

# **FCC Test Report**

Report No.: AGC02031180502TE05

**FCC ID** : 2AG94-C-8087

**APPLICATION PURPOSE**: Original Equipment

**PRODUCT DESIGNATION**: WIFI Module

**BRAND NAME** : C-CHIP

MODEL NAME : C-8087

**CLIENT** : Shenzhenshi Xinzhongxin Technology Co., Ltd

**DATE OF ISSUE** : Jun. 01, 2018

STANDARD(S)

TEST PROCEDURE(S) : FCC Part 15.247

**REPORT VERSION**: V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

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## REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	TO W	Jun. 01, 2018	Valid	Initial Release

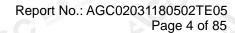
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## 1. VERIFICATION OF CONFORMITY

1162					
Applicant	Shenzhenshi Xinzhongxin Technology Co., Ltd				
Address	Block A3, Dong Huan Industrial Zone, Nanpu Road, Shajin Street, Baoan District, Shenzhen, China				
Manufacturer	Shenzhenshi Xinzhongxin Technology Co., Ltd				
Address	Block A3, Dong Huan Industrial Zone, Nanpu Road, Shajin Street, Baoan District, Shenzhen, China				
Product Designation	WIFI Module				
Brand Name	C-CHIP				
Test Model	C-8087				
Date of test	May 25, 2018 to Jun. 01, 2018				
Deviation	None				
Condition of Test Sample	Normal				
Test Result	Pass & Marian Company of the Company				
Report Template	AGCRT-US-BGN/RF				

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. 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 radiated emission limits of FCC Rules Part 15.247.

Tested By		Max 2ha	
GG Manager 1	Max Zh	nang(Zhang Yi)	Jun. 01, 2018
Reviewed By		Bore xie	
and the state of t	Bart Xi	e(Xie Xiaobin)	Jun. 01, 2018
Approved By		Foresto ce	The state of the s
(Compared Compared Co		ei(Lei Yonggang) orized Officer	Jun. 01, 2018

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## 2. GENERAL INFORMATION

## 2.1. PRODUCT DESCRIPTION

The EUT is designed as "WIFI Module". It is designed by way of utilizing the DSSS and OFDM technology to achieve the system operation.

A major technical description of EUT is described as following

7111ajor teorinical accomption	Total to decombed do following
Operation Frequency	2.412 GHz~2.462GHz
Output Power(Average)	IEEE 802.11b:16.81dBm; IEEE 802.11g:13.78dBm; IEEE 802.11n(20):13.42dBm; IEEE 802.11n(40):9.61dBm
Modulation	DSSS(DBPSK/DQPSK/CCK);OFDM(BPSK/QPSK/16-QAM/64-QAM)
Number of channels	11
Hardware Version	V1.2
Software Version	V1.2
Antenna Designation	PCB antenna
Antenna Gain	0dBi
Power Supply	DC 3.3V

## 2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
S S Andrew Company Com	CC 100	2412 MHZ
CO	2	2417 MHZ
	3 4 7 7 7	2422 MHZ
The Miles Complained (Complained Complained	C 4 manufacture C C 4	2427 MHZ
C Market CO	5	2432 MHZ
2400~2483.5MHZ	<b>1</b> 6	2437 MHZ
The Third Company	7 State Comment of the State of Comment of Co	2442 MHZ
A Standard Complement	8	2447 MHZ
100 FG	9	2452 MHZ
111	10	2457 MHZ
The Compliance @ # 1 not	11	2462 MHZ

Note: For 20MHZ bandwidth system use Channel 1 to Channel 11, For 40MHZ bandwidth system use Channel 3 to Channel 9

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## 2.3. IEEE 802.11N MODULATION SCHEME

MCS Index	Nss	Modulation	R	NBPSC	NCBPS NDBPS		BPS	Data rate(Mbps) 800nsGl		
d					20MHz	40MHz	20MHz	40MHz	20MHz	40MHz
0	1	BPSK	1/2	1 玩	52	108	26	54	6.5	13.5
1	Cont liance	QPSK	1/2	2	104	216	52	108	13.0	27.0
2	1 8	QPSK	3/4	2	104	216	78	162	19.5	40.5
3	(1)	16-QAM	1/2	4	208	432	104	216	26.0	54.0
4	1	16-QAM	3/4	4 %	208	432	156	324	39.0	81.0
5	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	64-QAM	2/3	6	312	648	208	432	52.0	108.0
6	1	64-QAM	3/4	6	312	648	234	489	58.5	121.5
7	1	64-QAM	5/6	6	312	648	260	540	65.0	135.0

Symbol	Explanation	
NSS	Number of spatial streams	
R	Code rate	
NBPSC	Number of coded bits per single carrier	
NCBPS	Number of coded bits per symbol	
NDBPS	Number of data bits per symbol	
GI A TANAMAN CONTRACTOR OF THE PARTY OF THE	Guard interval	

## 2.4. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID**: **2AG94-C-8087** filing to comply with the FCC Part 15 requirements.

