TEST REPORT
FROM
RFI GLOBAL SERVICES LTD

Test of: Orthogon Systems.
Spectra OS581XX.

To: FCC Part 15.247

Test Report Serial No:
RFI/MPTE3/RP46774JD01A
Supersedes Test Report Serial No:
RFI/MPTE2/RP46774JD01A

This Test Report Is Issued Under The Authority Of Andrew Brown, Operations Manager:  **pp**	
Tested By: Steven Wong 	**Checked By: Nigel Davison** 
Report Copy No: PDF01	
Issue Date: 18 Feburary 2005	**Test Dates: 17 January 2005 to 27 January 2005**

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RFI Global Services Ltd
Pavilion A, Ashwood Park, Ashwood Way, Basingstoke, Hampshire RG23 8BG
Telephone: +44 (0)1256 312000 Facsimile: +44 (0)1256 312001
Email: info@rfi-global.com Website: www.rfi-global.com

Registered in England and Wales. Company number:2117901

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To: FCC Part 15.247

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1. Client Information

Company Name:	Orthogon Systems.
Address:	Unit A1 Linhay Business Park Eastern Road Ashburton Devon TQ13 7UP
Contact Name:	Mr C Fisher

2. Equipment Under Test (EUT)

The following information (with the exception of the Date of Receipt) has been supplied by the client:

2.1. Identification of Equipment Under Test (EUT)

Brand Name:	Orthogon
Model Name or Number:	Spectra OS581XX
Unique Type Identification:	ODU
Serial Number:	00:04:56:80:00:20
FCC ID Number:	Not Stated
Country of Manufacture:	UK
Date of Receipt:	17 January 20052

Brand Name:	Orthogon
Model Name or Number:	Spectra OS581XX
Unique Type Identification:	Power IDU
Serial Number:	4036441
FCC ID Number:	QWP58100
Country of Manufacture:	UK
Date of Receipt:	17 January 20052

Brand Name:	MTi
Model Name or Number:	MT-20004
Unique Type Identification:	MT-20004
Serial Number:	01030
FCC ID Number:	Not Stated
Country of Manufacture:	Israel
Date of Receipt:	17 January 20052

Equipment Under Test (EUT) (Continued)

Brand Name:	Radiowave
Model Name or Number:	SP6-5.2NS
Unique Type Identification:	SP6-5.2NS
Serial Number:	813
FCC ID Number:	Not Stated
Country of Manufacture:	UK
Date of Receipt:	17 January 20052

2.2. Description of EUT

The equipment under test is a point to point Ethernet Bridge radio equipment operating in the band 5725 MHz to 5850 MHz (USA band limits).

There are 2 parts to the equipment.

Outdoor Unit, which comprises of an electronics enclosure and an integral, dual polarised antenna. The ODU contains all the main electronic components in the system and generates all the RF frequencies. It has two antenna ports one for the vertical antenna and one for the horizontal antenna. The equipment may be operated in BPSK, QPSK, 16QAM, 256 QAM or Acquisition modulation modes, which are selected via software control. All modes of modulation use the same hardware.

Indoor Unit, which provides an interface box between the ODU, the power supply and the customer's LAN network. This unit comprises basically of connectors, some LED's and filters.

The system is connected by CAT5 cables, which may be screened or unscreened.

The spectra OS581XX is available in two versions. The first is fitted with an integral antenna and the second is a connectorised version for use with external antennas and is fitted with a cover plate containing two N-types connectors. The fundamental product is otherwise identical in both versions – the version to be shipped is decided on the current production order.

2.3. Modifications Incorporated in EUT

During the course of testing the EUT was not modified.

2.4. Additional Information Related to Testing

Power Supply Requirement:	Nominal 115 V 60 Hz AC Mains supply		
Intended Operating Environment:	Residential, Commercial and Light Industry		
Equipment Category:	Fixed Link		
Type of Unit:	Base Station (Fixed Use)		
Interface Ports:	CAT5 Interconnects between RJ45s on both Power IDU and ODU (two on the ODU and one on the Power IDU) Ethernet 10/100baseT via RJ45 connector to external network on the Power IDU. Mains Supply interface on the Power IDU		
Transmit Frequency Range:	5742 MHz to 5832 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	0	5742
	Middle	4	5782
	Top	9	5832
Receive Frequency Range:	5742 MHz to 5832 MHz		
Receive Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	0	5742
	Middle	4	5782
	Top	9	5832
Maximum Power Output (Conducted)	26.8 dBm		

2.5. Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	Slave ODU
Brand Name:	Spectra OS581XX
Model Name or Number:	ODU
Serial Number:	00:04:56:80:00:16
Cable Length and Type:	Coaxial x 2, 2m
Connected to Port:	Horizontal / Vertical Antenna Port

Description:	Slave IDU Power Unit
Brand Name:	Spectra OS581XX
Model Name or Number:	Power IDU
Serial Number:	4068375
Cable Length and Type:	CATS 2m
Connected to Port:	Slave 2m

Description:	Laptop
Brand Name:	COMPAQ
Model Name or Number:	Armarda E700
Serial Number:	1J01DC64D014
Cable Length and Type:	CATS, 5m
Connected to Port:	Ethernet Port on ODU

Description:	Stepped Attenuator
Brand Name:	Weinschel
Model Name or Number:	AC117A-69-43
Serial Number:	188221
Cable Length and Type:	Not Applicable
Connected to Port:	Antenna Port between Master and Slave

Support Equipment (Continued)

Description:	Variable Attenuator
Brand Name:	Midwest Microwave
Model Name or Number:	CVA-LP92-30-SMA-79
Serial Number:	34078
Cable Length and Type:	Not Applicable
Connected to Port:	In line between EUT RF Port and Slave RF Port

Description:	Coaxial Cables
Brand Name:	Phophase
Model Name or Number:	Not Applicable
Serial Number:	Not Applicable
Cable Length and Type:	Lengths 1m
Connected to Port:	Antenna Port

3. Test Results

Reference:	FCC Part 15 Subpart C: 2004 (Section 15.247)
Title:	Code of Federal Regulations, Part 15 (47CFR15) Radio Frequency Devices
Purpose of Test:	To determine whether the equipment complied with the requirements of the specification for the purposes of certification.

3.1. Methods and Procedures

The methods and procedures used were as detailed in:

ANSI/TIA-603-B-2003
Land Mobile Communications Equipment, Measurements and performance Standards

ANSI C63.2 (1987)
Title: American National Standard for Instrumentation - Electromagnetic noise and field strength.

ANSI C63.4 (2003)
Title: American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

ANSI C63.5 (1988)
Title: American National Standard for the Calibration of antennas used for Radiated Emission measurements in Electromagnetic Interference (EMI) control.

ANSI C63.7 (1988)
Title: American National Standard Guide for Construction of Open Area Test Sites for performing Radiated Emission Measurements.

CISPR 16-1: (1999)
Title: Specification For Radio Disturbance and Immunity Measuring Apparatus and Methods. Part 1: Radio Disturbance and Immunity Measuring Apparatus.

DA00-705 (2000)
Title: Filing and Frequency Measurement Guidelines for Frequency Hopping Spread Spectrum Systems.

3.2. Definition of Measurement Equipment

The measurement equipment used complied with the requirements of the standards referenced in the Methods & Procedures section above. Appendix 1 contains a list of the test equipment used.

4. Deviations from the Test Specification

None.

5. Operation of the EUT During Testing

5.1. Operating Modes

The EUT was tested in the following operating modes, unless otherwise stated:

Radiated Emissions:
All transmitter radiated spurious pre-scan tests were performed on the middle channel of the assigned frequency block with the EUT connected to the MTI antenna and set to the highest power (BPSK modulation) mode.

Final measurements were then performed on any indicated spurious emissions on the top, middle and bottom channels in BPSK modulation mode (worst-case modulation mode) for both types of highest gain antenna.

All measurements performed with the MTI antenna and the Radiowave antenna.

All receiver radiated emissions were carried out with the unit set to Slave (search/standby) mode.

Conducted Emissions:

Operating as the Master unit on a link configured in Symmetric Data Mode

Band Edge Conducted Emissions tests were performed with the EUT set to BPSK, QPSK, 16QAM, 64QAM, 256 QAM and Acquisition modulation modes alternately on both the vertical and horizontal ports on the bottom and top channels.

Peak Output Power and Peak Power Spectral Density tests were performed with the EUT set to BPSK, QPSK, 16QAM, 64QAM, 256 QAM and Acquisition modulation modes alternately on both the vertical and horizontal ports on the bottom, middle and top full power channels.

6 dB bandwidth and 20 dB bandwidth tests were performed with the EUT set to BPSK, QPSK, 16QAM, 64QAM, 256 QAM and Acquisition modulation modes alternately on the horizontal port on the middle channel only.

After investigation of all the different modulation modes and both antenna polarisations tests of Conducted Spurious Emissions were performed with the EUT set to BPSK modulation mode and on both horizontal and vertical antenna ports. (Although the power measured at 100 kHz resolution bandwidth was higher on the acquisition mode, the BPSK modulation wasstill deemed as worst case mode because it is most probably used in a normal operating environment) Preliminary conducted spurious pre-scan tests were performed on the middle channel of the EUT. Final measurements were then performed on the bottom, middle and top channels if an emission was identified.

AC mains conducted emissions were performed at full power on the middle channel of the assigned frequency block, with BPSK modulation.

5.2. Configuration and Peripherals

The EUT was tested in the following configuration:

Outdoor Unit (Master) connected to the Indoor Unit supplied by an external 110VAC 60 Hz mains supply.

Radiated Emissions:
The EUT ODU connected to the MTI antenna was used for the radiated pre-scans and both types of antenna (MTi flat plate antenna and Radiowave parabolic dish antenna) were measured for the final measurements.

Conducted Emissions:
The Outdoor Unit was connected via attenuation to a Slave Outdoor Unit to establish a data link.

6. Summary of Test Results

Range of Measurements	Specification Reference	Port Type	Compliancy Status
Receiver AC Conducted Emissions (150 kHz to 30 MHz)	C.F.R. 47 FCC Part 15: 2004 Section 15.107	AC Mains	Complied
Receiver Radiated Spurious Emissions	C.F.R. 47 FCC Part 15: 2004 Section 15.109	Antenna	Complied
Transmitter AC Conducted Emissions (150 kHz to 30 MHz)	C.F.R. 47 FCC Part 15: 2004 Section 15.207	AC Mains	Complied
Transmitter Minimum 6 dB Bandwidth	C.F.R. 47 FCC Part 15: 2004 Section 15.247(a)(2)	Antenna Terminals	Complied
Transmitter 20 dB Bandwidth	C.F.R. 47 FCC Part 2: 2004 Section 2.1049	Antenna Terminals	Complied
Transmitter Peak Power Spectral Density	C.F.R. 47 FCC Part 15: 2004 Section 15.247(d)	Antenna Terminals	Complied
Transmitter Maximum Peak Output Power	C.F.R. 47 FCC Part 15: 2004 Section 15.247(b)(3)	Antenna Terminals	Complied
Transmitter Conducted Emissions	C.F.R. 47 FCC Part 15: 2004 Section 15.247 (c)	Antenna Terminals	Complied
Transmitter Radiated Emissions	C.F.R. 47 FCC Part 15: 2004 Section 15.247(c)/15.209(a)	Antenna	Complied
Transmitter Band Edge Conducted Emissions	C.F.R. 47 FCC Part 15: 2004 Section 15.247(c)	Antenna Terminals	Complied

6.1. Location of Tests

All the measurements described in this report were performed at the premises of
RFI Global Services Ltd, Ewhurst Park, Ramsdell, Basingstoke, Hampshire, RG26 5RQ, England.

7. Measurements, Examinations and Derived Results

7.1. General Comments

7.1.1. This section contains test results only.

7.1.2. Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to Section 8 for details of measurement uncertainties.

7.2. Receiver Mode AC Conducted Spurious Emissions: Section 15.107

7.2.1. The EUT was configured for AC conducted emissions measurements as described in Section 9 of this report.

7.2.2. Tests were performed to identify the maximum emission levels on the AC Mains line of the EUT.

Results:

Quasi-Peak Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.20781	Live	54.3	63.0	9.0	Complied
12.20561	Neutral	48.6	60.0	11.4	Complied
13.28227	Neutral	41.9	60.0	18.1	Complied
14.58472	Neutral	46.8	60.0	13.2	Complied
26.45949	Neutral	45.8	60.0	14.2	Complied

Average Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.20781	Neutral	44.8	53.0	8.5	Complied
12.20561	Neutral	48.1	50.0	1.9	Complied
13.28227	Neutral	36.2	50.0	13.8	Complied
14.58472	Neutral	46.6	50.0	3.4	Complied
26.45949	Neutral	45.6	50.0	4.4	Complied

Test of: **Orthogon Systems.**
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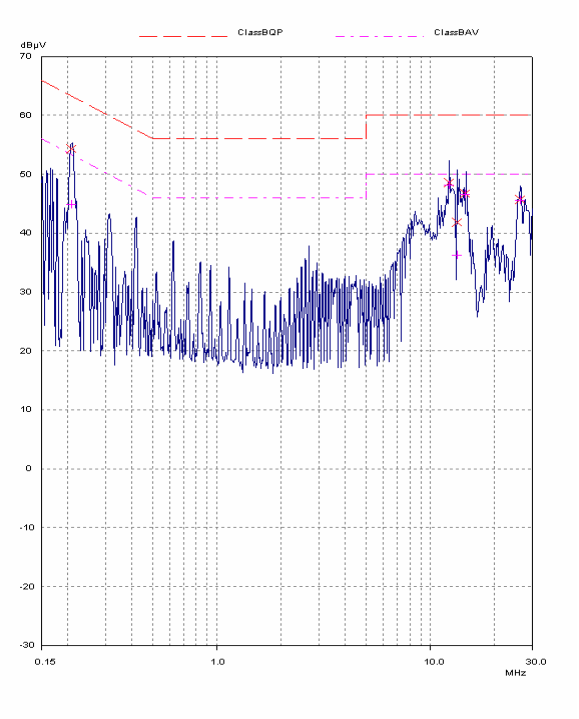
Receiver AC Conducted Spurious Emissions: Section 15.107 (Continued)



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.

7.3. Receiver Mode Radiated Spurious Emissions: Section 15.109

7.3.1. Electric Field Strength Measurements (Frequency Range: 30 to 1000 MHz)

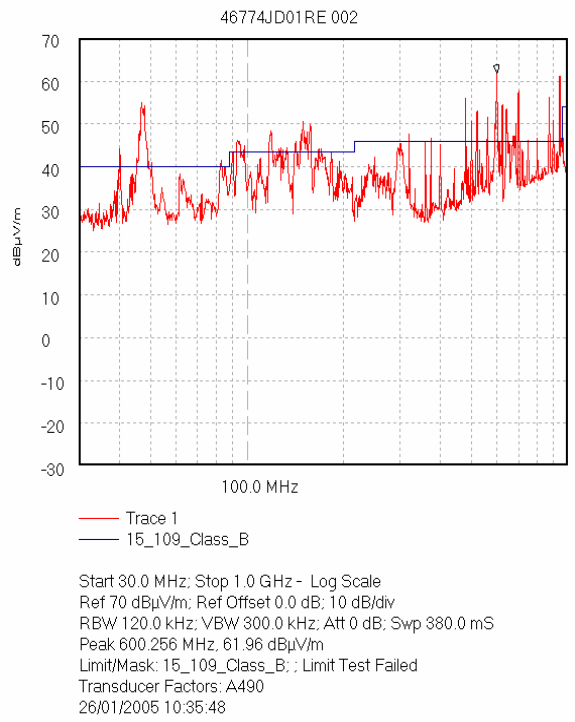
7.3.1.1. The EUT was configured for radiated emissions testing as described in Section 9 of this report.

7.3.1.2. Tests were performed to identify the maximum receiver or standby radiated emission levels.

Results for MTi 28.0 dBi antenna

Frequency (MHz)	Antenna Polarity	Quasi-Peak Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
47.065	Vert.	26.5	40.0	13.5	Complied
117.500	Vert.	37.5	43.5	6.0	Complied
148.811	Horiz.	32.4	43.5	11.1	Complied
156.650	Vert.	28.9	43.5	14.6	Complied
480.001	Horiz.	32.4	46.0	13.6	Complied
600.002	Vert.	28.3	46.0	17.7	Complied
699.999	Horiz.	28.6	46.0	17.4	Complied
873.600	Vert.	38.3	46.0	7.7	Complied
942.972	Vert.	33.8	46.0	12.2	Complied

Receiver Radiated Spurious Emissions: Section 15.109 (Continued)



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.

Receiver Mode Radiated Spurious Emissions: Section 15.109 (Continued)

7.3.2. Electric Field Strength Measurements (Frequency Range: 30 to 1000 MHz)

7.3.2.1. The EUT was configured for radiated emissions testing as described in Section 9 of this report.

7.3.2.2. Tests were performed to identify the maximum receiver or standby radiated emission levels.

Results for Radiowave 37.7 dBi antenna

Frequency (MHz)	Antenna Polarity	Quasi-Peak Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
47.059	Vert.	31.2	40.0	8.8	Complied
117.500	Vert.	34.2	43.5	9.3	Complied
148.811	Horiz.	30.1	43.5	13.4	Complied
156.650	Vert.	32.9	43.5	10.6	Complied
480.001	Horiz.	31.8	46.0	14.2	Complied
600.002	Vert.	24.8	46.0	21.2	Complied
699.999	Horiz.	27.6	46.0	18.4	Complied
873.598	Vert.	35.0	46.0	11.0	Complied
941.972	Vert.	33.8	46.0	12.2	Complied

Receiver Mode Radiated Emissions: Section 15.109 (Continued)

7.3.3. Electric Field Strength Measurements (Frequency Range: 1 to 30 GHz)

Results for MTi 28.0 dBi antenna

Highest Peak Level

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
1.000100	Vert.	27.1	21.5	0.5	49.1	74.0	24.9	Complied
1.099880	Horiz.	25.9	21.5	0.5	47.9	74.0	26.1	Complied
1.119942	Horiz.	25.4	21.5	0.5	47.4	74.0	26.6	Complied
1.499007	Vert.	25.5	21.5	0.6	47.6	74.0	26.4	Complied
1.625545	Vert.	25.0	21.6	0.7	47.3	74.0	26.7	Complied
2.973535	Vert.	21.3	22.0	0.9	44.2	74.0	29.8	Complied
3.045855	Horiz.	20.3	22.7	1.0	44.0	74.0	30.0	Complied
4.890080	Vert.	24.3	24.2	1.3	49.8	74.0	24.2	Complied
8.928050	Vert.	15.6	30.4	1.8	47.8	74.0	26.2	Complied
9.720080	Vert.	17.1	30.5	1.9	49.5	74.0	24.5	Complied

Highest Average Level

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
1.000100	Vert.	22.8	21.5	0.5	44.8	54.0	9.2	Complied
1.099880	Horiz.	22.3	21.5	0.5	44.3	54.0	9.7	Complied
1.119942	Horiz.	18.1	21.5	0.5	40.1	54.0	13.9	Complied
1.499007	Vert.	18.0	21.5	0.6	40.1	54.0	13.9	Complied
1.625545	Vert.	18.3	21.6	0.7	40.6	54.0	13.4	Complied
2.973535	Vert.	14.8	22.0	0.9	37.7	54.0	26.3	Complied
3.045855	Horiz.	14.6	22.7	1.0	38.3	54.0	25.7	Complied
4.890080	Vert.	24.2	24.2	1.3	49.7	54.0	4.3	Complied
8.928050	Vert.	14.5	30.4	1.8	46.7	54.0	7.3	Complied
9.720080	Vert.	16.6	30.5	1.9	49.0	54.0	5.0	Complied

Note(s):

Note: Plots 46774JD01RE018 and 46774JD01RE024 show emissions appearing at 9.3425 GHz, 18.859444 GHz and those being indicated at the right hand side of 46774JD01RE018 plot have been confirmed as background emissions not emitted from the EUT. Therefore, no final measurements were recorded.

Test of: Orthogon Systems.
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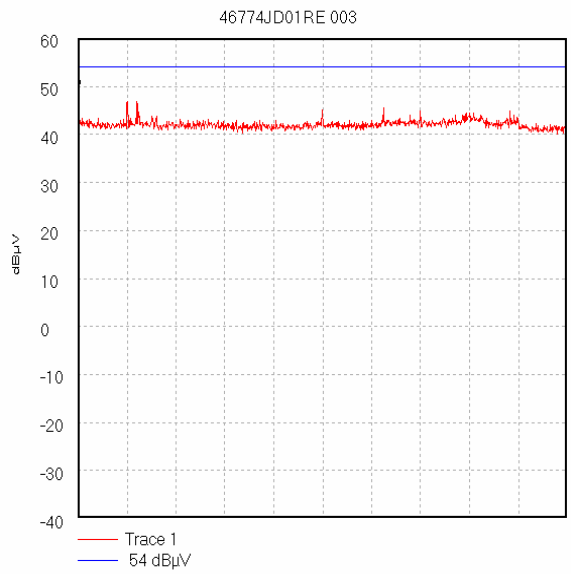
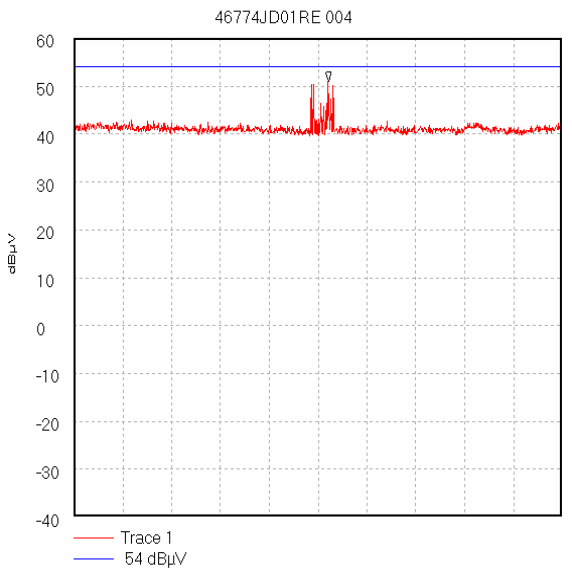
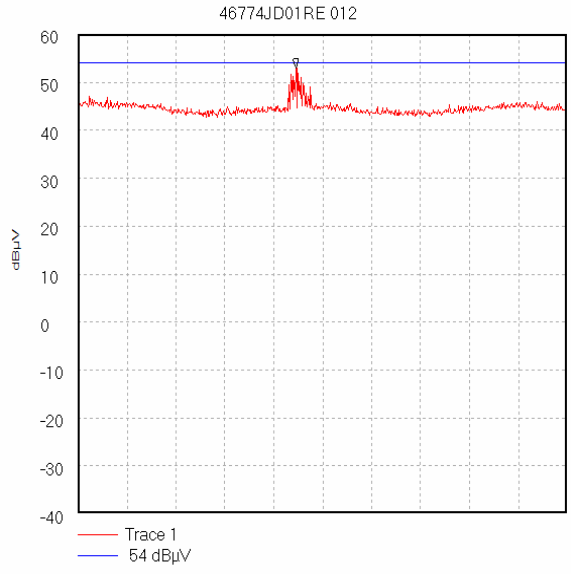
Receiver Radiated Spurious Emissions: Section 15.109 (Continued)



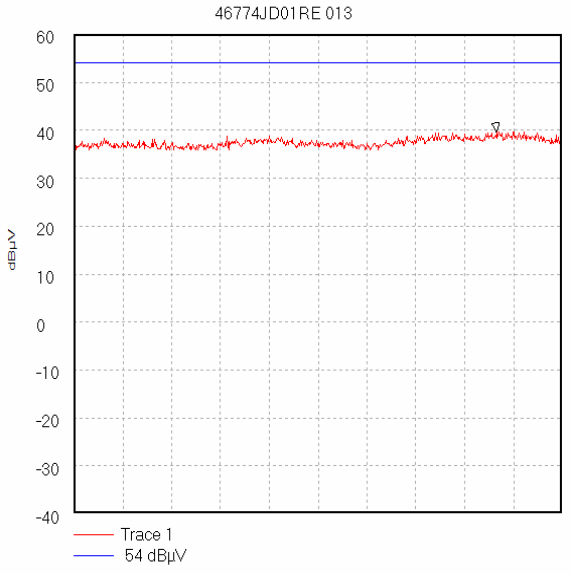
Start 1.0 GHz; Stop 2.0 GHz
Ref 60 dBµV; Ref Offset 0.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 1.0 GHz, 49.26 dBµV
Display Line: 54 dBµV; ; Limit Test Passed
26/01/2005 10:55:30



Start 2.0 GHz; Stop 4.0 GHz
Ref 60 dBµV; Ref Offset 0.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 3.042222 GHz, 51.04 dBµV
Display Line: 54 dBµV; ; Limit Test Passed
26/01/2005 11:05:42



Start 4.0 GHz; Stop 6.0 GHz
Ref 60 dBµV; Ref Offset 19.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 50.0 mS
Peak 4.89 GHz, 53.0 dBµV
Display Line: 54 dBµV;
27/01/2005 12:03:25



Start 6.0 GHz; Stop 8.0 GHz
Ref 60 dBµV; Ref Offset -7.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 50.0 mS
Peak 7.73 GHz, 39.67 dBµV
Display Line: 54 dBµV;
27/01/2005 12:44:09

Test of: **Orthogon Systems.**
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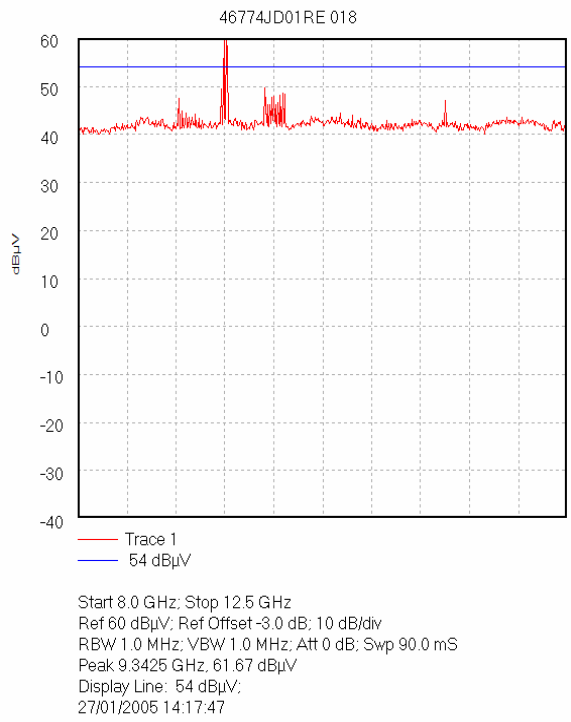
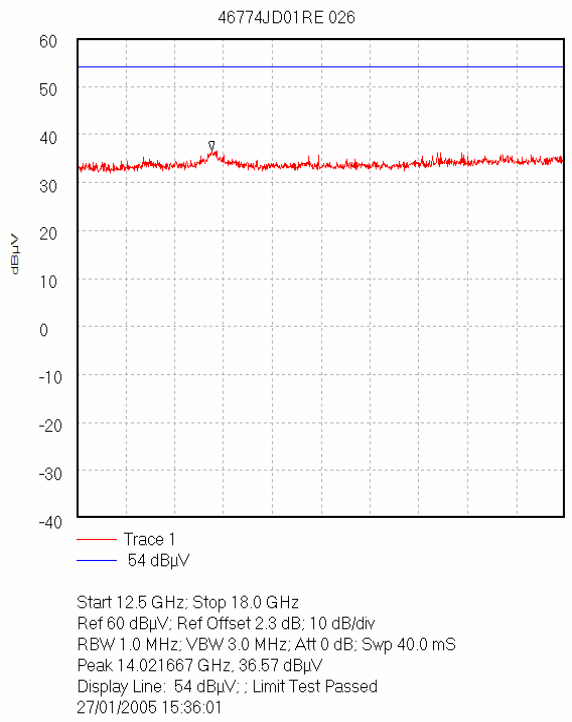
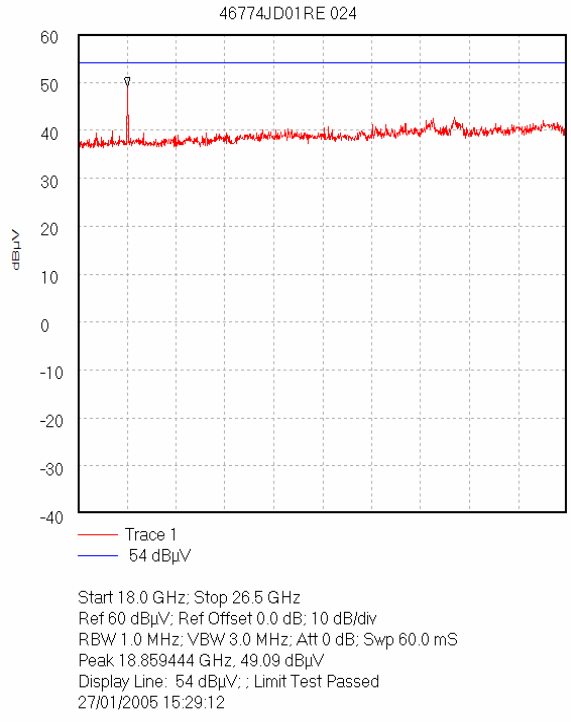
Idle Radiated Spurious Emissions: Section 15.109 (Continued)



