



# TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

**Test Report Serial No:**  
RFI/ RPTE4/ RP49755JD06A  
**Supersedes Test Report Serial No:**  
RFI/ RPTE3/ RP49755JD06A

<b>This Test Report Is Issued Under The Authority Of Steve Flocks, Service Leader Radio Performance Group:</b>		 pp Brian Watson
<b>Checked By:</b> Brian Watson		<b>Report Copy No:</b> PDF01
<b>Issue Date:</b> 13 May 2008	<b>Test Dates:</b> 21 January 2008 to 30 January 2008	

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**RFI GLOBAL SERVICES LTD**

**Test Report**

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**Issue Date: 13 May 2008**

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## 1. Client Information

<b>Company Name:</b>	Motorola Inc.
<b>Address:</b>	Unit A1 Linhay Business Park Eastern Road Ashburton Devon TQ13 7UP
<b>Contact Name:</b>	Mr C Fisher
<b>Contact Number:</b>	01364 655509
<b>E-Mail Address:</b>	clem.fisher@motorola.com

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## **2. Equipment Under Test (EUT)**

The following information (with the exception of the date of receipt) has been supplied by the customer:

### **2.1. Description of EUT**

The equipment under test is a 5.8 GHz band Wireless Ethernet Bridge.

The Product description is PTP58500.

The product comes as either an Integral antenna version (WB2855) or and external antenna version (WB2856).

The two units are identical bar the fact that either an integral antenna plate is fitted for the integral antenna or a connectors plate is fitted for the external antenna version.

### **2.2. Identification of Equipment Under Test (EUT)**

#### Antenna Port Measurement Sample

<b>Description:</b>	Wireless Ethernet Bridge
<b>Brand Name:</b>	PTP Range
<b>Product Description:</b>	PTP58500
<b>Model Name:</b>	WB2855, WB2856
<b>Serial Number:</b>	58500-1000AB
<b>IMEI Number:</b>	Not Applicable
<b>Hardware Version Number:</b>	P3
<b>Software Version Number:</b>	V.01
<b>FCC ID Number:</b>	QWP58500
<b>Country of Manufacture:</b>	Germany
<b>Date of Receipt:</b>	21 January 2008

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### Identification of Equipment Under Test (EUT) (Continued)

#### AC Conducted Emissions and Radiated Emissions Sample

<b>Description:</b>	Wireless Ethernet Bridge
<b>Brand Name:</b>	PTP Range
<b>Product Description:</b>	PTP58500
<b>Model Name:</b>	WB2855, WB2856
<b>Serial Number:</b>	58500-100073
<b>IMEI Number:</b>	Not Applicable
<b>Hardware Version Number:</b>	P3
<b>Software Version Number:</b>	PTP500-B456
<b>FCC ID Number:</b>	QWP58500
<b>Country of Manufacture:</b>	Germany
<b>Date of Receipt:</b>	21 January 2008

<b>Description:</b>	Power In Door Unit - PIDU
<b>Brand Name:</b>	PTP Range
<b>Model Name or Number:</b>	E083105AM
<b>Serial Number:</b>	0604018587
<b>IMEI Number:</b>	Not Applicable
<b>Hardware Version Number:</b>	Not Applicable
<b>Software Version Number:</b>	Not Applicable
<b>FCC ID Number:</b>	Not Applicable
<b>Country of Manufacture:</b>	China
<b>Date of Receipt:</b>	21 January 2008

### 2.3. Modifications Incorporated in the EUT

During the course of testing the EUT was not modified.

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#### 2.4. Support Equipment

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

<b>Description:</b>	6 foot dia. parabolic dish with feeder
<b>Brand Name:</b>	Andrew
<b>Model Name or Number:</b>	P6F-52-DET
<b>Serial Number:</b>	None stated
<b>Cable Length and Type:</b>	2 m, coaxial
<b>Connected to Port:</b>	RF

<b>Description:</b>	Laptop PC
<b>Brand Name:</b>	Dell
<b>Model Name or Number:</b>	Latitude D420
<b>Serial Number:</b>	None stated
<b>Cable Length and Type:</b>	CAT 5
<b>Connected to Port:</b>	Ethernet

<b>Description:</b>	Integral antenna
<b>Brand Name:</b>	Mars
<b>Model Name or Number:</b>	MA-WS57-30R
<b>Serial Number:</b>	9383
<b>Cable Length and Type:</b>	Not applicable
<b>Connected to Port:</b>	RF

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## 2.5. Additional Information Related to Testing

