

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

	OF
Applicant:	Deep Sentinel Corporation
	600 Main Street, Suite C, Pleasanton, CA 94566.
Product Name:	Deep Sentinel Camera
Brand Name:	Deep Sentinel
Model No.:	CAM-18001
Model Difference:	N/A
FCC ID:	2AO9O-CAM-18001
Report Number:	ER/2018/40015
FCC Rule Part:	§15.247, Cat: DTS
Issue Date:	May. 22, 2018
Date of Test:	Apr. 11, 2018(Conducted); May. 16, 2018(Radiated)
Date of EUT Received:	Apr. 10, 2018

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.

Tested By:

ani <

Louis Chen / Engineer

Approved By:

Jim Chang / Manager



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Revision History

Report Number	Revision	Description	Effected Page	Issue Date	Revised By
ER/2018/40015	Rev.00	Initial creation of docu- ment	All	Apr. 19, 2018	Elle Chang

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GENERAL INFORMATION 1

1.1 Product description

General:

Product Name:	Deep Sen	Deep Sentinel Camera			
Brand Name:	Deep Sen	tinel			
Model No.:	CAM-1800)1			
Model Difference:	N/A				
Software version:	N/A	N/A			
Hardware version:	N/A	N/A			
	3.6Vdc fro	3.6Vdc from rechargeable battery			
Power Supply: Battery:		Model No.: BAT-18001; Supplier: APACK TECHNOLOGY CO., LTD			

WI AN 2 4GHz

Wi-Fi 802.11	Frequency Range	Channels	Rated Power (dBm)	Modulation Technology	
b			20.04	DSSS	
g	2412-2462	11	25.61	OFDM	
n_HT20			25.46	OFDM	
Antenna Designation		Wifi 2.4G Antenna , Gain: 2.57 dBi,			
Modulation type:		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 – 144.4Mbps			

Test Methodology of Applied Standards

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1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.247

FCC KDB 558074 D01 DTS Meas. Guidance v04

ANSI C63.10:2013

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

1.3 Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803 (TAF code 0513)

FCC Registration Number and Designation are: 509634 / TW0001

1.4 Special Accessories

There are no special accessories used while test was conducted.

1.5 Equipment Modifications

There was no modification incorporated into the EUT.

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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 1dB and 10dB attenuator.

offset = RF cable loss (1.2dB)+ attenuation factor(10dB)=11.2dB)

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2.5 Configuration of Tested System

Fig. 2-1 Conducted Emission Configuration

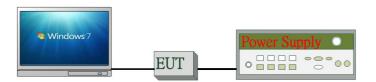


Fig 2-2 Radiated Emission Configuration



Table 2-1 Equipment Used in Tested System

ltem	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1	Notebook	Qisda	DHR700	9HK7101T02 61600025DH R700	Shielded	Unshielded
2	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
3.	DC Power Supply	Agilent	E3640A	MY53140006	N/A	Unshielded

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3 SUMMARY OF TEST RESULTS

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

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4 DESCRIPTION OF TEST MODES

4.1 Operated in 2400 ~ 2483.5MHz Band

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

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

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

RADIATED EMISSION TEST:

RADIATED EMISSION TEST (ABOVE 1 GHz)						
MODEAVAILABLE CHANNELTESTED CHANNELMODULATIONDATA 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		

Note:

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

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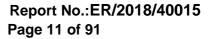


ANTENNA PORT CONDUCTED MEASUREMENT:

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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6 CONDUCTED EMISSION TEST

6.1 Standard Applicable

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

Frequency range	Limits dB(uV)						
MHz	Quasi-peak	Average					
0.15 to 0.50	66 to 56	56 to 46					
0.50 to 5	56	46					
5 to 30	60	50					
Note							
1.The lower limit shall apply at the transition frequencies							
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50							
MHz.							

6.2 Measurement Equipment Used

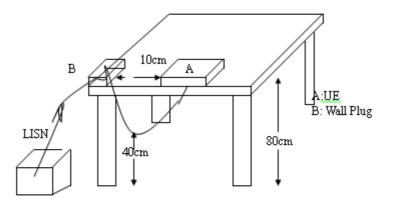
Conducted Emission Test Site								
EQUIPMENT	EQUIPMENT MFR		T MFR MODEL SERIAL		LAST	CAL DUE.		
TYPE		NUMBER	NUMBER	CAL.				
EXA Spectrum Analyzer	Agilent	N9010A	MY57120290	2018/02/14	2019/02/13			
Attenuator	Agilent	8495B	3308A22470	2018/01/02	2019/01/01			
Coaxial Cables	N/A	WK CE Cable	N/A	2018/01/02	2019/01/01			
Notebook	Lenovo	R400	7440AV6	N/A	N/A			

6.3 EUT Setup

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



6.4 Test SET-UP (Block Diagram of Configuration)



6.5 Measurement Procedure

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

6.6 Measurement Result

N/A, the device is powered by DC 3.6V Battery.

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7 DUTY CYCLE OF TEST SIGNAL

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

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

Formula:

Duty Cycle = Ton / (Ton+Toff)

Measurement Procedure:

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

Duty Cycle:

	Duty Cycle (%)	Duty Factor (dB)	1/T (kHz)	VBW setting (kHz)
802.11b	98.25	0.08	0.12	1.00
802.11g	90.32	0.44	0.72	1.00
802.11n_20	89.51	0.48	0.77	1.00

Duty Cycle Factor: $10 * \log(1/0.9825) = 0.08$ Duty Cycle Factor: $10 * \log(1/0.9032) = 0.44$ Duty Cycle Factor: $10 * \log(1/0.8951) = 0.48$

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7.1 DUTY CYCLE TEST SIGNAL Measurement Result

802.11 b



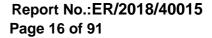
802.11 g

Keysight Spectrum Analyzer - Swept SA				
enter Freq 2.437000000	CHZ PNO: Fast Trig: Free Run IFGainLow #Atten: 30 dB	Avg Type: Voltage	02:35:38 PM Apr11, 2018 TRACE 12:34 5 1 TYPE WWWWWW DET P. N.N.N.W	Frequency
Ref Offset 11.2 dB	I GENELOW HIMAN OF ALL	Δι	Mkr3 1.546 ms -0.28 dB	Auto Tu
	Stableauscotteratures. Elevision en entrettere S	ekseed 102 304	กรับส่วนสารทาง ¹ ราช เมษารับไรเรียงไปเ	Center Fr 2.437000000 G
				Start Fr 2.437000000 0
0.0 0.0 0.0				Stop F 2.437000000 (
enter 2.437000000 GHz es BW 8 MHz	#VBW 8.0 MHz		Span 0 Hz 933 ms (1001 pts)	CF S 8.000000 M
RF MODE TRC, SCL X 1 Δ2 1 t (Δ) 2 F 1 t (Δ) 3 Δ4 1 t (Δ) 4 F 1 t 6	1.396 ms (Δ) - 0.85 dB 463.5 μs 21.40 dBm 1.546 ms (Δ) - 0.28 dB 463.5 μs 21.40 dBm	UNCTION FUNCTION WEITH	FUNCTION VALUE	Freq Off
7 8 9 9 0 1	17			Scale Ty
a		STATUS		

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802.11 n_20 MHz

Keysight Spectrum Analyzer					
Center Freq 2.43	50 B DC 7000000 GHz PN0: Fest	Trig: Free Run	Avg Type: Voltage	02:58:44 PM Apr 11, 2018 TRACE 1 2 3 4 5 TYPE WARMANN	Frequency
10 dB/div Ref 30.	IFGain:Low	#Atten: 30 dB	۵	Mkr3 1.460 ms 0.06 dB	Auto Tun
20 0 	suspittional Algebra	ht somerendsedenser och staarse biget	takan lawan di kawa di kala di ka	1∆2 netronalitionalition netronalition n	Center Fre 2.437000000 GH
10.0 20.0 30.0					Start Fre 2.437000000 GH
40, D 50, D 60, D				246418aw	Stop Fre 2.437000000 GP
Center 2.43700000 Res BW 8 MHz		W 8.0 MHz	Sweep 2.	Span 0 Hz 733 ms (1001 pts)	CF Ste 8.000000 Mi Auto Mi
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1,307 ms (Δ 910,2 μs 1,460 ms (Δ 910,2 μs	21.04 dBm			Freq Offs 01
7 8 9 10 11					Scale Typ
90		W.	STATUS		

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8 PEAK OUTPUT POWER MEASUREMENT

8.1 Standard Applicable

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

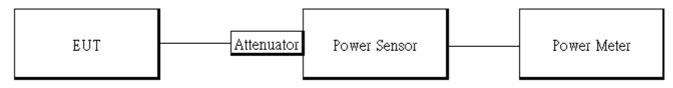
If the transmitting antenna of directional gain greater than 6dBi are used the peak output power form the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the Antenna exceeds 6dBi.

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

8.2 Measurement Equipment Used

Conducted Emission Test Site								
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.			
TYPE		NUMBER	NUMBER	CAL.				
Power Meter	Anritsu	ML2496A	1804001	2018/02/01	2019/01/31			
Attenuator	Agilent	8495B	3308A22470	2018/01/02	2019/01/01			
Coaxial Cables	N/A	WK CE Cable	N/A	2018/01/02	2019/01/01			
Notebook	Lenovo	R400	7440AV6	N/A	N/A			
Power Meter	Anritsu	ML2496A	1804001	2018/02/01	2019/01/31			
Attenuator	Agilent	8495B	3308A22470	2018/01/02	2019/01/01			
Coaxial Cables	N/A	WK CE Cable	N/A	2018/01/02	2019/01/01			
Notebook	Lenovo	R400	7440AV6	N/A	N/A			

8.3 Test Set-up



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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

802.1	802.11b Main									
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit		RESULT			
1	2412	1	19.75	94.41	1 Watt =	30.00	dBm	PASS		
6	2437	1	19.83	96.16	1 Watt =	30.00	dBm	PASS		
11	2462	1	20.04	100.93	1 Watt =	30.00	dBm	PASS		
802.1	1b Main			-						
СН	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Avg. Output Power (mW)	Limit		RESULT			
1	2412	1	17.14	51.76	1 Watt =	30.00	dBm	PASS		
6	2437	1	17.59	57.41	1 Watt =	30.00	dBm	PASS		
11	2462	1	17.64	58.08	1 Watt =	30.00	dBm	PASS		

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802.1	802.11g Main									
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit	RESULT				
1	2412	6	24.52	283.14	1 Watt = 30.00 dBm	PASS				
6	2437	6	25.61	363.92	1 Watt = 30.00 dBm	PASS				
11	2462	6	24.53	283.79	1 Watt = 30.00 dBm	PASS				
802.1	1g Main									
СН	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Avg. Output Power (mW)	Limit	RESULT				
1	2412	6	15.58	36.12	1 Watt = 30.00 dBm	PASS				
6	2437	6	17.37	54.55	1 Watt = 30.00 dBm	PASS				
11	2462	6	16.19	41.57	1 Watt = 30.00 dBm	PASS				

802.1	802.11n_HT20M Main									
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit		RESULT			
1	2412	MCS0	24.26	266.69	1 Watt =	30.00	dBm	PASS		
6	2437	MCS0	25.46	351.56	1 Watt =	30.00	dBm	PASS		
11	2462	MCS0	24.34	271.64	1 Watt =	30.00	dBm	PASS		
802.1	1n_HT20	M Main		·						
сн	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)	Avg. Output Power (mW)	Limit		RESULT			
1	2412	MCS0	14.78	30.06	1 Watt =	30.00	dBm	PASS		
6	2437	MCS0	17.42	55.21	1 Watt =	30.00	dBm	PASS		
11	2462	MCS0	15.01	31.70	1 Watt =	30.00	dBm	PASS		

