

Troll Systems

EMC TEST REPORT FOR

**6.4 GHz COFDM Video Transmitter, 8W
Model: SL-LB-TX-6465-01**

Tested to The Following Standards:

FCC Part 101

Report No.: 98965-8

Date of issue: June 9, 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.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Troll Systems
24950 Anza Dr
Valencia CA 91355

Representative: Michael King
Customer Reference Number: 23969

DATE OF EQUIPMENT RECEIPT:**DATE(S) OF TESTING:****REPORT PREPARED BY:**

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CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 98965

May 15, 2017

May 15-June 5, 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.

A handwritten signature in black ink that reads "Steve Behm".

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.
110 Olinda Place
Brea, CA 92823

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.02
EMITest Immunity	5.03.02

Site Registration & Accreditation Information

Location	CB #	TAIWAN	CANADA	FCC	JAPAN
Brea D, CA	US0060	SL2-IN-E-1146R	3082D-2	US1025	A-0147

SUMMARY OF RESULTS

Standard / Specification: FCC Part 101

Test Procedure	Description	Modifications	Results
2.1046 / 101.113	RF Power Output	NA	PASS
2.1047	Modulation Characteristics	NA	NA ¹
2.1049 / 101.109	Occupied Bandwidth	NA	PASS
2.1051 / 101.111	Spurious Emissions at Antenna Terminals	NA	PASS
2.1053 / 101.111	Field Strength of Spurious Radiation	NA	PASS
2.1055 / 101.107	Frequency Stability	NA	PASS

NA = Not Applicable

NA¹ = Test is not required under part 101.

Modifications During Testing

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

Summary of Conditions
No modifications were made during testing.

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
None

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
6.4 Ghz COFDM video transmitter, 8W	Troll Systems	SL-LB-TX-6465-01	ENG1

Support Equipment:

Device	Manufacturer	Model #	S/N
DC Power Supply	Agilent	6032A	MY41000668
Video Camera	JVC	GY-HM700CHU	155V1523
14V Power Supply	IDX Tek	IA-60a	D2-06152

Configuration 2

Equipment Tested:

Device	Manufacturer	Model #	S/N
6.4 Ghz COFDM video transmitter, 8W	Troll Systems	SL-LB-TX-6465-01	ENG1

Support Equipment:

Device	Manufacturer	Model #	S/N
DC Power Supply	Agilent	6032A	MY41000668
Video Camera	JVC	GY-HM700CHU	155V1523
14V Power Supply	IDX Tek	IA-60a	D2-06152
1k ohm resistor	AVT	AVT-100	NA
1k ohm resistor	AVT	AVT-100	NA
1k ohm resistor	AVT	AVT-100	NA
RS232 to Ethernet Converter	Lantronix	UDS200	00-02-4A-12-39-3D
Ethernet Switch	Netsys	NV-202	NA
Ethernet Switch	TP-Link	TL-SG108	215B147003233
Ethernet Switch	Linksys	SE1500	10E10J06408375
Ethernet Switch	Linksys	SD205	NA
Antenna	Troll Systems	SL-MINI-7G-CPL-03	189100002
12V Power Supply	Moso	MSP-C2000IC12.0-24M-US	5861U040112001818
12V Power Supply	Group West	12UR-12-0900	NA
12V Power Supply	Leader Electronics Inc.	MU08-6120050-A1	PWB0K1421708745
12V Power Supply	Moso	MSP-C2000IC12.0-24M-US	5861U040112001818
12V Power Supply	Group West	12UR-12-0900	NA
30dB Attenuator	Aeroflex/Weinschel	90-30-34	NA

FCC PART 101

2.1046 / 101.113 RF Power Output

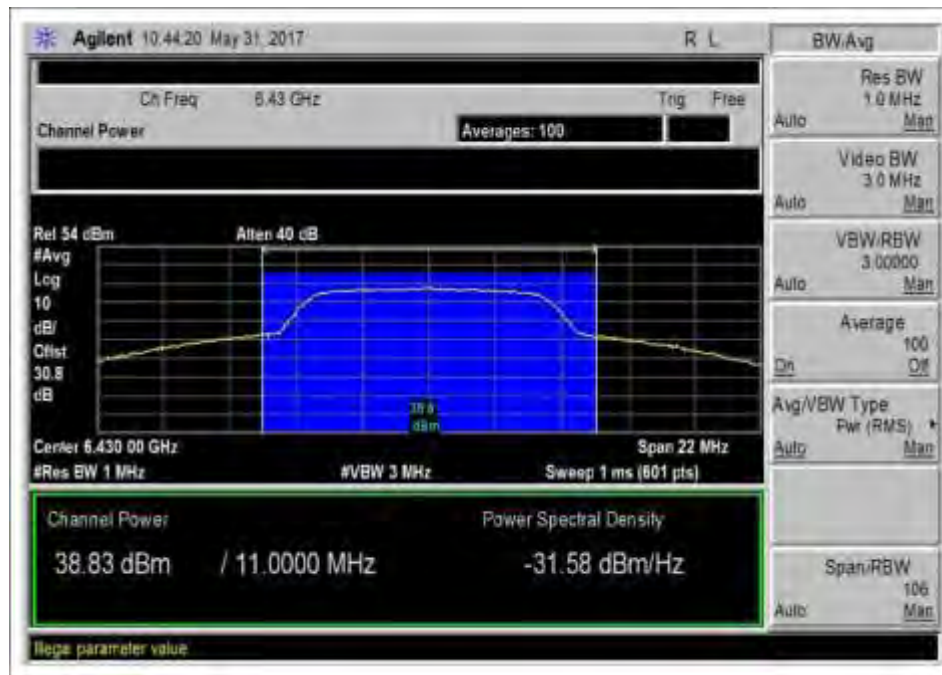
Test Setup/Conditions			
Test Location:	Brea Lab D	Test Engineer:	Don Nguyen
Test Method:	FCC 2.1046	Test Date(s):	5/31/2017
Configuration:	1		
Test Setup:	The EUT is placed on test bench and powered from 28Vdc external power supply. The input SDI is connected to a support camera. RF antenna port is connected to spectrum analyzer via 30db attenuator. The EUT is set to transmit continuously. Operating frequency: 6430-6521MHz Tested channel: 6430MHz (low CH), 6480MHz (mid CH), 6521MHz (hi CH) Max antenna gain: 12dBi Rated output power: 8W Video bitrate: 7/8 FEC, 1/32 Guard, 8MHz Bandwidth Modulation: QPSK, 16QAM, 64QAM Frequency range of measurement: 6430-6521MHz VBW=1MHz, VBW=3MHz		

Environmental Conditions			
Temperature (°C)	22	Relative Humidity (%):	52

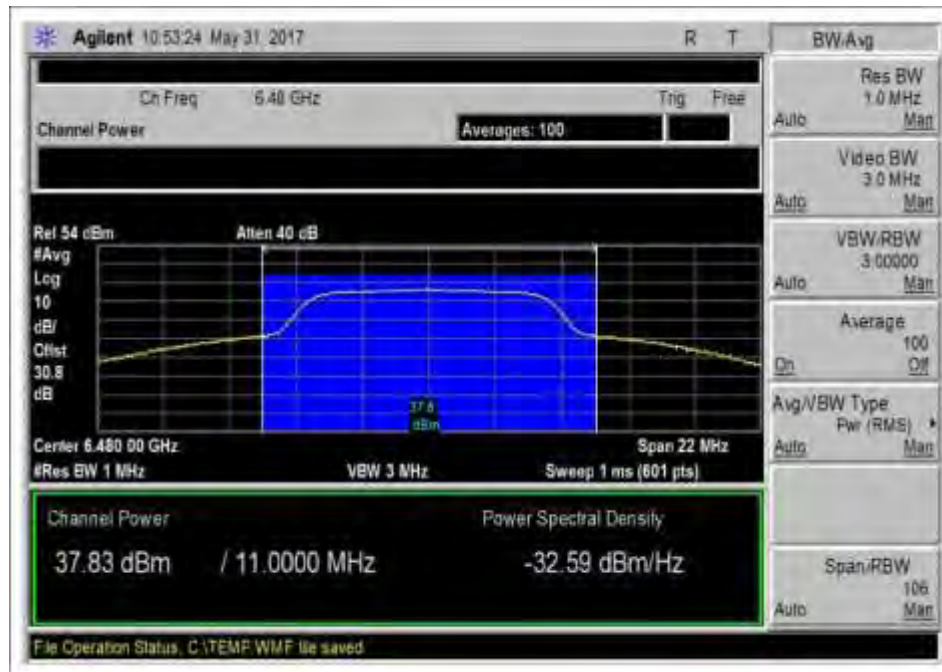
Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
P06554	Cable	Astrolab	32022-29094K-29094K-24TC	12/30/2015	12/30/2017
03432	Attenuator	Aeroflex/Weinschel	90-30-34	11/30/2015	11/30/2017
02672	Spectrum Analyzer	Belden	E4446A	3/2/2017	3/2/2019

