

## TEST REPORT

**Report Number: 17090708HKG-002**

NTML Group Limited

Application for Original Grant of 47 CFR Part 15 Certification

Single New of RSS-247 Issue 2 Equipment

(DSSS/OFDM modulation)

**FCC ID: 2A00H-MP60**

**IC: 23529-MP60**

**Prepared and Checked by:**

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Date: May 14, 2018

## TEST REPORT

### GENERAL INFORMATION

<b>Applicant Name:</b>	NTML Group Limited
<b>Applicant Address:</b>	Unit 207, 2/F., Wayson Commercial Building, No.28 Connaught Road West, Sheung Wan, Hong Kong, China.
<b>FCC Specification Standard:</b>	FCC Part 15, April 5, 2017 Edition
<b>FCC ID:</b>	2A00H-MP60
<b>FCC Model(s):</b>	MP60
<b>IC Specification Standard:</b>	RSS-247 Issue 2, February 2017 RSS-Gen Issue 4, December 2014
<b>IC:</b>	23529-MP60
<b>HVIN:</b>	MP60
<b>PMN:</b>	Smart Plug
<b>Type of EUT:</b>	Spread Spectrum Transmitter
<b>Description of EUT:</b>	Smart Plug
<b>Serial Number:</b>	N/A
<b>Sample Receipt Date:</b>	September 15, 2017
<b>Date of Test:</b>	September 15, 2017 to May 10, 2018
<b>Report Date:</b>	May 14, 2018
<b>Environmental Conditions:</b>	Temperature: +10 to 40°C Humidity: 10 to 90%

## TEST REPORT

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## TEST REPORT

### EXHIBIT 1 TEST RESULTS SUMMARY & STATEMENT OF COMPLIANCE

#### 1.0 TEST RESULTS SUMMARY & STATEMENT OF COMPLIANCE

##### 1.1 Summary of Test Results

Test Items	FCC Part 15 Section	RSS-247/ RSS-Gen# Section	Results	Details See Section
Antenna Requirement	15.203	7.1.2#	Pass	2.1
Max. Conducted Output Power (Peak)	15.247(b)(3)&(4)	5.4(4)	Pass	4.1
Min. 6dB RF Bandwidth	15.247(a)(2)	5.2(1)	Pass	4.2
Max. Power Density (average)	15.247(e)	5.2(2)	Pass	4.3
Out of Band Antenna Conducted Emission	15.247(d)	5.5	Pass	4.4
Radiated Emission in Restricted Bands and Spurious Emissions	15.247(d), 15.209 & 15.109	5.5	Pass	4.6
AC Power Line Conducted Emission	15.207 & 15.107	7.2.4#	Pass	4.7

Note: Pursuant to FCC Part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over expected variations in temperature and supply voltage were considered.

##### 1.2 Statement of Compliance

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

FCC Part 15, April 5, 2017 Edition  
RSS-247 Issue 2, February 2017  
RSS-Gen Issue 4, November 2014

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### EXHIBIT 2 GENERAL DESCRIPTION

#### 2.0 GENERAL DESCRIPTION

##### 2.1 Product Description

The MP60 (MP60) is a Smart Plug.

The Equipment Under Test (EUT) is a wireless power strip which is powered by 100-125 VAC, 60Hz. The EUT contains a WIFI module which is for the usage monitoring. There are 6 surge-protected outlet, 2 USB-C and 2 USB-A charging ports.

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 11 Mbps.

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 802.11NHT20 MIMO 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 216.7Mbps.

For 802. 11NHT40 MIMO mode, it operates at frequency range of 2422.000MHz to 2452.000MHz with 9 channels. It transmits via Orthogonal Frequency Division Multiplexing (OFDM) modulation. Maximum bit rate can be up to 450Mbps.

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

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

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### 2.2 Test Methodology

Radiated emission measurement was 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 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 and Industry Canada No.: 2042V-1.

### 2.4 Related Submittal(s) Grants

This is a single application for certification of a transceiver.

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### EXHIBIT 3 SYSTEM TEST CONFIGURATION

#### 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 was powered by 120VAC 60Hz Adaptor.

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 / **RSS-247 2.5**. Digital circuitries used to control additional functions other than the operation of the transmitter are subject to FCC Part 15 Section 15.109 / RSS-247 Section 5.5 Limits.

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### 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.



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### 3.3 Details of EUT and Description of Accessories

Description of Accessories:

The EUT is powered by 120VAC

Description of Accessories:

- 1) 1 x LAN Cable of 2m in length (Supplied by Intertek)
- 2) Lightbulbs for full loading (supplied by Intertek)

### 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  $\pm 5.3\text{dB}$  and  $\pm 0.99\text{dB}$  respectively. The value of the Measurement uncertainty for conducted emission test is  $\pm 4.2\text{dB}$ .

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.

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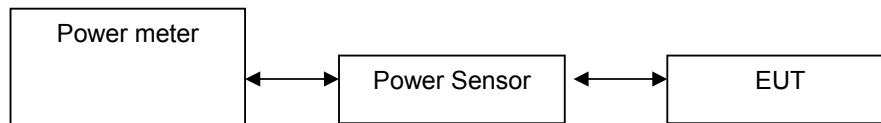
### EXHIBIT 4 TEST RESULTS

#### 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 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 = 2 dBi Antenna 0

Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	23.1	204.2
Middle Channel: 2437	23.7	234.4
High Channel: 2462	23.8	239.9

IEEE 802.11b (DSSS, 1 Mbps) Antenna Gain = 2 dBi Antenna 1

Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	23.5	223.9
Middle Channel: 2437	24.3	269.2
High Channel: 2462	24.2	263.0

## TEST REPORT

### 4.1 Maximum Conducted (peak) Output Power at Antenna Terminals – Cont'd

IEEE 802.11g (OFDM, 6 Mbps) Antenna Gain = 2 dBi Antenna 0

Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	24.2	263.0
Middle Channel: 2437	24.7	295.1
High Channel: 2462	25.0	316.2

IEEE 802.11g (OFDM, 6 Mbps) Antenna Gain = 2 dBi Antenna 1

Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	23.9	245.5
Middle Channel: 2437	24.4	275.4
High Channel: 2462	24.9	309.0

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna Gain = 2 dBi Antenna 0

Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	24.7	295.1
Middle Channel: 2437	25.0	316.2
High Channel: 2462	25.2	331.1

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna Gain = 2 dBi Antenna 1

Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	24.5	281.8
Middle Channel: 2437	24.9	309.0
High Channel: 2462	25.4	346.7

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

Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	27.1	508.5
Middle Channel: 2437	27.6	570.5
High Channel: 2462	28.0	625.2

The transmit signals are correlated with each other,  
Directional gain= $G_{ant}+10\log(N_{ant})$  dBi=2.0+3.0=5dBi

## TEST REPORT

### 4.1 Maximum Conducted Output Power at Antenna Terminals – Cont'd

IEEE 802.11n (40MHz) (OFDM, MCS0) Antenna Gain = 2 dBi Antenna 0

Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2422	23.4	218.8
Middle Channel: 2437	23.9	245.5
High Channel: 2452	24.2	263.0

