APPLICATION CERTIFICATION FCC Part 15C
On Behalf of
Trimax Digital Limited

ATSC HD DIGITAL RECEIVER
Model No.: HA2800,HAM2, HAO1, HAO2, HAO3,
HAO4, HAO5, HAO6, HAO7, HAO8, HAO9

FCC ID: 2ABAO-HA2800

Prepared for	:	Trimax Digital Limited
Address	:	Room 1016-1019, 10F, Max Smart Commercial Centre, No. 21 Baoxing Road, Bao'an District,Shenzhen, Guangdong Province, China
Prepared by	:	ACCURATE TECHNOLOGY CO., LTD
Address	:	F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China
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Report Number	:	ATE20132275
Date of Test	:	Oct 23-Nov 05, 2013
Date of Report	:	Nov 05, 2013

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Description Page

Test Report Certification

Applicant **:** Trimax Digital Limited

Manufacturer **:** Trimax Digital Limited

EUT Description **:** ATSC HD DIGITAL RECEIVER

(A) MODEL NO.: HA2800,HAM2,HAO1, HAO2, HAO3, HAO4, HAO5, HAO6, HAO7, HAO8, HAO9

(B) SERIAL NO.: N/A

(C) POWER SUPPLY: DC 12V (Power by Adapter)

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247
ANSI C63.4: 2009

The EUT was tested according to DTS test procedure of April 09, 2013 KDB558074 D01 DTS Meas Guidance v03 for compliance to FCC 47CFR 15.247 requirements

The device described above is tested by ACCURATE TECHNOLOGY CO. LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.247 limits. The measurement results are contained in this test report and ACCURATE TECHNOLOGY CO. LTD is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of ACCURATE TECHNOLOGY CO. LTD.

Date of Test : Oct 23-Nov 05, 2013

Prepared by :

(Engineer)

Approved & Authorized Signer :

(Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT	:	ATSC HD DIGITAL RECEIVER
Model Number	:	HA2800,HAM2,HAO1, HAO2, HAO3, HAO4, HAO5, HAO6, HAO7, HAO8, HAO9 Note: These samples are same except for the model number is difference. So we prepare the HA2800 for test
Frequency Range	:	802.11b/g/n(20MHz): 2412-2462MHz 802.11n(40MHz): 2422-2452MHz
Number of Channels	:	802.11b/g/n (20MHz):11 802.11n (40MHz): 7
Antenna Gain	:	4.16dBi
Power Supply	:	DC 12V (Power by adapter)
Adapter	:	Model number: RJ-AS120200U105-B Input: AC 100-240V; 50/60Hz 1.0A Output: DC 12V/2.0A USB line: Non-shielded, Non-detachable, 1.5m
Data Rate	:	802.11b: 11, 5.5, 2, 1 Mbps 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps 802.11n: up to 150Mbps
Applicant	:	Trimax Digital Limited
Address	:	Room 1016-1019, 10F, Max Smart Commercial Centre, No. 21 Baoxing Road, Bao'an District，Shenzhen, Guangdong Province，China
Manufacturer	:	Trimax Digital Limited
Address	:	Room 1016-1019, 10F, Max Smart Commercial Centre, No. 21 Baoxing Road, Bao'an District，Shenzhen, Guangdong Province，China
Date of sample received	:	Oct 23, 2013
Date of Test	:	Oct 23-Nov 05, 2013

1.2.Carrier Frequency of Channels

802.11b, 802.11g, 802.11n (20MHz)

Channel	Frequency(MHz)	Channel	Frequency(MHz)
01	2412	07	2442
02	2417	08	2447
03	2422	09	2452
04	2427	10	2457
05	2432	11	2462
06	2437	---	---

802.11n (40MHz)

Channel	Frequency(MHz)	Channel	Frequency(MHz)
---	---	07	2442
---	---	08	2447
03	2422	09	2452
04	2427	---	---
05	2432	---	---
06	2437	---	---

1.3.Special Accessory and Auxiliary Equipment

n.a.

1.4.Description of Test Facility

EMC Lab : Accredited by TUV Rheinland Shenzhen

Listed by FCC
The Registration Number is 752051

Listed by Industry Canada
The Registration Number is 5077A-2

Accredited by China National Accreditation Committee for Laboratories
The Certificate Registration Number is L3193

Name of Firm : ACCURATE TECHNOLOGY CO. LTD

Site Location : F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China

1.5.Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty (9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty (30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty (Above 1GHz)	=	4.06dB, k=2

2. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Type	S/N	Calibrated dates	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 12, 2013	Jan. 11, 2014
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 12, 2013	Jan. 11, 2014
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 12, 2013	Jan. 11, 2014
Pre-Amplifier	Rohde&Schwarz	CBLU1183540-01	3791	Jan. 12, 2013	Jan. 11, 2014
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 12, 2013	Jan. 11, 2014
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 12, 2013	Jan. 11, 2014
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 12, 2013	Jan. 11, 2014
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 12, 2013	Jan. 11, 2014
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 12, 2013	Jan. 11, 2014
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 12, 2013	Jan. 11, 2014
Highpass Filter	Wainwright Instruments	WHKX3.6/18G-10SS	N/A	Jan. 12, 2013	Jan. 11, 2014
Band Reject Filter	Wainwright Instruments	WRCG2400/2485-2375/2510-60/11SS	N/A	Jan. 12, 2013	Jan. 11, 2014

3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

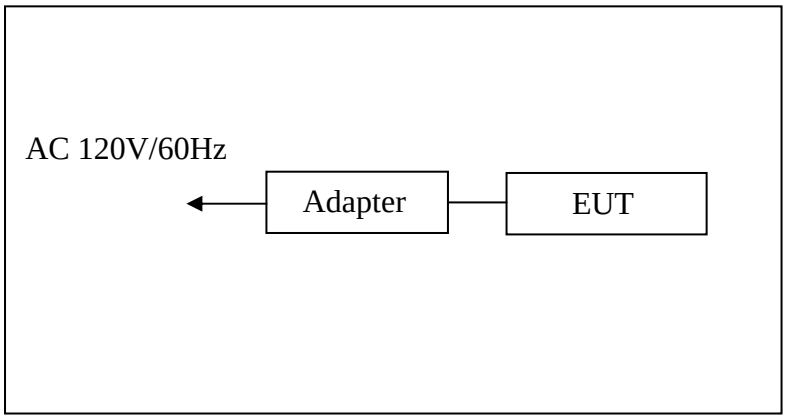
The mode is used: **1.802.11b Transmitting mode**
Low Channel: 2412MHz
Middle Channel: 2437MHz
High Channel: 2462MHz

2.802.11g Transmitting mode
Low Channel: 2412MHz
Middle Channel: 2437MHz
High Channel: 2462MHz

3.802.11n (20MHz) Transmitting mode
Low Channel: 2412MHz
Middle Channel: 2437MHz
High Channel: 2462MHz

4.802.11n (40MHz) Transmitting mode
Low Channel: 2422MHz
Middle Channel: 2437MHz
High Channel: 2452MHz
5. Charging

3.2.Configuration and peripherals

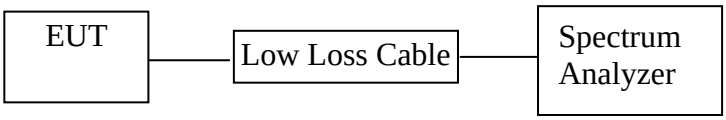


4. TEST PROCEDURES AND RESULTS

FCC Rules	**Description of Test**	**Result**
Section 15.247(a)(2)	6dB Bandwidth Test	Compliant
Section 15.247(e)	Power Spectral Density Test	Compliant
Section 15.247(b)(3)	Maximum Peak Output Power Test	Compliant
Section 15.247(d)	Band Edge Compliance Test	Compliant
Section 15.247(d) Section 15.209	Radiated Spurious Emission Test	Compliant
Section 15.247(d)	Conducted Spurious Emission Test	Compliant
Section 15.207	AC Power Line Conducted Emission Test	Compliant
Section 15.203	Antenna Requirement	Compliant

5. 6DB BANDWIDTH MEASUREMENT

5.1.Block Diagram of Test Setup



5.2.The Requirement For Section 15.247(a)(2)

Section 15.247(a)(2): Systems using digital modulation techniques may operate in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

5.3.EUT Configuration on Measurement

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

5.4.Operating Condition of EUT

5.4.1.Setup the EUT and simulator as shown as Section 5.1.

5.4.2.Turn on the power of all equipment.

5.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2412-2462 and 2422-2452MHz. We select 2412MHz, 2437MHz, 2462MHz and 2422MHz, 2437MHz, 2452MHz TX frequency to transmit.

5.5.Test Procedure

1. Set resolution bandwidth (RBW) = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 x 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.

5.6.Test Result

The test was performed with 802.11b			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2412	10.12	> 0.5MHz
Middle	2437	10.12	> 0.5MHz
High	2462	10.12	> 0.5MHz

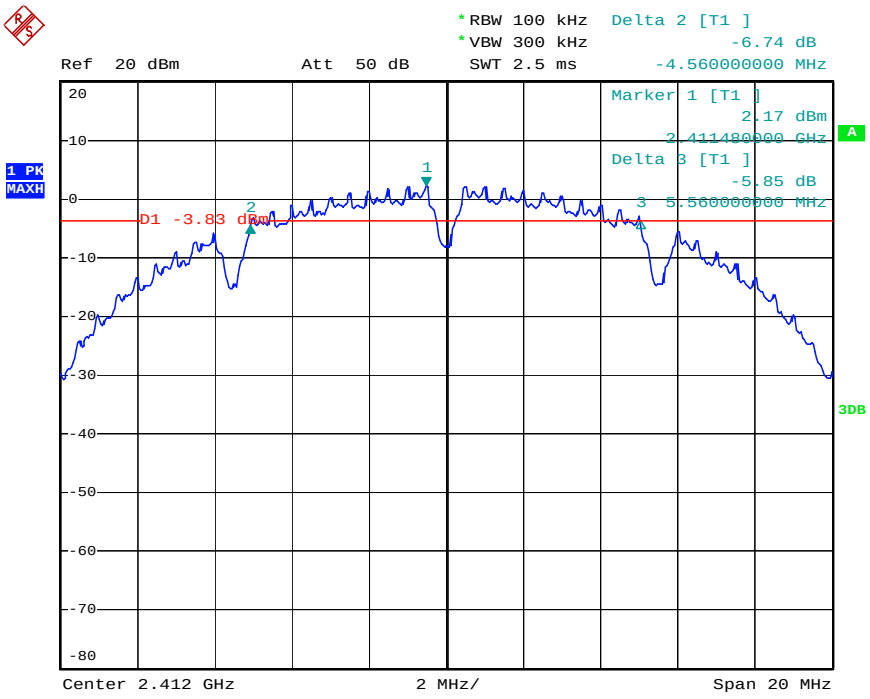
The test was performed with 802.11g			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2412	16.60	> 0.5MHz
Middle	2437	16.60	> 0.5MHz
High	2462	16.60	> 0.5MHz

The test was performed with 802.11n (Bandwidth: 20 MHz)			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2412	17.84	> 0.5MHz
Middle	2437	17.84	> 0.5MHz
High	2462	17.84	> 0.5MHz

The test was performed with 802.11n (Bandwidth: 40 MHz)			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2422	36.40	> 0.5MHz
Middle	2437	36.40	> 0.5MHz
High	2452	36.40	> 0.5MHz

The spectrum analyzer plots are attached as below.

802.11b Channel Low 2412MHz



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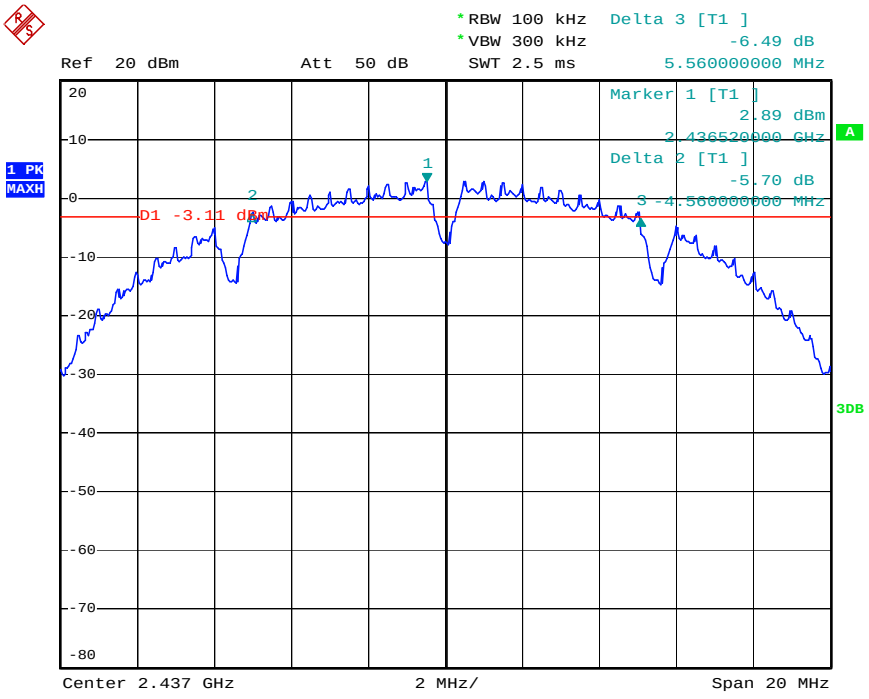
802.11b Channel Middle 2437MHz



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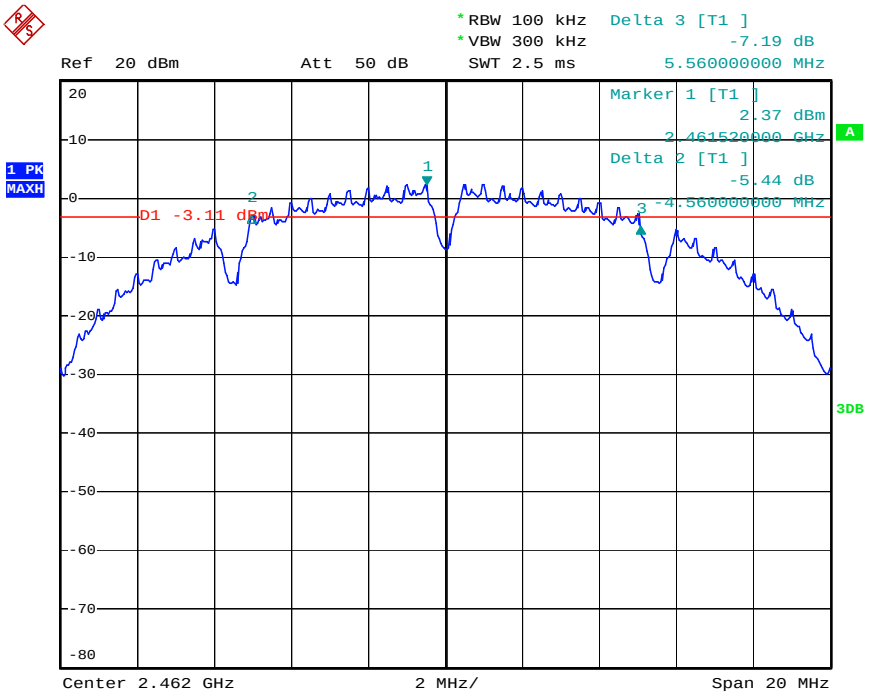
802.11b Channel High 2462MHz



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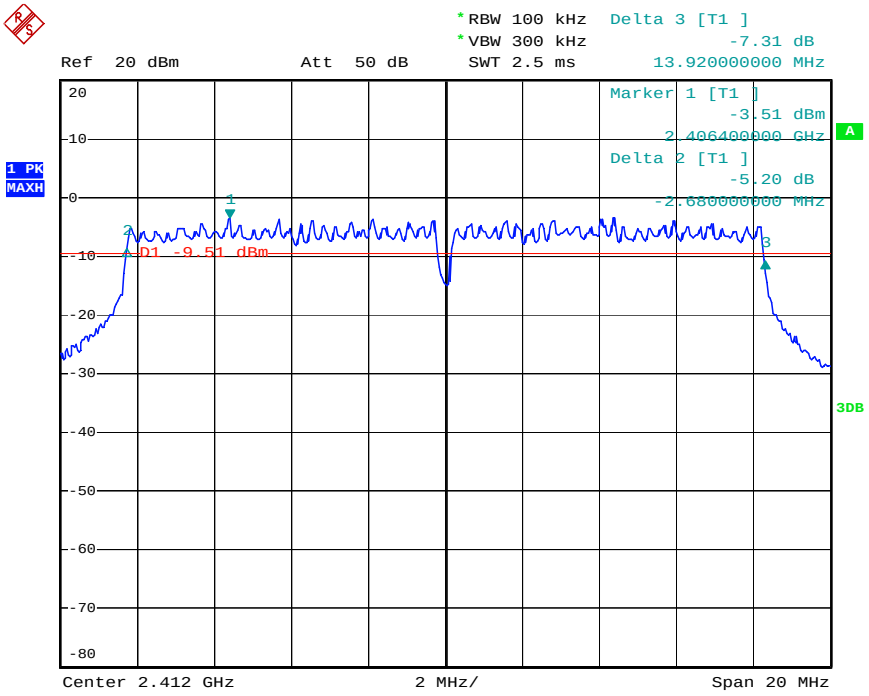
802.11g Channel Low 2412MHz



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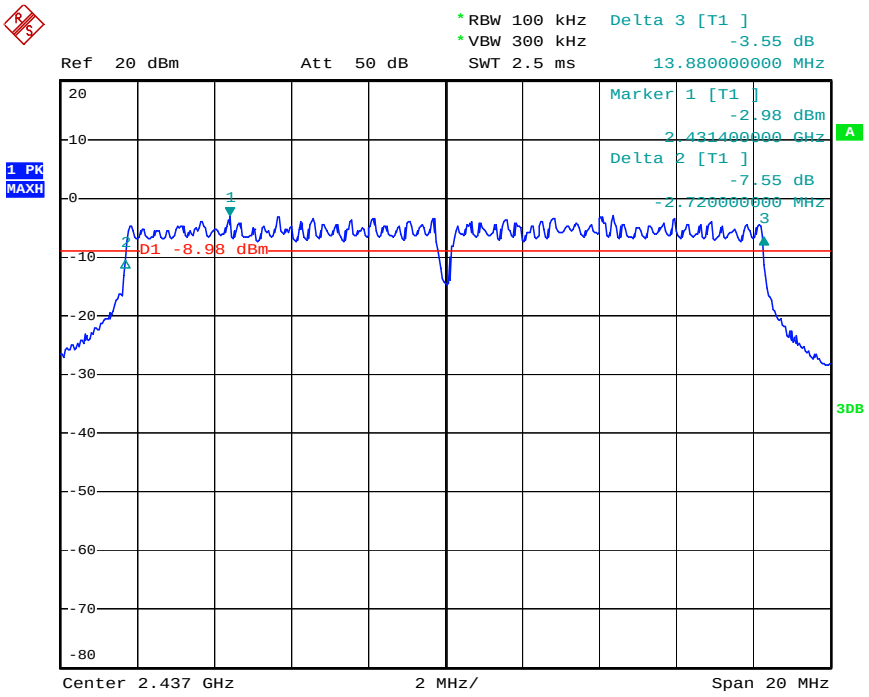
802.11g Channel Middle 2437MHz



