



ISO/IEC17025 Accredited Lab.

Report No:
File reference No:

FCC 1406125-03
2014-06-17

Applicant: Welgate Co.,Ltd

Product: U Stick (Mini PC)

Model No: WA-U420D, WA-U220D

Trademark: N/A

Test Standards: FCC Part 15 Subpart E, Paragraph 15.407

Test result: It is herewith confirmed and found to comply with the requirements set up by ANSI C63.4, FCC Part 15 Subpart C, Paragraph 15.407 regulations for the evaluation of electromagnetic compatibility

Approved By

Jack Chung

Jack Chung

Manager

Dated: June 17, 2014

Results appearing herein relate only to the sample tested

The technical reports is issued errors and omissions exempt and is subject to withdrawal at

SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO., LTD

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Special Statement:

The testing quality ability of our laboratory meet with “Quality Law of People’s Republic of China” Clause 19.

The testing quality system of our laboratory meet with ISO/IEC-17025 requirements, which is approved by CNAL. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

CNAL-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAL/AC01:2002 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of testing Laboratories.

FCC-Registration No.: 899988

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 899988.

IC- Registration No.: IC5205A-02

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration IC No.: 5205A-02.

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Test Report Conclusion

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1.0 General Details

1.1 Test Lab Details

Name : SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO., LTD
Address: 5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian District, Shenzhen,CHINA.
Telephone: (755) 83448688
Fax: (755) 83442996
Site on File with the Federal Communications Commission – United States
Registration Number: 899988
For 3m & 10 m OATS
Site Listed with Industry Canada of Ottawa, Canada
Registration Number: IC: 5205A-02
For 3m & 10 m OATS

1.2 Applicant Details

Applicant: Welgate Co.,Ltd
Address: 19F, Geopyeong Bldg, 129, Bongeunsa-ro, Gangnam-gu, Seoul, 135-726, Korea
Telephone: +82-2-3471-4181
Fax: --

1.3 Description of EUT

Product: U Stick (Mini PC)
Manufacturer: ShenZhen Netxeon Technology Co.,Ltd
Address: Unit 708,7/F West, Building 202 Tai Ran Industrial Park, Chegongmiao, Shenzhen, China
Brand Name: N/A
Additional Brand Name: N/A
Model Number: WA-U420D
Additional Model Number: WA-U220D
Type of Modulation IEEE 802.11a : OFDM(64QAM, 16QAM, QPSK, BPSK)
Frequency 5180MHz, 5200MHz, 5220MHz, 5240MHz;
5745MHz, 5765MHz, 5785MHz, 5805MHz
Air Data Rate IEEE 802.11a : 54, 48,36, 24, 18, 12, 9, 6 Mbps
Antenna: Integral antennas used.
Antenna Gain: Maximum 2.5dBi for 5G band
Test Mode: 5180MHz, 5200MHz, 5240MHz, 5745MHz, 5765MHz, 5805MHz, was tested. And 6Mbps air data rate was the worse case. During testing, EUT was set to 100% duty cycle.
Frequency Selection By software

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Power Supply: Model No.1: K-E70501000U1
Input: 100-240V, 50/60Hz, 0.15A Max; Output: 5V, 1000mA
Model No.2: K-E30502000U1
Input: 100-240V, 50/60Hz, 0.35A Max; Output: 5V, 2000mA
Model No.3: SK21G-0500200U
Input: AC100-240V, 50/60Hz, 0.4A Max; Output: 5V, 2A

Input Voltage: DC5V

1.4 Submitted Sample: 2 Samples

1.5 Test Duration

2014-05-29 to 2014-06-16

1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB

Radiated Emissions Uncertainty =4.7dB

1.7 Test Engineer

The sample tested by _____

Print Name: Terry Tang

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2.0	Test Equipments				
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	2013-08-23	2014-08-22
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100294	2013-08-23	2014-08-22
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100253	2013-08-23	2014-08-22
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	2013-08-25	2014-08-24
ESDV Test Receiver	ROHDE&SCHWARZ	ESDV	100008	2013-08-23	2014-08-22
Impuls-Begrenzer	ROHDE&SCHWARZ	ESH3-Z2	100281	2013-08-24	2014-08-23
System Controller	CT	SC100	-	--	--
Printer	EPSON	PHOTO EX3	CFNH234850	--	--
Computer	IBM	8434	1S8434KCE99BLXL O*	-	-
Loop Antenna	EMCO	6502	00042960	2013-08-23	2014-08-22
ESPI Test Receiver	ROHDE&SCHWARZ	ESI26	838786/013	2013-08-23	2014-08-22
3m OATS	--	--	N/A	2013-08-22	2014-08-21
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170265	2013-08-24	2014-08-23
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-631	2013-08-24	2014-08-23
Power meter	Anritsu	ML2487A	6K00003613	2013-08-24	2014-08-23
Power sensor	Anritsu	MA2491A	32263	2013-08-24	2014-08-23
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2013-08-24	2014-08-23
LISN	AFJ	LS16C	10010947251	2013-08-23	2014-08-22
LISN (Three Phase)	Schwarebeck	NSLK 8126	8126453	2013-08-23	2014-08-22
9*6*6 Anechoic	--	--	N/A	2013-08-22	2014-08-21
EMI Test Receiver	RS	ESCS30	100139	2013-08-23	2014-08-22

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2.1 Auxiliary Equipment

Name	Model No.	Serial No.	Manufacturer	Cable	FCC ID/DOC
TF Card	--	--	Kingston	--	--
Passive Earphone	--	--	--	--	--
LCD Monitor	PH2450	--	SAMSUNG	--	DOC

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3.0 Technical Details

3.1 Summary of test results

The EUT has been tested according to the following specifications:			
Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.107 & 15.407	Conducted Emission Test	PASS	Complies
FCC Part 15 Subpart E Paragraph 15.407 (b1/4/5/6/7), Part 15.205 and Part 15.209	Undesirable Emission and Restrict band	PASS	Complies
FCC Part 15, Paragraph 15.407 (a1/2/3)	Peak Transmit Power	PASS	Complies
FCC Part 15, Paragraph 15.407 (a)(6)	Peak Power Excursion	PASS	Complies
FCC Part 15, Paragraph 15.407 (a1/2/3)	Peak Power Spectral Density	PASS	Complies
FCC Part 15, Paragraph 15.407(g)	Frequency Stability	PASS	Complies

3.2 Test Standards

FCC Part 15 Subpart & Subpart E, Paragraph 15.407

4.0 EUT Modification

No modification by Shenzhen Timeway Technology Consulting Co., Ltd

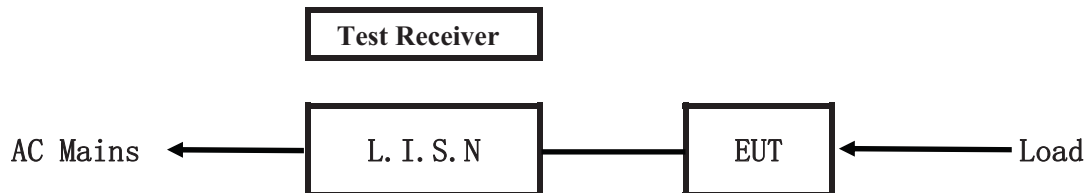
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5. Power Line Conducted Emission Test

5.1 Schematics of the test



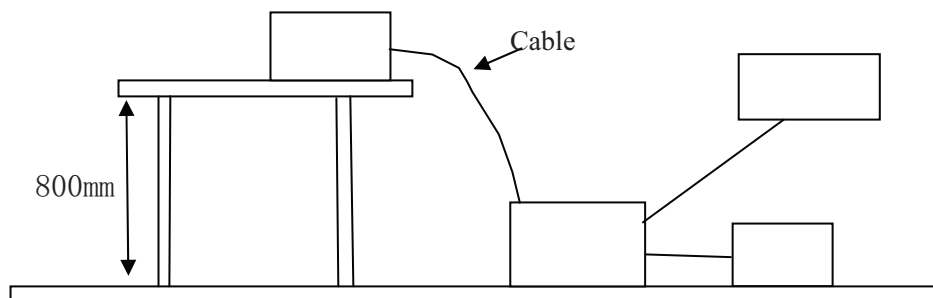
EUT: Equipment Under Test

5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.4-2003. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.4 –2003.

Test Voltage: 120V~, 60Hz

Block diagram of Test setup



5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.4-2003. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

A. EUT

Device	Manufacturer	Model	FCC
U Stick (Mini PC)	ShenZhen Netxeon Technology Co.,Ltd	WA-U420D, WA-U220D	FCC ID: 2ACDD-0508

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B. Internal Device

Device	Manufacturer	Model	Rating

C. Peripherals

Device	Manufacturer	Model	Rating
--	--	--	--

5.4 EUT Operating Condition

Operating condition is according to ANSI C63.4 -2003.

A Setup the EUT and simulators as shown on follow

B Enable AF signal and confirm EUT active to normal condition

5.5 Power line conducted Emission Limit according to Paragraph 15.207 and 15.107

Frequency (MHz)	Class A Limits (dB μ V)		Class B Limits (dB μ V)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ~ 0.50	79.0	66.0	66.0~56.0*	56.0~46.0*
0.50 ~ 5.00	73.0	60.0	56.0	46.0
5.00 ~ 30.00	73.0	60.0	60.0	50.0

- Notes:
1. *Decreasing linearly with logarithm of frequency.
 2. The tighter limit shall apply at the transition frequencies

5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

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A: Conducted Emission on Live Terminal (150kHz to 30MHz)

EUT Operating Environment

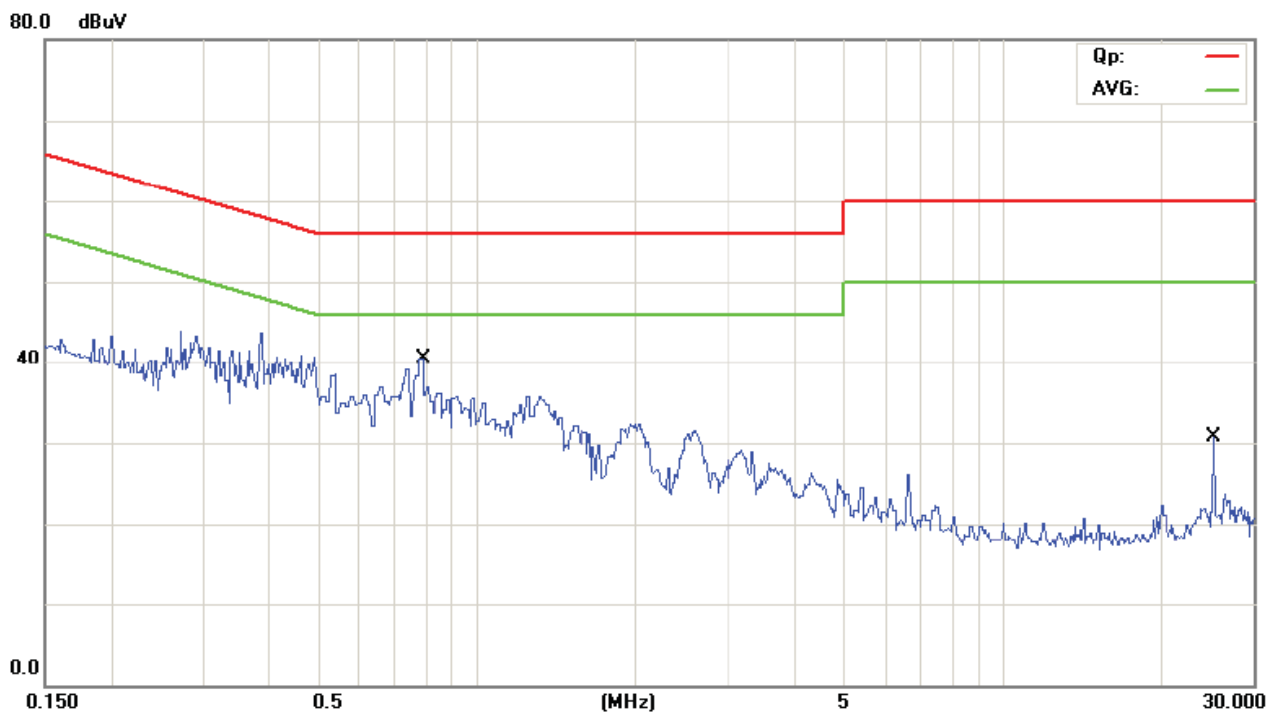
Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Keeping WIFI Transmitting

Equipment Level: Class B

Results: PASS

Please refer to following diagram for individual



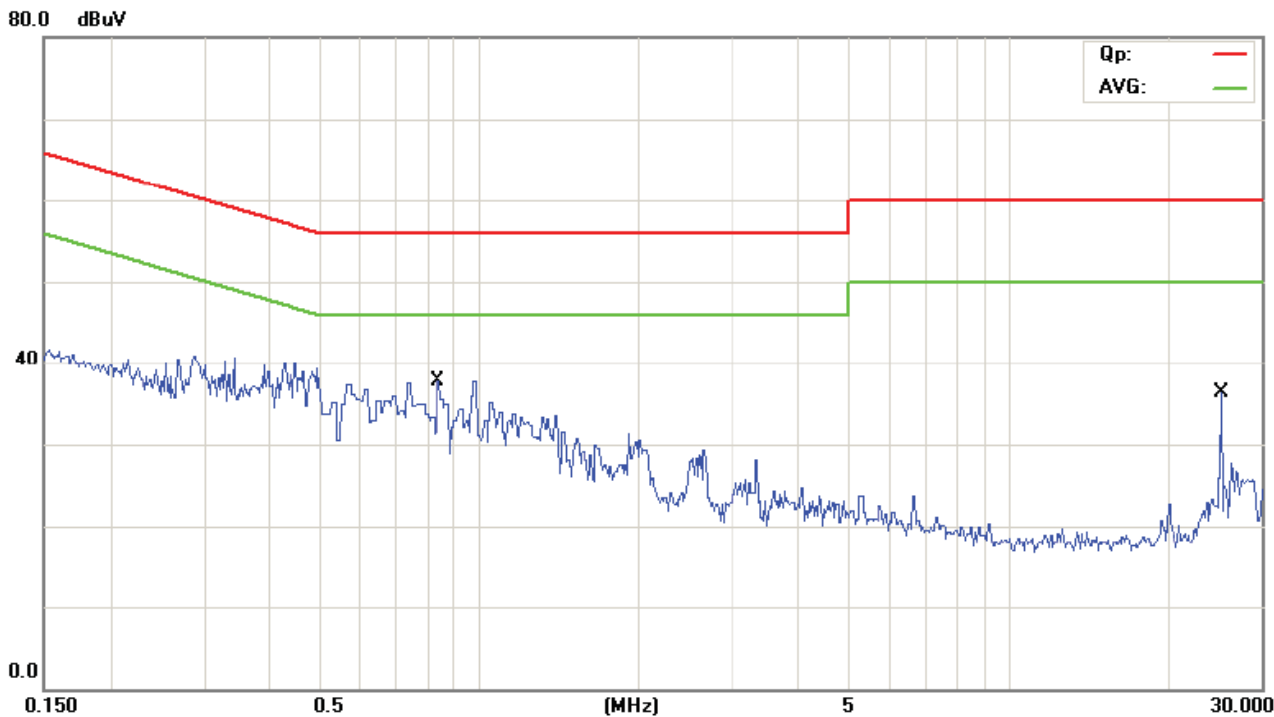
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	0.7813	17.30	11.67	28.97	56.00	-27.03	QP
2		0.7813	-7.40	11.67	4.27	46.00	-41.73	AVG
3		25.1737	19.60	11.40	31.00	60.00	-29.00	QP
4		25.1737	-10.60	11.40	0.80	50.00	-49.20	AVG

Note: Three adaptors was tested, only worst case was recorded

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B: Conducted Emission on Neutral Terminal (150kHz to 30MHz)
EUT Operating Environment
Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 KPa
EUT set Condition: Keeping WIFI Transmitting
Equipment Level: Class B
Results: Pass
Please refer to following diagram for individual



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.8284	11.20	11.72	22.92	56.00	-33.08	QP
2		0.8284	-13.70	11.72	-1.98	46.00	-47.98	AVG
3	*	25.1740	24.90	11.40	36.30	60.00	-23.70	QP
4		25.1740	-12.10	11.40	-0.70	50.00	-50.70	AVG

Note: Three adaptors was tested, only worst case was recorded

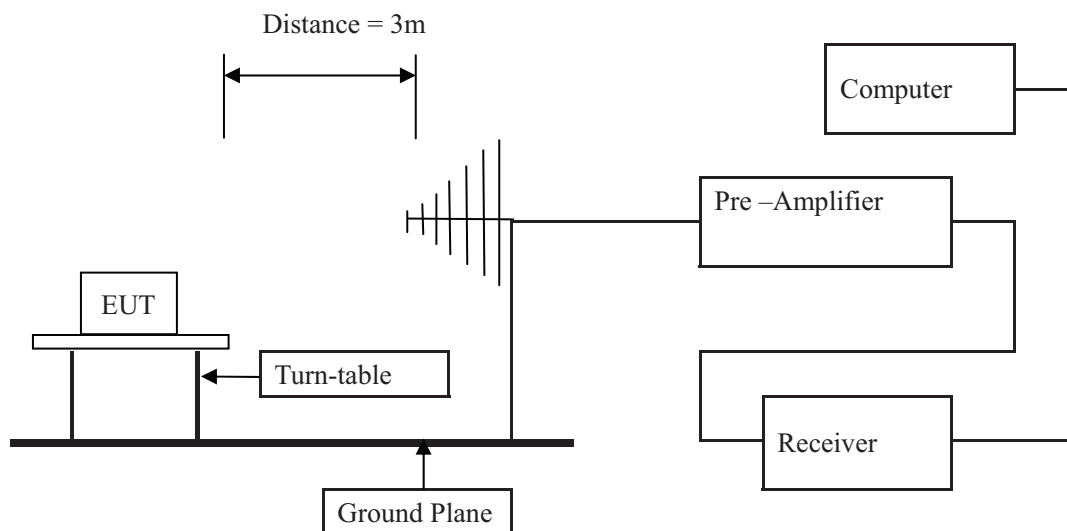
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6 Undesirable Emission and Restrict band

6.1 Test Method and test Procedure:

- (1) The EUT was tested according to ANSI C63.4 –2003. The radiated test was performed at Timeway Laboratory. This site is on file with the FCC laboratory division, Registration No.899988
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-2003.
- (3) The frequency spectrum from 30 MHz to 40 GHz was investigated. All readings from 30 MHz to 1 GHz are Quasi-peak values with a resolution bandwidth of 120 kHz. For measurement above 1GHz, peak values with RBW=1MHz, VBW=3MHz and PK detector.
Detector. Measurements were made at 3 meters.
- (4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a “QP” in the data table.
- (6) The antenna polarization : Vertical polarization and Horizontal polarization.

Block diagram of Test setup



6.2 Configuration of The EUT

Same as section 5.3 of this report

6.3 EUT Operating Condition

Same as section 5.4 of this report.

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6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

Frequencies in restricted band are complied to limit on Paragraph 15.209 and 15.109

Frequency Range (MHz)	Distance (m)	Field strength (dB μ V/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

- (1) For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27dBm/MHz
- (2) For transmitters operating in the 5.725- 5.825GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27dBm/MHz.