Test Data

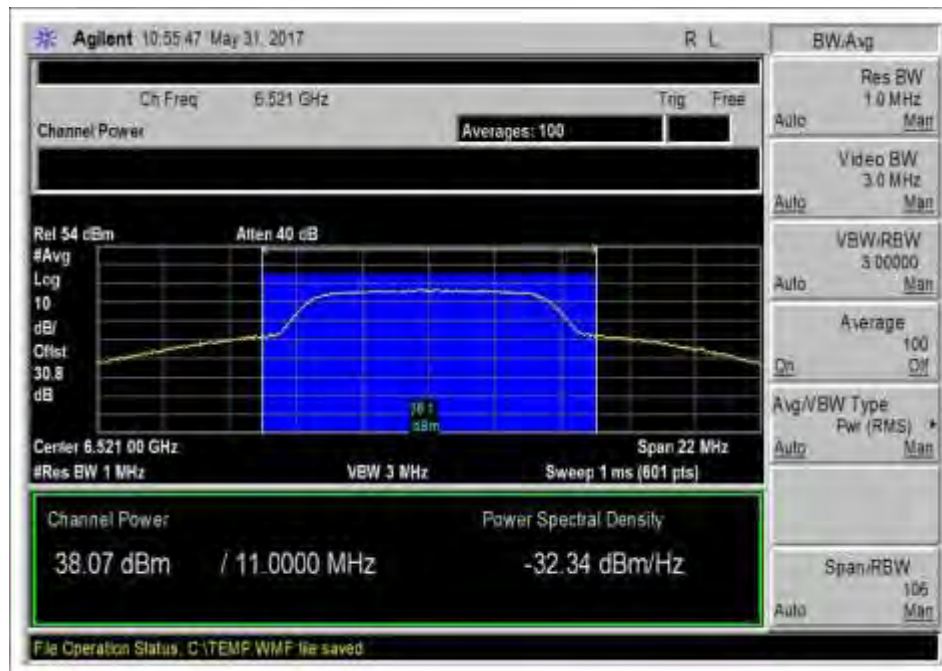
Test Results						
Modulation	RF Power + antenna gain Low CH (dBm)	RF Power + antenna gain Mid CH (dBm)	RF Power + antenna gain Hi CH (dBm)	Limit (dBm)	Limit (dBW)	Result
QPSK	50.83	49.83	50.07	65	35	Pass
16QAM	51.8	50.82	50.97	65	35	Pass
64QAM	50.18	49.28	49.56	65	35	Pass
Measurement Uncertainty	0.67dB					



