Moseley Associates Incorporated

ADDENDUM TO TEST REPORT 90130-16

Outdoor Unit Digital Transmitter TX ODU Event HD
&
Outdoor Unit Digital Receiver, RX ODU Event HD

Tested To The Following Standards:

FCC Part 74F Transmitter

Report No.: 90130-16A

Date of issue: March 18, 2010

ACCREDITED

TESTING
CERT #803.01, 803.02, 803.05, 803.06

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:

Moseley Associates Incorporated
111 Castilian Drive
Santa Barbara, CA 93117-3093

REPRESENTATIVE: Sunil Naik
Customer Reference Number: P512681-00

REPORT PREPARED BY:

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

Project Number: 90130

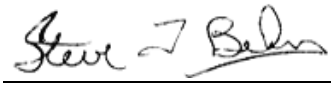
DATE OF EQUIPMENT RECEIPT: November 17, 2009
DATE(S) OF TESTING: November 17 December 8, 2009

Revision History

Original Date of Issue: January 20, 2010
Addendum A: To correct the typo of the FCC Subpart from FCC Part 74H to FCC Part 74F.

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.
110 Olinda Place
Brea, CA 92823

Site Registration & Accreditation Information

Location	JAPAN	CANADA	FCC
Brea A	R-301, C-314 & T-1572	3082D-1	90473

SUMMARY OF RESULTS

Standard / Specification: FCC Part 74F

Description	Test Procedure/Method	Results
RF Power Output	2.1046/FCC 74.636	Pass
Occupied Bandwidth	2.1049/FCC 74.637	Pass
Spurious Emissions at Antenna Terminal	2.1051/FCC 74.637	Pass
Field Strength of Spurious Radiation	2.1053/FCC 74.637	Pass
Frequency Stability	2.1055/FCC 74.661	Pass

Conditions During Testing

This list is a summary of the conditions noted for or modifications made to the equipment during testing.

Summary of Conditions
Modification: Installed ARC-LS-10055 PN LS 26 Absorber in the device. The Engineer has enhanced grounding of the RF shielding with copper clip. TX IF set at 2023MHz

EQUIPMENT UNDER TEST (EUT)

Outdoor Unit Digital Transmitter
Manuf: Moseley Associates Incorporated
Model: TX ODU Event HD
Serial: 104612-0925

Outdoor Unit Digital Receiver
Manuf: Moseley Associates Incorporated
Model: RX ODU Event HD
Serial: 101644-0925

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Ethernet Hub
Manuf: Netgear
Model: DS309
Serial: DS39A08000012

Software Defined In Door Unit (rx)
Manuf: Moseley Associates Incorporated
Model: MAH1A11G001
Serial: CF08284620

Software Defined In Door Unit (tx)
Manuf: Moseley Associates Incorporated
Model: MAH1A11G000
Serial: CF09170872

Power Supply
Manuf: Simpro
Model: SPU130-111
Serial: NA

Laptop
Manuf: Lenovo
Model: 0769
Serial: L3-TM909

FCC PART 74F

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) requirements for Experimental Radio, Auxiliary, Special Broadcast and other Program Distribution al Services.: Subpart F Television Broadcast Auxiliary Stations.

TEMPERATURE AND HUMIDITY DURING TESTING
The temperature during testing was within +15°C and + 35°C.
The relative humidity was between 20% and 75%.

2.1033 (c)(4) TYPE OF EMISSIONS
G7W

2.1033(c)(5) FREQUENCY RANGE
6425 -6525MHz

2.1033(c)(6) OPERATING POWER
28.4 dBm=0.7Watt

2.1033(c)(13) MODULATION INFORMATION
16QAM, 32QAM, 64QAM

2.1046 /FCC 74.636 - RF Power Output

Test Conditions: The EUT is placed on the test bench. IDU port of the transmitter is connected to remotely located support In Door Units and laptop. The Laptop is running test software to exercise the EUT and sending data packets from the transmitter.

Modification: Installed ARC-LS-10055 PN LS 26 Absorber in the device. The Engineer has enhanced grounding of the RF shielding with copper clip. TX IF set at 2023MHz

Signal profile of the EUT is measured at the TX port.

Engineer Name: E. Wong

Test Equipment				
Equipment	**Serial #**	**Cal Date**	**Cal Due**	**Asset #**
RF Power meter	GB37170458	021508	021510	02778
Power Sensor	MY41499662	021508	021510	02777

Test Data

Frequency	16 QAM	32 QAM	64 QAM
6437.5 MHz	0.65W	0.65W	0.68 W
6487.5 MHz	0.65W	0.65W	0.68 W
6512.5 MHz	0.65W	0.68 W	0.69 W

Test Setup Photos

2.1049/FCC 74.637- Occupied Bandwidth

Test Location: CKC Laboratories, Inc. •110. N. Olinda Place. • Brea, CA 92821 • (714) 993-6112

Customer: **Moseley Associates Incorporated**
Specification: **FCC 74.637(a)(2) Emission mask**
Work Order #: **90130** Date: 11/23/2009
Test Type: **Conducted Emissions** Time: 09:44:04
Equipment: **Outdoor Unit Digital Transmitter & Outdoor Unit Digital Receiver** Sequence#: 4
Manufacturer: Moseley Associates Incorporated Tested By: E. Wong
Model: TX ODU Event HD 110V 60Hz

S/N: 104612-0925,

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer	US44300438	07/23/2008	07/23/2010	02672
3'-40GHz cable	NA	10/28/2009	10/28/2011	P03174

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
*Outdoor Unit Digital Transmitter	Moseley Associates Incorporated	TX ODU Event HD	104612-0925

Support Devices:

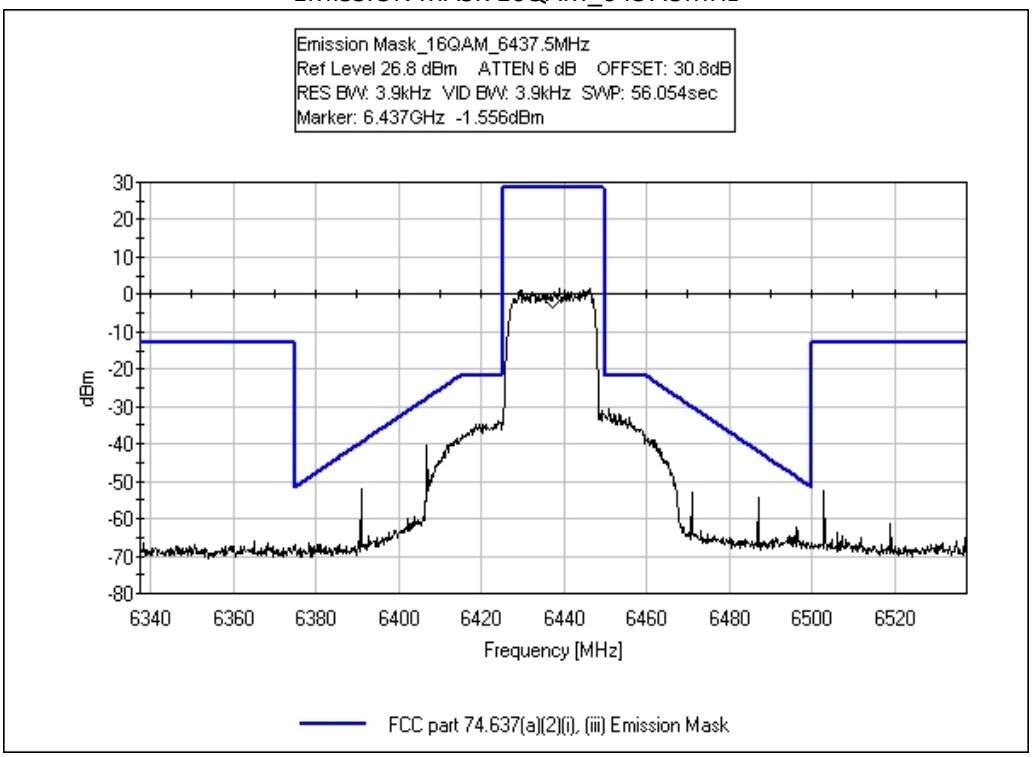
Function	Manufacturer	Model #	S/N
Ethernet Hub	Netgear	DS309	DS39A08000012
Software Defined In Door Unit (rx)	Moseley Associates Incorporated	MAH1A11G001	CF08284620
Software Defined In Door Unit (tx)	Moseley Associates Incorporated	MAH1A11G000	CF09170872
Power Supply	Simpro	SPU130-111	NA
Laptop	Lenovo	0769	L3-TM909