IEEE 802.11n (40MHz) (OFDM, MCS0) Antenna Gain = 2 dBi Antenna 1

Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2422	23.2	208.9
Middle Channel: 2437	23.5	223.9
High Channel: 2452	23.9	245.5

IEEE 802.11n (40MHz) (OFDM, MCS0) (MIMO)

Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2422	26.3	427.7
Middle Channel: 2437	26.7	469.4
High Channel: 2452	27.1	508.5

The transmit signals are correlated with each other,  
Directional gain =  $G_{ant} + 10 \log(N_{ant})$  dBi = 2.0 + 3.0 = 5 dBi

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 = 24.3 dBm

IEEE 802.11g (OFDM, 6 Mbps)  
max. conducted (peak) output level = 25.0 dBm

IEEE 802.11n (20MHz) (OFDM, MCS0 Mbps) - MIMO  
max. conducted (peak) output level = 28.0 dBm

IEEE 802.11n (40MHz) (OFDM, MCS0 Mbps) - MIMO  
max. conducted (peak) output level = 27.1 dBm

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

RF Conducted power data are saved with filename: RFconducted.pdf

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### 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) Antenna 0

Frequency (MHz)	6dB Bandwidth (MHz)
Low Channel: 2412	10.3
Middle Channel: 2437	10.3
High Channel: 2462	10.3

#### IEEE 802.11b (DSSS, 1 Mbps) Antenna 1

Frequency (MHz)	6dB Bandwidth (MHz)
Low Channel: 2412	9.8
Middle Channel: 2437	9.3
High Channel: 2462	9.9

#### IEEE 802.11g (OFDM, 6 Mbps) Antenna 0

Frequency (MHz)	6dB Bandwidth (MHz)
Low Channel: 2412	15.2
Middle Channel: 2437	15.4
High Channel: 2462	15.3

#### IEEE 802.11g (OFDM, 6 Mbps) Antenna 1

Frequency (MHz)	6dB Bandwidth (MHz)
Low Channel: 2412	15.8
Middle Channel: 2437	14.1
High Channel: 2462	14.6

## TEST REPORT

### 4.2 Minimum 6dB RF Bandwidth - Cont'd

#### IEEE 802.11n (20MHz) (OFDM, MCS0 Mbps) Antenna 0

Frequency (MHz)	6dB Bandwidth (MHz)
Low Channel: 2412	12.8
Middle Channel: 2437	13.1
High Channel: 2462	14.1

#### IEEE 802.11n (20MHz) (OFDM, MCS0 Mbps) Antenna 1

Frequency (MHz)	6dB Bandwidth (MHz)
Low Channel: 2412	16.0
Middle Channel: 2437	15.9
High Channel: 2462	14.1

#### IEEE 802.11n (40MHz) (OFDM, MCS0 Mbps) Antenna 0

Frequency (MHz)	6dB Bandwidth (MHz)
Low Channel: 2412	29.0
Middle Channel: 2437	34.0
High Channel: 2462	35.3

#### IEEE 802.11n (40MHz) (OFDM, MCS0 Mbps) Antenna 1

Frequency (MHz)	6dB Bandwidth (MHz)
Low Channel: 2412	27.2
Middle Channel: 2437	30.3
High Channel: 2462	29.4

#### Limits

6 dB bandwidth shall be at least 500kHz

The plots of 6dB RF bandwidth are saved with filename: RFconducted.pdf.

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### 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) Antenna 0

Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2412	9.95
Middle Channel: 2437	9.81
High Channel: 2462	9.75

#### IEEE 802.11b (DSSS, 1 Mbps) Antenna 0

Frequency (MHz)	PSD in 3kHz (dBm)
Low Channel: 2412	-5.04
Middle Channel: 2437	-4.37
High Channel: 2462	-3.81

#### IEEE 802.11b (DSSS, 1 Mbps) Antenna 1

Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2412	9.87
Middle Channel: 2437	9.72
High Channel: 2462	9.63

#### IEEE 802.11b (DSSS, 1 Mbps) Antenna 1

Frequency (MHz)	PSD in 3kHz (dBm)
Low Channel: 2412	-4.72
Middle Channel: 2437	-4.15
High Channel: 2462	-4.29

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### 4.3 Maximum Power Spectral Density – Cont'd

#### IEEE 802.11g (OFDM, 6 Mbps) Antenna 0

Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2412	8.13
Middle Channel: 2437	9.26
High Channel: 2462	9.05

#### IEEE 802.11g (OFDM, 6 Mbps) Antenna 0

Frequency (MHz)	PSD in 3kHz (dBm)
Low Channel: 2412	-6.03
Middle Channel: 2437	-4.27
High Channel: 2462	-4.27

#### IEEE 802.11g (OFDM, 6 Mbps) Antenna 1

Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2412	9.53
Middle Channel: 2437	9.27
High Channel: 2462	9.05

#### IEEE 802.11g (OFDM, 6 Mbps) Antenna 1

Frequency (MHz)	PSD in 3kHz (dBm)
Low Channel: 2412	-5.65
Middle Channel: 2437	-3.83
High Channel: 2462	-3.94



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### 4.3 Maximum Power Spectral Density – Cont'd

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna 0

Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2412	7.99
Middle Channel: 2437	9.89
High Channel: 2462	9.54

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna 0

Frequency (MHz)	PSD in 3kHz (dBm)
Low Channel: 2412	-6.74
Middle Channel: 2437	-5.68
High Channel: 2462	-5.27

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna 1

Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2412	7.51
Middle Channel: 2437	10.5
High Channel: 2462	11.1

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna 1

Frequency (MHz)	PSD in 3kHz (dBm)
Low Channel: 2412	-5.30
Middle Channel: 2437	-3.88
High Channel: 2462	-3.79

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna 0 + Antenna 1 (MIMO)

Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2412	10.8
Middle Channel: 2437	13.2
High Channel: 2462	13.4

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna 0 + Antenna 1 (MIMO)

Frequency (MHz)	PSD in 3kHz (dBm)
Low Channel: 2412	-2.95
Middle Channel: 2437	-1.68
High Channel: 2462	-1.46

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### 4.3 Maximum Power Spectral Density – Cont'd

IEEE 802.11n (40MHz) (OFDM, MCS0) Antenna 0

Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2422	6.09
Middle Channel: 2437	6.34
High Channel: 2452	6.38

IEEE 802.11n (40MHz) (OFDM, MCS0) Antenna 0

Frequency (MHz)	PSD in 3kHz (dBm)
Low Channel: 2422	-8.06
Middle Channel: 2437	-6.98
High Channel: 2452	-7.17

IEEE 802.11n (40MHz) (OFDM, MCS0) Antenna 1

Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2422	4.13
Middle Channel: 2437	5.10
High Channel: 2452	6.45

IEEE 802.11n (40MHz) (OFDM, MCS0) Antenna 1

Frequency (MHz)	PSD in 3kHz (dBm)
Low Channel: 2422	-9.02
Middle Channel: 2437	-8.33
High Channel: 2452	-8.13

IEEE 802.11n (40MHz) (OFDM, MCS0) Antenna 0 + Antenna 1 (MIMO)

Frequency (MHz)	PSD in 100kHz (dBm)
Low Channel: 2422	8.23
Middle Channel: 2437	7.54
High Channel: 2452	8.76

IEEE 802.11n (40MHz) (OFDM, MCS0) Antenna 0 + Antenna 1 (MIMO)

Frequency (MHz)	PSD in 3kHz (dBm)
Low Channel: 2422	-5.50
Middle Channel: 2437	-4.59
High Channel: 2452	-4.61

Cable Loss: 0.5 dB

Limit: 8dBm

The plots of power spectral density are saved with filename: RFconducted.pdf

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### 4.4 Out of Band Conducted Emissions

For 802.11b/g/n20/n40, 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/n40.