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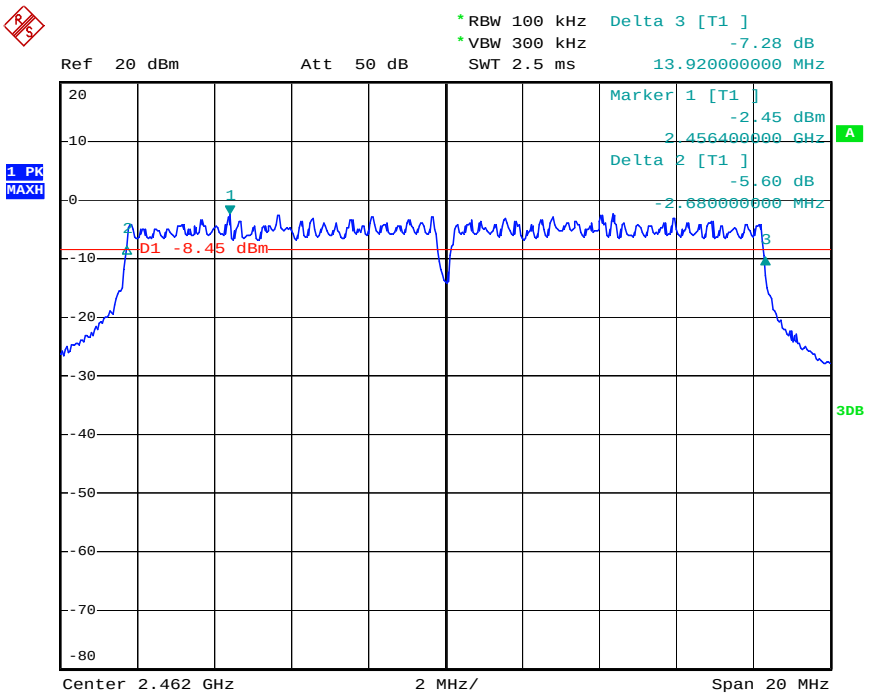
802.11g Channel High 2462MHz



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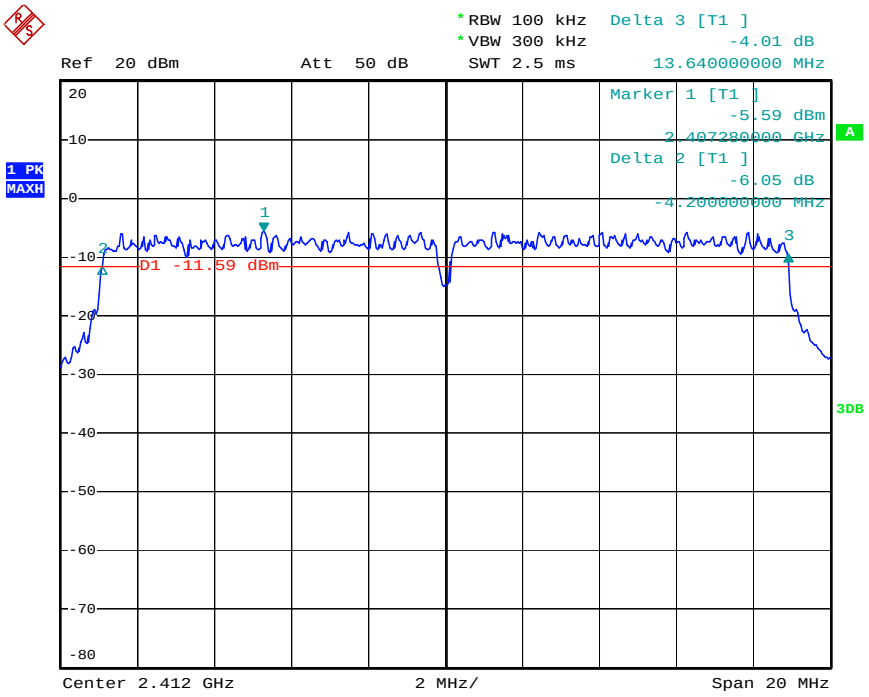
802.11n Channel Low 2412MHz (20MHz)



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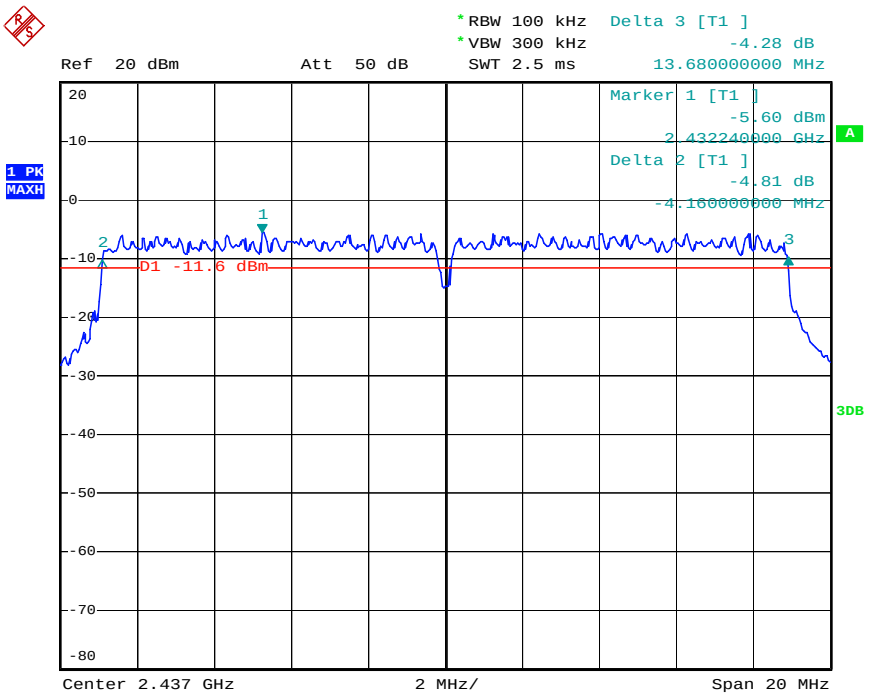
802.11n Channel Middle 2437MHz(20MHz)



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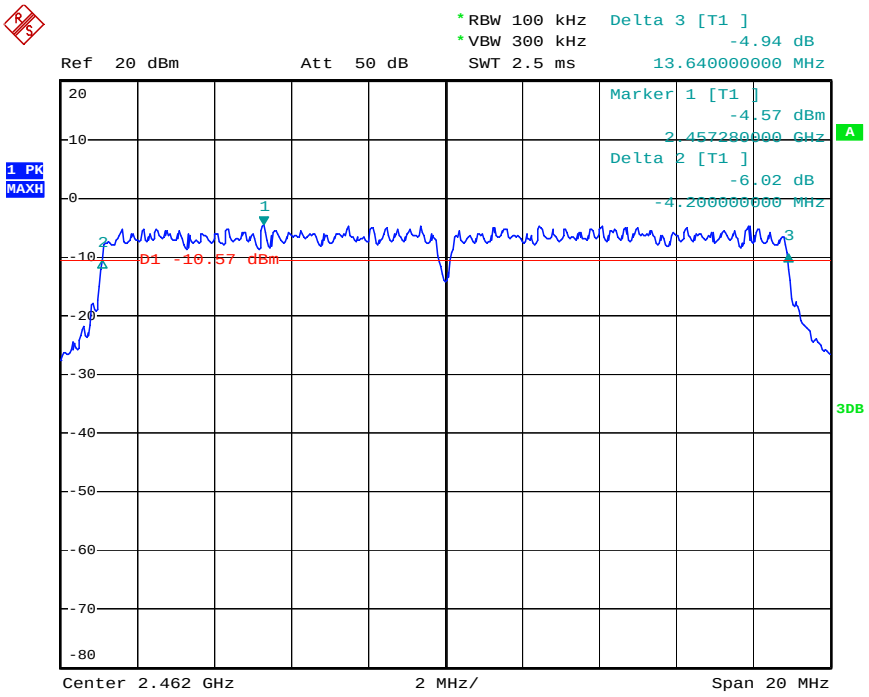
802.11n Channel High 2462MHz(20MHz)



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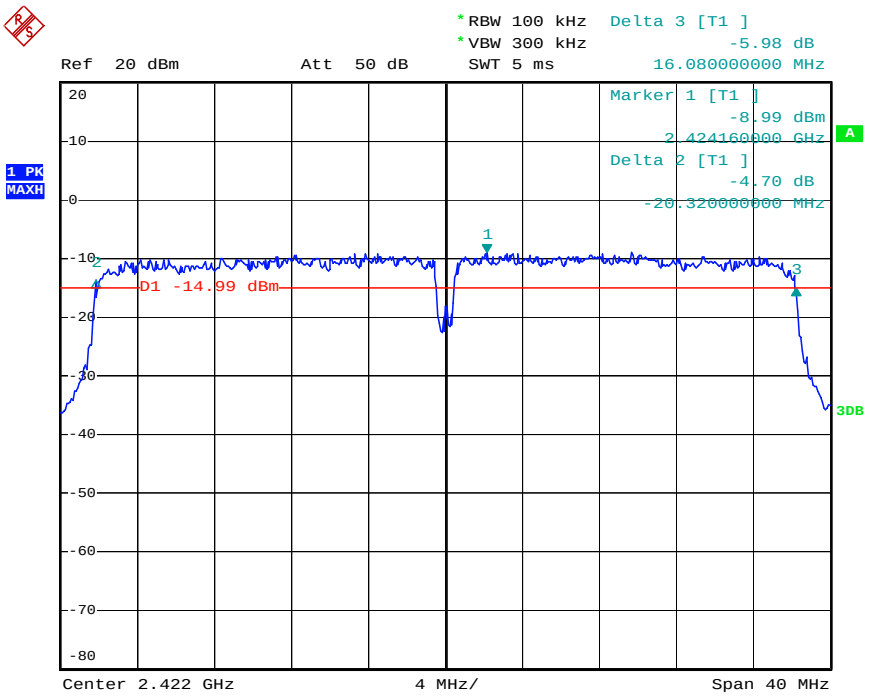
802.11n Channel Low 2422MHz (40MHz)



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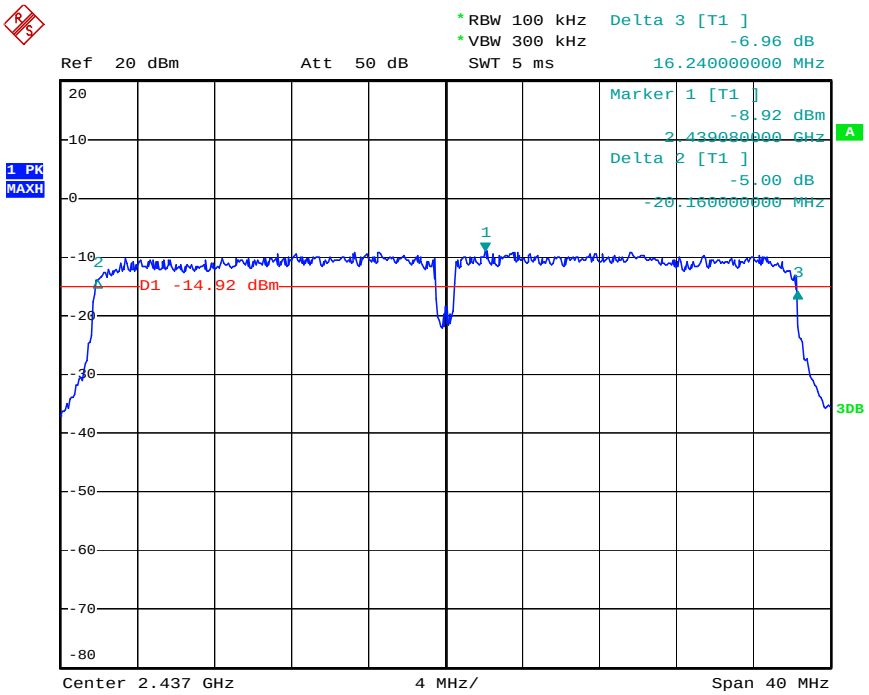
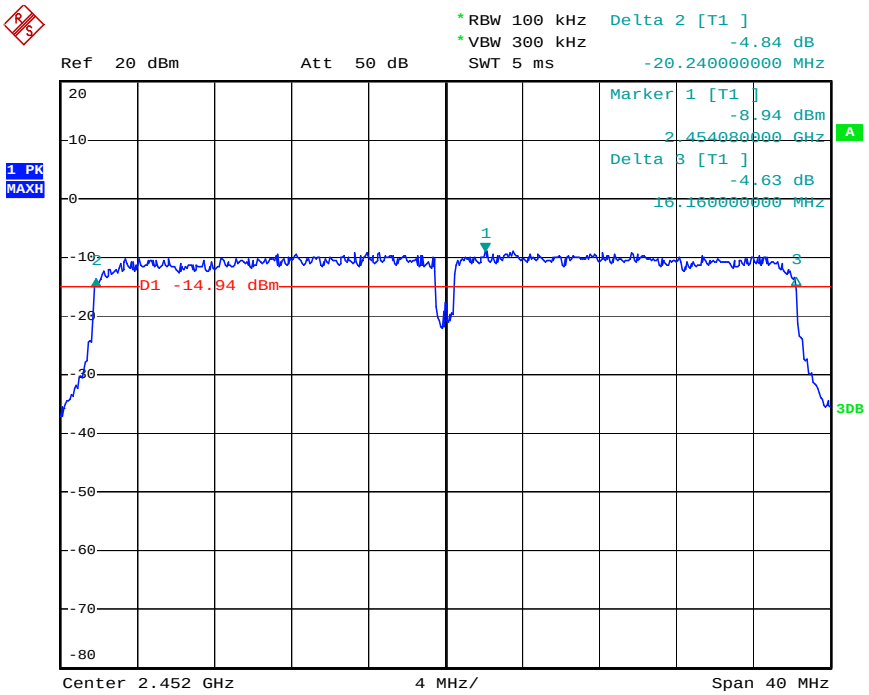
802.11n Channel Middle 2437MHz(40MHz)



Date: 25.OCT.2013 11:45:31

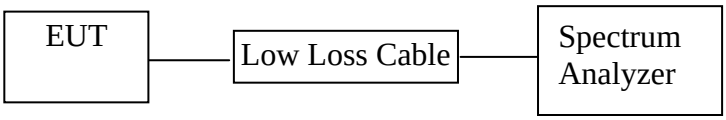
802.11n Channel High 2452MHz(40MHz)



Date: 25.OCT.2013 11:49:35

6. MAXIMUM PEAK OUTPUT POWER

6.1.Block Diagram of Test Setup



6.2.The Requirement For Section 15.247(b)(3)

Section 15.247(b)(3): For systems using digital modulation in the 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz bands: 1 Watt.

6.3.EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

6.4.Operating Condition of EUT

6.4.1.Setup the EUT and simulator as shown as Section 6.1.

6.4.2.Turn on the power of all equipment.

6.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2412-2462 and 2422-2452MHz. We select 2412MHz, 2437MHz, 2462MHz and 2422MHz, 2437MHz, 2452MHz TX frequency to transmit.

6.5.Test Procedure

6.5.1.The EUT was tested according to DTS test procedure of April 09, 2013 KDB558074 D01 DTS Meas Guidance v03 for compliance to FCC 47CFR 15.247 requirements.

6.5.2.The transmitter output was connected to the spectrum analyzer through a low loss cable.

6.5.3.Set RBW of spectrum analyzer to 1MHz and VBW to 3MHz.

6.5.4.Measurement the maximum peak output power.

6.6.Test Result

The test was performed with 802.11b				
Channel	Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power (mW)	Limits dBm / W
Low	2412	15.72	37.33	30 dBm / 1 W
Middle	2437	15.71	37.24	30 dBm / 1 W
High	2462	15.55	35.89	30 dBm / 1 W

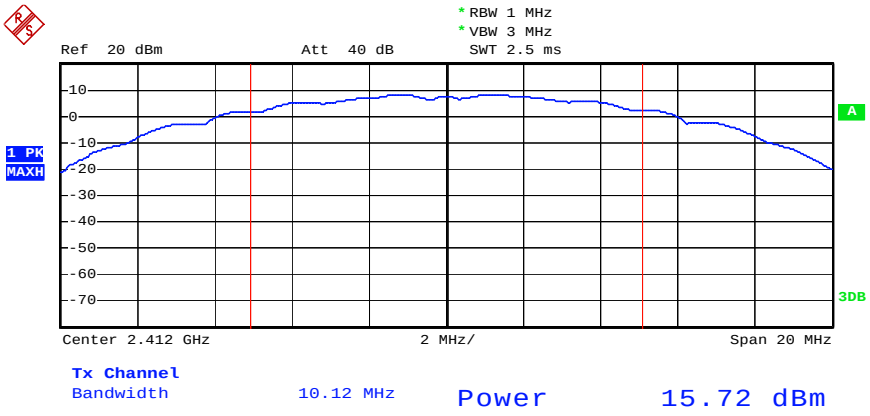
The test was performed with 802.11g				
Channel	Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power (mW)	Limits dBm / W
Low	2412	15.17	32.89	30 dBm / 1 W
Middle	2437	15.11	32.43	30 dBm / 1 W
High	2462	15.33	34.12	30 dBm / 1 W

The test was performed with 802.11n (20MHz)				
Channel	Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power (mW)	Limits dBm / W
Low	2412	15.82	38.19	30 dBm / 1 W
Middle	2437	15.43	34.91	30 dBm / 1 W
High	2462	15.85	38.46	30 dBm / 1 W

The test was performed with 802.11n (40MHz)				
Channel	Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power (mW)	Limits dBm / W
Low	2422	14.83	30.41	30 dBm / 1 W
Middle	2437	15.03	31.84	30 dBm / 1 W
High	2452	15.17	32.89	30 dBm / 1 W

The spectrum analyzer plots are attached as below.