Test Conditions / Notes:

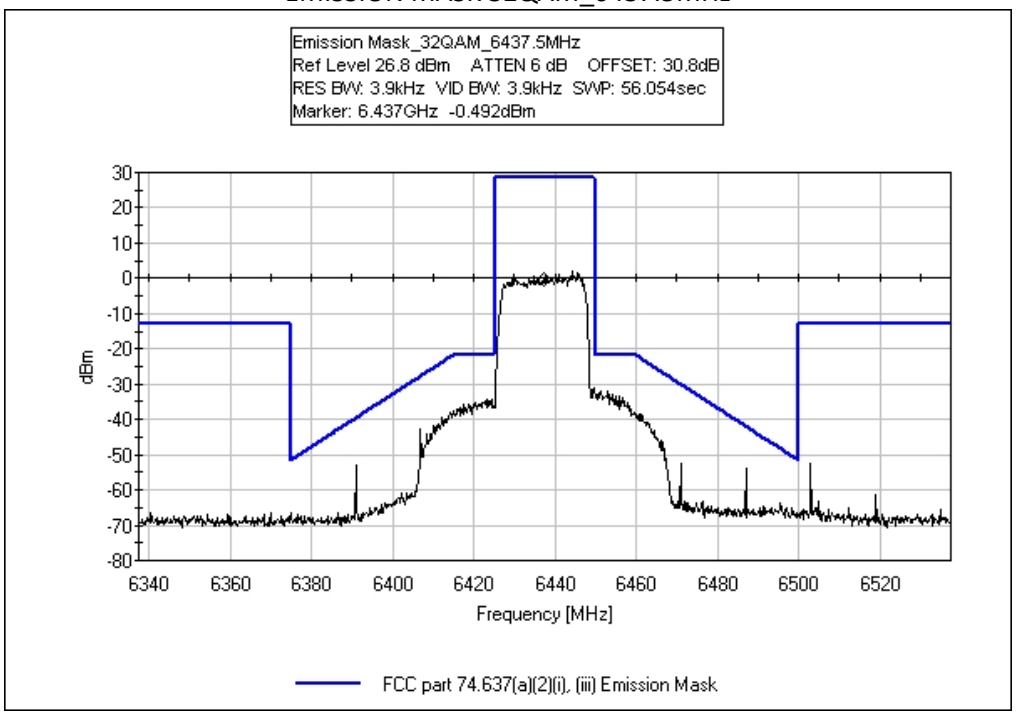
The EUT is place on the test bench. IDU port of the transmitter is connected to remotely located support In Door Units and laptop. The Laptop is running test software, to exercise the EUT. Sending data packets from the transmitter. Modification: Installed ARC-LS-10055 PN LS 26 Absorber in the device. Enhanced grounding of the RF shielding with copper clip. TX IF set at 2023MHz Signal profile of the EUT is measured at the TX port. Additional plots labeled as zoom 1 and Zoom 2 were captured at smaller span to demonstrate compliance.