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,n20,n40 below the maximum measured in-band peak PSD level.

All OOB and 99% OBW test data are saved with filename: RFconducted.pdf

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### 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 dB $\mu$ V/m

RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V

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 dB $\mu$ V 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 dB $\mu$ V/m. This value in dB $\mu$ V/m is converted to its corresponding level in  $\mu$ V/m.

$$RA = 62.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$PD = 0.0 \text{ dB}$$

$$AV = -10 \text{ dB}$$

$$FS = 62.0 + 7.4 + 1.6 - 29.0 + 0.0 + (-10.0) = 32.0 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm} [(32.0 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

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### 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 1-31 list the significant emission frequencies, the limit and the margin of compliance.

Judgement -

Passed by 0.3 dB margin

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### RADIATED EMISSION DATA

Mode: TX- Lowest Channel - Antenna 0

Table 1  
IEEE 802.11b (DSSS, 11 Mbps)

Polarization	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	46.0	33	29.4	42.4	54.0	-11.6
V	4824.000	33.0	33	34.9	34.9	54.0	-19.1
H	7236.000	31.7	33	37.9	36.6	54.0	-17.4
H	9648.000	30.9	33	40.4	38.3	54.0	-15.7
H	12060.000	33.2	33	40.5	40.7	54.0	-13.3
H	14472.000	34.8	33	40.0	41.8	54.0	-12.2

Polarization	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	56.8	33	29.4	53.2	74.0	-20.8
V	4824.000	44.8	33	34.9	46.7	74.0	-27.3
H	7236.000	43.2	33	37.9	48.1	74.0	-25.9
H	9648.000	42.3	33	40.4	49.7	74.0	-24.3
H	12060.000	44.7	33	40.5	52.2	74.0	-21.8
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- Middle Channel - Antenna 0

Table 2  
IEEE 802.11b (DSSS, 11 Mbps)

Polarization	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	32.6	33	34.9	34.5	54.0	-19.5
H	7311.000	31.8	33	37.9	36.7	54.0	-17.3
H	9748.000	30.8	33	40.4	38.2	54.0	-15.8
H	12185.000	33.3	33	40.5	40.8	54.0	-13.2
H	14622.000	36.7	33	38.4	42.1	54.0	-11.9

Polarization	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	44.6	33	34.9	46.5	74.0	-27.5
H	7311.000	43.4	33	37.9	48.3	74.0	-25.7
H	9748.000	42.0	33	40.4	49.4	74.0	-24.6
H	12185.000	44.9	33	40.5	52.4	74.0	-21.6
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-Highest Channel - Antenna 0

Table 3  
IEEE 802.11b (DSSS, 11 Mbps)

Polarization	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	46.7	33	29.4	43.1	54.0	-10.9
V	4924.000	32.7	33	34.9	34.6	54.0	-19.4
H	7386.000	31.9	33	37.9	36.8	54.0	-17.2
H	9848.000	30.7	33	40.4	38.1	54.0	-15.9
H	12310.000	33.4	33	40.5	40.9	54.0	-13.1
H	14772.000	36.6	33	38.4	42.0	54.0	-12.0

Polarization	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	57.3	33	29.4	53.7	74.0	-20.3
V	4924.000	44.5	33	34.9	46.4	74.0	-27.6
H	7386.000	43.5	33	37.9	48.4	74.0	-25.6
H	9848.000	41.8	33	40.4	49.2	74.0	-24.8
H	12310.000	45.0	33	40.5	52.5	74.0	-21.5

- 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- Lowest Channel - Antenna 0

Table 4  
IEEE 802.11g (OFDM, 54 Mbps)

Polarization	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
V	4824.000	33.5	33	34.9	35.4	54.0	-18.6
H	7236.000	32.1	33	37.9	37.0	54.0	-17.0
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	35.2	33	40.0	42.2	54.0	-11.8

Polarization	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	2390.000	68.3	33	29.4	64.7	74.0	-9.3
H	4824.000	45.4	33	34.9	47.3	74.0	-26.7
H	7236.000	43.9	33	37.9	48.8	74.0	-25.2
H	9648.000	42.8	33	40.4	50.2	74.0	-23.8
V	12060.000	44.8	33	40.5	52.3	74.0	-21.7
H	14472.000	46.5	33	40.0	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- Middle Channel - Antenna 0

Table 5  
IEEE 802.11g (OFDM, 54 Mbps)

Polarization	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	33.8	33	34.9	35.7	54.0	-18.3
H	7311.000	32.2	33	37.9	37.1	54.0	-16.9
H	9748.000	31.4	33	40.4	38.8	54.0	-15.2
H	12185.000	33.5	33	40.5	41.0	54.0	-13.0
V	14622.000	37.0	33	38.4	42.4	54.0	-11.6

Polarization	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	45.3	33	34.9	47.2	74.0	-26.8
H	7311.000	43.7	33	37.9	48.6	74.0	-25.4
H	9748.000	43.0	33	40.4	50.4	74.0	-23.6
H	12185.000	45.0	33	40.5	52.5	74.0	-21.5
V	14622.000	48.4	33	38.4	53.8	74.0	-20.2

- 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- Highest Channel - Antenna 0

Table 6  
IEEE 802.11g (OFDM, 54 Mbps)

Polarization	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	52.0	33	29.4	48.4	54.0	-5.6
V	4924.000	32.9	33	34.9	34.8	54.0	-19.2
H	7386.000	32.4	33	37.9	37.3	54.0	-16.7
H	9848.000	31.3	33	40.4	38.7	54.0	-15.3
H	12310.000	33.8	33	40.5	41.3	54.0	-12.7
V	14772.000	36.6	33	38.4	42.0	54.0	-12.0

Polarization	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	61.4	33	29.4	57.8	74.0	-16.2
V	4924.000	45.0	33	34.9	46.9	74.0	-27.1
H	7386.000	43.6	33	37.9	48.5	74.0	-25.5
H	9848.000	43.1	33	40.4	50.5	74.0	-23.5
H	12310.000	45.2	33	40.5	52.7	74.0	-21.3
V	14772.000	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- Lowest Channel - Antenna 0

Table 7  
IEEE 802.11n (20MHz) (OFDM, MCS7 Mbps)

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dB $\mu$ V/m)	Average Limit at 3m (dB $\mu$ V/m)	Margin (dB)
H	2390.000	55.0	33	29.4	51.4	54.0	-2.6
V	4824.000	32.8	33	34.9	34.7	54.0	-19.3
H	7236.000	32.0	33	37.9	36.9	54.0	-17.1
H	9648.000	31.2	33	40.4	38.6	54.0	-15.4
H	12060.000	33.0	33	40.5	40.5	54.0	-13.5
H	14472.000	35.4	33	40.0	42.4	54.0	-11.6