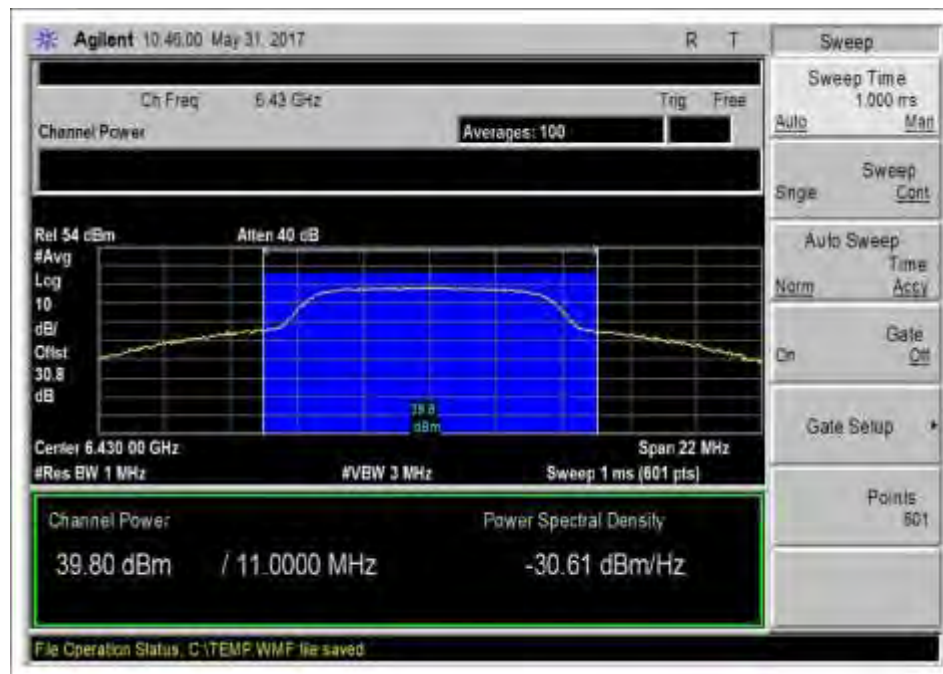
QPSK, Low Channel



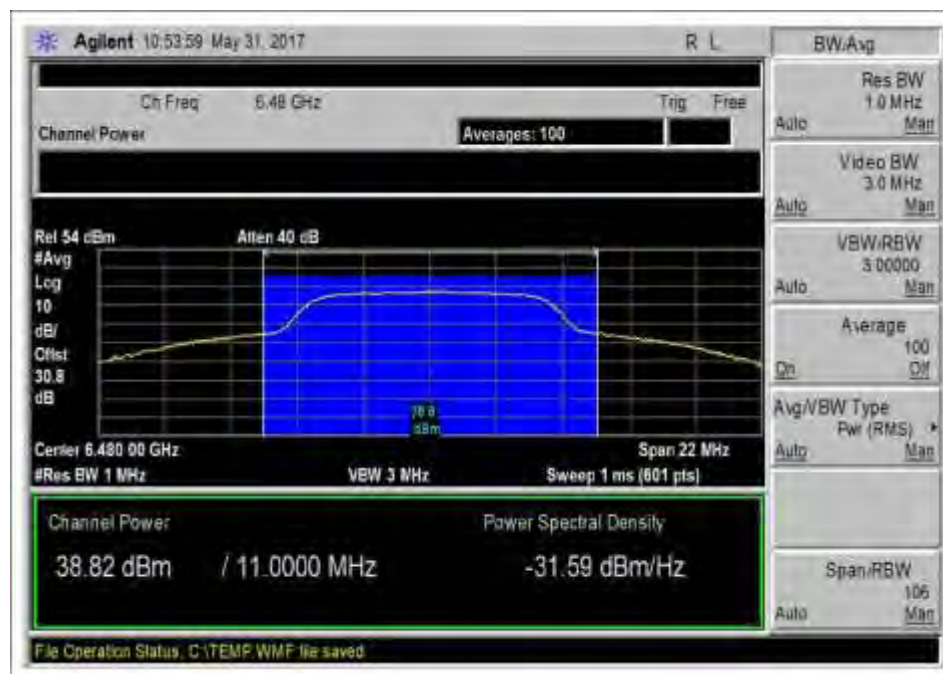
QPSK, Middle Channel



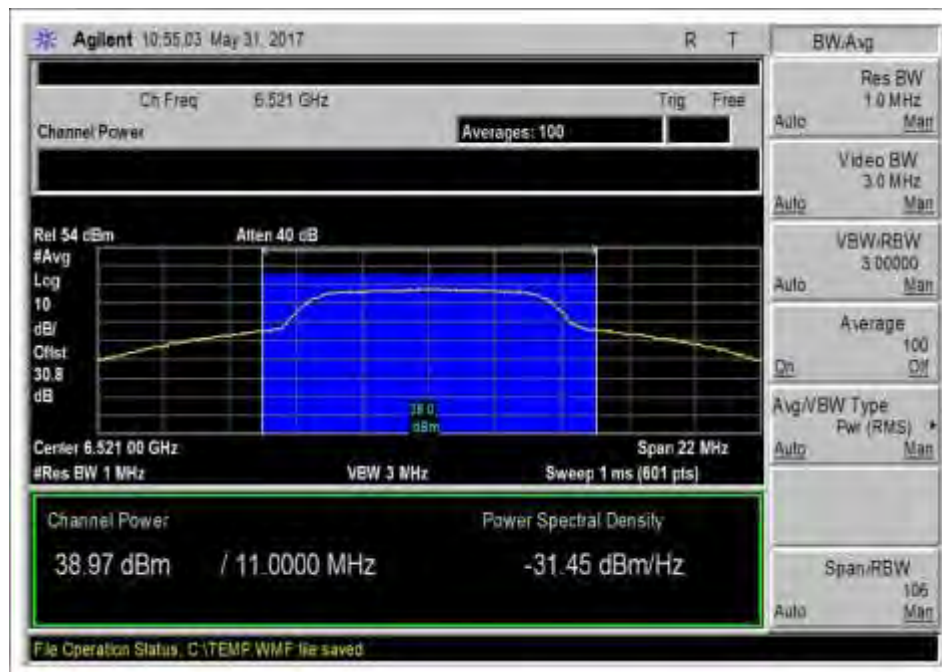
QPSK, High Channel



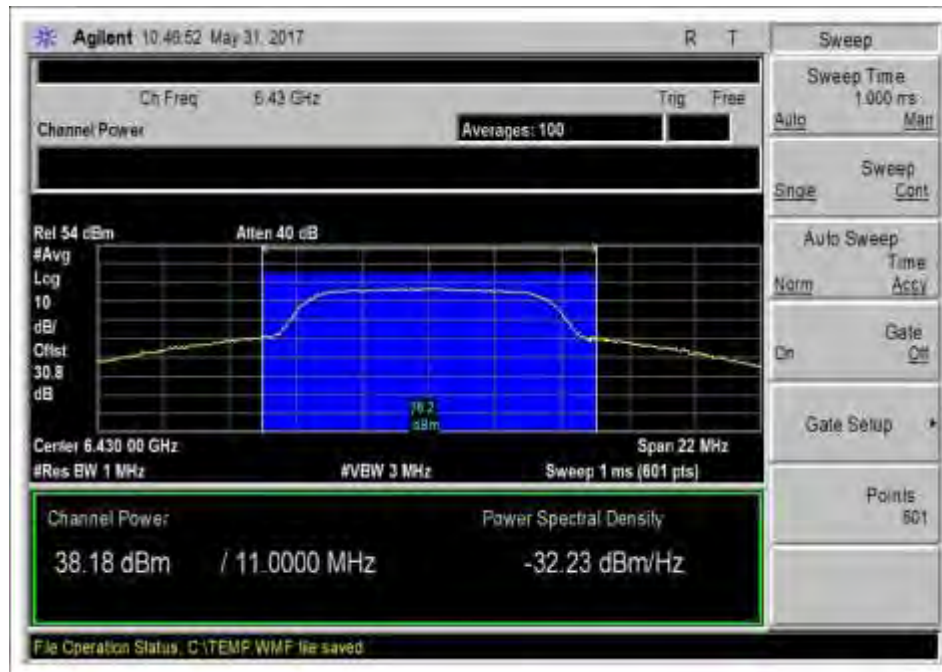
16QAM, Low Channel



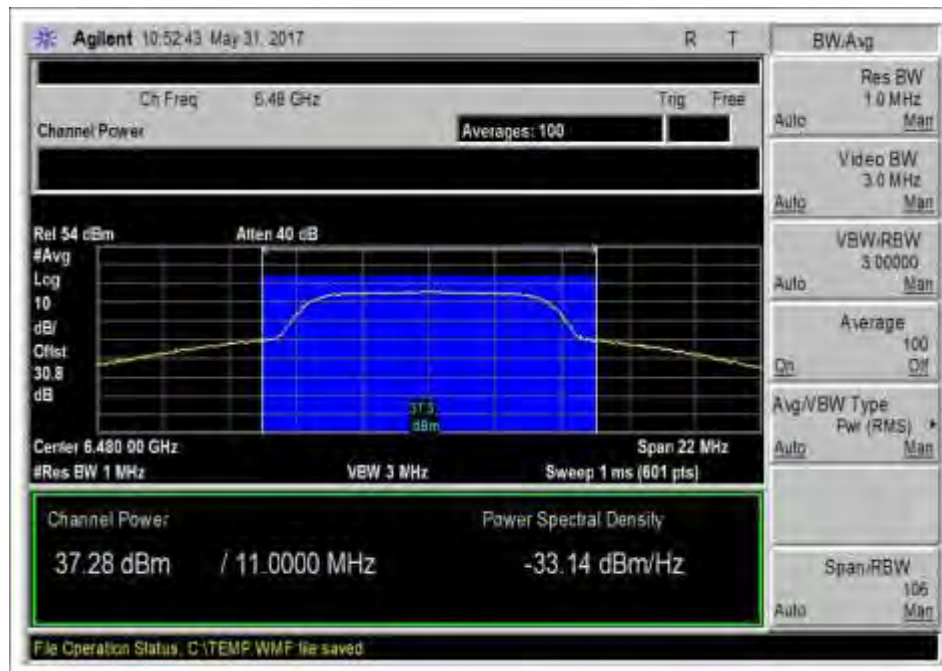
16QAM, Middle Channel



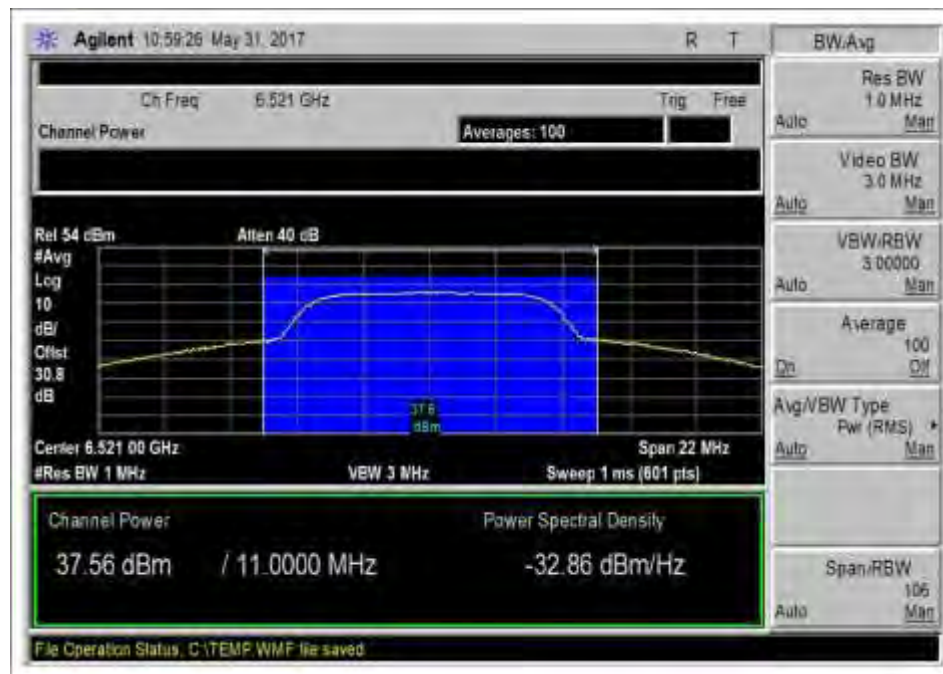
16QAM, High Channel



64QAM, Low Channel



64QAM, Middle Channel



64QAM, High Channel

Test Setup Photo(s)



2.1047 Modulation Characteristics

Not applicable because the EUT does not employ modulation characteristics.

2.1049 / 101.109 Occupied Bandwidth

Test Setup/Conditions			
Test Location:	Brea Lab D	Test Engineer:	Don Nguyen
Test Method:	FCC 2.1049	Test Date(s):	5/31/2017
Configuration:	1		
Test Setup:	The EUT is placed on test bench and powered from 28Vdc external power supply. The input SDI is connected to a support camera. RF antenna port is connected to spectrum analyzer via 30db attenuator. The EUT is set to transmit continuously. Operating frequency: 6430-6521MHz Tested channel: 6430MHz (low CH), 6480MHz (mid CH), 6521MHz (hi CH) Max antenna gain: 12dBi Rated output power: 8W Video bitrate: 7/8 FEC, 1/32 Guard, 8MHz Bandwidth Modulation: QPSK, 16QAM, 64QAM Frequency range of measurement: 6430-6521MHz VBW=82kHz, VBW=240kHz		

Environmental Conditions			
Temperature (°C)	22	Relative Humidity (%):	52

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
P06554	Cable	Astrolab	32022-29094K-29094K-24TC	12/30/2015	12/30/2017
03432	Attenuator	Aeroflex/Weinschel	90-30-34	11/30/2015	11/30/2017
02672	Spectrum Analyzer	Belden	E4446A	3/2/2017	3/2/2019

