Test Report # 317347 D

Equipment Under Test:	PHC-11AC1-A
Requirement	FCC 15.247, ISED Canada RSS-247 for a 2.4 GHz WLAN device
Test Date(s):	October 17th, 2018 to February 4th, 2020
Prepared for:	Philips North America LLC Attn: Mark Nolin 3000 Minuteman Road Andover, MA 1810

Report Issued by: Shane Dock, EMC Engineer

Signature:

Date: 4/16/2020

Report Reviewed by: Adam Alger, Quality Manager

Signature:

Date: 4/16/2020

Report Constructed by: Shane Dock, EMC Engineer

Signature:

Date: 1/15/2020

CONTENTS

Laird Connectivity Test Services in Review

The Laird Connectivity laboratory located at W66 N220 Commerce Court Cedarburg, Wisconsin, 53012 USA is recognized through the following organizations:

A2LA – American Association for Laboratory Accreditation

Accreditation based on ISO/IEC 17025:2017 with Electrical (EMC) Scope

A2LA Certificate Number: 1255.01

Scope of accreditation includes all test methods listed herein unless otherwise noted

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Federal Communications Commission (FCC) – USA

Accredited Test Firm Registration Number: 953492

Recognition of two 3 meter Semi-Anechoic Chambers

Government of Canada

Innovation, Science and Economic Development Canada

Accredited U.S. Identification Number: US0218

Recognition of two 3 meter Semi-Anechoic Chambers

1 Test Report Summary

During **October 17th, 2018 to February 4th, 2020** the Equipment Under Test (EUT), **PHC-11AC1-A**, as provided by **Philips North America LLC** was tested to the following requirements:

CFR 47 15.247 and RSS-247

Requirement	Description	Specification	Method	Result
FCC: 15.247 (a)(2) IC: RSS-247 5.2 (a)	Digital Modulation System 6 dB bandwidth	500 kHz	ANSI C63.10	Compliant
FCC: 2.1049 IC: RSS-GEN 6.7	Occupied Bandwidth	Reported	ANSI C63.10	Reported
FCC: 15.247 (b)(3) IC: RSS-247 5.4 (d)	Maximum Conducted Output Power	30 dBm	ANSI C63.10	Compliant
FCC: 15.247 (e) IC: RSS-247 5.2 (b)	Digital Modulation System Power Spectral Density	8 dBm / 3 kHz	ANSI C63.10	Compliant
FCC: 15.247 (d) IC: RSS-247 5.5	RF Spurious Emissions at the Transmitter Antenna Terminal	20 dBc	ANSI C63.10	Compliant
FCC: 15.247 (d) IC: RSS-GEN 8.10	Spurious Radiated Emissions in Restricted Bands	FCC 15.209 RSS-GEN 8.9	ANSI C63.10	Compliant
FCC: 2.1055 (d) IC: RSS-GEN 6.11	Frequency Stability	Reported	ANSI C63.10	Reported
FCC: 15.207 IC: RSS-GEN 8.8	AC Power Line Conducted Emissions	0.150-30 MHz	ANSI C63.10	Compliant

Notice:

The results relate only to the item tested and described in this report. Any modifications made to the equipment under test after the specified test date(s) may invalidate the data herein.

If the resulting measurement margin is seen to be within the uncertainty value, as listed in this report, the possibility exists that this unit may not meet the required limit specification if subsequently tested.

2 CLIENT INFORMATION

Company Name	Philips North America LLC
Contact Person	Mark Nolin
Address	3000 Minuteman Road Andover, MA 1810

2.1 Equipment Under Test (EUT) Information

The following information has been supplied by the client

Product Name	PHC-11AC1-A
Model Number	PHC-11AC1-A
Serial Number	Engineering Sample
Additional Information	FCC ID: 2ATC9-PHC-11AC1 IC ID: 25528- PHC11AC1

2.2 Product Description

Combined 802.11 a/b/g/n/ac WLAN and Bluetooth module.

2.3 Modifications Incorporated for Compliance

None noted at time of test

2.4 Deviations and Exclusions from Test Specifications

None noted at time of test

2.5 Programming Information

The EUT was programmed using wl commands via TeraTerm v4.99.

2.6 Additional Information

is a module provided with 3.3 VDC and was tested on a Host board with an antenna port termination for radiated emissions testing. The EUT was programmed via the serial connection through a devkit facilitated through a terminal connection program. The wl command set was used to program the EUT. EUT tested on channels 1-11. For radiated emissions, the 1 MBPS modulation was tested. For band edges and conducted testing: 1, 11, 6, 54 MBPS were tested and MCS0 and MCS7 were tested, both at HT20 and HT40. Firmware version is 7.45.151. The USI part number for this module is 8501-601900-01.

2.7 Power Profile

Channels	Band	Mode	Power Setting
1	2.4	802.11b	16
2	2.4	802.11b	16
3-9	2.4	802.11b	16
10	2.4	802.11b	16
11	2.4	802.11b	16
1	2.4	802.11g	11
2	2.4	802.11g	11.5
3-9	2.4	802.11g	15
10	2.4	802.11g	11.5
11	2.4	802.11g	10.5
1	2.4	802.11n HT20	9.5
2	2.4	802.11n HT20	11.5
3-9	2.4	802.11n HT20	16
10	2.4	802.11n HT20	11.5
11	2.4	802.11n HT20	10.5
3	2.4	802.11n HT40	11
4-8	2.4	802.11n HT40	13
9	2.4	802.11n HT40	12

3 REFERENCES

Publication	Edition	Date	AMD 1
CFR 47 Part 15	-	2020	-
RSS-GEN	5	2014	2019
RSS-247	2	2017	-
ANSI C63.10		2013	

4 UNCERTAINTY SUMMARY

Using the guidance of the following publications the calculated measurement uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level, using a coverage factor of k = 2.

References	Version / Date
CISPR 16-4-1	Ed. 2 (2009-02)
CISPR 16-4-2	Ed. 2 (2011-06)
CISPR 32	Ed. 1 (2012-01)
ANSI C63.23	2012
A2LA P103	February 4, 2016
A2LA P103c	August 10, 2015
ETSI TR 100-028	V1.3.1 (2001-03)

Measurement Type	Configuration	Uncertainty ±
Radiated Emissions	Biconical Antenna	5.0 dB
Radiated Emissions	Log Periodic Antenna	5.3 dB
Radiated Emissions	Horn Antenna	4.7 dB
AC Line Conducted Emissions	Artificial Mains Network	3.4 dB
Telecom Conducted Emissions	Asymmetric Artificial Network	4.9 dB
Disturbance Power Emissions	Absorbing Clamp	4.1 dB
Radiated Immunity	3 Volts/meter	2.2 dB
Conducted Immunity	CDN/EM/BCI	2.4/3.5/3.4 dB
EFT Burst/Surge	Peak pulse voltage	164 volts
ESD Immunity	15 kV level	1377 Volts

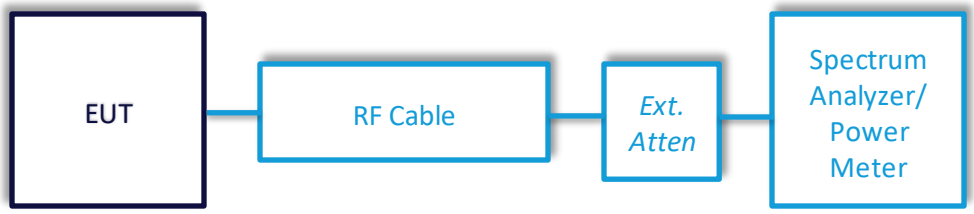
Parameter	ETSI U.C. ±	U.C. ±
Radio Frequency, from F0	$1x10^{-7}$	$0.55x10^{-7}$
Occupied Channel Bandwidth	5 %	2 %
RF conducted Power (Power Meter)	1.5 dB	1.2 dB
RF conducted emissions (Spectrum Analyzer)	3.0 dB	1.7 dB
All emissions, radiated	6.0 dB	5.3 dB
Temperature	1° C	0.65° C
Humidity	5 %	2.9 %
Supply voltages	3 %	1 %

5 TEST DATA

5.1 Antenna Port Conducted Emissions

Description of Measurement	The direct measurement of emissions at the antenna port of the EUT is achieved by use of a RF connection to a spectrum analyzer or power meter. The cable and attenuator factors are loaded into the analyzer or power meter allowing for direct measurement readings without the need for further corrections.
Example Calculations	Measurement (dBm) + Cable factor (dB) + External Attenuator (dB) = Corrected Reading (dBm) Margin (dB) = Limit (dBm) – Corrected Reading (dBm)

Block Diagram



5.1.1 Duty Cycle

Operator	Jeysson Gonzalez
QA	Aidi Zainal
Test Date	10/19/2018 – 1/15/2020
Location	Radio Bench
Temp. / R.H.	20.6°C / 40.1%RH
Method	ANSI C63.10

Limits: ***Reported***

Instrumentation

Laird
Smart Technology. Delivered.

Date : 19-Mar-2018 Test : Conducted Radio Job : C-3013

PE : Shane Dock Customer : Philips Healtchcare Quote : 317347

No.	Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due Date	Equipment Status
1	EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	1/11/2018	1/11/2019	Active Calibration
2	AA 960173	Cable	A.H. Systems, Inc	SAC-26G-1	388	5/15/2017	5/15/2018	Active Verification

Laird

Date : 11-Sep-2018 Test : Conducted Radio Job : C-3013

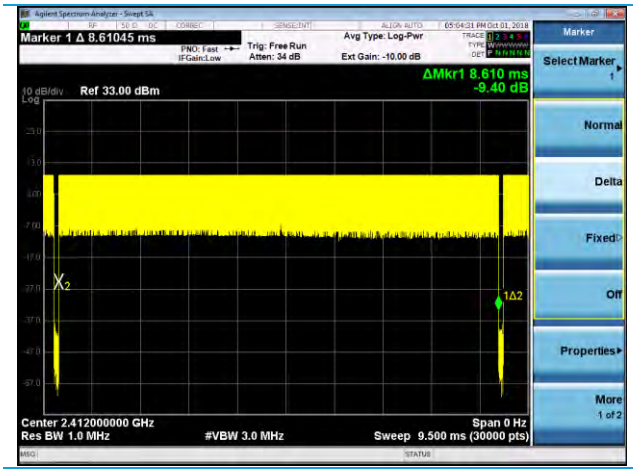
PE : Shane Dock Customer : Philips Healthcare Quote : 317347

No.	Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due Date	Equipment Status
1	AA 960173	Cable	A.H. Systems, Inc	SAC-26G-1	388	6/4/2018	6/4/2020	Active Calibration
2	EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	4/24/2019	4/24/2020	Active Calibration

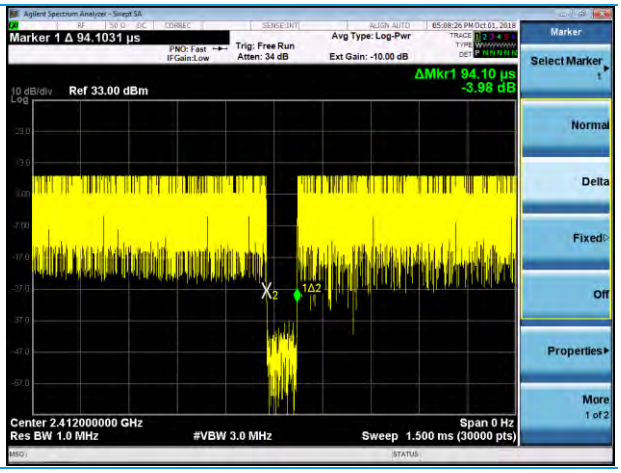
Table

Data Rate	On Time (µs)	Off time (µs)	Duty Cycle (%)	Correction Factor (dB)
1 MBPS	8610.0	94.1	98.9	0.0
11 MBPS	861.8	95.1	90.1	0.5
6 MBPS	1429.0	101.8	93.3	0.3
54 MBPS	179.9	102.7	63.7	2.0
HT20 MCS0	1337.0	101.5	92.9	0.3
HT20 MCS7	168.4	102.2	62.2	2.1
HT40 MCS0	666.2	100.4	86.9	0.6
HT40 MCS7	102.1	100.7	50.3	3.0

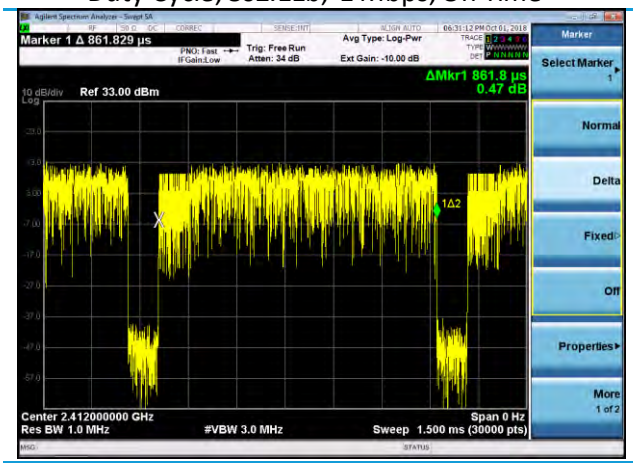
Plots



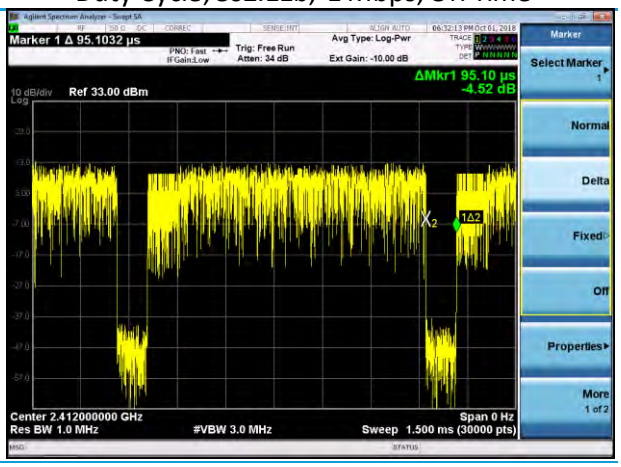
Duty Cycle, 802.11b, 1 Mbps, On Time



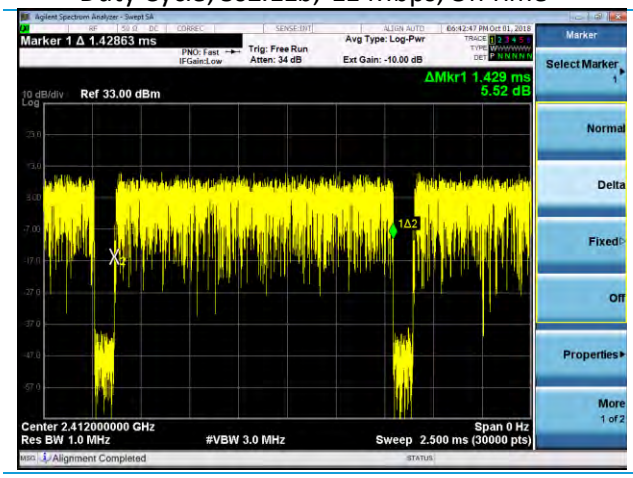
Duty Cycle, 802.11b, 1 Mbps, Off Time



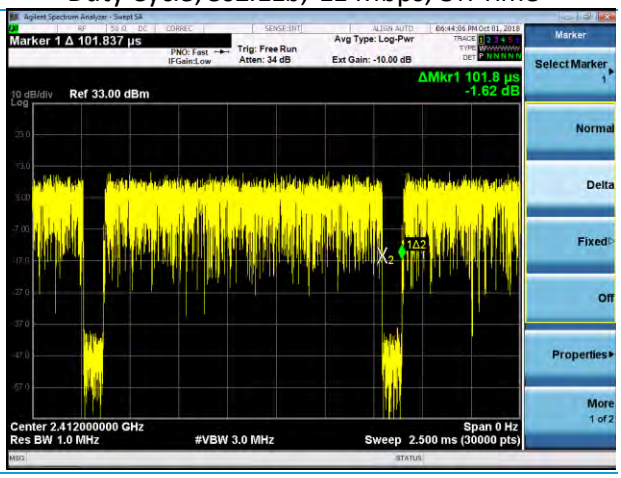
Duty Cycle, 802.11b, 11 Mbps, On Time



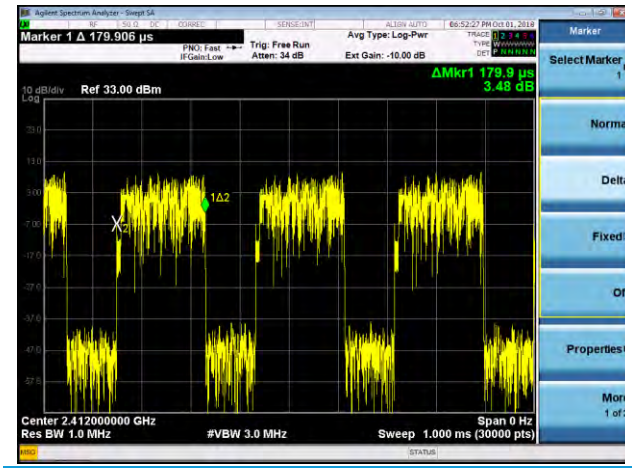
Duty Cycle, 802.11b, 11 Mbps, Off Time



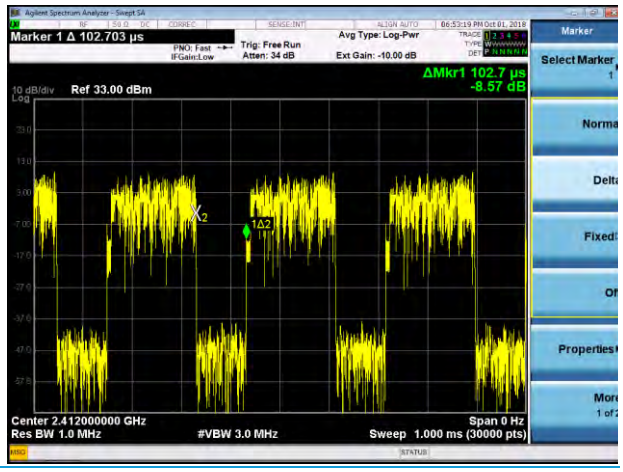
Duty Cycle, 802.11g, 6 Mbps, On Time



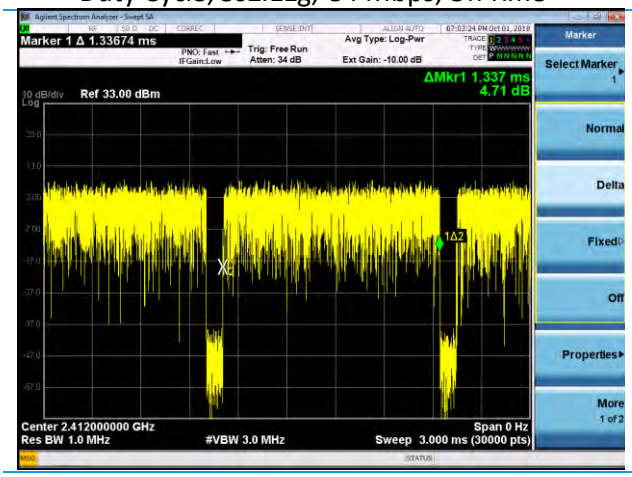
Duty Cycle, 802.11g, 6 Mbps, Off Time



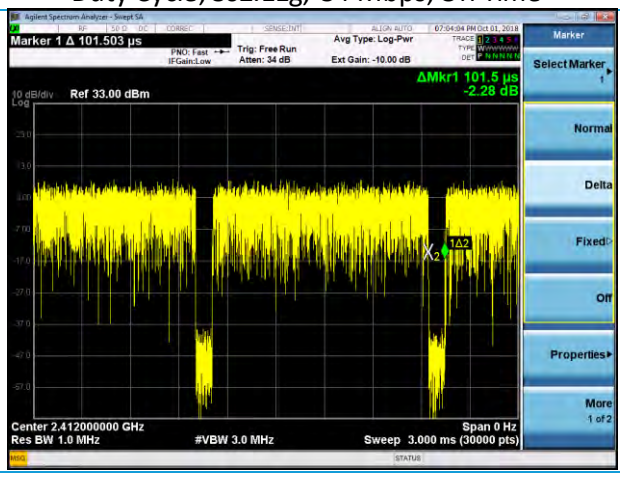
Duty Cycle, 802.11g, 54 Mbps, On Time



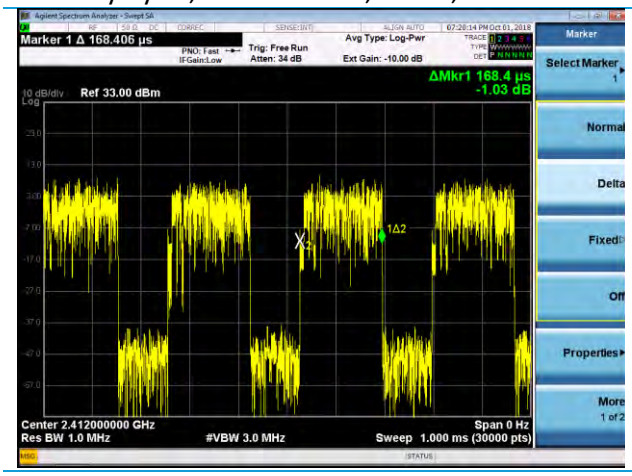
Duty Cycle, 802.11g, 54 Mbps, Off Time



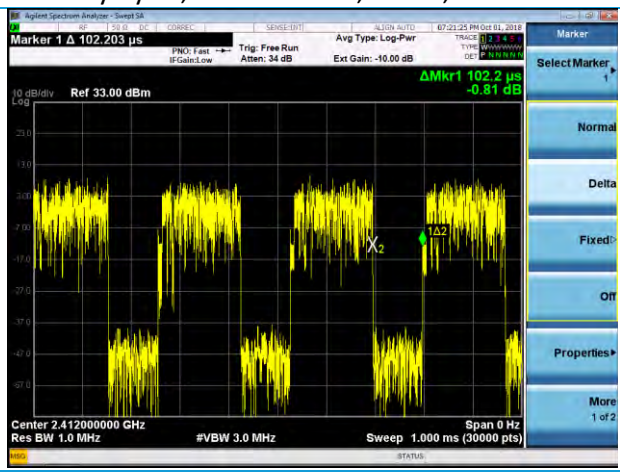
Duty Cycle, 802.11n HT20, MCS0, On Time



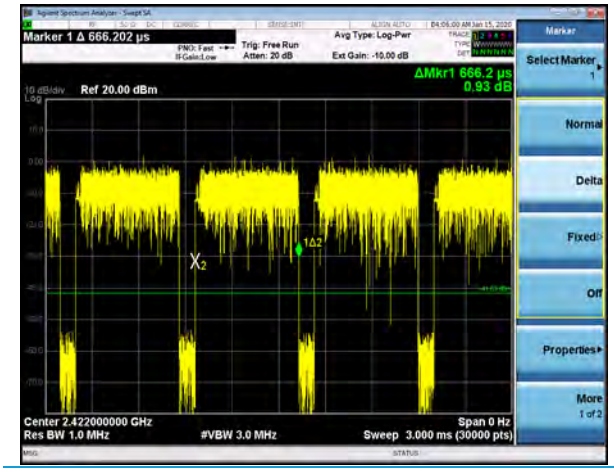
Duty Cycle, 802.11n HT20, MCS0, Off Time



