

# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

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

OF

WWZN Information Technology Company Limited Room 901, 9th Floor, No.19, Zhong Guancun Street, **Applicant:** Haidian District, Beijing, 100080 China Smart Watch **Product Name: Brand Name:** TicWatch Model No.: WG12036 **Model Difference:** N/A FCC ID: 2AP42-WG12036 IC: 24006-WG12036 **Report Number:** ER/2018/70017 FCC Rule Part: §15.247, Cat: DTS IC Rule Part: RSS-247 issue 2 Feb 2017 Issue Date: Aug. 03, 2018 Date of Test: Jul. 04, 2018~ Jul. 27, 2018 Date of EUT Received: Jul. 04, 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:

Approved By:

Louis Chen / Sr. Engineer

Jim Chang / Manager





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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# **Revision History**

Report Number	Revision	Description	Effected Page	Issue Date	Revised By
ER/2018/70017	Rev.00	Initial creation of document	All	Aug. 03, 2018	Violetta Tang

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#### **GENERAL INFORMATION** 1

# **1.1 Product description**

## General:

Product Name:	Smart Watch		
Brand Name:	TicWatch		
Model No.:	WG1203	6	
Model Difference:	N/A		
Product SW/HW version:	OWDT.180612.001 / 1000		
Radio SW/HW version:	OWDT.180612.001 / 1000		
Charging Dock:	Model No.: WG20026, Supplier: TicWatch		
	3.85Vdc Rechargeable Li-ion Battery or 5Vdc from charging dock		
Power Supply:	Battery:	Model No.: SP502626SF Supplier: Tianjin Lishen Battery Joint-stock Com., Ltd.	

## WLAN 2.4GHz:

Wi-Fi	Frequency Range	Channels	Rated Power in dBm (Peak)	Rated Power in dBm (EIRP)	Type of Emission	Modulation Technology
802.11b			17.50	4.78	13M4G1D	DSSS
802.11g	2412-2462	11	18.81	-0.23	17M1D1D	
802.11n HT20			18.89	-0.24	18M1D1D	OFDM
Antenna D	Antenna Designation: PIFA Antenna, Gain: -5.85dBi, Model No.: WG12036, Supplier: COMPAL					
Modulation	n 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 – 72.2Mbps				

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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

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

RSS-247 issue 2 Feb. 2017

RSS-Gen. issue 5 Apr. 2018

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

Canada Registration Number: 4620E-1

## **1.4 Special Accessories**

There are no special accessories used while test was conducted.

## **1.5 Equipment Modifications**

There was no modification incorporated into the EUT.

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#### SYSTEM TEST CONFIGURATION 2

# 2.1 EUT Configuration

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

# 2.2 EUT Exercise

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

# **2.3 Test Procedure**

#### 2.3.1 **Conducted Emissions**

The EUT is a placed on as turn table which is 0.8 m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz, The CISPR Quasi-Peak and Average detector mode is employed according to §15.207 & RSS-Gen §8.8. 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 and attenuator.

# Offset:

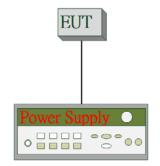
= RF cable loss (dB)+ attenuation factor(dB) dB =11 (dB)

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



# Fig.2-3 Conduction (AC Power Line)



# Fig. 2-2 Radiated Emission



	Table 2-1 Equipment Osed in Tested System							
ltem	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord		
1.	WLAN Test Software	N/A	N/A	N/A	N/A	N/A		
2.	DC Power Supply	Agilent	E3640A	MY40000811	N/A	Un-Shielded		
3.	Notebook	Lenovo	L420	LR-7HXZA	N/A	N/A		

## Table 2-1 Equipment Used in Tested System

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#### SUMMARY OF TEST RESULTS 3

FCC Rules	IC Rules	Description Of Test	Result
§15.207(a)	RSS-Gen §8.8	AC Power Line Conducted Emission	Compliant
§15.247(b) (3)	RSS-247 §5.4(4)	Peak Output Power	Compliant
§15.247(a)(2)	RSS-247 §5.2 (1) RSS-Gen §6.6	6dB & 99% Emission Bandwidth	Compliant
§15.247(d)	RSS-247 §5.5	Conducted Band Edge and Spurious Emission	Compliant
§15.247(d)	RSS-247 §5.5	Radiated Band Edge and Spurious Emission	Compliant
§15.247(e)	RSS-247 §5.2(2)	Power Spectral Density	Compliant
§15.203 §15.247(b)	RSS- Gen §6.8	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		

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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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11g	1 to 11	6	OFDM	6	Main

	RADIATED EMISSION TEST (ABOVE 1 GHz)				
MODEAVAILABLETESTED CHANNELMODULATIONDATA RATE (Mbps)ANTENNA PORT					
802.11b	1 to 11	1, 6, 11	DSSS	1	Main
802.11g	1 to 11	1, 6, 11	OFDM	6	Main
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	MCS 0	Main

#### Note:

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

# ANTENNA PORT CONDUCTED MEASUREMENT:

	CONDUCTED TEST					
MODE	AVAILABLE CHANNEL	TESTED CHANNELMODULATIONDATA RATE (Mbps)		ANTENNA PORT		
802.11b	1 to 11	1, 6, 11	DSSS	11	Main	
802.11g	1 to 11	1, 6, 11	OFDM	54	Main	
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	MCS 0	Main	

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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 Edge	+/- 0.84 dB
Peak Power Density	+/- 1.3 dB
Temperature	+/- 0.65 °C
Humidity	+/- 4.6 %
DC / AC Power Source	DC= +/- 0.13%, AC= +/- 0.2%

Radiated Spurious Emission:

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

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

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

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# 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 th									
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 TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.						
EXA Spectrum Analyzer	Agilent	N9010A	MY57120290	2018/02/14	2019/02/13						
Attenuator	Mini-Circuit	BW-S10W2+	2	2018/01/02	2019/01/01						
DC Power Supply	Anritsu	E3640A	MY40000811	2017/12/18	2018/12/17						

# 6.3 EUT Setup

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

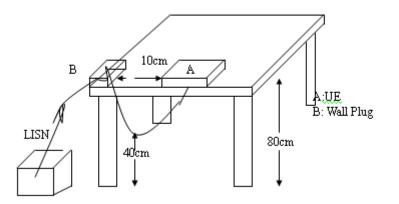
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# 6.4 Test SET-UP (Block Diagram of Configuration)



#### 6.5 Measurement Procedure

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

## 6.6 Measurement Result

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

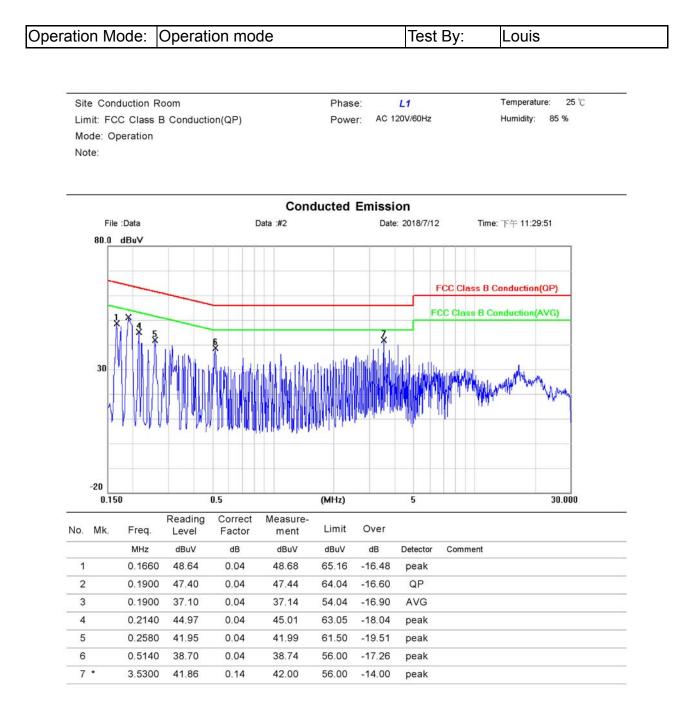
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# AC POWER LINE CONDUCTED EMISSION TEST DATA



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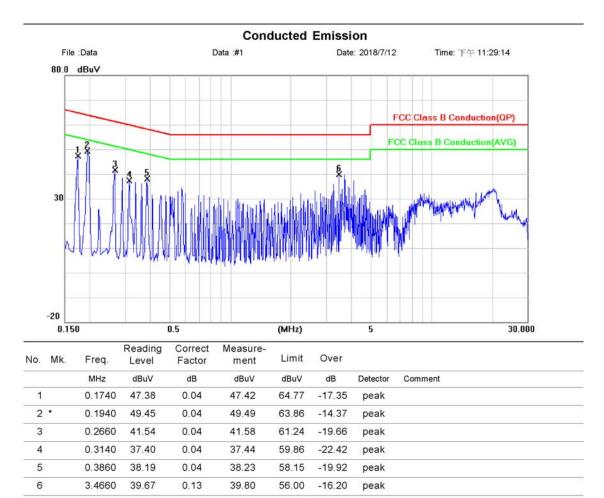
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25 °C

85 %

Site Conduction Room Phase: N Temperature: AC 120V/60Hz Humidity: Limit: FCC Class B Conduction(QP) Power: Mode: Operation Note:



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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)	1/T (kHz)	VBW setting (kHz)
802.11b	0.98	20.10	0.12	1.00
802.11g	0.87	20.59	0.73	1.00
802.11n_20	0.87	20.62	0.78	1.00