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

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9 6DB BANDWIDTH MEASUREMENT

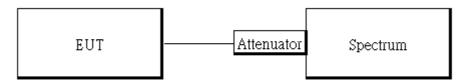
9.1 Standard Applicable

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

9.2 Measurement Equipment Used

Conducted Emission Test Site								
EQUIPMENT	MFR	MFR MODEL SERIAL		LAST	CAL DUE.			
TYPE		NUMBER	NUMBER	CAL.				
EXA Spectrum An- alyzer	Agilent	N9010A	MY57120290	2018/02/14	2019/02/13			
Attenuator	Agilent	8495B	3308A22470	2018/01/02	2019/01/01			
Coaxial Cables	N/A	WK CE Ca- ble	N/A	2018/01/02	2019/01/01			
Notebook	Lenovo	R400	7440AV6	N/A	N/A			

9.3 Test Set-up



9.4 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 4. For 6dB Bandwidth:

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

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

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

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

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9.5 Measurement Result

6dB Bandwidth

802.11b Main

Freq.	6dB BW	Limit	Result
(MHz)	(kHz)	(kHz)	Result
2412	9070	> 500	PASS
2437	8580	> 500	PASS
2462	9080	> 500	PASS

802.11g Main								
Freq.	6dB BW	Limit	Result					
(MHz)	(kHz)	(kHz)	Result					
2412	15140	> 500	PASS					
2437	15140	> 500	PASS					
2462	15140	> 500	PASS					

802.11 n HT20 Main

Freq.	6dB BW	Limit	Descrit
(MHz)	(kHz)	(kHz)	Result
2412	15140	> 500	PASS
2437	15140	> 500	PASS
2462	15140	> 500	PASS

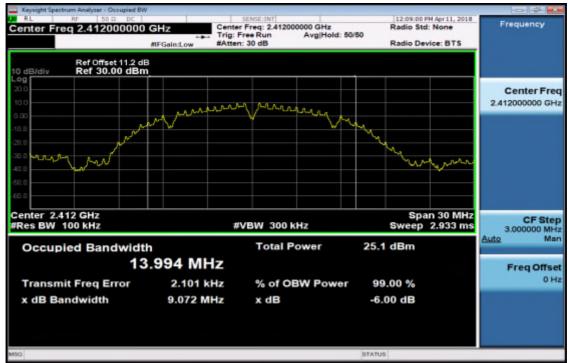
*Refer to next page for plots

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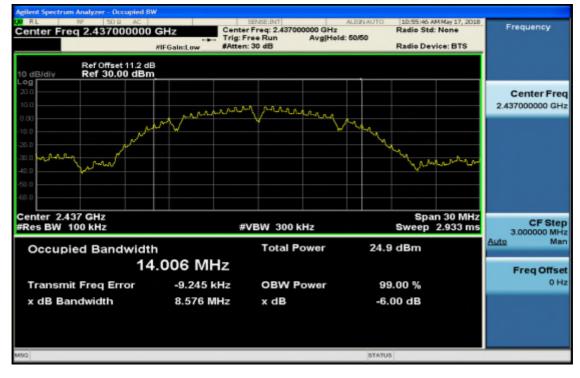
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802.11b 6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



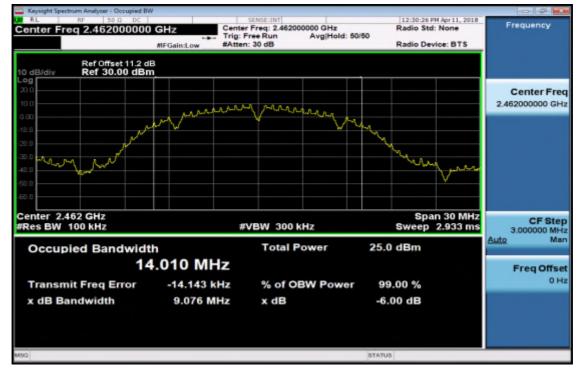
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6dB Band Width Test Data CH-High



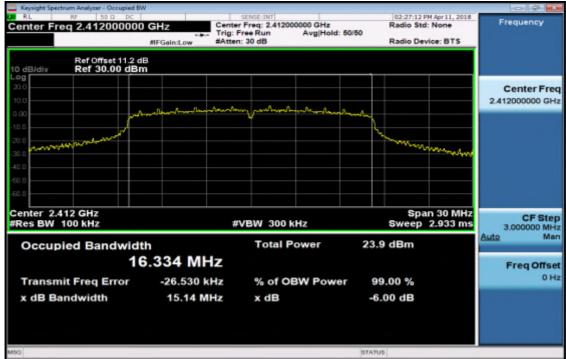
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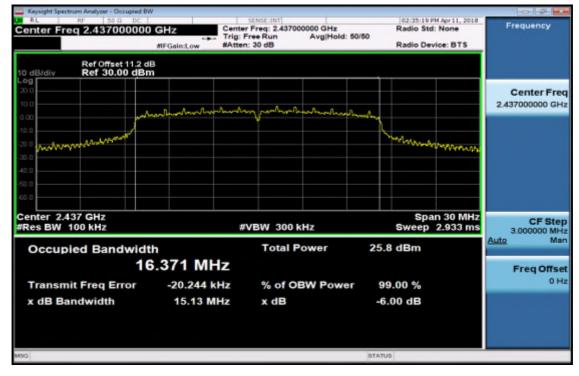
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802.11g 6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



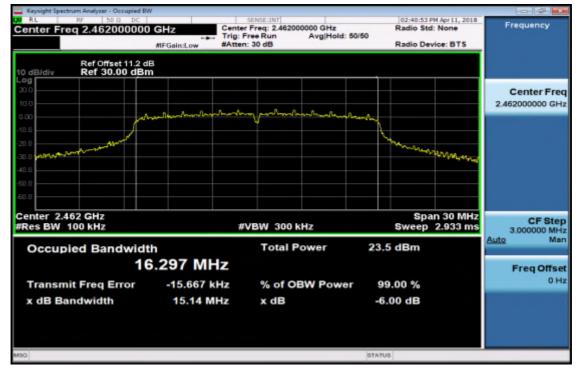
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6dB Band Width Test Data CH-High



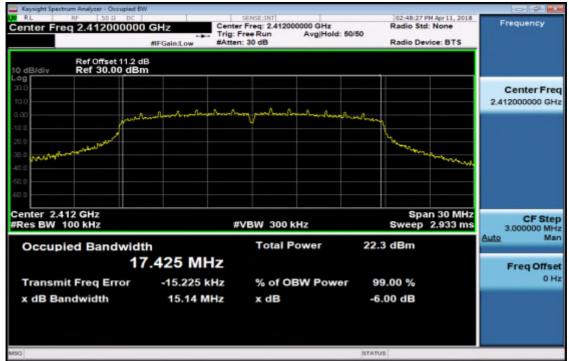
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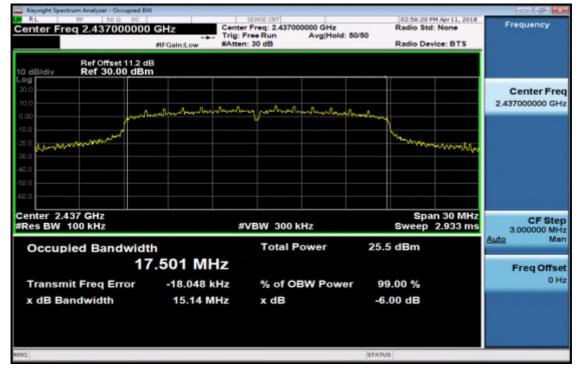
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802.11n_HT20M 6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



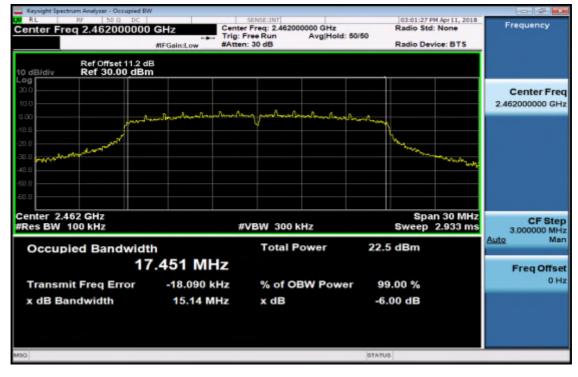
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6dB Band Width Test Data CH-High



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10 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

10.1 Standard Applicable

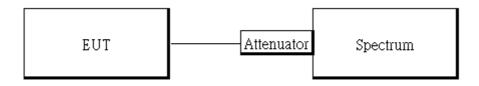
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

Conducted Emission Test Site								
EQUIPMENT MFR		MODEL	SERIAL	LAST	CAL DUE.			
TYPE		NUMBER	NUMBER	CAL.				
EXA Spectrum An- alyzer	Agilent	N9010A	MY57120290	2018/02/14	2019/02/13			
Attenuator	Agilent	8495B	3308A22470	2018/01/02	2019/01/01			
Coaxial Cables	N/A	WK CE Ca- ble	N/A	2018/01/02	2019/01/01			
Notebook	Lenovo	R400	7440AV6	N/A	N/A			

10.2 Measurement Equipment Used

10.3 Test SET-UP



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10.4 Measurement Procedure

Band Edge Limit Calculation:

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

Conducted Band Edge:

- To connect Antenna Port of EUT to Spectrum.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 4. Set start to edge frequency, and stop frequency of spectrum analyzer so as to encompass the spectrum to be examined.
- 5. Set the spectrum analyzer as RBW=100 kHz, VBW=300 kHz, Detector = Peak, Sweep = auto
- 6. Mark the highest reading of the emission as the reference level measurement.
- 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.
- Set RBW = 100 kHz & VBW= 300 kHz, Detector =Peak, Sweep = Auto.
- 4. Allow trace to fully stabilize.
- 5. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
- 6. Repeat above procedures until all default test channel measured were complete.

