DigitalPath, Inc.

TEST REPORT FOR

Gen7 AP
Models: G7RL10H and G7RL10S

Tested to The Following Standards:

FCC Part 15 Subpart E Section(s)

15.207 & 15.407
UNII 1 AND UNII 2a

Report No.: 100331-23

Date of issue: December 18, 2017

This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

ACCREDITED
Testing Certificates:
803.01, 803.02, 803.05, 803.06

CKC LABORATORIES, INC.
Testing the Future

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:	**REPORT PREPARED BY:**
DigitalPath, Inc. 1065 Marauder St. Chico, CA 95973	Terri Rayle CKC Laboratories, Inc. 5046 Sierra Pines Drive Mariposa, CA 95338
Representative: Brock Eastman	Project Number: 100331
DATE OF EQUIPMENT RECEIPT:	October 4, 2017
DATE(S) OF TESTING:	October 4, 2017 and November 3-17, 2017

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.

Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information

Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

1120 Fulton Place
Fremont, CA 94539

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.11

Site Registration & Accreditation Information

Location	NIST CB #	TAIWAN	CANADA	FCC	JAPAN
Fremont, CA	US0082	SL2-IN-E-1148R	3082B-1	US1023	A-0149
Mariposa A, CA	US0103	SL2-IN-E-1147R	3082A-2	US1024	A-0136

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart E - 15.407 (UNII 1 and UNII 2a)

Test Procedure	Description	Modifications	Results
15.215	Occupied Bandwidth	Mod. #1	Pass
15.407(a)	Output Power	Mod. #1	Pass
15.407(a)	Power Spectral Density	Mod. #1	Pass
15.407(a)	EIRP at >30º Elevation	Mod. #1	Pass
15.407(b)&(b)(1)	Radiated Emissions & Band Edge	Mod. #1	Pass
15.207	AC Conducted Emissions	Mod. #1	Pass

Modifications During Testing

This list is a summary of the modifications made to the equipment during testing.

Summary of Conditions
Modification #1: A new GPS unit was installed into the product in order to pass spurious emissions. Product Name: ublox7 Model: Max-7 GNSS module Serial: NA Manufacturer: ublox
All testing was repeated to insure validity of test results.

Modifications listed above must be incorporated into all production units.

Conditions During Testing

This list is a summary of the conditions noted to the equipment during testing.

Summary of Conditions
When Chains 0 & 1 are active the max data rates are 173Mbps, 360MBps and 780Mbps.

EQUIPMENT UNDER TEST (EUT)

During testing, numerous configurations may have been utilized. The configurations listed below support compliance to the standard(s) listed in the Summary of Results section.

Configuration 1

Equipment Tested:

Device	Manufacturer	Model #	S/N
Gen7 AP	DigitalPath, Inc.	G7RL10S	0000001
Switching Gigabit Power Supply	Ubiquiti Networks	GP-C500-120G	1713-0000107

Support Equipment:

Device	Manufacturer	Model #	S/N
AC/DC power Adapter	HP	Series PPP012H-S	F12941126327228
Laptop Computer	HP	Probook 6565b	None

Configuration 2

Equipment Tested:

Device	Manufacturer	Model #	S/N
Gen7 AP	DigitalPath, Inc.	G7RL10S	0000001
Switching Gigabit Power Supply	Ubiquiti Networks	GP-C500-120G	1713-0000107
30 Degree Horn Antenna	DigitalPath, Inc.	DP-TP-5-30	None

Support Equipment:

Device	Manufacturer	Model #	S/N
Laptop Computer	HP	Probook 6565b	None
AC/DC power Adapter	HP	Series PPP012H-S	F12941126327228

Configuration 3

Equipment Tested:

Device	Manufacturer	Model #	S/N
Gen7 AP	DigitalPath, Inc.	G7RL10S	0000001
Switching Gigabit Power Supply	Ubiquiti Networks	GP-C500-120G	1713-0000107
50 Degree Horn Antenna	Digital Path, Inc.	DP-TP-5-50	None

Support Equipment:

Device	Manufacturer	Model #	S/N
Laptop Computer	HP	Probook 6565b	None
AC/DC power Adapter	HP	Series PPP012H-S	F12941126327228

Configuration 4

Equipment Tested:

Device	Manufacturer	Model #	S/N
Gen7 AP	DigitalPath, Inc.	G7RL10S	0000001
Switching Gigabit Power Supply	Ubiquiti Networks	GP-C500-120G	1713-0000107
90 Degree Horn Antenna	Digital Path, Inc.	DP-TP-5-90	None

Support Equipment:

Device	Manufacturer	Model #	S/N
Laptop Computer	HP	Probook 6565b	None
AC/DC power Adapter	HP	Series PPP012H-S	F12941126327228

Configuration 5

Equipment Tested:

Device	Manufacturer	Model #	S/N
Gen7 AP	DigitalPath, Inc.	G7RL10H	0000002
Switching Gigabit Power Supply	Ubiquiti Networks	GP-C500-120G	1713-0000107

Support Equipment:

Device	Manufacturer	Model #	S/N
Laptop Computer	HP	Probook 6565b	None
AC/DC power Adapter	HP	Series PPP012H-S	F12941126327228

Configuration 7

Equipment Tested:

Device	Manufacturer	Model #	S/N
90 Degree Horn Antenna	DigitalPath, Inc.	DP-TP-5-90	None
50 Degree Horn Antenna	DigitalPath, Inc.	DP-TP-5-50	None
30 Degree Horn Antenna	DigitalPath, Inc.	DP-TP-5-30	None
Gen7 AP	DigitalPath, Inc.	G7RL10H	0000002
Gen7 AP	DigitalPath, Inc.	G7RL10S	0000001
Switching Gigabit Power Supply	Ubiquiti Networks	GP-C500-120G	1713-0000107

Support Equipment:

Device	Manufacturer	Model #	S/N
Laptop Computer	HP	Probook 6565b	None
AC/DC power Adapter	HP	Series PPP012H-S	F12941126327228

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of Wideband System:	802.11ac
Operating Frequency Range:	5.15 – 5.350 GHz
Modulation Type(s):	OFDM
Maximum Duty Cycle:	100%
Number of TX Chains:	4 (All are identical)
Antenna Type(s) and Gain:	30 Degree Horn / 17.5dBi 50 Degree Horn / 13dBi 90 Degree Horn / 9dBi HexHorn / 13dBi
Beamforming Type:	None
Antenna Connection Type:	Integral PCB Trace
Nominal Input Voltage:	48VDC POE
Firmware / Software used for Test:	Web Interface on EUT to Atheros TX99 Tool: athtestcmd provided by Qualcomm

Notes:

1. The 50 Degree Horn and the HexHorn are identical. The HexHorn has 6 of the 50 Degree horns within it and it uses the same exact radio.
2. Within the definitions provided within KDB 662911 D01 v02r01, the manufacturer declares the output from all antennas to be completely uncorrelated therefore, power aggregation is not required.

15.215 Occupied Bandwidth

Test Setup/Conditions			
Test Location:	Mariposa Lab A	Test Engineer:	Benny Lovan
Test Method:	ANSI C63.10 (2013), KDB 789033 v01r04 (May 2, 2017)	Test Date(s):	11/3/2017
Configuration:	1		
Test Setup:	The EUT is setup on a table with its antenna port directly connected to an analyzer through 11.4dB of attenuation. The EUT has two antenna ports that are identical. Testing was performed on Port 1		
Declaration:	Modification #1 was in place during testing.		

Environmental Conditions			
Temperature (ºC)	20	Relative Humidity (%):	42

Test Equipment

Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02660	Spectrum Analyzer	Agilent	E4446A	10/10/2016	10/10/2018
03361	Cable	Astrolab	32022-2-29094-48TC	1/10/2017	1/10/2019
P05935	Attenuator	Weinschel	84A-10	1/18/2016	1/18/2018

26dB Occupied Bandwidth

Test Data Summary UNII 1					
Frequency (MHz)	**Antenna Port**	**Modulation**	**Measured (kHz)**	**Limit (kHz)**	**Results**
5180	1	OFDM / 20MHz	23221	None	NA
5200	1	OFDM / 20MHz	23198		
5240	1	OFDM / 20MHz	23245		
5180	1	OFDM / 40MHz	43327		
5200	1	OFDM / 40MHz	43804		
5205	1	OFDM / 40MHz	43360		
5210	1	OFDM / 40MHz	43527		
5200	1	OFDM / 80MHz	89334		
5210	1	OFDM / 80MHz	89968		
5240	1	OFDM / 80MHz	88531		

Test Data Summary – UNII 2a					
Frequency (MHz)	**Antenna Port**	**Modulation**	**Measured (kHz)**	**Limit (kHz)**	**Results**
5260	1	OFDM / 20MHz	23469	None	NA
5300	1	OFDM / 20MHz	23325		
5320	1	OFDM / 20MHz	23046		
5260	1	OFDM / 40MHz	43571		
5300	1	OFDM / 40MHz	43669		
5310	1	OFDM / 40MHz	43647		
5320	1	OFDM / 40MHz	43662		
5260	1	OFDM / 80MHz	89866		
5300	1	OFDM / 80MHz	89836		

99% Occupied Bandwidth

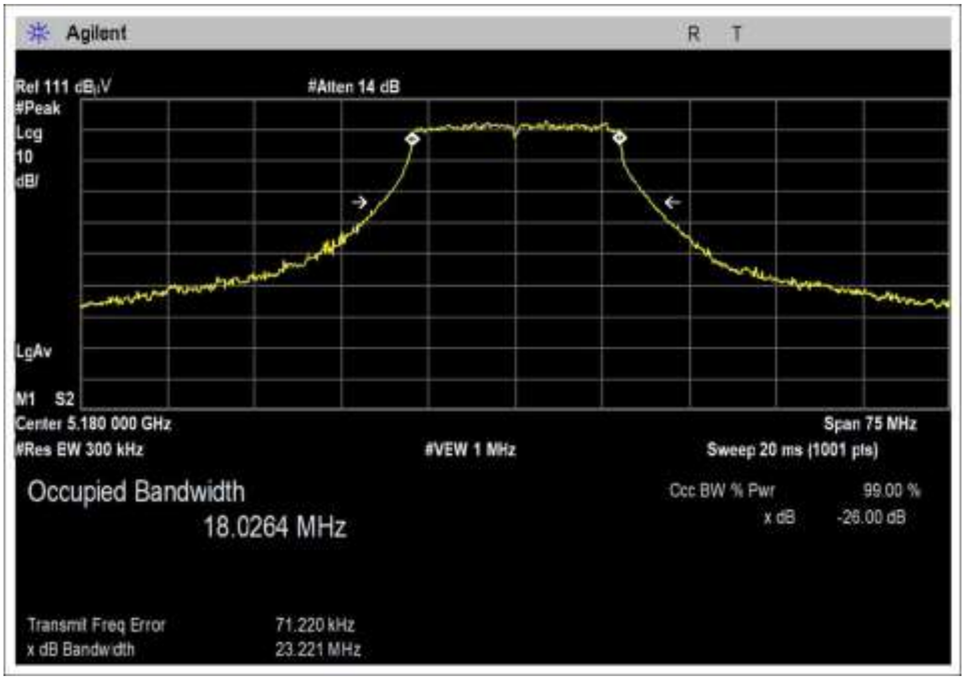
Test Data Summary – UNII 1					
Frequency (MHz)	Antenna Port	Modulation	Measured (kHz)	Limit (kHz)	Results
5180	1	OFDM / 20MHz	18026	None	NA
5200	1	OFDM / 20MHz	18014		
5240	1	OFDM / 20MHz	18020		
5180	1	OFDM / 40MHz	36421		
5200	1	OFDM / 40MHz	36398		
5205	1	OFDM / 40MHz	36388		
5210	1	OFDM / 40MHz	36424		
5200	1	OFDM / 80MHz	76233		
5210	1	OFDM / 80MHz	76195		
5240	1	OFDM / 80MHz	76222		

Test Data Summary – UNII 2a					
Frequency (MHz)	Antenna Port	Modulation	Measured (kHz)	Limit (kHz)	Results
5260	1	OFDM / 20MHz	18022	None	NA
5300	1	OFDM / 20MHz	18016		
5320	1	OFDM / 20MHz	18011		
5260	1	OFDM / 40MHz	36405		
5300	1	OFDM / 40MHz	36422		
5310	1	OFDM / 40MHz	36377		
5320	1	OFDM / 40MHz	36414		
5260	1	OFDM / 80MHz	76230		
5300	1	OFDM / 80MHz	76296		

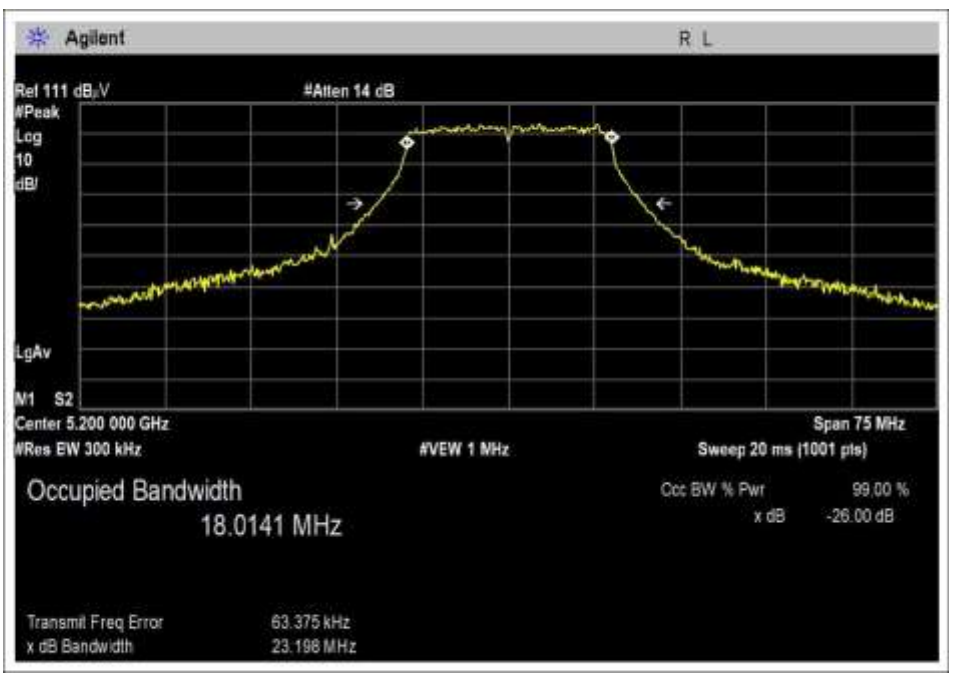
Plots

UNII 1

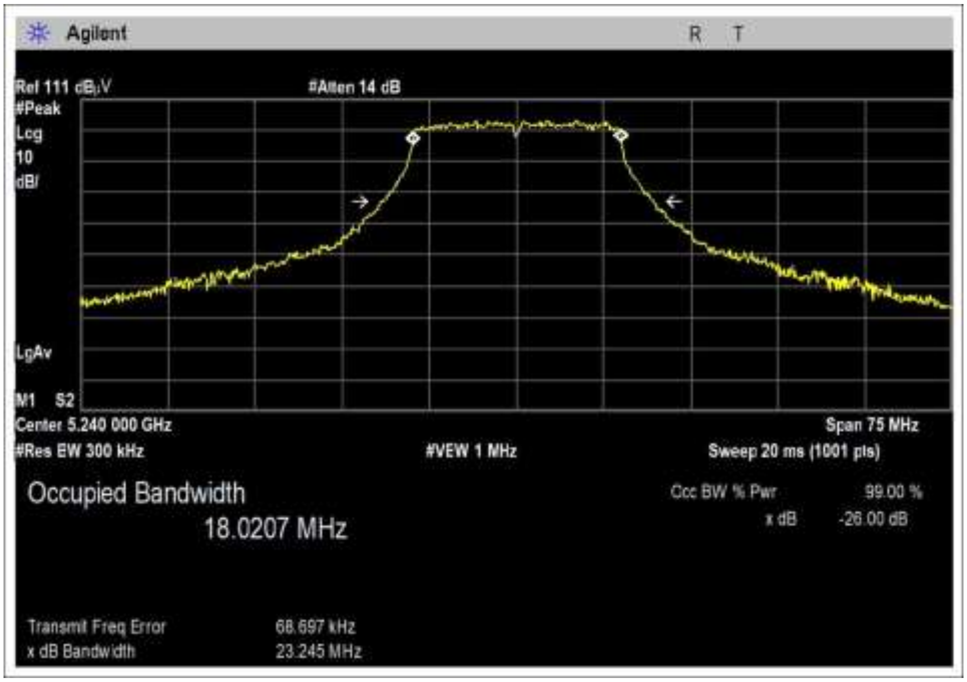
20MHz / -26dB



Low Channel

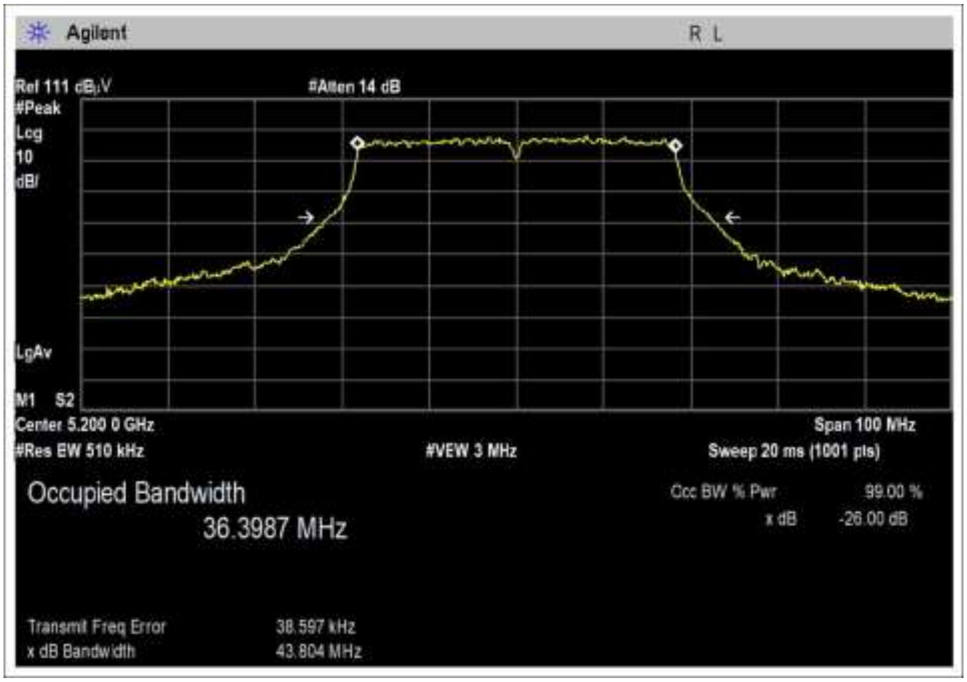


Middle Channel



High Channel

40MHz / -26dB



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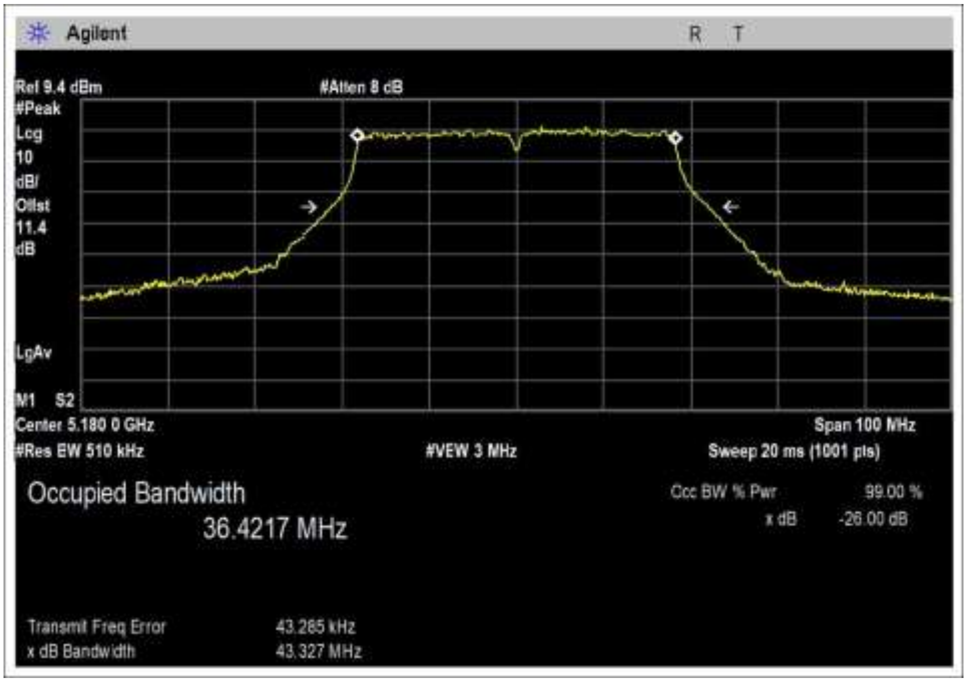
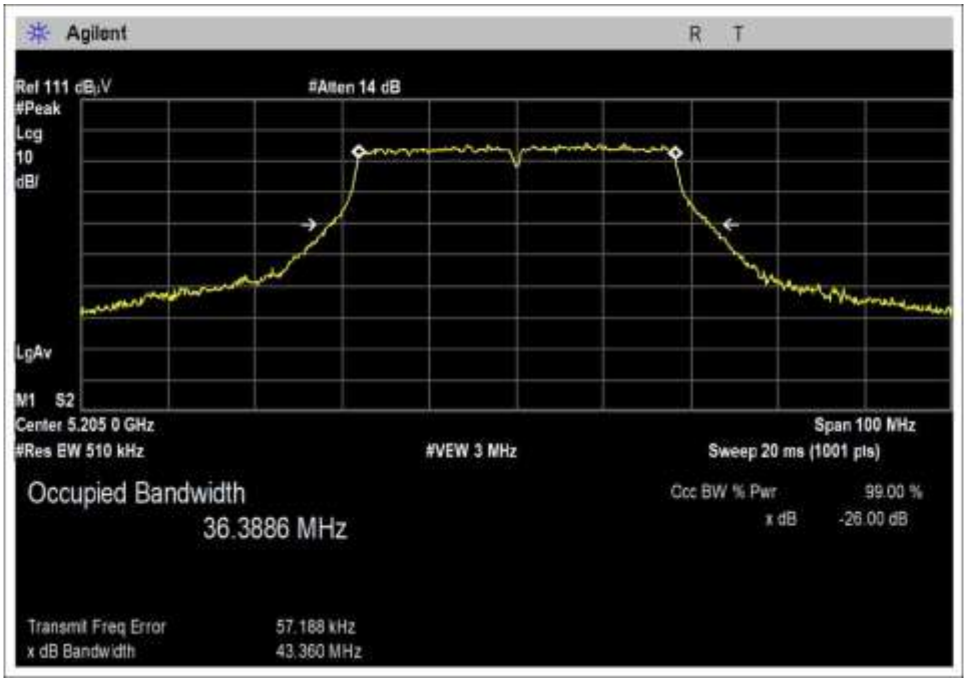


Low Channel, 5180



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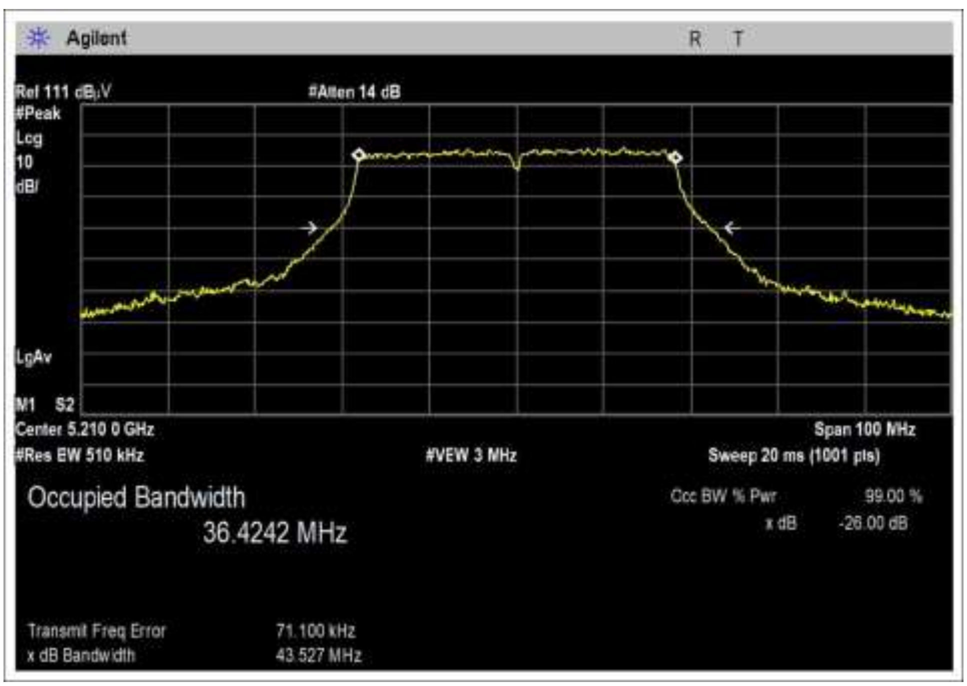
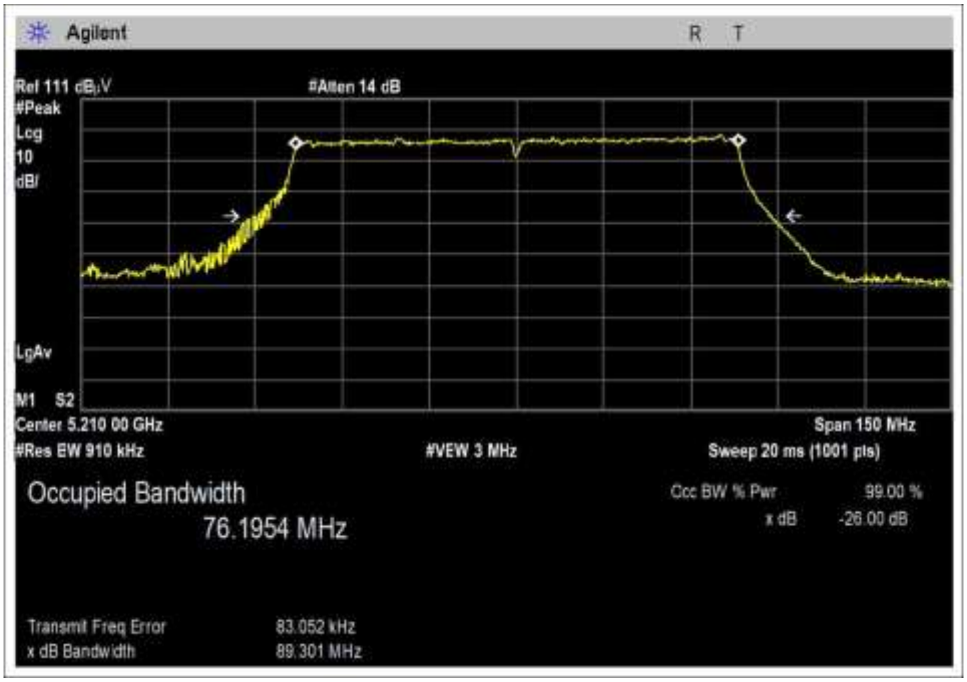
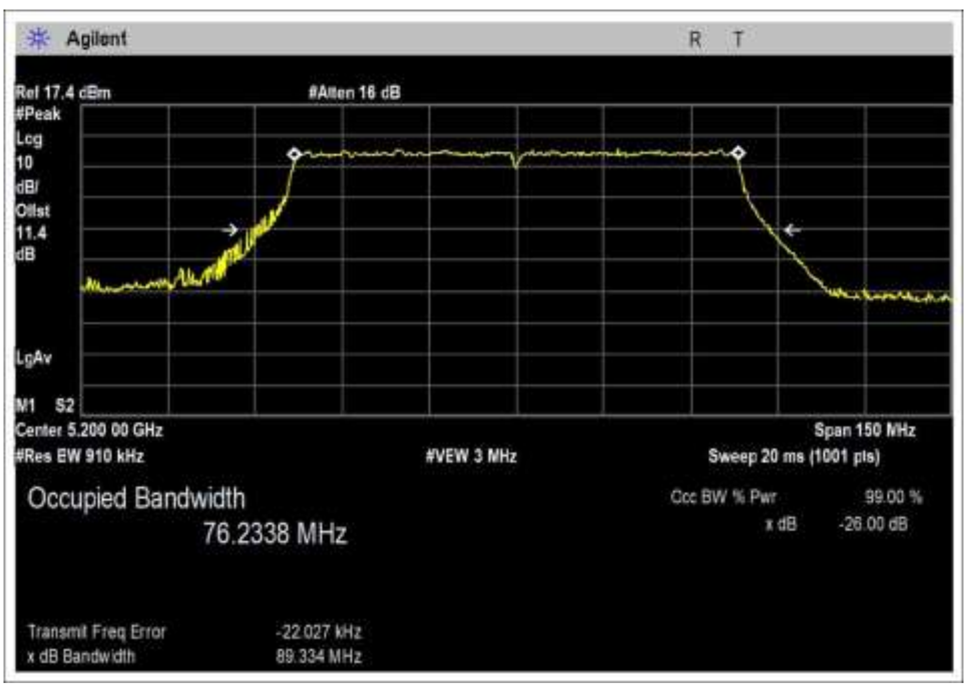


High Channel

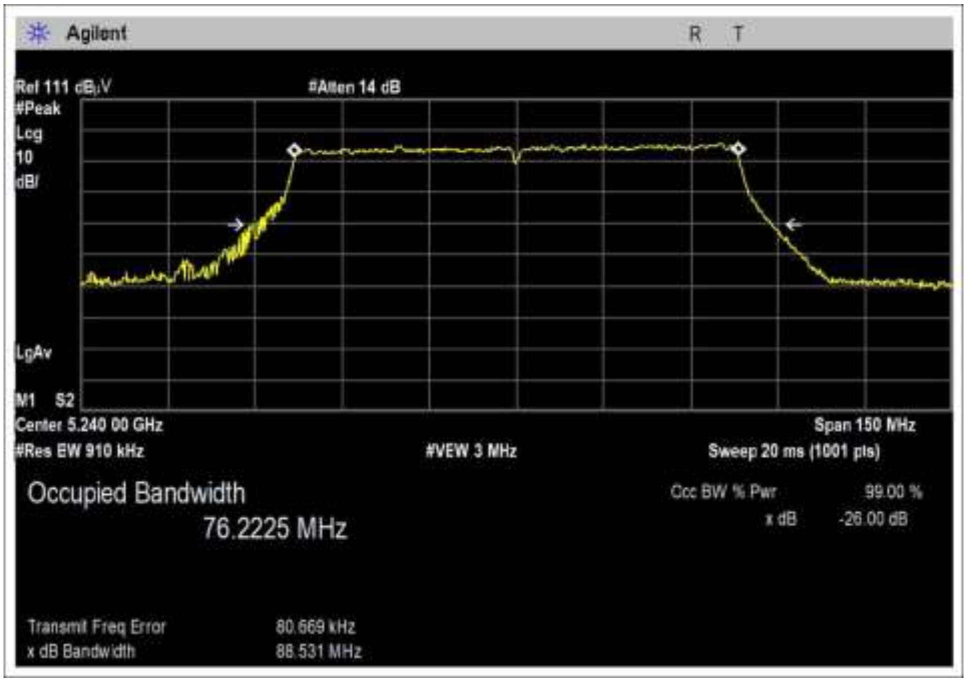
80MHz / -26dB



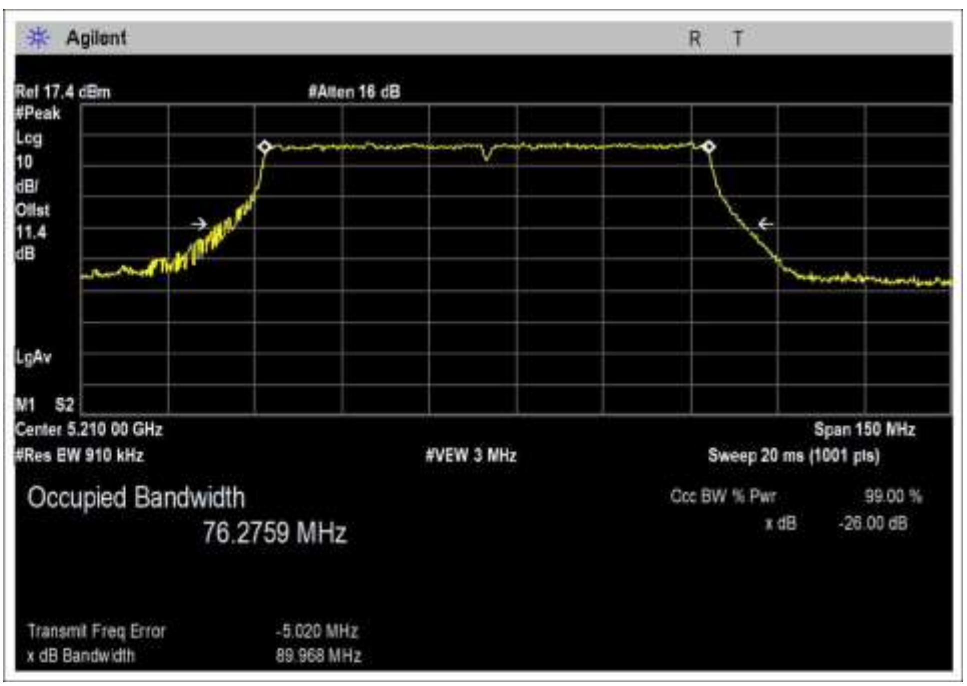
Low Channel



Low Channel, 5200



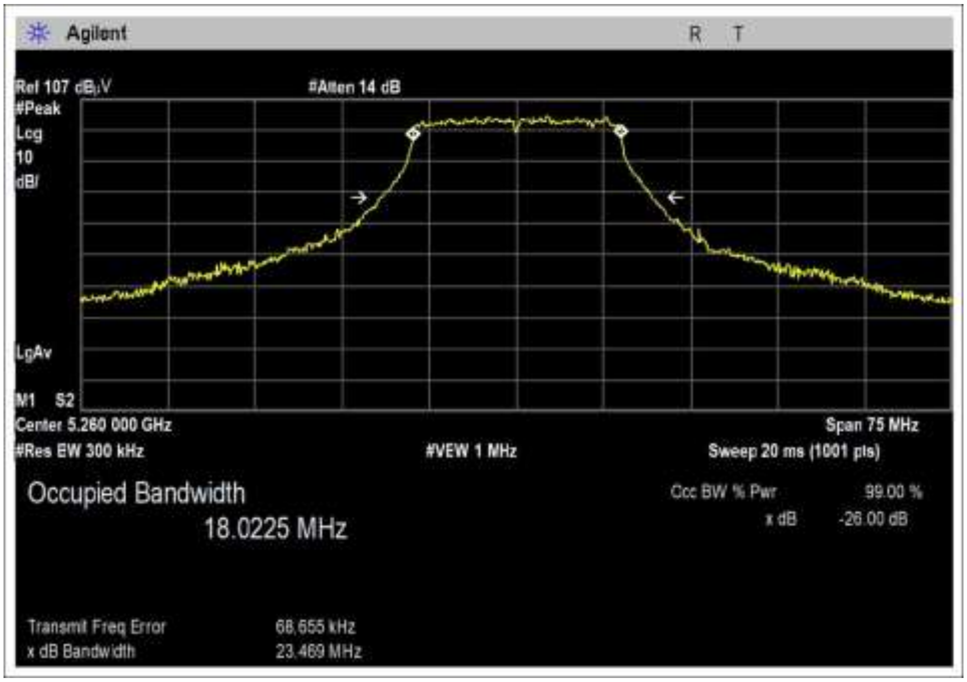
High Channel



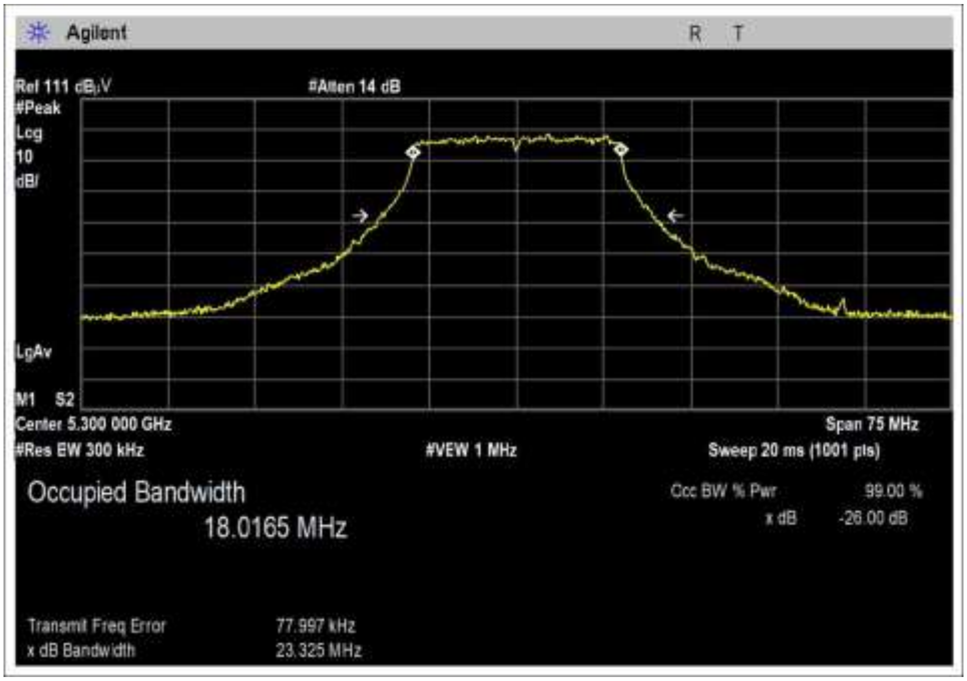
High Channel, 5210

UNII 2a

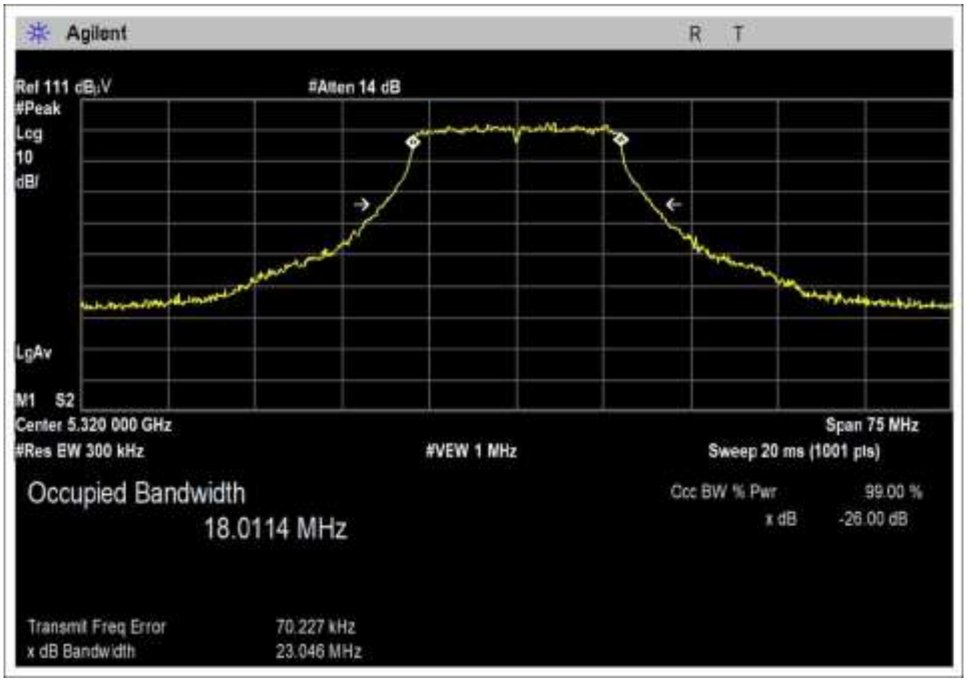
20MHz / -26dB



Low Channel

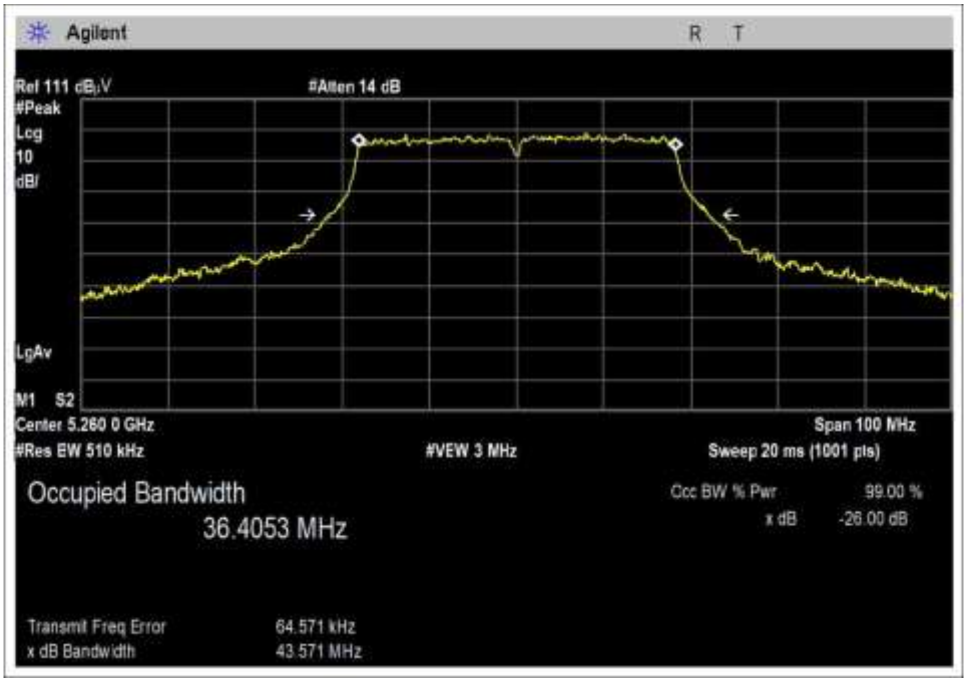


Middle Channel

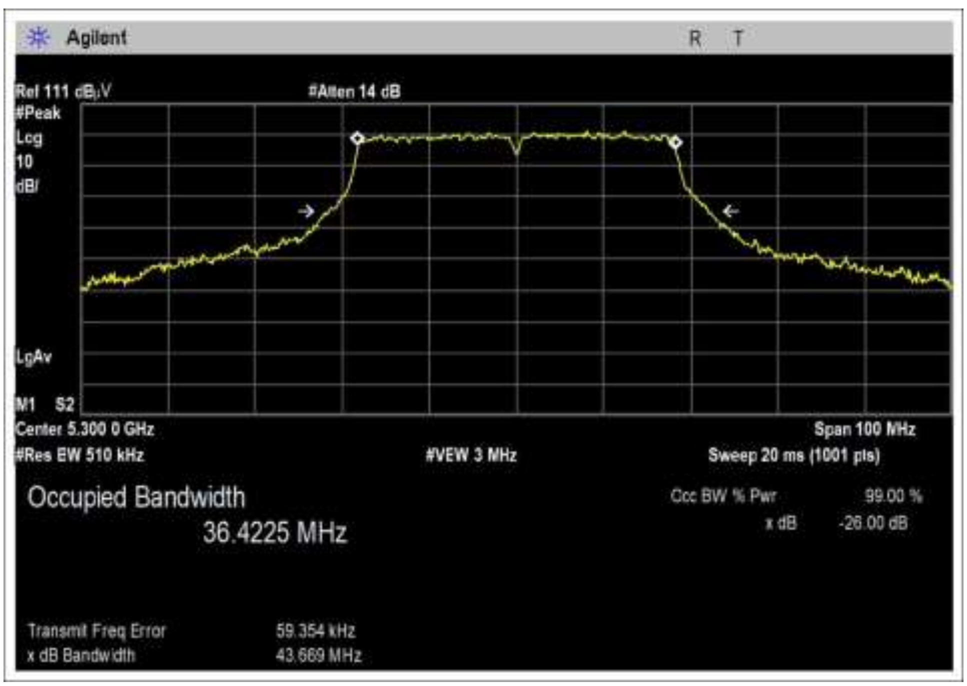


High Channel

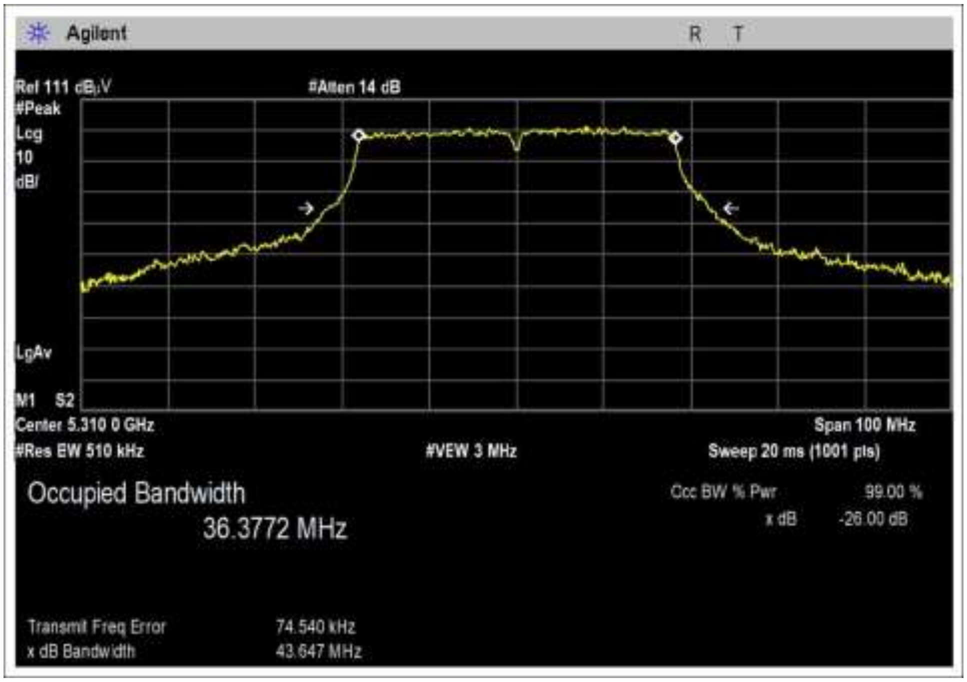
40MHz / -26dB



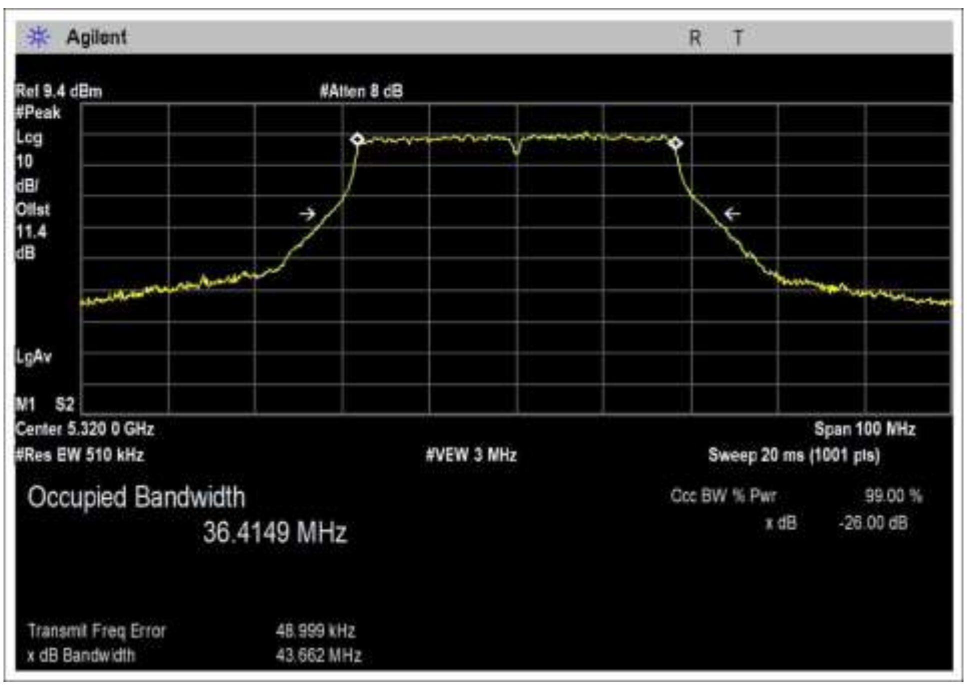
Low Channel



Middle Channel

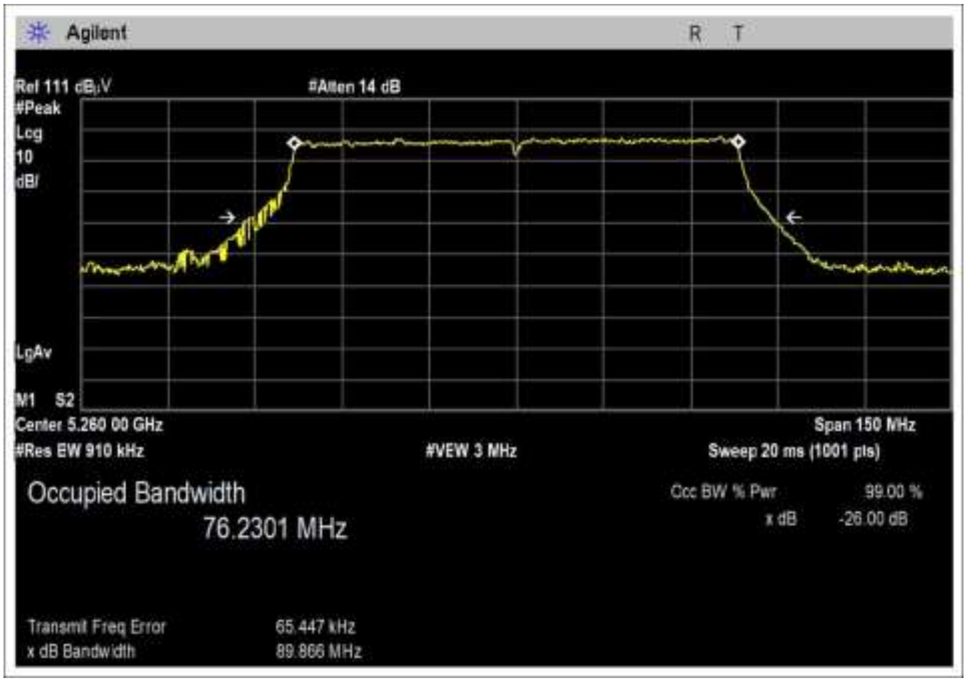


High Channel

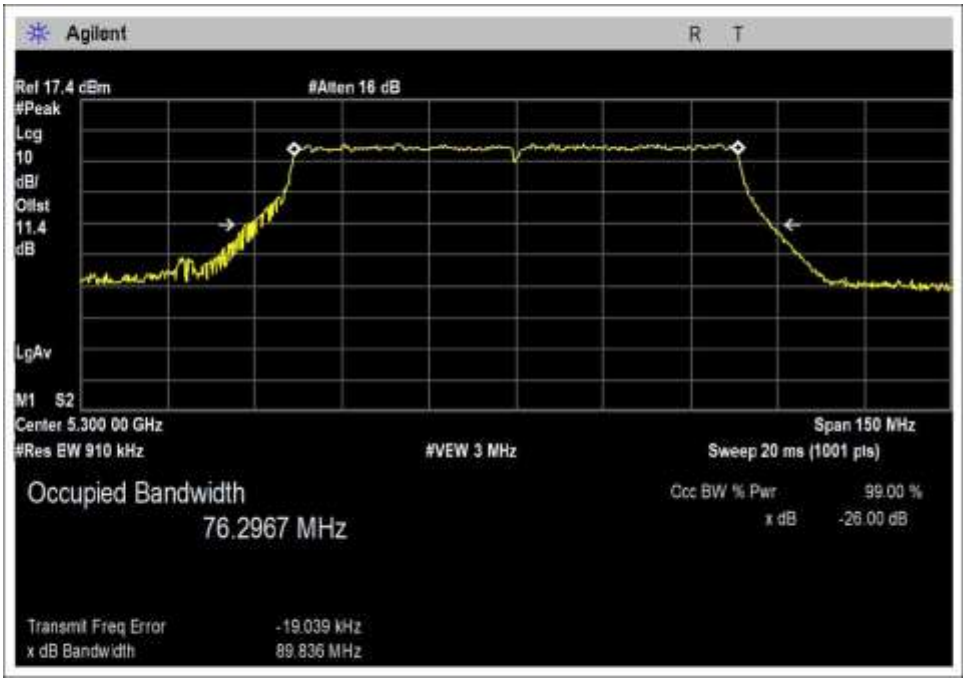


High Channel, 5320

80MHz / -26dB



Low Channel



High Channel, 5300

Test Setup Photos

15.407(a) Output Power

Test Setup/Conditions			
Test Location:	Mariposa Lab A	Test Engineer:	Benny Lovan
Test Method:	ANSI C63.10 (2013), KDB 789033 v01r04 (May 2, 2017)	Test Date(s):	11/14/2017 – 11/15/2017
Configuration:	1		
Test Setup:	The EUT is setup on a table with its antenna port directly connected to an analyzer through 11.4dB of attenuation. The EUT has two antenna ports that are identical. Testing was performed on Port 1		
Declaration:	Modification #1 was in place during testing.		

Environmental Conditions			
Temperature (ºC)	20-22	Relative Humidity (%):	42-45

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02660	Spectrum Analyzer	Agilent	E4446A	10/10/2016	10/10/2018
03361	Cable	Astrolab	32022-2-29094-48TC	1/10/2017	1/10/2019
P05935	Attenuator	Weinschel	84A-10	1/18/2016	1/18/2018

Test Data Summary - Voltage Variations-20MHz Channel Bandwidth					
Frequency (MHz)	Modulation / Ant Port	$V_{Minimum}$ (dBm)	$V_{Nominal}$ (dBm)	$V_{Maximum}$ (dBm)	Max Deviation from $V_{Nominal}$ (dB)
UNII 1					
5180	OFDM / Ant Port 1	17.98	17.96	17.98	0.02
5220	OFDM / Ant Port 1	20.43	20.44	20.42	0.02
5240	OFDM / Ant Port 1	20.79	20.78	20.76	0.03
UNII 2a					
5260	OFDM / Ant Port 1	20.73	20.74	20.73	0.01
5300	OFDM / Ant Port 1	20.04	20.06	20.07	0.03
5320	OFDM / Ant Port 1	16.90	16.89	16.88	0.02

Test performed using the conducted method and using the operational mode with the highest output power, representing worst case.

Test Data Summary - Voltage Variations-40MHz Channel Bandwidth					
Frequency (MHz)	Modulation / Ant Port	$V_{Minimum}$ (dBm)	$V_{Nominal}$ (dBm)	$V_{Maximum}$ (dBm)	Max Deviation from $V_{Nominal}$ (dB)
UNII 1					
5180	OFDM / Ant Port 1	12.30	12.32	12.30	0.02
5205	OFDM / Ant Port 1	17.00	17.01	17.02	0.02
5210	OFDM / Ant Port 1	17.13	17.13	17.15	0.02
UNII 2a					
5260	OFDM / Ant Port 1	17.62	17.62	17.63	0.01
5300	OFDM / Ant Port 1	17.01	16.98	17.00	0.03
5320	OFDM / Ant Port 1	13.20	13.21	13.20	0.01

Test performed using the conducted method and using the operational mode with the highest output power, representing worst case.