802.11b Channel Low 2412MHz



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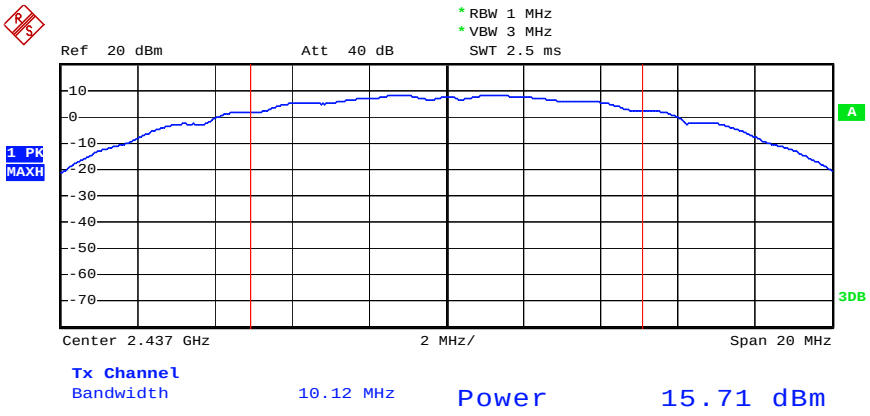
802.11b Channel Middle 2437MHz



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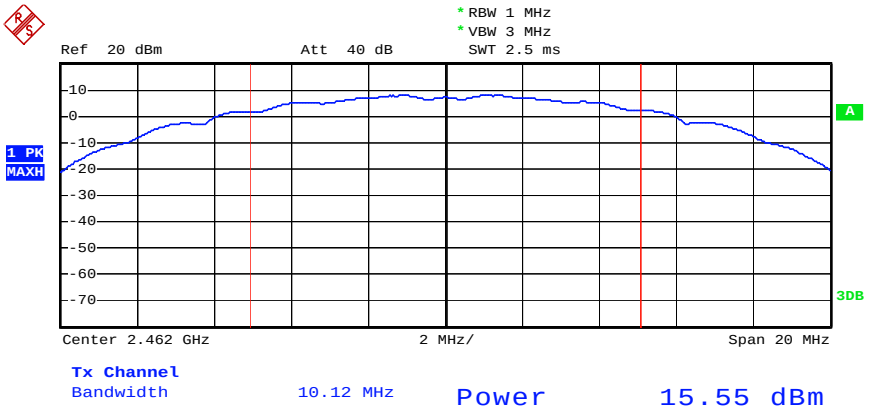
802.11b Channel High 2462MHz



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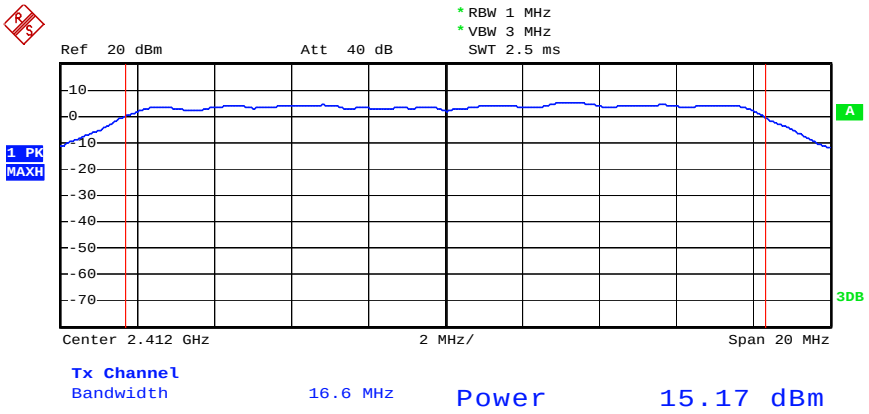
802.11g Channel Low 2412MHz



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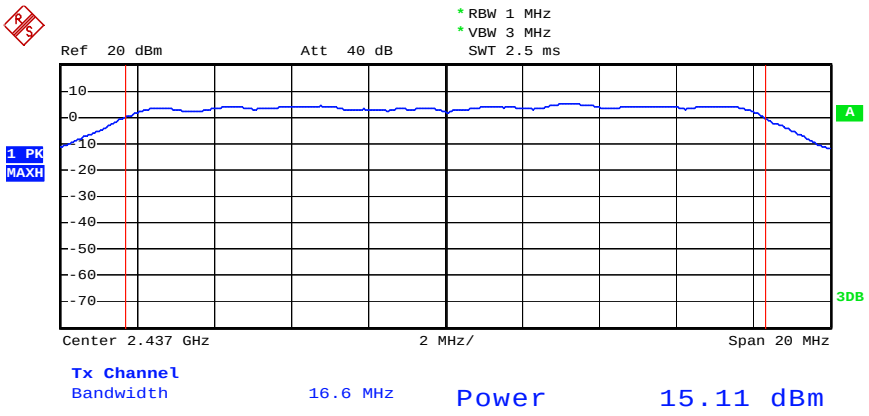
802.11g Channel Middle 2437MHz



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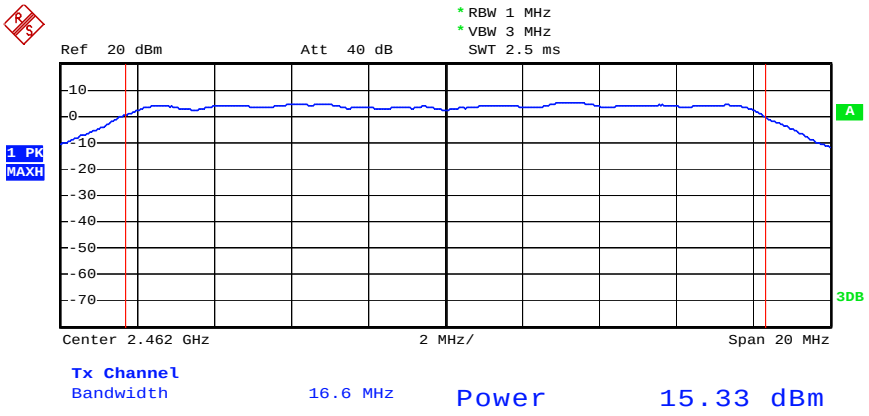
802.11g Channel High 2462MHz



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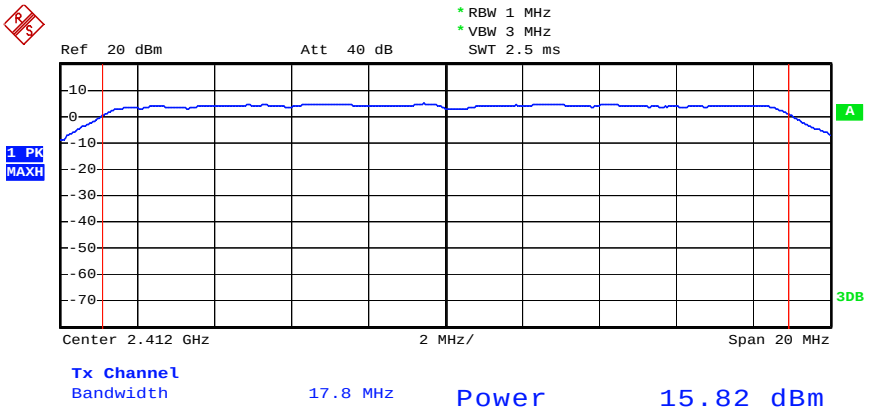
802.11n Channel Low 2412MHz (20MHz)



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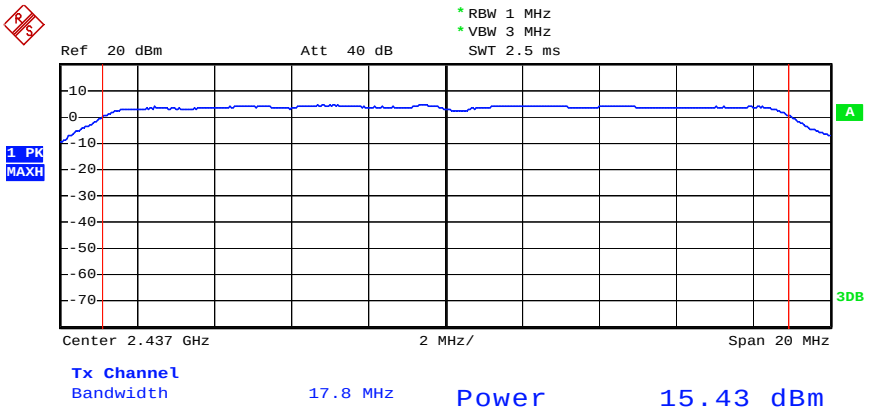
802.11n Channel Middle 2437MHz (20MHz)



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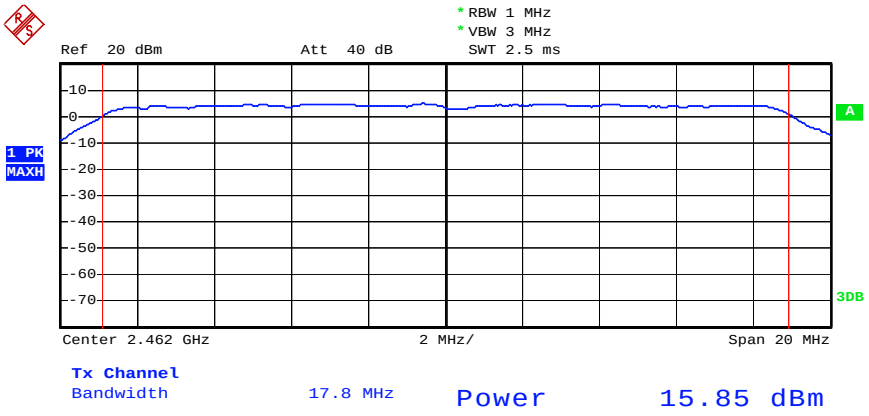
802.11n Channel High 2462MHz (20MHz)



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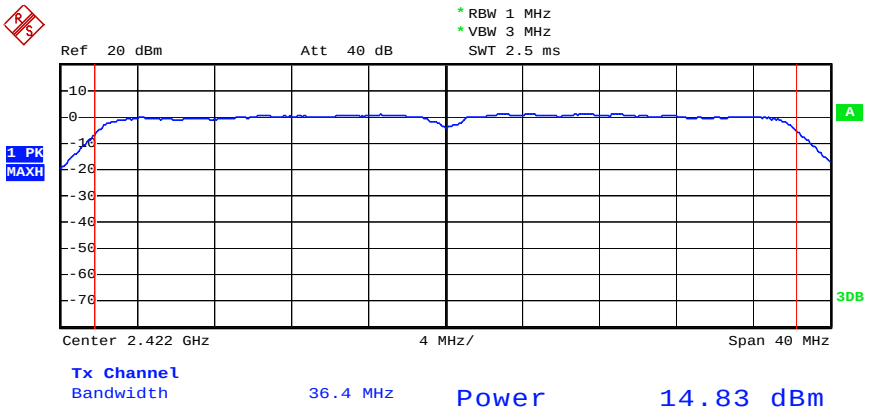
802.11n Channel Low 2422MHz (40MHz)



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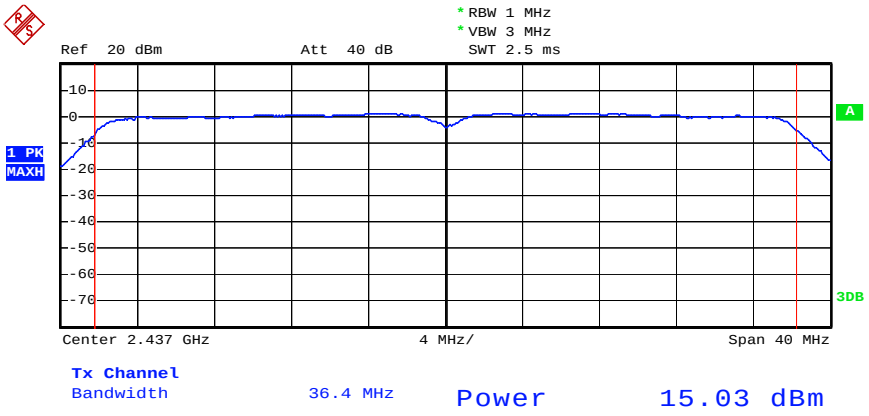
802.11n Channel Middle 2437MHz (40MHz)



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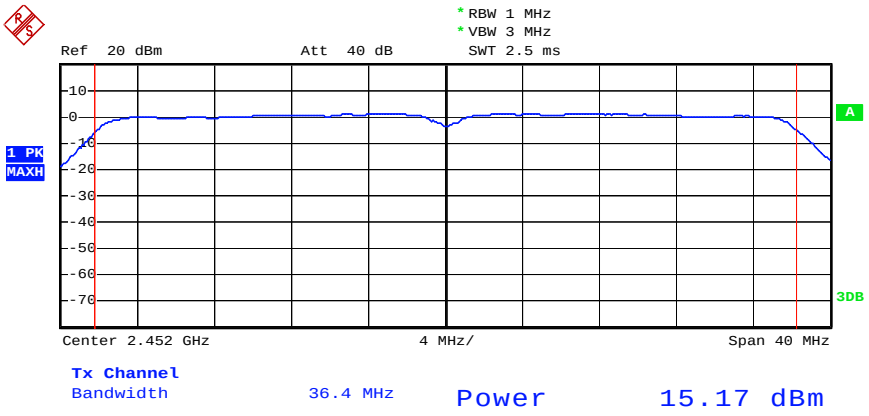
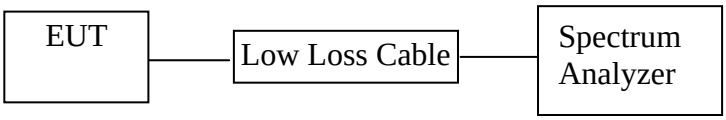
802.11n Channel High 2452MHz (40MHz)



Date: 25.OCT.2013 11:55:40

7. POWER SPECTRAL DENSITY MEASUREMENT

7.1.Block Diagram of Test Setup



7.2.The Requirement For Section 15.247(e)

Section 15.247(e): For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

7.3.EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

7.4.Operating Condition of EUT

7.4.1.Setup the EUT and simulator as shown as Section 7.1.

7.4.2.Turn on the power of all equipment.

7.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2412-2462 and 2422-2452MHz. We select 2412MHz, 2437MHz, 2462MHz and 2422MHz, 2437MHz, 2452MHz TX frequency to transmit.

7.5.Test Procedure

7.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

7.5.2.Measurement Procedure PKPSD:

This procedure must be used if maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit, and is optional if the maximum (average) conducted output power was used to demonstrate compliance.

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 3 kHz $\leqslant$ RBW $\leqslant$ 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 level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

7.5.3.Measurement the maximum power spectral density.

7.6.Test Result

The test was performed with 802.11b			
Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limits (dBm)
Low	2412	-16.57	8 dBm
Middle	2437	-16.47	8 dBm
High	2462	-15.97	8 dBm

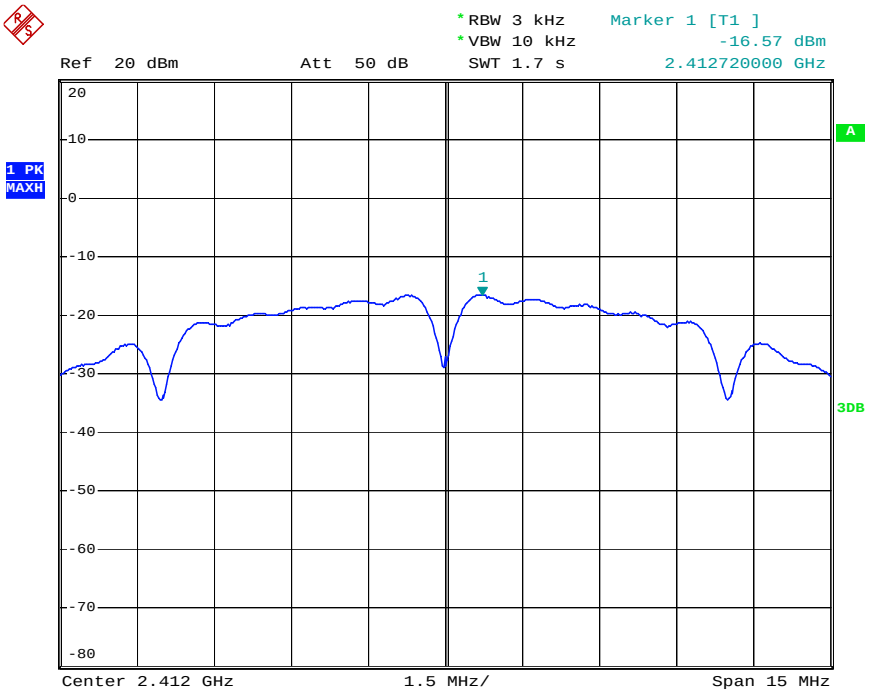
The test was performed with 802.11g			
Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limits (dBm)
Low	2412	-19.17	8 dBm
Middle	2437	-18.71	8 dBm
High	2462	-18.18	8 dBm

The test was performed with 802.11n (20MHz)			
Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limits (dBm)
Low	2412	-18.97	8 dBm
Middle	2437	-19.05	8 dBm
High	2462	-19.08	8 dBm

The test was performed with 802.11n (40MHz)			
Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limits (dBm)
Low	2422	-20.11	8 dBm
Middle	2437	-21.58	8 dBm
High	2452	-19.94	8 dBm

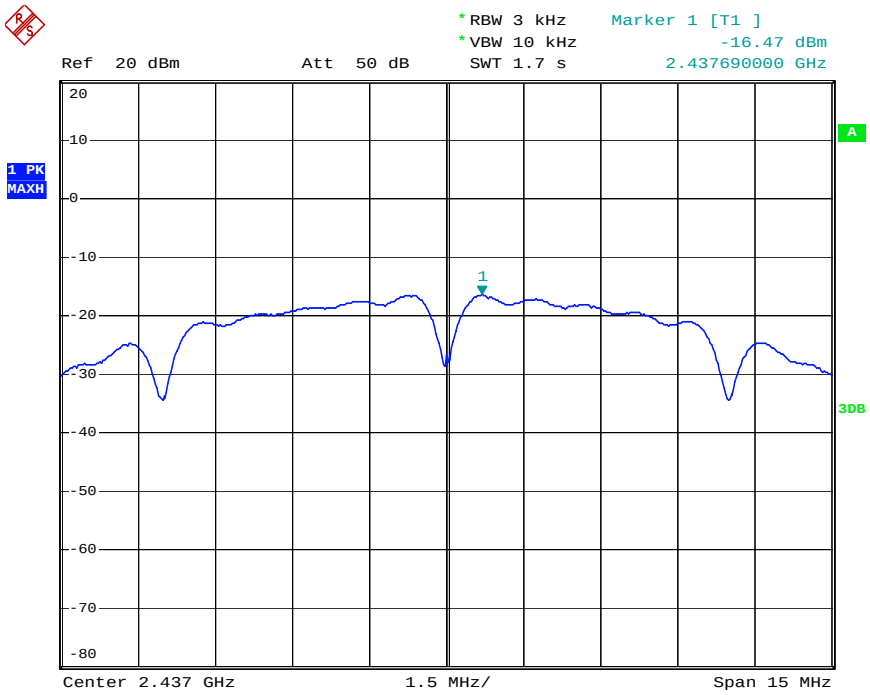
The spectrum analyzer plots are attached as below.

