 500	PASS
2437	10038	> 500	PASS
2462	9654	> 500	PASS

802.11g Main

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2412	16600	> 500	PASS
2437	16590	> 500	PASS
2462	16600	> 500	PASS

802.11 n HT20 Main

Frequency (MHz)	6dB Ban dwidth (kHz)	Limit (kHz)	Result
2412	17640	> 500	PASS
2437	17840	> 500	PASS
2462	17810	> 500	PASS



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



6dB Band Width Test Data CH-Mid

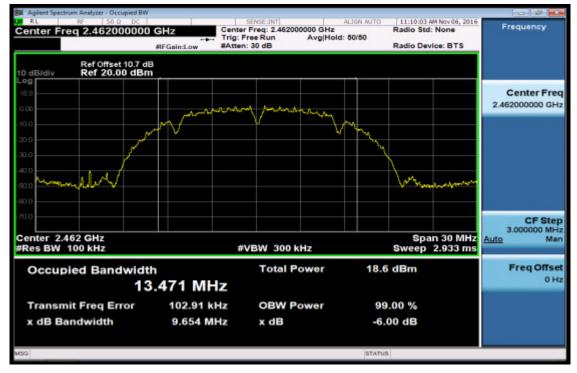


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6dB Band Width Test Data CH-High



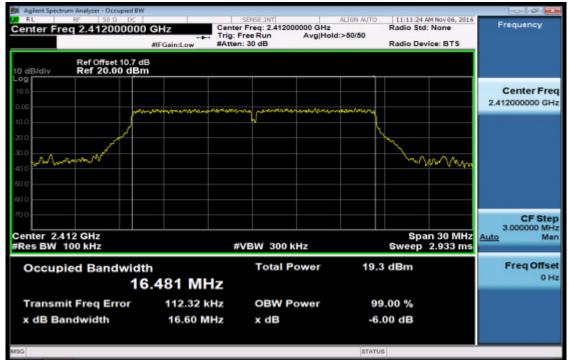
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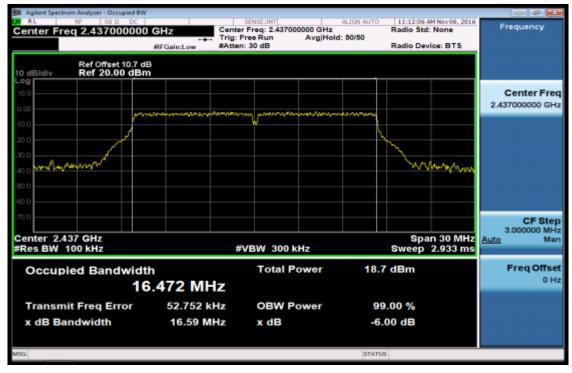
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802.11g (Main) 6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid

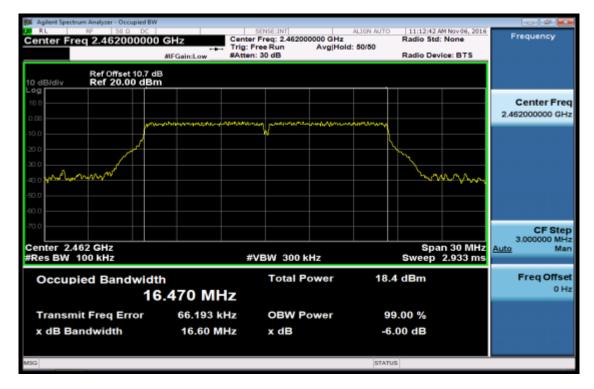


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6dB Band Width Test Data CH-High



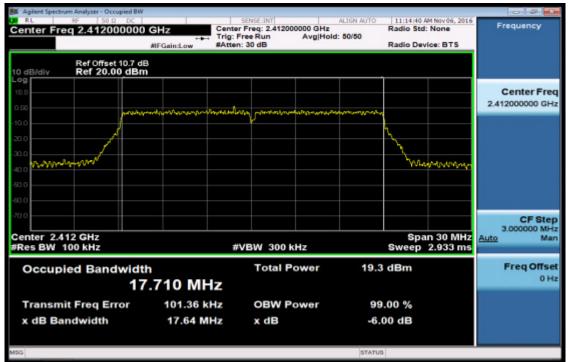
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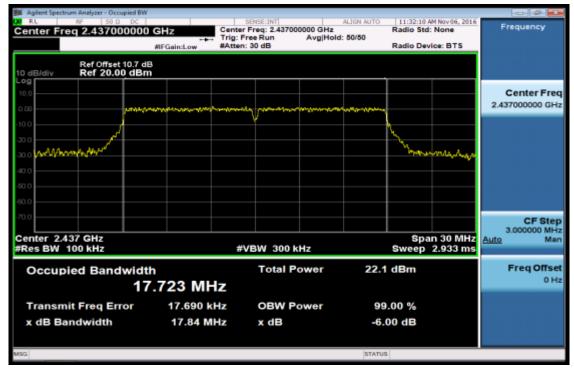
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802.11n 20M (Main) 6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid

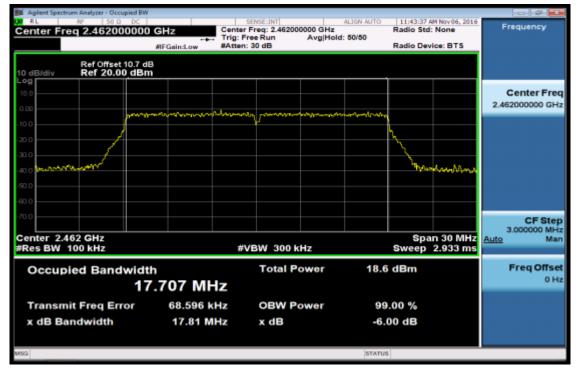


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6dB Band Width Test Data CH-High



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10 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

10.1 Standard Applicable

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

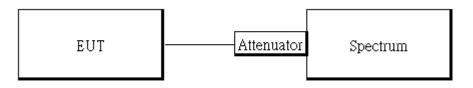
In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a) & RSS-Gen §8.10, must also comply with the radiated emission limits specified in §15.209(a) & RSS-Gen §8.8.

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

Conducted Emission Test Site									
EQUIPMENT	MFR	MFR MODEL SEI		LAST	CAL DUE.				
TYPE		NUMBER	NUMBER	CAL.					
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2016	04/13/2017				
Power Meter	Anritsu	ML2496A	1326001	06/23/2016	06/22/2017				
Power Sensor	Anritsu	MA2411B	1315048	06/23/2016	06/22/2017				
Power Sensor	Anritsu	MA2411B	1315049	06/23/2016	06/22/2017				
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	RF01	12/12/2015	12/11/2016				
DC Block	PASTERNACK	PE8210	RF29	12/12/2015	12/11/2016				
Splitter	RF-LAMBAD	RFLT2W1G18G	RF35	12/12/2015	12/11/2016				
Attenuator	WOKEN	218FS-10	RF23	12/12/2015	12/11/2016				
DC Power Supply	Agilent	E3640A	MY53140006	05/04/2016	05/03/2017				

10.2 Measurement Equipment Used

10.3 Test SET-UP



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10.4 Measurement Procedure

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.
- 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.
- 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.
- Set RBW = 100 kHz & VBW= 300 kHz, Detector =Peak, Sweep = Auto.
- 4. Allow trace to fully stabilize.
- 5. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
- 6. Repeat above procedures until all default test channel measured were complete.

10.5 Measurement Result

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

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

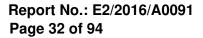


Band Edges Test Data CH-High



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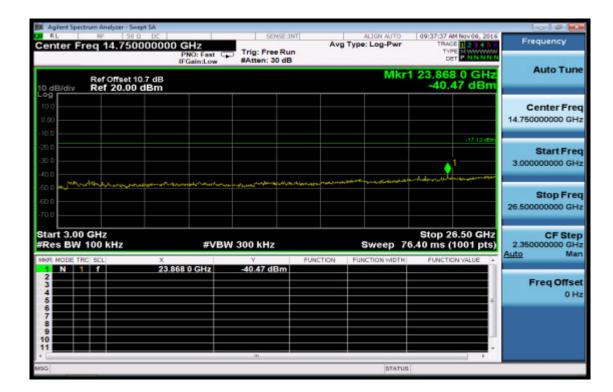
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802.11b **Spurious Emission Test Data CH-Low**

Agilent Spectrum Analyzer - Swept SA						and the second	- 4 - 2
Center Freq 1.515000000	GHz	SENSE:1N	Avg	ALIGN AUTO	09:37:19 AM Nove	3456	Frequency
Ref Offset 10.7 dB	PNO: Fast IFGain:Low	#Atten: 30 dB	1	Mk	r1 2.411 9 2.88 c	GHZ	Auto Tune
10.0					1		Center Freq 1.515000000 GHz
-20.0					-11	7.12 sBe	Start Freq 30.000000 MHz
-50.0 	ipineli gangal jaga san		984 - 24 July 19 - 9 - 24 - 24 - 24 - 24 - 24 - 24 - 24		hayayayatekteri eteri at		Stop Freq 3.000000000 GHz
Start 30 MHz #Res BW 100 kHz MRR MODE TRC SCL X	#VBW	300 kHz 7 2.88 dBm	FUNCTION	Sweep 9 Function worth	Stop 3.000 .667 ms (1001 FUNCTION VAL	pts)	CF Step 297.000000 MHz Auto Man
2 N 1 N 2 X 3 3 4 4 5 5 6 6 7 7 7 8 9 9 9 9 9 9 9 9 9 10	1119 GH2	2.46 dbm				-	Freq Offset 0 Hz
MSG				STATUS	1		



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Spurious Emission Test Data CH-Mid

Magilent Spectrum Analyzer - Swept SA						and the second second	
Center Freq 1.515000000	PNO: Fast C	SENSE IN	Avg	ALIGN AUTO	09:43:04 AM Nov 0 TRACE 1 2 TYPE 1 W	3456	Frequency
Ref Offset 10.7 dB 10 dB/div Ref 20.00 dBm	IFGain:Low	#Atten: 30 dB		Mk	r1 2.438 7 1.80 c	CH12	Auto Tune
10.0					• ¹		Center Freq 1.515000000 GHz
-10.0						20.00	Start Freq 30.000000 MHz
-50.0 -60.0 -70.0				and the second			Stop Freq 3.00000000 GHz
Start 30 MHz #Res BW 100 kHz	#VBW	/ 300 kHz	FUNCTION	Sweep 9.	Stop 3.000 667 ms (1001	pts)	CF Step 297.000000 MHa <u>suto</u> Mar
	438 7 GHz	1.80 dBm	PORCHON		P SHE HUN WE		Freq Offset 0 Hz
6 7 8 9							
MSG		m		STATUS			