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB $\mu$ V/m)	Peak Limit at 3m (dB $\mu$ V/m)	Margin (dB)
H	2390.000	66.8	33	29.4	63.2	74.0	-10.8
V	4824.000	44.6	33	34.9	46.5	74.0	-27.5
H	7236.000	43.4	33	37.9	48.3	74.0	-25.7
H	9648.000	42.1	33	40.4	49.5	74.0	-24.5
H	12060.000	44.6	33	40.5	52.1	74.0	-21.9
H	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- Middle Channel - Antenna 0

Table 8  
IEEE 802.11n (20MHz) (OFDM, MCS7 Mbps)

Polarization	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	33.7	33	34.9	35.6	54.0	-18.4
H	7311.000	31.9	33	37.9	36.8	54.0	-17.2
H	9748.000	31.3	33	40.4	38.7	54.0	-15.3
H	12185.000	33.5	33	40.5	41.0	54.0	-13.0
H	14622.000	37.1	33	38.4	42.5	54.0	-11.5

Polarization	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	45.5	33	34.9	47.4	74.0	-26.6
H	7311.000	43.1	33	37.9	48.0	74.0	-26.0
H	9748.000	41.9	33	40.4	49.3	74.0	-24.7
H	12185.000	44.7	33	40.5	52.2	74.0	-21.8
H	14622.000	48.4	33	38.4	53.8	74.0	-20.2

- 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- Highest Channel - Antenna 0

Table 9  
IEEE 802.11n (20MHz) (OFDM, MCS7 Mbps)

Polarization	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	53.3	33	29.4	49.7	54.0	-4.3
V	4924.000	32.4	33	34.9	34.3	54.0	-19.7
H	7386.000	32.1	33	37.9	37.0	54.0	-17.0
H	9848.000	31.7	33	40.4	39.1	54.0	-14.9
H	12310.000	33.8	33	40.5	41.3	54.0	-12.7
V	14772.000	36.8	33	38.4	42.2	54.0	-11.8

Polarization	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	65.4	33	29.4	61.8	74.0	-12.2
V	4924.000	44.8	33	34.9	46.7	74.0	-27.3
H	7386.000	43.6	33	37.9	48.5	74.0	-25.5
H	9848.000	43.0	33	40.4	50.4	74.0	-23.6
H	12310.000	45.0	33	40.5	52.5	74.0	-21.5
V	14772.000	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- Lowest Channel – Antenna 0

Table 10  
IEEE 802.11n (40MHz) (OFDM, MCS0)

Polarization	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	57.3	33	29.4	53.7	54.0	-0.3
V	4844.000	33.1	33	34.9	35.0	54.0	-19.0
H	7266.000	32.2	33	37.9	37.1	54.0	-16.9
H	9688.000	31.5	33	40.4	38.9	54.0	-15.1
H	12110.000	32.9	33	40.5	40.4	54.0	-13.6
V	14532.000	37.2	33	38.4	42.6	54.0	-11.4

Polarization	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	72.5	33	29.4	68.9	74.0	-5.1
V	4844.000	45.2	33	34.9	47.1	74.0	-26.9
H	7266.000	43.7	33	37.9	48.6	74.0	-25.4
H	9688.000	42.3	33	40.4	49.7	74.0	-24.3
H	12110.000	44.8	33	40.5	52.3	74.0	-21.7
V	14532.000	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- Middle Channel – Antenna 0

Table 11  
IEEE 802.11n (40MHz) (OFDM, MCS0)

Polarization	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	32.6	33	34.9	34.5	54.0	-19.5
H	7311.000	31.8	33	37.9	36.7	54.0	-17.3
H	9748.000	31.0	33	40.4	38.4	54.0	-15.6
H	12185.000	33.9	33	40.5	41.4	54.0	-12.6
H	14622.000	37.4	33	38.4	42.8	54.0	-11.2

Polarization	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	44.7	33	34.9	46.6	74.0	-27.4
H	7311.000	43.3	33	37.9	48.2	74.0	-25.8
H	9748.000	41.8	33	40.4	49.2	74.0	-24.8
H	12185.000	45.0	33	40.5	52.5	74.0	-21.5
H	14622.000	48.3	33	38.4	53.7	74.0	-20.3

- 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- Highest Channel – Antenna 0

Table 12  
IEEE 802.11n (40MHz) (OFDM, MCS0)

Polarization	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	53.2	33	29.4	49.6	54.0	-4.4
V	4904.000	32.8	33	34.9	34.7	54.0	-19.3
H	7356.000	32.1	33	37.9	37.0	54.0	-17.0
H	9808.000	31.2	33	40.4	38.6	54.0	-15.4
V	12260.000	33.7	33	40.5	41.2	54.0	-12.8
H	14712.000	37.1	33	38.4	42.5	54.0	-11.5

Polarization	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	67.3	33	29.4	63.7	74.0	-10.3
V	4904.000	45.0	33	34.9	46.9	74.0	-27.1
H	7356.000	43.6	33	37.9	48.5	74.0	-25.5
H	9808.000	42.2	33	40.4	49.6	74.0	-24.4
V	12260.000	44.7	33	40.5	52.2	74.0	-21.8
H	14712.000	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- Lowest Channel – Antenna 1

Table 13  
IEEE 802.11b (DSSS, 11 Mbps)

Polarization	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	51.4	33	29.4	47.8	54.0	-6.2
H	4824.000	43.3	33	34.9	45.2	54.0	-8.8
V	7236.000	30.3	33	37.9	35.2	54.0	-18.8
H	9648.000	29.5	33	40.4	36.9	54.0	-17.1
H	12060.000	30.2	33	40.5	37.7	54.0	-16.3
H	14472.000	31.5	33	40.0	38.5	54.0	-15.5

Polarization	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	66.0	33	29.4	62.4	74.0	-11.6
H	4824.000	53.1	33	34.9	55.0	74.0	-19.0
V	7236.000	38.5	33	37.9	43.4	74.0	-30.6
H	9648.000	40.4	33	40.4	47.8	74.0	-26.2
H	12060.000	39.5	33	40.5	47.0	74.0	-27.0
H	14472.000	41.5	33	40.0	48.5	74.0	-25.5

- 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- Middle Channel – Antenna 1

Table 14  
IEEE 802.11b (DSSS, 11 Mbps)

Polarization	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	43.5	33	34.9	45.4	54.0	-8.6
V	7311.000	30.5	33	37.9	35.4	54.0	-18.6
H	9748.000	29.4	33	40.4	36.8	54.0	-17.2
H	12185.000	29.9	33	40.5	37.4	54.0	-16.6
H	14622.000	33.3	33	38.4	38.7	54.0	-15.3

Polarization	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	53.9	33	34.9	55.8	74.0	-18.2
V	7311.000	38.8	33	37.9	43.7	74.0	-30.3
H	9748.000	40.5	33	40.4	47.9	74.0	-26.1
H	12185.000	40.0	33	40.5	47.5	74.0	-26.5
H	14622.000	42.8	33	38.4	48.2	74.0	-25.8

- 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- Highest Channel – Antenna 1

Table 15  
IEEE 802.11b (DSSS, 11 Mbps)