- Note:
1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
 2. In the Above Table, the higher limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT
 4. Three adaptors was tested, only worst case was recorded

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Test result

General Radiated Emission Data and Harmonics Radiated Emission Data

Radiated Emission In Horizontal (30MHz----1000MHz)

EUT set Condition: Keeping WIFI Transmitting

Results: Pass

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
168.000	34.41	H	43.50
504.040	37.13	H	46.00
168.000	30.41	V	43.50
504.000	40.80	V	46.00

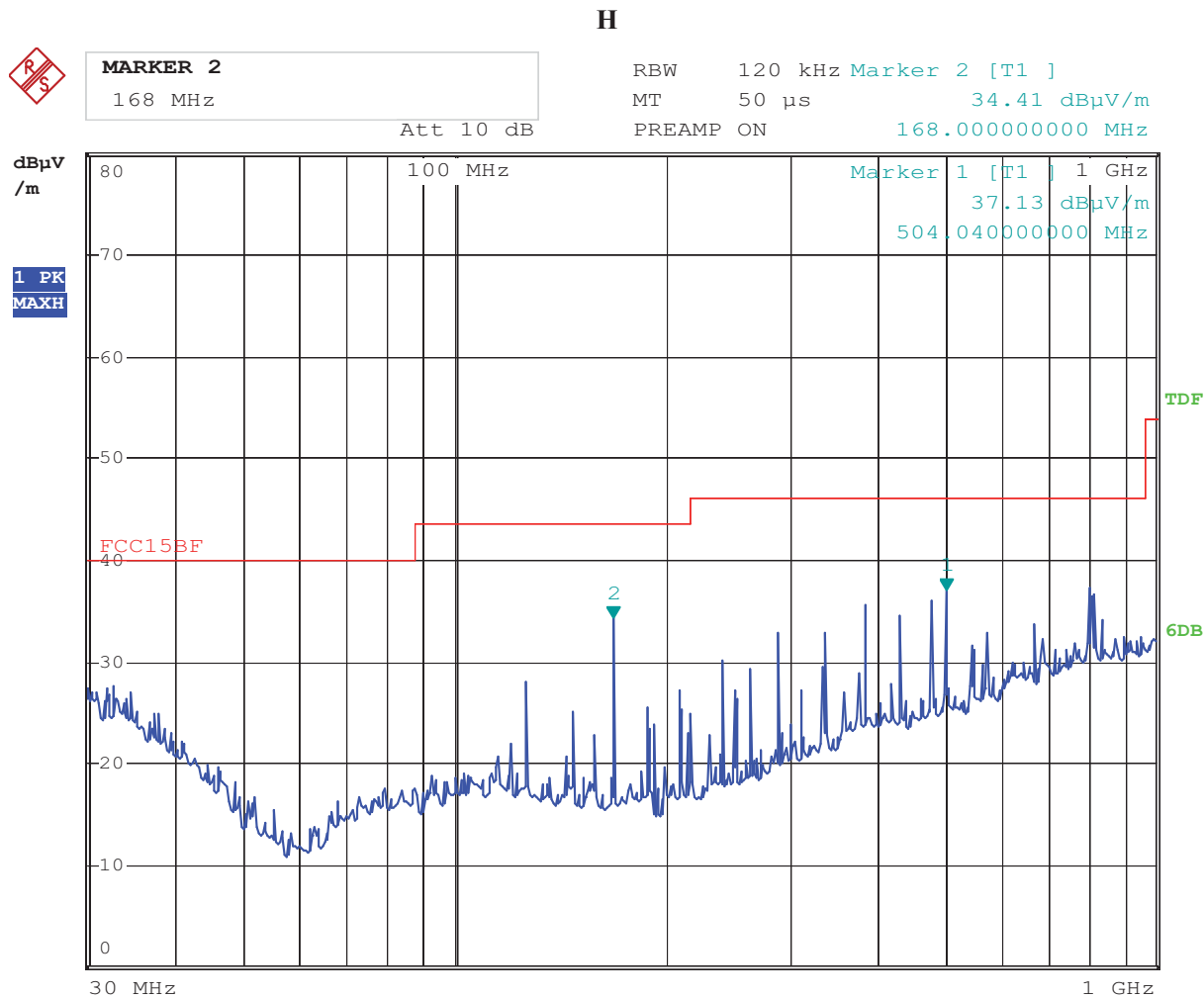
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Test Figure:

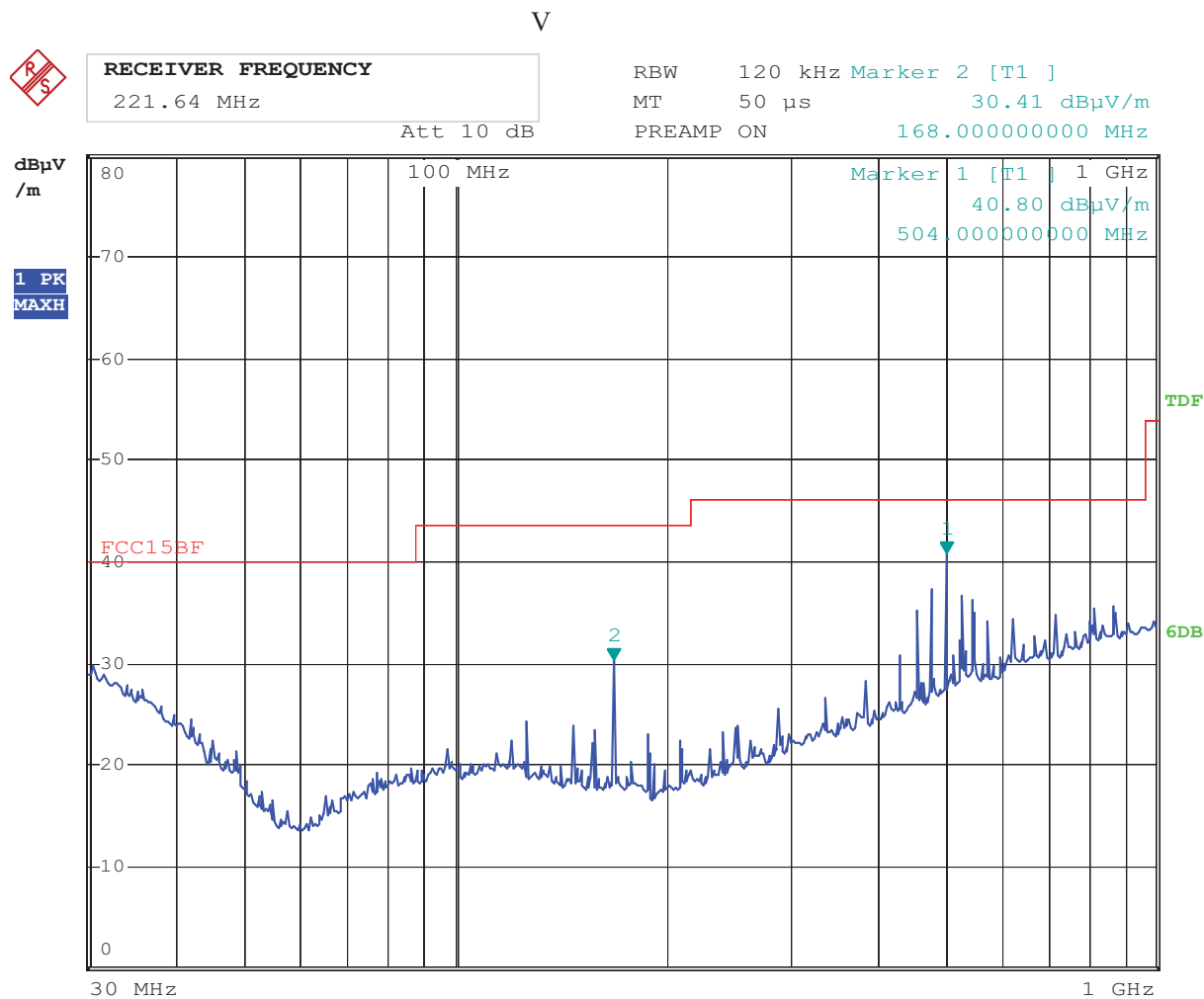


Date: 16.JUN.2014 15:38:41

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Test Figure:



Date: 16.JUN.2014 15:37:52

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Operation Mode: Keep Transmitting mode under CH36 5180MHz 6Mbps

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
10360	--	H	74(Peak)/ 54(AV)
15540	--	V	74(Peak)/ 54(AV)
20720	--	H/V	74(Peak)/ 54(AV)
25900	--	H/V	74(Peak)/ 54(AV)
31080	--	H/V	74(Peak)/ 54(AV)
36260	--	H/V	74(Peak)/ 54(AV)

- Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark "---" means that the emissions level is too low to be measured
3. For 802.11a mode 6Mbps

Operation Mode: Keep Transmitting mode under CH40 5200MHz 6Mbps

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
10400	--	H	74(Peak)/ 54(AV)
15600	--	V	74(Peak)/ 54(AV)
20800	--	H/V	74(Peak)/ 54(AV)
26000	--	H/V	74(Peak)/ 54(AV)
31200	--	H/V	74(Peak)/ 54(AV)
36400	--	H/V	74(Peak)/ 54(AV)

- Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark "---" means that the emissions level is too low to be measured
3. For 802.11a mode 6Mbps



Operation Mode: Keep Transmitting mode under CH48 5240MHz 6Mbps

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
10480	--	H	74(Peak)/ 54(AV)
15720	--	V	74(Peak)/ 54(AV)
20960	--	H/V	74(Peak)/ 54(AV)
26200	--	H/V	74(Peak)/ 54(AV)
31440	--	H/V	74(Peak)/ 54(AV)
36680	--	H/V	74(Peak)/ 54(AV)

- Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
 2. Remark "---" means that the emissions level is too low to be measured
 3. For 802.11a mode 6Mbps

Operation Mode: Keep Transmitting mode under CH149 5745MHz 6Mbps

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
11490	--	H	74(Peak)/ 54(AV)
17235	--	V	74(Peak)/ 54(AV)
22980	--	H/V	74(Peak)/ 54(AV)
28725	--	H/V	74(Peak)/ 54(AV)
34470	--	H/V	74(Peak)/ 54(AV)

- Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
 2. Remark "---" means that the emissions level is too low to be measured
 3. For 802.11a mode 6Mbps



Operation Mode: Keep Transmitting under CH153 5765MHz 6Mbps

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
11530	--	H	74(Peak)/ 54(AV)
17295	--	V	74(Peak)/ 54(AV)
23060	--	H/V	74(Peak)/ 54(AV)
28825	--	H/V	74(Peak)/ 54(AV)
34590	--	H/V	74(Peak)/ 54(AV)

- Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark "---" means that the emissions level is too low to be measured
3. For 802.11a mode 6Mbps

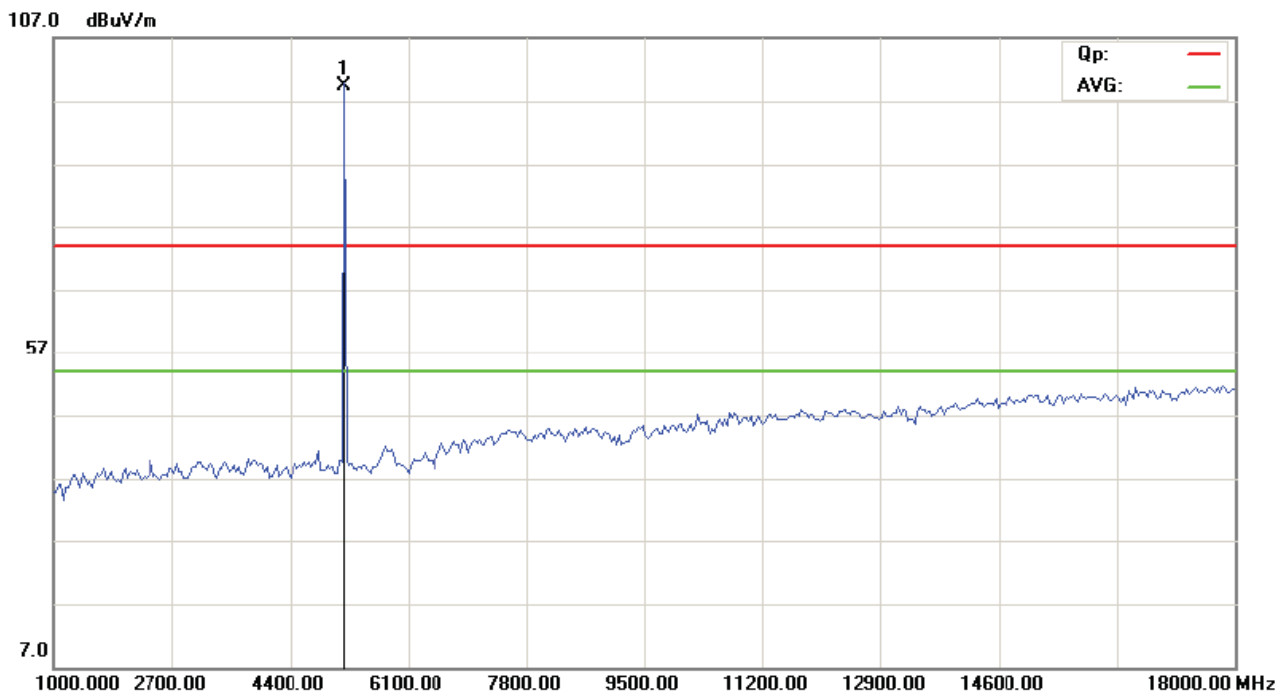
Operation Mode: Keep Transmitting under CH161 5805MHz 6Mbps

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
11610	--	H	74(Peak)/ 54(AV)
17415	--	V	74(Peak)/ 54(AV)
23220	--	H/V	74(Peak)/ 54(AV)
29025	--	H/V	74(Peak)/ 54(AV)
34830	--	H/V	74(Peak)/ 54(AV)

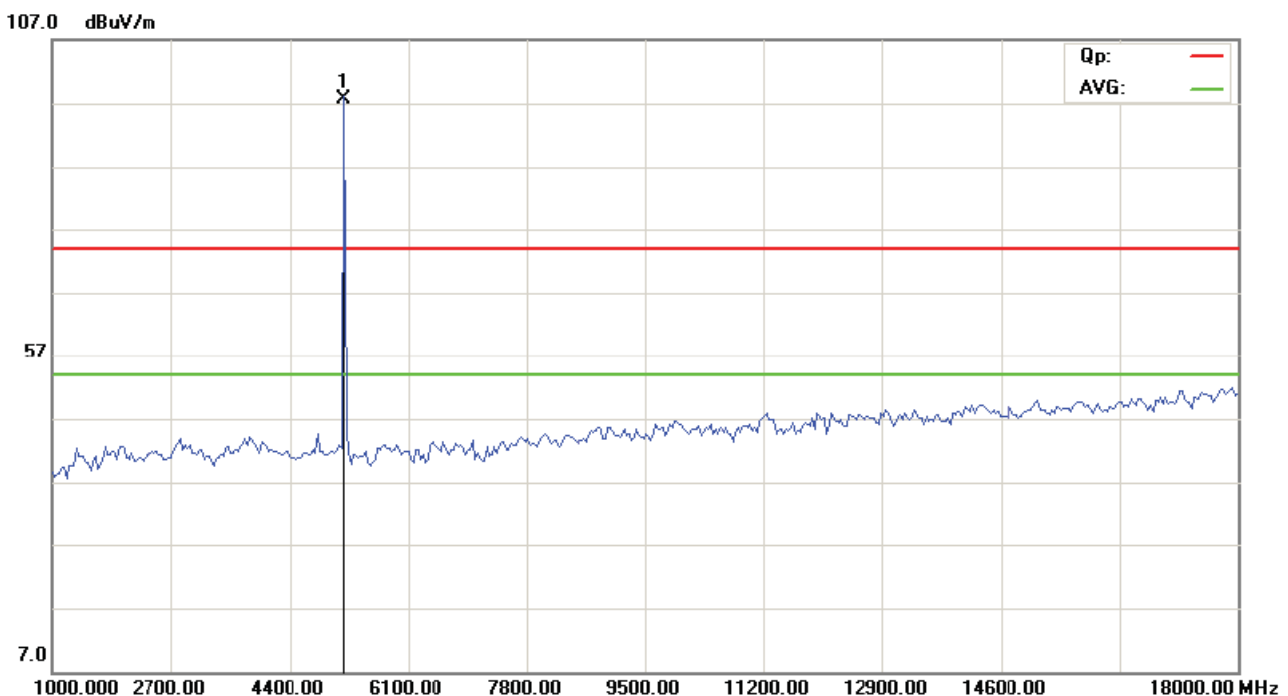
- Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark "---" means that the emissions level is too low to be measured
3. For 802.11a mode 6Mbps

Please refer to the following test plots for details:

CH36 for 11g at 6Mbps: Horizontal



CH36 for 11g at 6Mbps: Vertical

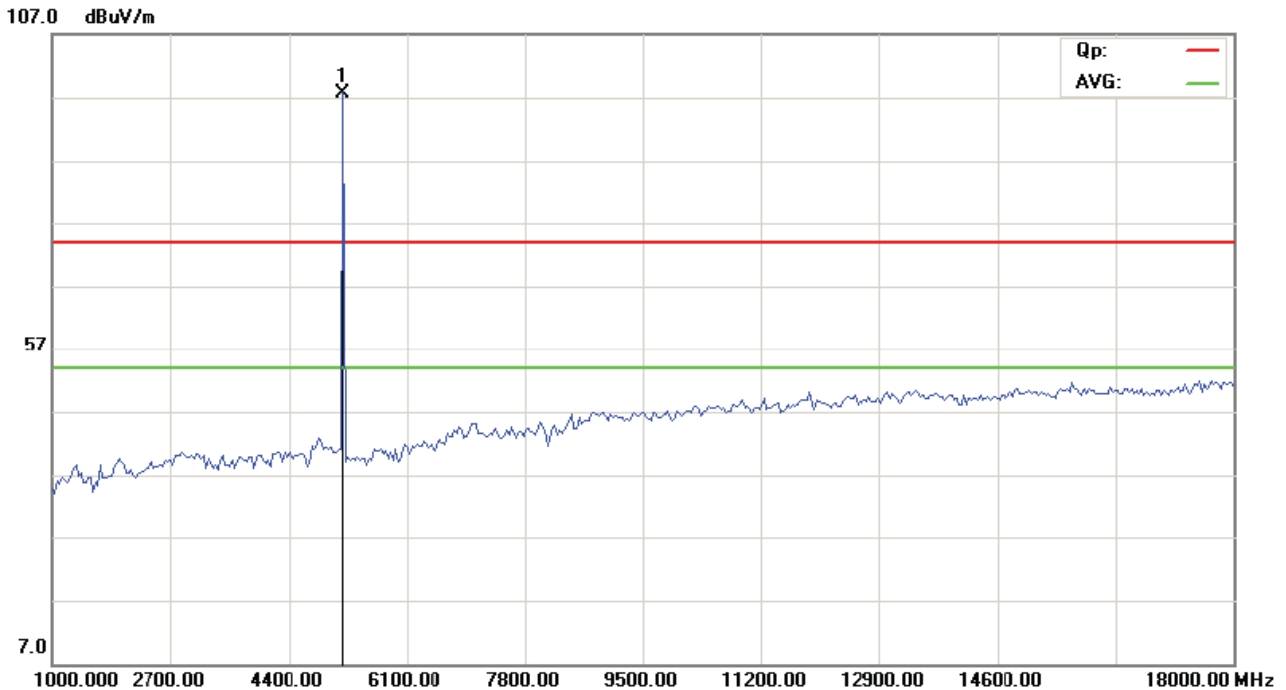


The report refers only to the sample tested and does not apply to the bulk.

