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# TEST REPORT

**Report Number: 17110387HKG-001**

Application for Original Grant of 47 CFR Part 15 Certification

**FCC ID: 2AKC5-SFC01**

| Prepared and Checked by: | Approved by: |
|---|---|
| Signed On File<br>Sung Man Yiu, Eric<br>Assistant Engineer | Digitally signed by Terry Chan<br>Location: Intertek Testing Services Hong Kong Ltd.<br>Chan Chi Hung, Terry<br>Manager<br>Date: May 03, 2018 |

# TEST REPORT

## GENERAL INFORMATION

| | |
|---|---|
| **Applicant Name:** | Smarter Applications Ltd. |
| **Applicant Address:** | 1 Long Lane,<br>London, SE1 4PG,<br>United Kingdom. |
| **FCC Specification Standard:** | FCC Part 15, October 1, 2016 Edition |
| **FCC ID:** | 2AKC5-SFC01 |
| **FCC Model(s):** | SFC01, LHFC01 |
| **Type of EUT:** | Spread Spectrum Transmitter |
| **Description of EUT:** | FridgeCam |
| **Serial Number:** | N/A |
| **Sample Receipt Date:** | November 10, 2017 |
| **Date of Test:** | April 02, 2018 to April 16, 2018 |
| **Report Date:** | May 03, 2018 |
| **Environmental Conditions:** | Temperature: +10 to 40°C<br>Humidity: 10 to 90% |

## TEST REPORT

## TABLE OF CONTENTS

# TEST REPORT

## 1.0 TEST RESULTS SUMMARY & STATEMENT OF COMPLIANCE

### 1.1 Summary of Test Results

| Test Items | FCC Part 15 Section | Results | Details See Section |
|---|---|---|---|
| Antenna Requirement | 15.203 | Pass | 2.1 |
| Max. Conducted Output Power (Peak) | 15.247(b)(3)&(4) | Pass | 4.1 |
| Min. 6dB RF Bandwidth | 15.247(a)(2) | Pass | 4.2 |
| Max. Power Density (Peak) | 15.247(e) | Pass | 4.3 |
| Out of Band Antenna Conducted Emission | 15.247(d) | Pass | 4.4 |
| Radiated Emission in Restricted Bands and Spurious Emissions | 15.247(d), 15.209 & 15.109 | Pass | 4.6 |
| AC Power Line Conducted Emission | 15.207 & 15.107 | Pass | 4.7 |

### 1.2 Statement of Compliance

The equipment under test is found to be complying with the following standard:

FCC Part 15, October 1, 2016 Edition

**TEST REPORT**

## 2.0 GENERAL DESCRIPTION

### 2.1 Product Description

The SFC01 is a FridgeCam.

The Equipment Under Test (EUT) operates at frequency range of 2412MHz to 2462MHz with 11 channels.

For 802.11b mode, it operates at frequency range of 2412.000MHz to 2462.000MHz with 11 channels. It transmits via Direct-sequence spread spectrum (DSSS) modulation. Maximum bit rate can be up to 11Mbps.
For 802.11g mode, it operates at frequency range of 2412.000MHz to 2462.000MHz with 11 channels. It transmits via Orthogonal Frequency Division Multiplexing (OFDM) modulation. Maximum bit rate can be up to 54Mbps.
For 802.11n (with 20MHz bandwidth) mode, it operates at frequency range of 2412.000MHz to 2462.000MHz with 11 channels. It transmits via Orthogonal Frequency Division Multiplexing (OFDM) modulation. Maximum bit rate can support up to 65Mbps.

The EUT is powered by a USB (5VDC)/3.7VDC Li-Ion rechargeable battery.

The antenna(s) used in the EUT is integral, and the test sample is a prototype.

The Model(s): LHFC01 is the same as the Model: SFC01 in electronics/electrical designs including software & firmware, PCB layout and construction design/physical design/enclosure. The only differences between these models are model number, trade name and cosmetic details to be sold for marketing purpose.

The circuit description is saved with filename: descri.pdf.

# TEST REPORT

## 2.2 Test Methodology

Both AC power line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). Preliminary radiated scans and all radiated measurements were performed in radiated emission test sites. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application. Antenna port conducted measurements were performed according to ANSI C63.10 (2013) and KDB Publication No.558074 D01 v04 (05-April-2017) All other measurements were made in accordance with the procedures in 47 CFR Part 2.

## 2.3 Test Facility

The radiated emission test site and antenna port conducted measurement facility used to collect the radiated data and conductive data are at Workshop No. 3, G/F., World-Wide Industrial Centre, 43-47 Shan Mei Street, Fo Tan, Sha Tin, N.T., Hong Kong. This test facility and site measurement data have been fully placed on file with the FCC.

## 2.4 Related Submittal(s) Grants

This is a single application for certification of a transceiver (WiFi portion)

## TEST REPORT

# 3.0 SYSTEM TEST CONFIGURATION

3.1 Justification

For radiated emissions testing, the equipment under test (EUT) was setup to transmit / receive continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables (if any) were manipulated to produce worst case emissions.

The EUT is powered by a USB (5VDC)/3.7VDC Li-Ion rechargeable battery.

For the measurements, the EUT was attached to a plastic stand if necessary and placed on the wooden turntable. If the base unit attached to peripherals, they were connected and operational (as typical as possible).

The signal was maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization were varied during the search for maximum signal level. The antenna height was varied from 1 to 4 meters. Radiated emissions were taken at three meters unless the signal level was too low for measurement at that distance. If necessary, a pre-amplifier was used and/or the test was conducted at a closer distance.

For any intentional radiator powered by AC power line, measurements of the radiated signal level of the fundamental frequency component of the emission was performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.

Radiated emission measurement for transmitter were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

Emission that are directly caused by digital circuits in the transmit path and transmitter portion were measured, and the limit are according to FCC Part 15 Section 15.209. Digital circuitries used to control additional functions other than the operation of the transmitter are subject to FCC Part 15 Section 15.109 Limits.

## TEST REPORT

3.1 Justification – Cont'd

Detector function for radiated emissions was in peak mode. Average readings, when required, were taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in section 4.8.3.

Determination of pulse desensitization was made according to *Hewlett Packard Application Note 150-2, Spectrum Analysis... Pulsed RF.* The effective period (Teff) was referred to Exhibit 4.8.3. With the resolution bandwidth 1MHz and spectrum analyzer IF bandwidth 3dB, the pulse desensitization factor was 0dB.

For AC line conducted emission test, the EUT along with its peripherals were placed on a 1.0m(W)x1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50ohm coupling impedance for measuring instrument. The LISN housing, measuring instrument case, reference ground plane, and vertical ground plane were bounded together. The excess power cable between the EUT and the LISN was bundled.

All connecting cables of EUT and peripherals were manipulated to find the maximum emission.

Different data rates have been tested. Worst case is reported only.

All relevant operation modes have been tested, and the worst case data is included in this report.

All data rates were tested under normal mode of WiFi. Only the worst-case data is shown in the report for DSSS and OFDM

3.2 EUT Exercising Software

The EUT exercise program (if any) used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

## TEST REPORT

3.3 Details of EUT and Description of Accessories

*Details of EUT:*

The EUT is power by a USB (5VDC)/3.7V Li-Ion rechargeable battery.

*Description of Accessories:*

(1) HP Notebook Computer(Adaptor Model: HSTNN-CA15) Provided by Intertek
(2) USB cable of 60cm long( provided by Client)

3.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test at a level of confidence of 95% has been considered. The values of the Measurement uncertainty for radiated emission test and RF conducted measurement test are ± 5.3dB and ±0.99dB respectively. The value of the Measurement uncertainty for conducted emission test is ±4.2dB.

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

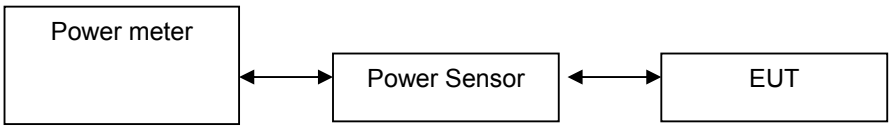
## TEST REPORT

## 4.0 TEST RESULTS

4.1 Maximum Conducted (peak) Output Power at Antenna Terminals

RF Conduct Measurement Test Setup

The figure below shows the test setup, which is utilized to make these measurements.




The antenna port of the EUT was connected to the input of a spectrum analyzer.

☒ The antenna power of the EUT was connected to the input of a power meter. Power was read directly and cable loss correction was added to the reading to the obtain power at the EUT antenna terminals. The measurement procedure 9.1.2 was used.

☐ The EUT should be configured to transmit continuously (at a minimum duty cycle of 98%) at full power over the measurement duration. The measurement procedure AVG1 was used.

IEEE 802.11b (DSSS, 1 Mbps) Antenna Gain = 1.2 dBi

| Frequency (MHz) | | Output in dBm | Output in mWatt |
|---|---|---|---|
| Low Channel: | 2412 | 19.4 | 87.096358996 |
| Middle Channel: | 2437 | 19.32 | 85.506671288 |
| High Channel: | 2462 | 19.2 | 83.17637711 |

IEEE 802.11g (OFDM, 6 Mbps) Antenna Gain = 1.2 dBi

| Frequency (MHz) | | Output in dBm | Output in mWatt |
|---|---|---|---|
| Low Channel: | 2412 | 23.15 | 206.53801558 |
| Middle Channel: | 2437 | 23.28 | 212.8139046 |
| High Channel: | 2462 | 23.16 | 207.01413488 |

## TEST REPORT

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna Gain = 1.2 dBi

| Frequency (MHz) | | Output in dBm | Output in mWatt |
|---|---|---|---|
| Low Channel: | 2412 | 23.2 | 208.92961309 |
| Middle Channel: | 2437 | 23.1 | 204.17379447 |
| High Channel: | 2462 | 22.9 | 194.98445998 |

Cable loss : 0.5 dB  External Attenuation : 0 dB

Cable loss, external attenuation: ☒ included in OFFSET function
☐ added to SA raw reading

IEEE 802.11b (DSSS, 1 Mbps)
max. conducted (peak) output level = 19.4 dBm

IEEE 802.11g (OFDM, 9 Mbps)
max. conducted (peak) output level = 23.28 dBm

IEEE 802.11n (20MHz) (OFDM, MCS0)
max. conducted (peak) output level = 23.2 dBm

Limits:
☒ 1W (30dBm) for antennas with gains of 6dBi or less

☐ ___W (___dBm) for antennas with gains more than 6dBi

## TEST REPORT

4.2 Minimum 6dB RF Bandwidth

The antenna port of the EUT was connected to the input of a spectrum analyzer. The EBW measurement procedure was used. A PEAK output reading was taken, a DISPLAY line was drawn 6dB lower than PEAK level. The 6dB bandwidth was determined from where the channel output spectrum intersected the display line.

IEEE 802.11b (DSSS, 1 Mbps)

| | Frequency (MHz) | 6dB Bandwidth (MHz) |
|---|---|---|
| Low Channel: | 2412 | 8.3 |
| Middle Channel: | 2437 | 8.3 |
| High Channel: | 2462 | 8.3 |

IEEE 802.11g (OFDM, 6 Mbps)

| | Frequency (MHz) | 6dB Bandwidth (MHz) |
|---|---|---|
| Low Channel: | 2412 | 16.5 |
| Middle Channel: | 2437 | 16.5 |
| High Channel: | 2462 | 16.5 |

IEEE 802.11n (20MHz) (OFDM, MCS0)

| | Frequency (MHz) | 6dB Bandwidth (MHz) |
|---|---|---|
| Low Channel: | 2412 | 17.1 |
| Middle Channel: | 2437 | 17.7 |
| High Channel: | 2462 | 17.7 |

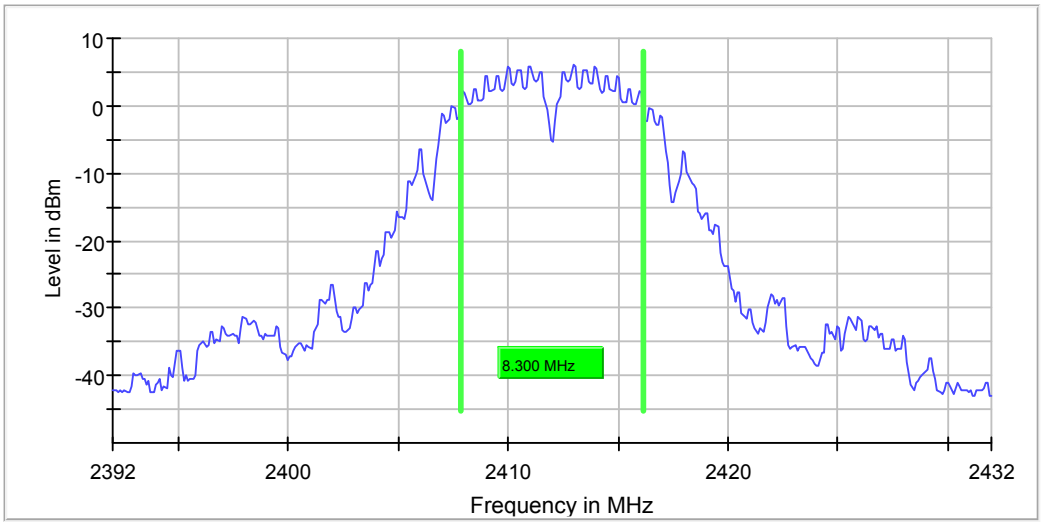
Limits
6 dB bandwidth shall be at least 500kHz

The plots of 6dB RF bandwidth are saved as below.