Polarization	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	55.4	33	29.4	51.8	54.0	-2.2
H	4924.000	43.9	33	34.9	45.8	54.0	-8.2
V	7386.000	30.2	33	37.9	35.1	54.0	-18.9
H	9848.000	29.2	33	40.4	36.6	54.0	-17.4
H	12310.000	30.4	33	40.5	37.9	54.0	-16.1
H	14772.000	32.9	33	38.4	38.3	54.0	-15.7

Polarization	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	67.4	33	29.4	63.8	74.0	-10.2
H	4924.000	53.5	33	34.9	55.4	74.0	-18.6
V	7386.000	38.3	33	37.9	43.2	74.0	-30.8
H	9848.000	40.1	33	40.4	47.5	74.0	-26.5
H	12310.000	40.3	33	40.5	47.8	74.0	-26.2
H	14772.000	42.9	33	38.4	48.3	74.0	-25.7

- 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- Lowest Channel – Antenna 1

Table 16  
IEEE 802.11g (OFDM, 54 Mbps)

Polarization	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	56.6	33	29.4	53.0	54.0	-1.0
V	4824.000	35.9	33	34.9	37.8	54.0	-16.2
V	7236.000	24.7	33	37.9	29.6	54.0	-24.4
V	9648.000	23.4	33	40.4	30.8	54.0	-23.2
V	12060.000	24.2	33	40.5	31.7	54.0	-22.3
H	14472.000	26.2	33	40.0	33.2	54.0	-20.8

Polarization	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	56.6	33	29.4	53.0	74.0	-21.0
V	4824.000	35.9	33	34.9	37.8	74.0	-36.2
V	7236.000	24.7	33	37.9	29.6	74.0	-44.4
V	9648.000	23.4	33	40.4	30.8	74.0	-43.2
V	12060.000	24.2	33	40.5	31.7	74.0	-42.3
H	14472.000	26.2	33	40.0	33.2	74.0	-40.8

- 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-Middle Channel – Antenna 1

Table 17  
IEEE 802.11g (OFDM, 54 Mbps)

Polarization	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	35.5	33	34.9	37.4	54.0	-16.6
V	7311.000	24.5	33	37.9	29.4	54.0	-24.6
V	9748.000	22.8	33	40.4	30.2	54.0	-23.8
V	12185.000	24.3	33	40.5	31.8	54.0	-22.2
H	14622.000	27.7	33	38.4	33.1	54.0	-20.9

Polarization	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	53.3	33	34.9	55.2	74.0	-18.8
V	7311.000	39.4	33	37.9	44.3	74.0	-29.7
V	9748.000	37.7	33	40.4	45.1	74.0	-28.9
V	12185.000	39.3	33	40.5	46.8	74.0	-27.2
H	14622.000	41.8	33	38.4	47.2	74.0	-26.8

- 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.
  6. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-Gen Section 8.10.
  7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
  8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.

## TEST REPORT

Mode: TX-Highest Channel – Antenna 1

Table 18  
IEEE 802.11g (OFDM, 54 Mbps)

Polarization	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	53.3	33	29.4	49.7	54.0	-4.3
V	4924.000	35.2	33	34.9	37.1	54.0	-16.9
V	7386.000	24.4	33	37.9	29.3	54.0	-24.7
V	9848.000	22.9	33	40.4	30.3	54.0	-23.7
V	12310.000	24.1	33	40.5	31.6	54.0	-22.4
H	14772.000	28.3	33	38.4	33.7	54.0	-20.3

Polarization	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	64.0	33	29.4	60.4	74.0	-13.6
V	4924.000	53.8	33	34.9	55.7	74.0	-18.3
H	7386.000	39.3	33	37.9	44.2	74.0	-29.8
H	9848.000	37.9	33	40.4	45.3	74.0	-28.7
H	12310.000	39.1	33	40.5	46.6	74.0	-27.4
V	14772.000	42.0	33	38.4	47.4	74.0	-26.6

- 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- Lowest Channel – Antenna 1

Table 19  
IEEE 802.11n (20MHz) (OFDM, MCS7 Mbps)

Polarization	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	56.4	33	29.4	52.8	54.0	-1.2
V	4824.000	33.5	33	34.9	35.4	54.0	-18.6
H	7236.000	31.5	33	37.9	36.4	54.0	-17.6
H	9648.000	30.8	33	40.4	38.2	54.0	-15.8
H	12060.000	33.1	33	40.5	40.6	54.0	-13.4
H	14472.000	35.2	33	40.0	42.2	54.0	-11.8

Polarization	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	71.9	33	29.4	68.3	74.0	-5.7
V	4824.000	49.3	33	34.9	51.2	74.0	-22.8
H	7236.000	43.1	33	37.9	48.0	74.0	-26.0
H	9648.000	42.0	33	40.4	49.4	74.0	-24.6
H	12060.000	44.8	33	40.5	52.3	74.0	-21.7
H	14472.000	46.7	33	40.0	53.7	74.0	-20.3

- 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- Middle Channel – Antenna 1

Table 20  
IEEE 802.11n (20MHz) (OFDM, MCS7 Mbps)

Polarization	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	33.3	33	34.9	35.2	54.0	-18.8
H	7311.000	31.4	33	37.9	36.3	54.0	-17.7
H	9748.000	30.5	33	40.4	37.9	54.0	-16.1
H	12185.000	33.5	33	40.5	41.0	54.0	-13.0
H	14622.000	36.8	33	38.4	42.2	54.0	-11.8

Polarization	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	48.9	33	34.9	50.8	74.0	-23.2
H	7311.000	42.9	33	37.9	47.8	74.0	-26.2
H	9748.000	41.7	33	40.4	49.1	74.0	-24.9
H	12185.000	45.0	33	40.5	52.5	74.0	-21.5
H	14622.000	48.4	33	38.4	53.8	74.0	-20.2

- 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- Highest Channel – Antenna 1

Table 21  
IEEE 802.11n (20MHz) (OFDM, MCS7 Mbps)

Polarization	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	55.7	33	29.4	52.1	54.0	-1.9
V	4924.000	33.1	33	34.9	35.0	54.0	-19.0
H	7386.000	31.6	33	37.9	36.5	54.0	-17.5
H	9848.000	30.9	33	40.4	38.3	54.0	-15.7
H	12310.000	33.6	33	40.5	41.1	54.0	-12.9
H	14772.000	36.7	33	38.4	42.1	54.0	-11.9

Polarization	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	69.9	33	29.4	66.3	74.0	-7.7
V	4924.000	48.8	33	34.9	50.7	74.0	-23.3
H	7386.000	43.2	33	37.9	48.1	74.0	-25.9
H	9848.000	42.0	33	40.4	49.4	74.0	-24.6
H	12310.000	45.1	33	40.5	52.6	74.0	-21.4
H	14772.000	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- Lowest Channel – Antenna 1

Table 22  
IEEE 802.11n (40MHz) (OFDM, MCS0)

Polarization	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	57.2	33	29.4	53.6	54.0	-0.4
V	4844.000	32.9	33	34.9	34.8	54.0	-19.2
H	7266.000	31.6	33	37.9	36.5	54.0	-17.5
H	9688.000	30.7	33	40.4	38.1	54.0	-15.9
H	12110.000	33.3	33	40.5	40.8	54.0	-13.2
H	14532.000	36.5	33	38.4	41.9	54.0	-12.1