## 2.5. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013). Radiated testing was performed at an antenna to EUT distance 3 meters.

## 2.6. SPECIAL ACCESSORIES

Refer to section 5.2.

## 2.7. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

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## 3. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the "Guide to the Expression of Uncertainty in measurement" (GUM) published by CISPR and ANSI.

- Uncertainty of Conducted Emission, Uc = ±3.2 dB
- Uncertainty of Radiated Emission below 1GHz, Uc = ±3.9 dB
- Uncertainty of Radiated Emission above 1GHz, Uc = ±4.8 dB

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## 4. DESCRIPTION OF TEST MODES

NO.		TEST MODE DESCRIPTION	N	
Kan All All	(S) A state of colors	Low channel TX	~GC *	100
2	The standard of the standard o	Middle channel TX		授加。
3	P.D.	High channel TX	The Manager State of	(a) All All Control Control
4	· · · · · · · · · · · · · · · · · · ·	Normal operating	The station of Globa	10 m

#### Note:

Transmit by 802.11b with Date rate (1/2/5.5/11)

Transmit by 802.11g with Date rate (6/9/12/18/24/36/48/54)

Transmit by 802.11n (20MHz) with Date rate (6.5/13/19.5/26/39/52/58.5/65)

Transmit by 802.11n (40MHz) with Date rate (13.5/27/40.5/54/81/108/121.5/135)

#### Note:

- The EUT has been set to operate continuously on the lowest, middle and highest operation frequency Individually, and the eut is operating at its maximum duty cycle>or equal 98%
- All modes under which configure applicable have been tested and the worst mode test data recording in the test report, if no other mode data.
- 3. For Radiated Emission, 3axis were chosen for testing for each applicable mode.

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## 5. SYSTEM TEST CONFIGURATION

## **5.1. CONFIGURATION OF EUT SYSTEM**

	EUT	Support
1		

#### **5.2. EQUIPMENT USED IN EUT SYSTEM**

Item	Equipment	Model No.	ID or Specification	Remark
1 8	WIFI Module	C-8087	2AG94-C-8087	EUT
2	PC Adapter	ADC6501TM	N/A	Support
3	PC	161301-01	N/A	Support

## **5.3. SUMMARY OF TEST RESULTS**

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.247	Output Power	Compliant
§15.247	6 dB Bandwidth	Compliant
§15.247	Conducted Spurious Emission	Compliant
§15.247	Maximum Conducted Output Power SPECTRAL Density	Compliant
§15.209	Radiated Emission	Compliant
§15.247	Band Edges	Compliant
§15.207	Line Conduction Emission	Compliant

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## 6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd			
Location	1-2F., Bldg.2, No.1-4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang, Bao'an District B112-B113, Bldg.12, Baoan Bldg Materials Center, No.1 of Xixiang Inner Ring Road, Baoan District, Shenzhen 518012			
NVLAP LAB CODE	600153-0			
Designation Number	CN5028			
FCC Test Firm Registration Number	682566			
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by National Voluntary Laboratory Accreditation program, NVLAP Code 600153-0			

## TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	M ESPI	101206	Jun.20, 2017	Jun.19, 2018
LISN	R&S	ESH2-Z5	100086	Aug.21, 2017	Aug.20, 2018

## **TEST EQUIPMENT OF RADIATED EMISSION TEST**

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Jun.20, 2017	Jun.19, 2018
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec.08, 2017	Dec.07, 2018
Power sensor	Aglient	U2021XA	MY54110007	Sep.21, 2017	Sep.20, 2018
2.4GHz Fliter	Micro-tronics	087	N/A	Jun. 20, 2017	Jun. 19, 2018
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep.20, 2017	Sep.19, 2018
preamplifier	ChengYi	EMC184045SE	980508	Sep.15, 2017	Sep.14, 2018
Active loop antenna (9K-30MHz)	A.H.	SAS-562B	N/A	Mar.01, 2018	Feb.28, 2020
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May.18, 2017	May.17, 2019
Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-205	Jun.20, 2017	Jun.19, 2018
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep.28, 2017	Sep.27, 2018

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## 7. OUTPUT POWER

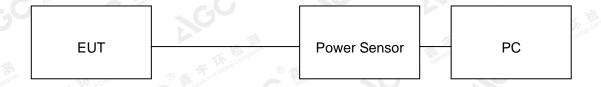
## 7.1. MEASUREMENT PROCEDURE

For average power test:

- 1. Connect EUT RF output port to power sensor through an RF attenuator.
- 2. Connect the power sensor to the PC.
- 3. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 4. Record the maximum power from the software.