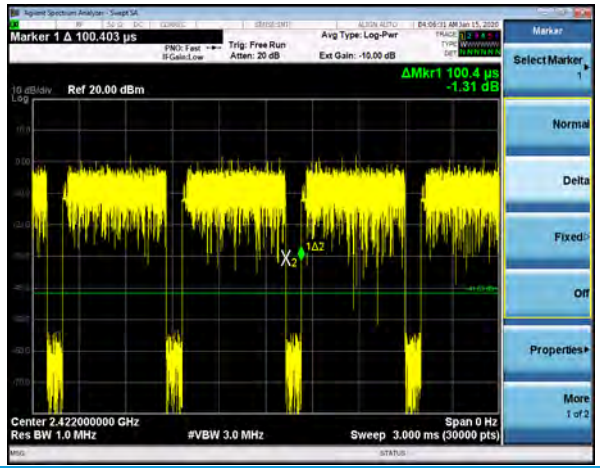
Duty Cycle, 802.11n HT20, MCS7, On Time



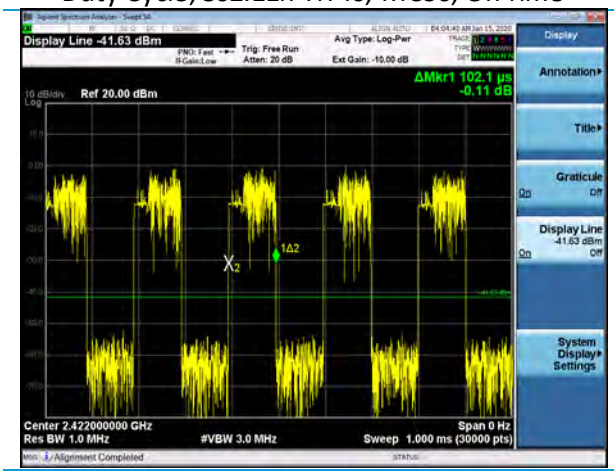
Duty Cycle, 802.11n HT20, MCS7, Off Time



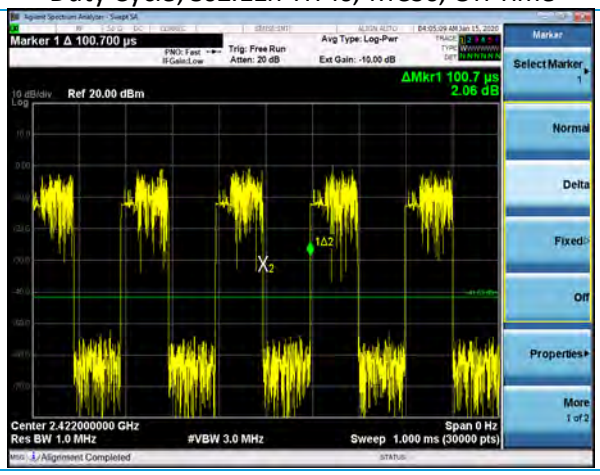
Duty Cycle, 802.11n HT40, MCS0, On Time



Duty Cycle, 802.11n HT40, MCS0, Off Time



Duty Cycle, 802.11n HT40, MCS7, On Time



Duty Cycle, 802.11n HT40, MCS7, Off Time

5.1.2 DTS Bandwidth

Operator	Jeysson Gonzalez
QA	Aidi Zainal
Test Date	10/19/2018
Location	Radio Bench
Temp. / R.H.	20.6°C / 40.1%RH
Requirement	FCC 15.247 Section (a)(2) RSS-247 Section 5.2 (a)
Method	ANSI C63.10 Section 11.8.2

Limits: 6 dB Bandwidth

Limit (kHz)
≥500

Test Parameters

Frequency	HT20: Channel 1(2412 MHz), Channel 6 (2437 MHz), Channel 11 (2462 MHz) HT40: Channel 3 (2422 MHz), Channel 6 (2437 MHz), Channel 9 (2452 MHz)
RBW	100 kHz
VBW	300 kHz
Detector	Peak
Trace Mode	Max Hold

Instrumentation

Laird

Date: 11-Sep-2018 Test: Conducted Radio Job: C-3013

PE: Shane Dock Customer: Philips Healthcare Quote: 317347

No.	Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due Date	Equipment Status
1	AA 960173	Cable	A.H. Systems, Inc	SAC-26G-1	388	6/4/2018	6/4/2020	Active Calibration
2	EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400298	4/24/2019	4/24/2020	Active Calibration

Tables

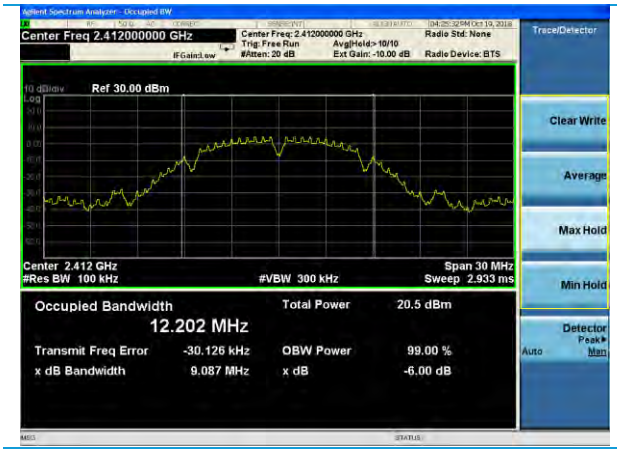
Mode	Data Rate	Channel	DTS BW (MHz)	Limit (MHz)	Margin (MHz)
802.11b	1 Mbps	1	9.1	0.5	8.6
802.11b	1 Mbps	6	9.1	0.5	8.6
802.11b	1 Mbps	11	9.1	0.5	8.6
802.11b	11 Mbps	1	8.8	0.5	8.3
802.11b	11 Mbps	6	8.9	0.5	8.4
802.11b	11 Mbps	11	8.9	0.5	8.4

Mode	Data Rate	Channel	DTS BW (MHz)	Limit (MHz)	Margin (MHz)
802.11g	6 Mbps	1	16.3	0.5	15.8
802.11g	6 Mbps	6	16.1	0.5	15.6
802.11g	6 Mbps	11	15.8	0.5	15.3
802.11g	54 Mbps	1	16.4	0.5	15.9
802.11g	54 Mbps	6	16.1	0.5	15.6
802.11g	54 Mbps	11	15.8	0.5	15.3

Mode	Data Rate	Channel	DTS BW (MHz)	Limit (MHz)	Margin (MHz)
802.11n HT20	MCS0	1	17.5	0.5	17.0
802.11n HT20	MCS0	6	17.3	0.5	16.8
802.11n HT20	MCS0	11	16.3	0.5	15.8
802.11n HT20	MCS7	1	17.7	0.5	17.2
802.11n HT20	MCS7	6	17.7	0.5	17.2
802.11n HT20	MCS7	11	16.3	0.5	15.8

Mode	Data Rate	Channel	DTS BW (MHz)	Limit (MHz)	Margin (MHz)
802.11n HT40	MCS0	3	35.7	0.5	35.2
802.11n HT40	MCS0	6	35.7	0.5	35.2
802.11n HT40	MCS0	9	35.5	0.5	35.0
802.11n HT40	MCS7	3	35.7	0.5	35.2
802.11n HT40	MCS7	6	35.9	0.5	35.4
802.11n HT40	MCS7	9	36.2	0.5	35.7

Plots



DTS BW, 802.11b, Channel 1, 1 Mbps

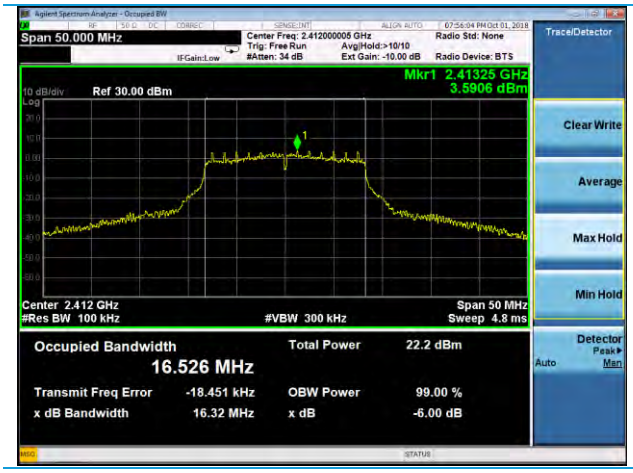
DTS BW, 802.11b, Channel 6, 1 Mbps

DTS BW, 802.11b, Channel 11, 1 Mbps

DTS BW, 802.11b, Channel 1, 11 Mbps

DTS BW, 802.11b, Channel 6, 11 Mbps

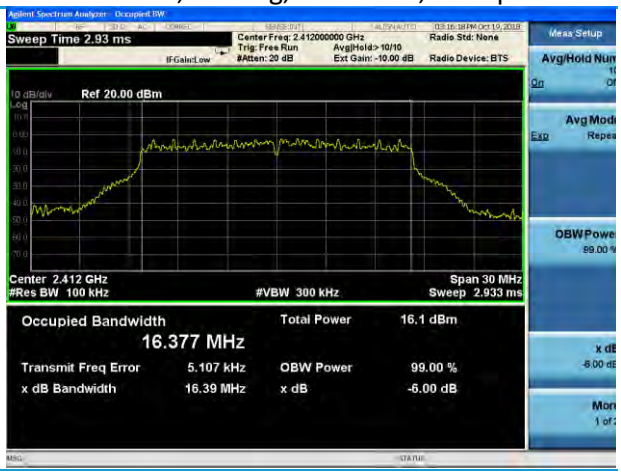
DTS BW, 802.11b, Channel 11, 11 Mbps



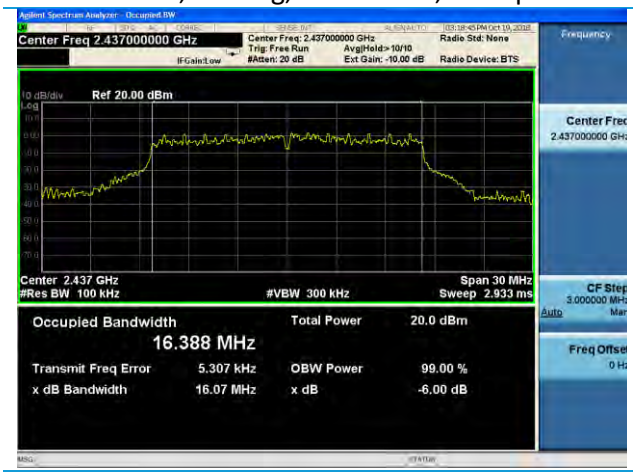
DTS BW, 802.11g, Channel 1, 6 Mbps

DTS BW, 802.11g, Channel 6, 6 Mbps

DTS BW, 802.11g, Channel 11, 6 Mbps

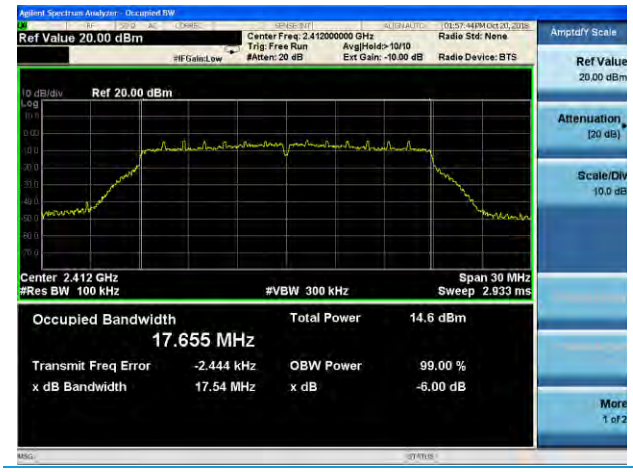


DTS BW, 802.11g, Channel 1, 54 Mbps



DTS BW, 802.11g, Channel 6, 54 Mbps

DTS BW, 802.11g, Channel 11, 54 Mbps



DTS BW, 802.11n HT20, Channel 1, MCS0

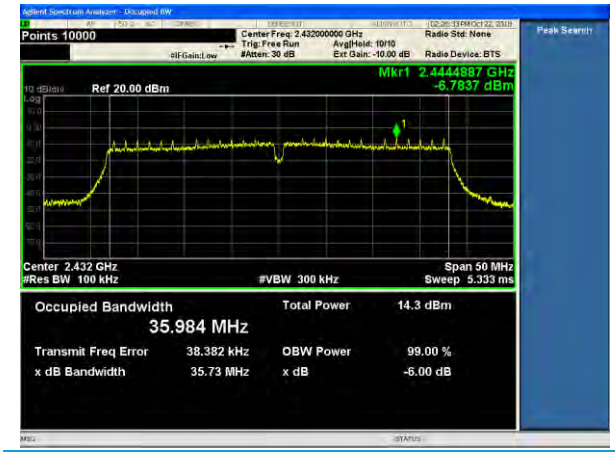
DTS BW, 802.11n HT20, Channel 6, MCS0

DTS BW, 802.11n HT20, Channel 11, MCS0

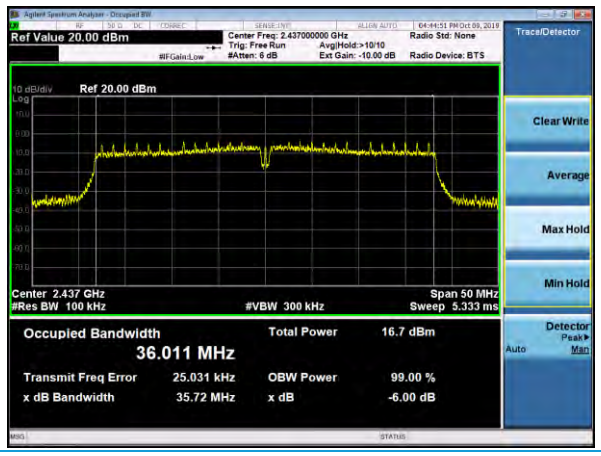
DTS BW, 802.11n HT20, Channel 1, MCS7

DTS BW, 802.11n HT20, Channel 6, MCS7

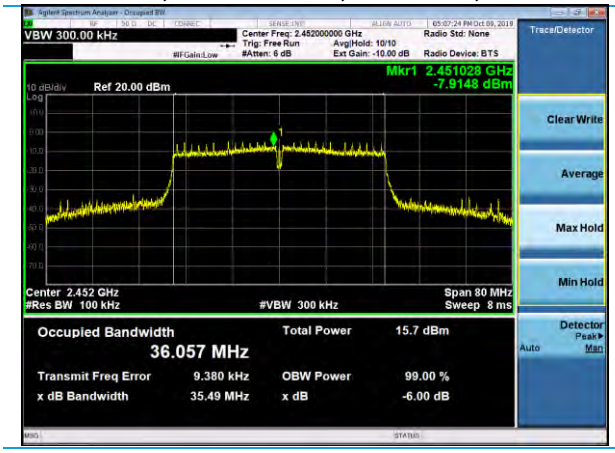
DTS BW, 802.11n HT20, Channel 11, MCS7



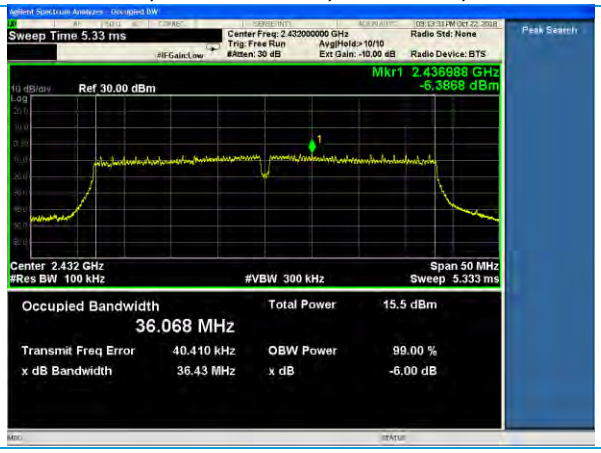
DTS BW, 802.11n HT40, Channel3, MCS0



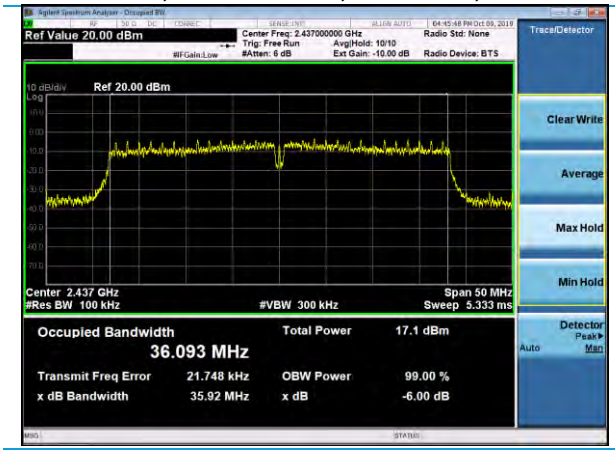
DTS BW, 802.11n HT40, Channel6, MCS0



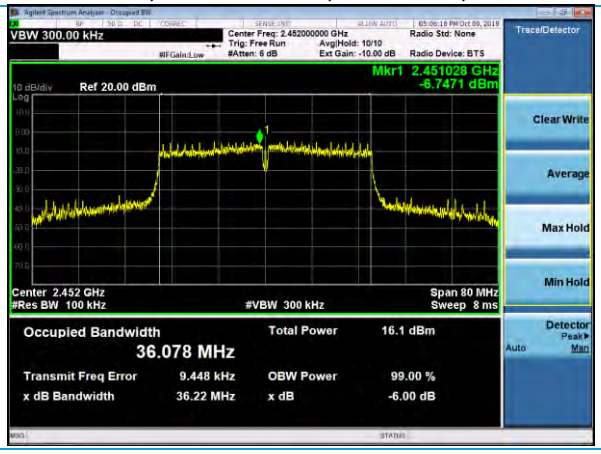
DTS BW, 802.11n HT40, Channel9, MCS0



DTS BW, 802.11n HT40, Channel3, MCS7



DTS BW, 802.11n HT40, Channel6, MCS7



DTS BW, 802.11n HT40, Channel9, MCS7

5.1.3 99% Occupied Bandwidth

Operator	Jeysson Gonzalez
QA	Aidi Zainal
Test Date	10/19/2018
Location	Radio Bench
Temp. / R.H.	20.6°C / 40.1%RH
Requirement	FCC 2.1049 RSS-GEN Section 6.7
Method	ANSI C63.10 Section 6.9.3

Limits: ***Reported***

Test Parameters

Frequency	HT20: Channel 1(2412 MHz), Channel 6 (2437 MHz), Channel 11 (2462 MHz) HT40: Channel 3 (2422 MHz), Channel 6 (2437 MHz), Channel 9 (2452 MHz)
RBW	802.11b: 200 kHz 802.11g: 300 kHz 802.11n HT20: 300 kHz 802.11n HT40: 510 kHz
VBW	802.11b: 620 kHz 802.11g: 910 kHz 802.11n HT20: 910 kHz 802.11n HT40: 1.5 MHz
Detector	Peak
Trace Mode	Max Hold

Instrumentation

Laird

Date : 11-Sep-2018 Test : Conducted Radio Job : C-3013

PE : Shane Dock Customer : Philips Healthcare Quote : 317347

No.	Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due Date	Equipment Status
1	AA 960173	Cable	A.H. Systems, Inc	SAC-26G-1	388	6/4/2018	6/4/2020	Active Calibration
2	EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400298	4/24/2019	4/24/2020	Active Calibration