Test Data

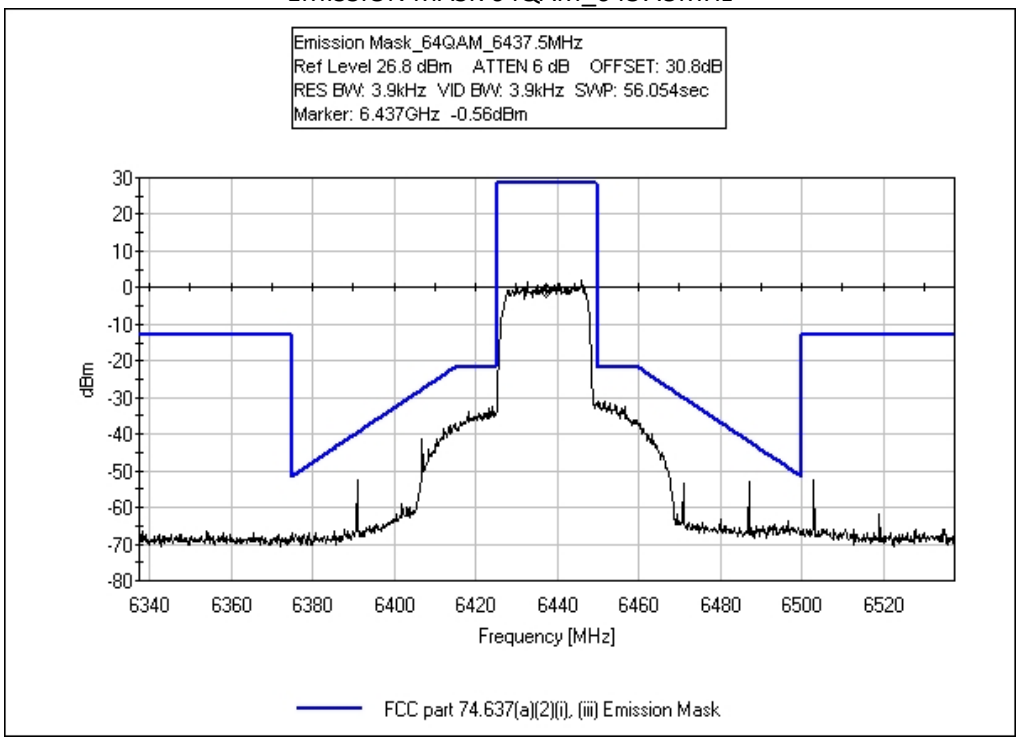
EMISSION MASK 16QAM_6437.5MHz



EMISSION MASK 32QAM_6437.5MHz



EMISSION MASK 64QAM_6437.5MHz



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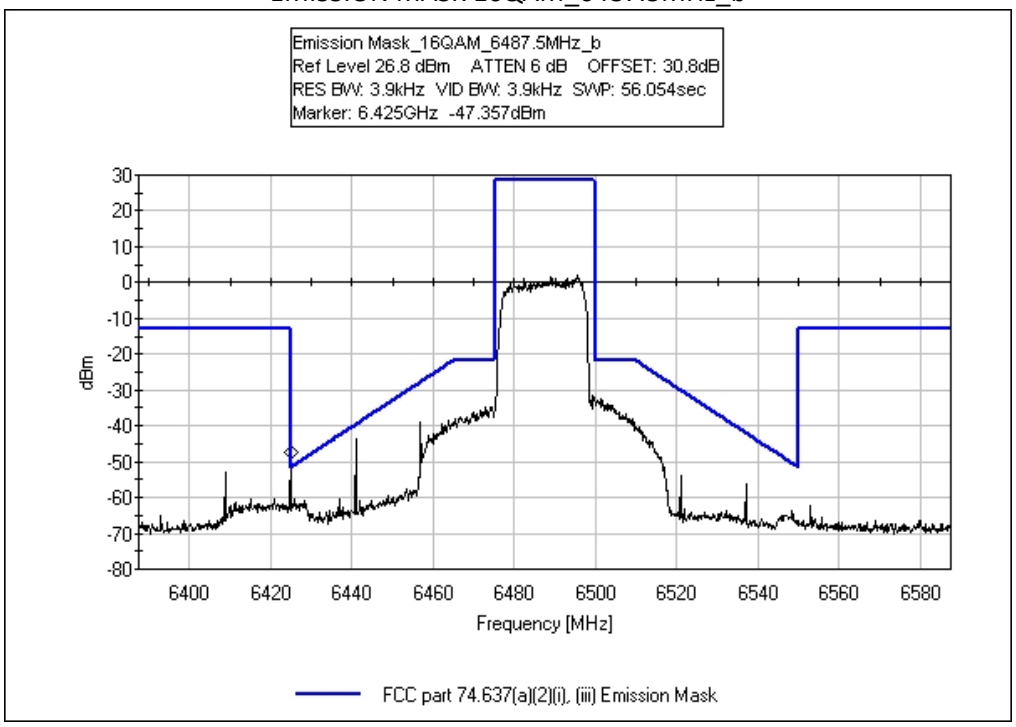
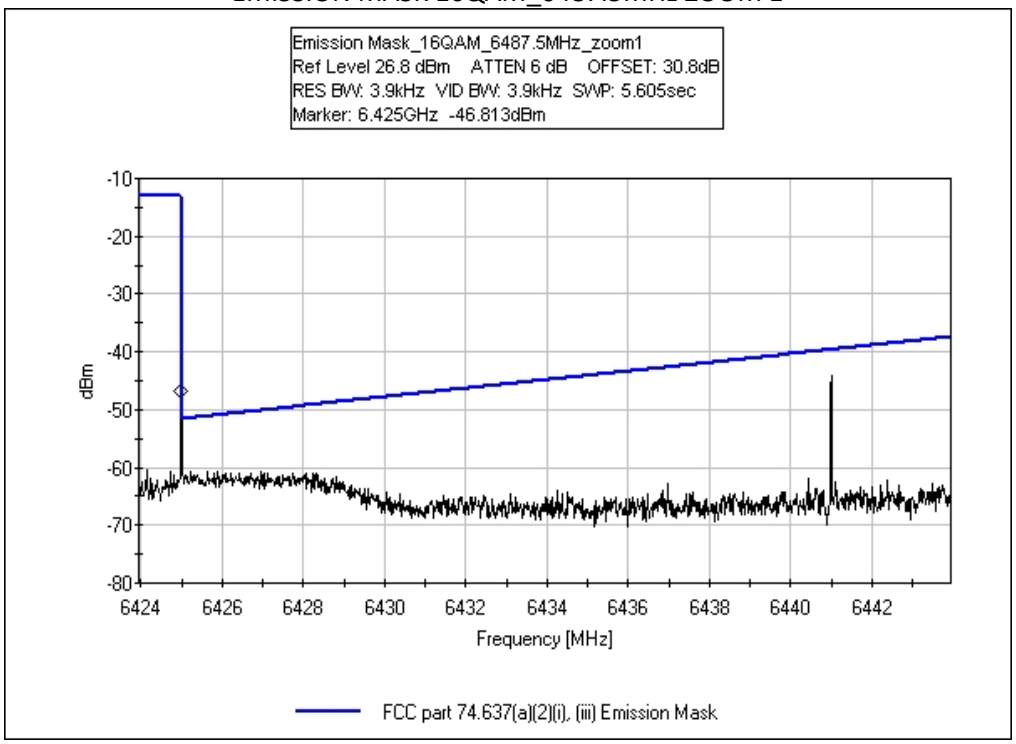
