

Test Report # 317060 B

Equipment Under Test: PPD

Test Date(s): 8/22/17 – 9/21/17

Prepared for: GE Healthcare
Attn: Matt Pekarske
8200 West Tower Ave.
Milwaukee, WI 53223

Report Issued by: Shane Dock, EMC Engineer

Signature:



Date: 10/25/17

Report Reviewed by: Adam Alger, Quality Systems Engineer

Signature: 

Date: 10/19/2017

Report Constructed by: Shane Dock, EMC Engineer

Signature:



Date: 10/25/17

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CONTENTS

Contents	2
Laird Technologies Test Services in Review	3
1 Test Report Summary	4
2 Client Information	5
2.1 Equipment Under Test (EUT) Information	5
2.2 Product Description	5
2.3 Modifications Incorporated for Compliance.....	5
2.4 Deviations and Exclusions from Test Specifications	5
2.5 Additional Information.....	5
2.6 Power Plan	6
2.7 Channel Plan	6
3 References	7
4 Uncertainty Summary	8
5 Test Data	9
5.1 Antenna Port Conducted Emissions.....	9
5.2 Radiated Emissions	45
5.3 AC Mains Conducted Emissions	67
6 Revision History	70

Laird Technologies Test Services in Review

The Laird Technologies, Inc. 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: 2005 with Electrical (EMC) Scope

A2LA Certificate Number: 1255.01

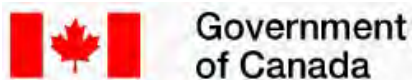
Scope of accreditation includes all test methods listed herein, unless otherwise noted.



Federal Communications Commission (FCC) – USA

Accredited recognition of two 3 meter Semi-Anechoic Chambers

Accredited Test Firm Registration Number: 953492



Innovation, Science and Economic Development Canada

ISED Site listing of two 3 meter Semi-Anechoic Chambers based on RSS-GEN – Issue 4

File Number: IC 3088A-2

File Number: IC 3088A-3

Company: GE Healthcare	Page 3 of 70	Name: PPD
Report: 317060 B		Model: See Section 2.1
Job: C-2826		Serial: See Section 2.1

1 TEST REPORT SUMMARY

During **8/22/17 to 9/21/17** the Equipment Under Test (EUT), **PPD**, as provided by **GE Healthcare** was tested to the following requirements:

Requirement	Description	Specification	Method	Result
FCC: 15.407 (e) ISED: RSS-247 5.2 (a)	5.725-5.85 GHz band minimum 6 dB bandwidth	500 kHz	KDB*	Pass
FCC: 2.1049 ISED: RSS-GEN 6.6	Occupied Bandwidth	Reported	KDB*	Reported
FCC: 15.407 (a)(2) ISED: RSS-247 6.2	Emission Bandwidth	Reported	KDB*	Reported
FCC: 15.407(a) ISED: RSS-247 6.2	Maximum Conducted Output Power	FCC 15.407 (a) RSS-247 6.2	KDB*	Pass
FCC: 15.407 (a)(5) ISED: RSS-247 6.2	Power Spectral Density	11 dBm/1 MHz 30 dBm/500 kHz	KDB*	Pass
FCC: 12.407 (b) ISED: RSS-247 6.2	Undesirable Emission Limits	FCC 12.407 (b) RSS-247 6.2	KDB*	Pass
FCC: 15.207 IC: RSS-GEN 8.8	AC Power Line Conducted Emissions	0.150-30 MHz	ANSI C63.10	Pass

Note: KDB* is referring to KDB 789033 D02 v01r04.

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	GE Healthcare
Contact Person	Matthew Pekarske
Address	8200 West Tower Ave

2.1 Equipment Under Test (EUT) Information

The following information has been supplied by the client

Product Name	PPD
Model Number	CARESCAPE ONE v1
Serial Number	Conducted measurements: SNA 16260004SP Radiated measurements: SNA 16270022SP DFS testing: SNA 16260004SP

2.2 Product Description

The PPD CARESCAPE ONE v1 is a transport bedside patient monitor used for measuring and displaying the physiologic data acquired from the connected patient. The wireless functionality will not be enabled in v1.

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 Additional Information

Unit's Wifi functionality programmed via serial connection. Unit connected to 120V power with an adaptor as well as an internal battery.

FCC .ini file: GE_modified_FCC_930-0049-R1.2.ini

IC .ini file: GE_modified_IC_930-0049-R1.2.ini

2.6 Power Plan

Band	UNII 1	UNII 2A	UNII 2C	UNII 3
Power Setting	Max	15250	15250	Max

2.7 Channel Plan

Channel	UNII 1	UNII 2A	UNII 2C	UNII 3
Low	36	56	100	149
Mid	40	60	116	157
High	44 (ISED) / 48 (FCC)	64	140	165

3 REFERENCES

Publication	Edition	Date
47 CFR, Parts 0-15 (FCC)		2017
RSS 247	2	2017
RSS GEN	4	2014
ANSI C63.10		2013
FCC KDB 789033 D02 v01r04		2016

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 $\pm$
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

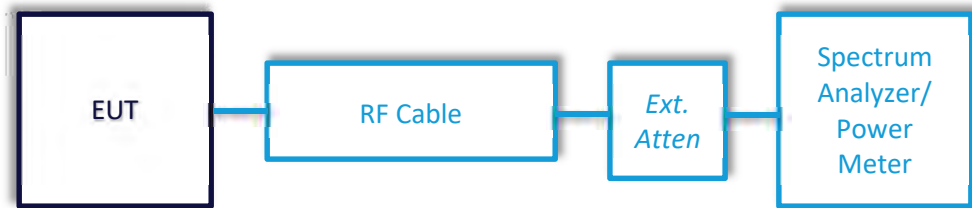
Parameter	ETSI U.C. $\pm$	U.C. $\pm$
Radio Frequency, from F0	1×10^{-7}	0.55×10^{-7}
Occupied Channel Bandwidth	5 %	2 %
RF conducted Power (Power Meter)	1.5 dB	1.2 dB
RF conducted emissions (Spectrum Analyzer)	3.0 dB	1.7 dB
All emissions, radiated	6.0 dB	5.3 dB
Temperature	1° C	0.65° C
Humidity	5 %	2.9 %
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 Antenna Port Conducted Emissions – Duty Cycle

Operator	Aidi Zainal
QA	Shane Dock
Test Date	8/31/17
Location	Conducted RF Test Area
Temp. / R.H.	21°-22°C / 27%-53% R.H.
Method	KDB 789033 D02 v01r04 Section II.B.2.b

Test Parameters

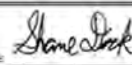
Settings	RBW = 8 MHz, VBW = 8 MHz, Zero Span
EUT	6 Mbps and MCS0 checked
Example Calculations	<u>Duty Cycle</u> = (on-time)/(on-time + off-time) Ex: $(390.5 \mu s) / (390.5 \mu s + 234.5 \mu s) = 0.625$ <u>Duty Cycle Correction</u> = $10 \log (1/\text{duty cycle})$ Ex: $10 \log (1/0.625) = 2.04$

Instrumentation

Laird
Smart Technology. Delivered.

Date: 22-Aug-2017 Test: Conducted RF Radio Job: C-2826
PE: Shane Dock Customer: GE Healthcare Quote: 317060

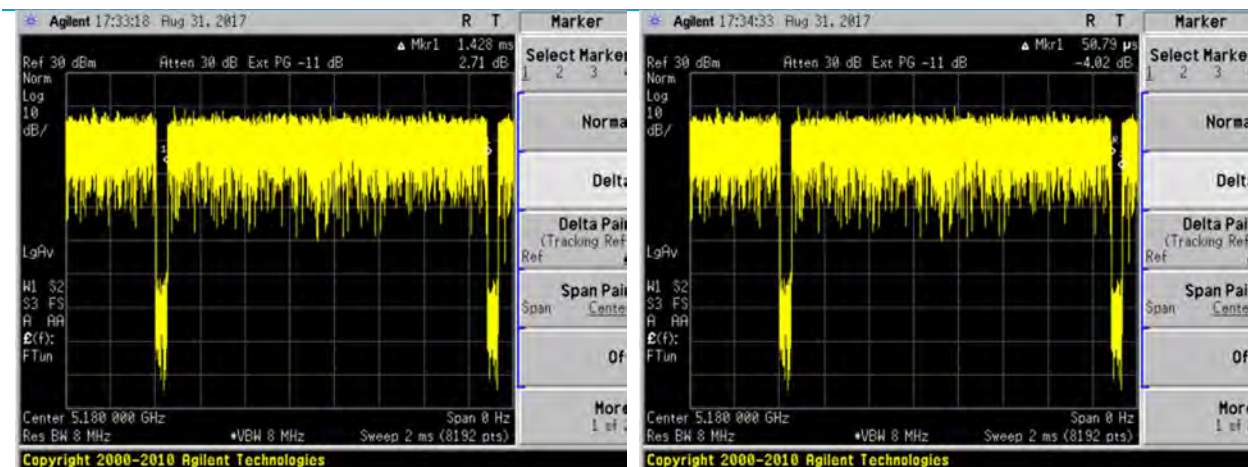
No.	Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due Date	Equipment Status
1	AA 900100	UTFLER Cable	Micro-Coax	UFC142A-0-0720-20X 218652-001		6/29/2016	11/11/2017	Active Verification
2	EE900073	Spectrum Analyzer	Agilent	E4446A	US45300564	11/21/2016	11/21/2017	Active Calibration

Tested By:  Quality Assurance: 

Table

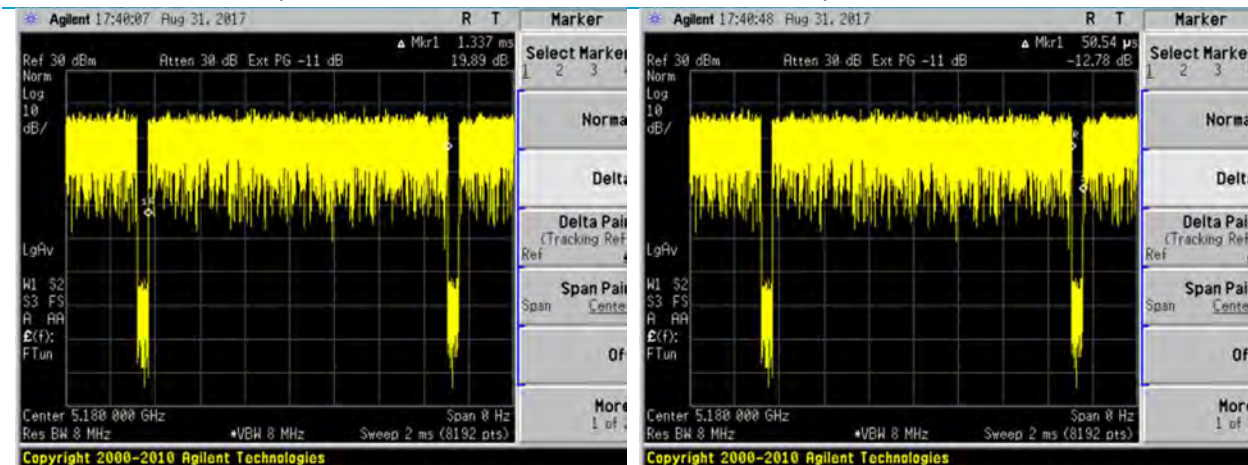
	6 Mbps	MCS0
T (ms)=	1.4280	1.3370
Toff (ms) =	0.0508	0.0505
DC =	0.9656	0.9636
DC correction (dB)	0.2	0.2

Plots



6 Mbps On Time

6 Mbps Mid Channel Off Time



MCS0 On Time

MCS0 Off Time

5.1.2 Antenna Port Conducted Emissions – Bandwidth

Operator	Aidi Zainal
QA	Coty Hammerer
Test Date	9/5/17, 9/7/17, 9/8/17
Location	Conducted RF Measurement Area
Temp. / R.H.	72 degrees F/ 66% RH
Requirement	EBW: FCC 15.407 (a)(2) / RSS-247 Section 6.2 Minimum 6 dB BW for the band 5.725-5.85GHz: FCC 15.407 (e)
Method	EBW: KDB 789033 D02 v01r04 Section II.C.1 Minimum 6dB BW: KDB 789033 D02 v01r04 Section II.C.2 OBW: KDB 789033 D02 v01r04 Section II.D

Limits:

Bandwidth Type	U-NII Band	Limit
EBW (26 dB)	All	N/A
Minimum 6 dB	U-NII-3	≥ 500 kHz
OBW	All	N/A

Test Parameters

Frequency	5180, 5200, 5220, 5240 MHz
Settings	Peak Detector
Settings	Max hold
Notes	UNII 1: Channel 44 is the High Channel for ISED. Channel 48 is the High Channel for the FCC.

Instrumentation



Date : 22-Aug-2017	Test : Conducted RF Radio	Job : C-2826
PE : Shane Dodi	Customer : GE Healthcare	Quote : 317060

No.	Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due Date	Equipment Status
1	AA 980160	UTFLEX Cable	Micro-Coax	UFC142A-0-0720-20X	215652-001	6/29/2016	11/11/2017	Active Verification
2	BE980073	Spectrum Analyzer	Agilent	E4448A	US45300564	11/21/2016	11/21/2017	Active Calibration

Tested By: 

Quality Assurance: 

Tables - UNII 1

802.11a			
6MBPS			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth
36	5180.0	22.8	16.5
40	5200.0	22.8	16.6
44	5220.0	22.9	16.7
48	5240.0	22.4	16.6

802.11n			
MCS0			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth
36	5180.0	23.2	17.7
40	5200.0	23.4	17.7
44	5220.0	23.3	17.6
48	5240.0	22.9	17.7

UNII 2A

802.11a			
6MBPS			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth
56	5280.0	26.4	16.8
60	5300.0	26.1	16.8
64	5320.0	26.4	16.7

802.11n			
MCS0			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth
56	5280.0	27.0	17.9
60	5300.0	26.3	17.8
64	5320.0	26.5	17.8

UNII 2C

802.11a			
6MBPS			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth
100	5500.0	24.5	16.7
116	5580.0	23.2	16.6
140	5700.0	23.6	16.6

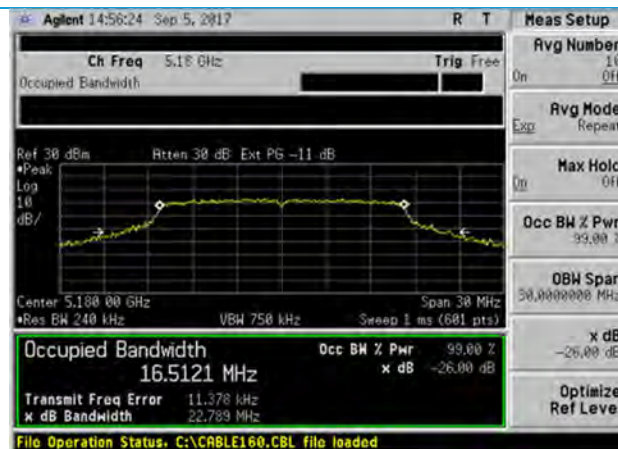
802.11n			
MCS0			
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth
100	5500.0	23.9	17.7
116	5580.0	23.8	17.7
140	5700.0	23.5	17.7

UNII 3

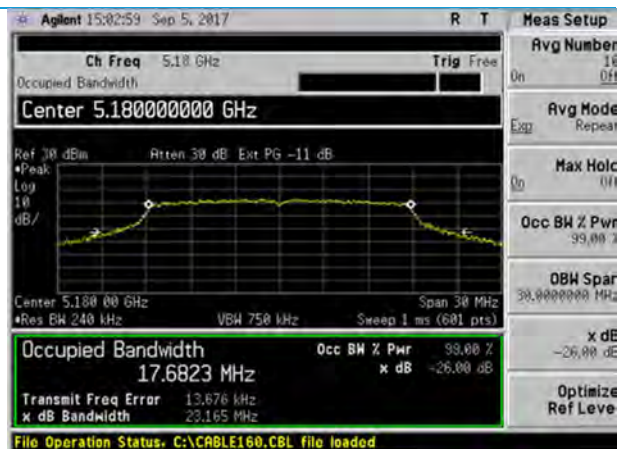
802.11a			
6MBPS			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth
149	5745.0	15.3	16.5
157	5785.0	15.4	16.5
165	5825.0	15.1	16.5

802.11n			
MCS0			
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth
149	5745.0	15.5	17.6
157	5785.0	15.3	17.6
165	5825.0	16.0	17.6

