

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

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

	OF		
Product Name:	Dimming Light Switch		
Brand Name:	WEMO		
Marketing Name:	WEMO Dimming Light Switch		
Model No.:	F7C059		
Model Difference:	NA		
FCC ID:	K7SF7C059		
IC:	3623A-F7C059		
Report No.:	E2/2016/B0004		
Issue Date:	Feb. 24, 2017		
FCC Rule Part:	§15.247, Cat: DTS		
IC Rule Part:	RSS-247 issue 1 :2015		
FCC Prepared for:	Belkin International Inc. 12045 East Waterfront Drive, Playa Vista, CA 90094, USA		
IC Prepared for:	Belkin International Inc. 12045 East Waterfront Drive, Playa Vista, CA 90094, USA		
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:	Belkin International Inc. 12045 East Waterfront Drive, Playa Vista, CA 90094, USA
Product Name:	Dimming Light Switch
Brand Name:	WEMO
Marketing Name:	WEMO Dimming Light Switch
Model No.:	F7C059
Model Difference:	NA
FCC ID:	K7SF7C059
IC:	3623A-F7C059
Report Number:	E2/2016/B0004
Date of test:	Nov. 02, 2016 ~ Feb. 23, 2017
Date of EUT Received:	Nov. 02, 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:	Jazz Huang	Date:	Feb. 24, 2017
-	Jazz / Engineer		
Prepared By:	Stefanle Yu	Date:	Feb. 24, 2017
Approved By:	Stefanie / Clerk Jim Chang	Date:	Feb. 24, 2017
	Jim Chang / Asst. Manager		

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Revision History

Report Number	Revision	Description	Issue Date
E2/2016/B0004	Rev.00	Initial creation of document	Feb. 24, 2017

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

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GENERAL INFORMATION 1

1.1 Product description

General:

Product Name:	Dimming Light Switch
Brand Name:	WEMO
Marketing Name:	WEMO Dimming Light Switch
Model No.:	F7C059
Model Difference:	NA
Product SW/HW ver- sion:	NA
Radio SW/HW version:	NA
Test SW Version:	NA
RF power setting in TEST SW:	NA
Power Supply:	120V, 60Hz from home wires

WLAN 2.4GHz:

Wi-Fi	Frequency Range	Channels	Rated Power	Type of Emission 99%	Modulation Technology	
11b/g	2412-2462	11	b: 19.52dBm g: 23.44dBm	b:14M7G1D g:16M4D1D	DSSS, OFDM	
11n	HT20 2412-2462	11	HT20:23.4dBm	HT20:17M6D1D	OFDM	
11n	HT40 2422-2452	9	HT40:23.15dBm	HT40:36M0D1D	OFDM	
Antenna Designation:		PIFA Antenna, Part No.: CW2917MT, Supplier: LITEON Gain:0.78dBi				
		CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM				
Transition 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 – 72.2Mbps 802.11 n_40MHz: 13.5 - 150.0Mbps				

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1.2 Product Feature of Equipment Under Test

The equipment under Test (Hereafter Called: EUT) is supporting below features.

Product Feature		
WLAN	802.11 b/g/n	

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

1.3 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.247

FCC KDB 558074 D01 DTS Meas. Guidance

Canada RSS-247 issue 1 May 2015

Canada RSS-Gen issue 4 Nov. 2014

ANSI C63.10:2013

Note:

All test items have been performed and record as per the above standards.

1.4 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

1.5 Special Accessories

There are no special accessories used while test was conducted.

1.6 Equipment Modifications

There was no modification incorporated into the EUT.

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2 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.

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 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 0.9dB and 10dB attenuator.

offset = RF cable loss (dB)+ attenuation factor(dB)=10.9dB)

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2.5 Configuration of Tested System

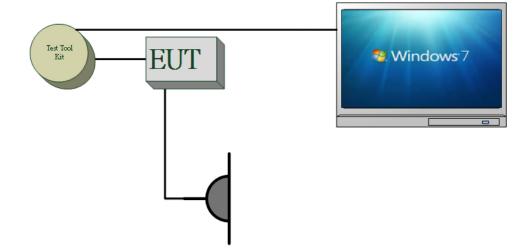


Fig. 2-1 Radiated & Conducted Emission

Table 2-1 Equipment Used in Tested System

ltem	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1	Notebook	Lenovo	L430	PK-OCGFF	Shielded	Unshielded
2	WLAN Test Software	N/A	N/A	N/A	N/A	N/A



SUMMARY OF TEST RESULTS 3

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

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					

7 channels are provided for 802.11n HT40

	—		
CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422 MHz	7	2442 MHz
4	2427 MHz	8	2447 MHz
5	2432 MHz	9	2452 MHz
6	2437 MHz		

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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	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			

Note:

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

ANTENNA PORT CONDUCTED MEASUREMENT:

CONDUCTED TEST							
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)			
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 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%

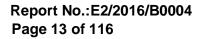
Radiated Spurious Emission:

	9kHz – 30MHz: +/- 2.87 dB				
	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: +/- 2.87 dB
	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.

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							
1. The lower limit shall apply at the transition frequencies							
2. The limit decreases linearly wit	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	N30N30-1042-150c m	N/A	02/07/2016	02/06/2017			
LISN	Schwarzbeck	NSLK 8127	8127-648	03/11/2016	03/10/2017			
Test Software	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.			

6.3 EUT Setup

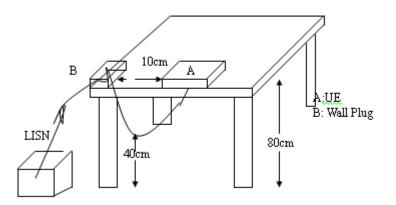
- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI 63.10:2013.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
- The LISN was connected with 120Vac/60Hz power source.

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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

Note: Refer to next page for measurement data and plots. Note2: The * reveals the worst-case results that closet to the limit

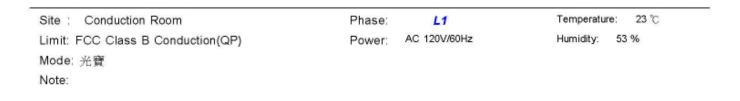
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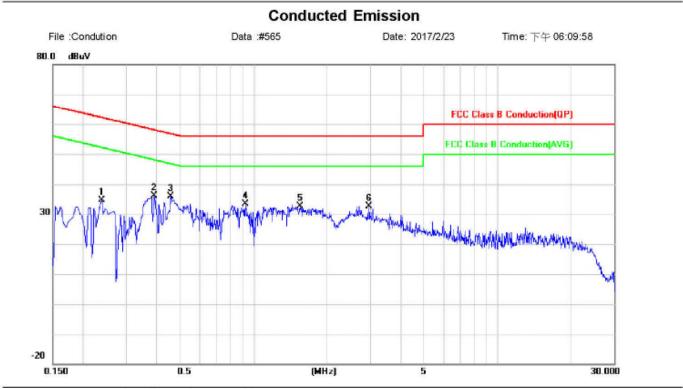
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AC POWER LINE CONDUCTED EMISSION TEST DATA



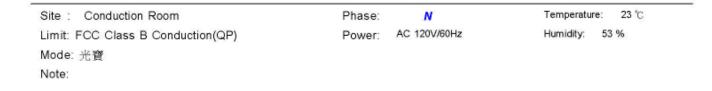


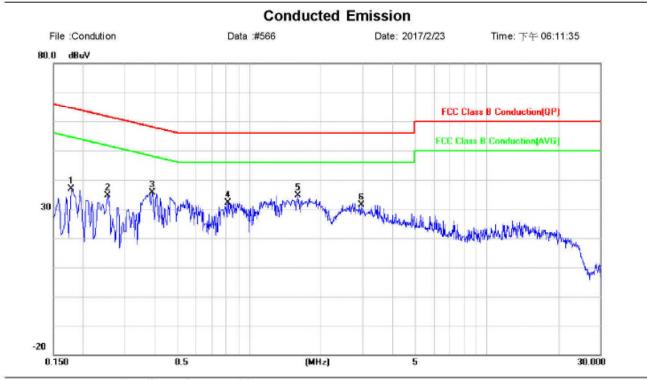
No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.2380	34.35	0.36	34.71	62.17	-27.46	peak	
2	0.3914	35.68	0.37	36.05	58.03	-21.98	peak	
3 *	0.4580	35.61	0.37	35.98	56.73	-20.75	peak	
4	0.9260	32.93	0.34	33.27	56.00	-22.73	peak	
5	1.5460	32.25	0.37	32.62	56.00	-23.38	peak	
6	2.9620	32.14	0.39	32.53	56.00	-23.47	peak	

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No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1780	36.45	0.39	36.84	64.58	-27.74	peak	
2	0.2540	34.26	0.39	34.65	61.63	-26.98	peak	
3	0.3900	35.17	0.39	35.56	58.06	-22.50	peak	
4	0.8140	31.74	0.41	32.15	56.00	-23.85	peak	
5 *	1.6100	34.18	0.42	34.60	56.00	-21.40	peak	
6	2.9740	30.83	0.43	31.26	56.00	-24.74	peak	

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DUTY CYCLE OF TEST SIGNAL 7

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

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

Formula:

Duty Cycle = Ton / (Ton+Toff)

Measurement Procedure:

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

Duty Cycle:

	Duty Cycle (%)	Duty Factor (dB)
802.11b	98.19	0.08
802.11g	91.25	0.40
802.11n_20	95.50	0.20
802.11n_40	80.92	0.92

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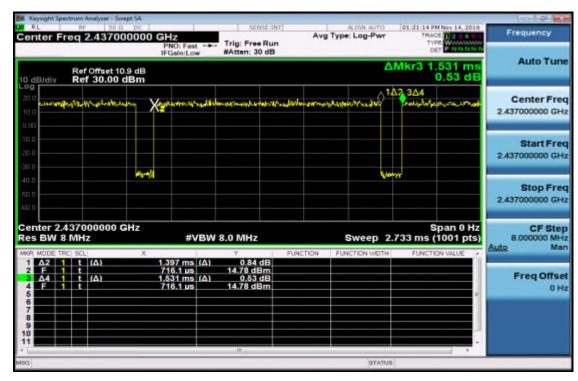


7.1 DUTY CYCLE TEST SIGNAL Measurement Result

802.11 b

Keysight Spec	trum Analyzer - Sw	rept SA					4 ·
Center Fr		00000 GHz	SENSE:1	Ave	aLIGN AUTO	11:35:59 AM Nov 14, 201 TRACE 1 2 3 4 5 TYPE	Frequency
	Ref Offset 10		#Atten: 30 dB		Δ	Mkr3 8.569 m 0.03 dl	Auto Tune
10 dB/div 20.0 10.0	Ref 30.00	dBm Xa			()3∆4		Center Freq 2.437000000 GHz
-10.0 -20.0 -30.0							Start Freq 2.437000000 GHz
-40.0 -60.0 -60.0							Stop Freq 2.437000000 GHz
Center 2.4 Res BW 8	SCL	#VE	3W 8.0 MHz	FUNCTION	Sweep 2	Span 0 H 2.20 ms (1001 pts FUNCTION VALUE	CF Step 8.000000 MHz Auto Man
1 A2 1 2 P 1 3 A4 1 4 F 1 5 6 7 7 8 9 9 9 10	t (Δ) t t (Δ) t	8.414 ms (7.348 ms 8.869 ms (7.348 ms	19.86 dBm				Freq Offset 0 Hz
ANSG DOM					STATUS		

802.11 g



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802.11 n_20 MHz

0

802.11 n_40 MHz

	ectrum Analyz				_								- 4 - C
Center F	req 2.43	370000	00 GH2	2 D: Fast ++		Run	Avg		Log-Pwr	TRA	M Nov 14, 2010	Free	freuch
10 dB/div		et 10.9 d 0.00 dBn	IFG	lin/Low	#Atten: 30	dB			4	Mkr3 8	300.4 μs 0.18 dB		Auto Tune
20.0	4. 6-4 /14 7 -7-1	**	X	rd-yrdd	ne junioritan	لورديوري.	142	0 3∆	A nor-former	Landfirtffr	handrontop		enter Fred
-10.0													Start Free
-40.0 -60.0 -60.0		hannight	W				iyayan lu	1					Stop Free
Center 2. Res BW 1	8 MHz	00 GHz		#VBV	/ 8.0 MHz				Sweep 1.	933 ms (8.0 Auto	CF Step 00000 MH Mar
4 F 4	HE SCL t (Δ) t t (Δ)		479	.7 μs (Δ) .5 μs .4 μs (Δ) .5 μs	4.13 9.63 de -0.18 9.63 de	dB 3m dB	NCTION	FUN	ICTION WEITH	FUNCT	ON VALUE	F	eq Offse 0 H
7 8 9 10 11					it.								
EPEN EPEN									STATUS				

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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.

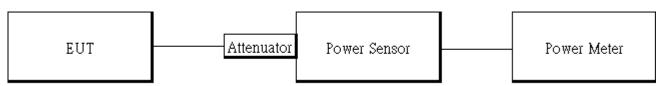
In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of Antenna exceeds 6dBi.

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	00100A1F1A 195C	RF01	12/12/2015	12/11/2016				
DC Block	PASTERNACK	PE8210	RF29	12/12/2015	12/11/2016				
Splitter	RF-LAMBAD	RFLT2W1G1 8G	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				

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:

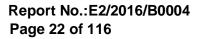
It is used as the auxiliary test equipment to conduct the output power measurement.

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

8.5 Measurement Result

802.11b Main								
СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit		RESULT	
1	2412	1	19.52	89.54	1 Watt =	30.00	dBm	PASS
6	2437	1	19.36	86.30	1 Watt =	30.00	dBm	PASS
11	2462	1	19.16	82.41	1 Watt =	30.00	dBm	PASS
802.11	b Main							
СН	Frequency (MHz)	Data Rate		Max. Output include tune up tolerance Power (mW)	Limit			RESULT
1	2412	1	17.45	55.59	1 Watt =	30.00	dBm	PASS
6	2437	1	17.42	55.21	1 Watt =	30.00	dBm	PASS
11	2462	1	17.25	53.09	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	23.44	220.80	1 Watt =	30.00	dBm	PASS	
6	2437	6	23.17	207.49	1 Watt =	30.00	dBm	PASS	
11	2462	6	22.9	194.98	1 Watt =	30.00	dBm	PASS	
802.11	g Main								
СН	Frequency (MHz)	Data Rate	-	Max. Output include tune up tolerance Power (mW)	I Imit			RESULT	
1	2412	6	14.46	27.93	1 Watt =	30.00	dBm	PASS	
6	2437	6	14.35	27.23	1 Watt =	30.00	dBm	PASS	
11	2462	6	14.19	26.24	1 Watt =	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	23.4	218.78	1 Watt =	30.00	dBm	PASS	
6	2437	MC S0	23.22	209.89	1 Watt =	30.00	dBm	PASS	
11	2462	MC S0	23.26	211.84	1 Watt =	30.00	dBm	PASS	
802.11	n_HT20M Main								
СН	Frequency (MHz)	Data Rate	-	Max. Output include tune up tolerance Power (mW)				RESULT	
1	2412	MC S0	14.42	27.67	1 Watt =	30.00	dBm	PASS	
6	2437	MC S0	14.22	26.42	1 Watt =	30.00	dBm	PASS	
11	2462	MC S0	14.48	28.05	1 Watt =	30.00	dBm	PASS	

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802.11	802.11n_HT40M Main								
СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit		RESULT		
3	2422	MC S0	23.1	204.17	1 Watt =	30.00	dBm	PASS	
6	2437	MC S0	22.98	198.61	1 Watt =	30.00	dBm	PASS	
9	2452	MC S0	23.15	206.54	1 Watt =	30.00	dBm	PASS	
802.11	n_HT40M Main								
сн	Frequency (MHz)	Data Rate	Max. Output include tune up tolerance Power	Max. Output include tune up tolerance Power				RESULT	
	()		(dBm)	(mW)					
3	2422	MC S0	14.26	26.67	1 Watt =	30.00	dBm	PASS	
6	2437	MC S0	14.25	26.61	1 Watt =	30.00	dBm	PASS	
9	2452	MC S0	14.48	28.05	1 Watt =	30.00	dBm	PASS	