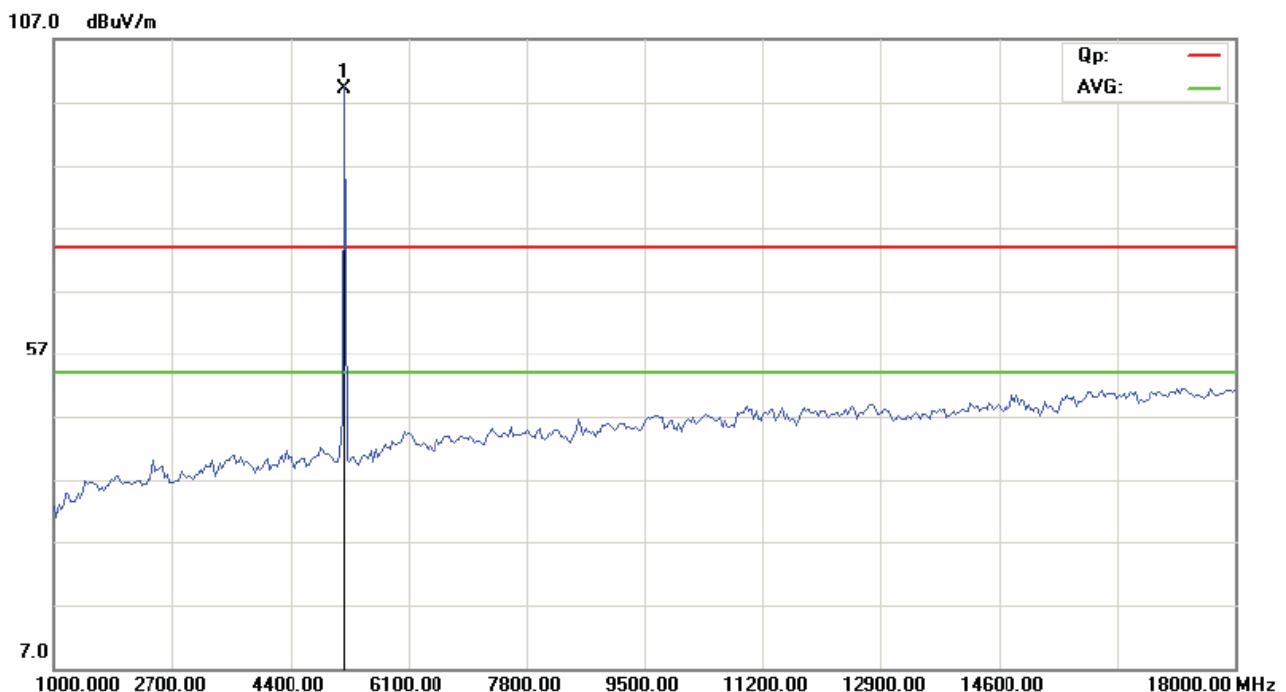
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CH40 for 11g at 6Mbps: Vertical



CH40 for 11g at 6Mbps: Horizontal



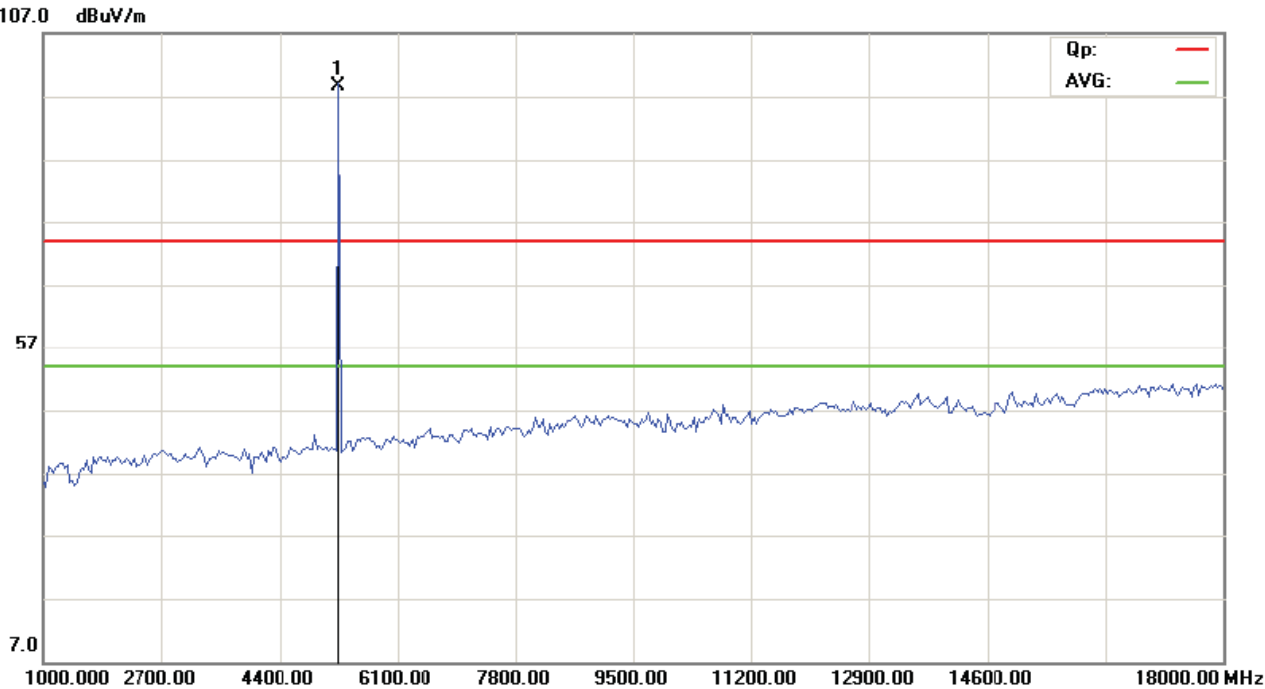
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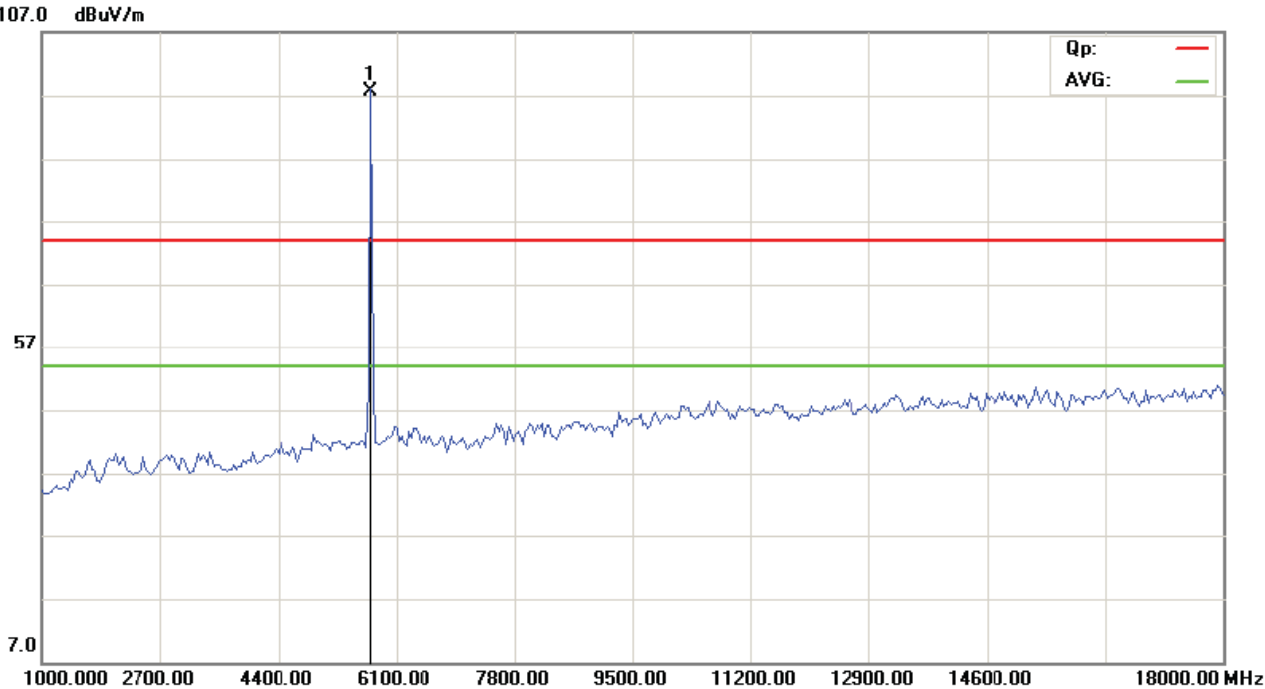
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CH48 for 11g at 6Mbps: Vertical



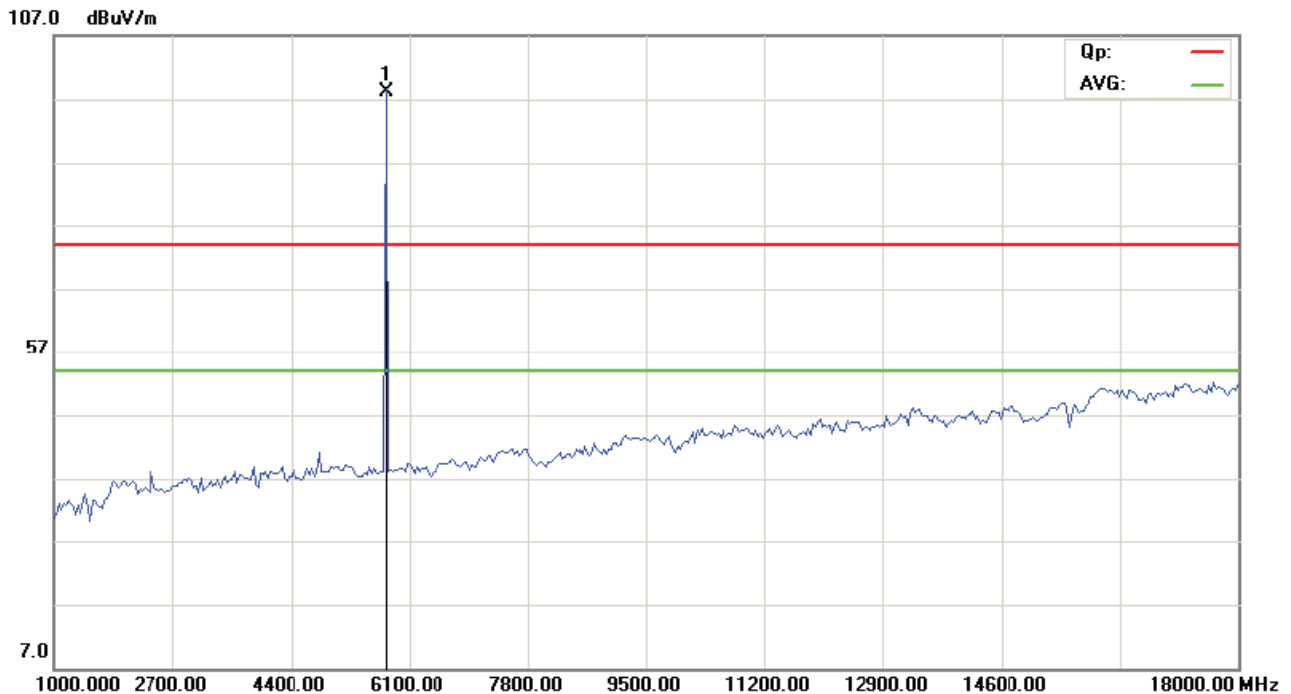
CH48 for 11g at 6Mbps: Horizontal



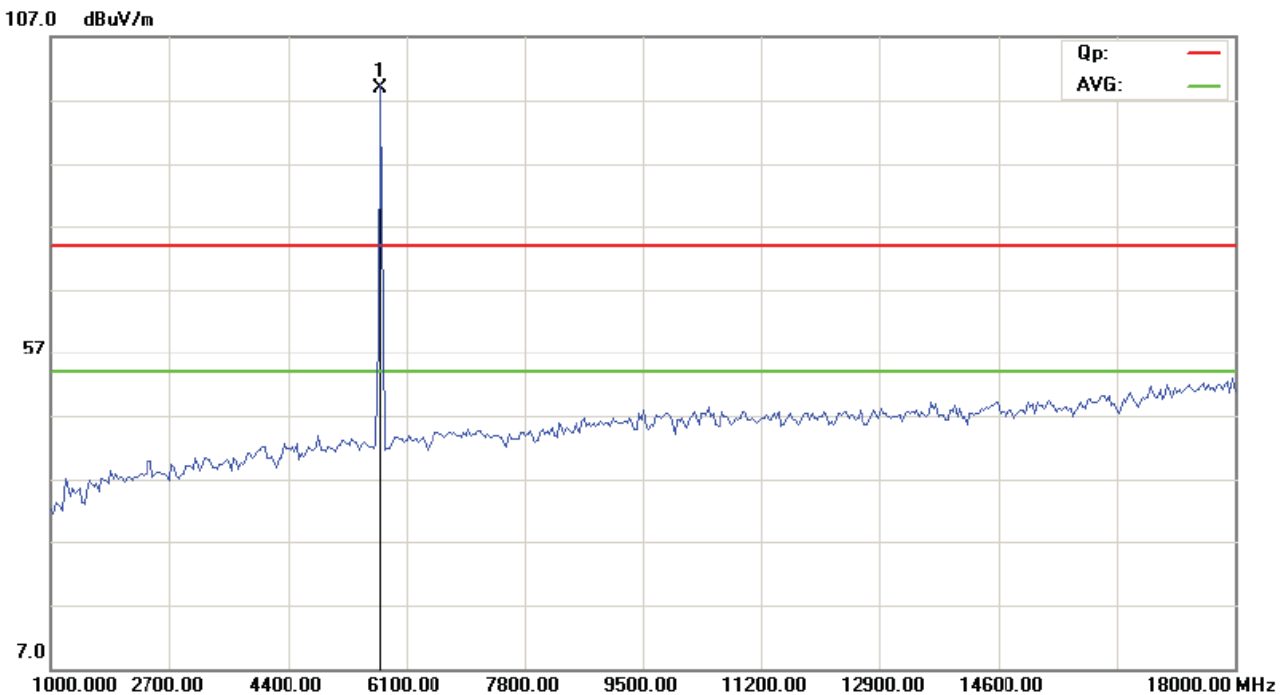
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Please refer to the following test plots for details:

CH149 for 11g at 6Mbps: Horizontal



CH149 for 11g at 6Mbps: Vertical

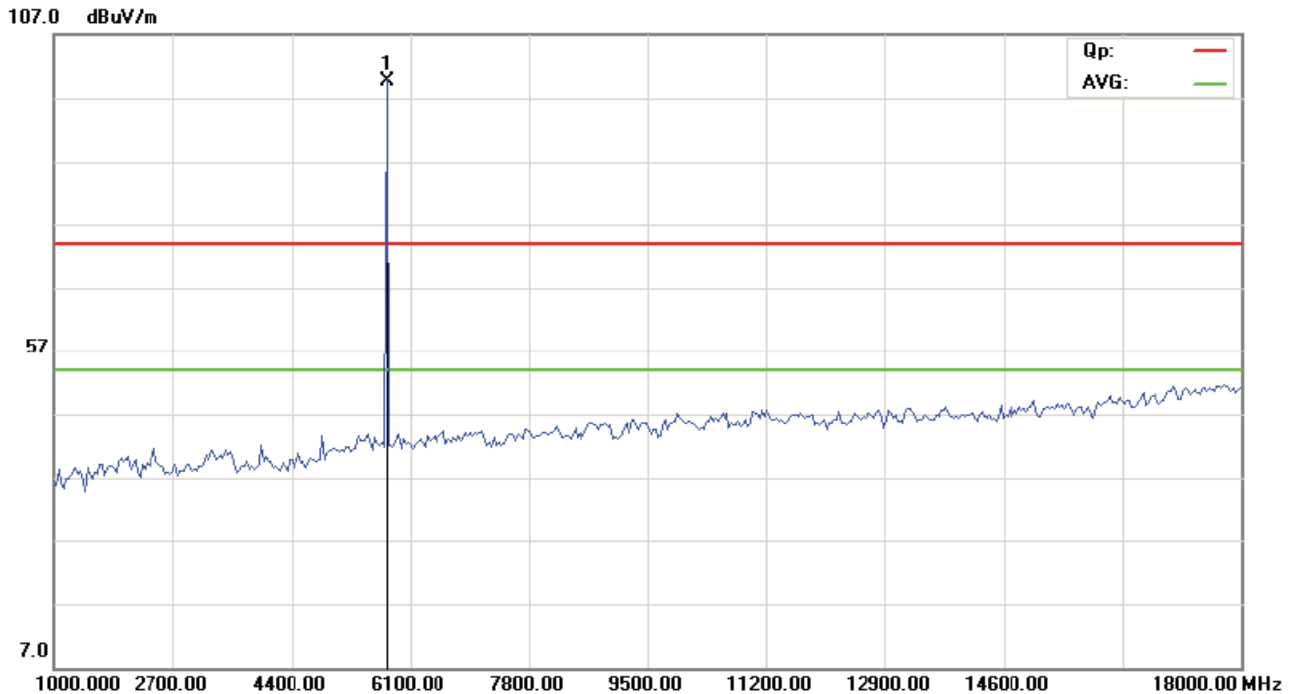


The report refers only to the sample tested and does not apply to the bulk.