Test Data Summary - Voltage Variations-80MHz Channel Bandwidth					
Frequency (MHz)	Modulation / Ant Port	$V_{Minimum}$ (dBm)	$V_{Nominal}$ (dBm)	$V_{Maximum}$ (dBm)	Max Deviation from $V_{Nominal}$ (dB)
UNII 1					
5200	OFDM / Ant Port 1	12.34	12.35	12.36	0.02
5240	OFDM / Ant Port 1	9.21	9.22	9.21	0.01
UNII 2a					
5260	OFDM / Ant Port 1	9.08	9.09	9.09	0.01
5300	OFDM / Ant Port 1	12.45	12.45	12.46	0.01

Test performed using the conducted method and using the operational mode with the highest output power, representing worst case.

Parameter Definitions:

Measurements performed at input voltage Vnominal ± 15%.

Parameter	Value
$V_{Nominal}$:	48 VDC
$V_{Minimum}$:	40.8 VDC
$V_{Maximum}$:	55.2 VDC

UNII 1 Test Data Summary - RF Conducted Measurement					
Measurement Option: AVGSA-1					
Frequency (MHz)	**Modulation**	**Ant. Type / Gain (dBi)**	**Measured (dBm)**	**Limit (dBm)**	**Results**
20MHz Channel BW					
5180	OFDM	17.5dBi 30DegHorn	13.17	≤ 18.5	Pass
5200	OFDM	17.5dBi 30DegHorn	13.20	≤ 18.5	Pass
5240	OFDM	17.5dBi 30DegHorn	13.46	≤ 18.5	Pass
5180	OFDM	13 dBi 50DegHorn / HexHorn	16.55	≤ 23	Pass
5200	OFDM	13 dBi 50DegHorn/ HexHorn	13.20	≤ 23	Pass
5240	OFDM	13 dBi 50DegHorn/ HexHorn	13.46	≤ 23	Pass
5180	OFDM	9dBi 90DegHorn	17.55	≤ 27	Pass
5200	OFDM	9 dBi 90DegHorn	19.84	≤ 27	Pass
5240	OFDM	9 dBi 90DegHorn	20.46	≤ 27	Pass
40MHz Channel BW					
5200	OFDM	17.5dBi 30DegHorn	9.48	≤ 18.5	Pass
5205	OFDM	17.5dBi 30DegHorn	9.52	≤ 18.5	Pass
5210	OFDM	17.5dBi 30DegHorn	9.65	≤ 18.5	Pass
5190	OFDM	13 dBi 50DegHorn/ HexHorn	10.74	≤ 23	Pass
5200	OFDM	13 dBi 50DegHorn/ HexHorn	9.8	≤ 23	Pass
5205	OFDM	13 dBi 50DegHorn/ HexHorn	9.85	≤ 23	Pass
5180	OFDM	9dBi 90DegHorn	11.77	≤ 27	Pass
5205	OFDM	9 dBi 90DegHorn	16.53	≤ 27	Pass
5210	OFDM	9 dBi 90DegHorn	16.67	≤ 27	Pass
80MHz Channel BW					
5240	OFDM	17.5dBi 30DegHorn	8.67	≤ 18.5	Pass
5210	OFDM	13 dBi 50DegHorn/ HexHorn	9.98	≤ 23	Pass
5240	OFDM	13 dBi 50DegHorn/ HexHorn	10.14	≤ 23	Pass
5200	OFDM	9dBi 90DegHorn	11.5	≤ 27	Pass
5205	OFDM	9 dBi 90DegHorn	13.45	≤ 27	Pass

For access points using antennas other than in fixed point-to-point applications, the limit is calculated in accordance with 15.407(a)(1)(i):

$Limit = 30 - Roundup(G - 6)$

UNII 2a Test Data Summary - RF Conducted Measurement					
Measurement Option: AVGSA-1					
Frequency (MHz)	**Modulation**	**Ant. Type / Gain (dBi)**	**Measured (dBm)**	**Limit (dBm)**	**Results**
20MHz Channel BW					
5260	OFDM	17.5dBi 30DegHorn	10.04	≤ 12.5	Pass
5300	OFDM	17.5dBi 30DegHorn	9.43	≤ 12.5	Pass
5320	OFDM	17.5dBi 30DegHorn	11.33	≤ 12.5	Pass
5260	OFDM	13 dBi 50DegHorn/ HexHorn	10.04	≤ 17	Pass
5300	OFDM	13 dBi 50DegHorn/ HexHorn	9.43	≤ 17	Pass
5320	OFDM	13 dBi 50DegHorn/ HexHorn	12.91	≤ 17	Pass
5260	OFDM	9dBi 90DegHorn	20.35	≤ 21	Pass
5300	OFDM	9 dBi 90DegHorn	19.80	≤ 21	Pass
5320	OFDM	9 dBi 90DegHorn	16.53	≤ 21	Pass
40MHz Channel BW					
5260	OFDM	17.5dBi 30DegHorn	10.21	≤ 12.5	Pass
5300	OFDM	17.5dBi 30DegHorn	9.65	≤ 12.5	Pass
5310	OFDM	17.5dBi 30DegHorn	6.72	≤ 12.5	Pass
5260	OFDM	13 dBi 50DegHorn/ HexHorn	12.25	≤ 17	Pass
5300	OFDM	13 dBi 50DegHorn/ HexHorn	14.33	≤ 17	Pass
5320	OFDM	13 dBi 50DegHorn/ HexHorn	12.32	≤ 17	Pass
5260	OFDM	9dBi 90DegHorn	16.74	≤ 21	Pass
5300	OFDM	9 dBi 90DegHorn	16.17	≤ 21	Pass
5320	OFDM	9 dBi 90DegHorn	12.42	≤ 21	Pass
80MHz Channel BW					
5260	OFDM	17.5dBi 30DegHorn	8.60	≤ 12.5	Pass
5260	OFDM	13 dBi 50DegHorn	12.14	≤ 17	Pass
5300	OFDM	13 dBi 50DegHorn	10.64	≤ 17	Pass
5260	OFDM	9dBi 90DegHorn	14.09	≤ 21	Pass
5300	OFDM	9 dBi 90DegHorn	11.72	≤ 21	Pass

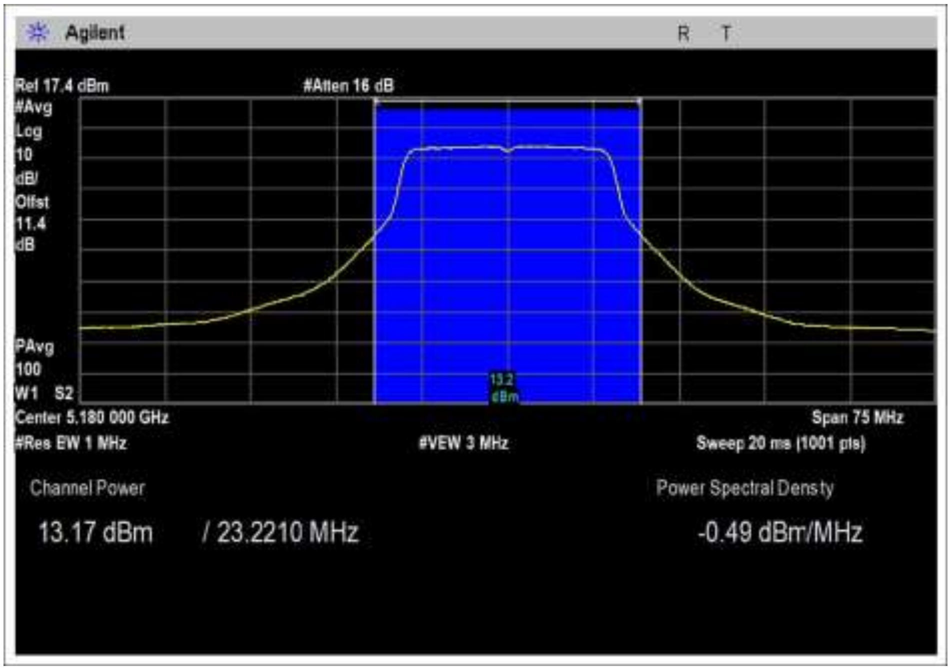
The limit is calculated in accordance with 15.407(a)(2):

$$Limit = The\ lesser\ of \begin{cases} 24\ dBm - (G-6) \\ 11dBm + 10LOG(B) - (G-6) \end{cases}$$

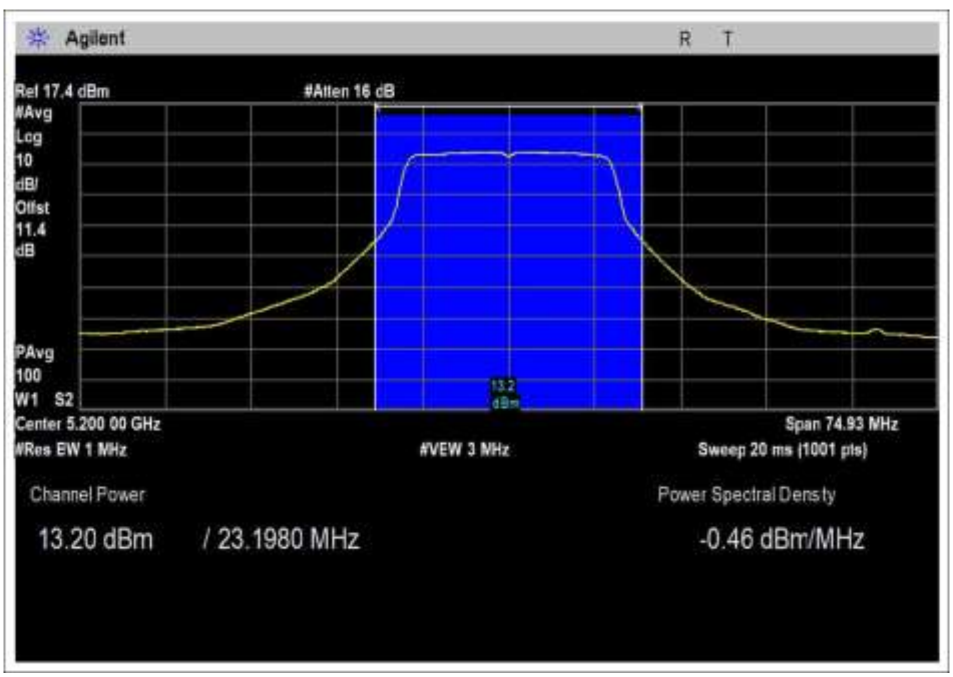
Plots

UNII 1

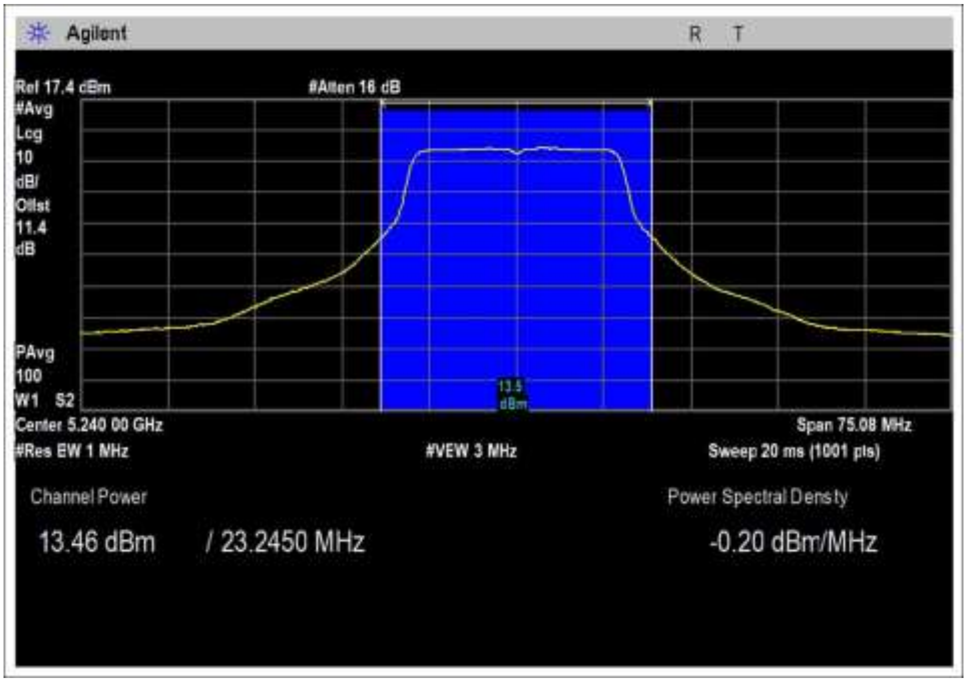
20MHz / 30Deg / 17.5dBi



LB, Set 16



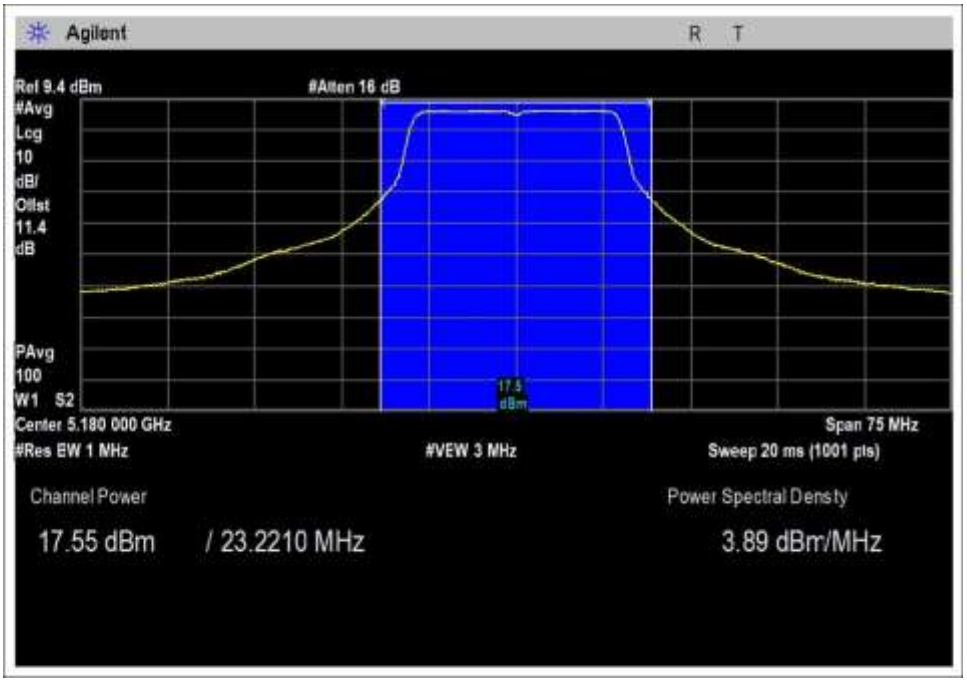
MB, Set 16



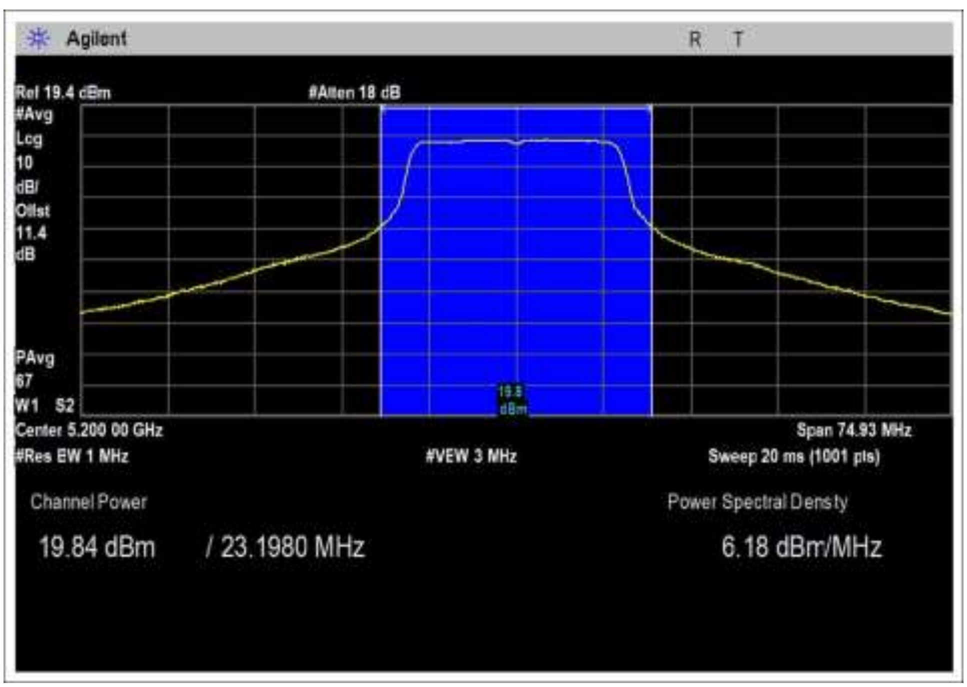
Agilent
R T
Ref 17.4 dBm
#Atten 16 dB
#Avg
Log
10
dB/
Offst
11.4
dB
PAvg
100
W1 S2
13.5
dBm
Center 5.240 00 GHz
Span 75.08 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 20 ms (1001 pts)
Channel Power
13.46 dBm / 23.2450 MHz
Power Spectral Density
-0.20 dBm/MHz

HB, Set 16

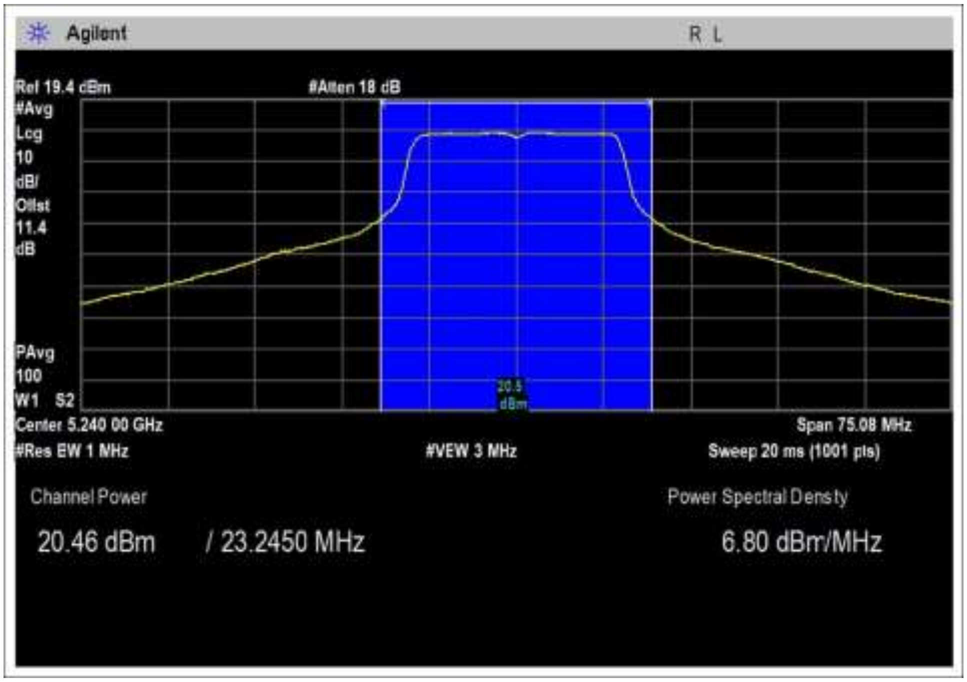
20MHz / 90Deg / 9dBi



LB, Set 20

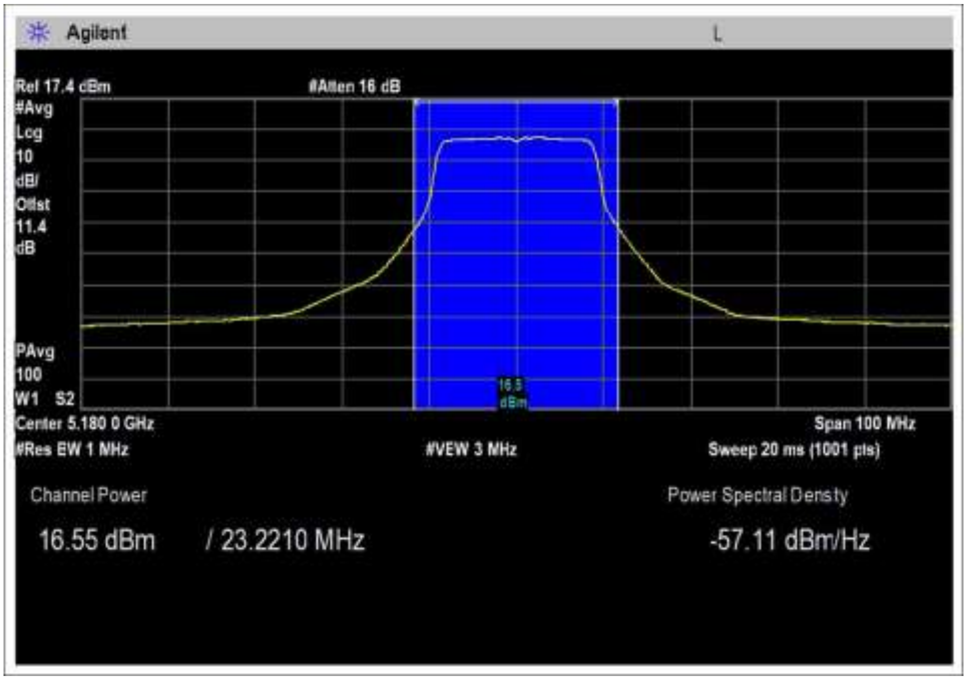


MB, Set 22

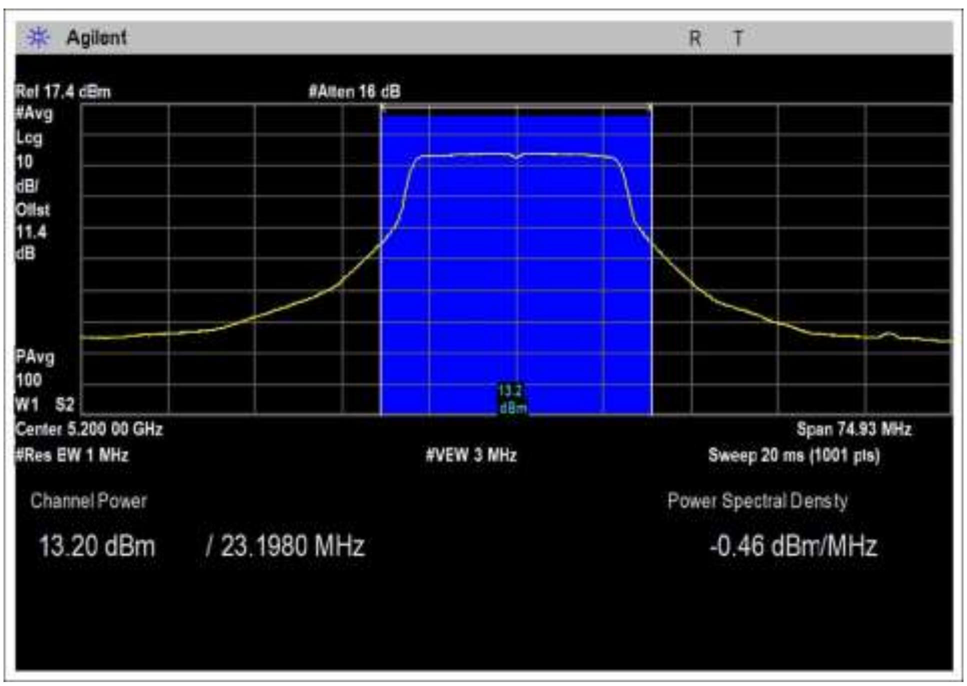

Agilent
R L
Ref 19.4 dBm
#Atten 18 dB
#Avg
Log
10
dB/
Offst
11.4
dB
PAvg
100
W1 S2
Center 5.240 00 GHz
Span 75.08 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 20 ms (1001 pts)
Channel Power
20.46 dBm / 23.2450 MHz
Power Spectral Density
6.80 dBm/MHz

HB, Set 22

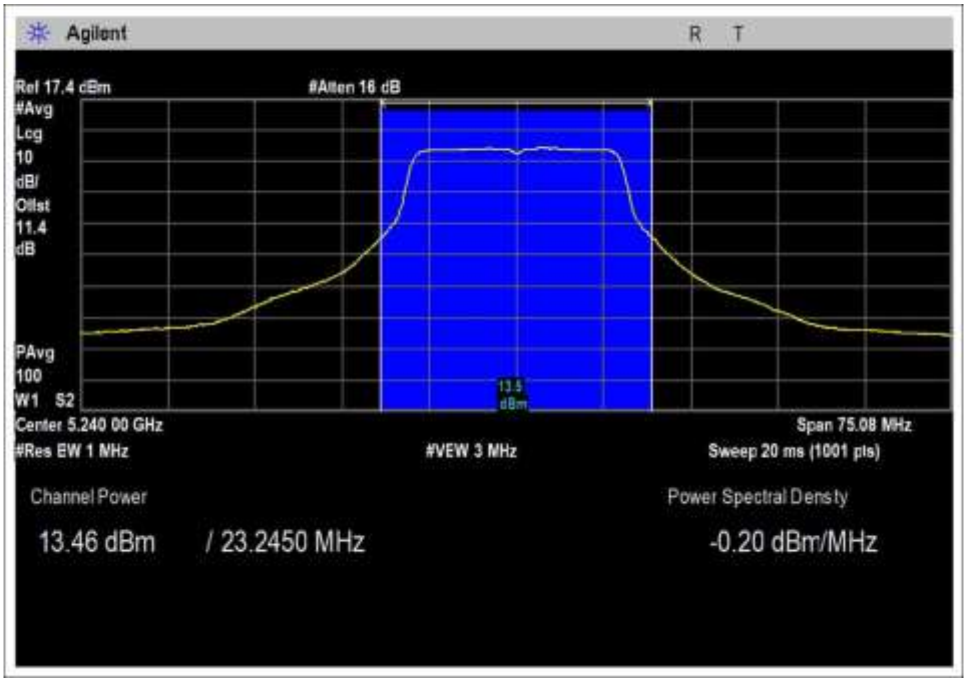
20MHz / HexHorn / 50Deg Horn / 13dBi



LB, Set 16

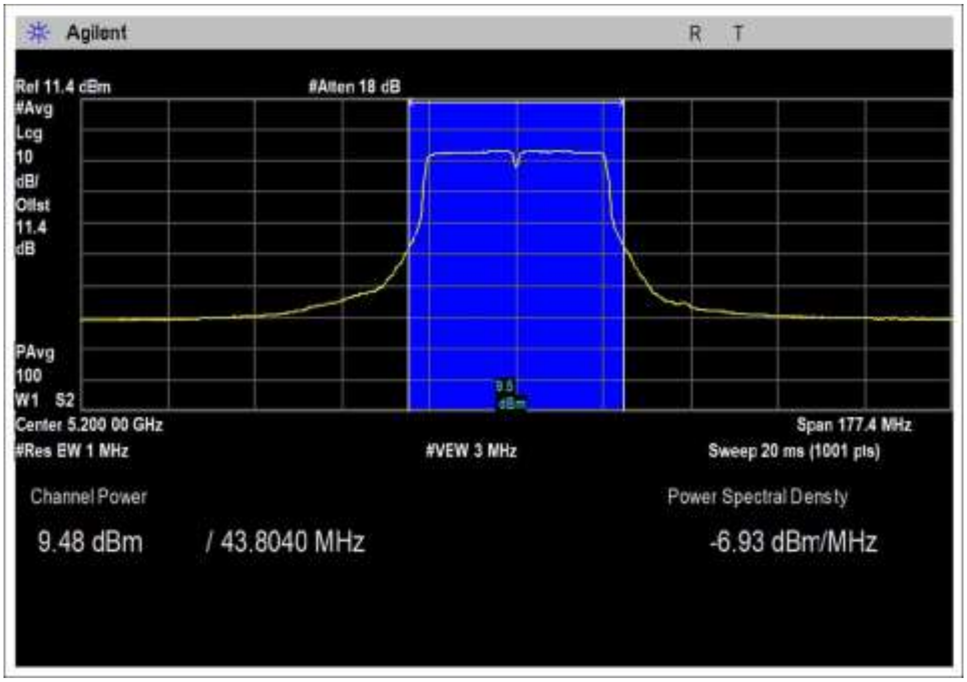


MB, Set 16

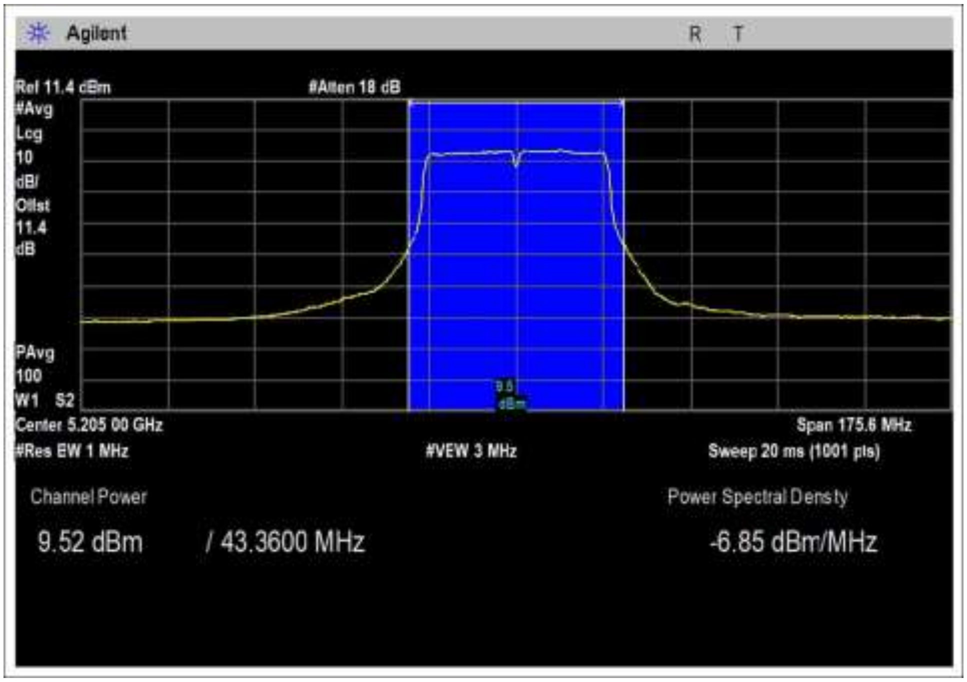

Agilent
R T
Ref 17.4 dBm
#Atten 16 dB
#Avg
Log
10
dB/
Offst
11.4
dB
PAvg
100
W1 S2
13.5
dBm
Center 5.240 00 GHz
Span 75.08 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 20 ms (1001 pts)
Channel Power
13.46 dBm / 23.2450 MHz
Power Spectral Density
-0.20 dBm/MHz

HB, Set 16

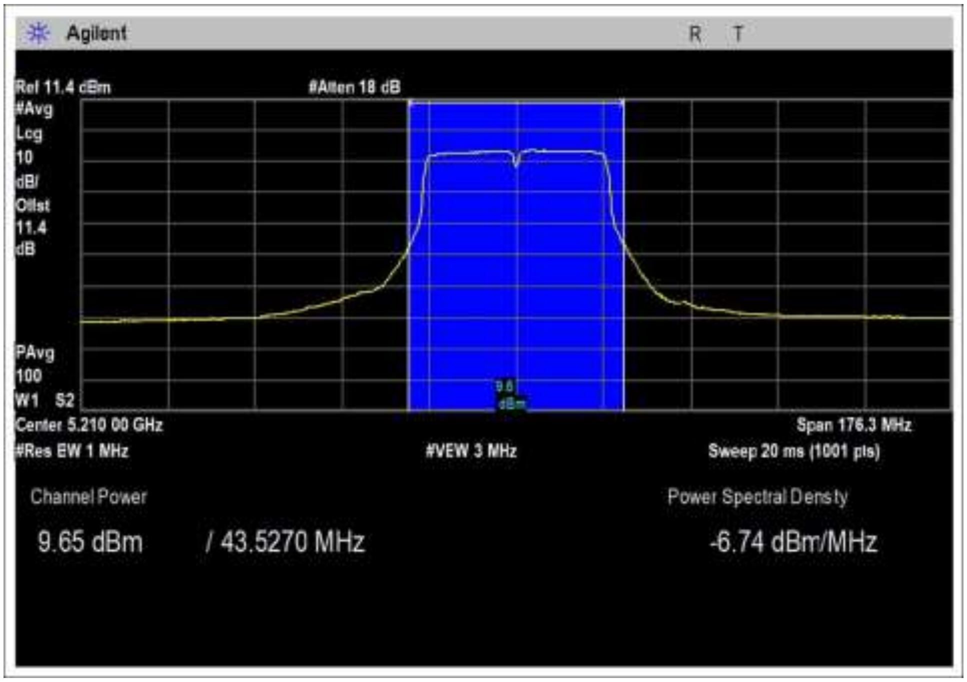
40MHz / 30Deg / 17.5dBi



LB, Set 12

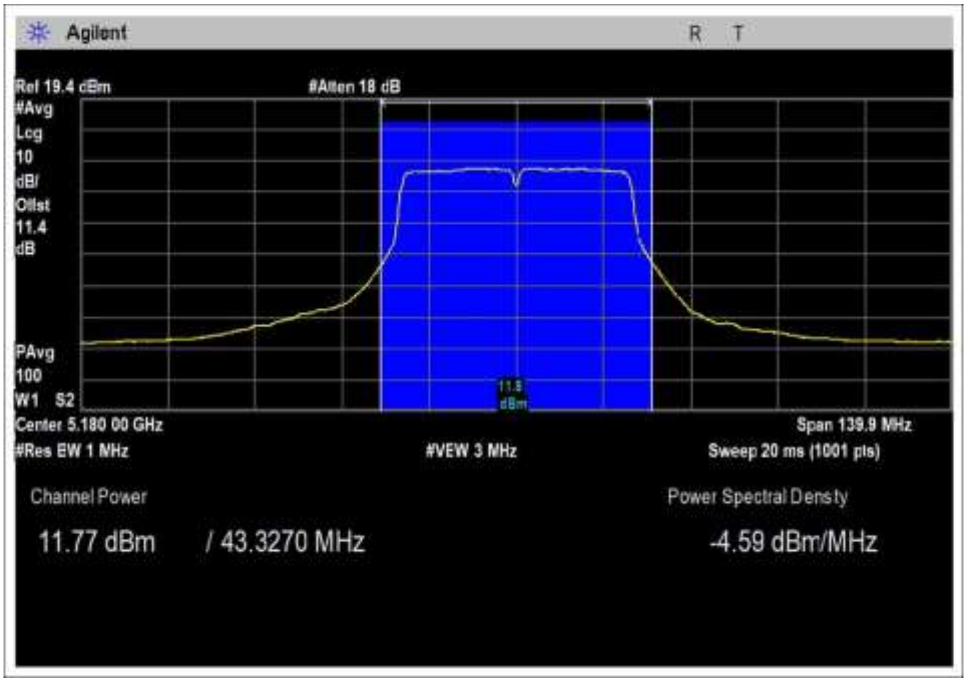


MB, Set 12

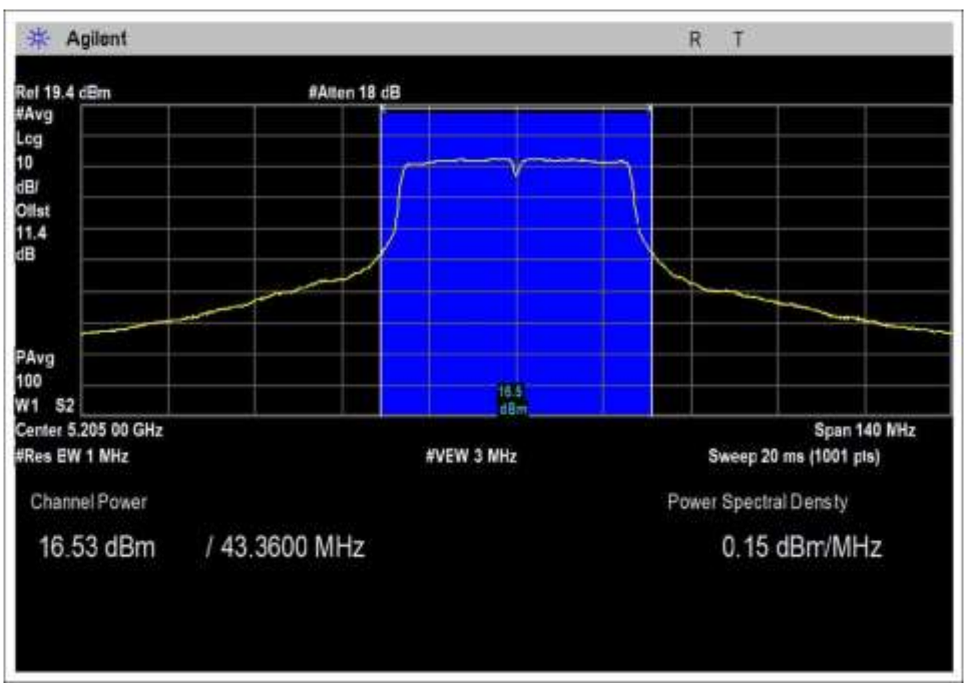

Agilent
R T
Ref 11.4 dBm
#Atten 18 dB
#Avg
Log
10
dB/
Offst
11.4
dB
PAvg
100
W1 S2
9.6
dBm
Center 5.210 00 GHz
Span 176.3 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 20 ms (1001 pts)
Channel Power
9.65 dBm
/ 43.5270 MHz
Power Spectral Density
-6.74 dBm/MHz

HB, Set 12

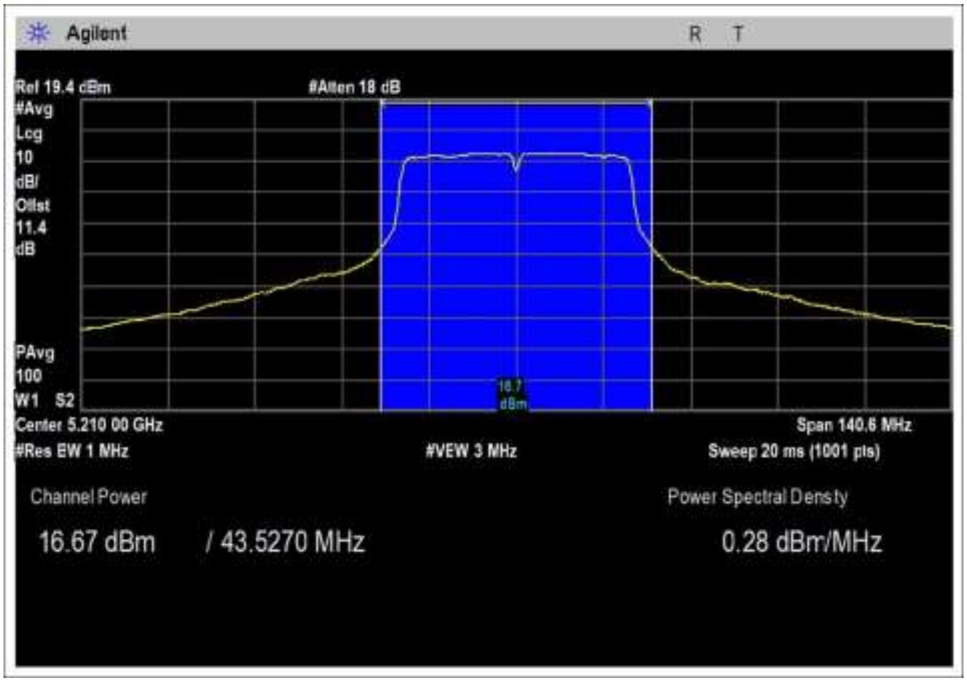
40MHz / 90Deg / 9dBi



LB, Set 14

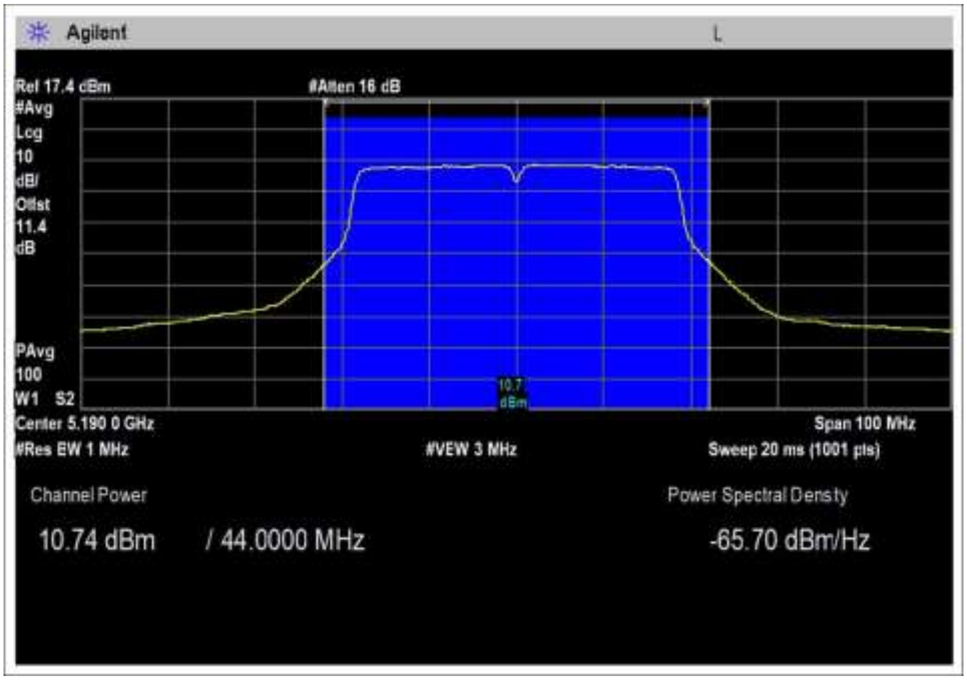


MB, Set 18.5

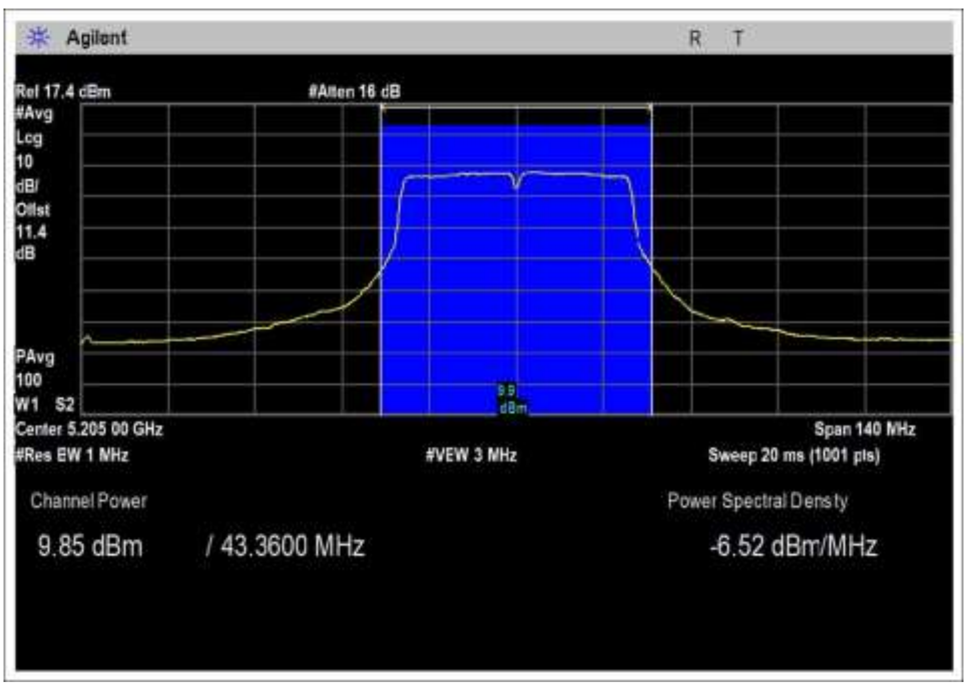

Agilent
R T
Ref 19.4 dBm
#Atten 18 dB
#Avg
Log
10
dB/
Offst
11.4
dB
PAvg
100
W1 S2
16.7
dBm
Center 5.210 00 GHz
Span 140.6 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 20 ms (1001 pts)
Channel Power
16.67 dBm / 43.5270 MHz
Power Spectral Density
0.28 dBm/MHz