**Note**: The EUT was tested according to ANSI C63.10 (2013) for compliance to FCC 47CFR 15.247 requirements.

# 7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) AVERAGE POWER SETUP



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## 7.3. LIMITS AND MEASUREMENT RESULT

TEST ITEM	OUTPUT POWER	200	100°	Co
TEST MODE	802.11b with data rate 1		·mi	The filling

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.412	16.54	30	Pass
2.437	16.72	30	Pass
2.462	16.81	30	Pass

TEST ITEM	OUTPUT POWER	® Milestation of Globas	® Attestation of Co.	100
TEST MODE	802.11g with data rate 6	GO 70		:10

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.412	13.45	30	Pass
2.437	13.52	30	Pass
2.462	13.78	30	Pass

TEST ITEM	OUTPUT POWER	-till	THE
TEST MODE	802.11n 20 with data rate 6.5	The Sabar Compliance	® ### Colored Colored

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.412	13.16	30	Pass
2.437	13.25	30	Pass
2.462	13.42	30	Pass

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TEST ITEM	OUTPUT POWER	® Franklion of Clobal	(S) Mary and Global Const	© Attestation of C
TEST MODE	802.11n 40 with data rate 13.5	30 , 0		

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.422	9.12	30	Pass
2.437	9.28	30	Pass
2.452	9.61	30	Pass

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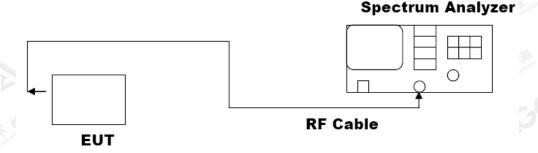
## 8. 6 DB BANDWIDTH

## **8.1. MEASUREMENT PROCEDURE**

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 3. Set SPA Centre Frequency = Operation Frequency, RBW= 100 KHz, VBW ≥ 3×RBW.
- 4. Set SPA Trace 1 Max hold, then View.

**Note:** The EUT was tested according to ANSI C63.10 (2013) for compliance to FCC 47CFR 15.247 requirements.

## 8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



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## 8.3. LIMITS AND MEASUREMENT RESULTS

TEST ITEM	6DB BANDWIDTH	(8) Attestation of Give	® Milestation of Globs	(S) Attestation of Attestation of
TEST MODE	802.11b with data rate 11	0 1	30	O min

	LIMITS AND MEAS	SUREMENT RESULT		
Applicable Limits				
Applicable Limits	Test Da	Criteria		
CO	Low Channel	10.06	PASS	
>500KHZ	Middle Channel	10.06	PASS	
® # Gobal Cook	High Channel	10.05	PASS	

TEST ITEM	6DB BANDWIDTH	(8) Allestation of Co.	EG Mesullon	C
TEST MODE	802.11g with data rate 54			

LIMITS AND MEASUREMENT RESULT				
Annicola Limite		Applicable Limits		
Applicable Limits	Test Data (MHz) Criteria			
S	Low Channel	16.38	PASS	
>500KHZ	Middle Channel	16.38	PASS	
8 Franklin of Gobal Co.	High Channel	16.38	PASS	

TEST ITEM	6DB BANDWIDTH	Jation of Global	(8) Allestation of Const	CO	NO
TEST MODE	802.11n 20 with data rate 6	35			玉

LIMITS AND MEASUREMENT RESULT						
Applicable Limits						
Applicable Limits	Test Dat	Criteria				
	Low Channel	17.58	PASS			
>500KHZ	Middle Channel	17.58	PASS			
3 char Compani	High Channel	17.57	PASS			

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TEST ITEM	6DB BANDWIDTH	© Management Clobal Control	® # John of Clobal Com	© Milestation of Co
TEST MODE	802.11n 40 with data rate 135			

	LIMITS AND MEASURE	MENT RESULT		
Applicable Limits				
Applicable Limits	Test Data (MHz)		Criteria	
Allow Allows	Low Channel	35.41	PASS	
>500KHZ	Middle Channel	35.40	PASS	
	High Channel	35.39	PASS	

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## 802.11b TEST RESULT TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



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#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



# 802.11g TEST RESULT TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



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#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



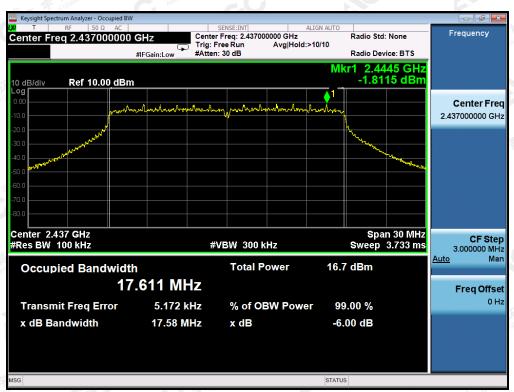
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# 802.11n (20) TEST RESULT TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



