

APPLICATION CERTIFICATION FCC Part 15C
On Behalf of
SHENZHEN WEI DA HUI ER TECHNOLOGY CO.,LTD.

HOLL WIFI Disk
Model No.: R220

FCC ID: 2AAV2-PENR220

Prepared for : SHENZHEN WEI DA HUI ER TECHNOLOGY
CO.,LTD.
Address : Floor 1st to 4th, NO.20 Building, Zhiheng Strategic
New Industrial Park, Guankou 2nd Road, Nanshan
District, Shenzhen, 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

Tel: (0755) 26503290
Fax: (0755) 26503396

Report No. : ATE20131791
Date of Test : Aug 22- Sep 23, 2013
Date of Report : Sep 23, 2013

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Test Report Certification

Applicant : SHENZHEN WEI DA HUI ER TECHNOLOGY CO.,LTD.
Manufacturer : SHENZHEN WEI DA HUI ER TECHNOLOGY CO.,LTD.
EUT Description : HOLL WIFI Disk
(A) MODEL NO.: R220
(B) Trade Name.: HOLL
(C) POWER SUPPLY: DC 3.7V (Powered by battery)

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 : Aug 22-Sep 23, 2013

Prepared by : Tim Zhang
(Tim.zhang, Engineer)

Approved & Authorized Signer : Sean Liu
(Sean Liu, Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	HOLL WIFI Disk
Model Number	:	R220
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	:	1.5dBi
Type of Antenna	:	Ceramic antenna
Power Supply	:	DC 3.7V (lithium-ion battery)
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	:	SHENZHEN WEI DA HUI ER TECHNOLOGY CO.,LTD.
Address	:	Floor 1st to 4th, NO.20 Building, Zhiheng Strategic New Industrial Park, Guankou 2nd Road, Nanshan District, Shenzhen, China
Manufacturer	:	SHENZHEN WEI DA HUI ER TECHNOLOGY CO.,LTD.
Address	:	Floor 1st to 4th, NO.20 Building, Zhiheng Strategic New Industrial Park, Guankou 2nd Road, Nanshan District, Shenzhen, China
Date of sample received	:	Aug 22, 2013
Date of Test	:	Aug 22-Sep 23, 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.Accessory and Auxiliary Equipment

PC

Manufacturer: LENOVO
M/N: 4290-RT8
S/N: R9-FW93G 11/08

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	CBLU118354 0-01	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	WHKX3.6/18 G-10SS	N/A	Jan. 12, 2013	Jan. 11, 2014
Band Reject Filter	Wainwright Instruments	WRCG2400/2 485-2375/2510 -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

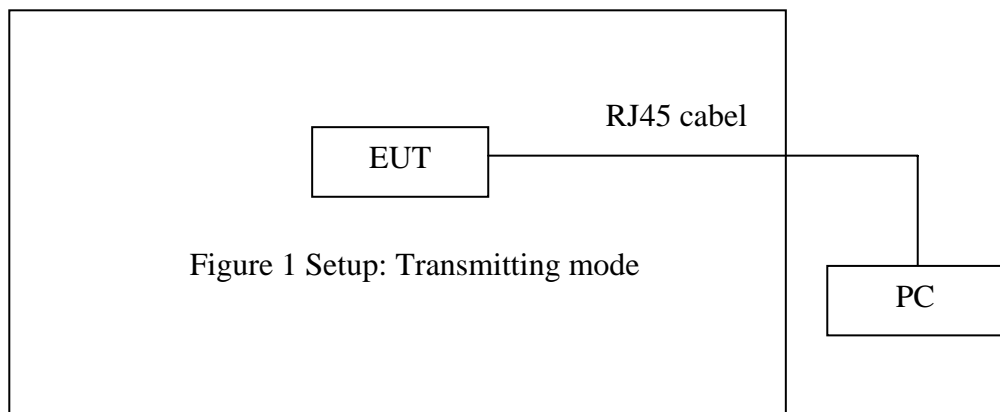
4.802.11n (40MHz) Transmitting mode

Low Channel: 2422MHz

Middle Channel: 2437MHz

High Channel: 2452MHz

3.2.Configuration and peripherals

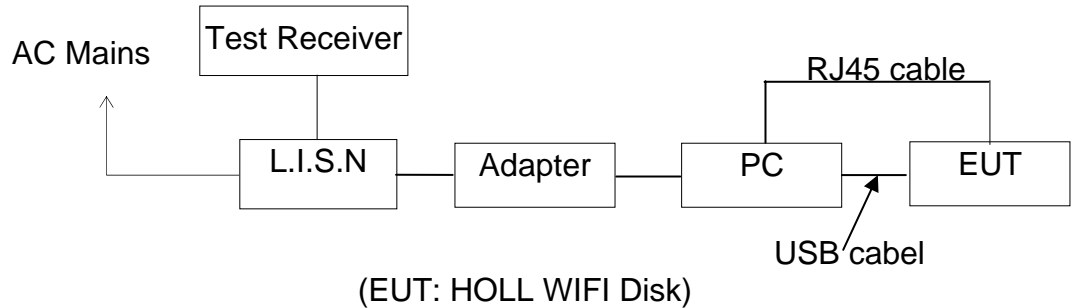


4. TEST PROCEDURES AND RESULTS

FCC Rules	Description of Test	Result
Section 15.207	Power Line Conducted Emission	Compliant
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 15.203	Antenna Requirement	Compliant

5. POWER LINE CONDUCTED MEASUREMENT

5.1. Block Diagram of Test Setup



5.2. Power Line Conducted Emission Measurement Limits

Frequency (MHz)	Limit dB(μV)	
	Quasi-peak Level	Average Level
0.15 - 0.50	66.0 – 56.0 *	56.0 – 46.0 *
0.50 - 5.00	56.0	46.0
5.00 - 30.00	60.0	50.0
NOTE1: The lower limit shall apply at the transition frequencies.		
NOTE2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.		

5.3. Configuration of EUT on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a 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 test mode and measure it.

5.5. Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4: 2009 on Conducted Emission Measurement.

The bandwidth of test receiver (R & S ESCS30) is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

5.6.Power Line Conducted Emission Measurement Results

PASS.

The frequency range from 150kHz to 30MHz is checked.

Test mode : Charging&communicating								
MEASUREMENT RESULT: "H0822-F06_fin"								
8/22/2013 9:20AM								
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE	
0.153024	50.70	11.5	66	15.1	QP	L1	GND	
0.183137	47.50	11.7	64	16.8	QP	L1	GND	
0.455055	41.20	12.5	57	15.6	QP	L1	GND	
MEASUREMENT RESULT: "H0822-F06_fin2"								
8/22/2013 9:20AM								
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE	
0.150000	33.50	11.5	56	22.5	AV	L1	GND	
0.447846	29.90	12.5	47	17.0	AV	L1	GND	
1.832860	25.60	12.4	46	20.4	AV	L1	GND	
MEASUREMENT RESULT: "H0822-F05_fin"								
8/22/2013 9:15AM								
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE	
0.151807	51.00	11.5	66	14.9	QP	N	GND	
0.182408	48.00	11.7	64	16.4	QP	N	GND	
0.483136	39.90	12.6	56	16.4	QP	N	GND	
MEASUREMENT RESULT: "H0822-F05_fin2"								
8/22/2013 9:15AM								
Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE	
0.151202	33.40	11.5	56	22.5	AV	N	GND	
0.449637	27.90	12.5	47	19.0	AV	N	GND	
1.938212	23.70	12.4	46	22.3	AV	N	GND	

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

The spectral diagrams are attached as below.

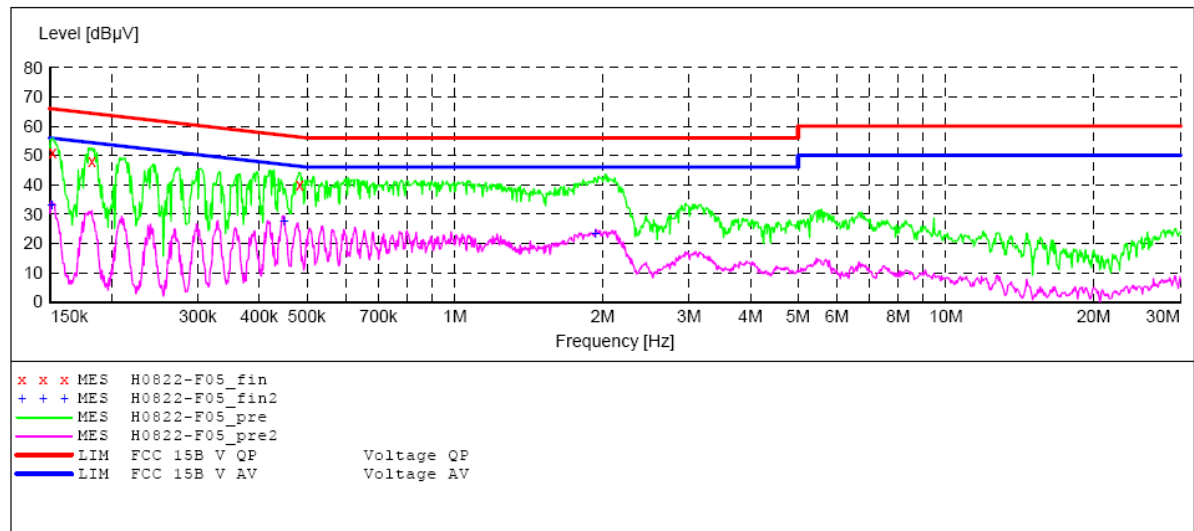
ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15

EUT: HOLL WIFI Disk M/N: R220
Manufacturer: WEI DA HUI ER
Operating Condition: Operation
Test Site: 1#Shielding Room
Operator: Alen
Test Specification: N 120V/60Hz
Comment: Report No:ATE20131791
Start of Test: 8/22/2013 / 9:13:50AM

SCAN TABLE: "V 150K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70
Start Stop Step Detector Meas. IF Transducer
Frequency Frequency Width Time Bandw.
150.0 kHz 30.0 MHz 4.5 kHz QuasiPeak 1.0 s 9 kHz NSLK8126 2008
Average



MEASUREMENT RESULT: "H0822-F05_fin"

8/22/2013 9:15AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.151807	51.00	11.5	66	14.9	QP	N	GND
0.182408	48.00	11.7	64	16.4	QP	N	GND
0.483136	39.90	12.6	56	16.4	QP	N	GND

MEASUREMENT RESULT: "H0822-F05_fin2"

8/22/2013 9:15AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.151202	33.40	11.5	56	22.5	AV	N	GND
0.449637	27.90	12.5	47	19.0	AV	N	GND
1.938212	23.70	12.4	46	22.3	AV	N	GND

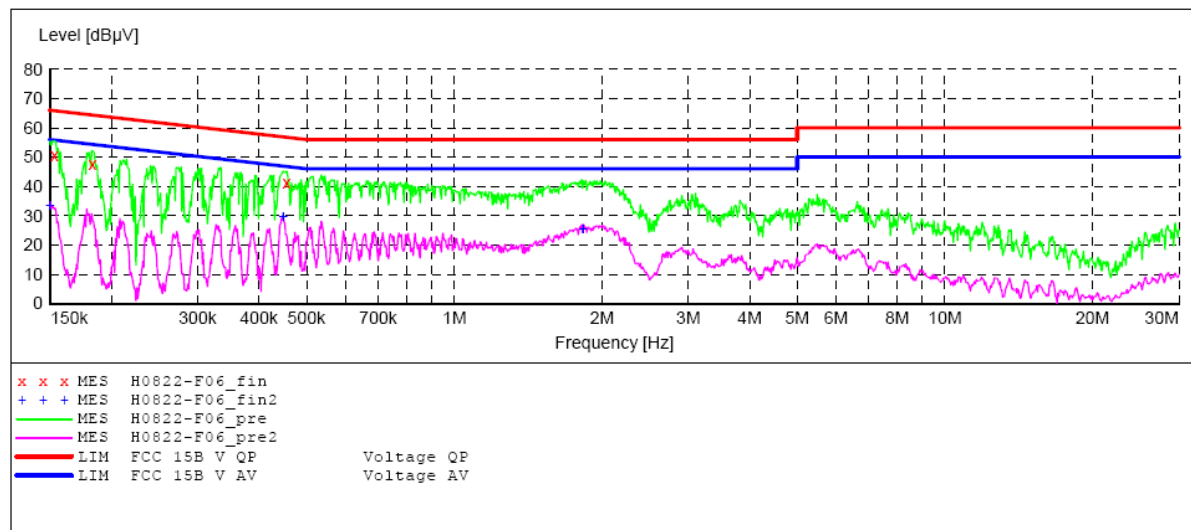
ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15

EUT: HOLL WIFI Disk M/N: R220
Manufacturer: WEI DA HUI ER
Operating Condition: Operation
Test Site: 1#Shielding Room
Operator: Alen
Test Specification: L 120V/60Hz
Comment: Report No:ATE20131791
Start of Test: 8/22/2013 / 9:16:24AM

SCAN TABLE: "V 150K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70
Start Stop Step Detector Meas. IF Transducer
Frequency Frequency Width Time Bandw.
150.0 kHz 30.0 MHz 4.5 kHz QuasiPeak 1.0 s 9 kHz NSLK8126 2008
Average



MEASUREMENT RESULT: "H0822-F06_fin"

8/22/2013 9:20AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.153024	50.70	11.5	66	15.1	QP	L1	GND
0.183137	47.50	11.7	64	16.8	QP	L1	GND
0.455055	41.20	12.5	57	15.6	QP	L1	GND

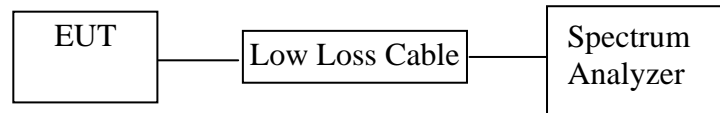
MEASUREMENT RESULT: "H0822-F06_fin2"

8/22/2013 9:20AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.150000	33.50	11.5	56	22.5	AV	L1	GND
0.447846	29.90	12.5	47	17.0	AV	L1	GND
1.832860	25.60	12.4	46	20.4	AV	L1	GND

6. 6DB BANDWIDTH MEASUREMENT

6.1. Block Diagram of Test Setup



6.2. 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.

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

1. Set resolution bandwidth (RBW) = 100 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

6.6.Test Result

The test was performed with 802.11b			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2412	10.76	> 0.5MHz
Middle	2437	10.76	> 0.5MHz
High	2462	10.76	> 0.5MHz

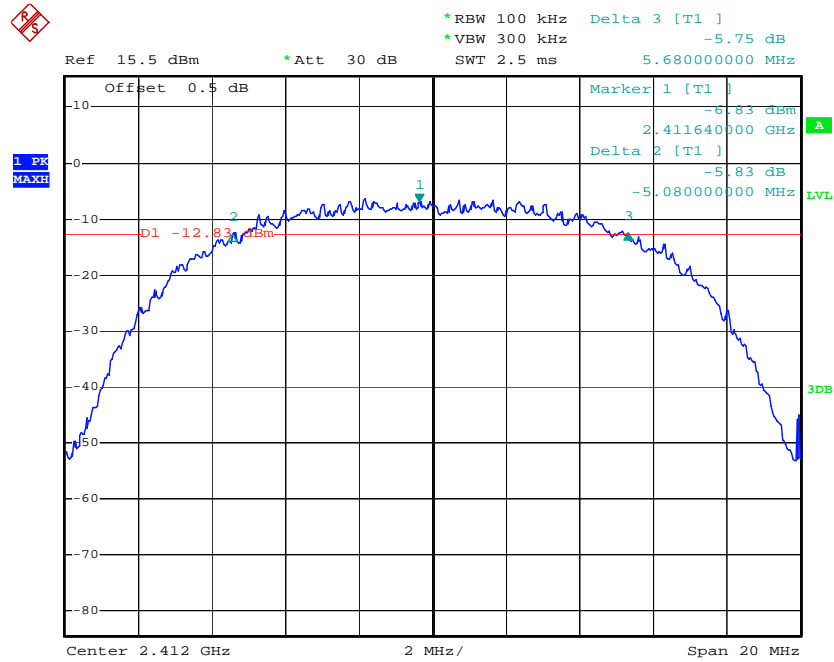
The test was performed with 802.11g			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2412	16.60	> 0.5MHz
Middle	2437	16.60	> 0.5MHz
High	2462	16.60	> 0.5MHz

The test was performed with 802.11n (Bandwidth: 20 MHz)			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2412	17.80	> 0.5MHz
Middle	2437	17.80	> 0.5MHz
High	2462	17.80	> 0.5MHz

The test was performed with 802.11n (Bandwidth: 40 MHz)			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
Low	2422	36.56	> 0.5MHz
Middle	2437	36.64	> 0.5MHz
High	2452	36.56	> 0.5MHz

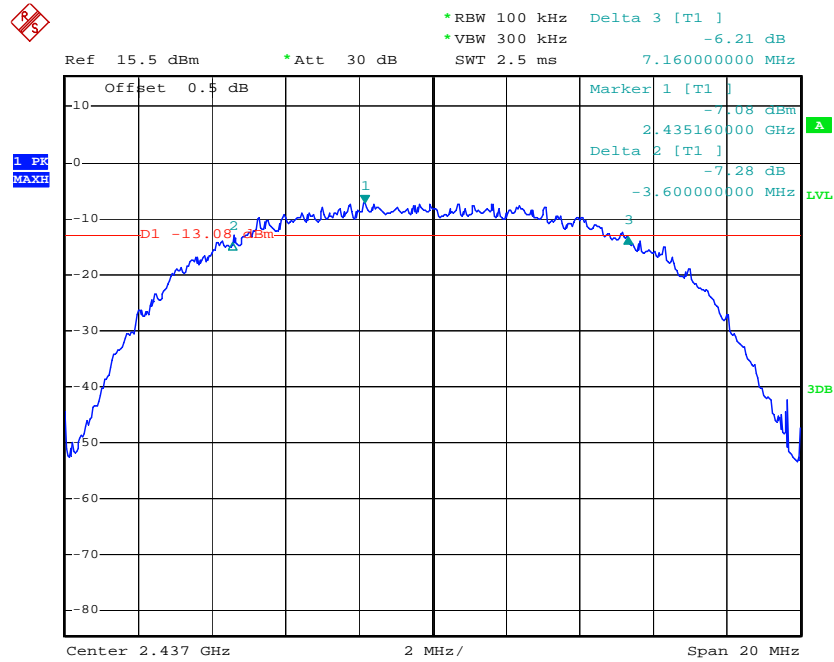
The spectrum analyzer plots are attached as below.

