

VERIFICATION OF COMPLIANCE

● Equipment : 802.11abgn, USB Dongle
Model No. : WUBR-508N
Applicant : SparkLAN Communications, Inc.
8F., No. 257, Sec. 2, Tiding Blvd., Neihu District, Taipei City 11493,
Taiwan

**I HEREBY****DECLARE THAT :**

The following technical requirements and test specifications are relevant to the presumption of conformity under the **RED Directive 2014/53/EU**.

The equipment was **Passed** the test performed according to **EN 301 893 V2.1.1 (2017-05)**

The test was carried out on **Apr. 27, 2017** at **SPORTON INTERNATIONAL INC. LAB.**

Phoenix Chen
Assistant Manager

CE Test Report

Equipment : 802.11abgn, USB Dongle
Brand Name : SparkLAN
Model No. : WUBR-508N
Standard : EN 301 893 V2.1.1(2017-05)
Operating Band : 5150 MHz – 5250 MHz
5250 MHz – 5350 MHz
5470 MHz – 5725 MHz
Applicant : SparkLAN Communications, Inc.
Manufacturer : 8F., No. 257, Sec. 2, Tiding Blvd., Neihu District, Taipei
City 11493, Taiwan
Operate Mode : Slave without radar detection

The product sample received on Apr. 11, 2016 and completely tested on Apr. 27, 2017. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in EN 301 893 V2.1.1(2017-05) and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.



Phoenix Chen
SPORTON INTERNATIONAL
INC.



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APPENDIX A. TEST PHOTOS

PHOTOGRAPHS OF EUT v01

Summary of Test Result

| Conformance Test Specifications | | | | | |
|---------------------------------|------------------|--|----------------------------|----------|--------|
| Report Clause | Ref. Std. Clause | Description | Limit | Result | Remark |
| 3.1 | 4.2.1 | Nominal Centre Frequency | EN 301 893 Clause 4.2.1.3 | Complied | - |
| 3.2 | 4.2.2 | Nominal Channel Bandwidth (NCB) and Occupied Channel Bandwidth (OCB) | EN 301 893 Clause 4.2.2.2 | Complied | - |
| 3.3 | 4.2.3 | RF Output Power | EN 301 893 Table 2 | Complied | - |
| 3.4 | 4.2.3 | Transmit Power Control (TPC) | EN 301 893 Table 3 | Complied | - |
| 3.5 | 4.2.3 | Power Density | EN 301 893 Table 2 | Complied | - |
| 3.6 | 4.2.4 | Transmitter Unwanted Emissions outside the 5 GHz RLAN Bands | EN 301 893 Table 4 | Complied | - |
| 3.7 | 4.2.4 | Transmitter Unwanted Emissions within the 5 GHz RLAN Bands | EN 301 893 Figure 1 | Complied | - |
| 4.1 | 4.2.5 | Receiver Spurious Emissions | EN 301 893 Table 5 | Complied | - |
| 5.1 | 4.2.7 | Adaptivity (Channel Access Mechanism) | EN 301 893 Clause 4.2.7.3 | Complied | - |
| 6.1 | 4.2.8 | Receiver Blocking | EN 301 893 Table 9 | Complied | - |
| 1.1.8 | 4.2.10 | Geo-location capability | EN 301 893 Clause 4.2.10.3 | N/A | - |



Report No. : ER232843-18AN

Revision History

[illegible]

1 General Description

1.1 Information

1.1.1 RF General Information

| RF General Information | | | | | |
|---|---------------------------|---------------------|----------------|--|---------------------------|
| Frequency Range (MHz) | IEEE Std. 802.11 Protocol | Ch. Frequency (MHz) | Channel Number | Number of Transmit Chains (N _{TX}) | EIRP - Output Power (dBm) |
| 5150-5250 | a | 5180-5240 | 36-48 [4] | 1 | 22.73 |
| 5250-5350 | | 5260-5320 | 52-64 [4] | 1 | 19.49 |
| 5470-5725 | | 5500-5700 | 100-140 [11] | 1 | 19.32 |
| 5150-5250 | n (HT20) | 5180-5240 | 36-48 [4] | 2 | 22.52 |
| 5250-5350 | | 5260-5320 | 52-64 [4] | 2 | 20.00 |
| 5470-5725 | | 5500-5700 | 100-140 [11] | 2 | 19.99 |
| 5150-5250 | n (HT40) | 5190-5230 | 38-46 [2] | 2 | 21.99 |
| 5250-5350 | | 5270-5310 | 54-62 [2] | 2 | 19.97 |
| 5470-5725 | | 5510-5670 | 102-134 [5] | 2 | 19.93 |
| Note 1: 802.11a/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation. | | | | | |

1.1.2 Antenna Information

| Antenna Category | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | Integral antenna (antenna permanently attached) |
| <input checked="" type="checkbox"/> | Temporary RF connector provided |
| <input type="checkbox"/> | No temporary RF connector provided Transmit chains bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path. |
| <input type="checkbox"/> | External antenna (dedicated antennas) |
| <input type="checkbox"/> | Single power level with corresponding antenna(s). |
| <input type="checkbox"/> | Multiple power level and corresponding antenna(s). |

| Antenna General Information | | | |
|-----------------------------|-----------|-----------|------------|
| No. | Ant. Cat. | Ant. Type | Gain (dBi) |
| 1-2 | Integral | Printed | 6.64 |

Remark:

- In modulation mode 11a, this EUT supports diversity. EUT was pre-tested Antenna Port 1 and Antenna Port 2 for single chain, and the worst case was Antenna Port 1. Therefore only the test data (Port 1) was recorded in this report.
- In modulation mode 11n, this EUT supports 2TX.

1.1.3 EUT Operational Condition

| | | | | | | |
|---|-------------------------------------|--|-------------------------------------|-------------------------------------|-------------------------------------|---------------|
| EUT Power Type | From DC Source | | | | | |
| DFS Operating Mode | <input type="checkbox"/> | Master | | | | |
| | <input type="checkbox"/> | Slave with radar detection | | | | |
| | <input checked="" type="checkbox"/> | Slave without radar detection | | | | |
| Device Types (Adaptivity) | <input checked="" type="checkbox"/> | Initiating Device | | | | |
| | <input checked="" type="checkbox"/> | Responding Device | | | | |
| | <input checked="" type="checkbox"/> | Supervised Device, which implements: | | | | |
| | <input checked="" type="checkbox"/> | Priority class 1 | <input checked="" type="checkbox"/> | Priority class 2 | | |
| | <input type="checkbox"/> | Priority class 1 implements EN 301 893 Table 7 Note1 | | | | |
| | <input type="checkbox"/> | Priority class 2 implements EN 301 893 Table 7 Note1 | | | | |
| | <input checked="" type="checkbox"/> | Priority class 3 | <input checked="" type="checkbox"/> | Priority class 4 | | |
| | <input type="checkbox"/> | Supervising Device, which implements: | | | | |
| | <input type="checkbox"/> | Priority class 1 | <input type="checkbox"/> | Priority class 2 | | |
| | <input type="checkbox"/> | Priority class 1 implements EN 301 893 Table 8 Note1 | | | | |
| | <input type="checkbox"/> | Priority class 2 implements EN 301 893 Table 8 Note1 | | | | |
| | <input type="checkbox"/> | Priority class 2 implements EN 301 893 Table 8 Note2 | | | | |
| <input type="checkbox"/> | Priority class 3 | <input type="checkbox"/> | Priority class 4 | | | |
| Communication Mode | <input checked="" type="checkbox"/> | IP Based (Load Based) | | <input type="checkbox"/> | Frame Based | |
| TPC Function | <input checked="" type="checkbox"/> | With TPC | | <input type="checkbox"/> | Without TPC | |
| Beamforming Function | <input type="checkbox"/> | With beamforming | | <input checked="" type="checkbox"/> | Without beamforming | |
| Weather Band (5600~5650MHz) | <input checked="" type="checkbox"/> | With 5600~5650MHz | | <input type="checkbox"/> | Without 5600~5650MHz | |
| Operational Voltage | <input checked="" type="checkbox"/> | Vnom (5 V) | <input checked="" type="checkbox"/> | Vmax (5.25 V) | <input checked="" type="checkbox"/> | Vmin (4.75 V) |
| Operational Temperature | <input checked="" type="checkbox"/> | Tnom (20°C) | <input checked="" type="checkbox"/> | Tmax (50°C) | <input checked="" type="checkbox"/> | Tmin (0°C) |
| Software / Firmware Version for Adaptivity & Receiver Blocking | | | | | 5.1.19.0 | |

1.1.4 Test Signal Duty Cycle

| Operated Mode for Worst Duty Cycle | | |
|---|-----------------|---------------------------------------|
| <input type="checkbox"/> Operated normally mode for worst duty cycle | | |
| <input checked="" type="checkbox"/> Operated test mode for worst duty cycle | | |
| Test Signal Duty Cycle (x) | N _{TX} | Power Duty Factor [dB] – (10 log 1/x) |
| <input checked="" type="checkbox"/> 100.00% - IEEE 802.11a | 1 | 0.00 |
| <input checked="" type="checkbox"/> 100.00% - IEEE 802.11n (HT20) | 2 | 0.00 |
| <input checked="" type="checkbox"/> 100.00% - IEEE 802.11n (HT40) | 2 | 0.00 |

1.1.5 Medium Access Protocol

| Medium Access Protocol | |
|--|--|
| Medium Access Protocol: | <input checked="" type="checkbox"/> IEEE Std. 802.11-2007 |
| | <input checked="" type="checkbox"/> IEEE Std. 802.11n-2009 |
| | <input checked="" type="checkbox"/> IEEE Std. 802.11ac-2012-D3.0 |
| | <input type="checkbox"/> IEEE Std. 802.15.1-2005 |
| | <input type="checkbox"/> Other: |
| <p>A medium access protocol has been implemented by the equipment. With mechanism designed to facilitate spectrum sharing with other devices in a wireless network. The equipment implements an adequate spectrum sharing mechanism and users will be equal access wireless network.</p> | |

1.1.6 Table for Existing Change

This product is an extension of original one reported under Sporton project number: ER232843-12AN

Below is the table for the change of the product with respect to the original one.

| Modifications | Performance Checking |
|---|---|
| Update standard to EN 301 893 V2.1.1 (2017-05) | Adaptivity and Receiver Blocking were evaluated |

1.1.7 Adaptive Equipment

| Adaptive Equipment | |
|-------------------------------------|---|
| Medium Access Mechanism: | |
| <input checked="" type="checkbox"/> | Option A: Procedure to verify the Medium Access Mechanism The test procedure which defined in clause 5.4.9.3.2.4.1 should be verified. |
| <input type="checkbox"/> | Option B: Compliance by declaration for the Medium Access Mechanism. The requirements contained in clause 4.2.7.3.2.6 and 4.2.7.3.2.7 should be declared compliance with by the manufacturer. |
| <input type="checkbox"/> | The related parameters are identical to EN 301 893 Table 7 for Supervised Device |
| <input type="checkbox"/> | The related parameters are identical to EN 301 893 Table 8 for Supervising Device |
| <input type="checkbox"/> | Other parameters |
| Maximum Channel Occupancy Time(s): | |
| <input checked="" type="checkbox"/> | Option A: Procedure to verify the maximum Channel Occupancy Time(s) The test procedure which defined in clause 5.4.9.3.2.5.1 should be verified. |
| <input type="checkbox"/> | Option B: Compliance by declaration for the maximum Channel Occupancy Time(s) The maximum Channel Occupancy Times which defined in clause 4.2.7.3.2.4 should be declared by the manufacturer. |
| <input type="checkbox"/> | The related parameters are identical to EN 301 893 Table 7 for Supervised Device |
| <input type="checkbox"/> | The related parameters are identical to EN 301 893 Table 8 for Supervising Device |
| <input type="checkbox"/> | Other parameters |
| Channel Operation Mode: | |
| <input checked="" type="checkbox"/> | Single Channel Operation |
| <input checked="" type="checkbox"/> | Multi-channel Operation |
| <input checked="" type="checkbox"/> | Option 1: Load Based Equipment may use any combination/grouping of 20 MHz Operating Channels out of the list of channels (Nominal Centre Frequencies) provided in clause 4.2.1, if it satisfies the channel access requirements (Channel Access Mechanism) for an Initiating Device as described in clause 4.2.7.3.2.6 on each such 20 MHz Operating Channel. |
| <input type="checkbox"/> | Option 2: EN 301 893 figure 3 defines bonded 40 MHz, 80 MHz or 160 MHz channels. Load Based Equipment that uses a combination/grouping of 20 MHz Operating Channels that is a subset of bonded 40 MHz, 80 MHz or 160 MHz channels, may transmit on any of the 20 MHz Operating Channels. |

1.1.8 Geo-location capability supported by the equipment

| Geo-location capability supported by the equipment | |
|--|--|
| <input type="checkbox"/> | Yes |
| <input type="checkbox"/> | The geographical location determined by the equipment as defined in EN 301 893, clause 4.2.10.3 is not accessible to the user. |
| <input checked="" type="checkbox"/> | No |

1.2 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ EN 301 893 V2.1.1 (2017-05)

1.3 Testing Location Information

| Testing Location | | | | |
|--|---------------|--|------------------|----------------|
| <input checked="" type="checkbox"/> HWA YA | ADD : | No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) | | |
| | TEL : | 886-3-327-3456 | FAX : | 886-3-327-0973 |
| <input type="checkbox"/> JHUBEI | ADD : | No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County, Taiwan (R.O.C.) | | |
| | TEL : | 886-3-656-9065 | FAX : | 886-3-656-9085 |
| Test Condition | Test Site No. | Test Engineer | Test Environment | Test Date |
| RF Conducted | TH01-HY | Ian | 23°C / 65% | 20/Oct/2014 |
| Radiated Emission | 05CH01-HY | Monday Lin | 21°C / 63% | 24/Oct/2014 |
| Adaptivity Site | DFS01-HY | Dexter | 24°C / 61.1% | 26/Apr/2017 |
| Receiver Blocking | DFS01-HY | Dexter | 24.2°C / 61.6% | 27/Apr/2017 |

1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

| Test Items | Uncertainty | Remark |
|--|--------------------------|--------------------------|
| Carrier Frequencies & Occupied Channel Bandwidth | 5.8×10^{-7} MHz | Confidence levels of 95% |
| Conducted Emission | 1.3 dB | Confidence levels of 95% |
| Radiated Emission (30MHz ~ 1,000MHz) | 2.3 dB | Confidence levels of 95% |
| Radiated Emission (1GHz ~ 18GHz) | 2.5 dB | Confidence levels of 95% |
| Radiated Emission (18GHz ~ 40GHz) | 3.3 dB | Confidence levels of 95% |

| Parameter | Uncertainty |
|---|--------------------------|
| RF frequency | 5.8×10^{-7} MHz |
| RF power conducted | ±1.2dB |
| RF power radiated | ±2.5dB |
| Spurious emissions, radiated | ±3.3dB |
| Humidity | ±2.4% |
| Temperature | ±0.33°C |
| Time | ±1.44% |
| 95% confidence level using a coverage factor of k=2 | |

2 Test Configuration of EUT

2.1 Test Channel Frequencies Configuration

| Worst Modulation Used for Conformance Testing | | | |
|---|------------------------------------|-----------------|-----------------------|
| Modulation Mode | Transmit Chains (N _{TX}) | Data Rate / MCS | Worst Data Rate / MCS |
| 11a | 1 | 6-54Mbps | 6 Mbps |
| HT20 | 2 | M8-15 | MCS 8 |
| HT40 | 2 | M8-15 | MCS 8 |

2.2 The Worse Case Power Setting Parameter

| The Worst Case Power Setting Parameter (lower sub-band) | | | | | |
|---|--------------------|----------------------|-------|------------|-------|
| Test Software Version | RT5x7x QA_V1.0.5.9 | | | | |
| Modulation Mode | N _{TX} | Test Frequency (MHz) | | | |
| | | NCB: 20MHz | | NCB: 40MHz | |
| | | 5180 | 5320 | 5190 | 5310 |
| 11a | 1 | 10 | 0E | - | - |
| HT20 | 2 | 0C,0C | 0F,0C | - | - |
| HT40 | 2 | - | - | 0E,0D | 0E,0A |




| The Worst Case Power Setting Parameter (lower sub-band) | | | | | |
|---|--------------------|----------------------|-------|------------|-------|
| Test Software Version | RT5x7x QA_V1.0.5.9 | | | | |
| Modulation Mode | N _{TX} | Test Frequency (MHz) | | | |
| | | NCB: 20MHz | | NCB: 40MHz | |
| | | 5500 | 5700 | 5510 | 5670 |
| 11a | 1 | 0E | 13 | - | - |
| HT20 | 2 | 0F,0E | 15,11 | - | - |
| HT40 | 2 | - | - | 0F,0F | 15,16 |

2.3 The Worst Case Measurement Configuration

| The Worst Case Mode for Following Conformance Tests | |
|---|---|
| Tests Item | Nominal Centre Frequencies |
| Test Condition | Conducted measurement at transmit chains. One channel out of the declared channels for each sub-band. In case of more than 1 channel plan has been declared, testing of these specific requirements need only be performed using one of the declared channel plans. |
| Modulation Mode | Un-modulation |

| The Worst Case Mode for Following Conformance Tests | |
|---|--|
| Tests Item | Occupied Channel Bandwidth |
| Test Condition | Conducted measurement at transmit chains. One channel out of the declared channels for each sub-band. For Occupied Channel Bandwidth, testing has been repeated for every declared nominal channel bandwidth within this sub-band. |
| Modulation Mode | 11a, HT20, HT40 |

| The Worst Case Mode for Following Conformance Tests | |
|---|--|
| Tests Item | RF Output Power, Power Density Transmitter Unwanted Emissions within the 5 GHz RLAN Bands |
| Test Condition | Conducted measurement at transmit chains |
| Modulation Mode | 11a, HT20, HT40 |

| The Worst Case Mode for Following Conformance Tests | | | |
|---|---|--|---|
| Tests Item | Transmitter Unwanted Emissions outside the 5 GHz RLAN Bands Receiver Spurious Emissions | | |
| Test Condition | Radiated measurement One channel out of the declared channels for each sub-band. In case of more than 1 channel plan has been declared, testing of these specific requirements need only be performed using one of the declared channel plans. If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type. | | |
| User Position | <input type="checkbox"/> EUT will be placed in fixed position. | | |
| | <input checked="" type="checkbox"/> EUT will be placed in mobile position and operating multiple positions. EUT shall be performed three orthogonal planes. | | |
| | <input type="checkbox"/> EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions. | | |
| Operating Mode | Transmit / Receive | | |
| 1 | Operating Mode Description | | |
| Modulation Mode | 11a, HT20, HT40 | | |
| Orthogonal Planes of EUT | X Plane | Y Plane | Z Plane |
| |  |  |  |
| | | V | |

| The Worst Case Mode for Following Conformance Tests | |
|---|---|
| Tests Item | Adaptivity |
| Test Condition | Conducted measurement at transmit chains. One channel out of the declared channels for each sub-band. For Adaptivity, testing has been performed using the highest nominal channel bandwidth. |

| The Worst Case Mode for Following Conformance Tests | |
|---|---|
| Test Item | Receiver blocking |
| Test Condition | Conducted measurement at one receiver chain. One channel with the lowest data rate out of the declared channels for each sub-band. |

2.4 Accessories and Support Equipment

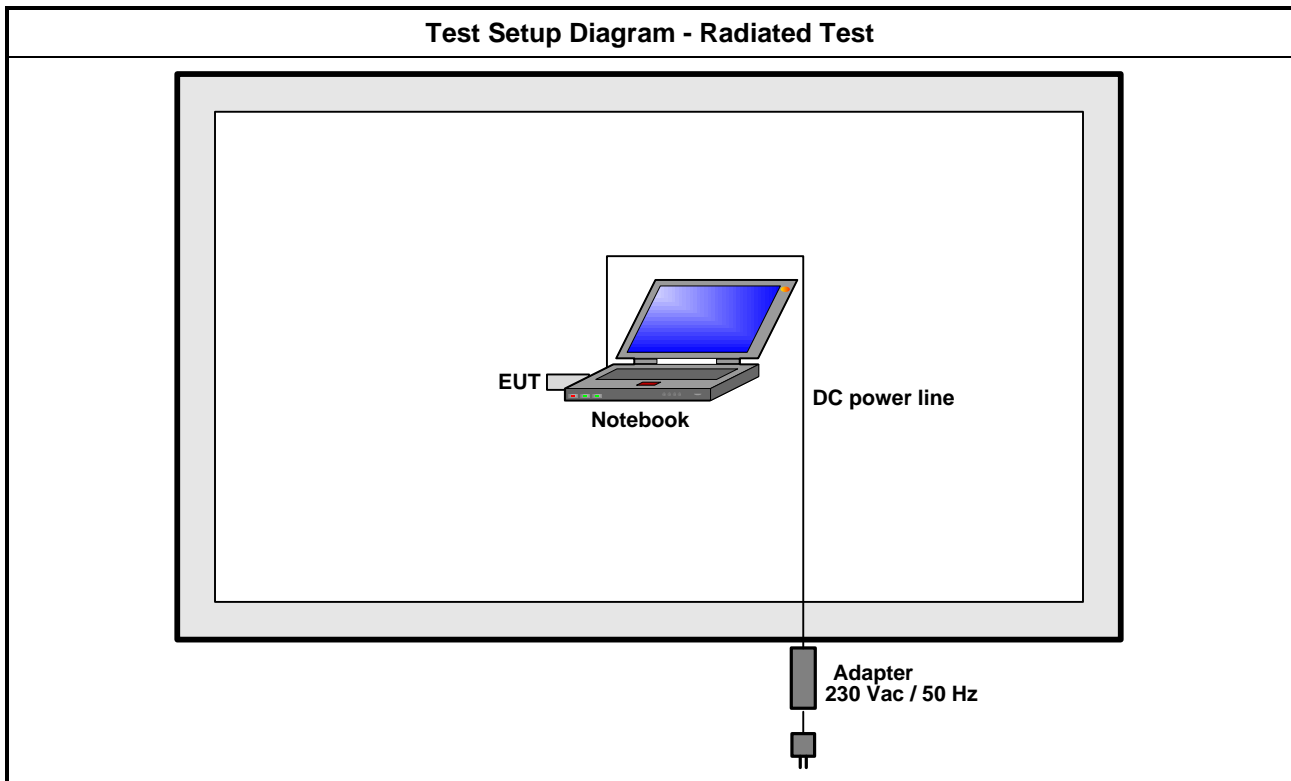
| Support Equipment - RF Conducted | | | |
|----------------------------------|------------------------|------------|------------|
| No. | Equipment | Brand Name | Model Name |
| 1 | Notebook | DELL | E5500 |
| 2 | AC Adaptor of Notebook | DELL | E5500 |

| Support Equipment - Radiated Emission | | | |
|---------------------------------------|------------------------|------------|------------|
| No. | Equipment | Brand Name | Model Name |
| 1 | Notebook | DELL | E5540 |
| 2 | AC Adaptor of Notebook | DELL | E5540 |

| Support Equipment - Adaptivity | | | |
|--------------------------------|----------------|------------|-----------------|
| No. | Equipment | Brand Name | Model Name |
| 1 | AP (Master) | EDIMAX | BR-6228GNS V2.0 |
| 2 | NoteBook | DELL | Latitude E5550 |
| 3 | Adapter for NB | DELL | FA90PSO-00 |
| 4 | NoteBook | DELL | Latitude E5540 |
| 5 | Adapter for NB | DELL | HA65NM130 |

| Support Equipment – Receiver Blocking | | | |
|---------------------------------------|----------------|------------|--------------------|
| No. | Equipment | Brand Name | Model Name |
| 1 | NoteBook | DELL | Latitude E5550 |
| 2 | Adapter for NB | DELL | FA90PSO-00 |
| 3 | Shielding Box | EMEC | EM-SHB-650550300-M |

2.5 Test Setup Diagram



3 Transmitter Test Result

3.1 Nominal Centre Frequency

3.1.1 Nominal Centre Frequency Limit

| Nominal Centre Frequency Limit |
|---|
| The actual centre frequency for any given channel declared by the manufacturer shall be maintained within the range $f_c \pm 20$ ppm. |

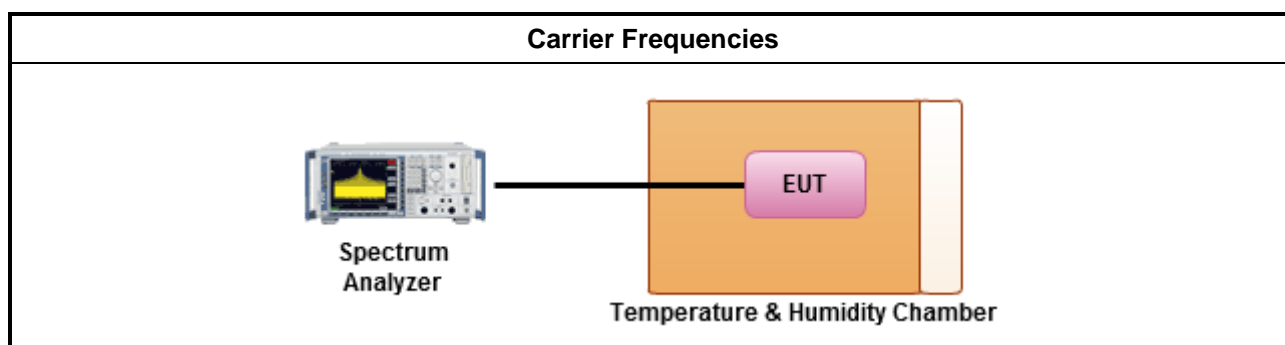
3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

| Test Method |
|--|
| <input checked="" type="checkbox"/> Refer as EN 301 893, clause 5.3.2 for test channel. In case of more than 1 channel plan has been declared, testing of these specific requirements need only be performed using one of the declared channel plans. |
| <input checked="" type="checkbox"/> Refer as EN 301 893, clause 5.4.2 for the carrier frequencies shall be measured using one of the options below. |
| <input checked="" type="checkbox"/> Refer as EN 301 893, clause 5.4.2.2.1.1 for equipment operating without modulation method <input type="checkbox"/> Refer as EN 301 893, clause 5.4.2.2.1.2 for equipment operating with modulation method |
| <input checked="" type="checkbox"/> Refer as EN 301 893, clause 5.4.2.2.1 for conducted measurement. |
| <input checked="" type="checkbox"/> Refer as EN 301 893, clause 5.4.2.1 for conducted measurements on smart antenna systems (equipment with multiple transmit chains) measurements need only to be performed on one of the active transmit chains (antenna outputs). |
| <input type="checkbox"/> Refer as EN 301 893, clause 5.4.2.2.2 for radiated measurement. |