Note:

offset 10.90 dB for SISO mode

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



9 6dB & 99% BANDWIDTH MEASUREMENT

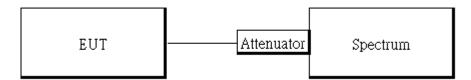
9.1 Standard Applicable

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

9.2 Measurement Equipment Used

	Conducted Emission Test Site									
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.					
TYPE		NUMBER	NUMBER	CAL.						
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2016	04/13/2017					
DC Block	PASTERNACK	PE8210	RF29	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. 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

802.11b Main

Frequency (MHz)	6d B Band wid th (kHz)	Limit (kHz)	Result
2412	9137	> 500	PASS
2437	9588	> 500	PASS
2462	10065	> 500	PASS

802.11g Main

Frequency (MHz)	6d B Band wid th (kHz)	Limit (kHz)	Result
2412	15130	> 500	PASS
2437	15100	> 500	PASS
2462	15140	> 500	PASS

802.11_n_HT20 Main

802.11_n_HT40 Main

Frequency (MHz)	6d B Band wid th (kHz)	Limit (kHz)	Result	Frequency (MHz)	6d B Band wid th (kHz)	Limit (kHz)	Result
2412	15120	> 500	PASS	2422	35130	> 500	PASS
2437	15140	> 500	PASS	2437	35130	> 500	PASS
2462	15140	> 500	PASS	2452	35130	> 500	PASS

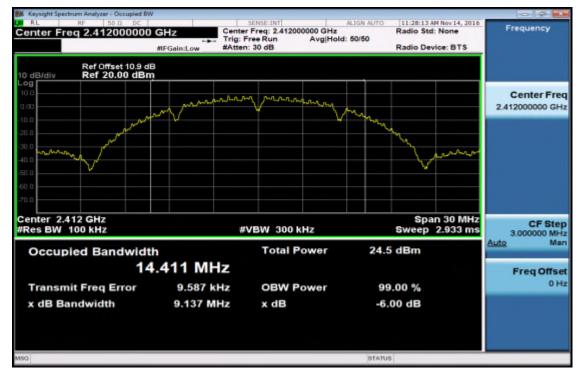
802.11b Main		802.11g Main				
Frequency (MHz)	99%Bandwidth (MHz)	Frequency (MHz)	99%Bandwidth (MHz)			
2412	14.211	2412	16.291			
2437	14.594	2437	16.432			
2462	14.711	2462	16.357			

802.11n_HT20M Main		802.11n_HT40M Main	
Frequency	99%Bandwidth	Frequency	99%Bandwidth
(MHz)	(MHz)	(MHz)	(MHz)
2412	17.564	2422	36.004
2437	17.553	2437	35.916
2462	17.538	2452	35.905

*Refer to next page for plots



6dB BANDWIDTH MEASUREMENT 802.11b **CH-Low**



CH-Mid

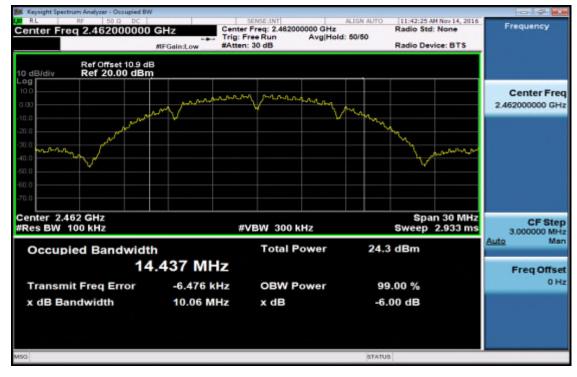


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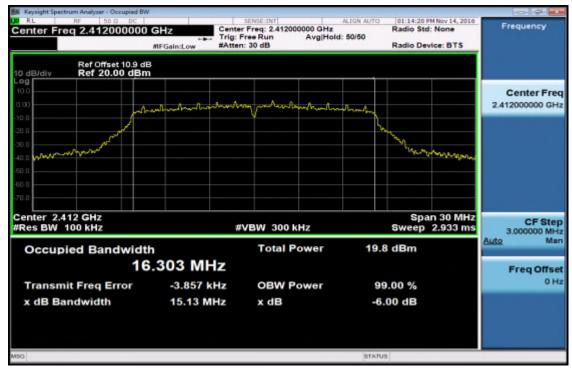
CH-High



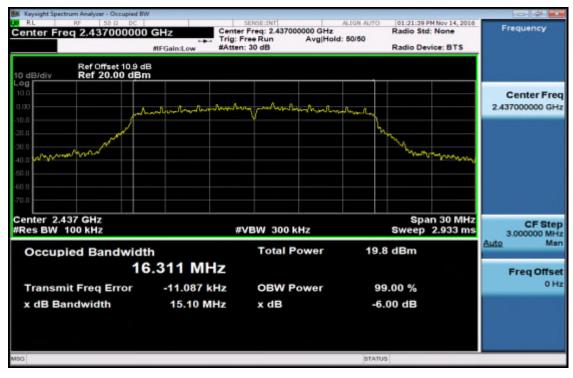
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802.11g **CH-Low**



CH-Mid

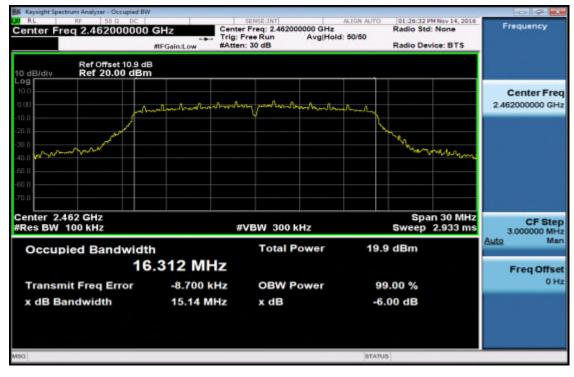


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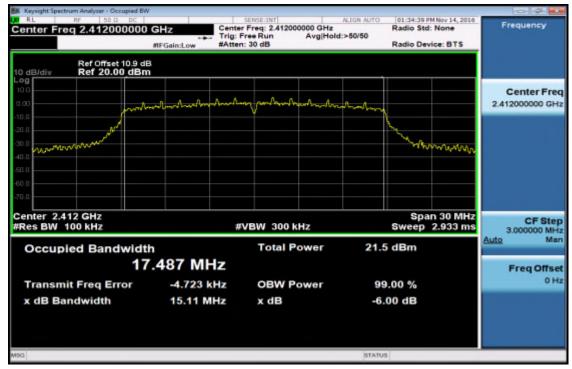
CH-High



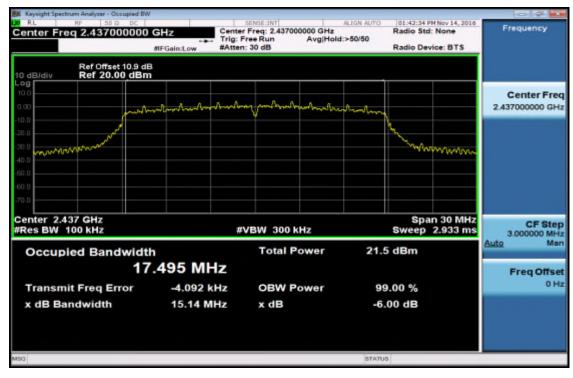


802.11n HT20M

CH-Low



CH-Mid

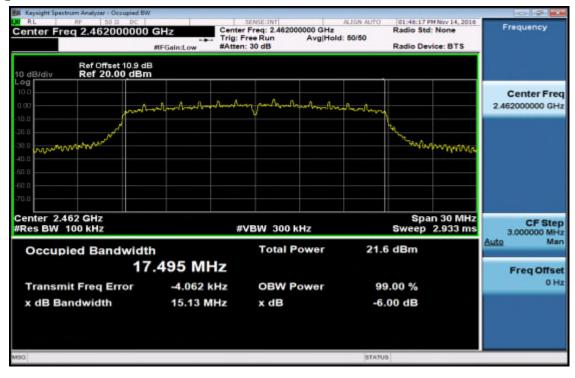


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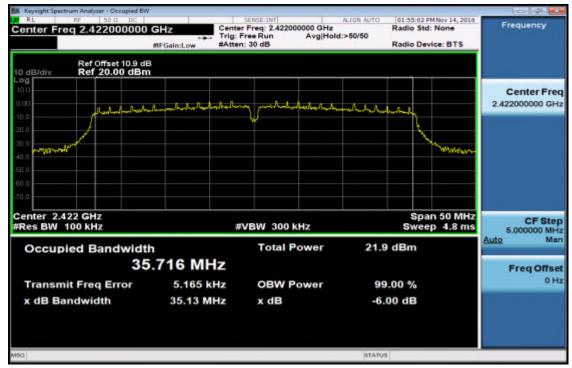
CH-High



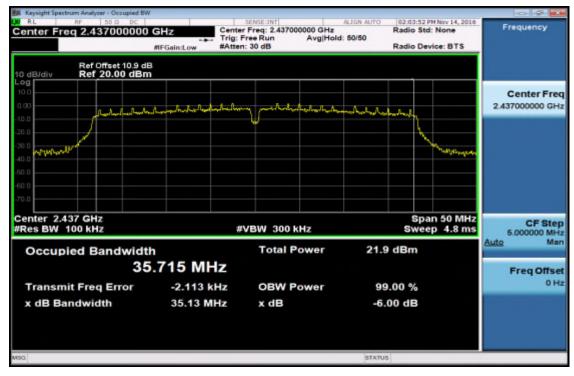


802.11n HT40M

CH-Low



CH-Mid

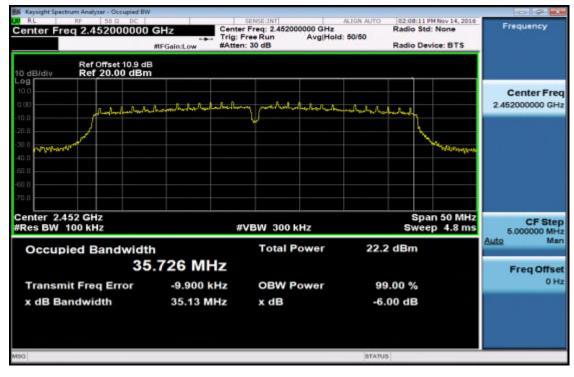


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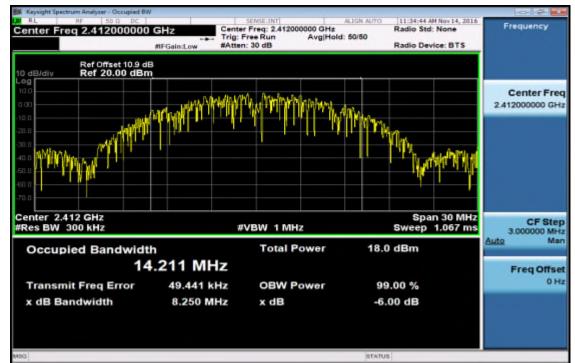


CH-High

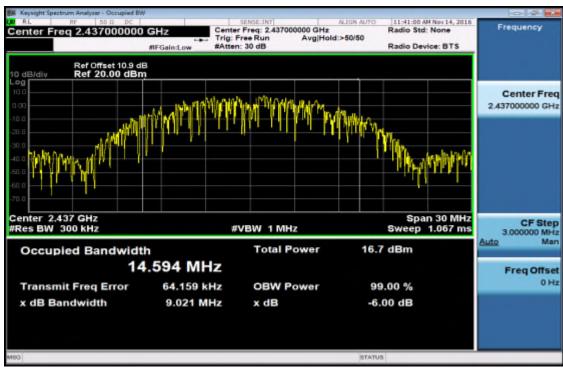




99% BANDWIDTH MEASUREMENT 802.11b **CH-Low**



CH-Mid

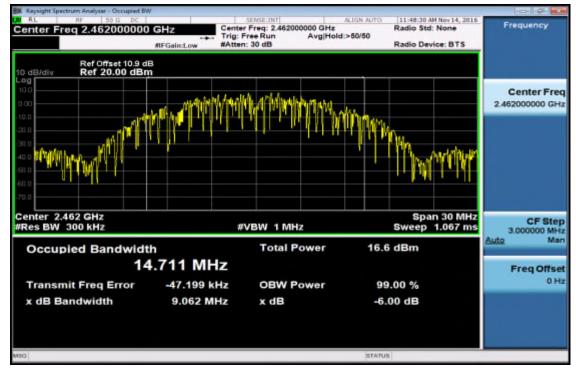


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CH-High

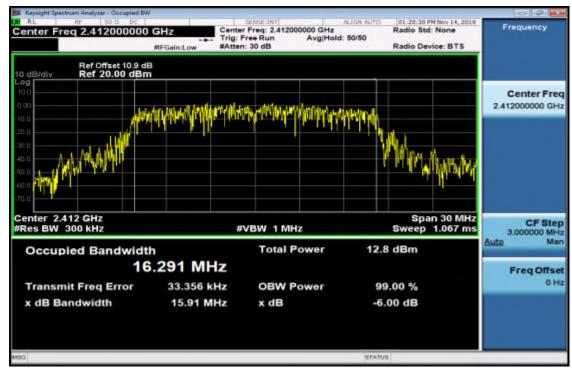


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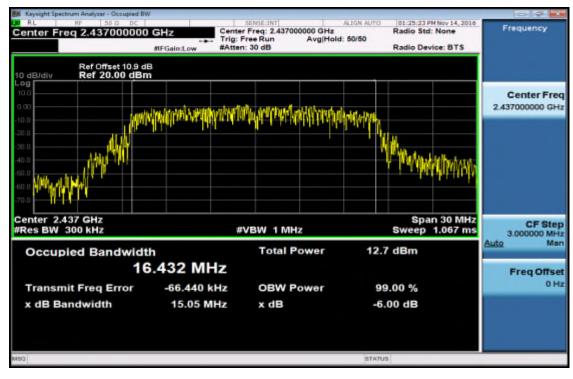
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802.11g **CH-Low**



CH-Mid

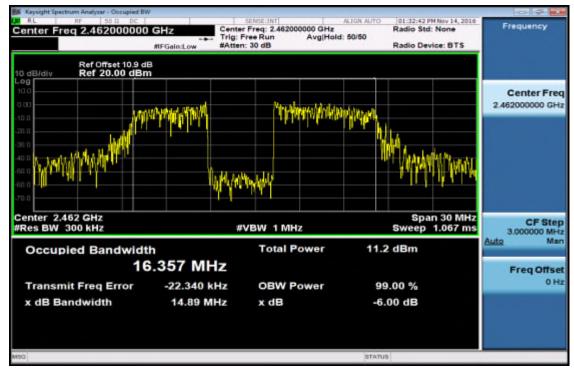


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CH-High



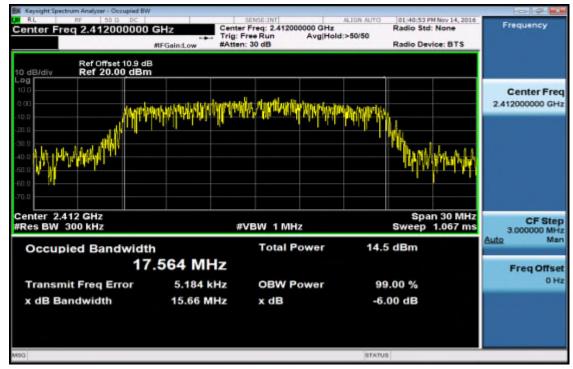
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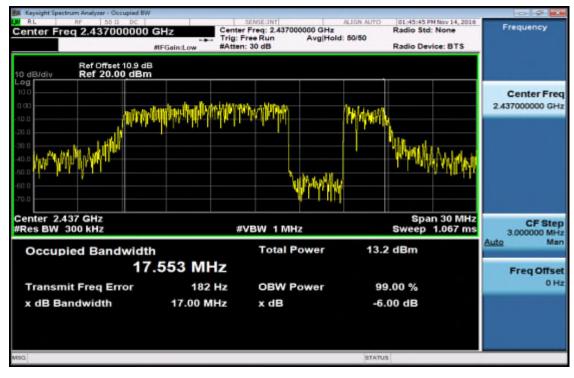


