

# **FCC Test Report**

Report No.: AGC01559190903FE05

FCC ID	: 2AANZCAFE
APPLICATION PURPOSE	: Original Equipment
PRODUCT DESIGNATION	: Smart Coffee Maker
BRAND NAME	: Quirky
MODEL NAME	: QKY-CAFE-SLV, QKY-CAFE
APPLICANT	: DGL Group LTD.
DATE OF ISSUE	: Sep. 18, 2019
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	/	Sep. 18, 2019	Valid	Initial Release



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## TABLE OF CONTENTS

1. VERIFICATION OF CONFORMITY	5
2. GENERAL INFORMATION	
2.1. PRODUCT DESCRIPTION	
2.2. TABLE OF CARRIER FREQUENCYS	
2.3. IEEE 802.11N MODULATION SCHEME	
2.4. RELATED SUBMITTAL(S) / GRANT (S)	7
2.5. TEST METHODOLOGY	7
2.6. SPECIAL ACCESSORIES	7
2.7. EQUIPMENT MODIFICATIONS	
3. MEASUREMENT UNCERTAINTY	
4. DESCRIPTION OF TEST MODES	9
5. SYSTEM TEST CONFIGURATION	10
5.1. CONFIGURATION OF EUT SYSTEM	
5.2. EQUIPMENT USED IN EUT SYSTEM	
5.3. SUMMARY OF TEST RESULTS	
6. TEST FACILITY	
7. OUTPUT POWER	
7.1. MEASUREMENT PROCEDURE	
7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	
7.3. LIMITS AND MEASUREMENT RESULT	
8. 6 DB BANDWIDTH	
8.1. MEASUREMENT PROCEDURE	
8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	
8.3. LIMITS AND MEASUREMENT RESULTS	
9. CONDUCTED SPURIOUS EMISSION	
9.1. MEASUREMENT PROCEDURE	
9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	
9.3. MEASUREMENT EQUIPMENT USED	
9.4. LIMITS AND MEASUREMENT RESULT	21
10. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY	36





10.1 MEASUREMENT PROCEDURE	
10.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)	
10.3 MEASUREMENT EQUIPMENT USED	
10.4 LIMITS AND MEASUREMENT RESULT	
11. RADIATED EMISSION	43
11.1. MEASUREMENT PROCEDURE	43
11.2. TEST SETUP	
11.3. LIMITS AND MEASUREMENT RESULT	
11.4. TEST RESULT	45
12. BAND EDGE EMISSION	
12.1. MEASUREMENT PROCEDURE	
12.2. TEST SET-UP	
12.3. TEST RESULT	52
13. FCC LINE CONDUCTED EMISSION TEST	64
13.1. LIMITS OF LINE CONDUCTED EMISSION TEST	64
13.2. BLOCK DIAGRAM OF TEST SETUP	64
13.3. PROCEDURE OF LINE CONDUCTED EMISSION TEST	
13.4. TEST RESULT OF LINE CONDUCTED EMISSION TEST	66
APPENDIX A: PHOTOGRAPHS OF TEST SETUP	68
APPENDIX B: PHOTOGRAPHS OF EUT	



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## **1. VERIFICATION OF CONFORMITY**

Applicant	DGL Group LTD.
Address	195 Raritan Center Parkway Edison, New Jersey United States 08837
manufacturer	DGL Group LTD.
Address	195 Raritan Center Parkway Edison, New Jersey United States 08837
Product Designation	Smart Coffee Maker
Brand Name	Quirky
Test Model	QKY-CAFE-SLV
Series Model	QKY-CAFE
Declaration of Difference	All the same except for the model name, color of appearance.
Date of test	Sep. 06, 2019 to Sep. 12, 2019
Deviation	None
Condition of Test Sample	Normal
Test Result	Pass
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.

Prepared By

Erik Yeng

Erik Yang (Project Engineer)

Sep. 12, 2019

**Reviewed By** 

Max Zhang

Max Zhang (Reviewer)

Sep. 18, 2019

Approved By

# Forrest in

Forrest Lei (Authorized Officer)

Sep. 18, 2019



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## 2. GENERAL INFORMATION

## **2.1. PRODUCT DESCRIPTION**

The EUT is designed as "Smart Coffee Maker". 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

<b>Operation Frequency</b>	2.412 GHz~2.462GHz
Output Power(Average)	IEEE 802.11b:18.98dBm; IEEE 802.11g:18.15dBm; IEEE 802.11n(20):18.41dBm
Modulation	DSSS(DBPSK/DQPSK/CCK);OFDM(BPSK/QPSK/16-QAM/64-QAM)
Number of channels	11 channels for 802.11b/g/n20
Hardware Version	KF-J187-KB-PCB-V2.0
Software Version	V1.2
Antenna Designation	PCB antenna
Antenna Gain	0dBi
Power Supply	AC120V 900W

## **2.2. TABLE OF CARRIER FREQUENCYS**

Frequency Band	Channel Number	Frequency
		2412 MHZ
	2	2417 MHZ
100 cC	3	2422 MHZ
	4	2427 MHZ
	5	2432 MHZ
2400~2483.5MHZ	6	2437 MHZ
	7	2442 MHZ
30	8	2447 MHZ
	9	2452 MHZ
	10	2457 MHZ
	11	2462 MHZ

Note: For 20MHZ bandwidth system use Channel 1 to Channel 11



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#### 2.3. IEEE 802.11N MODULATION SCHEME

MCS Index Nss Modulatio	Modulation	ation R	R NBPSC	NCI	BPS	NDI	NDBPS		Data rate(Mbps) 800nsGl	
macx		20MHz 40MH	40MHz	20MHz	40MHz	20MHz	40MHz			
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5
1 💿	1	QPSK	1/2	2	104	216	52	108	13.0	27.0
2	1	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	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	<sup>©</sup> 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	Guard interval		

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

This submittal(s) (test report) is intended for FCC ID: 2AANZCAFE filing to comply with the FCC Part 15 requirements.

#### 2.5. TEST METHODOLOGY

KDB 558074 D01 15.247 Meas Guidance v05: Guidance for compliance measurements on Digital transmissio n system, frequency hopping spread spectrum system, and hybrid system devices operating under section 15.247 of the FCC rules

ANSI C63.10:2013 : American National Standard for Testing Unlicensed Wireless Devices

#### 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,  $Uc = \pm 3.2 dB$
- 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
1	Low channel TX
2	Middle channel TX
3	High channel TX
4	Normal operating
Transmit by 802.	11b with Date rate (1/2/5.5/11) 11g with Date rate (6/9/12/18/24/36/48/54) 11n (20MHz) with Date rate (6.5/13/19.5/26/39/52/58.5/65)

#### Note:

1. 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%

2. 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. The test software is the ESP which can set the EUT into the individual test modes



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# 5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Radiated Emission Configure :

EUT

Conducted Emission Configure :

EUT

## 5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Smart Coffee Maker	QKY-CAFE-SLV	2AANZCAFE	EUT

## **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	AC Power Line Conduction Emission	Compliant



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## 6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd		
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China		
Designation Number	CN1259		
FCC Test Firm Registration Number	975832		
A2LA Cert. No.	5054.02		
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA		

#### **TEST EQUIPMENT OF CONDUCTED EMISSION TEST**

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	Jun. 12, 2019	Jun. 11, 2020
LISN	R&S	ESH2-Z5	100086	Aug. 26, 2019	Aug. 25, 2020

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

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Jun. 12, 2019	Jun. 11, 2020
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec. 20, 2018	Dec.19, 2019
Power sensor	Aglient	U2021XA	MY54110007	Sep. 09, 2019	Sep. 08, 2020
2.4GHz Fliter	EM Electronics	2400-2500	N/A	Feb. 27, 2019	Feb. 26, 2020
Attenuator	Wariors	W13	11324	Sep. 09, 2019	Sep. 08, 2020
Horn antenna	ETS-LINDGREN	3117	00154520	Oct. 21, 2018	Oct. 20, 2020
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	Jun. 12, 2019	Jun. 11, 2020
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May 17, 2019	May 16, 2020
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Oct. 25, 2018	Oct. 24, 2019
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep. 28, 2017	Sep. 27, 2019



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## 7. OUTPUT POWER

## 7.1. MEASUREMENT PROCEDURE

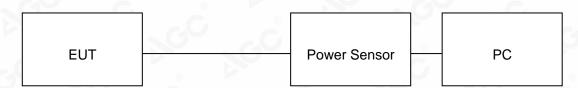
For average power test:

- 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
TEST MODE	802.11b with data rate 1

Frequency (GHz)	Average Power Applicable Limits (dBm) (dBm)		Pass or Fail
2.412	18.98	30	Pass
2.437	18.36	30	Pass
2.462	18.45	30	Pass

TEST ITEM	OUTPUT POWER
TEST MODE	802.11g with data rate 6

Frequency (GHz)	Average Power (dBm) (dBm)		Pass or Fail
2.412	18.15	30	Pass
2.437	17.63	30	Pass
2.462	17.87	30	Pass

TEST ITEM	OUTPUT POWER	No.	~GC	<i>c</i> .(
TEST MODE	802.11n 20 with data rate 6.5	8		N

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.412	18.41	30	Pass
2.437	17.64	30	Pass
2.462	17.72	30	Pass



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## 8.6 DB BANDWIDTH

#### **8.1. MEASUREMENT PROCEDURE**

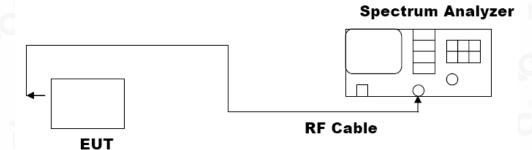
1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator

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 $\ge$ 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
TEST MODE	802.11b with data rate 11

#### LIMITS AND MEASUREMENT RESULT

Applicable Limite		Applicable Limits	
Applicable Limits	Test Da	ta (MHz)	Criteria
	Low Channel	8.575	PASS
>500KHZ	Middle Channel	8.112	PASS
	High Channel	8.545	PASS

TEST ITEM	6DB BANDWIDTH	8	
TEST MODE	802.11g with data rate 54		8

LIMITS AND MEASUREMENT RESULT							
Applicable Limite	Applicable Limits						
Applicable Limits	Test Data	(MHz)	Criteria				
	Low Channel	16.31	PASS				
>500KHZ	Middle Channel	16.34	PASS				
	High Channel	16.34	PASS				

TEST ITEM	6DB BANDWIDTH		No.	- 60
TEST MODE	802.11n 20 with data rate 65	ŝ	8	

LIMITS AND MEASUREMENT RESULT								
Applicable Limite		Applicable Limits						
Applicable Limits	Test D	Test Data (MHz)						
	Low Channel	17.56	PASS					
>500KHZ	Middle Channel	17.58	PASS					
AN NOV	High Channel	17.55	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

🔤 Keysight Spectrum Analyzer - Occupied I	BW					
Center Freq 2.41200000		SENSE:INT Center Freq: 2.41200 Trig: Free Run #Atten: 30 dB	ALIGN / 00000 GHz Avg Hold:>10/10	Radio Std		Frequency
10 dB/div Ref 20.00 dB	in Guilleow	#Atten: 30 dB		Mkr1 2.40		
0.00	1 formation for the second	when when	no hor have have h	ba		Center Freq 2.412000000 GHz
-10.0 -20.0 -30.0				hun way	MANYWA	
-40.0						
-70.0 Center 2.412 GHz				Spa	ın 30 MHz	
Res BW 100 kHz	141-	#VBW 300 F			3.733 ms	CF Step 3.000000 MHz <u>Auto</u> Man
Occupied Bandwid	6.718 MH		ower	22.1 UBIII		Freq Offset
Transmit Freq Error	-16.510 kH	z % of Ol	BW Power	99.00 %		0 Hz
x dB Bandwidth	16.31 MH	z xdB		-6.00 dB		
MSG				STATUS		



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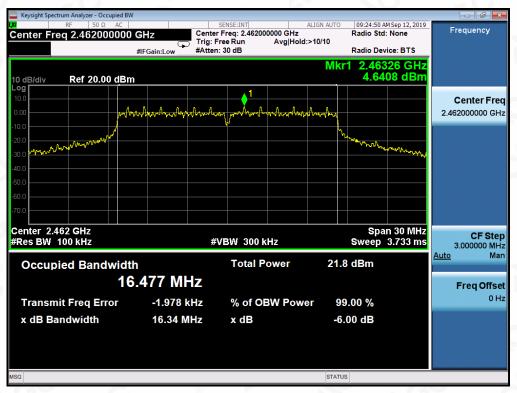
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#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL





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## 802.11n (20) TEST RESULT

#### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

09:28:15 AM Sep 12, 2019 Radio Std: None Center Freq: 2.412000000 GHz Trig: Free Run Avg|Hold:>10/10 #Atten: 30 dB Frequency Center Freq 2.412000000 GH #IFGain:Low Radio Device: BTS 2.41326 GHz 5.4997 dBm Mkr1 Ref 20.00 dBm **Center Freq** 2.412000000 GHz Span 30 MHz Sweep 3.733 ms Center 2.412 GHz #Res BW 100 kHz CF Step 3.000000 MHz #VBW 300 kHz <u>Auto</u> Ma **Total Power** 22.4 dBm Occupied Bandwidth 17.782 MHz **Freq Offset** 0 Hz -16.468 kHz % of OBW Power 99.00 % Transmit Freq Error x dB Bandwidth 17.56 MHz x dB -6.00 dB

#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

Keysight Spectrum Analyzer - Occupied BW							- 6	×
RF         50 Ω         AC           Center Freq         2.437000000	Trig	SENSE:INT ter Freq: 2.437000 : Free Run en: 30 dB		0/10	09:30:48 A Radio Std Radio Dev		Frequency	
10 dB/div Ref 20.00 dBm				Mkr1		99 GHz 54 dBm		
10.0 0.00	mlughandranton	hay walned	markathy	trahuna			Center Fr 2.437000000 G	
-10.0 -20.0 -30.0				\ 	m www.	Munna		
40.0								
70.0 Center 2.437 GHz						n 30 MHz	CF St	ter
#Res BW 100 kHz		#VBW 300 kl	lz		Sweep	3.733 ms	3.000000 N	NH:
Occupied Bandwidt	h	Total Po	ower	21.6	dBm		Auto N	Mar
17	.693 MHz						Freq Off	
Transmit Freq Error	-17.323 kHz	% of OB	W Power	99.	00 %		0	) H
x dB Bandwidth	17.58 MHz	x dB		-6.0	0 dB			
SG				STATUS				



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#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

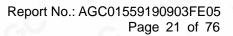
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## 9. CONDUCTED SPURIOUS EMISSION

#### 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 USEDJN

The same as described in section 6.

## 9.4. LIMITS AND MEASUREMENT RESULT

LIMITS AND MEA	SUREMENT RESULT				
Applicable 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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## Peak Searc Avg Type: Log-Pw Avg|Hold:>100/100 MHz Trig: Free Run #Atten: 30 dB PNO: Fast IFGain:Low Next Peal Mkr1 MHz <u>Ref 20.00 dBm</u> -59.163 dBm 0 dB/div Next Pk Right Next Pk Left Marker Delta Mkr→CF Mkr→RefLvl More 1 of 2 Stop 1.0000 GHz Sweep 93.33 ms (40000 pts) Start 0.0300 GHz #Res BW 100 kHz #VBW 300 kHz

## TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE OF (802.11b with data rate 1) FOR MODULATION IN LOW CHANNEL

Peak Search	09:08:13 AM Sep 12, 2019 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET PNNNNN	ALIGN AUTO : Log-Pwr :>100/100	Avg Typ Avg Hold		SEP Trig: Free #Atten: 3	SHZ PNO: Fast 🕞	961499 0	RF 50	
Next Pea	2.398 460 GHz -35.973 dBm	Mkr1				Juneon		Ref 20.00	) dB/div
Next Pk Righ									0.0
Next Pk Le									0.0
Marker Del	DL1 -23.40 dBm								0.0
Mkr→C									0.0
Mkr→RefL		an is na faailin i li Indee Tys yn News yn ar ar ar		den et types de terrest Recent de terrest		l ( ), a star a para seria ( ) ( ), b ( ) A tanga ( ), a star a seria ( ), a seria ( ), b ( )		in the first first of the	
Moi 1 of	Stop 2.4000 GHz							00 GHz	0.0 tart 1.00
	6.0 ms (40000 pts)	STATUS	\$	2	300 kHz	#VBW		100 kHz	Res BW



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## TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE OF( 802.11b with data rate 1) FOR MODULATION IN MIDDLE CHANNEL





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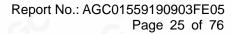
Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,