Tables

Mode	Data Rate	Channel	99% BW (MHz)
802.11b	1 Mbps	1	12.2
802.11b	1 Mbps	6	12.2
802.11b	1 Mbps	11	12.2
802.11b	11 Mbps	1	11.8
802.11b	11 Mbps	6	11.8
802.11b	11 Mbps	11	11.8

Mode	Data Rate	Channel	99% BW (MHz)
802.11g	6 Mbps	1	17.4
802.11g	6 Mbps	6	17.1
802.11g	6 Mbps	11	17.0
802.11g	54 Mbps	1	16.6
802.11g	54 Mbps	6	16.6
802.11g	54 Mbps	11	16.5

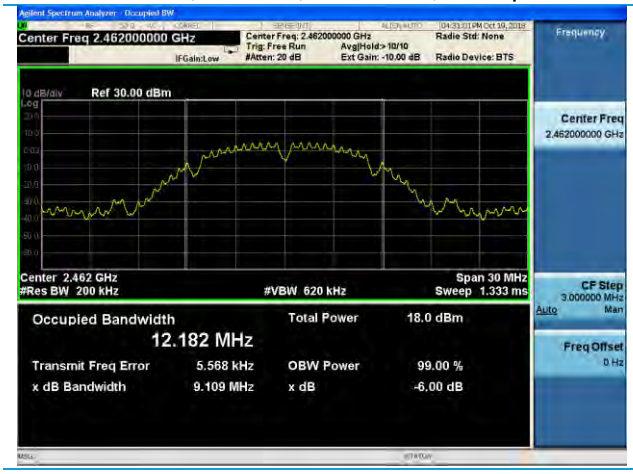
Mode	Data Rate	Channel	99% BW (MHz)
802.11n HT20	MCS0	1	18.1
802.11n HT20	MCS0	6	18.2
802.11n HT20	MCS0	11	18.0
802.11n HT20	MCS7	1	18.1
802.11n HT20	MCS7	6	17.9
802.11n HT20	MCS7	11	17.8

Mode	Data Rate	Channel	99% BW (MHz)
802.11n HT40	MCS0	3	36.3
802.11n HT40	MCS0	6	36.2
802.11n HT40	MCS0	9	36.2
802.11n HT40	MCS7	3	36.2
802.11n HT40	MCS7	6	36.2
802.11n HT40	MCS7	9	36.2

Plots

99% BW, 802.11b, Channel 1, 1 Mbps

99% BW, 802.11b, Channel 6, 1 Mbps



99% BW, 802.11b, Channel 11, 1 Mbps

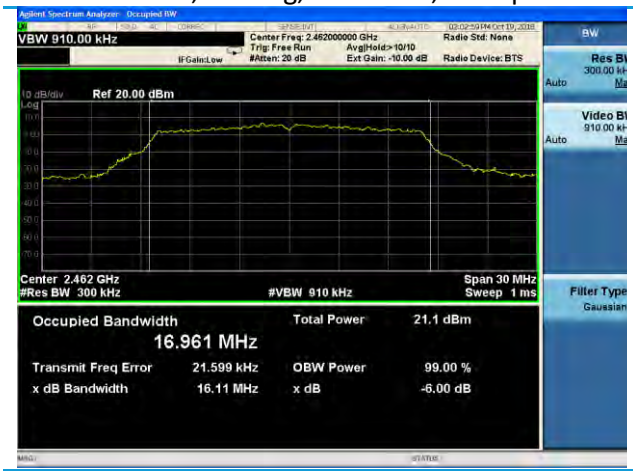
99% BW, 802.11b, Channel 1, 11 Mbps

99% BW, 802.11b, Channel 6, 11 Mbps

99% BW, 802.11b, Channel 11, 11 Mbps

99% BW, 802.11g, Channel 1, 6 Mbps

99% BW, 802.11g, Channel 6, 6 Mbps



99% BW, 802.11g, Channel 11, 6 Mbps

99% BW, 802.11g, Channel 1, 54 Mbps

99% BW, 802.11g, Channel 6, 54 Mbps

99% BW, 802.11g, Channel 11, 54 Mbps

99% BW, 802.11n HT20, Channel 1, MCS0

99% BW, 802.11n HT20, Channel 6, MCS0

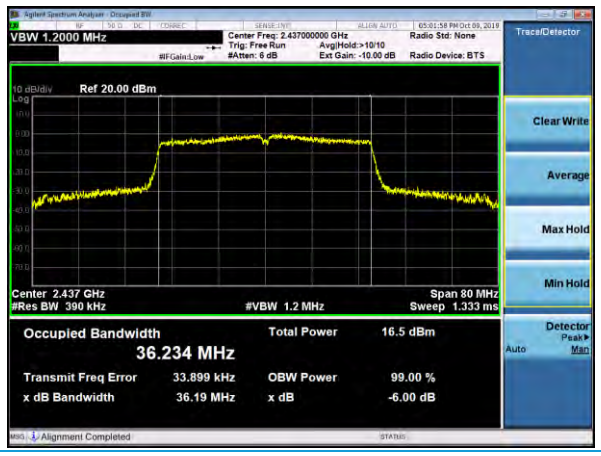
99% BW, 802.11n HT20, Channel 11, MCS0

99% BW, 802.11n HT20, Channel 1, MCS7

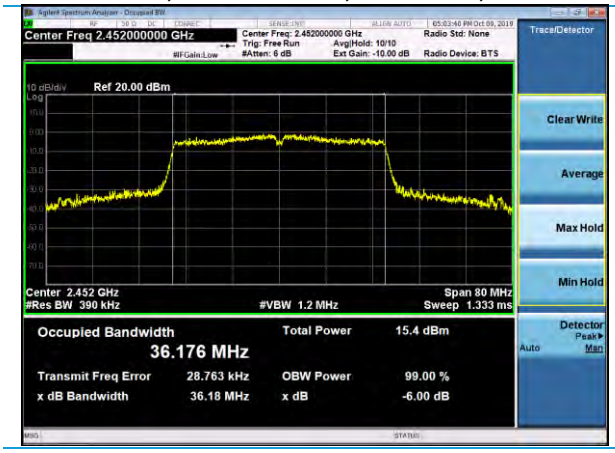
99% BW, 802.11n HT20, Channel 6, MCS7

99% BW, 802.11n HT20, Channel 11, MCS7

99% BW, 802.11n HT40, Channel3, MCS0

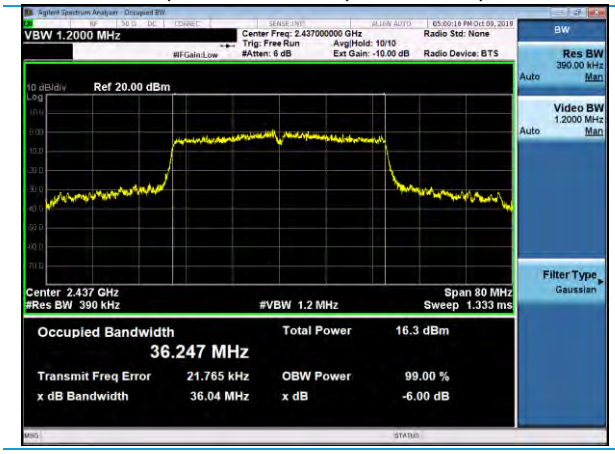


99% BW, 802.11n HT40, Channel6, MCS0

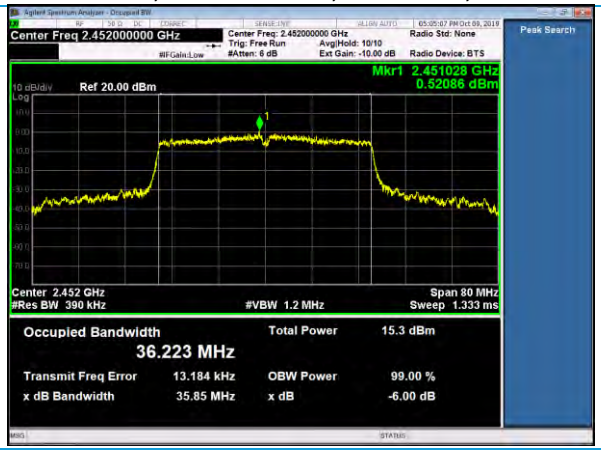


99% BW, 802.11n HT40, Channel9, MCS0

99% BW, 802.11n HT40, Channel3, MCS7



99% BW, 802.11n HT40, Channel6, MCS7



99% BW, 802.11n HT40, Channel9, MCS7

5.1.4 Maximum Conducted Output Power

Operator	Jeysson Gonzalez, Shane Dock, Jon Dilley
QA	Aidi Zainal, Shane Dock
Test Date	10/19/2018 - 2/4/2020
Location	Radio Bench
Temp. / R.H.	20.6°C / 40.1%RH
Requirement	FCC 15.247 (b)(3) RSS-247 Section 5.4 (4)
Method	HT20: PKPM1 per Section 11.9.1.3 of ANSI C63.10 HT40: AVGSA-2 per Section 11.9.2.2.4 of ANSI C63.10

Limits: Output Power

Limit (dBm)
30

Test Parameters

Frequency	HT20: Channel 1(2412 MHz), Channel 6 (2437 MHz), Channel 11 (2462 MHz) HT40: Channel 3 (2422 MHz), Channel 6 (2437 MHz), Channel 9 (2452 MHz)
RBW	1 to 5% of the OBW
VBW	3x RBW
Detector	RMS
Sweep	Single
Notes	Screenshots shown for Average Power measurements utilizing a spectrum analyzer. Peak Power measured for 20 MHz channels with a power meter.

Instrumentation

Laird

Date: 11-Sep-2018 Test: Conducted Radio Job: C-3013

PE: Shane Dock Customer: Philips Healthcare Quote: 317347

No.	Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due Date	Equipment Status
1	AA 960173	Cable	A.H. Systems, Inc	SAC-26G-1	388	6/4/2018	6/4/2020	Active Calibration
2	EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400298	4/24/2019	4/24/2020	Active Calibration

Date : 11-Sep-2018 Test : Conducted Radio Job : C-3013

PE : Shane Dock Customer : Philips Healthcare Quote : 317347

No.	Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due Date	Equipment Status
1	EE 960090	Meter - RF Power	Anritsu	ML2495A	1335006	4/25/2019	4/25/2020	Active Calibration
2	AA 960173	Cable	A.H. Systems, Inc	SAC-26G-1	388	6/4/2018	6/4/2020	Active Verification
3	EE 960091	Sensor - RF Power	Anritsu	MA2491A	1249277	4/25/2019	4/25/2020	Active Calibration

Tables

Mode	Data Rate	Channel	Power Setting	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
802.11b	1 Mbps	1	16.0	17.4	30.0	12.6
802.11b	1 Mbps	6	16.0	17.5	30.0	12.5
802.11b	1 Mbps	11	16.0	17.1	30.0	12.9
802.11b	11 Mbps	1	16.0	18.1	30.0	11.9
802.11b	11 Mbps	6	16.0	18.1	30.0	11.9
802.11b	11 Mbps	11	16.0	17.7	30.0	12.3
802.11g	6 Mbps	1	11.0	19.4	30.0	10.6
802.11g	6 Mbps	6	15.0	22.5	30.0	7.5
802.11g	6 Mbps	11	10.5	17.9	30.0	12.1
802.11g	54 Mbps	1	11.0	17.4	30.0	12.6
802.11g	54 Mbps	6	15.0	20.2	30.0	9.8
802.11g	54 Mbps	11	10.5	16.1	30.0	13.9
802.11n HT20	MCS0	1	9.5	16.7	30.0	13.3
802.11n HT20	MCS0	6	16.0	21.9	30.0	8.1
802.11n HT20	MCS0	11	10.5	16.9	30.0	13.1
802.11n HT20	MCS7	1	9.5	16.1	30.0	13.9
802.11n HT20	MCS7	6	16.0	21.2	30.0	8.8
802.11n HT20	MCS7	11	10.5	16.6	30.0	13.4

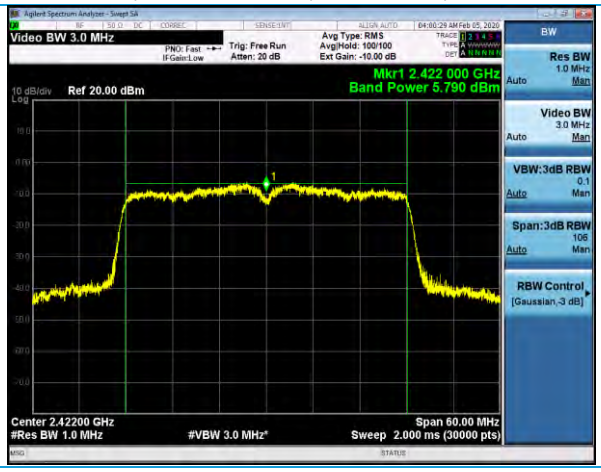
Mode	Data Rate	Channel	Pout (dBm)	Duty Cycle Correction (dB)	Average Output Power (dBm)	Limit (dBm)	Margin (dB)
802.11n HT40	MCS0	3	8.3	0.6	8.9	30.0	21.1
802.11n HT40	MCS0	6	10.2	0.6	10.8	30.0	19.2
802.11n HT40	MCS0	9	9.1	0.6	9.7	30.0	20.3
802.11n HT40	MCS7	3	5.8	3.0	8.8	30.0	21.2
802.11n HT40	MCS7	6	7.7	3.0	10.7	30.0	19.3
802.11n HT40	MCS7	9	6.7	3.0	9.7	30.0	20.3

Screen Captures – HT40

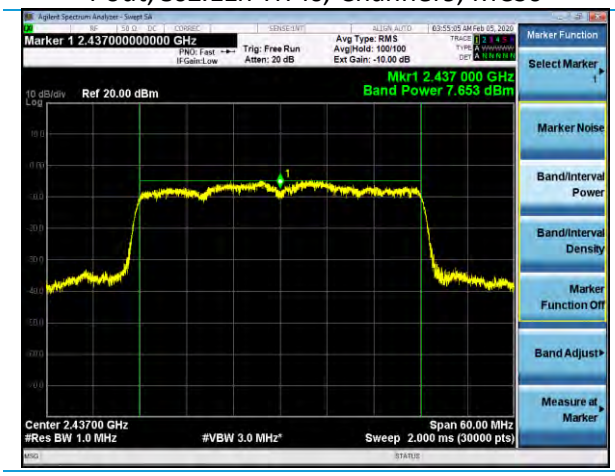
Pout, 802.11n HT40, Channel3, MCS0

Pout, 802.11n HT40, Channel6, MCS0

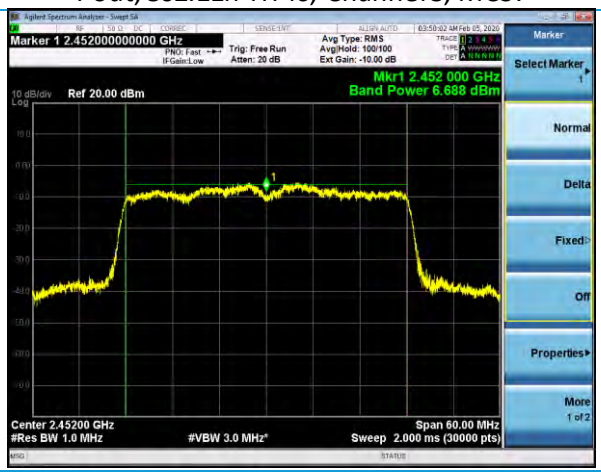
Pout, 802.11n HT40, Channel9, MCS0



Pout, 802.11n HT40, Channel3, MCS7



Pout, 802.11n HT40, Channel6, MCS7



Pout, 802.11n HT40, Channel9, MCS7

5.1.5 Power Spectral Density

Operator	Jon Dilley
QA	Shane Dock
Test Date	2/4/2020
Location	Radio Bench
Temp. / R.H.	20.6°C / 40.1%RH
Requirement	FCC 15.247 (e) RSS-247 Section 5.2 (2)
Method	PKPSD-2 per ANSI C63.10 Section 11.10.5 for 20 MHz channels AVGPSD-2 per ANSI C63.10 Section 11.10.2 for 40 MHz channels

Limits: Output Power

Limit (dBm/3kHz)
8

Test Parameters

Frequency	HT20: Channel 1(2412 MHz), Channel 6 (2437 MHz), Channel 11 (2462 MHz) HT40: Channel 3 (2422 MHz), Channel 6 (2437 MHz), Channel 9 (2452 MHz)
RBW	100 kHz
VBW	300 kHz
Detector	RMS
Sweep	Free Run
Duty Cycle Correction Calculation	10*log(1/D) where D is the duty cycle

Instrumentation

Laird

Date: 11-Sep-2018 Test: Conducted Radio Job: C-3013

PE: Shane Dock Customer: Philips Healthcare Quote: 317347

No.	Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due Date	Equipment Status
1	AA 960173	Cable	A.H. Systems, Inc	SAC-26G-1	388	6/4/2018	6/4/2020	Active Calibration
2	EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400286	4/24/2019	4/24/2020	Active Calibration

Tables

Mode	Data Rate	Channel	PSD (dBm)	Limit (dBm)	Margin (dB)
802.11 b	1 MBPS	1	6.0	8.0	2.0
802.11 b	1 MBPS	6	6.1	8.0	1.9
802.11 b	1 MBPS	11	5.9	8.0	2.1
802.11 b	11 MBPS	1	7.3	8.0	0.7
802.11 b	11 MBPS	6	7.6	8.0	0.4
802.11 b	11 MBPS	11	7.2	8.0	0.8
802.11 g	6 MBPS	1	-0.8	8.0	8.8
802.11 g	6 MBPS	6	3.2	8.0	4.8
802.11 g	6 MBPS	11	-2.4	8.0	10.4
802.11 g	54 MBPS	1	-0.6	8.0	8.6
802.11 g	54 MBPS	6	2.8	8.0	5.2
802.11 g	54 MBPS	11	-2.2	8.0	10.2
802.11 n HT20	MCS0	1	-0.6	8.0	8.6
802.11 n HT20	MCS0	6	3.7	8.0	4.3
802.11 n HT20	MCS0	11	-2.1	8.0	10.1
802.11 n HT20	MCS7	1	-2.8	8.0	10.8
802.11 n HT20	MCS7	6	3.8	8.0	4.2
802.11 n HT20	MCS7	11	-1.9	8.0	9.9

Mode	Data Rate	Channel	PSD (dBm)	Duty Cycle Correction Factor (dB)	Limit (dBm)	Margin (dB)
802.11 n HT40	MCS0	3	-12.2	0.6	8.0	19.6
802.11 n HT40	MCS0	6	-10.3	0.6	8.0	17.7
802.11 n HT40	MCS0	9	-11.5	0.6	8.0	18.9
802.11 n HT40	MCS7	3	-14.0	3.0	8.0	19.0
802.11 n HT40	MCS7	6	-11.8	3.0	8.0	16.8
802.11 n HT40	MCS7	9	-12.9	3.0	8.0	17.9

