2/F., Garment Centre,
576 Castle Peak Road, Kowloon,
Hong Kong.

Telephone: (852) 2173 8888
Facsimile: (852) 2785 5487
www.intertek.com

TEST REPORT

Report No.: 17031411HKG-002

Harman International Industries, Inc.

Application For Certification
(Original Grant)

FCC ID: API-MICROCORE
IC: 6132A-MICROCORE

This report contains the data of WLAN (WiFi) portion only.

PREPARED AND CHECKED BY:	APPROVED BY:
Signed On File Lee Shui Tim, Tim Lead Engineer	Digitally signed by Chow Chi Ming, Billy DN: cn=Chow Chi Ming, Billy, o=Intertek Testing Services Hong Kong Ltd, ou, email=billy.chow@intertek.com, c=HK Chow Chi Ming, Billy Manager Date: November 20, 2017

TEST REPORT

GENERAL INFORMATION

Grantee:	Harman International Industries, Inc.
Grantee Address:	8500 Balboa Blvd. Northridge, CA 91329 USA.
Contact Person:	Tim Song
Tel:	818-895-8173
Fax:	818-892-0325
e-mail:	tim.song@harman.com
Manufacturer:	Dongguan Kwan Hong Electronics Co., Ltd.
Manufacturer Address:	Kwan Hong Building, Xiao Bian 2nd Industrial Zone, Chang An, Dongguan, China (Peoples Republic Of)
Brand Name:	STUDER
Model / HVIN:	MICROCORE
PMN:	Mixing Console
Type of EUT:	Unlicensed National Information Infrastructure Transmitter
Description of EUT:	Mixing Console
Serial Number:	N/A
FCC ID / IC:	API-MICROCORE / 6132A-MICROCORE
Date of Sample Submitted:	March 24, 2017
Date of Test:	August 20, 2017 to September 15, 2017
Report No.:	17031411HKG-002
Report Date:	November 20, 2017
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

TEST REPORT

TABLE OF CONTENTS

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	15.407(a)	6.2.1.1/ 6.2.2.1/ 6.2.3.1/ 6.2.4.1	Pass	2.1
Max. Conducted Output Power (Peak)	15.407(a)	6.2.1.1/ 6.2.2.1/ 6.2.3.1/ 6.2.4.1	Pass	4.1
Transmit Power Control (TPC)	15.407(h)	6.2.1.1/ 6.2.2.1/ 6.2.3.1/ 6.2.4.1	N/A	See Remark
Min. 6dB RF Bandwidth	15.407(e)	6.2.4.1	Pass	4.2
Max. Power Density (average)	15.407(a)	6.2.4.1	Pass	4.3
Out of Band Antenna Conducted Emission	15.407(b)	6.2.1.2/ 6.2.2.2/ 6.2.3.2/ 6.2.4.2	Pass	4.4
Radiated Emission in Restricted Bands and Spurious Emissions	15.407(b), 15.209 & 15.109	6.2.1.2/ 6.2.2.2/ 6.2.3.2/ 6.2.4.2	Pass	4.6
AC Power Line Conducted Emission	15.207 & 15.107	7.2.4#	Pass	4.7
Dynamic Frequency Selection(DFS)	15.407	6.3.1	Pass	4.10

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, October 1, 2015 Edition
RSS-247 Issue 2, February 2017

TEST REPORT

EXHIBIT 2 GENERAL DESCRIPTION

2.0 **General Description**

2.1 Product Description

The Equipment Under Test (EUT) is a Mixing Console.

The Equipment Under Test (EUT) is a Remote Control Digital Mixer, equipped with multi-channel XLR/line input/output, headphone output, WiFi, LAN and USB Interface. Its operation can be controlled by a Smartphone/Notebook over WiFi link. The WiFi module covers both 2.4GHz and 5GHz band. For the 2.4GHz band, the EUT has only 802.11b mode that occupies a frequency range from 2412MHz to 2462MHz (11 channels with channel spacing of 5MHz). For 5GHz band, the EUT has only 802.11a mode that occupies a frequency range from 5180MHz to 5240MHz (4 channels with channel spacing of 20MHz) and another frequency range from 5745MHz to 5825MHz (5 channels with channel spacing of 20MHz). The EUT is powered by 100-240VAC. HDMI function is not implemented for this product. The applicant declared that the EUT is a slave unit without DFS function.

The EUT is power by 120VAC.