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#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



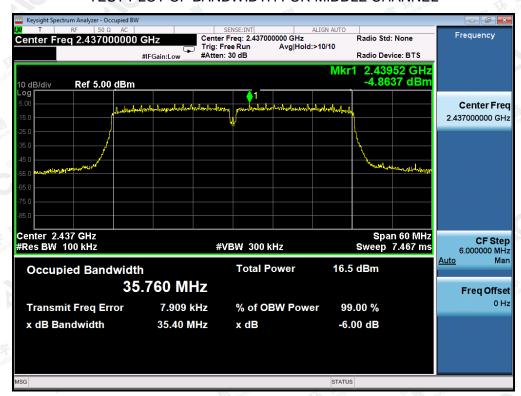
802.11n (40) TEST RESULT
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



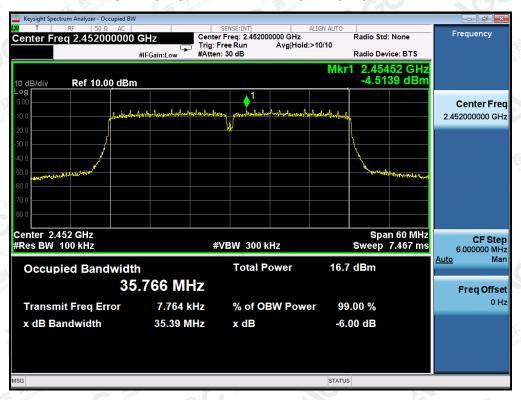
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#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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## 9. CONDUCTED SPURIOUS EMISSION

## 9.1. MEASUREMENT PROCEDURE

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2, Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 3. Set SPA Trace 1 Max hold, then View.

**Note:** The EUT was tested according to ANSI C63.10 (2013) for compliance to FCC 47CFR 15.247 requirements. Owing to satisfy the requirements of the number of measurement points, we set the RBW=1MHz, VBW>RBW, scan up through 10th harmonic, and consider the tested results as the worst case, if the tested results conform to the requirement, we can deem that the real tested results(set the RBW=100KHz, VBW>RBW) are conform to the requirement.

## 9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 8.2.

#### 9.3. MEASUREMENT EQUIPMENT USED

The same as described in section 6.

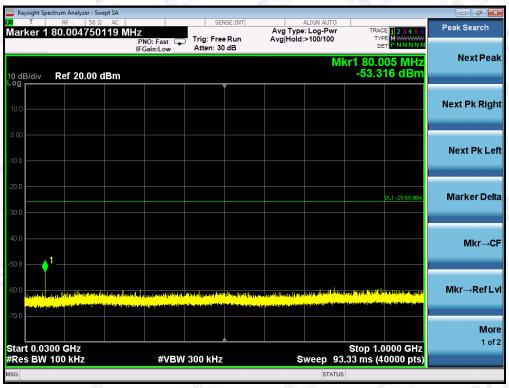
### 9.4. LIMITS AND MEASUREMENT RESULT

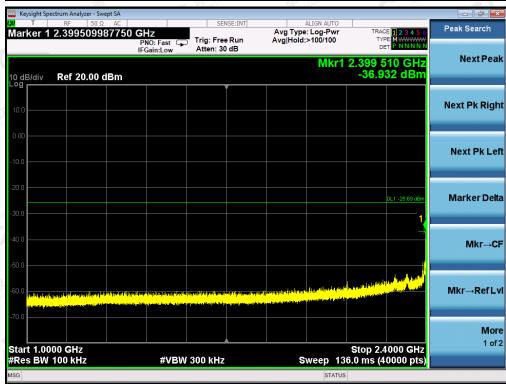
LIMITS AND MEASUREMENT RESULT				
Analizable Limite	Measurement Result			
Applicable Limits	Test Data	Criteria		
In any 100 KHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency	At least -30dBc than the limit Specified on the BOTTOM Channel	PASS		
power that is produce by the intentional radiator shall be at least 30 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power.  In addition, radiation 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))	At least -30dBc than the limit Specified on the TOP Channel	PASS		

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## TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE OF 802.11b FOR MODULATION IN LOW CHANNEL





