



*Full*

# TEST REPORT

**No. I14D00071-WLA**

*For*

**Client : Mobewire SAS**

**Production : Connected mobile with Printer**

**Model Name : MOBIPRINT<sup>3</sup>**

**FCC ID: QPN-3G-MOBIPRINT3**

**Hardware Version: V02**

**Software Version: V03**

**Issued date: 2015-03-04**

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of ECIT Shanghai.

**Test Laboratory:**

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# RF Test Report

Report No.: I14D00071-WLA

## Revision Version

| Report Number | Revision | Date       | Memo                            |
|---------------|----------|------------|---------------------------------|
| I14D00071-WLA | 00       | 2015-03-04 | Initial creation of test report |

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## 1. Test Laboratory

### 1.1. Testing Location

|               |   |
|---------------|---|
| Company Name: | ECIT Shanghai, East China Institute of Telecommunications                         |
| Address:      | 7-8F, G Area, No. 668, Beijing East Road, Huangpu District, Shanghai, P. R. China |
| Postal Code:  | 200001  |
| Telephone:    | (+86)-021-63843300  |
| Fax:          | (+86)-021-63843301  |

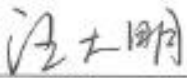
### 1.2. Testing Environment


|                      |           |
|----------------------|-----------|
| Normal Temperature:  | 15-35°C   |
| Extreme Temperature: | -10/+55°C |
| Relative Humidity:   | 20-75%    |

### 1.3. Project data

|                     |             |
|---------------------|-------------|
| Project Leader:     | Gong Yujuan |
| Testing Start Date: | 2014-12-24  |
| Testing End Date:   | 2015-02-28  |

### 1.4. Signature

  
Wang Daming  
(Prepared this test report)

  
Liu Jianquan  
(Reviewed this test report)

  
Zheng Zhongbin  
Director of the laboratory  
(Approved this test report)

## 2. Client Information

### 2.1. Applicant Information

Company Name:           Mobiwire SAS  
Address:                 79 AVENUE FRANCOIS ARAGO 92017 NANTERRE CEDEX  
                              France.  
Telephone:             33613423487  
Postcode:              92017

### 2.2. Manufacturer Information

Company Name:         MOBIWIRE MOBILES (NINGBO) CO.,LTD  
Address:                No.999,Dacheng East Road,Fenghua City,Zhejiang  
Telephone:             0574-88916450  
Postcode:              315500

### 3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

#### 3.1. About EUT

|                         |                                 |
|-------------------------|---------------------------------|
| EUT Description         | connected mobile with printer   |
| Model name              | MOBIPRINT <sup>3</sup>          |
| WLAN Frequency          | 2412MHz-2472MHz                 |
| WLAN Channel            | Channel1-Channel13              |
| WLAN type of modulation | 802.11b:DSSS<br>802.11g/n: OFDM |
| Extreme Temperature     | -10/+55°C                       |
| Nominal Voltage         | 7.4V                            |
| Extreme High Voltage    | 8.4V                            |
| Extreme Low Voltage     | 6.6V                            |

Note: Photographs of EUT are shown in ANNEX A of this test report.

#### 3.2. Internal Identification of EUT used during the test

| EUT ID* | SN or IMEI      | HW Version | SW Version | Date of receipt |
|---------|-----------------|------------|------------|-----------------|
| N01     | 353007060004445 | V02        | V03        | 2014-12-23      |

\*EUT ID: is used to identify the test sample in the lab internally.

#### 3.3. Internal Identification of AE used during the test

| AE ID* | Description | SN  |
|--------|-------------|-----|
| AE1    | RF cable    | --- |
| AE2    | ---         | --- |

\*AE ID: is used to identify the test sample in the lab internally.

## 4. Reference Documents

### 4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

| Reference  | Title   | Version |
|------------|---|---------|
| FCC Part15 | FCC CFR 47, Part 15,Subpart C:<br>15.205 Restricted bands of operation;<br>15.209 Radiated emission limits, general requirements;<br>15.247 Operation within the bands 902-928MHz,<br>2400-2483.5MHz, and 5725-5850MHz. | 2014    |
| ANSI 63.10 | Methods of Measurement of Radio-Noise Emissions from<br>Low-Voltage Electrical and Electronic Equipment in the<br>Range of 9KHz to 40GHz  | 2013    |



## 5. Summary of Test Results

A brief summary of the tests carried out is shown as following.

| Measurement Items                       | Sub-clause of Part15C | Sub-clause of IC | Verdict |
|---|-----------------------|------------------|---------|
| Maximum Peak Output Power               | 15.247(a)             | /                | P       |
| Peak Power Spectral Density             | 15.247(e)             | /                | P       |
| Occupied 6dB Bandwidth                  | 15.247(d)             | /                | P       |
| Band Edges Compliance                   | 15.247(b)             | /                | P       |
| Transmitter Spurious Emission-Conducted | 15.247                | /                | P       |
| Transmitter Spurious Emission-Radiated  | 15.247,15.209,        | /                | P       |
| AC Powerline Conducted Emission         | 15.107,15.207         | /                | P       |

Please refer to part 5 for detail.

The measurements are according to ANSI C63.10.

Terms used in Verdict column

|    |  |
|----|--|
| P  | Pass, the EUT complies with the essential requirements in the standard.        |
| NP | Not Perform, the test was not performed by ECIT.                               |
| NA | Not Applicable, the test was not applicable.                                   |
| F  | Fail, the EUT does not comply with the essential requirements in the standard. |

## Test Conditions

|      |                    |
|------|--------------------|
| Tnom | Normal temperature |
| Tmin | Low Temperature    |
| Tmax | High Temperature   |
| Vnom | Normal Voltage     |
| Vmin | Low Voltage        |
| Vmax | High Voltage       |
| Hnom | Norm Humidity      |
| Anom | Norm Air Pressure  |

For this report, all the test case listed above are tested under Normal Temperature and Normal Voltage, and also under norm humidity, the specific conditions as following:

|              |      |         |
|--------------|------|---------|
| Temperature  | Tnom | 22°C    |
| Voltage      | Vnom | 8.0V    |
| Humidity     | Hnom | 32%     |
| Air Pressure | Anom | 1010hPa |

### 5.1. Notes

All reported tests were carried out on a sample equipment to demonstrate limited compliance with section 3.

The test results of this test report relate exclusively to the item(s) tested as specified in section 5.

The following deviation from, additions to, or exclusions from the test specifications have been made. See section 3.

### 5.2. Statements

The product name MOBIPRINT<sup>3</sup>, supporting GPRS/WCDMA/ WLAN/BT, manufactured by MOBIWIRE MOBILES (NINGBO) CO.,LTD is a new product for testing.

ECIT has verified that the compliance of the tested device specified in section 5 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 5 of this test report.

## 6. Test result

### 6.1. Maximum Output Power

#### 6.1.1 Measurement Limit and method:

| Standard          | Limit(dBm) |
|-------------------|------------|
| FCC CRF 15.247(b) | < 30       |

#### 6.1.2 Test procedure

The measurement is according to ANSI C63.10 clause 11.2

1. The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Set  $RBW \geq OBW$ ,  $VBW \geq 3RBW$ .
4. Detector : Peak.
5. Trace mode: Max Hold

#### 6.1.3 Measurement Uncertainty:

|                         |                     |
|-------------------------|---------------------|
| Measurement Uncertainty | $\pm 0.75\text{dB}$ |
|-------------------------|---------------------|

#### 6.1.4 Maximum Peak Output Power-conducted

##### Measurement Results:

##### 802.11b/g mode

| Mode    | Data Rate(Mbps) | Test Result(dBm) |              |               |
|---------|-----------------|------------------|--------------|---------------|
|         |                 | 2412MHz(Ch1)     | 2437MHz(Ch6) | 2462MHz(Ch11) |
| 802.11b | 1               | 17.14            | 17.22        | 16.75         |
|         | 2               | 16.74            | /            | /             |
|         | 5.5             | 16.46            | /            | /             |
|         | 11              | 16.90            | /            | /             |
| 802.11g | 6               | 18.65            | /            | /             |
|         | 9               | 17.90            | /            | /             |
|         | 12              | 19.0             | /            | /             |

|  |    |       |       |       |
|--|----|-------|-------|-------|
|  | 18 | 17.93 | /     | /     |
|  | 24 | 18.99 | /     | /     |
|  | 36 | 19.35 | 18.91 | 18.48 |
|  | 48 | 18.73 | /     | /     |
|  | 54 | 19.19 | /     | /     |

The data rate 1Mbps and 36Mbps are selected as worse condition, and the following cases are performed with this condition.

### 802.11n mode

| Mode           | Data Rate(Index) | Teat Result(dBm) |              |               |
|----------------|------------------|------------------|--------------|---------------|
|                |                  | 2412MHz(Ch1)     | 2437MHz(Ch6) | 2462MHz(Ch11) |
| 802.11n(20MHz) | MCS0             | 13.10            | /            | /             |
|                | MCS1             | 13.07            | /            | /             |
|                | MCS2             | 12.89            | /            | /             |
|                | MCS3             | 13.23            | /            | /             |
|                | MCS4             | 18.50            | /            | /             |
|                | MCS5             | 18.33            | /            | /             |
|                | MCS6             | 18.77            | 18.64        | 18.15         |
|                | MCS7             | 17.52            | /            | /             |
| Mode           | Data Rate(Index) | Teat Result(dBm) |              |               |
|                |                  | 2422MHz(Ch3)     | 2437MHz(Ch6) | 2462MHz(Ch11) |
| 802.11n(40MHz) | MCS0             | 13.59            | /            | /             |
|                | MCS1             | 13.65            | /            | /             |
|                | MCS2             | 13.49            | /            | /             |
|                | MCS3             | 13.91            | /            | /             |
|                | MCS4             | 18.48            | /            | /             |
|                | MCS5             | 18.77            | /            | /             |

|  |      |       |       |       |
|--|------|-------|-------|-------|
|  | MCS6 | 19.06 | 19.08 | 19.04 |
|  | MCS7 | 17.69 | /     | /     |

The data rate MCS5 is selected as worse condition, and the following case are performed with this condition.

### 6.1.5 Maximum Average Output Power-conducted

#### 802.11b/g mode

| Mode    | Test Result(dBm) |              |               |
|---------|------------------|--------------|---------------|
|         | 2412MHz(Ch1)     | 2437MHz(Ch6) | 2462MHz(Ch11) |
| 802.11b | 14.70            | 14.71        | 14.47         |
| 802.11g | 10.95            | 10.75        | 10.65         |

#### 802.11n mode

| Mode           | Test Result(dBm) |              |               |
|----------------|------------------|--------------|---------------|
|                | 2412MHz(Ch1)     | 2437MHz(Ch6) | 2462MHz(Ch11) |
| 802.11n(20MHz) | 11.21            | 10.91        | 10.89         |
| 802.11n(40MHz) | 9.71             | 10.15        | 10.03         |

**Conclusion: PASS**

## 6.2. Peak Power Spectral Density

### 6.2.1 Measurement Limit:

| Standard               | Limit        |
|------------------------|--------------|
| FCC CFR Part 15.247(e) | < 8dBm/3 KHz |

### 6.2.2 Test procedures

The measurement is according to ANSI C63.10 clause 11.10.

1. The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Set analyzer center frequency to DTS channel center frequency.
4. Set the span to 1.5 times the DTS bandwidth.
5. Set the RBW to  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
6. Set the VBW  $\geq [3 \times \text{RBW}]$ .

7. Detector = peak.
8. Sweep time = auto couple.
9. Trace mode = max hold.
10. Allow trace to fully stabilize.
11. Use the peak marker function to determine the maximum amplitude level within the RBW.
12. If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

### 6.2.3 Measurement Uncertainty:

|                         |         |
|-------------------------|---------|
| Measurement Uncertainty | ±0.75dB |
|-------------------------|---------|

### 6.2.4 Measurement Results:

#### 802.11b/g mode

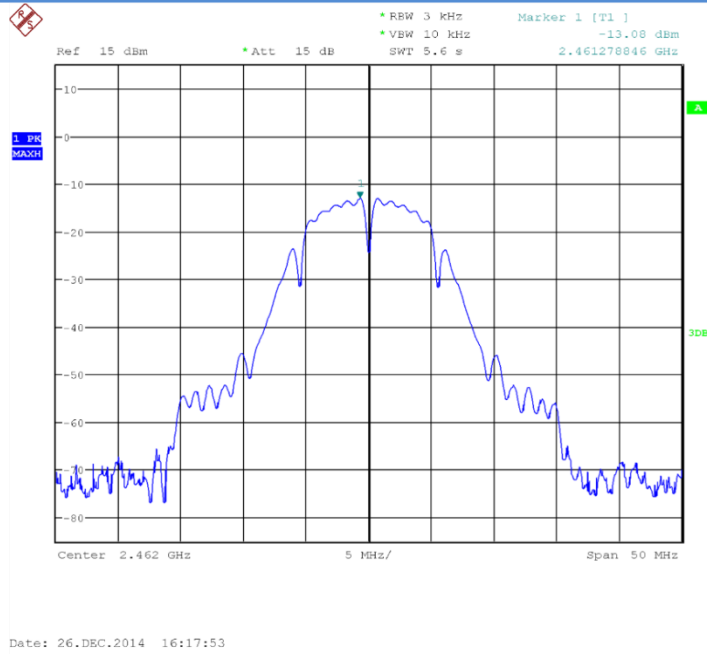
| Mode    | Channel | Power Spectral Density(dBm/3kHz) |         | Conclusion |
|---------|---------|----------------------------------|---------|------------|
|         |         | Fig.                             | Value   |            |
| 802.11b | 1       | Fig.1                            | -12.588 | P          |
|         | 6       | Fig.2                            | -12.691 | P          |
|         | 11      | Fig.3                            | -13.077 | P          |
| 802.11g | 1       | Fig.4                            | -13.59  | P          |
|         | 6       | Fig.5                            | -13.636 | P          |
|         | 11      | Fig.6                            | -13.695 | P          |

#### 802.11n mode

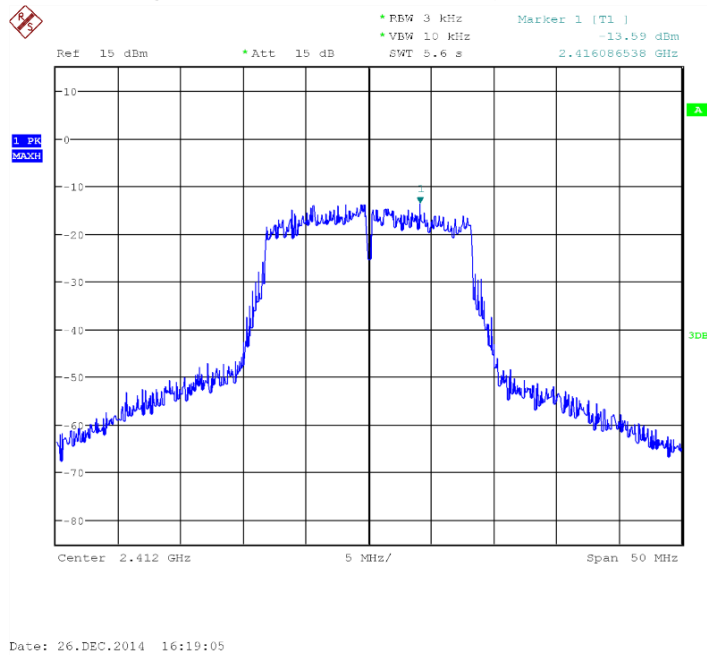
| Mode           | Channel | Power Spectral Density(dBm/3kHz) |         | Conclusion |
|----------------|---------|----------------------------------|---------|------------|
|                |         | Fig.                             | Value   |            |
| 802.11n(20MHz) | 1       | Fig.7                            | -13.364 | P          |
|                | 6       | Fig.8                            | -13.410 | P          |
|                | 11      | Fig.9                            | -13.998 | P          |