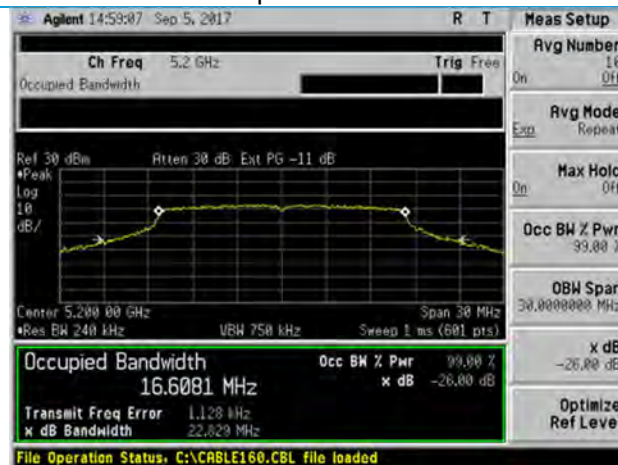
UNII 1



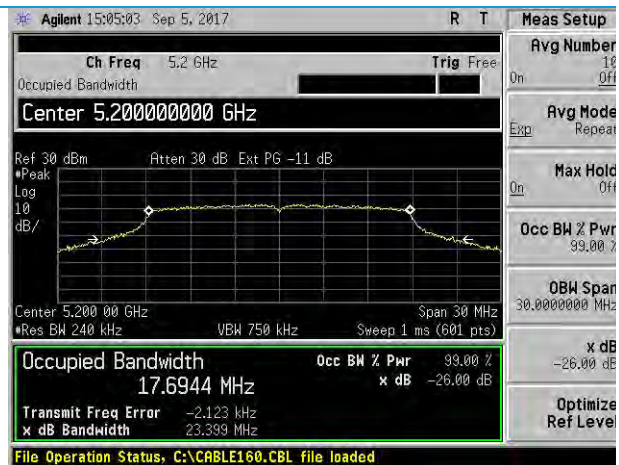
6 Mbps Channel 36



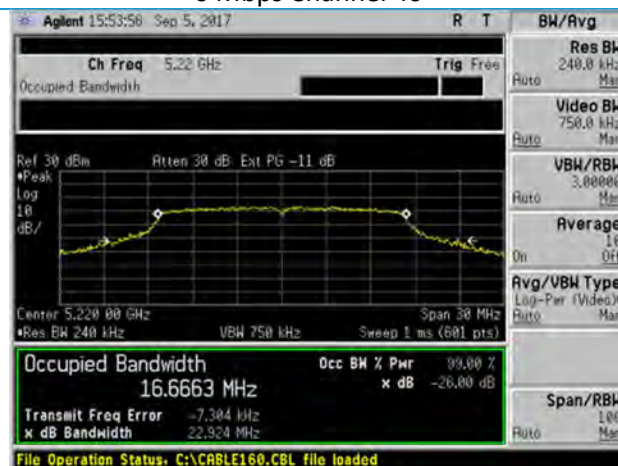
MCS0 Channel 36



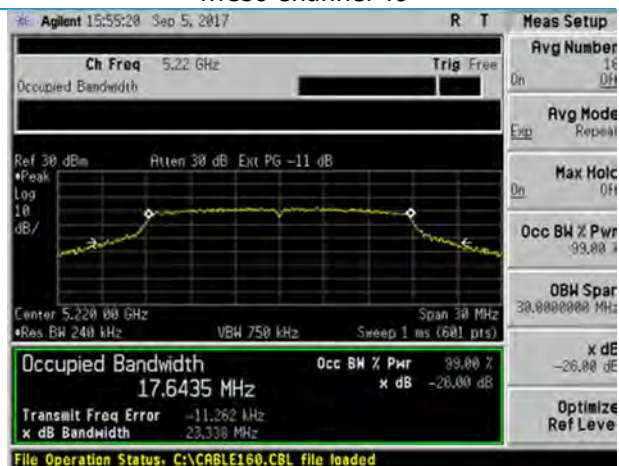
6 Mbps Channel 40



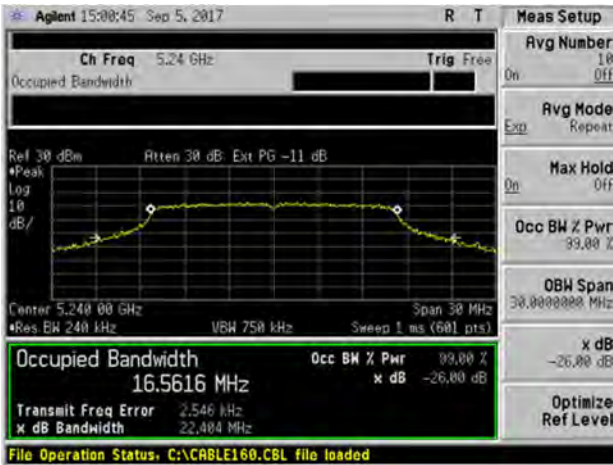
MCS0 Channel 40



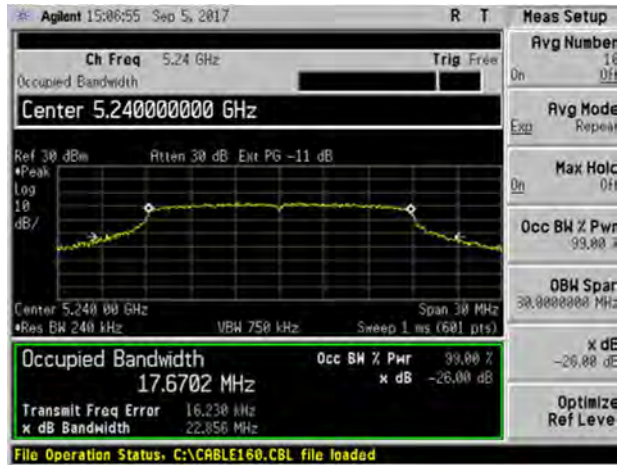
6 Mbps Channel 44



MCS0 Channel 44

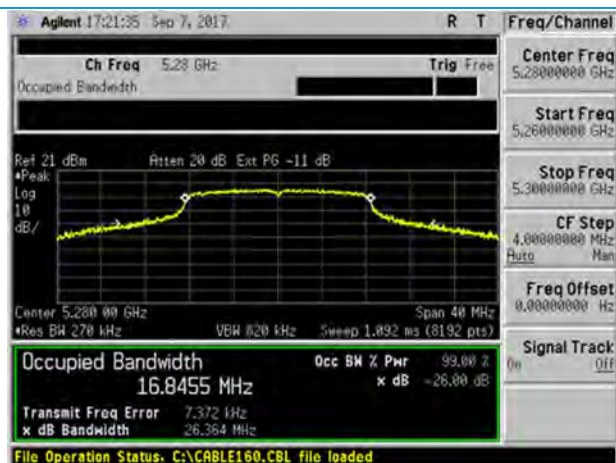


6 Mbps Channel 48

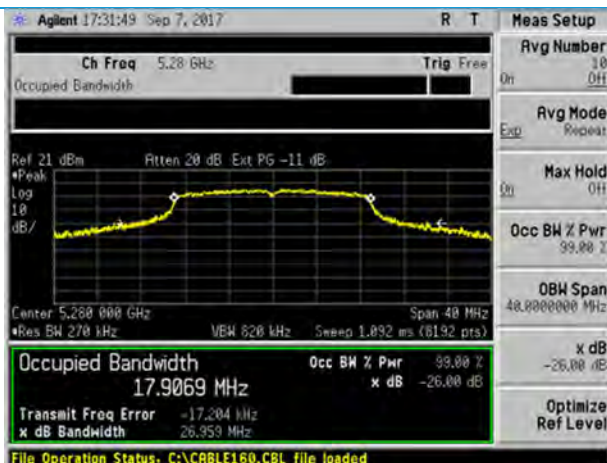


MCS0 Channel 48

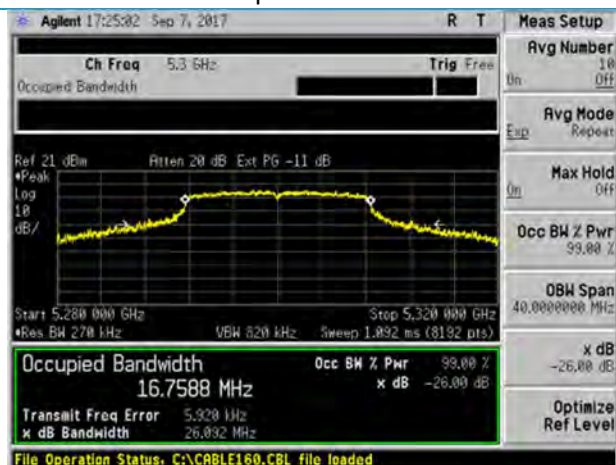
UNII 2A



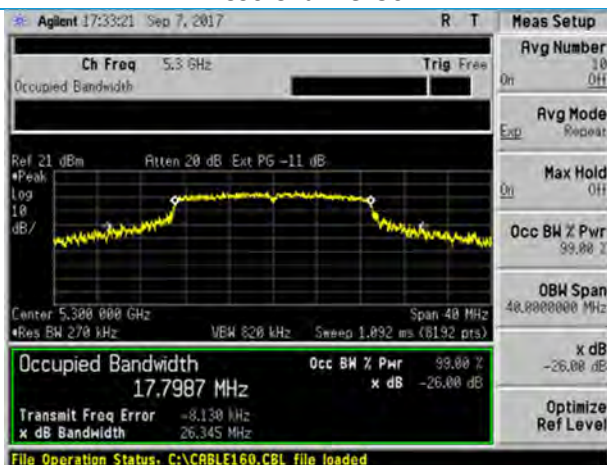
6 Mbps Channel 56



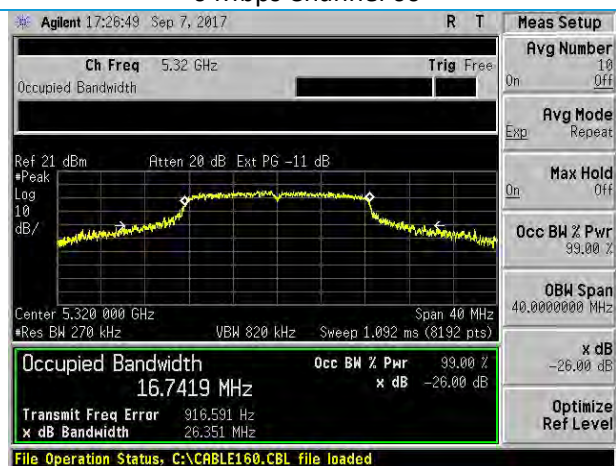
MCS0 Channel 56



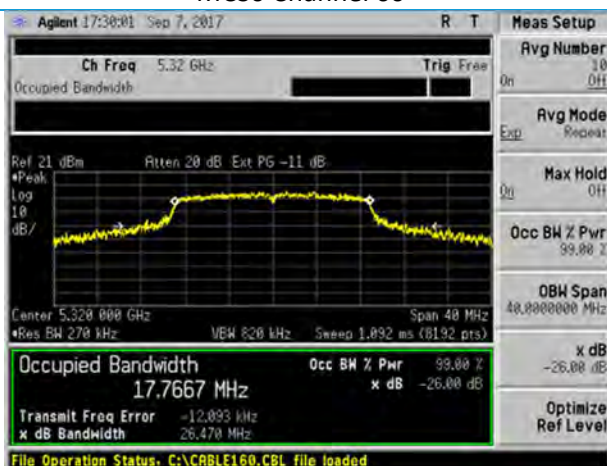
6 Mbps Channel 60



MCS0 Channel 60

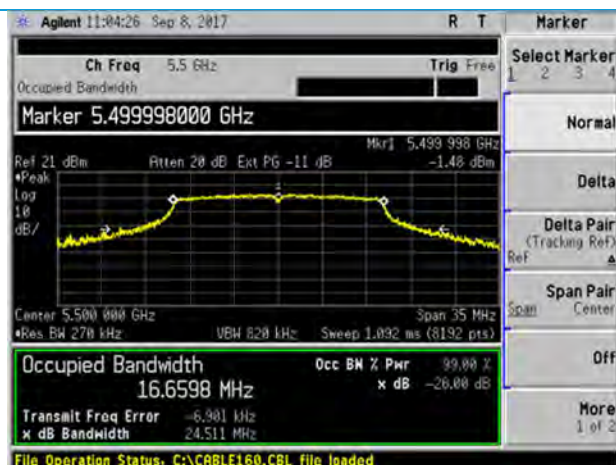


6 Mbps Channel 64

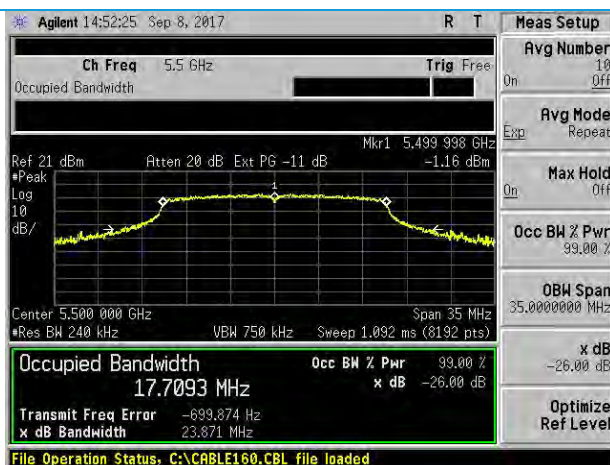


MCS0 Channel 64

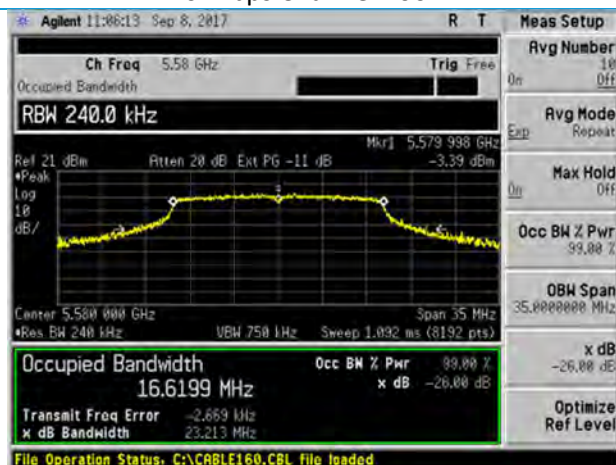
UNII 2C



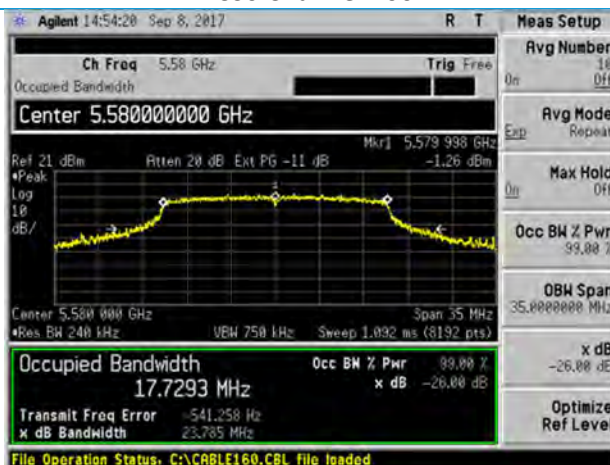
6 Mbps Channel 100



MCS0 Channel 100



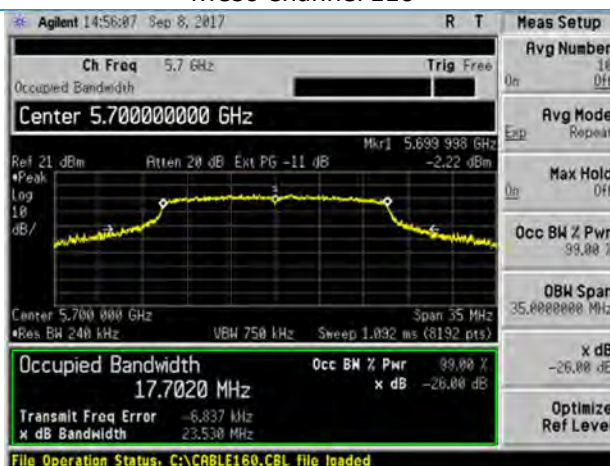
6 Mbps Channel 116



MCS0 Channel 116

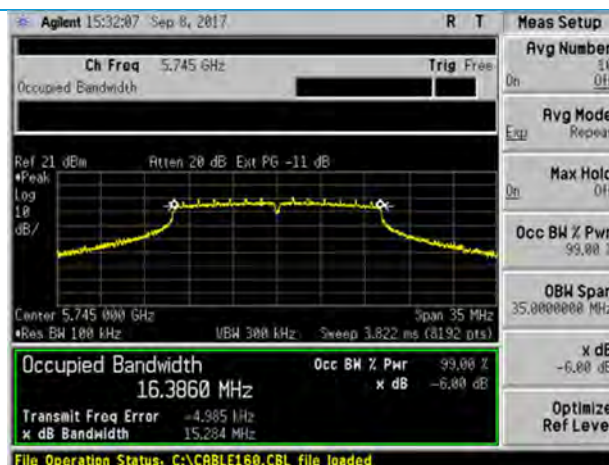


6 Mbps Channel 140

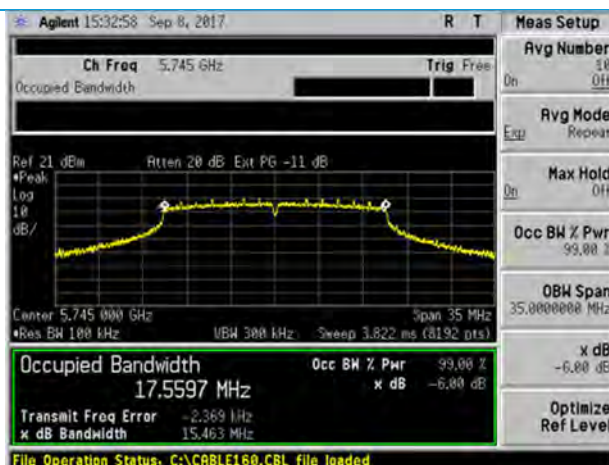


MCS0 Channel 140

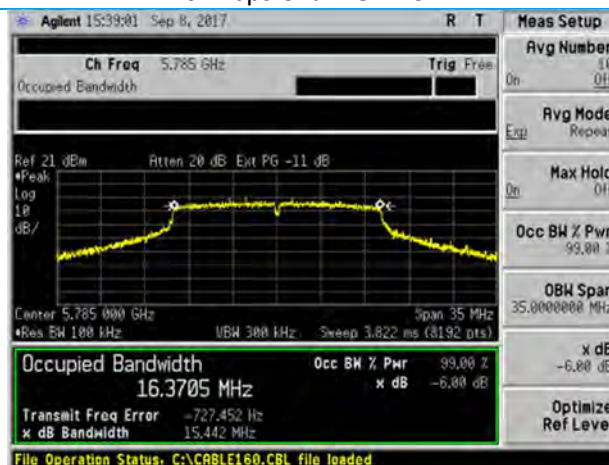
UNII 3 – 6 dB BW



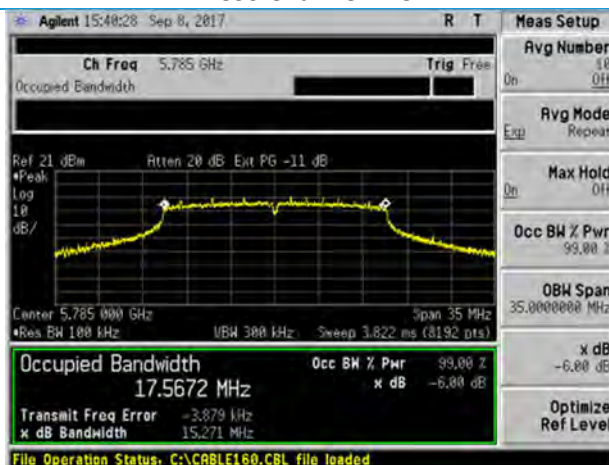
6 Mbps Channel 149



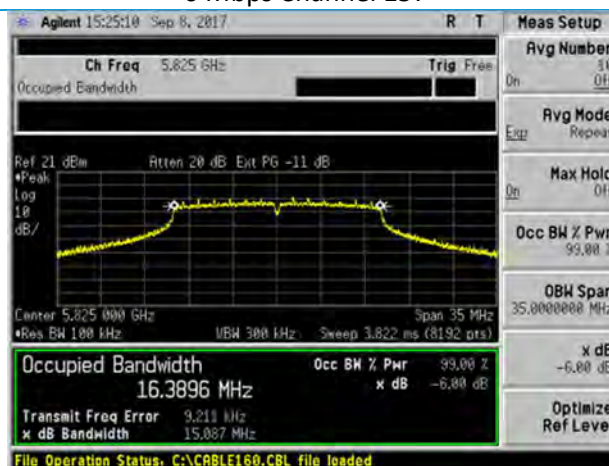
MCS0 Channel 149



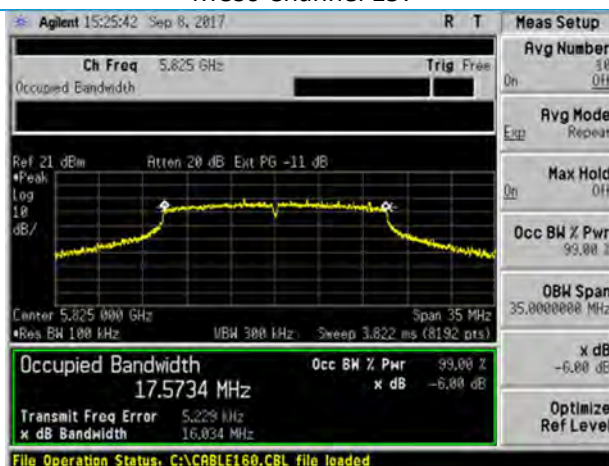
6 Mbps Channel 157



MCS0 Channel 157

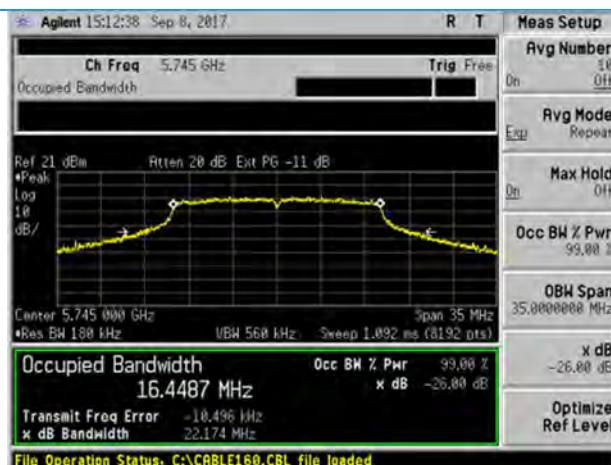


6 Mbps Channel 165

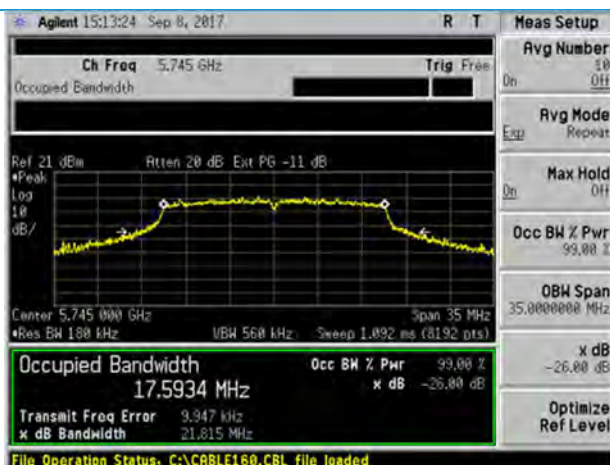


MCS0 Channel 165

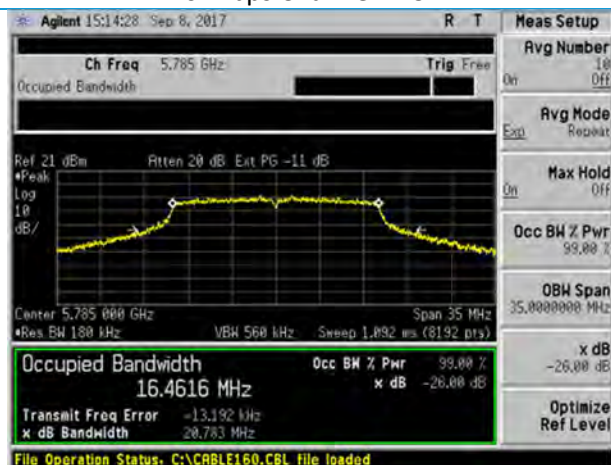
UNII 3 – 99% BW



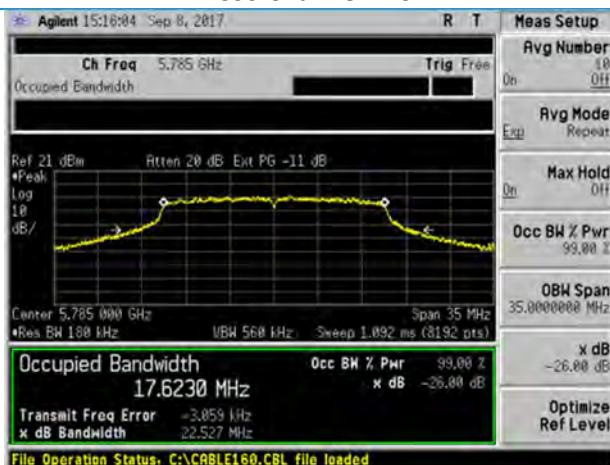
6 Mbps Channel 149



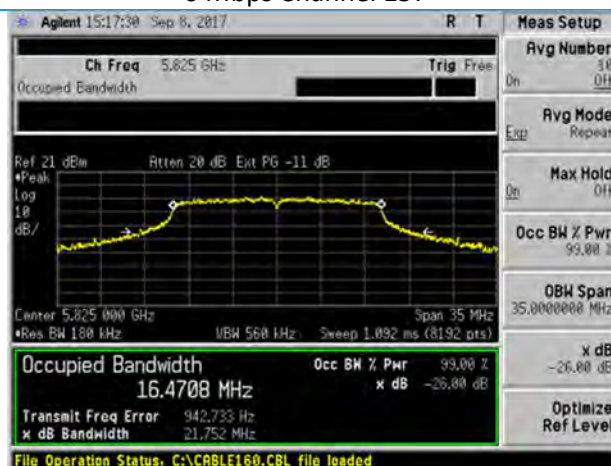
MCS0 Channel 149



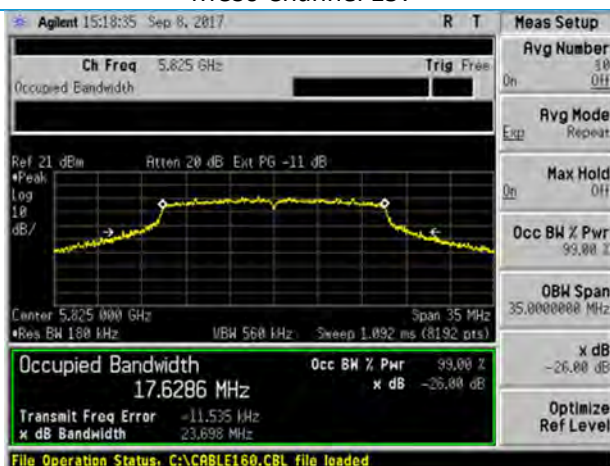
6 Mbps Channel 157



MCS0 Channel 157



6 Mbps Channel 165



MCS0 Channel 165

5.1.3 Antenna Port Conducted Emissions – Conducted Output Power

Operator	Aidi Zainal
QA	Coty Hammerer
Test Date	9/8/17, 9/15/17, 9/26/17,
Location	Conducted RF Measurement Area
Temp. / R.H.	71 degrees F/ 50% RH
Requirement	FCC 15.407 (a)(1)(iv), (a)(2), (a)(3) RSS 247 Issue 2 Sections 6.2.1.1, 6.2.2.1, 6.2.3.1, 6.2.4.1
Method	KDB 789033 D02 v01r04 Section II.E.2.d Method SA-2 U-NII-2C HT-20 signals: KDB 789033 D02 v01r04 Section II.E.2.b Method SA-1

