

## EMC TEST REPORT for Intentional Radiator (Wi-Fi Function)

### No. 130800216SHA-002

Applicant : TCT Mobile Limited  
5F, C building, No. 232, Liang Jing Road  
ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R.  
China. 201203

Manufacturer : TCL COMMUNICATION TECHNOLOGY HOLDINGS  
LIMITED  
70 Huifeng 4rd, ZhongKai Hi-tech Development District,  
Huizhou,Guangdong 516006 P.R.China

Equipment : one touch H200Y

Type/Model : H200Y-3ATLMX1

#### SUMMARY

The equipment complies with the requirements according to the following standard(s):

**47CFR Part 15 (2012):** Radio Frequency Devices

**ANSI C63.4 (2003):** American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

Date of issue: November 08, 2013

Prepared by:



Nemo Li (*Project Engineer*)

Reviewed by:



Daniel Zhao (*Reviewer*)



## **Description of Test Facility**

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## 1. General Information

### 1.1 Applicant Information

Applicant: TCT Mobile Limited  
5F, C building, No. 232, Liang Jing Road  
ZhangJiang High-Tech Park, Pudong Area Shanghai,  
P.R.China. 201203

Name of contact: Zhang Hongmei

Tel: +86 755 36645205

Manufacturer: TCL COMMUNICATION TECHNOLOGY  
HOLDINGS LIMITED  
70 Huifeng 4rd, ZhongKai Hi-tech Development  
District, Huizhou, Guangdong 516006 P.R.China

Sample received date : August 2, 2013  
Date of test : August 2, 2013 ~ October 15, 2013

### 1.2 Identification of the EUT

Equipment: one touch H200Y

Type/model: H200Y-3ATLMX1

FCC ID: RAD440

### 1.3 Technical specification

|                     |                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Frequency Range:    | 2412-2462MHz                                                                                                                                                                                                                                                                                                                                                                                                |
| Modulation:         | 802.11b: DSSS (CCK, DQPSK, DBPSK)<br>802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK)<br>802.11n HT20, HT40: OFDM (64QAM, 16QAM, QPSK, BPSK)                                                                                                                                                                                                                                                                        |
| Gain of Antenna:    | Outside dipole antenna: 3.0dBi<br>Inside copper antenna: 2.0dBi                                                                                                                                                                                                                                                                                                                                             |
| Rating:             | DC 12V powered by<br>AC/DC adapter input AC 100-240V, 50/60Hz, 500mA;<br>Output DC 12V, 1000mA                                                                                                                                                                                                                                                                                                              |
| Description of EUT: | This product is a 3G home gateway with high performance, which supports WLAN IEEE 802.11b/g/n, voice call, HSPA (7.2Mbps uplink / 5.76Mbps downlink), 2 RJ45 interfaces, 1RJ11 interface, and the internal 3G module is used for Internet access. There are two Wi-Fi antenna chains. Both were assessed and the worse one was listed in this report. There is an AC/DC adapter with model of S012NU1200100 |

### 1.4 Mode of operation during the test / Test peripherals used

While testing transmitting mode of EUT, the internal modulation and continuously transmission was applied.

The lowest, middle and highest channel were tested as representatives.

For 802.11b/g/n (HT20)----- lowest, 2412MHz; middle, 2437MHz; highest, 2462MHz.

For 802.11n HT40 ----- lowest, 2422MHz; middle, 2437MHz; highest, 2452MHz.

Test Peripherals:

PC: HP Compaq 6280 Pro Microtower

## 2. Test Specification

### 2.1 Instrument list

| Equipment                  | Type                              | Manu.             | Cal. Date  | Due Date   |
|----------------------------|-----------------------------------|-------------------|------------|------------|
| Test Receiver              | ESIB 26                           | R&S               | 2012-10-21 | 2013-10-20 |
| Semi-anechoic chamber      | -                                 | Albatross project | 2013-5-21  | 2014-5-20  |
| Bilog Antenna              | CBL 6112D                         | TESEQ             | 2013-5-16  | 2015-5-15  |
| Horn antenna               | HF 906                            | R&S               | 2013-5-13  | 2015-5-12  |
| Pre-amplifier              | Pre-amp 18                        | R&S               | 2013-4-12  | 2014-4-11  |
| Test Receiver              | ESCS 30                           | R&S               | 2012-10-21 | 2013-10-20 |
| A.M.N.                     | ESH2-Z5                           | R&S               | 2013-1-9   | 2014-1-8   |
| A.M.N.                     | ESH3-Z5                           | R&S               | 2013-1-10  | 2014-1-9   |
| High Pass Filter           | WHKX 1.0/15G-10SS                 | Wainwright        | 2013-2-8   | 2014-2-7   |
| High Pass Filter           | WHKX 2.8/18G-12SS                 | Wainwright        | 2013-2-8   | 2014-2-7   |
| High Pass Filter           | WHKX 7.0/1.8G-8SS                 | Wainwright        | 2013-2-8   | 2014-2-7   |
| Band Reject Filter         | WRCGV 2400/2483-2390/2493-35/10SS | Wainwright        | 2013-2-8   | 2014-2-7   |
| Test Receiver              | FSV40                             | R&S               | 2012-10-21 | 2013-10-20 |
| Power sensor / Power meter | N1911A/N1921A                     | Agilent           | 2013-04-12 | 2014-04-11 |
| Preamplifier               | AP-025C                           | Quietek           | 2012-11-25 | 2013-11-24 |
| Preamplifier               | AP-180C                           | Quietek           | 2012-11-25 | 2013-11-24 |
| Broad-Band Horn Antenna    | BBHA9120D                         | Schwarzbeck       | 2012-11-25 | 2013-11-24 |
| Broad-Band Horn Antenna    | BBHA9170                          | Schwarzbeck       | 2012-11-25 | 2013-11-24 |

### 2.2 Test Standard

47CFR Part 15 (2012)  
ANSI C63.4 (2003)

### 2.3 Test Summary

**This report applies to tested sample only. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai Limited.**

| TEST ITEM                           | FCC REFERENCE   | RESULT |
|-------------------------------------|-----------------|--------|
| Minimum 6dB Bandwidth               | 15.247(a)(2)    | Pass   |
| Maximum peak output power           | 15.247(b)       | Pass   |
| Power spectrum density              | 15.247(e)       | Pass   |
| Radiated emission                   | 15.205 & 15.209 | Pass   |
| Emission outside the frequency band | 15.247(d)       | Pass   |
| Power line conducted emission       | 15.207          | Pass   |

## 2.4 Data rate VS power

A special test command was used to control EUT work in Continuous TX mode (100% duty cycle), and select test channel, wireless mode and data rate.

| Mode                                                                                                                                                                                                                                                                                                                                                                                              | Data Rate (Mbps) | Channel | Frequency (MHz) |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---------|-----------------|
| IEEE 802.11b                                                                                                                                                                                                                                                                                                                                                                                      | 11               | L       | 2412            |
|                                                                                                                                                                                                                                                                                                                                                                                                   | 11               | M       | 2437            |
|                                                                                                                                                                                                                                                                                                                                                                                                   | 11               | H       | 2462            |
| IEEE 802.11g                                                                                                                                                                                                                                                                                                                                                                                      | 54               | L       | 2412            |
|                                                                                                                                                                                                                                                                                                                                                                                                   | 54               | M       | 2437            |
|                                                                                                                                                                                                                                                                                                                                                                                                   | 54               | H       | 2462            |
| IEEE 802.11n, HT20                                                                                                                                                                                                                                                                                                                                                                                | 65               | L       | 2412            |
|                                                                                                                                                                                                                                                                                                                                                                                                   | 65               | M       | 2437            |
|                                                                                                                                                                                                                                                                                                                                                                                                   | 65               | H       | 2462            |
| IEEE 802.11n, HT40                                                                                                                                                                                                                                                                                                                                                                                | 130              | L       | 2422            |
|                                                                                                                                                                                                                                                                                                                                                                                                   | 130              | M       | 2437            |
|                                                                                                                                                                                                                                                                                                                                                                                                   | 130              | H       | 2452            |
| <p>Note1: According to exploratory test, EUT has the maximum PK output power in above data rate, so those data rate were chosen to perform all the tests as representative:</p> <p>Note2: According to exploratory test, chain 0 has the maximum emission, so chain 0 was chosen to do all the tests for 11b and 11g. For 11n mode, EUT was tested with two antennas transmit simultaneously.</p> |                  |         |                 |

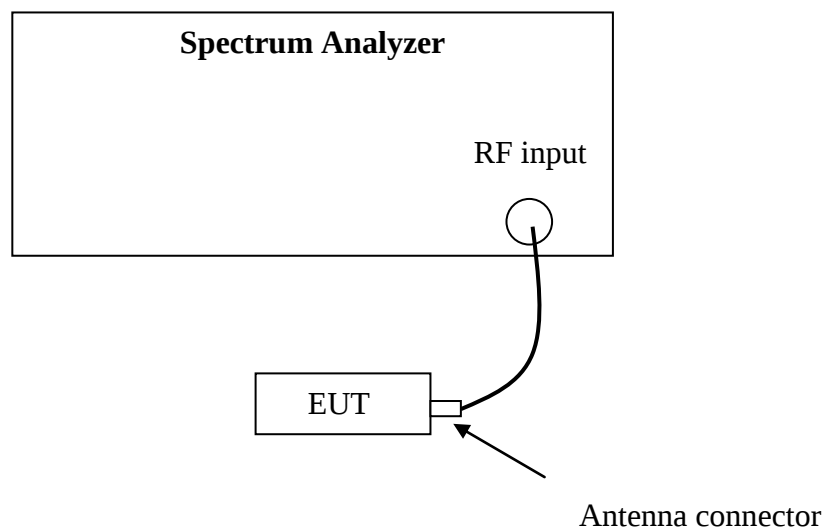
### 3. Minimum 6dB Bandwidth

Test result: PASS

#### 3.1 Limit

For systems using digital modulation techniques that may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz bands, the minimum 6 dB bandwidth shall be at least 500 kHz.

#### 3.2 Test Configuration



#### 3.3 Test Procedure and test setup

The minimum 6dB bandwidth per FCC §15.247(a)(2) is measured using the Spectrum Analyzer according to DTS test procedure of “KDB558074 D01 DTS Meas Guidance v03r01” for compliance to FCC 47CFR 15.247 requirements.

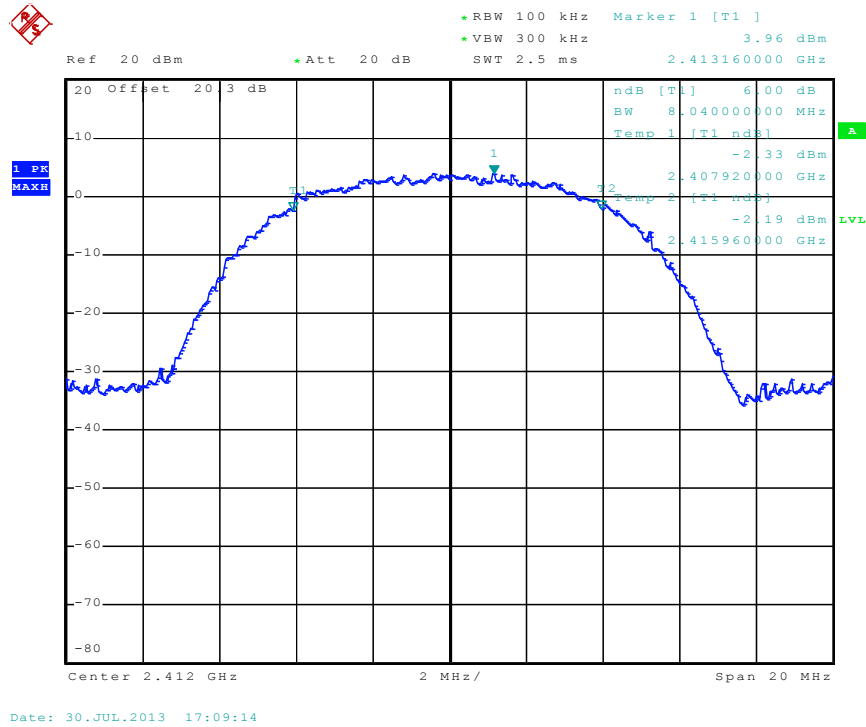
### 3.4 Test Protocol

Temperature : 25°C  
Relative Humidity : 55%

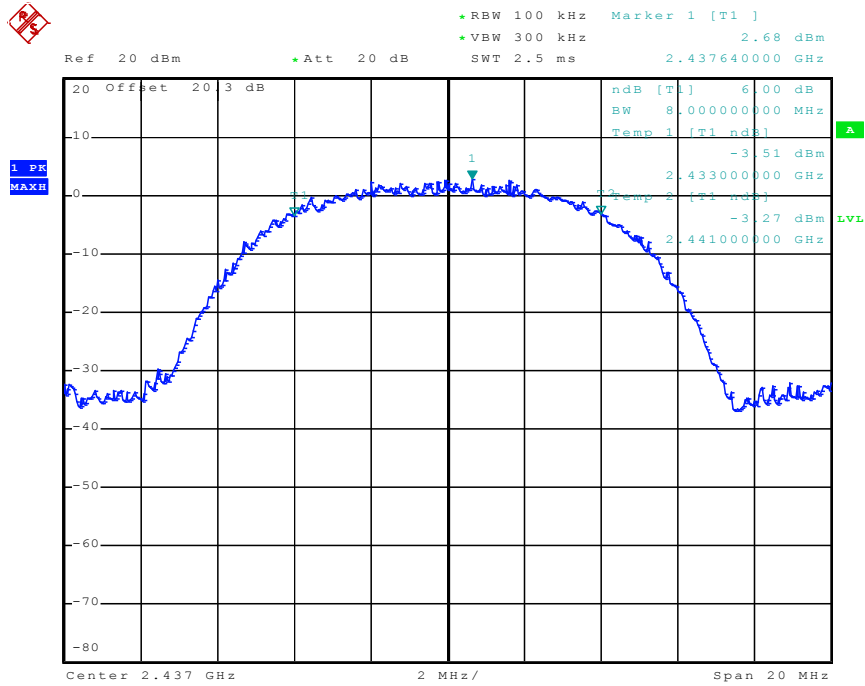
#### Single Chain

| Mode    | CH | Bandwidth (MHz) | Limit (MHz) |
|---------|----|-----------------|-------------|
| 802.11b | L  | 8.04            | ≥0.5        |
|         | M  | 8.00            |             |
|         | H  | 7.60            |             |