*b* = 0.977%, *g* = 0.873%,*n\_ht\_*20 = 0.866%

Duty Cycle Factor: 10 \* log(1/0.00977) = 20.1 Duty Cycle Factor: 10 \* log(1/0.00873) = 20.59 Duty Cycle Factor:  $10 * \log(1/0.00866) = 20.62$ 

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# 7.1 DUTY CYCLE TEST SIGNAL Measurement Result 802.11 b

		alyzer - Swept SA									
R Center F	RF Freq 2	50 Ω AC 2.412000000			SENSE:II	A		ALIGN AUTO : Log-Pwr	TRA	M Jul 06, 2018 CE <u>1 2 3 4 5 6</u> PE WWWWWWW	Frequency
			PNO: Fast IFGain:Low		Trig: Free Ru #Atten: 30 dB					PNNNNN	Auto Tun
10 dB/div		Offset 11 dB 7 20.00 dBm						4	10 Mkr3 2	.424 ms 0.97 dB	Auto Tuli
-og									3∆4		
10.0											Center Fre
0.00											2.412000000 GH
10.0											
20.0											Start Fre
30.0											2.412000000 GH
40.0											2.412000000 Gr
50.0											
											Stop Fre
60.0											2.412000000 GH
70.0											
Center 2	4120	00000 GHz							9	Span 0 Hz	CF Ste
Res BW			#V	BW :	8.0 MHz		9	Sweep '		(1001 pts)	8.000000 MH
MKR MODE T	RCI SCI	×			× I	FUNCTION	EUN	ICTION WIDTH	ELINCT	ON VALUE	<u>Auto</u> Ma
1 Δ2	1 t	(Δ)	8.229 ms	(Δ)	0.91 dB	Tonemen					
2 F 3 Δ4	1 t 1 t	(Δ)	2.288 ms 8.424 ms	(0)	12.11 dBm 0.97 dB						Freq Offs
4 F	i t	(Δ)	2.288 ms	(Δ)	12.11 dBm						0+
5 6											UT UT
7											
8 9											
10											
11										~	
sg								STATL	15		Ι
								SIAIC	~		

## 802.11 g

R		<mark>nalyzer - Sw</mark> F 50 Ω			CEN	ISE:INT		ALIGN AUTO	03:53:37 DM	4 Jul 06, 2018	
			00000 GH	IZ NO: Fast ↔ Sain:Low	- · -	Run	Ауд Туре	ElanAoro	TRAC	E 1 2 3 4 5 6 E WWWWWWW E P N N N N N	Frequency
0 dB/div		ef Offset 1* ef 20.00						Δ		0.28 dB	Auto Tui
og 10.0 <b>h</b> h 0.00			ela-alperterater	trificialie-Alicentrifi		unprayetel	gasting blaces app	Tribubility a Nipagina	1Δ2	3∆4 -/#Pgs-th-h	<b>Center Fr</b> 2.412000000 G
0.0 0.0 0.0 0.0	and a state	щ»							whore the second		Start Fr 2.412000000 G
0.0 0.0 0.0											Stop Fr 2.412000000 0
es BW	/ 8 MI	000000 ( Iz	GHz	#VBW	/ 8.0 MHz			-	.000 ms (	<u> </u>	CF Si 8.000000 N Auto M
KE MODE	1 t	(Δ)		64 ms (Δ)	-8.34	dB	CTION FUI	NCTION WIDTH	FUNCTIO	DN VALUE	
2 F 3 ∆4 4 F 5 6	1 t 1 t 1 t	(Δ)	1.5	0.0 μs 62 ms (Δ) 0.0 μs	11.09 dE -0.28 d 11.09 dE	dB					Freq Off 0
7 8 9 0											
					Ш					>	
G								STATU	s		

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## 802.11 n\_20 MHz

	rum Analyzer - Swe								
Center F	RF 50 Ω req 2.41200	0000 GHz	Tria	SENSE:INT		ALIGN AUTO : Log-Pwr	TRAC	M Jul 06, 2018 CE 1 2 3 4 5 6 DE WWWWWW	Frequency
		PNO: Fa IFGain:Lo		en: 30 dB			DI		Auto Tune
10 dB/div	Ref Offset 11 Ref 20.00 d	Bm					-	473 ms 0.71 dB	
Log 10.0 <mark>Իչչնաշ</mark> ե	antiper the second		makemberter	ndama Anna Asa	hand the property of the prope		3∆4 n vernik Martin	worker with the	Center Freq
-10.0									2.412000000 GHz
-20.0									Start Freq
-30.0		hunnally				handler			2.412000000 GHz
-50.0									
-60.0									<b>Stop Freq</b> 2.412000000 GHz
	412000000 G	U-						pan 0 Hz	
Res BW 8			VBW 8.0 N	1Hz	:	Sweep 3		1001 pts)	CF Step 8.000000 MHz
MKR MODE T 1 $\Delta 2$ 1	t (Δ)	× 1.275 ms		.26 dB	INCTION FUN	NCTION WIDTH	FUNCTIO	IN VALUE	<u>Auto</u> Man
2 F 3 ∆4 4 F	t t (Δ) t	870.0 µs 1.473 ms 870.0 µs	s (Δ) – 4	2 dBm ).71 dB 2 dBm					Freq Offset
5		010.0 µ		2 4211					0 Hz
7 8 9									
10 11								<u> </u>	
MSG						STATU	5		

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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.

Per RSS-247 §5.4(4)

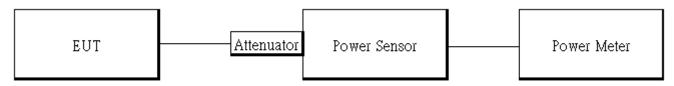
For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W. Except as provided in Section 5.4(5), the e.i.r.p. shall not exceed 4 W.

# 8.2 Measurement Equipment Used

	Conducted Emission Test Site											
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.							
Power Meter	Anritsu	ML2496A	1804001	2018/02/01	2019/01/31							
Attenuator	Mini-Circuit	BW-S10W2+	2	2018/01/02	2019/01/01							
Power Sensor	Anritsu	MA2411B	1726104	2018/02/01	2019/01/31							
DC Power Supply	Anritsu	E3640A	MY40000811	2017/12/18	2018/12/17							

# 8.3 Test Set-up

Power Meter:



# **8.4 Measurement Procedure**

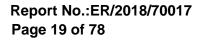
- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance .
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter.

## **Power Meter:**

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

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

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#### 8.5 Measurement Result

802.1	1b Main							
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	I	_imit		RESULT
1	2412	1	17.50	56.23	1 Watt =	30.00	dBm	PASS
6	2437	1	17.28	53.46	1 Watt = 30.00 dBm		PASS	
11	2462	1	16.93	49.32	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)	L	₋imit		RESULT
1	2412	1	14.98	31.46	1 Watt =	30.00	dBm	PASS
6	2437	1	14.71	29.56	1 Watt =	30.00	dBm	PASS
11	2462	1	14.52	28.30	1 Watt =	30.00	dBm	PASS
802.1	1g Main							
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	l	_imit		RESULT
1	2412	6	18.46	70.15	1 Watt =	30.00	dBm	PASS
6	2437	6	18.75	74.99	1 Watt =	30.00	dBm	PASS
11	2462	6	18.81	76.03	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	9.57	9.07	1 Watt =	30.00	dBm	PASS
6	2437	6	9.51	8.94	1 Watt =	30.00	dBm	PASS
11	2462	6	9.97	9.94	1 Watt =	30.00	dBm	PASS

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802.1	802.11n_HT20M Main												
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit			RESULT					
1	2412	MCS0	18.86	76.91	1 Watt =	30.00	dBm	PASS					
6	2437	MCS0	18.81	76.03	1 Watt =	30.00	dBm	PASS					
11	2462	MCS0	18.89	77.45	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	9.76	9.47	1 Watt =	30.00	dBm	PASS					
6	2437	MCS0	9.54	9.00	1 Watt =	30.00	dBm	PASS					
11	2462	MCS0	9.96	9.92	1 Watt =	30.00	dBm	PASS					

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

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#### EIRP

802.17	802.11b Main												
СН	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)		Limit		RESULT				
1	2412	1	14.98	-5.85	9.13	4W=	36	dBm	PASS				
6	2437	1	14.71	-5.85	8.86	4W=	36	dBm	PASS				
11	2462	1	14.52	-5.85	8.67	4W=	36	dBm	PASS				

## 1802 11g Main

002.1														
СН	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit	RESULT							
1	2412	6	9.57	-5.85	3.72	4W= 36 dBm	PASS							
6	2437	6	9.51	-5.85	3.66	4W= 36 dBm	PASS							
11	2462	6	9.97	-5.85	4.12	4W= 36 dBm	PASS							

802.1	802.11n_HT20M Main								
СН	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)		Limit		RESULT
1	2412	MCS0	9.76	-5.85	3.91	4W=	36	dBm	PASS
6	2437	MCS0	9.54	-5.85	3.69	4W=	36	dBm	PASS
11	2462	MCS0	9.96	-5.85	4.11	4W=	36	dBm	PASS

\* Note: EIRP = Average Power + Gain

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# 9 6DB & 99% BANDWIDTH MEASUREMENT

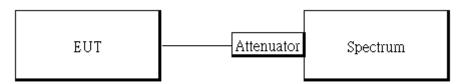
# 9.1 Standard Applicable

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

# 9.2 Measurement Equipment Used

	Conducted Emission Test Site						
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.		
EXA Spectrum Analyzer	Agilent	N9010A	MY57120290	2018/02/14	2019/02/13		
Attenuator	Mini-Circuit	BW-S10W2+	2	2018/01/02	2019/01/01		
DC Power Supply	Anritsu	E3640A	MY40000811	2017/12/18	2018/12/17		