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10.5 Measurement Result

Reference Level of Limit 802.11b mode					
Freq. PSD Reference Level of Limit					
(MHz)	(MHz) (dBm) (dBm)				
2412 9.57 -10.43					
2462	9.79	-10.21			

Referen	nce Leve	of Limit 802.11g mode	Reference	e Level	of Limit 802.11n20 mode
Freq.	PSD	Reference Level of Limit	Freq.	PSD	Reference Level of Limit
(MHz)	(dBm)	(dBm)	(MHz)	(dBm)	(dBm)
2412	6.40	-13.60	2412	5.00	-15.00
2462	5.81	-14.19	2462	5.11	-14.89

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



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Stop 2.42700 Sweep 2.933 ms /1001

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#VBW 300 kH

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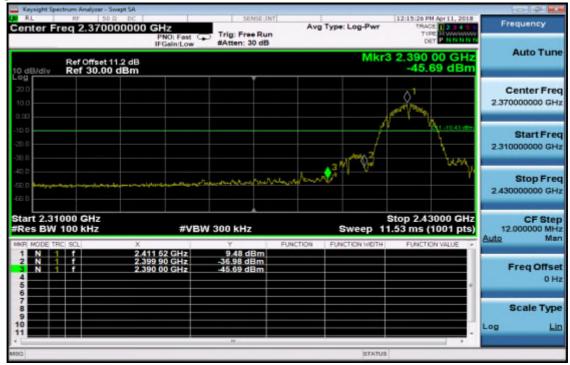
台灣檢驗科技股份有限公司	t (886-2) 2299-3279	f (886-2) 2298-0488	www.tw.sgs.com	

#VBW 300 kH

Stop 2.47700 G eep 2.933 ms (1001 s



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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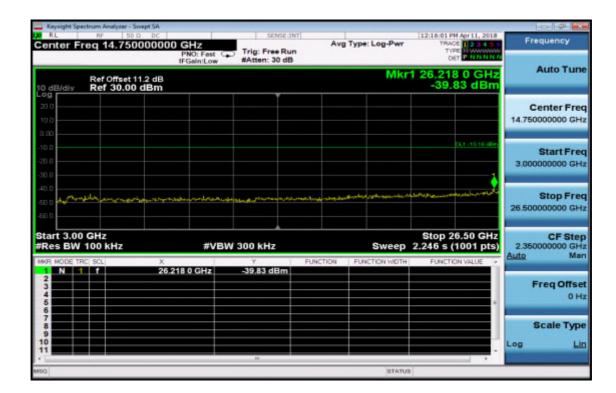
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802.11b Spurious Emission Test Data CH-Low

enter Freq 1.515000000	SENSE:3N	T	12:15:45 PM Apr 11, 2018	
	PNO: Fast C Trig: Free Run	Avg Type: Log-Pwr	TRACE 2343	Frequency
Ref Offset 11.2 dB dB/div Ref 30.00 dBm	IFGain:Low #Atten: 30 dB	Mk	r1 2.411 9 GHz 9.84 dBm	Auto Tun
•9			1	Center Fre 1.515000000 GR
110 D 			OLT-1016 sBm	Start Fre 30.000000 Mi
0.0	na general de la calenda d	an a	hanna the second second	Stop Fro 3.000000000 G
tart 0.030 GHz Res BW 100 kHz	#VBW 300 kHz		Stop 3.000 GHz 83.9 ms (1001 pts)	CF Sto 297.000000 M Auto M
N I X X 1 N I 2, 2, 3 3 4, 5, 5,	411 9 GHz 9.84 dBm	FUNCTION FUNCTION WOTH	FUNCTION VALUE +	Freq Offs 0
9 9 0				Scale Ty
1	17	STATUS		



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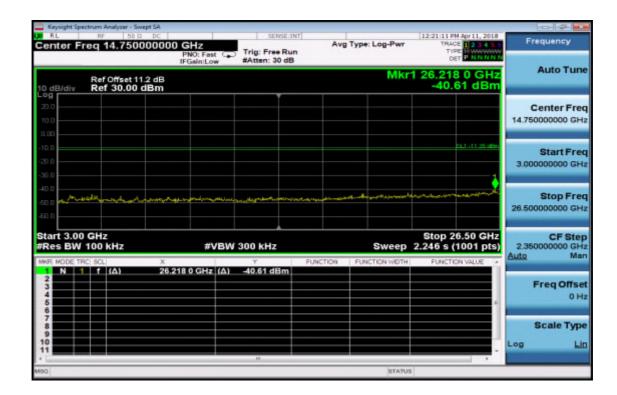
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Spurious Emission Test Data CH-Mid

	ectrum Analyzer - Sv					-			-0- 4
enter F	req 1.5150	p	NO: Fast	Trig: Free Run	Avg	Type: Log-Pwr	TRAC	M Apr 11, 2018	Frequency
0 dB/div	Ref Offset 1 Ref 30.00	1.2 dB	Sein/Low	#Atten: 30 dB		Mk	r1 2.43	5 7 GHz 65 dBm	Auto Tu
20.0 10.0							1		Center Fr 1.515000000 G
10 0 20 0 30 0								011-11-25- 49 4	Start Fr 30.000000 M
10,0 20,0 40,0	and a game of the second s		nan an	lainainead inn an Armann		والموارك والمراجع ومراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والم	Annon	1 ,1	Stop Fr 3.000000000 G
tart 0.03 Res BW	100 kHz	72	#VBW	300 kHz	FUNCTION	Sweep 2	83.9 ms (.000 GHz 1001 pts)	CF St 297.000000 M Auto M
1 N 1 2 3 4 5 6	f (Δ)	× 2.435	7 GHz (Δ)	8.65 dBm	PORCTION	FUNCTION WOTH	FUNCTI	6 B	Freq Off
7 8 9 0									Scale Ty
6						STATUS	1		



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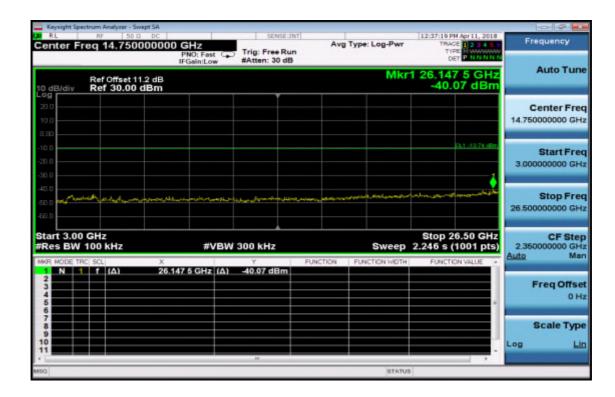
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Spurious Emission Test Data CH-High

Keysight Spectrum Analyzer - Swept			
enter Freq 1.515000	PNO: Fast C Trig: Free Run	Avg Type: Log-Pwr TRACE 2 3 4 TYPE Det P NMMN	Frequency
Ref Offset 11.2 0 dB/div Ref 30.00 dB	2 dB	Mkr1 2.462 4 GH2 9.26 dBm	Auto Tur
10.0 10.0		••••••••••••••••••••••••••••••••••••••	Center Fr 1.515000000 G
0 D		13.1.13.74 afte	Start Fr 30.000000 M
0.0 0.0 0.0	anga ang kalaning ng kalang kang kang kang kang kang kang kang k	apara-a-regardigity-anticipet	Stop Fr 3.000000000 G
tart 0.030 GHz Res BW 100 kHz	#VBW 300 kHz	Stop 3.000 GHz Sweep 283.9 ms (1001 pts	
NR MODE TRC SCL 1 Λ 1 Λ 1 Δ 2 3 -	X Y FUNCTION 2.462 4.GHz (Δ) 9.26 dBm	N FUNCTION WOTH FUNCTION VALUE	Freq Offs 0 Scale Ty
			2.08



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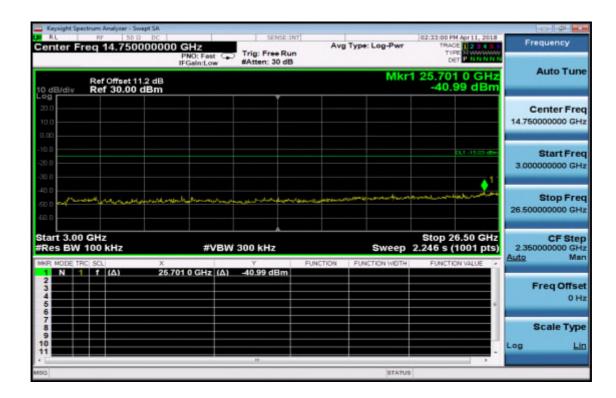
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802.11g Spurious Emission Test Data CH-Low

	ictrum Analyzer - Sv								
Center Fr	req 1.5150	P	NO: Fast 😱	Trig: Free Run	Avg	Type: Log-Pwr	02:32:40 PM Apr 11, 2 TRACE 1 2 3 4 TYPE N WWW DET P 11		Frequency
10 dB/div	Ref Offset 1 Ref 30.00	1.2 dB	Gain:Low	#Atten: 30 dB		Mk	r1 2.414 9 GI 4.97 dB		Auto Tuni
20.0 10.0							1	1.	Center Free 515000000 GH
-10.0							DL1-15.03		Start Fre 30.000000 MH
-40.0 -50.0	زافيتو وحيتار شهير الملافوه	and	nar nan serie	dagsanging yang pengentenang	4344-4346389 43-5 ₄ 3-64-74	handersterren en e	Constanting of the second states		Stop Fre
Start 0.03 #Res BW	100 kHz	x	#VBW	300 kHz	FUNCTION	Sweep 2	Stop 3.000 G 83.9 ms (1001 p	Hz ts) Auto	CF Ste 197.000000 MH 2 Ma
1 N 1 2 3 4 5 6	1 (Δ)		9.GHz (Δ)	4.97 dBm	Potentia		TORCHOR PROC		Freq Offse 0 H
7 8 9 10 11								. Log	Scale Typ
490						STATUS			



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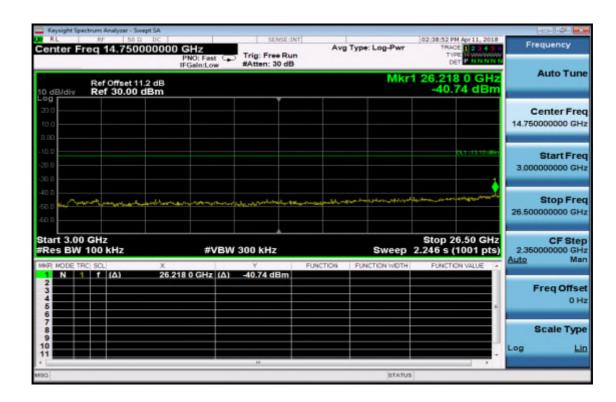
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Spurious Emission Test Data CH-Mid

Keysight Spectrum Analyzer - Swept SA			
RL RF 50 D DC enter Freq 1.515000000	PNO: Fast IFGsinLow #Atten: 30 dB	Avg Type: Log-Pwr Trace Type: Dog-Pwr	Frequency
Ref Offset 11.2 dB dB/div Ref 30.00 dBm	I GENEON	Mkr1 2.438 7 6.90	GHz Auto Tu dBm
00		1	Center Fr 1.515000000 G
		N.1	Start Fr 30.000000 M
0.0 0.0 0.0	ىرىيىغا ئېلىرىيە ئىيە		Stop Fr 3.00000000 G
art 0.030 GHz Res BW 100 kHz	#VBW 300 kHz	Stop 3.000 Sweep 283.9 ms (100	1 pts) 297.000000 N Auto N
R MODE TRIC SCL X N 1 f (Δ) 2, 3 4 5 6 7	-438 7 GHz (Δ) 6.90 dBm	TION FUNCTION WOTH FUNCTION VA	Freq Offs 0
			Scale Ty



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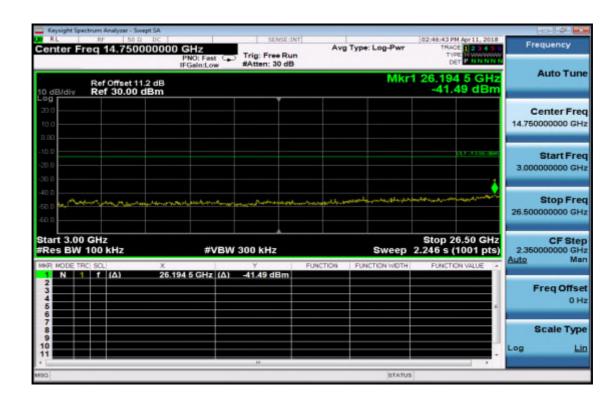
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Spurious Emission Test Data CH-High