The EUT has one antennas without MIMO function.

The antenna used in the EUT are external, detachable, with reverse-SMA connector.

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

This report covers 5.0GHz band WiFi portion only.

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.789033 D02 v01r04 (02-May-2017) All other measurements were made in accordance with the procedures in 47 CFR Part 2 and RSS-Gen Issue 4 (2014).

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 and Industry Canada No.: 2042V-1.

2.4 Related Submittal(s) Grants

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

TEST REPORT

EXHIBIT 3
SYSTEM TEST CONFIGURATION

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 was powered by 120VAC.

For the measurements, the EUT was attached to a plastic stand if necessary and placed on the wooden turntable which is four feet in diameter and approximately 0.8m in height above the ground plane for emission measurement at or below 1GHz and 1.5m in height above the ground plane for emission measurement above 1GHz. 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.

TEST REPORT

3.1 Justification – Cont'd

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.

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 4.2.3.

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 4.6.3. With the resolution bandwidth 1MHz and spectrum analyzer IF bandwidth 3dB, the pulse desensitization factor was 0dB.

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 power cord connected to one LISN (Line impedance stabilization network), which provided 50ohm coupling impedance for measuring instrument. Meanwhile, the peripheral or support equipment power cords connected to a separate LISN. The ac powers for all LISNs were obtained from the same power source. 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. Power cords of non-EUT equipment (peripherals) were not bundled. AC power cords of peripheral equipments draped over the rear edge of the table, and routed them down onto the floor of the ac power line conducted emission test site to the second LISN.

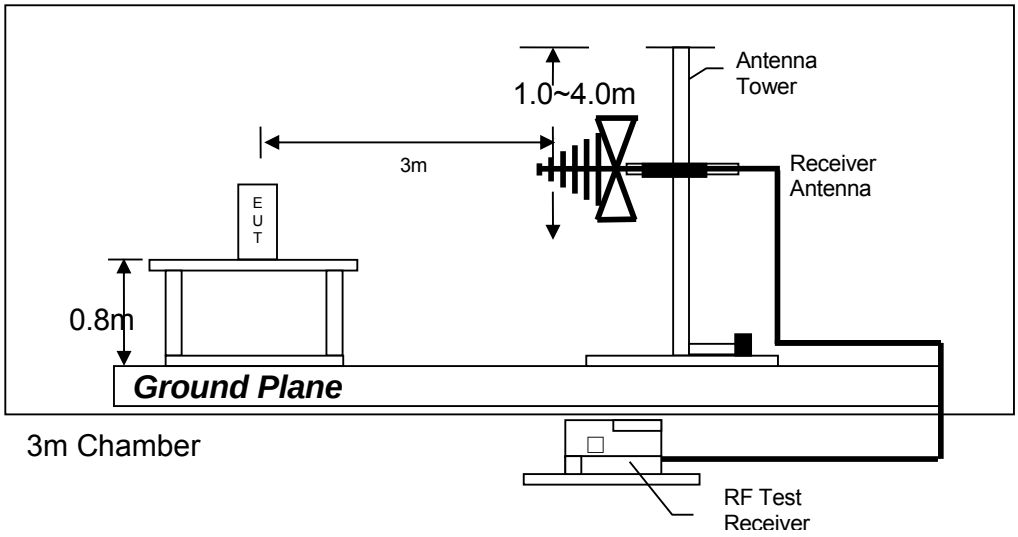
All connecting cables of EUT and peripherals were manipulated to find the maximum emission.

All setting of data rate for 802.11A of WiFi mode had been considered, and worst case test data are shown on this test report.