Test Data

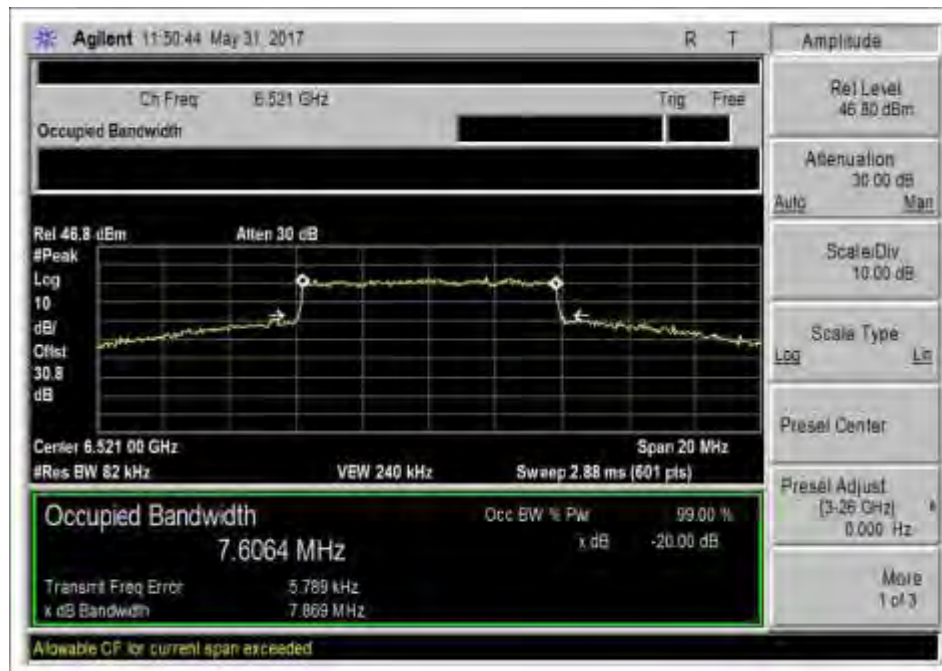
Test Results					
Modulation	Bandwidth Low CH (MHz)	Bandwidth Mid CH (MHz)	Bandwidth Hi CH (MHz)	Limit (MHz)	Result
QPSK	7.6309	7.5889	7.6064	25	Pass
16QAM	7.8190	7.8161	7.8293	25	Pass
64QAM	7.5808	7.5869	7.5791	25	Pass
Measurement Uncertainty	1%				



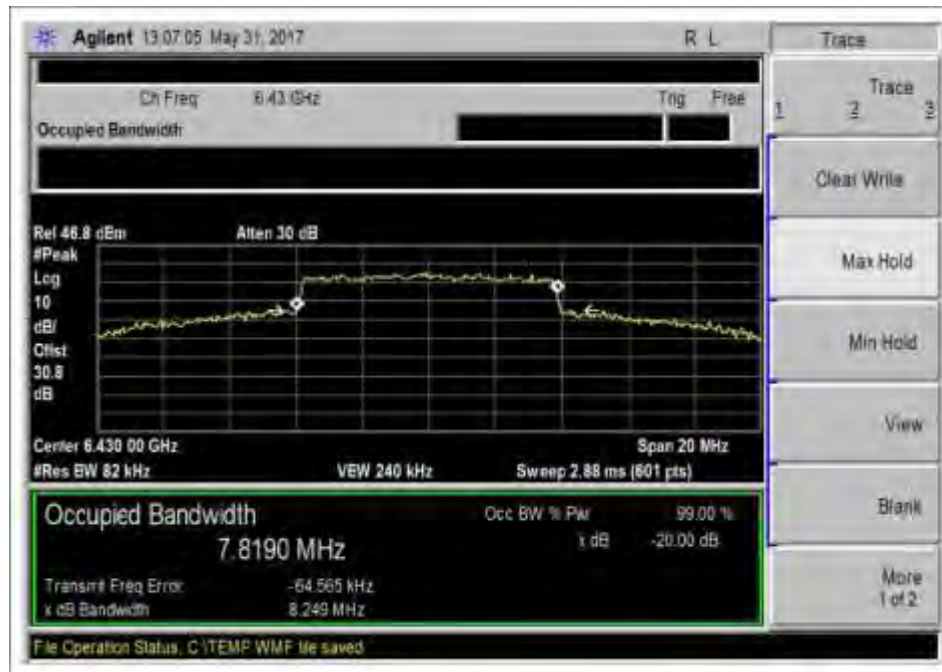
QPSK, Low Channel



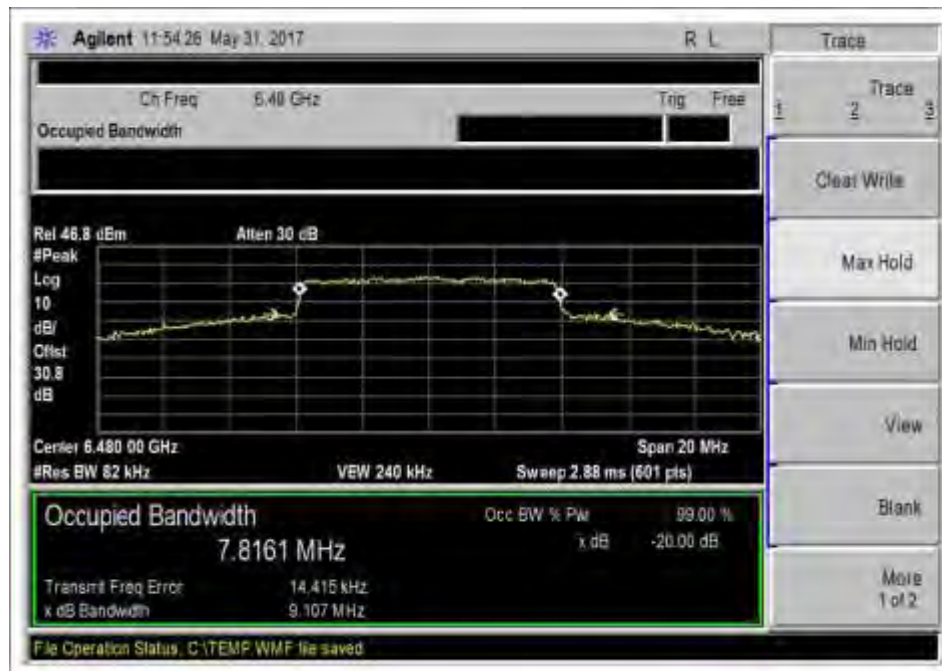
QPSK, Middle Channel



QPSK, High Channel



16QAM, Low Channel



16QAM, Middle Channel



16QAM, High Channel



64QAM, Low Channel



64QAM, Middle Channel



64QAM, High Channel

Test Setup Photo(s)



2.1051 / 101.111 Spurious Emissions at Antenna Terminals

Test Conditions / Setup

Test Setup/Conditions			
Test Location:	Brea Lab A	Test Engineer:	Don Nguyen
Test Method:	FCC 2.1051	Test Date(s):	5/31/2017
Configuration:	1		
Test Setup:	The EUT is placed on test bench and powered from 28Vdc external power supply. The input SDI is connected to a support camera. RF antenna port is connected to spectrum analyzer via 30db attenuator. The EUT is set to transmit continuously. Operating frequency: 6430-6521MHz Tested channel: 6430MHz (low CH), 6480MHz (mid CH), 6521MHz (hi CH) Max antenna gain: 12dBi Rated output power: 8W Video bitrate: 7/8 FEC, 1/32 Guard, 8MHz Bandwidth Modulation: QPSK, 16QAM, 64QAM Frequency range of measurement = 9kHz-40GHz RBW=3.9kHz, VBW=1.2MHz (within +/-250% of authorized bandwidth) RBW=1MHz, VBW=3MHz (outside of +/-250% of authorized bandwidth)		

