



ISO/IEC17025 Accredited Lab.

Report No:

FCC 1406191

File reference No:

2014-06-24

Applicant:

KanKunIT Technology Co., Ltd.

Product:

WiFi Smart Plug

Model No:

KK-SP3

Trademark:

N/A

Test Standards:

FCC Part 15.247

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 15.247 regulations for the evaluation of electromagnetic compatibility

Approved By

Jack Chung

Jack Chung

Manager

Dated:

June 24, 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**

5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian District, Shenzhen,CHINA.

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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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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: KanKunIT Technology Co., Ltd.
Address: No.7, Cuibai Road, Electronic Commerce Industrial Zone, Hangzhou City, Zhejiang Province, P. R. China
Telephone: --
Fax: --

1.3 Description of EUT

Product: WiFi Smart Plug
Manufacturer: KanKunIT Technology Co., Ltd.
Address: 4F, Bldg 4, Jinghua Square, No.1 Huafa North Road, Futian District, Shenzhen, China
Brand Name: N/A
Model Number: KK-SP3
Additional Model Number: N/A
Type of Modulation IEEE 802.11b : DSSS (CCK, QPSK, DBPSK)
IEEE 802.11g/n (HT20) : OFDM(64QAM, 16QAM, QPSK, BPSK)
Frequency range IEEE 802.11b/g/n (HT20) : 2412-2462MHz;
Channel Spacing 5MHz for IEEE 802.11b/g/n(HT20)
Air Data Rate IEEE 802.11b : 11, 5.5, 2, 1 Mbps
IEEE 802.11g : 54, 48,36, 24, 18, 12, 9, 6 Mbps
IEEE 802.11n HT20 : 65, 58.5, 52, 39, 26, 19.5, 13, 6.5 Mbps
Frequency Selection By software
Channel Number IEEE 802.11b/g/n (HT20) : 11 Channels
Antenna: Integral Antenna with maximum gain 0.5dBi
Rating: Input: 100 ~240V~, 50/60Hz ,10A

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1.4 Submitted Sample: 2 Samples

1.5 Test Duration
2014-04-29 to 2014-06-03

1.6 Test Uncertainty
Conducted Emissions Uncertainty =3.6dB
Radiated Emissions Uncertainty =4.7dB

1.7 Test Engineer *Terry Tang*
The sample tested by _____

Print Name: Terry Tang



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	2013-08-21	2014-08-20
LISN	AFJ	LS16C	10010947251	2013-08-21	2014-08-20
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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3. DESCRIPTION OF TEST MODES

IEEE 802.11b, 802.11g, 802.11n (HT20) mode

The EUT had been tested under operating condition. There are three channels have been tested as following:

Channel	Frequency (MHz)
Low	2412
Middle	2437
High	2462

IEEE 802.11b mode: 1Mbps data rate (worst case) was chosen for full testing. IEEE 802.11g mode: 6Mbps data rate (worst case) was chosen for full testing. IEEE 802.11n (HT20) mode: 6.5Mbps data rate (worst case) were chosen for full testing

The worst-case data rates are determined according to the description above, based on the investigations by measuring the PSD and average power across all the data rates, bandwidths, modulations and spatial stream modes.



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 & 15.207	Conducted Emission Test	PASS	Complies
FCC Part 15 Subpart C Paragraph 15.247(a)(2) Limit	Spectrum bandwidth of a Orthogonal Frequency Division Multiplex System Limit: 6dB bandwidth>500kHz	PASS	Complies
FCC Part 15, Paragraph 15.247(b)	Maximum peak output power Limit: max. 30dBm	PASS	Complies
FCC Part 15, Paragraph 15.109,15.205 & 15.209	Transmitter Radiated Emission Limit: Table 15.209	PASS	Complies
FCC Part 15, Paragraph 15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Complies
FCC Part 15, Paragraph 15.247(d)	Out of Band Emission and Restricted Band Radiation Limit: 20dB less than peak value of fundamental frequency Restricted band limit: Table 15.209	PASS	Complies

3.2 Test Standards

FCC Part 15 Subpart & Subpart C, Paragraph 15.247

4.0 EUT Modification

No modification by Shenzhen Timeway Technology Consulting Co., Ltd

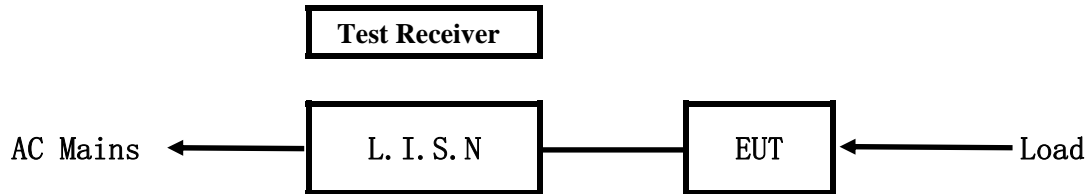
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5. Power Line Conducted Emission Test

5.1 Schematics of the test



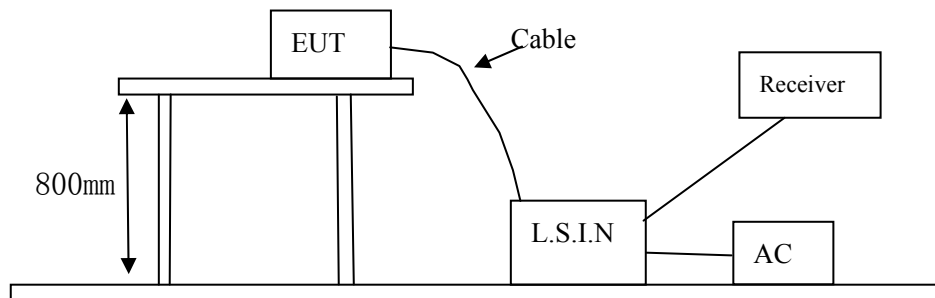
EUT: Equipment Under Test

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 ID
WiFi Smart Plug	KanKunIT Technology Co., Ltd.	KK-SP3	FCC ID: 2ACJ2KK-SP3

B. Internal Device

Device	Manufacturer	Model	FCC ID/DOC
N/A			

C. Peripherals

Device	Manufacturer	Model	FCC ID/DOC	Cable
--	--	--	--	--

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5.4 EUT Operating Condition

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

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

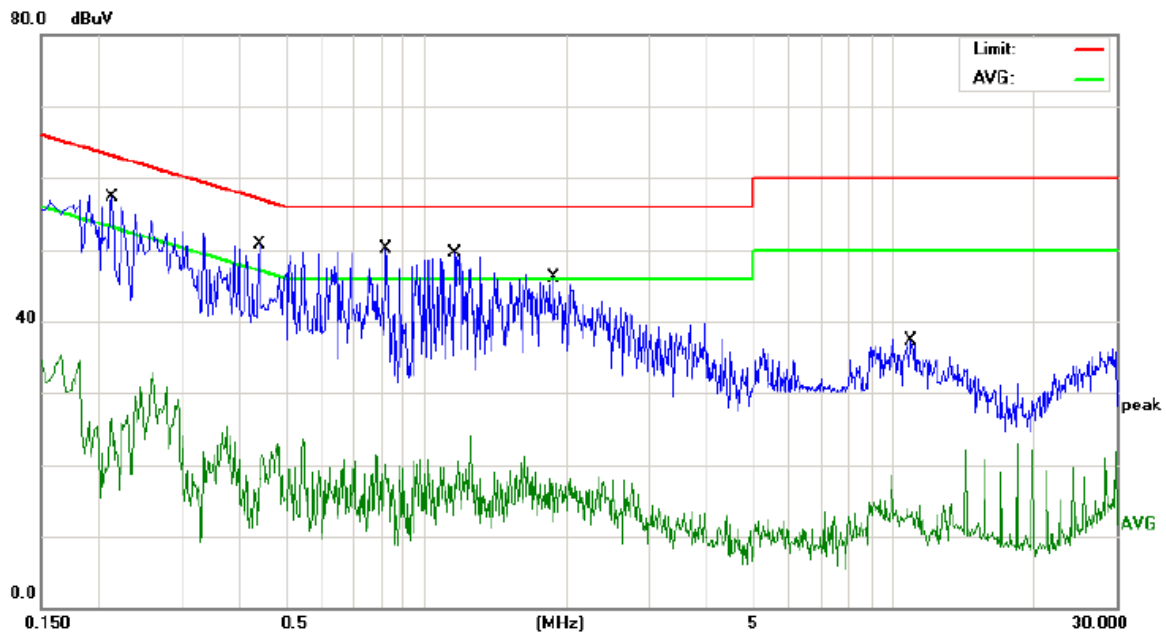
Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Keep 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	*	0.2127	47.03	10.34	57.37	63.10	-5.73	QP
2		0.2127	16.10	10.34	26.44	53.10	-26.66	AVG
3		0.4420	40.19	10.46	50.65	57.02	-6.37	QP
4		0.4420	10.25	10.46	20.71	47.02	-26.31	AVG
5		0.8220	39.47	10.60	50.07	56.00	-5.93	QP
6		0.8220	8.45	10.60	19.05	46.00	-26.95	AVG
7		1.1500	38.77	10.74	49.51	56.00	-6.49	QP
8		1.1700	9.81	10.74	20.55	46.00	-25.45	AVG
9		1.8820	35.39	10.72	46.11	56.00	-9.89	QP
10		1.8820	6.25	10.72	16.97	46.00	-29.03	AVG
11		10.9618	26.87	10.41	37.28	60.00	-22.72	QP
12		10.9618	2.31	10.41	12.72	50.00	-37.28	AVG

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B: Conducted Emission on Neutral Terminal (150kHz to 30MHz)

EUT Operating Environment

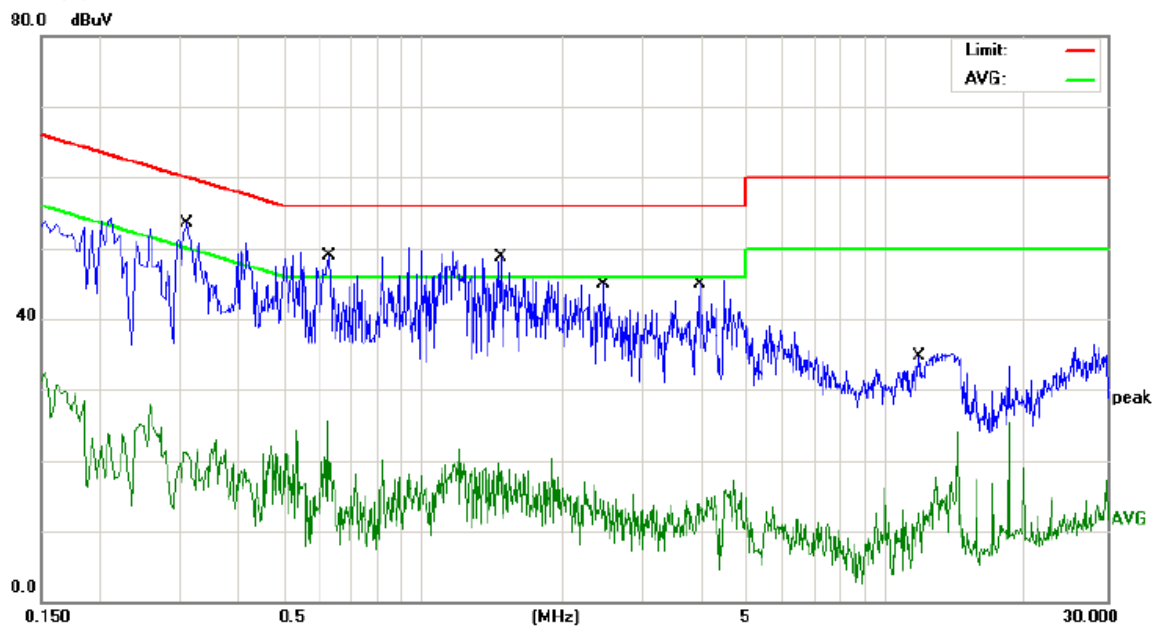
Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 kPa

EUT set Condition: Keep WIFI Transmitting

Equipment Level: Class B

Results: Pass

Please refer to following diagram for individual



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1	*	0.3100	42.95	10.63	53.58	59.97	-6.39	QP
2		0.3100	10.31	10.63	20.94	49.97	-29.03	AVG
3		0.6300	38.21	10.76	48.97	56.00	-7.03	QP
4		0.6300	9.22	10.76	19.98	46.00	-26.02	AVG
5		1.4780	37.91	10.73	48.64	56.00	-7.36	QP
6		1.4780	7.86	10.73	18.59	46.00	-27.41	AVG
7		2.4580	34.22	10.70	44.92	56.00	-11.08	QP
8		2.4580	3.57	10.70	14.27	46.00	-31.73	AVG
9		3.9700	34.19	10.64	44.83	56.00	-11.17	QP
10		3.9700	2.96	10.64	13.60	46.00	-32.40	AVG
11		11.7899	24.34	10.42	34.76	60.00	-25.24	QP
12		11.7899	2.06	10.42	12.48	50.00	-37.52	AVG

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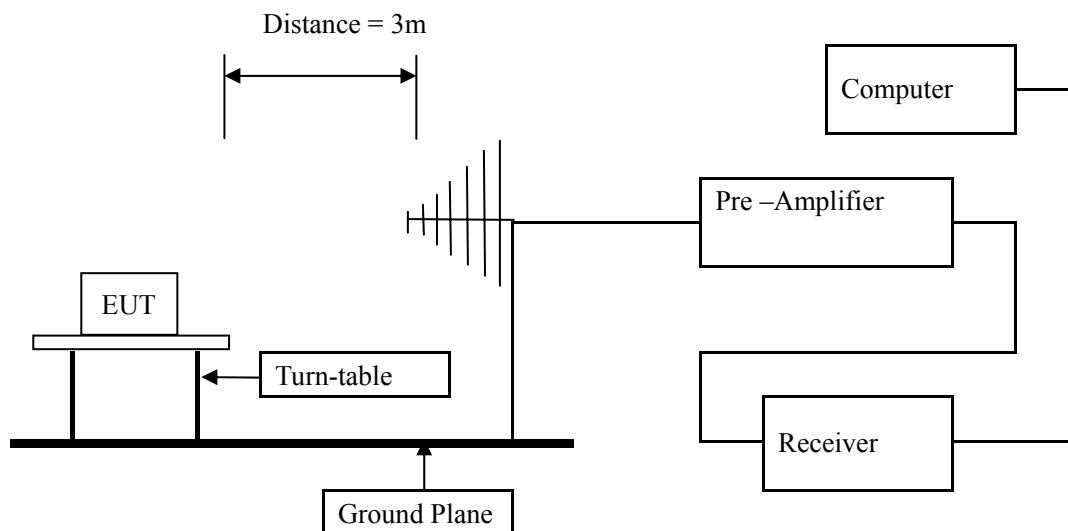
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6 Radiated Emission Test

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 25 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=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK 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

- 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. For radiated emissions in the frequency of 9kHz-30MHz, the measurements data were greater than 20dB below the limit.