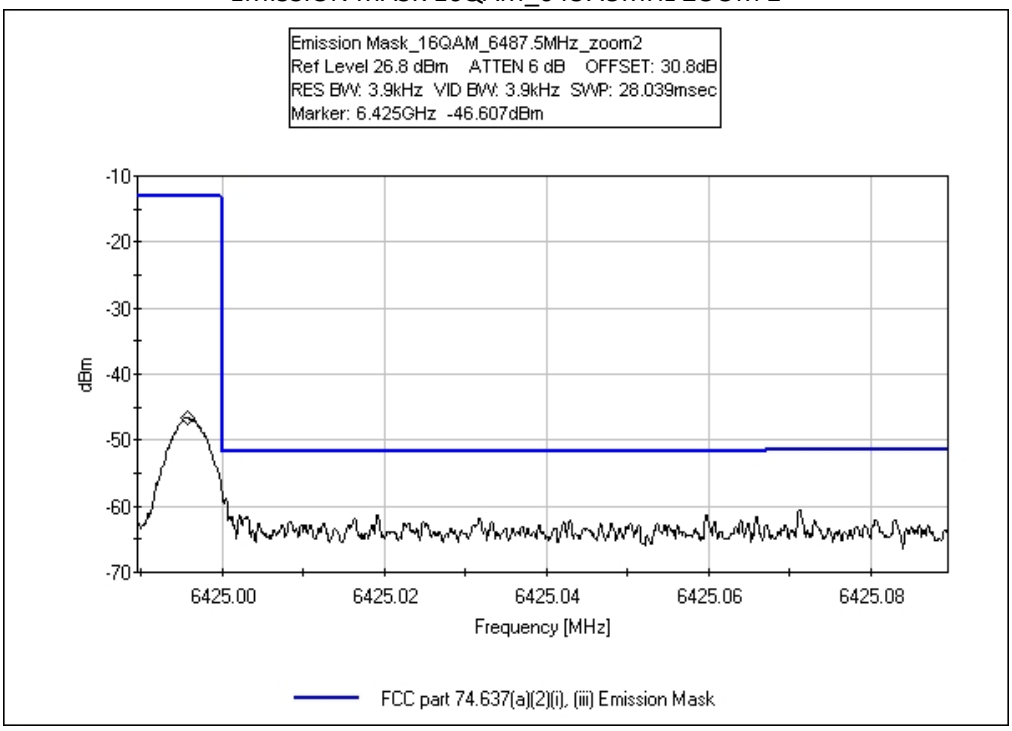


EMISSION MASK 16QAM_6487.5MHz ZOOM 1



EMISSION MASK 16QAM_6487.5MHz ZOOM 2



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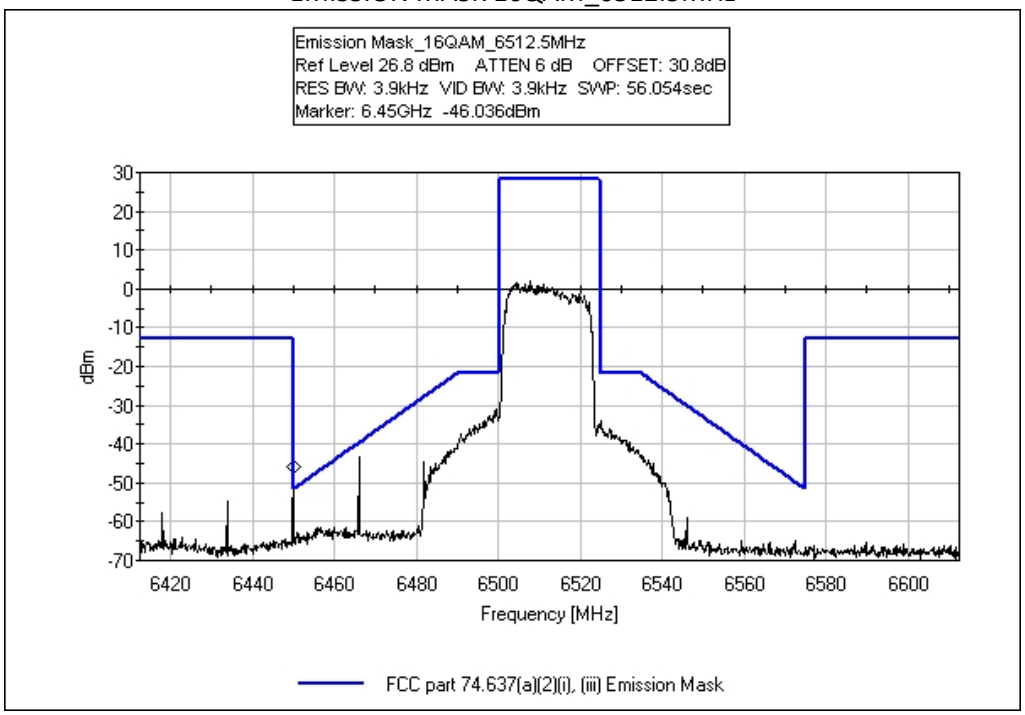
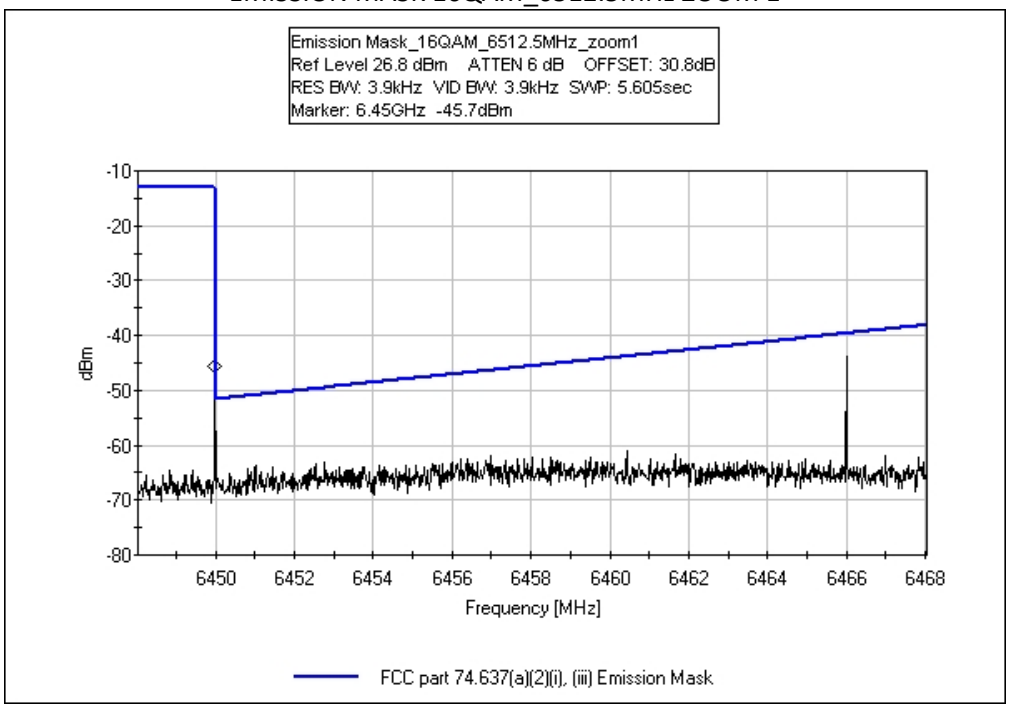
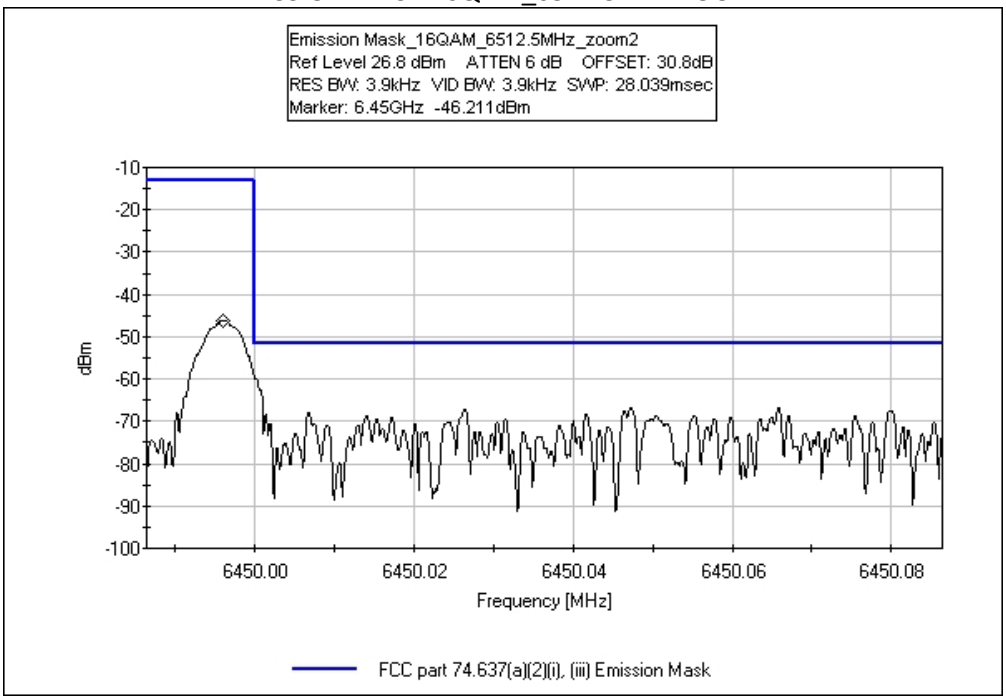