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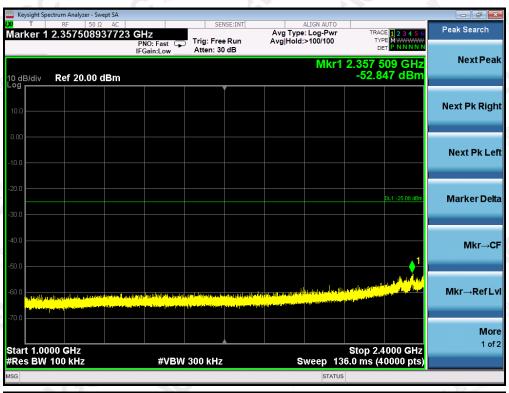


## TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE OF 802.11b FOR MODULATION IN MIDDLE CHANNEL



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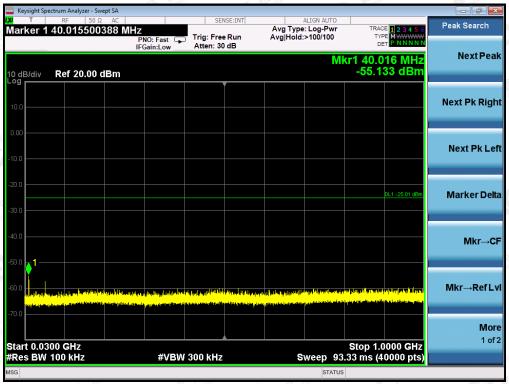


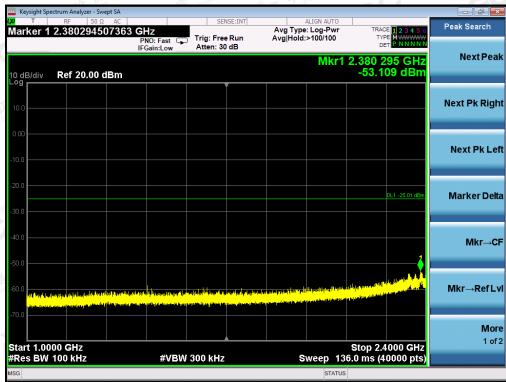


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## TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE OF 802.11b FOR MODULATION IN HIGH CHANNEL



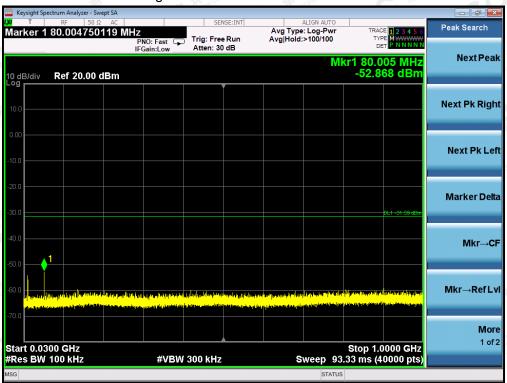


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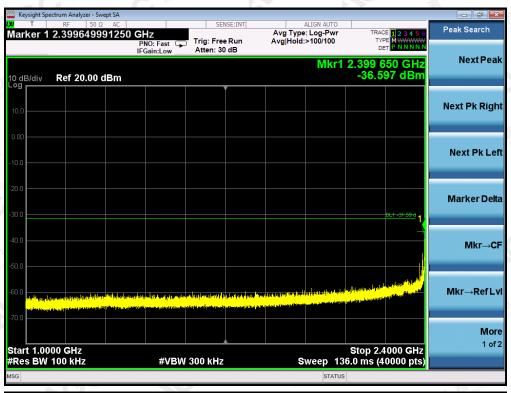


## TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE OF 802.11g FOR MODULATION IN LOW CHANNEL



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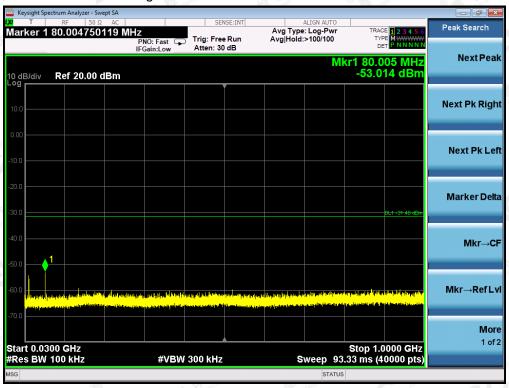