Limits:

U-NII Band	FCC Limit	ISED Limit
U-NII-1	24 dBm	Lesser of: 23 dBm or $[10\text{dBm} + 10\log(99\%\text{BW})]$ e.i.r.p.
U-NII-2A	Lesser of: 24 dBm or $[11\text{ dBm} + 10\log(26\text{ dB BW})]$	1) Lesser of: 24 dBm or $[11\text{ dBm} + 10\log(99\%\text{ BW})]$ 2) Lesser of: 30 dBm or $[17\text{ dBm} + 10\log(99\%\text{ BW})]$ e.i.r.p
U-NII-2C	Lesser of: 24 dBm or $[11\text{ dBm} + 10\log(26\text{ dB BW})]$	1) Lesser of: 24 dBm or $[11\text{ dBm} + 10\log(99\%\text{ BW})]$ 2) Lesser of: 30 dBm or $[17\text{ dBm} + 10\log(99\%\text{ BW})]$ e.i.r.p
U-NII-3	30 dBm	30 dBm

Test Parameters

Settings	RMS Detector
Settings	Integration over EBW
Settings	Measured over on and off times and add duty cycle correction
Example Calculation	Measured + Duty cycle correction = Output power
Example Calculation	Measured + Duty cycle correction+antenna gain = EIRP

Instrumentation

Laird
Smart Technology. Delivered.

Date : 22-Aug-2017 Test : Conducted RF Radio Job : C-2826
PE : Shane Dodd Customer : GE Healthcare Quote : 317060

No	Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due Date	Equipment Status
1	AA 9d0160	UTFLUX Cable	Micro-Coax	UFC142A-0-0720-20X	218652-001	6/29/2016	11/11/2017	Active Verification
2	EE900073	Spectrum Analyzer	Agilent	E4446A	US45300564	11/21/2016	11/21/2017	Active Calibration

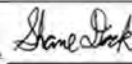
Tested By:  Quality Assurance: 

Table – UNII 1

6MBPS											
UNII 1 5150 to 5250 MHz											
Channel	Frequency (MHz)	99% BW (MHz)	Measured (dBm)	D.C. Correction (dB)	Output power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	FCC Limit (dBm)	FCC Margin (dB)	ISED Limit (dBm)	ISED Margin (dB)
36	5180.0	16.5	12.3	0.2	12.5	4.5	17.0	24.0	11.5	22.2	5.2
40	5200.0	16.6	12.4	0.2	12.6	4.5	17.1	24.0	11.4	22.2	5.1
44	5220.0	16.7	12.3	0.2	12.5	4.5	17.0	N/A	N/A	22.2	5.2
48	5240.0	16.6	12.2	0.2	12.4	4.5	16.9	24.0	11.6	N/A	N/A

MCSO											
UNII 1 5150 to 5250 MHz											
Channel	Frequency (MHz)	99% BW (MHz)	Measured (dBm)	D.C. Correction (dB)	Output power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	FCC Limit (dBm)	FCC Margin (dB)	ISED Limit (dBm)	ISED Margin (dB)
36	5180.0	17.7	12.2	0.2	12.4	4.5	16.9	24.0	11.6	22.5	5.5
40	5200.0	17.7	12.3	0.2	12.5	4.5	17.0	24.0	11.5	22.5	5.4
44	5220.0	17.6	12.2	0.2	12.4	4.5	16.9	N/A	N/A	22.5	5.6
48	5240.0	17.7	12.1	0.2	12.3	4.5	16.8	24.0	11.7	N/A	N/A

UNII 2A

6MBPS													
UNII 2a 5250 to 5350 MHz													
Channel	Frequency (MHz)	Measured (dBm)	D.C. Correction (dB)	Output power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	FCC Limit (dBm)	FCC Margin (dB)	ISED Cond Power limit (dBm)	ISED Cond Power margin (dB)	ISED EIRP Limit (dBm)	ISED EIRP Margin (dB)	
56	5280.0	15.8	0.2	16.0	4.5	20.5	24.0	8.0	23.3	7.3	29.3	8.8	
60	5300.0	15.9	0.2	16.1	4.5	20.6	24.0	7.9	23.2	7.2	29.2	8.7	
64	5320.0	15.8	0.2	16.0	4.5	20.5	24.0	8.0	23.2	7.2	29.2	8.7	

MCSO													
UNII 2a 5250 to 5350 MHz													
Channel	Frequency (MHz)	Measured (dBm)	D.C. Correction (dB)	Output power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	FCC Limit (dBm)	FCC Margin (dB)	ISED Cond Power limit (dBm)	ISED Cond Power margin (dB)	ISED EIRP Limit (dBm)	ISED EIRP Margin (dB)	
56	5280.0	15.7	0.2	15.9	4.5	20.4	24.0	8.1	23.5	7.7	29.5	9.2	
60	5300.0	15.7	0.2	15.9	4.5	20.4	24.0	8.1	23.5	7.6	29.5	9.1	
64	5320.0	15.7	0.2	15.9	4.5	20.4	24.0	8.1	23.5	7.6	29.5	9.1	

UNII 2C FCC

6MBPS								
UNII 2c 5470 to 5725 MHz								
Channel	Frequency (MHz)	99% BW(MHz)	EBW(MHz)	Measured(dBm)	D.C. Correction (dB)	Output power (dBm)	FCC Cond Power limit (dBm)	FCC Cond Power margin (dB)
100	5500.0	16.7	24.5	13.2	0.2	13.4	24.0	10.6
116	5580.0	16.6	23.2	13.1	0.2	13.3	24.0	10.7
140	5700.0	16.6	23.6	13.4	0.2	13.6	24.0	10.4

MCS0								
UNII 2c 5470 to 5725 MHz								
Channel	Frequency (MHz)	99% BW(MHz)	EBW(MHz)	Measured(dBm)	D.C. Correction (dB)	Output power (dBm)	FCC Cond Power limit (dBm)	FCC Cond Power margin (dB)
100	5500.0	17.7	23.9	13.1	0.2	13.3	24.0	10.7
116	5580.0	17.7	23.8	13.1	0.2	13.3	24.0	10.7
140	5700.0	17.7	23.5	13.3	0.2	13.5	24.0	10.5

UNII 2C ISED

6MBPS										
UNII 2c 5470 to 5725 MHz										
Channel	Frequency (MHz)	Measured (dBm)	D.C. Correction (dB)	Output power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	ISED Cond Power limit (dBm)	ISED Cond Power margin (dB)	ISED EIRP Limit (dBm)	ISED EIRP Margin (dB)
100	5500.0	12.5	0.2	12.7	4.5	17.2	23.2	10.5	29.2	12.0
116	5580.0	12.4	0.2	12.6	4.5	17.1	23.2	10.6	29.2	12.1
140	5700.0	12.4	0.2	12.6	4.5	17.1	23.2	10.6	29.2	12.1

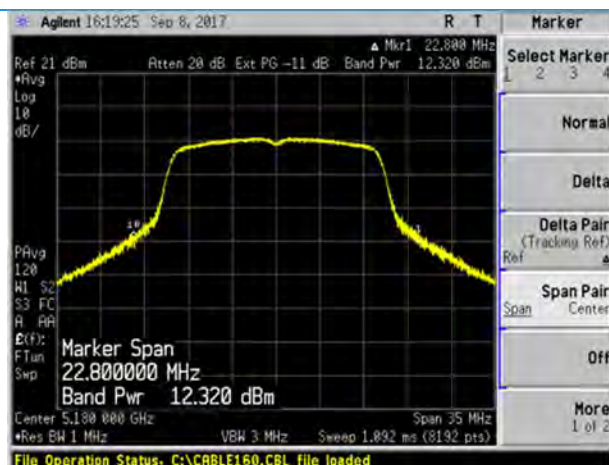
MCS0										
UNII 2c 5470 to 5725 MHz										
Channel	Frequency (MHz)	Measured (dBm)	D.C. Correction (dB)	Output power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	ISED Cond Power limit (dBm)	ISED Cond Power margin (dB)	ISED EIRP Limit (dBm)	ISED EIRP Margin (dB)
100	5500.0	12.4	0.2	12.6	4.5	17.1	23.5	10.9	29.5	12.4
116	5580.0	12.3	0.2	12.5	4.5	17.0	23.5	11.0	29.5	12.5
140	5700.0	12.3	0.2	12.5	4.5	17.0	23.5	11.0	29.5	12.5

UNII 3

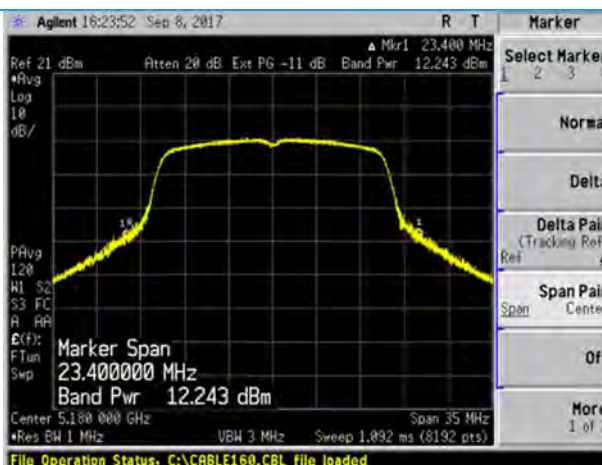
6MBPS							
Channel	Frequency (MHz)	99% BW(MHz)	Measured (dBm)	D.C. Correction (dB)	Output power (dBm)	FCC/ISED Cond Power limit (dBm)	FCC/ISED Cond Power margin (dB)
149	5745.0	16.5	12.0	0.2	12.2	30.0	17.8
157	5785.0	16.5	11.8	0.2	12.0	30.0	18.0
165	5825.0	16.5	11.8	0.2	12.0	30.0	18.0

MCS0							
Channel	Frequency (MHz)	99% BW(MHz)	Measured (dBm)	D.C. Correction (dB)	Output power (dBm)	FCC/ISED Cond Power limit (dBm)	FCC/ISED Cond Power margin (dB)
149	5745.0	17.6	11.8	0.2	12.0	30.0	18.0
157	5785.0	17.6	11.6	0.2	11.8	30.0	18.2
165	5825.0	17.6	11.7	0.2	11.9	30.0	18.1