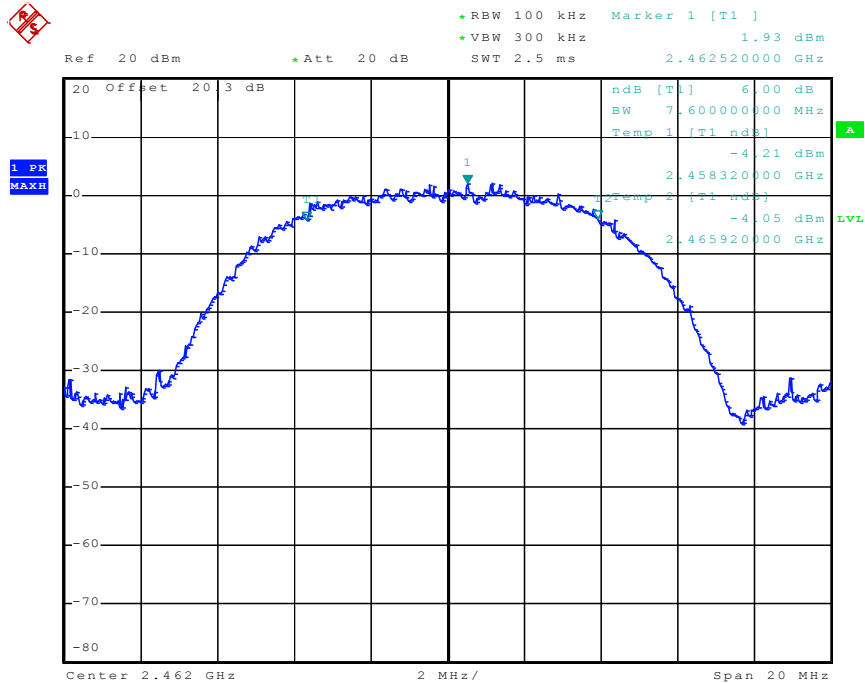
#### Channel L



### Channel M



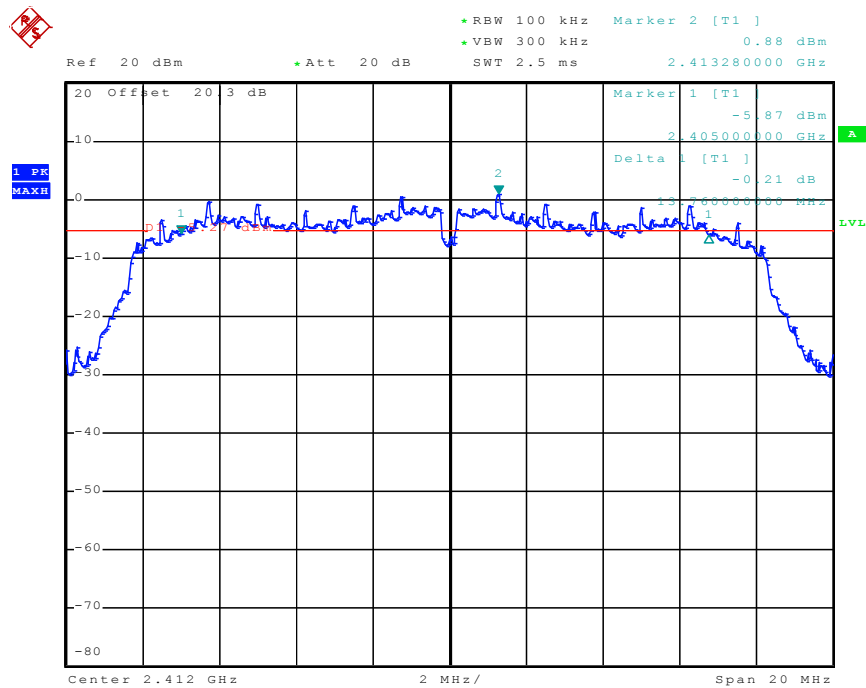
### Channel H



### Single Chain

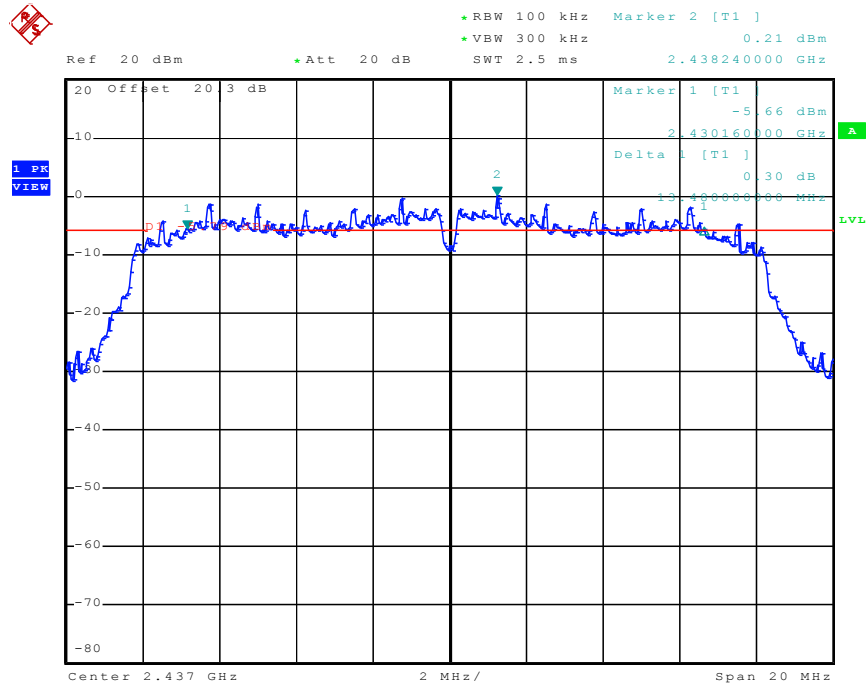
| Mode    | CH | Bandwidth (MHz) | Limit (MHz) |
|---------|----|-----------------|-------------|
| 802.11g | L  | 13.76           | $\geq 0.5$  |
|         | M  | 13.48           |             |
|         | H  | 13.56           |             |

### Channel L

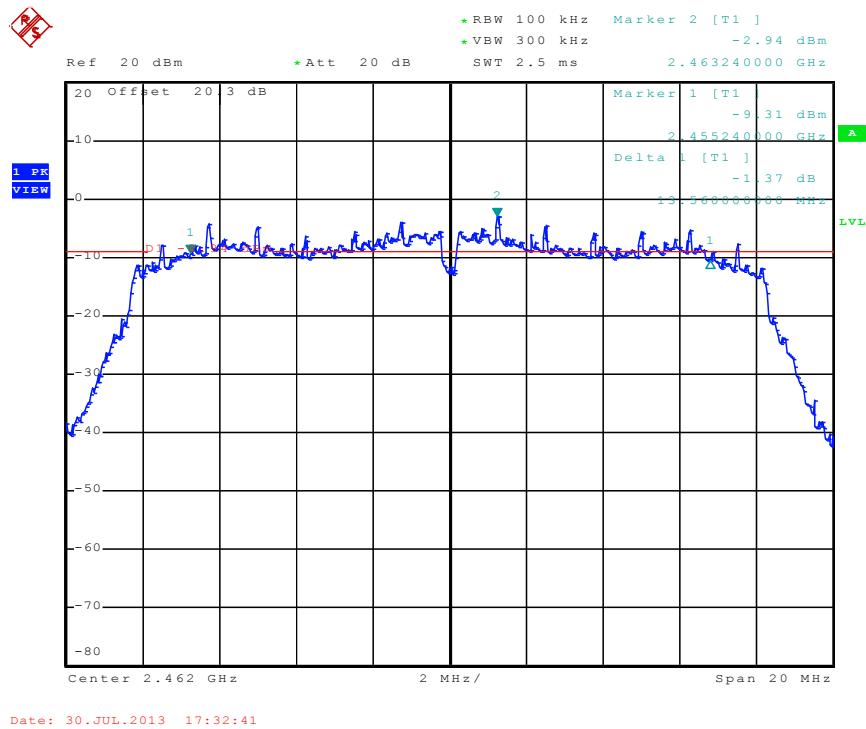


Date: 30.JUL.2013 17:27:29

### Channel M



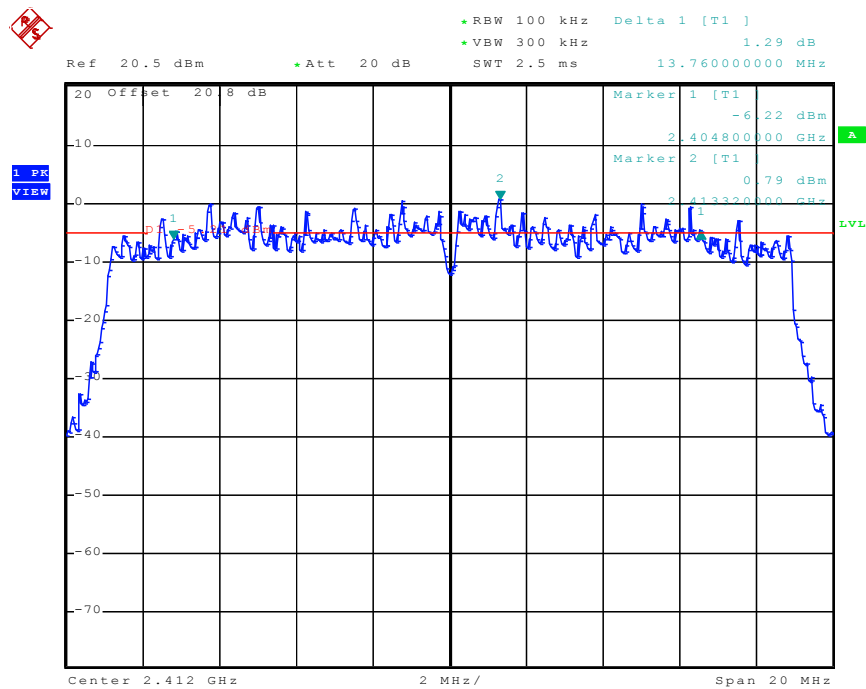
### Channel H



### Dual Chain

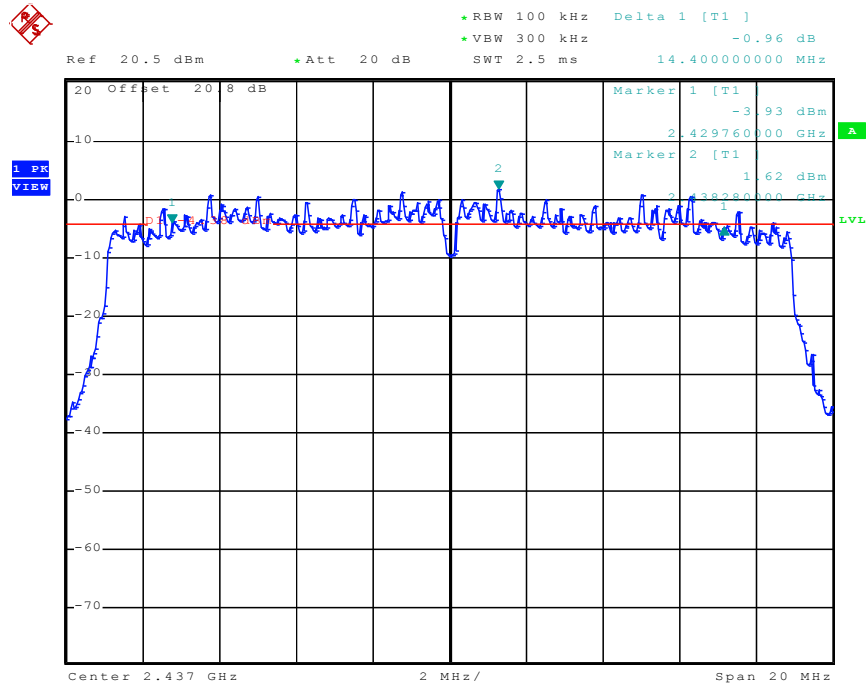
| Mode          | CH | Bandwidth (MHz) | Limit (MHz) |
|---------------|----|-----------------|-------------|
| 802.11n, HT20 | L  | 13.56           | $\geq 0.5$  |
|               | M  | 13.24           |             |
|               | H  | 13.52           |             |

### Channel L



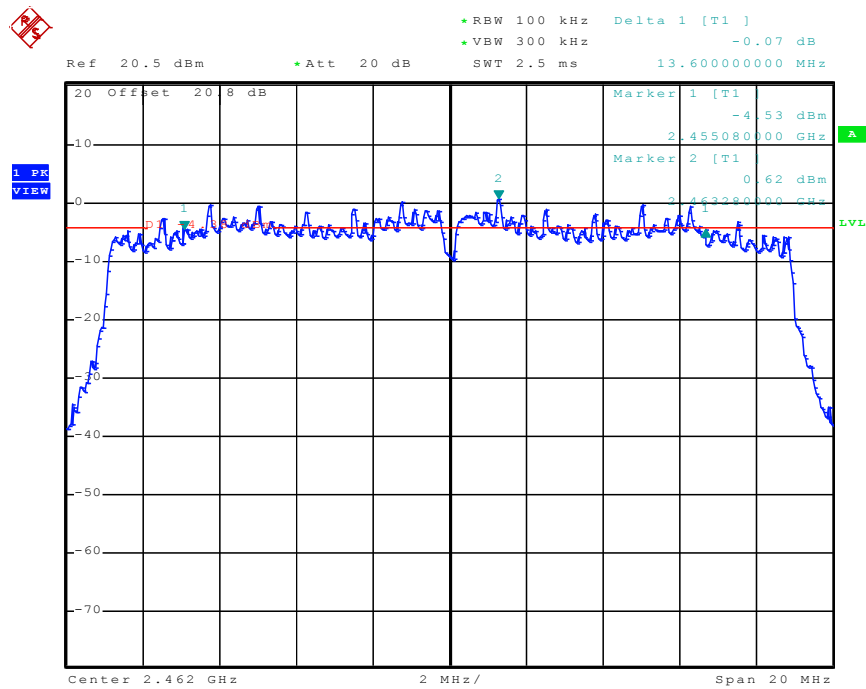
Date: 14.OCT.2013 17:16:36

## Channel M



Date: 14.OCT.2013 17:19:11

## Channel H

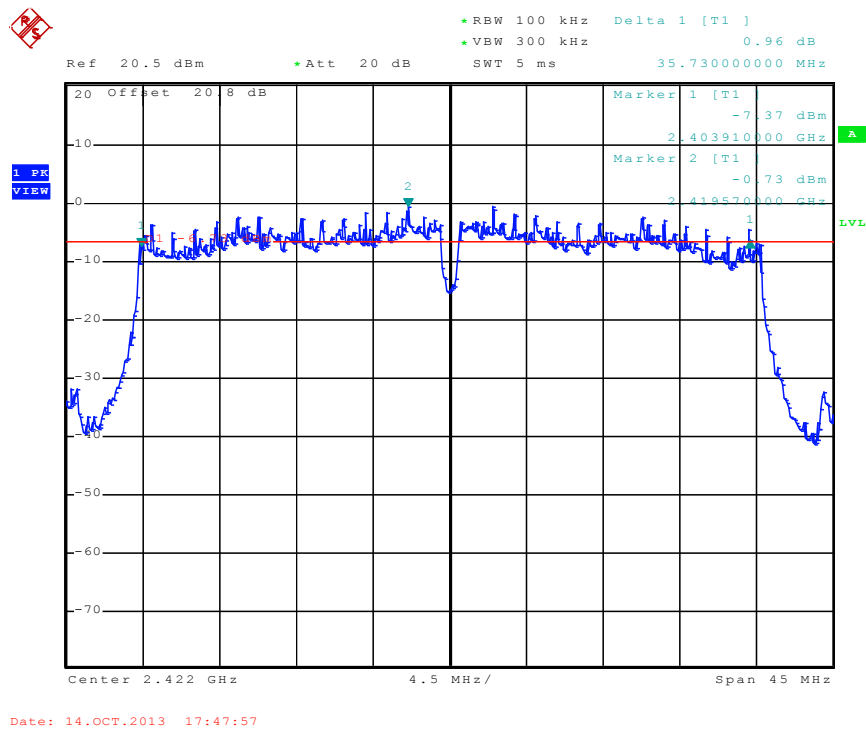


Date: 14.OCT.2013 17:20:10

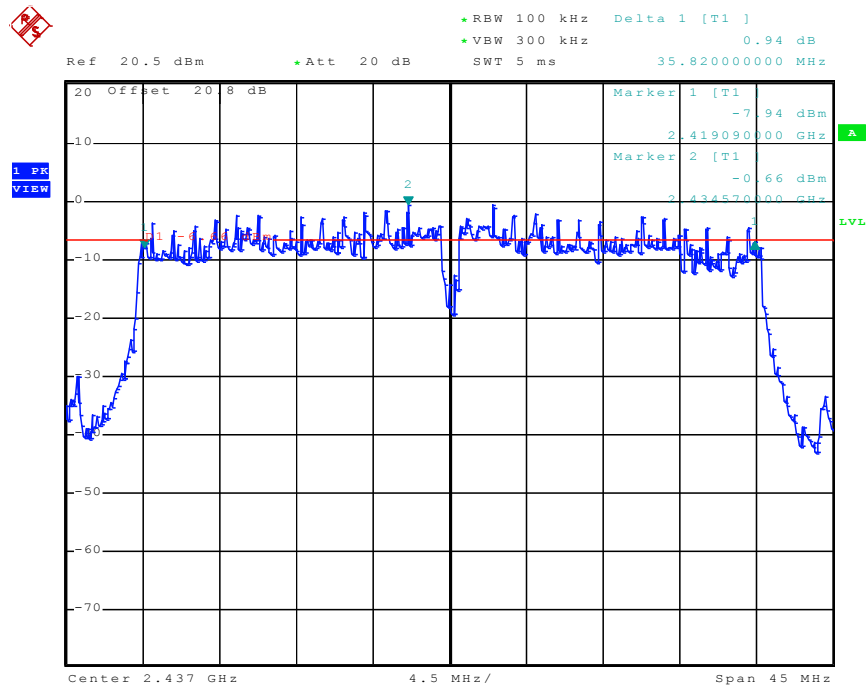
### Dual Chain

| Mode          | CH | Bandwidth (MHz) | Limit (MHz) |
|---------------|----|-----------------|-------------|
| 802.11n, HT40 | L  | 35.37           | $\geq 0.5$  |
|               | M  | 35.55           |             |
|               | H  | 35.19           |             |