802.11b Channel Low 2412MHz



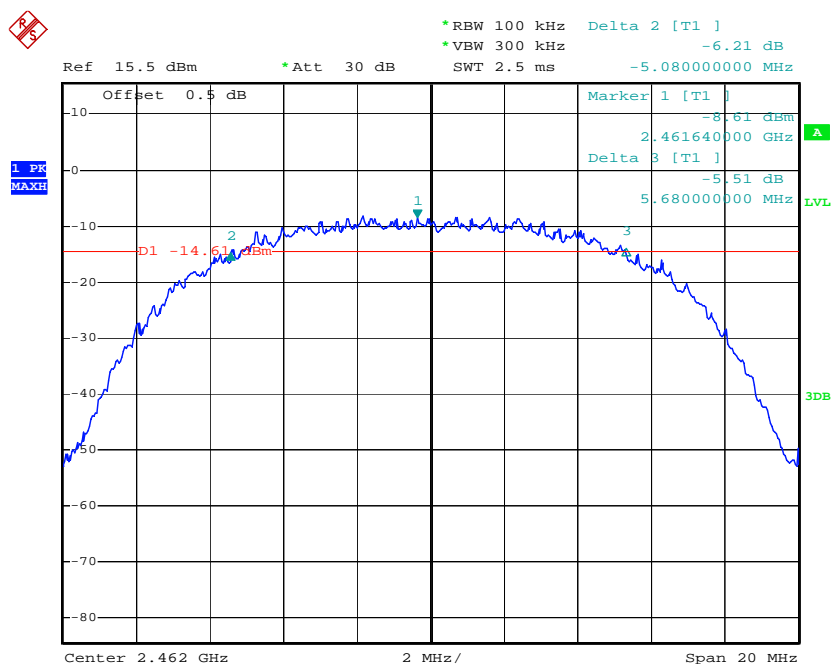
Date: 6.SEP.2013 14:44:23

802.11b Channel Middle 2437MHz



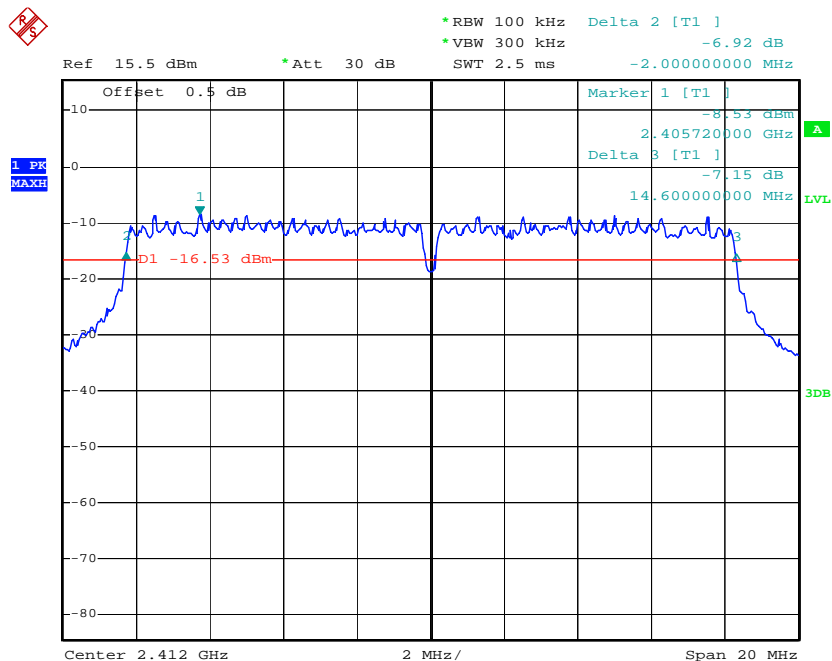
Date: 6.SEP.2013 14:41:31

802.11b Channel High 2462MHz



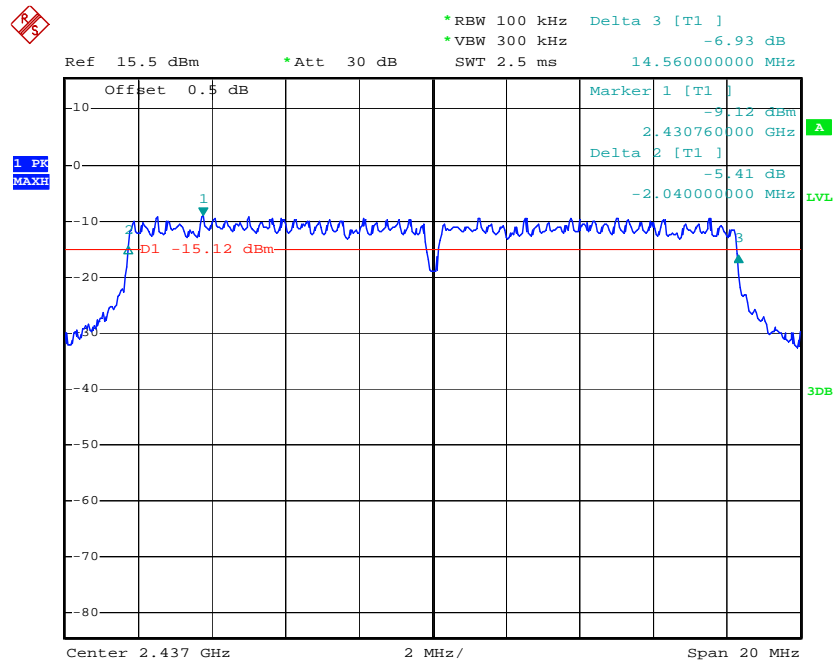
Date: 6.SEP.2013 14:38:08

802.11g Channel Low 2412MHz



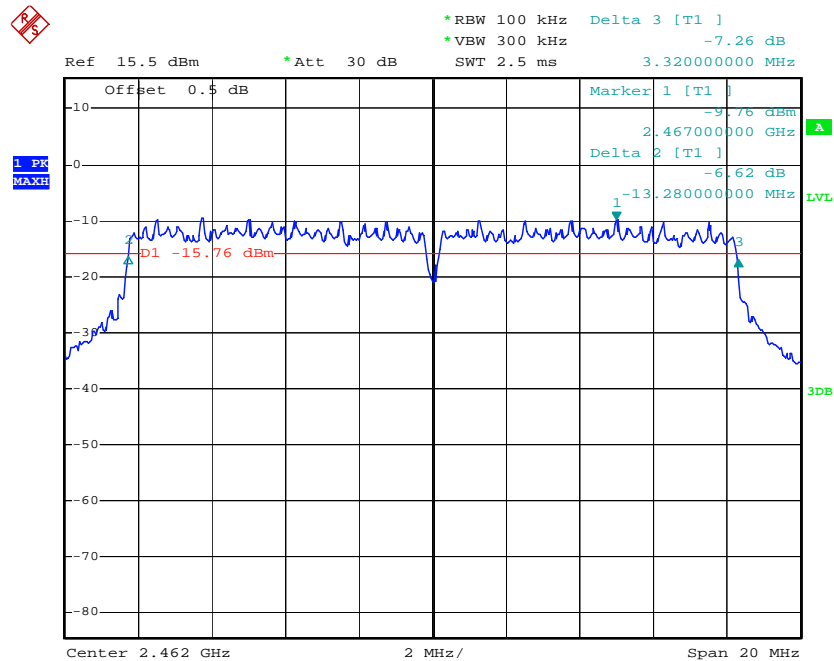
Date: 6.SEP.2013 14:48:26

802.11g Channel Middle 2437MHz



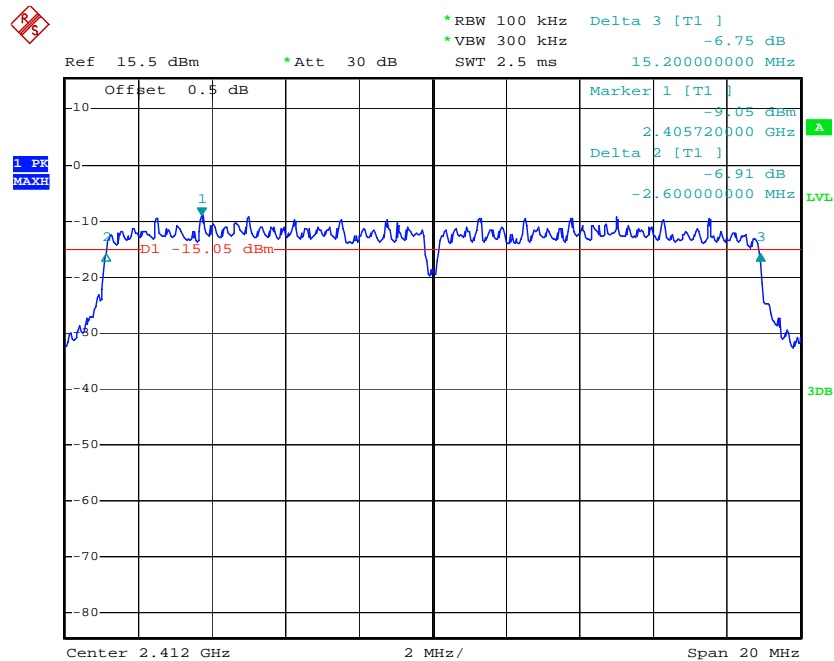
Date: 6.SEP.2013 14:51:36

802.11g Channel High 2462MHz



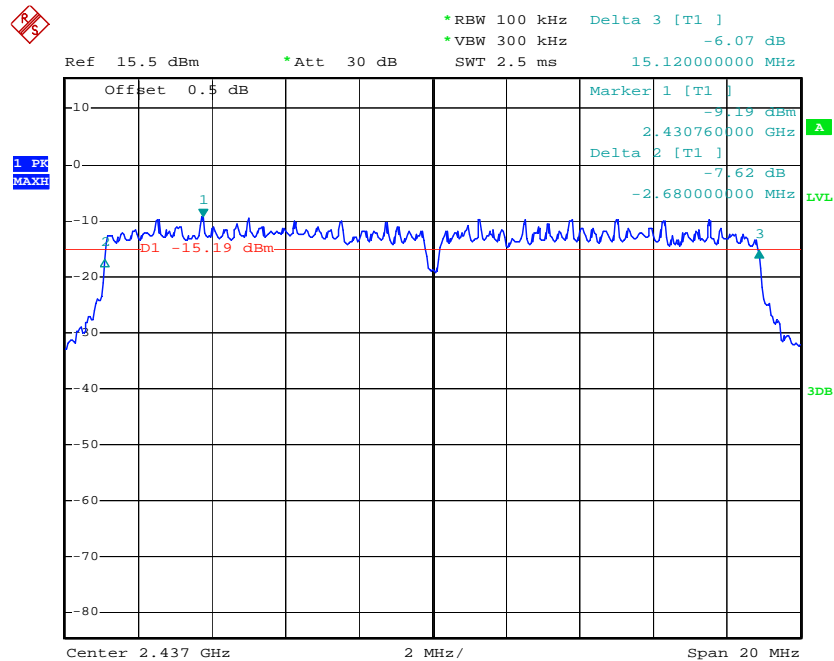
Date: 6.SEP.2013 14:55:36

802.11n Channel Low 2412MHz (20MHz)



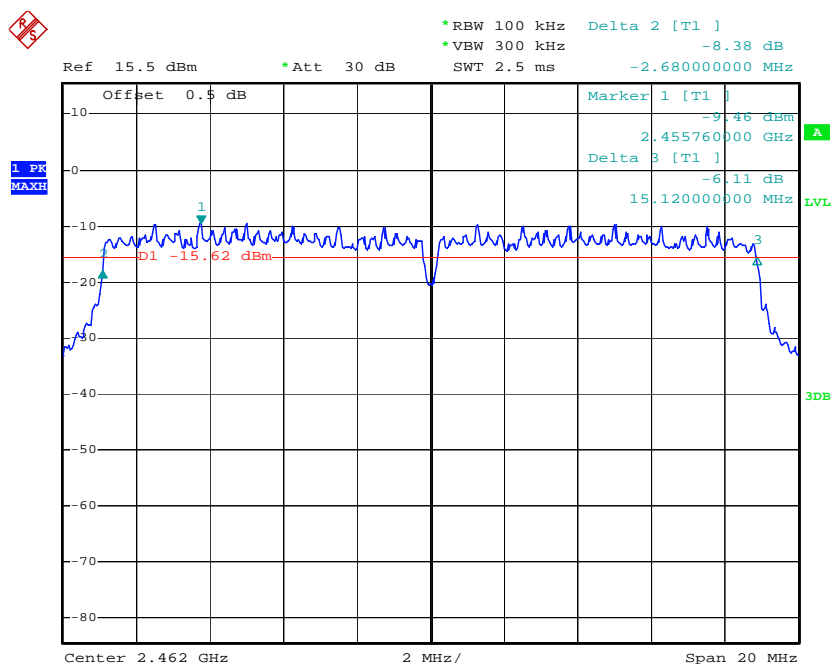
Date: 6.SEP.2013 15:08:35

802.11n Channel Middle 2437MHz(20MHz)



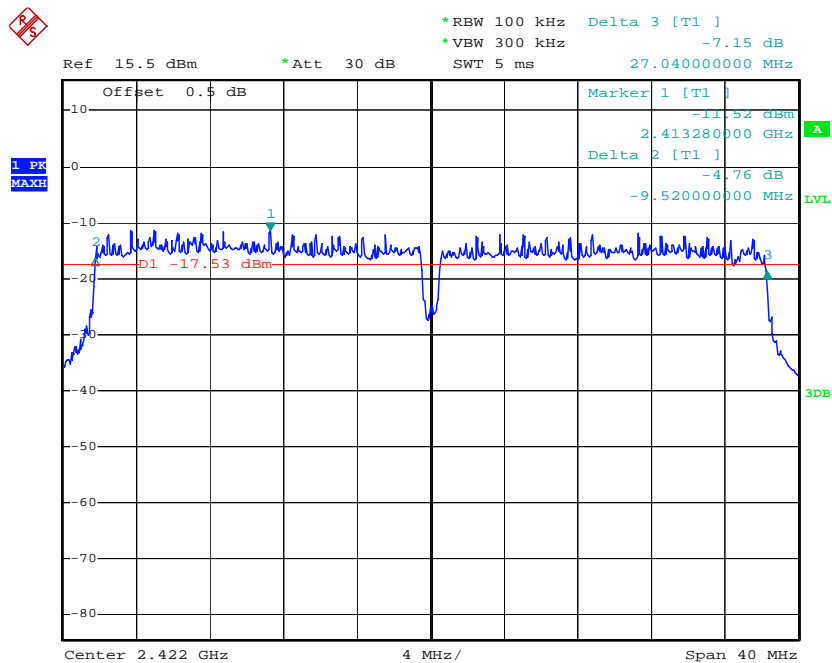
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802.11n Channel High 2462MHz(20MHz)



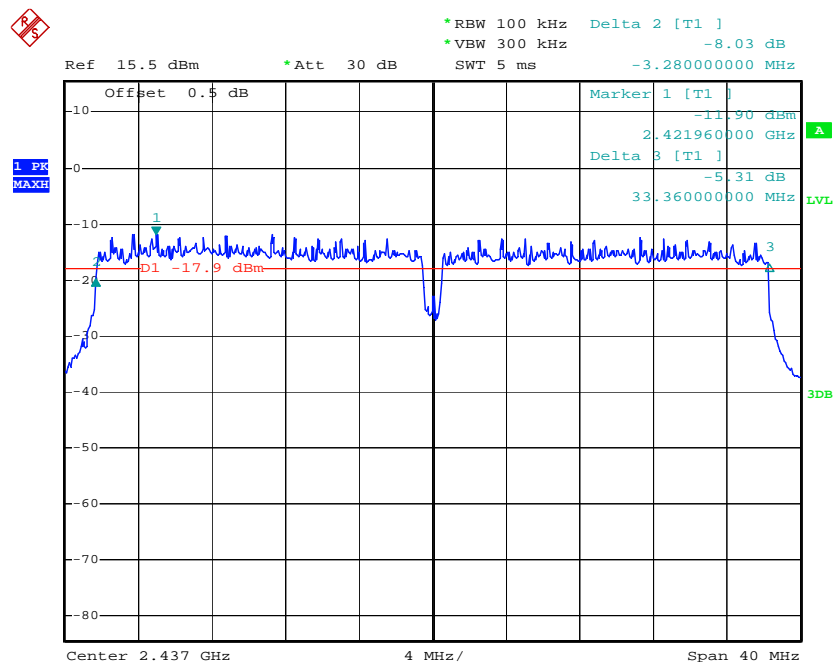
Date: 6.SEP.2013 14:59:47

802.11n Channel Low 2422MHz (40MHz)



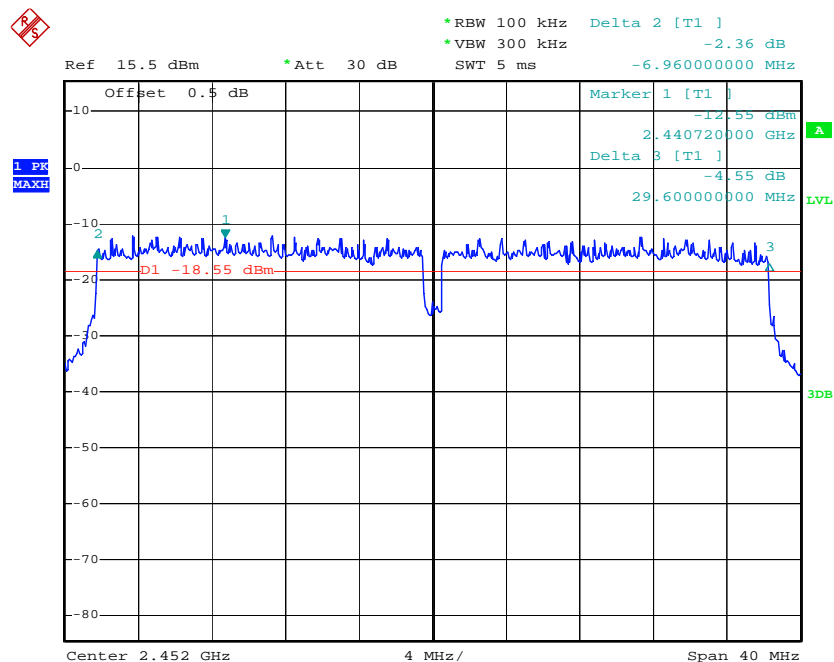
Date: 6.SEP.2013 15:13:43

802.11n Channel Middle 2437MHz(40MHz)



Date: 6.SEP.2013 15:17:05

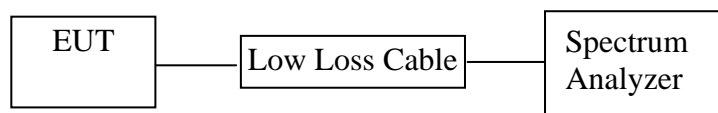
802.11n Channel High 2452MHz(40MHz)



Date: 6.SEP.2013 15:19:56

7. MAXIMUM PEAK OUTPUT POWER

7.1. Block Diagram of Test Setup



7.2. 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.

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 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.

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

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

7.5.4. Measurement the maximum peak output power.

7.6.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	9.43	8.77	30 dBm / 1 W
Middle	2437	8.22	6.64	30 dBm / 1 W
High	2462	7.42	5.52	30 dBm / 1 W

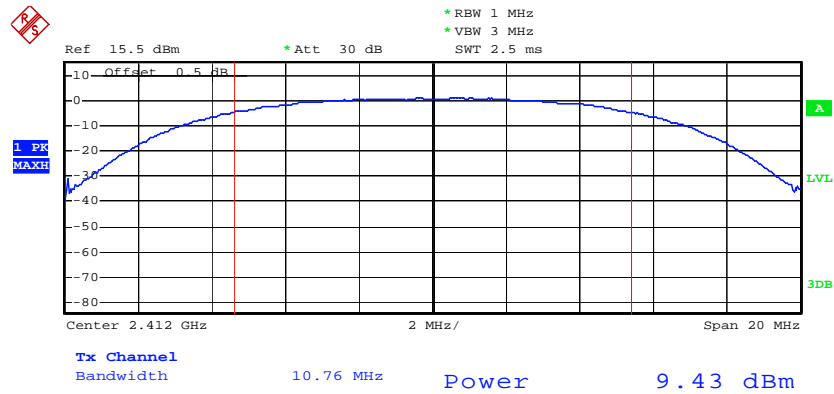
The test was performed with 802.11g				
Channel	Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power (mW)	Limits dBm / W
Low	2412	7.16	5.20	30 dBm / 1 W
Middle	2437	7.13	5.16	30 dBm / 1 W
High	2462	7.75	5.96	30 dBm / 1 W

The test was performed with 802.11n (20MHz)				
Channel	Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power (mW)	Limits dBm / W
Low	2412	7.08	5.11	30 dBm / 1 W
Middle	2437	6.48	4.45	30 dBm / 1 W
High	2462	6.45	4.42	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	7.21	5.26	30 dBm / 1 W
Middle	2437	6.78	4.76	30 dBm / 1 W
High	2452	6.51	4.48	30 dBm / 1 W

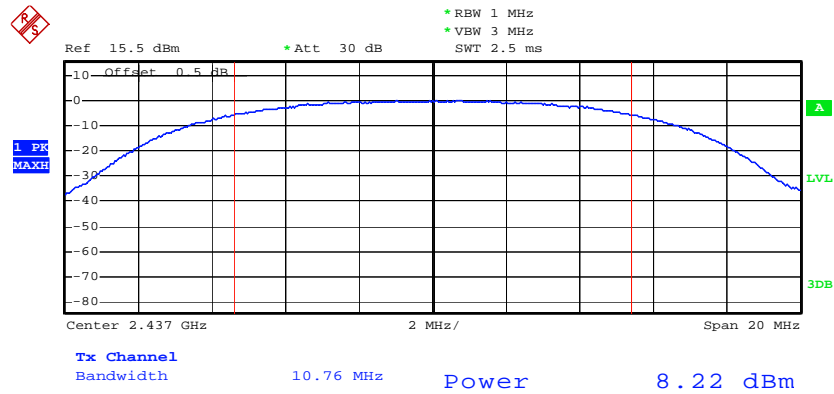
The spectrum analyzer plots are attached as below.

802.11b Channel Low 2412MHz



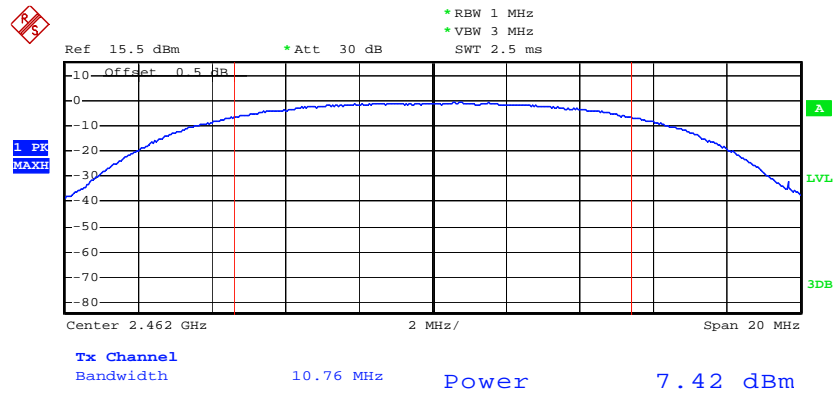
Date: 6.SEP.2013 10:11:05

802.11b Channel Middle 2437MHz



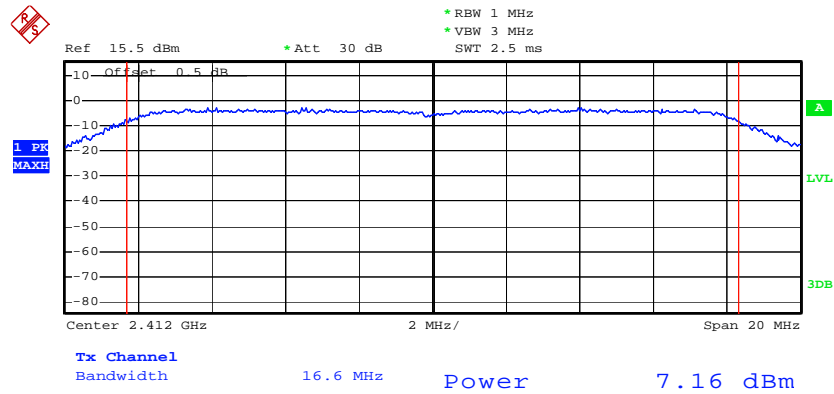
Date: 6.SEP.2013 10:12:26

802.11b Channel High 2462MHz



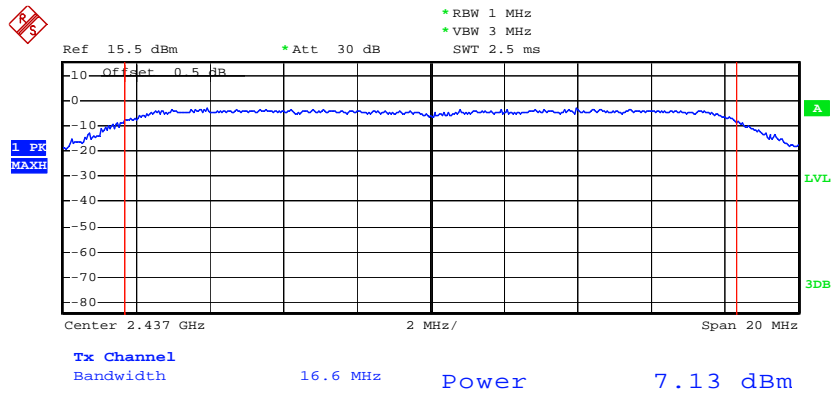
Date: 6.SEP.2013 10:16:33

802.11g Channel Low 2412MHz



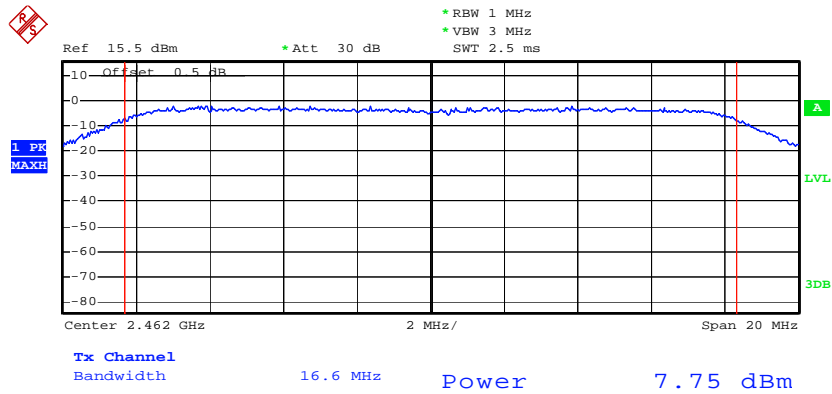
Date: 6.SEP.2013 10:30:12

802.11g Channel Middle 2437MHz



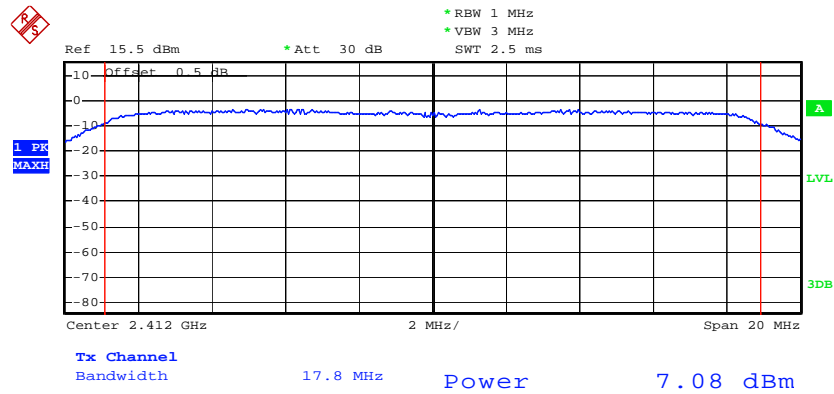
Date: 6.SEP.2013 10:26:22

802.11g Channel High 2462MHz



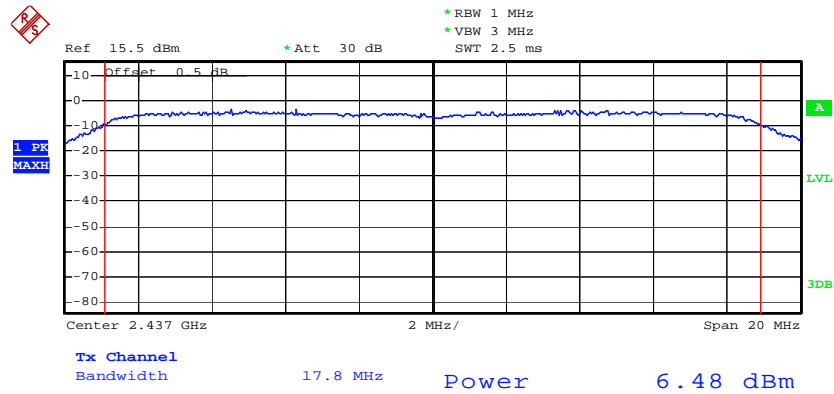
Date: 6.SEP.2013 10:21:37

802.11n Channel Low 2412MHz (20MHz)