# 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	8547.00	> 500	PASS		
2437	9051.00	> 500	PASS		
2462	8089.00	> 500	PASS		

802.11g Main				 802.11_	n_HT20 Mair	۱	
Freq.	6dB BW	Limit	Result	Freq.	6dB BW	Limit	Result
(MHz)	(kHz)	(kHz)	Result	(MHz)	(kHz)	(kHz)	Result
2412	16420.00	> 500	PASS	2412	17620.00	> 500	PASS
2437	16420.00	> 500	PASS	2437	17630.00	> 500	PASS
2462	16410.00	> 500	PASS	2462	17620.00	> 500	PASS

# 99% Bandwidth

802.11b Ma	ain	802.11g Ma	in	802.11n_H	T20M Main
Freq. (MHz)	99% BW (MHz)	Freq. (MHz)	99% BW (MHz)	Freq. (MHz)	99% BW (MHz)
2412	13.329	2412	17.130	2412	18.044
2437	13.332	2437	17.062	2437	18.100
2462	13.350	2462	17.110	2462	18.059

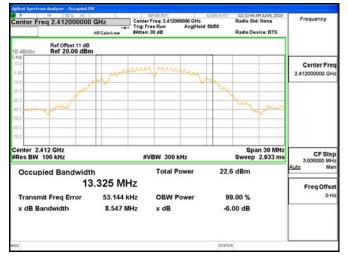
\*Refer to next page for plots

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#### 802.11b (Main)

#### 6dB Band Width Test Data CH-Low



#### 6dB Band Width Test Data CH-Mid



## 6dB Band Width Test Data CH-High



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



## 6dB Band Width Test Data CH-Mid



# 6dB Band Width Test Data CH-High



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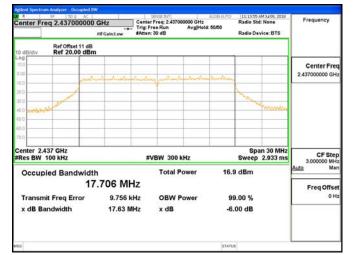


# 802.11n 20M (Main)

# 6dB Band Width Test Data CH-Low

Center Fre	eq 2.41200000		Sense Init Center Freq: 2.4120 Trig: Free Run Atten: 30 dB	ALIGN AU 00000 GHz Avg[Hold: 50/50	Radio Device: BTS	Frequency
10 dB/div	Ref Offset 11 dB Ref 20.00 dBr	n			_	
10.0		and	many when	and and the state	~	Center Freq 2.412000000 GHz
20.0	_				-	
40.0 0000000000000000000000000000000000					manda	
60.0						
Center 2.4 #Res BW			#VBW 300	kHz	Span 30 MHz Sweep 2.933 ms	
Occupi	ied Bandwidt 17	h 7.708 MHz	Total F	Power 1	7.2 dBm	<u>Auto</u> Man
	it Freq Error	9.649 kH	z OBW I		99.00 %	Freq Offsel 0 Hz
x dB Ba	ndwidth	17.62 MH:	z xdB		-6.00 dB	
50				57	stus	

#### 6dB Band Width Test Data CH-Mid



#### 6dB Band Width Test Data CH-High

台灣



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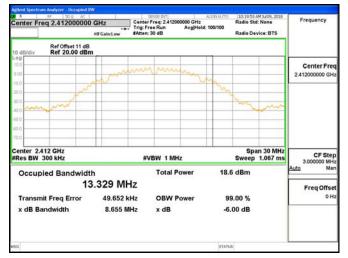
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#### 802.11b (Main)

#### 99% Band Width Test Data CH-Low



#### 99% Band Width Test Data CH-Mid



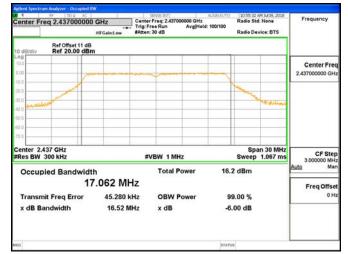
## 99% Band Width Test Data CH-High



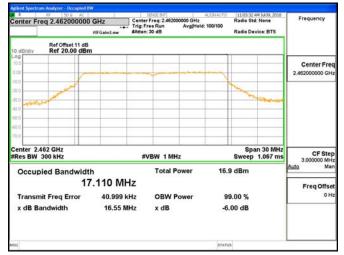
# 802.11g (Main) 99% Band Width Test Data CH-Low



#### 99% Band Width Test Data CH-Mid



# 99% Band Width Test Data CH-High



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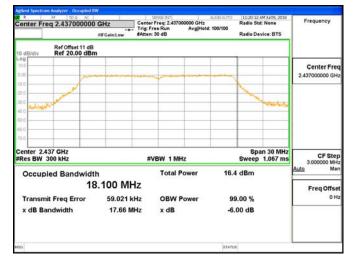


# 802.11n 20M (Main)

#### 99% Band Width Test Data CH-Low

R	RF 50.9 AC		SENSE INT		ALISIN AUTO	11:11:38 AM 3/09, 2018	Frequency
Center Fre	eq 2.412000000		Center Freq: 2.4120 Trig: Free Run Atten: 30 dB	AvgiHeld	: 100/100	Radio Std: None Radio Device: BTS	, requercy
10 dB/div	Ref Offset 11 dB Ref 20.00 dBm	n					
10.0							Center Freq 2.412000000 GHz
10.0 20.0	-					and a	
40.0							
60.0 70.0							
Center 2.4 Res BW			#VBW 1 MI	Hz		Span 30 MHz Sweep 1.067 ms	
Occup	ied Bandwidt		Total Power 16.6		ð dBm	<u>Auto</u> Man	
		3.044 MHz	-				Freq Offset
Transm	it Freq Error	44.996 kH	Z OBW I	Power	99	9.00 %	0 Hz
x dB Ba	andwidth	17.62 MH	z xdB		-6.	00 dB	
190					STATU	5	

#### 99% Band Width Test Data CH-Mid



#### 99% Band Width Test Data CH-High



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# 10 CONDUCTED BAND EDGE AND SPURIOUS EMISSION MEASUREMENT

# 10.1 Standard Applicable

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

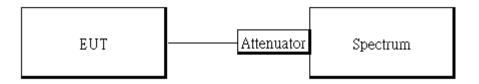
In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a) & RSS-Gen §8.10, must also comply with the radiated emission limits specified in §15.209(a) & RSS-Gen §8.8.

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

	Conducted Emission Test Site						
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.		
EXA Spectrum Analyzer	Agilent	N9010A	MY57120290	2018/02/14	2019/02/13		
Attenuator	Mini-Circuit	BW-S10W2+	2	2018/01/02	2019/01/01		
DC Power Supply	Anritsu	E3640A	MY40000811	2017/12/18	2018/12/17		

## 10.2 Measurement Equipment Used

# 10.3 Test SET-UP



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# **10.4 Measurement Procedure**

# **Conducted Band Edge Limt**

- 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 & ANSI C63.10.
- 3. Set the span to 1.5 times the DTS channel bandwidth.
- 4. Set the RBW = 100kHz & VBW = 300 kHz.
- 5. Detector = peak.
- 6. Sweep time = auto couple.
- 7. Trace mode = max hold.
- 8.Allow trace to fully stabilize.

9.Use the peak marker function to determine the maximum amplitude level.

# **Conducted Band Edge:**

- 1. To connect Antenna Port of EUT to Spectrum.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance & ANSI C63.10.
- 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 & ANSI C63.10.
- 3. Set RBW = 100 kHz & VBW= 300 kHz, Detector =Peak, Sweep = Auto.
- 4. Allow trace to fully stabilize.
- 5. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
- 6. Repeat above procedures until all default test channel measured were complete.

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#### 10.5 **Measurement Result**

Referer	nce Leve	l of Limit 802.11b mode	Referen	nce Leve	of Limit 802.11g mode
Freq.	PSD	Reference Level of Limit	Freq.	PSD	Reference Level of Limit
(MHz)	(dBm)	(dBm)	(MHz)	(dBm)	(dBm)
2412	7.04	-12.96	2412	-1.15	-21.15
2437	6.69	-13.31	2437	-1.44	-21.44
2462	6.26	-13.74	2462	-0.87	-20.87

#### Reference Level of Limit 802.11n20 mode

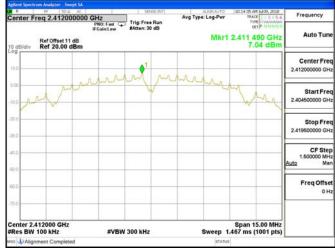
Freq.	PSD	Reference Level of Limit
(MHz)	(dBm)	(dBm)
2412	-1.09	-21.09
2437	-1.37	-21.37
2462	-1.25	-21.25

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#### 802.11b Band Edge Limit Test Data CH-Low



## 802.11b Band Edge Limit Test Data CH-Mid



#### 802.11b Band Edge Limit Test Data CH-High



#### 802.11g Band Edge Limit Test Data CH-Low



#### 802.11g Band Edge Limit Test Data CH-Mid



#### 802.11g Band Edge Limit Test Data CH-High



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#### 802.11n\_HT20 Band Edge Limit Test Data CH-Low



## 802.11n\_HT20 Band Edge Limit Test Data CH-Mid



802.11n\_HT20 Band Edge Limit Test Data CH-High



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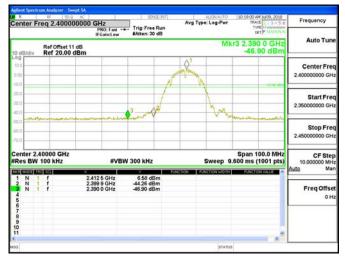
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#### 802.11b