Keysight Spectrum Analyze					
enter Freq 1.51	PNO: East	SENSE:3NT Ar Trig: Free Run #Atten: 30 dB	vg Type: Log-Pwr	02:40:26 PM Apr11, 2018 TRACE 2 2 4 5 5 TVPE DET P NO NO N	Frequency
0 dB/div Ref 30.	et 11.2 dB 00 dBm		Mkr	1 2.462 4 GHz 6.15 dBm	Auto Tu
				<u>}</u> 1	Center Fr 1.515000000 G
				201-1205-086	Start Fr 30.000000 M
0,0 0.0 0.0	يې د وې د وې د وې د وې د وې	and dealer and a second se	فتوفقه المعور والتياسي معرود والتح	housidental mangares has	Stop Fr 3.000000000 G
art 0.030 GHz Res BW 100 kHz R MODE TRC SCL	#VBW 3	00 kHz	Sweep 28	Stop 3.000 GHz 3.9 ms (1001 pts)	CF St 297.000000 N Auto M
1 N 1 f (Δ) 2 3 4 5	2.462 4 GHz (Δ)	6.15 dBm			Freq Offs 0
6 7 8 9 0					Scale Ty
2			STATUS		



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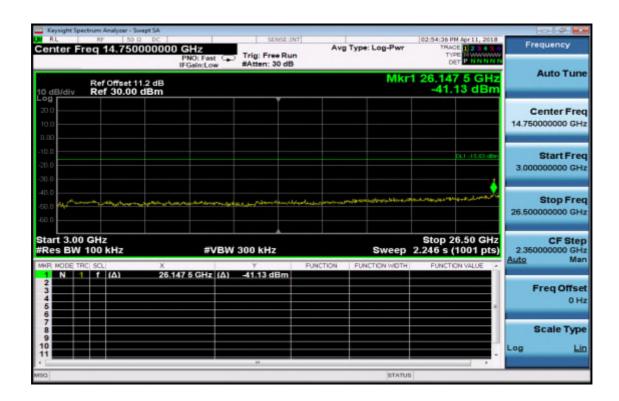
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802.11n_HT20 Spurious Emission Test Data CH-Low

Keynight Spe	ectrum Analyzer - Sv		_						
11.00	req 1.5150	00000 GH	O: Fast 😱	Trig: Free Rur	Ave	Type: Log-Pwr	TRAC	M Apr 11, 2018	Frequency
10 dB/div	Ref Offset 1 Ref 30.00	1.2 dB	ain:Low	#Atten: 30 dB		M	r1 2.41	4 9 GHz 17 dBm	Auto Tun
20.0 10.0 1.00							1		Center Fre 1.515000000 GH
10.0 20.0 30.0								01.1 ×15.63 dBm	Start Fre 30.000000 MH
40.0 50.0	ر ۲۰۰۹ میرونی ایک میرونی م میرونی میرونی			at the second	e a de mais de provisión	المريد والمدينة والمريد والمري	hardenter		Stop Fre 3.000000000 GH
Res BW	100 kHz	×	#VBW	300 kHz	FUNCTION	Sweep 2	83.9 ms (.000 GHz 1001 pts)	CF Ste 297.000000 Mi Auto Mi
1 N 1 2 3 4 5 6	1 (Δ)	2.414 9	GHz (Δ)	4.17 dBm					Freq Offs 01
7 8 9 10									Scale Typ Log L
						STATU			



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Spurious Emission Test Data CH-Mid

Keysight Spectrum Analyzer - Swept					
nter Freq 1.515000	000 GHz PN0: Fast	Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr	02:59:30 PM Apr 11, 2018 TRACE 1 2 3 4 5 TYPE NUMBER DET P NIN NN	Frequency
Ref Offset 11.2 B/div Ref 30.00 dB	dB		Mk	r1 2.441 6 GHz 5.51 dBm	
				∳ ¹	Center F 1.515000000
				641-14-49 dBn	Start F 30.000000
g-e, e-ogang-abel, aber adar aber aber aber	, and a second	والمراجع والمعرور المواجعين والم	and a second	Lotaruna and lapse, van der	Stop F 3.000000000
t 0.030 GHz s BW 100 kHz		300 kHz		Stop 3.000 GHz 33.9 ms (1001 pts)	
NODE TRIC SCL	× 2.441 6 GHz (Δ)	5.51 dBm	INCTION FUNCTION WOTH	FUNCTION VALUE	Freq Of
					Scale T
			STATUS		

RL	req 14.75000	DC.	Trig: Free Ru #Atten: 30 dB	Avg	Type: Log-Pwr	02:59:49 PM Apr 11, 20 TRACE 1 2 3 4 TYPE N WWW DET P N P N	Frequency
0 dB/div	Ref Offset 11.2 Ref 30.00 di	2 dB	weiten. ov up		Mkr	1 26,194 5 GH -39,64 dBr	
.og 20.0 10.0							Center Fre 14.750000000 GP
10.0 20.0 30.0						CL1-14.49-0	3.00000000 G
40.0 50.0	and and the second s	والمتر المرد المراسات	۵. اور ور و	م يودل م _{وجو} مريقه	محادا والمجاوية ومرود ومروقي	، مەدەردىنى بەرەپىدىنى بىرىنى بىرىن	Stop Fr 26.500000000 G
tart 3.00 Res BW	100 kHz	#V	/BW 300 kHz	FUNCTION	Sweep	Stop 26.50 GH 2.246 s (1001 pt FUNCTION VALUE	
1 N 1 2 3 4 5 6	f (Δ)	26.194 5 GHz	(Δ) -39.64 dBm				Freq Offe
7 8 9							Scale Ty
10					STATU		

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Spurious Emission Test Data CH-High

RL RF 50 D DC	SENSE:INT	02:07:00 PM Apr 11, 2018	
nter Freq 1.515000000		Avg Type: Log-Pwr	Frequency
Ref Offset 11.2 dB B/div Ref 30.00 dBm	I GAN LOW	Mkr1 2.459 5 GHz 3.70 dBm	Auto T
			Center F 1.515000000
		2U.1-16-20 (Br)	Start F 30.000000
and a second	ปลายเราะสามารถเหลือการสามารถสามารถสามารถสามารถสามารถสามารถสามารถสามารถสามารถสามารถสามารถสามารถสามารถสามารถสามาร	ng na	Stop F 3.000000000
rt 0.030 GHz s BW 100 kHz	#VBW 300 kHz	Stop 3.000 GHz Sweep 283.9 ms (1001 pts)	CF 9 297.000000 Auto
MODE TRC SOL Χ N 1 f (Δ) 2,	469 5 GHz (Δ) 3.70 dBm	UNCTION FUNCTION WOTH FUNCTION VALUE	Freq Of
			Scale T
		BTATUS	

RL	req 14,750	000000 G	Hz NO: Fest G	Trig: Free Ru #Atten: 30 dB	Avg	Type: Log-Pwr	TRAC	Apr 11, 2018 E 1 2 3 4 5 E 1 2 3 4 5 F 1 2	Freque	ncy
0 dB/div	Ref Offset 1 Ref 30.00	1.2 dB	Jan Con			Mkr	1 25.865	5 5 GHz 51 dBm	Aut	o Tur
og 20.0 10.0									Cent 14.750000	
10.0 20.0 30.0								out -15:20 (Bri	Sta 3.0000000	nt Fr
40.0 50.0	and a second	-4-14-1-iA	و بارو المراجع المراجع	المهدان والمسترك	مر المراجع الم المراجع المراجع ا	القبار الجارر معاصريه العذاريين مغ	مي ^{ر و} ي ارين سنبر مي	Na la la serie de serie	Sto 26.500000	op Fr
	100 kHz	14	#VBW	300 kHz			2.246 s (6.50 GHz 1001 pts)	2.350000 Auto	F St
KR MODE TR 1 N 1 2 3 4 5 6	f (Δ)	× 25.865	5 GHz (Δ)	-40.51 dBm	FUNCTION	FUNCTION WOTH	FUNCTIO	N VALOE 6	Freq	0
7 8 9									Scal	le Ty
al						STATU	e l			_

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11 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT

11.1 Standard Applicable

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

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

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

Note:

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

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11.2 Measurement Equipment Used:

966 Chamber							
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.		
TYPE		NUMBER	NUMBER	CAL.			
EMI Test Receiver	R&S	ESCI7	100760	2017/05/11	2018/05/10		
Spectrum Analyzer	Agilent	E4446A	MY51100003	2017/04/25	2018/04/24		
Loop Antenna	ETS-Lindgren	6502	148045	2017/09/20	2018/09/19		
Bilog Antenna	SCHWAZBECK	VULB9168	378	2017/12/29	2018/12/30		
Bilog Antenna	SCHWAZBECK	VULB9168	300	2017/12/20	2018/12/19		
Horn Antenna	Schwarzbeck	BBHA9120D	1441	2017/08/04	2018/08/03		
Pre-Amplifier	Agilent	8447D	2944A07676	2018/01/02	2019/01/01		
Pre-Amplifier	EMC Instruments	EMC0126530	980038	2018/01/02	2019/01/01		
· · · · · · · · · · · · · · · · · · ·	Corp.						
Turn Table	HD	DT420	N/A	N.C.R	N.C.R		
Antenna Tower	ChamPro	AM-BS-4500-B	060776-ABS	N.C.R	N.C.R		
Controller	ChamPro	EM1000	60776	N.C.R	N.C.R		
Low Loss Cable	Huber Suhner	966_RX	9	2018/01/02	2019/01/01		
3m Site NSA	SGS	966 chamber	N/A	2018/01/02	2019/01/01		
Low Loss Cable	Huber Suhner	966 TX	1	2018/01/02	2019/01/01		
Horn Antenna	Schwarzbeck	BBHA9170	184	2017/12/12	2018/12/11		
Pre-Amplifier	EMC Instruments Corp.	EMC184045	980135	2018/01/02	2019/01/01		

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

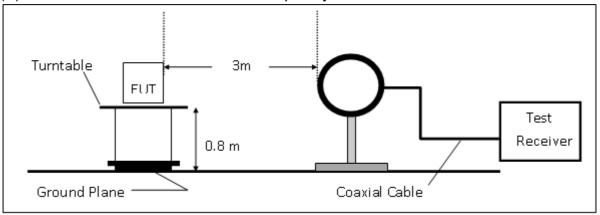
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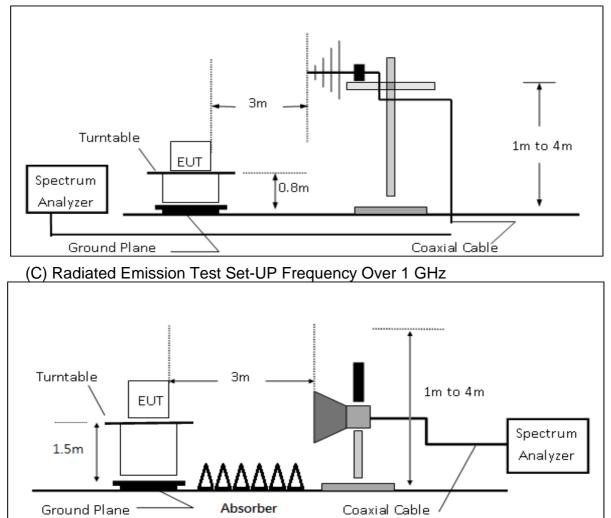


11.3 Test SET-UP

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



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



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11.4 Measurement Procedure

- 1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 2. The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequency> 1GHz above ground plane.
- 3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
- 4. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
- 5. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.
- 6. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
- 7. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
- 8. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 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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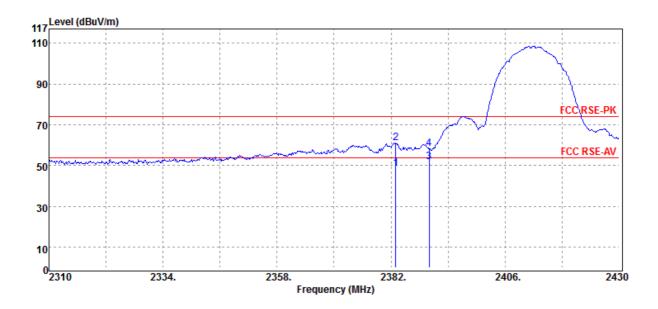
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Radiated Band Edge Measurement Result (802.11b)

Operation Band	:802.11b	Test Date	:2018-04-13
Fundamental Frequency	:2412 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Bandedge CH LOW	Engineer	:Tin
EUT Pol.	:E2 Plane	0	:VERTICAL



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

Factor(dB) = Antenna Factor(dBµV/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.