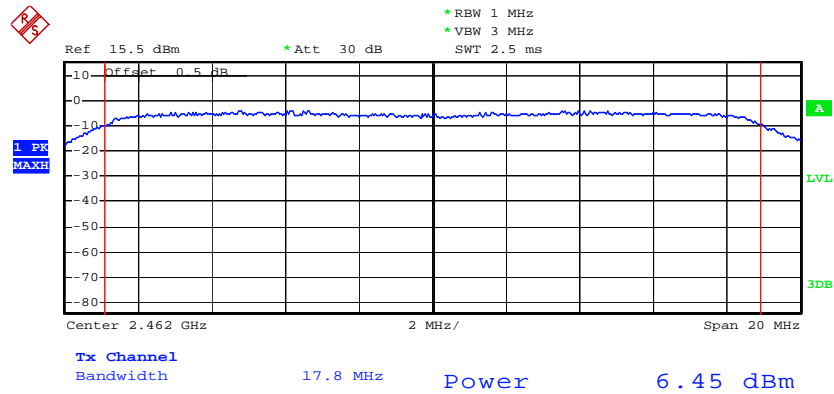
Date: 6.SEP.2013 10:34:06

802.11n Channel Middle 2437MHz (20MHz)



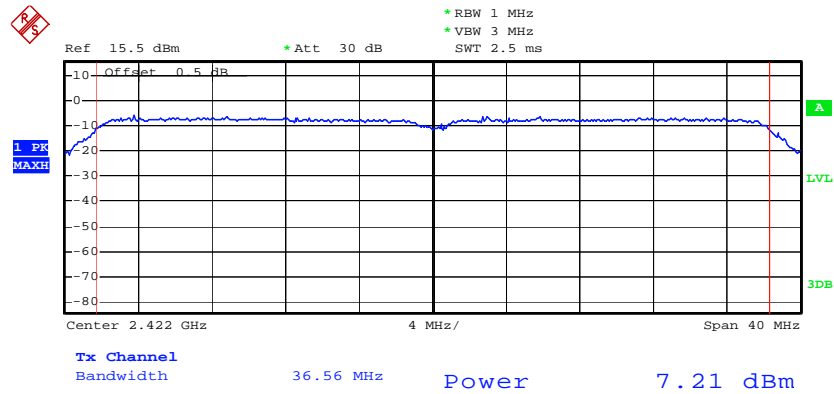
Date: 6.SEP.2013 10:36:43

802.11n Channel High 2462MHz (20MHz)



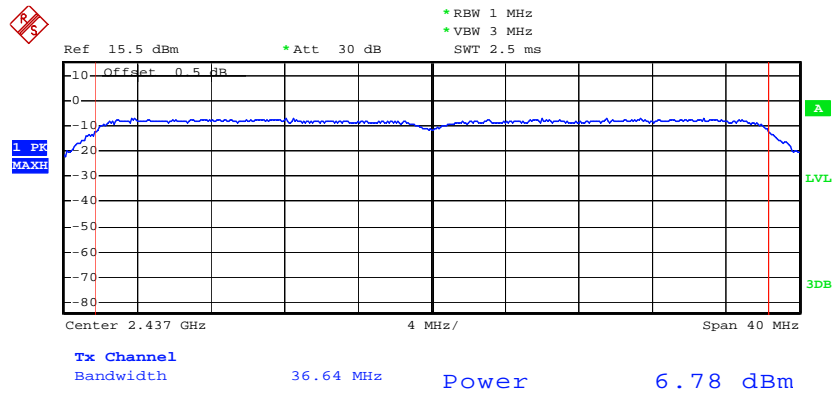
Date: 6.SEP.2013 10:39:30

802.11n Channel Low 2422MHz (40MHz)



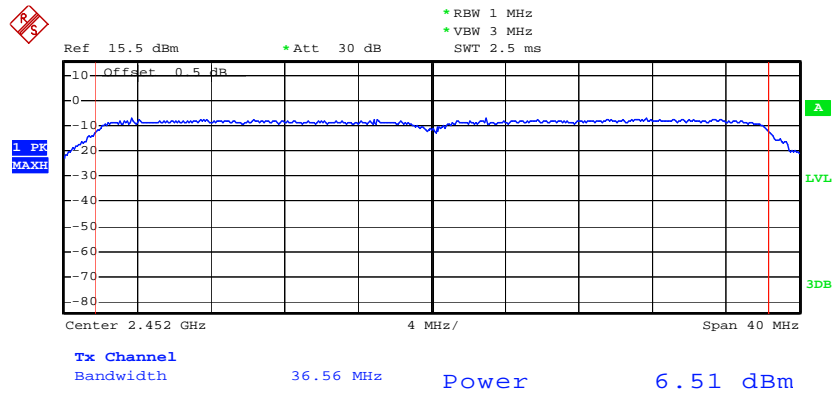
Date: 5.SEP.2013 16:01:31

802.11n Channel Middle 2437MHz (40MHz)



Date: 5.SEP.2013 15:56:09

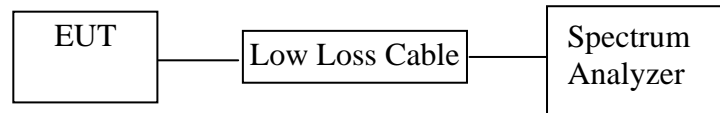
802.11n Channel High 2452MHz (40MHz)



Date: 5.SEP.2013 15:59:05

8. POWER SPECTRAL DENSITY MEASUREMENT

8.1. Block Diagram of Test Setup



8.2. 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.

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. We select 2412MHz, 2437MHz, 2462MHz and 2422MHz, 2437MHz, 2452MHz TX frequency to transmit.

8.5. Test Procedure

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

8.5.2. 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 $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
4. Set the VBW $\geq 3 \times \text{RBW}$.
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.

8.5.3.Measurement the maximum power spectral density.

8.6.Test Result

The test was performed with 802.11b			
Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limits (dBm)
Low	2412	-17.08	8 dBm
Middle	2437	-18.09	8 dBm
High	2462	-19.61	8 dBm

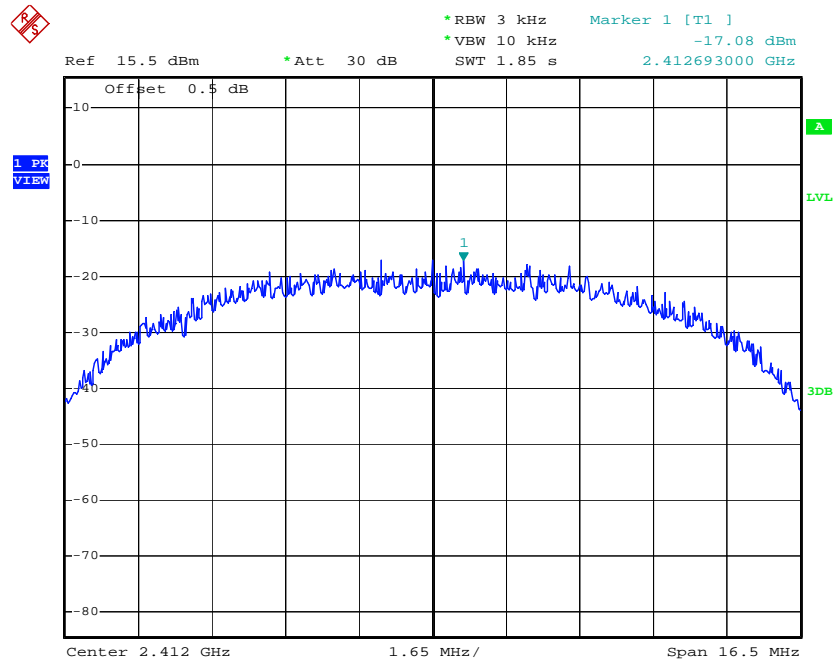
The test was performed with 802.11g			
Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limits (dBm)
Low	2412	-19.09	8 dBm
Middle	2437	-18.77	8 dBm
High	2462	-22.02	8 dBm

The test was performed with 802.11n (20MHz)			
Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limits (dBm)
Low	2412	-19.52	8 dBm
Middle	2437	-20.35	8 dBm
High	2462	-19.82	8 dBm

The test was performed with 802.11n (40MHz)			
Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limits (dBm)
Low	2422	-21.53	8 dBm
Middle	2437	-21.33	8 dBm
High	2452	-23.02	8 dBm

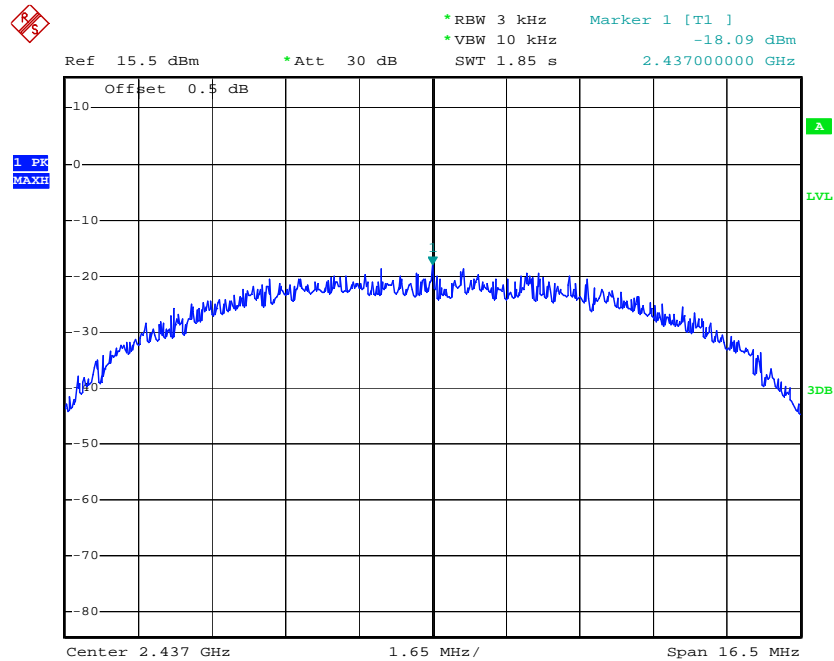
The spectrum analyzer plots are attached as below.

802.11b Channel Low 2412MHz



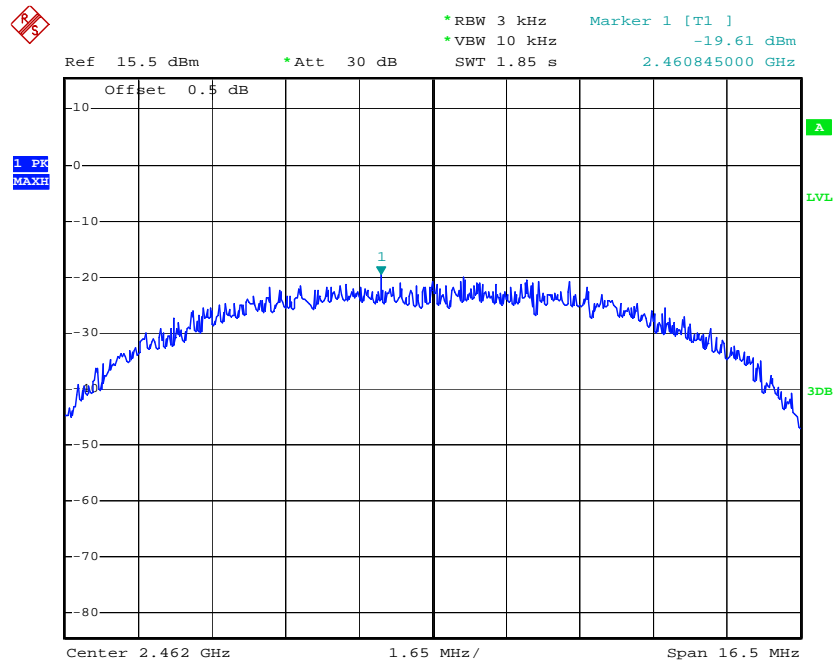
Date: 6.SEP.2013 11:14:42

802.11b Channel Middle 2437MHz



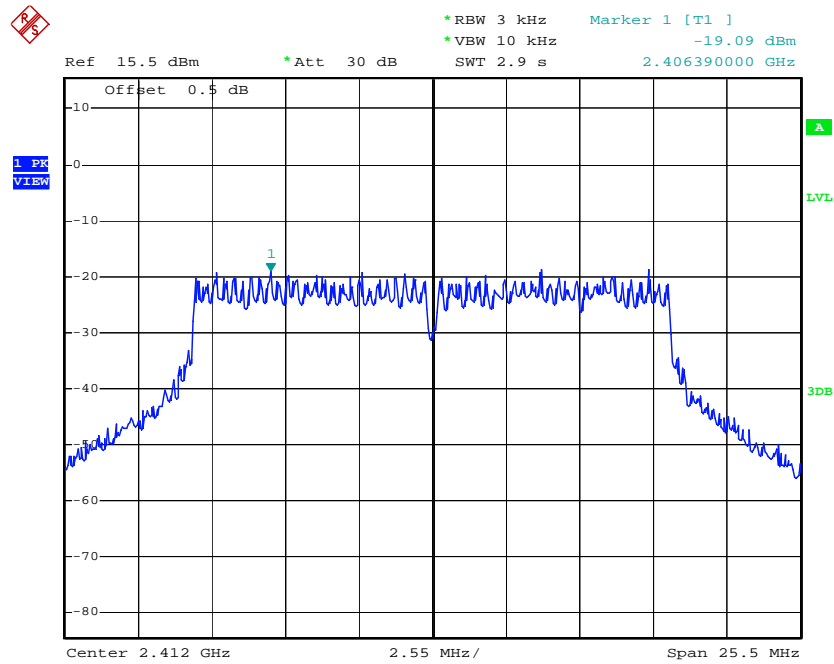
Date: 6.SEP.2013 11:09:46

802.11b Channel High 2462MHz



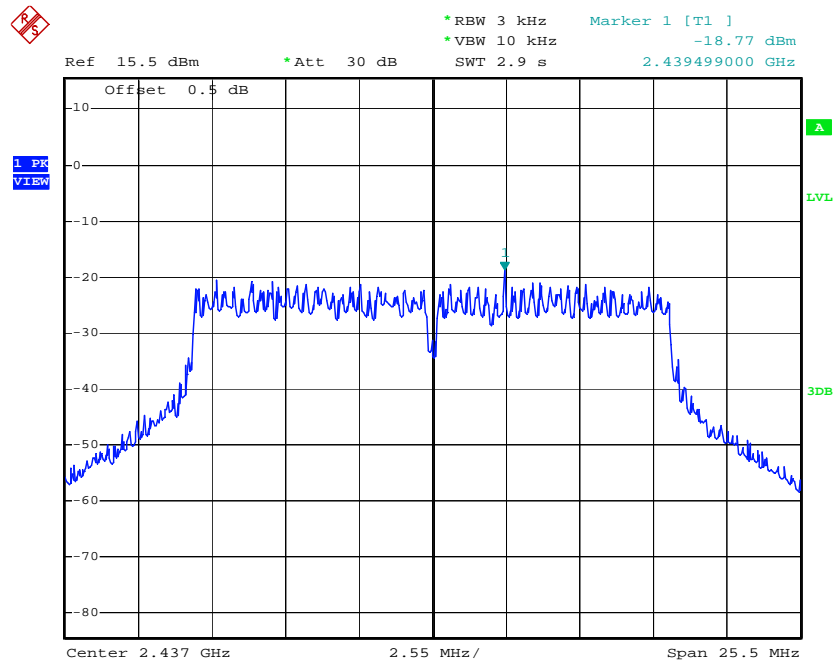
Date: 6.SEP.2013 11:08:21

802.11g Channel Low 2412MHz



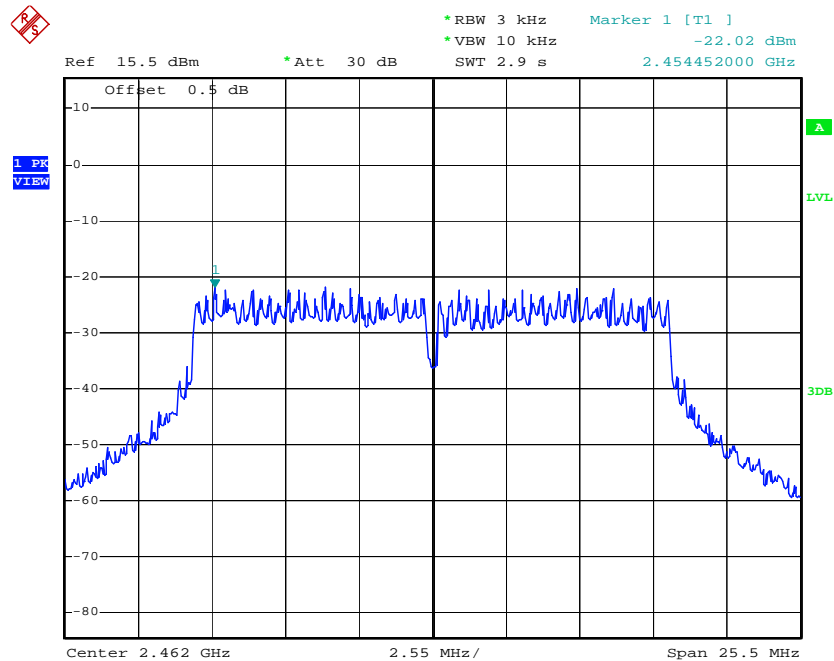
Date: 6.SEP.2013 10:56:58

802.11g Channel Middle 2437MHz



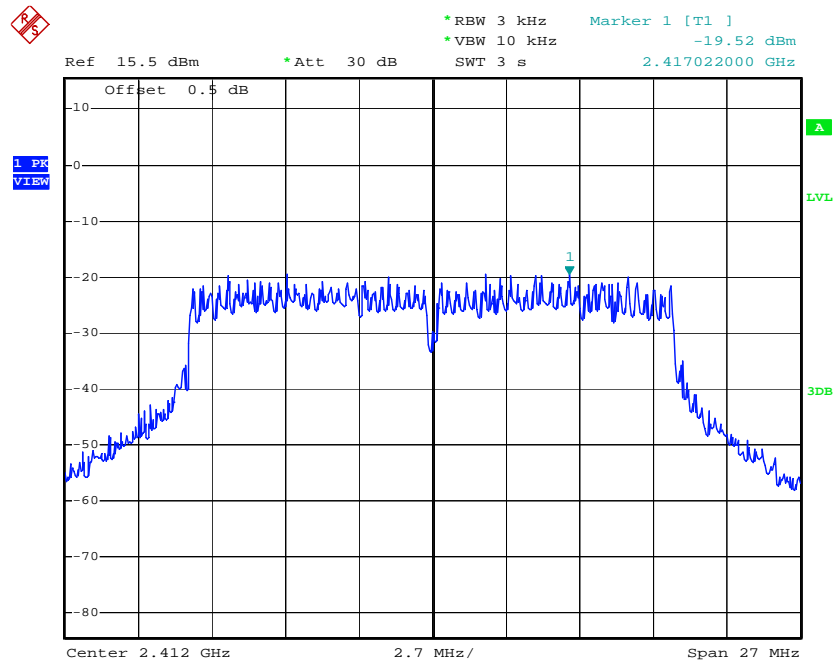
Date: 6.SEP.2013 11:00:48

802.11g Channel High 2462MHz



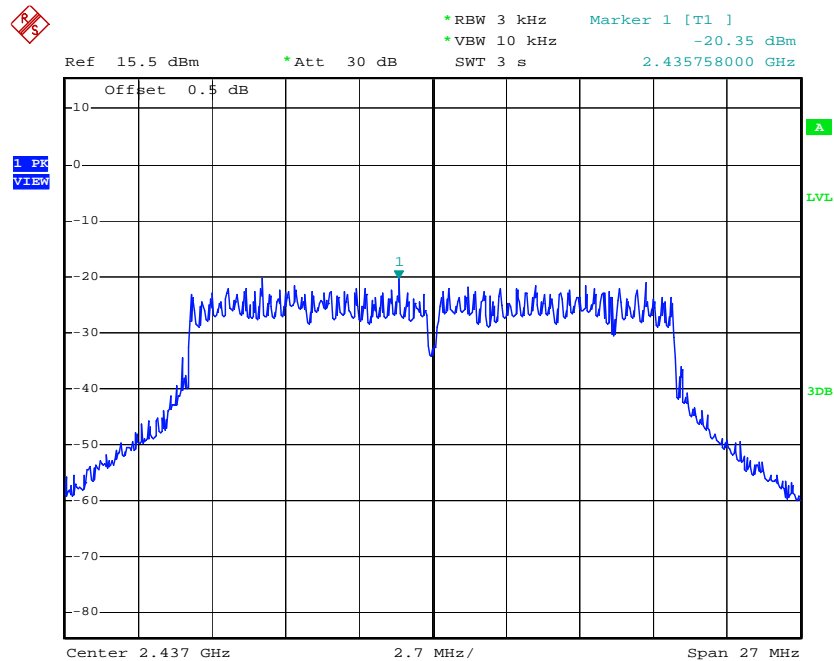
Date: 6.SEP.2013 11:05:28

802.11n Channel Low 2412MHz (20MHz)