Agilent Spectrum Analyzer - Sw		1			0 0
Center Freq 14.750	0000000 GHz PNO: Fast	SENSE INT	ALIGN AUTO Avg Type: Log-Pwr	09:43:25 AM Nov 06, 2016 TRACE 2 3 4 5 6 TYPE NOV NOV N	Frequency
Ref Offset : 10 dB/div Ref 20.00	IFGain:Low	#Atten: 30 dB	Mkr	1 25.395 5 GHz -40.91 dBm	Auto Tune
10.0 0.00					Center Fred 14.750000000 GH;
-20.0				-10.50 dbm	Start Free 3.000000000 GH
-50.0 -70.0	pang gana mang dapat		nanna an air de shoran an Anna an Anna an Anna an Anna an Anna Ann		Stop Free 26.50000000 GH
Start 3.00 GHz #Res BW 100 kHz	×		Sweep 7	Stop 26.50 GHz 5.40 ms (1001 pts) FUNCTION VALUE	CF Stej 2.350000000 GH <u>Auto</u> Ma
1 N 1 1 2 3 4 5 6	25.395 5 GHz	-40.91 dBm		-	Freq Offse 0 H
7 8 9 10					
4 ASG		л	STATUS	•	

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Spurious Emission Test Data CH-High

RL Freq 1.515000000 C	FIZ PNO: Fast IFGain:Low	Trig: Free Run #Atten: 30 dB	Avg	ALIGN AUTO Type: Log-Pwr Mk	Det P1	2 3 4 5 6 NNNNN	Frequency Auto Tu
Ref Offset 10.7 dB dB/div Ref 20.00 dBm	IFG8IN:LOW	wetten: oo db		Mk	1 2.462 4	GHZ	Auto Tu
-					1.76	dBm	
00					1		Center F 1.515000000 (
						10.24 (10)	Start F 30.000000 f
00 00 00 00 00	***	a Tamanan dinana di kabalah Matana kaba			/	***	Stop F 3.000000000
art 30 MHz tes BW 100 kHz	#VBV	V 300 kHz			Stop 3.000 667 ms (100	1 pts)	CF S 297.000000
NODE TRC SCL X 1 N 1 7 2,46 3 - - - - 4 - - - - 5 - - - - 6 - - - - 9 - - - -	52 4 GHz	¥ 1,76 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VA	UE •	Freq Off (
				STATUS		7	

	trum Analyzer - Sw		- 14						
enter Fr		DODOOOO GHZ PNO: IFGain	Fast 😱	SENSE 1	Av	g Type: Log-Pv	VF TRAC	M Nov 06, 2016	Frequency
0 dB/div	Ref Offset 1 Ref 20.00	0.7 dB				М	kr1 26.03 -41.	0 0 GHz 30 dBm	Auto Tur
og 10.0 1.00									Center Fre 14.750000000 GH
20.0 20.0 40.0							adara teres are states and	-10.24 cBm	Start Fre 3.000000000 Gi
0.0 0.0	and an and the second	al _{an} per contraction of the second second	Production of the second s	Anna Antolia Anna anna					Stop Fr 26.50000000 G
tart 3.00 Res BW	100 kHz		#VBW 3(00 kHz			76.40 ms (CF St 2.350000000 G Auto M
R MODE TR	C SCL	× 26,030 0 G	Hz -	41,30 dBm	FUNCTION	FUNCTION WE	TH FUNCTI	DN VALUE +	a second s
2 3 4 5									Freq Offs 0
6 7 8 9 0									
1				m					
G						ST/	TUS		

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



Band Edges Test Data CH-High

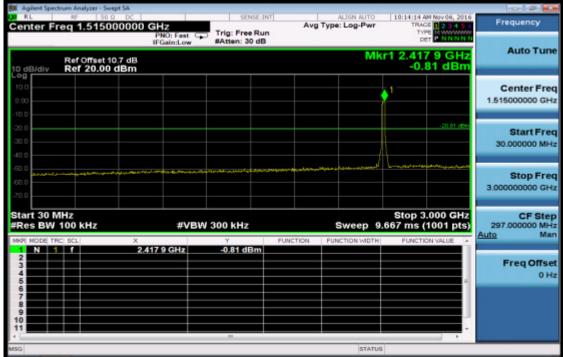


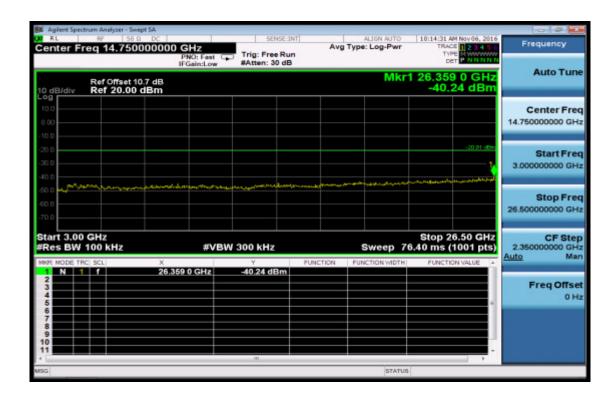
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802.11g **Spurious Emission Test Data CH-Low**





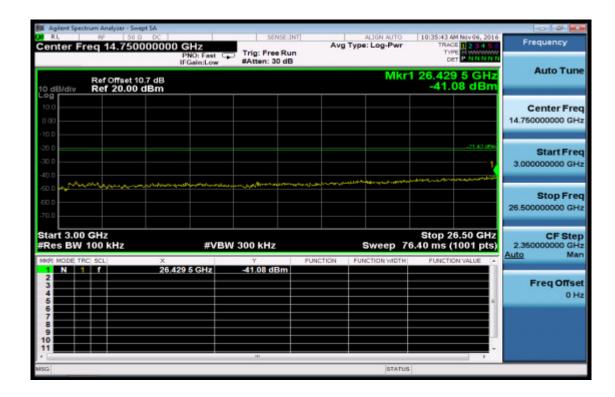
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Spurious Emission Test Data CH-Mid

	ctrum Analyzer - Swept SA		12.000		- Contraction of the Contraction		and the second second	- 4 - E
Center Fi	reg 1.51500000		SENSE IN	Avg	ALIGN AUTO Type: Log-Pwr	10:35:26 AM No TRACE	v06, 2016	Frequency
10 dB/div	Ref Offset 10.7 dB Ref 20.00 dBm	PNO: Fast IFGain:Low	#Atten: 30 dB		Mk	r1 2.441 6 -1.42	GHz	Auto Tune
10.0						• ¹		Center Fred 1.515000000 GH:
-20.0 -30.0 -40.0							21.42.494	Start Free 30.000000 MH
-50.0 -60.0 -70.0	مريس مريس من العربي م العربي من العربي من ال	ەدەۋىيەرىيەردۇن دەۋ ^{لىسەتىر} ئەت			ماللەر بىرىكىلەر دەخمۇد بىر		*****	Stop Free 3.000000000 GH
Start 30 M #Res BW	100 kHz	#VBW	/ 300 kHz	FUNCTION	Sweep 9	Stop 3.00 .667 ms (100	01 pts)	CF Stej 297.000000 MH Auto Ma
1 N 1 2 3 4 5		2.441 6 GHz	-1.42 dBm					Freq Offse 0 H
6 7 8 9 10								
4 MSG			m		STATU	5	•	



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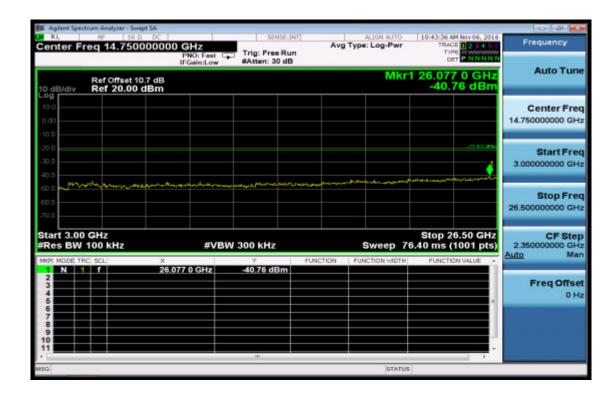
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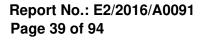
Spurious Emission Test Data CH-High

	trum Analyzer - Swep	t SA						
RL Center Fr	reg 1.51500	0000 GHz PNO: Fast	SENSE IN	Avg	ALIGN AUTO Type: Log-Pwr	10:43:19 AM TRACE	1 2 3 4 5 6	Frequency
0 dB/div	Ref Offset 10. Ref 20.00 d	IFGain:Low	#Atten: 30 dB		Mk	r1 2.456 -1.63	5 GHz 3 dBm	Auto Tur
0.00						∳ ¹		Center Fr 1.515000000 G
20.0								Start Fr 30.000000 M
50.0 50.0 70.0	unun den state den se	Jacon Approximation (Katendard		1487-012722-02040-074974-47		/ harmon	40	Stop Fr 3.000000000 G
tart 30 N Res BW	100 kHz	#VB\	N 300 kHz	FUNCTION	Sweep 9	Stop 3.0 .667 ms (10	01 pts)	CF St 297.000000 M Auto M
1 N 1 2 3 4 5		2,456 5 GHz	-1,63 dBm	P SHILL FROM		T SHE FRAM		Freq Offs 0
6 7 8 9 0								
a			m		STATUS	1	-	



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



Band Edges Test Data CH-High



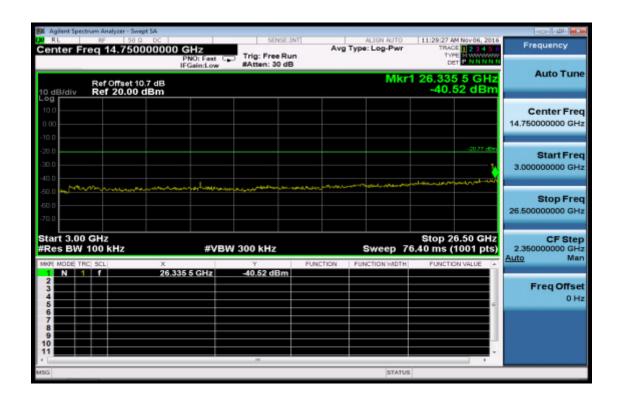
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802.11n HT20 **Spurious Emission Test Data CH-Low**

	m Analyzer - Swept Si						
Center Fre	q 1.515000	000 GHz	Trig: Free Ru	Avg	ALIGN AUTO Type: Log-Pwr	11:29:11 AM Nov 06, 20 TRACE 1 2 3 4 5 TYPE M WWWW	Frequency
10 dB/div	Ref Offset 10.7 Ref 20.00 dB		#Atten: 30 dB		Mk	r1 2.409 0 GH -0.77 dBn	Auto Tune
10.0 0.00						1	Center Free 1.515000000 GH
-20.0							Start Free 30.000000 MH
-50.0 -60.0 -70.0	Flander, en priferant and pre	يى ھو الد اور مېرو ، او موالي ورو کې د او ر		anaan ahaa ka k	ang da an		Stop Fre 3.000000000 GH
Start 30 MH #Res BW 10 MKR MODE TRC	SCL	x	300 kHz	FUNCTION	Sweep 9	Stop 3.000 GH .667 ms (1001 pts FUNCTION VALUE	
1 N 1 2 3 4 5 5 5 7 8 9 9 10 11		2.409 0 GHz	-0.77 dBm				Freq Offse 0 H
4 ASG			m		STATUS	1	



