# FCC Test Report

# Report No.: AGC01180160501FE05

FCC ID	: W9DA68W	
APPLICATION PURPOSE	: Original Equipment	
PRODUCT DESIGNATION	: IP Phone	
BRAND NAME	: ATCOM	
MODEL NAME	: A68W, A48W	
CLIENT	: ATCOM TECHNOLOGY CO.,	LIMITED
DATE OF ISSUE	: May 26, 2016	
STANDARD(S) TEST PROCEDURE(S)	FCC Part 15.247 KDB 558074 v03r04	
REPORT VERSION	: V1.0	



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# **Report Revise Record**

<b>Report Version</b>	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	May 26, 2016	Valid	Original Report

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Applicant	ATCOM TECHNOLOGY CO., LIMITED
Address	FL2, Block3, Huangguan Industry Park #21 Tai Ran 9th Rd, Futian, Shenzhen City, China
Manufacturer	ATCOM TECHNOLOGY CO., LIMITED
Address	FL2, Block3, Huangguan Industry Park #21 Tai Ran 9th Rd, Futian, Shenzhen City, China
Product Designation	IP Phone
Brand Name	АТСОМ
Test Model	A68W
Series Model	A48W
Model Difference	A68W and A48W with the same main PCB and RF modular, but different in appearance, size, keypad PCB and LCD. A68W was the worst model chose for test.
Date of test	May 23, 2016 to May 25, 2016
Deviation	None
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-US-BGN/RF

## **1. VERIFICATION OF CONFORMITY**

We hereby certify that:

The above equipment was tested by Dongguan Precise Testing Service 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.

Max Zha Tested by Max Zhang(Zhang May 26, 2016 Reviewed by Rock Huang(Huang Dinglue) May 26, 2016 Approved by Solger Zhang(Zhang Hongyi) May 26, 2016 Authorized Officer

# 2. GENERAL INFORMATION

## 2.1. PRODUCT DESCRIPTION

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

<b>Operation Frequency</b>	2.412 GHz~2.462GHz		
Output Power	IEEE 802.11b:9.26dBm; IEEE 802.11g:7.61dBm;		
	IEEE 802.11n(20):7.33dBm; IEEE 802.11n(40):3.61dBm		
Modulation	DSSS(DBPSK/DQPSK/CCK);OFDM(BPSK/QPSK/16-QAM/64-QAM)		
Number of channels	11		
Hardware Version	V12		
Software Version	A68W-1.0.6.e6661		
Antenna Designation	Wire Antenna		
Antenna Gain	1.5dBi		
Power Supply	DC 5V by adapter		

A major technical description of EUT is described as following

#### 2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
	1	2412 MHZ
	2	2417 MHZ
	3	2422 MHZ
	4	2427 MHZ
	5	2432 MHZ
2412-2462MHZ	6	2437 MHZ
	7	2442 MHZ
	8	2447 MHZ
	9	2452 MHZ
	10	2457 MHZ
	11	2462 MHZ

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

MCS Index	Nss	Modulation	R	NBPSC		BPS	NDBPS		Da rate(N 800)	ata Mbps) nsGl
					20MHz	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	1	64-QAM	5/6	6	312	648	260	540	65.0	135.0

#### 2.3. IEEE 802.11N MODULATION SCHEME

Symbol	Explanation	
NSS	Number of spatial streams	
R	R Code rate	
NBPSC	Number of coded bits per single carrier	
NCBPS Number of coded bits per symb		
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: W9DA68W** 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.

Others testing (listed at item 5.3) was performed according to the procedures in FCC Part 15.247 rules KDB 558074 D01 DTS Meas Guidance v03r04.

#### 2.6. SPECIAL ACCESSORIES

Refer to section 5.2.

## 2.7. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

## **3. MEASUREMENT UNCERTAINTY**

Conducted measurement: +/- 3.18dB Radiated measurement: +/- 3.91dB

## 4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel TX
2	Middle channel TX
3	High channel TX
4	Normal operating
Note:	
Transm	it by 802.11b with Date rate (1/2/5.5/11)
Transm	it by 802.11g with Date rate (6/9/12/18/24/36/48/54)
Tueses	it has 000 11 m (20011 L-) with Data rate (0 5/10/10 5/20/50/50/50 5/05)

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:

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. For Radiated Emission, 3axis were chosen for testing for each applicable mode.

## **5. SYSTEM TEST CONFIGURATION**

#### 5.1. CONFIGURATION OF EUT SYSTEM

## Configure:



#### 5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	IP Phone	A68W	FCC ID:W9DA68W	EUT
2	Adapter	KSAPH	N/A	Marketed
3	PC	Dell	510m	Support
4	Router	TP-link	808A	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

## 6. TEST FACILITY

Site	Dongguan Precise Testing Service Co., Ltd.
Location	Building D, Baoding Technology Park, Guangming Road2, Dongcheng District, Dongguan, Guangdong, China.
FCC Registration No.	371540
Description	The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.10:2013.

#### ALL TEST EQUIPMENT LIST

Radiated Emission Test Site					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 4, 2015	July 3, 2016
Trilog Broadband Antenna (25M-1GHz)	SCHWARZBECK	VULB9160	9160-3355	July 4, 2015	July 3, 2016
Signal Amplifier	SCHWARZBECK	BBV 9475	9745-0013	July 4, 2015	July 3, 2016
RF Cable	SCHWARZBECK	AK9515E	96221	July 4, 2015	July 3, 2016
3m Anechoic Chamber	CHENGYU	966	PTS-001	June 6, 2015	June 5, 2016
MULTI-DEVICE Positioning Controller	Max-Full	MF-7802	MF780208339	N/A	N/A
Active loop antenna (9K-30MHz)	Schwarzbeck	FMZB1519	1519-038	June 6, 2015	June 5, 2016
Spectrum analyzer	Agilent	E4407B	MY46185649	June 6, 2015	June 5, 2016
Power Sensor	Agilent	U2021XA	MY55050474	June 6, 2015	June 5, 2016
Horn Antenna (1G-18GHz)	SCHWARZBECK	BBHA9120D	9120D-1246	June 6, 2015	June 5, 2016
Horn Ant (18G-40GHz)	Schwarzbeck	BBHA 9170	9170-181	June 6, 2015	June 5, 2016

Conducted Emission Test Site					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
EMI Test Receiver	Rohde & Schwarz	ESCI	101417	July 4, 2015	July 3, 2016
Artificial Mains Network	Narda	L2-16B	000WX31025	July 8, 2015	July 7, 2016
Artificial Mains Network (AUX)	Narda	L2-16B	000WX31026	July 8, 2015	July 7, 2016
RF Cable	SCHWARZBECK	AK9515E	96222	July 4, 2015	July 3, 2016
Shielded Room	CHENGYU	843	PTS-002	June 6,2015	June 5,2016

# 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 KDB 558074v03r04 for compliance to FCC 47CFR 15.247 requirements.

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

## AVERAGE POWER SETUP



## 7.3. LIMITS AND MEASUREMENT RESULT

TEST ITEM	OUTPUT POWER
TEST MODE	802.11b with data rate 1

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.412	8.74	30	Pass
2.437	9.26	30	Pass
2.462	9.14	30	Pass

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

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.412	7.42	30	Pass
2.437	7.61	30	Pass
2.462	7.53	30	Pass

TEST ITEM	OUTPUT POWER
TEST MODE	802.11n 20 with data rate 6.5

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.412	7.02	30	Pass
2.437	7.33	30	Pass
2.462	7.28	30	Pass

TEST ITEM	OUTPUT POWER
TEST MODE	802.11n 40 with data rate 6.5

Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.422	3.26	30	Pass
2.437	3.45	30	Pass
2.452	3.61	30	Pass

## 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 KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

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



#### **Spectrum Analyzer**

## 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				
	Test Da	Criteria			
	Low Channel	10.10	PASS		
>500KHZ	Middle Channel	10.10	PASS		
	High Channel	10.11	PASS		

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

LIMITS AND MEASUREMENT RESULT					
Applicable Limits	Applicable Limits				
	Test Da	Criteria			
	Low Channel	16.58	PASS		
>500KHZ	Middle Channel	16.57	PASS		
	High Channel	16.57	PASS		

TEST ITEM	6DB BANDWIDTH
TEST MODE	802.11n 20 with data rate 65

LIMITS AND MEASUREMENT RESULT					
Applicable Limite	Applicable Limits				
Applicable Limits	Test Da	Criteria			
	Low Channel	17.85	PASS		
>500KHZ	Middle Channel	17.84	PASS		
	High Channel	17.85	PASS		

TEST ITEM	6DB BANDWIDTH
TEST MODE	802.11n 40 with data rate 65

LIMITS AND MEASUREMENT RESULT					
Applicable Limite	Applicable Limits				
	Test Da	Criteria			
	Low Channel	36.47	PASS		
>500KHZ	Middle Channel	36.48	PASS		
	High Channel	36.48	PASS		



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

#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL





#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

#### 802.11g TEST RESULT

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL





#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

Mailent Spectrum Analyzer - Occupied BW					
Center Freq 2.462000000	GHz Center Trig: Fr #EGain:Low #Atten:	ENSE:INT Freq: 2.462000000 GHz ree Run Avg Holo 30 dB	Radio Sto d:>10/10 Radio De	I: None	Frequency
10 dB/div Ref 20.00 dBm			Mkr1 2.46 -2.80	167 GHz 62 dBm	
10.00		↓ 1			Center Freq 2.462000000 GHz
-10.0	mhhawaaa	howwwww			
-30.0 -40.0 -40.0				AWWWWW	
-50.0					
.70.0 Center 2.462 GHz			Spa	an 30 MHz	CF Step 3.000000 MHz Auto Man
#Res BW 100 kHz	#V	/BW 300 kHz	Sweep	2.933 ms	
Occupied Bandwidtl	n 559 MHz	Total Power	16.7 dBm		<b>Freq Offset</b> 0 Hz
Transmit Freg Error	-18 881 kHz	OBW Power	99.00 %		
x dB Bandwidth	16.57 MHz	x dB	-6.00 dB		
MSG			STATUS		



#### 802.11n (20) TEST RESULT

#### TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

💓 Agilent Spectrum Analyzer - Occupied BW									
Center Freq 2.437000000	GHz Center	ENSE:INT Freq: 2.437000000 GHz	Radio Sto	I: None	Frequency				
	vice: BTS								
10 dB/div Ref 20.00 dBm	Mkr1         2.43412 GHz           10 dB/div         Ref 20.00 dBm         -4.0124 dBm								
	1				Center Freq 2.437000000 GHz				
-10.0	m. m. Mary many	www.	Ashmer a						
-20.0			h h						
-30.0 www.www.				ᢞᠲ᠕᠋᠂ᠰᢦᢩ᠕ᠰᢇ᠔ <sub>ᡢᢕ</sub> ᠮ					
-40.0									
-60.0									
-70.0					CF Step				
Center 2.437 GHz			Spa	an 30 MHz	3.000000 MHz Auto Man				
#Res BW 100 kHz	#V	'BW 300 kHz	Sweep	2.933 ms					
Occupied Bandwidt	h	Total Power	16.4 dBm		Freq Offset				
17.816 MHz									
Transmit Freq Error	-795 Hz	OBW Power	99.00 %						
x dB Bandwidth	17.84 MHz	x dB	-6.00 dB						
MSG			STATUS						



#### TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

## 802.11n (40) TEST RESULT

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL





#### TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

🎉 Agilent Spectrum Analyzer - Occ	upied BW								
Center Freq 2.45200	Frequency								
	#IFGain:Low #Atten: 30 dB Radio Device: BTS								
10 dB/div Ref 20.0	Mkr1         2.452         GHz           10 dB/div         Ref 20.00 dBm         -12.790 dBm								
10.0					Center Freq				
0.00					2.452000000 GHz				
-10.0		1							
-20.0	and the stand of t	adage	and the second of the second o						
-30.0			— <u> </u>						
-40.0 mld. whom What you			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	American Martin and					
-50.0									
-60.0									
-70.0					CF Step				
Center 2.452 GHz				Span 60 MHz	6.000000 MHz Auto Man				
#Res BW 100 kHz		#VBW 300 kHz	Sv	veep 5.8 ms					
Occupied Band	width	Total Powe	r 10.9 dBm		Freq Offset				
	36.154 MH	z			0 Hz				
Transmit Freq Er	ror 2.846 k	Hz OBW Powe	r 99.00 %						
x dB Bandwidth 36.48 MHz		Hz x dB	-6.00 dE	3					
MSG			STATUS						

## 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 KDB 558074 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							
Angliaghta Limita	Measurement Result						
	Test Data	Criteria					
In any 100 KHz Bandwidth Outside the	At least -20dBc than the limit						
frequency band in which the spread spectrum	Specified on the BOTTOM	PASS					
intentional radiator is operating, the radio frequency	Channel						
power that is produce by the intentional radiator							
shall be at least 20 dB below that in 100KHz							
bandwidth within the band that contains the highest							
level of the desired power.	At least -20dBc than the limit	DASS					
In addition, radiation emissions which fall in the	Specified on the TOP Channel	PA00					
restricted bands, as defined in §15.205(a), must also							
comply with the radiated emission limits specified							
in§15.209(a))							



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

🊺 Ag	jilent Spectr	um Analyzer - Sw	ept SA								
. <mark>x</mark> Mar	ker 1⊿	RF 50 9	2 DC 84783 G	Hz	SEN	NSE:INT	Avg Type	: Log-Pwr	TRAC	E 1 2 3 4 5 6	Peak Search
			P IF	NO: Fast Gain:Low	Trig: Free #Atten: 3	e Run 0 dB	Avg Hold:	:>100/100 M	kr1 4.82		Next Peak
10 di Log	B/div	Ref 20.00	dBm						-39.4	82 aBm	
10.0											Next Pk Right
0.00											
-10.0											Next Pk Left
-20.0										-20.76 dBm	Marker Delta
-30.0		<b>1</b>									
-40.0			الاستفاطين المستقاطين	la sensa ta parte de la contra da contra	lauk diras di si		and an and a state of the state			tentes tertetten er	Mkr→CF
-50.0		-	- Ann Park	and the second second	and the second	and a local distance	Theological and the second		والمستقلية والمستجهر والمتشد والم		
-60.0											Mkr→RefLvl
-70.0											
											More 1 of 2
Star #Re	t 2.48 ( s BW_1	GHZ .0 MHZ		#VBW	3.0 MHz		s	weep 3	Stop 2 8.00 ms (3	5.00 GHz 0000 pts)	
MSG								STATU	JS		

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



鱦 Agilent Sp	ectrum Analyzer - Swept S	SA							
Marker 1	RF 50 Ω 1 2.372839094	1636 GHz	S	ENSE:INT	Avg Type	: Log-Pwr	TRACI	E 1 2 3 4 5 6	Peak Search
		PNO: Fast IFGain:Low	Trig: Fr #Atten:	ee Run 30 dB	Avg Hold:	:>100/100	DE		
10 dB/div	Ref 20.00 dE	3m				Mkr	1 2.372 -57.57	84 GHz 77 dBm	NextPeak
10.0									Next Pk Right
0.00									
-10.0									Next Pk Left
-20.0								-19.20 dBm	Marker Delta
-30.0									Warner Dom
-40.0									Mkr→CF
-50.0								4	
-60.0	National polymerical in Anth The contract of the Anthr	, la philip i ann an ann an an Annaich anns an ann an an an Annaich ann an	a hay be good a dia yaa ki pirat biya Mara a dia yaa ka kilanti dhaa ahaa	ing a deep oostaat () Maarina ay saadaa a	lan para tang pana atan dari pa	n an	tin kasip batahan Sana sana sana basi Sana sana sana basi		Mkr→RefLvl
-70.0									More
Start 1.0 #Res BW	000 GHz 100 kHz	#V	'BW 300 kH	z	s	weep 13	Stop 2.4 4.0 ms (3	000 GHz 0000 pts)	
MSG						100 M A 100 A 100			
mod						STATUS			
Mod Agilent Spo	ectrum Analyzer - Swept S	SA	S	ENSE:INT		STATUS			
Marker	ectrum Analyzer - Swept S RF 50 Ω 1 24.01374442	SA DC 24814 GHz PNO: East	S Trig: Fr	ENSE:INT	Avg Type Avg Hold	e: Log-Pwr :>100/100	TRACI	E E M WWWWW	Peak Search
Agilent Spo Marker	ectrum Analyzer - Swept 3 RF 50 Ω 1 24.01374442	SA DC 24814 GHz PNO: Fast IFGain:Low	s Trig: Fr #Atten:	ENSE:INT ee Run 30 dB	Avg Type Avg Hold	:>Log-Pwr :>100/100	TRACI TYP DE 1 24.013		Peak Search Next Peak
Marker 10 dB/div	ectrum Analyzer - Swept RF 50 Ω 1 24.01374442 Ref 20.00 dE	SA DC 24814 GHz PNO: Fast IFGain:Low 3m	Trig: Fr , #Atten:	ENSE:INT ee Run 30 dB	Avg Type Avg Hold:	: Log-Pwr :>100/100	ткасі түр De 1 24.013 -42.34	E 12 3 4 5 6 E MWWWW P NNNN 3 7 GHz 42 dBm	Peak Search Next Peak
Marker /	ectrum Analyzer - Swept RF 50 Ω 1 24.01374442 Ref 20.00 dE	SA DC 24814 GHz PNO: Fast IFGain:Low BM	v Trig: Fr #Atten:	ee Run 30 dB	Avg Type Avg Hold:	: Log-Pwr >100/100	TRACI TYP DE 1 24.013 -42.34	23456 PNNNN 7 PNNNN 3 7 GHz 42 dBm	Peak Search Next Peak
Agilent Specific A	ectrum Analyzer - Swept RF 50 Ω 1 24.01374441 Ref 20.00 dE	SA DC 24814 GHz PNO: Fast IFGain:Low	Trig: Fr	ense:Int ee Run 30 dB	Avg Type Avg Hold:	:: Log-Pwr :>100/100	TRACI TYP DE 1 24.013 -42.34	123456 MWWWWW PNNNN 37GHz 42dBm	Peak Search Next Peak Next Pk Right Next Pk Left
Image: Constraint Specific Agriculture         Image: Constraint Agriculture         Image: Constrain	ectrum Analyzer - Swept RF 50 Ω 1 24.01374443 Ref 20.00 dE	SA DC 24314 GHz PNO: Fast IFGain:Low 3m	Trig: Fr	ense:Int ee Run 30 dB	Avg Type Avg Hold:	E: Log-Pwr >100/100	TRACI TYP DE 1 24.013 -42.34	123456 WWWWW PNNNN 37 GHz 42 dBm	Peak Search Next Peak Next Pk Right Next Pk Left
Agilent Specific X     Marker      10 dB/div     0.00     -10.0     -20.0     -30.0	ectrum Analyzer - Swept 1 RF 50 Ω 1 24.01374443 Ref 20.00 dE	SA DC 24814 GHz PNO: Fast IFGain:Low BM	Trig: Fr	ENSE:INT	Avg Type Avg Hold:	: Log-Pwr >100/100	TRACE TYP DE 1 24.013 -42.34	123456 MWWWW PANNNN 37 GHz 42 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta
Agilent Specific X     Marker /     10 dB/div     000     10.0     -10.0     -20.0     -30.0     -40.0	ectrum Analyzer - Swept 1 RF 50 Ω 1 24.01374441 Ref 20.00 dE	SA DC 24814 GHz PNO: Fast IFGain:Low BM	v Trig: Fr #Atten:	ENSE:INT	Avg Type Avg Hold:	:: Log-Pwr >100/100 Mkr	TRACI TYP DE 1 24.013 -42.34	□23456 F MWWWW T NNNN 37 GHz 42 dBm 	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF
Image: Specific	ectrum Analyzer - Swept 1 RF 50 Ω 1 24.01374442 Ref 20.00 dE	SA DC 24814 GHz PRO: Fast IFGain:Low BM	v Trig: Fr #Atten:	ENSE:INT		STATUS E: Log-Pwr >100/100 MIKC		123456 MWWWW PANNNN 37GHz 42dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta MkrCF
Image: Agging the system           Marker /           10 dB/div           0.00           10.0           0.00           -10.0           -10.0           -20.0           -30.0           -40.0           -50.0           -50.0	ectrum Analyzer - Swept 1 RF 50 Ω 1 24.01374441 Ref 20.00 dE	SA DC 24814 GHz PRO: Fast IFGain:Low BM Comparison Comparis	v Trig: Fr #Atten:	ENSE:INT	Avg Type Avg Hold:	status	TRACI TYP DE 1 24.013 -42.34	123456 MUNITER PANNAN 37GHz 42dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF
Marker           10 dB/div           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           -10.0           -10.0           -20.0           -30.0           -40.0           -50.0           -60.0           -70.0	ectrum Analyzer - Swept RF 50 Ω 1 24.01374442 Ref 20.00 dE	SA DC 24814 GHz PRO: Fast PRO: Fast	Trig: Fr #Atten:	ENSE:INT ee Run 30 dB	Avg Type Avg Hold:	status		1 -19.20 dbm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF
Image: Specific	ectrum Analyzer - Swept RF 50 Ω 1 24.01374443 Ref 20.00 dE	SA DC   24314 GHz PRO: Fast IFGain:Low 3m	Trig: Fr #Atten:	ENSE:INT	Avg Type Avg Hold:	E: Log-Pwr >100/100	TRACE TYP DE 1 24.013 -42.34	123356 PANNAN 7 CHZ 42 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF Mkr→Ref Lvl More 1 of 2