3.1.4 Test Setup



3.1.5 Test Result of Nominal Centre Frequency

| Test Date | Sep. 16, 2015 | | Carrier Frequencies Result | | |
|-----------|---------------|-------------|----------------------------|-------------------|-------------------------|
| Method | | | Carrier Stability (ppm) | | |
| Condition | Test Mode | Freq. (MHz) | Frequency (MHz) | Carrier Stability | Carrier Stability Limit |
| TnomVnom | Un-modulation | 5180 | 5179.98177 | -3.52 | ± 20 |
| TminVmax | Un-modulation | 5180 | 5180.02735 | 5.28 | ± 20 |
| TminVmin | Un-modulation | 5180 | 5180.02692 | 5.20 | ± 20 |
| TmaxVmax | Un-modulation | 5180 | 5180.02388 | 4.61 | ± 20 |
| TmaxVmin | Un-modulation | 5180 | 5180.02214 | 4.27 | ± 20 |
| TnomVnom | Un-modulation | 5500 | 5499.97916 | -3.79 | ± 20 |
| TminVmax | Un-modulation | 5500 | 5499.98307 | -3.08 | ± 20 |
| TminVmin | Un-modulation | 5500 | 5499.98698 | -2.37 | ± 20 |
| TmaxVmax | Un-modulation | 5500 | 5500.02171 | 3.95 | ± 20 |
| TmaxVmin | Un-modulation | 5500 | 5500.02127 | 3.87 | ± 20 |
| Result | | | Complied | | |

3.2 Occupied Channel Bandwidth

3.2.1 Occupied Channel Bandwidth Limit

| Nominal Channel Bandwidth and Occupied Channel Bandwidth Limit | |
|---|----------------------------------|
| The Occupied Channel Bandwidth (OCB) is the bandwidth containing 99 % of the power of the signal. The Nominal Channel Bandwidth (NCB) shall be at least 5 MHz at all times. And the Occupied Channel Bandwidth shall be between 80 % and 100 % of the declared Nominal Channel Bandwidth. | |
| Nominal Channel Bandwidth (MHz) | Occupied Channel Bandwidth (MHz) |
| 20 | 16 – 20 |
| 40 | 32 – 40 |
| 80 | 64 – 80 |
| 160 | 128 – 160 |

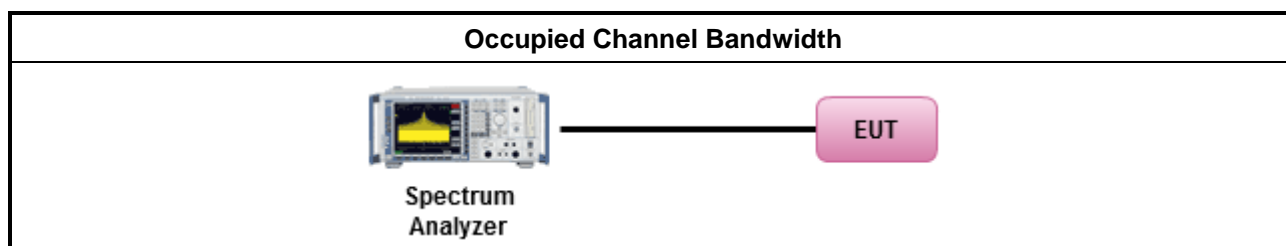
3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

| Test Method | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | Refer as EN 301 893, clause 5.3.2 for test channel. One channel out of the declared channels for each sub-band. For Occupied Channel Bandwidth, testing shall be repeated for every declared nominal channel bandwidth within this sub-band. |
| <input checked="" type="checkbox"/> | Refer as EN 301 893, clause 5.4.3.2.1 for conducted measurement. |
| <input checked="" type="checkbox"/> | Refer as EN 301 893, clause 5.4.3.2.1 for conducted measurements on smart antenna systems (equipment with multiple transmit chains) measurements need only to be performed on one of the active transmit chains (antenna outputs). |
| <input type="checkbox"/> | Refer as EN 301 893, clause 5.4.3.2.2 for radiated measurement. |

3.2.4 Test Setup



3.2.5 Test Result of NCB and OCB

| Test Date | Oct. 20, 2014 | Occupied Channel Bandwidth Result | | |
|-----------------|-----------------|-----------------------------------|---------------------------------|--|
| Modulation Mode | Frequency (MHz) | Occupied Channel Bandwidth (MHz) | Nominal Channel Bandwidth (MHz) | Occupied Channel Bandwidth Limit (MHz) |
| 11a | 5180 | 16.37 | 20 | 16-20 |
| 11a | 5500 | 16.31 | 20 | 16-20 |
| HT20 | 5180 | 17.47 | 20 | 16-20 |
| HT20 | 5500 | 17.47 | 20 | 16-20 |
| HT40 | 5190 | 35.86 | 40 | 32-40 |
| HT40 | 5510 | 35.90 | 40 | 32-40 |
| Result | | Complied | | |

3.3 RF Output Power

3.3.1 RF Output Power Limit

| Frequency Range (MHz) | Mean e.i.r.p. Limit (dBm) | |
|-----------------------|----------------------------|-------------------------------|
| | with TPC | w/o TPC |
| 5150-5350 | 23 | 20/23 <small>(note 1)</small> |
| 5470-5725 | 30 <small>(note 3)</small> | 27 <small>(note 3)</small> |

Note 1: The applicable limit is 20 dBm, except for transmissions whose nominal bandwidth falls completely within the band 5150 MHz to 5250 MHz, in which case the applicable limit is 23 dBm.

Note 2: The applicable limit is 7 dBm/MHz, except for transmissions whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz, in which case the applicable limit is 10 dBm/MHz.

Note 3: Slave devices without a Radar Interference Detection function shall comply with the limits for the band 5 250 MHz to 5 350 MHz.

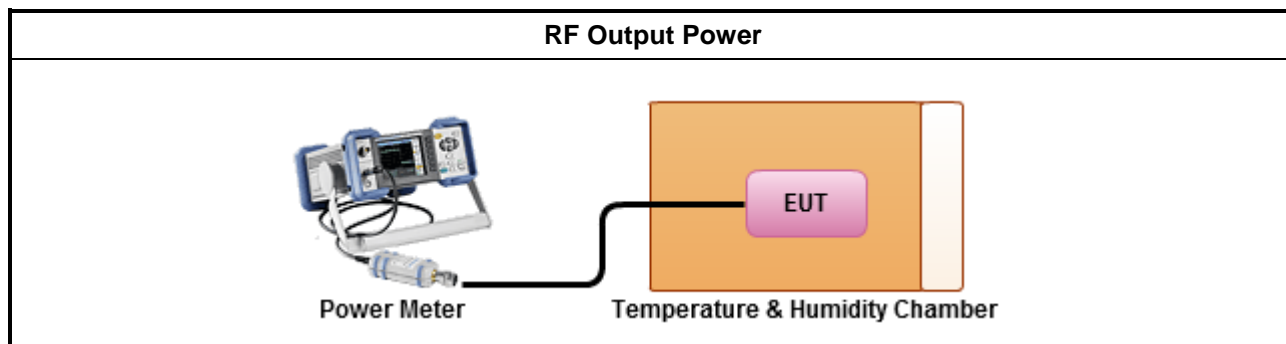
3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

| Test Method | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | The measurements shall be performed at both normal environmental conditions and at the extremes of the operating temperature range. |
| <input checked="" type="checkbox"/> | The EUT shall be configured to operate at the maximum stated transmitter output power level. |
| <input checked="" type="checkbox"/> | Refer as EN 301 893, clause 5.4.4 for the RF output power shall be measured using below options: |
| <input type="checkbox"/> | Option 1: For equipment with continuous transmission capability or for equipment operating (or with the capability to operate) with a constant duty cycle (e.g. Frame Based equipment). Refer as EN 301 893, clause 5.4.4.2.1.1.2. |
| <input checked="" type="checkbox"/> | Option 2: For equipment without continuous transmission capability and operating (or with the capability to operate) in only one sub-band. Refer as EN 301 893, clause 5.4.4.2.1.1.3. |
| <input type="checkbox"/> | Option 3: For equipment without continuous transmission capability and having simultaneous transmissions in both sub-bands. Refer as EN 301 893, clause 5.4.4.2.1.1.4. |
| <input checked="" type="checkbox"/> | Refer as EN 301 893, clause 5.4.4.2.1 for conducted measurement. |
| <input checked="" type="checkbox"/> | In case of conducted measurements on smart antenna systems operating in a mode with multiple transmit chains active simultaneously, the output power of each transmit chain shall be measured separately to calculate the total power (value "A" in dBm) for the EUT. |
| <input checked="" type="checkbox"/> | If multiple transmit chains, EIRP calculation could be following as methods: |
| <input checked="" type="checkbox"/> | $EIRP_{total} = P_{total} + G$ If more than one antenna assembly is intended for this power setting, the maximum overall antenna gain (G or G + Y) shall be used for EIRP. |
| <input type="checkbox"/> | Refer as EN 301 893, clause 5.4.4.2.2 for radiated measurement. |

3.3.4 Test Setup



3.3.5 Maximum Antenna Gain

| Maximum Antenna Gain Result | | | |
|-----------------------------|-----------------|-----------------|-----------------|
| Transmit Chains No. | 1 | 2 | - |
| Maximum Gain (dBi) | 6.64 | 6.64 | - |
| Modulation Mode | N _{TX} | N _{SS} | Max. Gain (dBi) |
| 11a,6-54Mbps | 1 | 1 | 6.64 |
| HT20,M8-15 | 2 | 2 | 6.64 |
| HT40,M8-15 | 2 | 2 | 6.64 |

3.3.6 Test Result of RF Output Power at the Highest Power - P_H

| RF Output Power at the Highest Power - P_H Result | | | | | | |
|---|-----------------|-----------------|-------------|-----------------------|------------|------------|
| Max. Gain (dBi) | | | 6.64 | RF Output Power (dBm) | | |
| Condition | Modulation Mode | N _{TX} | Freq. (MHz) | Chain-Port 1 | EIRP Power | EIRP Limit |
| TnomVnom | 11a | 1 | 5180 | 14.78 | 21.42 | 23.0 |
| TminVmax | 11a | 1 | 5180 | 16.00 | 22.64 | 23.0 |
| TminVmin | 11a | 1 | 5180 | 16.09 | 22.73 | 23.0 |
| TmaxVmax | 11a | 1 | 5180 | 11.31 | 17.95 | 23.0 |
| TmaxVmin | 11a | 1 | 5180 | 11.22 | 17.86 | 23.0 |
| TnomVnom | 11a | 1 | 5320 | 10.82 | 17.46 | 23.0 |
| TminVmax | 11a | 1 | 5320 | 12.85 | 19.49 | 23.0 |
| TminVmin | 11a | 1 | 5320 | 12.76 | 19.40 | 23.0 |
| TmaxVmax | 11a | 1 | 5320 | 7.53 | 14.17 | 23.0 |
| TmaxVmin | 11a | 1 | 5320 | 7.41 | 14.05 | 23.0 |
| TnomVnom | 11a | 1 | 5500 | 10.64 | 17.28 | 23.0 |
| TminVmax | 11a | 1 | 5500 | 12.67 | 19.31 | 23.0 |
| TminVmin | 11a | 1 | 5500 | 12.51 | 19.15 | 23.0 |
| TmaxVmax | 11a | 1 | 5500 | 7.45 | 14.09 | 23.0 |
| TmaxVmin | 11a | 1 | 5500 | 7.29 | 13.93 | 23.0 |
| TnomVnom | 11a | 1 | 5700 | 10.92 | 17.56 | 23.0 |
| TminVmax | 11a | 1 | 5700 | 12.68 | 19.32 | 23.0 |
| TminVmin | 11a | 1 | 5700 | 12.57 | 19.21 | 23.0 |
| TmaxVmax | 11a | 1 | 5700 | 7.51 | 14.15 | 23.0 |
| TmaxVmin | 11a | 1 | 5700 | 7.35 | 13.99 | 23.0 |
| Result | | | | Complied | | |

| RF Output Power at the Highest Power - P _H Result | | | | | | | | |
|--|-----------------|-----------------|-------------|-----------------------|--------------|-----------|------------|------------|
| Max. Gain (dBi) | | | 6.64 | RF Output Power (dBm) | | | | |
| Condition | Modulation Mode | N _{TX} | Freq. (MHz) | Chain-Port 1 | Chain-Port 2 | Sum Chain | EIRP Power | EIRP Limit |
| TnomVnom | HT20 | 2 | 5180 | 10.74 | 10.58 | 13.67 | 20.31 | 23.0 |
| TminVmax | HT20 | 2 | 5180 | 12.91 | 12.82 | 15.88 | 22.52 | 23.0 |
| TminVmin | HT20 | 2 | 5180 | 12.78 | 12.70 | 15.75 | 22.39 | 23.0 |
| TmaxVmax | HT20 | 2 | 5180 | 8.17 | 7.53 | 10.87 | 17.51 | 23.0 |
| TmaxVmin | HT20 | 2 | 5180 | 7.96 | 7.37 | 10.69 | 17.33 | 23.0 |
| TnomVnom | HT20 | 2 | 5320 | 8.13 | 9.07 | 11.64 | 18.28 | 23.0 |
| TminVmax | HT20 | 2 | 5320 | 10.25 | 10.44 | 13.36 | 20.00 | 23.0 |
| TminVmin | HT20 | 2 | 5320 | 10.16 | 10.51 | 13.35 | 19.99 | 23.0 |
| TmaxVmax | HT20 | 2 | 5320 | 5.19 | 5.17 | 8.19 | 14.83 | 23.0 |
| TmaxVmin | HT20 | 2 | 5320 | 4.87 | 4.96 | 7.93 | 14.57 | 23.0 |
| TnomVnom | HT20 | 2 | 5500 | 8.25 | 7.71 | 11.00 | 17.64 | 23.0 |
| TminVmax | HT20 | 2 | 5500 | 10.24 | 10.36 | 13.31 | 19.95 | 23.0 |
| TminVmin | HT20 | 2 | 5500 | 10.11 | 10.24 | 13.19 | 19.83 | 23.0 |
| TmaxVmax | HT20 | 2 | 5500 | 4.96 | 4.62 | 7.80 | 14.44 | 23.0 |
| TmaxVmin | HT20 | 2 | 5500 | 4.72 | 4.47 | 7.61 | 14.25 | 23.0 |
| TnomVnom | HT20 | 2 | 5700 | 9.17 | 9.43 | 12.31 | 18.95 | 23.0 |
| TminVmax | HT20 | 2 | 5700 | 10.41 | 10.26 | 13.35 | 19.99 | 23.0 |
| TminVmin | HT20 | 2 | 5700 | 10.33 | 10.31 | 13.33 | 19.97 | 23.0 |
| TmaxVmax | HT20 | 2 | 5700 | 4.71 | 5.28 | 8.01 | 14.65 | 23.0 |
| TmaxVmin | HT20 | 2 | 5700 | 4.65 | 5.05 | 7.86 | 14.50 | 23.0 |
| Result | | | | Complied | | | | |

| RF Output Power at the Highest Power - P _H Result | | | | | | | | |
|--|-----------------|-----------------|-------------|-----------------------|--------------|-----------|------------|------------|
| Max. Gain (dBi) | | | 6.64 | RF Output Power (dBm) | | | | |
| Condition | Modulation Mode | N _{TX} | Freq. (MHz) | Chain-Port 1 | Chain-Port 2 | Sum Chain | EIRP Power | EIRP Limit |
| TnomVnom | HT40 | 2 | 5190 | 10.12 | 9.18 | 12.69 | 19.33 | 23.0 |
| TminVmax | HT40 | 2 | 5190 | 12.21 | 12.46 | 15.35 | 21.99 | 23.0 |
| TminVmin | HT40 | 2 | 5190 | 12.10 | 12.33 | 15.23 | 21.87 | 23.0 |
| TmaxVmax | HT40 | 2 | 5190 | 6.24 | 5.85 | 9.06 | 15.70 | 23.0 |
| TmaxVmin | HT40 | 2 | 5190 | 6.17 | 5.79 | 8.99 | 15.63 | 23.0 |
| TnomVnom | HT40 | 2 | 5310 | 7.98 | 7.85 | 10.93 | 17.57 | 23.0 |
| TminVmax | HT40 | 2 | 5310 | 10.31 | 10.32 | 13.33 | 19.97 | 23.0 |
| TminVmin | HT40 | 2 | 5310 | 10.19 | 10.28 | 13.25 | 19.89 | 23.0 |
| TmaxVmax | HT40 | 2 | 5310 | 4.31 | 4.56 | 7.45 | 14.09 | 23.0 |
| TmaxVmin | HT40 | 2 | 5310 | 4.17 | 4.23 | 7.21 | 13.85 | 23.0 |
| TnomVnom | HT40 | 2 | 5510 | 8.29 | 7.85 | 11.09 | 17.73 | 23.0 |
| TminVmax | HT40 | 2 | 5510 | 10.25 | 10.25 | 13.26 | 19.90 | 23.0 |
| TminVmin | HT40 | 2 | 5510 | 10.11 | 10.14 | 13.14 | 19.78 | 23.0 |
| TmaxVmax | HT40 | 2 | 5510 | 4.56 | 3.92 | 7.26 | 13.90 | 23.0 |
| TmaxVmin | HT40 | 2 | 5510 | 4.32 | 3.78 | 7.07 | 13.71 | 23.0 |
| TnomVnom | HT40 | 2 | 5670 | 8.88 | 7.93 | 11.44 | 18.08 | 23.0 |
| TminVmax | HT40 | 2 | 5670 | 10.36 | 10.19 | 13.29 | 19.93 | 23.0 |
| TminVmin | HT40 | 2 | 5670 | 10.21 | 10.11 | 13.17 | 19.81 | 23.0 |
| TmaxVmax | HT40 | 2 | 5670 | 4.28 | 4.47 | 7.39 | 14.03 | 23.0 |
| TmaxVmin | HT40 | 2 | 5670 | 4.07 | 4.12 | 7.11 | 13.75 | 23.0 |
| Result | | | | Complied | | | | |

3.4 Transmit Power Control (TPC)

3.4.1 Transmit Power Control (TPC) Limit

| Mean e.i.r.p. Limits for RF Output Power at the Lowest Power Level | |
|--|-------------------|
| Frequency Range | Mean e.i.r.p. |
| 5250 MHz to 5350 MHz | 17 dBm |
| 5470 MHz to 5725 MHz | 24 dBm (see note) |
| Note : Slave devices without a Radar Interference Detection function shall comply with the limits for the band 5250 MHz to 5350 MHz. | |

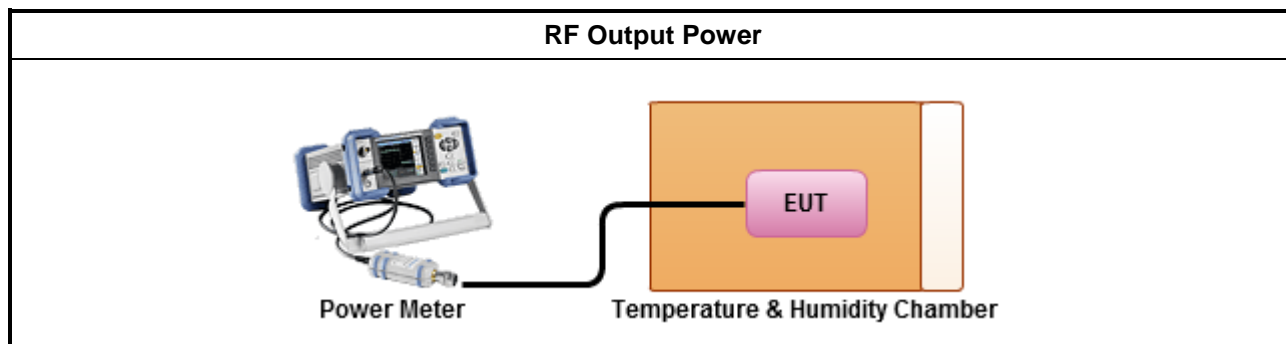
3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

| Test Method | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | The measurements shall be performed at both normal environmental conditions and at the extremes of the operating temperature range. |
| <input checked="" type="checkbox"/> | The EUT shall be configured to operate at the lowest stated transmitter output power level. |
| <input checked="" type="checkbox"/> | Refer as EN 301 893, clause 5.3.2 for test channel. In case of more than 1 channel plan has been declared, testing of these specific requirements need only be performed using one of the declared channel plans. |
| <input checked="" type="checkbox"/> | Refer as EN 301 893, clause 5.3.4 for the RF output power shall be measured using below options: |
| <input type="checkbox"/> | Option 1: For equipment with continuous transmission capability or for equipment operating (or with the capability to operate) with a constant duty cycle (e.g. Frame Based equipment). Refer as EN 301 893, clause 5.4.4.2.1.2.2. |
| <input checked="" type="checkbox"/> | Option 2: For equipment without continuous transmission capability and operating (or with the capability to operate) in only one sub-band. Refer as EN 301 893, clause 5.4.4.2.1.2.3. |
| <input type="checkbox"/> | Option 3: For equipment without continuous transmission capability and having simultaneous transmissions in both sub-bands. Refer as EN 301 893, clause 5.4.4.2.1.2.4. |
| <input checked="" type="checkbox"/> | Refer as EN 301 893, clause 5.4.4.2.1 for conducted measurement. |
| <input checked="" type="checkbox"/> | In case of conducted measurements on smart antenna systems operating in a mode with multiple transmit chains active simultaneously, the output power of each transmit chain shall be measured separately to calculate the total power (value "A" in dBm) for the EUT. |
| <input checked="" type="checkbox"/> | If multiple transmit chains, EIRP calculation could be following as methods: |
| <input checked="" type="checkbox"/> | $EIRP_{total} = P_{total} + G$ If more than one antenna assembly is intended for this power setting, the maximum overall antenna gain (G or G + Y) shall be used for EIRP. |
| <input type="checkbox"/> | Refer as EN 301 893, clause 5.4.4.2.2 for radiated measurement. |

3.4.4 Test Setup



3.4.5 Test Result of RF Output Power at the Lowest Power – P_L

| RF Output Power at the Lowest Power - P _L Result | | | | | |
|---|-----------------|-----------------|-------------|-----------------------|------------|
| Max. Gain (dBi) | | | 6.64 | RF Output Power (dBm) | |
| Condition | Modulation Mode | N _{TX} | Freq. (MHz) | EIRP Power | EIRP Limit |
| TnomVnom | 11a | 1 | 5320 | 11.46 | 17.0 |
| TminVmax | 11a | 1 | 5320 | 13.49 | 17.0 |
| TminVmin | 11a | 1 | 5320 | 13.40 | 17.0 |
| TmaxVmax | 11a | 1 | 5320 | 8.17 | 17.0 |
| TmaxVmin | 11a | 1 | 5320 | 8.05 | 17.0 |
| TnomVnom | HT20 | 2 | 5320 | 12.28 | 17.0 |
| TminVmax | HT20 | 2 | 5320 | 14.00 | 17.0 |
| TminVmin | HT20 | 2 | 5320 | 13.99 | 17.0 |
| TmaxVmax | HT20 | 2 | 5320 | 8.83 | 17.0 |
| TmaxVmin | HT20 | 2 | 5320 | 8.57 | 17.0 |
| TnomVnom | HT40 | 2 | 5310 | 11.57 | 17.0 |
| TminVmax | HT40 | 2 | 5310 | 13.97 | 17.0 |
| TminVmin | HT40 | 2 | 5310 | 13.89 | 17.0 |
| TmaxVmax | HT40 | 2 | 5310 | 8.09 | 17.0 |
| TmaxVmin | HT40 | 2 | 5310 | 7.85 | 17.0 |
| Result | | | Complied | | |
| Note 1: N _{TX} = Number of Transmit Chains | | | | | |

| RF Output Power at the Lowest Power - P _L Result | | | | | |
|---|-----------------|-----------------|-------------|-----------------------|------------|
| Max. Gain (dBi) | | | 6.64 | RF Output Power (dBm) | |
| Condition | Modulation Mode | N _{TX} | Freq. (MHz) | EIRP Power | EIRP Limit |
| TnomVnom | 11a | 1 | 5500 | 11.28 | 17.0 |
| TminVmax | 11a | 1 | 5500 | 13.31 | 17.0 |
| TminVmin | 11a | 1 | 5500 | 13.15 | 17.0 |
| TmaxVmax | 11a | 1 | 5500 | 8.09 | 17.0 |
| TmaxVmin | 11a | 1 | 5500 | 7.93 | 17.0 |
| TnomVnom | 11a | 1 | 5700 | 11.56 | 17.0 |
| TminVmax | 11a | 1 | 5700 | 13.32 | 17.0 |
| TminVmin | 11a | 1 | 5700 | 13.21 | 17.0 |
| TmaxVmax | 11a | 1 | 5700 | 8.15 | 17.0 |
| TmaxVmin | 11a | 1 | 5700 | 7.99 | 17.0 |
| Result | | | Complied | | |
| Note 1: N _{TX} = Number of Transmit Chains | | | | | |

| RF Output Power at the Lowest Power – P _L Result | | | | | |
|---|-----------------|-----------------|-------------|-----------------------|------------|
| Max. Gain (dBi) | | | 6.64 | RF Output Power (dBm) | |
| Condition | Modulation Mode | N _{TX} | Freq. (MHz) | EIRP Power | EIRP Limit |
| T _{nom} V _{nom} | HT20 | 2 | 5500 | 11.64 | 17.0 |
| T _{min} V _{max} | HT20 | 2 | 5500 | 13.95 | 17.0 |
| T _{min} V _{min} | HT20 | 2 | 5500 | 13.83 | 17.0 |
| T _{max} V _{max} | HT20 | 2 | 5500 | 8.44 | 17.0 |
| T _{max} V _{min} | HT20 | 2 | 5500 | 8.25 | 17.0 |
| T _{nom} V _{nom} | HT20 | 2 | 5700 | 12.95 | 17.0 |
| T _{min} V _{max} | HT20 | 2 | 5700 | 13.99 | 17.0 |
| T _{min} V _{min} | HT20 | 2 | 5700 | 13.97 | 17.0 |
| T _{max} V _{max} | HT20 | 2 | 5700 | 8.65 | 17.0 |
| T _{max} V _{min} | HT20 | 2 | 5700 | 8.50 | 17.0 |
| Result | | | Complied | | |
| Note 1: N _{TX} = Number of Transmit Chains | | | | | |

| RF Output Power at the Lowest Power – P _L Result | | | | | |
|---|-----------------|-----------------|-------------|-----------------------|------------|
| Max. Gain (dBi) | | | 6.64 | RF Output Power (dBm) | |
| Condition | Modulation Mode | N _{TX} | Freq. (MHz) | EIRP Power | EIRP Limit |
| TnomVnom | HT40 | 2 | 5510 | 11.73 | 17.0 |
| TminVmax | HT40 | 2 | 5510 | 13.90 | 17.0 |
| TminVmin | HT40 | 2 | 5510 | 13.78 | 17.0 |
| TmaxVmax | HT40 | 2 | 5510 | 7.90 | 17.0 |
| TmaxVmin | HT40 | 2 | 5510 | 7.71 | 17.0 |
| TnomVnom | HT40 | 2 | 5670 | 12.08 | 17.0 |
| TminVmax | HT40 | 2 | 5670 | 13.93 | 17.0 |
| TminVmin | HT40 | 2 | 5670 | 13.81 | 17.0 |
| TmaxVmax | HT40 | 2 | 5670 | 8.03 | 17.0 |
| TmaxVmin | HT40 | 2 | 5670 | 7.75 | 17.0 |
| Result | | | Complied | | |
| Note 1: N _{TX} = Number of Transmit Chains | | | | | |

3.5 Power Density

3.5.1 Power Density Limit

| Frequency Range (MHz) | Mean e.i.r.p. Density Limit (dBm/MHz) | |
|-----------------------|---------------------------------------|------------------------------|
| | with TPC | w/o TPC |
| 5150-5350 | 10 | 7/10 <small>(note 1)</small> |
| 5470-5725 | 17 <small>(note 2)</small> | 14 <small>(note 2)</small> |

Note 1: The applicable limit is 7 dBm/MHz, except for transmissions whose nominal bandwidth falls completely within the band 5150 MHz to 5250 MHz, in which case the applicable limit is 10 dBm/MHz.