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Spurious Emission Test Data CH-Mid

Agilent Spectrum Analyzer - Swept SA							
RL RF 50 Ω DC Center Freq 1.515000000	PNO: Fast C	SENSE INT Trig: Free Run #Atten: 30 dB		ALIGN AUTO Type: Log-Pwr	11:39:53 AM Nov TRACE	3456	Frequency
Ref Offset 10.7 dB 0 dB/div Ref 20.00 dBm	IFGain:Low	#Atten: 30 dB		Mk	r1 2.435 7 -1.07 d	GHZ	Auto Tun
					• ¹		Center Fre 1.515000000 GF
0.0						107 alber	Start Fre 30.000000 MF
0.0 			and a state of the				Stop Fre 3.000000000 GH
tart 30 MHz Res BW 100 kHz	#VBW	300 kHz			Stop 3.000 667 ms (100	pts)	CF Ste 297.000000 Mi Auto Mi
NOPE TRC SCL X 1 N 1 1 2.0 2 1 1 2.0 2.0 3 3 3 3 3 3 4 5 5 5 5 5 6 6 7 7 8 9 9 9 9 1 1 1	135 7 GHz	-1.07 dBm	FUNCTION	PUNCTION WIDTH	FUNCTION VAL		Freq Offs 0 F
a				STATUS			

Agilent Spec	trum Analyzer - Swept Si RF 50.0		SENSE 1	ed 1	ALIGN AUTO	11:40:10 AM Nov 06, 2016	
11.54	req 14.75000	PNO: Fast	Trig: Free Run	Avg	Type: Log-Pwr	TRACE 1 2 3 4 5 TYPE MWWWWWW	Frequency
10 dB/div	Ref Offset 10.7 Ref 20.00 dB	IFGain:Low	#Atten: 30 dB		Mkr	1 26.382 5 GHz -40.95 dBm	Auto Tun
10.0 0.00							Center Fre 14.750000000 GH
-10.0 -20.0 -30.0 -40.0						21 07 offer 1	Start Fre 3.00000000 GF
-50.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		a de la contra de la	,,	and a second second second	مواسط المعرط إعلى والمراجع والمراجع العرب معر ومعد والمراجع	Stop Fre 26.50000000 GH
Start 3.00 #Res BW	100 kHz	#VB\	V 300 kHz	FUNCTION	Sweep 7	Stop 26.50 GHz 6.40 ms (1001 pts)	CF Ste 2.35000000 GF Auto Ma
	1	26.382 5 GHz	-40,95 dBm	PORCHON		- CHALLER PROCESS	Freq Offs
6 7 8 9							
11			ш		STATUS	*	

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Spurious Emission Test Data CH-High

Agilent Spectrum Analyzer - Swi					
Center Freq 1.5150	00000 GHz PNO: Fast	SENSE INT	ALIGN AUTO Avg Type: Log-Pwr	11:52:26 AM Nov 06, 2016 TRACE 1 2 3 4 5 0 Type	Frequency
Ref Offset 1 10 dB/div Ref 20.00	IFGain:Low	#Atten: 30 dB	Mk	r1 2.459 5 GHz -1.60 dBm	Auto Tun
10.0 0.00				* 1	Center Fre 1.515000000 GH
-20.0					Start Fre 30.000000 MH
-50.0 -60.0 -70.0		tafan hala kankalan an damadaan	and an	1 Landon managed	Stop Fre 3.000000000 GH
Start 30 MHz #Res BW 100 kHz	#VBW	300 kHz	Sweep 9	Stop 3.000 GHz .667 ms (1001 pts)	CF Ste 297.000000 MH Auto Ma
1 N 1 7 2 3 4 5	2,459 5 GHz	-1,60 dBm			Freq Offse 0 F
6 7 8 9 10					
esa l		m	STATUS	5	

RL	trum Analyzer - Swept SA RF 50 Ω Di req 14.750000		SENSE IN	Avg	ALIGN AUTO	11:52:41 AM Nov 06, 201 TRACE 2 3 4 5 TYPE M WWWWW	Frequency
10 dB/div	Ref Offset 10.7 d Ref 20.00 dBr		#Atten: 30 dB		Mkr	1 25.513 0 GHz -40.92 dBm	Auto Tun
10.0 0.00							Center Fre 14.750000000 GF
-10.0 -20.0 -30.0 -40.0							Start Fre 3.000000000 GF
50.0 - 10.0 60.0 -70.0	nnd, departer, and from			مەراغا <u>مىيە تەرىما</u>	مىيەت ۋەرىمەن يەرىپىلەر بەرىمەن بەرىمەن بەرىپىلەر 		Stop Fre 26.500000000 Gi
Start 3.00 #Res BW	100 kHz	#VB	W 300 kHz	FUNCTION	Sweep 7	Stop 26.50 GHz 6.40 ms (1001 pts)	CF Ste 2.350000000 GR Auto Mi
1 N 1 2 3 4 5 6 7 8 9 9		25.513 0 GHz	-40.92 dBm				Freq Offs 01
95			m		STATUS	-	

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



11 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT

11.1 Standard Applicable

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

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

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

Note:

- 1. The lower limit shall apply at the transition frequencies.
- Emission level (dBµV/m) = 20 log Emission level (dBµV/m)

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11.2 Measurement Equipment Used:

SGS 966 Chamber No.C										
Name of Equipment	Manufacturer	Model	Serial Number	Calibra- tion Date	Calibra- tion Due					
EMI Test Receiver	R&S	ESU 40	100363	04/12/2016	04/11/2017					
Loop Antenna	ETS-Lindgren	6502	00143303	12/23/2015	12/22/2016					
Broadband Antenna	TESEQ	CBL 6112D	35240	11/03/2016	11/02/2017					
Horn Antenna	ETS-Lindgren	3117	00143272	12/16/2015	12/15/2016					
Horn Antenna	Schwarzbeck	BBHA9170	185	07/18/2016	07/17/2017					
Pre Amplifier	EMC Instruments	EMC330	980096	12/12/2015	12/11/2016					
Pre Amplifier	EMC Instruments	EMC0011830	980199	12/12/2015	12/11/2016					
Pre Amplifier	R&S	SCU-18	10204	12/12/2015	12/11/2016					
Pre Amplifier	R&S	SCU-26	100780	12/12/2015	12/11/2016					
Coaxial Cable	Huber+Suhner	RG 214/U	966Rx 9K-30M	12/12/2015	12/11/2016					
Coaxial Cable	Huber+Suhner	RG 214/U SUCOFLEX 104 966Rx 30M-		12/12/2015	12/11/2016					
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Rx 1G-18G	12/12/2015	12/11/2016					
Coaxial Cable	Huber+Suhner	mini 141-12 SUCOFLEX 104	966Rx 18G-40G	12/12/2015	12/11/2016					
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Tx 30M-18G	12/12/2015	12/11/2016					
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	966Tx 18G-40G	12/12/2015	12/11/2016					
Attenuator	WOKEN	218FS-10	RF27	12/12/2015	12/11/2016					
Site NSA	SGS	966 Chamber C	SAC-C	03/04/2016	03/03/2017					
Site VSWR	SGS	966 Chamber C	SAC-C	03/04/2016	03/03/2017					
DC Power Supply	HOLA	DP-3003	D7070035	05/04/2016	05/03/2017					
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.					
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.					
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.					
Test Software	World-Pallas	Dr. E	V 3.0 Lite	N.C.R.	N.C.R.					

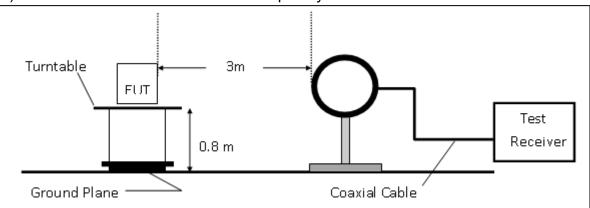
Note: N.C.R refers to Not Calibrated Required.

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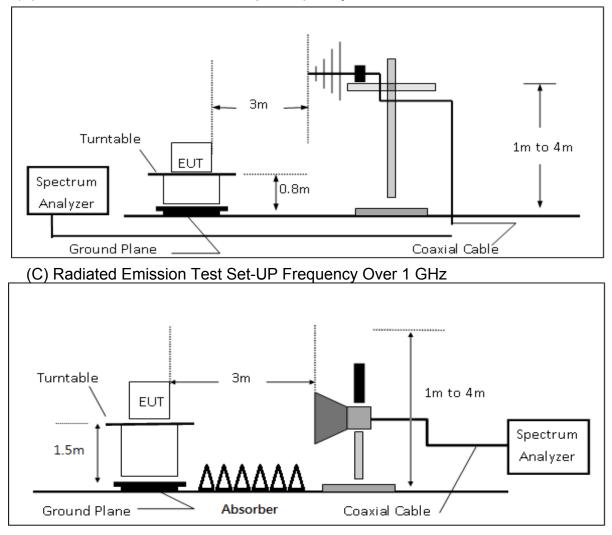


11.3 Test SET-UP





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



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11.4 Measurement Procedure

- 1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 2. The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequency> 1GHz above ground plane.
- 3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
- 4. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
- 5. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.
- 6. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
- 7. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
- 8. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 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	0	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

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

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

Note :

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

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

11.6 Test Results of Radiated Spurious Emissions form 9 kHz to 30 MHz

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

11.7 Measurement Result

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

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Radiated Band Edge Measurement Result (802.11b)

		•		•	-		2016/11/1	-	
	Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :		802.11 cy : 2412 M BE CH E2	IHz Tem Low Test	Date : p. / Humi. : Engineer : surement Ant	anna Pol	22.7deg_C/57RH Ashton Vertical		
			LZ	Meas			ventical		
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108	<u>.</u>								
	-								
96									
	1								
84	·-								
_ 72								PCC RSE PK	
(w/\/n									
Level [(dBuV/m]) 39	-							FCC RSE AV	
3 48	-								
						Ý			
36						*			
	-								
24									
12	<u>.</u>								
	1								
	0		2340	28: Frequenc		24		2430	
	Freq.	Note	Detector	Spectum	Factor	r Actual	Limit	Margin	
	•		Mode	Reading Le		FS	@3m	-	
_	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
-	2390.00	Е	Peak	43.38	0.92	44.30	74	-29.70	
	2390.00	E	Average	33.31	0.92	34.23	54	-19.77	