**Conclusion: PASS**



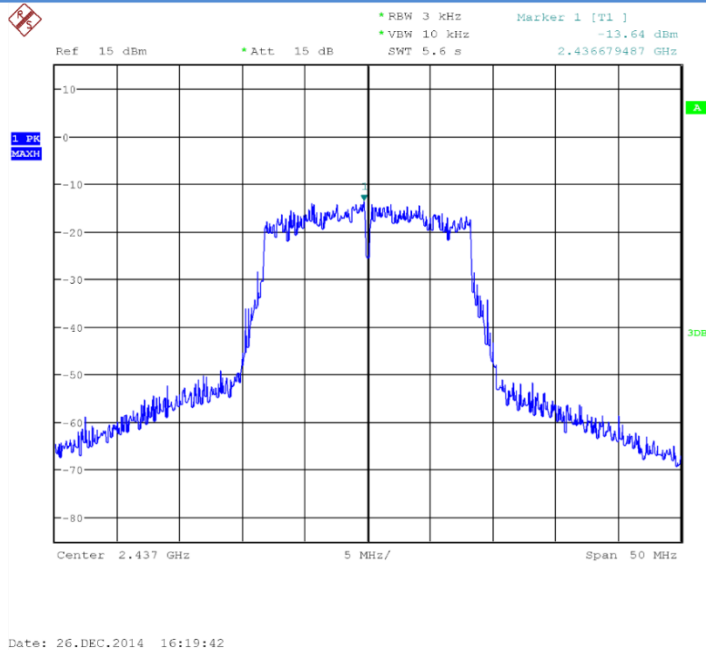


**Fig.3 Power Spectral Density (802.1b,Ch11)**

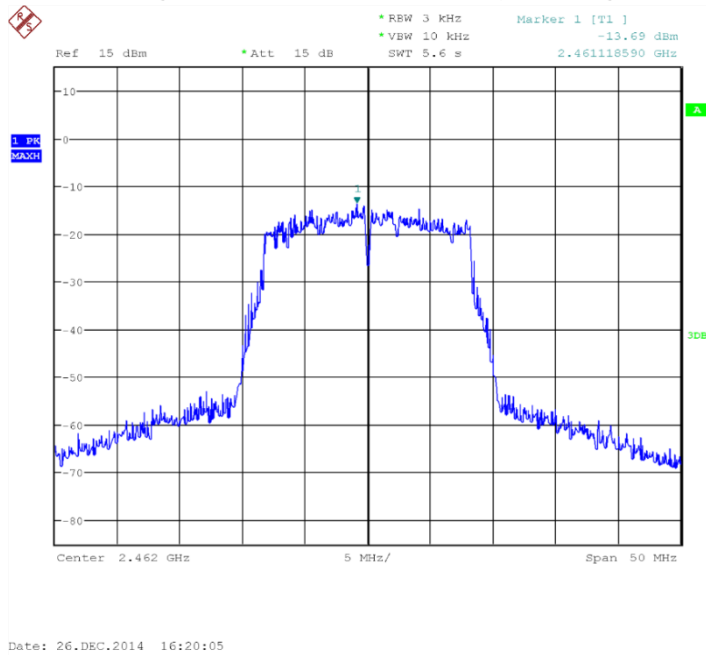


**Fig.4 Power Spectral Density (802.1g,Ch1)**

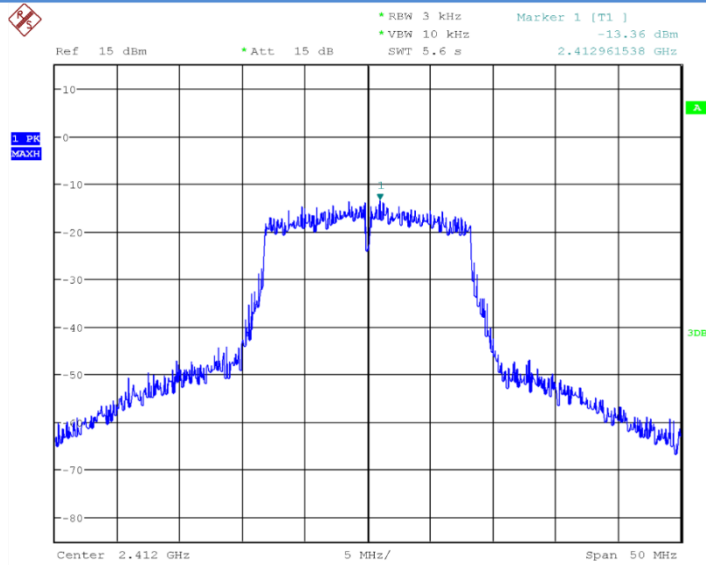




**Fig.5 Power Spectral Density (802.1g,Ch6)**

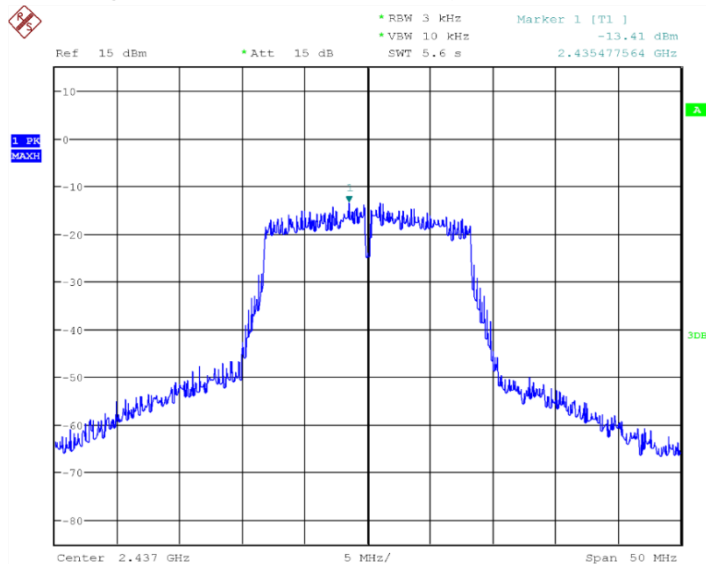


**Fig.6 Power Spectral Density (802.1g,Ch11)**



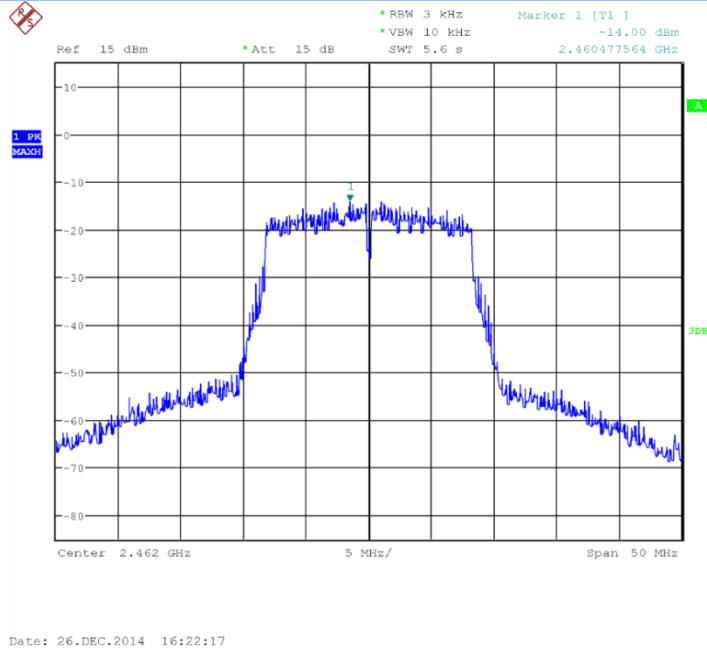
Date: 26.DEC.2014 16:20:53

**Fig.7 Power Spectral Density (802.1n-20MHz,Ch1)**



Date: 26.DEC.2014 16:21:50

**Fig.8 Power Spectral Density (802.1n-20MHz,Ch6)**



**Fig.9 Power Spectral Density (802.1n-20MHz,Ch11)**

## 6.3. Occupied 6dB Bandwidth

### 6.3.1 Measurement Limit:

| Standard                  | Limit(KHz) |
|---------------------------|------------|
| FCC 47 CFR Part 15.247(a) | ≥500       |

### 6.3.2 Test procedure

The measurement is according to ANSI C63.10 clause 11.8.

1. The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Set RBW = 100 kHz.
4. Set the VBW  $\geq [3 \times \text{RBW}]$ .
5. Detector = peak.
6. Trace mode = max hold.
7. Sweep = auto couple.
8. Allow the trace to stabilize.
9. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 6.3.3 Measurement Uncertainty:

|                         |          |
|-------------------------|----------|
| Measurement Uncertainty | ±60.80Hz |
|-------------------------|----------|

### 6.3.4 Measurement Result:

#### 802.11b/g mode

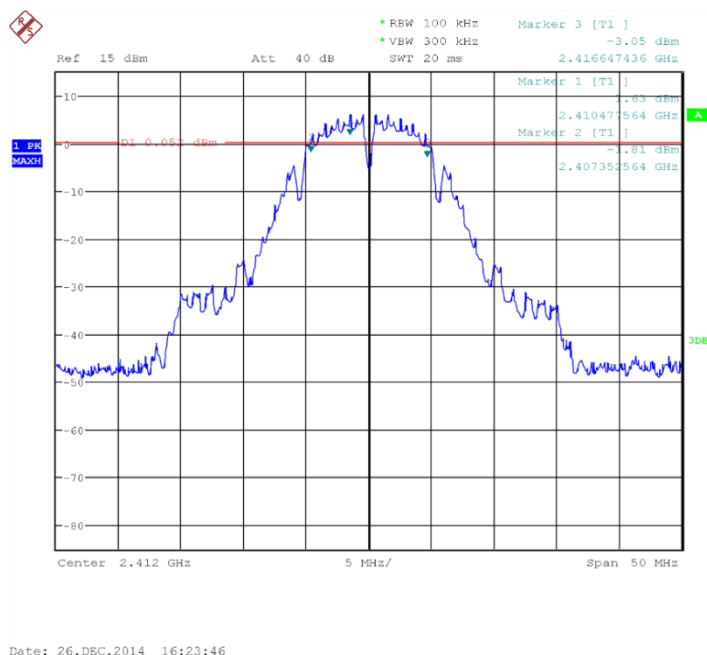
| Mode    | Channel | Occupied 6dB Bandwidth(KHz) |        | Conclusion |
|---------|---------|-----------------------------|--------|------------|
| 802.11b | 1       | Fig.10                      | 9.295  | P          |
|         | 6       | Fig.11                      | 9.295  | P          |
|         | 11      | Fig.12                      | 9.295  | P          |
| 802.11g | 1       | Fig.13                      | 16.506 | P          |
|         | 6       | Fig.14                      | 16.506 | P          |
|         | 11      | Fig.15                      | 16.506 | P          |

#### 802.11n mode

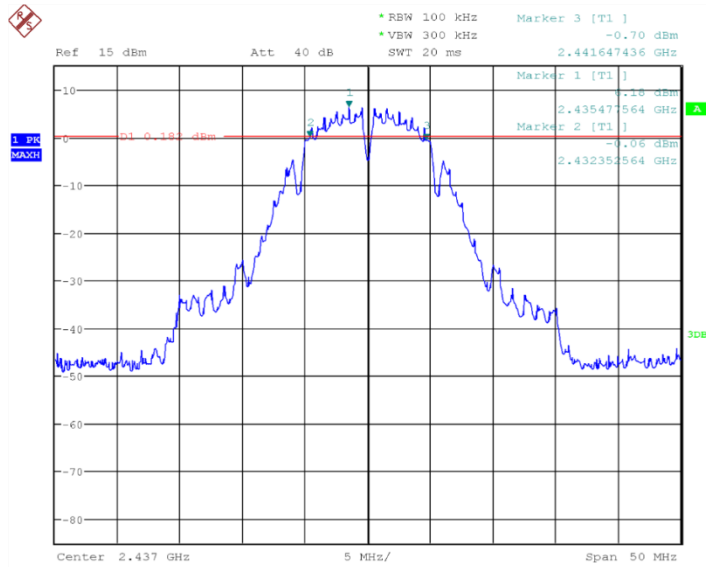
| Mode           | Channel | Occupied 6dB Bandwidth(KHz) |        | Conclusion |
|----------------|---------|-----------------------------|--------|------------|
| 802.11n(20MHz) | 1       | Fig.16                      | 16.506 | P          |
|                | 6       | Fig.17                      | 16.506 | P          |
|                | 11      | Fig.18                      | 16.506 | P          |

**Conclusion: PASS**

Test graphs as below:

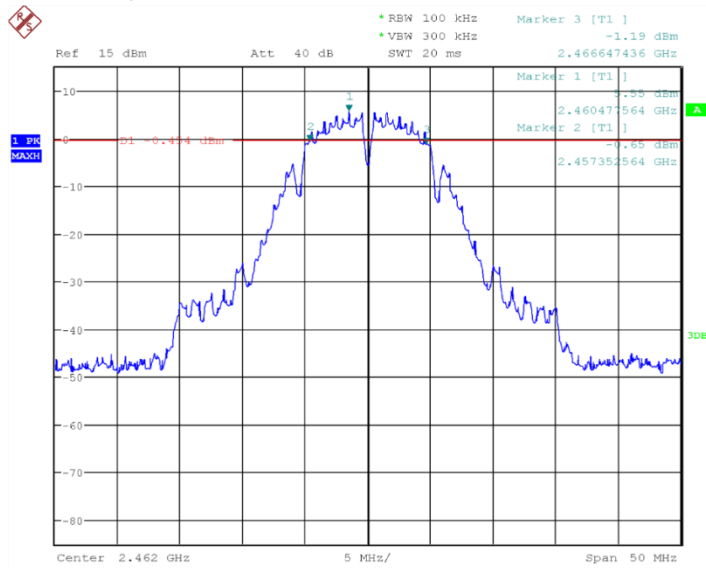


### Fig.10 Occupied 6dB Bandwidth (802.11b, Ch1)



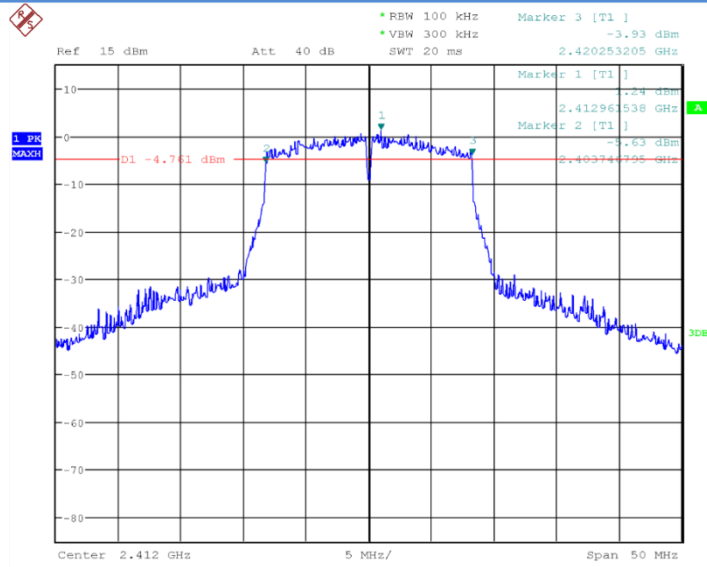
Date: 26.DEC.2014 16:24:45

### Fig.11 Occupied 6dB Bandwidth (802.11b, Ch6)



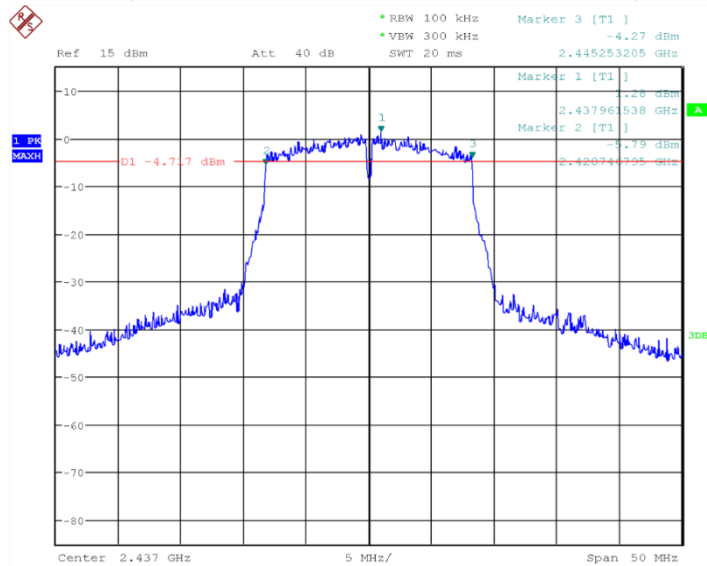
Date: 26.DEC.2014 16:26:37

### Fig.12 Occupied 6dB Bandwidth (802.11b, Ch11)



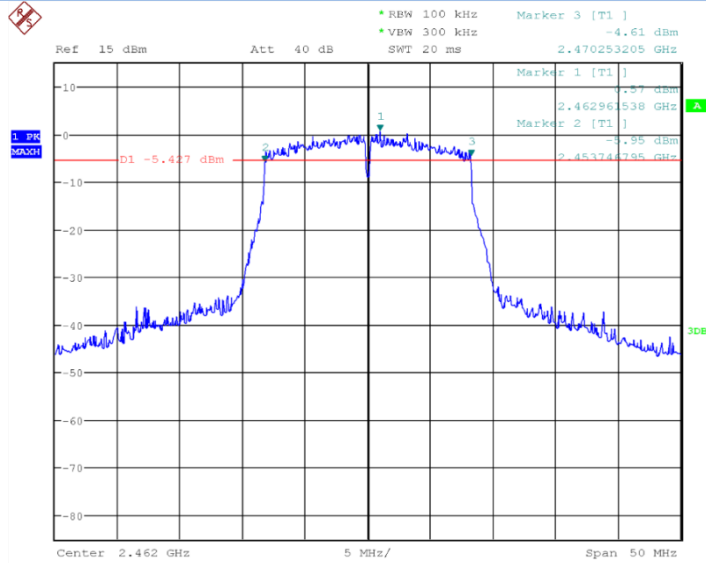
Date: 26.DEC.2014 16:27:24

**Fig.13 Occupied 6dB Bandwidth (802.11g, Ch1)**



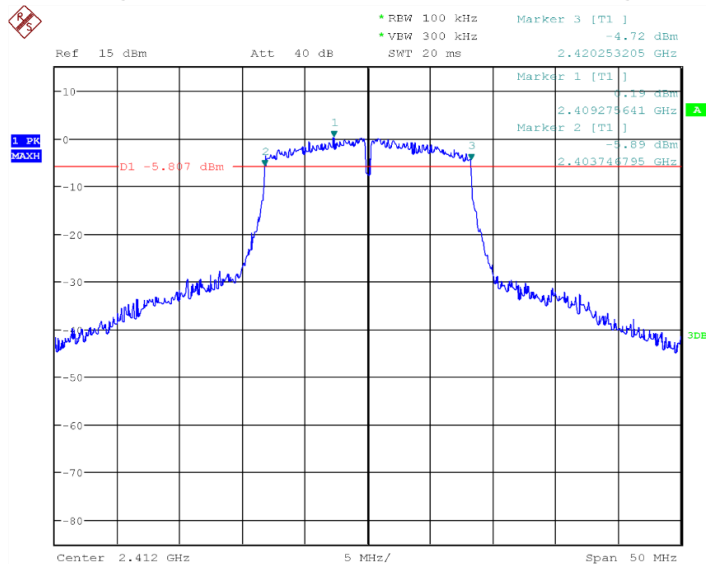
Date: 26.DEC.2014 16:28:04

**Fig.14 Occupied 6dB Bandwidth (802.11g, Ch6)**



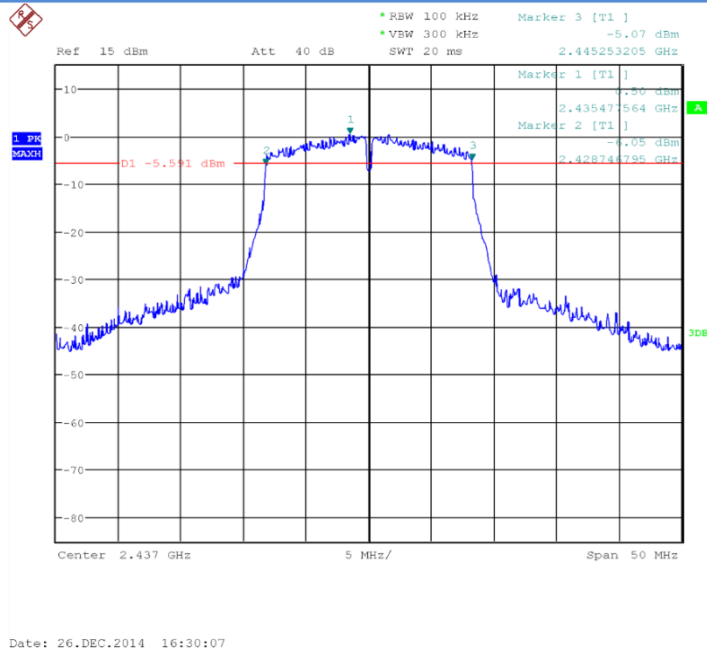
Date: 26.DEC.2014 16:28:35

**Fig.15 Occupied 6dB Bandwidth (802.11g, Ch11)**

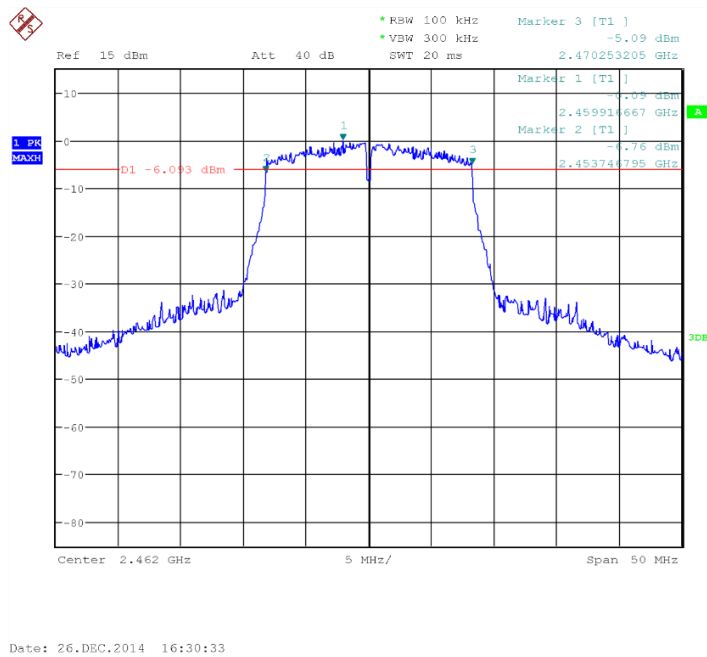


Date: 26.DEC.2014 16:29:41

**Fig.16 Occupied 6dB Bandwidth (802.11n-20MHz, Ch1)**



**Fig.17 Occupied 6dB Bandwidth (802.11n-20MHz, Ch6)**



**Fig.18 Occupied 6dB Bandwidth (802.11n-20MHz, Ch11)**

## 6.4. Band Edges Compliance

### 6.4.1 Measurement Limit:

| Standard                  | Limited(dBc) |
|---------------------------|--------------|
| FCC 47 CFR Part 15.247(d) | >20          |



## 6.4.2 Test procedures

The measurement is according to ANSI C63.10 clause 11.13.

1. The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Set instrument center frequency to the frequency of the emission to be measured (must be within 2MHz of the authorized band edge).
4. Set span to 2 MHz.
5. RBW = 100 kHz.
6. VBW  $\geq$  [3  $\times$  RBW].
7. Detector = peak.
8. Sweep time = auto.
9. Trace mode = max hold.
10. Allow sweep to continue until the trace stabilizes

## 6.4.3 Measurement Uncertainty:

|                         |                     |
|-------------------------|---------------------|
| Measurement Uncertainty | $\pm 0.75\text{dB}$ |
|-------------------------|---------------------|

## 6.4.4 Measurement results

### 802.11b/g mode

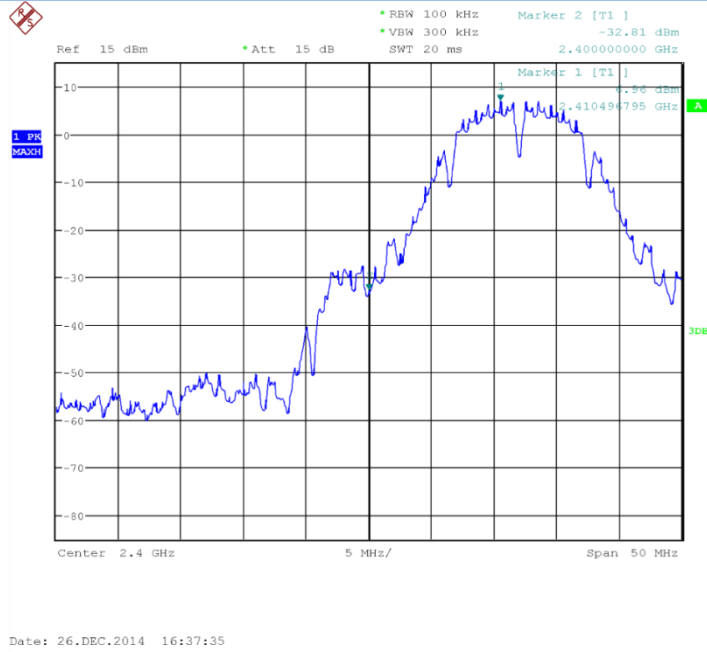
| Mode    | Channel | Test Results | Conclusion |
|---------|---------|--------------|------------|
| 802.11b | 1       | Fig.19       | P          |
|         | 11      | Fig.20       | P          |
| 802.11g | 1       | Fig.21       | P          |
|         | 11      | Fig.22       | P          |

### 802.11n mode

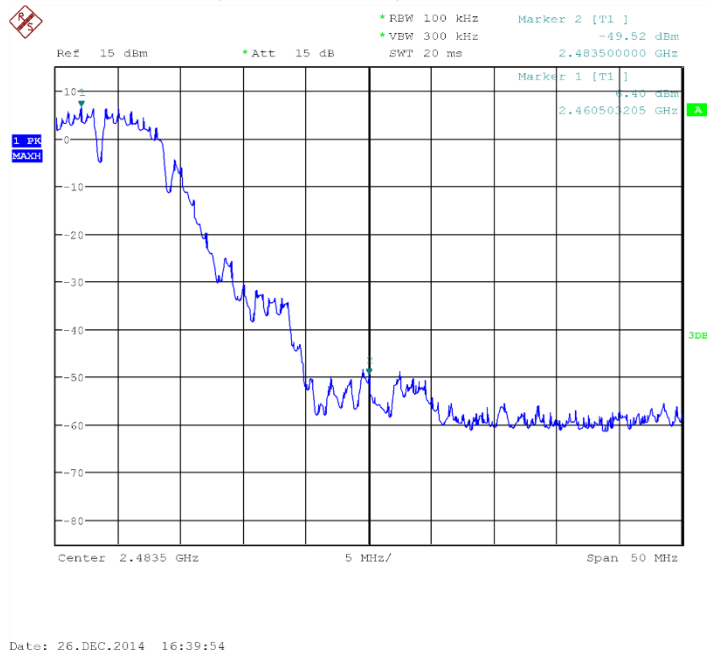
| Mode           | Channel | Test Results | Conclusion |
|----------------|---------|--------------|------------|
| 802.11n(20MHz) | 1       | Fig.23       | P          |
|                | 11      | Fig.24       | P          |