HB, Set 18.5

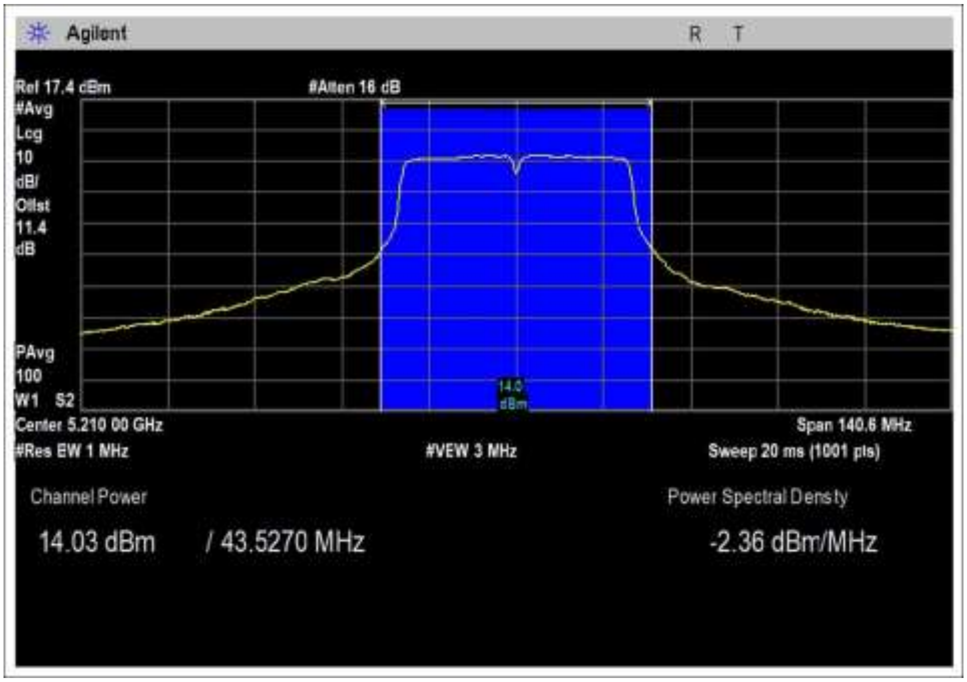
40MHz / HexHorn / 50Deg Horn / 13dBi



LB, Set 12

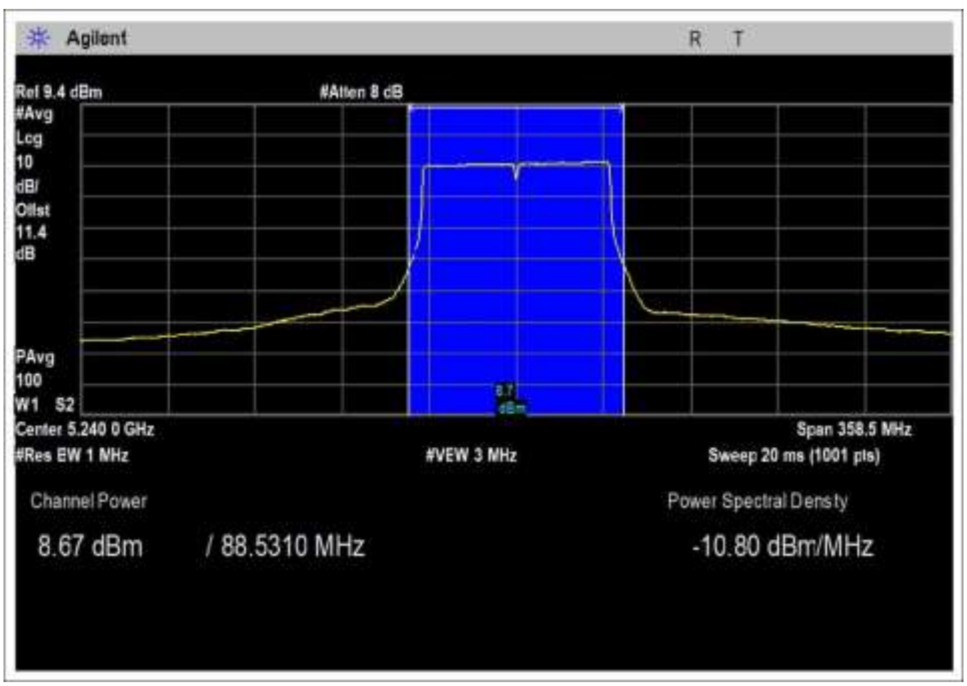


MB, Set 12



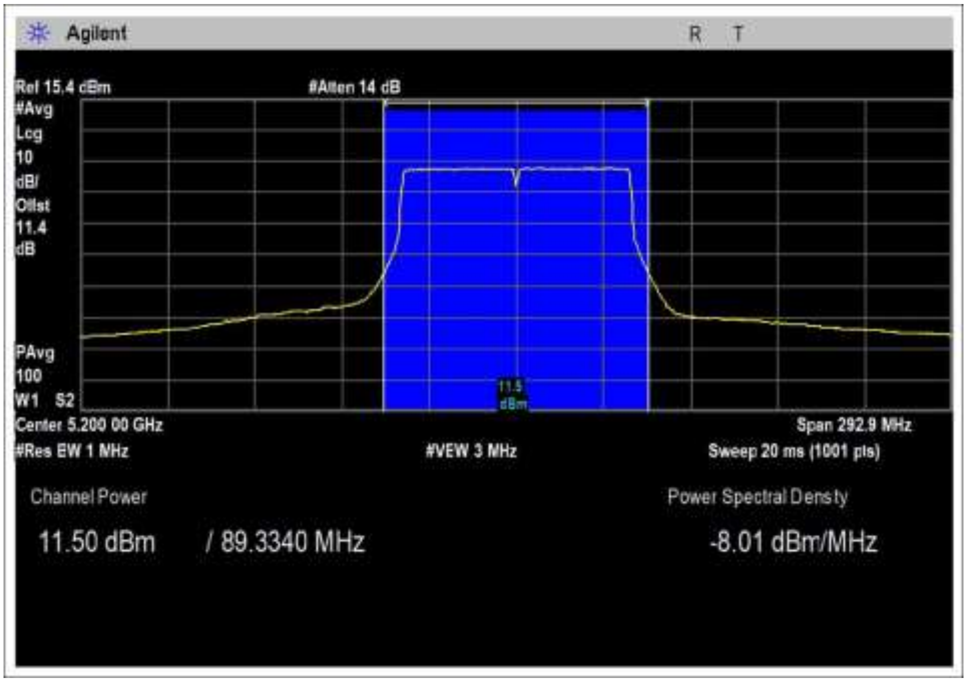
HB, Set 16

80MHz / 30Deg / 17.5dBi

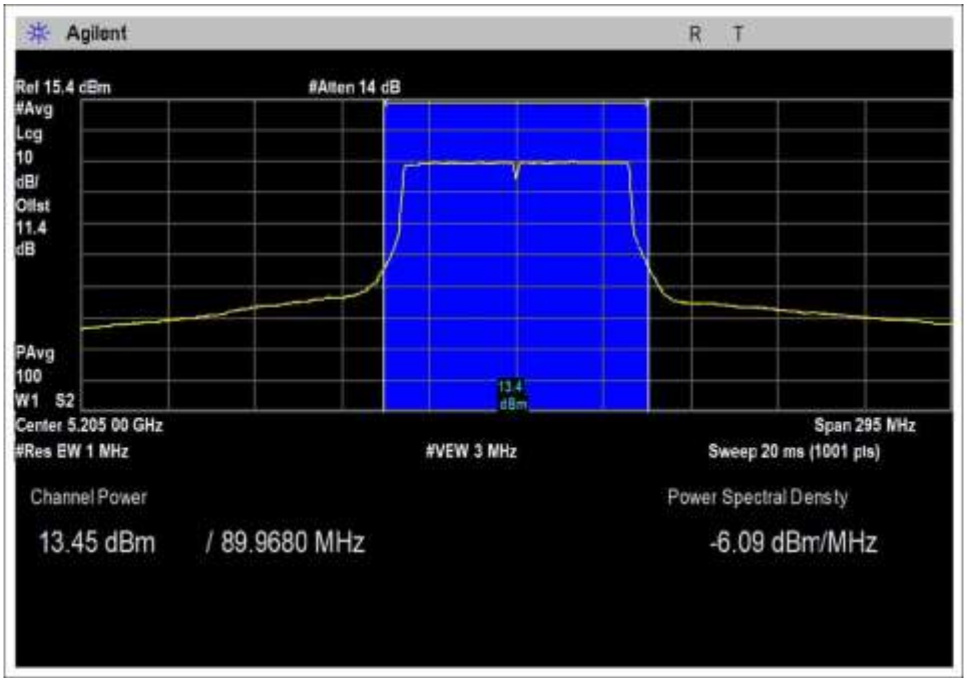


Set 10

80MHz / 90Deg / 9dBi

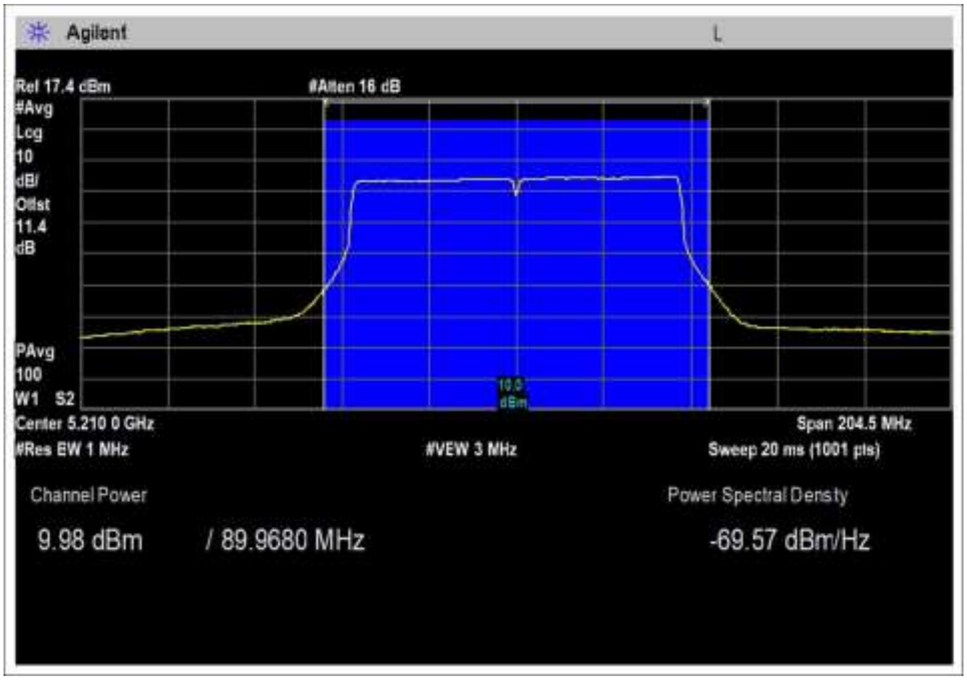


LB, Set 14



HB, Set 16

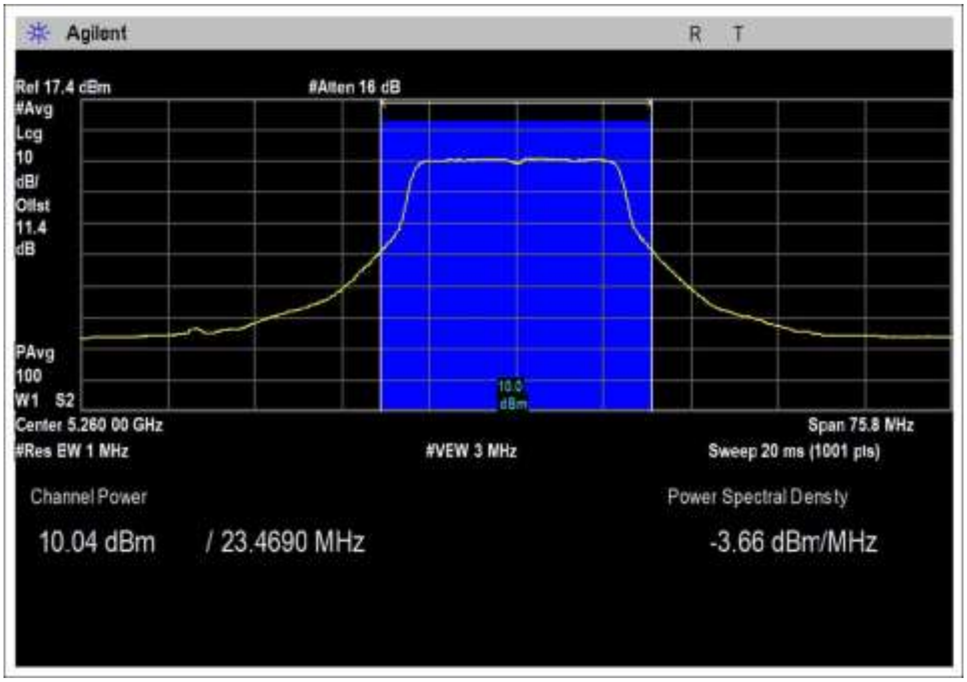
80MHz / HexHorn / 50Deg Horn / 13dBi



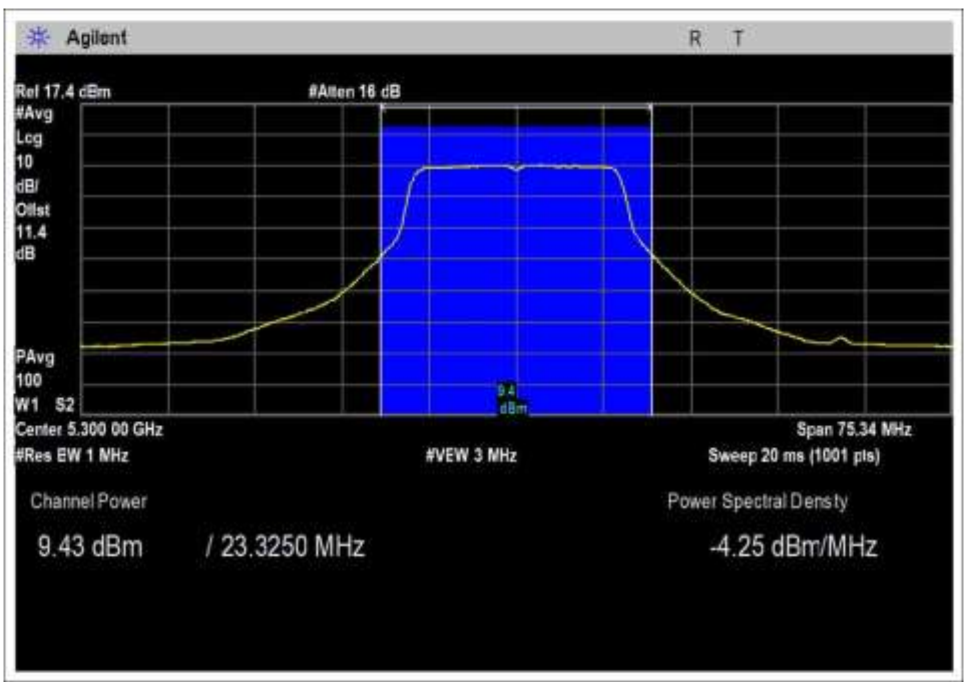
HB, Set 10

UNII 2a

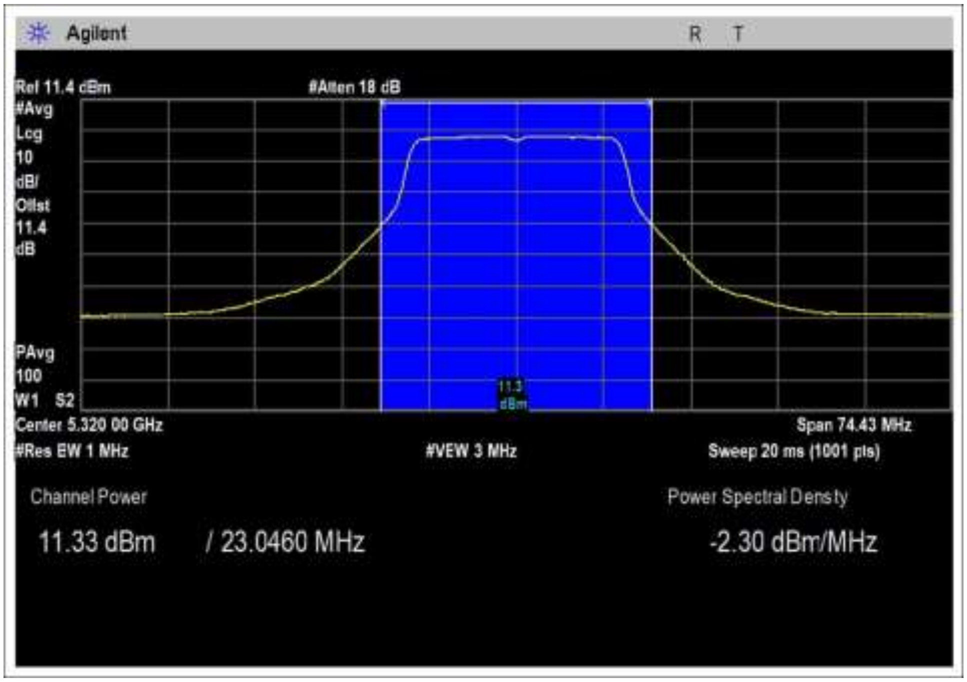
20MHz / 30Deg / 17.5dBi



LB, Set 12.5

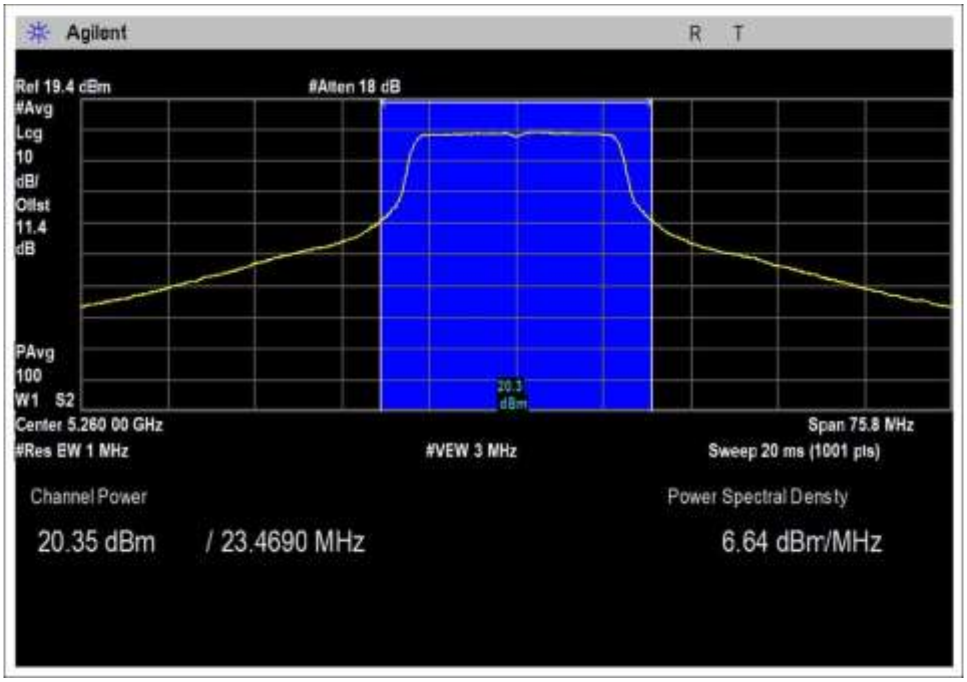


MB, Set 12.5

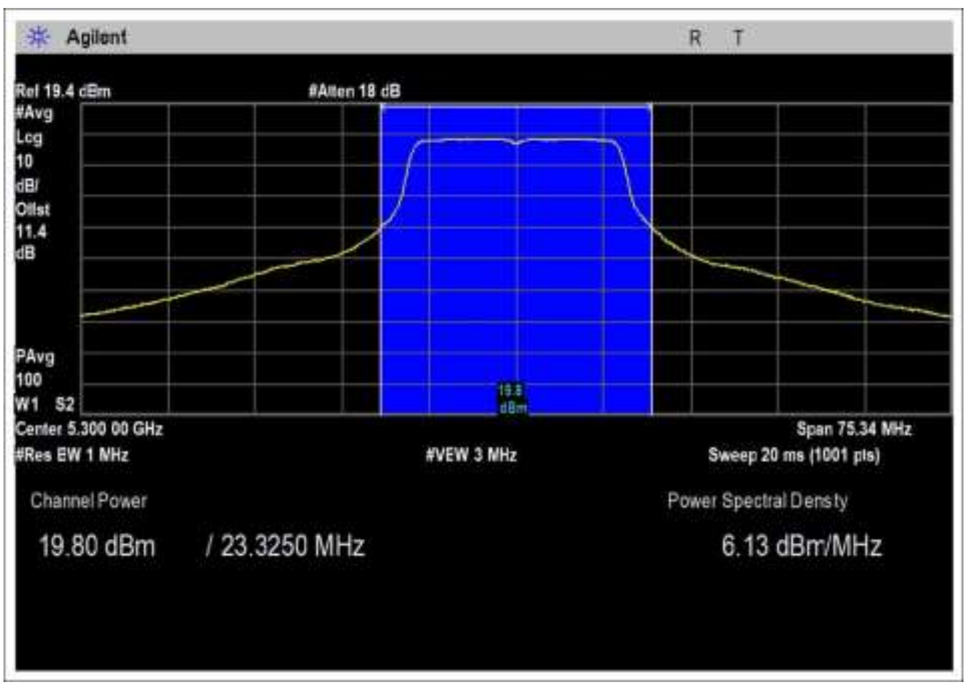

Agilent
R T
Ref 11.4 dBm
#Atten 18 dB
#Avg
Log
10
dB/
Offst
11.4
dB
PAvg
100
W1 S2
Center 5.320 00 GHz
Span 74.43 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 20 ms (1001 pts)
Channel Power
11.33 dBm / 23.0460 MHz
Power Spectral Density
-2.30 dBm/MHz

HB, Set 14

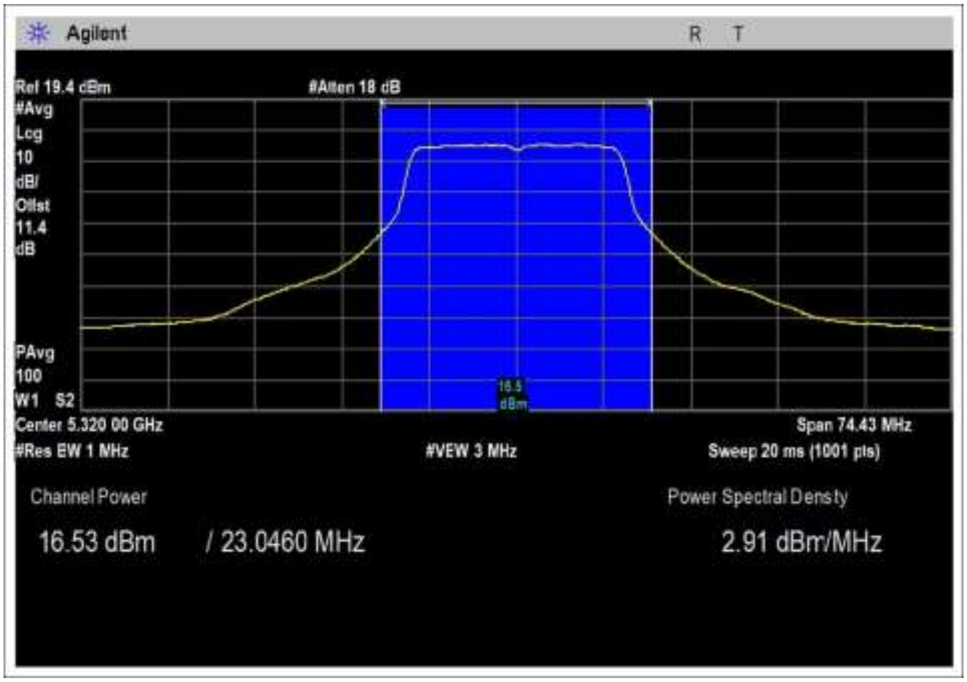
<u>**20MHz / 90Deg / 9dBi**</u>



LB, Set 22

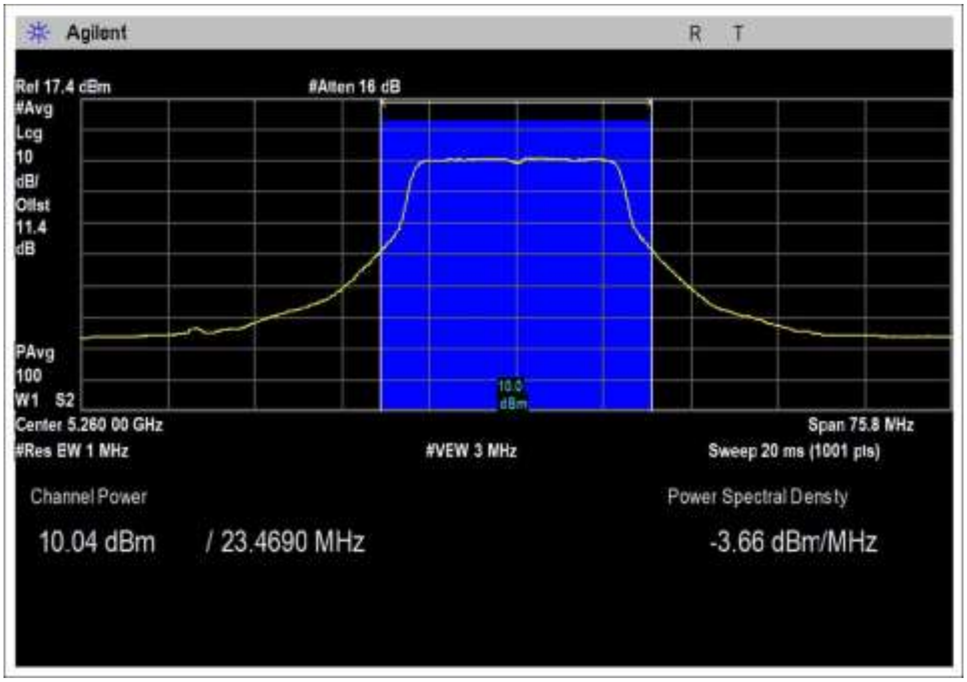


MB, Set 22

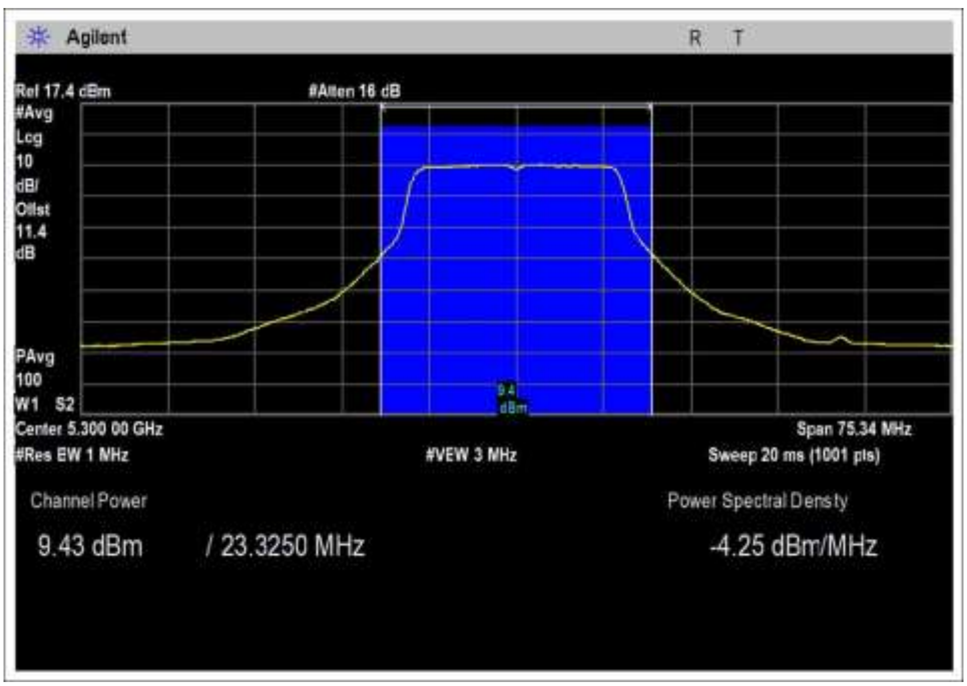

Agilent
R T
Ref 19.4 dBm
#Atten 18 dB
#Avg
Log
10
dB/
Offst
11.4
dB
PAvg
100
W1 S2
Center 5.320 00 GHz
Span 74.43 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 20 ms (1001 pts)
Channel Power
16.53 dBm / 23.0460 MHz
Power Spectral Density
2.91 dBm/MHz

HB, Set 19

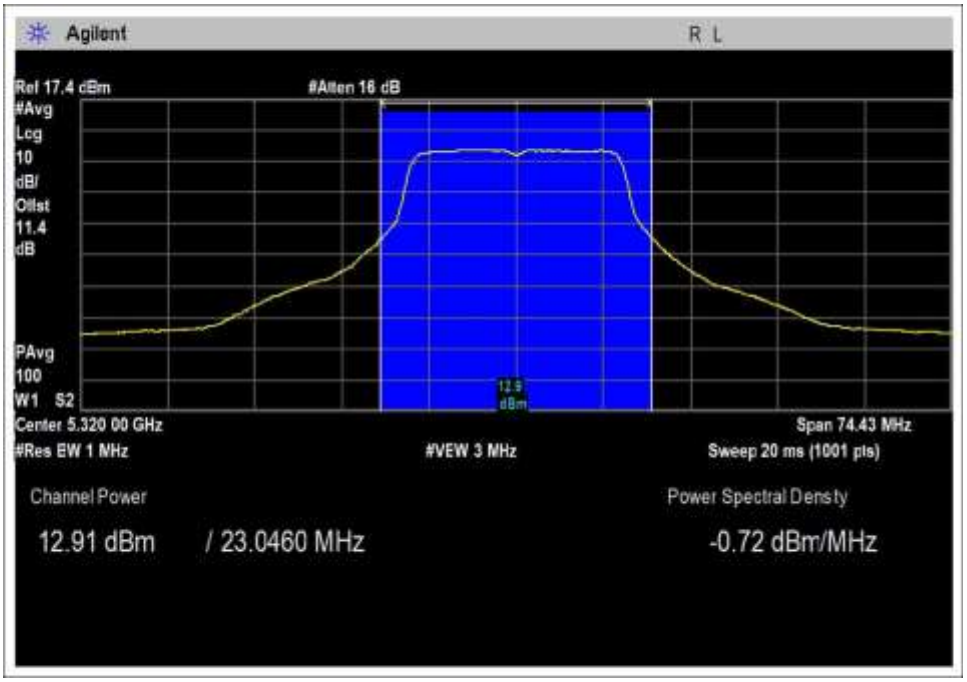
<u>**20MHz / HexHorn / 50Deg Horn / 13dBi**</u>



LB, Set 12.5



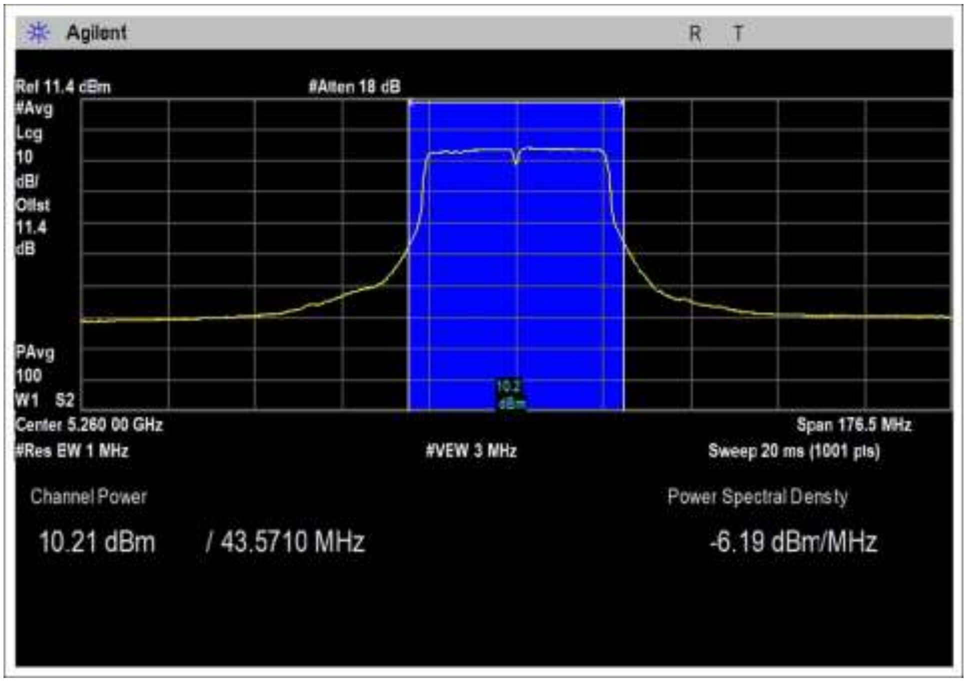
MB, Set 12.5



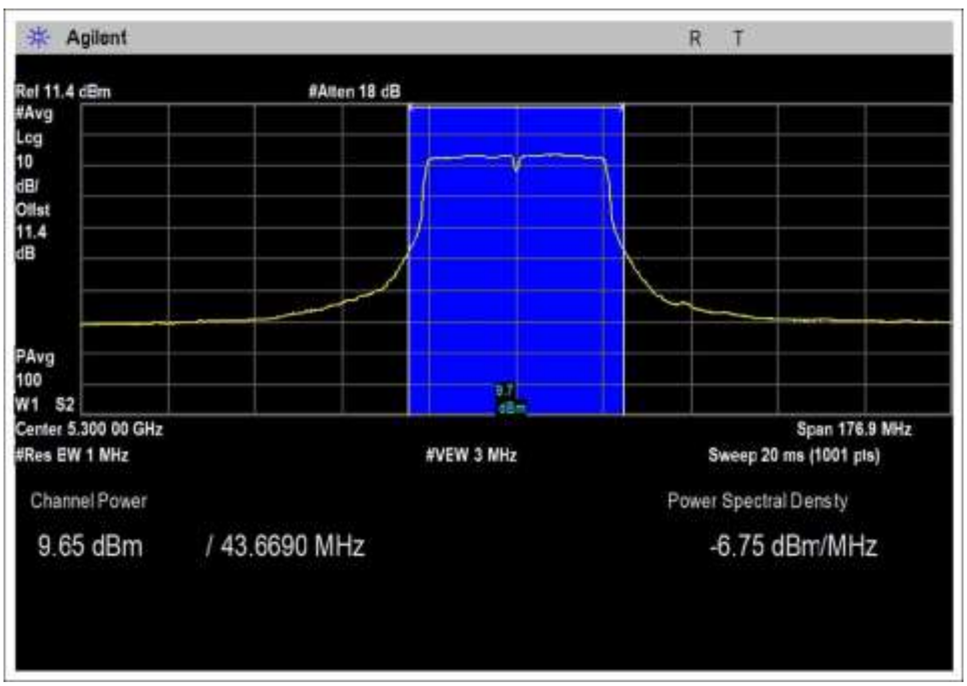
Agilent
R L
Ref 17.4 dBm
#Atten 16 dB
#Avg
Log
10
dB/
Offst
11.4
dB
PAvg
100
W1 S2
12.9
dBm
Center 5.320 00 GHz
Span 74.43 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 20 ms (1001 pts)
Channel Power
12.91 dBm
/ 23.0460 MHz
Power Spectral Density
-0.72 dBm/MHz

HB, Set 16

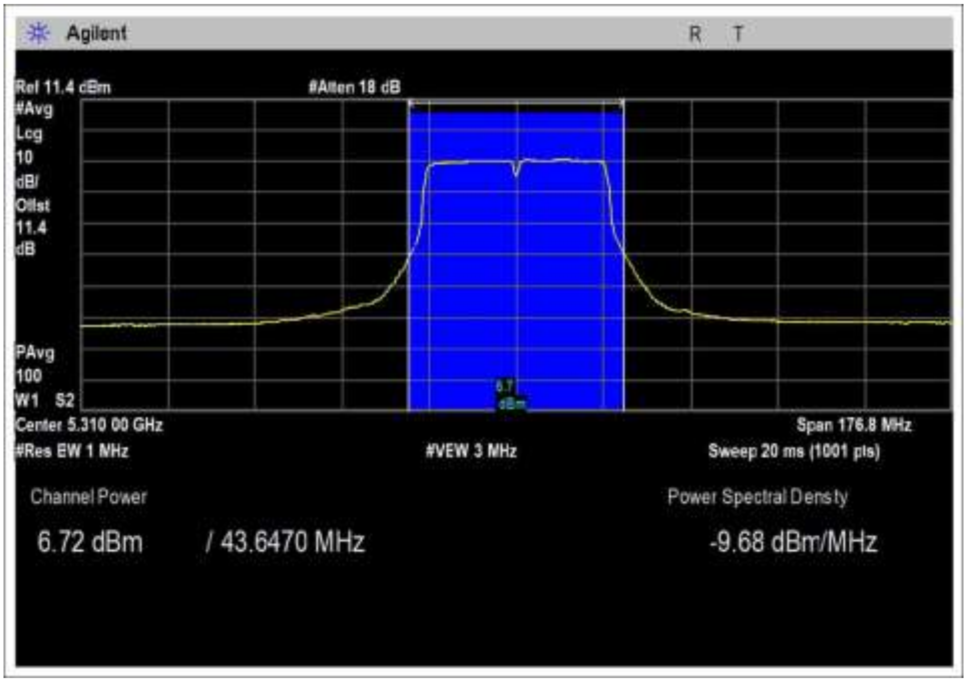
40MHz / 30Deg / 17.5dBi



LB, Set 12

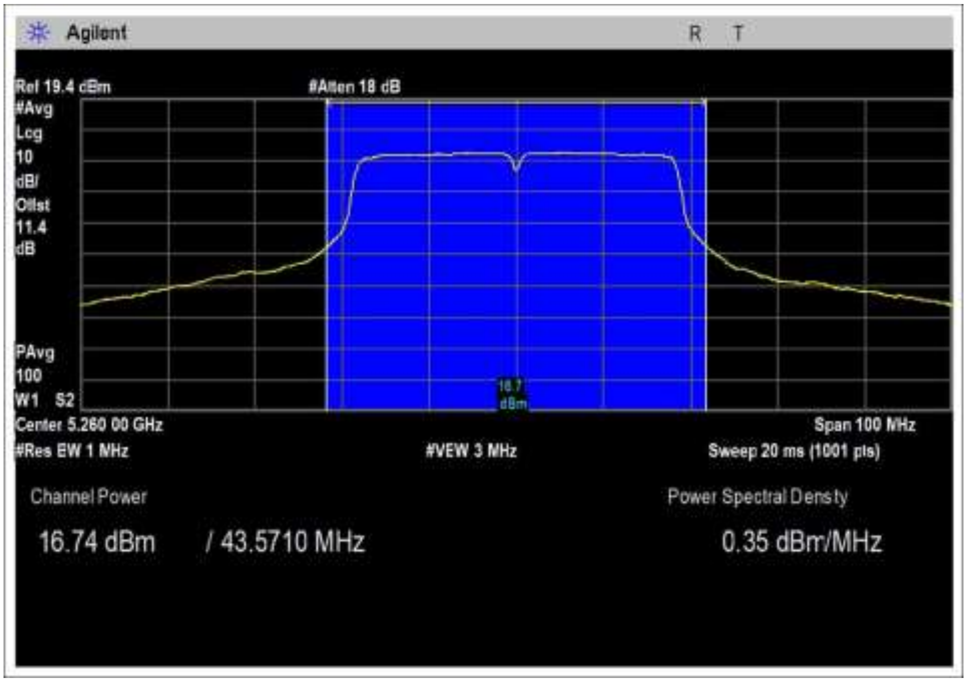


MB, Set 12

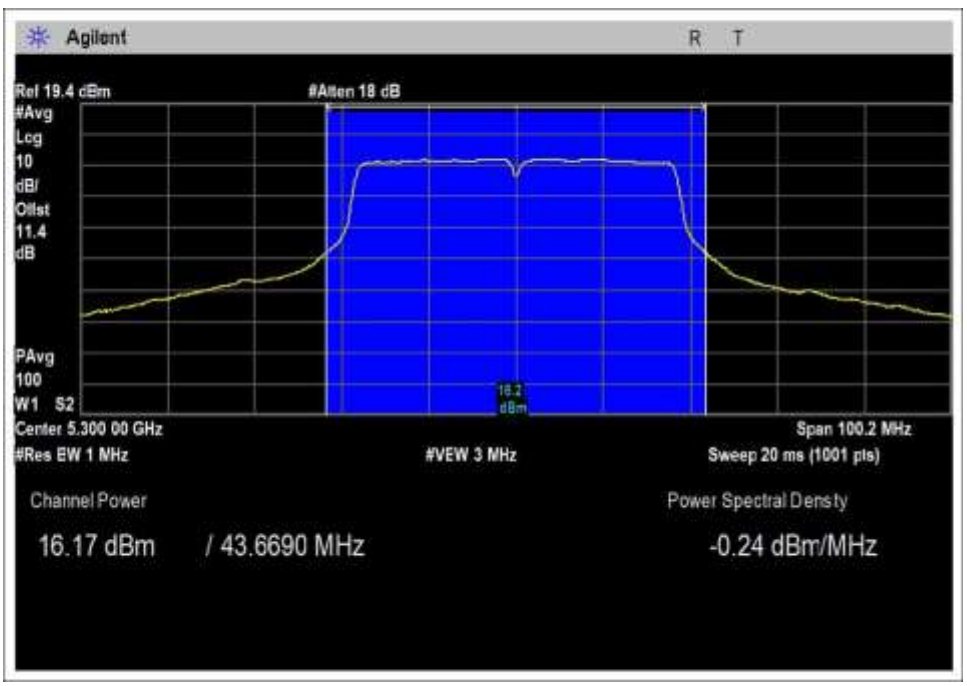

Agilent
R T
Ref 11.4 dBm
#Atten 18 dB
#Avg
Log
10
dB/
Offst
11.4
dB
PAvg
100
W1 S2
Center 5.310 00 GHz
Span 176.8 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 20 ms (1001 pts)
Channel Power
6.72 dBm
/ 43.6470 MHz
Power Spectral Density
-9.68 dBm/MHz

HB, Set 9

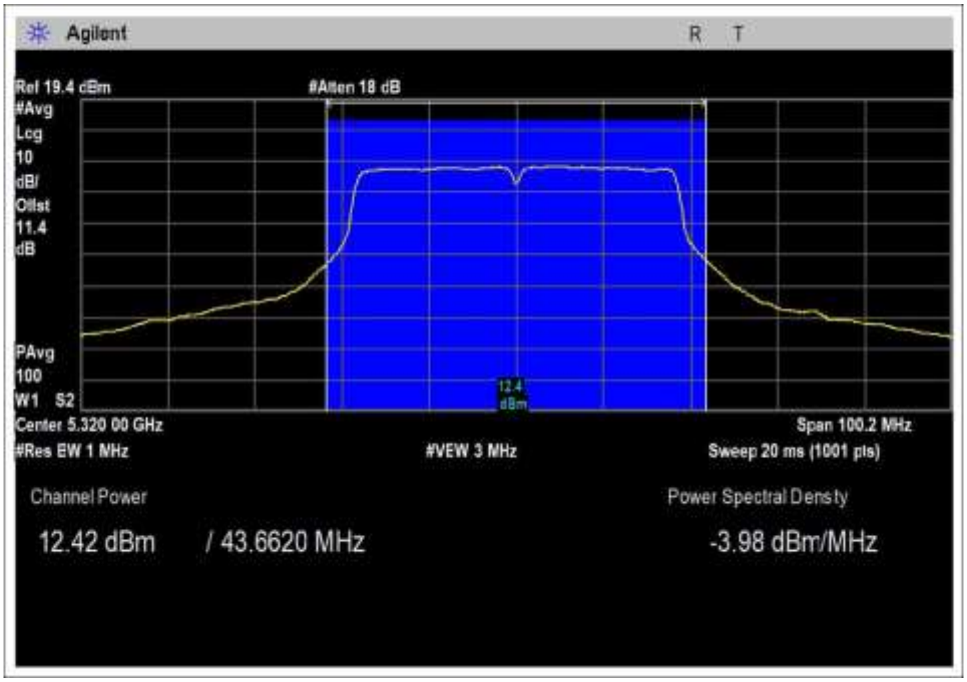
40MHz / 90Deg / 9dBi



LB, Set 18.5

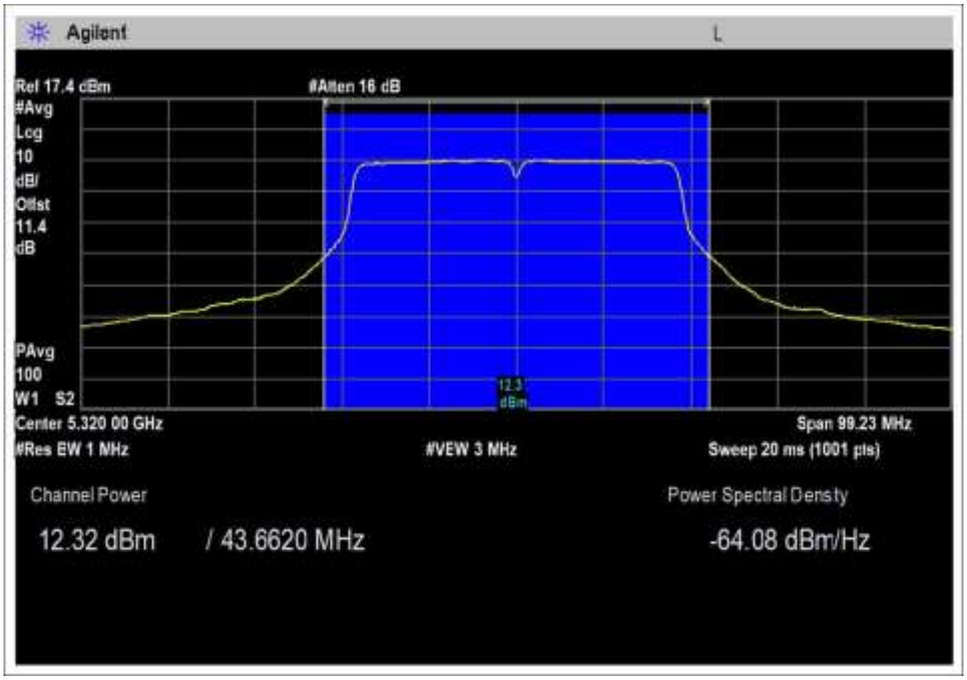


MB, Set 18.5

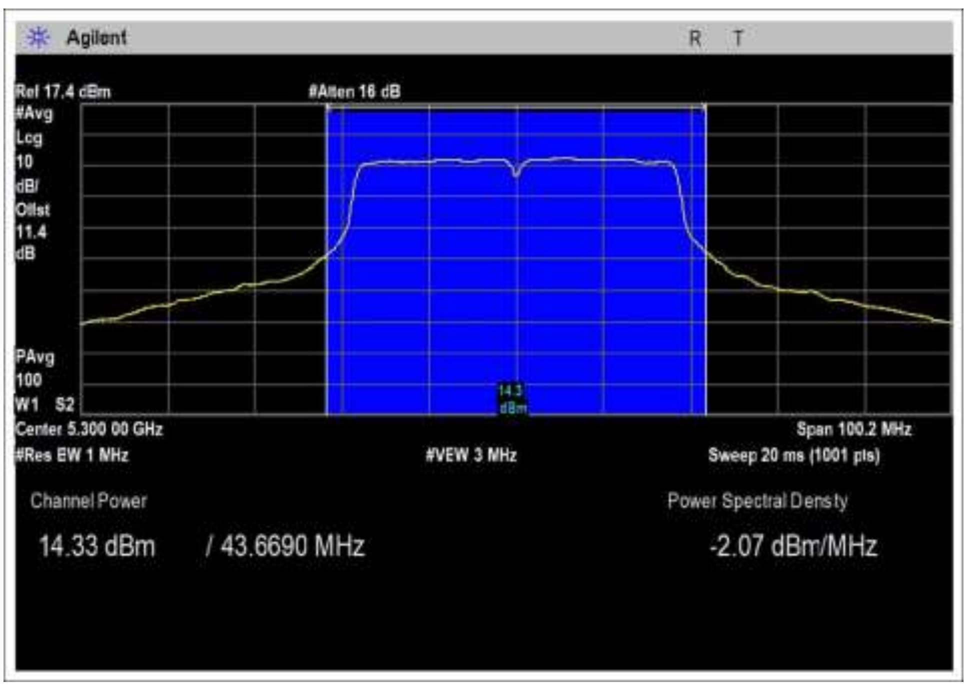

Agilent
R T
Ref 19.4 dBm
#Atten 18 dB
#Avg
Log
10
dB/
Offst
11.4
dB
PAvg
100
W1 S2
12.4
dBm
Center 5.320 00 GHz
Span 100.2 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 20 ms (1001 pts)
Channel Power
12.42 dBm / 43.6620 MHz
Power Spectral Density
-3.98 dBm/MHz

HB, Set 15

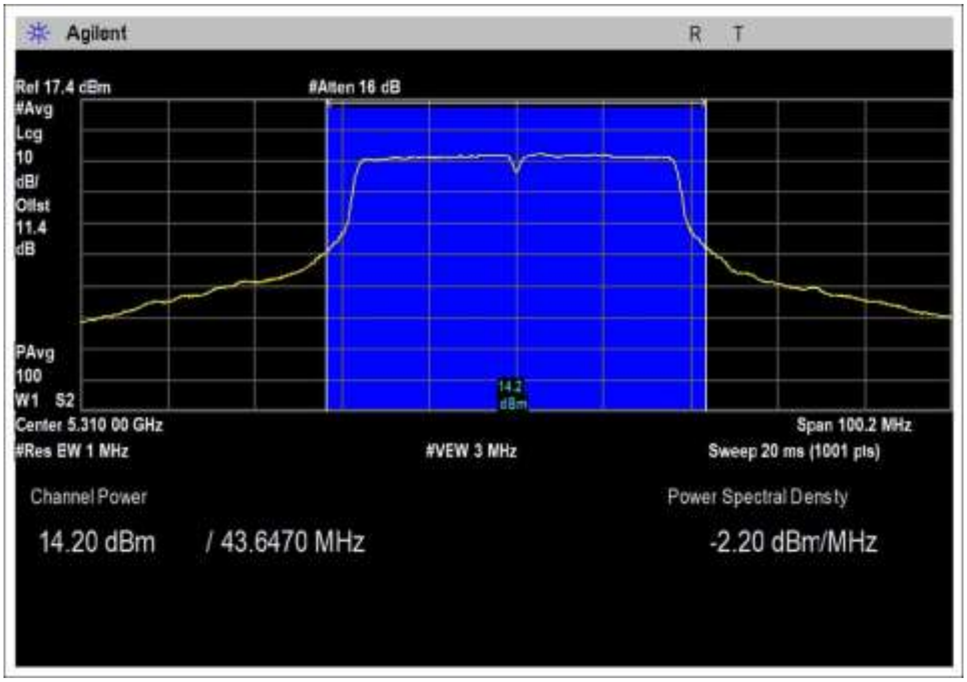
<u>**40MHz / HexHorn / 50Deg Horn / 13dBi**</u>



LB, Set 12

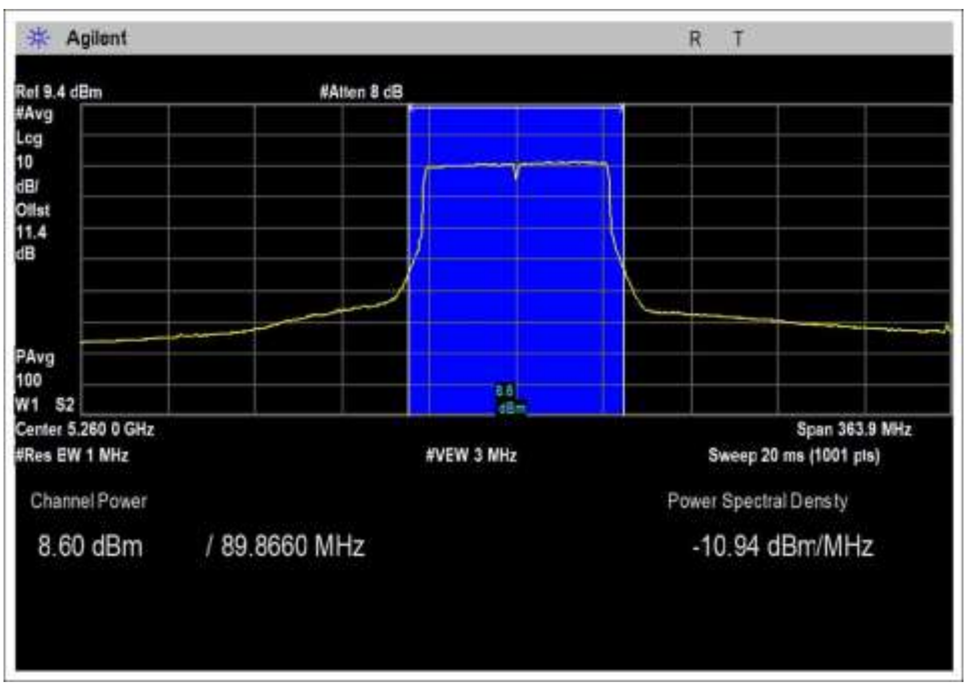


MB, Set 15



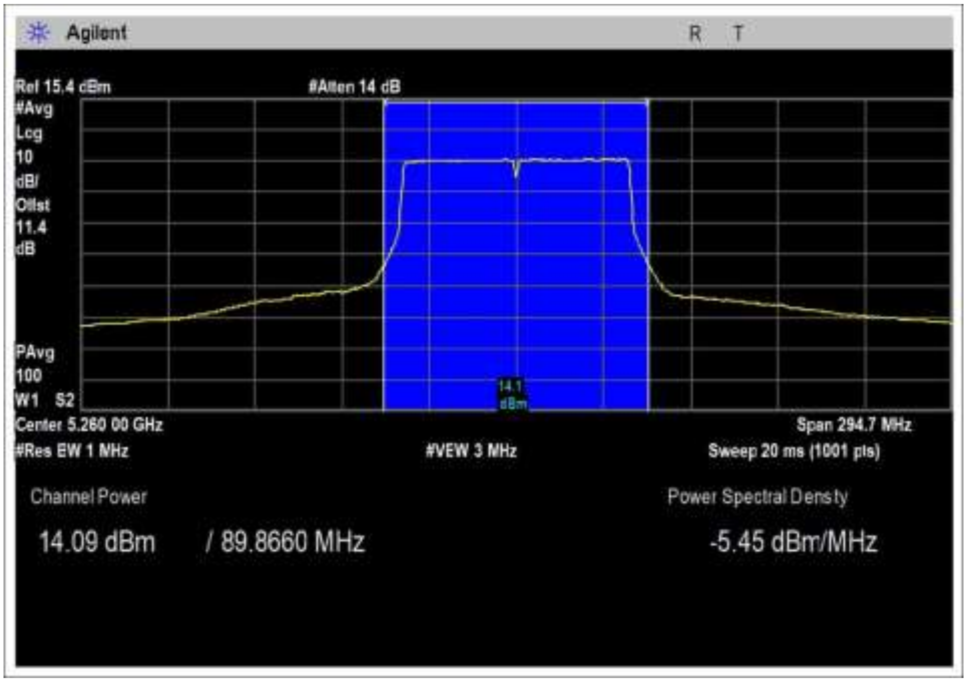
HB, Set 15

80MHz / 30Deg / 17.5dBi

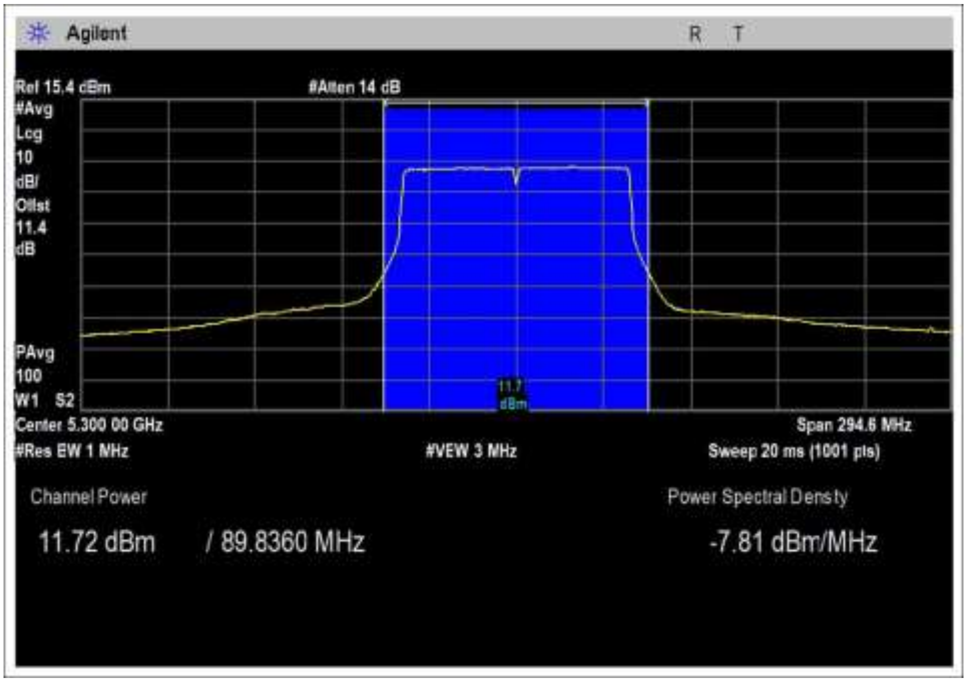


Set 10

80MHz / 90Deg / 9dBi

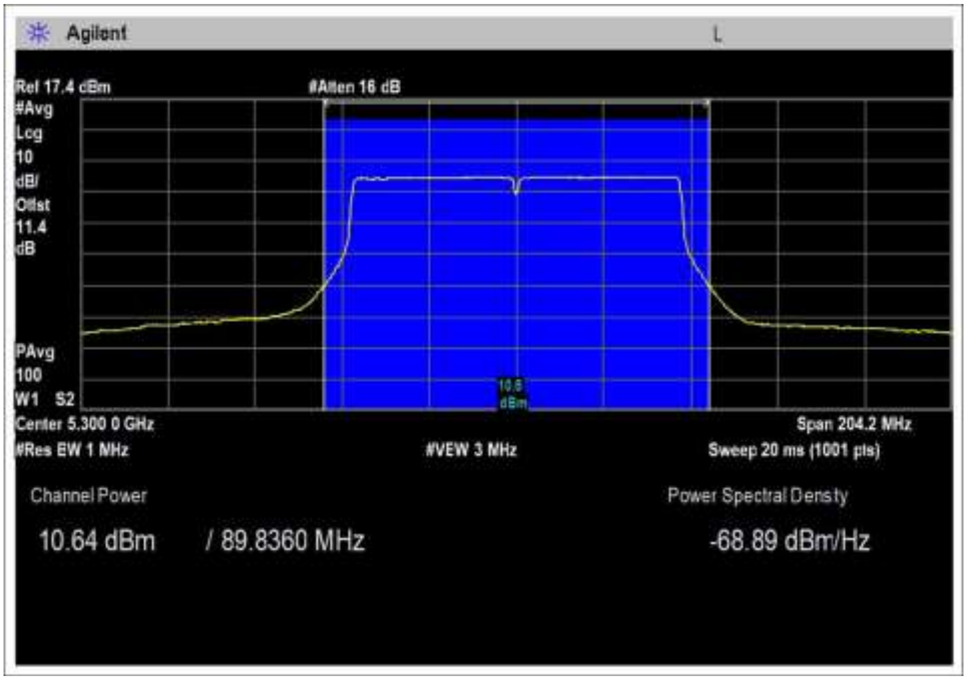


LB, Set 16



HB, Set 14

80MHz / HexHorn / 50Deg Horn / 13dBi



Set 12

Test Setup Photos

15.407(a) Power Spectral Density

Test Setup/Conditions			
Test Location:	Mariposa Lab A	Test Engineer:	Benny Lovan
Test Method:	ANSI C63.10 (2013), KDB 789033 v01r04 (May 2, 2017)	Test Date(s):	11/14/2017 – 11/15/2017
Configuration:	1		
Test Setup:	The EUT is setup on a table with its antenna port directly connected to an analyzer through 11.4dB of attenuation. The EUT has two antenna ports that are identical. Testing was performed on Port 1		
Declaration:	Modification #1 was in place during testing.		

