FCC Part 15
EMI TEST REPORT

of

E.U.T. : IR Day & Night Auto-Networking IP Camera

Model No. : EZ-IP01HW

FCC ID. : 2AA3ZIPCAM01

for

APPLICANT : EZ-WATCHING CO.,LTD

ADDRESS : 4F.-2, NO.77, Wufu 1st Rd., Lingya Dist., Kaohsiung City, 802, Taiwan

Test Performed by

ELECTRONICS TESTING CENTER, TAIWAN
NO. 34. LIN 5, DINGFU VIL., LINKOU DIST.,
NEW TAIPEI CITY, TAIWAN, 24442, R.O.C
Tel : (02)26023052 Fax : (02)26010910
http://www.etc.org.tw ; e-mail: emc@etc.org.tw
Report Number : 13-07-RBF-043-01

TEST REPORT CERTIFICATION

Applicant : EZ-WATCHING CO.,LTD

4F.-2, NO.77, Wufu 1st Rd., Lingya Dist., Kaohsiung City, 802, Taiwan

Manufacturer : EZ-WATCHING CO.,LTD

4F.-2, NO.77, Wufu 1st Rd., Lingya Dist., Kaohsiung City, 802, Taiwan

Description of EUT

a) Type of EUT : IR Day & Night Auto-Networking IP Camera

b) Trade Name : ---

c) Model No. : EZ-IP01HW

d) Serial Model No. : EZ-IP02HW; EZ-IP03HW; EZ-IP01HWH; EZ-IP02HWH; EZ-IP03HWH; EZ-IP04HWH; EZ-IP05HWH

e) Power Supply Adapter:DSA-12CA-12
I/P:100-240V.50-60Hz,0.3A
O/P:12V,1A

Regulation Applied : FCC Rules and Regulations Part 15 Subpart C

I HEREBY CERTIFY THAT: The data shown in this report were made in accordance with the procedures given in ANSI C63.4, and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

Note: 1. The result of the testing report relate only to the item tested.
2. The testing report shall not be reproduced expect in full, without the written approval of ETC.

Summary of Tests

Test	Results
Radiated Emission	**Pass**
Conducted Emission	**Pass**
Hopping Channel Separation	**Pass**
Number of Hopping frequencies used	**Pass**
Hopping Channel Bandwidth	**Pass**
Dwell Time of each frequency	**Pass**
Output Power Requirement	**Pass**
100 kHz Bandwidth of Frequency Band Edges Requirement	**Pass**
Out-of-Band Conducted Emission Requirement	**Pass**

Date Test Item Received	:	*Jul. 31, 2013*
Date Test Campaign Completed	:	*Sep. 03, 2013*
Date of Issue	:	*Oct. 21, 2013*

Test Engineer : Jiapeng Chen

(Jiapeng Chen, Engineer)

Approve & Authorized : S. S. Liou

S. S. Liou, Section Manager
EMC Dept. II of ELECTRONICS
TESTING CENTER, TAIWAN

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1 GENERAL INFORMATION

1.1 Product Description

a) Type of EUT	:	IR Day & Night Auto-Networking IP Camera
b) Trade Name	:	---
c) Model No.	:	EZ-IP01HW
d) Serial Model No.	:	EZ-IP02HW; EZ-IP03HW; EZ-IP01HWH; EZ-IP02HWH; EZ-IP03HWH; EZ-IP04HWH; EZ-IP05HWH
e) Power Supply	:	Adapter:DSA-12CA-12 I/P:100-240V.50-60Hz,0.3A O/P:12V,1A
f) Model Difference	:	Only model name designation is different, the device is the same.

1.2 Characteristics of Device

Size of EUT	:	105mm x 45mm x 20mm
Frequency band	:	IEEE 802.11b/g/n HT-20: 2412MHz~2462MHz IEEE 802.11n HT-40: 2422MHz~2452MHz
Number of channels	:	IEEE 802.11b / g / n HT-20: 11 channels IEEE 802.11n HT-40: 7 channels
Channel spacing	:	5MHz
Transmitter antenna source	:	Integrated PCB antenna

1.3 Test Methodology

Both conducted and radiated emissions were performed according to the procedures illustrated in ANSI C63.4 (2003). Other required measurements were illustrated in separate sections of this test report for details. For RF test the measurement procedure was refered to FCC KDB 558074 D01 DTS Meas Guidance v03r01.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the roof top of Building at NO. 34. LIN 5, DINGFU VIL., LINKOU DIST., NEW TAIPEI CITY, TAIWAN, 24442, R.O.C.

This site has been fully described in a report submitted to your office, and accepted in a letter dated Jan. 11, 2011.

2 PROVISIONS APPLICABLE

2.1 Definition

Unintentional radiator:
A device that intentionally generates and radio frequency energy for use within the device, or that sends radio frequency signals by conduction to associated equipment via connecting wiring, but which is not intended to emit RF energy by radiation or induction.

Class A Digital Device:
A digital device which is marketed for use in commercial or business environment; exclusive of a device which is market for use by the general public, or which is intended to be used in the home.

Class B Digital Device :
A digital device which is marketed for use in a residential environment notwithstanding use in a commercial, business of industrial environment. Example of such devices that are marketed for the general public.

Note : A manufacturer may also qualify a device intended to be marketed in a commercial, business, or industrial environment as a Class B digital device, and in fact is encouraged to do so, provided the device complies with the technical specifications for a Class B Digital Device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B Digital Device, Regardless of its intended use.

Intentional radiator:
A device that intentionally generates and emits radio frequency energy by radiation or induction.

2.2 Requirement for Compliance

(1) Conducted Emission Requirement

Except for Class A digital devices, for equpment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency MHz	Quasi Peak dB μV	Average dB μV
0.15 - 0.5	66-56*	56-46*
0.5 - 5.0	56	46
5.0 - 30.0	60	50

* Decreases with the logarithm of the frequency

(2) Radiated Emission Requirement

For unintentional device, according to §15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency MHz	Distance Meters	Radiated dB μV/m	Radiated μV/m
30 - 88	3	40.0	100
88 - 216	3	43.5	150
216 - 960	3	46.0	200
Above 960	3	54.0	500

For intentional device, according to §15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

(3) Antenna Requirement

For intentional device, according to §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.

(4) Bandwidth Requirement

For direct sequence system, according to 15.247(a)(2), the minimum 6dB bandwidth shall be at least 500 kHz.

(5) Output Power Requirement

For direct sequence system, according to 15.247(b), the maximum peak output power of the transmitter shall not exceed 1 Watt. If transmitting 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.

(6) 100 kHz Bandwidth of Frequency Band Edges Requirement

According to 15.247(c), if any 100 kHz bandwidth outside these frequency bands, the radio frequency power that is produced by the modulation products of the spreading sequence, the information sequence and the carrier frequency shall be either at least 20 dB below that in any 100 kHz bandwidth within the band that contains the highest level of the desired power or shall not exceed the general levels specified in §15.209(a), whichever results in the lesser attenuation.

(7) Power Density Requirement

According to 15.247(d), for direct sequence systems, the transmitted power density averaged over any 1 second interval shall not be greater than 8 dBm in any 3 kHz bandwidth within these bands.

2.3 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below :

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42-16.423	399.9-410	4.5-5.15
0.495 - 0.505 **	16.69475 - 16.69525	608-614	5.35-5.46
2.1735 - 2.1905	16.80425 - 16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475 - 156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3360-4400	Above 38.6
13.36-13.41			

** : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

2.4 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device :

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions : (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

2.5 User Information

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual.

The Federal Communications Commission Radio Frequency Interference Statement includes the following paragraph.

This equipment has been tested and found to comply with the limits for a Class B Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.

-- Increase the separation between the equipment and receiver.

-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-- Consult the dealer or an experienced radio / TV technician for help.

3. SYSTEM TEST CONFIGURATION

3.1 Justification

For both radiated and conducted emissions below 1 GHz, the system was configured for testing in a typical fashion as a customer would normally use it. The peripherals other than EUT were connected in normally standing by situation. Measurement was performed under the condition that a computer program was exercised to simulate data communication of EUT, and the transmission rate was set to maximum allowed by EUT. Three highest emissions were verified with varying placement of the cables connected to EUT to maximize the emission from EUT.

For conducted and radiated spurious emissions, whichever RF channel is operated, the digital circuits function identically. As the reason, measurement of radiated emissions from digital circuits is only performed with channel 1 by transmitting mode.

3.2 Devices for Tested System

Device	Manufacture	Model / FCC ID	Cable Description
IR Day & Night Auto-Networking IP Camera *	EZ-WATCHING CO.,LTD	EZ-IP01HW / 2AA3ZIPCAM01	1.6m Unshielded AC Adaptor Power Cord 1.8m Uhshielded RJ45 Line
Notebook PC	DELL		1.8m Unshielded AC Adaptor Power Cord

Remark "*" means equipment under test.

4 RADIATED EMISSION MEASUREMENT

4.1 Applicable Standard

For unintentional radiator, the radiated emission shall comply with §15.109(a).
For intentional radiators, according to §15.247 (a), operation under this provision is limited to frequency hopping and direct sequence spread spectrum, and the out band emission shall be comply with §15.247 (c)

4.2 Measurement Procedure

1. Setup the configuration per figure 1 and 2 for frequencies measured below and above 1 GHz respectively.
2. For emission frequencies measured below 1 GHz, a pre-scan is performed in a shielded chamber to determine the accurate frequencies of higher emissions will be checked on a open test site. As the same purpose, for emission frequencies measured above 1 GHz, a pre-scan also be performed with a 1 meter measuring distance before final test.
3. For emission frequencies measured below and above 1 GHz, set the spectrum analyzer on a 100 kHz and 1 MHz resolution bandwidth respectively for each frequency measured in step 2.
4. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0 ° to 360 ° with a speed as slow as possible, and keep the azimuth that highest emission is indicated on the spectrum analyzer. Vary the antenna position again and record the highest value as a final reading. A RF test receiver is also used to confirm emissions measured.
5. Repeat step 4 until all frequencies need to be measured were complete.
6. Repeat step 5 with search antenna in vertical polarized orientations.
7. Check the three frequencies of highest emission with varying the placement of cables associated with EUT to obtain the worse case and record the result.

Figure 1 : Frequencies measured below 1 GHz configuration

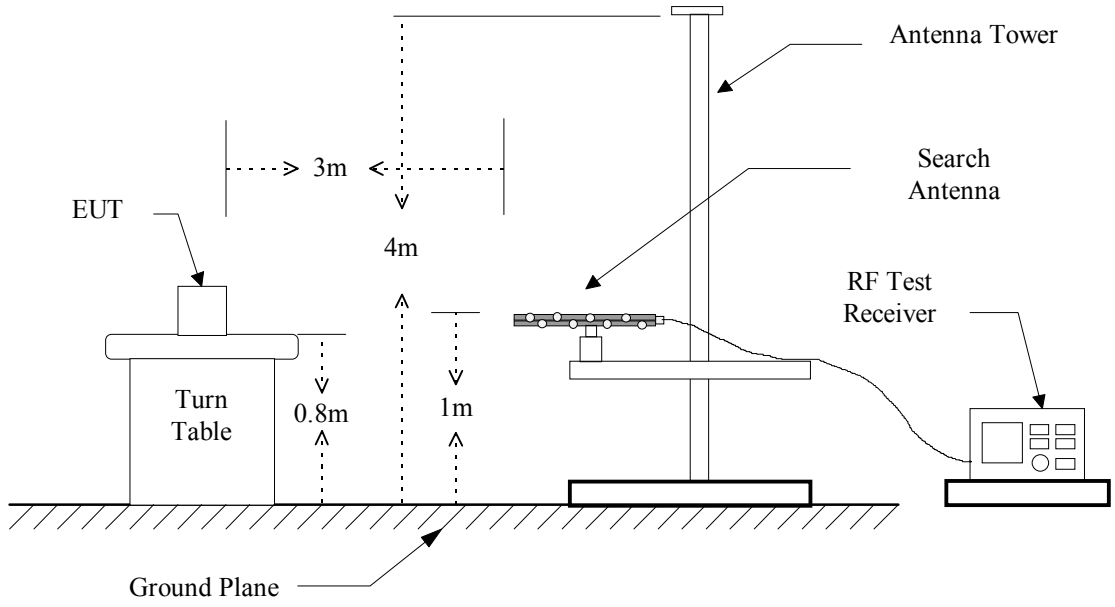
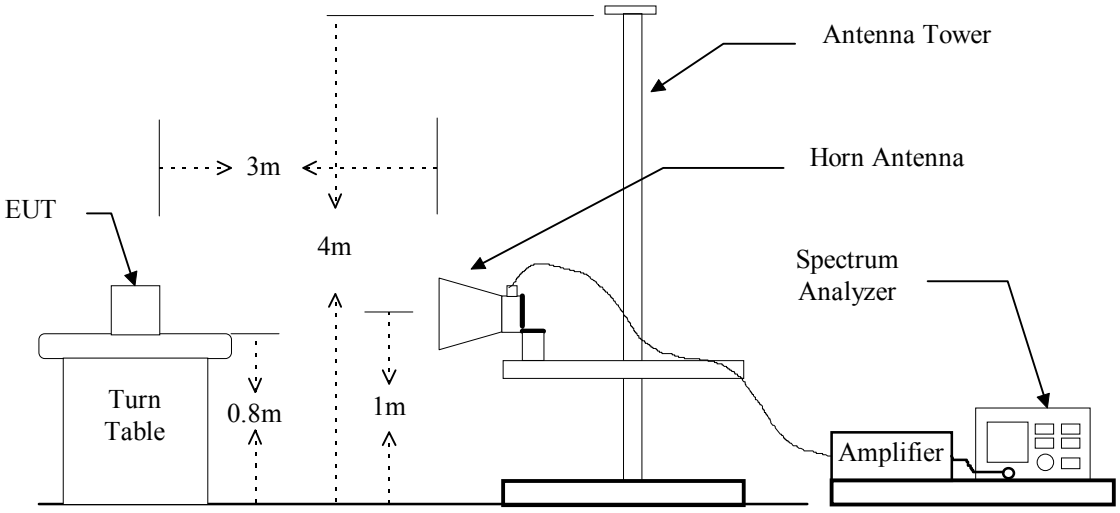


Figure 2 : Frequencies measured above 1 GHz configuration



4.3 Measuring Instrument

The following instrument are used for radiated emissions measurement:

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Test Receiver	Rohde & Schwarz	ESVS30	2013/05/06	2014/05/05
EMI Test Receiver	Rohde & Schwarz	ESL	2013/07/29	2014/07/28
Bi-Log Antenna	ETC	MCTD 2756	2013/01/17	2014/01/16
Log-periodic Antenna	EMCO	3146	2012/10/17	2013/10/16
Double Ridged Guide Horn Antenna	EMCO	3116	2012/11/23	2013/11/22
Biconical Antenna	EMCO	3110B	2012/12/13	2013/12/12
Double Ridged Antenna	EMCO	3115	2013/04/29	2014/04/28
Amplifier	HP	8449B	2013/01/09	2014/01/08
Amplifier	HP	83051A	2013/05/06	2014/05/05
Amplifier	HP	8447D	2013/05/03	2014/05/02
Spectrum	Rohde & Schwarz	FSP40	2012/12/07	2013/12/06

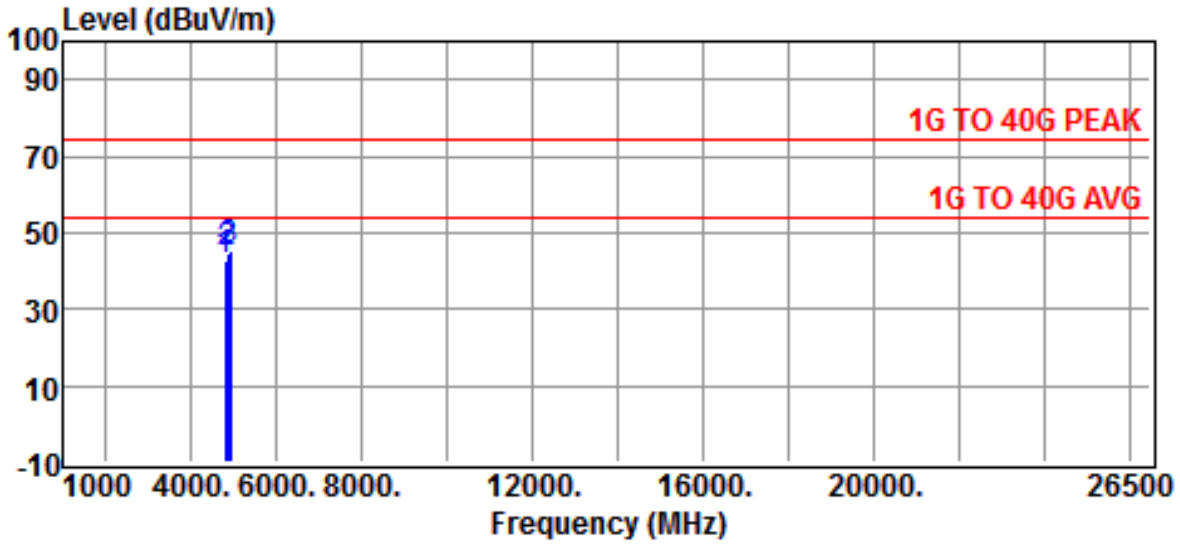
Measuring instrument setup in measured frequency band when specified detector function is used :

Frequency Band (MHz)	Instrument	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	RF Test Receiver	Quasi-Peak	120 kHz	N/A
	Spectrum Analyzer	Peak	100 kHz	100 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	1 MHz
	Spectrum Analyzer	Average	1 MHz	10 Hz

4.4 Radiated Emission Data

4.4.1 RF Portion

A. (802.11b)

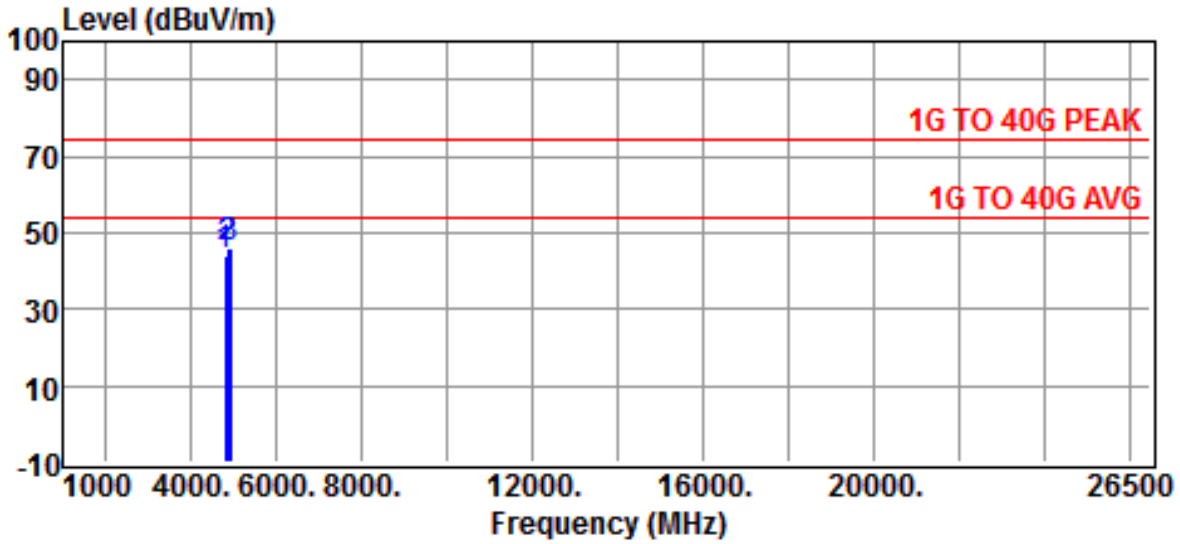


Site	:CHAMBER #2	Date	:2013-09-05
Limit	:1G TO 40G PEAK	Ant. Pol.	:HORIZONTAL
EUT	:802.11bgn IP Camera	Temp.	:24°C
Power Rating	:120V/60Hz	Humi.	:60%
Model	:EZ-IP01HW	Engineer.	:Jiapeng
Test Mode	:802.11B		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
4824.0000	41.2	1.3	42.5	74.0	-31.5	Peak
4874.0000	43.1	1.4	44.5	74.0	-29.5	Peak
4924.0000	43.8	1.5	45.3	74.0	-28.7	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.



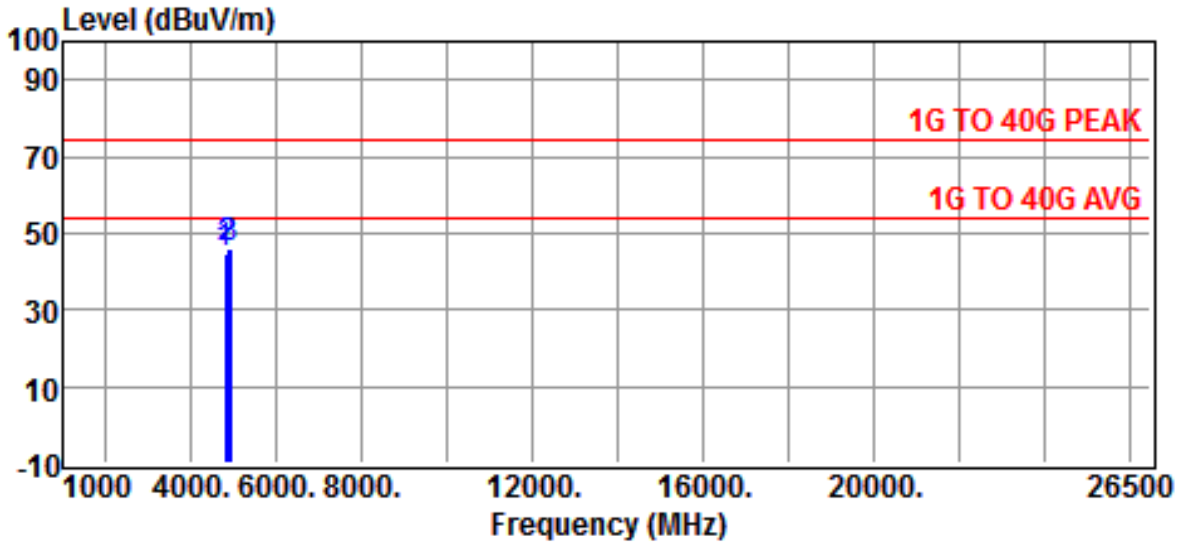
Site	:CHAMBER #2	Date	:2013-09-05
Limit	:1G TO 40G PEAK	Ant. Pol.	:VERTICAL
EUT	:802.11bgn IP Camera	Temp.	:24°C
Power Rating	:120V/60Hz	Humi.	:60%
Model	:EZ-IP01HW	Engineer.	:Jiapeng
Test Mode	:802.11B		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
4824.0000	42.6	1.3	43.9	74.0	-30.1	Peak
4874.0000	44.3	1.4	45.7	74.0	-28.3	Peak
4924.0000	44.3	1.5	45.8	74.0	-28.2	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

B. (802.11g)

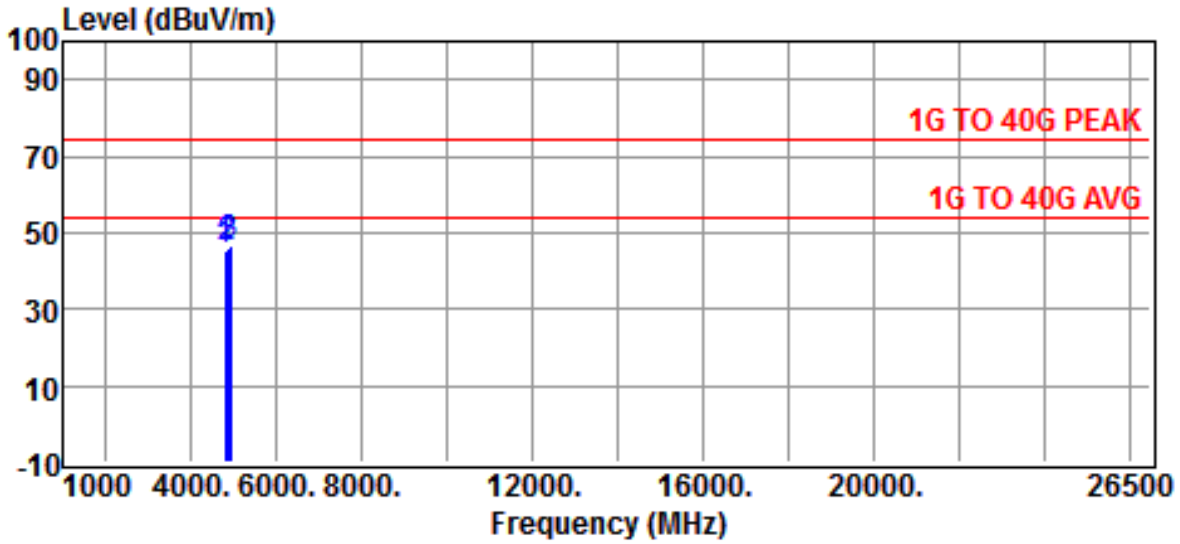


Site	:CHAMBER #2	Date	:2013-09-05
Limit	:1G TO 40G PEAK	Ant. Pol.	:HORIZONTAL
EUT	:802.11bgn IP Camera	Temp.	:24°C
Power Rating	:120V/60Hz	Humi.	:60%
Model	:EZ-IP01HW	Engineer.	:Jiapeng
Test Mode	:802.11G		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
4824.0000	43.3	1.3	44.6	74.0	-29.4	Peak
4874.0000	44.9	1.4	46.3	74.0	-27.7	Peak
4924.0000	44.6	1.5	46.1	74.0	-27.9	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.



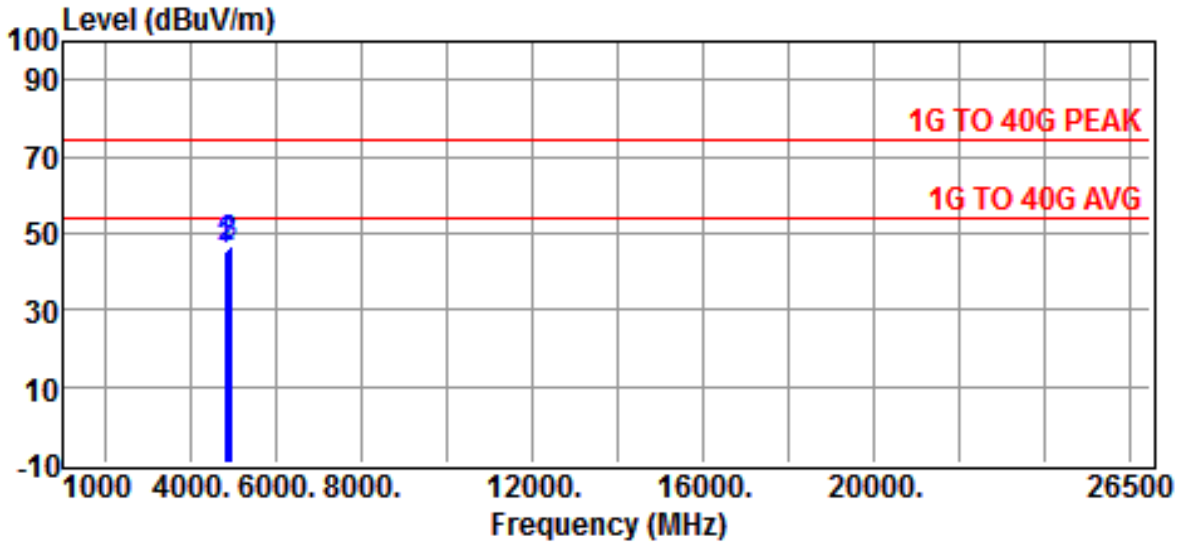
Site	:CHAMBER #2	Date	:2013-09-05
Limit	:1G TO 40G PEAK	Ant. Pol.	:VERTICAL
EUT	:802.11bgn IP Camera	Temp.	:24°C
Power Rating	:120V/60Hz	Humi.	:60%
Model	:EZ-IP01HW	Engineer.	:Jiapeng
Test Mode	:802.11G		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
4824.0000	43.8	1.3	45.1	74.0	-28.9	Peak
4874.0000	44.4	1.4	45.8	74.0	-28.2	Peak
4924.0000	45.1	1.5	46.6	74.0	-27.4	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

C. (802.11n HT-20)

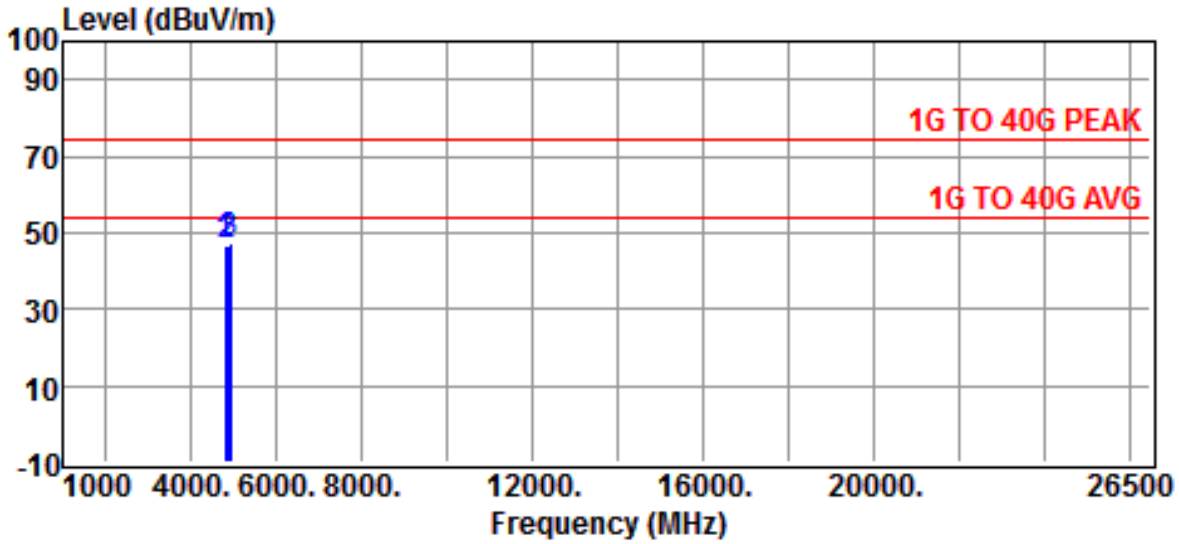


Site	:CHAMBER #2	Date	:2013-09-05
Limit	:1G TO 40G PEAK	Ant. Pol.	:HORIZONTAL
EUT	:802.11bgn IP Camera	Temp.	:24°C
Power Rating	:120V/60Hz	Humi.	:60%
Model	:EZ-IP01HW	Engineer.	:Jiapeng
Test Mode	:802.11N-20		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
4824.0000	43.8	1.3	45.1	74.0	-28.9	Peak
4874.0000	44.8	1.4	46.2	74.0	-27.8	Peak
4924.0000	45.4	1.5	46.9	74.0	-27.1	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.