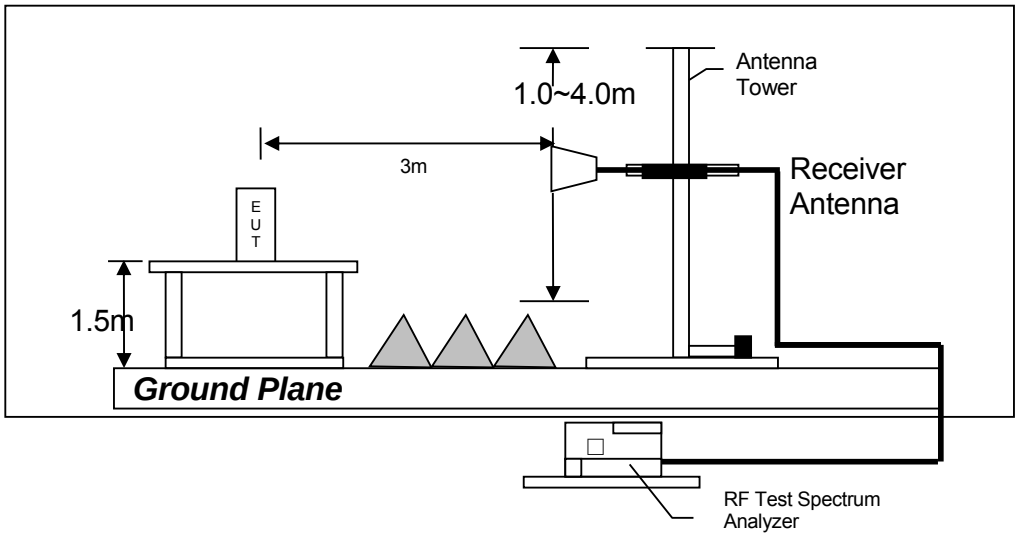
TEST REPORT

3.2 Radiated Emission Test Setup

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



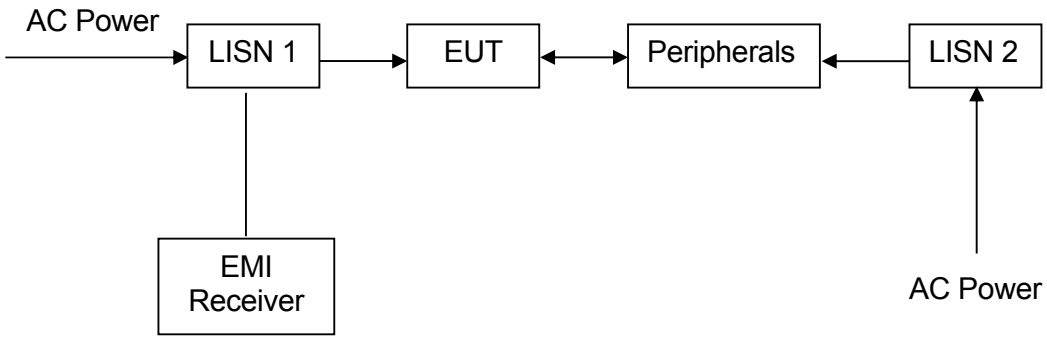
Test setup of radiated emissions up to 1GHz



Test setup of radiated emissions above 1GHz

TEST REPORT

3.3 AC Line Conducted Emission Test Setup



TEST REPORT

3.4 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.

Details of EUT:

1 The EUT is powered by 120VAC

Description of Accessories:

1. 1X Headphone cable of 1.2m long (with termination)
2. 2X 4GB USB Flash (Play and Record)
3. 16X Audio cable of 2m long (with termination)
4. 2X LAN cable of 2m long (with termination)
5. 2X USB cable of 2m long (with termination)
6. 1X Power cable of 2m long
   (Provided by Intertek)

3.5 Measurement Uncertainty

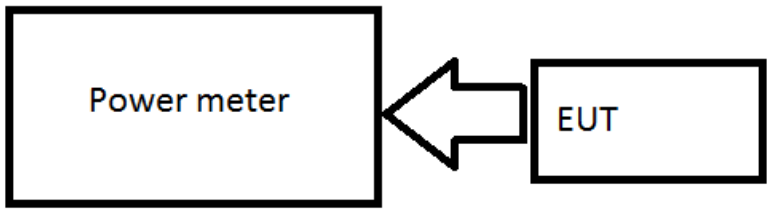
When determining of the test conclusion, the Measurement Uncertainty of test at a level of confidence of 95% has been considered. The values of the Measurement uncertainty for radiated emission test and RF conducted measurement test are ± 5.3dB and ±0.99dB respectively. The value of the Measurement uncertainty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

EXHIBIT 4 TEST RESULTS

4.0 Test Results



4.1 Measurement using a Power Meter(PM)

The antenna port of the EUT was connected to the input of a power meter.

(i) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied.

- The EUT is configured to transmit continuously or to transmit with a constant duty cycle. 789033 D02 General UNII Test Procedures New Rules v01r03 Page 8
- At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.
- The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.

(ii) If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in section II.B.

(iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.

(iv) Adjust the measurement in dBm by adding 10 log (1/x) where x is the duty cycle (e.g., 10 log (1/0.25) if the duty cycle is 25%).

