

# FCC Test Report

**Application Purpose** : Original grant  
**Applicant Name:** : INFINIX MOBILITY LIMITED  
**FCC I D** : 2AIZN-X521  
**Equipment Type** : Mobile phone  
**Model Name** : X521  
**Report Number** : FCC16053699-5  
**Standard(S)** : FCC Part 15 Subpart C  
**Date Of Receipt** : May 31, 2016  
**Date Of Issue** : June 16, 2016

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**REPORT REVISE RECORD**

| Report Version | Revise Time | Issued Date   | Valid Version | Notes           |
|----------------|-------------|---------------|---------------|-----------------|
| V1.0           | /           | June 16, 2016 | Valid         | Original Report |

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## 1. GENERAL INFORMATION

### GENERAL DESCRIPTION OF EUT

|                          |                                                                                                                 |
|--------------------------|-----------------------------------------------------------------------------------------------------------------|
| Test Model               | X521                                                                                                            |
| Applicant                | INFINIX MOBILITY LIMITED                                                                                        |
| Address                  | RMS 05-15, 13A/F SOUTH TOWER WORLD FINANCE CTR HARBOUR CITY 17 CANTON RD TST KLN HONG KONG                      |
| Manufacturer             | SHENZHEN TECNO TECHNOLOGY CO.,LTD.                                                                              |
| Address                  | 1-4th Floor,3rd Building,Pacific Industrial Park,No.2088,Shenyan Road,Yantian District,Shenzhen,Guangdong,China |
| Equipment Type           | Mobile phone                                                                                                    |
| Brand Name               | <b>Infinix</b>                                                                                                  |
| Hardware version:        | X521-J5086-B1-M-20160502                                                                                        |
| Software version:        | V1.2                                                                                                            |
| Extreme Temp. Tolerance  | -10℃ to +55℃                                                                                                    |
| Battery information:     | Li-ion Battery : BL-30QX<br>Voltage: 3.8V Capacity: 3000mAh<br>Limited Charge Voltage: 4.35V                    |
| Adapter Information:     | Adapter: A88-501500<br>Input: AC 100-240V 50-60Hz 0.35A<br>Output: DC 5V 1.5A                                   |
| Operating Frequency      | 2412-2462MHz                                                                                                    |
| Channels                 | 13                                                                                                              |
| Channel Spacing          | 5MHz                                                                                                            |
| Modulation Type          | CCK for IEEE 802.11b<br>OFDM for IEEE 802.11g/n HT-20/n HT-40                                                   |
| Antenna Type:            | Integral Antenna                                                                                                |
| Antenna gain:            | 1.55dBi                                                                                                         |
| Data of receipt          | May 31, 2016                                                                                                    |
| Date of test             | June 01, 2015, 2016 to June 11, 201                                                                             |
| Deviation                | None                                                                                                            |
| Condition of Test Sample | Normal                                                                                                          |

**We hereby certify that:**

The above equipment was tested by Shenzhen WST Testing Technology Co., Ltd.

The data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C 63.4:2009 and TIA/EIA 603. The sample tested as described in this report is in compliance with the FCC Rules Part15 Subpart C.

The test results of this report relate only to the tested sample identified in this report.

## 2. TEST DESCRIPTION

### 2.1 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately **95 %**.

| No. | Item                          | Uncertainty               |
|-----|-------------------------------|---------------------------|
| 1   | Conducted Emission Test       | $\pm 3.2\text{dB}$        |
| 2   | RF power, conducted           | $\pm 0.16\text{dB}$       |
| 3   | Spurious emissions, conducted | $\pm 0.21\text{dB}$       |
| 4   | All emissions, radiated(<1G)  | $\pm 4.7\text{dB}$        |
| 5   | All emissions, radiated(>1G)  | $\pm 4.7\text{dB}$        |
| 6   | Temperature                   | $\pm 0.5^{\circ}\text{C}$ |
| 7   | Humidity                      | $\pm 2\%$                 |

## 2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

| Pretest Mode | Description |
|--------------|-------------|
| Mode 1       | 802.11b     |
| Mode 2       | 802.11g     |
| Mode 3       | 802.11n20   |
| Mode 4       | 802.11n40   |

| For Conducted Emission |             |
|------------------------|-------------|
| Final Test Mode        | Description |
| Mode 1                 | 802.11b     |

| For Radiated Emission |             |
|-----------------------|-------------|
| Final Test Mode       | Description |
| Mode 1                | 802.11b     |
| Mode 2                | 802.11g     |
| Mode 3                | 802.11n20   |
| Mode 4                | 802.11n40   |

Note:

**(1) The measurements are performed at the highest, middle, lowest available channels.**

**(2) The EUT use new battery.**

**(3) The data rate was set in 1Mbps, 6 Mbps, 6.5 Mbps and 13.5M for radiated emission due to the highest RF output power.**

**(4) Record the worst case of each test item in this report.**

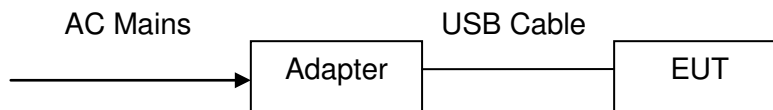
## 2.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

|                       |            |
|-----------------------|------------|
| Test software Version | N/A        |
| Test program          | *#3646633# |

|                          |          |          |          |
|--------------------------|----------|----------|----------|
| Frequency(802.11b/g/n20) | 2412 MHz | 2437 MHz | 2462 MHz |
| Frequency(802.11n40)     | 2422 MHz | 2437 MHz | 2452 MHz |

## 2.4 CONFIGURATION OF SYSTEM UNDER TEST



(EUT: Mobile phone)

| I/O Port of EUT |      |                          |             |
|-----------------|------|--------------------------|-------------|
| I/O Port Type   | Q'TY | Cable                    | Tested with |
| USB port        | 1    | 1m USB cable, unshielded | 1           |
| Power           | 1    | 1m                       | 1           |

## 2.5 DESCRIPTION OF SUPPORT UNITS (CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| Item | Equipment | Mfr/Brand | Model/Type No. | Series No. | Note |
|------|-----------|-----------|----------------|------------|------|
| 1    | Adapter   | /         | A88-501500     | /          | /    |
| 2    | Earphone  | /         | /              | /          | /    |

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.
- (4) The adapter supply by the applicant.

### 3. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

| FCC Part15 (15.247) , Subpart C |                                                                                                                                                        |          |          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|
| Standard Section                | Test Item                                                                                                                                              | Judgment | Remark   |
| 15.107 & 15.207                 | Conducted Emission Test                                                                                                                                | PASS     | Complies |
| 15.247(a)(2) Limit              | Spectrum bandwidth of a Orthogonal Frequency Division Multiplex System<br>Limit: 6dB bandwidth>500kHz                                                  | PASS     | Complies |
| 15.247(b)                       | Maximum peak outputpower<br>Limit: max. 30dBm                                                                                                          | PASS     | Complies |
| 15.109,15.205 & 15.209          | Transmitter Radiated Emission<br>Limit: Table 15.209                                                                                                   | PASS     | Complies |
| 15.247(e)                       | Power Spectral Density<br>Limit: max. 8dBm                                                                                                             | PASS     | Complies |
| 15.247(d)                       | Out of Band Emission and Restricted Band Radiation<br>Limit: 20dB less than peak value of fundamental frequency<br>Restricted band limit: Table 15.209 | PASS     | Complies |

**NOTE:**

(1)" N/A" denotes test is not applicable in this test report.

**4. MEASUREMENT INSTRUMENTS**

| Kind of Equipment         | Manufacturer           | Type No.    | Serial No. | Last Calibrated | Calibrated until |
|---------------------------|------------------------|-------------|------------|-----------------|------------------|
| EMI Test Receiver         | R&S                    | ESCI        | 100005     | 2015-08-18      | 2016-08-17       |
| Ultra Broadband ANT       | R&S                    | HL562       | 100157     | 2015-08-18      | 2016-08-17       |
| pre-amplifier             | CDSI                   | PAP-1G18-38 | --         | 2015-08-18      | 2016-08-17       |
| System Controller         | CT                     | SC100       | -          | 2015-08-18      | 2016-08-17       |
| Bi-log Antenna            | Chase                  | CBX521111C  | 2576       | 2015-08-18      | 2016-08-17       |
| Spectrum analyzer         | R&S                    | FSU26       | 200409     | 2015-08-18      | 2016-08-17       |
| Horn Antenna              | SCHWARZBECK            | 9120D       | 1141       | 2015-08-18      | 2016-08-17       |
| Bi-log Antenna            | Schwarebeck            | VULB9163    | 9163/340   | 2015-08-18      | 2016-08-17       |
| Loop Antenna              | EMCO                   | 6502        | 00042960   | 2015-08-21      | 2016-08-20       |
| Pre Amplifier             | H.P.                   | HP8447E     | 2945A02715 | 10/12/2015      | 10/11/2016       |
| Pre-Amplifier             | CDSI                   | PAP-1G18-38 | --         | 10/12/2015      | 10/11/2016       |
| 9*6*6 Anechoic            | --                     | --          | --         | 08/20/2015      | 08/19/2016       |
| Horn Antenna              | COMPLIANCE ENGINEERING | CE18000     | --         | 09/12/2015      | 09/11/2016       |
| Horn Antenna              | SCHWARZBECK            | BBHA9120D   | 9120D-631  | 08/22/2015      | 08/21/2016       |
| Power meter               | Anritsu                | ML2487A     | 6K00003613 | 08/22/2015      | 08/21/2016       |
| Power meter               | Anritsu                | MA2491A     | 32263      | 08/22/2015      | 08/21/2016       |
| H & T Chamber             | Guangzhou gongwen      | GDJS-500-40 | 0329       | 08/18/2015      | 08/17/2016       |
| EXA Signal Analyzer       | Aglient                | N9020A      | --         | 08/18/2015      | 08/17/2016       |
| USB Wideband Power Sensor | Aglient                | U2021XA     | --         | 08/18/2015      | 08/17/2016       |
| RF cable                  | H+S                    | --          | --         | 08/18/2015      | 08/17/2016       |

## 5. EMC EMISSION TEST

### 5.1 CONDUCTED EMISSION MEASUREMENT

#### 5.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

| FREQUENCY (MHz) | Class A (dBuV) |         | Class B (dBuV) |           | Standard |
|-----------------|----------------|---------|----------------|-----------|----------|
|                 | Quasi-peak     | Average | Quasi-peak     | Average   |          |
| 0.15 -0.5       | 79.00          | 66.00   | 66 - 56 *      | 56 - 46 * | FCC      |
| 0.50 -5.0       | 73.00          | 60.00   | 56.00          | 46.00     | FCC      |
| 5.0 -30.0       | 73.00          | 60.00   | 60.00          | 50.00     | FCC      |

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

| Receiver Parameters | Setting  |
|---------------------|----------|
| Attenuation         | 10 dB    |
| Start Frequency     | 0.15 MHz |
| Stop Frequency      | 30 MHz   |
| IF Bandwidth        | 9 kHz    |

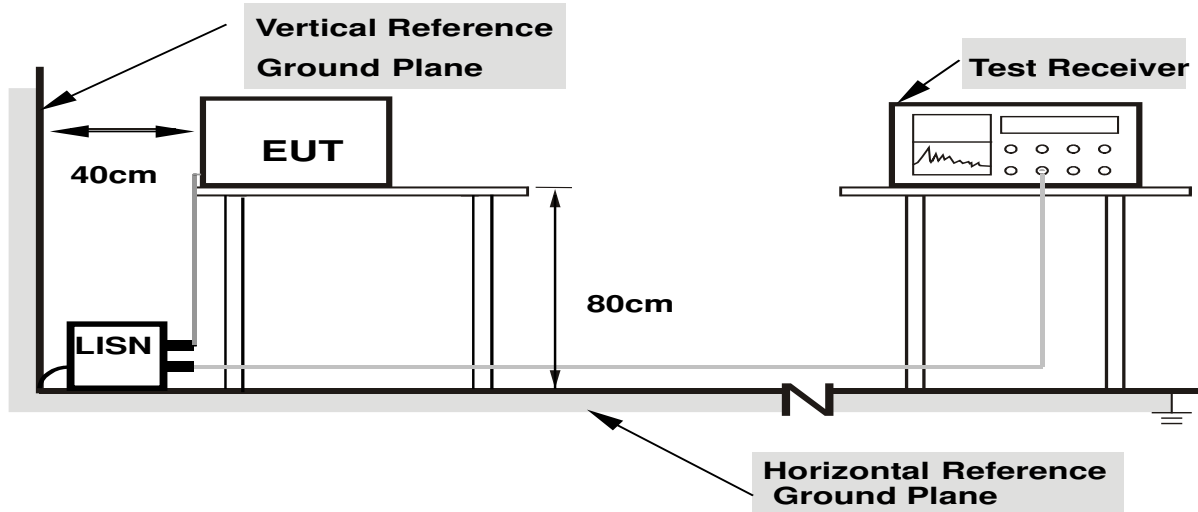
### 5.1.2 TEST PROCEDURE

- The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

### 5.1.3 DEVIATION FROM TEST STANDARD

No deviation

### 5.1.4 TEST SETUP



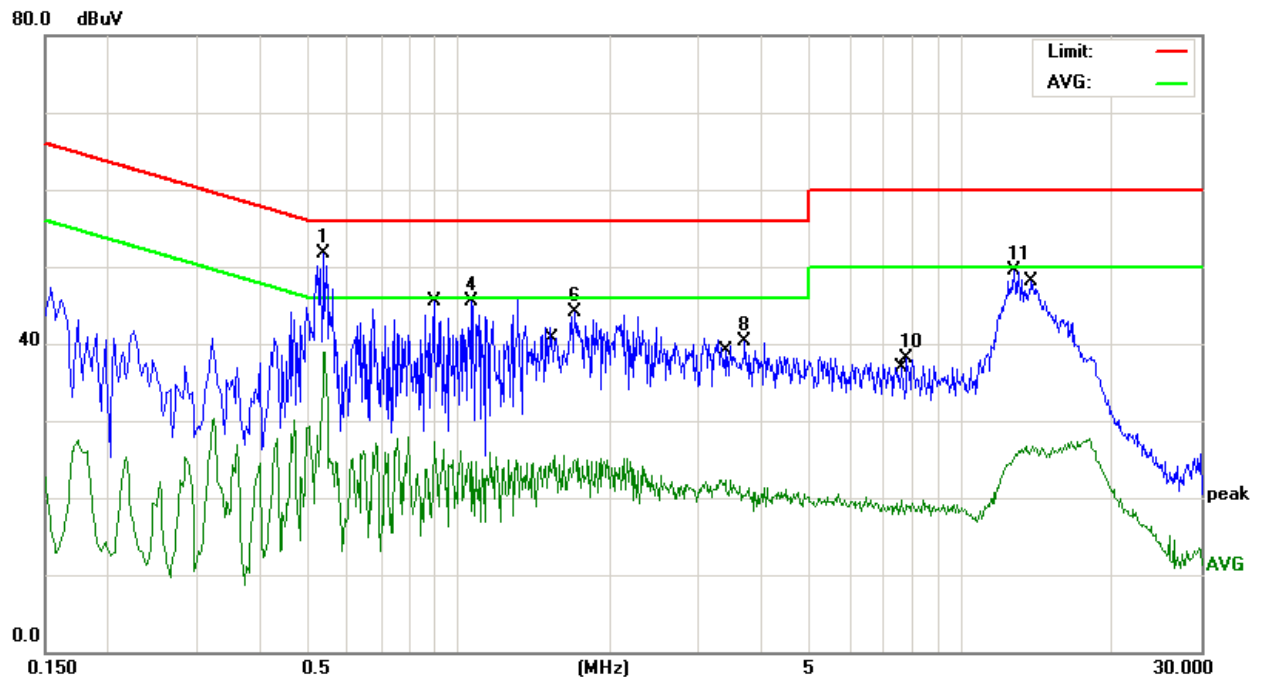
- Note:**
- Support units were connected to second LISN.
  - Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

### 5.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

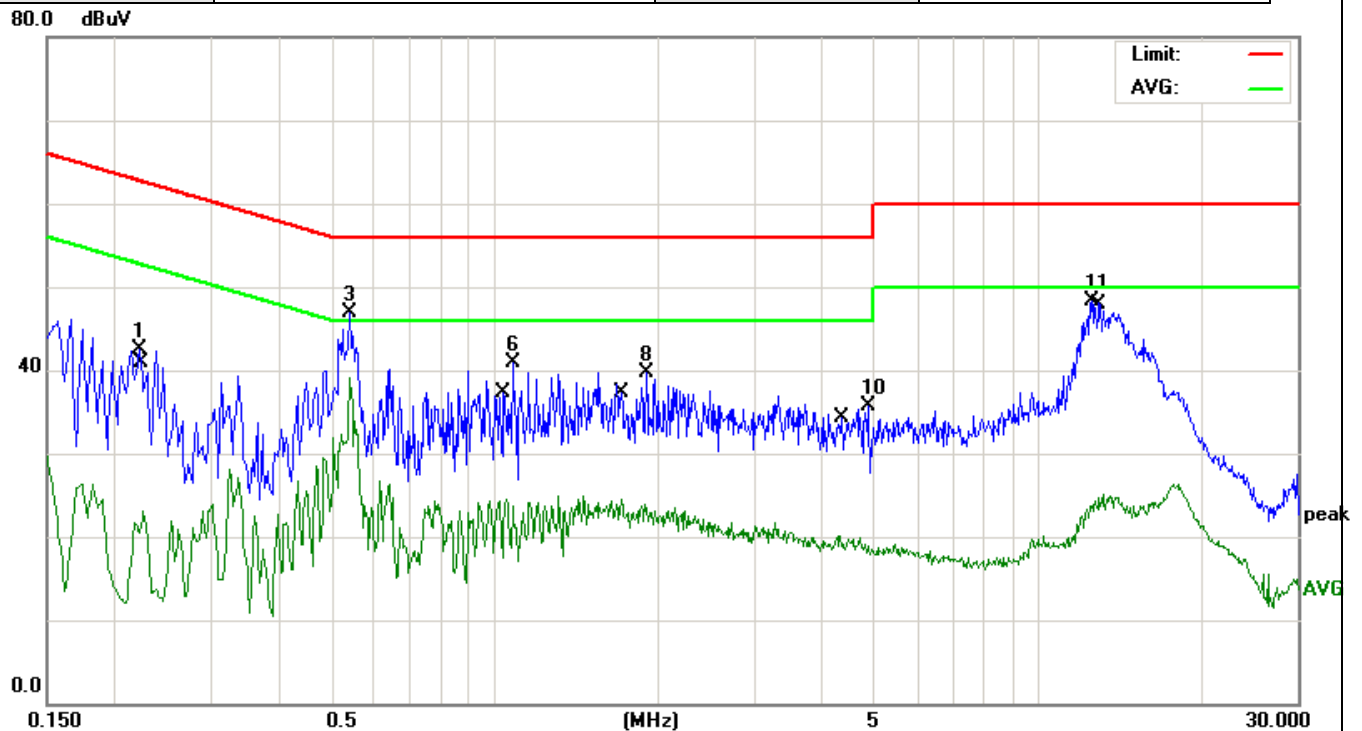
### 5.1.6 TEST RESULTS

|             |               |                   |                        |
|-------------|---------------|-------------------|------------------------|
| EUT         | Mobile phone  | Model Name        | X521                   |
| Temperature | 26 °C         | Relative Humidity | 54%                    |
| Pressure    | 1010hPa       | Phase             | L                      |
| Test Date   | June 01, 2016 | Test Mode         | Keep WIFI Transmitting |



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

|             |               |                   |                        |
|-------------|---------------|-------------------|------------------------|
| EUT         | Mobile phone  | Model Name        | X521                   |
| Temperature | 26 °C         | Relative Humidity | 54%                    |
| Pressure    | 1010hPa       | Phase             | N                      |
| Test Date   | June 01, 2016 | Test Mode         | Keep WIFI Transmitting |



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV | Limit<br>dBuV | Over<br>dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|
| 1   |     | 0.2220       | 32.08                    | 10.43                   | 42.51                    | 62.74         | -20.23     | peak     |
| 2   |     | 0.2260       | 12.59                    | 10.43                   | 23.02                    | 52.59         | -29.57     | AVG      |
| 3   |     | 0.5420       | 36.52                    | 10.39                   | 46.91                    | 56.00         | -9.09      | peak     |
| 4   | *   | 0.5420       | 28.65                    | 10.39                   | 39.04                    | 46.00         | -6.96      | AVG      |
| 5   |     | 1.0540       | 14.09                    | 10.34                   | 24.43                    | 46.00         | -21.57     | AVG      |
| 6   |     | 1.0820       | 30.57                    | 10.34                   | 40.91                    | 56.00         | -15.09     | peak     |
| 7   |     | 1.7100       | 14.18                    | 10.30                   | 24.48                    | 46.00         | -21.52     | AVG      |
| 8   |     | 1.9020       | 29.37                    | 10.29                   | 39.66                    | 56.00         | -16.34     | peak     |
| 9   |     | 4.2900       | 9.84                     | 10.24                   | 20.08                    | 46.00         | -25.92     | AVG      |
| 10  |     | 4.8500       | 25.39                    | 10.23                   | 35.62                    | 56.00         | -20.38     | peak     |
| 11  |     | 12.5219      | 38.18                    | 10.17                   | 48.35                    | 60.00         | -11.65     | peak     |
| 12  |     | 13.1900      | 14.88                    | 10.16                   | 25.04                    | 50.00         | -24.96     | AVG      |

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

## 5.2 RADIATED EMISSION MEASUREMENT

### 5.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

| Frequencies (MHz) | Field Strength (micorvolts/meter) | Measurement Distance (meters) |
|-------------------|-----------------------------------|-------------------------------|
| 0.009~0.490       | 2400/F(KHz)                       | 300                           |
| 0.490~1.705       | 24000/F(KHz)                      | 30                            |
| 1.705~30.0        | 30                                | 30                            |
| 30~88             | 100                               | 3                             |
| 88~216            | 150                               | 3                             |
| 216~960           | 200                               | 3                             |
| Above 960         | 500                               | 3                             |

#### LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

| FREQUENCY (MHz) | Limit (dBuV/m) (at 3M) |         |
|-----------------|------------------------|---------|
|                 | PEAK                   | AVERAGE |
| Above 1000      | 74                     | 54      |

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

| Spectrum Parameter                    | Setting                                          |
|---------------------------------------|--------------------------------------------------|
| Attenuation                           | Auto                                             |
| Start Frequency                       | 1000 MHz                                         |
| Stop Frequency                        | 10th carrier harmonic                            |
| RB / VB (emission in restricted band) | 1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average |

| Receiver Parameter     | Setting                          |
|------------------------|----------------------------------|
| Attenuation            | Auto                             |
| Start ~ Stop Frequency | 9kHz~150kHz / RB 200Hz for QP    |
| Start ~ Stop Frequency | 150kHz~30MHz / RB 9kHz for QP    |
| Start ~ Stop Frequency | 30MHz~1000MHz / RB 120kHz for QP |

### 5.2.2 TEST PROCEDURE

- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.

- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

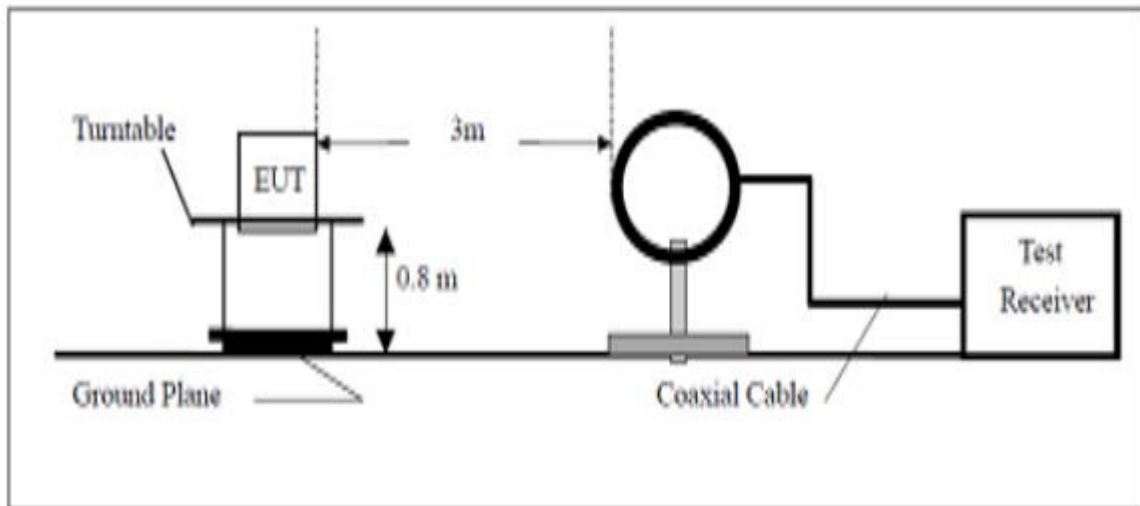
***Both horizontal and vertical antenna polarities were tested  
and performed pretest to three orthogonal axis. The worst case emissions were reported***

### **5.2.3 DEVIATION FROM TEST STANDARD**

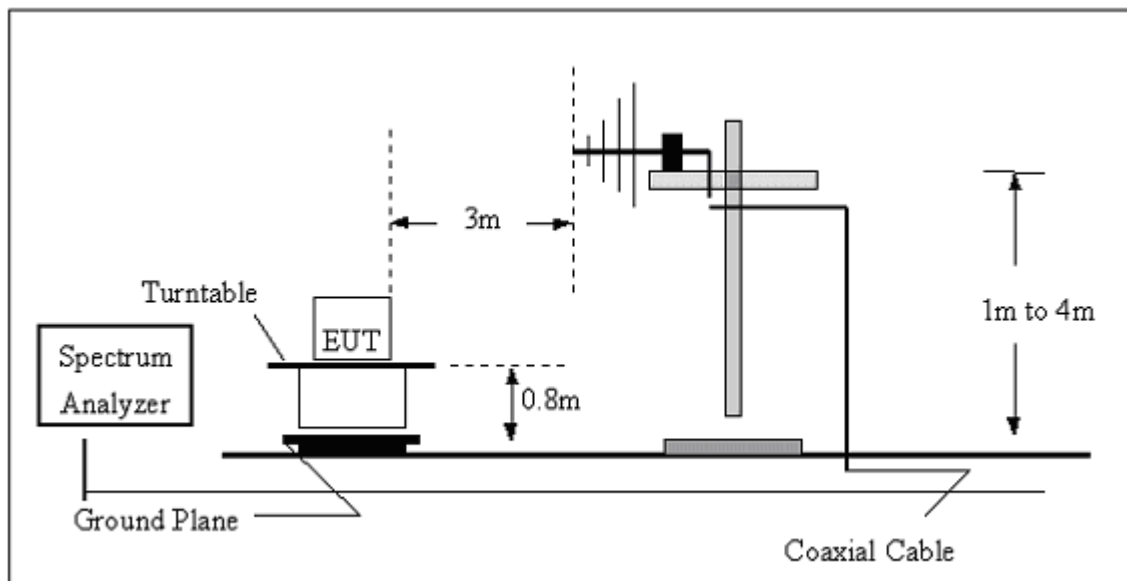
No deviation

## 5.2.4 TEST SETUP

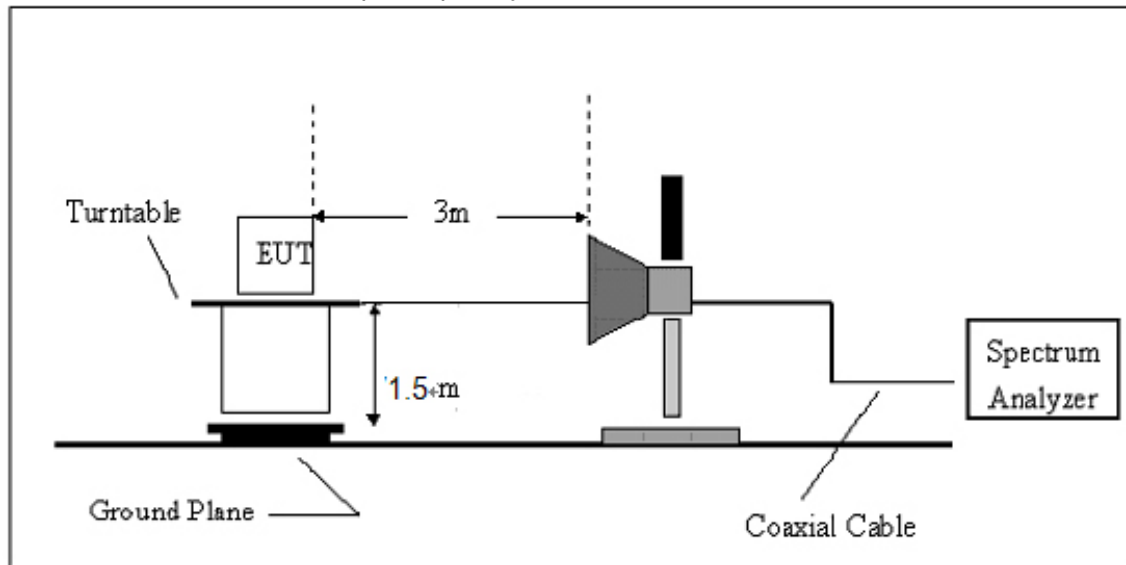
### (A) Radiated Emission Test-Up Frequency Below 30MHz



### (B) Radiated Emission Test-Up Frequency 30MHz~1GHz



## (C) Radiated Emission Test-Up Frequency Above 1GHz

**5.2.5 EUT OPERATING CONDITIONS**

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

**5.2.5.1 RESULTS (BELOW 30 MHZ)**

|             |                        |                   |               |
|-------------|------------------------|-------------------|---------------|
| EUT         | Mobile phone           | Model Name        | X521          |
| Temperature | 20 °C                  | Relative Humidity | 48%           |
| Pressure    | 1010 hPa               | Polarization      | ---           |
| Test Mode   | Keep WIFI Transmitting | Test Date         | June 01, 2016 |

| Freq. | Reading  | Limit    | Margin | State |
|-------|----------|----------|--------|-------|
| (MHz) | (dBuV/m) | (dBuV/m) | (dB)   | P/F   |
| --    | --       | --       | --     | P     |
| --    | --       | --       | --     | P     |

**NOTE:**

No result in this part for margin above 20dB.