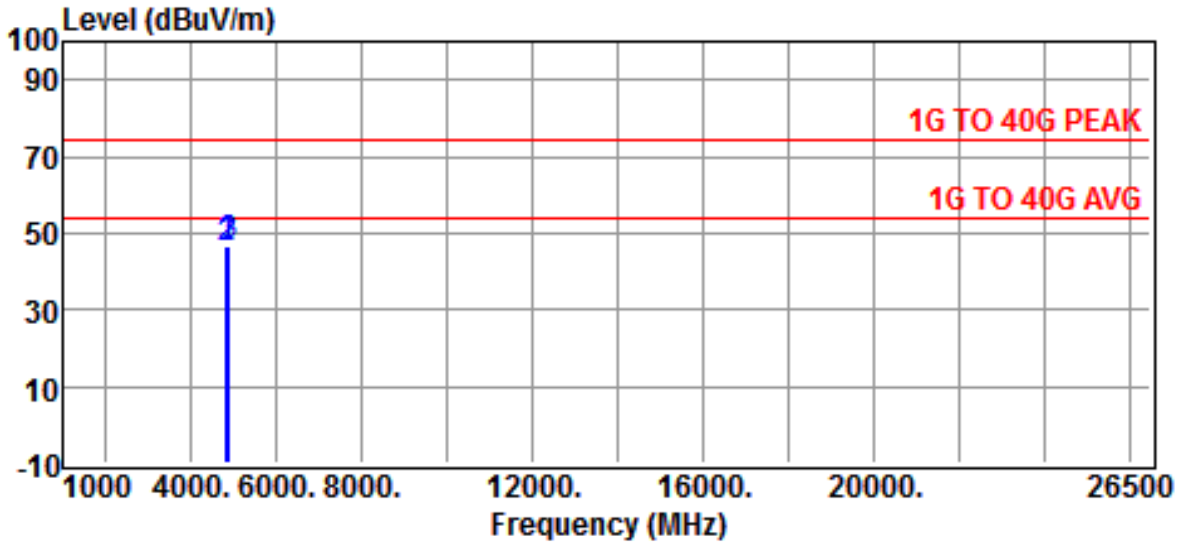
Site	:CHAMBER #2	Date	:2013-09-05
Limit	:1G TO 40G PEAK	Ant. Pol.	:VERTICAL
EUT	:802.11bgn IP Camera	Temp.	:24°C
Power Rating	:120V/60Hz	Humi.	:60%
Model	:EZ-IP01HW	Engineer.	:Jiapeng
Test Mode	:802.11N-20		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
4824.0000	45.5	1.3	46.8	74.0	-27.2	Peak
4874.0000	45.3	1.4	46.7	74.0	-27.3	Peak
4924.0000	45.5	1.5	47.0	74.0	-27.0	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

D. (802.11n HT-40)

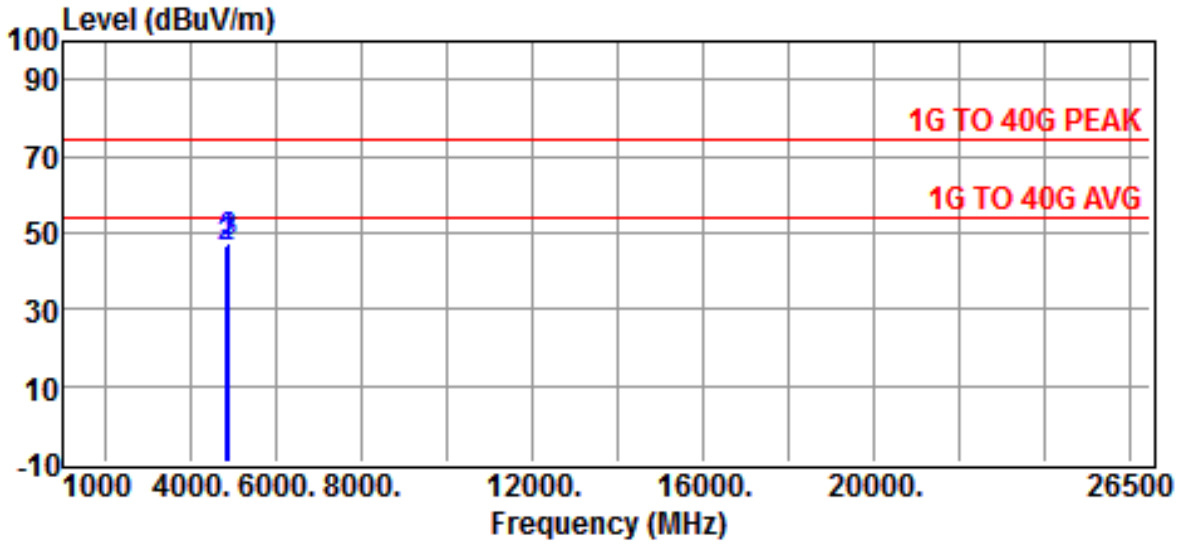


Site	:CHAMBER #2	Date	:2013-09-05
Limit	:1G TO 40G PEAK	Ant. Pol.	:HORIZONTAL
EUT	:802.11bgn IP Camera	Temp.	:24°C
Power Rating	:120V/60Hz	Humi.	:60%
Model	:EZ-IP01HW	Engineer.	:Jiapeng
Test Mode	:802.11N-40		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
4844.0000	45.6	1.3	46.9	74.0	-27.1	Peak
4874.0000	44.9	1.4	46.3	74.0	-27.7	Peak
4904.0000	45.4	1.4	46.8	74.0	-27.2	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.



Site	:CHAMBER #2	Date	:2013-09-05
Limit	:1G TO 40G PEAK	Ant. Pol.	:VERTICAL
EUT	:802.11bgn IP Camera	Temp.	:24°C
Power Rating	:120V/60Hz	Humi.	:60%
Model	:EZ-IP01HW	Engineer.	:Jiapeng
Test Mode	:802.11N-40		

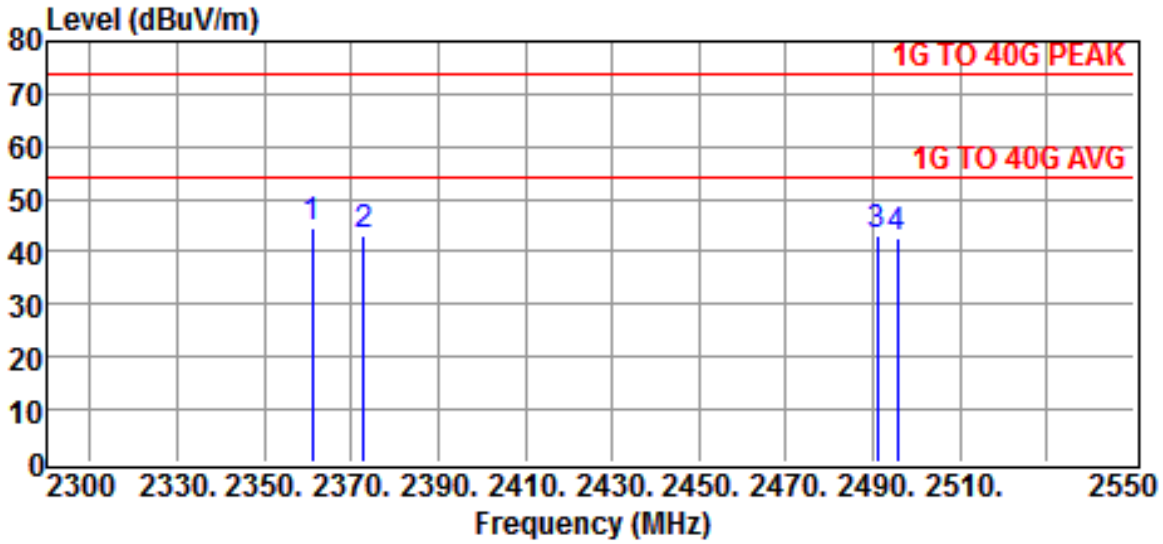
Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
4844.0000	45.3	1.3	46.6	74.0	-27.4	Peak
4874.0000	44.7	1.4	46.1	74.0	-27.9	Peak
4904.0000	45.7	1.4	47.1	74.0	-26.9	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

4.4.2 Radiated Eimssion of Restricted bands

A. (802.11b)

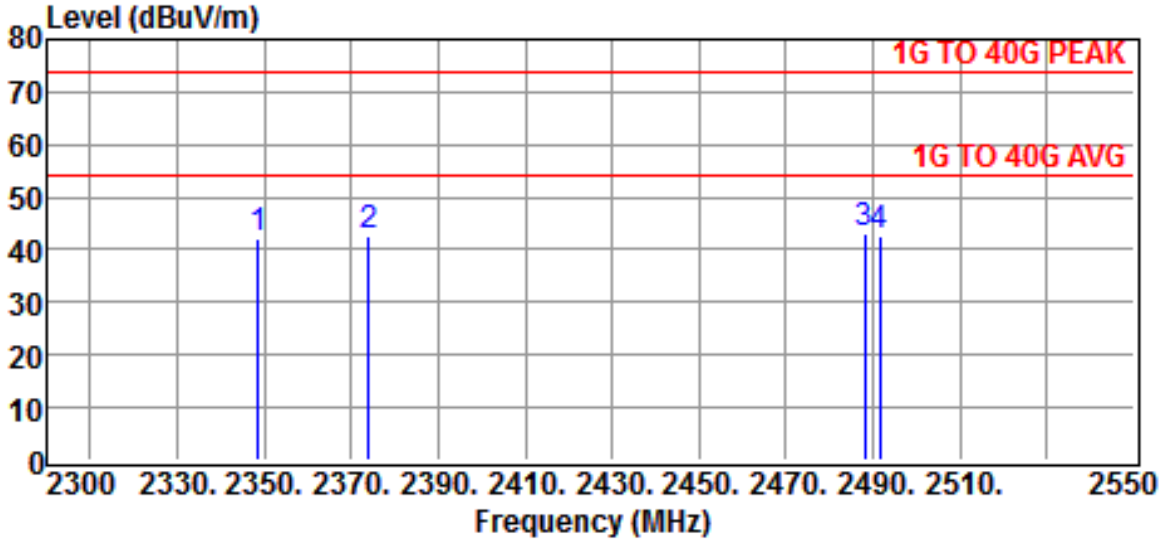


Site	:CHAMBER #2	Date	:2013-09-05
Limit	:1G TO 40G PEAK	Ant. Pol.	:HORIZONTAL
EUT	:802.11bgn IP Camera	Temp.	:25°C
Power Rating	:120V/60Hz	Humi.	:60%
Model	:EZ-IP01HW	Engineer.	:Jiapeng
Test Mode	:CH LO & HI - Restricted Bands		
Test Mode	:802.11B		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
2361.0000	50.4	-5.9	44.5	74.0	-29.5	Peak
2373.0000	48.8	-5.8	43.0	74.0	-31.0	Peak
2491.0000	48.5	-5.4	43.1	74.0	-30.9	Peak
2495.5000	48.0	-5.4	42.6	74.0	-31.4	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.



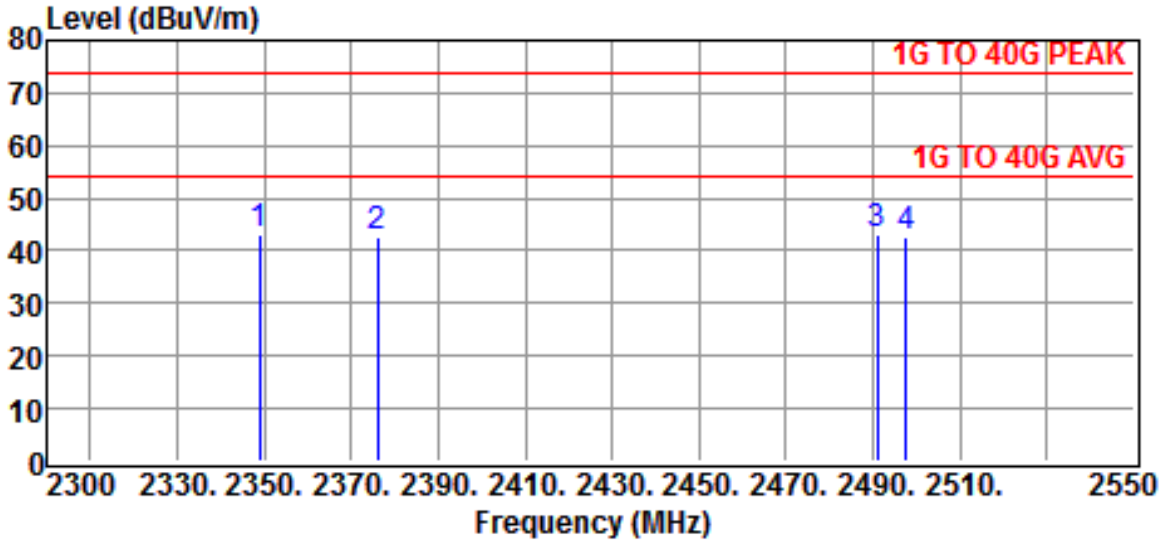
Site	:CHAMBER #2	Date	:2013-09-05
Limit	:1G TO 40G PEAK	Ant. Pol.	:VERTICAL
EUT	:802.11bgn IP Camera	Temp.	:25°C
Power Rating	:120V/60Hz	Humi.	:60%
Model	:EZ-IP01HW	Engineer.	:Jiapeng
Test Mode	:CH LO & HI - Restricted Bands		
Test Mode	:802.11B		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
2348.5000	47.9	-5.9	42.0	74.0	-32.0	Peak
2374.0000	48.5	-5.8	42.7	74.0	-31.3	Peak
2488.0000	48.4	-5.4	43.0	74.0	-31.0	Peak
2491.5000	48.1	-5.4	42.7	74.0	-31.3	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

B. (802.11g)

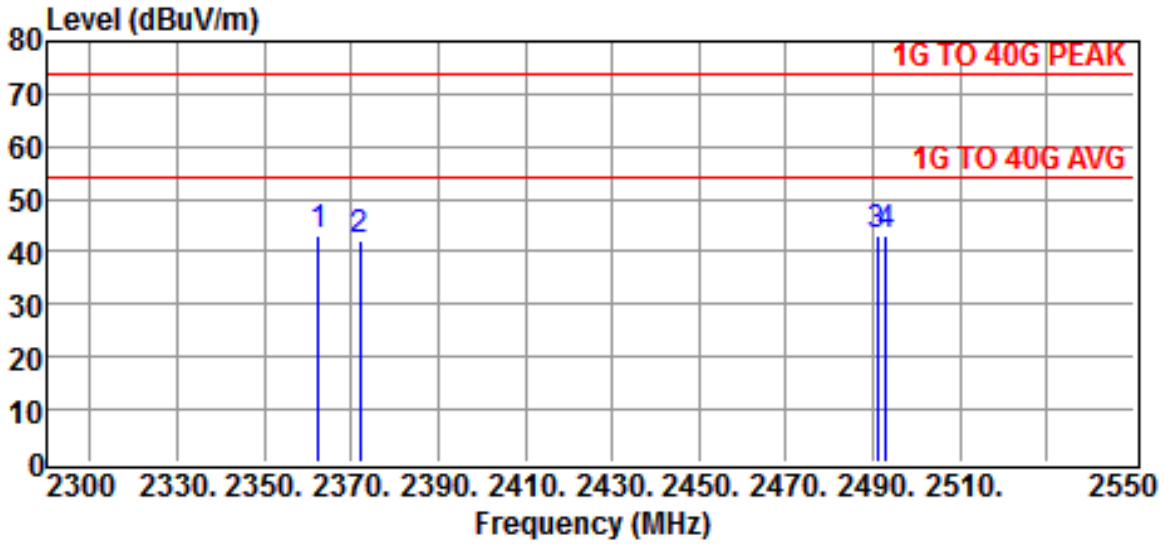


Site	:CHAMBER #2	Date	:2013-09-05
Limit	:1G TO 40G PEAK	Ant. Pol.	:HORIZONTAL
EUT	:802.11bgn IP Camera	Temp.	:25°C
Power Rating	:120V/60Hz	Humi.	:60%
Model	:EZ-IP01HW	Engineer.	:Jiapeng
Test Mode	:CH LO & HI - Restricted Bands		
Test Mode	:802.11G		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
2349.0000	49.2	-5.9	43.3	74.0	-30.7	Peak
2376.0000	48.2	-5.8	42.4	74.0	-31.6	Peak
2491.0000	48.3	-5.4	42.9	74.0	-31.1	Peak
2497.5000	47.9	-5.4	42.5	74.0	-31.5	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.



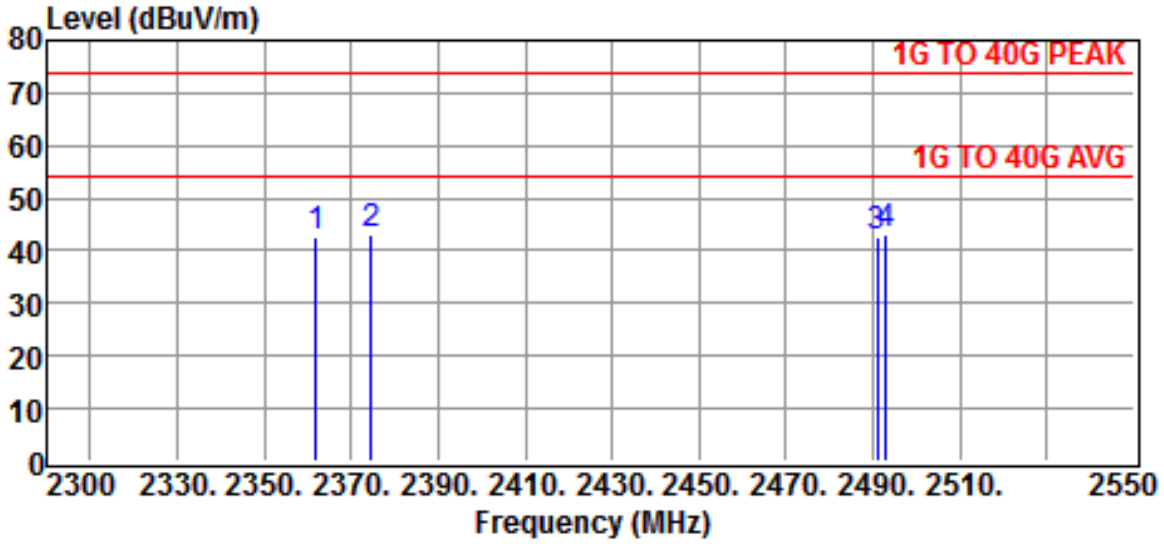
Site	:CHAMBER #2	Date	:2013-09-05
Limit	:1G TO 40G PEAK	Ant. Pol.	:VERTICAL
EUT	:802.11bgn IP Camera	Temp.	:25°C
Power Rating	:120V/60Hz	Humi.	:60%
Model	:EZ-IP01HW	Engineer.	:Jiapeng
Test Mode	:CH LO & HI - Restricted Bands		
Test Mode	:802.11G		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
2362.5000	49.0	-5.9	43.1	74.0	-30.9	Peak
2372.0000	47.9	-5.8	42.1	74.0	-31.9	Peak
2491.0000	48.3	-5.4	42.9	74.0	-31.1	Peak
2493.0000	48.5	-5.4	43.1	74.0	-30.9	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

C. (802.11n HT-20)

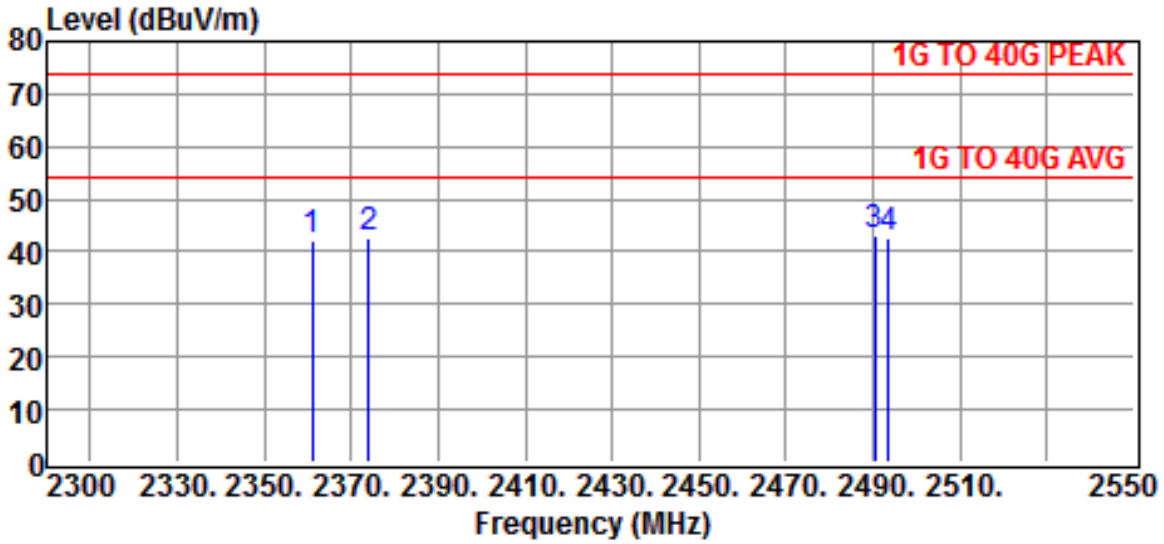


Site	:CHAMBER #2	Date	:2013-09-05
Limit	:1G TO 40G PEAK	Ant. Pol.	:HORIZONTAL
EUT	:802.11bgn IP Camera	Temp.	:25°C
Power Rating	:120V/60Hz	Humi.	:60%
Model	:EZ-IP01HW	Engineer.	:Jiapeng
Test Mode	:CH LO & HI - Restricted Bands		
Test Mode	:802.11N-20		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
2362.0000	48.6	-5.9	42.7	74.0	-31.3	Peak
2374.5000	48.8	-5.8	43.0	74.0	-31.0	Peak
2491.0000	48.0	-5.4	42.6	74.0	-31.4	Peak
2493.0000	48.3	-5.4	42.9	74.0	-31.1	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.



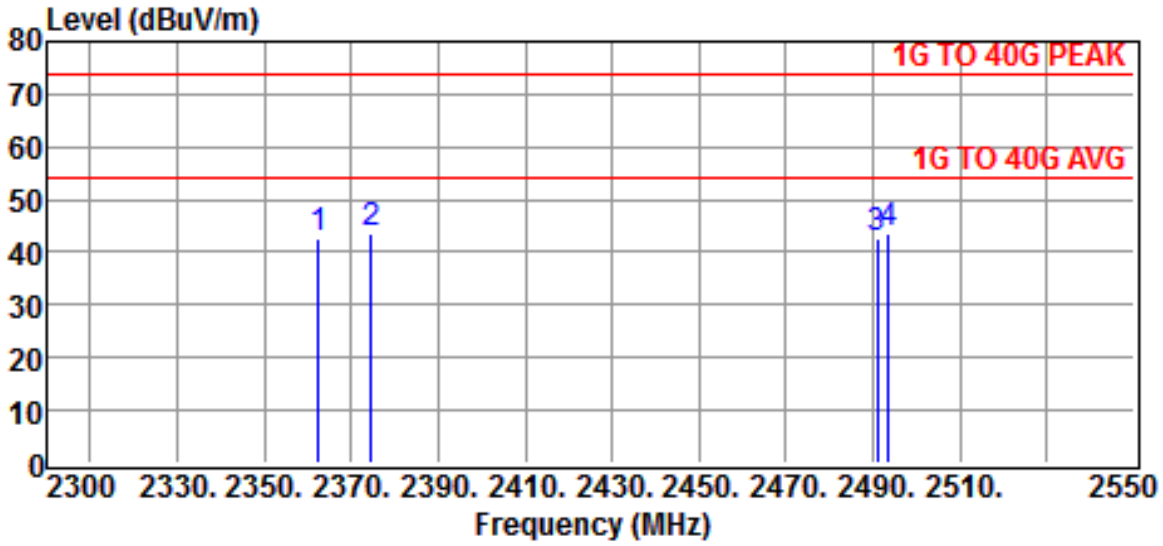
Site	:CHAMBER #2	Date	:2013-09-05
Limit	:1G TO 40G PEAK	Ant. Pol.	:VERTICAL
EUT	:802.11bgn IP Camera	Temp.	:25°C
Power Rating	:120V/60Hz	Humi.	:60%
Model	:EZ-IP01HW	Engineer.	:Jiapeng
Test Mode	:CH LO & HI - Restricted Bands		
Test Mode	:802.11N-20		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
2361.0000	47.9	-5.9	42.0	74.0	-32.0	Peak
2374.0000	48.6	-5.8	42.8	74.0	-31.2	Peak
2490.5000	48.5	-5.4	43.1	74.0	-30.9	Peak
2493.5000	48.2	-5.4	42.8	74.0	-31.2	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

D. (802.11n HT-40)

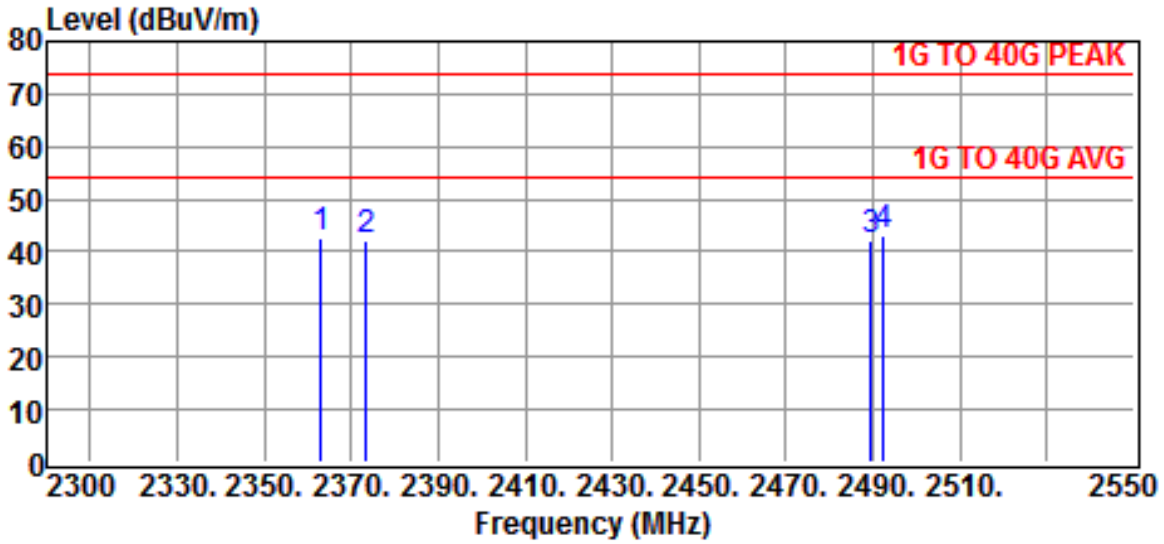


Site	:CHAMBER #2	Date	:2013-09-05
Limit	:1G TO 40G PEAK	Ant. Pol.	:HORIZONTAL
EUT	:802.11bgn IP Camera	Temp.	:25°C
Power Rating	:120V/60Hz	Humi.	:60%
Model	:EZ-IP01HW	Engineer.	:Jiapeng
Test Mode	:CH LO & HI - Restricted Bands		
Test Mode	:802.11N-40		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
2362.5000	48.5	-5.9	42.6	74.0	-31.4	Peak
2374.5000	49.2	-5.8	43.4	74.0	-30.6	Peak
2491.0000	48.2	-5.4	42.8	74.0	-31.2	Peak
2493.5000	48.8	-5.4	43.4	74.0	-30.6	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.