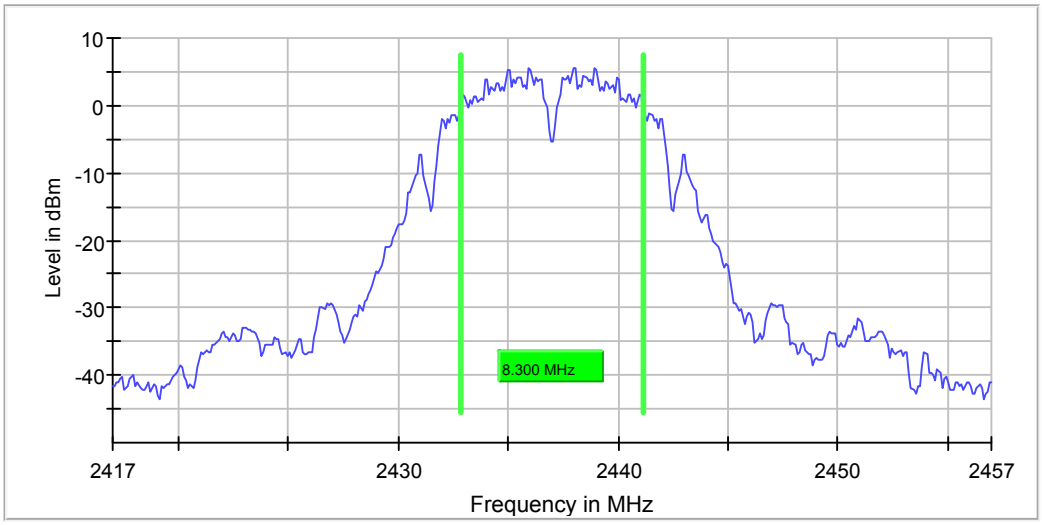
## TEST REPORT

## PLOTS OF 6dB RF BANDWIDTH

802.11b, Lowest Channel



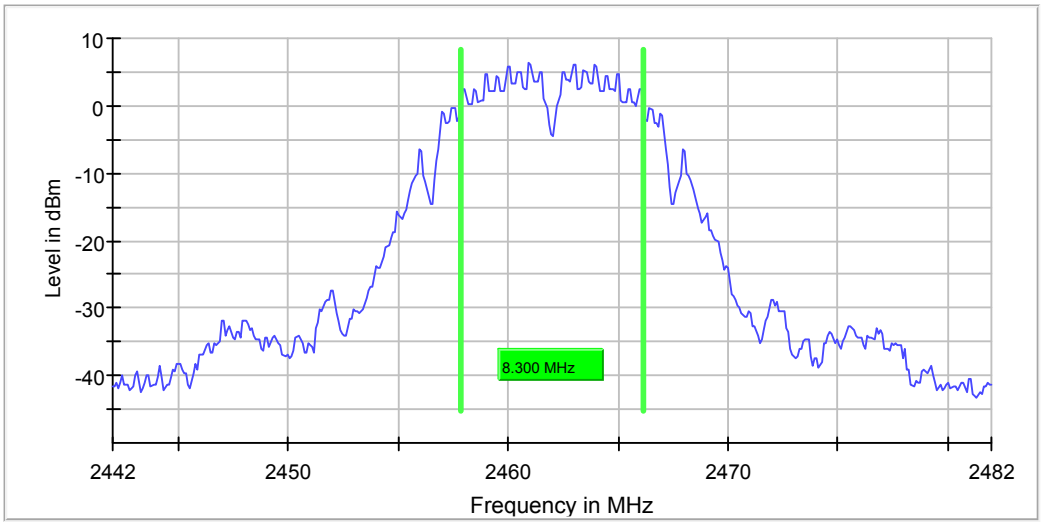

802.11b, Middle Channel



## TEST REPORT

## PLOTS OF 6dB RF BANDWIDTH

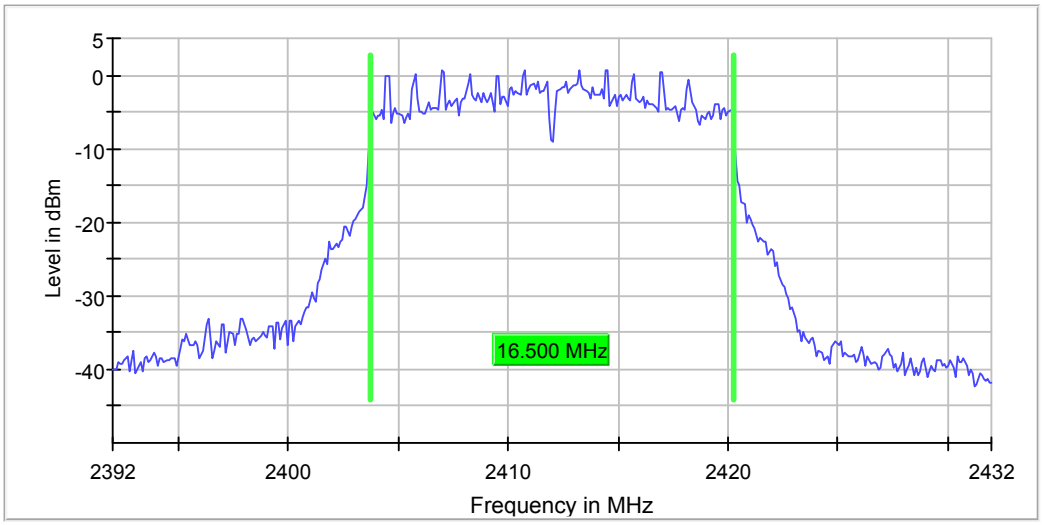
802.11b, Highest Channel



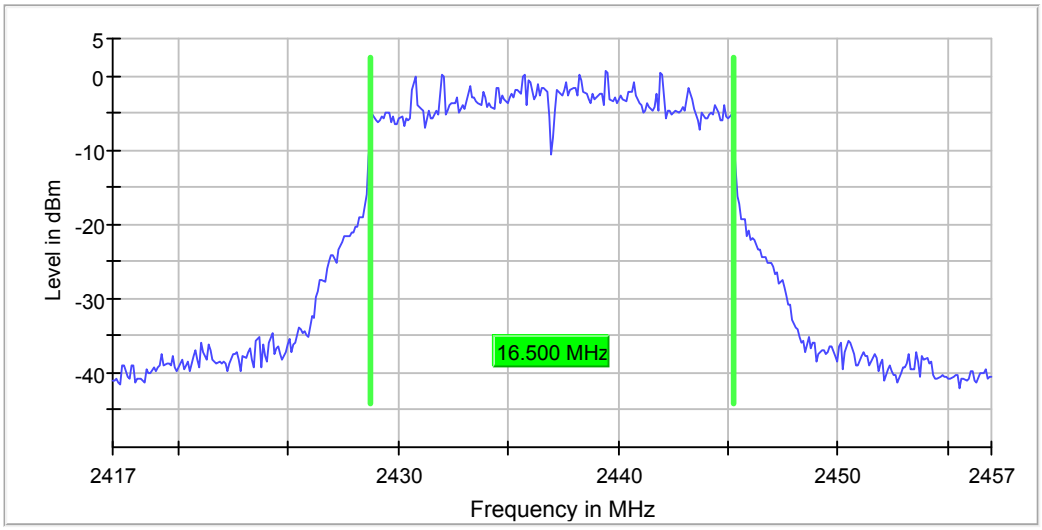
## TEST REPORT

## PLOTS OF 6dB RF BANDWIDTH

802.11g, Lowest Channel



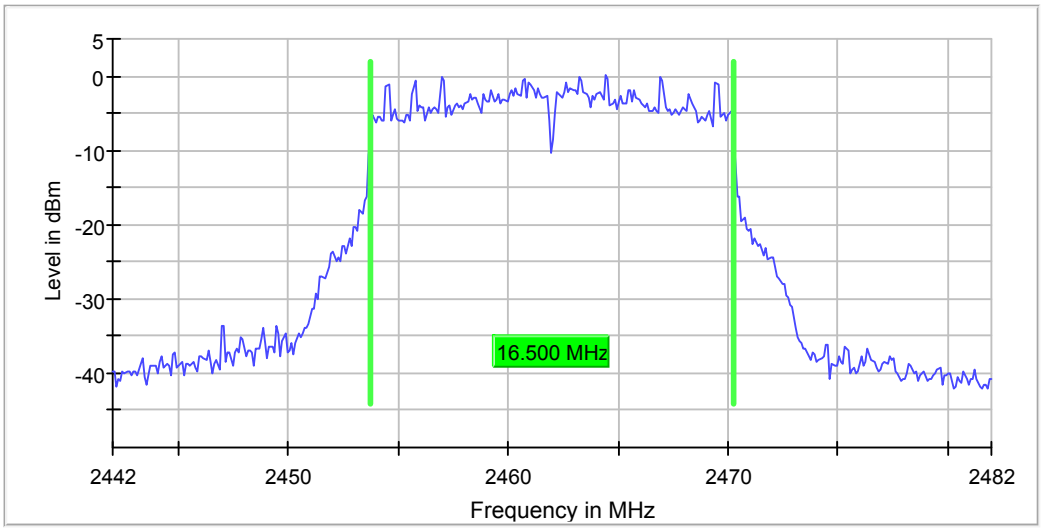

802.11g, Middle Channel



## TEST REPORT

## PLOTS OF 6dB RF BANDWIDTH

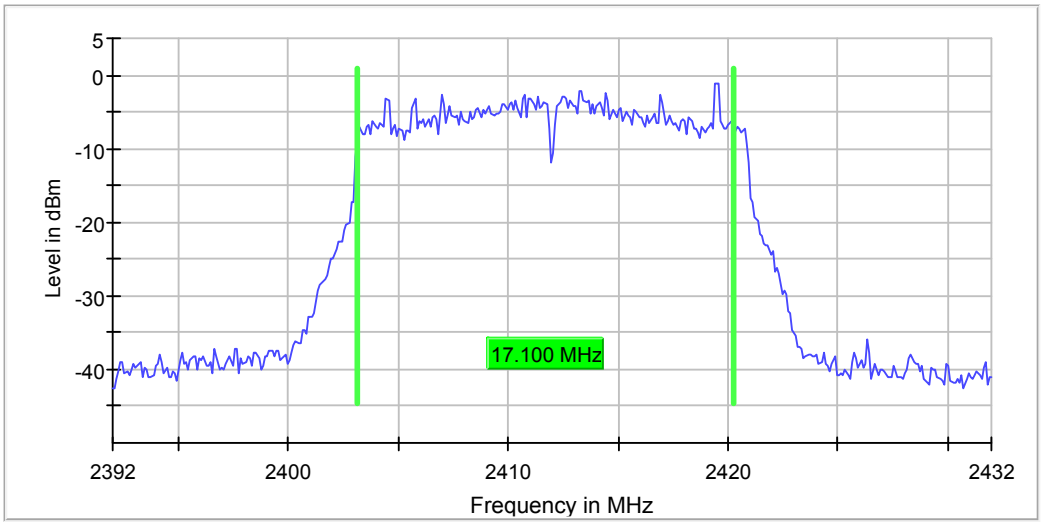
802.11g, Highest Channel



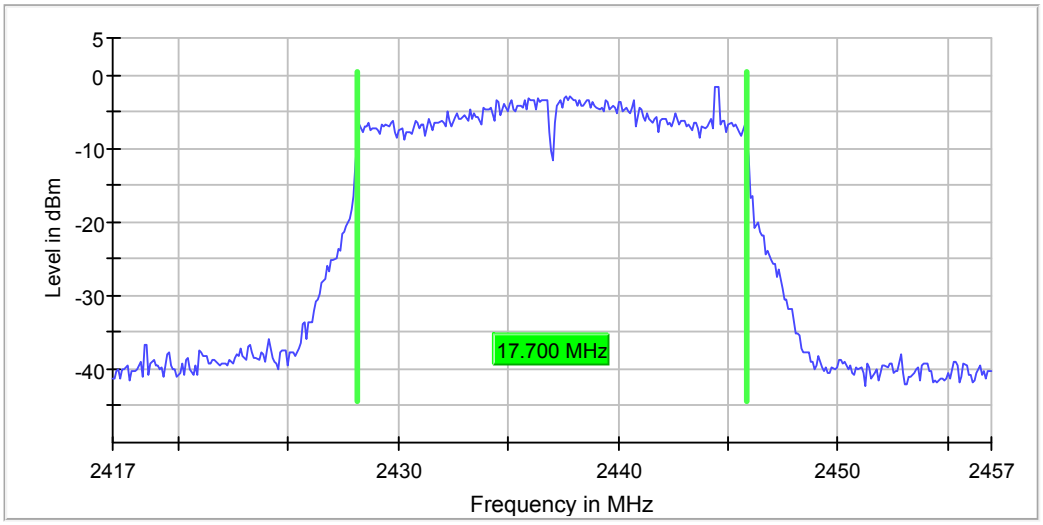
## TEST REPORT

## PLOTS OF 6dB RF BANDWIDTH

802.11n (20MHz), Lowest Channel



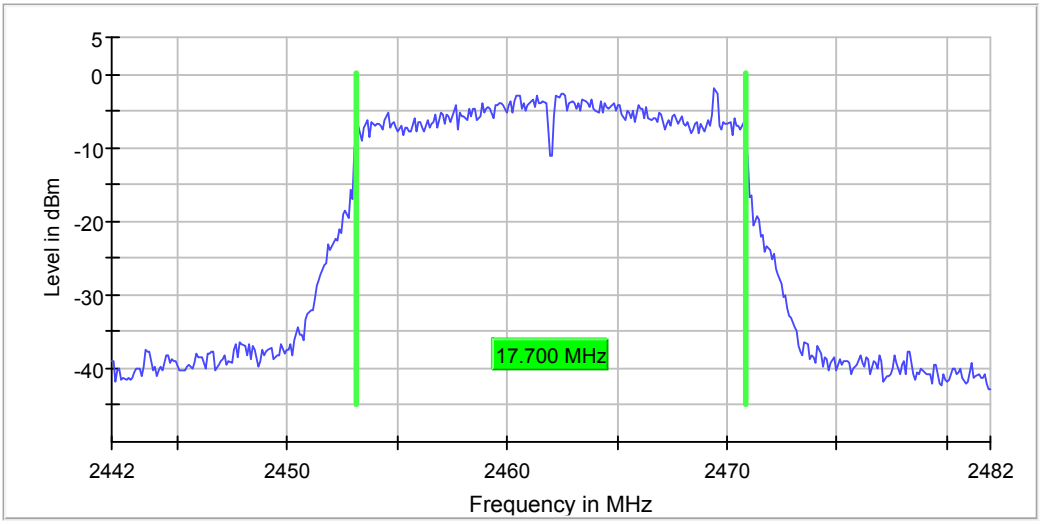

802.11n (20MHz), Middle Channel



## TEST REPORT

## PLOTS OF 6dB RF BANDWIDTH

802.11n (20MHz), Highest Channel




## Measurement

| Setting | Instrument Value | Target Value |
|---|---|---|
| Span | 40.000 MHz | 40.000 MHz |
| RBW | 100.000 kHz | ~ 100.000 kHz |
| VBW | 300.000 kHz | ~ 300.000 kHz |
| SweepPoints | 400 | ~ 400 |
| Sweeptime | 56.886 µs | AUTO |
| Reference Level | 20.000 dBm | 20.000 dBm |
| Attenuation | 40.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 100 | 100 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | FFT | AUTO |
| Preamp | off | off |
| Stablemode | Trace | Trace |
| Stablevalue | 0.50 dB | 0.50 dB |

## TEST REPORT

4.3 Maximum Power Spectral Density

Antenna output of the EUT was coupled directly to spectrum analyzer. The measurement procedure 10.2 PKPSD was used. If an external attenuator and/or cable was used, these losses are compensated for using the OFFSET function of the analyser.

IEEE 802.11b (DSSS, 1 Mbps)

| Frequency (MHz) | | PSD in 100kHz (dBm) |
|---|---|---|
| Low Channel: | 2412 | 6.333 |
| Middle Channel: | 2437 | 6.016 |
| High Channel: | 2462 | 6.312 |

IEEE 802.11g (OFDM, 6 Mbps)

| Frequency (MHz) | | PSD in 100kHz (dBm) |
|---|---|---|
| Low Channel: | 2412 | 0.316 |
| Middle Channel: | 2437 | 0.393 |
| High Channel: | 2462 | 0.324 |

IEEE 802.11n (20MHz) (OFDM, MCS0)

| Frequency (MHz) | | PSD in 100kHz (dBm) |
|---|---|---|
| Low Channel: | 2412 | -0.744 |
| Middle Channel: | 2437 | -0.534 |
| High Channel: | 2462 | -0.681 |

Cable Loss: 0.5 dB

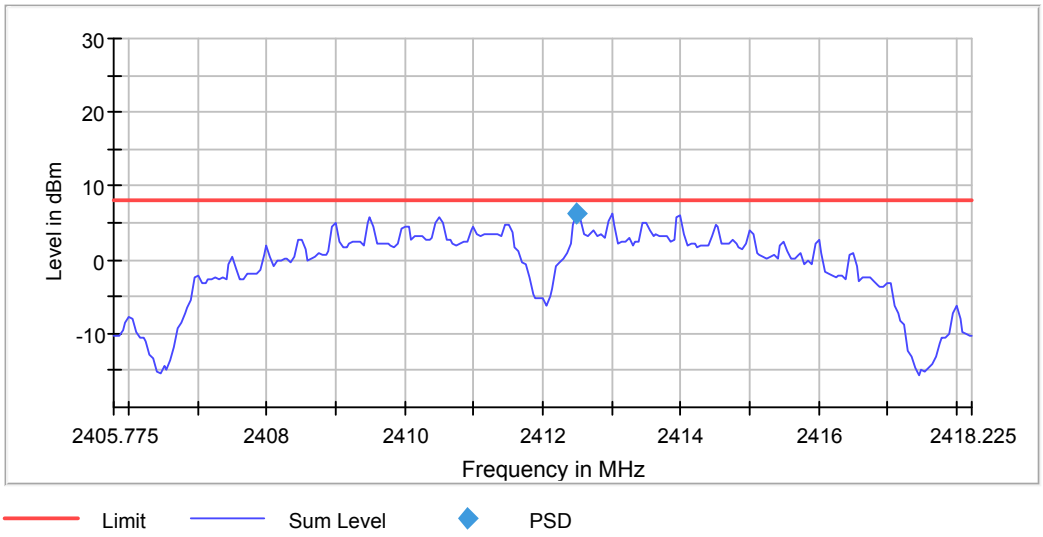
Limit:
8dBm

The plots of power spectral density are as below.