Note 2: Slave devices without a Radar Interference Detection function shall comply with limits for band 5250 MHz to 5350 MHz.

3.5.2 Measuring Instruments

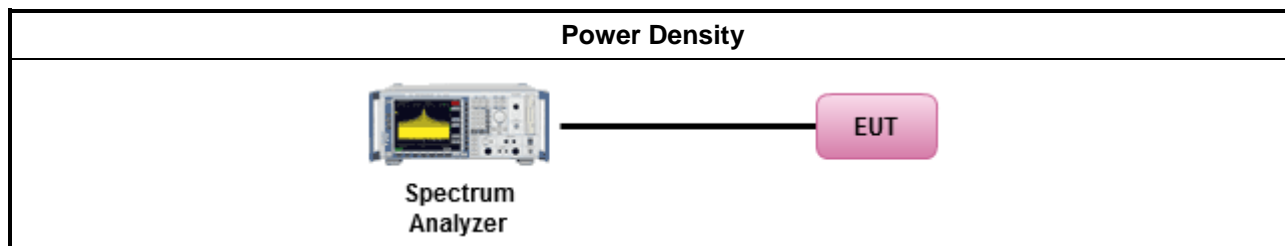
Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

| Test Method | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | The measurements shall be performed at normal environmental conditions. |
| <input checked="" type="checkbox"/> | The EUT shall be configured to operate at the maximum stated transmitter output power level. |
| <input checked="" type="checkbox"/> | Power density shall be measured using one of the options below. |
| <input type="checkbox"/> | Option 1: For equipment with continuous transmission capability or for equipment operating (or with the capability to operate) with a constant duty cycle (e.g. Frame Based equipment). Refer as EN 301 893, clause 5.4.4.2.1.3.2. |
| <input checked="" type="checkbox"/> | Option 2: For equipment without continuous transmission capability and without the capability to transmit with a constant duty cycle. Refer as EN 301 893, clause 5.4.4.2.1.3.3. |
| <input checked="" type="checkbox"/> | Refer as EN 301 893, clause 5.4.4.2.1 for conducted measurement. |
| <input checked="" type="checkbox"/> | The EUT supports multiple transmit chains using options given below: |
| <input checked="" type="checkbox"/> | Option 1: connect the UUT to the spectrum analyzer and use the following 5.4.4.2.1.3.2 settings, find the peak value of the trace and place the analyzer marker on this peak. This level is recorded as the highest mean power (power density) D in a 1 MHz band. In case of conducted measurements on smart antenna systems operating in a mode with multiple transmit chains active simultaneously, the power density of each transmit chain shall be measured separately to calculate the total power density (value "D" in dBm/MHz) for the UUT. The maximum spectral power density is calculated from the measured power density (D), the observed duty cycle x , the applicable antenna assembly gain "G" in dBi and if applicable the beamforming gain "Y" in dB, according to the formula below. $PD = D + G + Y + 10 \log (1/x) \text{ (dBm/MHz)}$. |

| | |
|---|---|
| | <p><input type="checkbox"/> Option 2: connect the UUT to the spectrum analyzer and use the 5.4.4.2.1.3.3 settings, Add up the values of power for all the samples in the file using the formula below.</p> $P_{\text{Sum}} = \sum_{n=1}^k P_{\text{sample}}(n)$ <p>Normalize the individual values for power (in dBm) so that the sum is equal to the EIRP(PH) measured for this sub-band. The following formulas can be used:</p> $G_{\text{Corr}} = P_{\text{Sum}} - P_{\text{H e.i.r.p}}$ $P_{\text{Samplecorr}}(n) = P_{\text{Sample}}(n) - G_{\text{Corr}}$ <p>with 'n' being the actual sample number</p> <p>Starting from the first sample $P_{\text{Samplecorr}}(n)$ in the file, add up the power (in mW) of the following samples representing a 1 MHz segment and record the results for power and position (i.e. sample #1 to sample #100). This is the Power Density (e.i.r.p.) for the first 1 MHz segment which shall be saved.</p> <p>Shift the start point of the samples added up in step (i.e. sample #2 to sample #101).</p> <p>Repeat step until the end of the data set and save the radiated power density values for each of the 1 MHz segments.</p> <p>From all the saved results, the highest value is the maximum Power Density (e.i.r.p.) for the UUT.</p> |
| | <p><input checked="" type="checkbox"/> If more than one antenna assembly is intended for this power setting, the maximum overall antenna gain (G or G + Y) shall be used for EIRP PSD.</p> |
| <p><input type="checkbox"/> Refer as EN 301 893, clause 5.4.4.2.2 for radiated measurement.</p> | |

3.5.4 Test Setup



3.5.5 Test Result of Power Density

| Test Date | Sep. 16, 2015 | | Power Density Result | | | |
|-----------------|-----------------|-------------|----------------------|-----------------|-------------------|----------------------|
| Modulation Mode | N _{TX} | Freq. (MHz) | PD (dBm/MHz) | Max. Gain (dBi) | EIRP PD (dBm/MHz) | EIRP Limit (dBm/MHz) |
| 11a | 1 | 5180 | 3.29 | 6.64 | 9.93 | 10 |
| 11a | 1 | 5320 | -0.72 | 6.64 | 5.92 | 10 |
| 11a | 1 | 5500 | -0.77 | 6.64 | 5.87 | 10 |
| 11a | 1 | 5700 | -1.74 | 6.64 | 4.90 | 10 |
| HT20 | 2 | 5180 | 1.97 | 6.64 | 8.61 | 10 |
| HT20 | 2 | 5320 | 0.22 | 6.64 | 6.86 | 10 |
| HT20 | 2 | 5500 | -0.54 | 6.64 | 6.10 | 10 |
| HT20 | 2 | 5700 | 0.14 | 6.64 | 6.78 | 10 |
| HT40 | 2 | 5190 | -0.99 | 6.64 | 5.65 | 10 |
| HT40 | 2 | 5310 | -3.99 | 6.64 | 2.65 | 10 |
| HT40 | 2 | 5510 | -3.51 | 6.64 | 3.13 | 10 |
| HT40 | 2 | 5670 | -3.07 | 6.64 | 3.57 | 10 |

3.6 Transmitter Unwanted Emissions outside the 5 GHz RLAN Bands

3.6.1 Transmitter Unwanted Emissions outside the 5 GHz RLAN Bands Limit

| Frequency Range | Maximum Power | Bandwidth |
|----------------------|---------------|-----------|
| 30 MHz to 47 MHz | -36 dBm | 100 kHz |
| 47 MHz to 74 MHz | -54 dBm | 100 kHz |
| 74 MHz to 87,5 MHz | -36 dBm | 100 kHz |
| 87,5 MHz to 118 MHz | -54 dBm | 100 kHz |
| 118 MHz to 174 MHz | -36 dBm | 100 kHz |
| 174 MHz to 230 MHz | -54 dBm | 100 kHz |
| 230 MHz to 470 MHz | -36 dBm | 100 kHz |
| 470 MHz to 862 MHz | -54 dBm | 100 kHz |
| 862 MHz to 1 GHz | -36 dBm | 100 kHz |
| 1 GHz to 5,15 GHz | -30 dBm | 1 MHz |
| 5,35 GHz to 5,47 GHz | -30 dBm | 1 MHz |
| 5,725 GHz to 26 GHz | -30 dBm | 1 MHz |

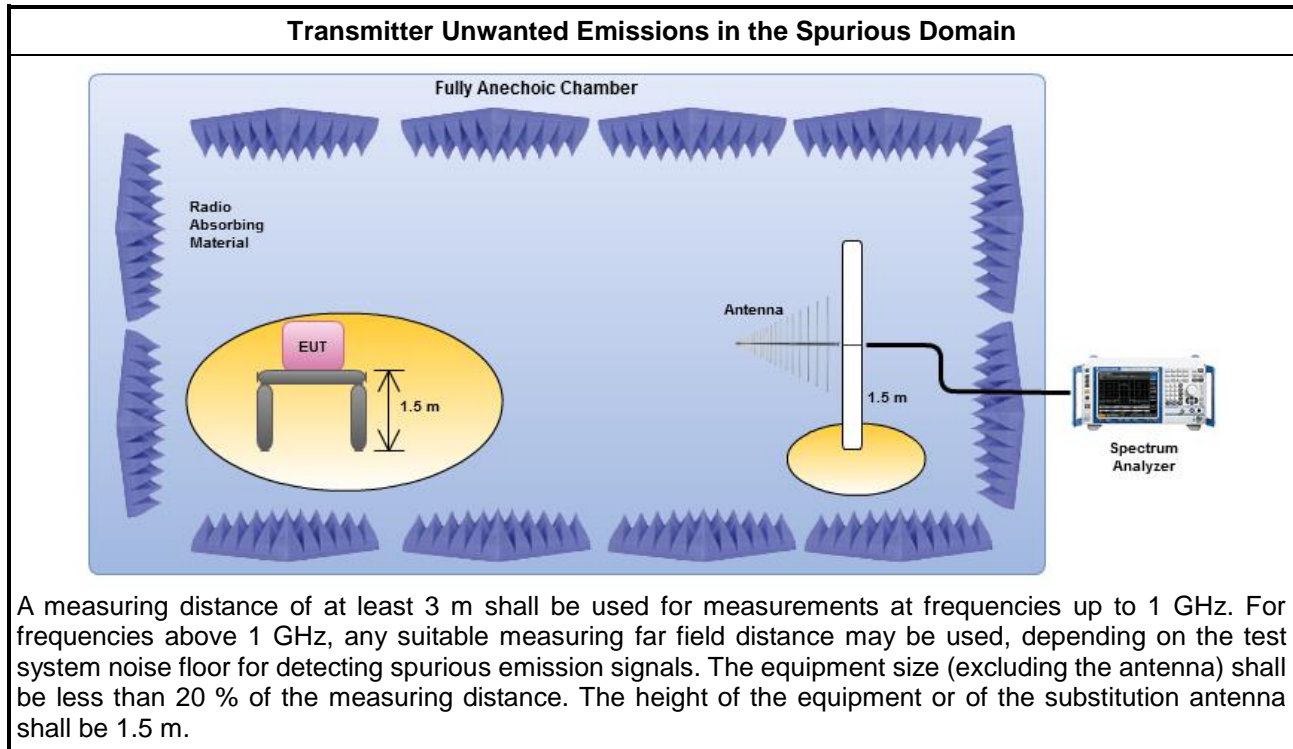
3.6.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

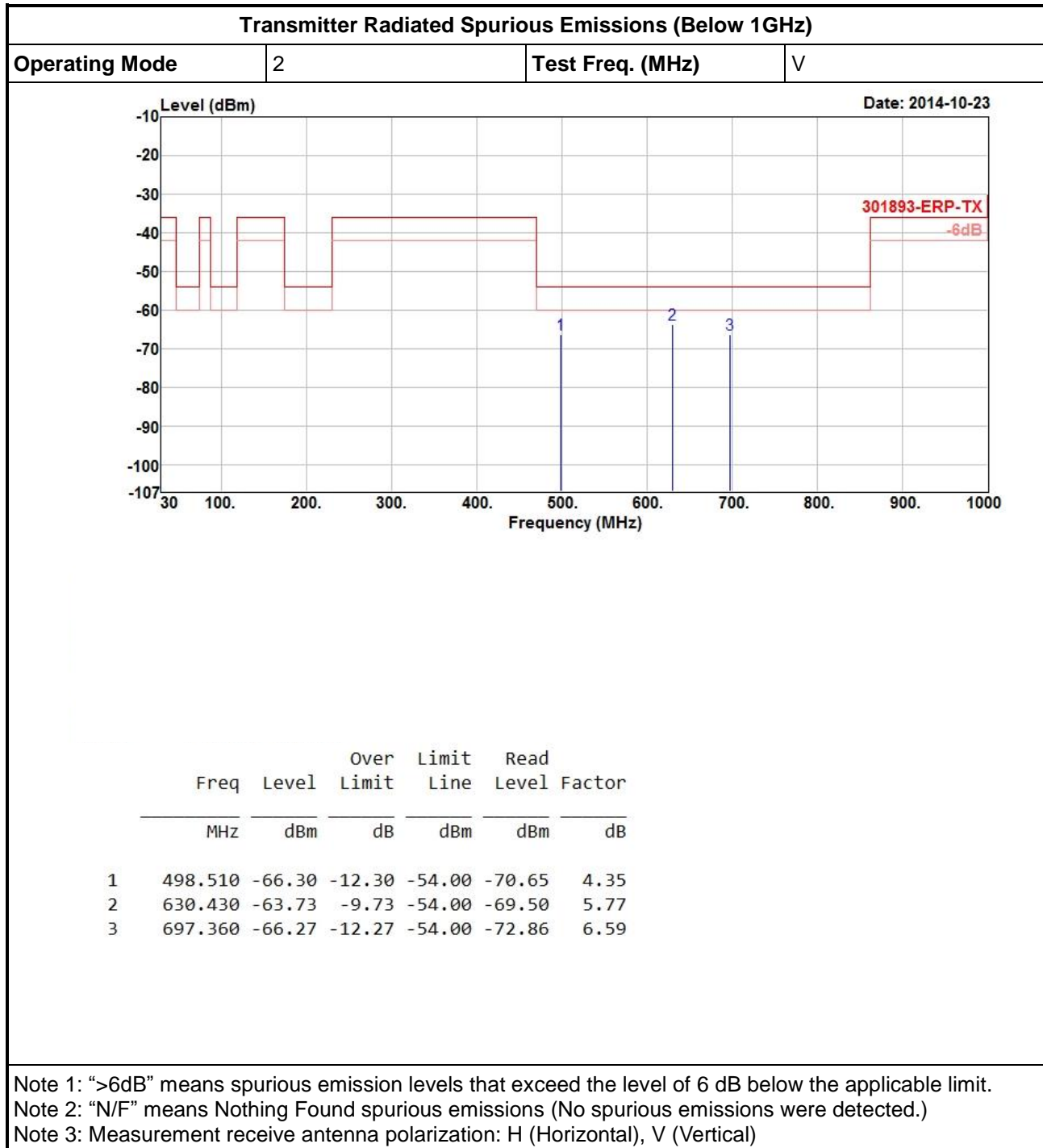
3.6.3 Test Procedures

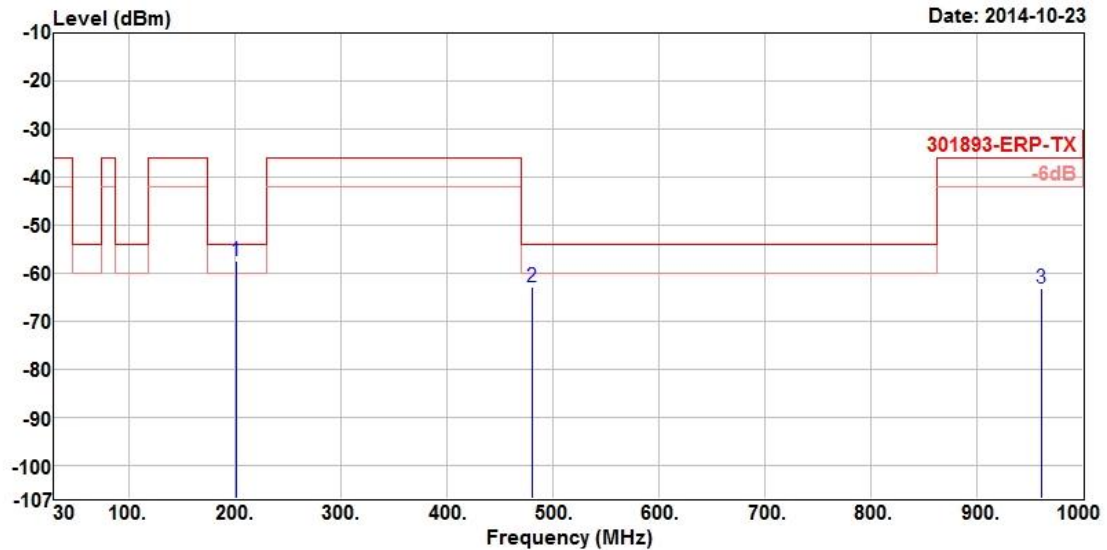
| Test Method | | | | | |
|-------------------------------------|---|--------------------------|---|--------------------------|--|
| <input checked="" type="checkbox"/> | Refer as EN 301 893, clause 5.3.2 for test channel. One channel out of the declared channels for each sub-band. In case of more than 1 channel plan has been declared, testing of these specific requirements need only be performed using one of the declared channel plans. | | | | |
| <input type="checkbox"/> | Refer as EN 301 893, clause 5.4.5.2.1 for conducted measurement. Conducted spurious emissions and radiated by the cabinet with the antenna connector(s) terminated by a specified load (cabinet radiation). | | | | |
| <input type="checkbox"/> | The EUT supports multiple transmit chains using options given below: <table border="1"> <tr> <td><input type="checkbox"/></td> <td>Option 1: The results for each of the transmit chains for the corresponding 1 MHz segments shall be added and compared with the transmitter spurious emissions limit.</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Option 2: the results for each of the transmit chains shall be individually compared with the transmitter spurious emissions limit. After that these limits have been reduced with $10 \times \log_{10}(T_{ch})$. (Number of active transmit chains).</td> </tr> </table> | <input type="checkbox"/> | Option 1: The results for each of the transmit chains for the corresponding 1 MHz segments shall be added and compared with the transmitter spurious emissions limit. | <input type="checkbox"/> | Option 2: the results for each of the transmit chains shall be individually compared with the transmitter spurious emissions limit. After that these limits have been reduced with $10 \times \log_{10}(T_{ch})$. (Number of active transmit chains). |
| <input type="checkbox"/> | Option 1: The results for each of the transmit chains for the corresponding 1 MHz segments shall be added and compared with the transmitter spurious emissions limit. | | | | |
| <input type="checkbox"/> | Option 2: the results for each of the transmit chains shall be individually compared with the transmitter spurious emissions limit. After that these limits have been reduced with $10 \times \log_{10}(T_{ch})$. (Number of active transmit chains). | | | | |
| <input checked="" type="checkbox"/> | Refer as EN 301 893, clause 5.4.5.2.2 for radiated measurement. | | | | |

3.6.4 Test Setup



3.6.5 Transmitter Radiated Unwanted Emissions (Below 1GHz)



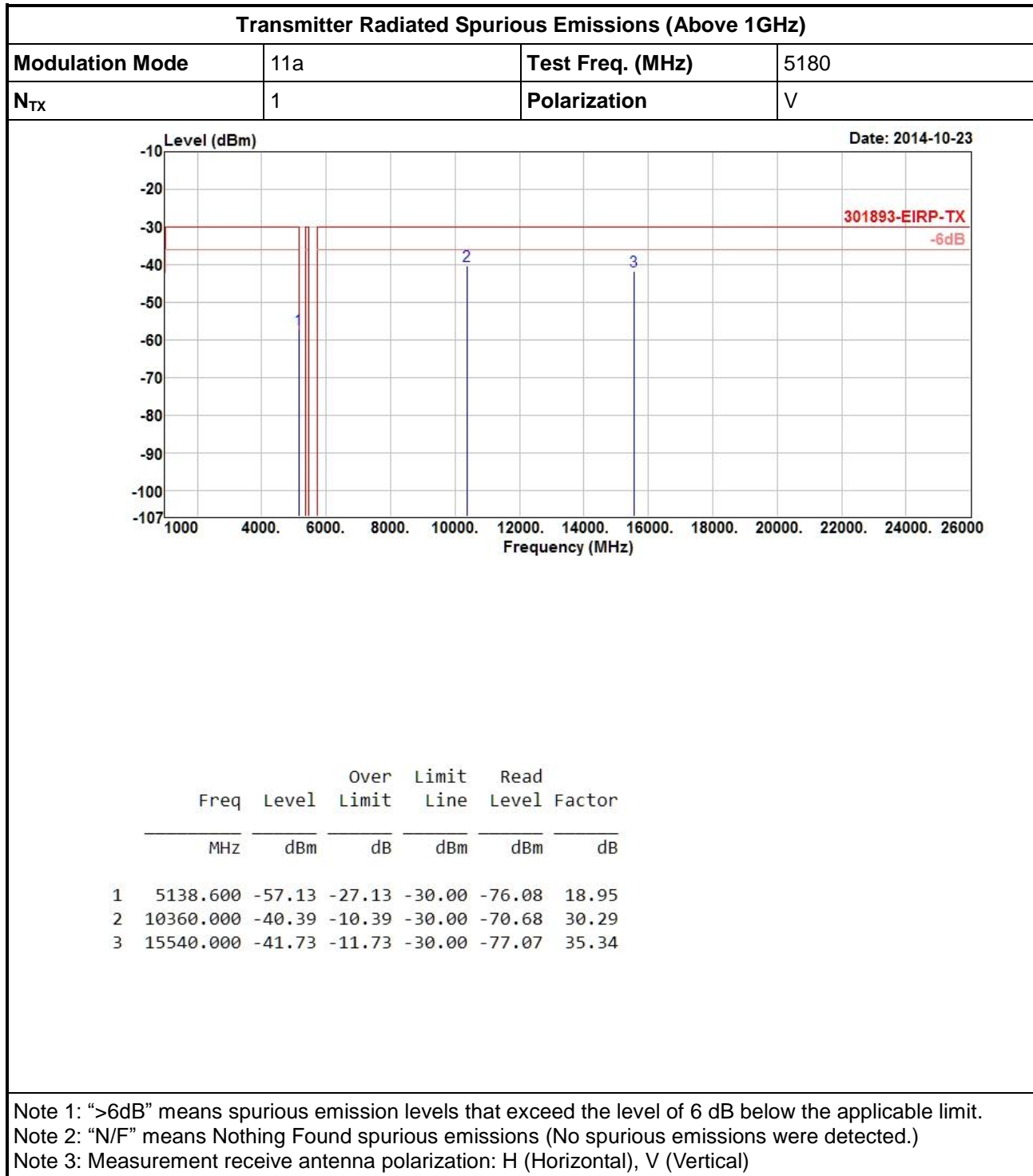
Transmitter Radiated Spurious Emissions (Below 1GHz)
Operating Mode
2
Polarization
H


| | Freq | Level | Over | Limit | Read | |
|--|------|-------|-------|-------|-------|--------|
| | MHz | dBm | Limit | Line | Level | Factor |
| | | | dB | dBm | dBm | dB |

| | | | | | | |
|---|---------|--------|--------|--------|--------|-------|
| 1 | 201.690 | -57.54 | -3.54 | -54.00 | -53.17 | -4.37 |
| 2 | 480.080 | -62.92 | -8.92 | -54.00 | -66.78 | 3.86 |
| 3 | 960.230 | -63.09 | -27.09 | -36.00 | -75.31 | 12.22 |

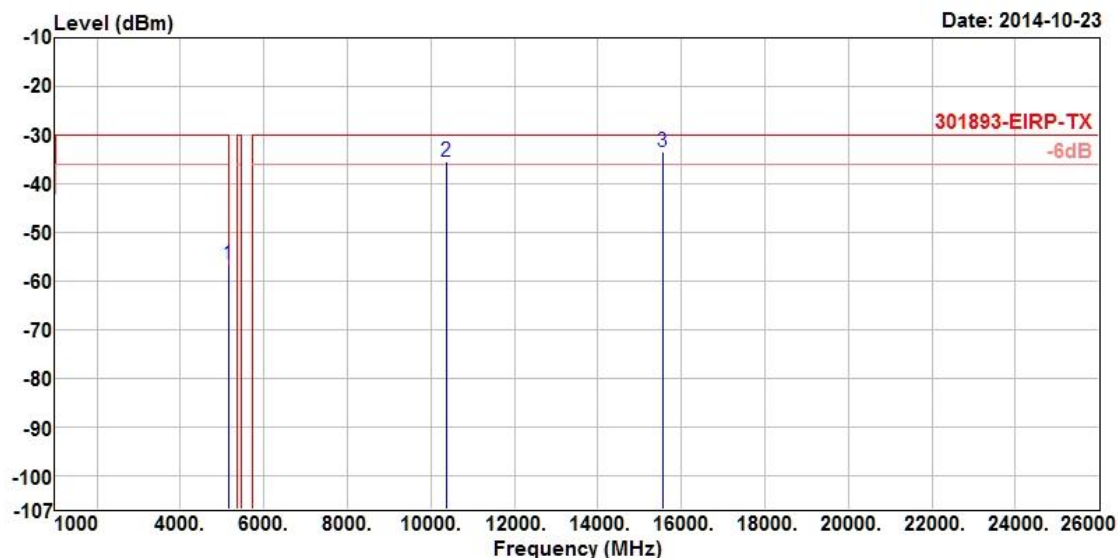
Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

3.6.6 Transmitter Radiated Unwanted Emissions (Above 1GHz)



Transmitter Radiated Spurious Emissions (Above 1GHz)

| | | | |
|------------------------|-----|-------------------------|------|
| Modulation Mode | 11a | Test Freq. (MHz) | 5180 |
| N_{TX} | 1 | Polarization | H |