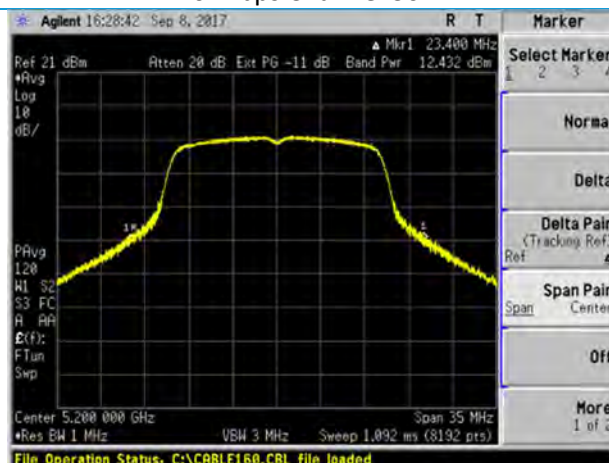
Plots - UNII 1



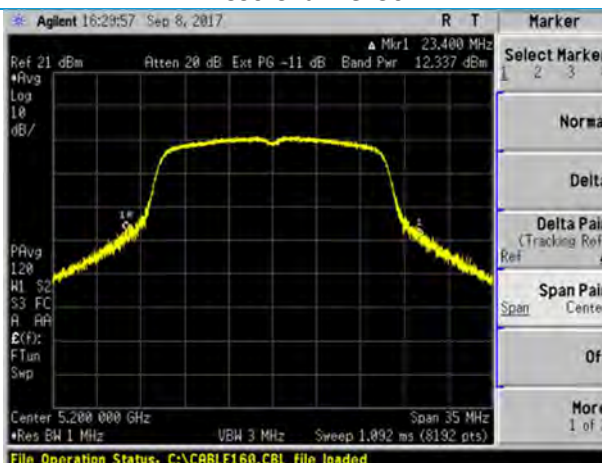
6 Mbps Channel 36



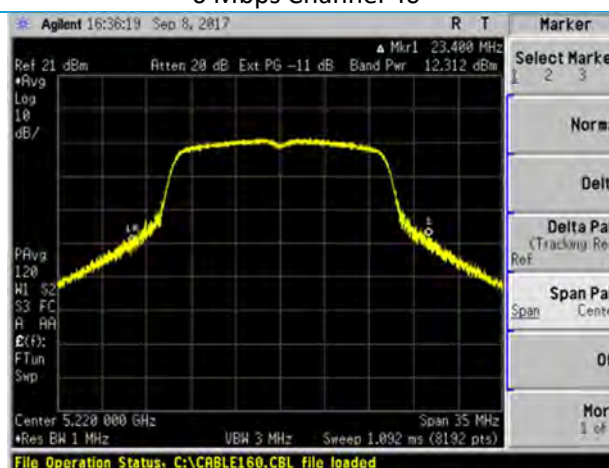
MCS0 Channel 36



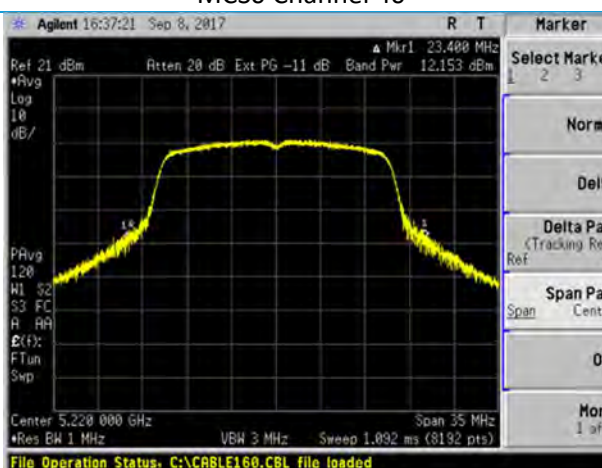
6 Mbps Channel 40



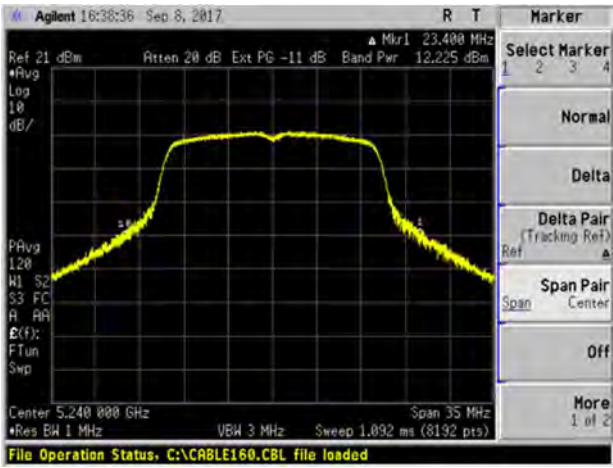
MCS0 Channel 40



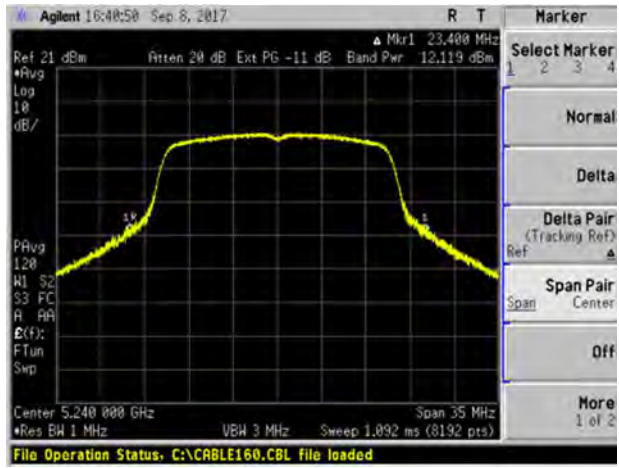
6 Mbps Channel 44



MCS0 Channel 44

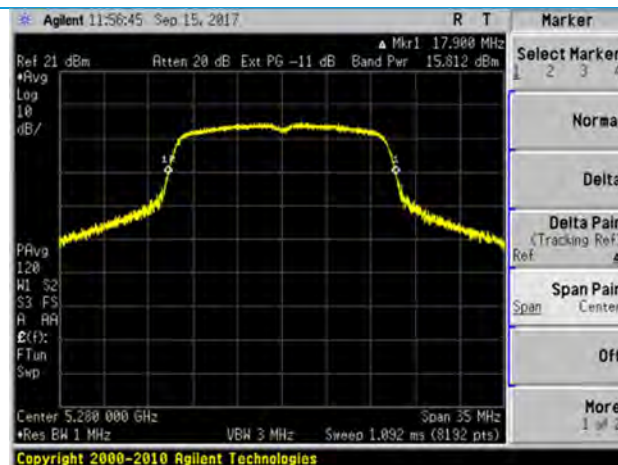


6 Mbps Channel 48

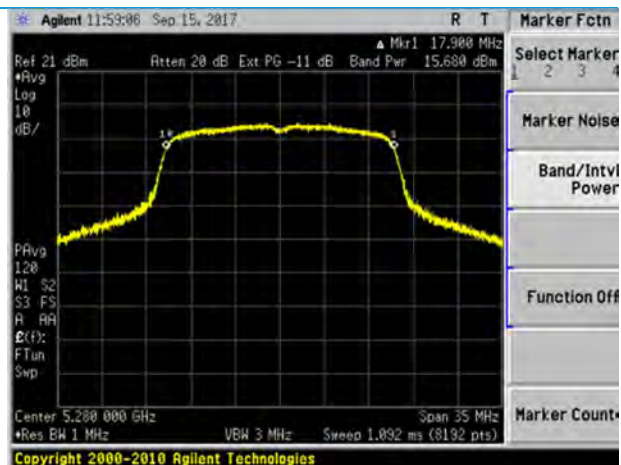


MCS0 Channel 48

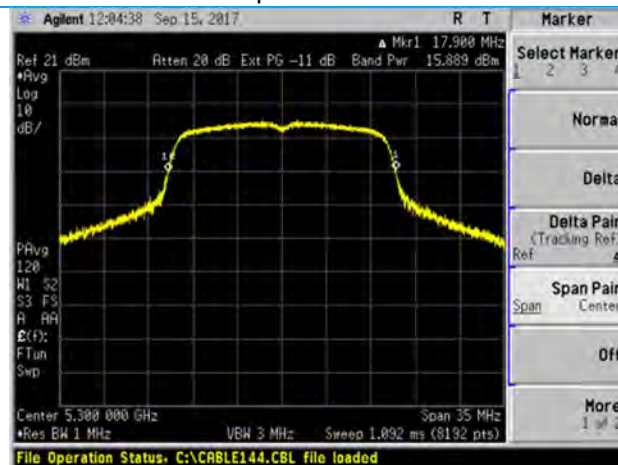
UNII 2A



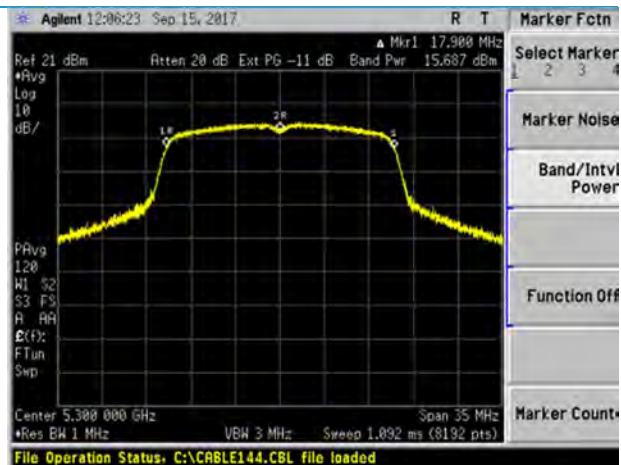
6 Mbps Channel 56



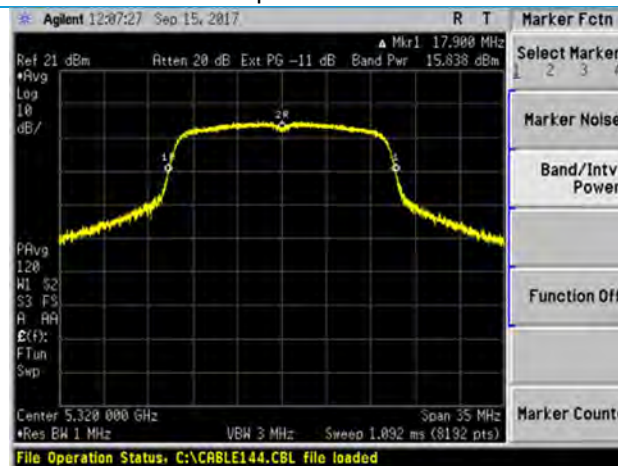
MCS0 Channel 56



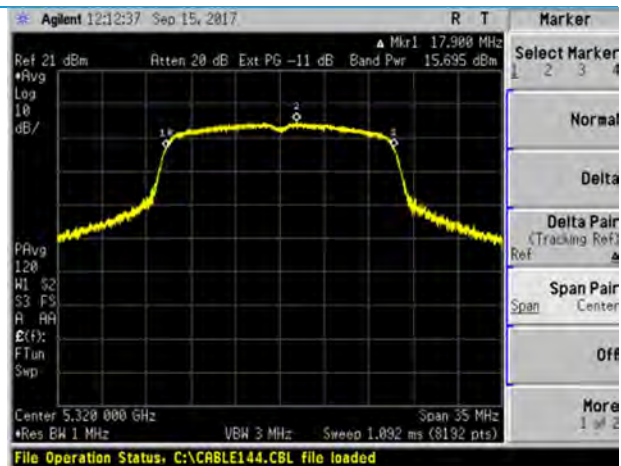
6 Mbps Channel 60



MCS0 Channel 60

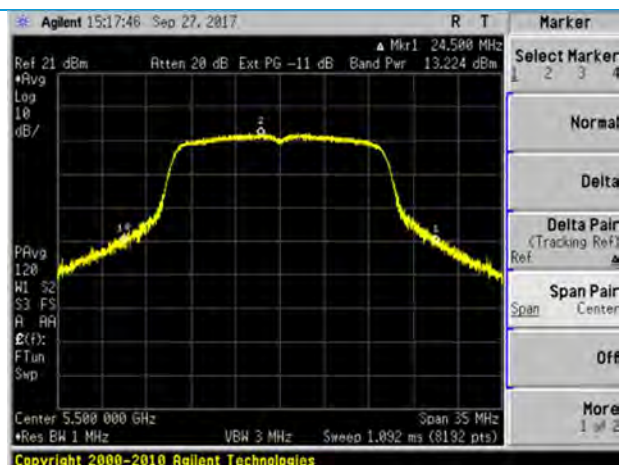


6 Mbps Channel 64

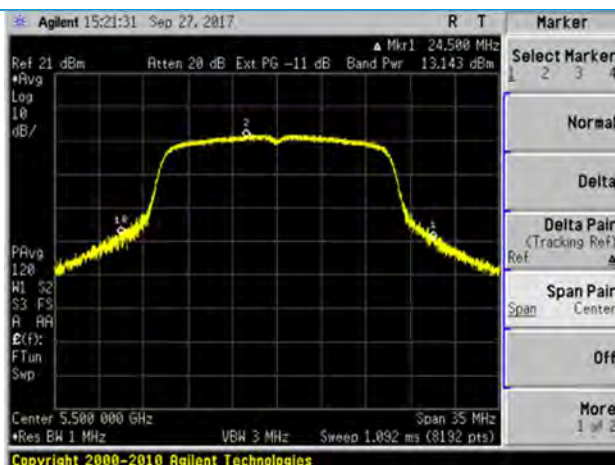


MCS0 Channel 64

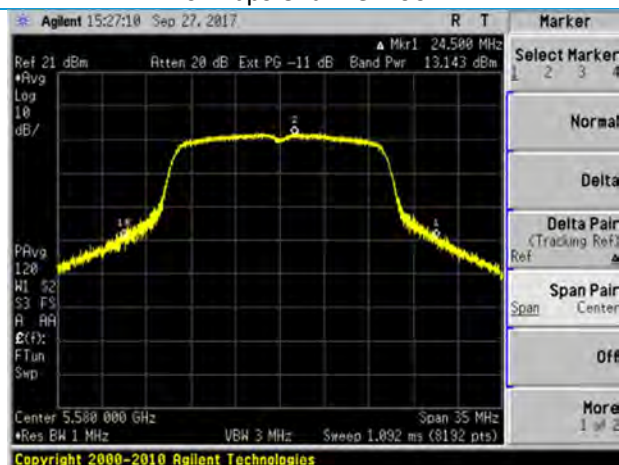
UNII 2C FCC



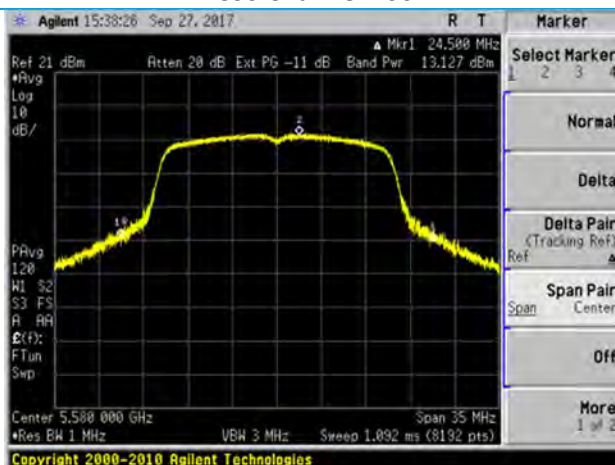
6 Mbps Channel 100



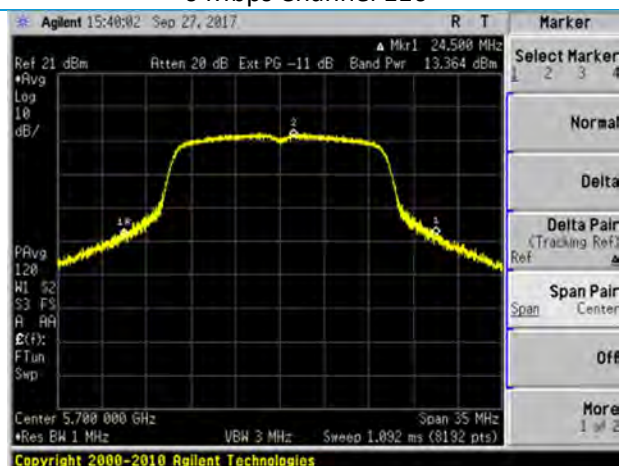
MCS0 Channel 100



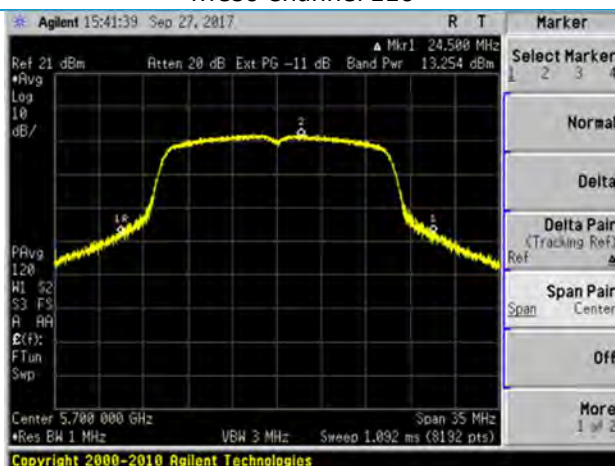
6 Mbps Channel 116



MCS0 Channel 116

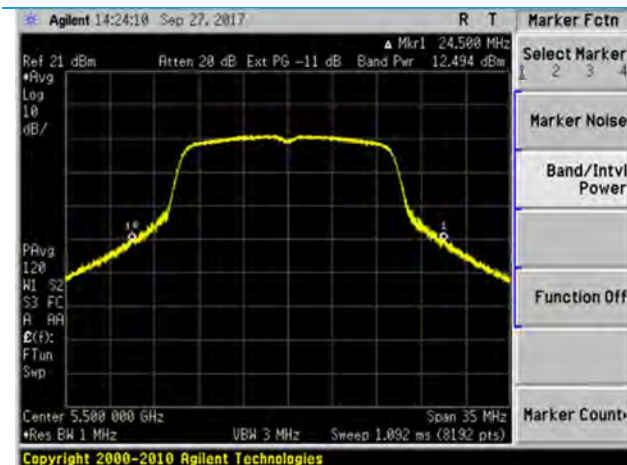


6 Mbps Channel 140

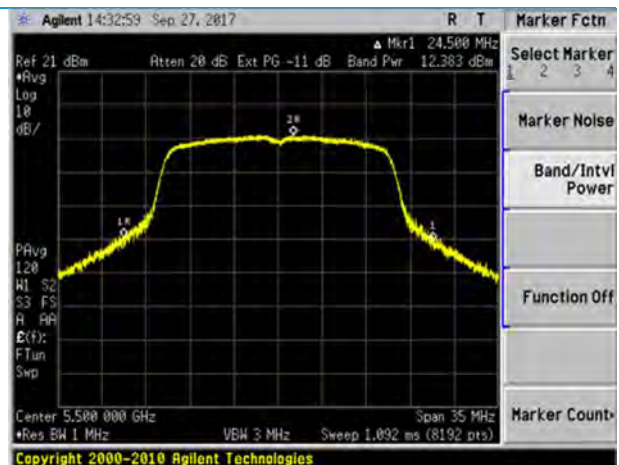


MCS0 Channel 140

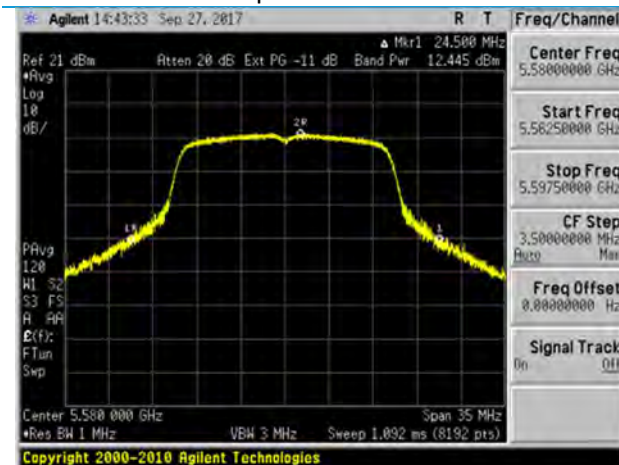
UNII 2C ISED



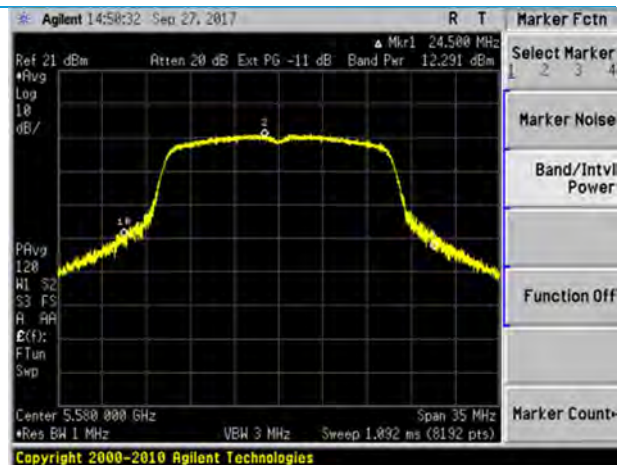
6 Mbps Channel 100



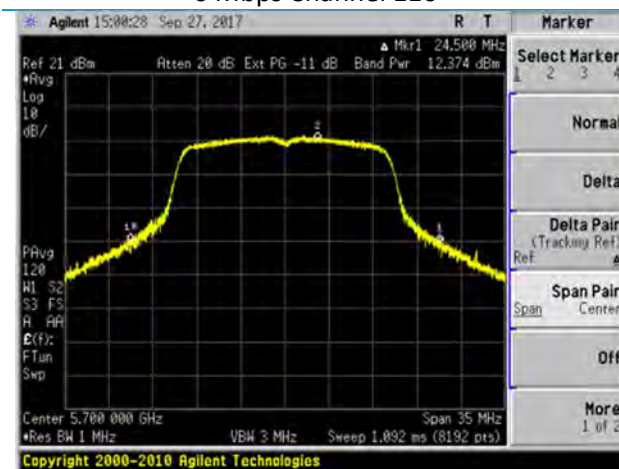
MCS0 Channel 100



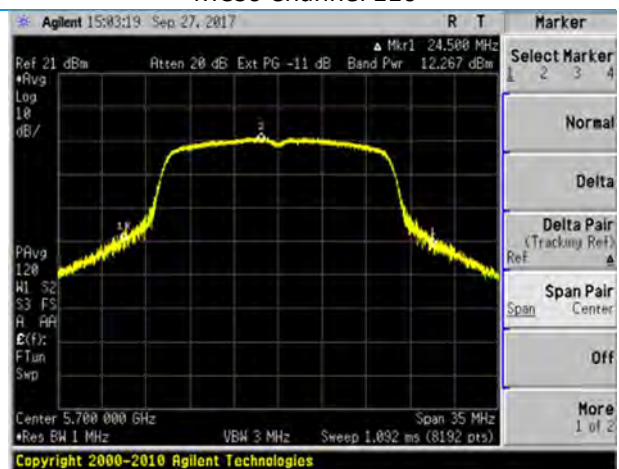
6 Mbps Channel 116



MCS0 Channel 116

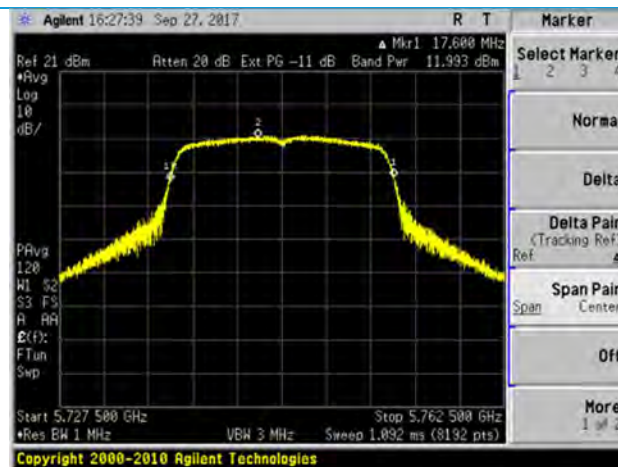


6 Mbps Channel 140

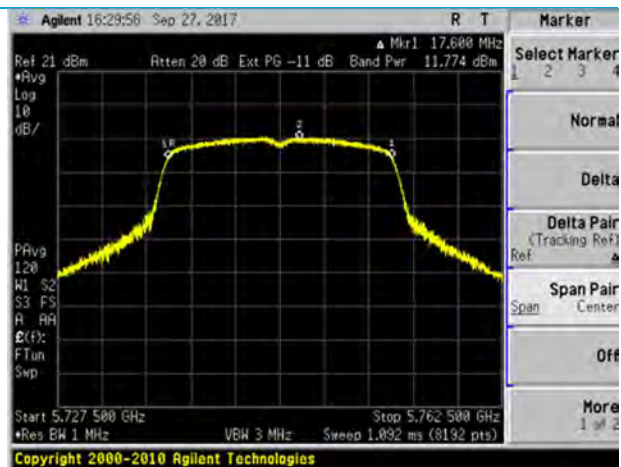


MCS0 Channel 140

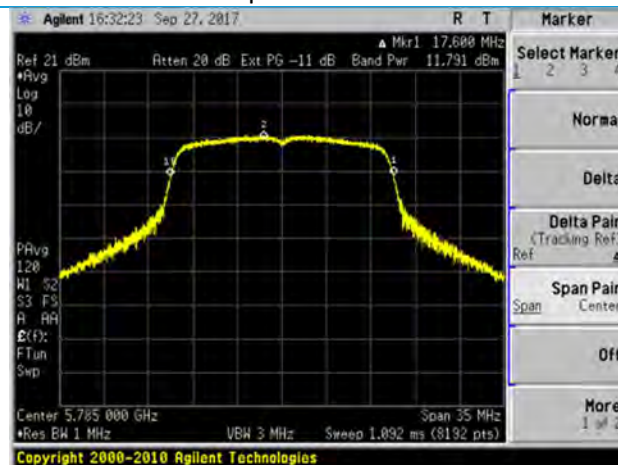
UNII 3



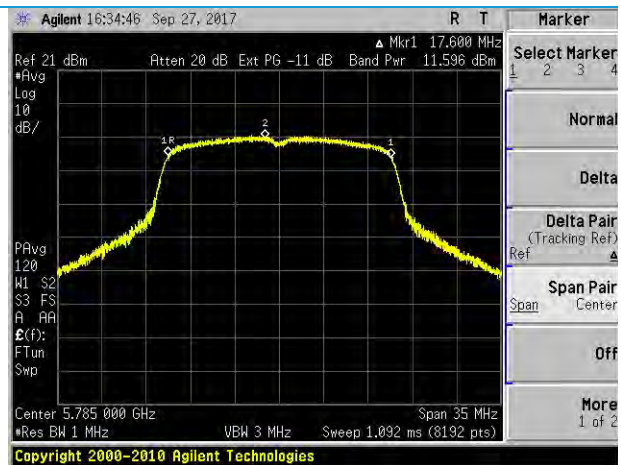
6 Mbps Channel 149



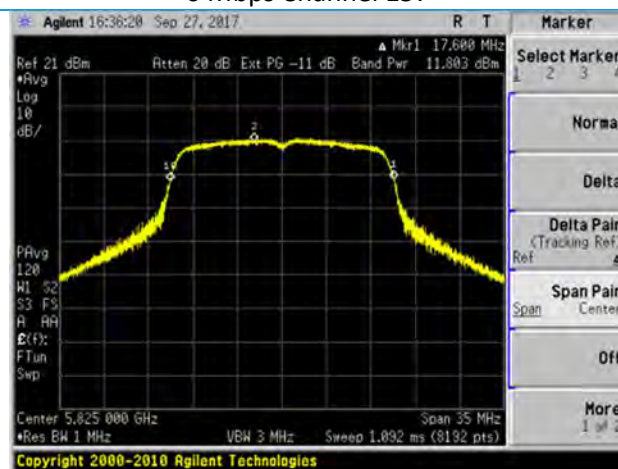
MCS0 Channel 149



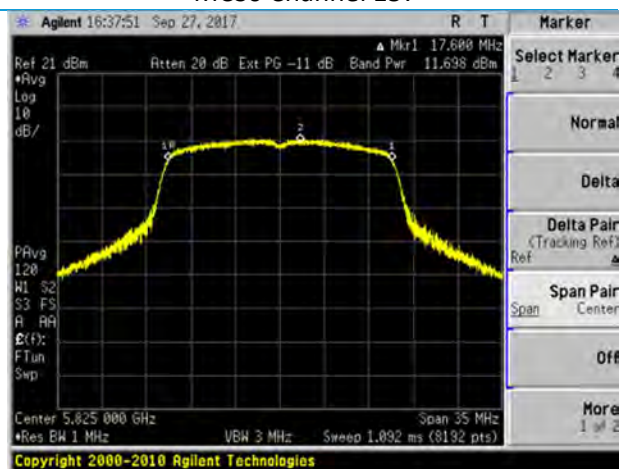
6 Mbps Channel 157



MCS0 Channel 157



6 Mbps Channel 165



MCS0 Channel 165

5.1.4 Antenna Port Conducted Emissions – Power Spectral Density (PSD)

Operator	Aidi Zainal
QA	Coty Hammerer
Test Date	9/15/17
Location	Conducted RF Measurement Area
Temp. / R.H.	71 degrees F/ 50% RH
Requirement	FCC 15.407 (a)(5) RSS 247 Issue 2 Sections 6.2.1.1, 6.2.2.1, 6.2.3.1, 6.2.4.1
Method	KDB 789033 D02 v01r04 Section II.F