## TEST REPORT

## PLOTS OF POWER SPECTRAL DENSITY

802.11b, Lowest channel

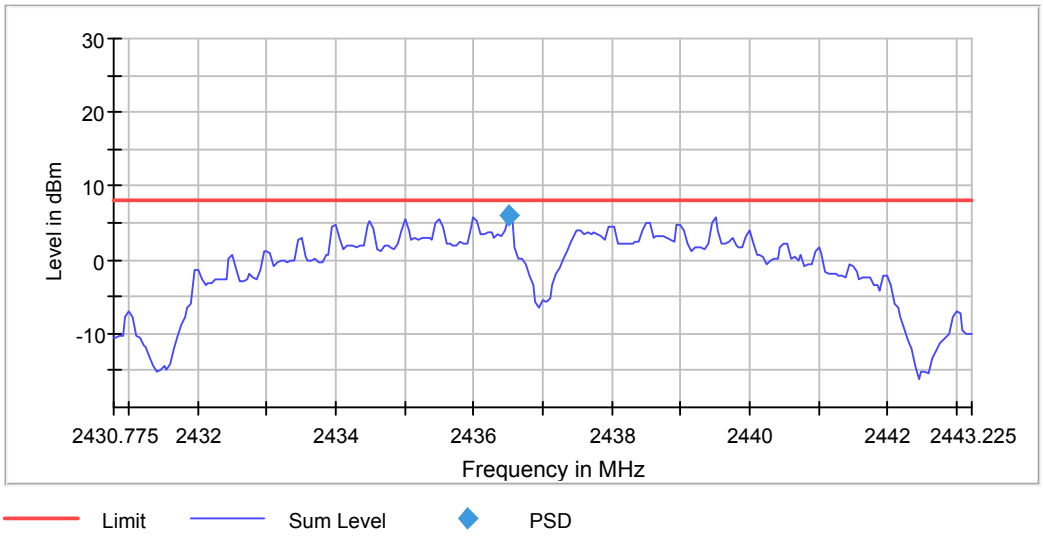



## Measurement

| Setting | Instrument Value | Target Value |
|---|---|---|
| Start Frequency | 2.40578 GHz | 2.40578 GHz |
| Stop Frequency | 2.41823 GHz | 2.41823 GHz |
| Span | 12.450 MHz | 12.450 MHz |
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 249 | ~ 249 |
| Sweeptime | 1.020 ms | AUTO |
| Reference Level | 20.000 dBm | 20.000 dBm |
| Attenuation | 40.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 100 | 100 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | Sweep | Sweep |
| Preamp | off | off |
| Stablemode | Trace | Trace |

## TEST REPORT

802.11b, Middle channel



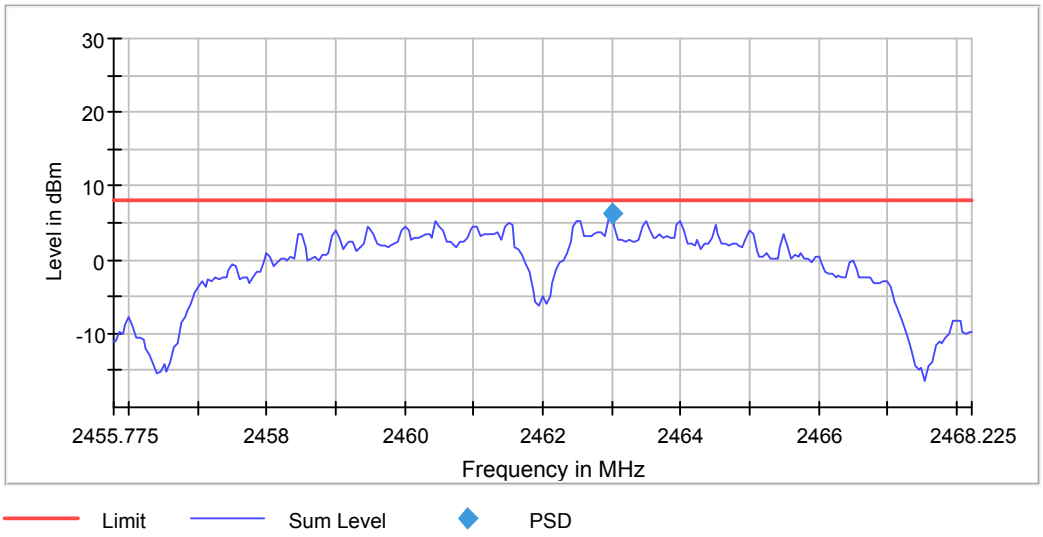

## Measurement

| Setting | Instrument Value | Target Value |
|---|---|---|
| Start Frequency | 2.43078 GHz | 2.43078 GHz |
| Stop Frequency | 2.44323 GHz | 2.44323 GHz |
| Span | 12.450 MHz | 12.450 MHz |
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 249 | ~ 249 |
| Sweeptime | 1.020 ms | AUTO |
| Reference Level | 20.000 dBm | 20.000 dBm |
| Attenuation | 40.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 100 | 100 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | Sweep | Sweep |
| Preamp | off | off |
| Stablemode | Trace | Trace |

## TEST REPORT

## PLOTS OF POWER SPECTRAL DENSITY

802.11b, Highest channel



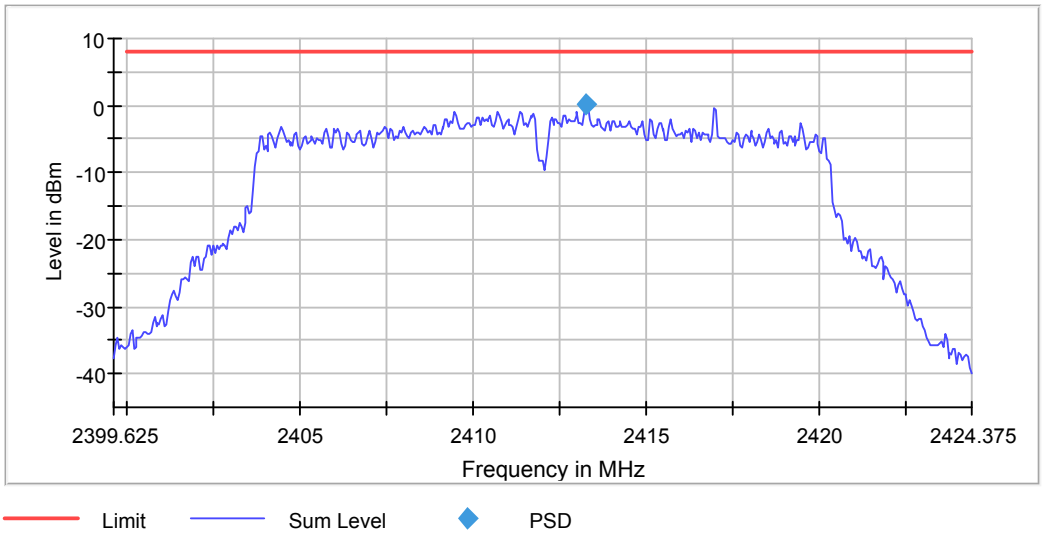

## Measurement

| Setting | Instrument Value | Target Value |
|---|---|---|
| Start Frequency | 2.45578 GHz | 2.45578 GHz |
| Stop Frequency | 2.46823 GHz | 2.46823 GHz |
| Span | 12.450 MHz | 12.450 MHz |
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 249 | ~ 249 |
| Sweeptime | 1.020 ms | AUTO |
| Reference Level | 20.000 dBm | 20.000 dBm |
| Attenuation | 40.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 100 | 100 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | Sweep | Sweep |
| Preamp | off | off |

## TEST REPORT

## PLOTS OF POWER SPECTRAL DENSITY

802.11g, Lowest channel

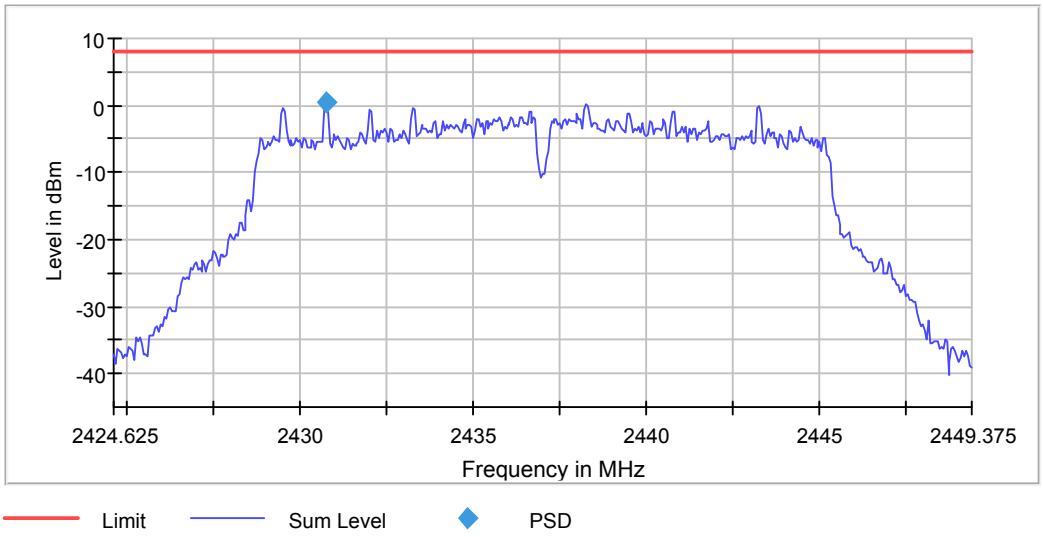



## Measurement

| Setting | Instrument Value | Target Value |
|---|---|---|
| Start Frequency | 2.39963 GHz | 2.39963 GHz |
| Stop Frequency | 2.42438 GHz | 2.42438 GHz |
| Span | 24.750 MHz | 24.750 MHz |
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 495 | ~ 495 |
| Sweeptime | 1.040 ms | AUTO |
| Reference Level | 20.000 dBm | 20.000 dBm |
| Attenuation | 40.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 100 | 100 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | Sweep | Sweep |
| Preamp | off | off |

## TEST REPORT

802.11g, Middle channel



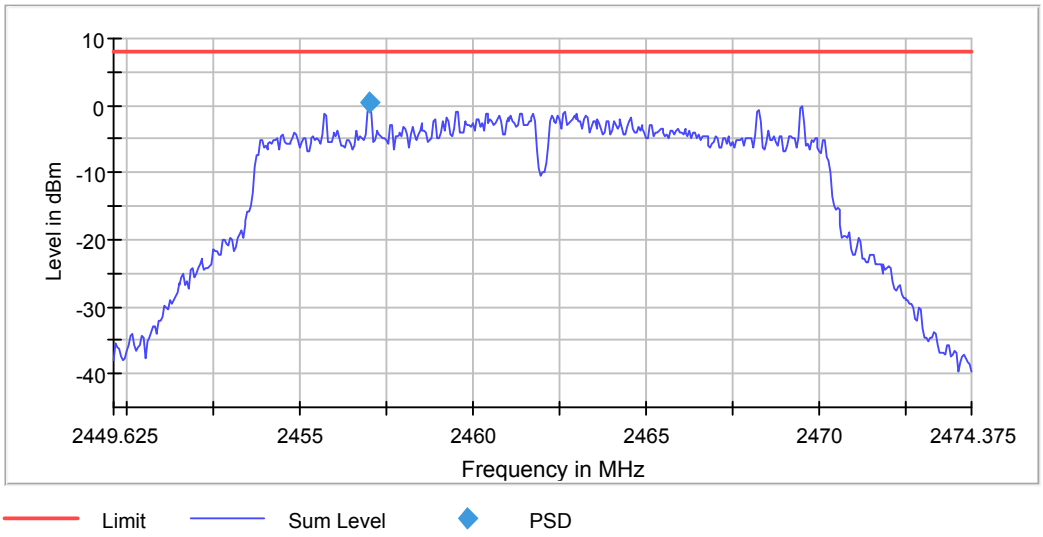

## Measurement

| Setting | Instrument Value | Target Value |
|---|---|---|
| Start Frequency | 2.42463 GHz | 2.42463 GHz |
| Stop Frequency | 2.44938 GHz | 2.44938 GHz |
| Span | 24.750 MHz | 24.750 MHz |
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 495 | ~ 495 |
| Sweeptime | 1.040 ms | AUTO |
| Reference Level | 20.000 dBm | 20.000 dBm |
| Attenuation | 40.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 100 | 100 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | Sweep | Sweep |
| Preamp | off | off |

## TEST REPORT

## PLOTS OF POWER SPECTRAL DENSITY

802.11g, Highest channel



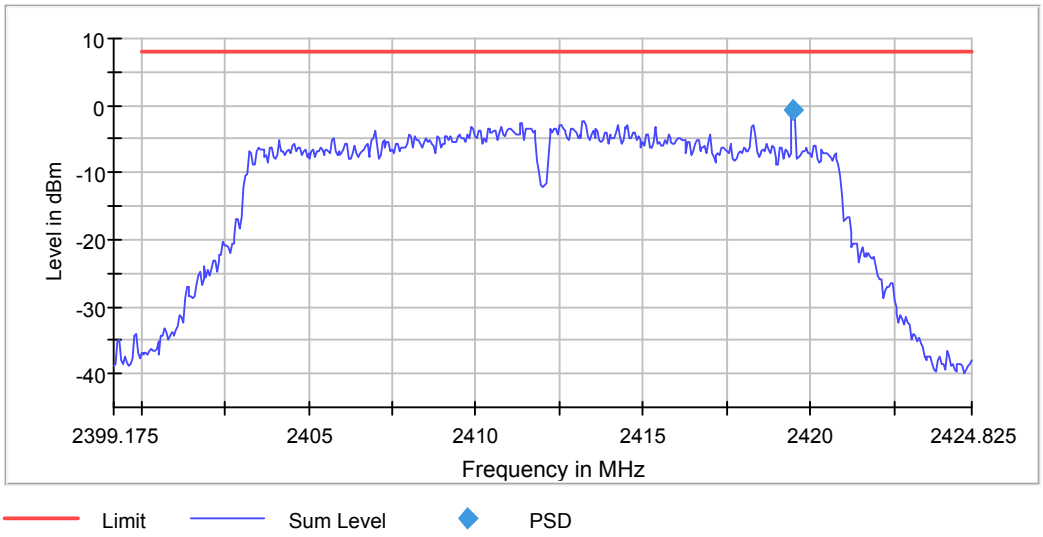

## Measurement

| Setting | Instrument Value | Target Value |
|---|---|---|
| Start Frequency | 2.44963 GHz | 2.44963 GHz |
| Stop Frequency | 2.47438 GHz | 2.47438 GHz |
| Span | 24.750 MHz | 24.750 MHz |
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 495 | ~ 495 |
| Sweeptime | 1.040 ms | AUTO |
| Reference Level | 20.000 dBm | 20.000 dBm |
| Attenuation | 40.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 100 | 100 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | Sweep | Sweep |
| Preamp | off | off |
| Stablemode | Trace | Trace |