### Channel L

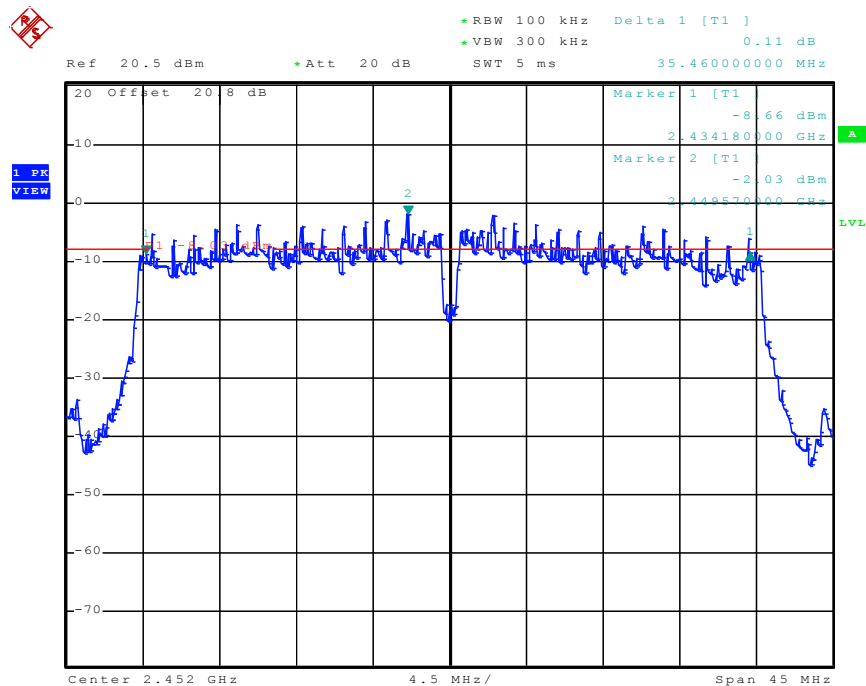


## Channel M



Date: 14.OCT.2013 17:49:06

## Channel H



Date: 14.OCT.2013 17:50:11

## 4. Maximum peak output power

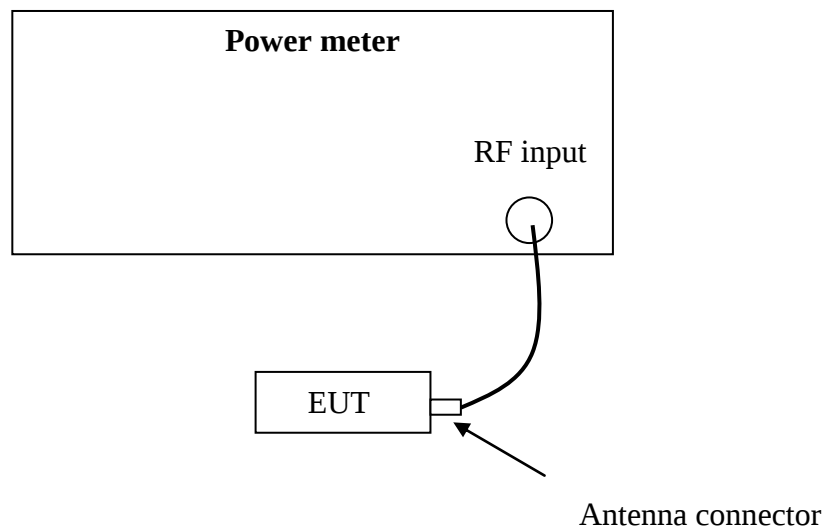
**Test result: Pass**

### 4.1 Test limit

- ☐ For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt
- ☐ For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts
- ☒ For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

If the transmitting antenna of directional gain greater than 6dBi is used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### 4.2 Test Configuration



### 4.3 Test procedure and test setup

The EUT was tested according to DTS test procedure of “KDB558074 D01 DTS Meas Guidance v03r01” for compliance to FCC 47CFR 15.247 requirements (clause 9.1.2).

#### 4.4 Test protocol

Temperature : 25 °C

Relative Humidity : 55 %

##### Single Chain

| Mode    | CH | Cable loss<br>(dB) | Conducted Power<br>(dBm) | Limit<br>(dBm) |
|---------|----|--------------------|--------------------------|----------------|
| 802.11b | L  | 0.3                | 18.34                    | ≤30            |
|         | M  | 0.3                | 17.59                    |                |
|         | H  | 0.3                | 16.87                    |                |

##### Single Chain

| Mode    | CH | Cable loss<br>(dB) | Conducted Power<br>(dBm) | Limit<br>(dBm) |
|---------|----|--------------------|--------------------------|----------------|
| 802.11b | L  | 0.3                | 19.39                    | ≤30            |
|         | M  | 0.3                | 18.24                    |                |
|         | H  | 0.3                | 16.62                    |                |

### Dual Chain

| Mode           | CH | Chain 0<br>(dBm) | Chain 1<br>(dBm) | Total Power<br>(dBm) | Limit<br>(dBm) |
|----------------|----|------------------|------------------|----------------------|----------------|
| 802.11n<br>H20 | L  | 20.55            | 20.17            | 23.37                | ≤30            |
|                | M  | 19.41            | 20.76            | 23.15                |                |
|                | H  | 16.35            | 20.23            | 21.72                |                |

### Dual Chain

| Mode           | CH | Chain 0<br>(dBm) | Chain 1<br>(dBm) | Total Power<br>(dBm) | Limit<br>(dBm) |
|----------------|----|------------------|------------------|----------------------|----------------|
| 802.11n<br>H40 | L  | 17.16            | 20.62            | 22.24                | ≤30            |
|                | M  | 17.32            | 20.66            | 22.31                |                |
|                | H  | 14.76            | 19.29            | 20.60                |                |

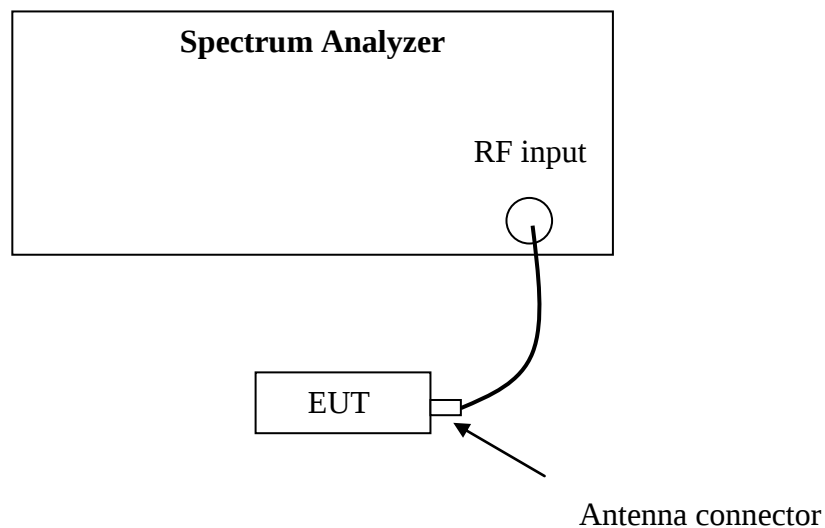
## 5. Power spectrum density

**Test result:** Pass

### 5.1 Test limit

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

### 5.2 Test Configuration



### 5.3 Test procedure and test setup

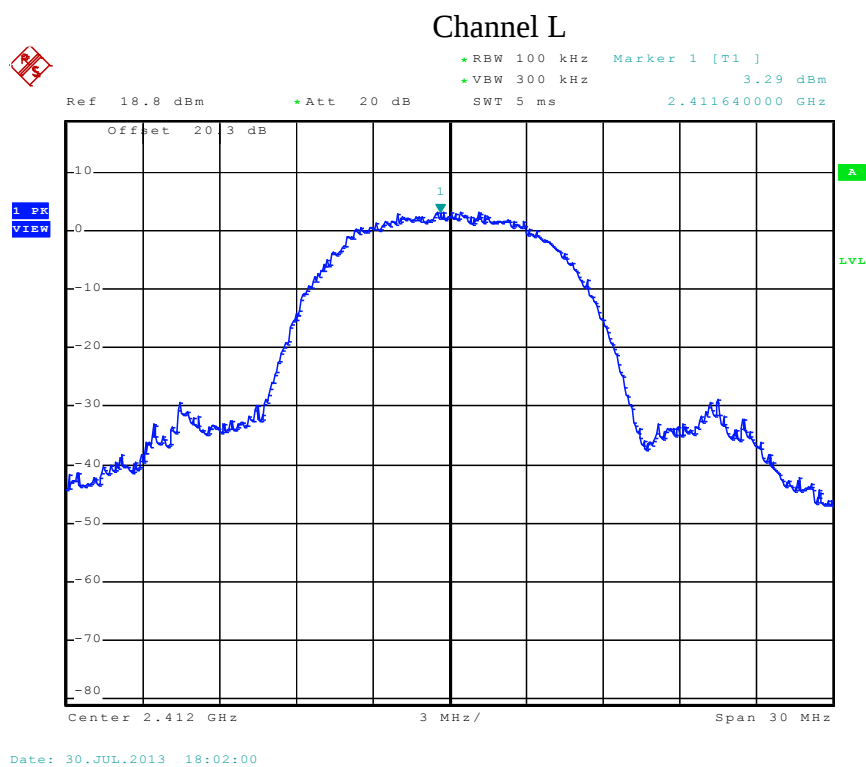
The power output per FCC §15.247(e) was tested according to DTS test procedure of “KDB558074 D01 DTS Meas Guidance v03r01” (clause 10.2) for compliance to FCC 47CFR 15.247 requirements.

## 5.4 Test Protocol

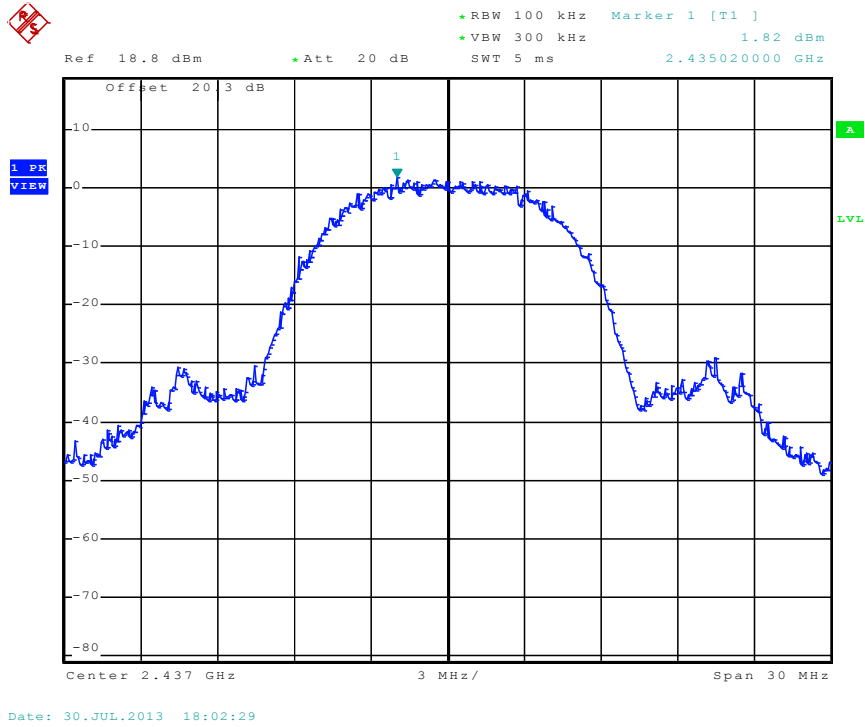
Temperature : 25 °C

Relative Humidity: 55 %

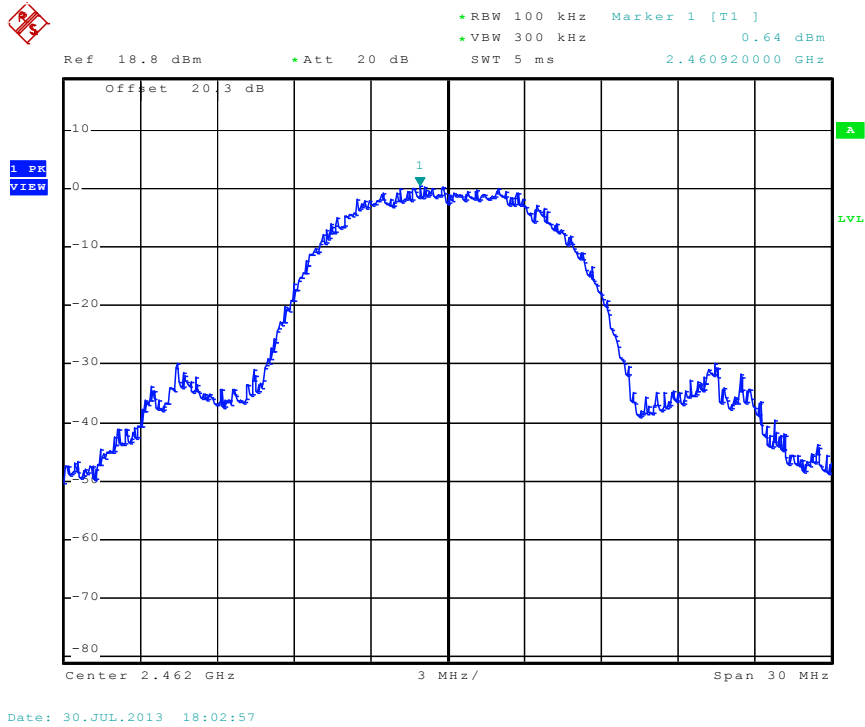
| Mode    | CH | Cable loss (dB) | Spectrum Density (dBm/100kHz) | Limit (dBm/100kHz) |
|---------|----|-----------------|-------------------------------|--------------------|
| 802.11b | L  | 0.3             | 3.29                          | ≤8.00              |
|         | M  | 0.3             | 1.82                          |                    |
|         | H  | 0.3             | 0.64                          |                    |