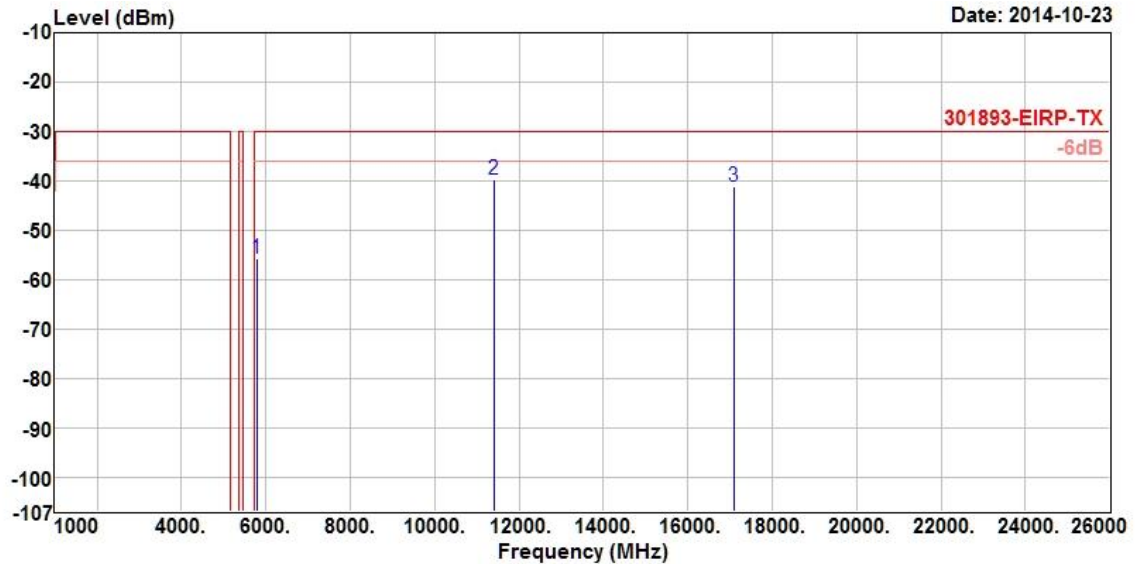


| | Freq | Level | Over | Limit | Read | |
|---|-----------|--------|--------|--------|--------|--------|
| | MHz | dBm | Limit | Line | Level | Factor |
| | | | dB | dBm | dBm | dB |
| 1 | 5148.300 | -56.62 | -26.62 | -30.00 | -76.02 | 19.40 |
| 2 | 10360.000 | -35.36 | -5.36 | -30.00 | -64.23 | 28.87 |
| 3 | 15540.000 | -33.38 | -3.38 | -30.00 | -70.37 | 36.99 |

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

| | | | |
|------------------------|-----|-------------------------|------|
| Modulation Mode | 11a | Test Freq. (MHz) | 5700 |
| N_{TX} | 1 | Polarization | V |

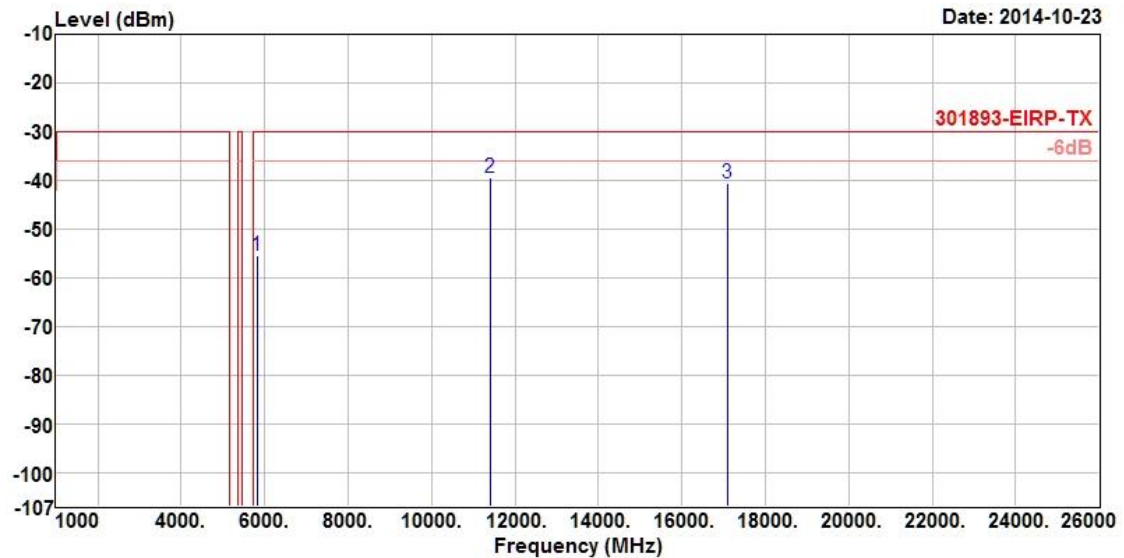


| | Freq | Level | Over | Limit | Read | |
|---|-----------|--------|--------|--------|--------|--------|
| | MHz | dBm | Limit | Line | Level | Factor |
| | | | dB | dBm | dBm | dB |
| 1 | 5780.400 | -55.87 | -25.87 | -30.00 | -76.61 | 20.74 |
| 2 | 11400.000 | -39.86 | -9.86 | -30.00 | -70.26 | 30.40 |
| 3 | 17100.000 | -41.03 | -11.03 | -30.00 | -82.31 | 41.28 |

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

| | | | |
|------------------------|-----|-------------------------|------|
| Modulation Mode | 11a | Test Freq. (MHz) | 5700 |
| N_{TX} | 1 | Polarization | H |



| | Freq | Level | Over | Limit | Read | |
|---|-----------|--------|--------|--------|--------|--------|
| | MHz | dBm | Limit | Line | Level | Factor |
| | | | dB | dBm | dBm | dB |
| 1 | 5817.600 | -55.56 | -25.56 | -30.00 | -76.57 | 21.01 |
| 2 | 11400.000 | -39.35 | -9.35 | -30.00 | -71.59 | 32.24 |
| 3 | 17100.000 | -40.68 | -10.68 | -30.00 | -81.25 | 40.57 |

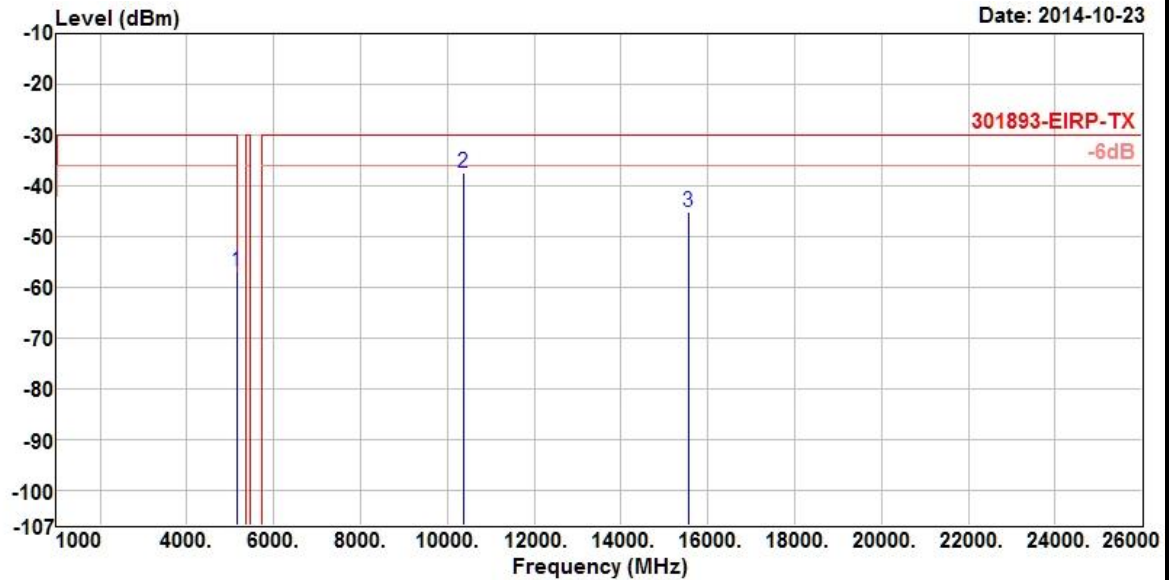
Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

| | | | |
|------------------------|------|-------------------------|------|
| Modulation Mode | HT20 | Test Freq. (MHz) | 5180 |
| N_{TX} | 1 | Polarization | V |

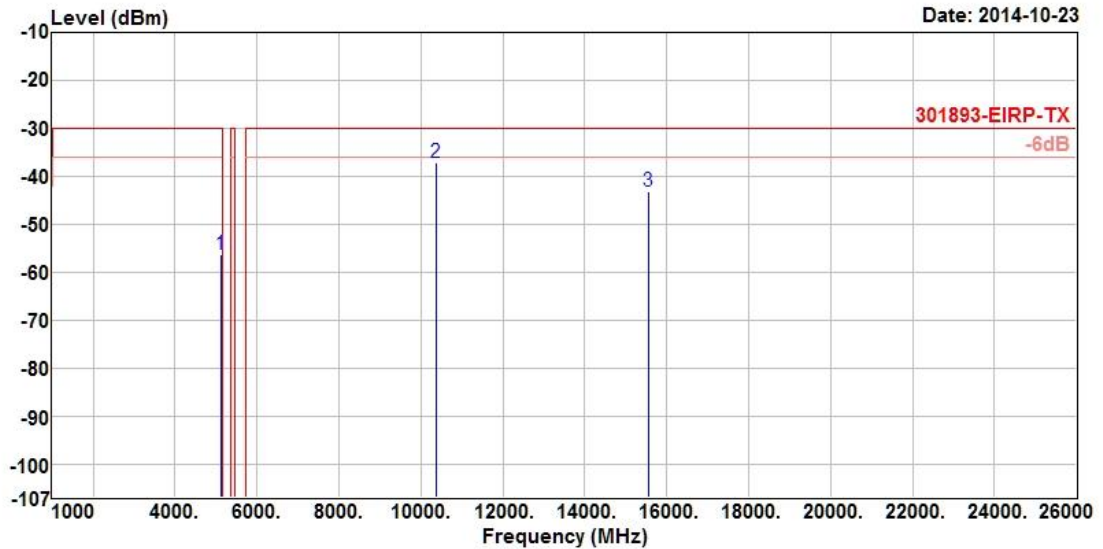


| | Freq | Level | Over Limit | Limit Line | Read Level | Factor |
|---|-----------|--------|------------|------------|------------|--------|
| | MHz | dBm | dB | dBm | dBm | dB |
| 1 | 5149.100 | -57.02 | -27.02 | -30.00 | -76.03 | 19.01 |
| 2 | 10360.000 | -37.34 | -7.34 | -30.00 | -67.63 | 30.29 |
| 3 | 15540.000 | -45.04 | -15.04 | -30.00 | -80.38 | 35.34 |

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

| | | | |
|------------------------|------|-------------------------|------|
| Modulation Mode | HT20 | Test Freq. (MHz) | 5180 |
| N_{TX} | 1 | Polarization | H |



| | Freq | Level | Over | Limit | Read | |
|---|-----------|--------|--------|--------|--------|--------|
| | MHz | dBm | Limit | Line | Level | Factor |
| | | | dB | dBm | dBm | dB |
| 1 | 5128.400 | -56.22 | -26.22 | -30.00 | -75.59 | 19.37 |
| 2 | 10360.000 | -37.21 | -7.21 | -30.00 | -66.08 | 28.87 |
| 3 | 15540.000 | -43.31 | -13.31 | -30.00 | -80.30 | 36.99 |

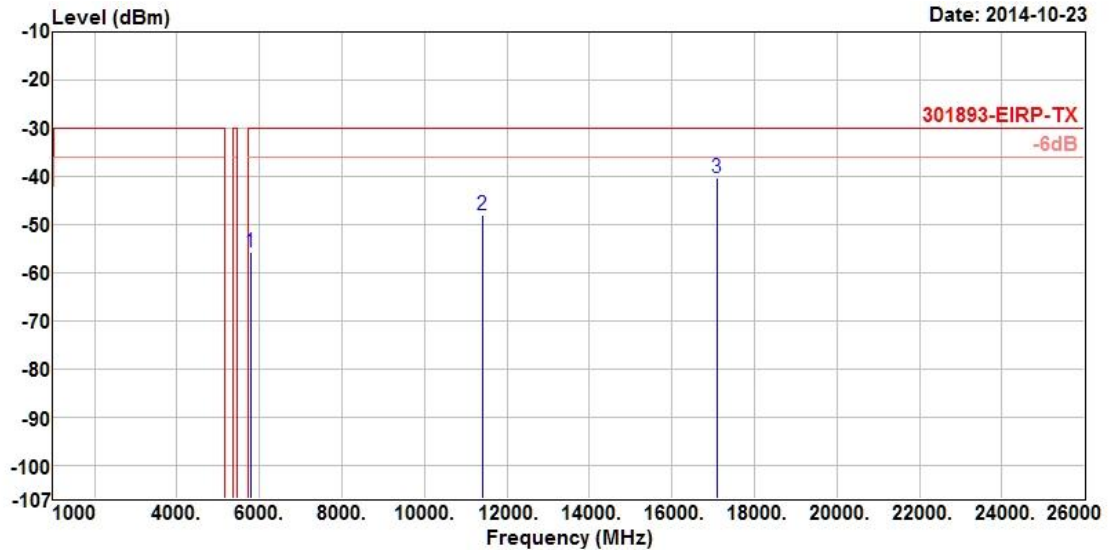
Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

| | | | |
|------------------------|------|-------------------------|------|
| Modulation Mode | HT20 | Test Freq. (MHz) | 5700 |
| N_{TX} | 1 | Polarization | V |

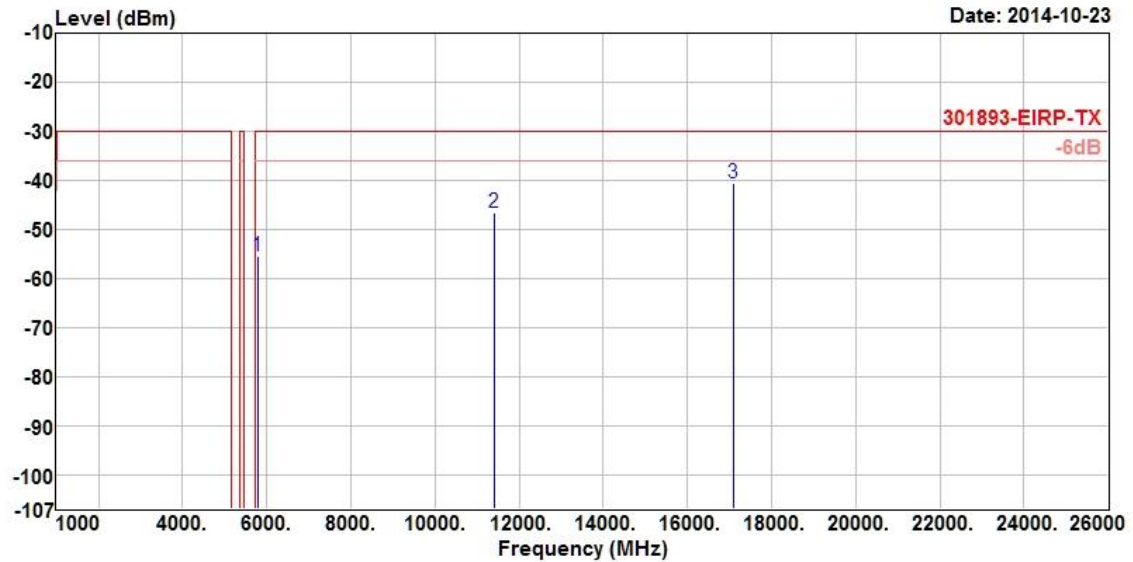


| | Freq | Level | Over | Limit | Read | |
|---|-----------|--------|--------|--------|--------|--------|
| | MHz | dBm | Limit | Line | Level | Factor |
| | | | dB | dBm | dBm | dB |
| 1 | 5777.900 | -55.71 | -25.71 | -30.00 | -76.45 | 20.74 |
| 2 | 11400.000 | -47.94 | -17.94 | -30.00 | -78.34 | 30.40 |
| 3 | 17100.000 | -40.30 | -10.30 | -30.00 | -81.58 | 41.28 |

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

| | | | |
|------------------------|------|-------------------------|------|
| Modulation Mode | HT20 | Test Freq. (MHz) | 5700 |
| N_{TX} | 1 | Polarization | H |



| | Freq | Level | Over Limit | Limit Line | Read Level | Factor |
|---|-----------|--------|---------------|---------------|---------------|--------|
| | MHz | dBm | dB | dBm | dBm | dB |
| 1 | 5785.300 | -55.57 | -25.57 | -30.00 | -76.50 | 20.93 |
| 2 | 11400.000 | -46.62 | -16.62 | -30.00 | -78.86 | 32.24 |
| 3 | 17100.000 | -40.74 | -10.74 | -30.00 | -81.31 | 40.57 |

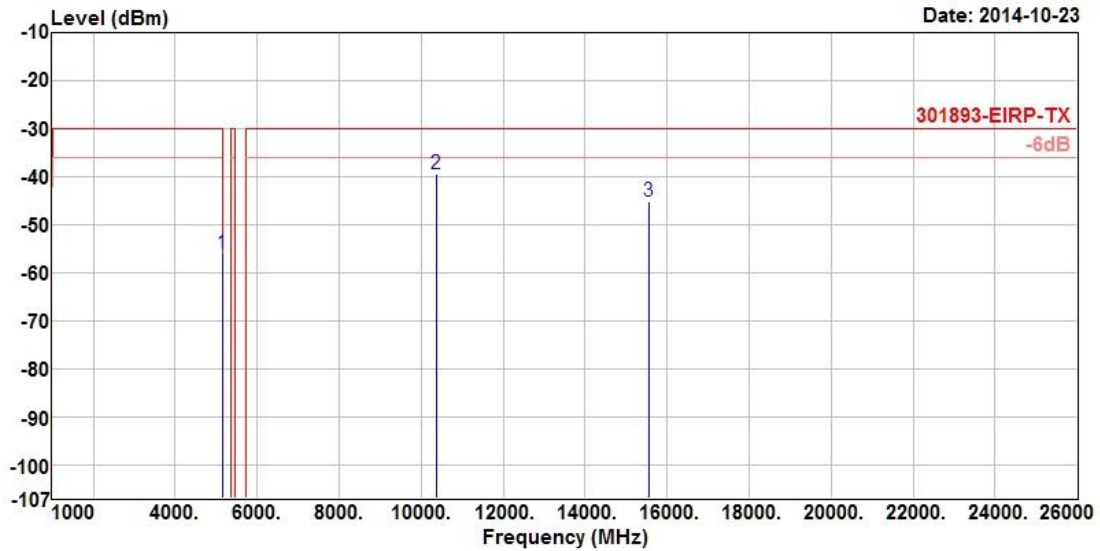
Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

| | | | |
|------------------------|------|-------------------------|------|
| Modulation Mode | HT40 | Test Freq. (MHz) | 5190 |
| N_{TX} | 1 | Polarization | V |

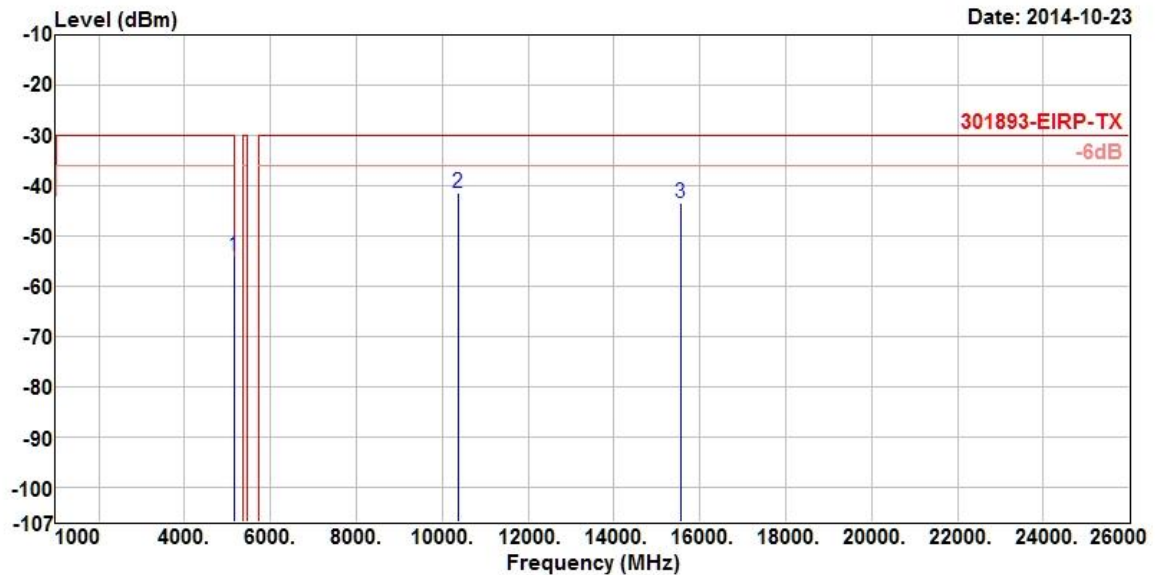


| | Freq | Level | Over Limit | Limit Line | Read Level | Factor |
|---|-----------|--------|------------|------------|------------|--------|
| | MHz | dBm | dB | dBm | dBm | dB |
| 1 | 5149.800 | -56.19 | -26.19 | -30.00 | -75.20 | 19.01 |
| 2 | 10380.000 | -39.48 | -9.48 | -30.00 | -69.82 | 30.34 |
| 3 | 15570.000 | -45.27 | -15.27 | -30.00 | -80.63 | 35.36 |

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

| | | | |
|------------------------|------|-------------------------|------|
| Modulation Mode | HT40 | Test Freq. (MHz) | 5190 |
| N_{TX} | 1 | Polarization | H |



| | Freq | Level | Over | Limit | Read | |
|---|-----------|--------|--------|--------|--------|--------|
| | MHz | dBm | Limit | Line | Level | Factor |
| | | | dB | dBm | dBm | dB |
| 1 | 5149.400 | -54.10 | -24.10 | -30.00 | -73.50 | 19.40 |
| 2 | 10380.000 | -41.57 | -11.57 | -30.00 | -70.46 | 28.89 |
| 3 | 15570.000 | -43.36 | -13.36 | -30.00 | -80.34 | 36.98 |

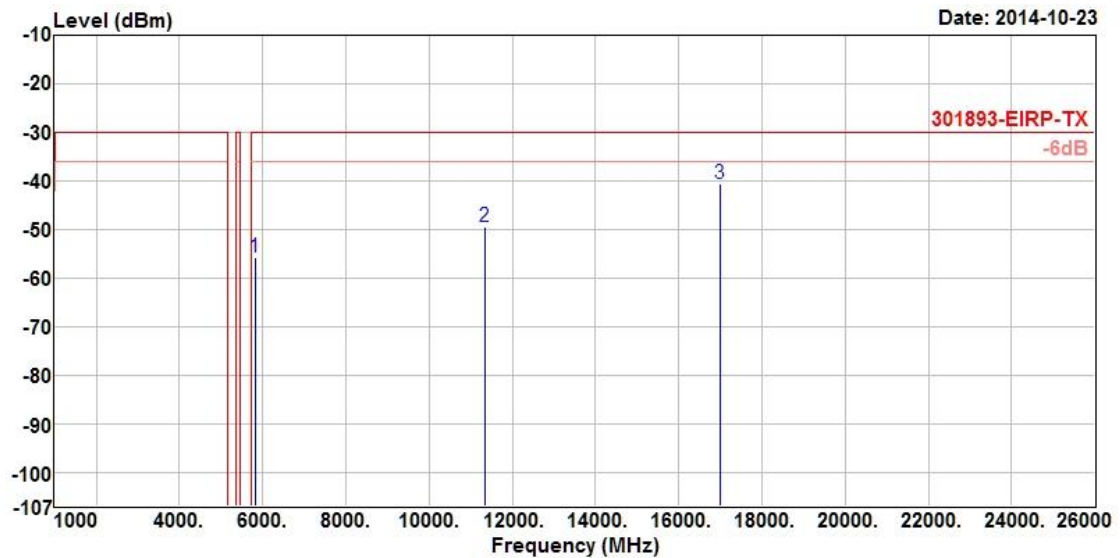
Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

| | | | |
|------------------------|------|-------------------------|------|
| Modulation Mode | HT40 | Test Freq. (MHz) | 5670 |
| N_{TX} | 1 | Polarization | V |

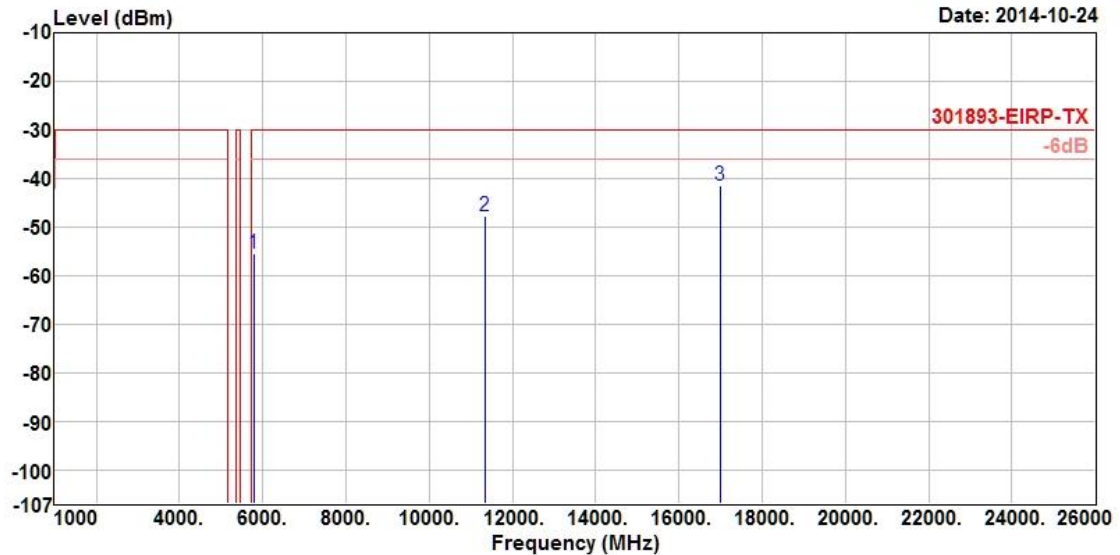


| | Freq | Level | Over | Limit | Read | |
|---|-----------|--------|--------|--------|--------|--------|
| | MHz | dBm | Limit | Line | Level | Factor |
| | | | dB | dBm | dBm | dB |
| 1 | 5818.000 | -55.76 | -25.76 | -30.00 | -76.55 | 20.79 |
| 2 | 11340.000 | -49.45 | -19.45 | -30.00 | -79.68 | 30.23 |
| 3 | 17010.000 | -40.52 | -10.52 | -30.00 | -81.48 | 40.96 |