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

〕 Agile	nt Spectru	m Analyzer -	Swept SA								
Mark	er 1 2	RF 5	οΩ DC 2827094	42 GHz PNO: Fa	st 🖵 Trig:	SENSE:INT	Avg Type Avg Hold:	:: Log-Pwr :>100/100	TRAC	E 1 2 3 4 5 6 E M WWWW	Peak Search
10 dB/	div	Ref 20.0	0 dBm	IFGain:Lo	ow #Atte	en: 30 dB		Mkr	1 23.86 -43.2	2 1 GHz 55 dBm	Next Peak
10.0											Next Pk Right
0.00 —											Next Pk Left
-10.0 -										-19.26 dBm	
-30.0 —											Marker Delta
-40.0			ki <sub>na</sub> na na angal	Natural Constant Solution	411 may later of the set	a part f	(experimental systems)	ية إذ المراجع عنه أنه الخاط المراجع . من الحق المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع ال	ر افغان و رفانی رو بافعان معالم و رو بافعان		Mkr→CF
-60.0		ale alfre, de aso		a ping a dia ang ang ang ang ang ang ang ang ang an	terfériða, "The secondary						Mkr→RefLvl
-70.0											More 1 of 2
Start #Res	2.48 G BW 1.	Hz 0 MHz		#	VBW 3.0 N	<b>/H</b> z	s	weep 38	2 Stop 3.00 ms	5.00 GHz 0000 pts)	
MSG								STATUS	S		

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



Magilent Spec	trum Analyzer - Swept SA		CENCETIN					
Marker 1	2.3976199200	664 GHz	Trig: Free Run	Avg Type Avg Hold	e: Log-Pwr :>100/100	TRACE 1 2 3 TYPE MWW	456 WWW	eak Search
		IFGain:Low	#Atten: 30 dB	<b>U</b>				Next Peak
10 dB/div	Ref 20.00 dBr	m			WIKE	-38.731 dl	Bm	
Log								
10.0							N	ext Pk Right
0.00								
0.00								Next Pk Left
-10.0								
-20.0								
						-23.9	7 dBm	Marker Delta
-30.0							1	
-40.0								Mkr→CF
-50.0								
35.0								
-60.0	հետիլում Արաստեններ	a <mark>kteen deptikaans, bartaski binare</mark>	entrum had to be all the	la ana kana mana mana kana kana kana kana		ter i provid set statistica e di tatis Recentratione della statistica e di tatistica e di	n N	Vlkr→Ref Lvl
-70.0	a second seco	n det mensen at ver mensen til at ster	an na sa	والمراجع والمراجع ومراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والم				
								More
Start 1.00	00 GHz	-43.7DAM	200 1411-			Stop 2.4000 C	Hz	1 of 2
#Res BW	100 KHZ	#VBW	300 KHZ	5	status	1.0 ms (30000	ots)	
Agilent Spec	trum Analyzer - Swent SA							
Markor 1	ctrum Analyzer - Swept SA RF 50 Ω D		SENSE:IN		e: Log-Pwr	TRACE 12 3	456 P	eak Search
Marker 1	ctrum Analyzer - Swept SA RF 50 Ω D 4.8245434847	C 783 GHz PNO: Fast IFGain:Low	SENSE:IN Trig: Free Run #Atten: 30 dB	Avg Type Avg Hold	e: Log-Pwr :>100/100	TRACE 1 2 3 TYPE MWW DET P N N	456 WWW NNN	eak Search
Magilent Spec	ctrum Analyzer - Swept SA RF 50 Ω D 4.824543484	783 GHz PNO: Fast IFGain:Low	SENSE:IN Trig: Free Run #Atten: 30 dB	Avg Type Avg Hold	e: Log-Pwr :>100/100	TRACE 1 2 3 TYPE MWW DET P NN T1 4.824 5 6	456 NNN HZ	eak Search Next Peak
Marker 1	ctrum Analyzer - Swept SA RF 50 Ω D 4.8245434847 Ref 20.00 dBr	783 GHz PNO: Fast IFGain:Low	SENSE:IN Trig: Free Run #Atten: 30 dB	Avg Type Avg Hold:	e: Log-Pwr :>100/100 Mkt	TRACE 1 2 3 TYPE MWW DET P NN 14.824 5 G -40.862 dl	4 5 6 WWW N N N HZ Bm	eak Search Next Peak
Agilent Species	trum Analyzer - Swept SA RF 50 Ω D 4.8245434847 Ref 20.00 dBr	ra GHz PNO: Fast IFGain:Low	SENSE:IN Trig: Free Run #Atten: 30 dB	Avg Type Avg Hold	e: Log-Pwr :>100/100	TRACE 1 2 3 TYPE MWW DET P NN r1 4.824 5 G -40.862 dl	456 NNN HZ Bm	eak Search Next Peak ext Pk Right
Marker 1 Marker 1 10 dB/div	ctrum Analyzer - Swept SA RF   50 Ω D 4.8245434847 Ref 20.00 dBf	783 GHz PNO: Fast IFGain:Low	SENSE:IN Trig: Free Run #Atten: 30 dB	Avg Type Avg Hold	e: Log-Pwr :>100/100 MK1	TRACE 1 2 3 TYPE MWW DET PIN 1 4.824 5 G -40.862 d	456 NNN HZ Bm	eak Search Next Peak ext Pk Right
Marker 1 Marker 1 10 dB/div 10.0	trum Analyzer - Swept SA RF   50 Ω D 4.8245434847 Ref 20.00 dBr	r 783 GHz PNO: Fast IFGain:Low	SENSE:IN Trig: Free Run #Atten: 30 dB	Avg Type Avg Hold	e: Log-Pwr >100/100	TRACE 1 2 3 TYPE M DET P NN r1 4.824 5 G -40.862 d	4 5 6 NNN HZ BM N	eak Search Next Peak ext Pk Right
Marker 1 Marker 1 10 dB/div 10.0	trum Analyzer - Swept SA RF 50 Ω D 4.8245434847 Ref 20.00 dBr	783 GHz PNO: Fast IFGain:Low	SENSE:IN Trig: Free Run #Atten: 30 dB	Avg Type Avg Hold	e: Log-Pwr :>100/100	TRACE 123 TYPE MWW DET PINN r1 4.824 5 G -40.862 dl	456 P	eak Search Next Peak ext Pk Right Next Pk Left
Marker 1 Marker 1 10 dB/div Log 10.0	trum Analyzer - Swept SA RF   50 Ω D 4.8245434847 Ref 20.00 dBr	TRANSPORT	SENSE:IN Trig: Free Run #Atten: 30 dB	Avg Type Avg Hold	e: Log-Pwr :>100/100	TRACE 123 TYPE Mww oet P NN r1 4.824 5 G -40.862 dl	456 NNN NHZ BM	eak Search Next Peak ext Pk Right Next Pk Left
Magilent Spece           Marker 1           10 dB/div           10.0           10.0           -20.0	trum Analyzer - Swept SA RF 50 Ω D 4.8245434847 Ref 20.00 dBr	TRANSFORMENT	SENSE:IN Trig: Free Run #Atten: 30 dB	Avg Type Avg Hold	e: Log-Pwr :>100/100	TRACE 1 2 3 TYPE M DET P NN r1 4.824 5 G -40.862 dl	4 5 6 Pi	eak Search Next Peak ext Pk Right Next Pk Left Marker Delta
Image: Agging the speed of the spe	trum Analyzer - Swept SA RF 50 Ω D 4.8245434847 Ref 20.00 dBr	n 783 GHz PNO: Fast IFGain:Low	SENSE:IN Trig: Free Run #Atten: 30 dB	Avg Type Avg Hold	a: Log-Pwr :>100/100	TRACE 1 2 3 TYPE MWW DET PNW 1 4.824 5 G -40.862 dl	4 5 6 Pi NNN HZ Bm 7 686 r	eak Search Next Peak ext Pk Right Next Pk Left Marker Delta
Marker 1	trum Analyzer - Swept SA RF   50 Q D 4.8245434847 Ref 20.00 dBr	TRANSPORT	SENSE:IN Trig: Free Run #Atten: 30 dB	Avg Type Avg Hold	e: Log-Pwr :>100/100	TRACE 1 2 3 TYPE M WW DET P NN r1 4.824 5 G -40.862 d	4 5 6 Pi	eak Search Next Peak ext Pk Right Next Pk Left Marker Delta
Magilent Specie           Marker 1           10 dB/div           10.0           10.0           -10.0           -20.0           -30.0           -40.0	trum Analyzer - Swept SA RF 50 Ω D 4.8245434847 Ref 20.00 dBr	Ta GHZ PN0: Fast IFGain:Low m	SENSE:IN Trig: Free Run #Atten: 30 dB	Avg Type Avg Hold	e: Log-Pwr :>100/100	TRACE 1 2 3 TYPE M WINDET P NN r1 4.824 5 G -40.862 dl	4 5 6 Pi	eak Search Next Peak ext Pk Right Next Pk Left Marker Delta Mkr→CF
Marker 1           Marker 1           10 dB/div           10.0           10.0           -10.0           -20.0           -30.0           -40.0           -50.0	trum Analyzer - Swept SA RF 50 Ω D 4.8245434847 Ref 20.00 dBr	m	SENSE:IN Trig: Free Run #Atten: 30 dB		2: Log-Pwr :>100/100 Mkt	TRACE ] 2 3 TYPE M WE DET P NN 1 4.824 5 G -40.862 dl		eak Search Next Peak ext Pk Right Next Pk Left Marker Delta Mkr→CF
Agilent Specie           Marker 1           10 dB/div           10.0           10.0           -20.0           -30.0           -40.0           -50.0           -60.0	trum Analyzer - Swept SA RF 50 Q D 4.8245434847 Ref 20.00 dBr	Table Control of the second se	SENSE:IN Trig: Free Run #Atten: 30 dB		2: Log-Pwr :>100/100	TRACE 1 2 3 TYPE M WW DET P NN r1 4.824 5 G -40.862 dl		eak Search Next Peak ext Pk Right Next Pk Left Marker Delta Mkr->CF
Agilent Spec           Marker 1           10 dB/div           10 dB/div           10.0           -10.0           -20.0           -30.0           -40.0           -60.0	trum Analyzer - Swept SA RF 50 Q D 4.8245434847 Ref 20.00 dBr	m	SENSE:IN Trig: Free Run #Atten: 30 dB		E: Log-Pwr >100/100	TRACE 1 2 3 TYPE M DET P NN r1 4.824 5 G -40.862 dl		eak Search Next Peak ext Pk Right Next Pk Left Marker Delta Mkr→CF
Marker 1           10 dB/div           10.0           10.0           10.0           -10.0           -20.0           -30.0           -40.0           -50.0           -60.0	trum Analyzer - Swept SA RF 50 Ω D 4.8245434847 Ref 20.00 dBr	m	SENSE:IN Trig: Free Run #Atten: 30 dB		2: Log-Pwr :>100/100 Mkt	TRACE 1 2 3 TYPE Mumo Det P NN 1 4.824 5 G -40.862 dl		eak Search Next Peak ext Pk Right Next Pk Left Marker Delta Mkr→CF Mkr→Ref Lvl
Marker 1           10 dB/div           10.0           10.0           10.0           10.0           10.0           -20.0           -30.0           -40.0           -50.0           -70.0           Start 2.49	trum Analyzer - Swept SA RF 50 Q D 4.8245434847 Ref 20.00 dBr	n n n n n n n n n n n n n n	SENSE:IN Trig: Free Run #Atten: 30 dB		2: Log-Pwr :>100/100 Mki	TRACE 1 2 3 TYPE M WINDET P NN r1 4.824 5 G -40.862 dl		eak Search Next Peak ext Pk Right Next Pk Left Marker Delta Mkr->CF Mkr->Ref Lvl More 1 of 2
Marker 1 10 dB/div 10 dB/div 10.0 10.0 -10.0 -20.0 -30.0 -40.0 -50.0 -40.0 -50.0 -40.0 -50.0 -70.0 Start 2.48 #Res BW	Ctrum Analyzer - Swept SA RF 50 Q D 4.8245434847 Ref 20.00 dBr 1 1 4 6 6 6 6 6 1 6 6 7 1 6 7 1 6 7 1 6 7 7 7 7 7 7 7 7 7 7 7 7 7	m	SENSE:IN Trig: Free Run #Atten: 30 dB	Avg Type Avg Hold:	E: Log-Pwr >100/100	TRACE 1 2 3 TYPE M TO ET P NN r1 4.824 5 G -40.862 dl -239 -239 -239 -239 -239 -239 -239 -239	4 5 6 P HZ Bm N N N N N N N N N N N N N	eak Search Next Peak ext Pk Right Next Pk Left Marker Delta Mkr→CF Mkr→Ref Lvl More 1 of 2