Limits:

U-NII Band	FCC Limit	ISED Limit
U-NII-1	11 dBm in 1 MHz	10 dBm in 1 MHz e.i.r.p.
U-NII-2A	11 dBm in 1 MHz	11 dBm in 1 MHz
U-NII-2C	11 dBm in 1 MHz	11 dBm in 1 MHz
U-NII-3	30 dBm in 500 kHz	30 dBm in 500 kHz

Test Parameters

Settings	RMS Detector
Settings	Integration over EBW
Settings	Measured over on and off times and add duty cycle correction
Example Calculation	Measured + Duty cycle correction = Output power
Example Calculation	Measured + Duty cycle correction + antenna gain = EIRP

Instrumentation



Date : 22-Aug-2017

Test : Conducted RF Radio

Job : C-2826

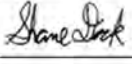
PE : Shane Dodi

Customer : GE Healthcare

Quote : 317060

No.	Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due Date	Equipment Status
1	AA 900100	UTFLX Cable	Micro-Coax	UFC142A-0-0720-20X	218652-001	6/29/2016	11/11/2017	Active Verification
2	EE900073	Spectrum Analyzer	Agilent	E4446A	US45300564	11/21/2016	11/21/2017	Active Calibration

Tested By: 

Quality Assurance: 

Table

UNII 1

UNII 2A

6MBPS									
UNII 2a 5250 to 5350 MHz									
Channel	Frequency (MHz)	Measured(dBm)	D.C. Correction (dB)	PSD (dBm)	FCC Limit(dBm)	FCC Margin (dB)	ISED Limit(dBm)	ISED Margin (dB)	
56	5280.0	5.7	0.2	5.9	11.0	5.1	11.0	5.1	
60	5300.0	5.9	0.2	6.1	11.0	4.9	11.0	4.9	
64	5320.0	5.9	0.2	6.1	11.0	4.9	11.0	4.9	

UNII 2C FCC

6MBPS						
UNII 2c 54700 to 5725 MHz						
Channel	Frequency (MHz)	Measured(dBm)	D.C. Correction (dB)	PSD (dBm)	FCC Limit(dBm)	FCC Margin (dB)
100	5500.0	3.1	0.2	3.3	11.0	7.7
116	5580.0	2.9	0.2	3.1	11.0	7.9
140	5700.0	3.3	0.2	3.5	11.0	7.5

MCS0						
UNII 2c 54700 to 5725 MHz						
Channel	Frequency (MHz)	Measured(dBm)	D.C. Correction (dB)	PSD (dBm)	FCC Limit(dBm)	FCC Margin (dB)
100	5500.0	2.8	0.2	3.0	11.0	8.0
116	5580.0	2.8	0.2	3.0	11.0	8.0
140	5700.0	2.9	0.2	3.1	11.0	7.9

UNII 2C ISED

6MBPS						
UNII 2c 54700 to 5725 MHz						
Channel	Frequency (MHz)	Measured(dBm)	D.C. Correction (dB)	PSD (dBm)	ISED Limit(dBm)	ISED Margin (dB)
100	5500.0	2.4	0.2	2.6	11.0	8.4
116	5580.0	2.5	0.2	2.7	11.0	8.3
140	5700.0	2.4	0.2	2.6	11.0	8.4

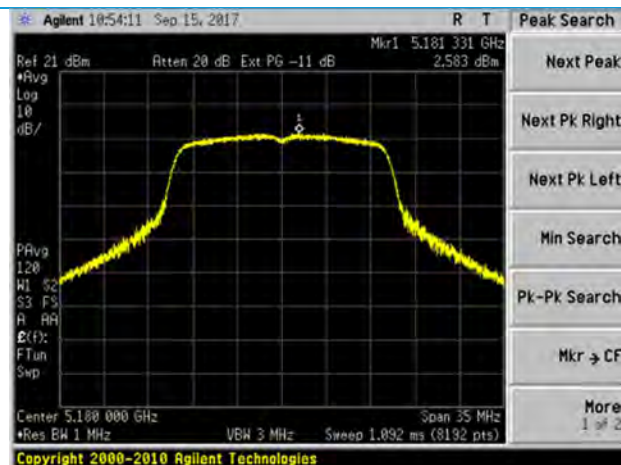
MCS0						
UNII 2c 54700 to 5725 MHz						
Channel	Frequency (MHz)	Measured(dBm)	D.C. Correction (dB)	PSD (dBm)	ISED Limit(dBm)	ISED Margin (dB)
100	5500.0	2.0	0.2	2.2	11.0	8.8
116	5580.0	2.0	0.2	2.2	11.0	8.8
140	5700.0	1.9	0.2	2.1	11.0	8.9

UNII 3

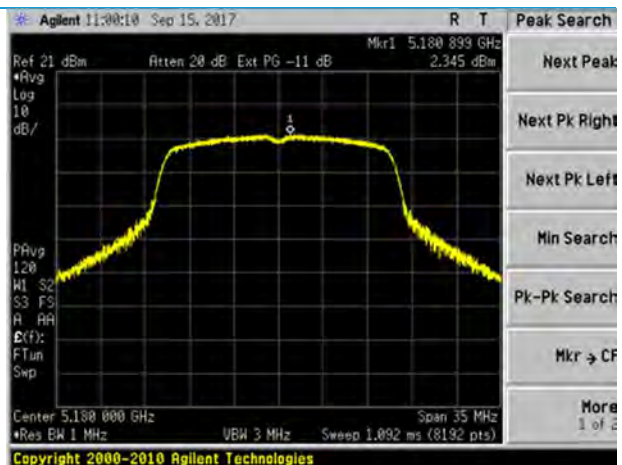
6MBPS						
UNII 2c 54700 to 5725 MHz						
Channel	Frequency (MHz)	Measured (dBm)	D.C. Correction (dB)	PSD (dBm)	ISED Limit (dBm)	ISED Margin (dB)
149	5745.0	1.9	0.2	2.1	11.0	8.9
157	5785.0	1.7	0.2	1.9	11.0	9.1
165	5825.0	1.7	0.2	1.9	11.0	9.1

MCS0						
UNII 2c 54700 to 5725 MHz						
Channel	Frequency (MHz)	Measured (dBm)	D.C. Correction (dB)	PSD (dBm)	ISED Limit (dBm)	ISED Margin (dB)
149	5745.0	1.6	0.2	1.8	11.0	9.2
157	5785.0	1.4	0.2	1.6	11.0	9.4
165	5825.0	1.5	0.2	1.7	11.0	9.3