802.11n 20MHz

CH-Low

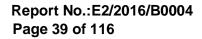


CH-Mid



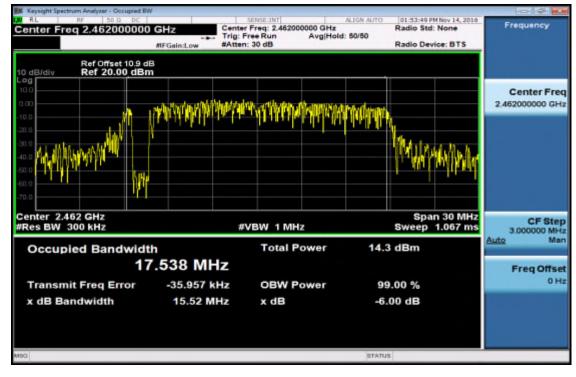
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CH-High



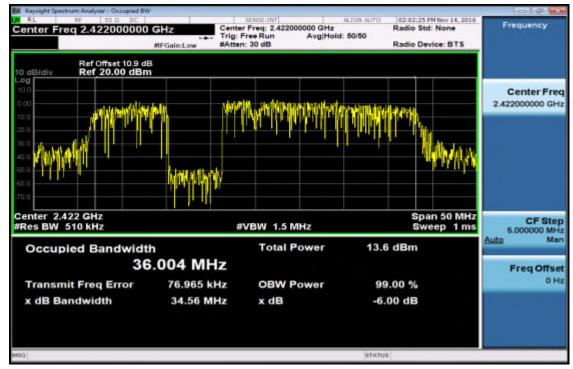
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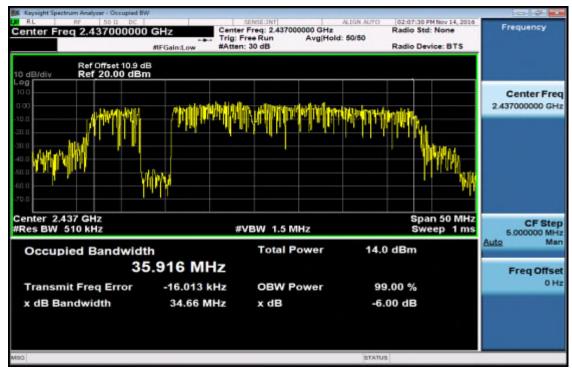


802.11n 40MHz

CH-Low



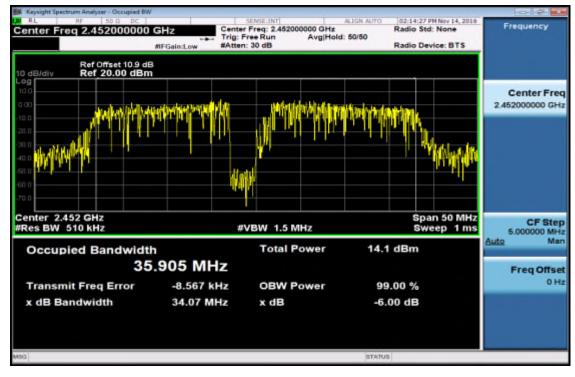
CH-Mid



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CH-High



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10 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

10.1 Standard Applicable

As per KDB 558074 D01 11.1 a)

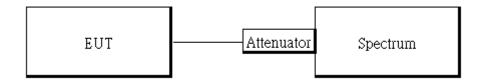
If the maximum peak conducted output power procedure was used to demonstrate compliance as described in 9.1, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 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	MFR	MODEL	SERIAL	LAST	CAL DUE.				
TYPE		NUMBER	NUMBER	CAL.					
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2016	04/13/2017				
DC Block	PASTERNACK	PE8210	RF29	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				

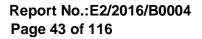
10.3 Test SET-UP



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10.4 Measurement Procedure

Conducted Band Edge:

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

Conducted Spurious Emission:

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

10.5 Measurement Result

Note:

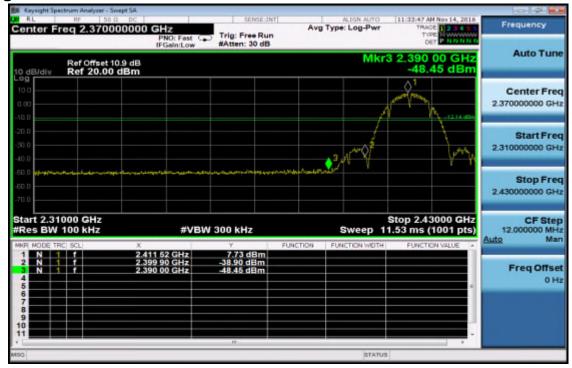
- 1. Refer to next page spectrum analyzer data chart and tabular data sheets.
- 2. For Restricted Band Edge Limit, please refer to section 12.5 of this report for measurement result.

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



Band Edges Test Data CH-High



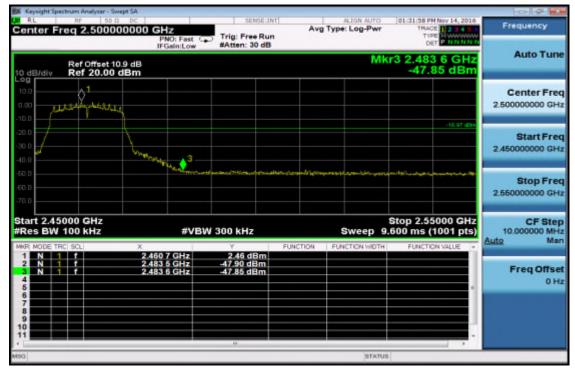
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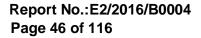
802.11g **Band Edges Test Data CH-Low**



Band Edges Test Data CH-High



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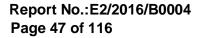
802.11n_HT20 **Band Edges Test Data CH-Low**



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

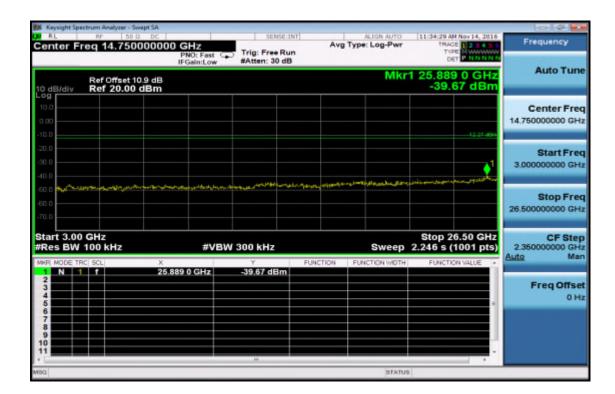


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802.11b **Spurious Emission Test Data CH-Low**

	SA .						44
enter Freq 1.5150000		Trig: Free Run		Type: Log-Pwr		2345	Frequency
Ref Offset 10.9 o 0 dB/div Ref 20.00 dB	IFGain:Low	#Atten: 30 dB		Mk	r1 2.411 9 7.73		Auto Tun
0.02 0.02						12.27.45%	Center Fre 1.515000000 GH
20.0							Start Fre 30.000000 MH
50.0 malabaseles.las.aspro./www.sha.ell.hosp.ho	مرور المرجولي أحد ^ا بعد المديد	warden frankrighen den serve	ry damply produces of	addient and a stand	mandateria	April 100	Stop Fre
ant 30 MHz Res BW 100 kHz		300 kHz	-		Stop 3.00 83.9 ms (100	1 pts)	3.00000000 GI CF Ste 297.000000 Mi <u>Auto</u> M
tart 30 MHz	#VBW 2.411 9 GHz	7 300 kHz 7.73 dBm	FUNCTION	Sweep 2		1 pts)	3.00000000 G CF St 297.000000 M

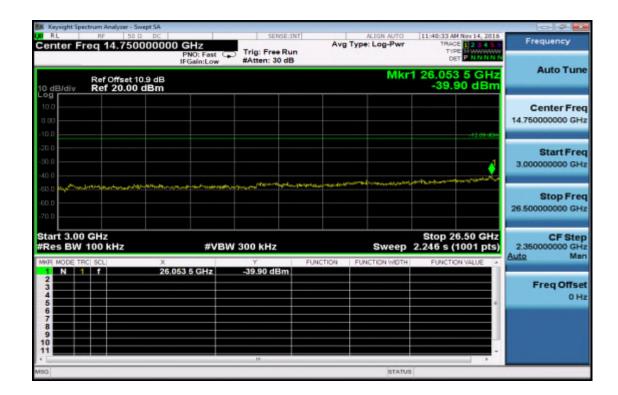


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Spurious Emission Test Data CH-Mid

	vept SA				
enter Freq 1.5150	00000 GHz PN0: Fast	Trig: Free Run	Avg Type: Log-Pwr	11:40:16 AM Nov 14, 2016 TRACE 2 14 5 TYPE NUMBER DET P NOVINS	Frequency
Ref Offset 10		#Atten: 30 dB	Mł	r1 2.438 7 GHz 7.11 dBm	Auto Tu
00 00 00				-12,09,009	Center Fr 1.515000000 G
10)0 					Start Fr 30.000000 M
1.0	والمريشة والإنجاب والمحافظ والرجال والمحافظ والمحا	مسم معدا ويدرون كور خومة ا ومرجو وحطرتها	and the second s	- have the second and the	
), D					
tart 30 MHz Res BW 100 kHz	#VB	W 300 kHz		Stop 3.000 GHz 83.9 ms (1001 pts)	Stop Fr 3.000000000 G CF St 297.000000 M <u>Auto</u> M
art 30 MHz Res BW 100 kHz R MODE TRC SCL N 1 f		W 300 kHz	Sweep 2	Stop 3.000 GHz 83.9 ms (1001 pts) FUNCTION VALUE	3.000000000 G CF St 297.000000 M

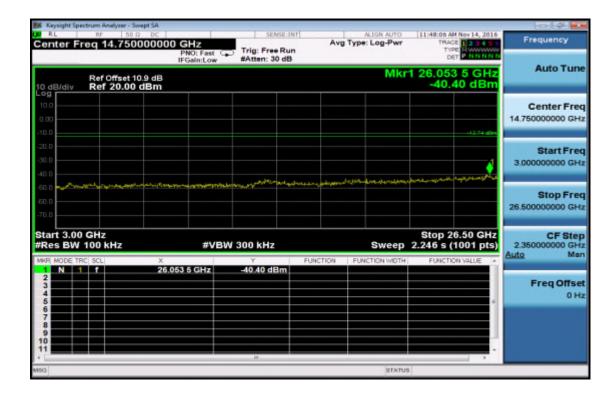


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Spurious Emission Test Data CH-High

enter Freq 1.51500000	PNO: Fast C Trig: Free Run	AUGH AUTO 11:47 Avg Type: Log-Pwr	HE AM Nov 14, 2016 TRACE 1 2 3 4 5 6 TVPE DOT NOV 14	Frequency
Ref Offset 10.9 dB dB/div Ref 20.00 dBm		Mkr1 2.	462 4 GHz 7.26 dBm	Auto Tu
00			-1274 dbs	Center Fr 1.515000000 G
				Start Fr 30.000000 M
 D D 	nen an de ser an de s	andren have an	ad his n, Alastra for form	Stop Fr 3.000000000 G
art 30 MHz	#VBW 300 kHz		p 3.000 GHz	CF SI
		Sweep 283.9 n		
Res BW 100 kHz IR MODE TRC SCL X I N 1 1 3 4 5 6 8 8 1 1 1 1 1 1 1 1				297.000000 M Auto N Freq Off 0

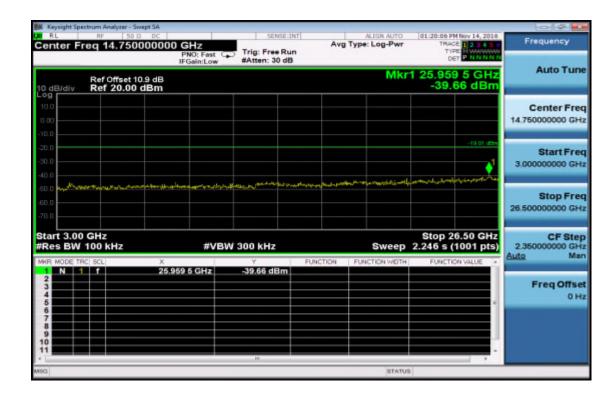


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802.11g **Spurious Emission Test Data CH-Low**

Keysight Spectrum A								
Center Freq 1	1.515000000 C		Trig: Free Run	Avg	Type: Log-Pwr	01:19:49 PM Nov TRACE		Frequency
10 dB/div Ref	Offset 10.9 dB 20.00 dBm	PNO: Fast G	#Atten: 30 dB		Mk	r1 2.406 0 0.99		Auto Tuno
10.0						1		Center Fre 1.515000000 GH
-10.0 -20.0 -30.0 -40.0							19.01 d 2 m	Start Fre 30.000000 MH
-50.0 -50.0 -70.0	Loldan and a subscription of the subscription	245-242 (F-154) (2274)	an (nyakana pertentike	n general and the state of the second se	house of the second	na lona kiter	Stop Fre 3.000000000 GH
Start 30 MHz #Res BW 100	х		V 300 kHz	FUNCTION	Sweep 2	Stop 3.00 83.9 ms (100 FUNCTION W	1 pts)	CF Ste 297.000000 MH Auto Ma
1 N 1 f 2 3 4 5 6 7 8 9 10 11	2.40	60 GHz	0.99 dBm					Freq Offse 0 H
90			11		STATUS	1		



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Spurious Emission Test Data CH-Mid

					-0- 4-
enter Freq 1.51500000	PNO: Fast	Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr		Frequency
Ref Offset 10.9 dB dB/div Ref 20.00 dBm		#Atten: 30 db	м	kr1 2.435 7 GH 1.31 dBn	Auto Tur
99 0.0 00				¢ ¹	Center Fr 1.515000000 G
				10.09.09	Start Fr 30.000000 M
0.0	атерикары	al-paratespy, Andrew, agencies of	dagan di kanangan pangan di kebulikan di kanan di pama	and have a second and the second and the second and the second second second second second second second second	Stop Fr
					3.000000000 G
tart 30 MHz Res BW 100 kHz		/ 300 kHz		Stop 3.000 GH 283.9 ms (1001 pts	Z CF Str 297.000000 M
tart 30 MHz Res BW 100 kHz			Sweep	283.9 ms (1001 pts	297.000000 M

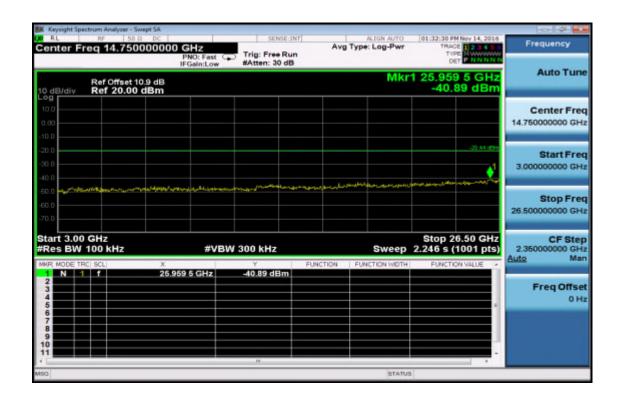
nter Freq 14.750		SENSE:0	Ave	ALIGN AUTO	01:25:00 PM Nov 14, 2016 TRACE 1 2 3 4 5 Type	Frequency
	PNO: Fas IFGain:Lo			Mkr	1 25,936 0 GHz	
dB/div Ref 20.00					-39.61 dBm	
						Center Free 14.750000000 GH
					-10 69 059	Start Free 3.000000000 GH
مىرىنىدىن مەرىكىرىيەر مەرىكى مەرىپىرىدىن مەرىكىرىيەر مەرىكىرى	haran dari yang sebagai kang seba	and the state of t		ang the Base of the state of th	ويتجمير تمريلي والمتار والمترر والمعاولين	Stop Free 26.50000000 GHz
3.00 GHz BW 100 kHz		VBW 300 kHz	#1.01.0773.0744		Stop 26.50 GHz 2.246 s (1001 pts)	CF Step 2.350000000 GHz Auto Man
N 1 1	X 25.936 0 GHz	-39.61 dBm	FUNCTION	FUNCTION WOTH	FUNCTION VALUE	Freq Offset