802.11b Channel Low 2412MHz



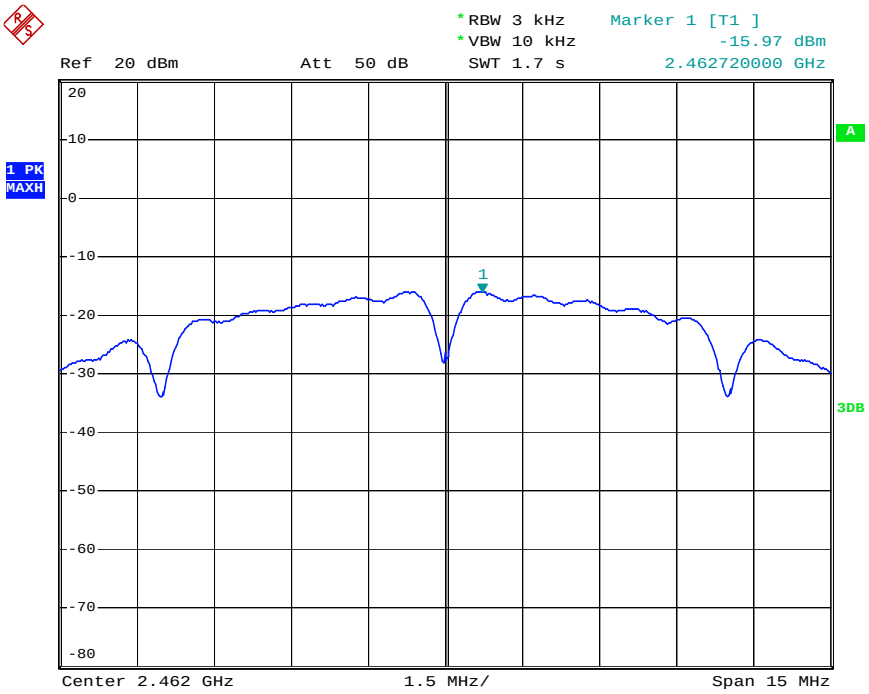
Date: 28.OCT.2013 08:23:07

802.11b Channel Middle 2437MHz



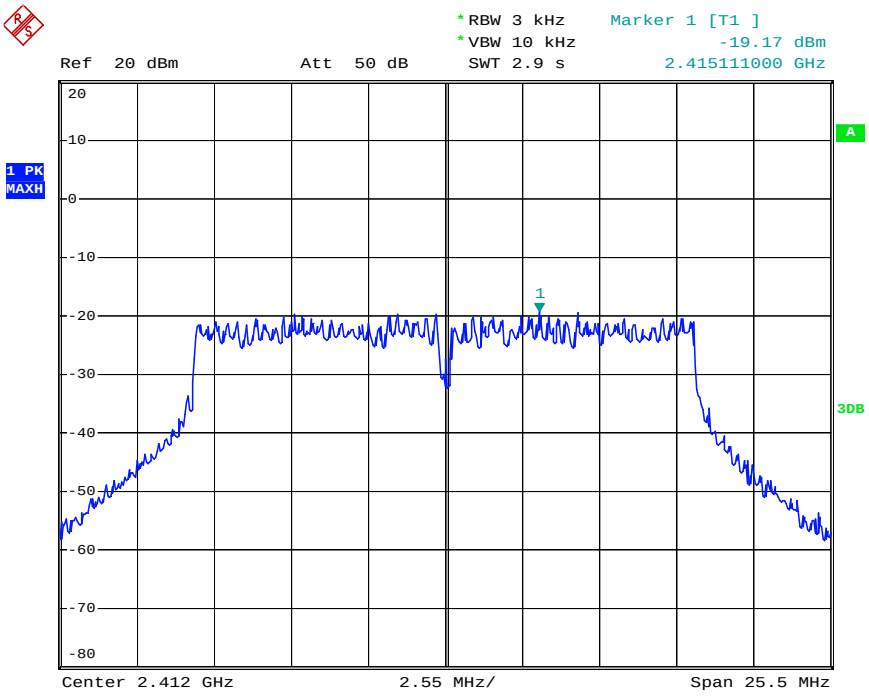
Date: 28.OCT.2013 08:23:57

802.11b Channel High 2462MHz



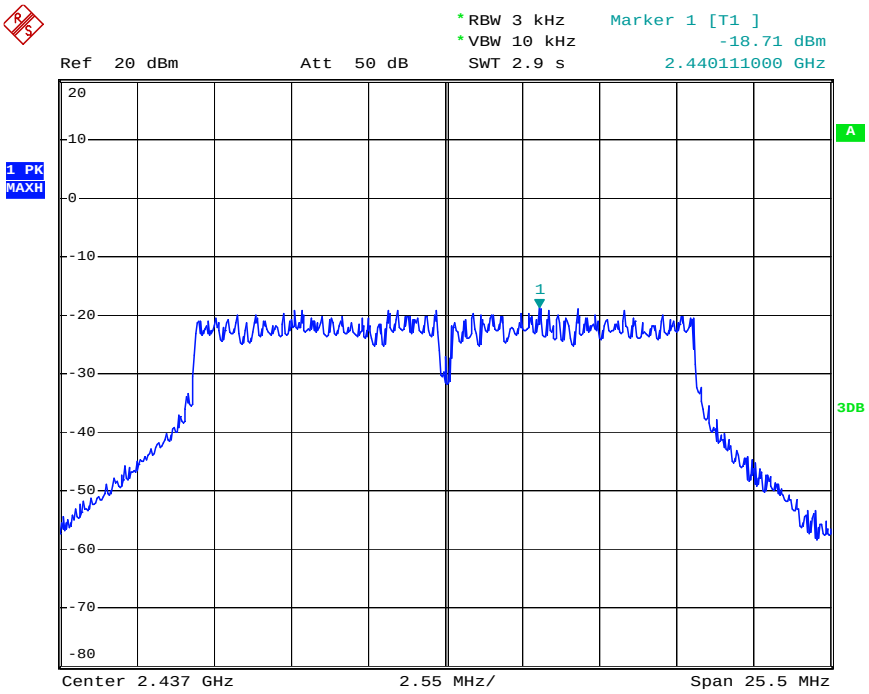
Date: 28.OCT.2013 08:24:34

802.11g Channel Low 2412MHz



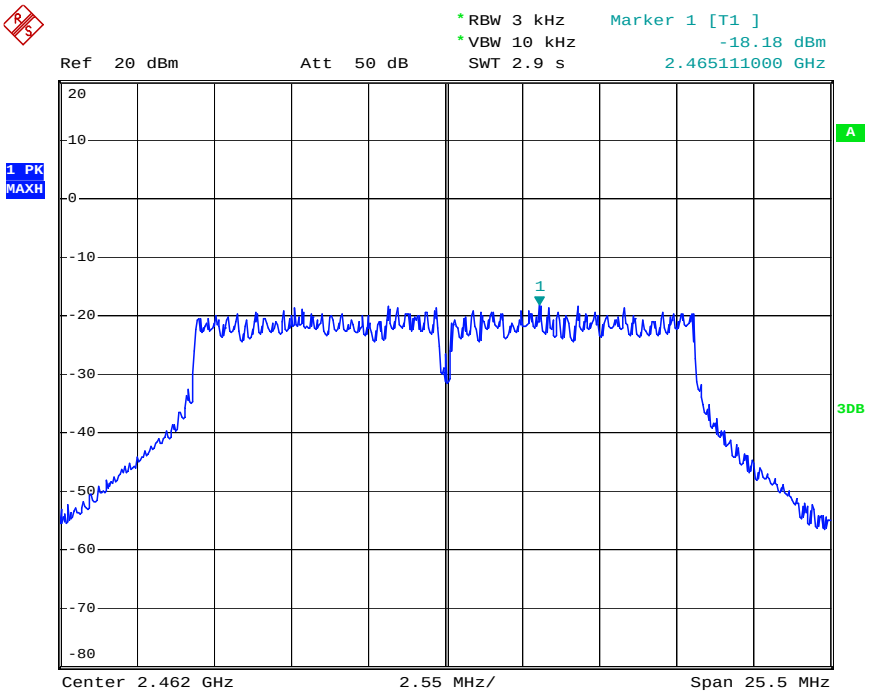
Date: 28.OCT.2013 08:28:08

802.11g Channel Middle 2437MHz



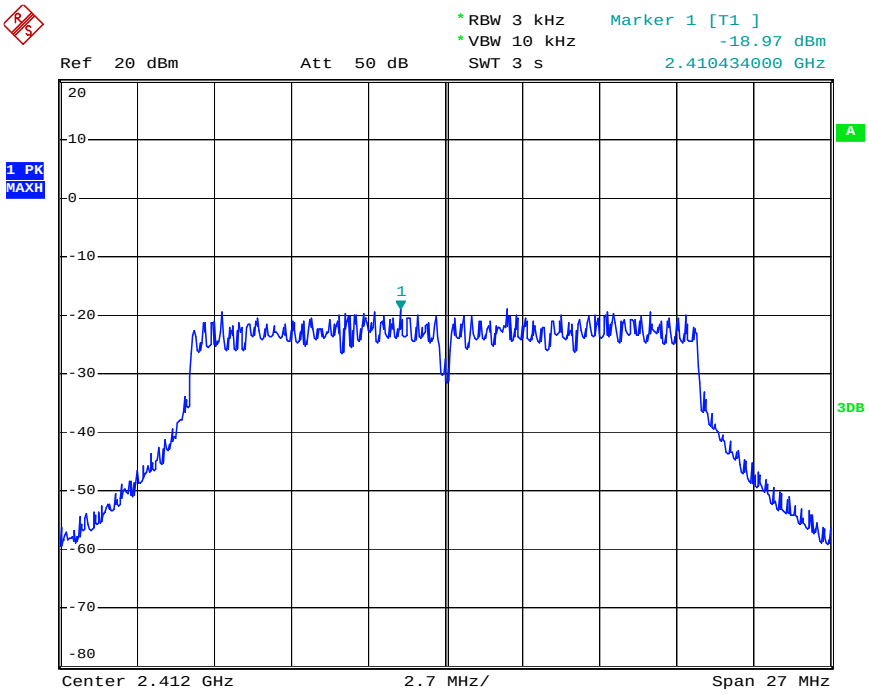
Date: 28.OCT.2013 08:27:32

802.11g Channel High 2462MHz



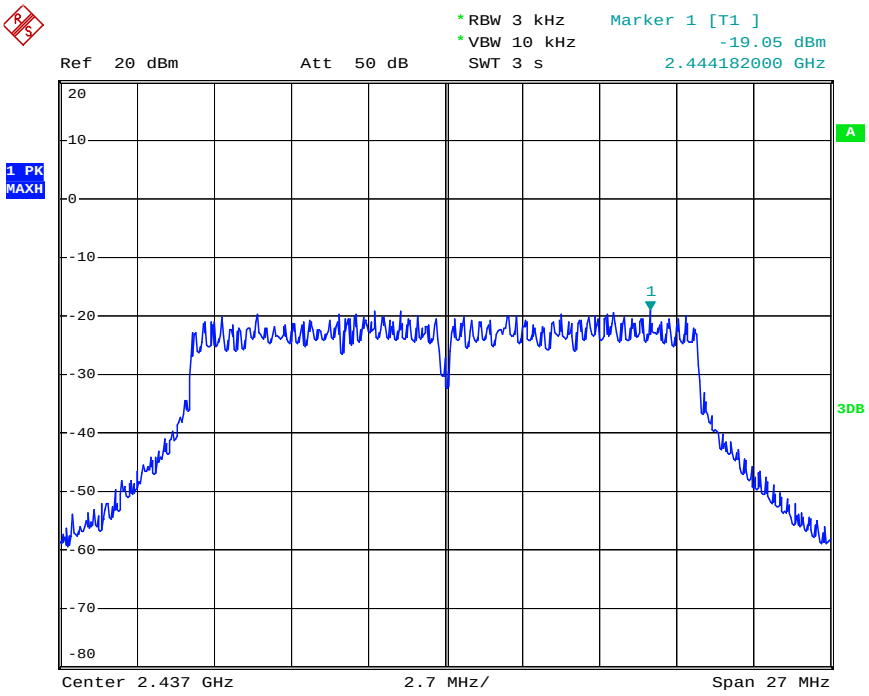
Date: 28.OCT.2013 08:26:56

802.11n Channel Low 2412MHz (20MHz)



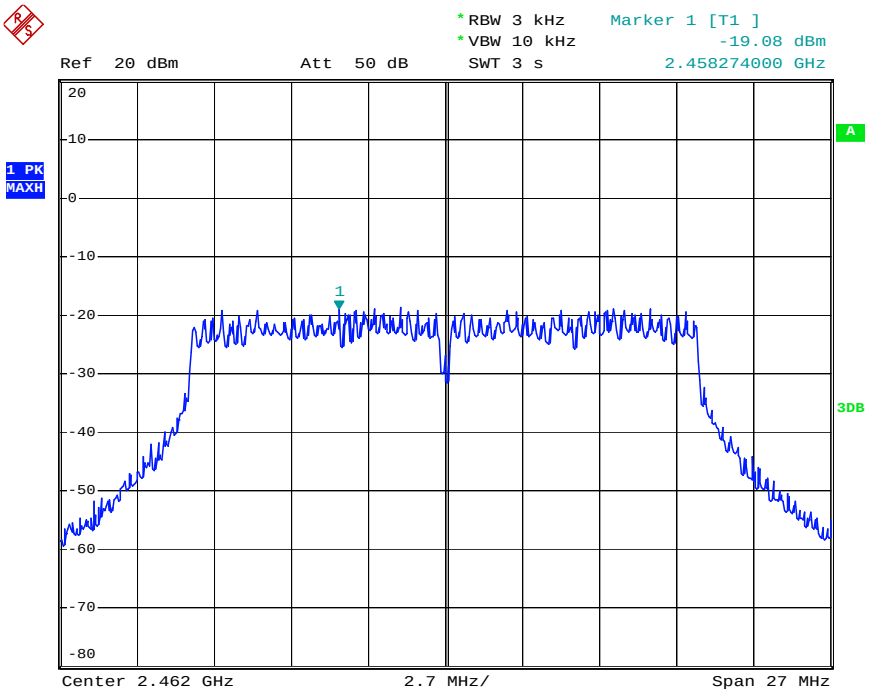
Date: 28.OCT.2013 08:30:22

802.11n Channel Middle 2437MHz (20MHz)



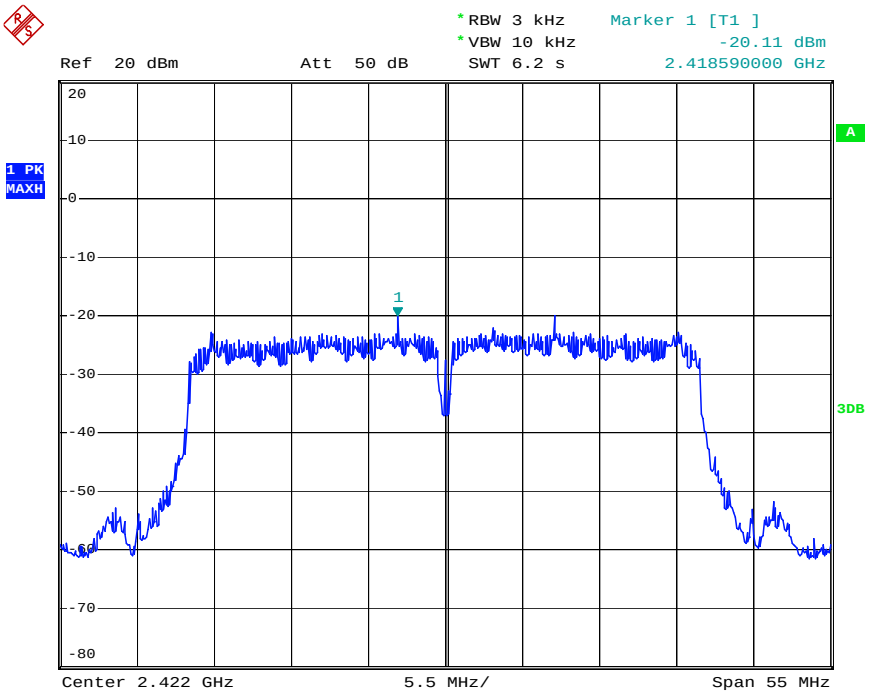
Date: 28.OCT.2013 08:30:57

802.11n Channel High 2462MHz(20MHz)



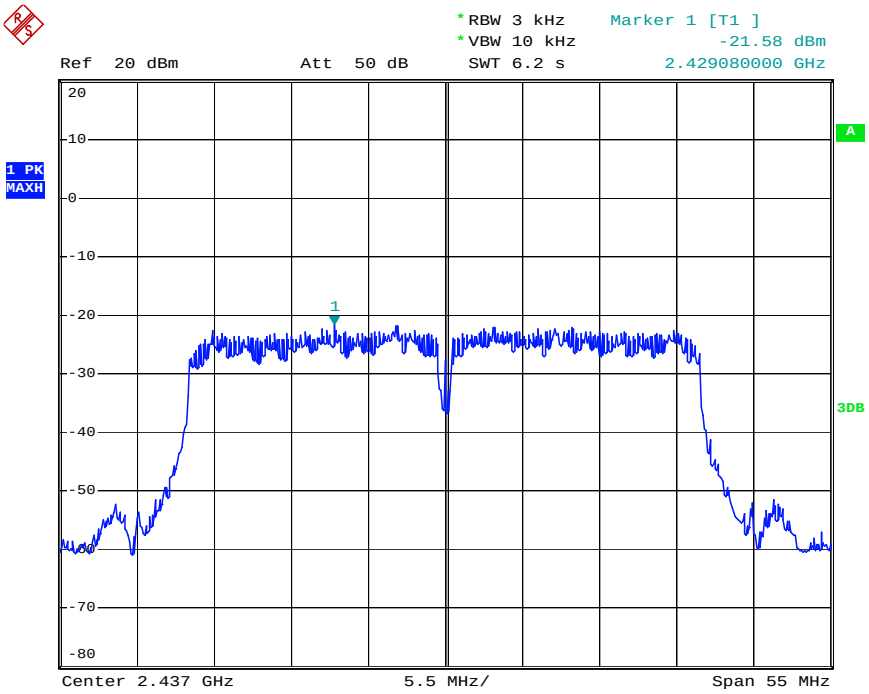
Date: 28.OCT.2013 08:32:50

802.11n Channel Low 2422MHz (40MHz)



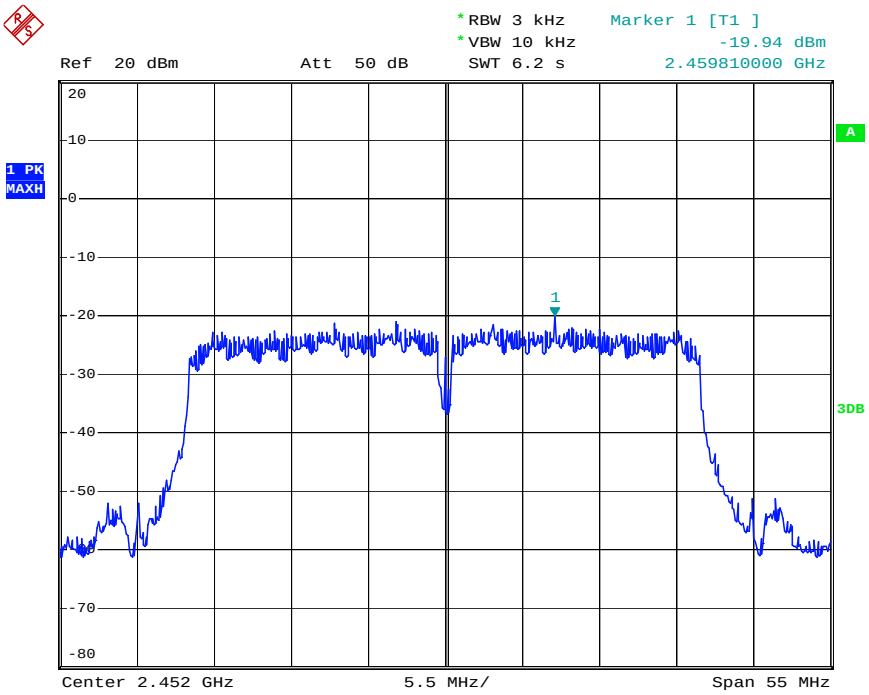
Date: 28.OCT.2013 08:36:16

802.11n Channel Middle 2437MHz(40MHz)



Date: 28.OCT.2013 08:37:49

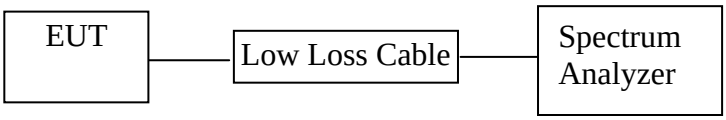
802.11n Channel High 2452MHz(40MHz)



Date: 28.OCT.2013 08:39:07

8. BAND EDGE COMPLIANCE TEST

8.1.Block Diagram of Test Setup



8.2.The Requirement For Section 15.247(d)

Section 15.247(d): 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

8.3.EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

8.4.Operating Condition of EUT

8.4.1.Setup the EUT and simulator as shown as Section 8.1.

8.4.2.Turn on the power of all equipment.

8.4.3.Let the EUT work in TX modes measure it. The transmit frequency are 2412-2462 and 2422-2452MHz MHz. We select 2412MHz, 2462MHz and 2422MHz, 2452MHz TX frequency to transmit.

8.5.Test Procedure

Conducted Band Edge:

8.5.1. The transmitter output was connected to the spectrum analyzer via a low loss cable.

8.5.2. Set RBW of spectrum analyzer to 100kHz and VBW to 300kHz.

Radiate Band Edge:

8.5.3. The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.

8.5.4. The turntable was rotated for 360 degrees to determine the position of maximum emission level.

8.5.5. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.