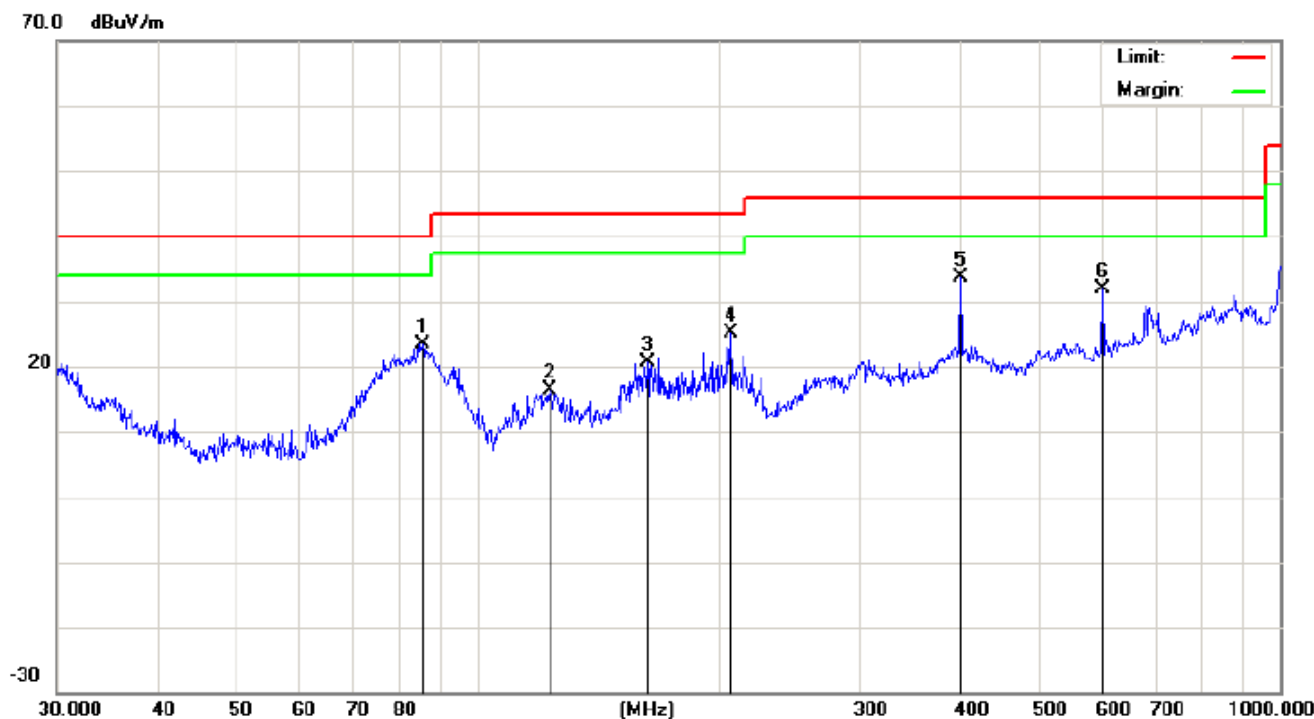


Test result
General Radiated Emission Data and Harmonics Radiated Emission Data

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

EUT set Condition: Keep WIFI Transmitting

Horizontal

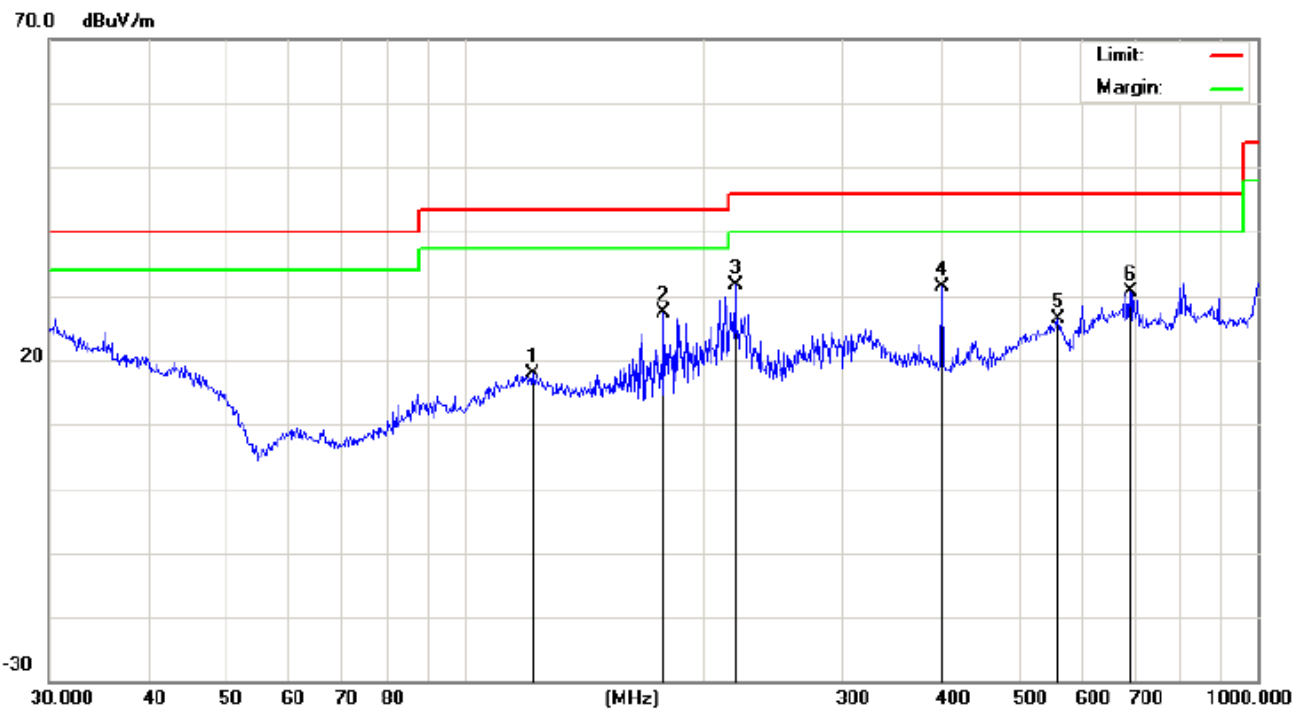


No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
		MHz	Level	Factor	ment			Detector
			dBuV	dB	dBuV/m	dBuV/m	dB	
1		85.5977	36.23	-12.74	23.49	40.00	-16.51	QP
2		123.2655	27.60	-11.21	16.39	43.50	-27.11	QP
3		163.1818	25.67	-4.95	20.72	43.50	-22.78	QP
4		207.1226	30.92	-5.76	25.16	43.50	-18.34	QP
5	*	400.4318	33.89	-0.33	33.56	46.00	-12.44	QP
6		601.4265	31.82	0.12	31.94	46.00	-14.06	QP

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Vertical



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
		MHz	Level	Factor	ment			Detector
			dBuV	dB	dBuV/m	dBuV/m	dB	
1		121.9755	22.35	-4.43	17.92	43.50	-25.58	QP
2		178.7584	35.29	-7.94	27.35	43.50	-16.15	QP
3	*	219.8449	37.79	-6.13	31.66	46.00	-14.34	QP
4		400.4319	34.77	-3.46	31.31	46.00	-14.69	QP
5		560.6928	23.52	2.85	26.37	46.00	-19.63	QP
6		691.9867	26.91	3.79	30.70	46.00	-15.30	QP

Remark: All of the Tx modes have been investigated, and only worst mode is presented in this report.

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Above 1GHz to 25GHz:

Operation Mode:	802.11b TX (Channel 1)	Test Date :	May 28, 2014
Frequency Range:	Above 1GHz	Temperature :	28°C
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	LHZ

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4824	V	57.68	36.06	74	54	-16.32	-17.94
7236	V	59.42	35.42	74	54	-14.58	-18.58
9648	V	59.33	37.94	74	54	-14.67	-16.06
4824	H	58.15	36.26	74	54	-15.85	-17.74
7236	H	57.38	36.49	74	54	-16.62	-17.51

All emissions not reported were more than 20dB below the specified limit or in the noise floor.

- Note:** (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3) Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

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Operation Mode: 802.11b TX (Channel 6) Test Date : May 28, 2014
Frequency Range: Above 1GHz Temperature : 28°C
Test Result: PASS Humidity : 65 %
Measured Distance: 3m Test By: LHZ

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4874	V	59.02	38.28	74	54	-14.98	-15.72
7311	V	58.74	36.41	74	54	-15.26	-17.59
9748	V	59.68	35.06	74	54	-14.32	-18.94
4874	H	57.13	37.91	74	54	-16.87	-16.09
7311	H	57.94	38.57	74	54	-16.06	-15.43

All emissions not reported were more than 20dB below the specified limit or in the noise floor.

- Note:**
- (1) All Readings are Peak Value and AV.
 - (2) Emission Level= Reading Level+Probe Factor +Cable Loss.
 - (3) Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

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Operation Mode: 802.11b TX (Channel 11) Test Date : May 28, 2014
Frequency Range: Above 1GHz Temperature : 28°C
Test Result: PASS Humidity : 65 %
Measured Distance: 3m Test By: LHZ

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4921	V	60.11	37.55	74	54	-13.89	-16.45
7386	V	59.57	37.16	74	54	-14.43	-16.84
4921	H	58.41	36.45	74	54	-15.59	-17.55
7386	H	59.67	35.74	74	54	-14.33	-18.26

No others harmonics emissions are higher than 20dB below the limits of 47 CFR Part 15.247.

- Note:**
- (1) All Readings are Peak Value and AV.
 - (2) Emission Level= Reading Level+Probe Factor +Cable Loss.
 - (3) Data of measurement within this frequency range shown “ -- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

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Operation Mode: 802.11g TX (Channel 1) Test Date : May 28, 2014
Frequency Range: Above 1GHz Temperature : 28°C
Test Result: PASS Humidity : 65 %
Measured Distance: 3m Test By: LHZ

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4824	V	64.6	47.3	74	54	-9.4	-6.7
7236	V	67.4	42.1	74	54	-6.6	-11.9
9648	V	66.2	45.6	74	54	-7.8	-8.4
4824	H	63.5	42.8	74	54	-10.5	-11.2
7236	H	62.0	45.6	74	54	-12.0	-8.4
9648	H	65.3	38.2	74	54	-8.7	-15.8

All emissions not reported were more than 20dB below the specified limit or in the noise floor.

- Note:**
- (1) All Readings are Peak Value and AV.
 - (2) Emission Level= Reading Level+Probe Factor +Cable Loss.
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Operation Mode: 802.11g TX (Channel 6) Test Date : May 28, 2014
Frequency Range: Above 1GHz Temperature : 28°C
Test Result: PASS Humidity : 65 %
Measured Distance: 3m Test By: LHZ

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4874	V	65.6	38.8	74	54	-8.4	-15.2
7311	V	62.0	42.8	74	54	-12.0	-11.2
9748	V	62.9	47.8	74	54	-11.1	-6.2
4874	H	64.0	44.7	74	54	-10.0	-9.3
7311	H	63.4	43.6	74	54	-10.6	-10.4
9748	H	63.5	39.4	74	54	-10.5	-14.6

All emissions not reported were more than 20dB below the specified limit or in the noise floor.

- Note:**
- (1) All Readings are Peak Value and AV.
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Operation Mode: 802.11g TX (Channel 11) Test Date : May 28, 2014
Frequency Range: Above 1GHz Temperature : 28°C
Test Result: PASS Humidity : 65 %
Measured Distance: 3m Test By: LHZ

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4924	V	61.6	38.1	74	54	-12.4	-15.9
7386	V	67.1	46.6	74	54	-6.9	-7.4
9848	V	66.7	42.6	74	54	-7.3	-11.4
4924	H	65.1	45.9	74	54	-8.9	-8.1
7386	H	62.0	39.6	74	54	-12.0	-14.4
9848	H	62.9	41.9	74	54	-11.1	-12.1

No others harmonics emissions are higher than 20dB below the limits of 47 CFR Part 15.247.

- Note:**
- (1) All Readings are Peak Value and AV.
 - (2) Emission Level= Reading Level+Probe Factor +Cable Loss.
 - (3) Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

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Operation Mode: 802.11n HT-20 TX (Channel 1) Test Date : May 28, 2014
Frequency Range: Above 1GHz Temperature : 28°C
Test Result: PASS Humidity : 65 %
Measured Distance: 3m Test By: LHZ

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4824	V	64.0	44.6	74	54	-10.0	-9.4
7236	V	61.3	45.4	74	54	-12.7	-8.6
4824	H	61.3	45.4	74	54	-12.7	-8.6
7236	H	58.6	44.4	74	54	-15.4	-9.6

All emissions not reported were more than 20dB below the specified limit or in the noise floor.

- Note:** (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3) Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.



Operation Mode: 802.11n HT-20 TX (Channel 6) Test Date : May 28, 2014
Frequency Range: Above 1GHz Temperature : 28°C
Test Result: PASS Humidity : 65 %
Measured Distance: 3m Test By: LHZ

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4874	V	62.3	42.5	74	54	-11.7	-11.5
7311	V	67.1	44.7	74	54	-6.9	-9.3
4874	H	63.9	42.4	74	54	-10.1	-11.6
7311	H	60.5	39.3	74	54	-13.5	-14.7

All emissions not reported were more than 20dB below the specified limit or in the noise floor.

- Note:**
- (1) All Readings are Peak Value and AV.
 - (2) Emission Level= Reading Level+Probe Factor +Cable Loss.
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Operation Mode: 802.11n HT-20 TX (Channel 11) Test Date : May 28, 2014
Frequency Range: Above 1GHz Temperature : 28°C
Test Result: PASS Humidity : 65 %
Measured Distance: 3m Test By: LHZ

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4924	V	64.3	43.2	74	54	-9.7	-10.8
7386	V	67.6	38.3	74	54	-6.4	-15.7
4924	H	60.9	44.9	74	54	-13.1	-9.1
7386	H	59.7	40.0	74	54	-14.3	-14.0

No others harmonics emissions are higher than 20dB below the limits of 47 CFR Part 15.247.

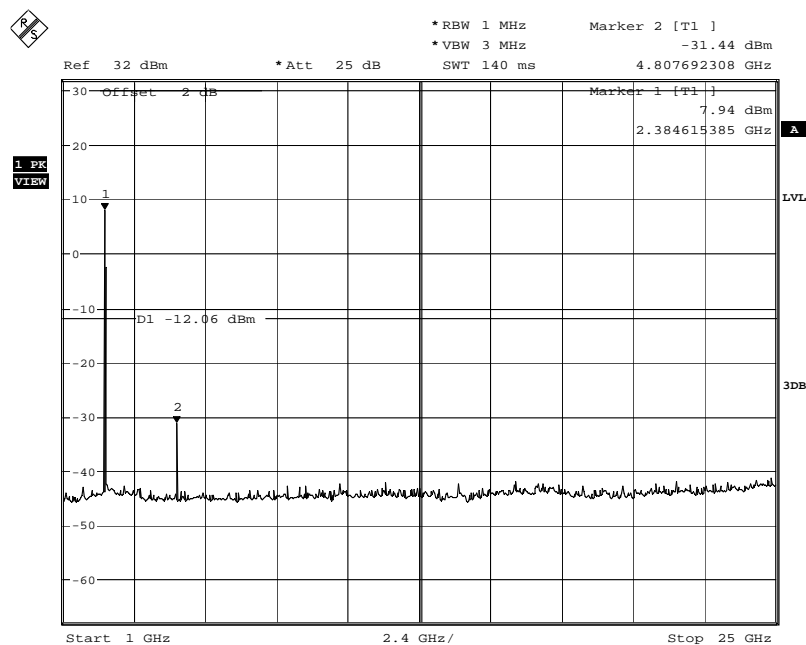
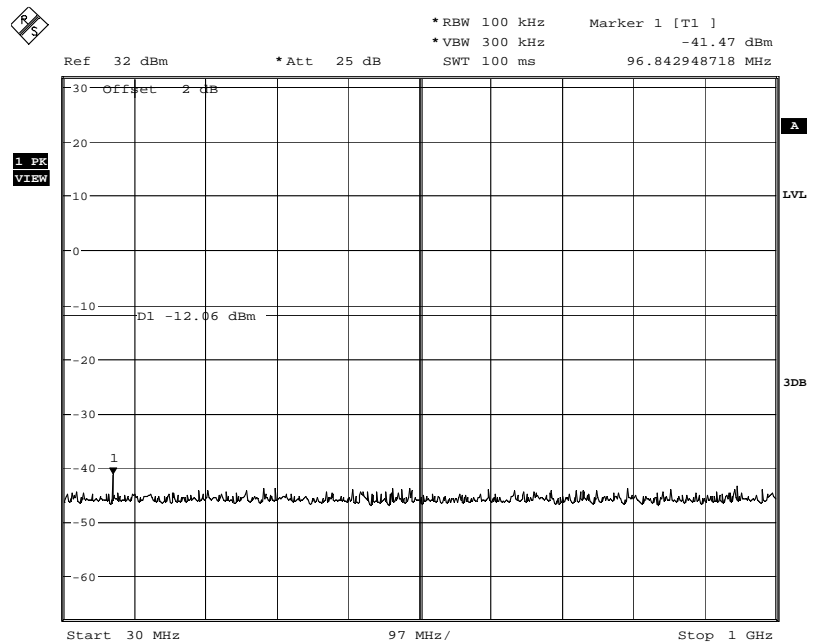
- Note:** (1) All Readings are Peak Value and AV.
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Antenna port conducted spurious emissions