**Conclusion: PASS**

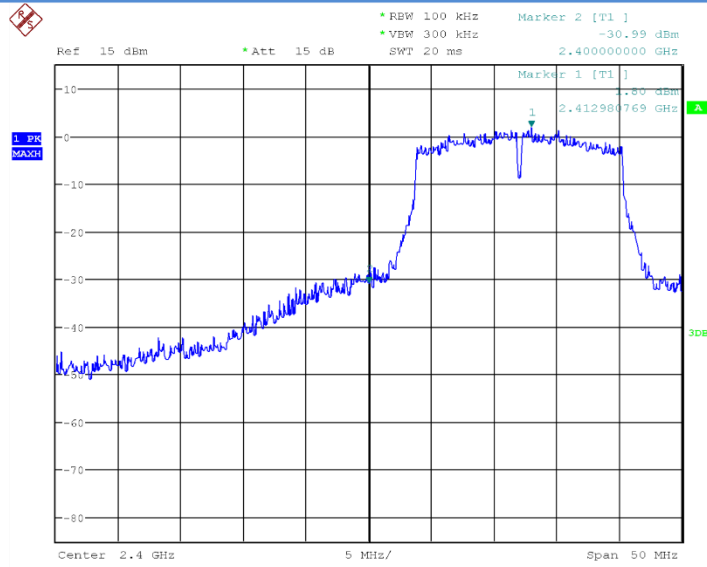
**Test graphs as blew:**



**Fig.19 Band Edges (802.11b, Ch1)**

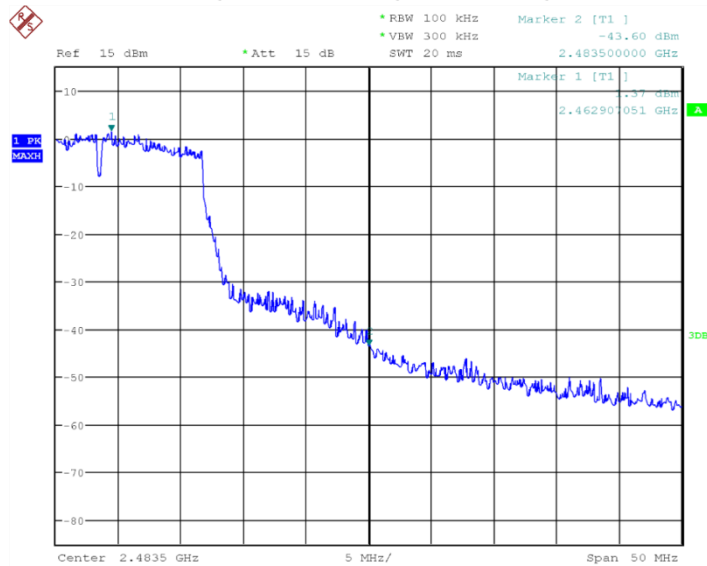


**Fig.20 Band Edges (802.11b, Ch11)**



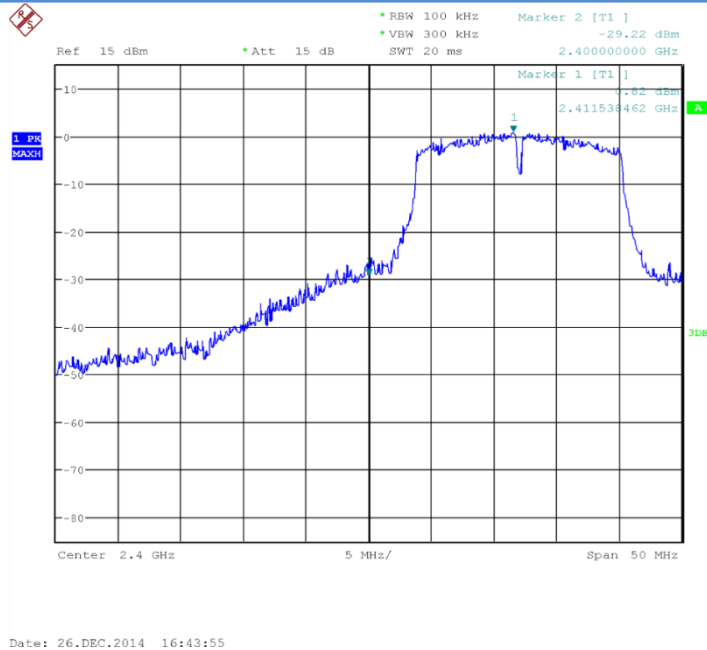
Date: 26.DEC.2014 16:41:25

**Fig.21 Band Edges (802.11g, Ch1)**

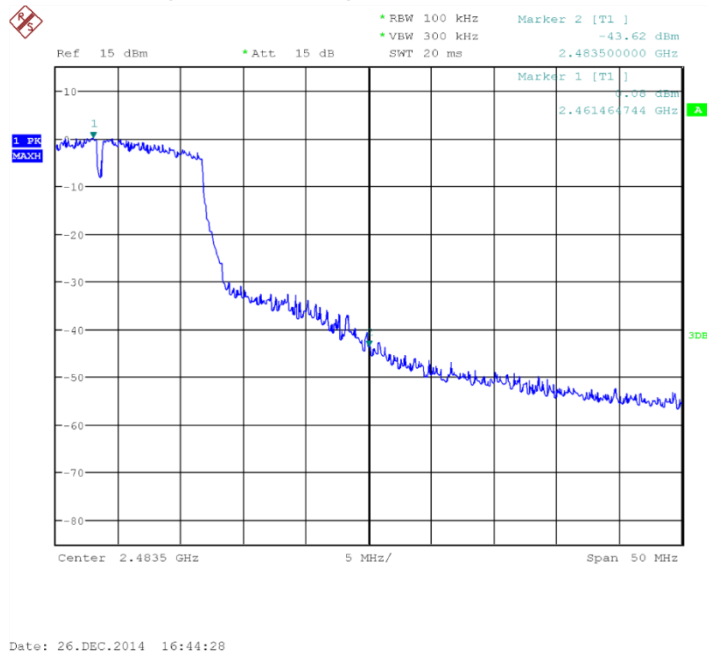


Date: 26.DEC.2014 16:43:23

**Fig.22 Band Edges (802.11g, Ch11)**



**Fig.23 Band Edges (802.11n-20MHz, Ch1)**



**Fig.24 Band Edges (802.11b-20MHz, Ch11)**

## 6.5. Transmitter Spurious Emission-conducted

### 6.5.1 Measurement Limit:

| Standard                  | Limit  |
|---------------------------|--|
| FCC 47 CFR Part 15.247(d) | 20dB below peak output power in 100KHz bandwidth |

## 6.5.2 Test procedures

This measurement is according to ANSI C63.10 clause 11.11.

1. The output power of EUT was connected to the spectrum analyzer. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.

Reference level measurement

3. Set instrument center frequency to DTS channel center frequency.
4. Set the span to  $\geq 1.5$  times the DTS bandwidth.
5. Set the RBW = 100 kHz.
6. Set the VBW  $\geq [3 \times \text{RBW}]$ .
7. Detector = peak.
8. Sweep time = auto couple.
9. Trace mode = max hold.
10. Allow trace to fully stabilize.
11. Use the peak marker function to determine the maximum PSD level.

Emission level measurement

12. Set the center frequency and span to encompass frequency range to be measured.
13. Set the RBW = 100 kHz.
14. Set the VBW  $\geq [3 \times \text{RBW}]$ .
15. Detector = peak.
16. Sweep time = auto couple.
17. Trace mode = max hold.
18. Allow trace to fully stabilize.
19. Use the peak marker function to determine the maximum amplitude level.

## 6.5.3 Measurement Uncertainty:

| Frequency Range                         | Uncertainty |
|---|-------------|
| $30\text{MHz} \leq f \leq 2\text{GHz}$  | 0.63        |
| $2\text{GHz} \leq f \leq 3.6\text{GHz}$ | 0.82        |
| $3.6\text{GHz} \leq f \leq 8\text{GHz}$ | 1.55        |
| $8\text{GHz} \leq f \leq 20\text{GHz}$  | 1.86        |
| $20\text{GHz} \leq f \leq 22\text{GHz}$ | 1.90        |
| $22\text{GHz} \leq f \leq 26\text{GHz}$ | 2.20        |

## 6.5.4 Measurement Result:

### 802.11b/g mode

| Mode | Channel | Frequency Range | Test Results | Conclusion |
|------|---------|-----------------|--------------|------------|
|      |         |                 |              |            |

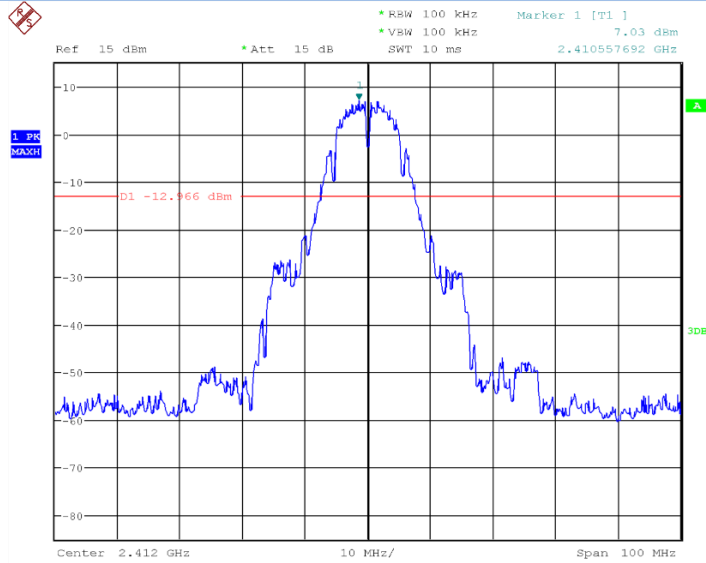
|         |    |             |        |   |
|---------|----|-------------|--------|---|
| 802.11b | 1  | 2.412GHz    | Fig.25 | P |
|         |    | 30MHz~26GHz | Fig.26 | P |
|         | 6  | 2.437GHz    | Fig.27 | P |
|         |    | 30MHz~26GHz | Fig.28 | P |
|         | 11 | 2.472GHz    | Fig.29 | P |
|         |    | 30MHz~26GHz | Fig.30 | P |
| 802.11g | 1  | 2.412GHz    | Fig.31 | P |
|         |    | 30MHz~26GHz | Fig.32 | P |
|         | 6  | 2.437GHz    | Fig.33 | P |
|         |    | 30MHz~26GHz | Fig.34 | P |
|         | 11 | 2.472GHz    | Fig.35 | P |
|         |    | 30MHz~26GHz | Fig.36 | P |

**802.11n mode**

| Mode           | Channel | Frequency Range | Test Results | Conclusion |
|----------------|---------|-----------------|--------------|------------|
| 802.11n(20MHz) | 1       | 2.412GHz        | Fig.37       | P          |
|                |         | 30MHz~26GHz     | Fig.38       | P          |
|                | 6       | 2.437GHz        | Fig.39       | P          |
|                |         | 30MHz~26GHz     | Fig.40       | P          |
|                | 11      | 2.472GHz        | Fig.41       | P          |
|                |         | 30MHz~26GHz     | Fig.42       | P          |

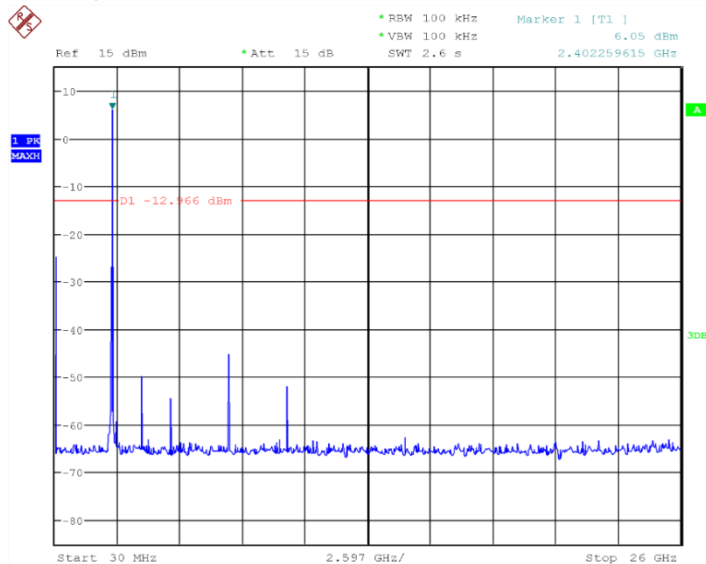
**Conclusion: PASS**

**Test graphs as below:**



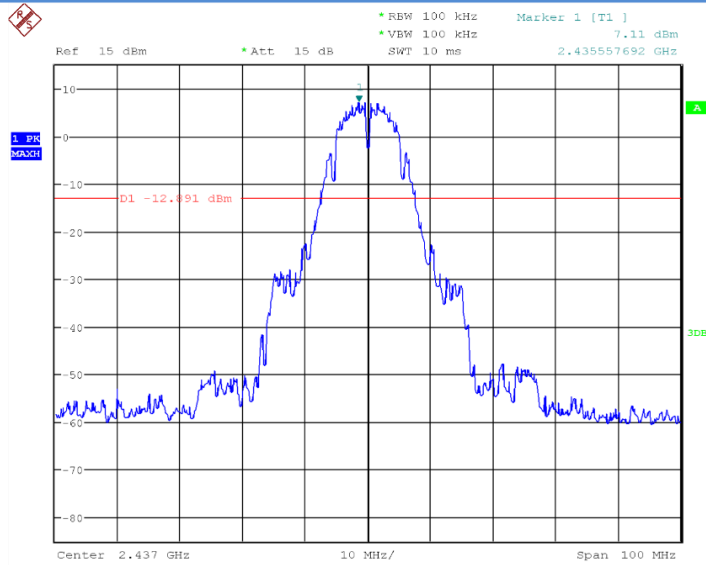
Date: 26.DEC.2014 16:53:31

**Fig.25 Conducted Spurious Emission (802.11b, Ch1)**



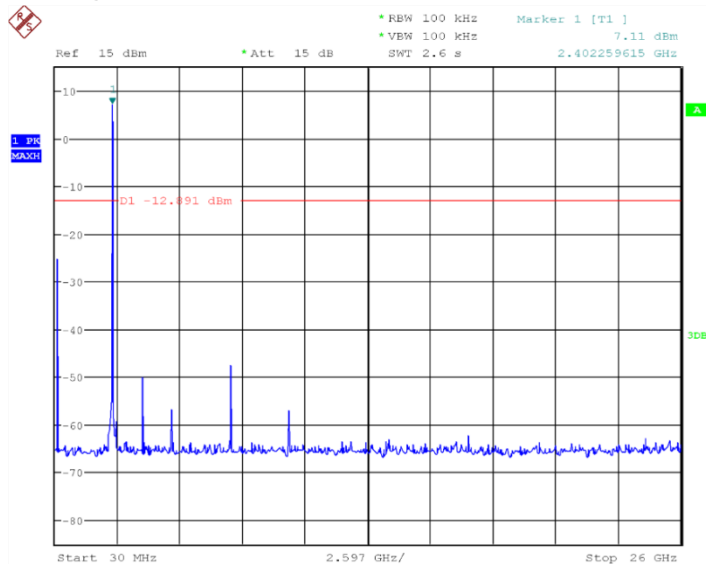
Date: 26.DEC.2014 16:53:52

**Fig.26 Conducted Spurious Emission (802.11b, Ch1, 30MHz~26GHz)**



Date: 26.DEC.2014 16:55:13

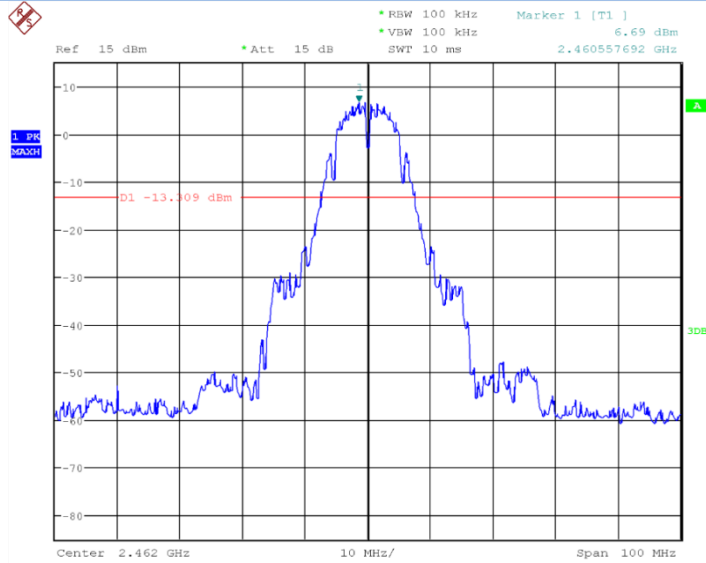
**Fig.27 Conducted Spurious Emission (802.11b, Ch6)**