TEST REPORT

UNII-1: 5150MHz-5250MHz
IEEE 802.11A (OFDM, 6Mbps)

Frequency (MHz)	ANT1 Conducted output power		ANT1 EIRP	
	dBm	mW	dBm	mW
5180.0	12.291	16.9	15.951	39.4
5220.0	12.278	16.9	15.938	39.2
5240.0	12.511	17.8	16.171	41.4

UNII-3: 5725MHz-5850MHz
IEEE 802.11A (OFDM, 6Mbps)

Frequency (MHz)	ANT1 Conducted output power		ANT1 EIRP	
	dBm	mW	dBm	mW
5745.0	2.695	1.9	3.355	2.2
5785.0	2.167	1.6	5.827	3.8
5825.0	1.866	1.5	5.526	3.6

4.1 Maximum Conducted Output Power at Antenna Terminals

Cable loss : 2.1 dB External Attenuation : 0 dB Antenna Gain :3.66dBi

UNII-1 :
IEEE 802.11A (OFDM, 6Mbps)
max. conducted (peak) output level = 12.511 dBm
max. EIRP (peak) output level = 16.171 dBm

UNII-3 :
IEEE 802.11A (OFDM, 6Mbps)
max. conducted (peak) output level = 2.695 dBm
max. EIRP (peak) output level = 5.526 dBm

TEST REPORT

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

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

The transmit signals <u>are not correlated</u> with each other.

Limits:

☒ FCC: 1W (30dBm) for antennas with gains of 6dBi or less.(Master device)

☒ For 5150MHz-5350MHz:
RSS: 200mW (23dBm) E.I.R.P
For 5725MHz-5825MHz:
RSS: 1W (30dBm) for antennas with gains of 6dBi or less. (Master device)

☐ 0.8W (29.23dBm) for antennas with gains more than 6dBi (Master device).

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.

IEEE802.11A (OFDM, HT20, MCS0)	
Frequency (MHz)	ANT1 6dB Bandwidth (MHz)
5745	16.8
5785	16.8
5825	16.7

Limits:
6 dB bandwidth shall be at least 500kHz

The plots of 6dB RF bandwidth and occupied bandwidth are saved with filename :UNII-3.pdf

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.

U-NII-1:
IEEE 802.11A (OFDM, 6Mbps)

Frequency (MHz)	ANT1 Conducted output power		ANT1 EIRP	
	dBm/MHz	mW/MHz	dBm/MHz	mW/MHz
5180.0	-0.05	0.9	3.61	2.3
5220.0	0.03	1.0	3.69	2.3
5240.0	0.240	1.1	3.90	2.5

U-NII-3

IEEE 802.11A (OFDM, 6Mbps)

Frequency (MHz)	ANT1 Conducted output power		ANT1 EIRP	
	dBm/500kHz	mW/500kHz	dBm/500kHz	mW/500kHz
5745.0	-12.511	0.06	-8.851	0.13
5785.0	-13.074	0.05	-9.414	0.11
5825.0	-13.510	0.04	-9.850	0.10

Limit:
For U-NII-1:
☒ FCC: 17dBm/MHz for antennas with gains less than 6dBi (Master device).
RSS: 10dBm/MHz E.I.R.P

For U-NII-3:
☒ FCC: 30dBm/500kHz for antennas with gains less than 6dBi (Master device).
RSS: 30dBm/500kHz for antennas with gains less than 6dBi (Master device).

The test data are saved with filename: UNII-1.pdf and UNII-3.pdf.

TEST REPORT

4.4 Out of Band Conducted Emissions

The measurement procedures under sections 2G of 789033 D02 General UNII Test Procedures New Rules v01r04 was used.

Furthermore, Integration Method for measuring bandedge emissions was incorporated in the test of the edge at MHz.

Limits:
For UNII-1:
All spurious emission outside 5150-5350MHz should be less then -27dBm/MHz for master device.
For UNII-2A:
All spurious emission outside 5150-5350MHz should be less then -27dBm/MHz for master device.
For UNII-2C:
All spurious emission outside 5470-5725MHz should be less then -27dBm/MHz for master device.
For UNII-3:
FCC:
All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

RSS:
Devices operating in the band 5725-5850 MHz shall have e.i.r.p. of unwanted emissions comply with the following:

a. 27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 Bm/MHz at 5 MHz above or below the band edges;
b. 15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at25 MHz above or below the band edges;
c. 10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at75 MHz above or below the band edges; and
d. -27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.