Plots

PSD, 802.11b, Channel 1, 1 Mbps

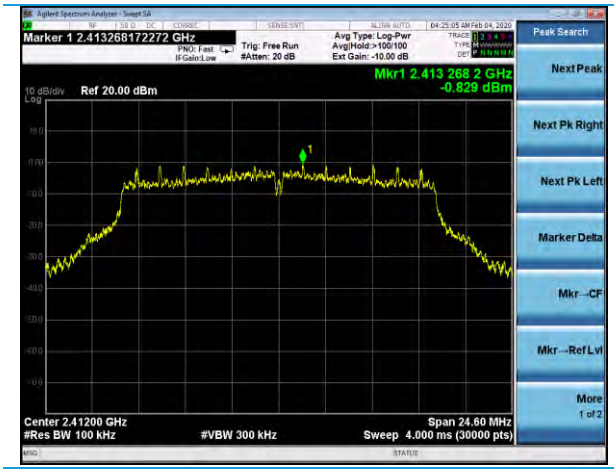
PSD, 802.11b, Channel 6, 1 Mbps

PSD, 802.11b, Channel 11, 1 Mbps

PSD, 802.11b, Channel 1, 11 Mbps

PSD, 802.11b, Channel 6, 11 Mbps

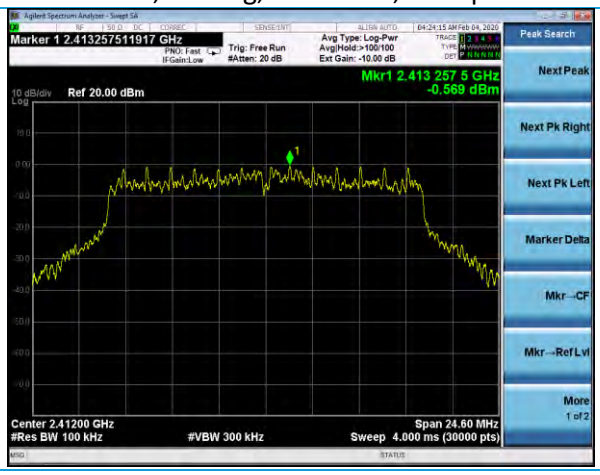
PSD, 802.11b, Channel 11, 11 Mbps



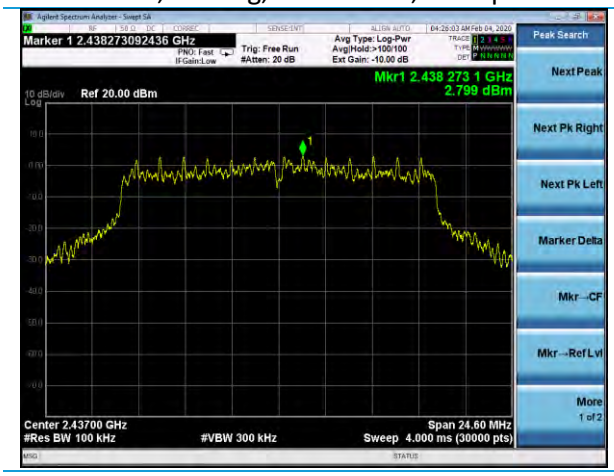
PSD, 802.11g, Channel 1, 6 Mbps

PSD, 802.11g, Channel 6, 6 Mbps

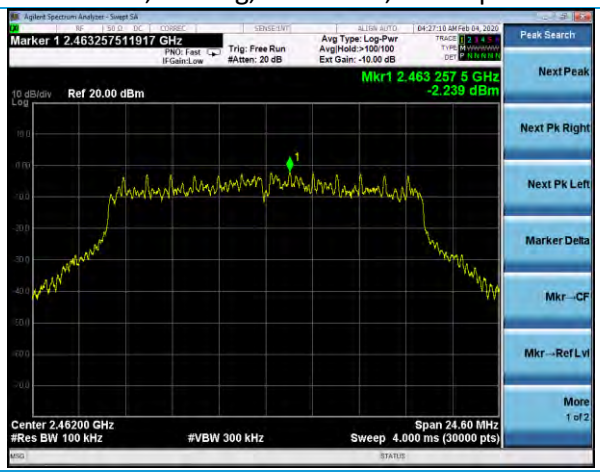
PSD, 802.11g, Channel 11, 6 Mbps



PSD, 802.11g, Channel 1, 54 Mbps

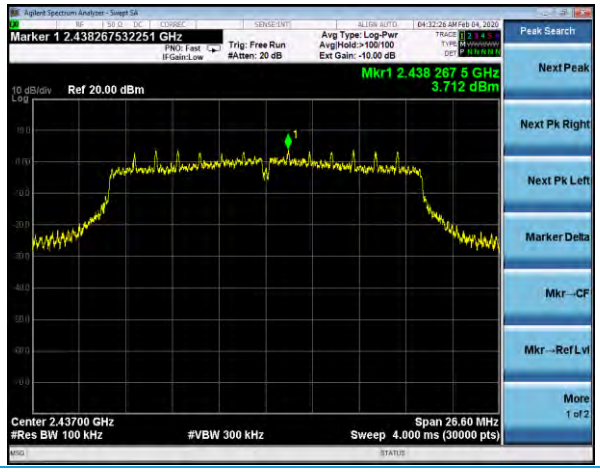


PSD, 802.11g, Channel 6, 54 Mbps

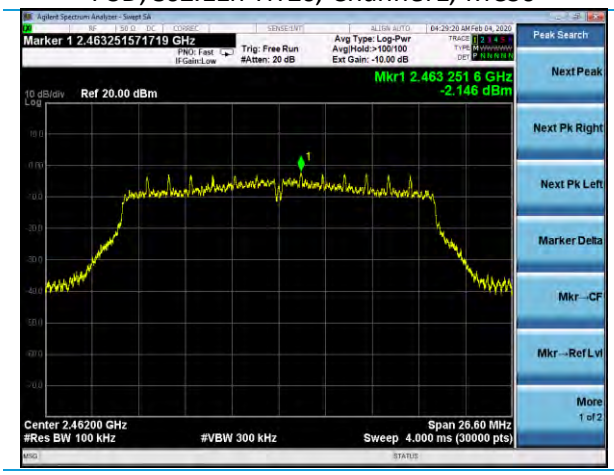


PSD, 802.11g, Channel 11, 54 Mbps

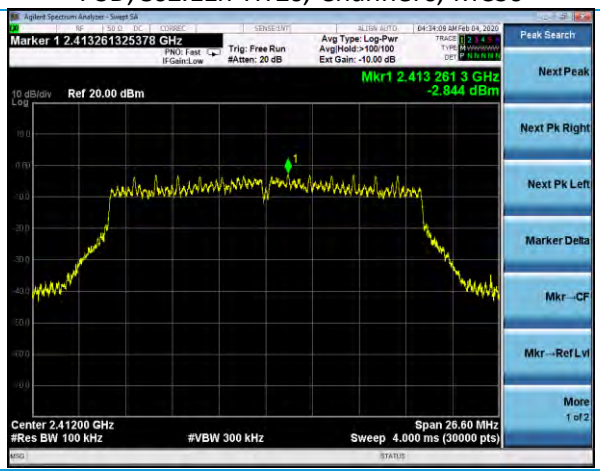
PSD, 802.11n HT20, Channel 1, MCS0



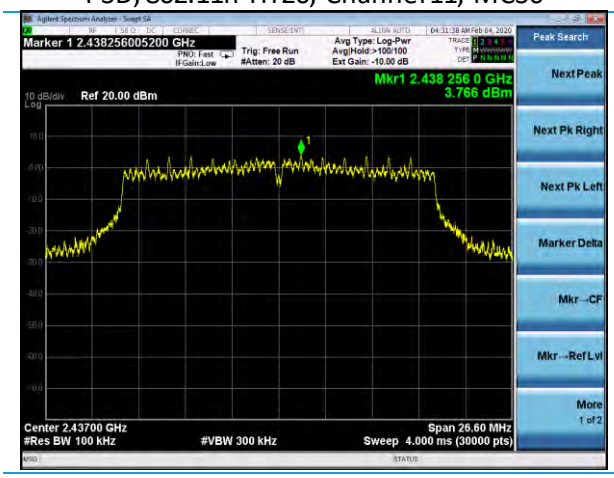
PSD, 802.11n HT20, Channel 6, MCS0



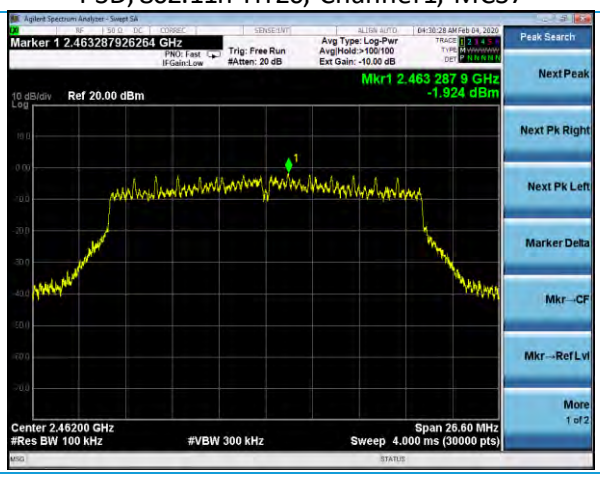
PSD, 802.11n HT20, Channel 11, MCS0



PSD, 802.11n HT20, Channel 1, MCS7

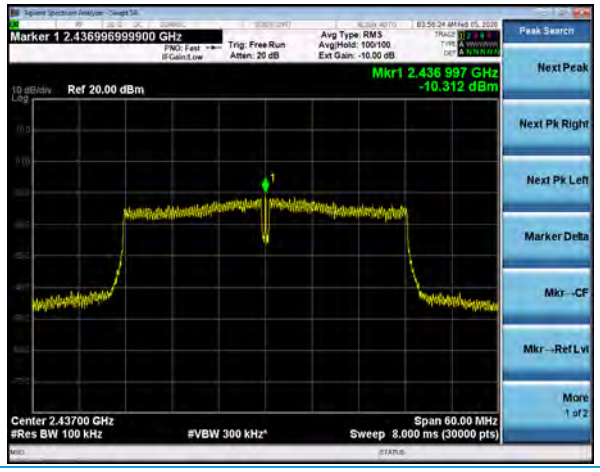


PSD, 802.11n HT20, Channel 6, MCS7



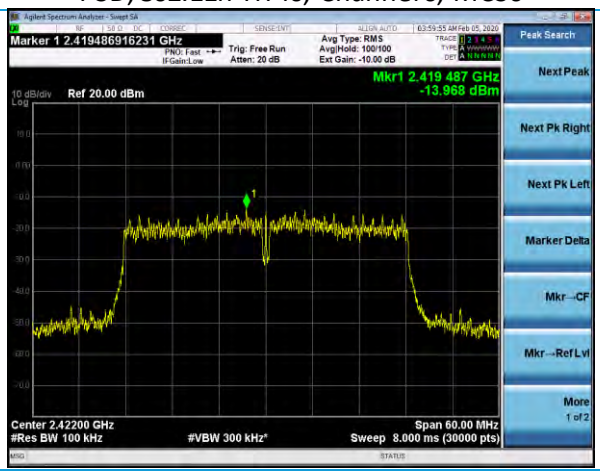
PSD, 802.11n HT20, Channel 11, MCS7

PSD, 802.11n HT40, Channel 3, MCS0

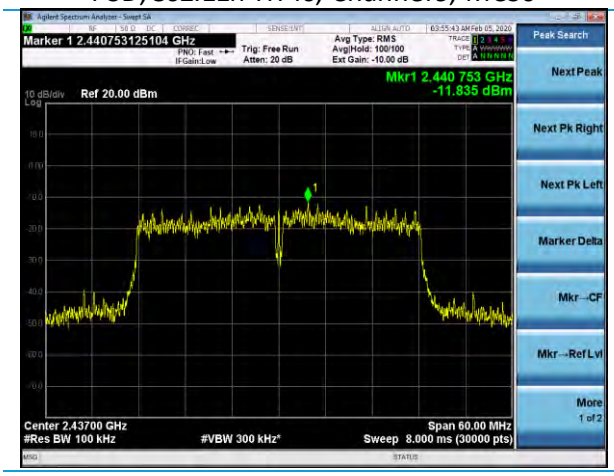


PSD, 802.11n HT40, Channel 6, MCS0

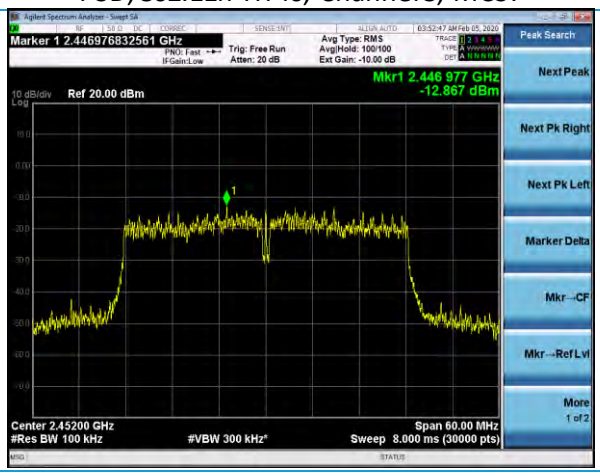
PSD, 802.11n HT40, Channel 9, MCS0



PSD, 802.11n HT40, Channel 3, MCS7



PSD, 802.11n HT40, Channel 6, MCS7



PSD, 802.11n HT40, Channel 9, MCS7

5.1.6 Conducted Spurious Emissions

Operator	Zach Wilson, Shane Dock
QA	Aidi Zainal
Test Date	10/9/2019 – 1/14/2020
Location	Radio Bench
Temp. / R.H.	20.7°C / 51.8%RH
Requirement	FCC 15.247 (d) RSS-247 Section 5.5
Method	ANSI C63.10 Section 11.11

Limits: Peak Power Measured (20 MHz Channels)

Limit
20 dBc

Limits: Average Power Measured (40 MHz Channels)

Limit
30 dBc

Test Parameters

Frequency	HT20: Channel 1(2412 MHz), Channel 6 (2437 MHz), Channel 11 (2462 MHz) HT40: Channel 3 (2422 MHz), Channel 6 (2437 MHz), Channel 9 (2452 MHz)
RBW	100 kHz
VBW	300 kHz

Instrumentation

Laird

Date : 11-Sep-2018 Test : Conducted Radio Job : C-3013

PE : Shane Dock Customer : Philips Healthcare Quote : 317347

No.	Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due Date	Equipment Status
1	AA 960173	Cable	A.H. Systems, Inc	SAC-26G-1	388	6/4/2018	6/4/2020	Active Calibration
2	EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	4/24/2019	4/24/2020	Active Calibration

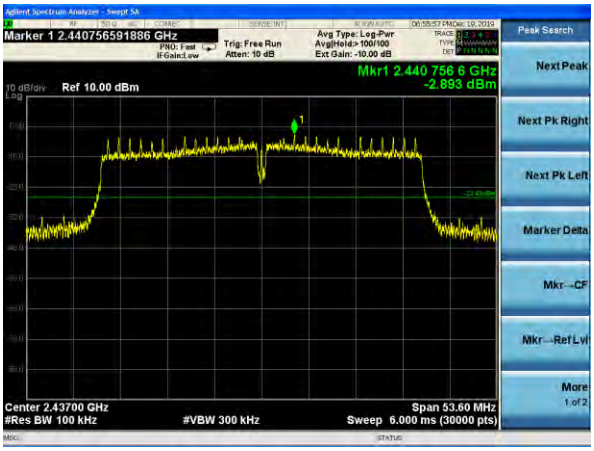
Tables

Data Rate	Channel	Frequency (MHz)	Measured Level (dBm)	Reference Level (dBm)	Limit (dBm)	Margin (dB)
1 MBPS	1	2262.8	-59.3	6.1	-13.9	45.4
1 MBPS	1	4824.3	-55.6	6.1	-13.9	41.7
1 MBPS	1	2398	-31.1	6.1	-13.9	17.2
1 MBPS	6	2285.9	-60.6	6.1	-13.9	46.7
1 MBPS	6	2510.5	-56.2	6.1	-13.9	42.3
1 MBPS	11	2309.7	-61.4	6.1	-13.9	47.5
1 MBPS	11	2536	-56.5	6.1	-13.9	42.6
1 MBPS	11	2483.5	-50.9	6.1	-13.9	37
11 MBPS	1	2262.4	-58.5	7.6	-12.4	46.1
11 MBPS	1	4824.3	-57.1	7.6	-12.4	44.7
11 MBPS	1	2398.4	-32.3	7.6	-12.4	19.9
11 MBPS	6	2285.3	-58.9	7.6	-12.4	46.5
11 MBPS	6	4873.8	-55.6	7.6	-12.4	43.2
11 MBPS	11	2309.7	-61.1	7.6	-12.4	48.7
11 MBPS	11	2536	-57.3	7.6	-12.4	44.9
11 MBPS	11	2483.5	-49.8	7.6	-12.4	37.4
6 MBPS	1	2263.7	-64.1	3.2	-16.8	47.3
6 MBPS	1	7235.7	-64.5	3.2	-16.8	47.7
6 MBPS	1	2399.6	-30.8	3.2	-16.8	14.0
6 MBPS	6	2284.7	-66.0	3.2	-16.8	49.2
6 MBPS	6	2514.3	-61.8	3.2	-16.8	45.0
6 MBPS	11	2308.1	-66.4	3.2	-16.8	49.6
6 MBPS	11	2539	-62.8	3.2	-16.8	46.0
6 MBPS	11	2483.6	-45.8	3.2	-16.8	29.0
54 MBPS	1	2263.1	-64.1	2.8	-17.2	46.9
54 MBPS	1	2580	-64.1	2.8	-17.2	46.9
54 MBPS	1	2398.9	-33.0	2.8	-17.2	15.8
54 MBPS	6	2286.5	-66.3	2.8	-17.2	49.1
54 MBPS	6	2511.3	-61.7	2.8	-17.2	44.5
54 MBPS	11	2308.6	-66.4	2.8	-17.2	49.2
54 MBPS	11	2533	-61.6	2.8	-17.2	44.4
54 MBPS	11	2484.2	-48.7	2.8	-17.2	31.5
HT20 MCS0	1	2261.3	-65.0	3.7	-16.3	48.7
HT20 MCS0	1	7235.7	-65.0	3.7	-16.3	48.7
HT20 MCS0	1	2399.9	-35.9	3.7	-16.3	19.6
HT20 MCS0	6	2283.7	-66.0	3.7	-16.3	49.7
HT20 MCS0	6	2511.3	-62.3	3.7	-16.3	46.0
HT20 MCS0	11	2308.2	-66.7	3.7	-16.3	50.4
HT20 MCS0	11	2544.3	-63.3	3.7	-16.3	47.0

HT20 MCS0	11	2483.6	-47.8	3.7	-16.3	31.5
HT20 MCS7	1	2261.2	-65.2	3.8	-16.2	49.0
HT20 MCS7	1	7235.7	-64.5	3.8	-16.2	48.3
HT20 MCS7	1	2399.2	-38.1	3.8	-16.2	21.9
HT20 MCS7	6	2284.7	-66.0	3.8	-16.2	49.8
HT20 MCS7	6	2509	-61.2	3.8	-16.2	45.0
HT20 MCS7	11	2308.1	-67.0	3.8	-16.2	50.8
HT20 MCS7	11	2536.8	-62.7	3.8	-16.2	46.5
HT20 MCS7	11	2483.9	-46.0	3.8	-16.2	29.8
HT40 MCS0	3	2397	-34.9	-2.9	-32.9	2.0
HT40 MCS0	6	2398.2	-41.5	-2.9	-32.9	8.6
HT40 MCS0	9	2399.5	-55.0	-2.9	-32.9	22.1
HT40 MCS0	3	2484.1	-55.8	-2.9	-32.9	22.9
HT40 MCS0	6	2483.6	-44.4	-2.9	-32.9	11.5
HT40 MCS0	9	2494.5	-34.3	-2.9	-32.9	1.4
HT40 MCS0	9	2500.8	-45.3	-2.9	-32.9	12.4
HT40 MCS7	3	2397	-35.3	-2.6	-32.6	2.7
HT40 MCS7	6	2399.8	-44.7	-2.6	-32.6	12.1
HT40 MCS7	9	2394.5	-53.7	-2.6	-32.6	21.1
HT40 MCS7	3	2485.2	-57.3	-2.6	-32.6	24.7
HT40 MCS7	6	2484.5	-45.8	-2.6	-32.6	13.2
HT40 MCS7	9	2489.5	-34.7	-2.6	-32.6	2.1
HT40 MCS7	9	2500	-51.8	-2.6	-32.6	19.1

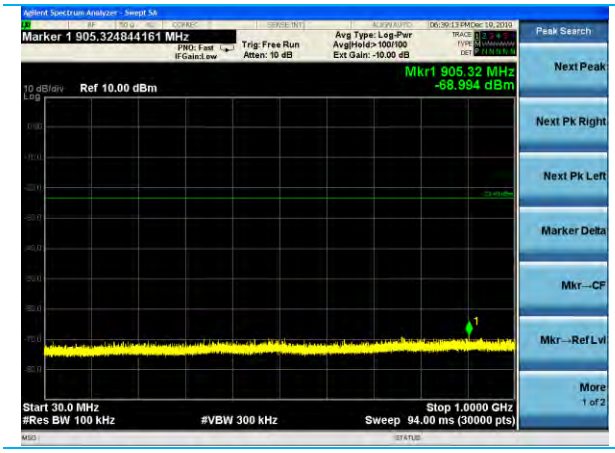
Plots – Conducted Tx Spurious (Worst Case: HT40 MCS0)