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Spurious Emission Test Data CH-High

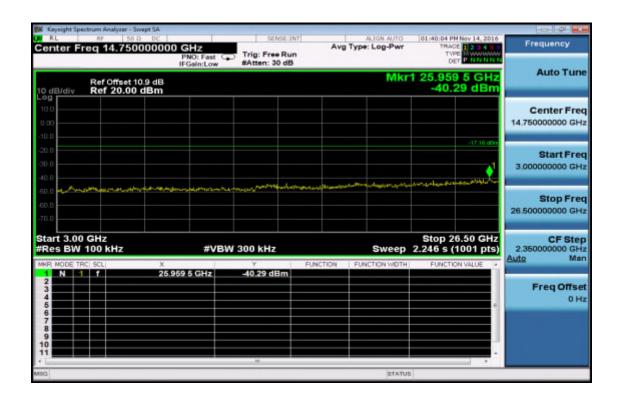
Keysight Spectrum Analyzer - Swept SA						
RL BP 50 0 00 enter Freq 1.515000000	PNO: Fast	Trig: Free Run #Atten: 30 dB	Avg Typ	ALIGN AUTO	01:32:15 PM Nov 14, 201 TRACE 1 2 1 4 TVPE 2 14 DET P Nov 10	Frequency
Ref Offset 10.9 dB 0 dB/div Ref 20.00 dBm	IFGain:Low	#Atten: 30 dB		Mk	r1 2.462 4 GH -0.44 dBr	Auto Tur
					* ¹	Center Fre 1.515000000 Gi
					-50,44.95	Start Fre 30.000000 Mi
0. 0 0. 0 0. 0 0. 0	n dagili ka sa	ga gan daga sa san daga daga daga daga daga daga daga da	angladjorgi opijenoveljori	n fan inner sûn serke ^k ister	el Marykiewalkes-walkywow	Stop Fr 3.00000000 G
tart 30 MHz Res BW 100 kHz	#VBW	/ 300 kHz	FUNCTION FU	Sweep 2	Stop 3.000 GH 83.9 ms (1001 pts	Z CF Sto 297.000000 M Auto M
	.462 4 GHz	-0.44 dBm				Freq Offs
6 7 8 9 0						





802.11n_HT20 **Spurious Emission Test Data CH-Low**

Keysight Spectrum Analyzer - Swept SA			
enter Freq 1.515000000	PNO: Fast C Trig: Free Run	ALIGN AUTO 01:39:50 PM Nev 14, 3 Avg Type: Log-Pwr TRACE 12.3 TYPE	Frequency
Ref Offset 10.9 dB dB/div Ref 20.00 dBm	IFGain:Low #Atten: 30 dB	Mkr1 2.414 9 G 2.84 dE	Auto Tun
•g		*1	Center Fre 1.515000000 GH
00 D 00 D 00 D 00 D			Start Fre 30.000000 MH
50.0	an gina Malanan Saran (Ingelan) yanan di seri dan yang di seri dan bar di seri dan bar di seri dan kan di seri Ingelan Malanan Saran (Ingelan)		Stop Fre 3.000000000 GR
Res BW 100 kHz		Stop 3.000 G Sweep 283.9 ms (1001 p ction FUNCTION WOTH FUNCTION VALUE	
1 N 1 f 2; 2 3 -	.414 9 GHz 2.84 dBm		Freq Offs 01



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



Spurious Emission Test Data CH-Mid

Reysight Spectrum Analyzer - Swept SA							
enter Freq 1.515000000	GHZ PNO: Fast	Trig: Free Run #Atten: 30 dB	Ave	Type: Log-Pwr	01:45:16 PM Nov 14 TRACE 1 2 TYPE NWA DET P 14		Frequency
Ref Offset 10.9 dB	Poantcow	WHITE OF OLD		Mk	r1 2.438 7 0 1.15 d	iHz Bm	Auto Tu
9 00 00					•1		Center Fr 1.515000000 0
					-10		Start Fr 30.000000 M
ан 10 Малариан (р. 1996) (р. 1996) (р. 1996) 10	والانتقاري والمتحرب فتانتها	gal stren Balladeri prograd	inggi y dage di parti	۵۰٬۰۰۰ میلیداد. دوارمدین استین الطب المدین	Nonenenene niere	drainer	Stop Fr 3.000000000 0
art 30 MHz Res BW 100 kHz	#VBW	300 kHz			Stop 3.000 83.9 ms (1001	pts)	CF St 297.000000 M
	138 7 GHz	√ 1.15 dBm	FUNCTION	FUNCTION WOTH	FUNCTION VALU		Freq Off
6 7 8 9 0							
		**					

Reysight Spectrum Analyzer - Swept SA RL RF SD D DC enter Freq 14.75000000	00 GHz PN0: Fast IFGain:Low	Trig: Free Ru #Atten: 30 dB	Avg	ALIGH AUTO	TRACI	Nov 14, 2016	Frequency
Ref Offset 10.9 dB				Mkr	1 25.936 -40.8	0 GHz 2 dBm	Auto Tur
og 0.0							Center Fr 14.750000000 G
						-10.05.050	Start Fr 3.000000000 G
00 - man to man to many	المصيح المراجع والمراج	udden at the star	Aprentic and the state of the	and the second second			
D, D							
tart 3.00 GHz Res BW 100 kHz		W 300 kHz	FUNCTION			3.50 GHz 1001 pts)	Stop Fr 26.50000000 G CF St 2.35000000 G <u>Auto</u> M
tart 3.00 GHz Res BW 100 kHz				Sweep	Stop 26 2.246 s (1	3.50 GHz 1001 pts)	26.50000000 G CF St 2.350000000 G

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Spurious Emission Test Data CH-High

RL RF 50 D DC		SENSE:INT	ALIGN AUTO	01:53:18 PM Nov 14, 201	
enter Freq 1.51500000	PNO: Fast	Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr	TRACE 12345 TYPE NUMBER DET P NUMBER	Frequency
Ref Offset 10.9 dB dB/div Ref 20.00 dBm			Mi	tr1 2.459 5 GH 3.52 dBn	Auto Tur
0.00				↓ ¹	Center Fr 1.515000000 G
				-16 48 dB	Start Fr 30.000000 M
0.0	CARL CONTRACTOR OF THE	ومندومهم والمعود والدر والدرو	aman and an and	and how and a second second second	
0, D					
tart 30 MHz Res BW 100 kHz	#VBW 3	00 kHz	Sweep 2	Stop 3.000 GH 83.9 ms (1001 pts	3.000000000 G
tart 30 MHz Res BW 100 kHz		00 kHz			3.00000000 G CF Str 297.000000 M <u>Auto</u> M Freq Offs
tart 30 MHz Res BW 100 kHz kR MODE TRC SCL X 1 N 1 f 2 3 4	#VBW 3	00 kHz	Sweep 2	83.9 ms (1001 pts	297.000000 M

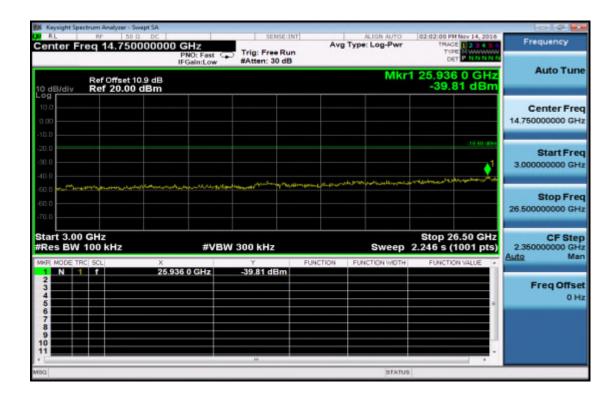
RL	In Analyzer - Swept SA RF 50 R DC		SENSE:1		ALIGN AUTO	01:53:32 PM Nov 14, 2	
enter Fre	q 14.75000000	PNO: Fast G IFGain:Low	Trig: Free Ru #Atten: 30 dB	n	Type: Log-Pwr	TRACE 1 2 3 4 TYPE DUMM DET P NOV	
0 dB/div	Ref Offset 10.9 dB Ref 20.00 dBm				Mkr	1 25.959 5 GI -40.25 dB	Auto T
0.00							Center 1 14.750000000
0.0 0.0 0.0						-15.40 (1 3.000000000
0.0 0.0	الله من المراجع المراجع المراجع المراجع	-*	ى الميانية الميانية من الميانية من الميانية الميانية الميانية الم	****			Stop 1 26.500000000
tart 3.00 G Res BW 10	00 kHz	#VB	W 300 kHz			Stop 26.50 Gl 2.246 s (1001 p	
RR MODE TRC		959 5 GHz	-40.25 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1
3 4 5 6							Freq O
/ 8 9 0							
a					STATU		

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802.11n_HT40 **Spurious Emission Test Data CH-Low**

	ctrum Analyzer - 1							
enter F		000000 GH	NO: Fast C	Trig: Free Ru	Avg	Type: Log-Pwr	02:01:28 PM Nov 14, TRACE 1 2 3 TYPE	Frequency
0 dB/div	Ref Offset Ref 20.00	10.9 dB	Gain:Low	#Atten: 30 dB		Mk	r1 2.417 9 G 1.32 de	Auto Tun
.og 10.0 0.00							1	Center Fre 1.515000000 GH
10.0 20.0 30.0 40.0							-10.66	030 Start Fre 30.000000 MF
50.0 50.0 70.0			un territoria per	استو واريون پايت استر اين م اين. 	and an and a second		Salarija, njenaja ogćala je najle	Stop Fre 3.00000000 GF
Res BW	100 kHz	X	#VB	W 300 kHz	FUNCTION	Sweep 2	Stop 3.000 G 83.9 ms (1001 p FUNCTION VALUE	297.000000 Mi Auto Mi
1 N 1 2 3 4 5 6		2.417	9 GHz	1.32 dBm				Freq Offs 01
7 8 9 10				19				



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Spurious Emission Test Data CH-Mid

Keysight Spectrum A							-C\$
11.6	50 R DC 1.515000000	GHz PNO: Fast	Trig: Free Run #Atten: 30 dB	Ave	Type: Log-Pwr	02:06:51 PM Nov 14, TRACE 1 2 3 TYPE DUM DET P NIN	Frequency
0 dB/div Ref	Offset 10.9 dB 20.00 dBm				Mk	r1 2.441 6 G 1.48 di	
0,0 1,00						•1 ∩	Center F 1.515000000 0
						-10.5	30.000000 M
	ويوجعه ومناوعهم	ىرەلىدەرمىي، يۇم مىرى			al-metericanon		Stop Fr 3.000000000 0
tart 30 MHz Res BW 100 I		#VBV	V 300 kHz	FUNCTION	Sweep 2	Stop 3.000 G 83.9 ms (1001) FUNCTION VALUE	297.000000 M
AR MODE TRC SCC 1 N 1 7 2 3 4 5		441 6 GHz	1.48 dBm	PORCINOA	FUNCTION WOTH	PUNCTION WEDE	Freq Off
6 7 8 9							
					STATUS		,
5					STATUS		

RL RF enter Freq 14	50 R DC 4.750000000 GH	Fast Fast Atten: 30 dB	Avg Type: Log-Pwr	02:07:13 PM Nov 14, 2016 TRACE 1 2 3 4 5 0 Type November DET P N N N N N	Frequency
0 dB/div Ref	ffset 10.9 dB 20.00 dBm	THE OW	Mki	1 25.372 0 GHz -40.37 dBm	Auto Tur
og 10.0					Center Fre 14.750000000 GR
20.0 30.0 40.0				-10.52 dBr	Start Fr 3.000000000 G
50, D 50, D 70, D		and and a second se	and the second		Stop Fr 26.500000000 G
tart 3.00 GHz Res BW 100 k	х	#VBW 300 kHz	Sweep	Stop 26.50 GHz 2.246 s (1001 pts)	CF St 2.350000000 G Auto M
N 1 1 2 3 4 5 6 6 7 8 9 9 0	25.372 0 (Hz _40.37 dBm			Freq Offe 0
			STATU	•	

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Spurious Emission Test Data CH-High

Keysight Spectrum Analyzer - Swept SA				
Enter Freq 1.515000000	BHZ PNO: Fest IFGain:Low #Atten: 30 dB	Avg Type: Log-Pwr	02:13:52 PM Nov 14, 2016 TRACE 1 2 3 4 5 TYPE NOV 14, 2016	Frequency
Ref Offset 10.9 dB dB/div Ref 20.00 dBm	In Galificow Wettern of G	-	kr1 2.456 5 GHz 0.62 dBm	Auto Tun
				Center Fre 1.515000000 GF
			.19.20.685	Start Fre 30.000000 MP
0.0 0.0 0.0		an a	a Mariana ang Kalanganganganganganganganganganganganganga	Stop Fre 3.00000000 Gi
tart 30 MHz Res BW 100 kHz	#VBW 300 kHz	Sweep 2	Stop 3.000 GHz 83.9 ms (1001 pts)	CF Ste 297.000000 Mi <u>Auto</u> M
	.456 5 GHz 0.62 dBm	Policitor Policitor Horn		Freq Offs 01
6 7 8 9 0				
	11			

RL	m Analyzer - Swept SA RF 50 B DC 7 14.75000000	0 GHz PN0: Fast G	Trig: Free Run #Atten: 30 dB	Ave	ALIGN AUTO	02:14:11 PM Nov 14, 201 TRACE 1 2 3 4 TYPE NOV	Frequency
0 dB/div	tef Offset 10.9 dB Ref 20.00 dBm	in Gameow			Mkr	1 25.936 0 GH: -39.81 dBn	
og 10.0 1.00							Center Fro 14.750000000 Gi
10.0 20.0 30.0 40.0						en ic.er.	Start Fr 3.000000000 G
50.0 50.0 70.0	رواری محلی الدامورو _{یون} پر روایی ور	erlistangethisforment		*****,****************************			Stop Fr 26.50000000 G
tart 3.00 GI Res BW 10	IO KHZ	1	V 300 KHz Y	FUNCTION	Sweep	Stop 26.50 GH: 2.246 s (1001 pts FUNCTION VALUE	CF St 2.350000000 G Auto M
N 1 2 3 4 5 6 7 8 9 9	1 25.	936 0 GHz	-39,81 dBm				Freq Offs 0
1	_		10				

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11 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT

11.1 Standard Applicable

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands must also comply with the §15.209 & RSS-Gen §8.10 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:

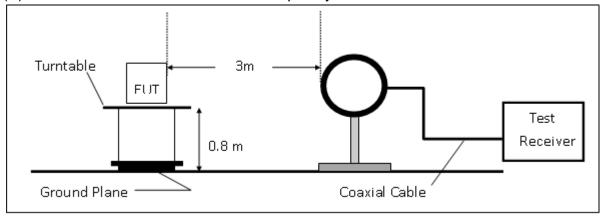
		966 Chambe	r		
EQUIPMENT	MFR MODEL SERIAL L		LAST	CAL DUE.	
TYPE		NUMBER	NUMBER	CAL.	
EMI Test Receiver	R&S	ESU 40	100363	04/12/2016	04/11/2017
Loop Antenna	ETS-Lindgren	6502	00143303	12/23/2015	12/22/2016
Broadband Antenna	TESEQ	CBL 6112D	35240	10/28/2015	11/02/2017
Horn Antenna	ETS-Lindgren	3117	00143272	12/16/2015	12/15/2016
Horn Antenna	Schwarzbeck	BBHA9170	185	07/24/2015	07/23/2016
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-3G	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.