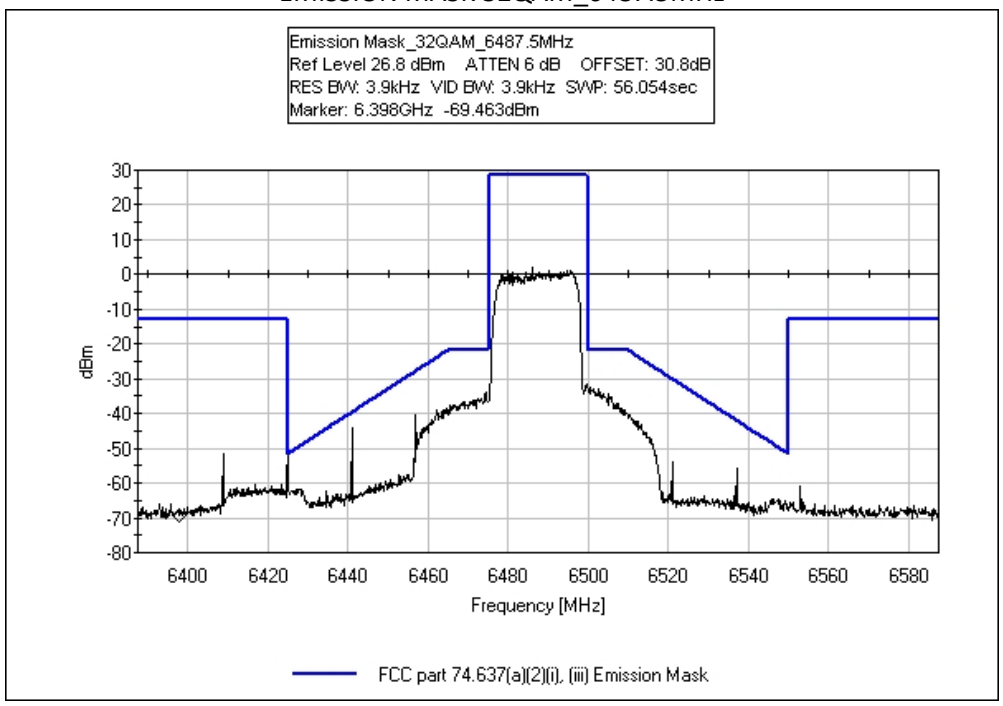
EMISSION MASK 16QAM_6512.5MHz ZOOM 1



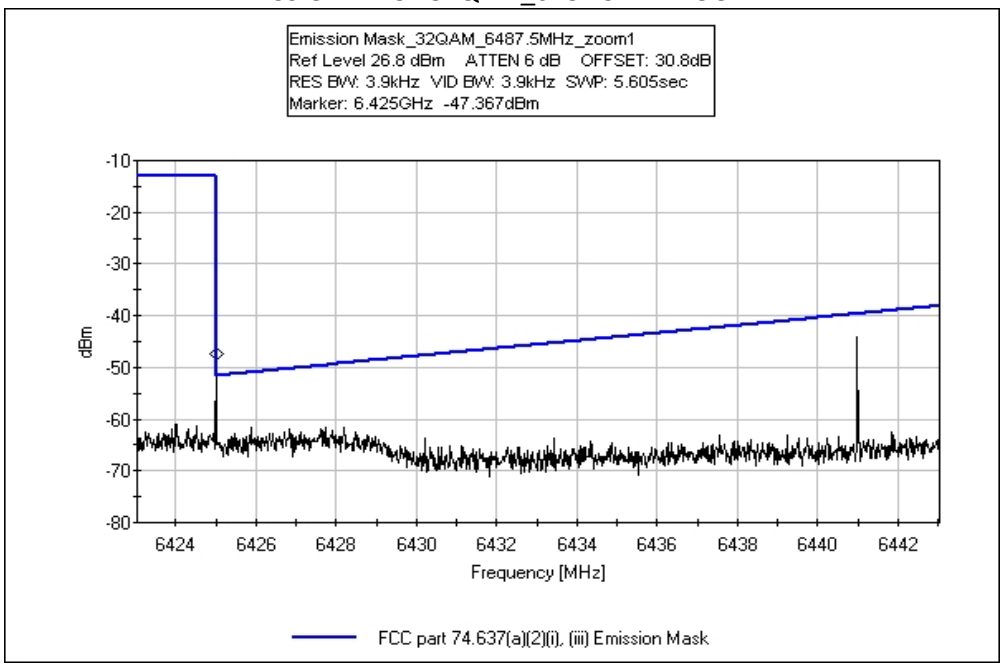
EMISSION MASK 16QAM_6512.5MHz ZOOM 2



EMISSION MASK 32QAM_6487.5MHz



EMISSION MASK 32QAM_6487.5MHz ZOOM 1



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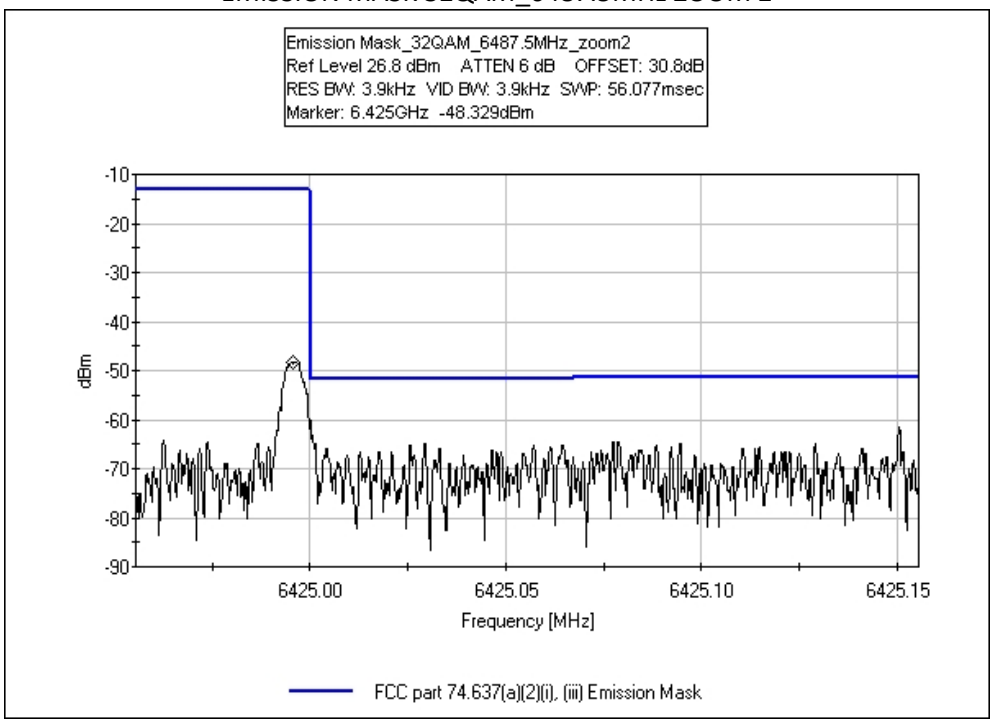
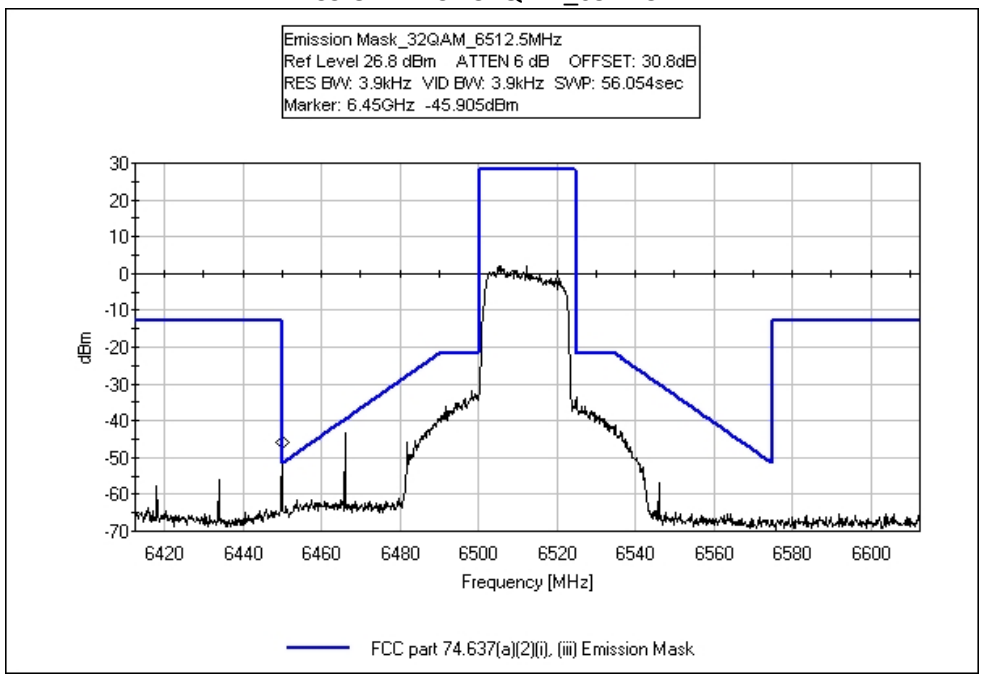
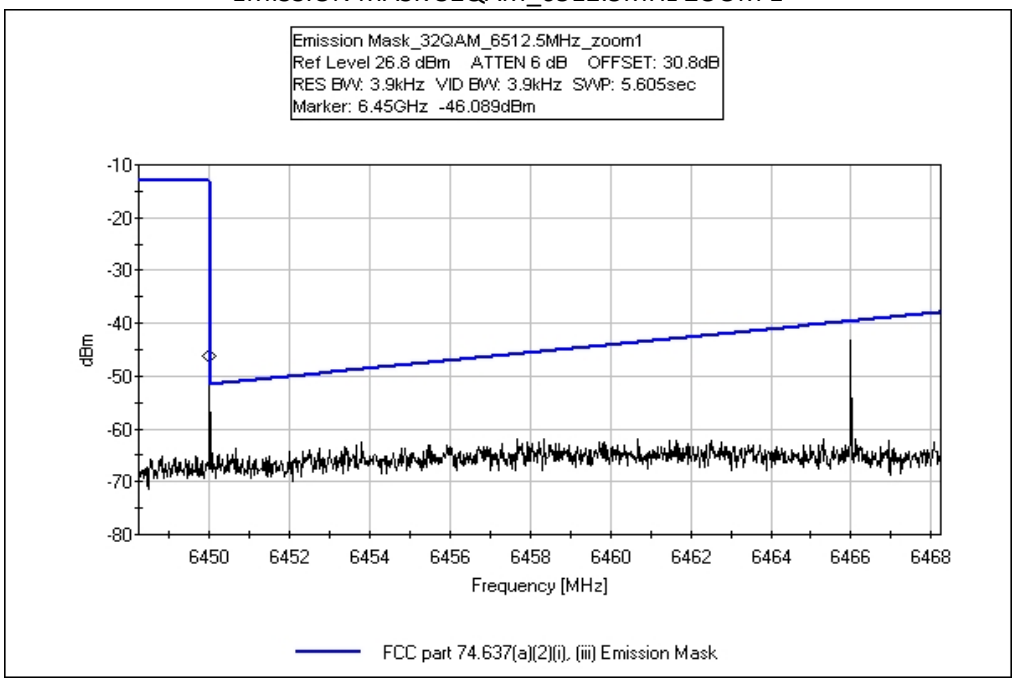