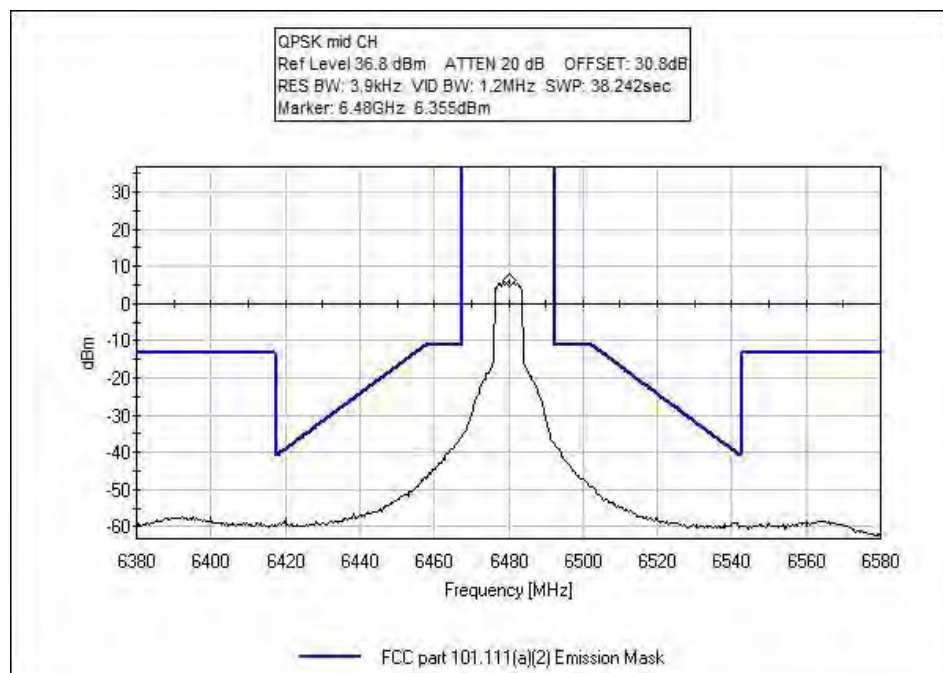
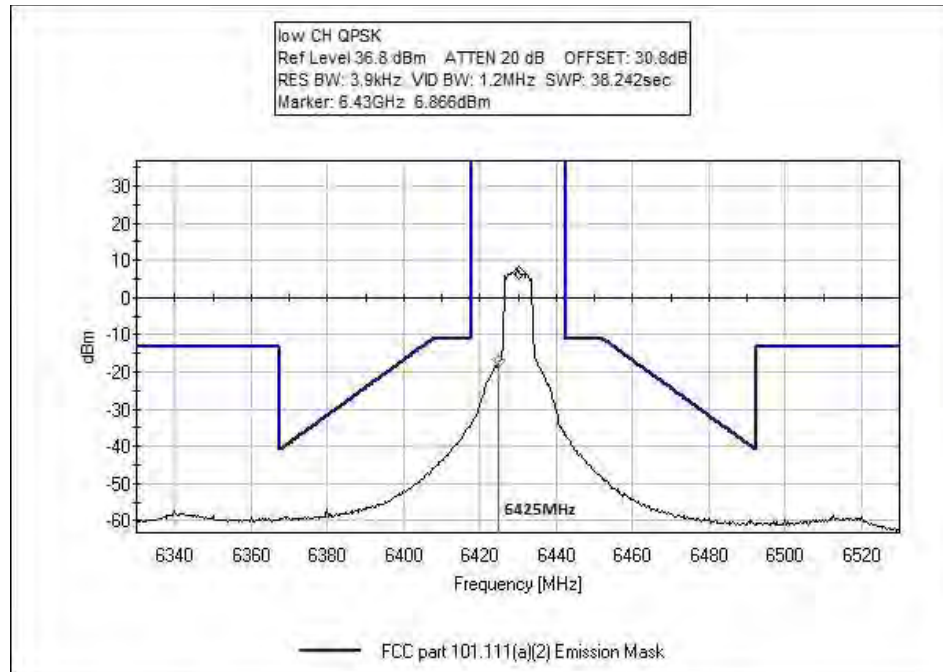
Environmental Conditions

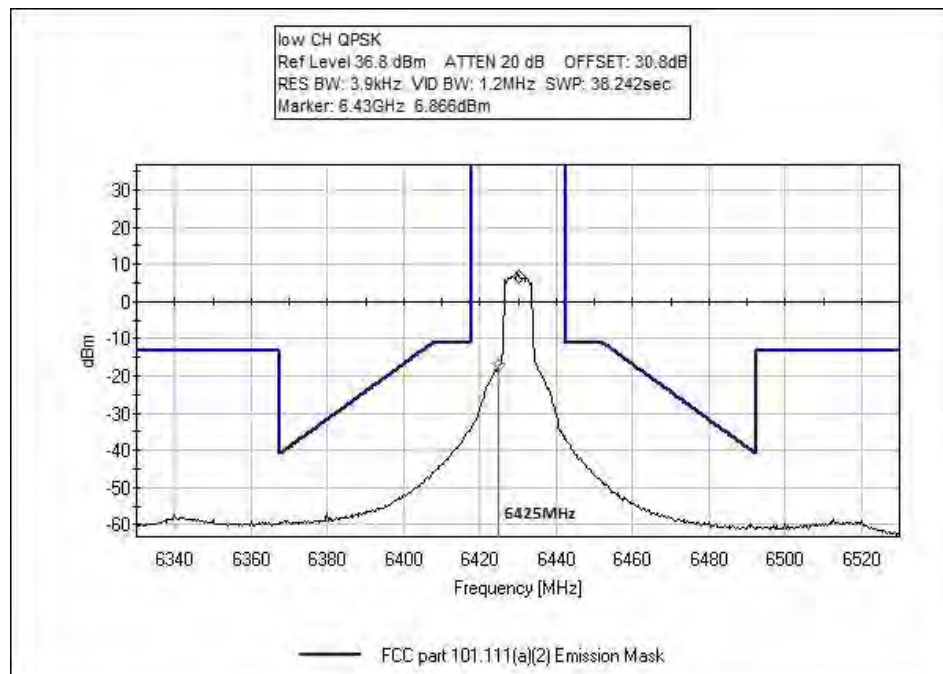
Temperature (°C)	22	Relative Humidity (%):	52
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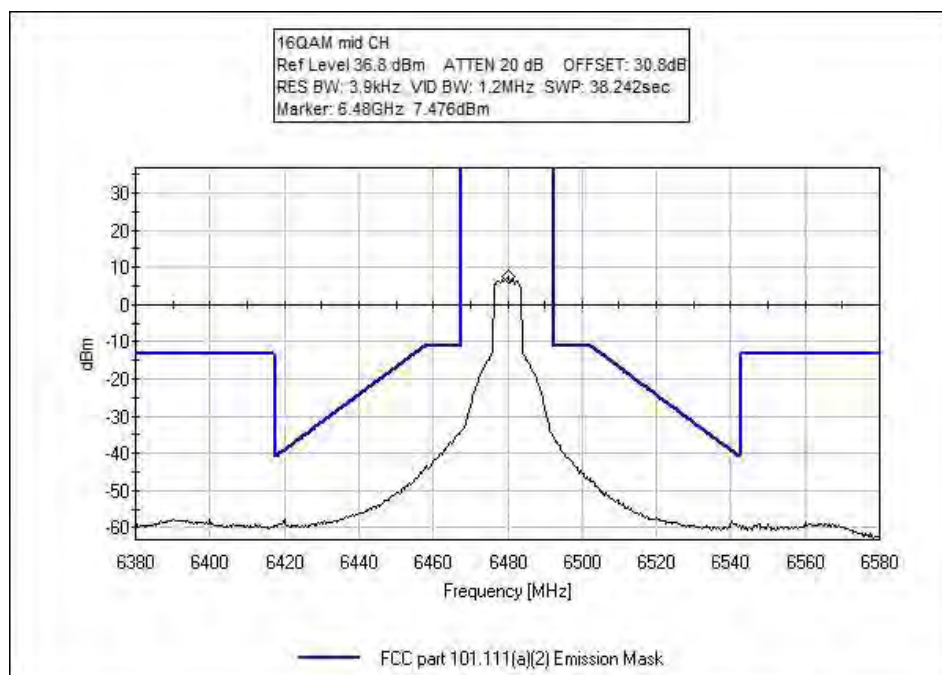
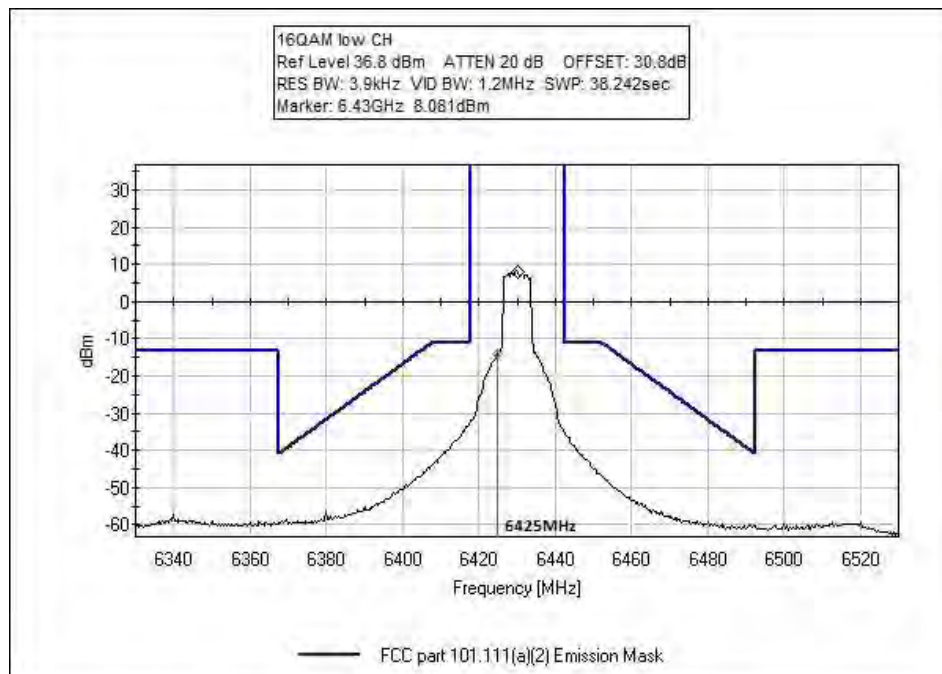
Test Equipment