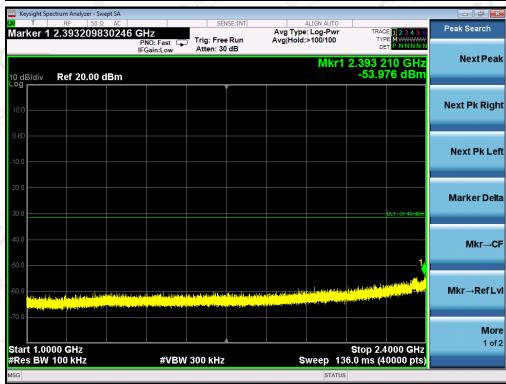


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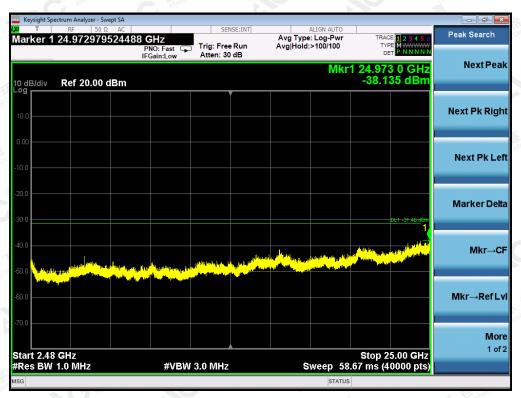
## TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE OF 802.11g FOR MODULATION IN MIDDLE CHANNEL



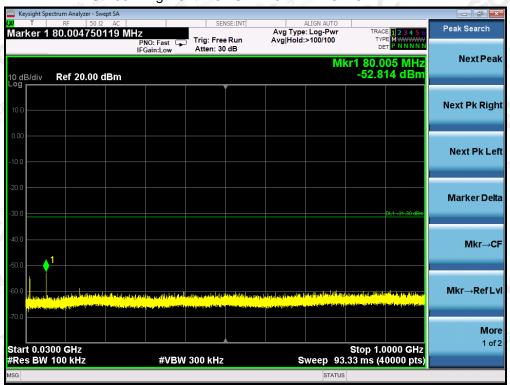


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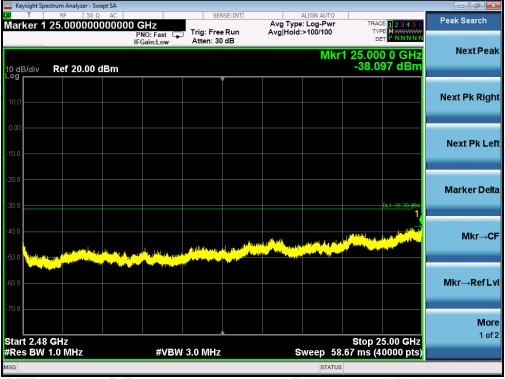
# TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE OF 802.11q FOR MODULATION IN HIGH CHANNEL



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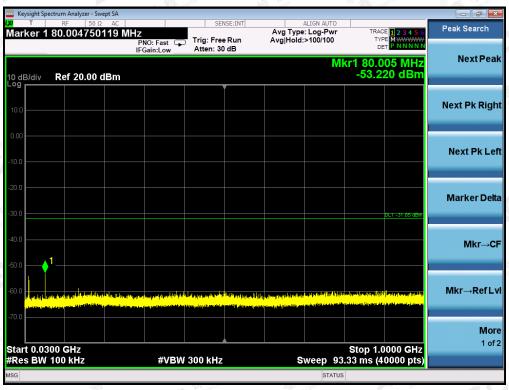


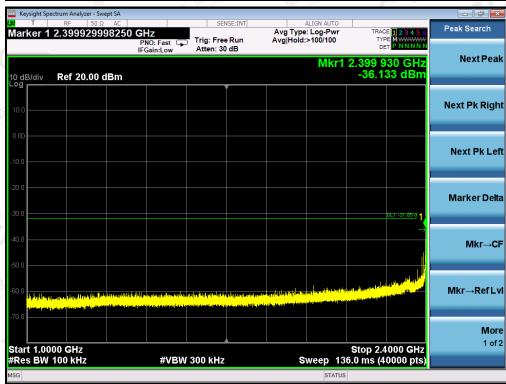


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## TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE OF 802.11n20 FOR MODULATION IN LOW CHANNEL



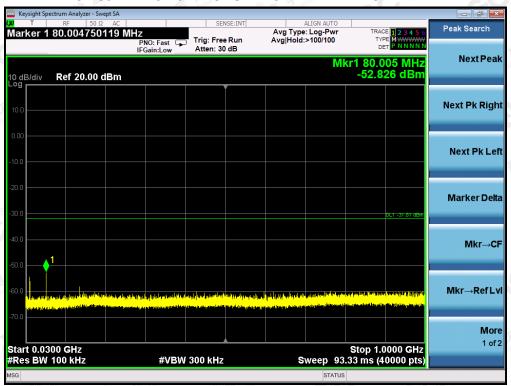


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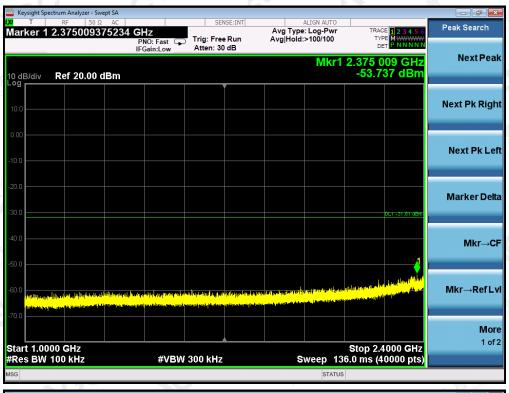