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

🊺 Ag	ilent Spect	rum Analyzer - Sw	ept SA						1		
. <mark>x</mark> Mar	ker 1	<sup>R</sup> 50 4.8748320	Ω DC 011067 G	Hz	SEN	ISE:INT	Avg Type	: Log-Pwr	TRAC	E 1 2 3 4 5 6	Peak Search
			1	PNO:Fast 🕞 FGain:Low	Trig: Free #Atten: 3	e Run 0 dB	Avg Hold:	>100/100	TYI		
								M	kr1 4.87	4 8 GHz	NextPeak
10 dE	3/div	Ref 20.00	dBm						-42.1	85 dBm	
209											
10.0											Next Pk Right
0.00											
-10.0											Next Pk Left
-20.0										-22.79 dBm	Marker Date
											warker Deita
-3U.U											
-40.0		<b>∮</b> 1									Mkr. CE
				h at here a		and a late to be a state of the second	المستعدية	http://www.ullo.		ab ta di birna ba bi	IVIKICF
-50.0	danta <mark>-</mark>		a da la constante de la consta La constante de la constante de			a selection and a second	and the second second	<u>انغور ، رسانگر ، سرور</u> ا	an an an the state of the section of	patoleos de la Mainar.	
60.0	<b>1</b>										Mkr. Dofl vi
-00.0											WIKI - KCI E VI
-70.0											
											More
Star	t 2.48	GHz						_	Stop 2	5.00 GHz	1 of 2
#Re	s BW	1.0 MHz		#VBN	/ 3.0 MHz		S	weep 3	8.00 ms (3	0000 pts)	
MSG								STATU	IS		

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

OF 802.11g FOR MODULATION IN HIGH CHANNEL



🂓 Agilent Spe	ectrum Analyzer - Swept SA	A				
Marker 1	RF 50 Ω D 1 2.381986066	202 GHz PN0: Fast	Trig: Free Run	Avg Type: Log-Pwr Avg Hold:>100/100		Peak Search
10 dB/div	Ref 20.00 dBi	IFGain:Low	#Atten: 30 dB	Mkr	1 2.381 99 GHz -54.530 dBm	Next Peak
10.0						Next Pk Right
-10.0						Next Pk Left
-20.0					-22.81 dBm	Marker Delta
-30.0						Mkr→CF
-50.0	the state of the second second		the well being sented at 196	Line to compress of the track of surgery type to the first of the mark	ins torough the stand of the st	Mkr→RefLvl
-70.0	a na 471 na 1996 na 19 Na 1966 na 1976 na 1996	an Channa ann an Ann an Shanna a' Shanna a' Shanna a' Shanna a	an tea fair an		1999 - Barris Andread and A	More
Start 1.00 #Res BW	000 GHz 100 kHz	#VBW	/ 300 kHz	Sweep 13	Stop 2.4000 GHz 4.0 ms (30000 pts)	1 of 2
Acilent Spe	ectrum Analyzer - Swept SA					
Marker 1	ectrum Analyzer - Swept SA RF 50 Ω D 2 484250575	A DC <b>D19 GHz</b>	SENSE:INT	Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6	Peak Search
Agilent Spe Marker 1	ectrum Analyzer - Swept SA RF 50 Ω C 1 2.484250575	019 GHz PNO: Fast IFGain:Low	SENSE:INT Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr Avg Hold:>100/100 Mk	TRACE 123456 TYPE MWWWWW DET PNNNN 12.4843 GHz 29.491 dBm	Peak Search
Marker 1	ectrum Analyzer - Swept Si RF 50 Ω C 1 2.4842505751 Ref 20.00 dB	A O19 GHZ PNO: Fast IFGain:Low m	⊃ Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr Avg Hold:>100/100 Mk	TRACE 123456 TYPE 0 WWWWW DET 0 NNNNN r1 2.484 3 GHz -29.491 dBm	Peak Search Next Peak
Marker 1 10 dB/div	ectrum Analyzer - Swept Si RF 50 Ω E 2.484250575 Ref 20.00 dB	A 019 GHZ PN0: Fast IFGain:Low m	SENSE:INT ☐ Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr Avg Hold:>100/100 Mk	TRACE 23456 TYPE WWWWW DET NNNNN r1 2.484 3 GHz -29.491 dBm	Peak Search Next Peak Next Pk Right
Agilent Spi	ectrum Analyzer - Swept 52 RF 50 Ω C Ref 20.00 dB1	A 019 GHz PNO: Fast IFGain:Low m	SENSE:INT Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr Avg Hold:>100/100	TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P NNNNN r1 2.484 3 GHz -29.491 dBm	Peak Search Next Peak Next Pk Right Next Pk Left
Agilent Spri     Agilent Spri     Marker       10 dB/div     0.00     -10.0     -20.0     1     -30.0     -40.0	ectrum Analyzer - Swept Si RF   50 Ω = C Ref 20.00 dB1	A 019 GHz PNO: Fast IFGain:Low m	SENSE:INT Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr Avg Hold:>100/100 Mk	TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P NNNNN r1 2.484 3 GHz -29.491 dBm	Peak Search Next Peak Next Pk Right Next Pk Left
Agilent Spr     Agilent Spr     Marker 1      10 dB/div     0      0.00      -10.0      -20.0      -30.0      -40.0      -50.0     Agthr	ectrum Analyzer - Swept 54 RF   50 Ω = C 1 2.484250575 Ref 20.00 dBr	A O19 GHZ PNO: Fast IFGain:Low m m	SENSE:INT Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr Avg Hold:>100/100 Mk	TRACE 1 2 3 4 5 6 TYPE MUNICIPAL OF THE NUMBER 71 2.484 3 GHz -29.491 dBm -29.491 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF
Agilent Spr     Agilent Spr     Marker 1      10 dB/div      0.00      -10.0      -20.0      -40.0      -50.0      -40.0      -50.0      -70.0      -	ectrum Analyzer - Swept 54 RF 50 Ω - E 1 2.484250575 Ref 20.00 dB1	A O19 GHZ PNO: Fast IFGain:Low m m	SENSE:INT Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr Avg Hold:>100/100 Mk	TRACE TYPE MINIMUM r1 2.484 3 GHz -29.491 dBm -29.491 dBm -29.491 dBm	Peak Search Next Peak Next Pk Righ Next Pk Lef Marker Delta Mkr→Cf
Agilent Spr     Marker 1     10 dB/div     0	ectrum Analyzer - Sweet 53 RF 50 Ω - E 1 2.484250575 Ref 20.00 dBr 	A 019 GHz PNO: Fast IFGain:Low M M M M M M M M M M M M M	SENSE:INT Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr Avg Hold:>100/100 Mk	TRACE 2 3 4 5 6 TYPE MINIMUM POINT NO. 100 1 2.484 3 GHz -29.491 dBm -22.61 dBm -22.61 dBm -22.61 dBm -22.61 dBm -22.61 dBm -20.00 GHz -20.00 GHz -20.00 GHz	Peak Search Next Peak Next Pk Right Next Pk Left Marker Detta Mkr→CF Mkr→Ref Lvi More 1 of 2



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

🊺 Ag	ilent Spect	rum Analyzer - S	wept SA								
<mark>.x</mark> Mar	ker 1	<sup>R</sup> ⊧ 50 4.823792	Ω DC 909764	GHz	SEN	ISE:INT	Avg Type	: Log-Pwr	TRAC	E 1 2 3 4 5 6	Peak Search
				PNO: Fast G	Trig: Free #Atten: 3	e Run DdB	Avg Hold:	>100/100	TYI Di		
								M	kr1 4.82	3 8 GHz	NextPeak
10 dE	3/div	Ref 20.00	) dBm						-40.6	43 dBm	
209											
10.0											Next Pk Right
0.00											
-10.0											Next Pk Left
-20.0										24.71 dBm	Marker Date
										-24.71 0.010	Marker Delta
-3U.U		4									
-40.0		_ <b>\</b>									Mkr. CE
			بايد ب	المريد الدارية		antidadanta turan	and the address of the	Local de la	dina, sina inte	lander filler faller	IVIKI→CF
-50.0	inii ni	della del Nota della			Notes de la seta de la Notes de la seta de la s	and the second secon			<del>ماناندر ریدگذ<sub>ده م</sub>یدور د</del>		
60.0											Mkr. Dofl vi
-00.0											WIKI -> KCI L VI
-70.0											
											More
Star	t 2.48	GHz							Stop 2	5.00 GHz	1 of 2
#Re	s BW	1.0 MHz		#VBV	/ 3.0 MHz		S	weep 38	3.00 ms (3	0000 pts)	
MSG								STATU	S		