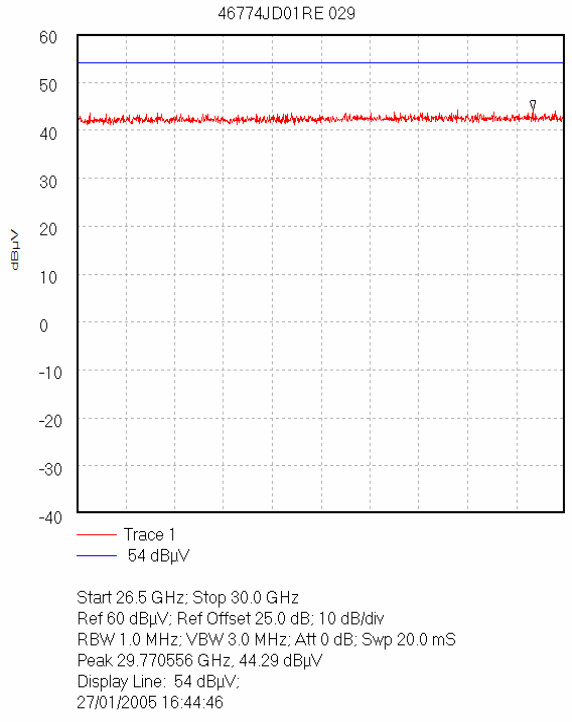
Start 8.0 GHz; Stop 12.5 GHz
Ref 60 dBµV; Ref Offset -3.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 90.0 mS
Peak 9.3425 GHz, 61.67 dBµV
Display Line: 54 dBµV;
27/01/2005 14:17:47



Start 12.5 GHz; Stop 18.0 GHz
Ref 60 dBµV; Ref Offset 2.3 dB; 10 dB/div
RBW 1.0 MHz; VBW 3.0 MHz; Att 0 dB; Swp 40.0 mS
Peak 14.021667 GHz, 36.57 dBµV
Display Line: 54 dBµV; ; Limit Test Passed
27/01/2005 15:36:01



Start 18.0 GHz; Stop 26.5 GHz
Ref 60 dBµV; Ref Offset 0.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 3.0 MHz; Att 0 dB; Swp 60.0 mS
Peak 18.859444 GHz, 49.09 dBµV
Display Line: 54 dBµV; ; Limit Test Passed
27/01/2005 15:29:12



Start 26.5 GHz; Stop 30.0 GHz
Ref 60 dBµV; Ref Offset 25.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 3.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 29.770556 GHz, 44.29 dBµV
Display Line: 54 dBµV;
27/01/2005 16:44:46

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Receiver Mode Radiated Emissions: Section 15.109 (Continued)

7.3.4. Electric Field Strength Measurements (Frequency Range: 1 to 30 GHz)

Results for Radiowave 37.7 dBi antenna

Highest Peak Level

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
1.000010	Vert.	30.4	21.5	0.5	52.4	74.0	21.6	Complied
1.099823	Vert.	28.4	21.5	0.5	50.4	74.0	23.6	Complied
1.119960	Vert.	23.9	21.5	0.5	45.9	74.0	28.1	Complied
1.499315	Vert.	22.3	21.5	0.6	44.4	74.0	29.6	Complied
1.625010	Horiz.	21.5	21.6	0.7	43.8	74.0	30.2	Complied
2.972785	Vert.	24.8	22.0	0.9	47.7	74.0	26.3	Complied
3.045830	Horiz.	26.1	22.7	1.0	49.8	74.0	24.2	Complied
4.890080	Vert.	22.5	24.2	1.3	48.0	74.0	26.0	Complied
8.927610	Horiz.	18.0	30.4	1.8	50.2	74.0	23.8	Complied
9.719432	Horiz.	16.9	30.5	1.9	49.3	74.0	24.7	Complied

Highest Average Level

Frequency (GHz)	Antenna Polarity	Detector Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Actual Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
1.000010	Vert.	27.4	21.5	0.5	49.4	54.0	4.6	Complied
1.099823	Vert.	24.1	21.5	0.5	46.1	54.0	7.9	Complied
1.119960	Vert.	17.6	21.5	0.5	39.6	54.0	14.4	Complied
1.499315	Vert.	28.3	21.5	0.6	40.4	54.0	13.6	Complied
1.625010	Horiz.	15.3	21.6	0.7	37.6	54.0	16.4	Complied
2.972785	Vert.	18.9	22.0	0.9	41.8	54.0	12.2	Complied
3.045830	Horiz.	22.6	22.7	1.0	46.3	54.0	7.7	Complied
4.890080	Vert.	21.7	24.2	1.3	47.2	54.0	6.8	Complied
8.927610	Horiz.	16.6	30.4	1.8	48.8	54.0	5.2	Complied
9.719432	Horiz.	16.2	30.5	1.9	48.6	54.0	5.4	Complied

Note(s):

Note: Plots 46774JD01RE018 and 46774JD01RE024 shows emissions appearing at 9.3425 GHz, 18.859444 GHz and those being indicated at the right hand side of 46774JD01RE018 plot have been confirmed as background emissions not emitted from the EUT. Therefore, no final measurements were recorded.

7.4. Transmitter AC Conducted Spurious Emissions: Section 15.207

7.4.1. The EUT was configured for AC conducted emissions measurements as described in Section 9 of this report.

7.4.2. Tests were performed to identify the maximum emission levels on the AC Mains line of the EUT.

Results:

Top Channel: Quasi-Peak Detector Measurements on Live and Neutral Lines

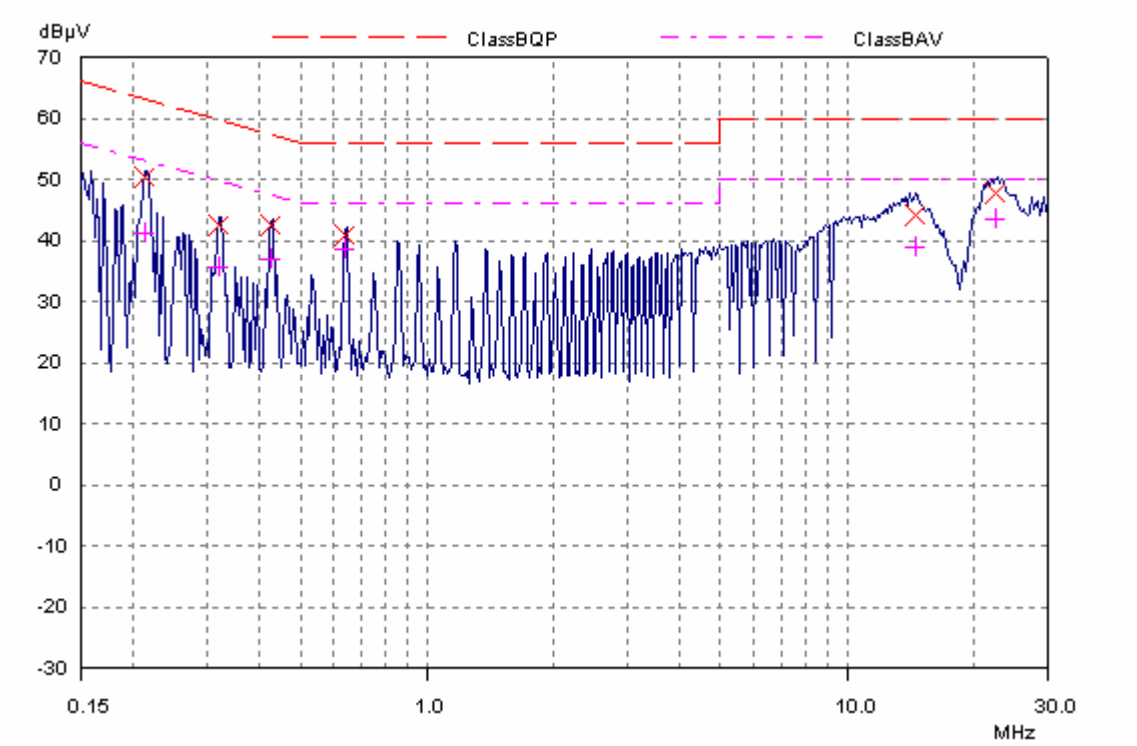
Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.21391	Live	50.4	63.1	12.7	Complied
0.31969	Neutral	42.5	59.7	17.2	Complied
0.42712	Live	42.6	57.3	14.7	Complied
0.64080	Neutral	40.9	56.0	15.1	Complied
14.50619	Neutral	44.2	60.0	15.8	Complied
22.62350	Neutral	47.8	60.0	12.2	Complied

Top Channel: Average Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.21391	Neutral	41.1	53.1	12.0	Complied
0.31969	Neutral	35.6	49.7	14.1	Complied
0.42712	Neutral	36.9	47.3	10.4	Complied
0.64080	Neutral	38.4	46.0	7.6	Complied
14.50619	Neutral	38.7	50.0	11.3	Complied
22.62350	Neutral	43.4	50.0	6.6	Complied

Test of: **Orthogon Systems.**
Spectra OS581XX.
To: **FCC Part 15.247**

Transmitter AC Conducted Spurious Emissions: Section 15.207 (Continued)



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.

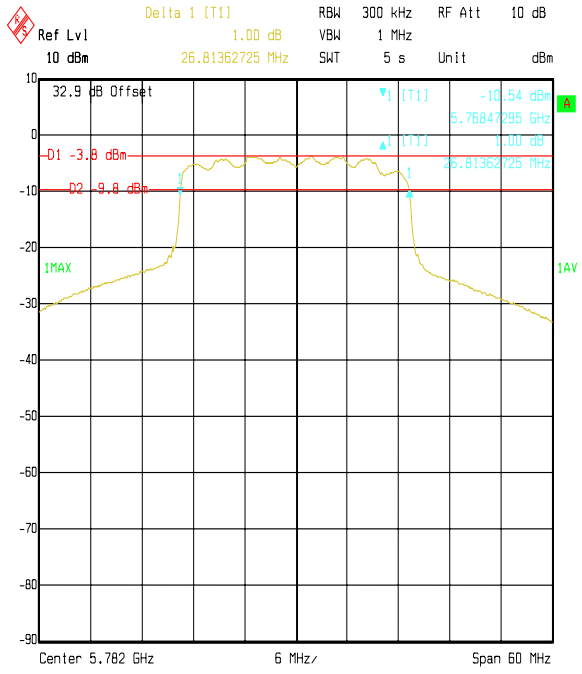
7.5.Transmitter Minimum 6 dB Bandwidth: Section 15.247(a)(2)

7.5.1. The EUT was configured for transmitter minimum bandwidth measurements as described in Section 9 of this report.

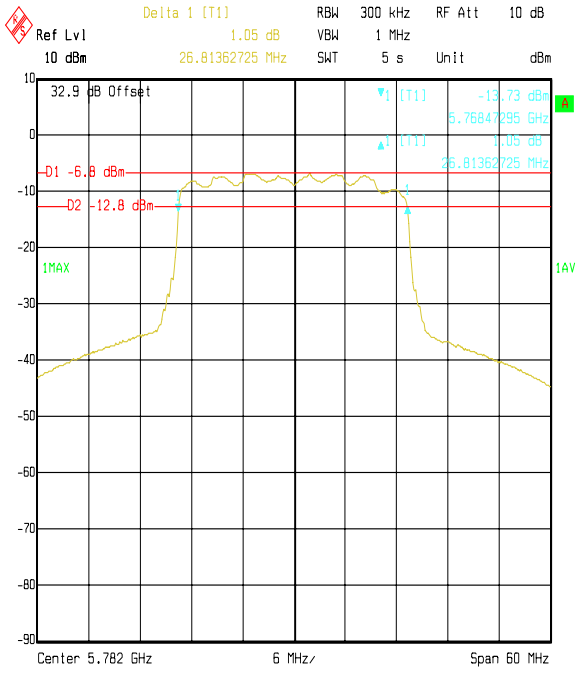
7.5.2. Tests were performed to identify the 6 dB bandwidth of the fundamental signal.

Results:

Channel	Channel	Transmitter 6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
BPSK	Middle	26.814	≥ 0.5	26.314	Complied
QPSK	Middle	26.814	≥ 0.5	26.314	Complied
16 QAM	Middle	26.814	≥ 0.5	26.314	Complied
64QAM	Middle	26.784	≥ 0.5	26.284	Complied
256 QAM	Middle	26.784	≥ 0.5	26.284	Complied
Acquisition	Middle	10.100	≥ 0.5	9.600	Complied



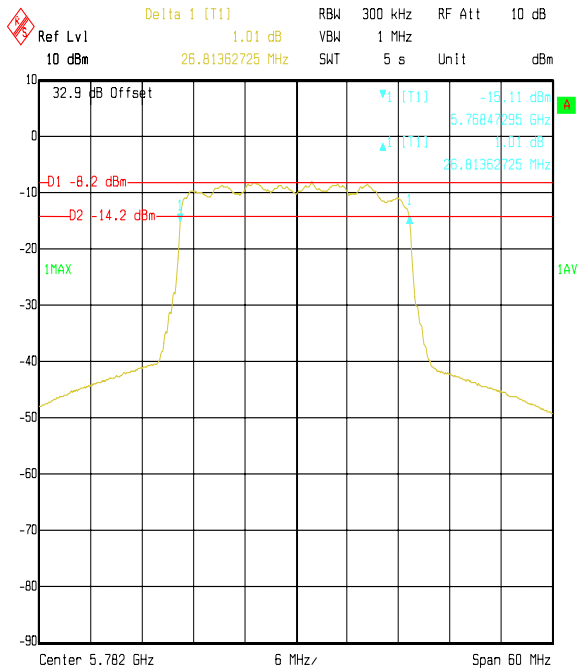
Title: Orthogon EUT; Spectra OS58XX FCC Part15.247
Comment A: 46774JD01 BPSK Middle Channel. -6dB Bandwidth
Date: 17.JAN.2005 13:14:59



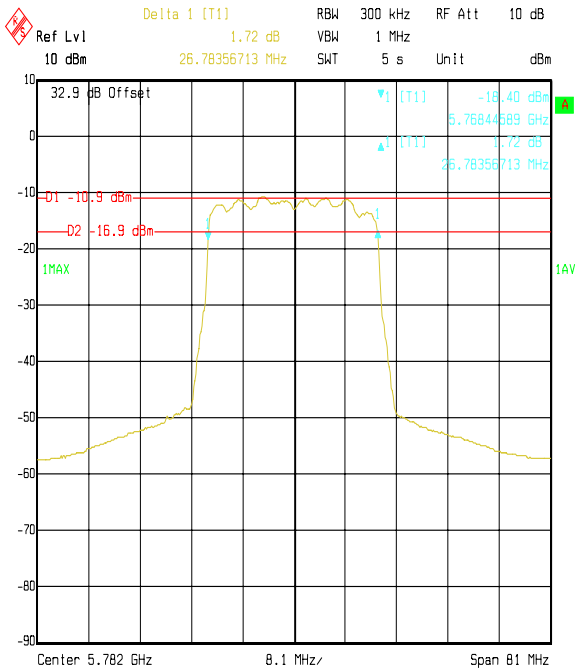
Title: Orthogon EUT; Spectra OS58XX FCC Part15.247
Comment A: 46774JD01 QPSK Middle Channel. -6dB Bandwidth
Date: 17.JAN.2005 13:12:01

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

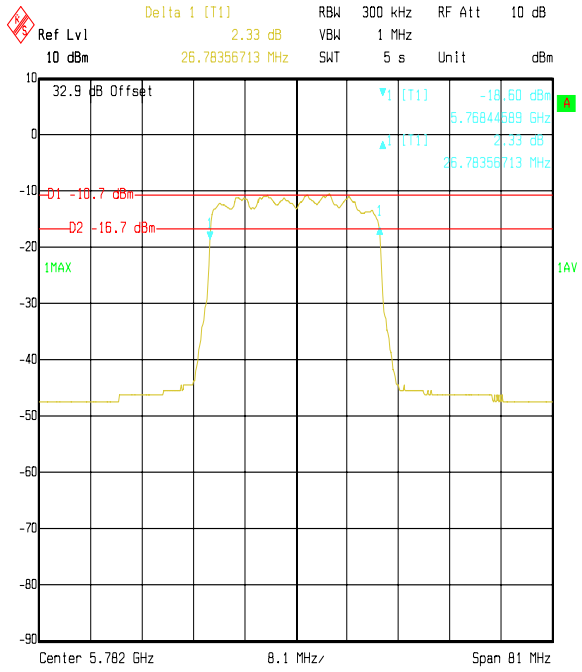
Transmitter Minimum 6 dB Bandwidth: Section 15.247(a)(2) (Continued)



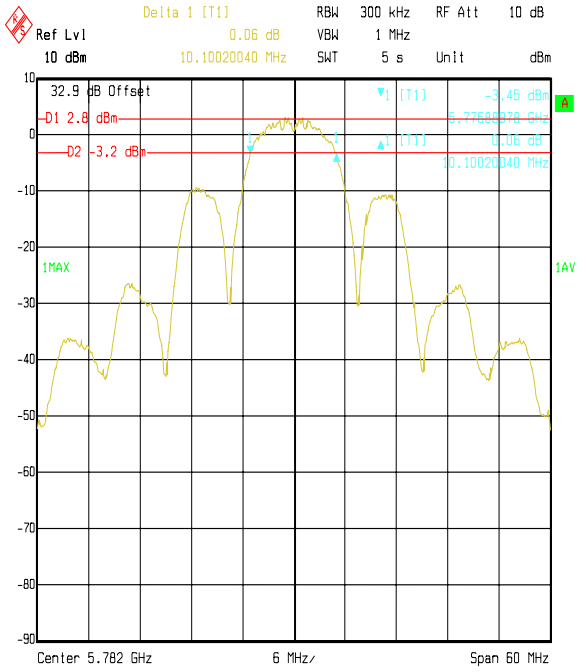
Title: Orthogon EUT; Spectra OS58XX FCC Part15.247
Comment A: 46774JD01 16QAM Middle Channel. -6dB Bandwidth
Date: 17.JAN.2005 13:10:00



Title: Orthogon EUT; Spectra OS58XX FCC Part15.247
Comment A: 46774JD01 64QAM Middle Channel. -6dB Bandwidth
Date: 17.JAN.2005 13:08:24



Title: Orthogon EUT; Spectra OS58XX FCC Part15.247
Comment A: 46774JD01 256QAM Middle Channel. -6dB Bandwidth
Date: 17.JAN.2005 13:06:52



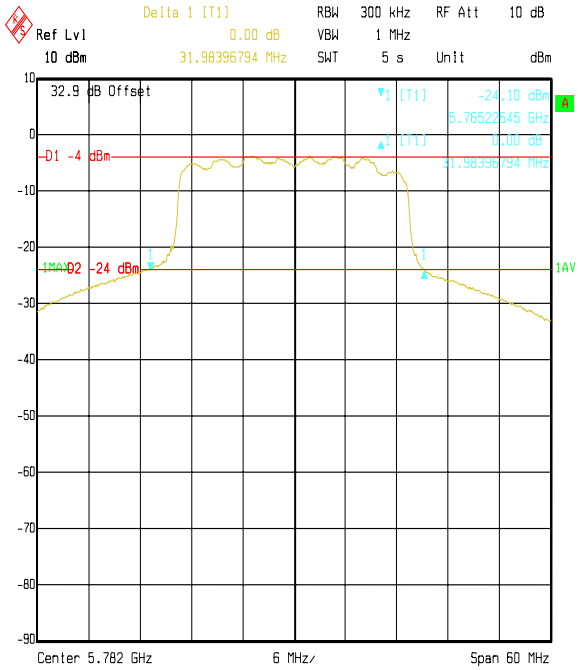
Title: Orthogon EUT; Spectra OS58XX FCC Part15.247
Comment A: 46774JD01 Acquisition Middle Channel. -6dB Bandwidth
Date: 17.JAN.2005 13:16:40

7.6.Transmitter 20 dB Bandwidth: Section 2.1049

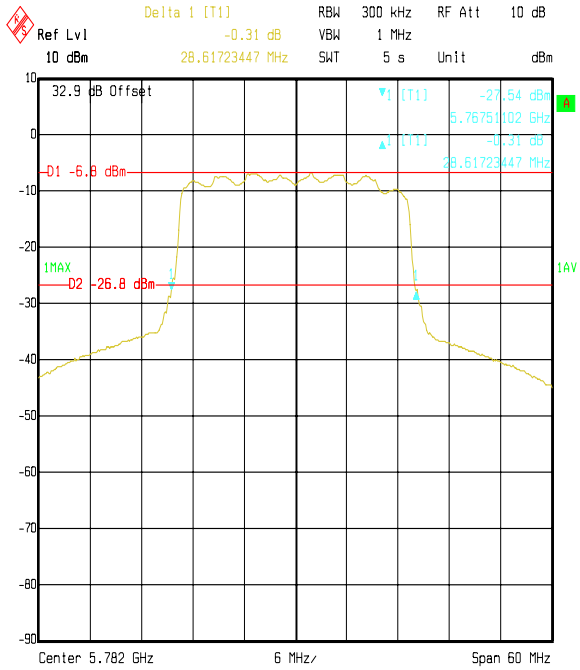
7.6.1. The EUT was configured for 20 dB bandwidth measurements as described in Section 9 of this report.

7.6.2. Tests were performed to identify the 20 dB bandwidth.

Operation Mode	Transmitter 20 dB Bandwidth (kHz)
BPSK	31.984
QPSK	28.617
16 QAM	28.377
64QAM	28.377
256 QAM	28.377
Acquisition	26.212



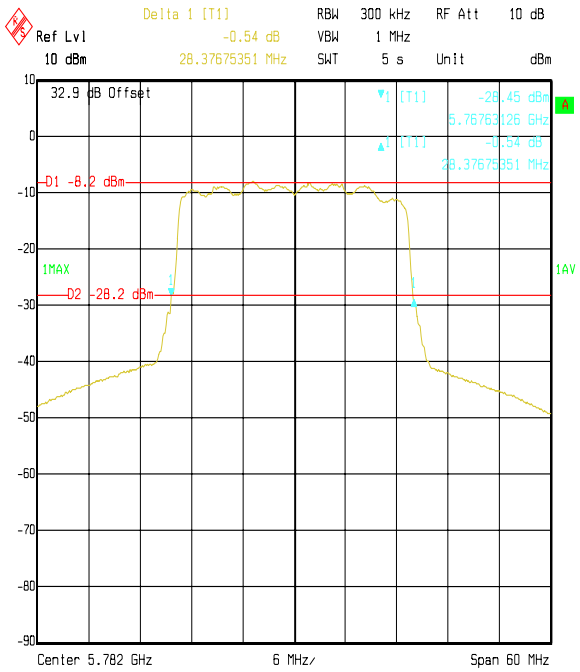
Title: Orthogon EUT; Spectra OS58XX FCC Part15.247
Comment A: 46774JD01 BPSK Middle Channel. 20dB Bandwidth
Date: 17.JAN.2005 13:28:24



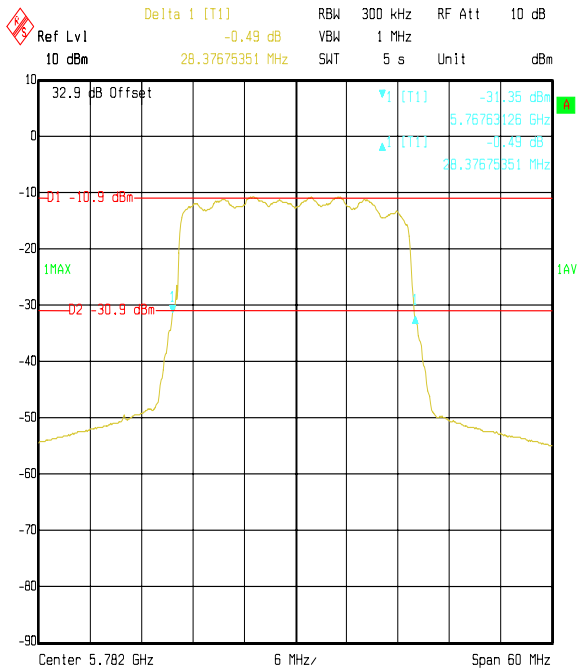
Title: Orthogon EUT; Spectra OS58XX FCC Part15.247
Comment A: 46774JD01 QPSK Middle Channel. 20dB Bandwidth
Date: 17.JAN.2005 13:27:04

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

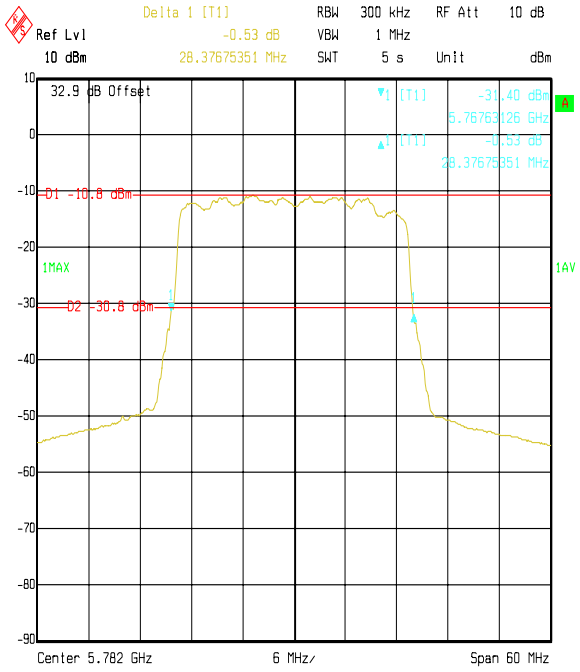
Transmitter 20 dB Bandwidth: Section 2.1049 (Continued)



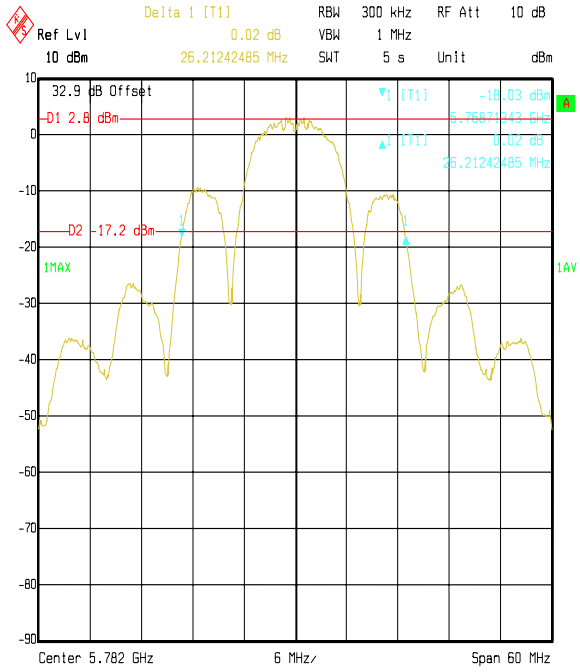
Title: Orthogon EUT; Spectra OS58XX FCC Part15.247
Comment A: 46774JD01 16QAM Middle Channel. 20dB Bandwidth
Date: 17.JAN.2005 13:25:54



Title: Orthogon EUT; Spectra OS58XX FCC Part15.247
Comment A: 46774JD01 64QAM Middle Channel. 20dB Bandwidth
Date: 17.JAN.2005 13:24:49



Title: Orthogon EUT; Spectra OS58XX FCC Part15.247
Comment A: 46774JD01 256QAM Middle Channel. 20dB Bandwidth
Date: 17.JAN.2005 13:23:33



Title: Orthogon EUT; Spectra OS58XX FCC Part15.247
Comment A: 46774JD01 Acquisition Middle Channel. 20dB Bandwidth
Date: 17.JAN.2005 13:21:10

7.7. Transmitter Peak Power Spectral Density: Section 15.247(d)

7.7.1. The EUT was configured for transmitter peak power spectral density measurements as described in Section 9 of this report.