Site	:CHAMBER #2	Date	:2013-09-05
Limit	:1G TO 40G PEAK	Ant. Pol.	:VERTICAL
EUT	:802.11bgn IP Camera	Temp.	:25°C
Power Rating	:120V/60Hz	Humi.	:60%
Model	:EZ-IP01HW	Engineer.	:Jiapeng
Test Mode	:CH LO & HI - Restricted Bands		
Test Mode	:802.11N-40		

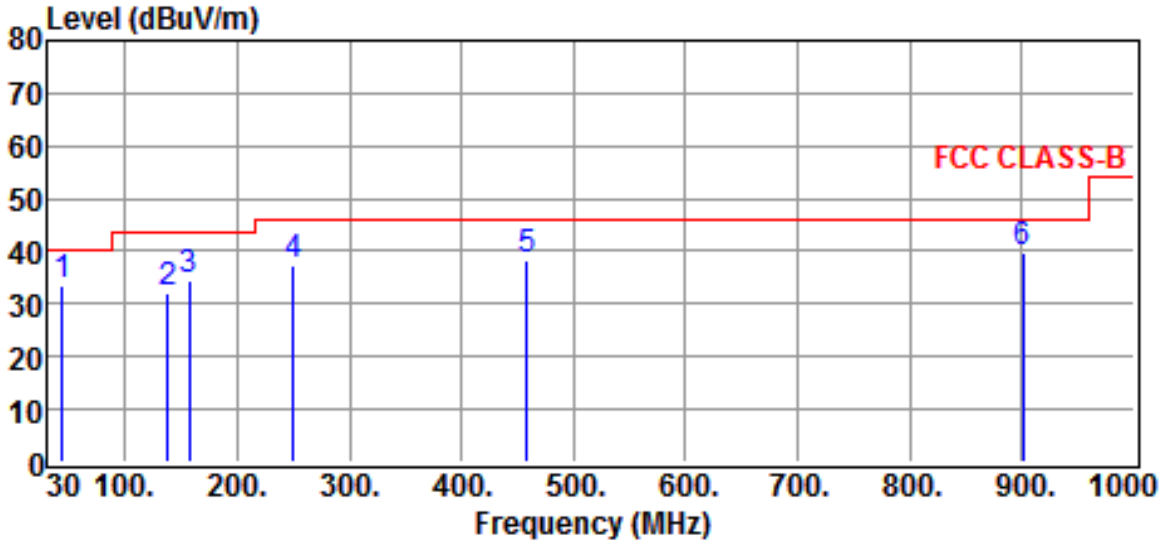
Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
2363.0000	48.7	-5.9	42.8	74.0	-31.2	Peak
2373.5000	47.9	-5.8	42.1	74.0	-31.9	Peak
2489.5000	47.3	-5.4	41.9	74.0	-32.1	Peak
2492.5000	48.3	-5.4	42.9	74.0	-31.1	Peak

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss - Amplifier Gain (if any)
3. The margin value=Limit - Result
4. Peak measurements are compared to the average limit - as peak measurements are below the average limit, they also comply with the peak limit.

4.4.3 Other Emission

a) Emission frequencies below 1 GHz

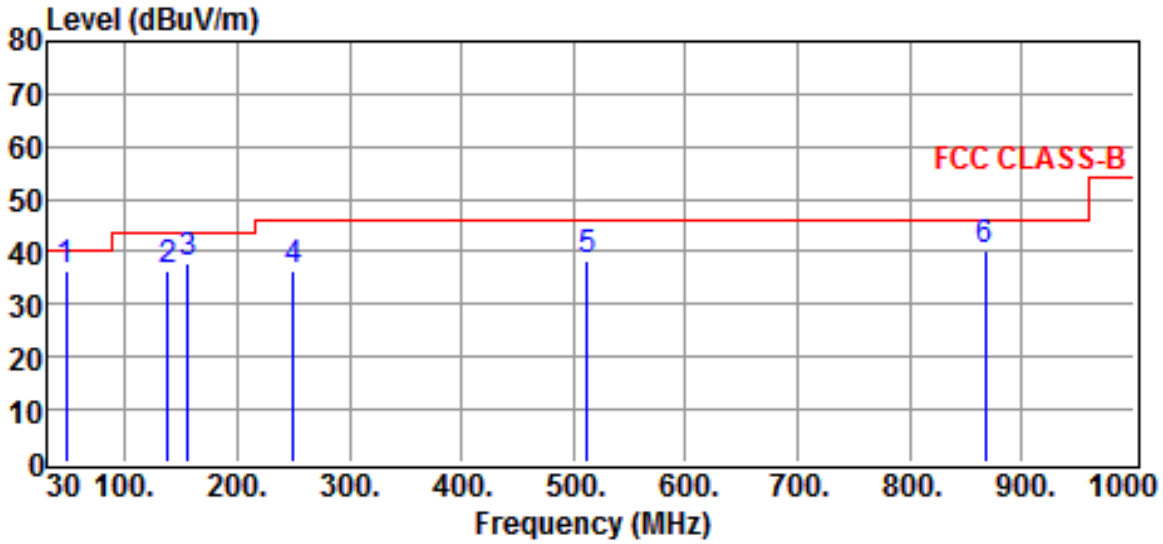


Site	:Open Site	Date	:2013-09-05
Limit	:FCC CLASS-B	Ant. Pol.	:HORIZONTAL
EUT	:802.11bgn IP Camera	Temp.	:25°C
Power Rating	:120V/60Hz	Humi.	:60%
Model	:EZ-IP01HW	Engineer.	:Jiapeng
Test Mode	:		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
43.5000	20.6	12.7	33.3	40.0	-6.7	QP
138.5400	18.4	13.9	32.3	43.5	-11.2	QP
156.9000	20.2	14.1	34.3	43.5	-9.2	QP
250.0500	17.3	20.1	37.4	46.0	-8.6	QP
458.2000	17.7	20.6	38.3	46.0	-7.7	QP
900.6000	11.3	28.5	39.8	46.0	-6.2	QP

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss
3. The margin value=Limit - Result



Site	:Open Site	Date	:2013-09-05
Limit	:FCC CLASS-B	Ant. Pol.	:VERTICAL
EUT	:802.11bgn IP Camera	Temp.	:25°C
Power Rating	:120V/60Hz	Humi.	:60%
Model	:EZ-IP01HW	Engineer.	:Jiapeng
Test Mode	:		

Freq MHz	Reading dBuV	Correction Factor dB	Result dBuV/m	Limits dBuV/m	Over limit dB	Detector
47.8200	24.2	12.3	36.5	40.0	-3.5	QP
138.5400	22.7	13.9	36.6	43.5	-6.9	QP
155.8200	23.9	14.0	37.9	43.5	-5.6	QP
250.0000	16.5	20.1	36.6	46.0	-9.4	QP
512.1000	16.7	21.8	38.5	46.0	-7.5	QP
867.0000	12.1	27.9	40.0	46.0	-6.0	QP

Note :

1. Result = Reading + Corrected Factor
2. Corrected Factor = Antenna Factor + Cable Loss
3. The margin value=Limit - Result

b) Emission frequencies Above 1GHz

Radiated emission frequencies above 1 GHz to 25 GHz were too low to be measured with a pre-amplifier of 35 dB.

4.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor, High Pass Filter Loss(if used) and Cable Loss, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

where

Corrected Factor = Antenna FACTOR + Cable Loss + High Pass Filter Loss - Amplifier Gain

4.6 Photos of Radiation Measuring Setup

5 CONDUCTED EMISSION MEASUREMENT

5.1 Standard Applicable

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

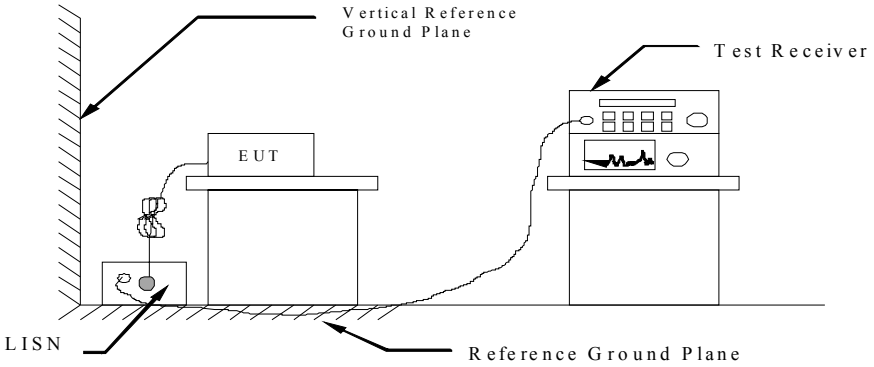
Frequency MHz	Quasi Peak dB μV	Average dB μV
0.15 - 0.5	66-56*	56-46*
0.5 - 5.0	56	46
5.0 - 30.0	60	50

* Decreases with the logarithm of the frequency

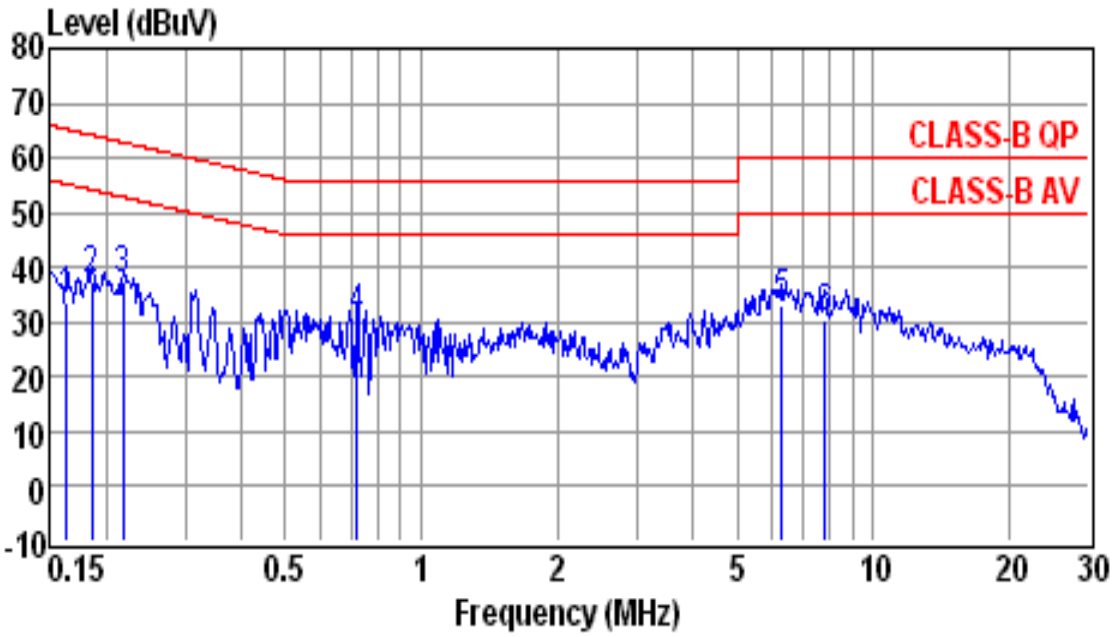
5.2 Measurement Procedure

1. Setup the configuration per figure 3.
2. A preliminary scan with a spectrum monitor is performed to identify the frequency of emission that has the highest amplitude relative to the limit by operating the EUT in selected modes of operation, typical cable positions, and with a typical system configuration.
3. Record the 6 or 8 highest emissions relative to the limit.
4. Measure each frequency obtained from step 3 by a test receiver set on quasi peak detector function, and then records the accuracy frequency and emission level. If all emissions measured in the specified band are attenuated more than 20 dB from the limit, this step would be ignored, and the peak detector function would be used.
5. Confirm the highest three emissions with variation of the EUT cable configuration and record the final data.
6. Repeat all above procedures on measuring each operation mode of EUT.

Figure 3: Conducted emissions measurement configuration



5.3 Conducted Emission Data

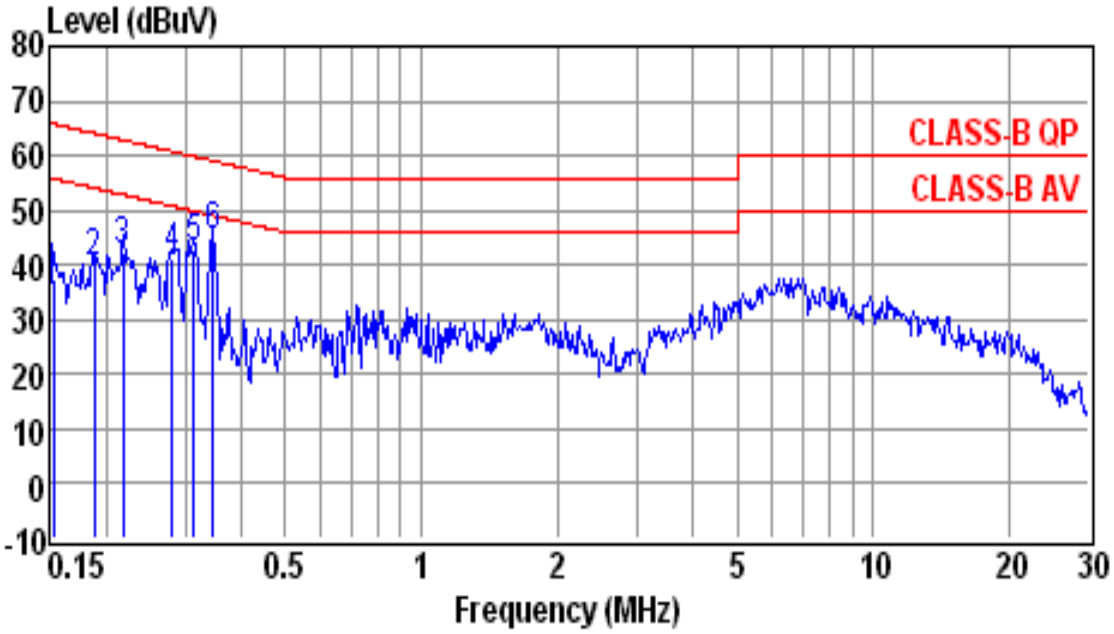


Site	: conducted #1	Date	: 08-14-2013
Condition	: CLASS-B QP	LISN	: NEUTRAL
Tem / Hum	: 25 ℃ / 58%	Test Mode	: WiFi
EUT	: EZ-IP01HW	Power Rating	: 120V/60Hz
Memo	:	Memo	:

Freq (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Remark
0.1641	23.4	10.3	33.7	65.3	-31.6	QP
0.1864	27.1	10.3	37.4	64.2	-26.8	QP
0.2185	27.4	10.3	37.7	62.9	-25.2	QP
0.7198	20.3	10.3	30.6	56.0	-25.4	QP
6.2850	22.7	10.5	33.2	60.0	-26.8	QP
7.8520	19.8	10.5	30.3	60.0	-29.7	QP

Note :

1. Result = Reading + Factor
2. Factor = LISN Factor + Cable Loss



Site	: conducted #1	Date	: 08-14-2013
Condition	: CLASS-B QP	LISN	: LINE
Tem / Hum	: 25 ℃ / 58%	Test Mode	: WiFi
EUT	: EZ-IP01HW	Power Rating	: 120V/60Hz
Memo	:	Memo	:

Freq (MHz)	Reading (dBuV)	Factor (dB)	Emission Level (dBuV)	Limit Line (dBuV)	Over Limit (dB)	Remark
0.1532	27.3	10.3	37.6	65.8	-28.2	QP
0.1884	29.7	10.3	40.0	64.1	-24.1	QP
0.2185	31.7	10.3	42.0	62.9	-20.9	QP
0.2803	31.0	10.3	41.3	60.8	-19.5	QP
0.3133	32.6	10.3	42.9	59.9	-17.0	QP
0.3465	34.8	10.3	45.1	59.0	-13.9	QP

Note :

1. Result = Reading + Factor
2. Factor = LISN Factor + Cable Loss

5.4 Result Data Calculation

The result data is calculated by adding the LISN Factor to the measured reading. The basic equation with a sample calculation is as follows:

RESULT = READING + LISN FACTOR

Assume a receiver reading of 22.5 dB μ V is obtained, and LISN Factor is 0.1 dB, then the total of disturbance voltage is 22.6 dB μ V.

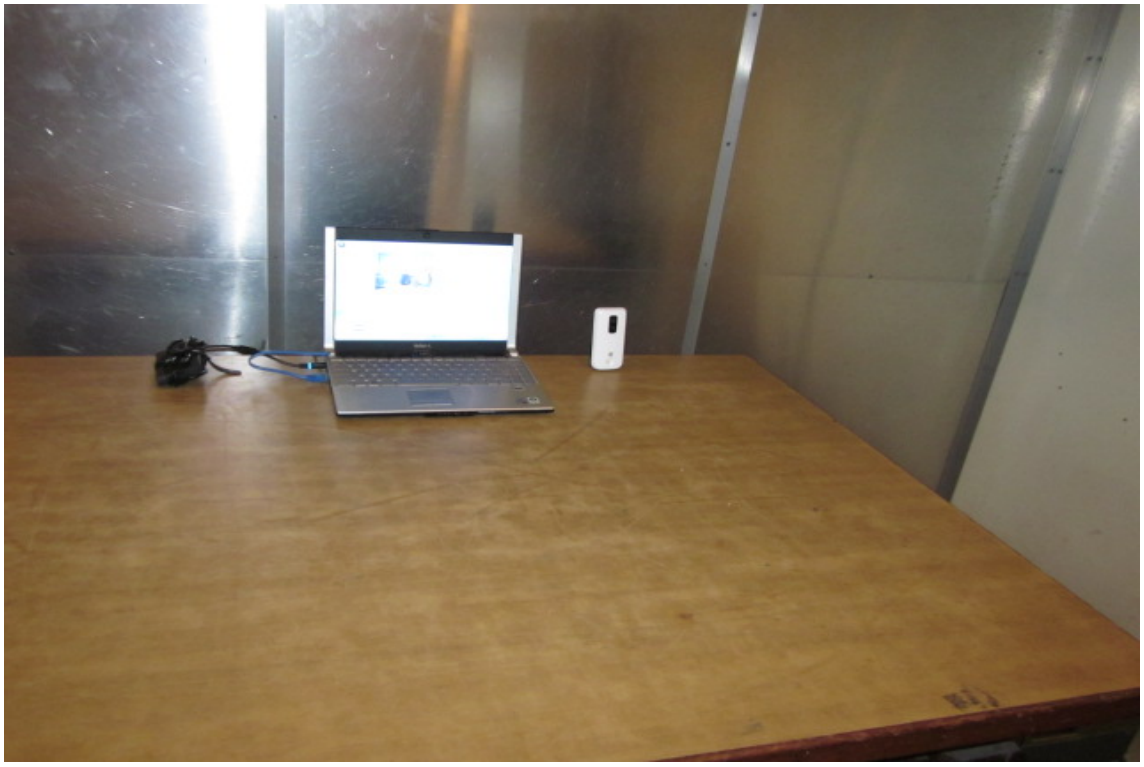
RESULT = 22.5 + 0.1 = 22.6 dB μ V
Level in μ V = Common Antilogarithm[(22.6 dB μ V)/20]
= 13.48 μ V

5.5 Conducted Measurement Equipment

The following test equipments are used during the conducted test.

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	ESCI	2013/07/15	2014/07/14
LISN	EMCO	3825/2	2012/11/02	2013/11/01
LISN	Rohde & Schwarz	ESH2-Z5	2013/04/12	2014/04/11

5.6 Photos of Conduction Measuring Setup



6 ANTENNA REQUIREMENT

6.1 Standard Applicable

For intentional device, according to §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 §15.247 (b), if transmitting 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.

6.2 Antenna Construction and Directional Gain

Please see photos submitted in Exhibit B.

The antenna was integrated on the PCB. No consideration of replacement. The antenna gain is 1.9 dBi which is less than 6dBi. No need to reduce the peak output power.

7 EMISSION BANDWIDTH MEASUREMENT

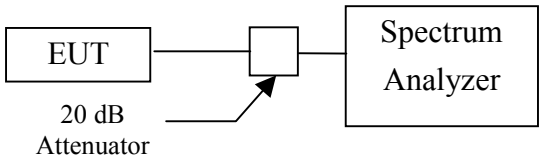
7.1 Standard Applicable

According to 15.247(a)(2), for direct sequence system, the minimum 6dB bandwidth shall be at least 500 kHz.

7.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 4 without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Figure 4: Emission bandwidth measurement configuration.



7.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Spectrum Analyzer	Rohde & Schwarz	FSP40	2012/12/07	2013/12/06

7.4 Measurement Data

Test Date : Sep. 03, 2013 Temperature : 25 °C Humidity : 65 %

A 802.11b

a) Channel Low: 6 dB Emission Bandwidth is 10.32 MHz
b) Channel Mid: 6 dB Emission Bandwidth is 10.32 MHz
c) Channel High: 6 dB Emission Bandwidth is 10.32 MHz

B 802.11g

a) Channel Low: 6 dB Emission Bandwidth is 16.64 MHz
b) Channel Mid: 6 dB Emission Bandwidth is 16.64 MHz
c) Channel High: 6 dB Emission Bandwidth is 16.64 MHz

C 802.11n HT-20

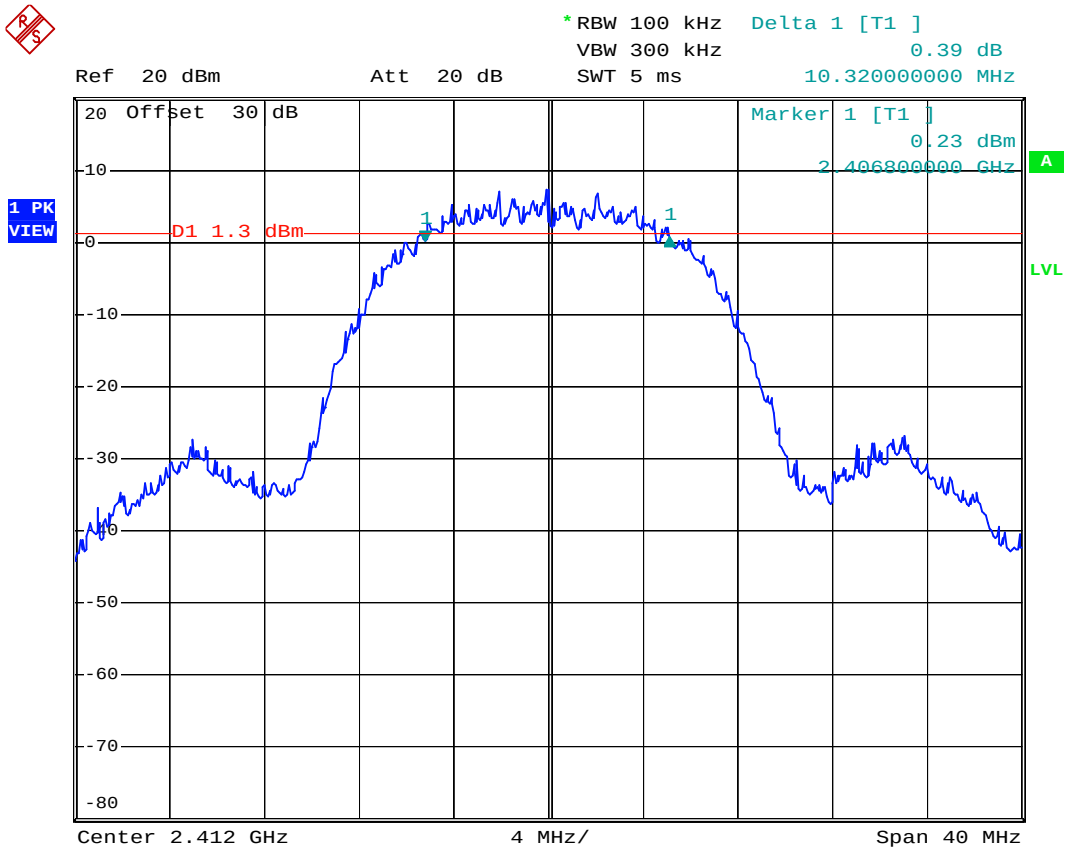
a) Channel Low: 6 dB Emission Bandwidth is 17.04 MHz
b) Channel Mid: 6 dB Emission Bandwidth is 17.04 MHz
c) Channel High: 6 dB Emission Bandwidth is 17.04 MHz

D 802.11n HT-40

a) Channel Low: 6 dB Emission Bandwidth is 36.00 MHz
b) Channel Mid: 6 dB Emission Bandwidth is 36.00 MHz
c) Channel High: 6 dB Emission Bandwidth is 36.00 MHz

Note : The expanded uncertainty: frequency $\times 1.65 \times 10^{-6}$ (1 GHz $< f \leq$ 18 GHz).

802.11b



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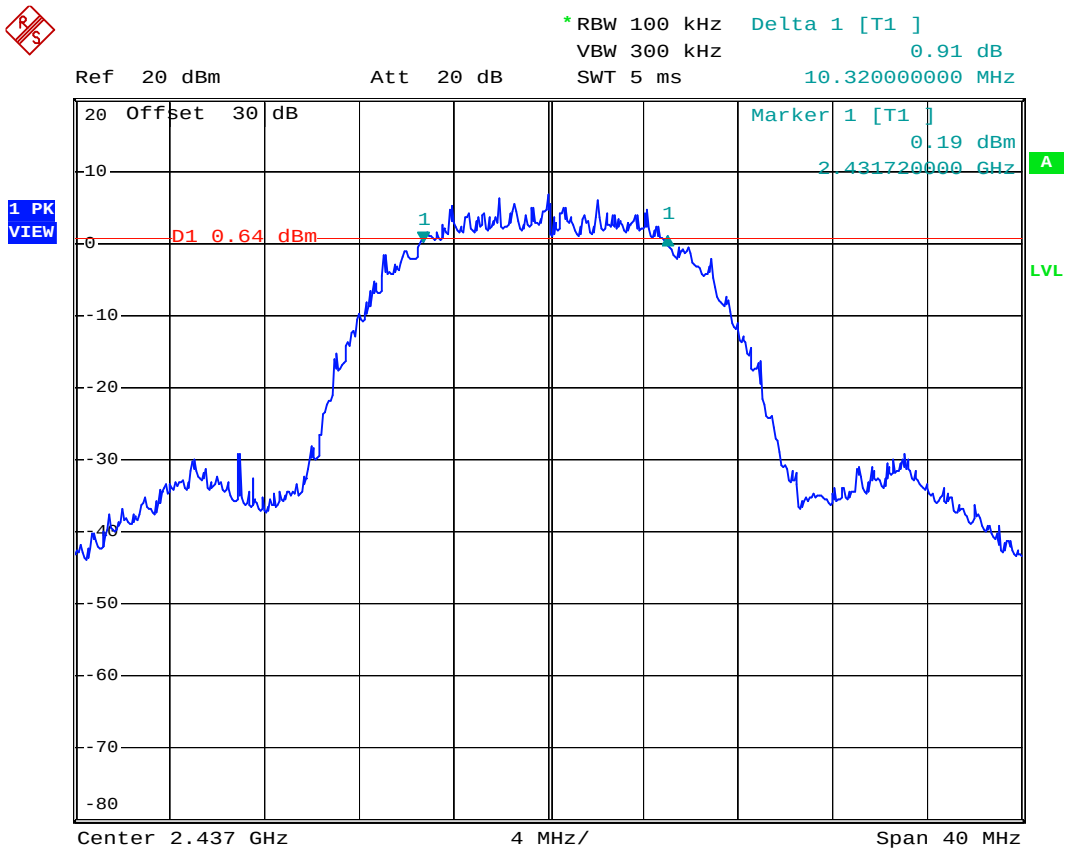

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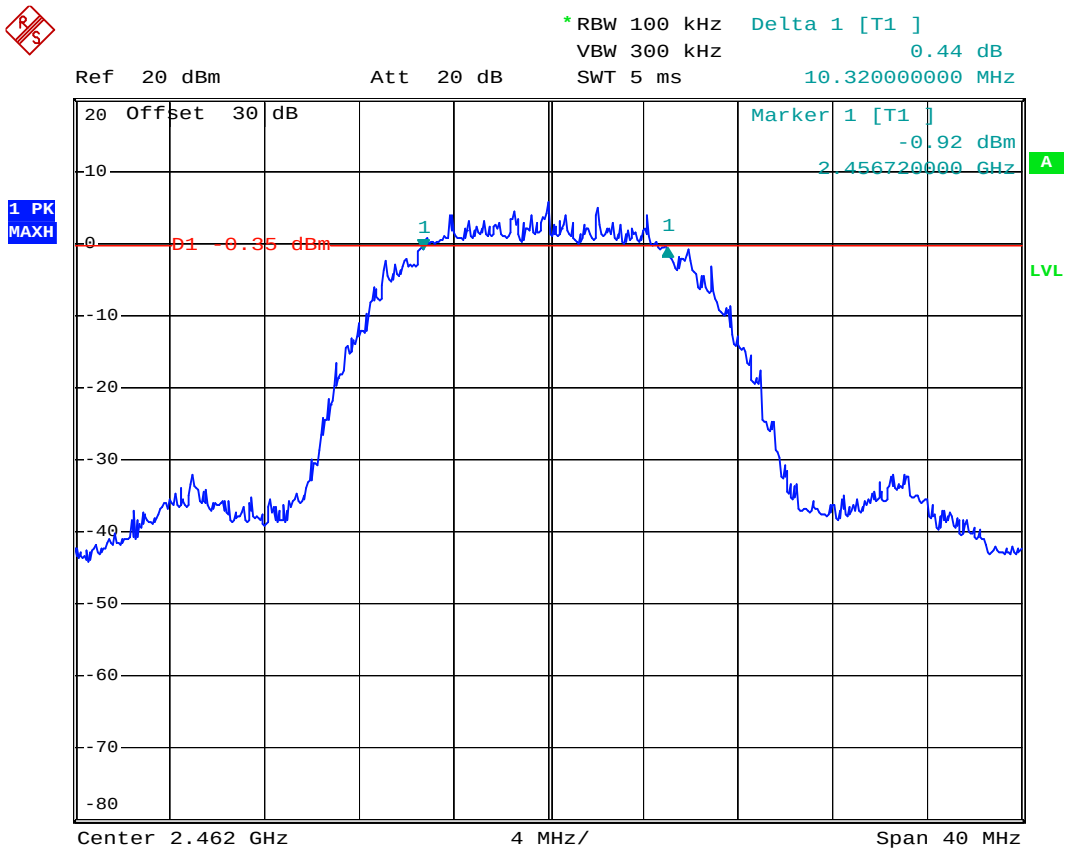
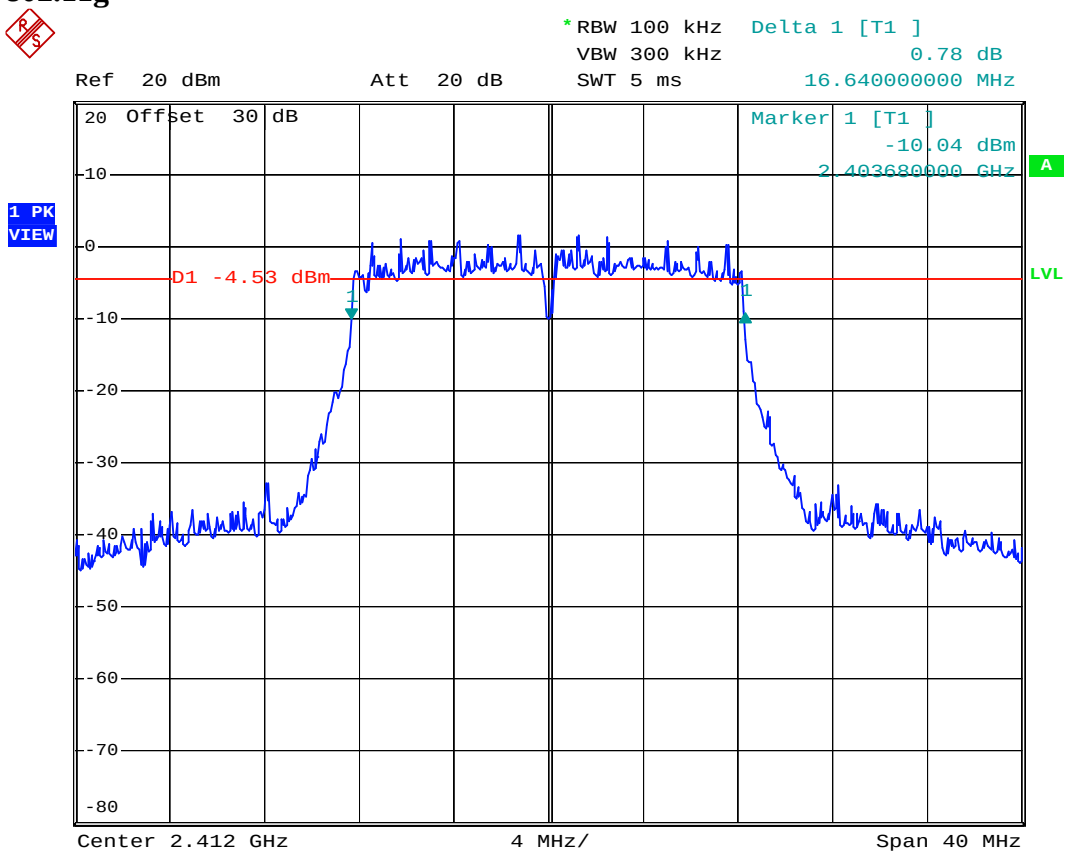