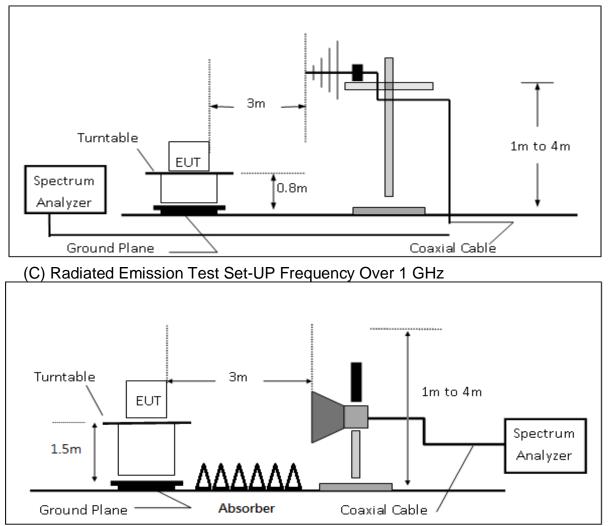


11.3 Test SET-UP

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



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





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)

Operation Mode :802.11bFundamental Frequency :2412 MHzOperation Band :BE CH LowEUT Pol. :H			IHz Temp. / H Low Test Eng	lumi. :	nna Pol. :	2016/11/10 22.7deg_C Ashton 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
2390.00	E	Peak	47.67	0.92	48.59	74	-25.41
2390.00	Е	Average	34.82	0.92	35.74	54	-18.26
Operation N Fundament Operation E EUT Pol. :	al Frequenc	802.11 cy : 2412 M BE CH H	IHz Temp. / H Low Test Eng	lumi. :	nna Pol. :	2016/11/10 22.7deg_C Ashton 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
2390.00	Е	Peak	46.52	0.92	47.44	74	-26.56
2390.00	E	Average	35.61	0.92	36.53	54	-17.47



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Operation Mode : Fundamental Frequenc Operation Band : EUT Pol. :	D Test Date Hz Temp. / H High Test Engi Measurer	lumi. :	nna Pol. :	2016/11/10 22.7deg_0 Ashton Vertical		
Freq. Note	Detector Mode	Spe <i>c</i> tum Reading Level	Factor	Actual FS	Limit @ 3m	Margin
MHz F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50 E	Peak	45.85	1.16	47.01	74	-26.99
2483.50 E	Average	34.80	1.16	35.96	54	-18.04
Operation Mode : Fundamental Frequenc Operation Band : EUT Pol. :	802.11b y : 2462 M BE CH I H	Hz Temp./H High Test Engi	lumi. :	nna Pol. :	2016/11/10 22.7deg_0 Ashton 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
2483.50 E	Peak	46.24	1.16	47.40	74	-26.60
2483.50 E	Average	34.44	1.16	35.60	54	-18.40

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Radiated Band Edge Measurement Result (802.11g)

Operation Mode :802.11gFundamental Frequency :2412 MHzOperation Band :BE CH LowEUT Pol. :H			IHz Temp. / H Low Test Eng	łumi. :	nna Pol. :	2016/11/10 22.7deg_C Ashton 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
2390.00	E	Peak	57.31	0.92	58.23	74	-15.77
2390.00	Е	Average	38.44	0.92	39.36	54	-14.64
Operation N Fundament Operation E EUT Pol. :	al Frequenc	802.11 cy : 2412 M BE CH H	IHz Temp. / H Low Test Eng	łumi. :	nna Pol. :	2016/11/1(22.7deg_C Ashton 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
2390.00	Е	Peak	58.99	0.92	59.91	74	-14.09
2390.00	Е	Average	40.15	0.92	41.07	54	-12.93



2483.50

Е

Average

Fundamental Frequency: 246			.11g Test Date : 2 MHz Temp. / Humi. : CH High Test Engineer : Measurement Antenna Pol. :		2016/11/10 22.7deg_C/57RH Ashton 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
2483.50	E	Peak	54.45	1.16	55.61	74	-18.39
2483.50	E	Average	37.27	1.16	38.43	54	-15.57
Operation M Fundamenta Operation E EUT Pol. : Freq.	al Frequenc	802.11 cy : 2462 M BE CH H Detector	Hz Temp./H High Test Eng	lumi. :	nna Pol. : Actual	201 6/11/1 22.7 deg_0 Ashton Horizontal Limit	C/57RH
riey.	NOLE		•	raciol	FS		warym
		Mode	Reading Level			@ 3m	10
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	E	Peak	55.80	1.16	56.96	74	-17.04

37.05

1.16

38.21

54

-15.79

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Radiated Band Edge Measurement Result (802.11_HT20)

Fundamental Frequency : Operation Band :		802.11 cy : 2412 N BE CH H	IHz Temp. / H Low Test Engi	Test Date : Temp. / Humi. : Test Engineer : Measurement Antenna Pol. :		2016/11/10 22.7deg_C/57RH Ashton 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
2388.84	S	Peak	61.04	0.91	61.95	74	-12.05
2388.84	S	Average	38.93	0.91	39.84	54	-14.16
2390.00	Е	Peak	59.46	0.92	60.38	74	-13.62
2390.00	Е	Average	40.57	0.92	41.49	54	-12.51
Operation Mode :802.11n20Fundamental Frequency :2412 MHzOperation Band :BE CH LowEUT Pol. :H		IHz Temp. / H Low Test Engi	lumi. :	nna Pol. :	2016/11/10 22.7deg_C Ashton Horizontal		
Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
•		Mode	Reading Level		FS	@ 3m	U
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	E	Peak	60.38	0.92	61.30	74	-12.70
2390.00	Е	Average	43.36	0.92	44.28	54	-9.72
					_*	-	-



2484.60

S

Average

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-15.05

54

Operation M	lode :	802.11	802.11n20 Test Date			2016/11/1	0	
Fundamental Frequency: 2462 MHz			IHz Temp.//	Temp. / Humi. :			22.7deg_C/57RH	
Operation B	and :	BE CH	High Test Eng	Test Engineer :				
EUT Pol. :		Н	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	
2483.50	E	Peak	56.02	1.16	57.18	74	-16.82	
2483.50	Е	Average	39.29	1.16	40.45	54	-13.55	
2484.60	S	Peak	57.08	1.16	58.24	74	-15.76	

Operation Mode :	802.11n20	Test Date :	2016/11/10
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH High	Test Engineer :	Ashton
EUT Pol. :	Н	Measurement Antenna Pol. :	Horizontal

37.79

1.16

38.95

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
2483.50	E	Peak	55.76	1.16	56.92	74	-17.08
2483.50	E	Average	38.73	1.16	39.89	54	-14.11
2483.80	S	Peak	56.56	1.16	57.72	74	-16.28
2483.80	S	Average	38.67	1.16	39.83	54	-14.17

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Radiated Band Edge Measurement Result (802.11_HT40)

Operation Mode :802.11Fundamental Frequency :2422 NOperation Band :BE CHEUT Pol. :H			Hz Temp. / H Low Test Eng	łumi. :	nna Pol. :	2016/11/10 22.7deg_C Ashton 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
2390.00	Е	Peak	69.93	0.92	70.86	74	-3.14
2390.00	Е	Average	49.90	0.92	50.82	54	-3.18
Operation Mode :802.11n40Fundamental Frequency :2422 MHzOperation Band :BE CH LowEUT Pol. :H		Hz Temp. / H Low Test Eng	łumi. :	nna Pol. :	2016/11/10 22.7deg_C 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
2390.00	Е	Peak	70.49	0.92	71.41	74	-2.59
2390.00	E	Average	50.33	0.92	51.25	54	-2.75



Operation Mode :802.11n40Fundamental Frequency :2452 MHzOperation Band :BE CH HighEUT Pol. :H			Hz Temp./H High Test Eng	Test Date : Temp. / Humi. : Test Engineer : Measurement Antenna Pol. :			2016/11/10 22.7deg_C/57RH Ashton 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	
2483.50	Е	Peak	63.61	1.16	64.77	74	-9.23	
2483.50	E	Average	43.77	1.16	44.93	54	-9.07	
2484.40	S	Peak	64.44	1.16	65.59	74	-8.41	
2484.40	S	Average	43.18	1.16	44.34	54	-9.66	
Operation Mode :802.11n40Fundamental Frequency :2452 MHzOperation Band :BE CH HighEUT Pol. :H			Hz Temp. / H High Test Eng Measurer	lumi. : ineer : nent Anter		2016/11/10 22.7deg_0 Ashton Horizontal	C/57RH	
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	
2483.50	E	Peak	62.41	1.16	63.57	74	-10.43	
2483.50	E	Average	42.93	1.16	44.09	54	-9.91	
2484.20	S	Peak	63.40	1.16	64.56	74	-9.44	
2484.20	S	Average	42.62	1.16	43.78	54	-10.22	

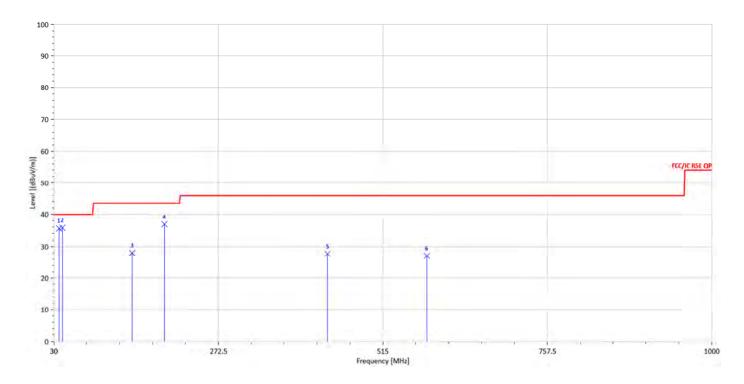
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Below 1GHz Worst-Case Data:

Radiated Spurious Emission Measurement Result (802.11 g)

Operation Mode :	802.11g	Test Date :	2016/11/14
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band:	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	Н	Measurement Antenna Pol. :	Vertical



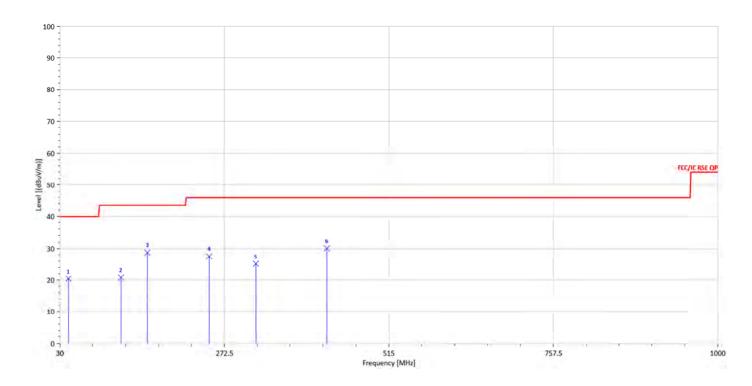
Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
37.76	S	QP	47.12	-11.49	35.63	40	-4.37
42.61	S	QP	50.45	-14.63	35.82	40	-4.18
145.43	S	Peak	44.35	-16.39	27.96	43.5	-15.54
192.96	S	Peak	54.96	-18.05	36.92	43.5	-6.58
433.52	S	Peak	37.25	-9.55	27.70	46	-18.30
579.99	S	Peak	33.21	-6.16	27.04	46	-18.96

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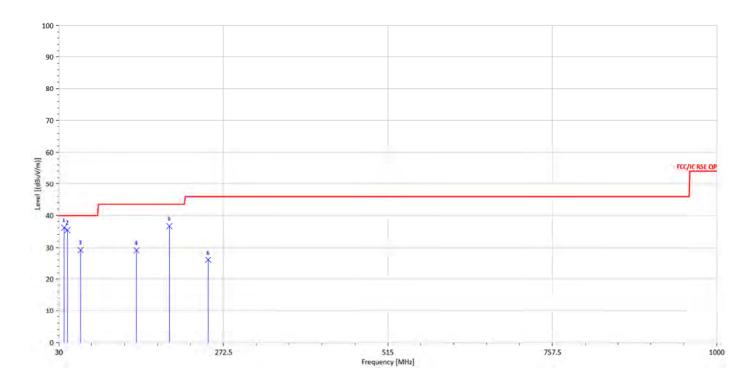
Operation Mode :	802.11g	Test Date:	2016/11/14
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	H	Measurement Antenna Pol. :	Horizontal



Fr	eq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
			Mode	Reading Level		FS	@3m	
M	Hz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
42	.61	S	Peak	35.06	-14.63	20.44	40	-19.56
120	0.21	S	Peak	36.69	-15.84	20.85	43.5	-22.65
159	9.01	S	Peak	46.23	-17.50	28.73	43.5	-14.77
250	0.19	S	Peak	42.07	-14.58	27.49	46	-18.51
319	9.06	S	Peak	37.47	-12.31	25.16	46	-20.84
423	3.82	S	Peak	39.34	-9.30	30.04	46	-15.96



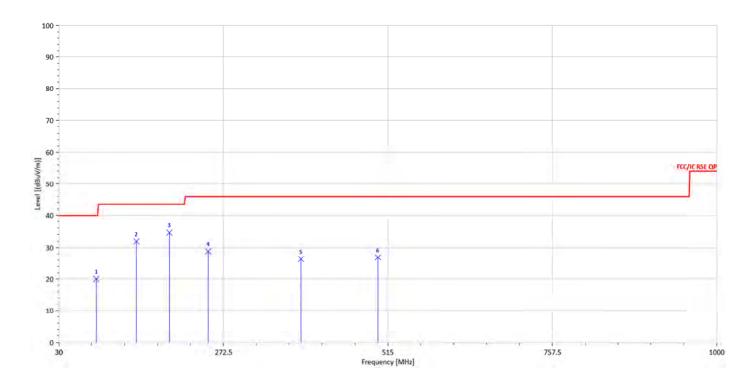
Operation Mode :	802.11g	Test Date:	2016/11/14
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Ashton
EUT Pol. :	H	Measurement Antenna Pol. :	Vertical



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
37.76	S	QP	47.62	-11.49	36.13	40	-3.87
42.61	S	QP	50.03	-14.63	35.40	40	-4.60
62.01	S	Peak	51.93	-22.71	29.23	40	-10.77
144.46	S	Peak	45.55	-16.39	29.16	43.5	-14.34
192.96	S	Peak	54.64	-18.05	36.59	43.5	-6.91
250.19	S	Peak	40.65	-14.58	26.07	46	-19.93



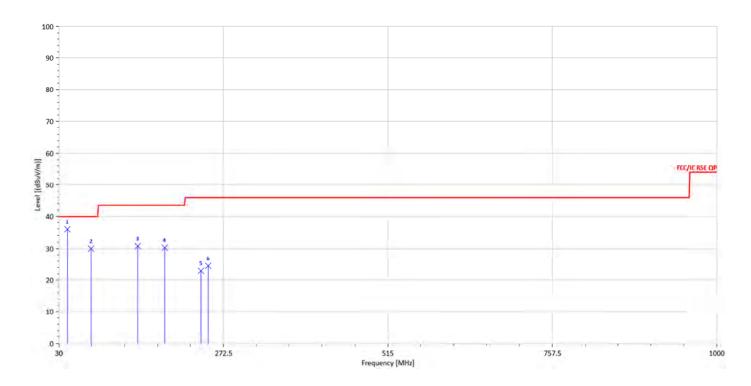
Operation Mode :	802.11g	Test Date:	2016/11/14
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Ashton
EUT Pol. :	H	Measurement Antenna Pol. :	Horizontal



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
85.29	S	Peak	40.23	-20.22	20.01	40	-19.99
144.46	S	Peak	48.30	-16.39	31.91	43.5	-11.59
192.96	S	Peak	52.70	-18.05	34.66	43.5	-8.84
250.19	S	Peak	43.37	-14.58	28.79	46	-17.21
386.96	S	Peak	36.47	-10.15	26.33	46	-19.67
500.45	S	Peak	34.40	-7.53	26.88	46	-19.12



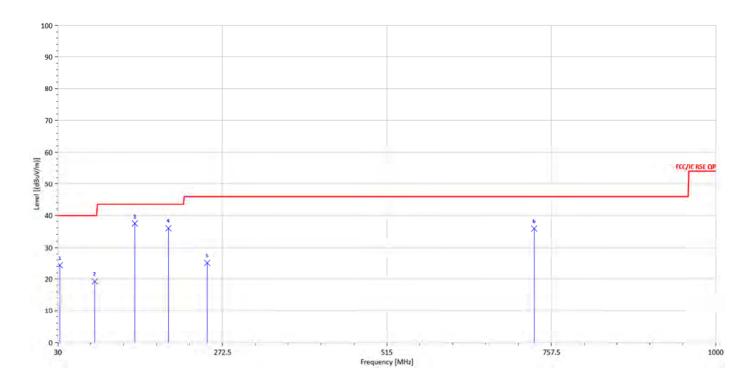
Operation Mode :	802.11g	Test Date :	2016/11/14
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer :	Ashton
EUT Pol. :	H	Measurement Antenna Pol. :	Vertical