## TEST REPORT

## PLOTS OF POWER SPECTRAL DENSITY

802.11n (20MHz), Lowest channel

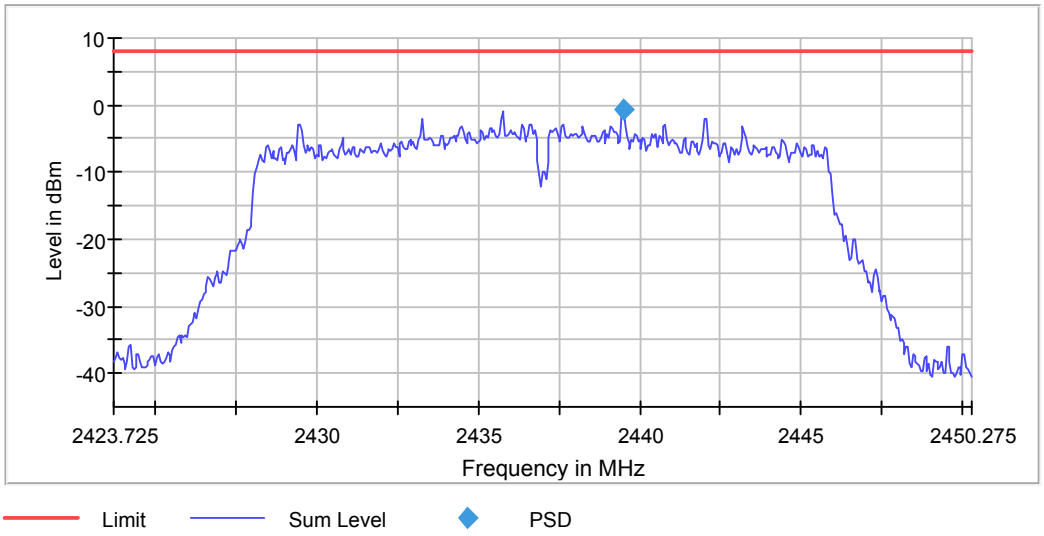



## Measurement

| Setting | Instrument Value | Target Value |
|---|---|---|
| Start Frequency | 2.39918 GHz | 2.39918 GHz |
| Stop Frequency | 2.42483 GHz | 2.42483 GHz |
| Span | 25.650 MHz | 25.650 MHz |
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 513 | ~ 513 |
| Sweeptime | 1.080 ms | AUTO |
| Reference Level | 20.000 dBm | 20.000 dBm |
| Attenuation | 40.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 100 | 100 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | Sweep | Sweep |
| Preamp | off | off |

## TEST REPORT

802.11n (20MHz), Middle channel



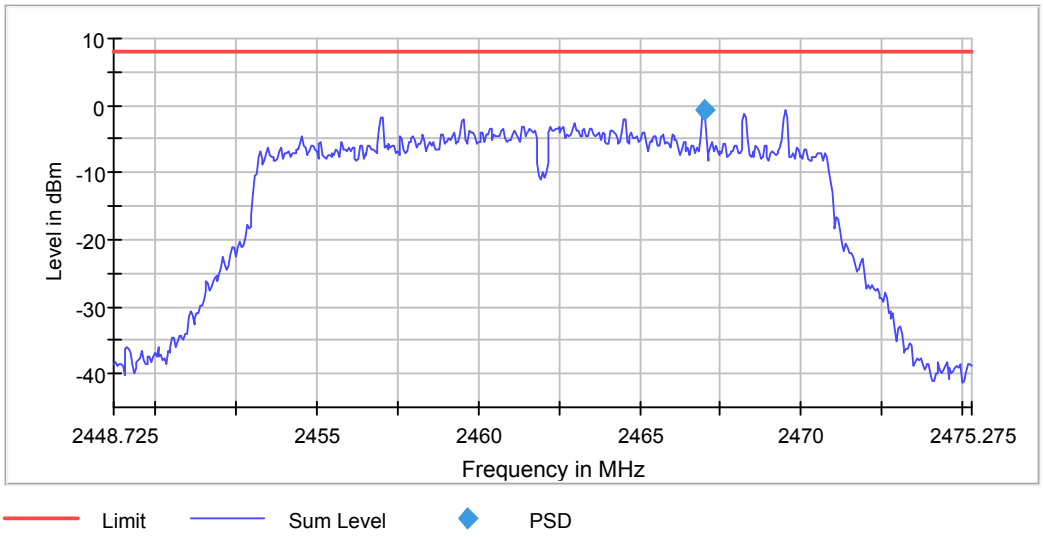

## Measurement

| Setting | Instrument Value | Target Value |
|---|---|---|
| Start Frequency | 2.42373 GHz | 2.42373 GHz |
| Stop Frequency | 2.45028 GHz | 2.45028 GHz |
| Span | 26.550 MHz | 26.550 MHz |
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 531 | ~ 531 |
| Sweeptime | 1.010 ms | AUTO |
| Reference Level | 20.000 dBm | 20.000 dBm |
| Attenuation | 40.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 100 | 100 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | Sweep | Sweep |
| Preamp | off | off |

## TEST REPORT

## PLOTS OF POWER SPECTRAL DENSITY

802.11n (20MHz), Highest channel




## Measurement

| Setting | Instrument Value | Target Value |
|---|---|---|
| Start Frequency | 2.44873 GHz | 2.44873 GHz |
| Stop Frequency | 2.47528 GHz | 2.47528 GHz |
| Span | 26.550 MHz | 26.550 MHz |
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 531 | ~ 531 |
| Sweeptime | 1.010 ms | AUTO |
| Reference Level | 20.000 dBm | 20.000 dBm |
| Attenuation | 40.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 100 | 100 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | Sweep | Sweep |
| Preamp | off | off |

## TEST REPORT

4.4 Out of Band Conducted Emissions

For 802.11b/g/n20, the maximum conducted (peak) output power was used to demonstrate compliance as described in 9.1. Then the display line (in red) shown in the following plots denotes the limit at 20dB below maximum measured in-band peak PSD level in 100 KHz bandwidth for 802.11b/g/n20.

The measurement procedures under sections 11 of KDB558074 D01 v04 (05-April-2017) were used.

Furthermore, delta measurement technique for measuring bandedge emissions was incorporated in the test of the edge at 2483.5MHz.

Limits:
All spurious emission and up to the tenth harmonic was measured and they were found to be at least for 802.11b,g and n20MHz below the maximum measured in-band peak PSD level.

## TEST REPORT

## PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11b, Lowest Channel

### Result

| DUT Frequency (MHz) | Result |
|---|---|
| 2412.000000 | PASS |

### Final measurements

| Frequency (MHz) | Level Pre Measurement (dBm) | level (dBm) | Limit (dBm) | Margin (dB) | Result |
|---|---|---|---|---|---|
| --- | --- | --- | --- | --- | --- |

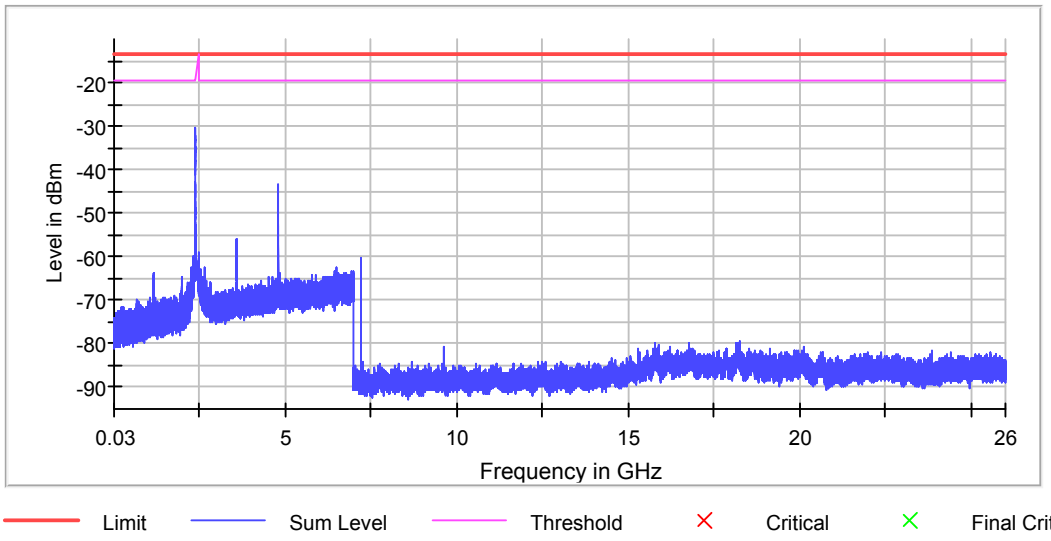
### Pre Measurements

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) |
|---|---|---|---|
| 2398.025000 | -30.3 | 16.6 | -13.7 |
| 2397.975000 | -30.7 | 17.0 | -13.7 |
| 2398.525000 | -32.0 | 18.3 | -13.7 |
| 2397.025000 | -32.3 | 18.7 | -13.7 |
| 2396.975000 | -32.6 | 19.0 | -13.7 |
| 2398.075000 | -32.7 | 19.0 | -13.7 |
| 2398.475000 | -32.8 | 19.1 | -13.7 |
| 2398.375000 | -33.0 | 19.3 | -13.7 |
| 2398.325000 | -33.1 | 19.4 | -13.7 |
| 2398.125000 | -33.2 | 19.5 | -13.7 |
| 2398.425000 | -33.5 | 19.8 | -13.7 |
| 2398.275000 | -33.5 | 19.9 | -13.7 |
| 2398.175000 | -33.7 | 20.1 | -13.7 |
| 2398.575000 | -33.8 | 20.1 | -13.7 |
| 2398.225000 | -33.9 | 20.2 | -13.7 |

### Measurement Settings

| Start Frequency (MHz) | Stop Frequency (MHz) | Pre Measurement | Final Measurement |
|---|---|---|---|
| 30.000000 | 1000.000000 | 1 | 1 |
| 1000.000000 | 2400.000000 | 2 | 2 |
| 2483.500000 | 7000.000000 | 2 | 2 |
| 7000.000000 | 18000.000000 | 2 | 2 |
| 18000.000000 | 26000.000000 | 2 | 2 |

## TEST REPORT




## Pre Measurement 1

| Setting | Instrument Value | Target Value |
|---|---|---|
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 19400 | ~ 19400 |
| Sweeptime | 1.061 ms | AUTO |
| Reference Level | -10.000 dBm | -30.000 dBm |
| Attenuation | 20.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 30 | 30 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | FFT | AUTO |
| Preamp | off | off |
| Stablemode | Trace | Trace |
| Stablevalue | 0.50 dB | 0.50 dB |

## Pre Measurement 2

| Setting | Instrument Value | Target Value |
|---|---|---|
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 28000 | ~ 28000 |
| Sweeptime | 28.000 ms | AUTO |
| Reference Level | -10.000 dBm | -30.000 dBm |
| Attenuation | 20.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 30 | 30 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | Sweep | AUTO |
| Preamp | off | off |
| Stablemode | Trace | Trace |
| Stablevalue | 0.50 dB | 0.50 dB |

## TEST REPORT

802.11b, Middle Channel

## Result

| DUT Frequency (MHz) | Result |
|---|---|
| 2437.000000 | PASS |

## Final measurements

| Frequency (MHz) | Level Pre Measurement (dBm) | level (dBm) | Limit (dBm) | Margin (dB) | Result |
|---|---|---|---|---|---|
| --- | --- | --- | --- | --- | --- |

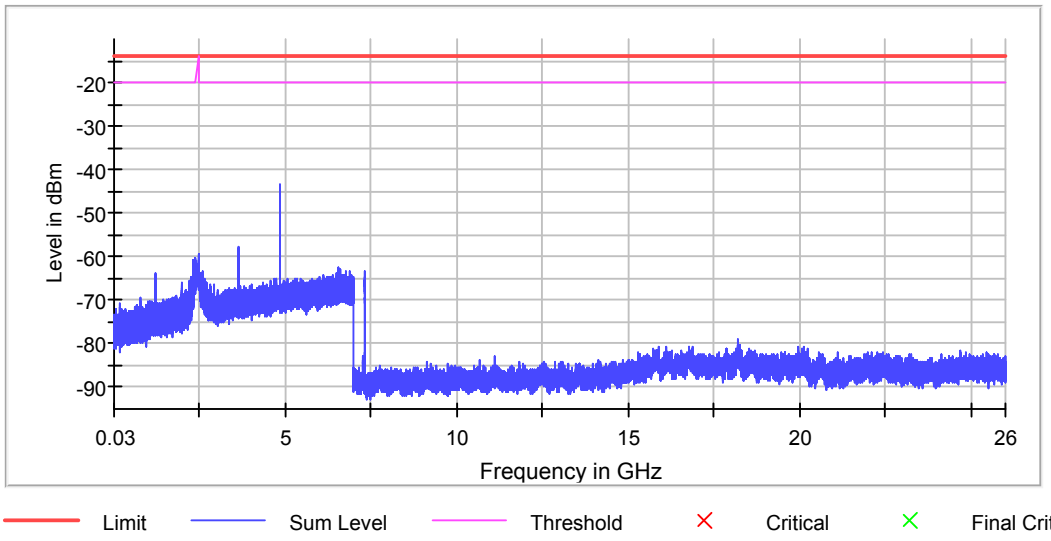
## Pre Measurements

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) |
|---|---|---|---|
| 4873.994633 | -43.3 | 29.3 | -14.0 |
| 4874.135769 | -47.3 | 33.3 | -14.0 |
| 4877.099630 | -52.7 | 38.7 | -14.0 |
| 4873.853497 | -52.8 | 38.8 | -14.0 |
| 4871.030772 | -53.0 | 39.0 | -14.0 |
| 4876.958493 | -53.1 | 39.2 | -14.0 |
| 4874.982586 | -56.9 | 42.9 | -14.0 |
| 4873.006679 | -57.6 | 43.6 | -14.0 |
| 3653.448650 | -57.9 | 43.9 | -14.0 |
| 3656.977055 | -58.0 | 44.0 | -14.0 |
| 3657.541600 | -58.0 | 44.0 | -14.0 |
| 3655.001148 | -58.0 | 44.0 | -14.0 |
| 3653.589786 | -58.1 | 44.1 | -14.0 |
| 3654.436604 | -58.2 | 44.2 | -14.0 |
| 3654.577740 | -58.6 | 44.6 | -14.0 |

## Measurement Settings

| Start Frequency (MHz) | Stop Frequency (MHz) | Pre Measurement | Final Measurement |
|---|---|---|---|
| 30.000000 | 1000.000000 | 1 | 1 |
| 1000.000000 | 2400.000000 | 2 | 2 |
| 2483.500000 | 7000.000000 | 2 | 2 |
| 7000.000000 | 18000.000000 | 2 | 2 |
| 18000.000000 | 26000.000000 | 2 | 2 |

## TEST REPORT




## Pre Measurement 1

| Setting | Instrument Value | Target Value |
|---|---|---|
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 19400 | ~ 19400 |
| Sweeptime | 1.061 ms | AUTO |
| Reference Level | -10.000 dBm | -30.000 dBm |
| Attenuation | 20.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 30 | 30 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | FFT | AUTO |
| Preamp | off | off |
| Stablemode | Trace | Trace |
| Stablevalue | 0.50 dB | 0.50 dB |

## Pre Measurement 2

| Setting | Instrument Value | Target Value |
|---|---|---|
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 28000 | ~ 28000 |
| Sweeptime | 28.000 ms | AUTO |
| Reference Level | -10.000 dBm | -30.000 dBm |
| Attenuation | 20.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 30 | 30 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | Sweep | AUTO |
| Preamp | off | off |
| Stablemode | Trace | Trace |
| Stablevalue | 0.50 dB | 0.50 dB |

## TEST REPORT

## PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11b, Highest Channel

### Result

| DUT Frequency (MHz) | Result |
|---|---|
| 2462.000000 | PASS |

### Final measurements

| Frequency (MHz) | Level Pre Measurement (dBm) | level (dBm) | Limit (dBm) | Margin (dB) | Result |
|---|---|---|---|---|---|
| --- | --- | --- | --- | --- | --- |