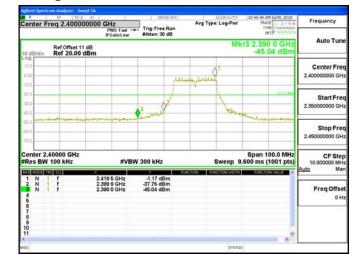
#### **Band Edge Test Data CH-Low**



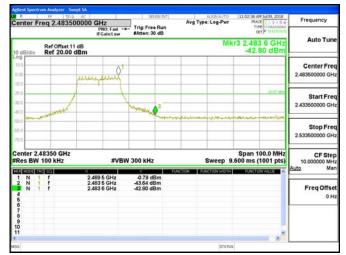
#### Band Edge Test Data CH-High



# 802.11g Band Edge Test Data CH-Low



#### Band Edge Test Data CH-High



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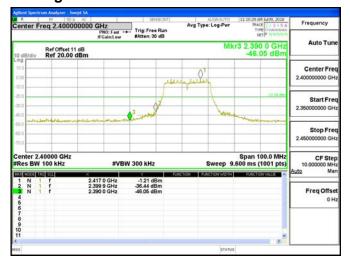
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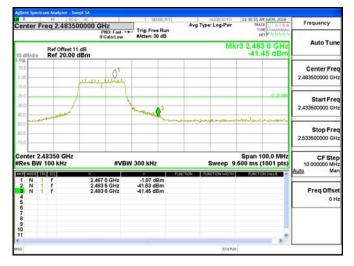
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# 802.11n HT20 **Band Edge Test Data CH-Low**



**Band Edge Test Data CH-High** 



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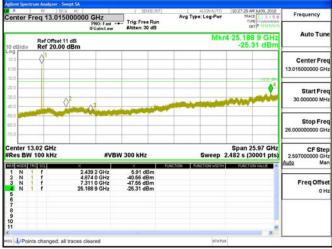
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# Spurious Emission\_802.11b\_20MHz\_Chain0\_2412MHz



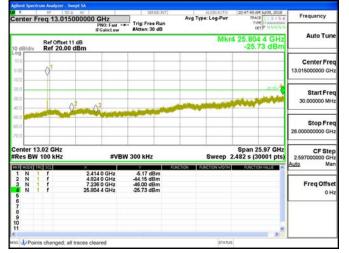
#### Spurious Emission\_802.11b\_20MHz\_Chain0\_2437MHz



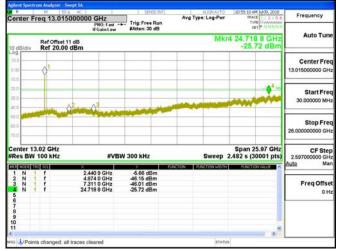
# Spurious Emission\_802.11b\_20MHz\_Chain0\_2462MHz



## Spurious Emission\_802.11g\_20MHz\_Chain0\_2412MHz



#### Spurious Emission\_802.11q\_20MHz\_Chain0\_2437MHz



## Spurious Emission\_802.11g\_20MHz\_Chain0\_2462MHz



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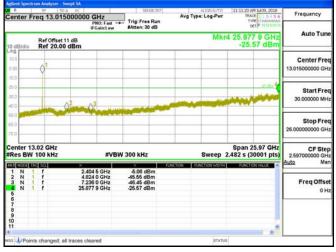
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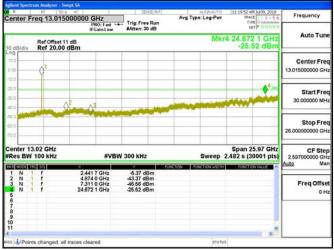
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# Spurious Emission\_802.11n\_20MHz\_Chain0\_2412MHz



#### Spurious Emission\_802.11n\_20MHz\_Chain0\_2437MHz



#### Spurious Emission\_802.11n\_20MHz\_Chain0\_2462MHz



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# 11 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT

## 11.1 Standard Applicable

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands must also comply with the §15.209 & RSS-Gen §8.8, 8.9 limit as below.

And according to §15.33(a) (1) & RSS-Gen §6.13(a), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

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

### Note:

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

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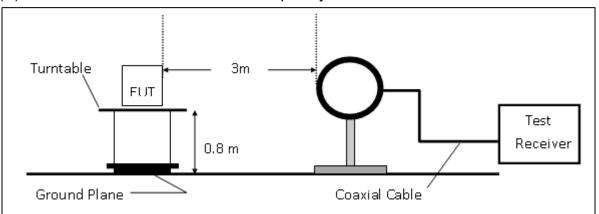
### **11.2 Measurement Equipment Used:**

966 Chamber								
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.			
Bi-log Antenna	SCHWAZBECK	VULB9168	378	2017/12/29	2018/12/28			
Horn Antenna	Schwarzbeck	BBHA9120D	1441	2017/08/04	2018/08/03			
Horn Antenna	Schwarzbeck	BBHA9170	184	2017/12/12	2018/12/11			
Loop Antenna	ETS.LINDGREN	6502	148045	2017/09/26	2018/09/25			
3m Site NSA	SGS	966 chamber	N/A	2018/01/02	2019/01/01			
Spectrum Analyzer	Agilent	E4446A	MY51100003	2018/05/15	2019/05/14			
EMI Test Receiver	R&S	ESCI7	100335	2018/02/02	2019/02/01			
Pre-Amplifier	HP	8449B	3008A00578	2018/01/02	2019/01/01			
Pre-Amplifier	HP	8447D	2944A07676	2018/01/02	2019/01/01			
Pre-Amplifier	EMC Instruments	EMC184045B	980135	2017/10/27	2018/10/26			
Filter 2400-2483.5 MHz	EWT	EWT-14-0166	M1	2018/01/02	2019/01/01			
Low Loss Cable	Huber Suhner	966_RX	9	2018/01/02	2019/01/01			

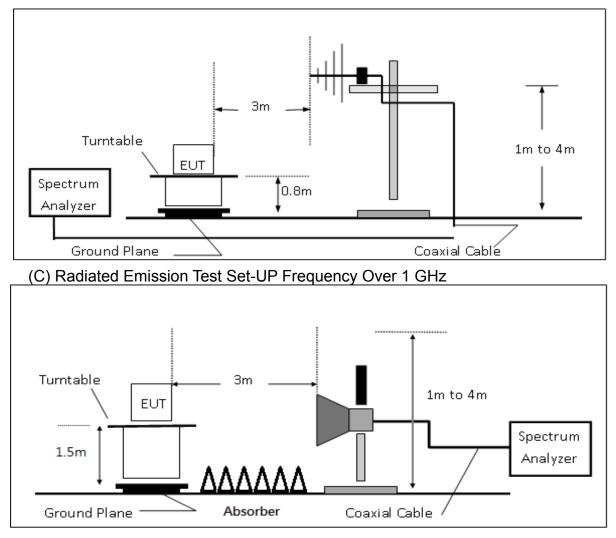


### 11.3 Test SET-UP

(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 & ANSI C63.10.
- 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	5	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

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

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

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

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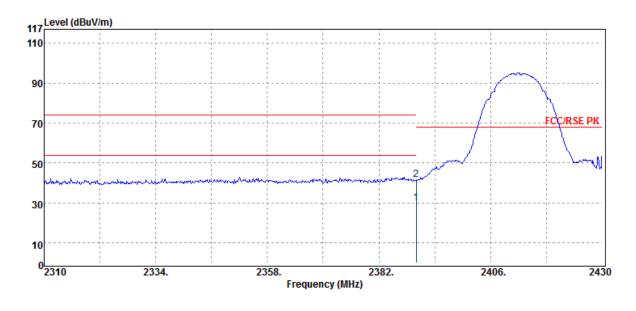
### Radiated Band Edge Measurement Result (802.11b)

**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11b :2412 MHz :Bandedge CH LOW :H Plane

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

:2018-07-05 :23 deg\_C / 61 RH :Tin :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	29.71	0.20	29.91	54.00	-24.09
2390.00	Peak	41.41	0.20	41.61	74.00	-32.39

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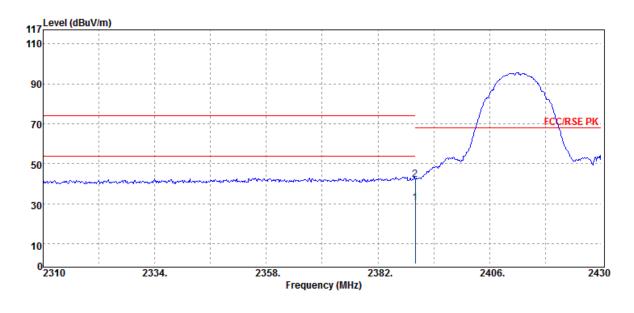


**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11b :2412 MHz :Bandedge CH LOW :H Plane

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

:2018-07-05 :23 deg\_C / 61 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	30.24	0.20	30.44	54.00	-23.56
2390.00	Peak	42.09	0.20	42.29	74.00	-31.71

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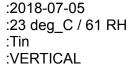
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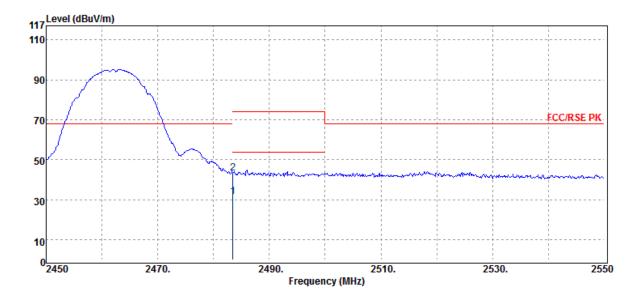