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Transmitter Radiated Spurious Emissions (Above 1GHz)

| | | | |
|------------------------|------|-------------------------|------|
| Modulation Mode | HT40 | Test Freq. (MHz) | 5670 |
| N_{TX} | 1 | Polarization | H |

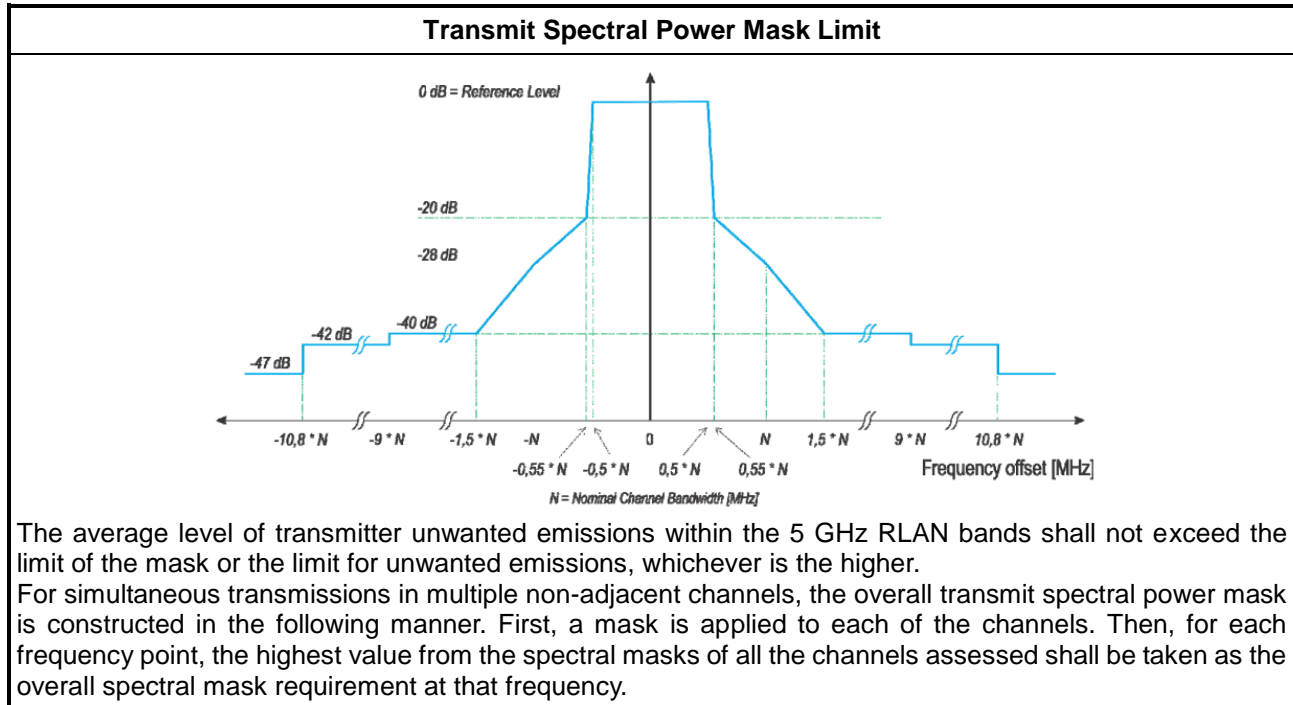


| | Freq | Level | Over | Limit | Read | |
|---|-----------|--------|--------|--------|--------|--------|
| | MHz | dBm | Limit | Line | Level | Factor |
| | | | dB | dBm | dBm | dB |
| 1 | 5781.500 | -55.49 | -25.49 | -30.00 | -76.42 | 20.93 |
| 2 | 11340.000 | -47.64 | -17.64 | -30.00 | -79.52 | 31.88 |
| 3 | 17010.000 | -41.60 | -11.60 | -30.00 | -81.82 | 40.22 |

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

3.7 Transmitter Unwanted Emissions within the 5 GHz RLAN Band

3.7.1 Transmitter Unwanted Emissions within the 5 GHz RLAN Band Limit



3.7.2 Measuring Instruments

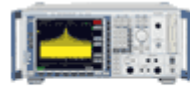
Refer a test equipment and calibration data table in this test report.

3.7.3 Test Procedures

| Test Method | |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | The measurements shall be performed at both normal environmental conditions. |
| <input checked="" type="checkbox"/> | Refer as EN 301 893, clause 5.4.6 for the transmit spectral power mask shall be measured using one of the options below: |
| <input checked="" type="checkbox"/> | Option 1: For equipment with continuous transmission capability (duty cycle equal to 100 %) |
| <input type="checkbox"/> | Option 2: For equipment without continuous transmission capability (duty cycle < 100 %) |
| <input checked="" type="checkbox"/> | Refer as EN 301 893, clause 5.4.6.2.1 for conducted measurement. |
| <input checked="" type="checkbox"/> | Refer as EN 301 893, clause 5.4.6.1 for conducted measurements on smart antenna systems (equipment with multiple transmit chains) measurements need only to be performed on one of the active transmit chains (antenna outputs). |
| <input type="checkbox"/> | Refer as EN 301 893, clause 5.4.6.2.2 for radiated measurement. |

3.7.4 Test Setup

Transmitter Unwanted Emissions within the 5 GHz RLAN Band

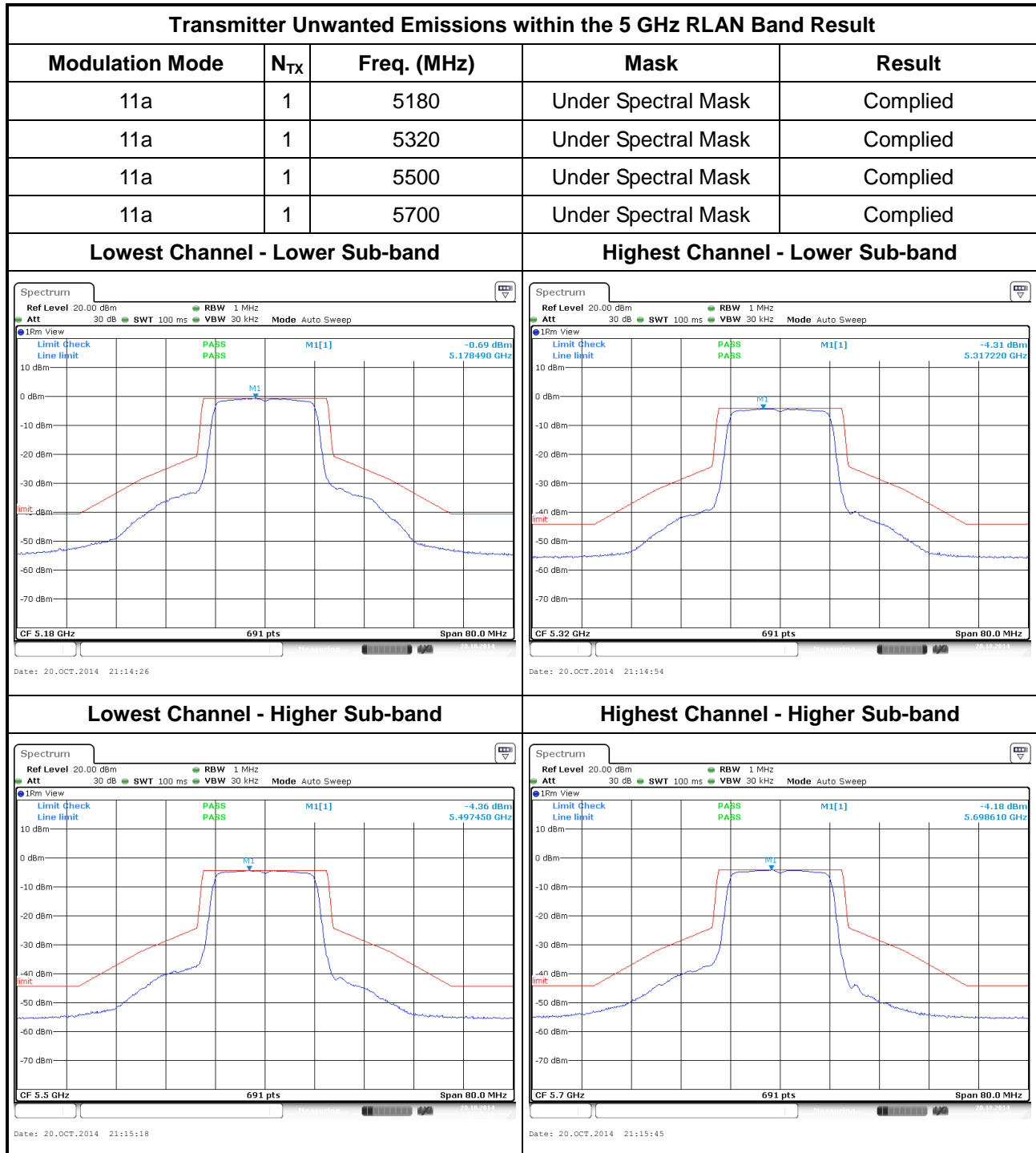


Spectrum
Analyzer



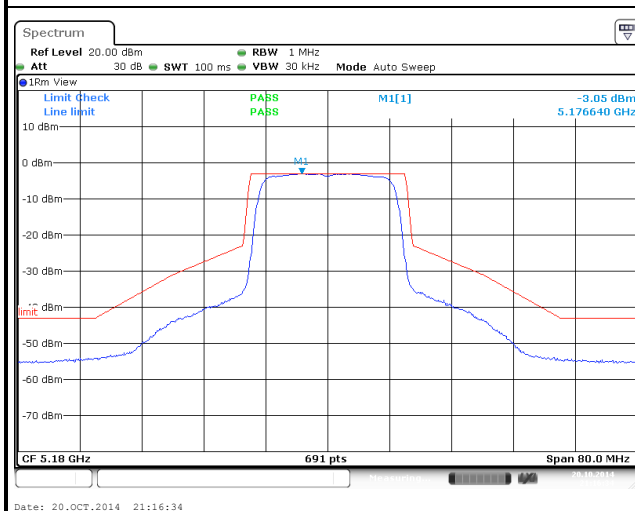
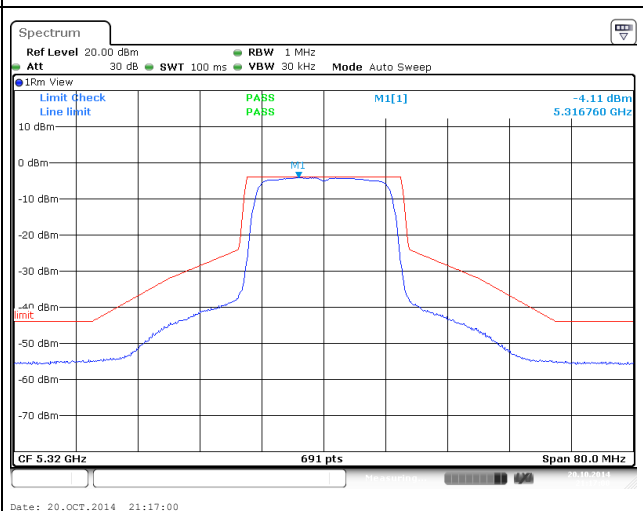
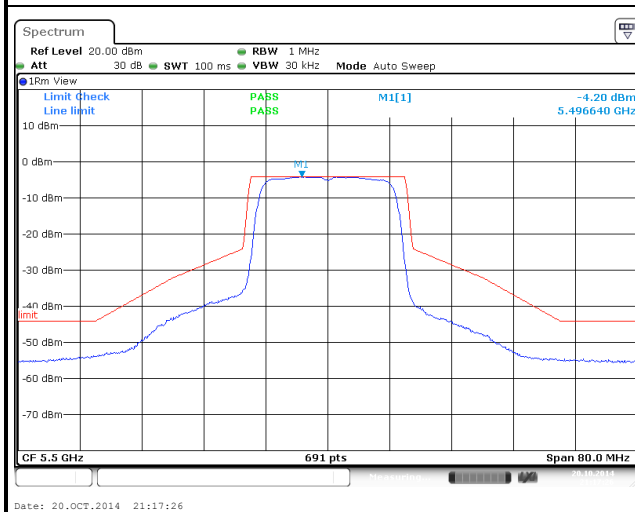
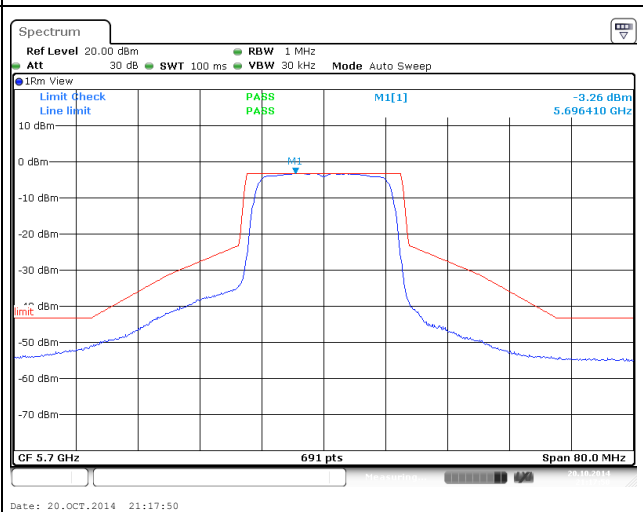
EUT

3.7.5 Test Result of Transmitter Unwanted Emissions within the 5 GHz RLAN Band



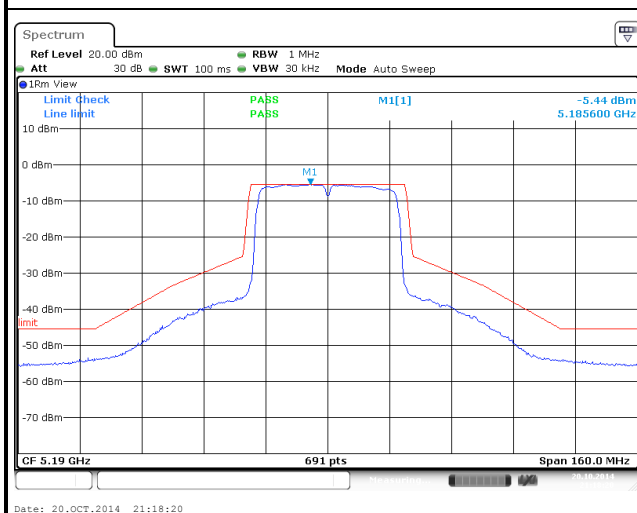
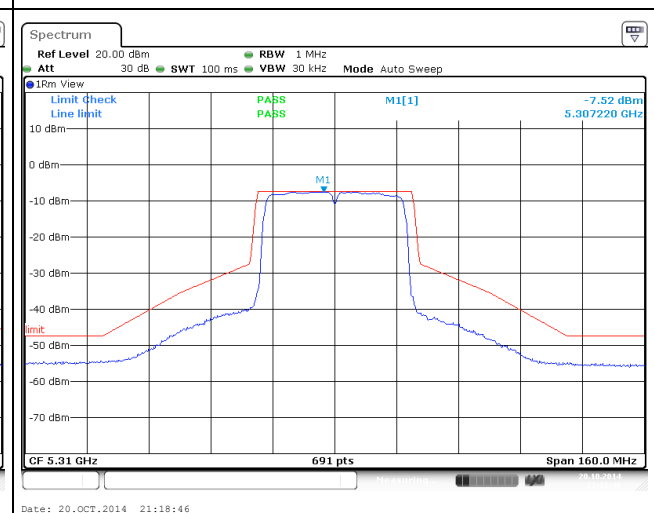
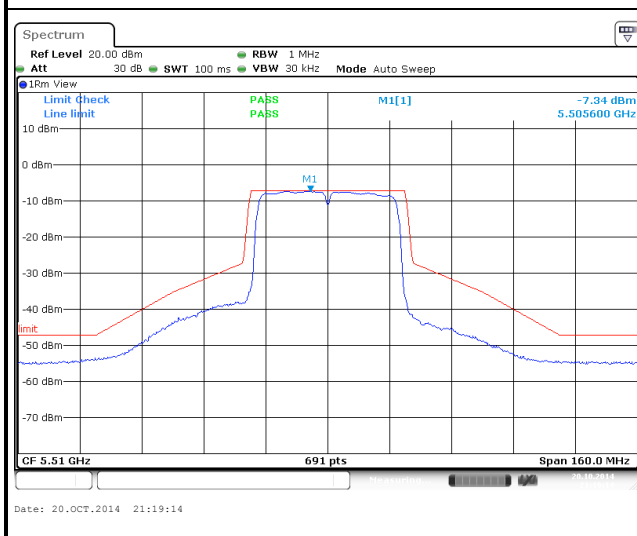
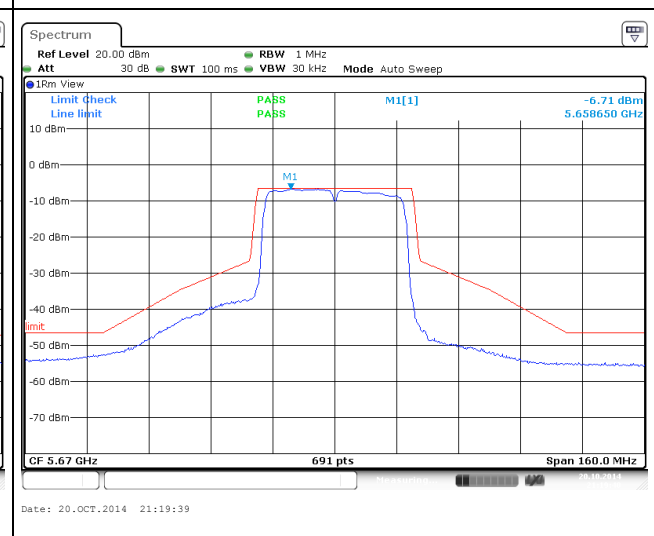
Transmitter Unwanted Emissions within the 5 GHz RLAN Band Result

| Modulation Mode | N _{TX} | Freq. (MHz) | Mask | Result |
|-----------------|-----------------|-------------|---------------------|----------|
| HT20 | 2 | 5180 | Under Spectral Mask | Complied |
| HT20 | 2 | 5320 | Under Spectral Mask | Complied |
| HT20 | 2 | 5500 | Under Spectral Mask | Complied |
| HT20 | 2 | 5700 | Under Spectral Mask | Complied |

Lowest Channel - Lower Sub-band

Highest Channel - Lower Sub-band

Lowest Channel - Higher Sub-band

Highest Channel - Higher Sub-band


Transmitter Unwanted Emissions within the 5 GHz RLAN Band Result

| Modulation Mode | N _{TX} | Freq. (MHz) | Mask | Result |
|-----------------|-----------------|-------------|---------------------|----------|
| HT40 | 2 | 5180 | Under Spectral Mask | Complied |
| HT40 | 2 | 5320 | Under Spectral Mask | Complied |
| HT40 | 2 | 5500 | Under Spectral Mask | Complied |
| HT40 | 2 | 5700 | Under Spectral Mask | Complied |

Lowest Channel - Lower Sub-band

Highest Channel - Lower Sub-band

Lowest Channel - Higher Sub-band

Highest Channel - Higher Sub-band


4 Receiver Test Result

4.1 Receiver Spurious Emissions

4.1.1 Receiver Spurious Emissions Limit

| Frequency Range | Maximum Power | Bandwidth |
|-----------------|---------------|-----------|
| 30 MHz to 1 GHz | -57 dBm | 100 kHz |
| 1 GHz to 26 GHz | -47 dBm | 1 MHz |

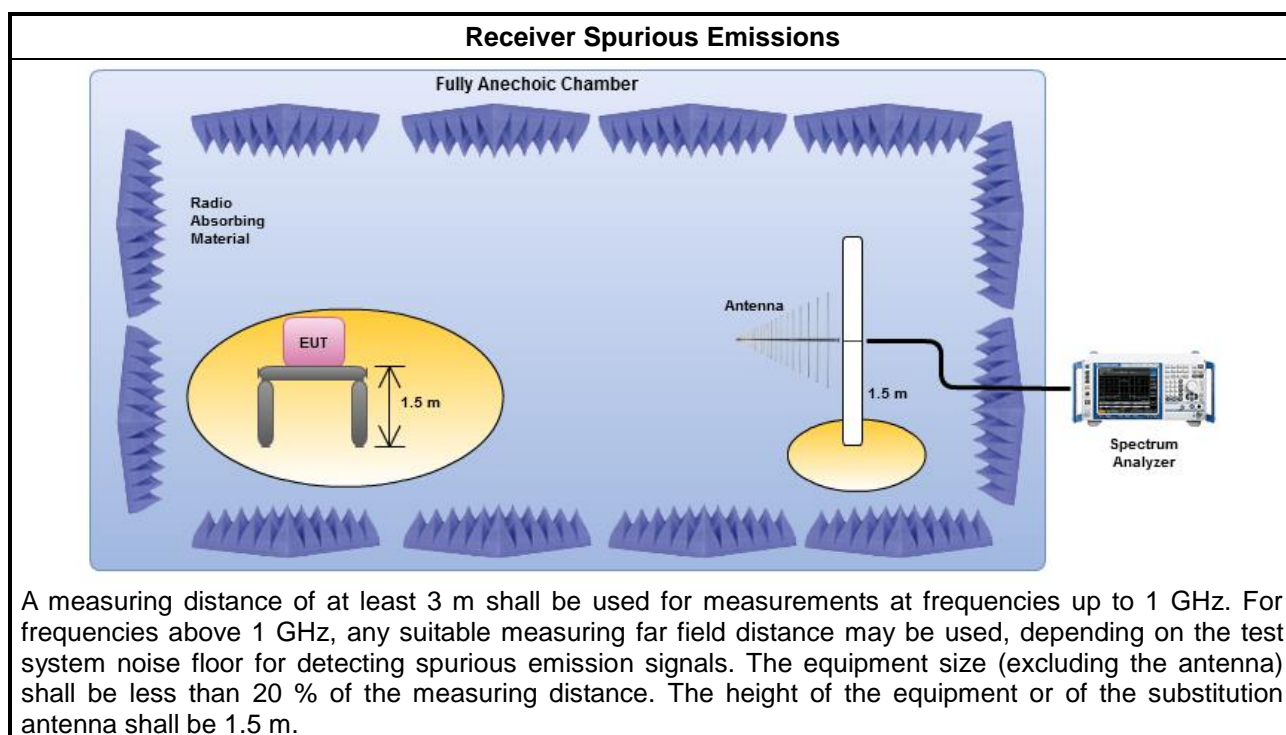
4.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

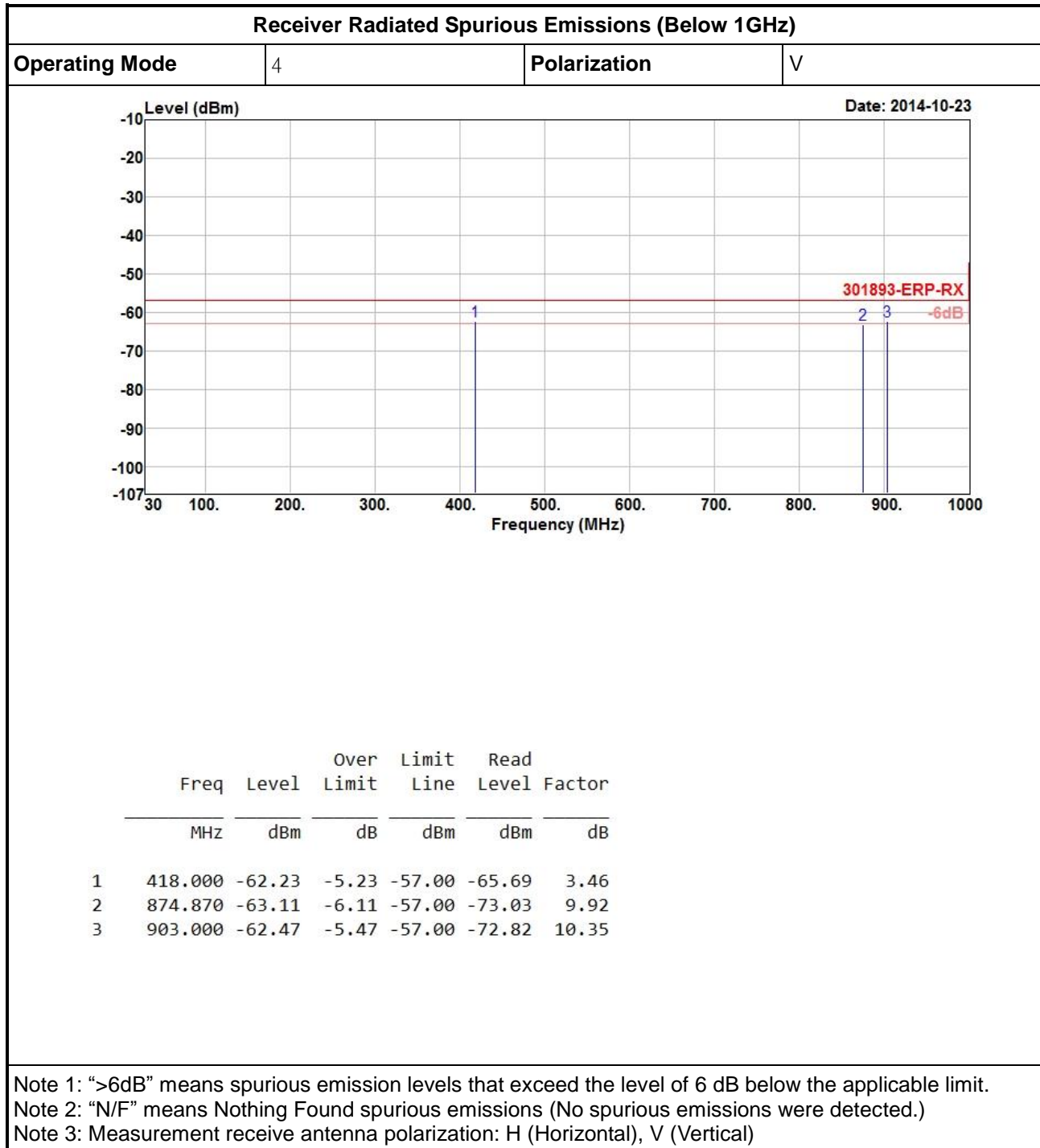
4.1.3 Test Procedures

| Test Method | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | Refer as EN 301 893, clause 5.2.3 for test channel. One channel out of the declared channels for each sub-band. In case of more than 1 channel plan has been declared, testing of these specific requirements need only be performed using one of the declared channel plans. |
| <input type="checkbox"/> | Refer as EN 301 893, clause 5.4.7.2.1 for conducted measurement. Conducted spurious emissions and radiated by the cabinet with the antenna connector(s) terminated by a specified load (cabinet radiation). |
| <input type="checkbox"/> | The EUT supports multiple receive chains, EN 301 893 clause 5.4.7.2.1 step 2 shall be repeated for each of the active receive chains, then sum the measured power (within the observed window) for each of the active receive chains. |
| <input checked="" type="checkbox"/> | Refer as EN 301 893, clause 5.4.7.2.2 for radiated measurement. |