Environmental Conditions			
Temperature (ºC)	20-22	Relative Humidity (%):	42-45

Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
02660	Spectrum Analyzer	Agilent	E4446A	10/10/2016	10/10/2018
03361	Cable	Astrolab	32022-2-29094-48TC	1/10/2017	1/10/2019
P05935	Attenuator	Weinschel	84A-10	1/18/2016	1/18/2018

UNII 1 Test Data Summary - RF Conducted Measurement					
Measurement Option: AVGSA-1					
Frequency (MHz)	**Modulation**	**Ant. Type / Gain (dBi)**	**Measured (dBm/MHz)**	**Limit (dBm/MHz)**	**Results**
20MHz Channel BW					
5180	OFDM	17.5dBi 30DegHorn	4.54	≤ 5.5	Pass
5200	OFDM	17.5dBi 30DegHorn	4.57	≤ 5.5	Pass
5240	OFDM	17.5dBi 30DegHorn	-0.20	≤ 5.5	Pass
5180	OFDM	13 dBi 50DegHorn/ HexHorn	4.46	≤ 10	Pass
5200	OFDM	13 dBi 50DegHorn/ HexHorn	4.57	≤ 10	Pass
5240	OFDM	13 dBi 50DegHorn/ HexHorn	-0.20	≤ 10	Pass
5180	OFDM	9dBi 90DegHorn	3.89	≤ 14	Pass
5200	OFDM	9 dBi 90DegHorn	6.18	≤ 14	Pass
5240	OFDM	9 dBi 90DegHorn	6.80	≤ 14	Pass
40MHz Channel BW					
5200	OFDM	17.5dBi 30DegHorn	-6.93	≤ 5.5	Pass
5205	OFDM	17.5dBi 30DegHorn	-6.85	≤ 5.5	Pass
5210	OFDM	17.5dBi 30DegHorn	-6.74	≤ 5.5	Pass
5190	OFDM	13 dBi 50DegHorn/ HexHorn	-4.52	≤ 10	Pass
5200	OFDM	13 dBi 50DegHorn/ HexHorn	-6.62	≤ 10	Pass
5205	OFDM	13 dBi 50DegHorn/ HexHorn	-6.52	≤ 10	Pass
5180	OFDM	9dBi 90DegHorn	-4.59	≤ 14	Pass
5205	OFDM	9 dBi 90DegHorn	0.15	≤ 14	Pass
5210	OFDM	9 dBi 90DegHorn	0.28	≤ 14	Pass
80MHz Channel BW					
5240	OFDM	17.5dBi 30DegHorn	-10.80	≤ 5.5	Pass
5210	OFDM	13 dBi 50DegHorn/ HexHorn	-7.97	≤ 10	Pass
5240	OFDM	13 dBi 50DegHorn/ HexHorn	-9.33	≤ 10	Pass
5200	OFDM	9dBi 90DegHorn	-8.01	≤ 14	Pass
5205	OFDM	9 dBi 90DegHorn	-6.09	≤ 14	Pass

For access points using antennas other than in fixed point-to-point applications, the limit is calculated in accordance with 15.407(a)(1)(i):

$Limit = 17 - Roundup(G - 6)$

UNII 2a Test Data Summary - RF Conducted Measurement					
Measurement Option: AVGSA-1					
Frequency (MHz)	**Modulation**	**Ant. Type / Gain (dBi)**	**Measured (dBm/MHz)**	**Limit (dBm/MHz)**	**Results**
20MHz Channel BW					
5260	OFDM	17.5dBi 30DegHorn	-3.66	≤ -0.5	Pass
5300	OFDM	17.5dBi 30DegHorn	-4.25	≤ -0.5	Pass
5320	OFDM	17.5dBi 30DegHorn	-2.30	≤ -0.5	Pass
5260	OFDM	13 dBi 50DegHorn/ HexHorn	-3.66	≤ 4	Pass
5300	OFDM	13 dBi 50DegHorn/ HexHorn	-4.25	≤ 4	Pass
5320	OFDM	13 dBi 50DegHorn/ HexHorn	-0.72	≤ 4	Pass
5260	OFDM	9dBi 90DegHorn	6.64	≤ 8	Pass
5300	OFDM	9 dBi 90DegHorn	6.13	≤ 8	Pass
5320	OFDM	9 dBi 90DegHorn	2.91	≤ 8	Pass
40MHz Channel BW					
5260	OFDM	17.5dBi 30DegHorn	-6.19	≤ -0.5	Pass
5300	OFDM	17.5dBi 30DegHorn	-6.75	≤ -0.5	Pass
5310	OFDM	17.5dBi 30DegHorn	-9.68	≤ -0.5	Pass
5260	OFDM	13 dBi 50DegHorn/ HexHorn	-4.14	≤ 4	Pass
5300	OFDM	13 dBi 50DegHorn/ HexHorn	-2.07	≤ 4	Pass
5320	OFDM	13 dBi 50DegHorn/ HexHorn	-2.734	≤ 4	Pass
5260	OFDM	9dBi 90DegHorn	0.35	≤ 8	Pass
5300	OFDM	9 dBi 90DegHorn	-0.24	≤ 8	Pass
5320	OFDM	9 dBi 90DegHorn	-3.98	≤ 8	Pass
80MHz Channel BW					
5260	OFDM	17.5dBi 30DegHorn	-10.94	≤ -0.5	Pass
5260	OFDM	13 dBi 50DegHorn/ HexHorn	-7.39	≤ 4	Pass
5300	OFDM	13 dBi 50DegHorn/ HexHorn	-7.772	≤ 4	Pass
5260	OFDM	9dBi 90DegHorn	-5.45	≤ 8	Pass
5300	OFDM	9 dBi 90DegHorn	-7.81	≤ 8	Pass

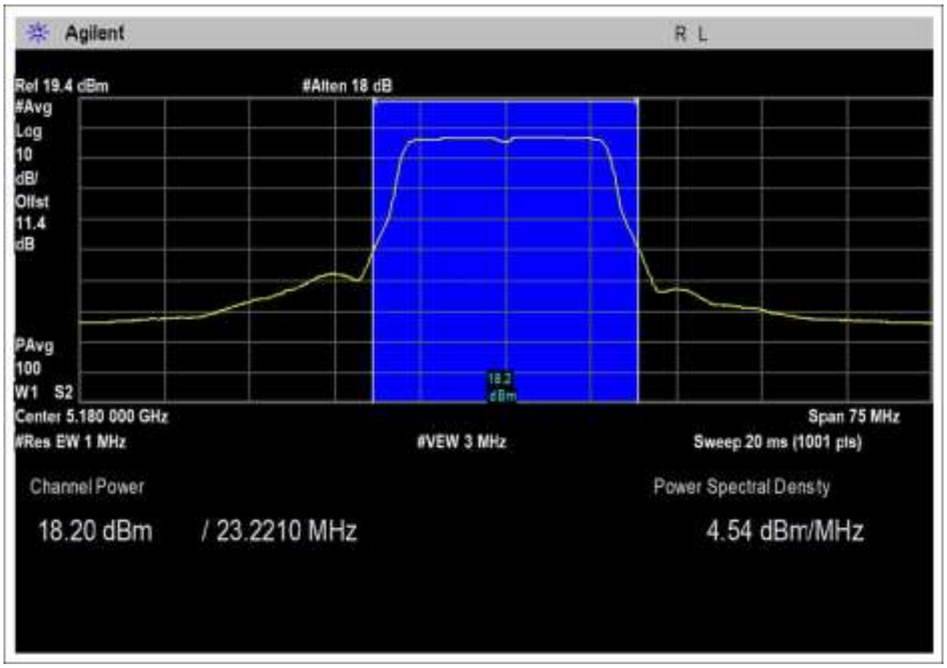
The limit is calculated in accordance with 15.407(a)(2):

$$Limit = 11 - Roundup(G - 6)$$

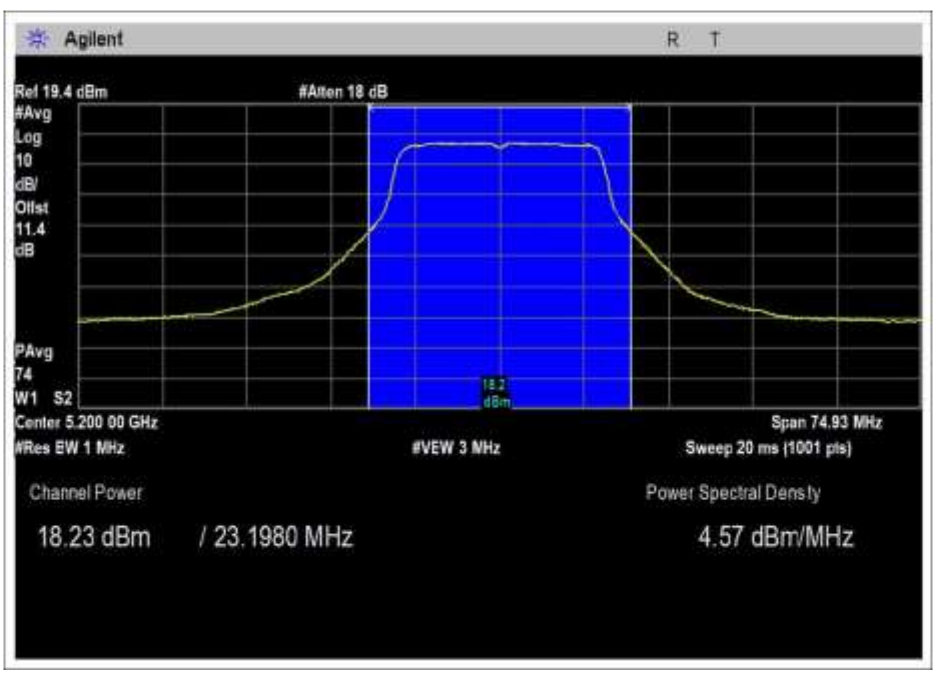
Plots

UNII 1

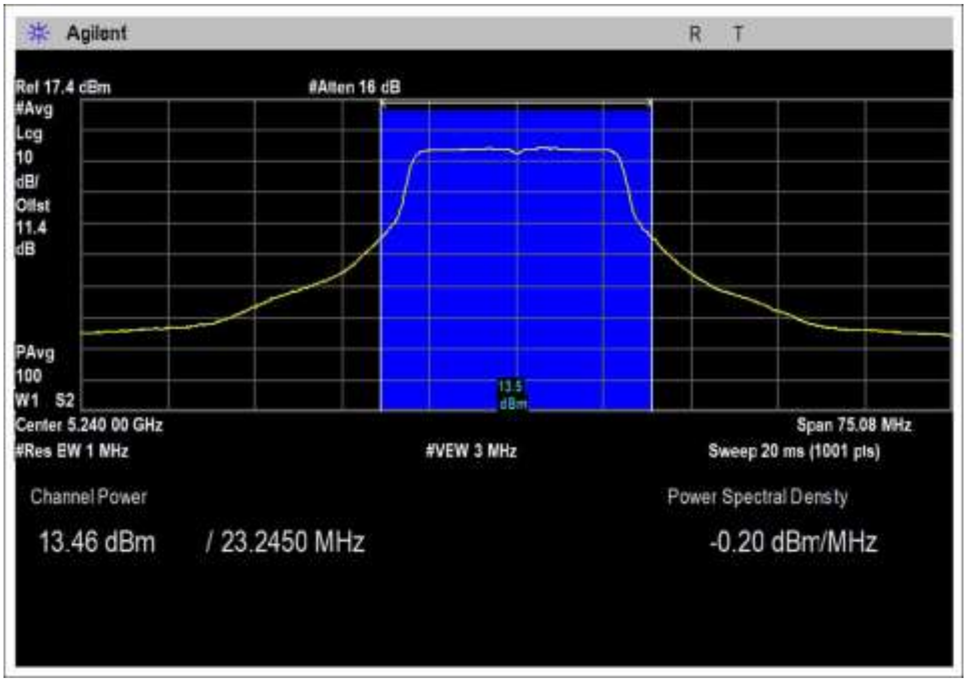
20MHz / 30Deg / 17.5dBi



LB, Set 16-20M



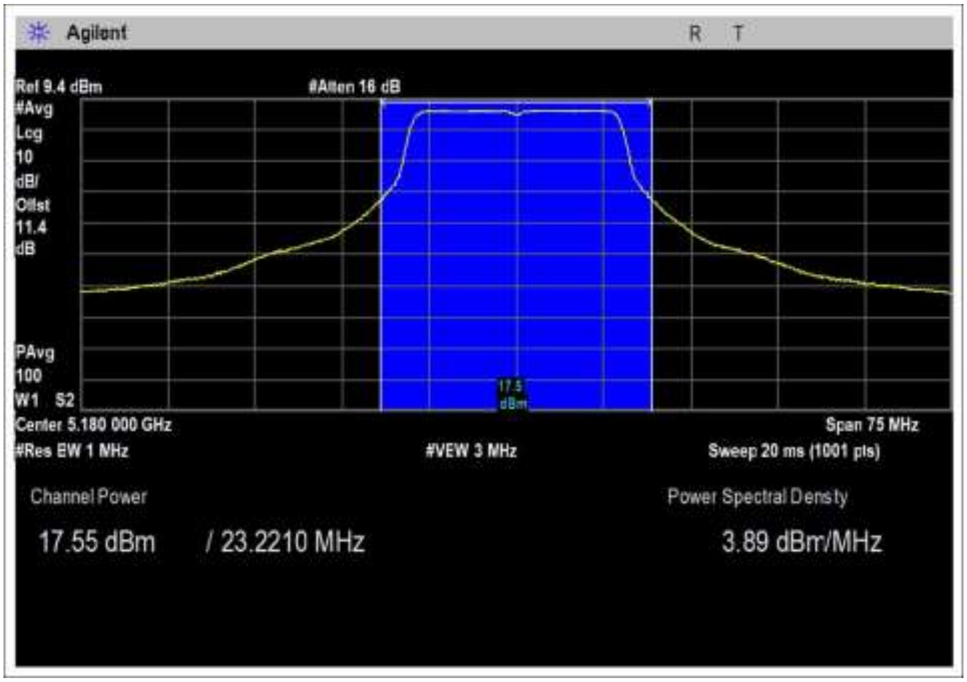
MB, Set 16-20M



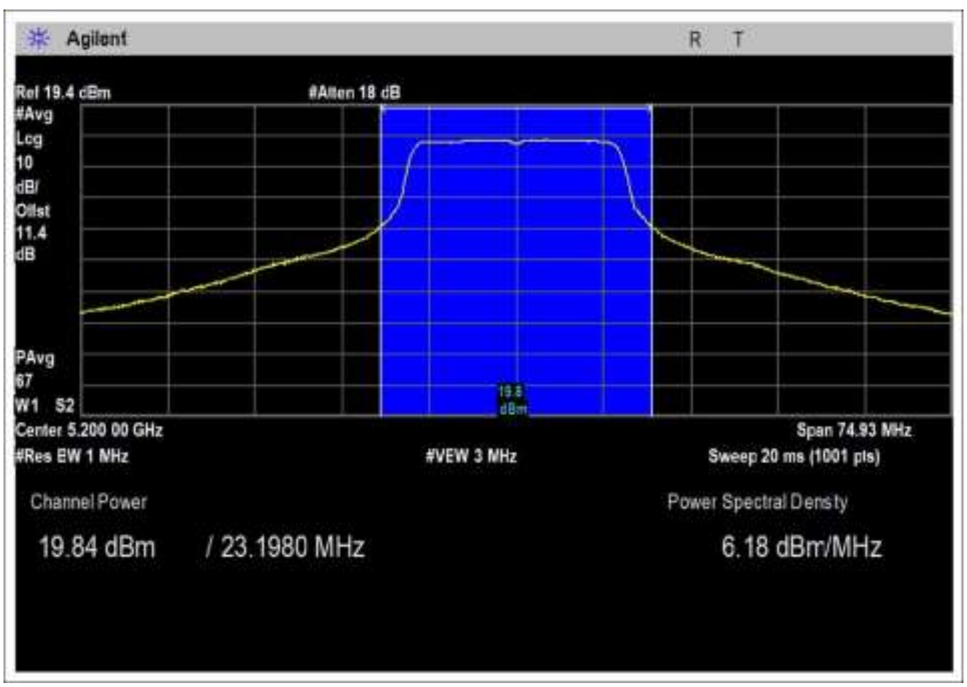
Agilent
R T
Ref 17.4 dBm
#Atten 16 dB
#Avg
Log
10
dB/
Offst
11.4
dB
PAvg
100
W1 S2
13.5
dBm
Center 5.240 00 GHz
Span 75.08 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 20 ms (1001 pts)
Channel Power
13.46 dBm / 23.2450 MHz
Power Spectral Density
-0.20 dBm/MHz

HB, Set 16-20M

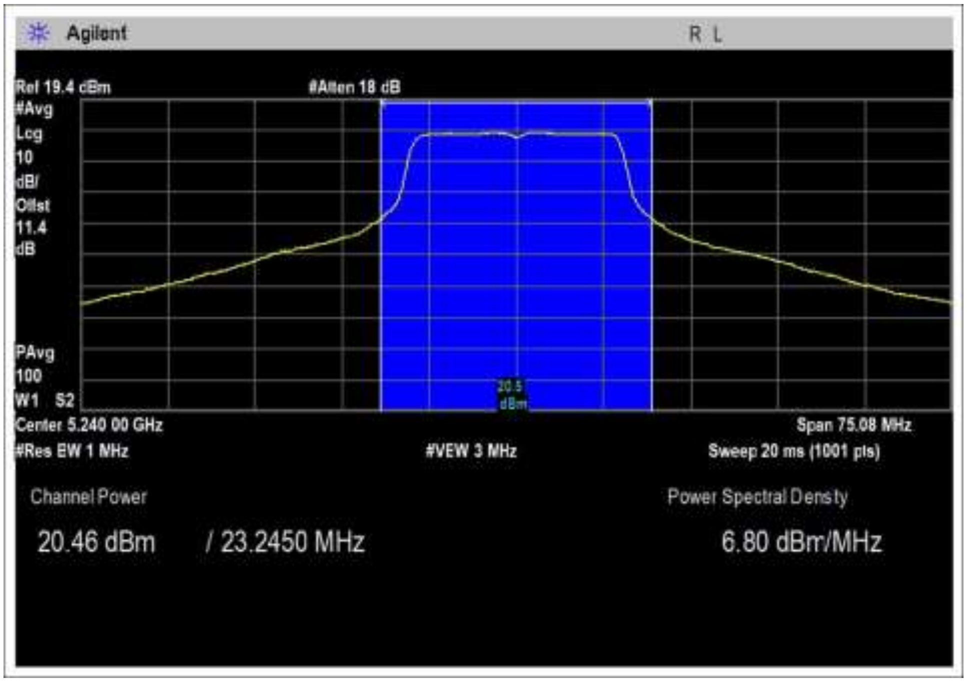
20MHz / 90Deg / 9dBi



LB, Set 20-20M

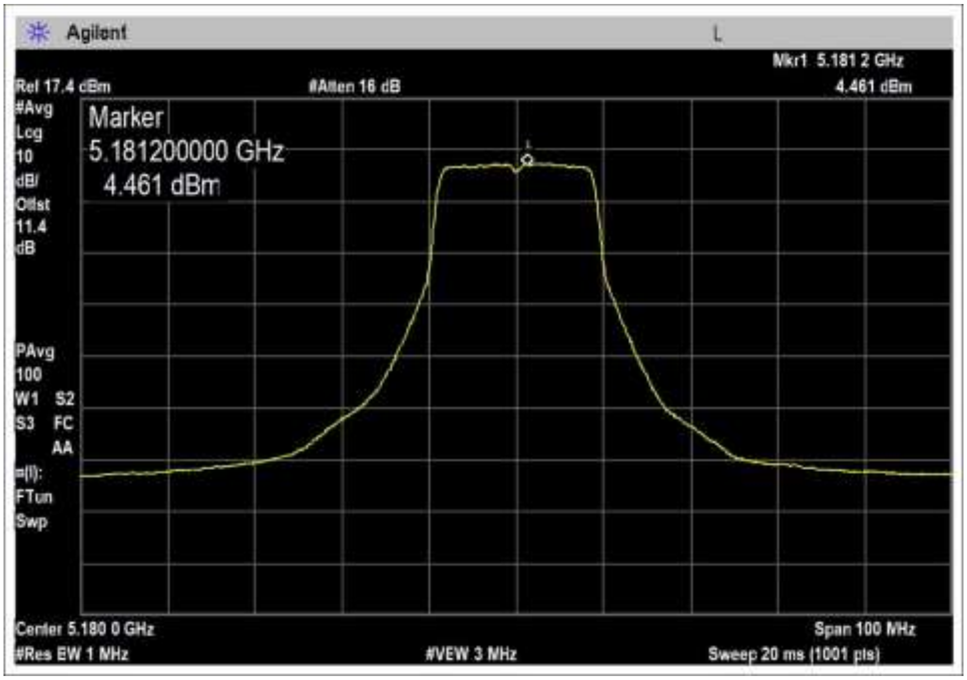


MB, Set 22-20M

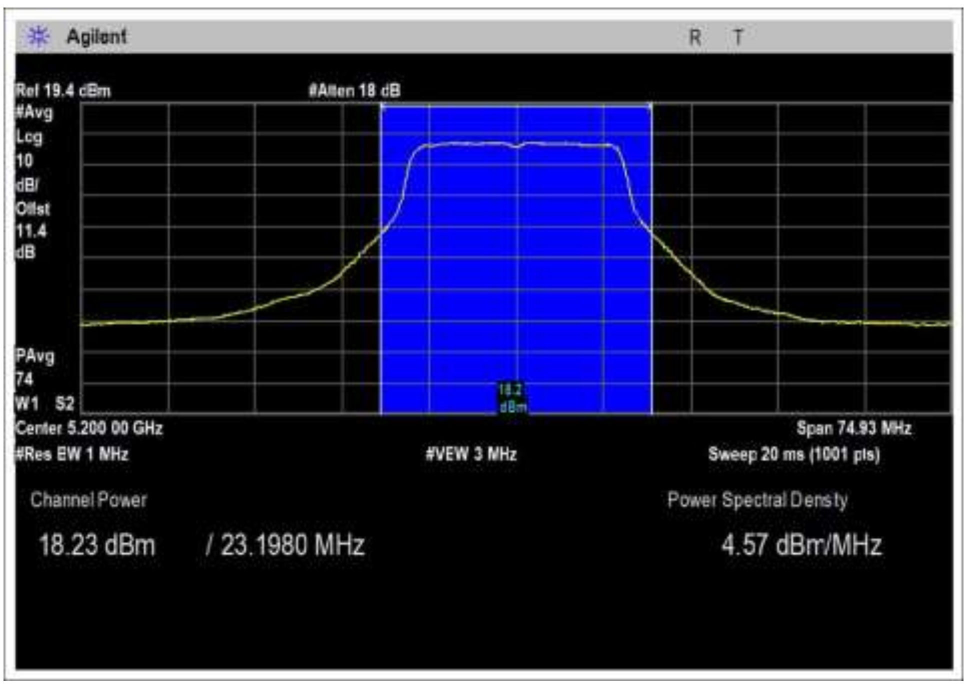

Agilent
R L
Ref 19.4 dBm
#Atten 18 dB
#Avg
Log
10
dB/
Offst
11.4
dB
PAvg
100
W1 S2
20.5
dBm
Center 5.240 00 GHz
Span 75.08 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 20 ms (1001 pts)
Channel Power
20.46 dBm / 23.2450 MHz
Power Spectral Density
6.80 dBm/MHz

HB, Set 22-20M

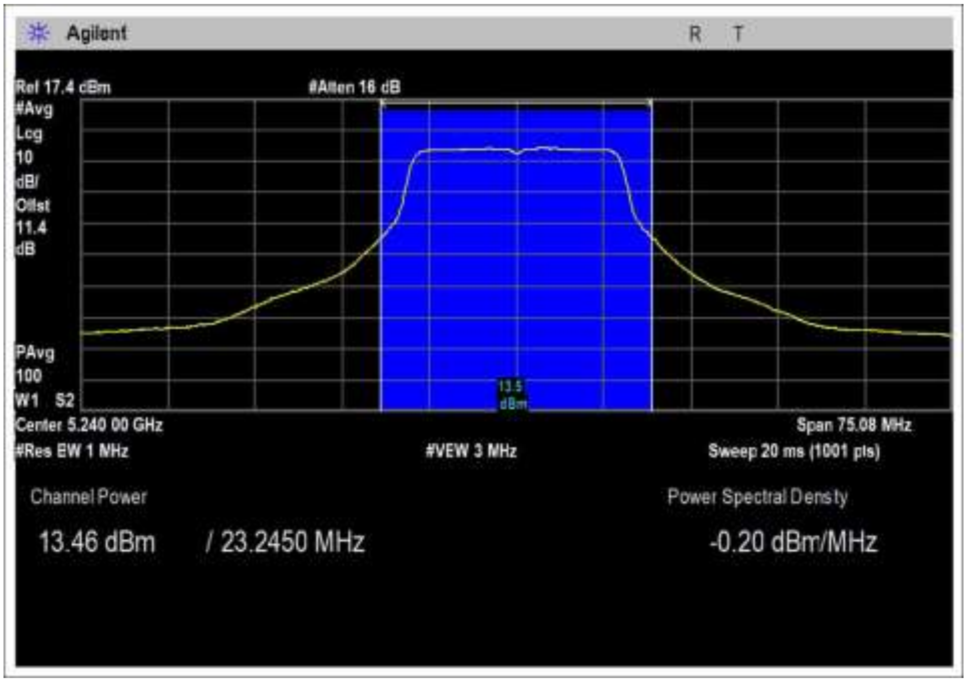
20MHz / HexHorn / 50Deg Horn / 13dBi



LB, Set 16-20M

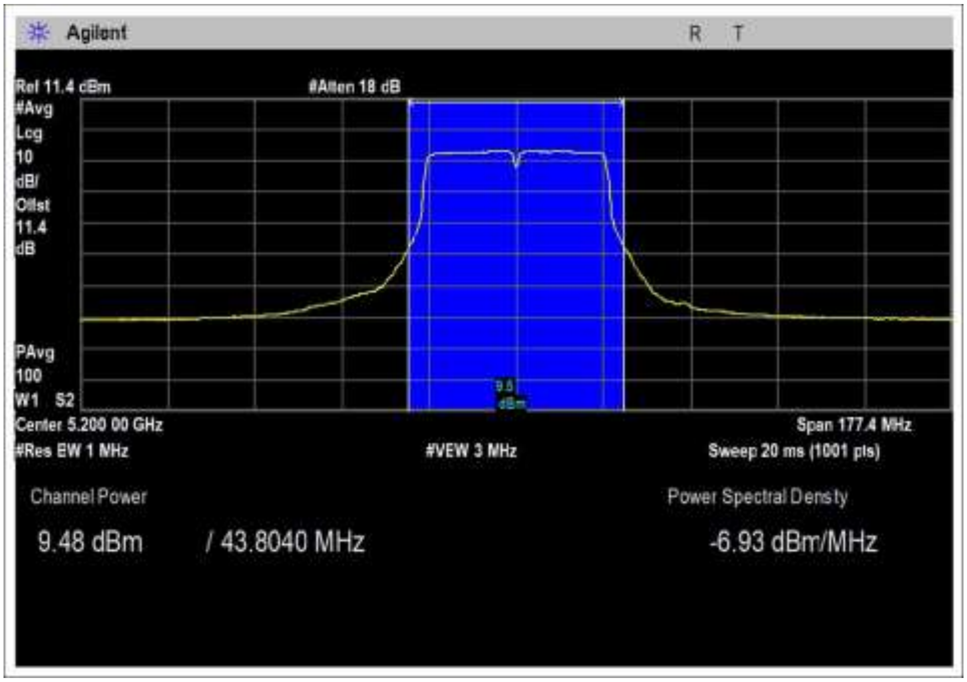


MB, Set 16-20M

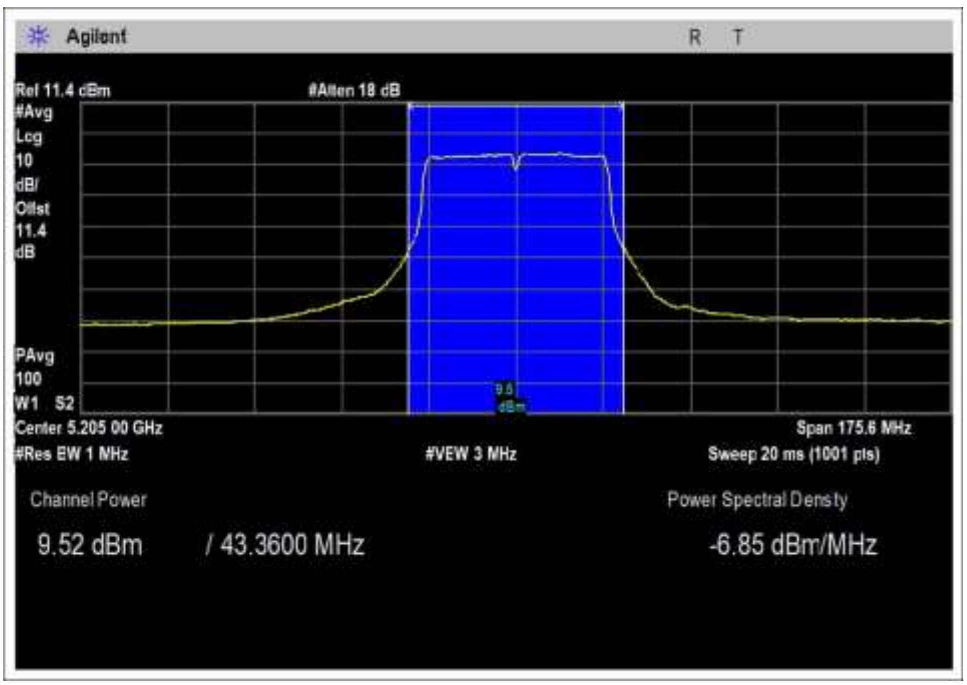

Agilent
R T
Ref 17.4 dBm
#Atten 16 dB
#Avg
Log
10
dB/
Offst
11.4
dB
PAvg
100
W1 S2
13.5
dBm
Center 5.240 00 GHz
Span 75.08 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 20 ms (1001 pts)
Channel Power
13.46 dBm / 23.2450 MHz
Power Spectral Density
-0.20 dBm/MHz

HB, Set 16-20M

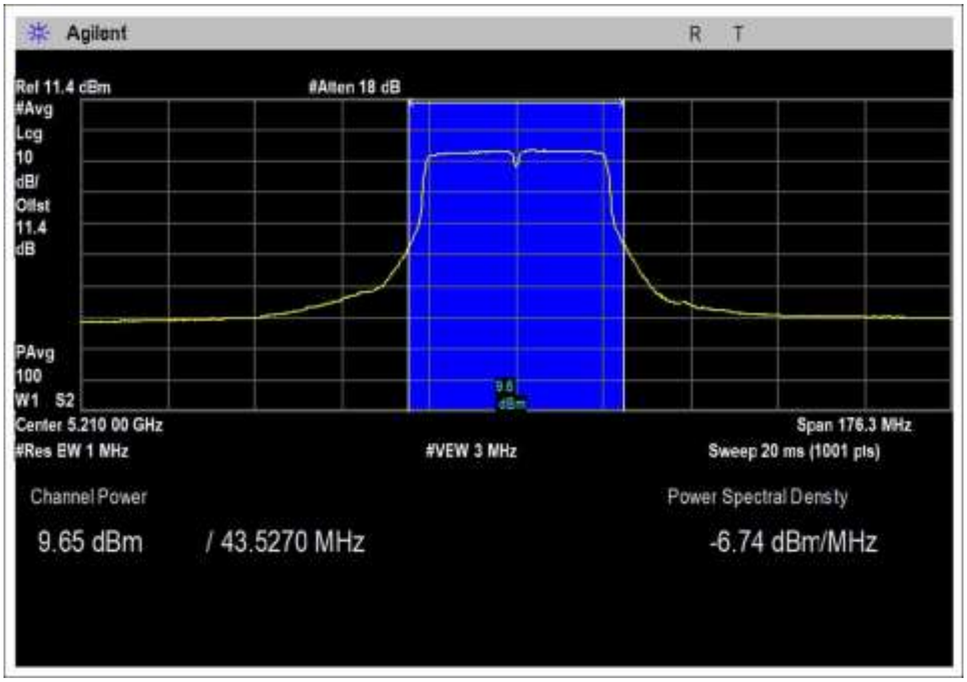
40MHz / 30Deg / 17.5dBi



LB, Set 12-40M

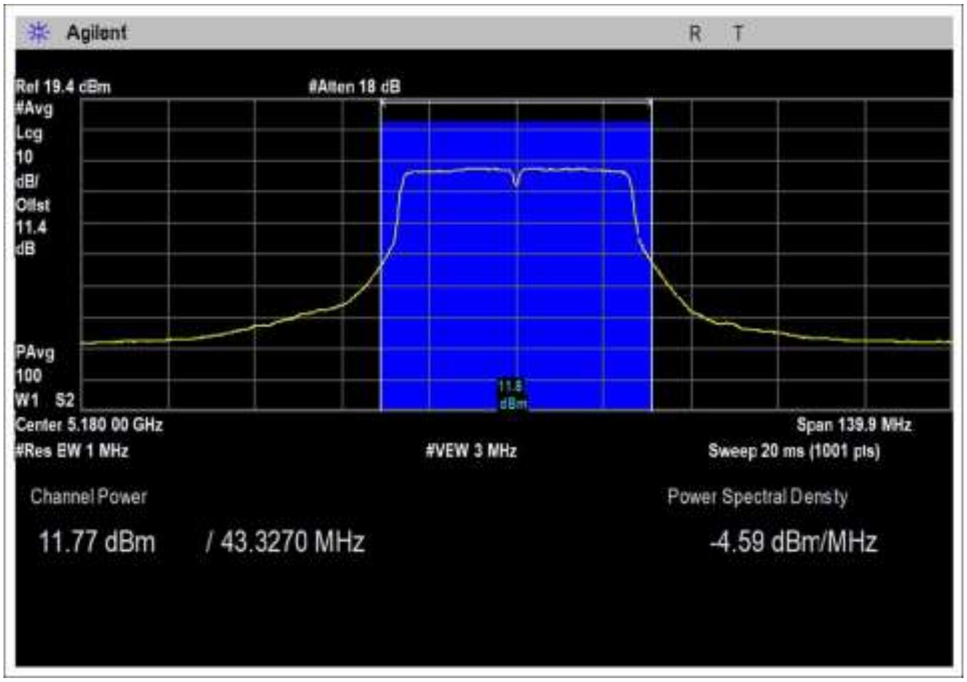


MB, Set 12-40M

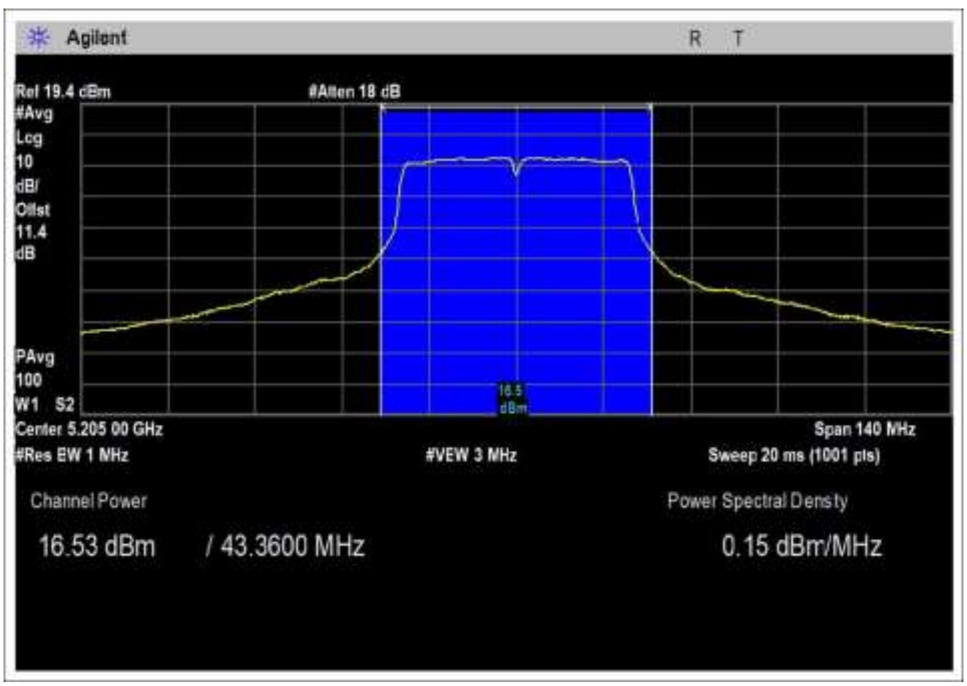

Agilent
R T
Ref 11.4 dBm
#Atten 18 dB
#Avg
Log
10
dB/
Offst
11.4
dB
PAvg
100
W1 S2
9.6
dBm
Center 5.210 00 GHz
Span 176.3 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 20 ms (1001 pts)
Channel Power
9.65 dBm
/ 43.5270 MHz
Power Spectral Density
-6.74 dBm/MHz

HB, Set 12-40M

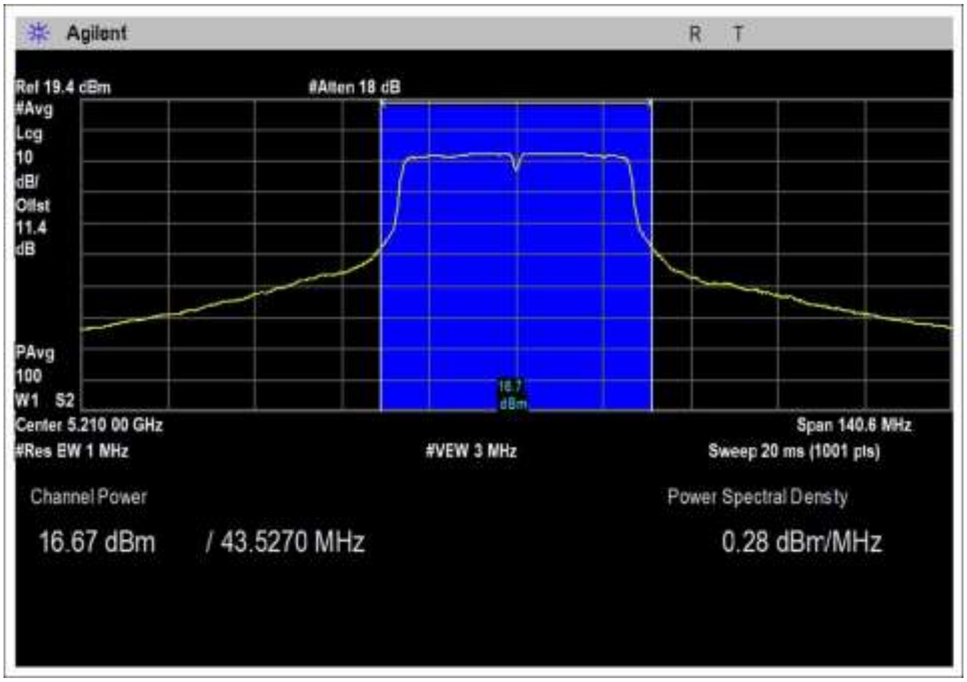
40MHz / 90Deg / 9dBi



LB, Set 14-40M

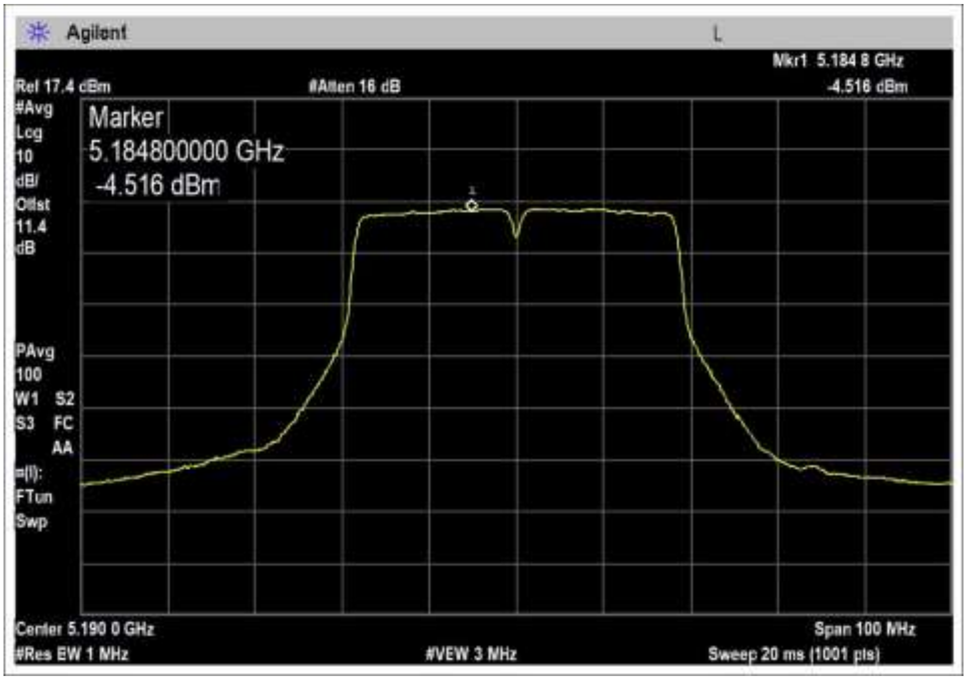


MB, Set 18.5-40M

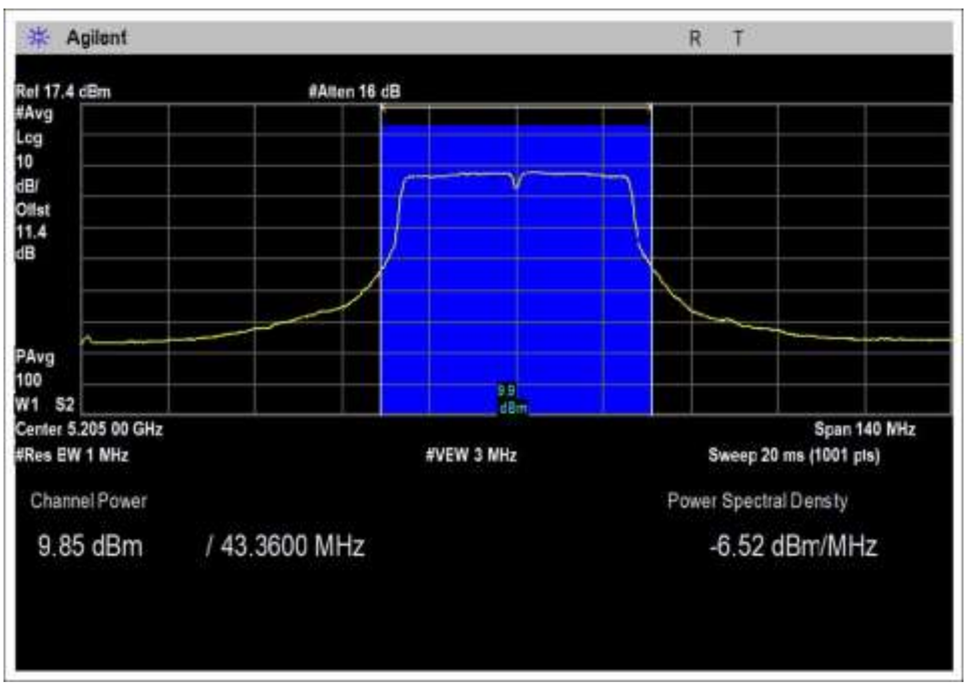


HB, Set 18.5-40M

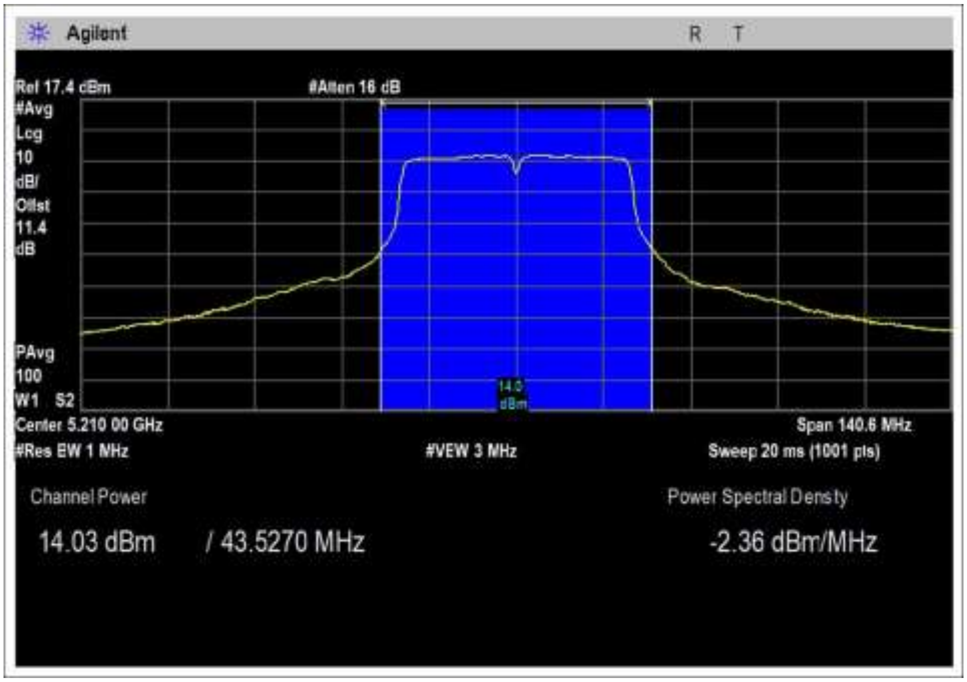
40MHz / HexHorn / 50Deg Horn / 13dBi



LB, Set 12-40M

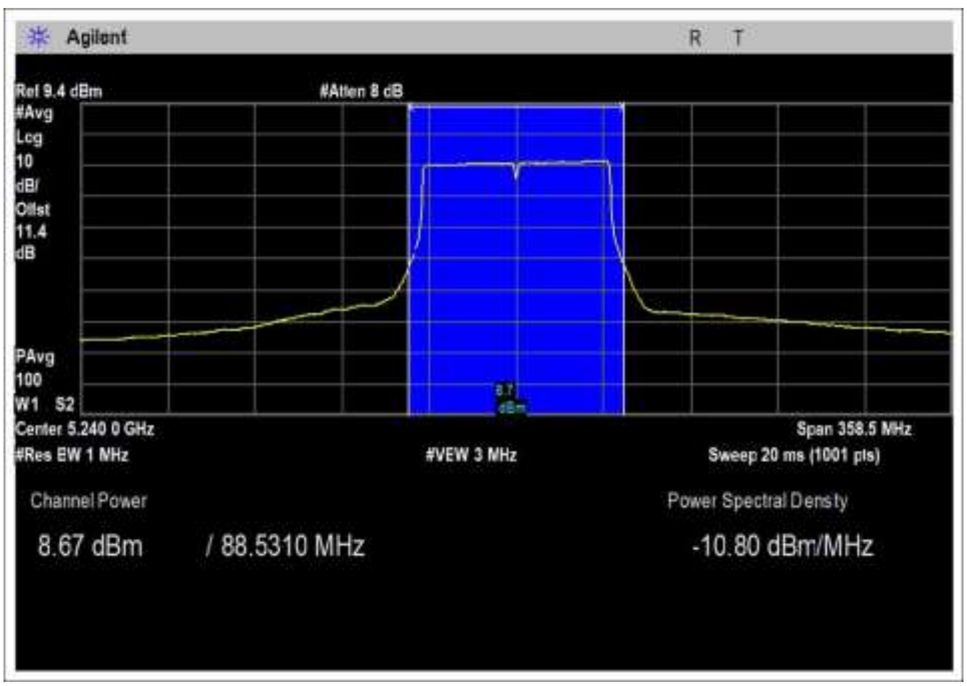


MB, Set 12-40M



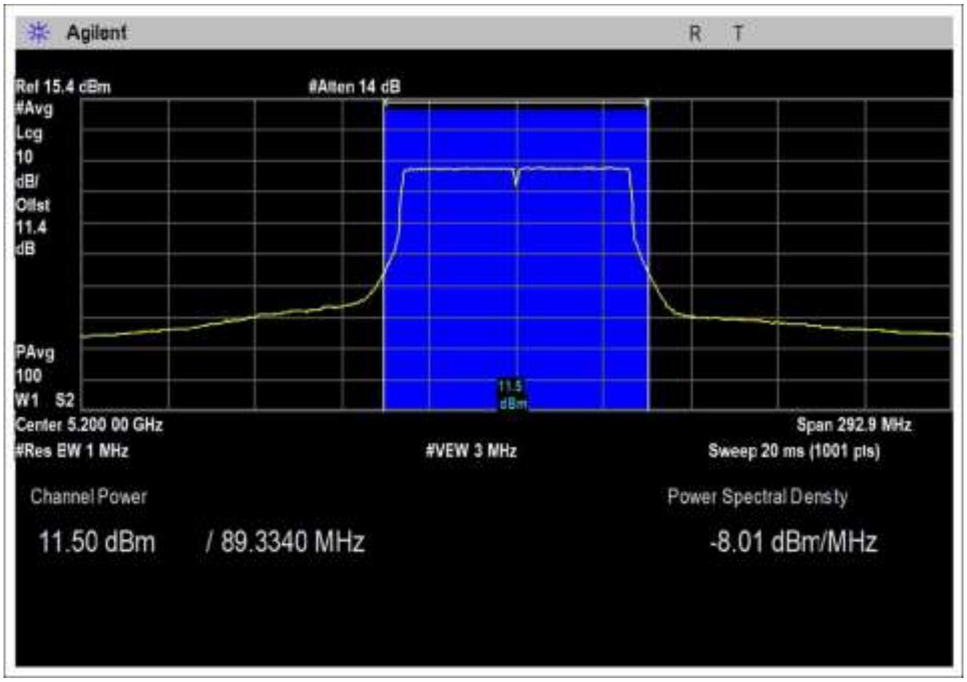
HB, Set 16-40M

80MHz / 30Deg / 17.5dBi

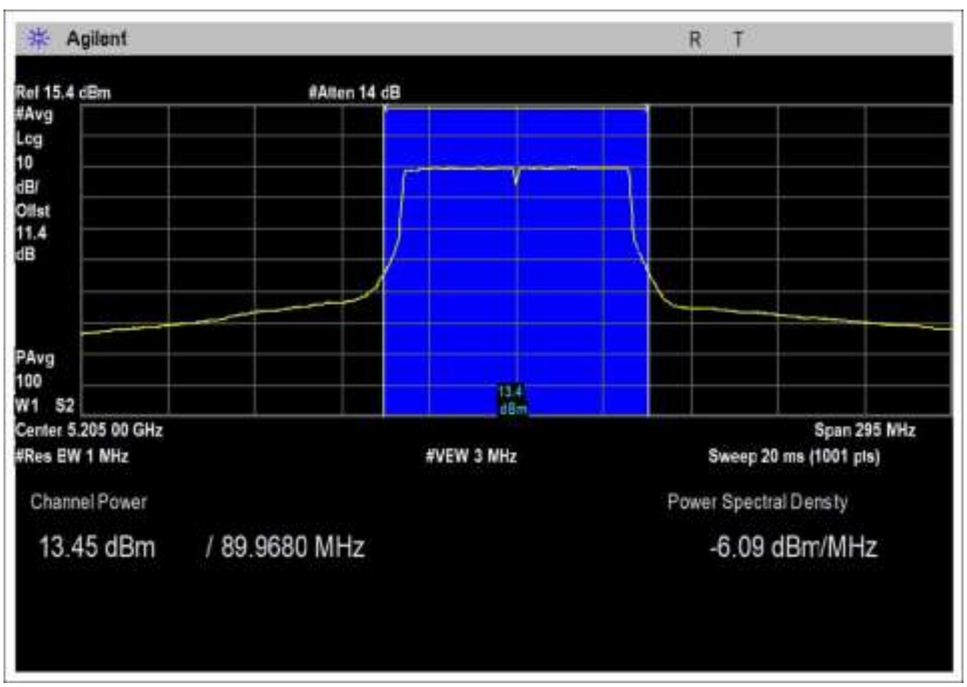


Set 10-80MHz

80MHz / 90Deg / 9dBi

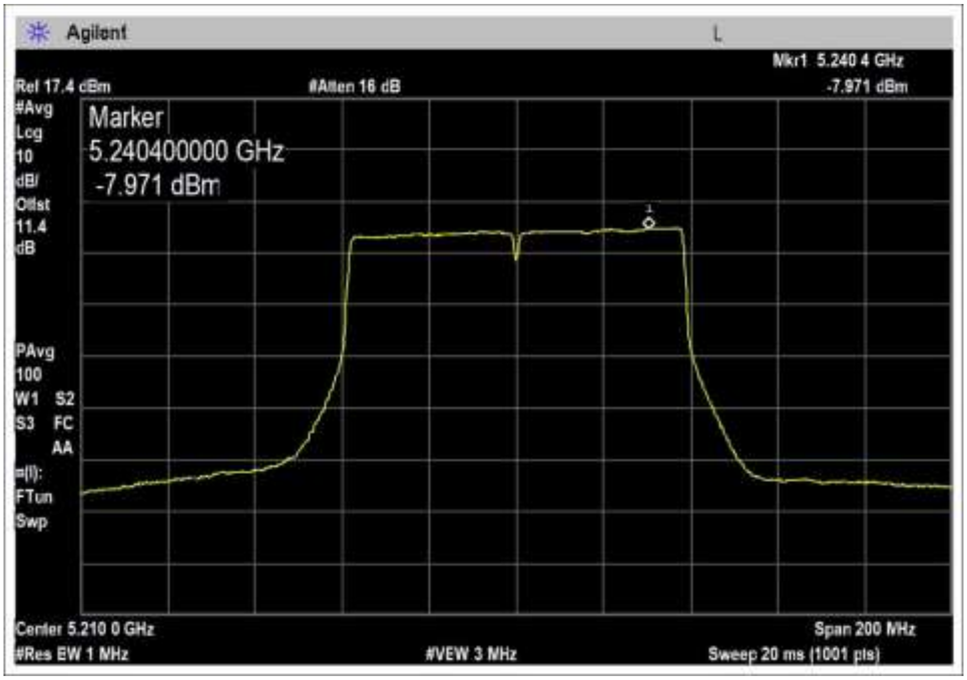


LB, Set 14-80M



HB, Set 16-80M

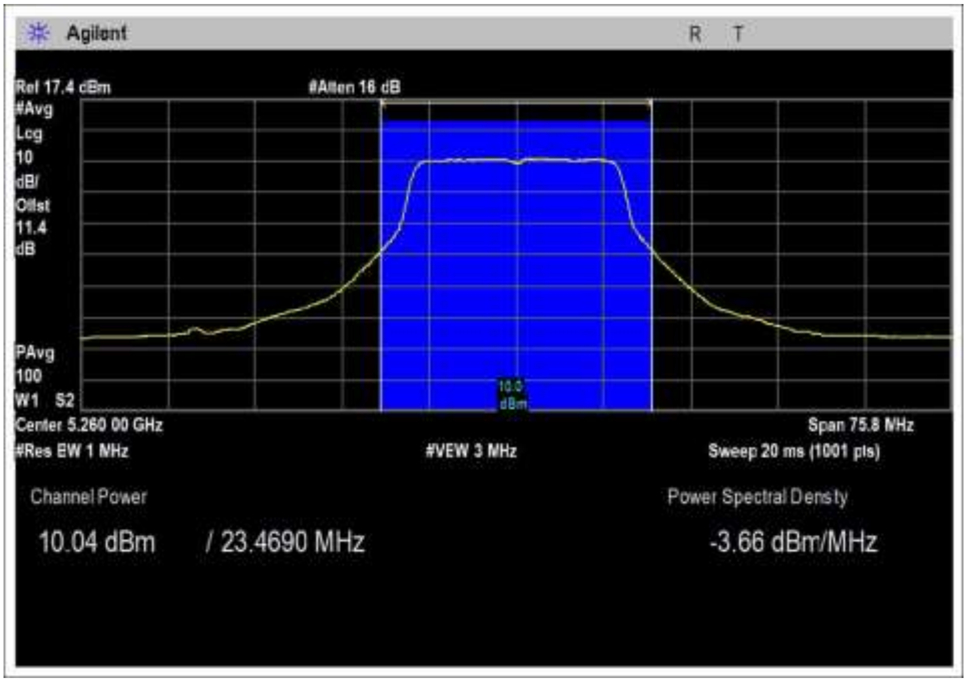
80MHz / HexHorn / 50Deg Horn / 13dBi



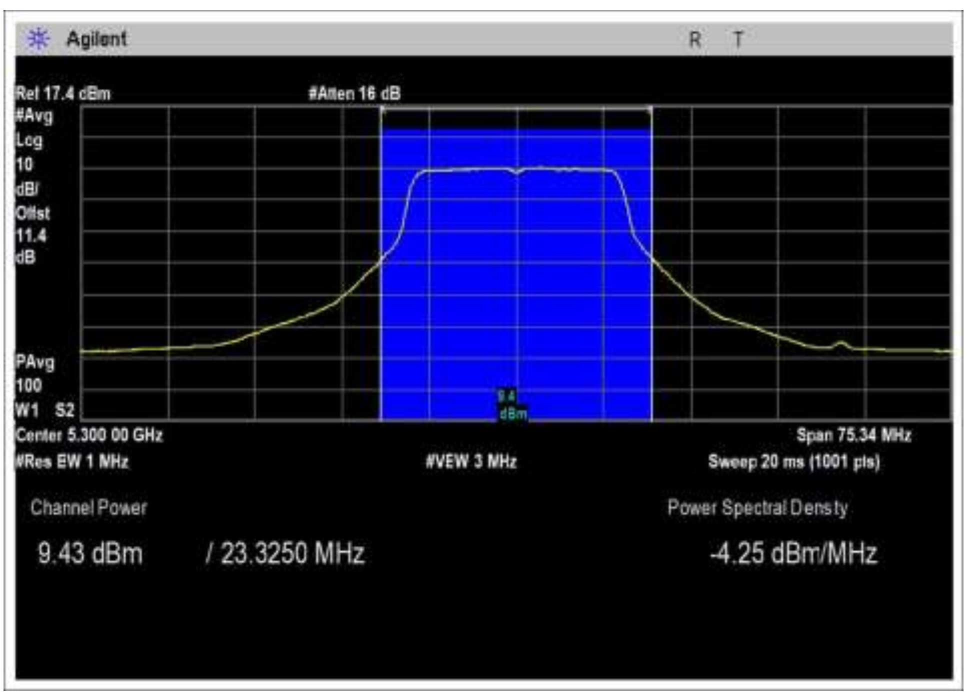
HB, Set 10-80M

UNII 2a

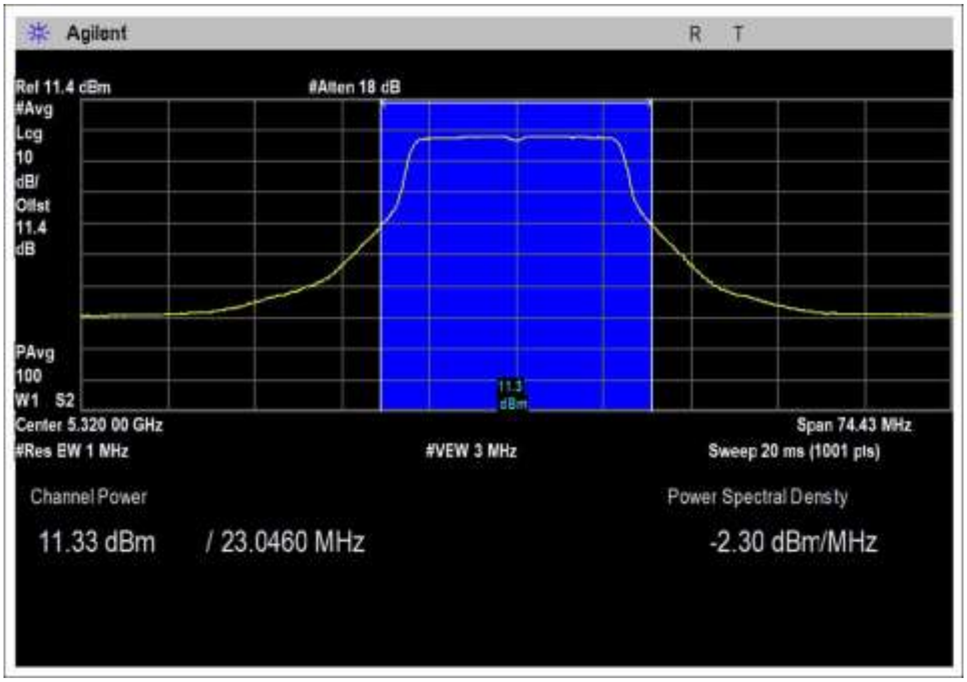
20MHz / 30Deg / 17.5dBi



LB, Set 12.5-20M

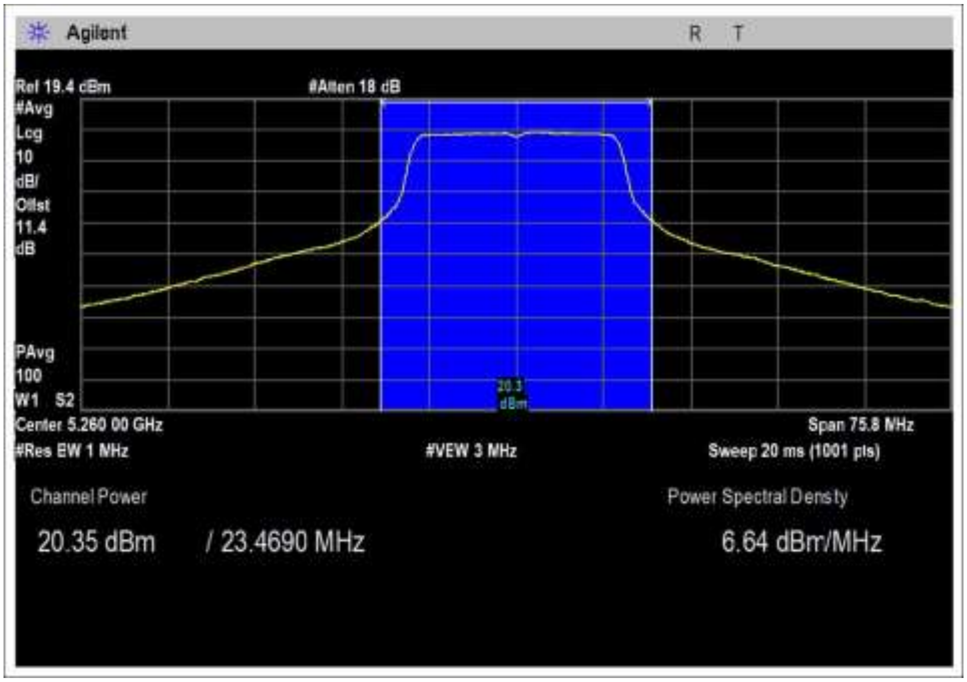


MB, Set 12.5-20M

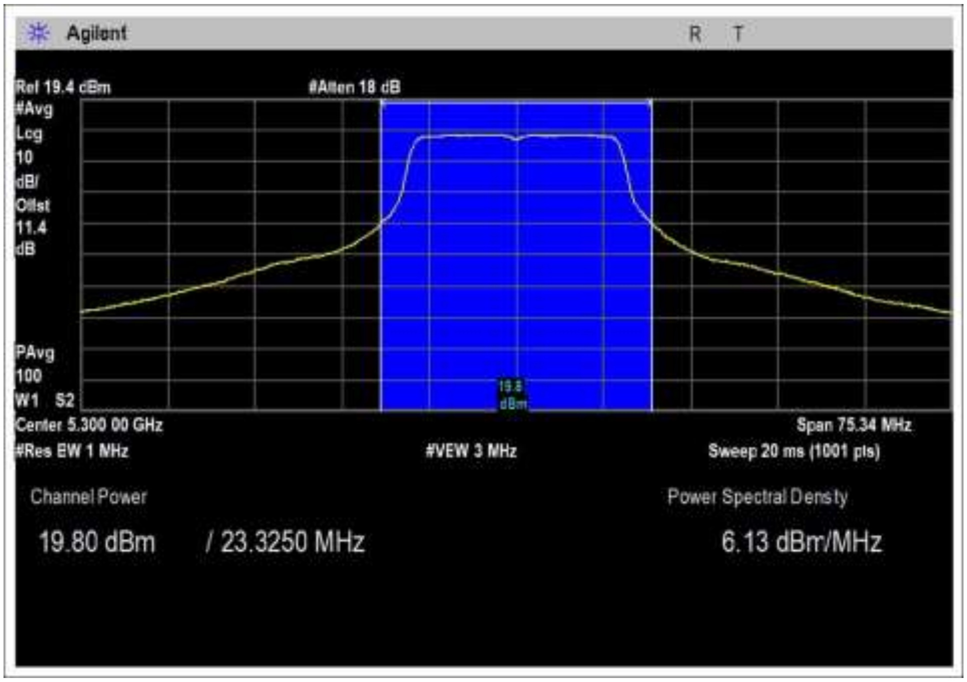

Agilent
R T
Ref 11.4 dBm
#Atten 18 dB
#Avg
Log
10
dB/
Offst
11.4
dB
PAvg
100
W1 S2
11.3 dBm
Center 5.320 00 GHz
Span 74.43 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 20 ms (1001 pts)
Channel Power
11.33 dBm
/ 23.0460 MHz
Power Spectral Density
-2.30 dBm/MHz