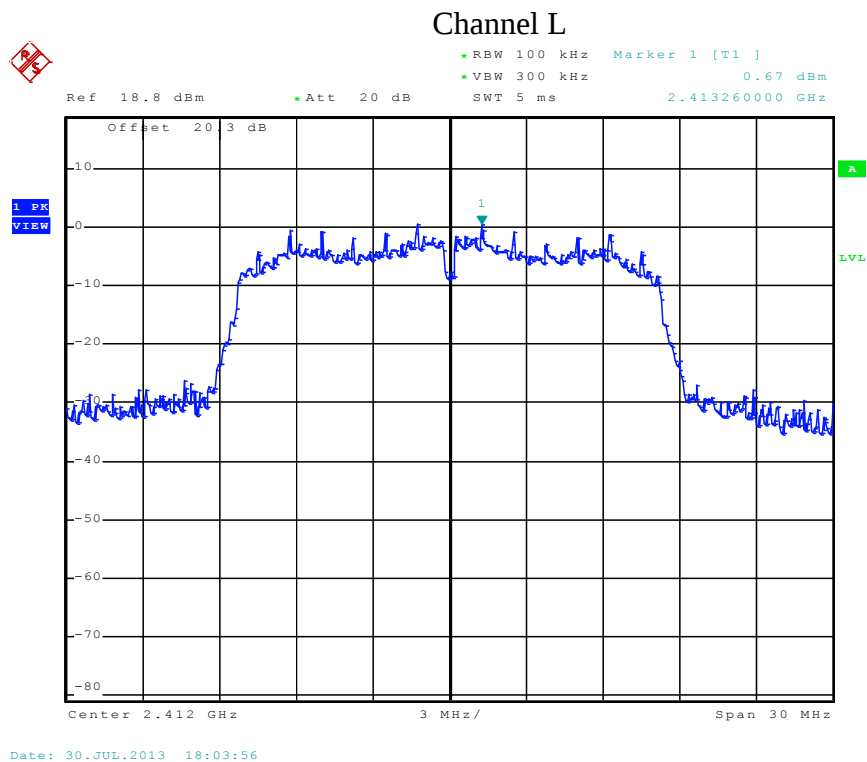
### Channel M

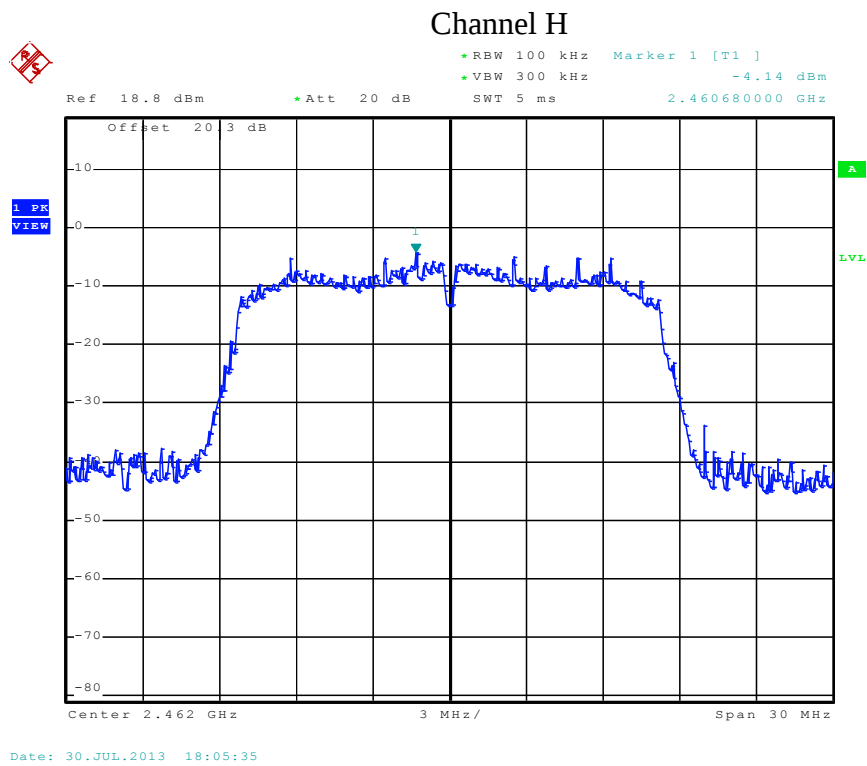
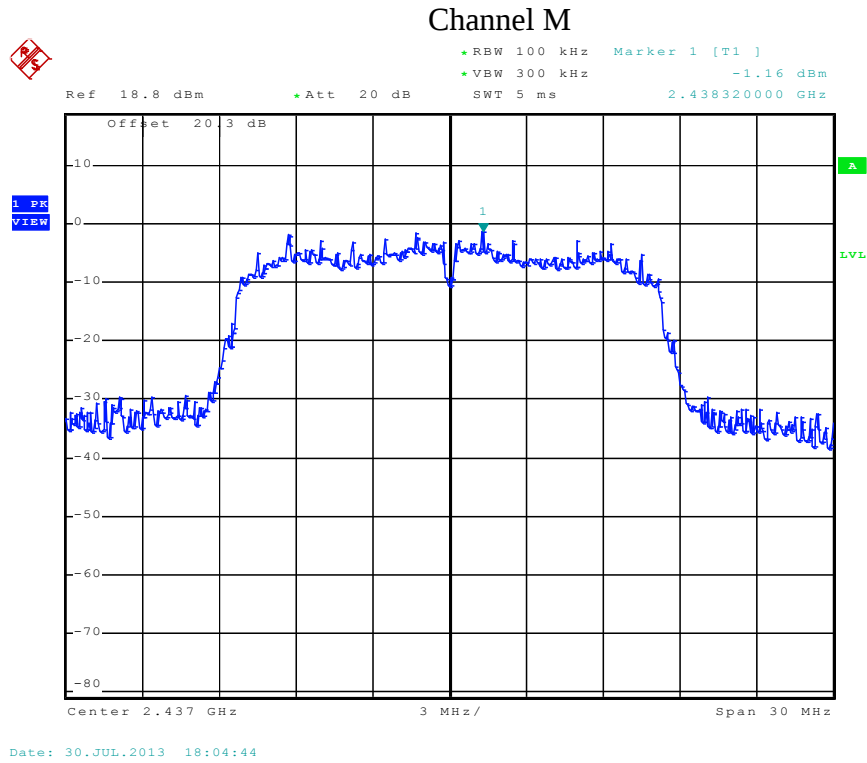


### Channel H



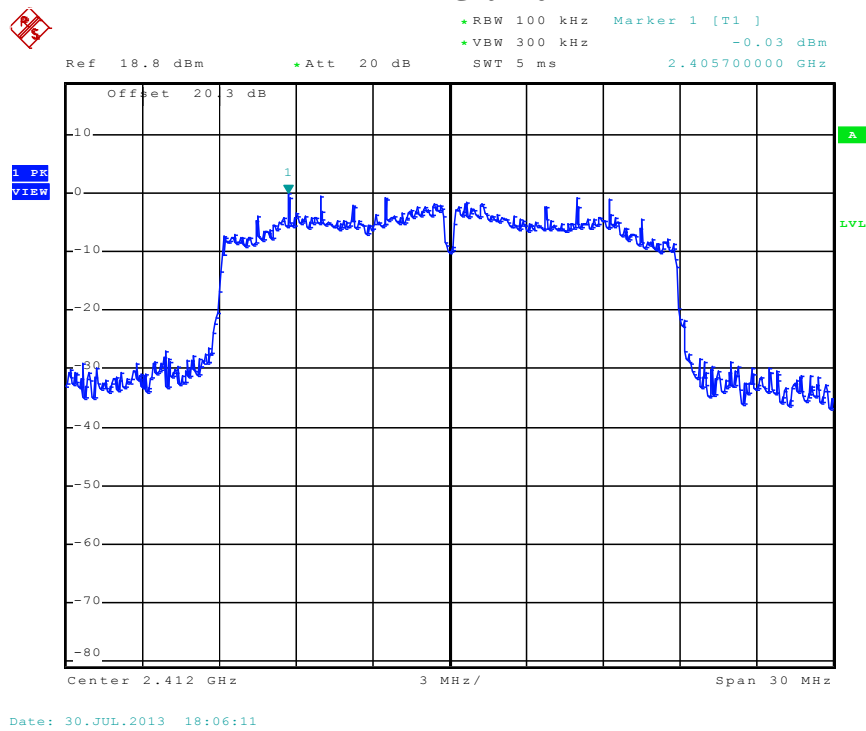
| Mode    | CH | Cable loss (dB) | Spectrum Density (dBm/100kHz) | Limit (dBm/100kHz) |
|---------|----|-----------------|-------------------------------|--------------------|
| 802.11g | L  | 0.3             | 0.67                          | ≤8.00              |
|         | M  | 0.3             | -1.16                         |                    |
|         | H  | 0.3             | -4.14                         |                    |



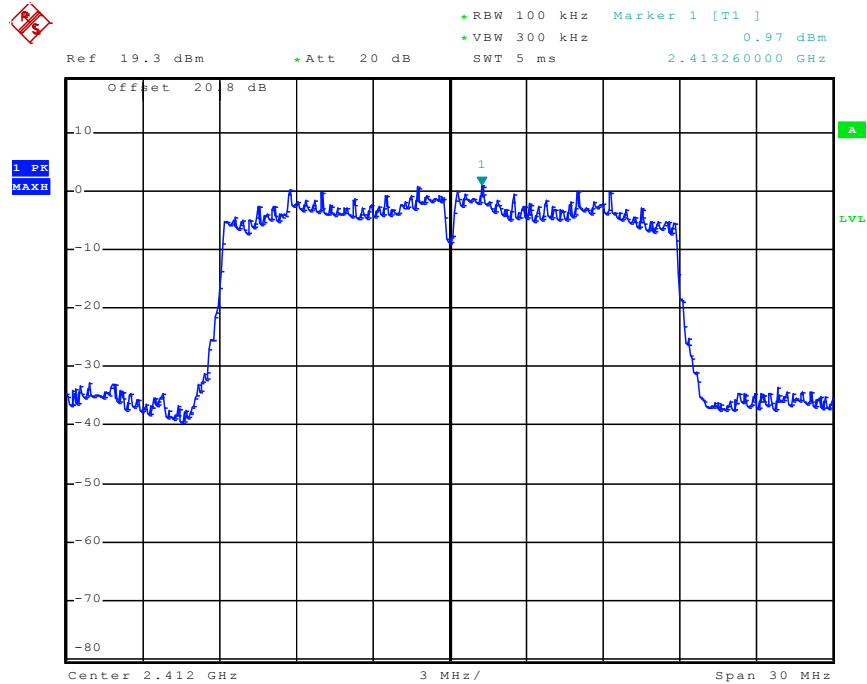


| Mode      | CH | Chain 0<br>(dBm/100kHz) | Chain 1<br>(dBm/100kHz) | Total power<br>density<br>(dBm/100kHz) | Limit<br>(dBm/100kHz) |
|-----------|----|-------------------------|-------------------------|----------------------------------------|-----------------------|
| 11n, HT20 | L  | -0.03                   | 0.97                    | 3.51                                   | ≤8.00                 |
|           | M  | -0.04                   | 1.67                    | 3.91                                   |                       |
|           | H  | -3.85                   | 0.58                    | 1.92                                   |                       |