	Operation I Fundament Operation I EUT Pol. :	tal Frequen	802.11 cy : 2412 M BE CH E2	1Hz Temp Low Test	Date : o. / Humi. : Engineer : surement Ante	enna Pol.:	2016/11/1 22.7deg_0 Ashton Horizontal	
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108								
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24								
12	<u>.</u>							
0								
,	310		2340		70 cy [MHz]	24(00	2430
	Freq.	Note	Detector	Spectum			Limit	Margin
	MHz	F/H/E/S	Mode PK/QP/AV	Reading Le dBµV	vel dB	FS dBµV/m	@3m dBµV/m	dB
-	2390.00	E	Peak	43.54	0.92	44.47	74	-29.53
	2390.00	Е	Average	32.85	0.92	33.77	54	-20.23



	Operation Fundamen Operation EUT Pol. :	tal Frequen	802.11 cy : 2462 M BE CH E2	1Hz Temp High Test	Date : o. / Humi. : Engineer : surement Ante	enna Pol. :	2016/11/1 22.7deg_0 Ashton Vertical	
120								
108	-							
96								
84	-							
72	·							FCC RSE PK
Level [(dBuV/m]) 39								FCC RSE AV
ें 48	-		Į.					
			Î					
36]		*					
24	-							
12	<u> </u>							
	1							
	M50		2475		ion cy [MHz]	25	25	2550
	Freq.	Note	Detector	Spectum		Actual	Limit	Margin
			Mode	Reading Le		FS	@3m	
-	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m 44.82	dBµV/m	dB -29.18
	2483.50 2483.50	E	Peak Average	43.66 32.78	1.16 1.16	44.82 33.94	74 54	-29.18 -20.06
	2703.30	L	Average	52.70	1.10	00.04	57	-20.00



	Operation N Fundament Operation E EUT Pol. :	al Frequenc	802.11 cy : 2462 M BE CH E2	IHz Tem High Test	Date : p. / Humi. : Engineer : surement Ante	enna Pol. :	2016/11/1 22.7deg_0 Ashton Horizontal	
120]							
108								
96								
84								
								FCC RSE PK
77								
Level [(dBuV/m]) 3								FCC RSE AV
हुँ 48								PLC ROC MY
			Ť					
36	:		*					
24								
12	<u>.</u>							
0								
	450		2475		2500 ncy [MHz]	252	5	2550
	Freq.	Note	Detector	Spectur		Actual	Limit	Margin
	N /II I		Mode	Reading Le		FS	@3m	-U
_	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
	2483.50	E	Peak	41.84	1.16	43.00	74	-31.00
	2483.50	E	Average	32.57	1.16	33.73	54	-20.27



Radiated Band Edge Measurement Result (802 11g)

Ra	diated Bar	ia Eage M	easurement	Result (802.	iig)				
	Operation I Fundament Operation I EUT Pol. :	tal Frequen	802.11 cy : 2412 M BE CH E2	IHz Temp Low Test	Date : b. / Humi. : Engineer : urement Ante	nna Pol. :	2016/11/1 22.7deg_0 Ashton Vertical		
120)								
108	-								
96	;								-
84	-]								
								FCC RSE	PK
۳ ۳						1 X			
tevel [(dBuV/m]) B)								_
1 45								FCC RSE	~
	· .					*			
36	; <u>-</u>								-
24	-								
	:								
12									-
	2310		2340	23 Frequen		240	, , ,		2430
	Freq.	Note	Detector Mode	Spectum Reading Le		Actual FS	Limit @3m	Margin	
	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
	2390.00	E	Peak	64.96	0.92	65.88	74	-8.12	
	2390.00	E	Average	43.98	0.92	44.90	54	-9.10	



	Operation I Fundamen Operation I EUT Pol. :	tal Frequenc	802.11 cy : 2412 N BE CH E2	IHz Temp Low Test	Date : o. / Humi. : Engineer : surement Ante	nna Pol. :	2016/11/1 22.7deg_0 Ashton Horizontal	
120]							
108	-							
96								
84								
72								FCC RSE PK
						3		
Level [(dBuV/m]) 39								FCC RSE AV
_3 								
36						*		
	:							
24								
12	1							
	310		2340		70 cy [MH2]	240	o	2430
	Freq.	Note	Detector	Spectum		Actual	Limit	Margin
	MHz	F/H/E/S	Mode PK/QP/AV	Reading Le dBµV	vel dB	FS dBµV/m	@3m dBµV/m	dB
-	2390.00	E	Peak	60.85	0.92	61.77	74	-12.23
	2390.00	Е	Average	40.67	0.92	41.59	54	-12.41



	Operation N Fundament Operation E EUT Pol. :	al Frequenc	802.11 cy : 2462 M BE CH E2	1Hz Tem High Test	Date: p. / Humi.: Engineer: surement Ante	enna Pol. :	2016/11/1 22.7deg_0 Ashton Vertical	
120								
108								
96								
84								
_ 72	-							FCC RSE PK
Bu//ml			* *					
Level [(dBuV/m]) 3								FCC RSE AV
48]							
36			×					
	:							
24								
12	<u>.</u>							
0								
	150		2475		500 ку [MHz]	252	5	2550
	Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
			Mode	Reading Le		FS	@3m	
_	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
	2483.50	Е	Peak	61.72	1.16	62.88	74	-11.12
	2483.50	E	Average	40.82	1.16	41.98	54	-12.02

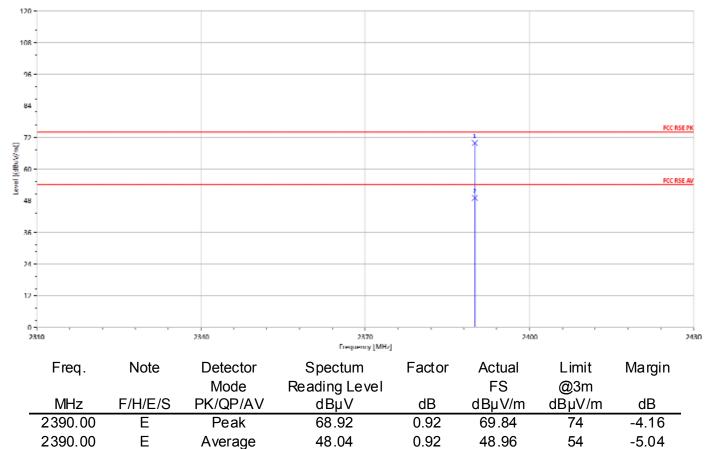


	Operation N Fundament Operation E EUT Pol. :	tal Frequen	802.11 cy : 2462 N BE CH E2	1Hz Tem High Test	Date: p. / Humi.: Engineer: surement Ante	enna Pol. :	2016/11/1 22.7deg_(Ashton Horizontal	C/57RH
120]							
108								
96								
84								
72								FCC RSE PK
[[m//m]]								
Level [(dBuV/m]) 3			×					FCC RSE AV
ے 48								
36			*					
	:							
24								
12	<u>.</u>							
0	<u> </u>							
	450		2475		500 icy [MHz]	25	55	2550
	Freq.	Note	Detector	Spectum		Actual	Limit	Margin
	MHz	F/H/E/S	Mode PK/QP/AV	Reading Le dBµV	vel dB	FS dBµV/m	@3m dBµV/m	dB
-	2483.50	<u> </u>	Peak	<u>авру</u> 56.20	1.16	<u>и Бр V/III</u> 57.36	<u>υσμν/π</u> 74	-16.64
	2483.50	E	Average	37.04	1.16	38.20	54	-15.80



Radiated Band Edge Measurement Result (802.11_HT20)

Operation Mode :	802.11n20	Test Date :	2016/11/17
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH Low	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol.:	Vertical



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	Operation I Fundament Operation I EUT Pol. :	tal Frequen	802.11 cy : 2412 M BE CH E2	1Hz Temp Low Test	Date : b. / Humi. : Engineer : surement Ante	enna Pol.:	2016/11/1 22.7deg_0 Ashton Horizontal	
120]							
108								
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Level [(dBuV/m]) 3						1		FCC RSE AV
ے 48								
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	:							
24								
12	<u>.</u>							
0								
2	310		2340		70 :y [MH2]	24	00	2430
	Freq.	Note	Detector	Spectum		Actual	Limit	Margin
	MHz	F/H/E/S	Mode PK/QP/AV	Reading Le [.] dBµV	vei dB	FS dBµV/m	@3m dBµV/m	dB
_	2390.00	E	Peak	63.30	0.92	64.22	74	-9.78
	2390.00	Е	Average	43.06	0.92	43.98	54	-10.02



2485.80

S

	Operation I Fundament Operation I EUT Pol. :	tal Frequence	802.11ı cy : 2462 M BE CH E2	lHz	Test Date Temp. / H Test Eng Measurer	łumi. :	na Pol. :	2016/11/17 22.7deg_0 Ashton Vertical	
120)]								
108	-								
96	;								
84									
77	-								FCC RSE PK
			1 X X						
Level [(dBuV/m]) B									FCC RSE AV
48									
36			* *						
24	1								
	1								
12									
	1 M50		2475		2500 Frequency [MH2]	* *	2525		2550
	Freq.	Note	Detector	•	ectum	Factor	Actual	Limit	Margin
	MHz	F/H/E/S	Mode PK/QP/AV		ng Level 3µV	dB	FS dBµV/m	@3m dBµV/m	dB
•	2483.50	E	Peak).93	1.16	62.09	74	-11.91
	2483.50	E	Average		3.52	1.16	39.68	54	-14.32
	2485.80	S	Peak	63	3.33	1.15	64.48	74	-9.52

36.89

Average

1.15

38.04

54

-15.96



2485.60

S

	Operation N Fundament Operation E EUT Pol. :	al Frequenc	802.11 cy : 2462 M BE CH E2	1Hz	Test D Temp Test E Measu	. / Hun Engine	er :	nna Pol. :	2016/11/17 22.7deg_0 Ashton Horizontal	
120										
108	1									
96										
84	-									
72										FCC RSE PK
			3							
Level [(dBuV/m]) 9			Ť.							FCC RSE AV
ڭ 48										
36			×;							
	:									
24										
12	<u>:</u>									
0	<u> </u>									
	450		2475		2500 Energiency		-	2525		2550
	Freq.	Note	Detector	•	pectum		actor	Actual	Limit	Margin
			Mode		ling Lev	el		FS	@3m	
-	MHz 2483.50	F/H/E/S E	PK/QP/AV Peak		dBµV 58.92		dB 1.16	dBµV/m 60.08	dBµV/m 74	dB -13.92
	2483.50 2483.50	E	Average		37.56		1.16	38.72	74 54	-15.92
	2485.60	S	Peak		57.30 51.33		1.15	62.49	74	-11.51