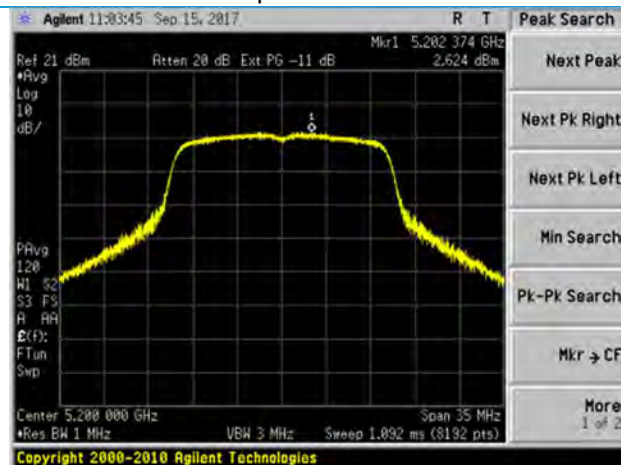
Plots - UNII 1



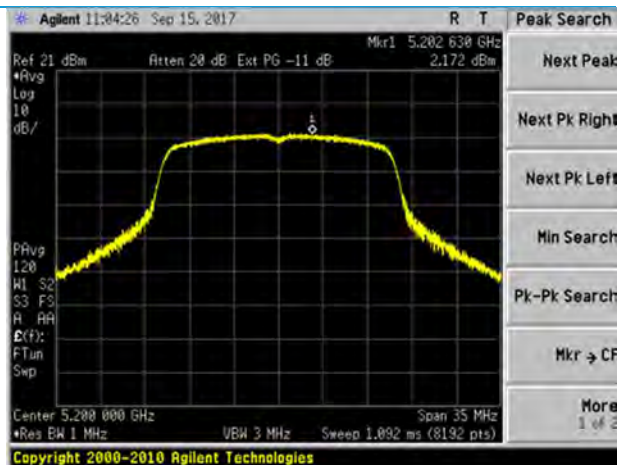
6 Mbps Channel 36



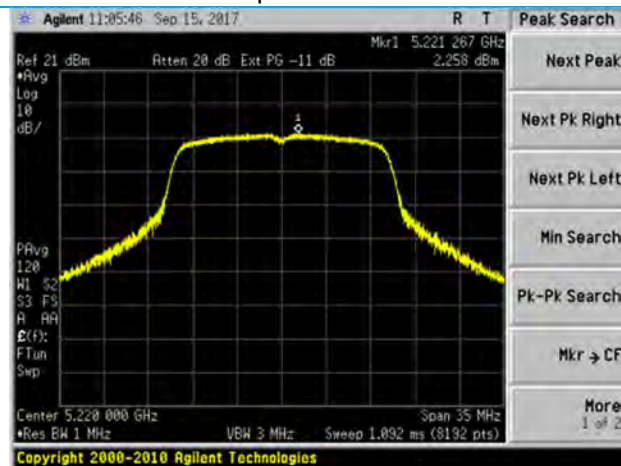
MCS0 Channel 36



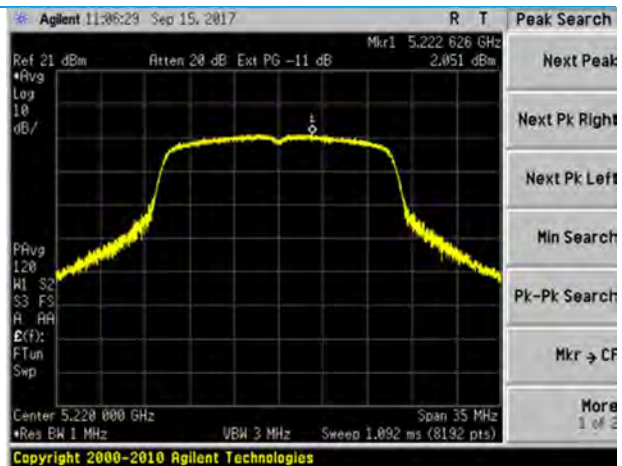
6 Mbps Channel 40



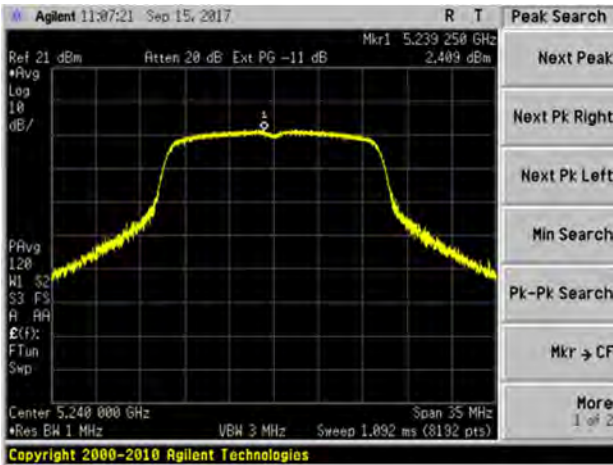
MCS0 Channel 40



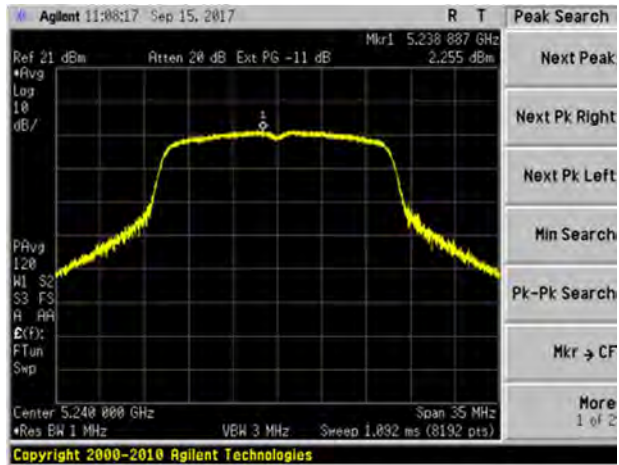
6 Mbps Channel 44



MCS0 Channel 44

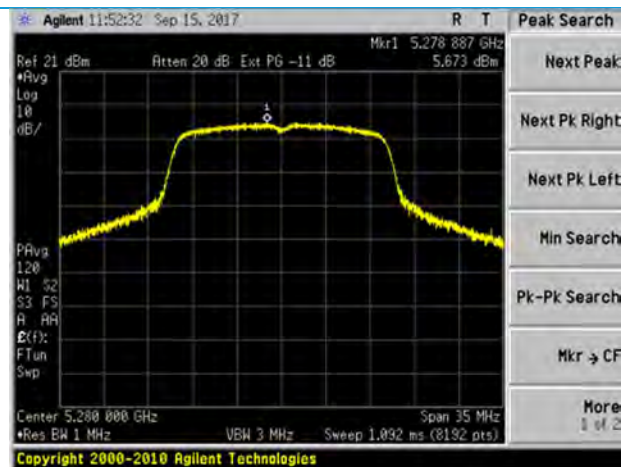


6 Mbps Channel 48

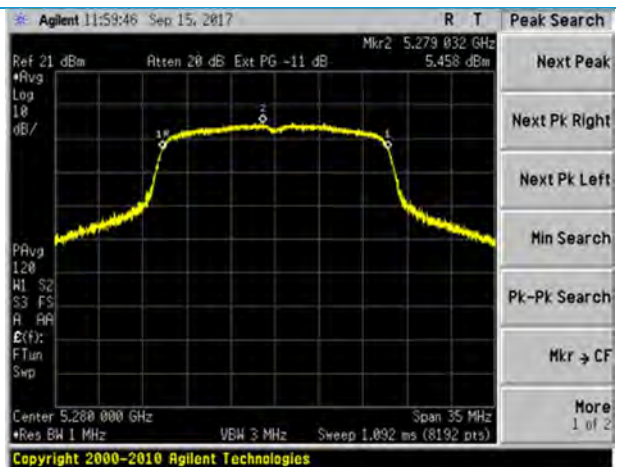


MCS0 Channel 48

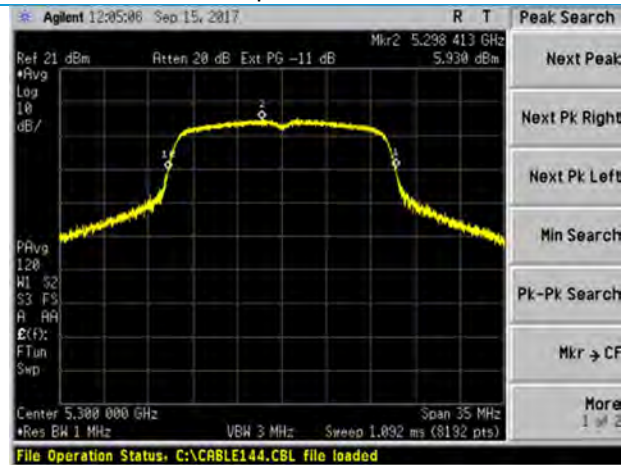
UNII 2A



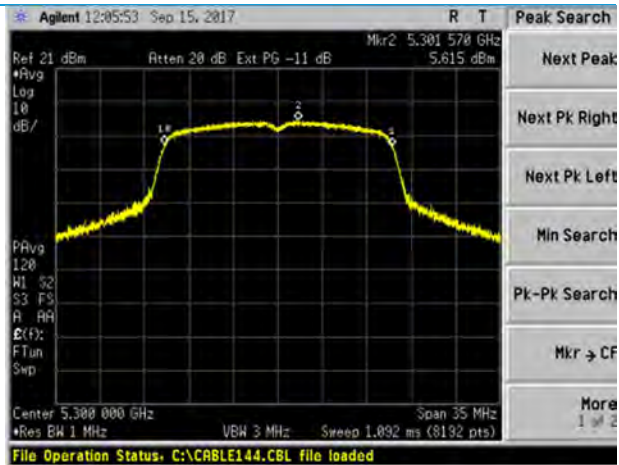
6 Mbps Channel 56



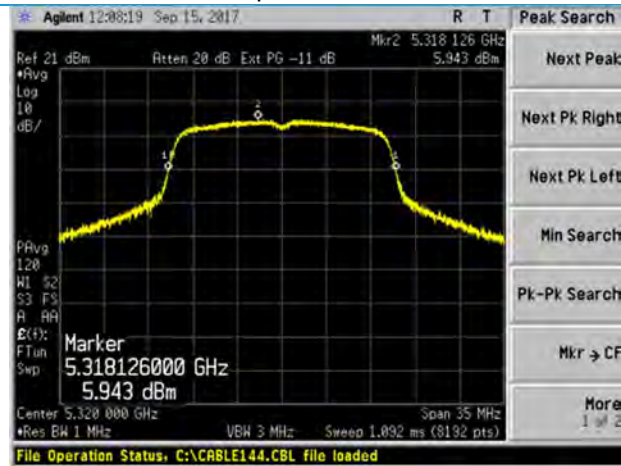
MCS0 Channel 56



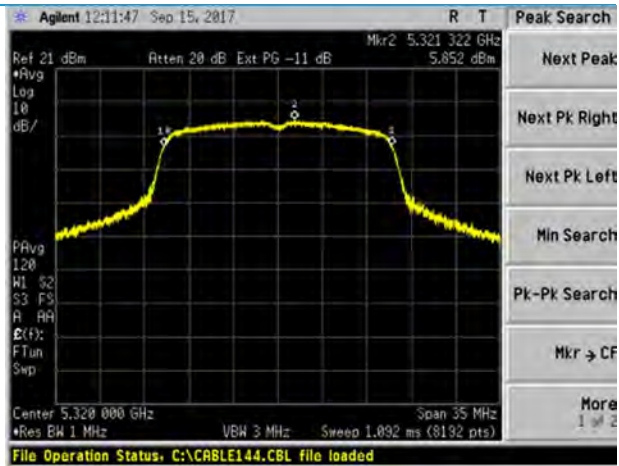
6 Mbps Channel 60



MCS0 Channel 60

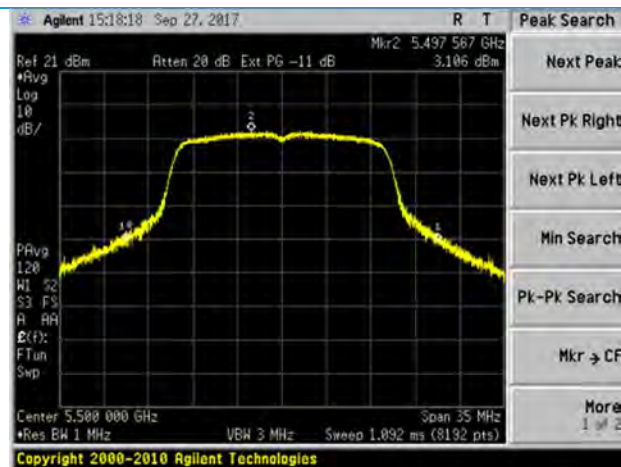


6 Mbps Channel 64

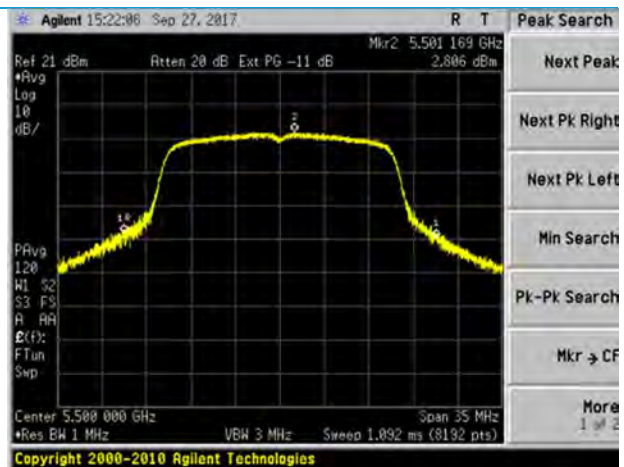


MCS0 Channel 64

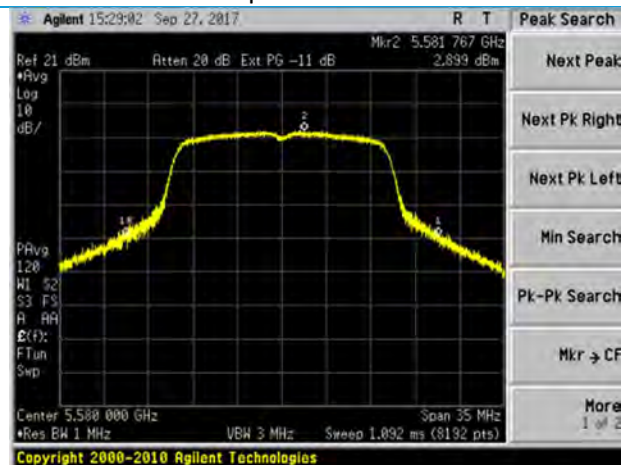
UNII 2C FCC



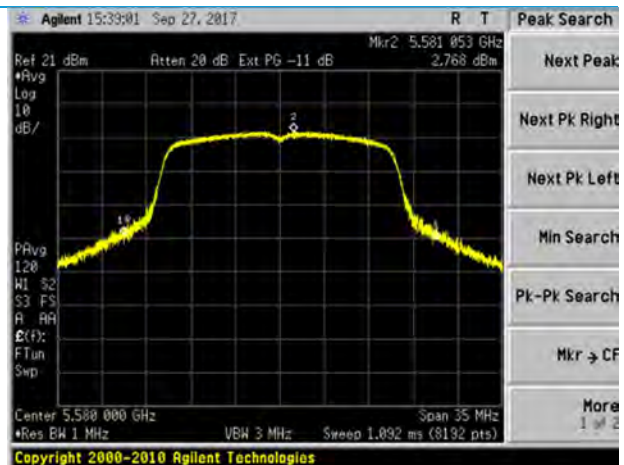
6 Mbps Channel 100



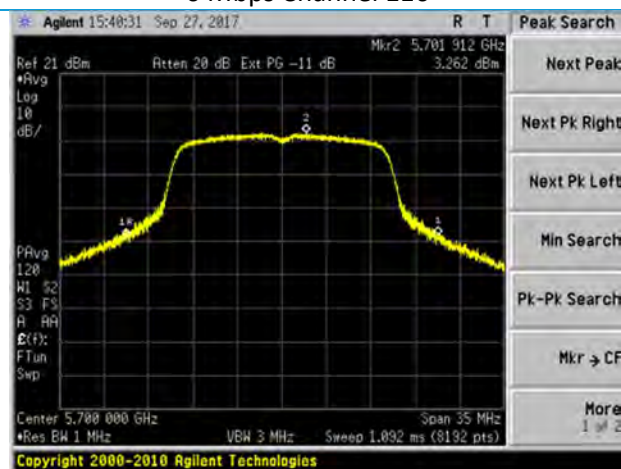
MCS0 Channel 100



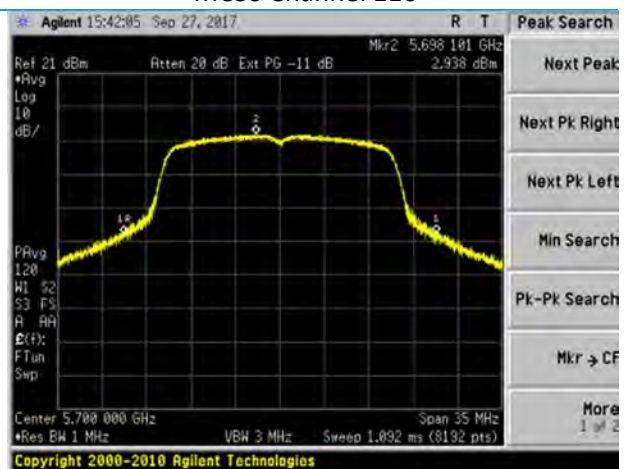
6 Mbps Channel 116



MCS0 Channel 116

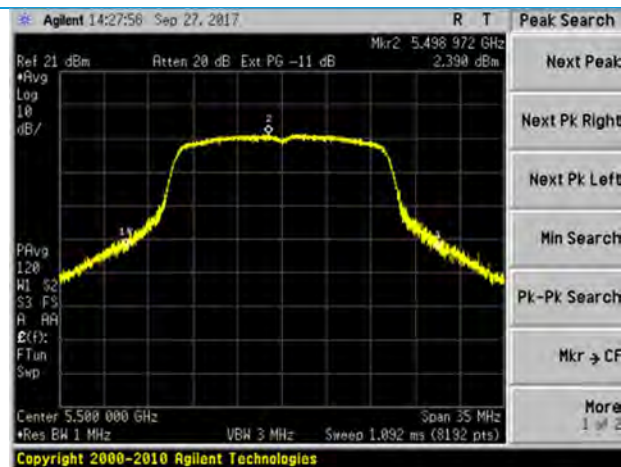


6 Mbps Channel 140

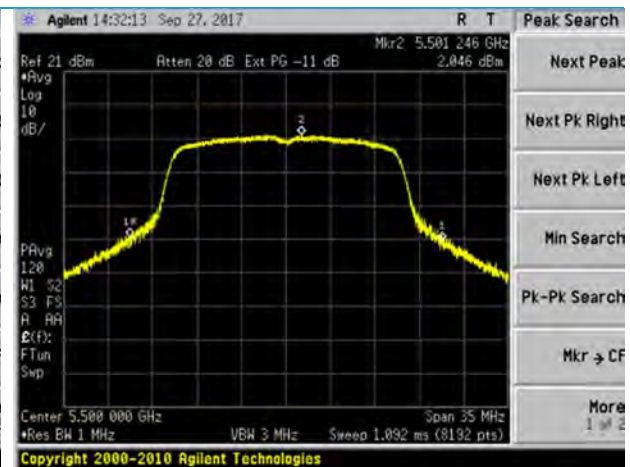


MCS0 Channel 140

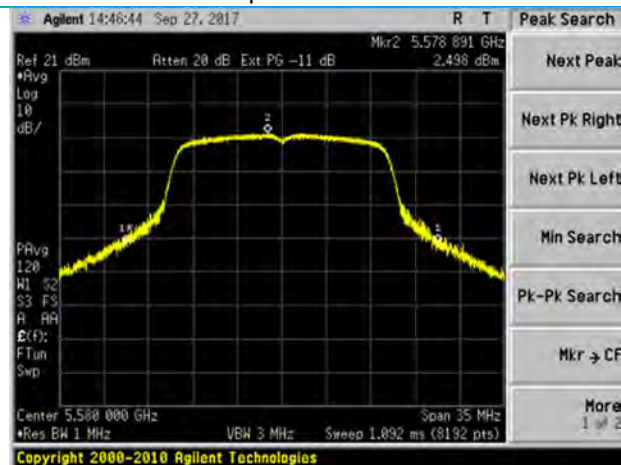
UNII 2C ISED



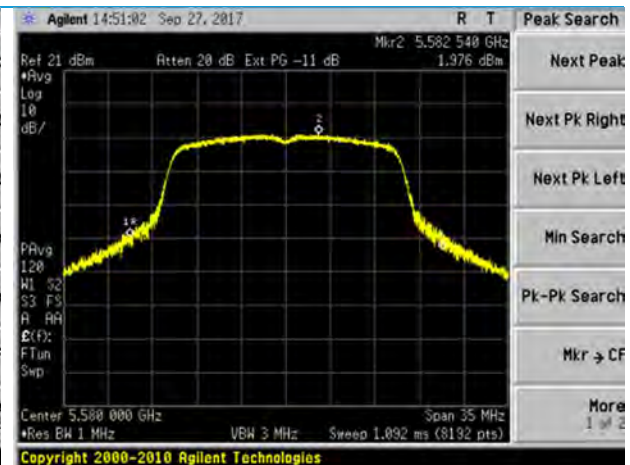
6 Mbps Channel 100



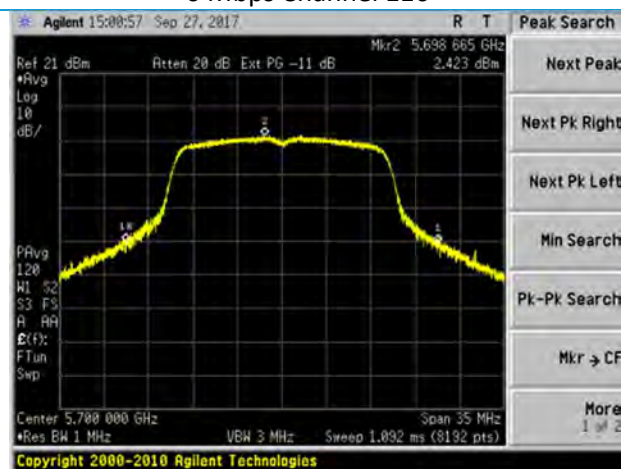
MCS0 Channel 100



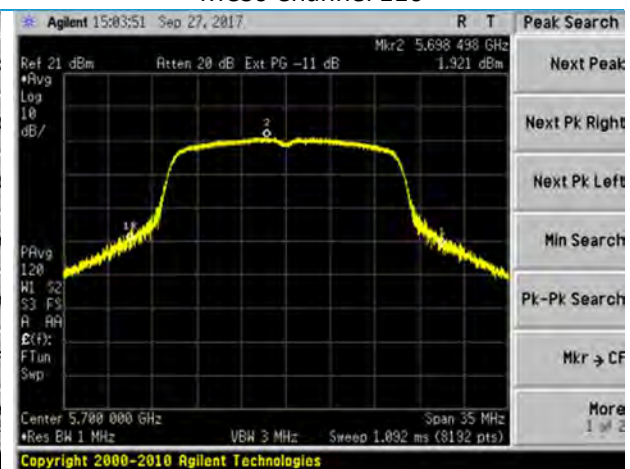
6 Mbps Channel 116



MCS0 Channel 116

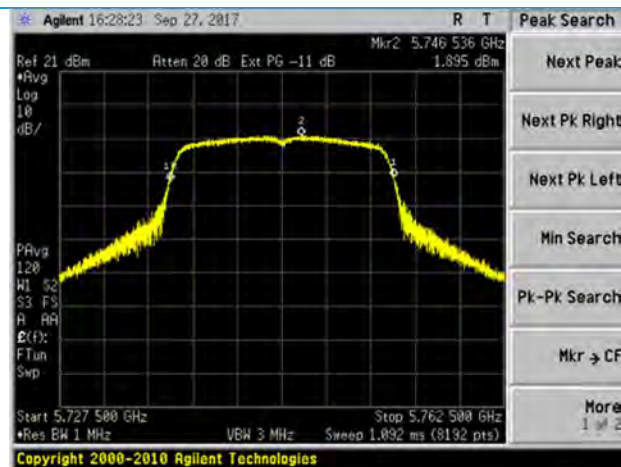


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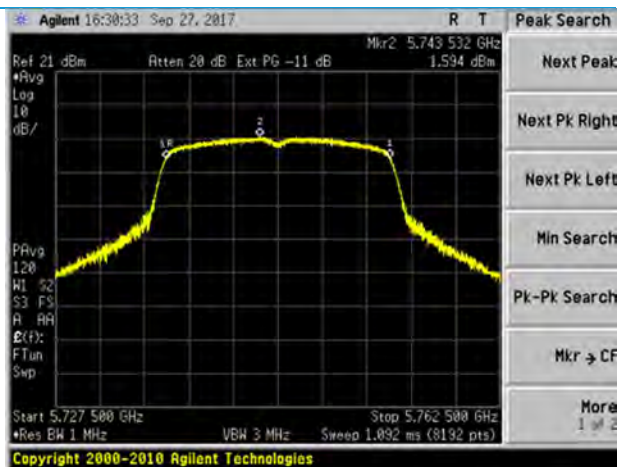


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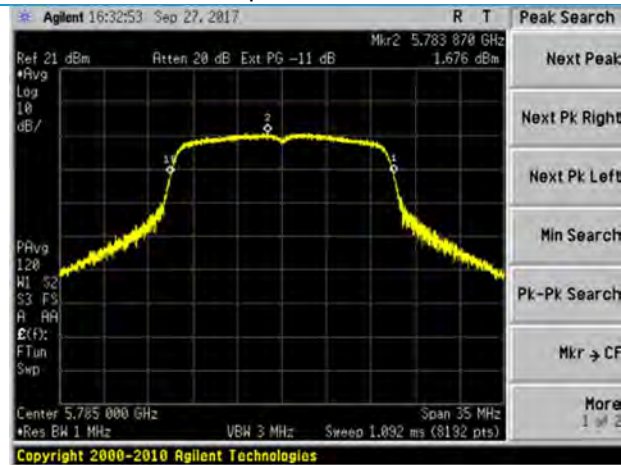
UNII 3



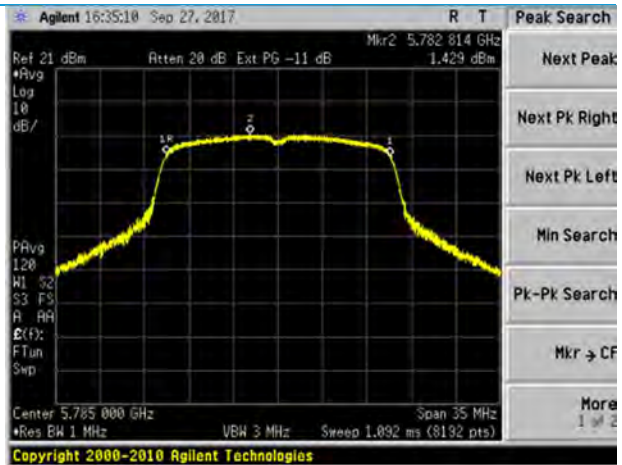
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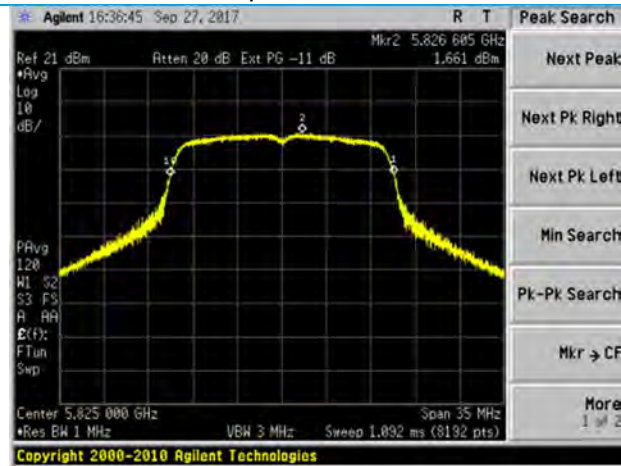
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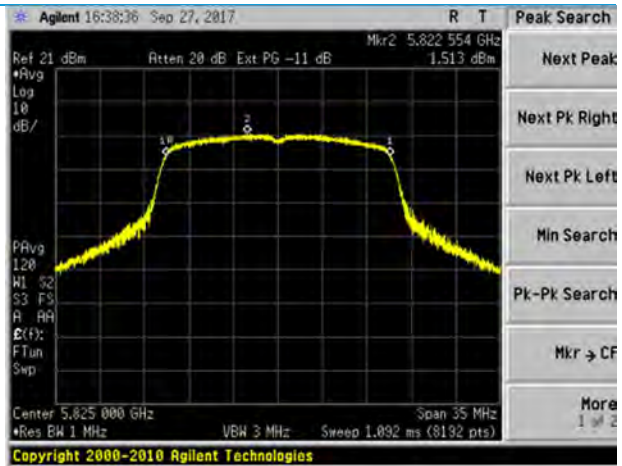
6 Mbps Channel 157



MCS0 Channel 157



6 Mbps Channel 165



MCS0 Channel 165

5.1.5 Antenna Port Conducted Emissions – Frequency Stability

Operator	Aidi Zainal
Test Date	4/25/12
Requirement	FCC: 2.1055 (d) IC: RSS-GEN 6.11
Method	ANSI C63.10 Section 6.8

Test Parameters

Frequency	5745, 5785, and 5825 MHz
Notes	Data leveraged from TIWI 5 Modular Data

Instrumentation



LS RESEARCH LLC

Wireless Product Development

Equipment Calibration

Date: 20-Dec-2011

Type Test: Conducted measurements

Job #: C-1371

Prepared By: Aidi

Customer: LSR

Quote #: 311362

No.	Asset#	Description	Manufacturer	Model#	Serial#	Cal Date	Cal Due Date	Equipment Status
1	AA 980 143	Flashtics	Core	EXD 100 1048.0	5546519	6/12/11	6/12/12	Active Calibration
2	CC 000221C	Spectrum Analyzer	HP	E4407B	U639160256	5/4/2011	5/4/2012	Active Calibration
3	EE 900073	Spectrum Analyzer	Agilent	E4446A	U845300564	4/25/2011	4/25/2012	Active Calibration
4	AA 980 144	Flashtics	Core	EXD 100 10720	5880373	6/12/11	6/12/12	Active Calibration

Project Engineer: Aidi

Quality Assurance: ADAMALGER

Project Engineer: Aidi

Quality Assurance: ADAMALGER

Table (Values below listed in Hz at the given voltages)

	3.06 VDC	3.6 VDC	4.14 VDC	Deviation
Low Channel	5745002200	5745002300	5745002340	140
Mid Channel	5785002280	5785002360	5785002280	80
High Channel	5825002160	5825002220	5825002320	160

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 – Band Edges

Operator	Shane Dock, Zach Wilson
QA	Adam Alger
Test Date	9/13/17 – 9/21/17
Location	Chamber 3, Chamber 5
Temp. / R.H.	72 degrees F/ 51% RH
Requirement	FCC 15.407 (b)(1-8) RSS 247 Issue 2 Sections 6.2.1.2, 6.2.2.2, 6.2.3.2, 6.2.4.2
Method	U-NII-1: KDB 789033 D02 v01r04 Sections II.G.5 & 11.G.6 AD
Sample Calculation (Limits)	Limit (dBuV/m) = Limit (dBm) + Conversion Factor (dB) 68.23 dBuV/m = -27 dBm + 95.23 dB

Limits:

U-NII Band	Measured Range (MHz)	FCC 15.407 Limit RSS 247 Limit (@ 3m)	FCC 15.209 Limit (@ 3m)
U-NII-1	4500-5150	68.23 dBμV/m	Peak 74 dBμV/m Average 54 dBμV/m
U-NII-1	5350-5460	68.23 dBμV/m	Peak 74 dBμV/m Average 54 dBμV/m
U-NII-1	5250-5350 (ISED only)	68.23 dBμV/m	N/A
U-NII-2A	4500-5150	68.23 dBμV/m	Peak 74 dBμV/m Average 54 dBμV/m
U-NII-2A	5250-5460	68.23 dBμV/m	Peak 74 dBμV/m Average 54 dBμV/m
U-NII-2C	5250-5460	68.23 dBμV/m	Peak 74 dBμV/m Average 54 dBμV/m
U-NII-3	5600-5725	See table below	N/A
U-NII-3	5850-5975	See table below	N/A

Limits:

U-NII-3 Peak Emission Limits	Frequency Range (MHz)
1) 122.23 dB μ V/m at frequencies from the band edges decreasing linearly to 110.83 dB μ V/m at 5 MHz above or below the band edges	5720-5725 5850-5855
2) 110.83 dB μ V/m at 5 MHz above or below the band edges decreasing linearly to 105.23 dB μ V/m at 25 MHz above or below the band edges	5700-5720 5855-5875
3) 105.23 dB μ V/m at 25 MHz above or below the band edges decreasing linearly to 68.23 dB μ V/m above or below the band edges; and 68.23 dB μ V/m at frequencies more than 75 MHz above or below the band edges.	5645 and down-5700 5875-5930 and up

Test Parameters

Distance	3m
RBW	1 MHz
VBW	1 kHz Avg, 3 MHz peak used for measurements
EUT Power	120VAC/60Hz
EUT Mode	WLAN Tx Mode, 6 Mbps and MCS0
EUT Channel	Low, Mid, High (See Channel Plan for the specific channels per UNII band)

Instrumentation



Date : 22-Aug-2017

Test : Spurious Emissions

Job : C-2826

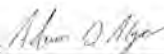
PE : Shane Dock

Customer : GE Healthcare

Quote : 317060

No.	Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due Date	Equipment Status
1	EE 960085	EM Receiver	Agilent	N9038A	MY51210148	5/12/2017	5/12/2018	Active Calibration
2	AA 960176	Cable - low loss 6m	A.H. Systems, Inc	SAC-26G-6	395	5/15/2017	5/15/2018	Active Verification
3	AA 960158	Double Ridge Horn Antenna	ETS Lindgren	3117	109300	4/12/2017	4/12/2018	Active Calibration
4	EE 960159	Low Noise Amplifier	Mini-Circuits	ZVA-213X-S+	462101702	4/12/2017	4/12/2018	Active Calibration
5	AA 960161	Highpass Filter 5 GHz	K&L Microwave	11SH10-8000	2	4/5/2017	4/5/2018	Active Calibration
6	EE 960087	Spectrum Analyzer	Agilent	N9010A	MY53400296	12/22/2016	12/22/2017	Active Calibration
7	AA 960162	EM Series Cable	MegaPhase	EM26-S1S1-120	12024301 001	6/29/2016	11/11/2017	Active Verification
8	AA 960174	Small Horn Antenna	ETS Lindgren	3116C-PA	00206880	5/1/2017	5/1/2018	Active Calibration
9	EE 960088	EM Receiver	Agilent	N9038A	MY51210138	3/2/2017	3/2/2018	Active Calibration
10	AA 960162	EM Series Cable	MegaPhase	EM26-S1S1-120	12024301 001	6/29/2016	11/11/2017	Active Verification
11	AA 960128	Biconical Antenna	ETS Lindgren	3110B	00062899	4/13/2017	4/13/2018	Active Calibration