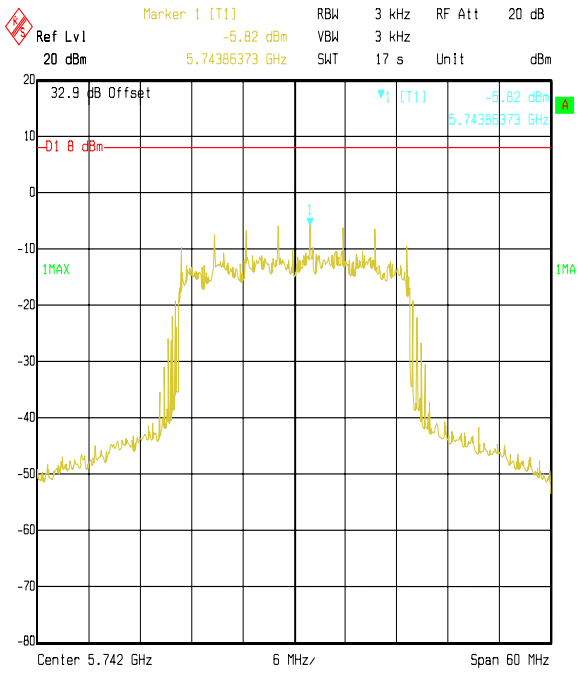
7.7.2. Tests were performed to identify the maximum peak power spectral density of the fundamental.

Results for BPSK

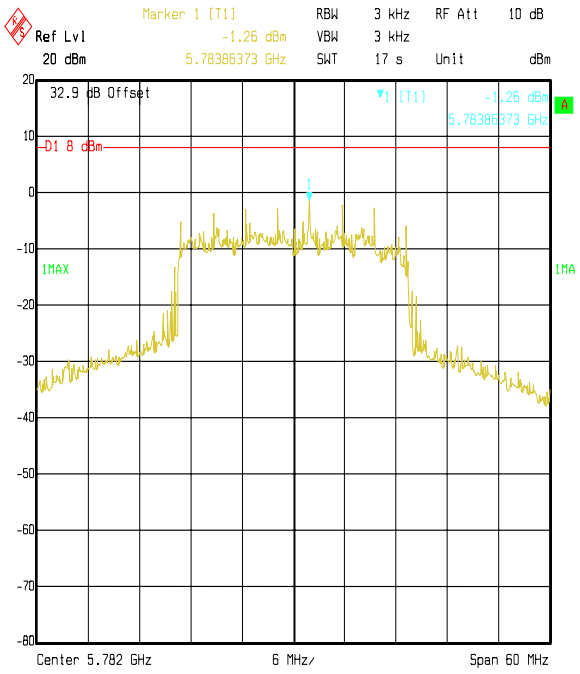
Channel	Antenna Polarity	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	Vert.	-5.8	8.0	13.8	Complied
Bottom	Horiz.	-5.3	8.0	13.3	Complied
Middle	Vert.	-1.3	8.0	9.3	Complied
Middle	Horiz.	-1.5	8.0	9.5	Complied
Top	Vert.	-5.0	8.0	13.0	Complied
Top	Horiz.	-5.7	8.0	13.7	Complied

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

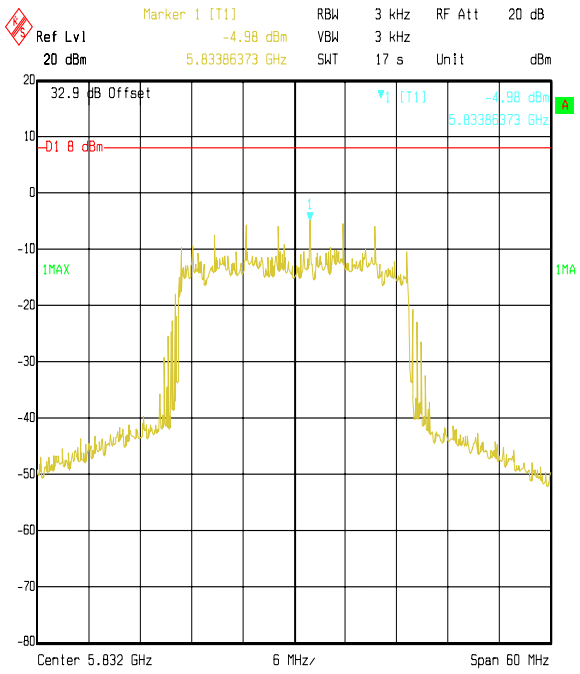
Transmitter Peak Power Spectral Density: Section 15.247(d) (Continued)



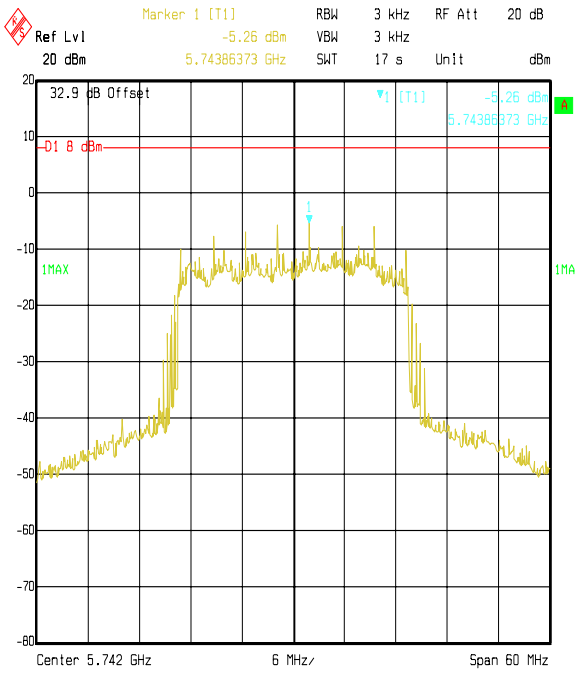
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 BPSK Bottom Channel. Spectral Power Density
Date: 17.JAN.2005 16:07:23



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247
Comment A: 46774JD01 BPSK Middle Channel. Spectral Power Density
Date: 17.JAN.2005 13:35:39



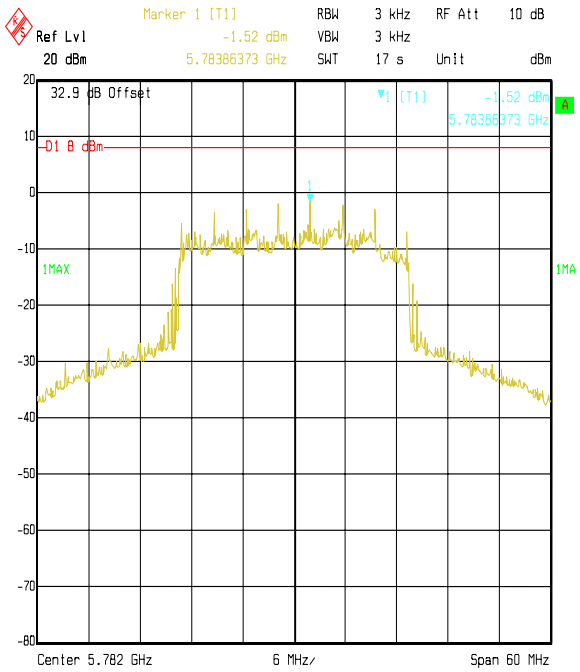
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 BPSK Top Channel. Spectral Power Density
Date: 17.JAN.2005 17:22:00



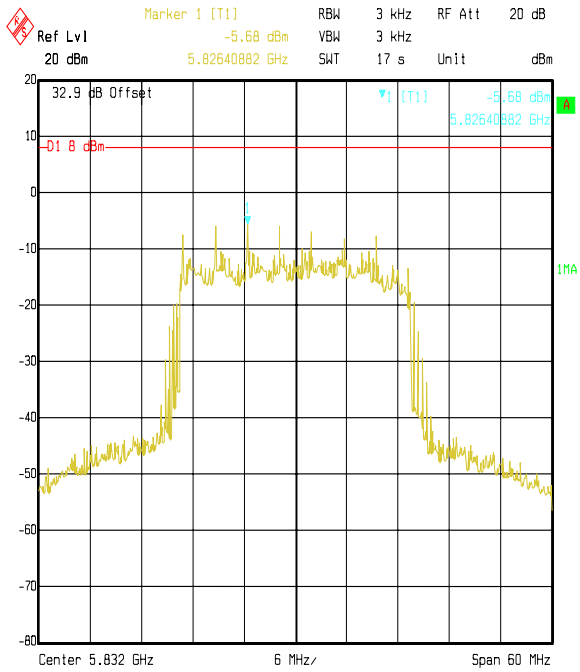
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 BPSK Bottom Channel. Spectral Power Density
Date: 17.JAN.2005 16:02:35

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

Transmitter Peak Power Spectral Density: Section 15.247(d) (Continued)



Title: Orthogon EUT; Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 BPSK Middle Channel. Spectral Power Density
Date: 17.JAN.2005 15:06:00



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 BPSK Top Channel. Spectral Power Density
Date: 17.JAN.2005 17:10:02

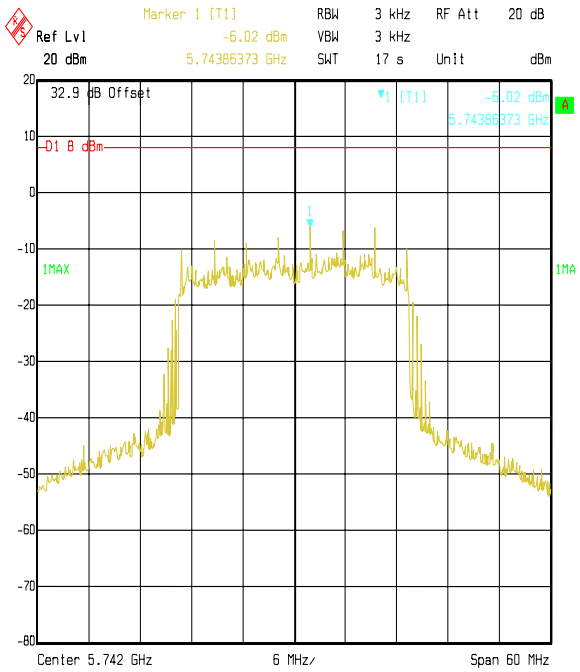
Transmitter Peak Power Spectral Density (Continued)

Results for QPSK

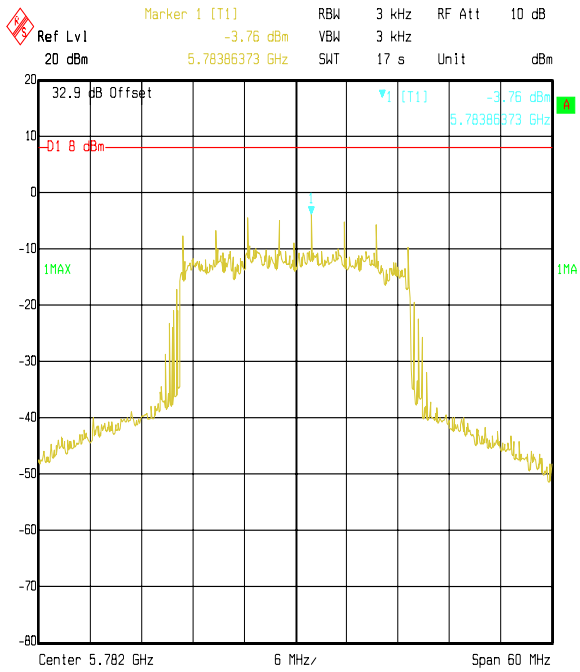
Channel	Antenna Polarity	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	Vert.	-6.0	8.0	14.0	Complied
Bottom	Horiz.	-6.4	8.0	14.4	Complied
Middle	Vert.	-3.8	8.0	11.8	Complied
Middle	Horiz.	-4.3	8.0	12.3	Complied
Top	Vert.	-4.4	8.0	12.4	Complied
Top	Horiz.	-5.0	8.0	13.0	Complied

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

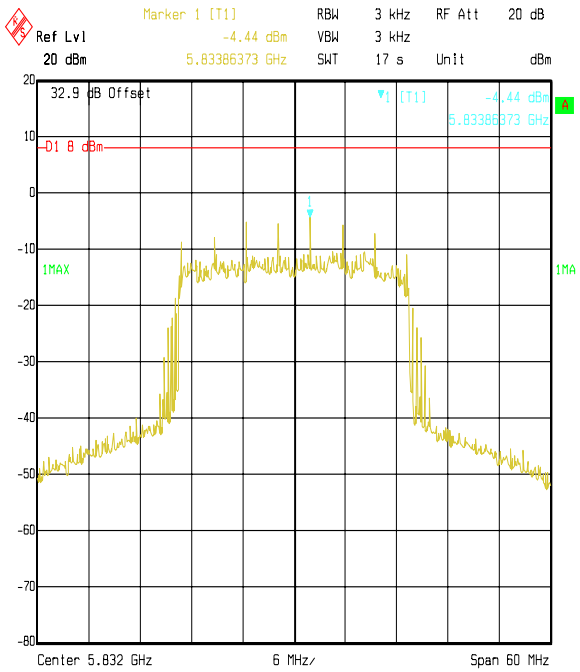
Transmitter Peak Power Spectral Density: Section (Continued)



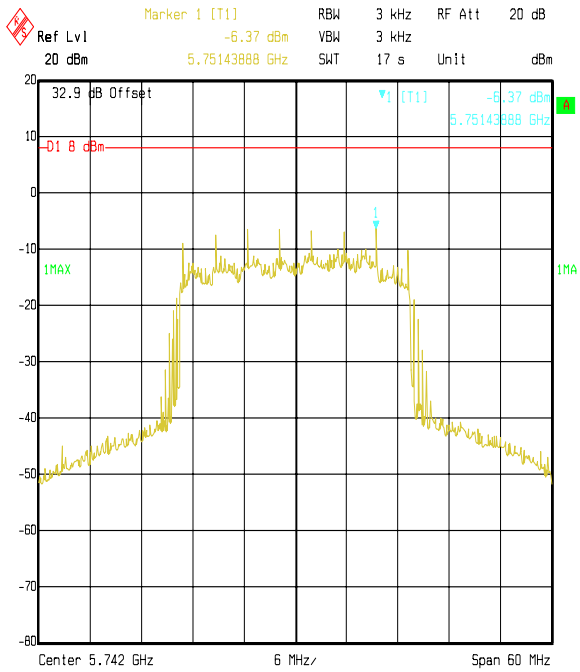
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 QPSK Bottom Channel. Spectral Power Density
Date: 17.JAN.2005 16:09:23



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247
Comment A: 46774JD01 QPSK Middle Channel. Spectral Power Density
Date: 17.JAN.2005 13:36:59



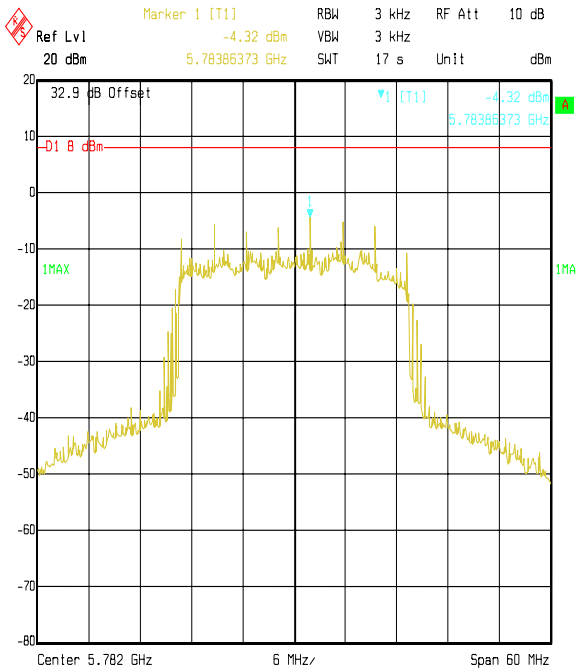
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 QPSK Top Channel. Spectral Power Density
Date: 17.JAN.2005 17:21:05



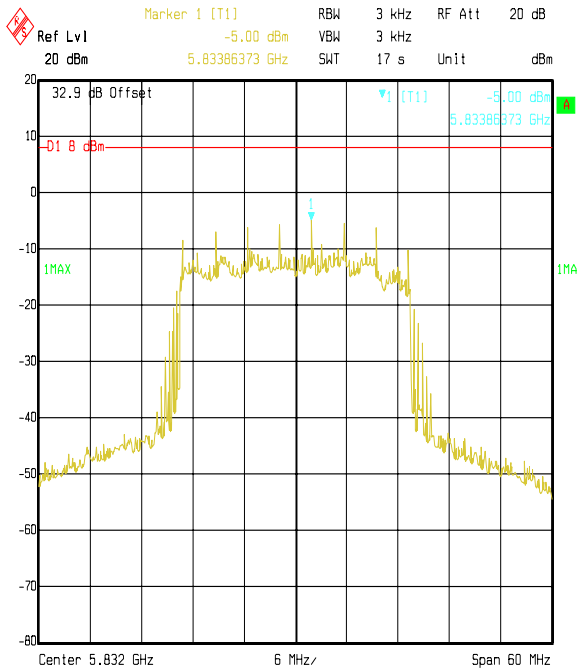
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 QPSK Bottom Channel. Spectral Power Density
Date: 17.JAN.2005 16:01:34

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

Transmitter Peak Power Spectral Density: Section (Continued)



Title: Orthogon EUT; Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 QPSK Middle Channel. Spectral Power Density
Date: 17.JAN.2005 15:03:48



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 QPSK Top Channel. Spectral Power Density
Date: 17.JAN.2005 17:11:12

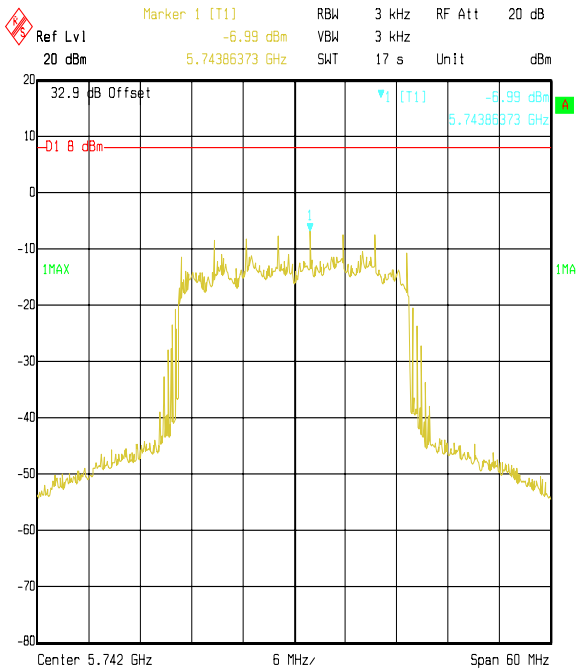
Transmitter Peak Power Spectral Density (Continued)

Results for 16 QAM

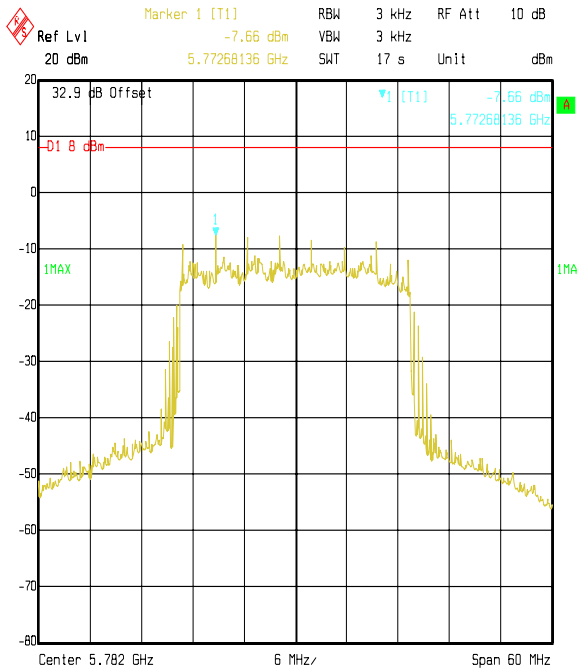
Channel	Antenna Polarity (H/V)	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	Vert.	-7.0	8.0	15.0	Complied
Bottom	Horiz.	-6.6	8.0	14.6	Complied
Middle	Vert.	-7.7	8.0	15.7	Complied
Middle	Horiz.	-6.9	8.0	14.9	Complied
Top	Vert.	-6.4	8.0	14.4	Complied
Top	Horiz.	-6.5	8.0	14.5	Complied

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

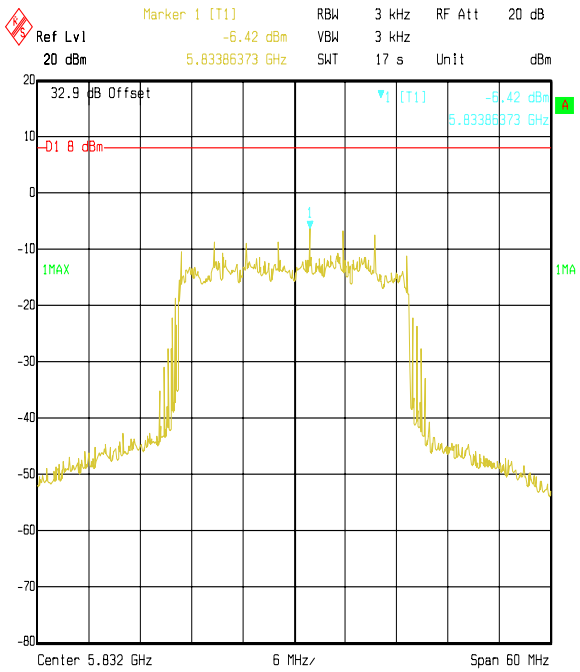
Transmitter Peak Power Spectral Density: Section (Continued)



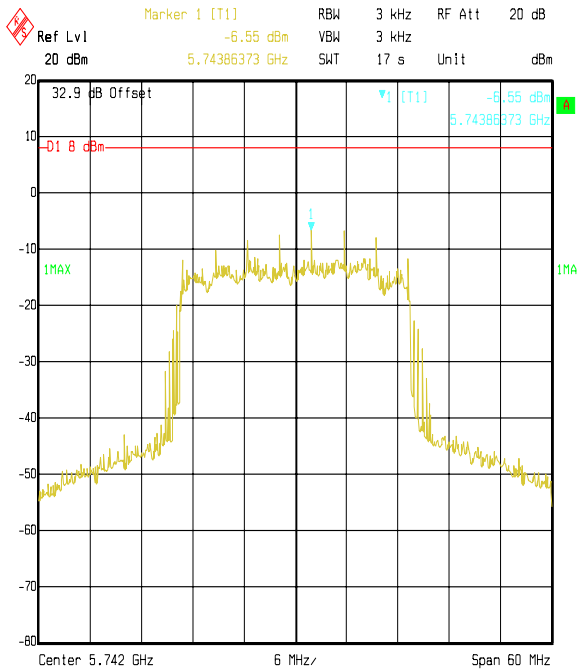
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 16QAM Bottom Channel. Spectral Power Density
Date: 17.JAN.2005 16:11:06



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247
Comment A: 46774JD01 16QAM Middle Channel. Spectral Power Density
Date: 17.JAN.2005 13:38:03



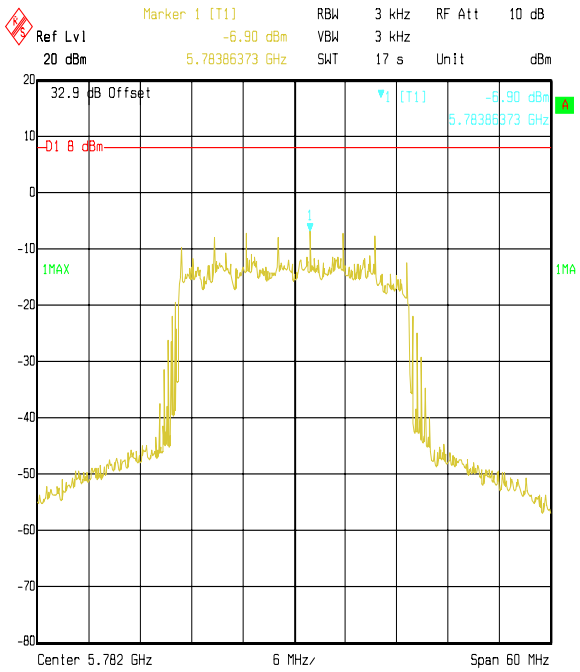
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 16QAM Top Channel. Spectral Power Density
Date: 17.JAN.2005 17:20:15



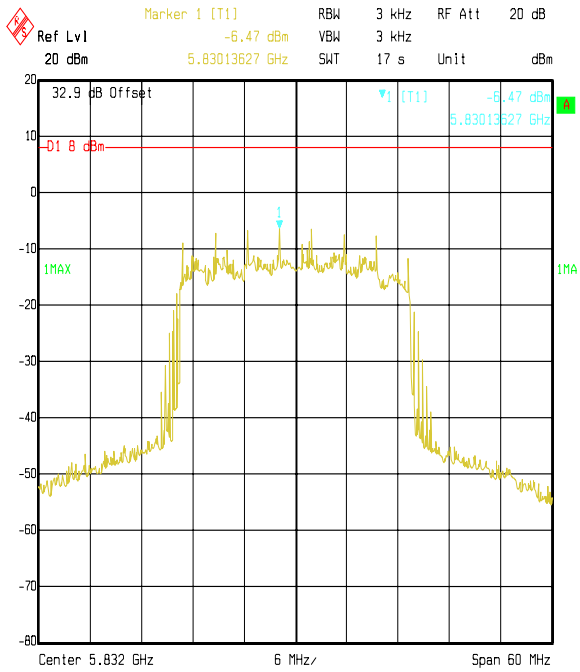
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 16QAM Bottom Channel. Spectral Power Density
Date: 17.JAN.2005 16:00:05

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

Transmitter Peak Power Spectral Density: Section (Continued)



Title: Orthogon EUT; Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 16QAM Middle Channel. Spectral Power Density
Date: 17.JAN.2005 15:02:58



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 16QAM Top Channel. Spectral Power Density
Date: 17.JAN.2005 17:12:32

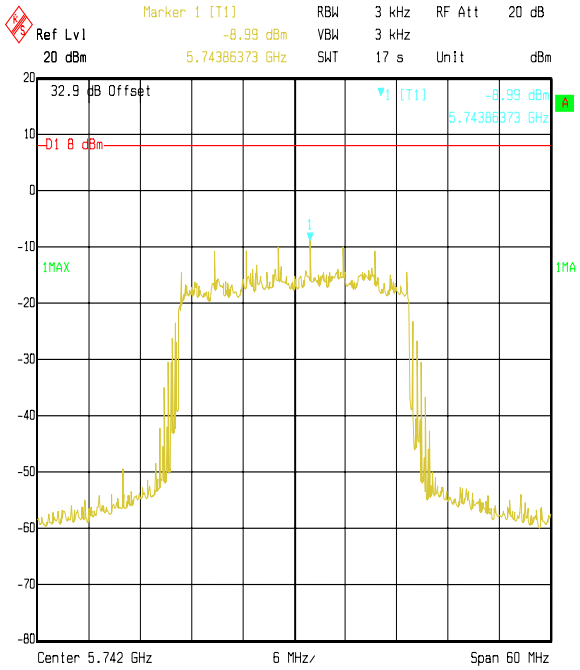
Transmitter Peak Power Spectral Density (Continued)