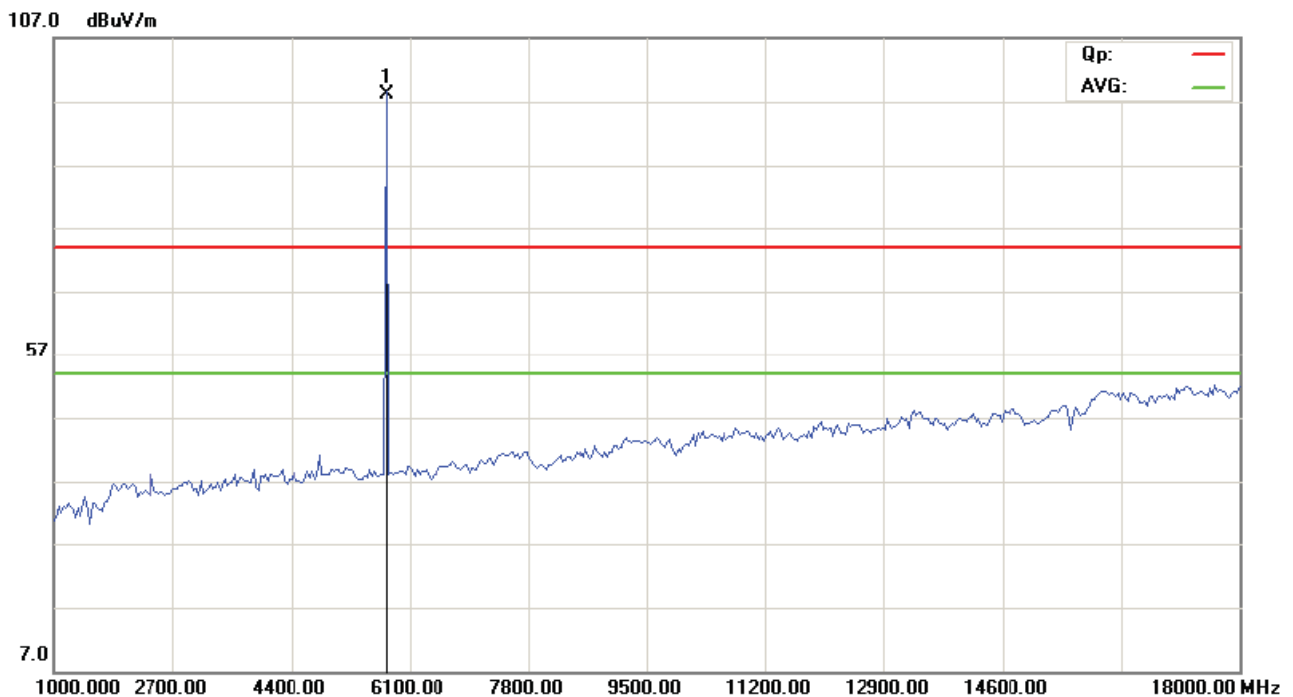
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CH153 for 11g at 6Mbps: Vertical

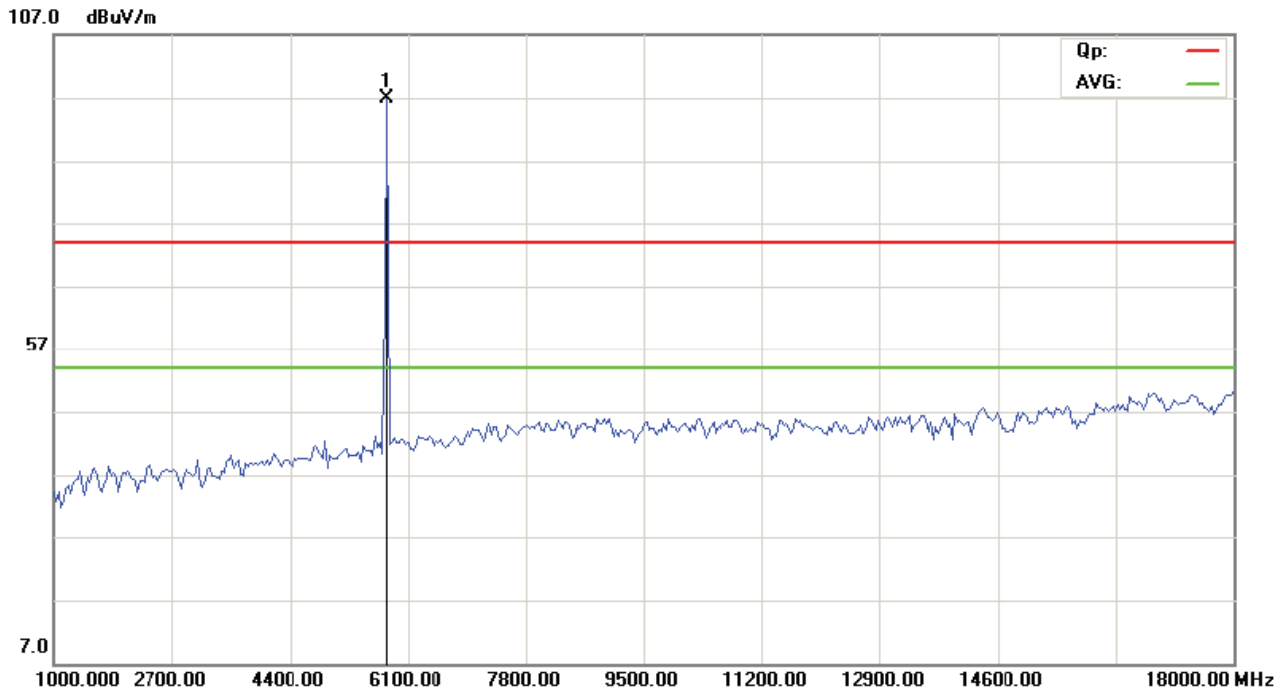


CH153 for 11g at 6Mbps: Horizontal

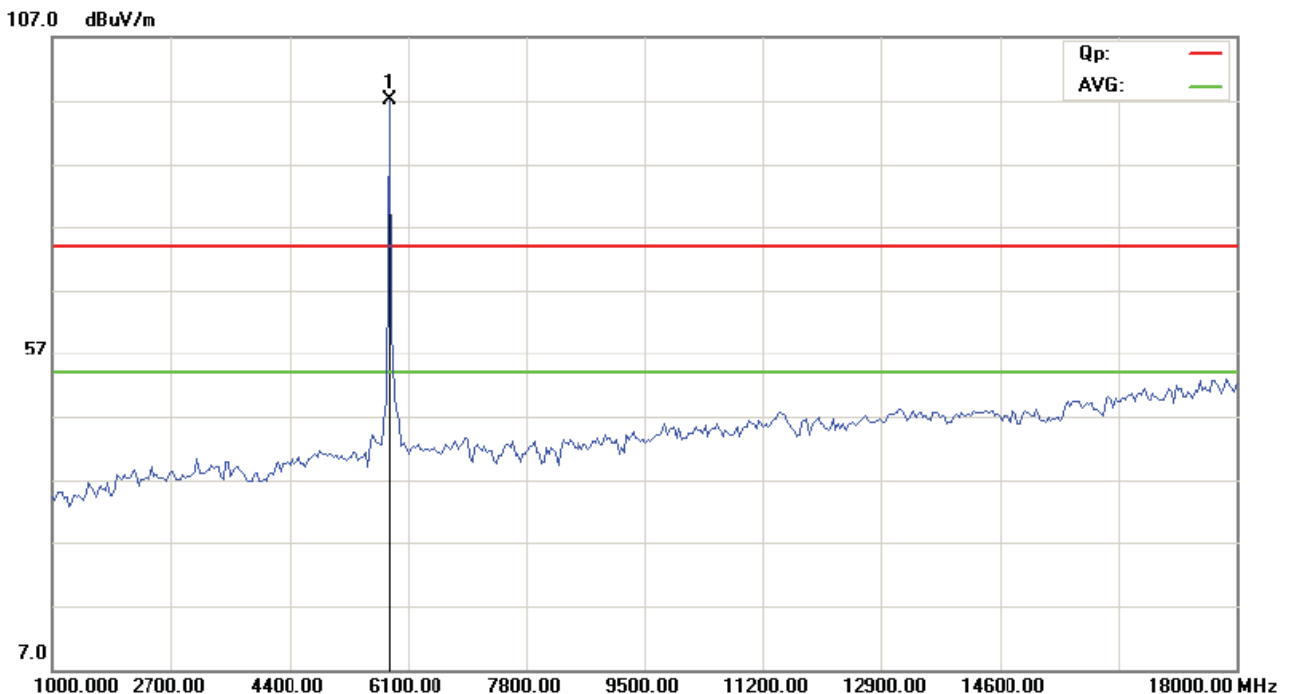


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CH161 for 11g at 6Mbps: Vertical



CH161 for 11g at 6Mbps: Horizontal



Note: For radiated Emissions from 18-40GHz, it is only the floor noise.



Restricted band Measurement				
EUT	U Stick (Mini PC)		Test Mode:	Channel 36 (5180MHz)
Mode	Keeping WIFI transmitting		Input Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
Horizontal				
5150	PK (dBμV/m)	43.66 (PK)	Limit	-27dBm/MHz
	EIRP (dBm)	-51.54		
Vertical				
5150	PK (dBμV/m)	43.92(PK)	Limit	-27dBm/MHz
	EIRP (dBm)	-51.28		

Remark: 1. According to KDB 789033 v01r03 section H) d) (iii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:

$$\text{EIRP[dBm]} = \text{E[dB}\mu\text{V/m]} - 95.2$$

For Example, if $\text{E[dB}\mu\text{V/m]}=43.66 \text{ dB}\mu\text{V/m}$,

$$\text{EIRP[dBm]} = \text{E[dB}\mu\text{V/m]} - 95.2=43.66-95.2= -51.54\text{dBm}$$

2. RBW=1MHz, VBW=3MHz

Restricted band Measurement				
EUT	U Stick (Mini PC)		Test Mode:	Channel 48 (5240MHz)
Mode	Keeping WIFI transmitting		Input Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
Horizontal				
5250	PK (dBμV/m)	60.19 (PK)	Limit	-27dBm/MHz
	EIRP (dBm)	-53.83		
Vertical				
5250	PK (dBμV/m)	58.86 (PK)	Limit	-27dBm/MHz
	EIRP (dBm)	-36.34		

Remark: 1. According to KDB 789033 v01r03 section H) d) (iii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:

$$\text{EIRP[dBm]} = \text{E[dB}\mu\text{V/m]} - 95.2$$

For Example, if $\text{E[dB}\mu\text{V/m]}=60.19 \text{ dB}\mu\text{V/m}$,

$$\text{EIRP[dBm]} = \text{E[dB}\mu\text{V/m]} - 95.2=60.19-95.2= -35.01\text{dBm}$$

2. RBW=1MHz, VBW=3MHz

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Restricted band Measurement				
EUT	U Stick (Mini PC)		Test Mode:	Channel 149 (5745MHz)
Mode	Keeping WIFI transmitting		Input Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
Horizontal				
5725MHz	PK (dBμV/m)	50.33 (PK)	Limit	-27dBm/MHz
	EIRP (dBm)	-44.87		
Vertical				
5725MHz	PK (dBμV/m)	48.29 (PK)	Limit	-27dBm/MHz
	EIRP (dBm)	-46.91		

Remark: 1. According to KDB 789033 v01r03 section H) d) (iii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:

$$\text{EIRP[dBm]} = \text{E[dB}\mu\text{V/m]} - 95.2$$

For Example, if $\text{E[dB}\mu\text{V/m]} = 50.33 \text{ dB}\mu\text{V/m}$,

$$\text{EIRP[dBm]} = \text{E[dB}\mu\text{V/m]} - 95.2 = 50.33 - 95.2 = -44.87 \text{ dBm}$$

2. RBW=1MHz, VBW=3MHz

Restricted band Measurement				
EUT	U Stick (Mini PC)		Test Mode:	Channel 161 (5805MHz)
Mode	Keeping WIFI transmitting		Input Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
Horizontal				
5825MHz	PK (dBμV/m)	51.28 (PK)	Limit	-27dBm/MHz
	EIRP (dBm)	-43.92		
Vertical				
5825MHz	PK (dBμV/m)	50.07 (PK)	Limit	-27dBm/MHz
	EIRP (dBm)	-45.13		

Remark: 1. According to KDB 789033 v01r03 section H) d) (iii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:

$$\text{EIRP[dBm]} = \text{E[dB}\mu\text{V/m]} - 95.2$$

For Example, if $\text{E[dB}\mu\text{V/m]} = 51.28 \text{ dB}\mu\text{V/m}$,

$$\text{EIRP[dBm]} = \text{E[dB}\mu\text{V/m]} - 95.2 = 51.28 - 95.2 = -43.92 \text{ dBm}$$

2. RBW=1MHz, VBW=3MHz

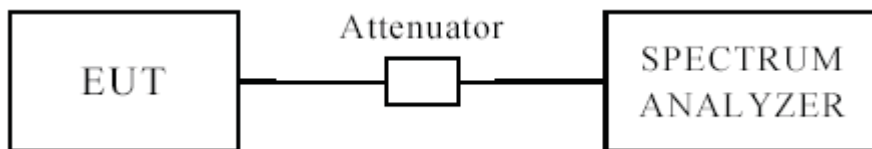
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7.0 26 dB OCCUPIED BANDWIDTH

7.1 Test Setup



7.3 Test Procedure

1. Set resolution bandwidth (RBW) = 300 kHz
2. Set the video bandwidth (VBW) = 1MHz
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 26 dB relative to the maximum level measured in the fundamental emission.

7.4 Test Result

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26dB Occupied Bandwidth

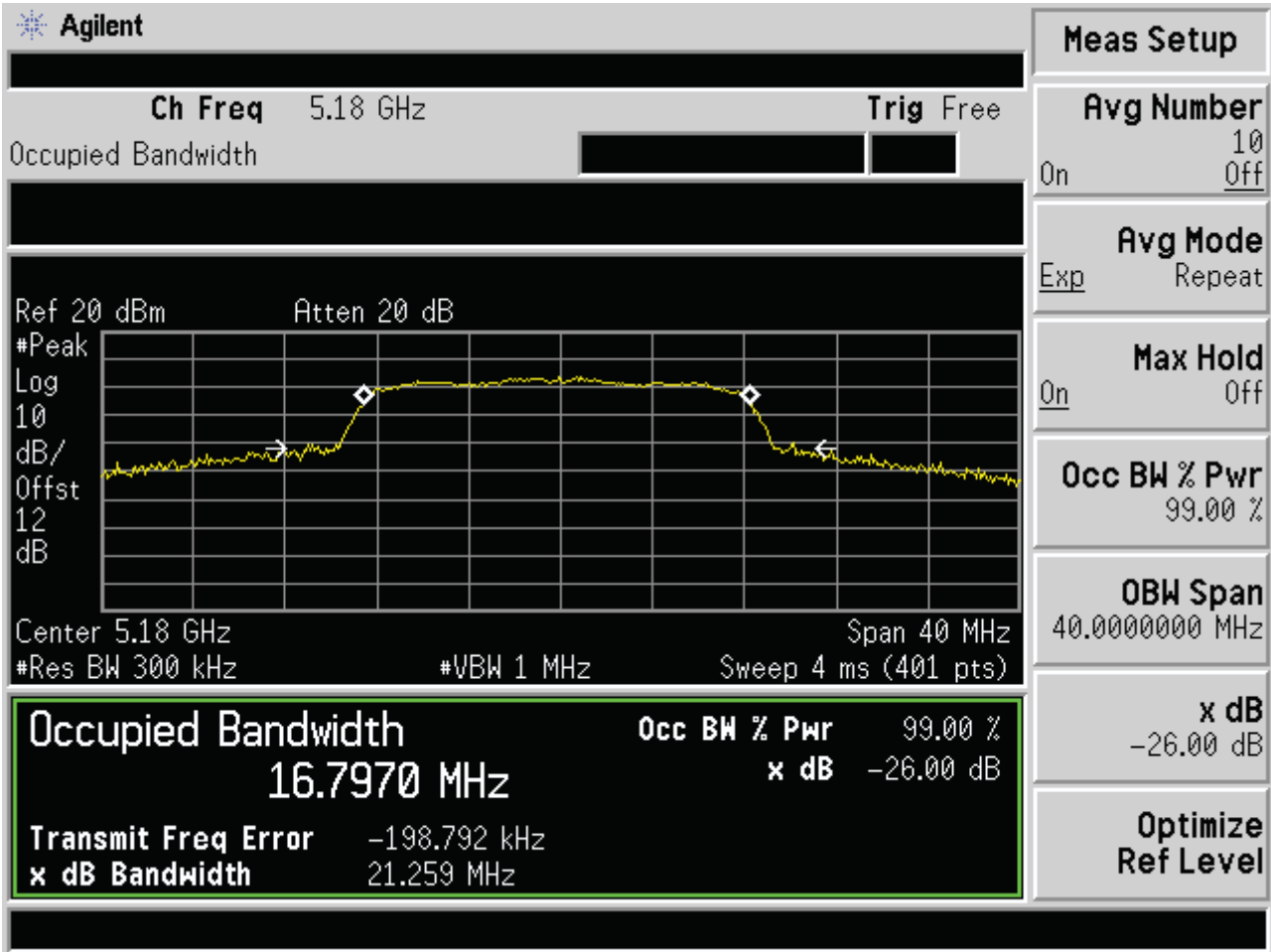
EUT		MID		Model	TD9300D
Mode		802.11a		Input Voltage	120V~
Temperature		24 deg. C,		Humidity	56% RH
Channel	Channel Frequency (MHz)	Data Transfer Rate (Mbps)	26 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass/ Fail
36	5180	6	21.259	--	Pass
40	5200	6	23.128	--	Pass
48	5240	6	22.438	--	Pass
149	5745	6	19.214	--	Pass
153	5765	6	19.555	--	Pass
161	5805	6	19.085	--	Pass

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Test Figure:

Channel 36

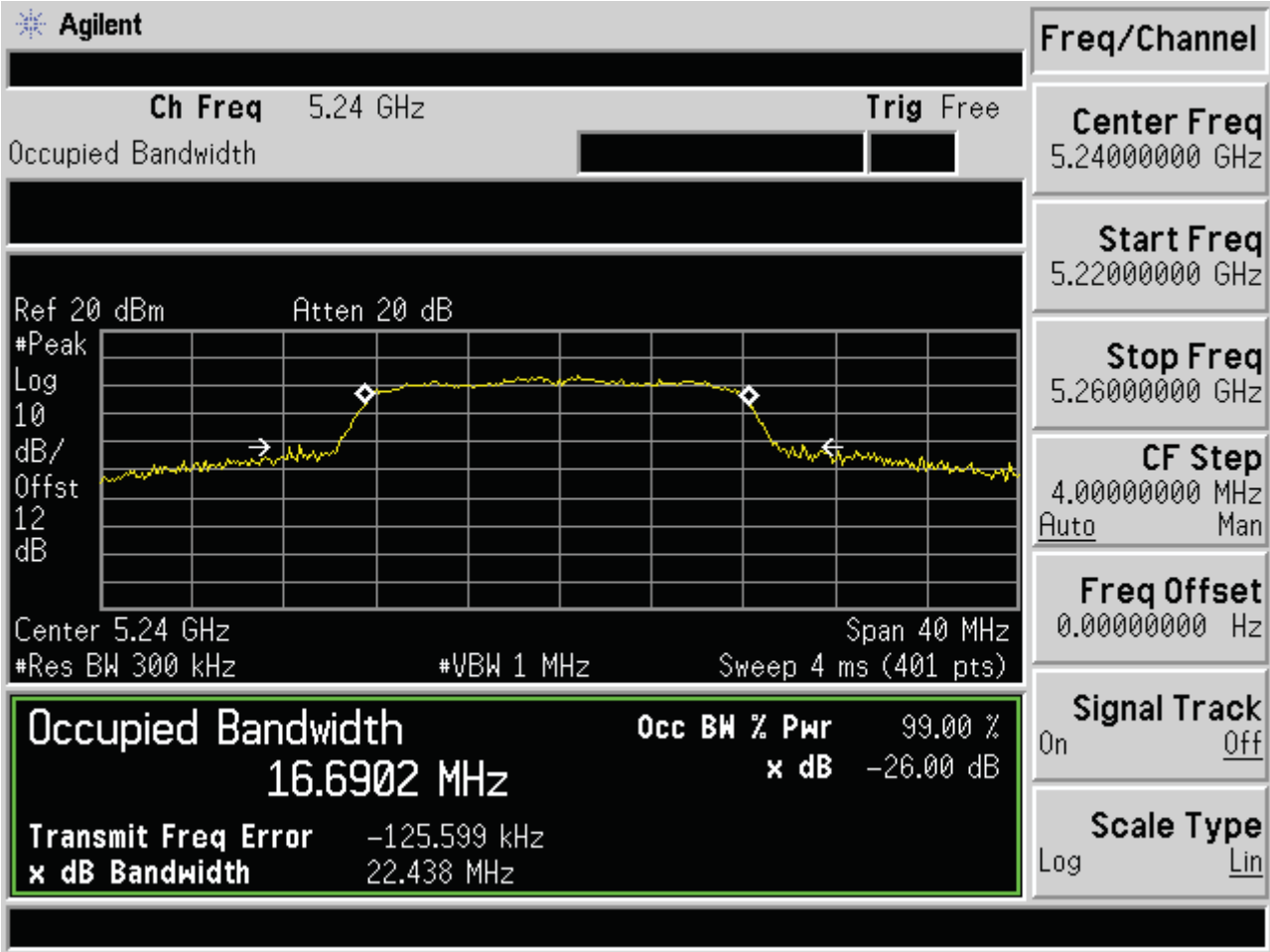


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Channel 48

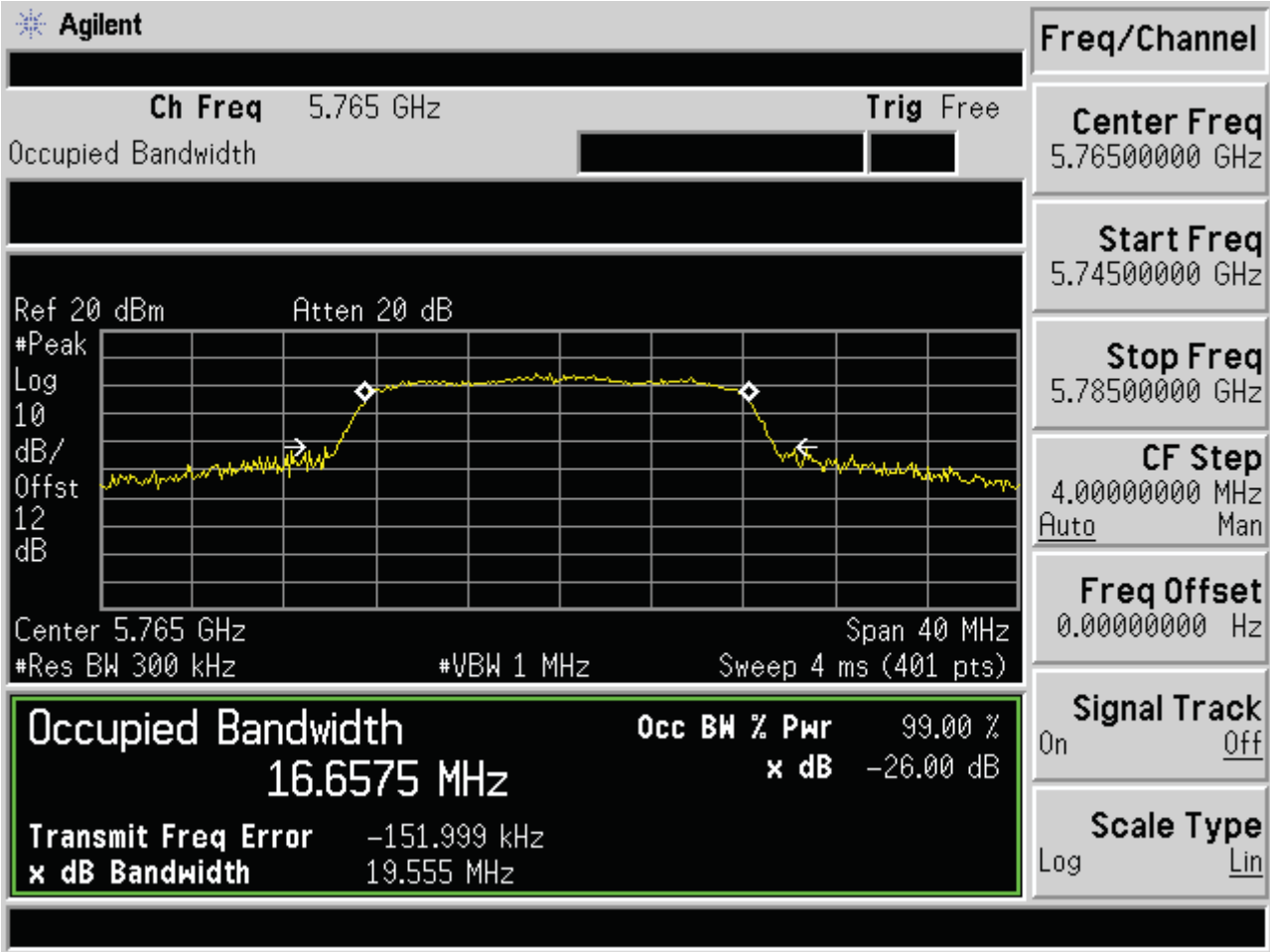


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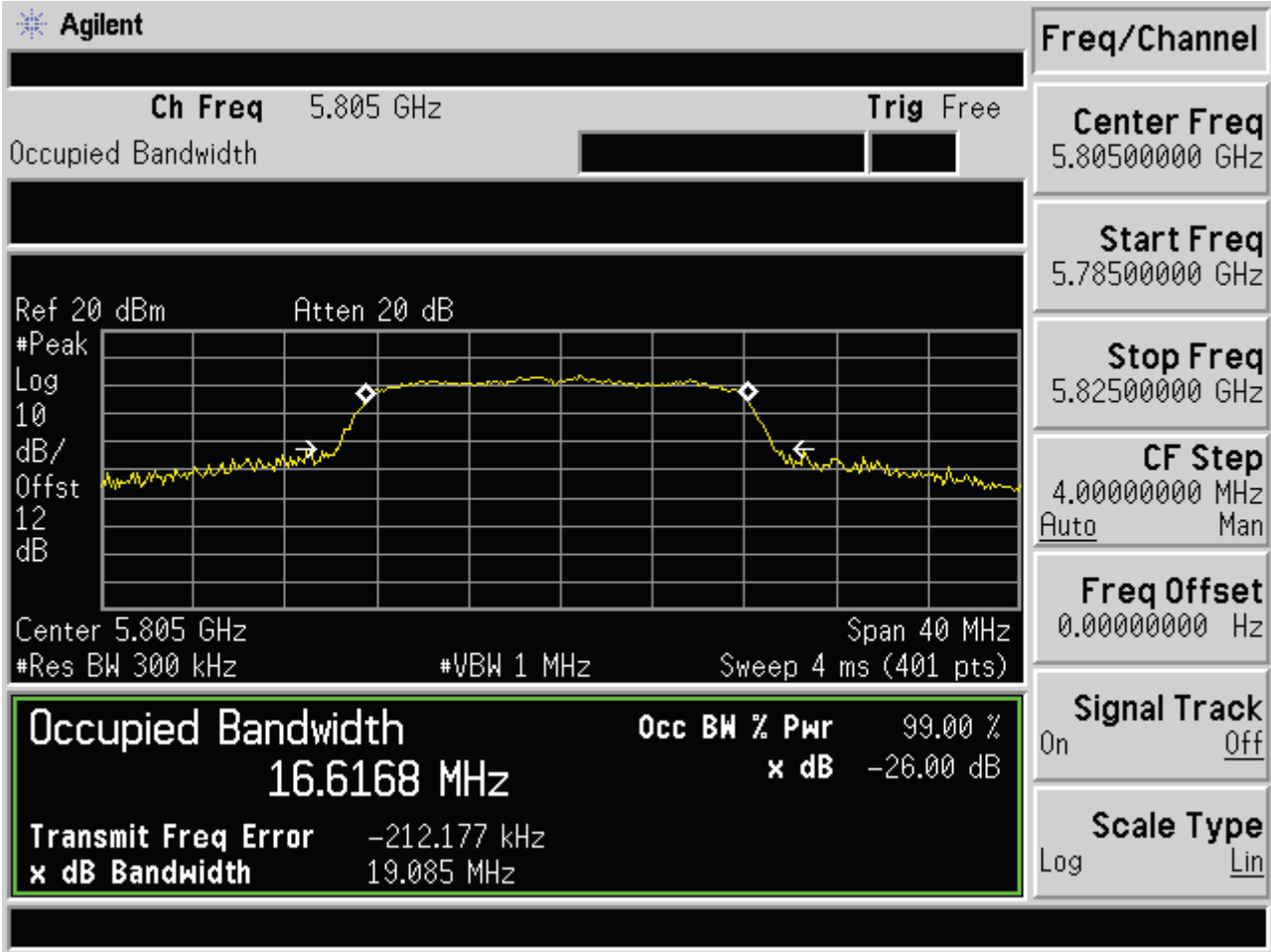
Channel 153



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Channel 161

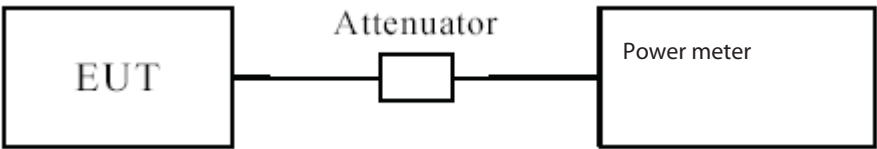


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8.0 MAX Transmit Power Measurement

8.1 Test Setup



8.2 Limits of MAX Transmit Power Measurement

Frequency Band	Limit
5.15 – 5.25GHz	The lesser of 50mW (17dBm) or 4dBm + 10logB
5.25 – 5.35GHz and 5.470-5.725GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB
5.725 – 5.825GHz	The lesser of 1W (30dBm) or 17dBm + 10logB

Note: Where B is the 26dB emission bandwidth in MHz.

8.3 Test Procedure

The RF power output was measured with a Power meter connected to the RF Antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate centre frequency.

Note: the average power was measured

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8.4 Test Results

EUT	U Stick (Mini PC)	Model	WA-U420D, WA-U220D	
Mode	802.11a	Input Voltage	120V~	
Temperature	24 deg. C,	Humidity	56% RH	
Channel	Frequency (MHz)	Total Power (dBm)	Limit (dBm)	Pass/ Fail
36	5180	14.92	17	Pass
40	5200	16.12	17	Pass
48	5240	15.32	17	Pass
149	5745	15.95	30	Pass
153	5765	15.35	30	Pass
161	5805	14.90	30	Pass

Note: 1. At final test to get the worst-case emission at 6Mbps for CH36, CH40, CH48, CH149, CH153 and CH161

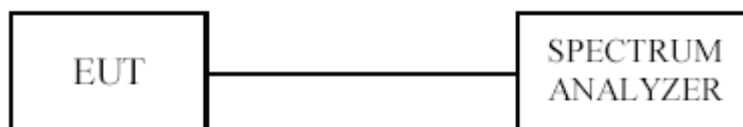
2. The result basic equation calculation as follow:

$$\text{Average Power Output} = \text{Power Reading} + \text{Cable loss} + \text{Attenuator}$$

3. The worse case was recorded

9. Power Power Spectral Density Measurement

9.1 Test Setup



9.2 Limits of Power Spectral Density Measurement

Frequency Band	Limit
5.15 – 5.25GHz	4dBm
5.25 – 5.35GHz and 5.470-5.725GHz	11dBm
5.725 – 5.825GHz	17dBm

9.3 Test Procedure

1. The EUT was directly connected to the spectrum analyzer
2. Set the RBW = 1MHz.
3. Set the VBW = 3MHz.
4. Set the span to encompass the entire emissions bandwidth (EBW) of the signal
5. Detector = RMS
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.

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9.4 Test Result

EUT	MID	Model	WA-U420D, WA-U220D		
Mode	802.11a 6Mbps	Input Voltage	120V~		
Temperature	24 deg. C,	Humidity	56% RH		
Channel	Frequency (MHz)	Final Power Spectral Density (dBm)	Limit (dBm)	Pass/ Fail	
36	5180	1.090	4	Pass	
40	5200	3.788	4	Pass	
48	5240	3.781	4	Pass	
149	5745	4.763	17	Pass	
153	5765	1.534	17	Pass	
161	5805	1.386	17	Pass	

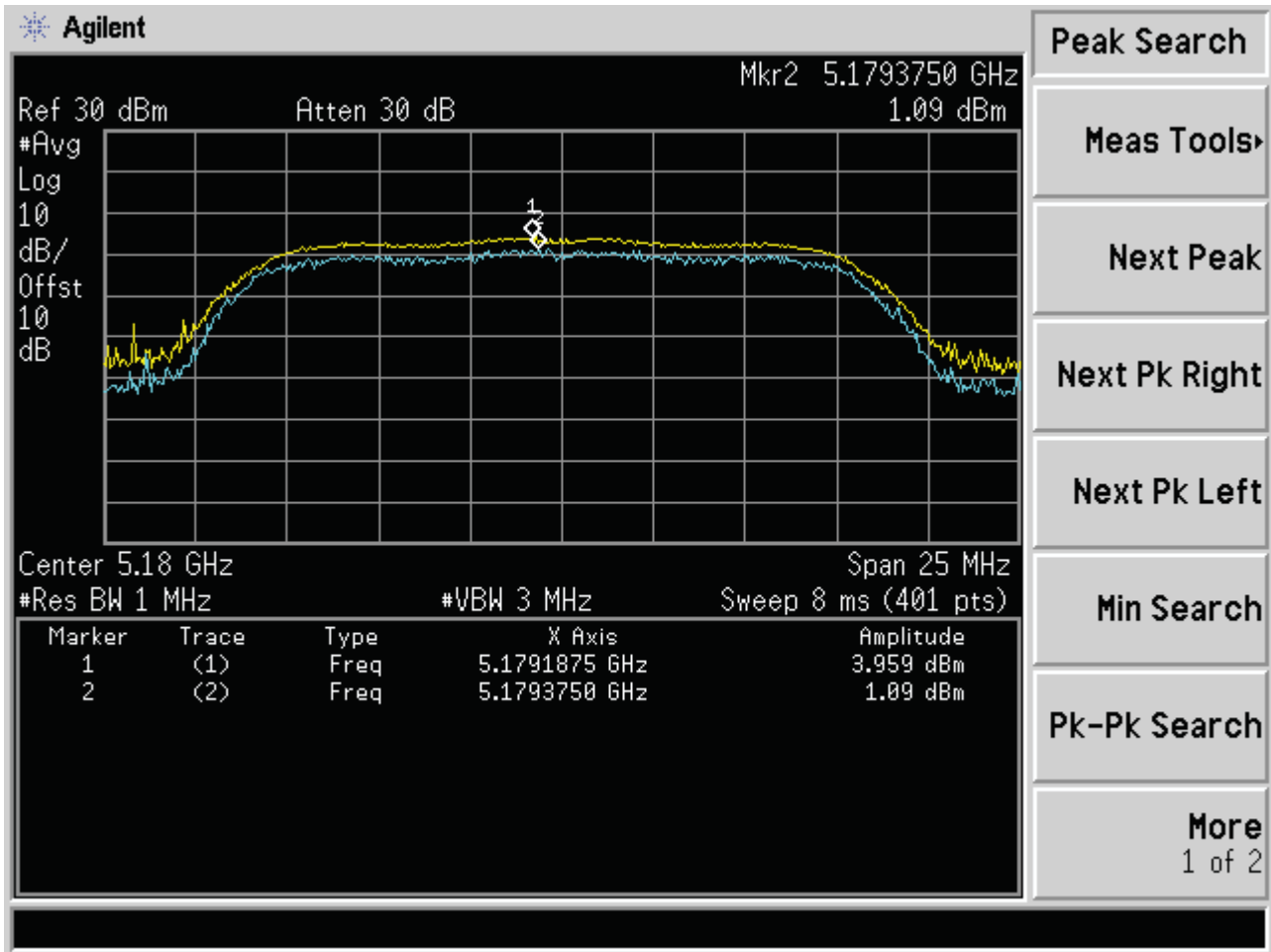
Note: 1. Test method According to KDB669211 E) 2) c)

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9.5 Photo of Power Spectral Density Measurement

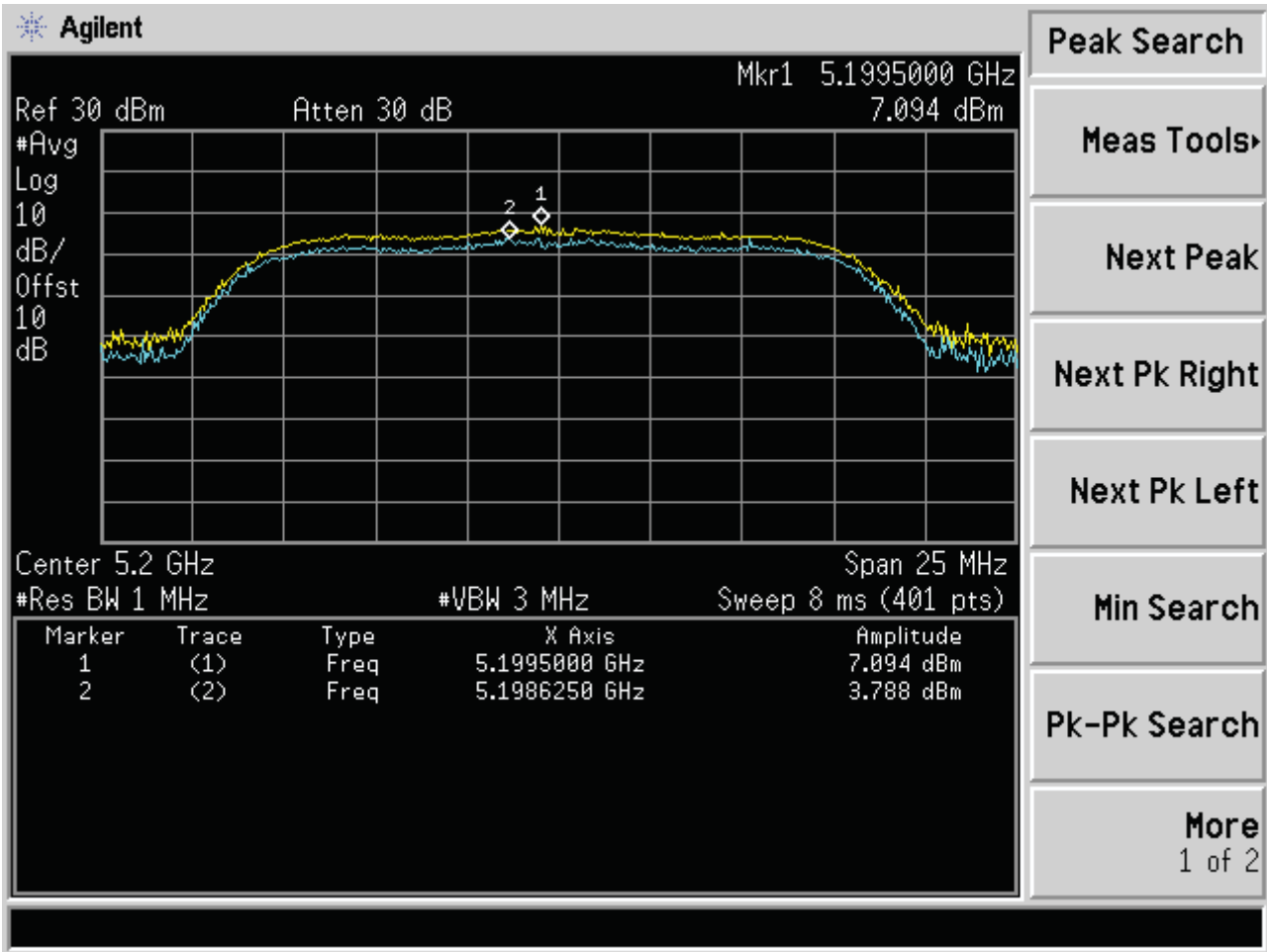
1.802.11a at 6Mbps of CH36



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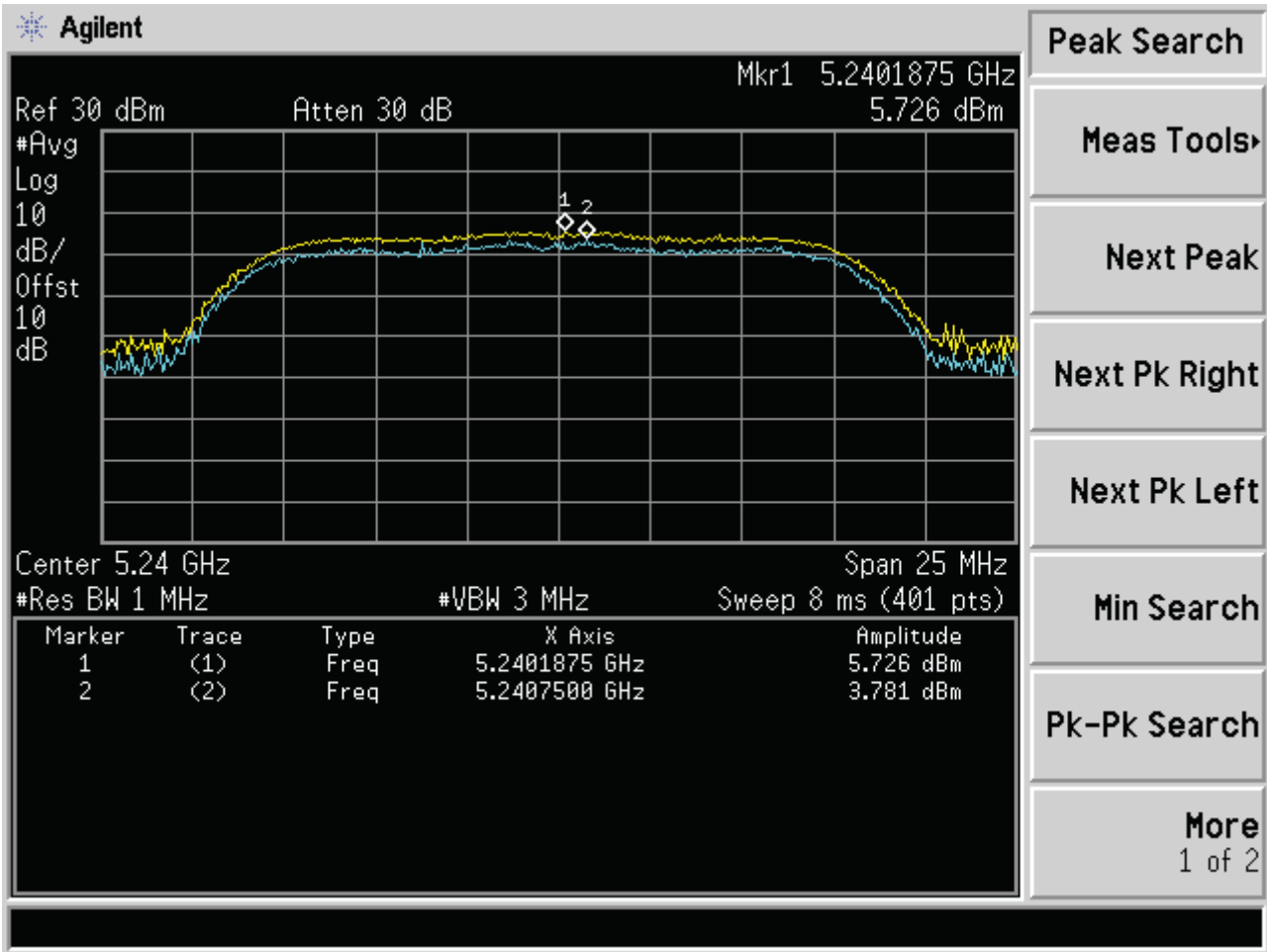
2.802.11a at 6Mbps of CH40