Keysight Spec	RF 50 S	2 AC		SEI	NSE:INT		ALIGN AUTO		M Sep 12, 2019	Peak Search
larker 12	2.4000000		PNO: Fast G IFGain:Low	Trig: Free #Atten: 3		Avg Type Avg Hold	e: Log-Pwr :>100/100	TYP	CE 1 2 3 4 5 6 PE M WWW P N N N N N	
							Mkr1	2.400 0	00 GHz	Next Pe
0 dB/div . <sup>og</sup>	Ref 20.00	dBm		,	•			-50.2	07 dBm	
										Next Pk Rig
10.0										J
0.00										
10.0										Next Pk L
.0.0										
20.0									DL1 -23.70 dBm	Marker De
30.0										
10.0									1	Mkr→
50.0										
50.0						ل بر بر به برا	المعرفة فروا المروا	والاستناد والم		Mkr→Refl
All antiget the	الاس المرابع المرابع المحمد المرابع المرابع المرابع المحمد الم <sub>ر</sub> اب مرابع	and Road to a by Basil de Real and the second states of the	rischen die Hendelsten die Hendels wenne Kanzalten Kundersten der	dalla distanti di la contra di secondo di se Na secondo di		ender der seine Geboorte		A france of the local states of		initi viteri
70.0										
										<b>M</b> 0 1 c
tart 1.000 Res BW 1			#\/P\/	V 300 kHz		_	10		000 GHz	
			#*VDV	V JUU KHZ		5	weep 13	0.U MS (4	0000 pts)	
G			#VDV	V 300 KH2		5	STATUS	· ·	0000 pts)	
	trum Analyzer - Sv	vept SA	#VBV	V 300 KH2	_	5		· ·	0000 pts)	
Keysight Spec	trum Analyzer - Sv RF 50 S 4.8736862	AC		SEI	NSE:INT	Avg Type	STATUS	09:10:14 A	M Sep 12, 2019 ≅ <b>1 2 3 4 5 6</b>	Peak Search
Keysight Spec		2 AC 29656		SE	NSE:INT		STATUS	09:10:14 A		Peak Search
Keysight Spec	RF 50 G 4.8736862	2 AC 29656 (	GHZ PNO: Fast	SEI	NSE:INT	Avg Type	ALIGN AUTO E: Log-Pwr :>100/100	09:10:14 A TRAC TYP D	MSep 12, 2019 E 1 2 3 4 5 6 MWWWWW PNNNNN 3 7 GHz	Peak Search
Keysight Spec	RF 50 \$	2 AC 29656 (	GHZ PNO: Fast	SEI	NSE:INT	Avg Type	ALIGN AUTO E: Log-Pwr :>100/100	09:10:14 A TRAC TYP D	M Sep 12, 2019 E 1 2 3 4 5 6 M WWWWW T P N N N N N	Peak Search
Keysight Spec	RF 50 G 4.8736862	2 AC 29656 (	GHZ PNO: Fast	SEI	NSE:INT	Avg Type	ALIGN AUTO E: Log-Pwr :>100/100	09:10:14 A TRAC TYP D	MSep 12, 2019 E 1 2 3 4 5 6 MWWWWW PNNNNN 3 7 GHz	Peak Search Next Pe
Keysight Spec	RF 50 G 4.8736862	2 AC 29656 (	GHZ PNO: Fast	SEI	NSE:INT	Avg Type	ALIGN AUTO E: Log-Pwr :>100/100	09:10:14 A TRAC TYP D	MSep 12, 2019 E 1 2 3 4 5 6 MWWWWW PNNNNN 3 7 GHz	Peak Search Next Pe
Contraction of the second seco	RF 50 G 4.8736862	2 AC 29656 (	GHZ PNO: Fast	SEI	NSE:INT	Avg Type	ALIGN AUTO E: Log-Pwr :>100/100	09:10:14 A TRAC TYP D	MSep 12, 2019 E 1 2 3 4 5 6 MWWWWW PNNNNN 3 7 GHz	Peak Search Next Pe Next Pk Rig
C dB/div	RF 50 G 4.8736862	2 AC 29656 (	GHZ PNO: Fast	SEI	NSE:INT	Avg Type	ALIGN AUTO E: Log-Pwr :>100/100	09:10:14 A TRAC TYP D	MSep 12, 2019 E 1 2 3 4 5 6 MWWWWW PNNNNN 3 7 GHz	Peak Search Next Pe Next Pk Rig
Contraction of the second seco	RF 50 G 4.8736862	2 AC 29656 (	GHZ PNO: Fast	SEI	NSE:INT	Avg Type	ALIGN AUTO E: Log-Pwr :>100/100	09:10:14 A TRAC TYP D	MSep 12, 2019 E 1 2 3 4 5 6 MWWWWW PNNNNN 3 7 GHz	Peak Search Next Pe Next Pk Rig
Keysight Spec     Iarker 1 4	RF 50 G 4.8736862	2 AC 29656 (	GHZ PNO: Fast	SEI	NSE:INT	Avg Type	ALIGN AUTO E: Log-Pwr :>100/100	09:10:14 A TRAC TYP D	MSep 12, 2019 E 1 2 3 4 5 6 MWWWWW PNNNNN 3 7 GHz	Peak Search Next Pe Next Pk Rig Next Pk L
Keysight Spec     Iarker 1 4	RF 50 G 4.8736862	2 AC 29656 (	GHZ PNO: Fast	SEI	NSE:INT	Avg Type	ALIGN AUTO E: Log-Pwr :>100/100	09:10:14 A TRAC TYP D	MSep 12, 2019 E 2 3 4 5 6 MINNINN 3 7 GHz 42 dBm	Peak Search Next Pe Next Pk Rig Next Pk L
Keysight Spec     Aarker 1 4     O dB/div     O dB/div     O	RF 50 G 4.8736862	2 AC 29656 (	GHZ PNO: Fast	SEI	NSE:INT	Avg Type	ALIGN AUTO E: Log-Pwr :>100/100	09:10:14 A TRAC TYP D	MSep 12, 2019 E 2 3 4 5 6 MINNINN 3 7 GHz 42 dBm	Peak Search Next Pe Next Pk Rig Next Pk L Marker De
Keysight Spec     Iarker 1 4	RF 50 G 4.8736862	2 AC 29656 (	GHZ PNO: Fast	SEI	NSE:INT	Avg Type	ALIGN AUTO E: Log-Pwr :>100/100	09:10:14 A TRAC TYP D	MSep 12, 2019 E 2 3 4 5 6 MINNINN 3 7 GHz 42 dBm	Peak Search Next Pe Next Pk Rig Next Pk L Marker De
C dB/div	Ref 20.00	2 AC 29656 (	GHZ PNO: Fast	SEI	NSE:INT	Avg Type	ALIGN AUTO 2: Log-Pwr :>100/100 Mk	09:10:14 A TRAC TYP D	MSep 12, 2019 E 2 3 4 5 6 MINNINN 3 7 GHz 42 dBm	Peak Search Next Pe Next Pk Rig Next Pk L Marker De
	Ref 20.00	2 AC 29656 (	GHZ PNO: Fast	SEI	NSE:INT	Avg Type	ALIGN AUTO E: Log-Pwr :>100/100	09:10:14 A	MSep 12, 2019 E 1 2 3 4 5 6 MWWWWW T NNNN 3 7 GHz 42 dBm	Peak Search Next Pe Next Pk Rig Next Pk L Marker De
Keysight Spect           Aarker 1 4           0 dB/div           0 0	Ref 20.00	2 AC 29656 (	GHZ PNO: Fast	SEI	NSE:INT	Avg Type	ALIGN AUTO 2: Log-Pwr :>100/100 Mk	09:10:14 A TRAC TV D r1 4.87 -50.7	MSep 12, 2019 E 1 2 3 4 5 6 M WWWWW T PINNIN 3 7 GHz 42 dBm	Peak Search Next Pe Next Pk Rig Next Pk L Marker De
Keysight Spect           Aarker 1 4           0 dB/div           0 0	Ref 20.00	2 AC 29656 (	GHZ PNO: Fast	SEI	NSE:INT	Avg Type	ALIGN AUTO 2: Log-Pwr :>100/100 Mk	09:10:14 A TRAC TV D r1 4.87 -50.7	MSep 12, 2019 E 1 2 3 4 5 6 M WWWWW T PINNIN 3 7 GHz 42 dBm	Next Pe Next Pk Rig Next Pk L Marker De Mkr→Ref I
Aarker 1 4 0 dB/div 9 9 10.0 0.00 20.0 20.0 20.0 20.0 20.0 50.0 5	Ref 20.00	2 AC 29656 (	GHZ PNO: Fast	SEI	NSE:INT	Avg Type	ALIGN AUTO 2: Log-Pwr :>100/100 Mk	09:10:14 AI TRAC TY DF r1 4.87 -50.7	MSep 12, 2019 E 2 3 4 5 6 MINNINN 3 7 GHz 42 dBm	Peak Search Next Pe Next Pk Rig Next Pk L Marker De
Keysight Spect           Aarker 1 4           0 dB/div           0 dV           0 dV           10 dV	Ref 20.00	2 AC 29656 (	CHZ PNO: Fast IF Gain:Low	SEI	NSE.INT e Run 0 dB	Avg Type	ALIGN AUTO :: Log-Pwr :>100/100 Mik	09:10:14 AI TRAC TV TV -50.7	MSep 12, 2019 E 1 2 3 4 5 6 M WWWWW T PINNIN 3 7 GHz 42 dBm	Peak Search Next Pe Next Pk Rig Next Pk L Marker De Mkr→Ref I