36.48

Average

1.15

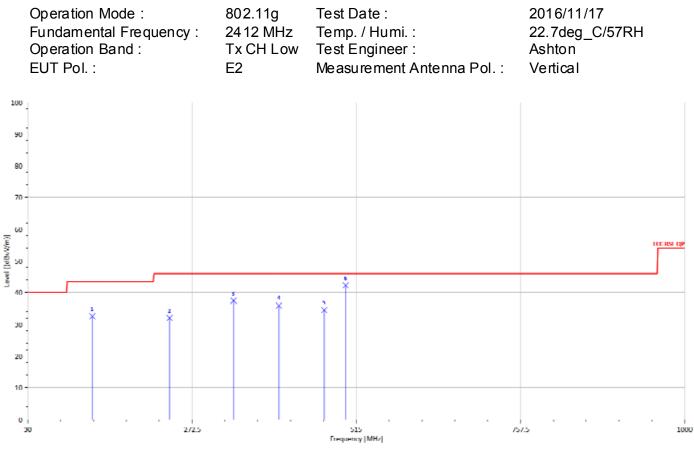
37.63

54

-16.37



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



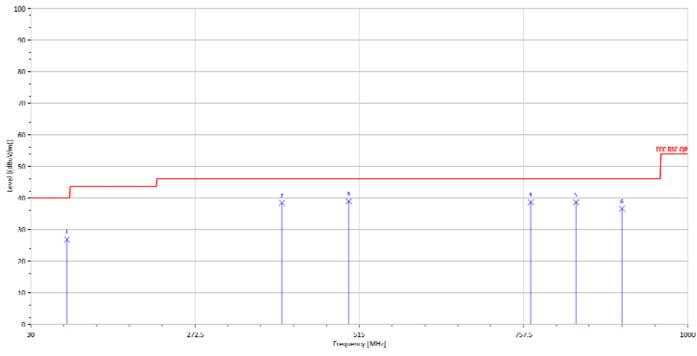
Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
125.06	S	Peak	48.25	-15.68	32.57	43.5	-10.93
239.52	S	Peak	47.31	-15.28	32.03	46	-13.97
333.61	S	Peak	49.32	-11.88	37.43	46	-8.57
400.54	S	Peak	45.69	-9.76	35.92	46	-10.08
467.47	S	Peak	42.27	-7.73	34.54	46	-11.46
499.48	S	Peak	49.94	-7.66	42.28	46	-3.72

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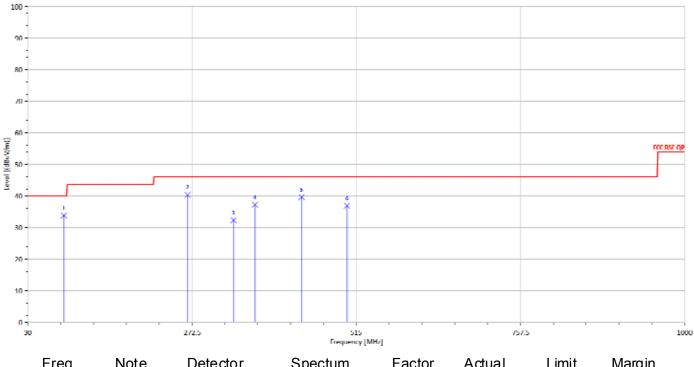
Operation Mode :	802.11g	Test Date :	2016/11/17
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol.:	Horizontal



Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
83.35	S	Peak	47.29	-20.47	26.82	40	-13.18
400.54	S	Peak	48.27	-9.76	38.50	46	-7.50
499.48	S	Peak	46.64	-7.66	38.98	46	-7.02
768.17	S	Peak	42.93	-4.23	38.70	46	-7.30
835.10	S	Peak	41.67	-2.98	38.68	46	-7.32
903.00	S	Peak	38.57	-1.92	36.65	46	-9.35



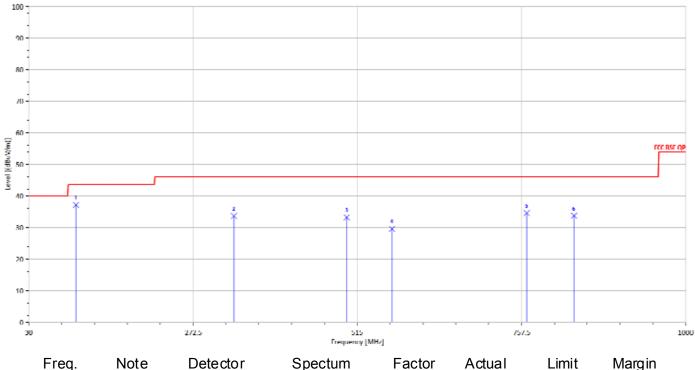
Operation Mode :	802.11g	Test Date :	2016/11/17
Fundamental Frequency : Operation Band :	2437 MHz Tx CH Mid	Temp. / Humi. : Test Engineer :	22.7deg_C/57RH Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq.	NOLE	Delector	Specium	Factor	Actual		Maryin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
83.35	S	Peak	54.30	-20.47	33.82	40	-6.18	
265.71	S	Peak	54.16	-13.79	40.38	46	-5.62	
333.61	S	Peak	44.18	-11.88	32.29	46	-13.71	
365.62	S	Peak	48.17	-10.89	37.28	46	-8.72	
434.49	S	Peak	49.09	-9.41	39.68	46	-6.32	
501.42	S	Peak	44.54	-7.59	36.95	46	-9.05	



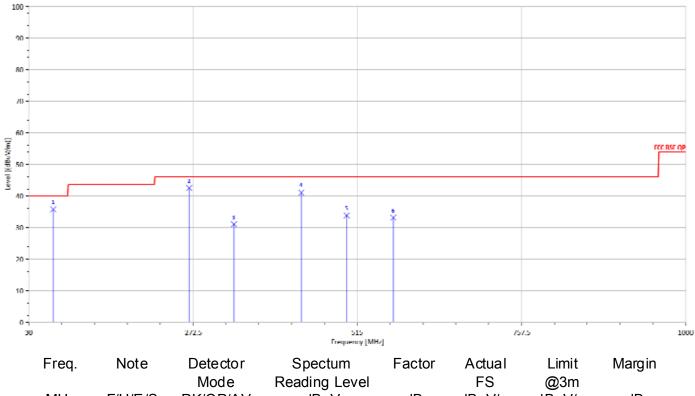
Operation Mode :	802.11g	Test Date :	2016/11/17
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



ricq.	11010	Deleolor	opeotani	i uotoi	7101001	E 11110	margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
99.84	S	Peak	54.93	-17.77	37.17	43.5	-6.33	
332.64	S	Peak	45.57	-11.92	33.65	46	-12.35	
499.48	S	Peak	40.86	-7.66	33.20	46	-12.80	
566.41	S	Peak	36.09	-6.55	29.54	46	-16.46	
765.26	S	Peak	38.90	-4.32	34.58	46	-11.42	
835.10	S	Peak	36.71	-2.98	33.73	46	-12.27	



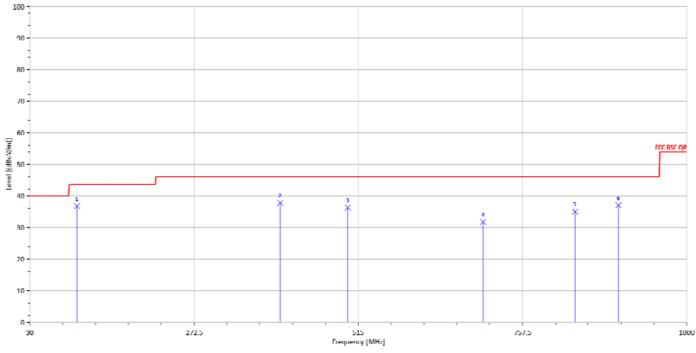
Operation Mode :	802.11g	Test Date :	2016/11/17
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



		mode	ricualing Level		10	Ce on i		
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
65.89	S	Peak	58.06	-22.29	35.77	40	-4.23	
266.68	S	Peak	56.30	-13.86	42.44	46	-3.56	
332.64	S	Peak	42.91	-11.92	30.99	46	-15.01	
432.55	S	Peak	50.52	-9.47	41.04	46	-4.96	
499.48	S	Peak	41.46	-7.66	33.79	46	-12.21	
568.35	S	Peak	39.81	-6.71	33.10	46	-12.90	



Operation Mode :	802.11g	Test Date :	2016/11/17
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



	Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
_	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
-	99.84	S	Peak	54.55	-17.77	36.78	43.5	-6.72
	399.57	S	Peak	47.59	-9.73	37.85	46	-8.15
	499.48	S	Peak	43.98	-7.66	36.32	46	-9.68
	699.30	S	Peak	36.85	-5.09	31.75	46	-14.25
	835.10	S	Peak	38.06	-2.98	35.07	46	-10.93
	899.12	S	Peak	39.42	-2.35	37.07	46	-8.93



Above 1GHz Data:

Radiated Spurious Emission Measurement Result (802.11 b)

	Operation Mod Fundamental F Operation Ban EUT Pol. :	requency :	802.11b 2412 MHz Tx CH Low E2	TestE	pate : / Humi. : Ingineer : Irement Antenna Pol.	22 As	016/11/17 2.7deg_C/57RH shton ertical
100	+						
20	1						
80	<u>.</u>						
							TCC IIST PK
70							
60	<u> </u>						
[(ш//л	l						ICENSE AV
Level ((dBuX/m)) 35	-	κ.					
ڭ 40	,	<					
30	_						
20							
10	<u> </u>						
	:						
0		י ו מעת		I3. Frequen	 /50 су [МН2]	20125	

	Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
-	4824.00	Н	Peak	40.12	7.58	47.70	74	-26.30
	4824.00	Н	Average	35.55	7.58	43.13	54	-10.87

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.



50

Δn

20

10

0 -1000

Freq.

