FCC Test Report

Report No.: AGC00529140503FE04

FCC ID	:	Y7WPLUMZ450
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	Check PLUS
BRAND NAME	:	plum
MODEL NAME	:	Z450
CLIENT	:	CLC Hong Kong Limited
DATE OF ISSUE	:	May 29, 2014
STANDARD(S)	:	FCC Part 15 Rules
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	/	May 29, 2014	Valid	Original Report

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1. VERIFICATION OF CONFORMITY

Applicant	CLC Hong Kong Limited
Address	1011A, 10/F., Harbour Centre Tower 1, No.1 Hok Cheung St., Hung Hom, Kowloon, Hong Kong
Manufacturer	CLC Technology Co., Ltd.
Address	Room 6G, Block C, NEO Building, Chegongmiao, Futian District, Shenzhen, P.R.China
Product Designation	Check PLUS
Brand Name	plum
Test Model	Z450
Date of test	May 18, 2014 to May 23, 2014
Deviation	None
Condition of Test Sample	Normal
Report Template	AGCRT-US-BGN/RF (2013-03-01)

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 C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with requirement of FCC Part 15 Rules requirement.

Prepared By	Matt Zhang	
	Matt Zhang	May 29, 2014
Checked By	Kidd Yang	
	Kidd Yang	May 29, 2014
Authorized By	Solger Zhang	
	Solger Zhang	May 29, 2014

2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

The EUT is designed as “Check PLUS”. 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

Operation Frequency	2.412 GHz～2.462GHz
Output Power	IEEE 802.11b:14.14dBm; IEEE 802.11g:13.04dBm; IEEE 802.11n(20):12.46dBm; IEEE 802.11n(40):7.85dBm
Modulation	DSSS(DBPSK/DQPSK/CCK);OFDM(BPSK/QPSK/16-QAM/64-QAM)
Number of channels	11
Hardware Version	1365E_MM1_V11
Software Version	N/A
Antenna Designation	Integrated Antenna
Antenna Gain	1.0dBi
Power Supply	DC3.7V by Built-in Li-ion Battery

2.2. TABLE OF CARRIER FREQUENCYS

Frequency Band	Channel Number	Frequency
2400~2483.5MHZ	1	2412 MHZ
	2	2417 MHZ
	3	2422 MHZ
	4	2427 MHZ
	5	2432 MHZ
	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

2.3. IEEE 802.11N MODULATION SCHEME

MCS Index	Nss	Modulation	R	NBPSC	NCBPS		NDBPS		Data rate(Mbps) 800nsGI	
					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

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: Y7WPLUMZ450** 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 C63.4 (2003).
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.

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: +/- 2.75dB

Radiated measurement: +/- 3.2dB

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: Transmit by 802.11b with Date rate (1/2/5.5/11) Transmit by 802.11g with Date rate (6/9/12/18/24/36/48/54) Transmit by 802.11n (20MHz) with Date rate (6.5/13/19.5/26/39/52/58.5/65) Transmit by 802.11n (40MHz) with Date rate (13.5/27/40.5/54/81/108/121.5/135)	

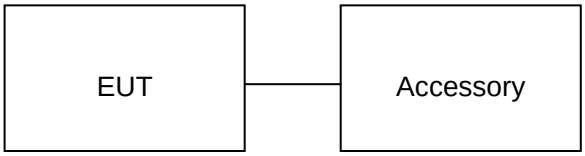
Note:

1. The EUT has been set to operate continuously on the lowest, middle and highest operation frequency individually.
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	Check PLUS	Z450	FCC ID: Y7WPLUMZ450	EUT
2	Adapter	PMC43	DC5.0V / 1A	Accessory
3	Battery	PMB46	DC3.7V / 1500 mAh	Accessory
4	Earphone	Z450	N/A	Accessory
5	USB Cable	Z450	N/A	Accessory

Note: All the accessories have been used during the test in conduction emission test.

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.247	Peak 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

Note: The EUT received power from DC3.7V lithium battery.

6. TEST FACILITY

Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	2/F., Building 2, No.1-No.4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang, Bao'an District, Shenzhen, Guangdong, China
Description	The test site is constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2003.

ALL TEST EQUIPMENT LIST

Description	Manufacturer	Model	S/N	Cal. Date	Cal. Due
Power Probe	R&S	NRP-Z23	100323	07/17/2013	07/16/2014
RF attenuator	N/A	RFA20db	68	N/A	N/A
Spectrum Analyzer	Agilent	E4440A	US41421290	07/17/2013	07/16/2014
Amplifier	EM	EM30180	0607030	02/27/2014	02/26/2015
Horn Antenna	EM	EM-AH-10180	67	04/19/2014	04/18/2015
Horn Antenna	A.H. Systems Inc.	SAS-574	--	07/17/2013	07/16/2014
EMI Test Receiver	Rohde & Schwarz	ESCI	100694	07/17/2013	07/16/2014
Biological Antenna	A.H. Systems Inc.	SAS-521-4	26	06/07/2013	06/06/2014
Loop Antenna	A.H.	SAS-526B	264	07/14/2013	07/13/2014
LISN	R&S	ESH3-Z5	8389791009	07/17/2013	07/16/2014

7. PEAK OUTPUT POWER

7.1. MEASUREMENT PROCEDURE

For peak power test:

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
3. Set the EUT Work on the top, middle and the bottom operation frequency individually.
4. Use the following spectrum analyzer settings:
   Set the RBW = 1 MHz
   Set the VBW ⩾ 3 RBW
   Set the span ⩾ 1.5 x DTS bandwidth
   Detector = peak
   Sweep time = auto couple
   Trace mode = max hold
5. Allow the trace to stabilize. Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges.
6. Record the result form the Spectrum Analyzer.

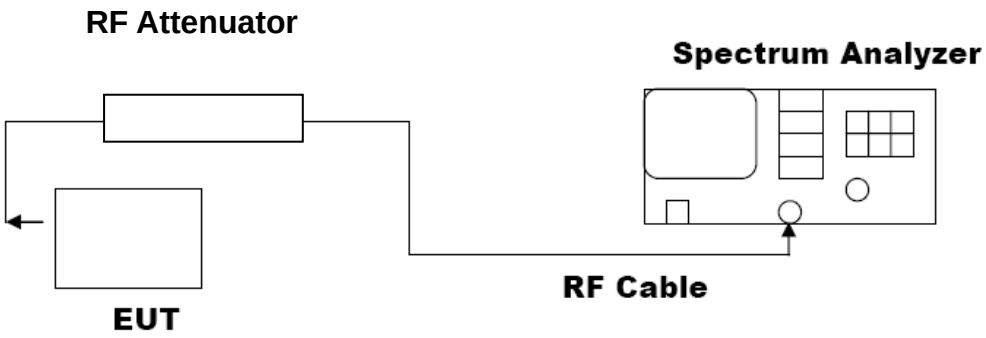
For average power test:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Connect EUT RF output port to power probe through an RF attenuator.
3. Connect the power probe to the PC.
4. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
5. Record the maximum power from the software.
6. The maximum peak power shall be less 1 Watt (30dBm).

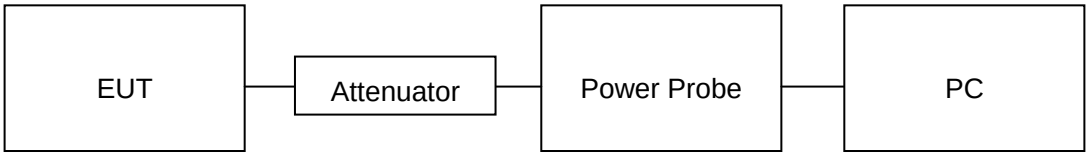
Note：The EUT was tested according to KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

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

PEAK POWER TEST SETUP



AVERAGE POWER SETUP

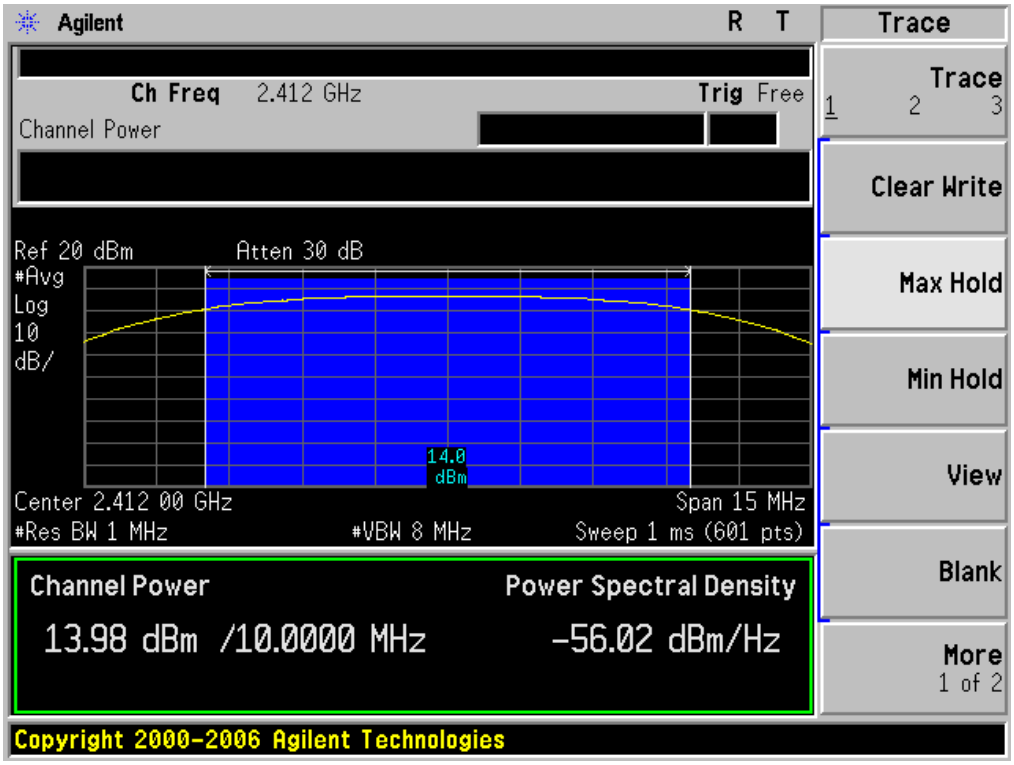


7.3. LIMITS AND MEASUREMENT RESULT

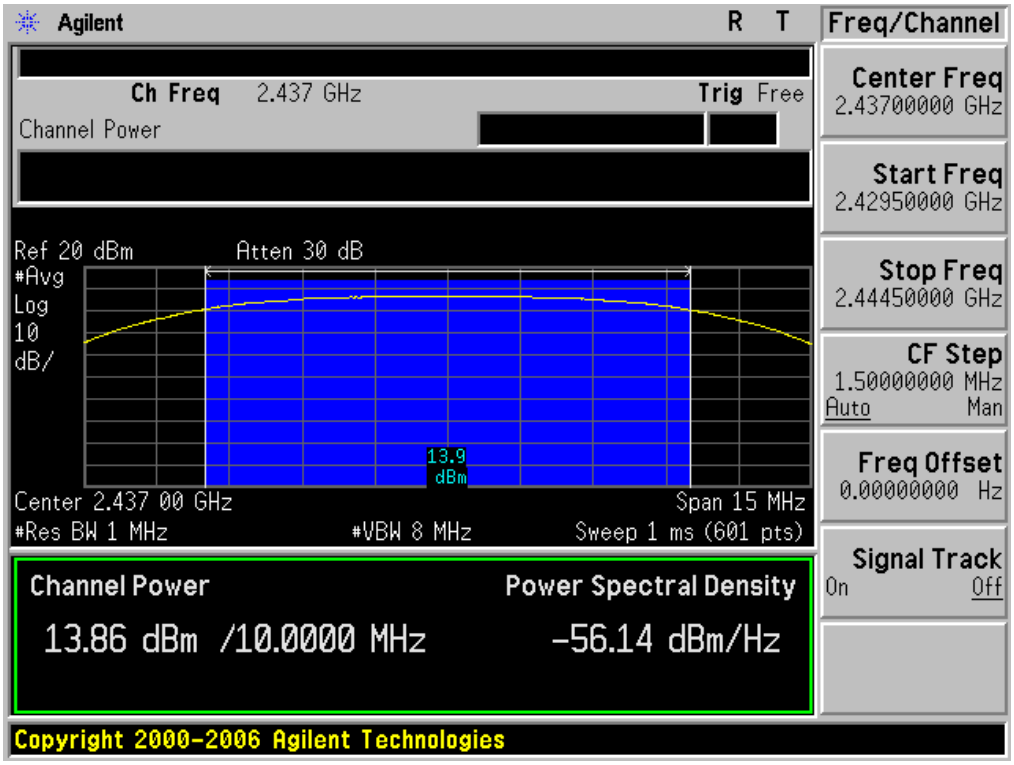
TEST ITEM	PEAK POWER
TEST MODE	802.11b with data rate 1

LIMITS AND MEASUREMENT RESULT				
Frequency (GHz)	**Average Power (dBm)**	**Peak Power (dBm)**	**Applicable Limits (dBm)**	**Pass or Fail**
2.412	12	13.98	30	Pass
2.437	11.88	13.86	30	Pass
2.462	12.16	14.14	30	Pass

CH1



CH6


Agilent
R T
Freq/Channel
Ch Freq 2.437 GHz
Trig Free
Channel Power
Center Freq
2.43700000 GHz
Start Freq
2.42950000 GHz
Stop Freq
2.44450000 GHz
CF Step
1.50000000 MHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Ref 20 dBm
Atten 30 dB
#Avg
Log
10
dB/
13.9
dBm
Center 2.437 00 GHz
Span 15 MHz
#Res BW 1 MHz
#VBW 8 MHz
Sweep 1 ms (601 pts)
Channel Power
Power Spectral Density
13.86 dBm /10.0000 MHz
-56.14 dBm/Hz
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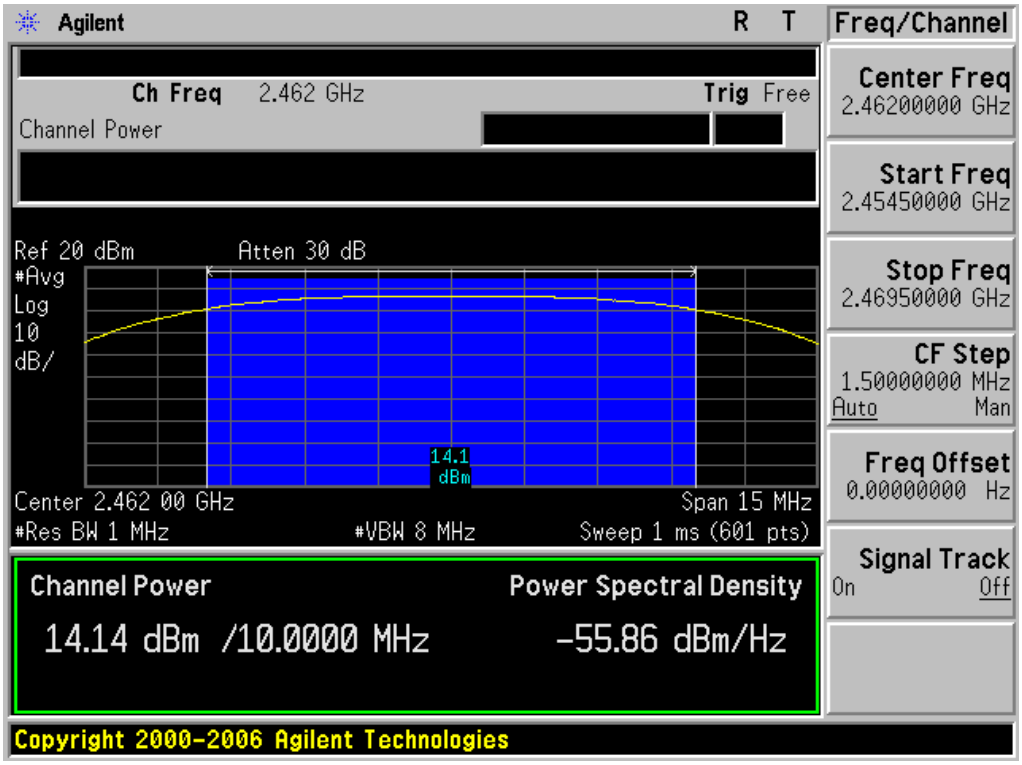
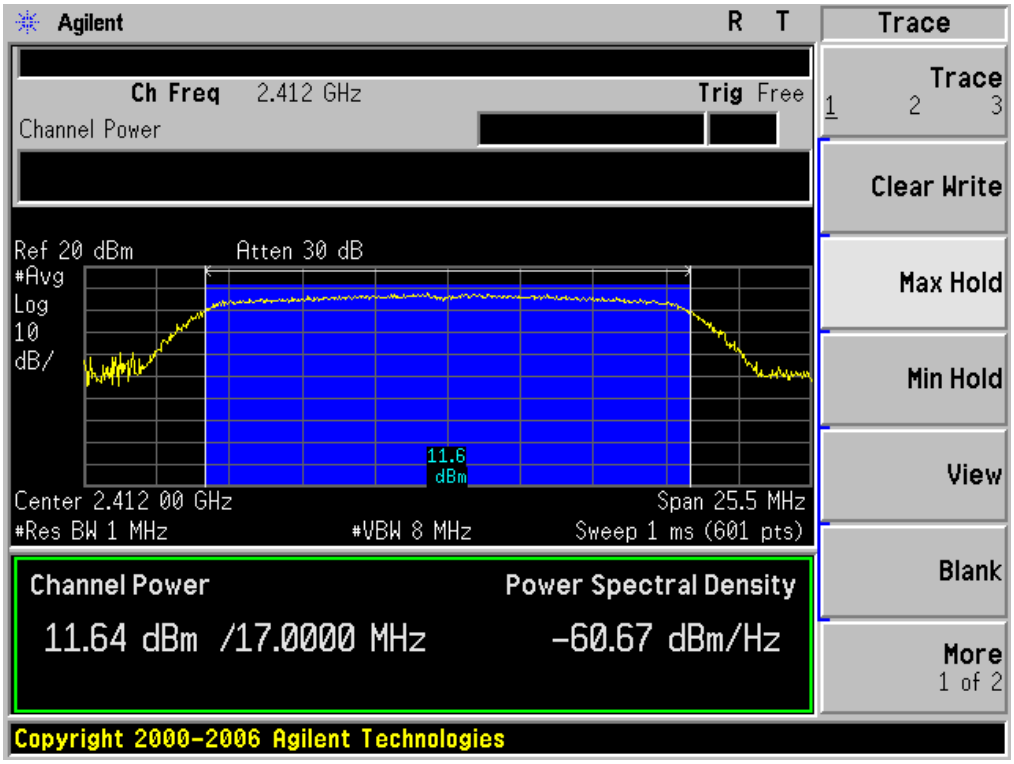
CH11


Agilent
R T
Freq/Channel
Ch Freq 2.462 GHz
Trig Free
Channel Power
Center Freq
2.46200000 GHz
Start Freq
2.45450000 GHz
Stop Freq
2.46950000 GHz
CF Step
1.50000000 MHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Ref 20 dBm
Atten 30 dB
#Avg
Log
10
dB/
14.1
dBm
Center 2.462 00 GHz
Span 15 MHz
#Res BW 1 MHz
#VBW 8 MHz
Sweep 1 ms (601 pts)
Channel Power
Power Spectral Density
14.14 dBm /10.0000 MHz
-55.86 dBm/Hz
Copyright 2000-2006 Agilent Technologies

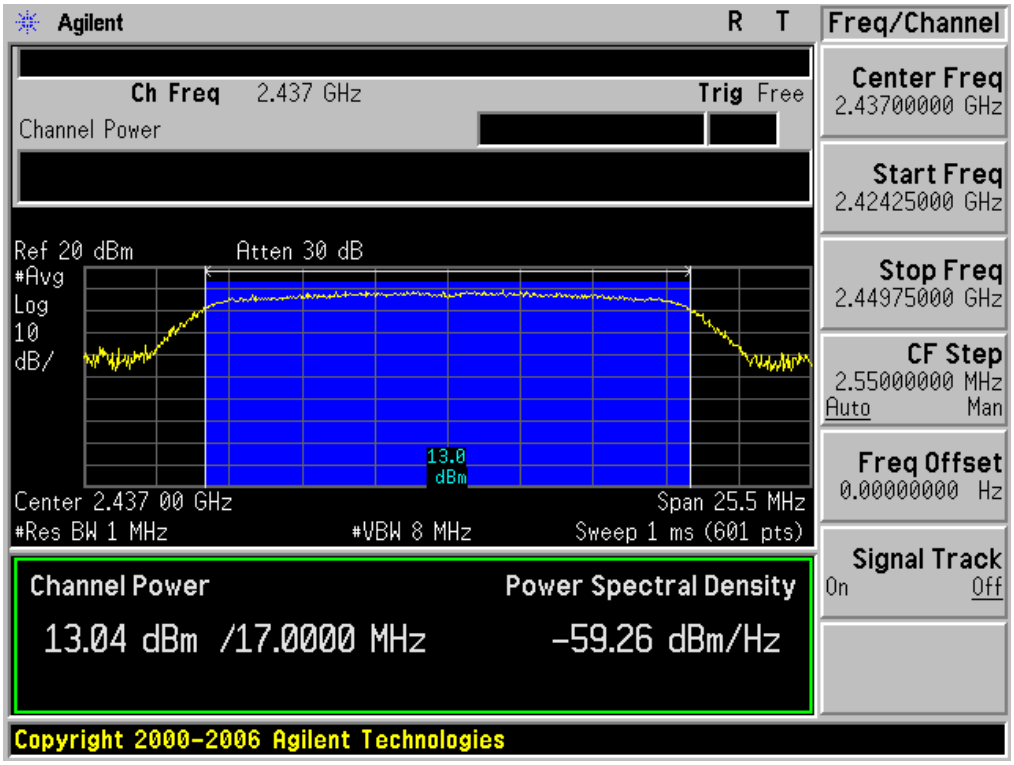
TEST ITEM	PEAK POWER
TEST MODE	802.11g with data rate 6

LIMITS AND MEASUREMENT RESULT				
Frequency (GHz)	**Average Power (dBm)**	**Peak Power (dBm)**	**Applicable Limits (dBm)**	**Pass or Fail**
2.412	9.66	11.64	30	Pass
2.437	11.06	13.04	30	Pass
2.462	10.15	12.13	30	Pass

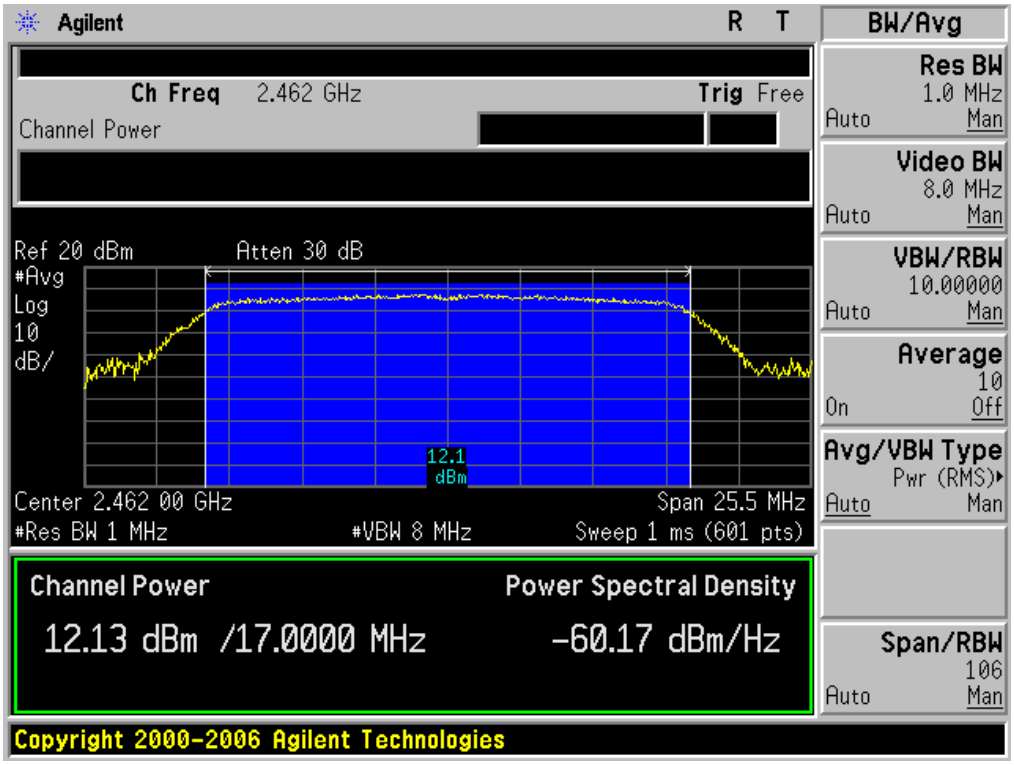
CH1



CH6


Agilent
R T
Freq/Channel
Ch Freq 2.437 GHz
Trig Free
Channel Power
Center Freq
2.43700000 GHz
Start Freq
2.42425000 GHz
Ref 20 dBm
Atten 30 dB
#Avg
Log
10
dB/
Stop Freq
2.44975000 GHz
CF Step
2.55000000 MHz
Auto Man
13.0
dBm
Freq Offset
0.00000000 Hz
Center 2.437 00 GHz
Span 25.5 MHz
#Res BW 1 MHz
#VBW 8 MHz
Sweep 1 ms (601 pts)
Signal Track
On Off
Channel Power
Power Spectral Density
13.04 dBm /17.0000 MHz
-59.26 dBm/Hz
Copyright 2000-2006 Agilent Technologies

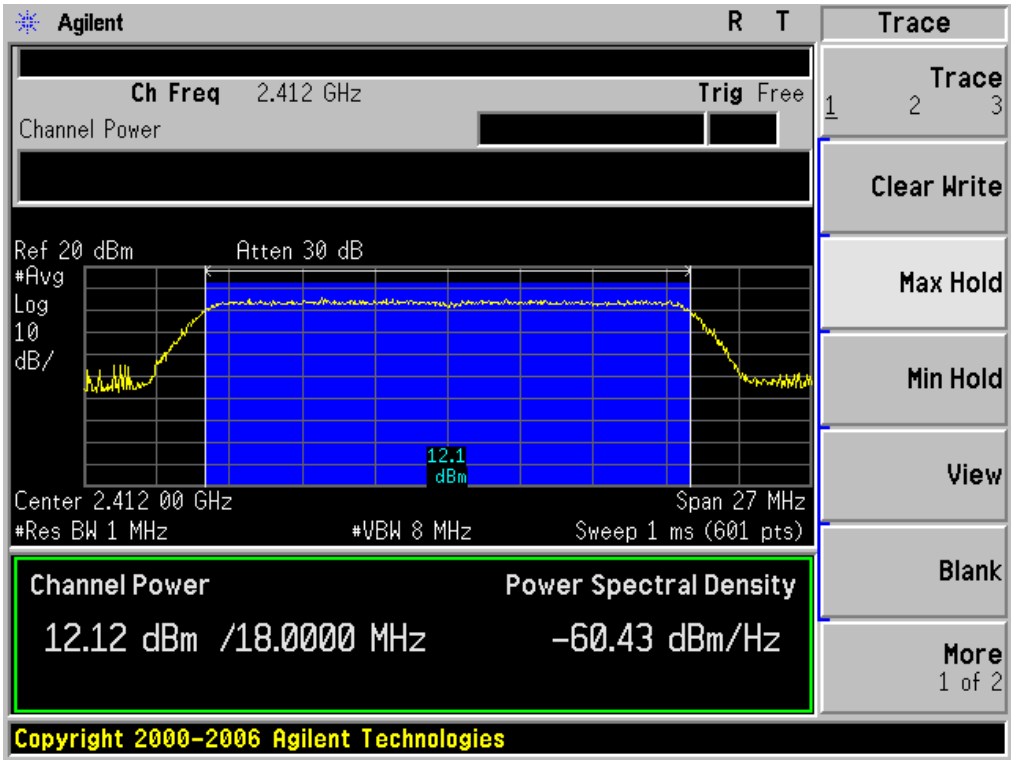
CH11


Agilent
R T
BW/Avg
Ch Freq 2.462 GHz
Trig Free
Channel Power
Res BW
1.0 MHz
Auto Man
Video BW
8.0 MHz
Auto Man
Ref 20 dBm
Atten 30 dB
#Avg
Log
10
dB/
VBW/RBW
10.00000
Auto Man
Average
10
On Off
12.1
dBm
Avg/VBW Type
Pwr (RMS)
Auto Man
Center 2.462 00 GHz
Span 25.5 MHz
#Res BW 1 MHz
#VBW 8 MHz
Sweep 1 ms (601 pts)
Channel Power
Power Spectral Density
12.13 dBm /17.0000 MHz
-60.17 dBm/Hz
Span/RBW
106
Auto Man
Copyright 2000-2006 Agilent Technologies