**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11b :2462 MHz :Bandedge CH HIGH :H Plane

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





ector Spectrum	Factor	Actual	Limit	Margin
ode Reading Level		FS	@3m	
QP/AV dBµV	dB	dBµV/m	dBµV/m	dB
erage 31.17	0.53	31.70	54.00	-22.30
eak 42.96	0.53	43.49	74.00	-30.51
	ode Reading Level QP/AV dBµV erage 31.17	ode Reading Level QP/AV dBµV dB erage 31.17 0.53	odeReading LevelFSQP/AVdBµVdBdBµV/merage31.170.5331.70	ode         Reading Level         FS         @3m           QP/AV         dBµV         dB         dBµV/m         dBµV/m           erage         31.17         0.53         31.70         54.00

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

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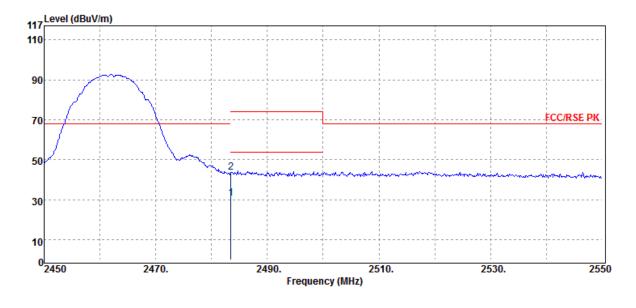


**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11b :2462 MHz :Bandedge CH HIGH :H Plane

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

:2018-07-06 :23 deg\_C / 61 RH :VERTICAL



argin
dB
3.07
0.10

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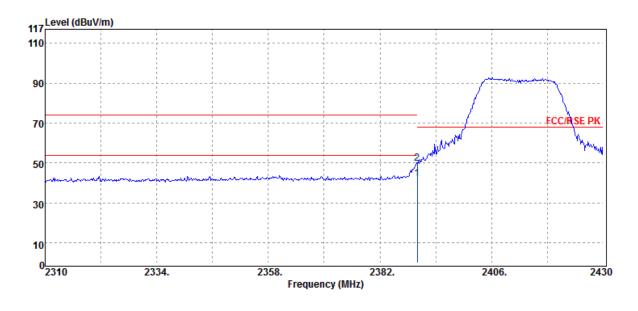
### Radiated Band Edge Measurement Result (802.11g)

**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11g :2412 MHz :Bandedge CH LOW :H Plane

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

:2018-07-06 :23 deg\_C / 61 RH :Tin :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	41.75	0.20	41.95	54.00	-12.05
2390.00	Peak	49.73	0.20	49.93	74.00	-24.07

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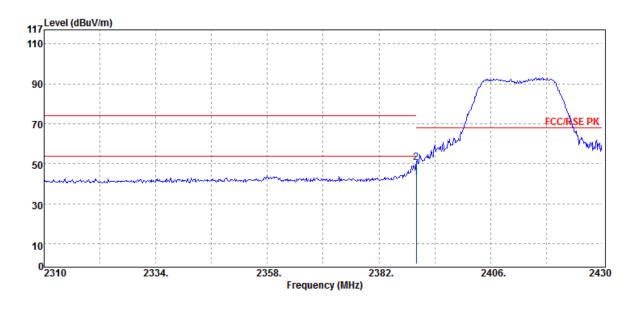


**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11g :2412 MHz :Bandedge CH LOW :H Plane

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

:2018-07-06 :23 deg\_C / 61 RH :Tin :HORIZONTAL



Detector	Spectrum	Factor	Actual	Limit	Margin
Mode	Reading Level		FS	@3m	
PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
Average	42.65	0.20	42.85	54.00	-11.15
Peak	50.60	0.20	50.80	74.00	-23.20
	Mode PK/QP/AV Average	ModeReading LevelPK/QP/AVdBµVAverage42.65	ModeReading LevelPK/QP/AVdBµVdBAverage42.650.20	ModeReading LevelFSPK/QP/AVdBµVdBdBµV/mAverage42.650.2042.85	Mode         Reading Level         FS         @3m           PK/QP/AV         dBμV         dB         dBμV/m         dBμV/m           Average         42.65         0.20         42.85         54.00

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

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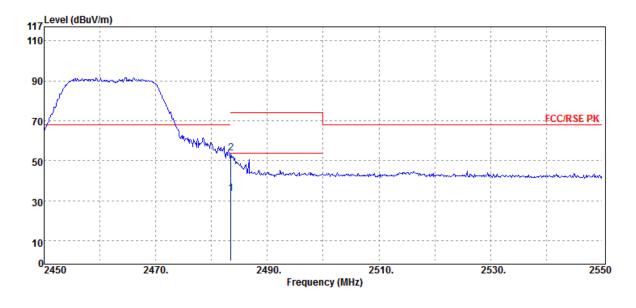


**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11g :2462 MHz :Bandedge CH HIGH :H Plane

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

:2018-07-06 :23 deg\_C / 61 RH :VERTICAL



F	req.	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
N	1Hz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
248	33.50	Average	32.94	0.53	33.47	54.00	-20.53
248	33.50	Peak	53.42	0.53	53.95	74.00	-20.05

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

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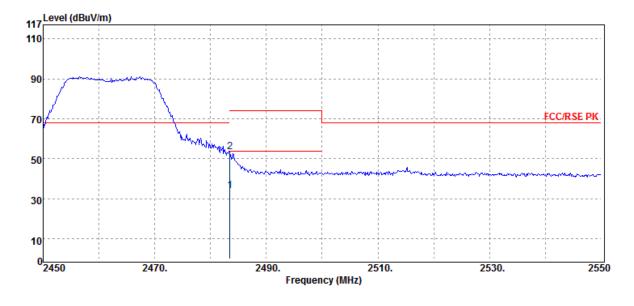


**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11g :2462 MHz :Bandedge CH HIGH :H Plane

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

:2018-07-06 :23 deg\_C / 61 RH :Tin :HORIZONTAL



Detector	Spectrum	Factor	Actual	Limit	Margin
Mode	Reading Level		FS	@3m	
PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
Average	33.32	0.53	33.85	54.00	-20.15
Peak	52.98	0.53	53.51	74.00	-20.49
	Mode PK/QP/AV Average	ModeReading LevelPK/QP/AVdBµVAverage33.32	ModeReading LevelPK/QP/AVdBµVdBAverage33.320.53	ModeReading LevelFSPK/QP/AVdBµVdBdBµV/mAverage33.320.5333.85	Mode         Reading Level         FS         @3m           PK/QP/AV         dBμV         dB         dBμV/m         dBμV/m           Average         33.32         0.53         33.85         54.00

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.



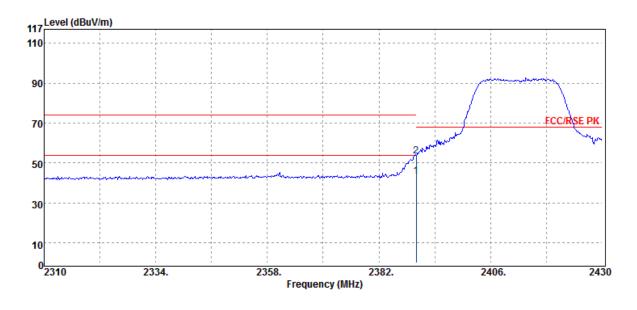
### Radiated Band Edge Measurement Result (802.11\_HT20)

**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20 :2412 MHz :Bandedge CH LOW :H Plane

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

:2018-07-06 :23 deg\_C / 61 RH :Tin :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	43.01	0.20	43.21	54.00	-10.79
2390.00	Peak	53.36	0.20	53.56	74.00	-20.44

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

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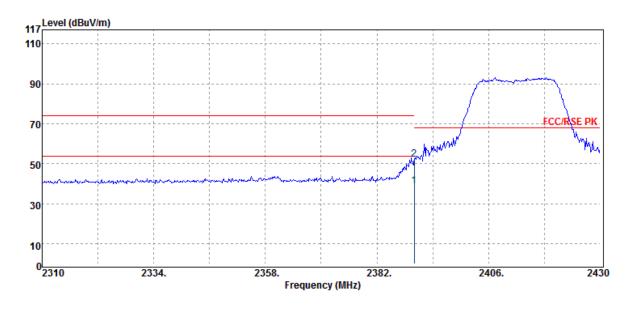


**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20 :2412 MHz :Bandedge CH LOW :H Plane

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

:2018-07-06 :23 deg\_C / 61 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	38.82	0.20	39.02	54.00	-14.98
2390.00	Peak	52.16	0.20	52.36	74.00	-21.64

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

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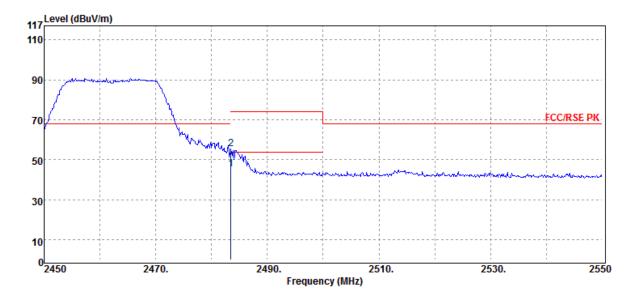


**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20 :2462 MHz :Bandedge CH HIGH :H Plane

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

:2018-07-06 :23 deg\_C / 61 RH :VERTICAL



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Average	44.66	0.53	45.19	54.00	-8.81
2483.50	Peak	54.87	0.53	55.40	74.00	-18.60