Date: 26.DEC.2014 16:55:34

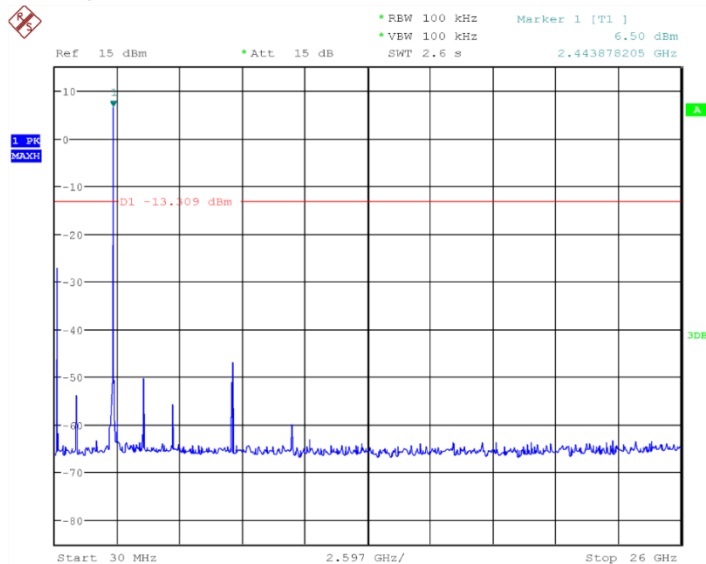
**Fig.28 Conducted Spurious Emission (802.11b, Ch6, 30MHz~26GHz)**