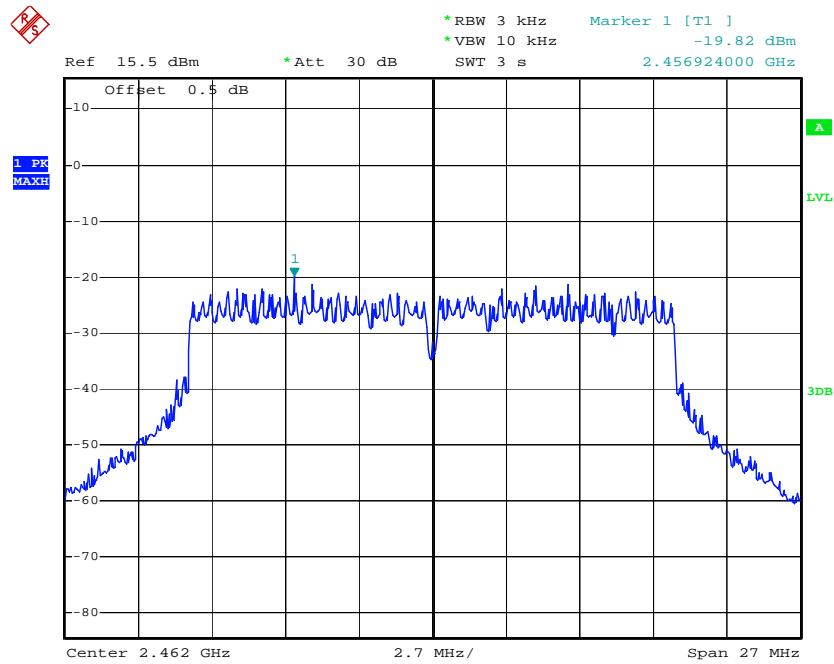
Date: 6.SEP.2013 10:54:07

802.11n Channel Middle 2437MHz (20MHz)



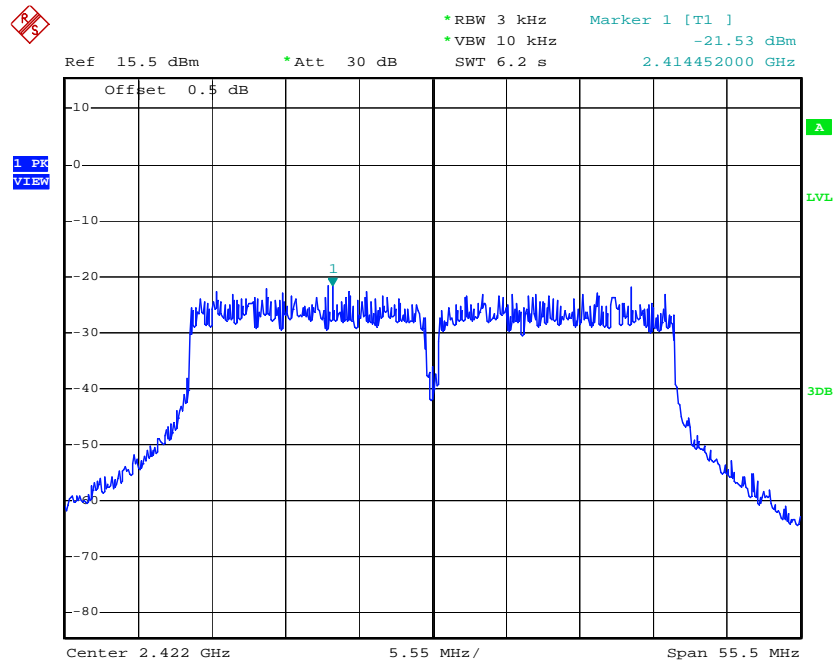
Date: 6.SEP.2013 10:51:56

802.11n Channel High 2462MHz(20MHz)



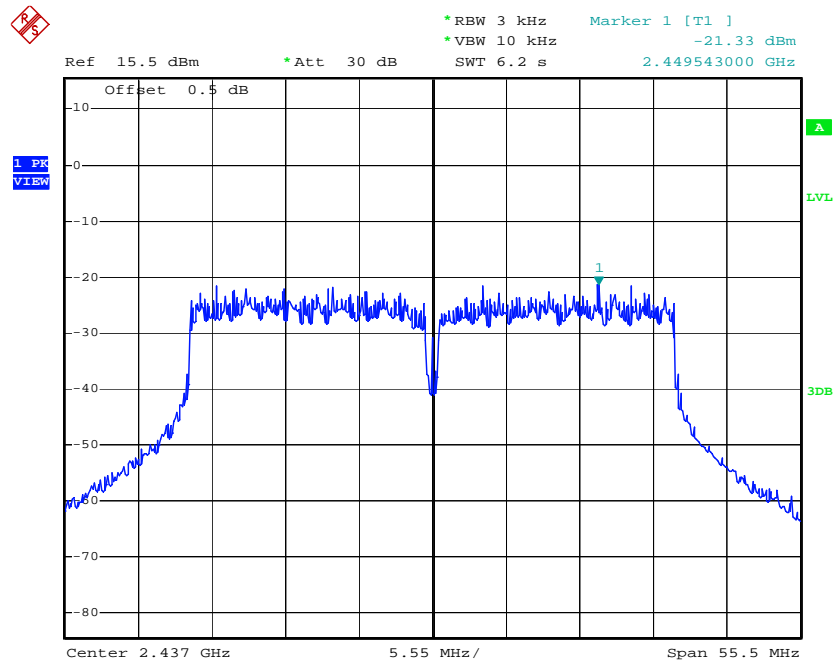
Date: 6.SEP.2013 10:47:57

802.11n Channel Low 2422MHz (40MHz)



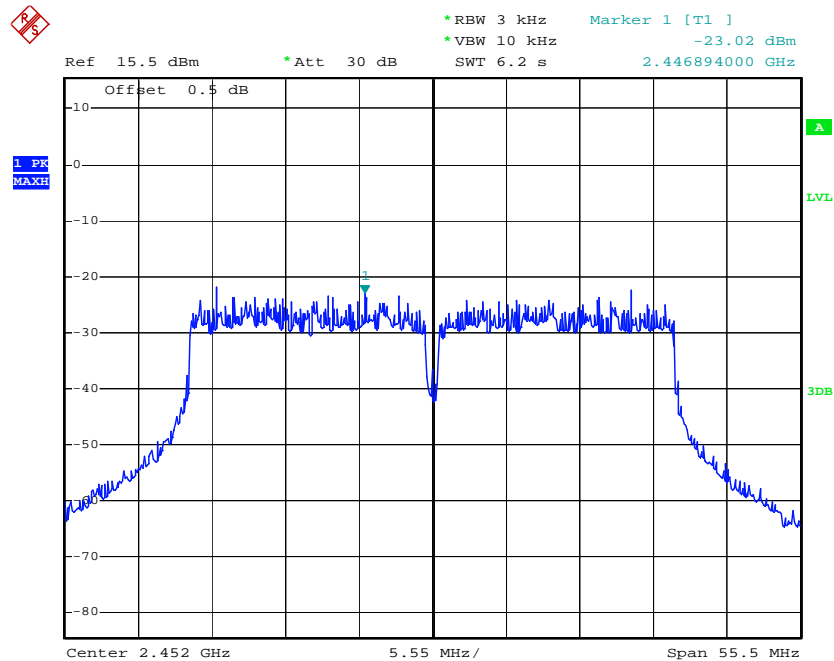
Date: 6.SEP.2013 11:20:30

802.11n Channel Middle 2437MHz(40MHz)



Date: 6.SEP.2013 11:26:01

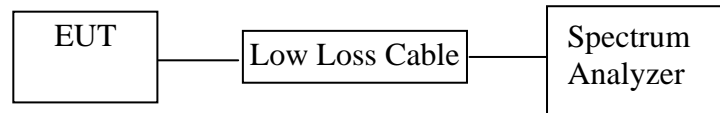
802.11n Channel High 2452MHz(40MHz)



Date: 6.SEP.2013 11:28:20

9. BAND EDGE COMPLIANCE TEST

9.1. Block Diagram of Test Setup



9.2. 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).

9.3. 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.

9.4. Operating Condition of EUT

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

9.4.2. Turn on the power of all equipment.

9.4.3. 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.

9.5. Test Procedure

Conducted Band Edge:

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

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

Radiate Band Edge:

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

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

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

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

9.5.7.RBW=1MHz, VBW=1MHz

9.5.8.The band edges was measured and recorded.

9.6.Test Result

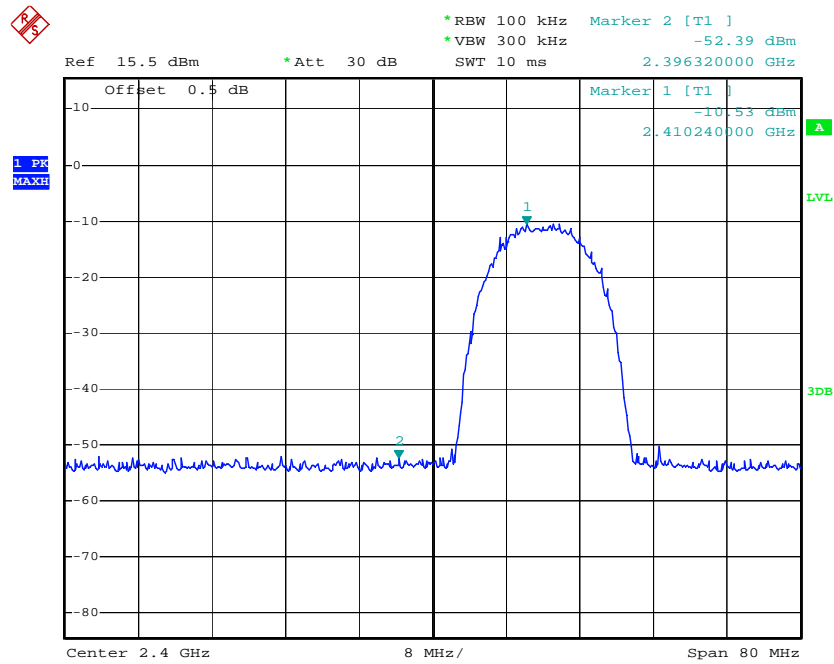
The test was performed with 802.11b		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2412	41.86	> 20dBc
2462	42.00	> 20dBc

The test was performed with 802.11g		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2412	31.32	> 20dBc
2462	40.10	> 20dBc

The test was performed with 802.11n (20MHz)		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2412	25.43	> 20dBc
2462	40.75	> 20dBc

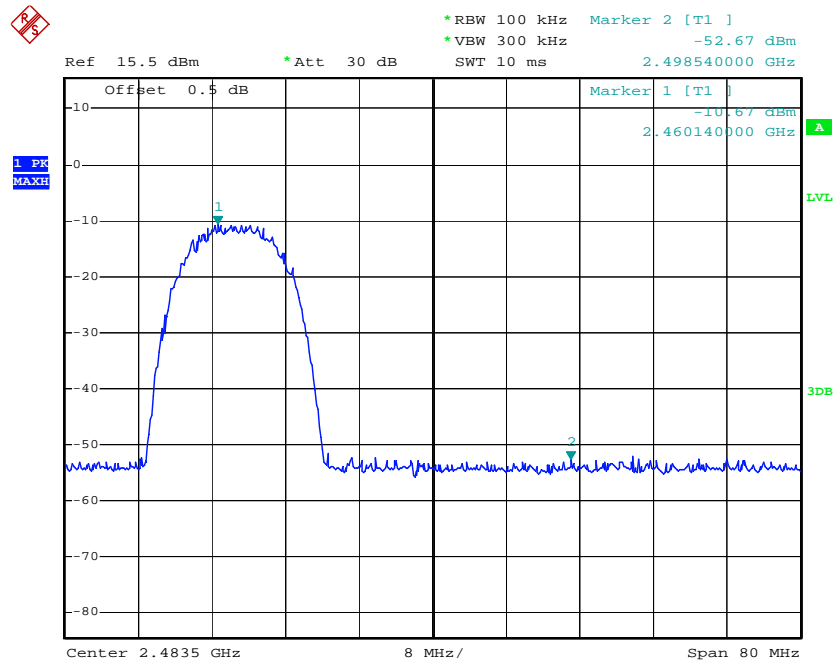
The test was performed with 802.11n (40MHz)		
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
2422	29.99	> 20dBc
2452	39.12	> 20dBc

802.11b Channel Low 2412MHz



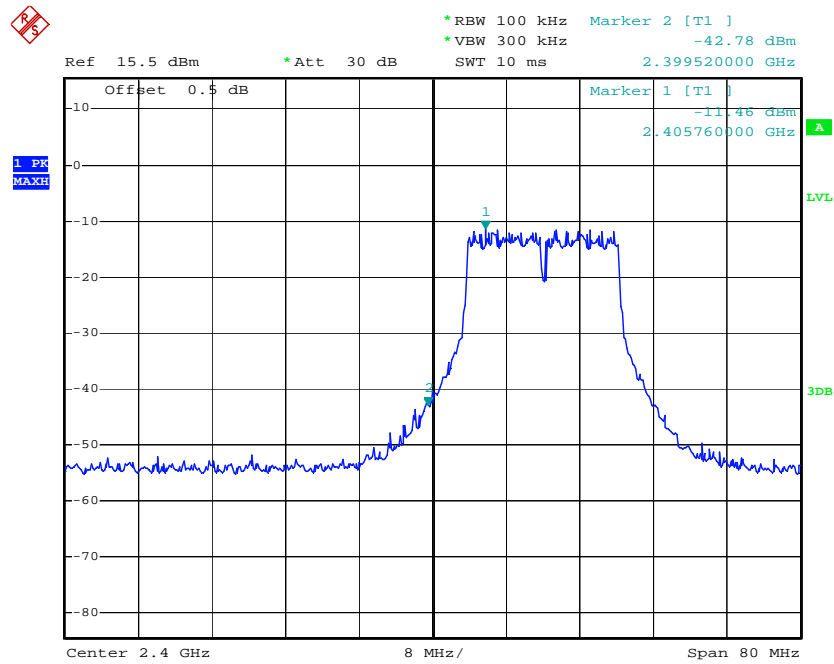
Date: 6.SEP.2013 14:27:33

802.11b Channel High 2462MHz



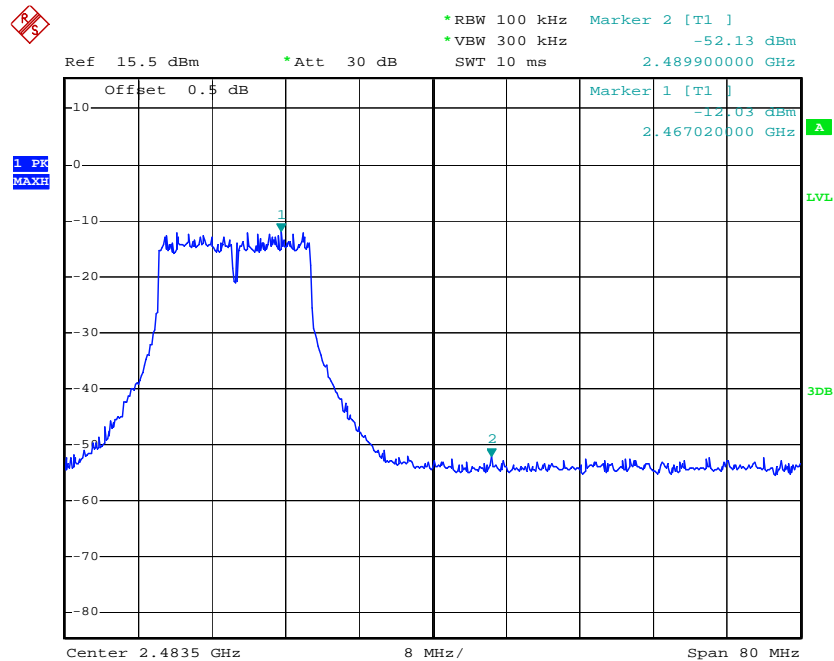
Date: 6.SEP.2013 14:31:59

802.11g Channel Low 2412MHz



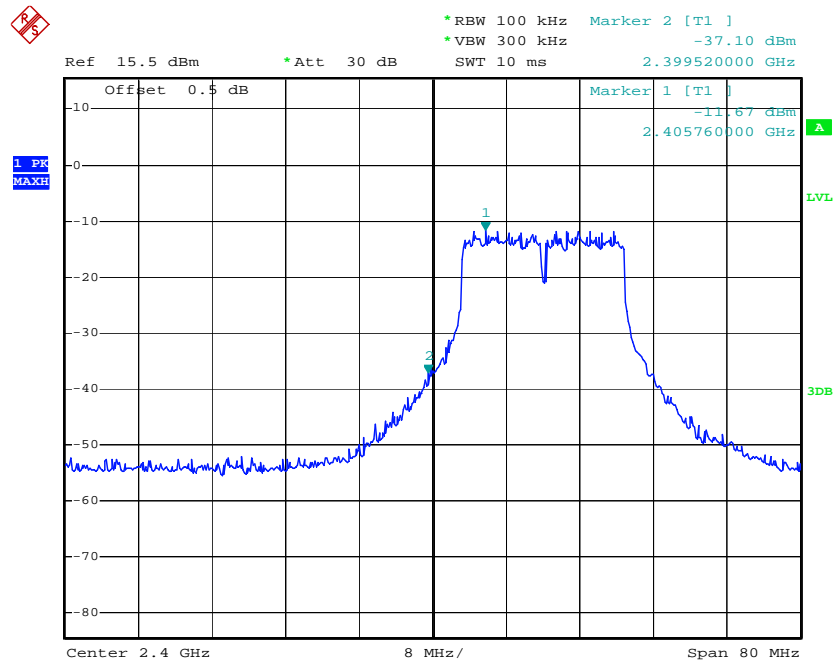
Date: 6.SEP.2013 14:19:10

802.11g Channel High 2462MHz



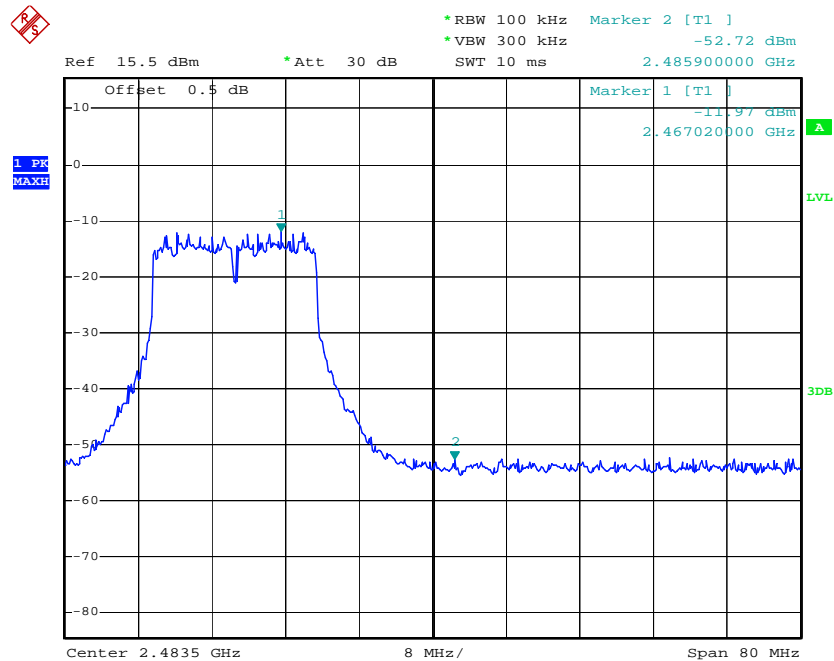
Date: 6.SEP.2013 14:16:13

802.11n Channel Low 2412MHz (20MHz)



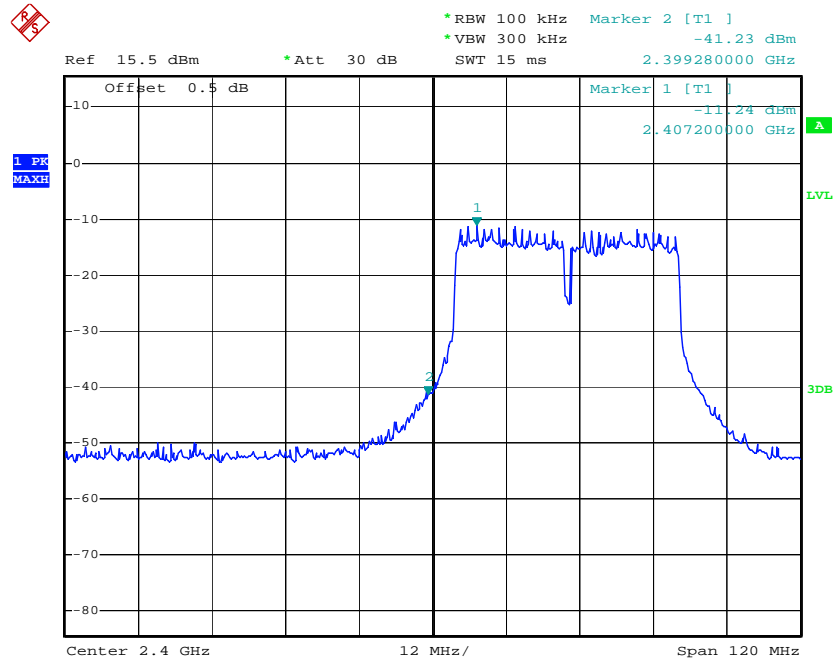
Date: 6.SEP.2013 14:10:18

802.11n Channel High 2462MHz (20MHz)



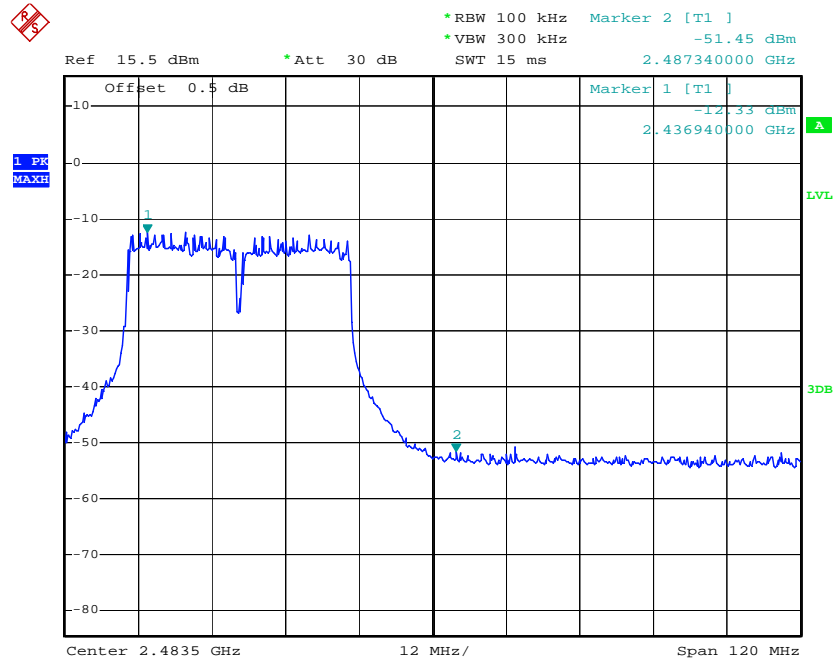
Date: 6.SEP.2013 14:13:25

802.11n Channel Low 2422MHz (40MHz)