HB, Set 14-20M

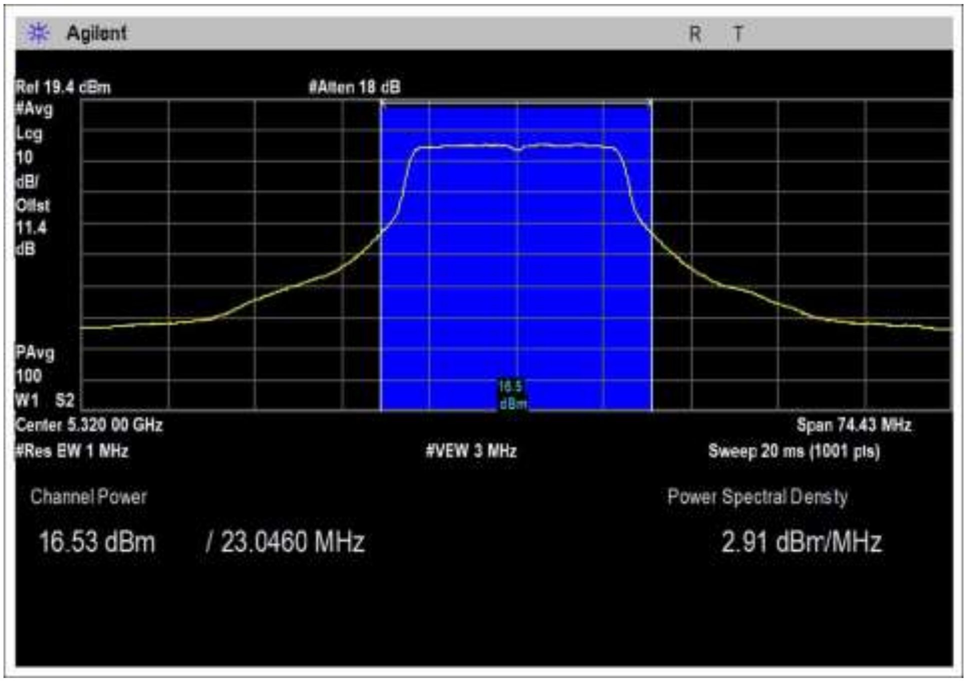
20MHz / 90Deg / 9dBi



LB, Set 22-20M

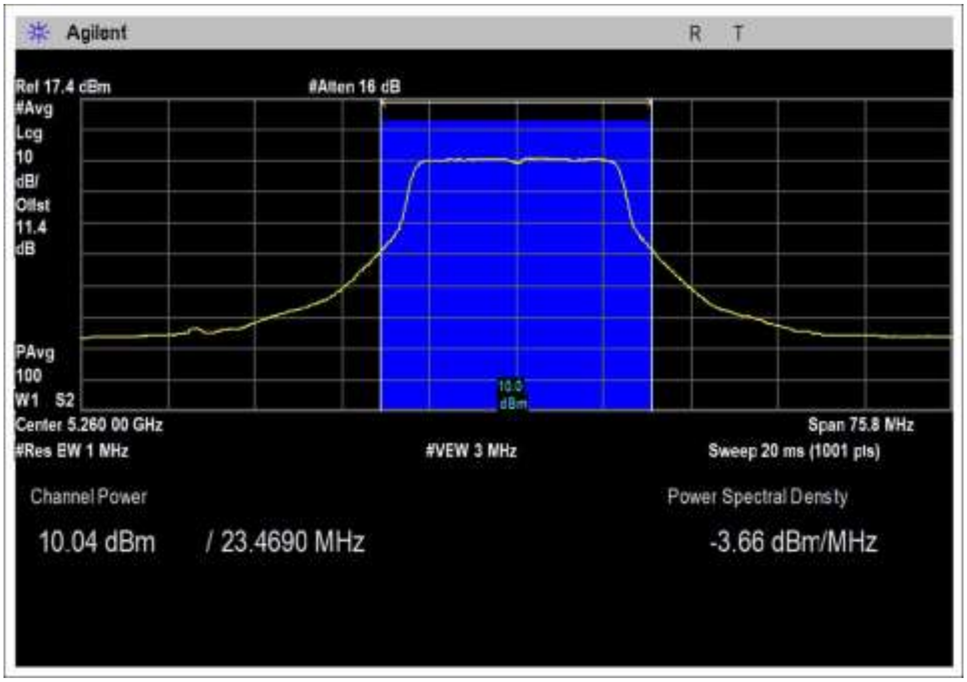


MB, Set 22-20M

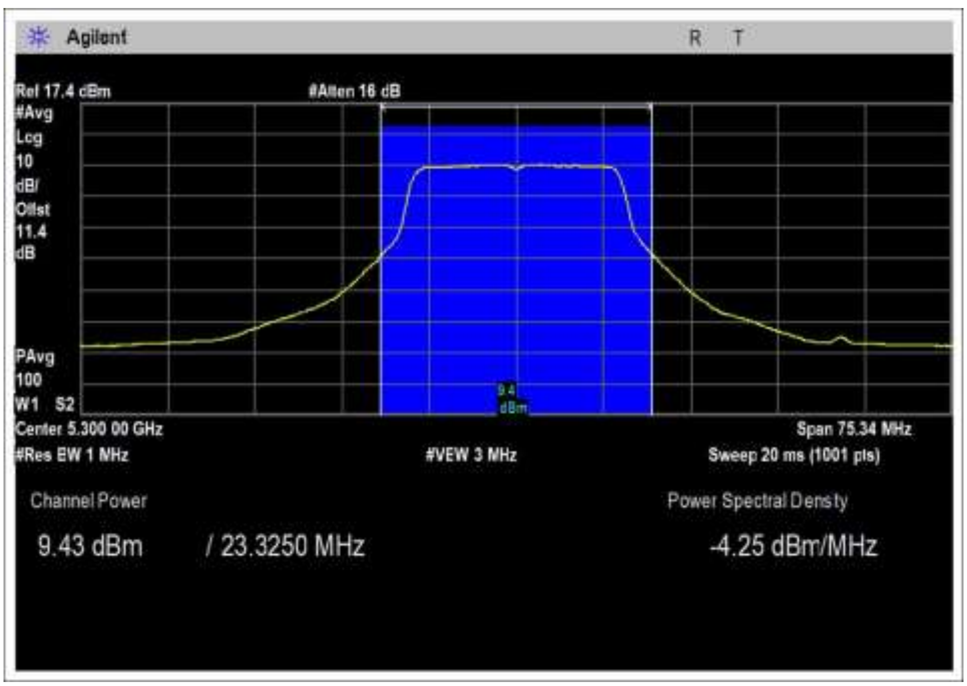

Agilent
R T
Ref 19.4 dBm
#Atten 18 dB
#Avg
Log
10
dB/
Offst
11.4
dB
PAvg
100
W1 S2
16.5
dBm
Center 5.320 00 GHz
Span 74.43 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 20 ms (1001 pts)
Channel Power
16.53 dBm / 23.0460 MHz
Power Spectral Density
2.91 dBm/MHz

HB, Set 19-20M

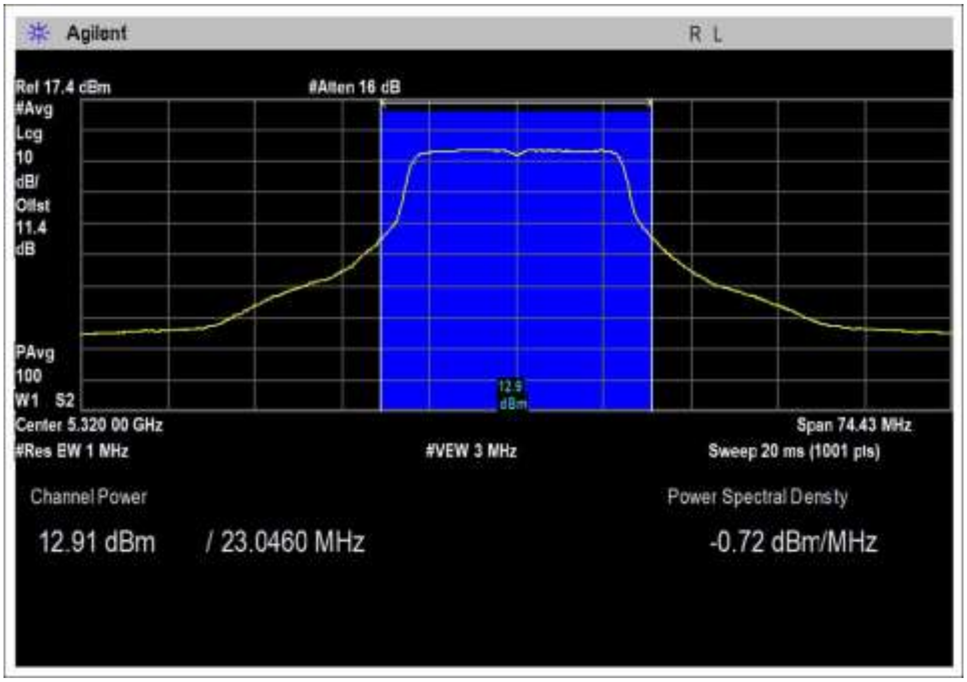
20MHz / HexHorn / 50Deg Horn / 13dBi



LB, Set 12.5-20M

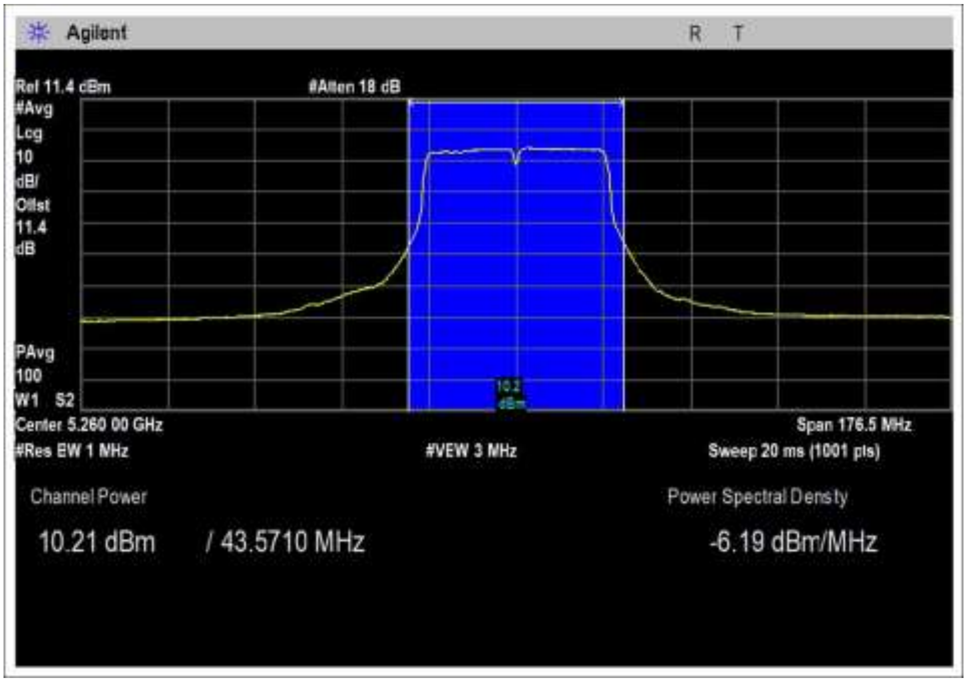


MB, Set 12.5-20M

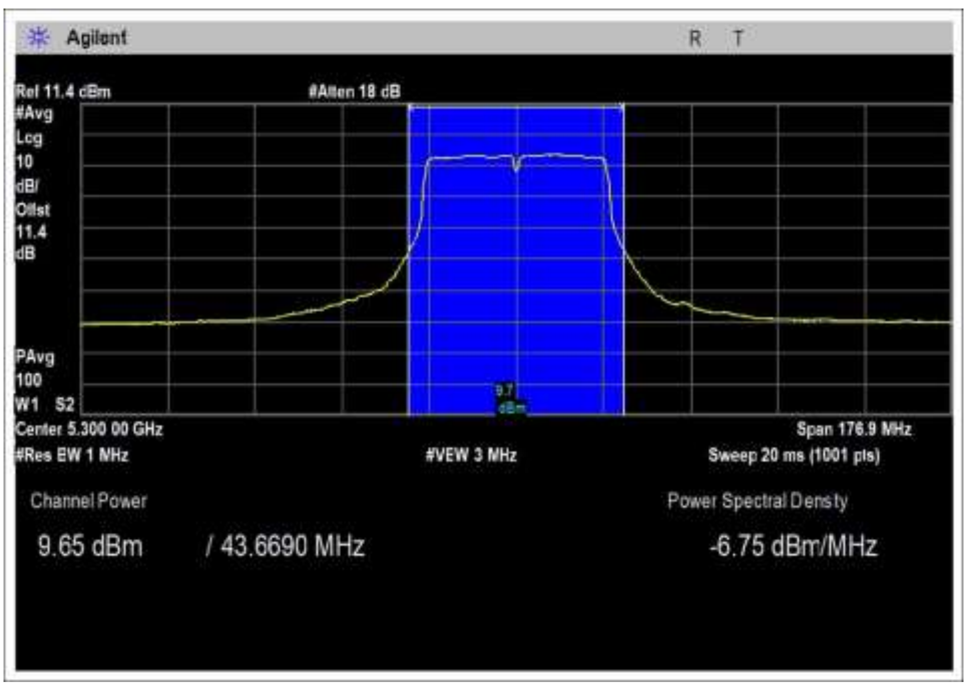

Agilent
R L
Ref 17.4 dBm
#Atten 16 dB
#Avg
Log
10
dB/
Offst
11.4
dB
PAvg
100
W1 S2
12.9
dBm
Center 5.320 00 GHz
Span 74.43 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 20 ms (1001 pts)
Channel Power
12.91 dBm / 23.0460 MHz
Power Spectral Density
-0.72 dBm/MHz

HB, Set 16-20M

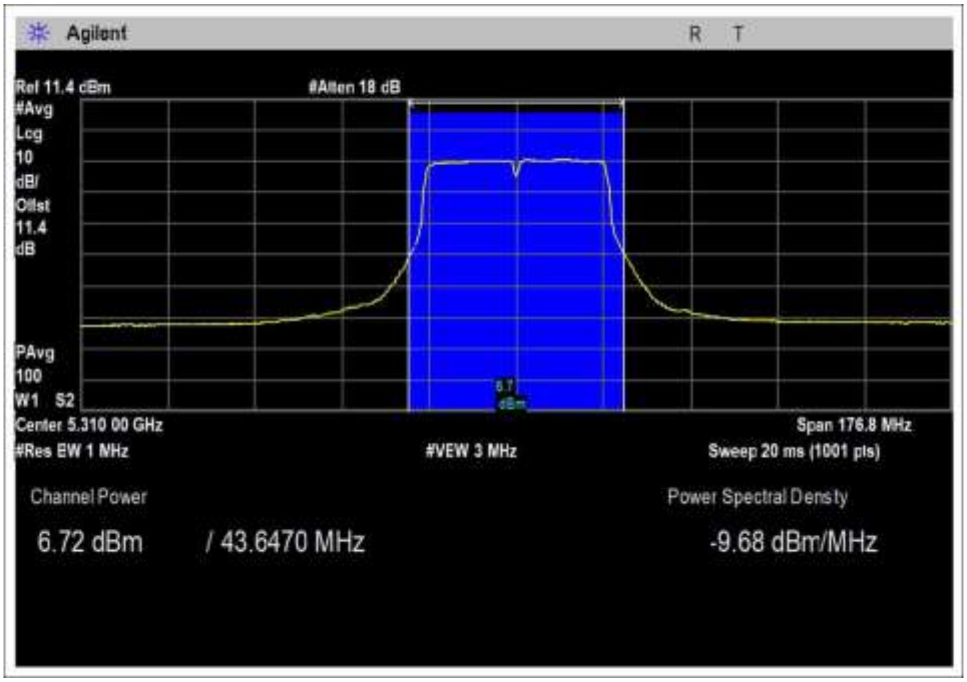
40MHz / 30Deg / 17.5dBi



LB, Set 12-40M

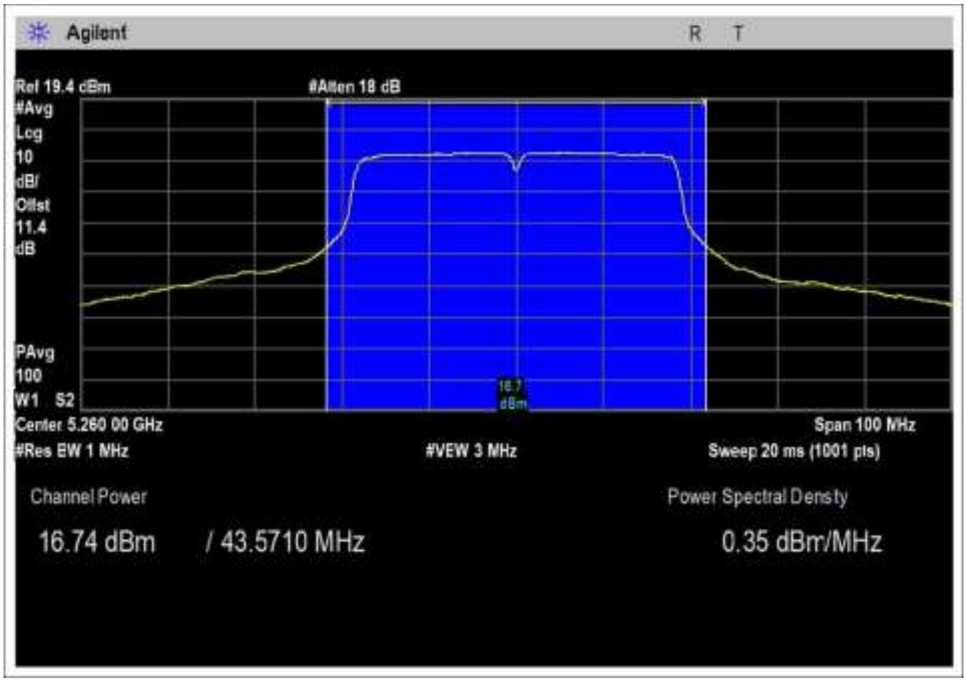


MB, Set 12-40M

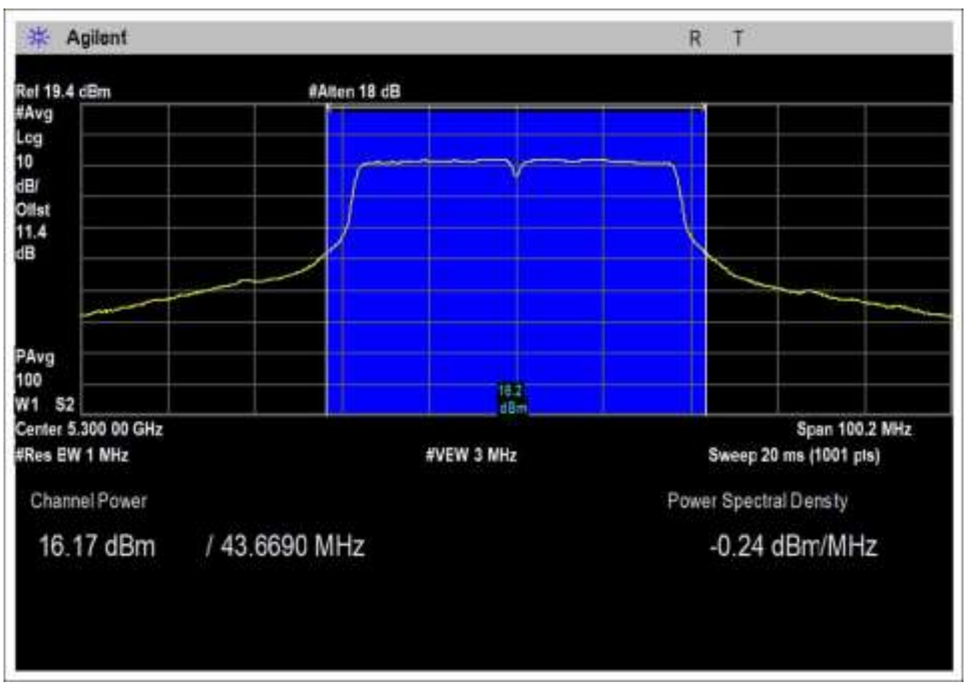

Agilent
R T
Ref 11.4 dBm
#Atten 18 dB
#Avg
Log
10
dB/
Offst
11.4
dB
PAvg
100
W1 S2
Center 5.310 00 GHz
Span 176.8 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 20 ms (1001 pts)
Channel Power
6.72 dBm
/ 43.6470 MHz
Power Spectral Density
-9.68 dBm/MHz

HB, Set 9-40M

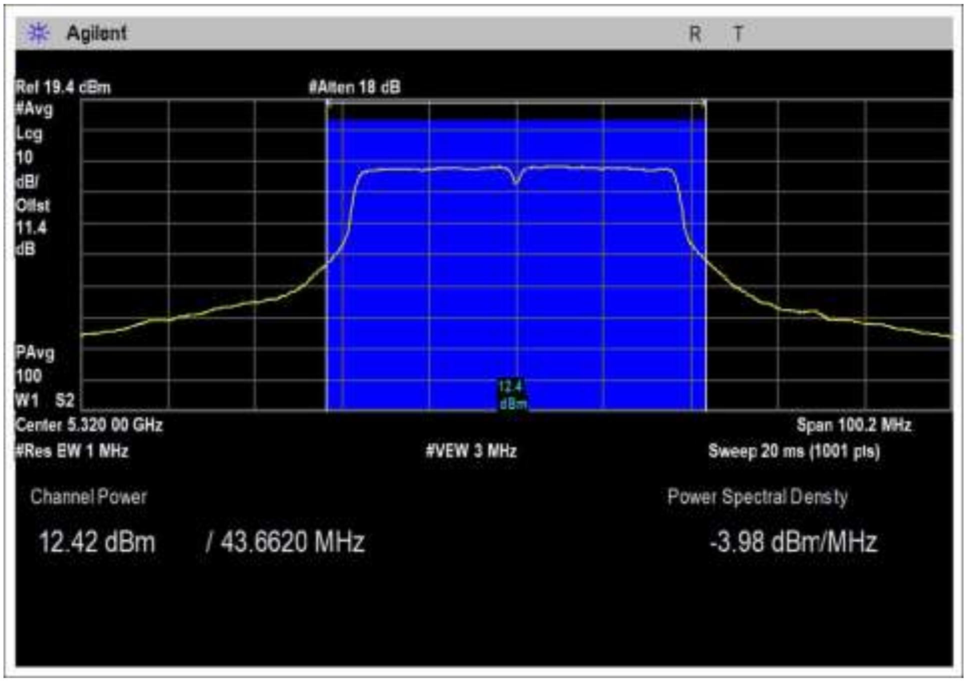
40MHz / 90Deg / 9dBi



LB, Set 18.5-40M

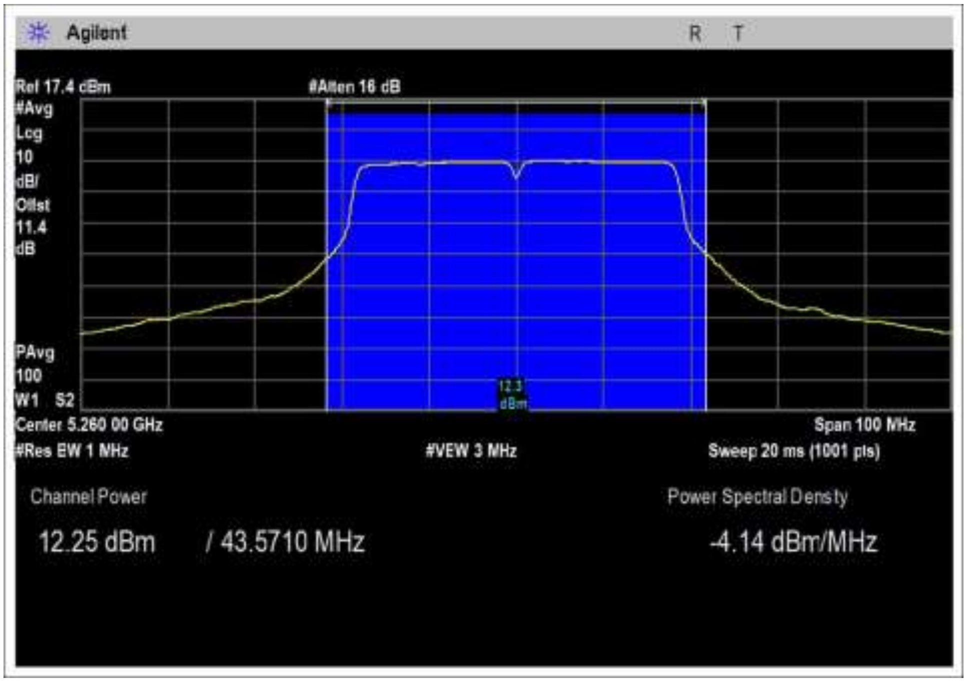


MB, Set 18.5-40M

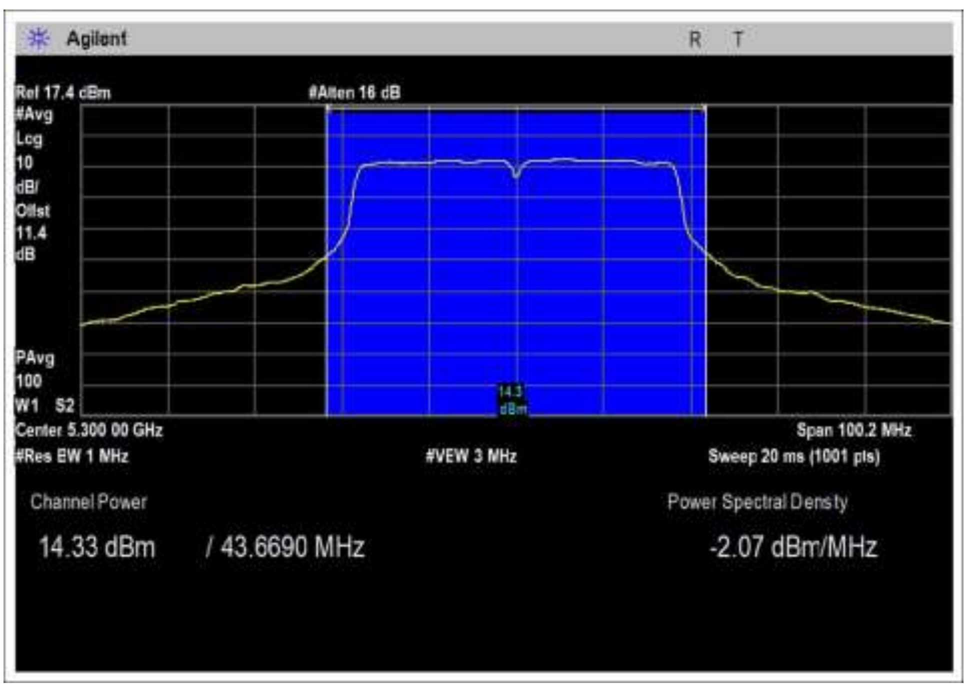

Agilent
R T
Ref 19.4 dBm
#Atten 18 dB
#Avg
Log
10
dB/
Offst
11.4
dB
PAvg
100
W1 S2
12.4 dBm
Center 5.320 00 GHz
Span 100.2 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 20 ms (1001 pts)
Channel Power
12.42 dBm / 43.6620 MHz
Power Spectral Density
-3.98 dBm/MHz

HB, Set 15-40M

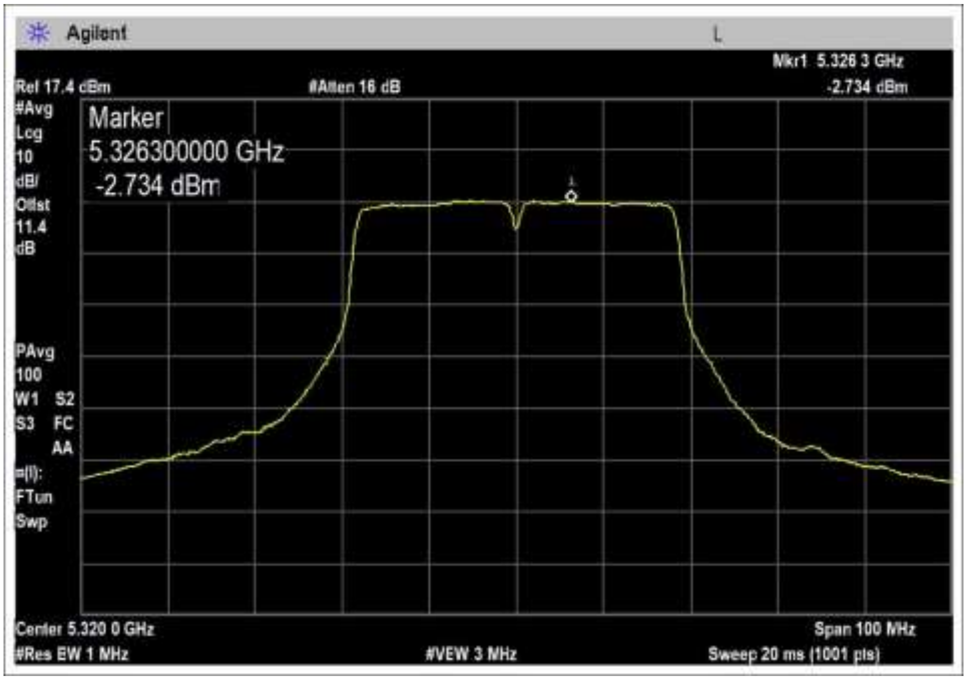
40MHz / HexHorn / 50Deg Horn / 13dBi



LB, Set 12-40M

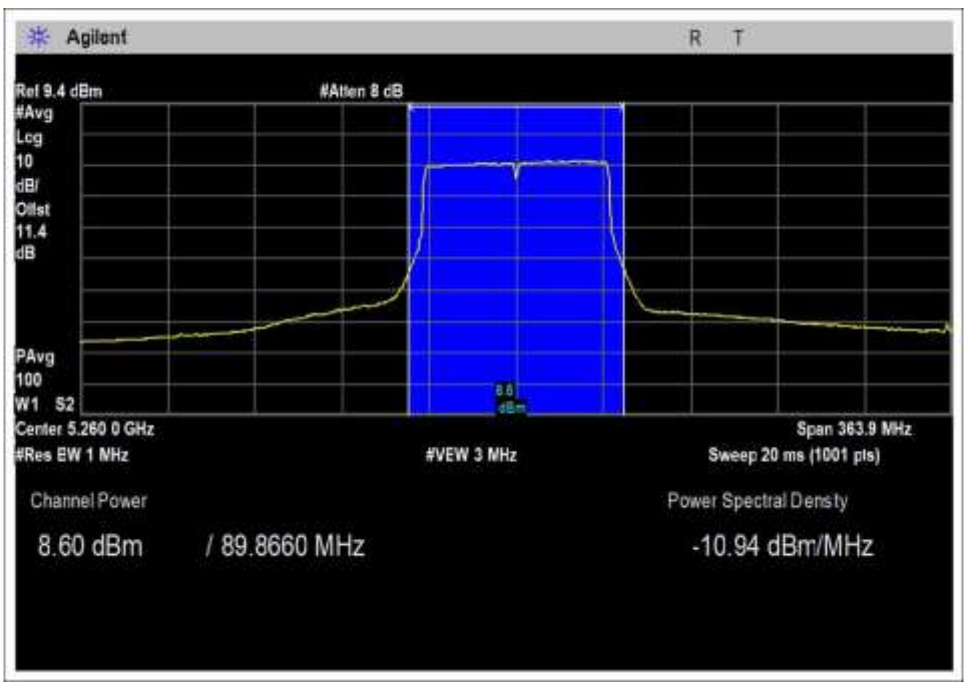


MB, Set 15-40M



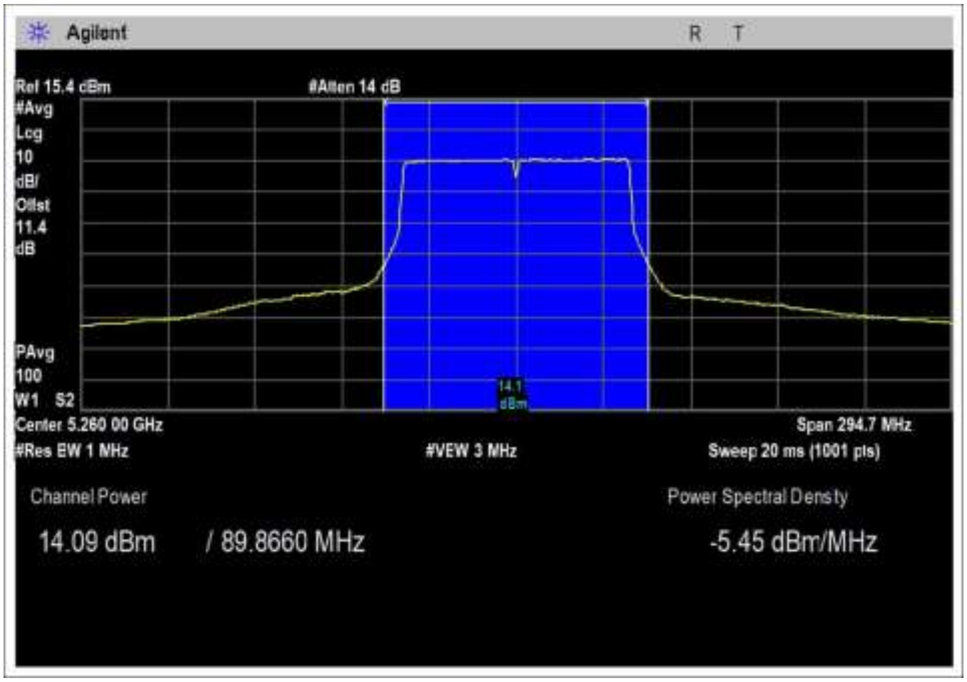
HB, Set 15-40M

80MHz / 30Deg / 17.5dBi

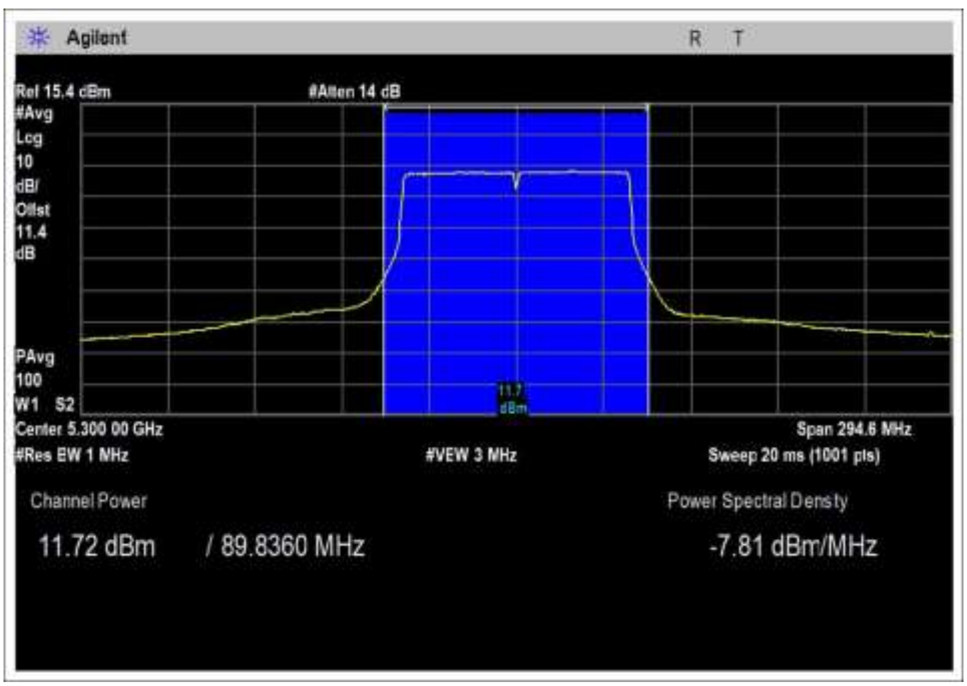


Set 10-80M

80MHz / 90Deg / 9dBi

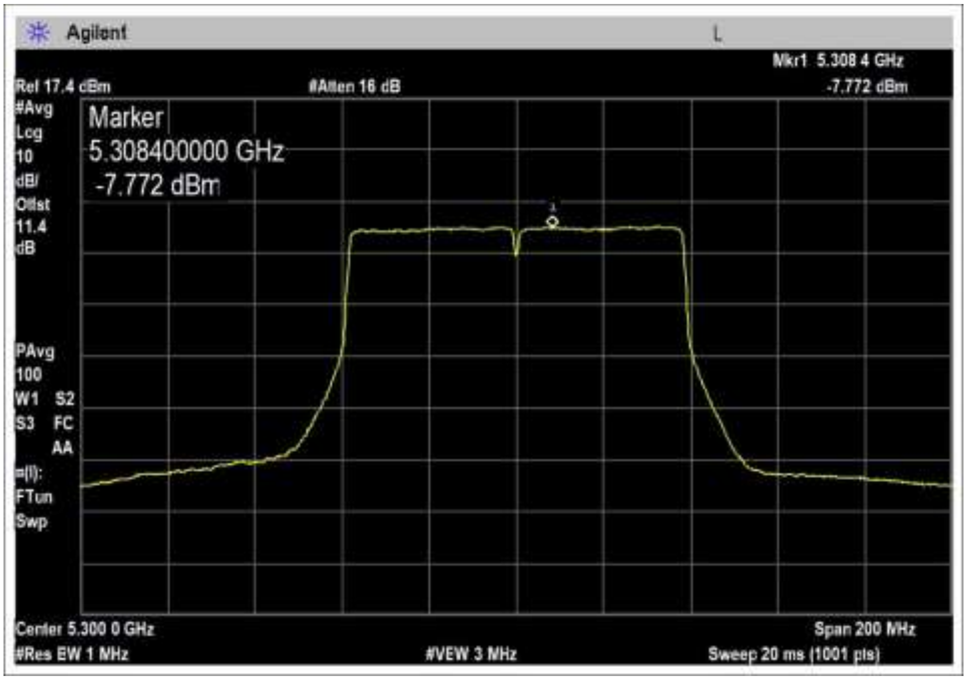


LB, Set 16-80M



HB, Set 14-80M

80MHz / HexHorn / 50Deg Horn / 13dBi



Set 12-80M

Test Setup Photos

15.407(a) EIRP at >30º Elevation

Test Setup/Conditions			
Test Location:	Mariposa Lab A	Test Engineer:	Benny Lovan
Test Method:	ANSI C63.10 (2013), KDB 789033 v01r04 (May 2, 2017)	Test Date(s):	11/17/2017
Configuration:	2, 3, and 4		
Test Setup:	The EUT is setup horizontally on a Styrofoam table and oriented such that the face of the EUT is parallel to the table's 0 degree marker. The testing receive antenna is also oriented horizontal so that the polarity between receive antenna and EUT are consistent. Using a controller, the table is turned from 30 to 95 degrees in the direction that exposes the top of the EUT to the antenna slowly while simultaneously taking data that is later plotted. The angle that produced maximum radiation is where the power reading was taken.		
Declaration:	Modification #1 was in place during testing.		

Environmental Conditions			
Temperature (ºC)	17-21	Relative Humidity (%):	45-48

Test Equipment

Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
00327	Horn Antenna	EMCO	3115	3/4/2016	3/4/2018
02115	Preamp	HP	83051A	2/27/2017	2/27/2019
03361	Cable	Astrolab	32022-2-29094-48TC	1/10/2017	1/10/2019
P05935	Attenuator	Weinschel	84A-10	1/18/2016	1/18/2018
03543	Cable	Astrolab	32022-29094K-29094K-10M	11/7/2017	11/7/2019
02660	Spectrum Analyzer	Agilent	E4446A	10/10/2016	10/10/2018

Test Data Summary - Radiated Measurement						
Measurement Option: AVGSA-1						
Frequency (MHz)	**Modulation**	**Ant. Type / Gain (dBi)**	**Field Strength (dBuV/m @3m)**	**Calculated (dBm)**	**Limit (dBm)**	**Results**
5200	OFDM	90 deg Horn / 9dBi	90.2	-5.03	≤21	Pass
5200	OFDM	30 deg Horn / 17.5	77.0	-18.23	≤21	Pass
5200	OFDM	50 deg Horn/ HexHorn / 13dBi	79.3	-15.93	≤21	Pass

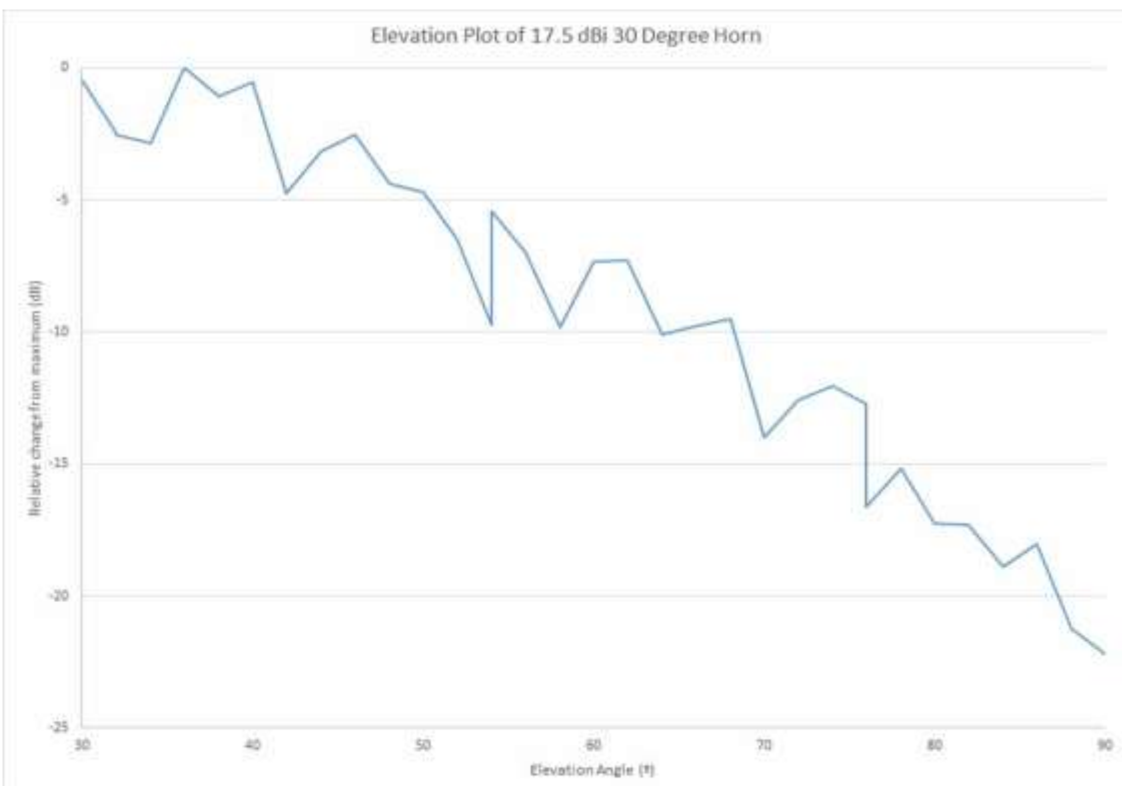
RF power calculated in accordance with KDB 789033.

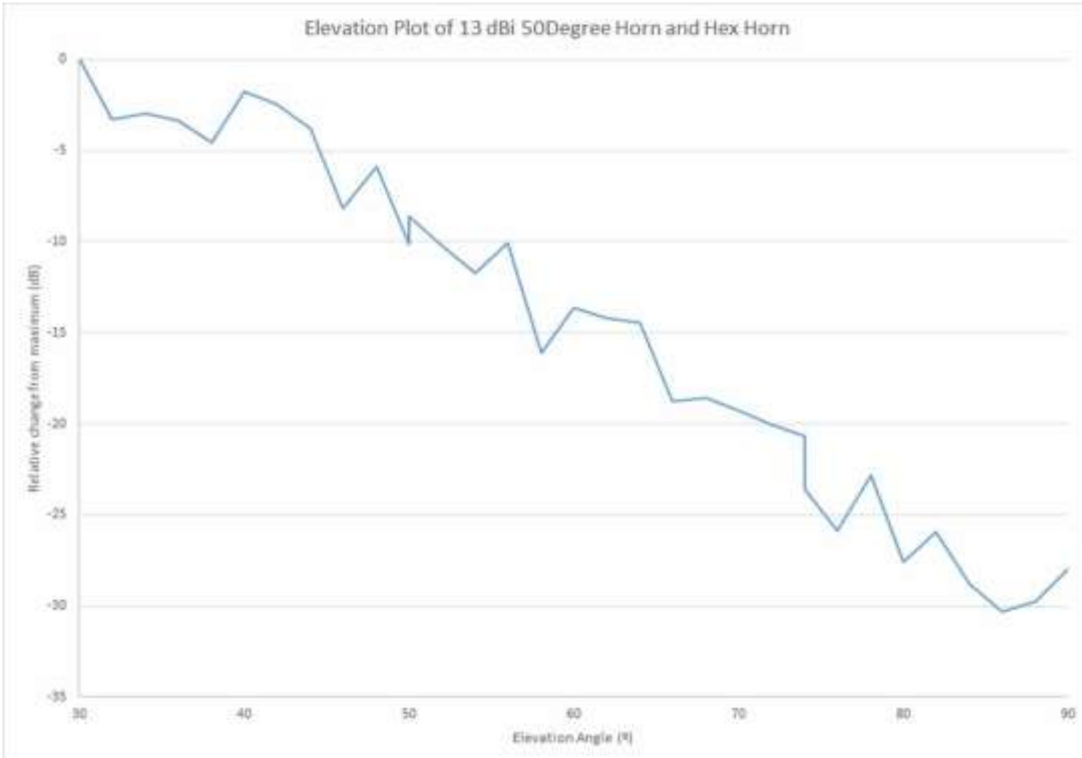
$$P(W) = \frac{(E \cdot d)^2}{30}$$

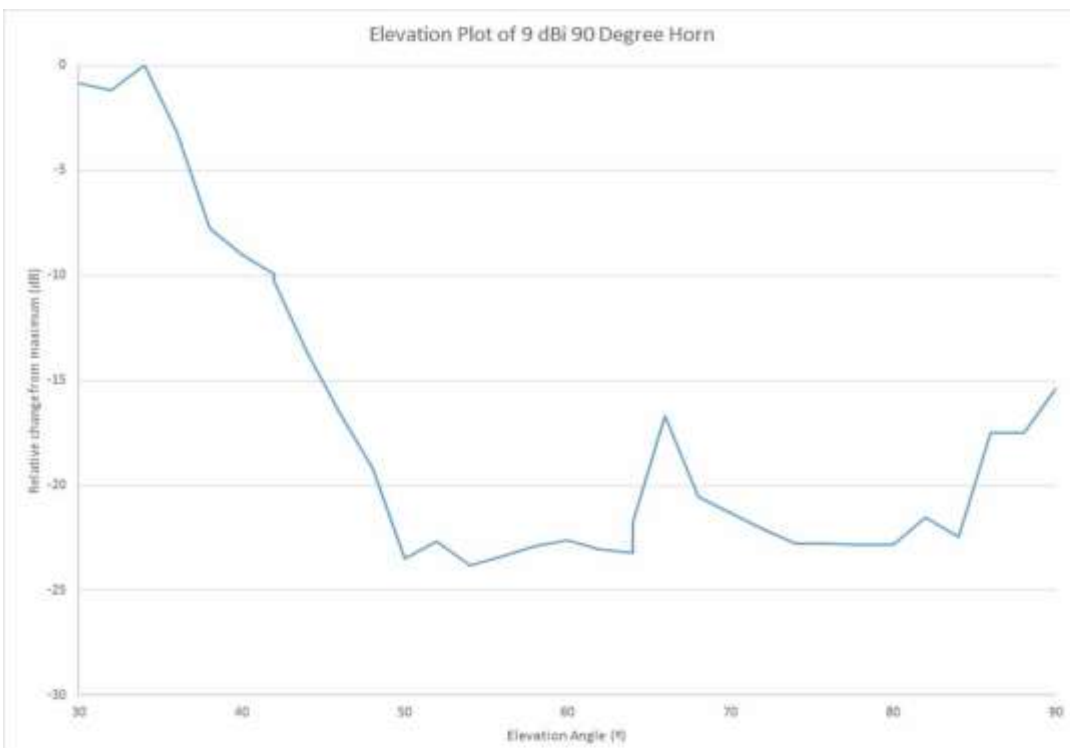
Or equivalently, in logarithmic form:

$$P(dBm) = E(dBuV/m) + 20LOG(d) - 104.77$$

Plots




Elevation Plot of 13 dBi 50Degree Horn and Hex Horn
Relative change from maximum (dB)
Elevation Angle (°)
0
-5
-10
-15
-20
-25
-30
-35
30
40
50
60
70
80
90


Elevation Plot of 9 dBi 90 Degree Horn
Relative change from maximum (dB)
Elevation Angle (°)
0
-5
-10
-15
-20
-25
-30
30
40
50
60
70
80
90

Test Setup / Conditions / Data

Test Location:	CKC Laboratories Inc. • 1120 Fulton Place • Fremont, CA 94539 • 510-249-1170
Customer:	**Digital Path**
Specification:	**15.407(a)(1) Power Limit at 30 Degree Elevation**
Work Order #:	**100331**
Test Type:	**Radiated Scan**
Tested By:	Benny Lovan
Software:	EMITest 5.03.11

Date:	11/17/2017
Time:	15:22:38
Sequence#:	6

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

Equipment is an outdoor access point for use in PTMP applications.