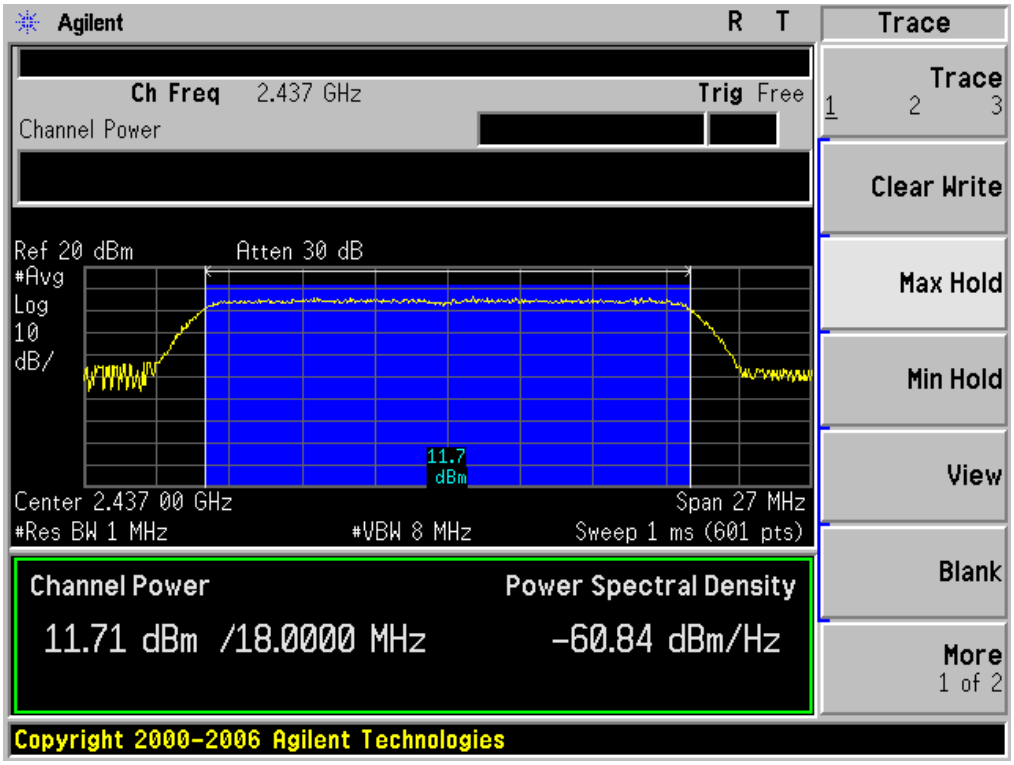
TEST ITEM	PEAK POWER
TEST MODE	802.11n 20 with data rate 6.5

LIMITS AND MEASUREMENT RESULT				
Frequency (GHz)	**Average Power (dBm)**	**Peak Power (dBm)**	**Applicable Limits (dBm)**	**Pass or Fail**
2.412	10.14	12.12	30	Pass
2.437	9.73	11.71	30	Pass
2.462	10.48	12.46	30	Pass

CH1



CH6


Agilent
R T
Trace
Ch Freq 2.437 GHz
Trig Free
Channel Power
Trace
1 2 3
Clear Write
Ref 20 dBm
Atten 30 dB
#Avg
Log
10
dB/
Max Hold
Min Hold
11.7
dBm
View
Center 2.437 00 GHz
Span 27 MHz
#Res BW 1 MHz
#VBW 8 MHz
Sweep 1 ms (601 pts)
Blank
Channel Power
Power Spectral Density
11.71 dBm /18.0000 MHz
-60.84 dBm/Hz
More
1 of 2
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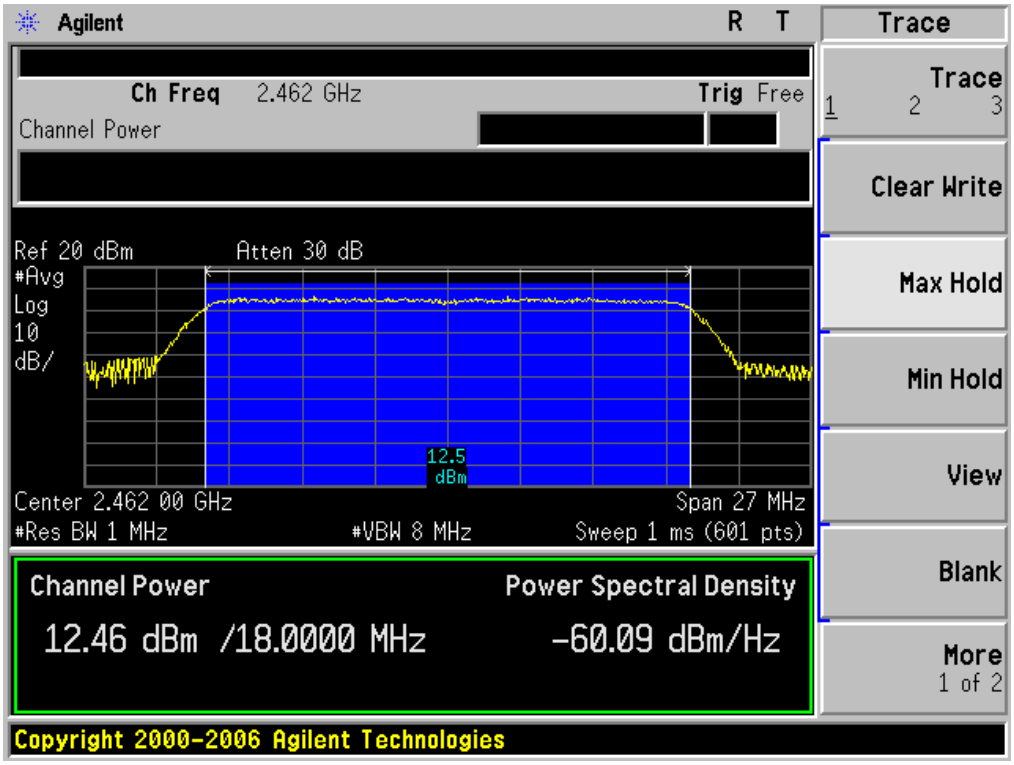
CH11


Agilent
R T
Trace
Ch Freq 2.462 GHz
Trig Free
Channel Power
Trace
1 2 3
Clear Write
Ref 20 dBm
Atten 30 dB
#Avg
Log
10
dB/
Max Hold
Min Hold
12.5
dBm
View
Center 2.462 00 GHz
Span 27 MHz
#Res BW 1 MHz
#VBW 8 MHz
Sweep 1 ms (601 pts)
Blank
Channel Power
Power Spectral Density
12.46 dBm /18.0000 MHz
-60.09 dBm/Hz
More
1 of 2
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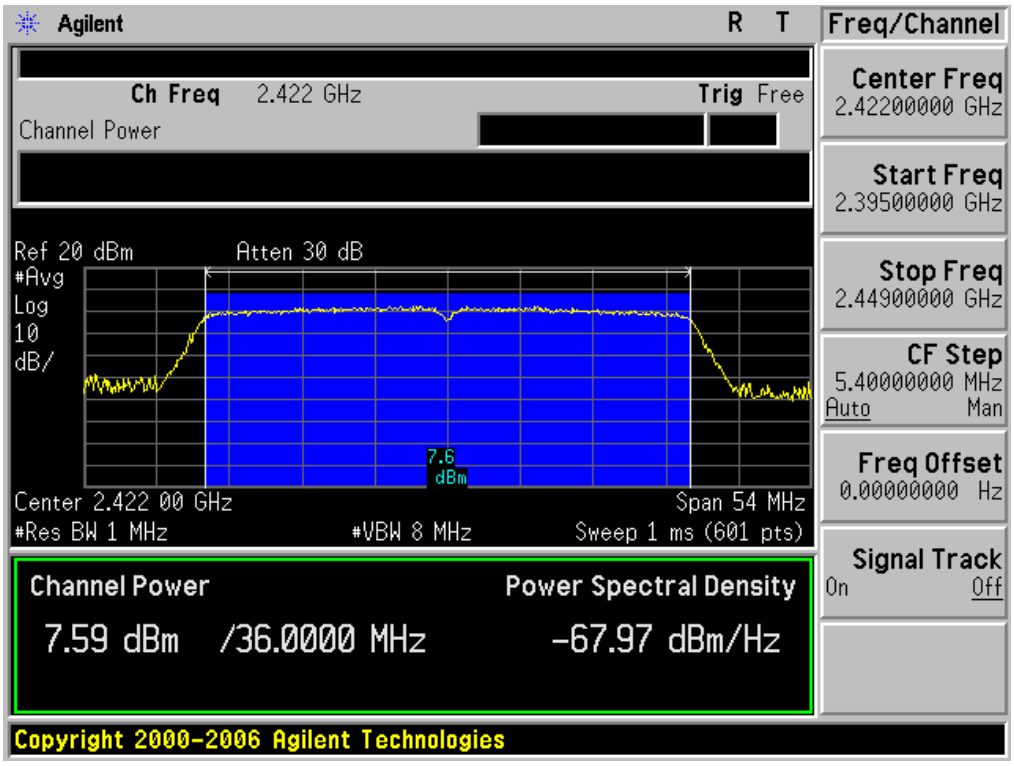
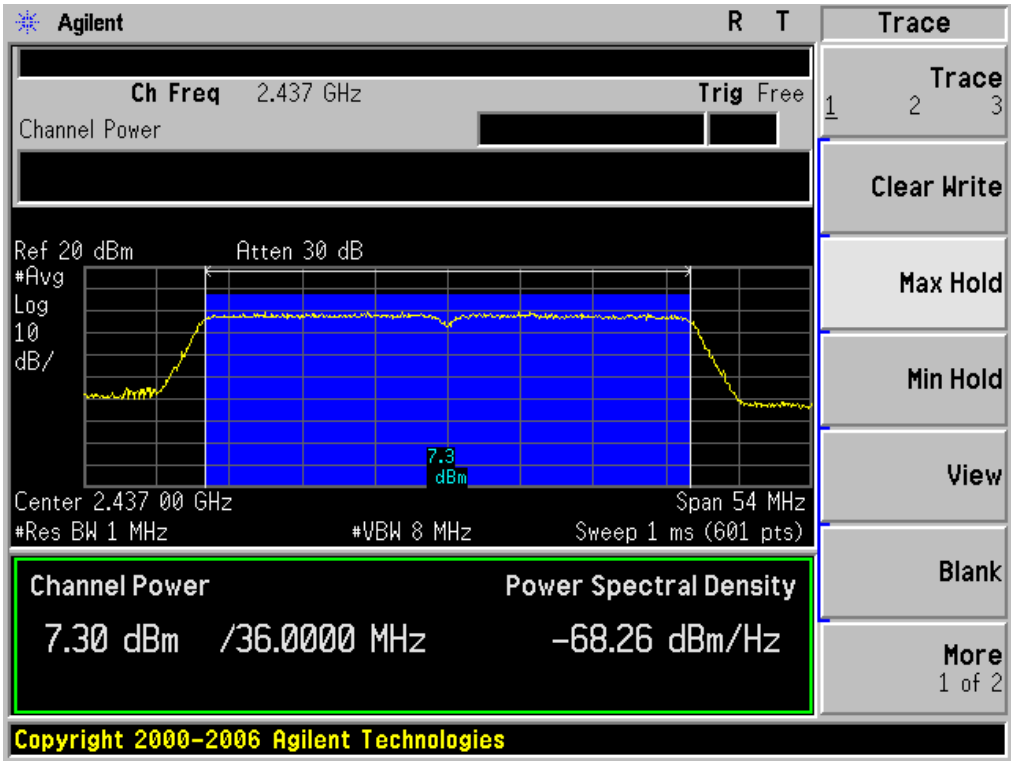
TEST ITEM	PEAK POWER
TEST MODE	802.11n 40 with data rate 13.5

LIMITS AND MEASUREMENT RESULT				
Frequency (GHz)	**Average Power (dBm)**	**Peak Power (dBm)**	**Applicable Limits (dBm)**	**Pass or Fail**
2.422	5.61	7.59	30	Pass
2.437	5.32	7.3	30	Pass
2.452	5.87	7.85	30	Pass

CH3



CH6


Agilent
R T
Trace
Ch Freq 2.437 GHz
Trig Free
Channel Power
Trace
1 2 3
Clear Write
Ref 20 dBm
Atten 30 dB
#Avg
Log
10
dB/
Max Hold
Min Hold
7.3
dBm
View
Center 2.437 00 GHz
Span 54 MHz
#Res BW 1 MHz
#VBW 8 MHz
Sweep 1 ms (601 pts)
Blank
Channel Power
Power Spectral Density
7.30 dBm /36.0000 MHz
-68.26 dBm/Hz
More
1 of 2
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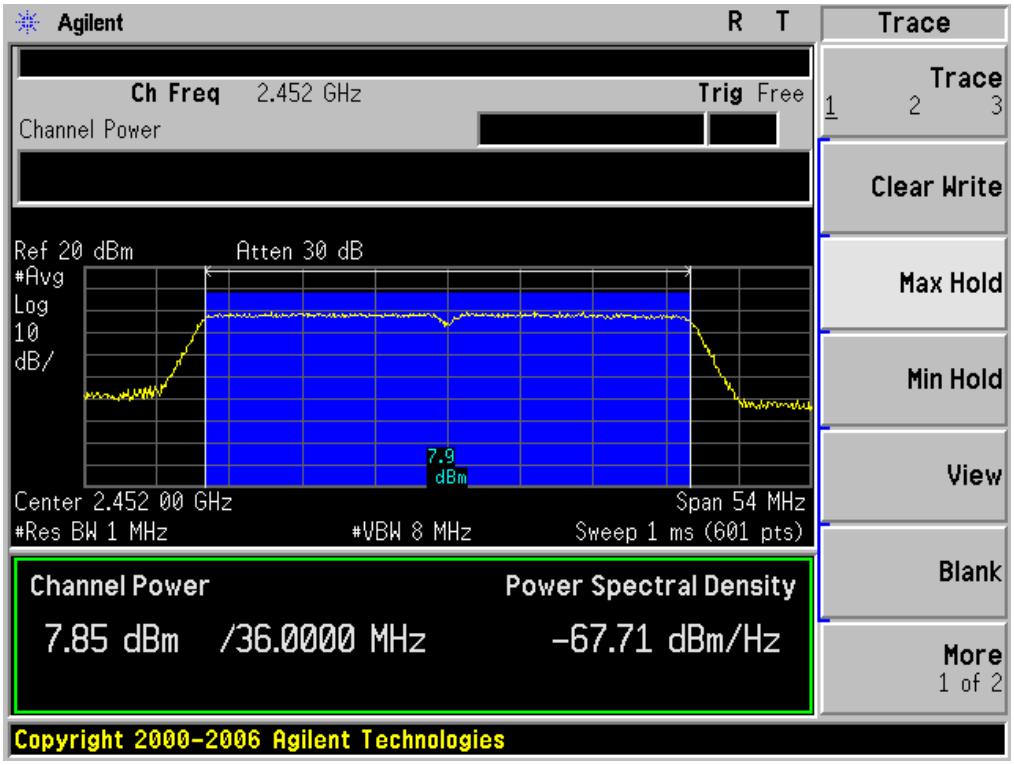
CH9


Agilent
R T
Trace
Ch Freq 2.452 GHz
Trig Free
Channel Power
Trace
1 2 3
Clear Write
Ref 20 dBm
Atten 30 dB
#Avg
Log
10
dB/
Max Hold
Min Hold
7.9
dBm
View
Center 2.452 00 GHz
Span 54 MHz
#Res BW 1 MHz
#VBW 8 MHz
Sweep 1 ms (601 pts)
Blank
Channel Power
Power Spectral Density
7.85 dBm /36.0000 MHz
-67.71 dBm/Hz
More
1 of 2
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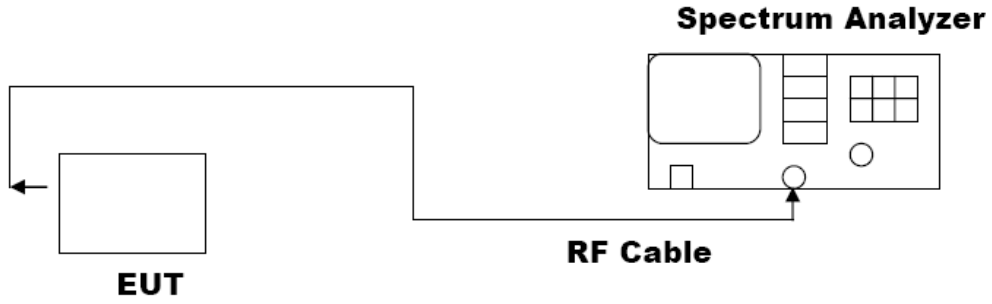
8. 6DB BANDWIDTH

8.1. MEASUREMENT PROCEDURE

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
3. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
4. Set SPA Centre Frequency = Operation Frequency, RBW= 100 KHz, VBW⩾RBW.
5. 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)



8.3. LIMITS AND MEASUREMENT RESULTS

TEST ITEM	6DB BANDWIDTH
TEST MODE	802.11b with data rate 11

LIMITS AND MEASUREMENT RESULT			
Applicable Limits	**Applicable Limits**		
	Test Data (MHz)		**Criteria**
>500KHZ	Low Channel	9.570	PASS
	Middle Channel	9.538	PASS
	High Channel	9.606	PASS

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

LIMITS AND MEASUREMENT RESULT			
Applicable Limits	**Applicable Limits**		
	Test Data (MHz)		**Criteria**
>500KHZ	Low Channel	16.069	PASS
	Middle Channel	16.106	PASS
	High Channel	15.487	PASS

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

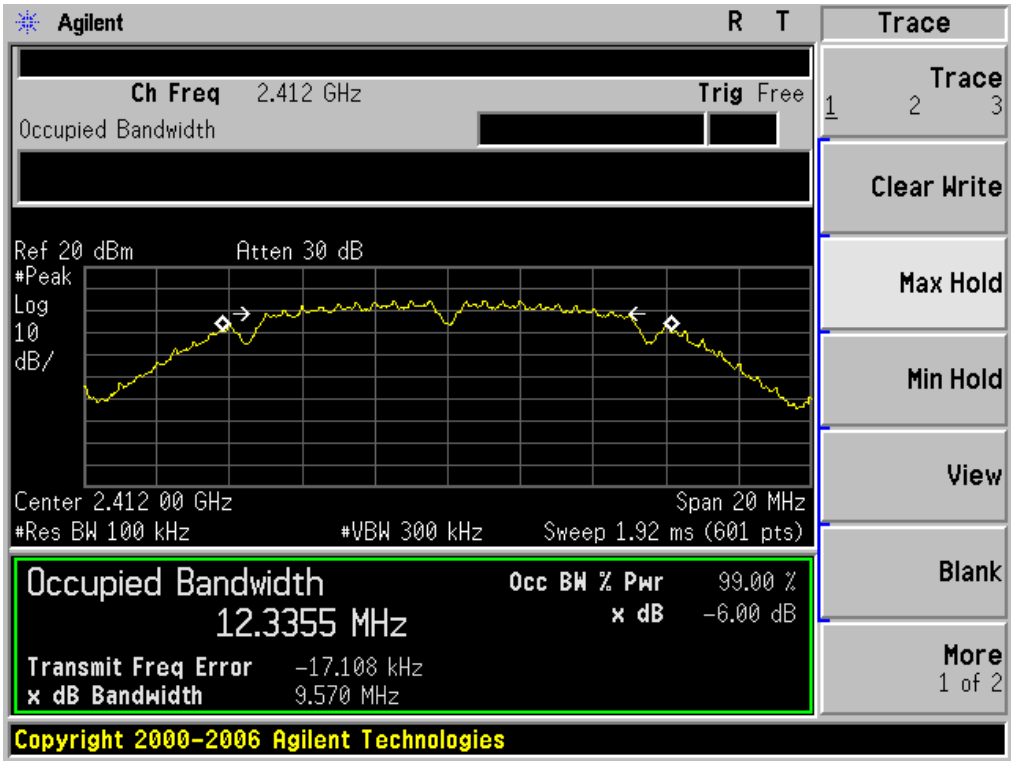
LIMITS AND MEASUREMENT RESULT			
Applicable Limits	**Applicable Limits**		
	Test Data (MHz)		**Criteria**
>500KHZ	Low Channel	17.597	PASS
	Middle Channel	17.650	PASS
	High Channel	17.627	PASS

TEST ITEM	6DB BANDWIDTH
TEST MODE	802.11n 40 with data rate 135

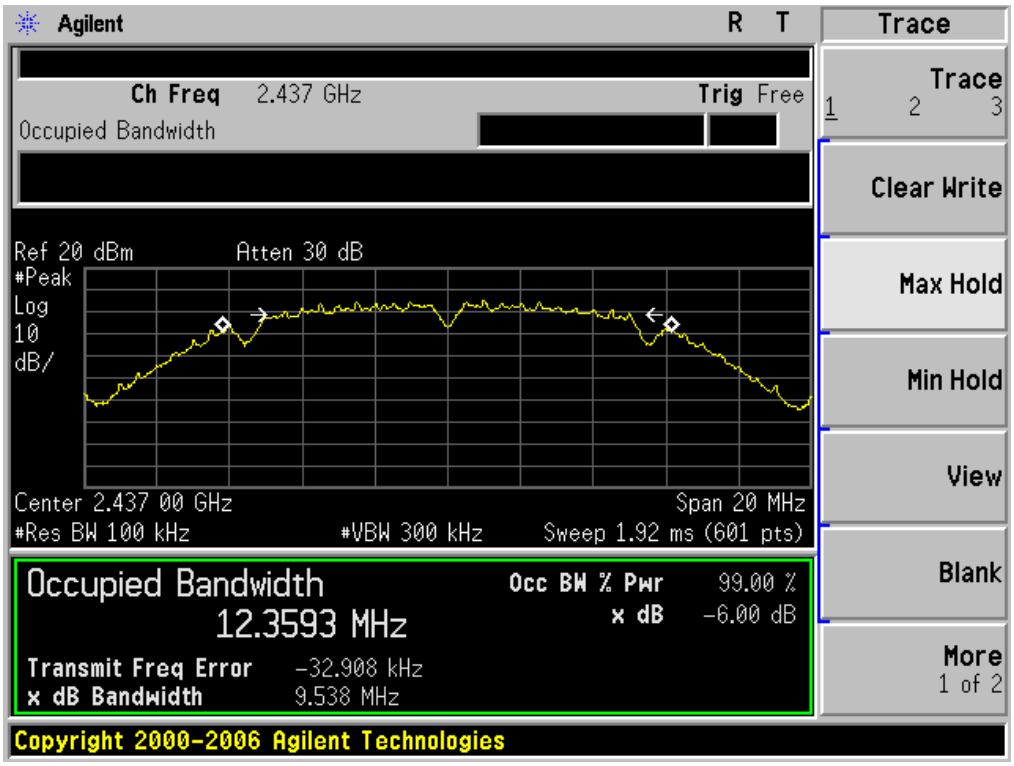
LIMITS AND MEASUREMENT RESULT			
Applicable Limits	**Applicable Limits**		
	Test Data (MHz)		**Criteria**
>500KHZ	Low Channel	35.764	PASS
	Middle Channel	35.867	PASS
	High Channel	36.051	PASS

802.11b TEST RESULT

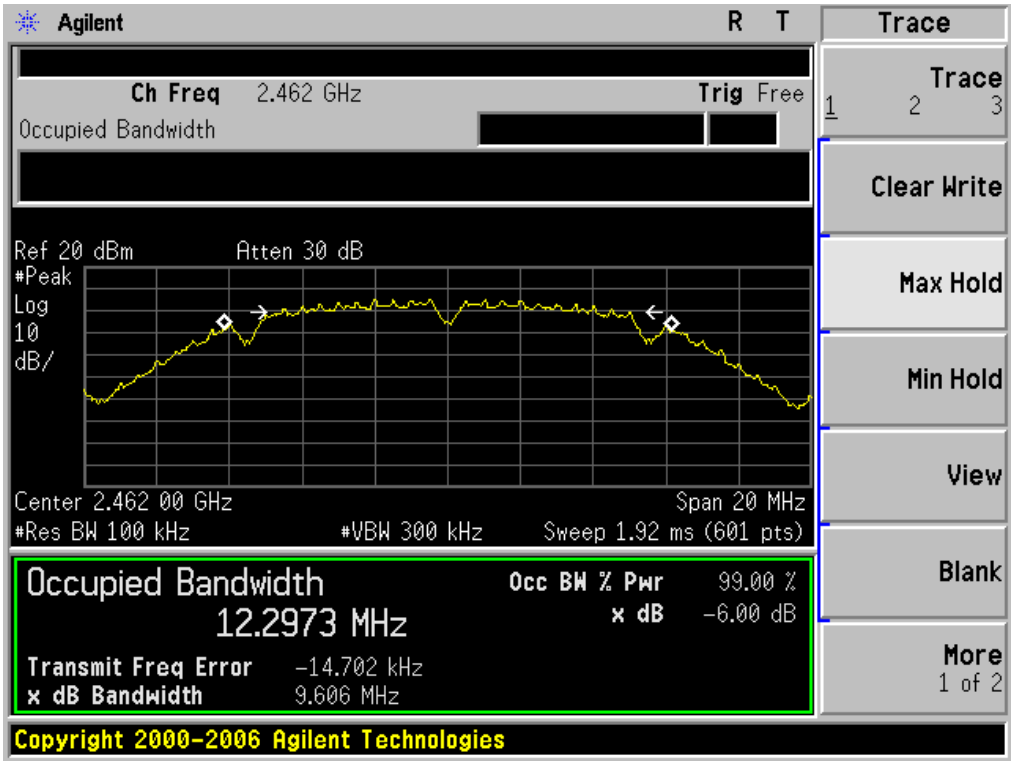
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

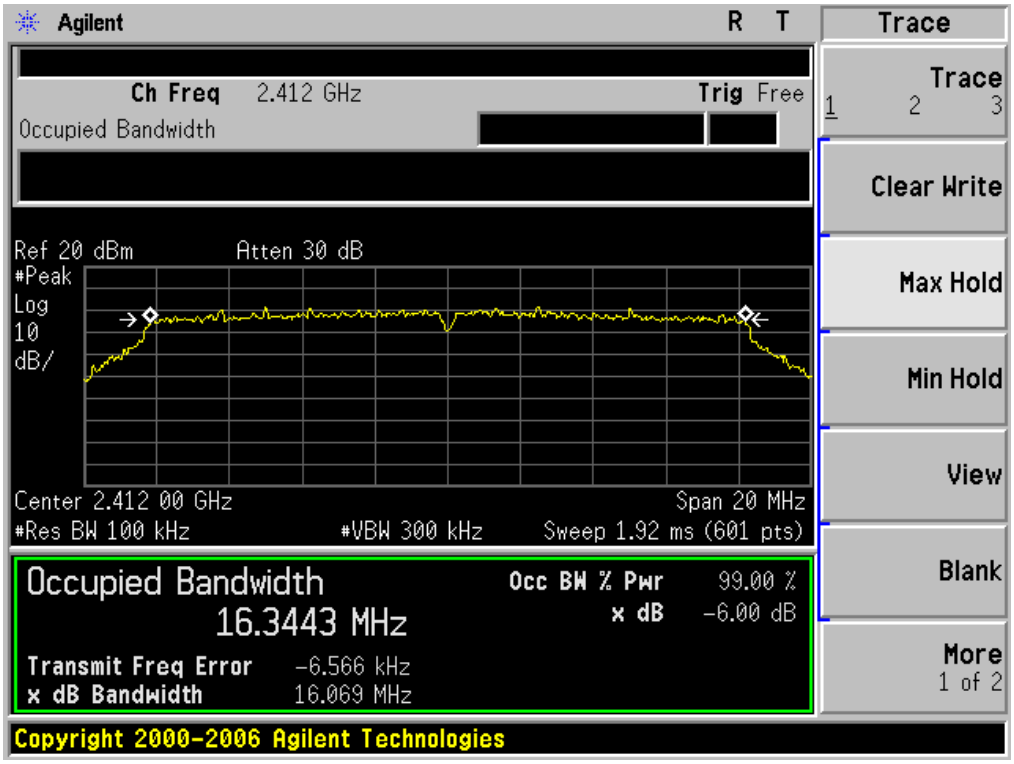


TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

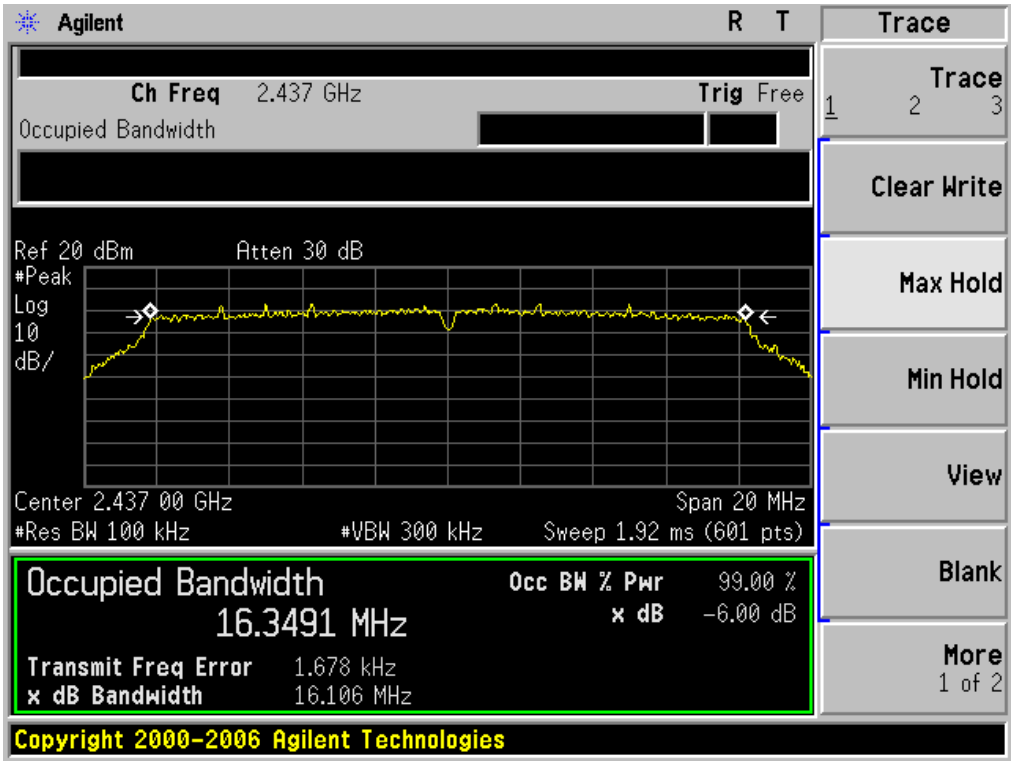


802.11g TEST RESULT

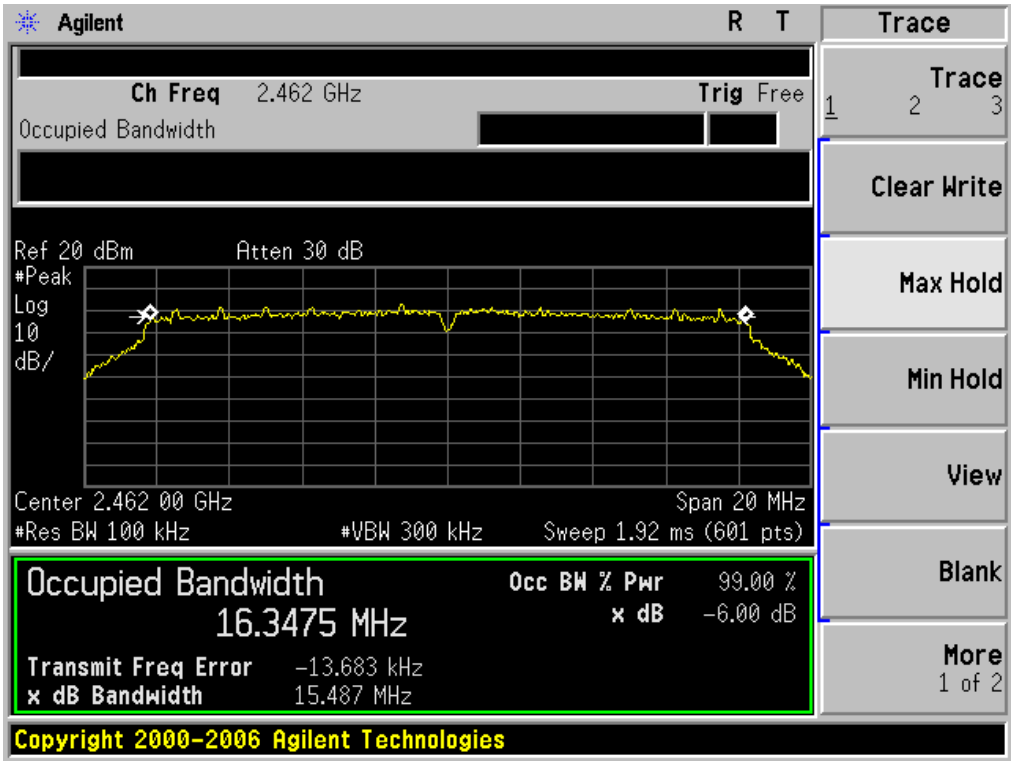
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