Date: 3.SEP.2013 09:55:30

802.11g



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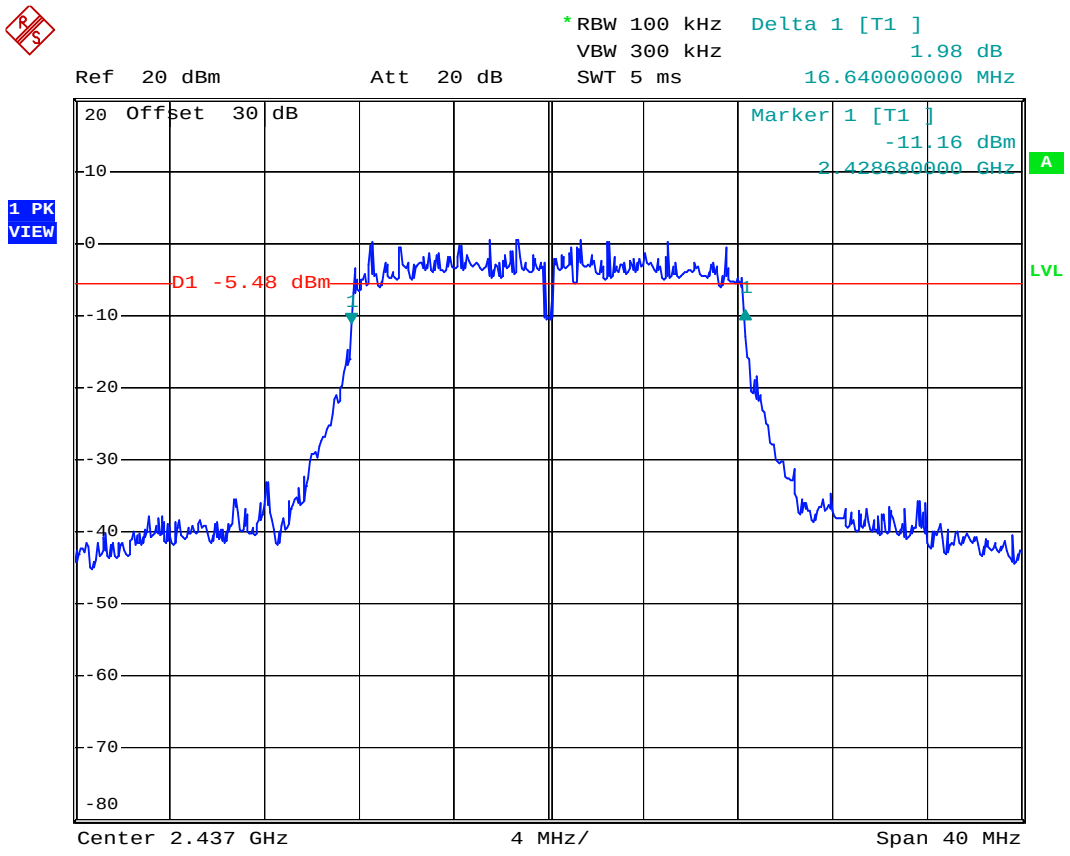

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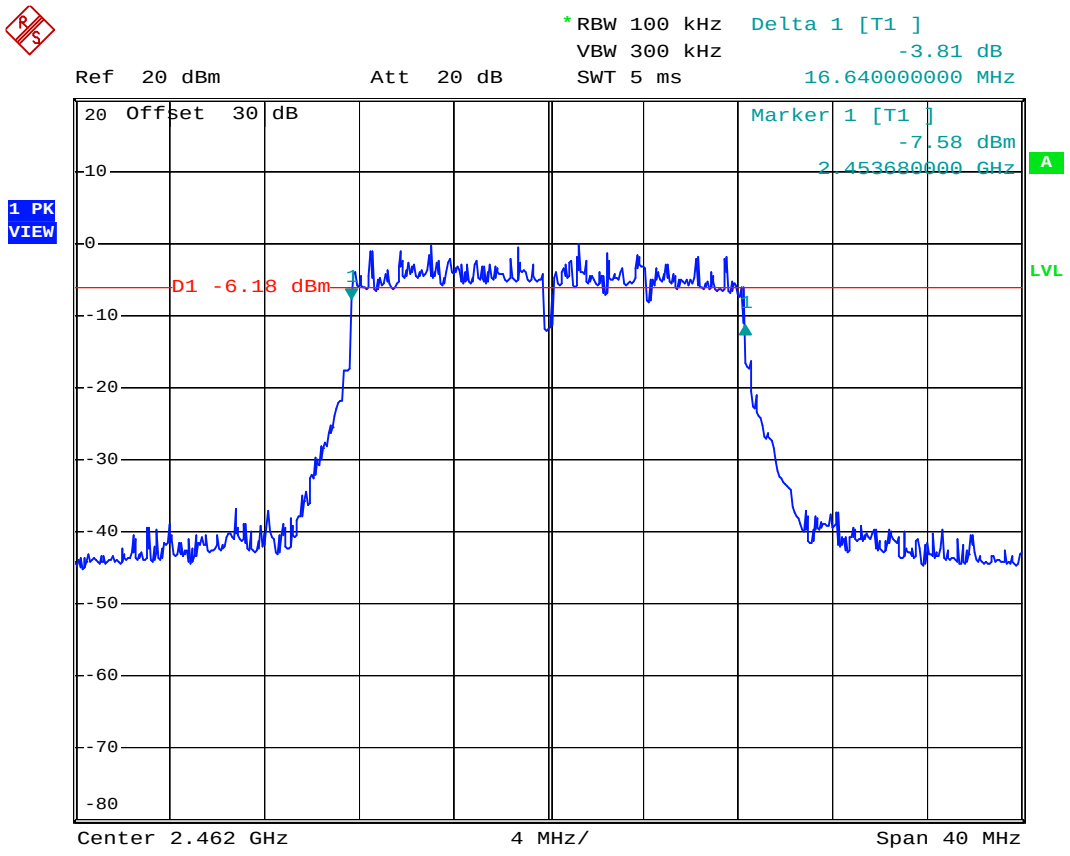
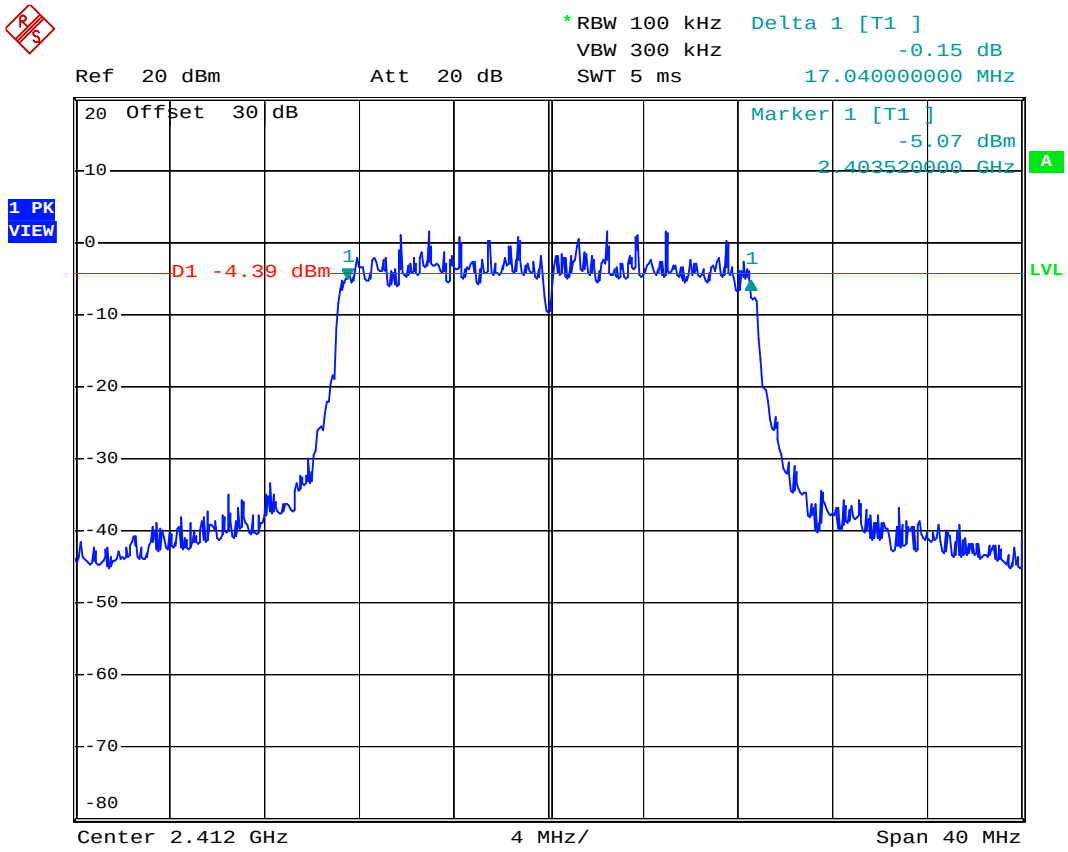


Date: 3.SEP.2013 12:09:38

802.11n HT-20



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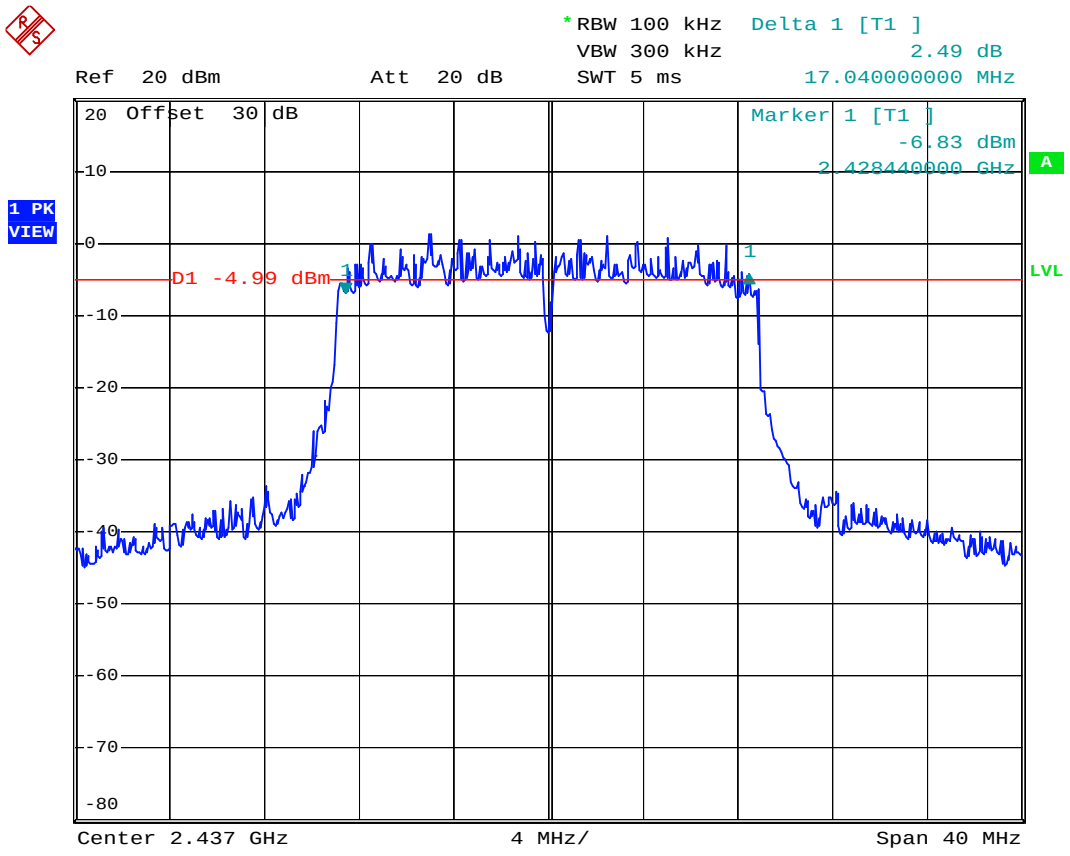

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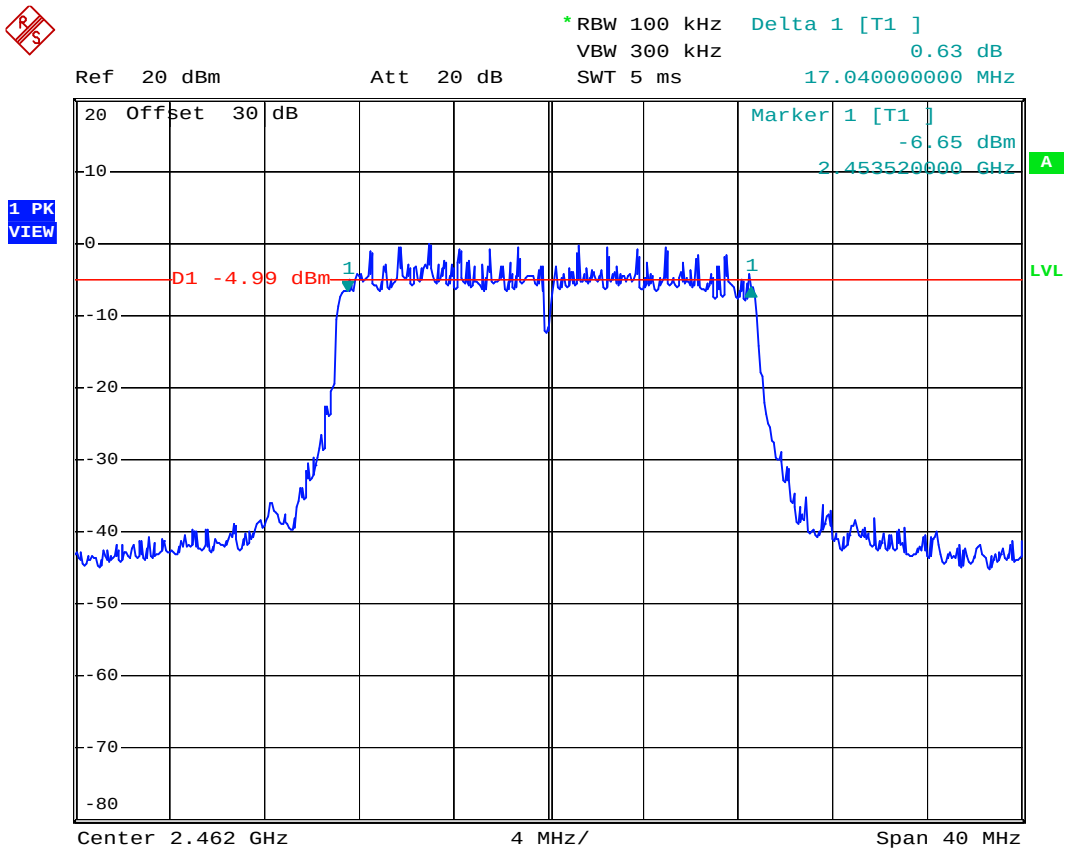

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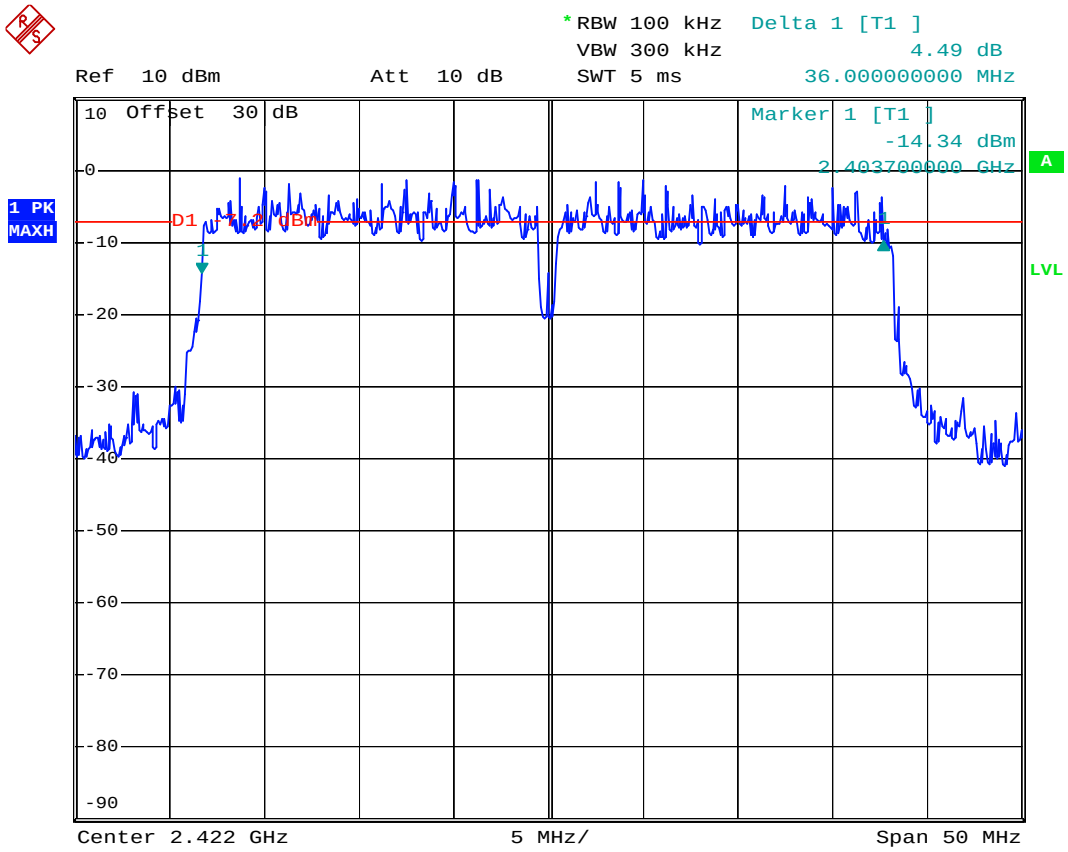
802.11n HT-40



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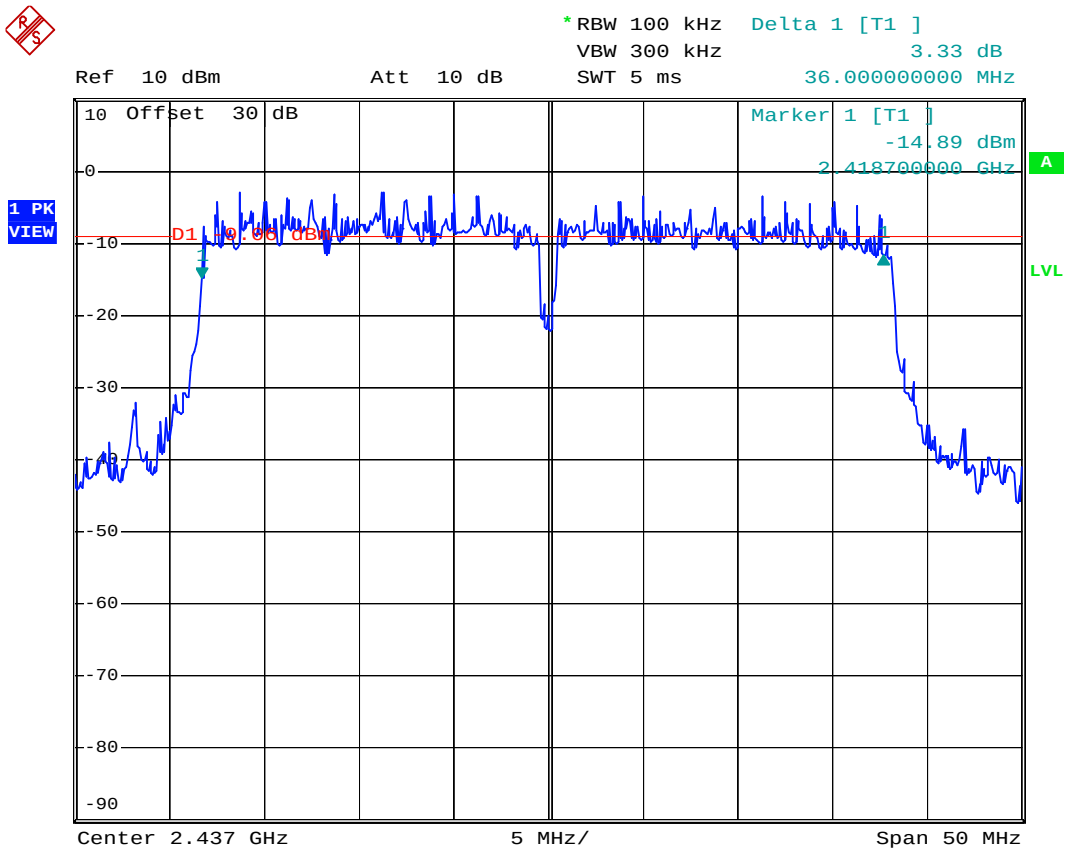

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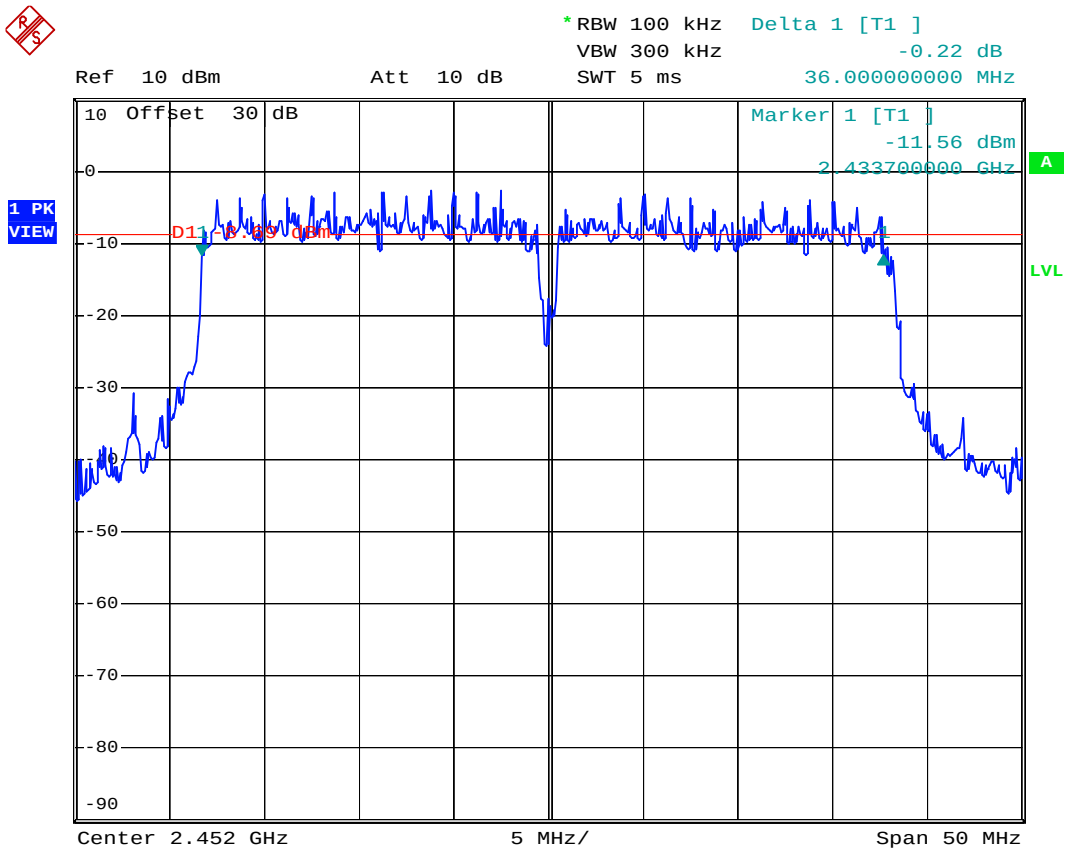


Date: 3.SEP.2013 14:08:45

8 OUTPUT POWER MEASUREMENT

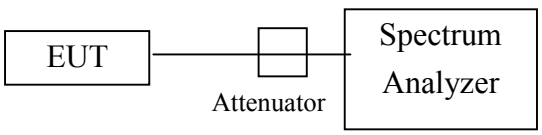
8.1 Standard Applicable

For direct sequence system, according to 15.247(b), the maximum peak output power of the transmitter shall not exceed 1 Watt. If transmitting 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.

8.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 5 without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set the RBW = 1 MHz.
4. Set the VBW ≥ 3 x RBW
5. Set the span ≥ 1.5 x DTS bandwidth.
6. Detector = peak.
7. Sweep time = auto couple.
8. Trace mode = max hold.
9. Allow trace to fully stabilize.
10. Use channel power function with the band limits set equal to the DTS bandwidth edges and record the level displayed.
11. Repeat above procedures until all frequencies measured were complete.

Figure 5: Output power and measurement configuration.



8.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
POWER METER+SENSOR	ANRITSU	ML2487A+MA2491A	2013/01/16	2014/01/15

8.4 Measurement Data

Test Date : Sep. 03, 2013 Temperature : 25 °C Humidity : 65 %

A 802.11b

a)	Channel Low:	Output Peak Power is	17.50	dBm	**59.234**	mW
b)	Channel Mid:	Output Peak Power is	16.59	dBm	**45.604**	mW
c)	Channel High:	Output Peak Power is	15.49	dBm	**35.400**	mW

B 802.11g

a)	Channel Low:	Output Peak Power is	14.23	dBm	**26.485**	mW
b)	Channel Mid:	Output Peak Power is	13.68	dBm	**23.335**	mW
c)	Channel High:	Output Peak Power is	12.34	dBm	**17.140**	mW

C.802.11n HT-20

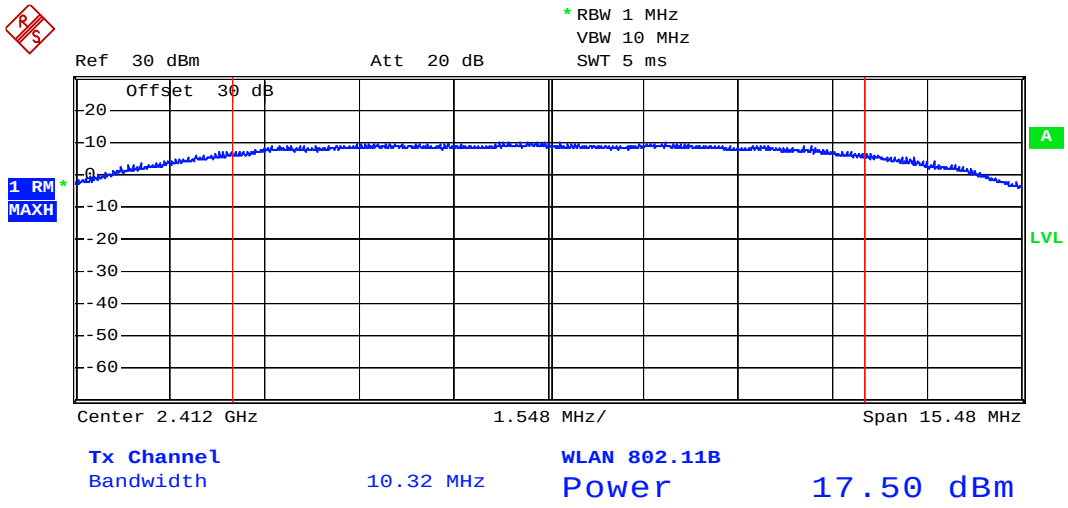
a)	Channel Low:	Output Peak Power is	13.99	dBm	**25.061**	mW
b)	Channel Mid:	Output Peak Power is	13.50	dBm	**22.387**	mW
c)	Channel High:	Output Peak Power is	11.18	dBm	**13.122**	mW

D.802.11n HT-40

a)	Channel Low:	Output Peak Power is	14.10	dBm	**25.704**	mW
b)	Channel Mid:	Output Peak Power is	12.84	dBm	**19.231**	mW
c)	Channel High:	Output Peak Power is	12.98	dBm	**19.861**	mW

Note : The expanded uncertainty: 2dB.