"---" : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2382.96	S	Average	48.39	0.18	48.57	54.00	-5.43
2382.96	S	Peak	60.88	0.18	61.06	74.00	-12.94
2390.00	Е	Average	51.46	0.20	51.66	54.00	-2.34
2390.00	Е	Peak	57.91	0.20	58.11	74.00	-15.89

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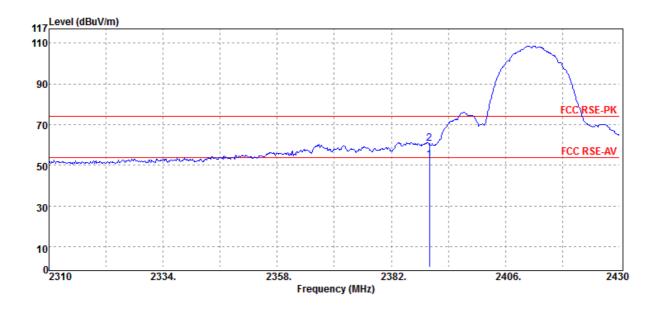
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Operation Band:802.11bFundamental Frequency:2412 MHzOperation Mode:Bandedge CH LOWEUT Pol.:E2 Plane

Test Date:20Temp./Humi.:21Engineer:TiMeasurement Antenna Pol.:He

:2018-04-12 :21 deg_C / 62 RH :Tin :HORIZONTAL



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

Factor(dB) = Antenna Factor(dBµV/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.

"---" : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	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	Average	52.57	0.20	52.77	54.00	-1.23
2390.00	E	Peak	60.63	0.20	60.83	74.00	-13.17

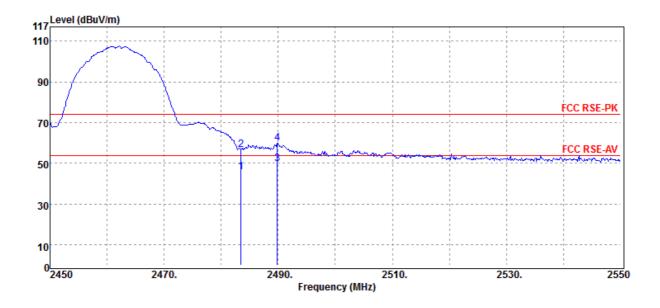
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Operation Band :802.11b Test Date :2018-04-12 **Fundamental Frequency** :2462 MHz Temp./Humi. :21 deg_C / 62 RH **Operation Mode** :Bandedge CH HIGH Engineer :Tin EUT Pol. :E2 Plane :VERTICAL Measurement Antenna Pol.



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

Factor(dB) = Antenna Factor(dBµV/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.

"---" : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	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	Е	Average	45.21	0.53	45.74	54.00	-8.26
2483.50	Е	Peak	56.09	0.53	56.62	74.00	-17.38
2489.80	S	Average	49.28	0.54	49.82	54.00	-4.18
2489.80	S	Peak	59.55	0.54	60.09	74.00	-13.91

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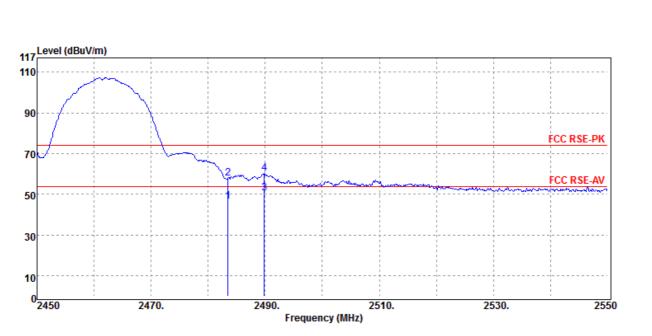
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Operation Band:80Fundamental Frequency:24Operation Mode:BEUT Pol.:E

:802.11b :2462 MHz :Bandedge CH HIGH :E2 Plane Test Date:2018-04-12Temp./Humi.:21 deg_C / 62 RHEngineer:TinMeasurement Antenna Pol.:HORIZONTAL



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

Factor(dB) = Antenna Factor(dBµV/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.

"---" : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	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	Е	Average	45.93	0.53	46.46	54.00	-7.54
2483.50	Е	Peak	57.40	0.53	57.93	74.00	-16.07
2489.80	S	Average	50.07	0.54	50.61	54.00	-3.39
2489.80	S	Peak	59.92	0.54	60.46	74.00	-13.54

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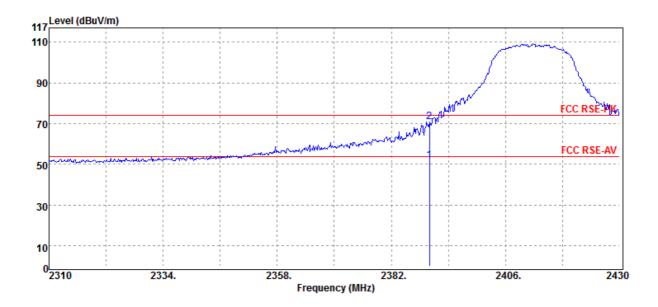
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Radiated Band Edge Measurement Result (802.11g)

Operation Band	:802.11g	Test Date	:2018-04-12
Fundamental Frequency	:2412 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Bandedge CH LOW	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



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

Factor(dB) = Antenna Factor(dBµV/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.

"---" : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	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	Average	51.50	0.20	51.70	54.00	-2.30
2390.00	Е	Peak	70.79	0.20	70.99	74.00	-3.01

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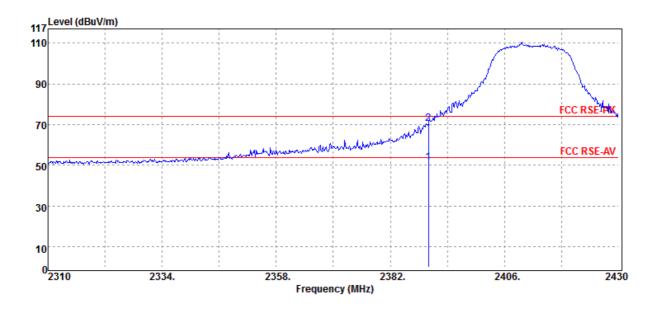
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Operation Band:802.11gFundamental Frequency:2412 MHzOperation Mode:Bandedge CH LOWEUT Pol.:E2 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2018-04-12 :21 deg_C / 62 RH :Kane :HORIZONTAL



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

Factor(dB) = Antenna Factor(dBµV/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.

"---" : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	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	Average	52.25	0.20	52.45	54.00	-1.55
2390.00	Е	Peak	70.41	0.20	70.61	74.00	-3.39

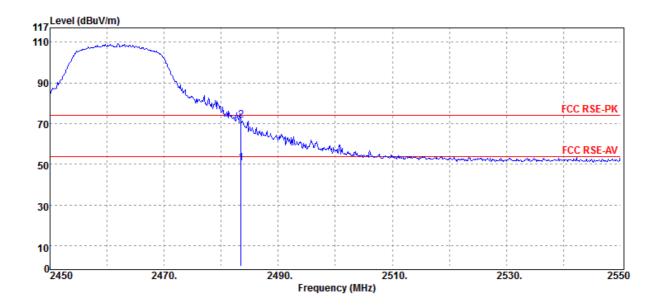
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Operation Band :802.11g Test Date :2018-04-12 **Fundamental Frequency** :2462 MHz Temp./Humi. :21 deg_C / 62 RH **Operation Mode** :Bandedge CH HIGH Engineer :Tin EUT Pol. :E2 Plane :VERTICAL Measurement Antenna Pol.



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

Factor(dB) = Antenna Factor(dBµV/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.

"---" : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	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	Е	Average	50.27	0.53	50.80	54.00	-3.20
2483.50	Е	Peak	71.12	0.53	71.65	74.00	-2.35

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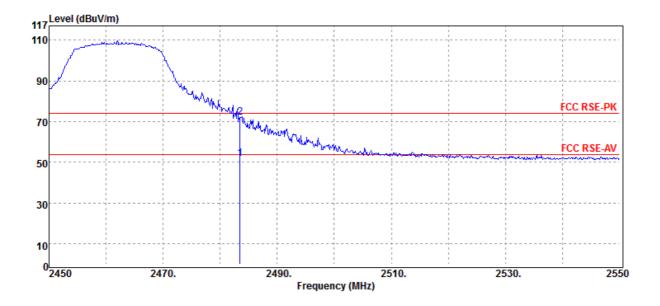
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Operation Band:802.7Fundamental Frequency:2462Operation Mode:BandEUT Pol.:E2 P

:802.11g :2462 MHz :Bandedge CH HIGH :E2 Plane Test Date:2018Temp./Humi.:21 deEngineer:TinMeasurement Antenna Pol.:HOR





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

Factor(dB) = Antenna Factor(dBµV/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.

"---" : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	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	Е	Average	51.15	0.53	51.68	54.00	-2.32
2483.50	Е	Peak	72.11	0.53	72.64	74.00	-1.36

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

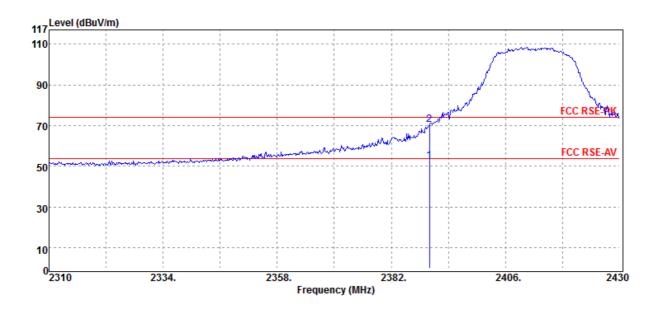
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Radiated Band Edge Measurement Result (802.11_HT20)

Operation Band	:802.11n20	Test Date	:2018-04-12
Fundamental Frequency	:2412 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Bandedge CH LOW	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



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

Factor(dB) = Antenna Factor(dBµV/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.