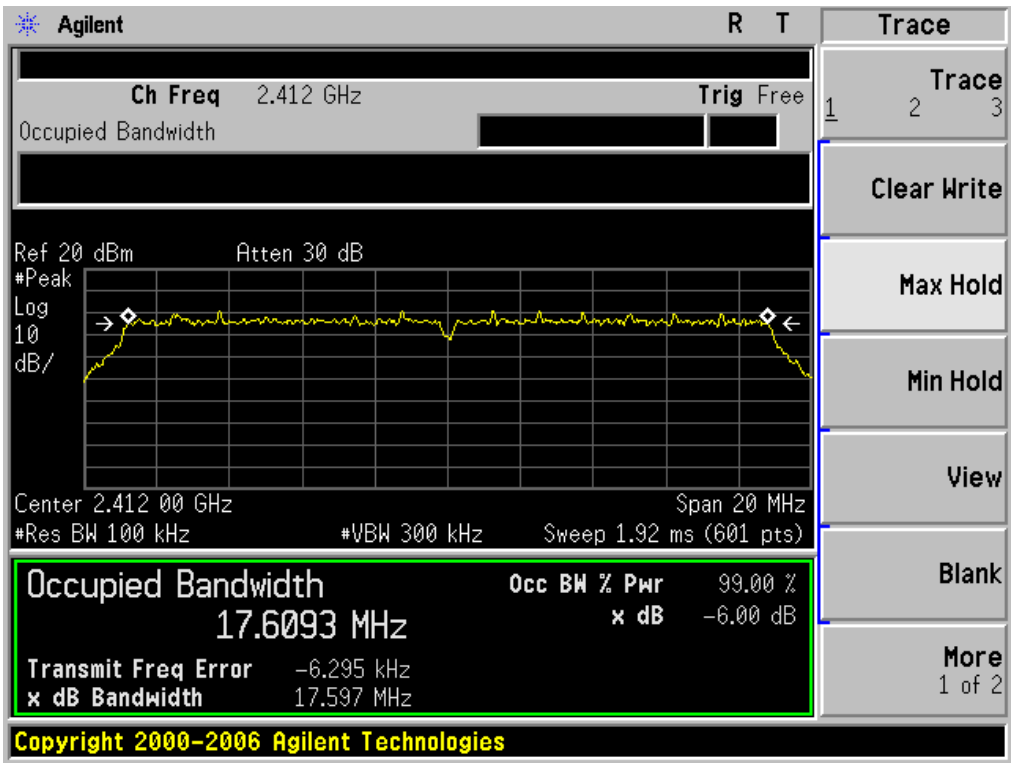


TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

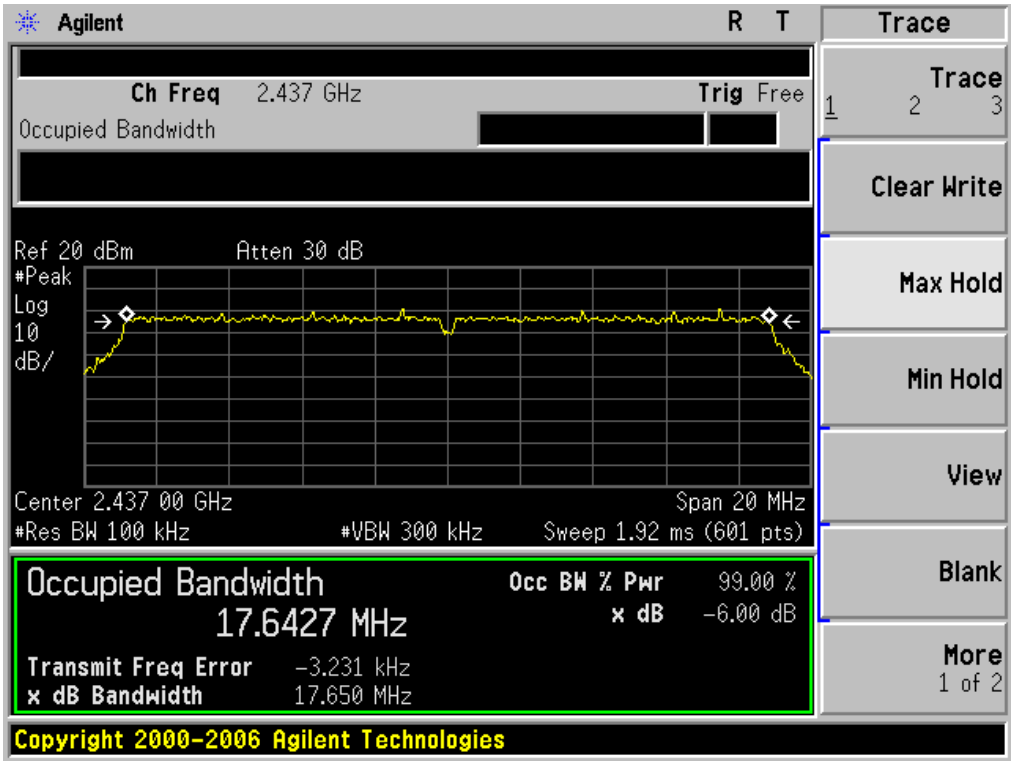


802.11n (20) TEST RESULT

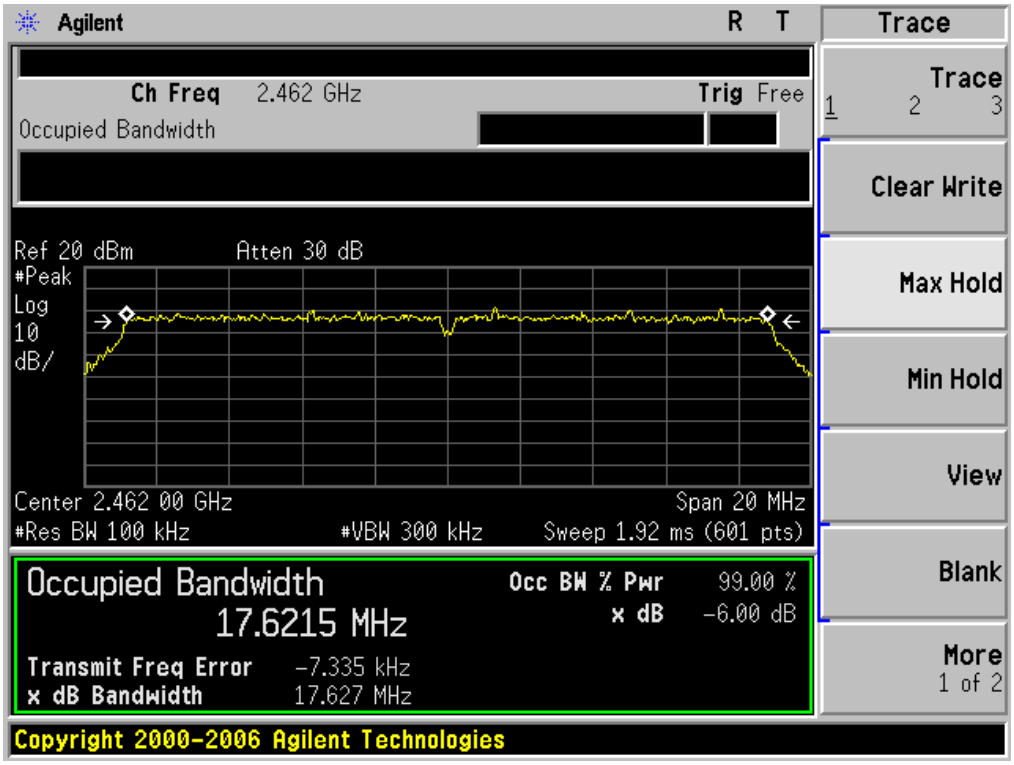
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

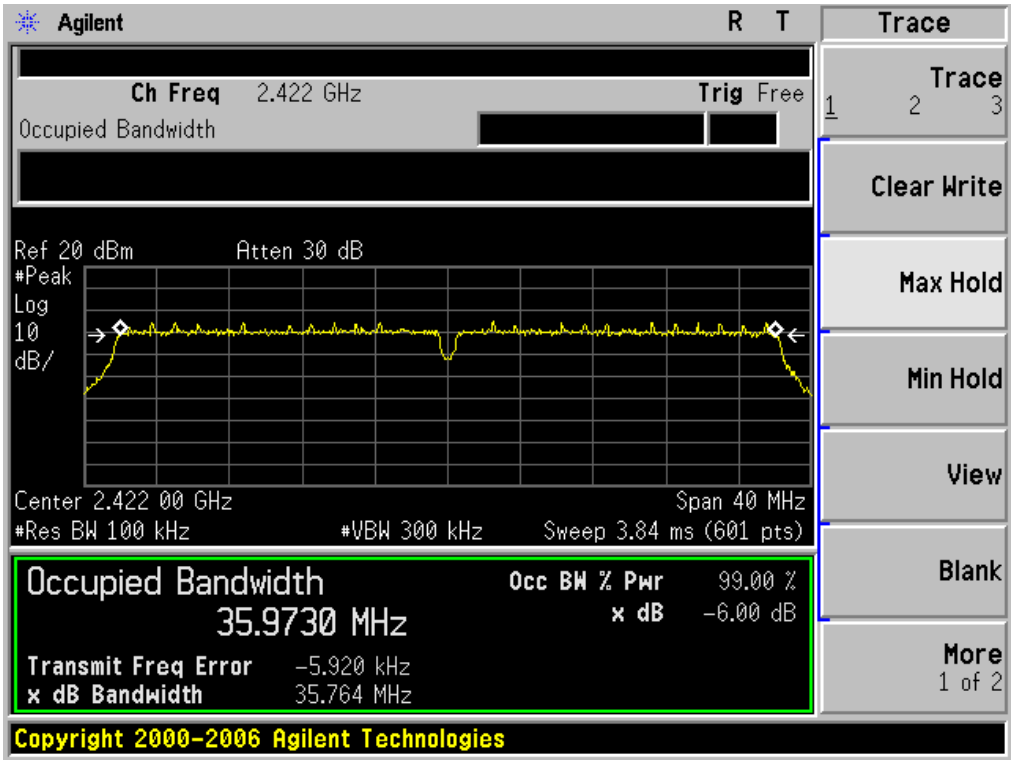


TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

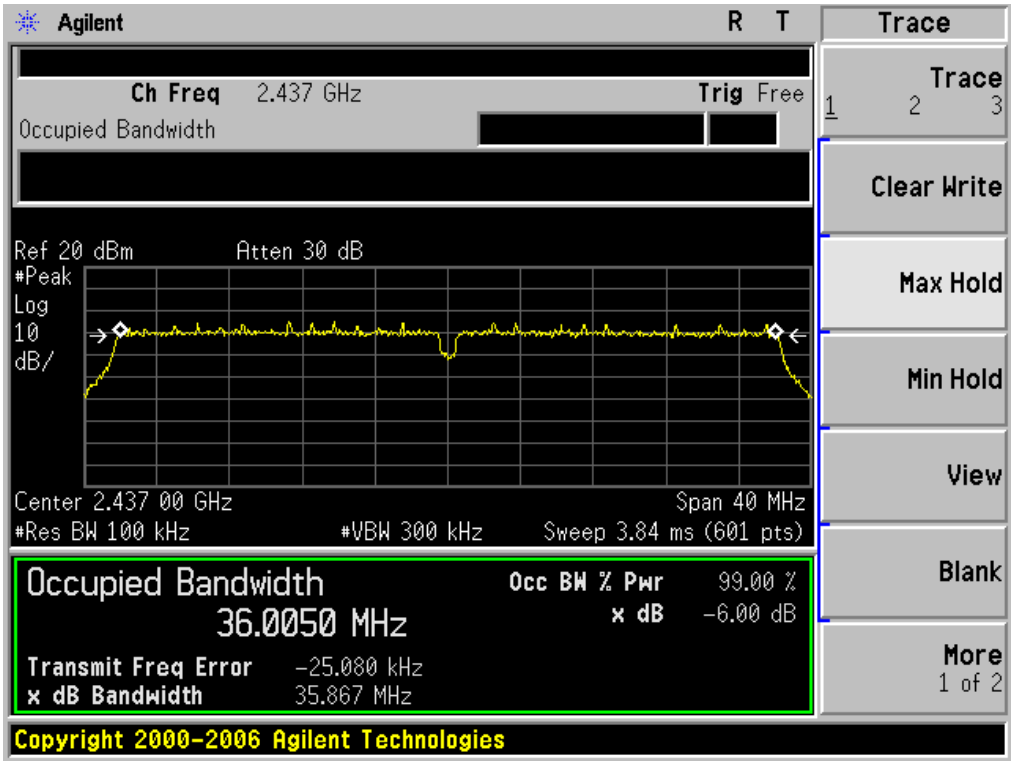


802.11n(40) TEST RESULT

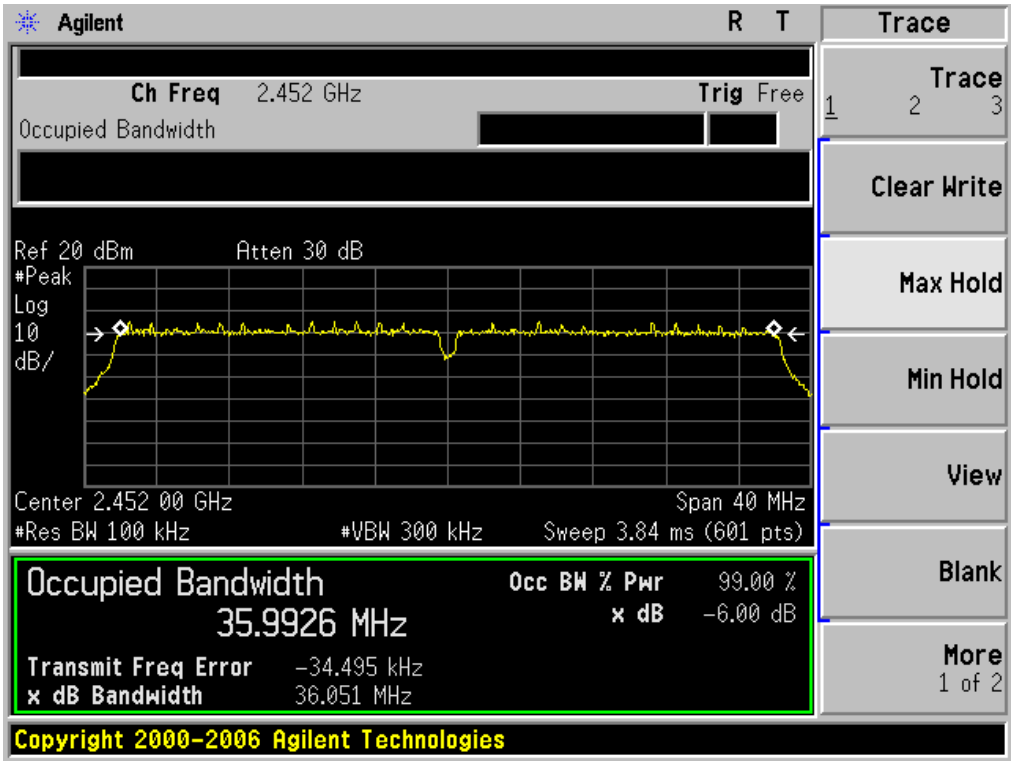
TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



9. CONDUCTED SPURIOUS EMISSION

9.1. MEASUREMENT PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
3, Set the EUT Work on the top, the middle and the bottom operation frequency individually.
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. 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.

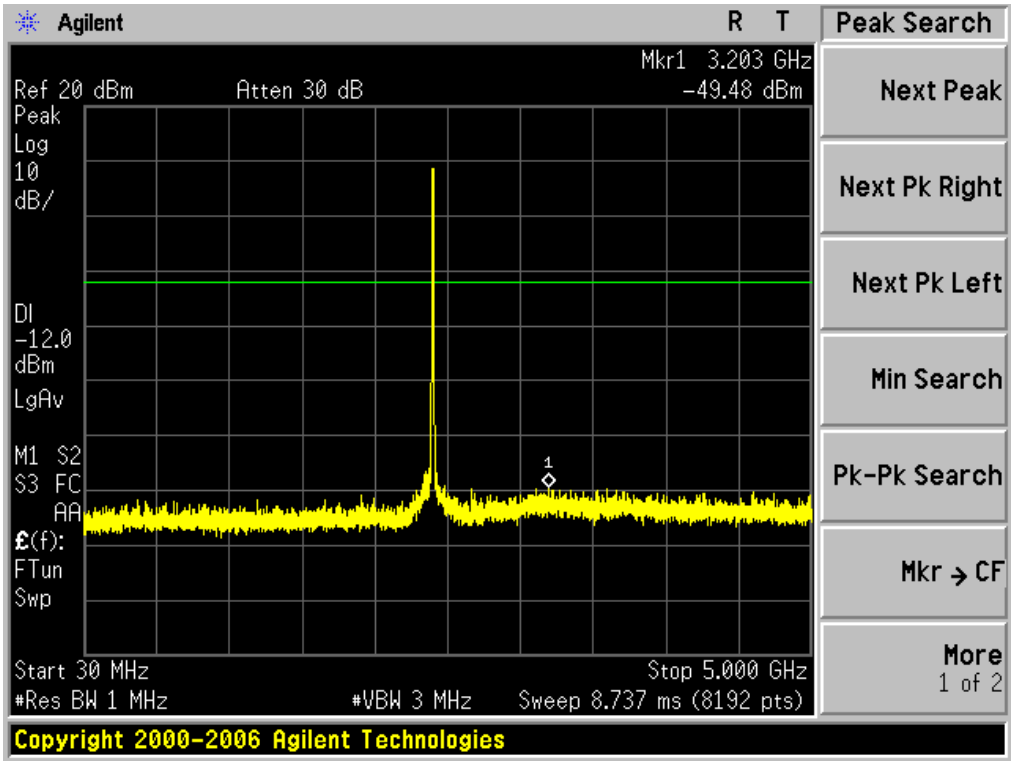
9.3. MEASUREMENT EQUIPMENT USED

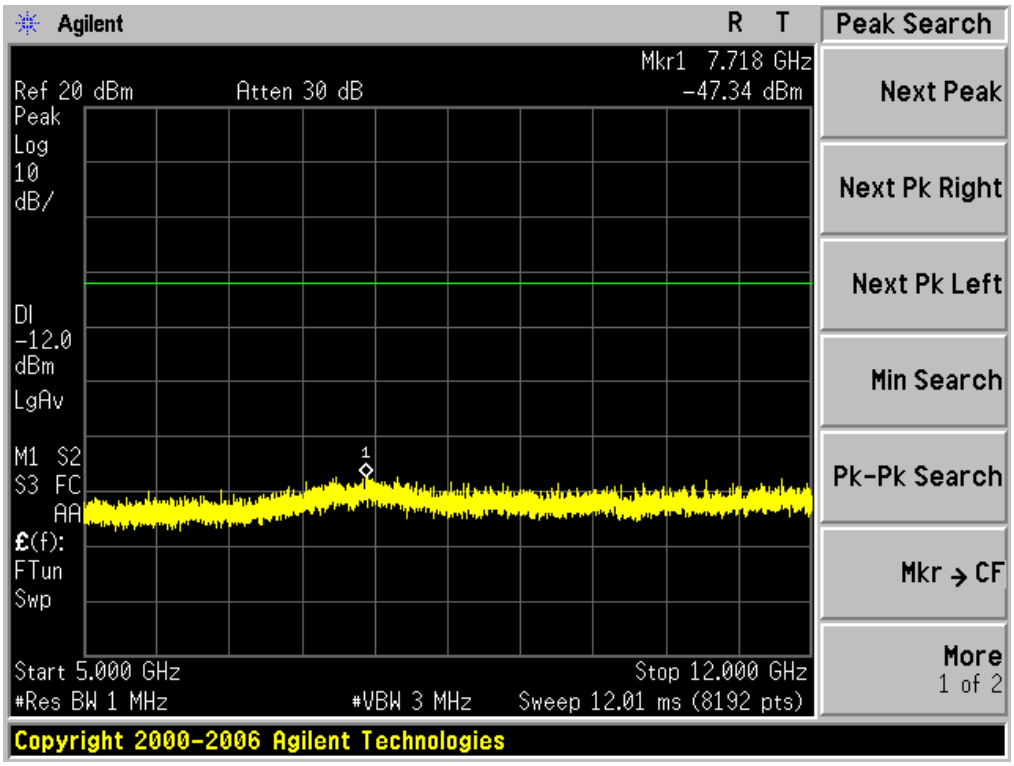
The same as described in section 6.

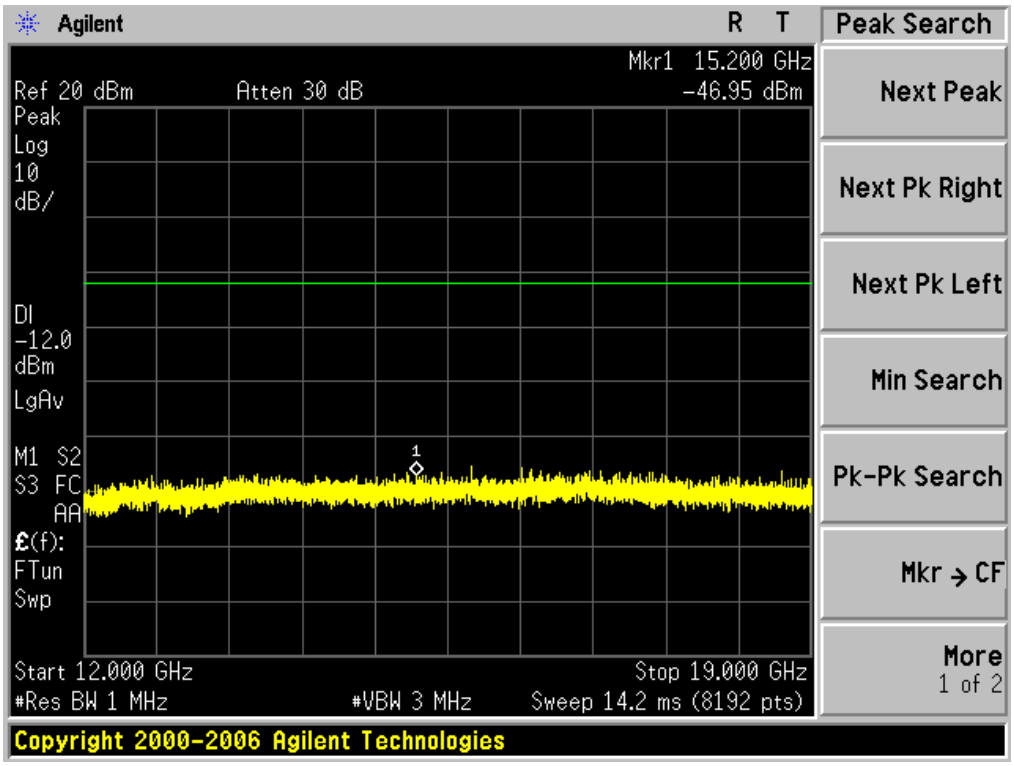
9.4. LIMITS AND MEASUREMENT RESULT

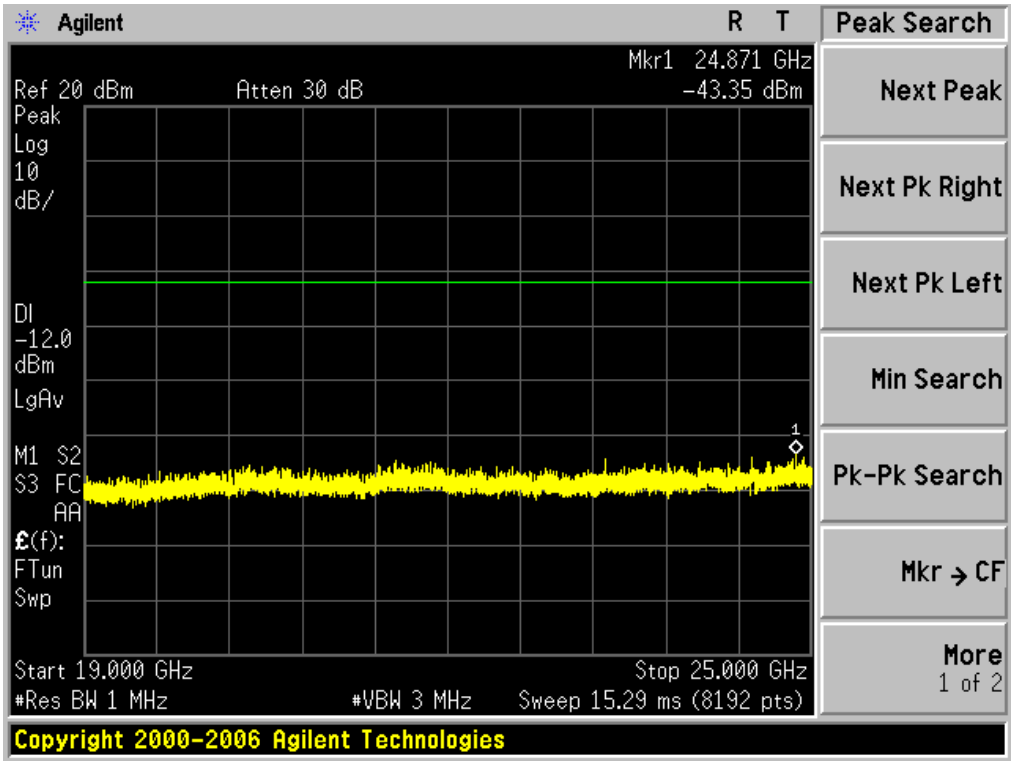
LIMITS AND MEASUREMENT RESULT		
Applicable Limits	**Measurement Result**	
	Test Data	**Criteria**
In any 100 KHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produce by the intentional radiator shall be at least 20 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power. 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 -20dBc than the limit Specified on the BOTTOM Channel	PASS
	At least -20dBc than the limit Specified on the TOP Channel	PASS