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

OF 802.11n20 FOR MODULATION IN MIDDLE CHANNEL



Dialent Spec	trum Analyzer - Swept SA		SENSEITN	т				
Marker 1	2.35697189900	63 GHz	Trig: Free Run	Avg Type Avg Hold	e: Log-Pwr l:>100/100	TRACE TYPE	123456 M	Peak Search
		IFGain:Low	#Atten: 30 dB		Mice	DET		Next Peak
10 dB/div	Ref 20.00 dBm				IVINI	-51.48	4 dBm	
10.0								Next Pk Right
0.00								
10.0								Next Pk Left
-10.0								
-20.0							-24.01 dBm	Marker Delta
-30.0								
-40.0								
-40.0							▲1	Mkr→CF
-50.0								
-60.0	a la cala la atante a cala strata	and the states with the server of the states	ا ماريخ او الريمانية ومراجع المراجع المراجع	all for the part of the second se	a san wa sisis di bisis a	et de stratighet de stat		Mkr→RefLvl
-70.0	a distanti ang ina distanti kata di kat	and the first of the second	to - Handrid et al. Unite Physical Street	- N DARIE II CERTA RADALES (D. 18	te i general din stati i sectori de la din de la	a Lineard a China Biblio		
								More
Start 1.00	00 GHz					Stop 2.4	000 GHz	1 of 2
#Res BW	100 KHZ	#VBV	V 300 KHZ	8	sweep 134	4.0 ms (30	1000 pts)	
					STATUS			
Agilent Spec	trum Analyzer - Swent SA				STATUS			
Marker 1	ctrum Analyzer - Swept SA RF 50 Ω DC 24 0595295000	983 GHz	SENSE:IN	T Avg Type	STATUS	TRACE	123456	Peak Search
Marker 1	ctrum Analyzer - Swept SA RF 50 Ω DC 24.0595295009	983 GHz PNO: Fast G IFGain:Low	SENSE:IN ☐ Trig: Free Run #Atten: 30 dB	T Avg Typ Avg Hold	e: Log-Pwr l:>100/100	TRACE TYPE DET	123456 M <del>WWWW</del> PNNNNN	Peak Search
Marker 1	ctrum Analyzer - Swept SA RF 50 Ω DC 24.0595295005	983 GHz PNO: Fast G IFGain:Low	☐ SENSE:IN ☐ Trig: Free Run #Atten: 30 dB	T Avg Type Avg Hold	e: Log-Pwr l:>100/100	TRACE TYPE DET 1 24.059	123456 MWWWWW PNNNNN 5 GHz	Peak Search
Agilent Spec M Marker 1	ctrum Analyzer - Swept SA RF 50 Ω DC 24.0595295009 Ref 20.00 dBm	9 <b>83 GHZ</b> PNO: Fast ↓ IFGain:Low	☐ SENSE:IN ☐ Trig: Free Run #Atten: 30 dB	T Avg Type Avg Hold	e: Log-Pwr I:>100/100	ткасе туре Deт 1 24.059 -42.22	123456 M PNNNN 5 GHz 1 dBm	Peak Search Next Peak
Marker 1	trum Analyzer - Swept SA RF 50 Ω DC 24.0595295009 Ref 20.00 dBm	983 GHz PNO: Fast IFGain:Low	☐ SENSE:IN ☐ Trig: Free Run #Atten: 30 dB	T Avg Typ Avg Hold	e: Log-Pwr I:>100/100	ткасе туре Deт 1 24.059 -42.22	123456 M PNNNN 5 GHz 1 dBm	Peak Search Next Peak Next Pk Right
Marker 1	ctrum Analyzer - Swept SA RF 50 Ω DC 24.0595295009 Ref 20.00 dBm	983 GHZ PNO: Fast IFGain:Low	☐ SENSE:IN ☐ Trig: Free Run #Atten: 30 dB	T Avg Type Avg Hold	e: Log-Pwr I:>100/100	TRACE TYPE DET 1 24.059 -42.22	123456 M PNNNNN 5 GHz 1 dBm	Peak Search Next Peak Next Pk Right
Marker 1	ctrum Analyzer - Swept SA RF 50 Ω DC 24.0595295009 Ref 20.00 dBm	983 GHz PNO: Fast IFGain:Low	☐ SENSE:IN ☐ Trig: Free Run #Atten: 30 dB	T Avg Typ Avg Hold	e: Log-Pwr 1:>100/100	TRACE TYPE DET 1 24.059 -42.22	123456 MWWWWW NNNNN 5 GHz 1 dBm	Peak Search Next Peak Next Pk Right
Agilent Spec     A	trum Analyzer - Swept SA RF 50 Ω DC 24.0595295009 Ref 20.00 dBm	983 GHZ PNO: Fast ↓ IFGain:Low	☐ SENSE:IN ☐ Trig: Free Run #Atten: 30 dB	T Avg Type Avg Hold	e: Log-Pwr I:>100/100	ткасе туре Deт 1 24.059 -42.22	123456 MWWWWW PNNNN 5 GHz 1 dBm	Peak Search Next Peak Next Pk Right Next Pk Left
Agilent Species     A	ctrum Analyzer - Swept SA RF 50 Ω DC 24.0595295009 Ref 20.00 dBm	983 GHz PNO: Fast IFGain:Low	☐ SENSE:IN ☐ Trig: Free Run #Atten: 30 dB	T Avg Typ Avg Hold	e: Log-Pwr I:>100/100	TRACE TYPE DET 1 24.059 -42.22	123456 MWWWWW PNNNNN 5 GHz 1 dBm	Peak Search Next Peak Next Pk Right Next Pk Left
Agilent Spec     A	trum Analyzer - Swept SA RF 50 Ω DC 24.0595295009 Ref 20.00 dBm	283 GHz PNO: Fast IFGain:Low	☐ SENSE:IN ☐ Trig: Free Run #Atten: 30 dB	T Avg Typ Avg Hold	e: Log-Pwr I:>100/100	ткасе туре Deт 1 24.059 -42.22	23456 MWWWWW PNNNN 5 GHz 1 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta
Agilent Spec     A	ctrum Analyzer - Swept SA RF 50 Ω DC 24.0595295009 Ref 20.00 dBm	983 GHz PNO: Fast IFGain:Low	Trig: Free Run #Atten: 30 dB	T Avg Typ Avg Hold	e: Log-Pwr I:>100/100	ткасе туре Deт 1 24.059 -42.22	1 2 3 4 5 6 WWWWWW P NNNN 5 GHz 1 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta
Marker 1           10 dB/div           0.00           -10.0           -10.0           -10.0           -40.0	trum Analyzer - Swept SA RF 50 Ω DC 24.0595295009 Ref 20.00 dBm	283 GHz PNO: Fast IFGain:Low	Trig: Free Run #Atten: 30 dB	T Avg Typ Avg Hold	e: Log-Pwr :>100/100	TRACE Type Det 1 24.059 -42.22	1 2 3 4 5 6 M WWWWW P NNNN 5 GHz 1 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF
Agilent Spec	ctrum Analyzer - Swept SA RF 50 Ω DC 24.0595295009 Ref 20.00 dBm	983 GHz PNO: Fast IFGain:Low	SENSE:IN Trig: Free Run #Atten: 30 dB		E: Log-Pwr I:>100/100 MKr'	TRACE TYPE DET 1 24.059 -42.22	2 3 4 5 6 WWWWWW P NNNN 5 GHz 1 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF
Agilent Spec     A	trum Analyzer - Swept SA RF 50 Ω DC 24.0595295009 Ref 20.00 dBm	983 GHz PNO: Fast IFGain:Low	SENSE:IN Trig: Free Run #Atten: 30 dB		e: Log-Pwr I:>100/100 MKr	TRACE TYPE DET 1 24.059 -42.22	2 3 4 5 6 M	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF
Marker 1           10 dB/div           10.0           -0.0           -10.0           -20.0           -30.0           -30.0           -60.0	trum Analyzer - Swept SA RF 50 Ω DC 24.0595295009 Ref 20.00 dBm	283 GHz PNO: Fast IFGain:Low	SENSE:IN Trig: Free Run #Atten: 30 dB		E: Log-Pwr I:>100/100 MKr'	TRACE TYPE DET 1 24.059 -42.22	2 3 4 5 6 WWWWWW P NNNN 5 GHz 1 dBm -24.01 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF
Marker 1           Marker 1           0.00           10.0           -10.0           -20.0           -30.0           -40.0           -50.0           -70.0	trum Analyzer - Swept SA RF 50 Ω DC 24.0595295009 Ref 20.00 dBm	983 GHz PNO: Fast IFGain:Low	SENSE:IN Trig: Free Run #Atten: 30 dB		E: Log-Pwr I:>100/100	TRACE TYPE DET 1 24.059 -42.22	1 2 3 4 5 6 M 2 3 4 5 6 M 2 3 4 5 6 P N N N N 5 GHz 1 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF
Marker 1           10 dB/div	trum Analyzer - Swept SA RF 50 Ω DC 24.0595295009 Ref 20.00 dBm	283 GHz PNO: Fast IFGain:Low	SENSE:IN Trig: Free Run #Atten: 30 dB		e: Log-Pwr :>100/100 MKr	TRACE Type Det 1 24.059 -42.22	23456 MWWWWW PNNNN 5 GHz 1 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Detta Mkr→CF Mkr→Ref Lvl More 1 of 2
Marker 1           10 dB/div           -20.0           -30.0           -40.0           -50.0           -20.0           -30.0           -20.0           -30.0           -20.0           -30.0           -20.0           -20.0           -20.0           -30.0           -20.0           -20.0           -20.0           -20.0           -20.0           -20.0           -20.0           -20.0           -20.0           -20.0           -20.0           -20.0           -20.0           -20.0           -20.0           -20.0           -20.0           -20.0	Ref 20.00 dBm	283 GHz PRO: Fast IFGain:Low	SENSE:IN Trig: Free Run #Atten: 30 dB	T Avg Typ AvgHold	e: Log-Pwr I:>100/100 MKr	TRACE Type Det 1 24.059 -42.22	1 2 3 4 5 6 PNNNNN 5 GHz 1 dBm 	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF Mkr→Ref Lvl Nore 1 of 2


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

🊺 Ag	ilent Spect	rum Analyzer - S	wept SA								
Mar	ker 1	<sup>R</sup> ⊧ 5	150038	GHz	SEI	NSE:INT	Avg Type	: Log-Pwi	r TRAC	E 123456	Peak Search
				PNO: Fast G	Trig: Free #Atten: 3	e Run 0 dB	Avg Hold	>100/100	TYF		
								N	lkr1 2.48	5 0 GHz	NextPeak
10 di Loa	3/div	Ref 20.0	0 dBm						-28.9	04 dBm	
10.0											Next PK Right
U.UU											Next Dist. of
-10.0											Next PK Left
-20.0	-									-24.61 dBm	Markor Dolta
20.0	2										Marker Della
-30.0											
-40.0											Mkr_CF
	1 <sup>1</sup> 0	demans as re-	يرا بالمراجع	التألف متراغل براغان و	المتعالية الم	المروان والألومين الم	Malification and	June (Cashing	ter anna a tha tha bh	ality is the star	
-50.0		aler (1997) - Aler	<b>Anton</b>			and the local division of the local division		اله <sub>ري ك</sub> اللار <sub>مريك</sub> ي	Non- Adda and Milescale Web		
-60.0											Mkr→RefLvl
-70.0											
											More
Star	t 2.48	GHz							Stop 2	5.00 GHz	1 of 2
#Re	sBW	1.0 MHz		#VBV	V 3.0 MHz		s	weep 3	38.00 ms (3	0000 pts)	
MSG								STAT	US		