Date: 6.SEP.2013 14:06:07

802.11n Channel High 2452MHz (40MHz)



Date: 6.SEP.2013 13:57:26

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:

$$\text{Result} = \text{Reading} + \text{Corrected Factor}$$

3. Display the measurement of peak values.



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 #1375

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: HOLL WIFI Disk

Mode: TX 2412MHz(802.11b)

Model: R220

Manufacturer: WEI DA HUI ER

Polarization: Vertical

Power Source: DC 3.7V

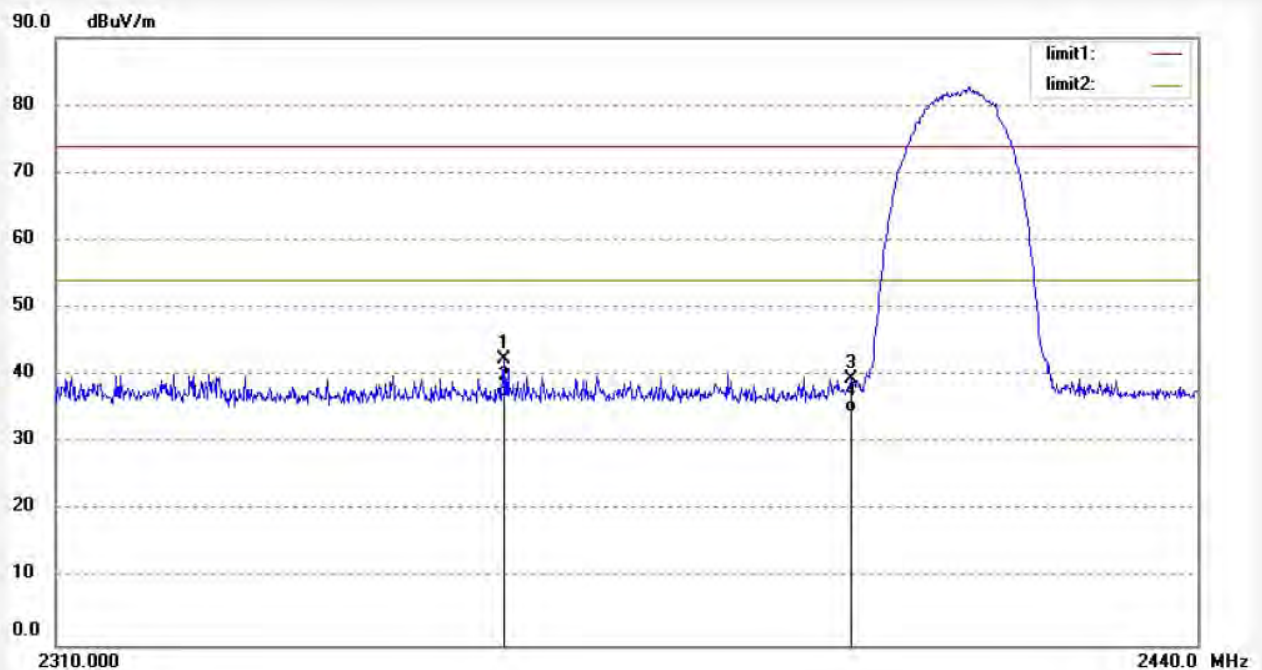
Date: 13/08/29/

Time: 8/45/27

Engineer Signature:

Distance: 3m

Note: Report No:ATE20131791

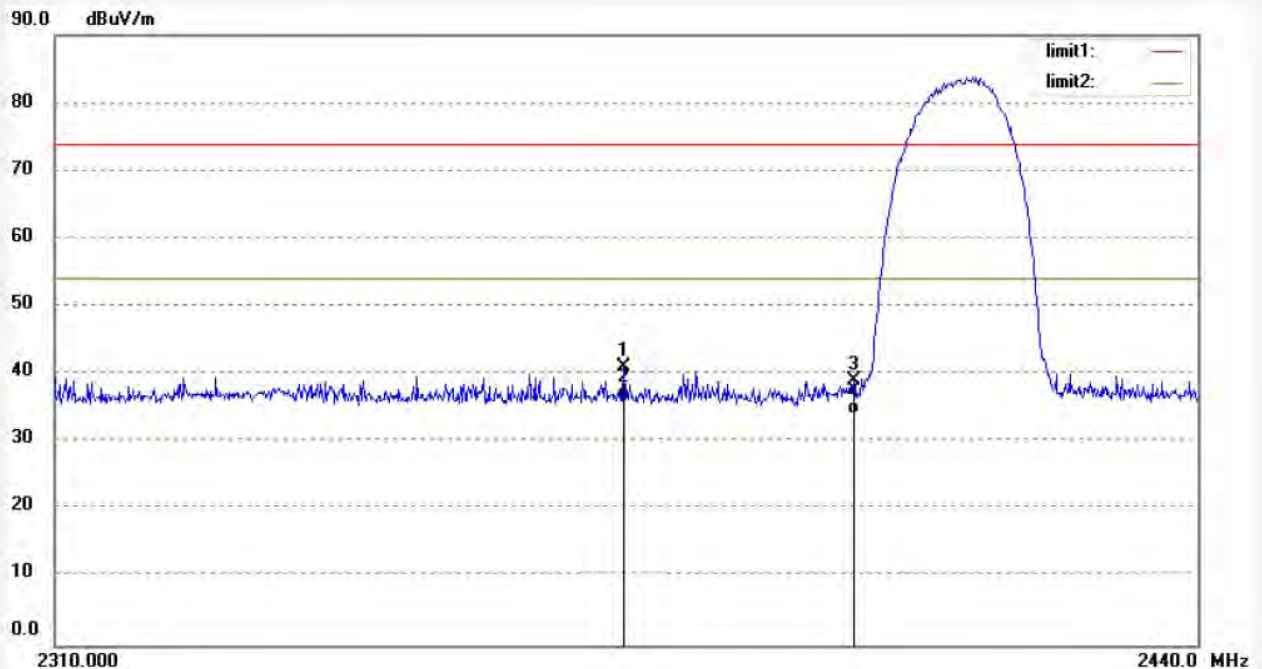


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2360.310	49.20	-6.86	42.34	74.00	-31.66	peak			
2	2360.310	43.68	-6.86	36.82	54.00	-17.18	AVG			
3	2400.000	46.24	-6.76	39.48	74.00	-34.52	peak			
4	2400.000	41.23	-6.76	34.47	54.00	-19.53	AVG			

Job No.: alen #1376
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: HOLL WIFI Disk
Mode: TX 2412MHz(802.11b)
Model: R220
Manufacturer: WEI DA HUI ER

Polarization: Horizontal
Power Source: DC 3.7V
Date: 13/08/29/
Time: 8/46/15
Engineer Signature:
Distance: 3m

Note: Report No:ATE20131791

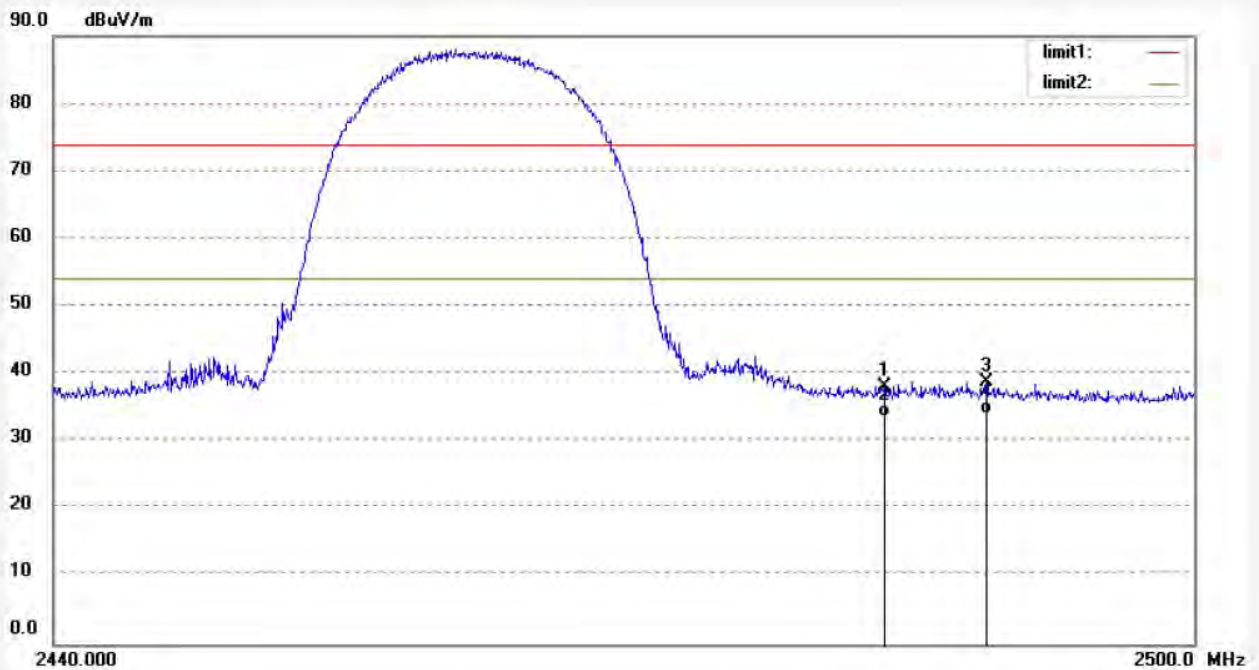


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2373.960	47.91	-6.83	41.08	74.00	-32.92	peak			
2	2373.960	43.12	-6.83	36.29	54.00	-17.71	AVG			
3	2400.000	45.69	-6.76	38.93	74.00	-35.07	peak			
4	2400.000	40.88	-6.76	34.12	54.00	-19.88	AVG			

Job No.: alen #1377
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: HOLL WIFI Disk
Mode: TX 2462MHz(802.11b)
Model: R220
Manufacturer: WEI DA HUI ER

Polarization: Horizontal
Power Source: DC 3.7V
Date: 13/08/29/
Time: 8/47/55
Engineer Signature:
Distance: 3m

Note: Report No:ATE20131791



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	44.78	-6.54	38.24	74.00	-35.76	peak			
2	2483.500	40.10	-6.54	33.56	54.00	-20.44	AVG			
3	2489.020	45.40	-6.52	38.88	74.00	-35.12	peak			
4	2489.020	40.68	-6.52	34.16	54.00	-19.84	AVG			



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 #1378

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: HOLL WIFI Disk

Mode: TX 2462MHz(802.11b)

Model: R220

Manufacturer: WEI DA HUI ER

Polarization: Vertical

Power Source: DC 3.7V

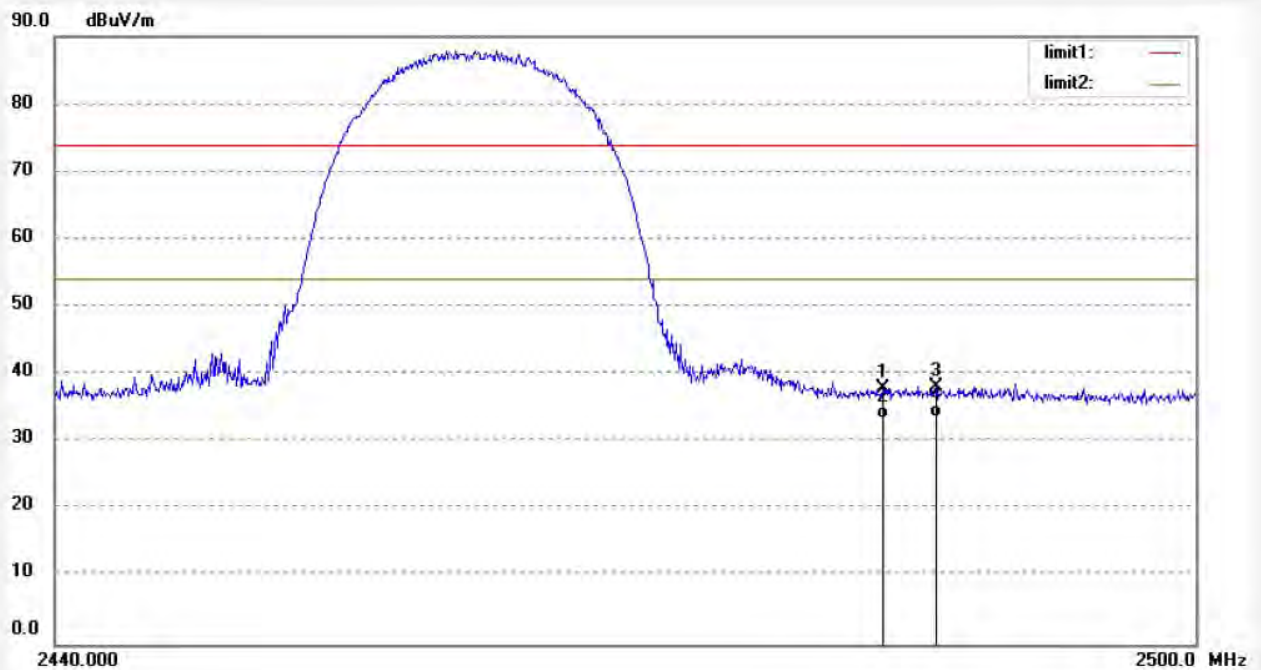
Date: 13/08/29/

Time: 8/48/34

Engineer Signature:

Distance: 3m

Note: Report No:ATE20131791



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	44.43	-6.54	37.89	74.00	-36.11	peak			
2	2483.500	40.01	-6.54	33.47	54.00	-20.53	AVG			
3	2486.260	44.73	-6.54	38.19	74.00	-35.81	peak			
4	2486.260	40.09	-6.54	33.55	54.00	-20.45	AVG			



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Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: alen #1381

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: HOLL WIFI Disk

Mode: TX 2412MHz(802.11g)

Model: R220

Manufacturer: WEI DA HUI ER

Polarization: Horizontal

Power Source: DC 3.7V

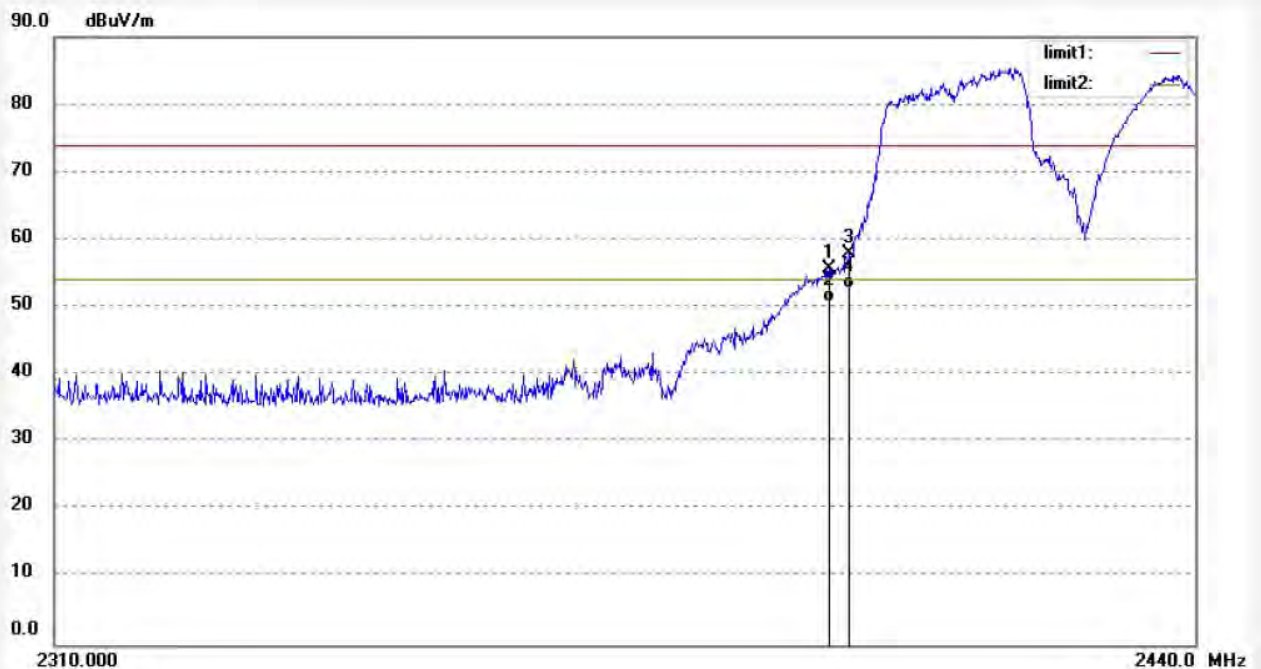
Date: 13/08/29/

Time: 8/52/32

Engineer Signature:

Distance: 3m

Note: Report No:ATE20131791



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2397.620	62.40	-6.76	55.64	74.00	-18.36	peak			
2	2397.620	57.41	-6.76	50.65	54.00	-3.35	AVG			
3	2400.000	64.59	-6.76	57.83	74.00	-16.17	peak			
4	2400.000	59.54	-6.76	52.78	54.00	-1.22	AVG			



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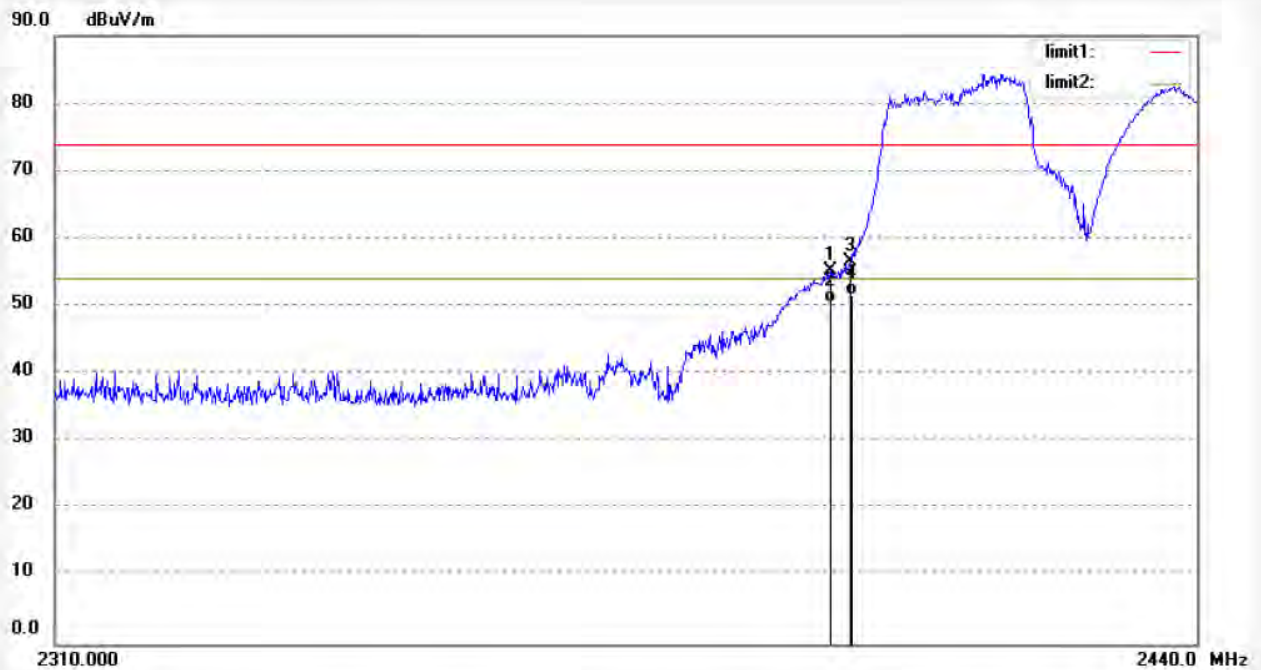
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
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Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: alen #1382
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: HOLL WIFI Disk
Mode: TX 2412MHz(802.11g)
Model: R220
Manufacturer: WEI DA HUI ER

Polarization: Vertical
Power Source: DC 3.7V
Date: 13/08/29/
Time: 8/53/03
Engineer Signature:
Distance: 3m

Note: Report No:ATE20131791



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2397.620	62.09	-6.76	55.33	74.00	-18.67	peak			
2	2397.620	57.17	-6.76	50.41	54.00	-3.59	AVG			
3	2400.000	63.24	-6.76	56.48	74.00	-17.52	peak			
4	2400.000	58.35	-6.76	51.59	54.00	-2.41	AVG			

Job No.: alen #1379

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: HOLL WIFI Disk

Mode: TX 2462MHz(802.11g)

Model: R220

Manufacturer: WEI DA HUI ER

Polarization: Vertical

Power Source: DC 3.7V

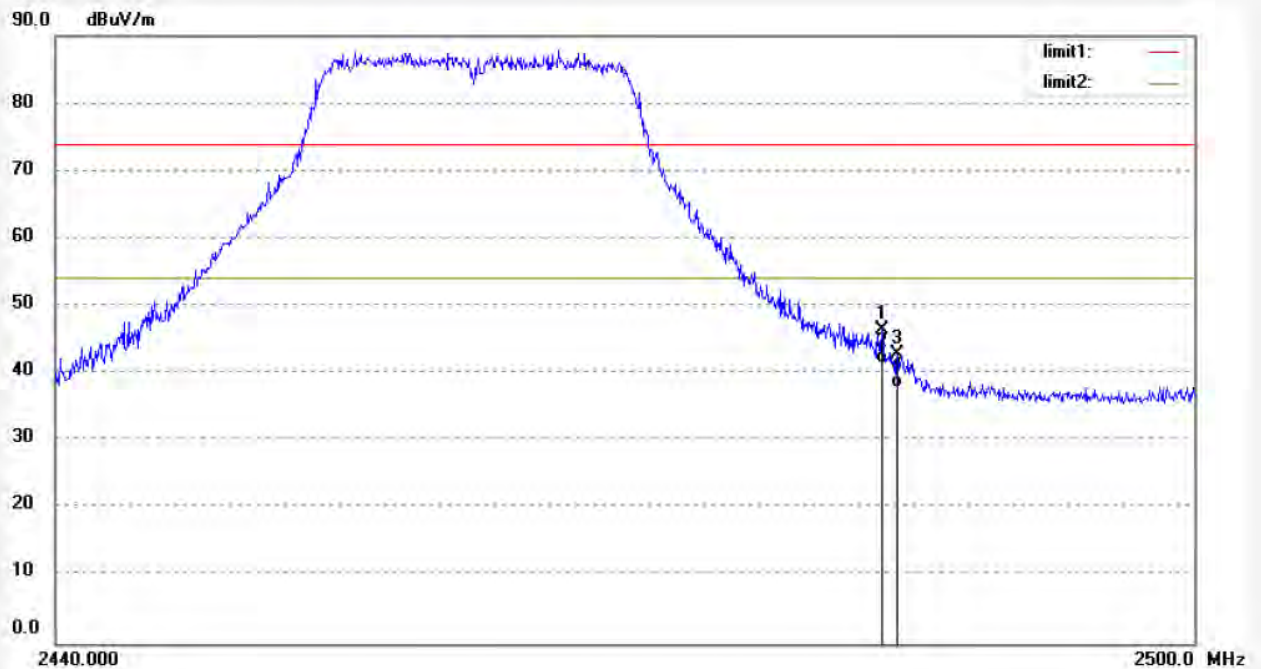
Date: 13/08/29/

Time: 8/50/20

Engineer Signature:

Distance: 3m

Note: Report No:ATE20131791

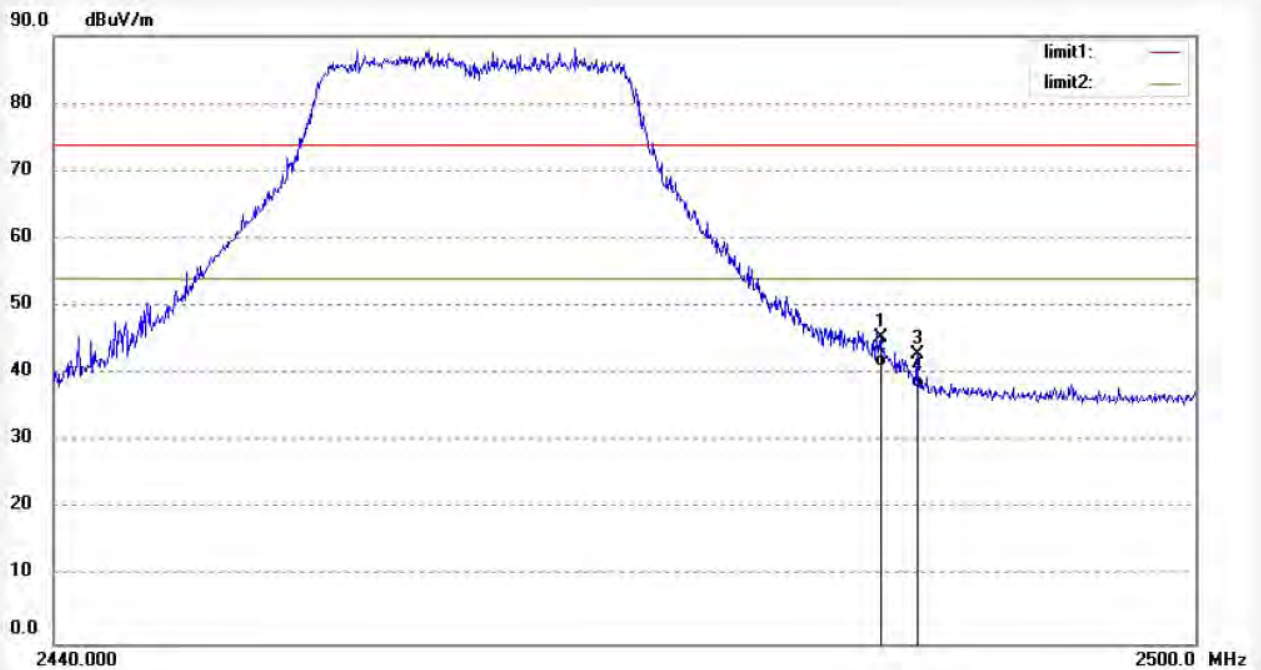


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	52.94	-6.54	46.40	74.00	-27.60	peak			
2	2483.500	47.98	-6.54	41.44	54.00	-12.56	AVG			
3	2484.220	49.45	-6.54	42.91	74.00	-31.09	peak			
4	2484.220	44.53	-6.54	37.99	54.00	-16.01	AVG			

Job No.: alen #1380
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: HOLL WIFI Disk
Mode: TX 2462MHz(802.11g)
Model: R220
Manufacturer: WEI DA HUI ER

Polarization: Horizontal
Power Source: DC 3.7V
Date: 13/08/29/
Time: 8/51/04
Engineer Signature:
Distance: 3m

Note: Report No:ATE20131791

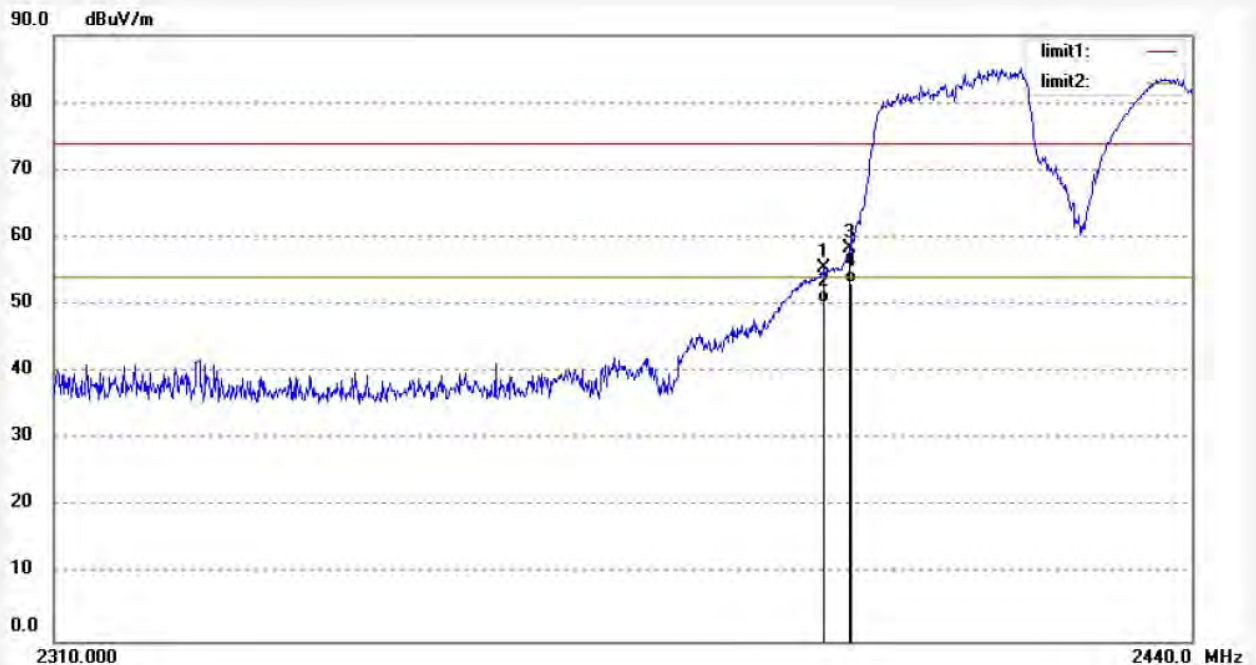


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	51.85	-6.54	45.31	74.00	-28.69	peak			
2	2483.500	47.56	-6.54	41.02	54.00	-12.98	AVG			
3	2485.240	49.49	-6.54	42.95	74.00	-31.05	peak			
4	2485.240	44.38	-6.54	37.84	54.00	-16.16	AVG			

Job No.: alen #1383
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: HOLL WIFI Disk
Mode: TX 2412MHz(802.11n)20MHz
Model: R220
Manufacturer: WEI DA HUI ER

Polarization: Vertical
Power Source: DC 3.7V
Date: 13/08/29/
Time: 8/54/45
Engineer Signature:
Distance: 3m

Note: Report No:ATE20131791

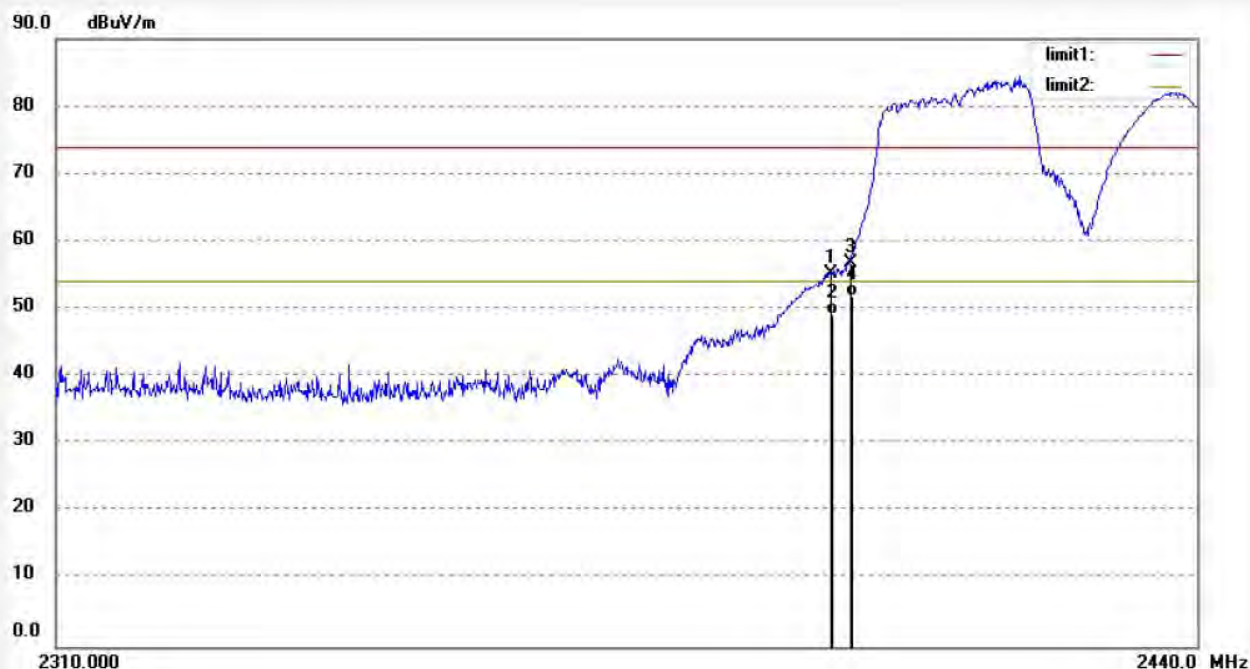


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2397.360	62.29	-6.76	55.53	74.00	-18.47	peak			
2	2397.360	57.10	-6.76	50.34	54.00	-3.66	AVG			
3	2400.000	65.07	-6.76	58.31	74.00	-15.69	peak			
4	2400.000	60.01	-6.76	53.25	54.00	-0.75	AVG			

Job No.: alen #1384
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: HOLL WIFI Disk
Mode: TX 2412MHz(802.11n)20MHz
Model: R220
Manufacturer: WEI DA HUI ER

Polarization: Horizontal
Power Source: DC 3.7V
Date: 13/08/29/
Time: 8/55/36
Engineer Signature:
Distance: 3m

Note: Report No:ATE20131791

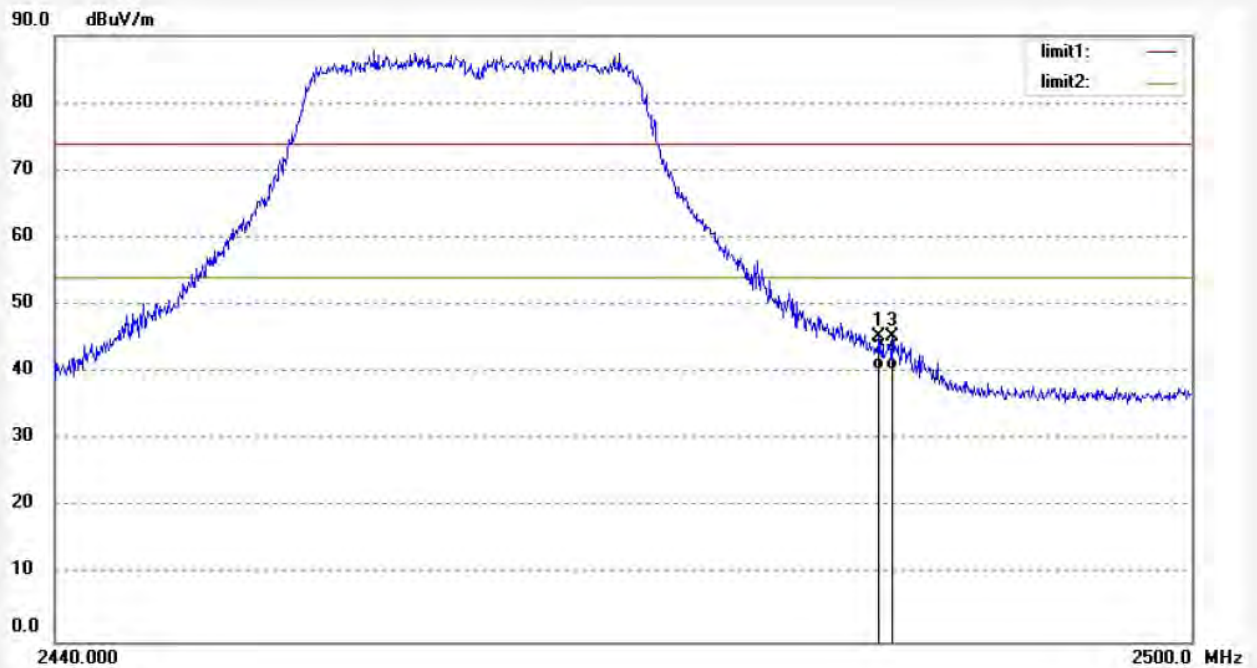


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2397.490	61.98	-6.76	55.22	74.00	-18.78	peak			
2	2397.490	56.01	-6.76	49.25	54.00	-4.75	AVG			
3	2400.000	63.68	-6.76	56.92	74.00	-17.08	peak			
4	2400.000	58.65	-6.76	51.89	54.00	-2.11	AVG			

Job No.: alen #1385
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: HOLL WIFI Disk
Mode: TX 2462MHz(802.11n)20MHz
Model: R220
Manufacturer: WEI DA HUI ER

Polarization: Horizontal
Power Source: DC 3.7V
Date: 13/08/29/
Time: 8/57/13
Engineer Signature:
Distance: 3m

Note: Report No:ATE20131791

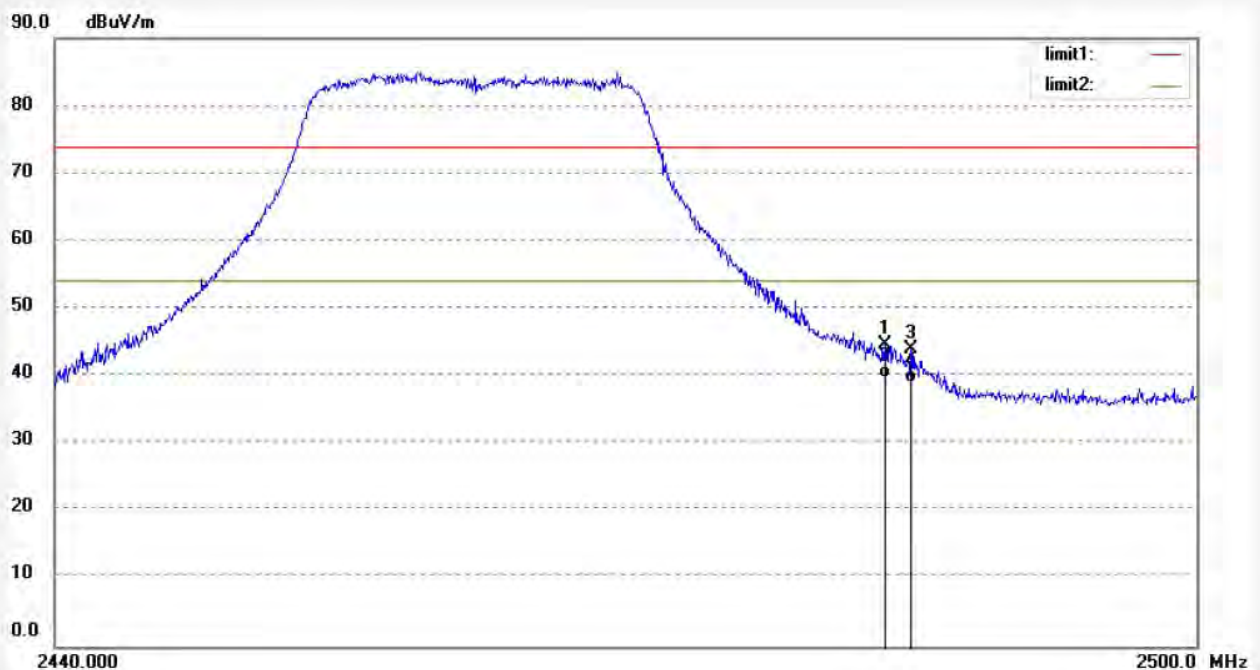


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	51.87	-6.54	45.33	74.00	-28.67	peak			
2	2483.500	46.99	-6.54	40.45	54.00	-13.55	AVG			
3	2484.100	51.78	-6.54	45.24	74.00	-28.76	peak			
4	2484.100	46.95	-6.54	40.41	54.00	-13.59	AVG			

Job No.: alen #1386
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: HOLL WIFI Disk
Mode: TX 2462MHz(802.11n)20MHz
Model: R220
Manufacturer: WEI DA HUI ER

Polarization: Vertical
Power Source: DC 3.7V
Date: 13/08/29/
Time: 8/58/00
Engineer Signature:
Distance: 3m

Note: Report No:ATE20131791



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	46.21	-6.54	39.67	54.00	-14.33	AVG			
3	2484.880	50.43	-6.54	43.89	74.00	-30.11	peak			
4	2484.880	45.65	-6.54	39.11	54.00	-14.89	AVG			



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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 #1389

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: HOLL WIFI Disk

Mode: TX 2422MHz(802.11n)40MHz

Model: R220

Manufacturer: WEI DA HUI ER

Polarization: Horizontal

Power Source: DC 3.7V

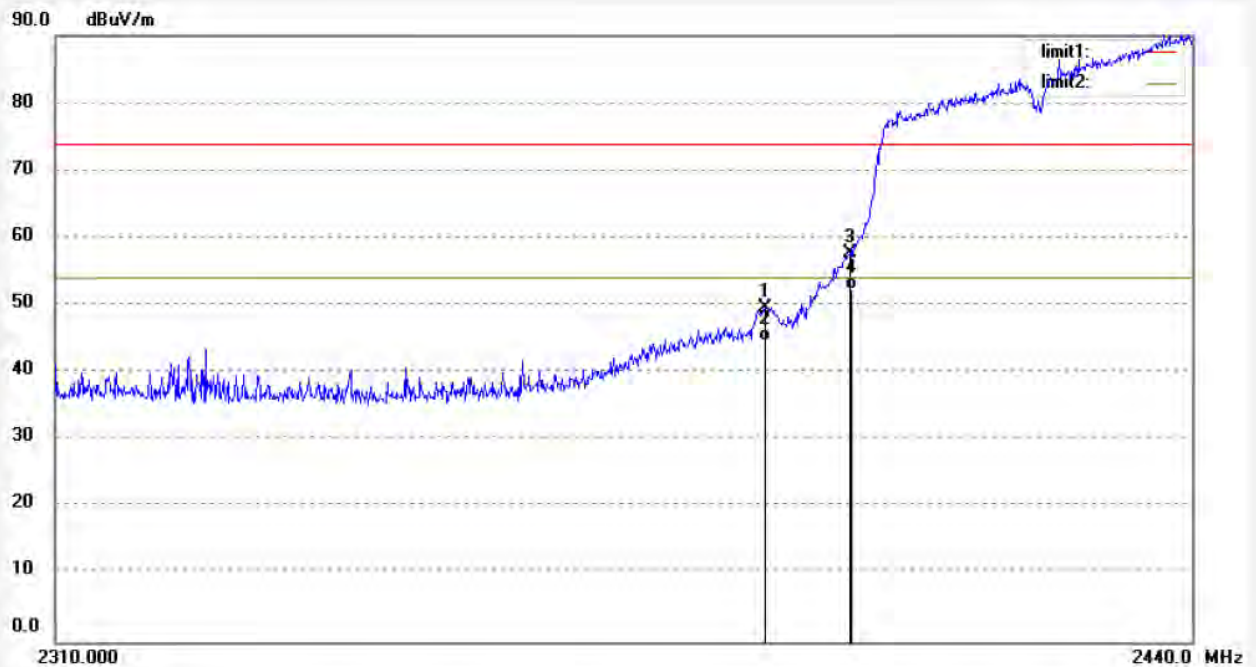
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Time: 9/02/22

Engineer Signature:

Distance: 3m

Note: Report No:ATE20131791



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.470	56.43	-6.77	49.66	74.00	-24.34	peak			
2	2390.470	51.54	-6.77	44.77	54.00	-9.23	AVG			
3	2400.000	64.37	-6.76	57.61	74.00	-16.39	peak			
4	2400.000	58.98	-6.76	52.22	54.00	-1.78	AVG			



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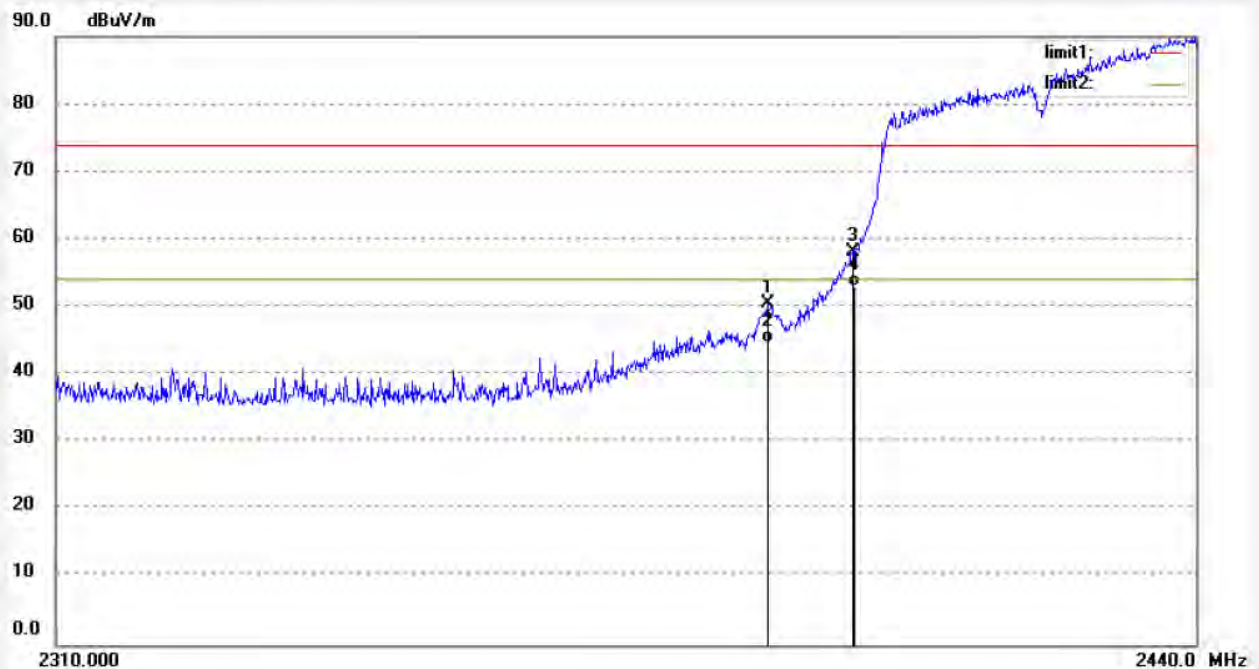
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Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: alen #1390
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: HOLL WIFI Disk
Mode: TX 2422MHz(802.11n)40MHz
Model: R220
Manufacturer: WEI DA HUI ER