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## 01 AM Sep 12, 2019 Peak Search Avg Type: Log-Pw Avg|Hold:>100/100 Marker 1 951.644291107 MHz Trig: Free Run #Atten: 30 dB PNO: Fast 🖵 IFGain:Low Next Peak Mkr1 951.644 MHz -59.628 dBm 10 dB/div Ref 20.00 dBm Next Pk Right Next Pk Left L1 -23.62 d Marker Delta Mkr→CF ▲1 Mkr→RefLvi More 1 of 2 Start 0.0300 GHz #Res BW 100 kHz Stop 1.0000 GHz Sweep 93.33 ms (40000 pts) #VBW 300 kHz Peak Search Marker 1 2.394189854746 GHz Avg Type: Log-Pwr Avg|Hold:>100/100 PNO: Fast Trig: Free Run IFGain:Low #Atten: 30 dB Next Peak Mkr1 2.394 190 GHz -52.770 dBm Ref 20.00 dBm 10 dB/div **Next Pk Right** Next Pk Left Marker Delta Mkr→CF Mkr→RefLv More 1 of 2 Start 1.0000 GHz #Res BW 100 kHz Stop 2.4000 GHz #VBW 300 kHz Sweep 136.0 ms (40000 pts)

## TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE OF( 802.11b with data rate 1) FOR MODULATION IN HIGH CHANNEL

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 Tel:
 +86-755 2523 4088

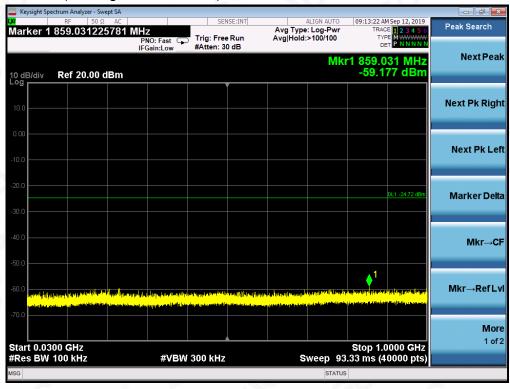
 E-mail:
 agc@agc-cert.com

 Service Hotline:400 089 2118





## TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE OF (802.11g with data rate 6) FOR MODULATION IN LOW CHANNEL

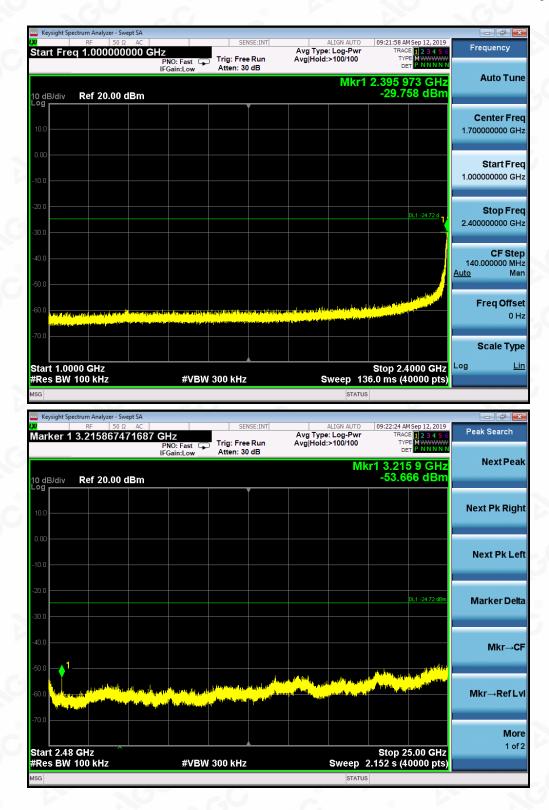




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#### AM Sep 12, 2019 Peak Search Avg Type: Log-Pw Avg|Hold:>100/100 2345 Marker 987.365434136 MHz Trig: Free Run Atten: 30 dB PNO: Fast IFGain:Low Next Peak Mkr1 987.365 MHz -59.765 dBm Ref 20.00 dBm 10 dB/div Next Pk Right Next Pk Left Marker Delta Mkr→CF Mkr→Ref Lvi More 1 of 2 Stop 1.0000 GHz Sweep 93.33 ms (40000 pts) Start 0.0300 GHz #Res BW 100 kHz #VBW 300 kHz STATUS sight Spectrum Analyzer - Swept SA 6 AM Sep 12, 2019 RACE **1 2 3 4 5** ( Peak Search Avg Type: Log-Pwr Avg|Hold:>100/100 Marker 1 2.400000000000 GHz Trig: Free Run Atten: 30 dB PNO: Fast IFGain:Low Next Peak Mkr1 2.400 000 GHz -48.881 dBm Ref 20.00 dBm 10 dB/div Next Pk Right Next Pk Left Marker Delta Mkr→CF Mkr→RefLvl More

## TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE OF (802.11g with data rate 6) FOR MODULATION IN MIDDLE CHANNEL

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Start 1.0000 GHz #Res BW 100 kHz

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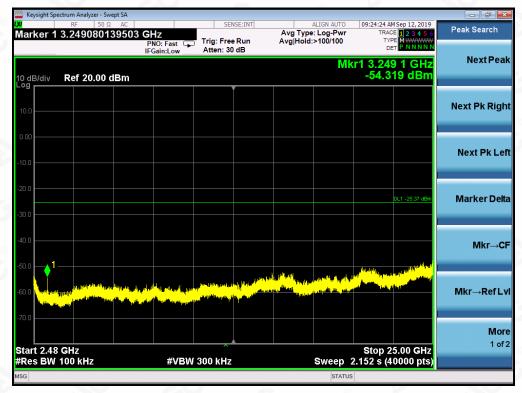
#VBW 300 kHz

Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,

Hangcheng Street, Bao'an District, Shenzhen, Guangdong, ChinaTel:+86-755 2523 4088E-mail:agc@agc-cert.comService Hotline:400 089 2118

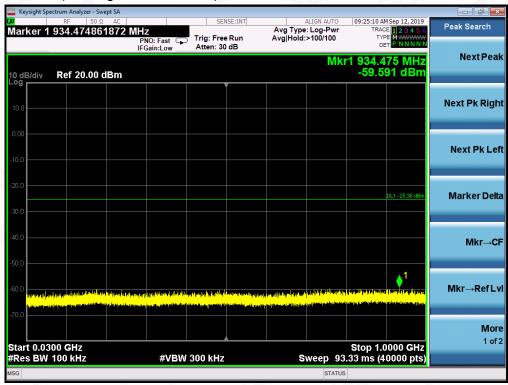
Stop 2.4000 GHz Sweep 136.0 ms (40000 pts) 1 of 2





#### TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE

#### OF (802.11g with data rate 6) FOR MODULATION IN HIGH CHANNEL

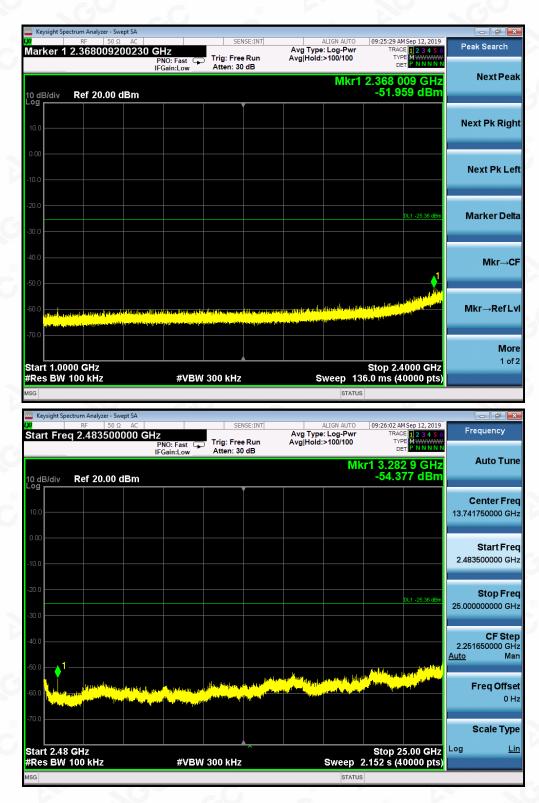




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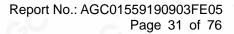
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 Tel:
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 E-mail:
 agc@agc-cert.com