Results for 64 QAM

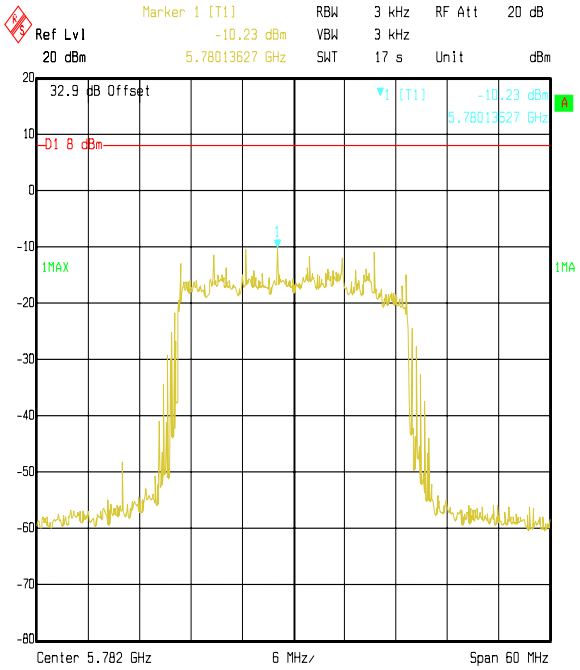
Channel	Antenna Polarity (H/V)	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	Vert.	-9.0	8.0	17.0	Complied
Bottom	Horiz.	-9.9	8.0	17.9	Complied
Middle	Vert.	-10.2	8.0	18.2	Complied
Middle	Horiz.	-10.0	8.0	18.0	Complied
Top	Vert.	-8.8	8.0	16.8	Complied
Top	Horiz.	-9.7	8.0	17.7	Complied

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

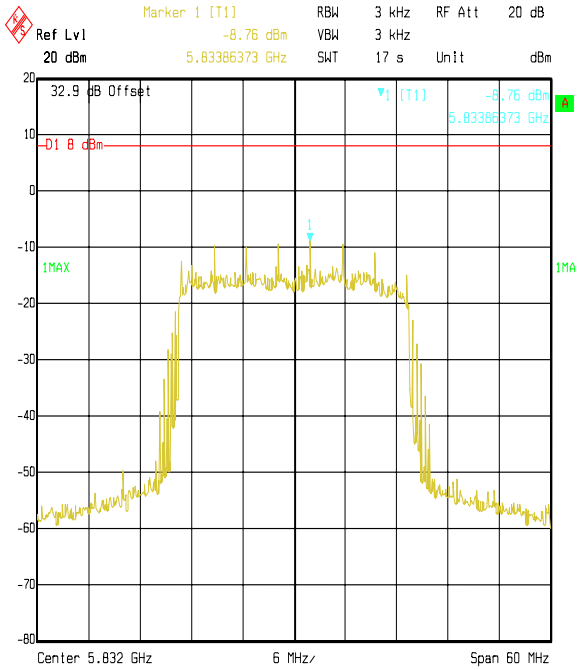
Transmitter Peak Power Spectral Density: Section (Continued)



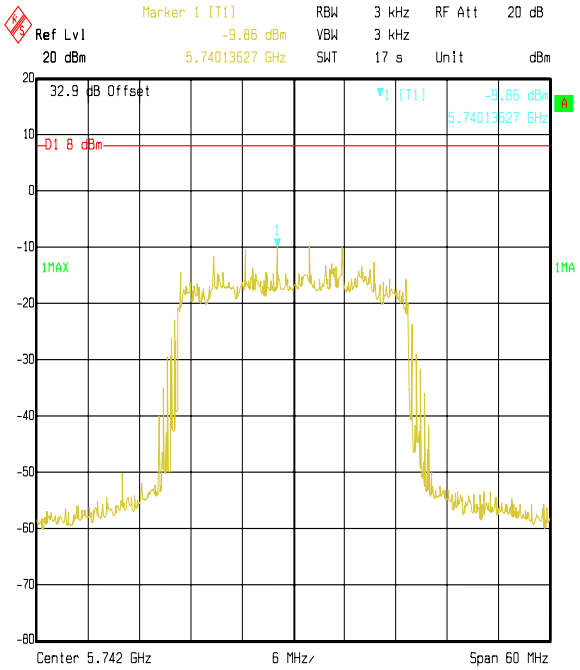
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 64QAM Bottom Channel. Spectral Power Density
Date: 17.JAN.2005 16:12:39



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 64QAM Middle Channel. Spectral Power Density
Date: 17.JAN.2005 17:37:49



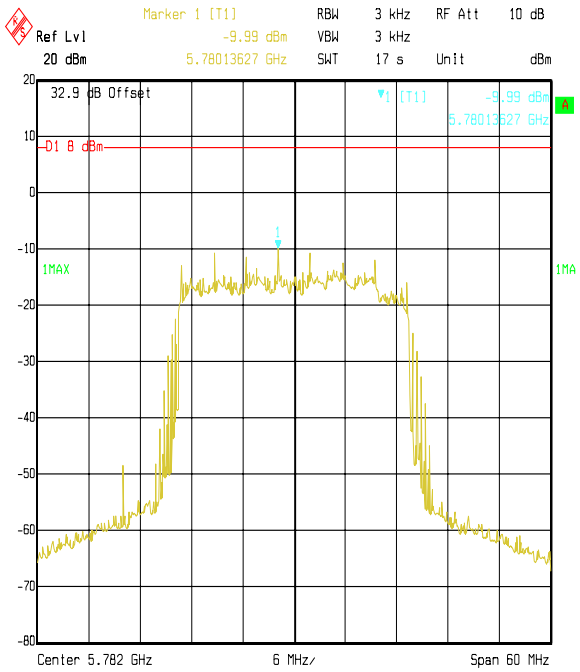
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 64QAM Top Channel. Spectral Power Density
Date: 17.JAN.2005 17:19:19



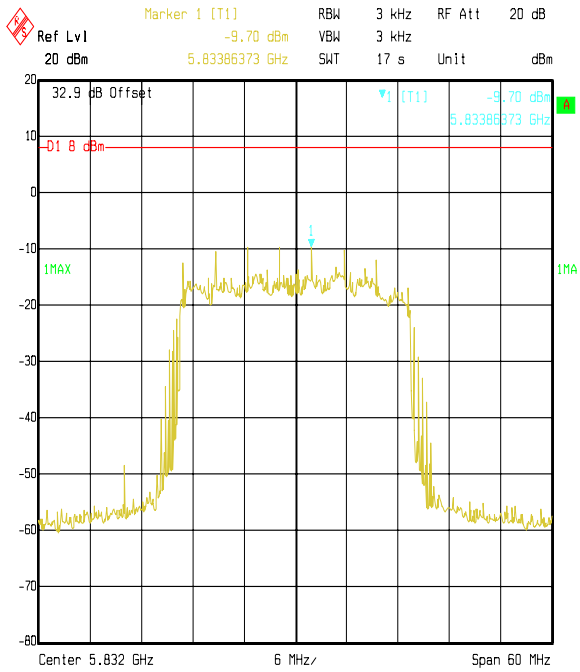
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 64QAM Bottom Channel. Spectral Power Density
Date: 17.JAN.2005 15:59:08

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

Transmitter Peak Power Spectral Density: Section (Continued)



Title: Orthogon EUT; Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 64QAM Middle Channel. Spectral Power Density
Date: 17.JAN.2005 15:01:48



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 64QAM Top Channel. Spectral Power Density
Date: 17.JAN.2005 17:13:31

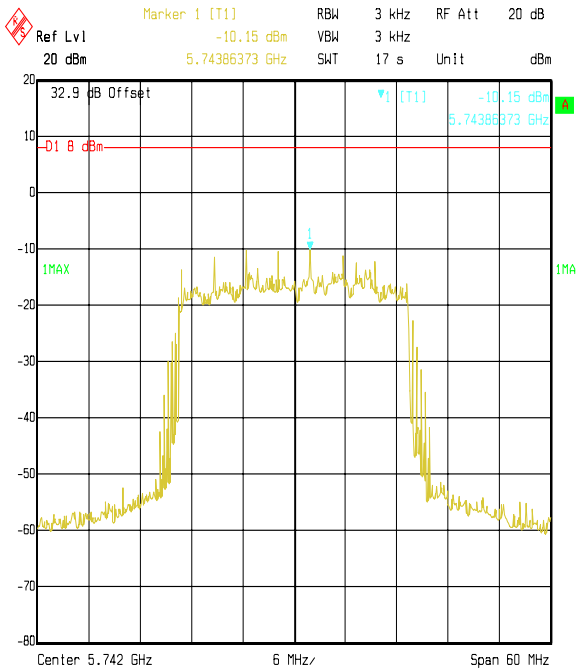
Transmitter Peak Power Spectral Density (Continued)

Results for 256 QAM

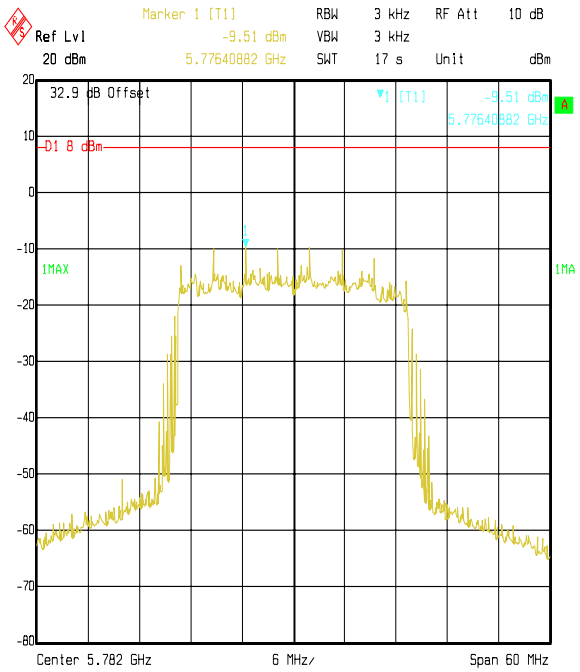
Channel	Antenna Polarity	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	Vert.	-10.2	8.0	18.2	Complied
Bottom	Horiz.	-10.0	8.0	18.0	Complied
Middle	Vert.	-9.5	8.0	17.5	Complied
Middle	Horiz.	-9.7	8.0	17.7	Complied
Top	Vert.	-8.7	8.0	16.7	Complied
Top	Horiz.	-9.7	8.0	17.7	Complied

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

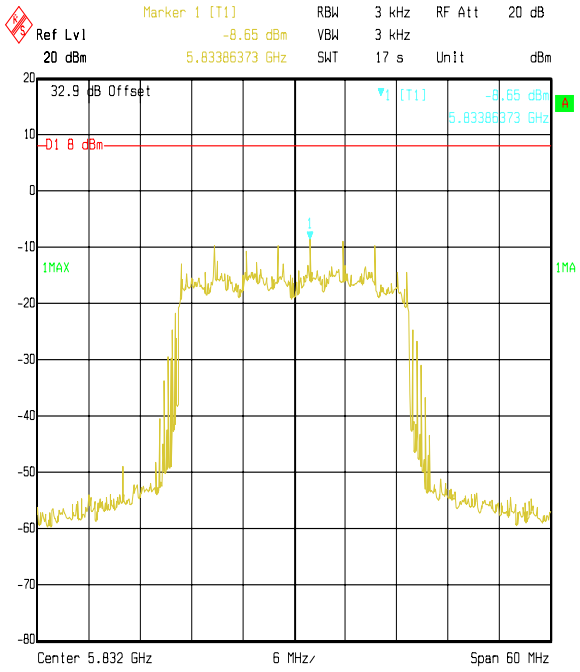
Transmitter Peak Power Spectral Density: Section (Continued)



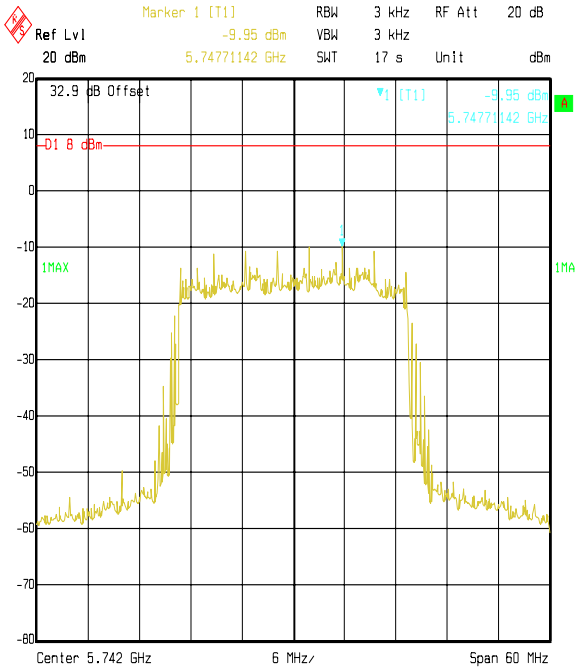
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 256QAM Bottom Channel. Spectral Power Density
Date: 17.JAN.2005 16:13:26



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247
Comment A: 46774JD01 256QAM Middle Channel. Spectral Power Density
Date: 17.JAN.2005 13:39:54



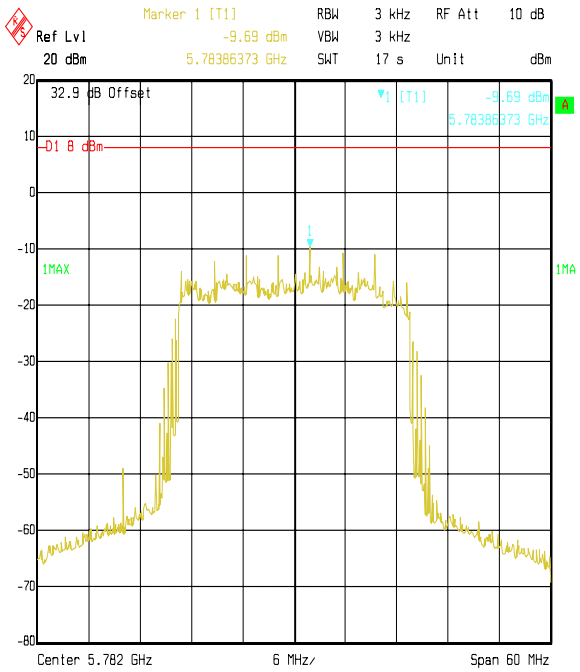
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 256QAM Top Channel. Spectral Power Density
Date: 17.JAN.2005 17:18:27



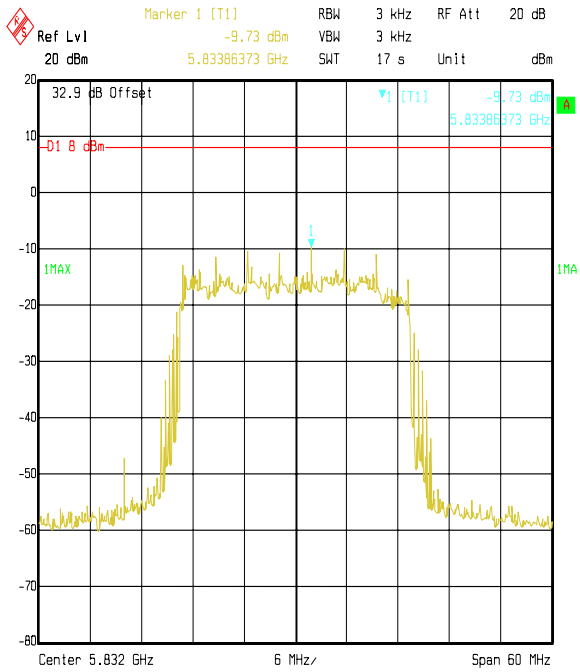
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 256QAM Bottom Channel. Spectral Power Density
Date: 17.JAN.2005 15:58:00

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

Transmitter Peak Power Spectral Density: Section (Continued)



Title: Orthogon EUT; Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 256QAM Middle Channel. Spectral Power Density
Date: 17.JAN.2005 15:00:05



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 256QAM Top Channel. Spectral Power Density
Date: 17.JAN.2005 17:14:25

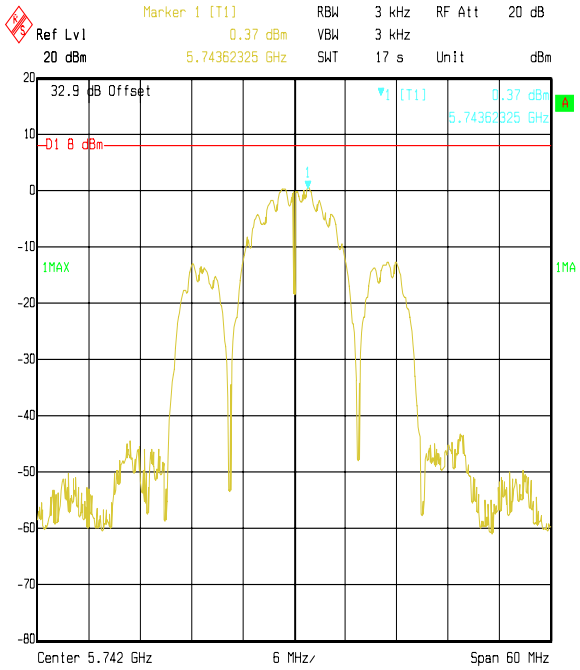
Transmitter Peak Power Spectral Density (Continued)

Results for Acquisition

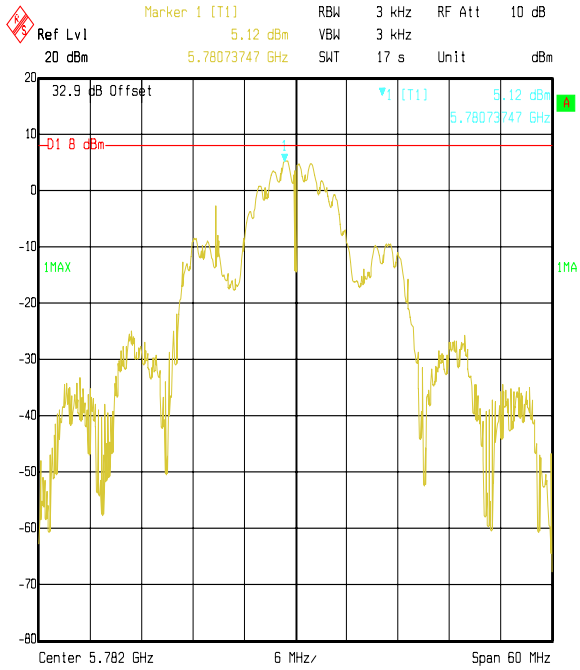
Channel	Antenna Polarity (H/V)	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	Vert.	0.4	8.0	7.6	Complied
Bottom	Horiz.	0.3	8.0	7.7	Complied
Middle	Vert.	5.1	8.0	2.9	Complied
Middle	Horiz.	4.4	8.0	3.6	Complied
Top	Vert.	1.1	8.0	6.9	Complied
Top	Horiz.	0.6	8.0	7.4	Complied

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

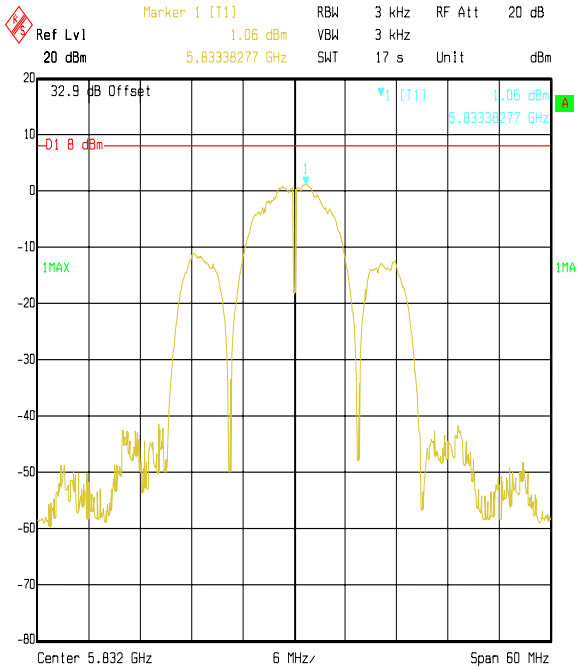
Transmitter Peak Power Spectral Density: Section (Continued)



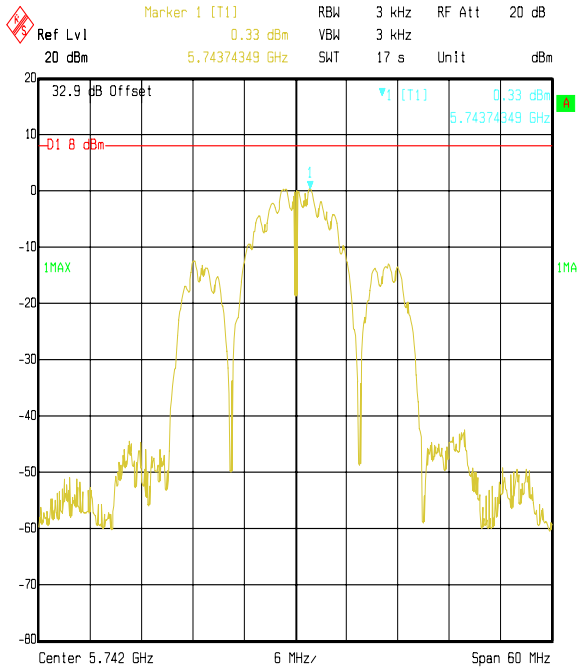
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 ACQUISITION Bottom Channel. Spectral Power Density
Date: 17.JAN.2005 16:14:38



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247
Comment A: 46774JD01 ACQUISITION Middle Channel. Spectral Power Density
Date: 17.JAN.2005 13:40:55



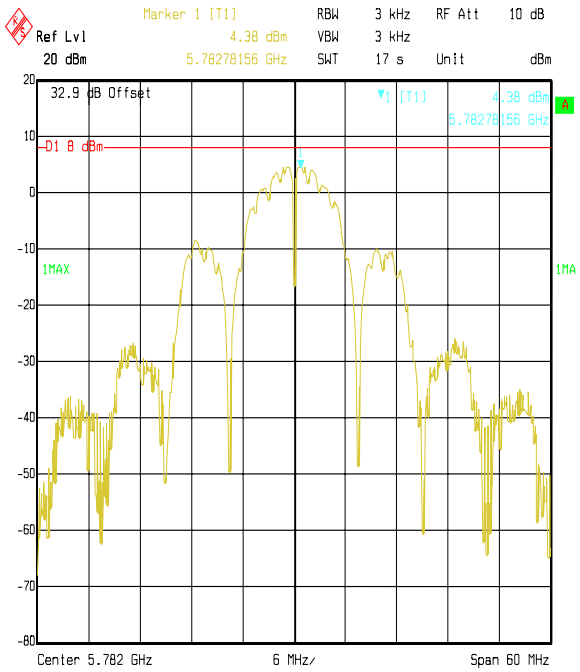
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 ACQUISITION Top Channel. Spectral Power Density
Date: 17.JAN.2005 17:16:44



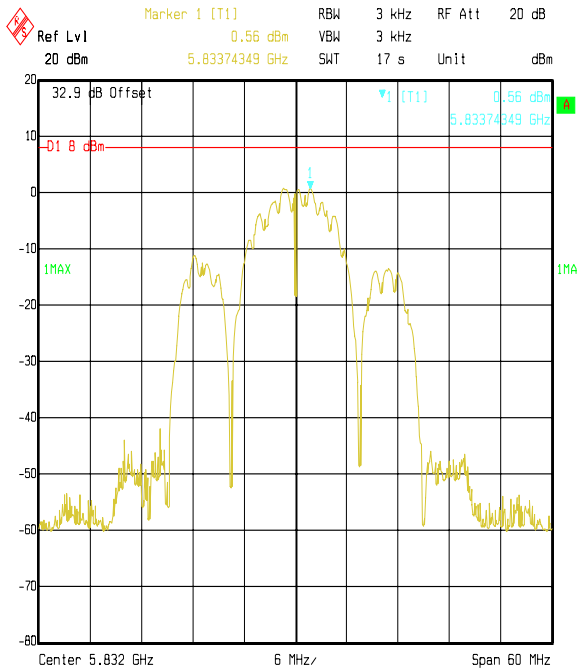
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 ACQUISITION Bottom Channel. Spectral Power Density
Date: 17.JAN.2005 16:03:57

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

Transmitter Peak Power Spectral Density: Section (Continued)



Title: Orthogon EUT; Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 ACQUISITION Middle Channel. Spectral Power Density
Date: 17.JAN.2005 14:58:06



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 ACQUISITION Top Channel. Spectral Power Density
Date: 17.JAN.2005 17:15:22

7.8. Transmitter Maximum Peak Output Power: Section 15.247(b)(3)

7.8.1. The EUT was configured for transmitter peak output power measurements as described in Section 9 of this report.

7.8.2. Tests were performed to identify the transmitter maximum peak output power of the EUT.

Results for BPSK

Channel	Conducted RF O/P Power at Horizontal Polarity Port (dBm)	Conducted RF O/P Power at Vertical Polarity Port (dB)	Total Combined Conducted RF O/P Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	19.8	19.5	22.7	30.0	7.3	Complied
Middle	23.6	23.9	26.8	30.0	3.2	Complied
Top	19.7	19.7	22.7	30.0	7.3	Complied

Note(s):

1. The Peak Output Power was measured with the AC supply voltage to the EUT varied between 85% and 115% of the nominal value of 110 Volts i.e. 93.5 and 126.5 Volts. The variation of the input AC supply voltage to the EUT had no effect on the Peak Output Power and results were identical for all three voltages. Consequently the results given in the table and valid for all three test voltages (93.5 Volts, 110 Volts and 126.5 Volts).

Test of: **Orthogon Systems.**
Spectra OS581XX.
To: **FCC Part 15.247**

Transmitter Maximum Peak Output Power: Section 15.247(b)(3) (Continued)

Results for QPSK

Channel	Conducted RF O/P Power at Horizontal Polarity Port (dBm)	Conducted RF O/P Power at Vertical Polarity Port (dB)	Total Combined Conducted RF O/P Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	19.8	19.5	22.7	30.0	7.3	Complied
Middle	20.6	20.7	23.7	30.0	6.4	Complied
Top	19.7	19.7	22.7	30.0	7.3	Complied

Note(s):

1. The Peak Output Power was measured with the AC supply voltage to the EUT varied between 85% and 115% of the nominal value of 110 Volts i.e. 93.5 and 126.5 Volts. The variation of the input AC supply voltage to the EUT had no effect on the Peak Output Power and results were identical for all three voltages. Consequently the results given in the table and valid for all three test voltages (93.5 Volts, 110 Volts and 126.5 Volts).

Test of: **Orthogon Systems.**
Spectra OS581XX.
To: **FCC Part 15.247**

Transmitter Maximum Peak Output Power: Section 15.247(b)(3) (Continued)

Results for 16 QAM

Channel	Conducted RF O/P Power at Horizontal Polarity Port (dBm)	Conducted RF O/P Power at Vertical Polarity Port (dB)	Total Combined Conducted RF O/P Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	19.1	19.0	22.1	30.0	7.9	Complied
Middle	19.1	19.3	22.2	30.0	7.8	Complied
Top	19.1	19.2	22.2	30.0	7.8	Complied

Note(s):

1. The Peak Output Power was measured with the AC supply voltage to the EUT varied between 85% and 115% of the nominal value of 110 Volts i.e. 93.5 and 126.5 Volts. The variation of the input AC supply voltage to the EUT had no effect on the Peak Output Power and results were identical for all three voltages. Consequently the results given in the table and valid for all three test voltages (93.5 Volts, 110 Volts and 126.5 Volts).

Transmitter Maximum Peak Output Power: Section 15.247(b)(3) (Continued)

Results for 64 QAM

Channel	Conducted RF O/P Power at Horizontal Polarity Port (dBm)	Conducted RF O/P Power at Vertical Polarity Port (dB)	Total Combined Conducted RF O/P Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	16.5	16.6	19.6	30.0	10.4	Complied
Middle	16.4	16.7	19.6	30.0	10.4	Complied
Top	16.3	16.8	19.6	30.0	10.4	Complied

Note(s):

1. The Peak Output Power was measured with the AC supply voltage to the EUT varied between 85% and 115% of the nominal value of 110 Volts i.e. 93.5 and 126.5 Volts. The variation of the input AC supply voltage to the EUT had no effect on the Peak Output Power and results were identical for all three voltages. Consequently the results given in the table and valid for all three test voltages (93.5 Volts, 110 Volts and 126.5 Volts).

Transmitter Maximum Peak Output Power: Section 15.247(b)(3) (Continued)

Results for 256 QAM

Channel	Conducted RF O/P Power at Horizontal Polarity Port (dBm)	Conducted RF O/P Power at Vertical Polarity Port (dB)	Total Combined Conducted RF O/P Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	16.5	16.6	19.6	30.0	10.4	Complied
Middle	16.4	16.7	19.6	30.0	10.4	Complied
Top	16.3	16.7	19.5	30.0	10.5	Complied

Note(s):

1. The Peak Output Power was measured with the AC supply voltage to the EUT varied between 85% and 115% of the nominal value of 110 Volts i.e. 93.5 and 126.5 Volts. The variation of the input AC supply voltage to the EUT had no effect on the Peak Output Power and results were identical for all three voltages. Consequently the results given in the table and valid for all three test voltages (93.5 Volts, 110 Volts and 126.5 Volts).