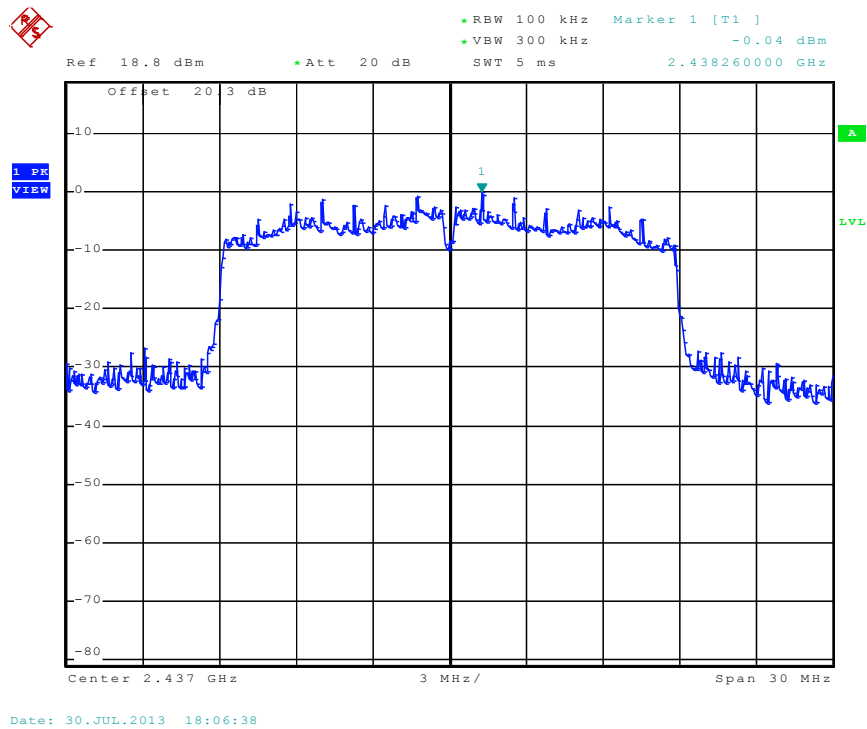
11n, HT20, Channel L  
Chain 0



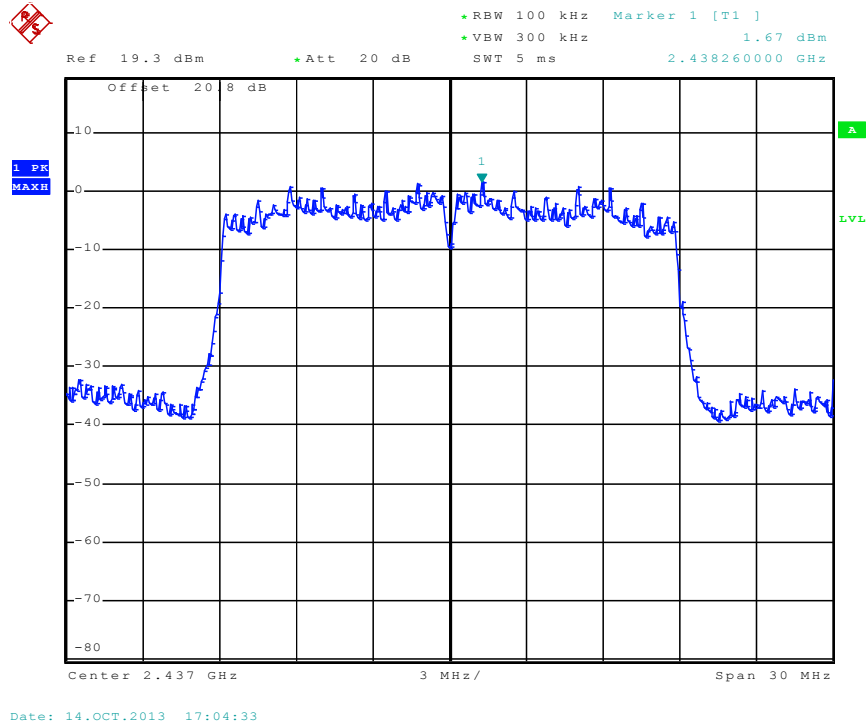
### Chain 1



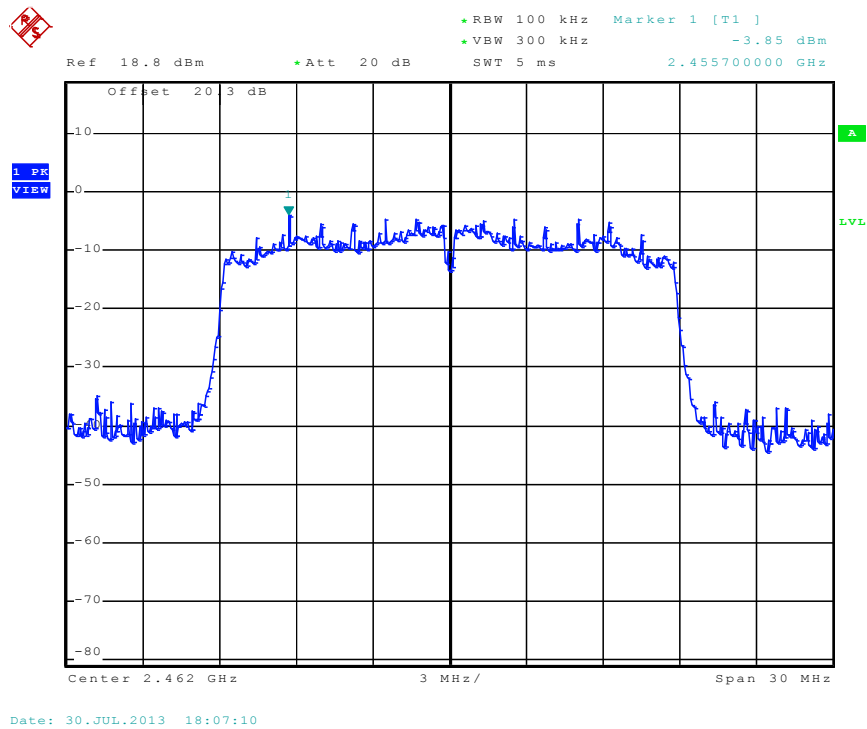
### 11n, HT20, Channel M Chain 0

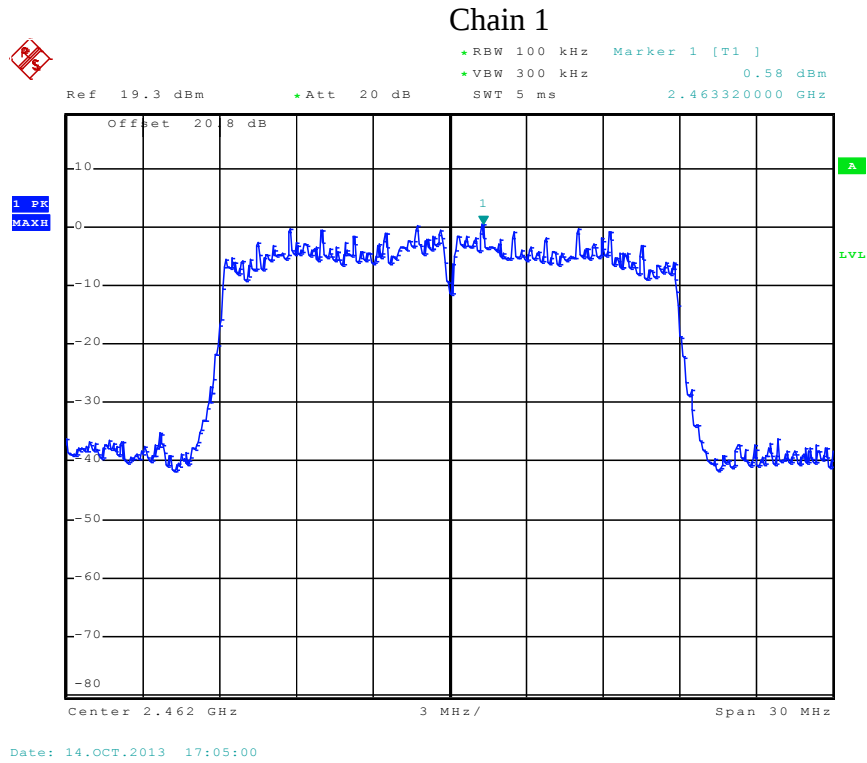


### Chain 1



### 11n, HT20, Channel H Chain 0

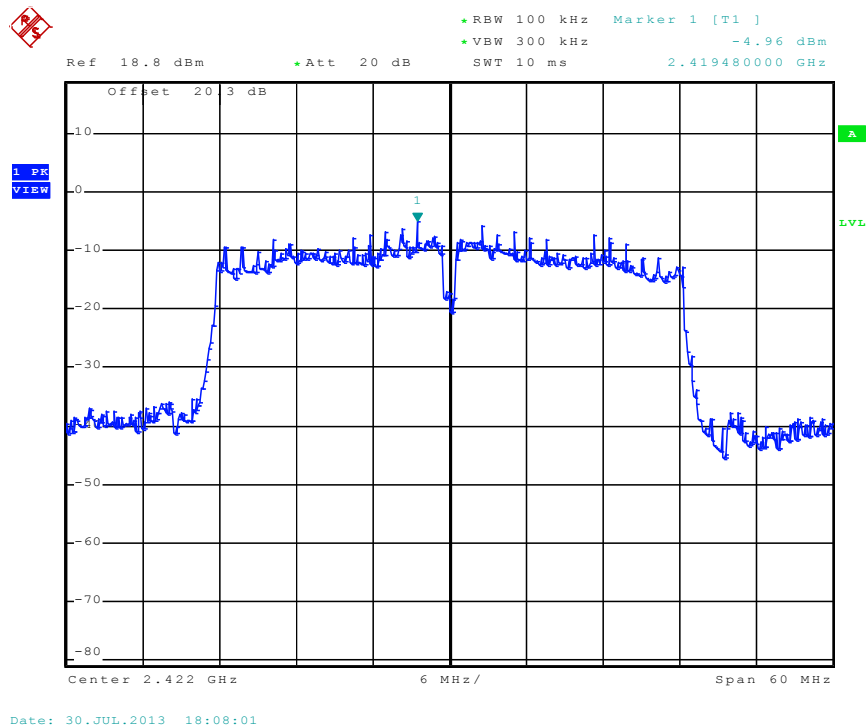




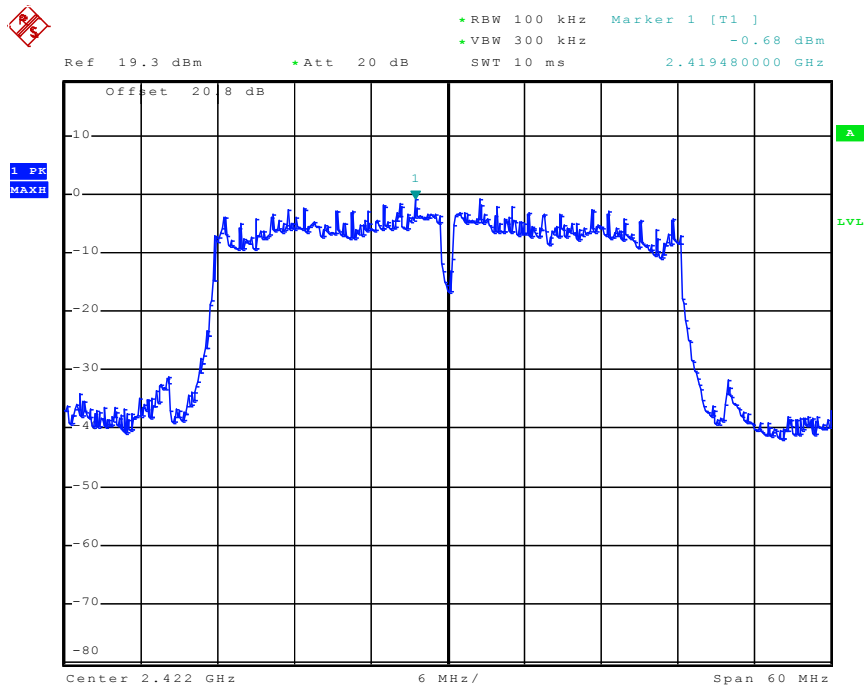
| Mode      | CH | Chain 0<br>(dBm/100kHz) | Chain 1<br>(dBm/100kHz) | Total power<br>density<br>(dBm/100kHz) | Limit<br>(dBm/100kHz) |
|-----------|----|-------------------------|-------------------------|----------------------------------------|-----------------------|
| 11n, HT40 | L  | -4.96                   | -0.68                   | 0.70                                   | ≤8.00                 |
|           | M  | -4.95                   | -0.52                   | 0.82                                   |                       |
|           | H  | -7.31                   | -1.83                   | -0.75                                  |                       |

Note: power spectrum density of 3kHz is -15.20dB lower than that of 100kHz.

### 11n, HT40, Channel L Chain 0



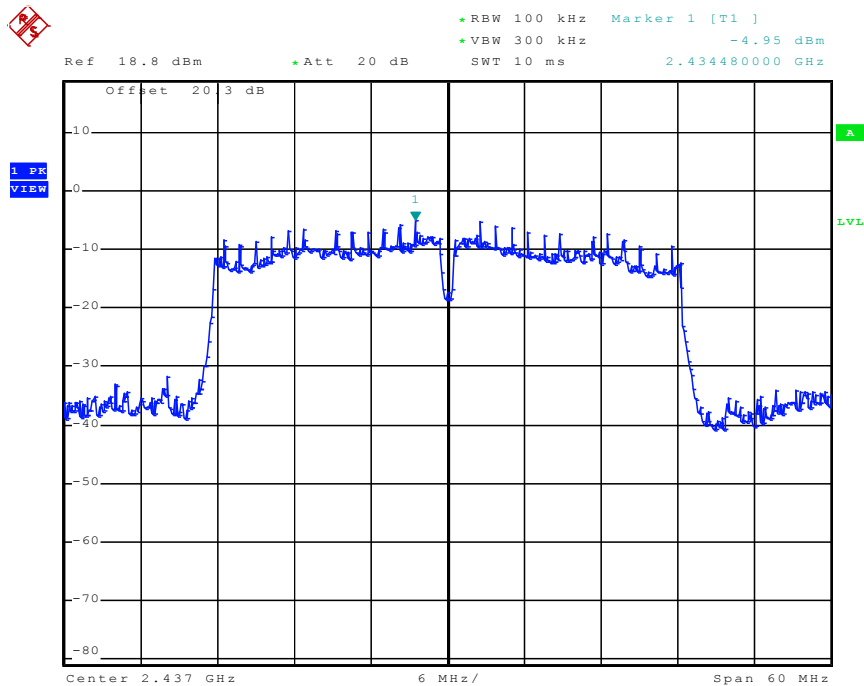
### Chain 1



Date: 14.OCT.2013 18:02:04

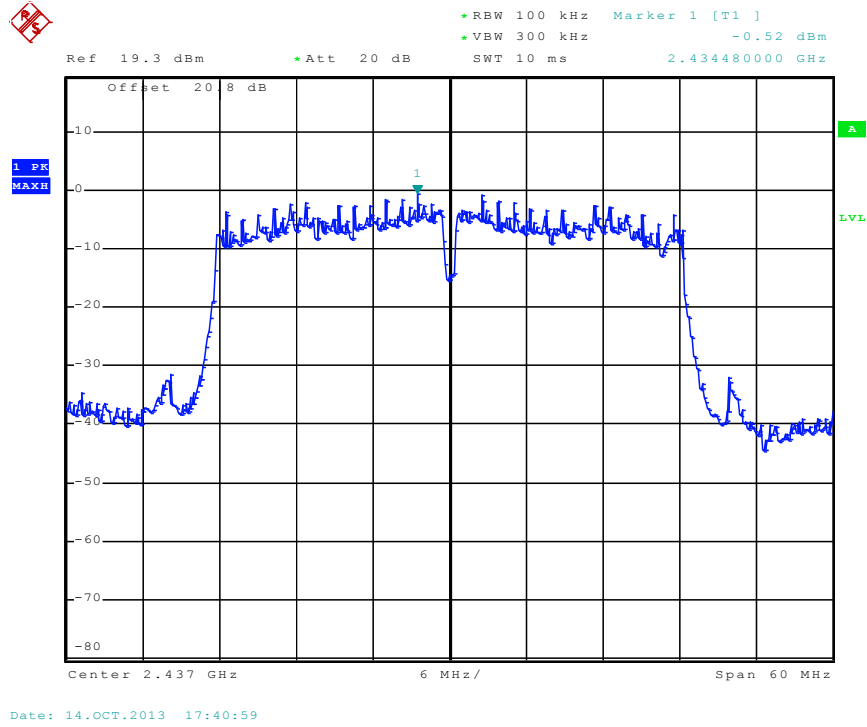
### 11n, HT40, Channel M

### Chain 0



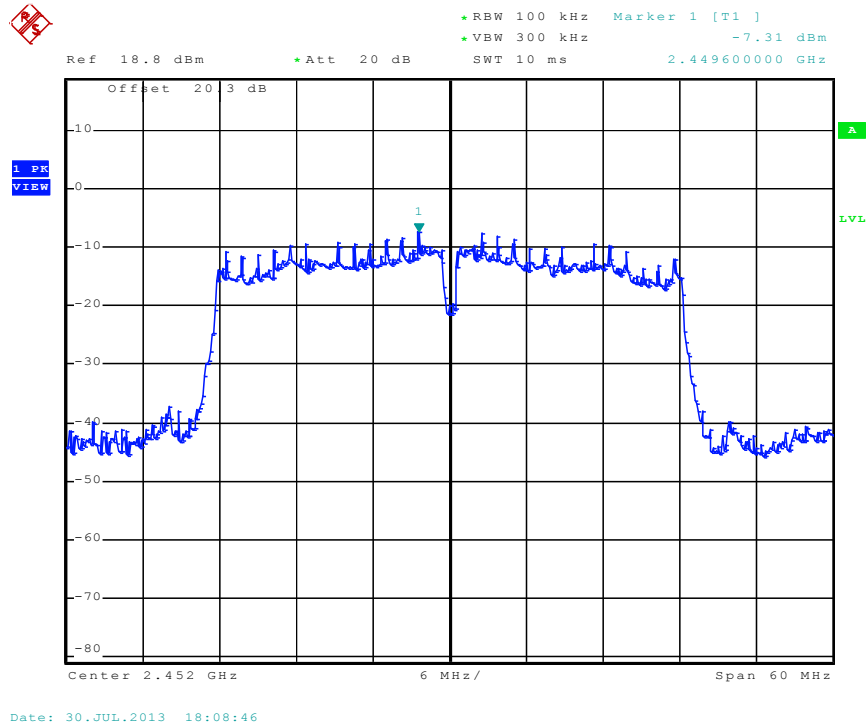
Date: 30.JUL.2013 18:08:25

### Chain 1

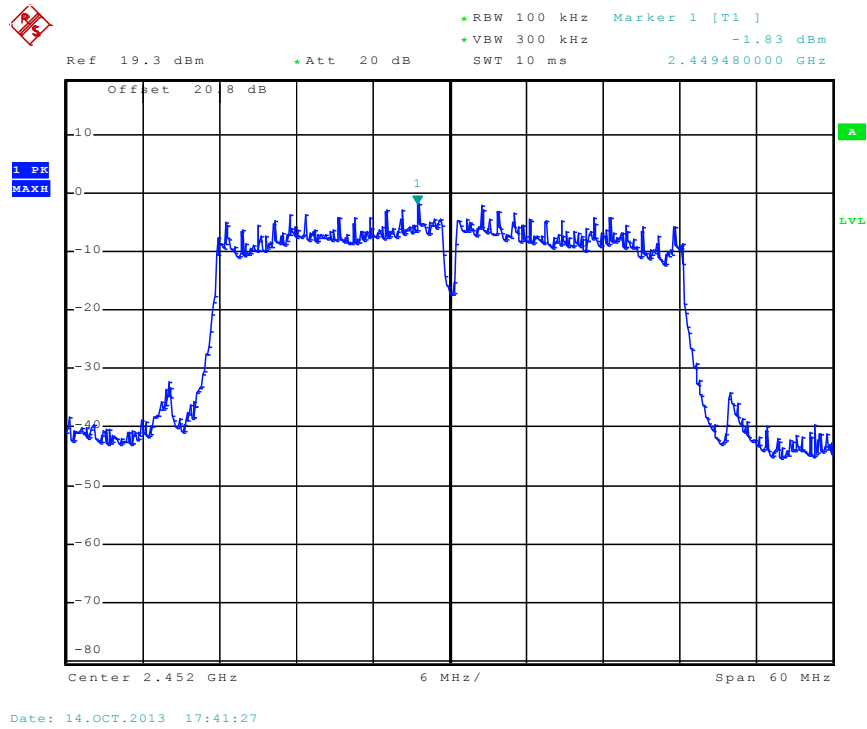


### 11n, HT40, Channel H

### Chain 0



Chain 1



## 6. Radiated emission

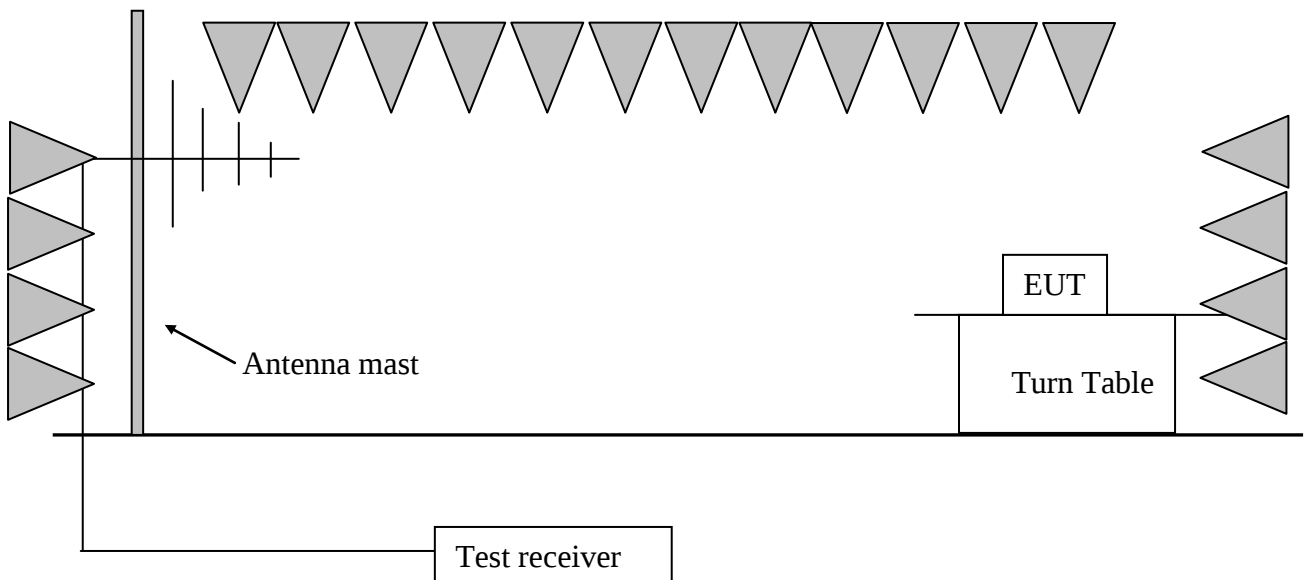
Test result: **PASS**

### 6.1 Test limit

The radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) showed as below:

| Frequency<br>(MHz) | Field Strength<br>(dBuV/m) | Measurement Distance<br>(m) |
|--------------------|----------------------------|-----------------------------|
| 30 - 88            | 40.0                       | 3                           |
| 88 - 216           | 43.5                       | 3                           |
| 216 - 960          | 46.0                       | 3                           |
| Above 960          | 54.0                       | 3                           |

### 6.2 Test Configuration



### 6.3 Test procedure and test setup

The measurement was applied in a semi-anechoic chamber. While testing for spurious emission higher than 1GHz, if applied, the pre-amplifier would be equipped just at the output terminal of the antenna.