The test data is saved with filename: UNII-1.pdf and UNII-3.pdf.

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 0antenna 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

15720 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 1-7 listed the significant emission frequencies, the limit and the margin of compliance.

Judgement -

Passed by 0.3 dB margin compare with average limit

TEST REPORT

Mode: A Mode 5180MHz Ant 1

Table 1
IEEE 802.11a (OFDM, 6 Mbps)

Radiated Emission Data

Polari-zation	Frequency (MHz)	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBuV/m)	Peak Limit at 3m (dBuV/m)	Margin (dB)
V	***5150.000***	***63.6***	***33***	***35.7***	***66.3***	***68.2***	***-1.9***
V	***15540.000***	***57.4***	***33***	***37.7***	***62.1***	***68.2***	***-6.1***
V	***19375.000***	***34.2***	***33***	***37.7***	***38.9***	***68.2***	***-29.3***
V	***20720.000***	***35.8***	***33***	***37.7***	***40.5***	***68.2***	***-27.7***

Polari-zation	Frequency (MHz)	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBuV/m)	Average Limit at 3m (dBuV/m)	Margin (dB)
V	***5150.000***	***50.9***	***33***	***35.7***	***53.6***	***54.0***	***-0.4***
V	***15540.000***	***48.6***	***33***	***37.7***	***53.3***	***54.0***	***-0.7***
V	***19375.000***	***30.1***	***33***	***37.7***	***34.8***	***54.0***	***-19.2***
V	***20720.000***	***30.7***	***33***	***37.7***	***35.4***	***54.0***	***-18.6***

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. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
8. Regarding to 15.407(b)(1)-(3) specifies that emissions outside of the respective U-NII bands are subject to a maximum emission limit (Peak) of -27 dBm/MHz.
   E[dBµV/m] = EIRP[dBm] + 95.2, for d = 3 meters.
   Thus, the Peak limit for U-NII should be -27+95.2=68.2 dBuV/m.

TEST REPORT

Mode: A Mode 5220MHz Ant 1

Table 2
IEEE 802.11a (OFDM, 6 Mbps)

Radiated Emission Data

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBuV/m)	Peak Limit at 3m (dBuV/m)	Margin (dB)
V	***15660.000***	***58.0***	***33***	***37.7***	***62.7***	***68.2***	***-5.5***
V	***20880.000***	***35.7***	***33***	***37.7***	***40.4***	***68.2***	***-27.8***
V	***31320.000***	***35.7***	***33***	***42.1***	***44.8***	***68.2***	***-23.4***

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBuV/m)	Average Limit at 3m (dBuV/m)	Margin (dB)
V	***15660.000***	***48.3***	***33***	***37.7***	***53.0***	***54.0***	***-1.0***
V	***20880.000***	***29.5***	***33***	***37.7***	***34.2***	***54.0***	***-19.8***
V	***31320.000***	***29.3***	***33***	***42.1***	***38.4***	***54.0***	***-15.6***

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. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
8. Regarding to 15.407(b)(1)-(3) specifies that emissions outside of the respective U-NII bands are subject to a maximum emission limit (Peak) of -27 dBm/MHz.
   E[dBµV/m] = EIRP[dBm] + 95.2, for d = 3 meters.
   Thus, the Peak limit for U-NII should be -27+95.2=68.2 dBuV/m.

TEST REPORT

Mode: A Mode 5240MHz Ant 1

Table 3
IEEE 802.11a (OFDM, 6 Mbps)

Radiated Emission Data

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBuV/m)	Peak Limit at 3m (dBuV/m)	Margin (dB)
V	***5350.000***	***56.3***	***33***	***35.7***	***59.0***	***68.2***	***-9.2***
V	***15720.000***	***57.8***	***33***	***37.7***	***62.5***	***68.2***	***-5.7***
V	***19435.000***	***35.0***	***33***	***37.7***	***39.7***	***68.2***	***-28.5***
V	***20960.000***	***36.2***	***33***	***37.7***	***40.9***	***68.2***	***-27.3***
H	***31140.000***	***35.6***	***33***	***42.1***	***44.7***	***68.2***	***-23.5***