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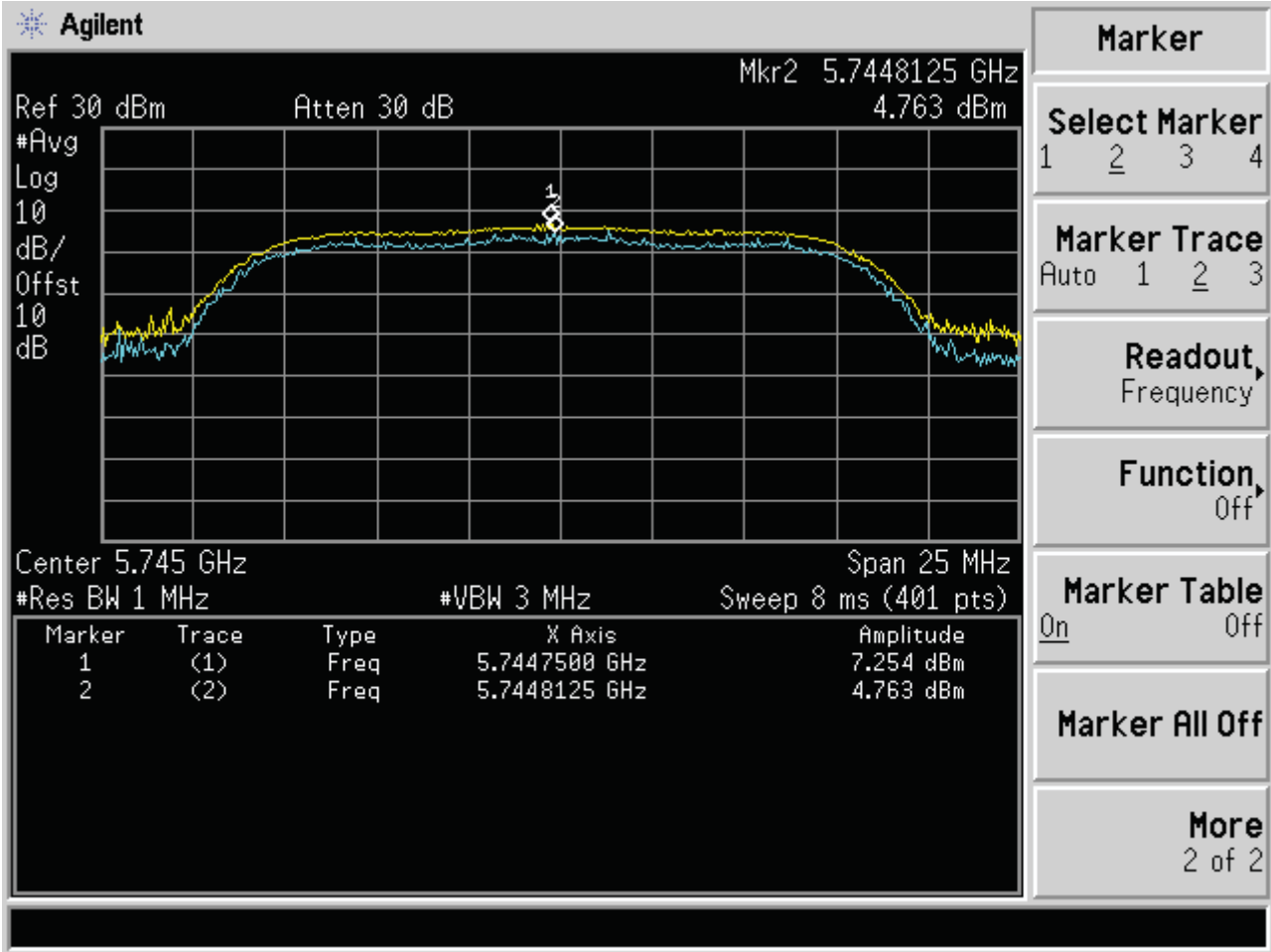
3.802.11a at 6Mbps of CH48



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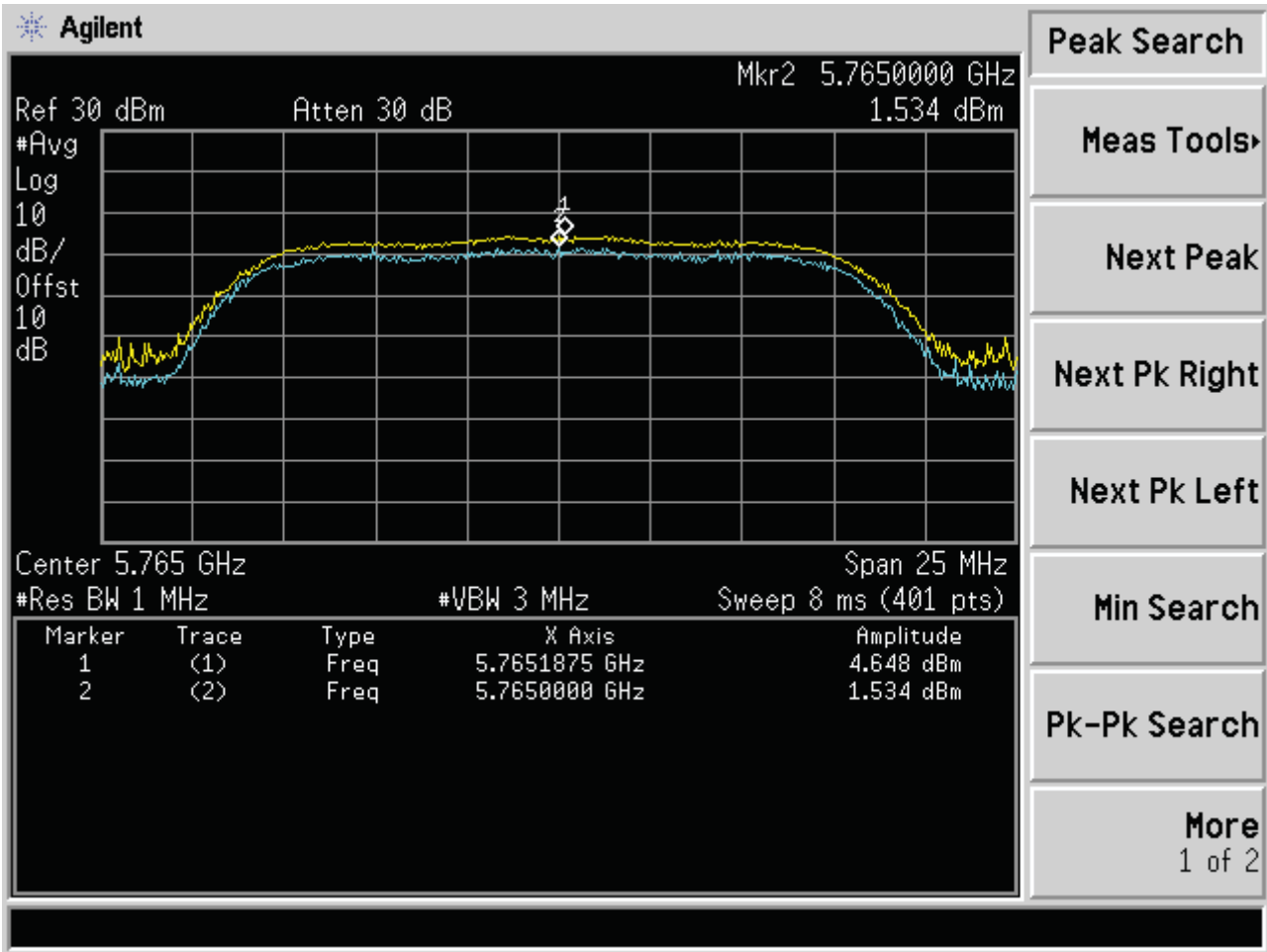
4.802.11a at 6Mbps of CH149



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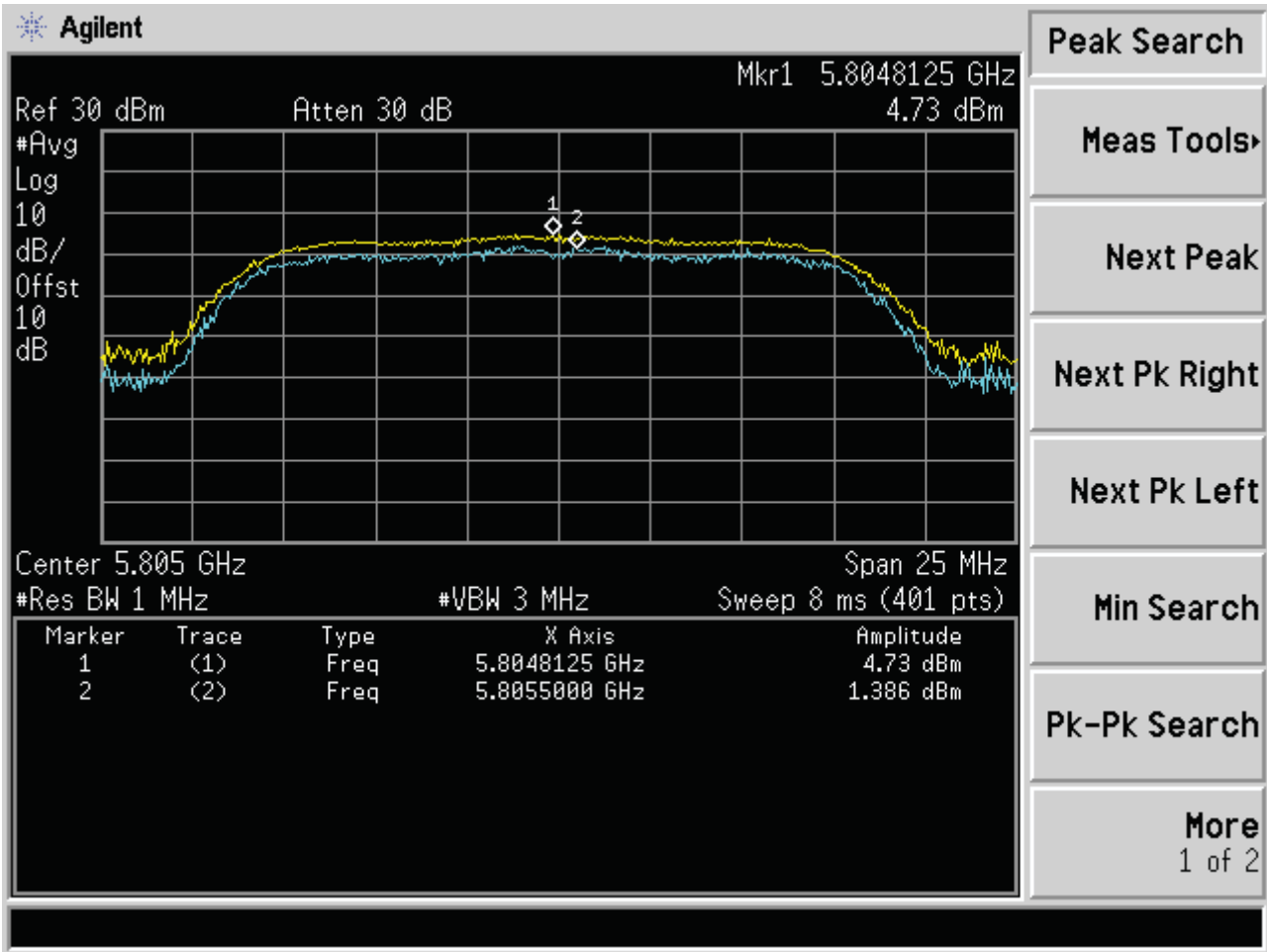
5.802.11a at 6Mbps of CH153



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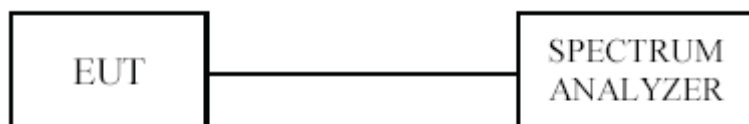
6.802.11a at 6Mbps of CH161



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10. Peak Excursion Measurement

10.2 Test Setup



10.2 Limits of Peak Power Excursion Measurement

Frequency Band	Limit
5.15 – 5.25GHz	13
5.25 – 5.35GHz and 5.470-5.725GHz	13
5.725 – 5.825GHz	13

10.3 Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna
2. Set the RBW = 1MHz (Peak and Average Trace)
3. Set the VBW = 3MHz (Peak and Average Trace)
4. Set the span to encompass the entire emissions bandwidth (EBW) of the signal
5. Detector = Peak (Peak Trace) / RMS (Average Trace)
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.

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10.4 Test Result

EUT	MID	Model	TD9300D		
Mode	802.11b 11Mbps	Input Voltage	120V~		
Temperature	24 deg. C,	Humidity	56% RH		
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Pass/ Fail	
36	5180	2.869	13	Pass	
40	5200	3.306	13	Pass	
48	5240	1.954	13	Pass	
149	5745	2.491	13	Pass	
153	5765	3.114	13	Pass	
161	5805	3.344	13	Pass	

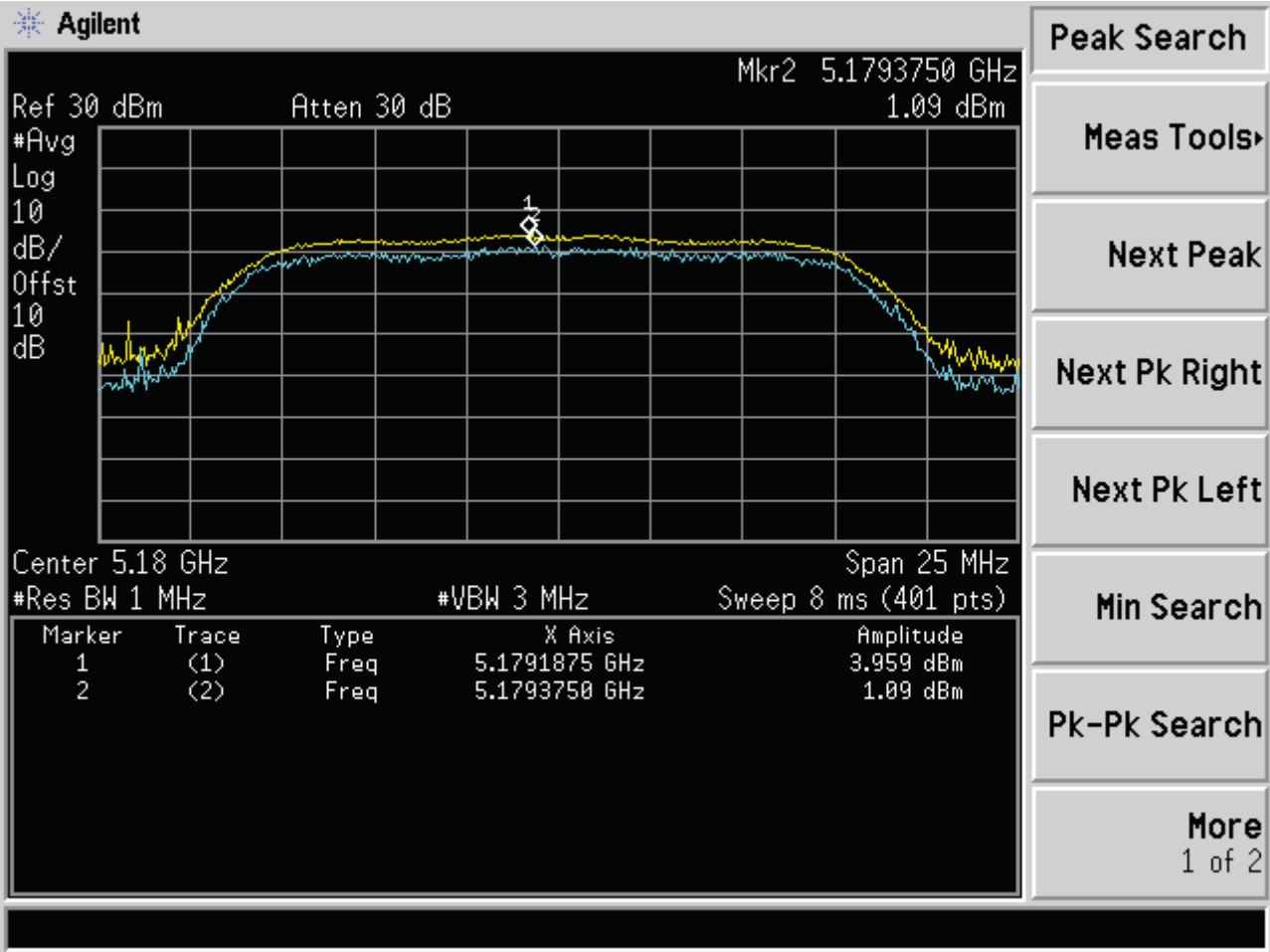
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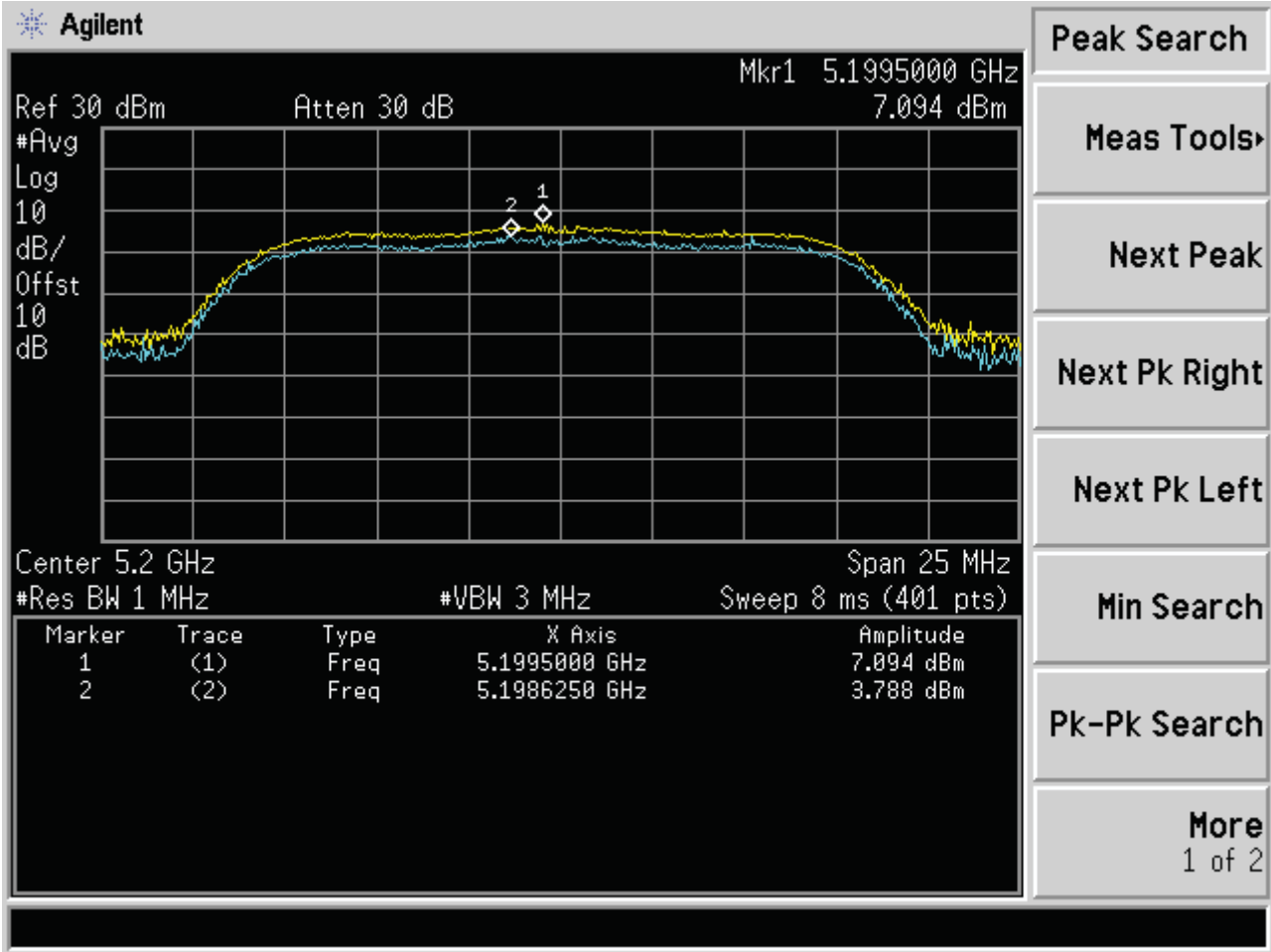
10.5 Photo of Peak Level
1.802.11a at 6Mbps of CH36