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



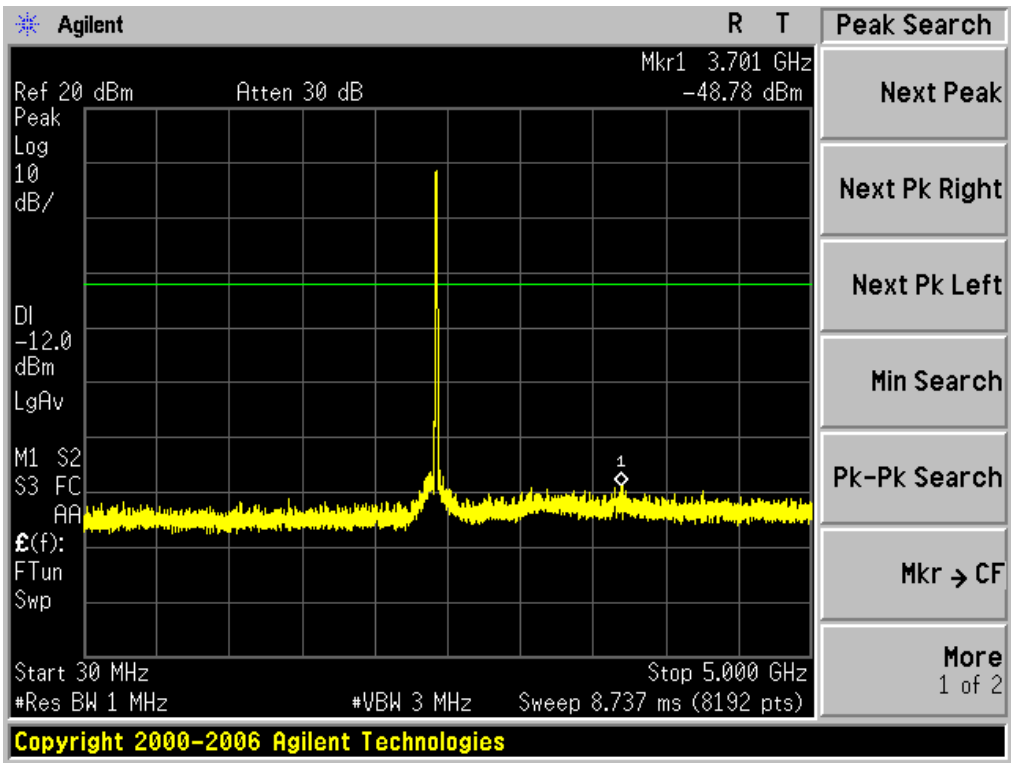


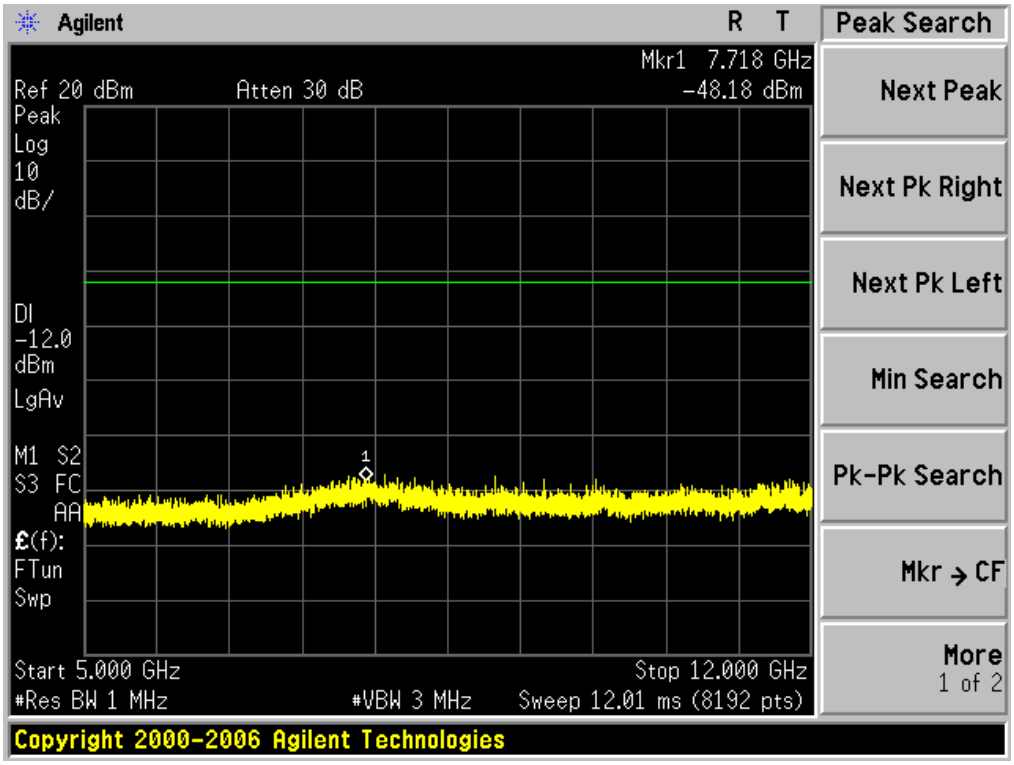

Agilent
R T
Peak Search
Mkr1 15.200 GHz
Ref 20 dBm
Atten 30 dB
-46.95 dBm
Peak
Log
10
dB/
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
DI
-12.0
dBm
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Start 12.000 GHz
Stop 19.000 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 14.2 ms (8192 pts)
Copyright 2000-2006 Agilent Technologies

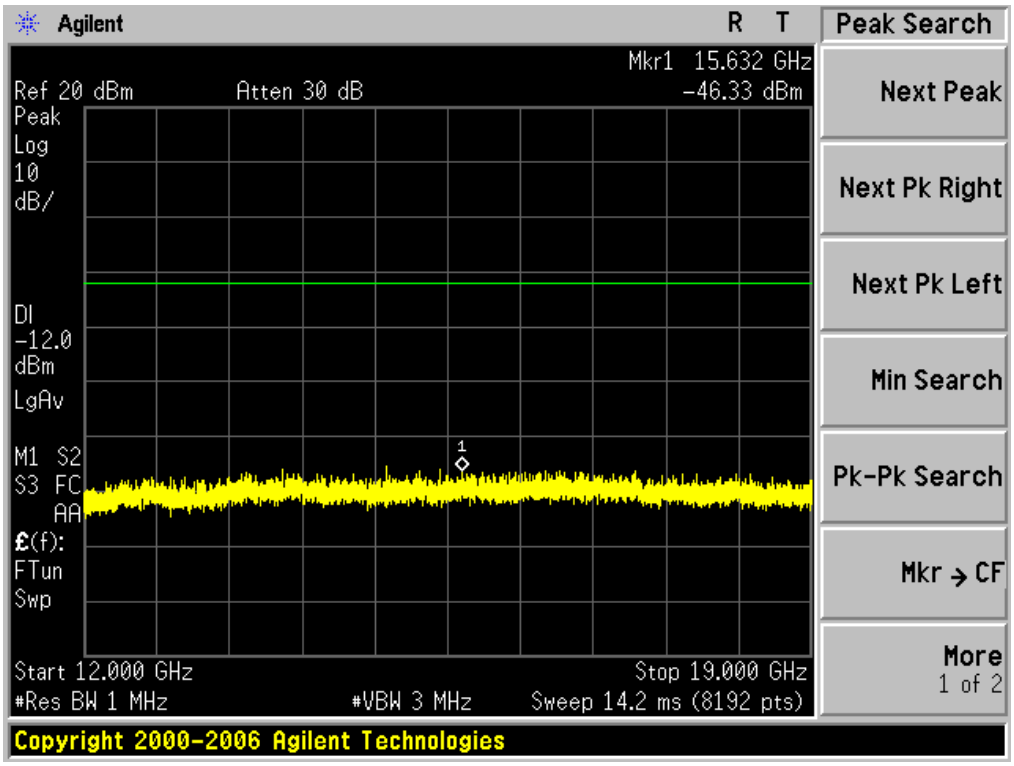

Agilent
R T
Peak Search
Mkr1 24.871 GHz
Ref 20 dBm
Atten 30 dB
-43.35 dBm
Peak
Log
10
dB/
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
DI
-12.0
dBm
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Start 19.000 GHz
Stop 25.000 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 15.29 ms (8192 pts)
Copyright 2000-2006 Agilent Technologies

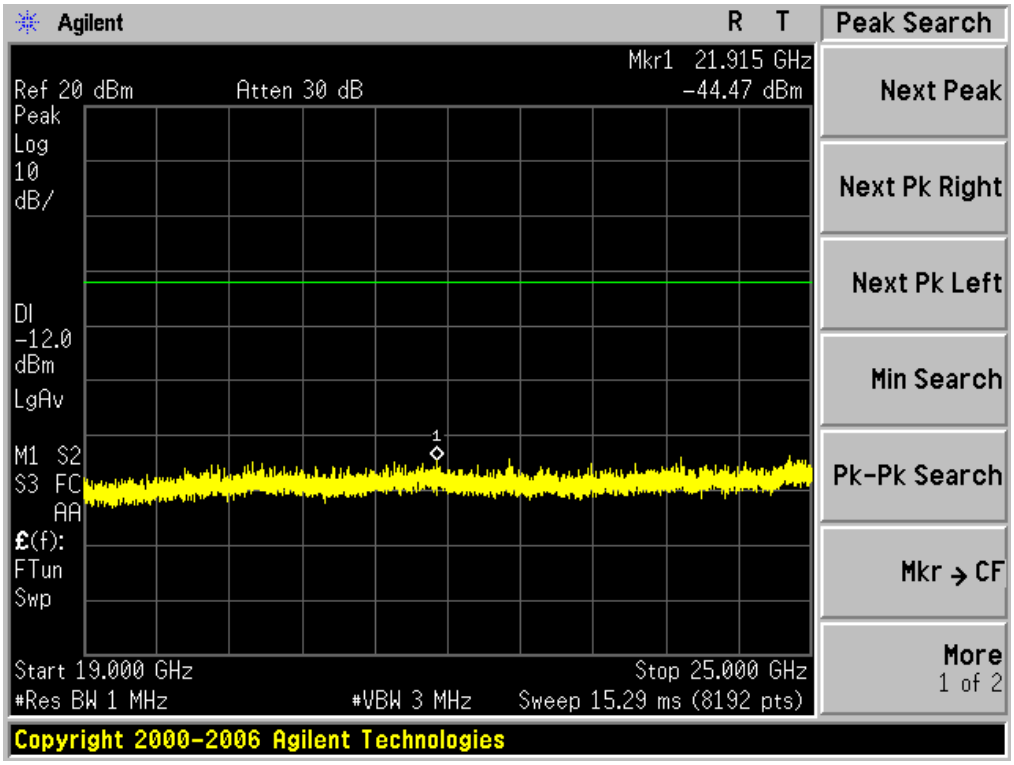
TEST PLOT OF OUT OF BAND EMISSIONS

OF 802.11b FOR MODULATION IN MIDDLE CHANNEL



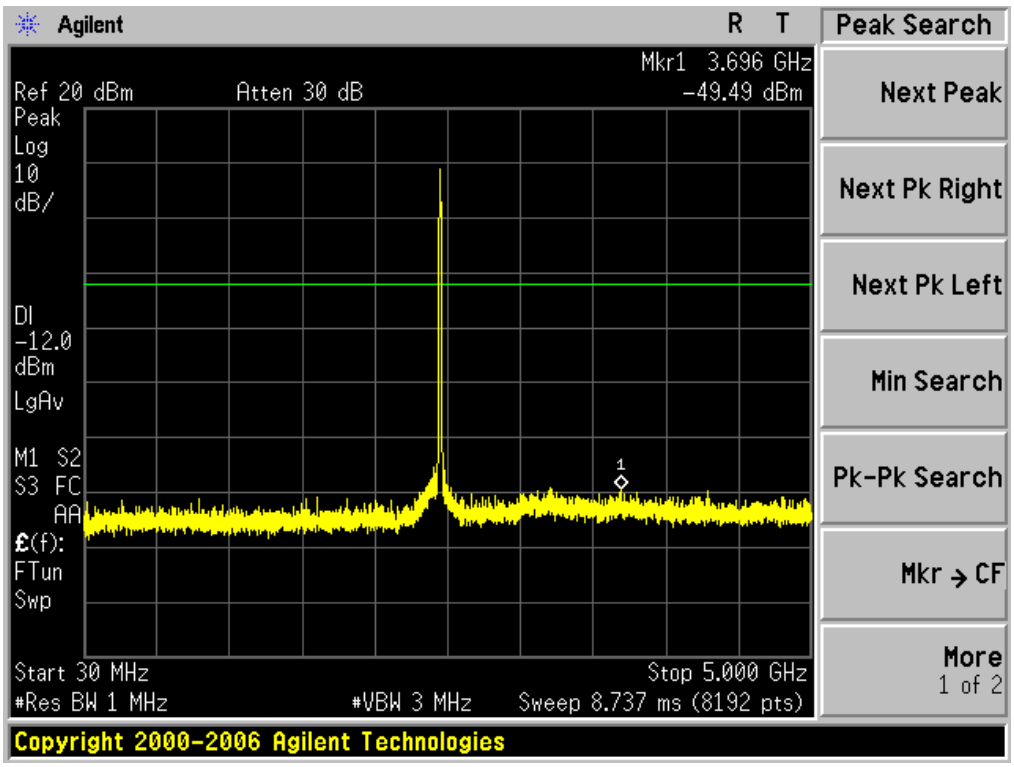


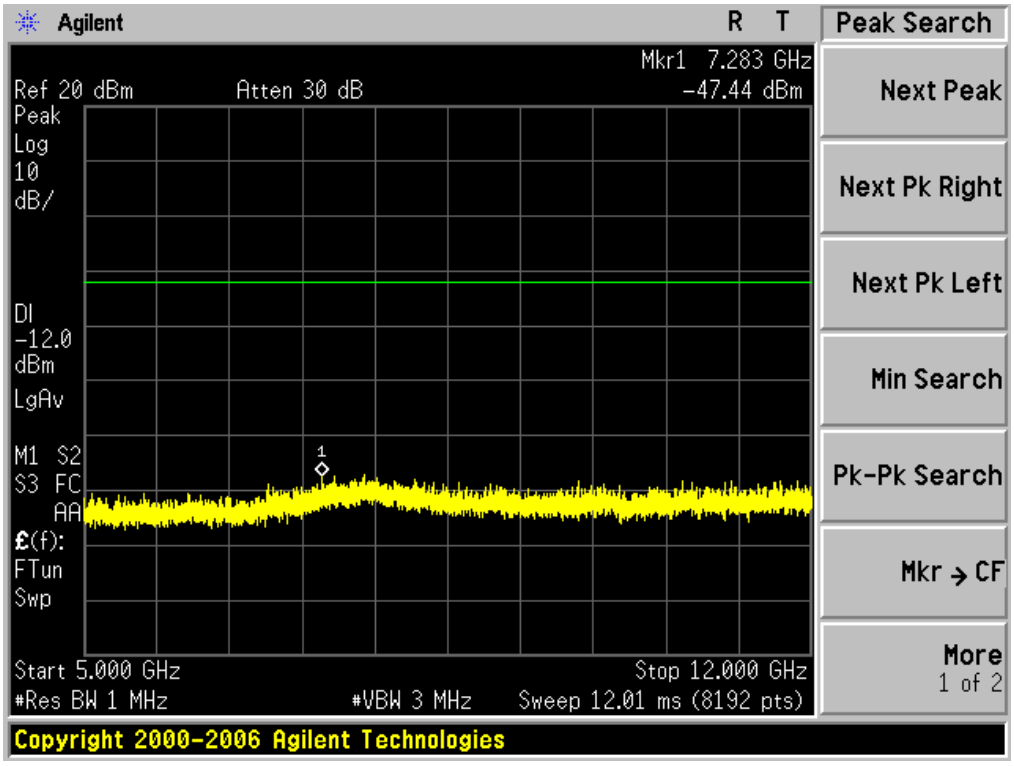

Agilent
R T
Peak Search
Mkr1 15.632 GHz
Ref 20 dBm
Atten 30 dB
-46.33 dBm
Peak
Log
10
dB/
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
DI
-12.0
dBm
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Start 12.000 GHz
Stop 19.000 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 14.2 ms (8192 pts)
Copyright 2000-2006 Agilent Technologies

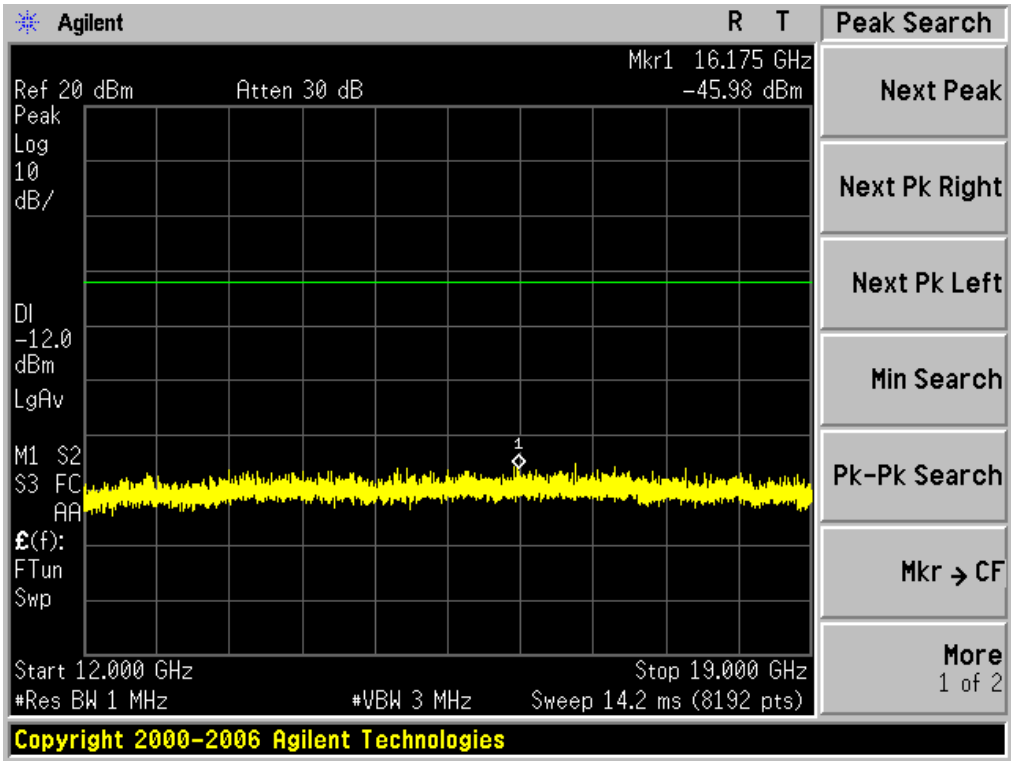

Agilent
R T
Peak Search
Mkr1 21.915 GHz
Ref 20 dBm
Atten 30 dB
-44.47 dBm
Peak
Log
10
dB/
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
DI
-12.0
dBm
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Start 19.000 GHz
Stop 25.000 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 15.29 ms (8192 pts)
Copyright 2000-2006 Agilent Technologies

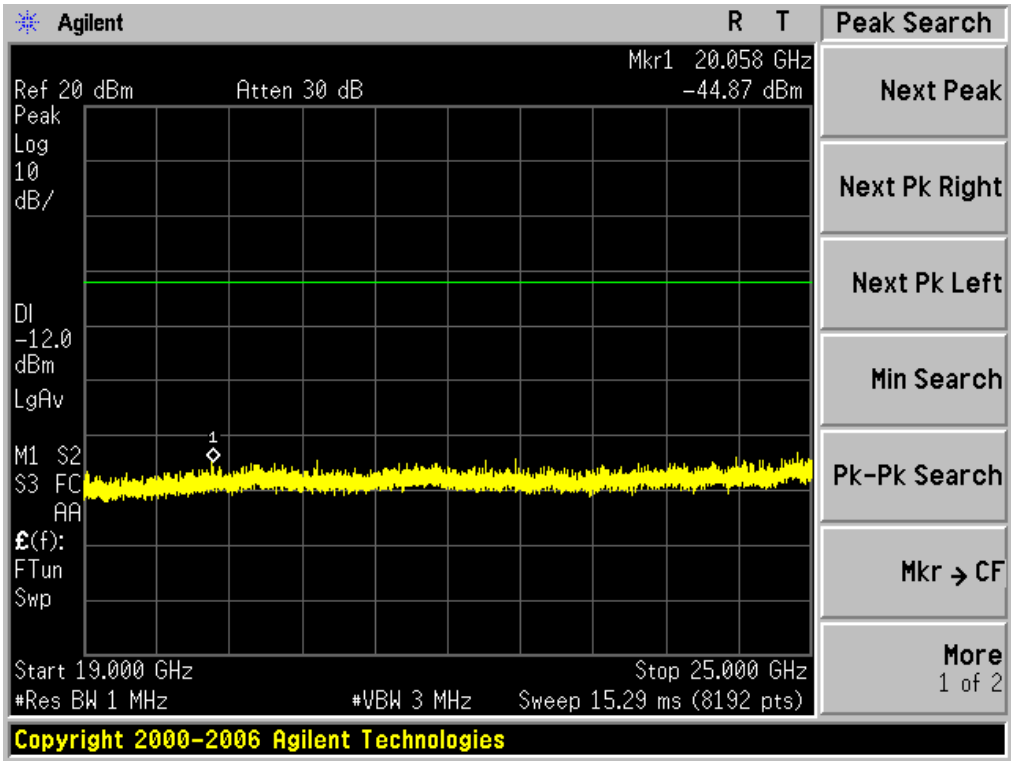
TEST PLOT OF OUT OF BAND EMISSIONS

OF 802.11b FOR MODULATION IN HIGH CHANNEL






Agilent
R T
Peak Search
Mkr1 16.175 GHz
Ref 20 dBm
Atten 30 dB
-45.98 dBm
Peak
Log
10
dB/
Next Peak
Next Pk Right
Next Pk Left
Dl
-12.0
dBm
LgAv
Min Search
M1 S2
S3 FC
AA
Pk-Pk Search
£(f):
FTun
Swp
Mkr → CF
More
1 of 2
Start 12.000 GHz
Stop 19.000 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 14.2 ms (8192 pts)
Copyright 2000-2006 Agilent Technologies


Agilent
R T
Peak Search
Mkr1 20.058 GHz
Ref 20 dBm
Atten 30 dB
-44.87 dBm
Peak
Log
10
dB/
Next Peak
Next Pk Right
Next Pk Left
Dl
-12.0
dBm
LgAv
Min Search
M1 S2
S3 FC
AA
Pk-Pk Search
£(f):
FTun
Swp
Mkr → CF
More
1 of 2
Start 19.000 GHz
Stop 25.000 GHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 15.29 ms (8192 pts)
Copyright 2000-2006 Agilent Technologies

10. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY

10.1 MEASUREMENT PROCEDURE

(1). The EUT was placed on a turn table which is 0.8m above ground plane.
(2). Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
(3). Set the EUT Work on the top, the middle and the bottom operation frequency individually.
(4). 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)**	**Limit (dBm)**	**Result**
Low Channel	-9.03	8	Pass
Middle Channel	-8.4	8	Pass
High Channel	-9.16	8	Pass

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

Channel No.	**PSD (dBm)**	**Limit (dBm)**	**Result**
Low Channel	-10.97	8	Pass
Middle Channel	-10.44	8	Pass
High Channel	-10.09	8	Pass

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

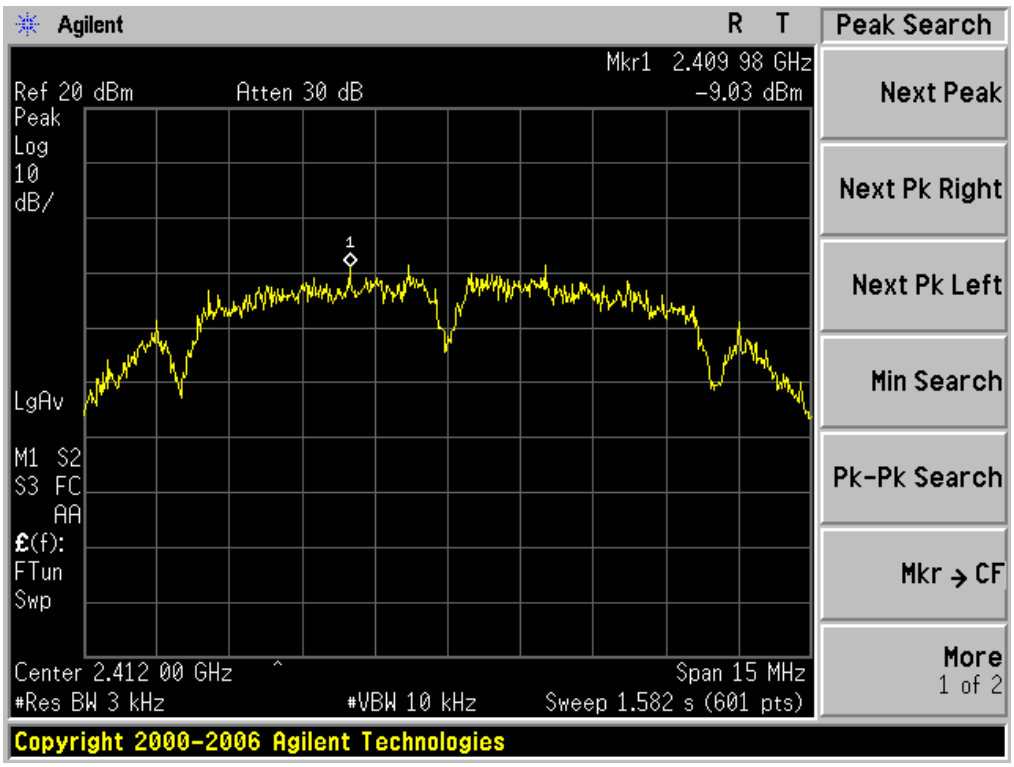
Channel No.	PSD (dBm)	Limit (dBm)	Result
Low Channel	-14.03	8	Pass
Middle Channel	-13.62	8	Pass
High Channel	-13.43	8	Pass

TEST ITEM	POWER PECTRAL DENSITY
TEST MODE	802.11n 40 with data rate 13.5

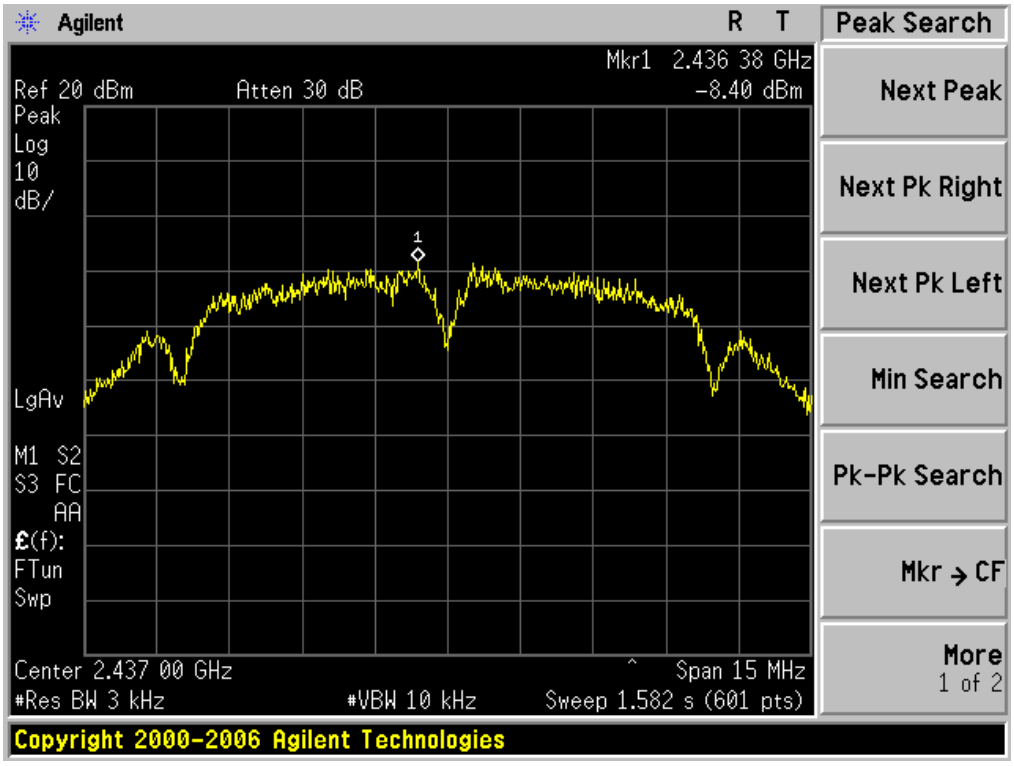
Channel No.	PSD (dBm)	Limit (dBm)	Result
Low Channel	-20.86	8	Pass
Middle Channel	-19.3	8	Pass
High Channel	-20.86	8	Pass

802.11b TEST RESULT

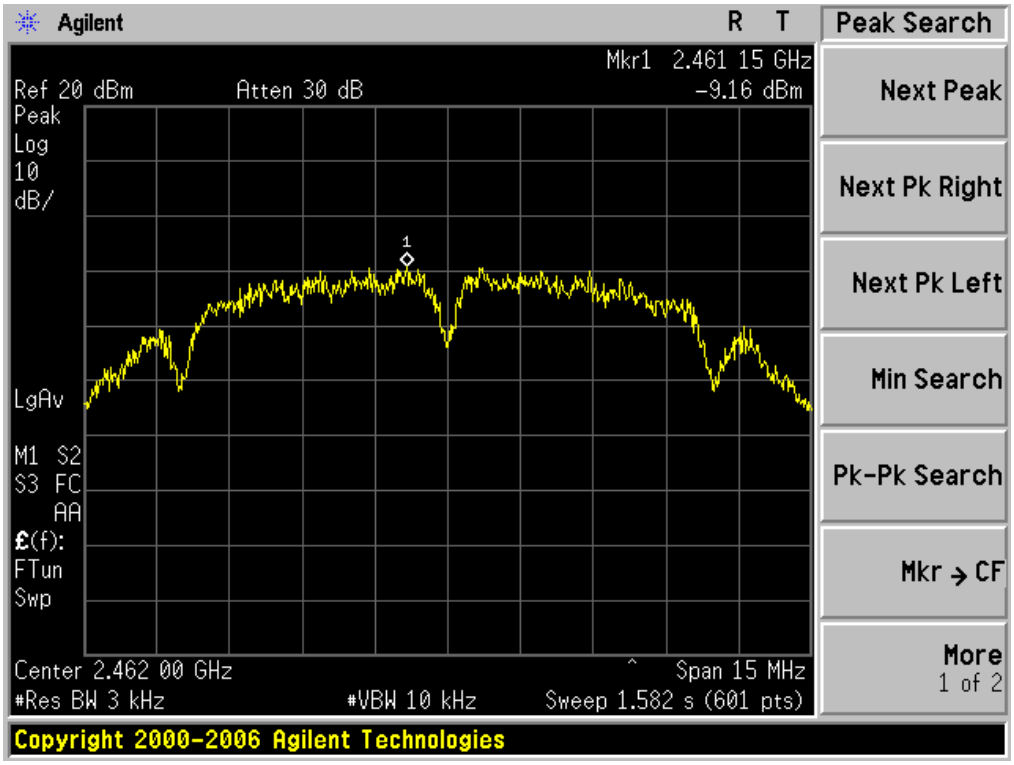
TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL



TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL

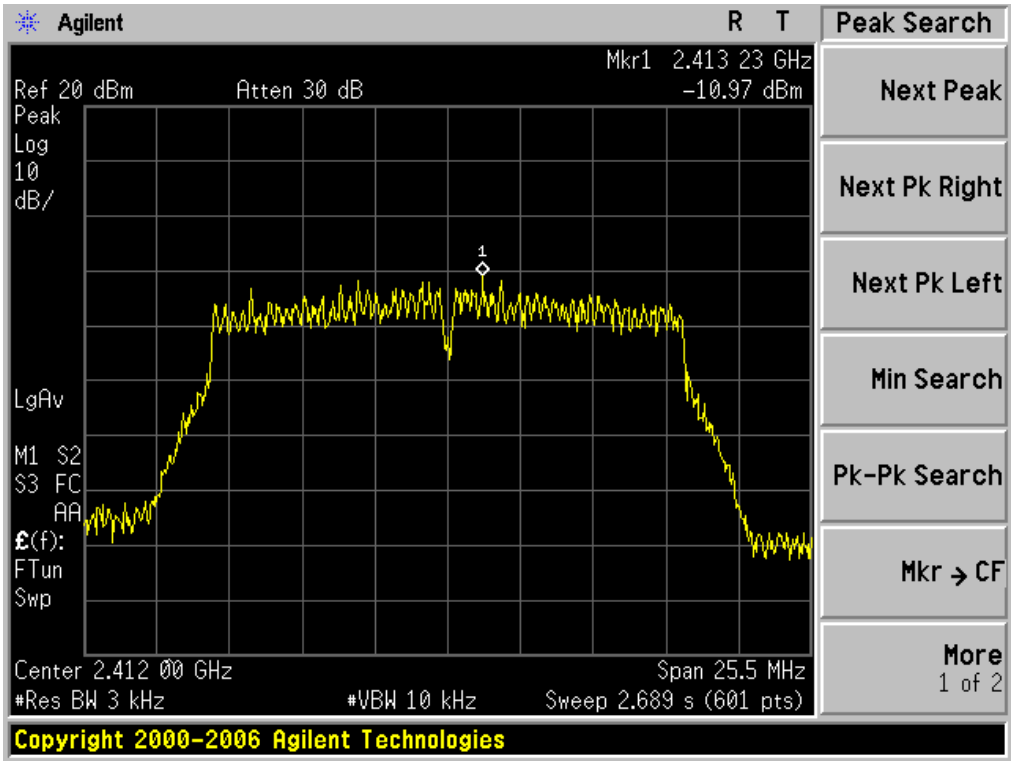


TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL

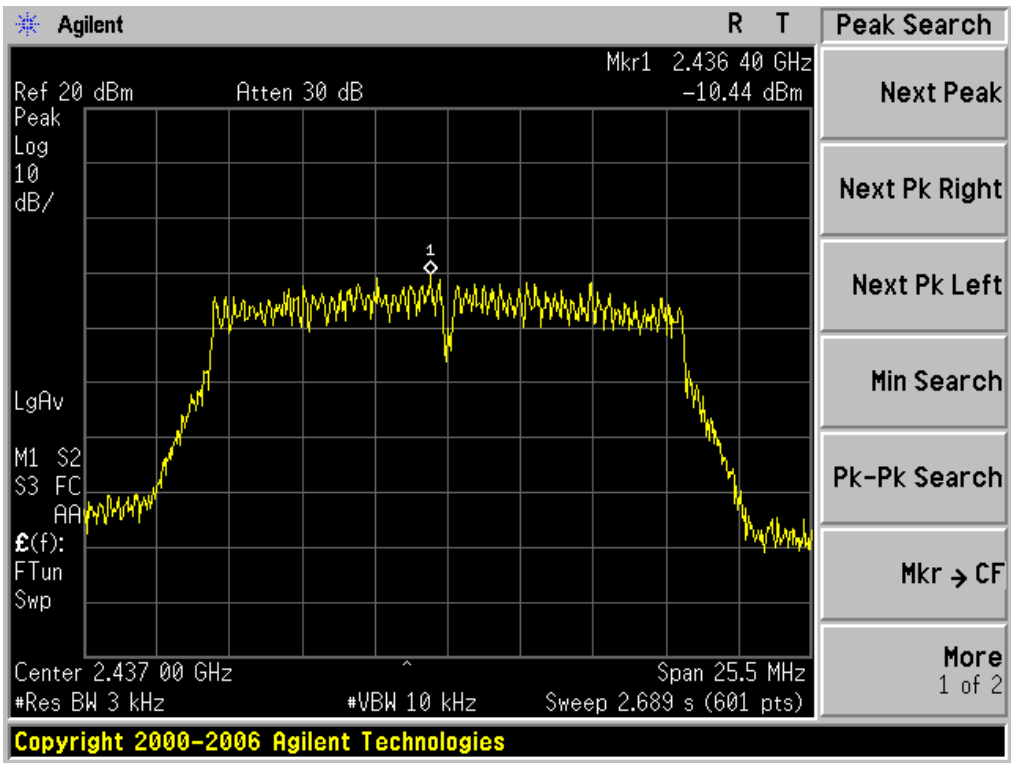


802.11g TEST RESULT

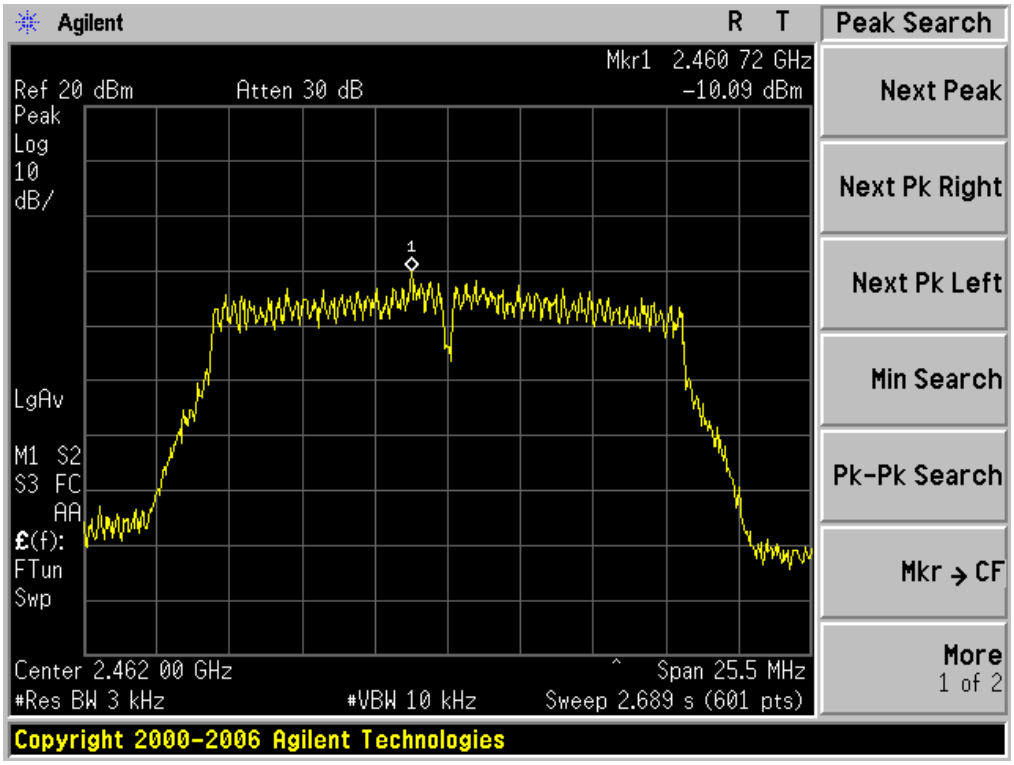
TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL



TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL

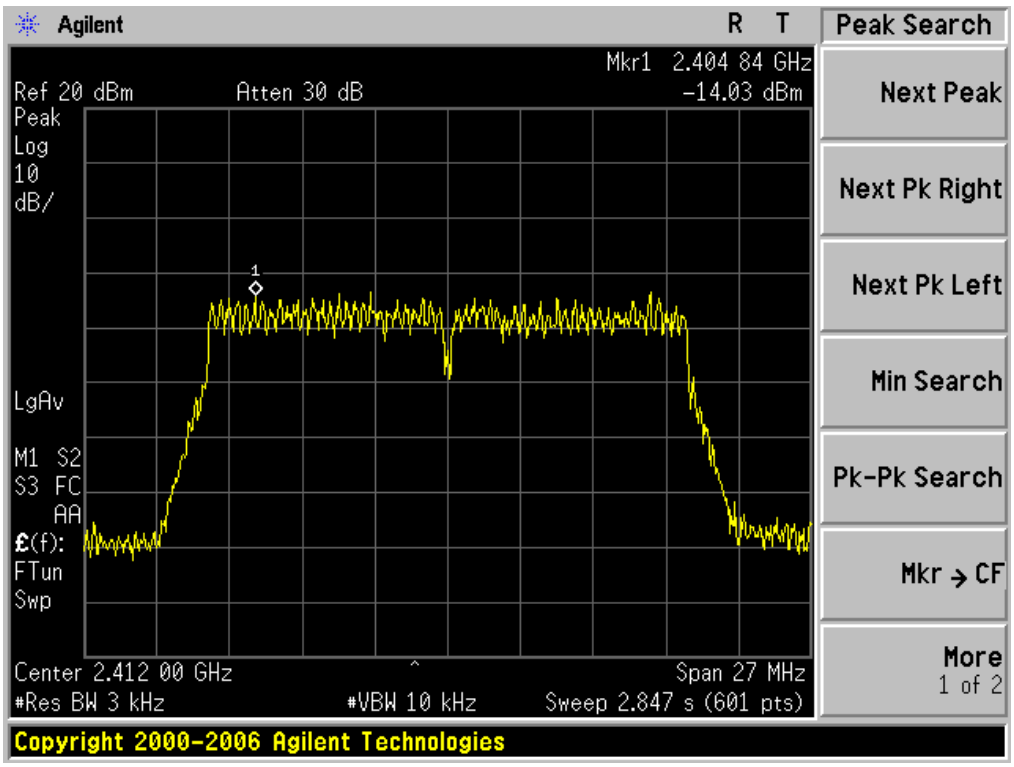


TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL

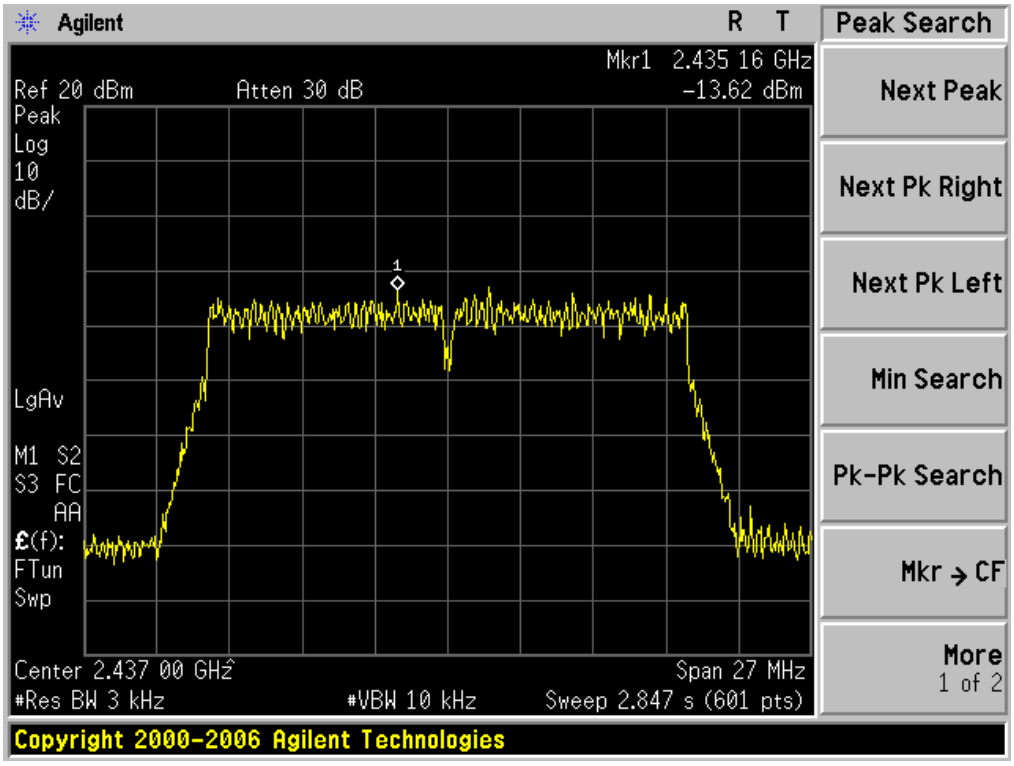


802.11n 20 TEST RESULT

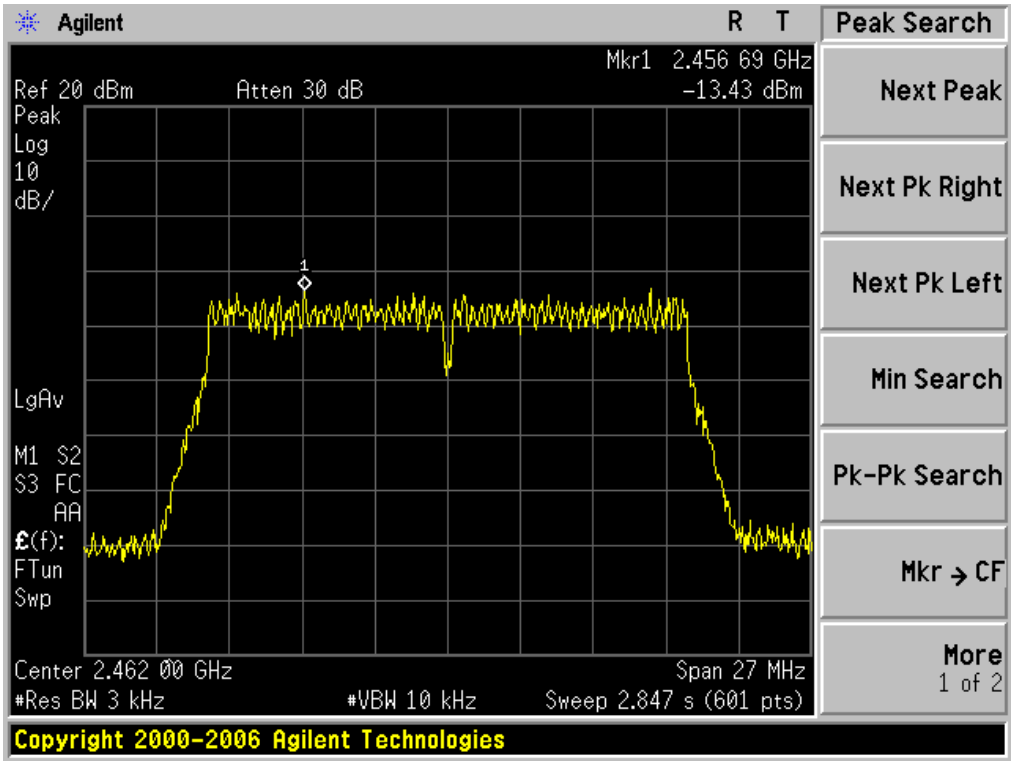
TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL



TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL

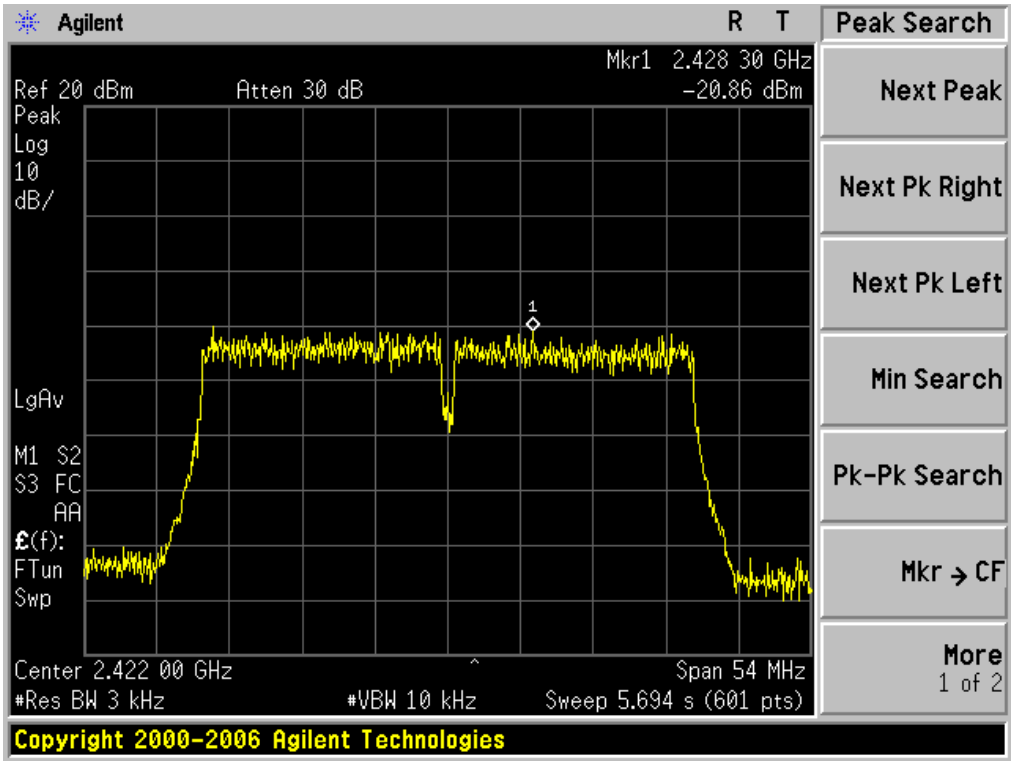


TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL

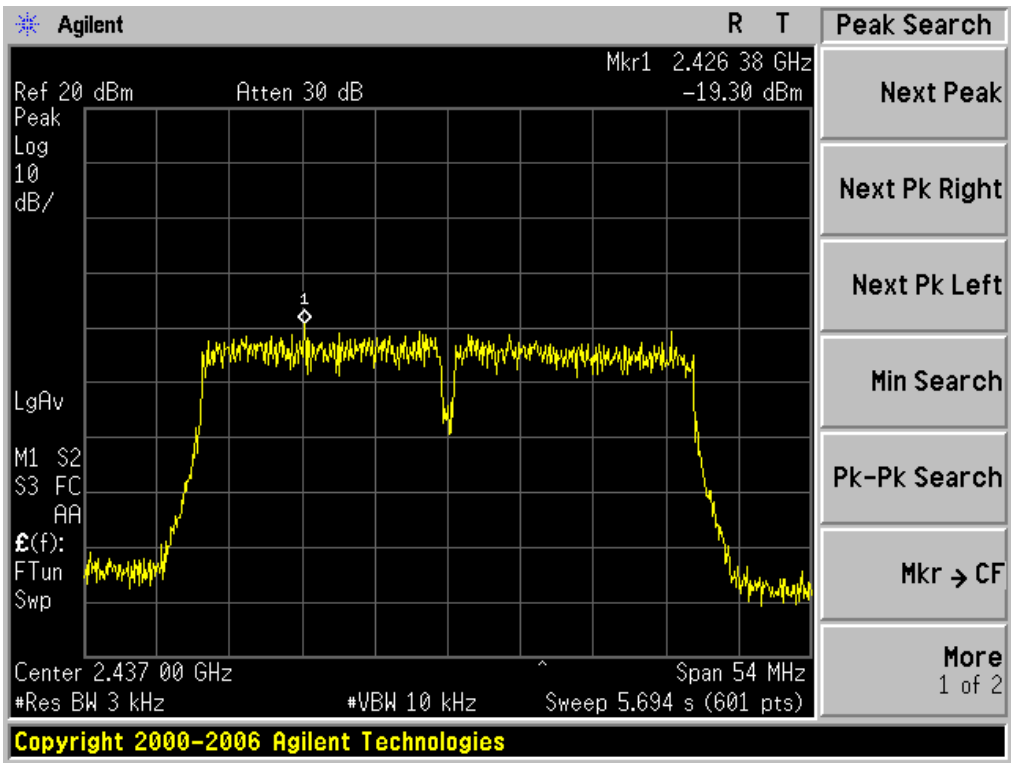


802.11n 40 TEST RESULT

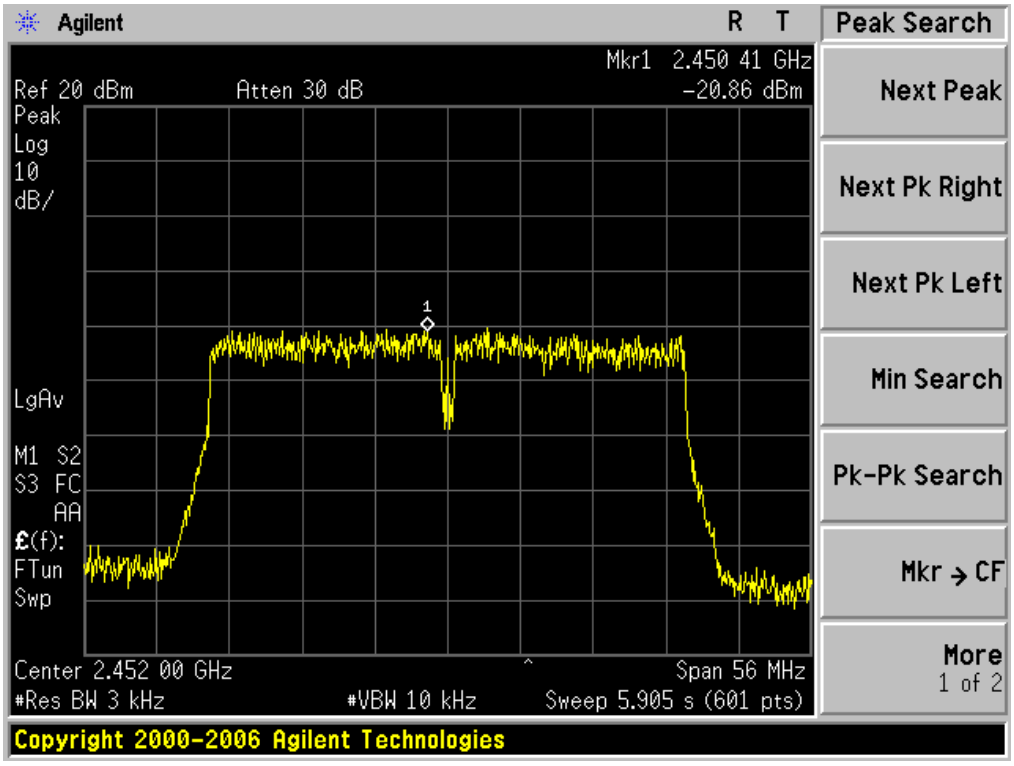
TEST PLOT OF SPECTRAL DENSITY FOR LOW CHANNEL



TEST PLOT OF SPECTRAL DENSITY FOR MIDDLE CHANNEL



TEST PLOT OF SPECTRAL DENSITY FOR HIGH CHANNEL



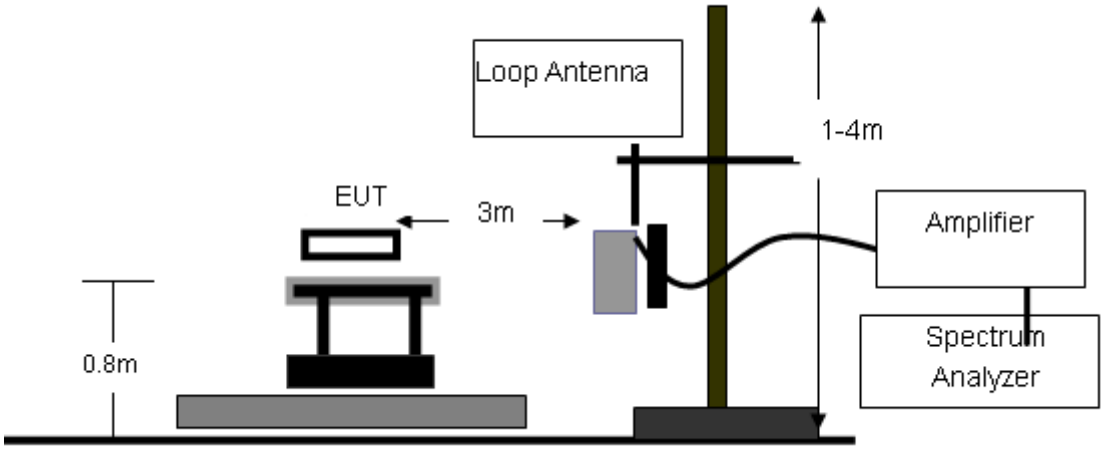
11. RADIATED EMISSION

11.1. MEASUREMENT PROCEDURE

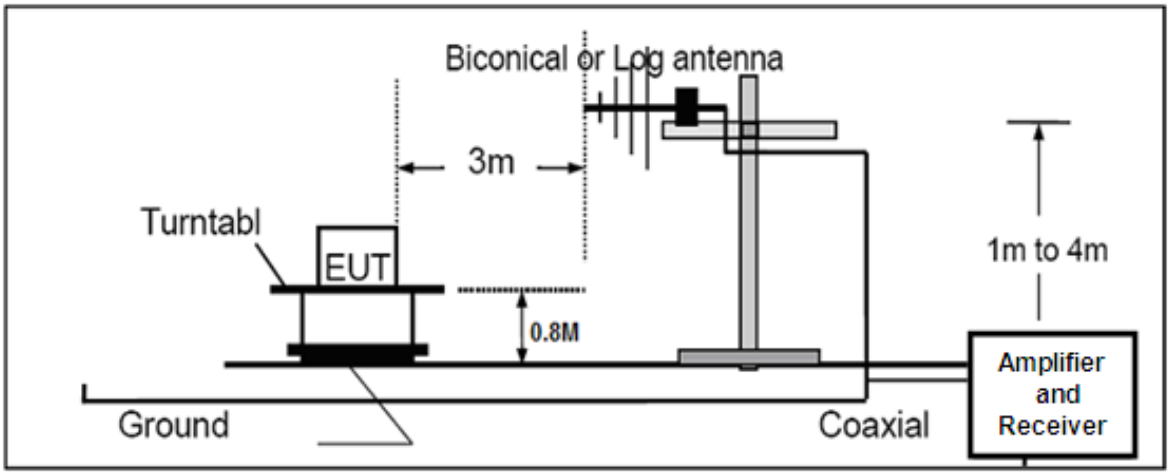
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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.
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

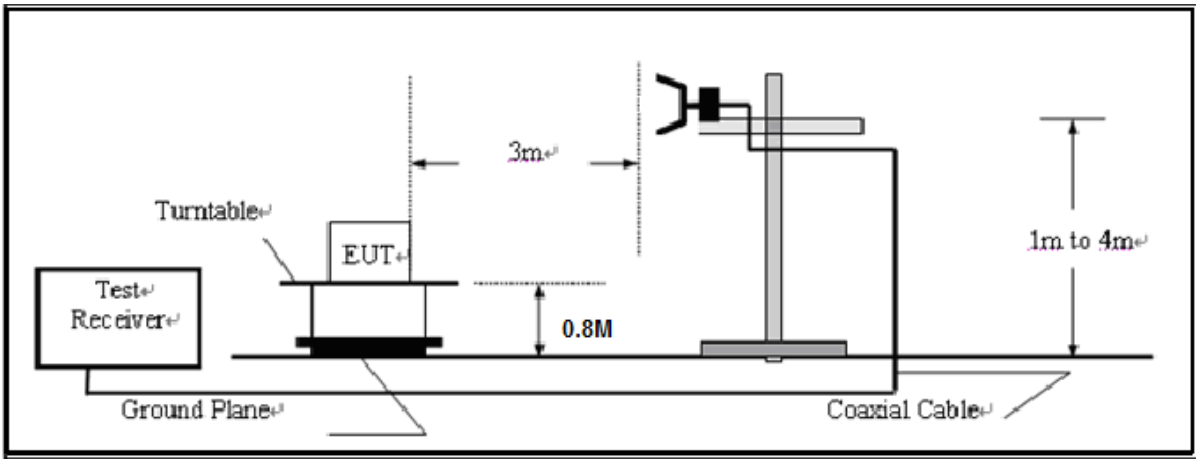
RADIATED EMISSION TEST SETUP BELOW 30MHz



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.