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBuV/m)	Average Limit at 3m (dBuV/m)	Margin (dB)
V	***5350.000***	***48.8***	***33***	***35.7***	***51.5***	***54.0***	***-2.5***
V	***15720.000***	***49.0***	***33***	***37.7***	***53.7***	***54.0***	***-0.3***
V	***19435.000***	***29.0***	***33***	***37.7***	***33.7***	***54.0***	***-20.3***
V	***20960.000***	***29.6***	***33***	***37.7***	***34.3***	***54.0***	***-19.7***
H	***31140.000***	***29.1***	***33***	***42.1***	***38.2***	***54.0***	***-15.8***

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. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
8. Regarding to 15.407(b)(1)-(3) specifies that emissions outside of the respective U-NII bands are subject to a maximum emission limit (Peak) of -27 dBm/MHz.
   E[dBµV/m] = EIRP[dBm] + 95.2, for d = 3 meters.
   Thus, the Peak limit for U-NII should be -27+95.2=68.2 dBuV/m.

TEST REPORT

Mode: A Mode 5745MHz Ant 1

Table 4
IEEE 802.11A (OFDM, 6Mbps)

Radiated Emission Data

Polari-zation	Frequency (MHz)	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBuV/m)	Peak Limit at 3m (dBuV/m)	Margin (dB)
V	***17235.000***	***34.3***	***33***	***37.6***	***38.9***	***68.2***	***-29.3***
V	***22980.000***	***35.9***	***33***	***38.3***	***41.2***	***68.2***	***-27.0***
V	***28725.000***	***35.6***	***33***	***40.1***	***42.7***	***68.2***	***-25.5***
H	***34470.000***	***37.5***	***33***	***41.1***	***45.6***	***68.2***	***-22.6***

Polari-zation	Frequency (MHz)	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBuV/m)	Average Limit at 3m (dBuV/m)	Margin (dB)
V	***17235.000***	***29.5***	***33***	***37.6***	***34.1***	***54.0***	***-19.9***
V	***22980.000***	***29.9***	***33***	***38.3***	***35.2***	***54.0***	***-18.8***
V	***28725.000***	***29.3***	***33***	***40.1***	***36.4***	***54.0***	***-17.6***
H	***34470.000***	***29.3***	***33***	***41.1***	***37.4***	***54.0***	***-16.6***

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. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 .
6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
8. Regarding to 15.407(b)(1)-(3) specifies that emissions outside of the respective U-NII bands are subject to a maximum emission limit (Peak) of -27 dBm/MHz.
   E[dBµV/m] = EIRP[dBm] + 95.2, for d = 3 meters.
   Thus, the Peak limit for U-NII should be -27+95.2=68.2 dBuV/m.

TEST REPORT

Mode: A Mode 5785MHz Ant 1

Table 5
IEEE 802.11A (OFDM, 6Mbps)

Radiated Emission Data

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBuV/m)	Peak Limit at 3m (dBuV/m)	Margin (dB)
V	***11570.000***	***53.3***	***33***	***40.5***	***60.8***	***68.2***	***-7.4***
V	***17355.000***	***34.1***	***33***	***37.6***	***38.7***	***68.2***	***-29.5***
V	***23140.000***	***35.7***	***33***	***38.6***	***41.3***	***68.2***	***-26.9***
V	***28925.000***	***35.3***	***33***	***40.1***	***42.4***	***68.2***	***-25.8***
V	***34710.000***	***37.1***	***33***	***41.3***	***45.4***	***68.2***	***-22.8***

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBuV/m)	Average Limit at 3m (dBuV/m)	Margin (dB)
V	***11570.000***	***45.6***	***33***	***40.5***	***53.1***	***54.0***	***-0.9***
V	***17355.000***	***29.6***	***33***	***37.6***	***34.2***	***54.0***	***-19.8***
V	***23140.000***	***30.2***	***33***	***38.6***	***35.8***	***54.0***	***-18.2***
V	***28925.000***	***29.6***	***33***	***40.1***	***36.7***	***54.0***	***-17.3***
V	***34710.000***	***29.3***	***33***	***41.3***	***37.6***	***54.0***	***-16.4***

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.
4. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 .
6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
8. Regarding to 15.407(b)(1)-(3) specifies that emissions outside of the respective U-NII bands are subject to a maximum emission limit (Peak) of -27 dBm/MHz.
   E[dBµV/m] = EIRP[dBm] + 95.2, for d = 3 meters.
   Thus, the Peak limit for U-NII should be -27+95.2=68.2 dBuV/m.