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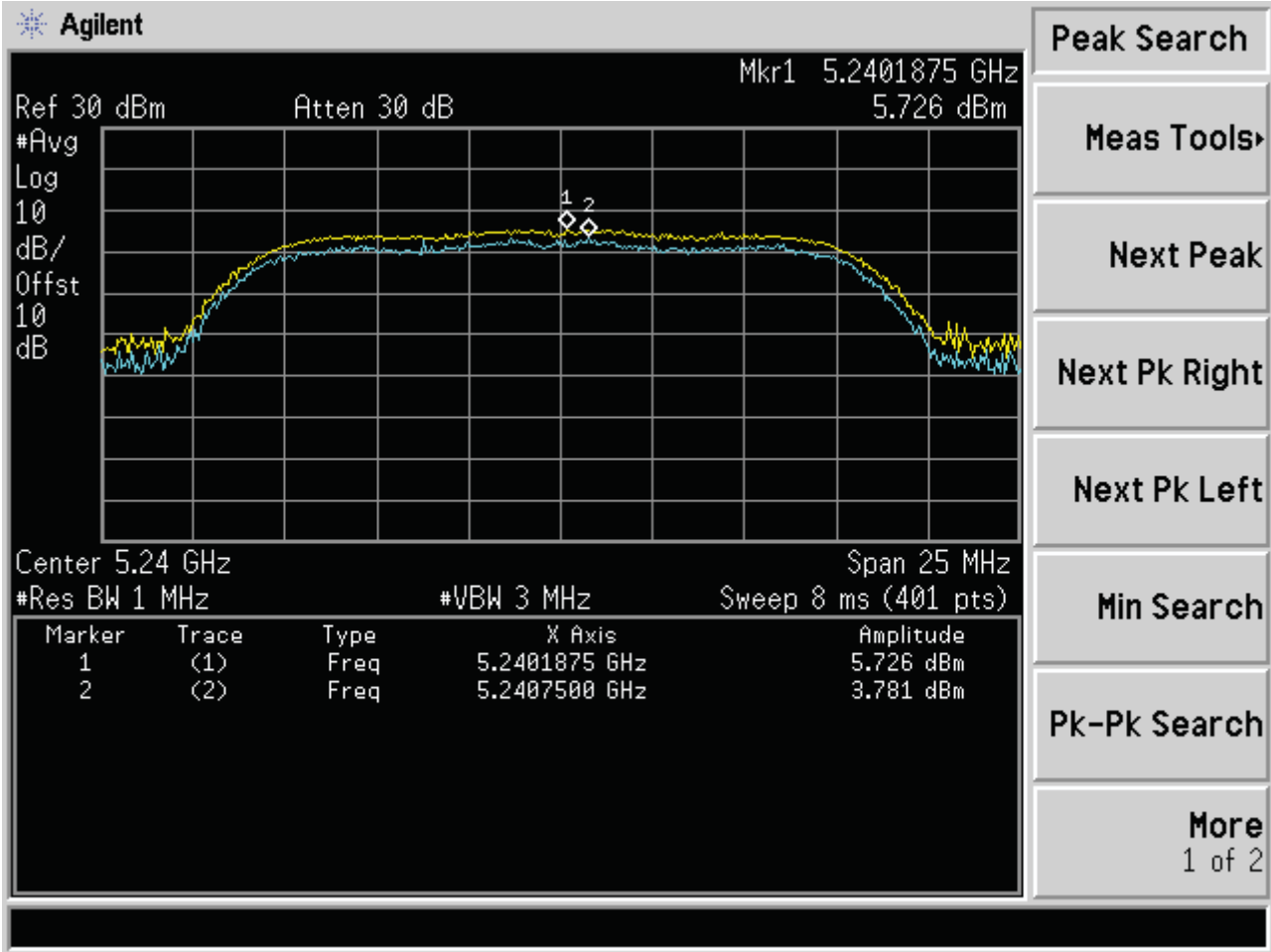
2.802.11a at 6Mbps of CH40



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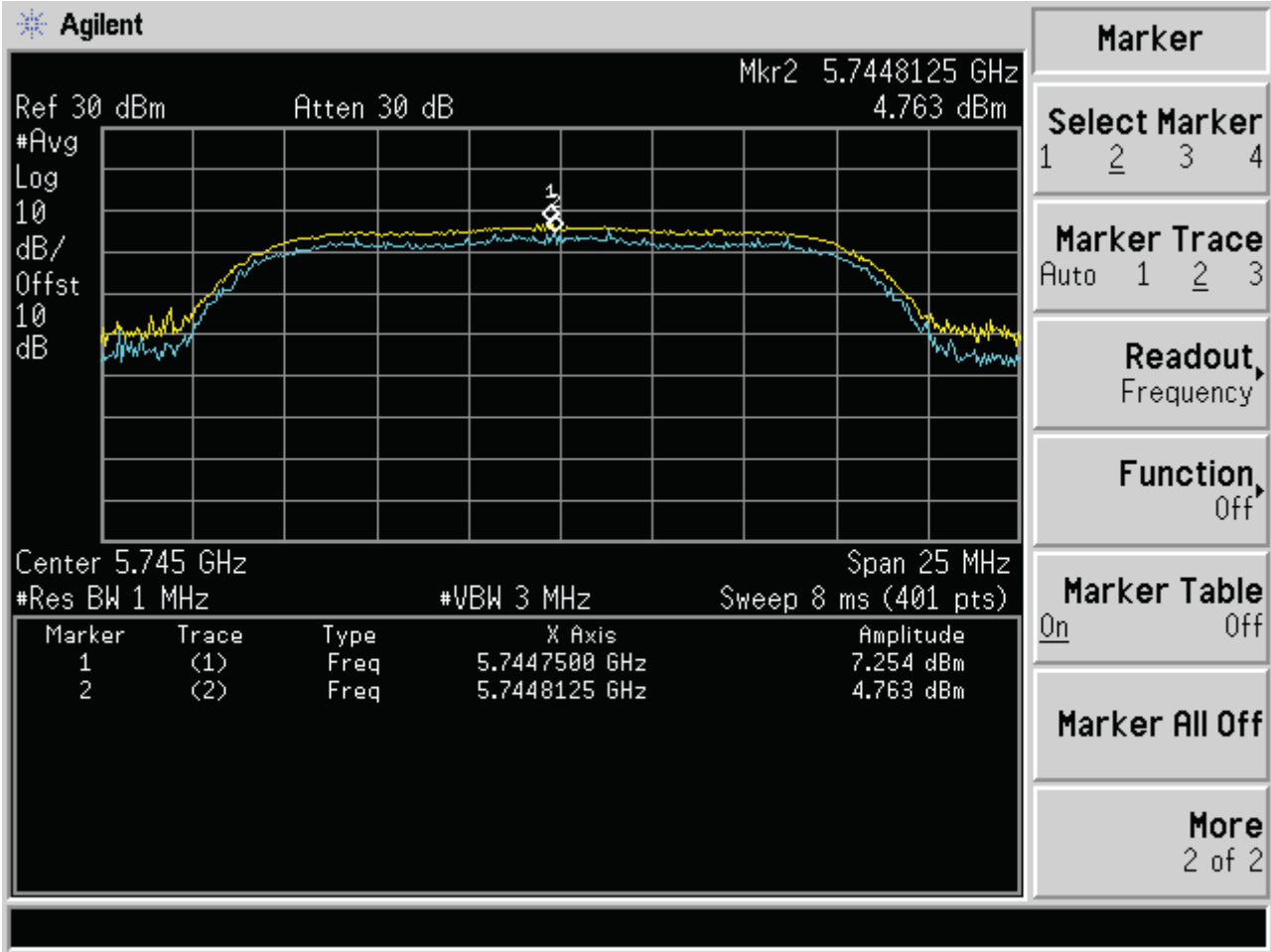
3.802.11a at 6Mbps of CH48



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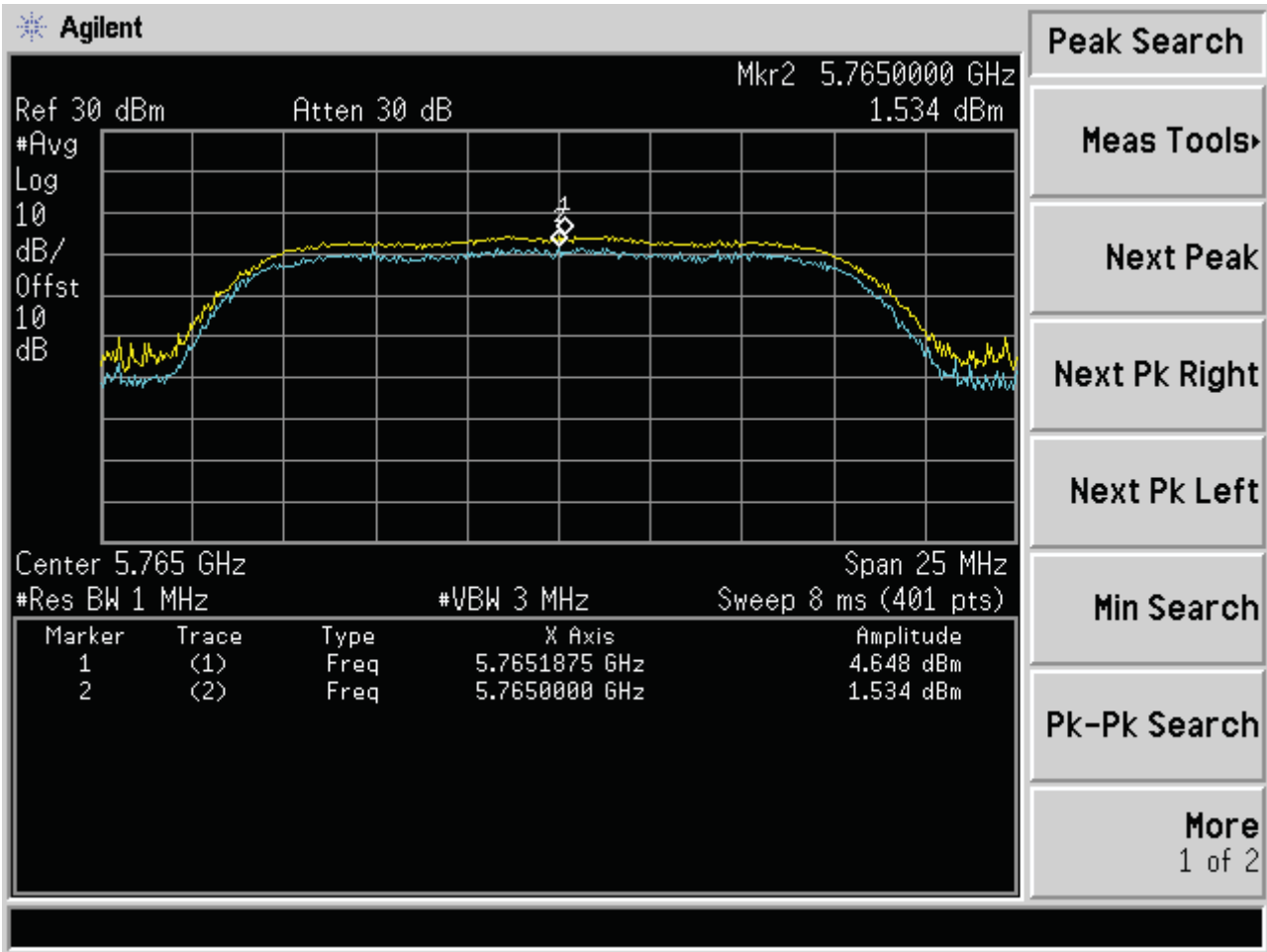
4.802.11a at 6Mbps of CH149



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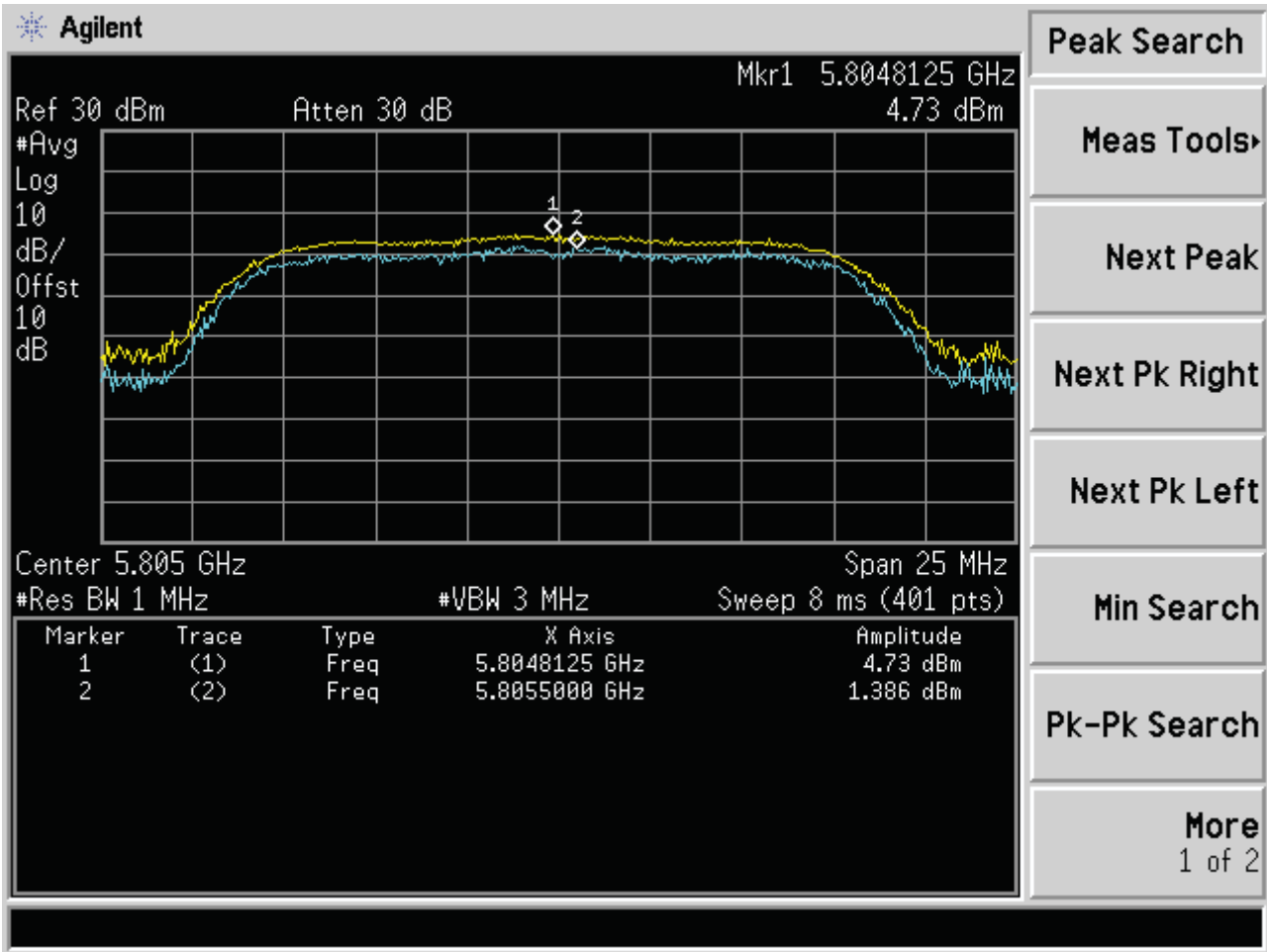
5.802.11a at 6Mbps of CH153



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6.802.11a at 6Mbps of CH161



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11.0 Frequency Stability

11.1 Limits of Frequency Stability Measurement

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.02\%$ of the operating frequency over a temperature variation of -30 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees

11.2 Test Procedure

1. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. The test chamber was allowed to stabilize at $+20$ degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

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11.3 Test Result

Channel 36 (5180MHz)

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)
138V	5179.9729
120V	5179.9792
102V	5179.9805
Max. Deviation (MHz)	0.0271
Max. Deviation (ppm)	5.2

Rated working voltage: DC120V

Temperature vs. Frequency Stability

Temperature (°C)	Measurement Frequency (MHz)
-30	5179.9762
-20	5179.9770
-10	5179.9833
0	5179.9827
10	5179.9739
20	5179.9812
30	5179.9766
40	5179.9802
50	5179.9813
Max. Deviation (MHz)	0.0261
Max. Deviation (ppm)	5.0