Polarization: Vertical
Power Source: DC 3.7V
Date: 13/08/29/
Time: 9/03/00
Engineer Signature:
Distance: 3m

Note: Report No:ATE20131791

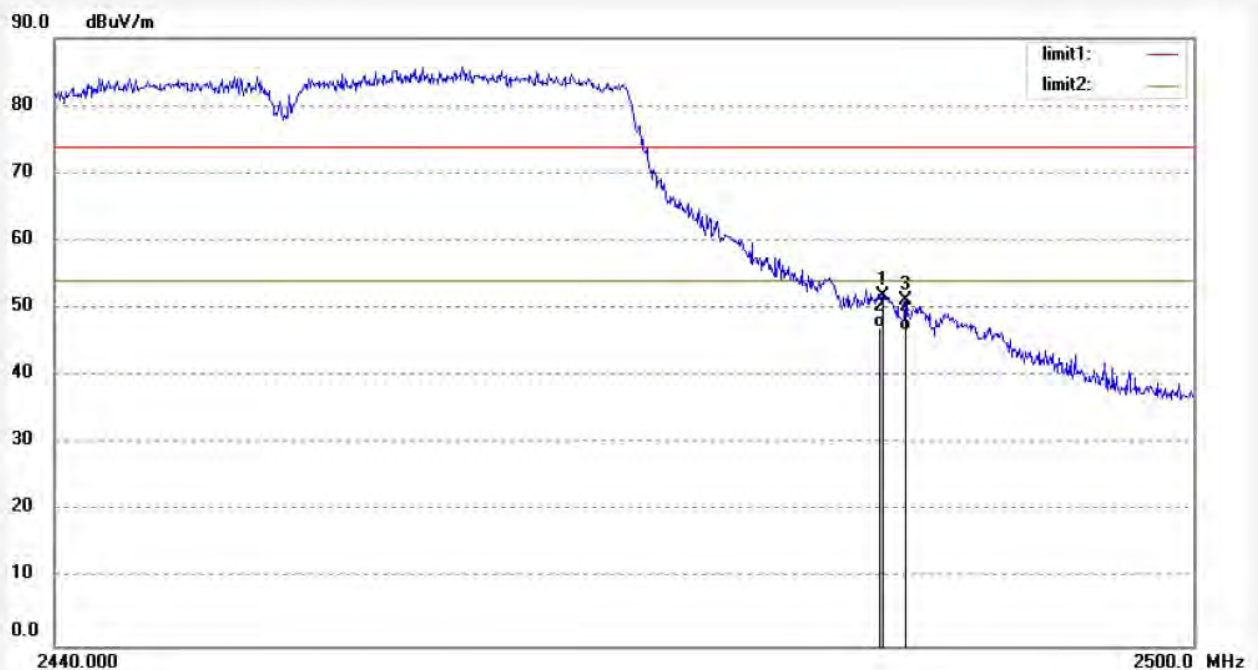


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.340	57.22	-6.78	50.44	74.00	-23.56	peak			
2	2390.340	51.35	-6.78	44.57	54.00	-9.43	AVG			
3	2400.000	65.03	-6.76	58.27	74.00	-15.73	peak			
4	2400.000	59.68	-6.76	52.92	54.00	-1.08	AVG			

Job No.: alen #1387
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: HOLL WIFI Disk
Mode: TX 2452MHz(802.11n)40MHz
Model: R220
Manufacturer: WEI DA HUI ER

Polarization: Vertical
Power Source: DC 3.7V
Date: 13/08/29/
Time: 9/00/01
Engineer Signature:
Distance: 3m

Note: Report No:ATE20131791



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	58.32	-6.54	51.78	74.00	-22.22	peak			
2	2483.500	53.68	-6.54	47.14	54.00	-6.86	AVG			
3	2484.700	57.66	-6.54	51.12	74.00	-22.88	peak			
4	2484.700	53.33	-6.54	46.79	54.00	-7.21	AVG			

Job No.: alen #1388

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: HOLL WIFI Disk

Mode: TX 2452MHz(802.11n)40MHz

Model: R220

Manufacturer: WEI DA HUI ER

Polarization: Horizontal

Power Source: DC 3.7V

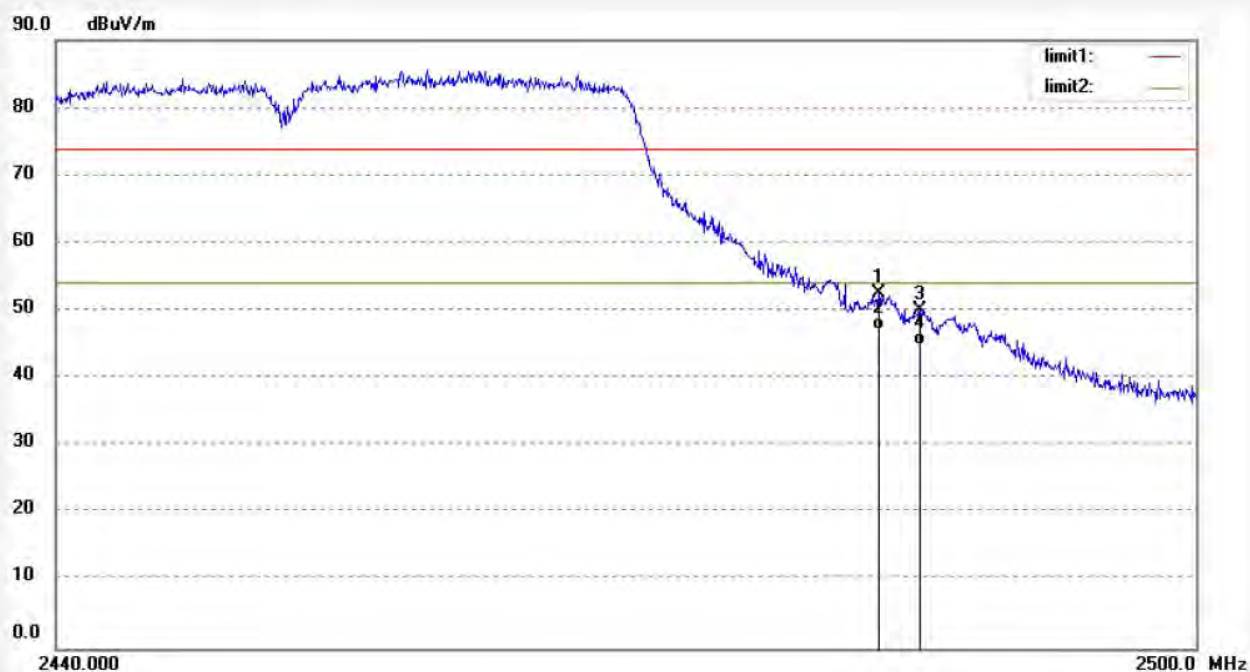
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Time: 9/00/46

Engineer Signature:

Distance: 3m

Note: Report No:ATE20131791

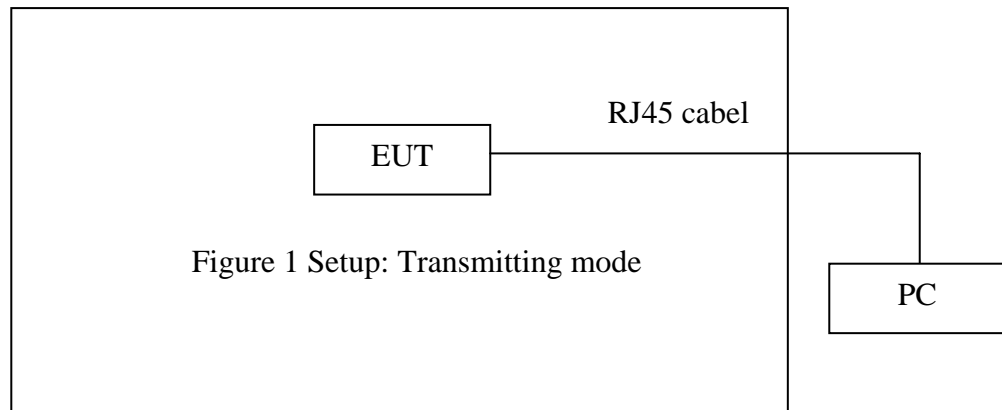


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	59.02	-6.54	52.48	74.00	-21.52	peak			
2	2483.500	53.68	-6.54	47.14	54.00	-6.86	AVG			
3	2485.360	56.64	-6.54	50.10	74.00	-23.90	peak			
4	2485.360	51.32	-6.54	44.78	54.00	-9.22	AVG			

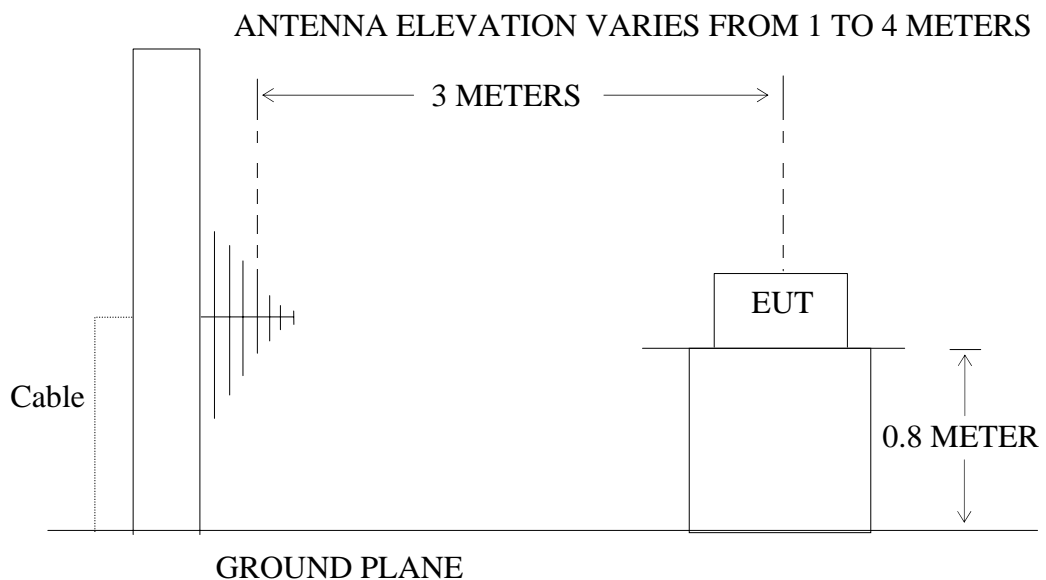
10. RADIATED SPURIOUS EMISSION TEST

10.1. Block Diagram of Test Setup

10.1.1. Block diagram of connection between the EUT and peripherals



10.1.2. Semi-Anechoic Chamber Test Setup Diagram



10.2. 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).

10.3.Restricted bands of operation

10.3.1.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			

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

²Above 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 Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

10.4.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.

10.5. Operating Condition of EUT

10.5.1. Setup the EUT and simulator as shown as Section 10.1.

10.5.2. Turn on the power of all equipment.

10.5.3. 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.

10.6. 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: $\text{Result} = \text{Reading} + \text{Corrected Factor}$

Where $\text{Corrected Factor} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$

10.7. 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 radiation emissions from 18-25GHz are not reported, because the test values lower than the limits of 20dB.

Below 1G



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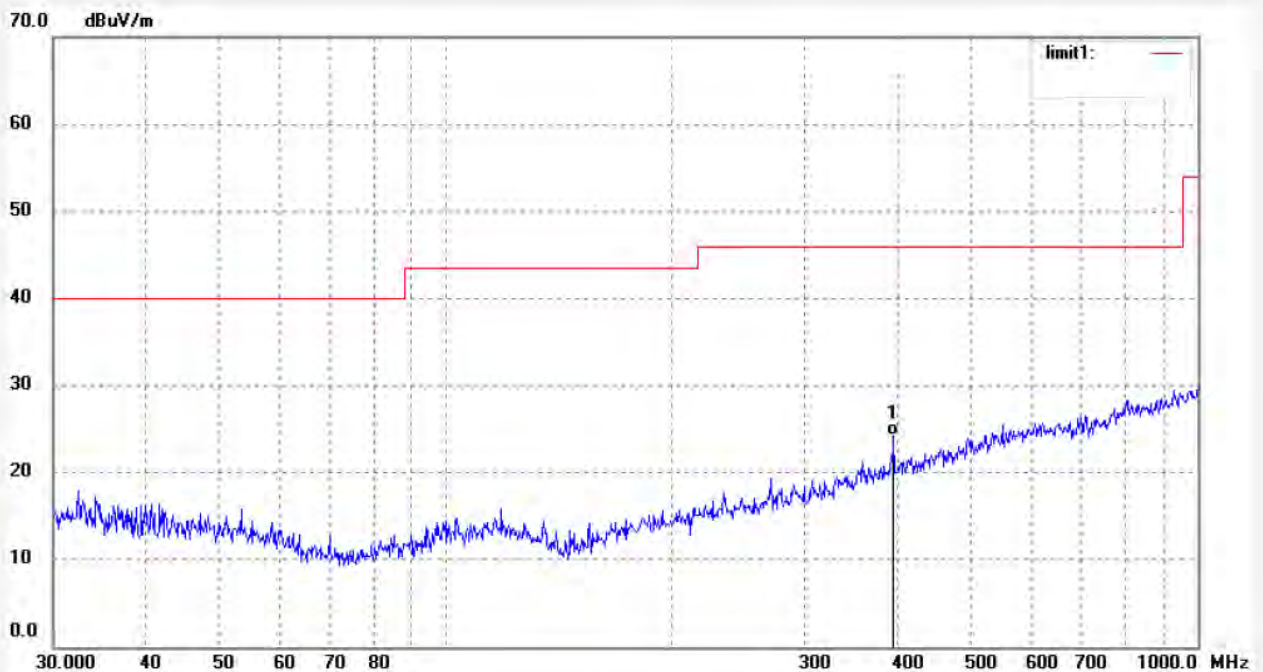
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Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: ALEN #1639
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: HOLL WIFI Disk
Mode: TX 2412MHz(802.11b)
Model: R220
Manufacturer: Wei Da Hui Er

Polarization: Vertical
Power Source: DC 3.7V
Date: 2013/08/26
Time: 13:37:28
Engineer Signature:
Distance: 3m

Note: Report No:ATE20131791



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	394.1198	31.30	-7.06	24.24	46.00	-21.76	QP			



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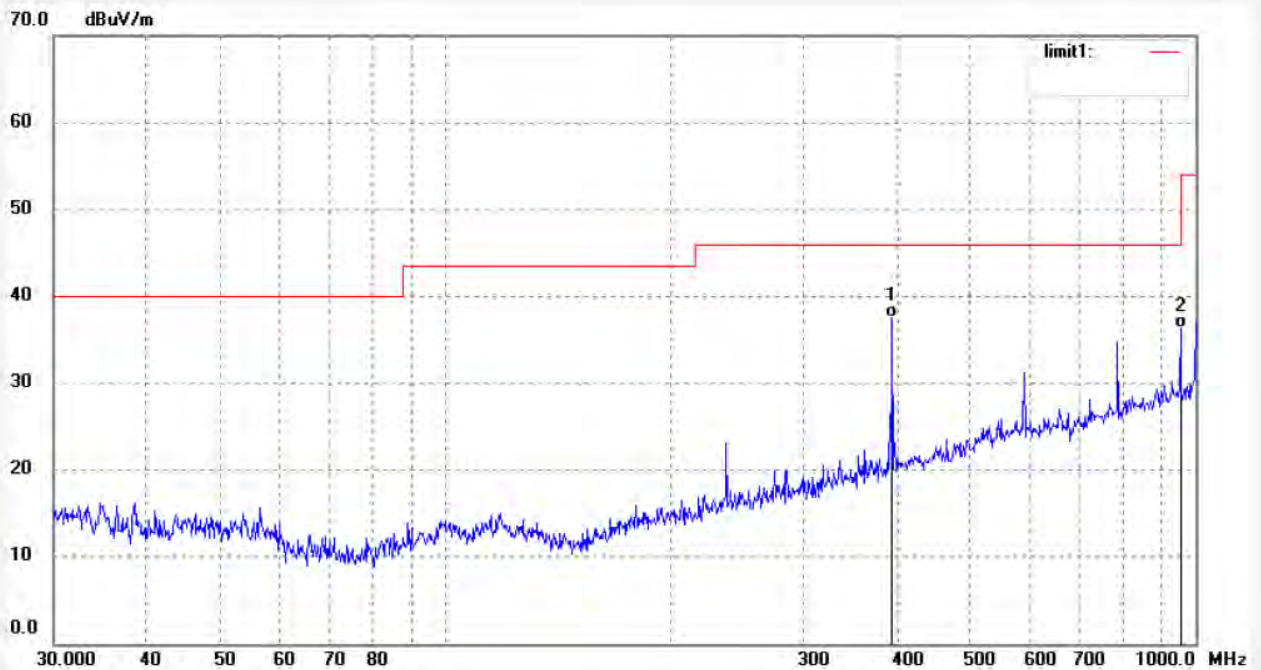
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Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: ALEN #1640
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: HOLL WIFI Disk
Mode: TX 2412MHz(802.11b)
Model: R220
Manufacturer: Wei Da Hui Er

Polarization: Horizontal
Power Source: DC 3.7V
Date: 2013/08/26
Time: 13:38:23
Engineer Signature:
Distance: 3m

Note: Report No:ATE20131791



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	394.1199	44.57	-7.06	37.51	46.00	-8.49	QP			
2	955.3509	34.09	2.29	36.38	46.00	-9.62	QP			



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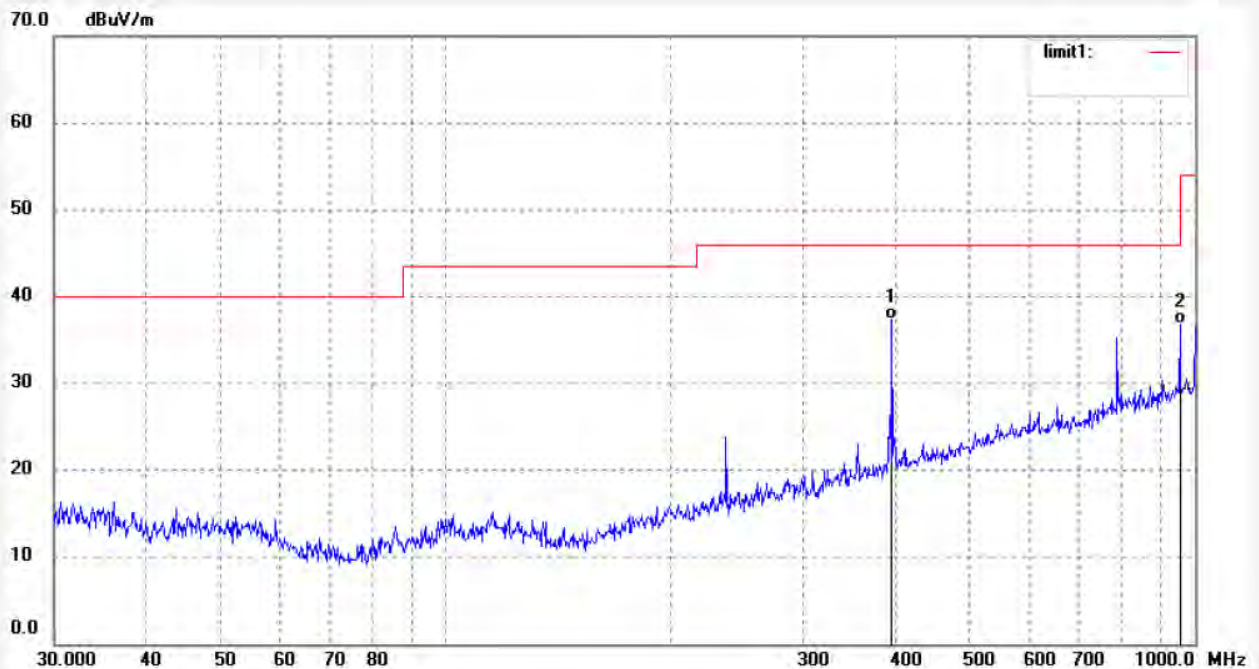
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: ALEN #1641
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: HOLL WIFI Disk
Mode: TX 2437MHz(802.11b)
Model: R220
Manufacturer: Wei Da Hui Er

Polarization: Horizontal
Power Source: DC 3.7V
Date: 2013/08/26
Time: 13:39:25
Engineer Signature:
Distance: 3m

Note: Report No:ATE20131791

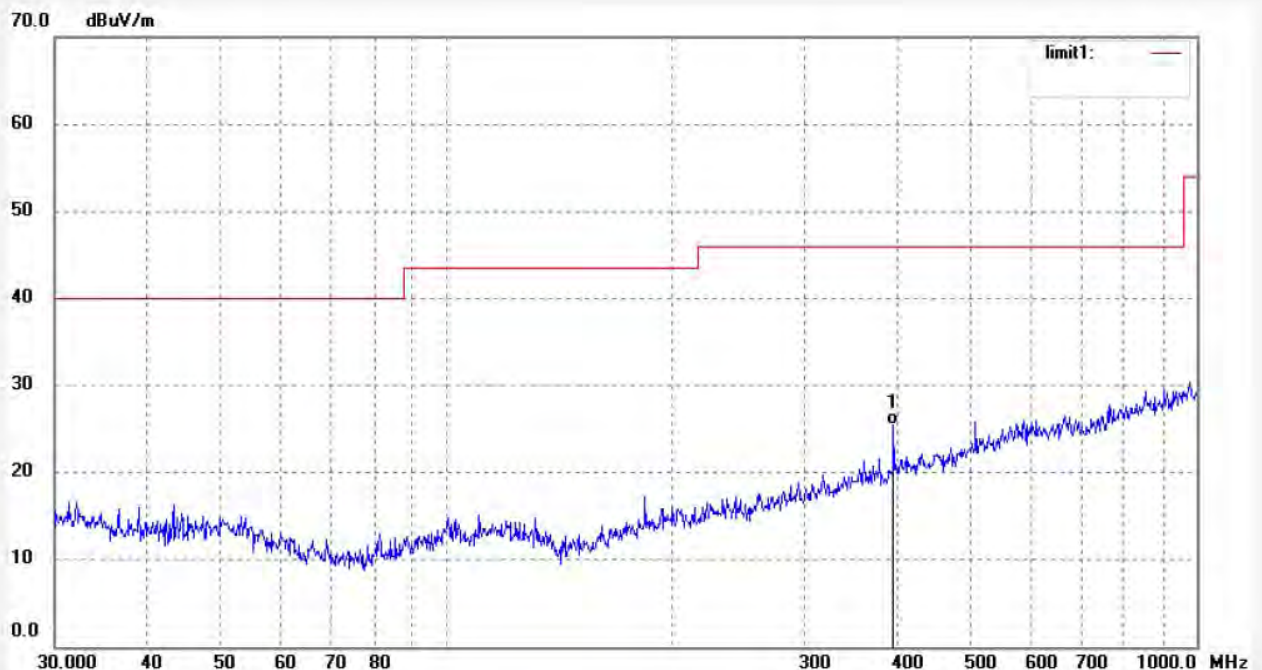


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	394.1198	44.48	-7.06	37.42	46.00	-8.58	QP			
2	955.3509	34.61	2.29	36.90	46.00	-9.10	QP			