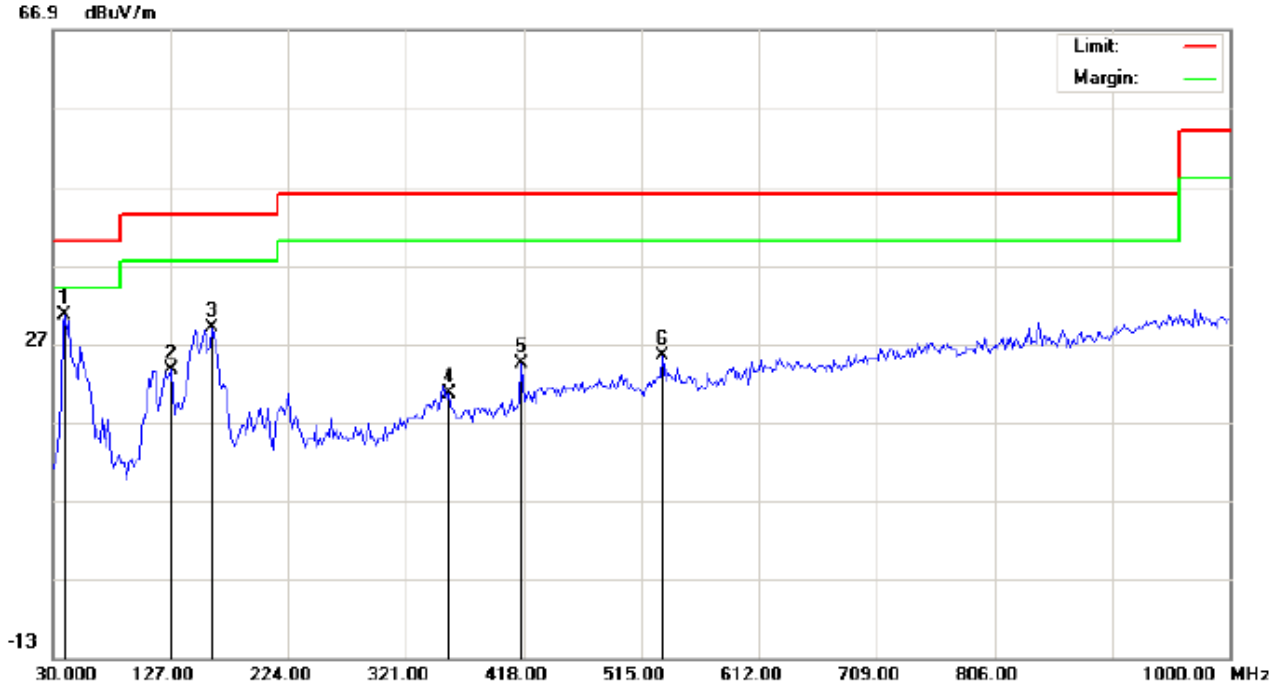
11.4. TEST RESULT

RADIATED EMISSION BELOW 30MHZ

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

RADIATED EMISSION BELOW 1GHZ

EUT	Check PLUS	**Model Name**	Z450
Temperature	25˚C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11b with date rate 1 2412MHZ	**Antenna**	Horizontal



Site: site #1
Limit: FCC Class B 3M Radiation
EUT: Check PLUS
M/N: Z450
Mode: Low Channel TX
Note:

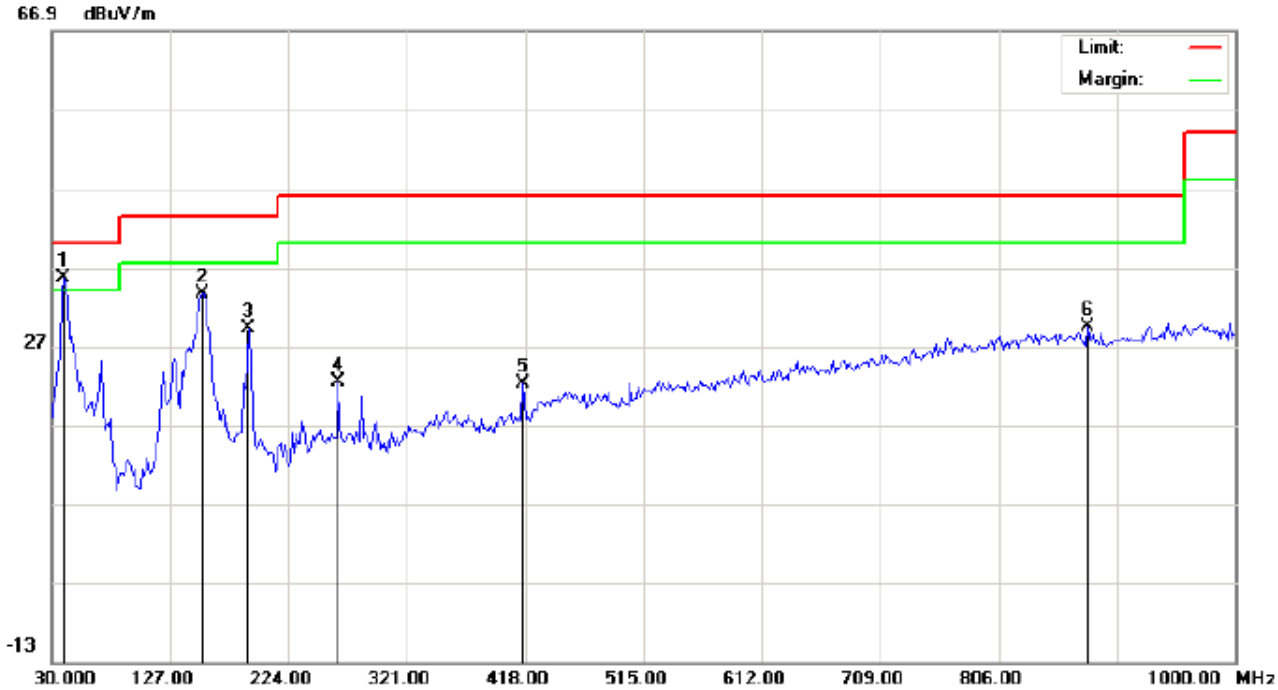
Polarization: *Horizontal*
Power: AC 120V/60Hz
Distance:

Temperature: 26
Humidity: 60 %

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	*	39.7000	19.15	11.51	30.66	40.00	-9.34	peak			
2		127.0000	10.60	13.03	23.63	43.50	-19.87	peak			
3		160.9499	13.96	15.13	29.09	43.50	-14.41	peak			
4		356.5667	1.88	18.78	20.66	46.00	-25.34	peak			
5		416.3833	4.91	19.57	24.48	46.00	-21.52	peak			
6		532.7833	3.33	22.02	25.35	46.00	-20.65	peak			

RESULT: PASS

EUT	Check PLUS	**Model Name**	Z450
Temperature	25˚C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11b with date rate 1 2412MHZ	**Antenna**	Vertical



Site: site #1
Limit: FCC Class B 3M Radiation
EUT: Check PLUS
M/N: Z450
Mode: Low Channel TX
Note:

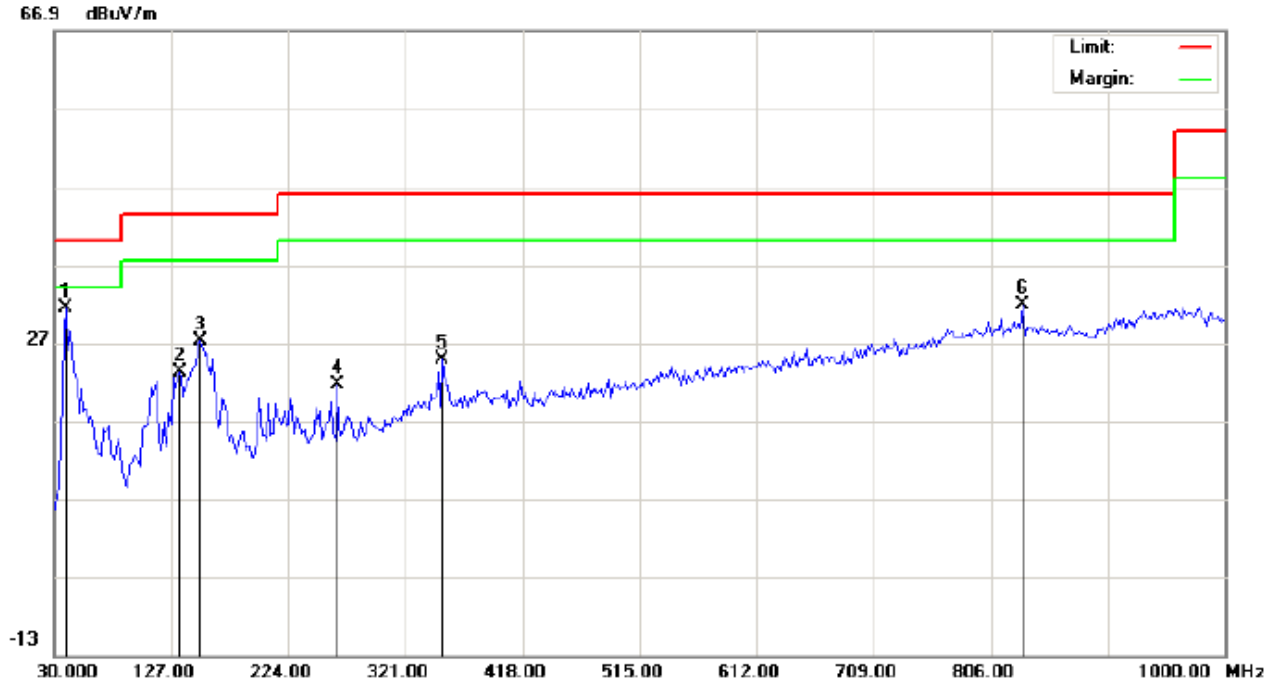
Polarization: *Vertical*
Power: AC 120V/60Hz
Distance:

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq. MHz	Reading dBuV	Factor dB/m	Measurement dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1	*	39.7000	27.17	8.51	35.68	40.00	-4.32	peak			
2		152.8667	18.39	15.28	33.67	43.50	-9.83	peak			
3		191.6665	18.05	11.11	29.16	43.50	-14.34	peak			
4		264.4166	8.04	14.34	22.38	46.00	-23.62	peak			
5		416.3833	2.65	19.57	22.22	46.00	-23.78	peak			
6		878.7500	1.31	28.06	29.37	46.00	-16.63	peak			

RESULT: PASS

EUT	Check PLUS	**Model Name**	Z450
Temperature	25˚C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11b with date rate 1 2437MHZ	**Antenna**	Horizontal



Site: site #1
Limit: FCC Class B 3M Radiation
EUT: Check PLUS
M/N: Z450
Mode: Middle Channel TX
Note:

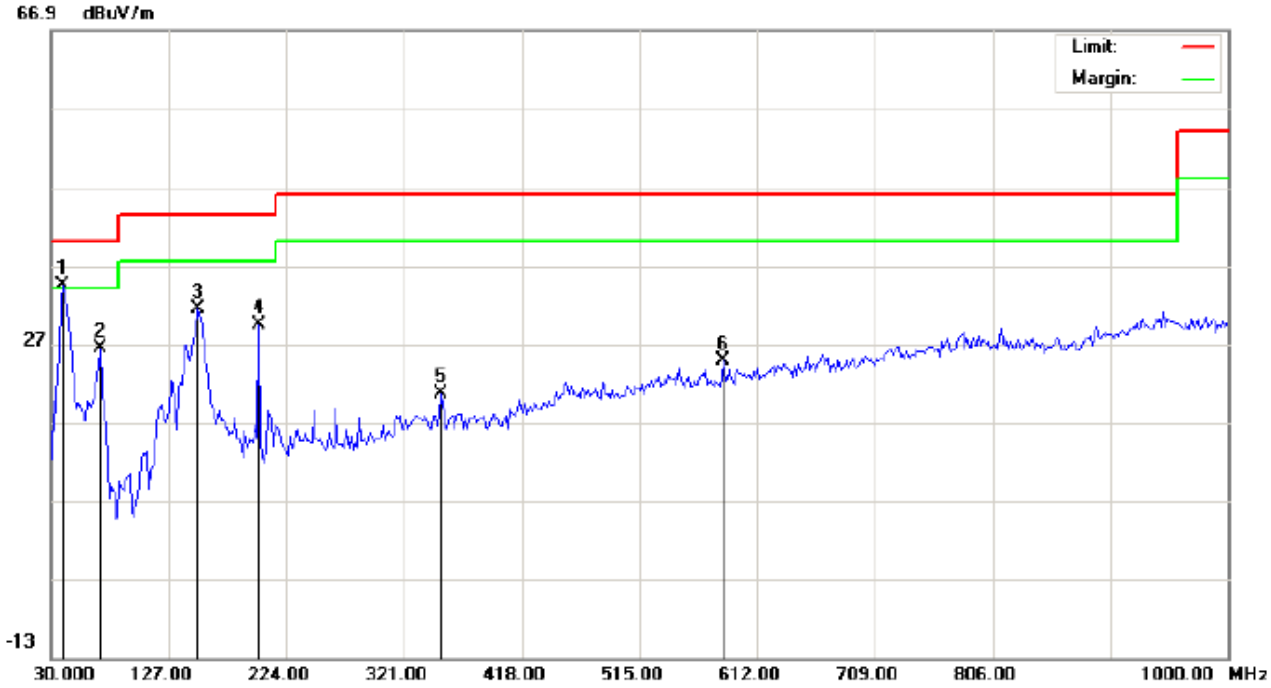
Polarization: *Horizontal*
Power: AC 120V/60Hz
Distance:

Temperature: 26
Humidity: 60 %

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	*	39.7000	19.85	11.51	31.36	40.00	-8.64	peak			
2		133.4667	9.14	14.11	23.25	43.50	-20.25	peak			
3		151.2500	11.90	15.27	27.17	43.50	-16.33	peak			
4		264.4166	7.30	14.34	21.64	46.00	-24.36	peak			
5		351.7167	5.98	18.75	24.73	46.00	-21.27	peak			
6		831.8667	4.54	27.31	31.85	46.00	-14.15	peak			

RESULT: PASS

EUT	Check PLUS	**Model Name**	Z450
Temperature	25˚C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11b with date rate 1 2437MHZ	**Antenna**	Vertical



Site: site #1
Limit: FCC Class B 3M Radiation
EUT: Check PLUS
M/N: Z450
Mode: Middle Channel TX
Note:

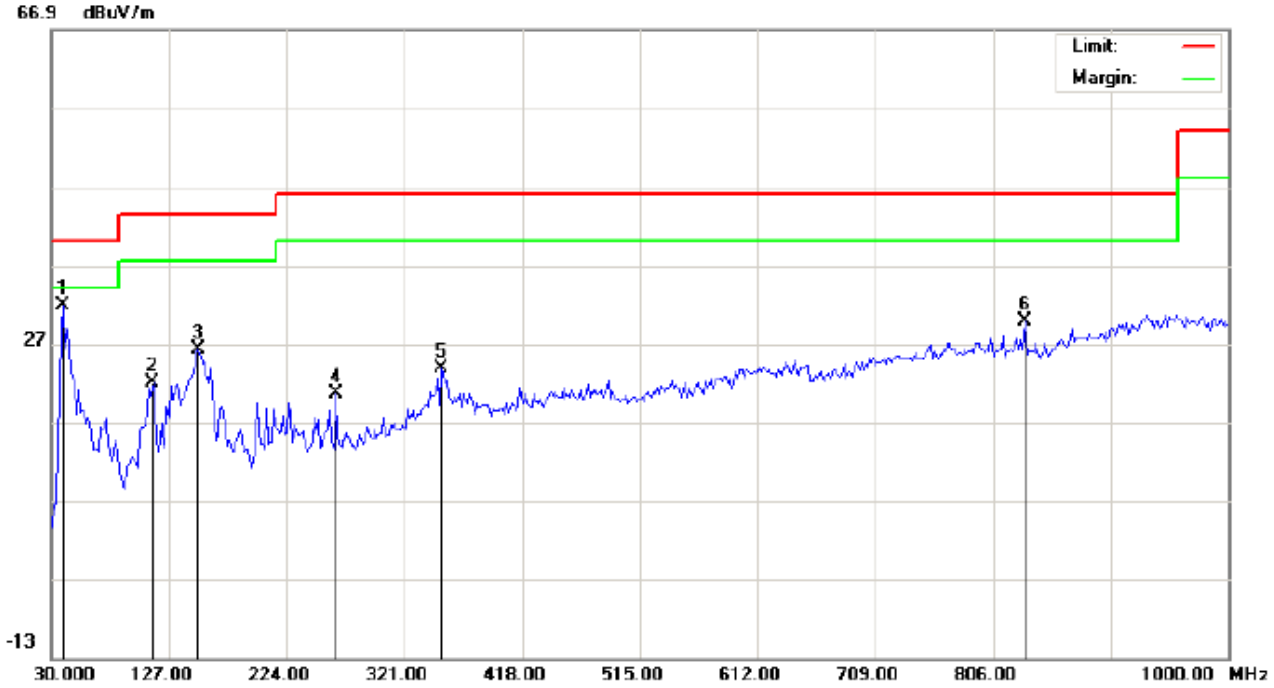
Polarization: *Vertical*
Power: AC 120V/60Hz
Distance:

Temperature: 26
Humidity: 60 %

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	*	39.7000	25.97	8.51	34.48	40.00	-5.52	peak			
2		70.4167	22.27	4.16	26.43	40.00	-13.57	peak			
3		151.2500	16.07	15.27	31.34	43.50	-12.16	peak			
4		201.3667	20.20	9.13	29.33	43.50	-14.17	peak			
5		351.7167	1.88	18.75	20.63	46.00	-25.37	peak			
6		584.5167	2.16	22.65	24.81	46.00	-21.19	peak			

RESULT: PASS

EUT	Check PLUS	**Model Name**	Z450
Temperature	25˚C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11b with date rate 1 2462MHZ	**Antenna**	Horizontal



Site: site #1
Limit: FCC Class B 3M Radiation
EUT: Check PLUS
M/N: Z450
Mode: High Channel TX
Note:

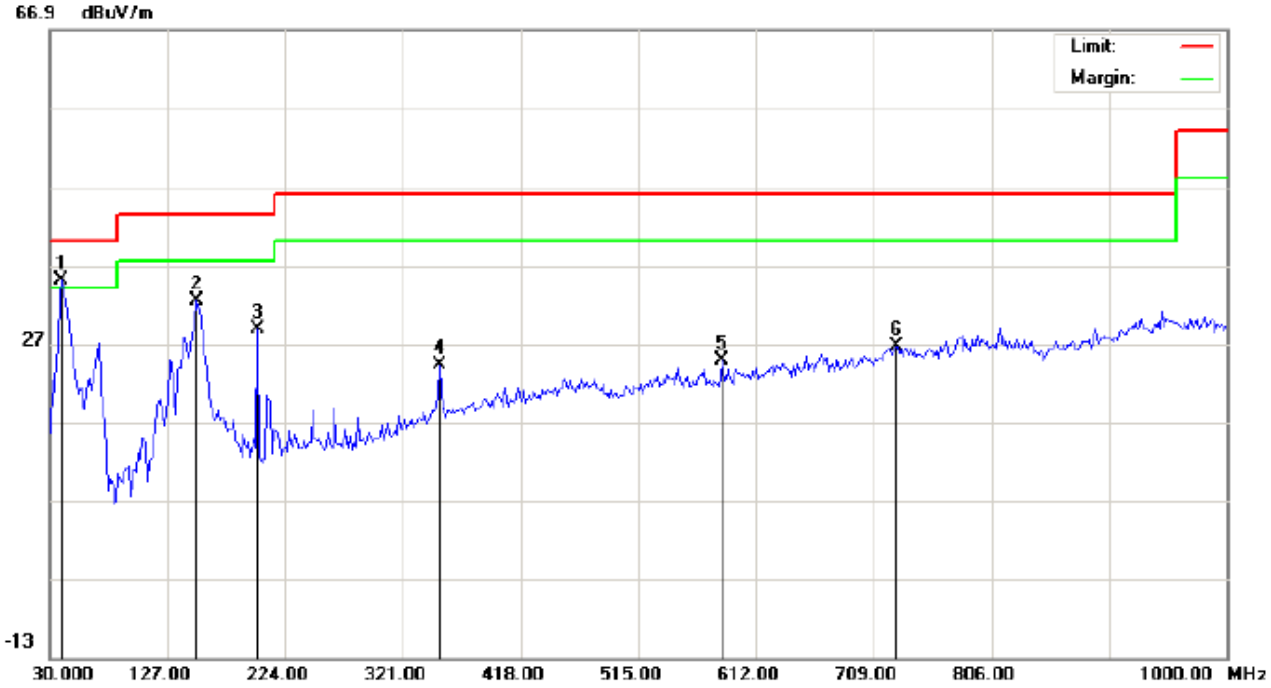
Polarization: *Horizontal*
Power: AC 120V/60Hz
Distance:

Temperature: 26
Humidity: 60 %

No.	Mk.	Freq. MHz	Reading dBuV	Factor dB/m	Measurement dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1	*	39.7000	20.35	11.51	31.86	40.00	-8.14	peak			
2		114.0665	10.59	11.45	22.04	43.50	-21.46	peak			
3		151.2500	10.90	15.27	26.17	43.50	-17.33	peak			
4		264.4166	6.30	14.34	20.64	46.00	-25.36	peak			
5		351.7167	4.98	18.75	23.73	46.00	-22.27	peak			
6		831.8667	2.54	27.31	29.85	46.00	-16.15	peak			

RESULT: PASS

EUT	Check PLUS	**Model Name**	Z450
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11b with date rate 1 2462MHZ	**Antenna**	Vertical



Site: site #1
Limit: FCC Class B 3M Radiation
EUT: Check PLUS
M/N: Z450
Mode: High Channel TX
Note:

Polarization: *Vertical*
Power: AC 120V/60Hz
Distance:

Temperature: 26
Humidity: 60 %

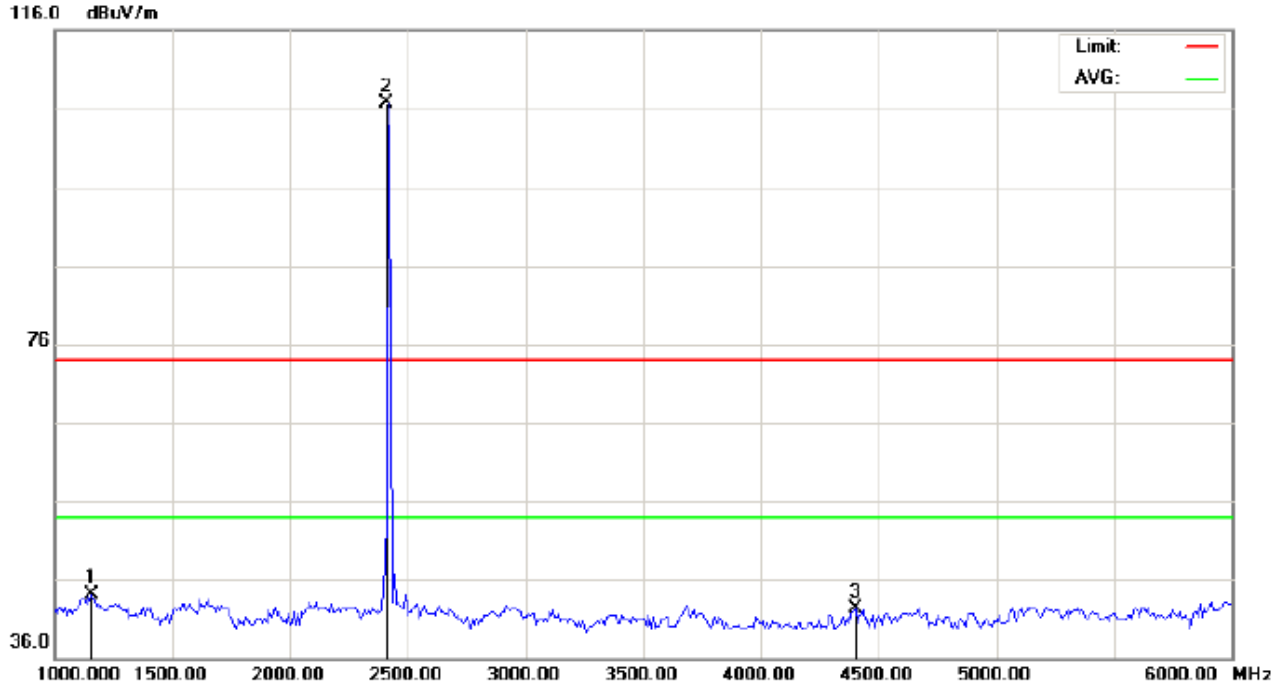
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	39.7000	26.47	8.51	34.98	40.00	-5.02	peak			
2		151.2500	17.07	15.27	32.34	43.50	-11.16	peak			
3		201.3667	19.70	9.13	28.83	43.50	-14.67	peak			
4		351.7167	5.38	18.75	24.13	46.00	-21.87	peak			
5		584.5167	2.16	22.65	24.81	46.00	-21.19	peak			
6		728.3999	0.61	26.01	26.62	46.00	-19.38	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.

RADIATED EMISSION ABOVE 1GHZ

EUT	Check PLUS	**Model Name**	Z450
Temperature	25˚C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11b with date rate 1 2412MHZ	**Antenna**	Horizontal



Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: Check PLUS
M/N: Z450
Mode: 802.11b Low Channel TX
Note:

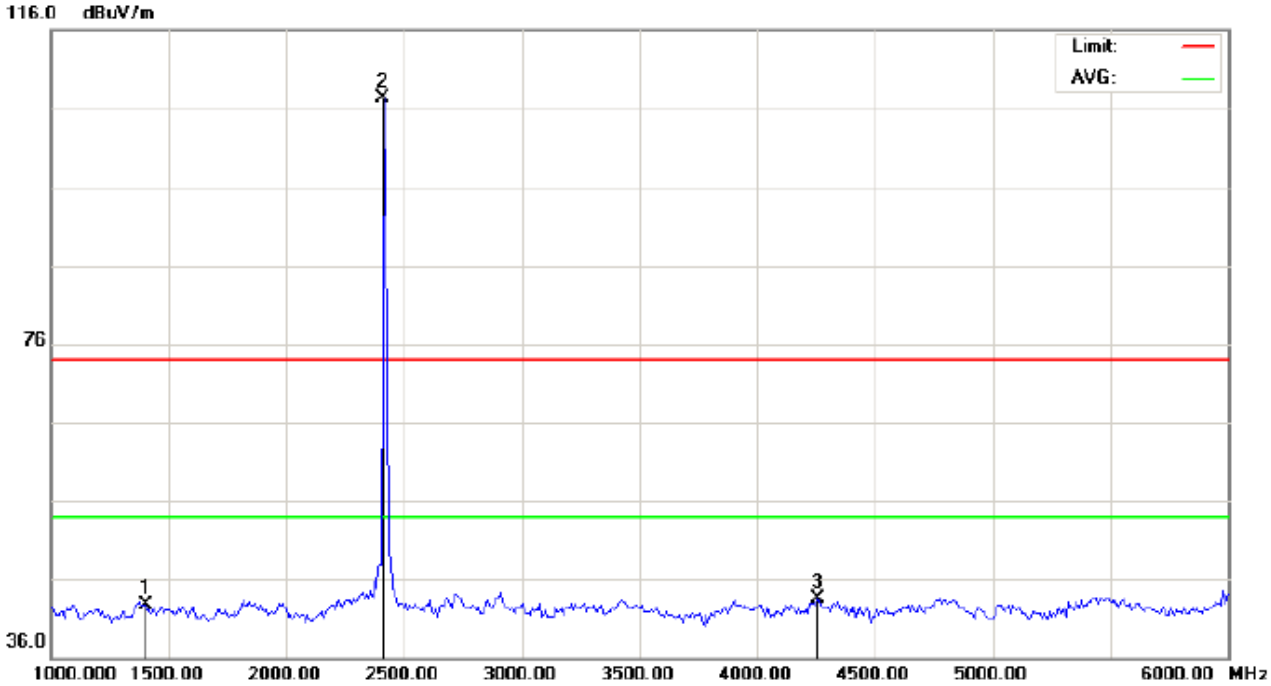
Polarization: ***Horizontal***
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

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		1158.333	59.62	-15.52	44.10	74.00	-29.90	peak			
2	*	2412.000	116.28	-9.67	106.61	74.00	32.61	peak			
3		4400.000	45.81	-3.45	42.36	74.00	-31.64	peak			

RESULT: PASS

EUT	Check PLUS	**Model Name**	Z450
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11b with date rate 1 2412MHZ	**Antenna**	Vertical



Site: site #1 Polarization: *Vertical* Temperature: 26
Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %
EUT: Check PLUS Distance: 3m
M/N: Z450
Mode: 802.11b Low Channel TX
Note:

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		1400.000	58.17	-15.42	42.75	74.00	-31.25	peak			
2	*	2412.000	117.07	-9.67	107.40	74.00	33.40	peak			
3		4258.333	47.46	-3.93	43.53	74.00	-30.47	peak			

RESULT: PASS

Note: The other modes radiation emissions have more than 20dB margin.

All modes radiation emission from 6GHz to 25GHz at least have 20dB margin.

Factor = Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.