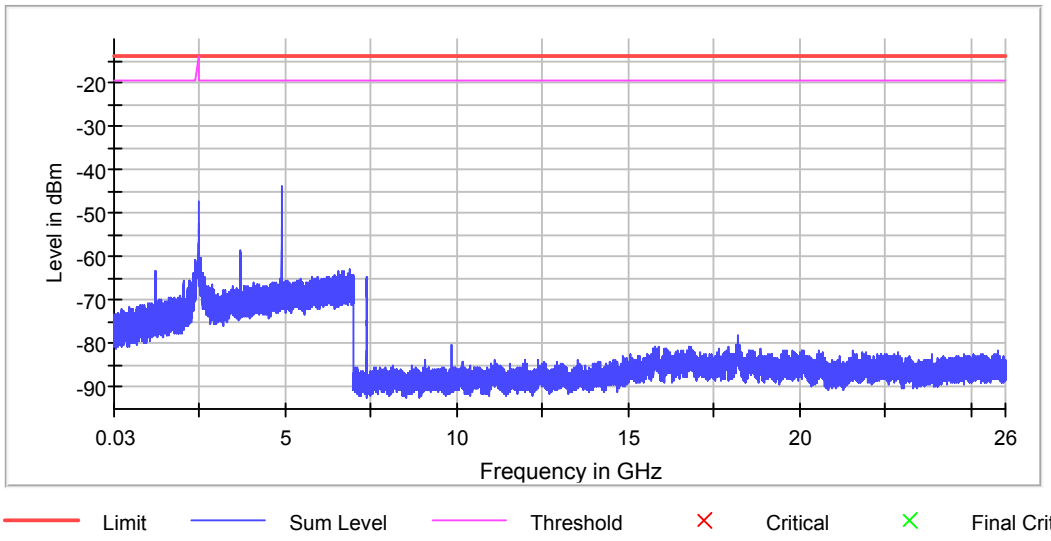
### Pre Measurements

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) |
|---|---|---|---|
| 4923.956853 | -43.8 | 30.1 | -13.7 |
| 4924.097989 | -45.5 | 31.8 | -13.7 |
| 2483.570568 | -47.4 | 33.7 | -13.7 |
| 2483.500000 | -47.4 | 33.7 | -13.7 |
| 2484.699658 | -52.5 | 38.8 | -13.7 |
| 4920.992992 | -53.2 | 39.5 | -13.7 |
| 4927.061850 | -53.2 | 39.5 | -13.7 |
| 2484.558522 | -53.3 | 39.6 | -13.7 |
| 2484.417385 | -53.5 | 39.8 | -13.7 |
| 2483.993977 | -53.8 | 40.1 | -13.7 |
| 2483.711704 | -54.1 | 40.4 | -13.7 |
| 2484.981930 | -54.1 | 40.4 | -13.7 |
| 2483.852841 | -54.2 | 40.5 | -13.7 |
| 4923.815717 | -54.4 | 40.7 | -13.7 |
| 2484.840794 | -54.6 | 41.0 | -13.7 |

### Measurement Settings

| Start Frequency (MHz) | Stop Frequency (MHz) | Pre Measurement | Final Measurement |
|---|---|---|---|
| 30.000000 | 1000.000000 | 1 | 1 |
| 1000.000000 | 2400.000000 | 2 | 2 |
| 2483.500000 | 7000.000000 | 2 | 2 |
| 7000.000000 | 18000.000000 | 2 | 2 |
| 18000.000000 | 26000.000000 | 2 | 2 |

## TEST REPORT




## Pre Measurement 1

| Setting | Instrument Value | Target Value |
|---|---|---|
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 19400 | ~ 19400 |
| Sweeptime | 1.061 ms | AUTO |
| Reference Level | -10.000 dBm | -30.000 dBm |
| Attenuation | 20.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 30 | 30 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | FFT | AUTO |
| Preamp | off | off |
| Stablemode | Trace | Trace |
| Stablevalue | 0.50 dB | 0.50 dB |

## Pre Measurement 2

| Setting | Instrument Value | Target Value |
|---|---|---|
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 28000 | ~ 28000 |
| Sweeptime | 28.000 ms | AUTO |
| Reference Level | -10.000 dBm | -30.000 dBm |
| Attenuation | 20.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 30 | 30 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | Sweep | AUTO |
| Preamp | off | off |
| Stablemode | Trace | Trace |
| Stablevalue | 0.50 dB | 0.50 dB |

# TEST REPORT

## PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11g, Lowest Channel

### Result

| DUT Frequency (MHz) | Result |
|---|---|
| 2412.000000 | PASS |

### Final measurements

| Frequency (MHz) | Level Pre Measurement (dBm) | level (dBm) | Limit (dBm) | Margin (dB) | Result |
|---|---|---|---|---|---|
| --- | --- | --- | --- | --- | --- |

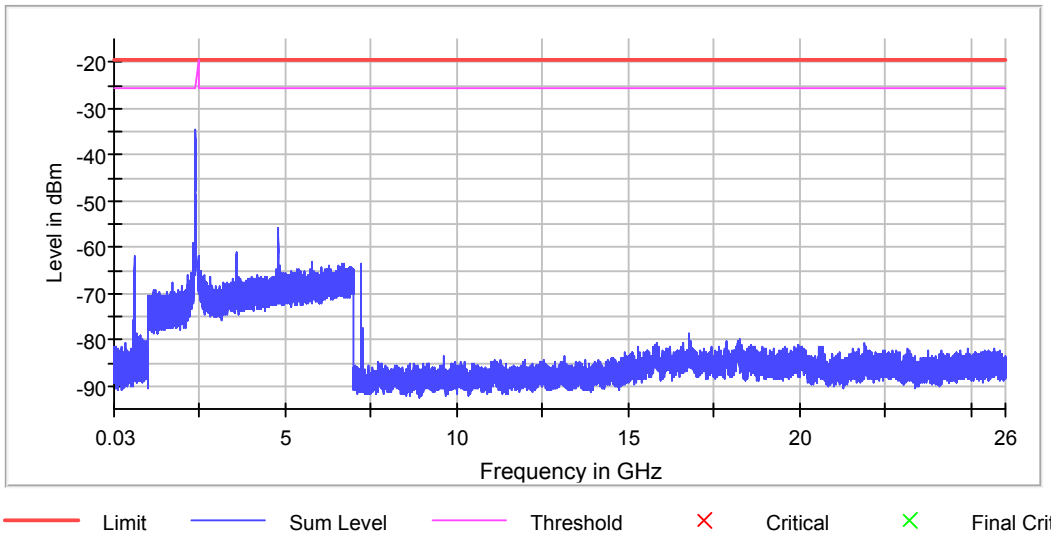
### Pre Measurements

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) |
|---|---|---|---|
| 2397.775000 | -34.5 | 14.8 | -19.7 |
| 2397.825000 | -34.8 | 15.1 | -19.7 |
| 2397.725000 | -35.1 | 15.4 | -19.7 |
| 2399.825000 | -35.4 | 15.7 | -19.7 |
| 2399.775000 | -35.6 | 15.9 | -19.7 |
| 2397.875000 | -36.0 | 16.3 | -19.7 |
| 2399.275000 | -36.1 | 16.4 | -19.7 |
| 2399.225000 | -36.2 | 16.5 | -19.7 |
| 2398.225000 | -36.7 | 17.0 | -19.7 |
| 2397.925000 | -36.7 | 17.0 | -19.7 |
| 2398.275000 | -36.7 | 17.0 | -19.7 |
| 2399.475000 | -37.2 | 17.5 | -19.7 |
| 2399.525000 | -37.2 | 17.5 | -19.7 |
| 2399.875000 | -37.3 | 17.6 | -19.7 |
| 2399.725000 | -37.4 | 17.7 | -19.7 |

### Measurement Settings

| Start Frequency (MHz) | Stop Frequency (MHz) | Pre Measurement | Final Measurement |
|---|---|---|---|
| 30.000000 | 1000.000000 | 1 | 1 |
| 1000.000000 | 2400.000000 | 2 | 2 |
| 2483.500000 | 7000.000000 | 2 | 2 |
| 7000.000000 | 18000.000000 | 2 | 2 |
| 18000.000000 | 26000.000000 | 2 | 2 |

## TEST REPORT




## Pre Measurement 1

| Setting | Instrument Value | Target Value |
|---|---|---|
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 19400 | ~ 19400 |
| Sweeptime | 1.061 ms | AUTO |
| Reference Level | -10.000 dBm | -30.000 dBm |
| Attenuation | 20.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 30 | 30 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | FFT | AUTO |
| Preamp | off | off |
| Stablemode | Trace | Trace |
| Stablevalue | 0.50 dB | 0.50 dB |

## Pre Measurement 2

| Setting | Instrument Value | Target Value |
|---|---|---|
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 28000 | ~ 28000 |
| Sweeptime | 28.000 ms | AUTO |
| Reference Level | -10.000 dBm | -30.000 dBm |
| Attenuation | 20.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 30 | 30 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | Sweep | AUTO |
| Preamp | off | off |
| Stablemode | Trace | Trace |
| Stablevalue | 0.50 dB | 0.50 dB |

## TEST REPORT

802.11g, Middle Channel

## Result

| DUT Frequency (MHz) | Result |
|---|---|
| 2437.000000 | PASS |

## Final measurements

| Frequency (MHz) | Level Pre Measurement (dBm) | level (dBm) | Limit (dBm) | Margin (dB) | Result |
|---|---|---|---|---|---|
| --- | --- | --- | --- | --- | --- |

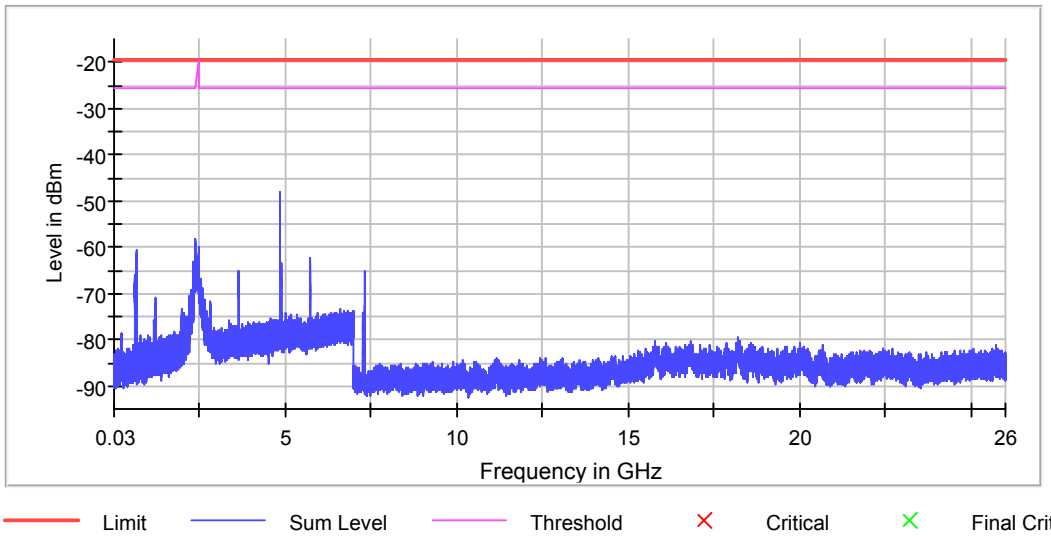
## Pre Measurements

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) |
|---|---|---|---|
| 4873.430088 | -47.9 | 28.3 | -19.6 |
| 4873.571224 | -48.0 | 28.4 | -19.6 |
| 4879.075537 | -48.7 | 29.1 | -19.6 |
| 4872.724407 | -49.0 | 29.4 | -19.6 |
| 4875.264859 | -49.0 | 29.4 | -19.6 |
| 4874.276905 | -49.3 | 29.7 | -19.6 |
| 4871.595317 | -49.4 | 29.7 | -19.6 |
| 4871.454181 | -49.4 | 29.8 | -19.6 |
| 4878.934400 | -49.4 | 29.8 | -19.6 |
| 4877.099630 | -49.5 | 29.9 | -19.6 |
| 4867.925776 | -49.6 | 30.0 | -19.6 |
| 4878.652128 | -49.7 | 30.1 | -19.6 |
| 4870.889636 | -49.8 | 30.2 | -19.6 |
| 4869.337138 | -49.8 | 30.2 | -19.6 |
| 4879.357809 | -49.9 | 30.3 | -19.6 |

## Measurement Settings

| Start Frequency (MHz) | Stop Frequency (MHz) | Pre Measurement | Final Measurement |
|---|---|---|---|
| 30.000000 | 1000.000000 | 1 | 1 |
| 1000.000000 | 2400.000000 | 2 | 2 |
| 2483.500000 | 7000.000000 | 2 | 2 |
| 7000.000000 | 18000.000000 | 2 | 2 |
| 18000.000000 | 26000.000000 | 2 | 2 |

## TEST REPORT




## Pre Measurement 1

| Setting | Instrument Value | Target Value |
|---|---|---|
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 19400 | ~ 19400 |
| Sweeptime | 1.061 ms | AUTO |
| Reference Level | -10.000 dBm | -30.000 dBm |
| Attenuation | 20.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 30 | 30 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | FFT | AUTO |
| Preamp | off | off |
| Stablemode | Trace | Trace |
| Stablevalue | 0.50 dB | 0.50 dB |

## Pre Measurement 2

| Setting | Instrument Value | Target Value |
|---|---|---|
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 28000 | ~ 28000 |
| Sweeptime | 28.000 ms | AUTO |
| Reference Level | -10.000 dBm | -30.000 dBm |
| Attenuation | 20.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 30 | 30 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | Sweep | AUTO |
| Preamp | off | off |
| Stablemode | Trace | Trace |
| Stablevalue | 0.50 dB | 0.50 dB |

# TEST REPORT

## PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11g, Highest Channel

## Result

| DUT Frequency (MHz) | Result |
|---|---|
| 2462.000000 | PASS |

## Final measurements

| Frequency (MHz) | Level Pre Measurement (dBm) | level (dBm) | Limit (dBm) | Margin (dB) | Result |
|---|---|---|---|---|---|
| --- | --- | --- | --- | --- | --- |

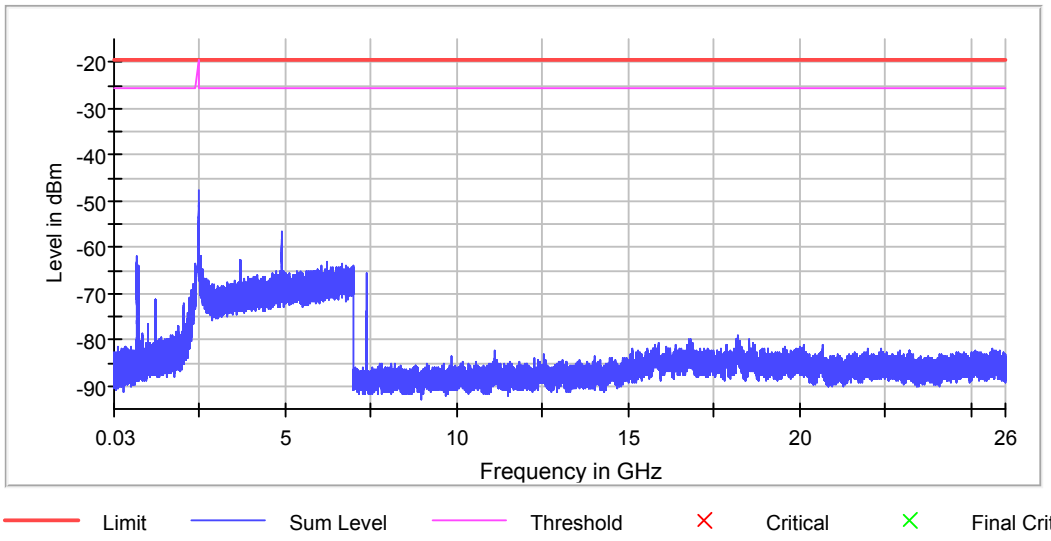
## Pre Measurements

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) |
|---|---|---|---|
| 2483.570568 | -47.7 | 28.0 | -19.7 |
| 2483.500000 | -47.7 | 28.0 | -19.7 |
| 2483.711704 | -47.9 | 28.2 | -19.7 |
| 2483.852841 | -48.8 | 29.1 | -19.7 |
| 2484.276249 | -50.6 | 30.9 | -19.7 |
| 2484.135113 | -51.1 | 31.4 | -19.7 |
| 2484.558522 | -51.1 | 31.4 | -19.7 |
| 2484.417385 | -51.4 | 31.7 | -19.7 |
| 2485.123066 | -52.1 | 32.4 | -19.7 |
| 2485.969884 | -52.3 | 32.6 | -19.7 |
| 2483.993977 | -52.3 | 32.7 | -19.7 |
| 2486.252156 | -52.7 | 33.0 | -19.7 |
| 2488.651472 | -53.0 | 33.3 | -19.7 |
| 2484.981930 | -53.1 | 33.4 | -19.7 |
| 2487.240110 | -53.2 | 33.5 | -19.7 |