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Channel 40 (5200MHz)

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)
138V	5199.9629
120V	5199.9712
102V	5199.9775
Max. Deviation (MHz)	0.0371
Max. Deviation (ppm)	7.1

Rated working voltage: DC120V

Temperature vs. Frequency Stability

Temperature (°C)	Measurement Frequency (MHz)
-30	5199.9682
-20	5199.9655
-10	5199.9709
0	5199.9728
10	5199.9815
20	5199.9752
30	5199.9738
40	5199.9690
50	5199.9718
Max. Deviation (MHz)	0.0345
Max. Deviation (ppm)	6.6

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Channel 48 (5240MHz)

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)
138V	5239.9772
120V	5239.9825
102V	5239.9811
Max. Deviation (MHz)	0.0168
Max. Deviation (ppm)	4.4

Rated working voltage: DC120V

Temperature vs. Frequency Stability

Temperature (°C)	Measurement Frequency (MHz)
-30	5239.9726
-20	5239.9758
-10	5329.9793
0	5239.9803
10	5239.9779
20	5239.9722
30	5239.9804
40	5239.9769
50	5239.9757
Max. Deviation (MHz)	0.0274
Max. Deviation (ppm)	5.2

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Channel 149 (5745MHz)

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)
138V	5744.9736
120V	5744.9791
102V	5744.9723
Max. Deviation (MHz)	0.0277
Max. Deviation (ppm)	4.8

Rated working voltage: DC120V

Temperature vs. Frequency Stability

Temperature (°C)	Measurement Frequency (MHz)
-30	5744.9722
-20	5744.9763
-10	5744.9755
0	5744.9790
10	5744.9788
20	5744.9758
30	5744.9802
40	5744.9733
50	5744.9762
Max. Deviation (MHz)	0.0278
Max. Deviation (ppm)	4.8

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Channel 153 (5765MHz)

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)
138V	5764.9803
120V	5764.9792
102V	5764.9785
Max. Deviation (MHz)	0.0215
Max. Deviation (ppm)	3.7

Rated working voltage: DC120V

Temperature vs. Frequency Stability

Temperature (°C)	Measurement Frequency (MHz)
-30	5764.9724
-20	5764.9687
-10	5764.9726
0	5764.9815
10	5764.9728
20	5764.9783
30	5764.9764
40	5764.9789
50	5764.9808
Max. Deviation (MHz)	0.0313
Max. Deviation (ppm)	5.4

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Channel 161 (5805MHz)

Voltage vs. Frequency Stability

Voltage	Measurement Frequency (MHz)
138V	5804.9778
120V	5804.9808
102V	5804.9823
Max. Deviation (MHz)	0.0222
Max. Deviation (ppm)	3.8

Rated working voltage: DC120V

Temperature vs. Frequency Stability

Temperature (°C)	Measurement Frequency (MHz)
-30	5804.9719
-20	5804.9725
-10	5804.9738
0	5804.9811
10	5804.9828
20	5804.9830
30	5804.9787
40	5804.9812
50	5804.9773
Max. Deviation (MHz)	0.0281
Max. Deviation (ppm)	4.8

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12.0 Antenna Requirement

12.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitter antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

12.2 Antenna Connected construction

Integral antennas used. The maximum Gain of each antenna is 2.5 dBi for 5G band.

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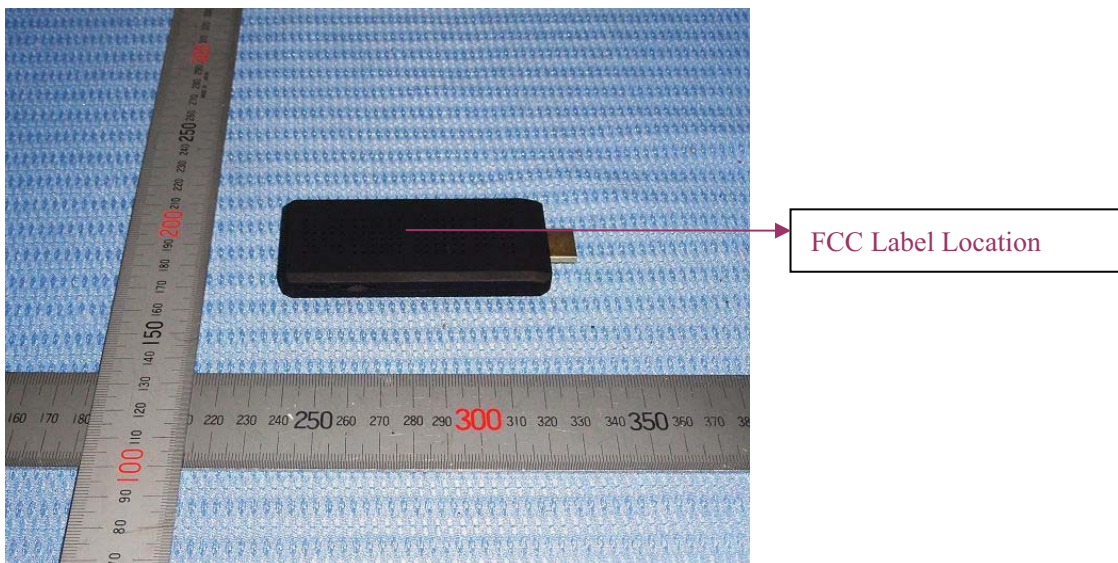
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13.0 FCC Label

FCC ID: 2ACDD-0508

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Mark Location:



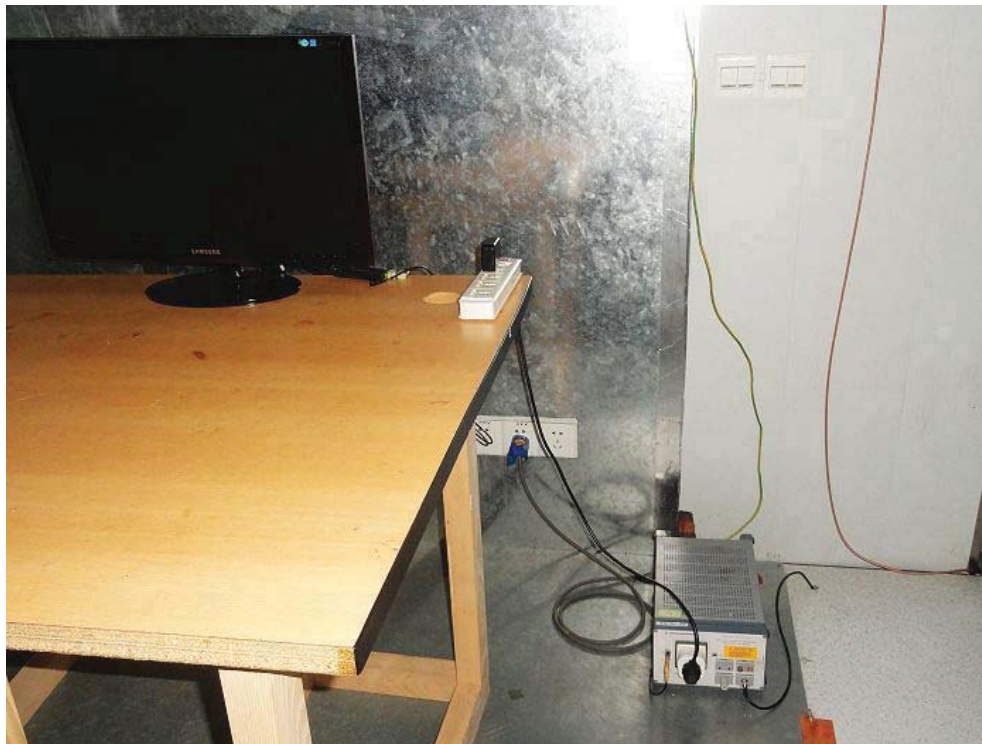
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14.0 Photo of testing

Conducted Emission Test Setup:



Radiated Emission Test Setup:

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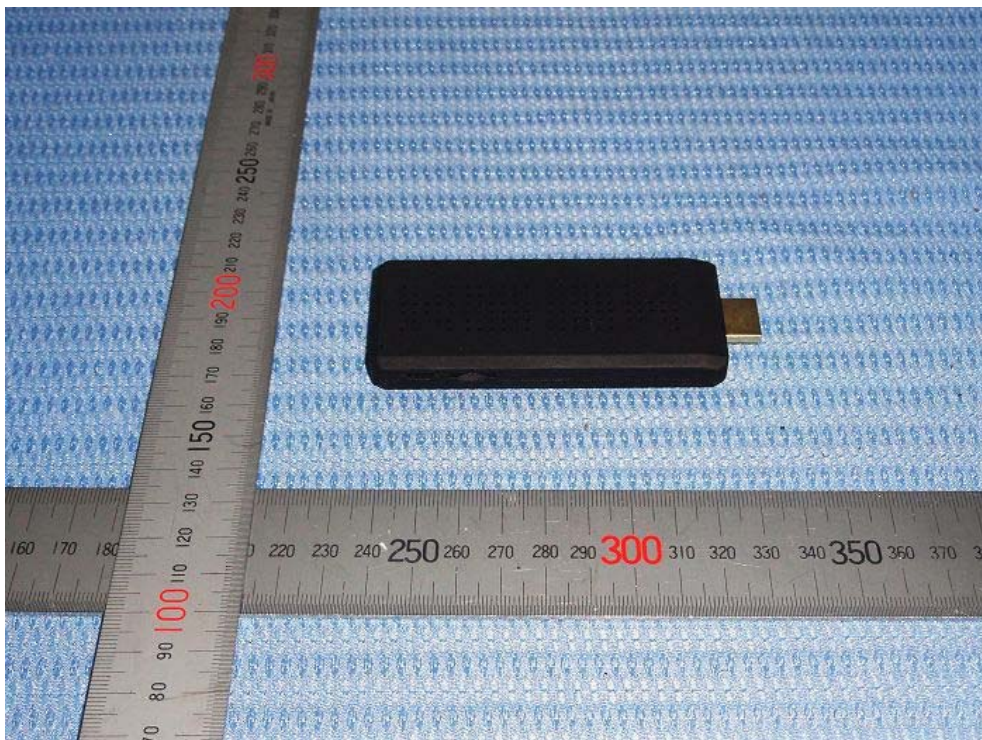
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Photographs – EUT

Outside view

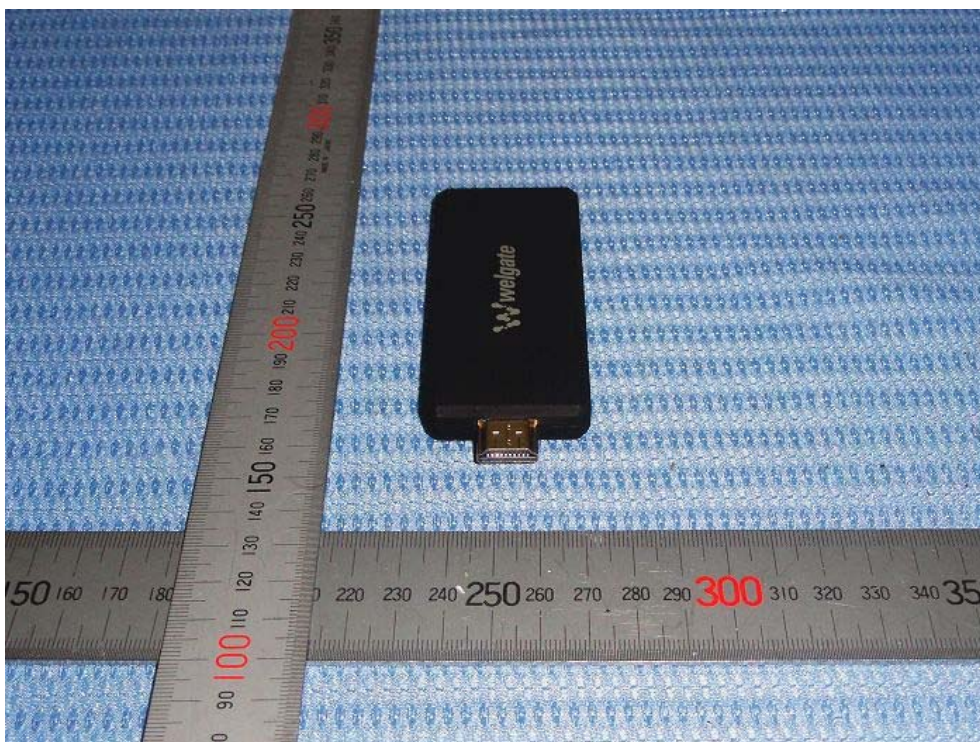


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Outside view



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Outside view



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Inside view

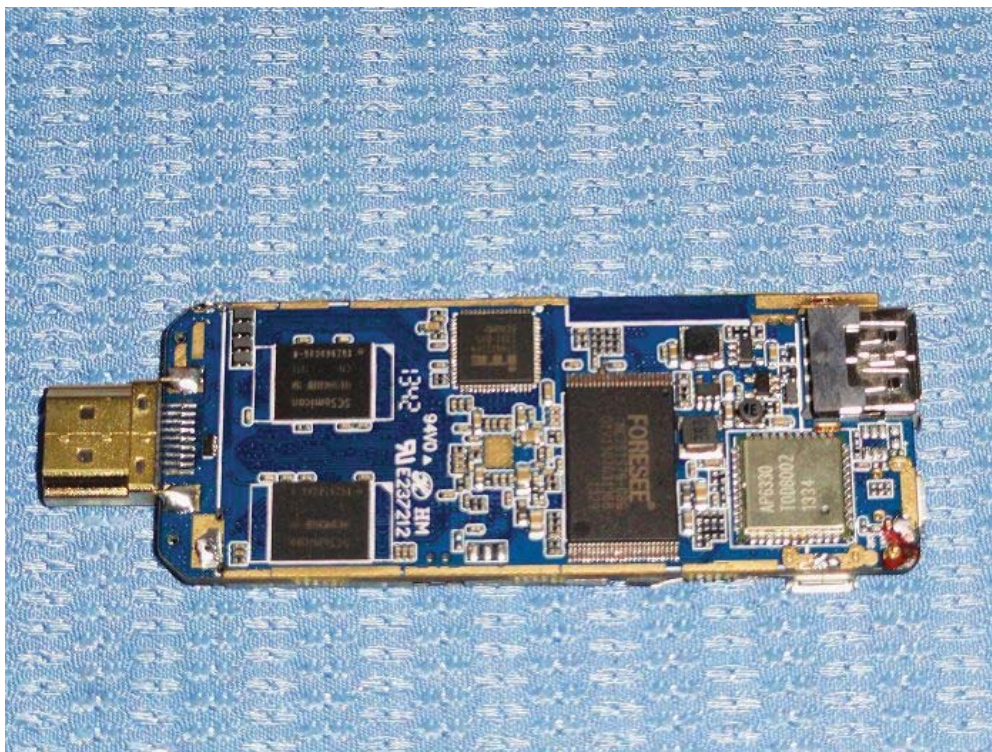


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Inside view

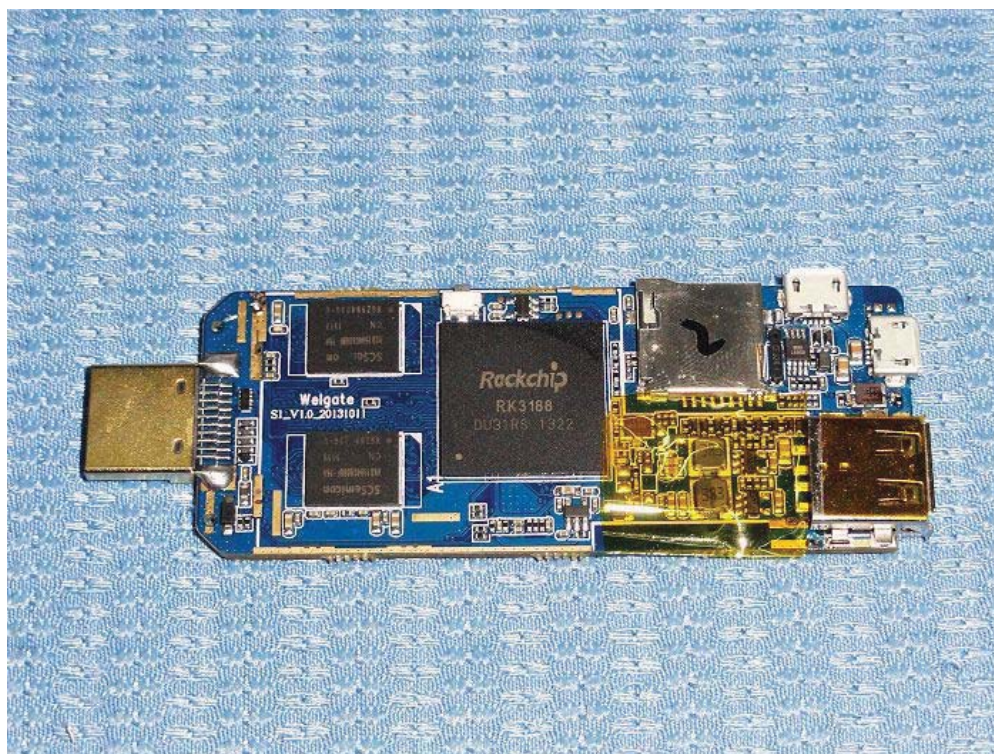
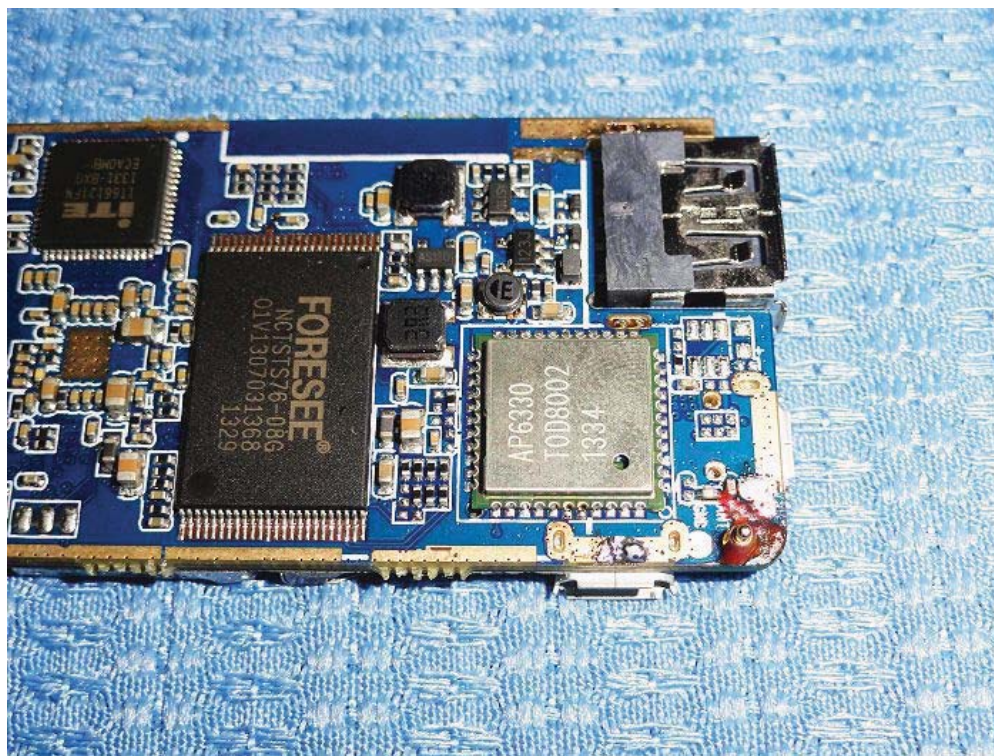


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Inside view



End of the report

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