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
42.61	S	QP	50.60	-14.63	35.97	40	-4.03
77.53	S	Peak	51.14	-21.17	29.97	40	-10.03
146.40	S	Peak	47.19	-16.45	30.74	43.5	-12.76
186.17	S	Peak	48.66	-18.41	30.25	43.5	-13.25
239.52	S	Peak	38.22	-15.28	22.94	46	-23.06
250.19	S	Peak	39.07	-14.58	24.49	46	-21.51



Operation Mode :	802.11g	Test Date :	2016/11/14
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer :	Ashton
EUT Pol. :	H	Measurement Antenna Pol. :	Horizontal



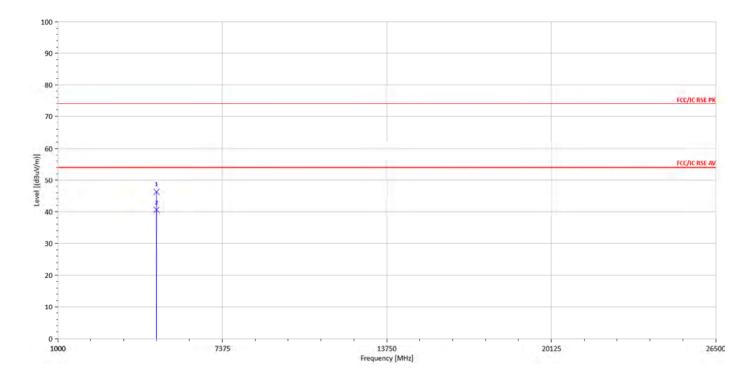
Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
32.91	S	Peak	33.08	-8.75	24.33	40	-15.67
84.32	S	Peak	39.61	-20.34	19.27	40	-20.73
143.49	S	Peak	53.73	-16.32	37.41	43.5	-6.09
192.96	S	Peak	54.00	-18.05	35.96	43.5	-7.54
250.19	S	Peak	39.65	-14.58	25.07	46	-20.93
732.28	S	Peak	40.61	-4.74	35.88	46	-10.12



Above 1GHz Data:

Radiated Spurious Emission Measurement Result (802.11 b)

Operation Mode :	802.11b	Test Date :	2016/11/10
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band:	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	Н	Measurement Antenna Pol. :	Vertical



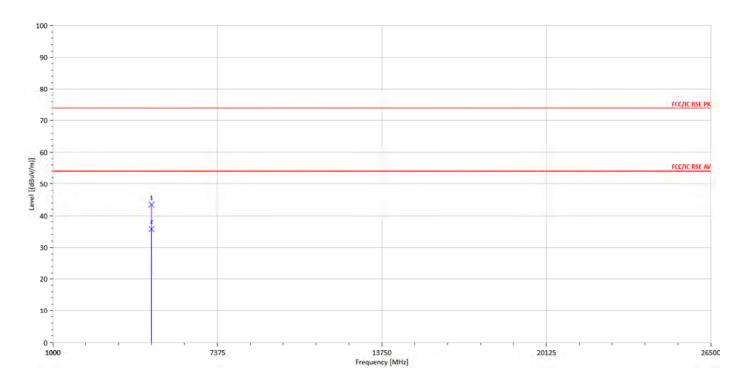
Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@ 3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Н	Peak	38.77	7.58	46.35	74	-27.65
4824.00	Н	Average	33.08	7.58	40.66	54	-13.34

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.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are relatined to so days only. 除非另有說明,此報告結果僅對測试之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。 This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <u>www.sgs.com/terms_and_conditions.htm</u> and, for elec-tronic format documents, subject to Terms and Conditions for Electronic Documents at <u>www.sgs.com/terms_edocument.htm</u>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



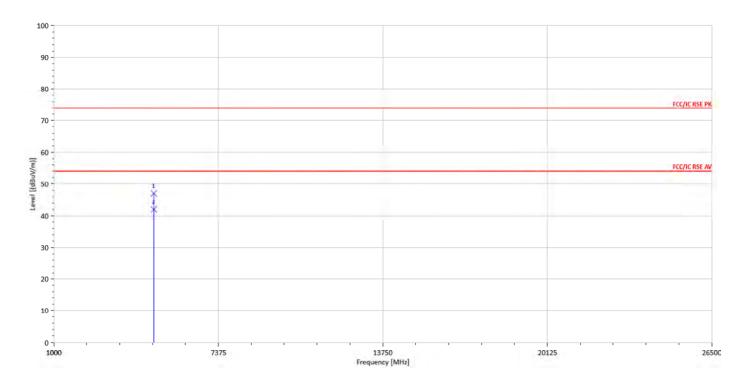
Operation Mode :	802.11b	Test Date:	2016/11/10
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	H	Measurement Antenna Pol. :	Horizontal



	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
4	824.00	Н	Peak	35.97	7.58	43.55	74	-30.45
4	824.00	Н	Average	28.22	7.58	35.80	54	-18.20



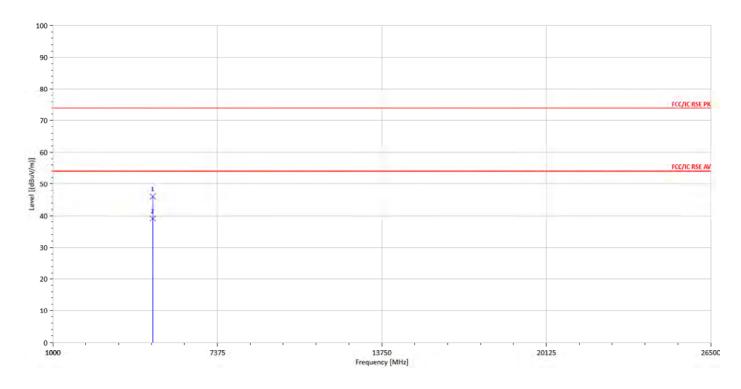
Operation Mode :	802.11b	Test Date:	2016/11/10
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Ashton
EUT Pol. :	H	Measurement Antenna Pol. :	Vertical



	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	39.17	7.91	47.08	74	-26.92
	4874.00	Н	Average	34.20	7.91	42.11	54	-11.89



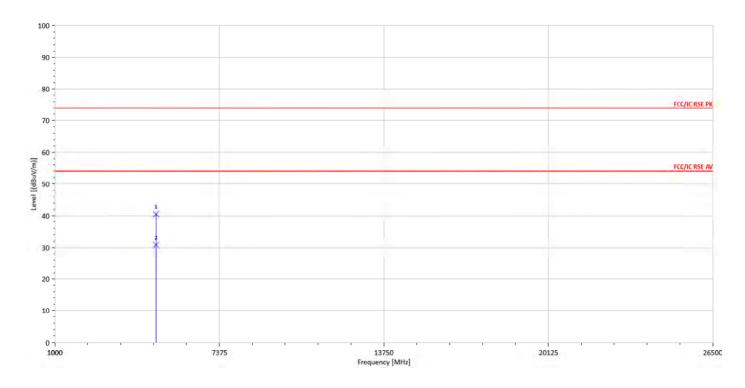
Operation Mode :	802.11b	Test Date :	2016/11/10
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Ashton
EUT Pol. :	H	Measurement Antenna Pol. :	Horizontal



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
4874.00	Н	Peak	38.24	7.91	46.15	74	-27.85
4874.00	Н	Average	31.27	7.91	39.18	54	-14.82



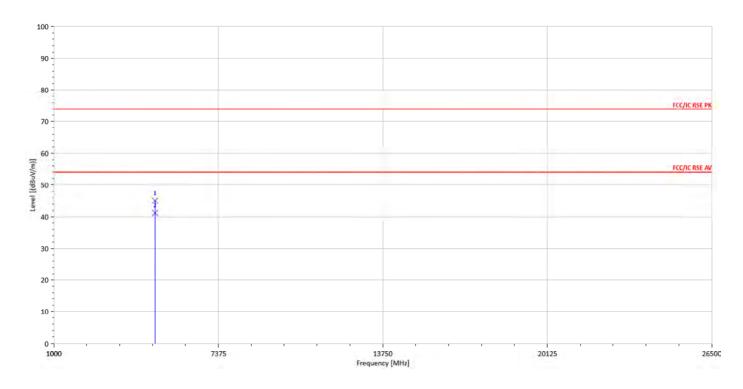
Operation Mode :	802.11b	Test Date :	2016/11/10
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band:	Tx CH High	Test Engineer :	Ashton
EUT Pol. :	Н	Measurement Antenna Pol. :	Vertical



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	
4924.00	Н	Peak	38.64	7.92	46.56	74	-27.44	
4924.00	Н	Average	32.86	7.92	40.78	54	-13.22	



Operation Mode :	802.11b	Test Date :	2016/11/10
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band:	Tx CH High	Test Engineer :	Ashton
EUT Pol. :	Н	Measurement Antenna Pol. :	Horizontal

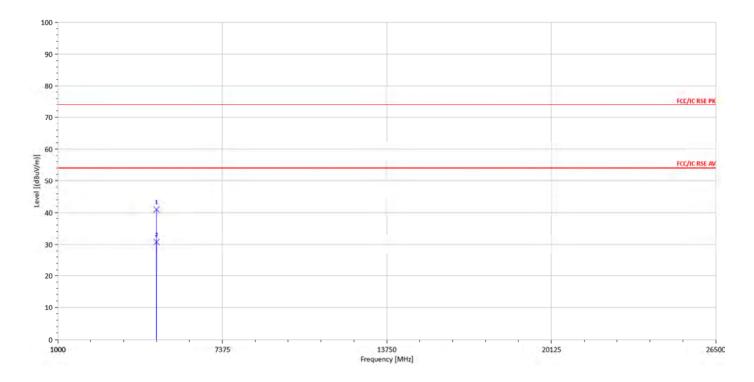


Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@ 3m		
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
4924.00	Н	Peak	37.23	7.92	45.15	74	-28.85	
4924.00	Н	Average	33.36	7.92	41.28	54	-12.72	



Radiated Spurious Emission Measurement Result (802.11 g)

Operation Mode :	802.11g	Test Date :	2016/11/10
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band:	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	Н	Measurement Antenna Pol. :	Vertical

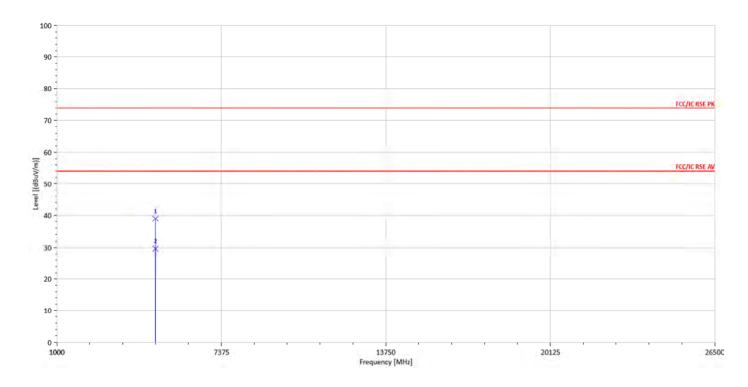


Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@ 3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Н	Peak	33.48	7.58	41.06	74	-32.94
4824.00	Н	Average	23.14	7.58	30.72	54	-23.28

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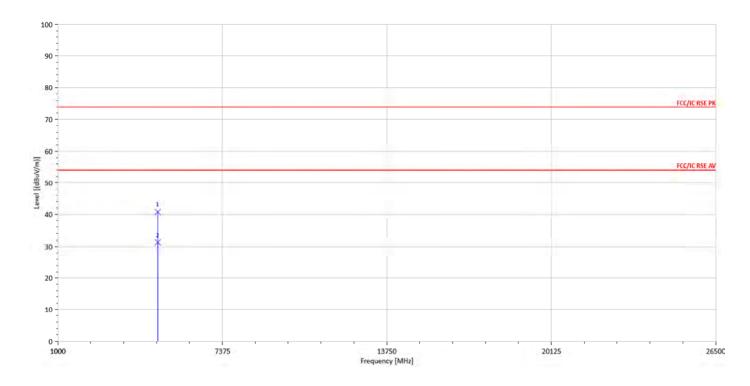
Operation Mode :	802.11 g	Test Date:	2016/11/10
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer :	Ashton
EUT Pol. :	H	Measurement Antenna Pol. :	Horizontal



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	31.42	7.58	38.99	74	-35.01	
4824.00	Н	Average	22.08	7.58	29.66	54	-24.34	



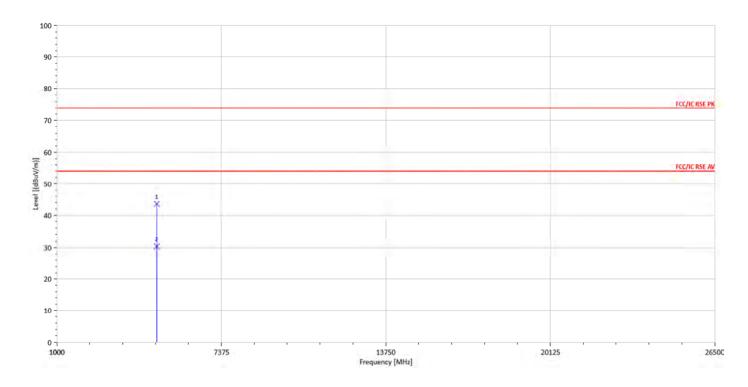
Operation Mode :	802.11g	Test Date:	2016/11/10
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer :	Ashton
EUT Pol. :	H	Measurement Antenna Pol. :	Vertical



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	32.91	7.91	40.82	74	-33.18	
4874.00	Н	Average	23.40	7.91	31.31	54	-22.69	



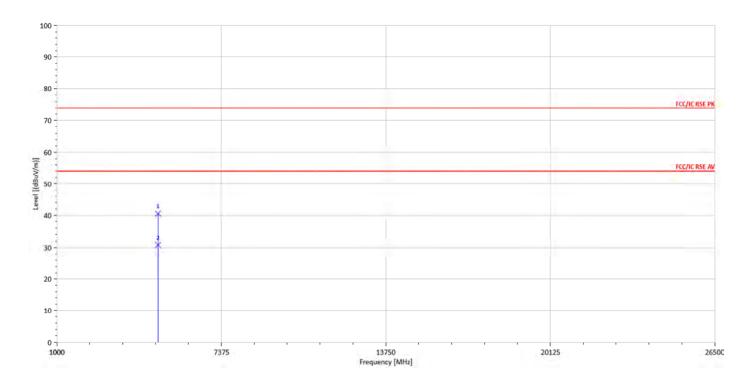
Operation Mode :	802.11g	Test Date :	2016/11/10
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer:	Ashton
EUT Pol. :	H	Measurement Antenna Pol.:	Horizontal



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	
4874.00	Н	Peak	35.74	7.91	43.65	74	-30.35	
4874.00	Н	Average	22.45	7.91	30.36	54	-23.64	



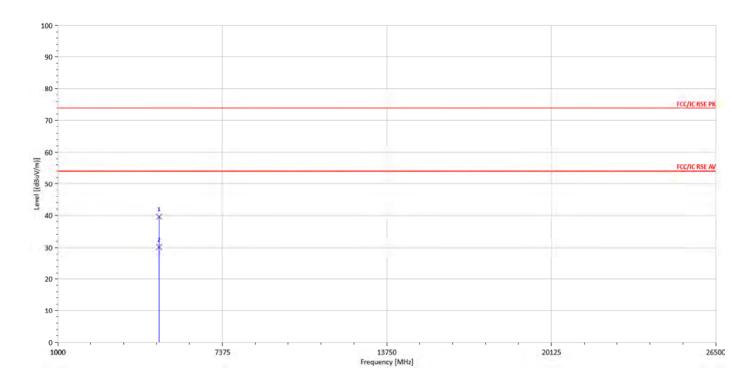
Operation Mode :	802.11g	Test Date :	2016/11/10
Fundamental Frequency : Operation Band :	2462 MHz Tx CH High	Temp. / Humi. : Test Engineer :	22.7deg_C/57RH Ashton
EUT Pol. :	Н	Measurement Antenna Pol. :	Vertical