Polarization	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	75.0	33	29.4	71.4	74.0	-2.6
V	4844.000	44.8	33	34.9	46.7	74.0	-27.3
H	7266.000	43.2	33	37.9	48.1	74.0	-25.9
H	9688.000	41.9	33	40.4	49.3	74.0	-24.7
H	12110.000	44.9	33	40.5	52.4	74.0	-21.6
H	14532.000	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- Middle Channel – Antenna 1

Table 23  
IEEE 802.11n (40MHz) (OFDM, MCS0)

Polarization	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	32.7	33	34.9	34.6	54.0	-19.4
H	7311.000	31.3	33	37.9	36.2	54.0	-17.8
H	9748.000	31.2	33	40.4	38.6	54.0	-15.4
H	12185.000	33.7	33	40.5	41.2	54.0	-12.8
H	14622.000	37.0	33	38.4	42.4	54.0	-11.6

Polarization	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	44.5	33	34.9	46.4	74.0	-27.6
H	7311.000	42.8	33	37.9	47.7	74.0	-26.3
H	9748.000	42.1	33	40.4	49.5	74.0	-24.5
H	12185.000	45.2	33	40.5	52.7	74.0	-21.3
H	14622.000	48.5	33	38.4	53.9	74.0	-20.1

- 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-Highest Channel – Antenna 1

Table 24  
IEEE 802.11n (40MHz) (OFDM, MCS0)

Polarization	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	56.6	33	29.4	53.0	54.0	-1.0
V	4904.000	32.7	33	34.9	34.6	54.0	-19.4
H	7356.000	31.8	33	37.9	36.7	54.0	-17.3
H	9808.000	30.6	33	40.4	38.0	54.0	-16.0
H	12260.000	33.8	33	40.5	41.3	54.0	-12.7
H	14712.000	36.8	33	38.4	42.2	54.0	-11.8

Polarization	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	71.1	33	29.4	67.5	74.0	-6.5
V	4904.000	44.6	33	34.9	46.5	74.0	-27.5
H	7356.000	43.3	33	37.9	48.2	74.0	-25.8
H	9808.000	41.7	33	40.4	49.1	74.0	-24.9
H	12260.000	45.3	33	40.5	52.8	74.0	-21.2
H	14712.000	48.3	33	38.4	53.7	74.0	-20.3

- 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- Lowest Channel – Antenna 0 + Antenna 1

Table 25  
IEEE 802.11n (20MHz) (OFDM, MCS7 Mbps)

Polarization	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	56.0	33	29.4	52.4	54.0	-1.6
V	4824.000	32.8	33	34.9	34.7	54.0	-19.3
H	7236.000	31.6	33	37.9	36.5	54.0	-17.5
H	9648.000	30.4	33	40.4	37.8	54.0	-16.2
H	12060.000	33.4	33	40.5	40.9	54.0	-13.1
H	14472.000	35.5	33	40.0	42.5	54.0	-11.5

Polarization	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	70.3	33	29.4	66.7	74.0	-7.3
V	4824.000	47.4	33	34.9	49.3	74.0	-24.7
H	7236.000	43.3	33	37.9	48.2	74.0	-25.8
H	9648.000	41.8	33	40.4	49.2	74.0	-24.8
H	12060.000	45.1	33	40.5	52.6	74.0	-21.4
H	14472.000	46.9	33	40.0	53.9	74.0	-20.1

- 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-Middle Channel – Antenna 0 + Antenna 1

Table 26  
IEEE 802.11n (20MHz) (OFDM, MCS7 Mbps)

Polarization	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	33.1	33	34.9	35.0	54.0	-19.0
H	7311.000	31.5	33	37.9	36.4	54.0	-17.6
H	9748.000	30.8	33	40.4	38.2	54.0	-15.8
H	12185.000	33.0	33	40.5	40.5	54.0	-13.5
H	14622.000	36.7	33	38.4	42.1	54.0	-11.9

Polarization	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	47.9	33	34.9	49.8	74.0	-24.2
H	7311.000	43.2	33	37.9	48.1	74.0	-25.9
H	9748.000	42.1	33	40.4	49.5	74.0	-24.5
H	12185.000	44.8	33	40.5	52.3	74.0	-21.7
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- Highest Channel – Antenna 0 + Antenna 1

Table 27  
IEEE 802.11n (20MHz) (OFDM, MCS7 Mbps)

Polarization	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	57.0	33	29.4	53.4	54.0	-0.6
V	4924.000	32.6	33	34.9	34.5	54.0	-19.5
H	7386.000	31.3	33	37.9	36.2	54.0	-17.8
H	9848.000	30.9	33	40.4	38.3	54.0	-15.7
H	12310.000	33.2	33	40.5	40.7	54.0	-13.3
H	14772.000	37.0	33	38.4	42.4	54.0	-11.6

Polarization	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	71.8	33	29.4	68.2	74.0	-5.8
V	4924.000	47.3	33	34.9	49.2	74.0	-24.8
H	7386.000	43.0	33	37.9	47.9	74.0	-26.1
H	9848.000	42.2	33	40.4	49.6	74.0	-24.4
H	12310.000	45.0	33	40.5	52.5	74.0	-21.5
H	14772.000	48.4	33	38.4	53.8	74.0	-20.2

- 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-Lowest Channel – Antenna 0 + Antenna 1

Table 28  
IEEE 802.11n (40MHz) (OFDM, MCS0)

Polarization	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	57.1	33	29.4	53.5	54.0	-0.5
V	4844.000	32.7	33	34.9	34.6	54.0	-19.4
H	7266.000	31.7	33	37.9	36.6	54.0	-17.4
H	9688.000	31.0	33	40.4	38.4	54.0	-15.6
H	12110.000	33.0	33	40.5	40.5	54.0	-13.5
H	14532.000	36.7	33	38.4	42.1	54.0	-11.9

Polarization	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	73.9	33	29.4	70.3	74.0	-3.7
V	4844.000	47.6	33	34.9	49.5	74.0	-24.5
H	7266.000	43.5	33	37.9	48.4	74.0	-25.6
H	9688.000	42.3	33	40.4	49.7	74.0	-24.3
H	12110.000	44.8	33	40.5	52.3	74.0	-21.7
H	14532.000	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- Middle Channel – Antenna 0 + Antenna 1

Table 29  
IEEE 802.11n (40MHz) (OFDM, MCS0)

Polarization	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	32.4	33	34.9	34.3	54.0	-19.7
H	7311.000	31.2	33	37.9	36.1	54.0	-17.9
H	9748.000	31.1	33	40.4	38.5	54.0	-15.5
H	12185.000	33.3	33	40.5	40.8	54.0	-13.2
H	14622.000	37.0	33	38.4	42.4	54.0	-11.6

Polarization	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	47.2	33	34.9	49.1	74.0	-24.9
H	7311.000	42.8	33	37.9	47.7	74.0	-26.3
H	9748.000	42.4	33	40.4	49.8	74.0	-24.2
H	12185.000	45.1	33	40.5	52.6	74.0	-21.4
H	14622.000	48.5	33	38.4	53.9	74.0	-20.1

- 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-Highest Channel – Antenna 0 + Antenna 1