Test of: **Orthogon Systems.**
Spectra OS581XX.
To: **FCC Part 15.247**

Transmitter Maximum Peak Output Power: Section 15.247(b)(3) (Continued)

Results for Acquisition

Channel	Conducted RF O/P Power at Horizontal Polarity Port (dBm)	Conducted RF O/P Power at Vertical Polarity Port (dB)	Total Combined Conducted RF O/P Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	18.9	18.9	21.9	30.0	8.1	Complied
Middle	23.4	23.4	26.4	30.0	3.6	Complied
Top	19.1	19.1	22.1	30.0	7.9	Complied

Note(s):

1. The Peak Output Power was measured with the AC supply voltage to the EUT varied between 85% and 115% of the nominal value of 110 Volts i.e. 93.5 and 126.5 Volts. The variation of the input AC supply voltage to the EUT had no effect on the Peak Output Power and results were identical for all three voltages. Consequently the results given in the table and valid for all three test voltages (93.5 Volts, 110 Volts and 126.5 Volts).

7.9. Transmitter Conducted Emissions: Section 15.247(c)

7.9.1. The EUT was configured for transmitter conducted emissions measurements as described in Section 9 of this report.

7.9.2. Tests were performed to identify the maximum transmitter conducted emission levels.

7.9.3. The limit lines shown in the plots below are set to a level 30 dB below the measured highest fundamental peak power.

Results:

Bottom Channel

Frequency (MHz)	Antenna Polarity (H/V)	Average Emission Level (dBm)	Average Emission Level (dBc)	Limit (dBc)	Margin (dB)	Result
17237.0	Horiz.	-63.5	-66.0	-30.0	36.0	Complied

Middle Channel

Frequency (MHz)	Antenna Polarity (H/V)	Average Emission Level (dBm)	Average Emission Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725	Vert.	-38.3	-40.6	-30.0	10.6	Complied
5725	Horiz.	-42.2	-44.7	-30.0	14.7	Complied
5850	Vert.	-41.3	-43.6	-30.0	13.6	Complied
5850	Horiz.	-44.7	-47.2	-30.0	17.2	Complied
17339.3	Horiz.	-50.2	-52.7	-30.0	22.7	Complied

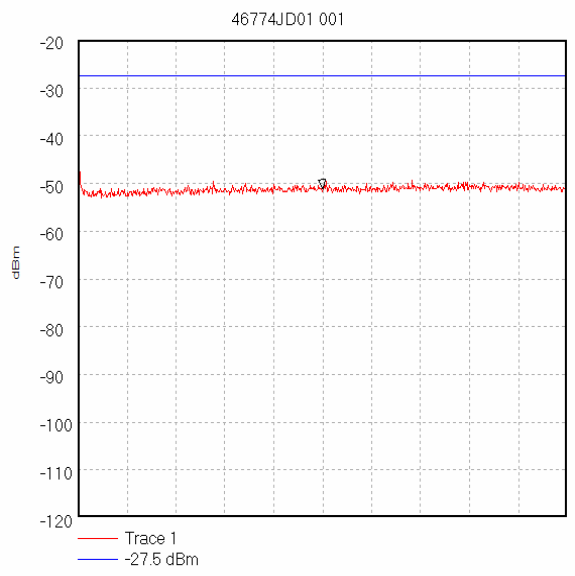
Top Channel

Frequency (MHz)	Average Emission Level (dBm)	Average Emission Level (dBc)	Limit (dBc)	Margin (dB)	Result
17512.5	Horiz.	-74.2	-30.0	46.7	Complied

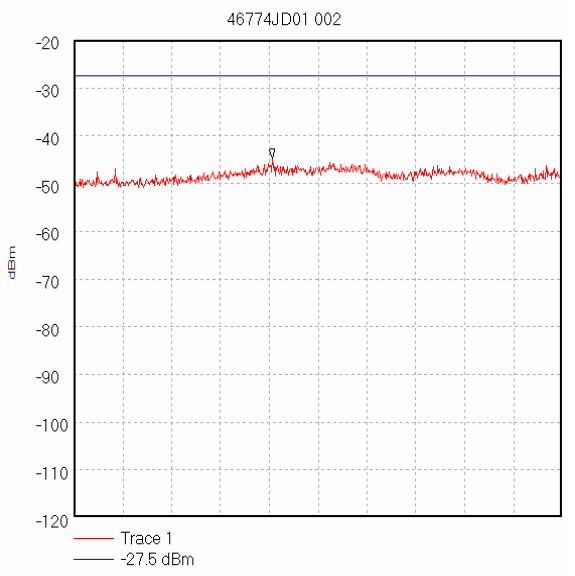
Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

Transmitter Conducted Emissions: Section 15.247(c) (Continued)

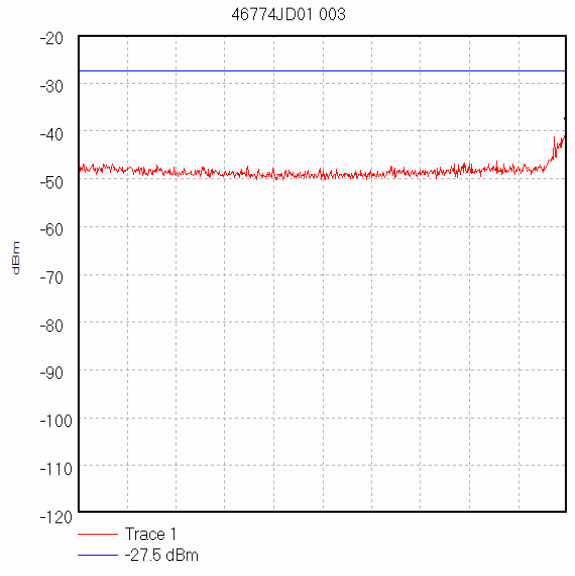
Horizontal Antenna Port



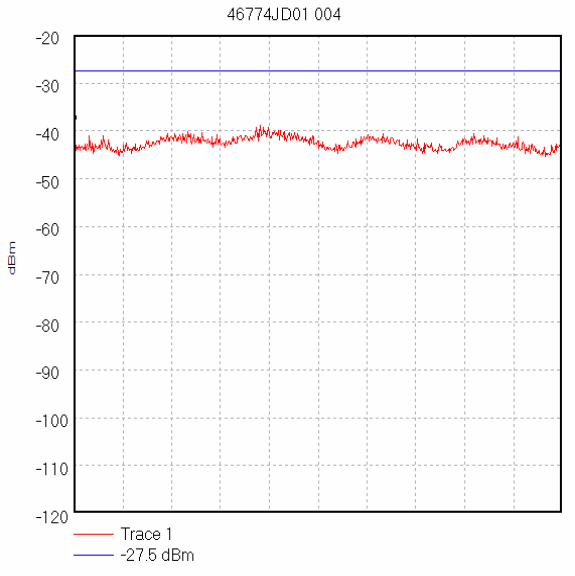
Start 1.0 MHz; Stop 1.0 GHz
Ref -20 dBm; Ref Offset 31.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 300.0 kHz; Att 10 dB; Swp 250.0 mS
Peak 500.5 MHz, -51.17 dBm
Display Line: -27.5 dBm;
17/01/2005 16:57:34



Start 1.0 GHz; Stop 5.0 GHz
Ref -20 dBm; Ref Offset 33.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 300.0 kHz; Att 10 dB; Swp 1.0 S
Peak 2.626667 GHz, -44.67 dBm
Display Line: -27.5 dBm;
17/01/2005 16:58:59



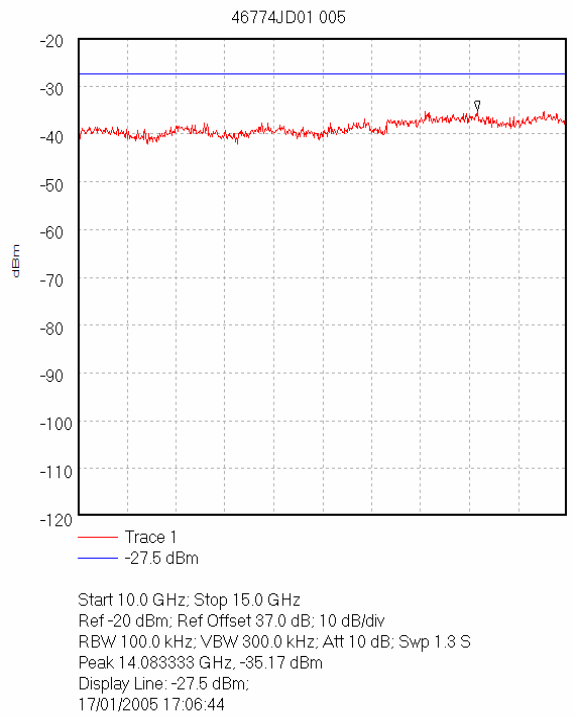
Start 5.0 GHz; Stop 5.725 GHz
Ref -20 dBm; Ref Offset 33.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 300.0 kHz; Att 10 dB; Swp 190.0 mS
Peak 5.725 GHz, -39.0 dBm
Display Line: -27.5 dBm;
17/01/2005 17:00:50



Start 5.85 GHz; Stop 10.0 GHz
Ref -20 dBm; Ref Offset 34.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 300.0 kHz; Att 10 dB; Swp 1.1 S
Peak 5.85 GHz, -38.83 dBm
Display Line: -27.5 dBm;
17/01/2005 17:03:58

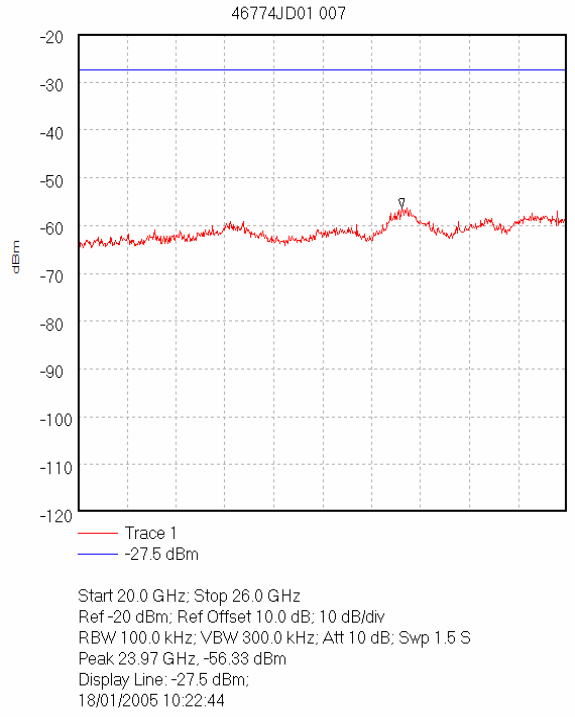
Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

Transmitter Conducted Emissions: Section 15.247(c) (Continued)

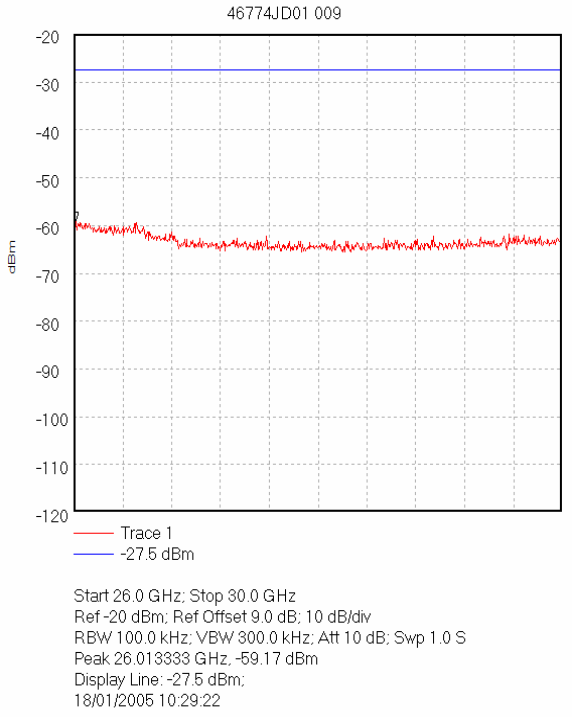


Start 10.0 GHz; Stop 15.0 GHz
Ref -20 dBm; Ref Offset 37.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 300.0 kHz; Att 10 dB; Swp 1.3 S
Peak 14.083333 GHz, -35.17 dBm
Display Line: -27.5 dBm;
17/01/2005 17:06:44

Start 15.0 GHz; Stop 20.0 GHz
Ref -20 dBm; Ref Offset 10.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 300.0 kHz; Att 10 dB; Swp 1.3 S
Peak 17.341667 GHz, -46.5 dBm
Display Line: -27.5 dBm;
18/01/2005 10:24:22



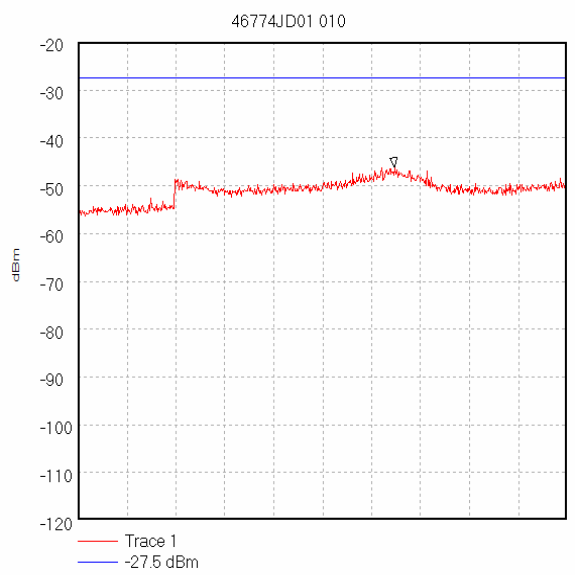
Start 20.0 GHz; Stop 26.0 GHz
Ref -20 dBm; Ref Offset 10.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 300.0 kHz; Att 10 dB; Swp 1.5 S
Peak 23.97 GHz, -56.33 dBm
Display Line: -27.5 dBm;
18/01/2005 10:22:44



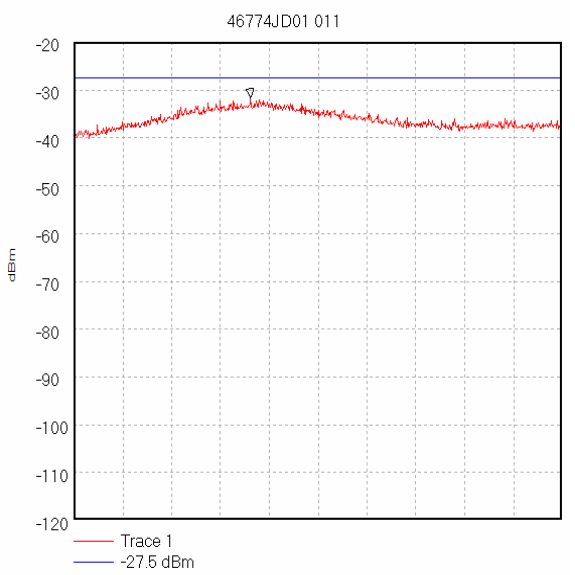
Start 26.0 GHz; Stop 30.0 GHz
Ref -20 dBm; Ref Offset 9.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 300.0 kHz; Att 10 dB; Swp 1.0 S
Peak 26.013333 GHz, -59.17 dBm
Display Line: -27.5 dBm;
18/01/2005 10:29:22

Test of: **Orthogon Systems.**
Spectra OS581XX.
To: **FCC Part 15.247**

Transmitter Conducted Emissions: Section 15.247(c) (Continued)



Start 30.0 GHz; Stop 35.0 GHz
Ref -20 dBm; Ref Offset 17.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 300.0 kHz; Att 10 dB; Swp 1.3 S
Peak 33.233333 GHz, -46.17 dBm
Display Line: -27.5 dBm;
18/01/2005 10:30:47

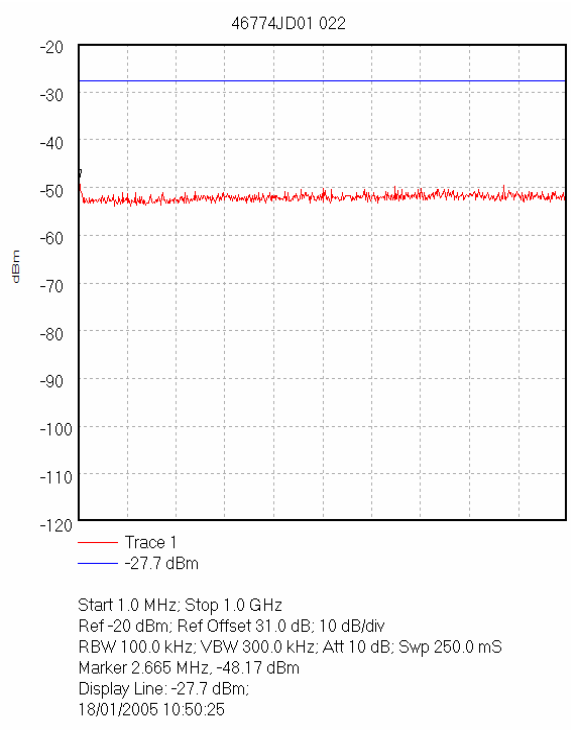


Start 35.0 GHz; Stop 40.0 GHz
Ref -20 dBm; Ref Offset 27.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 300.0 kHz; Att 10 dB; Swp 1.3 S
Peak 36.808333 GHz, -31.67 dBm
Display Line: -27.5 dBm;
18/01/2005 10:32:19

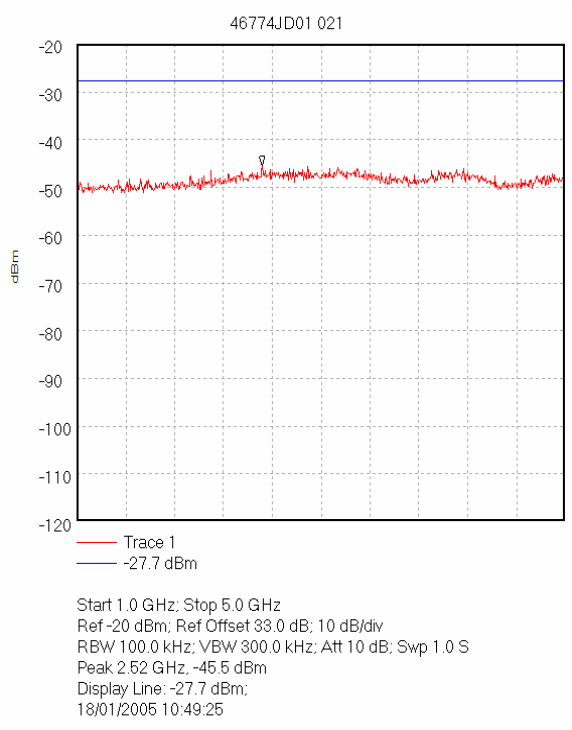
Test of: **Orthogon Systems.**
Spectra OS581XX.
To: **FCC Part 15.247**

Transmitter Conducted Emissions: Section 15.247(c) (Continued)

Vertical Antenna Port

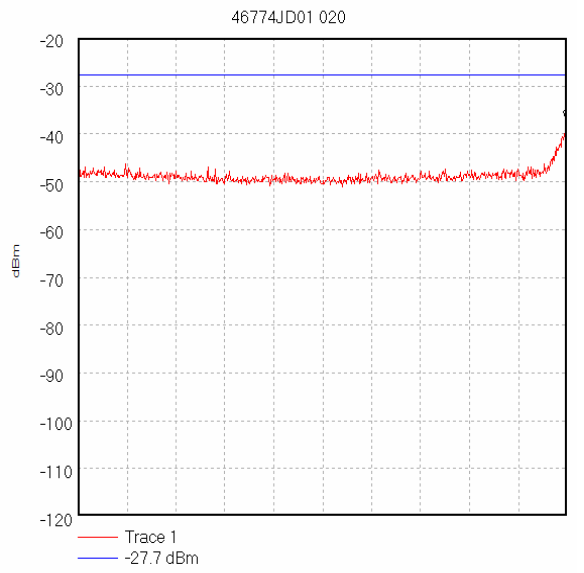


Start 1.0 MHz; Stop 1.0 GHz
Ref -20 dBm; Ref Offset 31.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 300.0 kHz; Att 10 dB; Swp 250.0 mS
Marker 2.665 MHz, -48.17 dBm
Display Line: -27.7 dBm;
18/01/2005 10:50:25

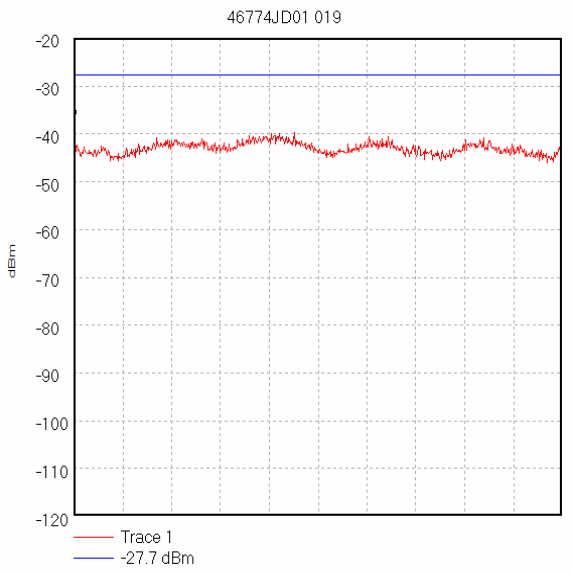


Start 1.0 GHz; Stop 5.0 GHz
Ref -20 dBm; Ref Offset 33.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 300.0 kHz; Att 10 dB; Swp 1.0 S
Peak 2.52 GHz, -45.5 dBm
Display Line: -27.7 dBm;
18/01/2005 10:49:25

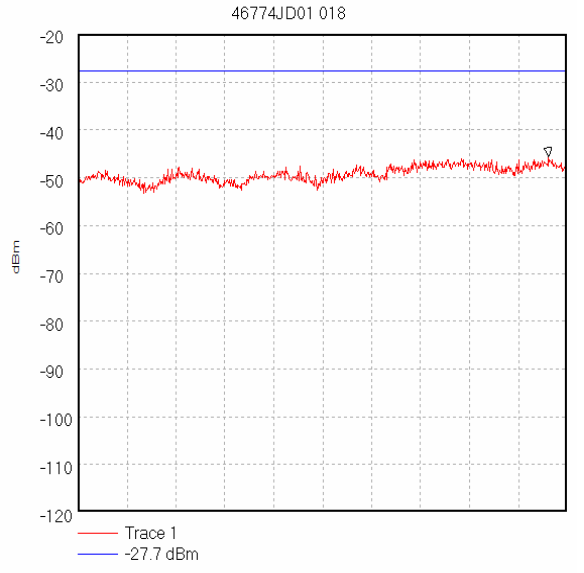
Transmitter Conducted Emissions: Section 15.247(c) (Continued)



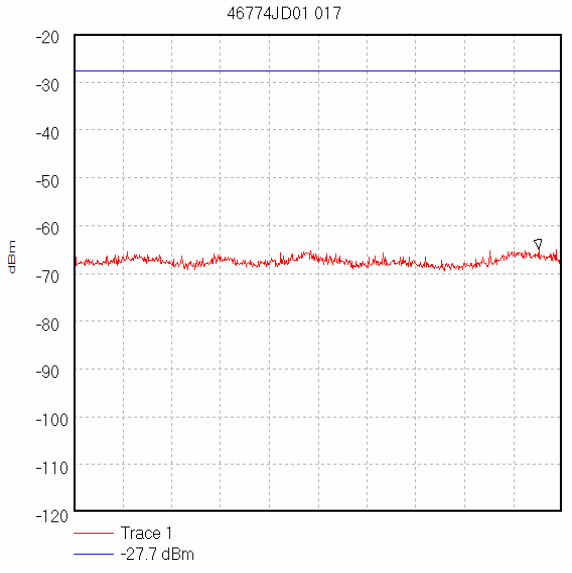
Start 5.0 GHz; Stop 5.725 GHz
Ref -20 dBm; Ref Offset 33.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 300.0 kHz; Att 10 dB; Swp 190.0 mS
Peak 5.723792 GHz, -37.17 dBm
Display Line: -27.7 dBm;
18/01/2005 10:47:45



Start 5.85 GHz; Stop 10.0 GHz
Ref -20 dBm; Ref Offset 34.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 300.0 kHz; Att 10 dB; Swp 1.1 S
Peak 5.85 GHz, -37.0 dBm
Display Line: -27.7 dBm;
18/01/2005 10:45:51



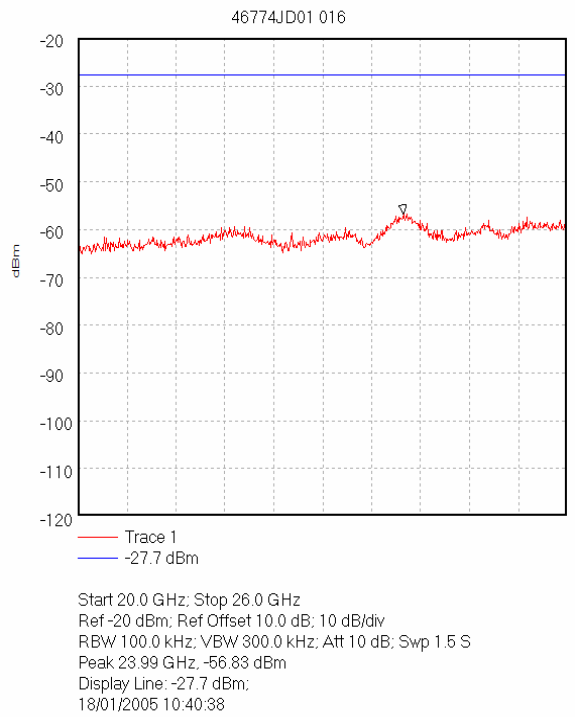
Start 10.0 GHz; Stop 15.0 GHz
Ref -20 dBm; Ref Offset 37.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 300.0 kHz; Att 0 dB; Swp 1.3 S
Peak 14.808333 GHz, -45.67 dBm
Display Line: -27.7 dBm;
18/01/2005 10:44:34



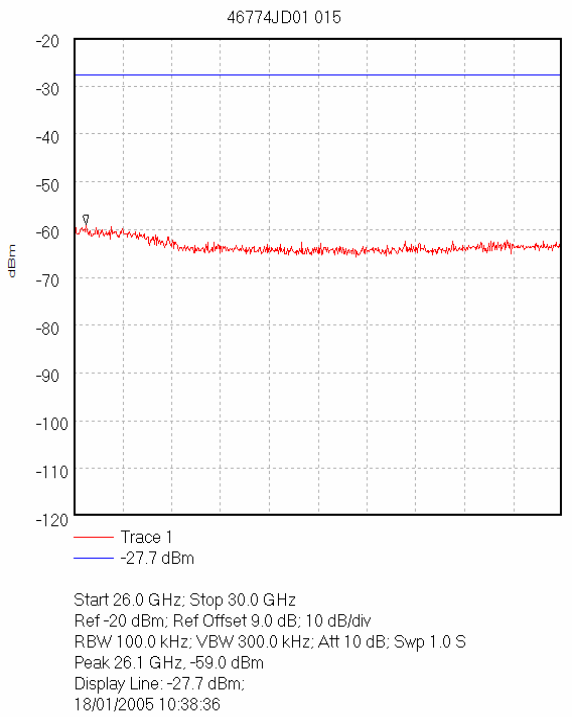
Start 15.0 GHz; Stop 20.0 GHz
Ref -20 dBm; Ref Offset 6.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 300.0 kHz; Att 10 dB; Swp 1.3 S
Peak 19.758333 GHz, -64.83 dBm
Display Line: -27.7 dBm;
18/01/2005 10:41:42