802.11b:

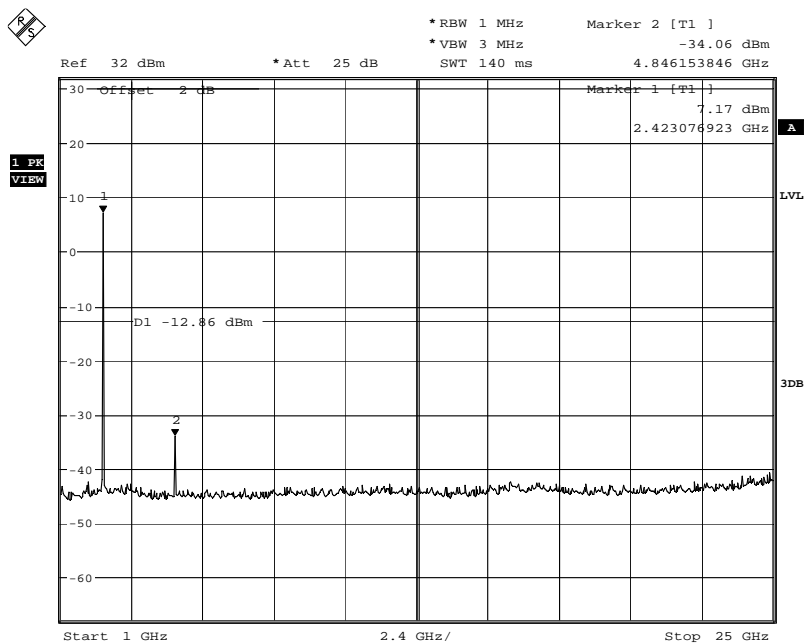
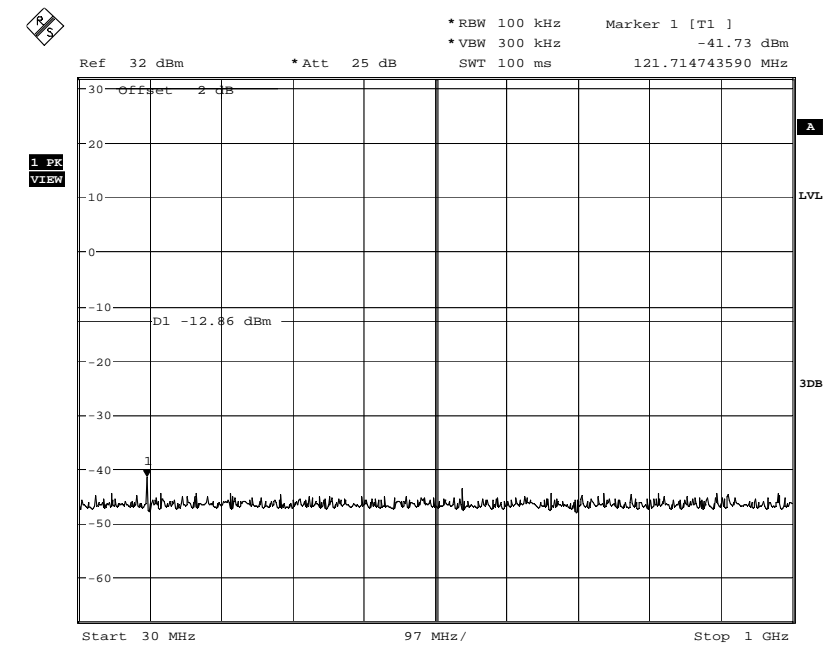
Low channel



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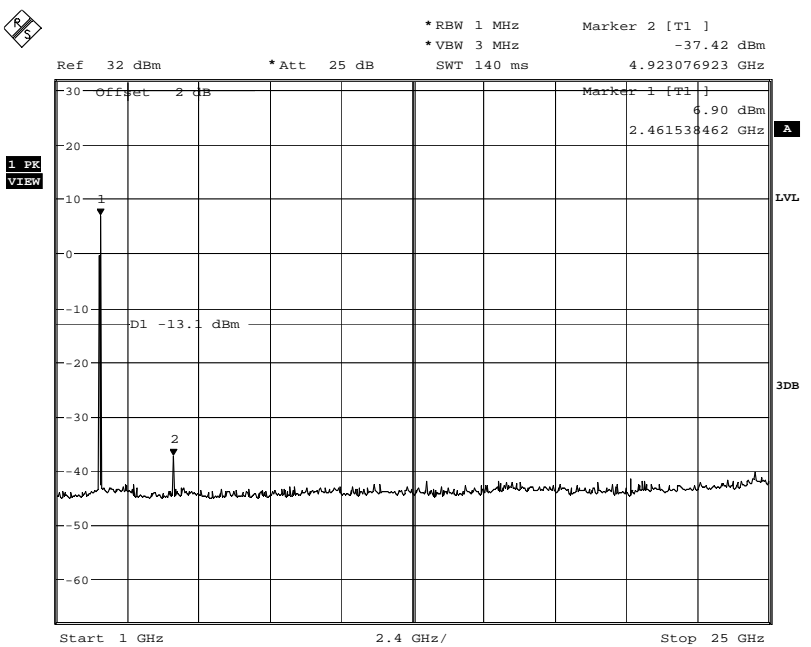
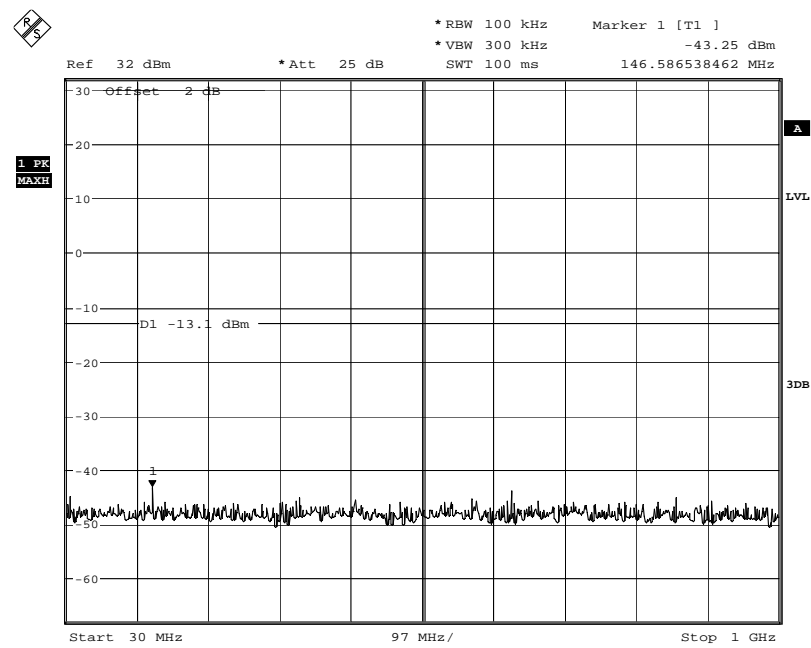
Middle channel



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High channel



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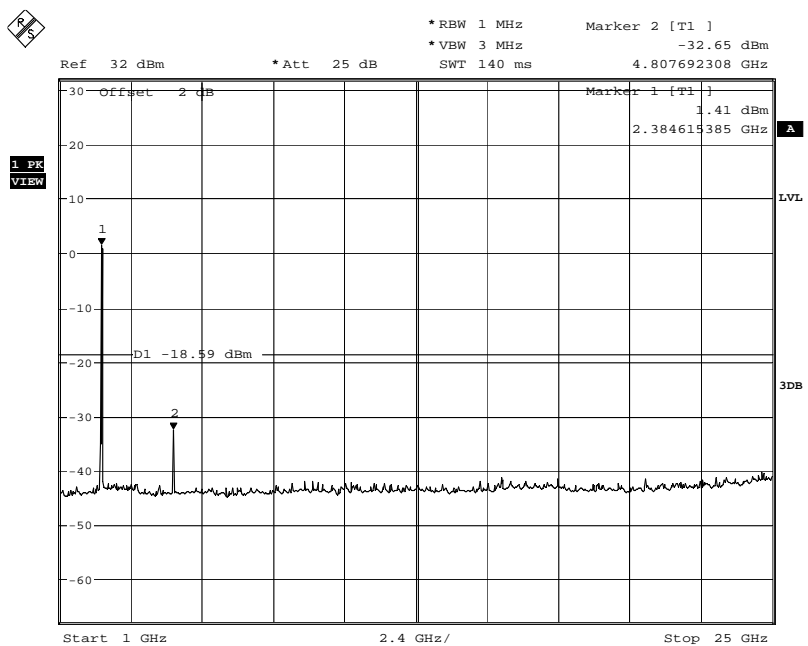
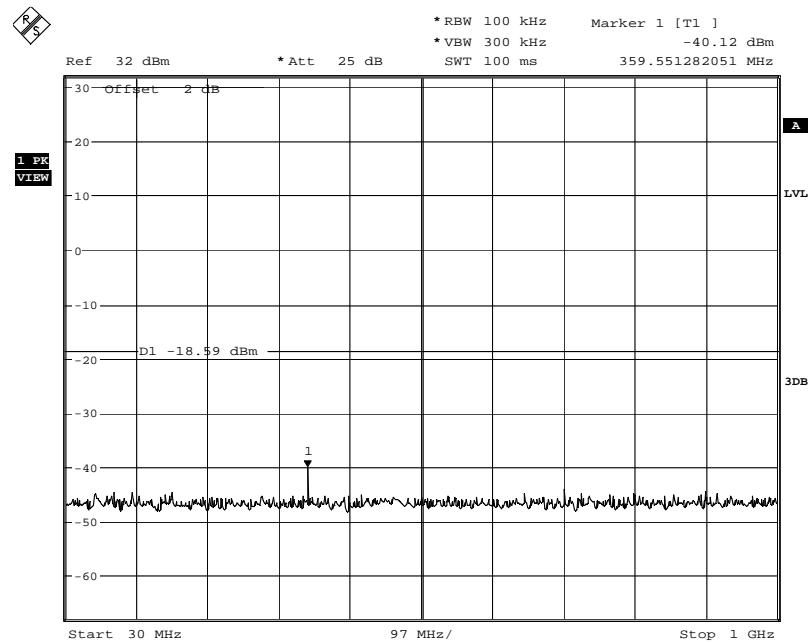
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802.11g:

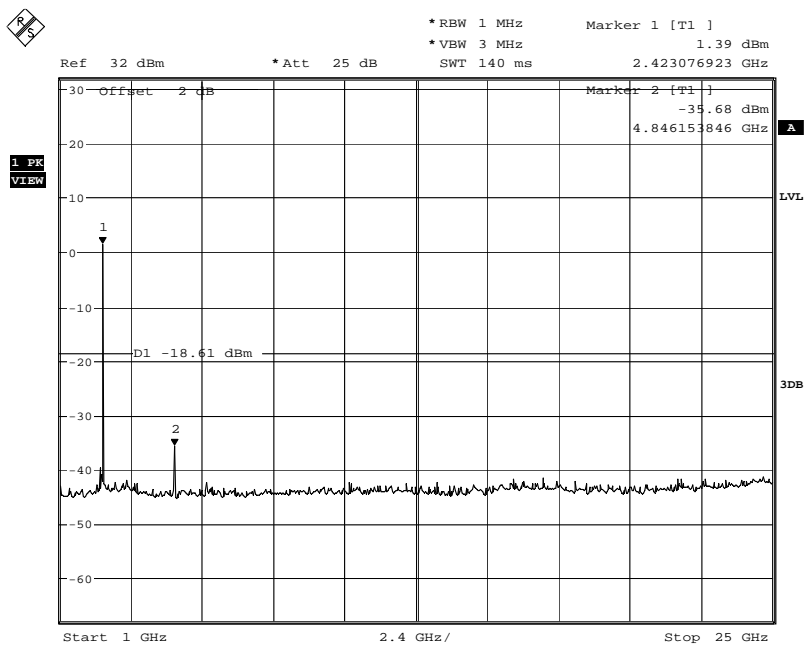
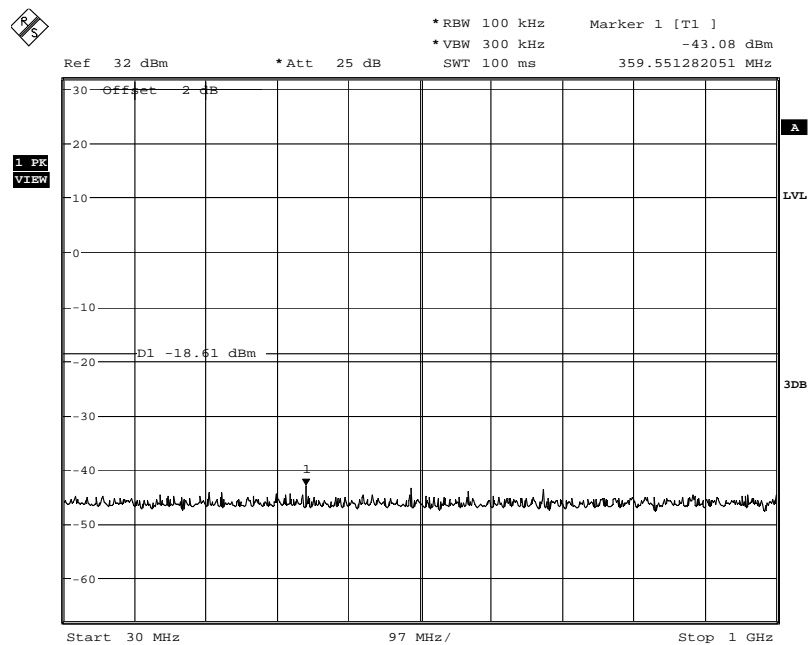
Low channel



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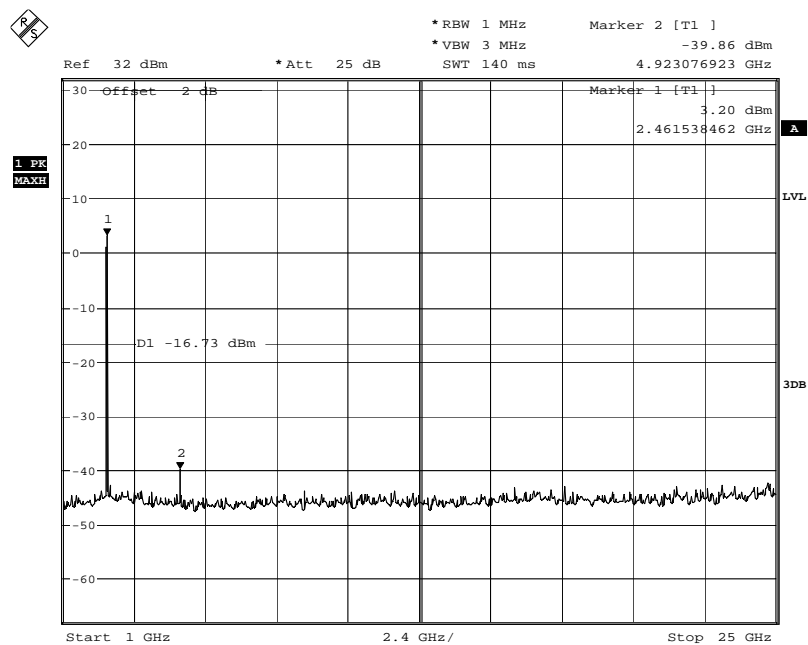
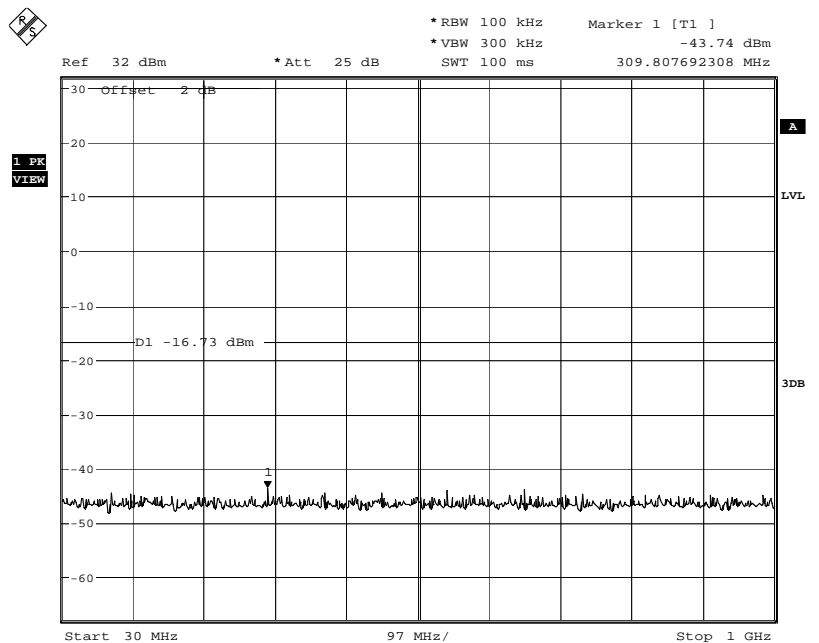
Middle channel