802.11b



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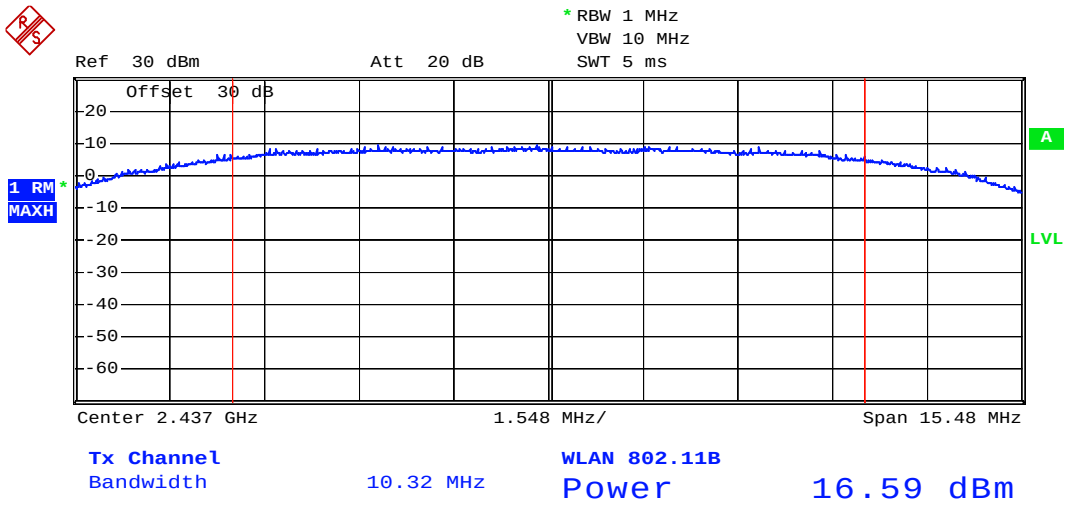

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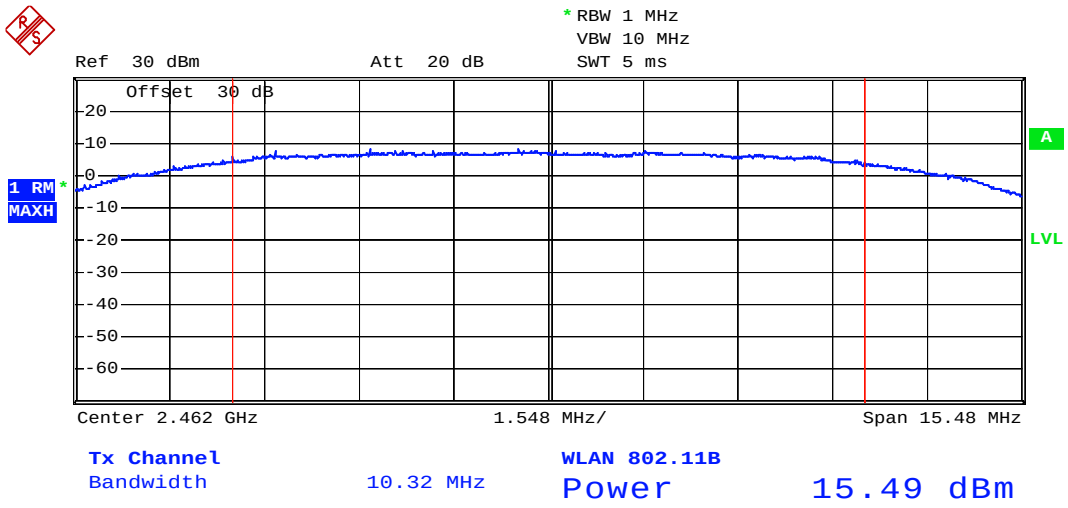

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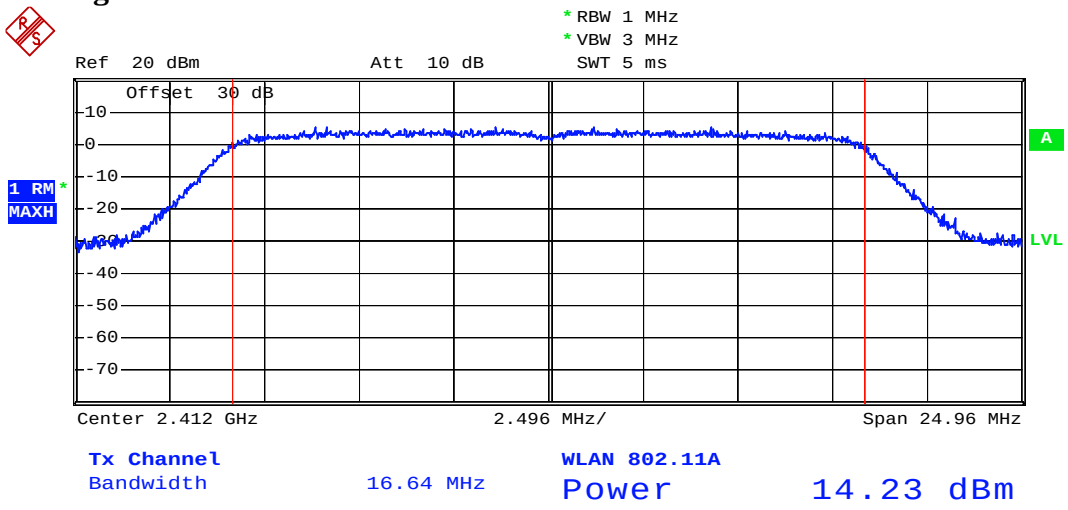
802.11g



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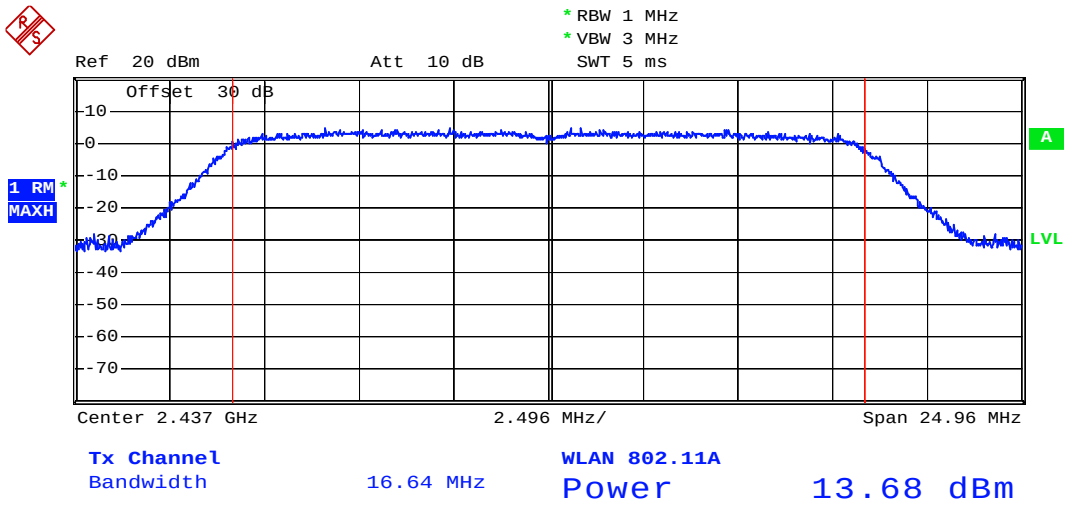

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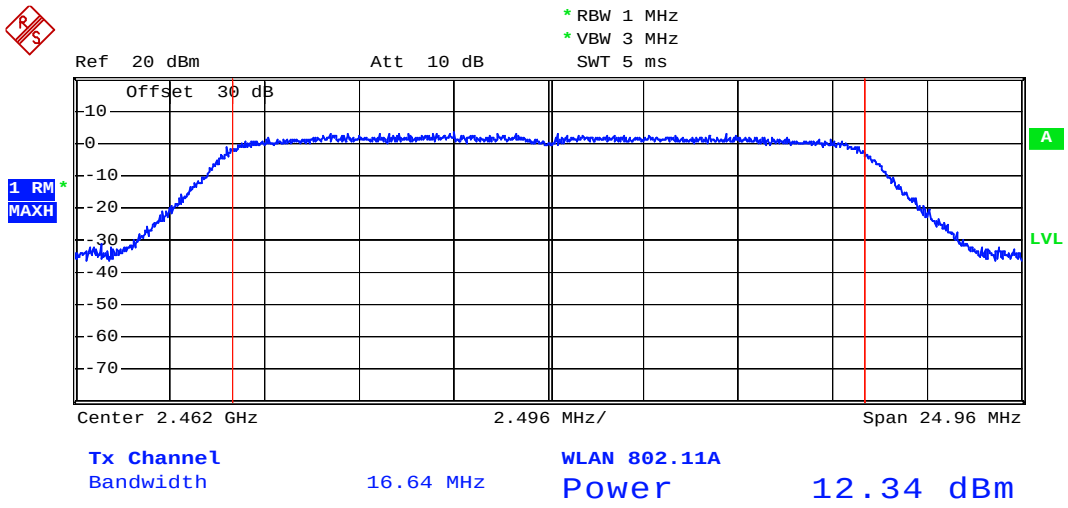

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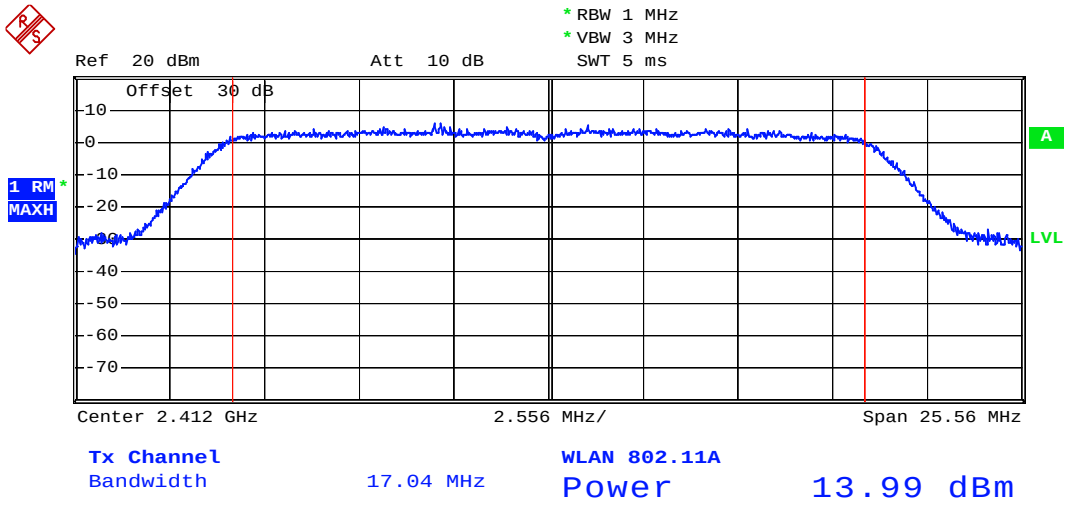
802.11n HT-20



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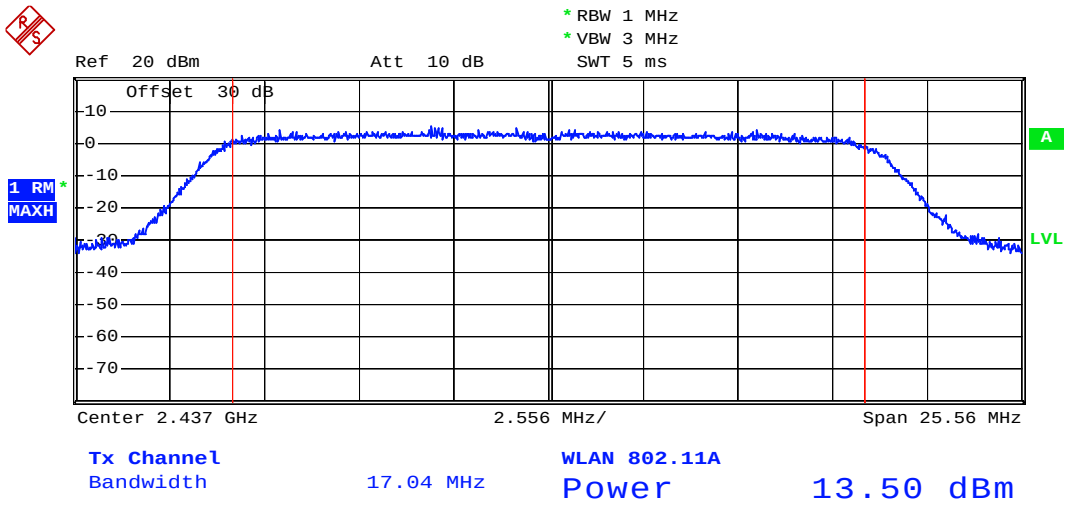

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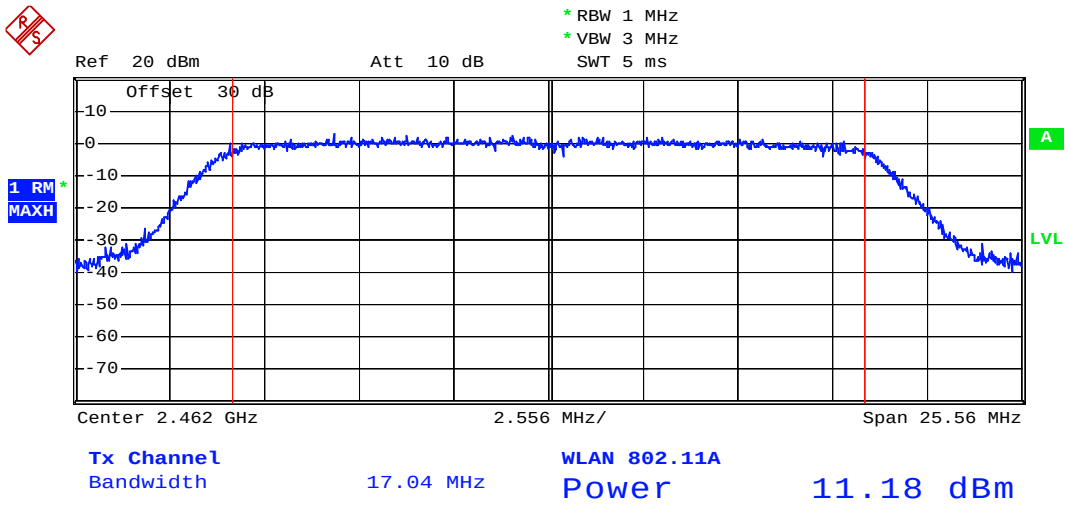

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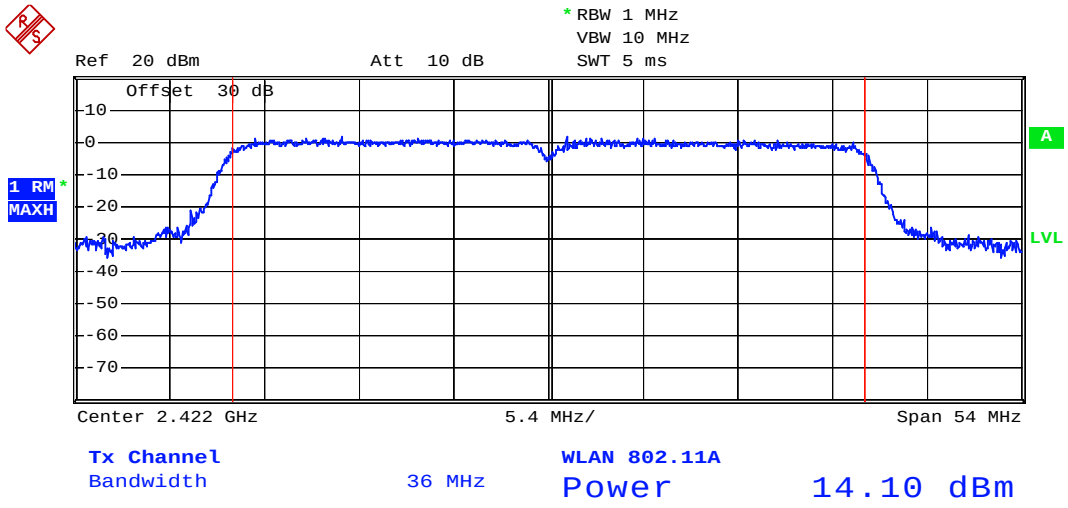
802.11n HT-40



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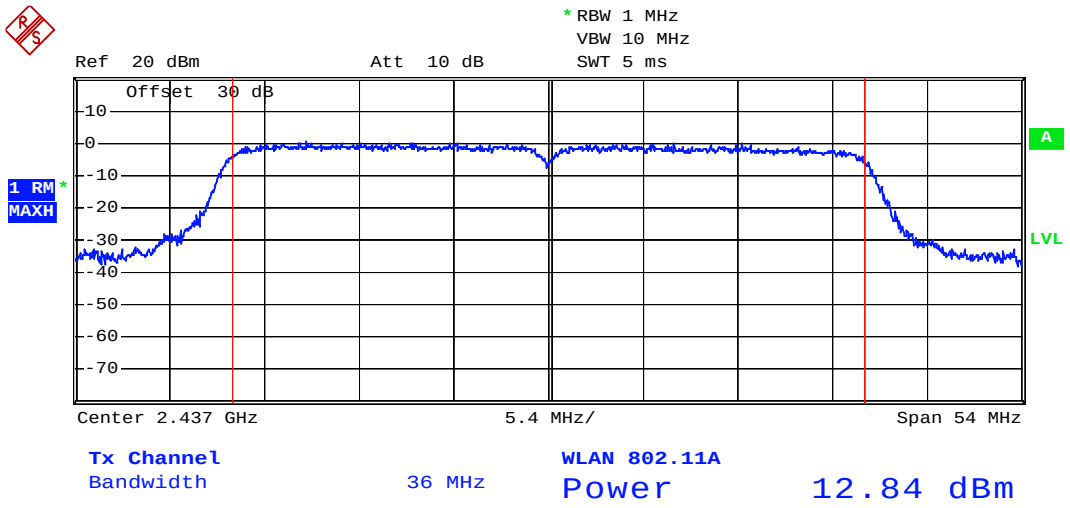

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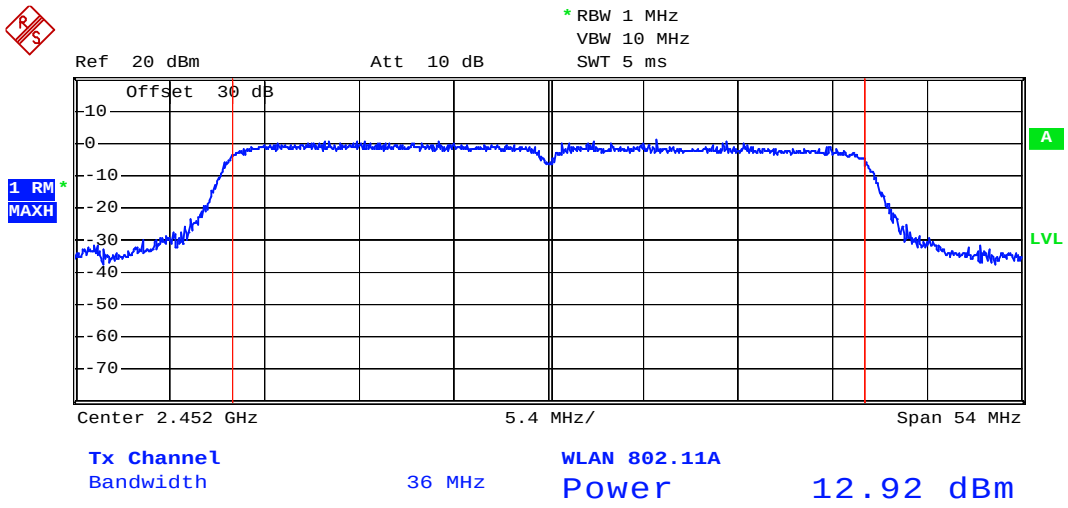


Date: 3.SEP.2013 14:15:09

9 100 kHz BANDWIDTH OF BAND EDGES MEASUREMENT

9.1 Standard Applicable

According to 15.247(c), if any 100 kHz bandwidth outside these frequency bands, the radio frequency power that is produced by the modulation products of the spreading sequence, the information sequence and the carrier frequency shall be either at least 20 dB below that in any 100 kHz bandwidth within the band that contains the highest level of the desired power or shall not exceed the general levels specified in §15.209(a), whichever results in the lesser attenuation.

9.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 5 without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set both RBW of spectrum analyzer to 100kHz and VBW to 1 MHz with a convenient frequency span including 100kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

9.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Spectrum Analyzer	Rohde & Schwarz	FSP40	2012/09/20	2013/09/20

9.4 Measurement Data

Test Date : Sep. 03, 2013 Temperature : 25 °C Humidity : 65 %

A 802.11b

a) Lower Band Edge : All emissions in this 100kHz bandwidth are attenuated more than 20dB from the carrier.
b) Upper Band Edge : All emissions in this 100kHz bandwidth are attenuated more than 20dB from the carrier.

B 802.11g

a) Lower Band Edge : All emissions in this 100kHz bandwidth are attenuated more than 20dB from the carrier.
b) Upper Band Edge : All emissions in this 100kHz bandwidth are attenuated more than 20dB from the carrier.

C 802.11n HT-20

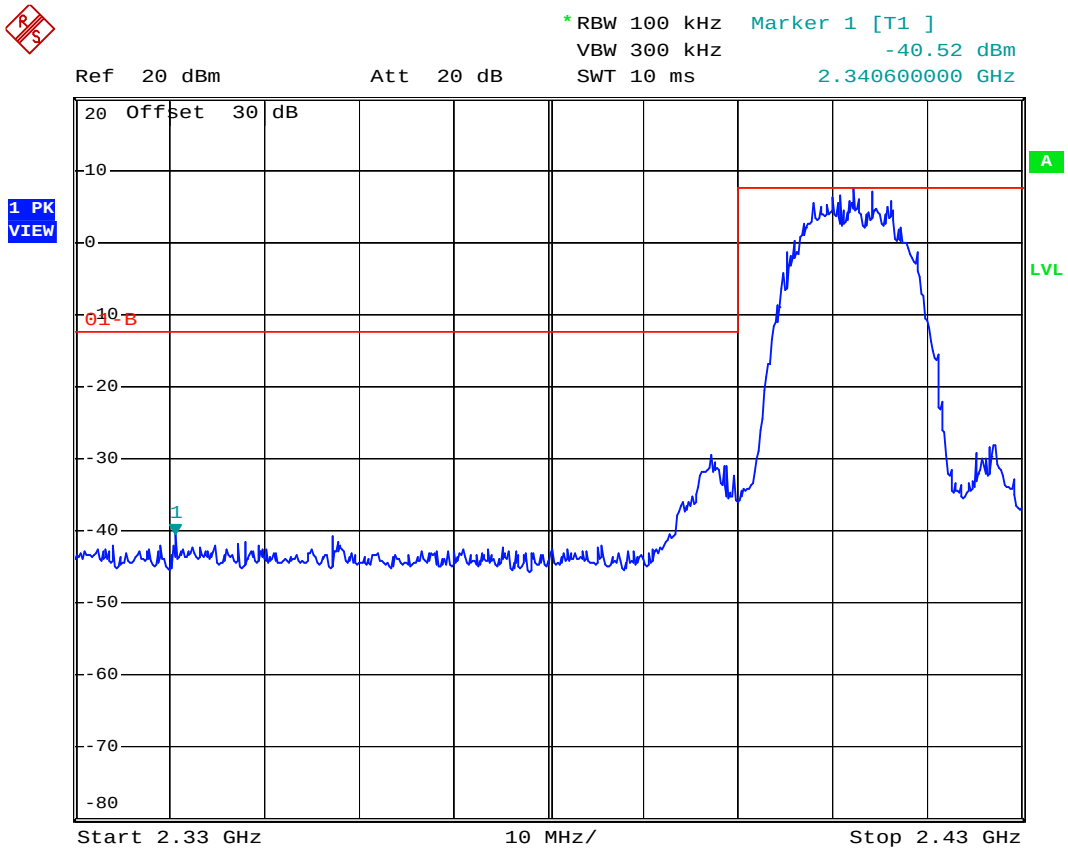
a) Lower Band Edge : All emissions in this 100kHz bandwidth are attenuated more than 20dB from the carrier.
b) Upper Band Edge : All emissions in this 100kHz bandwidth are attenuated more than 20dB from the carrier.

D 802.11n HT-40

a) Lower Band Edge : All emissions in this 100kHz bandwidth are attenuated more than 20dB from the carrier.
b) Upper Band Edge : All emissions in this 100kHz bandwidth are attenuated more than 20dB from the carrier.

Note : The expanded uncertainty: 2dB.

802.11b



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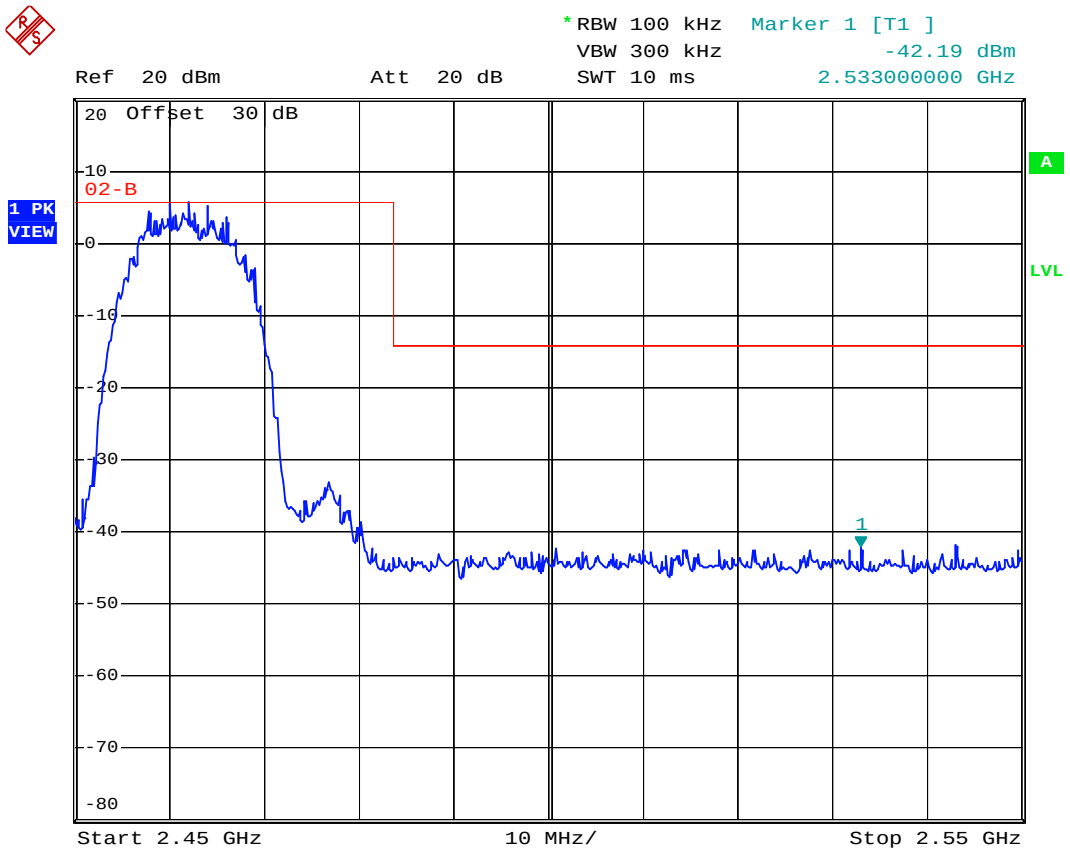

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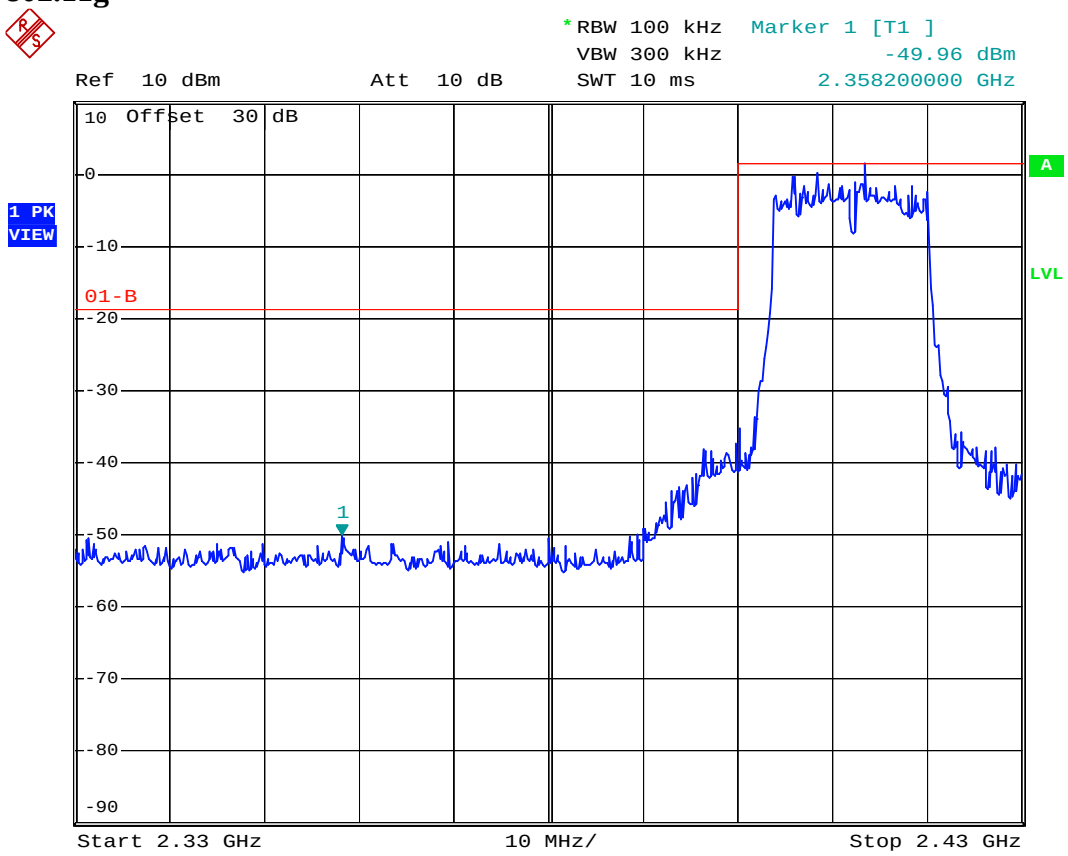
802.11g