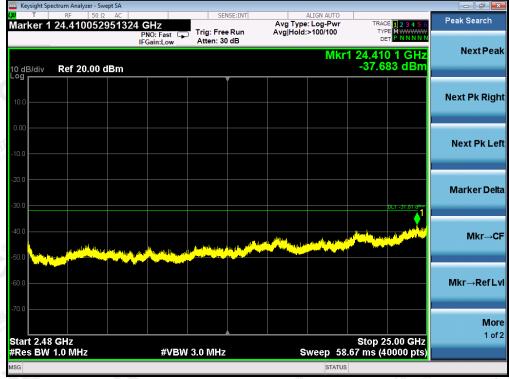
# TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE OF 802.11n20 FOR MODULATION IN MIDDLE CHANNEL



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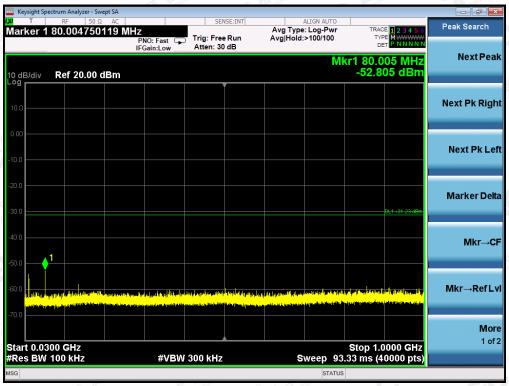


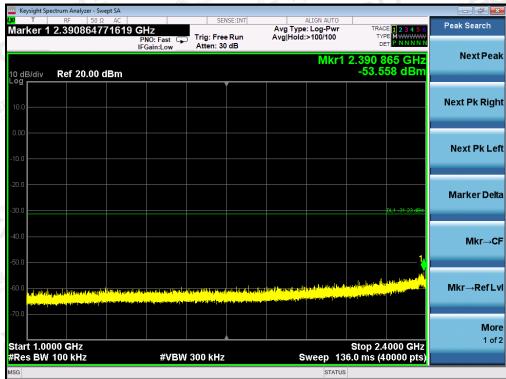


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## TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE OF 802.11n20 FOR MODULATION IN HIGH CHANNEL



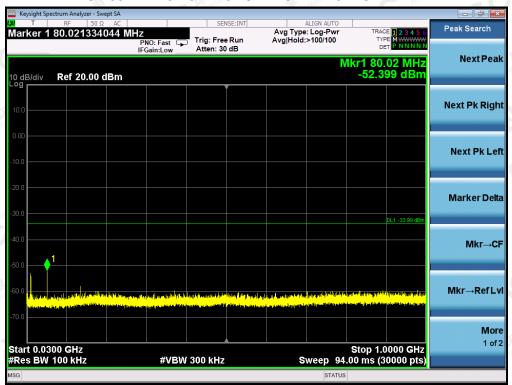


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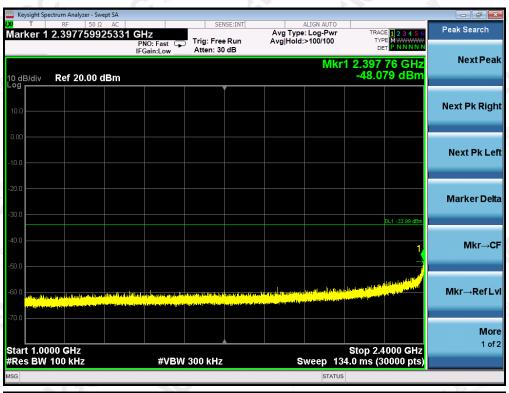


## TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE OF 802.11n40 FOR MODULATION IN LOW CHANNEL



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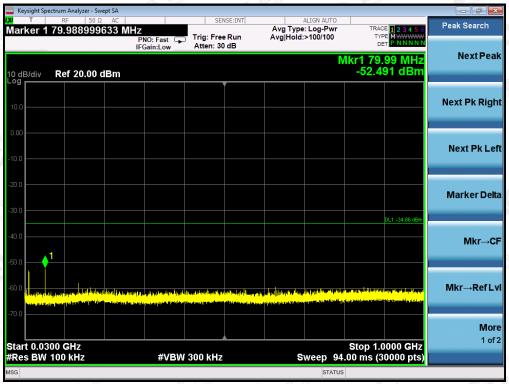