4.1.4 Test Setup



4.1.5 Receiver Radiated Spurious Emissions (Below 1GHz)

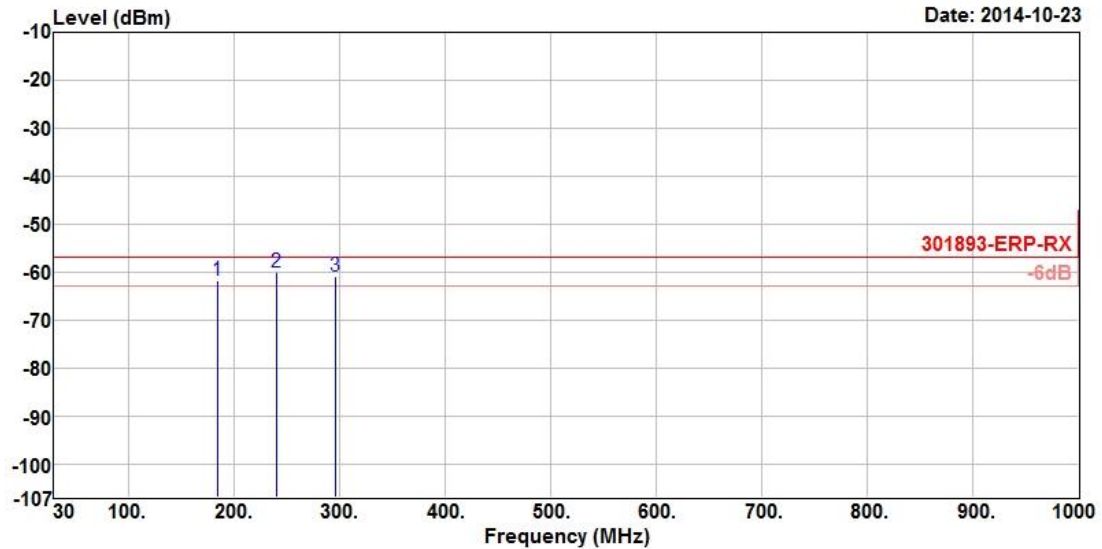


Receiver Radiated Spurious Emissions (Below 1GHz)
Operating Mode

4

Polarization

H

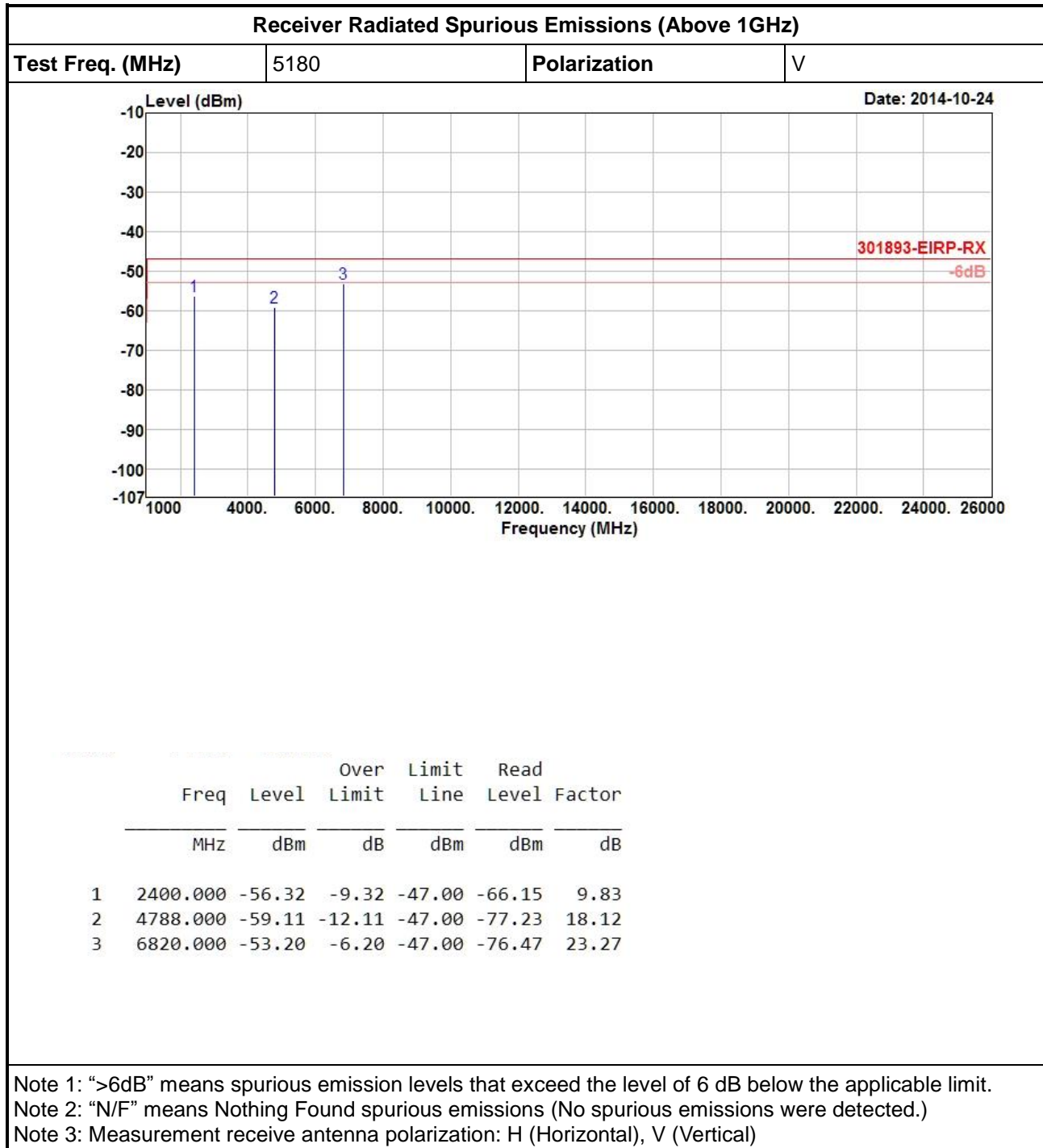


| | Freq | Level | Over Limit | Limit Line | Read Level | Factor |
|---|---------|--------|---------------|---------------|---------------|--------|
| | MHz | dBm | dB | dBm | dBm | dB |
| 1 | 185.200 | -61.92 | -4.92 | -57.00 | -57.29 | -4.63 |
| 2 | 240.490 | -60.12 | -3.12 | -57.00 | -57.18 | -2.94 |
| 3 | 296.750 | -60.88 | -3.88 | -57.00 | -60.33 | -0.55 |

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

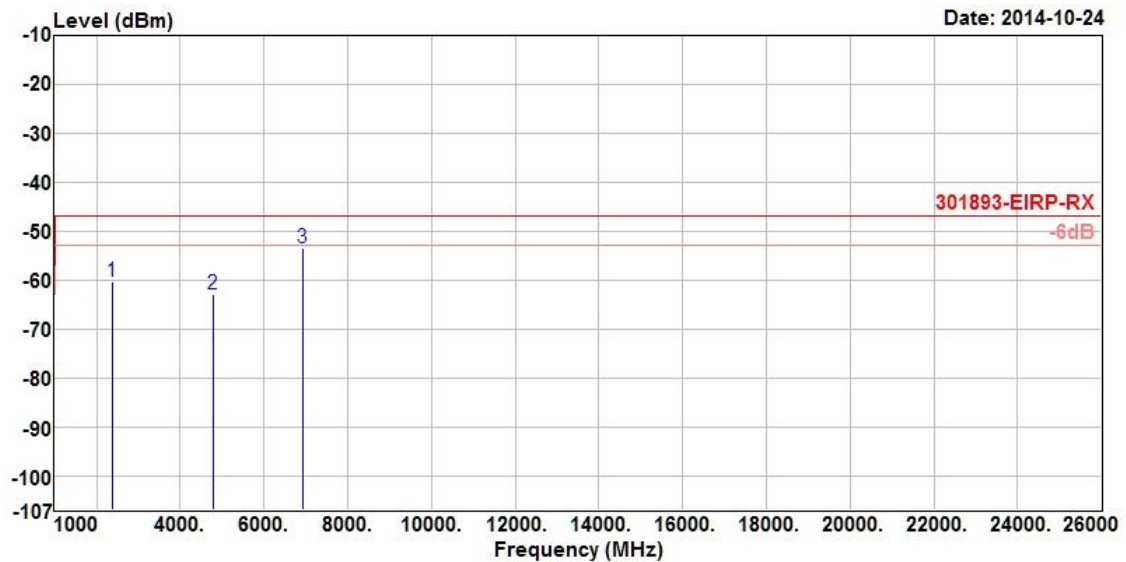
Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

4.1.6 Receiver Radiated Spurious Emissions (Above 1GHz)


Receiver Radiated Spurious Emissions (Above 1GHz)

| | | | |
|-------------------------|------|---------------------|---|
| Test Freq. (MHz) | 5180 | Polarization | H |
|-------------------------|------|---------------------|---|



| | Freq | Level | Over Limit | Limit Line | Read Level | Factor |
|---|----------|--------|---------------|---------------|---------------|--------|
| | MHz | dBm | dB | dBm | dBm | dB |
| 1 | 2374.000 | -60.28 | -13.28 | -47.00 | -70.77 | 10.49 |
| 2 | 4780.000 | -62.96 | -15.96 | -47.00 | -81.61 | 18.65 |
| 3 | 6930.000 | -53.53 | -6.53 | -47.00 | -76.26 | 22.73 |

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

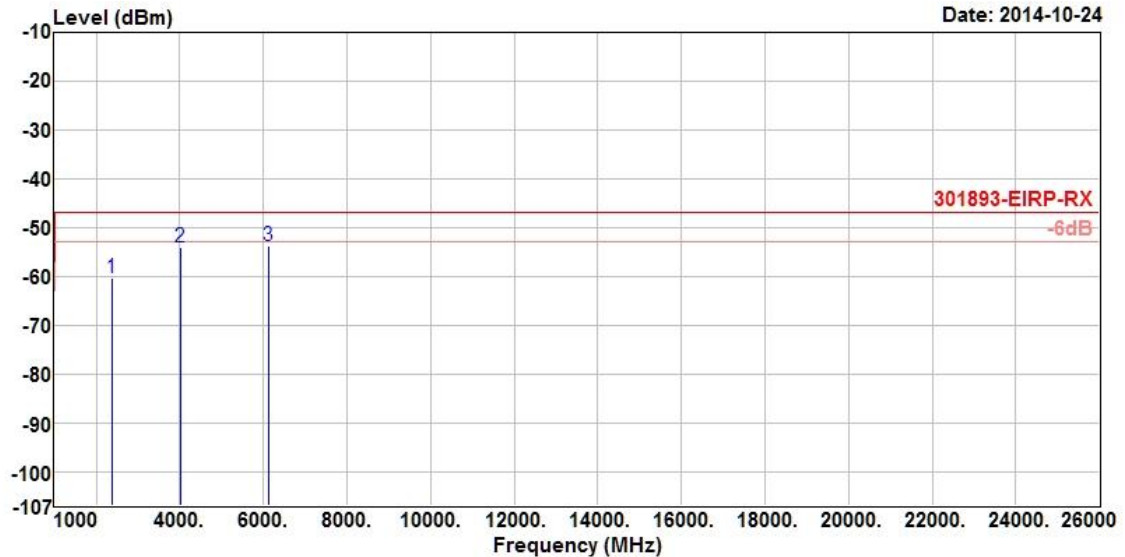
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Receiver Radiated Spurious Emissions (Above 1GHz)
Test Freq. (MHz)

5700

Polarization

V



| | Freq | Level | Over | Limit | Read | |
|---|----------|--------|--------|--------|--------|--------|
| | MHz | dBm | Limit | Line | Level | Factor |
| | | | dB | dBm | dBm | dB |
| 1 | 2366.000 | -60.36 | -13.36 | -47.00 | -70.78 | 10.42 |
| 2 | 4028.000 | -54.06 | -7.06 | -47.00 | -71.81 | 17.75 |
| 3 | 6134.000 | -53.70 | -6.70 | -47.00 | -75.07 | 21.37 |

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

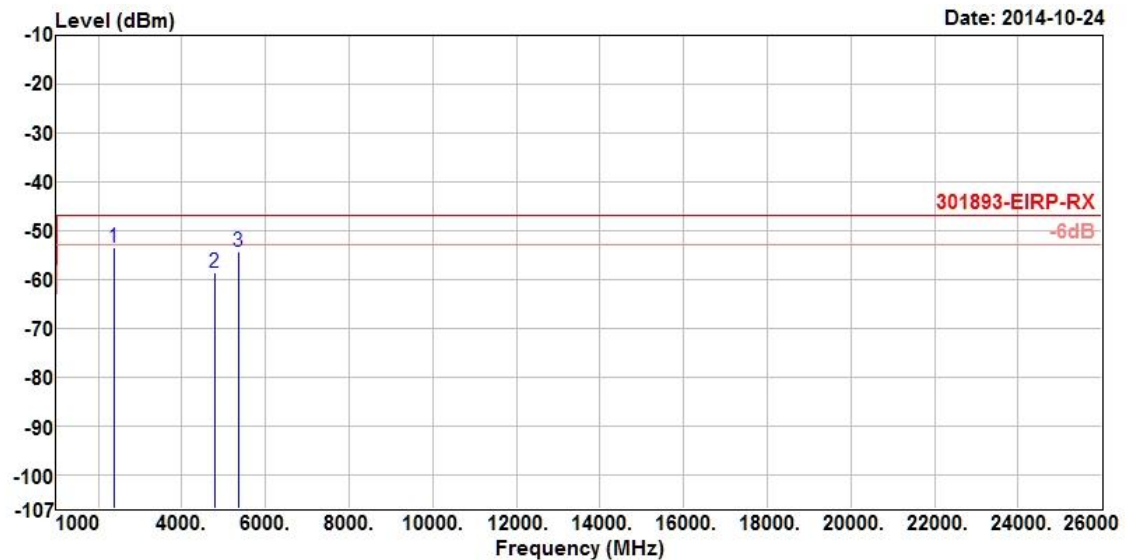
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Receiver Radiated Spurious Emissions (Above 1GHz)
Test Freq. (MHz)

5190

Polarization

V



| | Freq | Level | Over Limit | Limit Line | Read Level | Factor |
|---|----------|--------|---------------|---------------|---------------|--------|
| | MHz | dBm | dB | dBm | dBm | dB |
| 1 | 2392.000 | -53.49 | -6.49 | -47.00 | -63.32 | 9.83 |
| 2 | 4792.000 | -58.52 | -11.52 | -47.00 | -76.64 | 18.12 |
| 3 | 5356.000 | -54.28 | -7.28 | -47.00 | -73.99 | 19.71 |

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

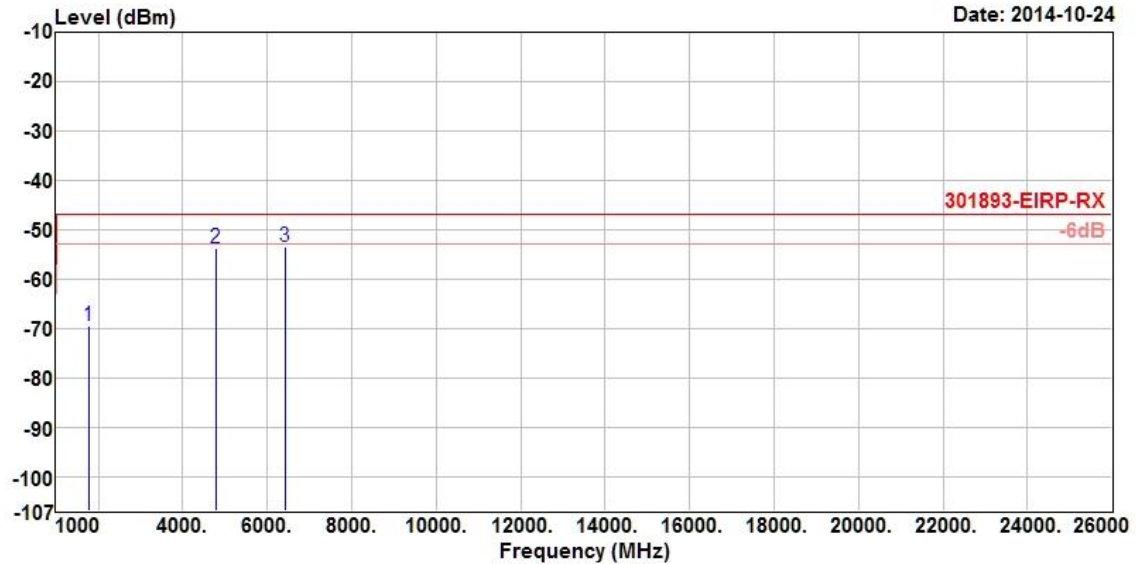
Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Receiver Radiated Spurious Emissions (Above 1GHz)
Test Freq. (MHz)

5190

Polarization

H

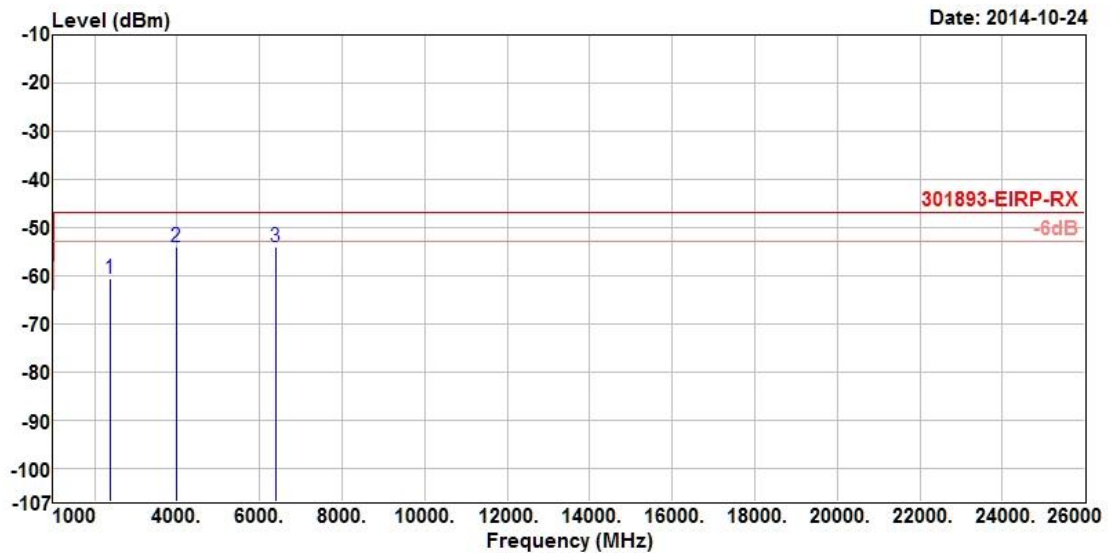


| | Freq | Level | Over Limit | Limit Line | Read Level | Factor |
|---|----------|--------|---------------|---------------|---------------|--------|
| | MHz | dBm | dB | dBm | dBm | dB |
| 1 | 1772.000 | -69.42 | -22.42 | -47.00 | -75.52 | 6.10 |
| 2 | 4792.000 | -53.87 | -6.87 | -47.00 | -72.57 | 18.70 |
| 3 | 6424.000 | -53.58 | -6.58 | -47.00 | -75.47 | 21.89 |

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Receiver Radiated Spurious Emissions (Above 1GHz)

| | | | |
|-------------------------|------|---------------------|---|
| Test Freq. (MHz) | 5670 | Polarization | V |
|-------------------------|------|---------------------|---|



| | Freq | Level | Over Limit | Limit Line | Read Level | Factor |
|---|----------|--------|---------------|---------------|---------------|--------|
| | MHz | dBm | dB | dBm | dBm | dB |
| 1 | 2374.000 | -60.58 | -13.58 | -47.00 | -71.07 | 10.49 |
| 2 | 3988.000 | -54.01 | -7.01 | -47.00 | -71.73 | 17.72 |
| 3 | 6398.000 | -54.12 | -7.12 | -47.00 | -75.98 | 21.86 |

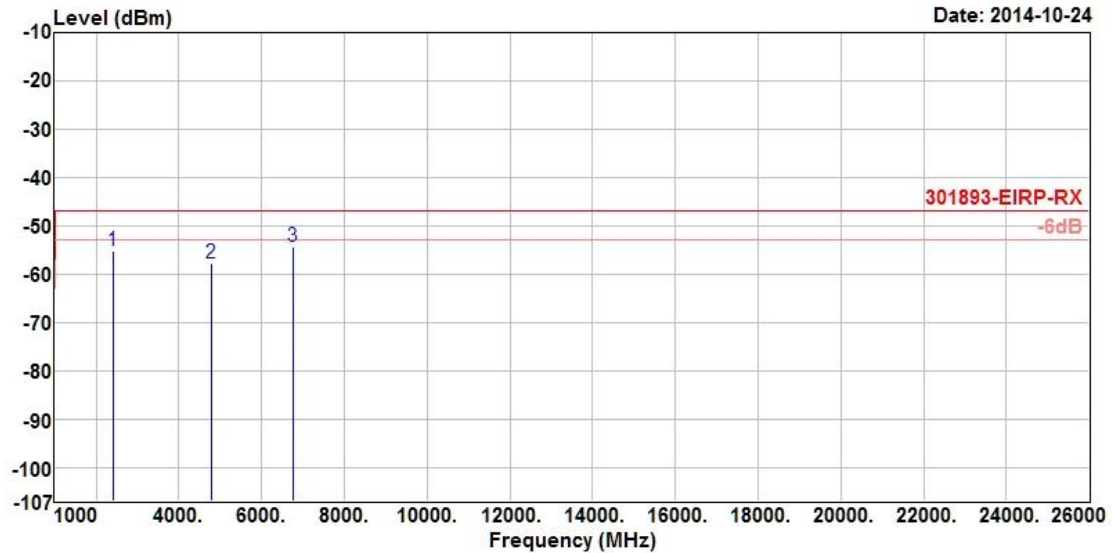
Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.
 Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)
 Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

Receiver Radiated Spurious Emissions (Above 1GHz)
Test Freq. (MHz)

5670

Polarization

H



| | Freq | Level | Over Limit | Limit Line | Read Level | Factor |
|---|----------|--------|---------------|---------------|---------------|--------|
| | MHz | dBm | dB | dBm | dBm | dB |
| 1 | 2418.000 | -55.34 | -8.34 | -47.00 | -65.17 | 9.83 |
| 2 | 4786.000 | -57.63 | -10.63 | -47.00 | -75.74 | 18.11 |
| 3 | 6762.000 | -54.25 | -7.25 | -47.00 | -77.43 | 23.18 |

Note 1: ">6dB" means spurious emission levels that exceed the level of 6 dB below the applicable limit.

Note 2: "N/F" means Nothing Found spurious emissions (No spurious emissions were detected.)