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High channel

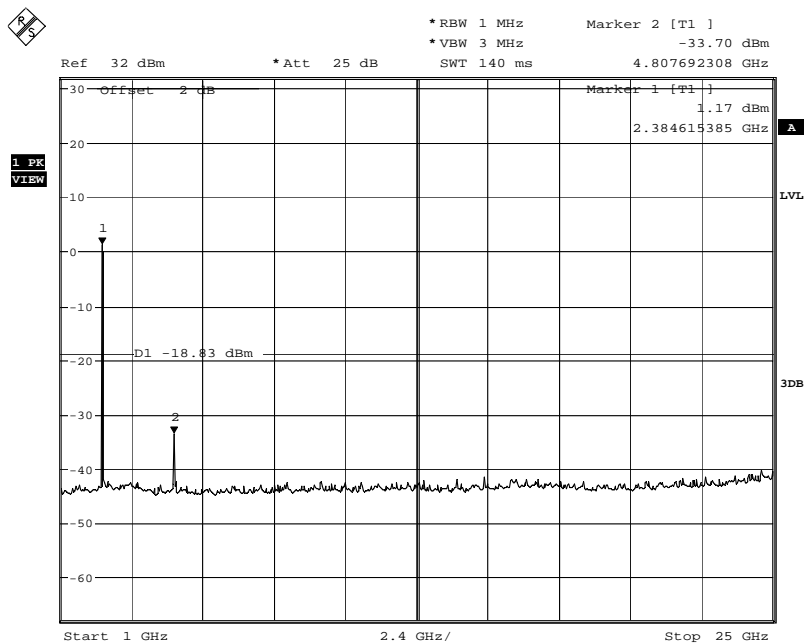
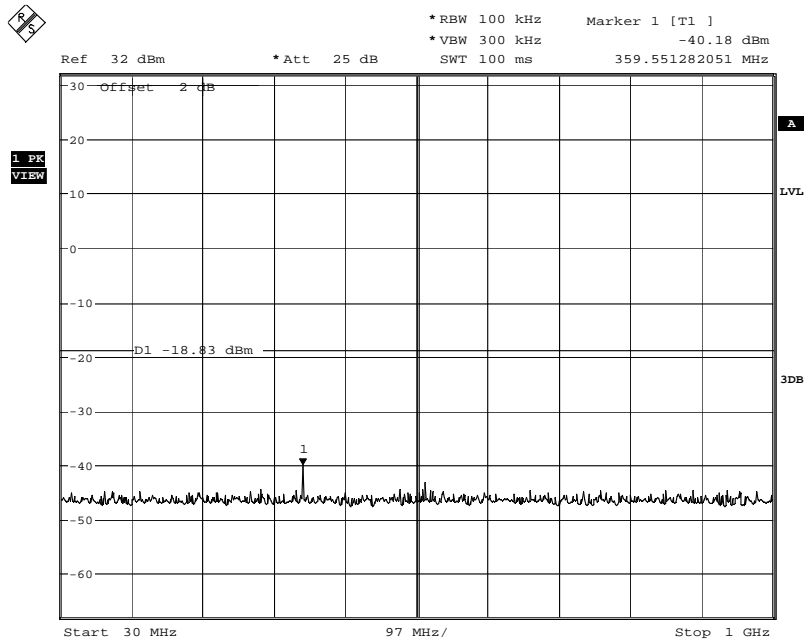


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802.11n HT20:

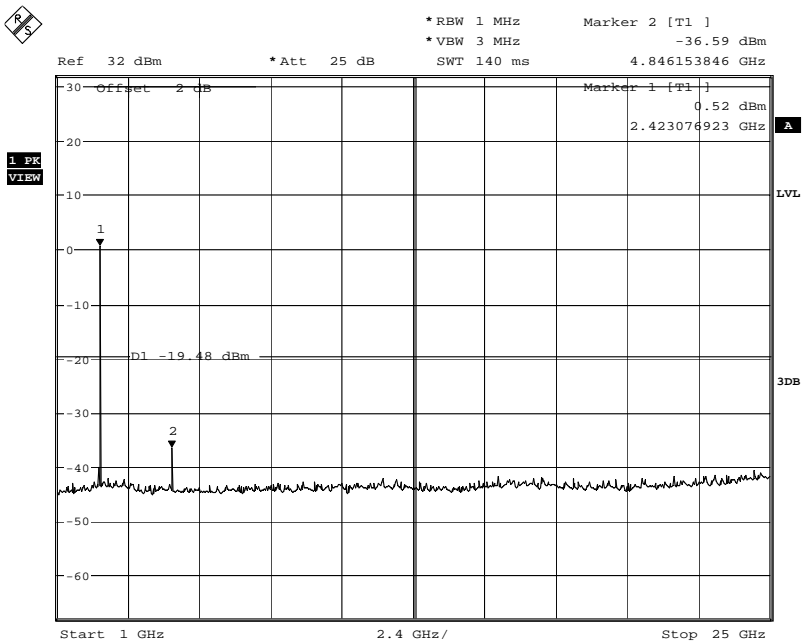
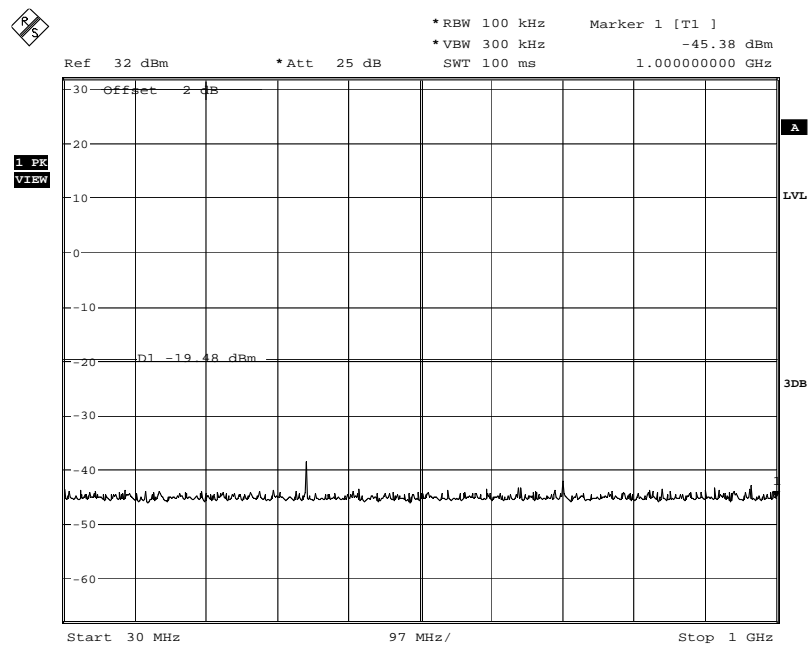
Low channel



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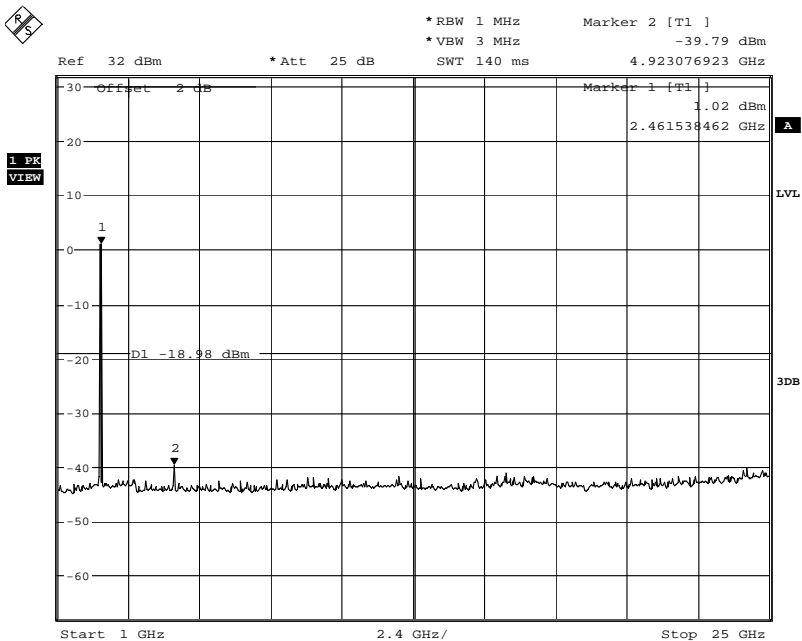
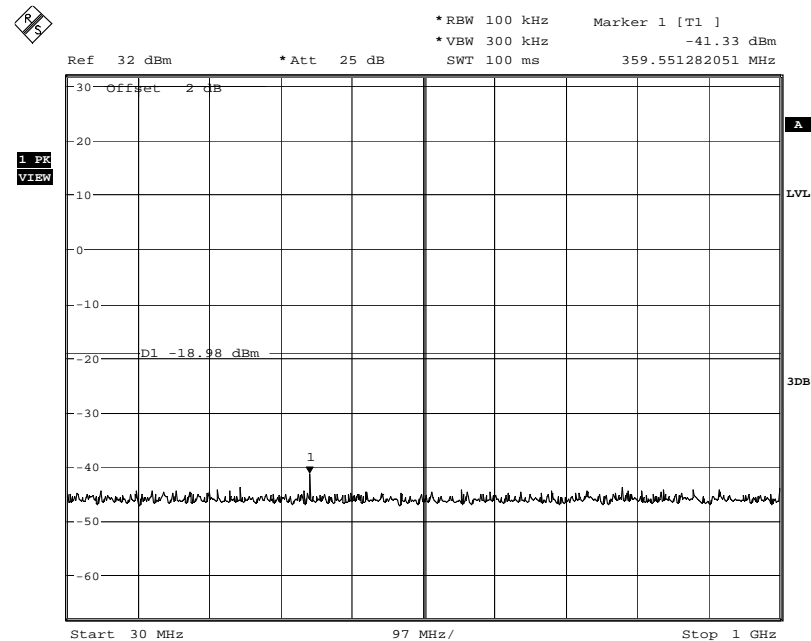
Middle channel



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High channel



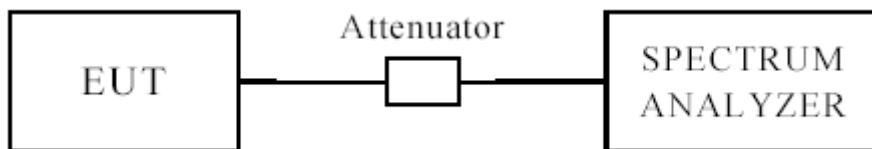
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7.0 6dB Bandwidth Measurement

7.1 Test Setup



7.2 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is >500 kHz

7.3 Test Procedure

1. Set resolution bandwidth (RBW) = 100 kHz
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
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 6 dB relative to the maximum level measured in the fundamental emission.

7.4 Test Result

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6dB Occupied Bandwidth

EUT	WIFI Smart Plug		Model	KK-SP3	
Mode	802.11b		Input Voltage	120V~	
Temperature	24 deg. C,		Humidity	56% RH	
Channel	Channel Frequency (MHz)	Data Transfer Rate (Mbps)	6 dB Bandwidth (kHz)	Minimum Limit (MHz)	Pass/ Fail
1	2412	1	10000	0.5	Pass
6	2437	1	10064	0.5	Pass
11	2462	1	10128	0.5	Pass

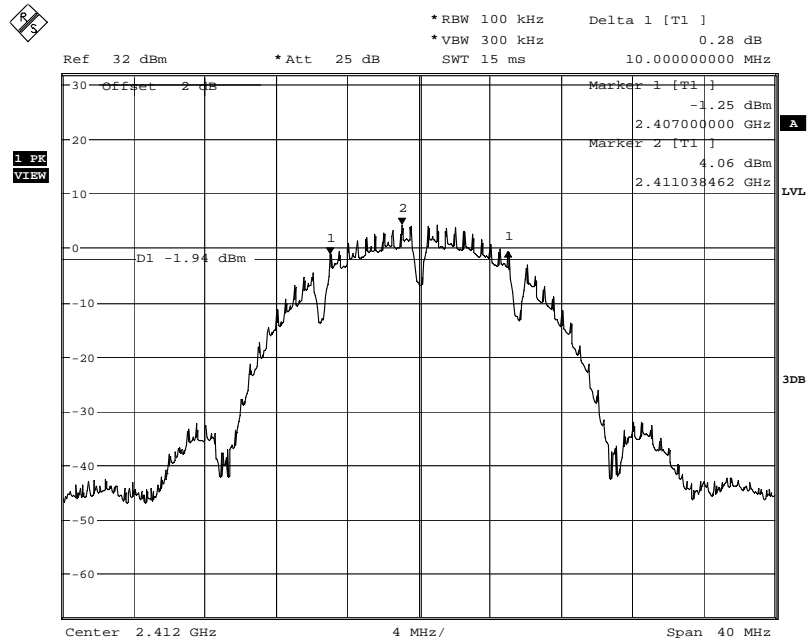
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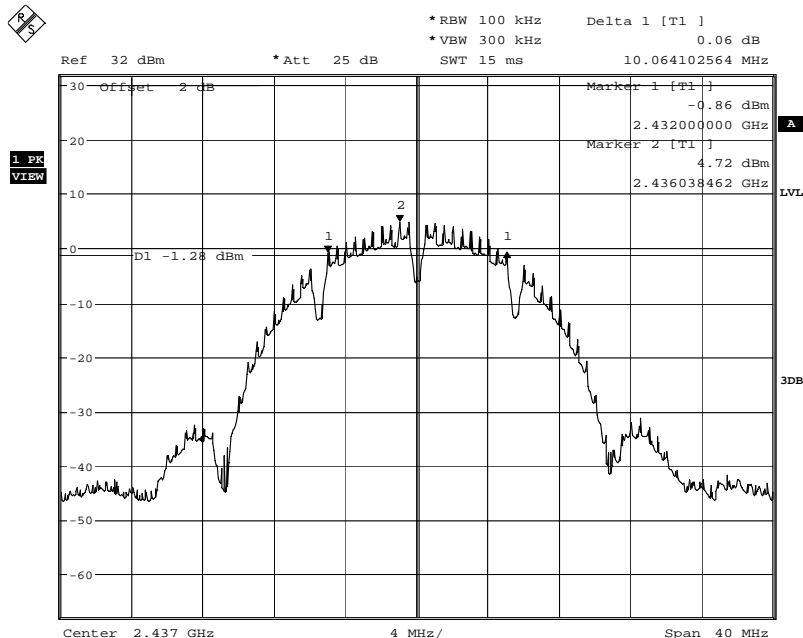
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1. 802.11b at 1Mbps of CH01



2. 802.11b at 1Mbps of CH06



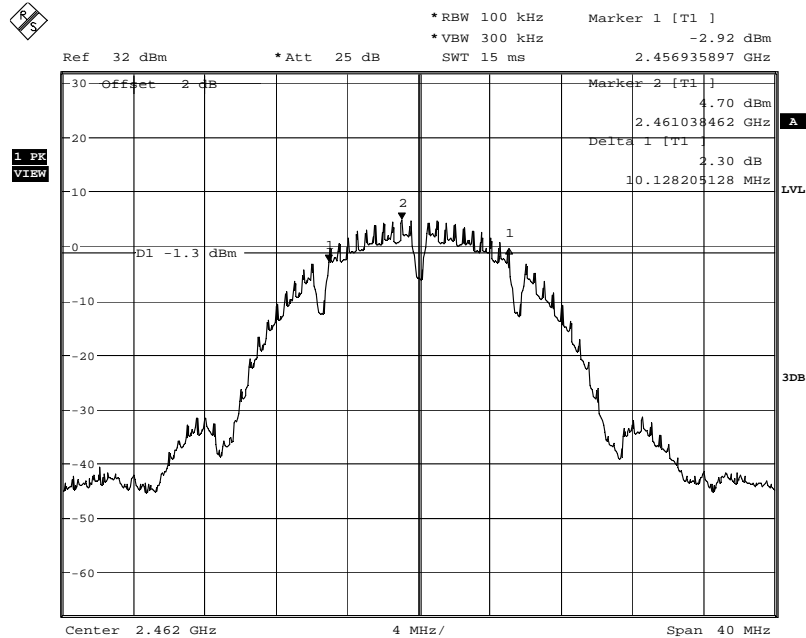
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3. 802.11b at 1Mbps of CH11