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

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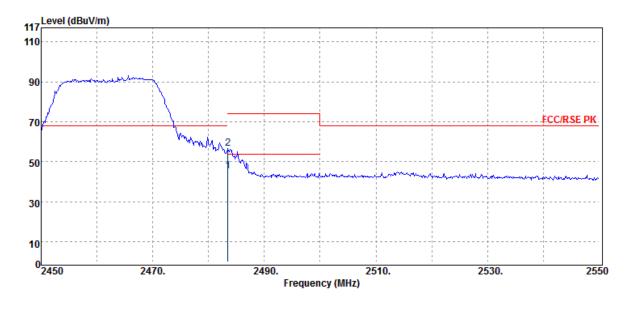


**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11n20 :2462 MHz :Bandedge CH HIGH :H Plane

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

:2018-07-06 :23 deg\_C / 61 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
2483.50	Average	45.00	0.53	45.53	54.00	-8.47
2483.50	Peak	56.22	0.53	56.75	74.00	-17.25

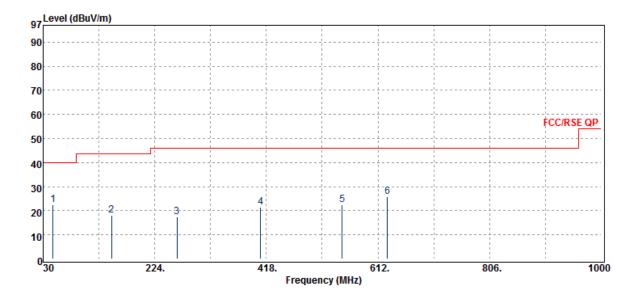
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



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

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

Operation Band:802.11gTest DateFundamental Frequency:2437 MHzTemp./Humi.Operation Mode:Tx CH MIDEngineerEUT Pol.:H PlaneMeasurement Antenna	:23 deg_C / 61 RH :Tin Pol. :VERTICAL
EUT POI. In Plane Measurement Antenna	POI. VERTICAL



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
47.46	Peak	30.78	-8.31	22.47	40.00	-17.53
149.31	Peak	26.66	-8.67	17.99	43.50	-25.51
262.80	Peak	26.17	-8.60	17.57	46.00	-28.43
408.30	Peak	26.75	-5.24	21.51	46.00	-24.49
549.92	Peak	26.15	-3.60	22.55	46.00	-23.45
628.49	Peak	28.03	-2.26	25.77	46.00	-20.23

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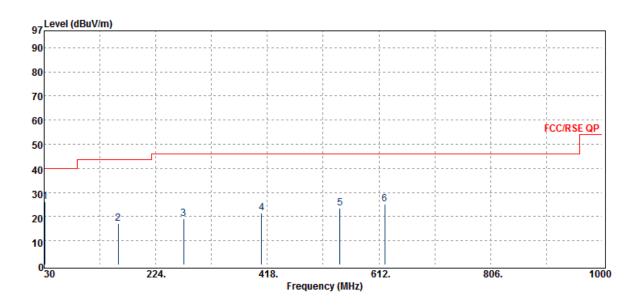
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**Operation Band** :802.11g Test Date Fundamental Frequency :2437 MHz **Operation Mode** :Tx CH MID Engineer EUT Pol. :H Plane

Temp./Humi. Measurement Antenna Pol.

:2018-07-09 :23 deg\_C / 61 RH :Tin :HORIZONTAL



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
31.94	Peak	35.55	-9.45	26.10	40.00	-13.90
159.01	Peak	25.67	-8.48	17.19	43.50	-26.31
272.50	Peak	27.33	-8.24	19.09	46.00	-26.91
408.30	Peak	26.65	-5.24	21.41	46.00	-24.59
544.10	Peak	27.11	-3.69	23.42	46.00	-22.58
621.70	Peak	27.47	-2.31	25.16	46.00	-20.84

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



### Above 1GHz Data:

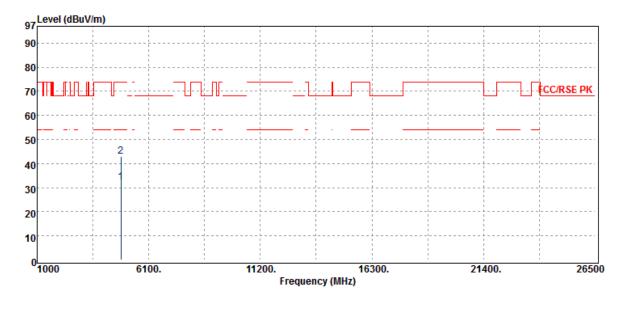
### Radiated Spurious Emission Measurement Result (802.11 b)

**Operation Band Fundamental Frequency** Operation Mode EUT Pol.

:802.11b :2412 MHz :Tx CH LOW :H Plane

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

:2018-07-06 :23 deg\_C / 61 RH :Tin :VERTICAL



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Average	24.86	7.35	32.21	54.00	-21.79
4824.00	Peak	35.47	7.35	42.82	74.00	-31.18

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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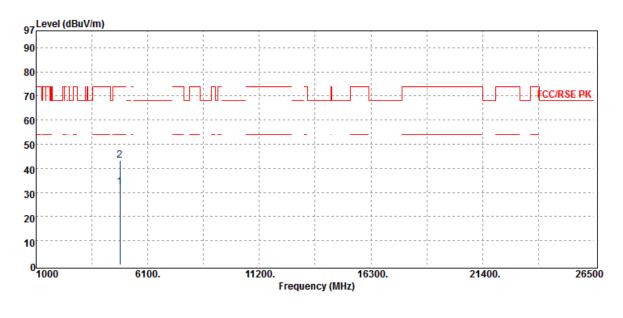
Report No.:ER/2018/70017 Page 57 of 78



Operation Band	:802.11b
Fundamental Frequency	:2412 MHz
Operation Mode	:Tx CH LOW
EUT Pol.	:H Plane

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

:2018-07-06 :23 deg\_C / 61 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
4824.00	Average	24.91	7.35	32.26	54.00	-21.74
4824.00	Peak	35.83	7.35	43.18	74.00	-30.82

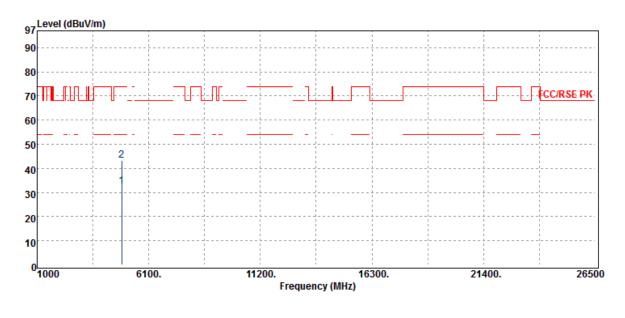
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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Operation Band	:802.11b	Test Date
Fundamental Frequency	:2437 MHz	Temp./Humi.
Operation Mode	:Tx CH MID	Engineer
EUT Pol.	:H Plane	Measurement Antenna Pol.

:2018-07-06 :23 deg\_C / 61 RH :Tin :VERTICAL



Detector	Spectrum	Factor	Actual	Limit	Margin
Mode	Reading Level		FS	@3m	
PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
Average	24.77	7.62	32.39	54.00	-21.61
Peak	35.54	7.62	43.16	74.00	-30.84
	Mode PK/QP/AV Average	ModeReading LevelPK/QP/AVdBµVAverage24.77	ModeReading LevelPK/QP/AVdBµVdBAverage24.777.62	ModeReading LevelFSPK/QP/AVdBµVdBdBµV/mAverage24.777.6232.39	Mode         Reading Level         FS         @3m           PK/QP/AV         dBμV         dB         dBμV/m         dBμV/m           Average         24.77         7.62         32.39         54.00

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

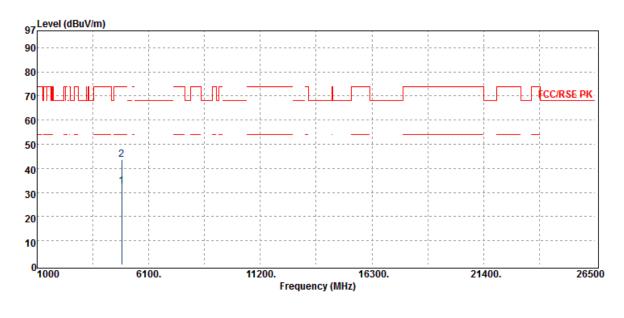
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Operation Band	:802.11b
Fundamental Frequency	:2437 MHz
Operation Mode	:Tx CH MID
EUT Pol.	:H Plane

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

:2018-07-06 :23 deg\_C / 61 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
4874.00	Average	24.86	7.62	32.48	54.00	-21.52
4874.00	Peak	35.96	7.62	43.58	74.00	-30.42

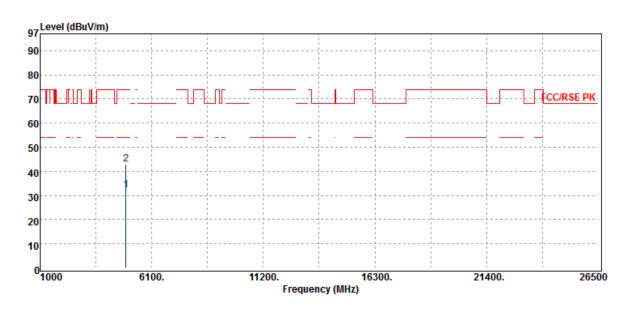
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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**Operation Band** :802.11b Fundamental Frequency :2462 MHz **Operation Mode** :Tx CH HIGH EUT Pol. :H Plane

Test Date :2018-07-06 Temp./Humi. :23 deg\_C / 61 RH Engineer :Tin :VERTICAL Measurement Antenna Pol.