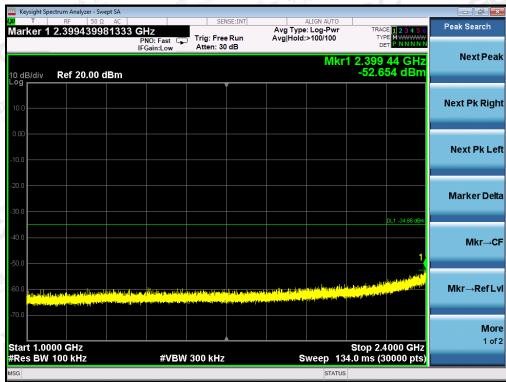


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## TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE OF 802.11n40 FOR MODULATION IN MIDDLE CHANNEL



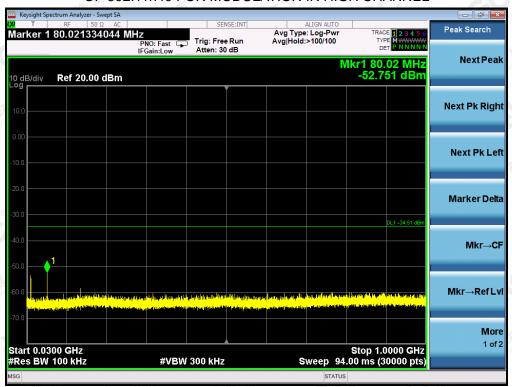


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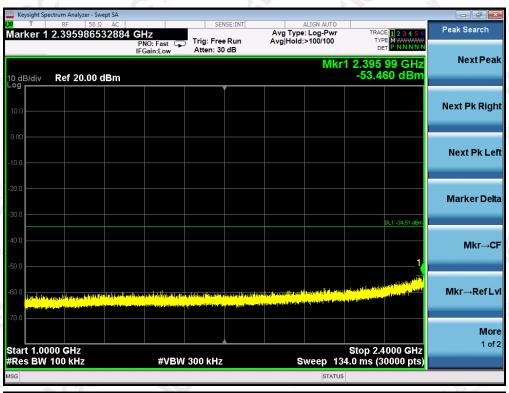


## TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE OF 802.11n40 FOR MODULATION IN HIGH CHANNEL



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## 10. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY

### 10.1 MEASUREMENT PROCEDURE

- (1). Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- (2). Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- (3). Set SPA Trace 1 Max hold, then View.

Note: The method of AVGPSD-1 in the ANSI C63.10 (2013) item 11.10 was used in this testing.

## 10.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

Refer To Section 8.2.

## **10.3 MEASUREMENT EQUIPMENT USED**

Refer To Section 6.

## **10.4 LIMITS AND MEASUREMENT RESULT**

TEST ITEM	POWER SPECTRAL DENSITY	TK 100 malanes	The Completion (8)
TEST MODE	802.11b with data rate 1	© Medalion of Cities C.C.	Ades Julion C

Channel No.	Power density (dBm/20kHz)	Limit (dBm/3kHz)	Result
Low Channel	0.667	6 8	Pass
Middle Channel	1.250	8	Pass
High Channel	0.044	8	Pass

TEST ITEM	POWER SPECTRAL DENSITY		
TEST MODE	802.11g with data rate 6	The Till	® # The of Codes Company

Channel No.	Power density (dBm/20kHz)	Limit (dBm/3kHz)	Result	
Low Channel	-6.770	The state of the s	Pass	
Middle Channel	-6.740	8	Pass	
High Channel	-6.525	8	Pass	

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TEST ITEM	POWER SPECTRAL DENSITY	The transfer of the same	The Tomplane	4 3
TEST MODE	802.11n 20 with data rate 6.5	@ Altestation of Gall	(8) Allestation of Glob	(S) Allestation of

Channel No.	Power density (dBm/20kHz)	Limit (dBm/3kHz)	Result	
Low Channel	-5.454	® # 8 CC	Pass	
Middle Channel	-7.117	8	Pass	
High Channel	-7.221	8	Pass	

TEST ITEM	POWER SPECTRAL DENSITY	C	:111
TEST MODE	802.11n 40 with data rate 13.5	The Complainte	The Separation of the Separati

Channel No.	Power density (dBm/20kHz)	Limit (dBm/3kHz)	Result
Low Channel	-9.911	8 F. J.	Pass
Middle Channel	-9.590	8	Pass
High Channel	-9.709	8	Pass

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## 802.11b TEST RESULT TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL



#### TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL



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