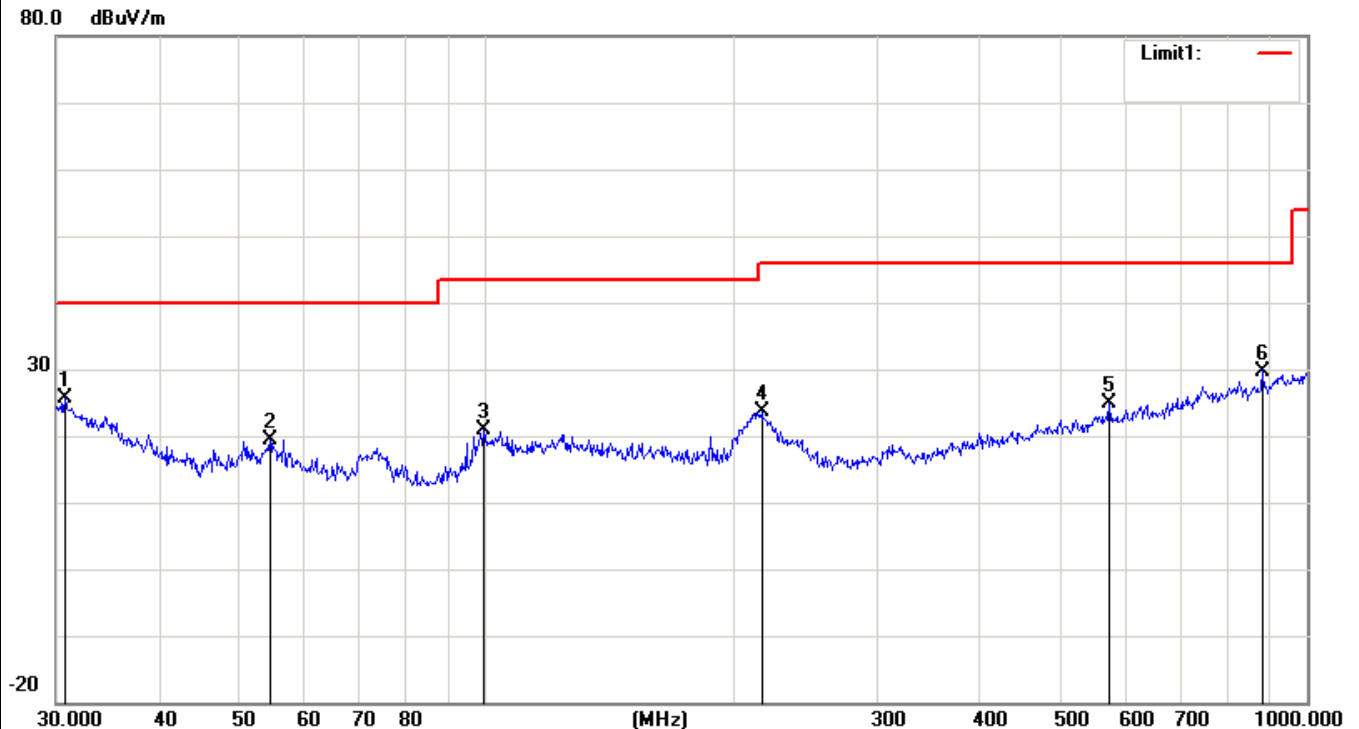
Distance extrapolation factor =  $20 \log (\text{specific distance/test distance})(\text{dB})$ ;

Limit line = specific limits(dBuV) + distance extrapolation factor.

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

### 5.2.5.2 TEST RESULTS (BETWEEN 30M – 1000 MHZ)

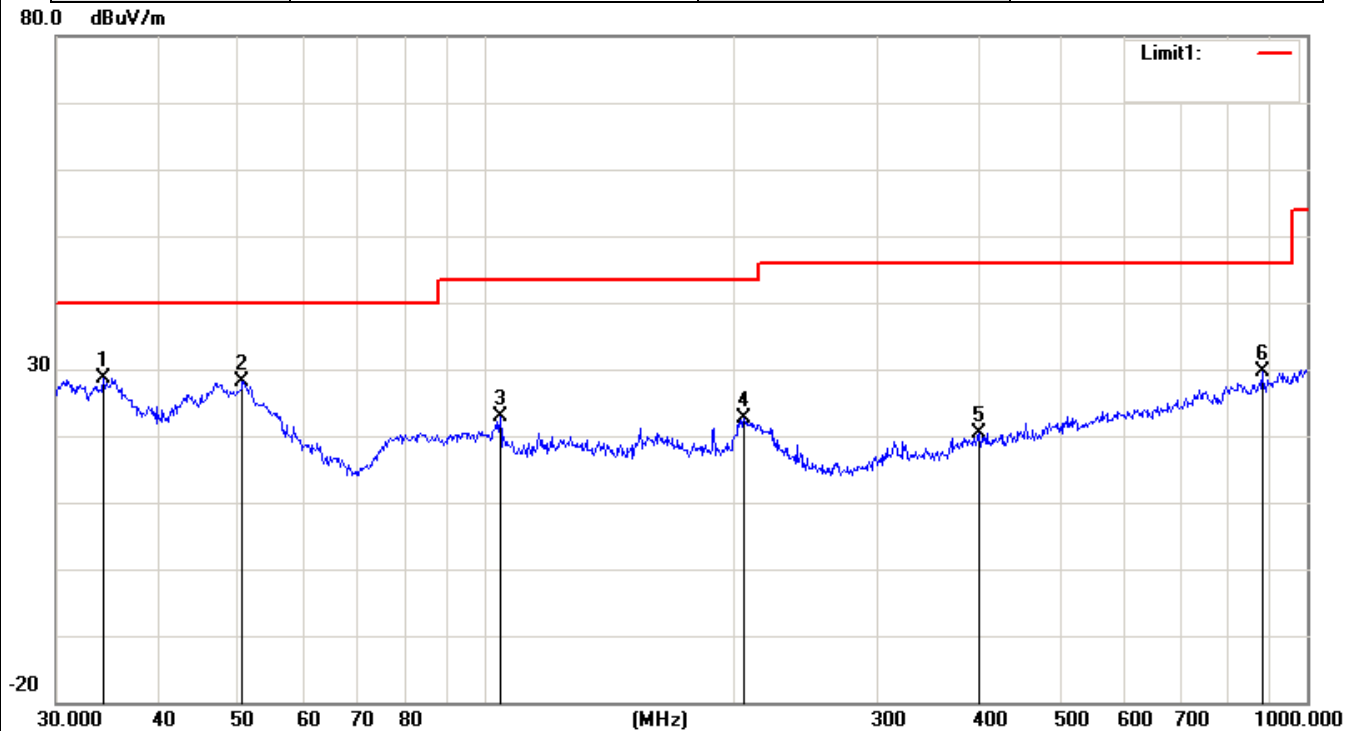
|             |                        |                   |               |
|-------------|------------------------|-------------------|---------------|
| EUT         | Mobile phone           | Model Name        | X521          |
| Temperature | 20 °C                  | Relative Humidity | 48%           |
| Pressure    | 1010 hPa               | Polarization :    | Horizontal    |
| Test Mode   | Keep WIFI Transmitting | Test Date         | June 01, 2016 |



| No. | Mk. | Freq.    | Reading Level | Correct Factor | Measurement | Limit  | Over   |          |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------|
|     |     | MHz      | dBuV          | dB             | dBuV/m      | dBuV/m | dB     | Detector |
| 1   | *   | 30.7455  | 22.59         | 2.99           | 25.58       | 40.00  | -14.42 | peak     |
| 2   |     | 54.6429  | 28.81         | -9.47          | 19.34       | 40.00  | -20.66 | peak     |
| 3   |     | 99.5281  | 27.19         | -6.39          | 20.80       | 43.50  | -22.70 | peak     |
| 4   |     | 216.7828 | 29.06         | -5.41          | 23.65       | 46.00  | -22.35 | peak     |
| 5   |     | 574.6258 | 24.40         | 0.59           | 24.99       | 46.00  | -21.01 | peak     |
| 6   |     | 881.4067 | 24.67         | 5.08           | 29.75       | 46.00  | -16.25 | peak     |

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

|             |                        |                   |               |
|-------------|------------------------|-------------------|---------------|
| EUT         | Mobile phone           | Model Name        | X521          |
| Temperature | 20 °C                  | Relative Humidity | 48%           |
| Pressure    | 1010 hPa               | Polarization :    | Vertical      |
| Test Mode   | Keep WIFI Transmitting | Test Date         | June 01, 2016 |



| No. | Mk. | Freq.    | Reading Level | Correct Factor | Measurement | Limit  | Over   |          |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------|
|     |     | MHz      | dBuV          | dB             | dBuV/m      | dBuV/m | dB     | Detector |
| 1   | *   | 34.2760  | 27.91         | 0.61           | 28.52       | 40.00  | -11.48 | peak     |
| 2   |     | 50.5860  | 37.19         | -9.07          | 28.12       | 40.00  | -11.88 | peak     |
| 3   |     | 104.1701 | 28.03         | -5.18          | 22.85       | 43.50  | -20.65 | peak     |
| 4   |     | 206.3976 | 27.71         | -5.05          | 22.66       | 43.50  | -20.84 | peak     |
| 5   |     | 399.0302 | 22.82         | -2.43          | 20.39       | 46.00  | -25.61 | peak     |
| 6   |     | 881.4067 | 24.56         | 5.08           | 29.64       | 46.00  | -16.36 | peak     |

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

### 5.2.5.3 TEST RESULTS (1GHZ TO 25GHZ)

Note: *the worst case is 1Mbps(CCK)mode as result in this part.*

|             |               |                   |           |
|-------------|---------------|-------------------|-----------|
| EUT         | Mobile phone  | Model Name        | X521      |
| Temperature | 20 °C         | Relative Humidity | 48%       |
| Pressure    | 1010 hPa      | Test Mode         | Mode 1 TX |
| Test Date   | June 01, 2016 | Frequency         | 2412MHz   |

| Freq.<br>(MHz) | Ant.<br>Pol. | Emission<br>Level(dBuV) |       | Limit<br>3m(dBuV/m) |    | Over(dB) |        |
|----------------|--------------|-------------------------|-------|---------------------|----|----------|--------|
|                |              | PK                      | AV    | PK                  | AV | PK       | AV     |
| 4824           | V            | 60.75                   | 40.63 | 74                  | 54 | -13.25   | -13.37 |
| 7236           | V            | 59.97                   | 40.06 | 74                  | 54 | -14.03   | -13.94 |
| 4824           | H            | 58.58                   | 40.63 | 74                  | 54 | -15.42   | -13.37 |
| 7236           | H            | 58.09                   | 39.09 | 74                  | 54 | -15.91   | -14.91 |

Remark:

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

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

|             |               |                   |           |
|-------------|---------------|-------------------|-----------|
| EUT         | Mobile phone  | Model Name        | X521      |
| Temperature | 20 °C         | Relative Humidity | 48%       |
| Pressure    | 1010 hPa      | Test Mode         | Mode 1 TX |
| Test Date   | June 01, 2016 | Frequency         | 2437MHz   |

| Freq.<br>(MHz) | Ant.Pol. | Emission Level(dBuV) |       | Limit<br>3m(dBuV/m) |    | Over(dB) |        |
|----------------|----------|----------------------|-------|---------------------|----|----------|--------|
|                |          | PK                   | AV    | PK                  | AV | PK       | AV     |
| 4874           | V        | 59.93                | 39.30 | 74                  | 54 | -14.07   | -14.70 |
| 7311           | V        | 59.35                | 39.97 | 74                  | 54 | -14.65   | -14.03 |
| 4874           | H        | 59.66                | 39.01 | 74                  | 54 | -14.34   | -14.99 |
| 7311           | H        | 58.15                | 39.15 | 74                  | 54 | -15.85   | -14.85 |

Remark:

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

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

|             |               |                   |           |
|-------------|---------------|-------------------|-----------|
| EUT         | Mobile phone  | Model Name        | X521      |
| Temperature | 20 °C         | Relative Humidity | 48%       |
| Pressure    | 1010 hPa      | Test Mode         | Mode 1 TX |
| Test Date   | June 01, 2016 | Frequency         | 2462MHz   |

| Freq.<br>(MHz) | Ant.Pol. | Emission Level(dBuV) |       | Limit<br>3m(dBuV/m) |    | Over(dB) |        |
|----------------|----------|----------------------|-------|---------------------|----|----------|--------|
|                |          | PK                   | AV    | PK                  | AV | PK       | AV     |
| 4924           | V        | 60.61                | 41.92 | 74                  | 54 | -13.39   | -12.08 |
| 7386           | V        | 59.08                | 39.31 | 74                  | 54 | -14.92   | -14.69 |
| 4924           | H        | 59.08                | 39.09 | 74                  | 54 | -14.92   | -14.91 |
| 7386           | H        | 58.48                | 39.48 | 74                  | 54 | -15.52   | -14.52 |

## Remark:

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

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

|             |               |                   |          |
|-------------|---------------|-------------------|----------|
| EUT         | Mobile phone  | Model Name        | X521     |
| Temperature | 20 °C         | Relative Humidity | 48%      |
| Pressure    | 1010 hPa      | Test Mode         | Mode2 TX |
| Test Date   | June 01, 2016 | Frequency         | 2412MHz  |

| Freq.<br>(MHz) | Ant. Pol. | Emission<br>Level(dBuV) |       | Limit 3m(dBuV/m) |    | Over(dB) |        |
|----------------|-----------|-------------------------|-------|------------------|----|----------|--------|
|                |           | PK                      | AV    | PK               | AV | PK       | AV     |
| 4824           | V         | 60.00                   | 41.27 | 74               | 54 | -14.00   | -12.73 |
| 7236           | V         | 58.28                   | 39.92 | 74               | 54 | -15.72   | -14.08 |
| 4824           | H         | 58.88                   | 40.13 | 74               | 54 | -15.12   | -13.87 |
| 7236           | H         | 59.63                   | 40.63 | 74               | 54 | -14.37   | -13.37 |

## Remark:

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

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

|             |               |                   |           |
|-------------|---------------|-------------------|-----------|
| EUT         | Mobile phone  | Model Name        | X521      |
| Temperature | 20 °C         | Relative Humidity | 48%       |
| Pressure    | 1010 hPa      | Test Mode         | Mode 2 TX |
| Test Date   | June 01, 2016 | Frequency         | 2437MHz   |

| Freq.<br>(MHz) | Ant.Pol. | Emission Level(dBuV) |       | Limit<br>3m(dBuV/m) |    | Over(dB) |        |
|----------------|----------|----------------------|-------|---------------------|----|----------|--------|
|                |          | PK                   | AV    | PK                  | AV | PK       | AV     |
| 4874           | V        | 58.84                | 39.23 | 74                  | 54 | -15.16   | -14.77 |
| 7311           | V        | 59.50                | 39.52 | 74                  | 54 | -14.50   | -14.48 |
| 4874           | H        | 59.42                | 39.68 | 74                  | 54 | -14.58   | -14.32 |
| 7311           | H        | 58.83                | 39.83 | 74                  | 54 | -15.17   | -14.17 |

## Remark:

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

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

|             |               |                   |           |
|-------------|---------------|-------------------|-----------|
| EUT         | Mobile phone  | Model Name        | X521      |
| Temperature | 20 °C         | Relative Humidity | 48%       |
| Pressure    | 1010 hPa      | Test Mode         | Mode 2 TX |
| Test Date   | June 01, 2016 | Frequency         | 2462MHz   |

| Freq.<br>(MHz) | Ant.Pol. | Emission Level(dBuV) |       | Limit<br>3m(dBuV/m) |    | Over(dB) |        |
|----------------|----------|----------------------|-------|---------------------|----|----------|--------|
|                |          | PK                   | AV    | PK                  | AV | PK       | AV     |
| 4924           | V        | 60.23                | 41.53 | 74                  | 54 | -13.77   | -12.47 |
| 7386           | V        | 58.67                | 40.94 | 74                  | 54 | -15.33   | -13.06 |
| 4924           | H        | 58.41                | 40.34 | 74                  | 54 | -15.59   | -13.66 |
| 7386           | H        | 59.98                | 40.98 | 74                  | 54 | -14.02   | -13.02 |

## Remark:

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

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

|             |               |                   |          |
|-------------|---------------|-------------------|----------|
| EUT         | Mobile phone  | Model Name        | X521     |
| Temperature | 20 °C         | Relative Humidity | 48%      |
| Pressure    | 1010 hPa      | Test Mode         | Mode3 TX |
| Test Date   | June 01, 2016 | Frequency         | 2412MHz  |

| Freq.<br>(MHz) | Ant. Pol. | Emission Level(dBuV) |       | Limit<br>3m(dBuV/m) |    | Over(dB) |        |
|----------------|-----------|----------------------|-------|---------------------|----|----------|--------|
|                | H/V       | PK                   | AV    | PK                  | AV | PK       | AV     |
| 4824           | V         | 58.82                | 40.13 | 74                  | 54 | -15.18   | -13.87 |
| 7236           | V         | 58.60                | 40.88 | 74                  | 54 | -15.40   | -13.12 |
| 4824           | H         | 59.65                | 39.53 | 74                  | 54 | -14.35   | -14.47 |
| 7236           | H         | 59.96                | 40.96 | 74                  | 54 | -14.04   | -13.04 |

## Remark:

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

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

|             |               |                   |           |
|-------------|---------------|-------------------|-----------|
| EUT         | Mobile phone  | Model Name        | X521      |
| Temperature | 20 °C         | Relative Humidity | 48%       |
| Pressure    | 1010 hPa      | Test Mode         | Mode 3 TX |
| Test Date   | June 01, 2016 | Frequency         | 2437MHz   |

| Freq.<br>(MHz) | Ant.Pol. | Emission Level(dBuV) |       | Limit<br>3m(dBuV/m) |    | Over(dB) |        |
|----------------|----------|----------------------|-------|---------------------|----|----------|--------|
|                | H/V      | PK                   | AV    | PK                  | AV | PK       | AV     |
| 4874           | V        | 59.52                | 40.79 | 74                  | 54 | -14.48   | -13.21 |
| 7311           | V        | 58.50                | 39.83 | 74                  | 54 | -15.50   | -14.17 |
| 4874           | H        | 59.19                | 39.88 | 74                  | 54 | -14.81   | -14.12 |
| 7311           | H        | 58.49                | 39.49 | 74                  | 54 | -15.51   | -14.51 |

## Remark:

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

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

|             |               |                   |           |
|-------------|---------------|-------------------|-----------|
| EUT         | Mobile phone  | Model Name        | X521      |
| Temperature | 20 °C         | Relative Humidity | 48%       |
| Pressure    | 1010 hPa      | Test Mode         | Mode 2 TX |
| Test Date   | June 01, 2016 | Frequency         | 2462MHz   |

| Freq.<br>(MHz) | Ant.Pol. | Emission Level(dBuV) |       | Limit<br>3m(dBuV/m) |    | Over(dB) |        |
|----------------|----------|----------------------|-------|---------------------|----|----------|--------|
|                |          | PK                   | AV    | PK                  | AV | PK       | AV     |
| 4924           | V        | 58.22                | 40.36 | 74                  | 54 | -15.78   | -13.64 |
| 7386           | V        | 59.26                | 39.50 | 74                  | 54 | -14.74   | -14.50 |
| 4924           | H        | 59.19                | 40.24 | 74                  | 54 | -14.81   | -13.76 |
| 7386           | H        | 58.24                | 39.24 | 74                  | 54 | -15.76   | -14.76 |

Remark:

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

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

|             |               |                   |          |
|-------------|---------------|-------------------|----------|
| EUT         | Mobile phone  | Model Name        | X521     |
| Temperature | 20 °C         | Relative Humidity | 48%      |
| Pressure    | 1010 hPa      | Test Mode         | Mode4 TX |
| Test Date   | June 01, 2016 | Frequency         | 2422MHz  |

| Freq.<br>(MHz) | Ant.<br>Pol. | Emission<br>Level(dBuV) |       | Limit<br>3m(dBuV/m) |    | Over(dB) |        |
|----------------|--------------|-------------------------|-------|---------------------|----|----------|--------|
|                |              | PK                      | AV    | PK                  | AV | PK       | AV     |
| 4844           | V            | 59.29                   | 39.19 | 74                  | 54 | -14.71   | -14.81 |
| 7266           | V            | 59.29                   | 39.94 | 74                  | 54 | -14.71   | -14.06 |
| 4844           | H            | 59.14                   | 40.47 | 74                  | 54 | -14.86   | -13.53 |
| 7266           | H            | 59.09                   | 40.09 | 74                  | 54 | -14.91   | -13.91 |

Remark:

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

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

|             |               |                   |           |
|-------------|---------------|-------------------|-----------|
| EUT         | Mobile phone  | Model Name        | X521      |
| Temperature | 20 °C         | Relative Humidity | 48%       |
| Pressure    | 1010 hPa      | Test Mode         | Mode 4 TX |
| Test Date   | June 01, 2016 | Frequency         | 2437MHz   |

| Freq.<br>(MHz) | Ant.Pol. | Emission Level(dBuV) |       | Limit<br>3m(dBuV/m) |    | Over(dB) |        |
|----------------|----------|----------------------|-------|---------------------|----|----------|--------|
|                | H/V      | PK                   | AV    | PK                  | AV | PK       | AV     |
| 4874           | V        | 59.56                | 39.48 | 74                  | 54 | -14.44   | -14.52 |
| 7311           | V        | 59.08                | 39.55 | 74                  | 54 | -14.92   | -14.45 |
| 4874           | H        | 58.36                | 40.63 | 74                  | 54 | -15.64   | -13.37 |
| 7311           | H        | 58.13                | 39.13 | 74                  | 54 | -15.87   | -14.87 |

## Remark:

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

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

|             |               |                   |           |
|-------------|---------------|-------------------|-----------|
| EUT         | Mobile phone  | Model Name        | X521      |
| Temperature | 20 °C         | Relative Humidity | 48%       |
| Pressure    | 1010 hPa      | Test Mode         | Mode 4 TX |
| Test Date   | June 01, 2016 | Frequency         | 2452MHz   |

| Freq.<br>(MHz) | Ant.Pol. | Emission Level(dBuV) |       | Limit<br>3m(dBuV/m) |    | Over(dB) |        |
|----------------|----------|----------------------|-------|---------------------|----|----------|--------|
|                | H/V      | PK                   | AV    | PK                  | AV | PK       | AV     |
| 4904           | V        | 59.28                | 41.19 | 74                  | 54 | -14.72   | -12.81 |
| 7356           | V        | 59.81                | 39.92 | 74                  | 54 | -14.19   | -14.08 |
| 4904           | H        | 58.65                | 40.73 | 74                  | 54 | -15.35   | -13.27 |
| 7356           | H        | 59.39                | 40.39 | 74                  | 54 | -14.61   | -13.61 |

## Remark:

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

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

## **6. ANTENNA APPLICATION**

### **6.1 Antenna requirement**

The EUT'S antenna is met the requirement of FCC part 15C section 15.203 and 15.247

FCC part 15C section 15.247 requirements: Systems operating in the 2402-2480MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

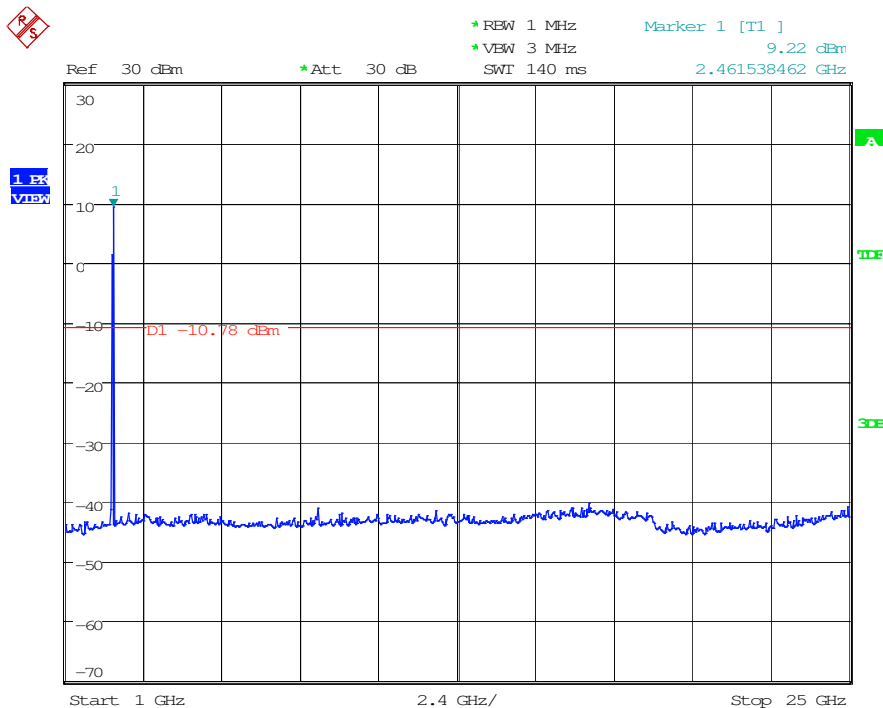
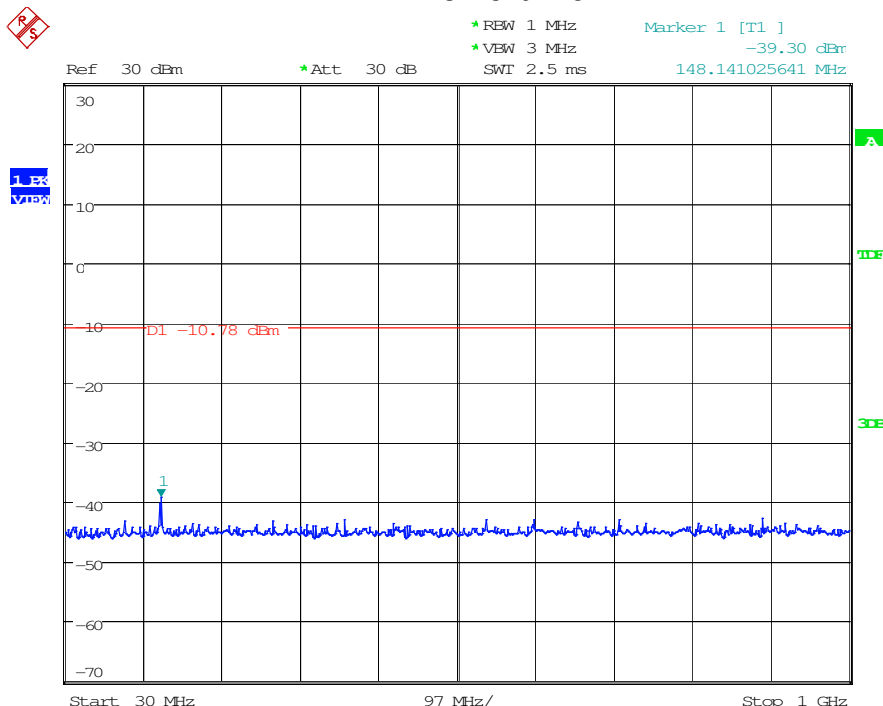
### **6.2 Result**

The EUT's antenna integrated on PCB, The antenna's gain is 1.55dBi and meets the requirement.