MHz

4824.00

4824.00

Level [(dBuV/m])

FCC RSE AV

26500

Margin

dB

-25.63

-9.22

	Operation Mode : Fundamental Frequency Operation Band : EUT Pol. :	802.11b : 2412 MHz Tx CH Low E2	TestE	Date : . / Humi. : Engineer : urement Antenna Pol. :	2016/11/17 22.7deg_C/57RH Ashton Horizontal
100 -					
<u>90</u> -					
80 -					ICE IN PK
70					

13750

Frequency [MHz]

Factor

dB

7.58

7.58

Spectum

Reading Level

dBµV

40.79

37.20

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7375

Detector

Mode

PK/QP/AV

Peak

Average

Note

F/H/E/S

Η

Н

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20125

Limit

@3m

dBµV/m

74

54

Actual

FS

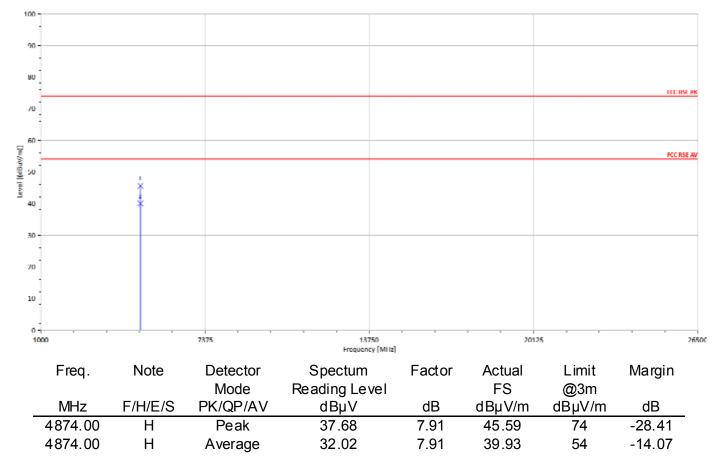
dBµV/m

48.37

44.78



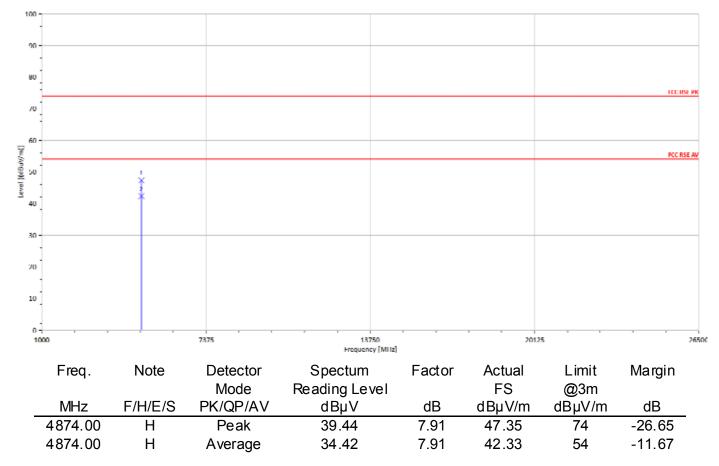
Operation Mode :	802.11b	Test Date :	2016/11/17
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Ashton
Operation Band :	Tx CH Mid	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



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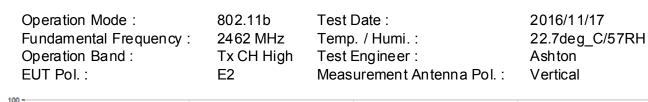


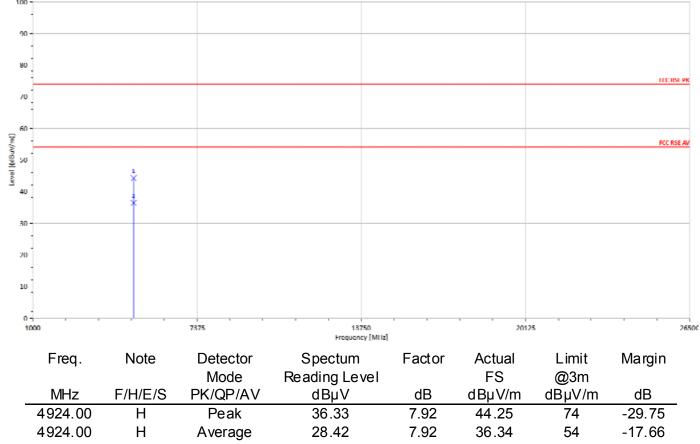
Operation Mode :	802.11b	Test Date :	2016/11/17
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol.:	Horizontal



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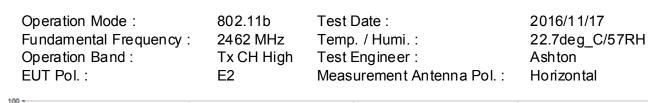


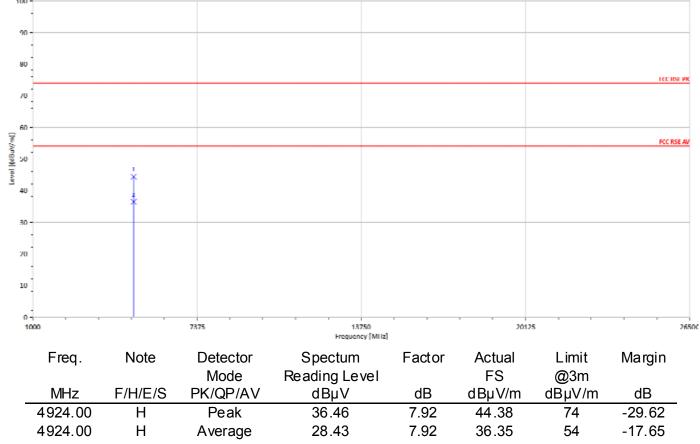




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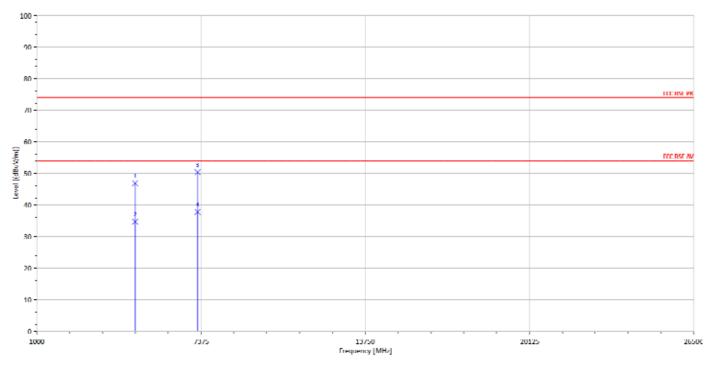


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Radiated Spurious Emission Measurement Result (802.11 g)

EUT Pol. : E2 Measurement Antenna Pol. : Vertical	Operation Mode : Fundamental Frequency : Operation Band : EUT Pol. :		Test Date : Temp. / Humi. : Test Engineer : Measurement Antenna Pol. :	2016/11/17 22.7deg_C/57RH Ashton Vertical
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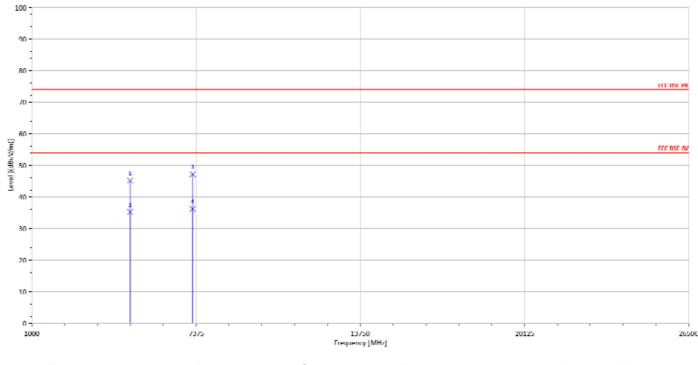
Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Н	Peak	39.26	7.58	46.84	74	-27.16
4824.00	Н	Average	27.14	7.58	34.72	54	-19.28
7236.00	Н	Peak	35.82	14.56	50.38	74	-23.62
7236.00	Н	Average	23.27	14.56	37.83	54	-16.17

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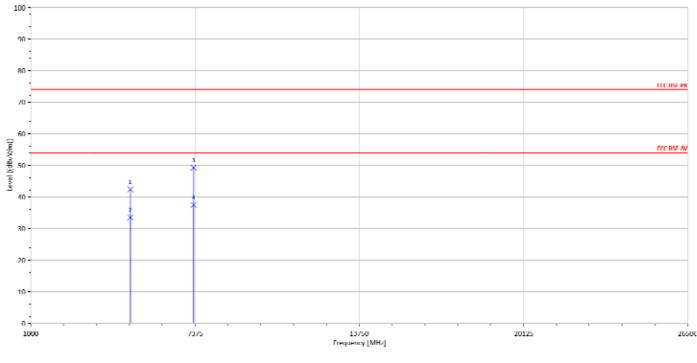
Operation Mode :	802.11g	Test Date :	2016/11/17
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band:	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
4824.00	Н	Peak	37.57	7.58	45.14	74	-28.86	
4824.00	Н	Average	27.69	7.58	35.27	54	-18.73	
7236.00	Н	Peak	32.62	14.56	47.18	74	-26.82	
7236.00	Н	Average	21.67	14.56	36.23	54	-17.77	



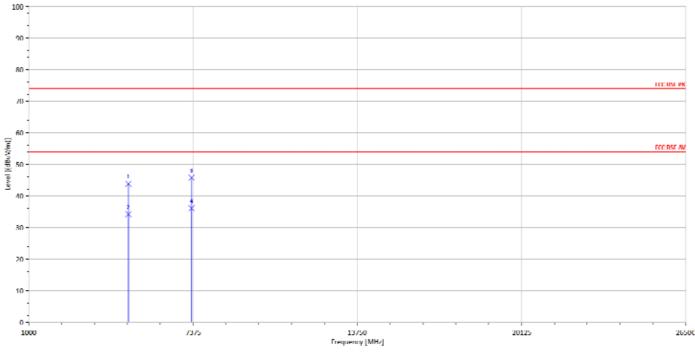
Operation Mode :	802.11g	Test Date :	2016/11/17
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Н	Peak	34.44	7.91	42.35	74	-31.65
4874.00	Н	Average	25.61	7.91	33.52	54	-20.48
7311.00	Н	Peak	34.80	14.47	49.27	74	-24.73
7311.00	Н	Average	23.05	14.47	37.52	54	-16.48



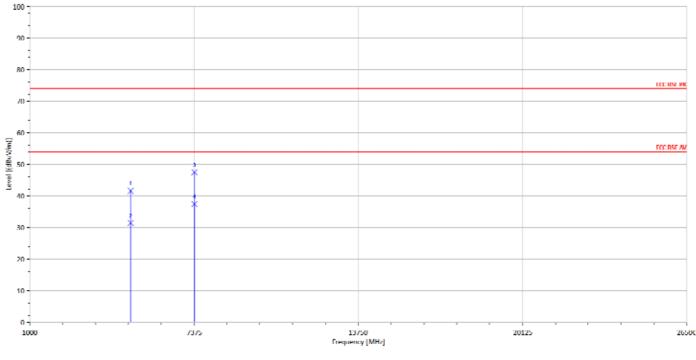
Operation Mode :	802.11g	Test Date :	2016/11/17
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal



Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	d Bµ V/m	dBµV/m	dB
	1/11/2/3		uυμν	uD	ubµv/m	ubµv/m	uD
4874.00	Н	Peak	35.86	7.91	43.77	74	-30.23
4874.00	Н	Average	26.30	7.91	34.21	54	-19.79
7311.00	Н	Peak	31.28	14.47	45.76	74	-28.24
7311.00	Н	Average	21.64	14.47	36.11	54	-17.89