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	
4924.00	Н	Peak	32.69	7.92	40.61	74	-33.39	
4924.00	Н	Average	22.88	7.92	30.80	54	-23.20	



Operation Mode :	802.11g	Test Date :	2016/11/10
Fundamental Frequency : Operation Band :	2462 MHz Tx CH High	Temp. / Humi. : Test Engineer :	22.7 deg_C/57RH Ashton
EUT Pol. :	Н	Measurement Antenna Pol. :	Horizontal

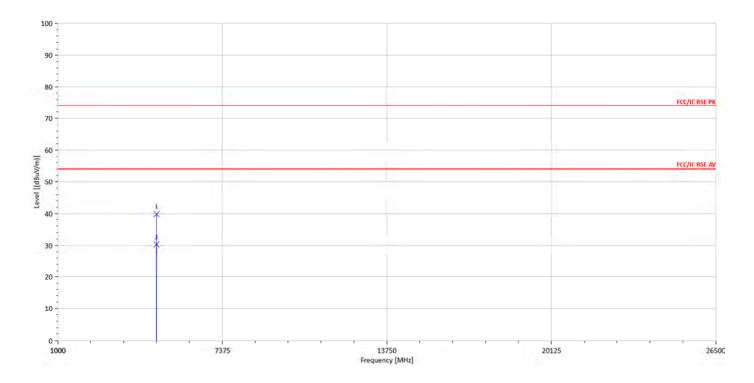


	Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin	
			Mode	Reading Level		FS	@ 3m		
	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
-	4924.00	Н	Peak	31.71	7.92	39.63	74	-34.37	
	4924.00	Н	Average	22.22	7.92	30.15	54	-23.85	



Radiated Spurious Emission Measurement Result (802.11_HT20)

Operation Mode :	802.11 n20	Test Date :	2016/11/10
Fundamental Frequency:	2412 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band:	Tx CH Low	Test Engineer:	Ashton
EUT Pol. :	Н	Measurement Antenna Pol.:	Vertical

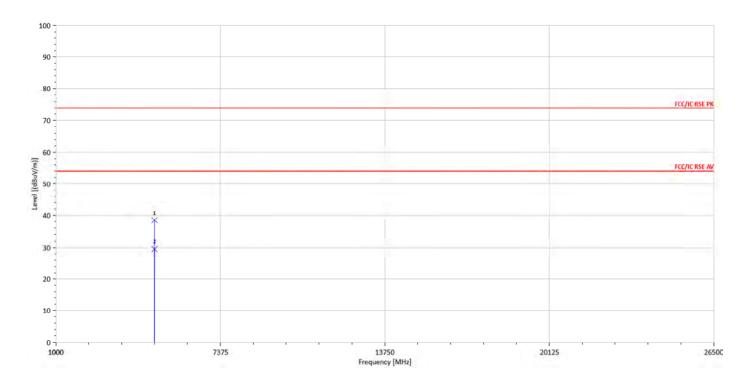


Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@ 3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Н	Peak	32.36	7.58	39.93	74	-34.07
4824.00	Н	Average	22.71	7.58	30.29	54	-23.71

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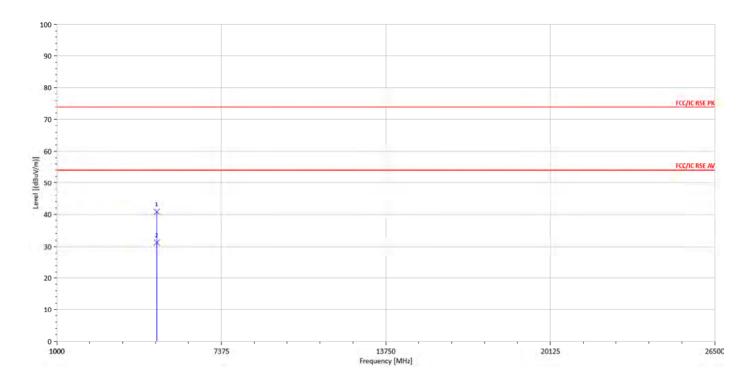
Operation Mode :	802.11 n20	Test Date :	2016/11/10
Fundamental Frequency :	2412 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Low	Test Engineer:	Ashton
EUT Pol. :	H	Measurement Antenna Pol.:	Horizontal



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	30.91	7.58	38.48	74	-35.52	
4824.00	Н	Average	21.91	7.58	29.49	54	-24.51	



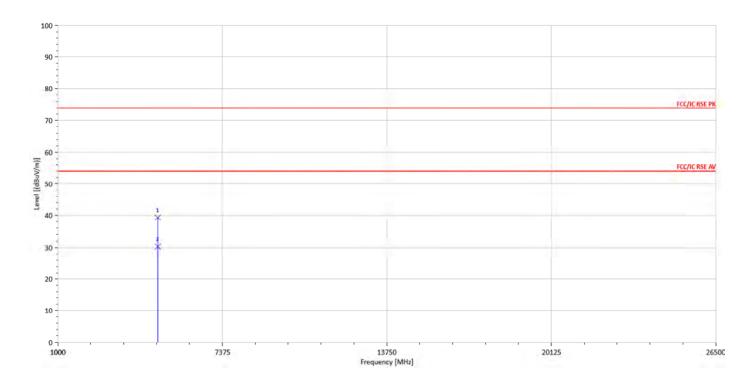
Operation Mode :	802.11n20	Test Date :	2016/11/10
Fundamental Frequency : Operation Band :	2437 MHz Tx CH Mid	Temp. / Humi. : Test Engineer :	22.7deg_C/57RH Ashton
EUT Pol. :	H	Measurement Antenna Pol.:	Vertical



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	32.98	7.91	40.89	74	-33.11	
4874.00	Н	Average	23.34	7.91	31.25	54	-22.75	



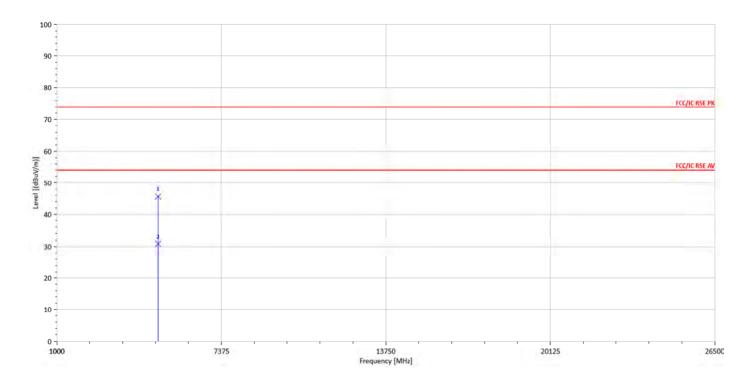
Operation Mode :	802.11n20	Test Date :	2016/11/10
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band : EUT Pol. :	Tx CH Mid H	Test Engineer : Measurement Antenna Pol. :	Ashton Horizontal



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	
4874.00	Н	Peak	31.44	7.91	39.35	74	-34.65	
4874.00	Н	Average	22.38	7.91	30.29	54	-23.71	



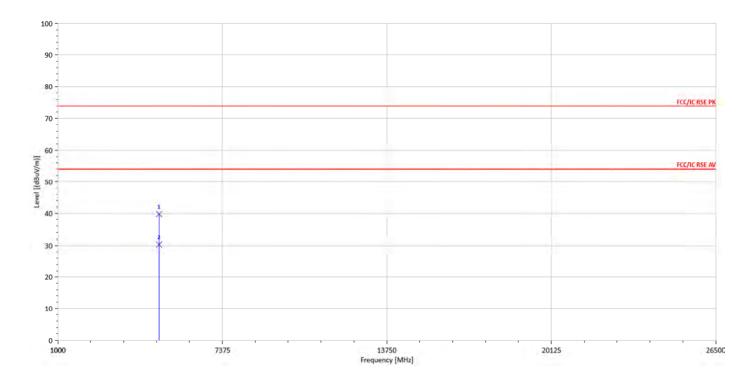
Operation Mode :	802.11n20	Test Date :	2016/11/10
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer:	Ashton
EUT Pol. :	H	Measurement Antenna Pol.:	Vertical



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	
4924.00	Н	Peak	37.81	7.92	45.73	74	-28.27	
4924.00	Н	Average	22.93	7.92	30.85	54	-23.15	



Operation Mode :	802.11n20	Test Date :	2016/11/10
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer:	Ashton
EUT Pol. :	H	Measurement Antenna Pol.:	Horizontal

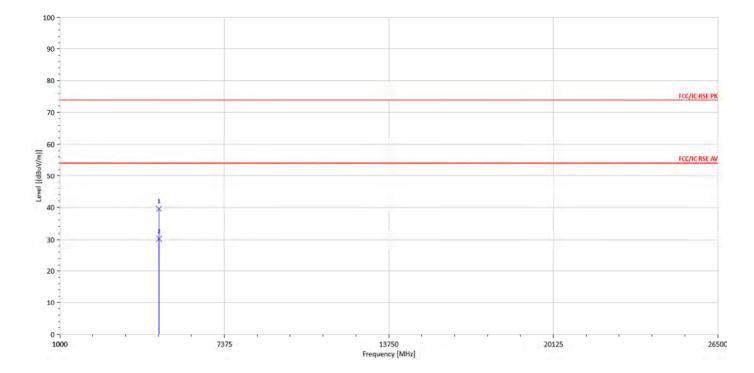


	Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin	
			Mode	Reading Level		FS	@ 3m		
	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
-	4924.00	Н	Peak	31.94	7.92	39.86	74	-34.14	
	4924.00	Н	Average	22.39	7.92	30.31	54	-23.69	



Radiated Spurious Emission Measurement Result (802.11_HT40)

Operation Mode :	802.11n40	Test Date:	2016/11/10
Fundamental Frequency :	2422 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band : EUT Pol. :	Tx CH Low H	Test Engineer: Measurement Antenna Pol.:	Ashton Vertical

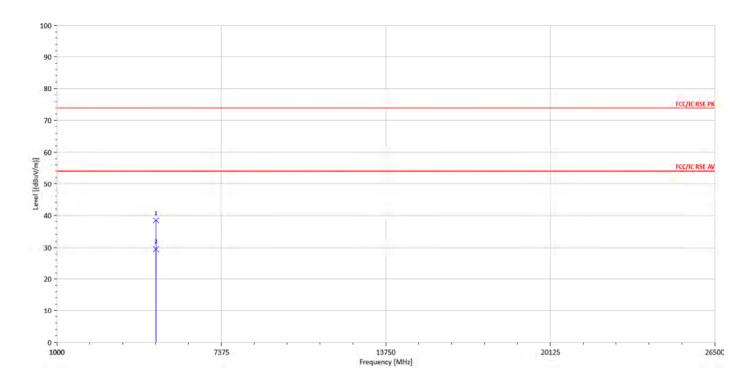


Freq.	Note	Detector Mode	Spectum Reading Level	Factor	Actual FS	Limit @ 3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4844.00	Н	Peak	32.04	7.55	39.59	74	-34.41
4844.00	Н	Average	22.71	7.55	30.26	54	-23.74

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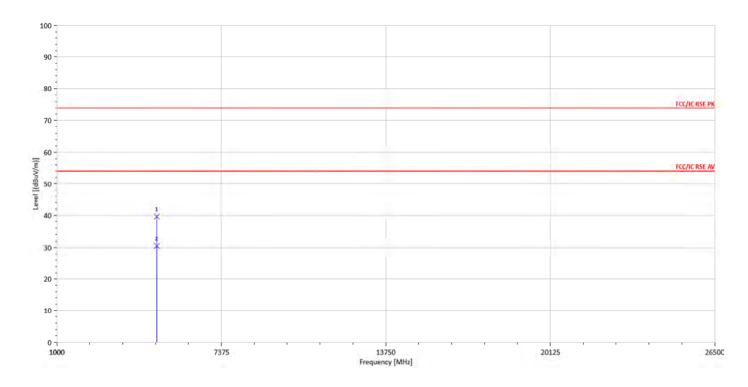
Operation Mode :	802.11n40	Test Date :	2016/11/10
Fundamental Frequency :	2422 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band : EUT Pol. :	Tx CH Low H	Test Engineer: Measurement Antenna Pol.:	Ashton Horizontal



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	
4844.00	Н	Peak	30.87	7.55	38.42	74	-35.58	
4844.00	Н	Average	21.94	7.55	29.49	54	-24.51	



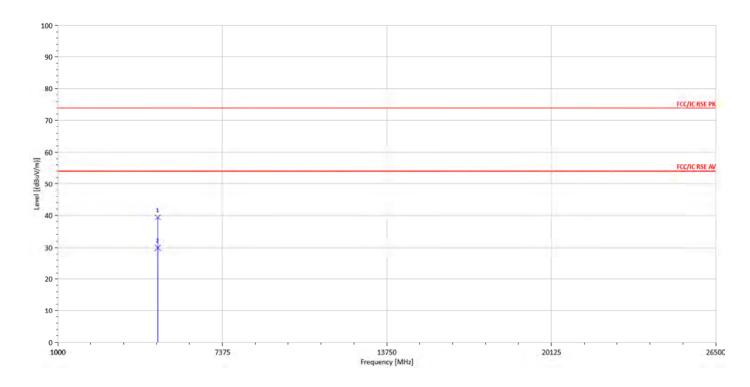
Operation Mode :	802.11n40	Test Date:	2016/11/10
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band:	Tx CH Mid	Test Engineer:	Ashton
EUT Pol. :	Н	Measurement Antenna Pol.:	Vertical



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	31.79	7.91	39.70	74	-34.30	
4874.00	Н	Average	22.60	7.91	30.51	54	-23.49	



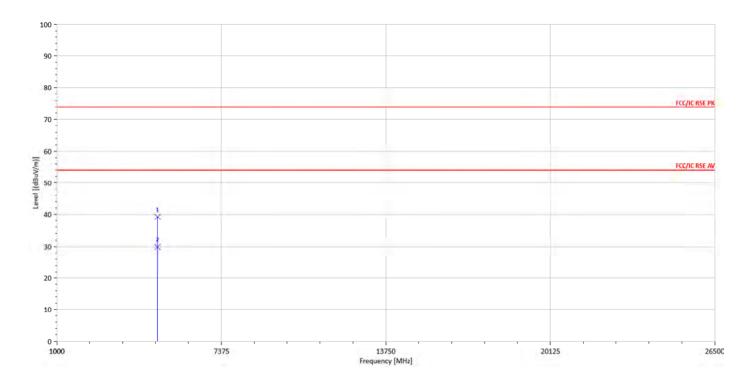
Operation Mode :	802.11n40	Test Date :	2016/11/10
Fundamental Frequency :	2437 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH Mid	Test Engineer:	Ashton
EUT Pol. :	H	Measurement Antenna Pol.:	Horizontal



	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
_	4874.00	Н	Peak	31.47	7.91	39.38	74	-34.62
	4874.00	Н	Average	22.01	7.91	29.92	54	-24.08



Operation Mode :	802.11n40	Test Date :	2016/11/10
Fundamental Frequency :	2452 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer:	Ashton
EUT Pol. :	H	Measurement Antenna Pol.:	Vertical

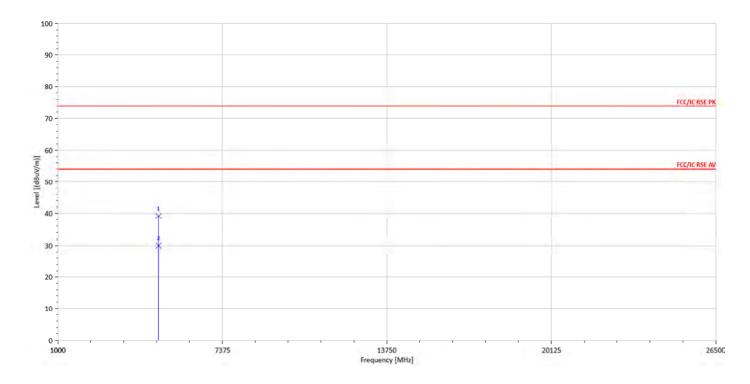


Freq.	Note	Detector	Spectum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@ 3m		
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
4904.00	Н	Peak	31.78	7.44	39.22	74	-34.78	
4904.00	Н	Average	22.42	7.44	29.86	54	-24.14	

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Operation Mode :	802.11n40	Test Date :	2016/11/10
Fundamental Frequency :	2452 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	Tx CH High	Test Engineer:	Ashton
EUT Pol. :	H	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	
4904.00	Н	Peak	31.74	7.44	39.19	74	-34.81	
4904.00	Н	Average	22.51	7.44	29.95	54	-24.05	



12 PEAK POWER SPECTRAL DENSITY

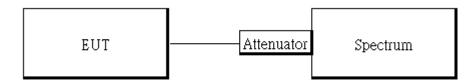
12.1 Standard Applicable

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

12.2 Measurement Equipment Used

Conducted Emission Test Site								
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.			
TYPE		NUMBER	NUMBER	CAL.				
EXA Spectrum Ana- lyzer	Agilent	N9030A	MY53120760	02/26/2016	02/25/2017			
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2016	01/01/2017			
Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102	23670/2	01/02/2016	01/01/2017			
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2016	01/01/2017			

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.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.