Modulation used: OFDM (802.11ac)
unit is in continuous mode
Antenna: 90 degree Horn, 30 degree Horn and 50 degree Horn
Gain: 9dBi, 17.5dBi and 13dBi

Highest Generated Frequency not related to radio: 1.4GHz

Frequency Range Investigated: Mid channel 5220 MHz at the highest amplitude for that channel.

Temperature: 17.8 ºC
Rel. Humidity: 48%

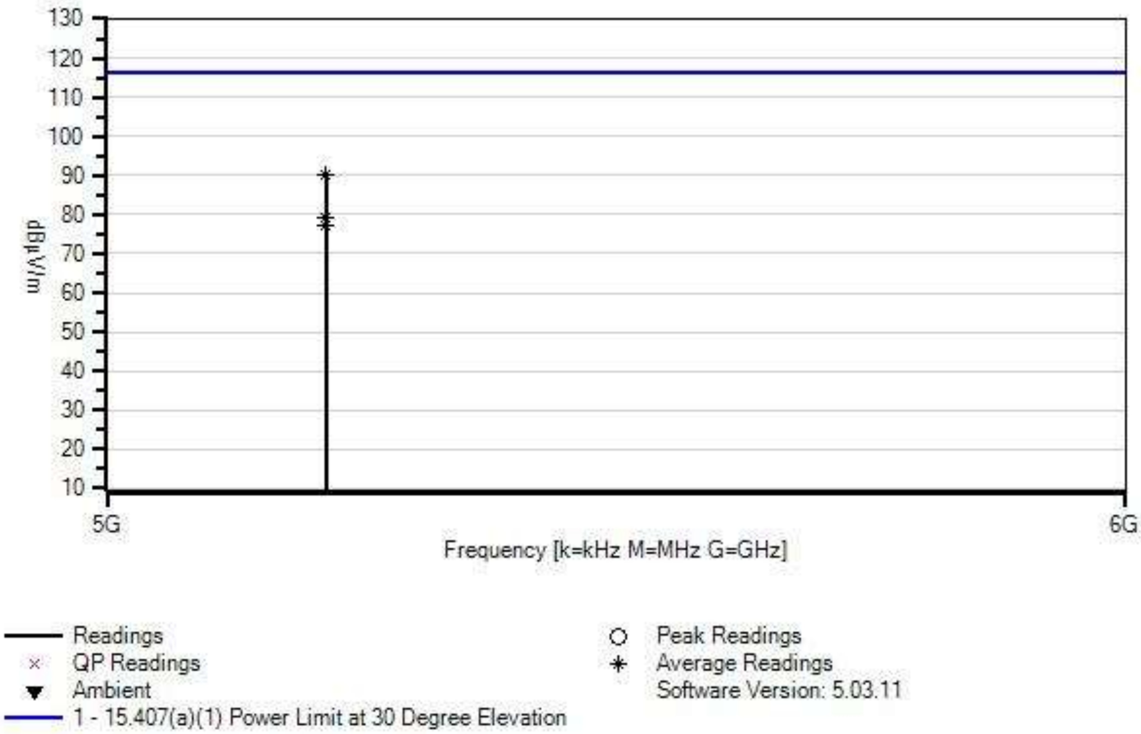
Test method: ANSI C63.10 (2013)

The receive antenna is co-polarized with the transmit antenna. The transmit antenna is set on its side and the table will be rotated 30 degrees for this measurement.
Power is measured using the integration method.

The HexHorn 30 degree elevation test will be performed with the 50 degree horn.
The radio and antenna are identical.

Modification #1 was in place during testing.

Digital Path WO#: 100331 Sequence#: 6 Date: 11/17/2017
15.407(a)(1) Power Limit at 30 Degree Elevation Test Distance: 3 Meters Horiz



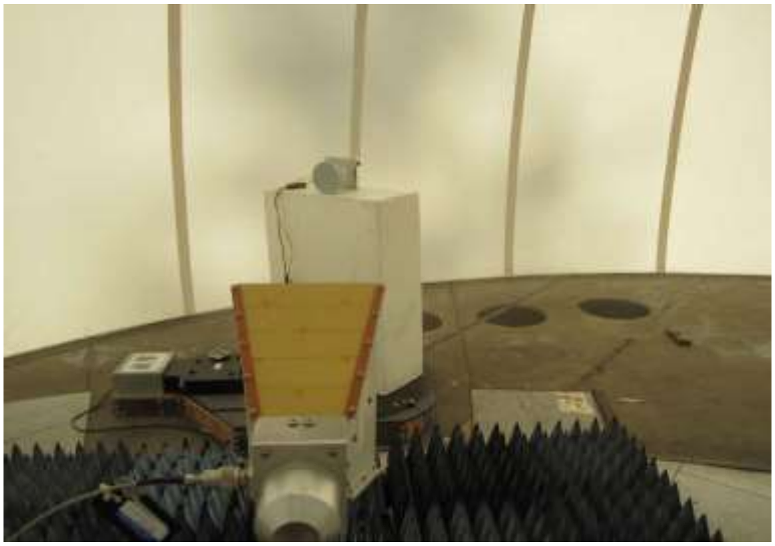
Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00327	Horn Antenna	3115	3/4/2016	3/4/2018
T2	AN02115	Preamp	83051A	2/27/2017	2/27/2019
T3	AN03361	Cable	32022-2-29094-48TC	1/10/2017	1/10/2019
T4	ANP05935	Attenuator	84A-10	1/18/2016	1/18/2018
T5	AN03543	Cable	32022-29094K-29094K-10M	11/7/2017	11/7/2019
T6	AN02660	Spectrum Analyzer	E4446A	10/10/2016	10/10/2018

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

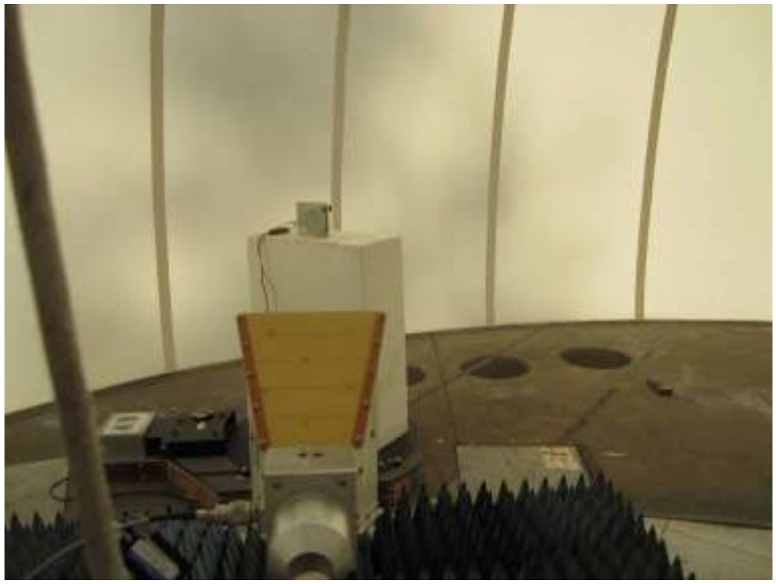
#	Freq MHz	Rdng dBµV	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	5200.000M Ave	72.3	+30.6 +8.7	-32.6 +0.0	+1.4	+9.8	+0.0	90.2	116.2 9dBi - Set 22 CH40 5220	-26.0	Horiz
2	5200.000M Ave	61.4	+30.6 +8.7	-32.6 +0.0	+1.4	+9.8	+0.0	79.3	116.2 13dBi - Set 16 CH40 5220	-36.9	Horiz
3	5200.000M Ave	59.1	+30.6 +8.7	-32.6 +0.0	+1.4	+9.8	+0.0	77.0	116.2 17.5dBi - Set 16 CH40 5220	-39.2	Horiz

Test Setup Photos



30Deg, 17.5dBi

50Deg, 13dBi



90Deg, 9dBi

15.407(b)&(b)(1) Radiated Emissions & Band Edge

Test Setup / Conditions / Data

Test Location:	CKC Laboratories Inc. • 1120 Fulton Place • Fremont, CA 94539 • 510-249-1170		
Customer:	**Digital Path**		
Specification:	**15.407(b) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**100331**	Date:	10/4/2017
Test Type:	**Radiated Scan**	Time:	14:41:25
Tested By:	Benny Lovan	Sequence#:	5
Software:	EMITest 5.03.11		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 7			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 7			

Test Conditions / Notes:

Equipment is an outdoor access point for use in PTMP applications.

Modulation used: OFDM (802.11ac)
Unit is Beaconing
Antenna: 50 degree Hex Array Horn (6 horns)
Operational Frequency: Radio 1 is at 5745MHz, Radio 2: 5540MHz and Radio 3: 5240MHz
Power Output Setting: all radios set to 17dBm

Frequency Range Investigated: 30-1000M
Highest Generated Frequency not related to radio: 1.4GHz

Radio 1 5745MHz – Max Data Rate = 86Mbps per chain
Radio 2: 5540MHz – Max Data Rate =86Mbps per chain
Radio 3: 5240MHz – Max Data Rate = 86Mbps per chain

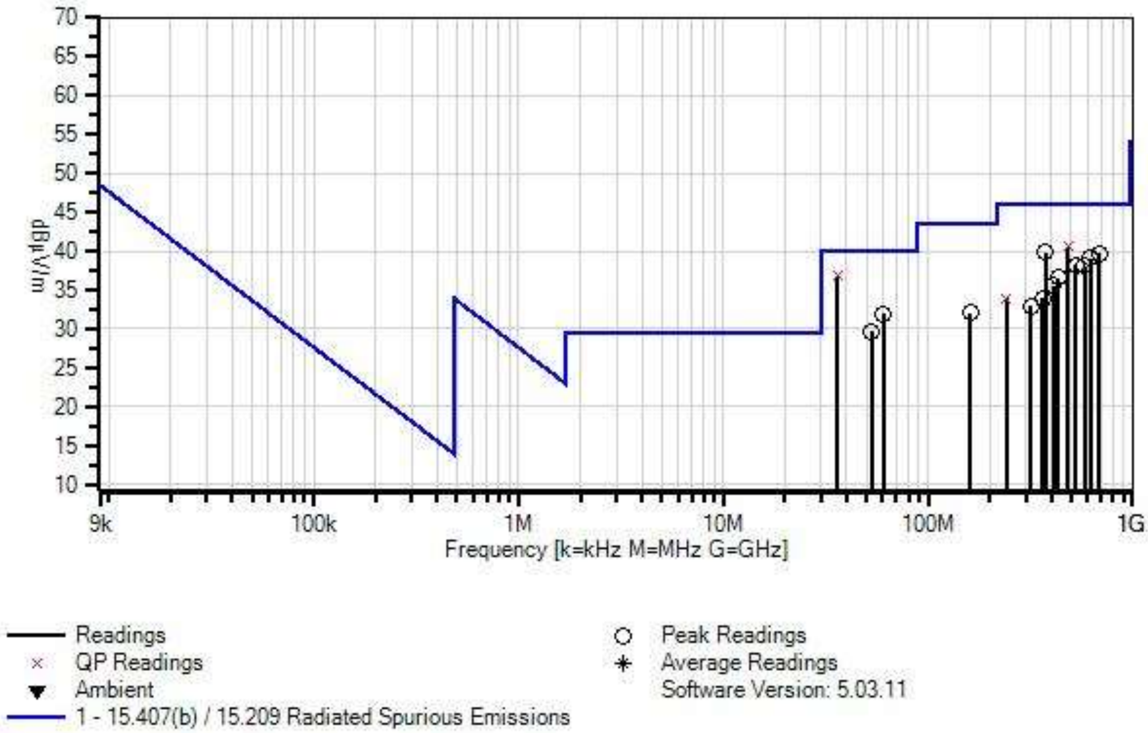
Temperature: 18ºC
Rel. Humidity: 27%

Test method: ANSI C63.10 (2013), KDB 789033 v01r04 (May 2, 2017)

This data sheet is for all antennas. The radio is identical in every configuration with the antenna being the only thing that changes. The radio is exercising all three radios within the system. For the HexHorn, all radios are identical but we are testing multiple frequencies at once. The customer's power to the EUT is POE. It has an AC to DC adapter which supplies the POE to the EUT. The EUT is setup with unshielded Ethernet cables.

Modification #1 was in place during testing.

Digital Path WO#: 100331 Sequence#: 5 Date: 10/4/2017
15.407(b) / 15.209 Radiated Spurious Emissions Test Distance: 10 Meters Horiz



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN01993	Biconilog Antenna	CBL6111C	11/1/2016	11/1/2018
T2	ANP05656	Attenuator	PE7004-6	12/22/2015	12/22/2017
T3	AN00449	Preamp-Top Amp (dB)	8447F	2/18/2016	2/18/2018
T4	ANP06847	Cable	LMR195-FR-6	7/31/2017	7/31/2019
T5	ANP06883	Cable	LMR195-FR-3	8/2/2017	8/2/2019
T6	ANP04249	Cable	CXTA04A-50	3/3/2016	3/3/2018
T7	ANP06230	Cable-Amplitude +15C to +45C (dB)	CXTA04A-50	11/29/2016	11/29/2018
T8	AN03634	Spectrum Analyzer	E4445A	8/30/2017	8/30/2018

Measurement Data: Reading listed by margin. Test Distance: 10 Meters

#	Freq MHz	Rdng dBµV	T1 T5 dB	T2 T6 dB	T3 T7 dB	T4 T8 dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	35.910M	30.5	+15.5	+6.0	-27.1	+0.2	+10.5	36.8	40.0	-3.2	Vert
QP			+0.1	+0.5	+0.6	+0.0					
^	35.910M	52.0	+15.5	+6.0	-27.1	+0.2	+10.5	58.3	40.0	+18.3	Vert
			+0.1	+0.5	+0.6	+0.0					
3	479.998M	28.5	+17.7	+6.0	-27.6	+0.7	+10.5	40.6	46.0	-5.4	Horiz
QP			+0.4	+1.8	+2.6	+0.0					
^	479.998M	31.6	+17.7	+6.0	-27.6	+0.7	+10.5	43.7	46.0	-2.3	Horiz
			+0.4	+1.8	+2.6	+0.0					
5	375.100M	29.9	+15.4	+6.0	-26.8	+0.6	+10.5	39.8	46.0	-6.2	Horiz
			+0.4	+1.6	+2.2	+0.0					
6	685.100M	24.0	+20.6	+6.0	-27.9	+0.8	+10.5	39.7	46.0	-6.3	Horiz
			+0.4	+2.2	+3.1	+0.0					
7	622.850M	23.8	+20.4	+6.0	-27.9	+0.8	+10.5	39.1	46.0	-6.9	Vert
			+0.4	+2.1	+3.0	+0.0					
8	524.700M	25.0	+18.7	+6.0	-27.7	+0.7	+10.5	38.2	46.0	-7.8	Horiz
			+0.4	+1.9	+2.7	+0.0					
9	581.700M	23.5	+19.9	+6.0	-27.9	+0.8	+10.5	38.1	46.0	-7.9	Vert
			+0.4	+2.0	+2.9	+0.0					
10	60.326M	34.9	+5.8	+6.0	-27.1	+0.3	+10.5	31.9	40.0	-8.1	Vert
			+0.1	+0.6	+0.8	+0.0					
11	431.700M	25.5	+16.7	+6.0	-27.3	+0.7	+10.5	36.5	46.0	-9.5	Vert
			+0.3	+1.7	+2.4	+0.0					
12	53.142M	31.3	+7.4	+6.0	-27.2	+0.2	+10.5	29.7	40.0	-10.3	Horiz
			+0.1	+0.6	+0.8	+0.0					

13	409.000M	24.9	+16.2 +0.4	+6.0 +1.7	-27.2 +2.3	+0.7 +0.0	+10.5	35.5	46.0	-10.5	Horiz
14	160.034M	28.8	+10.5 +0.2	+6.0 +1.0	-26.8 +1.4	+0.4 +0.0	+10.5	32.0	43.5	-11.5	Horiz
15	361.710M	24.3	+15.1 +0.3	+6.0 +1.6	-26.7 +2.2	+0.6 +0.0	+10.5	33.9	46.0	-12.1	Vert
16	240.000M QP	28.0	+12.0 +0.3	+6.0 +1.3	-26.4 +1.7	+0.5 +0.0	+10.5	33.9	46.0	-12.1	Vert
^	240.000M	35.4	+12.0 +0.3	+6.0 +1.3	-26.4 +1.7	+0.5 +0.0	+10.5	41.3	46.0	-4.7	Vert
18	318.878M	24.3	+14.0 +0.3	+6.0 +1.4	-26.2 +2.0	+0.6 +0.0	+10.5	32.9	46.0	-13.1	Vert

Test Location:	CKC Laboratories Inc. • 1120 Fulton Place • Fremont, CA 94539 • 510-249-1170		
Customer:	**Digital Path**		
Specification:	**15.407(b)(1) / 15.209 Radiated Spurious Emissions - Fixed PTP Devices**		
Work Order #:	**100331**	Date:	11/2/2017
Test Type:	**Radiated Scan**	Time:	15:40:00
Tested By:	Benny Lovan	Sequence#:	6
Software:	EMITest 5.03.11		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 7			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 7			

Test Conditions / Notes:

Equipment is an outdoor access point for use in PTMP applications.

Modulation used: OFDM (802.11ac)
Antenna: 50 degree Hex Array Horn (6 horns)
Operational Frequency: Radio 1 is at 5745MHz, Radio 2: 5540MHz and Radio 3: 5180MHz
Data Rate: Max
Power Output Setting: all radios set to 17dBm

Frequency Range Investigated: 1-26.5G
Highest Generated Frequency not related to radio: 1.4GHz

Radio 1 5745MHz – Max Data Rate = 86Mbps per chain
Radio 2: 5540MHz – Max Data Rate =86Mbps per chain
Radio 3: 5240MHz – Max Data Rate = 86Mbps per chain

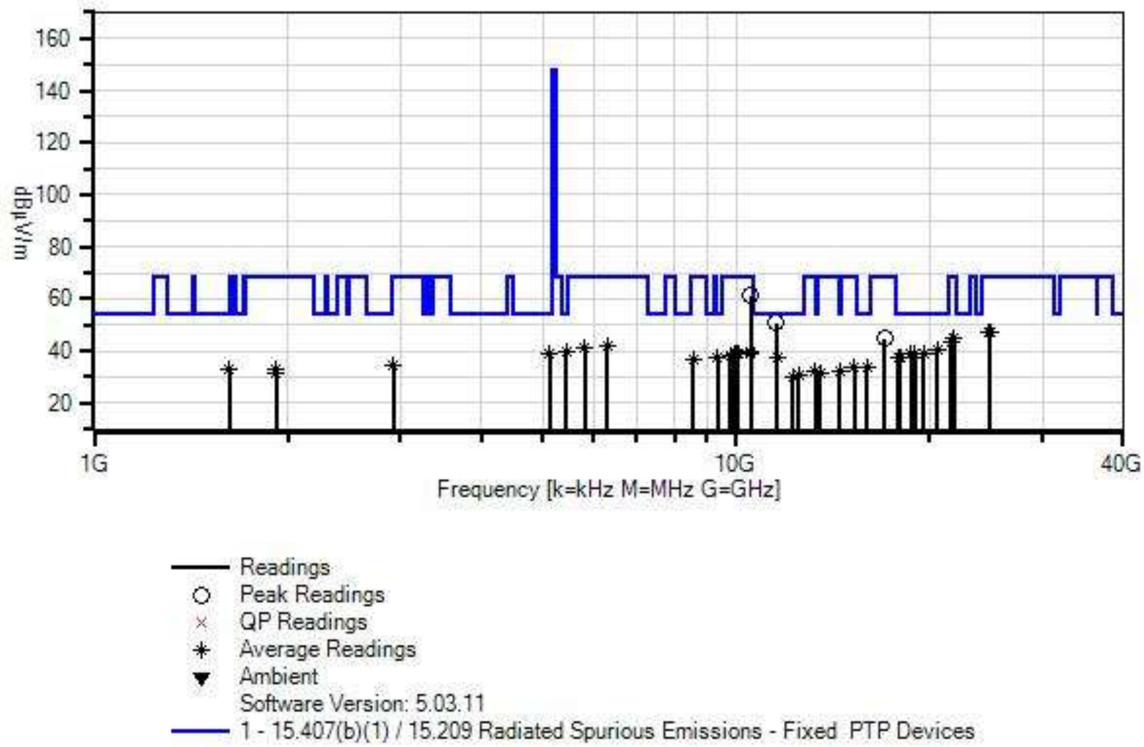
Temperature: 20.9ºC
Rel. Humidity: 46.1%

Test method: ANSI C63.10 (2013), KDB 789033 v01r04 (May 2, 2017)

This data sheet is for all antennas. The radio is identical in every configuration with the antenna being the only thing that changes. The radio is exercising all three radios within the system. For the HexHorn, all radios are identical but we are testing multiple frequencies at once. The customer's power to the EUT is POE. It has an AC to DC adapter which supplies the POE to the EUT. The EUT is setup with unshielded Ethernet cables.

Modification #1 was in place during testing.

Digital Path WO#: 100331 Sequence#: 6 Date: 11/2/2017
15.407(b)(1) / 15.209 Radiated Spurious Emissions - Fixed PTP Devices Test Distance: 3 Meters Horiz



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02115	Preamp	83051A	2/27/2017	2/27/2019
T2	AN00327	Horn Antenna	3115	3/4/2016	3/4/2018
T3	AN03361	Cable	32022-2-29094-48TC	1/10/2017	1/10/2019
T4	AN02660	Spectrum Analyzer	E4446A	10/10/2016	10/10/2018
T5	AN03543	Cable	32022-29094K-29094K-10M	11/2/2015	11/2/2017
T6	ANP06239	Attenuator	54A-10	8/8/2016	8/8/2018
T7	AN01417	High Pass Filter	84300-80039	1/18/2016	1/18/2018
T8	AN03366	Horn Antenna-ANSI C63.5 Calibration	GH-62-25	2/9/2016	2/9/2018
T9	AN02046	Horn Antenna	MWH-1826/B	10/7/2016	10/7/2018

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	T1 T5 T9 dB	T2 T6 dB	T3 T7 dB	T4 T8 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	11527.500 M	31.5	-32.9 +12.9 +0.0	+36.5 +0.0	+2.2 +0.4	+0.0 +0.0	+0.0	50.6	54.0	-3.4	Horiz
2	10527.500 M	42.1	-32.1 +12.3 +0.0	+36.1 +0.0	+2.1 +0.7	+0.0 +0.0	+0.0	61.2	68.2	-7.0	Horiz
3	20528.500 M Ave	19.1	-33.8 +17.7 +33.8	+0.0 +0.0	+2.8 +0.9	+0.0 +0.0	+0.0	40.5	54.0	-13.5	Vert
^	20528.500 M	32.0	-33.8 +17.7 +33.8	+0.0 +0.0	+2.8 +0.9	+0.0 +0.0	+0.0	53.4	54.0	-0.6	Vert
5	5429.500M Ave	20.8	-32.5 +8.8 +0.0	+31.1 +9.9	+1.5 +0.0	+0.0 +0.0	+0.0	39.6	54.0	-14.4	Horiz
^	5429.500M	35.0	-32.5 +8.8 +0.0	+31.1 +9.9	+1.5 +0.0	+0.0 +0.0	+0.0	53.8	54.0	-0.2	Horiz
7	19565.000 M Ave	18.3	-33.4 +17.1 +33.6	+0.0 +0.0	+2.8 +0.5	+0.0 +0.0	+0.0	38.9	54.0	-15.1	Horiz
^	19565.000 M	30.6	-33.4 +17.1 +33.6	+0.0 +0.0	+2.8 +0.5	+0.0 +0.0	+0.0	51.2	54.0	-2.8	Horiz
9	18915.000 M Ave	17.5	-32.5 +16.8 +33.7	+0.0 +0.0	+2.8 +0.5	+0.0 +0.0	+0.0	38.8	54.0	-15.2	Vert
^	18915.000 M	30.9	-32.5 +16.8 +33.7	+0.0 +0.0	+2.8 +0.5	+0.0 +0.0	+0.0	52.2	54.0	-1.8	Vert

11	18663.000 M Ave	17.4	-32.5 +16.7 +33.8	+0.0 +0.0	+2.7 +0.7	+0.0 +0.0	+0.0	38.8	54.0	-15.2	Horiz
^	18663.000 M	29.9	-32.5 +16.7 +33.8	+0.0 +0.0	+2.7 +0.7	+0.0 +0.0	+0.0	51.3	54.0	-2.7	Horiz
13	5116.500M Ave	21.2	-32.6 +8.4 +0.0	+30.4 +9.9	+1.4 +0.0	+0.0 +0.0	+0.0	38.7	54.0	-15.3	Horiz
^	5116.500M	37.3	-32.6 +8.4 +0.0	+30.4 +9.9	+1.4 +0.0	+0.0 +0.0	+0.0	54.8	54.0	+0.8	Horiz
15	9352.000M Ave	19.1	-31.8 +11.6 +0.0	+36.2 +0.0	+2.0 +0.5	+0.0 +0.0	+0.0	37.6	54.0	-16.4	Vert
^	9352.000M	29.0	-31.8 +11.6 +0.0	+36.2 +0.0	+2.0 +0.5	+0.0 +0.0	+0.0	47.5	54.0	-6.5	Vert
17	11587.000 M Ave	18.3	-32.9 +13.0 +0.0	+36.4 +0.0	+2.2 +0.4	+0.0 +0.0	+0.0	37.4	54.0	-16.6	Vert
^	11587.000 M	31.4	-32.9 +13.0 +0.0	+36.4 +0.0	+2.2 +0.4	+0.0 +0.0	+0.0	50.5	54.0	-3.5	Vert
19	17830.500 M Ave	18.3	-32.5 +16.4 +0.0	+0.0 +0.0	+2.6 +1.1	+0.0 +31.3	+0.0	37.2	54.0	-16.8	Horiz
^	17830.500 M	28.9	-32.5 +16.4 +0.0	+0.0 +0.0	+2.6 +1.1	+0.0 +31.3	+0.0	47.8	54.0	-6.2	Horiz
21	17988.300 M Ave	18.0	-32.5 +16.4 +0.0	+0.0 +0.0	+2.6 +1.2	+0.0 +31.4	+0.0	37.1	54.0	-16.9	Vert
^	17988.300 M	28.5	-32.5 +16.4 +0.0	+0.0 +0.0	+2.6 +1.2	+0.0 +31.4	+0.0	47.6	54.0	-6.4	Vert
23	15988.300 M Ave	19.2	-34.3 +15.3 +0.0	+0.0 +0.0	+2.5 +0.8	+0.0 +30.1	+0.0	33.6	54.0	-20.4	Vert
^	15988.300 M	29.3	-34.3 +15.3 +0.0	+0.0 +0.0	+2.5 +0.8	+0.0 +30.1	+0.0	43.7	54.0	-10.3	Vert
25	1625.000M Ave	29.9	-35.6 +4.6 +0.0	+23.2 +9.9	+0.8 +0.0	+0.0 +0.0	+0.0	32.8	54.0	-21.2	Horiz
^	1625.000M	38.4	-35.6 +4.6 +0.0	+23.2 +9.9	+0.8 +0.0	+0.0 +0.0	+0.0	41.3	54.0	-12.7	Horiz

27	24768.000 M Ave	23.7	-34.0 +19.6 +34.4	+0.0 +0.0	+3.2 +0.0	+0.0 +0.0	+0.0	46.9	68.2	-21.3	Vert
^	24768.000 M	36.7	-34.0 +19.6 +34.4	+0.0 +0.0	+3.2 +0.0	+0.0 +0.0	+0.0	59.9	68.2	-8.3	Vert
29	24730.000 M Ave	23.8	-34.0 +19.6 +34.3	+0.0 +0.0	+3.2 +0.0	+0.0 +0.0	+0.0	46.9	68.2	-21.3	Horiz
^	24730.000 M	35.2	-34.0 +19.6 +34.3	+0.0 +0.0	+3.2 +0.0	+0.0 +0.0	+0.0	58.3	68.2	-9.9	Horiz
31	13250.000 M Ave	20.1	-33.6 +14.0 +0.0	+0.0 +0.0	+2.2 +0.5	+0.0 +28.8	+0.0	32.0	54.0	-22.0	Horiz
^	13250.000 M	30.4	-33.6 +14.0 +0.0	+0.0 +0.0	+2.2 +0.5	+0.0 +28.8	+0.0	42.3	54.0	-11.7	Horiz
33	14488.300 M Ave	19.7	-34.4 +14.6 +0.0	+0.0 +0.0	+2.3 +0.4	+0.0 +29.3	+0.0	31.9	54.0	-22.1	Vert
^	14488.300 M	31.5	-34.4 +14.6 +0.0	+0.0 +0.0	+2.3 +0.4	+0.0 +29.3	+0.0	43.7	54.0	-10.3	Vert
35	12488.300 M Ave	19.1	-33.2 +13.5 +0.0	+0.0 +0.0	+2.2 +0.5	+0.0 +28.6	+0.0	30.7	54.0	-23.3	Vert
^	12488.300 M	31.8	-33.2 +13.5 +0.0	+0.0 +0.0	+2.2 +0.5	+0.0 +28.6	+0.0	43.4	54.0	-10.6	Vert
37	16988.300 M	28.4	-33.4 +15.9 +0.0	+0.0 +0.0	+2.5 +0.8	+0.0 +30.6	+0.0	44.8	68.2	-23.4	Vert
38	21781.500 M Ave	18.7	-31.4 +18.2 +34.6	+0.0 +0.0	+3.0 +1.6	+0.0 +0.0	+0.0	44.7	68.2	-23.5	Vert
^	21781.500 M	31.7	-31.4 +18.2 +34.6	+0.0 +0.0	+3.0 +1.6	+0.0 +0.0	+0.0	57.7	68.2	-10.5	Vert
40	12250.000 M Ave	18.6	-33.1 +13.4 +0.0	+0.0 +0.0	+2.2 +0.6	+0.0 +28.5	+0.0	30.2	54.0	-23.8	Horiz
^	12250.000 M	29.3	-33.1 +13.4 +0.0	+0.0 +0.0	+2.2 +0.6	+0.0 +28.5	+0.0	40.9	54.0	-13.1	Horiz
42	21567.000 M Ave	17.9	-31.7 +18.2 +34.5	+0.0 +0.0	+3.0 +1.5	+0.0 +0.0	+0.0	43.4	68.2	-24.8	Horiz
^	21567.000 M	30.8	-31.7 +18.2 +34.5	+0.0 +0.0	+3.0 +1.5	+0.0 +0.0	+0.0	56.3	68.2	-11.9	Horiz

44	6298.500M Ave	19.7	-31.8 +9.4 +0.0	+32.8 +9.9	+1.6 +0.0	+0.0 +0.0	+0.0	41.6	68.2	-26.6	Vert
^	6298.500M	30.3	-31.8 +9.4 +0.0	+32.8 +9.9	+1.6 +0.0	+0.0 +0.0	+0.0	52.2	68.2	-16.0	Vert
46	5798.500M Ave	21.5	-32.2 +9.0 +0.0	+31.7 +9.9	+1.5 +0.0	+0.0 +0.0	+0.0	41.4	68.2	-26.8	Vert
^	5798.500M	39.0	-32.2 +9.0 +0.0	+31.7 +9.9	+1.5 +0.0	+0.0 +0.0	+0.0	58.9	68.2	-9.3	Vert
48	5797.000M Ave	21.1	-32.2 +9.0 +0.0	+31.7 +9.9	+1.5 +0.0	+0.0 +0.0	+0.0	41.0	68.2	-27.2	Horiz
^	5797.000M	37.8	-32.2 +9.0 +0.0	+31.7 +9.9	+1.5 +0.0	+0.0 +0.0	+0.0	57.7	68.2	-10.5	Horiz
50	10537.978 M Ave	20.5	-32.1 +12.3 +0.0	+36.1 +0.0	+2.1 +0.7	+0.0 +0.0	+0.0	39.6	68.2	-28.6	Horiz
^	10537.978 M	46.4	-32.1 +12.3 +0.0	+36.1 +0.0	+2.1 +0.7	+0.0 +0.0	+0.0	65.5	68.2	-2.7	Horiz
52	10002.500 M Ave	18.9	-32.1 +12.1 +0.0	+37.4 +0.0	+2.1 +0.7	+0.0 +0.0	+0.0	39.1	68.2	-29.1	Vert
^	10002.500 M	31.0	-32.1 +12.1 +0.0	+37.4 +0.0	+2.1 +0.7	+0.0 +0.0	+0.0	51.2	68.2	-17.0	Vert
54	9909.500M Ave	18.9	-32.1 +12.0 +0.0	+37.2 +0.0	+2.1 +0.7	+0.0 +0.0	+0.0	38.8	68.2	-29.4	Vert
^	9909.500M	32.4	-32.1 +12.0 +0.0	+37.2 +0.0	+2.1 +0.7	+0.0 +0.0	+0.0	52.3	68.2	-15.9	Vert
56	10049.200 M Ave	18.6	-32.2 +12.1 +0.0	+37.3 +0.0	+2.1 +0.8	+0.0 +0.0	+0.0	38.7	68.2	-29.5	Horiz
^	10049.200 M	37.2	-32.2 +12.1 +0.0	+37.3 +0.0	+2.1 +0.8	+0.0 +0.0	+0.0	57.3	68.2	-10.9	Horiz
58	10527.043 M Ave	19.6	-32.1 +12.3 +0.0	+36.1 +0.0	+2.1 +0.7	+0.0 +0.0	+0.0	38.7	68.2	-29.5	Horiz
59	9769.500M Ave	19.0	-32.0 +11.9 +0.0	+36.8 +0.0	+2.0 +0.6	+0.0 +0.0	+0.0	38.3	68.2	-29.9	Vert
^	9769.500M	30.3	-32.0 +11.9 +0.0	+36.8 +0.0	+2.0 +0.6	+0.0 +0.0	+0.0	49.6	68.2	-18.6	Vert

61 8549.200M Ave	19.2	-31.5 +11.1 +0.0	+34.9 +0.0	+1.9 +1.0	+0.0 +0.0	+0.0	36.6	68.2	-31.6	Horiz
^ 8549.200M	39.8	-31.5 +11.1 +0.0	+34.9 +0.0	+1.9 +1.0	+0.0 +0.0	+0.0	57.2	68.2	-11.0	Horiz
63 2921.500M Ave	23.4	-33.1 +6.2 +0.0	+26.7 +9.9	+1.1 +0.0	+0.0 +0.0	+0.0	34.2	68.2	-34.0	Vert
^ 2921.500M	35.5	-33.1 +6.2 +0.0	+26.7 +9.9	+1.1 +0.0	+0.0 +0.0	+0.0	46.3	68.2	-21.9	Vert
65 15250.000 M Ave	20.3	-34.4 +15.0 +0.0	+0.0 +0.0	+2.4 +0.6	+0.0 +29.8	+0.0	33.7	68.2	-34.5	Horiz
^ 15250.000 M	31.5	-34.4 +15.0 +0.0	+0.0 +0.0	+2.4 +0.6	+0.0 +29.8	+0.0	44.9	68.2	-23.3	Horiz
67 1921.500M Ave	26.1	-33.6 +5.1 +0.0	+24.5 +9.8	+0.9 +0.0	+0.0 +0.0	+0.0	32.8	68.2	-35.4	Vert
^ 1921.500M	42.1	-33.6 +5.1 +0.0	+24.5 +9.8	+0.9 +0.0	+0.0 +0.0	+0.0	48.8	68.2	-19.4	Vert
69 1923.500M Ave	24.9	-33.6 +5.1 +0.0	+24.5 +9.8	+0.9 +0.0	+0.0 +0.0	+0.0	31.6	68.2	-36.6	Horiz
^ 1923.500M	45.9	-33.6 +5.1 +0.0	+24.5 +9.8	+0.9 +0.0	+0.0 +0.0	+0.0	52.6	68.2	-15.6	Horiz
71 13488.300 M Ave	19.4	-33.8 +14.1 +0.0	+0.0 +0.0	+2.2 +0.5	+0.0 +28.8	+0.0	31.2	68.2	-37.0	Vert
^ 13488.300 M	31.3	-33.8 +14.1 +0.0	+0.0 +0.0	+2.2 +0.5	+0.0 +28.8	+0.0	43.1	68.2	-25.1	Vert

Test Location:	CKC Laboratories Inc. • 1120 Fulton Place • Fremont, CA 94539 • 510-249-1170
Customer:	**Digital Path**
Specification:	**15.407(b)(1) / 15.209 Radiated Spurious Emissions - Fixed PTP Devices**
Work Order #:	**100331** Date: 11/10/2017
Test Type:	**Radiated Scan** Time: 06:30:36
Tested By:	Benny Lovan Sequence#: 6
Software:	EMITest 5.03.11

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 7			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 7			

Test Conditions / Notes:

Equipment is an outdoor access point for use in PTMP applications.

Modulation used: OFDM (802.11ac)
Antenna: All Horns
Operational Frequency: Radio 1 is at 5745MHz, Radio 2: 5540MHz and Radio 3: 5180MHz
Data Rate: Max
Power Output Setting: all radios set to 17dBm

Frequency Range Investigated: 26.5-40G
Highest Generated Frequency not related to radio: 1.4GHz

Radio 1 5745MHz – Max Data Rate = 86Mbps per chain
Radio 2: 5540MHz – Max Data Rate =86Mbps per chain
Radio 3: 5240MHz – Max Data Rate = 86Mbps per chain

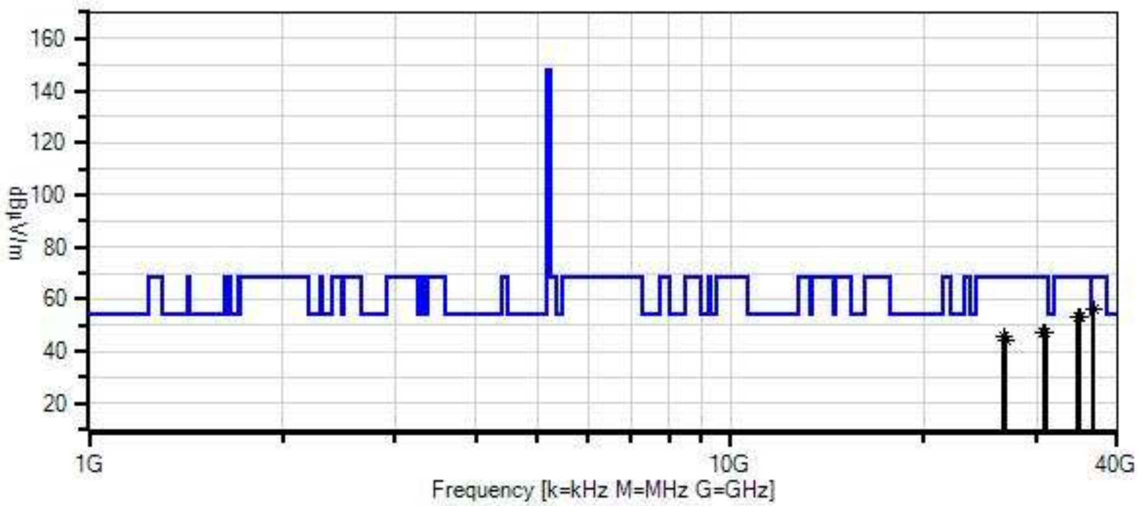
Temperature: 20.9ºC
Rel. Humidity: 46.1%

Test method: ANSI C63.10 (2013), KDB 789033 v01r04 (May 2, 2017)

This data sheet is for all antennas. The radio is identical in every configuration with the antenna being the only thing that changes. The radio is exercising all three radios within the system. For the HexHorn, all radios are identical but we are testing multiple frequencies at once. The customer's power to the EUT is POE. It has an AC to DC adapter which supplies the POE to the EUT. The EUT is setup with unshielded Ethernet cables.

Modification #1 was in place during testing.

Digital Path WO#: 100331 Sequence#: 6 Date: 11/10/2017
15.407(b)(1) / 15.209 Radiated Spurious Emissions - Fixed PTP Devices Test Distance: 3 Meters Vert



Readings
Peak Readings
QP Readings
Average Readings
Ambient
Software Version: 5.03.11
1 - 15.407(b)(1) / 15.209 Radiated Spurious Emissions - Fixed PTP Devices

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03543	Cable	32022-29094K-29094K-10M	11/7/2017	11/7/2019
	AN02660	Spectrum Analyzer	E4446A	10/10/2016	10/10/2018
T2	AN02695	Active Horn Antenna-ANSI C63.5 Calibration	AMFW-5F-260400-33-8P	5/11/2017	5/11/2019

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	36762.000 M Ave	28.8	+25.3	+2.1			+0.0	56.2	68.2	-12.0	Horiz
^	36762.000 M	34.1	+25.3	+2.1			+0.0	61.5	68.2	-6.7	Horiz
3	36762.000 M Ave	28.8	+25.3	+2.1			+0.0	56.2	68.2	-12.0	Vert
^	36762.000 M	35.9	+25.3	+2.1			+0.0	63.3	68.2	-4.9	Vert
5	34762.000 M Ave	25.3	+24.6	+3.0			+0.0	52.9	68.2	-15.3	Vert
^	34762.000 M	32.3	+24.6	+3.0			+0.0	59.9	68.2	-8.3	Vert
7	34967.000 M Ave	25.3	+24.7	+2.9			+0.0	52.9	68.2	-15.3	Horiz
^	34967.000 M	29.9	+24.7	+2.9			+0.0	57.5	68.2	-10.7	Horiz
9	30967.000 M Ave	20.8	+22.9	+3.6			+0.0	47.3	68.2	-20.9	Horiz
^	30967.000 M	31.4	+22.9	+3.6			+0.0	57.9	68.2	-10.3	Horiz

11	30762.000 M Ave	21.0	+22.8	+3.5	+0.0	47.3	68.2	-20.9	Vert
^	30762.000 M	32.8	+22.8	+3.5	+0.0	59.1	68.2	-9.1	Vert
13	26563.000 M Ave	21.7	+21.1	+2.9	+0.0	45.7	68.2	-22.5	Horiz
^	26563.000 M	33.9	+21.1	+2.9	+0.0	57.9	68.2	-10.3	Horiz
15	26762.000 M Ave	20.5	+21.2	+2.7	+0.0	44.4	68.2	-23.8	Vert
^	26762.000 M	32.8	+21.2	+2.7	+0.0	56.7	68.2	-11.5	Vert

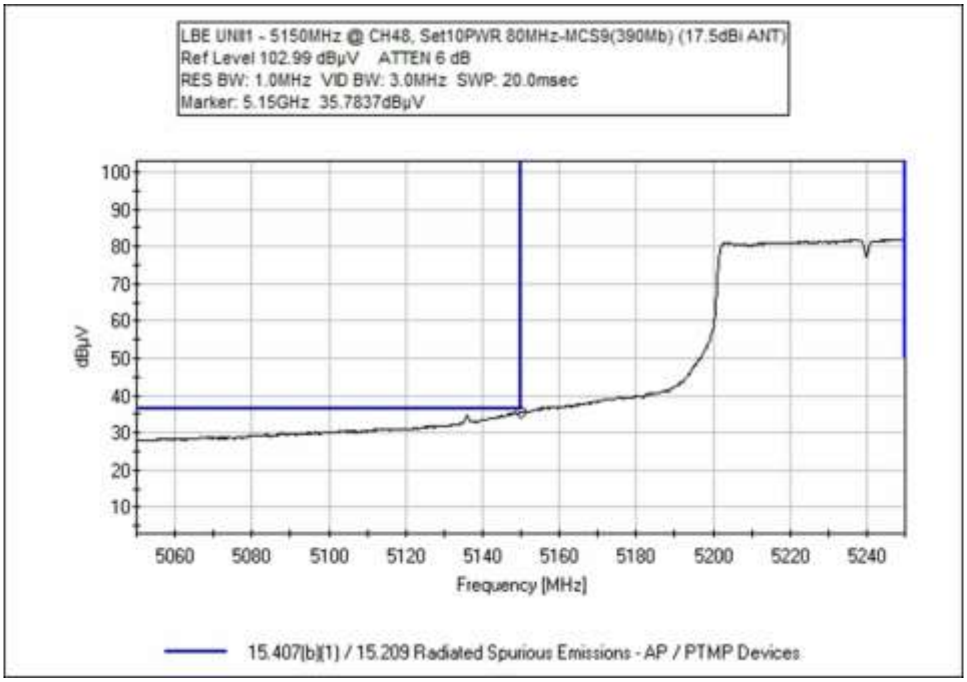
Band Edge

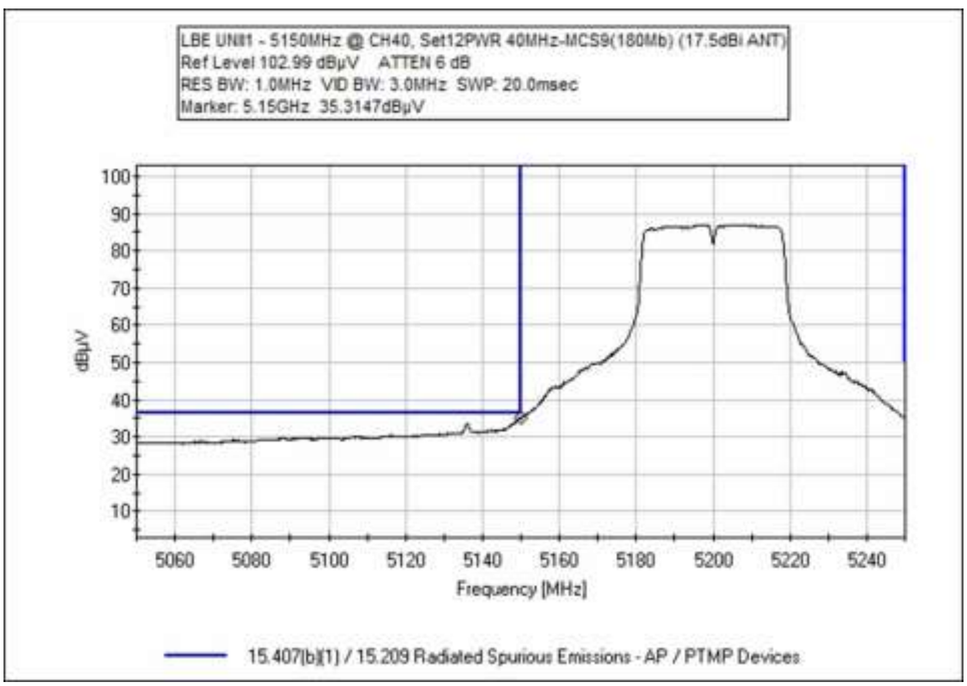
Band Edge Summary					
Frequency (MHz)	Modulation	Ant. Type	Field Strength (dBuV/m @3m)	Limit (dBuV/m @3m)	Results
Low – 5180	OFDM – 20MHz	90 Degree Horn / 9dBi	52.9	<54	Pass
High – 5320	OFDM – 20MHz	90 Degree Horn / 9dBi	53.6	<54	Pass
Low – 5180	OFDM – 40MHz	90 Degree Horn / 9dBi	52.9	<54	Pass
High – 5320	OFDM – 40MHz	90 Degree Horn / 9dBi	53.2	<54	Pass
Low – 5200	OFDM – 80MHz	90 Degree Horn / 9dBi	53.4	<54	Pass
High – 5300	OFDM – 80MHz	90 Degree Horn / 9dBi	52.2	<54	Pass
Low – 5180	OFDM – 20MHz	50 Degree Horn / HexHorn 13dBi	52.7	<54	Pass
High – 5320	OFDM – 20MHz	50 Degree Horn / HexHorn 13dBi	49.1	<54	Pass
Low – 5190	OFDM – 40MHz	50 Degree Horn / HexHorn 13dBi	53.3	<54	Pass
High – 5320	OFDM – 40MHz	50 Degree Horn / HexHorn 13dBi	52.2	<54	Pass
Low – 5210	OFDM – 80MHz	50 Degree Horn / HexHorn 13dBi	53.2	<54	Pass
High – 5300	OFDM – 80MHz	50 Degree Horn / HexHorn 13dBi	53.5	<54	Pass
Low – 5180	OFDM – 20MHz	30 Degree Horn / 17.5dBi	53.7	<54	Pass
High – 5320	OFDM – 20MHz	30 Degree Horn / 17.5dBi	53.9	<54	Pass
Low – 5200	OFDM – 40MHz	30 Degree Horn / 17.5dBi	53.2	<54	Pass
High – 5310	OFDM – 40MHz	30 Degree Horn / 17.5dBi	52.7	<54	Pass
Low – 5240	OFDM – 80MHz	30 Degree Horn / 17.5dBi	53.1	<54	Pass
High – 5260	OFDM – 80MHz	30 Degree Horn / 17.5dBi	53.3	<54	Pass

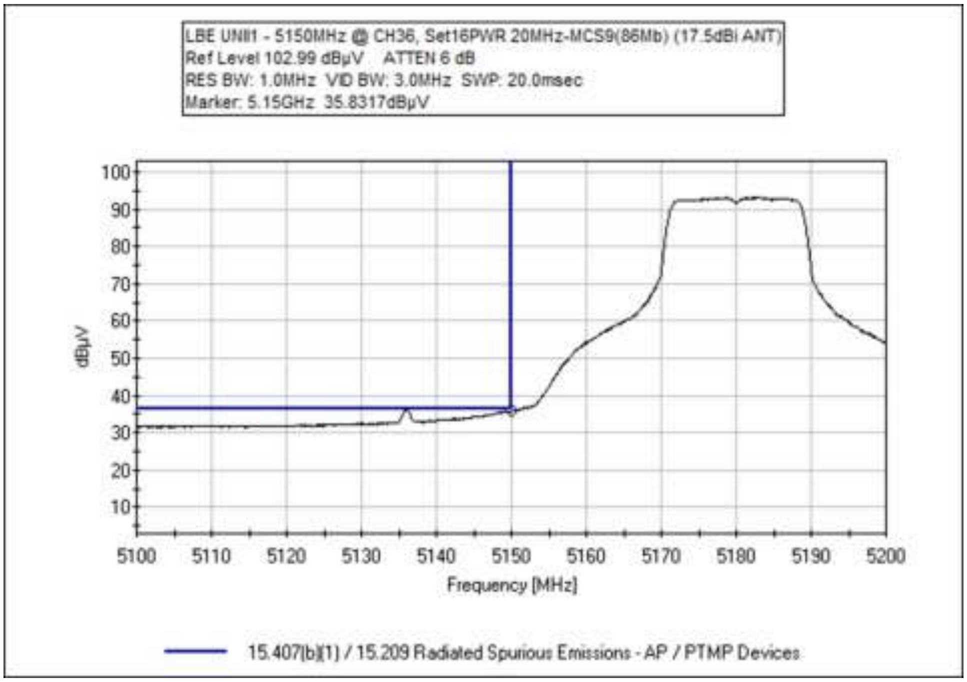
Band Edge Plots

UNII 1

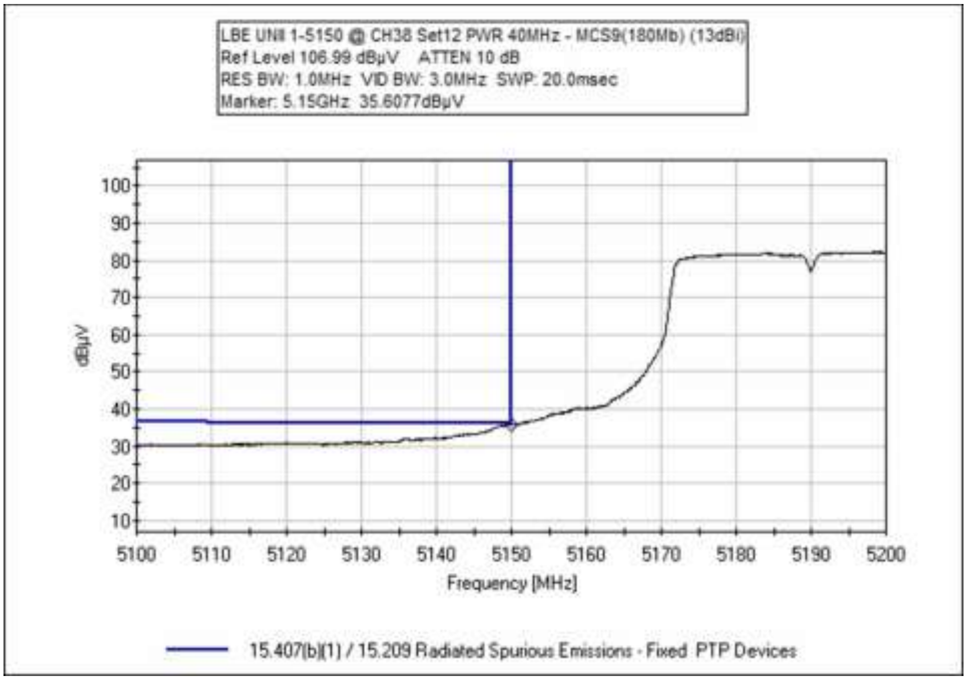
30Deg / 17.5dBi



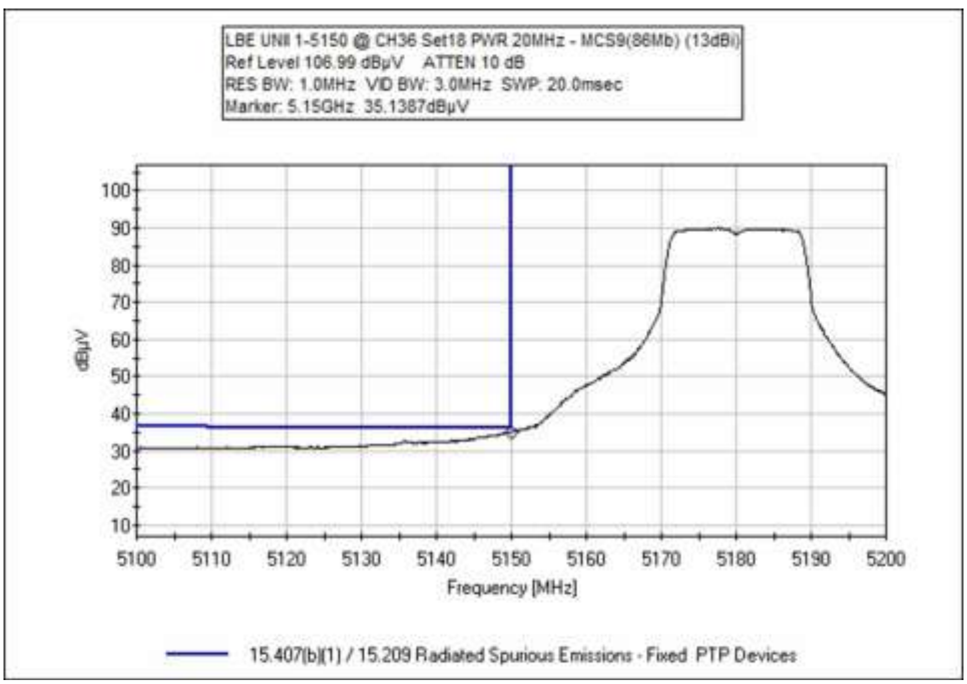



LBE UNII1 - 5150MHz @ CH36, Set16PWR 20MHz-MCS9(86Mb) (17.5dBi ANT)
Ref Level 102.99 dBμV ATTEN 6 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 5.15GHz 35.8317dBμV
dBμV
100
90
80
70
60
50
40
30
20
10
5100
5110
5120
5130
5140
5150
5160
5170
5180
5190
5200
Frequency [MHz]
15.407(b)(1) / 15.209 Radiated Spurious Emissions - AP / PTMP Devices