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6dB Occupied Bandwidth

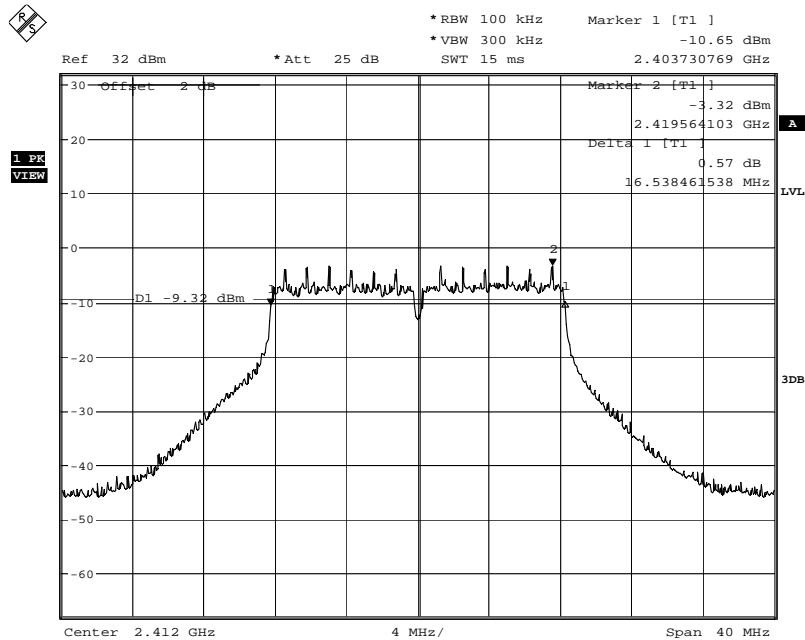
EUT		WIFI Smart Plug		Model	KK-SP3
Mode		802.11g		Input Voltage	120V~
Temperature		24 deg. C,		Humidity	56% RH
Channel	Channel Frequency (MHz)	Data Transfer Rate (Mbps)	6 dB Bandwidth (kHz)	Minimum Limit (MHz)	Pass/ Fail
1	2412	6	16538	0.5	Pass
6	2437	6	16474	0.5	Pass
11	2462	6	16474	0.5	Pass

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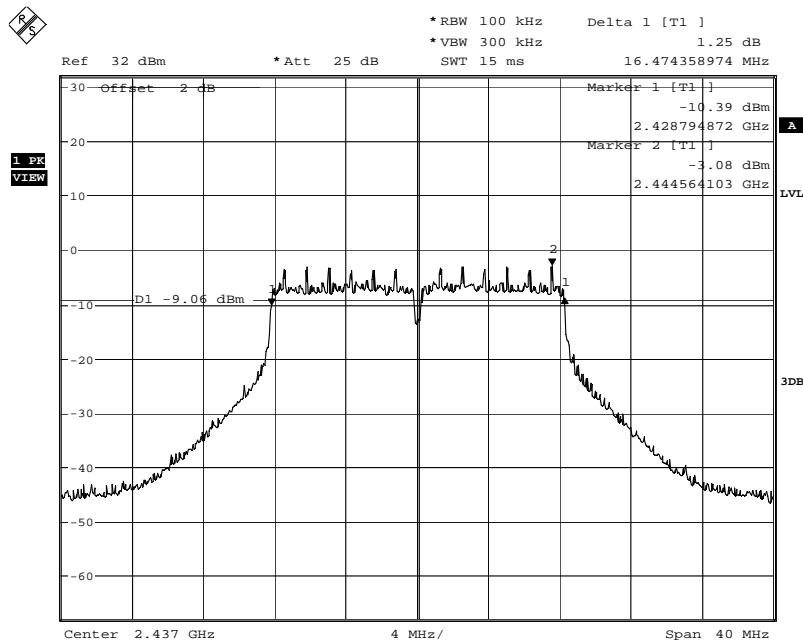


Test Plots:

1. 802.11g at 6Mbps of CH01



2. 802.11g at 6Mbps of CH06



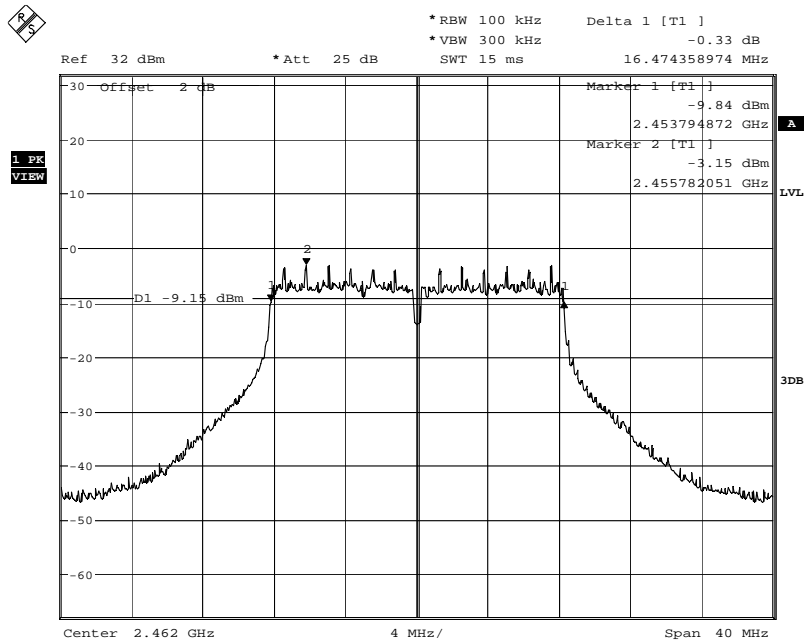
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3. 802.11g at 6Mbps of CH11



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6dB Occupied Bandwidth

EUT		WIFI Smart Plug		Model	KK-SP3
Mode		802.11n HT20		Input Voltage	120V~
Temperature		24 deg. C,		Humidity	56% RH
Channel	Channel Frequency (MHz)	Data Transfer Rate (Mbps)	6 dB Bandwidth (kHz)	Minimum Limit (MHz)	Pass/ Fail
1	2412	6.5M	17692	0.5	Pass
6	2437	6.5M	17564	0.5	Pass
11	2462	6.5M	17692	0.5	Pass

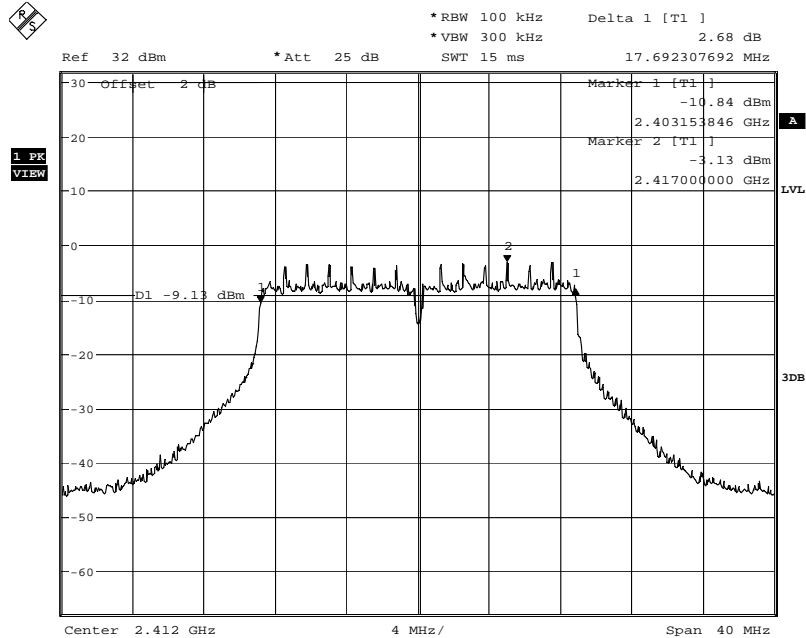
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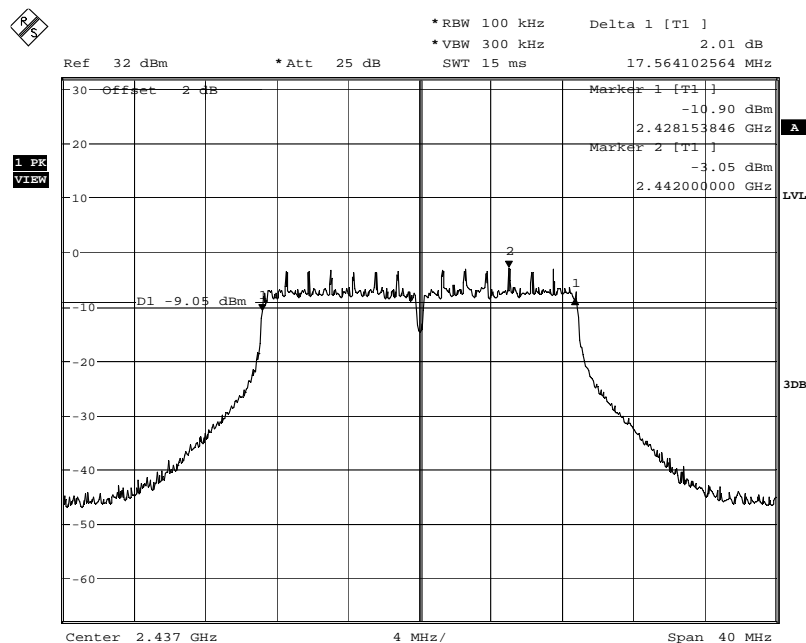
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Test Plots:

1. 802.11n at HT20 of CH01



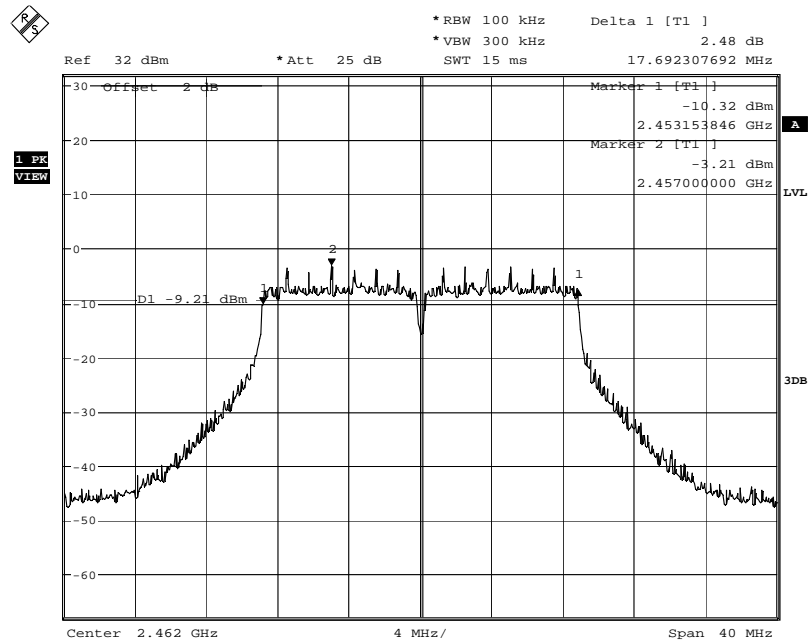
2. 802.11n at HT20 of CH06



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3. 802.11n at HT20 of CH11

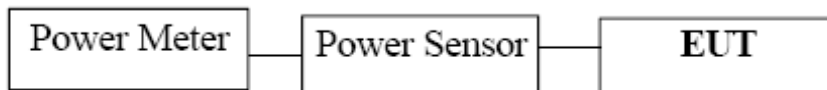


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8. Maximum Peak Output Power

8.1 Test Setup



8.2 Limits of Maximum Peak Output Power

The Maximum Peak Output Power Measurement is 30dBm.

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 peak power was measured

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8.4 Test Results

EUT	WIFI Smart Plug		Model	KK-SP3
Mode	802.11b		Input Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Channel	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass/ Fail
1	2412	16.78	30	Pass
6	2437	17.53	30	Pass
11	2462	17.17	30	Pass

Note: 1. At final test to get the worst-case emission at 1Mbps for CH01, CH06 and CH11

2. The result basic equation calculation as follow:

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

3. The worse case was recorded

EUT	WIFI Smart Plug		Model	KK-SP3
Mode	802.11g		Input Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Channel	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass/ Fail
1	2412	16.32	30	Pass
6	2437	16.85	30	Pass
11	2462	16.64	30	Pass

Note: 1. At final test to get the worst-case emission at 6Mbps for CH01, CH06 and CH11

2. The result basic equation calculation as follow:

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

3. The worse case was recorded

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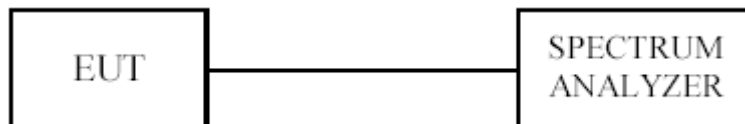
EUT	WIFI Smart Plug		Model	KK-SP3
Mode	802.11n (HT20)		Input Voltage	120V~
Temperature	24 deg. C,		Humidity	56% RH
Channel	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass/ Fail
1	2412	16.52	30	Pass
6	2437	16.70	30	Pass
11	2462	16.53	30	Pass

- Note: 1. At final test to get the worst-case emission at 6.5Mbps of 11n HT20 for CH01, CH06 and CH11
2. The result basic equation calculation as follow:
Peak Power Output = Peak Power Reading + Cable loss + Attenuator
3. The worse case was recorded



9. Power Spectral Density Measurement

9.1 Test Setup



9.2 Limits of Power Spectral Density Measurement

The Maximum Power Spectral Density Measurement is 8dBm.

9.3 Test Procedure

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW = 3 kHz.
3. Set the VBW = 10 kHz.
4. Set the span to 1.5 times the DTS channel bandwidth.
5. Detector = peak.
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.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
11. The resulting peak PSD level must be ≤ 8 dBm.