 Service Hotline:400 089 2118





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#### AM Sep 12, 2019 Peak Search Avg Type: Log-Pw Avg|Hold:>100/100 2345 Marker 03.230580765 MHz Trig: Free Run Atten: 30 dB PNO: Fast IFGain:Low Next Peak Mkr1 803.231 MHz -58.456 dBm Ref 20.00 dBm 10 dB/div Next Pk Right Next Pk Left Marker Delta Mkr→CF Mkr→RefLvi More 1 of 2 Stop 1.0000 GHz Sweep 93.33 ms (40000 pts) Start 0.0300 GHz #Res BW 100 kHz #VBW 300 kHz STATUS trum Analyzer - Swept SA 8 AM Sep 12, 2019 RACE **1 2 3 4 5** ( Start Freq 1.000000000 GHz PNO: Fast IFGain:Low Avg Type: Log-Pwr Avg|Hold:>100/100 Frequency Trig: Free Run Atten: 30 dB Auto Tune Mkr1 2.396 220 GHz -30.325 dBm Ref 20.00 dBm 10 dB/div **Center Freq** 1.700000000 GHz Start Freq 1.000000000 GHz Stop Freq 2.400000000 GHz **CF** Step 140.000000 MH Auto Mar **Freq Offset** 0 Hz Scale Type Start 1.0000 GHz #Res BW 100 kHz Stop 2.4000 GHz Sweep 136.0 ms (40000 pts) Log Lin #VBW 300 kHz

## TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE OF (802.11n20 with data rate 6.5) FOR MODULATION IN LOW CHANNEL

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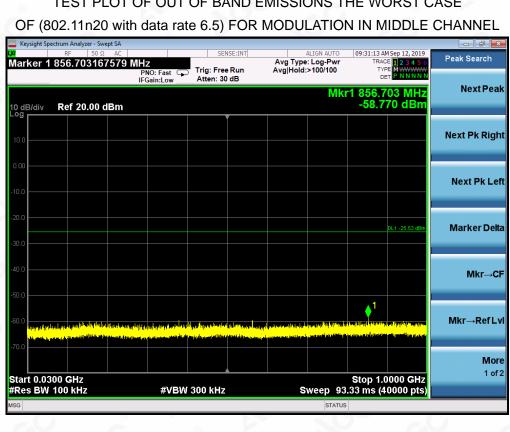
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#### TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE





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X/ R		6 011-	SENSE:II		ALIGN AUTO pe: Log-Pwr	09:31:33 AM Sep 12, 2019 TRACE 1 2 3 4 5 6	Peak Search
harker 1 2.3	9390984774	PNO: Fast G	Trig: Free Ru Atten: 30 dB		d:>100/100		
					Mkr1 2	2.393 910 GHz -49.736 dBm	Next Pe
0 dB/div Re	f 20.00 dBm		The second secon			-49.736 aBm	
10.0							Next Pk Rig
10.0							
0.00							
10.0							Next Pk L
20.0							
20.0						DL1 -25.53 dBm	Marker De
30.0							
40.0							Mkr→0
50.0						1	
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60.0	NPROVER PROPERTY AND INCOMENTATION OF THE OWNER OF THE OWNE	methonological			an a		Mkr→RefL
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							Mo
4-44 4 4 4 4 4						Stop 2.4000 GHz	1 0
		40 (D)	N 000 KU-		<b>0</b>	Stop 2.4000 GHZ	
Start 1.0000 0 #Res BW 100		#VBV	N 300 kHz		Sweep 136	stop 2.4000 GHZ .0 ms (40000 pts)	
Res BW 100	kHz	#VBV	N 300 kHz		Sweep 136	stop 2.4000 GHZ .0 ms (40000 pts)	
FRes BW 100	KHz Analyzer - Swept SA F 50 Ω AC		N 300 KHz	NT	Sweep 136 Status Align auto	.0 ms (40000 pts)	Peak Search
Res BW 100 sg Keysight Spectrum	KHZ Analyzer - Swept SA		SENSE:I		Sweep 136 status	.0 ms (40000 pts)	Peak Search
Res BW 100 sg Keysight Spectrum G Narker 1 3.2	kHz Analyzer - Swept SA F 50 Ω AC 4908013950	3 GHz PNO: Fast	SENSE:I		Sweep 136 STATUS ALIGN AUTO pe: Log-Pwr d:>100/100	09:32:00 AM Sep 12, 2019 TRACE 1 2 3 4 5 0 TYPE MWWWW DET P NNNNN 1 3 249 1 GHZ	Peak Search
Res BW 100 sg Keysight Spectrum Aarker 1 3.2	KHz Analyzer - Swept SA F 50 Ω AC	3 GHz PNO: Fast	SENSE:I		Sweep 136 STATUS ALIGN AUTO pe: Log-Pwr d:>100/100	09:32:00 AM Sep 12, 2019 TRACE 2 3 4 5 6 TYPE MWWWWW	Peak Search
Res BW 100 sa Keysight Spectrum R Aarker 1 3.2 0 dB/div Re	kHz Analyzer - Swept SA F 50 Ω AC 4908013950	3 GHz PNO: Fast	SENSE:I		Sweep 136 STATUS ALIGN AUTO pe: Log-Pwr d:>100/100	09:32:00 AM Sep 12, 2019 TRACE 1 2 3 4 5 0 TYPE MWWWW DET P NNNNN 1 3 249 1 GHZ	Peak Search Next Pea
Res BW 100 sa keysight Spectrum R Aarker 1 3.2 0 dB/div Re 10.0	kHz Analyzer - Swept SA F 50 Ω AC 4908013950	3 GHz PNO: Fast	SENSE:I		Sweep 136 STATUS ALIGN AUTO pe: Log-Pwr d:>100/100	09:32:00 AM Sep 12, 2019 TRACE 1 2 3 4 5 0 TYPE MWWWW DET P NNNNN 1 3 249 1 GHZ	Peak Search Next Pe
Res BW 100 sa keysight Spectrum R Aarker 1 3.2 0 dB/div Re 10.0	kHz Analyzer - Swept SA F 50 Ω AC 4908013950	3 GHz PNO: Fast	SENSE:I		Sweep 136 STATUS ALIGN AUTO pe: Log-Pwr d:>100/100	09:32:00 AM Sep 12, 2019 TRACE 1 2 3 4 5 0 TYPE MWWWW DET P NNNNN 1 3 249 1 GHZ	Peak Search Next Pe Next Pk Rig
Res BW 100 sa keysight Spectrum Aarker 1 3.2 0 dB/div Re 0 dB/div Re 0 0 dB/div Re	kHz Analyzer - Swept SA F 50 Ω AC 4908013950	3 GHz PNO: Fast	SENSE:I		Sweep 136 STATUS ALIGN AUTO pe: Log-Pwr d:>100/100	09:32:00 AM Sep 12, 2019 TRACE 1 2 3 4 5 0 TYPE MWWWW DET P NNNNN 1 3 249 1 GHZ	Peak Search Next Pea Next Pk Rig
Res BW 100 sc keysight Spectrum Aarker 1 3.2 0 dB/div Re 0 dB/div Re 0 dB/div Re	kHz Analyzer - Swept SA F 50 Ω AC 4908013950	3 GHz PNO: Fast	SENSE:I		Sweep 136 STATUS ALIGN AUTO pe: Log-Pwr d:>100/100	09:32:00 AM Sep 12, 2019 TRACE 1 2 3 4 5 0 TYPE MWWWW DET P NNNNN 1 3 249 1 GHZ	Peak Search Next Pea Next Pk Rig
Res BW 100           sc	kHz Analyzer - Swept SA F 50 Ω AC 4908013950	3 GHz PNO: Fast	SENSE:I		Sweep 136 STATUS ALIGN AUTO pe: Log-Pwr d:>100/100	09:32:00 AM Sep 12, 2019 TRACE 1 2 3 4 5 0 TYPE MWWWW DET P NNNNN 1 3 249 1 GHZ	Peak Search Next Pea Next Pk Rig Next Pk Lu
Res BW 100           sc	kHz Analyzer - Swept SA F 50 Ω AC 4908013950	3 GHz PNO: Fast G	SENSE:I		Sweep 136 STATUS ALIGN AUTO pe: Log-Pwr d:>100/100	09:32:00 AM Sep 12, 2019 TRACE 12, 34, 5 TYPE MWWWW DET P.N.N.N.N 1 3.249 1 GHz -53.964 dBm	Peak Search Next Pea Next Pk Rig Next Pk Lu
Res         BW 100           sa	kHz Analyzer - Swept SA F 50 Ω AC 4908013950	3 GHz PNO: Fast G	SENSE:I		Sweep 136 STATUS ALIGN AUTO pe: Log-Pwr d:>100/100	09:32:00 AM Sep 12, 2019 TRACE 12, 34, 5 TYPE MWWWW DET P.N.N.N.N 1 3.249 1 GHz -53.964 dBm	Peak Search Next Pe Next Pk Rig Next Pk Lu Marker De
Res         BW 100           sa         R           Aarker 1 3.2         R           0 dB/div         Re           0 0 dB/div         Re	kHz Analyzer - Swept SA F 50 Ω AC 4908013950	3 GHz PNO: Fast G	SENSE:I		Sweep 136 STATUS ALIGN AUTO pe: Log-Pwr d:>100/100	09:32:00 AM Sep 12, 2019 TRACE 12, 34, 5 TYPE MWWWW DET P.N.N.N.N 1 3.249 1 GHz -53.964 dBm	Peak Search Next Pe Next Pk Rig Next Pk Lu Marker De
Keysight Spectrum           Keysight Spectrum           Keysight Spectrum           Aarker 1 3.2           0 dB/div         Re           0 0         R <td>kHz Analyzer - Swept SA F 50 Ω AC 4908013950</td> <td>3 GHz PNO: Fast G</td> <td>SENSE:I</td> <td>NT Avg Tyj n Avg Hol</td> <td>Sweep 136 STATUS ALIGN AUTO pe: Log-Pwr d:&gt;100/100 Mikr</td> <td>09:32:00 AM Sep 12, 2019 TRACE 12, 34, 5 TYPE 12, 5</td> <td>Peak Search Next Pea Next Pk Rig Next Pk Lu Marker De Mkr→0</td>	kHz Analyzer - Swept SA F 50 Ω AC 4908013950	3 GHz PNO: Fast G	SENSE:I	NT Avg Tyj n Avg Hol	Sweep 136 STATUS ALIGN AUTO pe: Log-Pwr d:>100/100 Mikr	09:32:00 AM Sep 12, 2019 TRACE 12, 34, 5 TYPE 12, 5	Peak Search Next Pea Next Pk Rig Next Pk Lu Marker De Mkr→0
Keysight Spectrum           Keysight Spectrum           Keysight Spectrum           Aarker 1 3.2           0 dB/div         Re           0 0         R <td>kHz Analyzer - Swept SA F 50 Ω AC 4908013950</td> <td>3 GHz PNO: Fast G</td> <td>SENSE:I</td> <td>NT Avg Tyj n Avg Hol</td> <td>Sweep 136 status ALIGN AUTO pe: Log-Pwr d:&gt;100/100 MIKr</td> <td>09:32:00 AM Sep 12, 2019 TRACE 12, 34, 5 TYPE MWWWW DET P.N.N.N.N 1 3.249 1 GHz -53.964 dBm</td> <td>Peak Search Next Pea Next Pk Rig Next Pk Lu Marker De Mkr→0</td>	kHz Analyzer - Swept SA F 50 Ω AC 4908013950	3 GHz PNO: Fast G	SENSE:I	NT Avg Tyj n Avg Hol	Sweep 136 status ALIGN AUTO pe: Log-Pwr d:>100/100 MIKr	09:32:00 AM Sep 12, 2019 TRACE 12, 34, 5 TYPE MWWWW DET P.N.N.N.N 1 3.249 1 GHz -53.964 dBm	Peak Search Next Pea Next Pk Rig Next Pk Lu Marker De Mkr→0
#Res BW 100           Isc           Keysight Spectrum           R           Marker 1 3.2           Io dB/div           R           0.00           10.0           .00      .	kHz Analyzer - Swept SA F 50 Ω AC 4908013950	3 GHz PNO: Fast G	SENSE:I	NT Avg Tyj n Avg Hol	Sweep 136 STATUS ALIGN AUTO pe: Log-Pwr d:>100/100 Mikr	09:32:00 AM Sep 12, 2019 TRACE 12, 34, 5 TYPE 12, 5	Peak Search Next Pea Next Pk Rig Next Pk Lu
Res         BW 100           SG         R           Aarker 1 3.2         R           0 dB/div         Re	kHz Analyzer - Swept SA F 50 Ω AC 4908013950	3 GHz PNO: Fast G	SENSE:I	NT Avg Tyj n Avg Hol	Sweep 136 STATUS ALIGN AUTO pe: Log-Pwr d:>100/100 Mikr	.0 ms (40000 pts) [09:32:00 AM Sep 12, 2019 TRACE [] 2 3 4 5 6 TYPE MWWWWWW DT 1 3.249 1 GHz -53.964 dBm 0(1 -25 53 dBm 0(1 -25 53 dBm 0(1 -25 53 dBm	Peak Search Next Pea Next Pk Rig Next Pk Lu Marker De Mkr→Ref L Mo
Res         BW 100           SG         R           Aarker 1 3.2         R           0 dB/div         Re	Analyzer - Swept SA           F         50 Ω           AC           4908013950	3 GHz PNO: Fast G IFGain:Low	SENSE:I	NT Avg Tyj n Avg Hol	Sweep 136 Status ALIGN AUTO pe: Log-Pwr d:>100/100 Mikr	09:32:00 AM Sep 12, 2019 TRACE 12, 34, 5 TYPE 12, 5	Peak Search Next Pea Next Pk Rig Next Pk Lu Marker De Mkr→0



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#### 6 AM Sep 12, 2019 Peak Search Avg Type: Log-Pw Avg|Hold:>100/100 Marker 1 908.235705893 MHz Trig: Free Run Atten: 30 dB PNO: Fast 😱 IFGain:Low Next Peak Mkr1 908.236 MHz -59.507 dBm 10 dB/div Ref 20.00 dBm Next Pk Right Next Pk Left Marker Delta Mkr→CF 1 Mkr→RefLvi More 1 of 2 Start 0.0300 GHz #Res BW 100 kHz Stop 1.0000 GHz Sweep 93.33 ms (40000 pts) #VBW 300 kHz VSE:INT Peak Search Marker 1 2.399964999125 GHz Avg Type: Log-Pwr Avg|Hold:>100/100 Trig: Free Run Atten: 30 dB PNO: Fast IFGain:Low Next Peak Mkr1 2.399 965 GHz -51.039 dBm Ref 20.00 dBm 10 dB/div **Next Pk Right** Next Pk Left Marker Delta Mkr→CF Mkr→RefLv More 1 of 2 Start 1.0000 GHz #Res BW 100 kHz Stop 2.4000 GHz #VBW 300 kHz Sweep 136.0 ms (40000 pts)

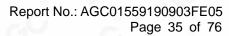
## TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE OF (802.11n20 with data rate 6.5) FOR MODULATION IN HIGH CHANNEL

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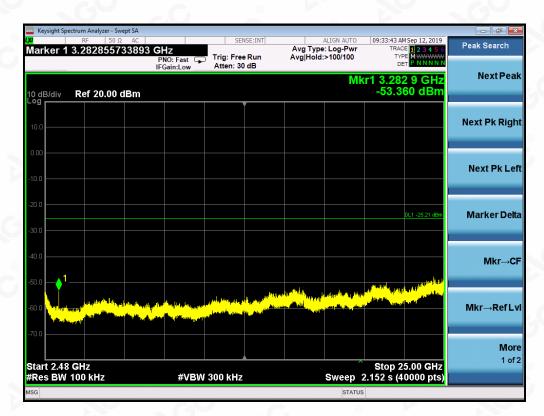
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## **10. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY**

## **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
TEST MODE	802.11b with data rate 1

Channel No.	Power density (dBm/20kHz)	Limit (dBm/3kHz)	Result
Low Channel	1.028	8	Pass
Middle Channel	0.766	8	Pass
High Channel	0.897	8	Pass