8.5.6. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

RBW=1MHz, VBW=1MHz

8.5.7. The band edges was measured and recorded.

8.6. Test Result

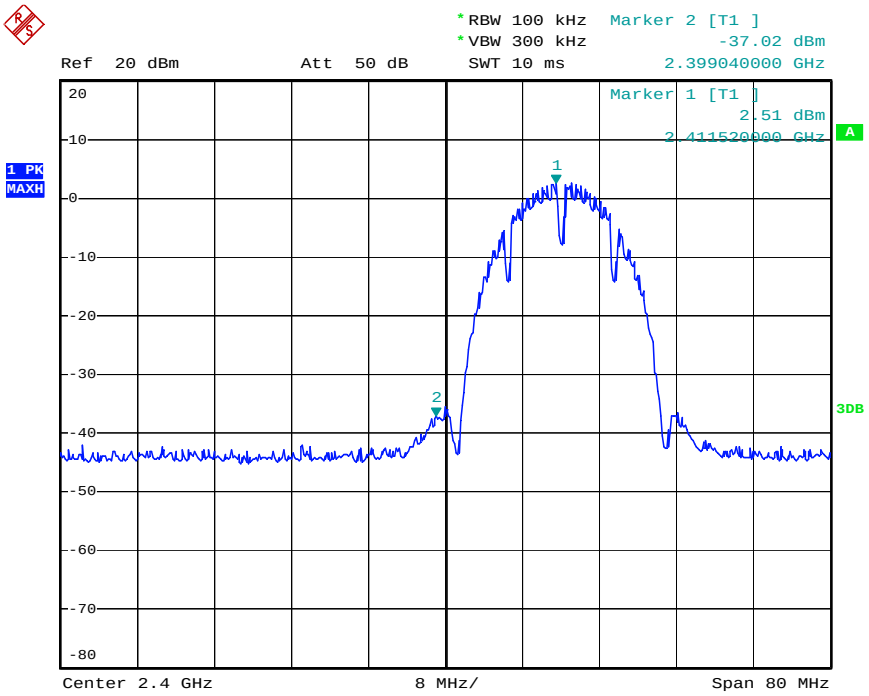
The test was performed with 802.11b		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2412	39.53	> 20dBc
2462	44.80	> 20dBc

The test was performed with 802.11g		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2412	32.87	> 20dBc
2462	37.02	> 20dBc

The test was performed with 802.11n (20MHz)		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2412	32.88	> 20dBc
2462	36.81	> 20dBc

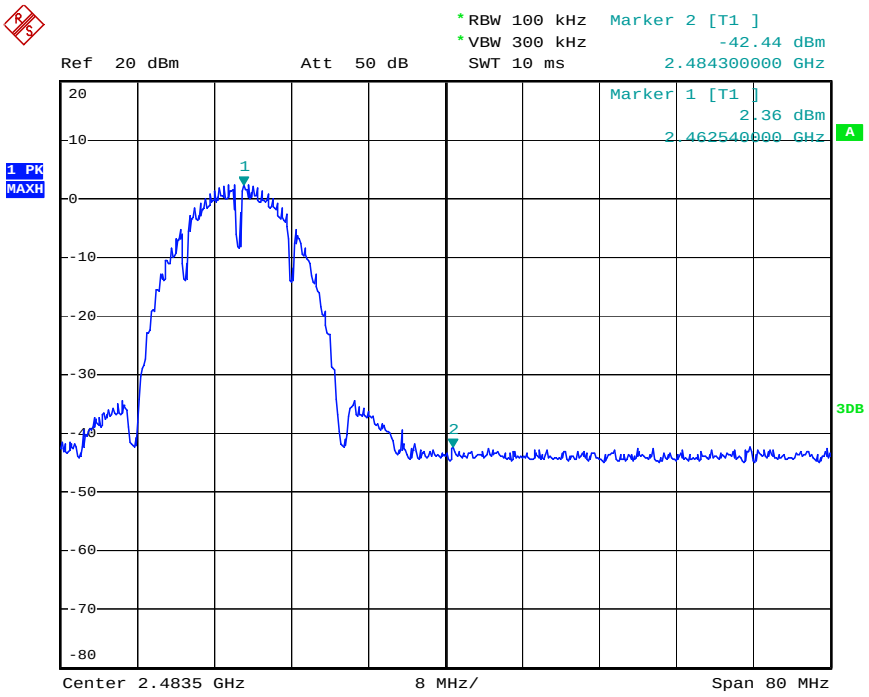
The test was performed with 802.11n (40MHz)		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2422	29.73	> 20dBc
2452	31.80	> 20dBc

802.11b Channel Low 2412MHz



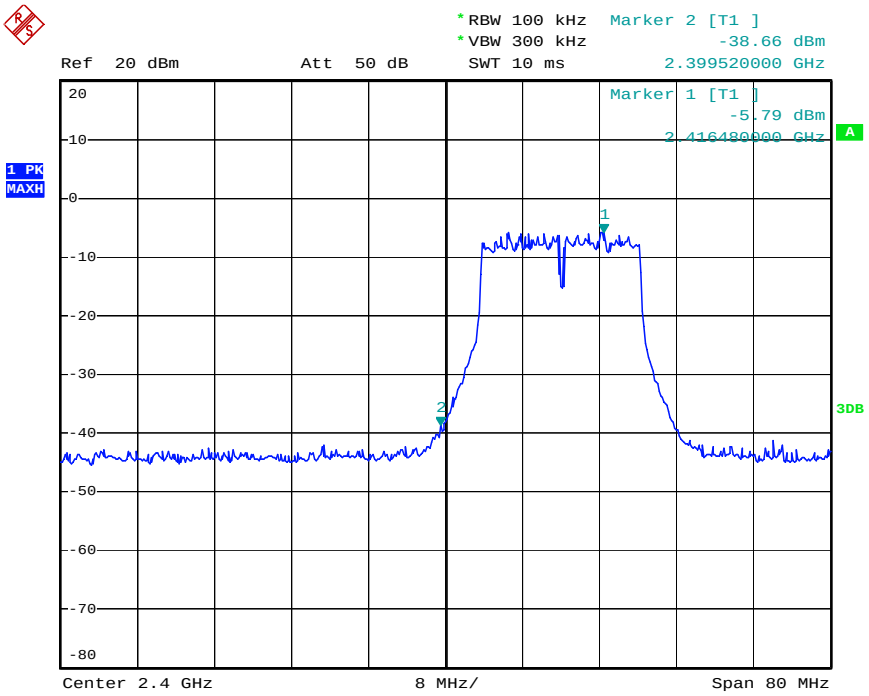
Date: 25.OCT.2013 10:54:35

802.11b Channel High 2462MHz



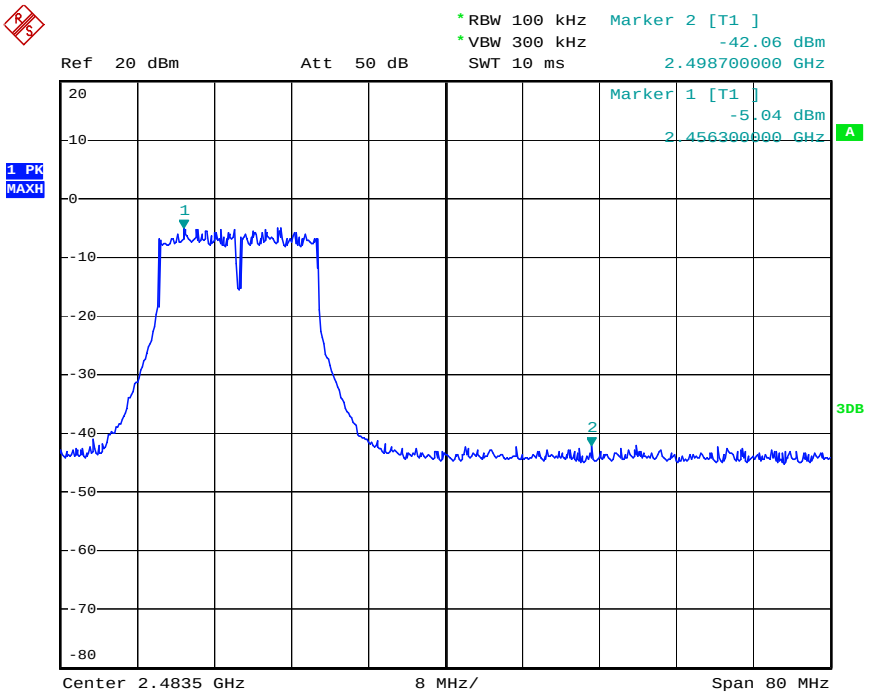
Date: 25.OCT.2013 10:53:16

802.11g Channel Low 2412MHz



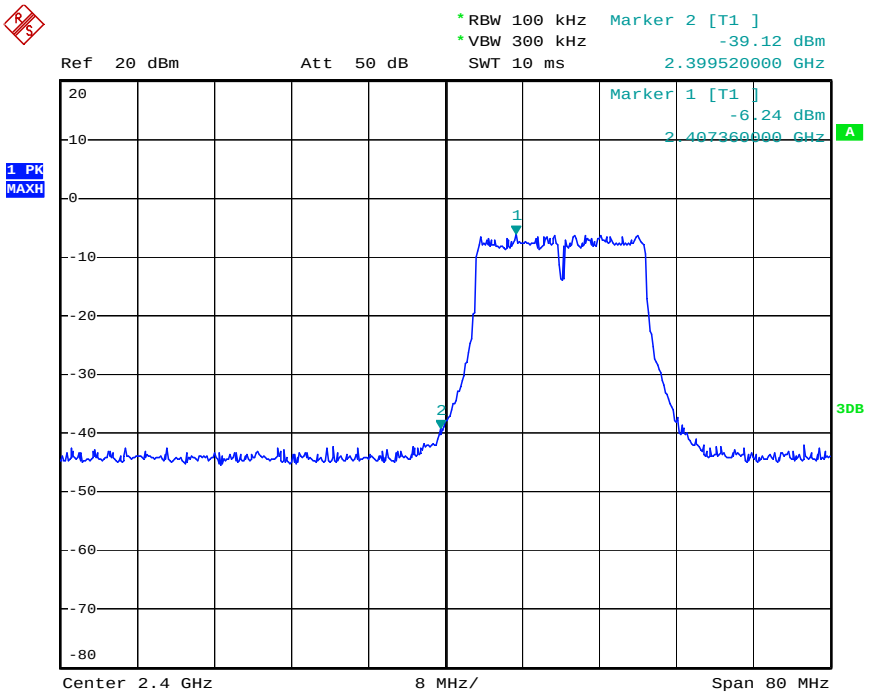
Date: 25.OCT.2013 11:29:35

802.11g Channel High 2462MHz



Date: 25.OCT.2013 11:28:34

802.11n Channel Low 2412MHz (20MHz)



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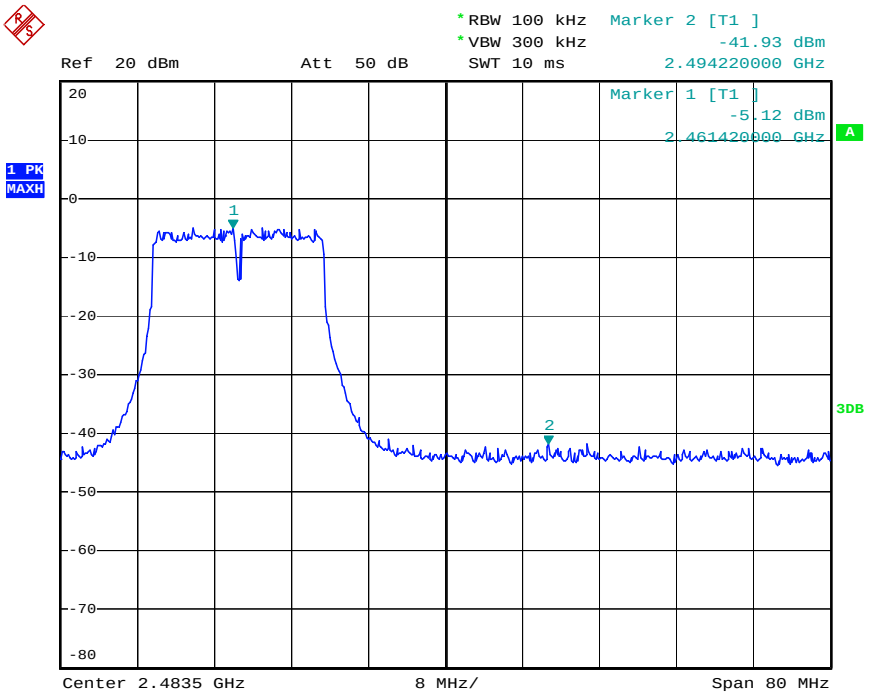
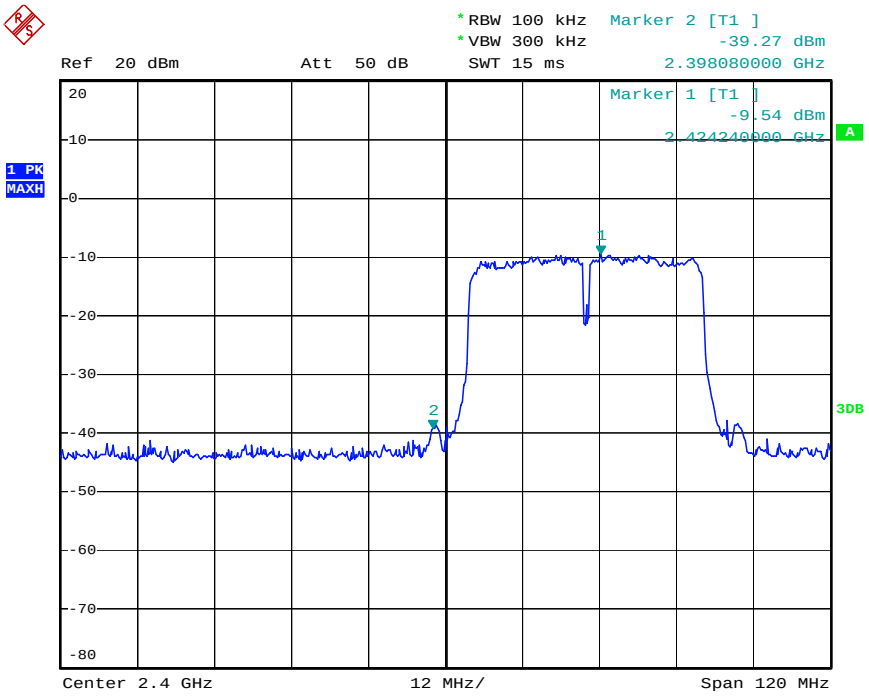
802.11n Channel High 2462MHz (20MHz)



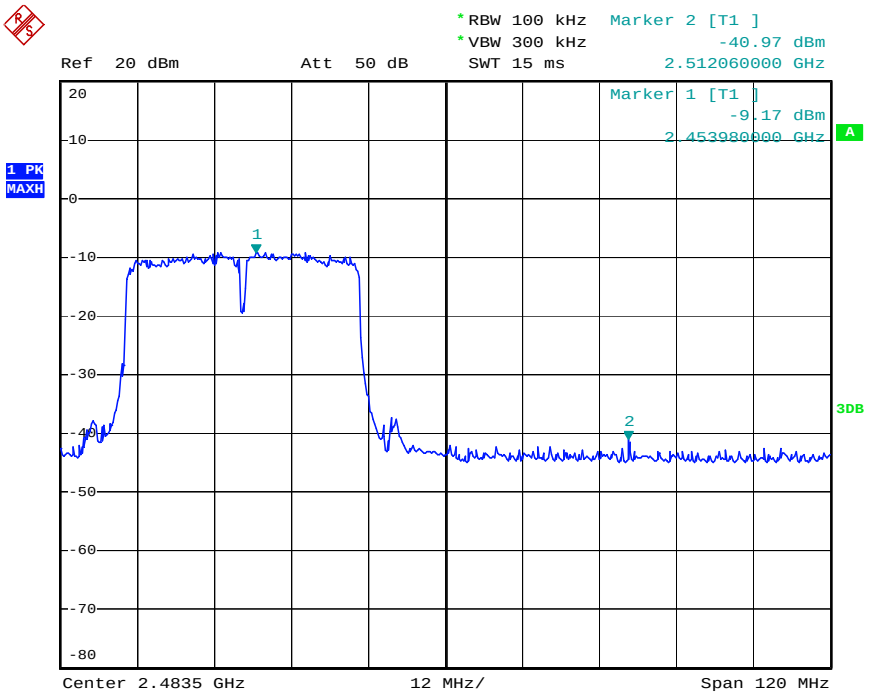
Date: 25.OCT.2013 11:31:58

802.11n Channel Low 2422MHz (40MHz)



Date: 25.OCT.2013 11:52:05

802.11n Channel High 2452MHz (40MHz)



Date: 25.OCT.2013 11:50:36

Radiated Band Edge Result

Note:

1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. 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
3. Display the measurement of peak values.

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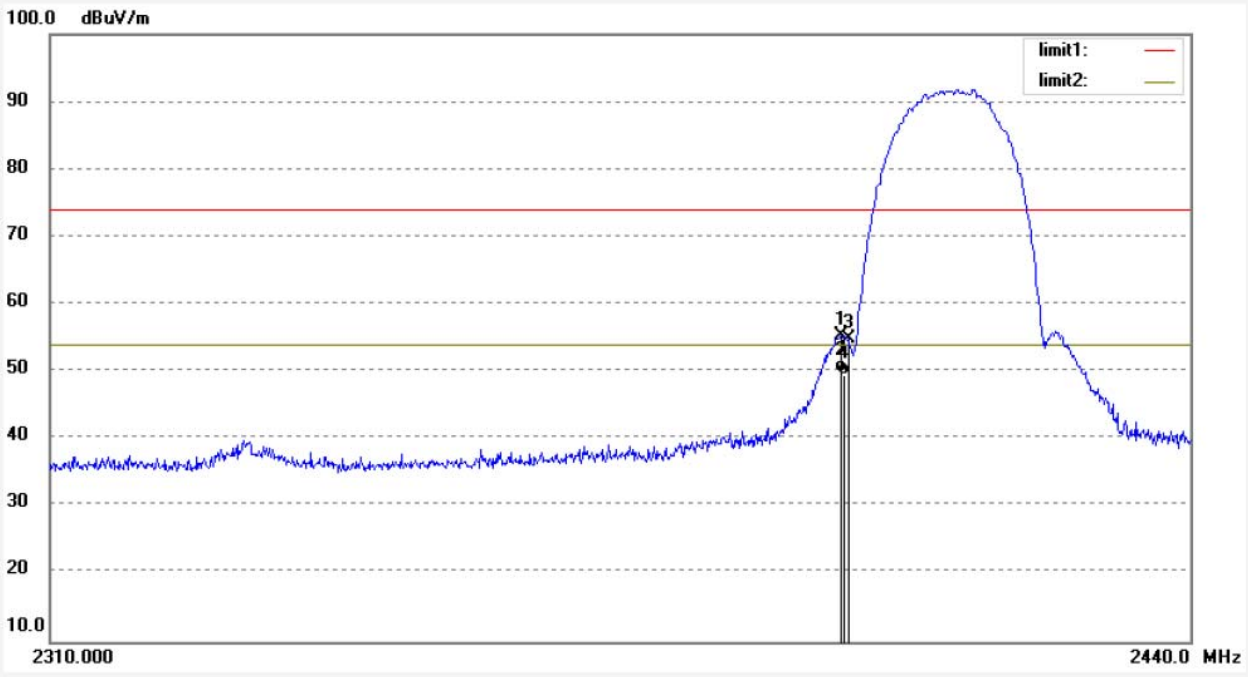
Job No.: alen #2349	Polarization: Vertical
Standard: FCC PK	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 13/11/02/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 9/29/41
EUT: ATSC HD DIGITAL RECEIVER	Engineer Signature:
Mode: TX 2412MHz(802.11b)	Distance: 3m
Model: HA2800	
Manufacturer: Trimax	