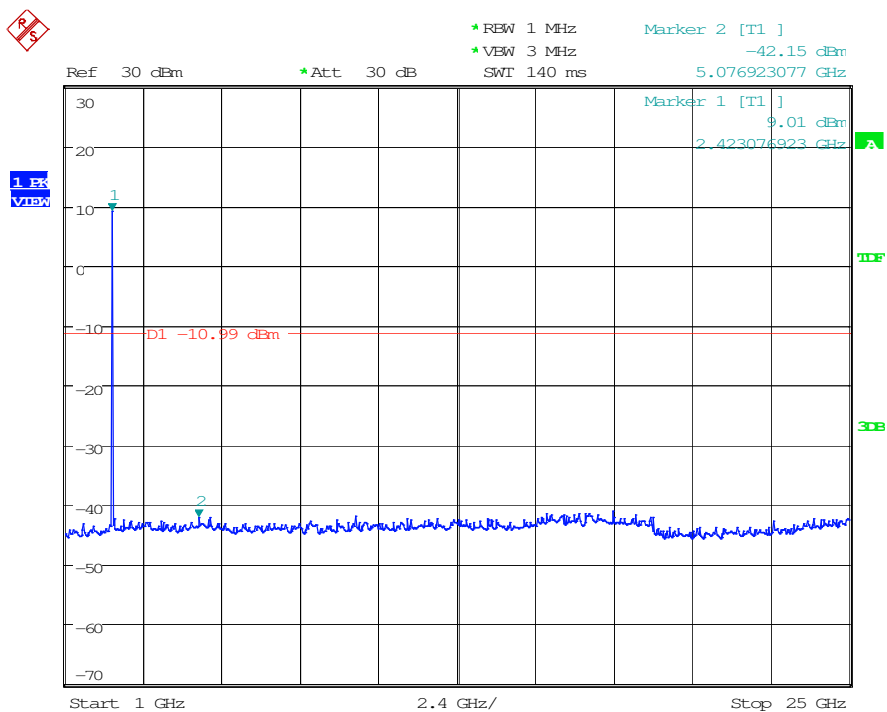
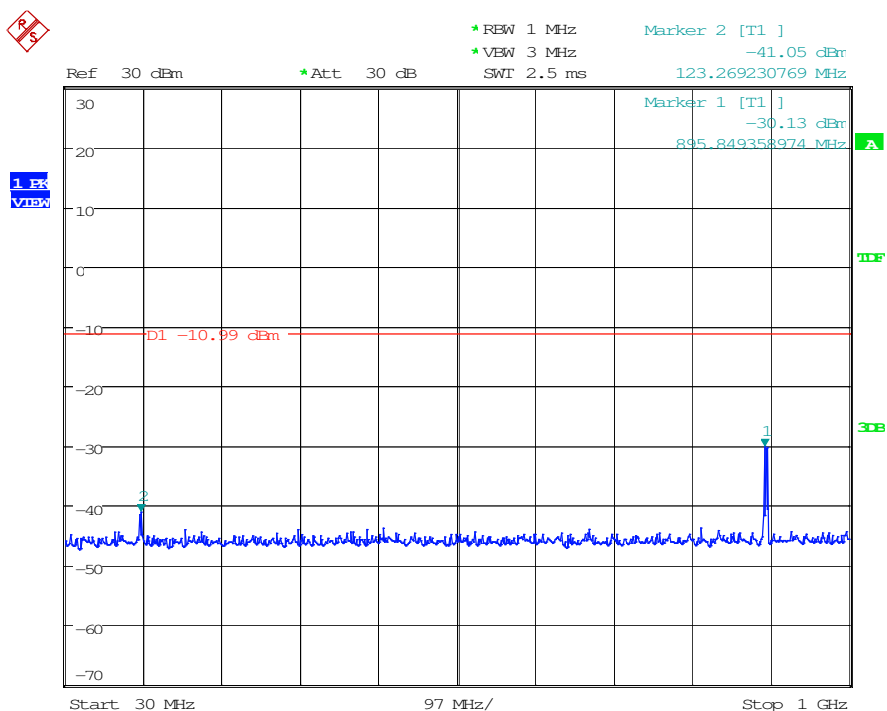
# Antenna port conducted spurious emissions

802.11b:

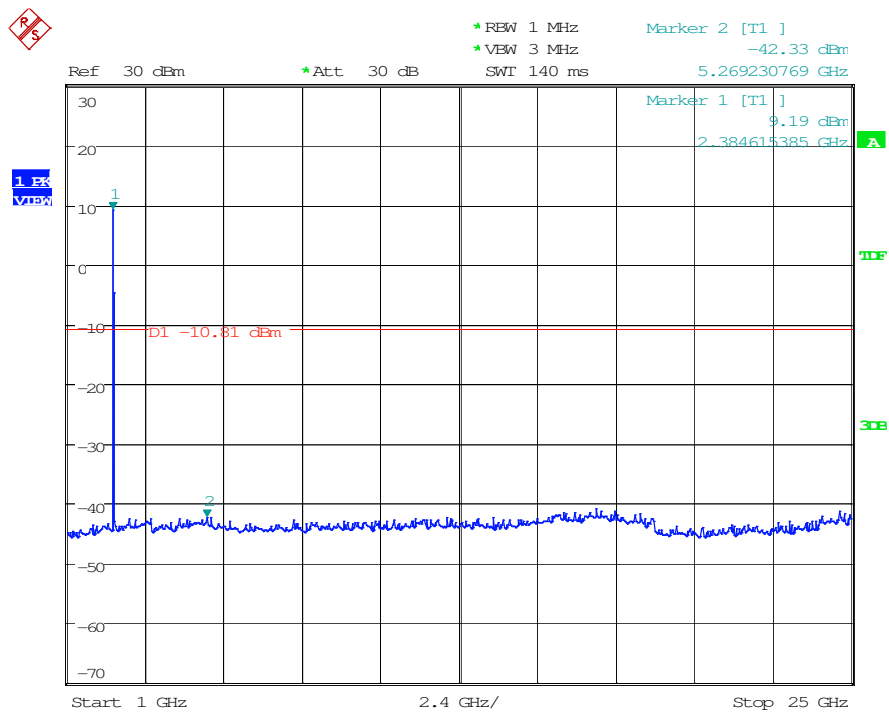
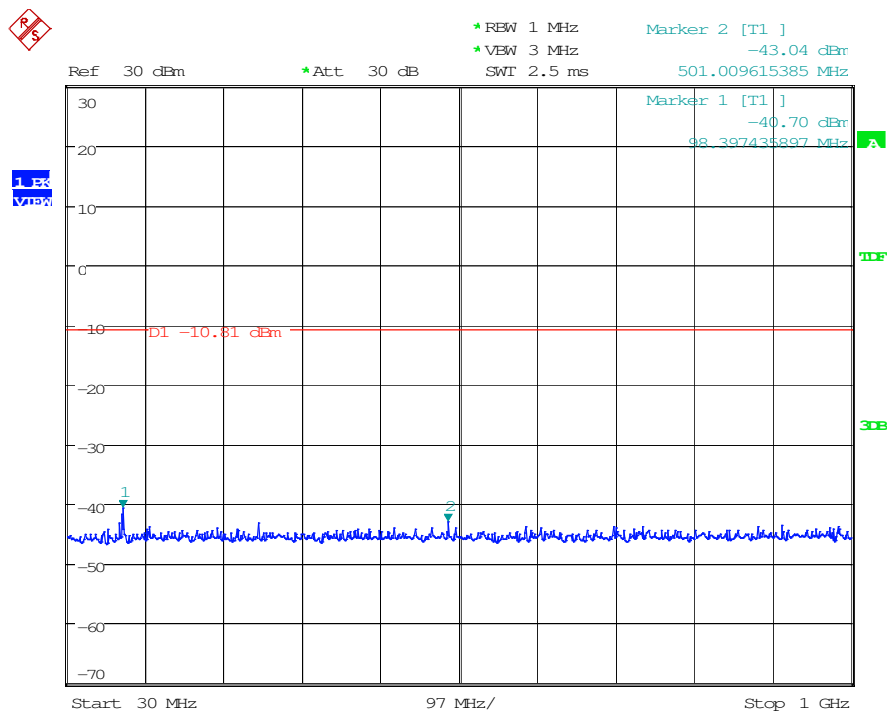
## Low channel



## Middle channel

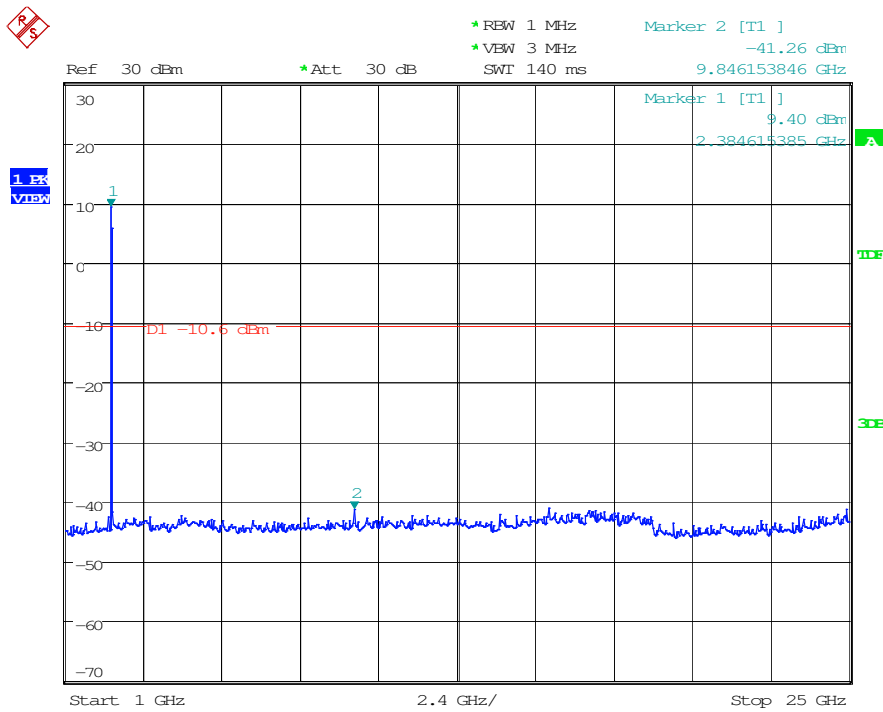
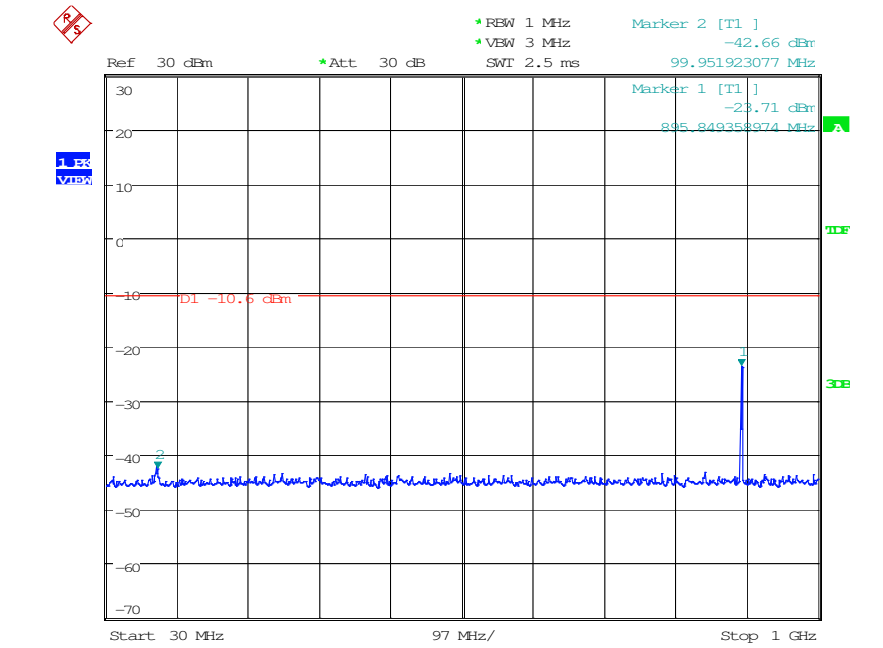


## High channel

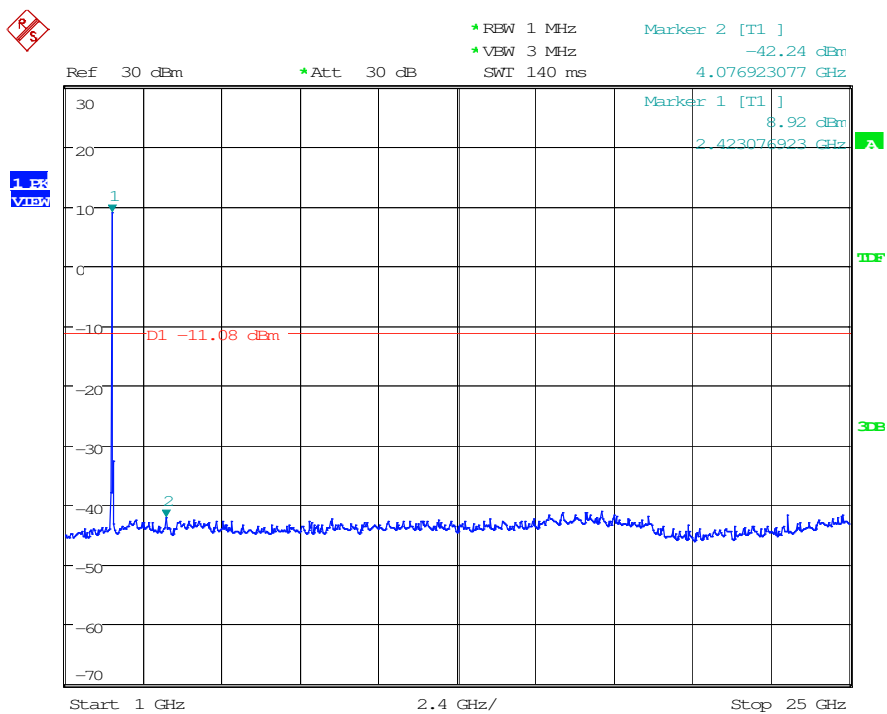
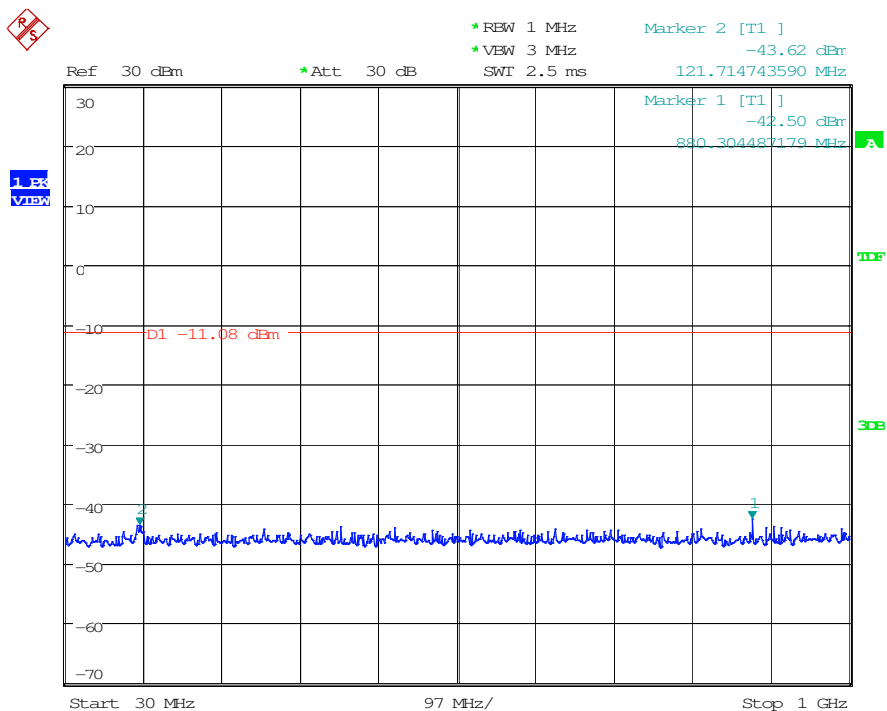


802.11g:

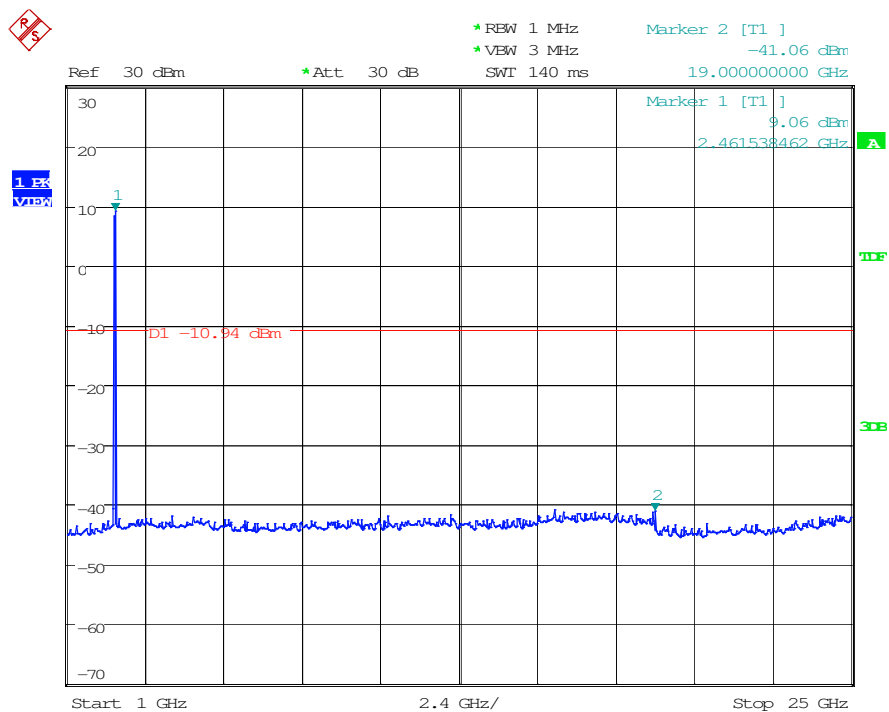
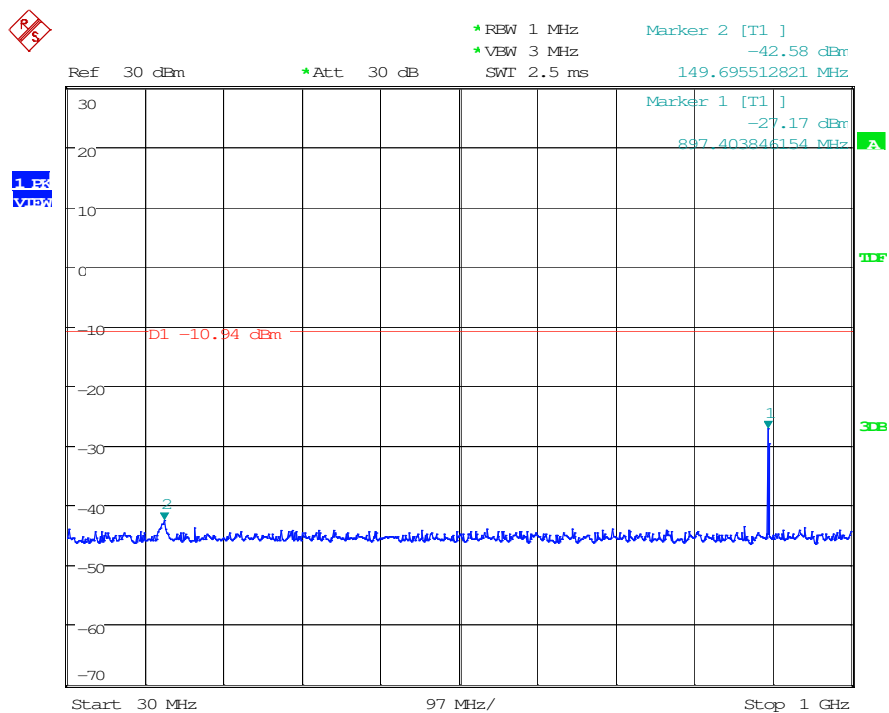
## Low channel



## Middle channel

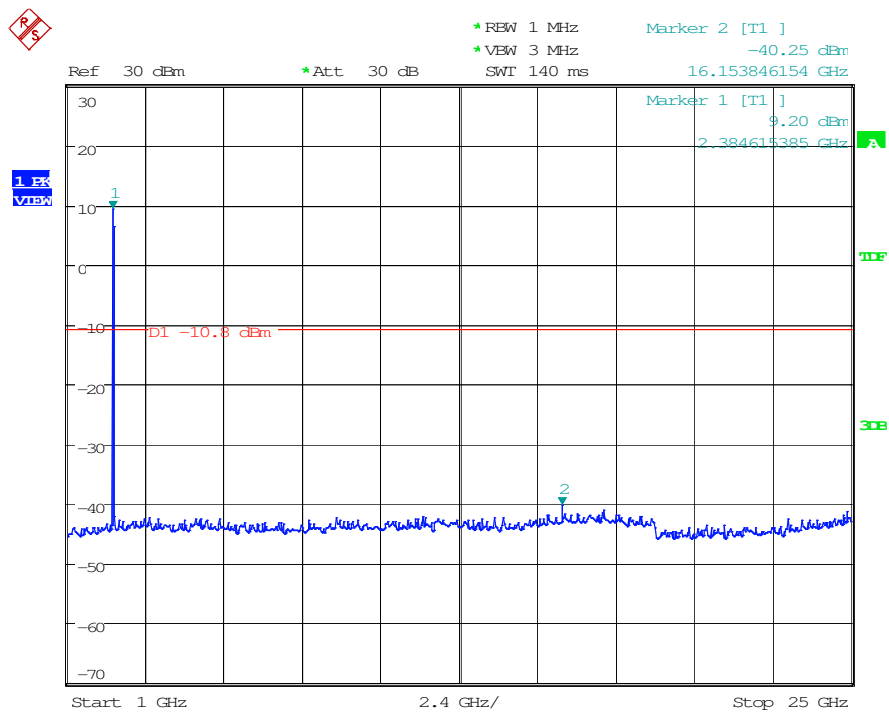
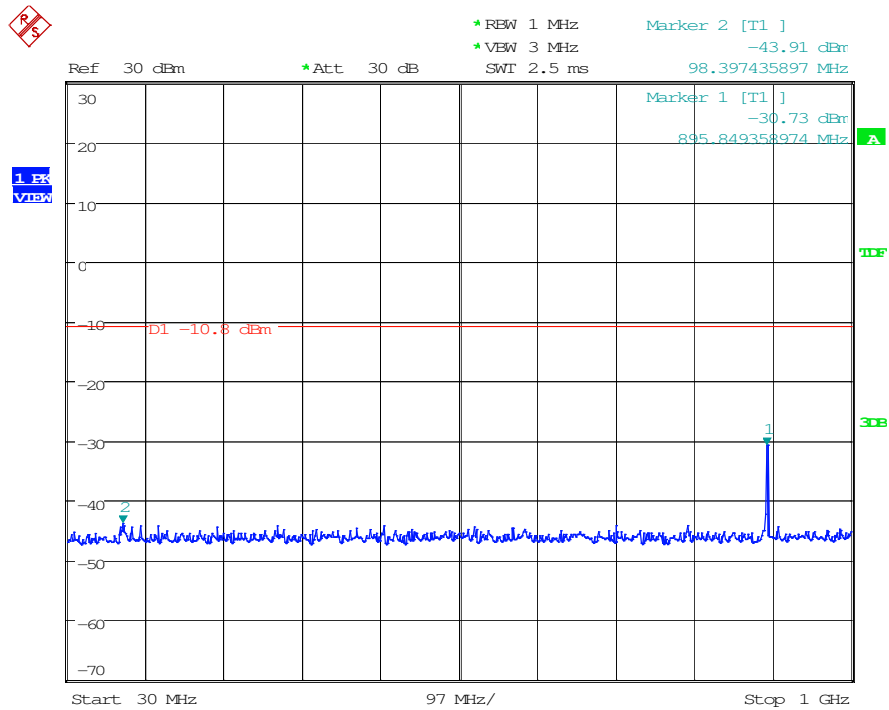


## High channel

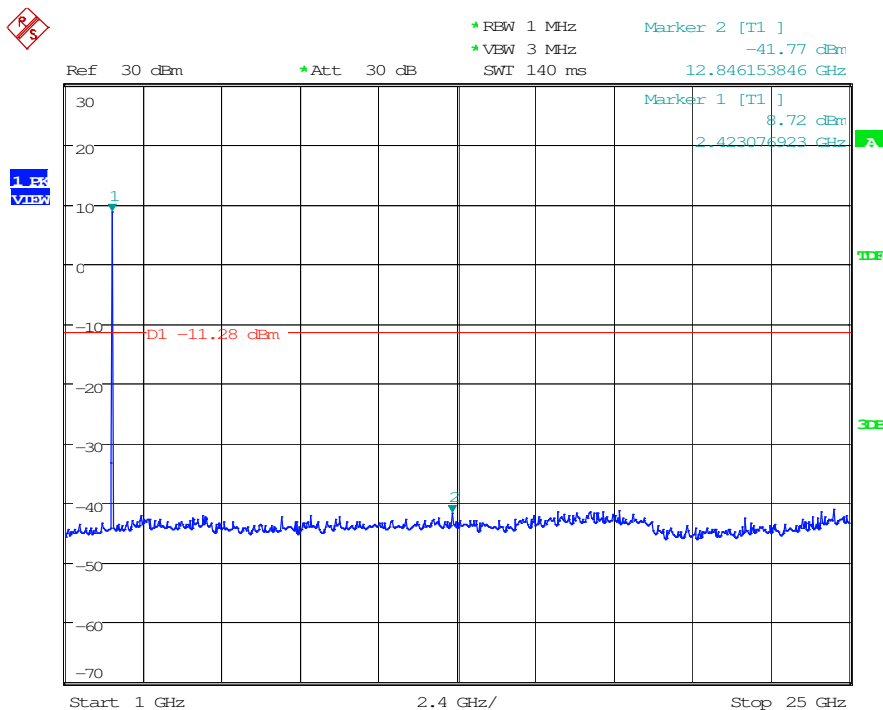
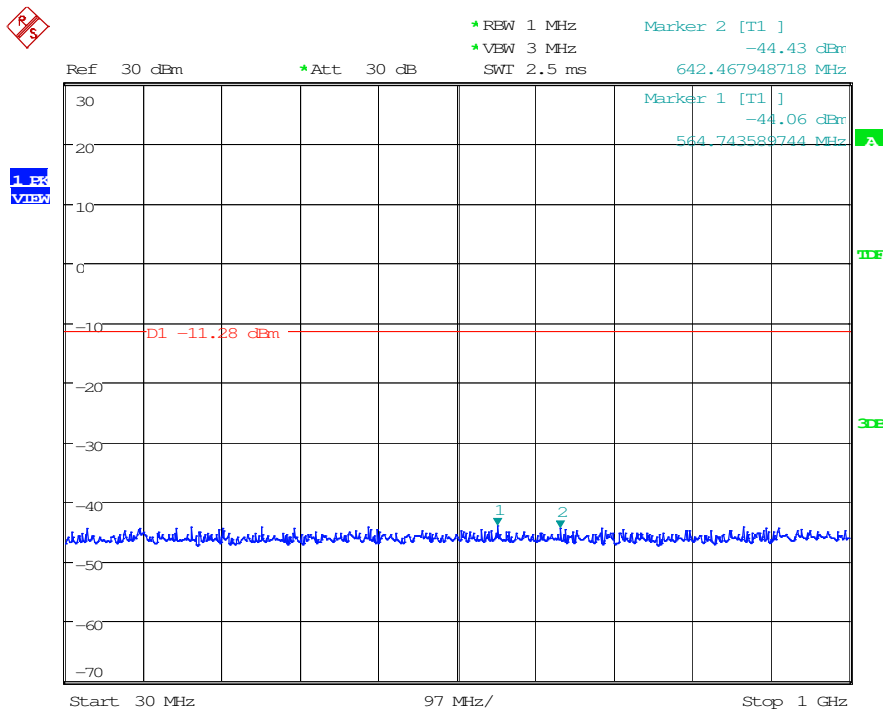


802.11n HT20:

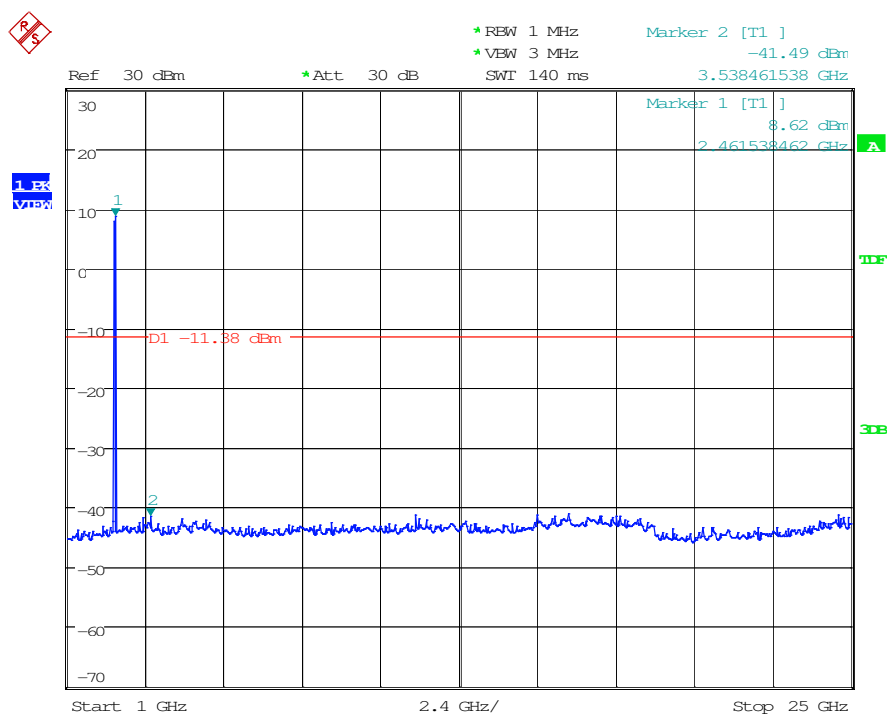
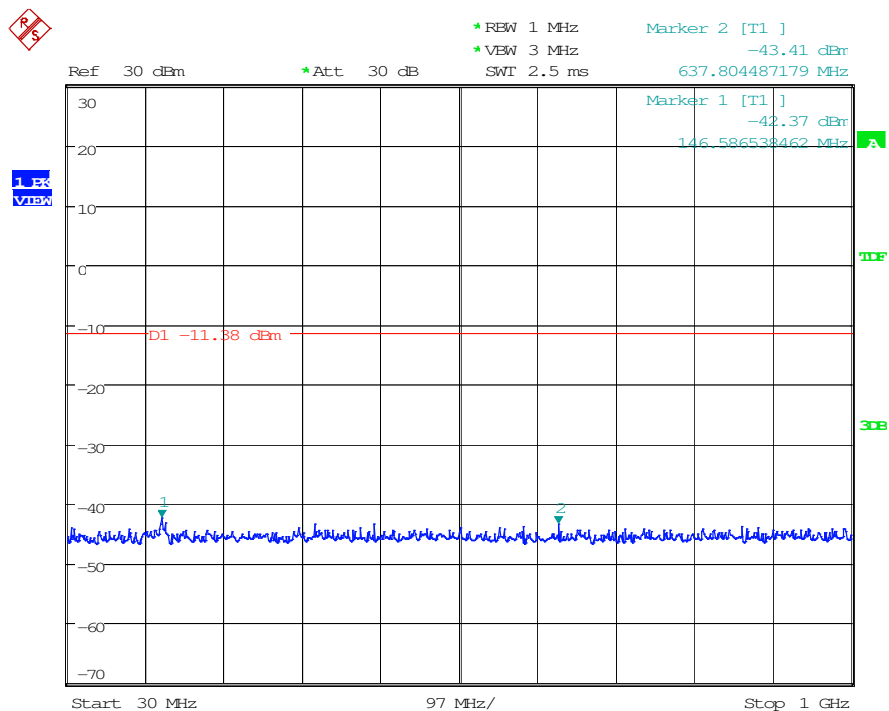
## Low channel



# Middle channel

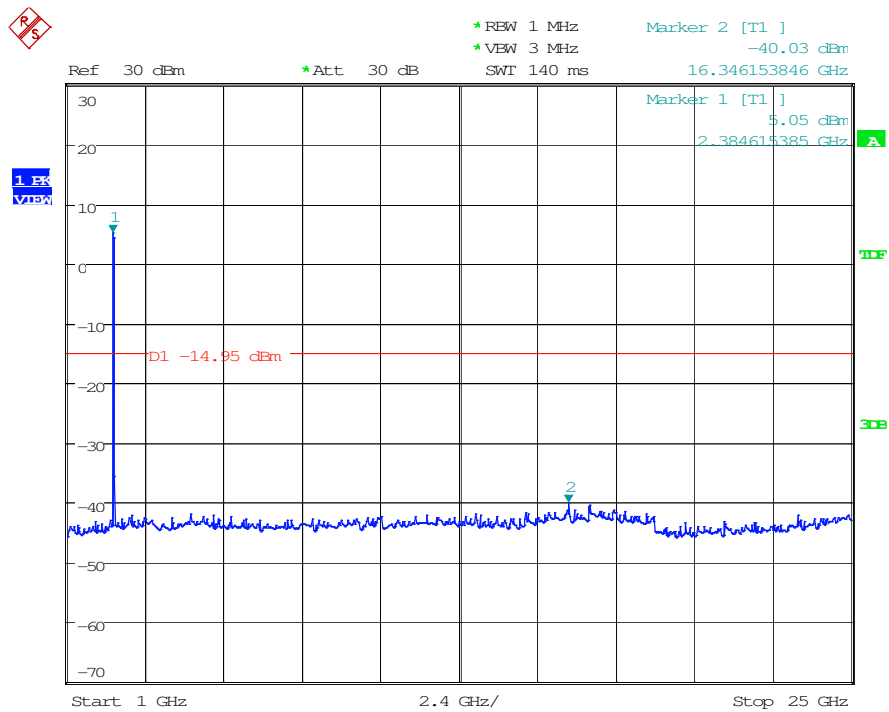
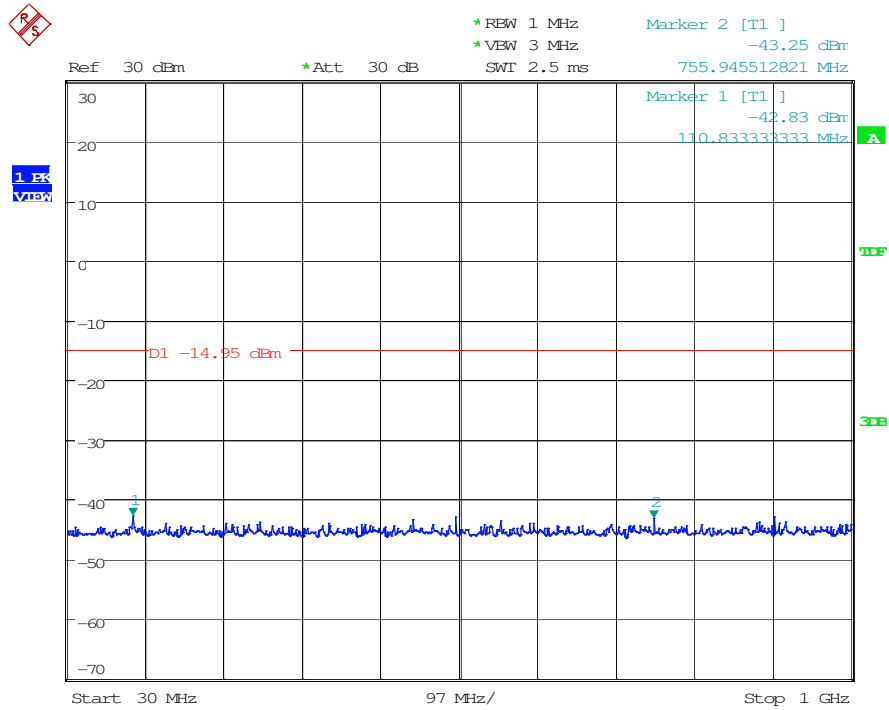


# High channel

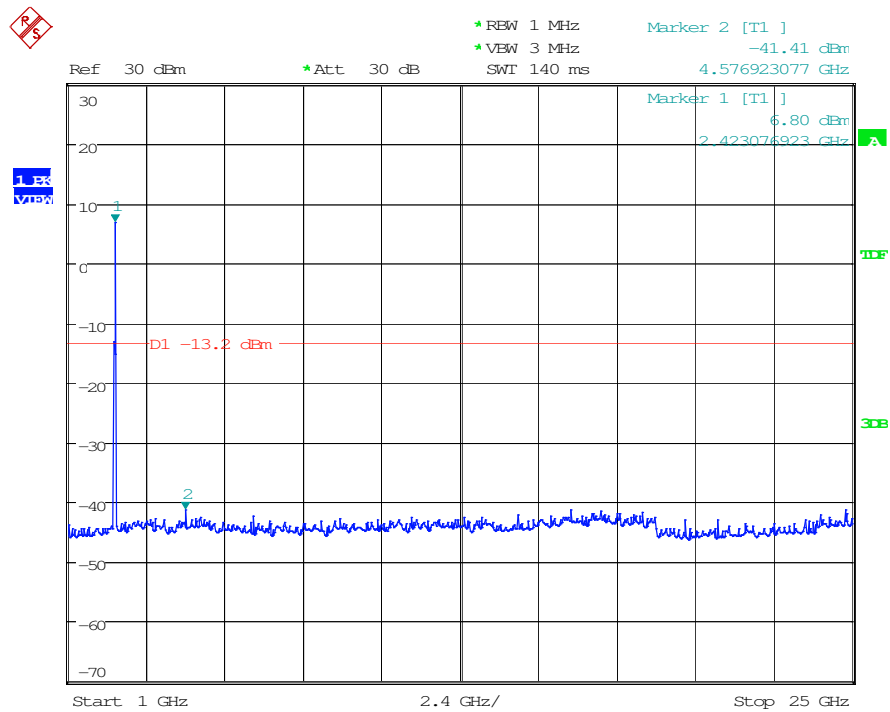
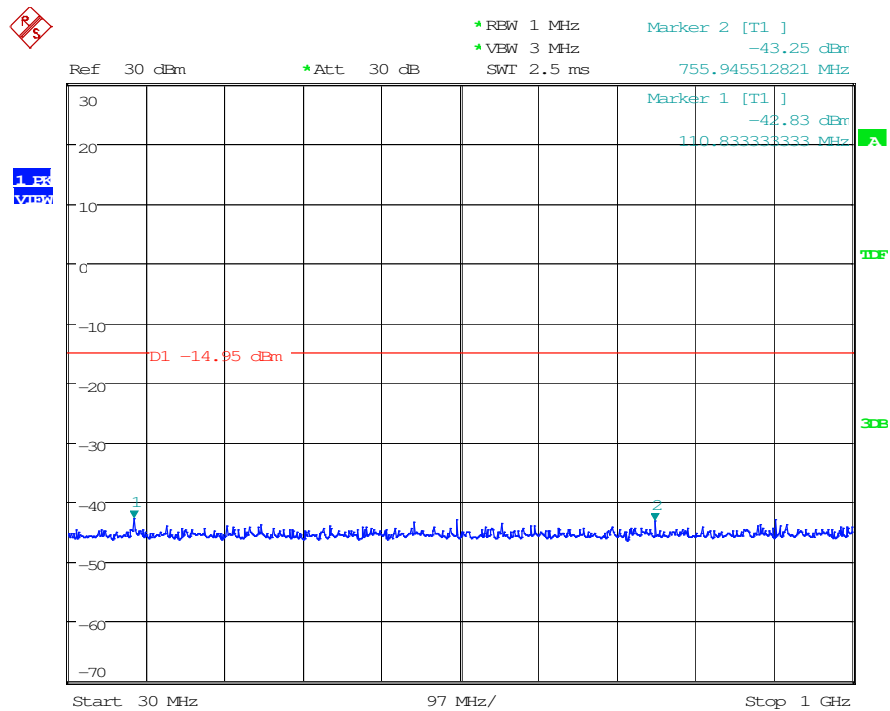


802.11n HT40:

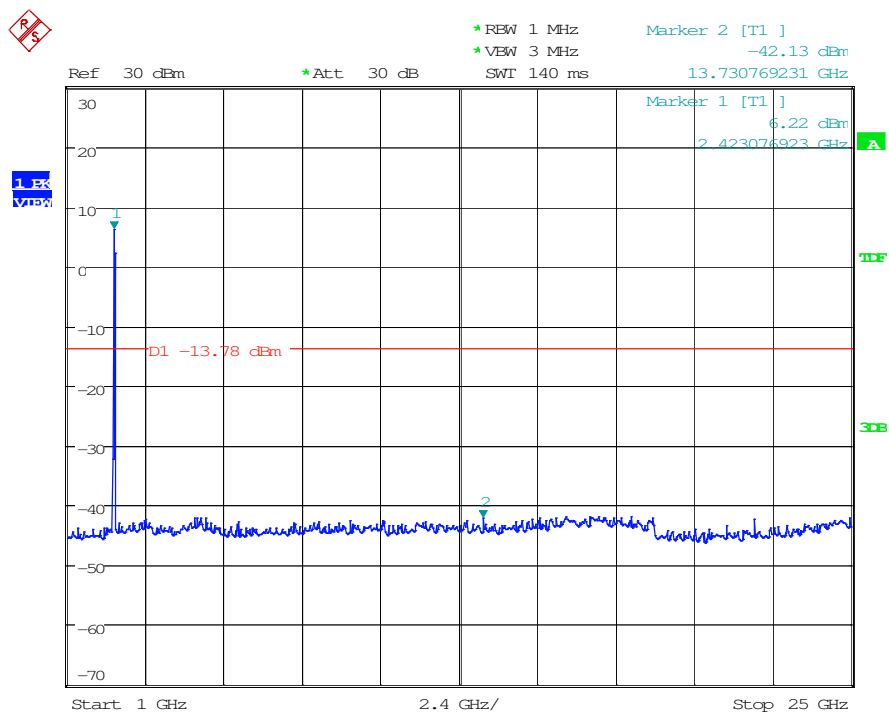
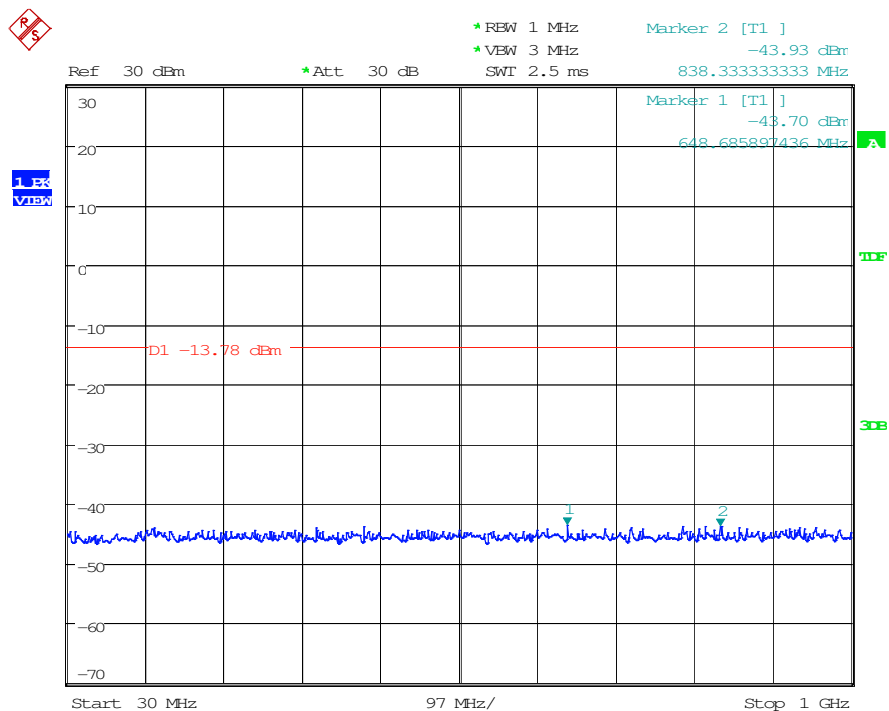
## Low channel



### Middle channel

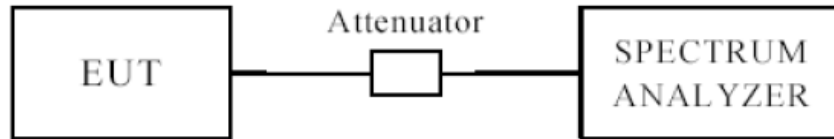


# High channel



## 7.0. 6DB BANDWIDTH MEASUREMENT

### 7.1 TEST SETUP



### 7.2 LIMITS OF 6DB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is >500 kHz

### 7.3 TEST PROCEDURE

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

### 7.4 TEST RESULT

6dB Occupied Bandwidth

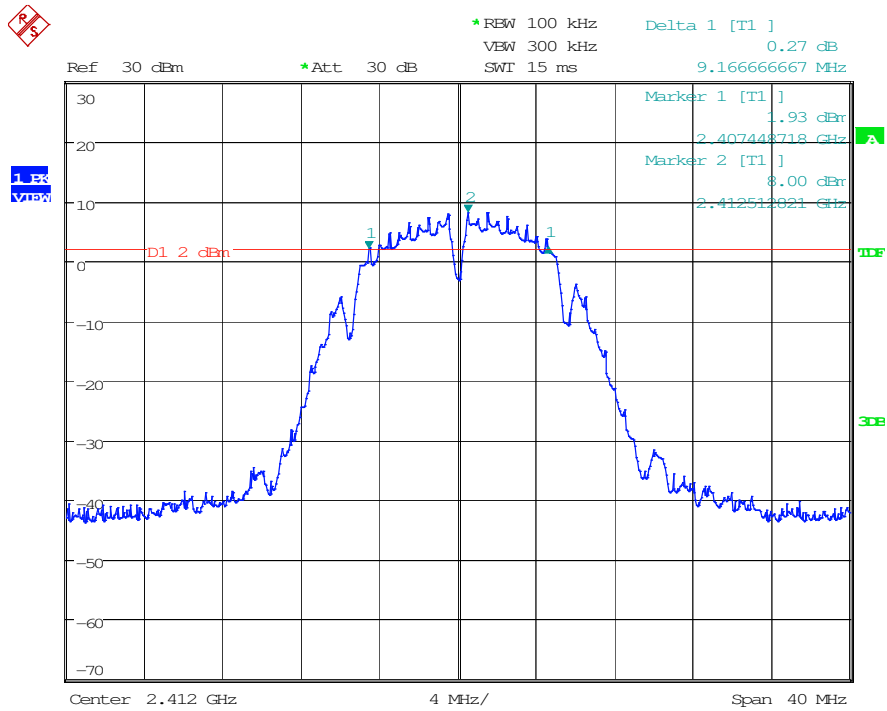
|             |                         |                           |                      |                     |            |        |  |
|-------------|-------------------------|---------------------------|----------------------|---------------------|------------|--------|--|
| EUT         |                         | Mobile phone              |                      | Model               |            | X521   |  |
| Mode        |                         | 802.11b                   |                      | Humidity            |            | 56% RH |  |
| Temperature |                         | 24 deg. C,                |                      |                     |            |        |  |
| Channel     | Channel Frequency (MHz) | Data Transfer Rate (Mbps) | 6 dB Bandwidth (kHz) | Minimum Limit (MHz) | Pass/ Fail |        |  |
| 1           | 2412                    | 1                         | 9166.7               | 0.5                 | Pass       |        |  |
| 6           | 2437                    | 1                         | 9615.4               | 0.5                 | Pass       |        |  |
| 11          | 2462                    | 1                         | 9615.4               | 0.5                 | Pass       |        |  |

|             |                         |                           |                      |                     |            |        |  |
|-------------|-------------------------|---------------------------|----------------------|---------------------|------------|--------|--|
| EUT         |                         | Mobile phone              |                      | Model               |            | X521   |  |
| Mode        |                         | 802.11g                   |                      | Humidity            |            | 56% RH |  |
| Temperature |                         | 24 deg. C,                |                      |                     |            |        |  |
| Channel     | Channel Frequency (MHz) | Data Transfer Rate (Mbps) | 6 dB Bandwidth (kHz) | Minimum Limit (MHz) | Pass/ Fail |        |  |
| 1           | 2412                    | 6                         | 16089.7              | 0.5                 | Pass       |        |  |
| 6           | 2437                    | 6                         | 16410.2              | 0.5                 | Pass       |        |  |
| 11          | 2462                    | 6                         | 16602.5              | 0.5                 | Pass       |        |  |

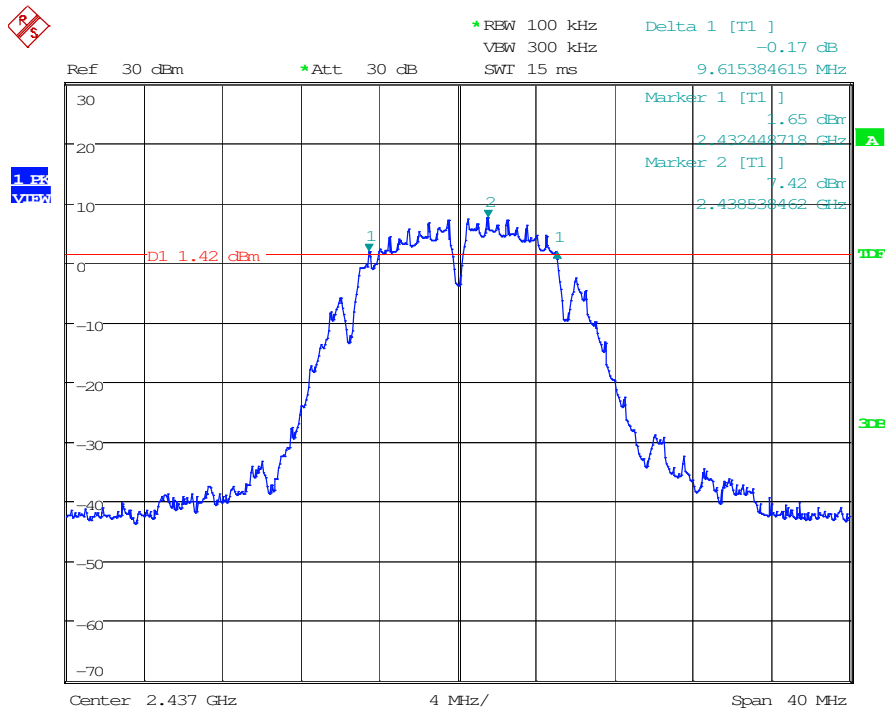
|             |                         |                           |                      |                     |            |        |  |
|-------------|-------------------------|---------------------------|----------------------|---------------------|------------|--------|--|
| EUT         |                         | Mobile phone              |                      | Model               |            | X521   |  |
| Mode        |                         | 802.11n20                 |                      | Humidity            |            | 56% RH |  |
| Temperature |                         | 24 deg. C,                |                      |                     |            |        |  |
| Channel     | Channel Frequency (MHz) | Data Transfer Rate (Mbps) | 6 dB Bandwidth (kHz) | Minimum Limit (MHz) | Pass/ Fail |        |  |
| 1           | 2412                    | 6.5                       | 17051.2              | 0.5                 | Pass       |        |  |
| 6           | 2437                    | 6.5                       | 17692.3              | 0.5                 | Pass       |        |  |
| 11          | 2462                    | 6.5                       | 17756.4              | 0.5                 | Pass       |        |  |

|             |                         |                           |                      |                     |            |        |  |
|-------------|-------------------------|---------------------------|----------------------|---------------------|------------|--------|--|
| EUT         |                         | Mobile phone              |                      | Model               |            | X521   |  |
| Mode        |                         | 802.11n40                 |                      | Humidity            |            | 56% RH |  |
| Temperature |                         | 24 deg. C,                |                      |                     |            |        |  |
| Channel     | Channel Frequency (MHz) | Data Transfer Rate (Mbps) | 6 dB Bandwidth (kHz) | Minimum Limit (MHz) | Pass/ Fail |        |  |
| 3           | 2422                    | 13.5                      | 36153.8              | 0.5                 | Pass       |        |  |
| 6           | 2437                    | 13.5                      | 35256.4              | 0.5                 | Pass       |        |  |
| 9           | 2452                    | 13.5                      | 33974.4              | 0.5                 | Pass       |        |  |