"---" : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	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	Average	52.54	0.20	52.74	54.00	-1.26
2390.00	Е	Peak	70.15	0.20	70.35	74.00	-3.65

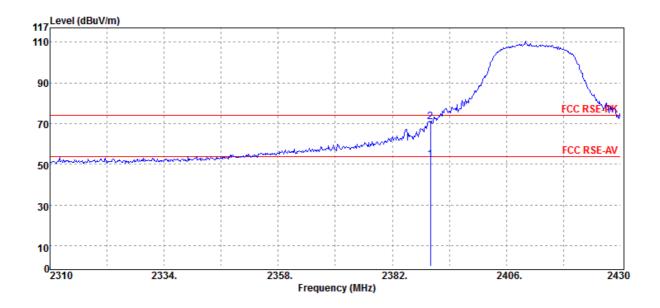
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Operation Band :802.11n20 Test Date :2018-04-12 **Fundamental Frequency** :2412 MHz Temp./Humi. :21 deg_C / 62 RH **Operation Mode** :Bandedge CH LOW Engineer :Tin EUT Pol. :E2 Plane :HORIZONTAL Measurement Antenna Pol.



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

Factor(dB) = Antenna Factor(dBµV/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.

"---" : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	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	Average	52.19	0.20	52.39	54.00	-1.61
2390.00	Е	Peak	70.50	0.20	70.70	74.00	-3.30

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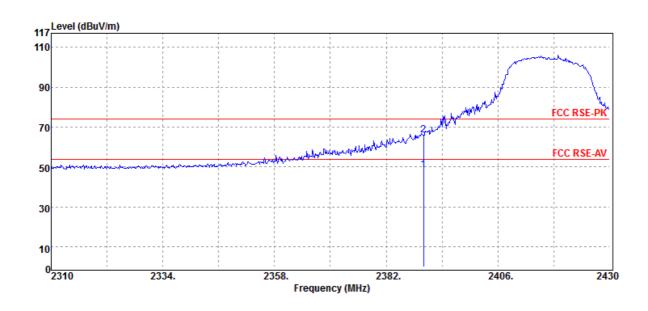
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Operation Band:802.11n20Fundamental Frequency:2417 MHzOperation Mode:Bandedge CH LOWEUT Pol.:E2 Plane

Test Date:2018-05-16Temp./Humi.:21 deg_C / 62 RHEngineer:TinMeasurement Antenna Pol.:VERTICAL



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Average	48.21	0.20	48.41	54.00	-5.59
2390.00	Peak	65.74	0.20	65.94	74.00	-8.06

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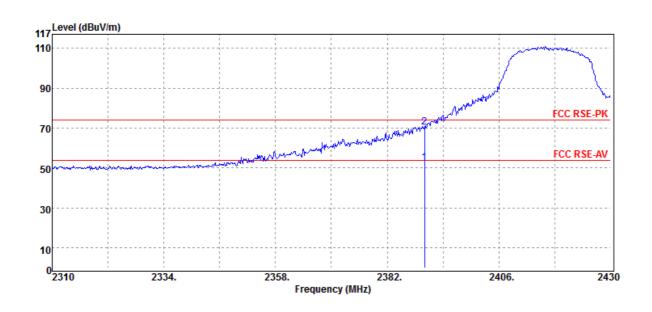
Report No.:ER/2018/40015 Page 60 of 91



Operation Band:802Fundamental Frequency:241Operation Mode:BarEUT Pol.:E2

:802.11n20 :2417 MHz :Bandedge CH LOW :E2 Plane Test Date:2018-05Temp./Humi.:21 deg_Engineer:TinMeasurement Antenna Pol.:HORIZO

:2018-05-16 :21 deg_C / 62 RH :Tin :HORIZONTAL



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
 MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Average	52.60	0.20	52.80	54.00	-1.20
2390.00	Peak	70.42	0.20	70.62	74.00	-3.38

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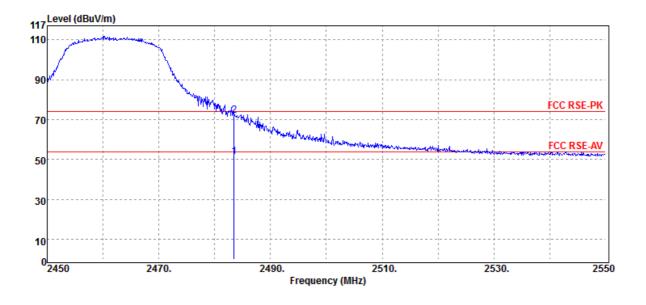
Report No.:ER/2018/40015 Page 61 of 91



ARFCN	:CH 11
Operation Band	:802.11n20
Fundamental Frequency	:2462 MHz
Operation Mode	:Bandedge CH HIGH
EUT Pol.	:E2 Plane

Test Date:2018-Temp./Humi.:21 degEngineer:TinMeasurement Antenna Pol.:VERT

:2018-04-12 :21 deg_C / 62 RH :Tin :VERTICAL



Freq.	Note	Detector	Spectrum	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	Е	Average	50.85	0.53	51.38	54.00	-2.62
2483.50	Е	Peak	71.73	0.53	72.26	74.00	-1.74

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

Factor(dB) = Antenna Factor(dBµV/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.

"---" : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

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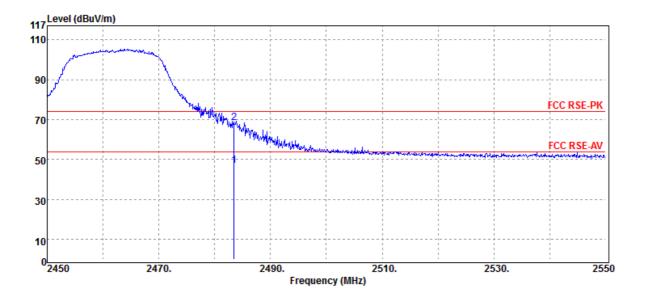
Report No.:ER/2018/40015 Page 62 of 91



l
ln20
MHz
edge CH HIGH
ane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2018-04-12 :21 deg_C / 62 RH :Tin :HORIZONTAL



Freq.	Note	Detector	Spectrum	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	Е	Average	46.54	0.53	47.07	54.00	-6.93
2483.50	Е	Peak	67.91	0.53	68.44	74.00	-5.56

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

Factor(dB) = Antenna Factor(dBµV/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.

"---" : denotes Noise Floor.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

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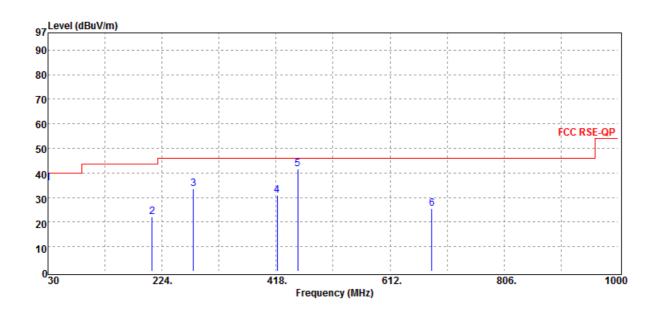
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Below 1GHz Worst-Case Data:

Radiated Spurious Emission Measurement Result (802.11 g)

Operation Band	:802.11g	Test Date	:2018-04-12
Fundamental Frequen-	:2437 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
30.00	S	Peak	44.72	-8.96	35.76	40.00	-4.24
207.51	S	Peak	31.25	-9.26	21.99	43.50	-21.51
277.35	S	Peak	39.78	-6.27	33.51	46.00	-12.49
419.94	S	Peak	33.70	-2.77	30.93	46.00	-15.07
454.86	S	Peak	44.10	-2.33	41.77	46.00	-4.23
682.81	S	Peak	24.14	1.53	25.67	46.00	-20.33

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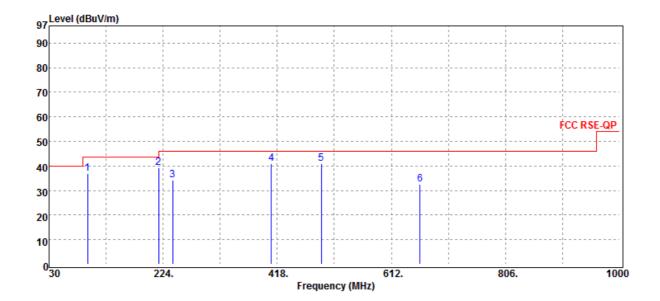
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Operation Band Fundamental Frequen- cy	:802.11g	Test Date	:2018-04-12
	:2437 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	a :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
95.96	S	Peak	49.95	-12.91	37.04	43.50	-6.46
216.24	S	Peak	48.37	-9.14	39.23	46.00	-6.77
240.49	S	Peak	42.13	-7.79	34.34	46.00	-11.66
408.30	S	Peak	44.00	-2.95	41.05	46.00	-4.95
492.69	S	Peak	43.64	-2.58	41.06	46.00	-4.94
660.50	S	Peak	32.14	0.48	32.62	46.00	-13.38

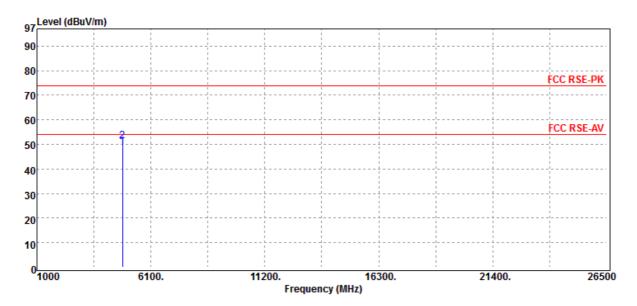
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Above 1GHz Data: Radiated Spurious Emission Measurement Result (802.11 b) **Operation Band** :802.11b **Test Date** :2018-04-12 Fundamental Frequen- :2412 MHz Temp./Humi. :21 deg_C / 62 RH CV **Operation Mode** :Tx CH LOW Engineer :Tin Antenna :VERTICAL Measurement EUT Pol. :E2 Plane Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Н	Average	41.51	7.35	48.86	54.00	-5.14
4824.00	Н	Peak	43.98	7.35	51.33	74.00	-22.67

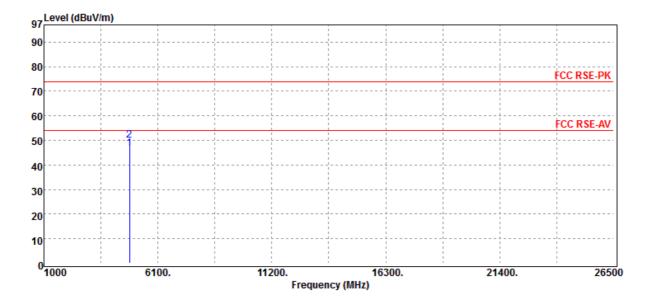
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Operation Band	:802.11b	Test Date	:2018-04-12
Fundamental Frequen- cy	:2412 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	a :HORIZONTAL

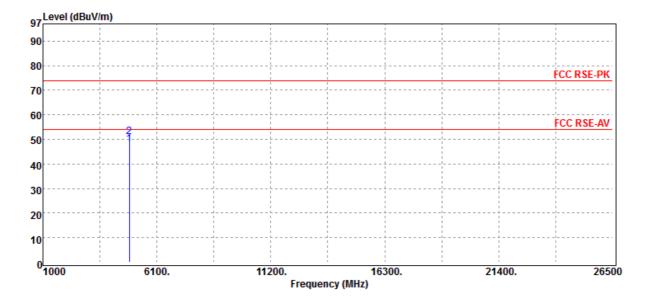


Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Н	Average	39.29	7.35	46.64	54.00	-7.36
4824.00	Н	Peak	42.80	7.35	50.15	74.00	-23.85