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



鱦 Agilent Spe	ectrum Analyzer - Swept S	A							- 6 -
Marker 1	RF 50 Ω	DC 0000 GHz	SEI	NSE:INT	Avg Type	: Log-Pwr	TRAC	E 1 2 3 4 5 6	Peak Search
mainton		PNO: Fast	Trig: Free #Atten: 3	e Run 0 dB	Avg Hold:	>100/100	TYP		
	2	II Guilleow				Mkr	1 2.400	00 GHz	Next Peak
10 dB/div	Ref 20.00 dB	im					-41.1	37 dBm	
10.0									Next Pk Right
0.00									
									Next Pk Left
-10.0									
-20.0									
									Marker Delta
-30.0								-32.43 dBm	
								1	
-40.0									Mkr→CF
50.0									
-30.0									
-60.0			and the second states in a	the strength for both	Manual Marine In	a a line of the second seco	deter frances of the last	with a strengt	Mkr→RefLvl
		n and state and a particular state of the second state of the second state of the second state of the second st		algebra and the second second	and in the second state	tes hores and this later	a and a second second second	ophism. (in	
-70.0									
									More
Start 1.0	000 GHz						Stop 2.4	000 GHz	1 of 2
#Res BW	100 kHz	#VB	W 300 kHz		S	weep 13	4.0 ms (3	0000 pts)	
MSG						STATUS			
							1		
🍺 Agilent Spe	ectrum Analyzer - Swept S	A							
Marker 1	ectrum Analyzer - Swept S RF 50 Ω	A DC 11556 GHz	SEI	NSE:INT	Avg Type	: Log-Pwr	TRAC	E 1 2 3 4 5 6	Peak Search
Marker 1	ectrum Analyzer - Swept S RF 50 Ω 1 23.88614667	A DC 1556 GHz PNO: Fast [EGain:] ow	→ Trig: Free #Atten: 3	NSE:INT	Avg Type Avg Hold:	:: Log-Pwr >100/100	TRAC TYF DE	E 123456 E M WWWW T P N N N N N	Peak Search
Marker 1	ectrum Analyzer - Swept S RF 50 Ω 1 23.88614667	A DC <b>1556 GHz</b> PNO: Fast IFGain:Low	Trig: Free #Atten: 3	NSE:INT e Run 0 dB	Avg Type Avg Hold:	:: Log-Pwr :>100/100	TRAC TYF DE 1 23.880	E ]] 2 3 4 5 6 E MWWWW T P NNNN S 1 GHz	Peak Search Next Peak
Agilent Spe Marker 1 10 dB/div	ectrum Analyzer - Swept S RF 50 Ω 1 23.88614667 Ref 20.00 dB	A DC 1556 GHz PNO: Fast IFGain:Low	SET ↓ Trig: Free #Atten: 3	NSE:INT e Run 0 dB	Avg Type Avg Hold:	:: Log-Pwr :>100/100 Mkr	TRAC TYF DE 1 23.880 -42.8	E 1 2 3 4 5 6 E M P NNNN 5 1 GHz 14 dBm	Peak Search Next Peak
Marker 1 Marker 1 10 dB/div	ectrum Analyzer - Swept S RF 50 Ω 1 23.88614667 Ref 20.00 dB	A DC 1556 GHz PNO: Fast IFGain:Low	Trig: Free #Atten: 3	NSE:INT e Run 0 dB	Avg Type Avg Hold:	:: Log-Pwr :>100/100 Mkr	ткас тур DE 1 23.886 -42.8	E 1 2 3 4 5 6 E M NON T P NNNN 3 1 GHz 14 dBm	Peak Search Next Peak
Agilent Spe Marker 1 10 dB/div	ectrum Analyzer - Swept S RF 50 Ω 1 23.88614667 Ref 20.00 dB	A DC 1556 GHz PNO: Fast IFGain:Low	Trig: Free #Atten: 3	NSE:INT e Run 0 dB	Avg Type Avg Hold:	:: Log-Pwr :>100/100 Mkr	ткас тур 1 23.880 -42.8	<sup>е</sup> 123456 ⊭Минини тРимими 31 GHz 14 dBm	Peak Search Next Peak
Agilent Spe Marker 1 10 dB/div	ectrum Analyzer - Swept S RF 50 Ω 1 23.88614667 Ref 20.00 dB	A DC 15556 GHz PNO: Fast IFGain:Low	Trig: Free #Atten: 3	NSE:INT e Run 0 dB	Avg Type Avg Hold:	:: Log-Pwr :>100/100 Mkr	TRAC TYF DE 1 23.888 -42.8	E 1 2 3 4 5 6 E M T P NNNN 3 1 GHz 14 dBm	Peak Search Next Peak
10 dB/div 10.00	ectrum Analyzer - Swept S RF 50 Ω 1 23.88614667 Ref 20.00 dB	A DC 11556 GHz PNO: Fast IFGain:Low	Trig: Free #Atten: 3	NSE:INT e Run 0 dB	Avg Type Avg Hold:	:: Log-Pwr >100/100 Mkr	TRAC TYF DE 1 23.880 -42.8	E 1 2 3 4 5 6 E MWWWWW T P NNNNN 6 1 GHz 14 dBm	Peak Search Next Peak
Marker 1 10 dB/div	ectrum Analyzer - Swept S RF 50 Ω 1 23.88614667 Ref 20.00 dB	A DC 11556 GHz PNO: Fast IFGain:Low	Trig: Free #Atten: 3	e Run 0 dB	Avg Type Avg Hold:	:: Log-Pwr >100/100 Mkr	TRAC TYF DE 1 23.88( -42.8	6 1 GHz	Peak Search Next Peak Next Pk Right Next Pk Left
Marker 1 10 dB/div	ectrum Analyzer - Swept S RF 50 Ω 1 23.88614667 Ref 20.00 dB	A DC   11556 GHz IFGain:Low	Trig: Free #Atten: 3	NSE:INT e Run 0 dB	Avg Type Avg Hold:	e: Log-Pwr .>100/100 Mkr	TRAC TVF DE 1 23.880 -42.8	5 1 GHz 14 dBm	Peak Search Next Peak Next Pk Right
Agilent Spe X Marker 1 10 dB/div 10.0	ectrum Analyzer - Swept S RF 50 Ω 1 23.886144667 Ref 20.00 dB	A DC <b>11556 GHz</b> PNO: Fast IFGain:Low	Trig: Free #Atten: 3	NSE:INT e Run 0 dB	Avg Type Avg Hold:	:: Log-Pwr >100/100 MIKr	TRAC TYP DE 1 23.881 -42.8	3 1 GHz 14 dBm	Peak Search Next Peak Next Pk Right Next Pk Left
Agilent Spe XX Marker 1 10.0 -10.0	ectrum Analyzer - Swept S RF 50 Ω 1 23.88614667 Ref 20.00 dB	A DC 11556 GHz PNO: Fast IFGain:Low	→ Trig: Fre #Atten: 3	NSE:INT e Run 0 dB	Avg Type Avg Hold:	:: Log-Pwr >100/100 MIKT	TRAC TYP DE 1 23.888 -42.8	1 2 3 4 5 6 T P NNNN N 3 1 GHz 14 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta
Agilent Spe Marker 1 10 dB/div 10.0 -10.0 -20.0	ectrum Analyzer - Swept S RF 50 Ω 1 23.88614667 Ref 20.00 dE	SA DC 11556 GHz PNO: Fast IFGain:Low	→ Trig: Fre #Atten: 3	NSE:INT e Run 0 dB	Avg Type Avg Hold:	:: Log-Pwr >100/100 Mkr	TRAC TY DE 1 23.888 -42.8	E 1 2 3 4 5 6 E M MANNY T P NNNNN 3 1 GHz 14 dBm	Peak Search Next Peak Next Pk Right Next Pk Left
Agilent Spr     Z     Z     Agilent Spr     Z	ectrum Analyzer - Swept S RF 50 Ω 1 23.88614667 Ref 20.00 dB	SA DC C P1556 GHz PNO: Fast IFGain:Low	→ Trig: Free #Atten: 3	NSE:INT	Avg Type Avg Hold:	:: Log-Pwr :>100/100 Mkr	TRAC TYF DE 1 23.888 -42.8	E 1 2 3 4 5 6 E MWWWW T P NNNNN 3 1 GHz 14 dBm	Peak Search Next Peak Next Pk Right Next Pk Left
Marker           10 dB/div           20           10.0	ectrum Analyzer - Swept S RF 50 Ω 1 23.88614667 Ref 20.00 dB	A DC P1556 GHz PN0: Fast IFGain:Low	Trig: Free #Atten: 3	NSE:INT	Avg Type Avg Hold:	:: Log-Pwr :>100/100 Mkr	TRAC TVF DE 1 23.888 -42.8	E 1 2 3 4 5 6 E MWWWWW T P NNNNN 3 1 GHz 14 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta
Agilent Specify     Marker 1     10 dB/div     10.0     .00     .	ectrum Analyzer - Swept S RF 50 Ω 1 23.8886144667 Ref 20.00 dB	A DC P1556 GHz PNO: Fast IFGain:Low SM	Trig: Free #Atten: 3	NSE:INT e Run 0 dB	Avg Type Avg Hold:	: Log-Pwr >100/100 Mkr	TRAC TYF DE 1 23.888 -42.8	6 1 2 3 4 5 6 MMMMMM P NNNN 6 1 GHz 14 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF
Agilent Speizer     Marker 1     10 dB/div     Log     10.0     .00     .00     .10.0     .00     .30.0     .40.0     .50.0     .71 m	ectrum Analyzer - Swept S RF 50 Ω 1 23.8886144667 Ref 20.00 dB	A DC P1556 GHz PNO: Fast IFGain:Low	Trig: Free #Atten: 3	NSE:INT	Avg Type Avg Hold:	2: Log-Pwr >>100/100 Mkr	TRAC TVF DE 1 23.881 -42.8	5 1 GHz 14 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta
Image: Agilent Spectrum           Marker           10 dB/div           0.00           10.0           0.00           -10.0           -20.0           -30.0           -40.0           -50.0           17.1 m           -60.0	ectrum Analyzer - Swept S RF 50 Ω 1 23.8886144667 Ref 20.00 dB	A DC P1556 GHz PNO: Fast IFGain:Low m	Trig: Free #Atten: 3	NSE:INT	Avg Type Avg Hold:	2: Log-Pwr >>100/100 Mkr	TRAC TVF DE 1 23.881 -42.8	6 1 GHz 14 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr-CF
Marker           10 dB/div           10.0           10.0           10.0           -20.0           -30.0           -40.0           -50.0           -50.0	ectrum Analyzer - Swept S RF 50 Ω 1 23.8886144667 Ref 20.00 dB	A DC P1556 GHz PNO: Fast IFGain:Low m	Trig: Free #Atten: 3	NSE:INT	Avg Type Avg Hold:	2: Log-Pwr >100/100 Mkr	TRAC TVF DE 1 23.881 -42.8	6 1 GHz 14 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF
Marker           10 dB/div           10.0           10.0           10.0           -20.0           -30.0           -30.0           -50.0           -50.0           -70.0	ectrum Analyzer - Swept S RF 50 Ω 1 23.8886144667 Ref 20.00 dB	A DC P1556 GHz PNO: Fast IFGain:Low Sm	Trig: Free #Atten: 3	NSE:INT		2: Log-Pwr >>100/100 Mkr	TRAC TVF DE 1 23.88 -42.8	6 1 GHz 14 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF
Marker           10 dB/div           10.0           10.0           10.0           -20.0           -30.0           -40.0           -50.0           -70.0           -70.0	ectrum Analyzer - Swept S RF 50 Ω 1 23.888614667 Ref 20.00 dB	A DC 71556 GHz PNO: Fast IFGain:Low Sm	Trig: Free #Atten: 3	NSE:INT	Avg Type Avg Hold:	2: Log-Pwr >>100/100 Mkr	TRAC TVF DE 1 23.88/ -42.8	E 1 2 3 4 5 6 M M M M M M F P N N N N M 6 1 GHz 14 dBm -32 43 dBm -32 43 dBm -32 43 dBm -32 43 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF Mkr→Ref Lvi More
Agilent Spe Marker 1 10.0 B/div 10.0	ectrum Analyzer - Swept S RF 50 Ω 1 23.888614667 Ref 20.00 dB	A DC 71556 GHz PNO: Fast IFGain:Low Bm	SEI	NSE:INT e Run 0 dB 	Avg Type Avg Hold:	2: Log-Pwr >>100/100 Mkr	TRAC TVF DE 1 23.880 -42.8	6 1 GHz 14 dBm	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF Mkr→Ref Lvl More 1 of 2
Agilent Spe Marker 1 10.0 0.00 -10.0 -20.0 -30.0 -30.0 -40.0 -50.0 -70.0 -70.0 Start 2.44 #Res BW	ectrum Analyzer - Swept S RF 50 Ω Ref 20.00 dB	SA DC	Trig: Free #Atten: 3	NSE:INT	Avg Type Avg Hold:	e: Log-Pwr >>100/100 Mkr	TRAC TVF DE 1 23.881 -42.8	<ul> <li>1 2 3 4 5 6 MMNNNN A 1 GHz 14 dBm         </li> <li>-32 43 dBm         </li> <li>-32</li></ul>	Peak Search Next Peak Next Pk Right Next Pk Left Marker Delta Mkr→CF Mkr→Ref Lvl More 1 of 2