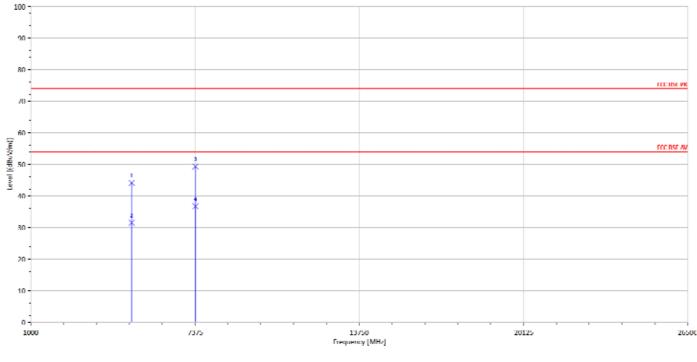
Operation Mode :	802.11g	Test Date :	2016/11/17
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	22.7deg C/57RH
Operation Band :	Tx CH High	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Н	Peak	33.66	7.92	41.58	74	-32.42
4924.00	Н	Average	23.50	7.92	31.42	54	-22.58
7386.00	Н	Peak	32.49	15.00	47.49	74	-26.51
7386.00	Н	Average	22.45	15.00	37.45	54	-16.55



Operation Mode:	802.11g	Test Date :	2016/11/17
Fundamental Frequency:	2462 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal

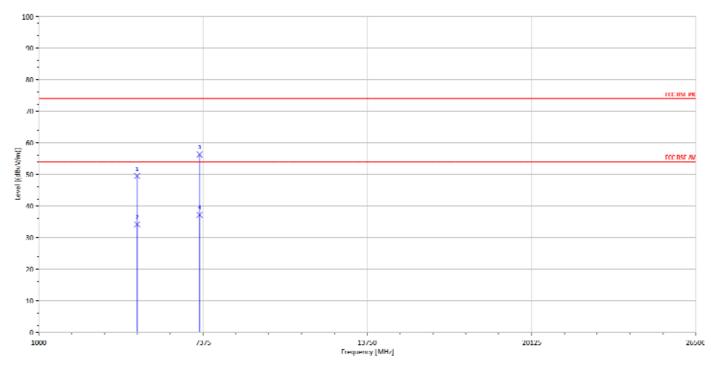


Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Н	Peak	36.14	7.92	44.06	74	-29.94
4924.00	Н	Average	23.55	7.92	31.47	54	-22.53
7386.00	Н	Peak	34.33	15.00	49.33	74	-24.67
7386.00	Н	Average	21.74	15.00	36.74	54	-17.26



Radiated Spurious Emission Measurement Result (802.11_HT20)

Operation Mode : 802.	11n20 Test Date :	2016/11/17
Fundamental Frequency : 2412	2 MHz Temp. / Humi. :	22.7 deg_C/57RH
Operation Band : Tx C	H Low Test Engineer :	Ashton
EUT Pol. : E2	Measurement Antenna Pol.	: Vertical

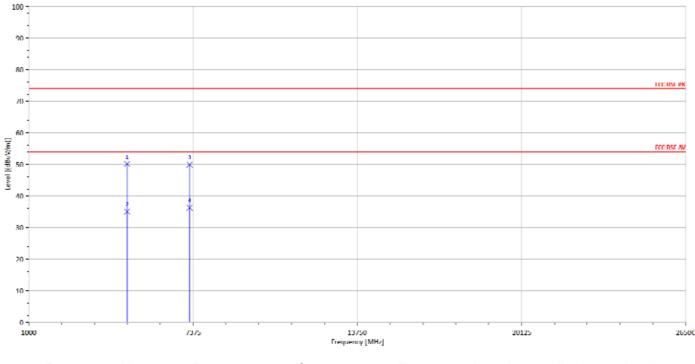


Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Н	Peak	41.92	7.58	49.50	74	-24.50
4824.00	Н	Average	26.61	7.58	34.19	54	-19.81
7236.00	Н	Peak	41.72	14.56	56.28	74	-17.72
7236.00	Н	Average	22.67	14.56	37.23	54	-16.77

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



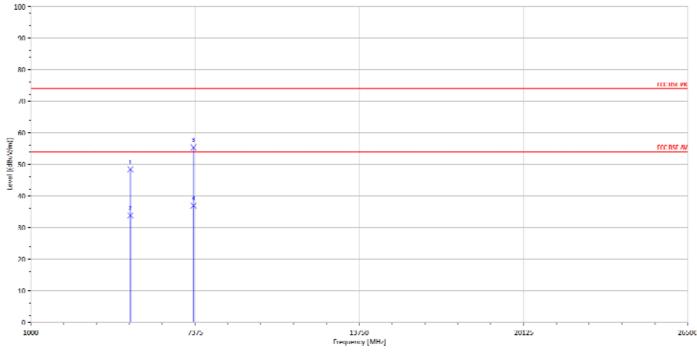
Operation Mode :	802.11n20	Test Date :	2016/11/17
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	22.7 deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol.:	Horizontal



Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
4824.00	Н	Peak	42.57	7.58	50.15	74	-23.85	
4824.00	Н	Average	27.51	7.58	35.09	54	-18.91	
7236.00	Н	Peak	35.37	14.56	49.93	74	-24.07	
7236.00	Н	Average	21.75	14.56	36.31	54	-17.69	



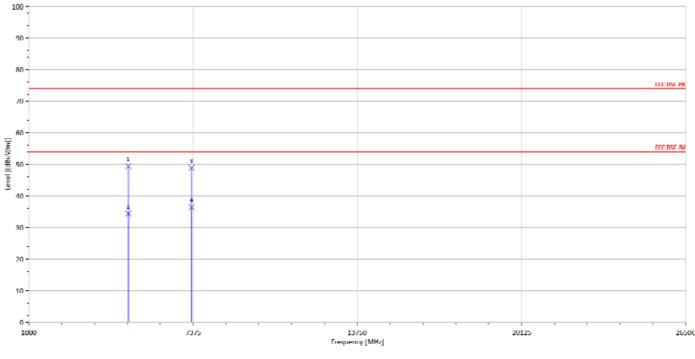
Operation Mode :	802.11n20	Test Date :	2016/11/17
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	22.7 deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Н	Peak	40.53	7.91	48.44	74	-25.56
4874.00	Н	Average	25.93	7.91	33.84	54	-20.16
7311.00	Н	Peak	40.89	14.47	55.36	74	-18.64
7311.00	Н	Average	22.49	14.47	36.96	54	-17.04



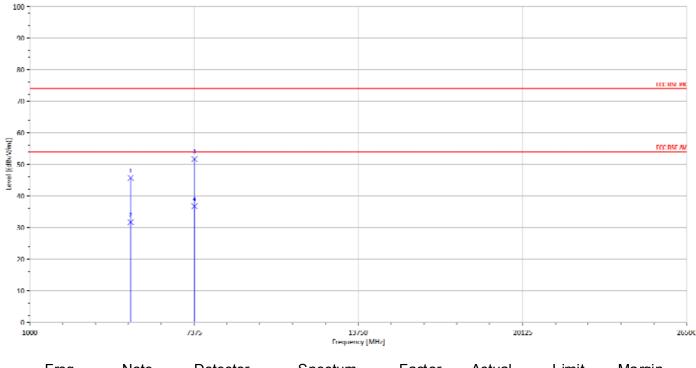
802.11n20	Test Date :	2016/11/17
2437 MHz	Temp. / Humi. :	22.7deg_C/57RH
Tx CH Mid	Test Engineer :	Ashton
E2	Measurement Antenna Pol. :	Horizontal
	2437 MHz Tx CH Mid	2437 MHz Temp. / Humi. : Tx CH Mid Test Engineer :



Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Н	Peak	41.48	7.91	49.39	74	-24.61
4874.00	Н	Average	26.45	7.91	34.36	54	-19.64
7311.00	Н	Peak	34.39	14.47	48.86	74	-25.14
7311.00	Н	Average	21.93	14.47	36.40	54	-17.60



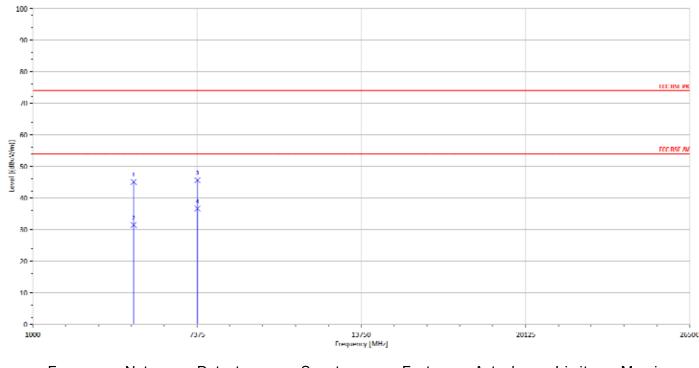
Operation Mode :	802.11n20	Test Date :	2016/11/17
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	22.7 deg_C/57RH
Operation Band :	Tx CH High	Test Engineer :	Ashton
EUT Pol. :	E2	Measurement Antenna Pol. :	Vertical



⊢req.	Note	Detector	Spectum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	_
4924.00	Н	Peak	37.76	7.92	45.68	74	-28.32	
4924.00	Н	Average	23.72	7.92	31.64	54	-22.36	
7386.00	Н	Peak	36.69	15.00	51.69	74	-22.31	
7386.00	Н	Average	21.77	15.00	36.77	54	-17.23	



Operation Mode :	802.11n20	Test Date :	2016/11/17
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	22.7deg C/57RH
Operation Band : EUT Pol. :		•	Ashton Horizontal



Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	_
4924.00	Н	Peak	37.12	7.92	45.04	74	-28.96	
4924.00	Н	Average	23.51	7.92	31.43	54	-22.57	
7386.00	Н	Peak	30.57	15.00	45.57	74	-28.43	
7386.00	Н	Average	21.66	15.00	36.66	54	-17.34	



12 PEAK POWER SPECTRAL DENSITY

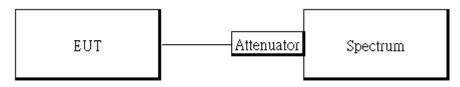
12.1 Standard Applicable

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	EQUIPMENT MFR		SERIAL	LAST	CAL DUE.					
ТҮРЕ		NUMBER	NUMBER	CAL.						
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2016	04/13/2017					
Power Meter	Anritsu	ML2496A	1326001	06/23/2016	06/22/2017					
Power Sensor	Anritsu	MA2411B	1315048	06/23/2016	06/22/2017					
Power Sensor	Anritsu	MA2411B	1315049	06/23/2016	06/22/2017					
Coaxial Cable 30cm	WOKEN	00100A1F1A195C	RF01	12/12/2015	12/11/2016					
DC Block	PASTERNACK	PE8210	RF29	12/12/2015	12/11/2016					
Splitter	RF-LAMBAD	RFLT2W1G18G	RF35	12/12/2015	12/11/2016					
Attenuator	WOKEN	218FS-10	RF23	12/12/2015	12/11/2016					
DC Power Supply	Agilent	E3640A	MY53140006	05/04/2016	05/03/2017					

12.3 Test Set-up



12.4 Measurement Procedure

- 1. Set analyzer center frequency to DTS channel center frequency.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 3. Set the span to 1.5 times the DTS channel bandwidth.
- 4. Set the RBW = 3 kHz & VBW = 10 kHz.
- 5. For defining Restricted Band Edge Limit: Set the RBW = 100kHz & VBW = 300 kHz.
- 6. Detector = peak.
- 7. Sweep time = auto couple.
- 8. Trace mode = max hold.
- 9. Allow trace to fully stabilize.
- 10. Use the peak marker function to determine the maximum amplitude level.