Table 30  
IEEE 802.11n (40MHz) (OFDM, MCS0)

Polarization	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	55.9	33	29.4	52.3	54.0	-1.7
V	4904.000	32.3	33	34.9	34.2	54.0	-19.8
H	7356.000	31.3	33	37.9	36.2	54.0	-17.8
H	9808.000	30.9	33	40.4	38.3	54.0	-15.7
H	12260.000	32.9	33	40.5	40.4	54.0	-13.6
H	14712.000	37.3	33	38.4	42.7	54.0	-11.3

Polarization	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	71.3	33	29.4	67.7	74.0	-6.3
V	4904.000	47.1	33	34.9	49.0	74.0	-25.0
H	7356.000	42.9	33	37.9	47.8	74.0	-26.2
H	9808.000	41.9	33	40.4	49.3	74.0	-24.7
H	12260.000	44.7	33	40.5	52.2	74.0	-21.8
H	14712.000	48.6	33	38.4	54.0	74.0	-20.0

- 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: USB Socket - Power On

Table 31

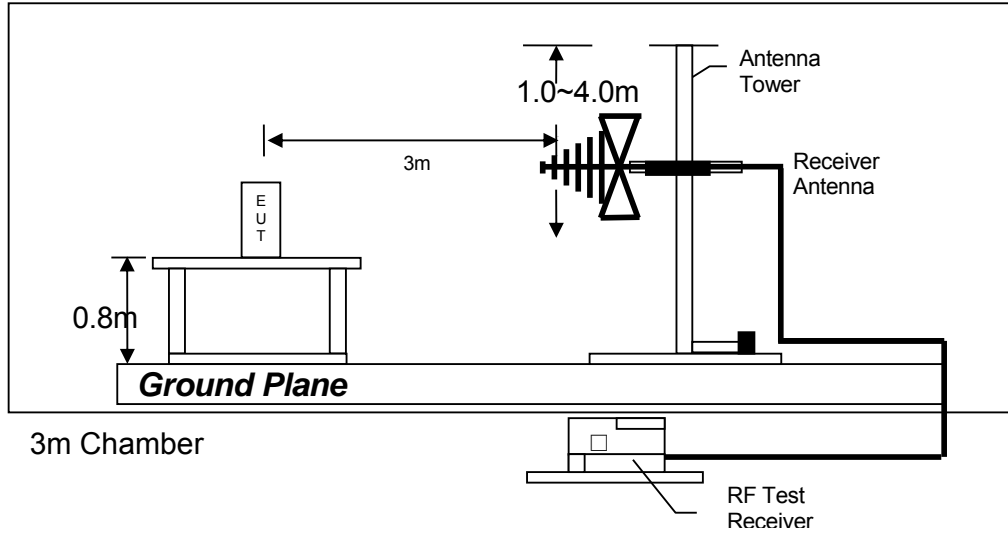
Polarization	Frequency (MHz)	Reading (dBμV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
V	41.954	32.2	16	10.0	26.2	40.0	-13.8
V	54.954	34.2	16	11.0	29.2	40.0	-10.8
H	78.083	37.5	16	6.0	27.5	40.0	-12.5
V	109.933	34.9	16	14.0	32.9	43.5	-10.6
H	176.450	28.2	16	19.0	31.2	43.5	-12.3
H	600.033	25.4	16	29.0	38.4	46.0	-7.6
H	900.062	26.3	16	32.0	42.3	46.0	-3.7
H	999.990	23.6	16	33.0	40.6	54.0	-13.4

- 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.

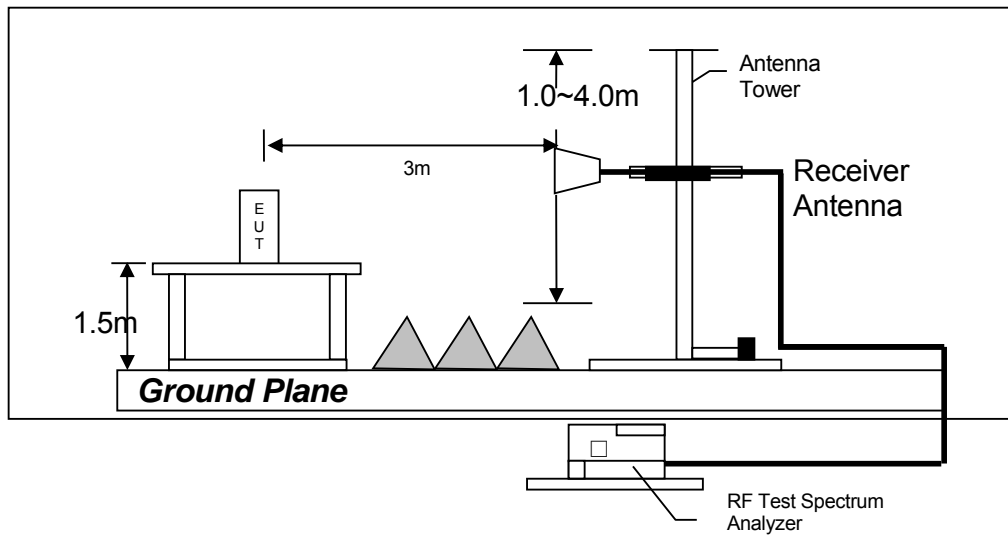
## TEST REPORT

### 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

4.011 MHz

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

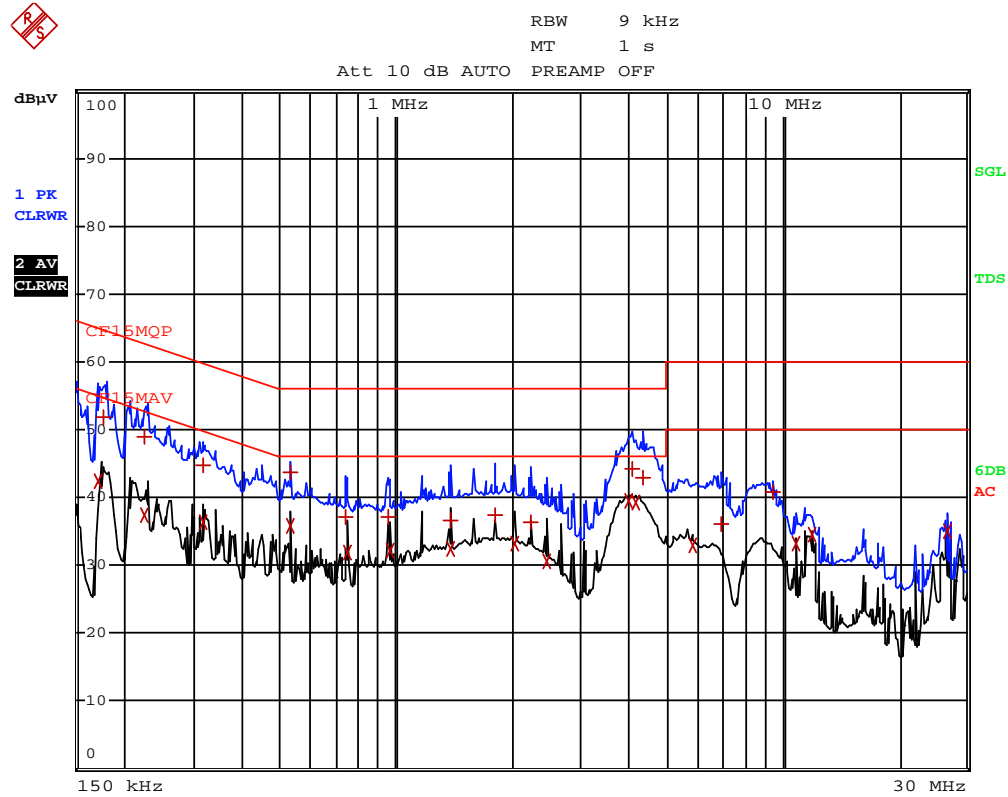
The plot(s) and data in the following pages list the significant emission frequencies, the limit and the margin of compliance.