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	24.80	7.59	32.39	54.00	-21.61
4924.00	Peak	35.22	7.59	42.81	74.00	-31.19

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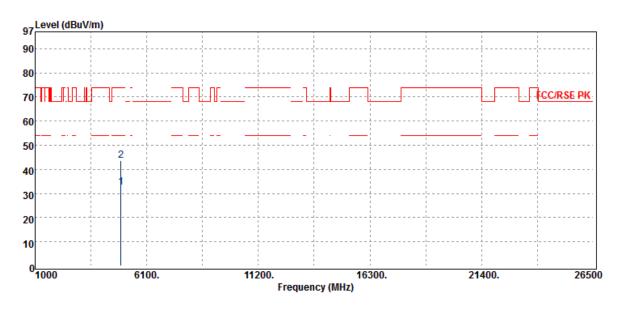
Report No.:ER/2018/70017 Page 61 of 78



**Operation Band** :802.11b Fundamental Frequency :2462 MHz **Operation Mode** :Tx CH HIGH EUT Pol. :H Plane

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

:2018-07-06 :23 deg\_C / 61 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
4924.00	Average	24.90	7.59	32.49	54.00	-21.51
4924.00	Peak	36.17	7.59	43.76	74.00	-30.24

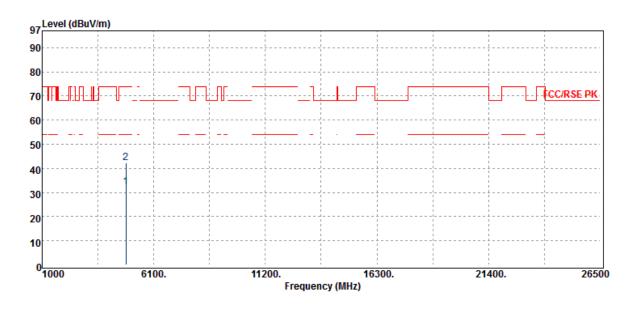
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#### Radiated Spurious Emission Measurement Result (802.11 g)

Operation Band	:802.11g	Test Date	:2018-07-06
Fundamental Frequency	:2412 MHz	Temp./Humi.	:23 deg_C / 61 RH
Operation Mode	:Tx CH LOW	Engineer	:Tin
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



Detector	Spectrum	Factor	Actual	Limit	Margin
Mode	Reading Level		FS	@3m	
PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
Average	24.91	7.35	32.26	54.00	-21.74
Peak	34.86	7.35	42.21	74.00	-31.79
	Mode PK/QP/AV Average	ModeReading LevelPK/QP/AVdBµVAverage24.91	ModeReading LevelPK/QP/AVdBµVdBAverage24.917.35	ModeReading LevelFSPK/QP/AVdBµVdBdBµV/mAverage24.917.3532.26	Mode         Reading Level         FS         @3m           PK/QP/AV         dBμV         dB         dBμV/m         dBμV/m           Average         24.91         7.35         32.26         54.00

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.

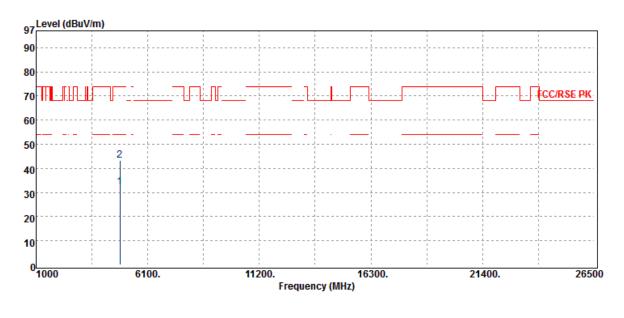
Report No.:ER/2018/70017 Page 63 of 78



Operation Band	:802.11g
Fundamental Frequency	:2412 MHz
Operation Mode	:Tx CH LOW
EUT Pol.	:H Plane

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

:2018-07-06 :23 deg\_C / 61 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
4824.00	Average	25.02	7.35	32.37	54.00	-21.63
4824.00	Peak	35.97	7.35	43.32	74.00	-30.68

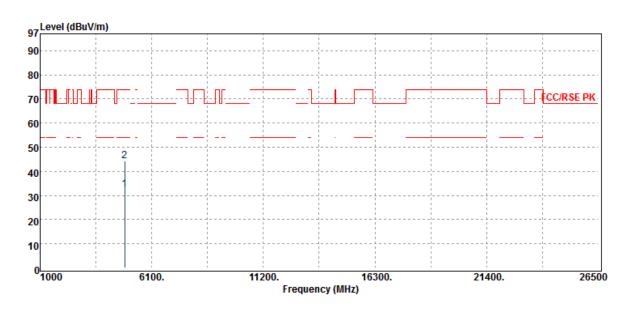
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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

Test Date :2018-07-06 Temp./Humi. :23 deg\_C / 61 RH Engineer :Tin :VERTICAL Measurement Antenna Pol.



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	-
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	24.84	7.62	32.46	54.00	-21.54
4874.00	Peak	36.72	7.62	44.34	74.00	-29.66

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.

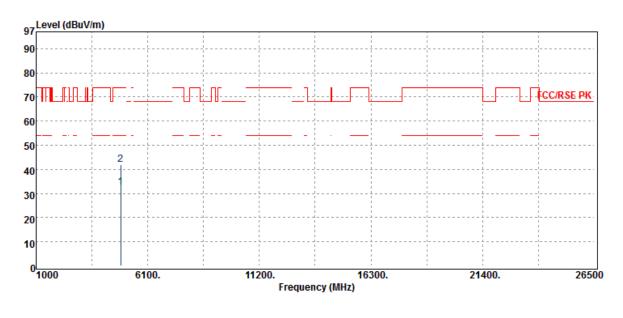
Report No.:ER/2018/70017 Page 65 of 78



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

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

:2018-07-06 :23 deg\_C / 61 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
4874.00	Average	24.92	7.62	32.54	54.00	-21.46
4874.00	Peak	34.37	7.62	41.99	74.00	-32.01

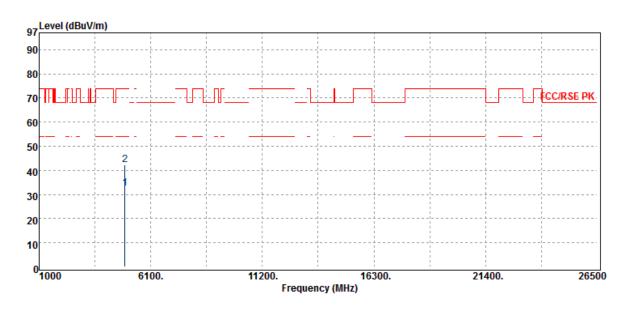
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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**Operation Band** :802.11g Fundamental Frequency :2462 MHz **Operation Mode** :Tx CH HIGH EUT Pol. :H Plane

Test Date :2018-07-06 Temp./Humi. :23 deg\_C / 61 RH Engineer :Tin :VERTICAL Measurement Antenna Pol.



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	24.85	7.59	32.44	54.00	-21.56
4924.00	Peak	34.76	7.59	42.35	74.00	-31.65

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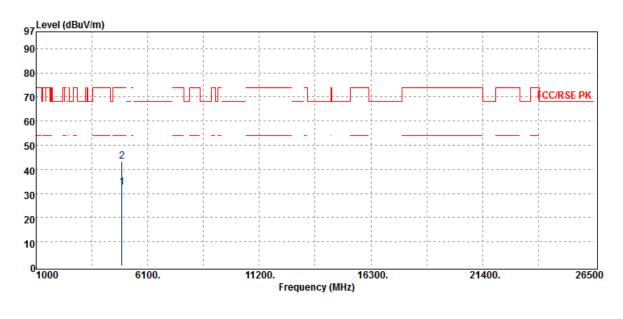
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**Operation Band** :802.11g Fundamental Frequency :2462 MHz **Operation Mode** :Tx CH HIGH EUT Pol. :H Plane

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

:2018-07-06 :23 deg\_C / 61 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
4924.00	Average	24.92	7.59	32.51	54.00	-21.49
4924.00	Peak	35.83	7.59	43.42	74.00	-30.58

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.



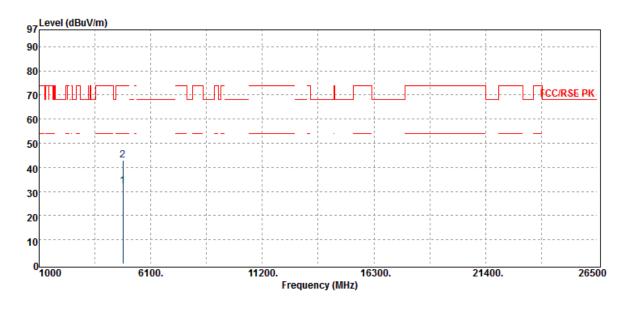
#### Radiated Spurious Emission Measurement Result (802.11n\_HT20)

Operation Band
<b>Fundamental Frequency</b>
Operation Mode
EUT Pol.