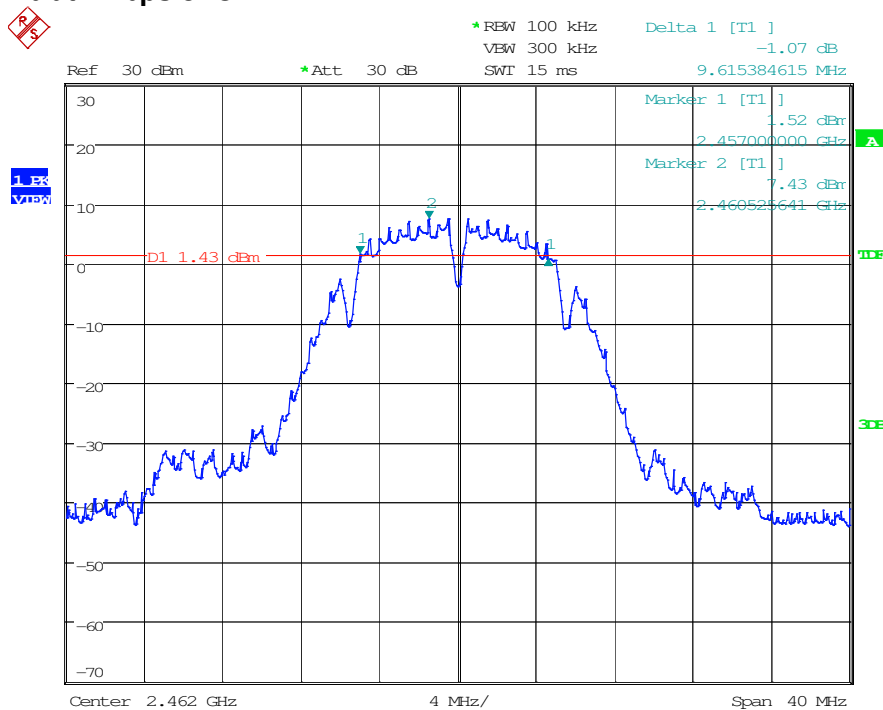
## 802.11b at 1Mbps of CH1



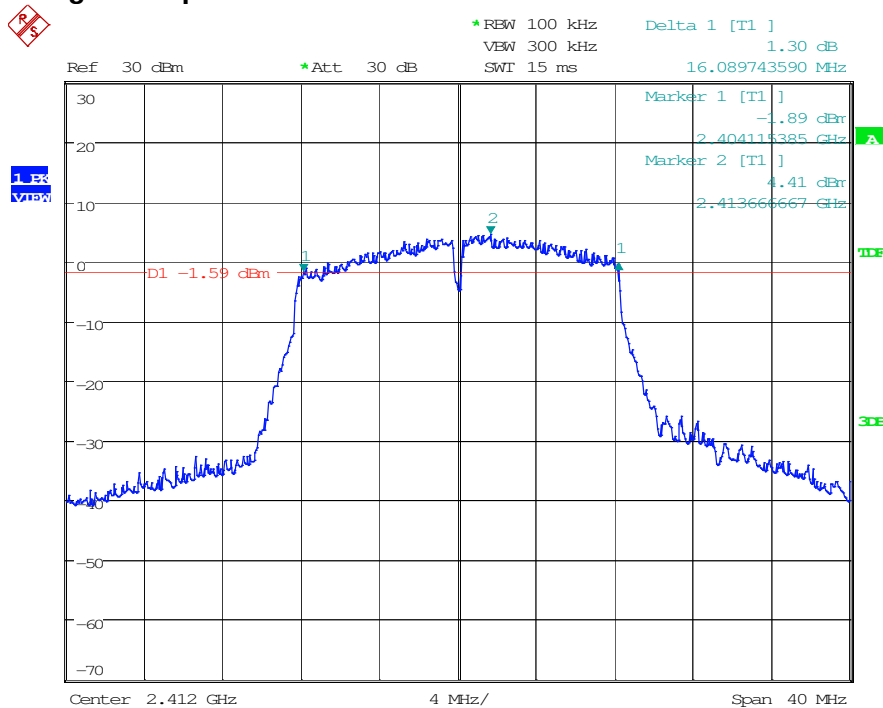
## 802.11b at 1Mbps of CH6



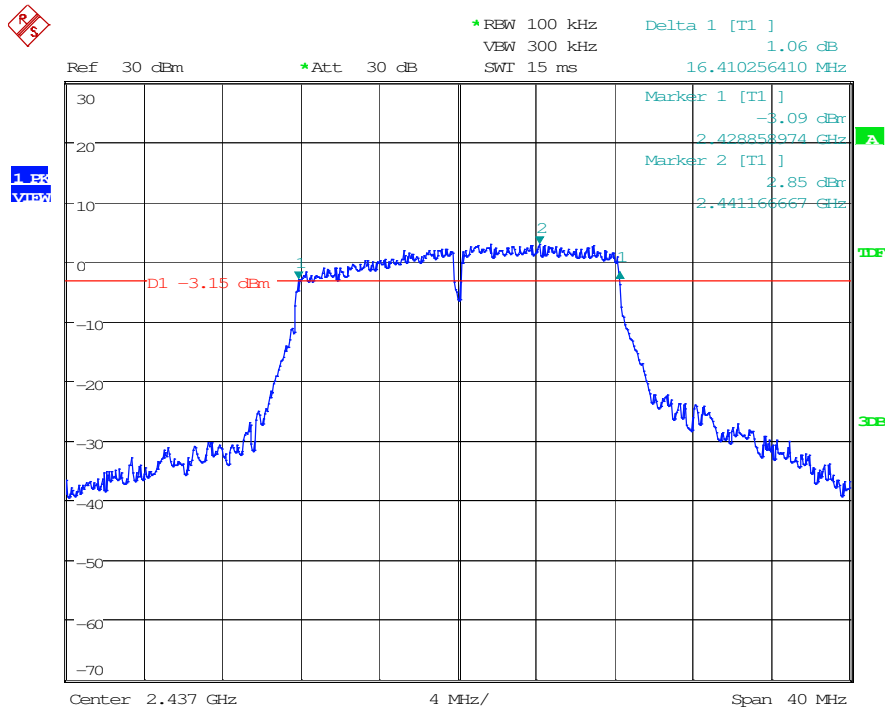
# 802.11b at 1Mbps of CH11



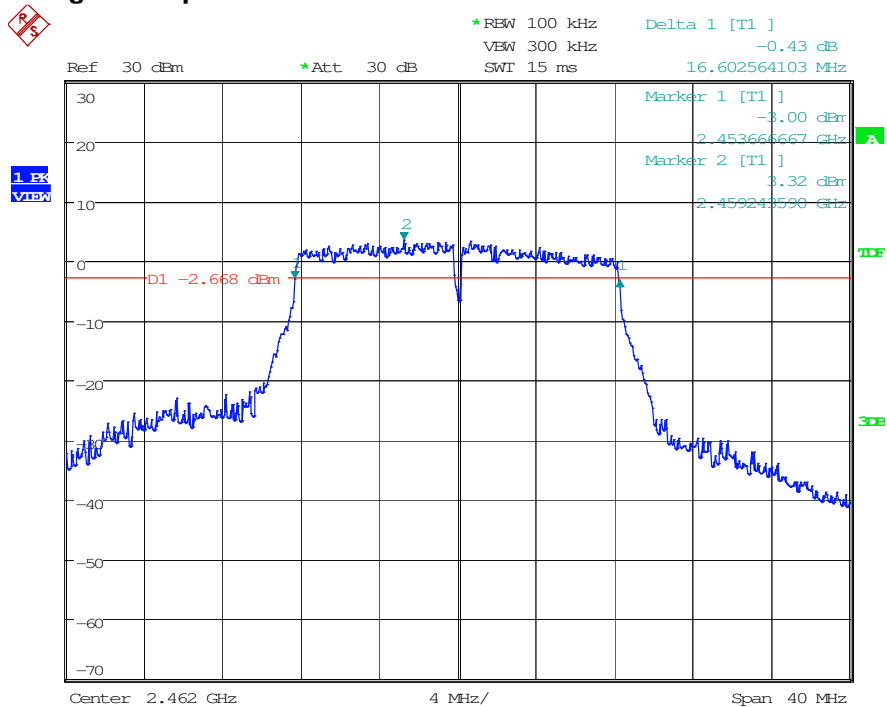
# 802.11g at 6Mbps of CH1



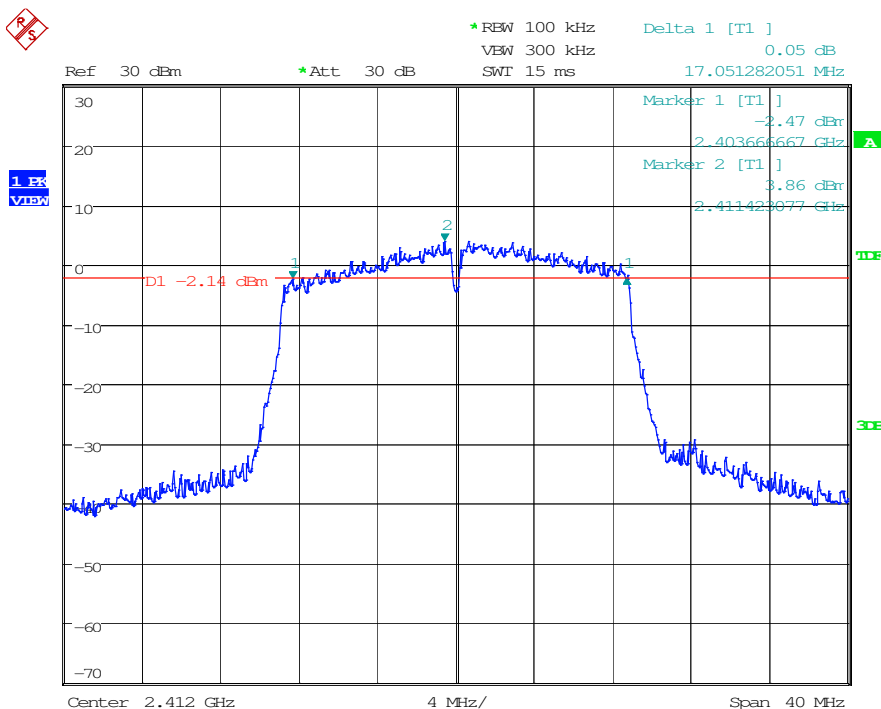
### 802.11g at 6Mbps of CH6



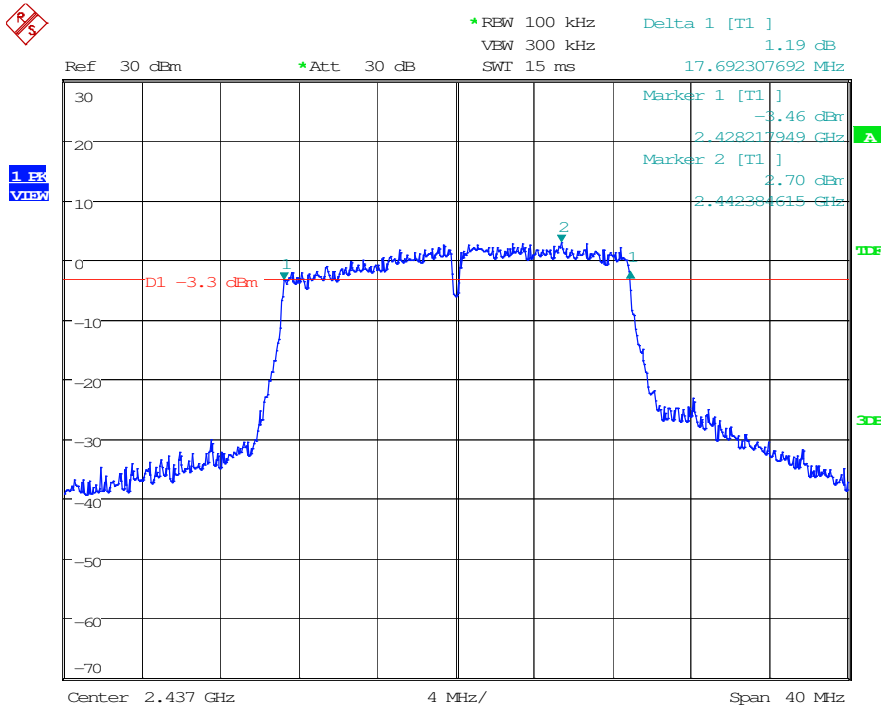
### 802.11g at 6Mbps of CH11



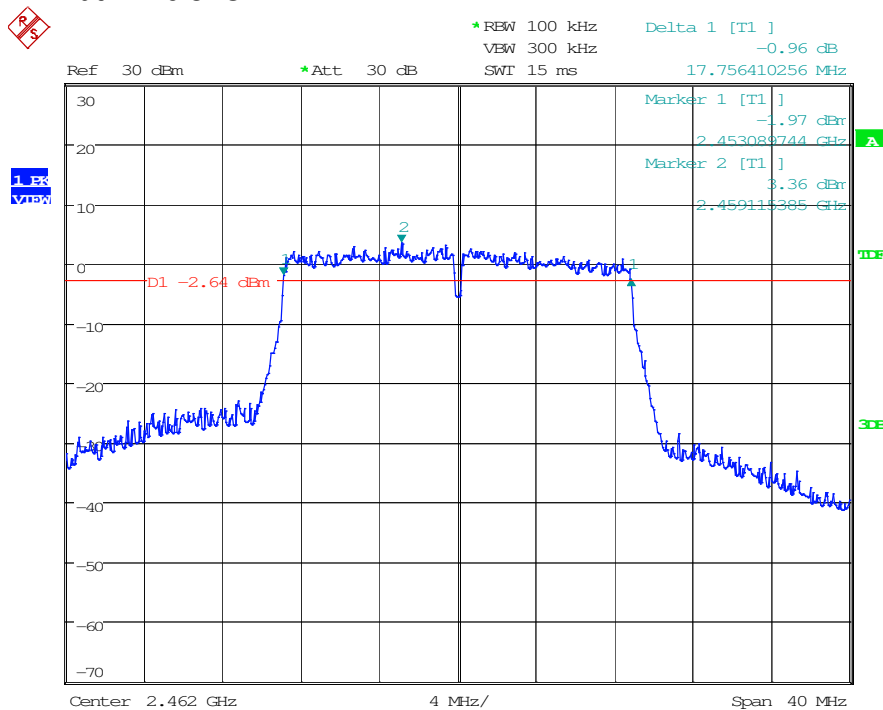
# 802.11n at HT20 of CH1



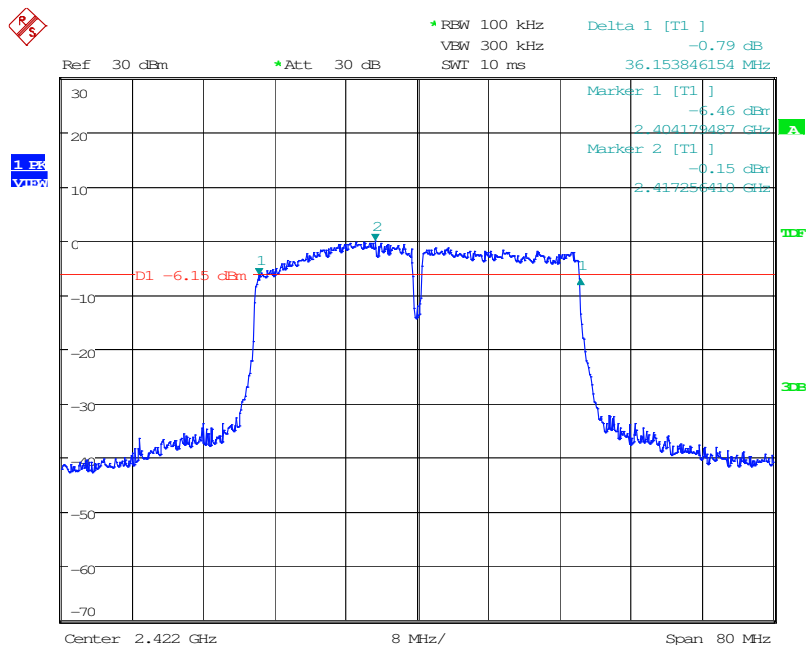
# 802.11n at HT20 of CH6



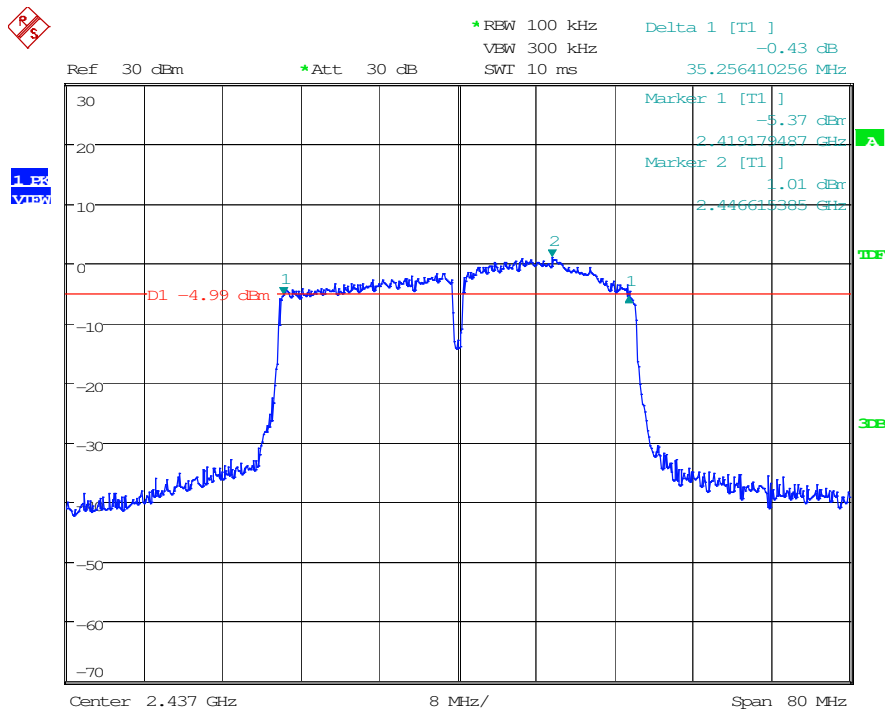
## 802.11n at HT20 of CH11



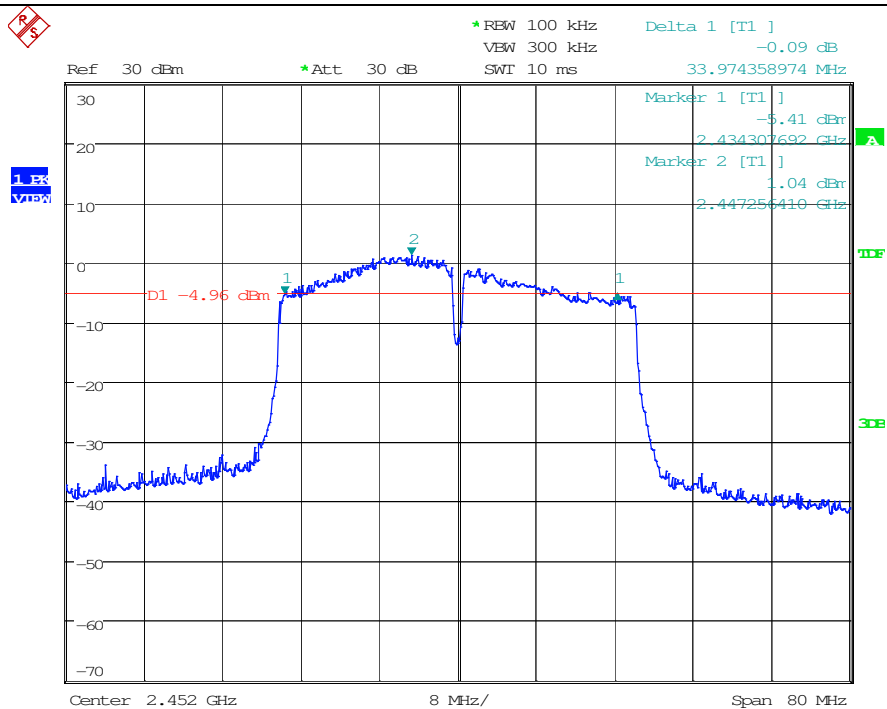
## 802.11n at HT40 of CH3



## 802.11n at HT40 of CH6

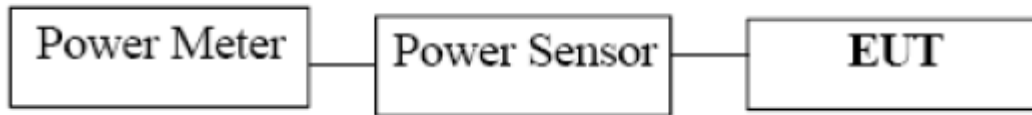


## 802.11n at HT40 of CH9



## 8.0. MAXIMUM PEAK OUTPUT POWER

### 8.1 TEST SETUP



### 8.2 LIMITS OF MAXIMUM PEAK OUTPUT POWER

The Maximum Peak Output Power Measurement is 30dBm.

### 8.3 TEST PROCEDURE

The RF power output was measured with a Power meter connected to the RF Antenna connector measurement while EUT was operating in transmit mode at the appropriate centre frequency.

Note: the peak power was measured.

### 8.4 TEST RESULTS

|             |                         |                         |  |                        |  |            |  |
|-------------|-------------------------|-------------------------|--|------------------------|--|------------|--|
| EUT         |                         | Mobile phone            |  | Model                  |  | X521       |  |
| Mode        |                         | 802.11b                 |  | Humidity               |  | 56% RH     |  |
| Temperature |                         | 24 deg. C,              |  |                        |  |            |  |
| Channel     | Channel Frequency (MHz) | Peak Power Output (dBm) |  | Peak Power Limit (dBm) |  | Pass/ Fail |  |
| 1           | 2412                    | 16.68                   |  | 30                     |  | Pass       |  |
| 6           | 2437                    | 16.65                   |  | 30                     |  | Pass       |  |
| 11          | 2462                    | 17.17                   |  | 30                     |  | Pass       |  |

Note: 1. At final test to get the worst-case emission at 1Mbps for CH1, CH6 and CH11

2. The result basic equation calculation as follow:

Peak Power Output = Peak Power Reading + Cable loss + Attenuator

3. The worse case was recorded

|             |                         |                         |  |                        |  |            |  |
|-------------|-------------------------|-------------------------|--|------------------------|--|------------|--|
| EUT         |                         | Mobile phone            |  | Model                  |  | X521       |  |
| Mode        |                         | 802.11g                 |  | Humidity               |  | 56% RH     |  |
| Temperature |                         | 24 deg. C,              |  |                        |  |            |  |
| Channel     | Channel Frequency (MHz) | Peak Power Output (dBm) |  | Peak Power Limit (dBm) |  | Pass/ Fail |  |
| 1           | 2412                    | 15.40                   |  | 30                     |  | Pass       |  |
| 6           | 2437                    | 15.07                   |  | 30                     |  | Pass       |  |
| 11          | 2462                    | 16.04                   |  | 30                     |  | Pass       |  |

Note: 1. At final test to get the worst-case emission at 6 Mbps for CH1, CH6 and CH11

2. The result basic equation calculation as follow:

Peak Power Output = Peak Power Reading + Cable loss + Attenuator

3. The worse case was recorded

|             |                         |                         |  |                        |  |            |  |
|-------------|-------------------------|-------------------------|--|------------------------|--|------------|--|
| EUT         |                         | Mobile phone            |  | Model                  |  | X521       |  |
| Mode        |                         | 802.11n(HT20)           |  | Humidity               |  | 56% RH     |  |
| Temperature |                         | 24 deg. C,              |  |                        |  |            |  |
| Channel     | Channel Frequency (MHz) | Peak Power Output (dBm) |  | Peak Power Limit (dBm) |  | Pass/ Fail |  |
| 1           | 2412                    | 15.89                   |  | 30                     |  | Pass       |  |
| 6           | 2437                    | 15.36                   |  | 30                     |  | Pass       |  |
| 11          | 2462                    | 15.73                   |  | 30                     |  | Pass       |  |

Note: 1. At final test to get the worst-case emission at 6.5Mbps for CH1, CH6 and CH11

2. The result basic equation calculation as follow:

Peak Power Output = Peak Power Reading + Cable loss + Attenuator

3. The worse case was recorded

|             |                         |                         |                        |            |  |
|-------------|-------------------------|-------------------------|------------------------|------------|--|
| EUT         | Mobile phone            |                         | Model                  | X521       |  |
| Mode        | 802.11n (HT40)          |                         | Humidity               | 56% RH     |  |
| Temperature | 24 deg. C,              |                         |                        |            |  |
| Channel     | Channel Frequency (MHz) | Peak Power Output (dBm) | Peak Power Limit (dBm) | Pass/ Fail |  |
| 3           | 2422                    | 15.38                   | 30                     | Pass       |  |
| 6           | 2437                    | 16.78                   | 30                     | Pass       |  |
| 9           | 2452                    | 15.08                   | 30                     | Pass       |  |

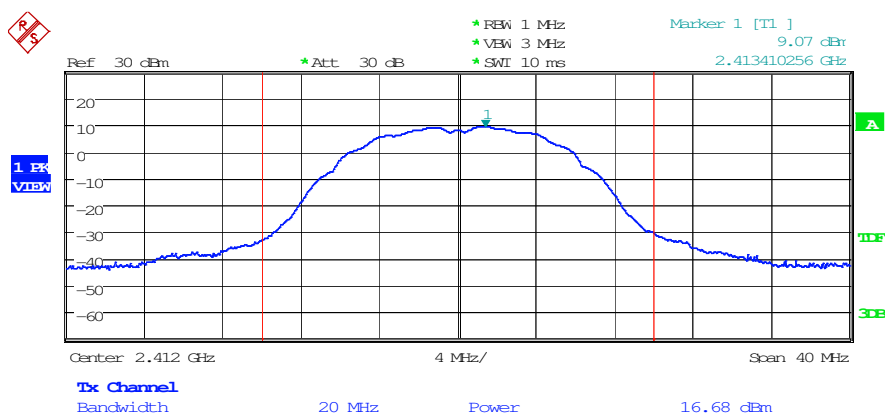
Note: 1. At final test to get the worst-case emission at 13.5Mbps for CH3, CH6 and CH9

2. The result basic equation calculation as follow:

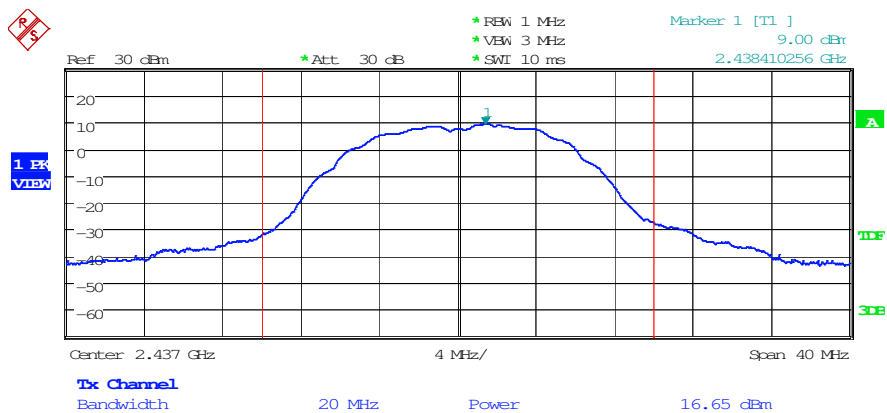
Peak Power Output = Peak Power Reading + Cable loss + Attenuator