Note 3: Measurement receive antenna polarization: H (Horizontal), V (Vertical)

5 Adaptivity Test Result

5.1 Adaptivity

5.1.1 Adaptivity Limit

| Adaptivity Limit | | | | |
|---|----------------------|-------------------------|-------------------------|---|
| <input checked="" type="checkbox"/> Priority Class dependent Channel Access parameters for Supervised Devices: | | | | |
| Class # | p₀ | CW_{min} | CW_{max} | Maximum Channel Occupancy Time (COT) |
| <input checked="" type="checkbox"/> 4 | 2 | 3 | 7 | 2 ms |
| <input checked="" type="checkbox"/> 3 | 2 | 7 | 15 | 4 ms |
| <input checked="" type="checkbox"/> 2 | 3 | 15 | 1 023 | 6 ms (see note 1) |
| <input checked="" type="checkbox"/> 1 | 7 | 15 | 1 023 | 6 ms (see note 1) |
| NOTE 1: The maximum <i>Channel Occupancy Time</i> (COT) of 6 ms may be increased to 8 ms by inserting one or more pauses. The minimum duration of a pause shall be 100 μ s. The maximum duration (Channel Occupancy) before including any such pause shall be 6 ms. Pause duration is not included in the channel occupancy time. NOTE 2: the values for p ₀ , CW _{min} , CW _{max} are minimum values. Greater values are allowed. | | | | |
| <input type="checkbox"/> Priority Class dependent Channel Access parameters for Supervising Devices: | | | | |
| Class # | p₀ | CW_{min} | CW_{max} | maximum Channel Occupancy Time (COT) |
| <input type="checkbox"/> 4 | 1 | 3 | 7 | 2 ms |
| <input type="checkbox"/> 3 | 1 | 7 | 15 | 4 ms |
| <input type="checkbox"/> 2 | 3 | 15 | 63 | 6 ms (see note 1 and note 2) |
| <input type="checkbox"/> 1 | 7 | 15 | 1 023 | 6 ms (see note 1) |
| NOTE 1: The maximum <i>Channel Occupancy Time</i> (COT) of 6 ms may be increased to 8 ms by inserting one or more pauses. The minimum duration of a pause shall be 100 μ s. The maximum duration (Channel Occupancy) before including any such pause shall be 6 ms. Pause duration is not included in the channel occupancy time. NOTE 2: The maximum Channel Occupancy Time (COT) of 6 ms may be increased to 10 ms by extending CW to CW \times 2 + 1 when selecting the random number q for any backoff(s) that precede the Channel Occupancy that may exceed 6 ms or which follow the Channel Occupancy that exceeded 6 ms. The choice between preceding or following a Channel Occupancy shall remain unchanged during the operation time of the device. NOTE 3: The values for p ₀ , CW _{min} , CW _{max} are minimum values. Greater values are allowed. | | | | |
| Energy Detect Threshold (ED Threshold): | | | | |
| <input checked="" type="checkbox"/> Option 1: For equipment that for its operation in the 5 GHz bands is conforming to IEEE 802.11™ac-2013 [10], clause 22, or to IEEE 802.11™-2012, clause 18 or clause 20, or any combination of these clauses, the Energy Detect Threshold (ED Threshold) is independent of the equipment's maximum transmit power (P _H). The Energy Detect Threshold (ED Threshold) shall be: <div style="text-align: center; margin-top: 10px;"> $TL = -75 \text{ dBm/MHz}$ </div> | | | | |
| <input type="checkbox"/> Option 2: For equipment conforming to one or more of the clauses listed in Option 1, and to at least one other operating mode, and for equipment conforming to none of the clauses listed in Option 1, the Energy Detect Threshold (ED Threshold) shall be proportional to the equipment's maximum transmit power (P _H). Assuming a 0 dBi receive antenna the Energy Detect Threshold (ED Threshold) shall be: <div style="margin-left: 40px; margin-top: 10px;"> $\text{For } PH \leq 13 \text{ dBm: } TL = -75 \text{ dBm/MHz}$ $\text{For } 13 \text{ dBm} < PH < 23 \text{ dBm: } TL = -85 \text{ dBm/MHz} + (23 \text{ dBm} - PH)$ $\text{For } PH \geq 23 \text{ dBm: } TL = -85 \text{ dBm/MHz}$ </div> | | | | |

- | |
|--|
| <input checked="" type="checkbox"/> Short Control Signalling Transmissions: <ul style="list-style-type: none"> Within an observation period of 50 ms, the number of Short Control Signalling Transmissions by the equipment shall be equal to or less than 50. The total duration of the equipment's Short Control Signalling Transmissions shall be less than 2 500 μs within said observation period. |
|--|

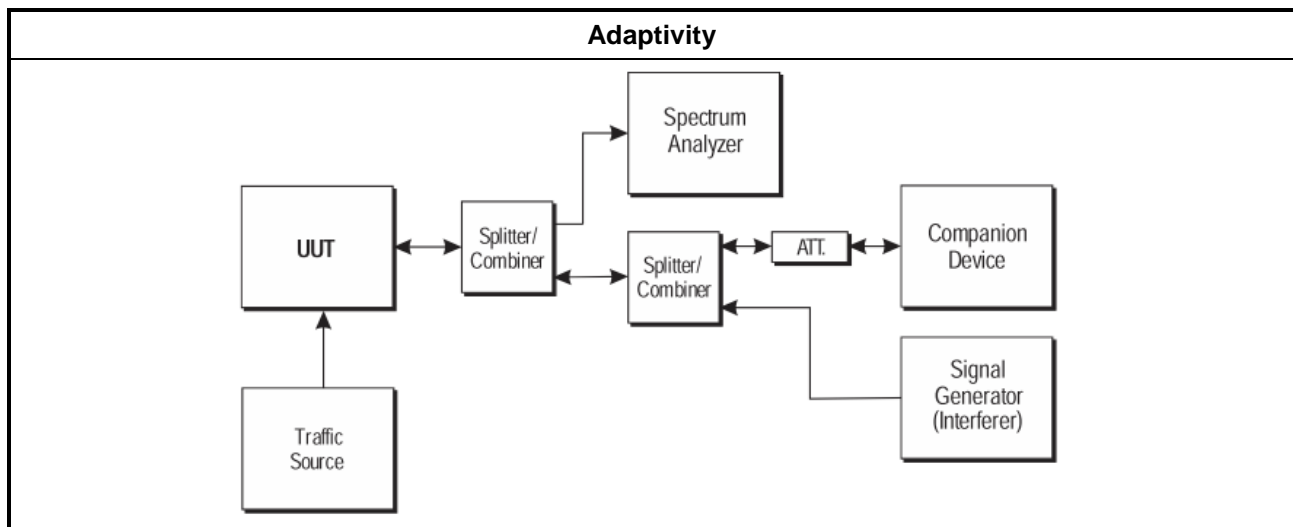
5.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

5.1.3 Test Procedures

| Test Method | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | Refer as EN 301 893, clause 5.3.2 for test channel: One channel out of the declared channels. |
| <input checked="" type="checkbox"/> | Refer as EN 301 893, clause 5.4.9.3.2 for conducted measurement. |
| <input checked="" type="checkbox"/> | For conducted measurements on devices with multiple transmit chains and receive chains. The power splitter/combiner shall be used to combine all the transmit/receive chains (antenna outputs) into a single test point. The insertion loss of the power splitter/combiner shall be taken into account. |
| <input type="checkbox"/> | Refer as EN 301 893, clause 5.4.9.3.4 for radiated measurement. |

5.1.4 Test Setup



5.1.5 Test Result of Adaptivity

| Adaptivity Result | | | | |
|---------------------------|-------------|---------------------------------|------|------|
| Detection Threshold Level | | -68.36 dBm/MHz | | |
| Modulation Mode | Freq. (MHz) | Adaptivity Interference Signals | | |
| | | AWGN | LTE | OFDM |
| 802.11n 20M | 5180 | Pass | Pass | Pass |
| 802.11n 40M | 5190 | Pass | - | - |
| Result | | Complied | | |

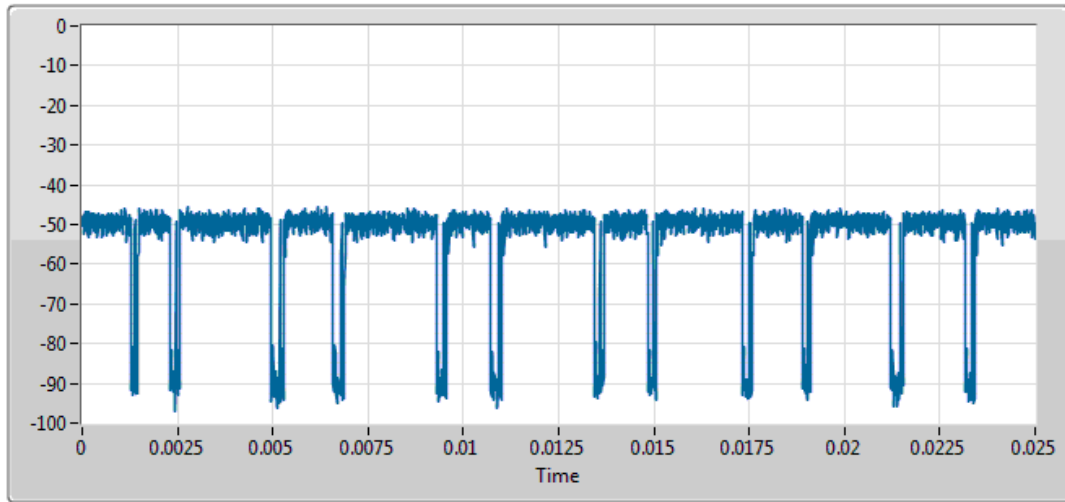
| Short Control Signal Transmissions Result | | | | | | | | | |
|---|-------------|---------------------------------|-------|-------|------------|----------------|-----|------|-------|
| Modulation Mode | Freq. (MHz) | Adaptivity Interference Signals | | | | | | | |
| | | AWGN | LTE | OFDM | Limit (ms) | AWGN | LTE | OFDM | Limit |
| | | SCST (ms) | | | | Number of SCST | | | |
| 802.11n 20M | 5180 | 0.379 | 1.525 | 1.553 | 2.5 | 8 | 1 | 2 | 50 |
| 802.11n 40M | 5190 | 1.276 | - | - | 2.5 | 3 | - | - | 50 |
| Result | Complied | | | | | | | | |

| Medium Access Mechanism & Maximum Channel Occupancy Time(s) Result | | | | | |
|--|-------------|---|---------|-------------------------------|---------|
| Modulation Mode | Freq. (MHz) | Measured Data | | | |
| | | Max. Value within 10000 Channel Occupancy Time(s) | | Cumulative Probabilities p(n) | |
| | | Result (ms) | Limit | Result | Limit |
| 802.11n 20M | 5180 | 1.463 | Class 2 | Pass | Class 2 |
| 802.11n 40M | 5190 | 1.75 | Class 2 | Pass | Class 2 |
| Result | | Complied | | | |

802.11an 20M -5180MHz

Duty Cycle Plot

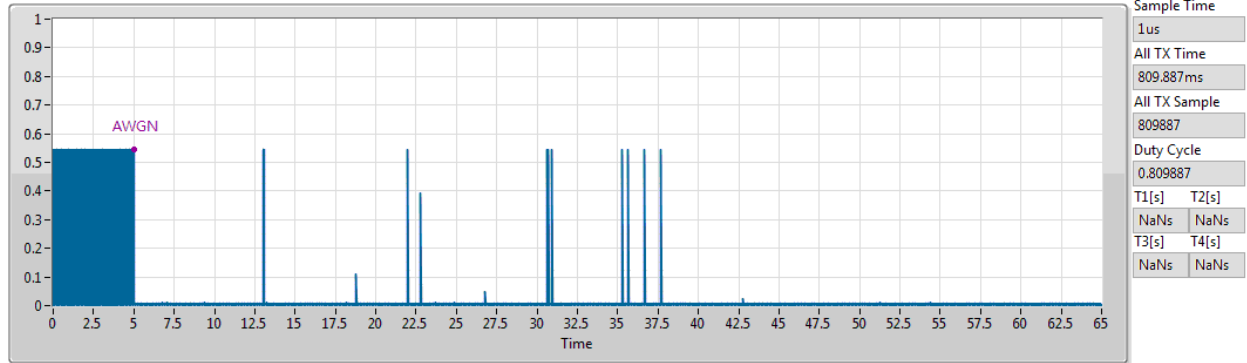
Time Analysis



| | |
|---------------|-------|
| Sample Time | |
| 3.125us | |
| All TX Time | |
| 22.209375ms | |
| All TX Sample | |
| 7107 | |
| Duty Cycle | |
| 0.888264 | |
| T1[s] | T2[s] |
| NaNs | NaNs |
| T3[s] | T4[s] |
| NaNs | NaNs |

Adaptivity Result - AWGN

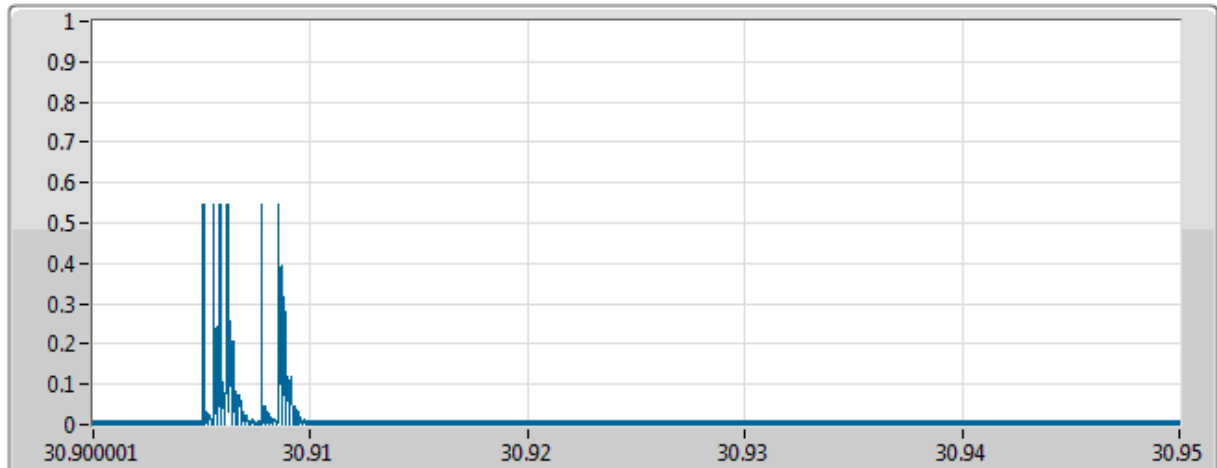
Time Analysis



AWGN: Adding the interference signal.

Short Control Signalling Transmissions - AWGN

Short Control Signalling Transmissions



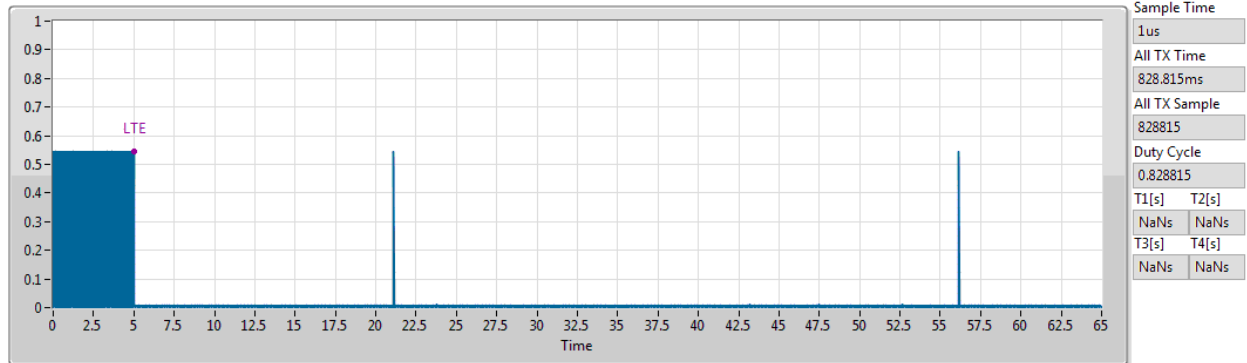
Time Number

379us

8

Adaptivity Result - LTE

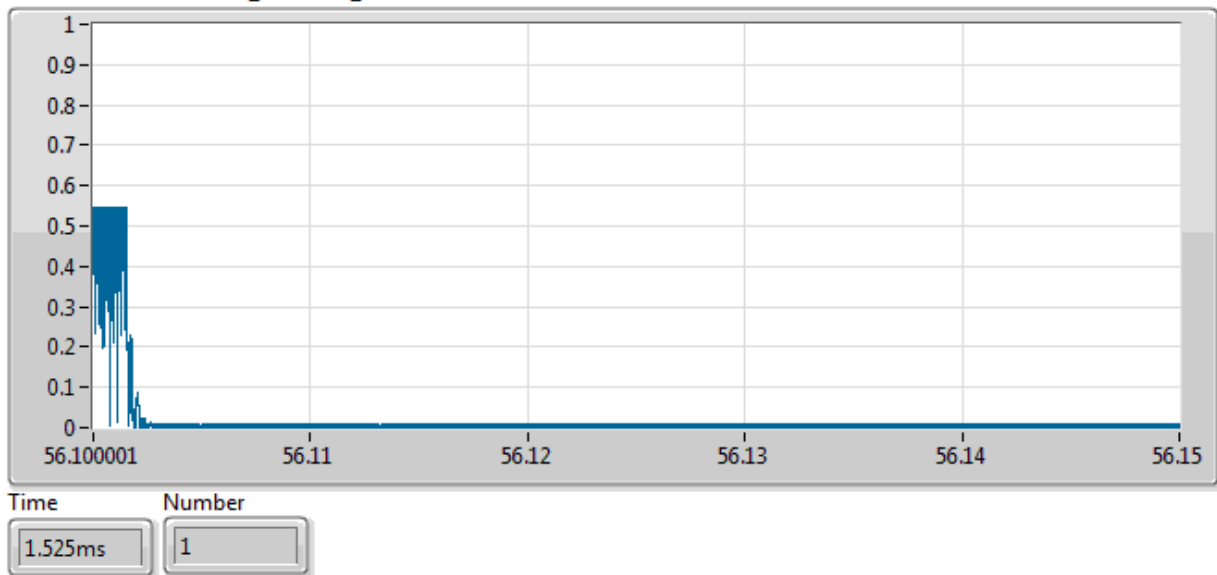
Time Analysis



LTE: Adding the interference signal.

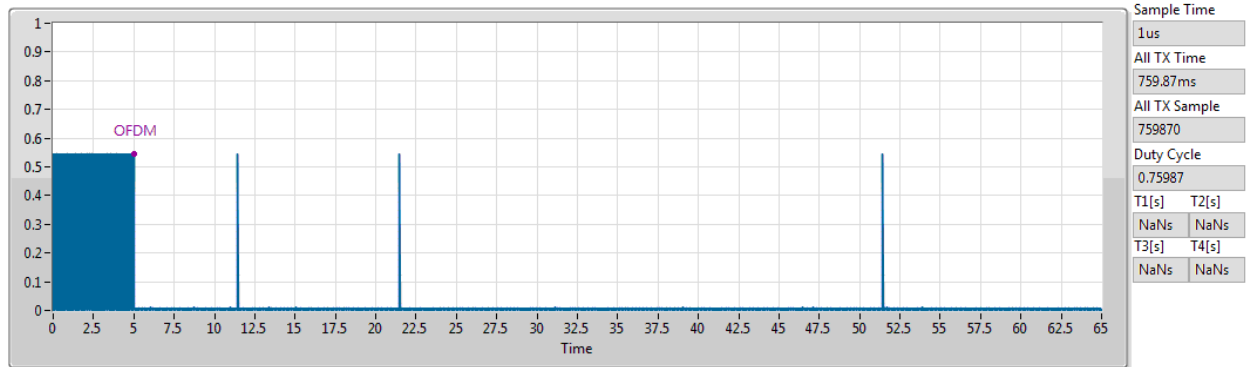
Short Control Signalling Transmissions - LTE

Short Control Signalling Transmissions



Adaptivity Result - OFDM

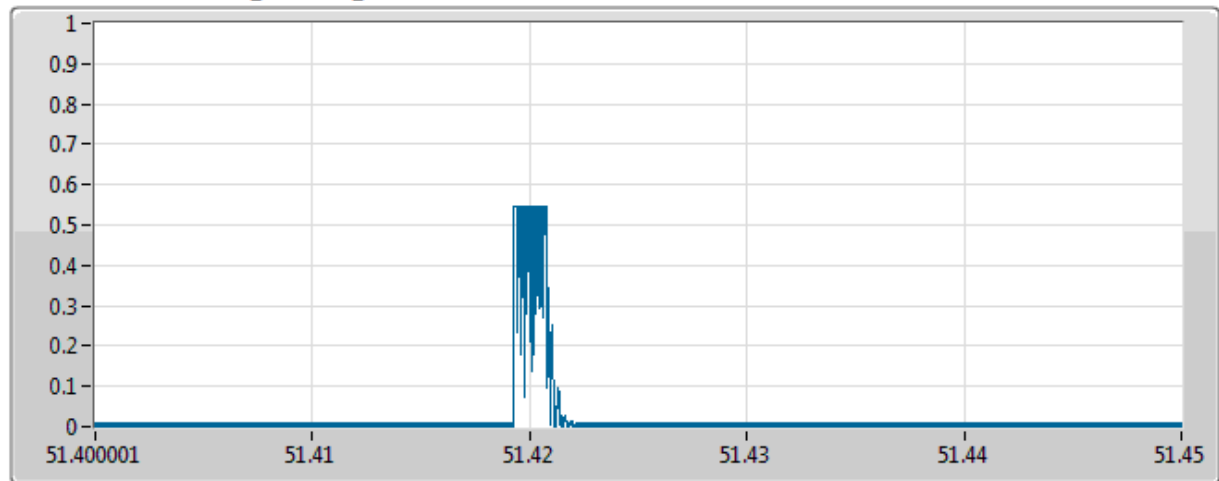
Time Analysis



OFDM: Adding the interference signal.

Short Control Signalling Transmissions - OFDM

Short Control Signalling Transmissions



Time

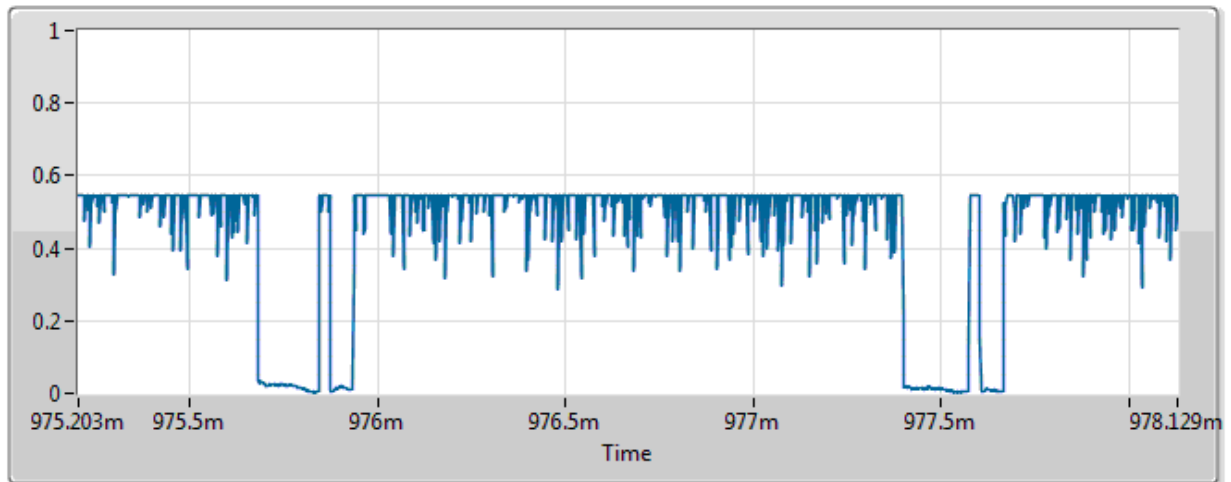
Number

1.553ms

2

Max. Channel Occupancy Time

Max On Time



1.463ms

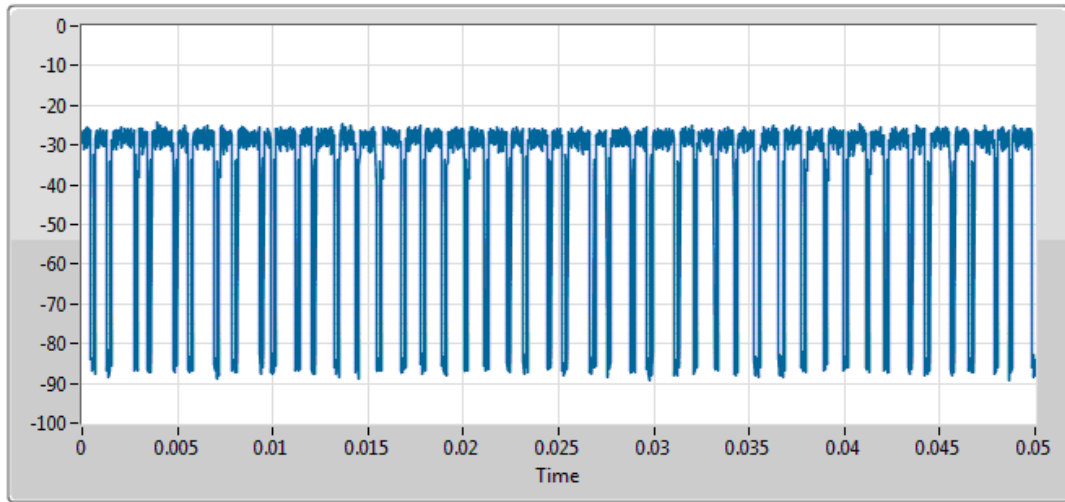
| | |
|-----------------------|-------------------|
| Priority Class | Class 2 |
| Operating Type | Supervised Device |

| n | H(Bn) | Pn | Pn Limit | Result |
|----------|--------------|-----------|-----------------|---------------|
| 0 | 213 | 0.01826 | 0.05000 | Pass |
| 1 | 488 | 0.06008 | 0.12000 | Pass |
| 2 | 586 | 0.11031 | 0.18250 | Pass |
| 3 | 1268 | 0.21899 | 0.24500 | Pass |
| 4 | 722 | 0.28088 | 0.30750 | Pass |
| 5 | 739 | 0.34422 | 0.37000 | Pass |
| 6 | 655 | 0.40036 | 0.43250 | Pass |
| 7 | 687 | 0.45924 | 0.49500 | Pass |
| 8 | 701 | 0.51933 | 0.55750 | Pass |
| 9 | 679 | 0.57753 | 0.62000 | Pass |
| 10 | 779 | 0.64430 | 0.68250 | Pass |
| 11 | 739 | 0.70764 | 0.74500 | Pass |
| 12 | 661 | 0.76429 | 0.80750 | Pass |
| 13 | 720 | 0.82600 | 0.87000 | Pass |
| 14 | 695 | 0.88557 | 0.93250 | Pass |
| 15 | 695 | 0.94514 | 0.99500 | Pass |
| 16 | 640 | 1.00000 | 1.00000 | Pass |

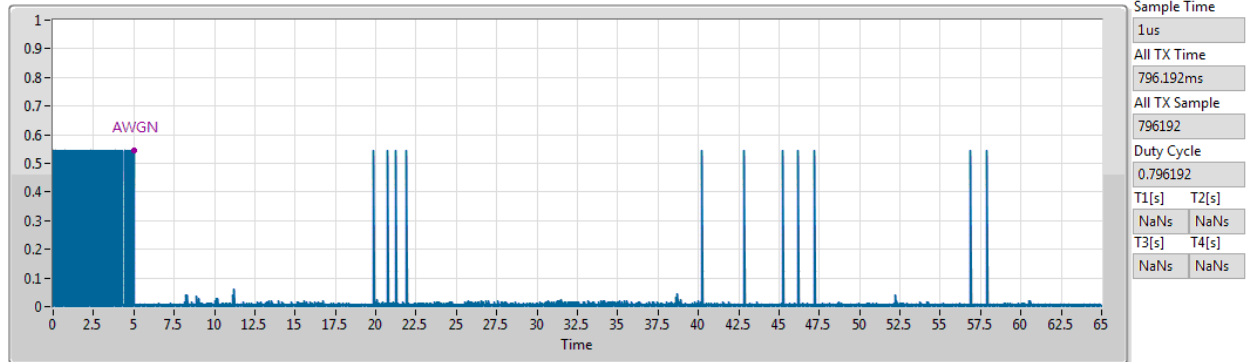
802.11an 40M – 5190MHz

Duty Cycle Plot

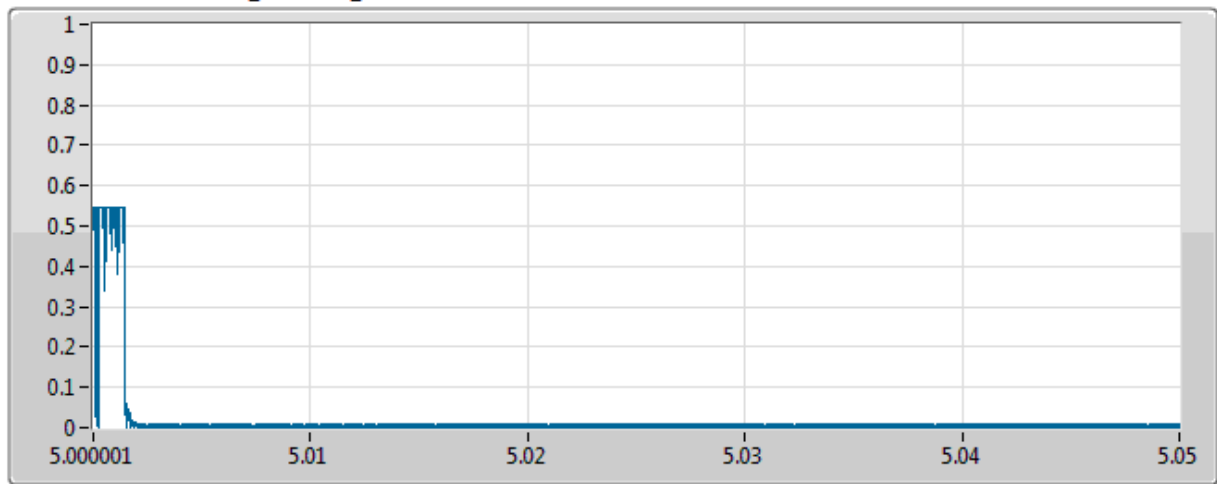
Time Analysis



| | |
|---------------|-------|
| Sample Time | |
| 6.25us | |
| All TX Time | |
| 40.825ms | |
| All TX Sample | |
| 6532 | |
| Duty Cycle | |
| 0.816398 | |
| T1[s] | T2[s] |
| NaNs | NaNs |
| T3[s] | T4[s] |
| NaNs | NaNs |

Adaptivity Result – AWGN
Time Analysis


AWGN: Adding the interference signal.