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

12. BAND EDGE EMISSION

12.1. MEASUREMENT PROCEDURE

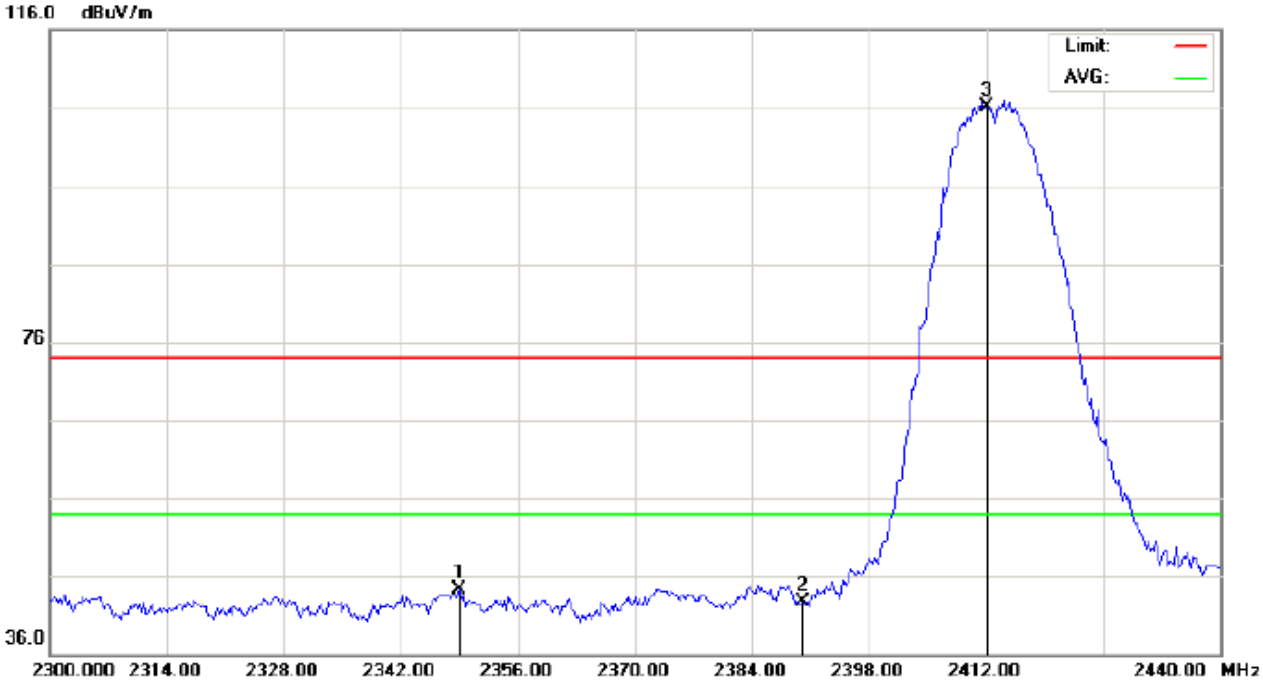
1. Set the EUT Work on the top, the bottom operation frequency individually.
2. Set SPA Start or Stop Frequency = Operation Frequency, RBW>=1%span, VBW>=RBW
3. The band edges was measured and recorded.

12.2. TEST SET-UP

Radiated same as 11.2

12.3. TEST RESULT

EUT	Check PLUS	**Model Name**	Z450
Temperature	25˚C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11b with data rate 1 2412MHZ	**Antenna**	Horizontal



Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: Check PLUS
M/N: Z450
Mode: 802.11b Low Channel TX
Note:

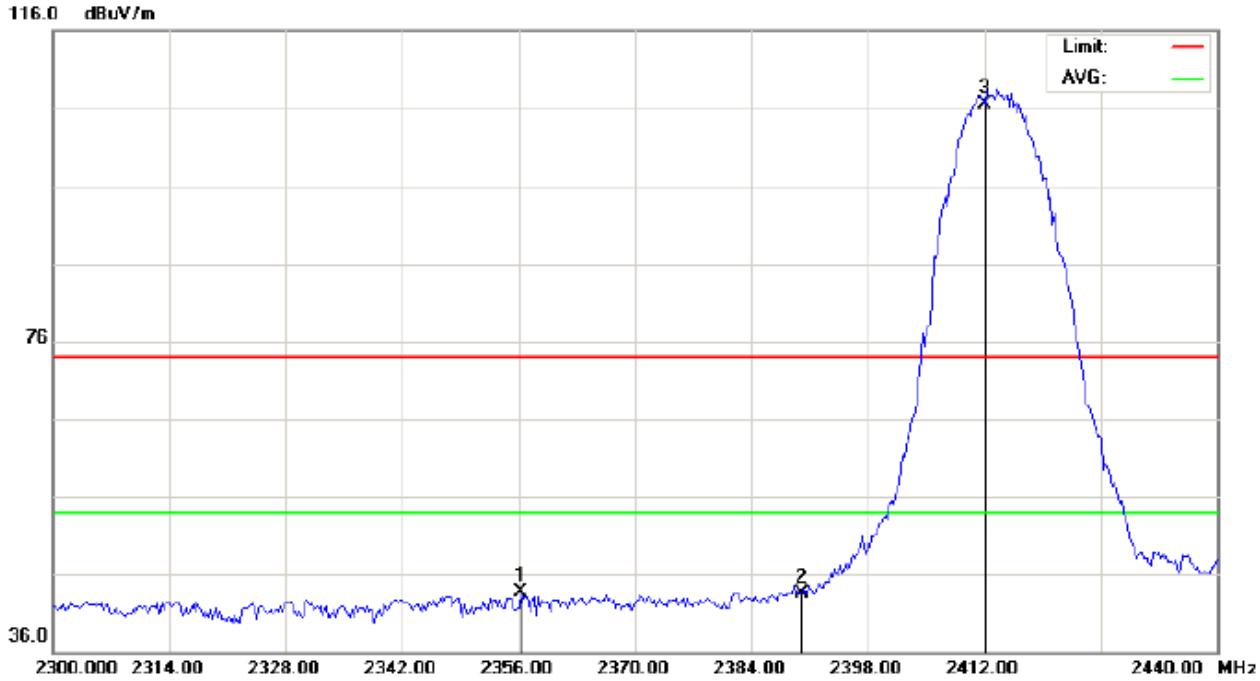
Polarization: *Horizontal*
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

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		2349.000	54.04	-9.74	44.30	74.00	-29.70	peak			
2		2390.000	52.40	-9.69	42.71	74.00	-31.29	peak			
3	*	2412.000	115.86	-9.67	106.19	74.00	32.19	peak			

RESULT: PASS

EUT	Check PLUS	**Model Name**	Z450
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11b with data rate 1 2412MHZ	**Antenna**	Vertical



Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: Check PLUS
M/N: Z450
Mode: 802.11b Low Channel TX
Note:

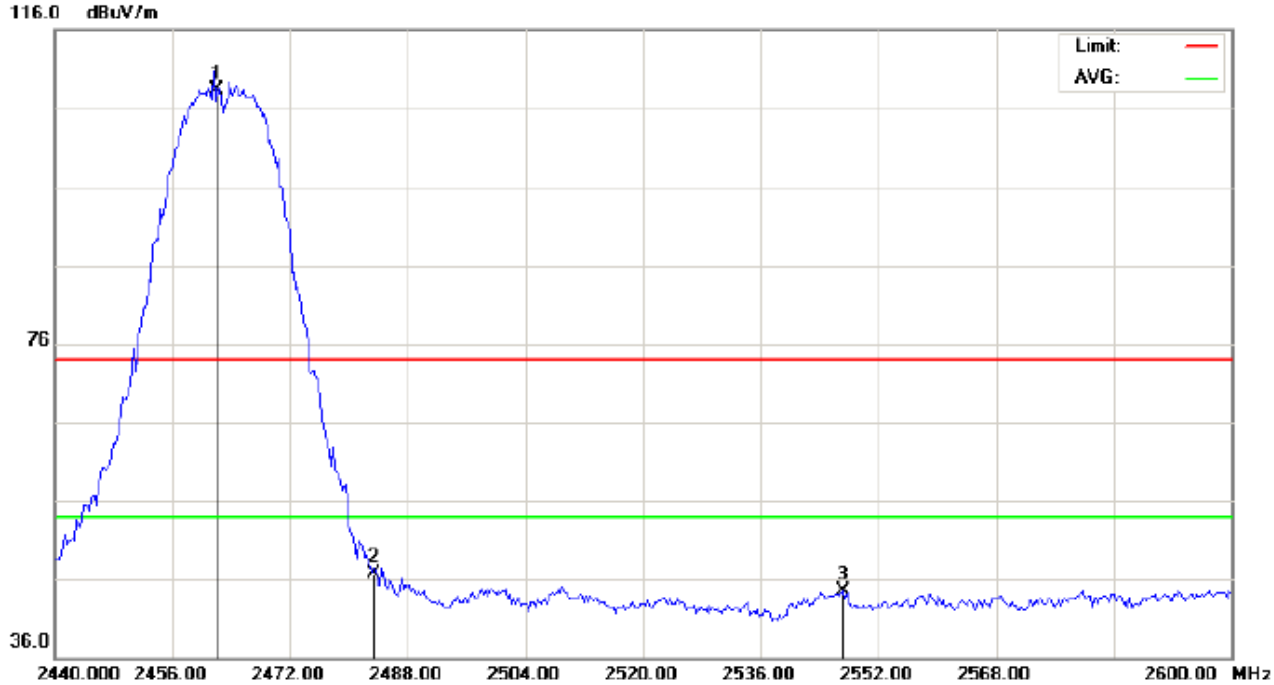
Polarization: *Vertical*
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

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		2356.233	53.42	-9.73	43.69	74.00	-30.31	peak			
2		2390.000	53.27	-9.69	43.58	74.00	-30.42	peak			
3	*	2412.000	116.08	-9.67	106.41	74.00	32.41	peak			

RESULT: PASS

EUT	Check PLUS	**Model Name**	Z450
Temperature	25˚C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11b with data rate 1 2462MHZ	**Antenna**	Horizontal



Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: Check PLUS
M/N: Z450
Mode: 802.11b High Channel TX
Note:

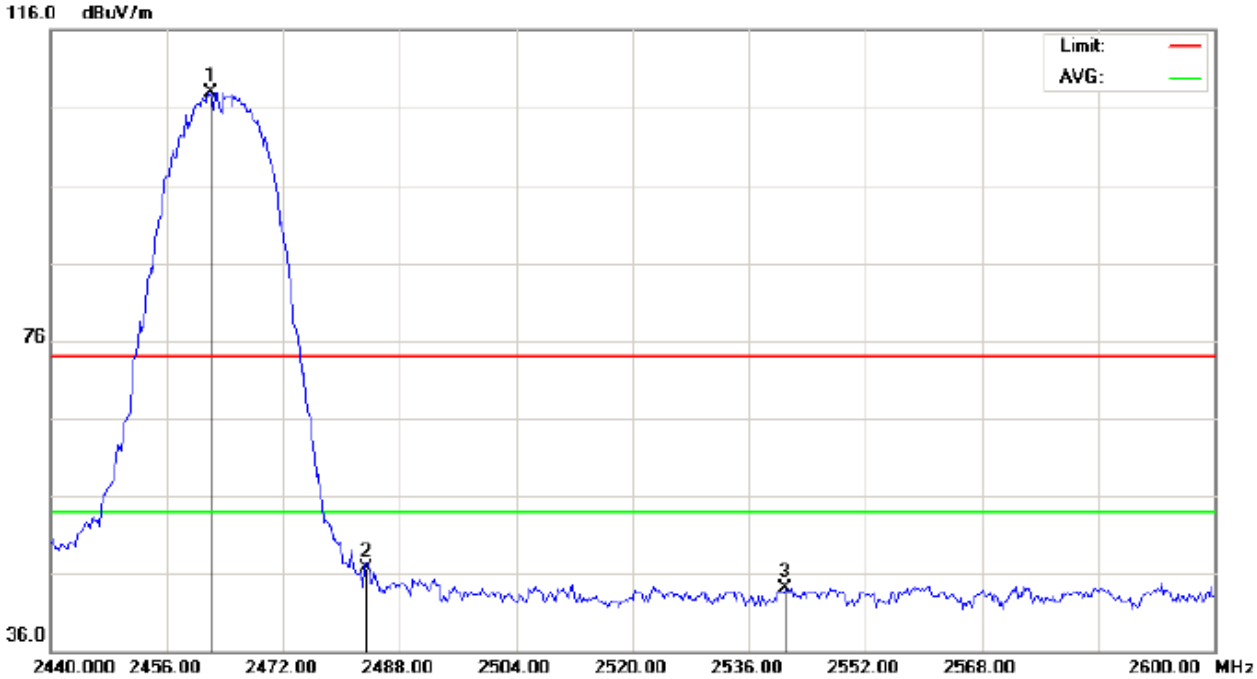
Polarization: *Horizontal*
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

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	*	2462.000	117.89	-9.61	108.28	74.00	34.28	peak			
2		2483.500	56.31	-9.59	46.72	74.00	-27.28	peak			
3		2547.200	53.99	-9.46	44.53	74.00	-29.47	peak			

RESULT: PASS

EUT	Check PLUS	**Model Name**	Z450
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11b with data rate 1 2462MHZ	**Antenna**	Vertical



Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: Check PLUS
M/N: Z450
Mode: 802.11b High Channel TX
Note:

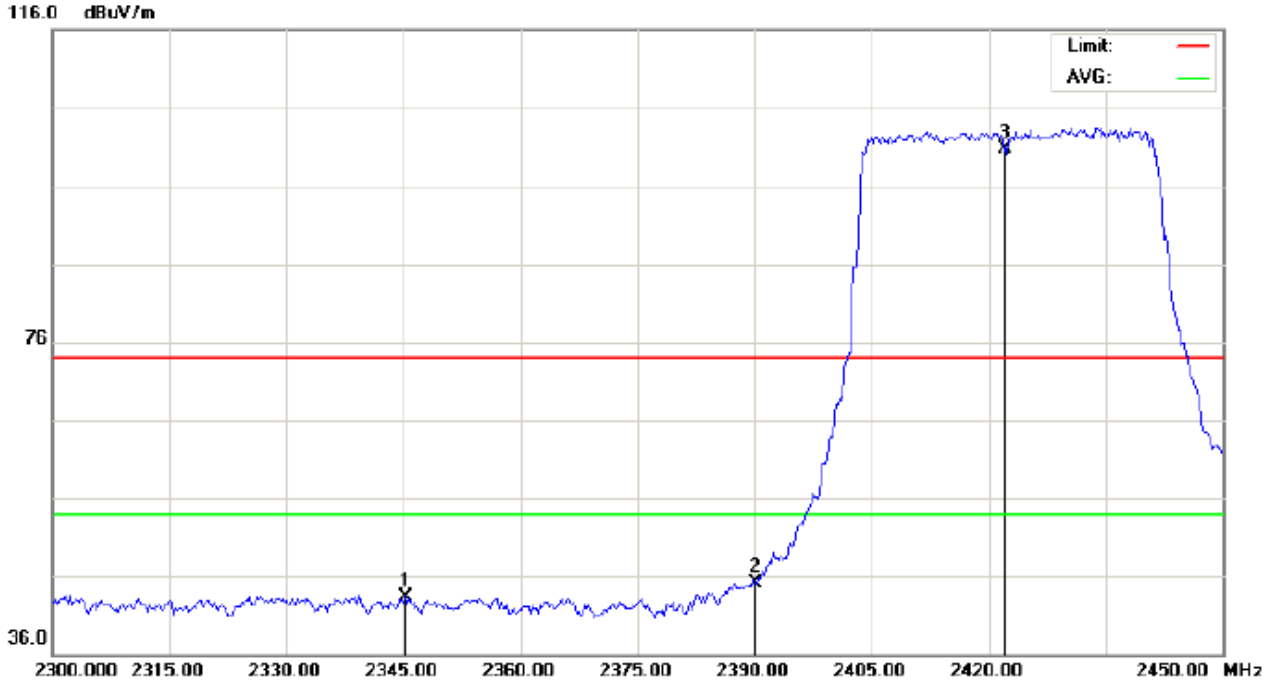
Polarization: *Vertical*
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

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	*	2462.000	117.42	-9.61	107.81	74.00	33.81	peak			
2		2483.500	56.22	-9.59	46.63	74.00	-27.37	peak			
3		2541.067	53.65	-9.47	44.18	74.00	-29.82	peak			

RESULT: PASS

EUT	Check PLUS	**Model Name**	Z450
Temperature	25˚C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11n 40 with data rate 13.5 2422MHZ	**Antenna**	Horizontal

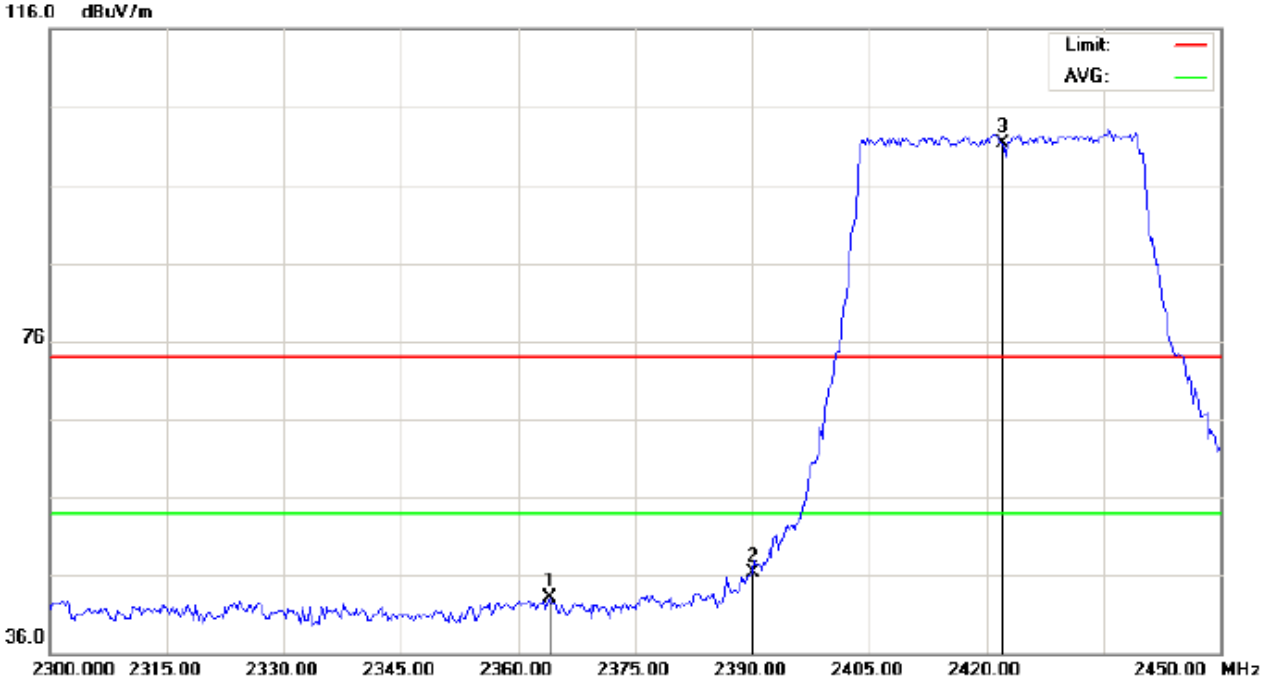


Site: site #1 Polarization: ***Horizontal*** Temperature: 26
Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %
EUT: Check PLUS Distance: 3m
M/N: Z450
Mode: 802.11n(40) Low Channel TX
Note:

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		2345.250	53.14	-9.74	43.40	74.00	-30.60	peak			
2		2390.000	54.71	-9.69	45.02	74.00	-28.98	peak			
3	*	2422.000	110.32	-9.66	100.66	74.00	26.66	peak			

RESULT: PASS

EUT	Check PLUS	**Model Name**	Z450
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11n 40 with data rate 13.5 2422MHZ	**Antenna**	Vertical



Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: Check PLUS
M/N: Z450
Mode: 802.11n(40) Low Channel TX
Note:

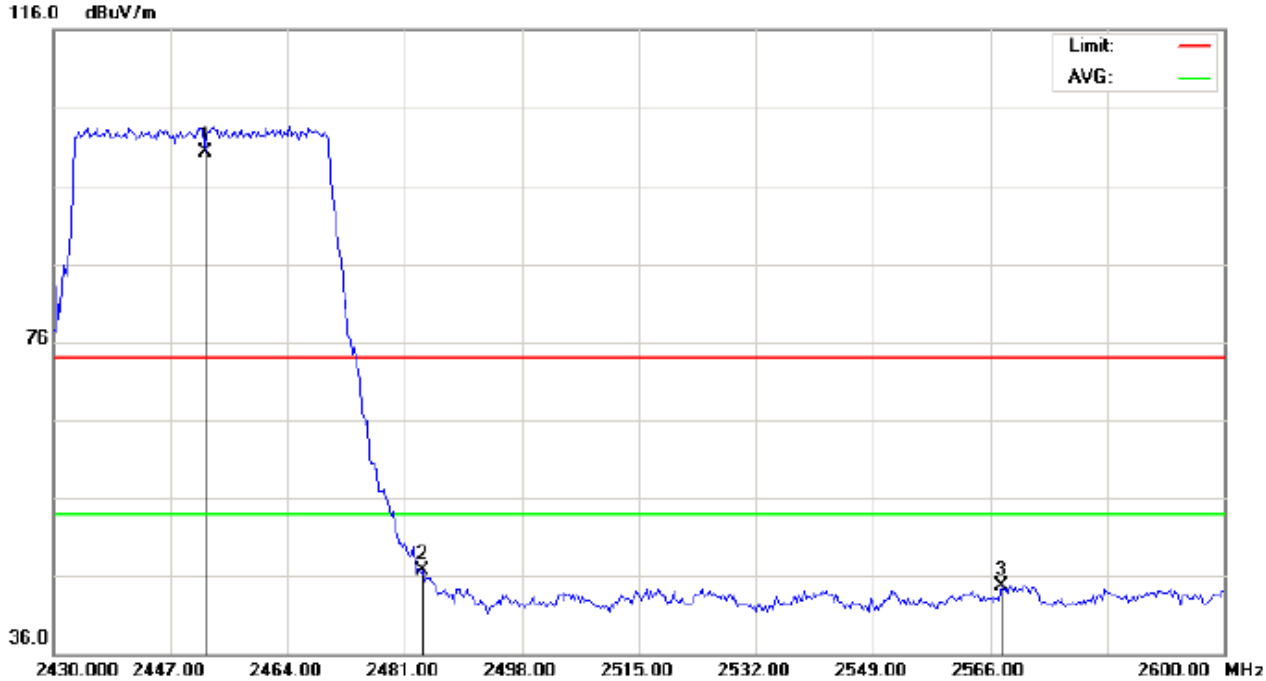
Polarization: *Vertical*
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

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		2364.000	52.86	-9.72	43.14	74.00	-30.86	peak			
2		2390.000	55.90	-9.69	46.21	74.00	-27.79	peak			
3	*	2422.000	110.87	-9.66	101.21	74.00	27.21	peak			

RESULT: PASS

EUT	Check PLUS	**Model Name**	Z450
Temperature	25°C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11n 40 with data rate 13.5 2452MHZ	**Antenna**	Horizontal



Site: site #1
Limit: FCC Class B 3M Radiation above 1GHZ(PK)
EUT: Check PLUS
M/N: Z450
Mode: 802.11n(40) High Channel TX
Note:

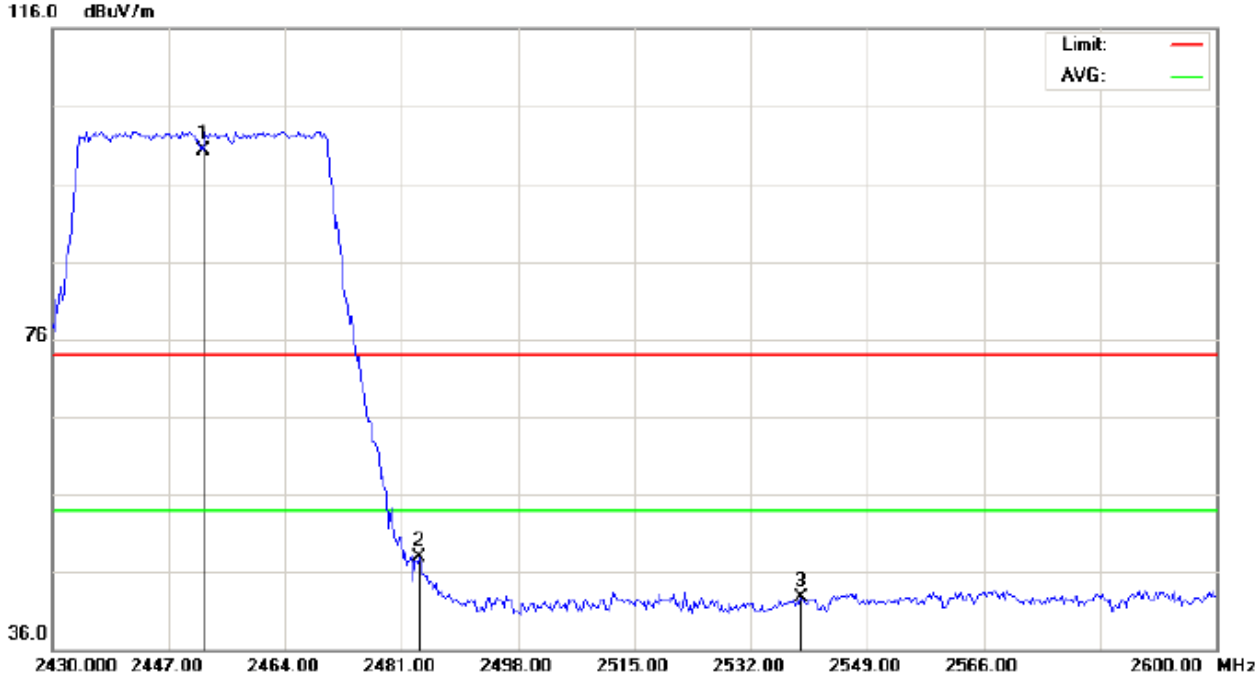
Polarization: *Horizontal*
Power:
Distance: 3m

Temperature: 26
Humidity: 60 %

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	*	2452.000	109.97	-9.62	100.35	74.00	26.35	peak			
2		2483.500	56.29	-9.59	46.70	74.00	-27.30	peak			
3		2567.700	54.18	-9.41	44.77	74.00	-29.23	peak			

RESULT: PASS

EUT	Check PLUS	**Model Name**	Z450
Temperature	25˚C	**Relative Humidity**	55.4%
Pressure	960hPa	**Test Voltage**	Normal Voltage
Test Mode	802.11n 40 with data rate 13.5 2452MHZ	**Antenna**	Vertical



Site: site #1 Polarization: *Vertical* Temperature: 26
Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %
EUT: Check PLUS Distance: 3m
M/N: Z450
Mode: 802.11n(40) High Channel TX
Note:

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	*	2452.000	109.90	-9.62	100.28	74.00	26.28	peak			
2		2483.500	57.53	-9.59	47.94	74.00	-26.06	peak			
3		2539.367	52.13	-9.47	42.66	74.00	-31.34	peak			

RESULT: PASS

Note: The other modes radiation emission have enough 20dB margin.

Factor = Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.

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

13. FCC LINE CONDUCTED EMISSION TEST

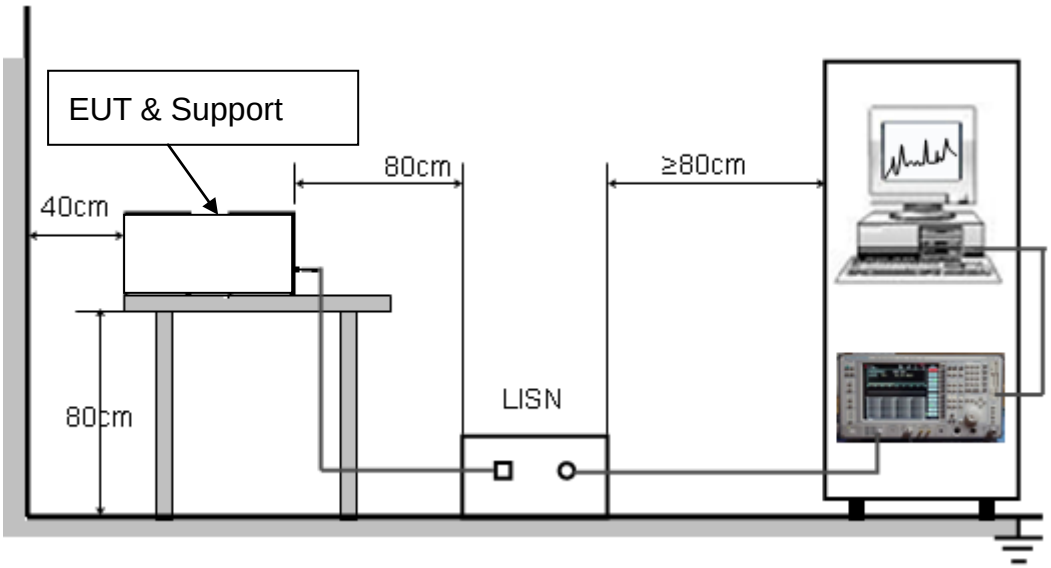
13.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	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

1. 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 C63.4 (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 C63.4.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4. All support equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received charging voltage by adapter which 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.

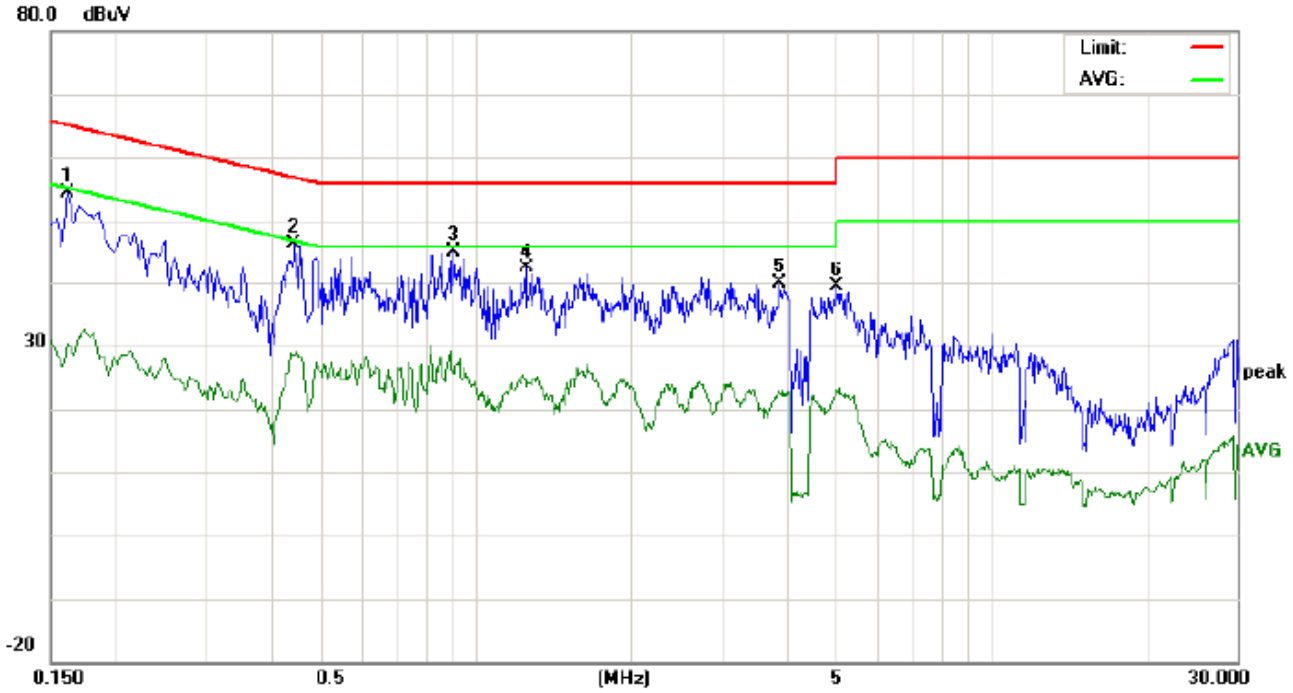
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

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.
2. 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 on the Summary Data page.