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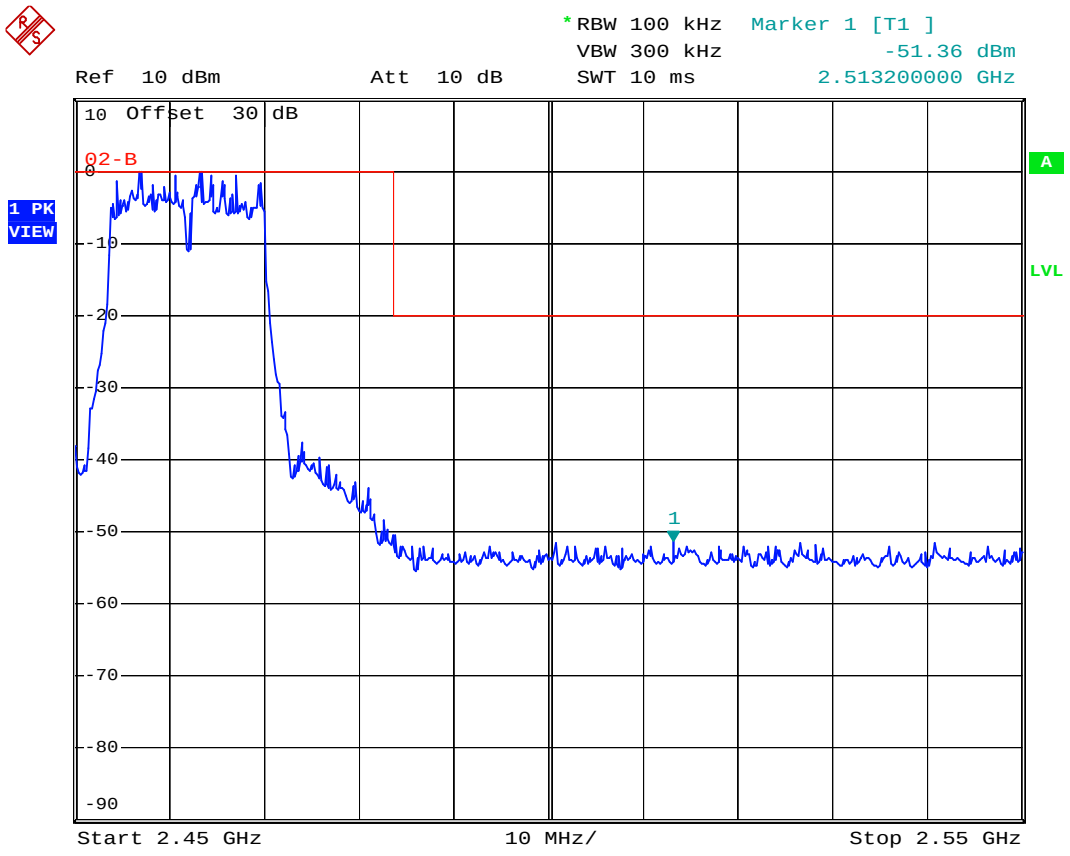

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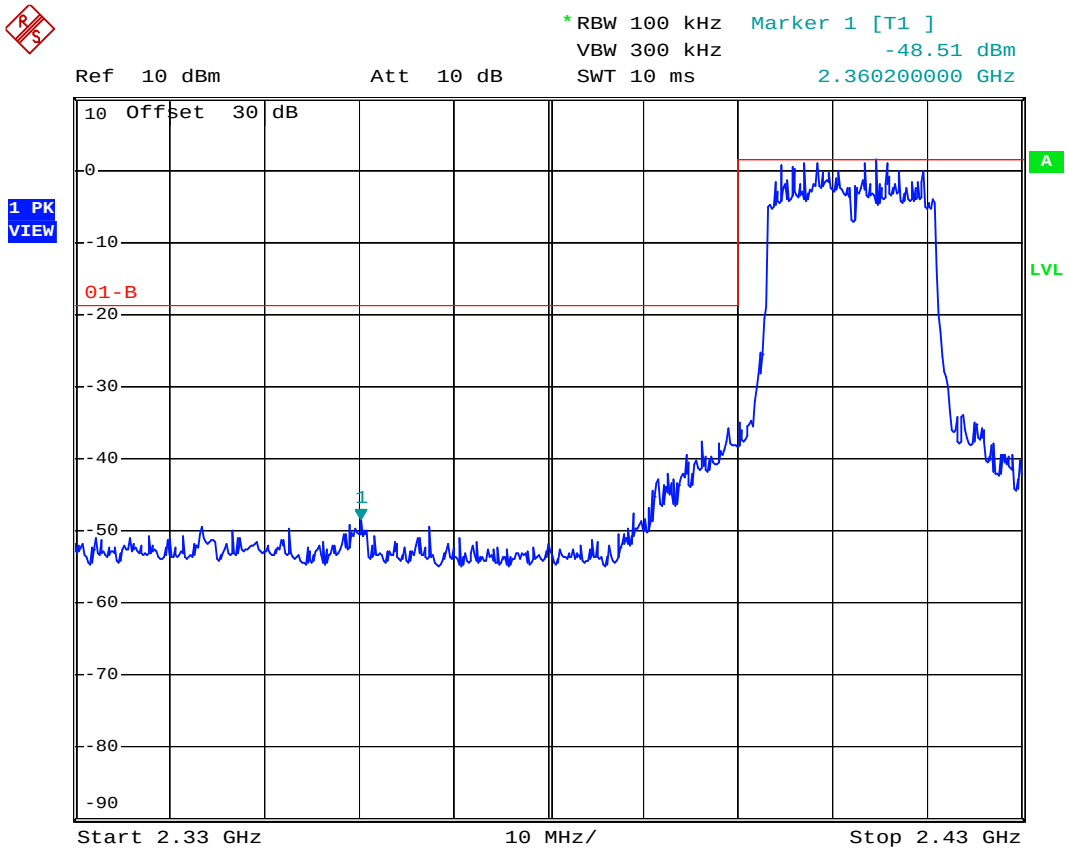
802.11n HT-20



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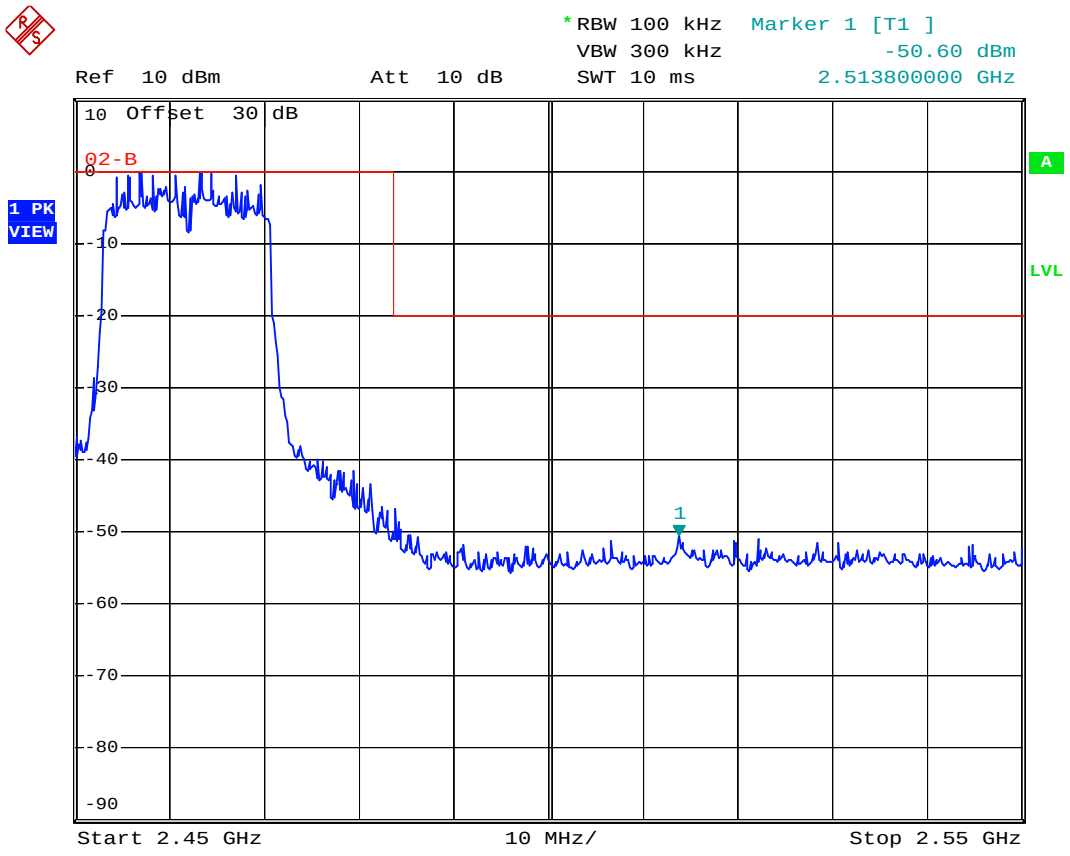

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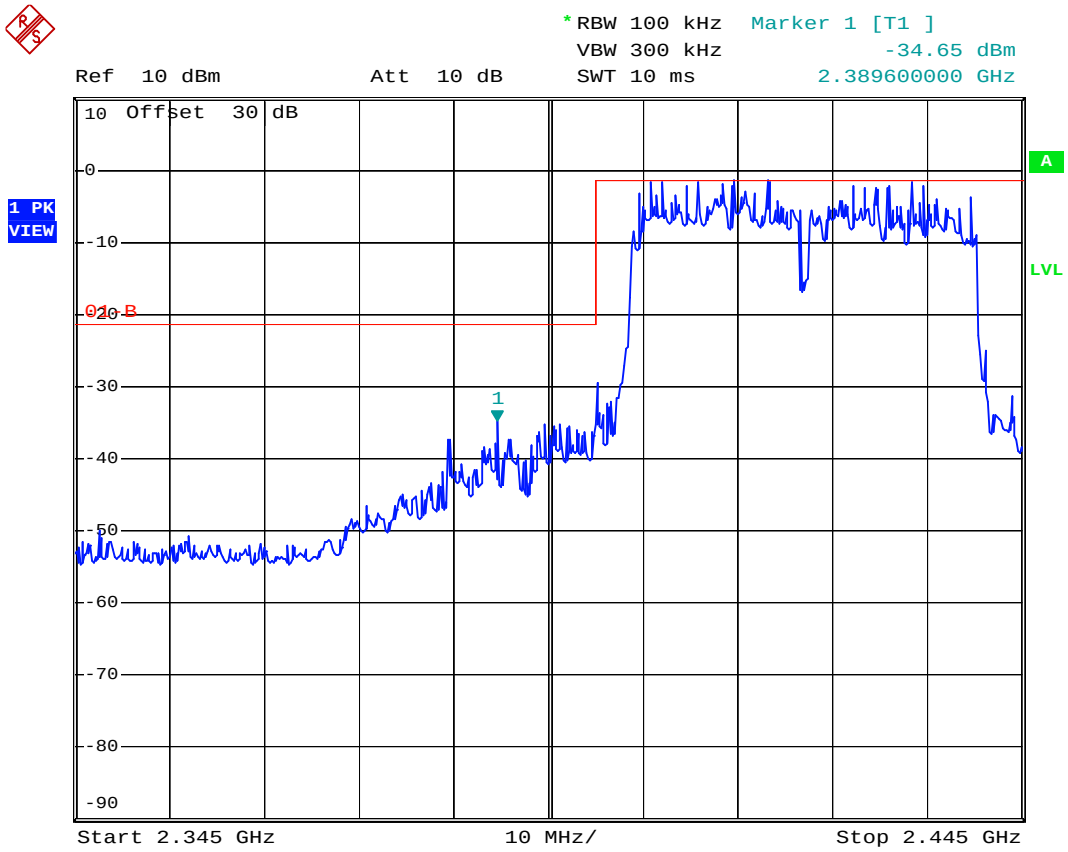
802.11n HT-40



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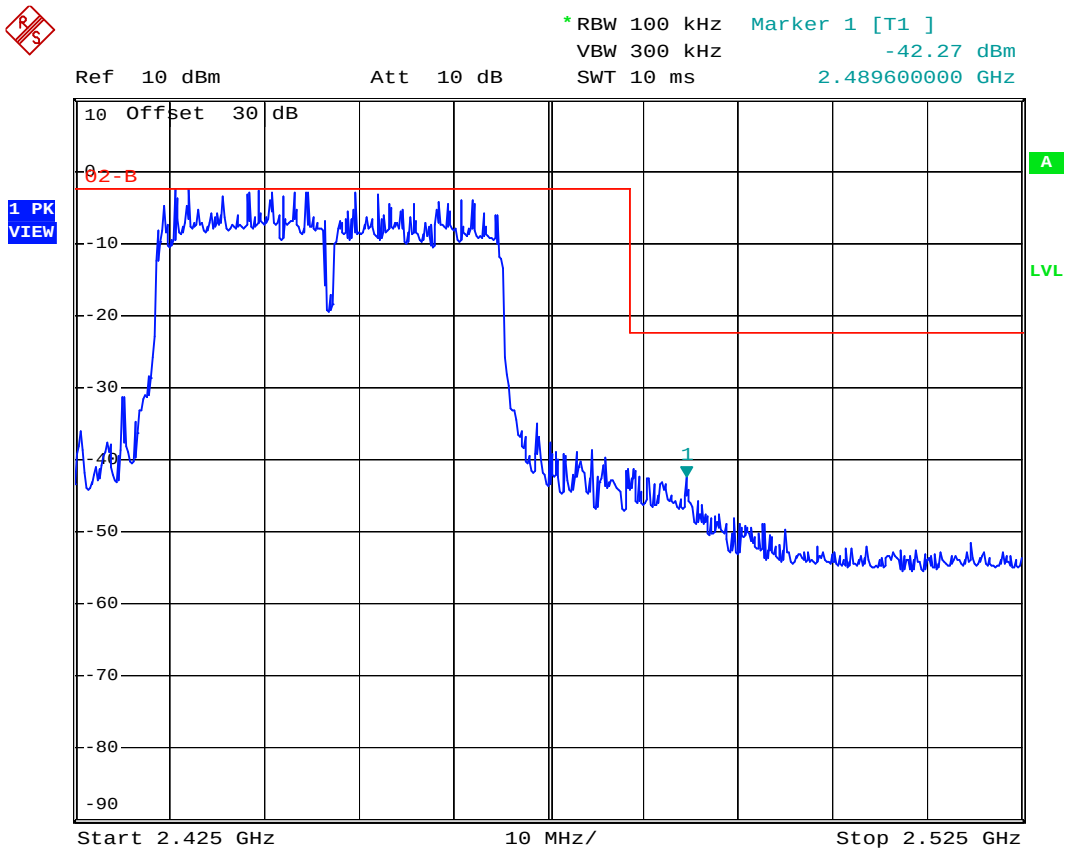


Date: 3.SEP.2013 14:31:38

10 POWER DENSITY MEASUREMENT

10.1 Standard Applicable

According to 15.247(d), for direct sequence systems, the transmitted power density averaged over any 1 second interval shall not be greater than 8 dBm in any 3 kHz bandwidth within these bands.

10.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 4 without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set EUT to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Following the procedures below.

    1) Set analyzer center frequency to DTS channel center frequency.
    2) Set the span to 1.5 times the DTS channel bandwidth.
    3) Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
    4) Set the VBW ≥ 3 x RBW.
    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 levelb within the RBW.
    10) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
4. Repeat above procedures until all measured frequencies were complete.

10.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Spectrum Analyzer	Rohde & Schwarz	FSP40	2012/09/20	2013/09/20

10.4 Measurement Data

Test Date : Sep. 03, 2013 Temperature : 25 °C Humidity : 65 %

A 802.11b

a) Channel Low: Maximun Power Density of 3 kHz Bandwidth is -7.37 dBm
b) Channel Mid: Maximun Power Density of 3 kHz Bandwidth is -8.47 dBm
c) Channel High: Maximun Power Density of 3 kHz Bandwidth is -10.84 dBm

B 802.11g

a) Channel Low: Maximun Power Density of 3 kHz Bandwidth is -16.29 dBm
b) Channel Mid: Maximun Power Density of 3 kHz Bandwidth is -16.26 dBm
c) Channel High: Maximun Power Density of 3 kHz Bandwidth is -17.19 dBm

C 802.11n HT-20

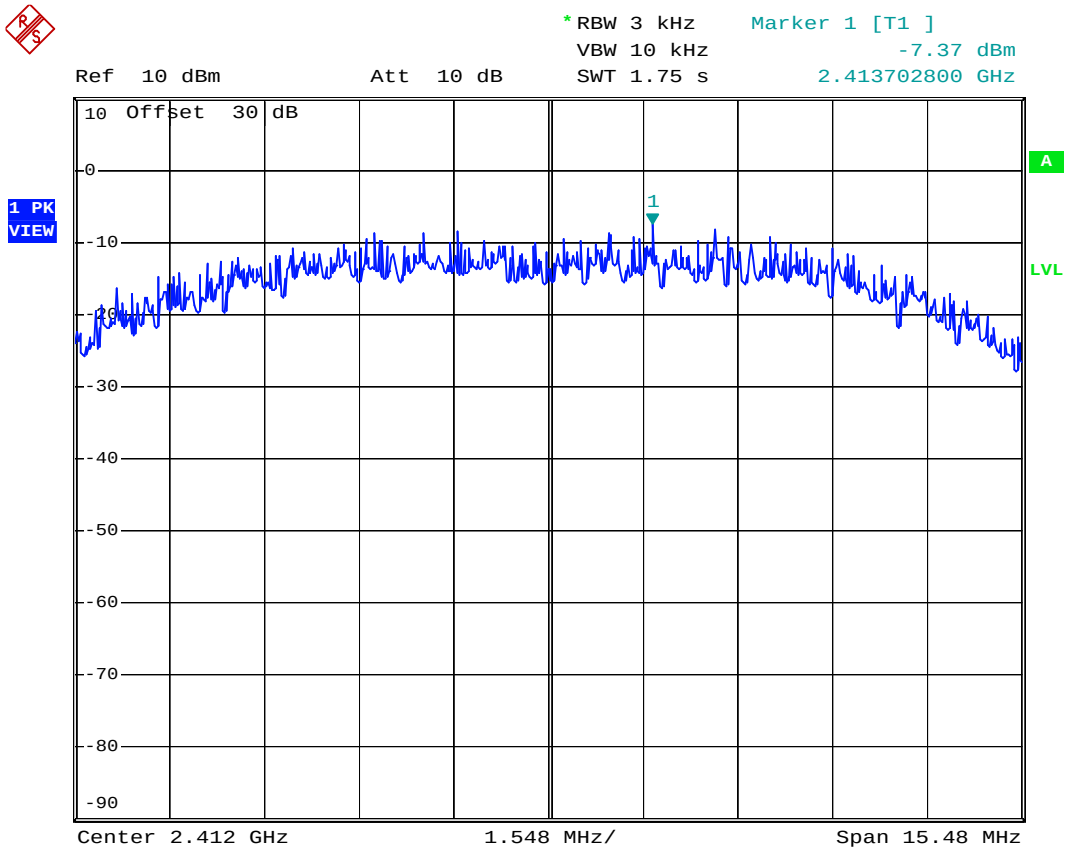
a) Channel Low: Maximun Power Density of 3 kHz Bandwidth is -15.02 dBm
b) Channel Mid: Maximun Power Density of 3 kHz Bandwidth is -15.88 dBm
c) Channel High: Maximun Power Density of 3 kHz Bandwidth is -18.03 dBm

D 802.11n HT-40

a) Channel Low: Maximun Power Density of 3 kHz Bandwidth is -19.36 dBm
b) Channel Mid: Maximun Power Density of 3 kHz Bandwidth is -20.81 dBm
c) Channel High: Maximun Power Density of 3 kHz Bandwidth is -20.91 dBm

Note : The expanded uncertainty: 2dB.

802.11b



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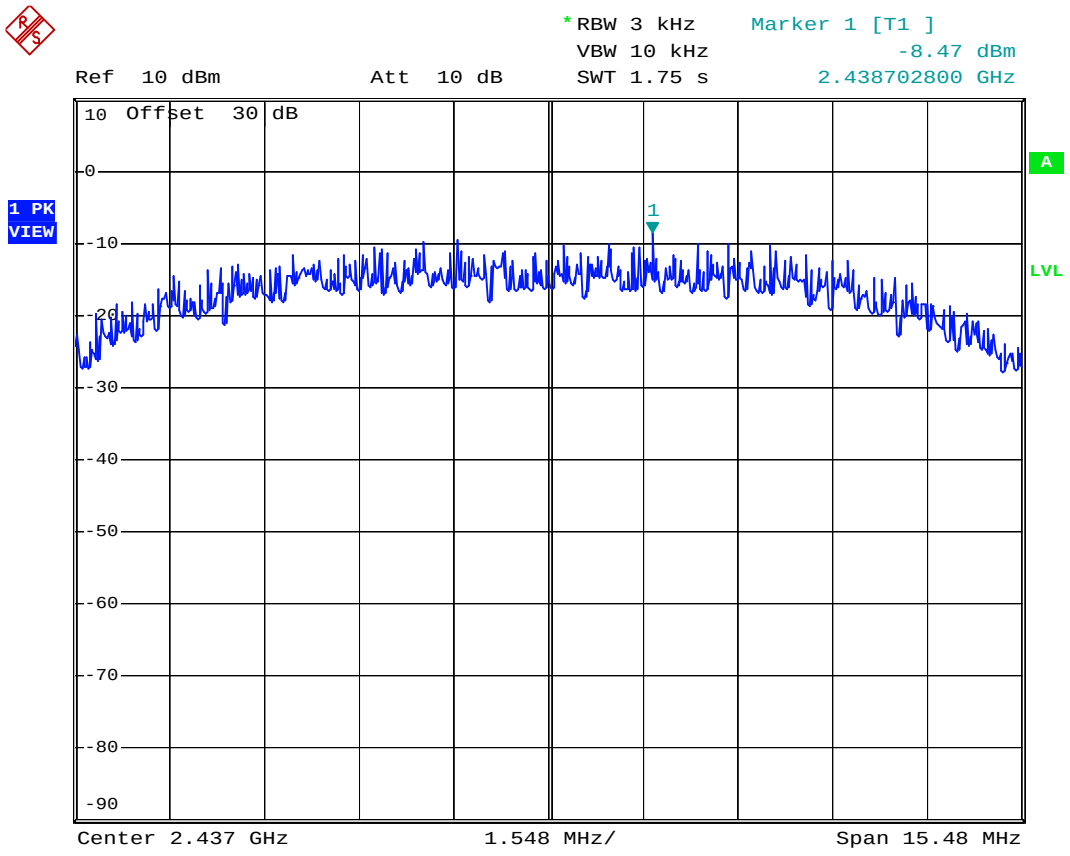

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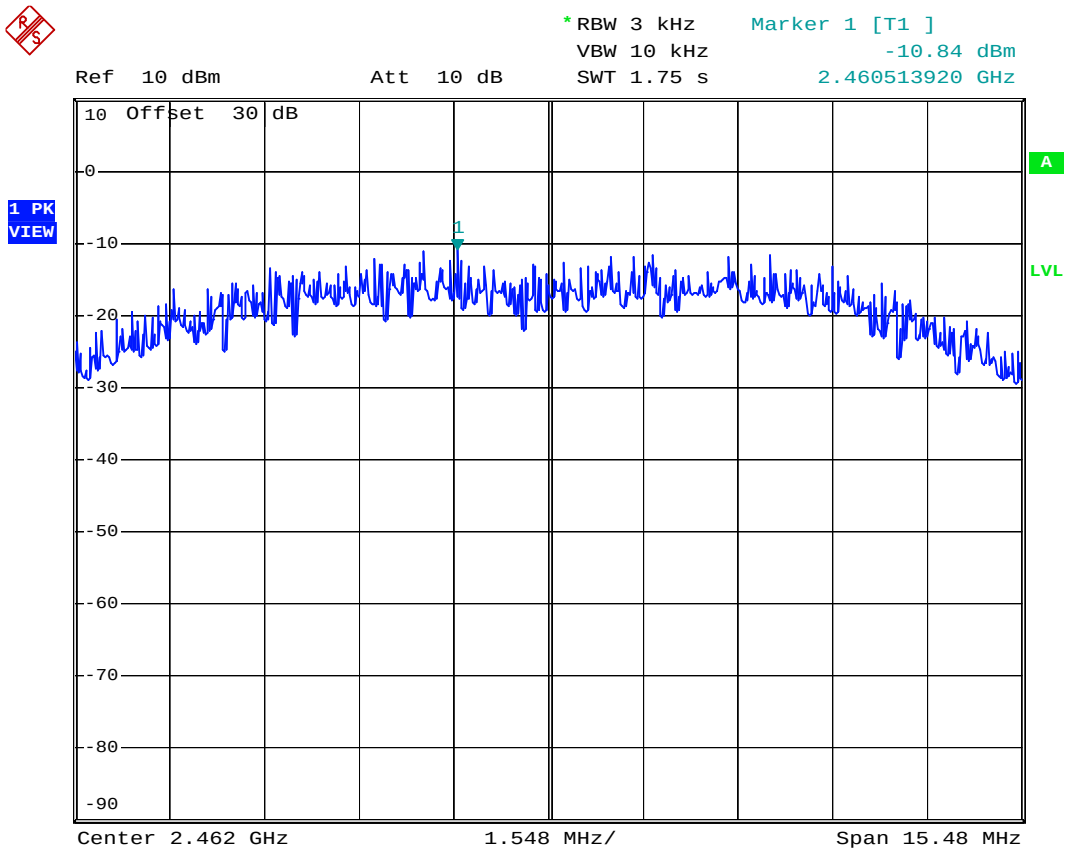
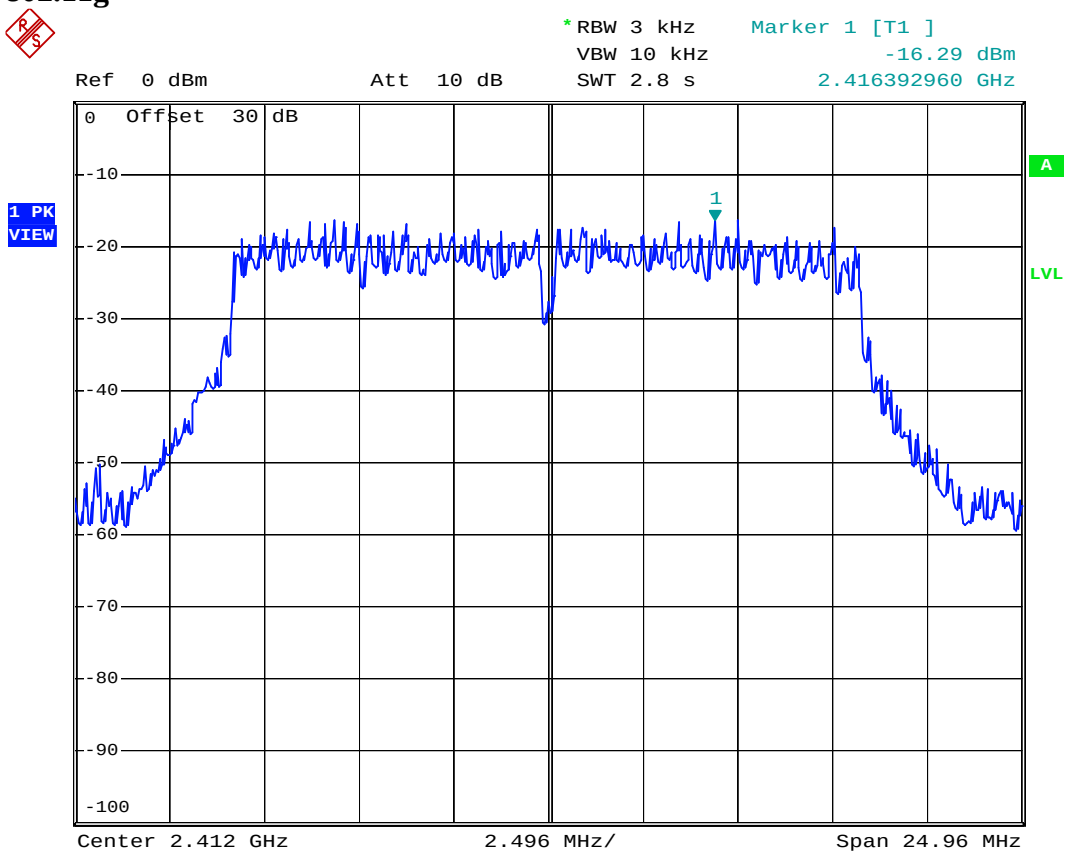