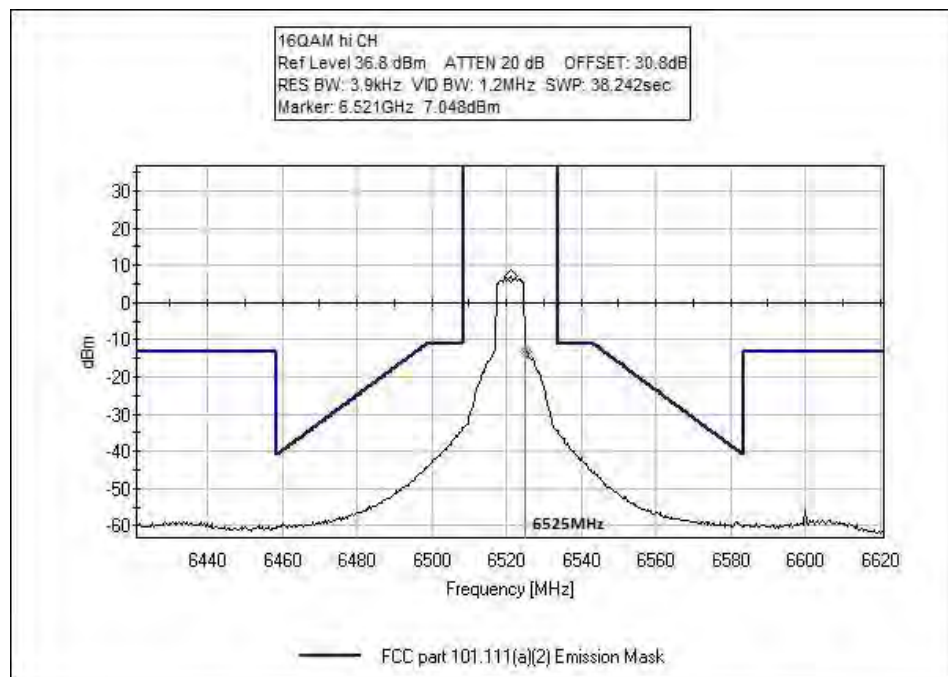
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
P06554	Cable	Astrolab	32022-29094K-29094K-24TC	12/30/2015	12/30/2017
03432	Attenuator	Aeroflex/Weinschel	90-30-34	11/30/2015	11/30/2017
02672	Spectrum Analyzer	Belden	E4446A	3/2/2017	3/2/2019

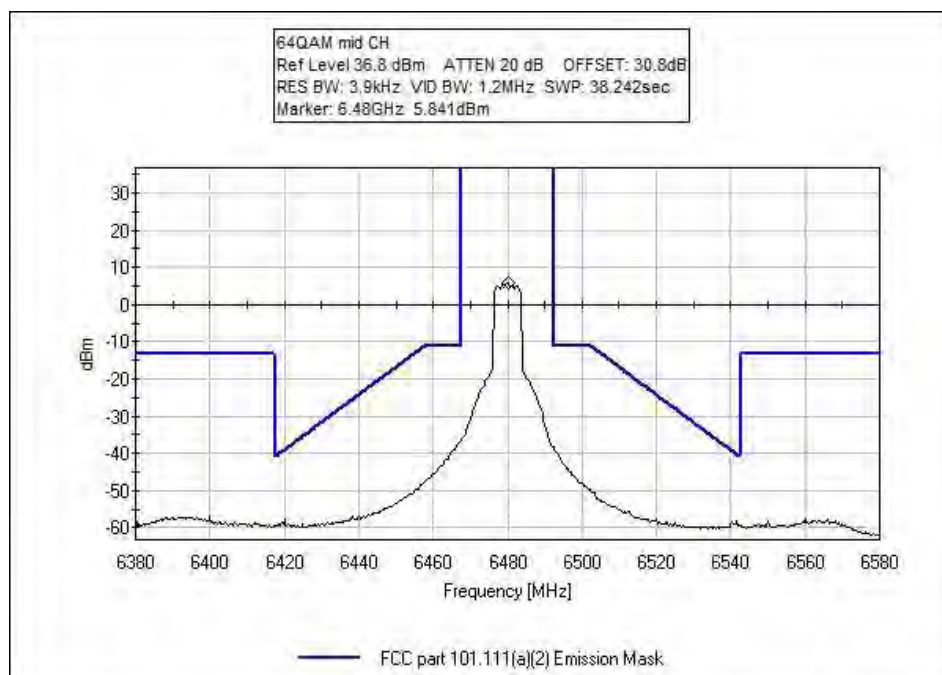
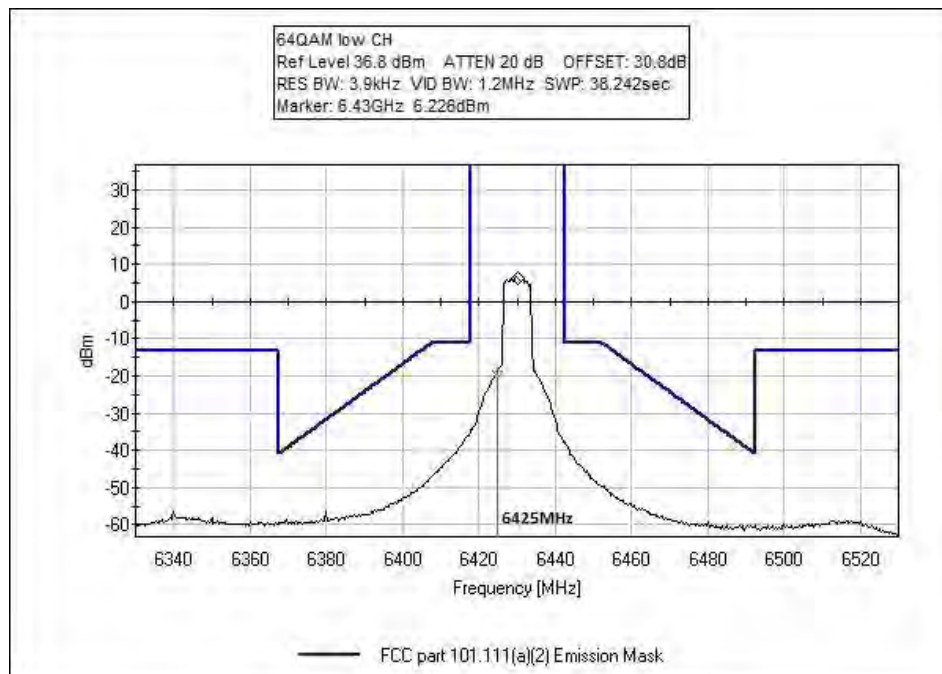
Test Data