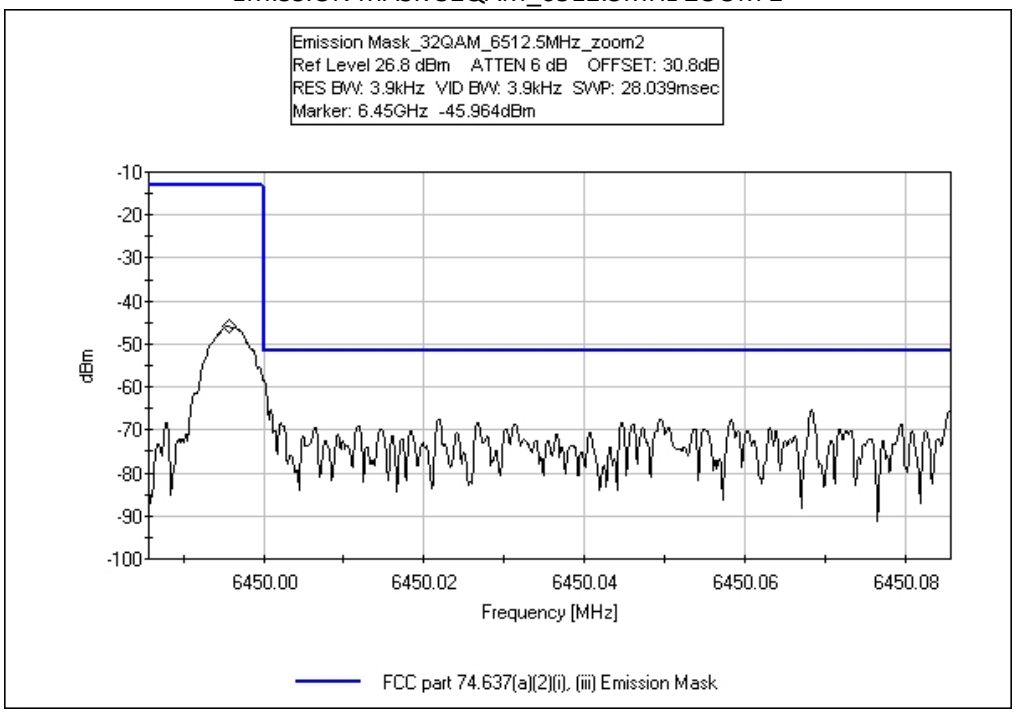
EMISSION MASK 32QAM_6512.5MHz



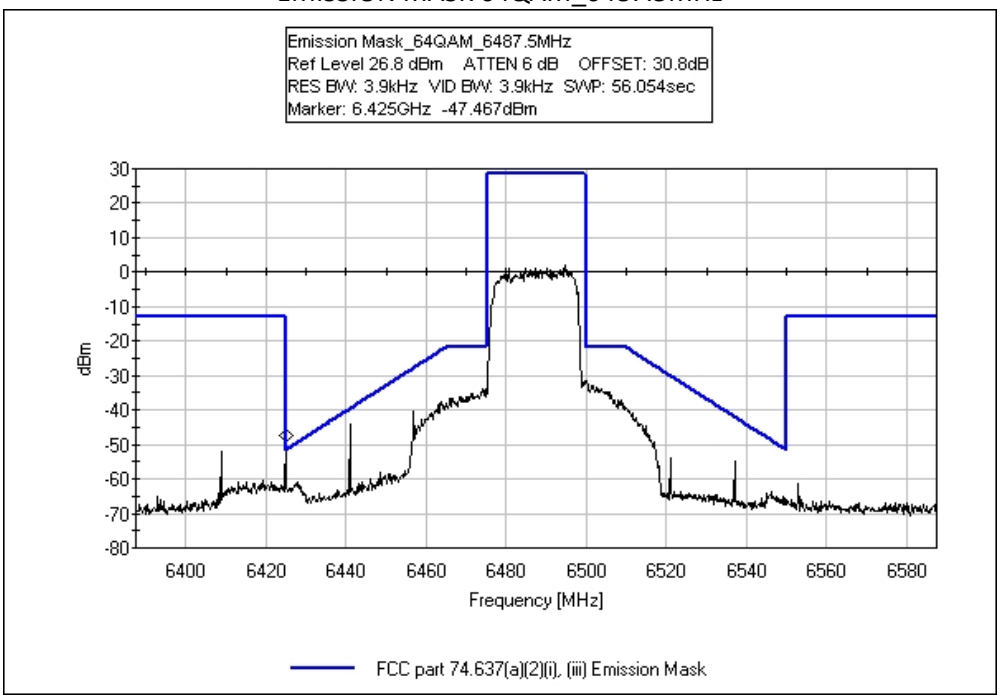
EMISSION MASK 32QAM_6512.5MHz ZOOM 1



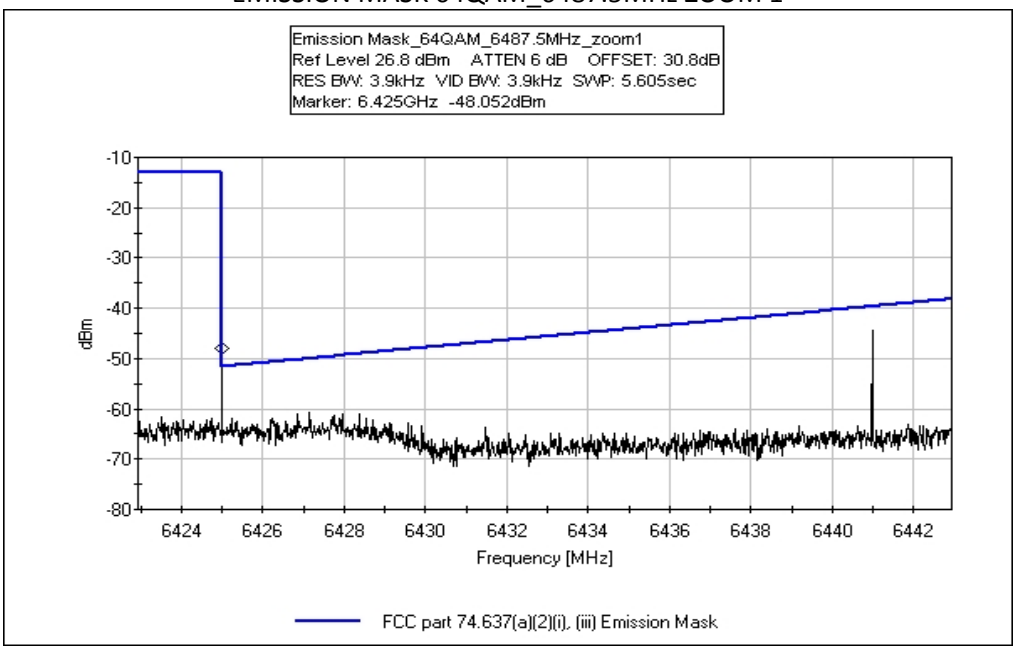
EMISSION MASK 32QAM_6512.5MHz ZOOM 2



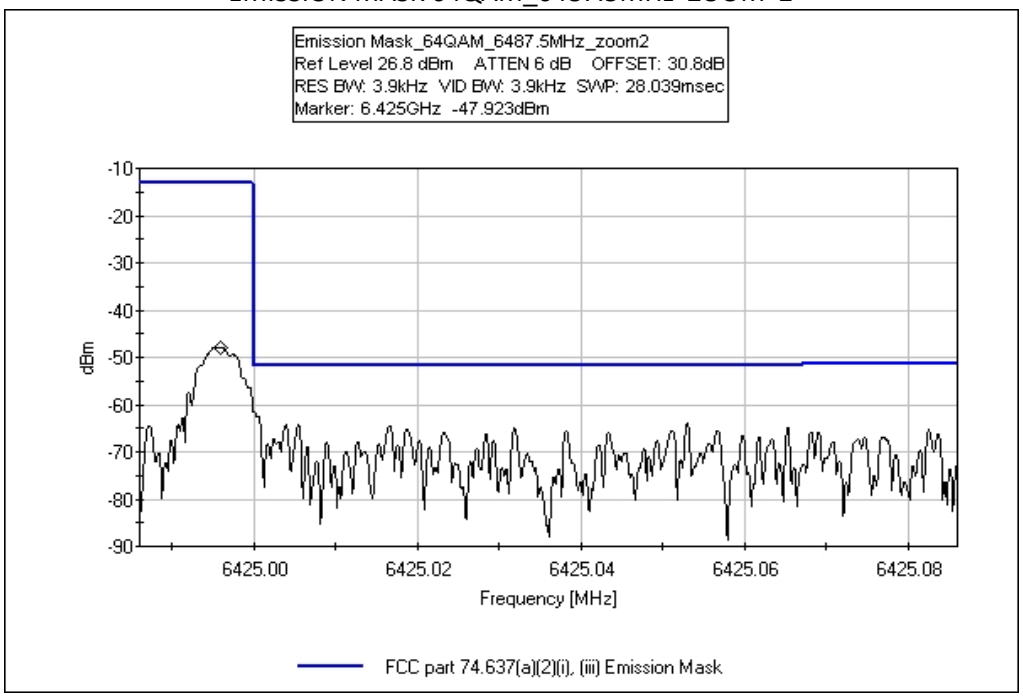
EMISSION MASK 64QAM_6487.5MHz



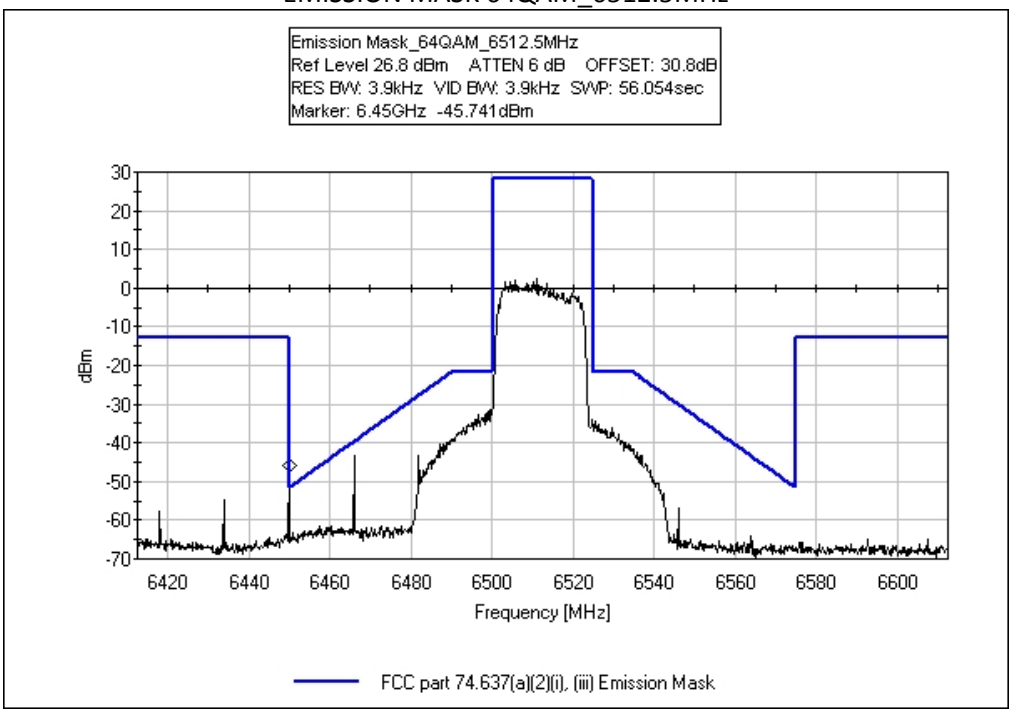
EMISSION MASK 64QAM_6487.5MHz ZOOM 1



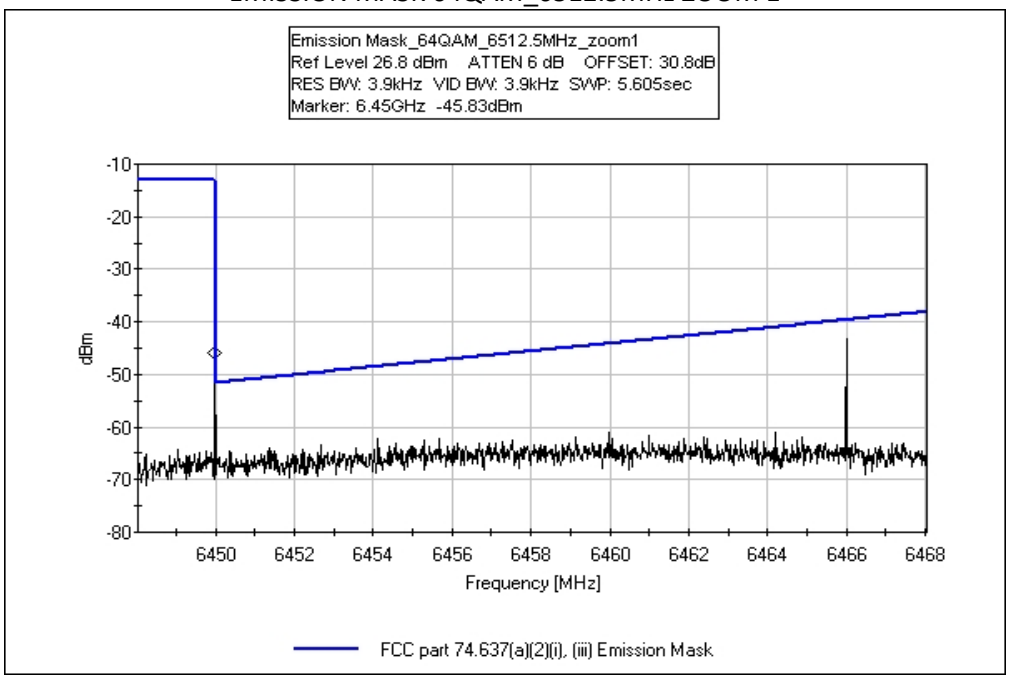
EMISSION MASK 64QAM_6487.5MHz ZOOM 2



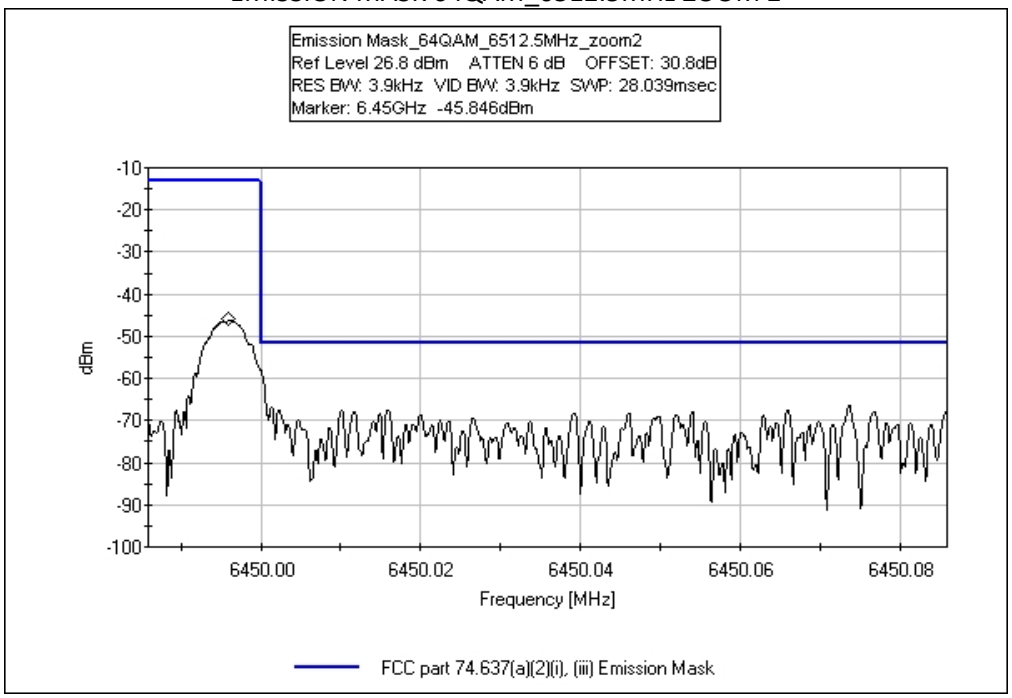
EMISSION MASK 64QAM_6512.5MHz



EMISSION MASK 64QAM_6512.5MHz ZOOM 1



EMISSION MASK 64QAM_6512.5MHz ZOOM 2



Test Setup Photos

2.1051/FCC 74.637- Spurious Emissions at Antenna Terminal

LIMIT LINE FOR SPURIOUS CONDUCTED EMISSION

REQUIRED ATTENUATION = 43+10 LOG P DB

Limit line (dBuV) = V_{dBuv} - Attenuation

$$V_{dBuV} = 20 \text{ Log } \frac{V}{1 \text{ x } 10^{-6}}$$

$$= 20\left(\text{Log } V - \text{Log } 1 \text{ x } 10^{-6}\right)$$

$$= 20 \text{ Log } V - 20 \text{ Log} 1 \text{ x } 10^{-6}$$

$$= 20 \text{ Log } V - 20(-6)$$

$$= 20 \text{ Log } V + 120$$

$$\text{Attenuation} = 43 + 10 \text{ Log } P$$

$$= 43 + 10 \text{ Log } \frac{V^2}{R}$$

$$= 43 + 10\left(\text{Log } V^2 - \text{Log } R\right)$$

$$= 43 + 10\left(2 \text{ Log } V - \text{Log } R\right)$$

$$= 43 + 20 \text{ Log } V - 10 \text{ Log } R$$

Limit line = V_{dBuv} - Attenuation

= 20 Log V + 120 – (43 + 20 Log V – 10Log R)

= 20 Log V + 120 – 43 – 20 Log V + 10Log R

= 20 Log V + 120 – 43 – 20 Log V + 10Log R

= 120 – 43 + 10 Log 50 Note : R = 50 Ω

= 120 –43 + 16.897