Reference Level

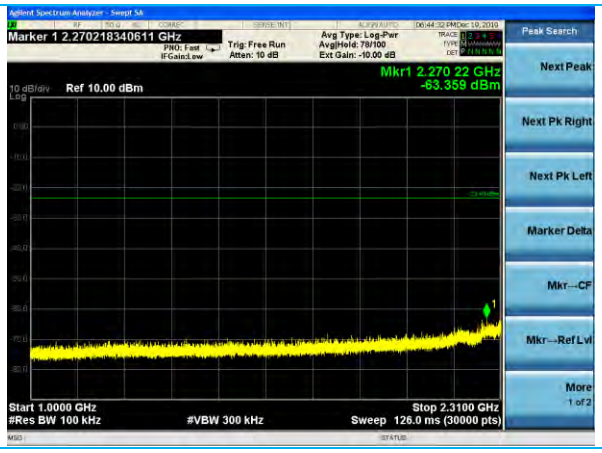


HT40 MCS0 Channel 6

Plots

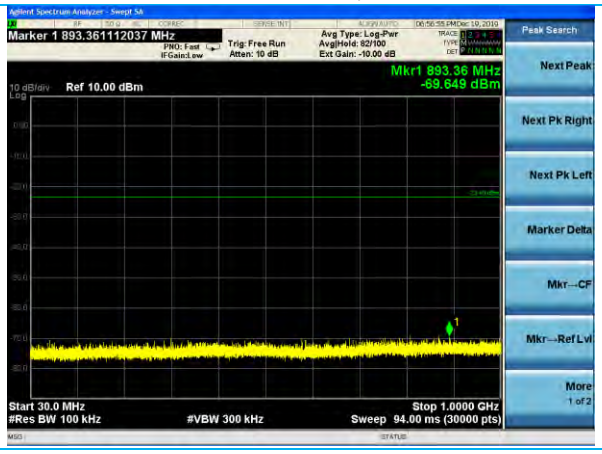


HT40 MCS0 Channel 3, 30-1000 MHz

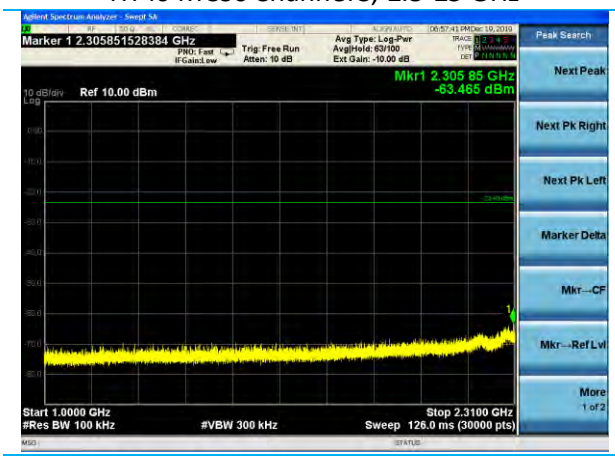


HT40 MCS0 Channel 3, 1-2.31 GHz

HT40 MCS0 Channel 3, 2.5-25 GHz

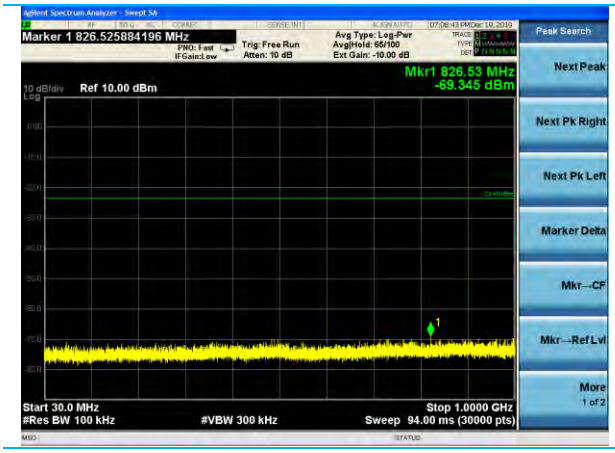


HT40 MCS0 Channel 6, 30-1000 MHz



HT40 MCS0 Channel 6, 1-2.31 GHz

HT40 MCS0 Channel 6, 2.5-25 GHz

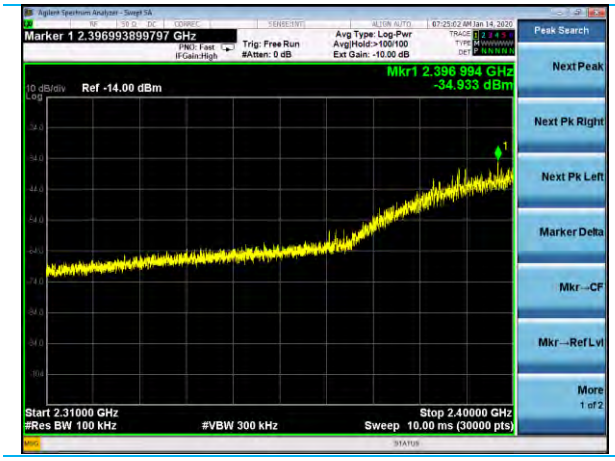


HT40 MCS0 Channel 9, 30-1000 MHz

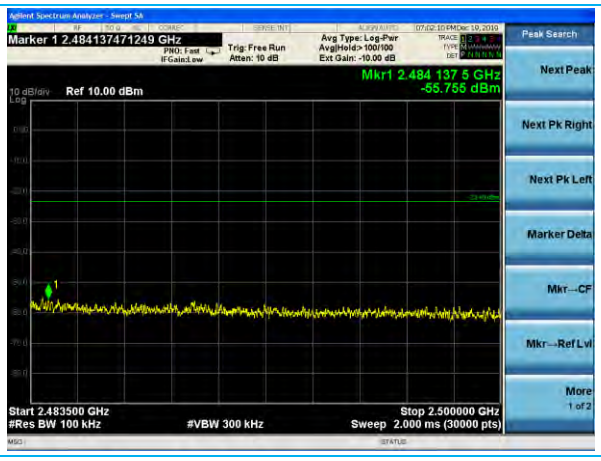
HT40 MCS0 Channel 9, 1-2.31 GHz

HT40 MCS0 Channel 9, 2.5-25 GHz

Plots – Band Edges

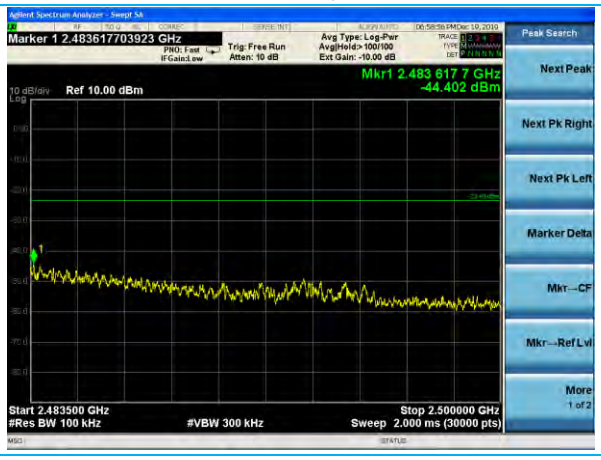


HT40 MCS0 Channel 3, 2.31-2.4 GHz

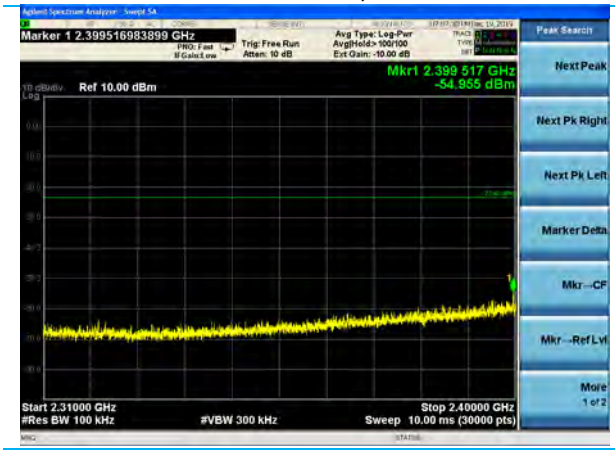


HT40 MCS0 Channel 3, 2.4835-2.5 GHz

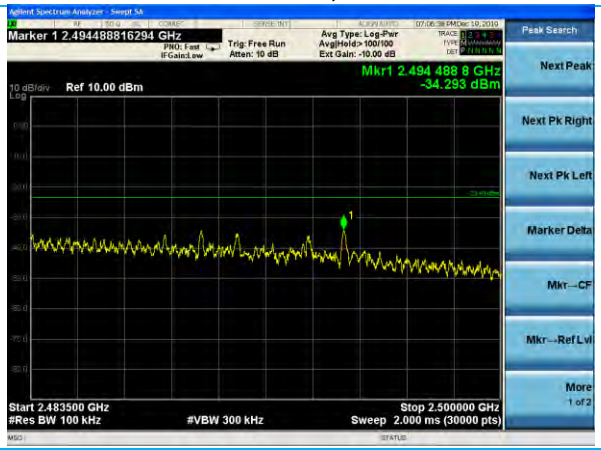
HT40 MCS0 Channel 6, 2.31-2.4 GHz



HT40 MCS0 Channel 6, 2.4835-2.5 GHz



HT40 MCS0 Channel 9, 2.31-2.4 GHz



HT40 MCS0 Channel 9, 2.4835-2.5 GHz

5.1.7 Conducted Spurious Emissions

Operator	Zach Wilson, Shane Dock
QA	Aidi Zainal
Test Date	10/9/2019 – 1/14/2020
Location	Radio Bench
Temp. / R.H.	20.7°C / 51.8%RH
Requirement	FCC 15.247 (d) RSS-247 Section 8.10
Method	ANSI C63.10 Sections 11.12

Limits: Emissions in Restricted Frequency Bands

Peak Limit (dBm)	Average Limit (dBm)
-21.23	-41.23

Test Parameters

Frequency	HT20: Channel 1(2412 MHz), Channel 6 (2437 MHz), Channel 11 (2462 MHz) HT40: Channel 3 (2422 MHz), Channel 6 (2437 MHz), Channel 9 (2452 MHz)
RBW	100 kHz (< 1 GHz) 1 MHz (> 1 GHz)
VBW	300 kHz (< 1 GHz) 3 MHz (> 1 GHz)
Detector	Peak, Average
Notes	Under 1 GHz peak data compared against restricted bands quasi peak limits as worst case. Peak Measurements done per ANSI C63.10 11.12.2.4. Average Measurements done per 11.12.2.5.2 where emissions are noted.

Instrumentation

Laird

Date : 11-Sep-2018 Test : Conducted Radio Job : C-3013

PE : Shane Dock Customer : Philips Healthcare Quote : 317347

No.	Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due Date	Equipment Status
1	AA 960173	Cable	A.H. Systems, Inc	SAC-26G-1	388	6/4/2018	6/4/2020	Active Calibration
2	EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	4/24/2019	4/24/2020	Active Calibration

Tables

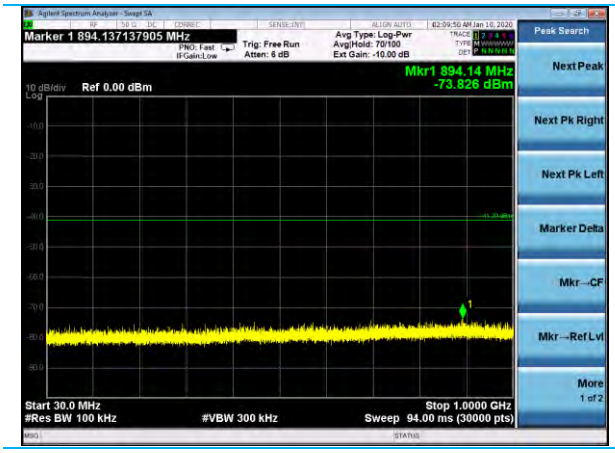
Data Rate	Channel	Frequency (MHz)	Average Reading (dBm)	Correction Factor (dB)	Antena Gain (dBi)	e.i.r.p Reading (dBm)	Limit (dBm)	Margin (dB)
1 MBPS	1	2260.7	-57.1	0.0	5.5	-51.6	-41.2	10.4
1 MBPS	1	4824.0	-60.4	0.0	5.5	-54.9	-41.2	13.7
1 MBPS	1	2389.9	-51.5	0.0	5.5	-46.0	-41.2	4.8
1 MBPS	1	2487.9	-53.9	0.0	5.5	-48.4	-41.2	7.2
1 MBPS	6	2286.0	-57.7	0.0	5.5	-52.2	-41.2	11.0
1 MBPS	6	4873.9	-60.1	0.0	5.5	-54.6	-41.2	13.5
1 MBPS	6	2360.9	-55.8	0.0	5.5	-50.3	-41.2	9.0
1 MBPS	6	2489.0	-59.2	0.0	5.5	-53.7	-41.2	12.5
1 MBPS	11	2236.0	-61.3	0.0	5.5	-55.8	-41.2	14.6
1 MBPS	11	4923.9	-60.2	0.0	5.5	-54.7	-41.2	13.5
1 MBPS	11	2385.5	-56.1	0.0	5.5	-50.6	-41.2	9.4
1 MBPS	11	2483.5	-50.8	0.0	5.5	-45.3	-41.2	4.1
11 MBPS	1	2263.6	-57.2	0.5	5.5	-51.2	-41.2	9.9
11 MBPS	1	4824.0	-64.5	0.5	5.5	-58.5	-41.2	17.3
11 MBPS	1	2390.0	-52.5	0.5	5.5	-46.5	-41.2	5.3
11 MBPS	1	2488.1	-53.8	0.5	5.5	-47.8	-41.2	6.6
11 MBPS	6	2288.2	-58.6	0.5	5.5	-52.6	-41.2	11.4
11 MBPS	6	4873.9	-64.4	0.5	5.5	-58.4	-41.2	17.2
11 MBPS	6	2361.2	-55.7	0.5	5.5	-49.7	-41.2	8.4
11 MBPS	6	2485.3	-58.5	0.5	5.5	-52.5	-41.2	11.3
11 MBPS	11	2238.0	-61.0	0.5	5.5	-55.0	-41.2	13.9
11 MBPS	11	4924.2	-65.0	0.5	5.5	-59.0	-41.2	17.7
11 MBPS	11	2387.7	-56.1	0.5	5.5	-50.1	-41.2	8.9
11 MBPS	11	2483.8	-52.5	0.5	5.5	-46.5	-41.2	5.4
6 MBPS	1	2261.1	-64.0	0.3	5.5	-58.2	-41.2	17.0
6 MBPS	1	2390.0	-49.3	0.3	5.5	-43.5	-41.2	2.3
6 MBPS	6	2288.5	-62.1	0.3	5.5	-56.3	-41.2	15.1
6 MBPS	6	2361.5	-59.0	0.3	5.5	-53.2	-41.2	12.0
6 MBPS	6	2483.9	-57.7	0.3	5.5	-51.9	-41.2	10.7
6 MBPS	11	2385.7	-64.5	0.3	5.5	-58.7	-41.2	17.6
6 MBPS	11	2484.1	-49.8	0.3	5.5	-44.0	-41.2	2.8
54 MBPS	1	2261.6	-65.3	2.0	5.5	-57.8	-41.2	16.6
54 MBPS	1	2389.4	-51.6	2.0	5.5	-44.1	-41.2	2.9
54 MBPS	1	2484.8	-61.3	2.0	5.5	-53.8	-41.2	12.6
54 MBPS	6	2286.4	-64.3	2.0	5.5	-56.8	-41.2	15.6
54 MBPS	6	2361.6	-60.9	2.0	5.5	-53.4	-41.2	12.3
54 MBPS	6	2483.6	-59.9	2.0	5.5	-52.4	-41.2	11.1
54 MBPS	11	2388.4	-65.2	2.0	5.5	-57.7	-41.2	16.6

54 MBPS	11	2483.8	-51.1	2.0	5.5	-43.6	-41.2	2.3
HT20 MCS0	1	2261.2	-65.3	0.3	5.5	-59.5	-41.2	18.2
HT20 MCS0	1	2389.9	-49.1	0.3	5.5	-43.3	-41.2	2.1
HT20 MCS0	1	2486.6	-62.1	0.3	5.5	-56.3	-41.2	15.2
HT20 MCS0	6	2284.3	-63.5	0.3	5.5	-57.7	-41.2	16.5
HT20 MCS0	6	2390.0	-60.0	0.3	5.5	-54.2	-41.2	13.0
HT20 MCS0	6	2484.3	-58.6	0.3	5.5	-52.8	-41.2	11.6
HT20 MCS0	11	2483.5	-51.8	0.3	5.5	-46.0	-41.2	4.8
HT20 MCS7	1	2261.2	-67.1	2.1	5.5	-59.5	-41.2	18.2
HT20 MCS7	1	2389.5	-54.1	2.1	5.5	-46.5	-41.2	5.3
HT20 MCS7	6	2285.0	-64.9	2.1	5.5	-57.3	-41.2	16.1
HT20 MCS7	6	2363.4	-61.2	2.1	5.5	-53.6	-41.2	12.4
HT20 MCS7	6	2484.2	-59.7	2.1	5.5	-52.1	-41.2	10.9
HT20 MCS7	11	2483.8	-51.7	2.1	5.5	-44.1	-41.2	2.9
HT40 MCS0	3	2389.7	-51.0	0.6	5.5	-44.9	-41.2	3.7
HT40 MCS0	9	2483.7	-50.9	0.6	5.5	-44.8	-41.2	3.6
HT40 MCS7	3	2389.8	-53.8	3.0	5.5	-45.3	-41.2	4.1
HT40 MCS7	9	2485.1	-52.3	3.0	5.5	-43.8	-41.2	2.6

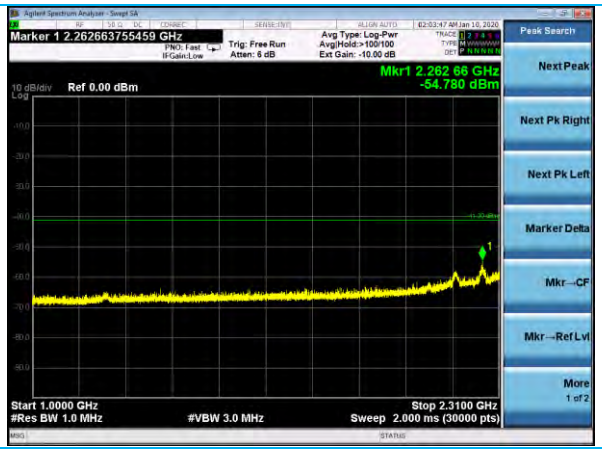
Data Rate	Channel	Frequency (MHz)	Peak Reading (dBm)	Antena Gain (dBi)	e.i.r.p Reading (dBm)	Limit (dBm)	Margin (dB)
1 MBPS	1	2261.4	-49.2	5.5	-43.7	-21.2	22.5
1 MBPS	1	4823.6	-57.1	5.5	-51.6	-21.2	30.4
1 MBPS	1	2390.0	-43.9	5.5	-38.4	-21.2	17.2
1 MBPS	1	2488.4	-46.2	5.5	-40.7	-21.2	19.5
1 MBPS	6	2286.6	-50.5	5.5	-45.0	-21.2	23.8
1 MBPS	6	4873.8	-57.4	5.5	-51.9	-21.2	30.7
1 MBPS	6	2360.8	-47.7	5.5	-42.2	-21.2	21.0
1 MBPS	6	2485.4	-49.1	5.5	-43.6	-21.2	22.4
1 MBPS	11	2309.8	-52.6	5.5	-47.1	-21.2	25.9
1 MBPS	11	4924.1	-57.3	5.5	-51.8	-21.2	30.6
1 MBPS	11	2385.7	-48.5	5.5	-43.0	-21.2	21.8
1 MBPS	11	2483.9	-43.2	5.5	-37.7	-21.2	16.5
11 MBPS	1	2262.0	-49.2	5.5	-43.7	-21.2	22.5
11 MBPS	1	4824.3	-56.9	5.5	-51.4	-21.2	30.2
11 MBPS	1	2389.7	-42.5	5.5	-37.0	-21.2	15.8
11 MBPS	1	2486.8	-45.6	5.5	-40.1	-21.2	18.9
11 MBPS	6	2285.1	-50.7	5.5	-45.2	-21.2	24.0
11 MBPS	6	4874.6	-56.7	5.5	-51.2	-21.2	30.0
11 MBPS	6	2362.4	-46.7	5.5	-41.2	-21.2	20.0

11 MBPS	6	2486.1	-48.3	5.5	-42.8	-21.2	21.6
11 MBPS	11	2239.0	-53.2	5.5	-47.7	-21.2	26.5
11 MBPS	11	4924.1	-56.7	5.5	-51.2	-21.2	30.0
11 MBPS	11	2388.1	-47.7	5.5	-42.2	-21.2	21.0
11 MBPS	11	2483.8	-41.7	5.5	-36.2	-21.2	15.0
6 MBPS	1	2260.0	-54.5	5.5	-49.0	-21.2	27.8
6 MBPS	1	2389.9	-32.0	5.5	-26.5	-21.2	5.3
6 MBPS	6	2290.0	-53.2	5.5	-47.7	-21.2	26.5
6 MBPS	6	2389.1	-46.3	5.5	-40.8	-21.2	19.6
6 MBPS	6	2486.4	-44.5	5.5	-39.0	-21.2	17.8
6 MBPS	11	2383.6	-54.6	5.5	-49.1	-21.2	27.9
6 MBPS	11	2484.0	-36.5	5.5	-31.0	-21.2	9.8
54 MBPS	1	2261.4	-55.0	5.5	-49.5	-21.2	28.3
54 MBPS	1	2389.5	-37.3	5.5	-31.8	-21.2	10.6
54 MBPS	1	2486.3	-49.5	5.5	-44.0	-21.2	22.8
54 MBPS	6	2290.3	-54.6	5.5	-49.1	-21.2	27.9
54 MBPS	6	2363.9	-50.3	5.5	-44.8	-21.2	23.6
54 MBPS	6	2486.7	-48.0	5.5	-42.5	-21.2	21.3
54 MBPS	11	2384.4	-54.6	5.5	-49.1	-21.2	27.9
54 MBPS	11	2483.7	-34.8	5.5	-29.3	-21.2	8.1
HT20 MCS0	1	2262.7	-54.8	5.5	-49.3	-21.2	28.1
HT20 MCS0	1	2389.9	-33.7	5.5	-28.2	-21.2	7.0
HT20 MCS0	1	2492.8	-51.1	5.5	-45.6	-21.2	24.4
HT20 MCS0	6	2287.3	-54.0	5.5	-48.5	-21.2	27.3
HT20 MCS0	6	2357.8	-48.9	5.5	-43.4	-21.2	22.2
HT20 MCS0	6	2484.1	-46.7	5.5	-41.2	-21.2	20.0
HT20 MCS0	11	2484.1	-38.3	5.5	-32.8	-21.2	11.6
HT20 MCS7	1	2265.8	-57.1	5.5	-51.6	-21.2	30.4
HT20 MCS7	1	2389.3	-39.8	5.5	-34.3	-21.2	13.1
HT20 MCS7	6	2285.2	-53.6	5.5	-48.1	-21.2	26.9
HT20 MCS7	6	2359.3	-49.6	5.5	-44.1	-21.2	22.9
HT20 MCS7	6	2483.7	-47.1	5.5	-41.6	-21.2	20.4
HT20 MCS7	11	2485.1	-36.3	5.5	-30.8	-21.2	9.6
HT40 MCS0	3	2387.0	-37.6	5.5	-32.1	-21.2	10.9
HT40 MCS0	9	2483.6	-33.2	5.5	-27.7	-21.2	6.5
HT40 MCS7	3	2388.1	-37.2	5.5	-31.7	-21.2	10.5
HT40 MCS7	9	2484.6	-36.4	5.5	-30.9	-21.2	9.7