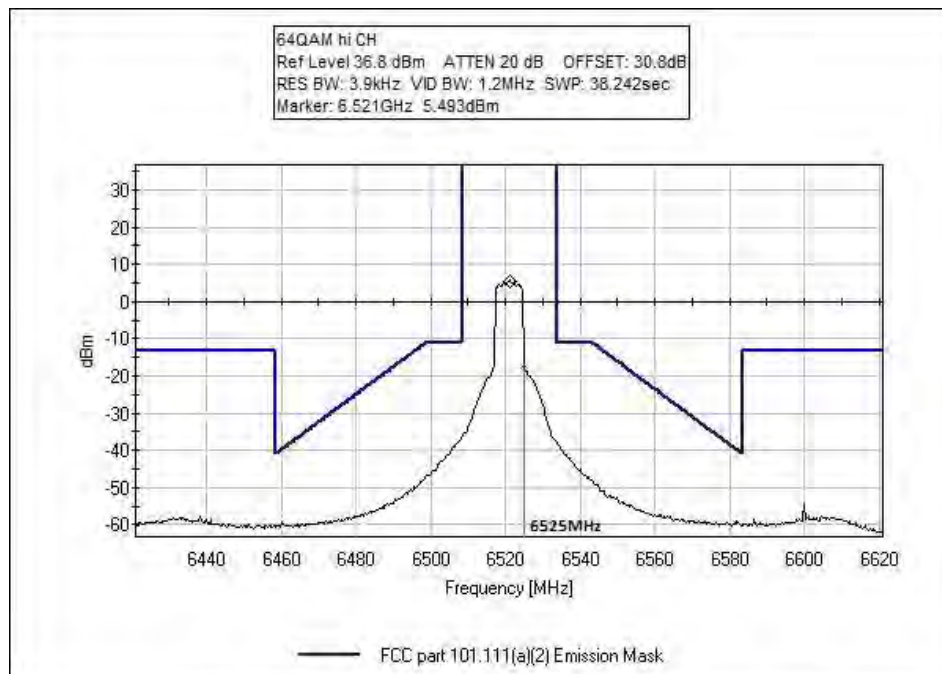












Spurious emissions outside of +/-250% of Authorized Bandwidth				
Frequency (MHz)	Modulation	Measure power (dBuV)	Limit (dBuV)	Result
NED	NED	NED	94	Pass

NED = No emissions detected within 30dB of limit line.

Measurement Uncertainty: 0.67dB.

LIMIT LINE FOR SPURIOUS CONDUCTED EMISSION

$$\text{REQUIRED ATTENUATION} = 43 + 10 \log P \text{ DB}$$

$$\text{Limit line (dBuV)} = V_{\text{dBuV}} - \text{Attenuation}$$

$$\begin{aligned} V_{\text{dBuV}} &= 20 \log \frac{V}{1 \times 10^{-6}} \\ &= 20 (\log V - \log 1 \times 10^{-6}) \\ &= 20 \log V - 20 \log 1 \times 10^{-6} \\ &= 20 \log V - 20 (-6) \\ &= 20 \log V + 120 \end{aligned}$$

$$\begin{aligned} \text{Attenuation} &= 43 + 10 \log P \\ &= 43 + 10 \log \frac{V^2}{R} \\ &= 43 + 10 (\log V^2 - \log R) \\ &= 43 + 10 (2 \log V - \log R) \\ &= 43 + 20 \log V - 10 \log R \end{aligned}$$

$$\begin{aligned} \text{Limit line} &= V_{\text{dBuV}} - \text{Attenuation} \\ &= 20 \log V + 120 - (43 + 20 \log V - 10 \log R) \\ &= 20 \log V + 120 - 43 - 20 \log V + 10 \log R \\ &= 20 \log V + 120 - 43 - 20 \log V + 10 \log R \\ &= 120 - 43 + 10 \log 50 \quad \text{Note : } R = 50 \, \Omega \\ &= 120 - 43 + 16.897 \\ &= 94 \text{ dBuV or } -13 \text{ dBm at any power level} \end{aligned}$$

Test Setup Photo(s)



2.1053 / 101.111 Field Strength of Spurious Radiation

Test Conditions / Setup

Test Setup/Conditions			
Test Location:	Brea Lab A	Test Engineer:	Don Nguyen
Test Method:	FCC 2.1053	Test Date(s):	5/31/2017
Configuration:	2		
Test Setup:	The EUT is placed on Styrofoam platform at 0.8m height and powered by 28Vdc power supply. The input voltage to the power supply is 120Vac/60Hz. Aux port is connected to a breakout cable. The breakout cable consists of 5x Ethernet cable, 2xRS232 in loop, 1x5Vdc, 2x28Vdc, 3x12Vdc load lines. 4xEthernet cables are connected to support hubs, 1 Ethernet cable is connected to a RS232 to Ethernet converter. All DC outputs are connected 1k ohm resistors. Composite (left port) and SDI (right port) inputs are connected to a support camera. SDI output (middle port) is connected to a support monitor. Antenna control port is connected to a support antenna. RF antenna port is terminated with a 50ohm load. Programming ports 2x USB and 1x Ethernet are unpopulated and not accessible to users. All support equipment is located under the ground plane. The EUT is tested in preferred orientation declared by the manufacturer. The EUT is set to continuously transmit. Operating frequency: 6430-6521MHz Channel: 6430MHz (low CH), 6480MHz (mid CH), 6521MHz (hi CH) Max antenna gain: 12dBi Rated output power: 8W Video bitrate: 7/8 FEC, 1/32 Guard, 8MHz Bandwidth Modulation: 16QAM (highest measured fundamental power) Frequency range of measurement = 9kHz-40GHz RBW=3.9kHz, VBW=1.2MHz (within +/-250% of authorized bandwidth) RBW=1MHz, VBW=3MHz (outside of +/-250% of authorized bandwidth)		

Environmental Conditions

Temperature (°C)	24	Relative Humidity (%):	53
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Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
P06554	Cable	Astrolab	32022-29094K-29094K-24TC	12/30/2015	12/30/2017
02672	Spectrum Analyzer	Agilent	E4446A	3/2/2017	3/2/2019
00314	Loop Antenna	EMCO	6502	5/20/2016	5/20/2018
01413	Horn Antenna	HP	84125-80008	10/7/2016	10/7/2018
03158A	Horn Antenna	Dorado	GH-28-25	3/30/2017	3/30/2019
01994	Biconilog Antenna	Chase	CBL6111C	3/11/2016	3/11/2018
00010	Preamp	HP	8447D	3/14/2016	3/14/2018
P05283	Attenuator	Midwest Microwave	ATT-0218-06-NNN-02	5/5/2016	5/5/2018
P05555	Cable	Pasternack	RG223/U	4/5/2016	4/5/2018
P05569	Cable-Amplitude +15C to +45C (dB)	Pasternack	RG-214/U	12/7/2016	12/7/2018
P04382	Cable	Andrew	LDF-50	6/6/2016	6/6/2018
00787	Preamp	HP	83017A	6/10/2015	6/10/2017
01646	Horn Antenna	Emco	3115	3/4/2016	3/4/2018
P07139	Cable	Andrew	ANDL1-PNMNM-48	3/1/2017	3/1/2019

Test Data

Spurious emissions outside of +/-250% of Authorized Bandwidth				
Frequency (MHz)	Modulation	Measure power (dBuV)	Limit (dBuV)	Result
NED	NED	NED	82.23	Pass

NED = No emissions found within 30dB of limit line.

Measurement Uncertainty: 3.73dB.

LIMIT LINE FOR SPURIOUS RADIATED EMISSION

$$\text{REQUIRED ATTENUATION} = 43 + 10 \log P \text{ (dB)}$$

For radiated spurious emission measured at 3 meter test distance.

$$\begin{aligned} \text{Required attenuation} &= 43 + 10 \log P_{t \text{ at 3 meter}} \text{ dB} \\ \text{Limit line (dBuV)} &= E_{\text{dBuV}} - \text{Attenuation} \end{aligned}$$

E_{dBuV} = Measured field strength at 3 meter in dBuV/m

Power Density (Isotropic)

$$P_D = \frac{P_t}{4\pi r^2}$$

P_D = Power Density in Watts /m²

P_t = Average Transmit Power

r = Test distance

Field Intensity E (V/m)

$$E = \sqrt{P_D \times 377}$$

$$E = \frac{\sqrt{P_t \times 377}}{4\pi r^2}$$

$$E = \sqrt{\frac{P_t \times 30}{r^2}}$$

$$P_t = \left(\frac{E^2 \times r^2}{30} \right)$$

$$10 \log P_t = 10 \log E^2 \text{ (V/m)} + 10 \log r^2 - 10 \log 30$$

$$10 \log P_t = 20 \log E \text{ (V/m)} + 20 \log r - 10 \log 30$$

At 3 meter, $r = 3 \text{ m}$

$$10 \log P_t = 20 \log E \text{ (V/m)} + 20 \log 3 - 10 \log 30$$

$$10 \log P_t = 20 \log E \text{ (V/m)} + 9.54 - 14.77$$

$$10 \log P_t = 20 \log E \text{ (V/m)} - 5.23$$

Since $20 \log E \text{ (V/m)} = 20 \log E \text{ (uV/m)} - 120$

$$10 \log P_t = 20 \log E \text{ (uV/m)} - 120 - 5.23$$

$$10 \log P_t = 20 \log E \text{ (uV/m)} - 125.23$$

$$\begin{aligned} \text{Limit line (dBuV) at 3 meter} &= E_{\text{dBuV}} - \text{Attenuation} \\ &= E_{\text{dBuV}} - (43 + 10 \log P_{t \text{ at 3 meter}}) \\ &= E_{\text{dBuV}} - 43 - 10 \log P_{t \text{ at 3 meter}} \\ &= E_{\text{dBuV}} - 43 - (20 \log E \text{ (uV/m)} - 125.23) \\ &= E_{\text{dBuV}} - 43 - 20 \log E \text{ (uV/m)} + 125.23 \\ &= E_{\text{dBuV}} - 20 \log E \text{ (uV/m)} + 82.23 \end{aligned}$$