Tested By: 

Quality Assurance: 

Table

UNII 1

Lower Band Edge Measurements - Peak									
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
4.5832	6 Mbps	36	Front	Vertical	110	193	61.01	74.00	12.99
4.6430	MCS0	36	Front	Vertical	110	193	60.21	74.00	13.80
4.6723	54 Mbps	36	Front	Vertical	110	193	60.21	74.00	13.79
4.5462	MCS7	36	Front	Vertical	110	193	59.44	74.00	14.57

Lower Band Edge Measurements - Average									
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Avg Reading (dBμV/m)	Avg Limit (dBμV/m)	Avg Margin (dB)
5.1500	6 Mbps	36	Front	Vertical	110	193	49.4	54.0	4.6
5.1487	MCS0	36	Front	Vertical	110	193	50.0	54.0	4.0
5.1474	54 Mbps	36	Front	Vertical	110	193	49.8	54.0	4.2
5.1500	MCS7	36	Front	Vertical	110	193	49.8	54.0	4.2

ISED

Chan 44 Upper Band Edge Measurements - Peak									
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
5.3808	6 Mbps	44	Front	Vertical	110	174.75	60.43	74.00	13.57
5.3790	MCS0	44	Front	Vertical	110	174.75	61.60	74.00	12.40

Chan 44 Upper Band Edge Measurements - Average									
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Avg Reading (dBμV/m)	Avg Limit (dBμV/m)	Avg Margin (dB)
5.3544	6 Mbps	44	Front	Vertical	110	174.75	48.86	54.0	5.15
5.4170	MCS0	44	Front	Vertical	110	174.75	49.96	54.0	4.04

FCC

Upper Band Edge Measurements - Peak									
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
5.3907	6 Mbps	48	Front	Vertical	100	194.75	59.8	74.0	14.2
5.4212	MCS0	48	Front	Vertical	100	194.75	59.7	74.0	14.3

Upper Band Edge Measurements – Average									
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Avg Reading (dBμV/m)	Avg Limit (dBμV/m)	Avg Margin (dB)
5.3540	6 Mbps	48	Front	Vertical	100	194.75	48.8	54.0	5.2
5.4035	MCS0	48	Front	Vertical	100	194.75	49.8	54.0	4.2

UNII 2A FCC

Lower Band Edge Measurements - Peak @ 4500-5150 MHz using Channel 56									
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
5.1394	6 Mbps	56	Vertical	Horizontal	100	180	52.8	74.0	21.2
5.1099	MCS0	56	Vertical	Horizontal	100	180	52.3	74.0	21.7

Lower Band Edge Measurements - Average @ 4500-5150 MHz using Channel 56									
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Avg Reading (dBμV/m)	Avg Limit (dBμV/m)	Avg Margin (dB)
5.1276	6 Mbps	56	Vertical	Horizontal	100	180	43.4	54.0	10.6
5.1223	MCS0	56	Vertical	Horizontal	100	180	43.4	54.0	10.6

Upper Band Edge Measurements - Peak @ 5350-5460 MHz using Channel 64									
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
5.3508	6 Mbps	64	Vertical	Horizontal	183	182.5	66.7	74.0	7.3
5.3534	MCS0	64	Vertical	Horizontal	183	182.5	67.2	74.0	6.8

Upper Band Edge Measurements - Average @ 5350-5460 MHz using Channel 64

Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Avg Reading (dBμV/m)	Avg Limit (dBμV/m)	Avg Margin (dB)
5.3500	6 Mbps	64	Vertical	Horizontal	183	182.5	51.3	54.0	2.7
5.3500	MCS0	64	Vertical	Horizontal	183	182.5	52.1	54.0	1.9

UNII 2A ISED

Lower Band Edge Measurements - Peak @ 5150-5250 MHz using channel 56

Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
5.2494	6 Mbps	56	Vertical	Horizontal	100	180	66.6	68.2	1.6
5.2492	MCS0	56	Vertical	Horizontal	100	180	67.8	68.2	0.4

Upper Band Edge Measurements - Peak

Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
5.3540	6 Mbps	64	Front	Vertical	183.0	182.5	67.4	68.2	0.8
5.3533	MCS0	64	Front	Vertical	183.0	182.5	66.9	68.2	1.3

UNII 2C FCC

Lower Band Edge Measurements - Peak

Frequency (GHz)	Data Rate	Channel	Power Setting	EUT orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
5.4698	6 Mbps	100	15250	Front	Vertical	142.0	182.5	59.5	74.0	14.5
5.4666	MCS0	100	15250	Front	Vertical	142.0	182.5	61.1	74.0	12.9

Lower Band Edge Measurements - Average

Frequency (GHz)	Data Rate	Channel	Power Setting	EUT orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Avg Reading (dBμV/m)	Avg Limit (dBμV/m)	Avg Margin (dB)
5.4699	6 Mbps	100	15250	Front	Vertical	142.0	182.5	45.0	54.0	9.0
5.4698	MCS0	100	15250	Front	Vertical	142.0	182.5	45.4	54.0	8.6

Upper Band Edge Measurements - Peak									
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
5.7325	6 Mbps	140	Front	Vertical	135	151.1	59.0	68.2	9.2
5.7251	MCS0	140	Front	Vertical	135	151.1	61.8	68.2	6.4

UNII 2C ISD

Lower Band Edge Measurements - Peak & Average @ 5350-5470 MHz, Channel 100												
Frequency (GHz)	Data Rate	Channel	EUT orient.	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)	Avg. Reading (dBμV/m)	Avg. Limit (dBμV/m)	Avg. Margin (dB)
5.4699	6 Mbps	100	Front	Vertical	142.0	182.5	59.7	74.0	14.3	44.0	54.0	10.0
5.4695	MCS0	100	Front	Vertical	142.0	182.5	59.7	74.0	14.3	45.4	54.0	8.6

Lower Band Edge Measurements - Peak @ 5600-5650 MHz, Channel 136										
Frequency (GHz)	Data Rate	Channel	Power Setting	EUT orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
5.6499	6 Mbps	136	15250	Front	Vertical	137.0	150.8	57.0	68.2	11.2
5.6442	MCS0	136	15250	Front	Vertical	137.0	150.8	60.5	68.2	7.7

Upper Band Edge Measurements - Peak @ 5725-5850 MHz, Channel 140										
Frequency (GHz)	Data Rate	Channel	PWR Setting	EUT orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
5.7262	6 Mbps	140	15250	Front	Vertical	135.0	151.1	57.7	68.2	10.5
5.7275	MCS0	140	15250	Front	Vertical	135.0	151.1	62.9	68.2	5.3

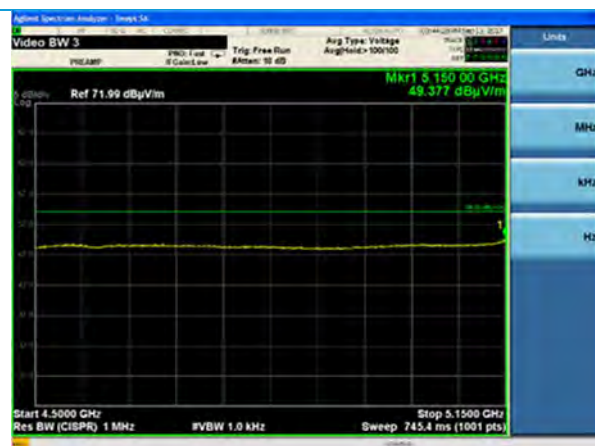
UNII 3

Lower Band Edge Measurements - Peak							
Frequency (GHz)	EUT orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
5.7240	Vertical	Horizontal	128.0	210.5	63.5	68.2	4.7
5.9020	Vertical	Horizontal	128.0	210.5	55.3	68.2	12.9

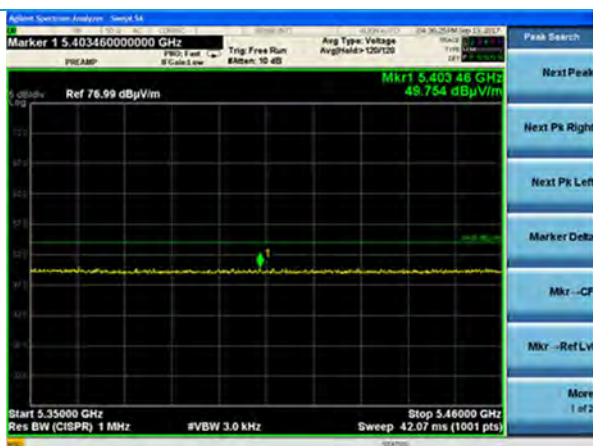
Lower Band Edge Measurements - Peak							
Frequency (GHz)	EUT orientation	Antenna Polarity	Height (cm)	Azimuth (degree)	Avg. Reading (dBμV/m)	Avg. Limit (dBμV/m)	Avg. Margin (dB)
5.7249	Vertical	Horizontal	128.0	210.5	49.9	54.0	4.1
5.9249	Vertical	Horizontal	128.0	210.5	44.5	54.0	9.5

Plots start on next page (Worst Case Shown)

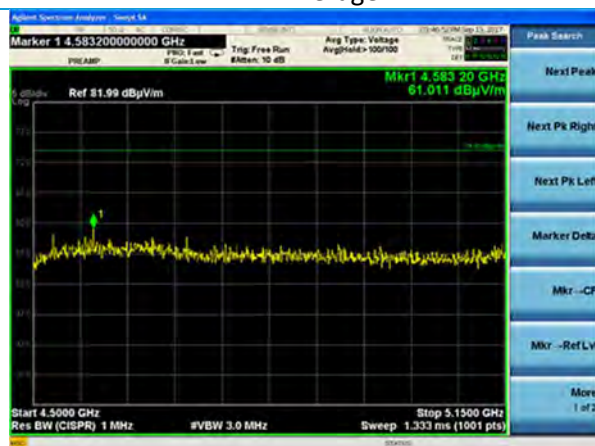
UNII 1



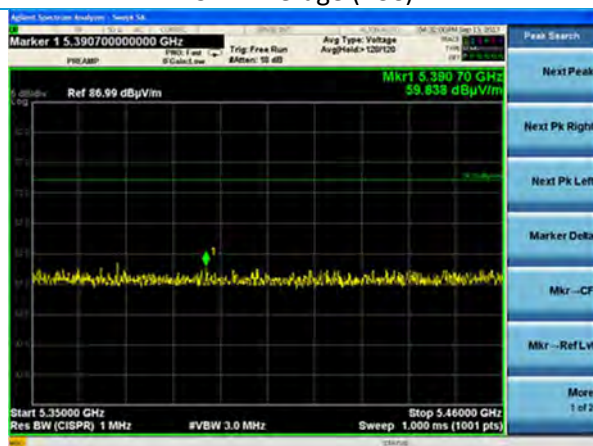
LBE Average



UBE Average (FCC)



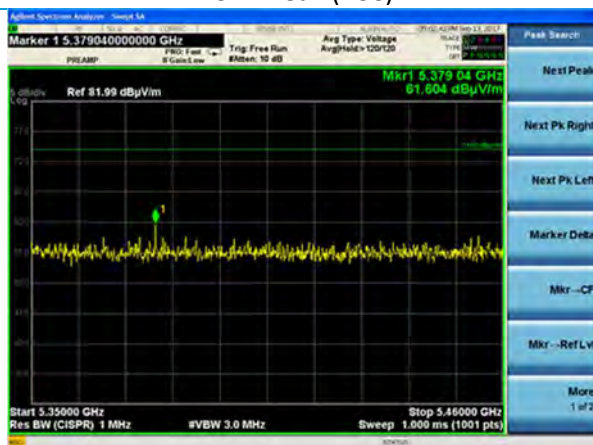
LBE Peak



UBE Peak (FCC)

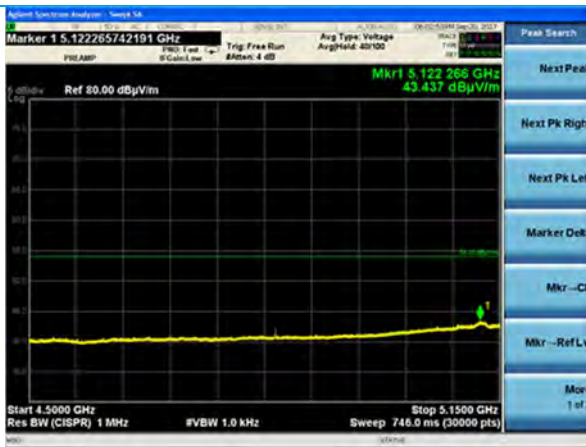


UBE Average (ISED)

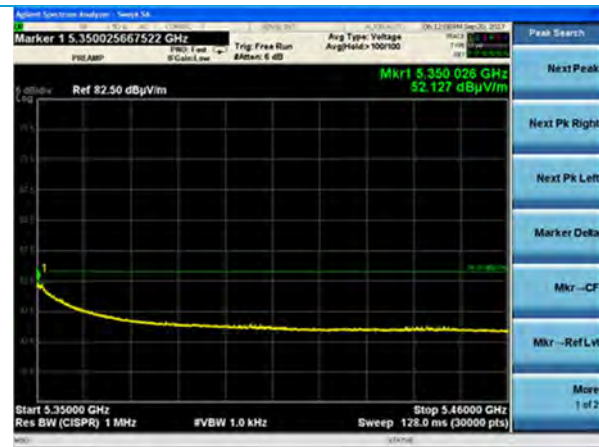


UBE Peak (ISED)

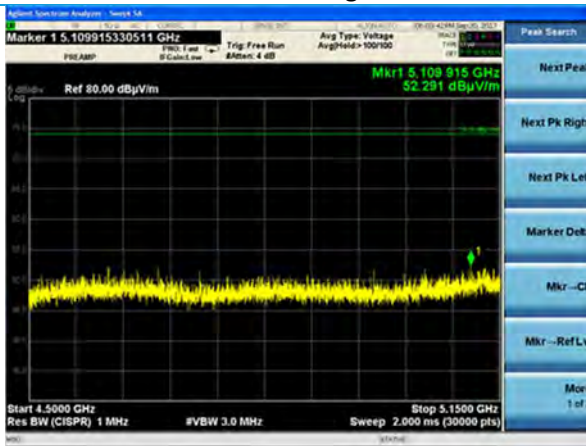
UNII 2A FCC



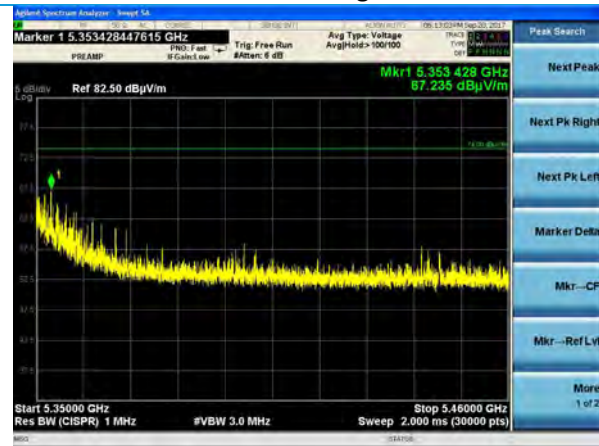
LBE Average



UBE Average

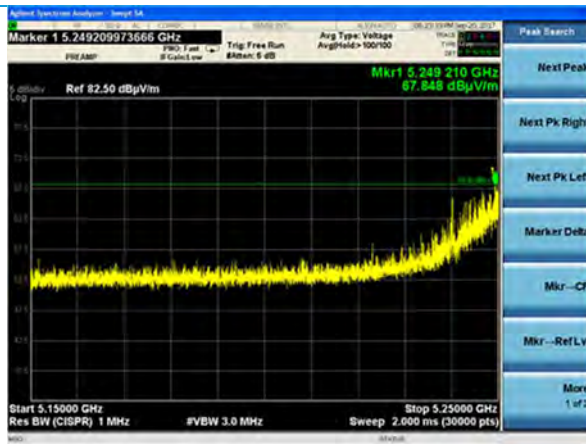


LBE Peak

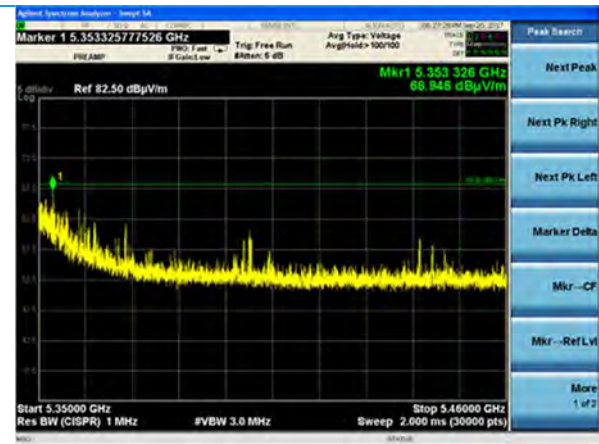


UBE Peak

UNII 2A ISD

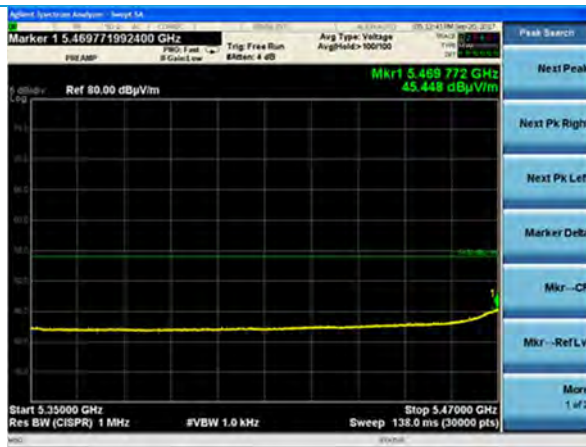


LBE Peak

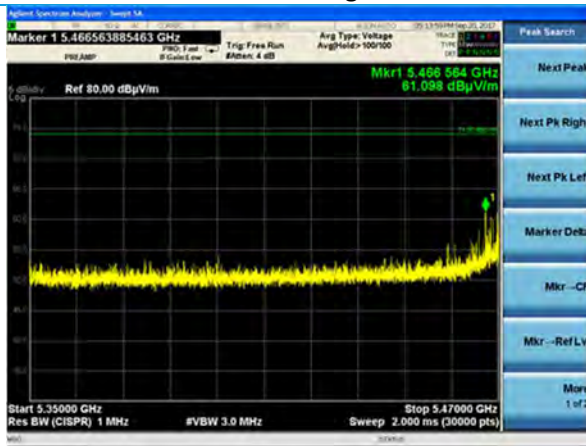


UBE Peak

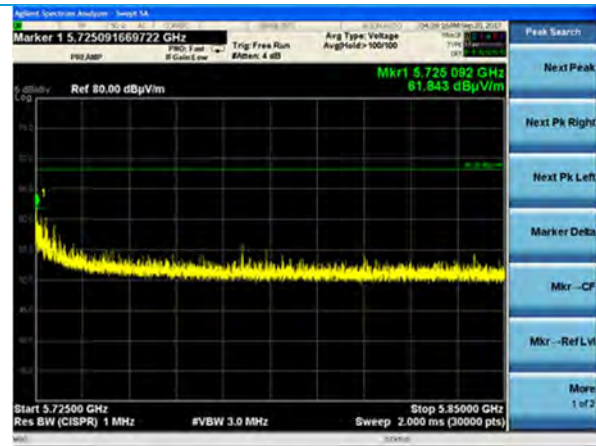
UNII 2C FCC



LBE Average



LBE Peak

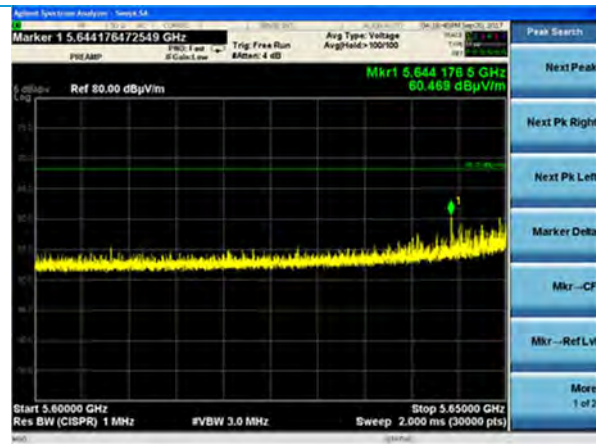


UBE Peak

UNII 2C ISED

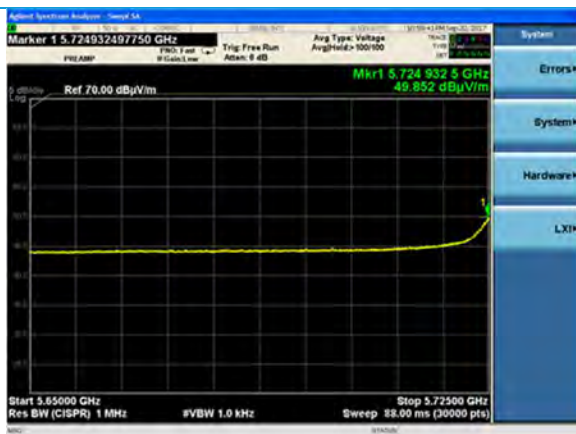


LBE Peak



UBE Peak

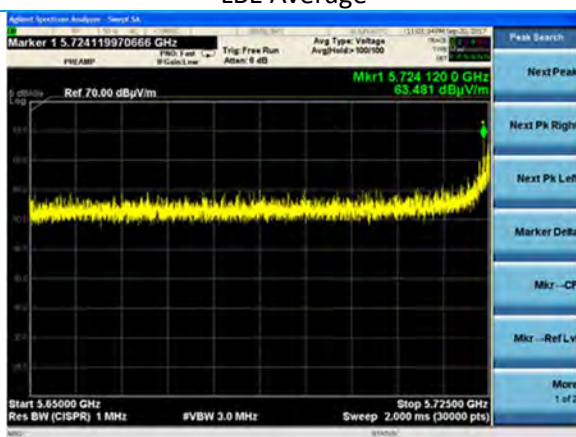
UNII 3



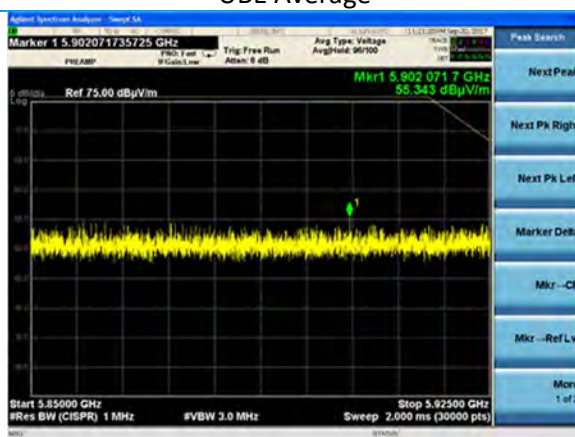
LBE Average



UBE Average



LBE Peak



UBE Peak

5.2.2 Radiated – Spurious & Harmonic Emissions

Operator	Zach Wilson
QA	Shane Dock
Test Date	8/30/17 - 9/21/17
Location	Chamber 3, Chamber 5
Temp. / R.H.	72 degrees F/ 51% RH
Requirement	FCC 15.407 (b)(1-8) RSS 247 Issue 2 Sections 6.2.1.2, 6.2.2.2, 6.2.3.2, 6.2.4.2
Method	KDB 789033 D02 v01r04 Section II.G.1,3,5 (max), 6 (average)