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12.5 Measurement Result

POWER DENSITY 802.11b MODE						
Frequency	RF Power	Maximum				
(MHz)	Density	Limit	Result			
(1011 12)	(dBm)	(dBm)				
2412	4.45	8.00	PASS			
2437	-7.98	8.00	PASS			
2462	-8.61	8.00	PASS			

POWER DENSITY 802.11g MODE						
Frequency	RF Power	Maximum				
(MHz)	Density	Limit	Result			
	(dBm)	(dBm)				
2412	-13.46	8.00	PASS			
2437	-14.27	8.00	PASS			
2462	-13.99	8.00	PASS			

POWER DENSITY 802.11n HT20 MODE POWER DENSITY 802.11n HT40 MODE

Frequency	RF Power	Maximum	
(MHz)	Density	Limit	Result
	(dBm)	(dBm)	
2412	-11.85	8.00	PASS
2437	-12.53	8.00	PASS
2462	-12.59	8.00	PASS

Frequency	RF Power	Maximum		
(MHz)	Density	Limit	Result	
(10112)	(dBm)	(dBm)		
2422	-13.87	8.00	PASS	
2437	-13.69	8.00	PASS	
2452	-14.86	8.00	PASS	

Band edge Limit

Banded	ge Limit 802	.11b MODE	Banded	ge Limit 802	.11g MODE	
Frequency	RFPower	Bandedge	Frequency	RFPower	Bandedge	
(MHz)	Density	Limit	(MHz)	Density	Limit	
()	(dBm)	(dBm)	((dBm)	(dBm)	
2412	7.69	-12.31	2412	3.19	-16.81	
2462	7.42	-12.58	2462	3.03	-16.97	
1			Bandedge Limit 802.11n40 MODE			
Bandedge	e Limit 802. ⁻	11n20 MODE	Bandedge	e Limit 802.′	11n40 MODE	
	e Limit 802. ² RF Power	11n20 MODE Bandedge		e Limit 802. RF Power	11n40 MODE Bandedge	
Frequency			Frequency			
	RFPower	Bandedge		RFPower	Bandedge	
Frequency	RF Power Density	Bandedge Limit	Frequency	RF Power Density	Bandedge Limit	

Note:

offset 10.90 dB for SISO mode

*Refer to next page for plots



802.11b PSD(CH-Low)



802.11b PSD (CH-Mid)



802.11b PSD (CH-High)



802.11g PSD(CH-Low)



802.11g PSD (CH-Mid)



P802.11g PSD (CH-High)



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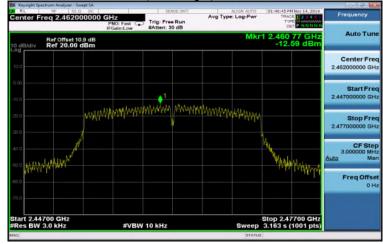
802.11n_HT20 PSD (CH-Low)



802.11n_HT20 PSD (CH-Mid)



802.11n_HT20 PSD (CH-High)



802.11n_HT40 PSD (CH-Low)



802.11n_HT40 PSD (CH-Mid)



802.11n_HT40 PSD (CH-High)



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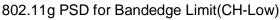


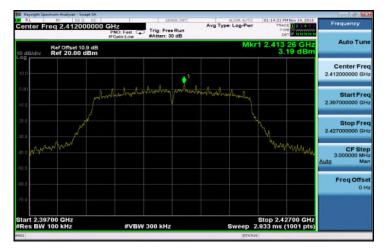
802.11b PSD for Band edge Limit (CH-Low)



802.11b PSD for Bandedge Limit(CH-High)



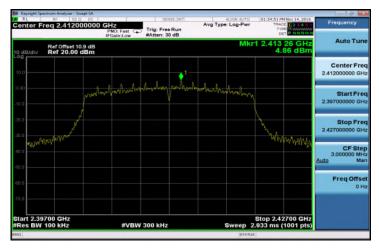




802.11g PSD for Band edge Limit(CH-High)



802.11n_HT20 PSD for Bandedge Limit(CH-Low)



802.11n_HT20 PSD for Bandedge Limit(CH-High)



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802.11n HT40 PSD for Bandedge Limit(CH-Low)



802.11n_HT40 PSD for Bandedge Limit(CH-High)

Center Freq 2.452000000 GHz	Free Run 1: 30 dB		02:00:27 PM Nev 14, 22 TRACE 2 2 4 TYPE DWART 0et P 1111 1 2.449 48 GH 2,28 dB	Auto Tune
Delivery Ref Offset 10.9 dB 9 100 100 100 100 100 100 100	1		1 2.449 48 GH 2.28 dB	
00 100 100 100 100 100	1			Center Free
Malushakakakakaka	teleteler as			2.452000000 GH
0.0	and have any method of	ekstrad Scholad		Start Free 2.422000000 GH
0.0			h h h h h h h h h h h h h h h h h h h	Stop Free 2.482000000 GH
0 0 0			and the second second second	CF Step 6.000000 MH Auto Mar
0.0				Freq Offse 0 H
tart 2.42200 GHz			Stop 2.48200 Gł	
Res BW 100 kHz #VBW 300 kl	HZ	Sweep 5	.800 ms (1001 pt	(\$)

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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.

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14 MAXIMUM PERMISSIBLE EXPOSURE (MPE)

14.1 Standard Applicable

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

This is a Mobile device, the MPE is required.

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

Limits for Maximum Permissive Exposure (MPE)

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

F = frequency in MHz

* = Plane-wave equipment power density

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Maximum Permissible Exposure (MPE) Evaluation

802.11b Main								
СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit		RESULT	
1	2412	1	19.52	89.54	1 Watt =	30.00	dBm	PASS
6	2437	1	19.36	86.30	1 Watt =	30.00	dBm	PASS
11	2462	1	19.16	82.41	1 Watt =	30.00	dBm	PASS
802.11	b Main							
СН	Frequency (MHz)	Data Rate	•	Max. Output include tune up tolerance Power (mW)	Limit		RESULT	
1	2412	1	17.45	55.59	1 Watt =	30.00	dBm	PASS
6	2437	1	17.42	55.21	1 Watt =	30.00	dBm	PASS
11	2462	1	17.25	53.09	1 Watt =	30.00	dBm	PASS

MPE Prediction (802.11b 2412~2462)

Prediction of MPE limit at a given distance

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

S=PG/4πR²

Where: S = Power densityP = Power input to antenna

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

R = Distance to the center of radiation of the antenna

Max. output power including tune-up tolerancel:	17.45	(dBm)			
Max. output power including tune-up tolerancel:	55.590426	(mW)			
Duty cycle:	98.19	(%)			
Maximum Pav :	54.584239	(mW)			
Peak Antenna gain (Maximum):	0.78	(dBi)			
Peak Antenna gain (linear):	1.1967405	(numeric)			
Prediction distance:	20	(cm)			
Prediction frequency:	2412	(MHz)			
MPE limit for uncontrolled exposure at prediction	1	(mW/cm^2)			
Power density at predication frequency at 20 (cm)	0.013	(mW/cm^2)			
Measurement Result					
The predicted power density level at 20 cm is 0.013 mW/cm2.					
This is below the uncontrolled exposure limit of 1 mW/cm2 at 2412MHz.					

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802.11g Main									
СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit		RESULT		
1	2412	6	23.44	220.80	1 Watt =	30.00	dBm	PASS	
6	2437	6	23.17	207.49	1 Watt =	30.00	dBm	PASS	
11	2462	6	22.9	194.98	1 Watt =	30.00	dBm	PASS	
802.11	802.11g Main								
СН	Frequency (MHz)	Data Rate	•	Max. Output include tune up tolerance Power (mW)	Limit		RESULT		
1	2412	6	14.46	27.93	1 Watt =	30.00	dBm	PASS	
6	2437	6	14.35	27.23	1 Watt =	30.00	dBm	PASS	
11	2462	6	14.19	26.24	1 Watt =	30.00	dBm	PASS	

MPE Prediction (802.11g 2412~2462)

Prediction of MPE limit at a given distance

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

S=PG/4πR²

Where: S = Power densityP = Power input to antenna

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

R = Distance to the center of radiation of the antenna

Max. output power including tune-up tolerancel:	14.46	(dBm)			
Max. output power including tune-up tolerancel:	27.925438	(mW)			
Duty cycle:	91.25	(%)			
Maximum Pav :	25.481963	(mW)			
Peak Antenna gain (Maximum):	0.78	(dBi)			
Peak Antenna gain (linear):	1.1967405	(numeric)			
Prediction distance:	20	(cm)			
Prediction frequency:	2412	(MHz)			
MPE limit for uncontrolled exposure at prediction	1	(mW/cm^2)			
Power density at predication frequency at 20 (cm)	0.006	(mW/cm^2)			
Measurement Result					
The predicted power density level at 20 cm is 0.006 mW/cm2.					
This is below the uncontrolled exposure limit of 1 mW/cm2 at 2412MHz.					

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802.11n_HT20M Main								
СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit		RESULT	
1	2412	MC S0	23.4	218.78	1 Watt =	30.00	dBm	PASS
6	2437	MC S0	23.22	209.89	1 Watt =	30.00	dBm	PASS
11	2462	MC S0	23.26	211.84	1 Watt =	30.00	dBm	PASS
802.11n_HT20M Main								
СН	Frequency (MHz)	Data Rate	-	Max. Output include tune up tolerance Power (mW)	Limit		RESULT	
1	2412	MC S0	14.42	27.67	1 Watt =	30.00	dBm	PASS
6	2437	MC S0	14.22	26.42	1 Watt =	30.00	dBm	PASS
11	2462	MC S0	14.48	28.05	1 Watt =	30.00	dBm	PASS

MPE Prediction (802.11n_HT20 2412~2462)

Prediction of MPE limit at a given distance

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

S=PG/4πR²

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

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

R = Distance to the center of radiation of the antenna

· · · · · · · · · · · · · · · · · · ·		1	
Max. output power including tune-up tolerancel:	14.48	(dBm)	
Max. output power including tune-up tolerancel:	28.054336	(mW)	
Duty cycle:	95.5	(%)	
Maximum Pav :	26.791891	(mW)	
Peak Antenna gain (Maximum):	0.78	(dBi)	
Peak Antenna gain (linear):	1.1967405	(numeric)	
Prediction distance:	20	(cm)	
Prediction frequency:	2462	(MHz)	
MPE limit for uncontrolled exposure at prediction	1	(mW/cm^2)	
Power density at predication frequency at 20 (cm)	0.006	(mW/cm^2)	
Measurement Result The predicted power density level at 20 cm is 0.006 mW/cm2.			

This is below the uncontrolled exposure limit of 1 mW/cm2 at 2462MHz.

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802.11n_HT40M Main								
СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit		RESULT	
3	2422	MC S0	23.1	204.17	1 Watt =	30.00	dBm	PASS
6	2437	MC S0	22.98	198.61	1 Watt =	30.00	dBm	PASS
9	2452	MC S0	23.15	206.54	1 Watt =	30.00	dBm	PASS
802.11	n_HT40M Main							-
сн	Frequency (MHz)	Data Rate		Max. Output include tune up tolerance Power (mW)			RESULT	
3	2422	MC S0	14.26	26.67	1 Watt =	30.00	dBm	PASS
6	2437	MC S0	14.25	26.61	1 Watt =	30.00	dBm	PASS
9	2452	MC S0	14.48	28.05	1 Watt =	30.00	dBm	PASS

MPE Prediction (802.11n_HT40 2422~2452)

Prediction of MPE limit at a given distance

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

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

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

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

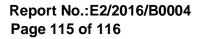
R = Distance to the center of radiation of the antenna

Max. output power including tune-up tolerancel:	14.48	(dBm)		
Max. output power including tune-up tolerancel:	28.05433638	(mW)		
Duty cycle:	80.92	(%)		
Maximum Pav :	22.701569	(mW)		
Peak Antenna gain (Maximum):	0.78	(dBi)		
Peak Antenna gain (linear):	1.196740531	(numeric)		
Prediction distance:	20	(cm)		
Prediction frequency:	2452	(MHz)		
MPE limit for uncontrolled exposure at prediction	1	(mW/cm^2)		
Power density at predication frequency at 20 (cm)	0.005	(mW/cm^2)		
Measurement Result				
The predicted power density level at 20 cm is 0.005 mW/cm2.				
This is below the uncontrolled exposure limit of 1 mW/cm2 at 2452MHz.				

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15 MAXIMUM PERMISSIBLE EXPOSURE (MPE)

15.1 Standard Applicable

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

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

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

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

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

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

15.2 Maximum Permissible Exposure (MPE) Exemption

802.11 b:

Max. output power including tune-up tolerance:	17.45	(dBm)
Max. output power including tune-up tolerance:	55.590426	(mW)
Antenna gain (Peak):	0.78	(dBi)
Maximum antenna gain:	1.1967405	(numeric)
Frenquency	2412	MHz
Limit	2.6840	W

Evaluation Result

The radiated power is 17.45 + 0.78 = 18.23 dBm(EIRP) = 66.527 mW = 0.066527 W that is less than or equal to 2.684W. Hence, following section 2.5.2 of RSS102 issue 5, RF exposure evaluation is no longer required.

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802.11 g:

Max. output power including tune-up tolerance:	14.46	(dBm)
Max. output power including tune-up tolerance:	27.925438	(mW)
Antenna gain (Peak):	0.78	(dBi)
Maximum antenna gain:	1.1967405	(numeric)
Frenquency	2412	MHz
Limit	2.6840	W

Evaluation Result

The radiated power is 14.46 + 0.78 = 15.24 dBm(EIRP) = 33.42 mW = 0.03342 W that is less than or equal to 2.684W. Hence, following section 2.5.2 of RSS102 issue 5, RF exposure evaluation is no longer required.

802.11n HT20:

Max. output power including tune-up tolerance:	14.48	(dBm)
Max. output power including tune-up tolerance:	28.054336	(mW)
Antenna gain (Peak):	0.78	(dBi)
Maximum antenna gain:	1.1967405	(numeric)
Frenquency	2462	MHz
Limit	2.7219	W

Evaluation Result

The radiated power is 14.48 + 0.78 = 15.26 dBm(EIRP) = 33.574mW = 0.033574W that is less than or equal to 2.722W. Hence, following section 2.5.2 of RSS102 issue 5, RF exposure evaluation is no longer required.

802.11 n_HT40:

Max. output power including tune-up tolerance:	14.48	(dBm)
Max. output power including tune-up tolerance:	28.054336	(mW)
Antenna gain (Peak):	0.78	(dBi)
Maximum antenna gain:	1.1967405	(numeric)
Frenquency	2452	MHz
Limit	2.7144	W

Evaluation Result

The radiated power is 14.48 + 0.78 = 15.26 dBm(EIRP) = 33.574mW = 0.033574W that is less than or equal to 2.714W. Hence, following section 2.5.2 of RSS102 issue 5, RF exposure evaluation is no longer required.

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