Since $20 \log E \text{ (uV/m)} = E \text{ in dBuV/m}$

$$= E_{\text{dBuV}} - E_{\text{dBuV}} + 82.23$$

$$\text{Radiated Emission limit 3 meter} = 82.23 \text{ dBuV at any power level measured in dBuV}$$

Test Setup Photo(s)





2.1055 / 101.107 Frequency Stability

Test Conditions / Setup			
Test Location:	Brea Lab D	Test Engineer:	Don Nguyen
Test Method:	FCC 2.1055	Test Date(s):	6/5/2017
Configuration:	1		
Test Setup:	The EUT is placed inside a temperature chamber and powered from 28Vdc external power supply. The input SDI is connected to a support camera. RF antenna port is connected to spectrum analyzer via 30db attenuator. The EUT is set to transmit continuously. Operating frequency: 6430-6521MHz Tested channel: 6430MHz (low CH), 6480MHz (mid CH), 6521MHz (hi CH) Max antenna gain: 12dBi Rated output power: 8W Video bitrate: 7/8 FEC, 1/32 Guard, 8MHz Bandwidth Modulation: QPSK, 16QAM, 64QAM Frequency range of measurement: 6430-6521MHz VBW=1MHz, VBW=3MHz		

Environmental Conditions			
Temperature (°C)	25	Relative Humidity (%):	47

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
01878	Temperature Chamber	Thermotron Corp.	S 1.2 Mini-Max	5/15/2017	5/15/2019
P06554	Cable	Astrolab	32022-29094K-29094K-24TC	12/30/2015	12/30/2017
03432	Attenuator	Aeroflex/Weinschel	90-30-34	11/30/2015	11/30/2017
02672	Spectrum Analyzer	Belden	E4446A	3/2/2017	3/2/2019

Test Data

Test Conditions		Modulation: QPSK					
		Low CH (MHz)	Mid CH (MHz)	Hi CH (MHz)	Frequency tolerance (%)	Limit (%)	Result
-30°C	V _{max} (32.2)V _{dc}	6430	6480	6521	0	0.005	Pass
	V _{min} (25.2)V _{dc}	6430	6480	6521	0	0.005	Pass
-20°C	V _{max} (32.2)V _{dc}	6430	6480	6521	0	0.005	Pass
	V _{min} (25.2)V _{dc}	6430	6480	6521	0	0.005	Pass
-10°C	V _{max} (32.2)V _{dc}	6430	6480	6521	0	0.005	Pass
	V _{min} (25.2)V _{dc}	6430	6480	6521	0	0.005	Pass
0°C	V _{max} (32.2)V _{dc}	6430	6480	6521	0	0.005	Pass
	V _{min} (25.2)V _{dc}	6430	6480	6521	0	0.005	Pass
10°C	V _{max} (32.2)V _{dc}	6430	6480	6521	0	0.005	Pass
	V _{min} (25.2)V _{dc}	6430	6480	6521	0	0.005	Pass
20°C	V _{max} (32.2)V _{dc}	6430	6480	6521	0	0.005	Pass
	V _{min} (25.2)V _{dc}	6430	6480	6521	0	0.005	Pass
30°C	V _{max} (32.2)V _{dc}	6430	6480	6521	0	0.005	Pass
	V _{min} (25.2)V _{dc}	6430	6480	6521	0	0.005	Pass
40°C	V _{max} (32.2)V _{dc}	6430	6480	6521	0	0.005	Pass
	V _{min} (25.2)V _{dc}	6430	6480	6521	0	0.005	Pass
50°C	V _{max} (32.2)V _{dc}	6430	6480	6521	0	0.005	Pass
	V _{min} (25.2)V _{dc}	6430	6480	6521	0	0.005	Pass
Maximum Deviation		0				0.005	
Measurement Uncertainty		1°C					

Test Conditions		Modulation: 16QAM					
		Low CH	Mid CH	Hi CH	Frequency tolerance (%)	Limit (%)	Result
-30°C	$V_{\min}(32.2)V_{dc}$	6430	6480	6521	0	0.005	Pass
	$V_{\max}(25.2)V_{dc}$	6430	6480	6521	0	0.005	Pass
-20°C	$V_{\min}(32.2)V_{dc}$	6430	6480	6521	0	0.005	Pass
	$V_{\max}(25.2)V_{dc}$	6430	6480	6521	0	0.005	Pass
-10°C	$V_{\min}(32.2)V_{dc}$	6430	6480	6521	0	0.005	Pass
	$V_{\max}(25.2)V_{dc}$	6430	6480	6521	0	0.005	Pass
0°C	$V_{\min}(32.2)V_{dc}$	6430	6480	6521	0	0.005	Pass
	$V_{\max}(25.2)V_{dc}$	6430	6480	6521	0	0.005	Pass
10°C	$V_{\min}(32.2)V_{dc}$	6430	6480	6521	0	0.005	Pass
	$V_{\max}(25.2)V_{dc}$	6430	6480	6521	0	0.005	Pass
20°C	$V_{\min}(32.2)V_{dc}$	6430	6480	6521	0	0.005	Pass
	$V_{\max}(25.2)V_{dc}$	6430	6480	6521	0	0.005	Pass
30°C	$V_{\min}(32.2)V_{dc}$	6430	6480	6521	0	0.005	Pass
	$V_{\max}(25.2)V_{dc}$	6430	6480	6521	0	0.005	Pass
40°C	$V_{\min}(30.8)V_{dc}$	6430	6480	6521	0	0.005	Pass
	$V_{\max}(25.2)V_{dc}$	6430	6480	6521	0	0.005	Pass
50°C	$V_{\min}(30.8)V_{dc}$	6430	6480	6521	0	0.005	Pass
	$V_{\max}(25.2)V_{dc}$	6430	6480	6521	0	0.005	Pass
Maximum Deviation		0				0.005	Pass
Measurement Uncertainty		1°C					

Test Conditions		Modulation: 64QAM					
		Low CH	Mid CH	Hi CH	Frequency tolerance (%)	Limit (%)	Result
-30°C	V _{min} (32.2)Vdc	6430	6480	6521	0	0.005	Pass
	V _{max} (25.2)Vdc	6430	6480	6521	0	0.005	Pass
-20°C	V _{min} (32.2)Vdc	6430	6480	6521	0	0.005	Pass
	V _{max} (25.2)Vdc	6430	6480	6521	0	0.005	Pass
-10°C	V _{min} (32.2)Vdc	6430	6480	6521	0	0.005	Pass
	V _{max} (25.2)Vdc	6430	6480	6521	0	0.005	Pass
0°C	V _{min} (32.2)Vdc	6430	6480	6521	0	0.005	Pass
	V _{max} (25.2)Vdc	6430	6480	6521	0	0.005	Pass
10°C	V _{min} (32.2)Vdc	6430	6480	6521	0	0.005	Pass
	V _{max} (25.2)Vdc	6430	6480	6521	0	0.005	Pass
20°C	V _{min} (32.2)Vdc	6430	6480	6521	0	0.005	Pass
	V _{max} (25.2)Vdc	6430	6480	6521	0	0.005	Pass
30°C	V _{min} (32.2)Vdc	6430	6480	6521	0	0.005	Pass
	V _{max} (25.2)Vdc	6430	6480	6521	0	0.005	Pass
40°C	V _{min} (30.8)Vdc	6430	6480	6521	0	0.005	Pass
	V _{max} (25.2)Vdc	6430	6480	6521	0	0.005	Pass
50°C	V _{min} (30.8)Vdc	6430	6480	6521	0	0.005	Pass
	V _{max} (25.2)Vdc	6430	6480	6521	0	0.005	Pass
Maximum Deviation		0				0.005	Pass
Measurement Uncertainty		1°C					

Test Setup Photo(s)