The EUT and simulators were placed on a 0.8m high wooden turntable above the horizontal metal ground plane. The turn table rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mast. The antenna moved up and down between from 1meter to 4 meters to find out the maximum emission level.

The EUT was tested according to DTS test procedure of KDB558074 D01 DTS “Meas Guidance v03r01” (clause 10.2) for compliance to FCC 47CFR 15.247 requirements.

## 6.4 Test protocol

Mode 802.11b

| CH | Polarization | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|----|--------------|-----------------|-----------------------|----------------------------|----------------|-------------|----------|
| L  | V            | 2412.00         | 5.2                   | 112.0                      | Fundamental    | /           | PK       |
|    | V            | 74.71           | -27.7                 | 27.4                       | 40             | 12.6        | PK       |
|    | H            | 500.42          | -14.9                 | 34.4                       | 46             | 11.6        | PK       |
|    | H            | 624.83          | -12.6                 | 33.6                       | 46             | 12.4        | PK       |
|    | H            | 751.18          | -10.0                 | 34.3                       | 46             | 11.7        | PK       |
|    | H            | 875.59          | -8.2                  | 35.2                       | 46             | 10.8        | PK       |
|    | H            | 1000.00         | -6.8                  | 36.6                       | 54             | 17.4        | PK       |
|    | H            | 2375.00         | 3.6                   | 50.7                       | 74             | 23.3        | PK       |
|    | H            | 2375.00         | 3.6                   | 38.9                       | 54             | 15.1        | AV       |
|    | H            | 2503.00         | 3.6                   | 45.6                       | 74             | 28.4        | PK       |
|    | H            | 2503.00         | 3.6                   | 36.0                       | 54             | 18.0        | AV       |
|    | H            | 3216.00         | -4.7                  | 48.7                       | 54             | 5.3         | PK       |
|    | H            | 4824.00         | -0.9                  | 46.7                       | 54             | 7.3         | PK       |
| M  | V            | 74.71           | -27.7                 | 27.7                       | 40             | 12.3        | PK       |
|    | H            | 500.42          | -14.9                 | 35.0                       | 46             | 11.0        | PK       |
|    | H            | 624.83          | -12.6                 | 32.9                       | 46             | 13.1        | PK       |
|    | H            | 751.18          | -10.0                 | 32.6                       | 46             | 13.4        | PK       |
|    | H            | 875.59          | -8.2                  | 33.6                       | 46             | 12.4        | PK       |
|    | H            | 2375.00         | 3.6                   | 46.0                       | 74             | 28.0        | PK       |
|    | H            | 2375.00         | 3.6                   | 36.4                       | 54             | 17.6        | AV       |
|    | H            | 2503.00         | 3.6                   | 46.4                       | 74             | 27.6        | PK       |
|    | H            | 2503.00         | 3.6                   | 36.9                       | 54             | 17.1        | AV       |
|    | H            | 3249.20         | -5.1                  | 48.5                       | 54             | 5.5         | PK       |
|    | H            | 4874.00         | -0.7                  | 45.6                       | 54             | 8.4         | PK       |
| H  | V            | 2462.80         | 5.5                   | 111.5                      | Fundamental    | /           | PK       |
|    | V            | 30.00           | -24.1                 | 21.9                       | 40             | 18.1        | PK       |

|  |   |         |       |      |    |      |    |
|--|---|---------|-------|------|----|------|----|
|  | V | 76.21   | -27.7 | 27.1 | 40 | 12.9 | PK |
|  | V | 250.00  | -20.8 | 28.5 | 46 | 17.5 | PK |
|  | H | 500.00  | -14.9 | 37.3 | 46 | 8.7  | PK |
|  | H | 750.00  | -10.0 | 30.2 | 46 | 15.8 | PK |
|  | H | 1000.00 | -6.8  | 37.1 | 54 | 16.9 | PK |
|  | H | 2375.00 | 3.6   | 46.8 | 74 | 27.2 | PK |
|  | H | 2375.00 | 3.6   | 37.2 | 54 | 16.8 | AV |
|  | H | 2503.00 | 3.6   | 46.1 | 74 | 27.9 | PK |
|  | H | 2503.00 | 3.6   | 36.5 | 54 | 17.5 | AV |

## Mode 802.11g

| CH | Polarization | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|----|--------------|-----------------|-----------------------|----------------------------|----------------|-------------|----------|
| L  | V            | 2412.80         | 5.2                   | 109.5                      | Fundamental    | /           | PK       |
|    | V            | 30.00           | -24.1                 | 22.2                       | 40             | 17.8        | PK       |
|    | V            | 74.71           | -27.7                 | 27.6                       | 40             | 12.4        | PK       |
|    | H            | 500.42          | -14.9                 | 36.7                       | 46             | 9.3         | PK       |
|    | H            | 624.83          | -12.6                 | 29.1                       | 46             | 16.9        | PK       |
|    | H            | 875.59          | -8.2                  | 35.7                       | 46             | 10.3        | PK       |
|    | H            | 1000.00         | -6.8                  | 37.9                       | 54             | 16.1        | PK       |
|    | H            | 2375.00         | 3.6                   | 47.8                       | 74             | 26.2        | PK       |
|    | H            | 2375.00         | 3.6                   | 38.6                       | 54             | 15.4        | AV       |
|    | H            | 2503.00         | 3.6                   | 46.3                       | 74             | 27.7        | PK       |
|    | H            | 2503.00         | 3.6                   | 36.5                       | 54             | 17.5        | AV       |
|    | H            | 3216.00         | -4.7                  | 49.0                       | 54             | 5           | PK       |
| M  | V            | 2437.60         | 5.4                   | 110.2                      | Fundamental    | /           | PK       |
|    | V            | 30.00           | -24.1                 | 21.5                       | 40             | 18.5        | PK       |
|    | V            | 76.65           | -27.5                 | 27.9                       | 40             | 12.1        | PK       |
|    | H            | 500.42          | -14.9                 | 36.7                       | 46             | 9.3         | PK       |
|    | H            | 624.83          | -12.6                 | 33.3                       | 46             | 12.7        | PK       |

|   |   |         |       |       |             |      |    |
|---|---|---------|-------|-------|-------------|------|----|
|   | H | 751.18  | -10.0 | 33.5  | 46          | 12.5 | PK |
|   | H | 875.59  | -8.2  | 33.5  | 46          | 12.5 | PK |
|   | H | 2375.00 | 3.6   | 46.3  | 74          | 27.7 | PK |
|   | H | 2375.00 | 3.6   | 36.4  | 54          | 17.6 | AV |
|   | H | 2503.00 | 3.6   | 47.0  | 74          | 27.0 | PK |
|   | H | 2503.00 | 3.6   | 36.5  | 54          | 17.5 | AV |
|   | H | 3249.20 | -5.1  | 47.9  | 54          | 6.1  | PK |
|   | H | 4874.00 | -0.7  | 41.9  | 54          | 12.1 | PK |
| H | V | 2462.80 | 5.5   | 108.6 | Fundamental | /    | PK |
|   | V | 30.00   | -24.1 | 21.0  | 40          | 19.0 | PK |
|   | V | 76.65   | -27.5 | 27.0  | 40          | 13.0 | PK |
|   | H | 500.42  | -14.9 | 36.5  | 46          | 9.5  | PK |
|   | H | 751.18  | -10   | 32.6  | 46          | 13.4 | PK |
|   | H | 875.59  | -8.2  | 34.5  | 46          | 11.5 | PK |
|   | H | 1000.00 | -6.8  | 36.8  | 54          | 17.2 | PK |
|   | H | 2375.00 | 3.6   | 45.8  | 74          | 28.2 | PK |
|   | H | 2375.00 | 3.6   | 37.2  | 54          | 16.8 | AV |
|   | H | 2503.00 | 3.6   | 46.4  | 74          | 27.6 | PK |
|   | H | 2503.00 | 3.6   | 36.0  | 54          | 18.0 | AV |
|   | H | 3282.80 | -4.8  | 47.0  | 54          | 7.0  | PK |

## Mode 802.11n HT20

| CH | Polarization | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|----|--------------|-----------------|-----------------------|----------------------------|----------------|-------------|----------|
| L  | V            | 2410.40         | 5.1                   | 108.4                      | Fundamental    | /           | PK       |
|    | V            | 76.65           | -27.5                 | 26.7                       | 40             | 13.3        | PK       |
|    | H            | 500.42          | -14.9                 | 37.4                       | 46             | 8.6         | PK       |
|    | H            | 624.83          | -12.6                 | 32.5                       | 46             | 13.5        | PK       |
|    | H            | 667.60          | -11.8                 | 30.3                       | 46             | 15.7        | PK       |
|    | H            | 751.18          | -10.0                 | 30.7                       | 46             | 15.3        | PK       |
|    | H            | 875.59          | -8.2                  | 34.0                       | 46             | 12.0        | PK       |

|   |   |         |       |       |             |      |    |
|---|---|---------|-------|-------|-------------|------|----|
|   | H | 2375.00 | 3.6   | 49.6  | 74          | 24.4 | PK |
|   | H | 2375.00 | 3.6   | 38.9  | 54          | 15.1 | AV |
|   | H | 2503.00 | 3.6   | 45.9  | 74          | 28.1 | PK |
|   | H | 2503.00 | 3.6   | 36.5  | 54          | 17.5 | AV |
|   | H | 3216.00 | -4.7  | 48.2  | 54          | 5.8  | PK |
| M | V | 2436.00 | 5.5   | 108.8 | Fundamental | /    | PK |
|   | V | 74.71   | -27.7 | 27.8  | 40          | 12.2 | PK |
|   | H | 500.42  | -14.9 | 37.3  | 46          | 8.7  | PK |
|   | H | 624.83  | -12.6 | 32.0  | 46          | 14.0 | PK |
|   | H | 751.18  | -10   | 31.3  | 46          | 14.7 | PK |
|   | H | 875.59  | -8.2  | 34.2  | 46          | 11.8 | PK |
|   | H | 1000.00 | -6.8  | 37.8  | 54          | 16.2 | PK |
|   | H | 2375.00 | 3.6   | 46.4  | 74          | 27.6 | PK |
|   | H | 2375.00 | 3.6   | 36.4  | 54          | 17.6 | AV |
|   | H | 2503.00 | 3.6   | 45.9  | 74          | 28.1 | PK |
|   | H | 2503.00 | 3.6   | 36.9  | 54          | 17.1 | AV |
|   | H | 3249.20 | -5.1  | 47.5  | 54          | 6.5  | PK |
| H | V | 2463.60 | 5.5   | 107.8 | Fundamental | /    | PK |
|   | V | 76.65   | -27.5 | 26.5  | 40          | 13.5 | PK |
|   | V | 249.66  | -20.8 | 28.8  | 46          | 17.2 | PK |
|   | H | 500.42  | -14.9 | 37.7  | 46          | 8.3  | PK |
|   | H | 667.60  | -11.8 | 29.6  | 46          | 16.4 | PK |
|   | H | 751.18  | -10   | 30.8  | 46          | 15.2 | PK |
|   | H | 1000.00 | -6.8  | 36.8  | 54          | 17.2 | PK |
|   | H | 2375.00 | 3.6   | 47.3  | 74          | 26.7 | PK |
|   | H | 2375.00 | 3.6   | 36.4  | 54          | 17.6 | AV |
|   | H | 2503.00 | 3.6   | 45.6  | 74          | 28.4 | PK |
|   | H | 2503.00 | 3.6   | 36.5  | 54          | 17.5 | AV |
|   | H | 3282.80 | -4.8  | 47.0  | 54          | 7.0  | PK |
|   | H | 4924.00 | -0.5  | 41.7  | 54          | 12.3 | PK |

## Mode 802.11n HT40

| CH | Polarization | Frequency (MHz) | Correct Factor (dB/m) | Corrected Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|----|--------------|-----------------|-----------------------|----------------------------|----------------|-------------|----------|
| L  | V            | 2412.42         | 5.2                   | 109.4                      | Fundamental    | /           | PK       |
|    | V            | 30.00           | -24.1                 | 22.3                       | 40             | 17.7        | PK       |
|    | V            | 76.65           | -27.5                 | 27.0                       | 40             | 13.0        | PK       |
|    | H            | 500.42          | -14.9                 | 37.9                       | 46             | 8.1         | PK       |
|    | H            | 751.18          | -10                   | 30.8                       | 46             | 15.2        | PK       |
|    | H            | 920.30          | -7.4                  | 31.1                       | 46             | 14.9        | PK       |
|    | H            | 1000.00         | -6.8                  | 37.4                       | 54             | 16.6        | PK       |
|    | H            | 2375.00         | 3.6                   | 51.4                       | 74             | 22.6        | PK       |
|    | H            | 2375.00         | 3.6                   | 41.1                       | 54             | 12.9        | AV       |
|    | H            | 2503.00         | 3.6                   | 46.1                       | 74             | 27.9        | PK       |
|    | H            | 2503.00         | 3.6                   | 36.5                       | 54             | 17.5        | AV       |
|    | H            | 3216.00         | -4.7                  | 49.2                       | 54             | 4.8         | PK       |
| M  | V            | 2437.20         | 5.4                   | 110.3                      | Fundamental    | /           | PK       |
|    | V            | 76.65           | -27.5                 | 27.1                       | 40             | 12.9        | PK       |
|    | H            | 500.42          | -14.9                 | 35.5                       | 46             | 10.5        | PK       |
|    | H            | 624.83          | -12.6                 | 33.5                       | 46             | 12.5        | PK       |
|    | H            | 751.18          | -10                   | 34.2                       | 46             | 11.8        | PK       |
|    | H            | 875.59          | -8.2                  | 31.6                       | 46             | 14.4        | PK       |
|    | H            | 1000.00         | -6.8                  | 37.2                       | 54             | 16.8        | PK       |
|    | H            | 2375.00         | 3.6                   | 47.3                       | 74             | 26.7        | PK       |
|    | H            | 2375.00         | 3.6                   | 36.8                       | 54             | 17.2        | AV       |
|    | H            | 2503.00         | 3.6                   | 45.1                       | 74             | 28.9        | PK       |
|    | H            | 2503.00         | 3.6                   | 36.5                       | 54             | 17.5        | AV       |
|    | H            | 3249.20         | -5.1                  | 46.7                       | 54             | 7.3         | PK       |
| H  | V            | 2462.80         | 5.5                   | 109.0                      | Fundamental    | /           | PK       |
|    | V            | 74.71           | -27.7                 | 26.5                       | 40             | 13.5        | PK       |
|    | H            | 500.42          | -14.9                 | 35.1                       | 46             | 10.9        | PK       |

|   |         |       |      |    |      |    |
|---|---------|-------|------|----|------|----|
| H | 624.83  | -12.6 | 33.9 | 46 | 12.1 | PK |
| H | 667.60  | -11.8 | 30.0 | 46 | 16.0 | PK |
| H | 751.18  | -10.0 | 34.3 | 46 | 11.7 | PK |
| H | 920.30  | -7.4  | 31.2 | 46 | 14.8 | PK |
| H | 2375.00 | 3.6   | 47.5 | 74 | 26.5 | PK |
| H | 2375.00 | 3.6   | 37.2 | 54 | 16.8 | AV |
| H | 2503.00 | 3.6   | 46.7 | 74 | 27.3 | PK |
| H | 2503.00 | 3.6   | 36.9 | 54 | 17.1 | AV |
| H | 3282.80 | -4.8  | 47.0 | 54 | 7.0  | PK |

Remark: 1. Correct Factor = Antenna Factor + Cable Loss (-Amplifier, is employed)

2. Corrected Reading = Original Receiver Reading + Correct Factor

3. Margin = limit – Corrected Reading

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,

Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10dBuV.

Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m; Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m

Assuming limit = 54dBuV/m, Corrected Reading = 10.20dBuV/m, then Margin = 54 -10.20 = 43.80dBuV/m

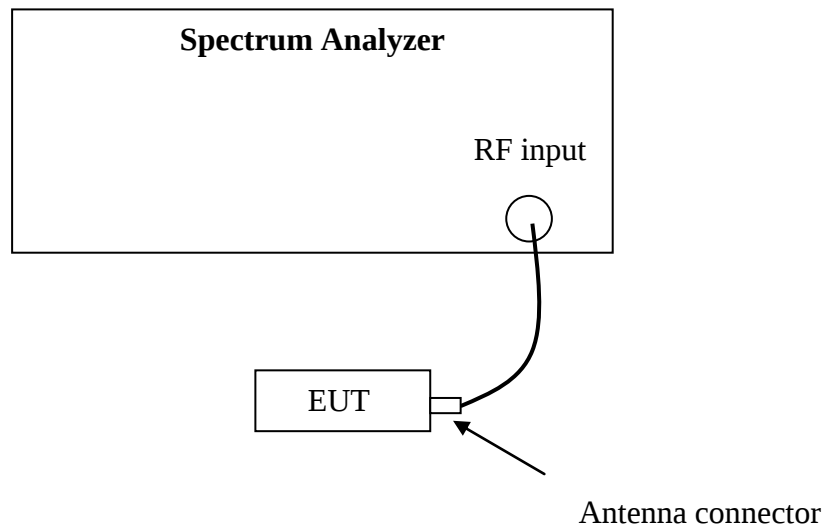
## 7. Emission outside the frequency Band

**Test result:** PASS

### 7.1 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.

### 7.2 Test Configuration



### 7.3 Test procedure and test setup

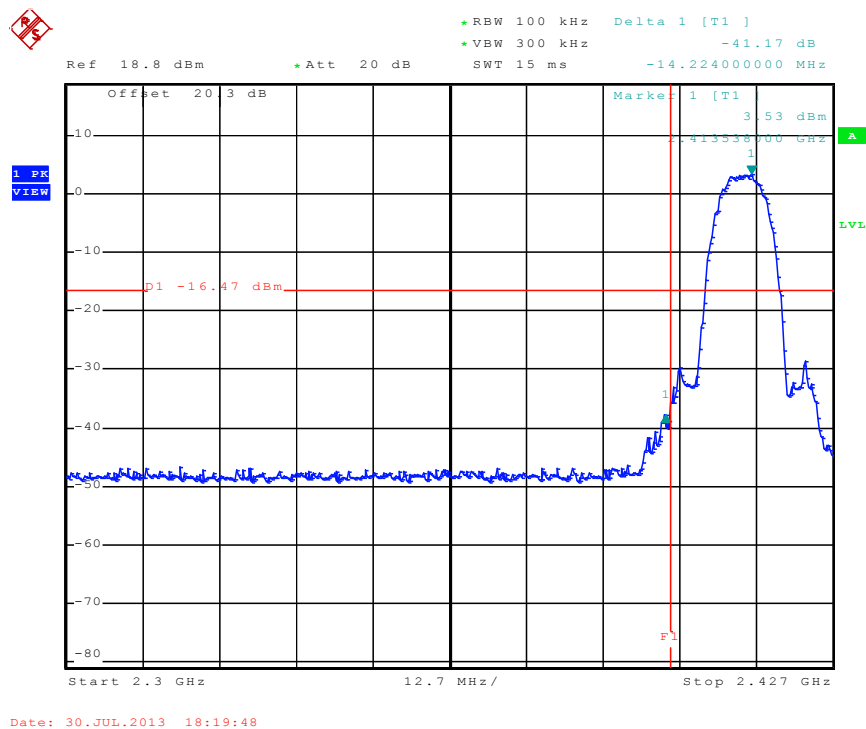
The Emission outside the frequency Band per FCC §15.247(d) is measured using the Spectrum Analyzer with the resolutions bandwidth set at 100kHz, the video bandwidth set at 300kHz, and the SPAN>>RBW.

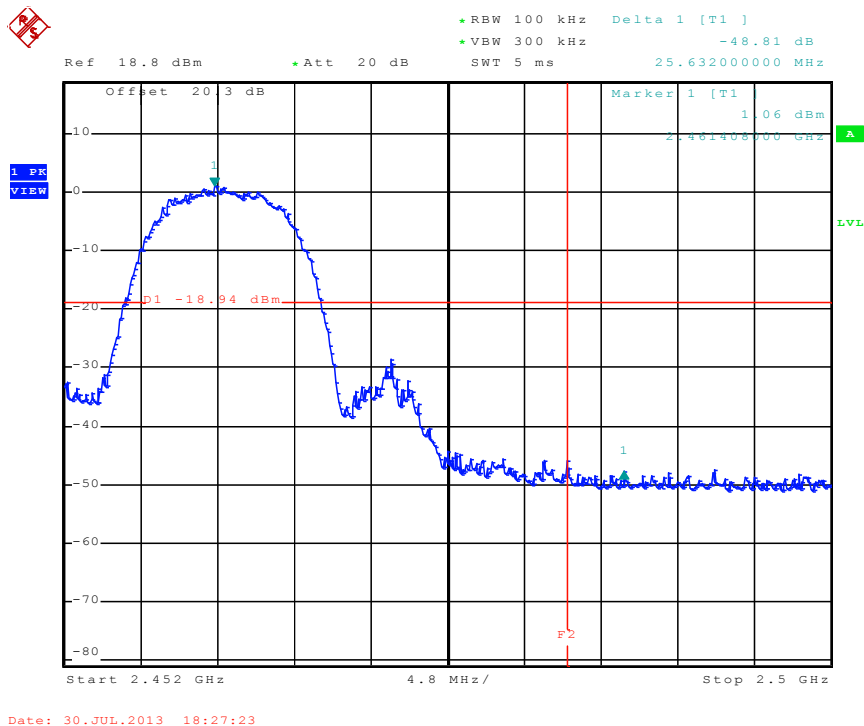
The EUT was tested according to DTS test procedure of “KDB558074 D01 DTS Meas Guidance v03r01” (clause 11.0) for compliance to FCC 47CFR 15.247 requirements.

## 7.4 Test protocol

| Mode    | CH | Max reading among band (dBm) | The most restrict Attenuation outside band (dB) | Limit (dB) |
|---------|----|------------------------------|-------------------------------------------------|------------|
| 802.11b | L  | 3.53                         | 41.17                                           | ≥20        |
|         | M  | 3.13                         | 44.14                                           |            |
|         | H  | 1.06                         | 48.81                                           |            |

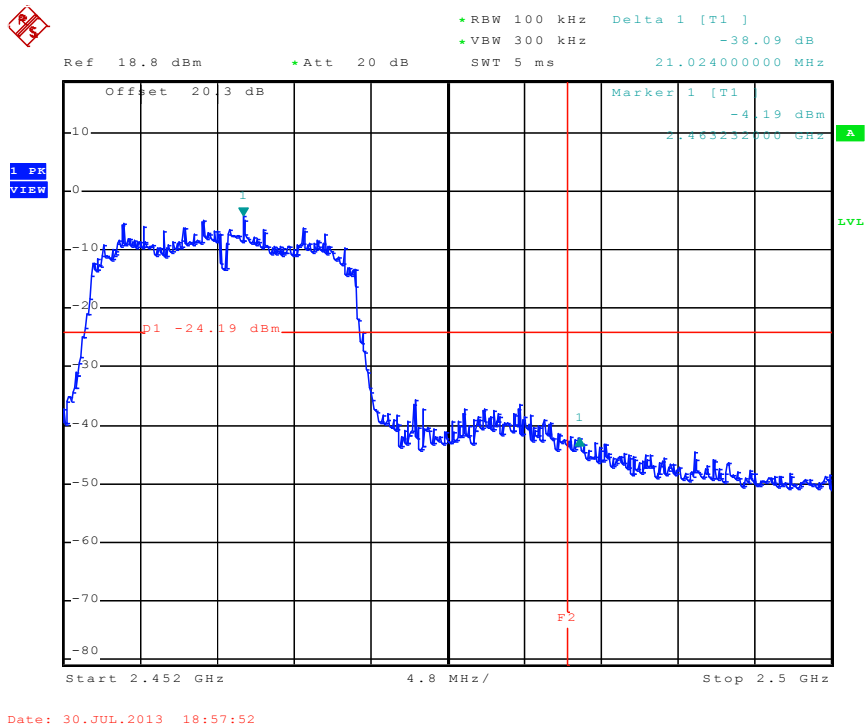
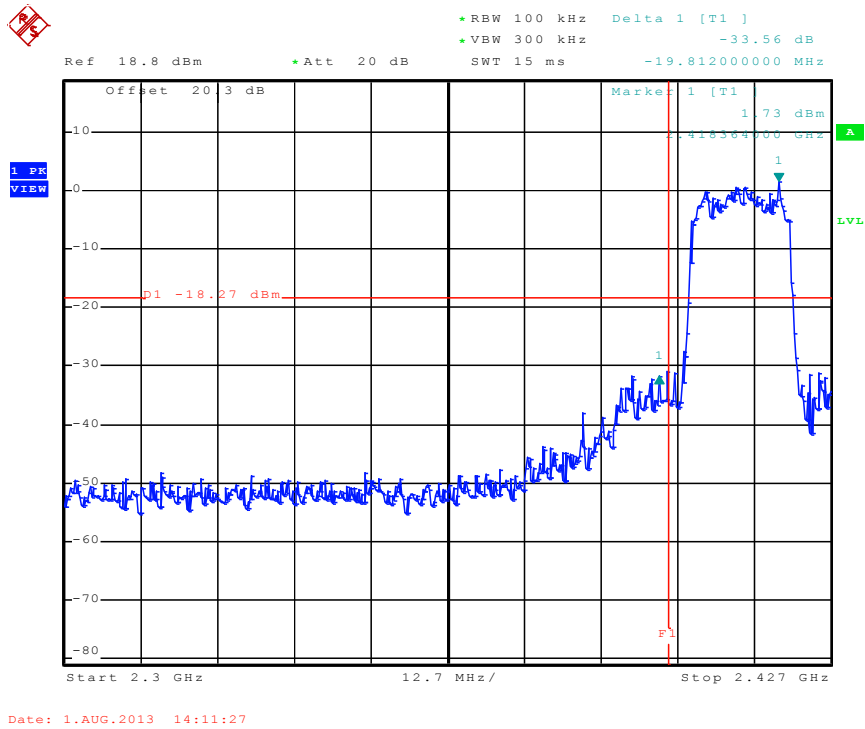
Note: The test was performed from 9kHz to 26GHz and the worst graph of band edge emission is listed below.





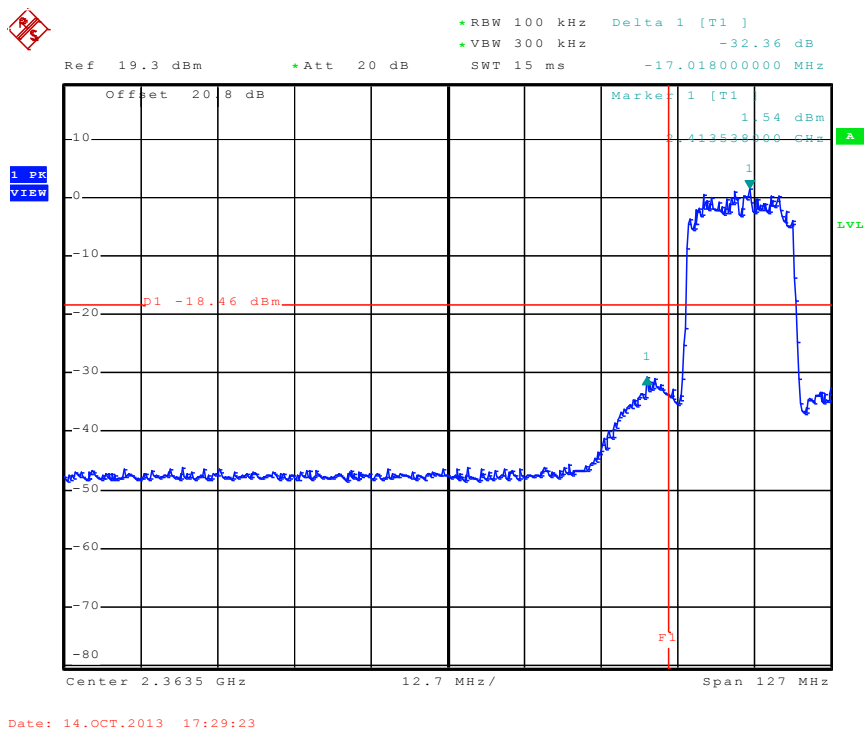
| Mode    | CH | Max reading among band (dBm) | The most restrict Attenuation outside band (dB) | Limit (dB) |
|---------|----|------------------------------|-------------------------------------------------|------------|
| 802.11g | L  | 1.73                         | 33.56                                           | ≥20        |
|         | M  | -1.03                        | 35.13                                           |            |
|         | H  | -4.19                        | 38.09                                           |            |

Note: The test was performed from 9kHz to 26GHz and the worst graph of band edge emission is listed below.

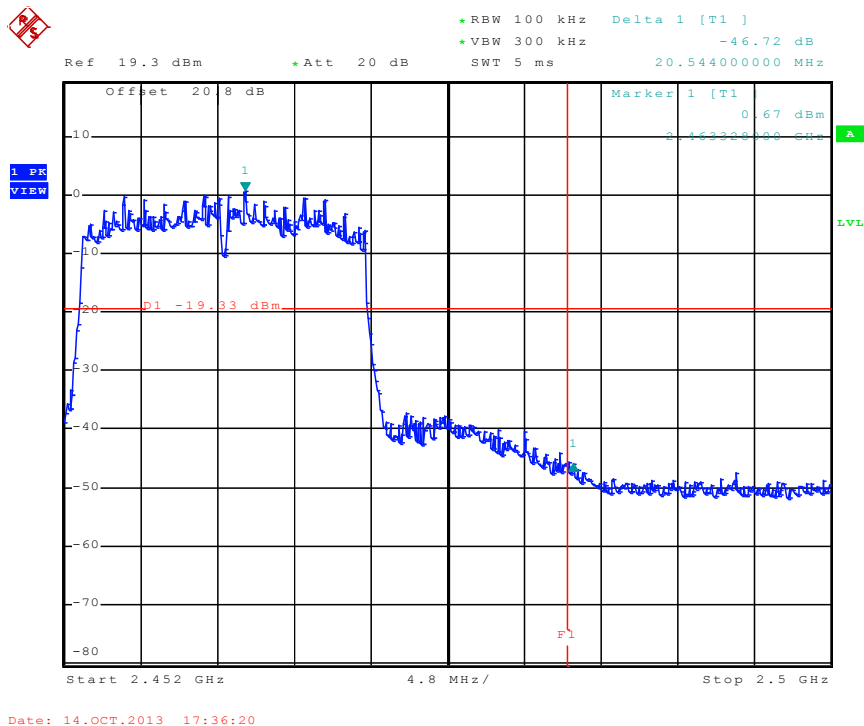


| Mode      | CH | Max reading among band (dBm) | The most restrict Attenuation outside band (dB) | Limit (dB) |
|-----------|----|------------------------------|-------------------------------------------------|------------|
| 11n, HT20 | L  | 1.54                         | 32.36                                           | ≥20        |
|           | M  | 1.25                         | 35.68                                           |            |
|           | H  | 0.67                         | 46.72                                           |            |

Note: The test was performed from 9kHz to 26GHz and the worst graph of band edge emission is listed below.