13.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

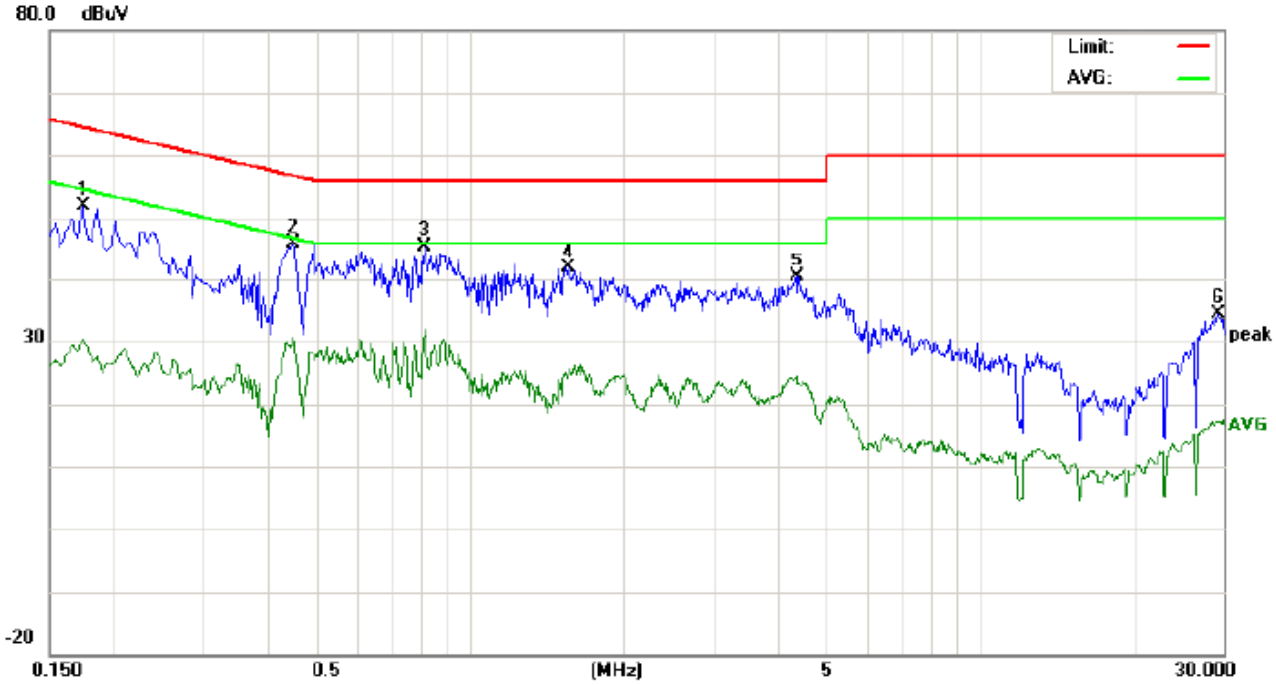
LINE CONDUCTED EMISSION TEST LINE 1-L



Site: Conduction | Phase: *L1* | Temperature: 26
Limit: FCC Class B Conduction(QP) | Power: AC 120V/60Hz | Humidity: 60 %
EUT: Check PLUS
M/N: Z450
Mode: Normal Operating(WIFI)
Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1620	44.22		20.19	10.17	54.39		30.36	65.36	55.36	-10.97	-25.00	P	
2	0.4460	35.92		18.25	10.36	46.28		28.61	56.95	46.95	-10.67	-18.34	P	
3	0.9060	34.66		15.62	10.41	45.07		26.03	56.00	46.00	-10.93	-19.97	P	
4	1.2500	31.99		14.34	10.37	42.36		24.71	56.00	46.00	-13.64	-21.29	P	
5	3.8900	38.87		20.40	10.45	49.32		30.85	56.00	46.00	-6.68	-15.15	P	
6	5.0099	29.21		12.90	10.24	39.45		23.14	60.00	50.00	-20.55	-26.86	P	

Line Conducted Emission Test Line 2-N



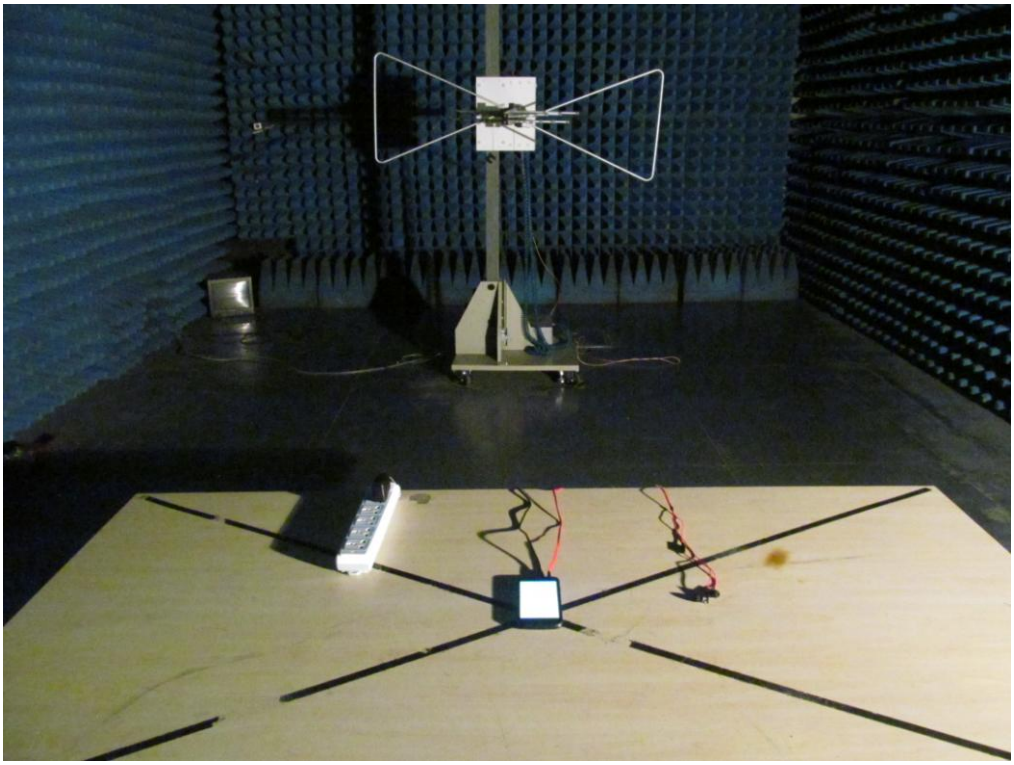
Site: Conduction
Phase: N
Temperature: 26
Limit: FCC Class B Conduction(QP)
Power: AC 120V/60Hz
Humidity: 60 %
EUT: Check PLUS
M/N: Z450
Mode: Normal Operating(WIFI)
Note:

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1739	41.74		20.11	10.19	51.93		30.30	64.77	54.77	-12.84	-24.47	P	
2	0.4500	35.53		20.19	10.37	45.90		30.56	56.87	46.87	-10.97	-16.31	P	
3	0.8139	35.12		21.68	10.30	45.42		31.98	56.00	46.00	-10.58	-14.02	P	
4	1.5660	31.55		14.46	10.36	41.91		24.82	56.00	46.00	-14.09	-21.18	P	
5	4.3738	30.12		14.11	10.27	40.39		24.38	56.00	46.00	-15.61	-21.62	P	
6	29.2300	24.25		6.90	10.12	34.37		17.02	60.00	50.00	-25.63	-32.98	P	

APPENDIX A: PHOTOGRAPHS OF TEST SETUP

FCC LINE CONDUCTED EMISSION TEST SETUP

FCC RADIATED EMISSION TEST SETUP

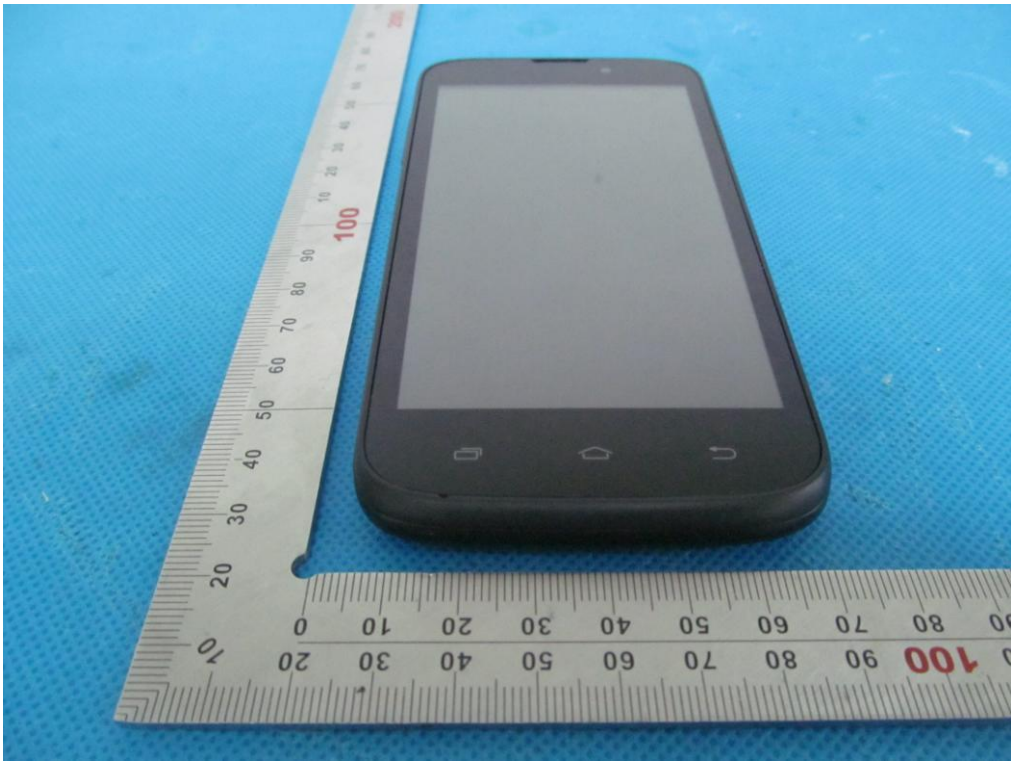


APPENDIX B: PHOTOGRAPHS OF EUT

TOTAL VIEW OF EUT

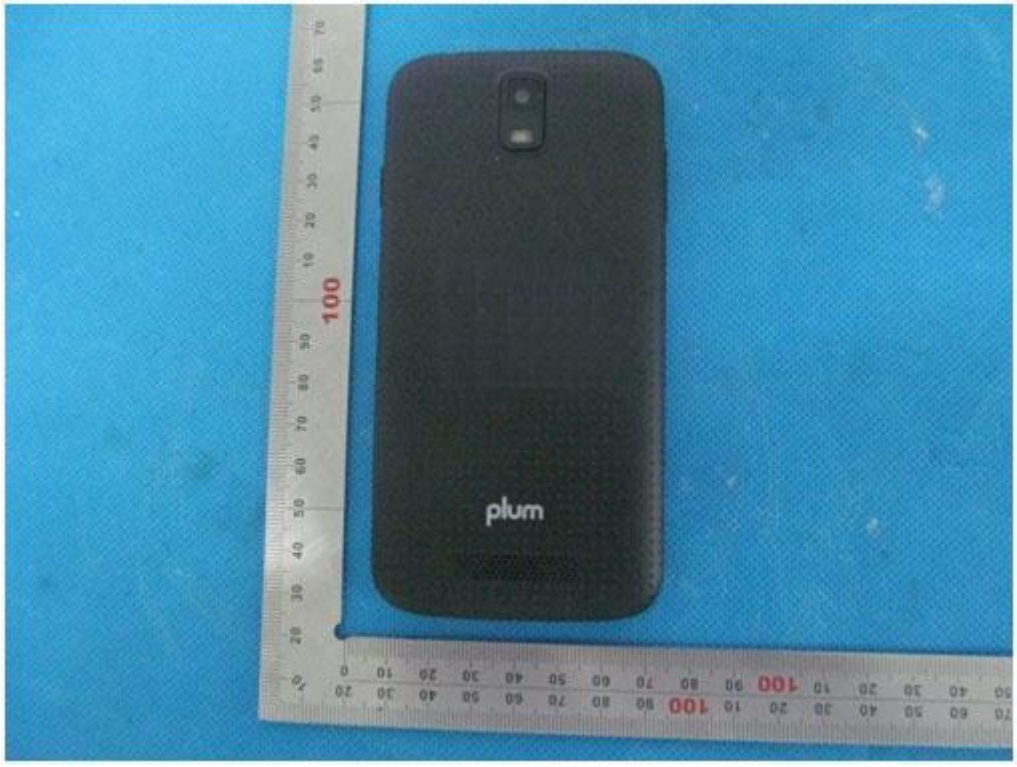
TOP VIEW OF EUT

BOTTOM VIEW OF EUT

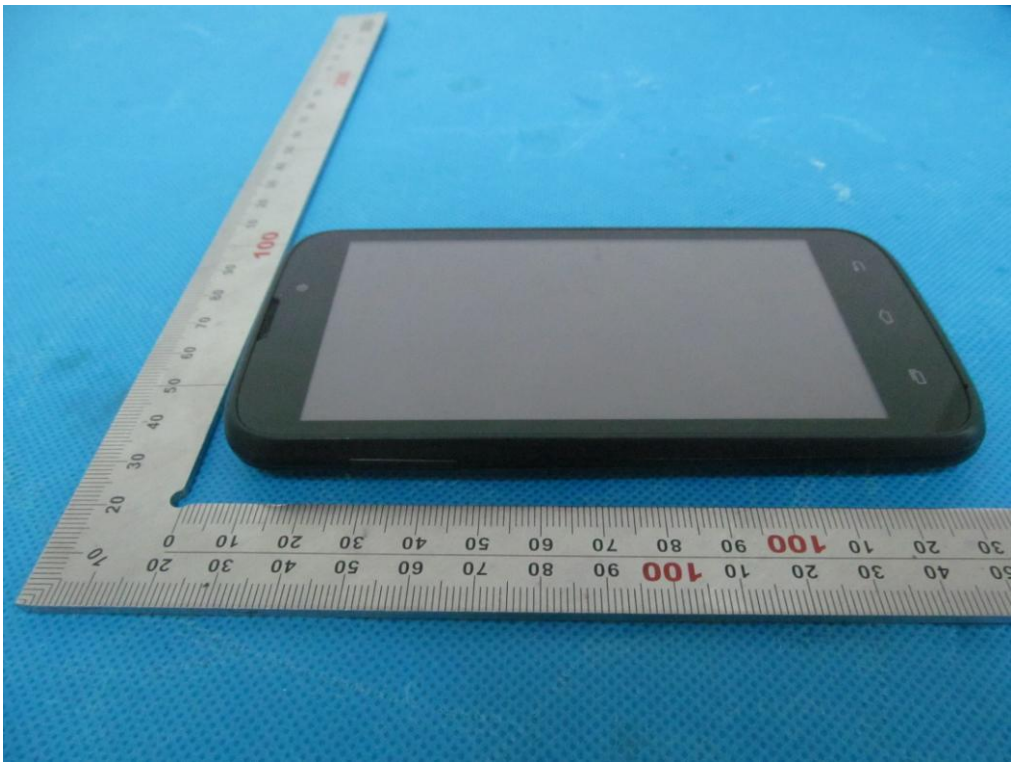


FRONT VIEW OF EUT

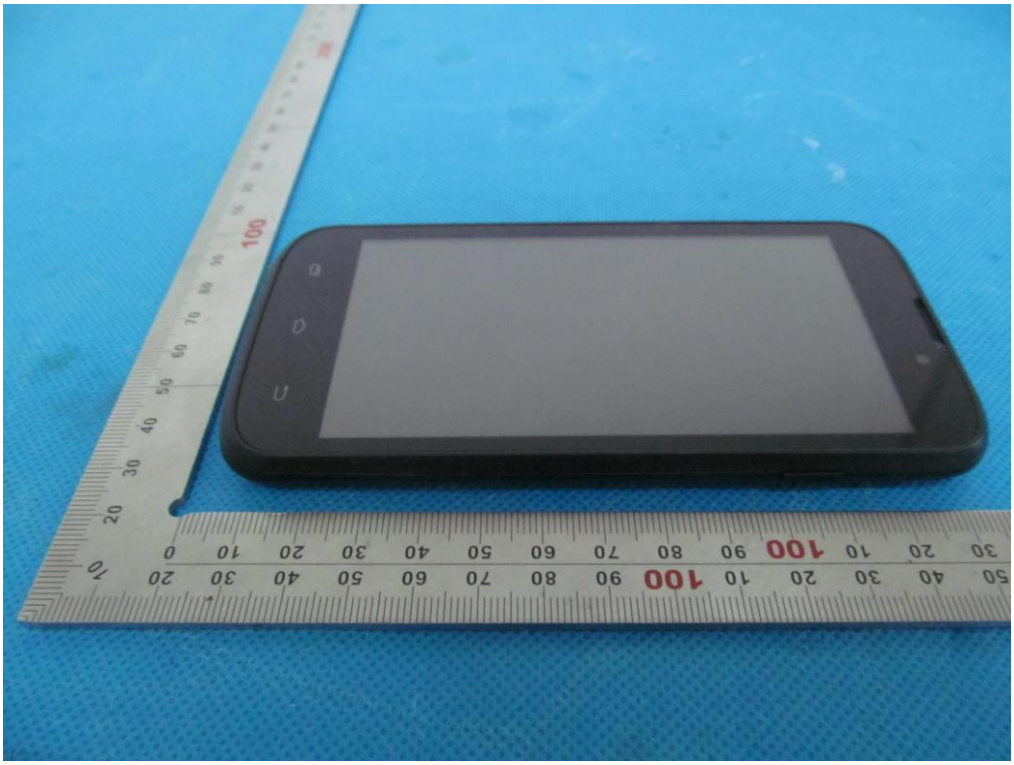
BACK VIEW OF EUT



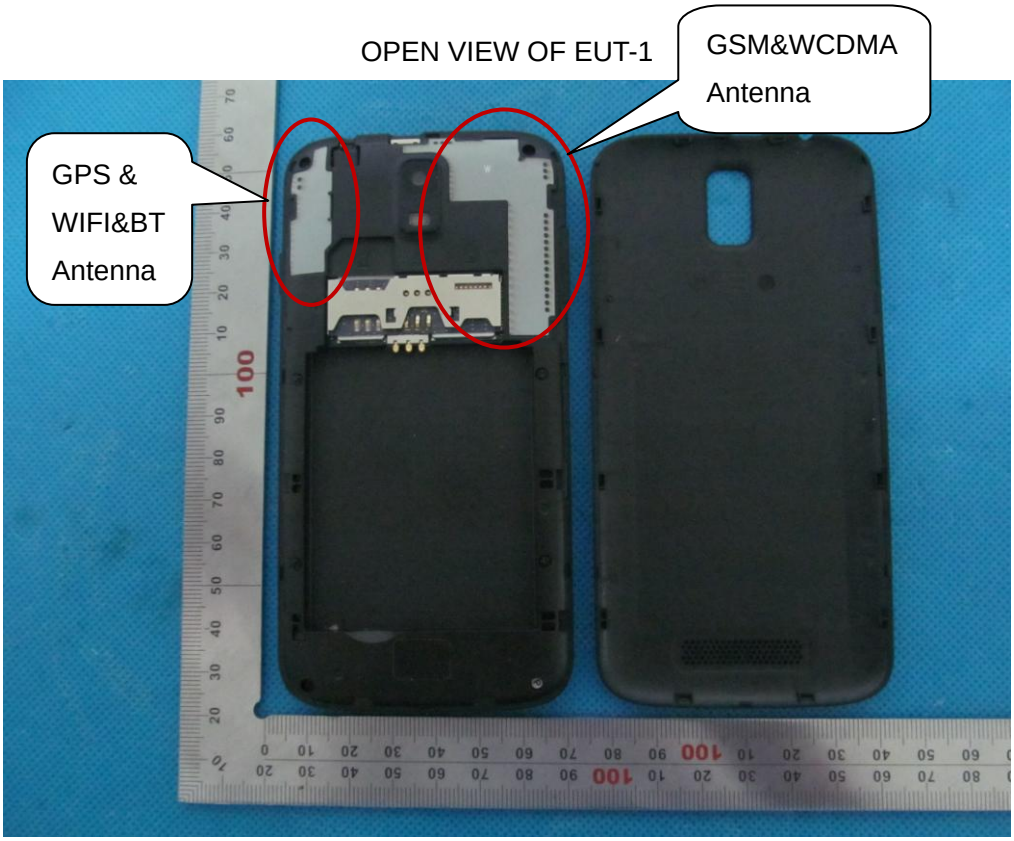
LEFT VIEW OF EUT



RIGHT VIEW OF EUT

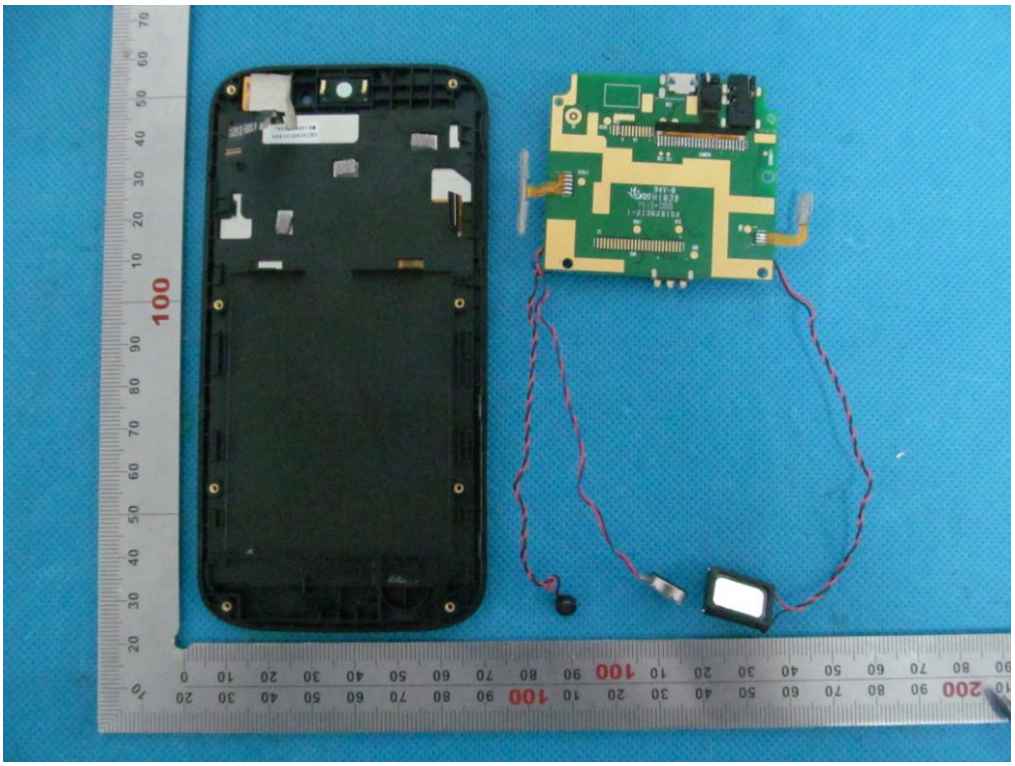


OPEN VIEW OF EUT-1

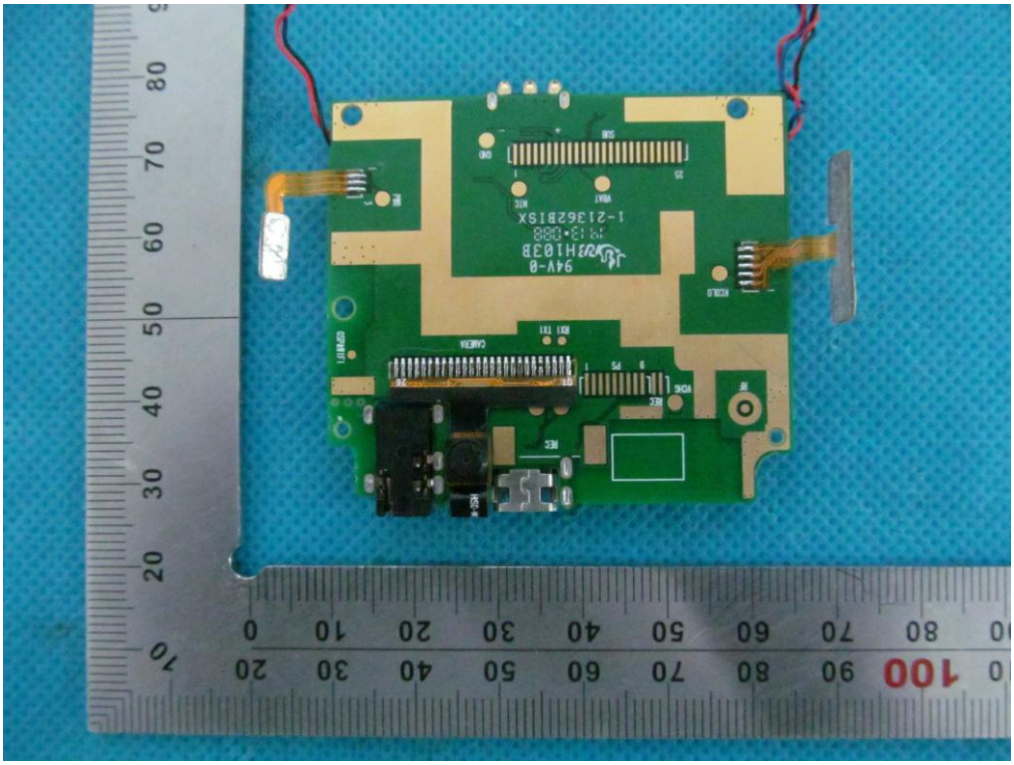


OPEN VIEW OF EUT-2

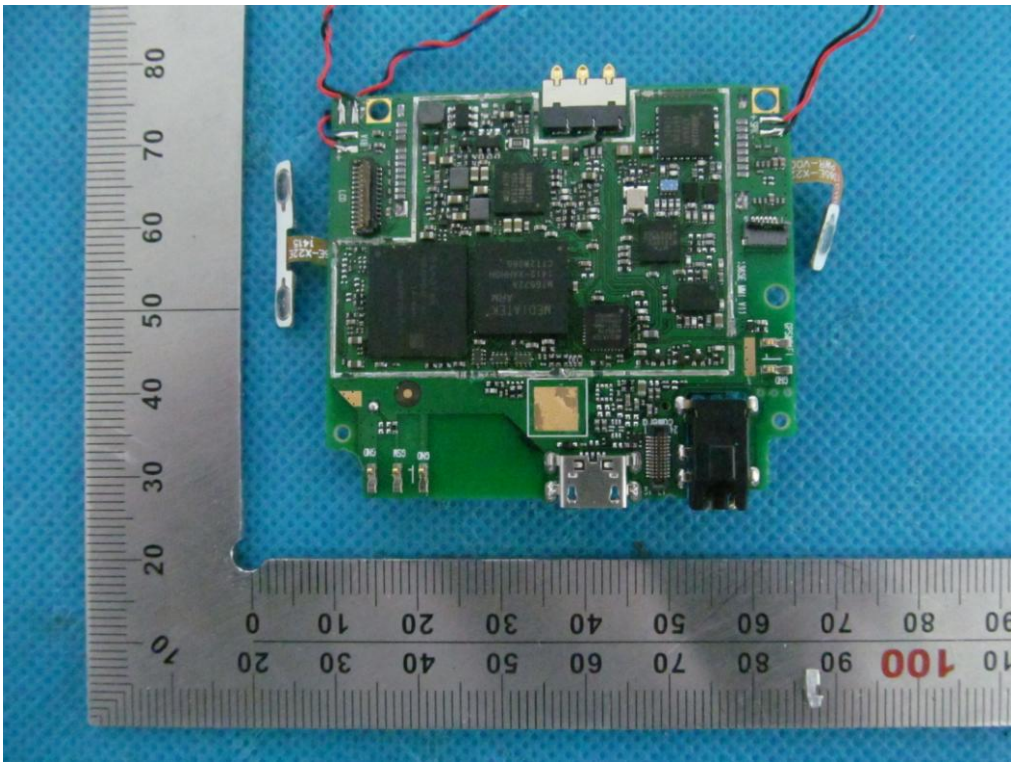
OPEN VIEW OF EUT-3



INTERNAL VIEW OF EUT-1



INTERNAL VIEW OF EUT-2



----END OF REPORT----