Short Control Signalling Transmissions
Short Control Signalling Transmissions


Time

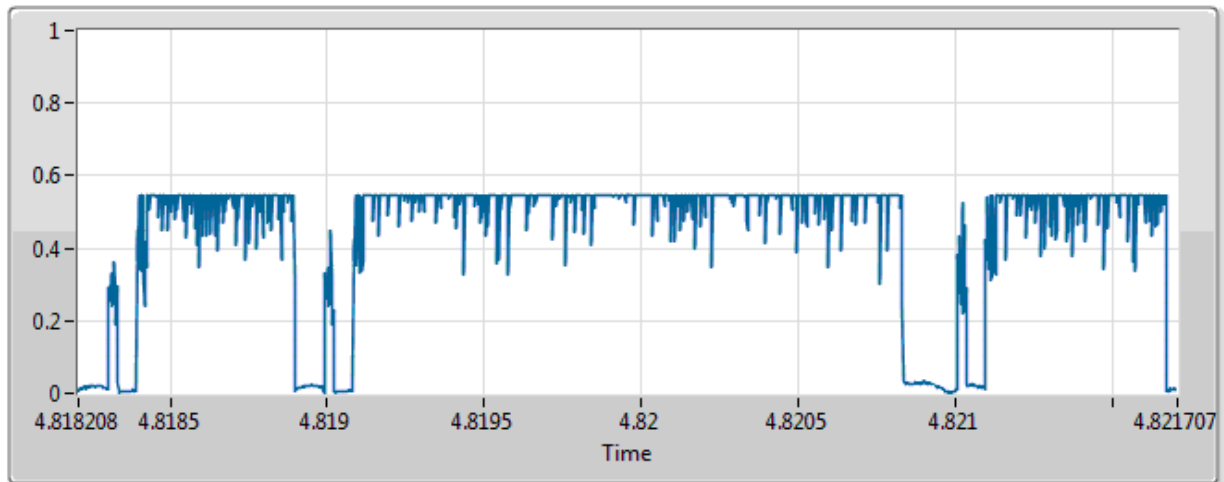
Number

1.276ms

3

Max. Channel Occupancy Time

Max On Time



1.75ms

| | |
|-----------------------|-------------------|
| Priority Class | Class 2 |
| Operating Type | Supervised Device |

| n | H(Bn) | Pn | Pn Limit | Result |
|----------|--------------|-----------|-----------------|---------------|
| 0 | 39 | 0.00335 | 0.05000 | Pass |
| 1 | 390 | 0.03687 | 0.12000 | Pass |
| 2 | 587 | 0.08732 | 0.18250 | Pass |
| 3 | 1191 | 0.18969 | 0.24500 | Pass |
| 4 | 745 | 0.25372 | 0.30750 | Pass |
| 5 | 763 | 0.31930 | 0.37000 | Pass |
| 6 | 687 | 0.37834 | 0.43250 | Pass |
| 7 | 718 | 0.44005 | 0.49500 | Pass |
| 8 | 716 | 0.50159 | 0.55750 | Pass |
| 9 | 715 | 0.56304 | 0.62000 | Pass |
| 10 | 755 | 0.62793 | 0.68250 | Pass |
| 11 | 723 | 0.69007 | 0.74500 | Pass |
| 12 | 788 | 0.75780 | 0.80750 | Pass |
| 13 | 709 | 0.81874 | 0.87000 | Pass |
| 14 | 727 | 0.88122 | 0.93250 | Pass |
| 15 | 681 | 0.93975 | 0.99500 | Pass |
| 16 | 701 | 1.00000 | 1.00000 | Pass |

6 Receiver Blocking Test Result

6.1 Receiver Blocking

6.1.1 Receiver Blocking Limit

| Receiver Blocking Limit | | | | |
|---|---------------------------------|---|-------------------------------|-------------------------|
| Receiver Blocking Parameters | | | | |
| Wanted signal mean power from companion device (dBm) | Blocking signal frequency (MHz) | Blocking signal power (dBm) (see note2) | | Type of blocking signal |
| | | Master or Slave with radar detection | Slave without radar detection | |
| $P_{min} + 6 \text{ dB}$ | 5 100 | -53 | -59 | CW |
| $P_{min} + 6 \text{ dB}$ | 4 900 5 000 5 975 | -47 | -53 | CW |
| NOTE 1: P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined clause 4.2.8.3 in the absence of any blocking signal. | | | | |
| NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the same levels should be used at the antenna connector irrespective of antenna gain. | | | | |

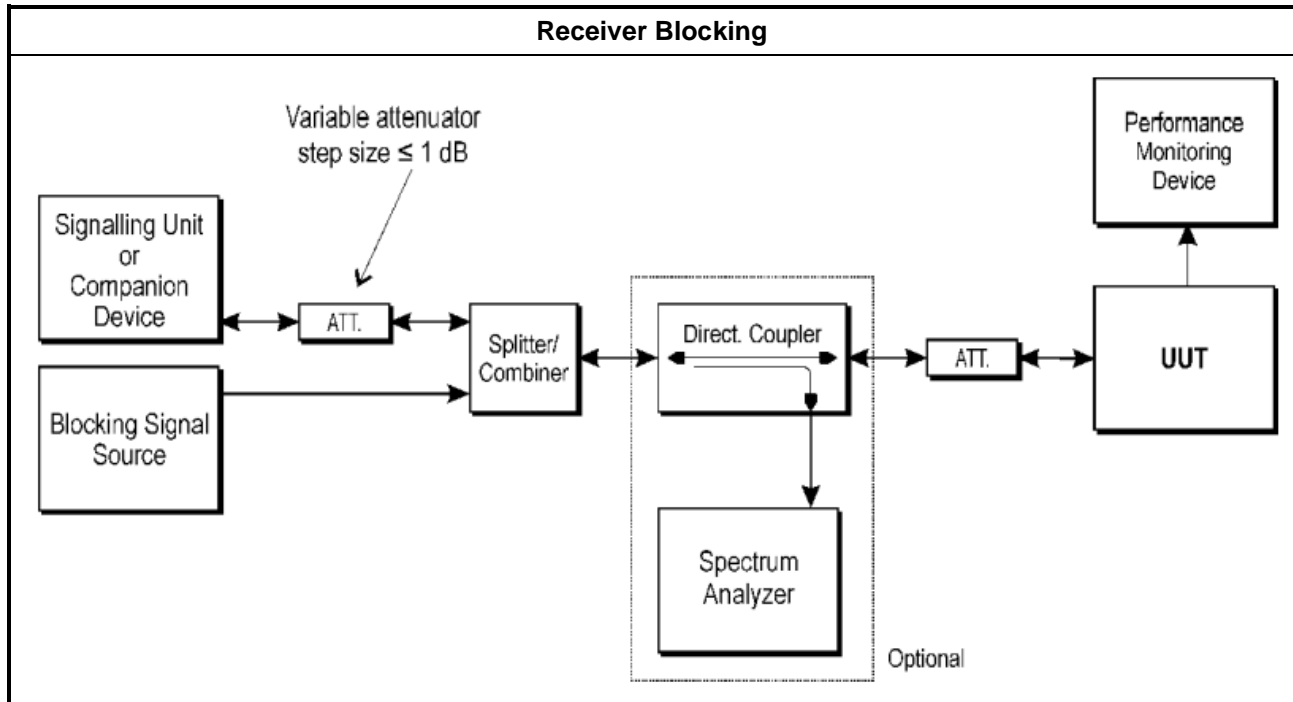
6.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

6.1.3 Test Procedures

| Test Method | |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | Refer as EN 301 893, clause 5.4.10.2.1 for conducted measurement. |
| <input checked="" type="checkbox"/> | For systems using multiple receive chains only one chain (antenna port) need to be tested. All other receiver inputs shall be terminated. |
| <input type="checkbox"/> | Refer as EN 301 893, clause 5.4.10.2.2 for radiated measurement. |

6.1.4 Test Setup



6.1.5 Test Result of Receiver Blocking

| Receiver Blocking Result | | | | | | | |
|-----------------------------|------------------------------|---|-------------------------------|---------------------------------|-------------------------|-------------|--|
| P_{min}(dBm) | -84.5 | | | | | | |
| Modulation Mode | Operation Frequency (MHz) | Wanted Signal Mean Power from Companion Device (dBm) P _{min} + 6 dB | Receiver Blocking Power (dBm) | Blocking Signal Frequency (MHz) | Type of Blocking Signal | Test Result | Blocking Signal Level at which the Performance Criteria is no longer met (dBm) |
| 802.11a | 5180 | -78.5 | -46.36 | 5100 | CW | Pass | -28 |
| | 5180 | -78.5 | -40.36 | 4900 | CW | Pass | -21 |
| | 5180 | -78.5 | -40.36 | 5000 | CW | Pass | -21 |
| | 5180 | -78.5 | -40.36 | 5975 | CW | Pass | -6 |
| Limit | PER(Packet Error Rate) ≤ 10% | | | | | | |
| Result | Complied | | | | | | |

| Receiver Blocking Result | | | | | | | |
|-----------------------------|------------------------------|---|-------------------------------|---------------------------------|-------------------------|-------------|--|
| P_{min}(dBm) | -84.2 | | | | | | |
| Modulation Mode | Operation Frequency (MHz) | Wanted Signal Mean Power from Companion Device (dBm) P _{min} + 6 dB | Receiver Blocking Power (dBm) | Blocking Signal Frequency (MHz) | Type of Blocking Signal | Test Result | Blocking Signal Level at which the Performance Criteria is no longer met (dBm) |
| 802.11a | 5500 | -78.2 | -46.36 | 5100 | CW | Pass | -21 |
| | 5500 | -78.2 | -40.36 | 4900 | CW | Pass | -17 |
| | 5500 | -78.2 | -40.36 | 5000 | CW | Pass | -18 |
| | 5500 | -78.2 | -40.36 | 5975 | CW | Pass | -11 |
| Limit | PER(Packet Error Rate) ≤ 10% | | | | | | |
| Result | Complied | | | | | | |

7 Test Equipment and Calibration Data

Instrument for Conducted Test

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Calibration Due Date |
|----------------------------|--------------|------------------|-------------|-----------------|------------------|----------------------|
| Spectrum Analyzer | R&S | FSV 40 | 101013 | 9KHz~40GHz | 25/Jan/2014 | 24/Jan/2015 |
| Temp. and Humidity Chamber | Giant Force | GTH-225-20-SP-SD | MAA1112-007 | -20 ~ 100℃ | 20/Nov/2013 | 19/Nov/2014 |
| Signal Generator | R&S | SMR40 | 100116 | 10MHz ~ 40GHz | 31/Jul/2014 | 30/Jul/2015 |
| Power Sensor | Anritsu | MA2411B | 0917017 | 300MHz ~ 40GHz | 28/Jan/2014 | 27/Jan/2015 |
| Power Meter | Anritsu | ML2495A | 0949003 | 300MHz ~ 40GHz | 28/Jan/2014 | 27/Jan/2015 |
| RF Cable-2m | HUBER+SUHNER | SUCOFLEX_104 | SN 345675/4 | 30MHz ~ 26.5GHz | 02/Dec/2013 | 01/Dec/2014 |

Instrument for Radiated Test

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Calibration Due Date |
|-------------------|--------------|-----------|-------------|-----------------|------------------|----------------------|
| Spectrum Analyzer | R&S | FSV 40 | 101514 | 10Hz~40GHz | 13/Jun/2014 | 12/Jun/2015 |
| Amplifier | Agilent | 8447D | 2944A11146 | 10kHz ~ 1.3GHz | 15/Jul/2014 | 14/Jul/2015 |
| Amplifier | Agilent | 8449B | 3008A02096 | 1GHz ~ 26.5GHz | 27/Mar/2014 | 26/Mar/2015 |
| Bilog Antenna | SCHAFFNER | CBL6111C | 2737 | 25MHz ~ 2GHz | 20/Sep/2014 | 19/Sep/2015 |
| Horn Antenna | ETS | 3115 | 6744 | 1GHz ~ 18GHz | 05/May/2014 | 04/May/2015 |
| Horn Antenna | SCHWARZBECK | BBHA9170 | BBHA9170221 | 15GHz ~ 40GHz | 22/Jan/2014 | 21/Jan/2015 |

Instrument for Adaptivity

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Calibration Due Date |
|-------------------------|-----------------|-----------------|------------|-----------------|------------------|----------------------|
| Spectrum Analyzer | R&S | FSP7 | 100644 | 9kHz ~ 7GHz | 08/Nov/2016 | 07/Nov/2017 |
| Vector Signal Generator | R&S | SMU200A | 102098 | 100kHz ~ 6GHz | 12/Jan/2017 | 11/Jan/2018 |
| RF cable 0.5m | MTJ Cooperation | 000000-MT26A-50 | D5105 | 1 GHz ~ 40 GHz | 02/Nov/2016 | 01/Nov/2017 |
| RF cable 0.5m | MTJ Cooperation | 000000-MT26A-50 | D5106 | 1 GHz ~ 40 GHz | 02/Nov/2016 | 01/Nov/2017 |
| RF cable 0.2m | MTJ Cooperation | 000000-MT26A-20 | D5101 | 1 GHz ~ 40 GHz | 02/Nov/2016 | 01/Nov/2017 |

Instrument for Receiver Blocking

| Instrument | Manufacturer | Model No. | Serial No. | Spec. | Calibration Date | Calibration Due Date |
|------------------------------|-----------------|------------------|------------|----------------|------------------|----------------------|
| Spectrum Analyzer | R&S | FSP7 | 100644 | 9kHz ~ 7GHz | 08/Nov/2016 | 07/Nov/2017 |
| Vector Signal Generator | R&S | SMU200A | 102098 | 100kHz ~ 6GHz | 12/Jan/2017 | 11/Jan/2018 |
| Wireless connectivity tester | R&S | CMW270 | 100855 | 70 MHz ~ 6 GHz | 17/Nov/2016 | 16/Nov /2017 |
| RF cable 0.5m | MTJ Cooperation | 000000-MT26A-50 | D5105 | 1 GHz ~ 40 GHz | 02/Nov/2016 | 01/Nov/2017 |
| RF cable 0.5m | MTJ Cooperation | 000000-MT26A-50 | D5106 | 1 GHz ~ 40 GHz | 02/Nov/2016 | 01/Nov/2017 |
| RF cable 0.5m | MTJ Cooperation | 000000-MT26A-50 | D5107 | 1 GHz ~ 40 GHz | 02/Nov/2016 | 01/Nov/2017 |
| RF cable 2m | MTJ Cooperation | 000000-MT18A-200 | D5100 | 1 GHz ~ 40 GHz | 02/Nov/2016 | 01/Nov/2017 |

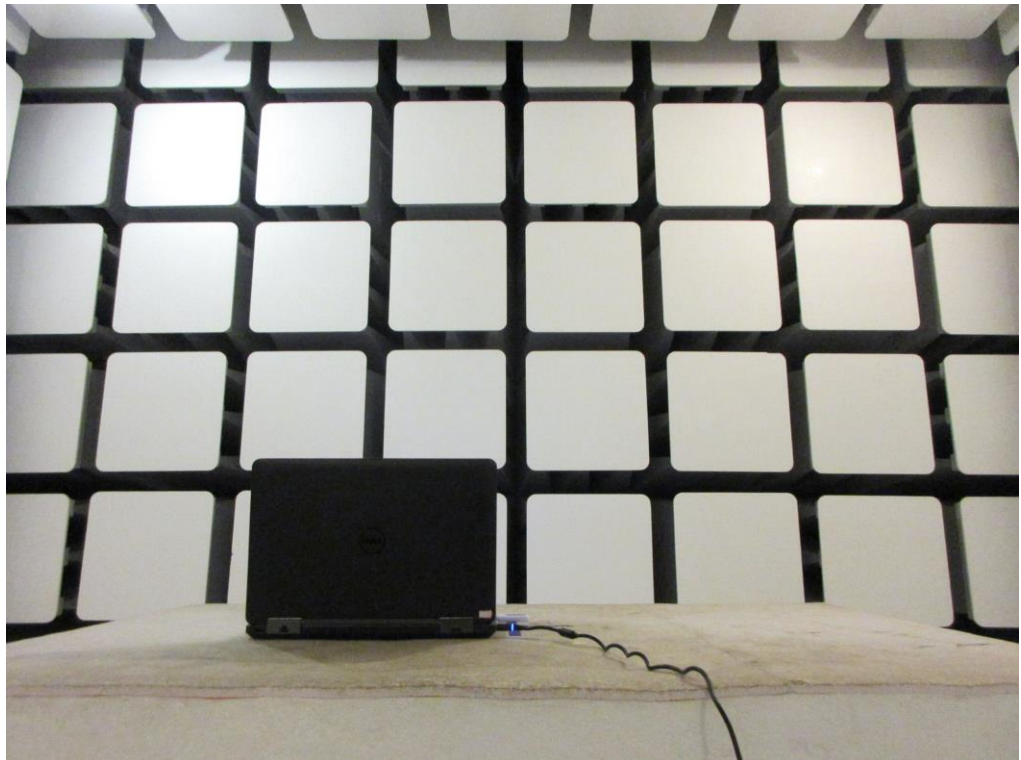
Appendix A. Test Photos

1. Photographs of Radiated Emissions Test Configuration

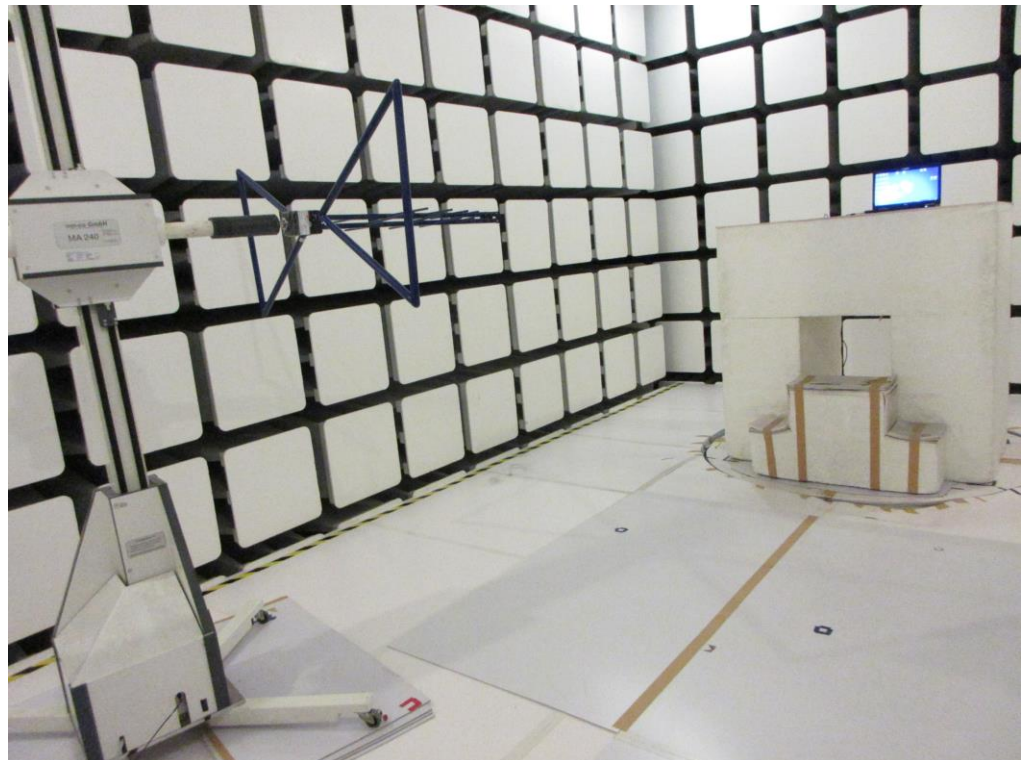
Front view



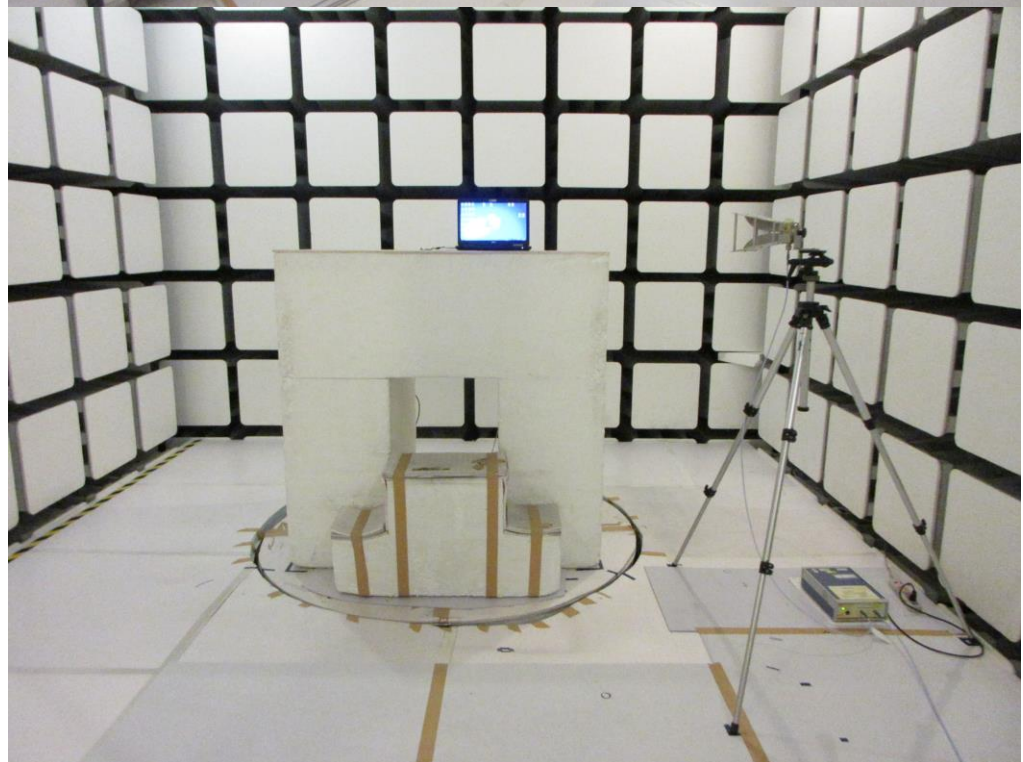
Rear view



Below 1GHz



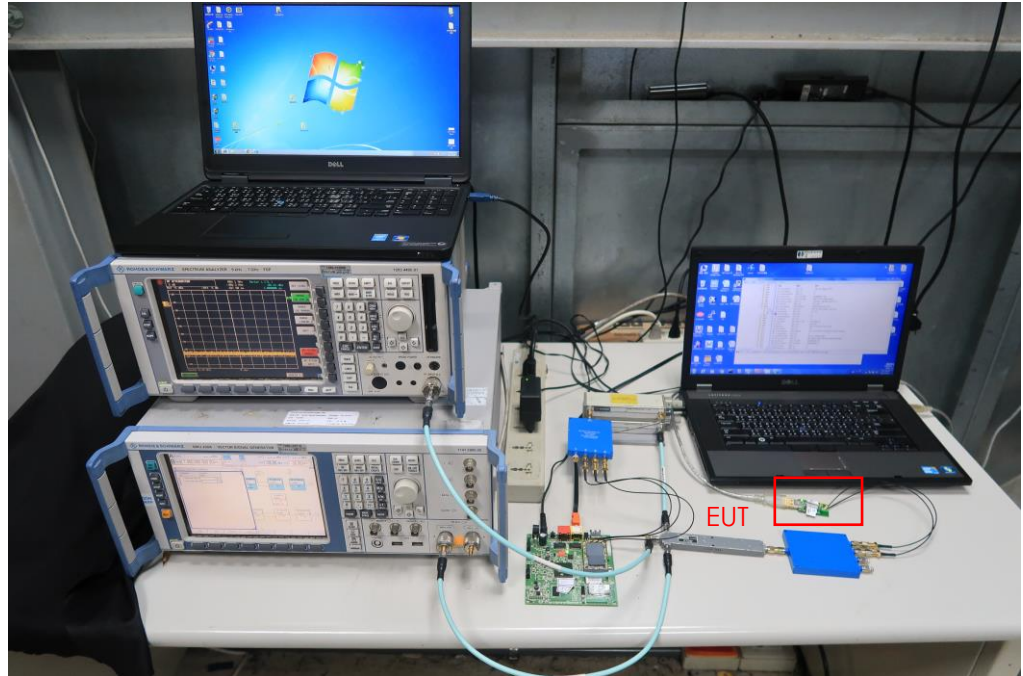
Above 1GHz



**EUT took a close
view**



2. Photographs of Adaptivity Test Configuration



3. Photographs of Receiver Blocking Test Configuration