Note: Report No:ATE20132275



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2399.570	62.06	-6.76	55.30	74.00	-18.70	peak			
2	2399.570	56.65	-6.76	49.89	54.00	-4.11	AVG			
3	2400.000	61.55	-6.76	54.79	74.00	-19.21	peak			
4	2400.000	56.21	-6.76	49.45	54.00	-4.55	AVG			

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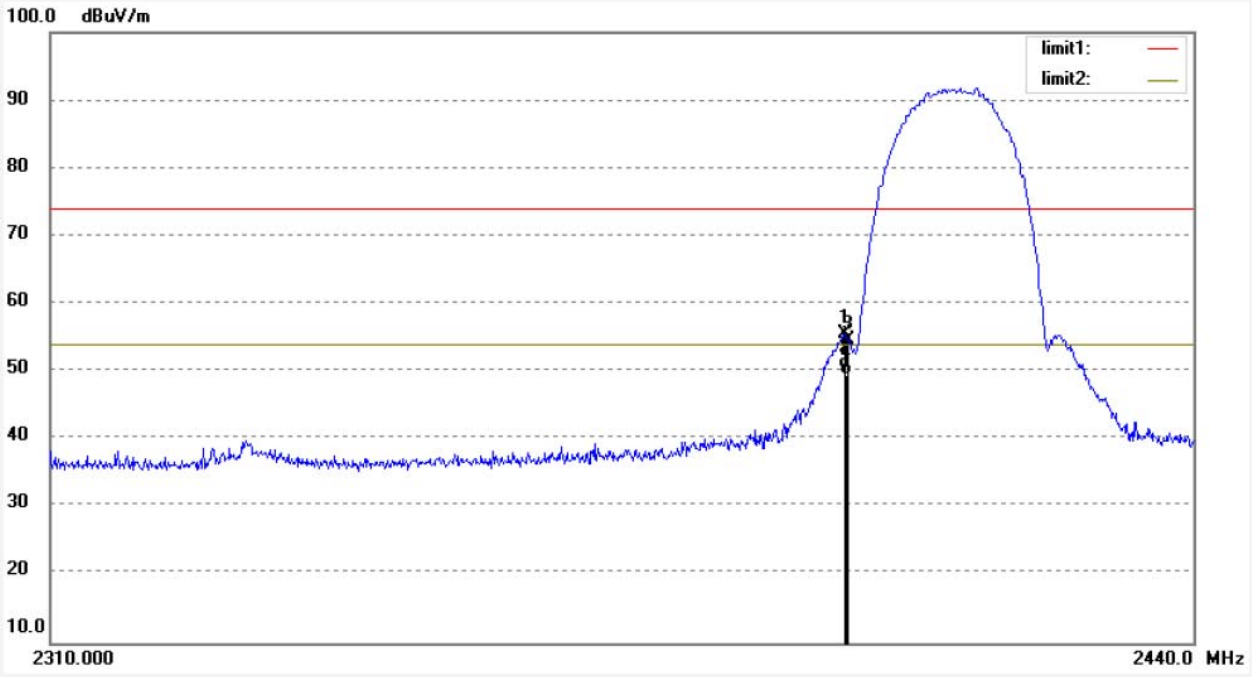
Job No.: alen #2351
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: ATSC HD DIGITAL RECEIVER
Mode: TX 2412MHz(802.11b)
Model: HA2800
Manufacturer: Trimax

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 13/11/02/
Time: 9/30/59
Engineer Signature:
Distance: 3m

Note: Report No:ATE20132275



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2399.700	62.22	-6.76	55.46	74.00	-18.54	peak			
2	2399.700	57.24	-6.76	50.48	54.00	-3.52	AVG			
3	2400.000	61.43	-6.76	54.67	74.00	-19.33	peak			
4	2400.000	56.36	-6.76	49.60	54.00	-4.40	AVG			

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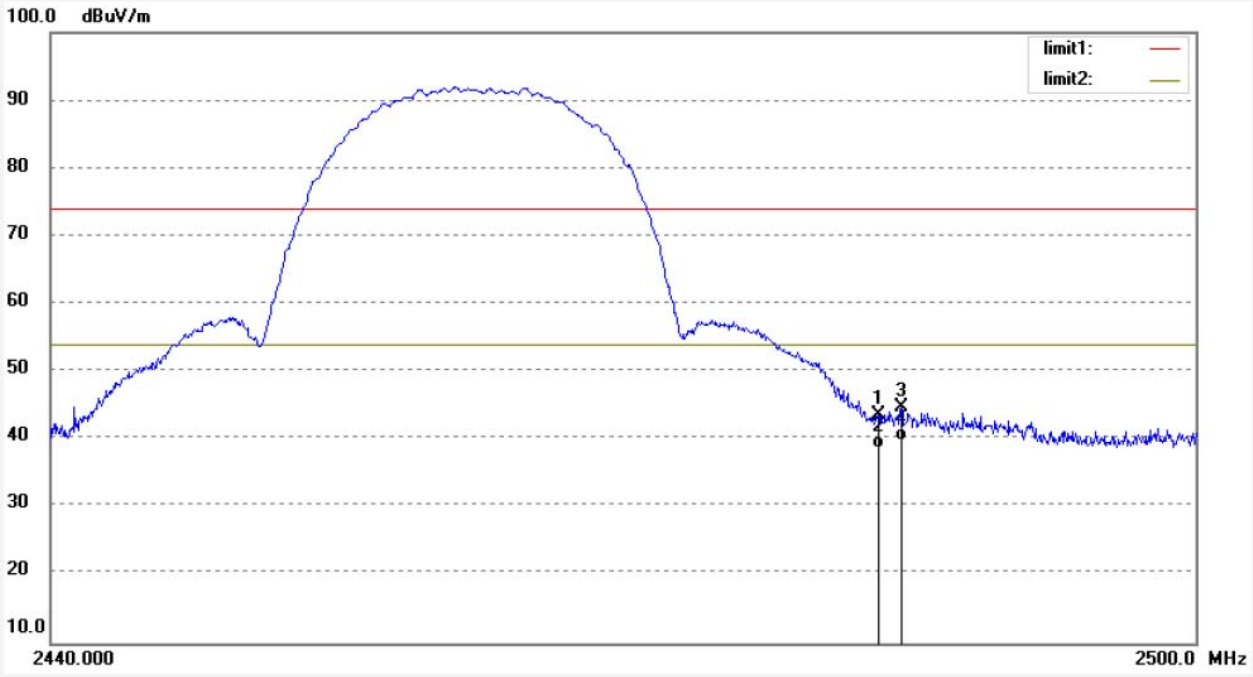
Job No.: alen #2352
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: ATSC HD DIGITAL RECEIVER
Mode: TX 2462MHz(802.11b)
Model: HA2800
Manufacturer: Trimax

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 13/11/02/
Time: 9/32/42
Engineer Signature:
Distance: 3m

Note: Report No:ATE20132275



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	50.16	-6.54	43.62	74.00	-30.38	peak			
2	2483.500	45.12	-6.54	38.58	54.00	-15.42	AVG			
3	2484.460	51.39	-6.54	44.85	74.00	-29.15	peak			
4	2484.460	46.35	-6.54	39.81	54.00	-14.19	AVG			

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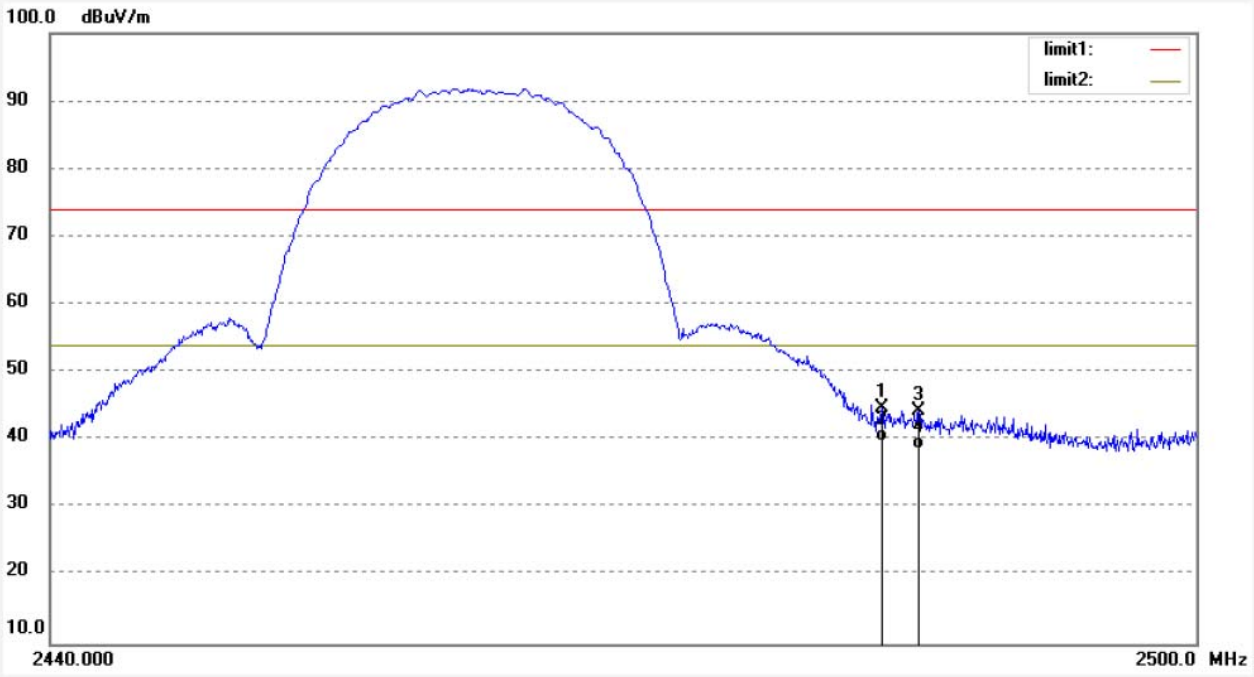
Fax:+86-0755-26503396

Job No.: alen #2353
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: ATSC HD DIGITAL RECEIVER
Mode: TX 2462MHz(802.11b)
Model: HA2800
Manufacturer: Trimax

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 13/11/02/
Time: 9/33/28
Engineer Signature:
Distance: 3m

Note: Report No:ATE20132275



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	51.22	-6.54	44.68	74.00	-29.32	peak			
2	2483.500	46.36	-6.54	39.82	54.00	-14.18	AVG			
3	2485.360	50.81	-6.54	44.27	74.00	-29.73	peak			
4	2485.360	45.32	-6.54	38.78	54.00	-15.22	AVG			

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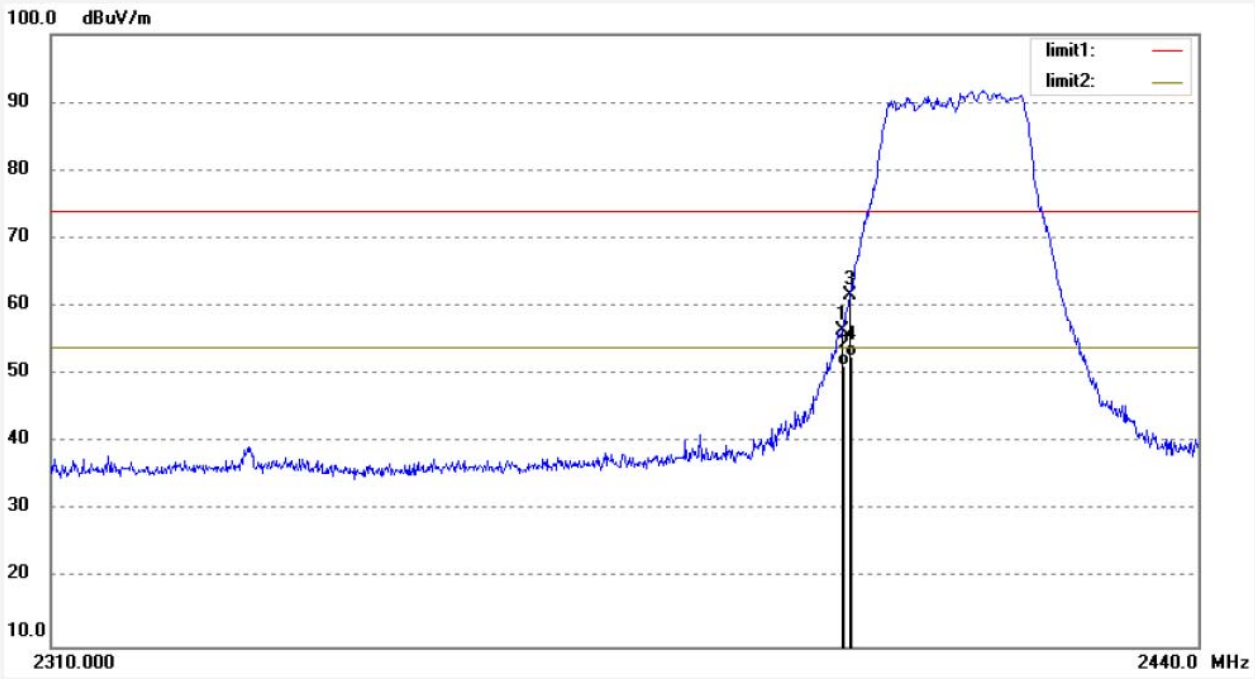
Fax:+86-0755-26503396

Job No.: alen #2348
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: ATSC HD DIGITAL RECEIVER
Mode: TX 2412MHz(802.11g)
Model: HA2800
Manufacturer: Trimax

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 13/11/02/
Time: 9/28/12
Engineer Signature:
Distance: 3m

Note: Report No:ATE20132275



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2399.050	63.11	-6.76	56.35	74.00	-17.65	peak			
2	2399.050	58.12	-6.76	51.36	54.00	-2.64	AVG			
3	2400.000	68.46	-6.76	61.70	74.00	-12.30	peak			
4	2400.000	59.32	-6.76	52.56	54.00	-1.44	AVG			

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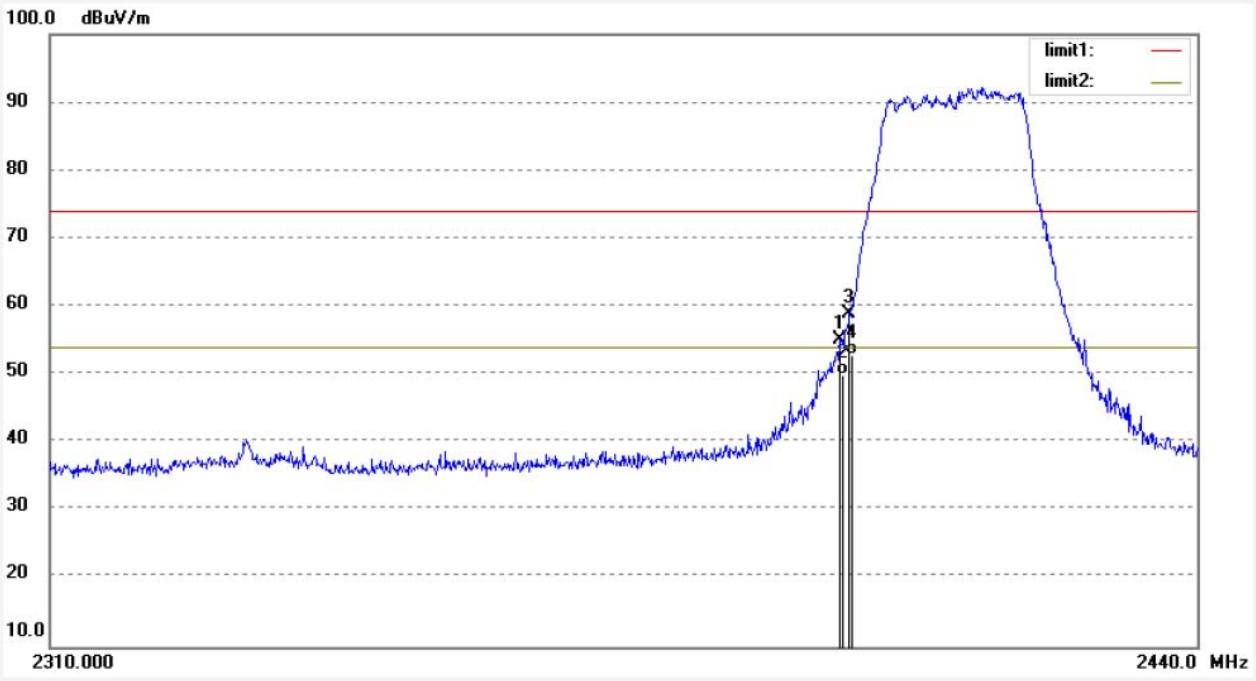
Fax:+86-0755-26503396

Job No.: alen #2347
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: ATSC HD DIGITAL RECEIVER
Mode: TX 2412MHz(802.11g)
Model: HA2800
Manufacturer: Trimax

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 13/11/02/
Time: 9/27/20
Engineer Signature:
Distance: 3m

Note: Report No:ATE20132275



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2398.920	61.86	-6.76	55.10	74.00	-18.90	peak			
2	2398.920	56.78	-6.76	50.02	54.00	-3.98	AVG			
3	2400.000	65.60	-6.76	58.84	74.00	-15.16	peak			
4	2400.000	59.57	-6.76	52.81	54.00	-1.19	AVG			

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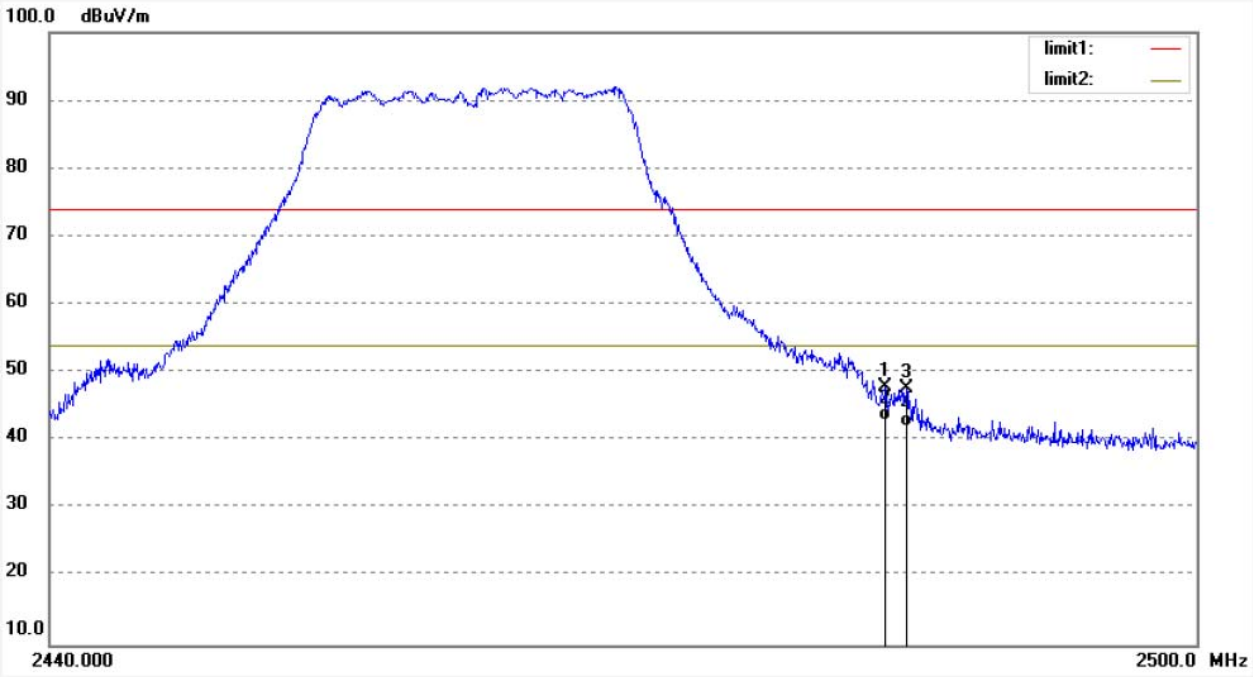
Job No.: alen #2345
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: ATSC HD DIGITAL RECEIVER
Mode: TX 2462MHz(802.11g)
Model: HA2800
Manufacturer: Trimax