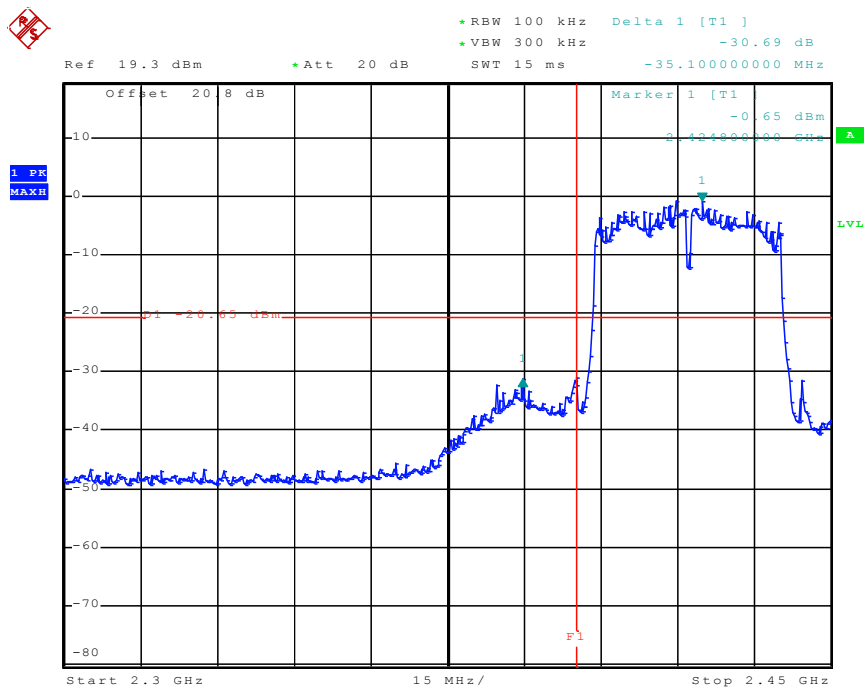


Date: 14.OCT.2013 17:29:23

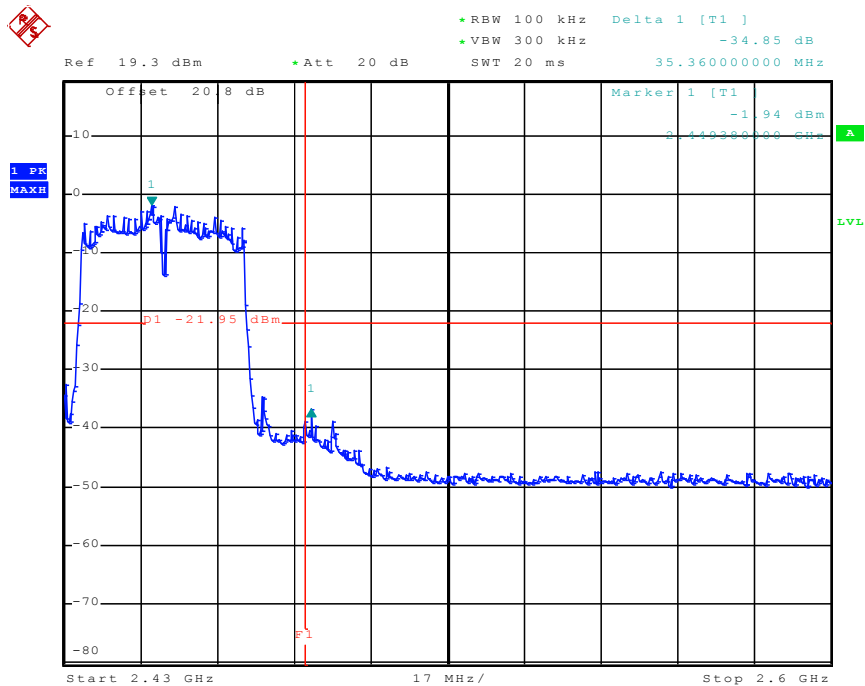


| Mode      | CH | Max reading<br>among band<br>(dBm) | The most restrict<br>Attenuation outside band<br>(dB) | Limit<br>(dB) |
|-----------|----|------------------------------------|-------------------------------------------------------|---------------|
| 11n, HT40 | L  | -0.65                              | 30.69                                                 | ≥20           |
|           | M  | -1.13                              | 32.35                                                 |               |
|           | H  | -1.94                              | 34.85                                                 |               |

Note: The test was performed from 9kHz to 26GHz and the worst graph of band edge emission is listed below.



Date: 14.OCT.2013 17:53:47



Date: 14.OCT.2013 17:56:21

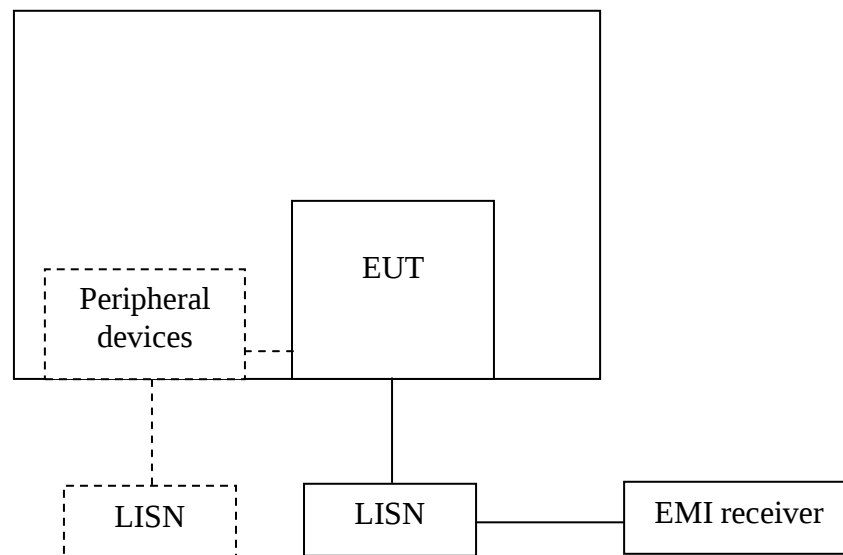
## 8. Power line conducted emission

**Test result:**      **Pass**

### 8.1 Limit

| Frequency of Emission (MHz)                      | Conducted Limit (dBuV) |            |
|--------------------------------------------------|------------------------|------------|
|                                                  | QP                     | AV         |
| 0.15-0.5                                         | 66 to 56*              | 56 to 46 * |
| 0.5-5                                            | 56                     | 46         |
| 5-30                                             | 60                     | 50         |
| * Decreases with the logarithm of the frequency. |                        |            |

### 8.2 Test configuration



☒ For table top equipment, wooden support is 0.8m height table

☐ For floor standing equipment, wooden support is 0.1m height rack.

### 8.3 Test procedure and test set up

The EUT are connected to the main power through a line impedance stabilization network (LISN). This provides a  $50\Omega/50\mu\text{H}$  coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a  $50\Omega/50\mu\text{H}$  coupling impedance with  $50\Omega$  termination.

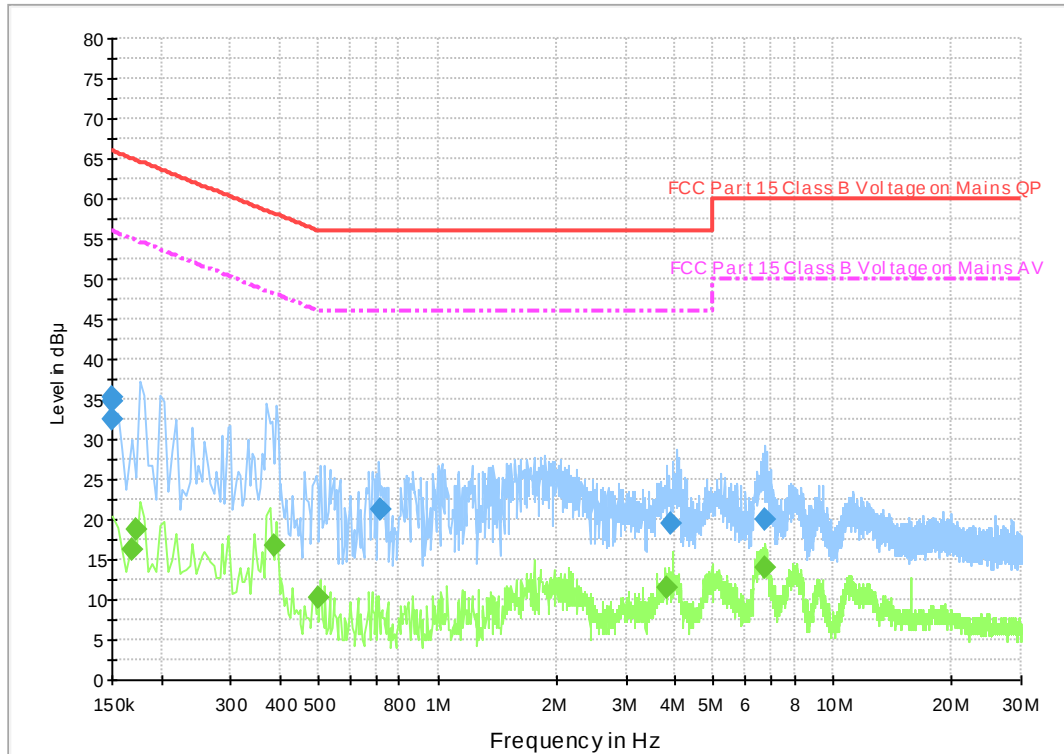
Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4 on conducted measurement. The bandwidth of the test receiver is set at 9 kHz.

## 8.4 Test protocol

All the modes were tested and the data of the worst mode (802.11n HT40 dual chain) was listed in the report.

L line

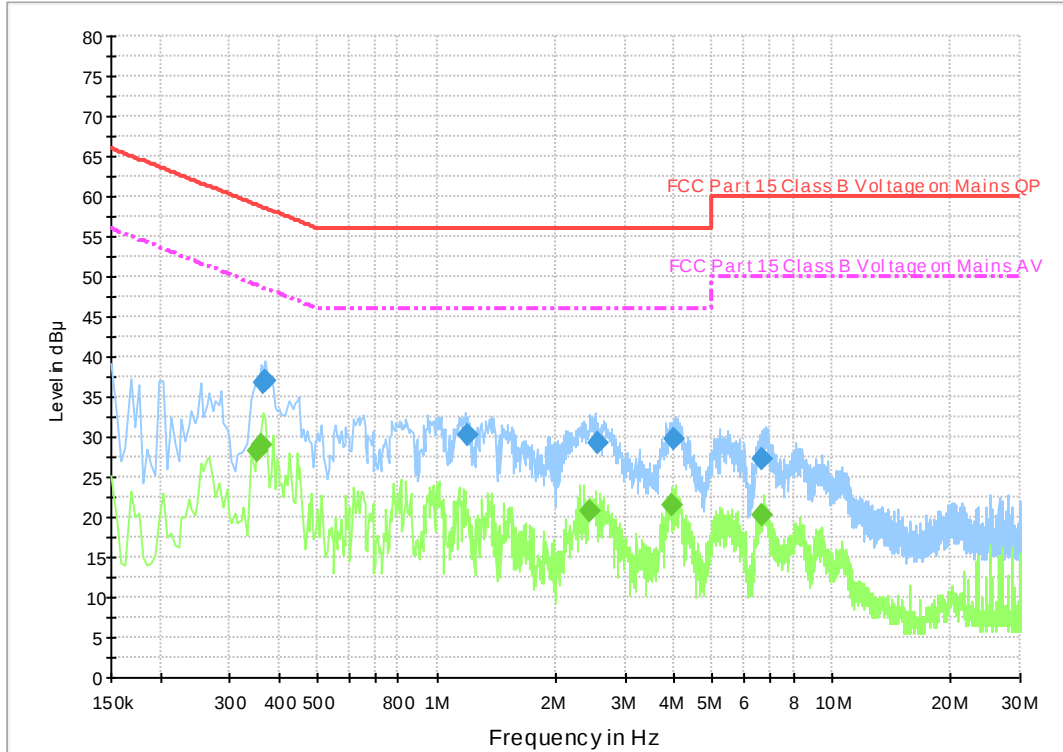
Voltage with 2-Line-LISN



| Frequency (MHz)                                                                                                       | level dB(μV) | Correction Factor (dB) | Limit dB(μV) | Margin (dB) | Detector |
|-----------------------------------------------------------------------------------------------------------------------|--------------|------------------------|--------------|-------------|----------|
| 0.15                                                                                                                  | 35.3         | 9.7                    | 66.0         | 30.7        | QP       |
| 0.15                                                                                                                  | 34.8         | 9.7                    | 66.0         | 31.2        | QP       |
| 0.15                                                                                                                  | 32.6         | 9.7                    | 66.0         | 33.4        | QP       |
| 0.71                                                                                                                  | 21.2         | 9.7                    | 56.0         | 34.8        | QP       |
| 3.90                                                                                                                  | 19.6         | 9.8                    | 56.0         | 36.4        | QP       |
| 6.72                                                                                                                  | 20.1         | 10.0                   | 60.0         | 39.9        | QP       |
| 0.17                                                                                                                  | 16.3         | 9.7                    | 55.1         | 38.7        | AV       |
| 0.17                                                                                                                  | 18.7         | 9.7                    | 54.8         | 36.2        | AV       |
| 0.38                                                                                                                  | 16.8         | 9.8                    | 48.2         | 31.4        | AV       |
| 0.50                                                                                                                  | 10.2         | 9.8                    | 46.0         | 35.8        | AV       |
| 3.81                                                                                                                  | 11.6         | 9.8                    | 46.0         | 34.4        | AV       |
| 6.71                                                                                                                  | 13.9         | 10.0                   | 50.0         | 36.1        | AV       |
| Remark: 1. Correction Factor (dB) = LISN Factor (dB) + Cable Loss (dB).<br>2. Margin (dB) = Limit - Corrected Reading |              |                        |              |             |          |

# N line

Voltage with 2-Line-LISN



| Frequency (MHz) | level dB(μV) | Correction Factor (dB) | Limit dB(μV) | Margin (dB) | Detector |
|-----------------|--------------|------------------------|--------------|-------------|----------|
| 0.37            | 36.8         | 9.7                    | 58.6         | 21.8        | QP       |
| 0.37            | 37.0         | 9.7                    | 58.5         | 21.5        | QP       |
| 1.20            | 30.2         | 9.6                    | 56.0         | 25.8        | QP       |
| 2.56            | 29.3         | 9.9                    | 56.0         | 26.7        | QP       |
| 3.98            | 29.7         | 9.9                    | 56.0         | 26.3        | QP       |
| 6.69            | 27.2         | 9.9                    | 60.0         | 32.8        | QP       |
| 0.35            | 28.3         | 9.7                    | 48.9         | 20.7        | AV       |
| 0.36            | 29.1         | 9.7                    | 48.7         | 19.6        | AV       |
| 2.45            | 20.7         | 9.9                    | 46.0         | 25.3        | AV       |
| 3.92            | 21.4         | 9.9                    | 46.0         | 24.6        | AV       |
| 6.67            | 20.1         | 9.9                    | 50.0         | 29.9        | AV       |

Remark: 1. Correction Factor (dB) = LISN Factor (dB) + Cable Loss (dB).  
2. Margin (dB) = Limit - Corrected Reading