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9.4 Test Result

EUT		WIFI Smart Plug		Model		KK-SP3	
Mode		802.11b		Input Voltage		120V~	
Temperature		24 deg. C,		Humidity		56% RH	
Channel	Channel Frequency (MHz)		Final RF Power Level in (dBm)		Maximum Limit (dBm)		Pass/ Fail
1Mbps							
1	2412		-9.93		8		Pass
6	2437		-10.22		8		Pass
11	2462		-8.82		8		Pass

Mode		802.11g		Input Voltage		120V~	
Temperature		24 deg. C,		Humidity		56% RH	
Channel	Channel Frequency (MHz)		Final RF Power Level in (dBm)		Maximum Limit (dBm)		Pass/ Fail
6Mbps							
1	2412		-17.68		8		Pass
6	2437		-16.60		8		Pass
11	2462		-17.55		8		Pass

Mode		802.11n-HT20		Input Voltage		120V~	
Temperature		24 deg. C,		Humidity		56% RH	
Channel	Channel Frequency (MHz)		Final RF Power Level in (dBm)		Maximum Limit (dBm)		Pass/ Fail
6.5Mbps							
1	2412		-17.00		8		Pass
6	2437		-16.93		8		Pass
11	2462		-17.55		8		Pass

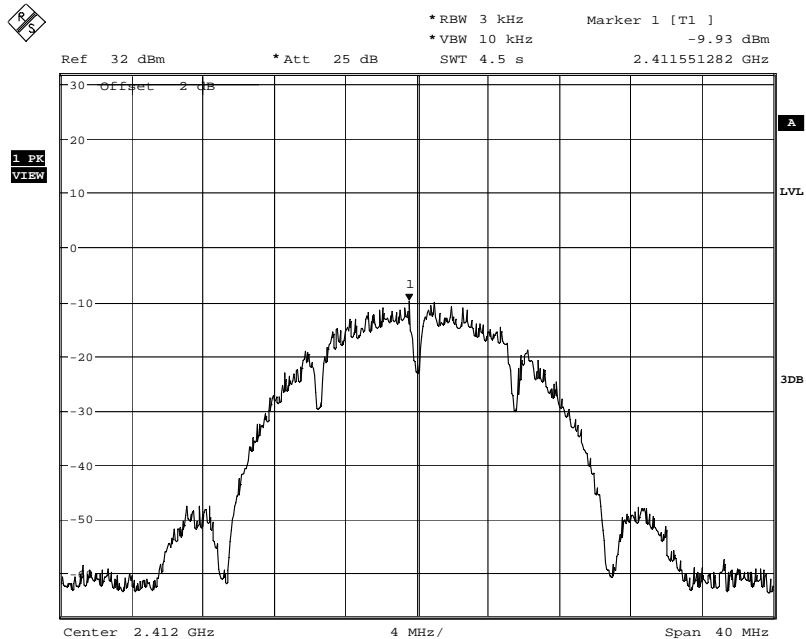
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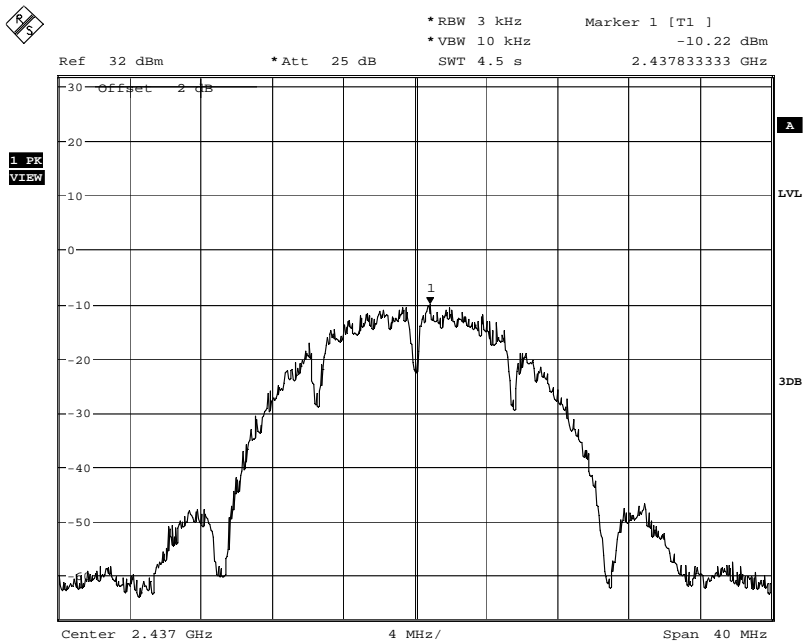


9.5 Photo of Power Spectral Density Measurement 802.11b

Low Channel



Middle Channel



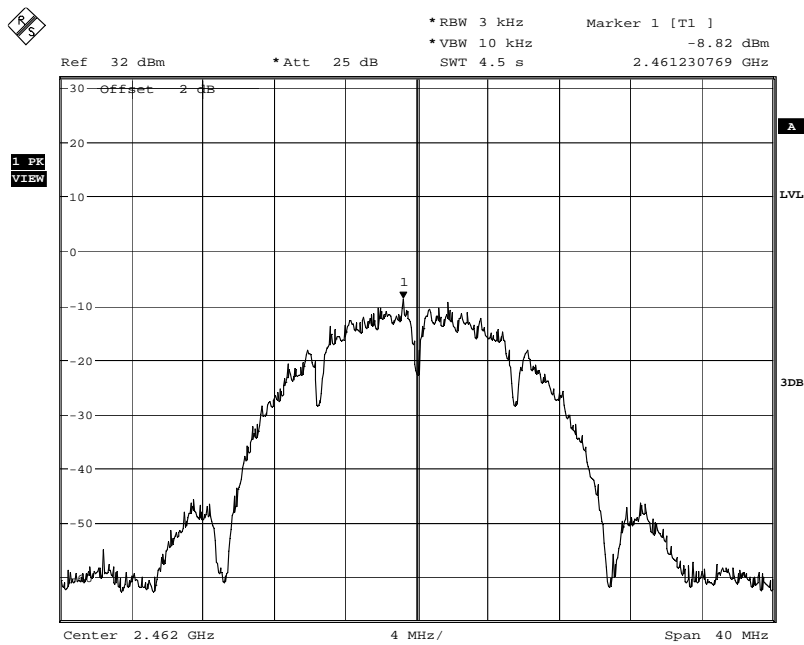
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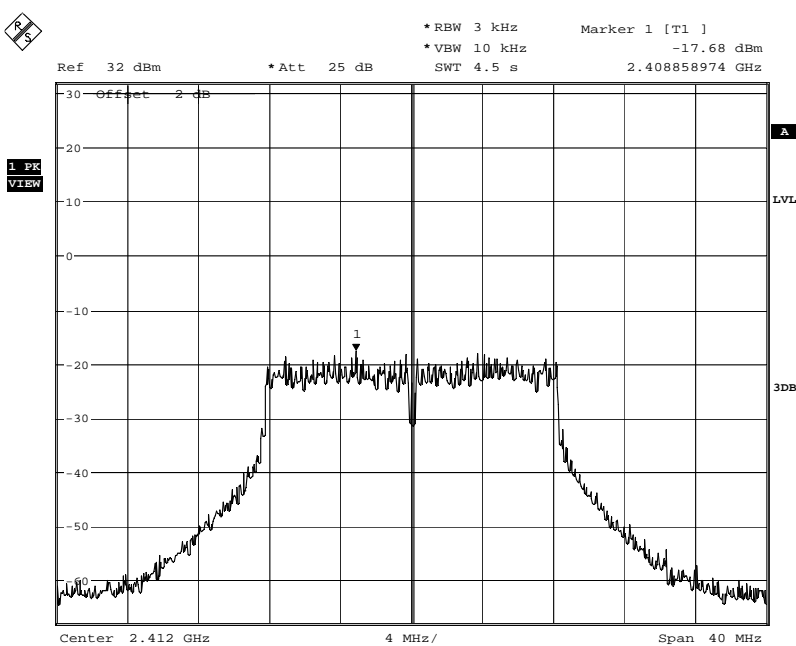


High Channel



802.11g

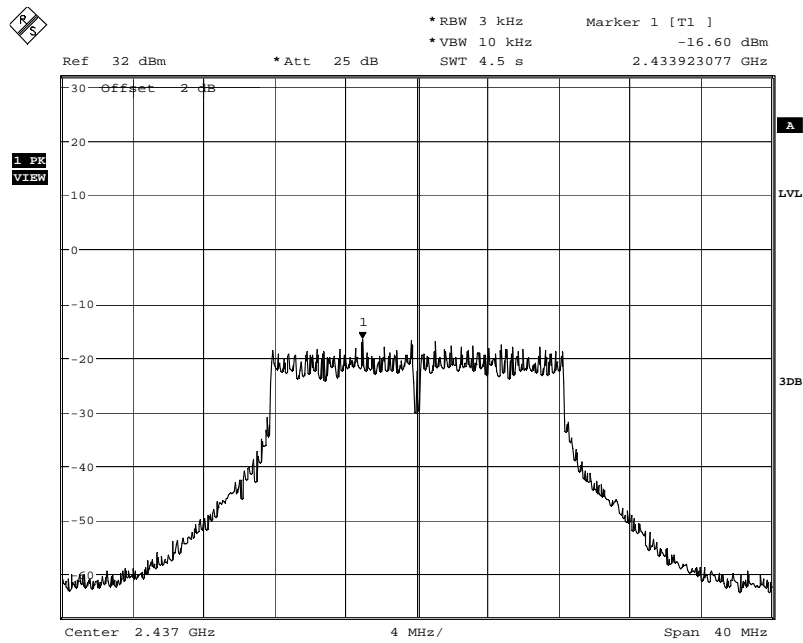
Low Channel



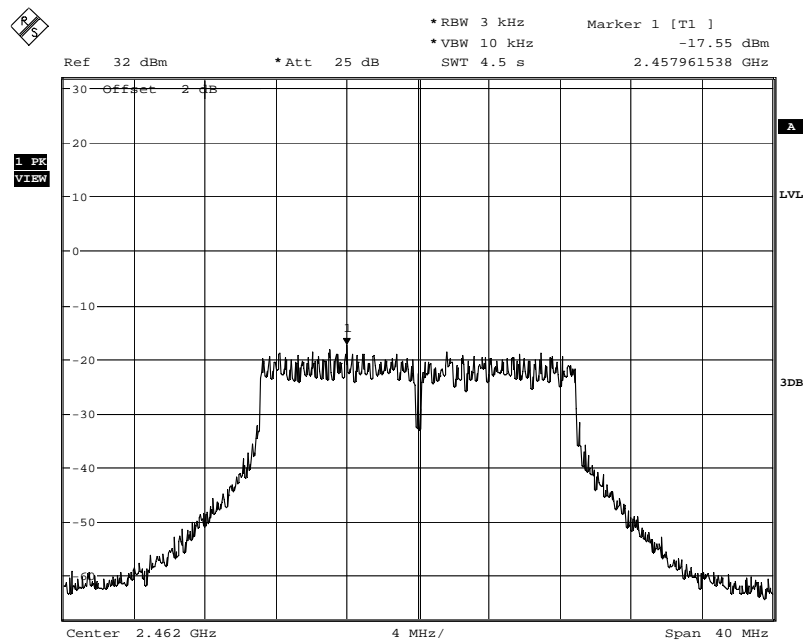
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Middle Channel



High Channel

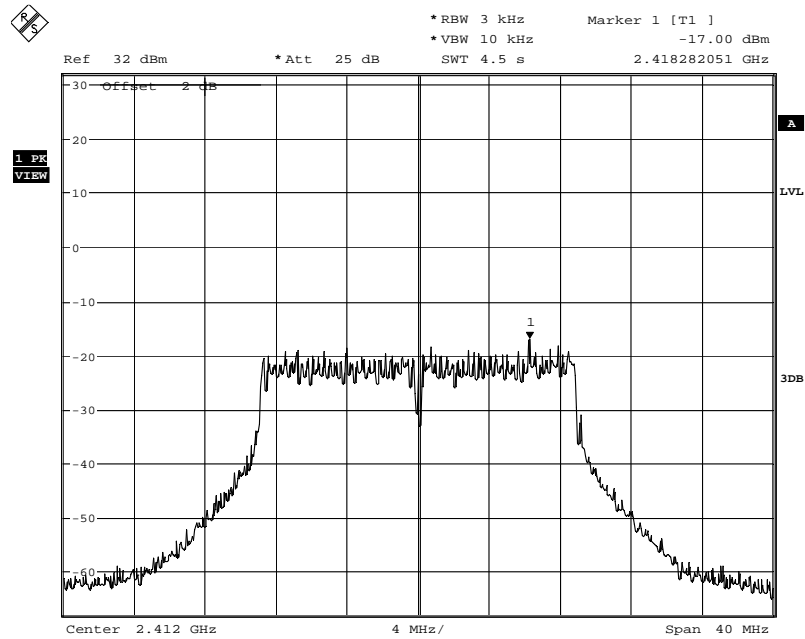


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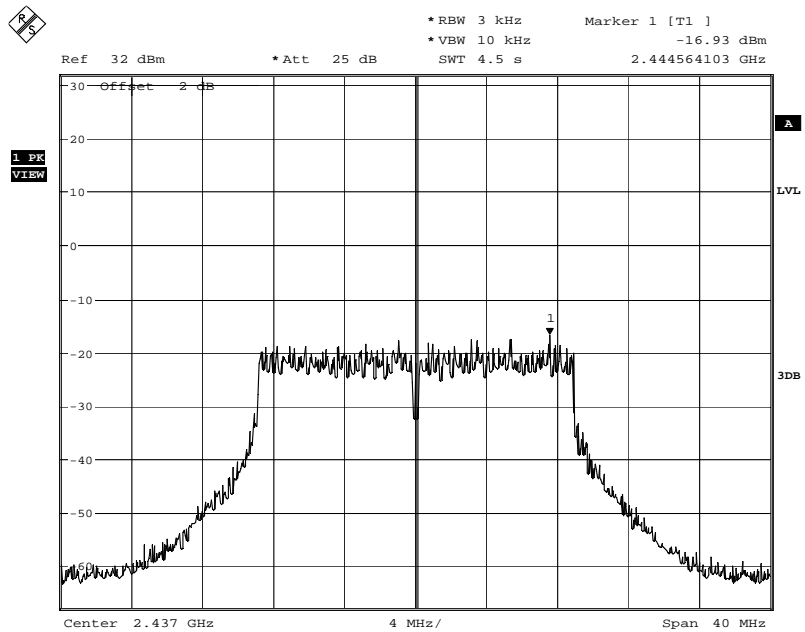


802.11n-HT20

Low Channel



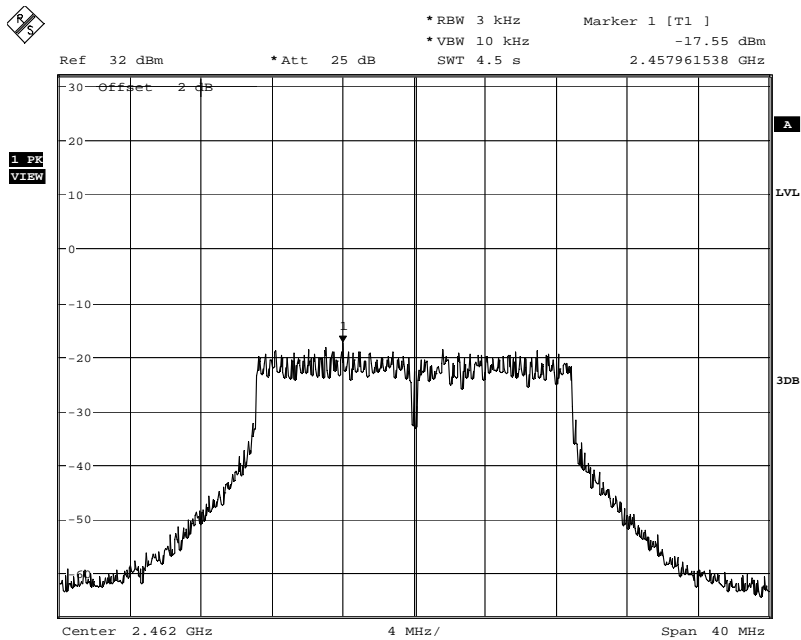
Middle Channel



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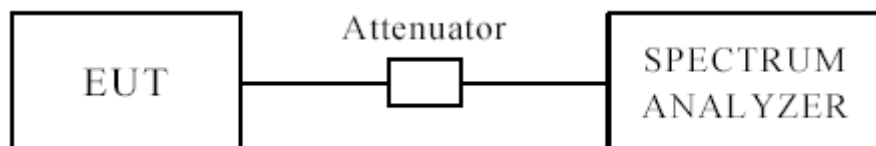
High Channel



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10 Out of Band Measurement

10.1 Test Setup for band edge



The restricted band requirement based on radiated emission test; please see the clause 6 for the test setup

10.2 Limits of Out of Band Emissions Measurement

1. Below -20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

10.3 Test Procedure

For signals in the restricted bands above and below the 2.4-2.483GHz allocated band a measurement was made of radiated emission test.(Peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector)

For bandage test, the spectrum set as follows: RBW=100, VBW=100 kHz. A conducted measurement used

10.4 Test Result

Please see next pages

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Restricted band Measurement

802.11b

Indicated		result (PK/AV)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247		
Frequency (MHz)	Receiver Reading (dBμV/m)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low Channel (2412MHz)											
2390	45.33	AV	250	1.2	V	30.3	4.1	33.1	46.63	54	7.37
2390	45.44	AV	60	1.6	H	30.3	4.1	33.1	46.74	54	7.26
2390	55.63	PK	180	1.3	V	30.3	4.1	33.1	56.93	74	17.07
2390	55.86	PK	210	1.1	H	30.3	4.1	33.1	57.16	74	16.81
High Channel (2462MHz)											
2483.5	36.91	AV	360	1.5	V	31	4.4	32.7	39.61	54	14.39
2483.5	37.85	AV	45	1.5	H	31	4.4	32.7	40.55	54	13.45
2483.5	46.58	PK	0	1.4	V	31	4.4	32.7	49.28	74	24.72
2483.5	47.88	PK	200	1.4	H	31	4.4	32.7	50.58	74	23.42

Note: The BAND EDGE RESTRICTED BANDS emission is too low at least 20dB to the Fundamental.