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Operation Band	:802.11b	Test Date	:2018-04-12
Fundamental Frequen-	:2437 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	':VERTICAL

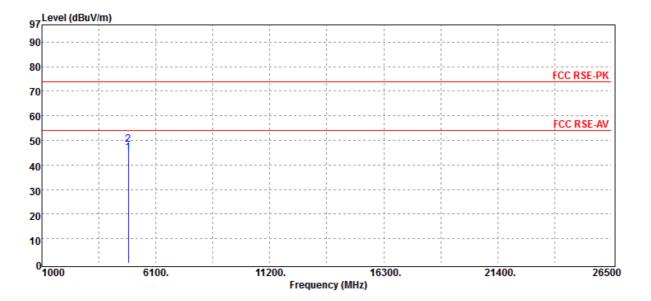


Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	н	Average	40.49	7.62	48.11	54.00	-5.89
4874.00	Н	Peak	43.44	7.62	51.06	74.00	-22.94

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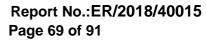


Operation Band	:802.11b	Test Date	:2018-04-12
Fundamental Frequen	:2437 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	¹ :HORIZONTAL



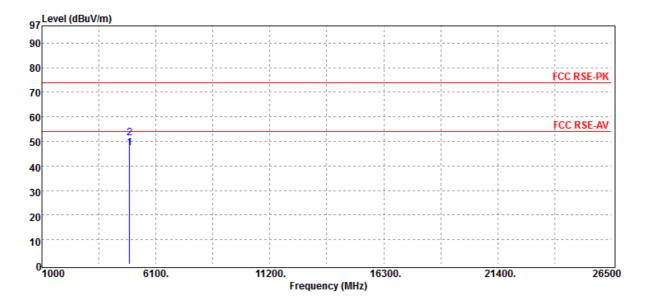
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe	
		Mode	Reading Level		FS	@3m	Margin	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
4874.00	Н	Average	37.30	7.62	44.92	54.00	-9.08	
4874.00	Н	Peak	40.77	7.62	48.39	74.00	-25.61	
<u>MHz</u> 4874.00	Н	PK/QP/AV Average	dBμV 37.30	7.62	dBµV/m 44.92	dBμV/m 54.00	dB -9.08	

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Operation Band	:802.11b	Test Date	:2018-04-12
Fundamental Frequen- cy	:2462 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	':VERTICAL

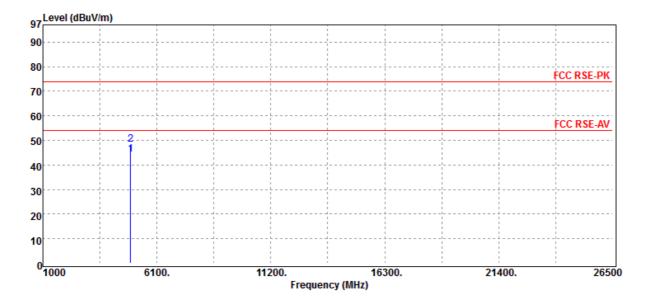


Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Н	Average	39.71	7.59	47.30	54.00	-6.70
4924.00	Н	Peak	43.86	7.59	51.45	74.00	-22.55

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Operation Band	:802.11b	Test Date	:2018-04-12
Fundamental Frequen- cy	:2462 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	HORIZONTAL



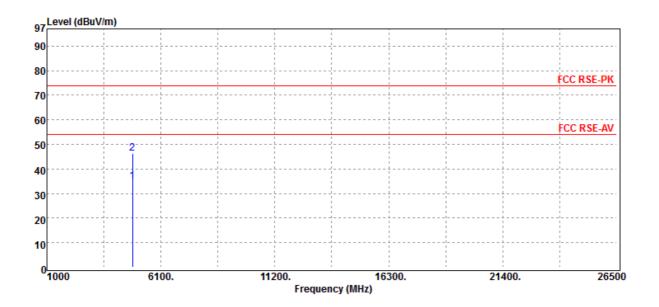
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Н	Average	36.86	7.59	44.45	54.00	-9.55
4924.00	Н	Peak	40.72	7.59	48.31	74.00	-25.69

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Radiated Spurious Emission Measurement Result (802.11 g)

Operation Band	:802.11g	Test Date	:2018-04-12
Fundamental Frequen- cv	:2412 MHz	Temp./Humi.	:21 deg_C / 62 RH
5	:Tx CH LOW	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	·VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Н	Average	27.60	7.35	34.95	54.00	-19.05
4824.00	Н	Peak	38.93	7.35	46.28	74.00	-27.72

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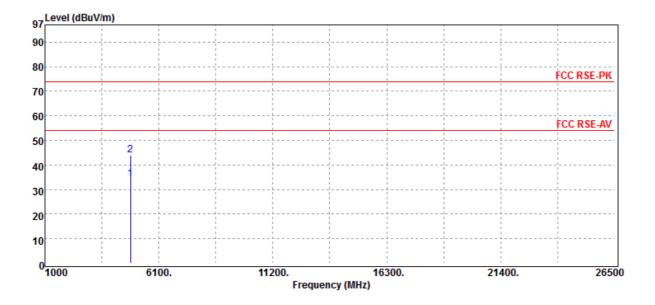
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Operation Band Fundamental Frequen- cy	:802.11g	Test Date	:2018-04-12	
	:2412 MHz	Temp./Humi.	:21 deg_C / 62 RH	
Operation Mode	:Tx CH LOW	Engineer	:Tin	
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	HORIZONTAL	



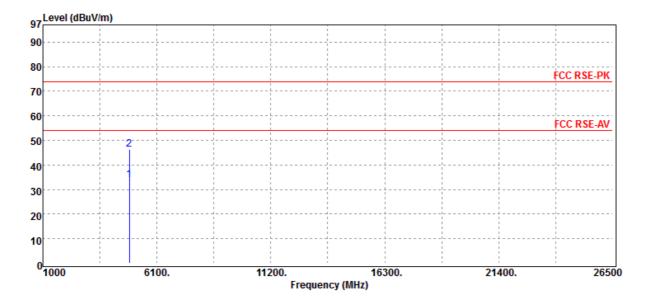
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	н	Average	26.90	7.35	34.25	54.00	-19.75
4824.00	Н	Peak	36.77	7.35	44.12	74.00	-29.88

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Operation Band	:802.11g	Test Date	:2018-04-12
Fundamental Frequen-	:2437 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL

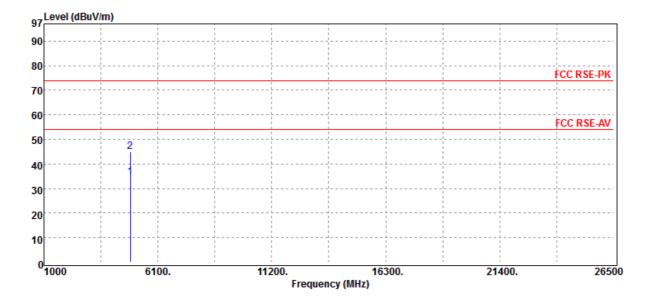


	Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
			Mode	Reading Level		FS	@3m	Margin
_	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
	4874.00	н	Average	26.21	7.62	33.83	54.00	-20.17
	4874.00	Н	Peak	38.56	7.62	46.18	74.00	-27.82



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Operation Band	:802.11g	Test Date	:2018-04-12
Fundamental Frequen-	:2437 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	HORIZONTAL



	Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe	
			Mode	Reading Level		FS	@3m	Margin	
_	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
	4874.00	Н	Average	26.85	7.62	34.47	54.00	-19.53	
	4874.00	Н	Peak	37.45	7.62	45.07	74.00	-28.93	
	4874.00	Н	Average	dBµV 26.85	7.62	34.47	54.00	dB -19.53	

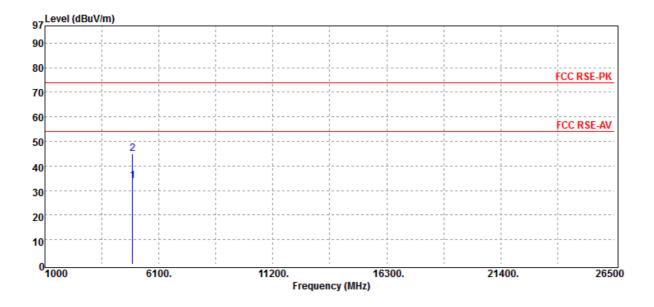
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Operation Band Fundamental Frequen- cy	:802.11g	Test Date	:2018-04-12
	:2462 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	VERTICAL



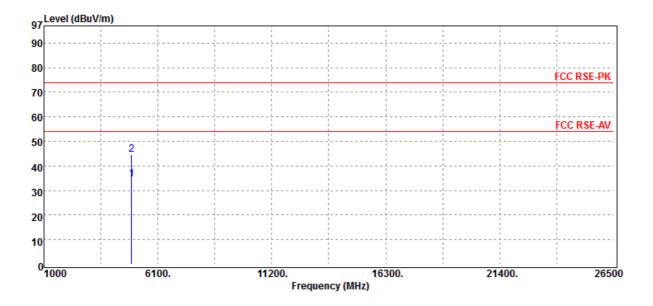
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Н	Average	26.33	7.59	33.92	54.00	-20.08
4924.00	Н	Peak	37.39	7.59	44.98	74.00	-29.02
4924.00	Н	Peak	37.39	7.59	44.98	74.00	-29.02

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Operation Band	:802.11g	Test Date	:2018-04-12
Fundamental Frequen-	:2462 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	HORIZONTAL



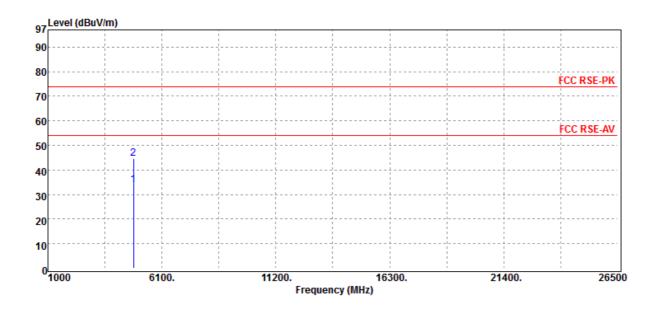
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Н	Average	26.90	7.59	34.49	54.00	-19.51
4924.00	Н	Peak	37.13	7.59	44.72	74.00	-29.28
4924.00	Н	e	37.13	7.59	44.72	74.00	-29.28

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Radiated Spurious Emission Measurement Result (802.11_HT20)

Operation Band	:802.11n20	Test Date	:2018-04-12
Fundamental Frequen- cv	:2412 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	a :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Н	Average	26.44	7.35	33.79	54.00	-20.21
4824.00	Н	Peak	37.35	7.35	44.70	74.00	-29.30