Passed by 6.53 dB margin compare with CISPR Average limit

## TEST REPORT

### AC POWER LINE CONDUCTED EMISSION

Worst Case: WiFi operation



Date: 19.APR.2018 09:38:14



## TEST REPORT

Worst Case: WiFi Operation

EDIT PEAK LIST (Final Measurement Results)					
Trace1:	CF15MQP				
Trace2:	CF15MAV				
Trace3:	---				
	TRACE	FREQUENCY	LEVEL dBμV		DELTA LIMIT dB
2	CISPR Average	172.5 kHz	42.47 L1		-12.36
1	Quasi Peak	177 kHz	51.80 L1		-12.82
1	Quasi Peak	226.5 kHz	49.07 L1		-13.50
2	CISPR Average	226.5 kHz	37.40 L1		-15.17
1	Quasi Peak	316.5 kHz	44.71 L1		-15.08
2	CISPR Average	316.5 kHz	36.34 L1		-13.44
1	Quasi Peak	532.5 kHz	43.58 N		-12.41
2	CISPR Average	532.5 kHz	35.88 N		-10.11
1	Quasi Peak	739.5 kHz	37.15 N		-18.84
2	CISPR Average	744 kHz	31.82 N		-14.17
1	Quasi Peak	955.5 kHz	37.24 N		-18.75
2	CISPR Average	960 kHz	32.26 N		-13.73
1	Quasi Peak	1.3785 MHz	36.56 L1		-19.43
2	CISPR Average	1.383 MHz	32.50 L1		-13.49
1	Quasi Peak	1.806 MHz	37.32 L1		-18.67
2	CISPR Average	2.022 MHz	33.14 L1		-12.85
1	Quasi Peak	2.2245 MHz	36.42 L1		-19.57
2	CISPR Average	2.4495 MHz	30.64 L1		-15.35
2	CISPR Average	4.011 MHz	39.46 L1		-6.53
1	Quasi Peak	4.074 MHz	44.16 L1		-11.83

Date: 19.APR.2018 09:37:53

## TEST REPORT

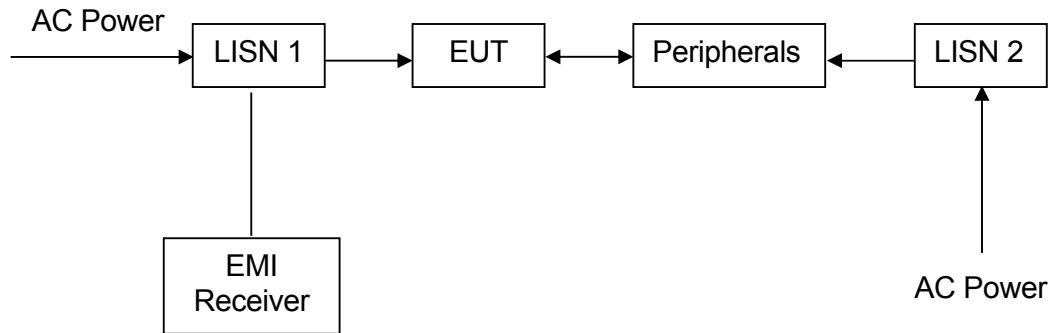
Worst Case: WiFi Operation

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	CF15MQP			
Trace2:	CF15MAV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
2 CISPR Average	4.1865 MHz	39.34 L1		-6.65
1 Quasi Peak	4.362 MHz	43.00 L1		-12.99
2 CISPR Average	5.8515 MHz	33.06 L1		-16.93
1 Quasi Peak	6.972 MHz	36.08 L1		-23.91
1 Quasi Peak	9.429 MHz	40.68 N		-19.31
2 CISPR Average	10.7925 MHz	33.33 L1		-16.66
2 CISPR Average	11.895 MHz	34.53 N		-15.46
2 CISPR Average	26.61 MHz	34.95 L1		-15.04

Date: 19.APR.2018 09:45:32

## TEST REPORT

### 4.7.3 Conducted Emission Test Setup



## TEST REPORT

### EXHIBIT 5 EQUIPMENT LIST

#### 5.0 EQUIPMENT LIST

##### 1) Radiated Emissions Test

Equipment	Emi Test Receiver	Spectrum Analyzer	Biconical Antenna
Registration No.	EW-3156	EW-3281	EW-2512
Manufacturer	R&S	R&S	EMCO
Model No.	ESR26	FSV40	3104C
Calibration Date	November 10, 2017	January 02, 2018	November 16, 2016
Calibration Due Date	November 10, 2018	January 02, 2019	May 16, 2018

Equipment	Log Periodic Antenna	Double Ridged Guide Antenna	12m Double Shield RF Cable (20MHz to 6GHz)
Registration No.	EW-1042	EW-0194	EW-1852
Manufacturer	EMCO	EMCO	RADIALL
Model No.	3148	3115	N(m)-RG142 - N(m)
Calibration Date	June 19, 2017	March 14, 2018	January 19, 2018
Calibration Due Date	December 19, 2018	September 14, 2019	January 19, 2019

Equipment	RF Cable 14m (1GHz to 26.5GHz)
Registration No.	EW-2781
Manufacturer	GREATBILLION
Model No.	SMA m/SHF5MPU /SMA m ra14m,26G
Calibration Date	September 25, 2017
Calibration Due Date	September 25, 2018

##### 2) Conducted Emissions Test

Equipment	EMI Test Receiver	RF Cable 9kHz to 1000MHz	Artificial Mains Network
Registration No.	EW-2500	EW-3170	EW-0192
Manufacturer	ROHDESCHWARZ	N/A	ROHDESCHWARZ
Model No.	ESCI	9kHz to 1000MHz	ESH3-Z5
Calibration Date	Oct. 13, 2017	Mar. 20, 2018	Oct. 27, 2017
Calibration Due Date	Oct. 13, 2018	Mar. 20, 2019	Aug. 25, 2018

## TEST REPORT

### 5.0 EQUIPMENT LIST – Cont'd

#### 3) RF Conductive Measurement Test

<b>Equipment</b>	<b>Spectrum Analyzer</b>	<b>Wideband Power Sensor</b>
Registration No.	EW-3016	EW-3309b
Manufacturer	R&S	R&S
Model No.	FSV40	NRP-Z81
Calibration Date	Jul. 20, 2017	May. 23, 2017
Calibration Due Date	Jul. 20, 2018	May. 23, 2018