Limits:

U-NII Band	Frequency Range	FCC Limit (@ 3m)	ISED Limit (@ 3m)
All	30-88 MHz	Quasi-peak 40 dBμV/m	Quasi-peak 40 dBμV/m
All	88-216 MHz	Quasi-peak 43.5 dBμV/m	Quasi-peak 43.5 dBμV/m
All	216-960 MHz	Quasi-peak 46 dBμV/m	Quasi-peak 46 dBμV/m
All	960-1000 MHz	Peak 74 dBμV/m Average 54 dBμV/m	Peak 74 dBμV/m Average 54 dBμV/m
U-NII-1	1-40 GHz	Emissions outside of 5150-5350 MHz ≤ 68.23 dBμV/m	Emissions outside of 5150-5350 MHz ≤ 68.23 dBμV/m
U-NII-2A	1-40 GHz	Emissions outside of 5150-5350 MHz ≤ 68.23 dBμV/m	1) Emissions outside of 5250-5350 MHz ≤ 68.23 dBμV/m OR 2) Emissions outside of 5150-5350 MHz ≤ 68.23 dBμV/m AND PSD must comply with ISED U- NII-1 PSD limit
U-NII-2C	1-40 GHz	Emissions outside of 5470-5725 MHz ≤ 68.23 dBμV/m	1) Emissions outside of 5470-5600 MHz AND 5650-5725 MHz ≤ 68.23 dBμV/m 2) Devices w/ BW overlapping the band edge of 5725 MHz can meet the emission limit of 68.23 dBμV/m at 5850 MHz instead of 5725 MHz
U-NII-3	1-40 GHz	Unwanted emissions must comply with the following: 1) 122.23 dBμV/m at frequencies from the band edges decreasing linearly to 110.83 dBμV/m at 5 MHz above or below the band edges; 2) 110.83 dBμV/m at 5 MHz above or below the band edges decreasing linearly to 105.23 dBμV/m at 25 MHz above or below the band edges; 3) 105.23 dBμV/m at 25 MHz above or below the band edges decreasing linearly to 68.23 dBμV/m above or below the band edges; and 68.23 dBμV/m at frequencies more than 75 MHz above or below the band edges.	

Test Parameters

Frequency	30-40000 MHz
Distance	3 meters
Test Chamber	Above 1 GHz: Absorbers on floor and tilt gear added to antenna assembly to maintain cone of radiation.
Note	Emissions below 1 GHz not a function of Radio
Example Calculation	Raw Data + Antenna Factor + Cable Factor = Reported Data 19.77 dBμV + 12.5 dB/m + 0.93 dB = 38.8 dBμV/m

Instrumentation



Date : 22-Aug-2017

PE : Shane Dock

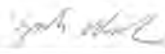
Test : Spurious Emissions

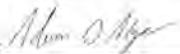
Customer : GE Healthcare

Job : C-2826

Quote : 317060

No.	Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due Date	Equipment Status
1	EE 960085	EM Receiver	Agilent	N9038A	MY51210148	5/12/2017	5/12/2018	Active Calibration
2	AA 960176	Cable - low loss 6m	A.H. Systems, Inc	SAC-26G-6	395	5/15/2017	5/15/2018	Active Verification
3	AA 960158	Double Ridge Horn Antenna	ETS Lindgren	3117	109300	4/12/2017	4/12/2018	Active Calibration
4	EE 960159	Low Noise Amplifier	Mini-Circuits	ZVA-213X-S+	462101702	4/12/2017	4/12/2018	Active Calibration
5	AA 960161	Highpass Filter 5 GHz	K&L Microwave	11SH10-8000	2	4/5/2017	4/5/2018	Active Calibration
6	EE 960087	Spectrum Analyzer	Agilent	N9010A	MY53400296	12/22/2016	12/22/2017	Active Calibration
7	AA 960162	EM Series Cable	MegaPhase	EM26-S1S1-120	12024301 001	6/29/2016	11/11/2017	Active Verification
8	AA 960174	Small Horn Antenna	ETS Lindgren	3116C-PA	00206880	5/1/2017	5/1/2018	Active Calibration
9	EE 960088	EM Receiver	Agilent	N9038A	MY51210138	3/2/2017	3/2/2018	Active Calibration
10	AA 960162	EM Series Cable	MegaPhase	EM26-S1S1-120	12024301 001	6/29/2016	11/11/2017	Active Verification
11	AA 960128	Biconical Antenna	ETS Lindgren	3110B	00062899	4/13/2017	4/13/2018	Active Calibration

Tested By: 

Quality Assurance: 

Table

UNII 1

1-4.5 GHz Peak							
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
3.3695	6 Mbps	36	Front	Vertical	53.3	74.0	20.7
3.5025	MCS0	36	Front	Vertical	53.4	74.0	20.6
3.3625	6 Mbps	36	Front	Horizontal	53.1	74.0	20.9
3.5970	MCS0	36	Front	Horizontal	52.9	74.0	21.1

1-4.5 GHz Average							
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Avg Reading (dBμV/m)	Avg Limit (dBμV/m)	Avg Margin (dB)
3.4500	6 Mbps	36	Front	Vertical	45.8	54.0	8.2
3.3310	MCS0	36	Front	Vertical	46.2	54.0	7.8
3.5830	6 Mbps	36	Front	Horizontal	46.1	54.0	7.9
3.5935	MCS0	36	Front	Horizontal	46.2	54.0	7.8

5.46-8 GHz Peak							
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
7.4209	6 Mbps	44	Front	Vertical	57.3	74.0	16.7
7.6622	6 Mbps	44	Front	Horizontal	57.1	74.0	16.9

5.46-8 GHz Average							
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Avg Reading (dBμV/m)	Avg Limit (dBμV/m)	Avg Margin (dB)
7.9187	6 Mbps	44	Front	Vertical	50.5	54.0	3.5
7.8425	6 Mbps	44	Front	Horizontal	50.7	54.0	3.3

UNII 2A FCC

1-4.5 GHz Peak							
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
3.5270	6 Mbps	56	Front	Vertical	52.4	74.0	21.6
3.3485	6 Mbps	56	Front	Horizontal	52.2	74.0	21.8

1-4.5 GHz Average							
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Avg Reading (dBμV/m)	Avg Limit (dBμV/m)	Avg Margin (dB)
3.5970	6 Mbps	56	Front	Vertical	46.0	54.0	8.0
3.3660	6 Mbps	56	Front	Horizontal	45.9	54.0	8.1

5.46-8 GHz Peak							
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
7.3523	6 Mbps	64	Front	Vertical	57.5	74.0	16.5
7.3752	6 Mbps	64	Front	Horizontal	56.4	74.0	17.6

5.46-8 GHz Average							
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Avg Reading (dBμV/m)	Avg Limit (dBμV/m)	Avg Margin (dB)
7.5276	6 Mbps	64	Front	Vertical	50.5	54.0	3.5
7.7612	6 Mbps	64	Front	Horizontal	51.0	54.0	3.0

UNII 2A ISED

1-4.5 GHz Peak							
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
3.5270	6 Mbps	56	Front	Vertical	52.4	74.0	21.6
3.3485	6 Mbps	56	Front	Horizontal	52.2	74.0	21.8

1-4.5 GHz Average							
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Avg Reading (dBμV/m)	Avg Limit (dBμV/m)	Avg Margin (dB)
3.5970	6 Mbps	56	Front	Vertical	46.0	54.0	8.0
3.3660	6 Mbps	56	Front	Horizontal	45.9	54.0	8.1

5.46-8 GHz Peak							
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
7.3523	6 Mbps	64	Front	Vertical	57.5	74.0	16.5
7.3752	6 Mbps	64	Front	Horizontal	56.4	74.0	17.6

5.46-8 GHz Average							
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Avg Reading (dBμV/m)	Avg Limit (dBμV/m)	Avg Margin (dB)
7.5276	6 Mbps	64	Front	Vertical	50.5	54.0	3.5
7.7612	6 Mbps	64	Front	Horizontal	51.0	54.0	3.0

UNII 2C

1-5.35 GHz Peak							
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
5.1590	6 Mbps	100	Front	Vertical	53.8	74.0	20.2
3.4741	6 Mbps	100	Front	Horizontal	52.7	74.0	21.3

1-5.35 GHz Average							
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Avg Reading (dBμV/m)	Avg Limit (dBμV/m)	Avg Margin (dB)
5.1563	6 Mbps	100	Front	Vertical	47.2	54.0	6.8
3.5959	6 Mbps	100	Front	Horizontal	46.3	54.0	7.7

5.85-8 GHz Peak							
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Peak Reading (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)
7.7437	6 Mbps	140	Front	Vertical	56.5	74.0	17.5
7.3251	6 Mbps	140	Front	Horizontal	57.2	74.0	16.8

5.85-8 GHz Average							
Frequency (GHz)	Data Rate	Channel	EUT orientation	Antenna Polarity	Avg Reading (dBμV/m)	Avg Limit (dBμV/m)	Avg Margin (dB)
7.8886	6 Mbps	140	Front	Vertical	50.6	54.0	3.4
7.7236	6 Mbps	140	Front	Horizontal	50.5	54.0	3.5

UNII 3

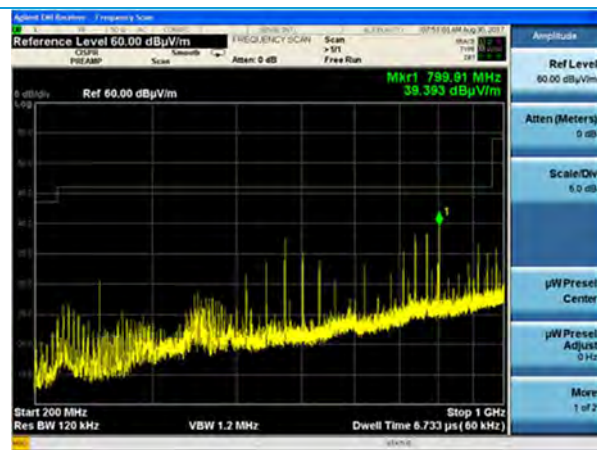
Emissions for UNII 3 are not a function of the EUT

Plots – U-NII Spurious Emissions

Plots show worst case (highest) emissions in the respective frequency range over all U-NII bands, unless otherwise noted.



30-200 MHz



200-1000 MHz



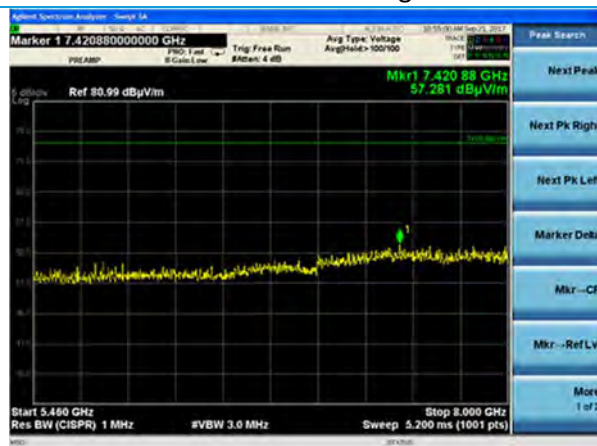
1-4.5 GHz – Peak



1-4.5 GHz – Average



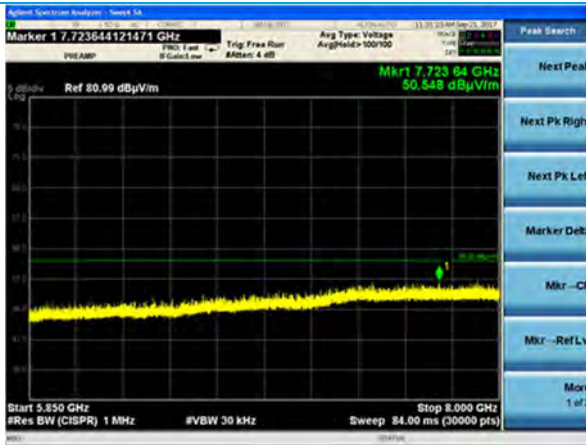
1-5.35 GHz – Average (U-NII-2C/U-NII-3)



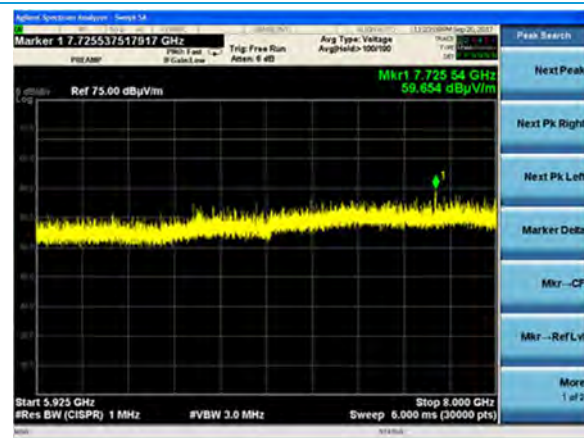
5.46-8 GHz – Peak (U-NII-1/U-NII-2A)

Plots – U-NII Spurious Emissions

Plots show worst case (highest) emissions in the respective frequency range over all U-NII bands, unless otherwise noted.



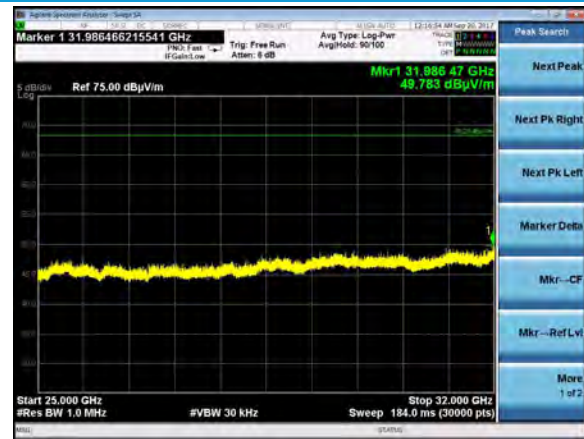
5.725-8 GHz – Average (U-NII-2C)



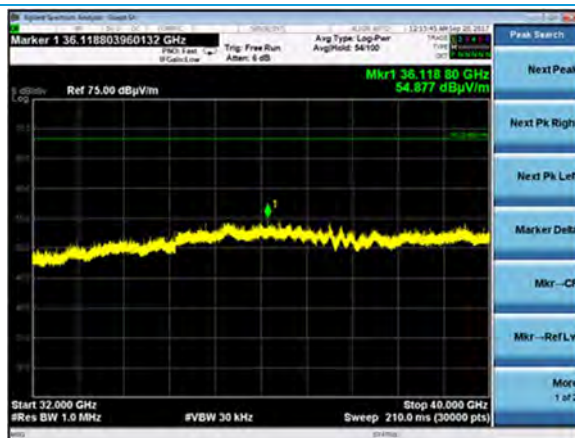
5.975-8 GHz – Peak (U-NII-3)



18-25 GHz – RBW



25-32 GHz – RBW



32-40 GHz – RBW

5.3 AC Mains Conducted Emissions

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.

Description of Measurement

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.

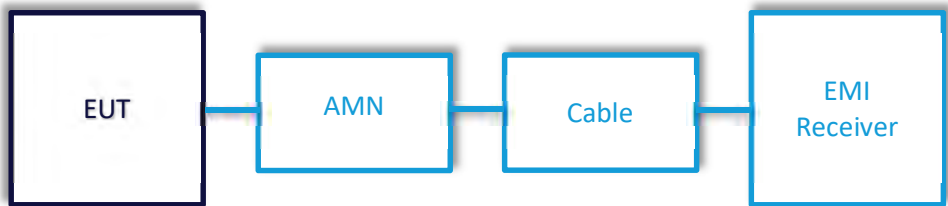
Maximum emissions are determined with a peak max hold trace then measurements at a selection of the highest points are made with quasi-peak and average detectors. Results are recorded and compared to limit for each line. (e.g. line and neutral)

Example Calculations

$$\text{Measurement (dB}\mu\text{V)} + \text{Cable factor (dB)} + \text{Other (dB)} = \text{Corrected Reading (dB}\mu\text{V)}$$

$$\text{Margin (dB)} = \text{Limit (dB}\mu\text{V)} - \text{Corrected Reading (dB}\mu\text{V)}$$

Block Diagram



5.3.1 AC Mains Conducted Emissions

Operator	Shane Dock
Test Date	8/22/17
Location	Conducted AC Mains Emissions
Temp. / R.H.	72/51%
Requirement	FCC 15.407 (b)(6) / RSS-GEN Section 8.8
Method	ANSI C63.10 2013 Section 6.2

Limits:

Frequency of Emission (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	.150-30 MHz
Settings	RBW = 9 kHz, VBW = 90 kHz
Example Calculation	Raw Data + Correction Factor = Reported Data 20.75 dBμV + 0.78 dB = 21.53 dBμV
EUT Configuration	Tx Mode Tested on Mid Channel (Worst-Case)

Instrumentation



Smart Technology. Delivered.

Date : 22-Aug-2017

Test : Conducted Emissions

Job : C-2826

FE : Shane Dock

Customer : GE Healthcare

Quote : 317060

No.	Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due Date	Equipment Status
1	EE 960089	LISN	COM-POWER	LI-215A	191943	3/13/2017	3/13/2018	Active Calibration
2	EE 960088	EMI Receiver	Agilent	N9038A	MY51210138	3/2/2017	3/2/2018	Active Calibration

Company: GE Healthcare	Page 68 of 70	Name: PPD
Report: 317060 B		Model: See Section 2.1
Job: C-2826		Serial: See Section 2.1

Table – Conducted AC Emissions Data

Line	Frequency (MHz)	Q-Peak Reading (dBμV)	Q-Peak Limit (dBμV)	Quasi-Peak Margin (dB)	Average Reading (dBμV)	Average Limit (dBμV)	Average Margin (dB)
1	0.244	40.9	61.9	21.0	29.2	51.9	22.8
1	0.159	46.0	65.5	19.5	32.5	55.5	23.1
1	0.150	47.2	66.0	18.8	33.0	56.0	23.0
1	0.186	43.7	64.2	20.5	33.0	54.2	21.2
2	0.150	45.2	66.0	20.8	20.9	56.0	35.1
2	0.159	44.0	65.5	21.6	20.2	55.5	35.3
2	0.172	42.4	64.8	22.4	19.4	54.8	35.5
2	0.191	42.5	64.0	21.5	29.1	54.0	24.9

Plots – Conducted AC Emissions



6 REVISION HISTORY

Version	Date	Notes	Person
V0	10/12/17	First Draft	Shane Dock
V1	10/18/17	Revised Draft	Shane Dock
V2	10/25/17	Final Draft	Shane Dock
V3	2/2/18	Updated Draft	Shane Dock
V4	3/6/18	Frequency Stability Added	Shane Dock

END OF REPORT