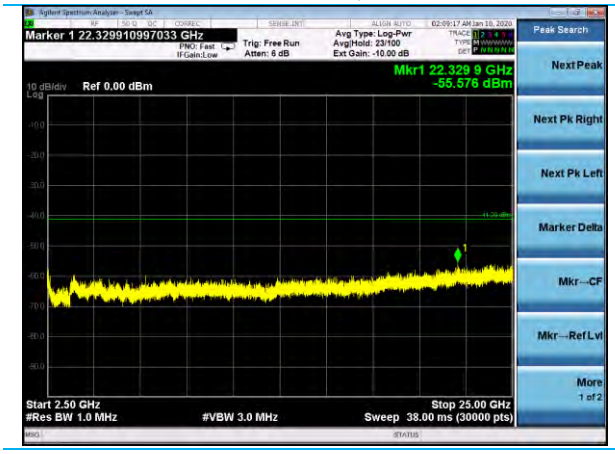
Plots – Conducted Tx Spurious (Worst Case: HT20 MCS0)



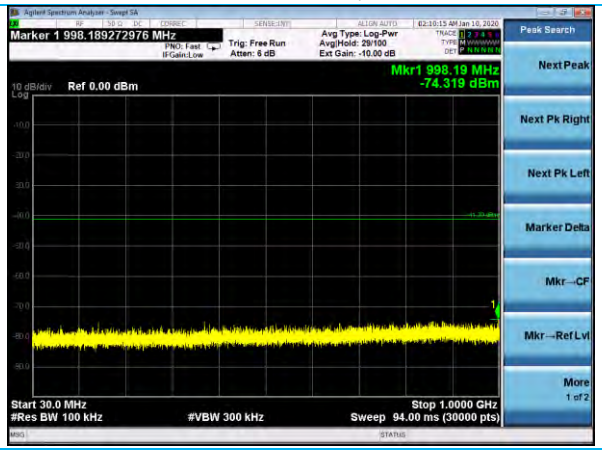
HT20 MCS0 Channel 1, 30-1000 MHz



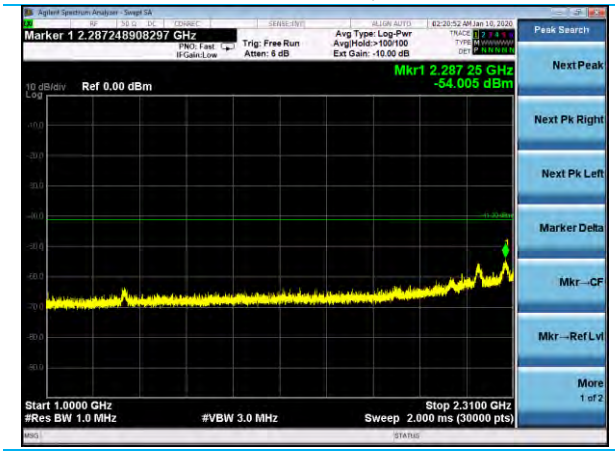
HT20 MCS0 Channel 1, 1-2.31 GHz



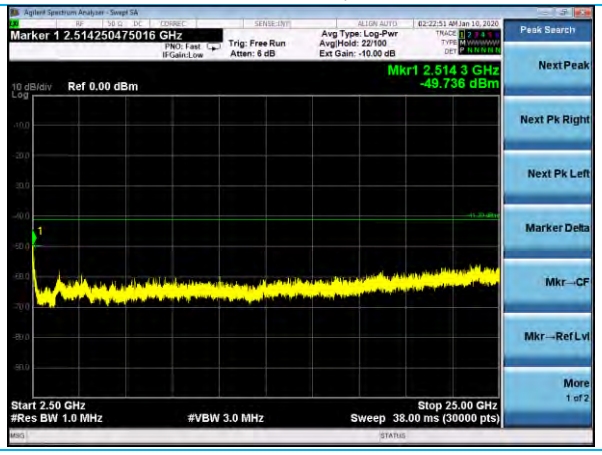
HT20 MCS0 Channel 1, 2.5-25 GHz



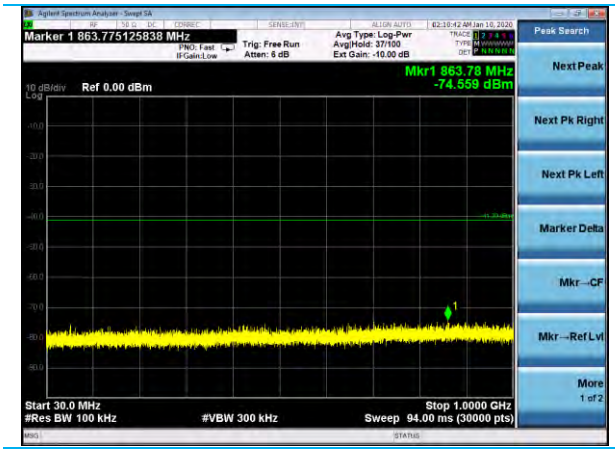
HT20 MCS0 Channel 6, 30-1000 MHz



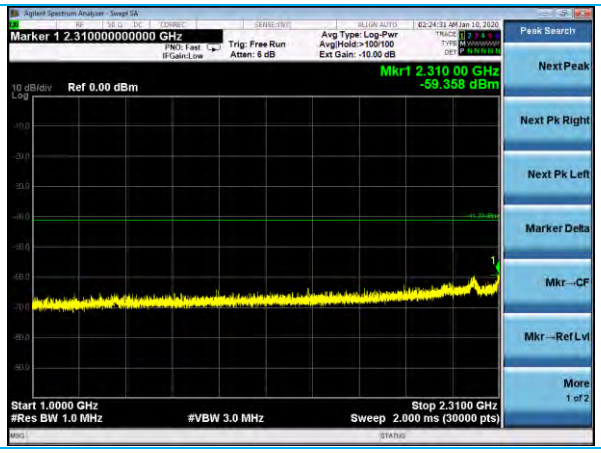
HT20 MCS0 Channel 6, 1-2.31 GHz



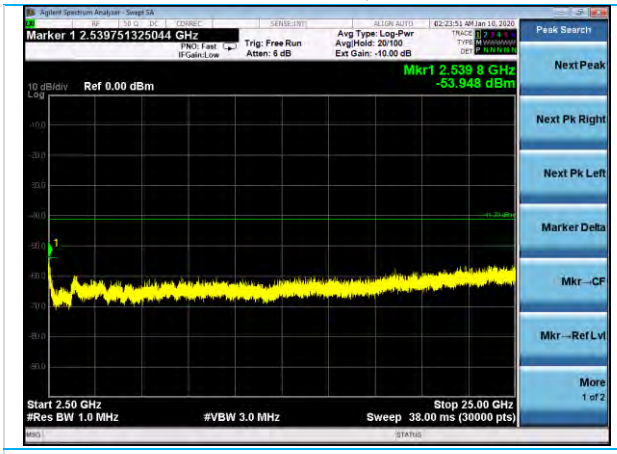
HT20 MCS0 Channel 6, 2.5-25 GHz



HT20 MCS0 Channel 11, 30-1000 MHz

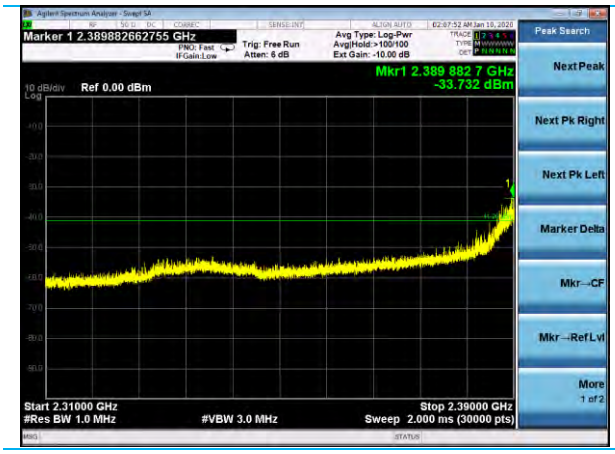


HT20 MCS0 Channel 11, 1-2.31 GHz

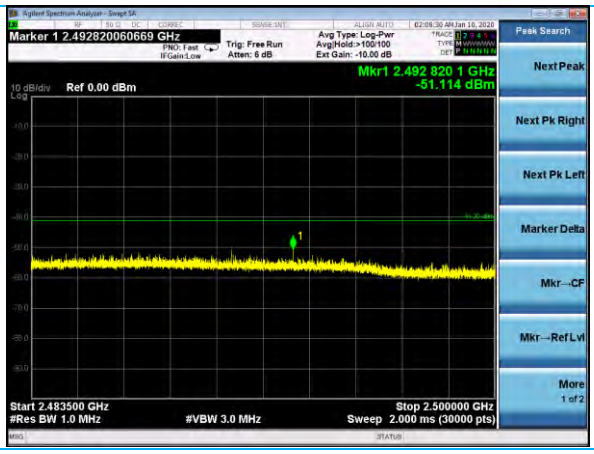


HT20 MCS0 Channel 11, 2.5-25 GHz

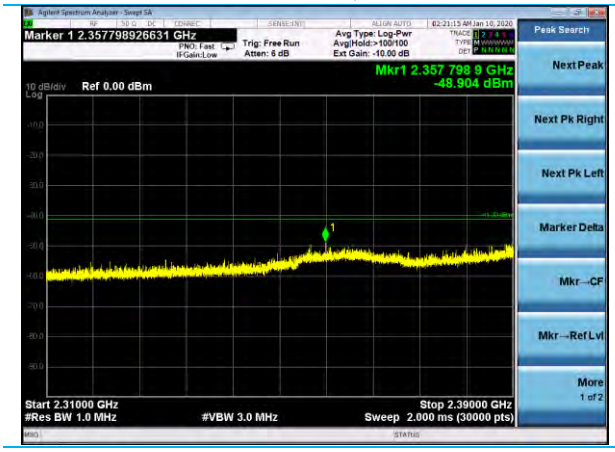
Plots – Peak Band Edges



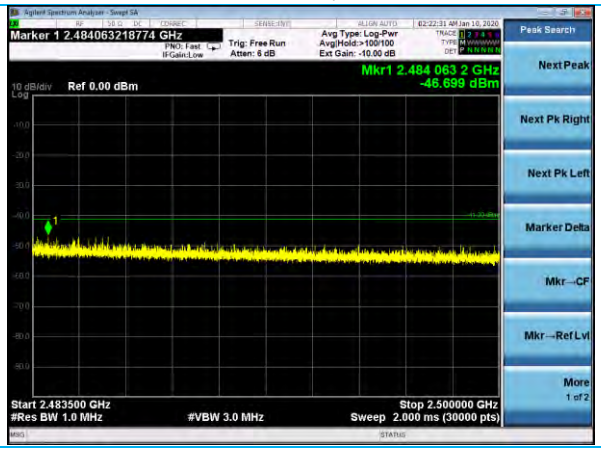
HT20 MCS0 Channel 1, 2.31-2.39 GHz



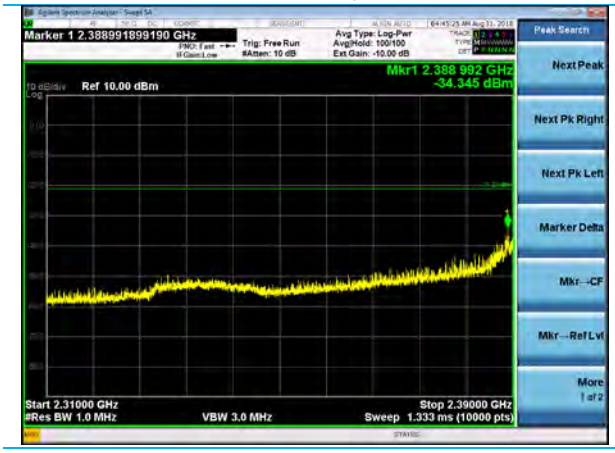
HT20 MCS0 Channel 1, 2.4835-2.5 GHz



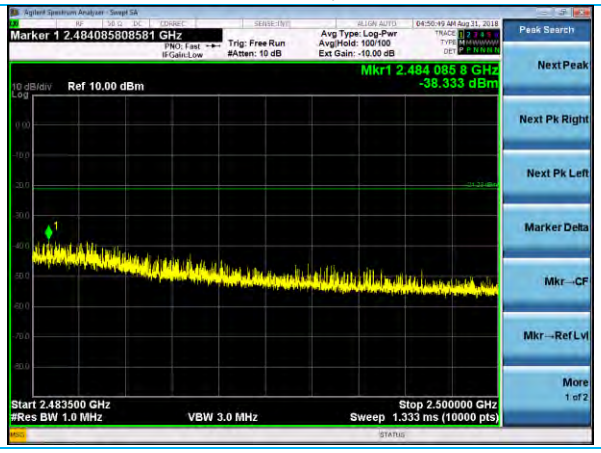
HT20 MCS0 Channel 6, 2.31-2.39 GHz



HT20 MCS0 Channel 6, 2.4835-2.5 GHz



HT20 MCS0 Channel 11, 2.31-2.39 GHz

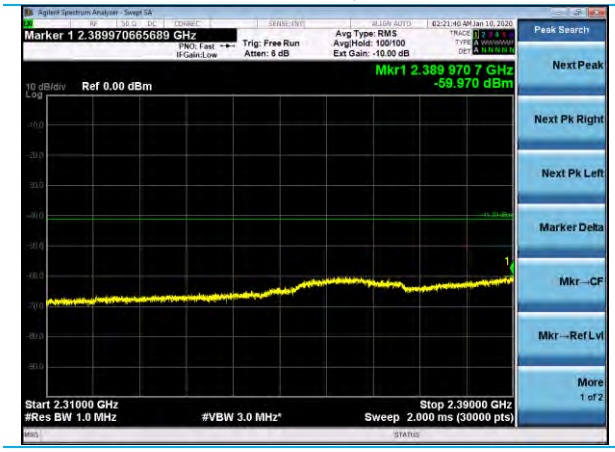


HT20 MCS0 Channel 11, 2.4835-2.5 GHz

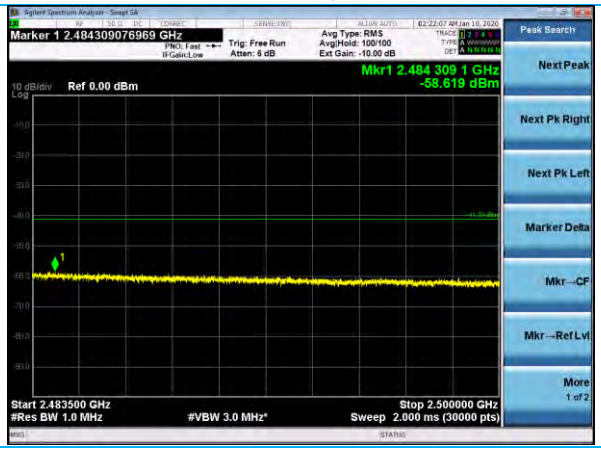
Plots – Average Band Edges

HT20 MCS0 Channel 1, 2.31-2.39 GHz

HT20 MCS0 Channel 1, 2.4835-2.5 GHz



HT20 MCS0 Channel 6, 2.31-2.39 GHz



HT20 MCS0 Channel 6, 2.4835-2.5 GHz

HT20 MCS0 Channel 11, 2.31-2.39 GHz

HT20 MCS0 Channel 11, 2.4835-2.5 GHz

5.1.8 Frequency Stability

Operator	Anthony Smith
QA	Zach Wilson
Test Date	10/21/2019
Location	Bench
Temp. / R.H.	21.7°C/49%
Requirement	FCC 2.1055 (d) RSS-GEN 6.11
Method	ANSI C63.10 Section 6.8

Limits: Reported

Test Parameters

Frequency	Channel (2412 MHz)

EUT Parameters

Power	3.3 VDC via Bench Supply as reference, and varied per Table.

Instrumentation

Date : 11-Sep-2018 Test : Conducted Radio Job : C-3013

PE : Shane Dock Customer : Philips Healthcare Quote : 317347

No.	Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due Date	Equipment Status
1	EE 960087	Analyzer - Spectrum	Agilent	N9010A	MY53400296	4/24/2019	4/24/2020	Active Calibration
2	AA 960171	Cable	A.H. Systems, Inc	SAC-26G-6	386	11/12/2018	11/12/2019	Active Verification

Table

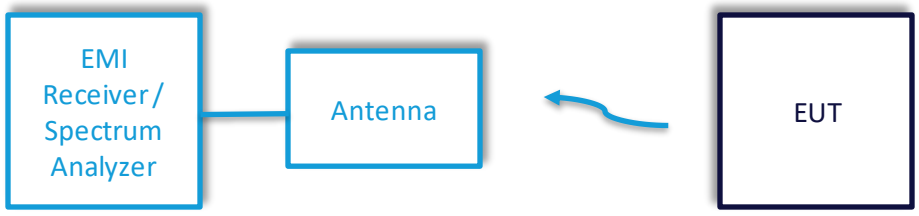
Temperature (°C)	Input Power (VDC)	Frequency (Hz)	Deviation (Hz)
20	3.3	2411999241	0
20	2.8	2412002157	2916
20	3.8	2411999767	526

Note: Deviation is with respect to the 3.3 VDC value.

5.2 Radiated Emissions

Description of Measurement	The frequency spectrum is investigated for intentional and / or unintentional signals emanating from the EUT by use of a standardized test site and measurement antenna. The antenna, cable, pre-amp, and other necessary measurement system correction factors are loaded onto the EMI receiver / spectrum analyzer when the measurements are performed allowing the data to be gathered and reported as corrected values. The maximum emissions from the EUT are determined by turn-table azimuth rotation (360°) and scanning of the measurement antenna. Maximized levels are noted at degree values of azimuth, measurement antenna height, and measurement antenna polarity.
Example Calculations	Measurement (dBµV) + Cable factor (dB) + Other (dB) + Antenna Factor (dB/m) = Corrected Reading (dBµV/m) Margin (dB) = Limit (dBµV/m) - Corrected Reading (dBµV/m) Example at 4000 MHz: Reading = 40 dBµV + 3.4 dB + 0.9 dB + 6.5 dB/m = 50.8 dBµV/m Average Limit = 20 log (500) = 54 dBµV/m Margin = 54 dBµV/m - 50.8 dBµV/m = 3.2 dB

Block Diagram



5.2.1 Radiated Emissions 30-1000 MHz

Operator	Braden Smith	**QA**	Jeysson Gonzalez
Temperature	23.6°C	**R.H. %**	32.60%
Test Date	4/30/2019	**Location**	Chamber 3
Requirement	FCC 15.209	**Method**	ANSI C63.10

Limits: FCC 15.209

Frequency (MHz)	Quasi Peak Limit (dBµV/m)
30-88	40
88-216	43.5
216-960	46
960-1000	54

Test Parameters

Frequency	30-1000 MHz	**Distance**	3m
Detector(s)	Max hold with peak detector for plots. Quasi peak detector for final measurements.	**Table height**	80cm
RBW	120 kHz	**VBW**	1.2 MHz
Data Notes	All data rates below tested. Three EUT orientations tested. Only showing worst case data/plots with respect to the limit.	**EUT Orientations**	Vertical, Flat, Horizontal

EUT Parameters

Input Power	5 VDC via Bench Supply	**Mode**	WLAN 2.4 GHz Transmit Mode 802.11b/g/n
Dates Rates	802.11b: 1 MBPS	**Antenna**	50Ω Termination
Channels	1,6,11		

Instrumentation

Date: 11-Sep-2018 Test: Radiated Emissions Job: C-3013

PE: Shane Dock Customer: Philips Healthcare Quote: 317347

No.	Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due Date	Equipment Status
1	EE 960088	Analyzer - EMI Receiver	Agilent	N9038A	MY51210138	4/23/2019	4/23/2020	Active Calibration
2	AA 960150	Antenna - Biconical	ETS Lindgren	3110B	0003-3348	4/20/2018	4/20/2020	Active Calibration
3	AA 960195	Antenna - Log Periodic	A.H. Systems, Inc	SAS-512-2	557	1/30/2018	1/30/2020	Active Calibration

Table

Frequency (MHz)	Antenna Polarity	EUT Orientation	Height (cm)	Azimuth (degree)	Quasi-Peak Reading (dBµV/m)	Quasi-Peak Limit (dBµV/m)	Quasi-Peak Margin (dB)
64.6	Horizontal	Vertical	100	0	34.8	40.0	5.2
64.9	Horizontal	Vertical	100	0	34.7	40.0	5.3
64.9	Horizontal	Horizontal	100	275	35.2	40.0	4.8
64.9	Horizontal	Flat	100	0	34.8	40.0	5.2
119.5	Horizontal	Vertical	100	0	28.9	43.5	14.6
398.2	Vertical	Vertical	100	0	34.1	46.0	11.9
398.4	Horizontal	Vertical	100	0	34.2	46.0	11.9
758.6	Horizontal	Vertical	100	0	36.4	46.0	9.6
963.2	Vertical	Vertical	100	0	38.0	54.0	16.0

Plots

30-1000 MHz, Vertical EUT, Vertical Antenna
802.11b, 1 Mbps, Channel 1

30-1000 MHz, Vertical EUT, Horizontal Antenna
802.11b, 1 Mbps, Channel 1

30-1000 MHz, Vertical EUT, Vertical Antenna
802.11b, 1 Mbps, Channel 11

30-1000 MHz, Vertical EUT, Horizontal Antenna
802.11b, 1 Mbps, Channel 11

200-1000 MHz, Vertical EUT, Vertical Antenna
802.11b, 1 Mbps, Channel 1

200-1000 MHz, Vertical EUT, Horizontal Antenna
802.11b, 1 Mbps, Channel 1

5.2.2 Radiated Emissions 1-4 GHz

Operator	Jon Dilley, Anthony Smith	**QA**	Shane Dock
Temperature	24.2C, 23.2°C	**R.H. %**	38.9%, 35%
Test Date	10/25/18, 10/26/18	**Location**	Chamber 5, Chamber 3
Requirement	FCC 15.209, FCC 15.205	**Method**	ANSI C63.10

Limits: FCC 15.209, FCC 15.205

Frequency (GHz)	Average Limit (dBµV/m)	Peak Limit (dBµV/m)
1-4	54	74

Test Parameters

Frequency	1-4 GHz	**Distance**	3m
Detector(s)	Max hold with peak detector for plots. Peak detector and reduced VBW for average for final measurements.	**Table height**	150cm
RBW	1 MHz	**VBW**	3 MHz for peak measurements. 1 kHz reduced VBW used for average measurements in restricted bands. 30 kHz reduced VBW for average measurements outside of restricted bands.
EUT Orientations	Vertical, Flat, Horizontal. Horizontal worst case with respect to the limit and only orientation shown in the data/plots.	**Antenna Polarization**	Peak field strength of fundamental for each data rate/channel found and considered worst case for band edge measurements. Horizontal antenna polarity used for data/plots.