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

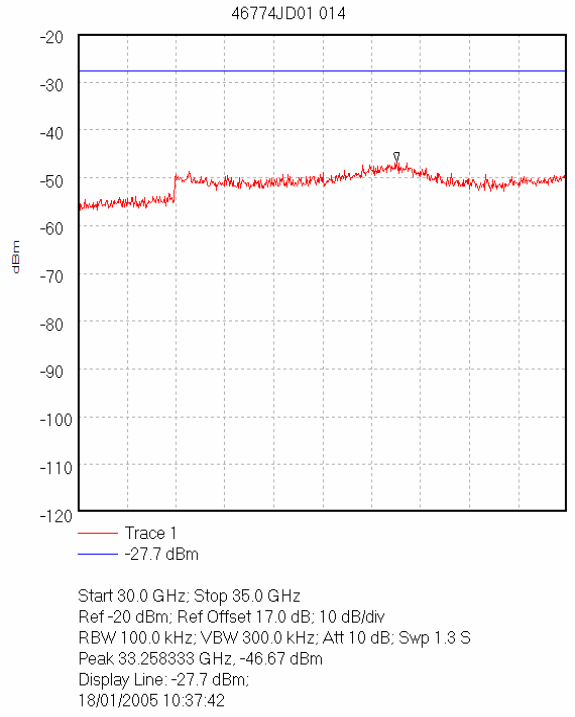
Transmitter Conducted Emissions: Section 15.247(c) (Continued)



Start 20.0 GHz; Stop 26.0 GHz
Ref -20 dBm; Ref Offset 10.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 300.0 kHz; Att 10 dB; Swp 1.5 S
Peak 23.99 GHz, -56.83 dBm
Display Line: -27.7 dBm;
18/01/2005 10:40:38



Start 26.0 GHz; Stop 30.0 GHz
Ref -20 dBm; Ref Offset 9.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 300.0 kHz; Att 10 dB; Swp 1.0 S
Peak 26.1 GHz, -59.0 dBm
Display Line: -27.7 dBm;
18/01/2005 10:38:36



Start 30.0 GHz; Stop 35.0 GHz
Ref -20 dBm; Ref Offset 17.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 300.0 kHz; Att 10 dB; Swp 1.3 S
Peak 33.258333 GHz, -46.67 dBm
Display Line: -27.7 dBm;
18/01/2005 10:37:42

Start 35.0 GHz; Stop 40.0 GHz
Ref -20 dBm; Ref Offset 27.0 dB; 10 dB/div
RBW 100.0 kHz; VBW 300.0 kHz; Att 10 dB; Swp 1.3 S
Peak 36.725 GHz, -32.33 dBm
Display Line: -27.7 dBm;
18/01/2005 10:37:00

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

7.10. Transmitter Radiated Emissions: Section 15.247(c) and 15.209(a)

7.10.1. Electric Field Strength Measurements: 30 to 1000 MHz
(Emissions Occurring in the Restricted Bands)

7.10.1.1. The EUT was configured for radiated emissions testing as described in Section 9 of this report.

7.10.1.2. Tests were performed to identify the maximum transmitter radiated emission levels.

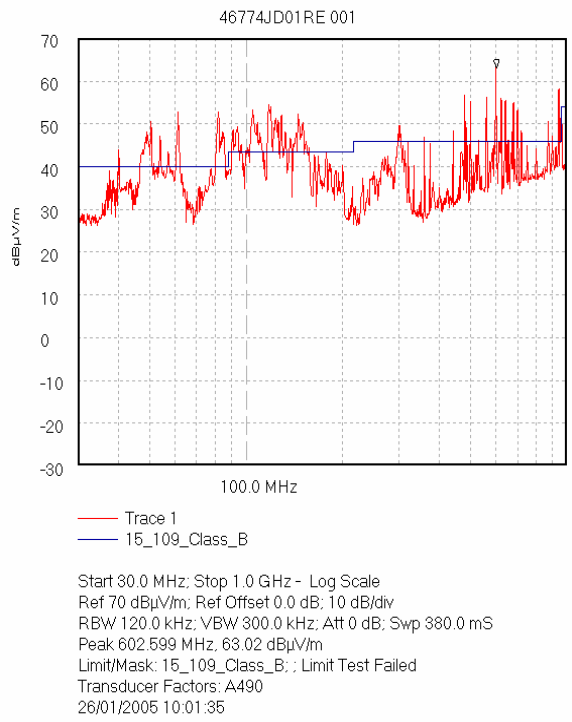
Middle Channel with MTi 28.0 dBi antenna fitted

Frequency (MHz)	Antenna Polarity	Quasi-Peak Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
117.027	Vert.	37.5	43.5	6.0	Complied
136.540	Horiz.	37.4	43.5	6.1	Complied
612.002	Horiz.	44.6	46.0	1.4	Complied
960.003	Vert.	34.3	54.0	19.7	Complied

Note(s):

1. The preliminary scans showed similar emission levels for each mode below 1 GHz, therefore final radiated emissions measurements were performed with the EUT set to the middle channel only.

Transmitter Radiated Emissions: Section 15.247(c) and 15.209(a) (Continued)



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.

Transmitter Radiated Emissions: Section 15.247(c) and 15.209(a) (Continued)

7.10.2. Electric Field Strength Measurements (Frequency Range: 30 to 1000 MHz)
(Emissions Occurring in the Restricted Bands)

7.10.2.1. The EUT was configured for radiated emissions testing as described in Section 9 of this report.

7.10.2.2. Tests were performed to identify the maximum transmitter radiated emission levels.

Middle Channel with Radiowave 37.7 dBi antenna fitted

Frequency (GHz)	Antenna Polarity (H/V)	Q-P Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
117.018	Vert.	34.9	43.5	8.6	Complied
136.540	Horiz.	29.8	43.5	13.7	Complied
612.015	Horiz.	45.0	46.0	1.0	Complied
960.003	Vert.	36.3	54.0	17.7	Complied

Transmitter Radiated Emissions: Section 15.247(c) and 15.209(a) (Continued)

7.10.3. Electric Field Strength Measurements (Frequency Range: 30 to 1000 MHz)
(Emissions Outside the Restricted Bands)

Middle Channel with MTi 28.0 dBi antenna fitted

Frequency (GHz)	Antenna Polarity (H/V)	Average Level (dBμV/m)	-30 dBc Limit (dBμV/m)	Margin (dB)	Result
600.002	Vert.	28.3	95.7	67.4	Complied
941.972	Vert.	33.8	95.7	61.9	Complied

Note(s):

1. The preliminary scans showed similar emission levels for each mode below 1 GHz, therefore final radiated emission measurements were performed with the EUT set to the middle channel only.

Transmitter Radiated Emissions: Section 15.247(c) and 15.209(a) (Continued)

7.10.4. Electric Field Strength Measurements (Frequency Range: 30 to 1000 MHz)
(Emissions Outside the Restricted Bands)

Middle Channel with Radiowave 37.7 dBi antenna fitted

Frequency (GHz)	Antenna Polarity (H/V)	Average Level (dBμV/m)	-30 dBc Limit (dBμV/m)	Margin (dB)	Result
600.002	Vert.	29.6	105.4	75.8	Complied
941.972	Vert.	33.8	105.4	71.6	Complied

Note(s):

1. The preliminary scans showed similar emission levels for each mode below 1 GHz, therefore final radiated emissions measurements were performed with the EUT set to the middle channel only.

Transmitter Radiated Emissions: Section 15.247(c) and 15.209(a) (Continued)

7.10.5. Electric Field Strength Measurements (Frequency Range: 1 to 40 GHz)
(Emissions Occurring in the Restricted Bands)

Results for MTi 28.0 dBi antenna

Highest Peak Level: Bottom Channel

Frequency (GHz)	Antenna Polarity	Peak Detector Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Actual Peak Level (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)	Result
1.000100	Vert.	27.6	21.5	0.5	49.6	74.0	24.4	Complied
1.099880	Horiz.	25.9	21.5	0.5	47.9	74.0	26.1	Complied
1.600110	Vert.	25.1	21.6	0.7	47.4	74.0	26.6	Complied
1.699800	Vert.	25.3	21.6	0.7	47.6	74.0	26.4	Complied
4.860075	Vert.	24.8	24.2	1.3	50.3	74.0	23.7	Complied

Highest Average Level: Bottom Channel

Frequency (GHz)	Antenna Polarity	Average Detector Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Actual Average Level (dBμV/m)	Average Limit (dBμV/m)	Average Margin (dB)	Result
1.000100	Vert.	22.8	21.5	0.5	44.8	54.0	9.2	Complied
1.099880	Horiz.	22.3	21.5	0.5	44.3	54.0	9.7	Complied
1.600110	Vert.	19.5	21.6	0.7	41.8	54.0	12.2	Complied
1.699800	Vert.	19.5	21.6	0.7	41.8	54.0	12.2	Complied
4.860075	Vert.	22.8	24.2	1.3	48.3	54.0	5.7	Complied

Highest Peak Level: Middle Channel

Frequency (GHz)	Antenna Polarity	Peak Detector Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Actual Peak Level (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)	Result
1.000100	Vert.	27.6	21.5	0.5	49.6	74.0	24.4	Complied
1.099880	Horiz.	25.9	21.5	0.5	47.9	74.0	26.1	Complied
1.600110	Vert.	25.1	21.6	0.7	47.4	74.0	26.6	Complied
1.699800	Vert.	25.3	21.6	0.7	47.6	74.0	26.4	Complied
4.860075	Vert.	25.2	24.2	1.3	50.7	74.0	23.3	Complied

Transmitter Radiated Emissions: Section 15.247(c) and 15.209(a) (Continued)

Highest Average Level: Middle Channel

Frequency (GHz)	Antenna Polarity	Average Detector Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Actual Average Level (dBμV/m)	Average Limit (dBμV/m)	Average Margin (dB)	Result
1.000100	Vert.	22.8	21.5	0.5	44.8	54.0	9.2	Complied
1.099880	Horiz.	22.3	21.5	0.5	44.3	54.0	9.7	Complied
1.600110	Vert.	19.5	21.6	0.7	41.8	54.0	12.2	Complied
1.699800	Vert.	19.5	21.6	0.7	41.8	54.0	12.2	Complied
4.860075	Vert.	22.5	24.2	1.3	48.0	54.0	6.0	Complied

Highest Peak Level: Top Channel

Frequency (GHz)	Antenna Polarity	Peak Detector Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Actual Peak Level (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)	Result
1.000100	Vert.	27.6	21.5	0.5	49.60	74.0	24.4	Complied
1.099880	Horiz.	25.9	21.5	0.5	47.9	74.0	26.1	Complied
1.600110	Vert.	25.1	21.6	0.7	47.4	74.0	26.6	Complied
1.699800	Vert.	25.3	21.6	0.7	47.6	74.0	26.4	Complied
4.860075	Vert.	24.5	24.2	1.3	50.0	74.0	24.0	Complied

Highest Average Level: Top Channel

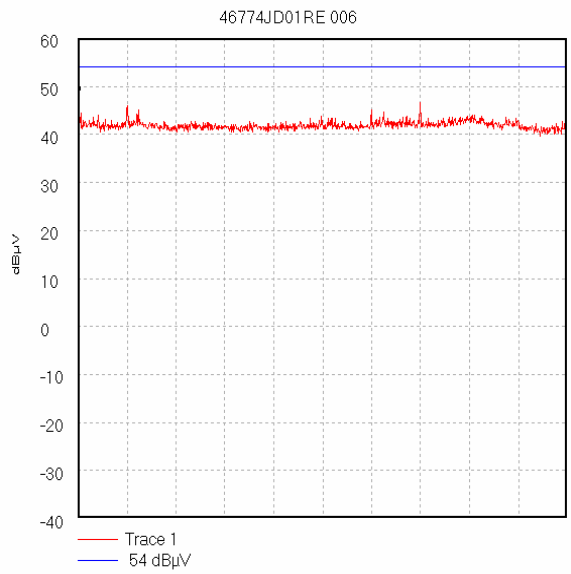
Frequency (GHz)	Antenna Polarity	Average Detector Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Actual Average Level (dBμV/m)	Average Limit (dBμV/m)	Average Margin (dB)	Result
1.000100	Vert.	22.8	21.5	0.5	44.8	54.0	9.2	Complied
1.099880	Horiz.	22.3	21.5	0.5	44.3	54.0	9.7	Complied
1.600110	Vert.	19.5	21.6	0.7	41.8	54.0	12.2	Complied
1.699800	Vert.	19.5	21.6	0.7	41.8	54.0	12.2	Complied
4.860075	Vert.	22.3	24.2	1.3	47.8	54.0	6.2	Complied

Note(s):

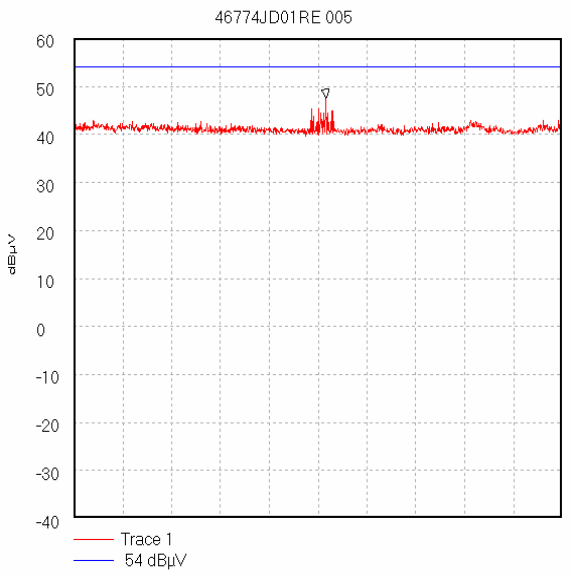
1. Plot 46774JD01RE015 and 46774JD01RE025 shows emissions appearing at 9.3425 GHz and 18.859444 GHz. It has been confirmed that these emissions are background emissions and not emitted from the EUT. Therefore, no further measurements were recorded for these emissions.

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

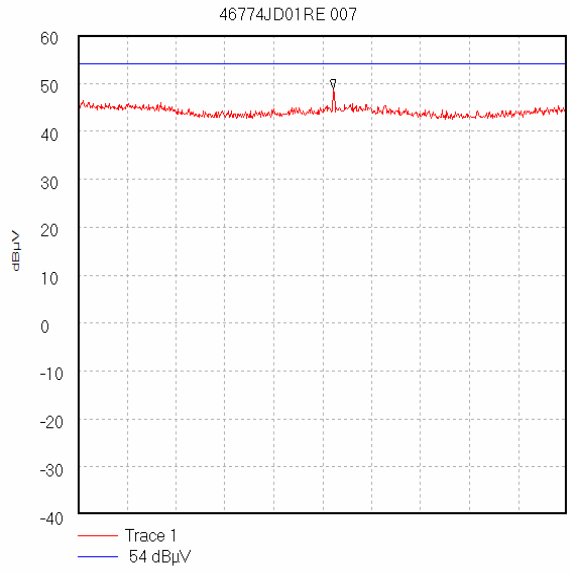
Transmitter Radiated Emissions: Section 15.247(c) and 15.209(a) (Continued)



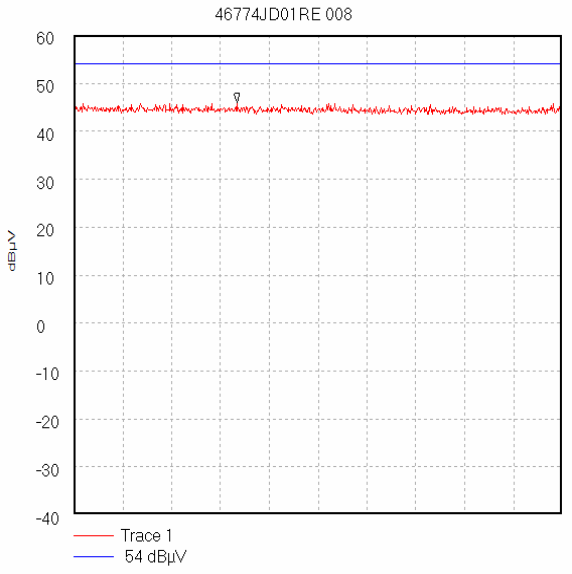
Start 1.0 GHz; Stop 2.0 GHz
Ref 60 dBµV; Ref Offset 0.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 1.0 GHz, 48.04 dBµV
Display Line: 54 dBµV; ; Limit Test Passed
26/01/2005 11:22:15



Start 2.0 GHz; Stop 4.0 GHz
Ref 60 dBµV; Ref Offset 0.0 dB; 10 dB/div
RBW 1000.0 kHz; VBW 1.0 MHz; Att 0 dB; Swp 20.0 mS
Peak 3.033333 GHz, 47.54 dBµV
Display Line: 54 dBµV; ; Limit Test Passed
26/01/2005 11:17:17



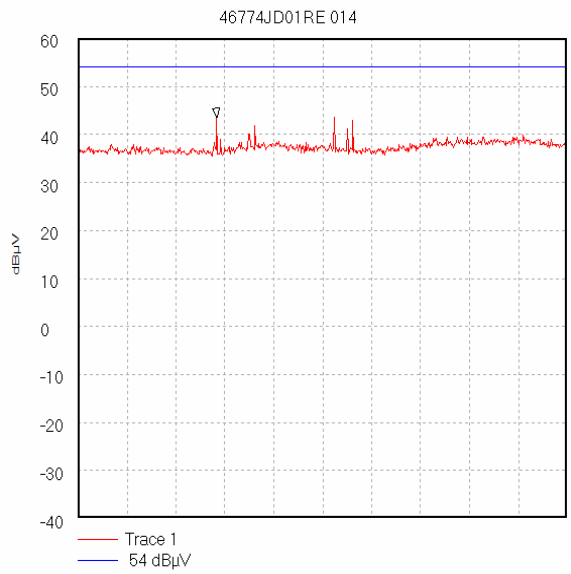
Start 4.0 GHz; Stop 5.725 GHz
Ref 60 dBµV; Ref Offset 19.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 50.0 mS
Peak 4.899875 GHz, 48.83 dBµV
Display Line: 54 dBµV;
27/01/2005 10:31:13



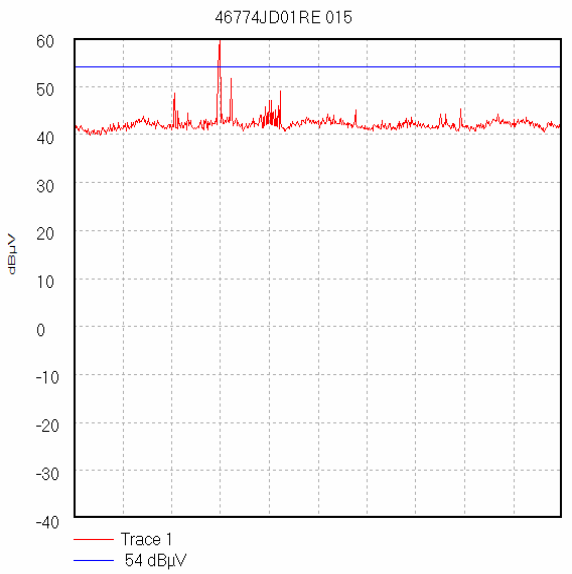
Start 5.85 GHz; Stop 6.0 GHz
Ref 60 dBµV; Ref Offset 19.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 50.0 mS
Peak 5.9 GHz, 46.0 dBµV
Display Line: 54 dBµV;
27/01/2005 10:50:38

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

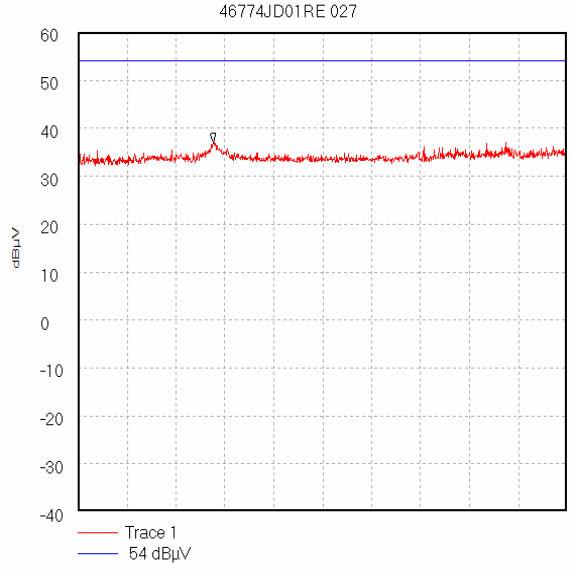
Transmitter Radiated Emissions: Section 15.247(c) and 15.209(a) (Continued)



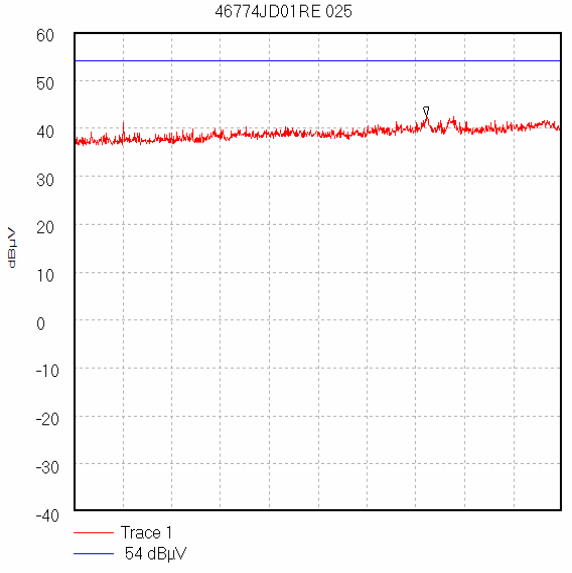
Start 6.0 GHz; Stop 8.0 GHz
Ref 60 dBµV; Ref Offset -7.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 50.0 mS
Peak 6.566667 GHz, 43.5 dBµV
Display Line: 54 dBµV;
27/01/2005 12:48:17



Start 8.0 GHz; Stop 12.5 GHz
Ref 60 dBµV; Ref Offset -3.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 1.0 MHz; Att 0 dB; Swp 90.0 mS
Peak 9.3425 GHz, 61.67 dBµV
Display Line: 54 dBµV;
27/01/2005 14:03:17



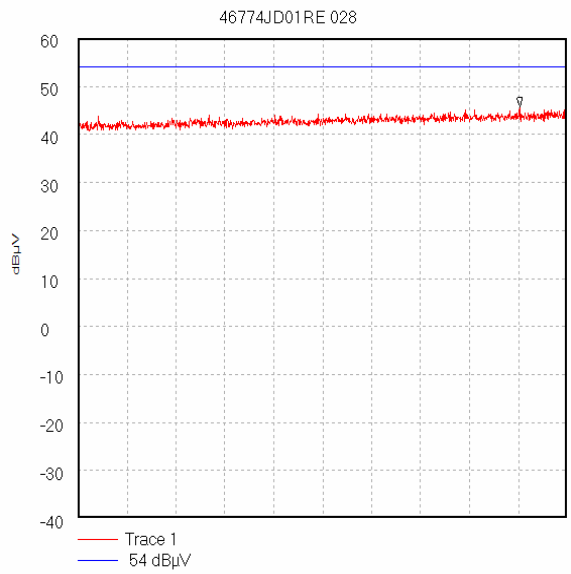
Start 12.5 GHz; Stop 18.0 GHz
Ref 60 dBµV; Ref Offset 2.3 dB; 10 dB/div
RBW 1.0 MHz; VBW 3.0 MHz; Att 0 dB; Swp 40.0 mS
Peak 14.021667 GHz, 37.07 dBµV
Display Line: 54 dBµV; ; Limit Test Passed
27/01/2005 15:44:17



Start 18.0 GHz; Stop 26.5 GHz
Ref 60 dBµV; Ref Offset 0.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 3.0 MHz; Att 0 dB; Swp 60.0 mS
Peak 24.138889 GHz, 42.48 dBµV
Display Line: 54 dBµV; ; Limit Test Passed
27/01/2005 15:31:51

Test of: **Orthogon Systems.**
Spectra OS581XX.
To: **FCC Part 15.247**

Transmitter Radiated Emissions: Section 15.247(c) and 15.209(a) (Continued)



Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter Radiated Emissions: Section 15.247(c) and 15.209(a) (Continued)

7.10.6. Electric Field Strength Measurements (Frequency Range: 1 to 40 GHz)
(Emissions Occurring in the Restricted Bands)

Results for Radiowave 37.7 dBi antenna

Highest Peak Level: Bottom Channel

Frequency (GHz)	Antenna Polarity	Peak Detector Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Actual Peak Level (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)	Result
1.000020	Vert.	30.3	21.5	0.5	52.3	74.0	21.7	Complied
1.101100	Horiz.	26.0	21.5	0.5	48.0	74.0	26.0	Complied
1.598445	Vert.	23.7	21.6	0.7	46.0	74.0	28.0	Complied
1.699770	Vert.	23.6	21.6	0.7	45.9	74.0	28.1	Complied
4.859980	Vert.	27.5	24.2	1.3	53.0	74.0	21.0	Complied

Highest Average Level: Bottom Channel

Frequency (GHz)	Antenna Polarity	Average Detector Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Actual Average Level (dBμV/m)	Average Limit (dBμV/m)	Average Margin (dB)	Result
1.000020	Vert.	26.1	21.5	0.5	48.1	54.0	5.9	Complied
1.101100	Horiz.	22.8	21.5	0.5	44.8	54.0	9.2	Complied
1.598445	Vert.	18.9	21.6	0.7	41.2	54.0	12.8	Complied
1.699770	Vert.	18.7	21.6	0.7	41.0	54.0	13.0	Complied
4.859980	Vert.	26.7	24.2	1.3	52.2	54.0	1.8	Complied

Highest Peak Level: Middle Channel

Frequency (GHz)	Antenna Polarity	Peak Detector Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Actual Peak Level (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)	Result
1.000020	Vert.	30.3	21.5	0.5	42.3	74.0	21.7	Complied
1.101100	Horiz.	26.0	21.5	0.5	48.0	74.0	26.0	Complied
1.598445	Vert.	23.7	21.6	0.7	46.0	74.0	28.0	Complied
1.699770	Vert.	23.6	21.6	0.7	45.9	74.0	28.1	Complied
4.859980	Vert.	22.5	24.2	1.3	48.0	74.0	26.0	Complied

Transmitter Radiated Emissions: Section 15.247(c) and 15.209(a) (Continued)

Highest Average Level: Middle Channel

Frequency (GHz)	Antenna Polarity	Average Detector Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Actual Average Level (dBμV/m)	Average Limit (dBμV/m)	Average Margin (dB)	Result
1.000020	Vert.	26.1	21.5	0.5	48.1	54.0	5.9	Complied
1.101100	Horiz.	22.8	21.5	0.5	44.8	54.0	9.2	Complied
1.598445	Vert.	18.9	21.6	0.7	41.2	54.0	12.8	Complied
1.699770	Vert.	18.7	21.6	0.7	41.0	54.0	13.0	Complied
4.859980	Vert.	21.3	24.2	1.3	46.8	54.0	7.2	Complied

Highest Peak Level: Top Channel

Frequency (GHz)	Antenna Polarity	Peak Detector Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Actual Peak Level (dBμV/m)	Peak Limit (dBμV/m)	Peak Margin (dB)	Result
1.000020	Vert.	30.3	21.5	0.5	52.3	74.0	21.7	Complied
1.101100	Horiz.	26.0	21.5	0.5	48.0	74.0	26.0	Complied
1.598445	Vert.	23.7	21.6	0.7	46.0	74.0	28.0	Complied
1.699770	Vert.	23.6	21.6	0.7	45.9	74.0	28.1	Complied
4.859980	Vert.	22.1	24.2	1.3	47.6	74.0	26.4	Complied

Highest Average Level: Top Channel

Frequency (GHz)	Antenna Polarity	Average Detector Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Actual Average Level (dBμV/m)	Average Limit (dBμV/m)	Average Margin (dB)	Result
1.000020	Vert.	26.1	21.5	0.5	48.1	54.0	5.9	Complied
1.101100	Horiz.	22.8	21.5	0.5	44.8	54.0	9.2	Complied
1.598445	Vert.	18.9	21.6	0.7	41.2	54.0	12.8	Complied
1.699770	Vert.	18.7	21.6	0.7	41.0	54.0	13.0	Complied
4.859980	Vert.	21.6	24.2	1.3	47.1	54.0	6.9	Complied

7.11. Transmitter Band Edge Conducted Emissions: Section 15.247(c)

7.11.1. The EUT was configured for transmitter conducted emission measurements as described in Section 9 of this report.

7.11.2. Tests were performed to identify the maximum conducted band edge emission levels.

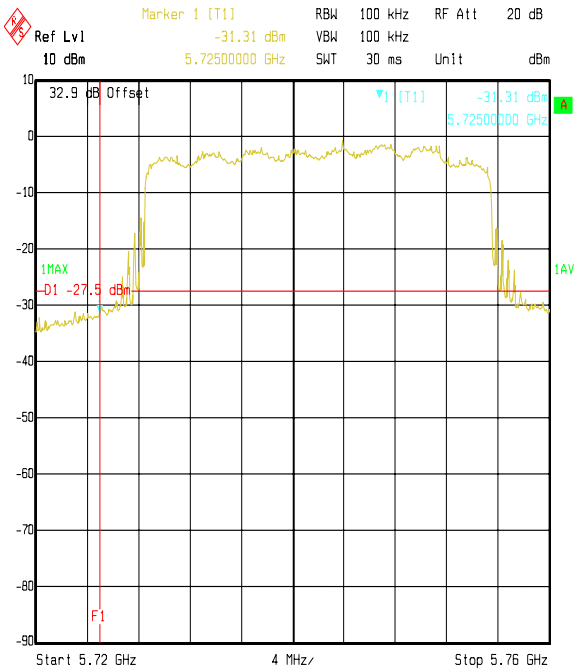
7.11.3. The limit lines shown in the plots below are set to a level 30 dB below the measured fundamental peak power of the channels closest to the lower and upper band edge.