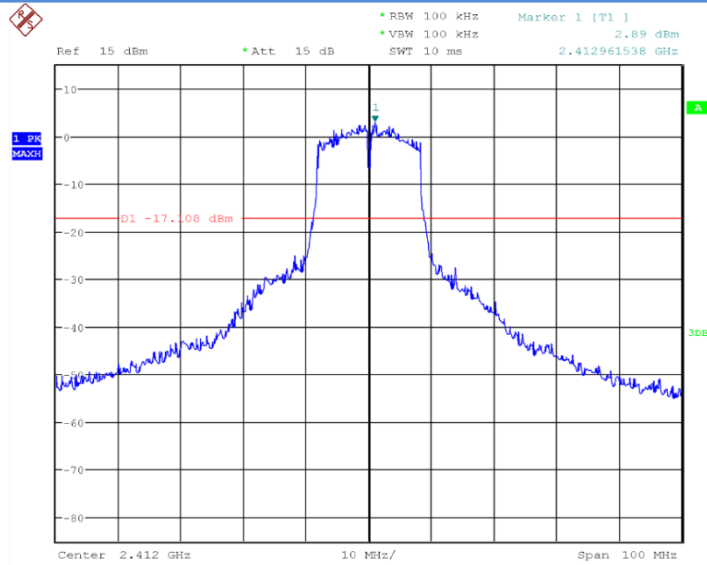
Date: 26.DEC.2014 16:56:20

**Fig.29 Conducted Spurious Emission (802.11b, Ch11)**



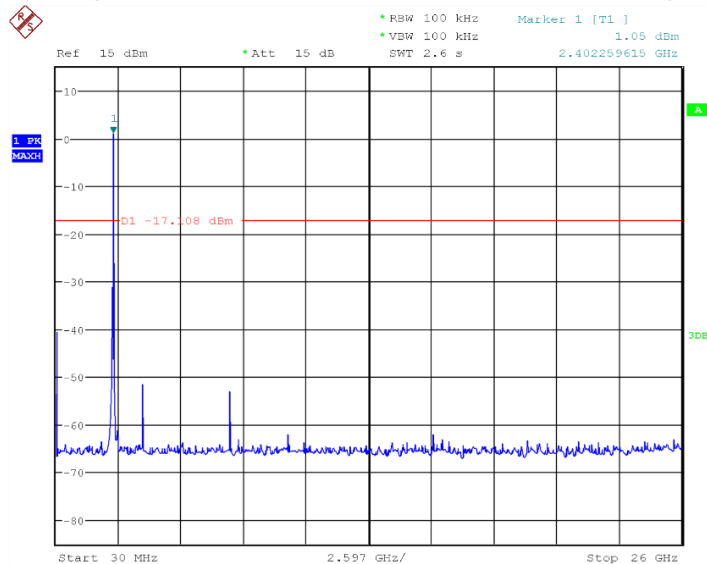
Date: 26.DEC.2014 16:56:41

**Fig.30 Conducted Spurious Emission (802.11b, Ch11, 30MHz~26GHz)**



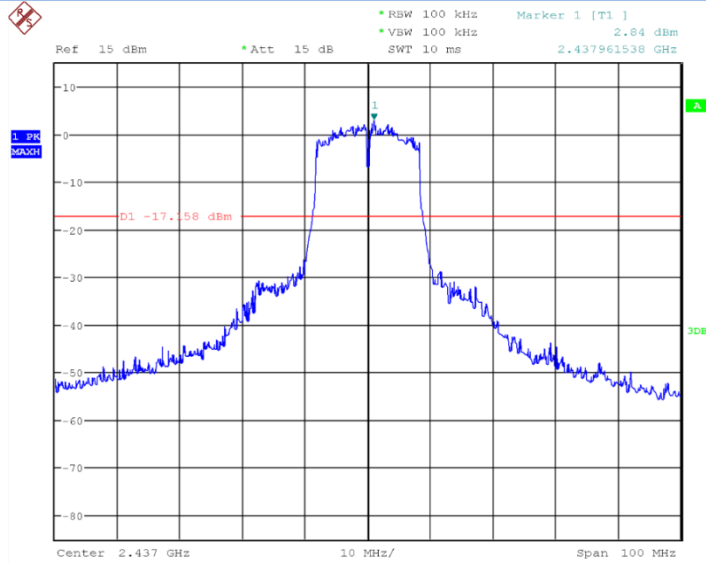
Date: 26.DEC.2014 16:57:18

**Fig.31 Conducted Spurious Emission (802.11g, Ch1)**



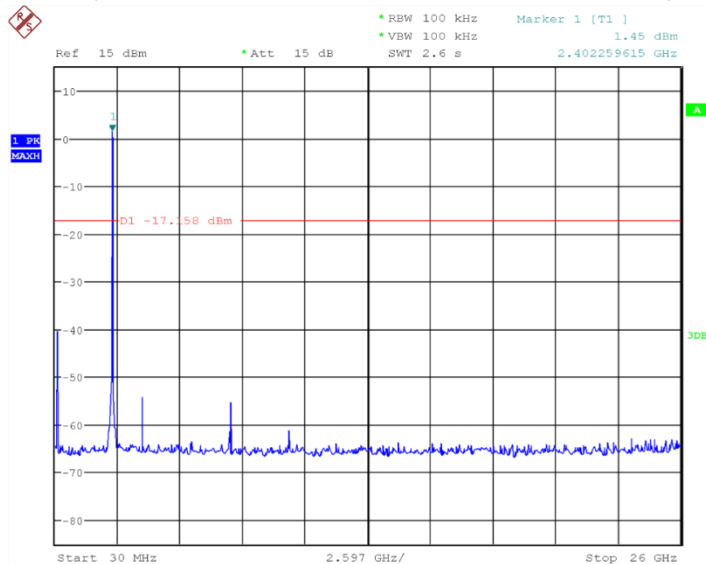
Date: 26.DEC.2014 16:57:39

**Fig.32 Conducted Spurious Emission (802.11g, Ch1, 30MHz~26GHz)**



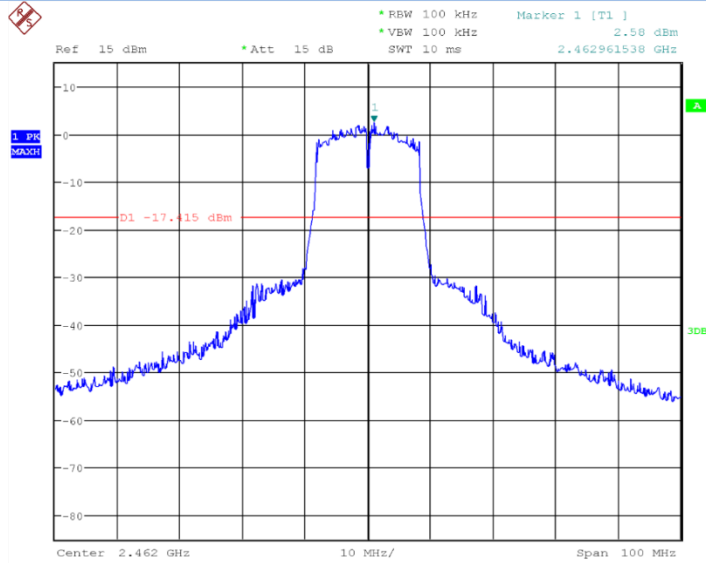
Date: 26.DEC.2014 16:58:25

**Fig.33 Conducted Spurious Emission (802.11g, Ch6)**



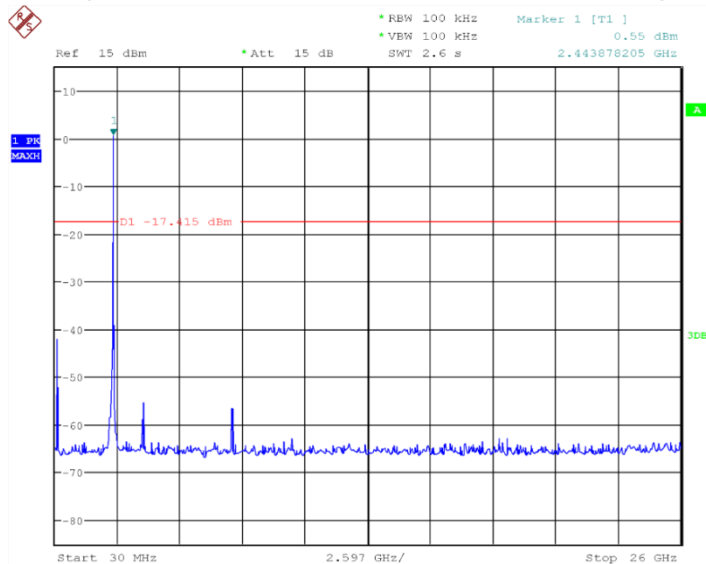
Date: 26.DEC.2014 16:58:46

**Fig.34 Conducted Spurious Emission (802.11g, Ch6, 30MHz~26GHz)**



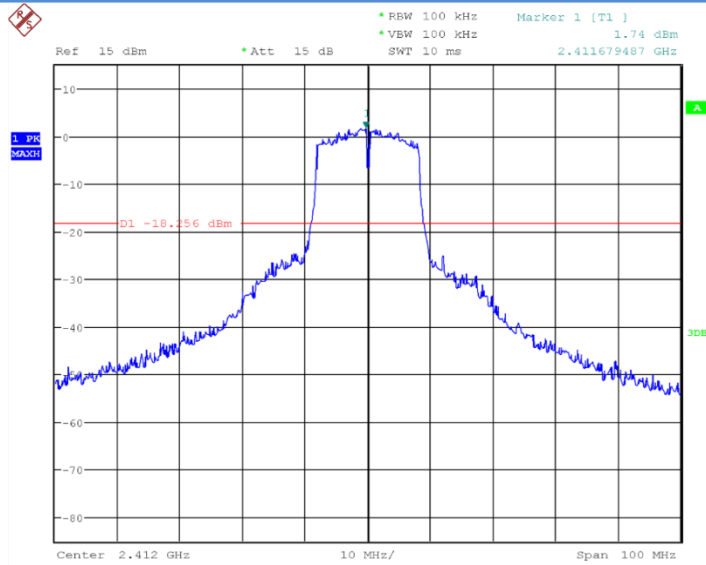
Date: 26.DEC.2014 16:59:27

**Fig.35 Conducted Spurious Emission (802.11g, Ch11)**



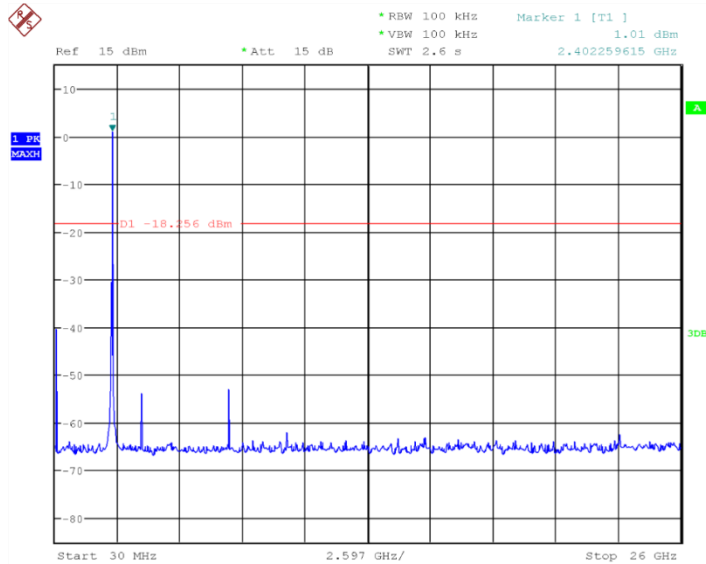
Date: 26.DEC.2014 16:59:48

**Fig.36 Conducted Spurious Emission (802.11g, Ch11, 30MHz~26GHz)**



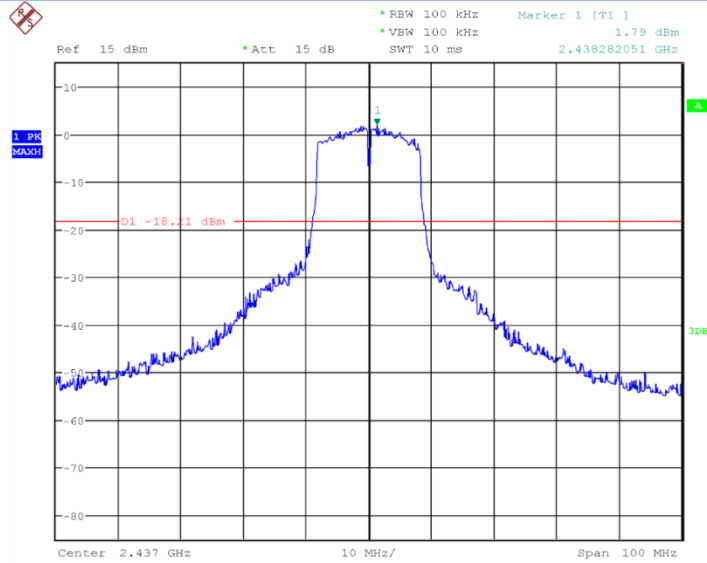
Date: 26.DEC.2014 17:00:26

**Fig.37 Conducted Spurious Emission (802.11n-20MHz, Ch1)**



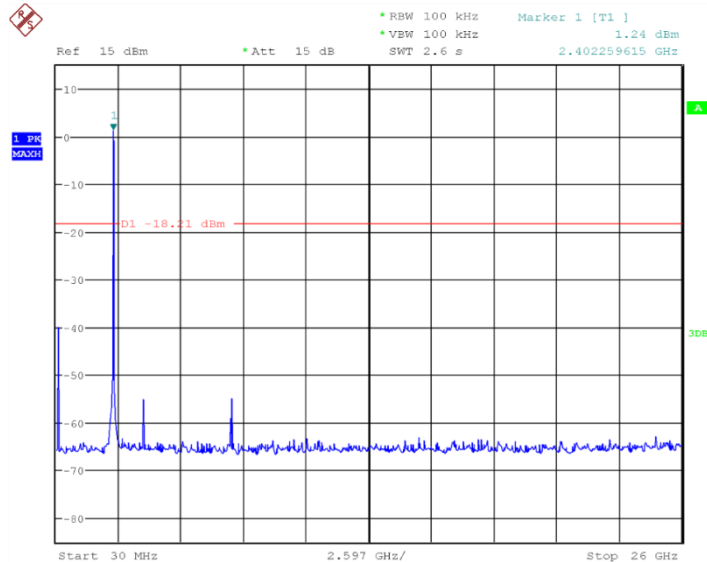
Date: 26.DEC.2014 17:00:47

**Fig.38 Conducted Spurious Emission (802.11n-20MHz, Ch1, 30MHz~26GHz)**



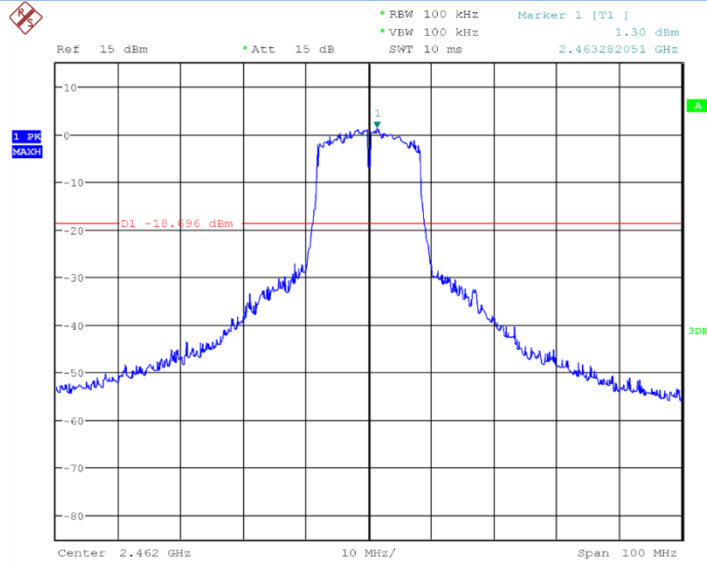
Date: 26.DEC.2014 17:01:15

**Fig.39 Conducted Spurious Emission (802.11n-20MHz, Ch6)**



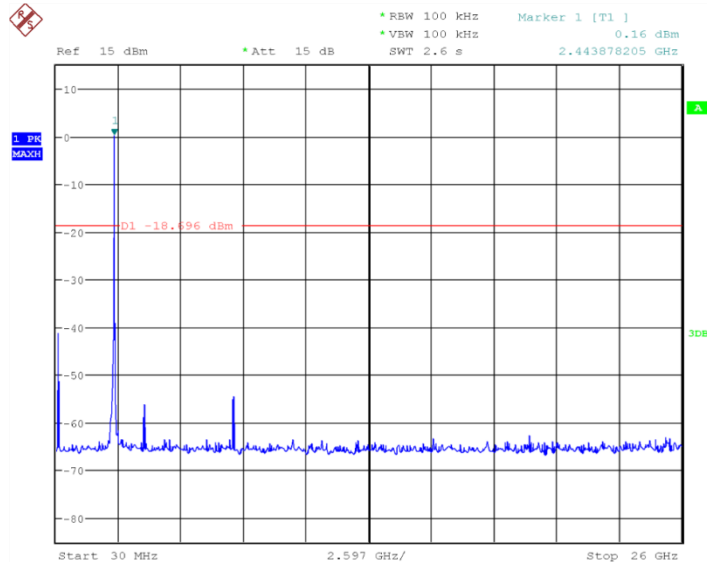
Date: 26.DEC.2014 17:01:36

**Fig.40 Conducted Spurious Emission (802.11n-20MHz, Ch6, 30MHz~26GHz)**



Date: 26.DEC.2014 17:02:53

**Fig.41 Conducted Spurious Emission (802.11n-20MHz, Ch11)**



Date: 26.DEC.2014 17:03:13

**Fig.42 Conducted Spurious Emission (802.11n-20MHz, Ch11, 30MHz~26GHz)**

## 6.6. Transmitter Spurious Emission-Radiated

### 6.6.1 Measurement Limit:

| Standard                             | Limit                        |
|--------------------------------------|------------------------------|
| FCC 47 CFR Part 15.247,15.205,15.209 | 20dB below peak output power |

In addition, radiated emissions which fall in the restricted bands, as defined in 25.205(a),

must also comply with the radiated emission limits specified in 15.209(a)(see 15.205(c)).  
The measurement is according to ANSI C63.10 clause 11.11 and 11.12.

### 6.6.2 Limit in restricted band:

| Frequency of emission(MHz) | Field strength(uV/m) | Field strength(dBuV/m) |
|----------------------------|----------------------|------------------------|
| 30~88                      | 100                  | 40                     |
| 88~216                     | 150                  | 43.5                   |
| 216~960                    | 200                  | 46                     |
| Above 960                  | 500                  | 54                     |

### 6.6.3 Test procedures

Portable, small, lightweight, or modular devices that may be handheld, worn on the body, or placed on a table during operation shall be positioned on a nonconducting platform, the top of which is 80 cm above the reference ground plane. The preferred area occupied by the EUT arrangement is 1 m by 1.5 m, but it may be larger or smaller to accommodate various sized EUTs. For testing purposes, ceiling- and wall-mounted devices also shall be positioned on a tabletop (see also ANSI C63.4-2009 section 6.3.4 and 6.3.5). In making any tests involving handheld, body-worn, or ceiling-mounted equipment, it is essential to recognize that the measured levels may be dependent on the orientation (attitude) of the three orthogonal axes of the EUT. Thus, exploratory tests as specified in 8.3.1 shall be carried out for various axes orientations to determine the attitude having maximum or near-maximum emission level.

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During testing, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emission from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

| Frequency of emission (MHz) | RBW/VBW       | Sweep Times (s) |
|-----------------------------|---------------|-----------------|
| 30~1000                     | 100KHz/300KHz | 5               |
| 1000~4000                   | 1MHz/1MHz     | 15              |
| 4000~18000                  | 1MHz/1MHz     | 40              |
| 18000~26500                 | 1MHz/1MHz     | 20              |

### 802.11b/g mode

| Mode | Channel | Frequency Range | Test Results | Conclusion |
|------|---------|-----------------|--------------|------------|
|------|---------|-----------------|--------------|------------|



|         |       |                 |        |   |
|---------|-------|-----------------|--------|---|
| 802.11b | Power | 2.38GHz~2.45GHz | Fig.44 | P |
|         | Power | 2.45GHz~2.5GHz  | Fig.45 | P |
|         | 1     | 30MHz~1GHz      | Fig.46 | P |
|         |       | 1GHz~3GHz       | Fig.47 | P |
|         |       | 3GHz~18GHz      | Fig.48 | P |
| 802.11g | Power | 2.38GHz~2.45GHz | Fig.49 | P |
|         | Power | 2.45GHz~2.5GHz  | Fig.50 | P |
|         | 11    | 30MHz~1GHz      | Fig.51 | P |
|         |       | 1GHz~3GHz       | Fig.52 | P |
|         |       | 3GHz~18GHz      | Fig.53 | P |

**802.11n mode**

| Mode           | Channel      | Frequency Range | Test Results | Conclusion |
|----------------|--------------|-----------------|--------------|------------|
| 802.11n(20MHz) | Power        | 2.38GHz~2.45GHz | Fig.54       | P          |
|                | Power        | 2.45GHz~2.5GHz  | Fig.55       | P          |
|                | 1            | 30MHz~1GHz      | Fig.56       | P          |
|                |              | 1GHz~3GHz       | Fig.57       | P          |
|                |              | 3GHz~18GHz      | Fig.58       | P          |
| /              | All channels | 18GHz~26.5GHz   | Fig.59       | P          |

**Conclusion: PASS**
**Note:**

A "reference path loss" is established and  $A_{Rpi}$  is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

$P_{Mea}$  is the field strength recorded from the instrument.

The measurement results are obtained as described below:

$AR_{pi} = \text{Cable loss} + \text{Antenna Gain} - \text{Preamplifier gain}$

$\text{Result} = P_{Mea} + \text{Cable loss} + \text{Antenna Gain} - \text{Preamplifier gain} = P_{Mea} + AR_{pi}$

**802.11b mode**
**Ch1 30MHz~1GHz**

| Frequency(MHz) | Result(dBuV/m) | AR <sub>pi</sub> (dB) | P <sub>Mea</sub> (dBuV/m) | Polarity |
|----------------|----------------|-----------------------|---------------------------|----------|
|----------------|----------------|-----------------------|---------------------------|----------|

|           |       |       |       |   |
|-----------|-------|-------|-------|---|
| 34.559392 | 13.72 | -25.9 | 39.62 | V |
| 35.058672 | 14.55 | -25.9 | 40.45 | V |
| 39.345028 | 21.98 | -25.0 | 46.98 | V |
| 41.163240 | 20.10 | -24.9 | 45    | V |
| 42.628128 | 19.33 | -25.0 | 44.33 | V |

**Ch1 1GHz~3GHz**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|----------------|----------------|-----------|--------------|----------|
| 2734.020192    | 53.26          | 9.9       | 43.36        | V        |
| 2770.590385    | 52.47          | 10.3      | 42.17        | V        |

**Ch1 3GHz~18GHz**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|----------------|----------------|-----------|--------------|----------|
| 16494.790867   | 59.59          | 26.9      | 32.69        | H        |
| 17133.936933   | 59.72          | 26.9      | 32.82        | V        |
| 17591.932133   | 62.83          | 27.0      | 35.83        | H        |

**802.11g**
**Ch11 30MHz~1GHz**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|----------------|----------------|-----------|--------------|----------|
| 34.581832      | 14.26          | -25.9     | 40.16        | V        |
| 35.009720      | 12.16          | -25.9     | 38.06        | V        |
| 35.314532      | 13.73          | -25.9     | 39.63        | V        |
| 41.486432      | 15.87          | -24.9     | 40.77        | V        |

**Ch11 1GHz~3GHz**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|----------------|----------------|-----------|--------------|----------|
| 2905.581346    | 55.34          | 11.6      | 43.74        | H        |
| 2942.236154    | 55.62          | 12.2      | 43.42        | H        |

**Ch11 3GHz~18GHz**



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| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|----------------|----------------|-----------|--------------|----------|
| 15965.383200   | 58.65          | 25.1      | 33.55        | H        |
| 16510.254667   | 59.53          | 26.8      | 32.73        | V        |
| 16799.834600   | 60.19          | 27.4      | 32.79        | V        |

### 802.11n-20MHz

#### Ch1 30MHz~1GHz

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|----------------|----------------|-----------|--------------|----------|
| 34.662800      | 14.67          | -25.9     | 40.57        | V        |
| 39.441820      | 21.67          | -25.0     | 46.67        | V        |
| 42.814720      | 18.95          | -25.0     | 43.95        | V        |
| 50.955780      | 19.06          | -25.0     | 44.06        | V        |
| 150.830008     | 22.16          | -27.1     | 49.26        | H        |

#### Ch1 1GHz~3GHz

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|----------------|----------------|-----------|--------------|----------|
| 2954.030193    | 56.16          | 12.4      | 43.76        | H        |
| 2988.395000    | 57.06          | 13.4      | 43.66        | V        |

#### Ch1 3GHz~18GHz

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|----------------|----------------|-----------|--------------|----------|
| 15478.636333   | 56.84          | 23.3      | 33.54        | V        |
| 15936.663867   | 58.78          | 24.9      | 33.88        | H        |
| 16165.351800   | 58.27          | 25.4      | 32.87        | V        |
| 16972.205933   | 60.44          | 27.1      | 33.34        | H        |

#### All Ch 18GHz~26.5GHz

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|----------------|----------------|-----------|--------------|----------|
| 21179.000000   | 45.48          | 6.97      | 38.51        | V        |
| 22748.950000   | 41.63          | 3.05      | 38.58        | H        |
| 23684.800000   | 41.59          | 3.05      | 38.54        | H        |

|              |       |      |       |   |
|--------------|-------|------|-------|---|
| 24633.400000 | 40.05 | 3.05 | 37.00 | V |
| 25567.550000 | 43.01 | 2.90 | 40.11 | H |
| 26066.500000 | 42.06 | 2.90 | 39.16 | V |

Test graphs as below:

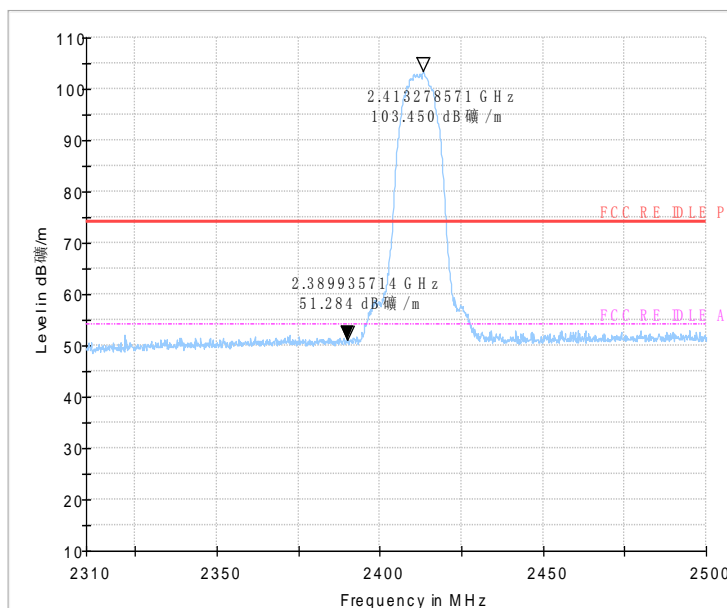


Fig.44 Radiated emission (Power): 802.11b, low channel

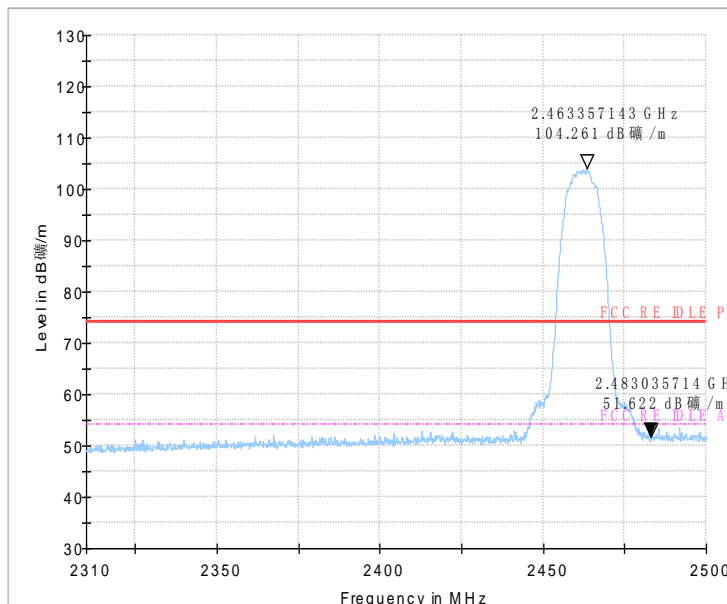
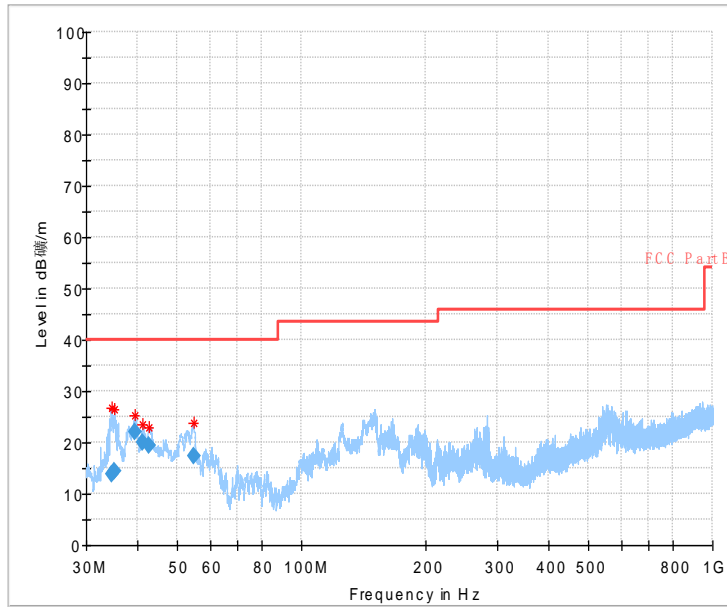
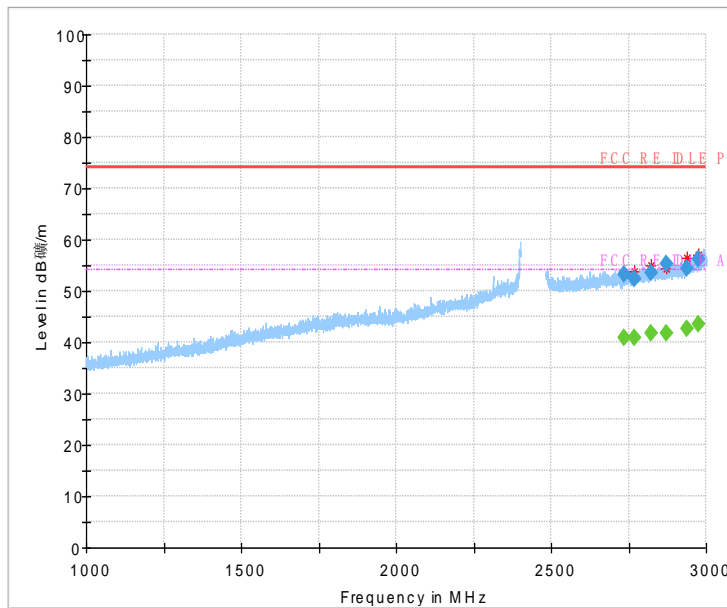


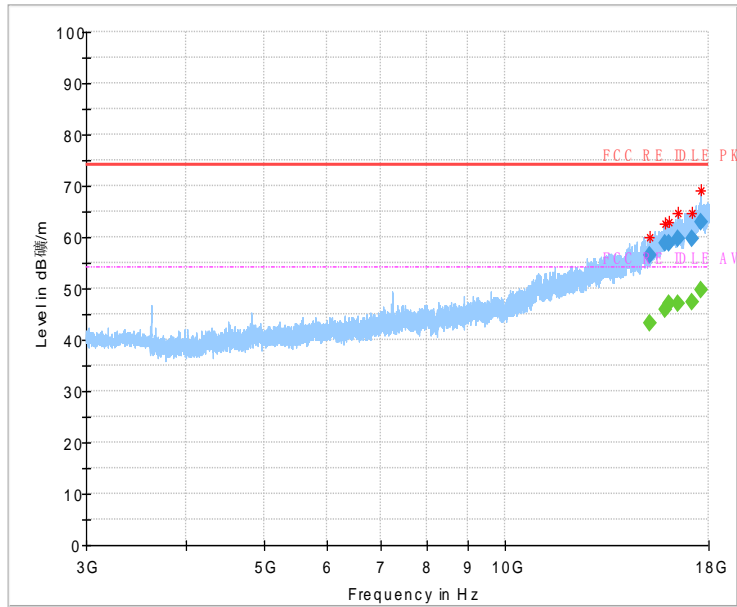
Fig.45 Radiated emission (Power): 802.11b, high channel



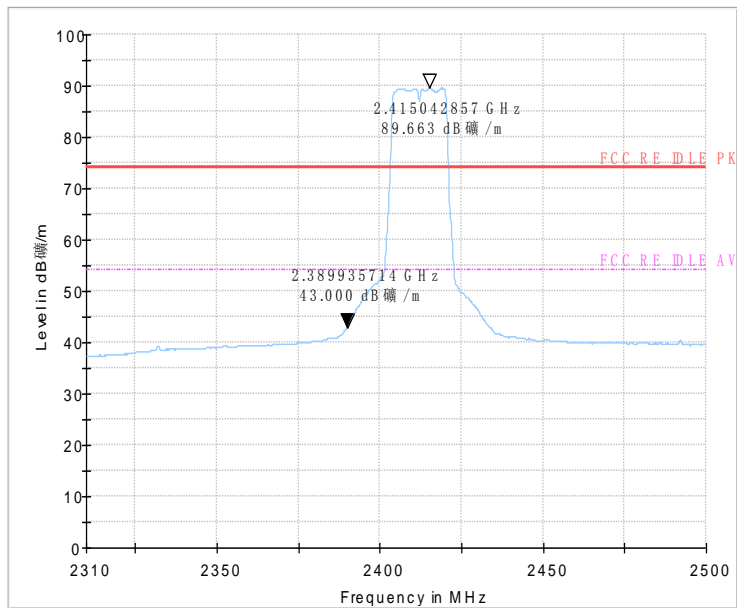
**Fig.46 Radiated Spurious Emission (802.11b,Ch1,30MHz~1GHz)**



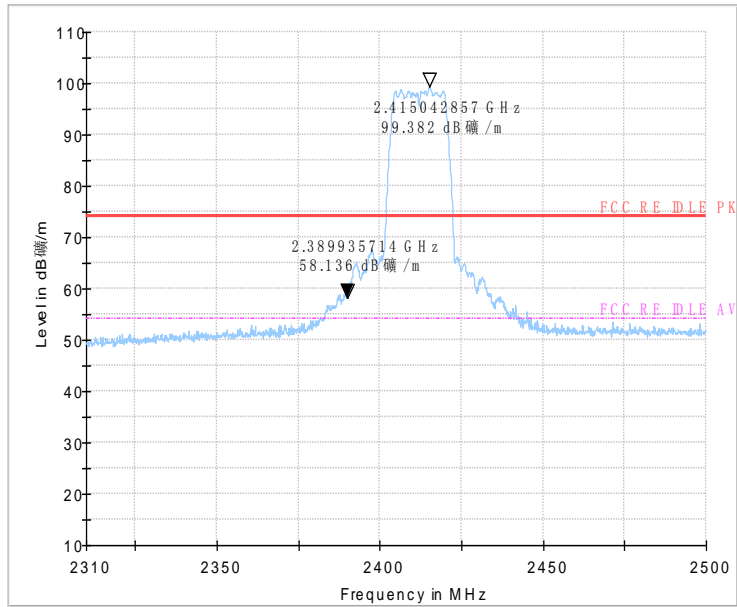
**Fig.47 Radiated Spurious Emission (802.11b,Ch1,1GHz~3GHz)**



**Fig.48 Radiated Spurious Emission (802.11b,Ch1,3GHz~18GHz)**

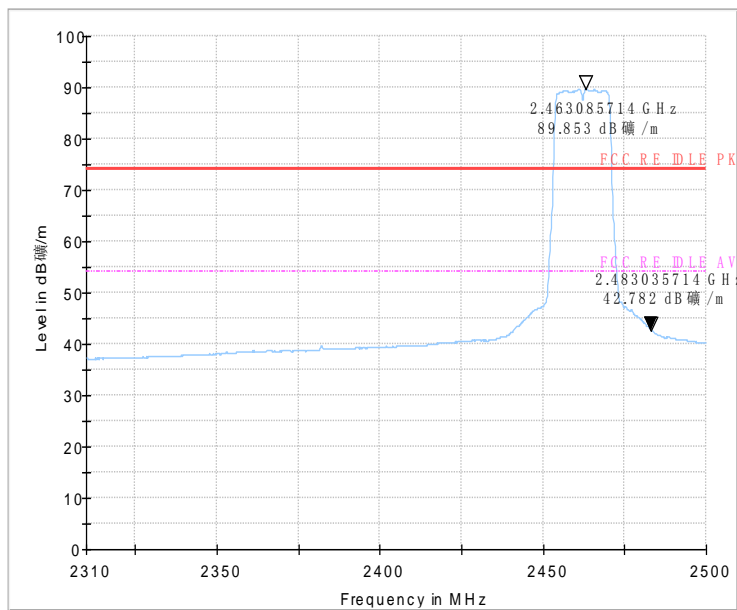


(AV)

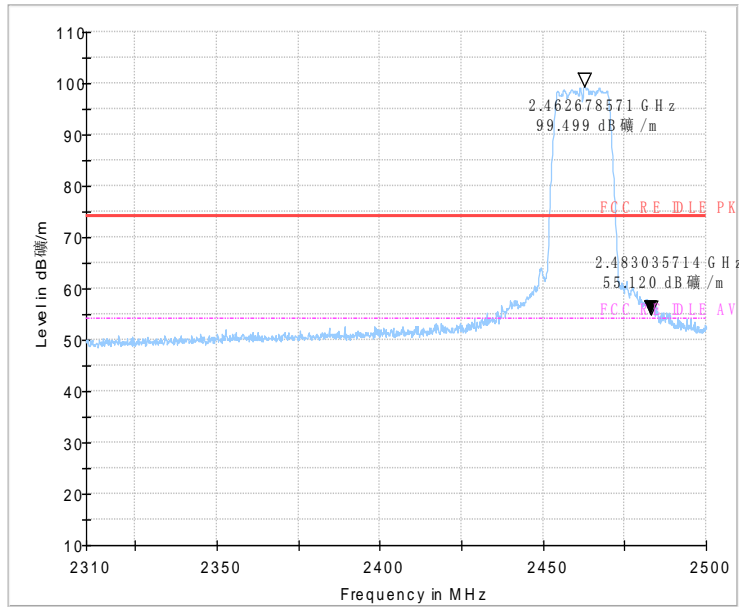


(PEAK)

**Fig.49 Radiated emission (Power): 802.11g, low channel**

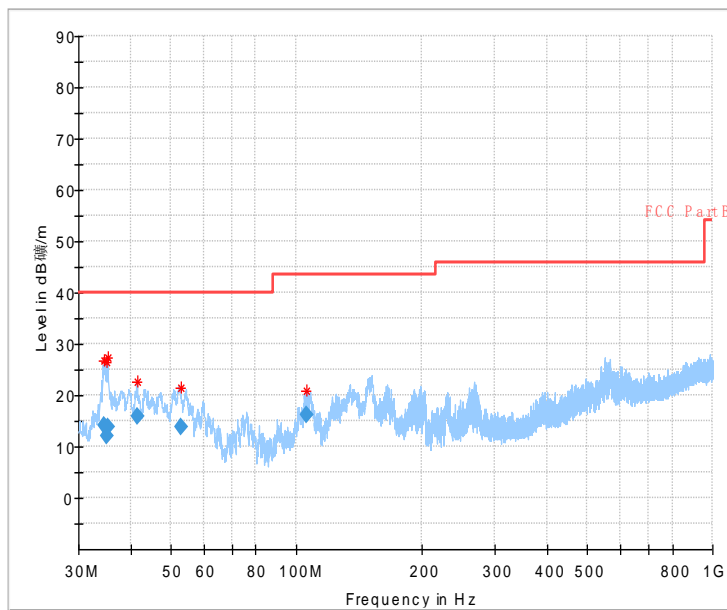


(AV)



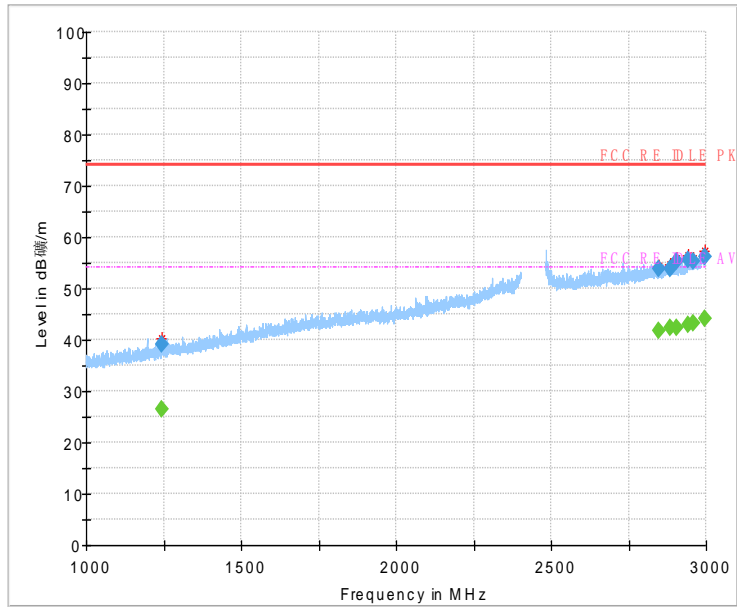
(PEAK)