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

🎉 Ag	jilent Spec	trum Ana	lyzer - Swe	ept SA									
<mark>ıxı</mark> Mar	ker 1	RF 2.484	50 s 12505	DC 75019		Fast 🕞	SEI	Run	Avg Type Avg Hold:	: Log-Pw >100/100	r TR. T	ACE 1 2 3 4 5 6 YPE M WWWWW	Peak Search
10 dl	B/div	Ref	20.00	dBm	IFGai	n:Low	#Atten: 3	0 dB		N	/kr1 2.48 -41.3	84 3 GHz 218 dBm	Next Peak
<b>Log</b> 10.0													Next Pk Right
0.00													Next Pk Left
-20.0													Marker Delta
-40.0	1							ulterdate see.	and the standard		le <mark>l</mark> mar en les ters bi	-32.75 dBm	Mkr→CF
-50.0 -60.0			di kin dina <mark>P</mark> rovinsi				la di altera e dan Terrede de gener				<mark>bike ( and eye a streed bi</mark>		Mkr→RefLvi
-70.0 Star	1 2 4 8	GHZ									Stop	25.00 GHz	More 1 of 2
#Re	s BW	1.0 M	Hz			#VBW	/ 3.0 MHz		S	weep	38.00 ms (	30000 pts)	
					_					JIA			

# TEST PLOT OF OUT OF BAND EMISSIONS THE WORST CASE

OF 802.11n40 FOR MODULATION IN HIGH CHANNEL





Note: The 100kHz RBW used in the conducted spurious test from 2.4835GHz to 25GHz may result in long measuring times, To avoid such long measuring times, the 1MHz RBW can be used for pre-test. If the emission level exceeded the limit at one or more frequencies, the 100kHz RBW would be used for final test at the special frequency.

# **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 PKPSD in the KDB 558074 item 10.2 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 PECTRAL DENSITY
TEST MODE	802.11b with data rate 1

Channel No.	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result	
Low Channel	-17.631	8	Pass	
Middle Channel	-14.931	8	Pass	
High Channel	-15.175	8	Pass	

TEST ITEM	POWER PECTRAL DENSITY
TEST MODE	802.11g with data rate 6

Channel No.	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result	
Low Channel	-18.678	8	Pass	
Middle Channel	-15.510	8	Pass	
High Channel	-15.758	8	Pass	

TEST ITEM	POWER PECTRAL DENSITY
TEST MODE	802.11n 20 with data rate 6.5

Channel No.	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
Low Channel	-18.260	8	Pass
Middle Channel	-17.017	8	Pass
High Channel	-16.910	8	Pass

TEST ITEM	POWER PECTRAL DENSITY
TEST MODE	802.11n 40 with data rate 6.5

Channel No.	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
Low Channel	-19.827	8	Pass
Middle Channel	-17.166	8	Pass
High Channel	-18.560	8	Pass



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

TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL





TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL

### 802.11g TEST RESULT

TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL





TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL

_											
🊺 Agile	ent Spectr	um Analyzer - Sw	ept SA								
Mark	er 1 2	RF   50 Ω 2.4604234	23423	GHz	Trig: Free	e Run	Avg Type Avg Hold	: Log-Pwr :>100/100	TRAC	E 1 2 3 4 5 6 E M WWWW	Peak Search
				IFGain:Low	#Atten: 3	0 dB			Di		
10 15		<b>D</b> -5 00 00	-1D					Mkr	1 2.460	42 GHz	NextPeak
	alv	Rel 20.00	аыт						10.1		
10.0											Next Pk Right
10.0											
0.00											
-10.0					1						Next Pk Left
				h. Idhuu	Idented		I. La base a	L. Auga			
-20.0			- JIMAN	MANAANAA		An Andrew Add	ul hi hin hai				Marker Delta
-30.0			<u> </u>					<del>ار ار</del>			
-40.0			<b>V</b>					<u>۲</u>	N		
		A MARINE STREET							-VWWWY	ulu mita u	Mkr→CF
-50.0	apa pa	r <u>in</u> -								en be national	
-60.0											Mkr→RefLvl
-70.0											
											1 of 2
Cente	er 2.4	6200 GHz			40.000			<b>.</b>	Span 3	0.00 MHz	1012
#Res	BW 3	.U KHZ		#VBW	10 KHZ			sweep	3.163 S (	1000 pts)	
MSG								STATUS			

TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL



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

TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL





### TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL

#### 802.11n 40 TEST RESULT

TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL





TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL

# TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL



# **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 VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer. 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.

### 11.2. TEST SETUP

Radiated Emission Test-Setup Frequency Below 30MHz



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



# RADIATED EMISSION TEST SETUP ABOVE 1000MHz



# **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.

EUT	IP Phone	Model Name	A68W
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2412MHZ	Antenna	Horizontal

# **RADIATED EMISSION BELOW 1GHZ**



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	64.887	1.75	11.85	39.70	30.24	23.06	40.00	-16.94	Peak
2.	88.964	2.04	9.17	31.13	30.35	11.99	43.50	-31.51	Peak
3.	112.920	2.26	11.36	31.50	30.43	14.69	43.50	-28.81	Peak
4.	121.976	2.33	12.15	32.11	30.46	16.13	43.50	-27.37	Peak
5.	348.027	3.27	14.21	30.90	30.82	17.56	46.00	-28.44	Peak
6.	383.932	3.36	14.97	30.26	30.86	17.73	46.00	-28.27	Peak

EUT	IP Phone	Model Name	A68W
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2412MHZ	Antenna	Vertical



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Le∨el dBuV/m	Limit dBuV/m	O∨er Limit dB	Remark
1.	37.812	1.26	13.54	39.14	30.05	23.89	40.00	-16.11	Peak
2.	51.481	1.54	12.16	44.04	30.16	27.58	40.00	-12.42	Peak
3.	54.071	1.59	11.97	45.43	30.17	28.82	40.00	-11.18	Peak
4.	64.208	1.74	11.89	53.43	30.23	36.83	40.00	-3.17	Peak
5.	88.033	2.03	9.06	38.90	30.34	19.65	43.50	-23.85	Peak
6.	124.133	2.34	12.28	38.54	30.46	22.70	43.50	-20.80	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.

# **RADIATED EMISSION ABOVE 1GHZ**

EUT	IP Phone	Model Name	A68W
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2412MHZ	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type	
4824.106	49.85	3.72	53.57	74	-20.43	peak	
4824.085	44.13	3.72	47.85	54	-6.15	AVG	
7236.048	42.38	8.15	50.53	74	-23.47	peak	
7236.035	36.28	8.15	44.43	54	-9.57	AVG	
Remark:							
Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

EUT	IP Phone	Model Name	A68W
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2412MHZ	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type	
4824.036	46.53	3.72	50.25	74	-23.75	peak	
4824.071	41.54	3.72	45.26	54	-8.74	AVG	
7236.037	39.88	8.15	48.03	74	-25.97	peak	
7236.101	34.21	8.15	42.36	54	-11.64	AVG	
Remark:							
Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

# Report No.: AGC01180160501FE05 Page 57 of 94

EUT	IP Phone	Model Name	A68W
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2437MHZ	Antenna	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type	
4874.023	48.89	3.75	52.64	74	-21.36	peak	
4874.119	44.74	3.75	48.49	54	-5.51	AVG	
7311.079	41.54	8.16	49.7	74	-24.3	peak	
7311.026	38.77	8.16	46.93	54	-7.07	AVG	
Remark:							
Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

EUT	IP Phone	Model Name	A68W
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2437MHZ	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4874.030	46.33	3.75	50.08	74	-23.92	peak
4874.099	40.58	3.75	44.33	54	-9.67	AVG
7311.108	40.74	8.16	48.9	74	-25.1	peak
7311.091	35.97	8.16	44.13	54	-9.87	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

#### Report No.: AGC01180160501FE05 Page 58 of 94

EUT	IP Phone	Model Name	A68W
Temperature	25°C	Relative Humidity	55.4%
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
4924.024	46.74	3.81	50.55	74	-23.45	peak
4924.020	41.28	3.81	45.09	54	-8.91	AVG
7386.047	41.39	8.19	49.58	74	-24.42	peak
7386.044	36.58	8.19	44.77	54	-9.23	AVG
Remark:						
Factor = Ante	Factor = Antenna Factor + Cable Loss – Pre-amplifier.					