Results: BPSK

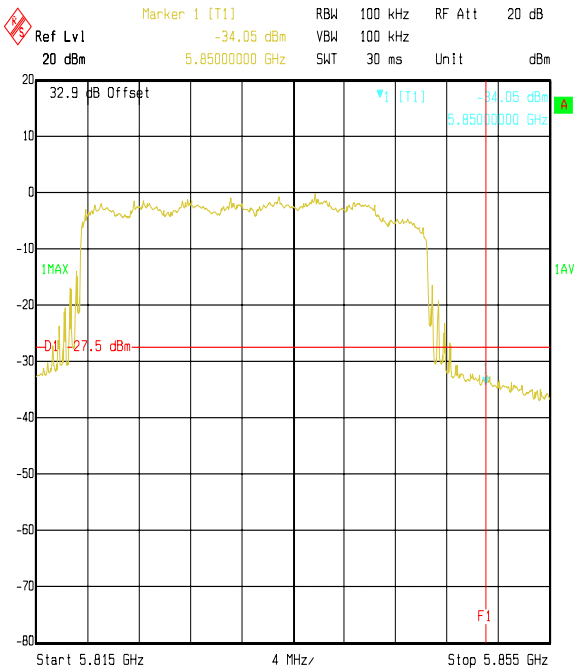
Frequency (MHz)	Antenna Polarity (H/V)	Peak Emission Level (dBm)	Peak Emission Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725	Horiz.	-31.3	-33.8	-30.0	3.8	Complied
5850	Horiz.	-34.1	-36.6	-30.0	6.6	Complied
5725	Vert.	-32.3	-34.6	-30.0	4.6	Complied
5850	Vert.	-32.4	-34.7	-30.0	4.7	Complied

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

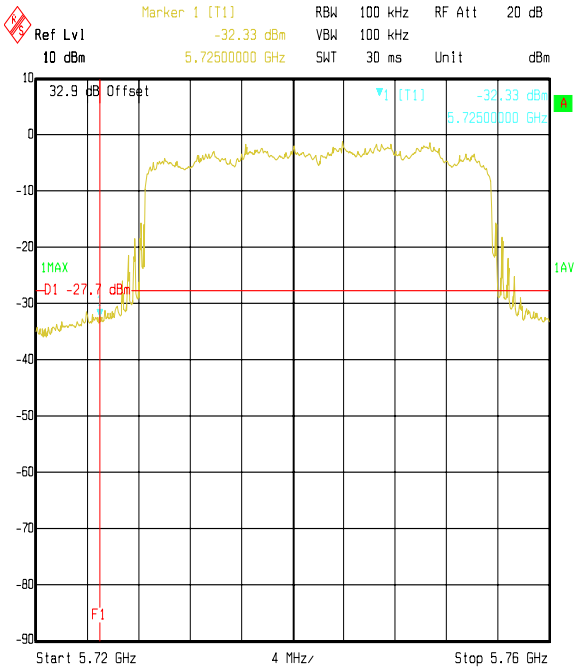
Transmitter Band Edge Conducted Emissions: Section 15.247(c) (Continued)



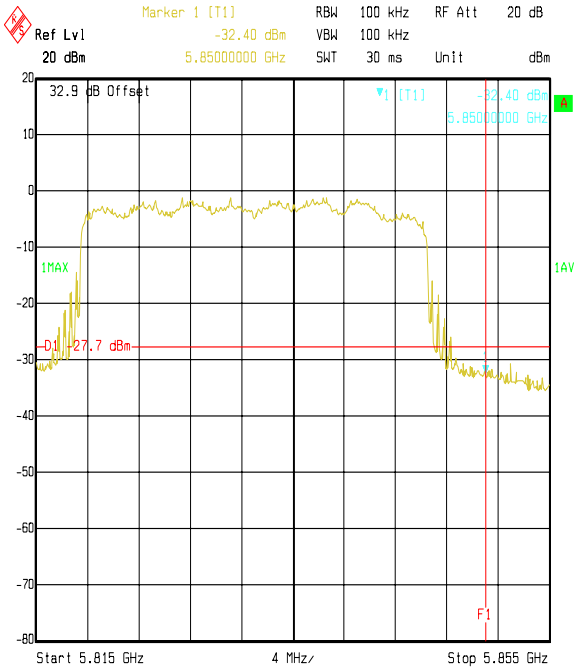
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 BPSK Bottom Channel. Cond. BandEdge.
Date: 17.JAN.2005 15:47:44



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 BPSK Top Channel. Cond. Bandedge
Date: 17.JAN.2005 17:07:16



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 BPSK Bottom Channel. Cond. BandEdge.
Date: 17.JAN.2005 15:42:55



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 BPSK Top Channel. Cond. Bandedge
Date: 17.JAN.2005 16:58:06

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

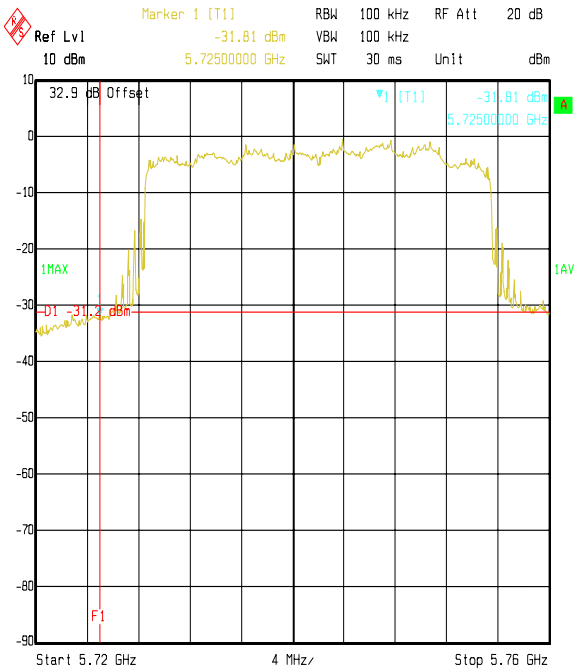
Transmitter Band Edge Conducted Emissions: Section 15.247(c) (Continued)

Results: QPSK

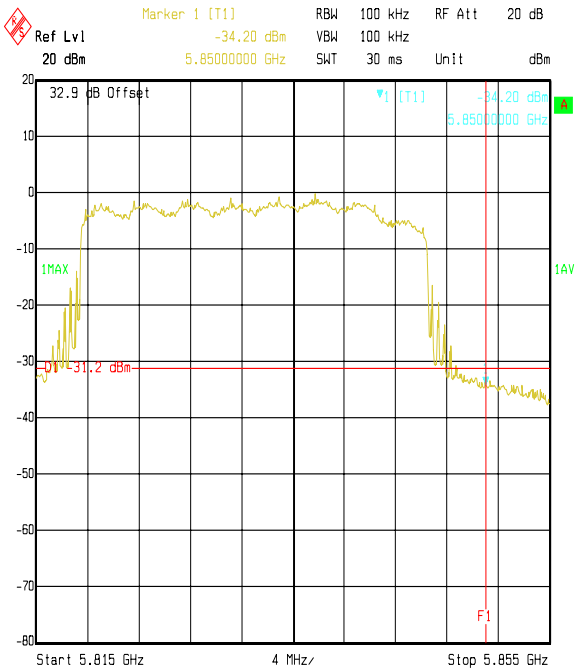
Frequency (MHz)	Antenna Polarity (H/V)	Peak Emission Level (dBm)	Peak Emission Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725	Horiz.	-31.8	-30.6	-30.0	0.6	Complied
5850	Horiz.	-34.2	-33.0	-30.0	3.0	Complied
5725	Vert.	-33.5	-32.3	-30.0	2.3	Complied
5850	Vert.	-32.3	-31.1	-30.0	1.1	Complied

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

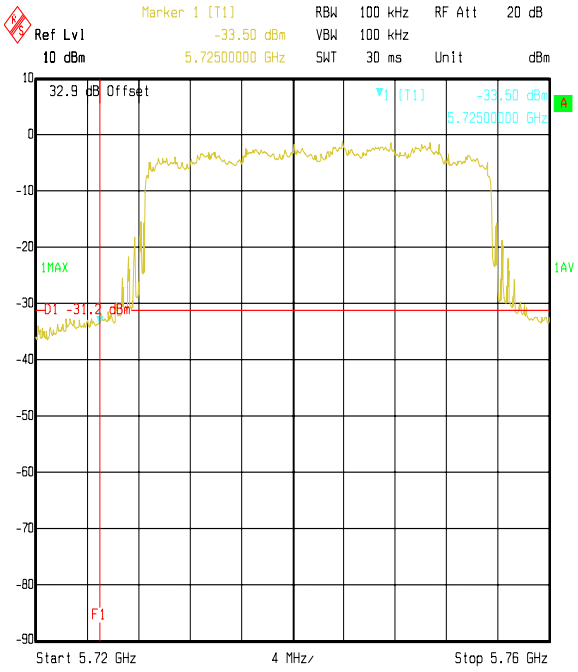
Transmitter Band Edge Conducted Emissions: Section 15.247(c) (Continued)



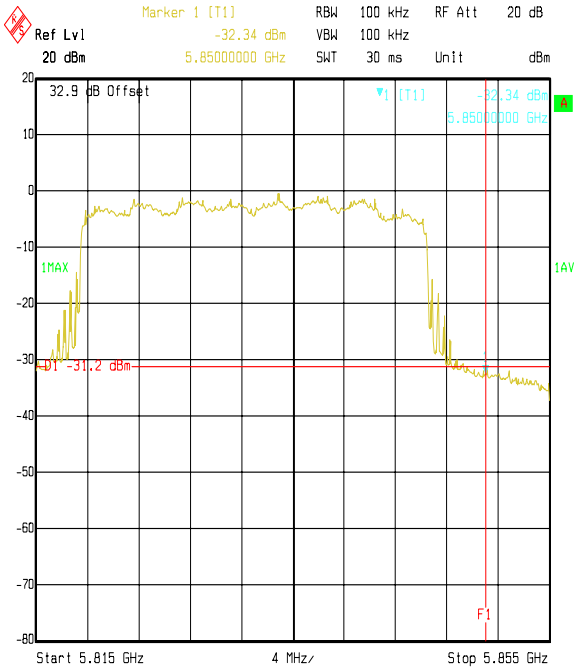
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 QPSK Bottom Channel. Cond. BandEdge.
Date: 17.JAN.2005 15:48:38



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 QPSK Top Channel. Cond. Bandedge
Date: 17.JAN.2005 17:06:39



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 QPSK Bottom Channel. Cond. BandEdge.
Date: 17.JAN.2005 15:43:38



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 QPSK Top Channel. Cond. Bandedge
Date: 17.JAN.2005 16:58:52

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

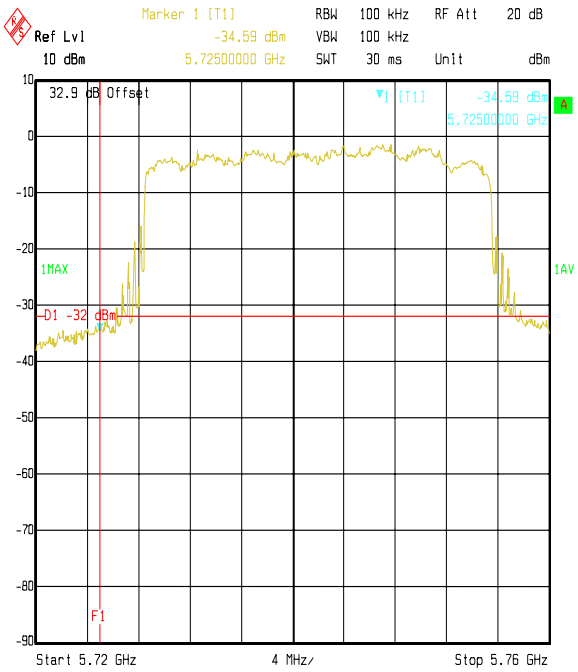
Transmitter Band Edge Conducted Emissions: Section 15.247(c) (Continued)

Results: 16 QAM

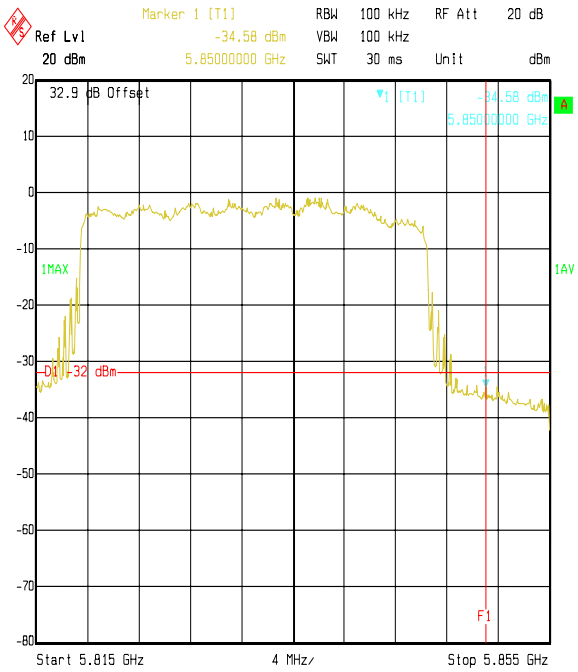
Frequency (MHz)	Antenna Polarity (H/V)	Peak Emission Level (dBm)	Peak Emission Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725	Horiz.	-34.6	-32.6	-30.0	2.6	Complied
5850	Horiz.	-34.6	-32.6	-30.0	2.6	Complied
5725	Vert.	-34.7	-32.8	-30.0	2.8	Complied
5850	Vert.	-33.0	-31.1	-30.0	1.1	Complied

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

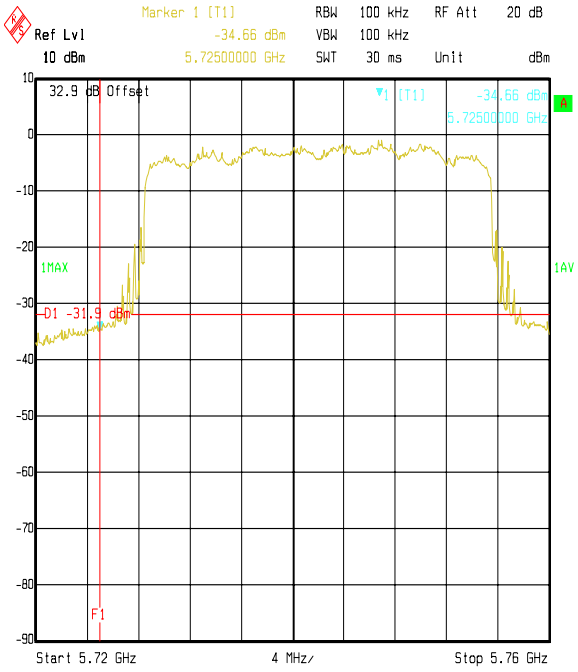
Transmitter Band Edge Conducted Emissions: Section 15.247(c) (Continued)



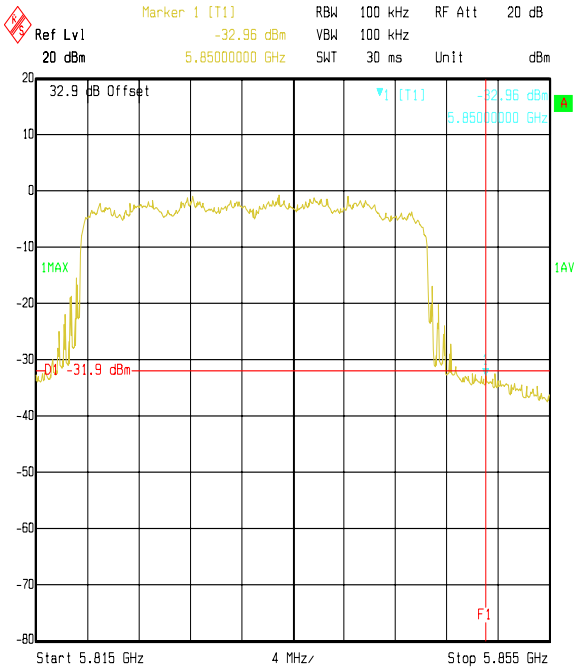
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 16QAM Bottom Channel. Cond. BandEdge.
Date: 17.JAN.2005 15:49:38



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 16QAM Top Channel. Cond. Bandedge
Date: 17.JAN.2005 17:05:49



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 16QAM Bottom Channel. Cond. BandEdge.
Date: 17.JAN.2005 15:36:42



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 16QAM Top Channel. Cond. Bandedge
Date: 17.JAN.2005 16:59:42

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

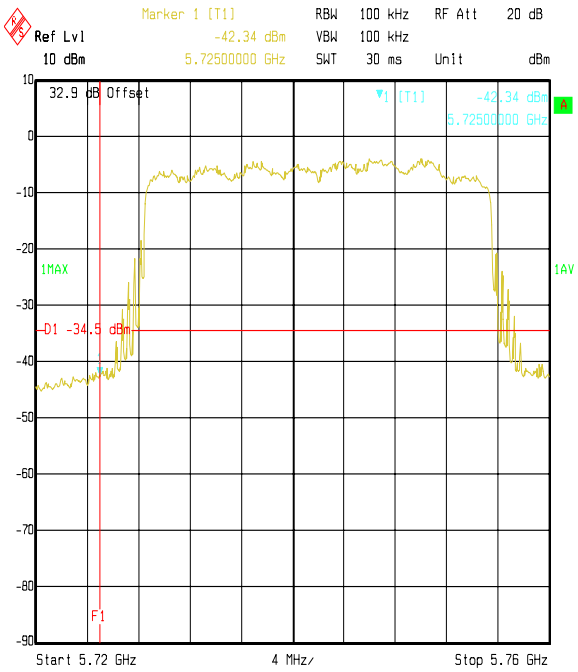
Transmitter Band Edge Conducted Emissions: Section 15.247(c) (Continued)

Results: 64 QAM

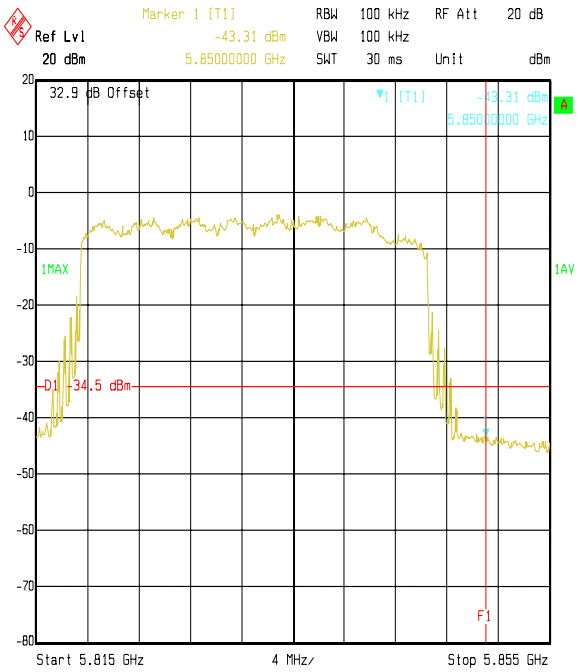
Frequency (MHz)	Antenna Polarity (H/V)	Peak Emission Level (dBm)	Peak Emission Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725	Horiz.	-42.3	-37.8	-30.0	7.8	Complied
5850	Horiz.	-43.3	-38.8	-30.0	8.8	Complied
5725	Vert.	-41.5	-37.1	-30.0	7.1	Complied
5850	Vert.	-42.1	-37.7	-30.0	7.7	Complied

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

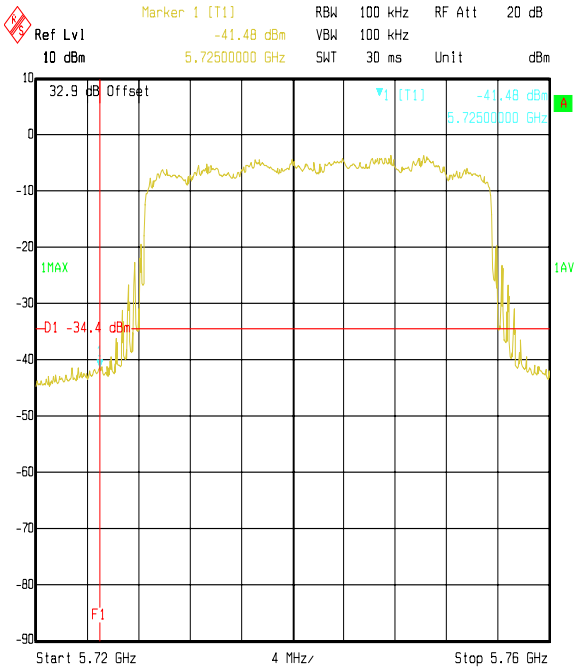
Transmitter Band Edge Conducted Emissions: Section 15.247(c) (Continued)



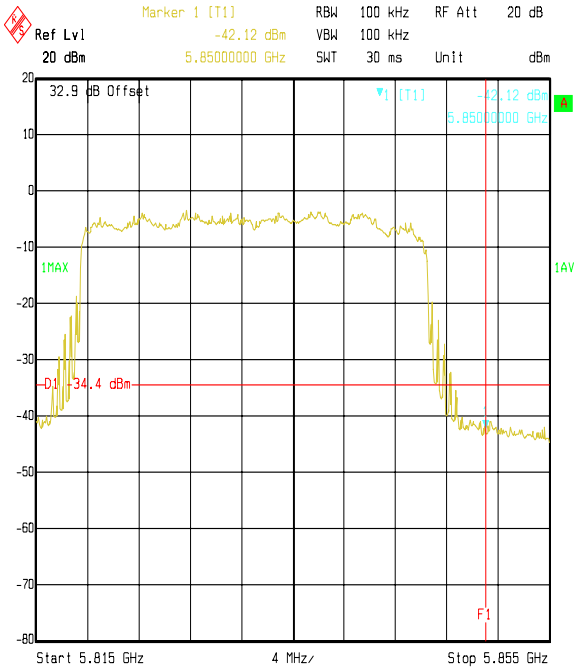
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 64QAM Bottom Channel. Cond. BandEdge.
Date: 17.JAN.2005 15:50:30



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 64QAM Top Channel. Cond. Bandedge
Date: 17.JAN.2005 17:05:19



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 64QAM Bottom Channel. Cond. BandEdge.
Date: 17.JAN.2005 15:38:21



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 64QAM Top Channel. Cond. Bandedge
Date: 17.JAN.2005 17:00:22

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

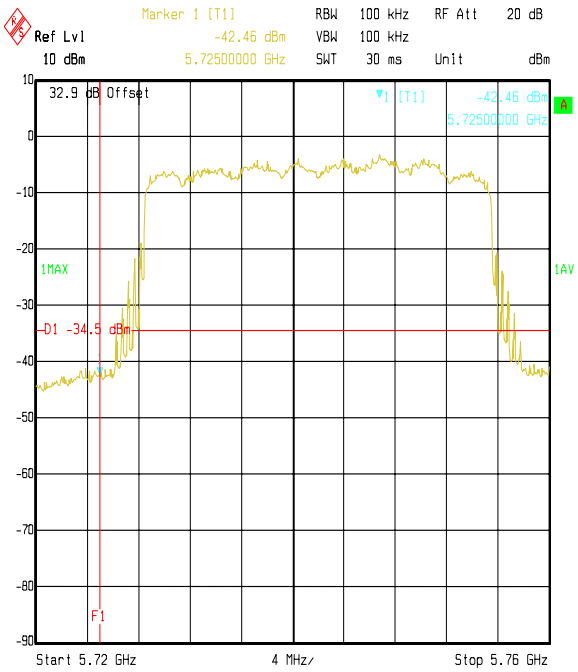
Transmitter Band Edge Conducted Emissions: Section 15.247(c) (Continued)

Results: 256 QAM

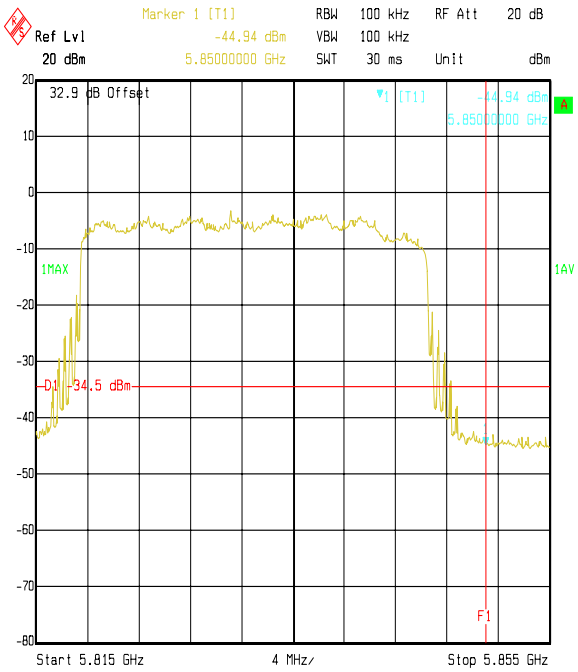
Frequency (MHz)	Antenna Polarity (H/V)	Peak Emission Level (dBm)	Peak Emission Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725	Horiz.	-42.5	-38.0	-30.0	8.0	Complied
5850	Horiz.	-44.9	-40.4	-30.0	10.4	Complied
5725	Vert.	-42.7	-38.3	-30.0	8.3	Complied
5850	Vert.	-42.7	-38.3	-30.0	8.3	Complied

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

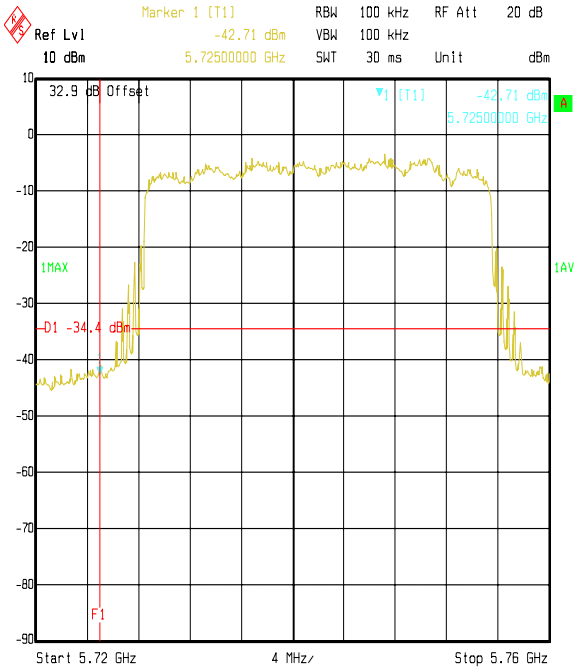
Transmitter Band Edge Conducted Emissions: Section 15.247(c) (Continued)