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.



12.5 Measurement Result

PO	WER	DENSITY	802	2.11b M	ODE	
Freque		RF Power	M	aximum		
(MH	5	Density		Limit	Resu	ı İt
•	,	(dBm)	((dBm)		
241		-14.32		8.00	PAS	S
243	7	-14.66		8.00	PAS	S
246	2	-15.35		8.00	PAS	S
PO	WER	DENSITY	802	2.11g M	ODE	
Frague		RF Power	M	aximum		
Freque (MHz	-	Density		Limit	Resu	ı It
	,	(dBm)		(dBm)		
241		-15.26		8.00	PAS	S
243	7	-15.48		8.00	PAS	S
246	2	-15.70		8.00	PAS	S
POWE	R DEI	NSITY 802	2.1	1n HT20)E
Frague		RF Power	M	aximum		
Freque (MHz	-	Density		Limit	Resu	ı It
		(dBm) -14.16		(dBm)		
	2412			8.00	PAS	S
243		-14.17		8.00	PAS	S
246	2	-14.97	8.00		PAS	S
В	anded	lge Limit 8	02.	11b MOI	DE]
Freq	uency	RF Powe	er	Bandedge		
	1Hz)	Density	'	Limi	t	
· ·		(dBm)	_	(dBn		
	412	2.45		-17.5		
24	462	1.49		-18.5	51	
В	anded	lge Limit 8		-		
Frea	uency	RF Powe		Bande	0	
	1Hz)	Density	'	Lim		
· ·	412	(dBm) -1.07		<u>(dBn)</u> -21.0		
	462	-1.94		-21.9		ł
		ge Limit 80	2.1			1
				Bande		ł
	uency	Density		Lim	0	
(1)	1Hz)	(dBm)		(dBn		
24	412	-0.25		-20.2	-	

*Refer to next page for plots



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



Power Spectral Density Test Plot (CH-Mid)



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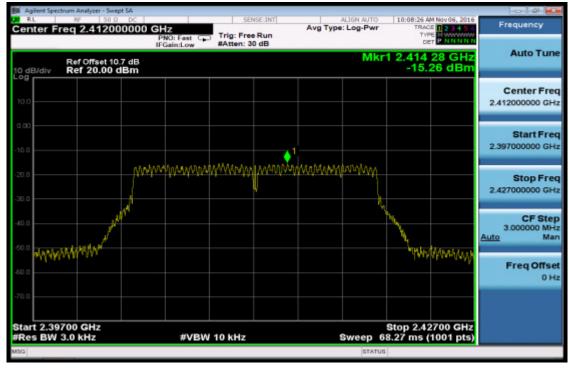


Power Spectral Density Test Plot (CH-High)

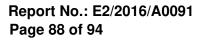


802.11g

Power Spectral Density Test Plot (CH-Low)

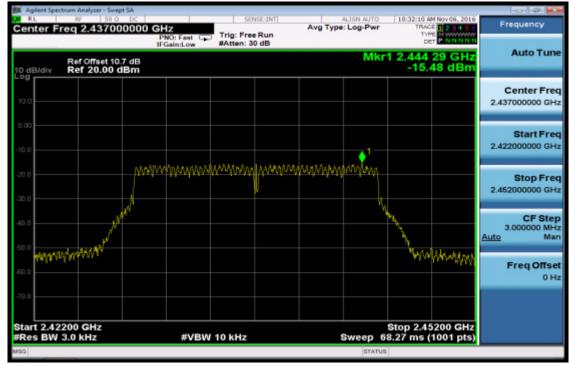


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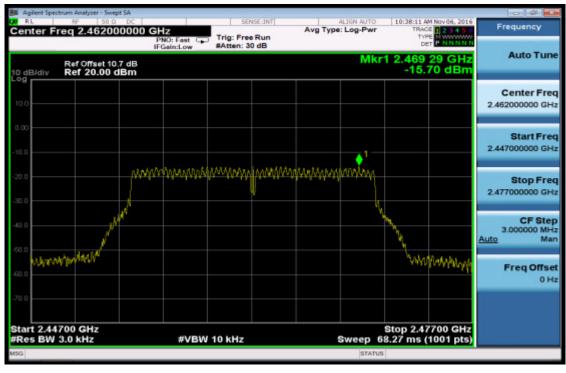




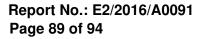
Power Spectral Density Test Plot (CH-Mid)



Power Spectral Density Test Plot (CH-High)

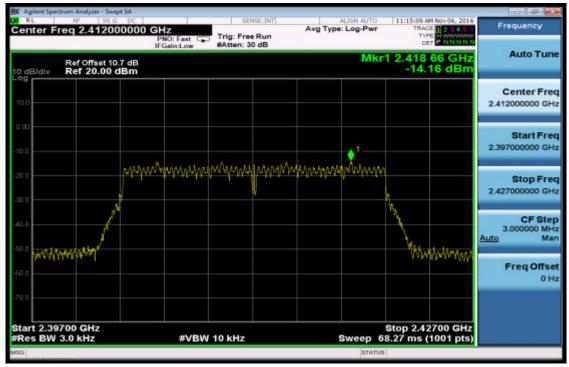


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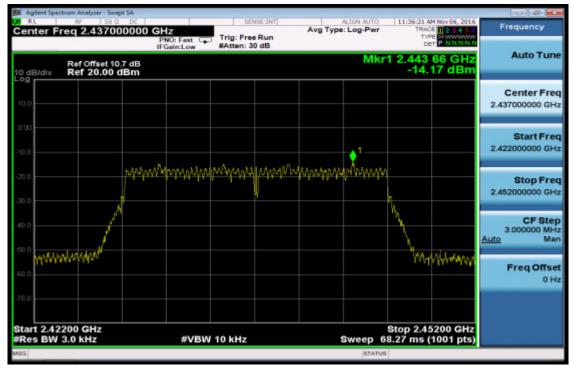




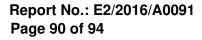
802.11n HT20 Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)

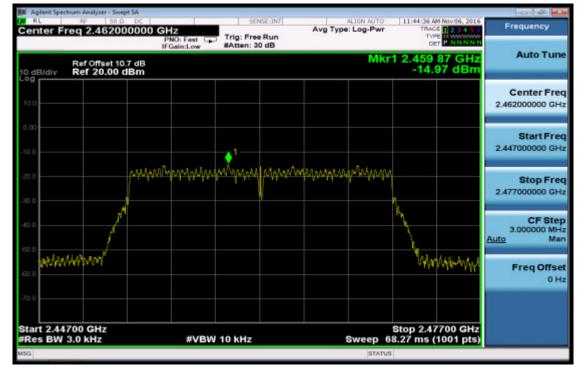


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Power Spectral Density Test Plot (CH-High)



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802.11b PSD for Band edge Limit (CH-Low)



802.11b PSD for Bandedge Limit(CH-High)



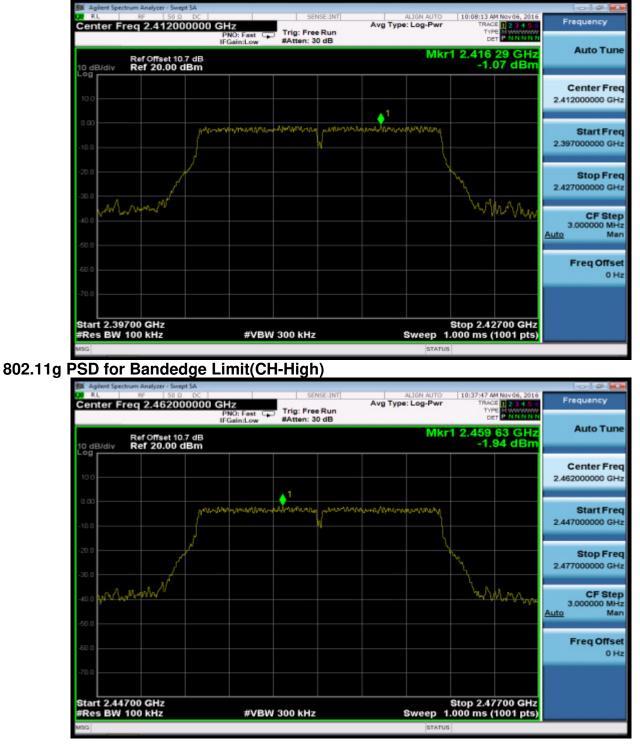
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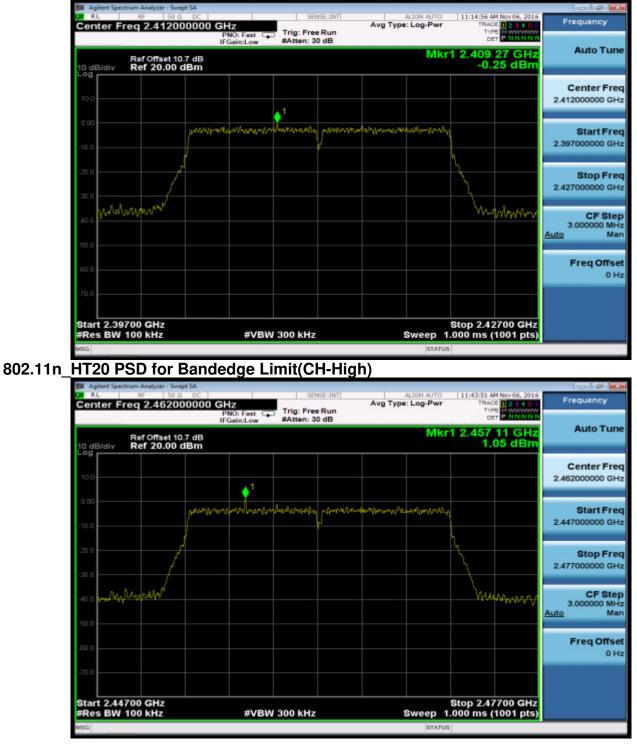
802.11g PSD for Bandedge Limit(CH-Low)



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802.11n_HT20 PSD for Bandedge Limit(CH-Low)



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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.

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

~ End of Report ~

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