## Measurement Settings

| Start Frequency (MHz) | Stop Frequency (MHz) | Pre Measurement | Final Measurement |
|---|---|---|---|
| 30.000000 | 1000.000000 | 1 | 1 |
| 1000.000000 | 2400.000000 | 2 | 2 |
| 2483.500000 | 7000.000000 | 2 | 2 |
| 7000.000000 | 18000.000000 | 2 | 2 |
| 18000.000000 | 26000.000000 | 2 | 2 |

## TEST REPORT




## Pre Measurement 1

| Setting | Instrument Value | Target Value |
|---|---|---|
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 19400 | ~ 19400 |
| Sweeptime | 1.061 ms | AUTO |
| Reference Level | -10.000 dBm | -30.000 dBm |
| Attenuation | 20.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 30 | 30 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | FFT | AUTO |
| Preamp | off | off |
| Stablemode | Trace | Trace |
| Stablevalue | 0.50 dB | 0.50 dB |

## Pre Measurement 2

| Setting | Instrument Value | Target Value |
|---|---|---|
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 28000 | ~ 28000 |
| Sweeptime | 28.000 ms | AUTO |
| Reference Level | -10.000 dBm | -30.000 dBm |
| Attenuation | 20.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 30 | 30 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | Sweep | AUTO |
| Preamp | off | off |
| Stablemode | Trace | Trace |
| Stablevalue | 0.50 dB | 0.50 dB |

## TEST REPORT

## PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11n (20MHz), Lowest Channel

### Result

| DUT Frequency (MHz) | Result |
|---|---|
| 2412.000000 | PASS |

### Final measurements

| Frequency (MHz) | Level Pre Measurement (dBm) | level (dBm) | Limit (dBm) | Margin (dB) | Result |
|---|---|---|---|---|---|
| --- | --- | --- | --- | --- | --- |

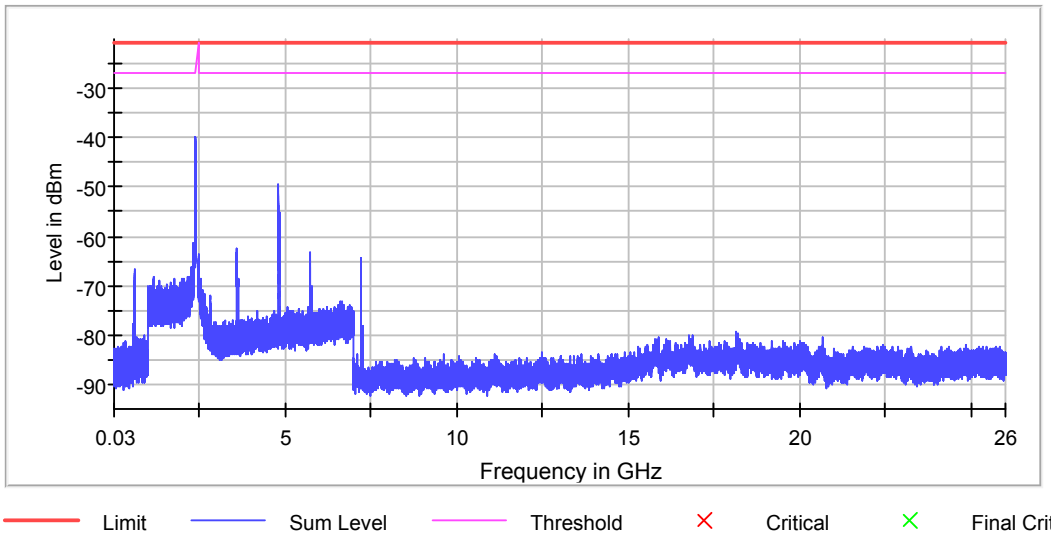
### Pre Measurements

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) |
|---|---|---|---|
| 2396.425000 | -39.7 | 19.0 | -20.7 |
| 2396.375000 | -40.0 | 19.2 | -20.7 |
| 2398.925000 | -40.0 | 19.3 | -20.7 |
| 2398.175000 | -40.1 | 19.3 | -20.7 |
| 2399.875000 | -40.1 | 19.4 | -20.7 |
| 2398.975000 | -40.2 | 19.4 | -20.7 |
| 2399.925000 | -40.3 | 19.6 | -20.7 |
| 2398.225000 | -40.3 | 19.6 | -20.7 |
| 2396.625000 | -40.5 | 19.7 | -20.7 |
| 2399.475000 | -40.6 | 19.9 | -20.7 |
| 2398.275000 | -40.8 | 20.0 | -20.7 |
| 2399.525000 | -40.8 | 20.1 | -20.7 |
| 2397.375000 | -41.1 | 20.4 | -20.7 |
| 2398.325000 | -41.2 | 20.4 | -20.7 |
| 2399.825000 | -41.2 | 20.5 | -20.7 |

### Measurement Settings

| Start Frequency (MHz) | Stop Frequency (MHz) | Pre Measurement | Final Measurement |
|---|---|---|---|
| 30.000000 | 1000.000000 | 1 | 1 |
| 1000.000000 | 2400.000000 | 2 | 2 |
| 2483.500000 | 7000.000000 | 2 | 2 |
| 7000.000000 | 18000.000000 | 2 | 2 |
| 18000.000000 | 26000.000000 | 2 | 2 |

## TEST REPORT




## Pre Measurement 1

| Setting | Instrument Value | Target Value |
|---|---|---|
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 19400 | ~ 19400 |
| Sweeptime | 1.061 ms | AUTO |
| Reference Level | -10.000 dBm | -30.000 dBm |
| Attenuation | 20.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 30 | 30 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | FFT | AUTO |
| Preamp | off | off |
| Stablemode | Trace | Trace |
| Stablevalue | 0.50 dB | 0.50 dB |

## Pre Measurement 2

| Setting | Instrument Value | Target Value |
|---|---|---|
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 28000 | ~ 28000 |
| Sweeptime | 28.000 ms | AUTO |
| Reference Level | -10.000 dBm | -30.000 dBm |
| Attenuation | 20.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 30 | 30 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | Sweep | AUTO |
| Preamp | off | off |
| Stablemode | Trace | Trace |
| Stablevalue | 0.50 dB | 0.50 dB |

## TEST REPORT

## PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11n (20MHz), Middle Channel

### Result

| DUT Frequency (MHz) | Result |
|---|---|
| 2437.000000 | PASS |

### Final measurements

| Frequency (MHz) | Level Pre Measurement (dBm) | level (dBm) | Limit (dBm) | Margin (dB) | Result |
|---|---|---|---|---|---|
| --- | --- | --- | --- | --- | --- |

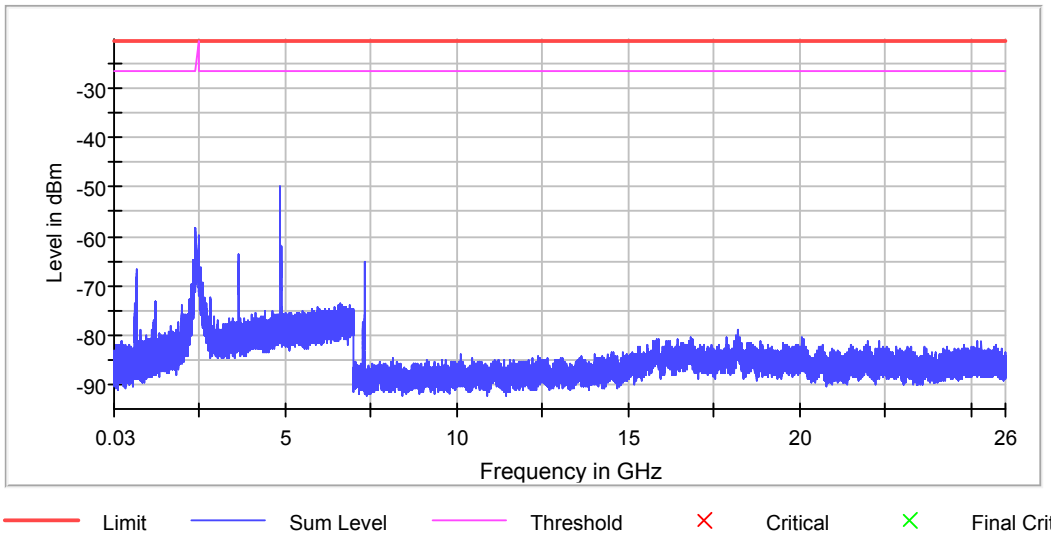
### Pre Measurements

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) |
|---|---|---|---|
| 4870.042819 | -49.8 | 29.3 | -20.5 |
| 4870.607364 | -51.1 | 30.6 | -20.5 |
| 4869.901683 | -51.3 | 30.7 | -20.5 |
| 4868.490321 | -51.3 | 30.8 | -20.5 |
| 4877.523038 | -51.5 | 31.0 | -20.5 |
| 4868.349184 | -51.7 | 31.2 | -20.5 |
| 4875.264859 | -51.8 | 31.3 | -20.5 |
| 4870.325091 | -51.9 | 31.3 | -20.5 |
| 4867.502367 | -52.0 | 31.4 | -20.5 |
| 4870.466228 | -52.0 | 31.5 | -20.5 |
| 4870.183955 | -52.0 | 31.5 | -20.5 |
| 4873.430088 | -52.3 | 31.8 | -20.5 |
| 4877.099630 | -52.4 | 31.9 | -20.5 |
| 4869.337138 | -52.6 | 32.1 | -20.5 |
| 4873.006679 | -52.9 | 32.3 | -20.5 |

### Measurement Settings

| Start Frequency (MHz) | Stop Frequency (MHz) | Pre Measurement | Final Measurement |
|---|---|---|---|
| 30.000000 | 1000.000000 | 1 | 1 |
| 1000.000000 | 2400.000000 | 2 | 2 |
| 2483.500000 | 7000.000000 | 2 | 2 |
| 7000.000000 | 18000.000000 | 2 | 2 |
| 18000.000000 | 26000.000000 | 2 | 2 |

## TEST REPORT




## Pre Measurement 1

| Setting | Instrument Value | Target Value |
|---|---|---|
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 19400 | ~ 19400 |
| Sweeptime | 1.061 ms | AUTO |
| Reference Level | -10.000 dBm | -30.000 dBm |
| Attenuation | 20.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 30 | 30 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | FFT | AUTO |
| Preamp | off | off |
| Stablemode | Trace | Trace |
| Stablevalue | 0.50 dB | 0.50 dB |

## Pre Measurement 2

| Setting | Instrument Value | Target Value |
|---|---|---|
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 28000 | ~ 28000 |
| Sweeptime | 28.000 ms | AUTO |
| Reference Level | -10.000 dBm | -30.000 dBm |
| Attenuation | 20.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 30 | 30 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | Sweep | AUTO |
| Preamp | off | off |
| Stablemode | Trace | Trace |
| Stablevalue | 0.50 dB | 0.50 dB |

## TEST REPORT

## PLOTS OF OUT OF BAND CONDUCTED EMISSIONS

802.11n (20MHz), Highest Channel

### Result

| DUT Frequency (MHz) | Result |
|---|---|
| 2437.000000 | PASS |

### Final measurements

| Frequency (MHz) | Level Pre Measurement (dBm) | level (dBm) | Limit (dBm) | Margin (dB) | Result |
|---|---|---|---|---|---|
| --- | --- | --- | --- | --- | --- |

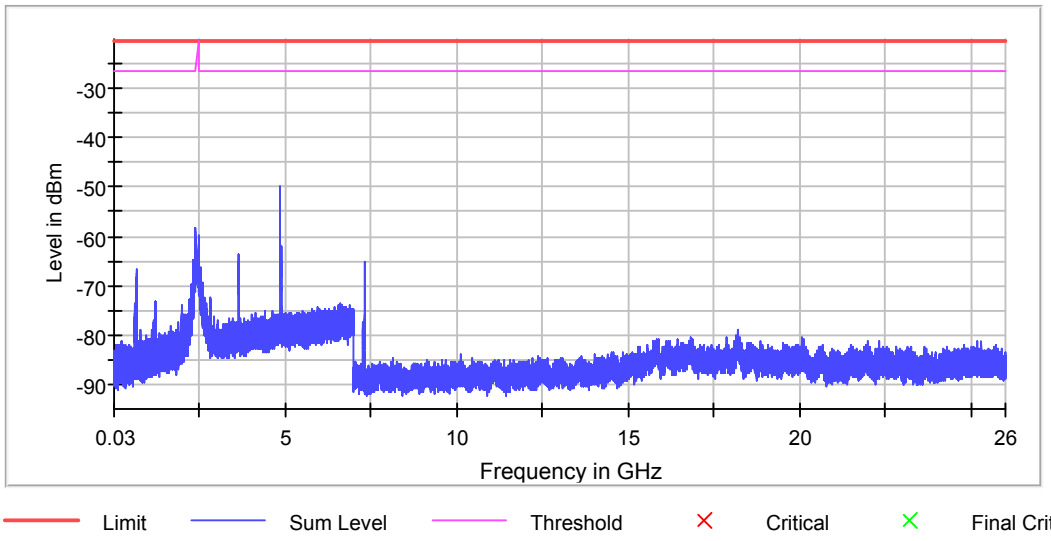
### Pre Measurements

| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) |
|---|---|---|---|
| 4870.042819 | -49.8 | 29.3 | -20.5 |
| 4870.607364 | -51.1 | 30.6 | -20.5 |
| 4869.901683 | -51.3 | 30.7 | -20.5 |
| 4868.490321 | -51.3 | 30.8 | -20.5 |
| 4877.523038 | -51.5 | 31.0 | -20.5 |
| 4868.349184 | -51.7 | 31.2 | -20.5 |
| 4875.264859 | -51.8 | 31.3 | -20.5 |
| 4870.325091 | -51.9 | 31.3 | -20.5 |
| 4867.502367 | -52.0 | 31.4 | -20.5 |
| 4870.466228 | -52.0 | 31.5 | -20.5 |
| 4870.183955 | -52.0 | 31.5 | -20.5 |
| 4873.430088 | -52.3 | 31.8 | -20.5 |
| 4877.099630 | -52.4 | 31.9 | -20.5 |
| 4869.337138 | -52.6 | 32.1 | -20.5 |
| 4873.006679 | -52.9 | 32.3 | -20.5 |

### Measurement Settings

| Start Frequency (MHz) | Stop Frequency (MHz) | Pre Measurement | Final Measurement |
|---|---|---|---|
| 30.000000 | 1000.000000 | 1 | 1 |
| 1000.000000 | 2400.000000 | 2 | 2 |
| 2483.500000 | 7000.000000 | 2 | 2 |
| 7000.000000 | 18000.000000 | 2 | 2 |
| 18000.000000 | 26000.000000 | 2 | 2 |

## TEST REPORT




## Pre Measurement 1

| Setting | Instrument Value | Target Value |
|---|---|---|
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 19400 | ~ 19400 |
| Sweeptime | 1.061 ms | AUTO |
| Reference Level | -10.000 dBm | -30.000 dBm |
| Attenuation | 20.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 30 | 30 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | FFT | AUTO |
| Preamp | off | off |
| Stablemode | Trace | Trace |
| Stablevalue | 0.50 dB | 0.50 dB |

## Pre Measurement 2

| Setting | Instrument Value | Target Value |
|---|---|---|
| RBW | 100.000 kHz | <= 100.000 kHz |
| VBW | 300.000 kHz | >= 300.000 kHz |
| SweepPoints | 28000 | ~ 28000 |
| Sweeptime | 28.000 ms | AUTO |
| Reference Level | -10.000 dBm | -30.000 dBm |
| Attenuation | 20.000 dB | AUTO |
| Detector | Peak | Peak |
| SweepCount | 30 | 30 |
| Filter | 3 dB | 3 dB |
| Trace Mode | Max Hold | Max Hold |
| Sweeptype | Sweep | AUTO |
| Preamp | off | off |
| Stablemode | Trace | Trace |
| Stablevalue | 0.50 dB | 0.50 dB |

**TEST REPORT**

4.5 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

FS = RA + AF + CF - AG + PD + AV

Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB
PD = Pulse Desensitization in dB
AV = Average Factor in -dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

FS = RA + AF + CF - AG + PD + AV

Example
Assume a receiver reading of 62.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29.0 dB is subtracted. The pulse desensitization factor of the spectrum analyzer is 0.0 dB, and the resultant average factor is -10.0 dB. The net field strength for comparison to the appropriate emission limit is 32.0 dBμV/m. This value in dBμV/m is converted to its corresponding level in μV/m.