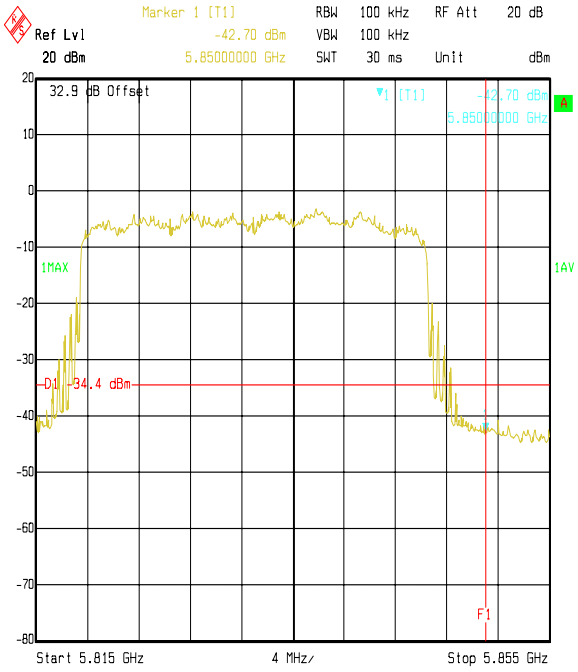
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 256QAM Bottom Channel. Cond. BandEdge.
Date: 17.JAN.2005 15:51:38



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 256QAM Top Channel. Cond. Bandedge
Date: 17.JAN.2005 17:04:38



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 256QAM Bottom Channel. Cond. BandEdge.
Date: 17.JAN.2005 15:38:58



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 256QAM Top Channel. Cond. Bandedge
Date: 17.JAN.2005 17:00:56

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

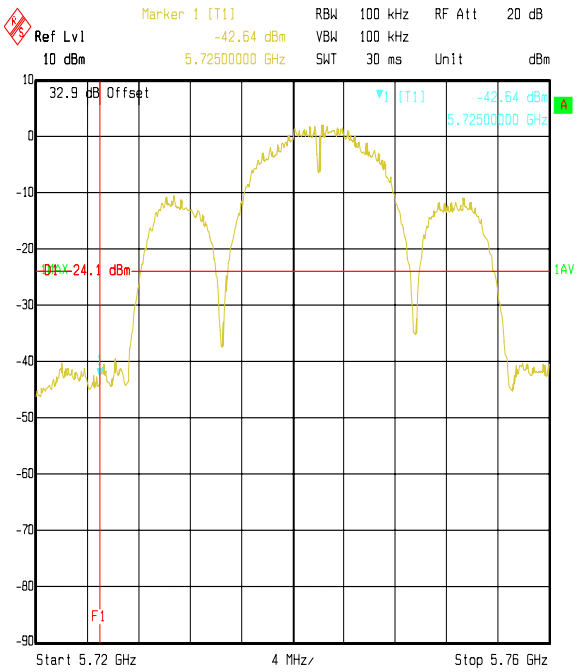
Transmitter Band Edge Conducted Emissions: Section 15.247(c) (Continued)

Results: Acquisition

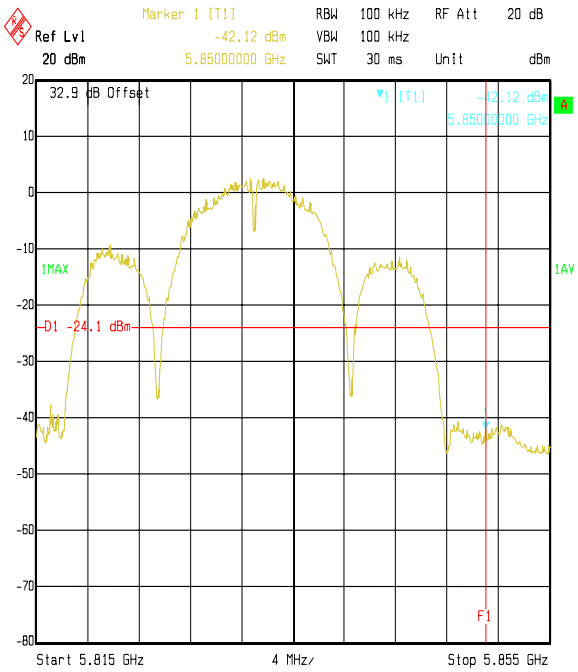
Frequency (MHz)	Antenna Polarity (H/V)	Peak Emission Level (dBm)	Peak Emission Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725	Horiz.	-42.6	-48.5	-30.0	18.5	Complied
5850	Horiz.	-42.1	-48.0	-30.0	18.0	Complied
5725	Vert.	-43.1	-49.4	-30.0	19.4	Complied
5850	Vert.	-40.2	-46.5	-30.0	16.5	Complied

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

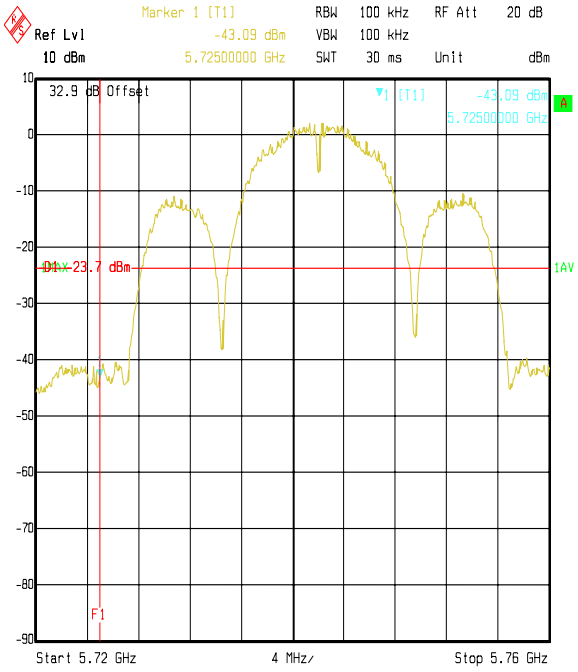
Transmitter Band Edge Conducted Emissions: Section 15.247(c) (Continued)



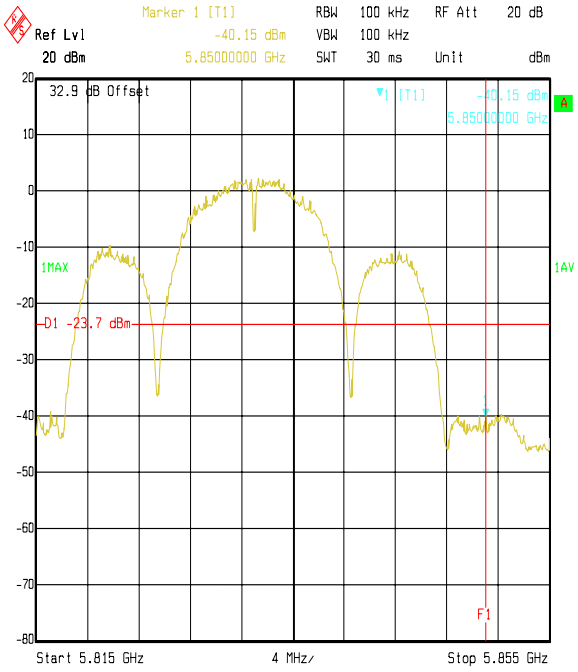
Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 ACQUISITION Bottom Channel. Cond. BandEdge.
Date: 17.JAN.2005 15:53:40



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Horiz. Port.
Comment A: 46774JD01 ACQUISITION Top Channel. Cond. Bandedge
Date: 17.JAN.2005 17:03:04



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 ACQUISITION Bottom Channel. Cond. BandEdge.
Date: 17.JAN.2005 15:41:05



Title: Orthogon EUT: Spectra OS58XX FCC Part15.247 Vert. Port.
Comment A: 46774JD01 ACQUISITION Top Channel. Cond. Bandedge
Date: 17.JAN.2005 17:01:41

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

8. Measurement Uncertainty

8.1. No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently, the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

8.2. The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

8.3. The uncertainty of the result may need to be taken into account when interpreting the measurement results.

8.4. The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor, such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	+/- 3.25 dB
Transmitter Maximum Peak Output Power	Not applicable	95%	+/- 0.46 dB
Conducted Emissions Antenna Port	30 MHz to 40 GHz	95%	+/- 1.2 dB
Spectral Power Density	Not applicable	95%	+/- 1.2 dB
6 dB/20 dB Bandwidth	Not applicable	95%	+/- 0.12 %
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	+/- 5.26 dB
Radiated Spurious Emissions	1 GHz to 40 GHz	95%	+/- 1.78 dB

8.5. The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty, the published guidance of the appropriate accreditation body is followed.

9. Measurement Methods

9.1. AC Mains Conducted Emissions

AC mains conducted emissions measurements were performed in accordance with the standard, against appropriate limits for each detector function.

The test was performed in a shielded enclosure with the equipment arranged as detailed in the standard on a wooden bench using the floor of the screened enclosure as the ground reference plane. The EUT was powered with 115V 60 Hz AC mains supplied via a Line Impedance Stabilisation Network (LISN).

Initial measurements in the form of swept scans covering the entire measurement band were performed in order to identify frequencies on which the EUT was generating interference. In order to minimise the time taken for these swept measurements, a Peak detector was used in conjunction with the appropriate detector IF measuring bandwidths (see table below). Repetitive scans were performed to allow for emissions with low repetition rates, and the duty cycle of the EUT. The test configuration was the same for the initial scans as for the final measurements.

Following the initial scans, a graph was produced giving an overview of the emissions from the EUT plotted against the appropriate specification limit. A tolerance line was set 6 dB below the specification limit and levels above the tolerance line were re-tested (at individual frequencies) using the appropriate detector function.

The test equipment settings for conducted emissions measurements were as follows:

Receiver Function	Initial Scan	Final Measurements
Detector Type:	Peak	Quasi-Peak (CISPR)/Average
Mode:	Max Hold	Not applicable
Bandwidth:	10 kHz*	9 kHz*
Amplitude Range:	60 dB	20 dB
Measurement Time:	Not applicable	> 1 s
Observation Time:	Not applicable	> 15 s
Step Size:	Continuous sweep	Not applicable
Sweep Time:	Coupled	Not applicable

9.2. Radiated Emissions

Radiated emissions measurements were performed in accordance with the standard, against appropriate limits for each detector function.

Initial measurements covering the entire measurement band in the form of swept scans in a shielded enclosure were performed in order to identify frequencies on which the EUT was generating interference. This determined the frequencies on which the EUT should be re-measured in full on the open area test site. In order to minimise the time taken for the swept measurements, a Peak detector was used in conjunction with the appropriate detector IF measuring bandwidth (see table below). Repetitive scans were performed to allow for emissions with low repetition rates.

The initial scans were performed using an antenna height of 1.5 m and a measurement distance of 3 m. Following the initial scans, graphs were produced giving an overview of the emissions from the EUT plotted against the appropriate specification limit. Any emission within 20 dB of the limit were then measured on the open area test site, except in cases where the noise floor was within 20 dB of the limit, in these cases the highest point of the noise floor was measured.

Where an emission fell inside a restricted band, measurements were made at the appropriate test distance using a measuring receiver with a Quasi-Peak detector for measurements below 1000 MHz and an Average and Peak detector for measurements above 1000 MHz. A peak detector was used for all other measurements.

For the final measurements the EUT was arranged on a non-conducting turn table on a standard test site compliant with ANSI C63.4 – 2001 Clause 5.4.

All measurements on the open area test site were performed using broadband antennas.

On the open area test site, at each frequency where a signal was to be measured, the trace was maximised by rotating a turntable through 360°. The angle at which the maximum signal was observed was locked out. For frequencies below 1000 MHz the test antenna was varied in height between 1 m and 4 m in order to further maximise the target emission.

For frequencies above 1000 MHz where a horn antenna was used, height searching was performed to locate the optimal height of the horn with respect to the EUT. At this point the horn was locked off and the turntable was again rotated through 360° to maximise the target signal. It should be noted that the received signal from the EUT would diminish very quickly after it exits the beam width of the horn antenna, for this reason it may not be necessary to fully height search with the horns.

At this point, any signals found to be between the limit and a level 6 dB below it were further maximised by changing the configuration of the EUT, e.g. re-routing cables to peripherals and moving peripherals with respect to the EUT.

Scans were performed to the upper frequency limits as stated in Section 15.33

The final field strength was determined as the indicated level in dBμV plus cable loss and antenna factor.

Radiated Emissions (Continued)

The test equipment settings for radiated emissions measurements were as follows:

Receiver Function	Initial Scan	Final Measurements Below 1 GHz	Final Measurements Above 1 GHz
Detector Type:	Peak	Quasi-Peak (CISPR)	Peak / Average
Mode:	Max Hold	Not applicable	Max Hold
Bandwidth:	(120 kHz < 1 GHz) (1 MHz > 1 GHz)	120 kHz	1 MHz
Amplitude Range:	100 dB	100 dB	100 dB
Step Size:	Continuous sweep	Not applicable	Not applicable
Sweep Time:	Coupled	Not applicable	Not applicable

9.3. Conducted Antenna Port Emissions

Conducted antenna port emissions measurements were performed using a 100 kHz bandwidth in accordance with the standard against the appropriate limits.

Prior to testing being performed a suitable RF attenuator and cable were calibrated for the required frequency range. For each measurement range the calibrated level of the attenuator and cable were entered as an offset into the spectrum analyser to compensate for the losses in the measurement set up.

Initial measurements covering the entire measurement band in the form of swept scans were performed in order to identify frequencies on which the EUT was generating interference. This determined the frequencies on which final measurements were necessary. To make the final measurements a peak detector was used in conjunction with the appropriate detector IF measuring bandwidth.

Repetitive scans were performed to allow for emissions with low repetition rates.

Scans were performed to the upper frequency limits as stated in 15.33(a)(1)

Final measurements were performed on the worst-case configuration as described in Part 15.31(i) for conducted emissions.

9.4. Minimum 6 dB Bandwidth

The EUT and spectrum analyser were configured for conducted antenna port emissions measurements.

Prior to testing being performed a suitable RF attenuator and cable were calibrated for the required frequencies. For each frequency the calibrated level of the attenuator and cable were entered as an offset into the spectrum analyser to compensate for the losses in the measurement set up.

To determine the 6 dB bandwidth, a resolution bandwidth of 300 kHz was used, which is approximates to 1% of the 6 dB bandwidth. A video bandwidth of 1 MHz was used. The analyser was set to a span of greater than twice the 6 dB bandwidth and for a maximum hold scan to capture the profile of the signal. The peak level was then determined, and a reference established 6 dB below the peak level. The bandwidth was determined at the points where the 6 dB reference crossed the profile of the emission.

9.5. Transmitter 20 dB Bandwidth

The EUT and spectrum analyser was configured for transmitter radiated emissions measurements.

To determine the occupied bandwidth, a resolution bandwidth of 300 kHz was used, which is greater than 1% of the 20 dB bandwidth. A video bandwidth of a least the same value was used. The analyser was set for a maximum hold scan to capture the profile of the signal. The peak level was then determined, and a reference line was drawn 20 dB below the peak level. The bandwidth was determined at the points where the 20 dB reference crossed the profile of the emission.

9.6. Spectral Power Density

The EUT and spectrum analyser were configured for conducted antenna port emissions measurements.

Prior to testing being performed a suitable RF attenuator and cable were calibrated for the required frequencies. For each frequency the calibrated level of the attenuator and cable were entered as an offset into the spectrum analyser to compensate for the losses in the measurement set up.

Prior to the measurement being taken the spectrum analyser was tuned to the fundamental frequency of the EUT.

A resolution bandwidth of 3 kHz was selected and the analyser was set to a span of greater than twice the 6 dB bandwidth. The trace was max held and a reading was taken at the peak point of the trace.

9.7. Peak Output Power

The EUT was configured for conducted antenna port emissions measurements.

Prior to testing being performed a suitable RF attenuator and cable were calibrated for the required frequencies. For each frequency to be measured, the calibrated level of the attenuator and cable were entered as an offset into the wideband peak power meter to compensate for the measurement set up.

To determine the transmitter output power, the EUT was operated at maximum power and a result was obtained using the spectrum analyser to measure the duty cycle of the emission, then using the following formula 10 log (1/Duty Cycle) and added to the wideband average power meter reading.

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.
A004	ESH3-Z5 LISN	Rohde & Schwarz	ESH3-Z5	890 604/027
A027	Horn Antenna	Eaton	9188-2	301
A031	2 to 4 GHz Eaton Horn Antenna	Eaton	91889-2	557
A1141	HP 11691D	Hewlett Packerd	11691D	1212A02494
A1227	Pre Amplifier	Agilent	8449B	3008A01566
A131	100 ohm Coupling Unit	RFI Ltd Basingstoke	100 Ohm 1W	None
A1317	376BNM Narda 40W Termination	Narda	376BNM	0103
A1319	Narda AVG Power 10W	Narda	375 BNM	0212
A1360	ESH3-Z2 Pulse Limiter	Rohde & Schwarz	ESH3-Z2	A1360-20112003
A1391	HUBER + SUHNER AG	HUBER + SUHNER AG	757987	6810.17.B
A1398	Weinschel Associates	Weinschel Associates	WA46-20	A129
A1430	LRL	LRL	WC28sma	383
A1441	waveguide to coax adapter	unknown	MFR 01456	42AC206
A1442	Waveguide to coax adapter	unknown	A7589-3	N/A
A1451	WG22 to 3.5mm	Penn Engineering	1430-1BM1	None
A203	WG 22 Horn Antenna	Flann Microwave Ltd	22240-20	343
A259	Bilog Antenna	Chase	CBL6111	1513
A366	WG 22 isolator	MRI	FRR-400	169
A392	3 dB attenuator (9)	Suhner	6803.17.B	None
A427	WG 14 horn	Flann	14240-20	150
A428	WG 12 horn	Flann	12240-20	134
A429	WG 16 horn	Flann	16240-20	561
A430	WG 18 horn	Flann	18240-20	425
A436	WG 20 horn	Flann	20240-20	330
A553	Bi-log Antenna	Chase	CBL6111A	1593

Test Equipment Used (Continued)

RFI No.	Instrument	Manufacturer	Type No.	Serial No.
C1000	Cable	Rosenberger	FA210A1020M303 09	002
C1001	Cable	Rosenberger	FA210A1020M303 09	003
C1031	Coaxial Cable	Rosenberger	FA210B-1-010M-30X30	FA00C 7591
C1068	Rosenberger	Rosenberger	001	001
C360	Cable	Rosenberger	UFA210A-1-1181-70x70	1927
C364	BNC Cable	Rosenberger	RG142	None
C436	Cable	Hewlett Packard	5061-5458	5061-5458-C436
C453	Cable	Rosenberger	RG142XX-001-RFIB	C453-10081998
C565	C565-N-3	Rosenberger	UFA 210A-1-1181-70x70	96 L 0703
G085	Generator	Hewlett Packard	83650L	3614A00104
M003	Spectrum Monitor	Rohde & Schwarz	EZM	883 580/008
M023	ESVP Receiver	Rohde & Schwarz	ESVP	872 991/027
M069	ESMI Spectrum Analyser / Receiver	Rohde & Schwarz	ESMI	829 808/007 (DU) / 827 063/008 (RU)
M088	Receiver / Spectrum Analyser System	Rohde & Schwarz	ESBI	DU:835862/018 RU:835387/006
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016
M152	WG22 Mixer	Rohde & Schwarz	FS-Z16	None
M281	Power Meter	Hewlett Packard	E4418A (EPM441A)	GB37170210-01
M283	Power Sensor	Hewlett Packard	8487A	3318A03241
M295	HP 8564E	Hewlett Packard	8564E	3846A01561
S201	Site 1	RFI	1	
S212	Site 12	RFI	12	

NB In accordance with UKAS requirements, all the measurement equipment is on a calibration schedule.

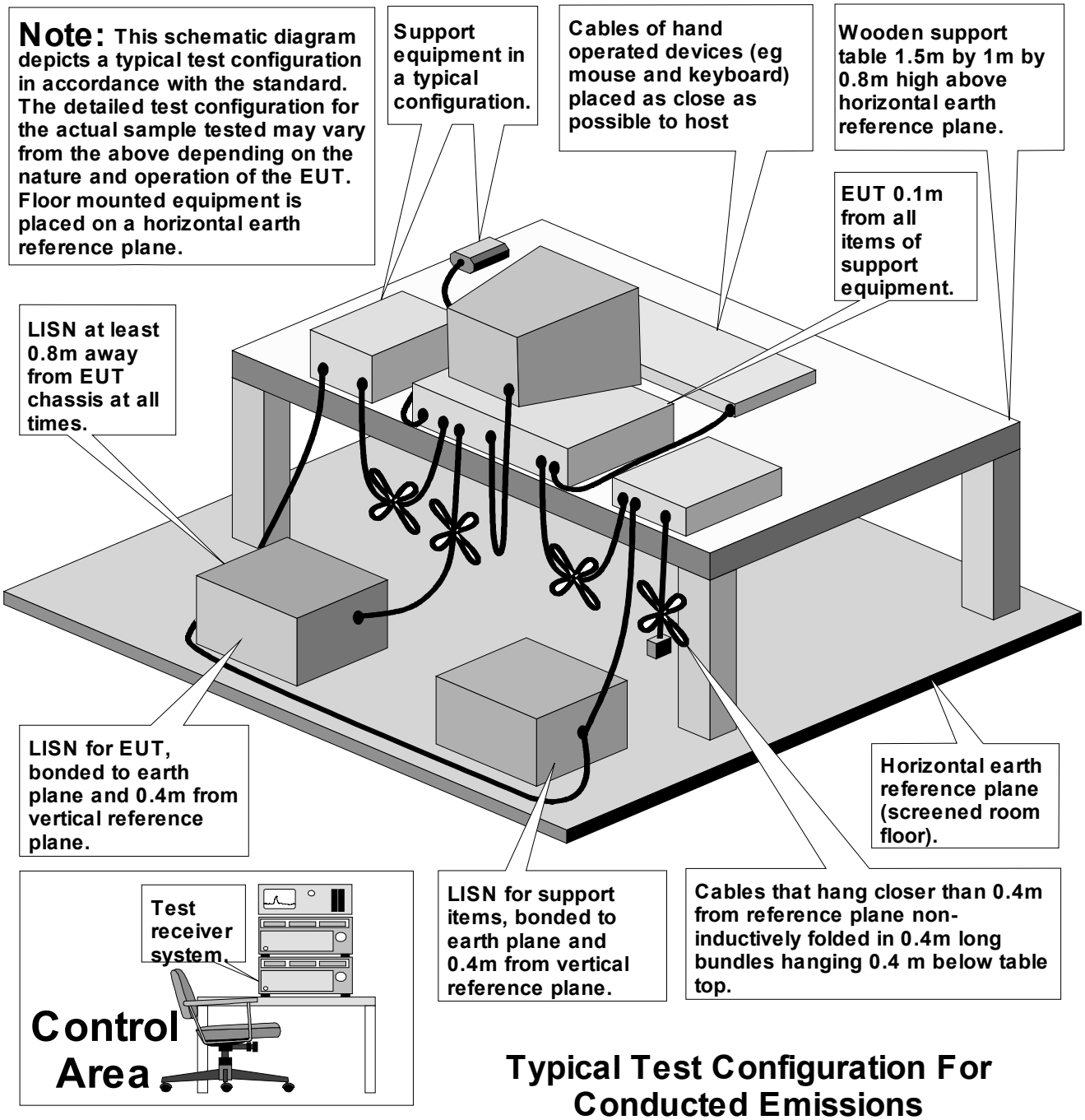
Appendix 2. Test Configuration Drawings

This appendix contains the following drawings:

Drawing Reference Number	Title
DRG\46774JD01\EMICON	Test configuration for measurement of conducted emissions.
DRG\46774JD01\EMIRAD	Test configuration for measurement of radiated emissions.

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

DRG\46774JD01\EMICON

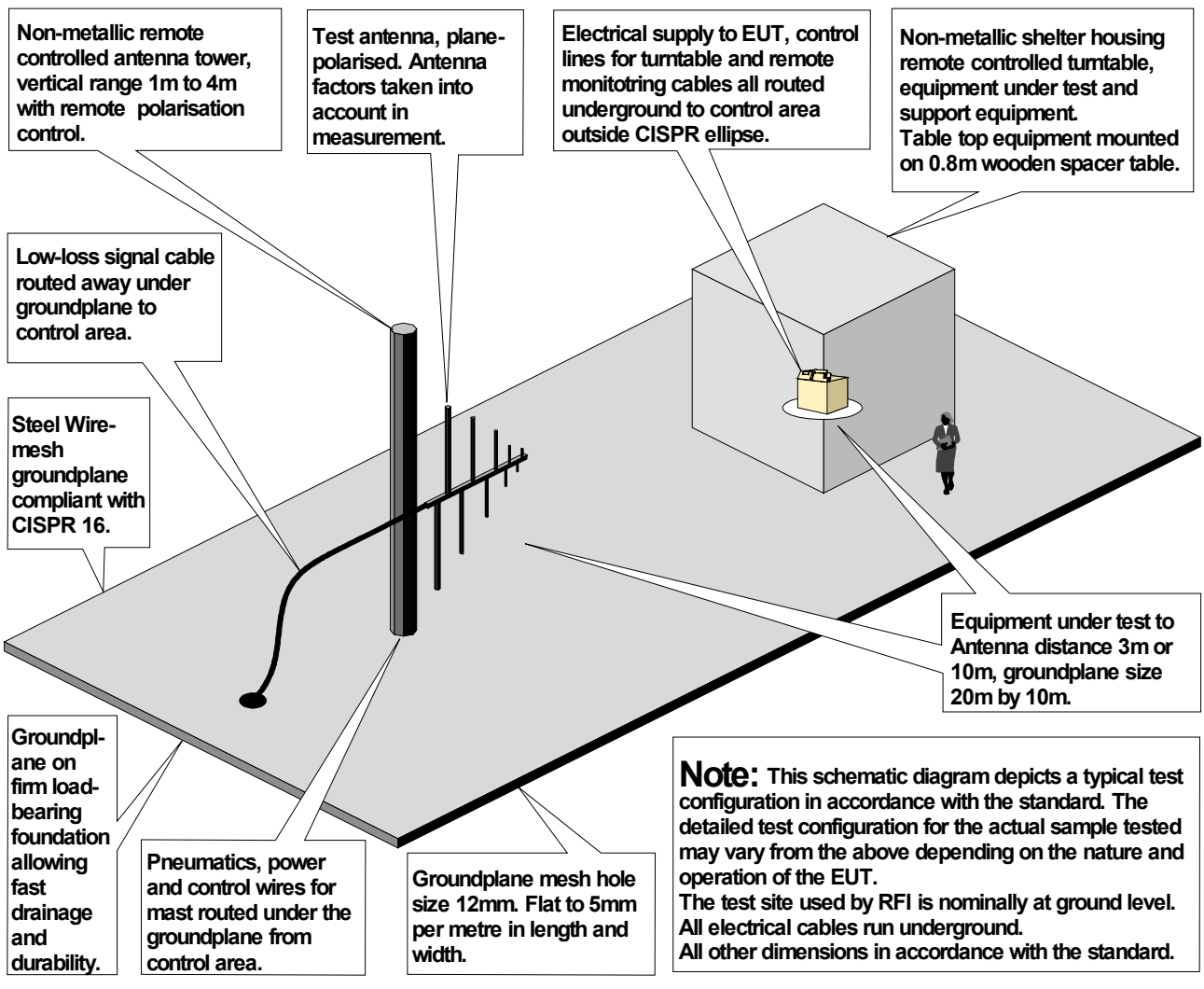


Typical Test Configuration For Conducted Emissions Measurements In Accordance With ANSI C63.4-1992

Tests performed in a screened enclosure

Test of: Orthogon Systems.
Spectra OS581XX.
To: FCC Part 15.247

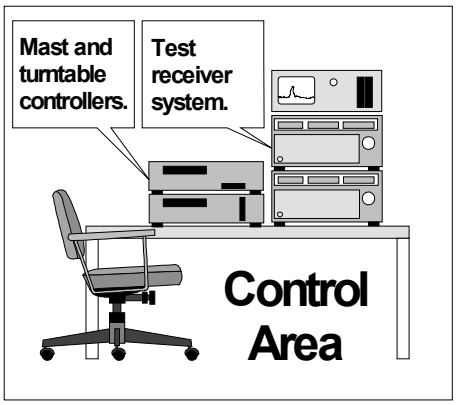
DRG\46774JD01\EMIRAD



Note: This schematic diagram depicts a typical test configuration in accordance with the standard. The detailed test configuration for the actual sample tested may vary from the above depending on the nature and operation of the EUT.
The test site used by RFI is nominally at ground level.
All electrical cables run underground.
All other dimensions in accordance with the standard.

Test Configuration For Radiated Emissions Measurements

Reflection-free area: >60m by 52m
(CISPR ellipse)
Groundplane Earthed
Control room outside CISPR ellipse



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