802.11g

Indicated		result (PK/AV)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247		
Frequency (MHz)	Receiver Reading (dBμV/m)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit dBμV/m)	Margin (dB)
Low Channel (2412MHz)											
2390	36.36	AV	350	1.1	V	30.3	4.1	33.1	37.66	54	16.34
2390	38.77	AV	90	1.3	H	30.3	4.1	33.1	40.07	54	13.93
2390	58.98	PK	290	1.7	V	30.3	4.1	33.1	60.28	74	13.72
2390	63.28	PK	120	1.3	H	30.3	4.1	33.1	64.58	74	9.42
HighChannel (2462MHz)											
2483.5	37.33	AV	30	1.4	V	31	4.4	32.7	40.03	54	13.97
2483.5	40.97	AV	280	1.7	H	31	4.4	32.7	43.67	54	10.33
2483.5	63.11	PK	150	1.1	V	31	4.4	32.7	65.81	74	8.19
2483.5	65.58	PK	90	1.4	H	31	4.4	32.7	68.28	74	5.72

Note: the BAND EDGE RESTRICTED BANDS emission is too low at least 20dB to the Fundamental.

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802.11n HT20

Indicated		result (PK/AV)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247		
Frequency (MHz)	Receiver Reading (dBμV/m)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit dBμV/m)	Margin (dB)
Low Channel (2412MHz)											
2390	39.25	AV	20	1.2	V	30.3	4.1	33.1	40.55	54	13.45
2390	42.57	AV	10	1.9	H	30.3	4.1	33.1	43.87	54	10.13
2390	61.88	PK	190	1.7	V	30.3	4.1	33.1	63.18	74	10.82
2390	65.56	PK	310	1.7	H	30.3	4.1	33.1	66.86	74	7.14
HighChannel (2462MHz)											
2483.5	40.72	AV	260	1.7	V	31	4.4	32.7	43.42	54	10.58
2483.5	44.32	AV	210	1.3	H	31	4.4	32.7	47.02	54	6.98
2483.5	62.57	PK	280	1.7	V	31	4.4	32.7	65.27	74	8.73
2483.5	64.43	PK	160	1.2	H	31	4.4	32.7	67.13	74	6.87

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Band-edge Measurement

Conducted measurement:

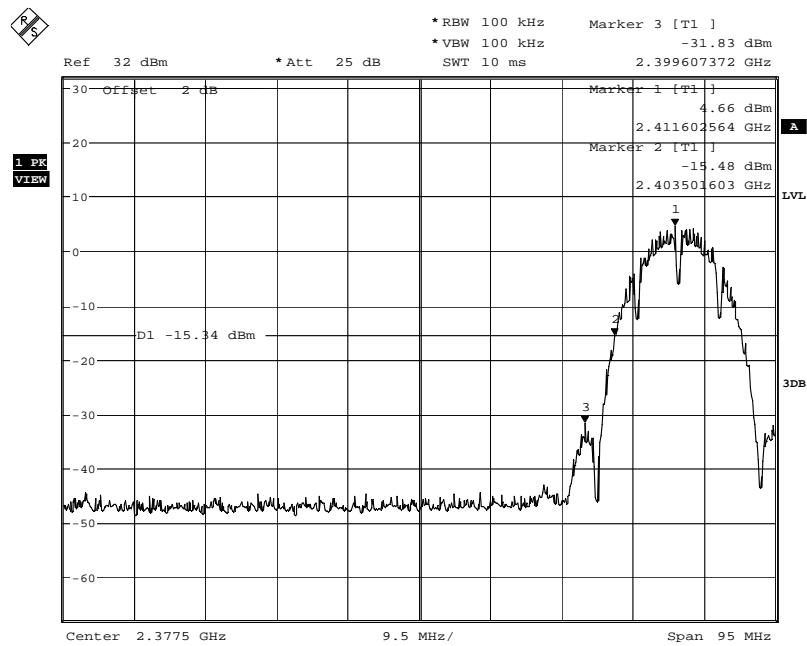
For 802.11b mode

CH01 at 1Mbps

Band-edge and Restricted band Measurement

EUT	WIFI Smart Plug	Model	KK-SP3
Mode	Keeping Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



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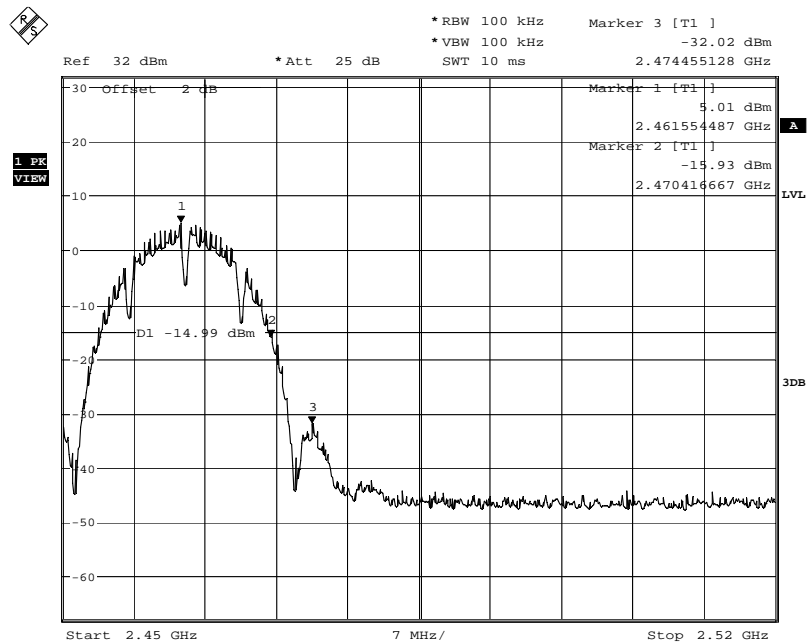


CH11 at 1Mbps

Band-edge Measurement

EUT	WIFI Smart Plug	Model	KK-SP3
Mode	Keeping Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Note: The Max. FS in Restrict Band are measured in conventional method.

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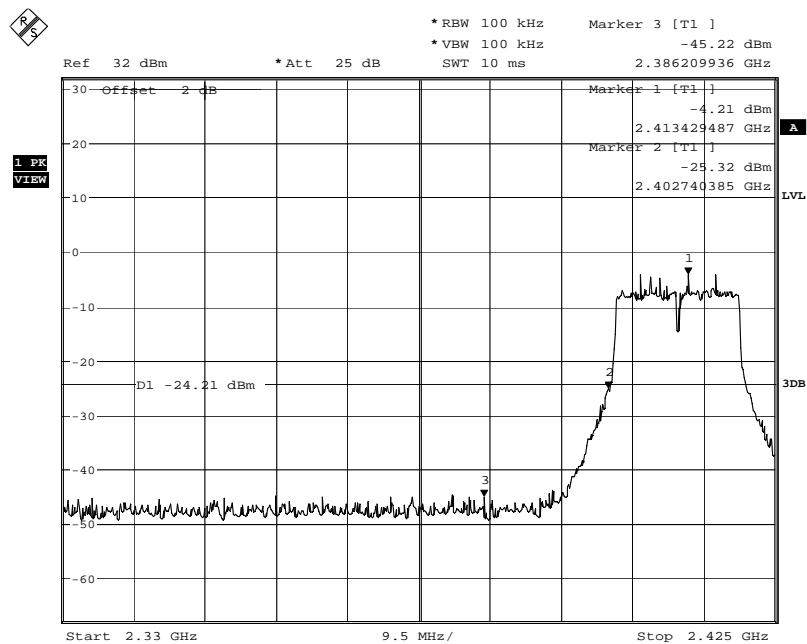


For 802.11g mode

CH01 at 6Mbps
Band-edge Measurement

EUT	WIFI Smart Plug	Model	KK-SP3
Mode	Keeping Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



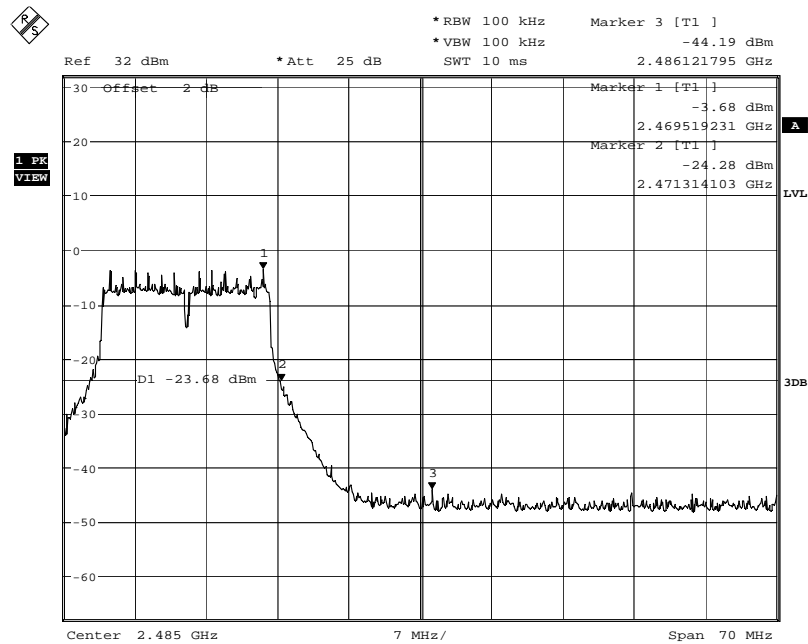
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CH11 at 6Mbps
Band-edge Measurement

EUT	WIFI Smart Plug	Model	KK-SP3
Mode	Keeping Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Note: The Max. FS in Restrict Band are measured in conventional method.

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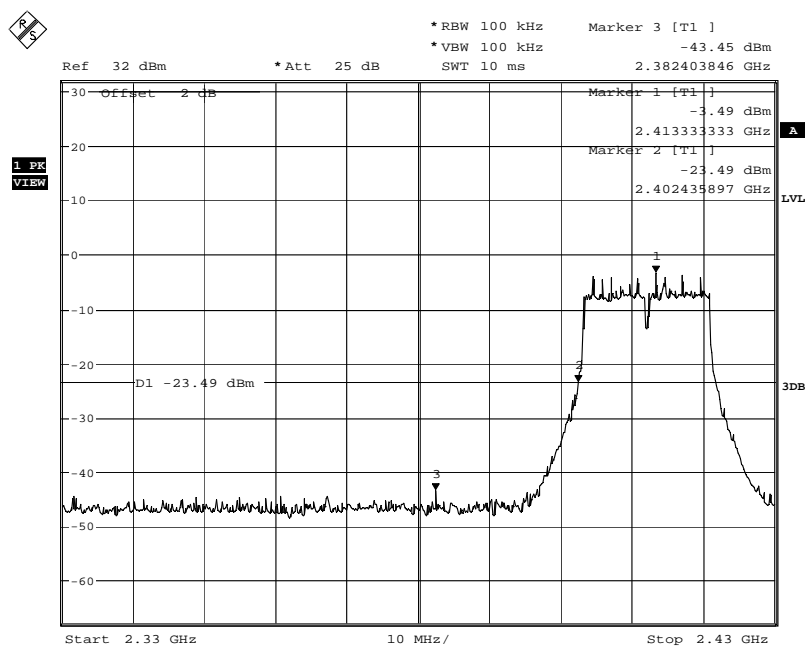
For 802.11n (HT20) mode

CH01 at 6.5Mbps

Band-edge and Restricted band Measurement

EUT	WIFI Smart Plug	Model	KK-SP3
Mode	Keeping Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



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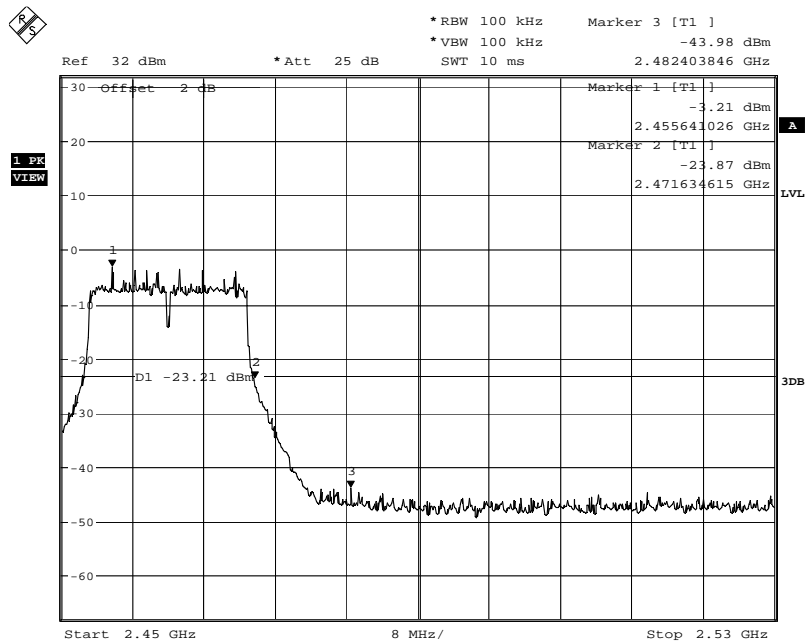


CH11 at 6.5Mbps

Band-edge and Restricted band Measurement

EUT	WIFI Smart Plug	Model	KK-SP3
Mode	Keeping Transmitting	Input Voltage	120V~
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Note: The Max. FS in Restrict Band are measured in conventional method.

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11.0 Antenna Requirement

11.1 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.

11.2 Antenna Connected construction

Integral antenna used. The maximum Gain of the antennas is 0.5dBi.