:802.11n20 :2412 MHz :Tx CH LOW :H Plane

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

:2018-07-06 :23 deg\_C / 61 RH :Tin :VERTICAL



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Average	24.88	7.35	32.23	54.00	-21.77
4824.00	Peak	35.54	7.35	42.89	74.00	-31.11

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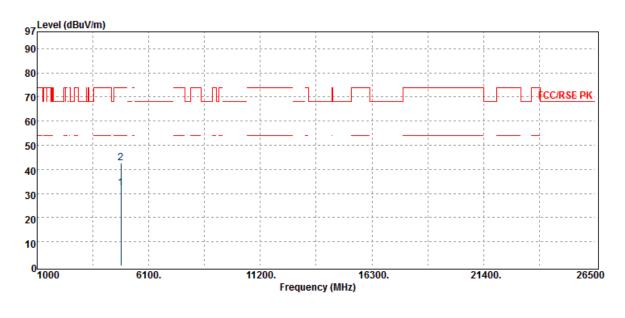
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**Operation Band** :802.11n20 Fundamental Frequency :2412 MHz **Operation Mode** :Tx CH LOW EUT Pol. :H Plane

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

:2018-07-06 :23 deg\_C / 61 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
4824.00	Average	24.99	7.35	32.34	54.00	-21.66
4824.00	Peak	35.26	7.35	42.61	74.00	-31.39

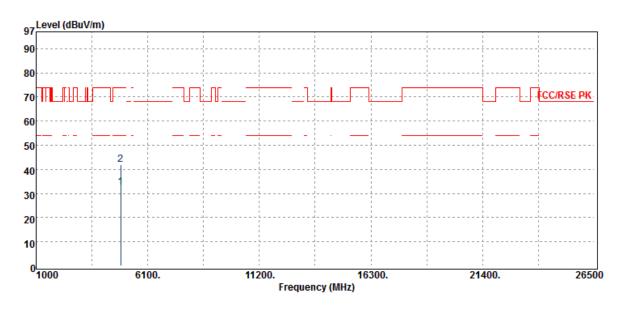
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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**Operation Band** :802.11n20 Test Date Fundamental Frequency :2437 MHz Temp./Humi. **Operation Mode** :Tx CH MID Engineer EUT Pol. :H Plane Measurement Antenna Pol.

:2018-07-06 :23 deg\_C / 61 RH :Tin :VERTICAL



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	_
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Average	24.79	7.62	32.41	54.00	-21.59
4874.00	Peak	34.47	7.62	42.09	74.00	-31.91

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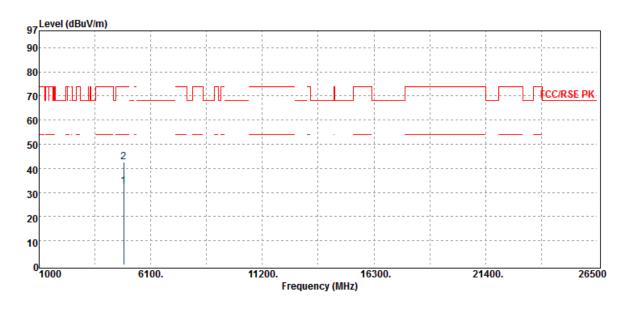
Report No.:ER/2018/70017 Page 71 of 78



**Operation Band** :802.11n20 Fundamental Frequency :2437 MHz **Operation Mode** :Tx CH MID EUT Pol. :H Plane

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

:2018-07-06 :23 deg\_C / 61 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
4874.00	Average	24.89	7.62	32.51	54.00	-21.49
4874.00	Peak	35.07	7.62	42.69	74.00	-31.31

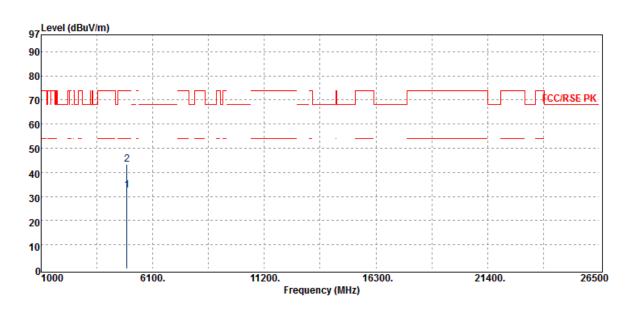
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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**Operation Band** :802.11n20 Fundamental Frequency :2462 MHz **Operation Mode** :Tx CH HIGH EUT Pol. :H Plane

Test Date :2018-07-06 Temp./Humi. :23 deg\_C / 61 RH Engineer :Tin :VERTICAL Measurement Antenna Pol.



Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Average	24.84	7.59	32.43	54.00	-21.57
4924.00	Peak	35.69	7.59	43.28	74.00	-30.72

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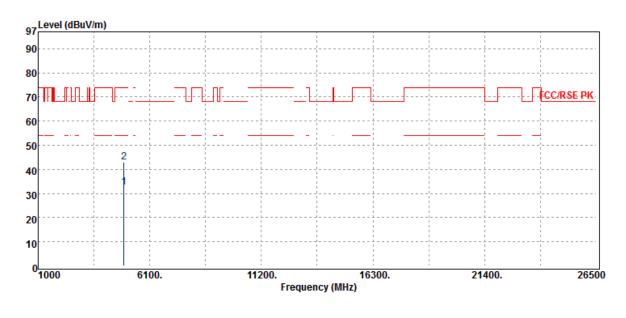
Report No.:ER/2018/70017 Page 73 of 78



**Operation Band** :802.11n20 Fundamental Frequency :2462 MHz **Operation Mode** :Tx CH HIGH EUT Pol. :H Plane

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

:2018-07-06 :23 deg\_C / 61 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
4924.00	Average	25.05	7.59	32.64	54.00	-21.36
4924.00	Peak	35.34	7.59	42.93	74.00	-31.07

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# 12 PEAK POWER SPECTRAL DENSITY

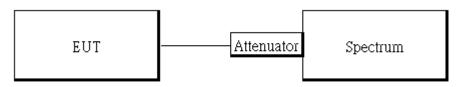
# 12.1 Standard Applicable

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

## 12.2 Measurement Equipment Used

Conducted Emission Test Site							
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.		
EXA Spectrum Analyzer	Agilent	N9010A	MY57120290	2018/02/14	2019/02/13		
Attenuator	Mini-Circuit	BW-S10W2+	2	2018/01/02	2019/01/01		
DC Power Supply	Anritsu	E3640A	MY40000811	2017/12/18	2018/12/17		

## 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 & ANSI C63.10.
- 3. Set the span to 1.5 times the DTS channel bandwidth.
- 4. Set the RBW = 3 kHz. & the VBW = 10 kHz
- 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				POWER DENSITY 802.11g			
Freq.	PPSD	Limit	Result	Freq.	PPSD	Limit	Decult
(MHz)	(dBm)	(dBm)	Result	(MHz)	(dBm)	(dBm)	Result
2412	-7.48	8.00	PASS	2412	-15.79	8.00	PASS
2437	-7.06	8.00	PASS	2437	-15.63	8.00	PASS
2462	-8.65	8.00	PASS	2462	-15.70	8.00	PASS

POWER DENSITY 802.11n HT20						
Freq.	PPSD	Limit	Result			
(MHz)	(dBm)	(dBm)	Result			
2412	-15.60	8.00	PASS			
2437	-15.72	8.00	PASS			
2462	-15.67	8.00	PASS			

dB for SISO mode offset 11.00

\*Refer to next page for plots

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



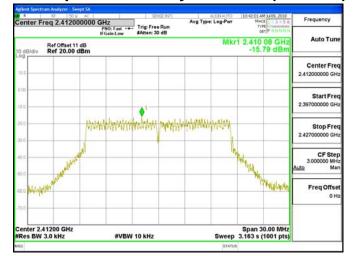
# Power Spectral Density Test Plot (CH-Mid)



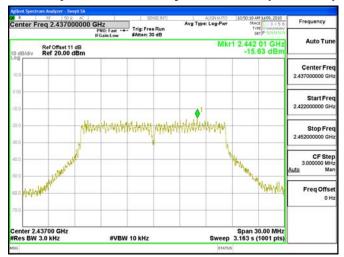
# Power Spectral Density Test Plot (CH-High)



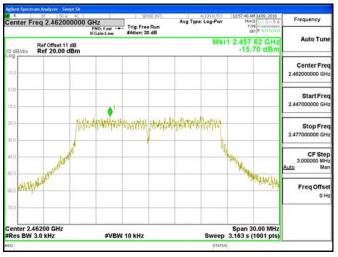
# 802.11g Power Spectral Density Test Plot (CH-Low)



## **Power Spectral Density Test Plot (CH-Mid)**



# Power Spectral Density Test Plot (CH-High)



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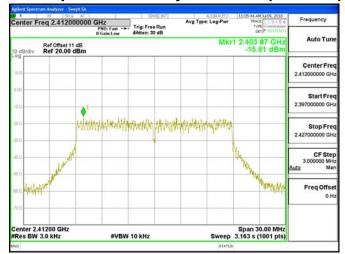
台灣檢驗科技股份有限公司

f (886-2) 2298-0488

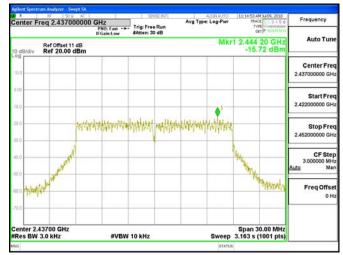
www.tw.sgs.com



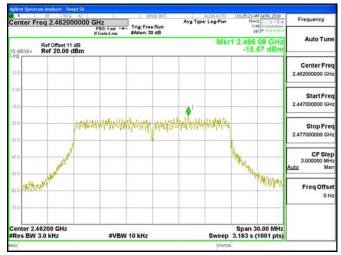
### 802.11n\_HT20 **Power Spectral Density Test Plot (CH-Low)**



# **Power Spectral Density Test Plot (CH-Mid)**



# 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 and has no consideration of replacement. Please see EUT photo for details.

~ End of Report ~

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