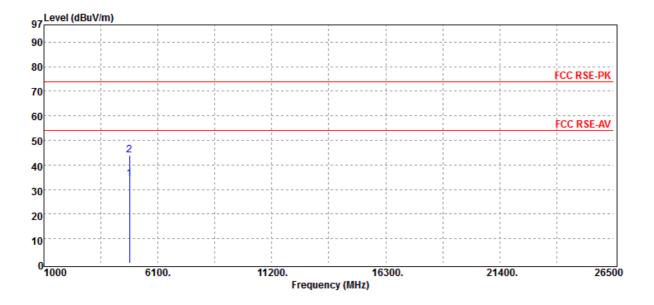
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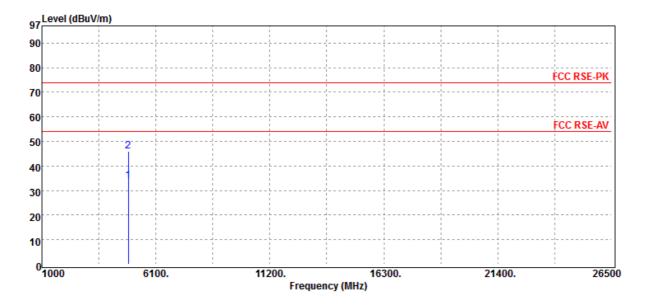
Operation Band	:802.11n20	Test Date	:2018-04-12
Fundamental Frequen- cy	:2412 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	н	Average	27.02	7.35	34.37	54.00	-19.63
4824.00	Н	Peak	36.57	7.35	43.92	74.00	-30.08



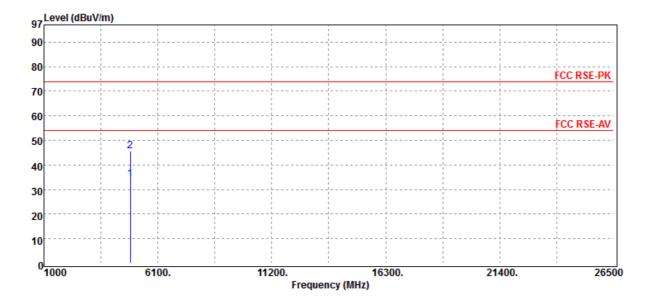
Operation Band	:802.11n20	Test Date	:2018-04-12
Fundamental Frequen-	:2437 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	VERTICAL



Note	Detector	Spectrum	Factor	Actual	Limit	Safe
	Mode	Reading Level		FS	@3m	Margin
F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
н	Average	26.18	7.62	33.80	54.00	-20.20
Н	Peak	38.52	7.62	46.14	74.00	-27.86
	F/H/E/S H	Mode F/H/E/S PK/QP/AV H Average	ModeReading LevelF/H/E/SPK/QP/AVdBµVHAverage26.18	ModeReading LevelF/H/E/SPK/QP/AVdBµVdBHAverage26.187.62	ModeReading LevelFSF/H/E/SPK/QP/AVdBµVdBHAverage26.187.6233.80	ModeReading LevelFS@3mF/H/E/SPK/QP/AVdBµVdBdBµV/mdBµV/mHAverage26.187.6233.8054.00



Operation Band	:802.11n20	Test Date	:2018-04-12
Fundamental Frequen-	:2437 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH MID	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	^a :HORIZONTAL

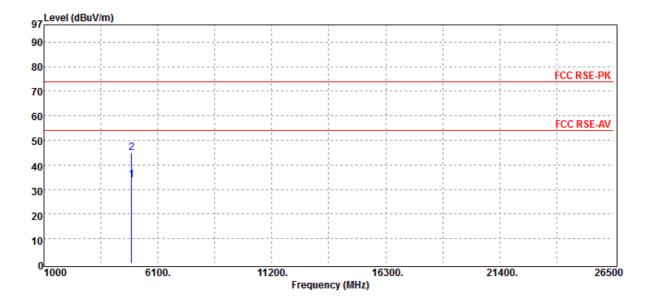


Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Н	Average	26.69	7.62	34.31	54.00	-19.69
4874.00	Н	Peak	37.98	7.62	45.60	74.00	-28.40

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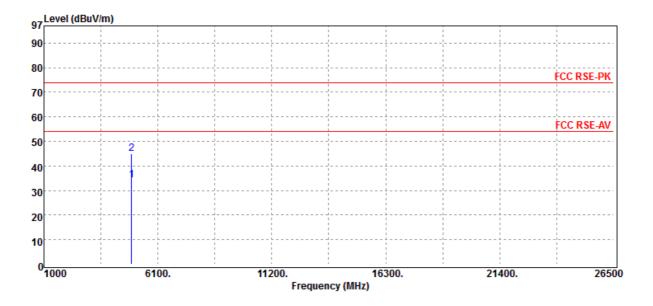
Operation Band	:802.11n20	Test Date	:2018-04-12
Fundamental Frequen-	:2462 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	н	Average	26.25	7.59	33.84	54.00	-20.16
4924.00	Н	Peak	37.31	7.59	44.90	74.00	-29.10
4924.00	Н	PK/QP/AV Average	dBµV 26.25	7.59	dBµV/m 33.84	<u>dBμV/m</u> 54.00	dB -20.16



Operation Band	:802.11n20	Test Date	:2018-04-12
Fundamental Frequen- cy	:2462 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH HIGH	Engineer	:Tin
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Н	Average	26.78	7.59	34.37	54.00	-19.63
4924.00	Н	Peak	37.26	7.59	44.85	74.00	-29.15

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12 PEAK POWER SPECTRAL DENSITY

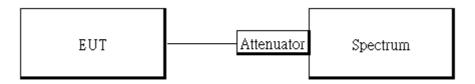
12.1 Standard Applicable

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

12.2 Measurement Equipment Used

Conducted Emission Test Site								
EQUIPMENT	MFR	IFR MODEL SERIAL		LAST	CAL DUE.			
TYPE		NUMBER	NUMBER	CAL.				
EXA Spectrum An- alyzer	Agilent	N9010A	MY57120290	2018/02/14	2019/02/13			
Attenuator	Agilent	8495B	3308A22470	2018/01/02	2019/01/01			
Coaxial Cables	N/A	WK CE Ca- ble	N/A	2018/01/02	2019/01/01			
Notebook	Lenovo	R400	7440AV6	N/A	N/A			

12.3 Test Set-up



12.4 Measurement Procedure

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

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12.5 Measurement Result

	POWER DENSITY 802.11b							
Freq. (MHz)	PPSD W/O Duty Factor (dBm)	Offset	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Result		
2412	-4.95	11.20	0.08	-4.87	8.00	PASS		
2437	-4.80	11.20	0.08	-4.72	8.00	PASS		
2462	-2.16	11.20	0.08	-2.08	8.00	PASS		
	POW	ER DEN	SITY 802.	11g				
Freq. (MHz)	PPSD W/O Duty Factor (dBm)	Offset	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Result		
2412	-8.39	11.20	0.44	-7.95	8.00	PASS		
2437	-8.36	11.20	0.44	-7.92	8.00	PASS		
2462	-8.83	11.20	0.44	-8.39	8.00	PASS		
	POWER	DENSIT	Y 802.11r	n HT20				
Freq. (MHz)	PPSD W/O Duty Factor (dBm)	Offset	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Result		
2412	-8.90	11.20	0.48	-8.42	8.00	PASS		
2437	-7.77	11.20	0.48	-7.29	8.00	PASS		
2462	-9.79	11.20	0.48	-9.31	8.00	PASS		

*Refer to next page for plots

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



Power Spectral Density Test Plot (CH-Mid)



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Power Spectral Density Test Plot (CH-High)



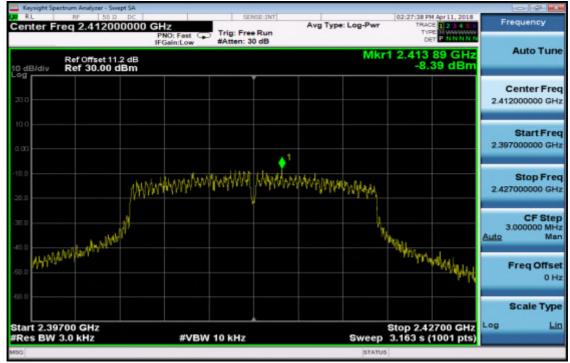
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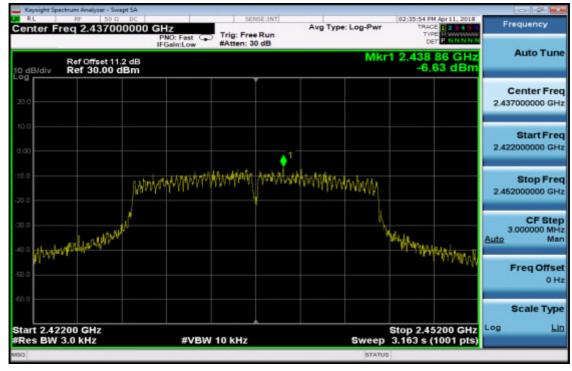
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802.11g Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)



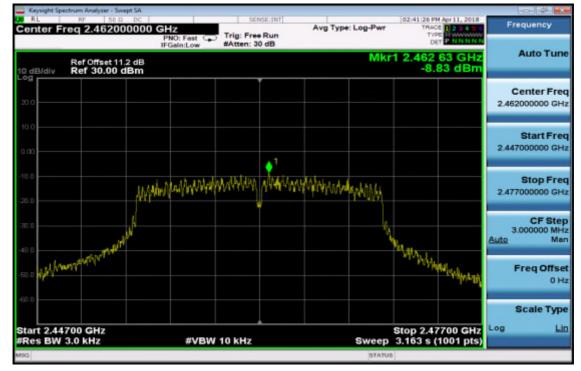
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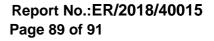
Power Spectral Density Test Plot (CH-High)



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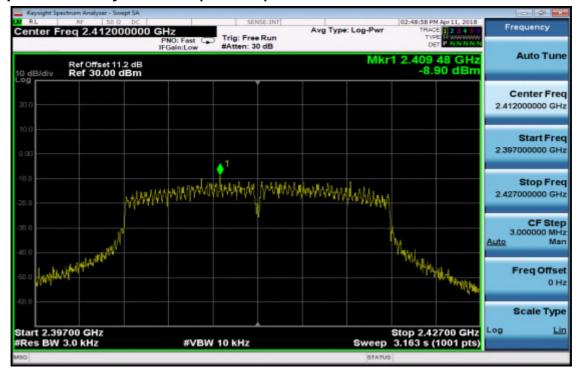
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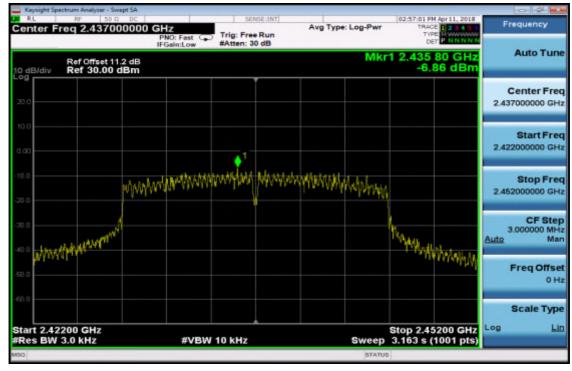




802.11n_HT20 Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)



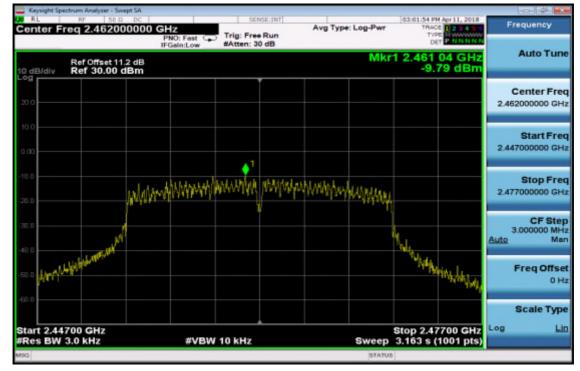
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Power Spectral Density Test Plot (CH-High)



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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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