3. The worse case was recorded.

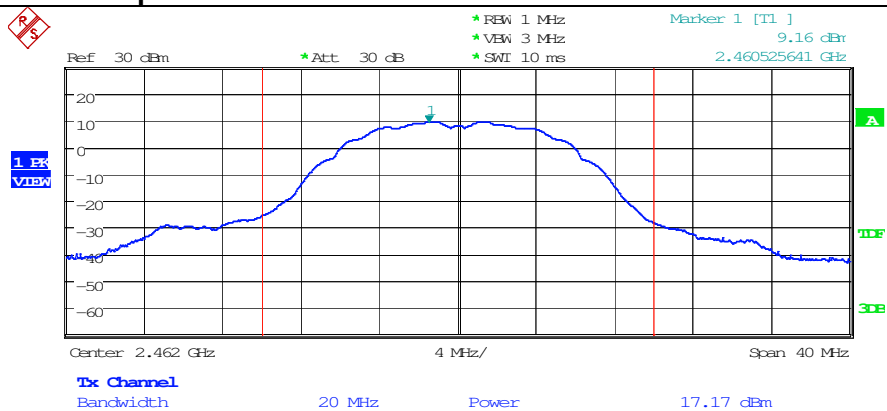
## 802.11b at 1Mbps of CH1



## 802.11b at 1Mbps of CH6

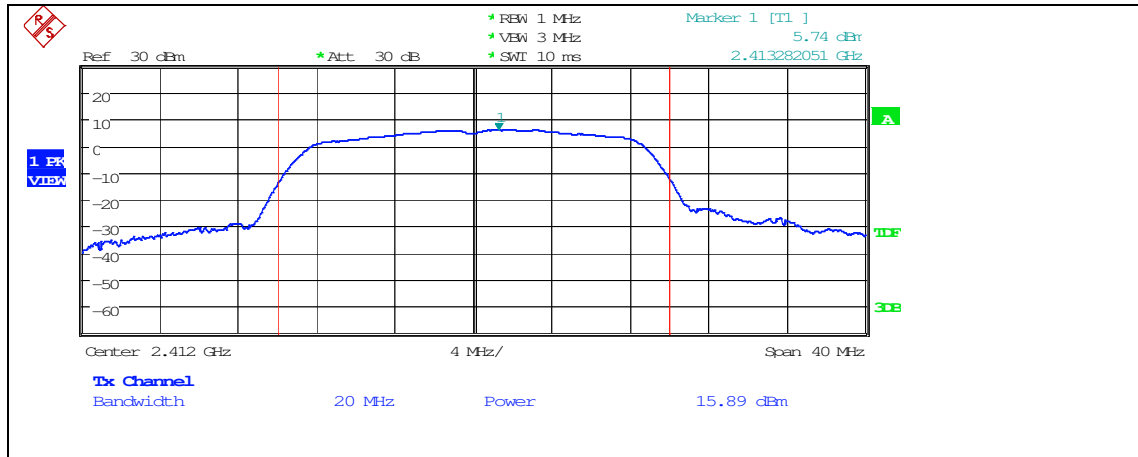


## 802.11b at 1Mbps of CH11

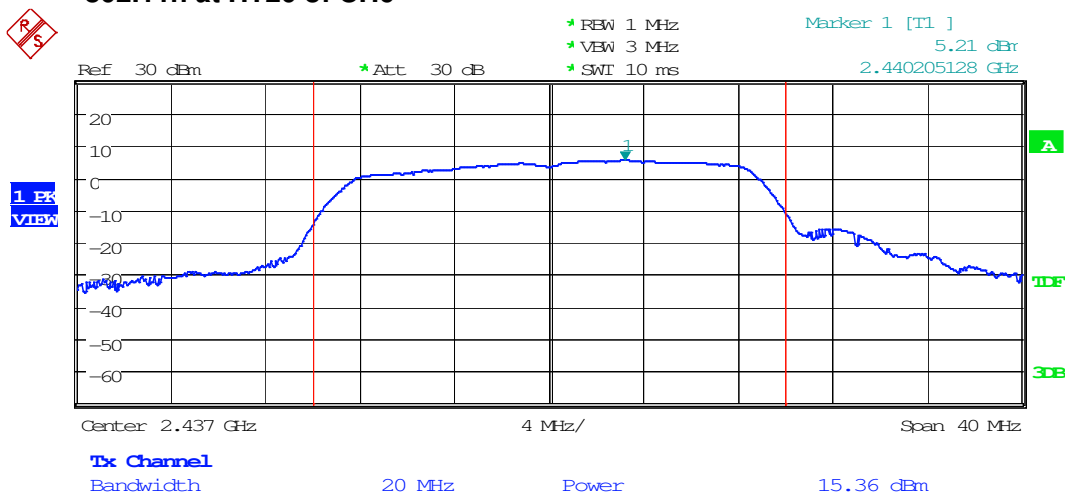




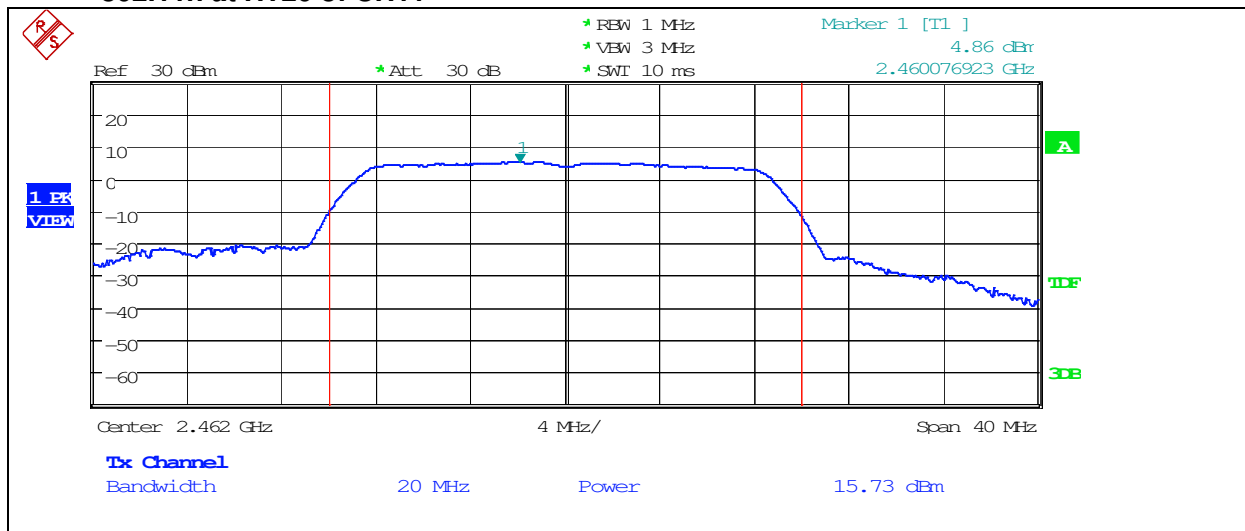
## 802.11n at HT20 of CH1

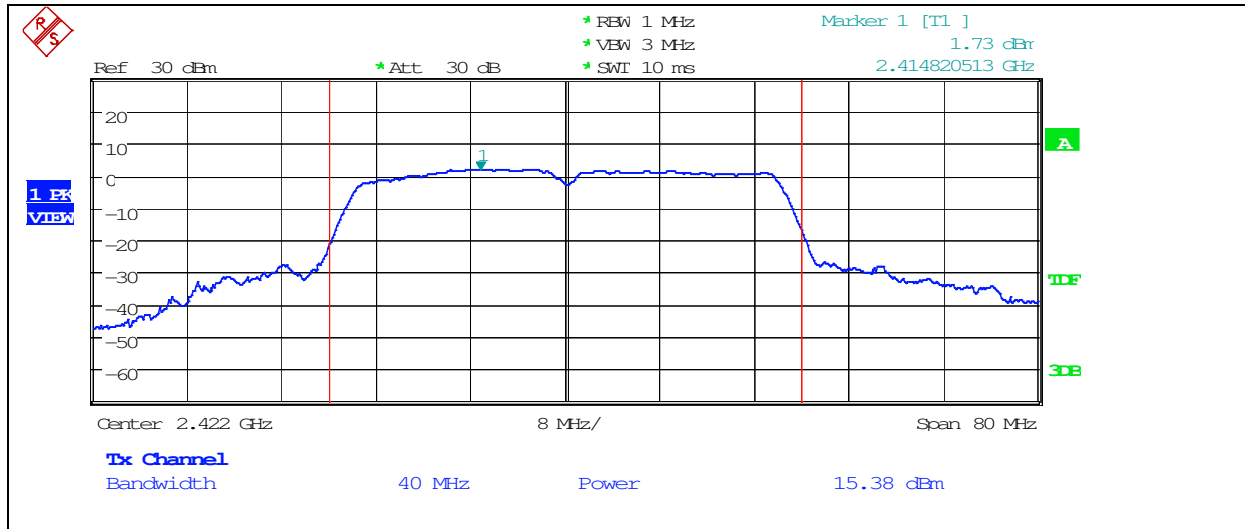
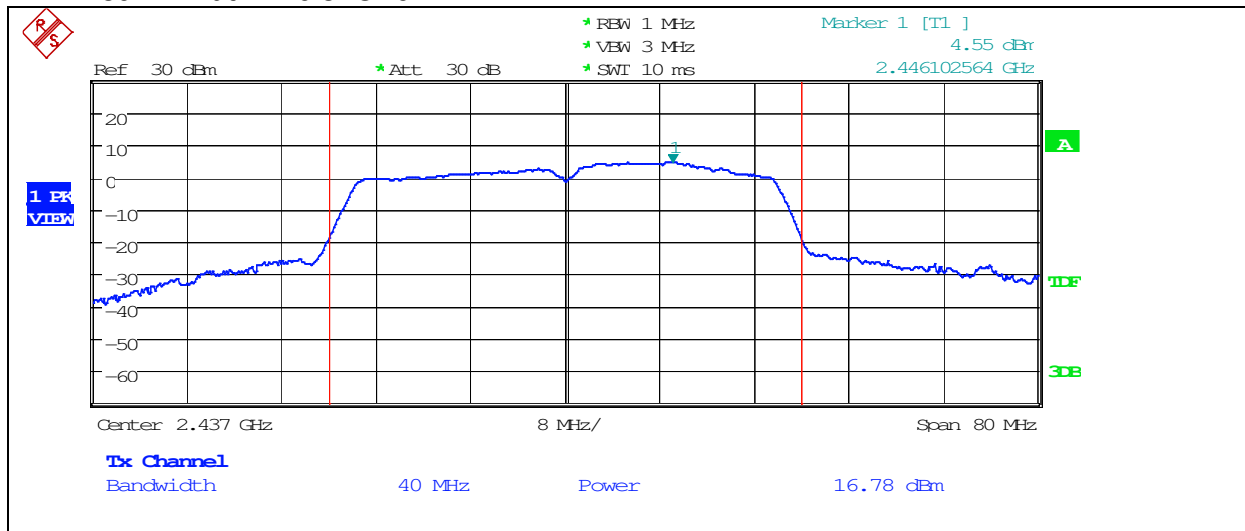
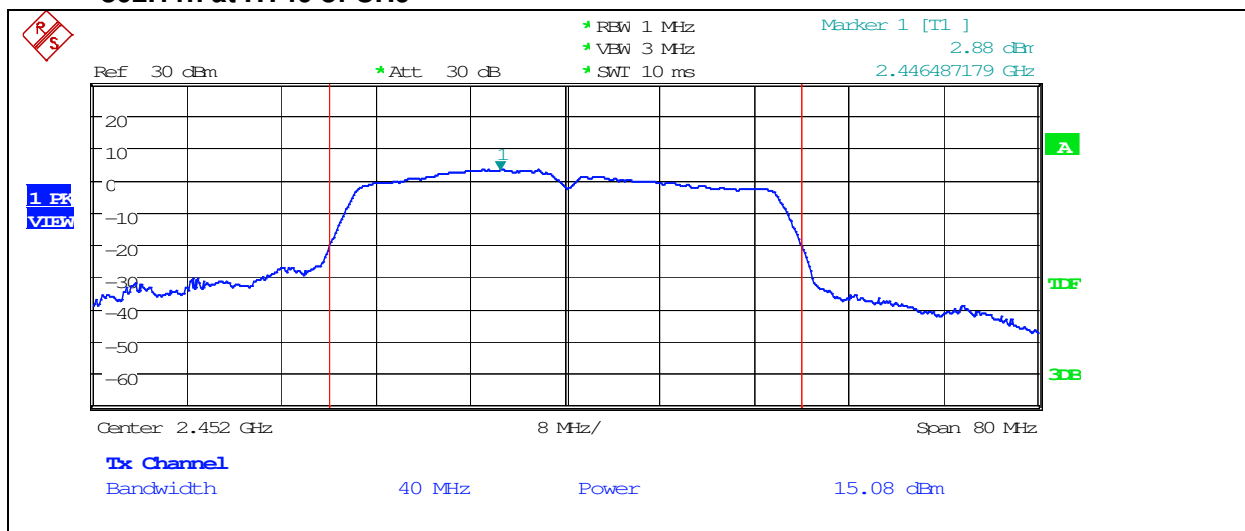


## 802.11n at HT20 of CH6



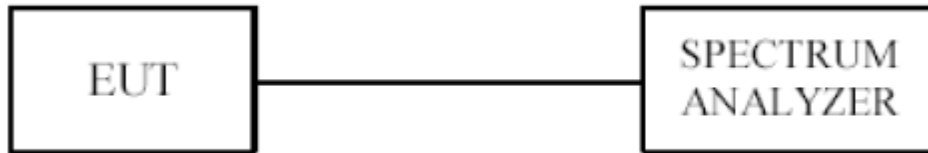
## 802.11n at HT20 of CH11



**802.11n at HT40 of CH3****802.11n at HT40 of CH6****802.11n at HT40 of CH9**

## 9. POWER SPECTRAL DENSITY MEASUREMENT

### 9.1 TEST SETUP



### 9.2 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum Power Spectral Density Measurement is 8dBm.

### 9.3 TEST PROCEDURE

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW = 3 kHz.
3. Set the VBW = 10 kHz.
4. Set the span to 1.5 times the DTS channel bandwidth.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
11. The resulting peak PSD level must be  $\leq 8$  dBm.

**9.4 TEST RESULT**

|             |                         |              |                               |          |                     |        |            |
|-------------|-------------------------|--------------|-------------------------------|----------|---------------------|--------|------------|
| EUT         |                         | Mobile phone |                               | Model    |                     | X521   |            |
| Mode        |                         | 802.11b      |                               | Humidity |                     | 56% RH |            |
| Temperature |                         | 24 deg. C,   |                               |          |                     |        |            |
| Channel     | Channel Frequency (MHz) |              | Final RF Power Level in (dBm) |          | Maximum Limit (dBm) |        | Pass/ Fail |
| 1Mbps       |                         |              |                               |          |                     |        |            |
| 1           | 2412                    |              | -14.85                        |          | 8                   |        | Pass       |
| 6           | 2437                    |              | -15.18                        |          | 8                   |        | Pass       |
| 11          | 2462                    |              | -15.54                        |          | 8                   |        | Pass       |

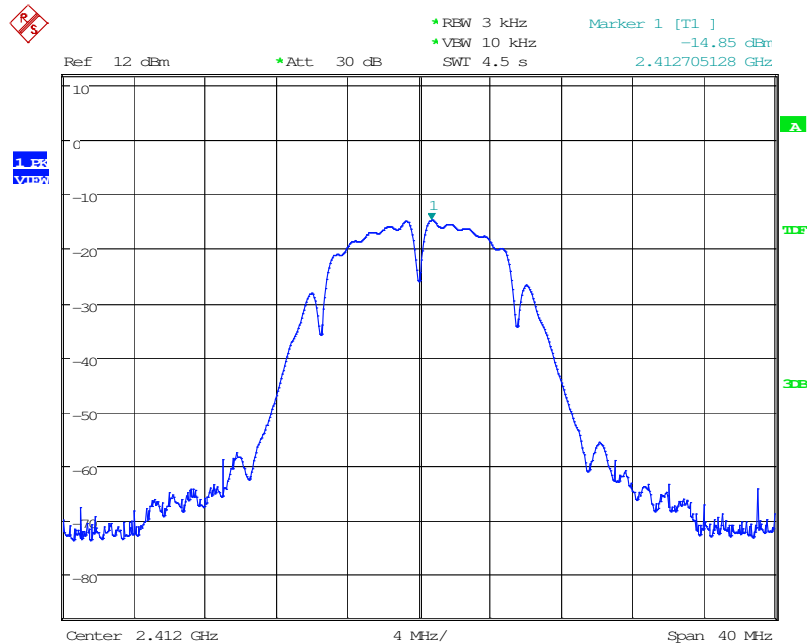
|             |                         |              |                               |          |                     |        |            |
|-------------|-------------------------|--------------|-------------------------------|----------|---------------------|--------|------------|
| EUT         |                         | Mobile phone |                               | Model    |                     | X521   |            |
| Mode        |                         | 802.11g      |                               | Humidity |                     | 56% RH |            |
| Temperature |                         | 24 deg. C,   |                               |          |                     |        |            |
| Channel     | Channel Frequency (MHz) |              | Final RF Power Level in (dBm) |          | Maximum Limit (dBm) |        | Pass/ Fail |
| 6Mbps       |                         |              |                               |          |                     |        |            |
| 1           | 2412                    |              | -15.01                        |          | 8                   |        | Pass       |
| 6           | 2437                    |              | -16.20                        |          | 8                   |        | Pass       |
| 11          | 2462                    |              | -16.02                        |          | 8                   |        | Pass       |

|             |                         |              |                               |          |                     |        |            |
|-------------|-------------------------|--------------|-------------------------------|----------|---------------------|--------|------------|
| EUT         |                         | Mobile phone |                               | Model    |                     | X521   |            |
| Mode        |                         | 802.11n HT20 |                               | Humidity |                     | 56% RH |            |
| Temperature |                         | 24 deg. C,   |                               |          |                     |        |            |
| Channel     | Channel Frequency (MHz) |              | Final RF Power Level in (dBm) |          | Maximum Limit (dBm) |        | Pass/ Fail |
| 6.5Mbps     |                         |              |                               |          |                     |        |            |
| 1           | 2412                    |              | -15.45                        |          | 8                   |        | Pass       |
| 6           | 2437                    |              | -15.95                        |          | 8                   |        | Pass       |
| 11          | 2462                    |              | -16.19                        |          | 8                   |        | Pass       |

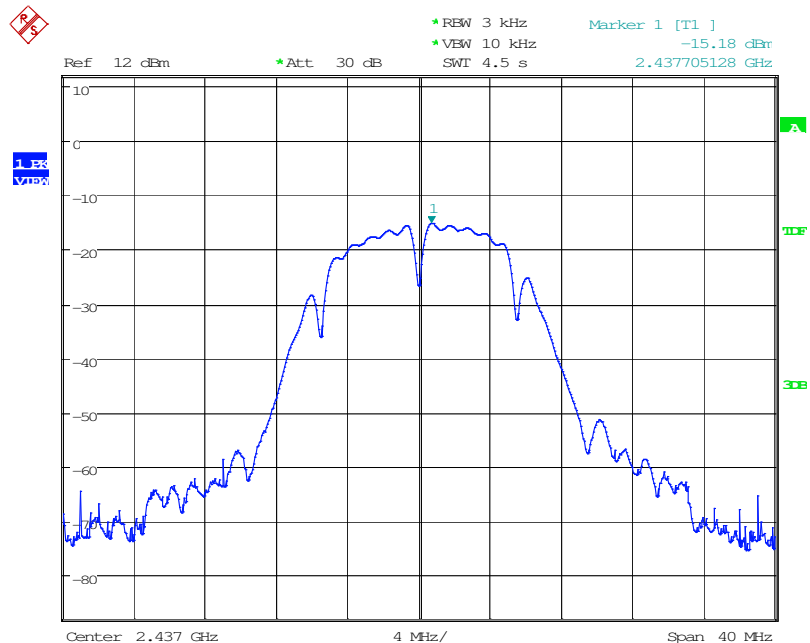
|             |                               |                                  |  |                        |  |            |  |
|-------------|-------------------------------|----------------------------------|--|------------------------|--|------------|--|
| EUT         |                               | Mobile phone                     |  | Model                  |  | X521       |  |
| Mode        |                               | 802.11n HT40                     |  | Humidity               |  | 56% RH     |  |
| Temperature |                               | 24 deg. C,                       |  |                        |  |            |  |
| Channel     | Channel<br>Frequency<br>(MHz) | Final RF Power<br>Level in (dBm) |  | Maximum Limit<br>(dBm) |  | Pass/ Fail |  |
| 13.5Mbps    |                               |                                  |  |                        |  |            |  |
| 3           | 2422                          | -16.44                           |  | 8                      |  | Pass       |  |
| 6           | 2437                          | -16.74                           |  | 8                      |  | Pass       |  |
| 9           | 2452                          | -16.23                           |  | 8                      |  | Pass       |  |