Date: 3.SEP.2013 10:15:30

802.11g



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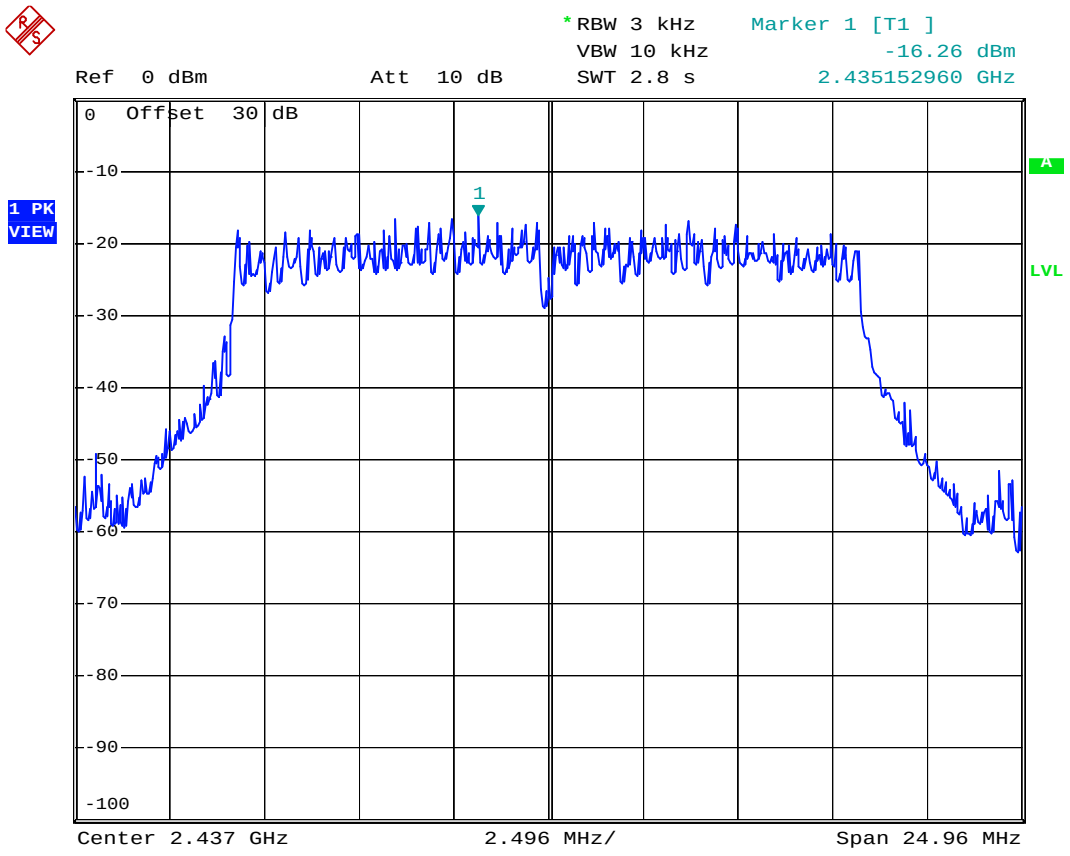

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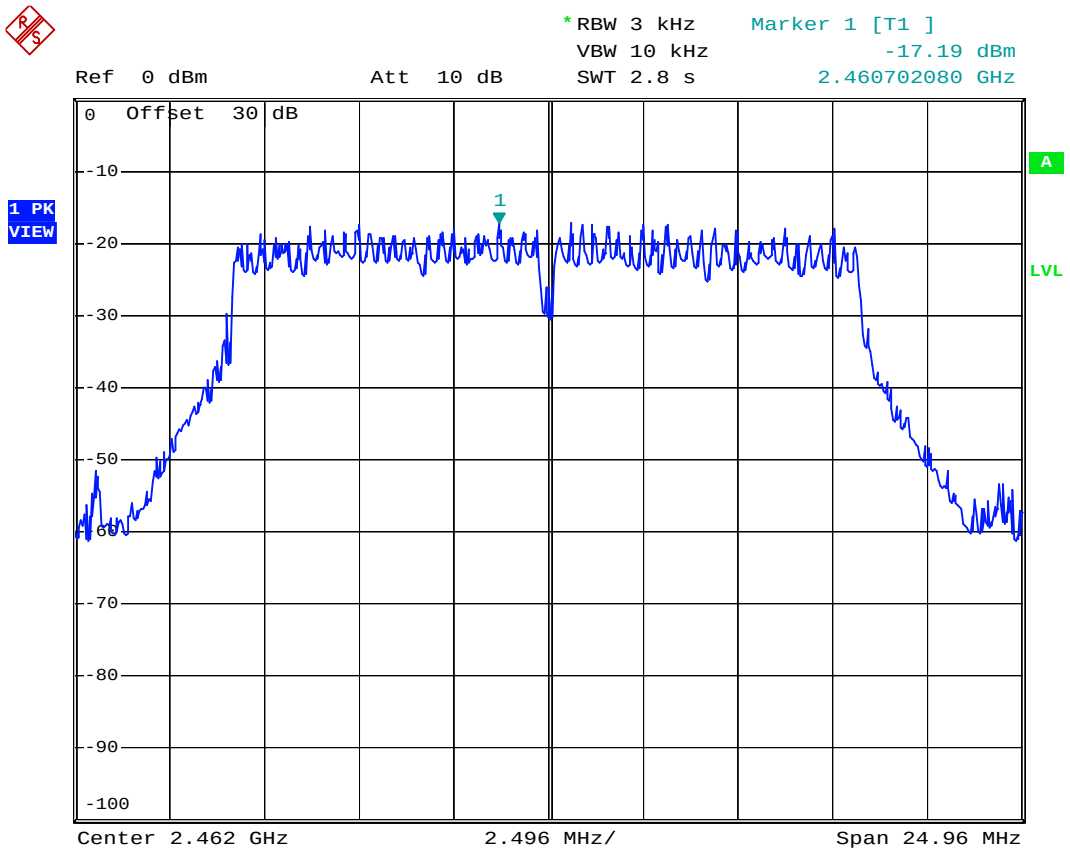

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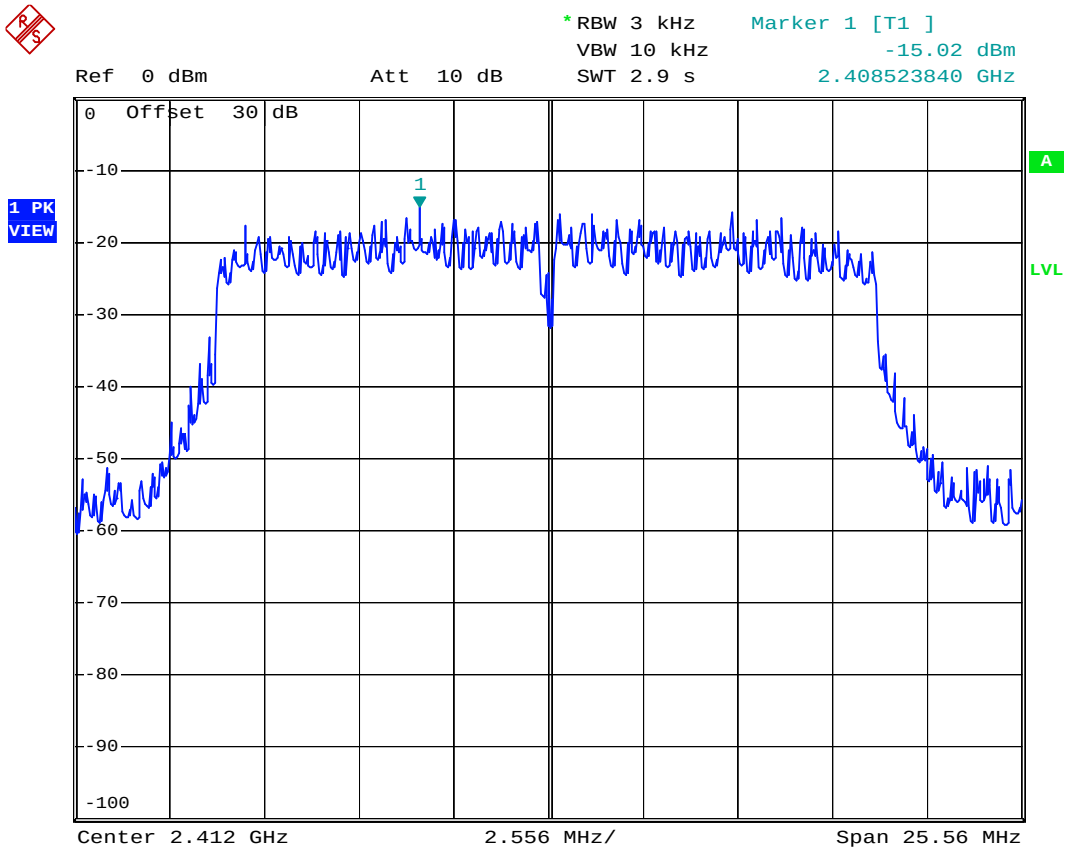
802.11n HT-20



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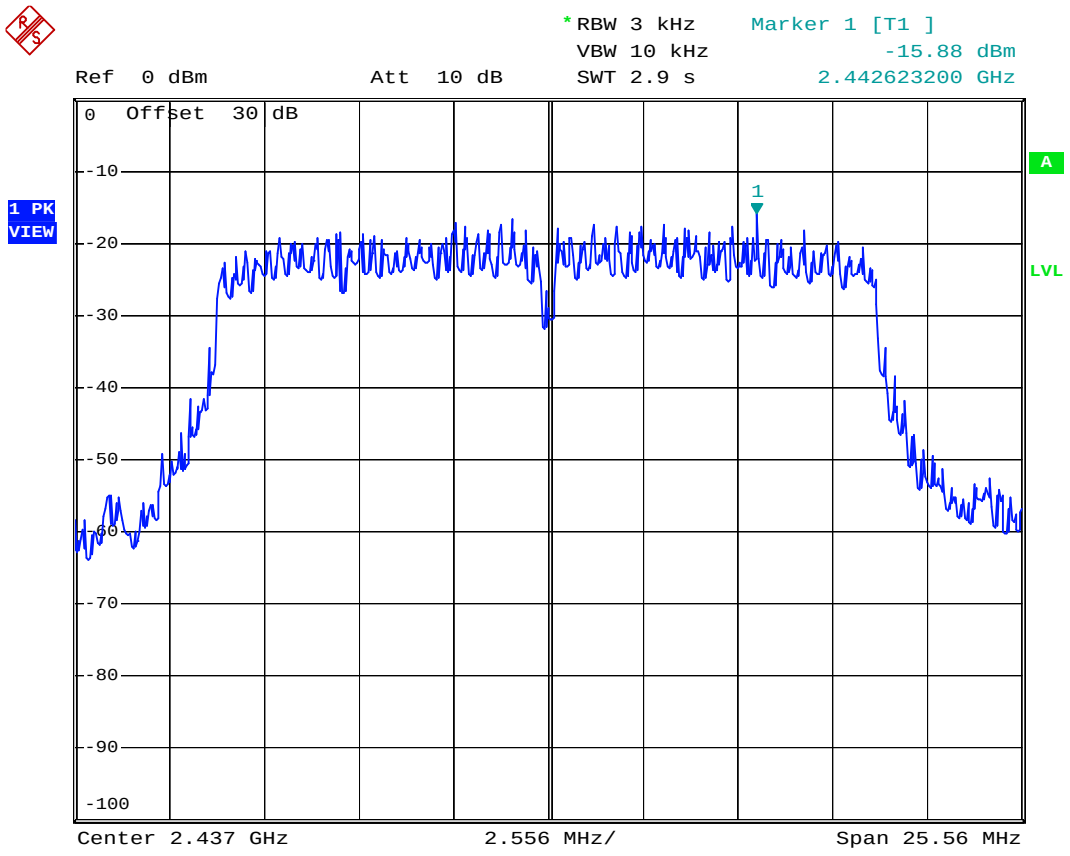

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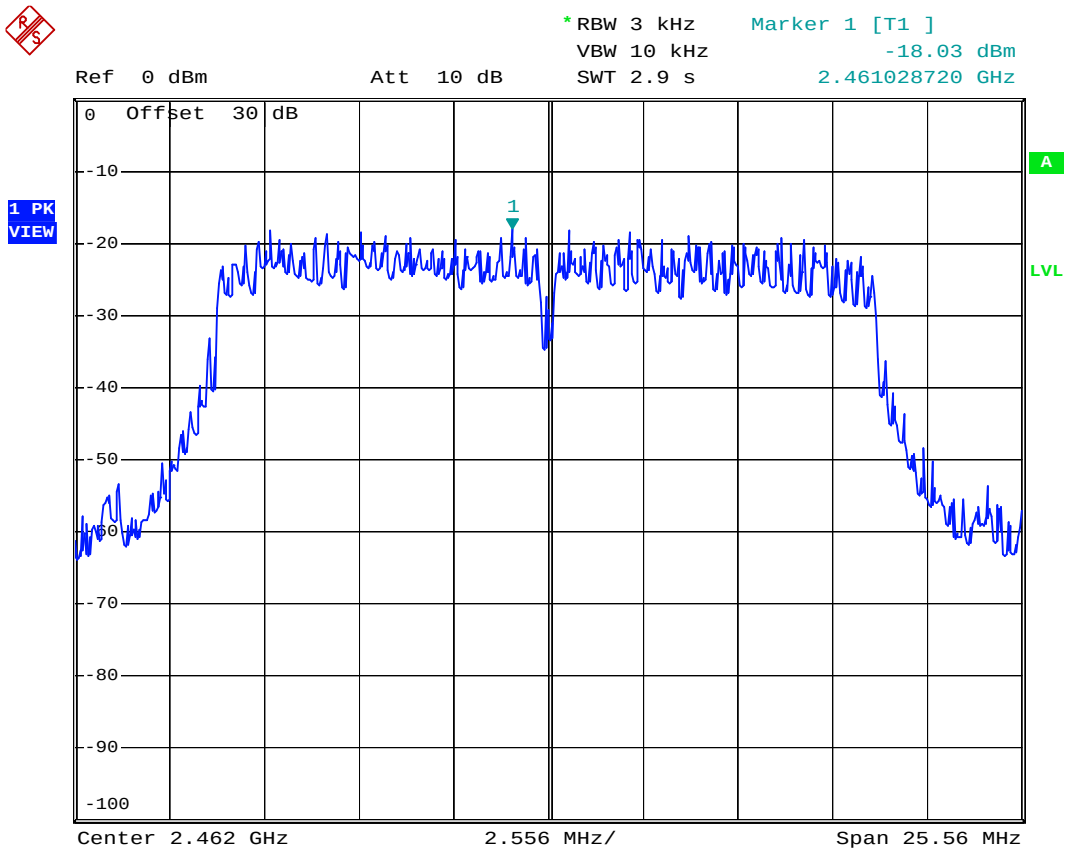

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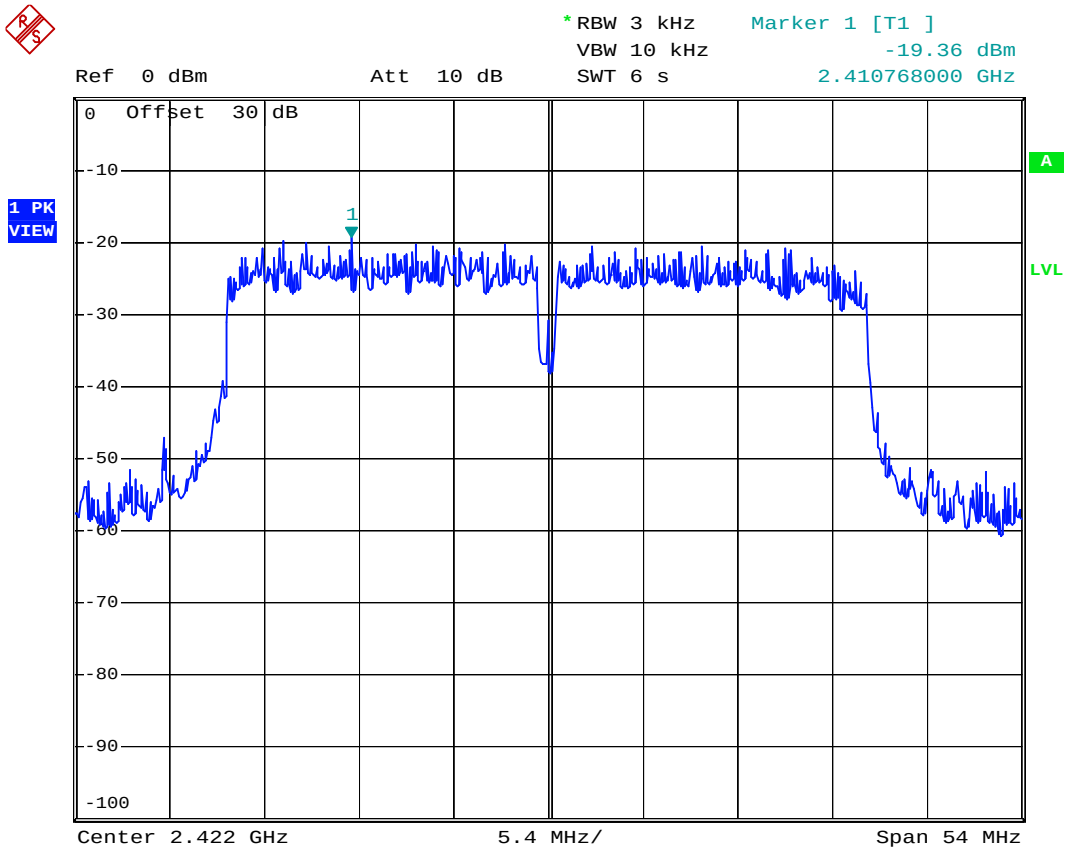
802.11n HT-40



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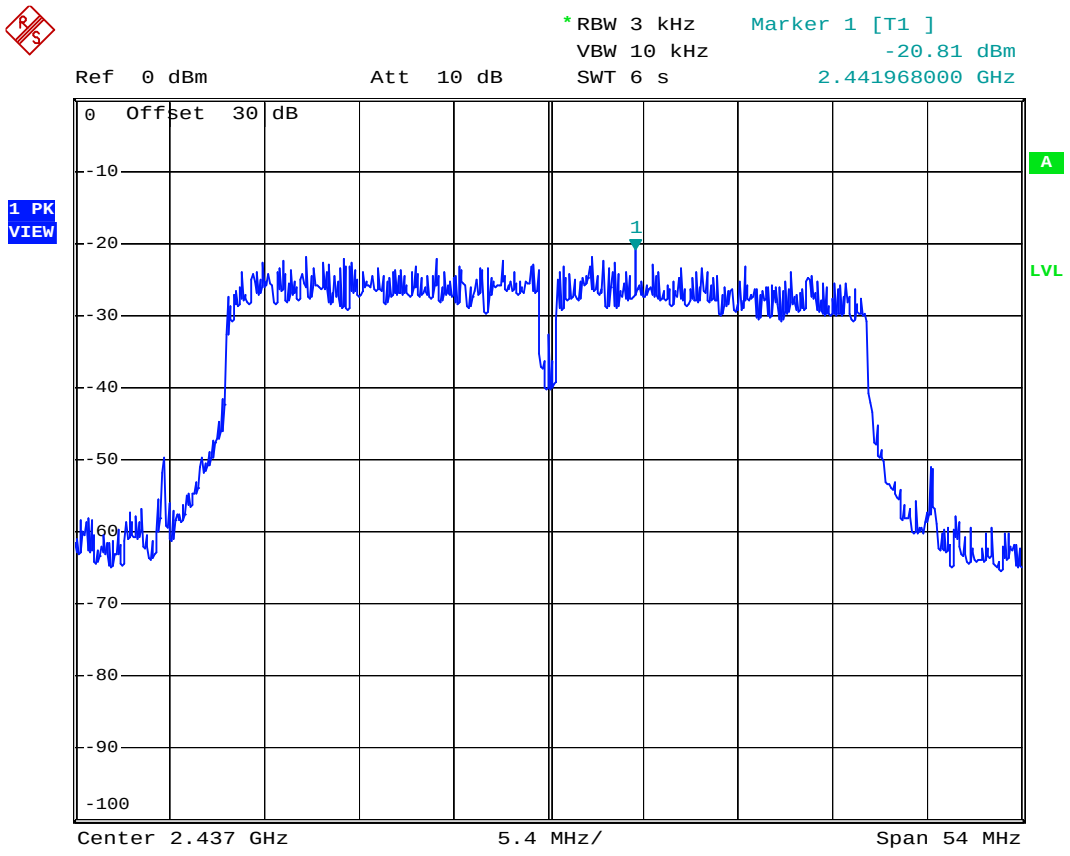

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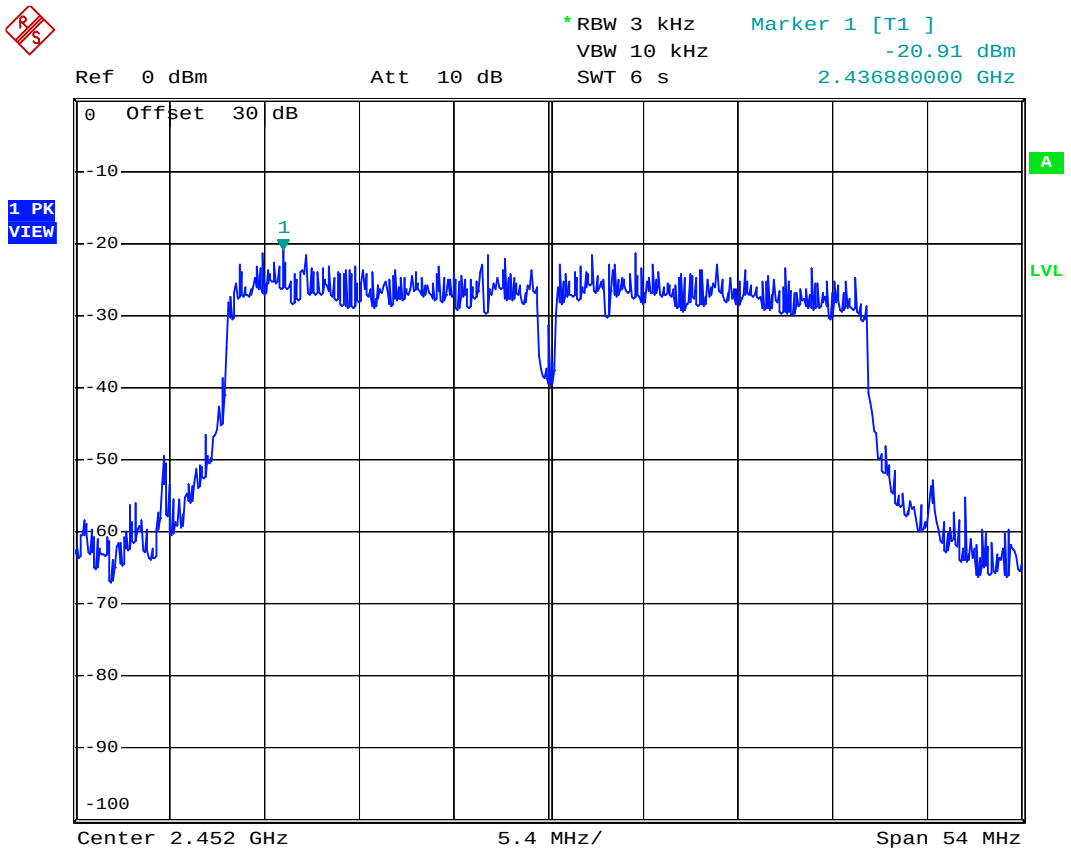

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11. OUT-OF-BAND CONDUCTED EMISSION MEASUREMENT

11.1 Standard Applicable

According to 15.247(c), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required.

11.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 4 without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Use the following spectrum analyzer settings:
   Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.
   RBW = 100 kHz
   VBW ≥ RBW
   Sweep = auto
   Detector function = peak
   Trace = max hold.
4. Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded. Plot the result on the screen of spectrum analyzer.
5. Repeat above procedures until all measured frequencies were complete.

11.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Calibration Date	Next Cal. Date
Spectrum Analyzer	Rohde & Schwarz	FSP40	2012/12/07	2013/12/06

11.4 Measurement Data

Test Date : Sep. 03, 2013 Temperature : 25 °C Humidity : 65 %

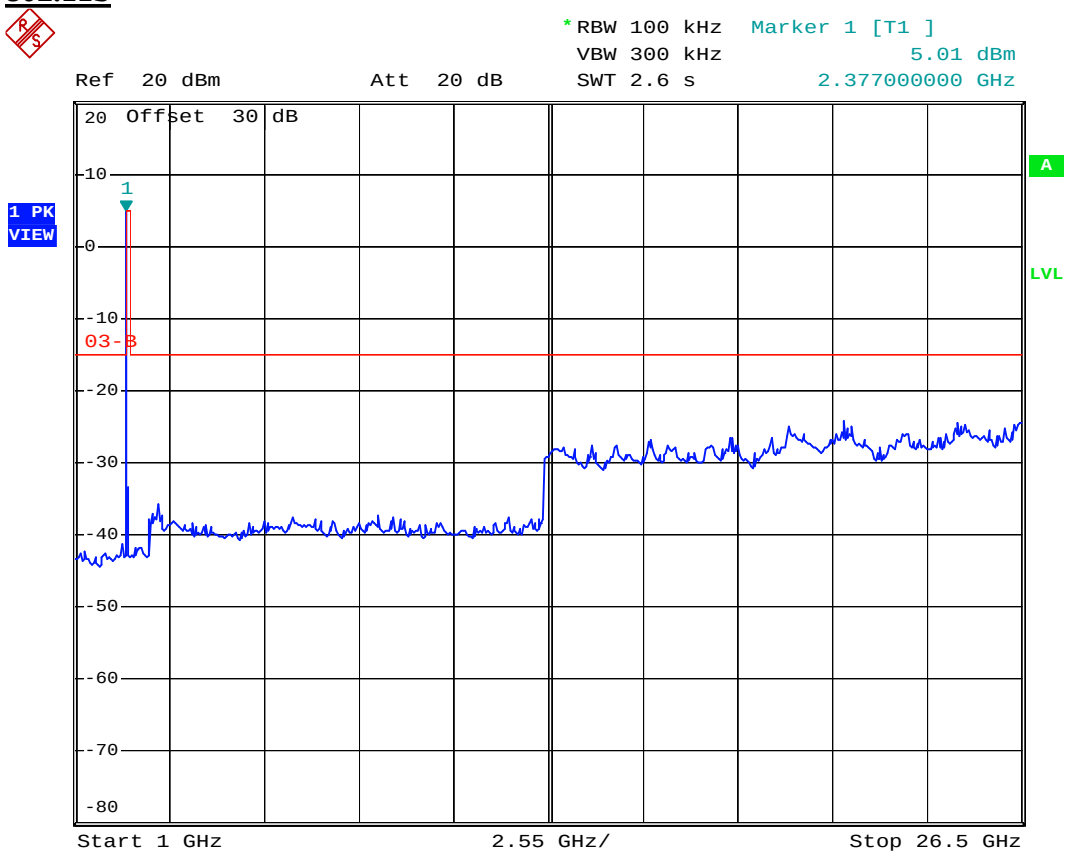
A 802.11b
B 802.11g
C 802.11n HT-20
D 802.11n HT-40

Model : Channel Low/ Model : Channel Mid/ Model : Channel High

1 GHz to 25 GHz frequency band: All emissions are attenuated more than 20dB from

Note : The expanded uncertainty: 2dB.