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12.0 Photo of testing

Conducted Emission Test Setup:

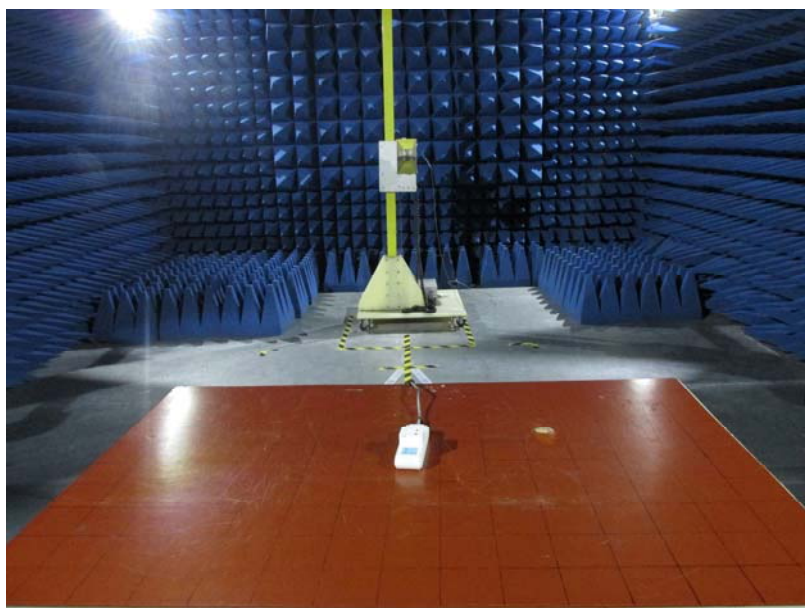
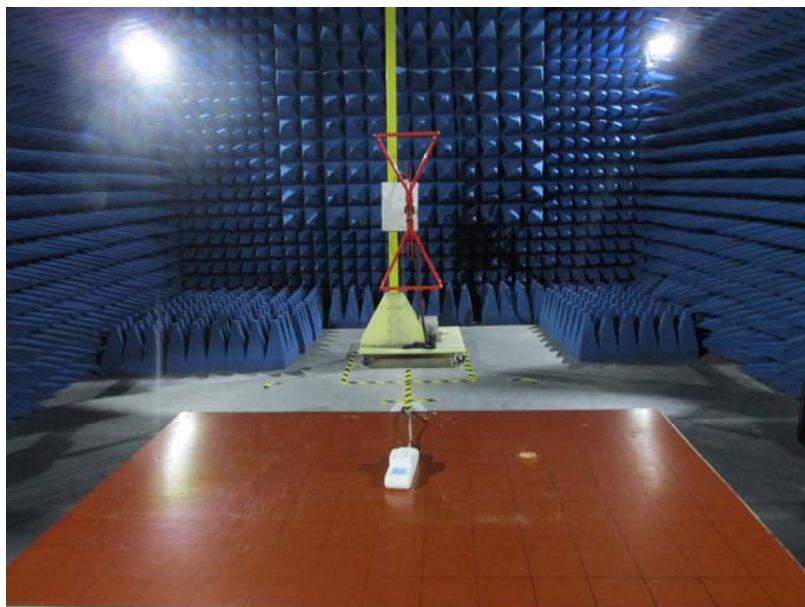


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Radiated Emission Test Setup:



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Appearance photograph of EUT



Appearance photograph of EUT

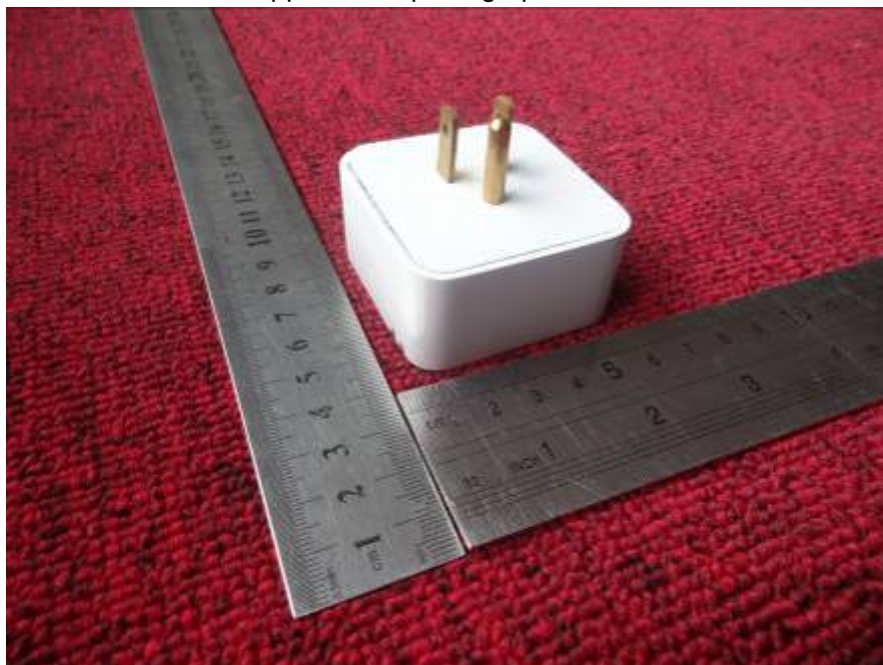


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Appearance photograph of EUT



Appearance photograph of EUT



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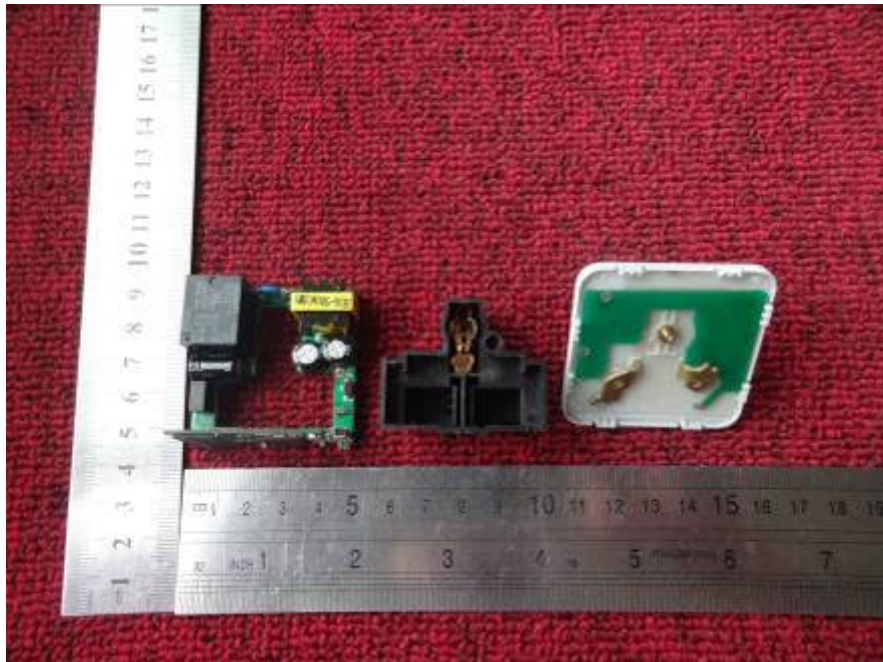
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Internal photograph of EUT



Internal photograph of EUT

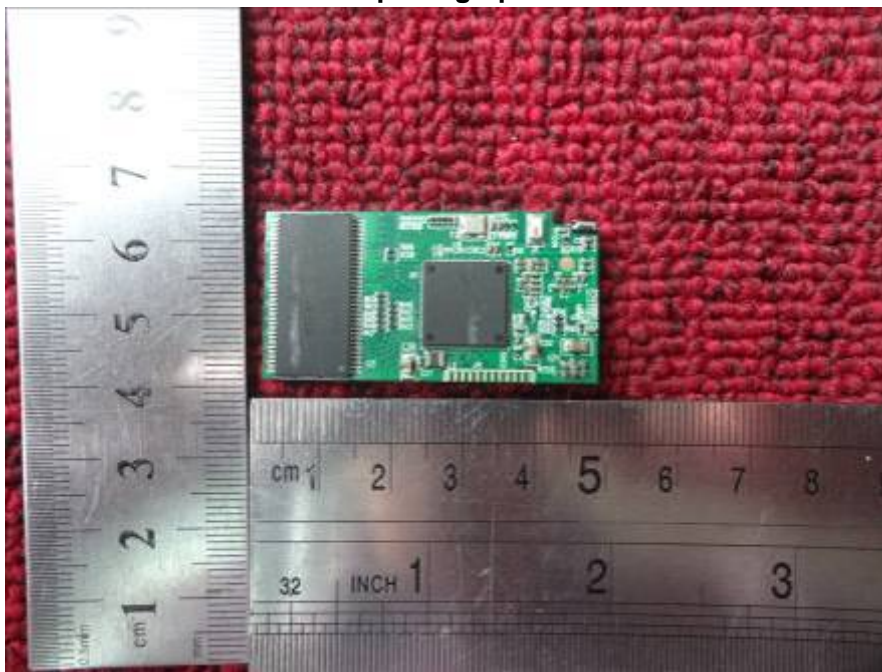


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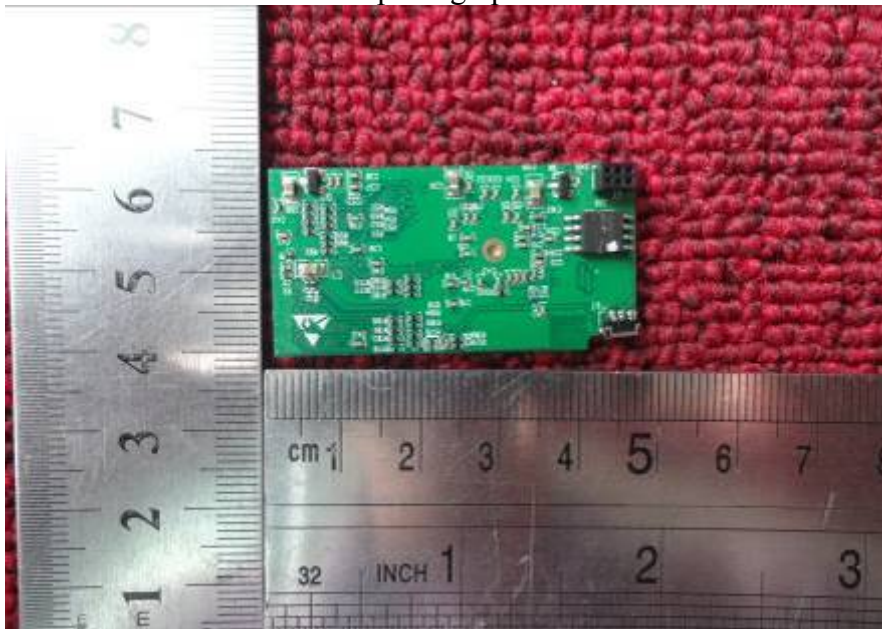
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Internal photograph of EUT



Internal photograph of EUT

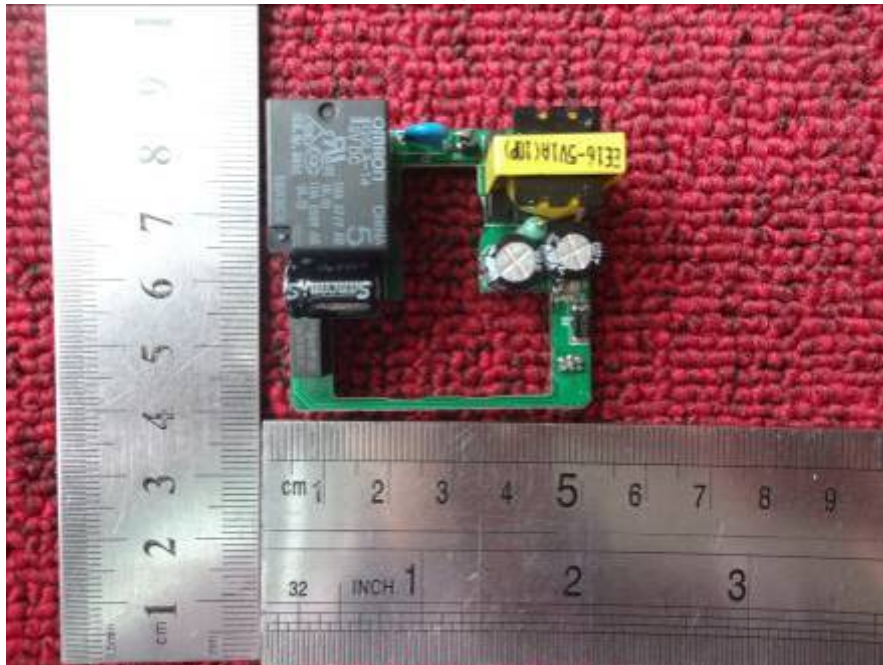


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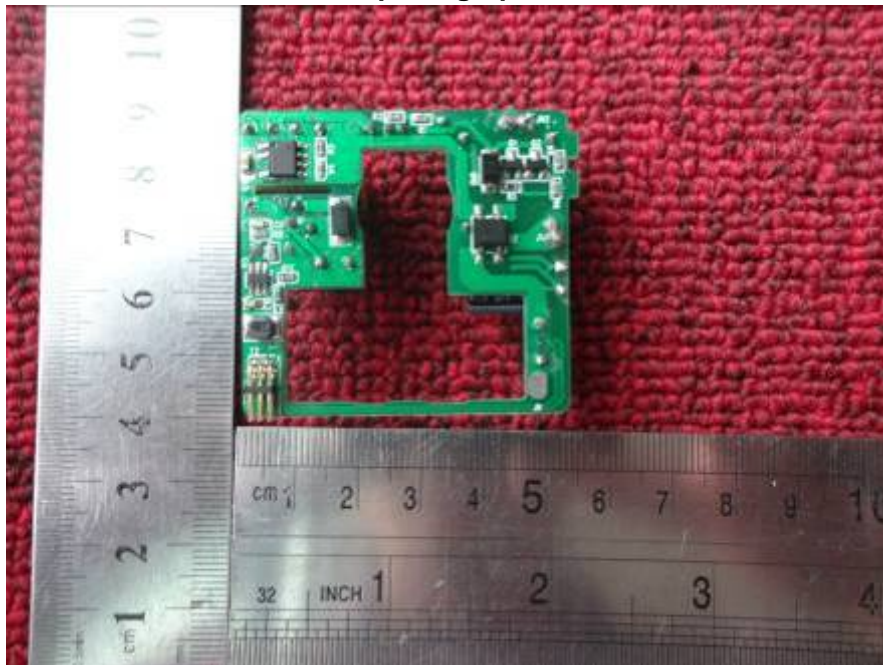
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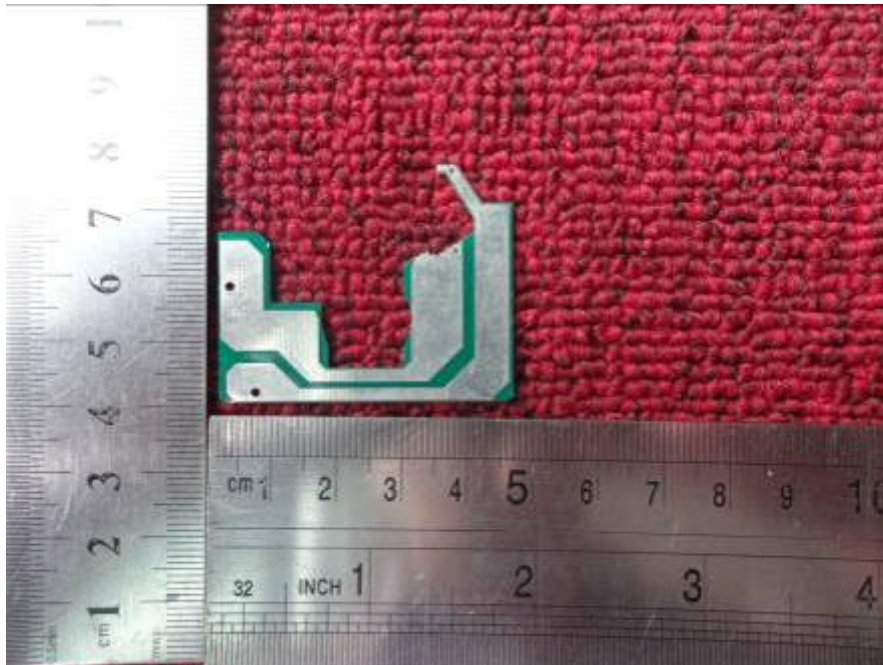


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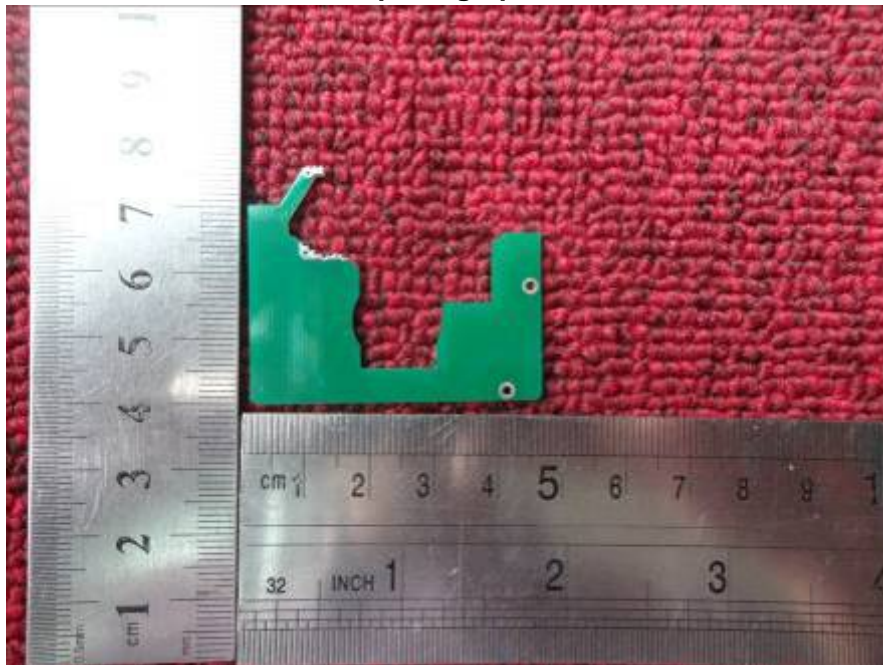
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Internal photograph of EUT



Internal photograph of EUT



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