RA = 62.0 dBμV
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
PD = 0.0 dB
AV = -10 dB

FS = 62.0 + 7.4 + 1.6 – 29.0 + 0.0 + (-10.0) = 32.0 dBμV/m

Level in μV/m = Common Antilogarithm [(32.0 dBμV/m)/20] = 39.8 μV/m

## TEST REPORT

4.6 Transmitter Radiated Emissions in Restricted Bands and Spurious Emissions

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

4.6.1 Radiated Emission Configuration Photograph

Worst Case Restricted Band Radiated Emission
at

2390 MHz

The worst case radiated emission configuration photographs are saved with filename: config photos.pdf

4.6.2 Radiated Emission Data

The data in tables 1-10 list the significant emission frequencies, the limit and the margin of compliance.

Judgement -

Passed by 0.5 dB margin

## TEST REPORT

## RADIATED EMISSION DATA

Mode: TX-Channel 01

Table 1
IEEE 802.11b (DSSS, 1 Mbps)

| Polari-zation | Frequency (MHz) | Reading (dBµV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBµV/m) | Average Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| H | 2390.000 | 54.0 | 33 | 29.4 | 50.4 | 54.0 | -3.6 |
| H | 4824.000 | 27.0 | 33 | 34.9 | 28.9 | 54.0 | -25.1 |
| H | 7236.000 | 26.8 | 33 | 37.9 | 31.7 | 54.0 | -22.3 |
| H | 9648.000 | 31.0 | 33 | 40.4 | 38.4 | 54.0 | -15.6 |
| V | 12060.000 | 33.1 | 33 | 40.5 | 40.6 | 54.0 | -13.4 |
| H | 14472.000 | 34.3 | 33 | 40.0 | 41.3 | 54.0 | -12.7 |

| Polari-zation | Frequency (MHz) | Reading (dBµV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBµV/m) | Peak Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| H | 2390.000 | 64.6 | 33 | 29.4 | 61.0 | 74.0 | -13.0 |
| H | 4824.000 | 38.6 | 33 | 34.9 | 40.5 | 74.0 | -33.5 |
| H | 7236.000 | 40.0 | 33 | 37.9 | 44.9 | 74.0 | -29.1 |
| H | 9648.000 | 42.8 | 33 | 40.4 | 50.2 | 74.0 | -23.8 |
| V | 12060.000 | 45.3 | 33 | 40.5 | 52.8 | 74.0 | -21.2 |
| H | 14472.000 | 46.4 | 33 | 40.0 | 53.4 | 74.0 | -20.6 |

NOTES:
1. Peak detector is used for the emission measurement.
2. Average detector is used for the average data of emission measurement.
3. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.

## TEST REPORT

Mode: TX-Channel 06

Table 2
IEEE 802.11b (DSSS, 1 Mbps)

| Polari-zation | Frequency (MHz) | Reading (dBµV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBµV/m) | Average Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| H | 4874.000 | 31.3 | 33 | 34.9 | 33.2 | 54.0 | -20.8 |
| V | 7311.000 | 30.1 | 33 | 37.9 | 35.0 | 54.0 | -19.0 |
| V | 9748.000 | 30.4 | 33 | 40.4 | 37.8 | 54.0 | -16.2 |
| H | 12185.000 | 33.4 | 33 | 40.5 | 40.9 | 54.0 | -13.1 |
| H | 14622.000 | 36.7 | 33 | 38.4 | 42.1 | 54.0 | -11.9 |

| Polari-zation | Frequency (MHz) | Reading (dBµV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBµV/m) | Peak Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| H | 4874.000 | 43.6 | 33 | 34.9 | 45.5 | 74.0 | -28.5 |
| V | 7311.000 | 41.6 | 33 | 37.9 | 46.5 | 74.0 | -27.5 |
| V | 9748.000 | 42.3 | 33 | 40.4 | 49.7 | 74.0 | -24.3 |
| H | 12185.000 | 44.7 | 33 | 40.5 | 52.2 | 74.0 | -21.8 |
| H | 14622.000 | 48.2 | 33 | 38.4 | 53.6 | 74.0 | -20.4 |

NOTES:
1. Peak detector is used for the emission measurement.
2. Average detector is used for the average data of emission measurement
3. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.

## TEST REPORT

Mode: TX-Channel 11

Table 3
IEEE 802.11b (DSSS, 1 Mbps)

| Polari-zation | Frequency (MHz) | Reading (dBµV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBµV/m) | Average Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| H | 2483.500 | 52.2 | 33 | 29.4 | 48.6 | 54.0 | -5.4 |
| V | 4924.000 | 30.2 | 33 | 34.9 | 32.1 | 54.0 | -21.9 |
| H | 7386.000 | 32.2 | 33 | 37.9 | 37.1 | 54.0 | -16.9 |
| V | 9848.000 | 32.4 | 33 | 40.4 | 39.8 | 54.0 | -14.2 |
| H | 12310.000 | 34.3 | 33 | 40.5 | 41.8 | 54.0 | -12.2 |
| V | 14772.000 | 36.6 | 33 | 38.4 | 42.0 | 54.0 | -12.0 |

| Polari-zation | Frequency (MHz) | Reading (dBµV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBµV/m) | Peak Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| H | 2483.500 | 65.2 | 33 | 29.4 | 61.6 | 74.0 | -12.4 |
| V | 4924.000 | 41.9 | 33 | 34.9 | 43.8 | 74.0 | -30.2 |
| H | 7386.000 | 43.7 | 33 | 37.9 | 48.6 | 74.0 | -25.4 |
| V | 9848.000 | 42.7 | 33 | 40.4 | 50.1 | 74.0 | -23.9 |
| H | 12310.000 | 46.2 | 33 | 40.5 | 53.7 | 74.0 | -20.3 |
| V | 14772.000 | 47.9 | 33 | 38.4 | 53.3 | 74.0 | -20.7 |

NOTES:
1. Peak detector is used for the emission measurement.
2. Average detector is used for the average data of emission measurement
3. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.

## TEST REPORT

Mode: TX-Channel 01

Table 4
IEEE 802.11g (OFDM, 6 Mbps)

| Polari-zation | Frequency (MHz) | Reading (dBµV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBµV/m) | Average Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| H | 2390.000 | 54.7 | 33 | 29.4 | 51.1 | 54.0 | -2.9 |
| H | 4824.000 | 27.7 | 33 | 34.9 | 29.6 | 54.0 | -24.4 |
| H | 7236.000 | 27.4 | 33 | 37.9 | 32.3 | 54.0 | -21.7 |
| V | 9648.000 | 27.3 | 33 | 40.4 | 34.7 | 54.0 | -19.3 |
| H | 12060.000 | 27.9 | 33 | 40.5 | 35.4 | 54.0 | -18.6 |
| H | 14472.000 | 30.5 | 33 | 40.0 | 37.5 | 54.0 | -16.5 |

| Polari-zation | Frequency (MHz) | Reading (dBµV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBµV/m) | Peak Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| H | 2390.000 | 69.9 | 33 | 29.4 | 66.3 | 74.0 | -7.7 |
| H | 4824.000 | 41.5 | 33 | 34.9 | 43.4 | 74.0 | -30.6 |
| H | 7236.000 | 43.7 | 33 | 37.9 | 48.6 | 74.0 | -25.4 |
| V | 9648.000 | 40.8 | 33 | 40.4 | 48.2 | 74.0 | -25.8 |
| H | 12060.000 | 44.2 | 33 | 40.5 | 51.7 | 74.0 | -22.3 |
| H | 14472.000 | 46.1 | 33 | 40.0 | 53.1 | 74.0 | -20.9 |

NOTES:
1. Peak detector is used for the emission measurement.
2. Average detector is used for the average data of emission measurement
3. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.

## TEST REPORT

Mode: TX-Channel 06

Table 5
IEEE 802.11g (OFDM, 6 Mbps)

| Polari-zation | Frequency (MHz) | Reading (dBµV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBµV/m) | Average Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| V | 4874.000 | 26.4 | 33 | 34.9 | 28.3 | 54.0 | -25.7 |
| V | 7311.000 | 28.1 | 33 | 37.9 | 33.0 | 54.0 | -21.0 |
| H | 9748.000 | 27.2 | 33 | 40.4 | 34.6 | 54.0 | -19.4 |
| H | 12185.000 | 27.4 | 33 | 40.5 | 34.9 | 54.0 | -19.1 |
| V | 14622.000 | 31.3 | 33 | 38.4 | 36.7 | 54.0 | -17.3 |

| Polari-zation | Frequency (MHz) | Reading (dBµV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBµV/m) | Peak Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| V | 4874.000 | 41.7 | 33 | 34.9 | 43.6 | 74.0 | -30.4 |
| V | 7311.000 | 42.7 | 33 | 37.9 | 47.6 | 74.0 | -26.4 |
| H | 9748.000 | 41.4 | 33 | 40.4 | 48.8 | 74.0 | -25.2 |
| H | 12185.000 | 44.8 | 33 | 40.5 | 52.3 | 74.0 | -21.7 |
| V | 14622.000 | 48.1 | 33 | 38.4 | 53.5 | 74.0 | -20.5 |

NOTES:
1. Peak detector is used for the emission measurement.
2. Average detector is used for the average data of emission measurement
3. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.

## TEST REPORT

Mode: TX-Channel 11

Table 6
IEEE 802.11g (OFDM, 6 Mbps)

| Polari-zation | Frequency (MHz) | Reading (dBµV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBµV/m) | Average Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| H | 2483.500 | 55.3 | 33 | 29.4 | 51.7 | 54.0 | -2.3 |
| H | 4924.000 | 28.2 | 33 | 34.9 | 30.1 | 54.0 | -23.9 |
| H | 7386.000 | 27.9 | 33 | 37.9 | 32.8 | 54.0 | -21.2 |
| H | 9848.000 | 25.5 | 33 | 40.4 | 32.9 | 54.0 | -21.1 |
| H | 12310.000 | 28.1 | 33 | 40.5 | 35.6 | 54.0 | -18.4 |
| V | 14772.000 | 31.7 | 33 | 38.4 | 37.1 | 54.0 | -16.9 |

| Polari-zation | Frequency (MHz) | Reading (dBµV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBµV/m) | Peak Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| H | 2483.500 | 73.4 | 33 | 29.4 | 69.8 | 74.0 | -4.2 |
| H | 4924.000 | 40.8 | 33 | 34.9 | 42.7 | 74.0 | -31.3 |
| H | 7386.000 | 41.4 | 33 | 37.9 | 46.3 | 74.0 | -27.7 |
| H | 9848.000 | 38.3 | 33 | 40.4 | 45.7 | 74.0 | -28.3 |
| H | 12310.000 | 44.3 | 33 | 40.5 | 51.8 | 74.0 | -22.2 |
| V | 14772.000 | 48.0 | 33 | 38.4 | 53.4 | 74.0 | -20.6 |

NOTES:
1. Peak detector is used for the emission measurement.
2. Average detector is used for the average data of emission measurement
3. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.

## TEST REPORT

Mode: TX-Channel 01

Table 7
IEEE 802.11n (20MHz) (OFDM, MCS0)

| Polari-zation | Frequency (MHz) | Reading (dBµV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBµV/m) | Average Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| H | 2390.000 | 55.8 | 33 | 29.4 | 52.2 | 54.0 | -1.8 |
| H | 4824.000 | 25.2 | 33 | 34.9 | 27.1 | 54.0 | -26.9 |
| H | 7236.000 | 26.4 | 33 | 37.9 | 31.3 | 54.0 | -22.7 |
| V | 9648.000 | 23.7 | 33 | 40.4 | 31.1 | 54.0 | -22.9 |
| V | 12060.000 | 33.2 | 33 | 40.5 | 40.7 | 54.0 | -13.3 |
| V | 14472.000 | 35.6 | 33 | 40.0 | 42.6 | 54.0 | -11.4 |

| Polari-zation | Frequency (MHz) | Reading (dBµV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBµV/m) | Peak Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| H | 2390.000 | 77.1 | 33 | 29.4 | 73.5 | 74.0 | -0.5 |
| H | 4824.000 | 40.2 | 33 | 34.9 | 42.1 | 74.0 | -31.9 |
| H | 7236.000 | 41.8 | 33 | 37.9 | 46.7 | 74.0 | -27.3 |
| V | 9648.000 | 39.2 | 33 | 40.4 | 46.6 | 74.0 | -27.4 |
| V | 12060.000 | 44.8 | 33 | 40.5 | 52.3 | 74.0 | -21.7 |
| V | 14472.000 | 46.6 | 33 | 40.0 | 53.6 | 74.0 | -20.4 |

NOTES:
1. Peak detector is used for the emission measurement.
2. Average detector is used for the average data of emission measurement
3. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.

## TEST REPORT

Mode: TX-Channel 06

Table 8
IEEE 802.11n (20MHz) (OFDM, MCS0)

| Polari-zation | Frequency (MHz) | Reading (dBµV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBµV/m) | Average Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| H | 4874.000 | 26.7 | 33 | 34.9 | 28.6 | 54.0 | -25.4 |
| H | 7311.000 | 26.6 | 33 | 37.9 | 31.5 | 54.0 | -22.5 |
| V | 9748.000 | 26.8 | 33 | 40.4 | 34.2 | 54.0 | -19.8 |
| H | 12185.000 | 33.8 | 33 | 40.5 | 41.3 | 54.0 | -12.7 |
| V | 14622.000 | 37.6 | 33 | 38.4 | 43.0 | 54.0 | -11.0 |

| Polari-zation | Frequency (MHz) | Reading (dBµV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBµV/m) | Peak Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| H | 4874.000 | 39.6 | 33 | 34.9 | 41.5 | 74.0 | -32.5 |
| H | 7311.000 | 42.1 | 33 | 37.9 | 47.0 | 74.0 | -27.0 |
| V | 9748.000 | 39.3 | 33 | 40.4 | 46.7 | 74.0 | -27.3 |
| H | 12185.000 | 44.9 | 33 | 40.5 | 52.4 | 74.0 | -21.6 |
| V | 14622.000 | 48.1 | 33 | 38.4 | 53.5 | 74.0 | -20.5 |

NOTES:
1. Peak detector is used for the emission measurement.
2. Average detector is used for the average data of emission measurement
3. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.