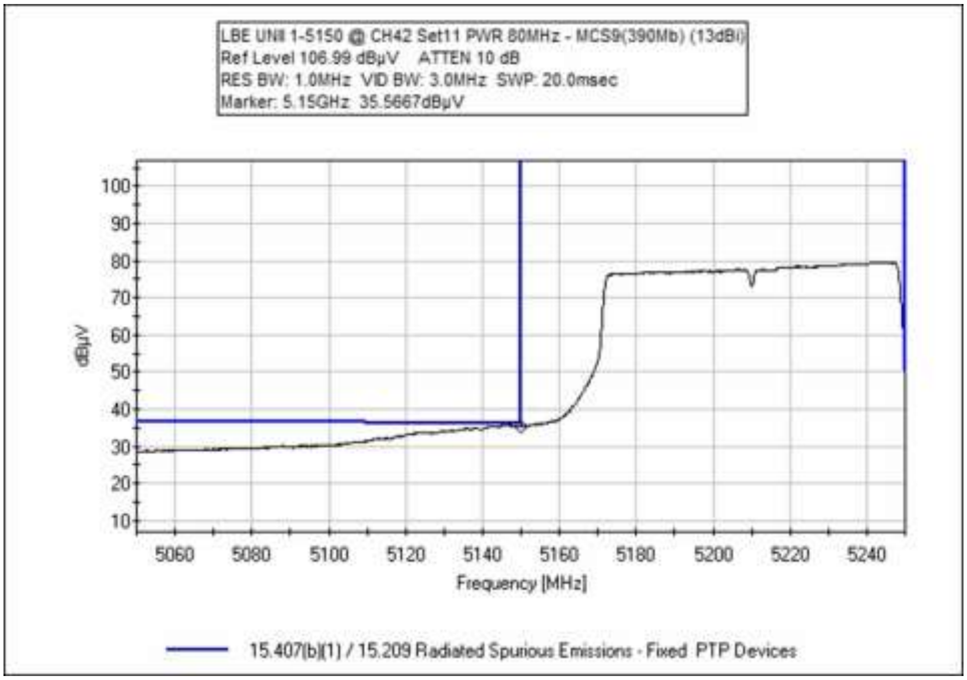
50Deg / 13dBi



LBE UNII 1-5150 @ CH38 Set12 PWR 40MHz - MCS9(180Mb) (13dBi)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 5.15GHz 35.6077dBµV
dBµV
Frequency [MHz]
15.407(b)(1) / 15.209 Radiated Spurious Emissions - Fixed PTP Devices

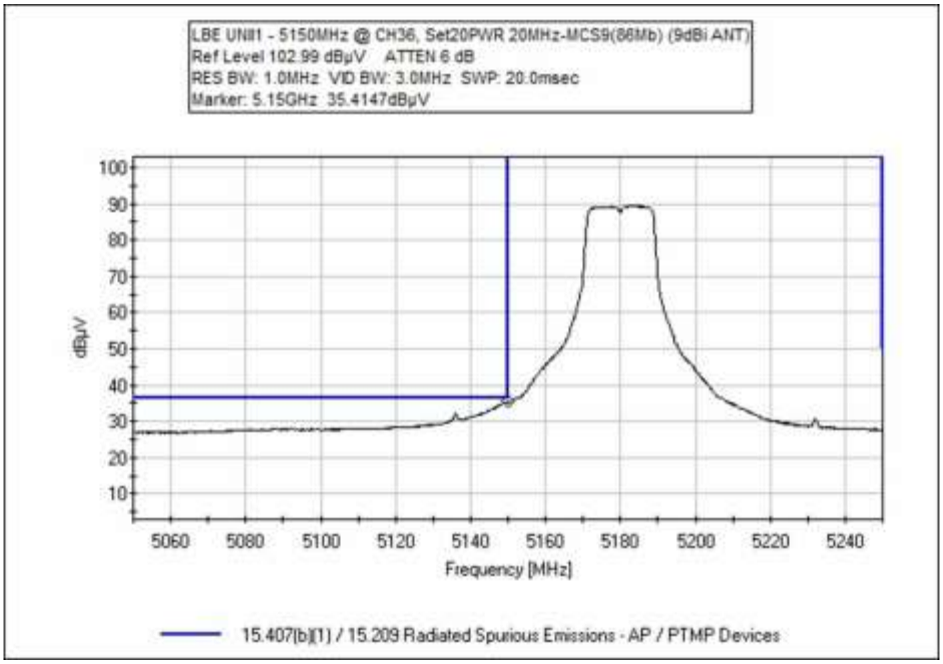


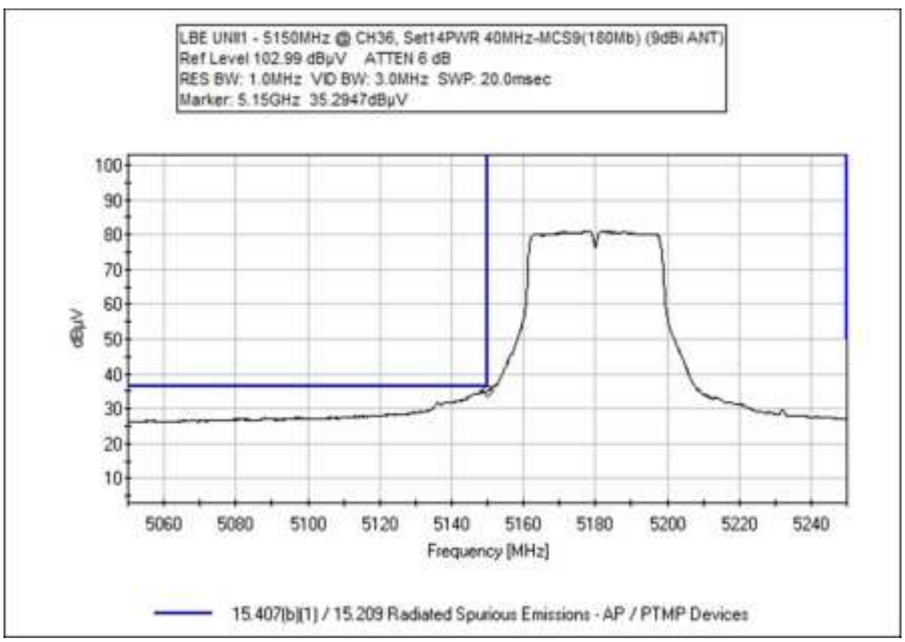
LBE UNII 1-5150 @ CH36 Set18 PWR 20MHz - MCS9(86Mb) (13dBi)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 5.15GHz 35.1387dBµV
dBµV
Frequency [MHz]
15.407(b)(1) / 15.209 Radiated Spurious Emissions - Fixed PTP Devices

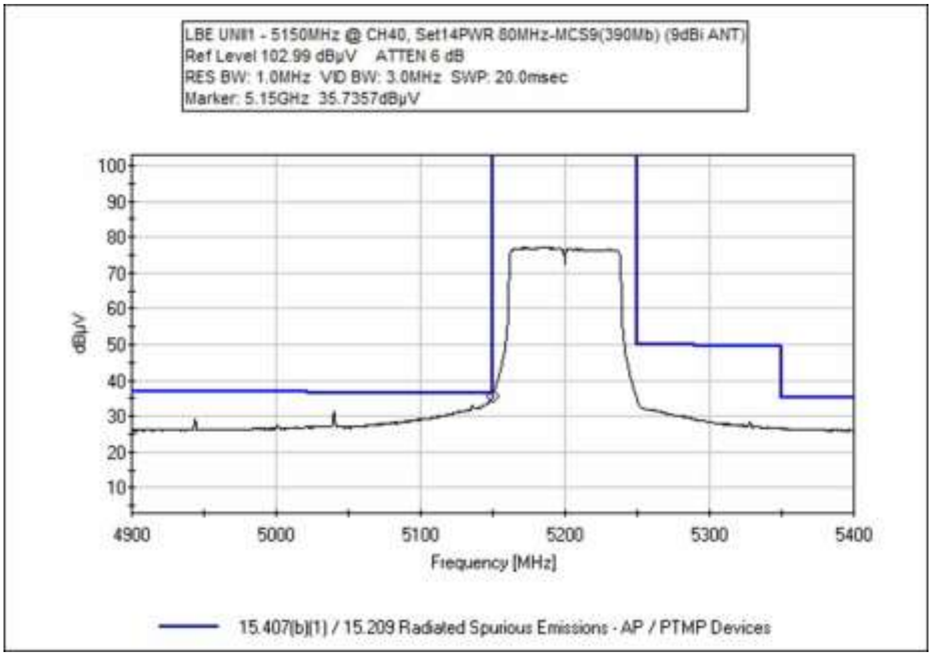


LBE UNII 1-5150 @ CH42 Set11 PWR 80MHz - MCS9(390Mb) (13dBi)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 5.15GHz 35.5667dBµV
dBµV
Frequency [MHz]
15.407(b)(1) / 15.209 Radiated Spurious Emissions - Fixed PTP Devices

90Deg / 9dBi

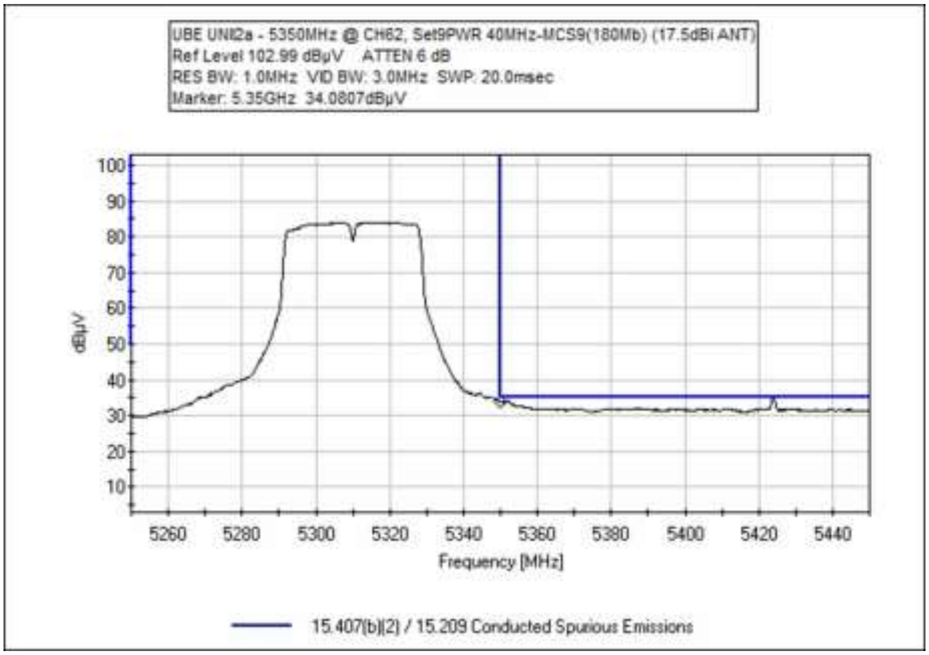

LBE UNII1 - 5150MHz @ CH36, Set20PWR 20MHz-MCS9(86Mb) (9dBi ANT)
Ref Level 102.99 dBµV ATTEN 6 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 5.15GHz 35.4147dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
5060 5080 5100 5120 5140 5160 5180 5200 5220 5240
Frequency [MHz]
15.407(b)(1) / 15.209 Radiated Spurious Emissions - AP / PTMP Devices

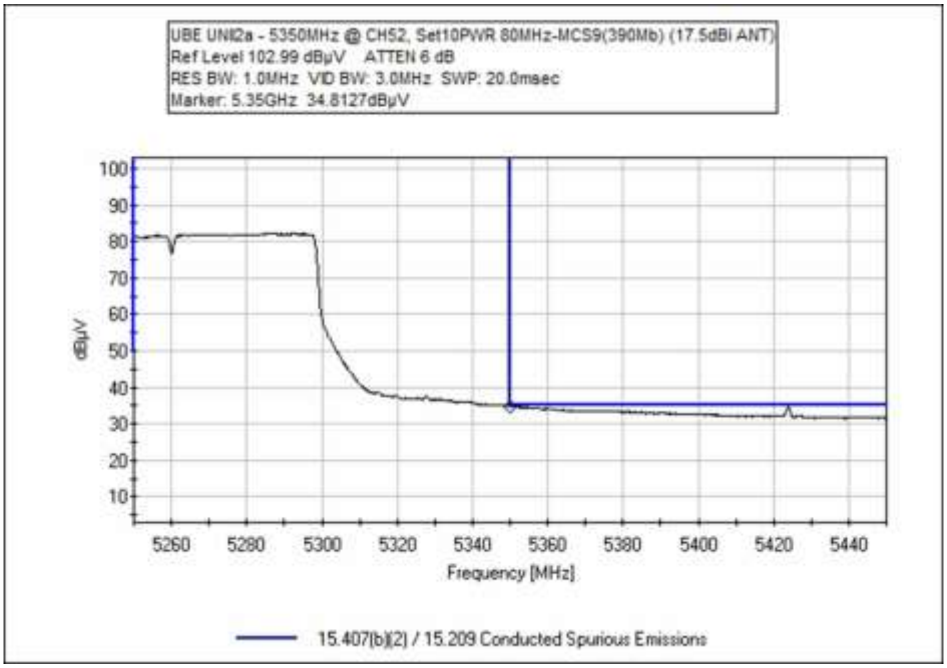

LBE UNII1 - 5150MHz @ CH36, Set14PWR 40MHz-MCS9(180Mb) (9dBi ANT)
Ref Level 102.99 dBµV ATTEN 6 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 5.15GHz 35.2947dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
5060 5080 5100 5120 5140 5160 5180 5200 5220 5240
Frequency [MHz]
15.407(b)(1) / 15.209 Radiated Spurious Emissions - AP / PTMP Devices

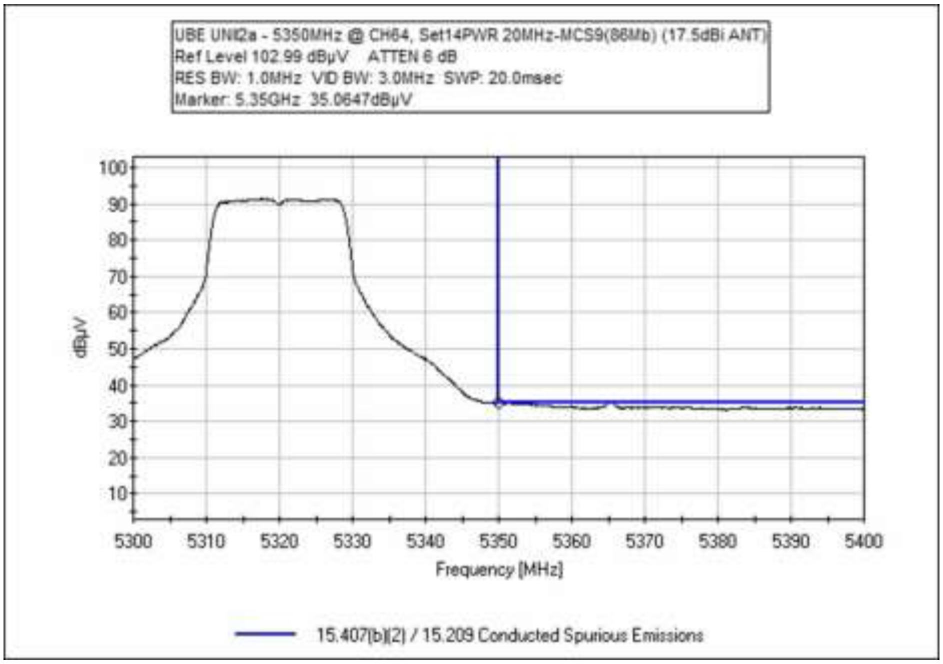

LBE UNII1 - 5150MHz @ CH40, Set14PWR 80MHz-MCS9(390Mb) (9dBi ANT)
Ref Level 102.99 dBµV ATTEN 6 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 5.15GHz 35.7357dBµV
dBµV
Frequency [MHz]
15.407(b)(1) / 15.209 Radiated Spurious Emissions - AP / PTMP Devices

UNII 2a

30Deg / 17.5dBi

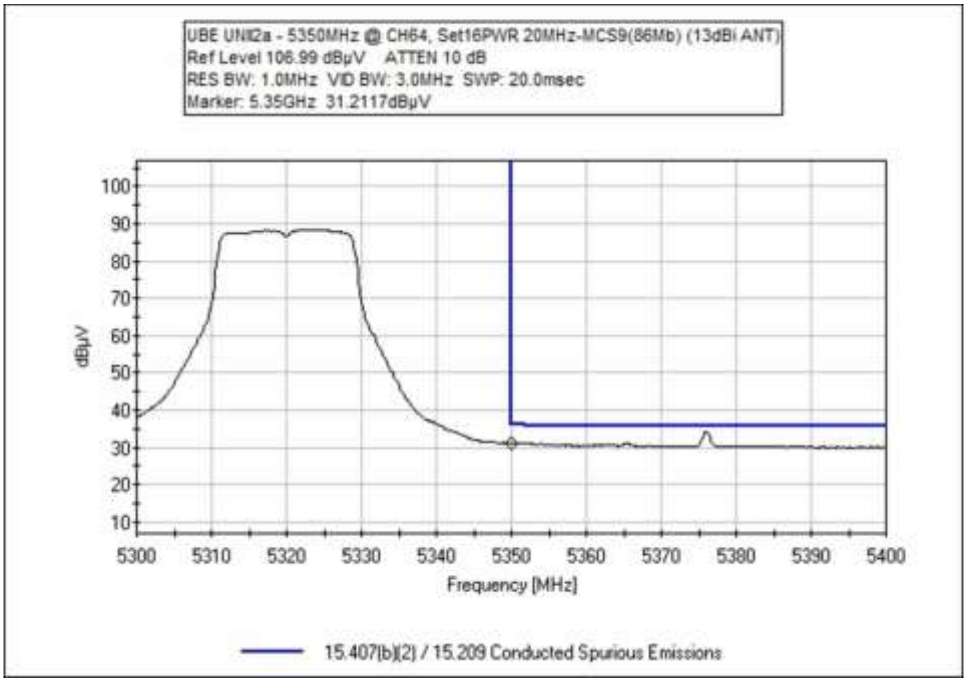


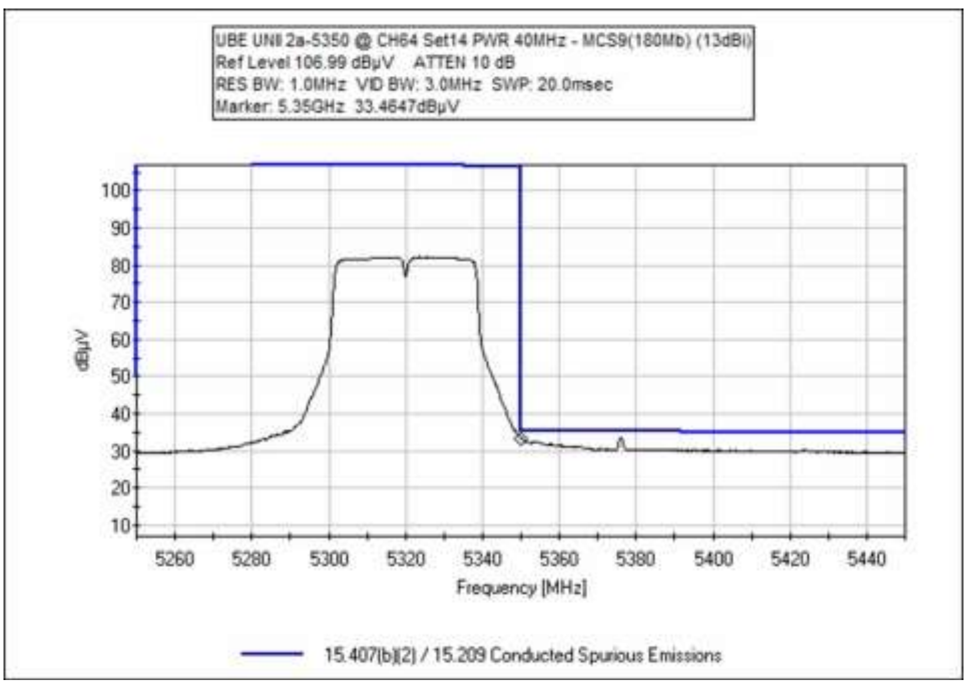


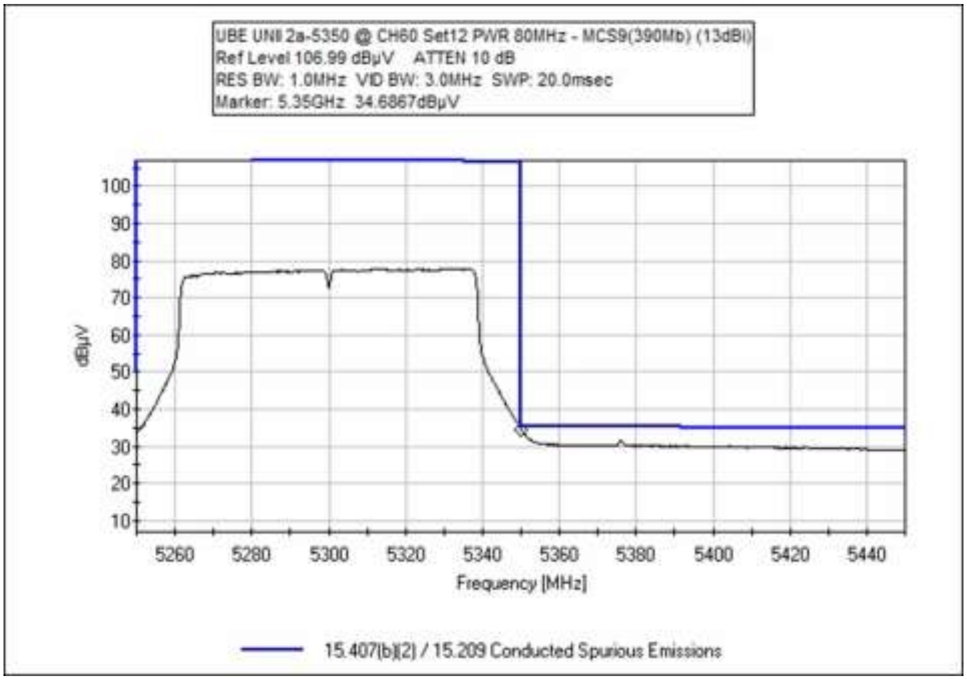


UBE UNII2a - 5350MHz @ CH64, Set14PWR 20MHz-MCS9(86Mb) (17.5dBi ANT)
Ref Level 102.99 dBµV ATTEN 6 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 5.35GHz 35.0647dBµV
dBµV
Frequency [MHz]
15.407(b)(2) / 15.209 Conducted Spurious Emissions

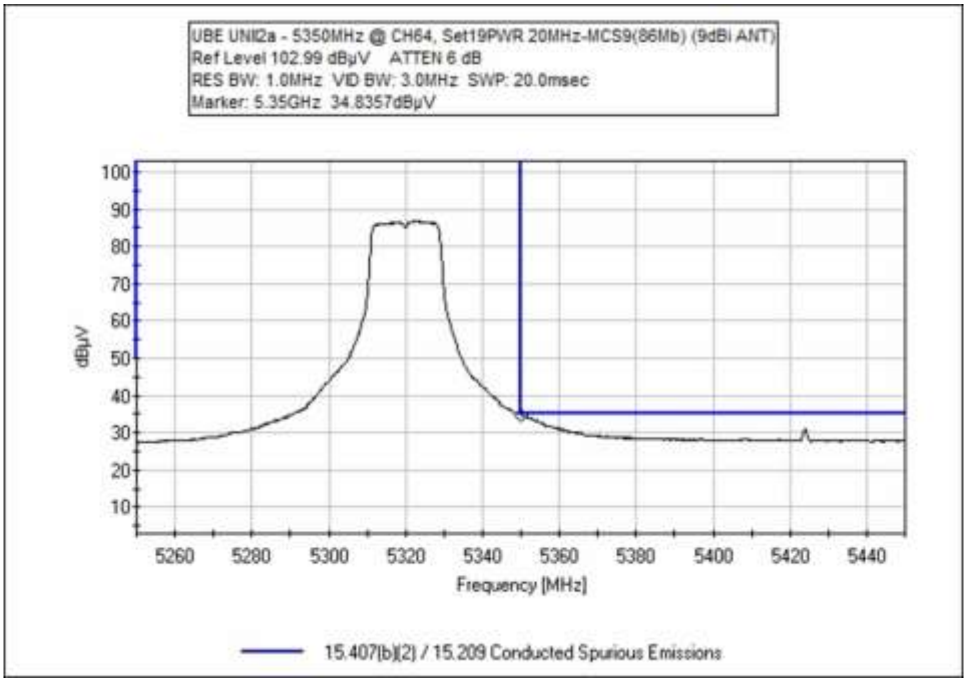
50Deg / 13dBi

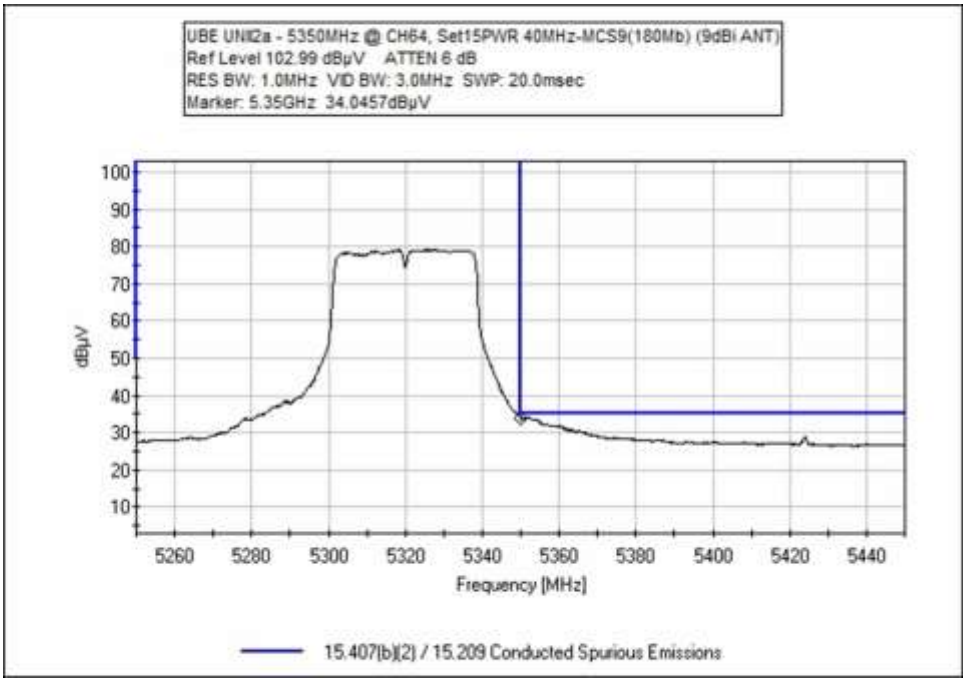

UBE UNII2a - 5350MHz @ CH64, Set16PWR 20MHz-MCS9(86Mb) (13dBi ANT)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 5.35GHz 31.2117dBµV
dBµV
Frequency [MHz]
15.407(b)(2) / 15.209 Conducted Spurious Emissions

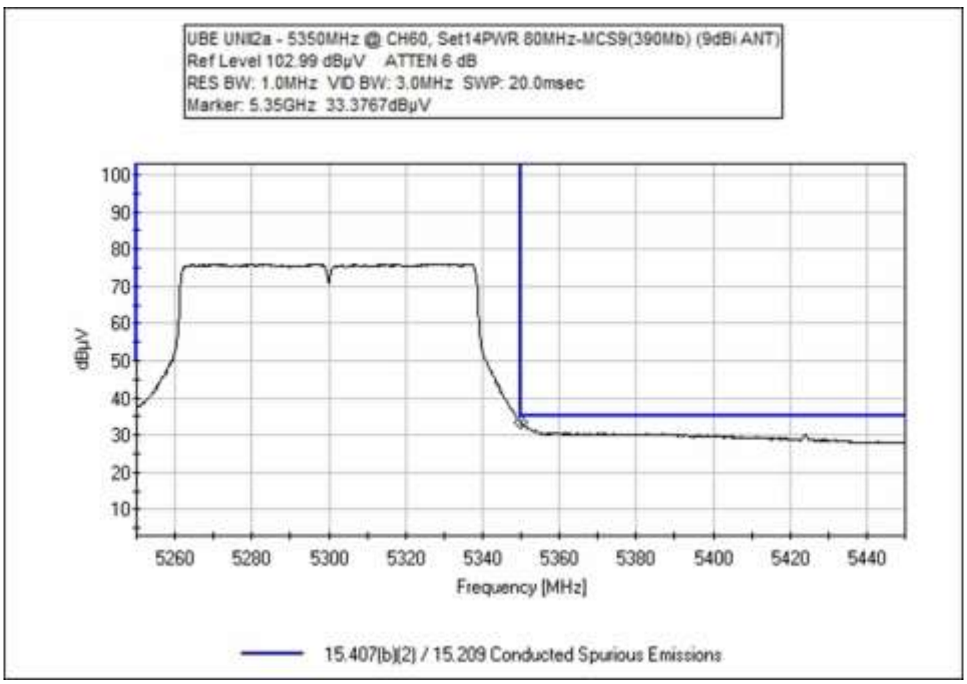

UBE UNII 2a-5350 @ CH64 Set14 PWR 40MHz - MCS9(180Mb) (13dBi)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 5.35GHz 33.4647dBµV
dBµV
Frequency [MHz]
15.407(b)(2) / 15.209 Conducted Spurious Emissions


UBE UNII 2a-5350 @ CH60 Set12 PWR 80MHz - MCS9(390Mb) (13dBi)
Ref Level 106.99 dBµV ATTEN 10 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 5.35GHz 34.6867dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
5260
5280
5300
5320
5340
5360
5380
5400
5420
5440
Frequency [MHz]
15.407(b)(2) / 15.209 Conducted Spurious Emissions

90Deg / 9dBi


UBE UNII2a - 5350MHz @ CH64, Set19PWR 20MHz-MCS9(86Mb) (9dBi ANT)
Ref Level 102.99 dBµV ATTEN 6 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 5.35GHz 34.8357dBµV
dBµV
100
90
80
70
60
50
40
30
20
10
5260
5280
5300
5320
5340
5360
5380
5400
5420
5440
Frequency [MHz]
15.407(b)(2) / 15.209 Conducted Spurious Emissions


UBE UNII2a - 5350MHz @ CH64, Set15PWR 40MHz-MCS9(180Mb) (9dBi ANT)
Ref Level 102.99 dBµV ATTEN 6 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 5.35GHz 34.0457dBµV
dBµV
Frequency [MHz]
15.407(b)(2) / 15.209 Conducted Spurious Emissions


UBE UNII2a - 5350MHz @ CH60, Set14PWR 80MHz-MCS9(390Mb) (9dBi ANT)
Ref Level 102.99 dBµV ATTEN 6 dB
RES BW: 1.0MHz VID BW: 3.0MHz SWP: 20.0msec
Marker: 5.35GHz 33.3767dBµV
dBµV
Frequency [MHz]
15.407(b)(2) / 15.209 Conducted Spurious Emissions

Test Setup / Conditions / Data

Test Location:	CKC Laboratories Inc. • 1120 Fulton Place • Fremont, CA 94539 • 510-249-1170		
Customer:	**Digital Path**		
Specification:	**15.407(b)(1) / 15.209 Radiated Spurious Emissions - AP / PTMP Devices**		
Work Order #:	**100331**	Date:	11/17/2017
Test Type:	**Radiated Scan**	Time:	14:35:35
Tested By:	Benny Lovan	Sequence#:	6
Software:	EMITest 5.03.11		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

Equipment is an outdoor access point for use in PTMP applications.

Modulation used: OFDM (802.11ac)
unit is in continuous mode
Antenna: 30 degree Horn
Gain: 17.5dBi

Highest Generated Frequency not related to radio: 1.4GHz

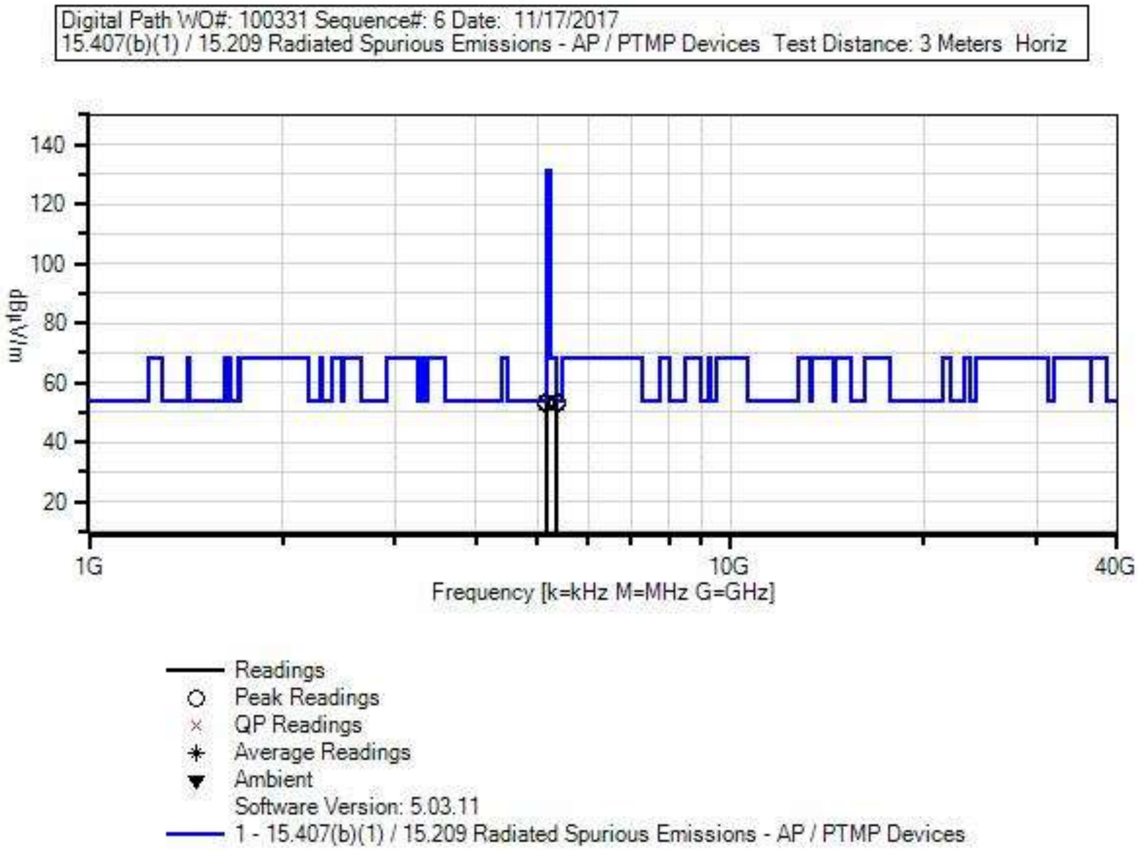
Radio 1 5745MHz – Max Data Rate = 86Mbps per chain
Radio 2: 5540MHz – Max Data Rate =86Mbps per chain
Radio 3: 5240MHz – Max Data Rate = 86Mbps per chain

Temperature: 17.8 ºC
Rel. Humidity: 48%

Test method: ANSI C63.10 (2013), KDB 789033 v01r04 (May 2, 2017)

The EUT is usually setup on a roof or tower. For testing, it has been placed on a tripod that mimics actual installation. The EUT has multiple radios within the EUT but all are identical. The customer's power to the EUT is POE. It has an AC to DC adapter which supplies the POE to the EUT. The EUT is setup with unshielded Ethernet cables.

Modification #1 was in place during testing.


Digital Path WO#: 100331 Sequence#: 6 Date: 11/17/2017
15.407(b)(1) / 15.209 Radiated Spurious Emissions - AP / PTMP Devices Test Distance: 3 Meters Horiz
140
120
100
80
60
40
20
dBµV/m
1G
10G
40G
Frequency [k=kHz M=MHz G=GHz]
Readings
Peak Readings
QP Readings
Average Readings
Ambient
Software Version: 5.03.11
1 - 15.407(b)(1) / 15.209 Radiated Spurious Emissions - AP / PTMP Devices

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00327	Horn Antenna	3115	3/4/2016	3/4/2018
T2	AN02115	Preamp	83051A	2/27/2017	2/27/2019
T3	AN03361	Cable	32022-2-29094-48TC	1/10/2017	1/10/2019
T4	ANP05935	Attenuator	84A-10	1/18/2016	1/18/2018
T5	AN03543	Cable	32022-29094K-29094K-10M	11/7/2017	11/7/2019
T6	AN02660	Spectrum Analyzer	E4446A	10/10/2016	10/10/2018

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	5350.000M	35.2	+30.9 +9.0	-32.5 +0.0	+1.5	+9.8	+0.0	53.9	54.0 UBE UNII2a - 5350MHz @ CH64, Set14PWR 20MHz-MCS9(86Mb) (17.5dBi ANT)	-0.1	Horiz
2	5150.000M	36.0	+30.4 +8.7	-32.6 +0.0	+1.4	+9.8	+0.0	53.7	54.0 LBE UNII1 - 5150MHz @ CH36, Set16PWR 20MHz-MCS9(86Mb) (17.5dBi ANT)	-0.3	Horiz
3	5350.000M	34.6	+30.9 +9.0	-32.5 +0.0	+1.5	+9.8	+0.0	53.3	54.0 UBE UNII2a - 5350MHz @ CH52, Set10PWR 80MHz-MCS9(390Mb) (17.5dBi ANT)	-0.7	Horiz
4	5150.000M	35.5	+30.4 +8.7	-32.6 +0.0	+1.4	+9.8	+0.0	53.2	54.0 LBE UNII1 - 5150MHz @ CH40, Set12PWR 40MHz-MCS9(180Mb) (17.5dBi ANT)	-0.8	Horiz
5	5150.000M	35.4	+30.4 +8.7	-32.6 +0.0	+1.4	+9.8	+0.0	53.1	54.0 LBE UNII1 - 5150MHz @ CH48, Set10PWR 80MHz-MCS9(390Mb) (17.5dBi ANT)	-0.9	Horiz
6	5350.000M	34.0	+30.9 +9.0	-32.5 +0.0	+1.5	+9.8	+0.0	52.7	54.0 UBE UNII2a - 5350MHz @ CH62, Set9PWR 40MHz-MCS9(180Mb) (17.5dBi ANT)	-1.3	Horiz

Test Location:	CKC Laboratories Inc. • 1120 Fulton Place • Fremont, CA 94539 • 510-249-1170
Customer:	**Digital Path**
Specification:	**15.407(b)(1) / 15.209 Radiated Spurious Emissions - AP / PTMP Devices**
Work Order #:	**100331**
Date:	11/13/2017
Test Type:	**Radiated Scan**
Time:	15:49:17
Tested By:	Benny Lovan
Sequence#:	6
Software:	EMITest 5.03.11

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 4			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 4			

Test Conditions / Notes:

Equipment is an outdoor access point for use in PTMP applications.

Modulation used: OFDM (802.11ac)
unit is in continuous mode
Antenna: 90 degree Horn
Gain: 9dBi

Highest Generated Frequency not related to radio: 1.4GHz

Radio 1 5745MHz – Max Data Rate = 86Mbps per chain
Radio 2: 5540MHz – Max Data Rate =86Mbps per chain
Radio 3: 5240MHz – Max Data Rate = 86Mbps per chain

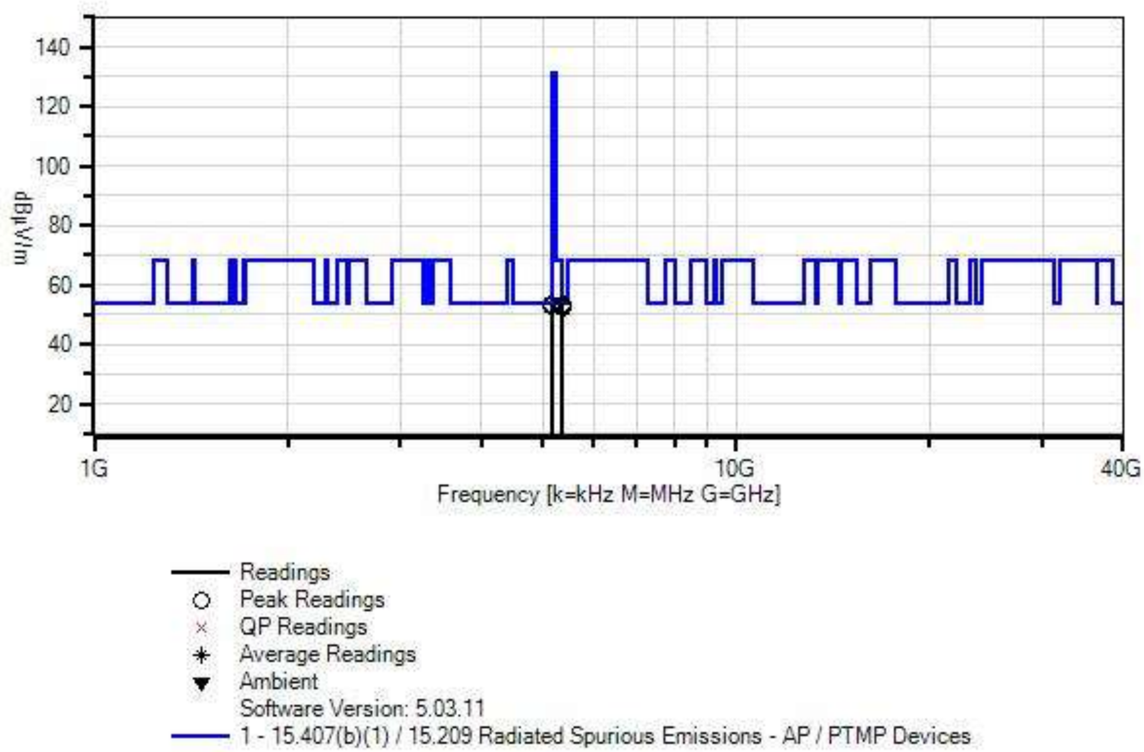
Temperature: 14.2ºC
Rel. Humidity: 64%

Test method: ANSI C63.10 (2013), KDB 789033 v01r04 (May 2, 2017)

The EUT is usually setup on a roof or tower. For testing, it has been placed on a tripod that mimics actual installation. The EUT has multiple radios within the EUT but all are identical. The customer's power to the EUT is POE. It has an AC to DC adapter which supplies the POE to the EUT. The EUT is setup with unshielded Ethernet cables.

Modification #1 was in place during testing.

Digital Path WO#: 100331 Sequence#: 6 Date: 11/13/2017
15.407(b)(1) / 15.209 Radiated Spurious Emissions - AP / PTMP Devices Test Distance: 3 Meters Horiz



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00327	Horn Antenna	3115	3/4/2016	3/4/2018
T2	AN02115	Preamp	83051A	2/27/2017	2/27/2019
T3	AN03361	Cable	32022-2-29094-48TC	1/10/2017	1/10/2019
T4	ANP05935	Attenuator	84A-10	1/18/2016	1/18/2018
T5	AN03543	Cable	32022-29094K-29094K-10M	11/7/2017	11/7/2019
T6	AN02660	Spectrum Analyzer	E4446A	10/10/2016	10/10/2018

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	5350.000M	34.9	+30.9 +9.0	-32.5 +0.0	+1.5	+9.8	+0.0	53.6	54.0 UBE UNII2a - 5350MHz @ CH64, Set19PWR 20MHz-MCS9(86Mb) (9dBi ANT)	-0.4	Horiz
2	5150.000M	35.7	+30.4 +8.7	-32.6 +0.0	+1.4	+9.8	+0.0	53.4	54.0 LBE UNII1 - 5150MHz @ CH40, Set14PWR 80MHz-MCS9(390Mb) (9dBi ANT)	-0.6	Horiz
3	5350.000M	34.5	+30.9 +9.0	-32.5 +0.0	+1.5	+9.8	+0.0	53.2	54.0 UBE UNII2a - 5350MHz @ CH64, Set15PWR 40MHz-MCS9(180Mb) (9dBi ANT)	-0.8	Horiz
4	5150.000M	35.2	+30.4 +8.7	-32.6 +0.0	+1.4	+9.8	+0.0	52.9	54.0 LBE UNII1 - 5150MHz @ CH36, Set14PWR 40MHz-MCS9(180Mb) (9dBi ANT)	-1.1	Horiz
5	5150.000M	35.2	+30.4 +8.7	-32.6 +0.0	+1.4	+9.8	+0.0	52.9	54.0 LBE UNII1 - 5150MHz @ CH36, Set20PWR 20MHz-MCS9(86Mb) (9dBi ANT)	-1.1	Horiz
6	5350.000M	33.5	+30.9 +9.0	-32.5 +0.0	+1.5	+9.8	+0.0	52.2	54.0 UBE UNII2a - 5350MHz @ CH60, Set14PWR 80MHz-MCS9(390Mb) (9dBi ANT)	-1.8	Horiz

Test Location:	CKC Laboratories Inc. • 1120 Fulton Place • Fremont, CA 94539 • 510-249-1170
Customer:	**Digital Path**
Specification:	**15.407(b)(1) / 15.209 Radiated Spurious Emissions - Fixed PTP Devices**
Work Order #:	**100331** Date: 11/7/2017
Test Type:	**Radiated Scan** Time: 09:59:25
Tested By:	Benny Lovan Sequence#: 6
Software:	EMITest 5.03.11

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 5			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 5			

Test Conditions / Notes:

Equipment is an outdoor access point for use in PTMP applications.

Modulation used: OFDM (802.11ac)
Unit is in continuous mode
Antenna: 50 degree Hex Array Horn (6 horns)

Data collected will be for both the HexHorn and the 50 Degree Horn. The customer declares that the antennas are exactly the same and so are the radios.

Highest Generated Frequency not related to radio: 1.4GHz

Radio 1 5745MHz – Max Data Rate = 86Mbps per chain
Radio 2: 5540MHz – Max Data Rate =86Mbps per chain
Radio 3: 5240MHz – Max Data Rate = 86Mbps per chain

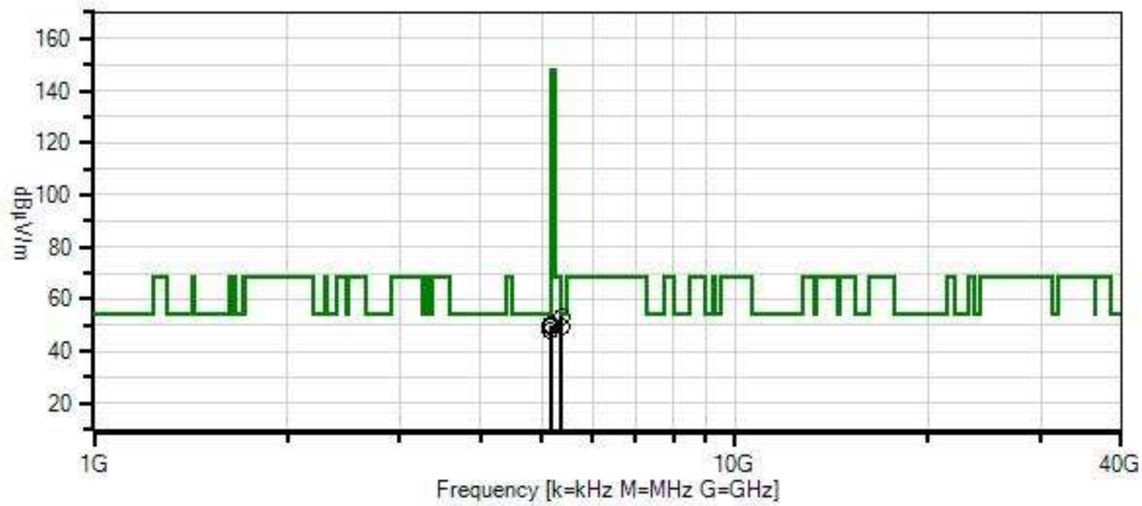
Temperature: 18ºC
Rel. Humidity: 27%

Test method: ANSI C63.10 (2013), KDB 789033 v01r04 (May 2, 2017)

The EUT is usually setup on a roof or tower. For testing, it has been placed on a non-conductive table. The EUT has 6 Horn Antennas in a hexagon shape. It has 3 radios and 4 chains. Each radio is identical as well as each transmit chain. The customer's power to the EUT is POE. It has an AC to DC adapter which supplies the POE to the EUT. The EUT is setup with unshielded Ethernet cables.

Modification #1 was in place during testing.