= 94 dBuV at any power level

Test Location: CKC Laboratories, Inc. •110. N. Olinda Place. • Brea, CA 92821 • (714) 993-6112

Customer:	**Moseley Associates Incorporated**		
Specification:	**FCC part 74.637(a)(2) Conducted Spurious Emission**		
Work Order #:	**90130**	Date:	11/19/2009
Test Type:	**Conducted Emissions**	Time:	11:20:34
Equipment:	**Outdoor Unit Digital Transmitter**	Sequence#:	3
Manufacturer:	Moseley Associates Incorporated	Tested By:	E. Wong
Model:	TX ODU Event HD		110V 60Hz
S/N:	104612-0925		

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer	US44300438	07/23/2008	07/23/2010	02672
3'-40GHz cable	NA	10/28/2009	10/28/2011	P03174
5.8 GHz HPF	1	03/25/2008	03/25/2010	02755

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
*Outdoor Unit Digital Transmitter	Moseley Associates Incorporated	TX ODU Event HD	104612-0925

Support Devices:

Function	Manufacturer	Model #	S/N
Ethernet Hub	Netgear	DS309	DS39A08000012
Software Defined In Door Unit (rx)	Moseley Associates Incorporated	MAH1A11G001	CF08284620
Software Defined In Door Unit (tx)	Moseley Associates Incorporated	MAH1A11G000	CF09170872
Power Supply	Simpro	SPU130-111	NA
Laptop	Lenovo	0769	L3-TM909

Test Conditions / Notes:

The EUTs are place on the wooden table lined with Styrofoam of 5 cm in thickness. TX port of the Transmitter is connected to the RX port of the receiver. RX port of the transmitter is not populated as this RX port is not used in simplex mode. IDU port of the transmitter and receiver are connected to remotely located support In Door Units and laptop.