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 13/11/02/
Time: 9/25/57
Engineer Signature:
Distance: 3m

Note: Report No:ATE20132275



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	54.37	-6.54	47.83	74.00	-26.17	peak			
2	2483.500	49.57	-6.54	43.03	54.00	-10.97	AVG			
3	2484.700	54.20	-6.54	47.66	74.00	-26.34	peak			
4	2484.700	48.65	-6.54	42.11	54.00	-11.89	AVG			

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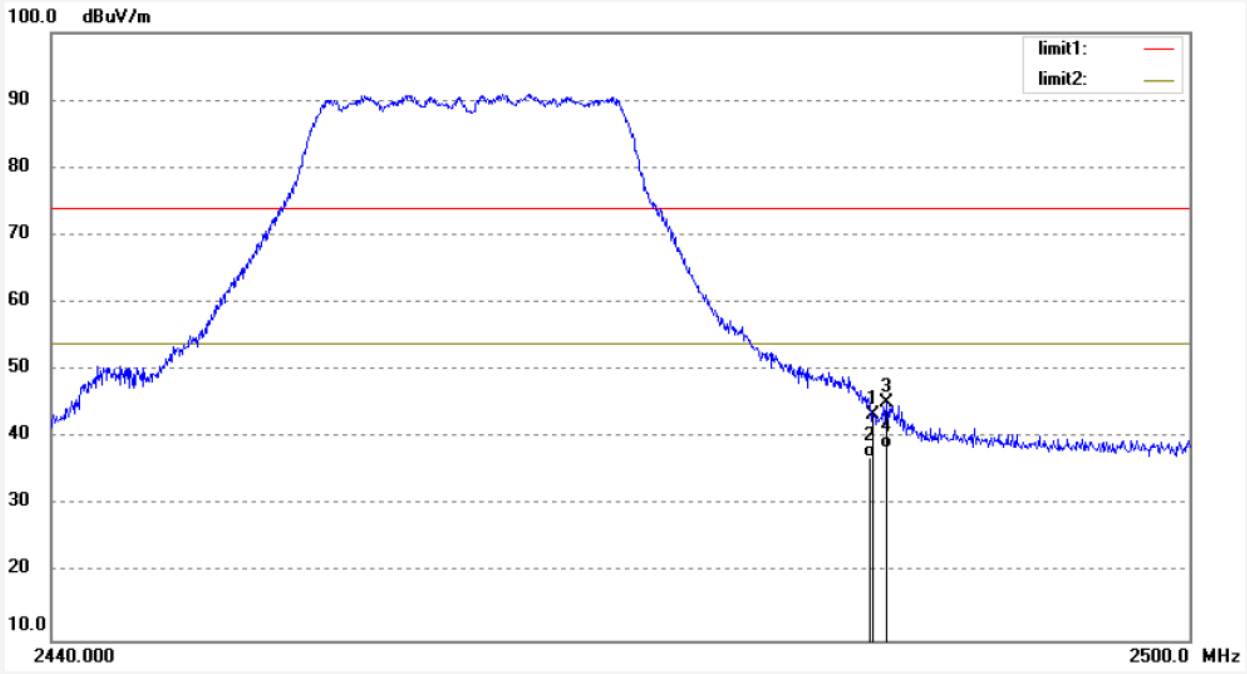
Job No.: alen #2344	Polarization: Vertical
Standard: FCC PK	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 13/11/02/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 9/25/25
EUT: ATSC HD DIGITAL RECEIVER	Engineer Signature:
Mode: TX 2462MHz(802.11g)	Distance: 3m
Model: HA2800	
Manufacturer: Trimax	

Note: Report No:ATE20132275



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	49.88	-6.54	43.34	74.00	-30.66	peak			
2	2483.500	43.57	-6.54	37.03	54.00	-16.97	AVG			
3	2483.920	51.81	-6.54	45.27	74.00	-28.73	peak			
4	2483.920	45.02	-6.54	38.48	54.00	-15.52	AVG			

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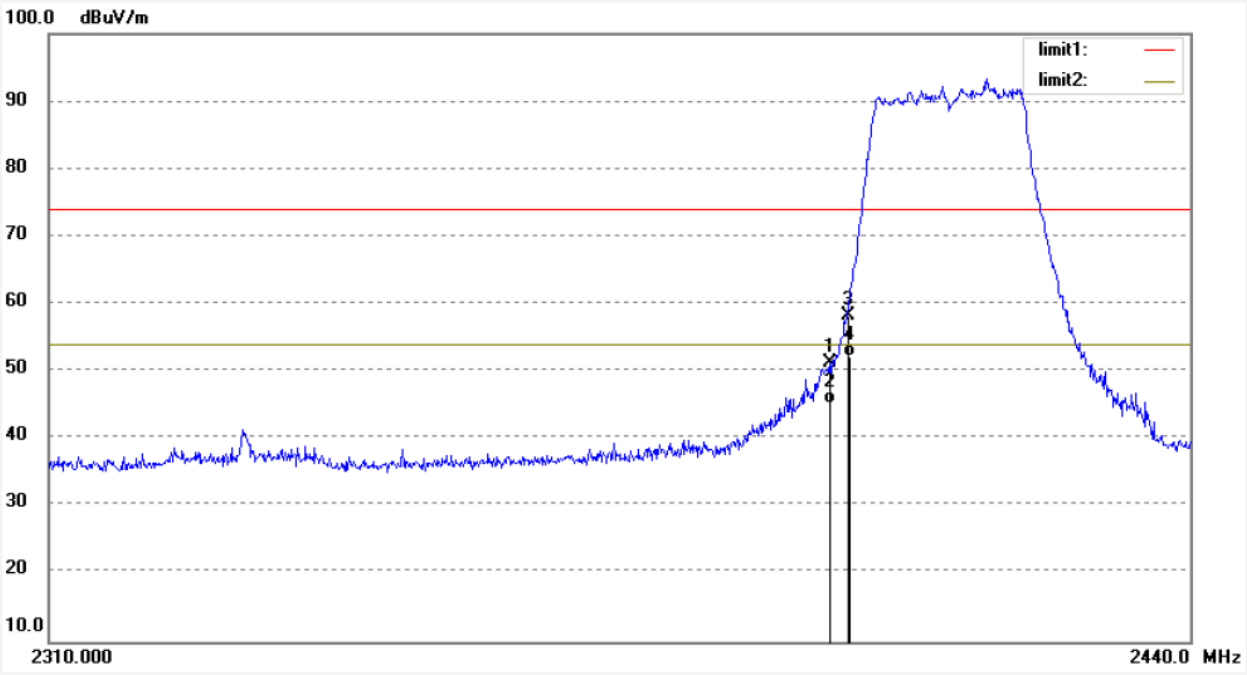
Job No.: alen #2340
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: ATSC HD DIGITAL RECEIVER
Mode: TX 2412MHz(802.11n20)
Model: HA2800
Manufacturer: Trimax

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 13/11/02/
Time: 9/21/10
Engineer Signature:
Distance: 3m

Note: Report No:ATE20132275



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2398.270	57.96	-6.75	51.21	74.00	-22.79	peak			
2	2398.270	51.98	-6.75	45.23	54.00	-8.77	AVG			
3	2400.000	65.07	-6.76	58.31	74.00	-15.69	peak			
4	2400.000	58.89	-6.76	52.13	54.00	-1.87	AVG			

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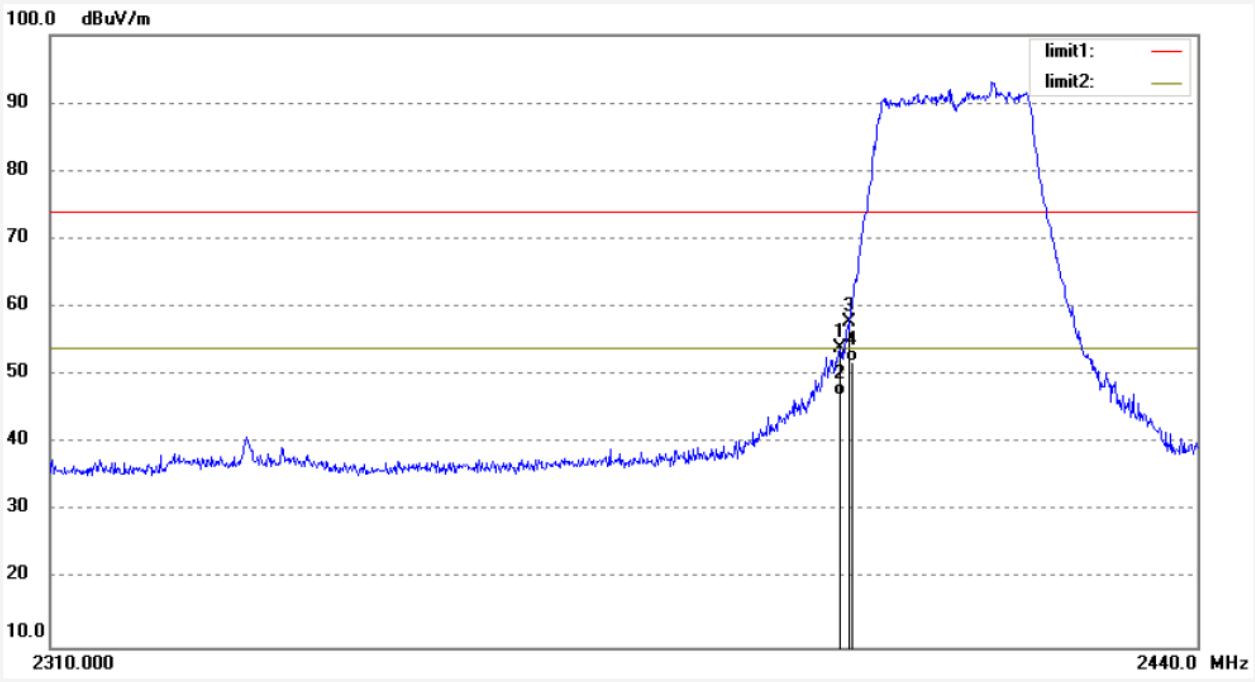
Job No.: alen #2341
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: ATSC HD DIGITAL RECEIVER
Mode: TX 2412MHz(802.11n20)
Model: HA2800
Manufacturer: Trimax

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 13/11/02/
Time: 9/21/59
Engineer Signature:
Distance: 3m

Note: Report No:ATE20132275



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2398.920	60.68	-6.76	53.92	74.00	-20.08	peak			
2	2398.920	53.78	-6.76	47.02	54.00	-6.98	AVG			
3	2400.000	64.65	-6.76	57.89	74.00	-16.11	peak			
4	2400.000	58.68	-6.76	51.92	54.00	-2.08	AVG			

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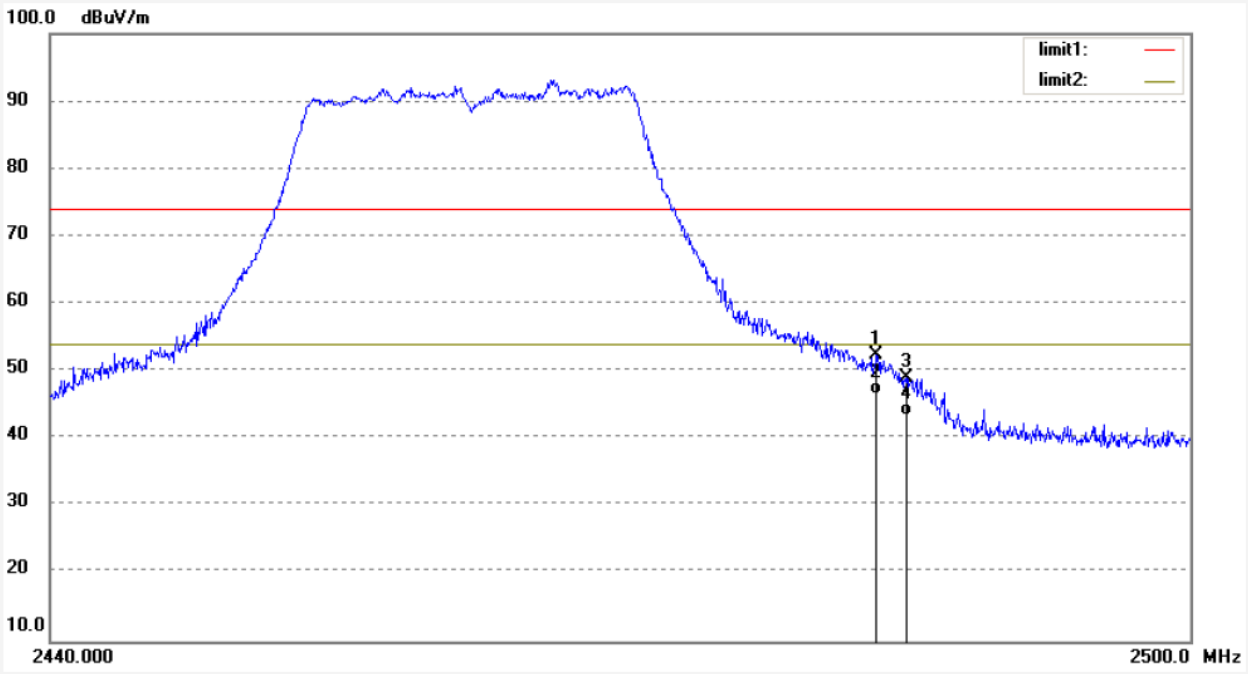
Job No.: alen #2342	Polarization: Horizontal
Standard: FCC PK	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 13/11/02/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 9/23/17
EUT: ATSC HD DIGITAL RECEIVER	Engineer Signature:
Mode: TX 2462MHz(802.11n20)	Distance: 3m
Model: HA2800	
Manufacturer: Trimax	

Note: Report No:ATE20132275



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	59.01	-6.54	52.47	74.00	-21.53	peak			
2	2483.500	53.02	-6.54	46.48	54.00	-7.52	AVG			
3	2484.940	55.54	-6.54	49.00	74.00	-25.00	peak			
4	2484.940	50.04	-6.54	43.50	54.00	-10.50	AVG			

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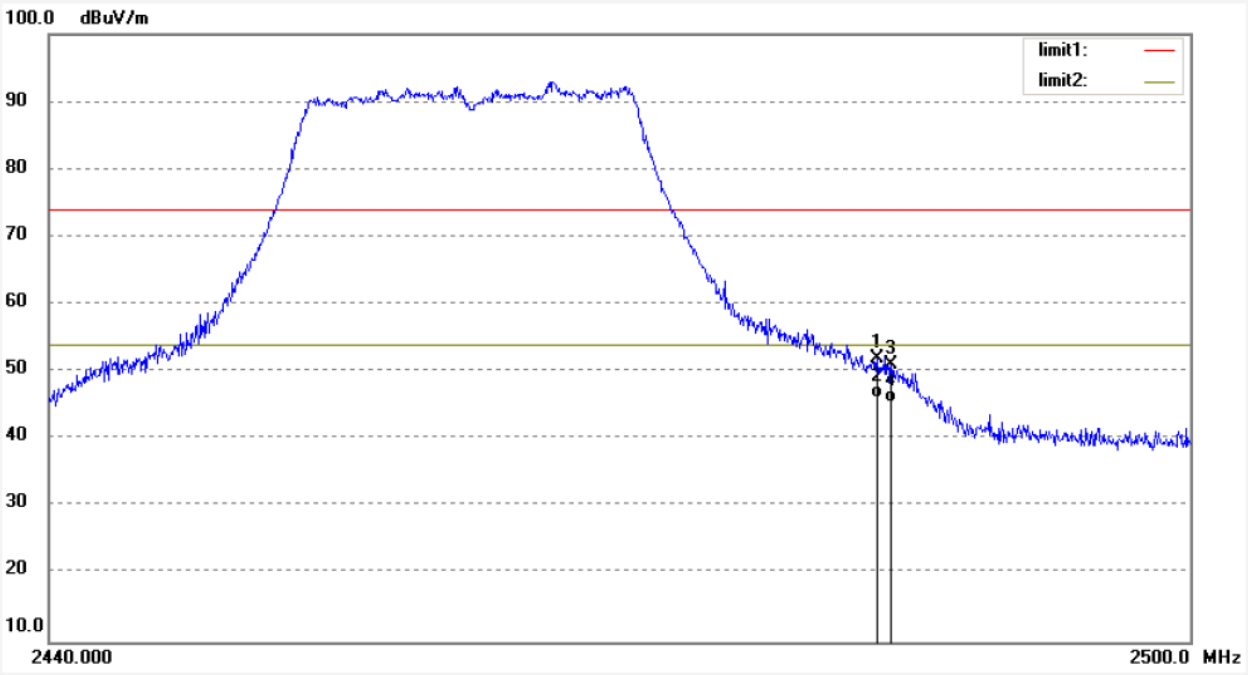
Job No.: alen #2343
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: ATSC HD DIGITAL RECEIVER
Mode: TX 2462MHz(802.11n20)
Model: HA2800
Manufacturer: Trimax

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 13/11/02/
Time: 9/23/48
Engineer Signature:
Distance: 3m

Note: Report No:ATE20132275



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	58.56	-6.54	52.02	74.00	-21.98	peak			
2	2483.500	52.65	-6.54	46.11	54.00	-7.89	AVG			
3	2484.160	57.69	-6.54	51.15	74.00	-22.85	peak			
4	2484.160	51.87	-6.54	45.33	54.00	-8.67	AVG			

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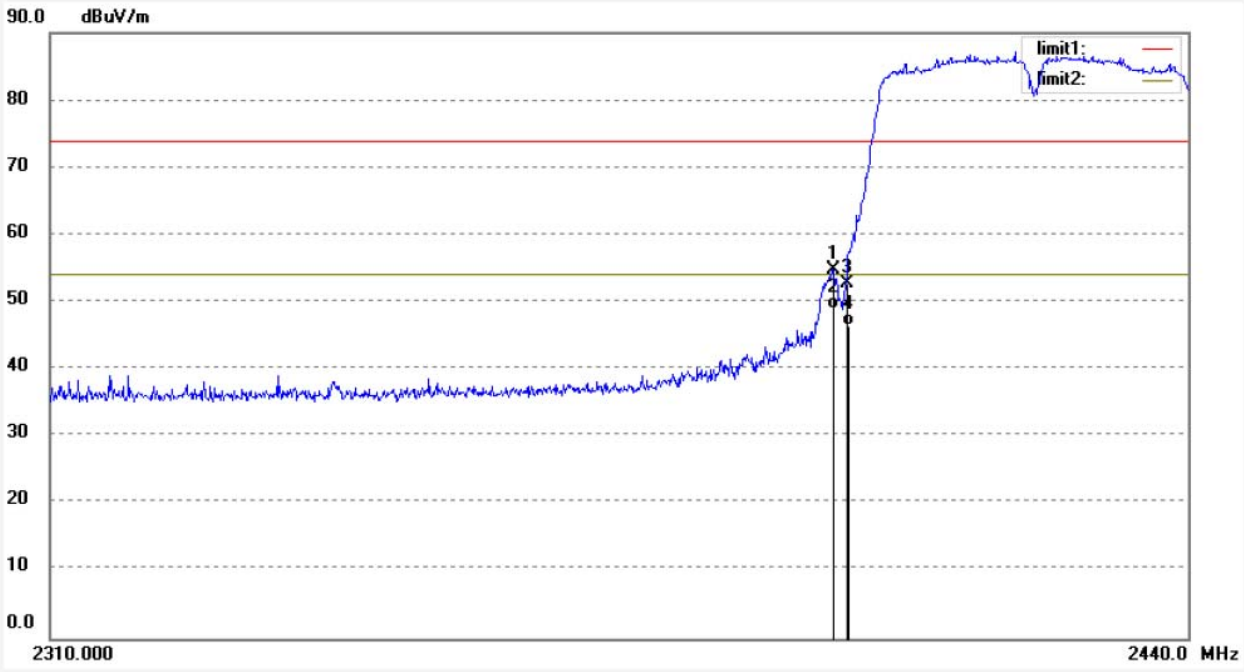
Job No.: alen #2338
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: ATSC HD DIGITAL RECEIVER
Mode: TX 2422MHz(802.11n40)
Model: HA2800
Manufacturer: Trimax