EUT	IP Phone	Model Name	A68W
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with date rate 1 2462MHZ	Antenna	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	value Type
4924.111	44.12	3.81	47.93	74	-26.07	peak
4924.063	40.74	3.81	44.55	54	-9.45	AVG
7386.075	40.87	8.19	49.06	74	-24.94	peak
7386.074	36.07	8.19	44.26	54	-9.74	AVG
Remark:						
Factor = Ante	Factor = Antenna Factor + Cable Loss – Pre-amplifier.					

# **RESULT: PASS**

Note:

Other emissions from 8G 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.

# **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.

### 12.3. TEST RESULT

EUT	IP Phone	Model Name	A68W
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with data rate 1 2412MHZ	Antenna	Horizontal





📕 Agilent Spectrum Analyzer - Swept SA				
RF 50 Ω DC Aarker 2 2.413043043043	3 GHz PNO: Fast Trig: Free Run EGain: Low #Atten: 20 dB	Avg Type: RMS Avg Hold:>100/100	TRACE 1 2 3 4 5 6 TYPE A WWWW DET A NNNNN	Peak Search
10 dB/div Ref 106.99 dBµ\	V	Mkr2	2.413 04 GHz 99.212 dBµV	NextPeal
97.0 87.0 77.0			2	Next Pk Righ
67.0 57.0 47.0	1			Next Pk Le
27.0 27.0				Marker Delt
Start 2.37000 GHz Res BW 1.0 MHz	#VBW 3.0 MHz*	St Sweep 1.00	top 2.42000 GHz 66 ms (1000 pts) FUNCTION VALUE	Mkr→C
1 N 1 f 2.3 2 N 1 f 2.4 3 4 5 6	390 00 GHz 39.959 dBμV 413 04 GHz 99.202 dBμV		====	Mkr→RefL
7 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9				Mor 1 of
sg	m	STATUS	•	

### Report No.: AGC01180160501FE05 Page 61 of 94

EUT	IP Phone	Model Name	A68W
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







### Report No.: AGC01180160501FE05 Page 62 of 94

EUT	IP Phone	Model Name	A68W
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with data rate 1 2462MHZ	Antenna	Horizontal



ΡK

AV



### Report No.: AGC01180160501FE05 Page 63 of 94

EUT	IP Phone	Model Name	A68W
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11b with data rate 1 2462MHZ	Antenna	Vertical

ΡK



AV



### Report No.: AGC01180160501FE05 Page 64 of 94

EUT	IP Phone	Model Name	A68W
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11g with data rate 6 2412MHZ	Antenna	Horizontal





### Report No.: AGC01180160501FE05 Page 65 of 94

EUT	IP Phone	Model Name	A68W
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11g with data rate 6 2412MHZ	Antenna	Vertical

ΡK







### Report No.: AGC01180160501FE05 Page 66 of 94

EUT	IP Phone	Model Name	A68W
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11g with data rate 6 2462MHZ	Antenna	Horizontal



ΡK

AV

Agilent Spectrum Analyzer - Swept SA	A			
Marker 2 2.463113113	BITTA CHZ SENSE: STITA CHZ Trig: Free Ro	Avg Type: RMS un Avg Hold:>100/100	TRACE 1 2 3 4 5 6 TYPE A WWWWW	Peak Search
10 dB/div Ref 106.99 dl	IFGain:Low #Atten: 20 d	B Mkr	2 2.463 11 GHz 91.470 dBµV	NextPeal
97.0 87.0	¢2			Next Pk Righ
67.0 57.0 47.0		1		Next Pk Le
37.0 27.0 17.0				Marker Delt
Start 2.45000 GHz #Res BW 1.0 MHz	#VBW 3.0 MHz*	Sweep 1	Stop 2.50000 GHz .066 ms (1000 pts)	Mkr→C
1 N 1 f 2 N 1 f 3 4 5 6	2.483 50 GHz 50.837 dBµV 2.463 11 GHz 91.470 dBµV		E	Mkr→RefL
7 8 9 10 11				Mor 1 of
MSG		STATU	3	

### Report No.: AGC01180160501FE05 Page 67 of 94

EUT	IP Phone	Model Name	A68W
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11g with data rate 6 2462MHZ	Antenna	Vertical

ΡK



AV



### Report No.: AGC01180160501FE05 Page 68 of 94

EUT	IP Phone	Model Name	A68W
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 20 with data rate 6.5 2412MHZ	Antenna	Horizontal

ΡK







### Report No.: AGC01180160501FE05 Page 69 of 94

EUT	IP Phone	Model Name	A68W
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 20 with data rate 6.5 2412MHZ	Antenna	Vertical

ΡK







### Report No.: AGC01180160501FE05 Page 70 of 94

EUT	IP Phone	Model Name	A68W
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 20with data rate 6.5 2462MHZ	Antenna	Horizontal





### Report No.: AGC01180160501FE05 Page 71 of 94

EUT	IP Phone	Model Name	A68W
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 20 with data rate 6.5 2462MHZ	Antenna	Vertical

ΡK



AV



### Report No.: AGC01180160501FE05 Page 72 of 94

EUT	IP Phone	Model Name	A68W
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 40 with data rate 6.5 2422MHZ	Antenna	Horizontal

ΡK






#### Report No.: AGC01180160501FE05 Page 73 of 94

EUT	IP Phone	Model Name	A68W
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 40 with data rate 6.5 2422MHZ	Antenna	Vertical

ΡK







#### Report No.: AGC01180160501FE05 Page 74 of 94

EUT	IP Phone	Model Name	A68W
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 40with data rate 6.5 2452MHZ	Antenna	Horizontal

ΡK



AV



#### Report No.: AGC01180160501FE05 Page 75 of 94

EUT	IP Phone	Model Name	A68W
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n 40 with data rate 6.5 2452MHZ	Antenna	Vertical

ΡK



AV

📁 Agilent Spectrum Analyzer - Swept SA			- 0 ×
Marker 2 2.454174174174	GHz SENSE:INT	Avg Type: RMS TRACE 123456	Peak Search
10 dB/div Ref 106.99 dBµV	PNO: Fast C Trig: Free Run IFGain:Low #Atten: 20 dB	Mkr2 2.454 17 GHz 82.187 dBµV	Next Peak
97.0 87.0 77.0	2 		Next Pk Right
67.0 57.0 47.0			Next Pk Left
37.0 27.0 17.0			Marker Delta
Start 2.43000 GHz #Res BW 1.0 MHz MKR MODE TRC SCL X	#VBW 3.0 MHz*	Stop 2.50000 GHz Sweep 1.066 ms (1000 pts)	Mkr→CF
1 N 1 f 2.48 2 N 1 f 2.45 3 3 4 4 4 4 5 5 5 6 6 4 4 4 4 4 4 4 5 5 6 6 4 </td <td>33 50 GHz 42.701 dBµV 54 17 GHz 82.218 dBµV</td> <td></td> <td>Mkr→RefLv</td>	33 50 GHz 42.701 dBµV 54 17 GHz 82.218 dBµV		Mkr→RefLv
7 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9			More 1 of 2
MSG		STATUS	

# **13. FCC LINE CONDUCTED EMISSION TEST**

## **13.1. LIMITS OF LINE CONDUCTED EMISSION TEST**

Frequency	Maximum RF Line Voltage			
Frequency	Q.P.( dBuV)	Average( dBuV)		
150kHz~500kHz	66-56	56-46		
500kHz~5MHz	56	46		
5MHz~30MHz	60	50		

Note:

1. The lower limit shall apply at the transition frequency.

2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

### **13.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST**



### 13.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

- The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2. Support equipment, if needed, was placed as per ANSI C63.10.
- 3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4. All support equipments received AC120V/60Hz power from a LISN, if any.
- 5. The EUT received 120V/60Hzpower by a LISN..
- 6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
- 8. During the above scans, the emissions were maximized by cable manipulation.
- 9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

#### 13.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

- 1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
- A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
- 3. The test data of the worst case condition(s) was reported.



### **13.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST**

No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBuV	Emission Le∨el dBuV	Limit dBuV	O∨er Limit dB	Remark
1.	0.162	10.60	0.60	42.75	53.95	65.34	-11.39	QP
2.	0.164	10.60	0.60	20.66	31.86	55.25	-23.39	Average
3.	0.186	10.61	0.60	40.09	51.30	64.20	-12.90	QP -
4.	0.188	10.61	0.60	17.14	28.35	54.11	-25.76	Average
5.	0.222	10.61	0.60	34.00	45.21	62.74	-17.53	QP -
6.	0.224	10.61	0.60	11.61	22.82	52.66	-29.84	Average
7.	0.262	10.62	0.60	32.02	43.24	61.38	-18.14	QP -
8.	0.263	10.62	0.60	12.77	23.99	51.34	-27.35	Average
9.	0.310	10.63	0.60	30.13	41.36	59.97	-18.61	QP -
10.	0.312	10.63	0.60	11.32	22.55	49.93	-27.38	Average
11.	0.389	10.64	0.60	33.54	44.78	58.08	-13.30	QP -
12.	0.396	10.64	0.60	20.81	32.05	47.95	-15.90	Average

Line Conducted Emission Test Line 1-L



### Line Conducted Emission Test Line 2-N

No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBuV	Emission Le∨el dBuV	Limit dBuV	O∨er Limit dB	Remark
1.	0.154	10.60	0.60	43.91	55.11	65.78	-10.67	QP
2.	0.156	10.60	0.60	21.13	32.33	55.65	-23.32	Average
3.	0.164	10.60	0.60	42.27	53.47	65.25	-11.78	QP -
4.	0.166	10.60	0.60	19.47	30.67	55.16	-24.49	Average
5.	0.182	10.61	0.60	40.41	51.62	64.42	-12.80	QP -
6.	0.183	10.61	0.60	17.33	28.54	54.33	-25.79	Average
7.	0.198	10.61	0.60	37.04	48.25	63.71	-15.46	QP -
8.	0.201	10.61	0.60	15.06	26.27	53.58	-27.31	Average
9.	0.211	10.61	0.60	35.75	46.96	63.18	-16.22	QP -
10.	0.212	10.61	0.60	14.30	25.51	53.14	-27.63	Average
11.	0.289	10.63	0.60	33.14	44.37	60.54	-16.17	QP -
12.	0.292	10.63	0.60	12.94	24.17	50.46	-26.29	Average