Job No.: ALEN #1642
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: HOLL WIFI Disk
Mode: TX 2437MHz(802.11b)
Model: R220
Manufacturer: Wei Da Hui Er

Polarization: Vertical
Power Source: DC 3.7V
Date: 2013/08/26
Time: 13:40:44
Engineer Signature:
Distance: 3m

Note: Report No:ATE20131791

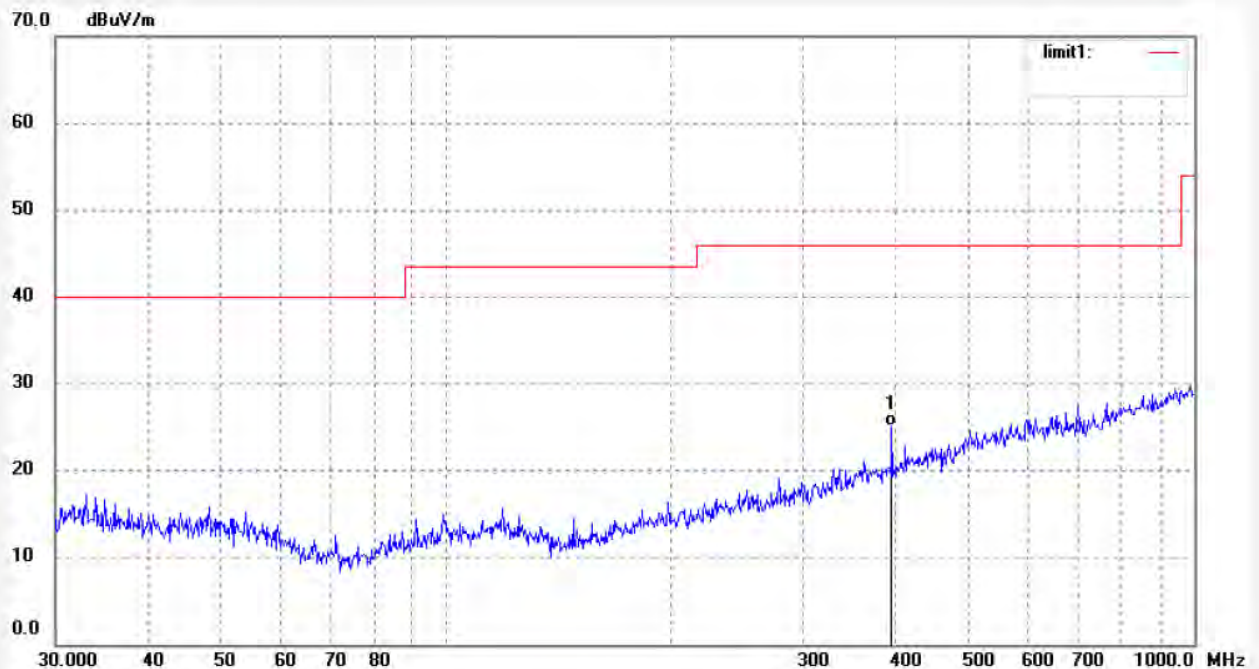


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	394.1198	32.59	-7.06	25.53	46.00	-20.47	QP			

Job No.: ALEN #1643
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: HOLL WIFI Disk
Mode: TX 2462MHz(802.11b)
Model: R220
Manufacturer: Wei Da Hui Er

Polarization: Vertical
Power Source: DC 3.7V
Date: 2013/08/26
Time: 13:41:40
Engineer Signature:
Distance: 3m

Note: Report No:ATE20131791



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	394.1198	32.22	-7.06	25.16	46.00	-20.84	QP			



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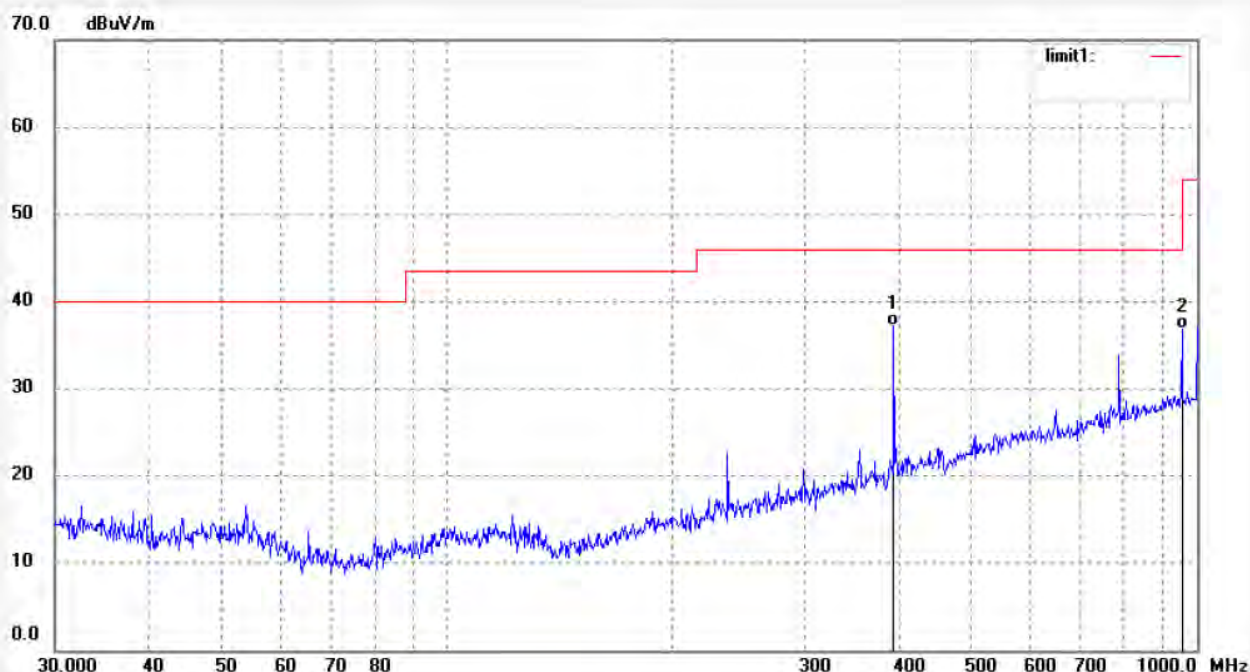
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: ALEN #1644
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: HOLL WIFI Disk
Mode: TX 2462MHz(802.11b)
Model: R220
Manufacturer: Wei Da Hui Er

Polarization: Horizontal
Power Source: DC 3.7V
Date: 2013/08/26
Time: 13:42:31
Engineer Signature:
Distance: 3m

Note: Report No:ATE20131791

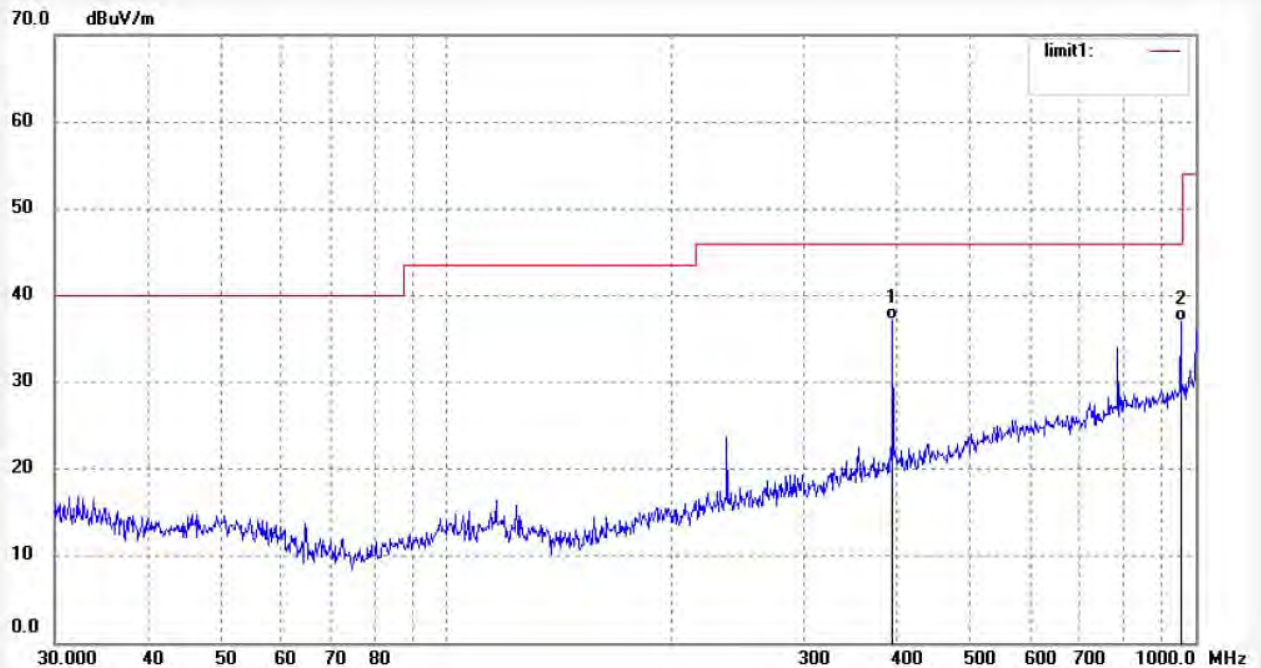


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	394.1199	44.17	-7.06	37.11	46.00	-8.89	QP			
2	955.3509	34.60	2.29	36.89	46.00	-9.11	QP			

Job No.: ALEN #1649
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: HOLL WIFI Disk
Mode: TX 2412MHz(802.11g)
Model: R220
Manufacturer: Wei Da Hui Er

Polarization: Horizontal
Power Source: DC 3.7V
Date: 2013/08/26
Time: 13:47:03
Engineer Signature:
Distance: 3m

Note: Report No:ATE20131791



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	394.1199	44.23	-7.06	37.17	46.00	-8.83	QP			
2	955.3509	34.73	2.29	37.02	46.00	-8.98	QP			



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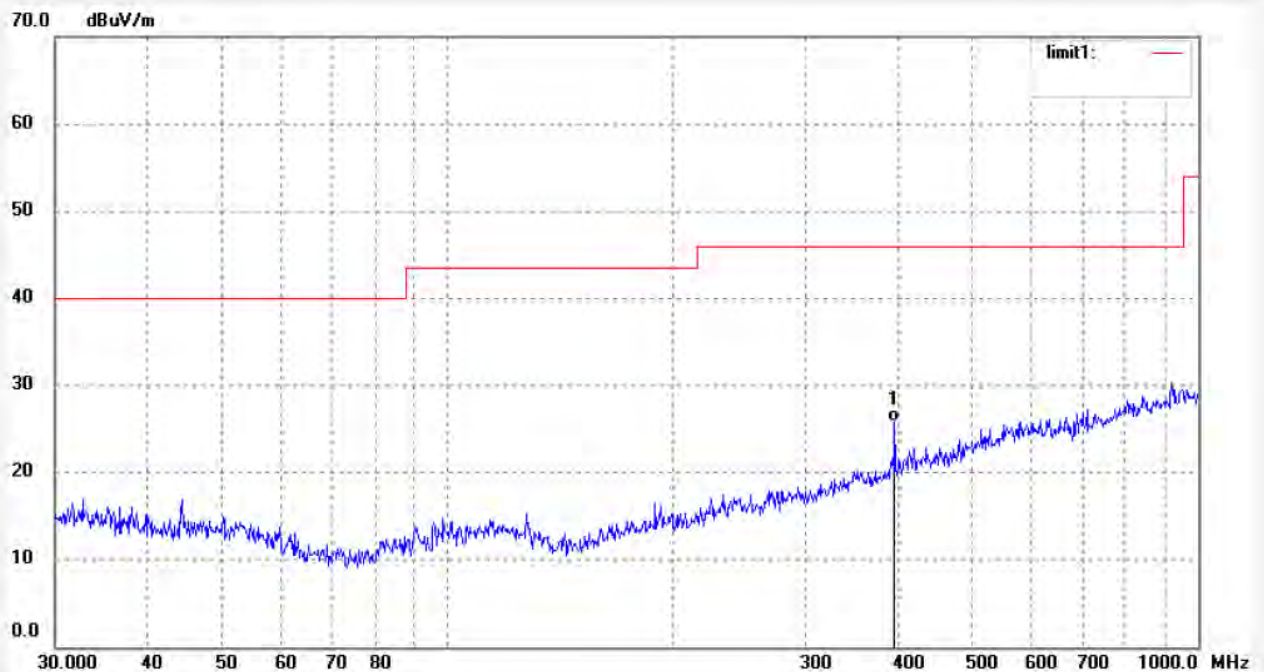
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: ALEN #1650
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: HOLL WIFI Disk
Mode: TX 2412MHz(802.11g)
Model: R220
Manufacturer: Wei Da Hui Er

Polarization: Vertical
Power Source: DC 3.7V
Date: 2013/08/26
Time: 13:48:12
Engineer Signature:
Distance: 3m

Note: Report No:ATE20131791

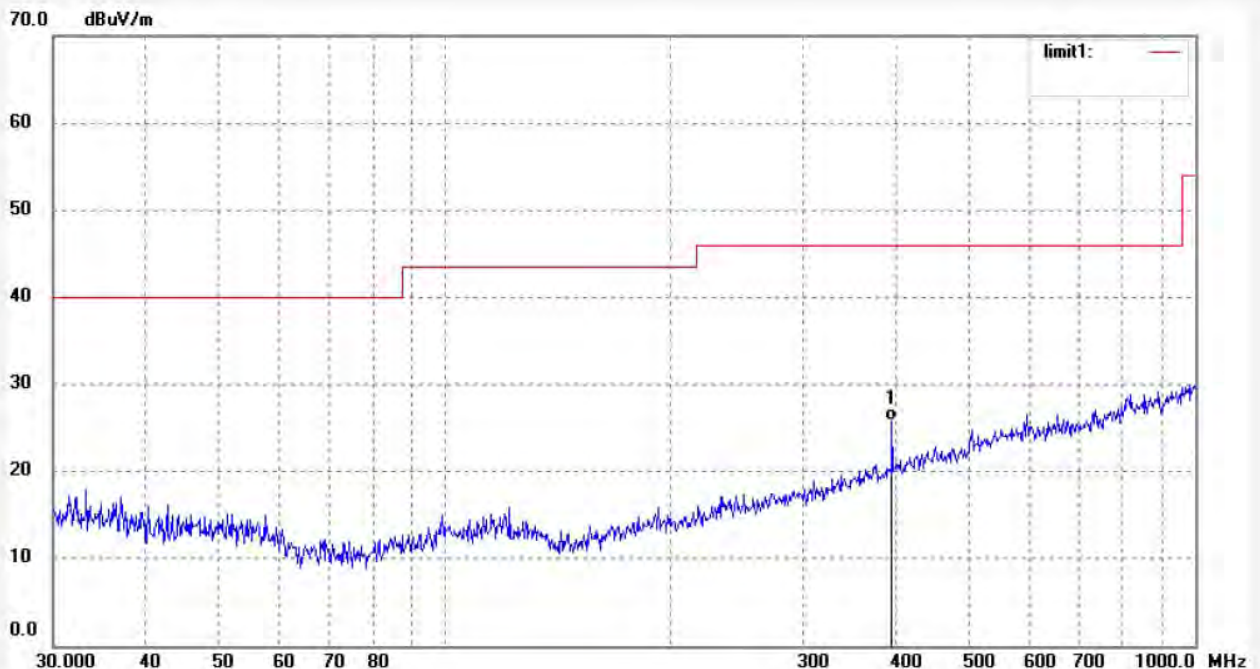


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	394.1198	32.82	-7.06	25.76	46.00	-20.24	QP			

Job No.: ALEN #1647
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: HOLL WIFI Disk
Mode: TX 2437MHz(802.11g)
Model: R220
Manufacturer: Wei Da Hui Er

Polarization: Vertical
Power Source: DC 3.7V
Date: 2013/08/26
Time: 13:45:21
Engineer Signature:
Distance: 3m

Note: Report No:ATE20131791



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	394.1198	32.90	-7.06	25.84	46.00	-20.16	QP			



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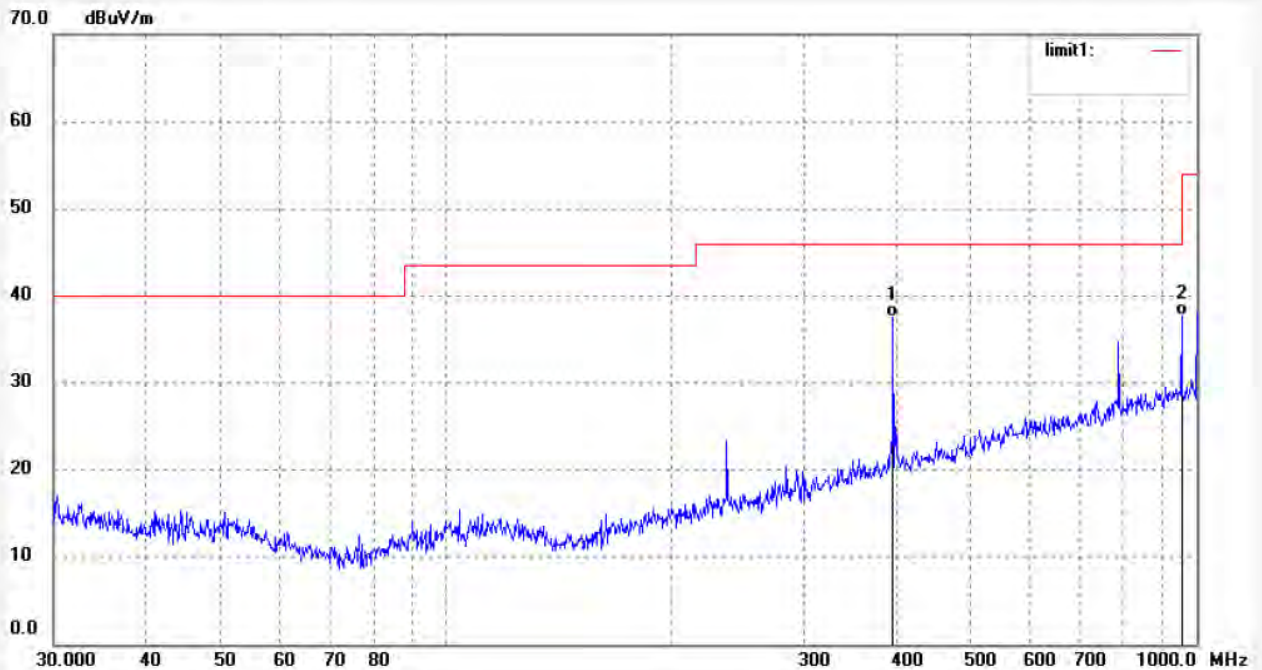
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: ALEN #1648
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: HOLL WIFI Disk
Mode: TX 2437MHz(802.11g)
Model: R220
Manufacturer: Wei Da Hui Er

Polarization: Horizontal
Power Source: DC 3.7V
Date: 2013/08/26
Time: 13:46:11
Engineer Signature:
Distance: 3m

Note: Report No:ATE20131791



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	394.1199	44.58	-7.06	37.52	46.00	-8.48	QP			
2	955.3509	35.50	2.29	37.79	46.00	-8.21	QP			



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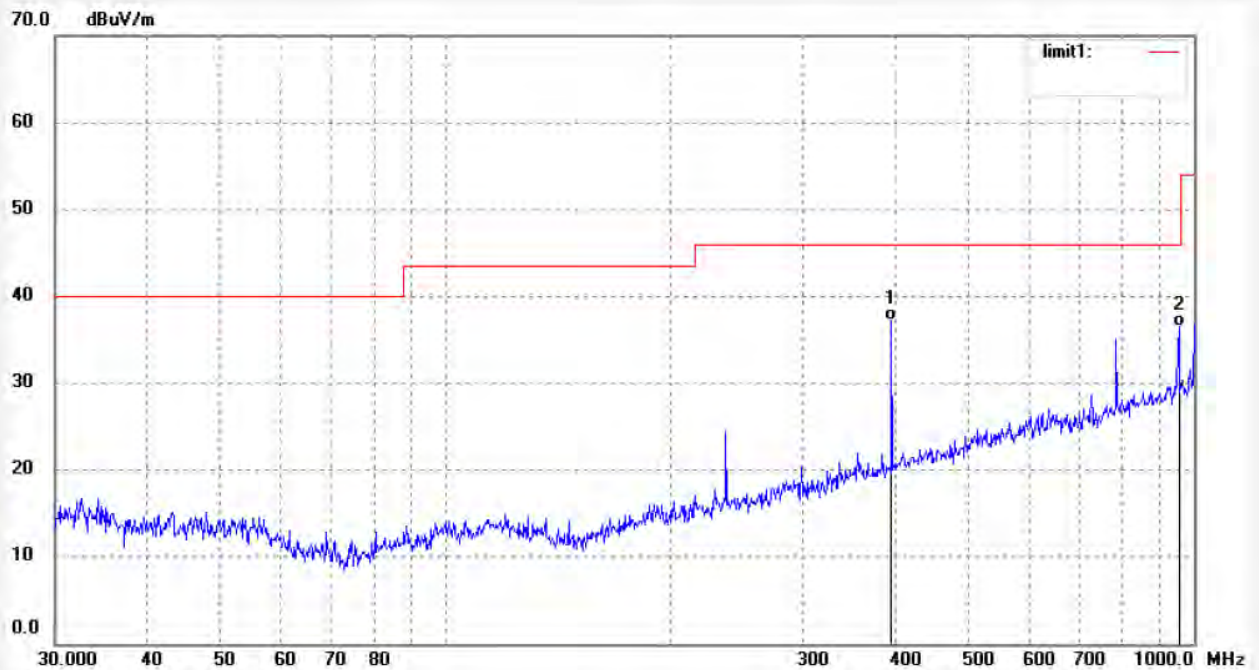
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: ALEN #1645
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: HOLL WIFI Disk
Mode: TX 2462MHz(802.11g)
Model: R220
Manufacturer: Wei Da Hui Er

Polarization: Horizontal
Power Source: DC 3.7V
Date: 2013/08/26
Time: 13:43:27
Engineer Signature:
Distance: 3m

Note: Report No:ATE20131791



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	394.1199	44.19	-7.06	37.13	46.00	-8.87	QP			
2	955.3509	34.23	2.29	36.52	46.00	-9.48	QP			