802.11b



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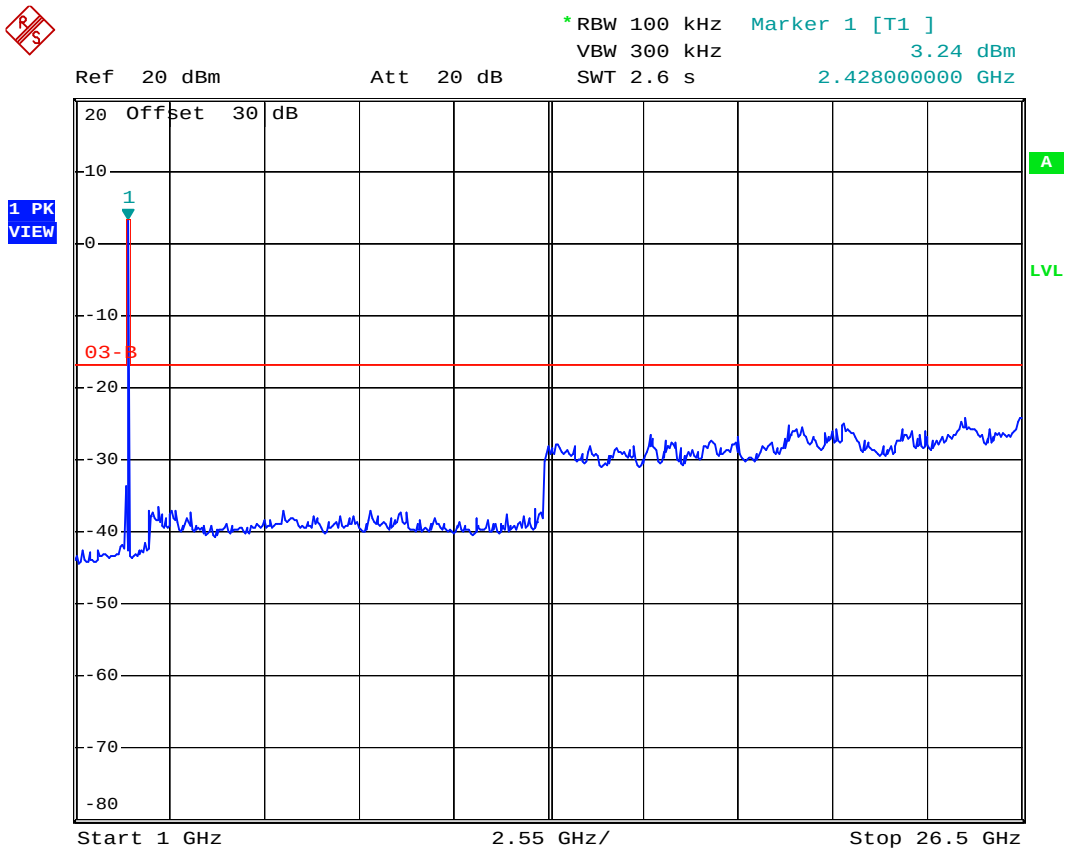

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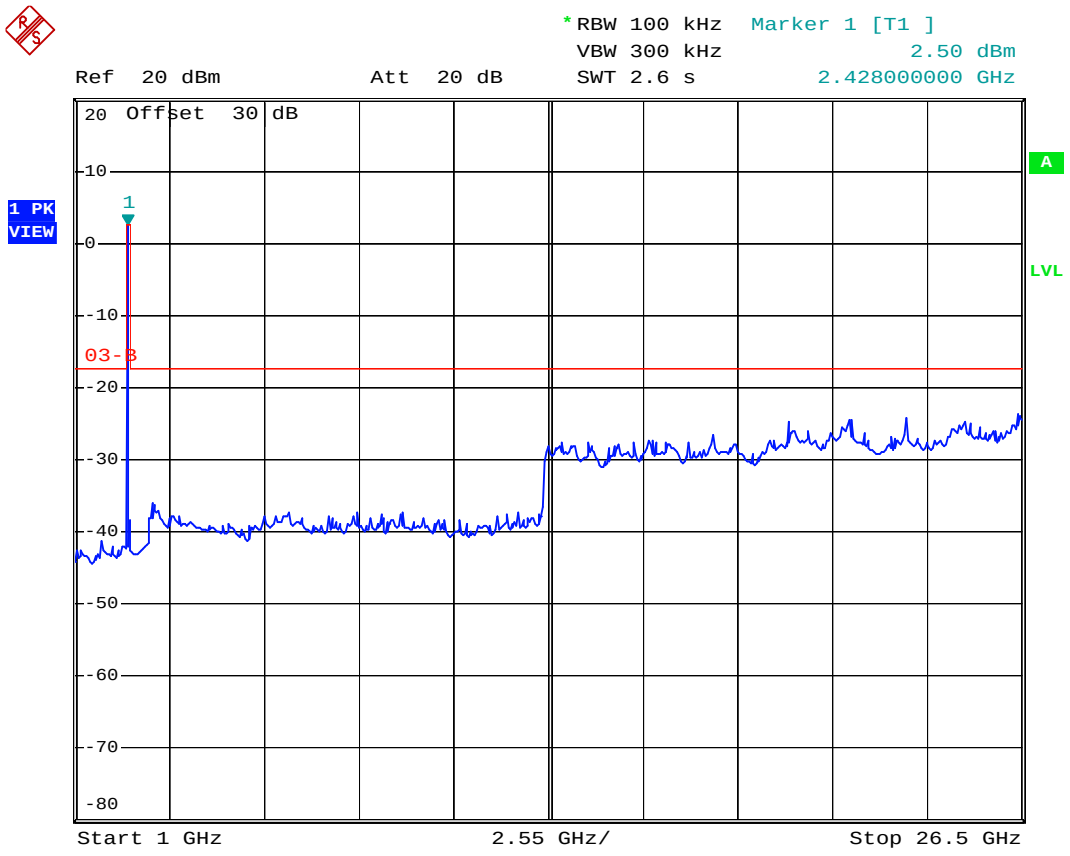

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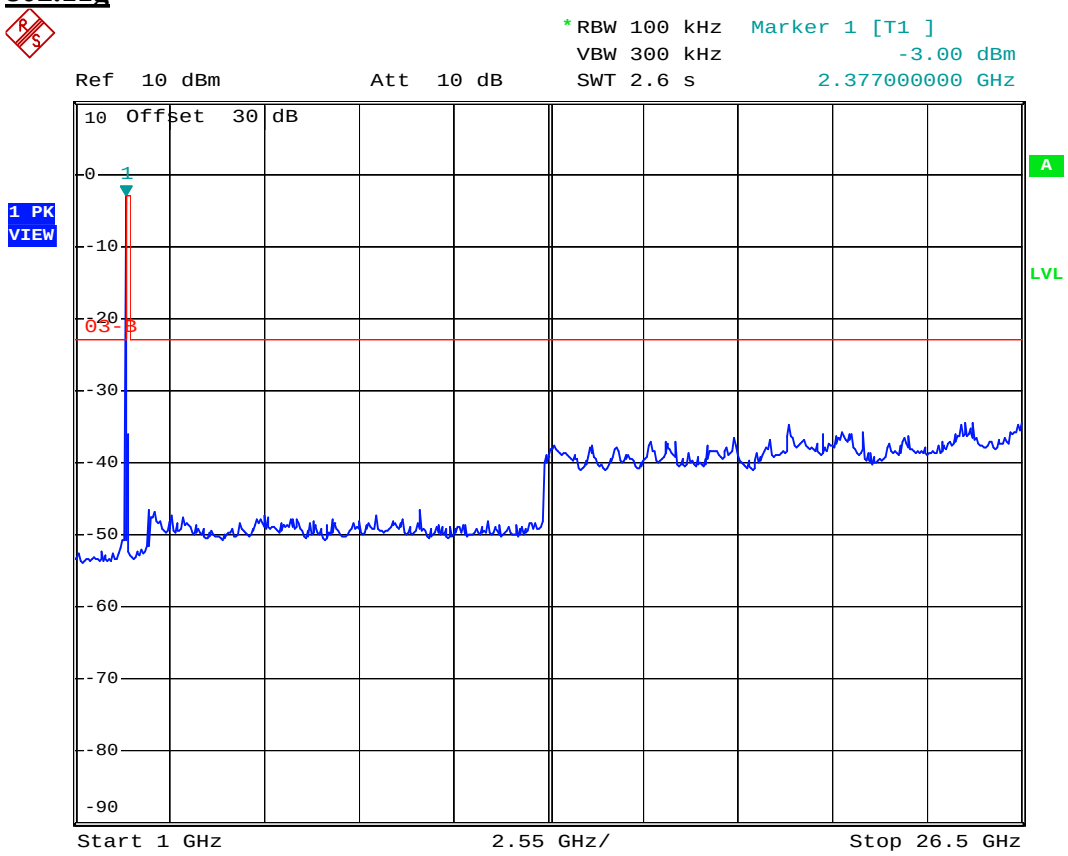
802.11g



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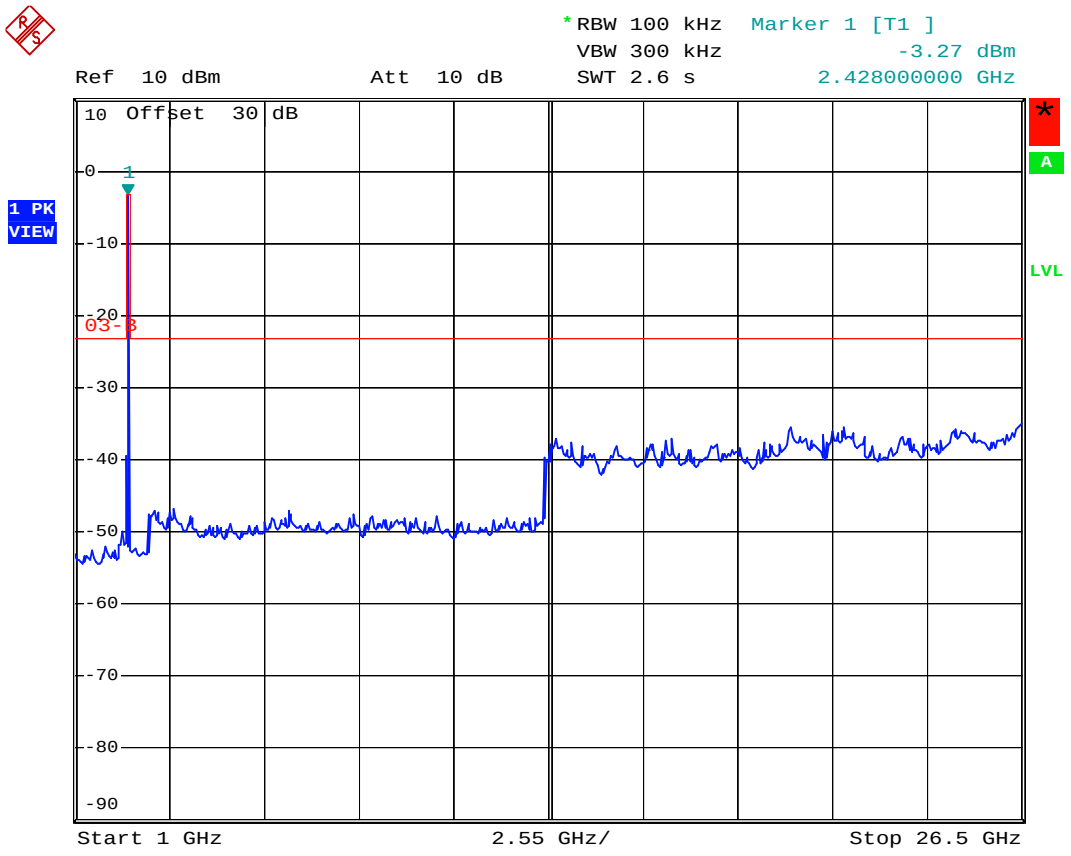

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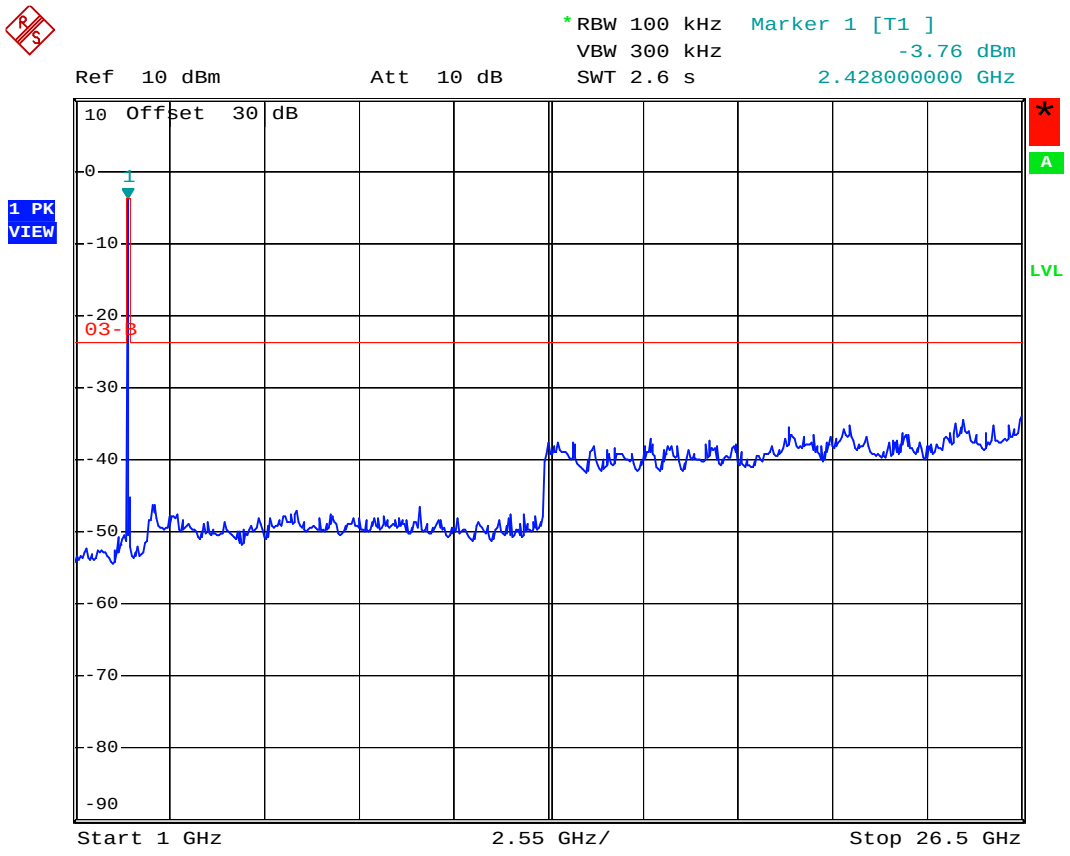

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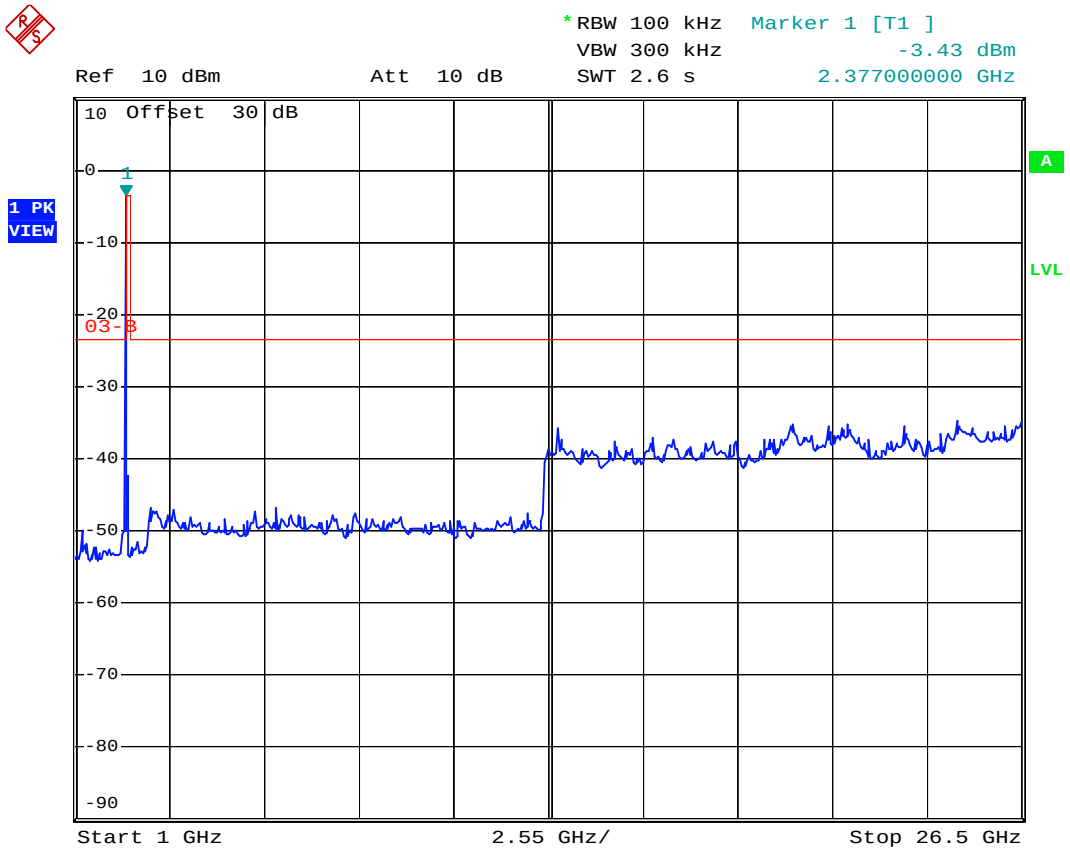
802.11n HT-20



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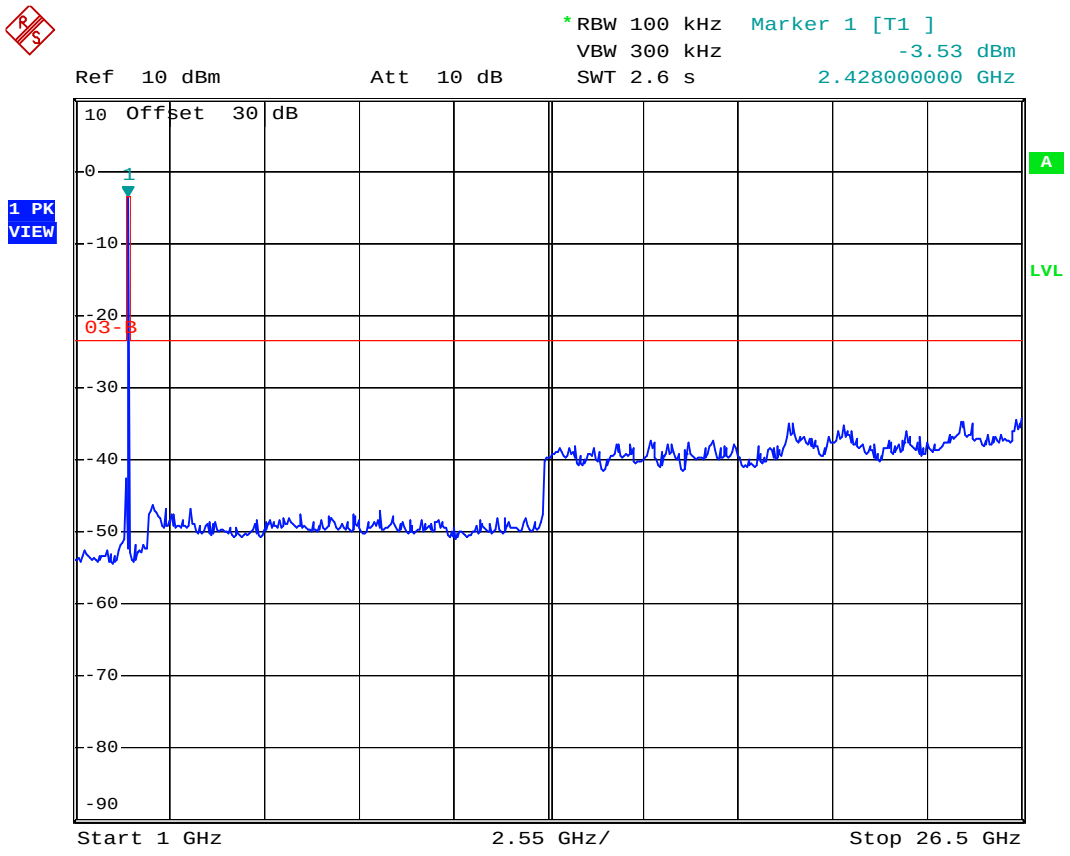

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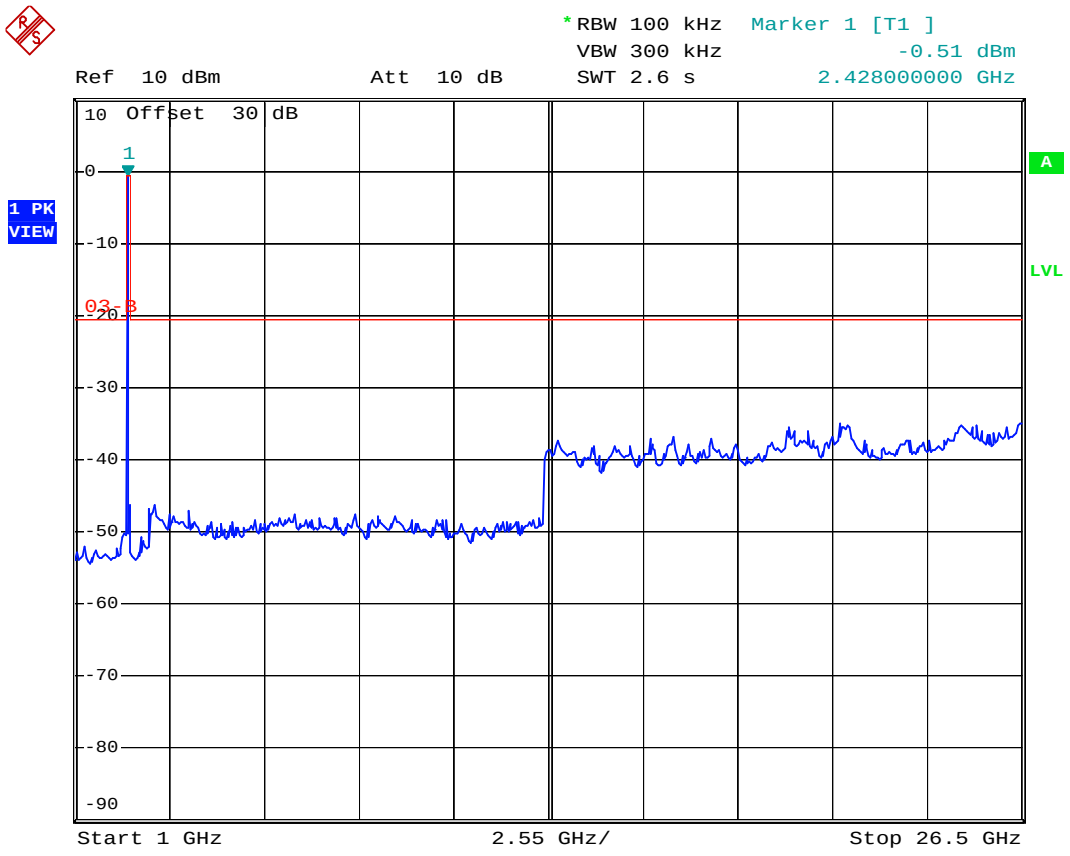

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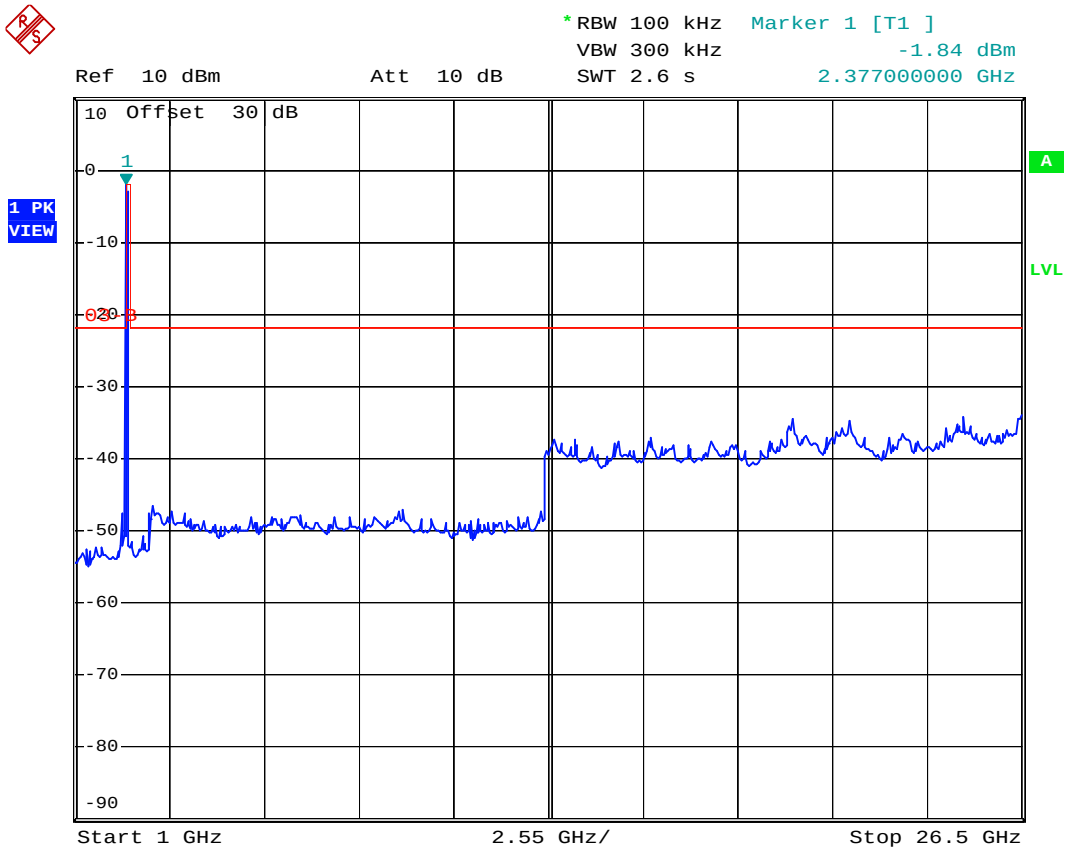
802.11n HT-40



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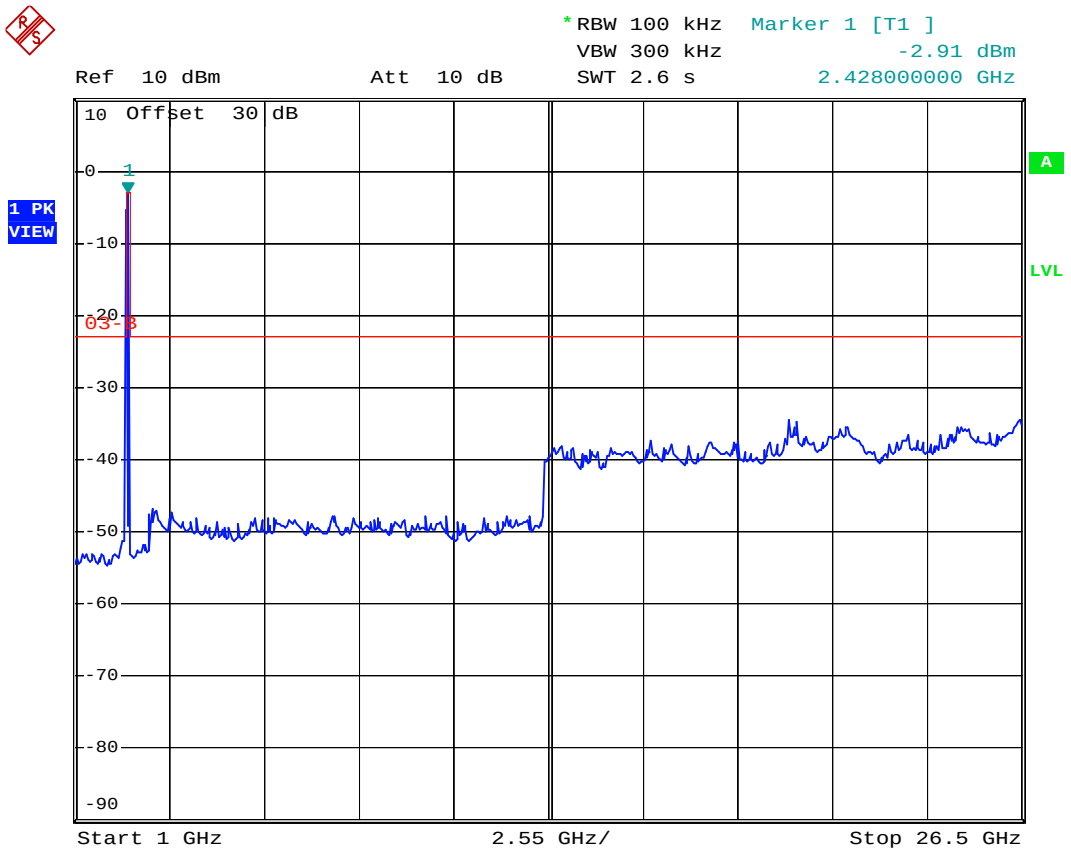

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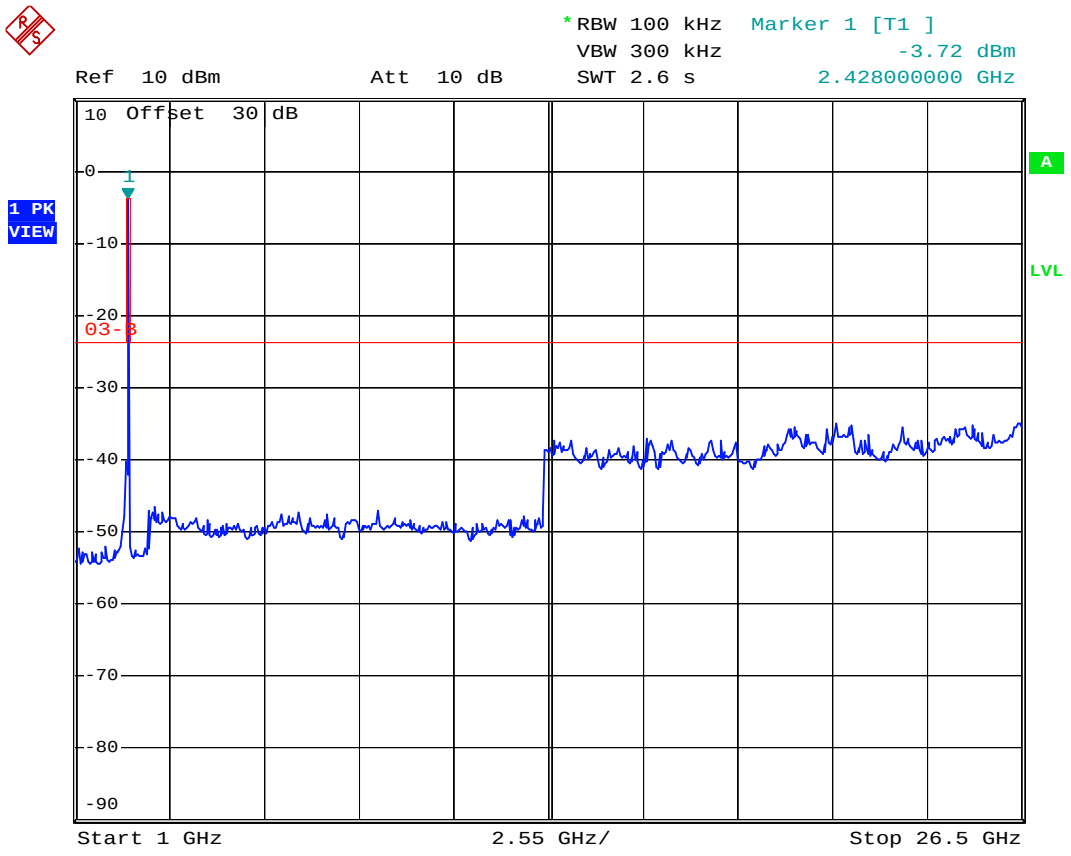

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