EUT Parameters

Input Power	5 VDC via Bench Supply	**Mode**	WLAN 2.4 GHz Transmit Mode 802.11b/g/n
Channels	1, 6, 11 (20 MHz Channels) 3, 6, 9 (40 MHz Channels)	**Antenna**	50Ω Termination

Instrumentation

Date : 27-Nov-2018 Test : Radiated Emissions Job : C-3013

PE : Shane Dock Customer : Philips Healthcare Quote : 317347

No.	Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due Date	Equipment Status
1	EE 960088	Analyzer - EMI Receiver	Agilent	N9038A	MY51210138	4/24/2018	4/24/2019	Active Calibration
2	AA 960158	Antenna - Double Ridge Horn	ETS Lindgren	3117	109300	3/26/2018	3/26/2019	Active Calibration

Table

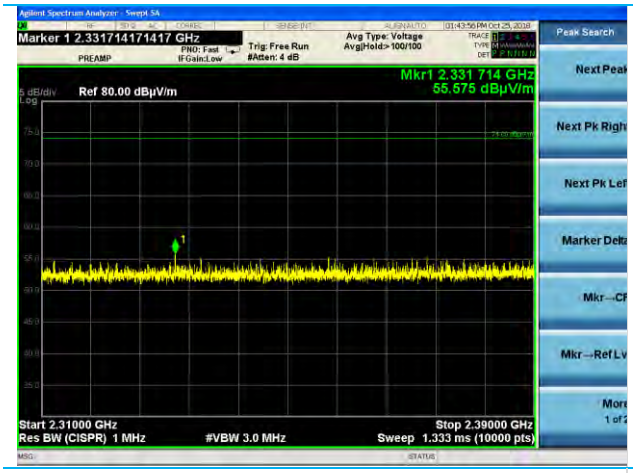
Frequency (MHz)	Height (cm)	Azimuth (degree)	Peak Reading (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Antenna Polarity	Channel	Data Rate
2331.7	230.0	0.0	55.6	74.0	18.4	H	1	1 Mbps
2484.4	230.0	0.0	56.8	74.0	17.2	H	11	1 Mbps
2382.0	230.0	0.0	55.8	74.0	18.2	H	1	11 Mbps
2486.0	230.0	0.0	56.3	74.0	17.7	H	11	11 Mbps
2346.0	230.0	0.0	55.9	74.0	18.1	H	1	6 Mbps
2488.5	230.0	0.0	56.0	74.0	18.0	H	11	6 Mbps
2315.4	230.0	0.0	55.4	74.0	18.6	H	1	54 Mbps
2494.5	230.0	0.0	57.0	74.0	17.0	H	11	54 Mbps
2378.0	230.0	0.0	55.3	74.0	18.7	H	1	MCS0 HT20
2489.4	230.0	0.0	56.5	74.0	17.5	H	11	MCS0 HT20
2382.2	230.0	0.0	55.4	74.0	18.7	H	1	MCS7 HT20
2498.0	230.0	0.0	56.1	74.0	17.9	H	11	MCS7 HT20
2327.7	230.0	0.0	55.4	74.0	18.6	H	3	MCS0 HT40
2499.3	230.0	0.0	56.7	74.0	17.3	H	9	MCS0 HT40
2363.8	230.0	0.0	55.9	74.0	18.1	H	3	MCS7 HT40
2489.1	230.0	0.0	56.3	74.0	17.7	H	9	MCS7 HT40

Frequency (MHz)	Height (cm)	Azimuth (degree)	Average Reading (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Antenna Polarity	Channel	Data Rate
2389.6	230.0	0.0	44.0	54.0	10.0	H	1	1 Mbps
2499.7	230.0	0.0	44.9	54.0	9.1	H	11	1 Mbps
2388.0	230.0	0.0	44.2	54.0	9.8	H	1	11 Mbps
2497.0	230.0	0.0	44.9	54.0	9.1	H	11	11 Mbps
2388.0	230.0	0.0	44.1	54.0	9.9	H	1	6 Mbps
2499.9	230.0	0.0	44.8	54.0	9.2	H	11	6 Mbps
2386.9	230.0	0.0	44.0	54.0	10.0	H	1	54 Mbps
2495.5	230.0	0.0	44.9	54.0	9.1	H	11	54 Mbps
2383.6	230.0	0.0	44.0	54.0	10.0	H	1	MCS0 HT20
2496.0	230.0	0.0	44.9	54.0	9.1	H	11	MCS0 HT20
2381.5	230.0	0.0	44.0	54.0	10.0	H	1	MCS7 HT20
2494.0	230.0	0.0	44.7	54.0	9.3	H	11	MCS7 HT20
2383.0	230.0	0.0	44.0	54.0	10.0	H	3	MCS0 HT40
2499.5	230.0	0.0	44.6	54.0	9.4	H	9	MCS0 HT40
2384.7	230.0	0.0	44.0	54.0	10.0	H	3	MCS7 HT40
2499.1	230.0	0.0	44.6	54.0	9.4	H	9	MCS7 HT40

Frequency (MHz)	Height (cm)	Azimuth (degree)	Peak Reading (dBµV/m)	Peak Limit (dBµV/m)	Margin (dB)	Antenna Polarity	Channel	Data Rate
2101.6	230.0	0.0	55.0	74.0	19.0	H	1	1 Mbps
2011.2	230.0	0.0	55.5	75.0	19.5	H	6	1 Mbps
2243.5	230.0	0.0	55.9	76.0	20.1	V	6	1 Mbps
3593.8	230.0	0.0	59.2	77.0	17.8	H	11	1 Mbps

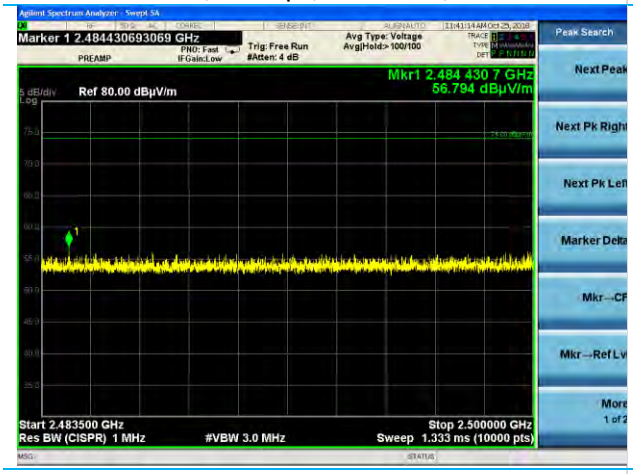
Frequency (MHz)	Height (cm)	Azimuth (degree)	Average Reading (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Antenna Polarity	Channel	Data Rate
2265.1	230.0	0.0	48.5	54.0	5.5	H	6	1 Mbps
2269.3	230.0	0.0	48.6	55.0	6.4	H	1	1 Mbps
3598.7	230.0	0.0	51.8	56.0	4.2	V	6	1 Mbps

Plots

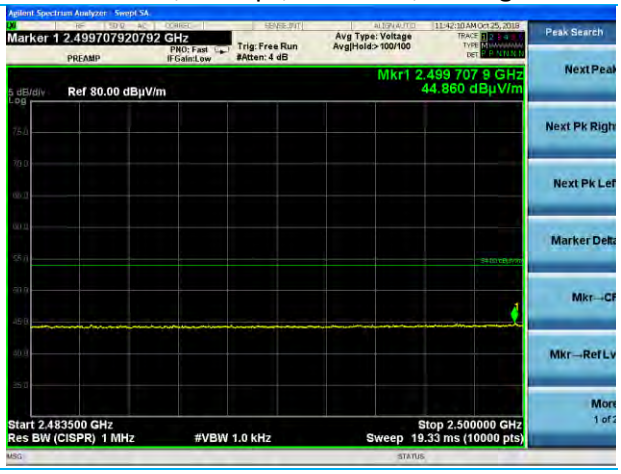


2310-2390 MHz, Side EUT, Horizontal Antenna
802.11b, 1 Mbps, Channel 1, Peak

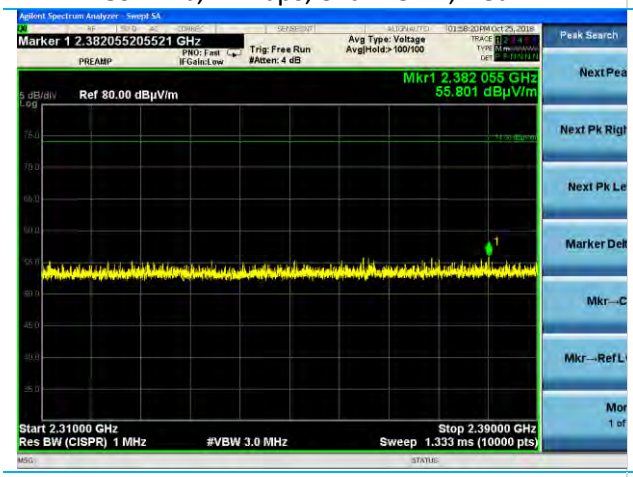
2310-2390 MHz, Side EUT, Horizontal Antenna
802.11b, 1 Mbps, Channel 1, Average



2483.5-2500 MHz, Side EUT, Horizontal Antenna
802.11b, 1 Mbps, Channel 11, Peak

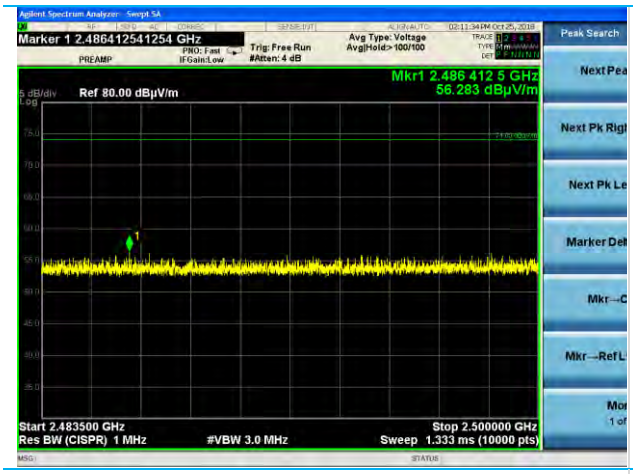


2483.5-2500 MHz, Side EUT, Horizontal Antenna
802.11b, 1 Mbps, Channel 11, Average



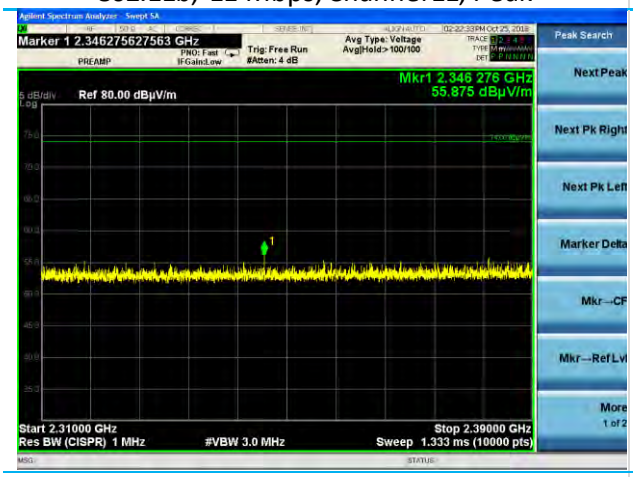
2310-2390 MHz, Side EUT, Horizontal Antenna
802.11b, 11 Mbps, Channel 1, Peak

2310-2390 MHz, Side EUT, Horizontal Antenna
802.11b, 11 Mbps, Channel 1, Average



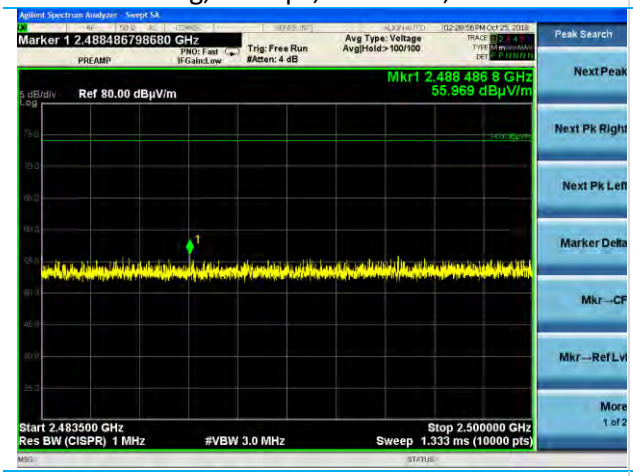
2483.5-2500 MHz, Side EUT, Horizontal Antenna 802.11b, 11 Mbps, Channel 11, Peak

2483.5-2500 MHz, Side EUT, Horizontal Antenna 802.11b, 11 Mbps, Channel 11, Average

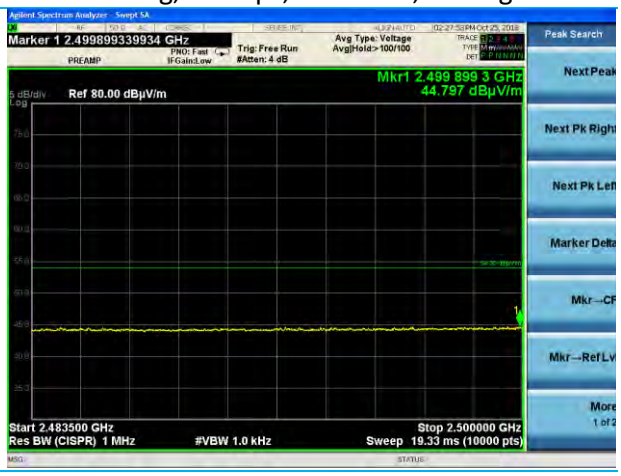


2310-2390 MHz, Side EUT, Horizontal Antenna 802.11g, 6 Mbps, Channel 1, Peak

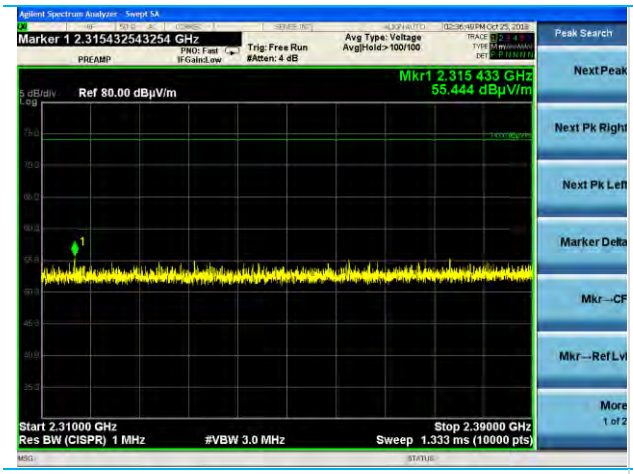
2310-2390 MHz, Side EUT, Horizontal Antenna 802.11g, 6 Mbps, Channel 1, Average



2483.5-2500 MHz, Side EUT, Horizontal Antenna 802.11g, 6 Mbps, Channel 11, Peak

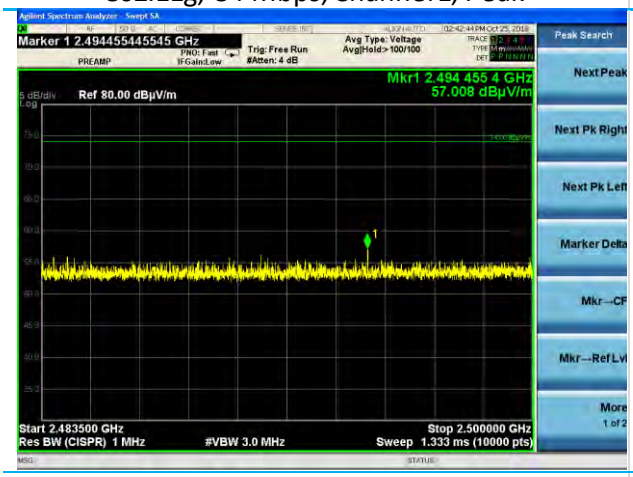


2483.5-2500 MHz, Side EUT, Horizontal Antenna 802.11g, 6 Mbps, Channel 11, Average

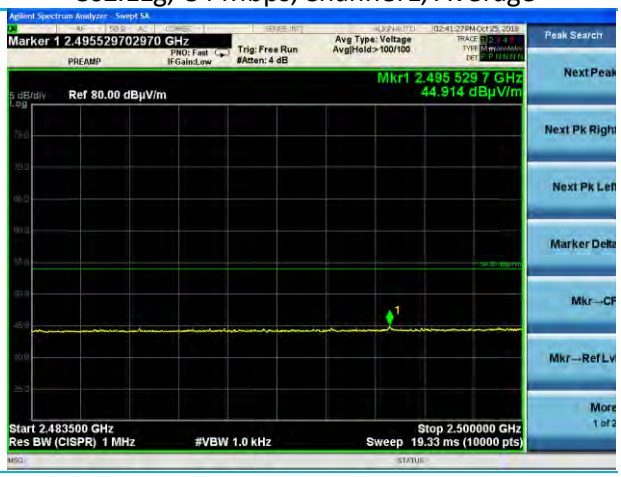


2310-2390 MHz, Side EUT, Horizontal Antenna 802.11g, 54 Mbps, Channel 1, Peak

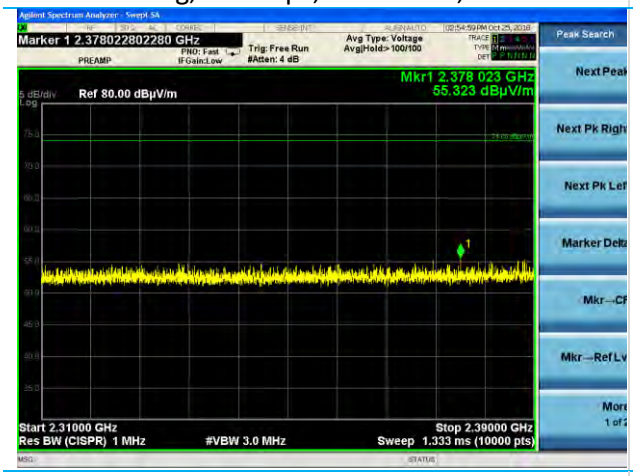
2310-2390 MHz, Side EUT, Horizontal Antenna 802.11g, 54 Mbps, Channel 1, Average



2483.5-2500 MHz, Side EUT, Horizontal Antenna 802.11g, 54 Mbps, Channel 11, Peak

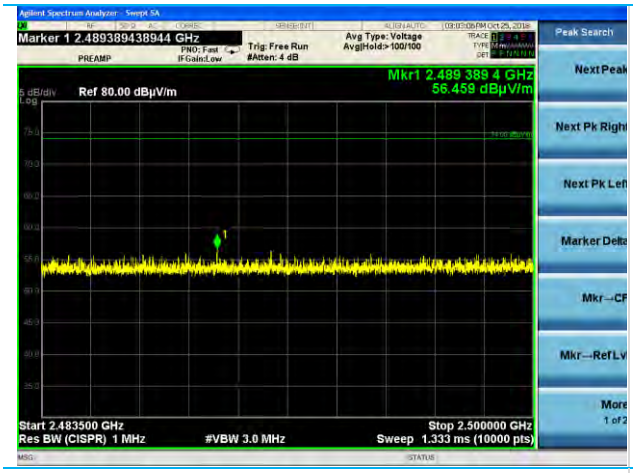


2483.5-2500 MHz, Side EUT, Horizontal Antenna 802.11g, 54 Mbps, Channel 11, Average