**Fig.50 Radiated emission (Power): 802.11g, high channel**

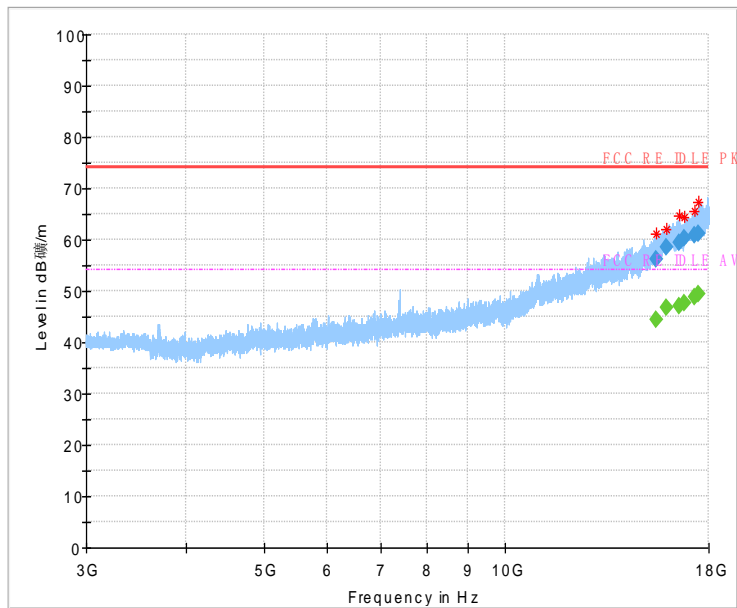


**Fig.51 Radiated Spurious Emission (802.11g,Ch11,30MHz~1GHz)**

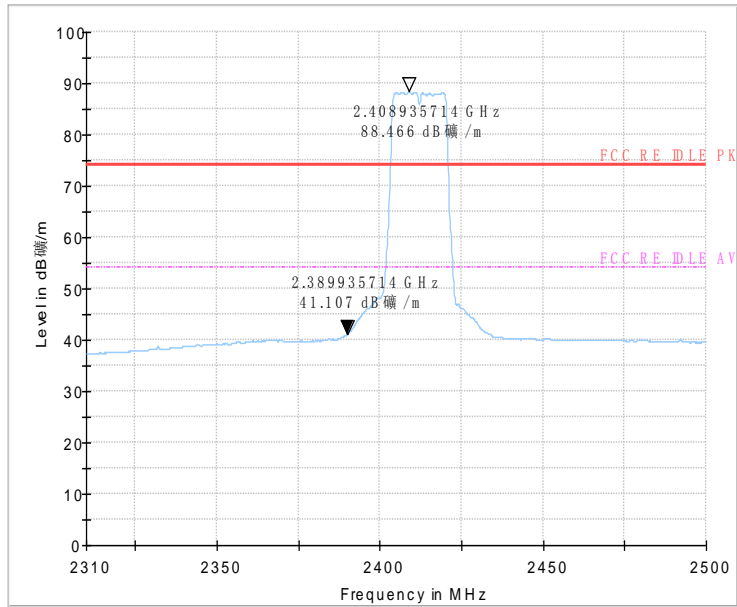




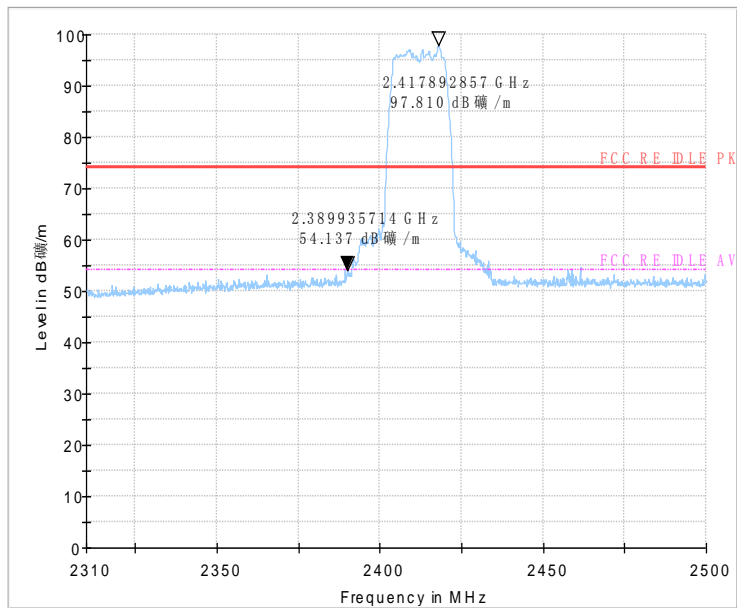
**Fig.52 Radiated Spurious Emission (802.11g,Ch11,1GHz~3GHz)**



**Fig.53 Radiated Spurious Emission (802.11g,Ch11,3GHz~18GHz)**

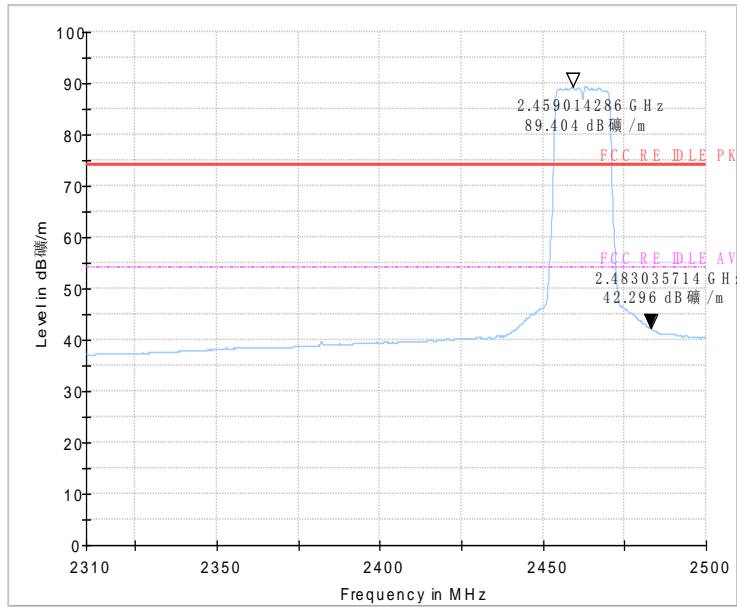


(AV)

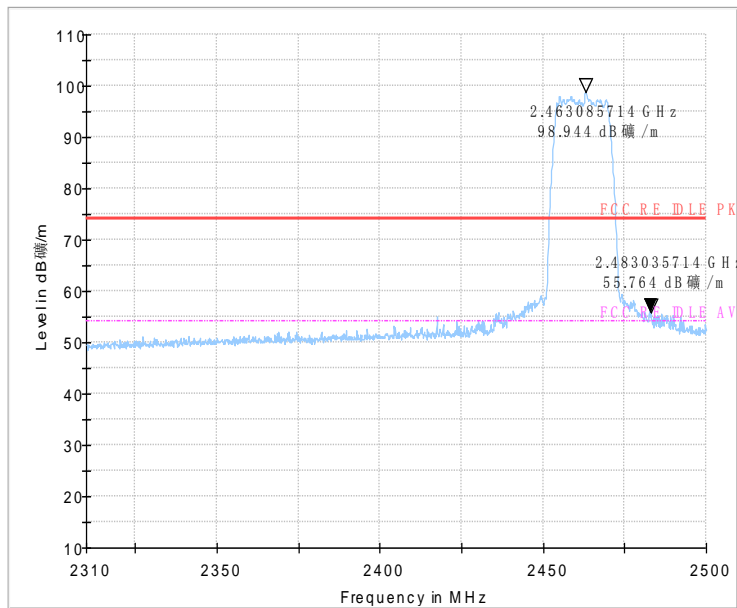


(PEAK)

**Fig.54 Radiated emission (Power): 802.11n, low channel**

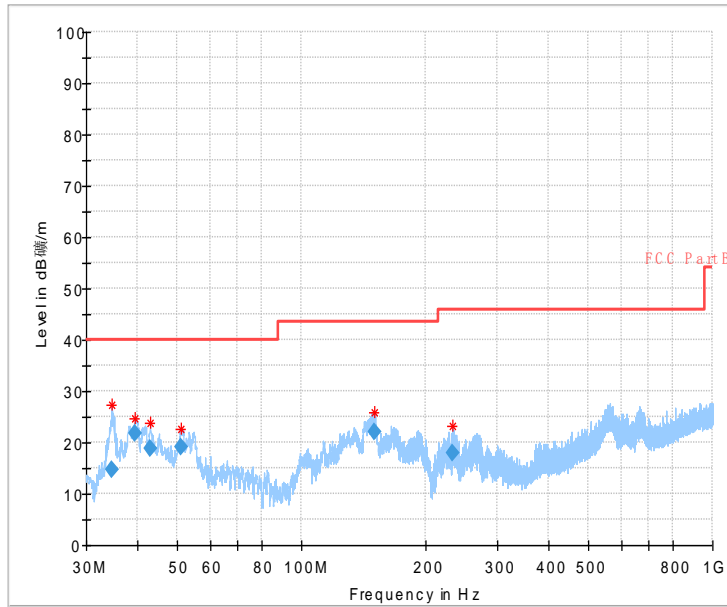


(AV)

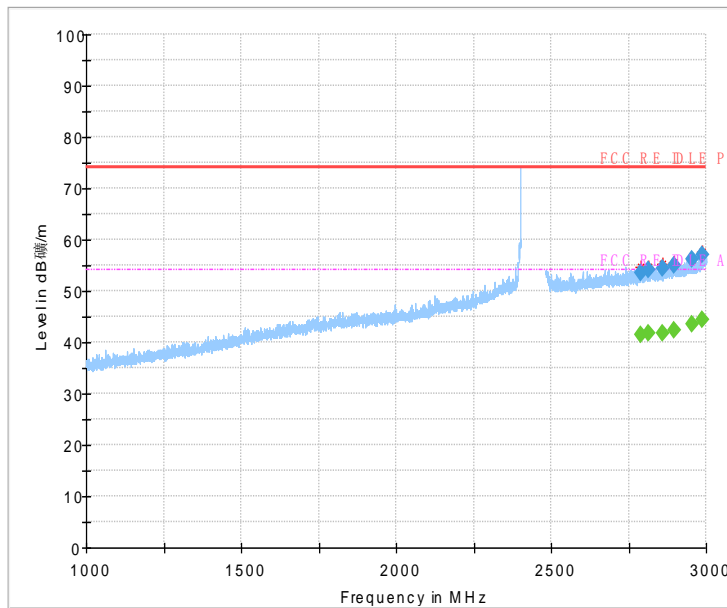


(PEAK)

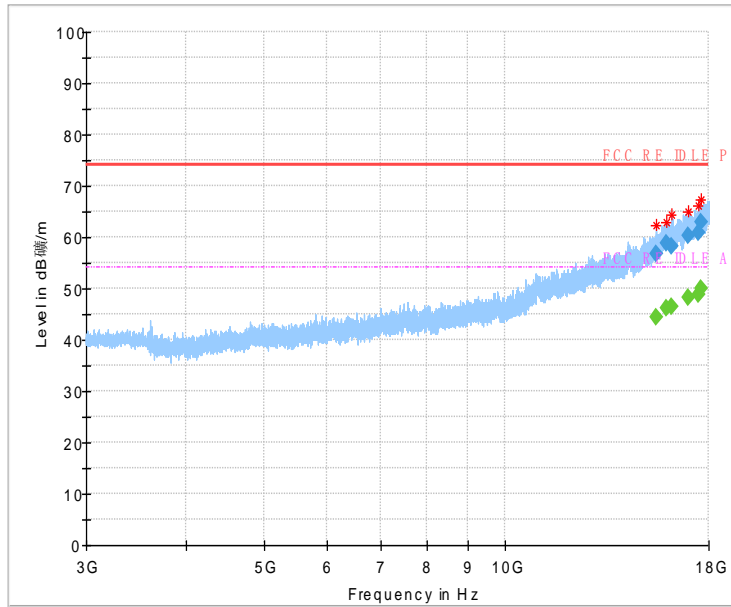
**Fig.55 Radiated emission (Power): 802.11n, high channel**



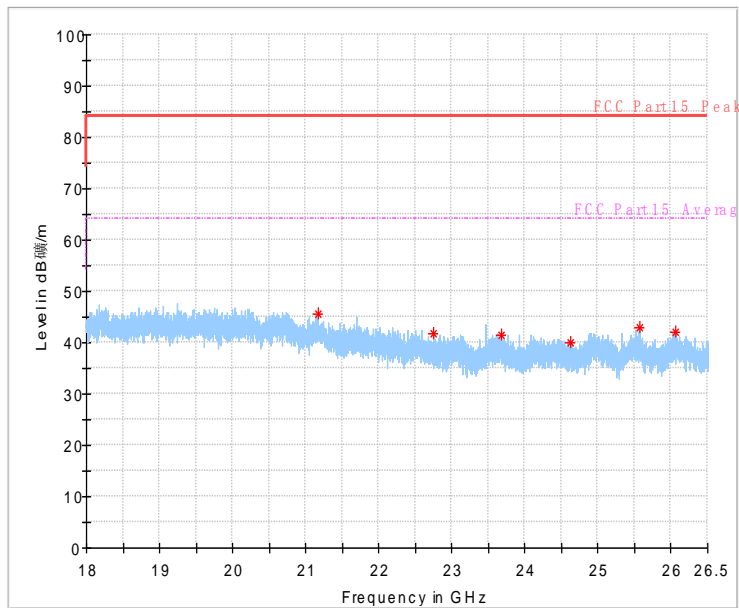
**Fig.56 Radiated Spurious Emission (802.11 n-20MHz,Ch1,30MHz~1GHz)**



**Fig.57 Radiated Spurious Emission (802.11 n-20MHz,Ch1,1GHz~3GHz)**



**Fig.58 Radiated Spurious Emission (802.11 n-20MHz,Ch1,3GHz~18GHz)**



**Fig.59 Radiated emission: GFSK, 18 GHz – 26.5 GHz**

## 7. T Test Equipments and Ancillaries Used For Tests

The test equipments and ancillaries used are as follows.

### Conducted test system

| No. | Equipment              | Model    | Serial Number | Manufacturer | Calibration Due date |
|-----|------------------------|----------|---------------|--------------|----------------------|
| 1   | Vector Signal Analyzer | FSQ26    | 101096        | R&S          | 2015-07-06           |
| 2   | DC Power Supply        | ZUP60-14 | LOC-220Z006   | TDL-Lambda   | 2016-01-18           |

### Radiated emission test system

| No. | Equipment                            | Model    | Serial Number | Manufacturer | Calibration Due date |
|-----|--------------------------------------|----------|---------------|--------------|----------------------|
| 1   | Universal Radio Communication Tester | CMU200   | 123101        | R&S          | 2015-07-05           |
| 3   | Test Receiver                        | ESU40    | 100307        | R&S          | 2015-07-24           |
| 4   | Trilog Antenna                       | VULB9163 | 19-162515     | Schwarzbeck  | 2017-11-04           |
| 5   | Double Ridged Guide Antenna          | ETS-3117 | 135885        | ETS          | 2017-05-05           |
| 8   | 2-Line V-Network                     | ENV216   | 101380        | R&S          | 2015-07-24           |

### Anechoic chamber

Fully anechoic chamber by Frankonia German.

## 8. Test Environment

**Shielding Room1** (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

|                              |  |
|------------------------------|--|
| Temperature                  | Min. = 15 °C, Max. = 30 °C                 |
| Relative humidity            | Min. = 30 %, Max. = 60 %                   |
| Shielding effectiveness      | > 110 dB                                   |
| Ground system resistance     | < 0.5 Ω                                    |
| Uniformity of field strength | Between 0 and 6 dB, from 80MHz to 3000 MHz |

**Control room** did not exceed following limits along the EMC testing:

|                          |                            |
|--------------------------|----------------------------|
| Temperature              | Min. = 15 °C, Max. = 35 °C |
| Relative humidity        | Min. =30 %, Max. = 60 %    |
| Shielding effectiveness  | > 110 dB                   |
| Electrical insulation    | > 10 kΩ                    |
| Ground system resistance | < 0.5 Ω                    |

**Fully-anechoic chamber1** (6.8 meters×3.08 meters×3.53 meters) did not exceed following limits along the EMC testing:

|                              |  |
|------------------------------|--|
| Temperature                  | Min. = 15 °C, Max. = 30 °C                 |
| Relative humidity            | Min. = 30 %, Max. = 60 %                   |
| Shielding effectiveness      | > 110 dB                                   |
| Electrical insulation        | > 10 kΩ                                    |
| Ground system resistance     | < 0.5 Ω                                    |
| Uniformity of field strength | Between 0 and 6 dB, from 80MHz to 3000 MHz |

**Fully-anechoic chamber2** (Tapered Section: 8.75 meters×3.66 meters×3.66 meters, Rectangular Section: 7.32 meters×3.97 meters×3.66 meters) did not exceed following limits along the EMC testing:

|                   |                            |
|-------------------|----------------------------|
| Temperature       | Min. = 15 °C, Max. = 30 °C |
| Relative humidity | Min. = 35 %, Max. = 60 %   |



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|                              |  |
|------------------------------|--|
| Shielding effectiveness      | > 110 dB                                   |
| Electrical insulation        | > 10 k $\Omega$                            |
| Ground system resistance     | < 0.5 $\Omega$                             |
| Uniformity of field strength | Between 0 and 6 dB, from 30MHz to 40000MHz |

### ANNEX A. Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

\*\*\*\*\*End The Report\*\*\*\*\*