TEST ITEM	POWER SPECTRAL DENSITY			S
TEST MODE	802.11g with data rate 6	c.C	8	

Channel No.	Power density (dBm/20kHz)	Limit (dBm/3kHz)	Result
Low Channel	-1.362	8	Pass
Middle Channel	-1.674	8	Pass
High Channel	-1.496	8	Pass



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TEST ITEM	POWER SPECTRAL DENSITY	POWER SPECTRAL DENSITY				
TEST MODE	802.11n 20 with data rate 6.5	802.11n 20 with data rate 6.5				
0		8				
Channel No.	Power density (dBm/20kHz)	Limit (dBm/3kHz)	Result			
Low Channel	-0.477	8	Pass			
Middle Channel	-1.284	8	Pass			
High Channel	-1.293	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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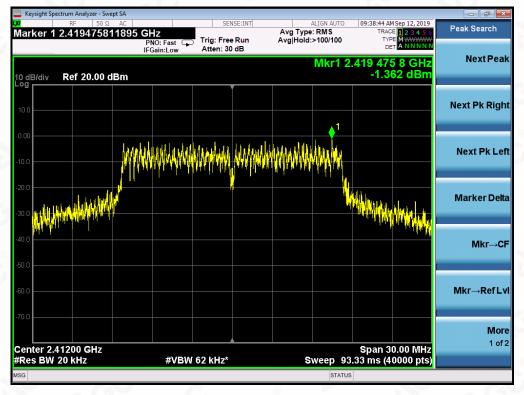




### TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL

# 802.11g TEST RESULT

TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL

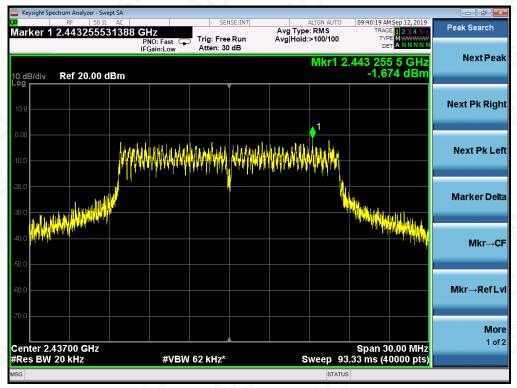




Attestation of Global Compliance(Shenzhen)Co.,Ltd.

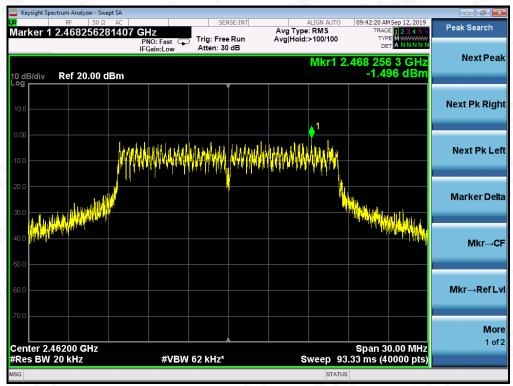
Add: 2/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,





### TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL

### TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL

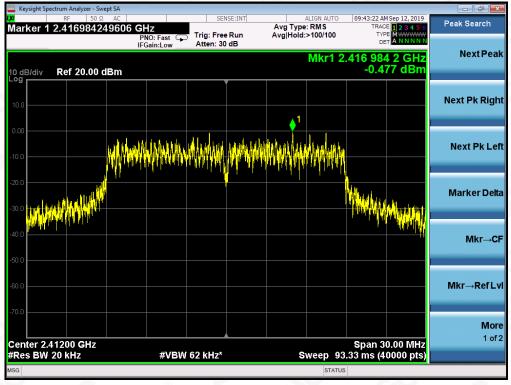




Attestation of Global Compliance(Shenzhen)Co.,Ltd.

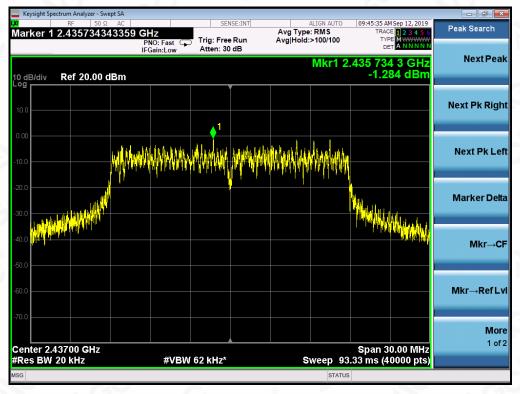
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# 802.11n 20 TEST RESULT TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL

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

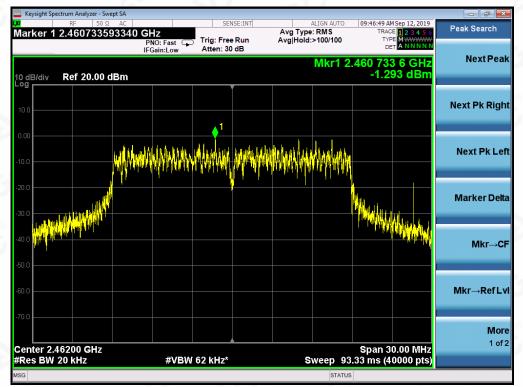


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# TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL



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# **11. RADIATED EMISSION**

#### **11.1. MEASUREMENT PROCEDURE**

- 1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
- 2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- 3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
- 4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
- 5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
- 6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- 7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
- 8.If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
- 9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- 10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High Low scan is not required in this case.



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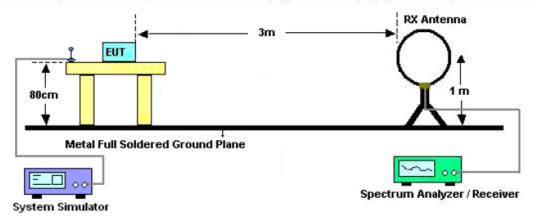
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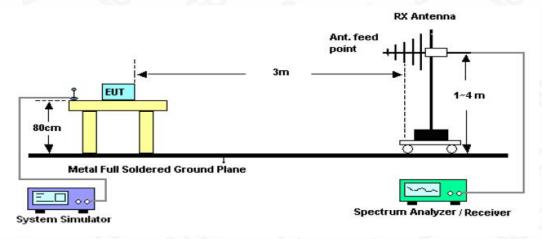


### 11.2. TEST SETUP

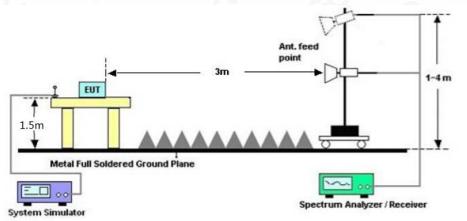
Radiated Emission Test-Setup Frequency Below 30MHz



### RADIATED EMISSION TEST SETUP 30MHz-1000MHz



### RADIATED EMISSION TEST SETUP ABOVE 1000MHz





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## **11.3. LIMITS AND MEASUREMENT RESULT**

#### 15.209(a) Limit in the below table has to be followed

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Note: All modes were tested For restricted band radiated emission,

the test records reported below are the worst result compared to other modes.

# 11.4. TEST RESULT

# RADIATED EMISSION BELOW 30MHZ

No emission found between lowest internal used/generated frequencies to 30MHz.