Digital Path WO#: 100331 Sequence#: 6 Date: 11/7/2017
15.407(b)(1) / 15.209 Radiated Spurious Emissions - Fixed PTP Devices Test Distance: 3 Meters Horiz



Readings
Peak Readings
QP Readings
Average Readings
Ambient
Software Version: 5.03.11
1 - 15.407(b)(1) / 15.209 Radiated Spurious Emissions - Fixed PTP Devices

Test Equipment:

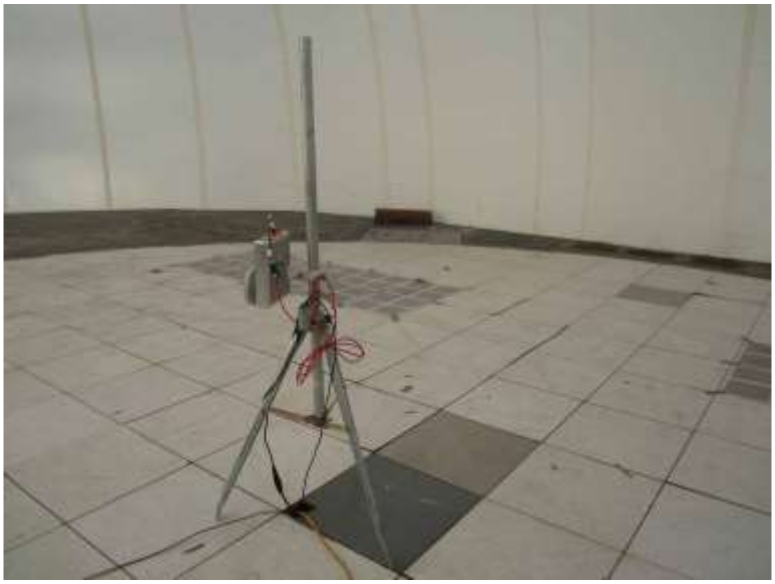
ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN03634	Spectrum Analyzer	E4445A	8/30/2017	8/30/2018
T2	AN00327	Horn Antenna	3115	3/4/2016	3/4/2018
T3	AN03543	Cable	32022-29094K-29094K-10M	11/2/2015	11/2/2017
T4	AN02115	Preamp	83051A	2/27/2017	2/27/2019
T5	AN03361	Cable	32022-2-29094-48TC	1/10/2017	1/10/2019
T6	ANP05411	Attenuator	54A-10	1/18/2016	1/18/2018

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

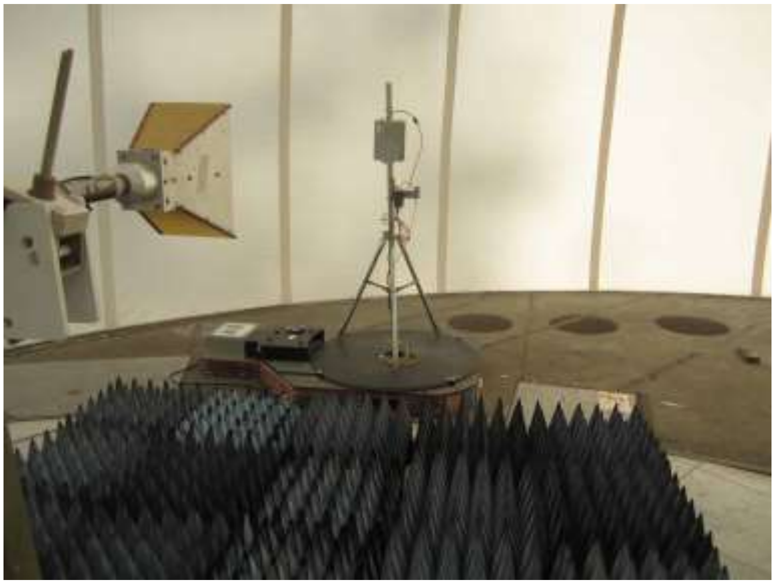
#	Freq MHz	Rdng dBμV	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	5350.000M	35.6	+0.0 +1.5	+30.9 +9.4	+8.6	-32.5	+0.0	53.5	54.0 UBE UNII2a - 5350MHz @ CH62, Set15PWR 40MHz-MCS9(180Mb) (13dBi ANT)	-0.5	Horiz
2	5150.000M	33.1	+0.0 +1.4	+30.4 +9.4	+8.4	-32.6	+0.0	50.1	54.0 LBE UNII1 - 5150MHz @ CH36, Set16PWR 20MHz-MCS9(86Mb) (13dBi ANT)	-3.9	Horiz
3	5150.000M	32.7	+0.0 +1.4	+30.4 +9.4	+8.4	-32.6	+0.0	49.7	54.0 LBE UNII1 - 5150MHz @ CH40, Set12PWR 40MHz-MCS9(180Mb) (13dBi ANT)	-4.3	Horiz
4	5350.000M	31.8	+0.0 +1.5	+30.9 +9.4	+8.6	-32.5	+0.0	49.7	54.0 UBE UNII2a - 5350MHz @ CH52, Set12PWR 80MHz-MCS9(390Mb) (13dBi ANT)	-4.3	Horiz
5	5350.000M	31.2	+0.0 +1.5	+30.9 +9.4	+8.6	-32.5	+0.0	49.1	54.0 UBE UNII2a - 5350MHz @ CH64, Set16PWR 20MHz-MCS9(86Mb) (13dBi ANT)	-4.9	Horiz
6	5150.000M	31.1	+0.0 +1.4	+30.4 +9.4	+8.4	-32.6	+0.0	48.1	54.0 LBE UNII1 - 5150MHz @ CH48, Set10PWR 80MHz-MCS9(390Mb) (13dBi ANT)	-5.9	Horiz

Test Setup Photos

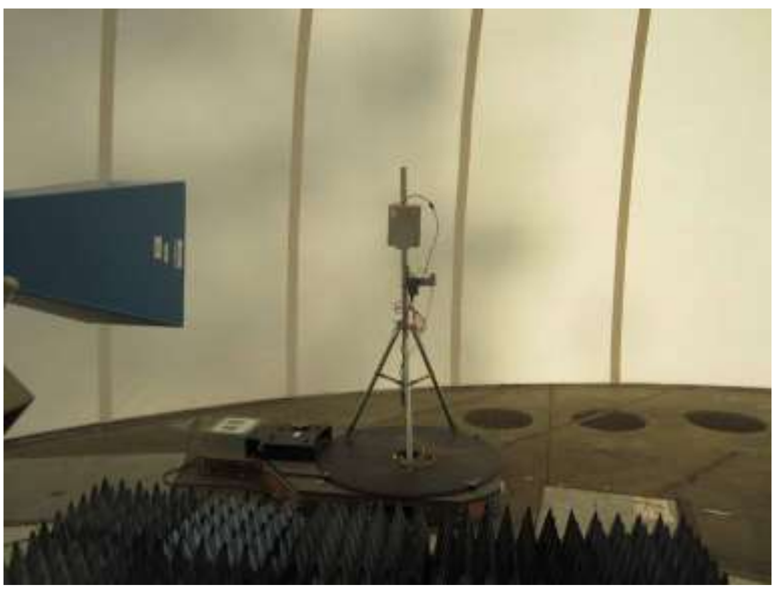
9dBi-30-1000MHz



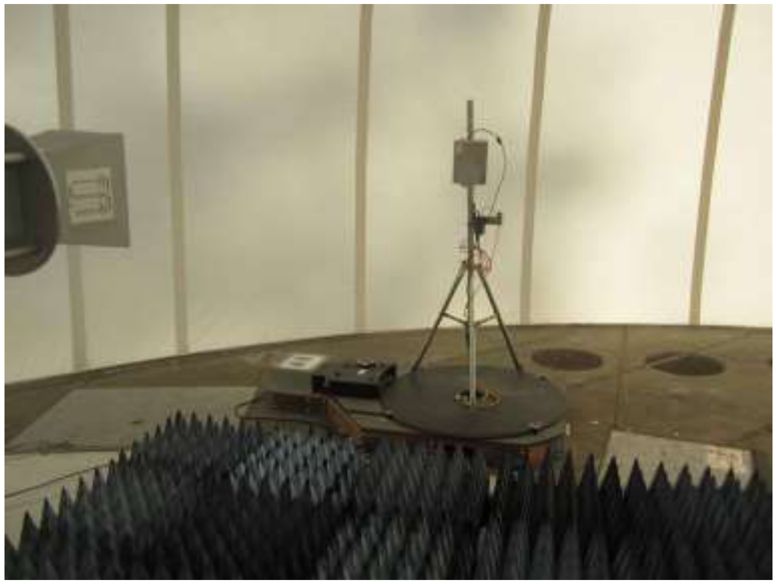
9dBi-30-1000MHz



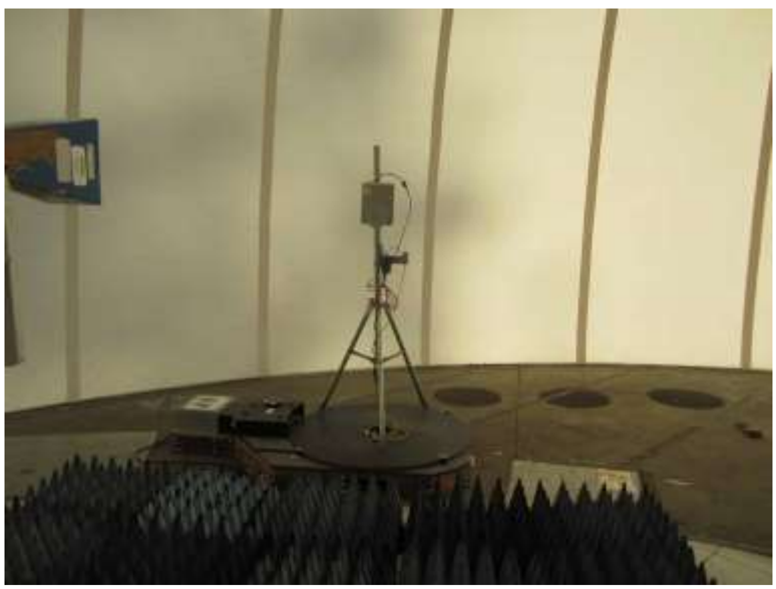
9dBi-1-12GHz, Cone placement



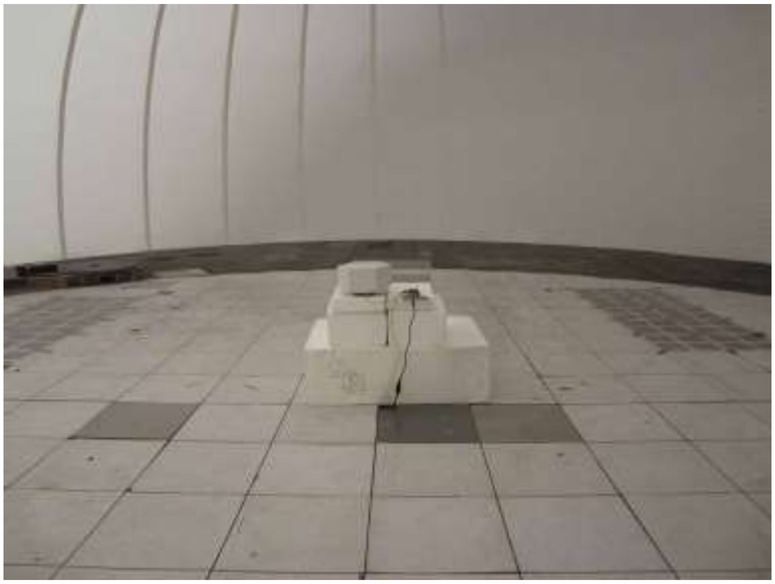
9dBi-12-18GHz, Cone placement



9dBi-18-26.5GHz, Cone placement

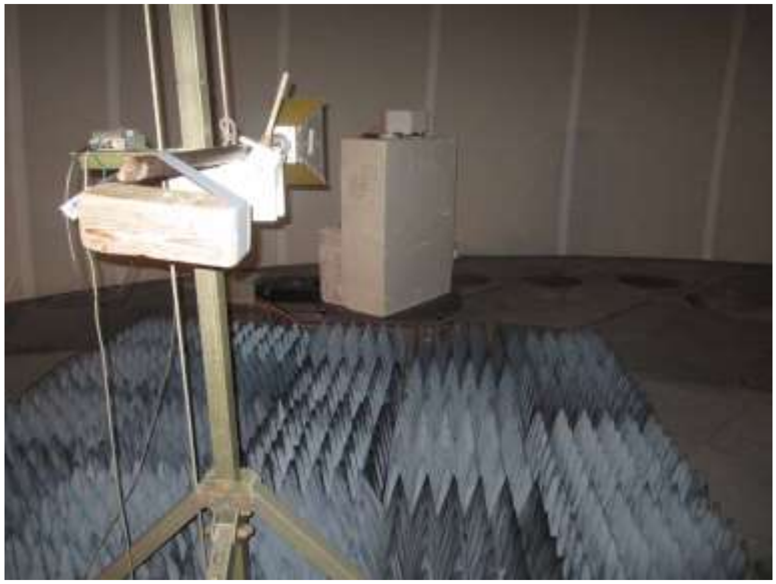


9dBi-26.5-40GHz, Cone placement

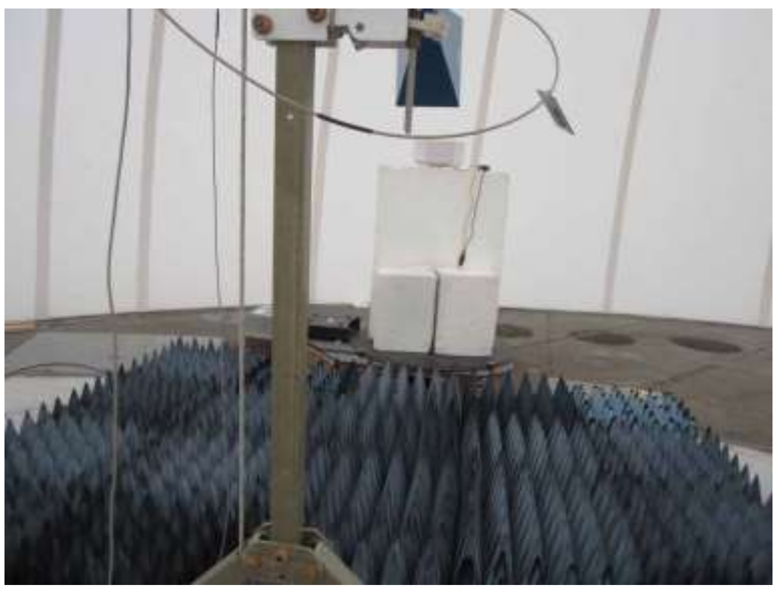


13dBi-Hex-30-1000MHz

13dBi-Hex-30-1000MHz



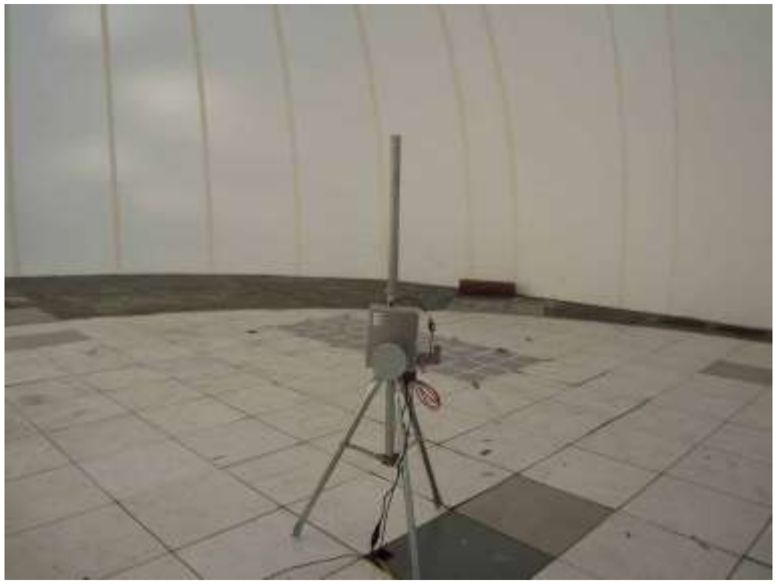
13dBi-Hex-1-12GHz, Cone placement



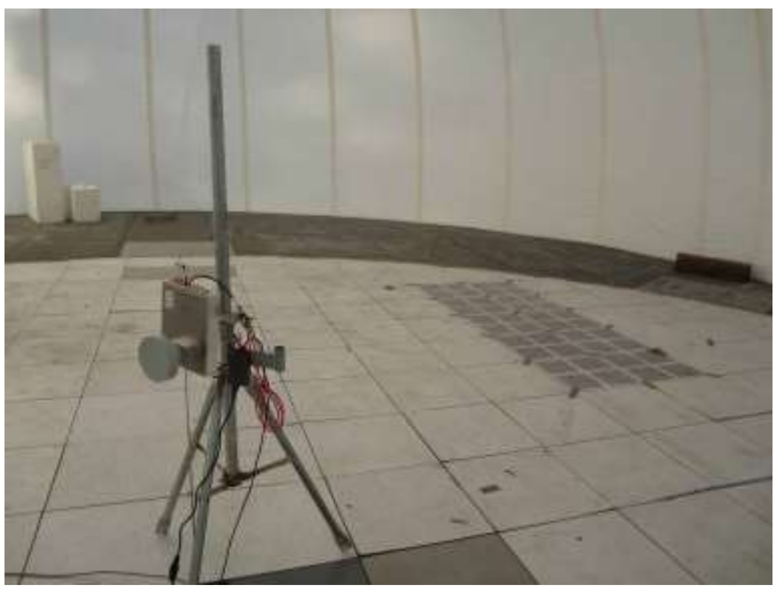
13dBi-Hex-12-18GHz, Cone placement

13dBi-Hex-18-26.5GHz, Cone placement

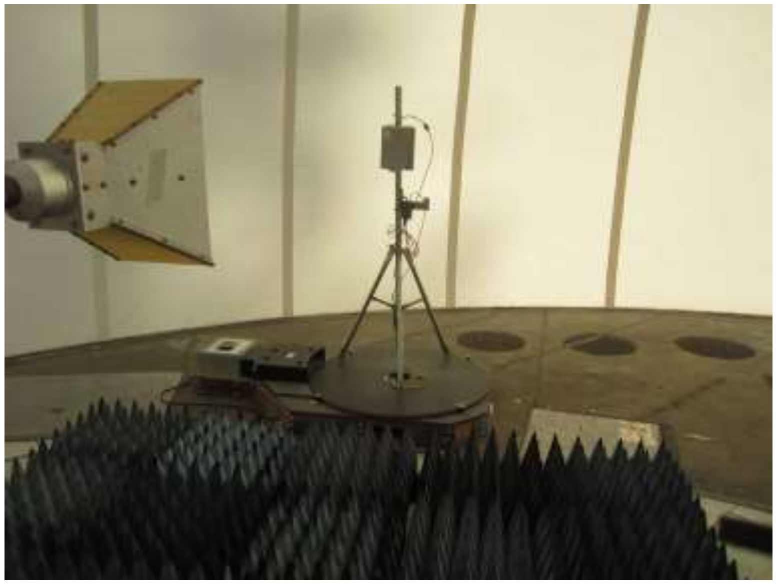
13dBi-Hex-26.5-40GHz, Cone placement



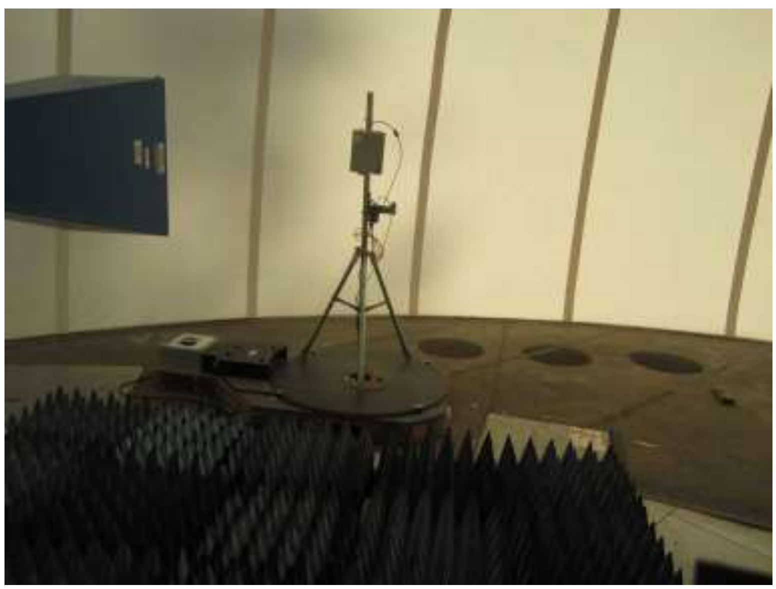
13dBi-Horn-30-1000MHz



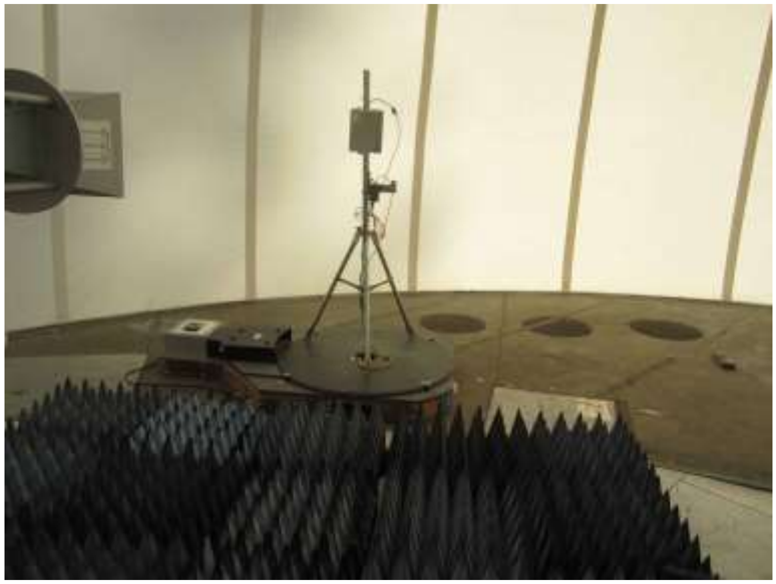
13dBi-Horn-30-1000MHz-



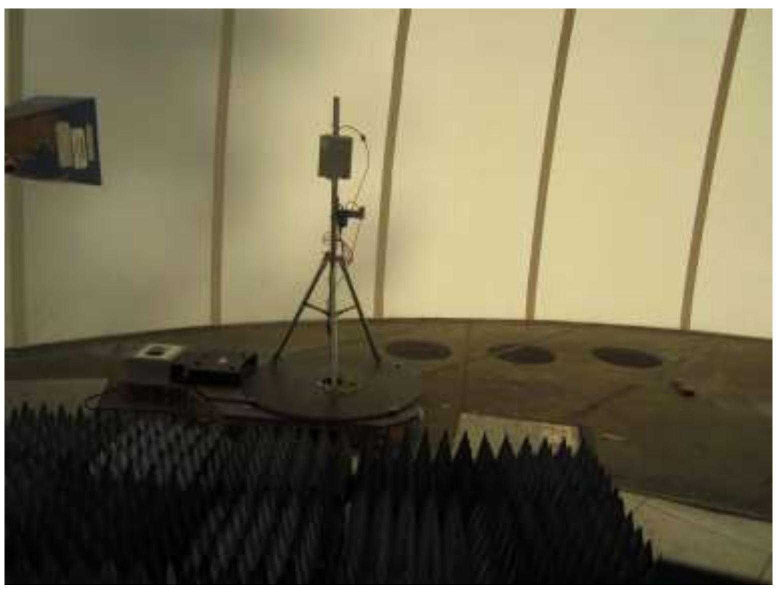
13dBi-Horn-1-12GHz, Cone placement



13dBi-Horn-12-18GHz, Cone placement

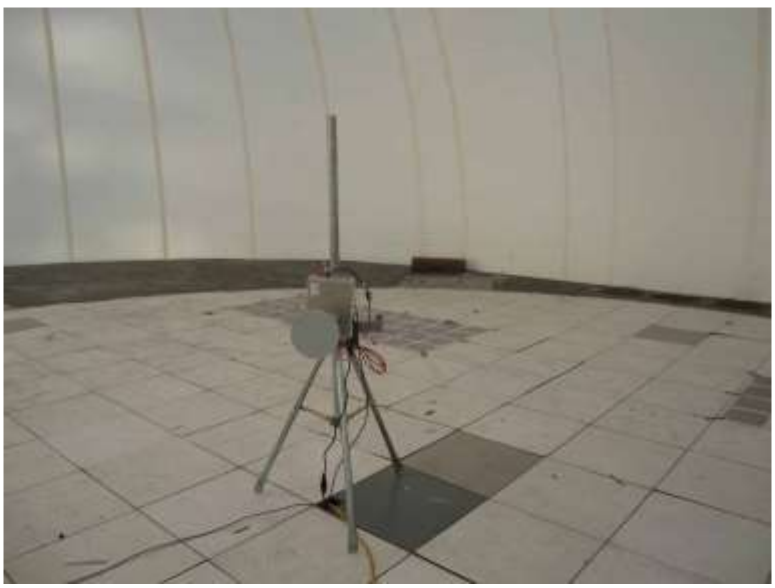


13dBi-Horn-18-26.5GHz, Cone placement

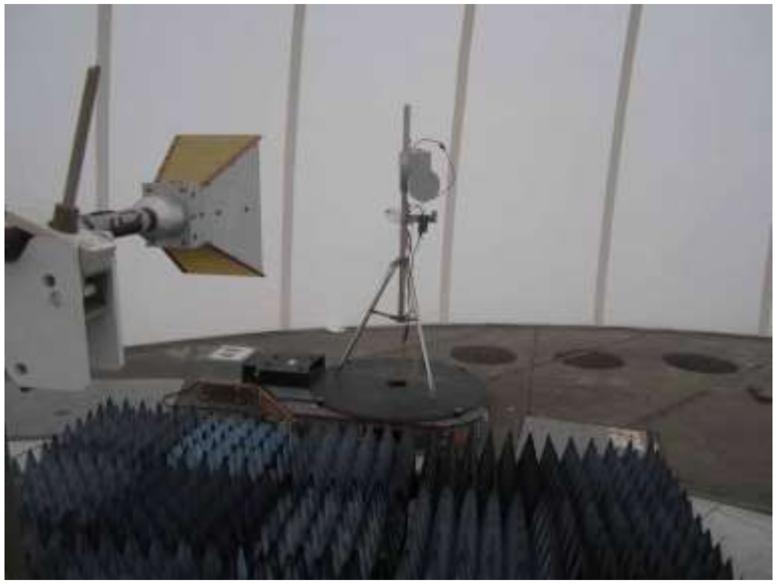


13dBi-Horn-26.5-40GHz, Cone placement

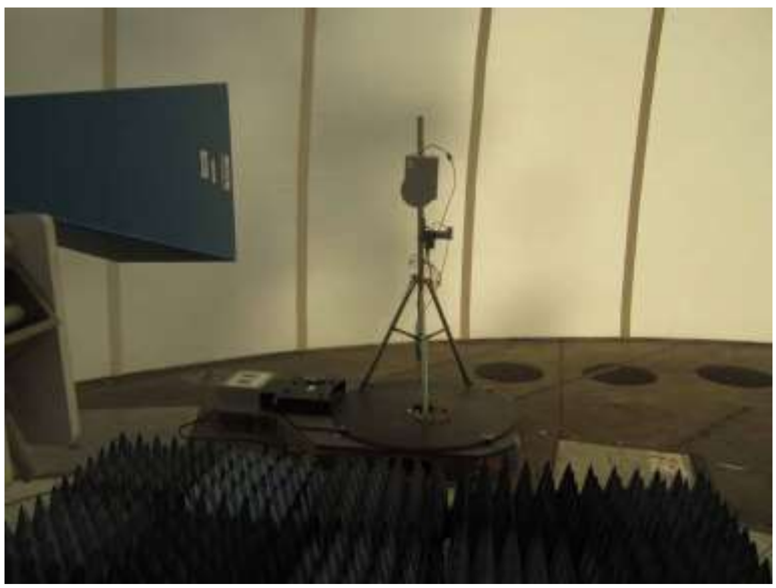
17.5dBi-30-1000MHz



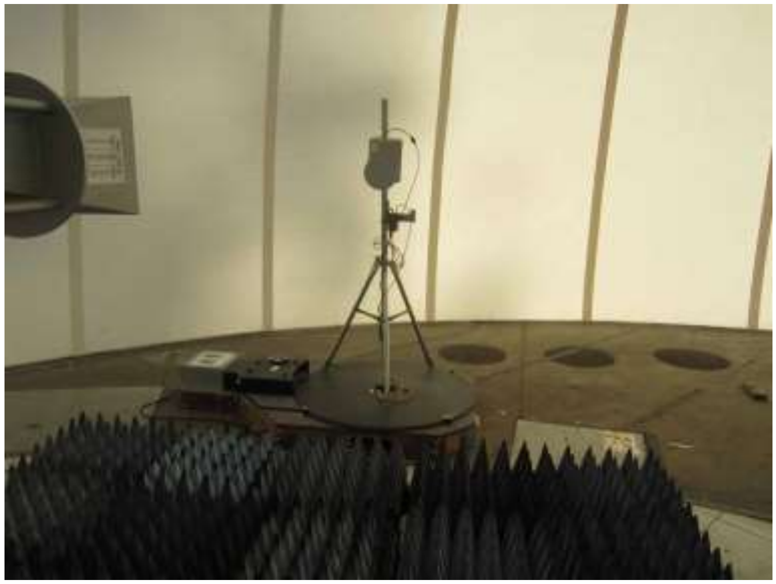
17.5dBi-30-1000MHz



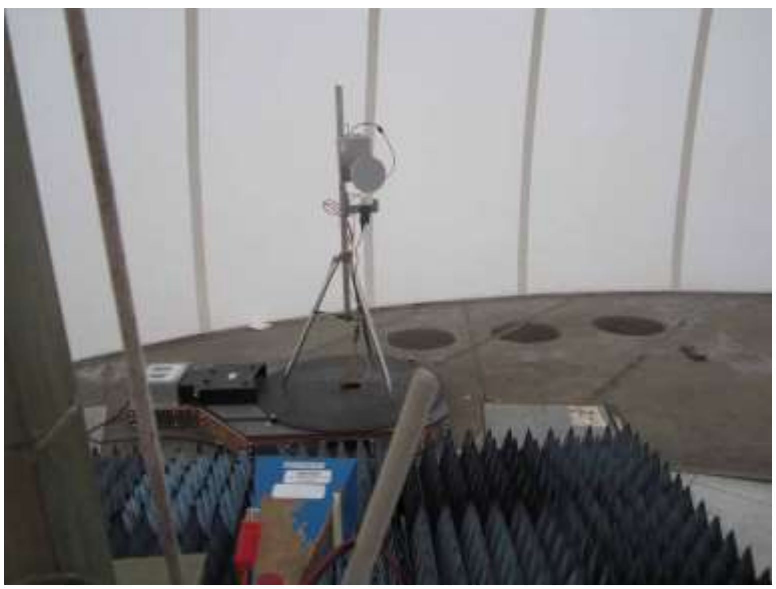
17.5dBi-1-12GHz, Cone placement



17.5dBi-12-18GHz, Cone placement



17.5dBi-18-26.5GHz, Cone placement



17.5dBi-26.5-40GHz, Cone placement

15.207 AC Conducted Emissions

Test Setup / Conditions / Data

Test Location:	CKC Laboratories Inc. • 1120 Fulton Place • Fremont, CA 94539 • 510-249-1170		
Customer:	**Digital Path**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**100331**	Date:	10/4/2017
Test Type:	**Conducted Emissions**	Time:	11:04:45
Tested By:	Benny Lovan	Sequence#:	1
Software:	EMITest 5.03.11		120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 5			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 5			

Test Conditions / Notes:

Equipment is an outdoor access point

Modulation used: OFDM (802.11ac)
Unit is Beaconing
Antenna: 50 degree Hex Array Horn (6 horns)
Note: The power supply for the radio is POE and has an external unit that provides it. For testing of conducted emissions, we will perform the scans on this antenna as the worst case. The radio is identical to all other configurations using different antennas. This antenna has the ability to transmit on multiple antennas simultaneously and it was chosen to represent the conducted emissions.

Operational Frequency: Radio 1 is at 5745MHz, Radio 2: 5540MHz and Radio 3: 5240MHz
Power Output Setting: all radios set to 17dBm

Frequency Range Investigated: 150kHz - 30MHz
Highest Generated Frequency not related to radio: 1.4GHz

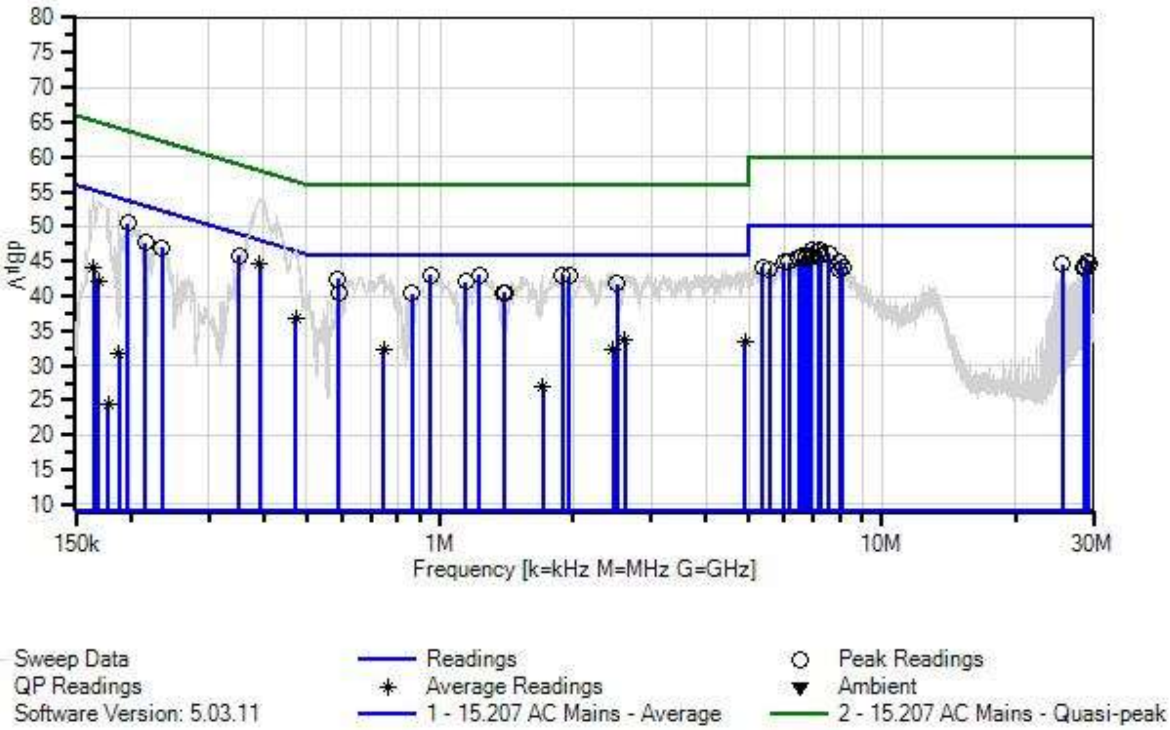
Temperature: 18ºC
Rel. Humidity: 27%

Test method: ANSI C63.10 (2013)

The EUT is usually setup on a roof or tower. For testing, it has been placed on a non-conductive tabletop. The EUT has 6 Horn Antennas in a hexagon shape. It is exercising all three radios within the system. All radios are identical but we are testing multiple frequencies at once. The customer's power to the EUT is POE. It has an AC to DC adapter which supplies the POE to the EUT. The power supply cable is shorter than 80cm so it is placed at a position above the ground plane that extends the power supply cable fully. The EUT is setup with unshielded Ethernet cables.

Modification #1 was in place during testing.

Digital Path WO#: 100331 Sequence#: 1 Date: 10/4/2017
15.207 AC Mains - Average Test Lead: 120V 60Hz Line



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05624	Attenuator	PE7010-10	1/15/2017	1/15/2019
T2	AN00374	50uH LISN-Line (L1) (dB)	8028-TS-50-BNC	1/9/2017	1/9/2018
	AN00374	50uH LISN-Return (L2)	8028-TS-50-BNC	1/9/2017	1/9/2018
T3	AN02609	High Pass Filter	HE9615-150K-50-720B	2/18/2016	2/18/2018
T4	ANP06231	Cable	CXTA04A-70	3/3/2016	3/3/2018
T5	ANP06232	Cable	CXTA04A-35	3/3/2016	3/3/2018
T6	ANP06847	Cable	LMR195-FR-6	7/31/2017	7/31/2019
	AN03634	Spectrum Analyzer	E4445A	8/30/2017	8/30/2018

Measurement Data: Reading listed by margin. Test Lead: Line

#	Freq MHz	Rdng dBμV	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	1.226M	32.5	+10.0 +0.1	+0.1 +0.0	+0.2	+0.1	+0.0	43.0	46.0	-3.0	Line
2	953.754k	32.5	+10.0 +0.1	+0.1 +0.0	+0.2	+0.1	+0.0	43.0	46.0	-3.0	Line
3	1.889M	32.5	+10.0 +0.1	+0.1 +0.0	+0.2	+0.1	+0.0	43.0	46.0	-3.0	Line
4	1.962M	32.3	+10.0 +0.1	+0.1 +0.0	+0.2	+0.2	+0.0	42.9	46.0	-3.1	Line
5	351.436k	35.6	+10.0 +0.0	+0.1 +0.0	+0.1	+0.0	+0.0	45.8	48.9	-3.1	Line
6	391.432k Ave	34.3	+10.0 +0.0	+0.1 +0.0	+0.2	+0.0	+0.0	44.6	48.0	-3.4	Line
^	391.432k	43.9	+10.0 +0.0	+0.1 +0.0	+0.2	+0.0	+0.0	54.2	48.0	+6.2	Line
8	196.541k	40.1	+10.0 +0.0	+0.1 +0.0	+0.2	+0.0	+0.0	50.4	53.8	-3.4	Line
9	7.238M	35.7	+10.0 +0.1	+0.1 +0.1	+0.2	+0.3	+0.0	46.5	50.0	-3.5	Line
10	6.932M	35.7	+10.0 +0.1	+0.1 +0.1	+0.2	+0.3	+0.0	46.5	50.0	-3.5	Line
11	587.778k	32.0	+10.0 +0.0	+0.1 +0.0	+0.3	+0.1	+0.0	42.5	46.0	-3.5	Line
12	7.157M	35.4	+10.0 +0.1	+0.1 +0.1	+0.2	+0.3	+0.0	46.2	50.0	-3.8	Line
13	7.571M	35.2	+10.0 +0.2	+0.1 +0.1	+0.2	+0.3	+0.0	46.1	50.0	-3.9	Line
14	1.145M	31.6	+10.0 +0.0	+0.1 +0.0	+0.2	+0.1	+0.0	42.0	46.0	-4.0	Line
15	6.607M	35.1	+10.0 +0.1	+0.1 +0.1	+0.2	+0.3	+0.0	45.9	50.0	-4.1	Line
16	6.905M	35.1	+10.0 +0.1	+0.1 +0.1	+0.2	+0.3	+0.0	45.9	50.0	-4.1	Line

17	7.256M	35.1	+10.0 +0.1	+0.1 +0.1	+0.2	+0.3	+0.0	45.9	50.0	-4.1	Line
18	2.519M	31.2	+10.0 +0.1	+0.1 +0.1	+0.1	+0.2	+0.0	41.8	46.0	-4.2	Line
19	6.697M	35.0	+10.0 +0.1	+0.1 +0.1	+0.2	+0.3	+0.0	45.8	50.0	-4.2	Line
20	6.752M	34.7	+10.0 +0.1	+0.1 +0.1	+0.2	+0.3	+0.0	45.5	50.0	-4.5	Line
21	6.472M	34.6	+10.0 +0.1	+0.1 +0.1	+0.2	+0.3	+0.0	45.4	50.0	-4.6	Line
22	6.851M	34.6	+10.0 +0.1	+0.1 +0.1	+0.2	+0.3	+0.0	45.4	50.0	-4.6	Line
23	29.054M	32.8	+10.0 +0.4	+0.5 +0.2	+0.3	+0.8	+0.0	45.0	50.0	-5.0	Line
24	8.013M	34.2	+10.0 +0.1	+0.1 +0.1	+0.1	+0.3	+0.0	44.9	50.0	-5.1	Line
25	6.148M	34.2	+10.0 +0.1	+0.1 +0.1	+0.1	+0.3	+0.0	44.9	50.0	-5.1	Line
26	5.995M	34.1	+10.0 +0.1	+0.1 +0.1	+0.1	+0.3	+0.0	44.8	50.0	-5.2	Line
27	216.175k	37.4	+10.0 +0.0	+0.1 +0.0	+0.2	+0.0	+0.0	47.7	53.0	-5.3	Line
28	235.083k	36.7	+10.0 +0.0	+0.1 +0.0	+0.2	+0.0	+0.0	47.0	52.3	-5.3	Line
29	25.546M	32.6	+10.0 +0.4	+0.4 +0.2	+0.3	+0.7	+0.0	44.6	50.0	-5.4	Line
30	29.308M	32.4	+10.0 +0.4	+0.5 +0.2	+0.3	+0.8	+0.0	44.6	50.0	-5.4	Line
31	1.396M	30.0	+10.0 +0.1	+0.1 +0.0	+0.2	+0.1	+0.0	40.5	46.0	-5.5	Line
32	865.570k	30.0	+10.0 +0.0	+0.1 +0.0	+0.2	+0.1	+0.0	40.4	46.0	-5.6	Line
33	1.405M	29.9	+10.0 +0.1	+0.1 +0.0	+0.2	+0.1	+0.0	40.4	46.0	-5.6	Line
34	589.959k	29.8	+10.0 +0.0	+0.1 +0.0	+0.3	+0.1	+0.0	40.3	46.0	-5.7	Line
35	5.373M	33.5	+10.0 +0.1	+0.1 +0.1	+0.1	+0.3	+0.0	44.2	50.0	-5.8	Line
36	8.157M	33.4	+10.0 +0.1	+0.2 +0.1	+0.1	+0.3	+0.0	44.2	50.0	-5.8	Line
37	28.554M	32.0	+10.0 +0.4	+0.5 +0.2	+0.3	+0.7	+0.0	44.1	50.0	-5.9	Line
38	28.808M	31.8	+10.0 +0.4	+0.5 +0.2	+0.3	+0.8	+0.0	44.0	50.0	-6.0	Line
39	5.553M	33.2	+10.0 +0.1	+0.1 +0.1	+0.1	+0.3	+0.0	43.9	50.0	-6.1	Line
40	8.031M	33.1	+10.0 +0.1	+0.2 +0.1	+0.1	+0.3	+0.0	43.9	50.0	-6.1	Line
41 Ave	472.152k	26.5	+10.0 +0.0	+0.1 +0.0	+0.2	+0.1	+0.0	36.9	46.5	-9.6	Line
^	472.152k	36.7	+10.0 +0.0	+0.1 +0.0	+0.2	+0.1	+0.0	47.1	46.5	+0.6	Line

43	164.544k Ave	33.4	+10.0 +0.0	+0.1 +0.0	+0.5	+0.0	+0.0	44.0	55.2	-11.2	Line
44	2.625M Ave	23.1	+10.0 +0.1	+0.1 +0.1	+0.1	+0.2	+0.0	33.7	46.0	-12.3	Line
^	2.625M	32.9	+10.0 +0.1	+0.1 +0.1	+0.1	+0.2	+0.0	43.5	46.0	-2.5	Line
46	4.909M Ave	22.7	+10.0 +0.1	+0.1 +0.1	+0.1	+0.2	+0.0	33.3	46.0	-12.7	Line
^	4.909M	33.2	+10.0 +0.1	+0.1 +0.1	+0.1	+0.2	+0.0	43.8	46.0	-2.2	Line
48	168.907k Ave	31.6	+10.0 +0.0	+0.1 +0.0	+0.4	+0.0	+0.0	42.1	55.0	-12.9	Line
^	164.544k	44.8	+10.0 +0.0	+0.1 +0.0	+0.5	+0.0	+0.0	55.4	55.2	+0.2	Line
^	168.907k	44.1	+10.0 +0.0	+0.1 +0.0	+0.4	+0.0	+0.0	54.6	55.0	-0.4	Line
51	2.459M Ave	21.7	+10.0 +0.1	+0.1 +0.1	+0.1	+0.2	+0.0	32.3	46.0	-13.7	Line
^	2.459M	33.1	+10.0 +0.1	+0.1 +0.1	+0.1	+0.2	+0.0	43.7	46.0	-2.3	Line
53	747.036k Ave	21.8	+10.0 +0.0	+0.1 +0.0	+0.2	+0.1	+0.0	32.2	46.0	-13.8	Line
^	747.036k	32.3	+10.0 +0.0	+0.1 +0.0	+0.2	+0.1	+0.0	42.7	46.0	-3.3	Line
55	1.711M Ave	16.4	+10.0 +0.1	+0.1 +0.0	+0.2	+0.2	+0.0	27.0	46.0	-19.0	Line
^	1.711M	31.8	+10.0 +0.1	+0.1 +0.0	+0.2	+0.2	+0.0	42.4	46.0	-3.6	Line
57	187.815k Ave	21.2	+10.0 +0.0	+0.1 +0.0	+0.3	+0.0	+0.0	31.6	54.1	-22.5	Line
^	187.815k	40.1	+10.0 +0.0	+0.1 +0.0	+0.3	+0.0	+0.0	50.5	54.1	-3.6	Line
59	177.634k Ave	14.1	+10.0 +0.0	+0.1 +0.0	+0.3	+0.0	+0.0	24.5	54.6	-30.1	Line
^	177.634k	43.3	+10.0 +0.0	+0.1 +0.0	+0.3	+0.0	+0.0	53.7	54.6	-0.9	Line

Test Location:	CKC Laboratories Inc. • 1120 Fulton Place • Fremont, CA 94539 • 510-249-1170		
Customer:	**Digital Path**		
Specification:	**15.207 AC Mains - Average**		
Work Order #:	**100331**	Date:	10/4/2017
Test Type:	**Conducted Emissions**	Time:	11:11:41
Tested By:	Benny Lovan	Sequence#:	2
Software:	EMITest 5.03.11		120V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 5			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 5			

Test Conditions / Notes:

Equipment is an outdoor access point

Modulation used: OFDM (802.11ac)
Unit is Beaconing
Antenna: 50 degree Hex Array Horn (6 horns)
Note: The power supply for the radio is POE and has an external unit that provides it. For testing of conducted emissions, we will perform the scans on this antenna as the worst case. The radio is identical to all other configurations using different antennas. This antenna has the ability to transmit on multiple antennas simultaneously and it was chosen to represent the conducted emissions.

Operational Frequency: Radio 1 is at 5745MHz, Radio 2: 5540MHz and Radio 3: 5240MHz
Power Output Setting: all radios set to 17dBm

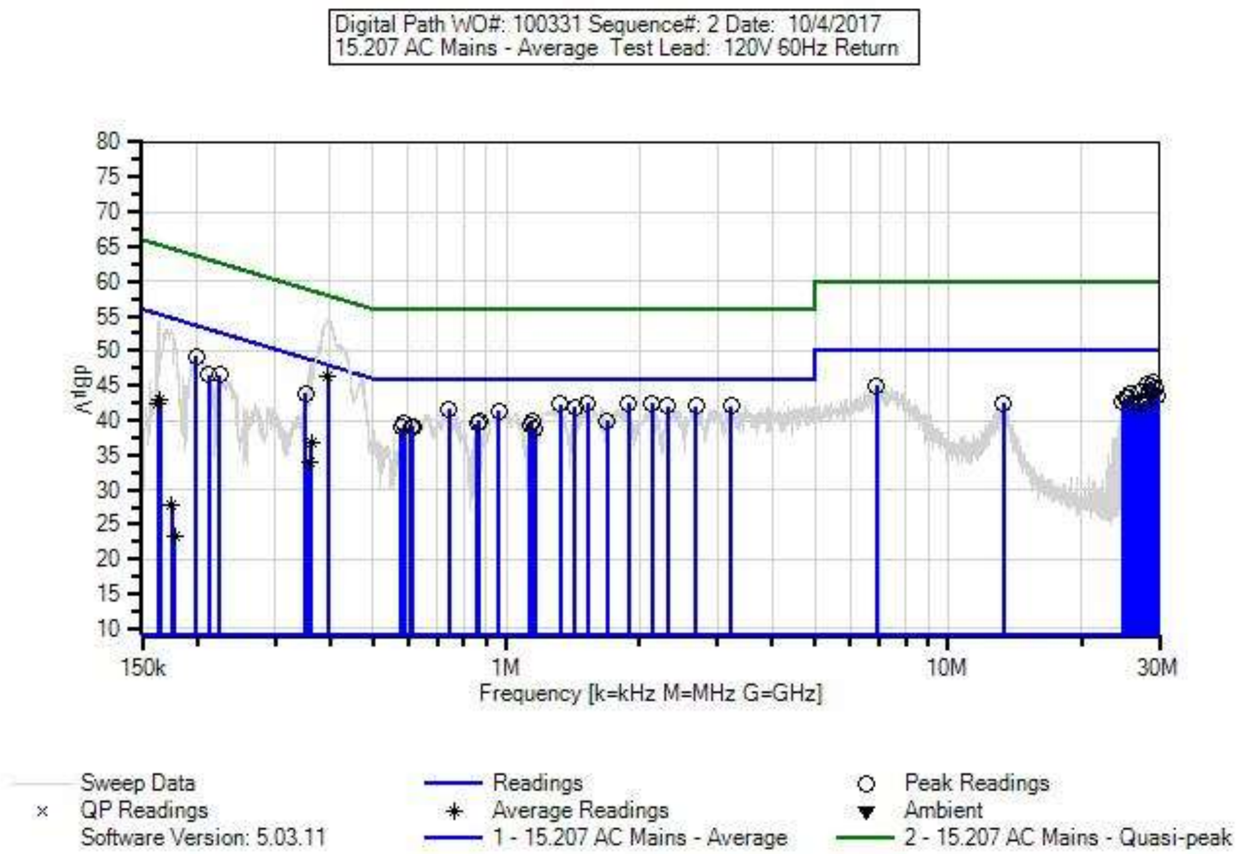
Frequency Range Investigated: 150kHz - 30MHz
Highest Generated Frequency not related to radio: 1.4GHz

Temperature: 18ºC
Rel. Humidity: 27%

Test method: ANSI C63.10 (2013)

The EUT is usually setup on a roof or tower. For testing, it has been placed on a non-conductive tabletop. The EUT has 6 Horn Antennas in a hexagon shape. It is exercising all three radios within the system. All radios are identical but we are testing multiple frequencies at once. The customer's power to the EUT is POE. It has an AC to DC adapter which supplies the POE to the EUT. The power supply cable is shorter than 80cm so it is placed at a position above the ground plane that extends the power supply cable fully. The EUT is setup with unshielded Ethernet cables.

Modification #1 was in place during testing.



Digital Path WO#: 100331 Sequence#: 2 Date: 10/4/2017
15.207 AC Mains - Average Test Lead: 120V 60Hz Return
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
dBµV
150k
1M
10M
30M
Frequency [k=kHz M=MHz G=GHz]
Sweep Data
QP Readings
Software Version: 5.03.11
Readings
Average Readings
1 - 15.207 AC Mains - Average
Peak Readings
Ambient
2 - 15.207 AC Mains - Quasi-peak

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05624	Attenuator	PE7010-10	1/15/2017	1/15/2019
	AN00374	50uH LISN-Line (L1) (dB)	8028-TS-50-BNC	1/9/2017	1/9/2018
T2	AN00374	50uH LISN-Return (L2)	8028-TS-50-BNC	1/9/2017	1/9/2018
T3	AN02609	High Pass Filter	HE9615-150K-50-720B	2/18/2016	2/18/2018
T4	ANP06231	Cable	CXTA04A-70	3/3/2016	3/3/2018
T5	ANP06232	Cable	CXTA04A-35	3/3/2016	3/3/2018
T6	ANP06847	Cable	LMR195-FR-6	7/31/2017	7/31/2019
	AN03634	Spectrum Analyzer	E4445A	8/30/2017	8/30/2018

Measurement Data: Reading listed by margin. Test Lead: Return

#	Freq MHz	Rdng dBµV	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1 Ave	395.067k	36.0	+10.0 +0.0	+0.1 +0.0	+0.2	+0.0	+0.0	46.3	48.0	-1.7	Retur
^	395.067k	44.1	+10.0 +0.0	+0.1 +0.0	+0.2	+0.0	+0.0	54.4	48.0	+6.4	Retur
3	1.894M	32.0	+10.0 +0.1	+0.1 +0.0	+0.2	+0.1	+0.0	42.5	46.0	-3.5	Retur
4	2.136M	31.7	+10.0 +0.1	+0.1 +0.1	+0.2	+0.2	+0.0	42.4	46.0	-3.6	Retur
5	1.528M	31.9	+10.0 +0.1	+0.1 +0.0	+0.2	+0.1	+0.0	42.4	46.0	-3.6	Retur
6	1.324M	31.9	+10.0 +0.0	+0.1 +0.0	+0.2	+0.1	+0.0	42.3	46.0	-3.7	Retur
7	3.225M	31.4	+10.0 +0.1	+0.1 +0.1	+0.1	+0.3	+0.0	42.1	46.0	-3.9	Retur
8	2.315M	31.3	+10.0 +0.1	+0.1 +0.1	+0.2	+0.2	+0.0	42.0	46.0	-4.0	Retur
9	2.685M	31.4	+10.0 +0.1	+0.1 +0.1	+0.1	+0.2	+0.0	42.0	46.0	-4.0	Retur
10	1.430M	31.4	+10.0 +0.1	+0.1 +0.0	+0.2	+0.1	+0.0	41.9	46.0	-4.1	Retur
11	740.490k	31.2	+10.0 +0.0	+0.1 +0.0	+0.2	+0.1	+0.0	41.6	46.0	-4.4	Retur
12	198.721k	38.9	+10.0 +0.0	+0.1 +0.0	+0.2	+0.0	+0.0	49.2	53.7	-4.5	Retur
13	962.259k	30.9	+10.0 +0.1	+0.1 +0.0	+0.2	+0.1	+0.0	41.4	46.0	-4.6	Retur
14	29.061M	33.1	+10.0 +0.4	+0.6 +0.2	+0.3	+0.8	+0.0	45.4	50.0	-4.6	Retur
15	28.308M	33.0	+10.0 +0.4	+0.5 +0.2	+0.3	+0.7	+0.0	45.1	50.0	-4.9	Retur
16	6.887M	34.1	+10.0 +0.1	+0.2 +0.1	+0.2	+0.3	+0.0	45.0	50.0	-5.0	Retur

17	351.435k	33.6	+10.0 +0.0	+0.1 +0.0	+0.1	+0.0	+0.0	43.8	48.9	-5.1	Retur
18	28.808M	32.7	+10.0 +0.4	+0.5 +0.2	+0.3	+0.8	+0.0	44.9	50.0	-5.1	Retur
19	29.308M	32.3	+10.0 +0.4	+0.6 +0.2	+0.3	+0.8	+0.0	44.6	50.0	-5.4	Retur
20	1.141M	29.6	+10.0 +0.0	+0.1 +0.0	+0.2	+0.1	+0.0	40.0	46.0	-6.0	Retur
21	27.054M	31.9	+10.0 +0.4	+0.5 +0.2	+0.3	+0.7	+0.0	44.0	50.0	-6.0	Retur
22	28.554M	31.9	+10.0 +0.4	+0.5 +0.2	+0.3	+0.7	+0.0	44.0	50.0	-6.0	Retur
23	870.660k	29.5	+10.0 +0.0	+0.1 +0.0	+0.2	+0.1	+0.0	39.9	46.0	-6.1	Retur
24	1.694M	29.3	+10.0 +0.1	+0.1 +0.0	+0.2	+0.2	+0.0	39.9	46.0	-6.1	Retur
25	224.174k	36.2	+10.0 +0.0	+0.1 +0.0	+0.2	+0.0	+0.0	46.5	52.7	-6.2	Retur
26	25.800M	31.6	+10.0 +0.4	+0.5 +0.2	+0.3	+0.7	+0.0	43.7	50.0	-6.3	Retur
27	29.808M	31.3	+10.0 +0.4	+0.6 +0.2	+0.3	+0.8	+0.0	43.6	50.0	-6.4	Retur
28	588.504k	29.0	+10.0 +0.0	+0.1 +0.0	+0.3	+0.1	+0.0	39.5	46.0	-6.5	Retur
29	861.206k	29.0	+10.0 +0.0	+0.1 +0.0	+0.3	+0.1	+0.0	39.5	46.0	-6.5	Retur
30	212.538k	36.2	+10.0 +0.0	+0.1 +0.0	+0.2	+0.0	+0.0	46.5	53.1	-6.6	Retur
31	1.132M	28.9	+10.0 +0.0	+0.1 +0.0	+0.2	+0.1	+0.0	39.3	46.0	-6.7	Retur
32	25.553M	31.2	+10.0 +0.4	+0.5 +0.2	+0.3	+0.7	+0.0	43.3	50.0	-6.7	Retur
33	609.593k	28.6	+10.0 +0.0	+0.1 +0.0	+0.3	+0.1	+0.0	39.1	46.0	-6.9	Retur
34	614.683k	28.6	+10.0 +0.0	+0.1 +0.0	+0.3	+0.1	+0.0	39.1	46.0	-6.9	Retur
35	25.299M	31.1	+10.0 +0.3	+0.5 +0.2	+0.3	+0.7	+0.0	43.1	50.0	-6.9	Retur
36	578.323k	28.4	+10.0 +0.0	+0.1 +0.0	+0.3	+0.1	+0.0	38.9	46.0	-7.1	Retur
37	1.162M	28.3	+10.0 +0.1	+0.1 +0.0	+0.2	+0.1	+0.0	38.8	46.0	-7.2	Retur
38	27.807M	30.7	+10.0 +0.4	+0.5 +0.2	+0.3	+0.7	+0.0	42.8	50.0	-7.2	Retur
39	24.799M	30.8	+10.0 +0.3	+0.4 +0.2	+0.3	+0.7	+0.0	42.7	50.0	-7.3	Retur
40	28.054M	30.6	+10.0 +0.4	+0.5 +0.2	+0.3	+0.7	+0.0	42.7	50.0	-7.3	Retur
41	13.355M	31.2	+10.0 +0.2	+0.2 +0.2	+0.2	+0.5	+0.0	42.5	50.0	-7.5	Retur
42	26.553M	30.4	+10.0 +0.4	+0.5 +0.2	+0.3	+0.7	+0.0	42.5	50.0	-7.5	Retur

43	27.300M	30.4	+10.0 +0.4	+0.5 +0.2	+0.3	+0.7	+0.0	42.5	50.0	-7.5	Retur
44	361.616k Ave	26.6	+10.0 +0.0	+0.1 +0.0	+0.2	+0.0	+0.0	36.9	48.7	-11.8	Retur
45	164.543k Ave	32.3	+10.0 +0.0	+0.1 +0.0	+0.5	+0.0	+0.0	42.9	55.2	-12.3	Retur
46	163.089k Ave	31.7	+10.0 +0.0	+0.1 +0.0	+0.5	+0.0	+0.0	42.3	55.3	-13.0	Retur
^	163.089k	43.6	+10.0 +0.0	+0.1 +0.0	+0.5	+0.0	+0.0	54.2	55.3	-1.1	Retur
^	164.543k	43.2	+10.0 +0.0	+0.1 +0.0	+0.5	+0.0	+0.0	53.8	55.2	-1.4	Retur
^	160.907k	39.2	+10.0 +0.0	+0.1 +0.0	+0.6	+0.0	+0.0	49.9	55.4	-5.5	Retur
50	358.707k Ave	23.7	+10.0 +0.0	+0.1 +0.0	+0.2	+0.0	+0.0	34.0	48.8	-14.8	Retur
^	358.707k	39.7	+10.0 +0.0	+0.1 +0.0	+0.2	+0.0	+0.0	50.0	48.8	+1.2	Retur
^	361.616k	39.5	+10.0 +0.0	+0.1 +0.0	+0.2	+0.0	+0.0	49.8	48.7	+1.1	Retur
53	175.451k Ave	17.5	+10.0 +0.0	+0.1 +0.0	+0.3	+0.0	+0.0	27.9	54.7	-26.8	Retur
54	177.633k Ave	13.0	+10.0 +0.0	+0.1 +0.0	+0.3	+0.0	+0.0	23.4	54.6	-31.2	Retur
^	177.633k	43.5	+10.0 +0.0	+0.1 +0.0	+0.3	+0.0	+0.0	53.9	54.6	-0.7	Retur
^	175.451k	42.9	+10.0 +0.0	+0.1 +0.0	+0.3	+0.0	+0.0	53.3	54.7	-1.4	Retur
^	180.541k	39.4	+10.0 +0.0	+0.1 +0.0	+0.3	+0.0	+0.0	49.8	54.5	-4.7	Retur

Test Setup Photos

SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

Uncertainties reported are worst case for all CKC Laboratories' sites and represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBμV/m, the spectrum analyzer reading in dBμV was corrected by using the following formula. This reading was then compared to the applicable specification limit. Individual measurements were compared with the displayed limit value in the margin column. The margin was calculated based on subtracting the limit value from the corrected measurement value; a positive margin represents a measurement exceeding the limit, while a negative margin represents a measurement less than the limit.

SAMPLE CALCULATIONS		
	Meter reading	(dBμV)
+	Antenna Factor	(dB/m)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBμV/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or caret ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point, the measuring device is set into the linear mode and the scan time is reduced.