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 13/11/02/
Time: 9/17/31
Engineer Signature:
Distance: 3m

Note: Report No:ATE20132275



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2398.920	61.59	-6.76	54.83	74.00	-19.17	peak			
2	2398.920	55.65	-6.76	48.89	54.00	-5.11	AVG			
3	2400.000	59.53	-6.76	52.77	74.00	-21.23	peak			
4	2400.000	53.21	-6.76	46.45	54.00	-7.55	AVG			

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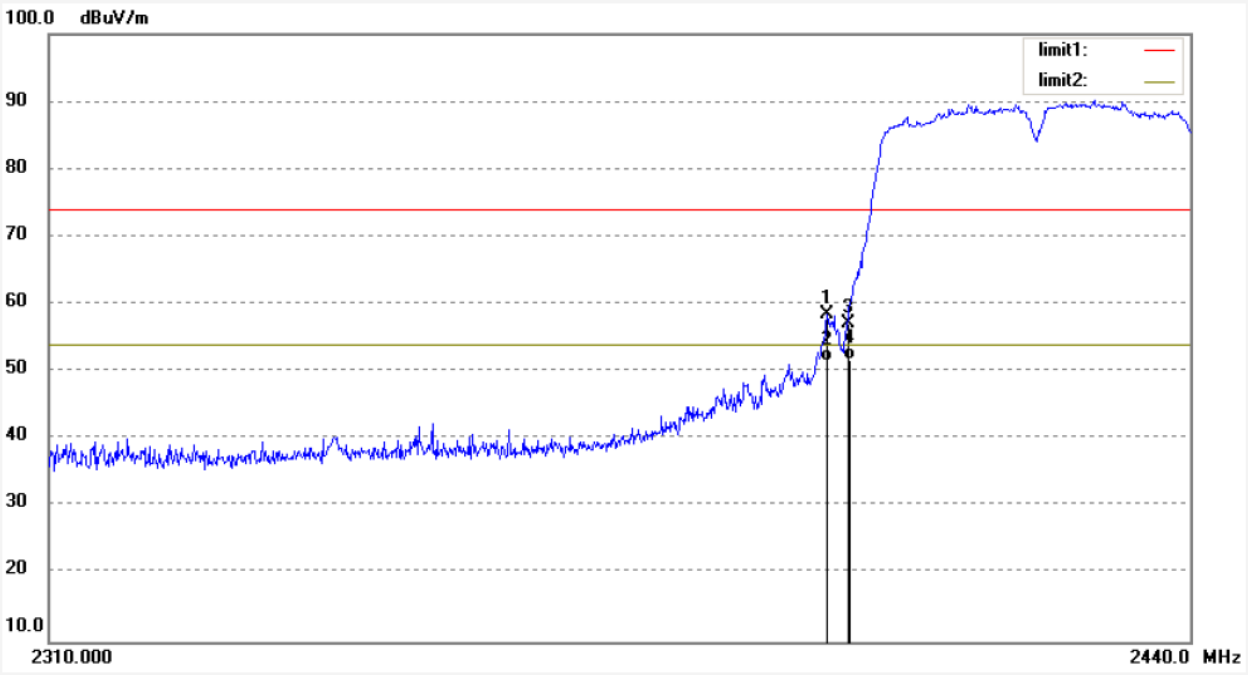
Job No.: alen #2339
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: ATSC HD DIGITAL RECEIVER
Mode: TX 2422MHz(802.11n40)
Model: HA2800
Manufacturer: Trimax

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 13/11/02/
Time: 9/19/16
Engineer Signature:
Distance: 3m

Note: Report No:ATE20132275



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2398.010	65.24	-6.76	58.48	74.00	-15.52	peak			
2	2398.010	58.24	-6.76	51.48	54.00	-2.52	AVG			
3	2400.000	63.80	-6.76	57.04	74.00	-16.96	peak			
4	2400.000	58.54	-6.76	51.78	54.00	-2.22	AVG			

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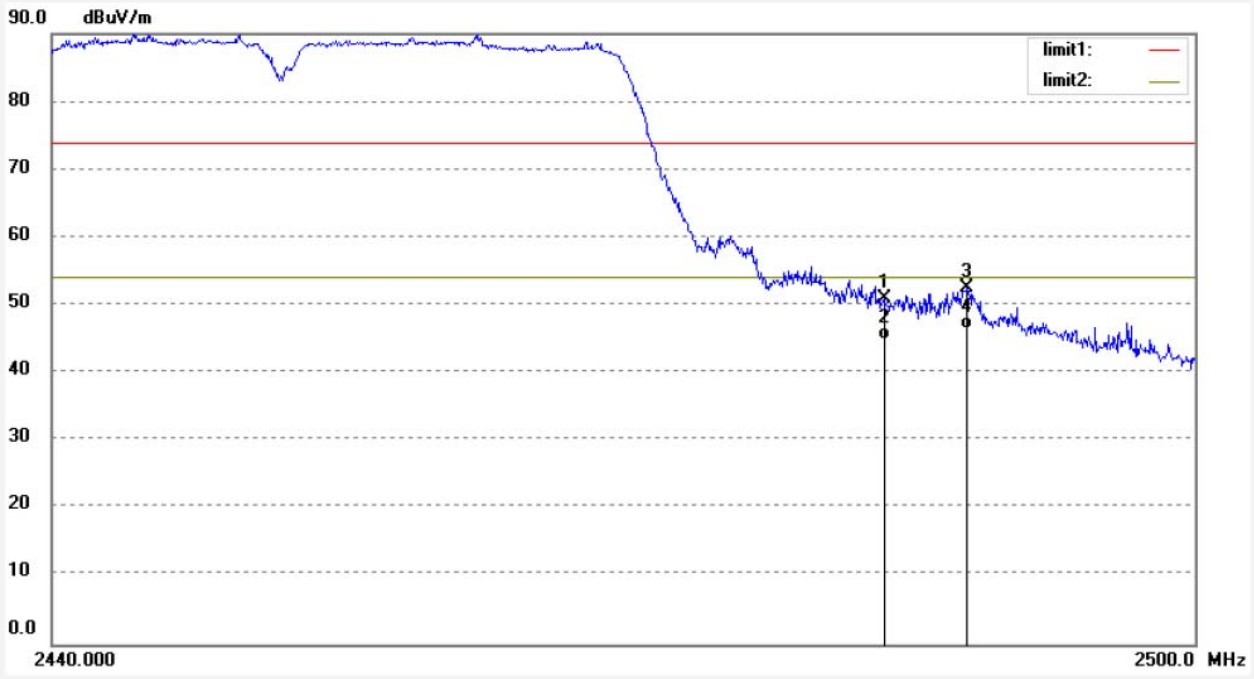
Job No.: alen #2336
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: ATSC HD DIGITAL RECEIVER
Mode: TX 2452MHz(802.11n40)
Model: HA2800
Manufacturer: Trimax

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 13/11/02/
Time: 9/13/45
Engineer Signature:
Distance: 3m

Note: Report No:ATE20132275



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	57.59	-6.54	51.05	74.00	-22.95	peak			
2	2483.500	51.35	-6.54	44.81	54.00	-9.19	AVG			
3	2488.000	59.03	-6.52	52.51	74.00	-21.49	peak			
4	2488.000	53.01	-6.52	46.49	54.00	-7.51	AVG			

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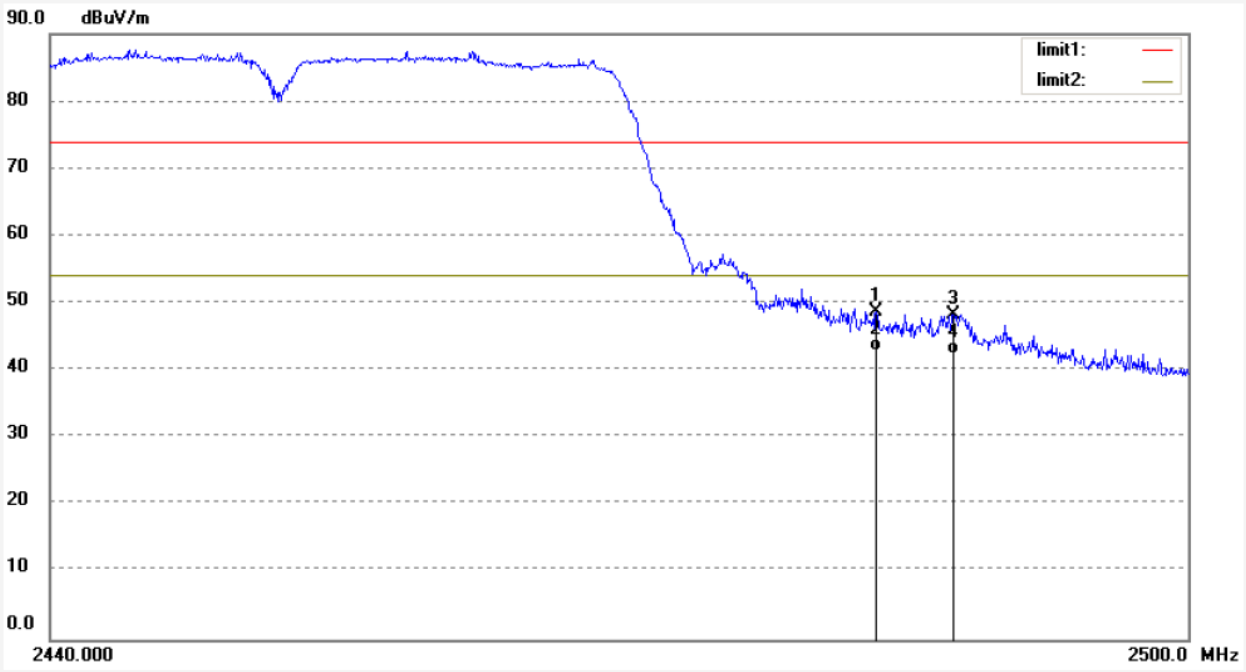
Job No.: alen #2337
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: ATSC HD DIGITAL RECEIVER
Mode: TX 2452MHz(802.11n40)
Model: HA2800
Manufacturer: Trimax

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 13/11/02/
Time: 9/15/50
Engineer Signature:
Distance: 3m

Note: Report No:ATE20132275

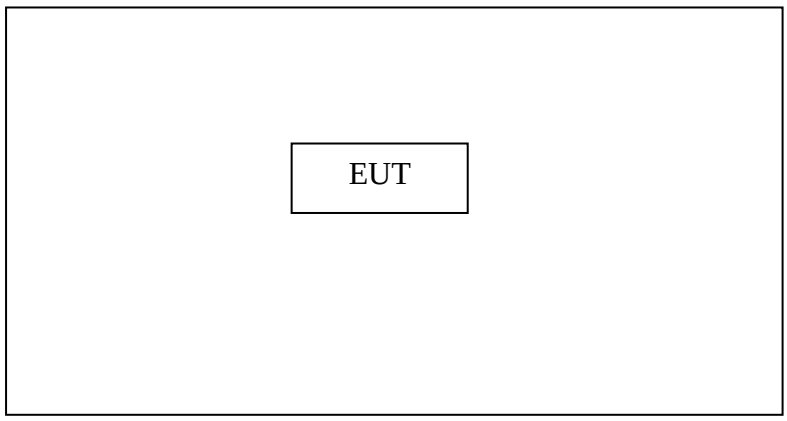


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	55.18	-6.54	48.64	74.00	-25.36	peak			
2	2483.500	49.41	-6.54	42.87	54.00	-11.13	AVG			
3	2487.580	54.84	-6.52	48.32	74.00	-25.68	peak			
4	2487.580	48.98	-6.52	42.46	54.00	-11.54	AVG			

9. RADIATED SPURIOUS EMISSION TEST

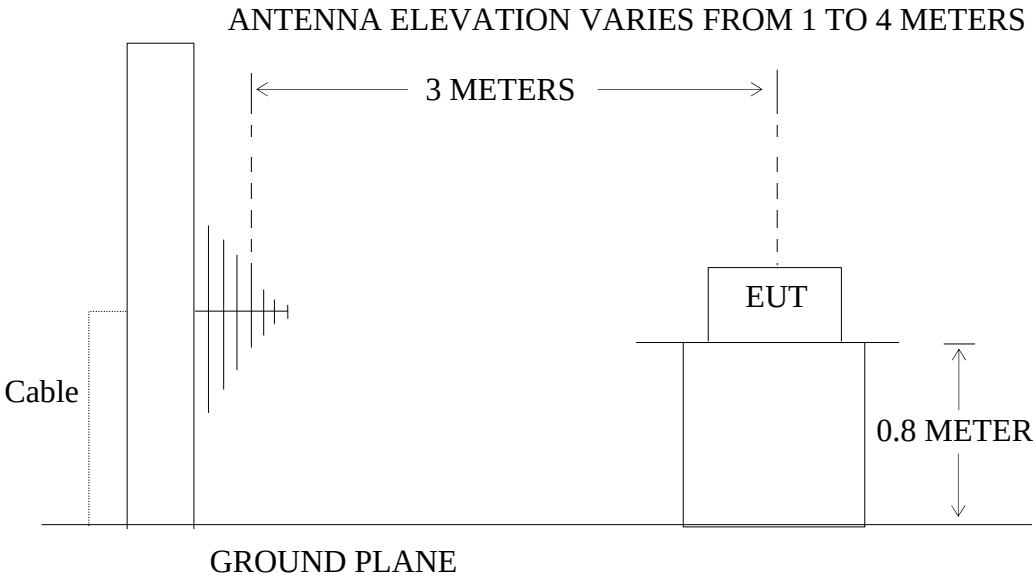
9.1.Block Diagram of Test Setup

9.1.1.Block diagram of connection between the EUT and peripherals



Setup: Transmitting mode

9.1.2.Semi-Anechoic Chamber Test Setup Diagram



9.2.The Limit For Section 15.247(d)

Section 15.247(d): 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the

transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

9.3.Restricted bands of operation

9.3.1.FCC Part 15.205 Restricted bands of operation

(a) Except as shown in paragraph (d) of this section, 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
[1]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	2690-2900	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	3600-4400	([2])
13.36-13.41			

[1]Until February 1, 1999, this restricted band shall be 0.490-0.510

[2]Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emission appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, Compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

9.4.Configuration of EUT on Measurement

The equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

9.5.Operating Condition of EUT

9.5.1.Setup the EUT and simulator as shown as Section 9.1.

9.5.2.Turn on the power of all equipment.

9.5.3.Let the EUT work in TX modes measure it. The transmit frequency are 2412-2462 and 2422-2452MHz. We select 2412MHz, 2437MHz, 2462MHz and 2422MHz, 2437MHz, 2452MHz TX frequency to transmit.

9.6.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4: 2009 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.
The worst-case data rate for this channel to be 1Mbps for 802.11b mode and 6Mbps for 802.11g mode and 150Mbps for 802.11n mode, based on previous with 802.11 WLAN product design architectures.

The bandwidth of test receiver is set at 9kHz in below 30MHz. and set at 120kHz in 30-1000MHz, and 1MHz in above 1000MHz.

The frequency range from 9kHz to 25GHz is checked.
The final measurement in band 9-90kHz, 110-490kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.
The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:
Result = Reading + Corrected Factor
Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

9.7.The Field Strength of Radiation Emission Measurement Results

Note: 1. Emissions attenuated more than 20 dB below the permissible value are not reported.

2. *: Denotes restricted band of operation.

3. The fundamental radiated emissions were reduced by Band Reject Filter in the attached plots.

4. The EUT is tested radiation emission at each test mode(802.11 b/g/n) in three axes. The worst emissions are reported in all test mode and channels.

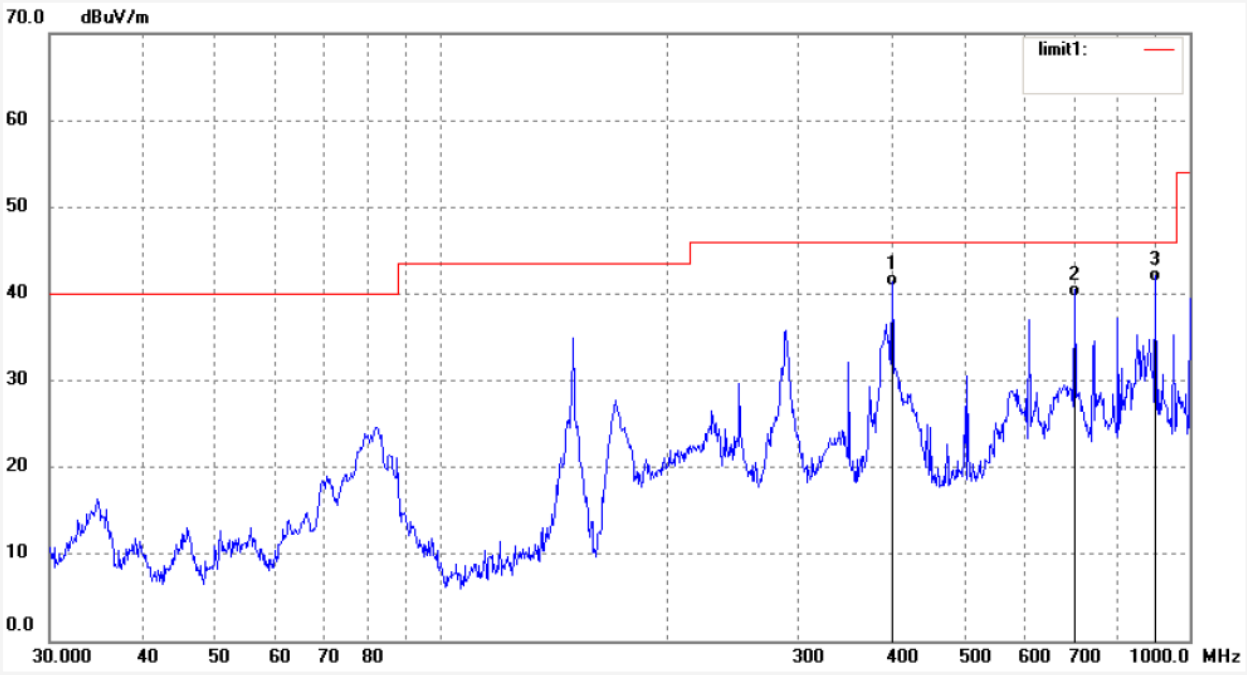
5. The 18-25GHz emissions are not reported, because the levels are too low against the limit.

Below 1G

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: alen #2354	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: AC 120V/60Hz
Test item: Radiation Test	Date: 13/11/02/
Temp.(C)/Hum.(%) 25 C / 55 %	Time: 9/45/31
EUT: ATSC HD DIGITAL RECEIVER	Engineer Signature:
Mode: TX 2462MHz(802.11b)	Distance: 3m
Model: HA2800	
Manufacturer: Trimax	

Note: Report No:ATE20132275



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	400.4318	56.42	-15.63	40.79	46.00	-5.21	QP			
2	701.7609	49.46	-9.77	39.69	46.00	-6.31	QP			
3	900.1473	47.54	-6.11	41.43	46.00	-4.57	QP			