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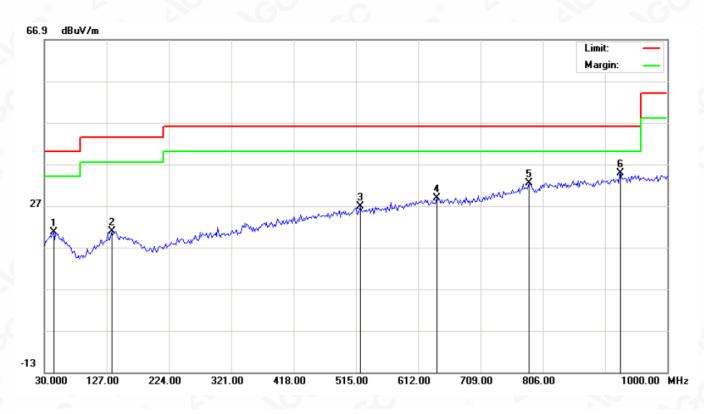
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#### **RADIATED EMISSION BELOW 1GHZ**

EUT	Smart Coffee Maker	Model Name	QKY-CAFE-SLV
Temperature	25°C	Relative Humidity	55.5%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2412MHZ	Antenna	Horizontal



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	•	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		44.5500	0.75	19.93	20.68	40.00	-19.32	peak			
2		135.0833	1.97	18.92	20.89	43.50	-22.61	peak			
3		521.4667	1.47	25.41	26.88	46.00	-19.12	peak			
4		641.1000	1.31	27.44	28.75	46.00	-17.25	peak			
5		784.9833	2.38	30.07	32.45	46.00	-13.55	peak			
6	*	927.2500	2.79	31.93	34.72	46.00	-11.28	peak			

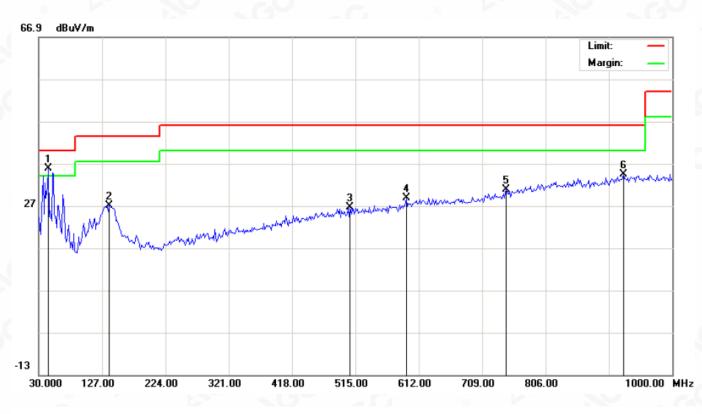
### **RESULT: PASS**



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EUT	Smart Coffee Maker	Model Name	QKY-CAFE-SLV
Temperature	25°C	Relative Humidity	55.5%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2412MHZ	Antenna	Vertical



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	•	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm degree		
1	*	44.5500	15.96	19.93	35.89	40.00	-4.11	peak			
2		138.3167	7.88	19.12	27.00	43.50	-16.50	peak			
3		506.9167	1.56	25.13	26.69	46.00	-19.31	peak			
4		592.6000	2.02	26.80	28.82	46.00	-17.18	peak			
5		746.1833	1.68	29.19	30.87	46.00	-15.13	peak			
6		925.6333	2.40	31.92	34.32	46.00	-11.68	peak			

#### **RESULT: PASS**

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

- 2. The "Factor" value can be calculated automatically by software of measurement system.
- 3. All test modes had been pre-tested. The 802.11b at low channel is the worst case and recorded in the report.



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EUT	Smart Coffee Maker	Model Name	QKY-CAFE-SLV
Temperature	25°C	Relative Humidity	55.5%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2412MHZ	Antenna	Horizontal

# **RADIATED EMISSION ABOVE 1GHZ**

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Value Type
4824.064	56.24	3.72	59.96	74	-14.04	peak
4824.093	41.17	3.72	44.89	54 💿	-9.11	AVG
7236.102	48.33	8.15	56.48	74	-17.52	peak
7236.106	35.69	8.15	43.84	54	-10.16	AVG
		- 0	0	1		
6		<u> </u>	- C			
Remark:				<u> </u>	C.	(6)
actor = Ante	enna Factor + Ca	able Loss – F	Pre-amplifier.		69	- 6

EUT	Smart Coffee Maker	Model Name	QKY-CAFE-SLV
Temperature	25°C	Relative Humidity	55.5%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2412MHZ	Antenna	Vertical

Frequency	Meter Reading	Factor	<b>Emission Level</b>	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4824.073	49.08	3.72	52.8	74	-21.2	peak
4824.11	39.46	3.72	43.18	54	-10.82	AVG
7236.071	44.66	8.15	52.81	74	-21.19	peak
7236.055	34.87	8.15	43.02	54	-10.98	AVG
		- 6	®		- 6	- 6
6			G			0
emark:					Ø	
actor = Ante	enna Factor + Ca	ble Loss – F	Pre-amplifier.		C.	®



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EUT	Smart Coffee Maker	Model Name	QKY-CAFE-SLV
Temperature	25°C	Relative Humidity	55.5%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2437MHZ	Antenna	Horizontal

(9.)				<u> </u>		
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4874.063	64.21	3.75	67.96	74	-6.04	peak
4874.045	44.05	3.75	47.8	54	-6.2	AVG
7311.096	58.78	8.16	66.94	74	-7.06	peak
7311.109	39.96	8.16	48.12	54	-5.88	AVG
	2.0		0			
C		S		8		N.
emark:				20		(a)
actor = Ante	enna Factor + C	able Loss –	Pre-amplifier.		GU	C.

EUT	Smart Coffee Maker	Model Name	QKY-CAFE-SLV
Temperature	25°C	Relative Humidity	55.5%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2437MHZ	Antenna	Vertical

Meter Reading	Factor	<b>Emission Level</b>	Limits	Margin	
(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Value Type
63.18	3.75	66.93	74	-7.07	peak
44.57	3.75	48.32	54	-5.68	AVG
56.49	8.16	64.65	74	-9.35	peak
38.12	8.16	46.28	54	-7.72	AVG
NO <sup>-</sup>	-6			-6	1
		6 .0	0		
	(dBµV) 63.18 44.57 56.49	(dBµV)         (dB)           63.18         3.75           44.57         3.75           56.49         8.16	(dBµV)         (dB)         (dBµV/m)           63.18         3.75         66.93           44.57         3.75         48.32           56.49         8.16         64.65	(dBµV)         (dB)         (dBµV/m)         (dBµV/m)           63.18         3.75         66.93         74           44.57         3.75         48.32         54           56.49         8.16         64.65         74	(dBµV)         (dB)         (dBµV/m)         (dBµV/m)         (dB)           63.18         3.75         66.93         74         -7.07           44.57         3.75         48.32         54         -5.68           56.49         8.16         64.65         74         -9.35



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EUT	Smart Coffee Maker	Model Name	QKY-CAFE-SLV
Temperature	25°C	Relative Humidity	55.5%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2462MHZ	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Value Type
4924.063	65.33	3.81	69.14	74	-4.86	peak
4924.04	45.39	3.81	49.2	54	-4.8	AVG
7386.119	58.18	8.19	66.37	74	-7.63	peak
7386.061	39.22	8.19	47.41	54	-6.59	AVG
			0			
8		j j	- 6	8		
emark:				20		
actor = Ante	enna Factor + C	able Loss –	Pre-amplifier.		60	C

EUT	Smart Coffee Maker	Model Name	QKY-CAFE-SLV
Temperature	25°C	Relative Humidity	55.5%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2462MHZ	Antenna	Vertical

Frequency	Meter Reading	Factor	<b>Emission Level</b>	Limits	Margin	
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Value Type
4924.023	65.67	3.81	69.48	74	-4.52	peak
4924.051	45.25	3.81	49.06	54	-4.94	AVG
7386.062	59.26	8.19	67.45	74	-6.55	peak
7386.093	38.44	8.19	46.63	54	-7.37	AVG
	<u> </u>	- 6	8		.0	1 - 5
Remark:			5 20	9		
actor = Ante	enna Factor + Ca	ble Loss – P	re-amplifier.		<u> </u>	(R)

### **RESULT: PASS**

**Note:** Other emissions from 1G to 25 GHz are considered as ambient noise. No recording in the test report. Factor = Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.

The "Factor" value can be calculated automatically by software of measurement system.

All test modes had been pre-tested. The 802.11b mode is the worst case and recorded in the report.



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# **12. BAND EDGE EMISSION**

### **12.1. MEASUREMENT PROCEDURE**

Radiated restricted band edge measurements

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting

#### 12.2. TEST SET-UP

same as 11.2

Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain. Field Strength=Factor + Reading level

2. The factor had been edited in the "Input Correction" of the Spectrum Analyzer. So the Amplitude of test plots is equal to Reading level plus the Factor in dB. Use the A dB( $\mu$ V) to represent the Amplitude. Use the F dB( $\mu$ V/m) to represent the Field Strength. So A=F.



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# 12.3. TEST RESULT

EUT	Smart Coffee Maker	Model Name	QKY-CAFE-SLV
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with data rate 1 2412MHZ	Antenna	Horizontal

ΡK



AV



**RESULT: PASS** 



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#### Report No.: AGC01559190903FE05 Page 53 of 76

EUT	Smart Coffee Maker	Model Name	QKY-CAFE-SLV
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with data rate 1 2412MHZ	Antenna	Vertical

ΡK



#### AV



**RESULT: PASS** 



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