TEST REPORT

Mode: A Mode 5825MHz Ant 1

Table 6
IEEE 802.11A (OFDM, 6Mbps)

Radiated Emission Data

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBuV/m)	Peak Limit at 3m (dBuV/m)	Margin (dB)
V	***11650.000***	***53.7***	***33***	***40.5***	***61.2***	***68.2***	***-7.0***
V	***17475.000***	***34.0***	***33***	***37.6***	***38.6***	***68.2***	***-29.6***
V	***23300.000***	***35.9***	***33***	***38.6***	***41.5***	***68.2***	***-26.7***
V	***29125.000***	***35.9***	***33***	***40.0***	***42.9***	***68.2***	***-25.3***
H	***34950.000***	***37.6***	***33***	***41.3***	***45.9***	***68.2***	***-22.3***

Polari-zation	Frequency	Reading (dBuV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBuV/m)	Average Limit at 3m (dBuV/m)	Margin (dB)
V	***11650.000***	***45.7***	***33***	***40.5***	***53.2***	***54.0***	***-0.8***
V	***17475.000***	***29.8***	***33***	***37.6***	***34.4***	***54.0***	***-19.6***
V	***23300.000***	***29.8***	***33***	***38.6***	***35.4***	***54.0***	***-18.6***
V	***29125.000***	***29.3***	***33***	***40.0***	***36.3***	***54.0***	***-17.7***
H	***34950.000***	***28.8***	***33***	***41.3***	***37.1***	***54.0***	***-16.9***

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. Horn antenna is used for the emission over 1000MHz.
5. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 .
6. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
7. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
8. Regarding to 15.407(b)(1)-(3) specifies that emissions outside of the respective U-NII bands are subject to a maximum emission limit (Peak) of -27 dBm/MHz.
   E[dBµV/m] = EIRP[dBm] + 95.2, for d = 3 meters.
   Thus, the Peak limit for U-NII should be -27+95.2=68.2 dBuV/m.

TEST REPORT

Worst Case: EUT Transmitting

Table 7

Radiated Emission Data

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	60.051	45.5	16	10.0	39.5	40.0	-0.5
V	150.550	43.8	16	14.0	41.8	43.5	-1.7
H	***425.010***	***36.6***	***16***	***25.0***	***45.6***	***46.0***	***-0.4***
V	474.995	35.3	16	26.0	45.3	46.0	-0.7
V	***959.997***	***28.1***	***16***	***33.0***	***45.1***	***46.0***	***-1.0***

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. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.

TEST REPORT

4.6.3 Transmitter Duty Cycle Calculation

Not applicable – No average factor is required.

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

24.576 MHz

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

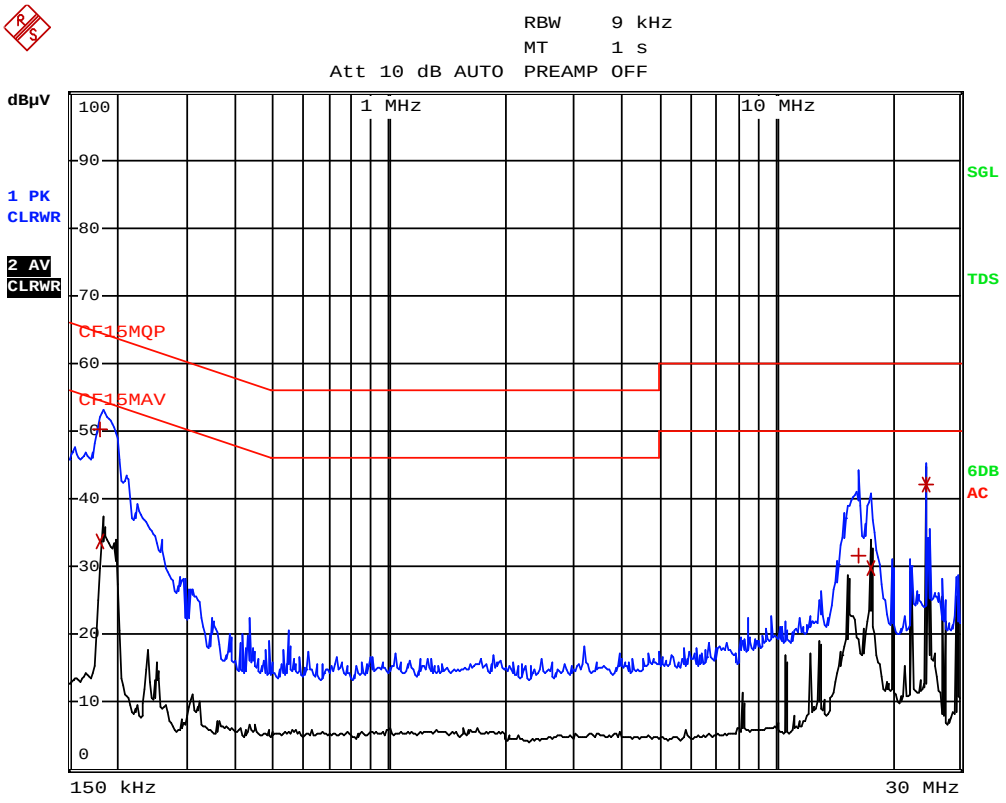
4.7.2 AC Power Line Conducted Emission Data