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

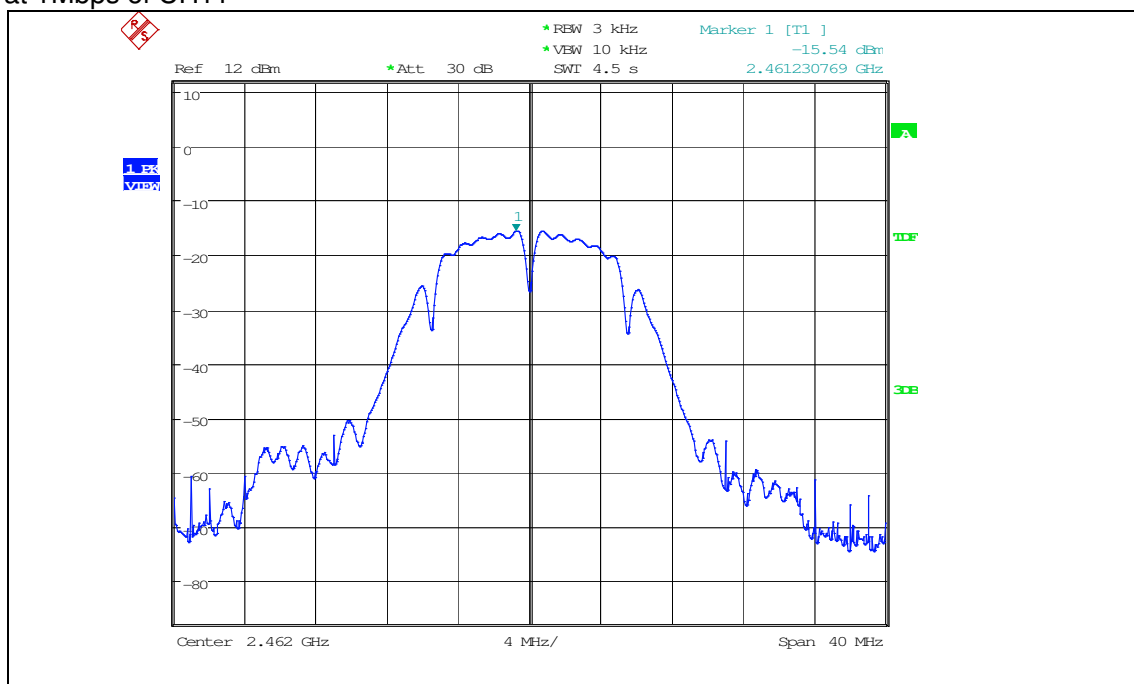
## 802.11b at 1Mbps of CH1



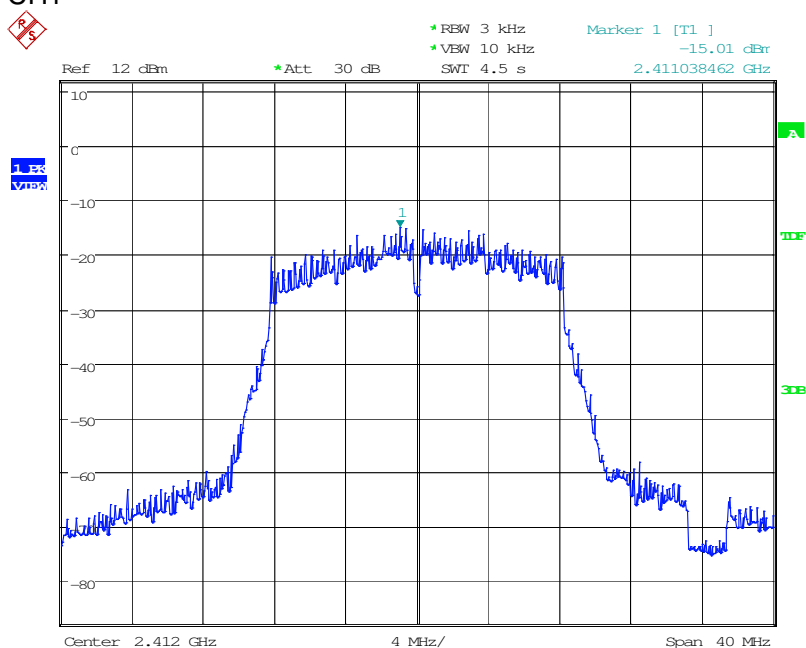
## 802.11b at 1Mbps at CH6



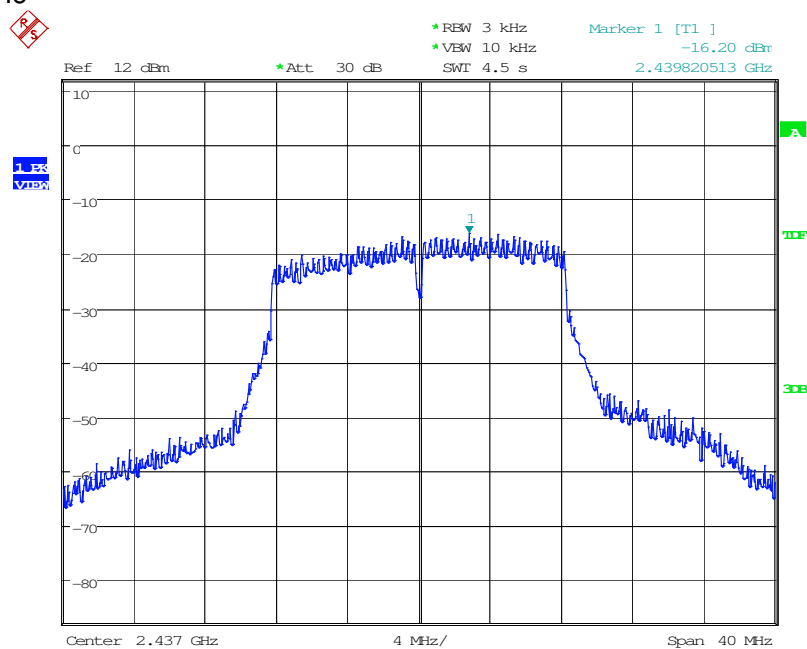
## 802.11b at 1Mbps of CH11



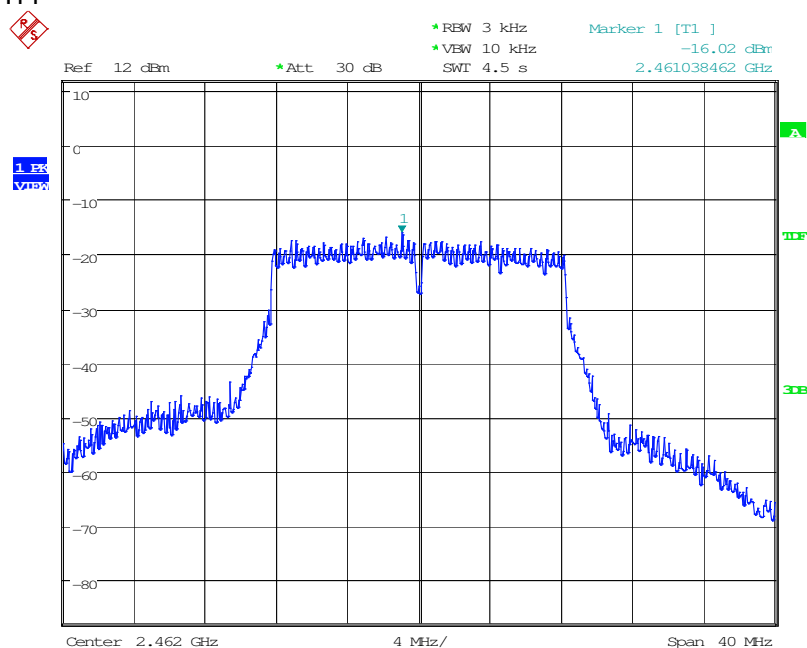
## 802.11g at 6Mbps of CH1



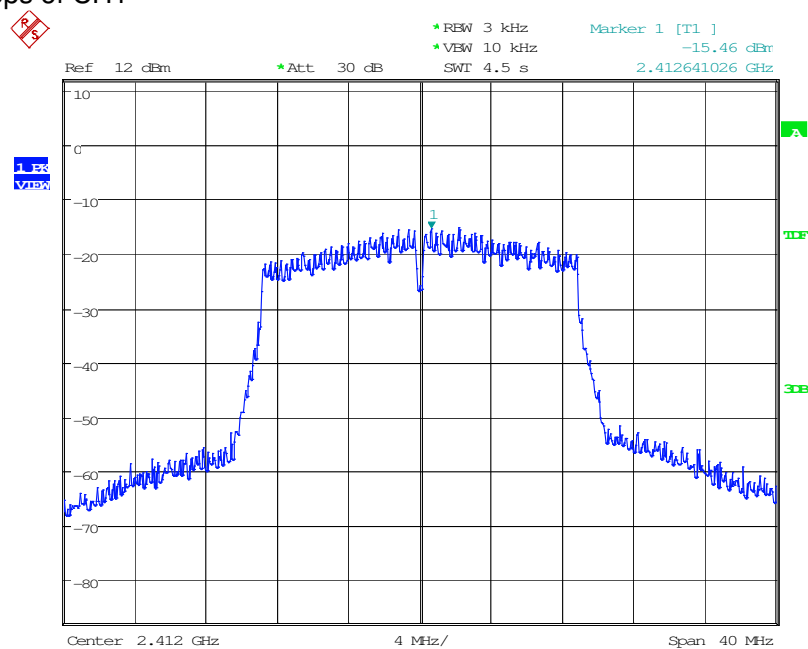
## 802.11g at 6Mbps of CH6



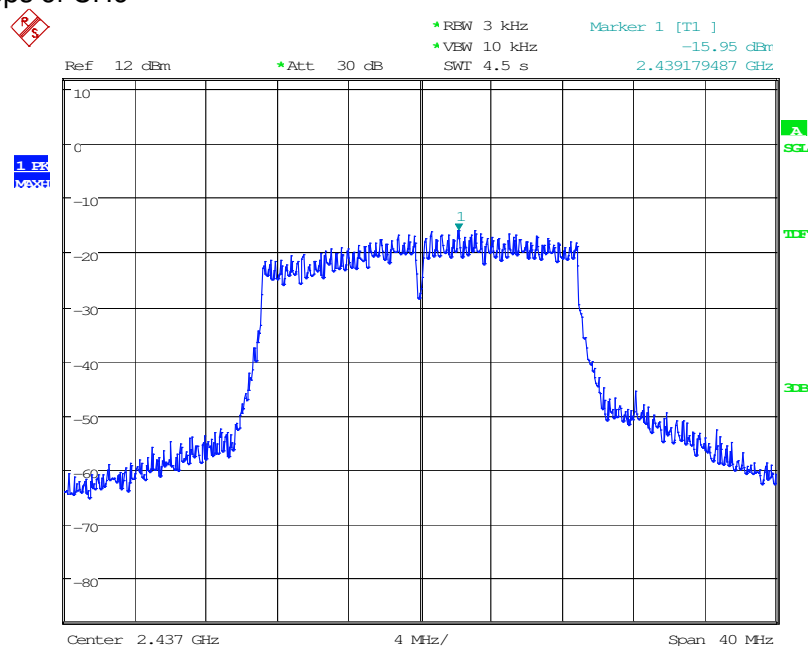
## 802.11g at 6Mbps of CH11



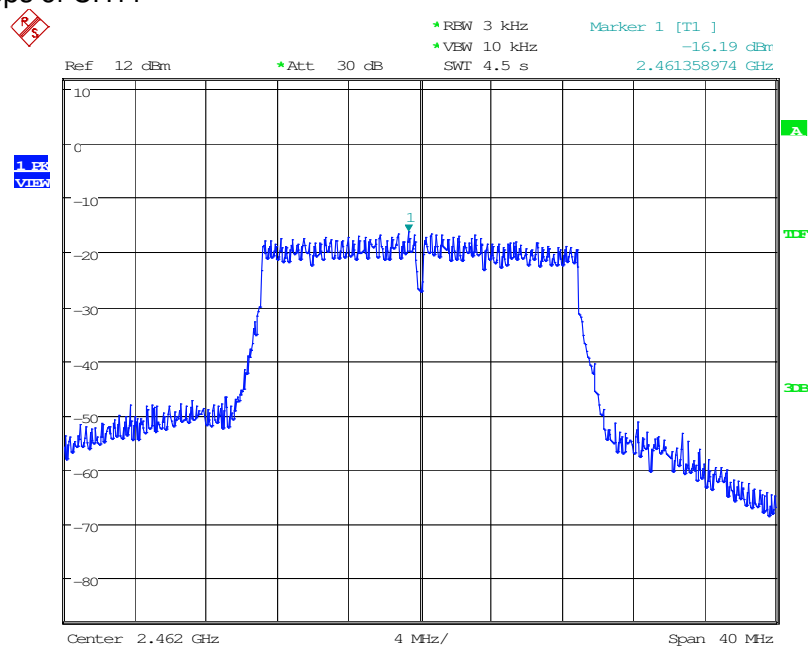
## 802.11n HT20 at 6.5Mbps of CH1



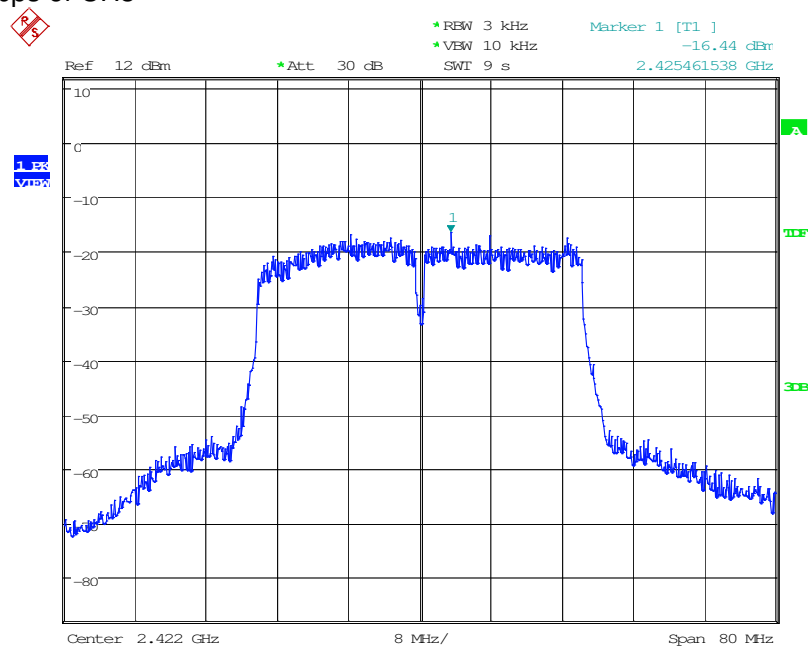
## 802.11n HT20 at 6.5Mbps of CH6



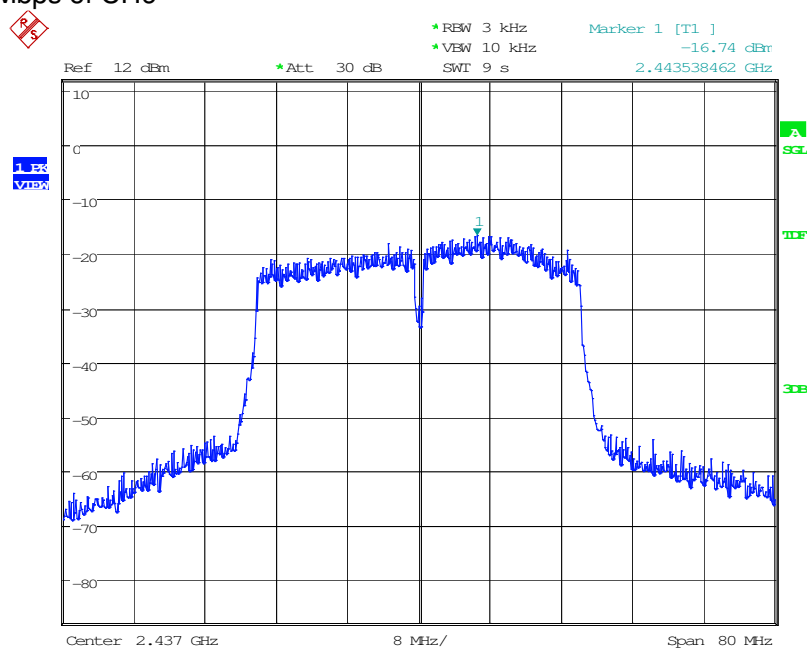
## 802.11n HT20 at 6.5Mbps of CH11



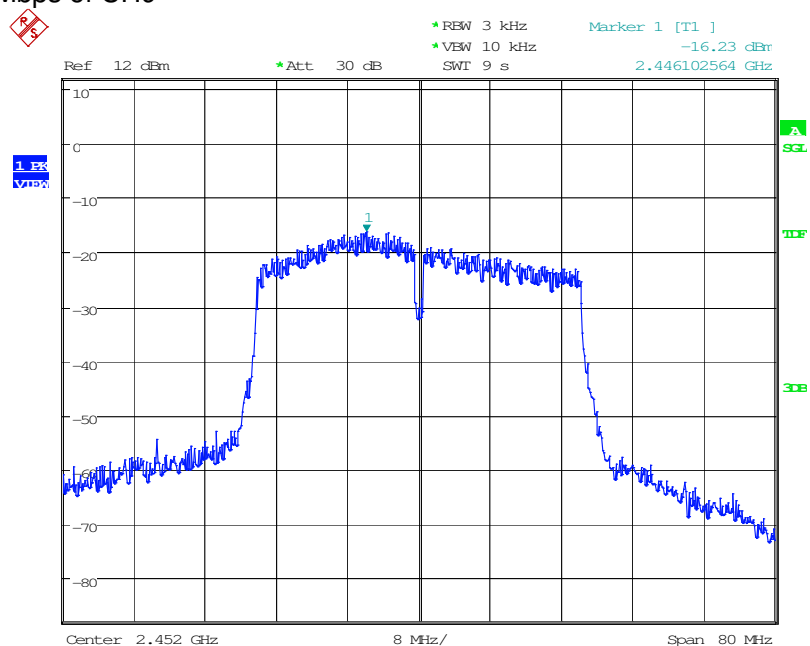
## 802.11n HT40 at 13.5Mbps of CH3



## 802.11n HT40 at 13.5Mbps of CH6

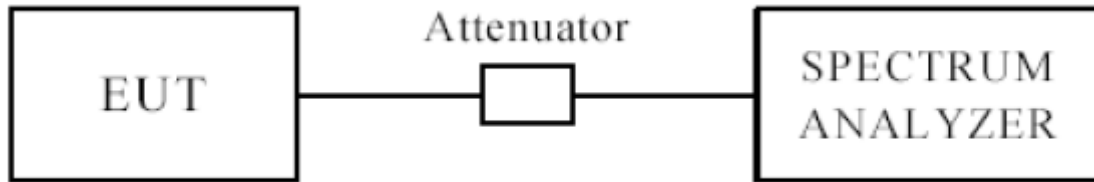


## 802.11n HT40 at 13.5Mbps of CH9



## 10. OUT OF BAND MEASUREMENT

### 10.1 TEST SETUP FOR BAND EDGE



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

### 10.2 LIMITS OF OUT OF BAND EMISSIONS MEASUREMENT

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

### 10.3 TEST PROCEDURE

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

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

### 10.4 TEST RESULT

Please see next pages

Note: This is a handheld device. The radiated emissions should be tested under 3-axes position (Lying, Stand), After pre-test. It was found that the worse radiated emission was get at the lying position.

**Radiated measurement:****802.11b**

| Indicated              |                                 | result<br>(PK/AV) | Antenna<br>Polar<br>(H/V) | Correction Factor        |                       |                          | FCC Part 15.247           |                   |                |
|------------------------|---------------------------------|-------------------|---------------------------|--------------------------|-----------------------|--------------------------|---------------------------|-------------------|----------------|
| Frequency<br>(MHz)     | Receiver<br>Reading<br>(dBμV/m) |                   |                           | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Pre-Amp.<br>Gain<br>(dB) | Cord.<br>Amp.<br>(dBμV/m) | Limit<br>(dBμV/m) | Margin<br>(dB) |
| Low Channel (2412MHz)  |                                 |                   |                           |                          |                       |                          |                           |                   |                |
| 2390                   | 37.84                           | AV                | V                         | 30.3                     | 4.1                   | 33.1                     | 39.14                     | 54                | 14.86          |
| 2390                   | 37.54                           | AV                | H                         | 30.3                     | 4.1                   | 33.1                     | 38.84                     | 54                | 15.16          |
| 2390                   | 52.97                           | PK                | V                         | 30.3                     | 4.1                   | 33.1                     | 54.27                     | 74                | 19.73          |
| 2390                   | 52.57                           | PK                | H                         | 30.3                     | 4.1                   | 33.1                     | 53.87                     | 74                | 20.13          |
| High Channel (2462MHz) |                                 |                   |                           |                          |                       |                          |                           |                   |                |
| 2483.5                 | 33.30                           | AV                | V                         | 31                       | 4.4                   | 32.7                     | 36.00                     | 54                | 18.00          |
| 2483.5                 | 31.30                           | AV                | H                         | 31                       | 4.4                   | 32.7                     | 34.00                     | 54                | 20.00          |
| 2483.5                 | 46.81                           | PK                | V                         | 31                       | 4.4                   | 32.7                     | 49.51                     | 74                | 24.49          |
| 2483.5                 | 47.12                           | PK                | H                         | 31                       | 4.4                   | 32.7                     | 49.82                     | 74                | 24.18          |

**802.11g**

| Indicated              |                                 | result<br>(PK/AV) | Antenna<br>Polar<br>(H/V) | Correction Factor        |                       |                          | FCC Part 15.247           |                   |                |
|------------------------|---------------------------------|-------------------|---------------------------|--------------------------|-----------------------|--------------------------|---------------------------|-------------------|----------------|
| Frequency<br>(MHz)     | Receiver<br>Reading<br>(dBμV/m) |                   |                           | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Pre-Amp.<br>Gain<br>(dB) | Cord.<br>Amp.<br>(dBμV/m) | Limit<br>(dBμV/m) | Margin<br>(dB) |
| Low Channel (2412MHz)  |                                 |                   |                           |                          |                       |                          |                           |                   |                |
| 2390                   | 30.62                           | AV                | V                         | 30.3                     | 4.1                   | 33.1                     | 31.92                     | 54                | 22.08          |
| 2390                   | 30.45                           | AV                | H                         | 30.3                     | 4.1                   | 33.1                     | 31.75                     | 54                | 22.25          |
| 2390                   | 39.75                           | PK                | V                         | 30.3                     | 4.1                   | 33.1                     | 41.05                     | 74                | 32.95          |
| 2390                   | 41.80                           | PK                | H                         | 30.3                     | 4.1                   | 33.1                     | 43.10                     | 74                | 30.90          |
| High Channel (2462MHz) |                                 |                   |                           |                          |                       |                          |                           |                   |                |
| 2483.5                 | 31.18                           | AV                | V                         | 31                       | 4.4                   | 32.7                     | 33.88                     | 54                | 20.12          |
| 2483.5                 | 30.42                           | AV                | H                         | 31                       | 4.4                   | 32.7                     | 33.12                     | 54                | 20.88          |
| 2483.5                 | 41.47                           | PK                | V                         | 31                       | 4.4                   | 32.7                     | 44.17                     | 74                | 29.83          |
| 2483.5                 | 41.91                           | PK                | H                         | 31                       | 4.4                   | 32.7                     | 44.61                     | 74                | 29.39          |

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

**802.11n HT20**

| Indicated              |                                 | result<br>(PK/AV) | Antenna<br>Polar<br>(H/V) | Correction Factor        |                       |                          | FCC Part 15.247           |                   |                |
|------------------------|---------------------------------|-------------------|---------------------------|--------------------------|-----------------------|--------------------------|---------------------------|-------------------|----------------|
| Frequency<br>(MHz)     | Receiver<br>Reading<br>(dBμV/m) |                   |                           | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Pre-Amp.<br>Gain<br>(dB) | Cord.<br>Amp.<br>(dBμV/m) | Limit<br>(dBμV/m) | Margin<br>(dB) |
| Low Channel (2412MHz)  |                                 |                   |                           |                          |                       |                          |                           |                   |                |
| 2390                   | 33.69                           | AV                | V                         | 30.3                     | 4.1                   | 33.1                     | 34.99                     | 54                | 19.01          |
| 2390                   | 33.44                           | AV                | H                         | 30.3                     | 4.1                   | 33.1                     | 34.74                     | 54                | 19.26          |
| 2390                   | 51.01                           | PK                | V                         | 30.3                     | 4.1                   | 33.1                     | 52.31                     | 74                | 21.69          |
| 2390                   | 52.10                           | PK                | H                         | 30.3                     | 4.1                   | 33.1                     | 53.40                     | 74                | 20.60          |
| High Channel (2462MHz) |                                 |                   |                           |                          |                       |                          |                           |                   |                |
| 2483.5                 | 29.78                           | AV                | V                         | 31                       | 4.4                   | 32.7                     | 32.48                     | 54                | 21.52          |
| 2483.5                 | 31.95                           | AV                | H                         | 31                       | 4.4                   | 32.7                     | 34.65                     | 54                | 19.35          |
| 2483.5                 | 40.88                           | PK                | V                         | 31                       | 4.4                   | 32.7                     | 43.58                     | 74                | 30.42          |
| 2483.5                 | 40.06                           | PK                | H                         | 31                       | 4.4                   | 32.7                     | 42.76                     | 74                | 31.24          |

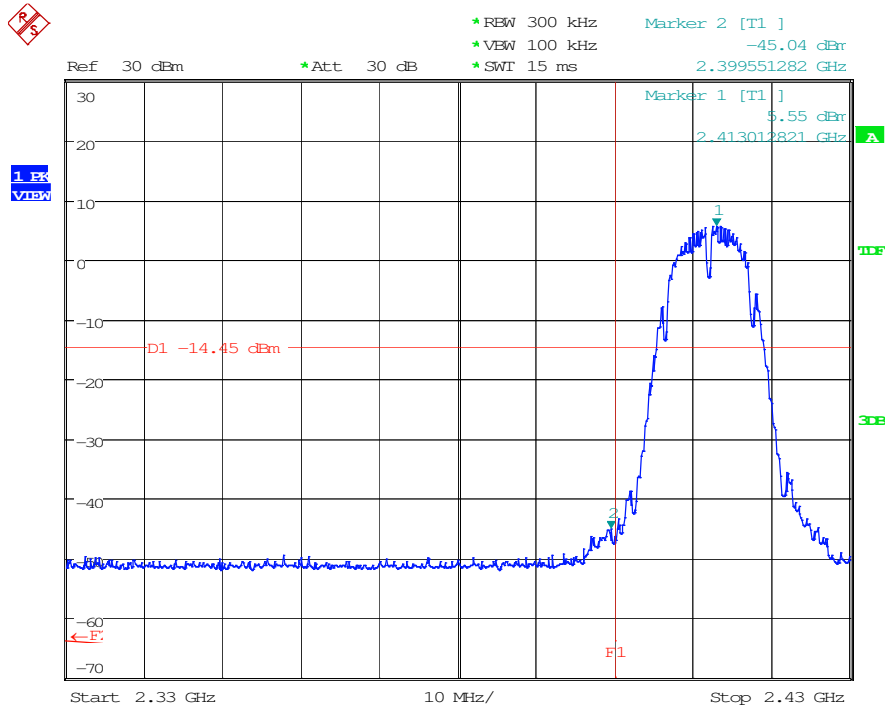
**802.11n HT40**

| Indicated              |                                 | result<br>(PK/AV) | Antenna<br>Polar<br>(H/V) | Correction Factor        |                       |                          | FCC Part 15.247           |                   |                |
|------------------------|---------------------------------|-------------------|---------------------------|--------------------------|-----------------------|--------------------------|---------------------------|-------------------|----------------|
| Frequency<br>(MHz)     | Receiver<br>Reading<br>(dBμV/m) |                   |                           | Ant.<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Pre-Amp.<br>Gain<br>(dB) | Cord.<br>Amp.<br>(dBμV/m) | Limit<br>(dBμV/m) | Margin<br>(dB) |
| Low Channel (2422MHz)  |                                 |                   |                           |                          |                       |                          |                           |                   |                |
| 2390                   | 35.16                           | AV                | V                         | 30.3                     | 4.1                   | 33.1                     | 36.46                     | 54                | 17.54          |
| 2390                   | 35.04                           | AV                | H                         | 30.3                     | 4.1                   | 33.1                     | 36.34                     | 54                | 17.66          |
| 2390                   | 52.18                           | PK                | V                         | 30.3                     | 4.1                   | 33.1                     | 53.48                     | 74                | 20.52          |
| 2390                   | 52.16                           | PK                | H                         | 30.3                     | 4.1                   | 33.1                     | 53.46                     | 74                | 20.54          |
| High Channel (2452MHz) |                                 |                   |                           |                          |                       |                          |                           |                   |                |
| 2483.5                 | 30.28                           | AV                | V                         | 31                       | 4.4                   | 32.7                     | 32.98                     | 54                | 21.02          |
| 2483.5                 | 29.93                           | AV                | H                         | 31                       | 4.4                   | 32.7                     | 32.63                     | 54                | 21.37          |
| 2483.5                 | 41.64                           | PK                | V                         | 31                       | 4.4                   | 32.7                     | 44.34                     | 74                | 29.66          |
| 2483.5                 | 40.12                           | PK                | H                         | 31                       | 4.4                   | 32.7                     | 42.82                     | 74                | 31.18          |

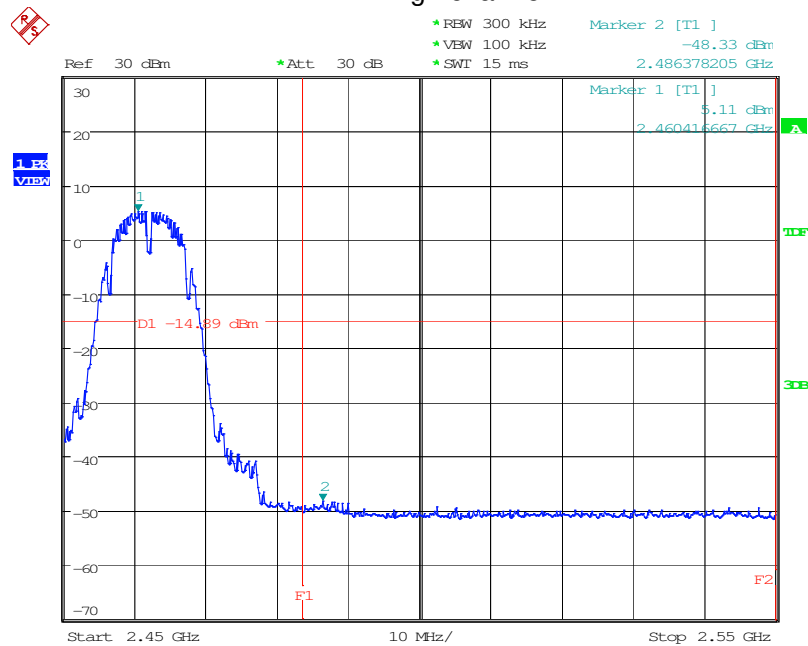
Note: The BAND EDGE RESTRICTED BANDS emission is too low at least 20dB to the Fundamental.

802.11b:

## Low channel

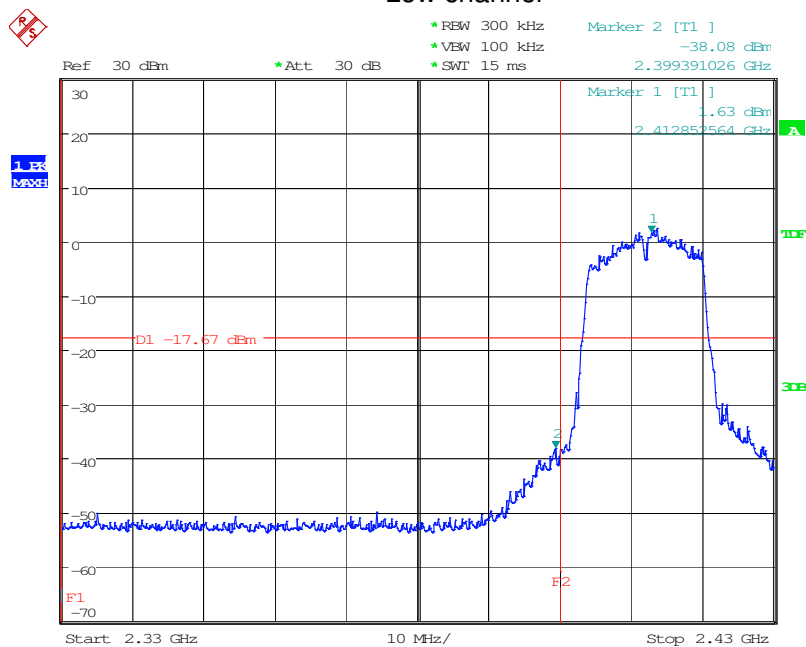


## High channel

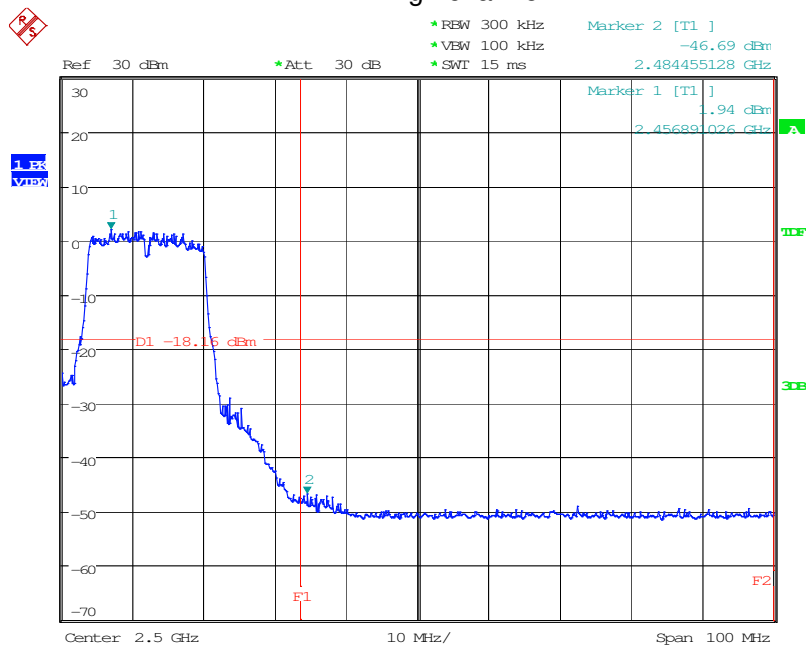


802.11g:

## Low channel

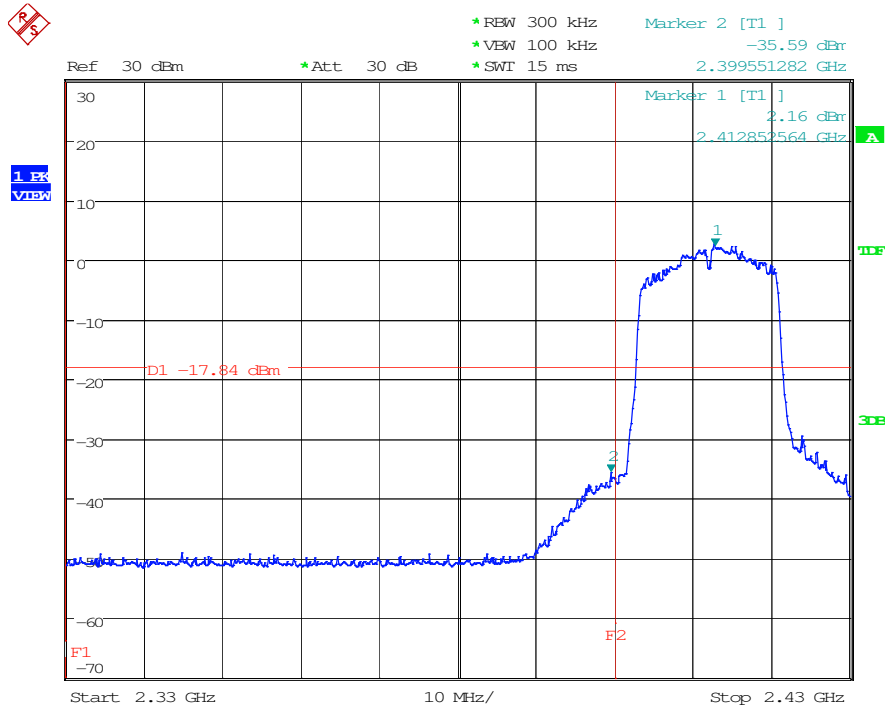


## High channel

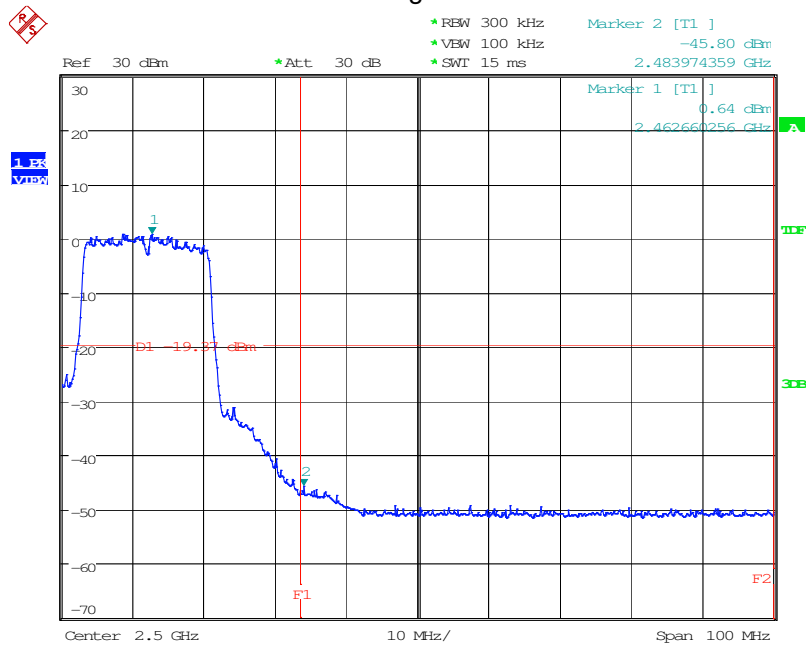


## 802.11n HT20:

## Low channel

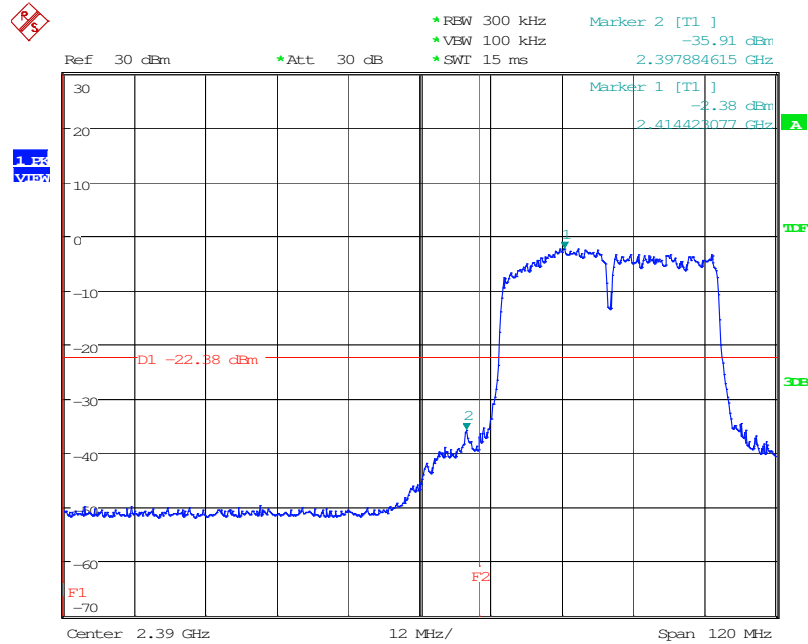


## High channel

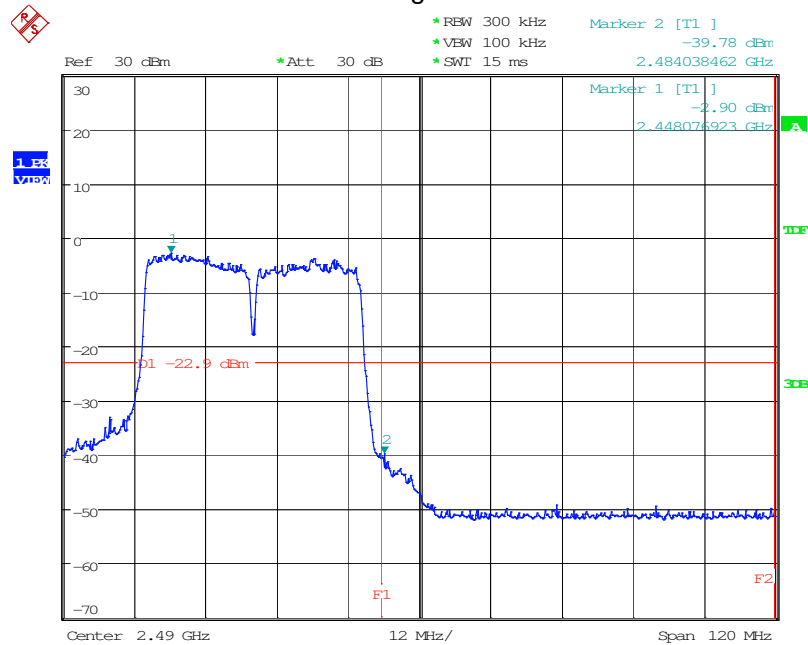


## 802.11n HT40:

## Low channel



## High channel



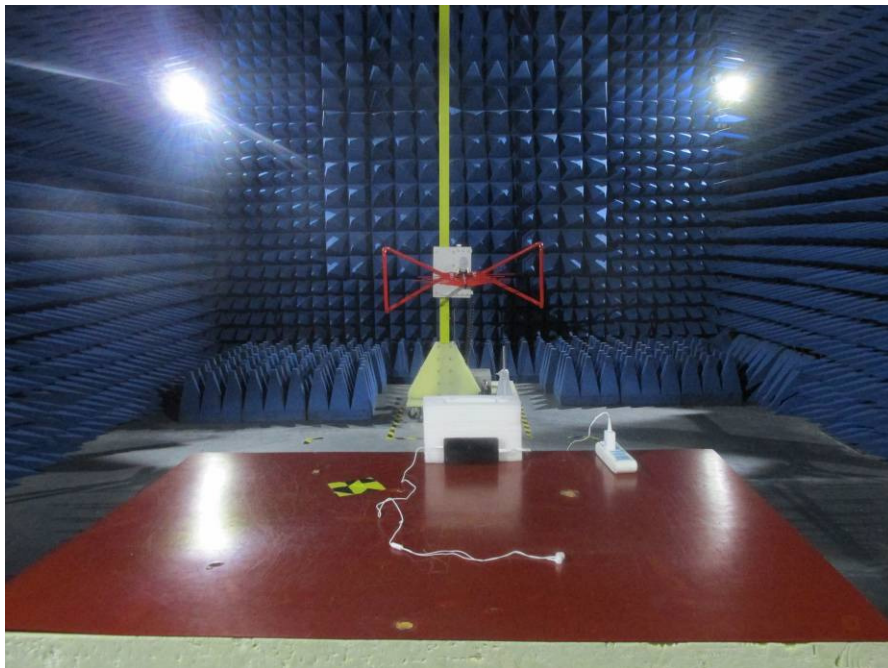
Date: 13.JUN.2016 16:16:49

## 11. EUT TEST PHOTO

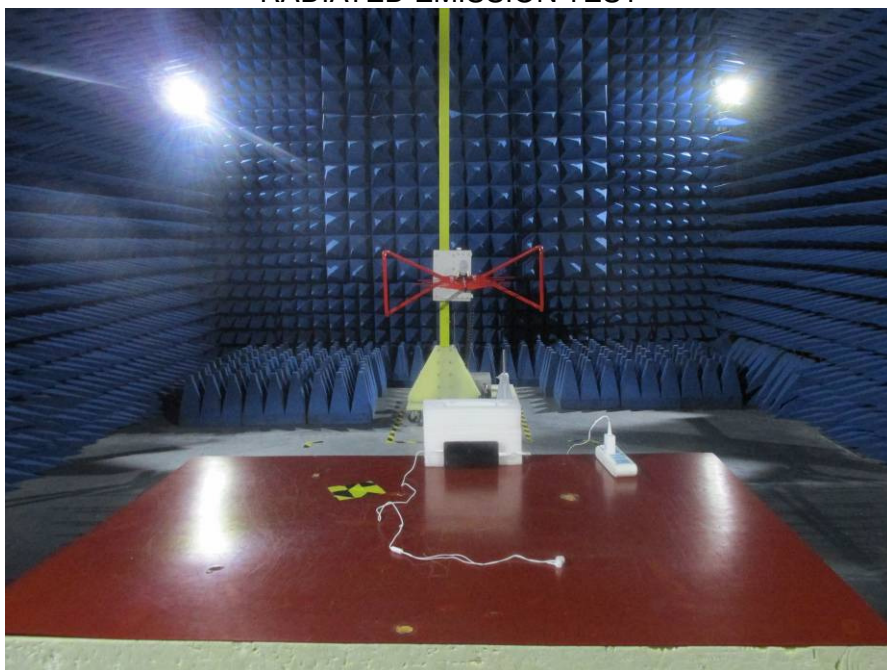
CONDUCTED EMISSION TEST



RADIATED EMISSION TEST



## RADIATED EMISSION TEST

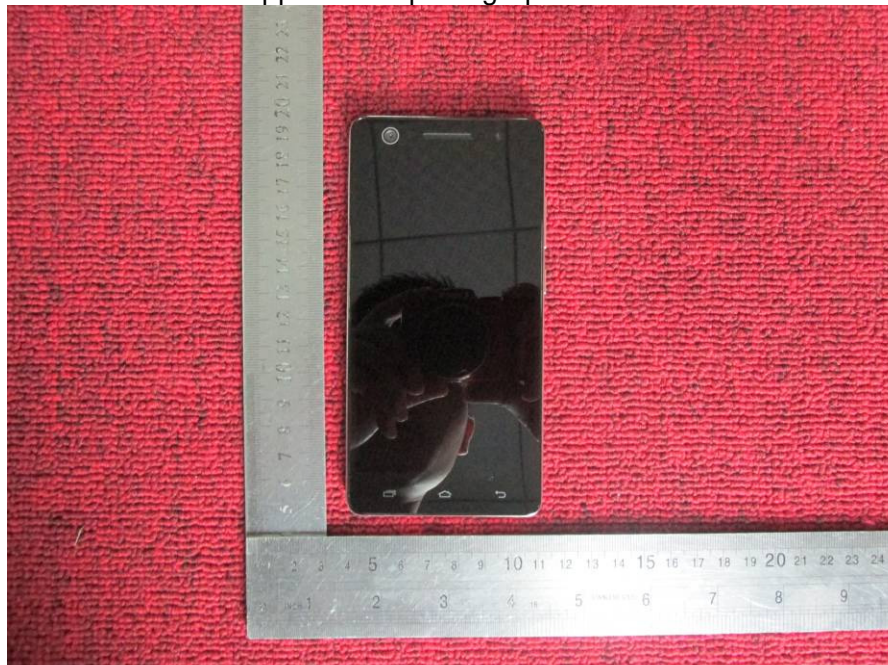


## 12. PHOTOGRAPHS OF EUT

Appearance photograph of EUT



Appearance photograph of EUT



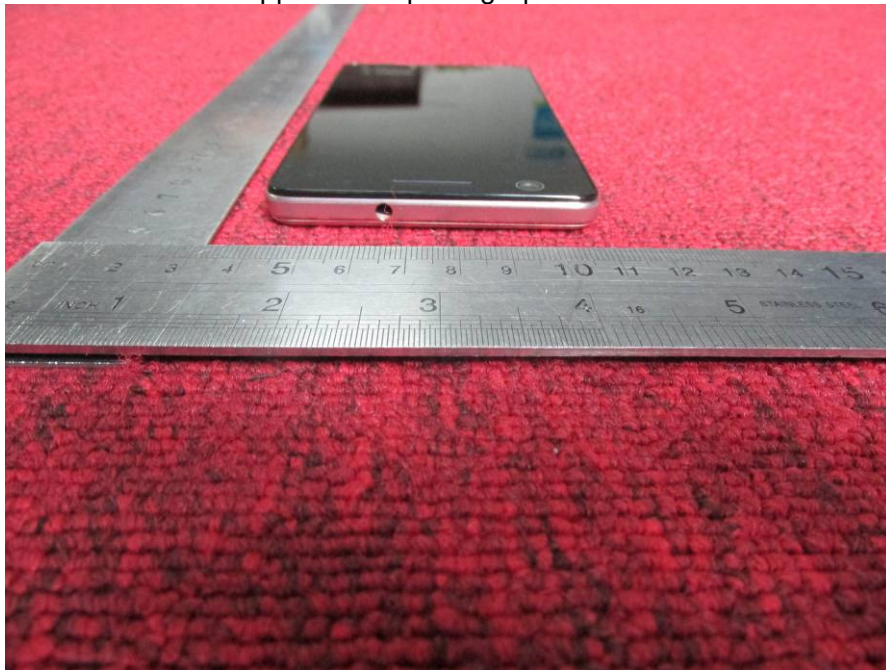
Appearance photograph of EUT



Appearance photograph of EUT



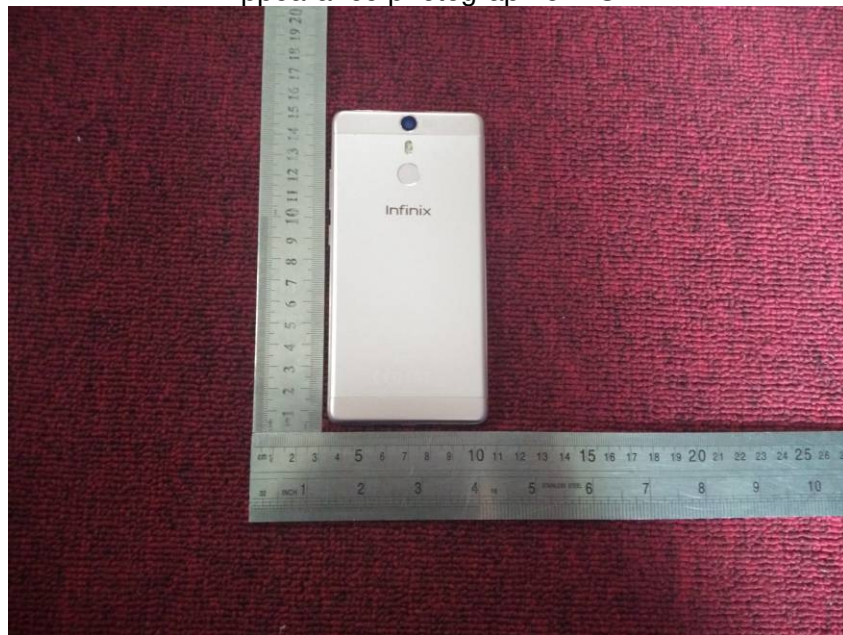
Appearance photograph of EUT



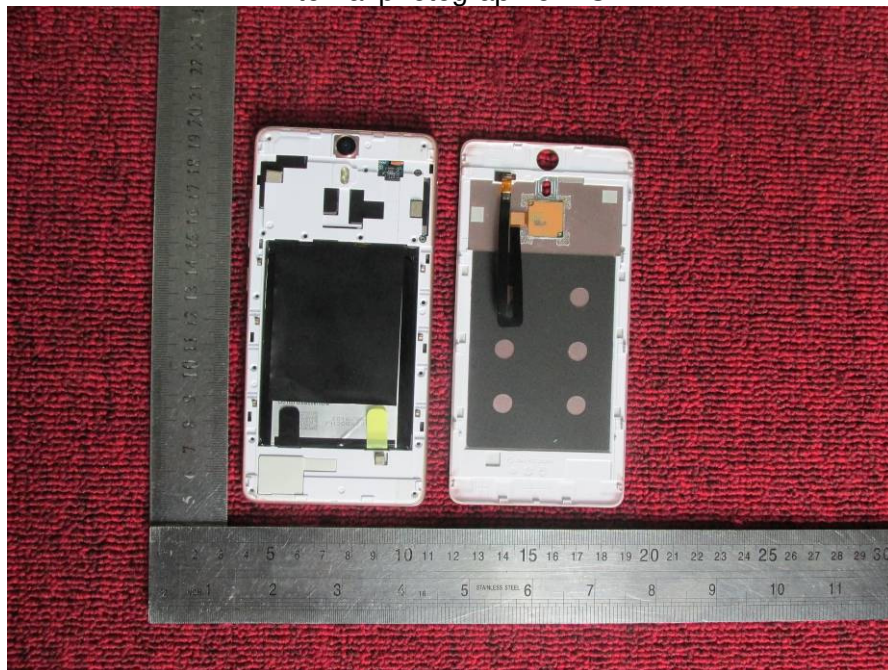
Appearance photograph of EUT



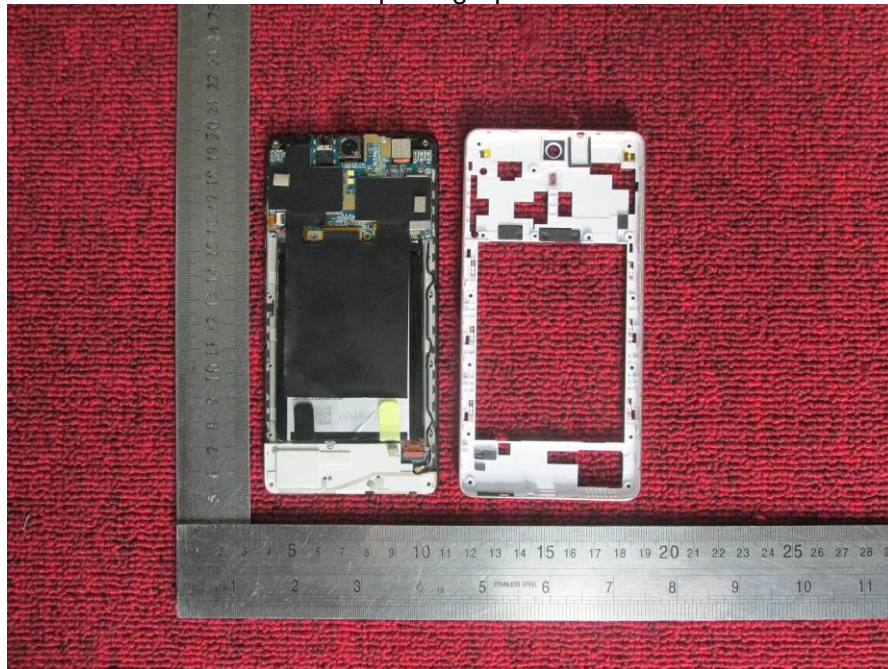
Appearance photograph of EUT



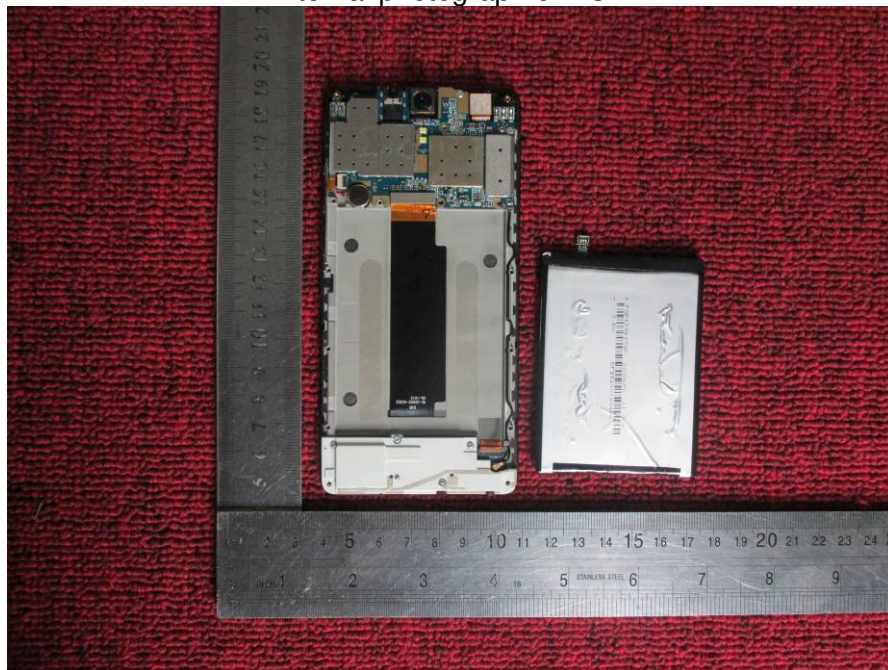
Internal photograph of EUT



Internal photograph of EUT



Internal photograph of EUT



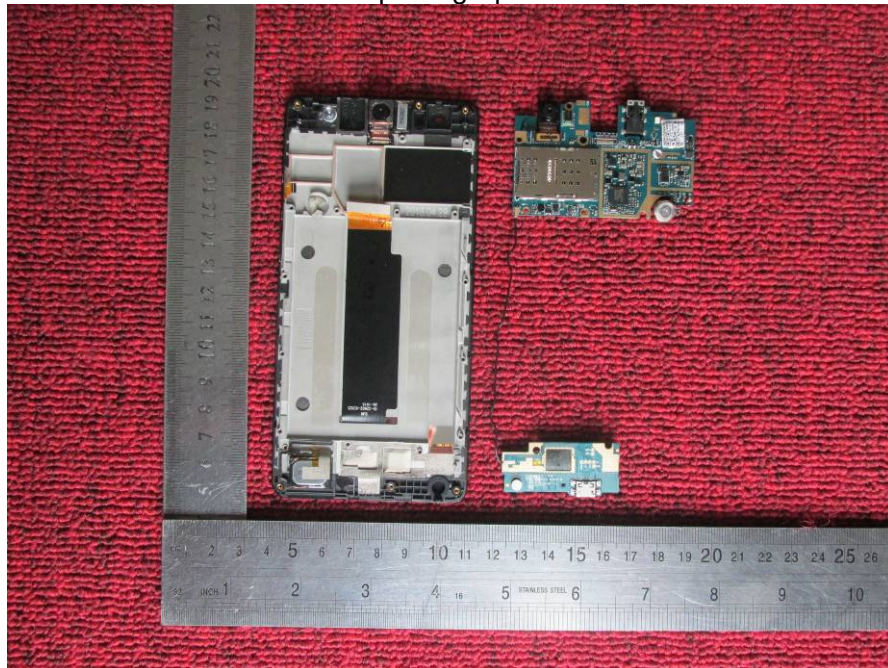
Internal photograph of EUT



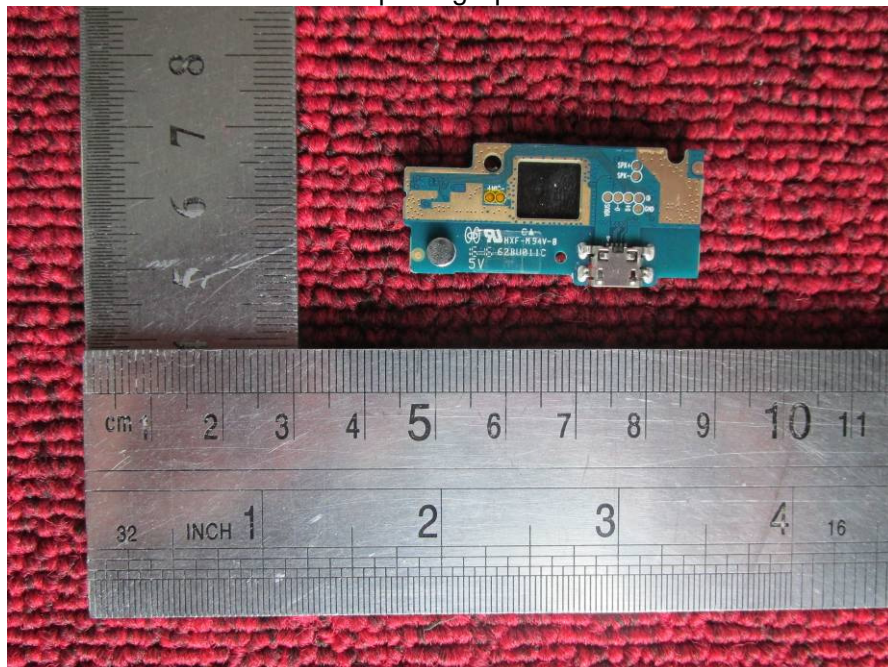
Internal photograph of EUT



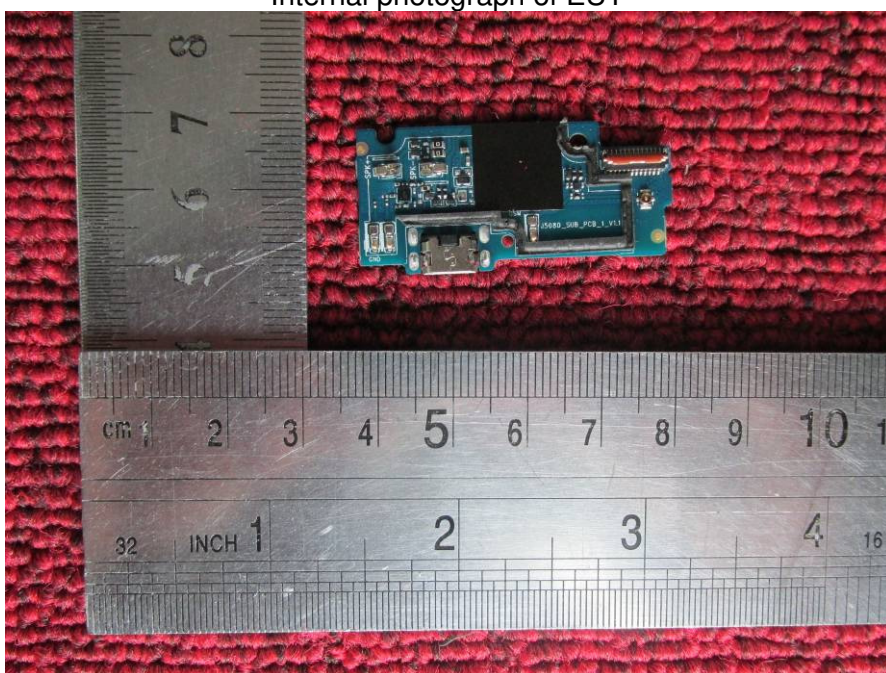
Internal photograph of EUT



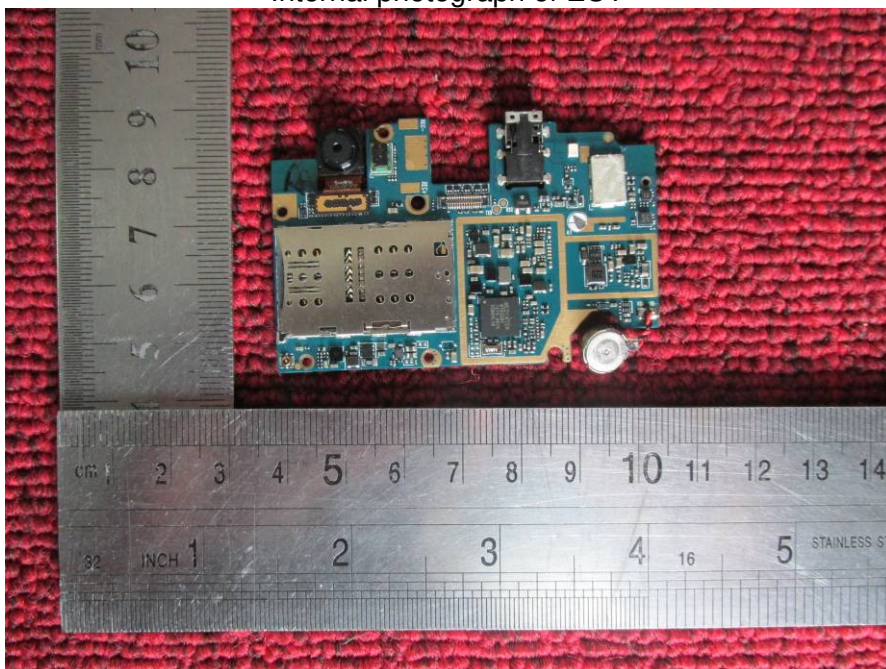
Internal photograph of EUT



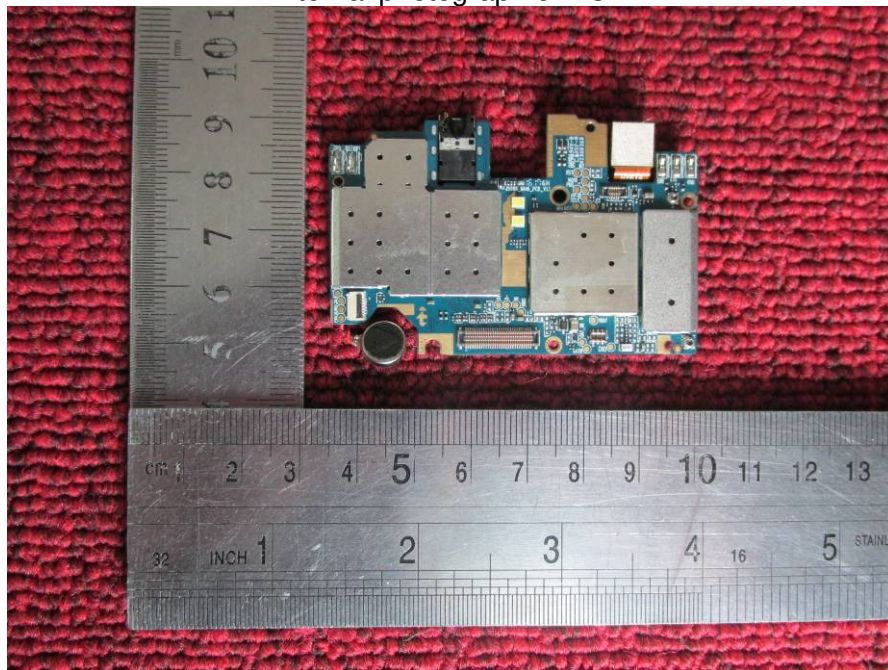
Internal photograph of EUT



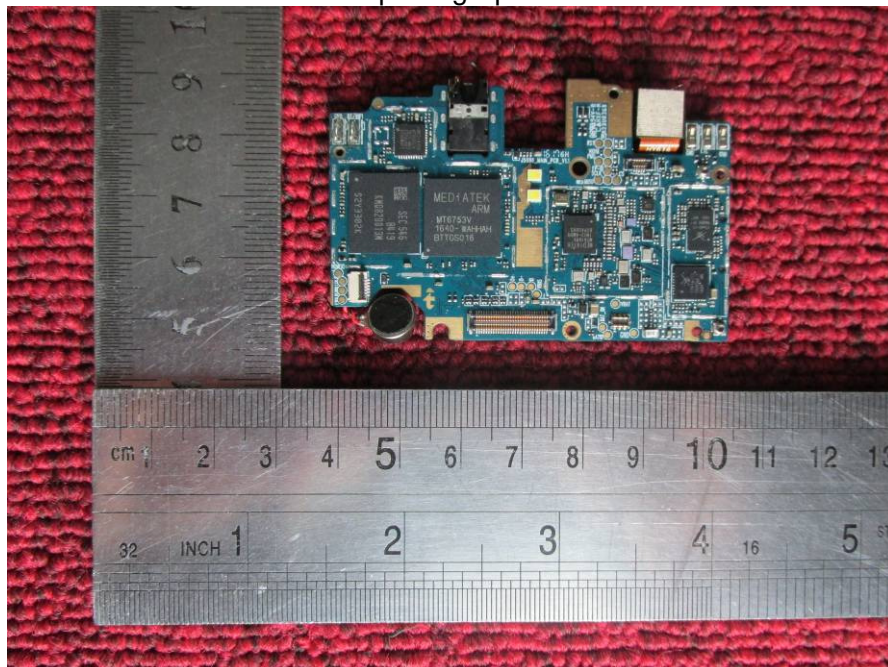
Internal photograph of EUT



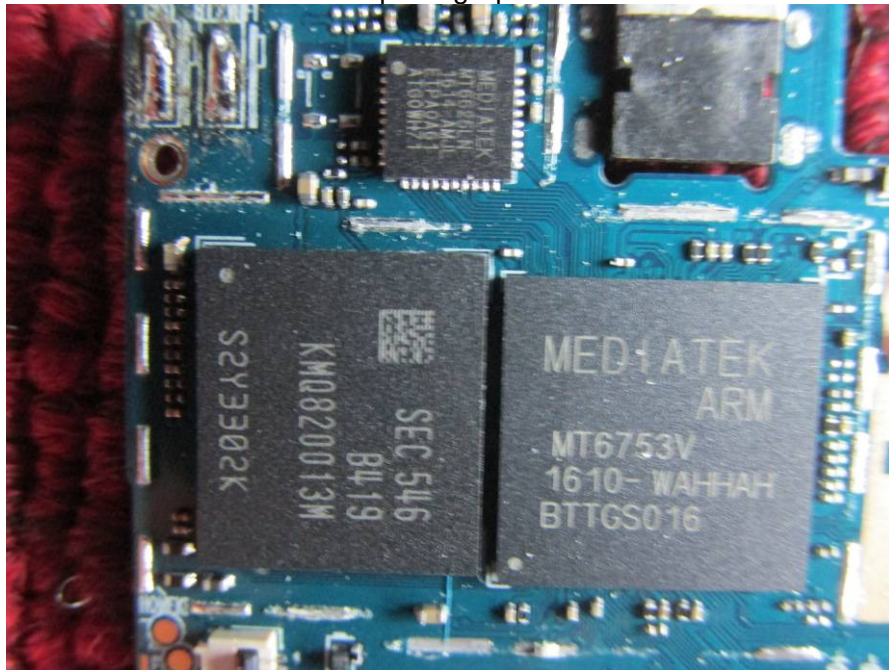
Internal photograph of EUT



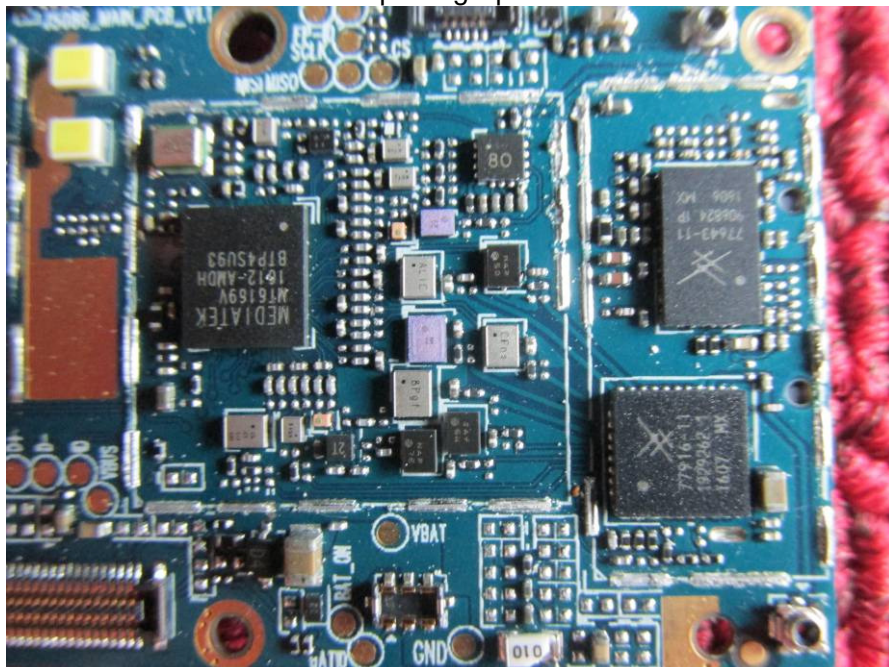
Internal photograph of EUT



Internal photograph of EUT



Internal photograph of EUT



**---END OF REPORT---**