## TEST REPORT

Mode: TX-Channel 11

Table 9
IEEE 802.11n (20MHz) (OFDM, MCS0)

| Polari-zation | Frequency (MHz) | Reading (dBµV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m (dBµV/m) | Average Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| H | 2483.500 | 50.8 | 33 | 29.4 | 47.2 | 54.0 | -6.8 |
| V | 4924.000 | 26.0 | 33 | 34.9 | 27.9 | 54.0 | -26.1 |
| H | 7386.000 | 25.5 | 33 | 37.9 | 30.4 | 54.0 | -23.6 |
| V | 9848.000 | 26.1 | 33 | 40.4 | 33.5 | 54.0 | -20.5 |
| H | 12310.000 | 34.2 | 33 | 40.5 | 41.7 | 54.0 | -12.3 |
| H | 14772.000 | 37.0 | 33 | 38.4 | 42.4 | 54.0 | -11.6 |

| Polari-zation | Frequency (MHz) | Reading (dBµV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBµV/m) | Peak Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| H | 2483.500 | 66.6 | 33 | 29.4 | 63.0 | 74.0 | -11.0 |
| V | 4924.000 | 39.6 | 33 | 34.9 | 41.5 | 74.0 | -32.5 |
| H | 7386.000 | 41.3 | 33 | 37.9 | 46.2 | 74.0 | -27.8 |
| V | 9848.000 | 39.4 | 33 | 40.4 | 46.8 | 74.0 | -27.2 |
| H | 12310.000 | 44.2 | 33 | 40.5 | 51.7 | 74.0 | -22.3 |
| H | 14772.000 | 48.0 | 33 | 38.4 | 53.4 | 74.0 | -20.6 |

NOTES:
1. Peak detector is used for the emission measurement.
2. Average detector is used for the average data of emission measurement
3. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.

## TEST REPORT

Mode: WiFi Charging

Table 9

| Polarization | Frequency (MHz) | Reading (dBµV) | Pre-amp (dB) | Antenna Factor (dB) | Net at 3m (dBµV/m) | Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| V | 31.316 | 38.9 | 16 | 10.0 | 32.9 | 40.0 | -7.1 |
| H | 114.944 | 40.0 | 16 | 14.0 | 38.0 | 43.5 | -5.6 |
| V | 162.405 | 32.5 | 16 | 16.0 | 32.5 | 43.5 | -11.0 |
| H | 244.301 | 37.0 | 16 | 20.0 | 41.0 | 46.0 | -5.0 |
| V | 249.982 | 38.0 | 16 | 20.0 | 42.0 | 46.0 | -4.0 |
| H | 326.127 | 32.1 | 16 | 24.0 | 40.1 | 46.0 | -5.9 |
| V | 374.974 | 30.7 | 16 | 24.0 | 38.7 | 46.0 | -7.3 |
| H | 500.034 | 31.5 | 16 | 26.0 | 41.5 | 46.0 | -4.6 |
| V | 625.026 | 25.3 | 16 | 29.0 | 38.3 | 46.0 | -7.7 |
| H | 750.086 | 24.8 | 16 | 30.0 | 38.8 | 46.0 | -7.2 |

NOTES:
1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4.

## TEST REPORT

Mode: WiFi On

Table 10

| Polarization | Frequency (MHz) | Reading (dBµV) | Pre-amp (dB) | Antenna Factor (dB) | Net at 3m (dBµV/m) | Limit at 3m (dBµV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|
| V | 44.342 | 31.4 | 16 | 10.0 | 25.4 | 40.0 | -14.6 |
| V | 82.449 | 34.6 | 16 | 7.0 | 25.6 | 40.0 | -14.4 |
| V | 166.978 | 28.3 | 16 | 17.0 | 29.3 | 43.5 | -14.2 |
| V | 249.982 | 34.2 | 16 | 20.0 | 38.2 | 46.0 | -7.8 |
| V | 374.974 | 30.6 | 16 | 24.0 | 38.6 | 46.0 | -7.4 |
| V | 500.034 | 27.7 | 16 | 26.0 | 37.7 | 46.0 | -8.3 |
| V | 625.026 | 25.4 | 16 | 29.0 | 38.4 | 46.0 | -7.6 |
| V | 750.086 | 25.9 | 16 | 30.0 | 39.9 | 46.0 | -6.1 |

NOTES:
1. Peak detector is used for the emission measurement.

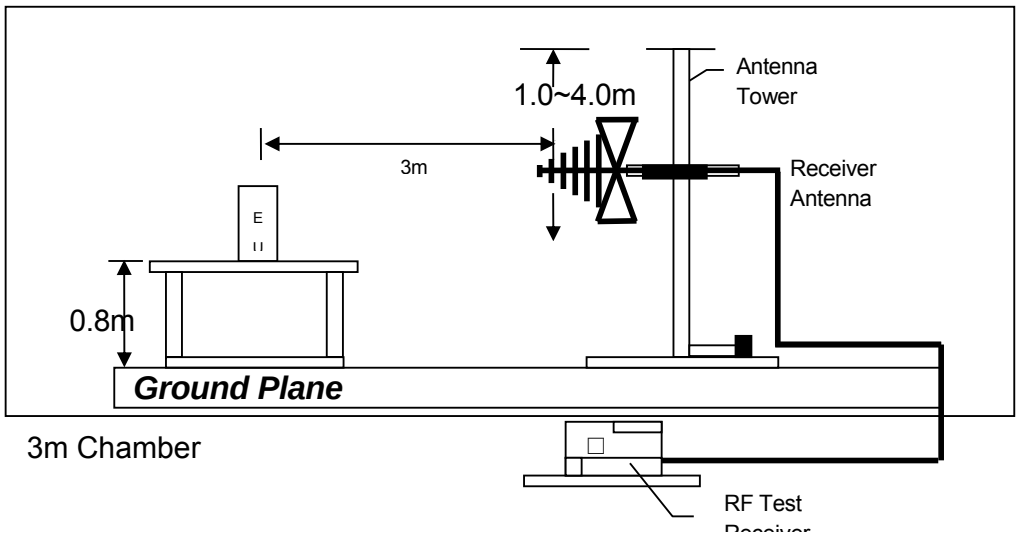
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

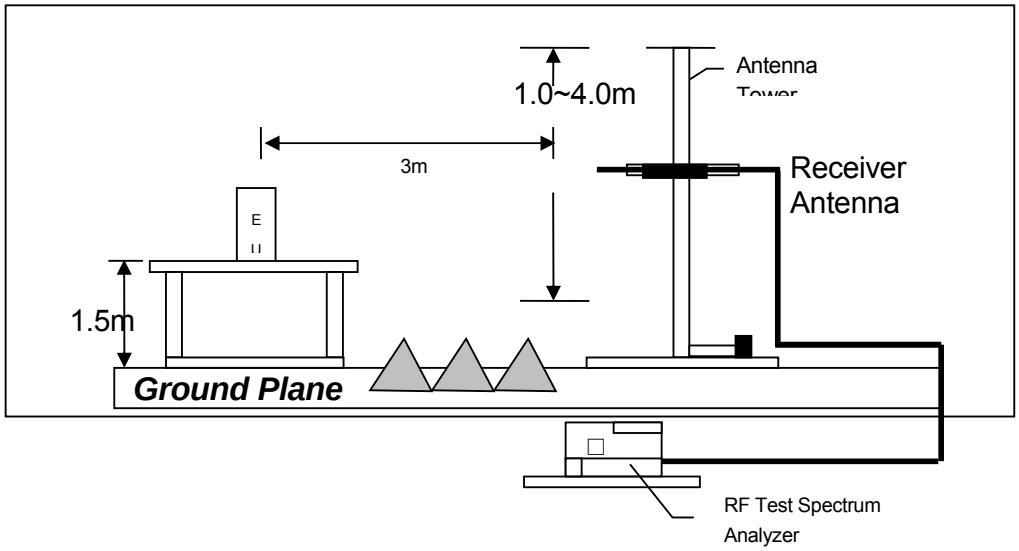
## TEST REPORT

4.6.3 Radiated Emission Test Setup

The figure below shows the test setup, which is utilized to make these measurements.




Test setup of radiated emissions up to 1GHz




Test setup of radiated emissions above 1GHz

## TEST REPORT

### 4.6.4 Transmitter Duty Cycle Calculation

Not applicable – No average factor is required.

## TEST REPORT

4.7 AC Power Line Conducted Emission

☐ Not applicable – EUT is only powered by battery for operation.

☒ EUT connects to AC power line. Emission Data is listed in following pages.

☐ Base Unit connects to AC power line and has transmission. Handset connects to AC power line but has no transmission. Emission Data of Base Unit is listed in following pages.

4.7.1 AC Power Line Conducted Emission Configuration Photograph

Worst Case Line-Conducted Configuration
at

195 kHz

The worst case line conducted configuration photographs are attached in the Appendix and saved with filename: config photos.pdf

4.7.2 AC Power Line Conducted Emission Data

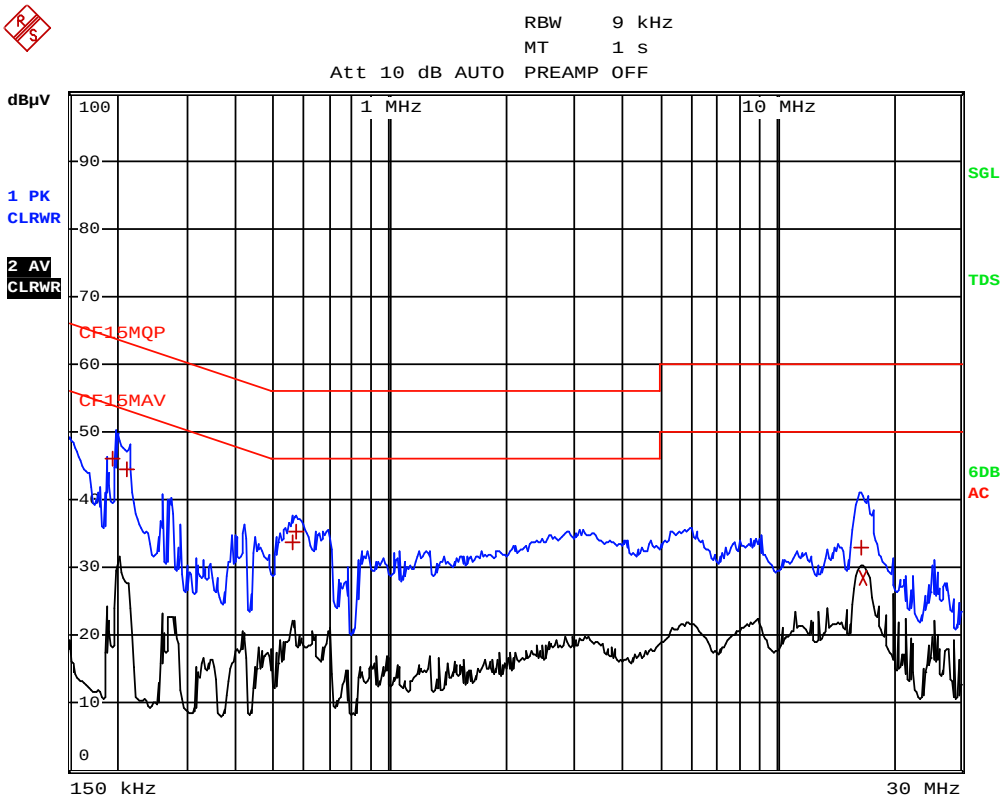
The plot(s) and data in the following pages list the significant emission frequencies, the limit and the margin of compliance.

Passed by 17.79 dB margin compare with Quasi-peak limit

# TEST REPORT

## AC POWER LINE CONDUCTED EMISSION

Worst Case: Wi-Fi On Mode



## TEST REPORT

Worst Case: Wi-Fi On Mode

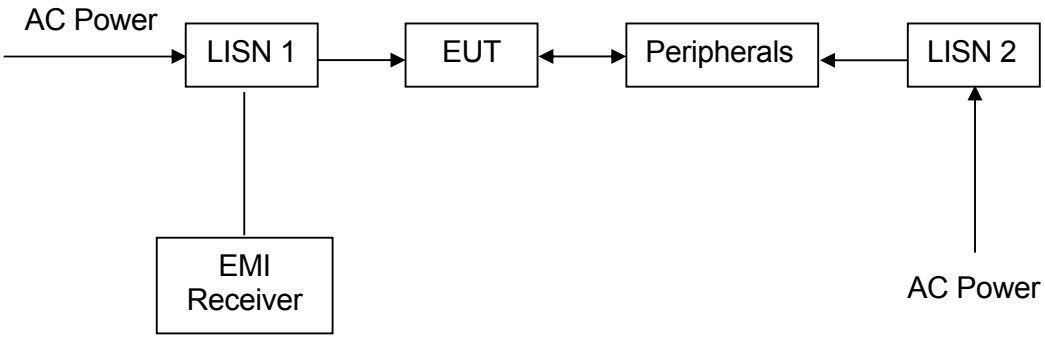
EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

| TRACE | | FREQUENCY | LEVEL dBµV | | DELTA LIMIT dB |
|---|---|---|---|---|---|
| 1 | Quasi Peak | 195 kHz | 46.03 | L1 | -17.79 |
| 1 | Quasi Peak | 213 kHz | 44.39 | L1 | -18.69 |
| 1 | Quasi Peak | 559.5 kHz | 33.64 | L1 | -22.35 |
| 1 | Quasi Peak | 573 kHz | 35.36 | L1 | -20.63 |
| 1 | Quasi Peak | 16.629 MHz | 33.04 | L1 | -26.95 |
| 2 | CISPR Average | 16.6785 MHz | 28.45 | L1 | -21.54 |

## TEST REPORT

### 4.7.3 Conducted Emission Test Setup



## TEST REPORT

## 5.0 EQUIPMENT LIST

1) Radiated Emissions Test

| Equipment | BiConiLog Antenna | Double Ridged Guide Antenna | EMI Test Receiver |
|---|---|---|---|
| Registration No. | EW-3061 | EW-1133 | EW-3156 |
| Manufacturer | EMCO | EMCO | R&S |
| Model No. | 3142E | 3115 | ESR26 |
| Calibration Date | November 02, 2017 | May 24, 2017 | November 10, 2017 |
| Calibration Due Date | November 02, 2018 | November 24, 2018 | November 10, 2018 |

2) Conducted Emissions Test

| Equipment | EMI Test Receiver | Artificial Mains | Pulse Limiter |
|---|---|---|---|
| Registration No. | EW-2500 | EW-0192 | EW-3248 |
| Manufacturer | R&S | R&S | R&S |
| Model No. | ESCI | ESH3-Z5 | E3H3-Z2 |
| Calibration Date | October 13, 2017 | October 27, 2017 | November 03, 2017 |
| Calibration Due Date | October 13, 2018 | August 25, 2018 | October 12, 2018 |

| Equipment | RF Cable 9kHz to 1000MHz | LISN |
|---|---|---|
| Registration No. | EW-3170 | EW-2874 |
| Manufacturer | N/A | R&S |
| Model No. | 9kHz to 1000MHz | ENV-216 |
| Calibration Date | March 20, 2017 | March 16, 2017 |
| Calibration Due Date | March 20, 2018 | March 16, 2018 |

3) Conductive Measurement Test

| Equipment | Spectrum Analyzer | RF Cable (up to 40GHz) 1.5m length | RF Power Meter with Power Sensor (N1921A) |
|---|---|---|---|
| Registration No. | EW-2253 | EW-3104 | EW-2270 |
| Manufacturer | R&S | N/A | N/A |
| Model No. | FSP40 | SMA-M to SMA-M | AGILENTTECH |
| Calibration Date | July 24, 2017 | February 28, 2017 | January 15, 2018 |
| Calibration Due Date | July 24, 2018 | February 28, 2018 | January 15, 2019 |

**END OF TEST REPORT**