The Laptop is running test software, to exercise the EUT. Sending data packets from the transmitter to the receiver via the support indoor units.
Frequency range =6425 -6525MHz
Power= 28.4 dBm=0.7Watt
Modulation= 16QAM, 32QAM, 64QAM
Frequency = 6437Mhz, 6487.5MHz, 6512.5MHz
Frequency range of measurement = 9 kHz- 40 GHz.
Frequency 9 kHz - 150 kHz RBW=200 Hz, VBW=200 Hz; 150 kHz- 30 MHz RBW=9 kHz, VBW=9 kHz; 30 MHz- 1000 MHz RBW=120 kHz, VBW=120 kHz; 1000 MHz-40000 MHz RBW=1 MHz, VBW=1 MHz

25°C, 11% Relative Humidity

Modification: Installed ARC-LS-10055 PN LS 26 Absorber in the device. Enhanced grounding of the RF shielding with copper clip. TX IF set at 2023MHz

No Emissions found.

Test Setup Photos

2.1053/FCC 74.637 - Field Strength of Spurious Radiation

Test Location: CKC Laboratories, Inc. •110. N. Olinda Place. • Brea, CA 92821 • (714) 993-6112

Customer: **Moseley Associates Incorporated**
Specification: **FCC74.637(a)(2) Radiated Spurious Em.LIM**
Work Order #: **90130** Date: 11/18/2009
Test Type: **Radiated Scan** Time: 11:03:49
Equipment: **Outdoor Unit Digital Transmitter & Outdoor Unit Digital Receiver** Sequence#: 2
Manufacturer: Moseley Associates Incorporated Tested By: E. Wong
Model: TX ODU Event HD, RX ODU Event HD
S/N: 104612-0925, 101644-0925

***Test Equipment*:**

Function	S/N	Calibration Date	Cal Due Date	Asset #
Spectrum Analyzer	US44300438	07/23/2008	07/23/2010	02672
Bilog Antenna	2451	01/21/2008	01/21/2010	01995
Pre amp to SA Cable	Cable #10	04/16/2009	04/16/2011	P05050
Cable	Cable15	01/05/2009	01/05/2011	P05198
Pre Amp	1937A02548	05/02/2008	05/02/2010	00309
Horn Antenna	6246	06/06/2008	06/06/2010	00849
Microwave Pre-amp	3123A00281	07/28/2008	07/28/2010	00786
2'-40GHz cable	NA	09/21/2009	09/21/2011	P2948
Heliax Antenna Cable	P5565	09/04/2008	09/04/2010	P05565
18-26GHz Horn	942126-003	11/12/2008	11/12/2010	01413
5.8 GHz HPF	1	03/25/2008	03/25/2010	02755
Loop Antenna	2014	06/16/2008	06/16/2010	00314

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
*Outdoor Unit Digital Receiver	Moseley Associates Incorporated	RX ODU Event HD	101644-0925
*Outdoor Unit Digital Transmitter	Moseley Associates Incorporated	TX ODU Event HD	104612-0925

Support Devices:

Function	Manufacturer	Model #	S/N
Ethernet Hub	Netgear	DS309	DS39A08000012
Software Defined In Door Unit (rx)	Moseley Associates Incorporated	MAH1A11G001	CF08284620
Software Defined In Door Unit (tx)	Moseley Associates Incorporated	MAH1A11G000	CF09170872
Power Supply	Simpro	SPU130-111	NA
Laptop	Lenovo	0769	L3-TM909

Test Conditions / Notes:

The EUTs are place on the wooden table lined with Styrofoam of 5 cm in thickness. TX port of the Transmitter is connected to the RX port of the receiver. RX port of the transmitter is not populated as this RX port is not used in simplex mode. IDU port of the transmitter and receiver are connected to remotely located support In Door Units and laptop.

The Laptop is running test software, to exercise the EUT. Sending data packets from the transmitter to the receiver via the support indoor units.
Frequency range =6425 -6525MHz
Power= 28.4 dBm=0.7Watt
Modulation= 64QAM
Frequency = 6437Mhz, 6487.5MHz, 6512.5MHz
Frequency range of measurement = 9 kHz- 40 GHz.
Frequency 9 kHz - 150 kHz RBW=200 Hz, VBW=200 Hz; 150 kHz- 30 MHz RBW=9 kHz, VBW=9 kHz; 30 MHz- 1000 MHz RBW=120 kHz, VBW=120 kHz; 1000 MHz-40000 MHz RBW=1 MHz, VBW=1 MHz

25°C, 11% Relative Humidity

Modification: Installed ARC-LS-10055 PN LS 26 Absorber in the device. Enhanced grounding of the RF shielding with copper clip.

No emissions found.

Test Setup Photos


EVENT HD

2.1055/FCC 74.661- Frequency Stability

Test Equipment				
Equipment	**Serial #**	**Cal Date**	**Cal Due**	**Asset #**
Temperature Chamber	NA	080608	080610	01878
Thermometer	6995216	110909	110911	05947
DC Power Supply	988614	101408	101410	1438

Test Data

Customer:	**Moseley Associates Incorporated**
WO#:	90130
Date:	23-Mar-33
Test Engineer:	E. wong
Device Model #:	TX ODU Event HD
Operating Voltage:	48 **VDC**
Frequency Limit:	0.005 **%**

FCC

Temperature Variations

		Channel 1 (MHz)	Dev. (%)	Channel 2 (MHz)	Dev. (%)	Channel 3 (MHz)	Dev. (%)
Channel Frequency:		6424.170000	6dB point	6474.170000	6dB point	6499.080000	6dB point
Temp (C)	Voltage						
-30	48	6424.08000	0.00140	6474.25000	0.00124	6499.25000	0.00262
-20	48	6424.330000	0.00249	6474.420000	0.00386	6499.000000	0.00123
-10	48	6424.420000	0.00389	6474.410000	0.00371	6499.310000	0.00354
0	48	6424.330000	0.00249	6473.920000	0.00386	6499.250000	0.00262
10	48	6424.250000	0.00125	6474.420000	0.00386	6499.170000	0.00138
20	48	6424.170000	0.00000	6474.170000	0.00000	6499.080000	0.00000
30	48	6424.440000	0.00420	6474.120000	0.00077	6498.950000	0.00200
40	48	6424.350000	0.00280	6474.190000	0.00031	6499.120000	0.00062
50	48	6424.530000	0.00560	6474.410000	0.00371	6499.190000	0.00169

Voltage Variations (±15%)

Temp (C)	Voltage	Channel 1 (MHz)	Dev. (MHz)	Channel 2 (MHz)	Dev. (MHz)	Channel 3 (MHz)	Dev. (MHz)
20	40.8	6424.17000	0.00000	6474.17000	0.00000	6499.08000	0.00000
20	48.0	6424.17000	0.00000	6474.17000	0.00000	6499.08000	0.00000
20	55.2	6424.17000	0.00000	6474.17000	0.00000	6499.08000	0.00000
Max Deviation (MHz)			**0.00560**		**0.00386**		**0.00354**
Max Deviation (%)			**0.00009**		**0.00006**		**0.00005**
			PASS		**PASS**		**PASS**

Test Conditions:

The EUT is placed in the temperature chamber. RF signal is monitored from the antenna port. A spectrum analyzer is employed to measured the frequency stability of the EUT

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

The reported measurement uncertainties are calculated based on the worst case of all laboratory environments from CKC Laboratories, Inc. test sites. Only those parameters which require estimation of measurement uncertainty are reported. The reported worst case measurement uncertainty is less than the maximum values derived in CISPR 16-4-2. Reported uncertainties 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

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.

SAMPLE CALCULATIONS		
	Meter reading	(dBµV)
+	Antenna Factor	(dB)
+	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. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used. When conducted emissions testing was performed, a 10 dB external attenuator was used with internal offset correction in the analyzer.

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 "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the highest readings, this is indicated as a "QP" or an "Ave" on the appropriate rows of the data sheets. 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/receiver readings recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the measuring device called "peak hold," the measuring device had the ability to measure transients 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

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the quasi-peak detector.

Average

For certain frequencies, average measurements may be made using the spectrum analyzer/receiver. 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.