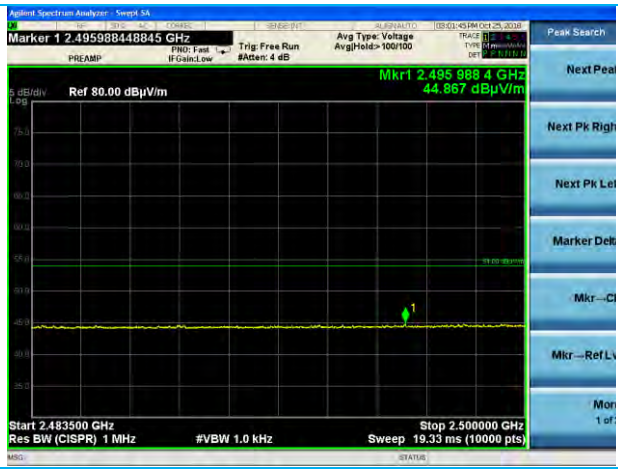


2310-2390 MHz, Side EUT, Horizontal Antenna 802.11n HT20, MCS0, Channel 1, Peak

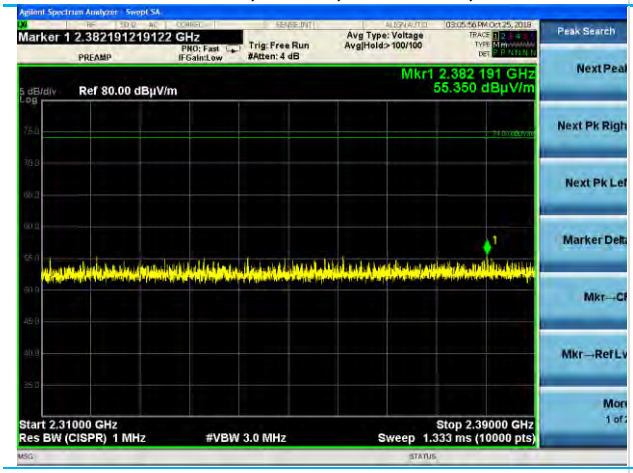
2310-2390 MHz, Side EUT, Horizontal Antenna 802.11n HT20, MCS0, Channel 1, Average



2483.5-2500 MHz, Side EUT, Horizontal Antenna
802.11n HT20, MCS0, Channel 1, Peak

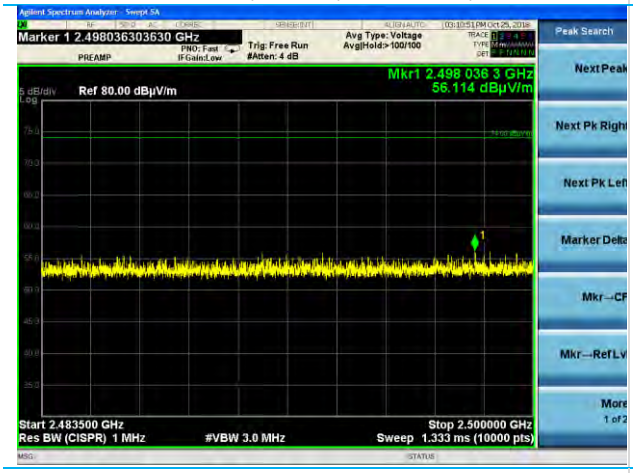


2483.5-2500 MHz, Side EUT, Horizontal Antenna
802.11n HT20, MCS0, Channel 1, Average

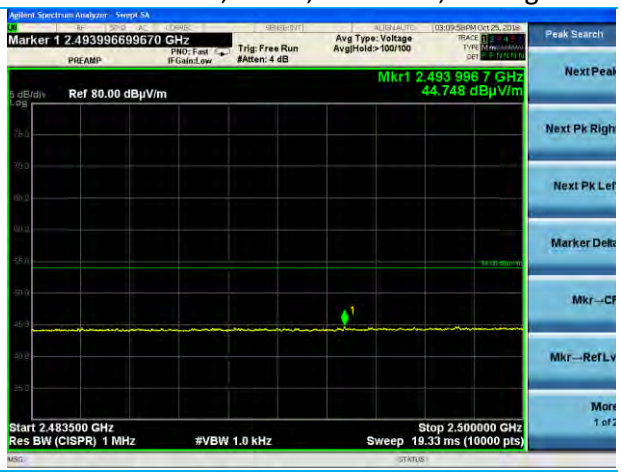


2310-2390 MHz, Side EUT, Horizontal Antenna
802.11n HT20, MCS7, Channel 1, Peak

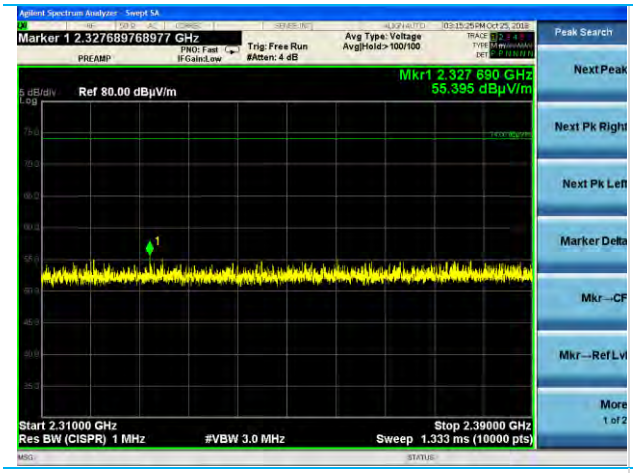
2310-2390 MHz, Side EUT, Horizontal Antenna
802.11n HT20, MCS7, Channel 1, Average



2483.5-2500 MHz, Side EUT, Horizontal Antenna
802.11n HT20, MCS7, Channel 11, Peak

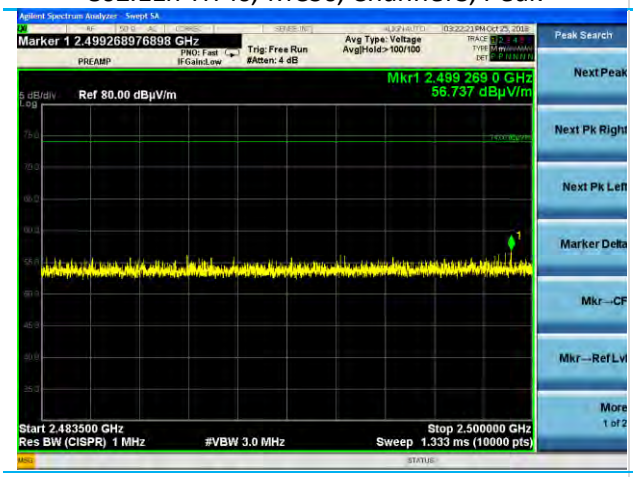


2483.5-2500 MHz, Side EUT, Horizontal Antenna
802.11n HT20, MCS7, Channel 11, Average



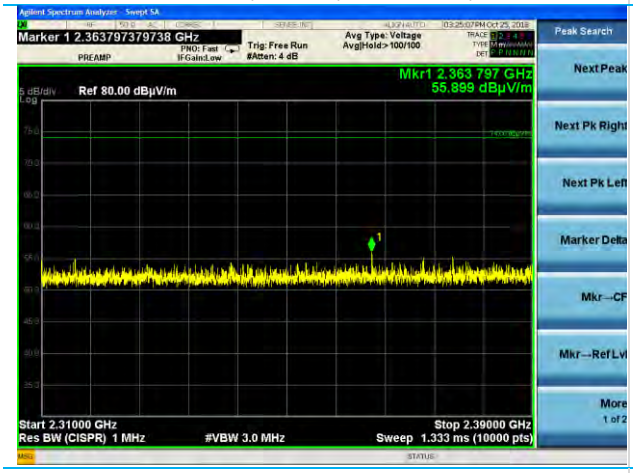
2310-2390 MHz, Side EUT, Horizontal Antenna
802.11n HT40, MCS0, Channel 3, Peak

2310-2390 MHz, Side EUT, Horizontal Antenna
802.11n HT40, MCS0, Channel 3, Average



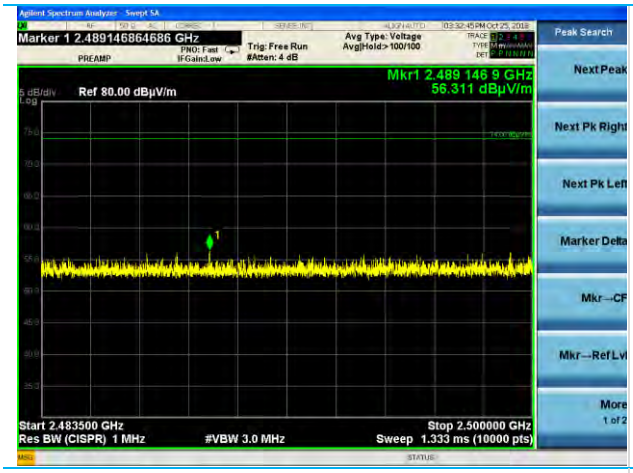
2483.5-2500 MHz, Side EUT, Horizontal Antenna
802.11n HT40, MCS0, Channel 9, Peak

2483.5-2500 MHz, Side EUT, Horizontal Antenna
802.11n HT40, MCS0, Channel 9, Average



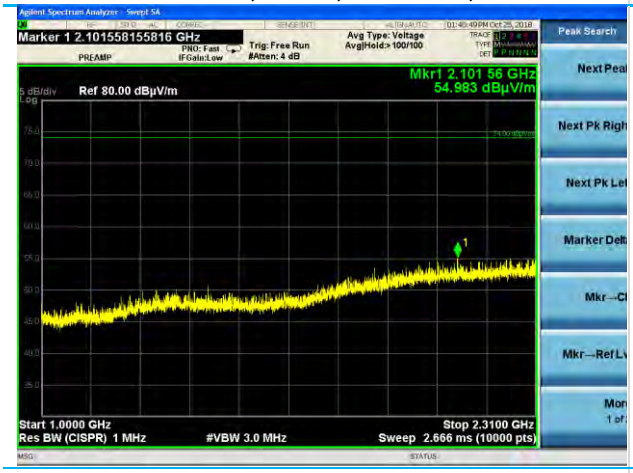
2310-2390 MHz, Side EUT, Horizontal Antenna
802.11n HT40, MCS7, Channel 3, Peak

2310-2390 MHz, Side EUT, Horizontal Antenna
802.11n HT40, MCS7, Channel 3, Average



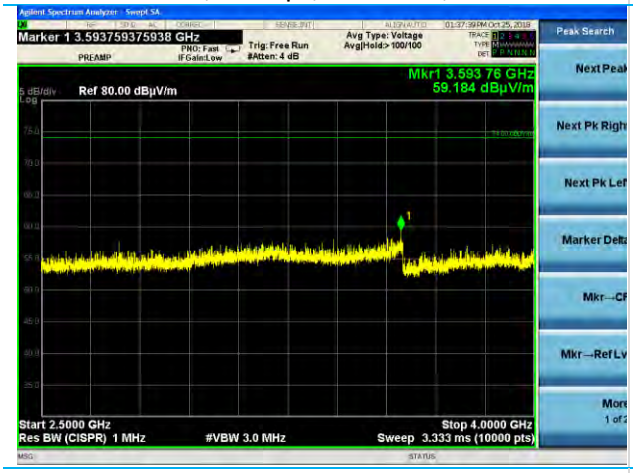
2483.5-2500 MHz, Side EUT, Horizontal Antenna 802.11n HT40, MCS7, Channel 9, Peak

2483.5-2500 MHz, Side EUT, Horizontal Antenna 802.11n HT40, MCS7, Channel 9, Average



1000-2310 MHz, Side EUT, Horizontal Antenna 802.11b, 1 Mbps, Channel 1, Peak

1000-2310 MHz, Side EUT, Horizontal Antenna 802.11b, 1 Mbps, Channel 1, Average



2500-4000 MHz, Side EUT, Horizontal Antenna 802.11b, 1 Mbps, Channel 11, Peak

2500-4000 MHz, Side EUT, Horizontal Antenna 802.11b, 1 Mbps, Channel 11, Average

5.2.3 Radiated Emissions 4-25 GHz

Operator	Anthony Smith	QA	Jeysson Gonzalez
Temperature	24.1°C, 23.6°C	R.H. %	48.0%, 46.0%
Test Date	4/26/2019, 5/2/2019	Location	Chamber 3
Requirement	FCC 15.209, FCC 15.205	Method	ANSI C63.10

Limits: FCC 15.209, FCC 15.205

Frequency (GHz)	Average Limit (dBµV/m)	Peak Limit (dBµV/m)
4-25	54	74

Test Parameters

Frequency	4-25 GHz	Distance	3m
Detector(s)	Max hold with peak detector for plots. Quasi peak detector for final measurements.	Table height	150cm
RBW	1 MHz	VBW	3 MHz for peak measurements. 1 kHz reduced VBW used for average measurements in restricted bands.
EUT Orientations	Vertical, Flat, Horizontal. Flat worst case with respect to the limit and only orientation shown in the data/plots.	Antenna Polarization	Peak field strength of fundamental for each data rate/channel found and considered worst case for band edge measurements. Horizontal antenna polarity used for data/plots.

EUT Parameters

Input Power	5 VDC via Bench Supply	**Mode**	WLAN 2.4 GHz Transmit Mode 802.11b
Dates Rates	802.11b: 1 Mbps (Worst-Case)	**Antenna**	50Ω Termination
Channels	1: 2412 MHz 11: 2462 MHz		

Instrumentation

Date: 11-Sep-2018 Test: Radiated Emissions Job: C-3013

PE: Shane Dock Customer: Philips Healthcare Quote: 317347

No.	Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due Date	Equipment Status
1	AA 960007	Antenna - Double Ridge Horn	EMCO	3115	9311-4138	9/12/2018	9/12/2019	Active Calibration
2	EE 960085	Analyzer - EMI Receiver	Agilent	N9038A	MY51210148	4/24/2019	4/24/2020	Active Calibration
3	AA 960176	Cable	A.H. Systems, Inc	SAC-26G-6	395	6/4/2018	6/4/2020	Active Verification
4	EE 960160	Antenna - Low Noise Amplifier	Mini-Circuits	ZVA-213X-S+	977711030	9/12/2018	9/12/2019	Active Calibration
5	AA 960153	Filter - High Pass 2.4 GHz	KWM	HPF-L-14186	7272-04	4/22/2019	4/22/2020	Active Calibration
6	AA 960174	Antenna - Small Horn	ETS Lindgren	3116C-PA	00206880	5/15/2018	5/15/2020	Active Calibration
7	AA 960171	Cable	A.H. Systems, Inc	SAC-26G-6	386	11/12/2018	11/12/2019	Active Verification

Data

Emissions above 10 GHz represent Noise Floor Emissions.

Frequency (MHz)	Antenna Polarity	Height (cm)	Azimuth (degree)	Average Reading (dBµV/m)	Average Limit (dBµV/m)	Average Margin (dB)	Channel
4824.0	V	285	0	35.1	54.0	18.9	1
4824.1	V	165	0	34.3	54.0	19.7	1
9649.6	V	250	0	38.4	54.0	15.6	11
17705.3	V	150	0	48.3	54.0	5.7	1
22822.4	H	150	0	45.6	54.0	8.4	11

Frequency (MHz)	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBµV/m)	Peak Limit (dBµV/m)	Peak Margin (dB)	Channel
4824.0	V	285	0	40.7	74.0	33.4	1
4824.1	V	165	0	40.1	74.0	33.9	1
9649.6	V	250	0	44.3	74.0	29.7	11
17705.3	V	150	0	52.6	74.0	21.4	1
22822.4	H	150	0	51.4	74.0	22.6	11

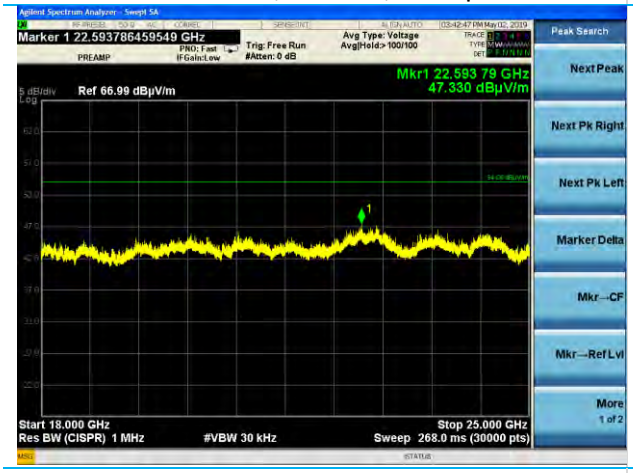
Plots

4-18 GHz, Flat EUT, Horizontal Antenna
Channel 1, 802.11b, 1 Mbps

4-18 GHz, Flat EUT, Vertical Antenna
Channel 1, 802.11b, 1 Mbps

4-18 GHz, Flat EUT, Horizontal Antenna
Channel 11, 802.11b, 1 Mbps

4-18 GHz, Flat EUT, Vertical Antenna
Channel 11, 802.11b, 11 Mbps



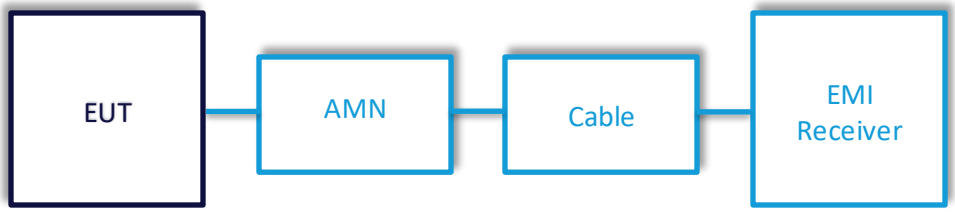
18-25 GHz, Flat EUT, Horizontal Antenna
Channel 1, 802.11b, 1 Mbps

18-25 GHz, Flat EUT, Vertical Antenna
Channel 1, 802.11b, 1 Mbps

5.3 AC Mains Conducted Emissions

Description of Measurement	A line impedance stabilization network (LISN) or artificial mains network (AMN) allows the emissions of the power supply conductors to be measured while isolating the EUT from the supply mains. The AMN, cable, and other necessary measurement system correction factors are loaded onto the EMI receiver when the measurements are performed. The data is gathered and reported as the corrected values. Maximum emissions are determined with a peak max hold trace then measurements at a selection of the highest points are made with quasi-peak and average detectors. Results are recorded and compared to limit for each line. (e.g. line and neutral)
Example Calculations	Measurement (dBµV) + Cable factor (dB) + Other (dB) = Corrected Reading (dBµV) Margin (dB) = Limit (dBµV) - Corrected Reading (dBµV)

Block Diagram



5.3.1 AC Mains Conducted Emissions

Operator	Shane Dock
QA	Anthony Smith
Test Date	1/24/2020
Location	Conducted Bench
Temp. / R.H.	21.3°C, 38.7 % RH
Requirement	FCC Part 15.207 RSS-GEN 8.8
Method	ANSI C63.10 Section 6.2

Limits:

Frequency (MHz)	Conducted Limit (dBµV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency

Test Parameters

Frequency	0.15 – 30 MHz	**Distance**	40 cm from VCP
Detector(s)	Quasi-Peak, Average	**Table height**	80 cm
RBW	9 kHz	**VBW**	90 kHz
Notes	WLAN, 1 MBPS, Channel 1 data shown (Worst Case)		

Instrumentation

Date : 19-Sep-2019 Test : Conducted Emissions Job : C-3013

PE : Shane Dock Customer : Philips Healthcare Quote : 317347

No.	Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due Date	Equipment Status
1	EE 960088	Analyzer - EMI Receive	Agilent	N9038A	MY51210138	4/23/2019	4/23/2020	Active Calibration
2	EE 960162	LISN	COM-POWER	LI-215A	191969	4/22/2019	4/22/2020	Active Calibration
3	LSC-200	Cable	Micro-Coax	UFB311A-0-1440-70U70U	64639 224071	12/9/2019	12/9/2020	Active Verification

EUT Parameters

Input Power	Module powered by 3.3 VDC provided by AC-DC converter	**Mode**	Modulated Tx
EUT	EUT Connected to Host board	**EUT**	WLAN, 1 MBPS, Channel 1 data shown (Worst Case)

Table

Frequency (MHz)	Line	Quasi-Peak Reading (dBµV)	Quasi-Peak Limit (dBµV)	Quasi-Peak Margin (dB)	Average Reading (dBµV)	Average Limit (dBµV)	Average Margin (dB)
0.159	L1	36.5	65.5	29.0	24.3	55.5	31.2
0.226	L1	38.7	62.6	23.9	26.6	52.6	26.0
0.327	L1	43.0	59.5	16.5	32.4	49.5	17.1
0.150	L2	51.6	66.0	14.4	27.7	56.0	28.3
0.168	L2	49.9	65.1	15.2	25.1	55.1	30.0
0.244	L2	42.8	62.0	19.2	26.0	52.0	26.0

Plots

Line 1

Line 2

6 Revision History

Version	Date	Notes	Person
V0	9/19/2019	Initial Draft	Zach Wilson
V1	1/15/2020	Generated Customer Draft	Shane Dock
V2	1/31/2020	1st Round of Updates	Shane Dock
V3	2/4/2020	2nd Round of Updates	Shane Dock
V4	3/17/2020	3rd Round of Updates	Shane Dock
V5	4/14/2020	Review Concluded	Shane Dock
V6	4/16/2020	Final Draft	Shane Dock

END OF REPORT