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

Passed by 7.84 dB margin compare with average limit

TEST REPORT

Worst Case: WiFi Transmit



TEST REPORT

EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

TRACE		FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1	Quasi Peak	181.5 kHz	50.17	L1	-14.23
2	CISPR Average	181.5 kHz	33.64	N	-20.77
1	Quasi Peak	16.3275 MHz	31.65	L1	-28.34
2	CISPR Average	17.6775 MHz	29.68	L1	-20.31
1	Quasi Peak	24.576 MHz	42.00	N	-17.99
2	CISPR Average	24.576 MHz	42.15	N	-7.84

TEST REPORT

4.8 Frequency Stability requirement

Frequency (MHz)	Mode	Measured Value (ppm) (0°C)	Measured Value (ppm) (10°C)	Measured Value (ppm) (20°C)	Measured Value (ppm) (30°C)	Measured Value (ppm) (40°C)	Measured Value (ppm) (50°C)
5180	A	0.804	0.952	4.054	4.102	3.840	3.700
5745		0.725	0.854	4.090	4.894	3.842	4.418

Temperature (°C)	Frequency (MHz)	Mode	Measured Value (ppm) 120VAC	Measured Value (ppm) 132VAC	Measured Value (ppm) 108VAC
25	5180	A	4.054	4.601	3.893
25	5745		4.09	3.568	4.496

The Maximum value is +4.897ppm.
It is proved that the frequency stability such that an emission is maintained within the band of operation under all condition.

TEST REPORT

4.9 U-NII1 99% bandwidth requirement

For the case if a channel operating in U-NII 1 band has a 26-dB bandwidth that straddles into U-NII 2A band but its 99% occupied power bandwidth does not. For this rare case, DFS requirement does not apply.

The plots of U-NII1 99% bandwidth is saved with filename: UNII-1_99%.pdf proved that no further test for DFS.

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-3016	EW-2512
Manufacturer	R&S	R&S	EMCO
Model No.	ESR26	FSV40	3104C
Calibration Date	Dec. 06. 2016	Jul. 20, 2017	Nov. 16, 2016
Calibration Due Date	Dec. 06, 2017	Jul. 20, 2018	May 16, 2018

Equipment	Log Periodic Antenna	Pyramidal Horn Antenna	Double Ridged Guide Antenna
Registration No.	EW-1042	EW-0905	EW-1133
Manufacturer	EMCO	EMCO	EMCO
Model No.	3148	3160-09	3115
Calibration Date	Jun. 19, 2017	Feb. 12, 2016	Nov. 05, 2015
Calibration Due Date	Dec. 19, 2018	Aug. 12, 2017	May 05, 2017

2) Conductive Measurement Test

Equipment	RF Power Meter with Power Sensor (N1921A)	Spectrum Analyzer
Registration No.	EW-2270	EW-2249
Manufacturer	AGILENTTECH	R&S
Model No.	N1911A	FSP30
Calibration Date	Jan. 04, 2017	Dec. 23, 2016
Calibration Due Date	Jan. 04, 2018	Nov. 27, 2017

3) Conducted Emissions Test

Equipment	EMI Test Receiver	LISN
Registration No.	EW-2500	EW-2501
Manufacturer	R&S	R&S
Model No.	ESCI	ENV-216
Calibration Date	Nov. 17, 2016	Feb. 21, 2017
Calibration Due Date	Nov. 15, 2017	Jan. 05, 2018

END OF TEST REPORT