<b>Intended Operating Environment:</b>	Residential, Commercial and Light Industry		
<b>Equipment Category:</b>	Microwave fixed radio link		
<b>Type of Unit:</b>	Base Station (Fixed used) Transceiver		
<b>Power Supply Requirement:</b>	Nominal 110 V, 60 Hz AC Mains Supply		
<b>Transmit Frequency Range:</b>	5725 MHz to 5850 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel Description</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Bottom	Not Applicable	5735
	Middle	Not Applicable	5790
	Top	Not Applicable	5840
<b>Receive Frequency Range:</b>	5725 MHz to 5850 MHz		
<b>Receive Channels Tested:</b>	<b>Channel Description</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Bottom	Not Applicable	5735
	Middle	Not Applicable	5790
	Top	Not Applicable	5840

## 2.6. Port Identification

Port	Description	Type/Length
1	RF output (Vertical)	N type male
2	RF output (Horizontal)	N type male
3	Data port	RJ45 Ethernet



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### **3. Test Specification, Methods and Procedures**

#### **3.1. Test Specification**

Reference:	FCC Part 15.247: 2007 Subpart C Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz
Title:	Code of Federal Regulations, Part 15.247 (47CFR15)

#### **3.2. Methods and Procedures**

The methods and procedures used were as detailed in:

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.

#### **3.3. 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**

There were no deviations from the test specification.

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## **5. Operation and Configuration of the EUT during Testing**

### **5.1. Operating Modes**

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

- Fixed Modulation Modes as applicable – Acquisition, BPSK, QPSK, 16QAM, 64QAM.
- At maximum TX output powers.
- On frequency channels: Top = 5840MHz, Centre = 5790MHz, Bottom = 5735 MHz.
- The EUT was transmitting in Acquisition mode for all radiated tests.

### **5.2. Configuration and Peripherals**

The EUT was tested in the following configuration:

- The EUT was configured as a master device.
- RF ports of EUT connected to a second PTP 58500 unit to establish a radio link for all conducted emissions. The EUT was tested in all supported modulation modes.
- Radiated Pre-Scans was performed with both RF ports terminated into 50 Ohm loads. Final radiated measurements were performed with each antenna type fitted. A laptop PC used to configure and monitor the EUT during testing via the Ethernet port.
- As the radio part of the device is identical for WB2855 and WB2856 conducted tests were performed on one set of hardware only.
- The final radiated measurements were performed on WB2855 (Integral Antenna Version) and WB28556 (External Antenna Port Version) with a 6 foot (182 cm) diameter parabola dish antenna connected.
- No receiver tests were performed as the EUT only operates in transceiver mode.
- EUT s/no: P3 58500 1000AB used for all conducted tests.
- EUT s/no: P3 58500 100073 used for all radiated tests.

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## 6. Summary of Test Results

Range of Measurements	FCC Part 15 Reference	IC RSS Reference	Port Type	Compliance Status
Transmitter AC Conducted Emissions (150 kHz to 30 MHz)	Section 15.207	RSS-Gen 7.2.2	AC Mains	Complied
Transmitter Minimum 6 dB Bandwidth	15.247(a)(2)	RSS-210 A8.2	Antenna Terminals	Complied
Transmitter 20 dB Bandwidth	Section 2.1049	RSS-210 9.2	Antenna Terminals	Complied
Transmitter Peak Power Spectral Density	Section 15.247(e)	RSS-210 A8.2	Antenna Terminals	Complied
Transmitter Maximum Peak Output Power	15.247(b)(3)	RSS-210 A8.4	Antenna Terminals	Complied
Transmitter Conducted Emissions	Section 15.247 (d)	RSS-210 A8.5	Antenna Terminals	Complied
Transmitter Radiated Emissions	Sections 15.247(d) & 15.209(a)	RSS-210 A8.5	Antenna	Complied
Transmitter Band Edge Conducted Emissions	Section 15.247(d)	RSS-210 A8.5	Antenna Terminals	Complied
Transmitter Band Edge Radiated Emissions	Sections 15.247(d) & 15.209(a)	RSS-210 A8.5	Antenna	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.

FCC Site Registration Number: 90895

IC Site Registration Number: 3485

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## **7. Measurements, Examinations and Derived Results**

### **7.1. General Comments**

This section contains test results only.

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.

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## 7.2. Test Results

### 7.2.1. Transmitter AC Conducted Spurious Emissions

Tests were performed using the test methods detailed in ANSI C63.4 Section 7.

#### Results:

#### Quasi-Peak Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Note(s)
25.894500	Live	48.8	60.0	11.2	Complied
26.524500	Live	51.6	60.0	8.4	Complied
27.154500	Live	52.5	60.0	7.5	Complied
27.474000	Live	48.0	60.0	12.0	Complied
27.789000	Live	48.7	60.0	11.3	Complied
28.104000	Live	50.7	60.0	9.3	Complied
28.419000	Live	49.6	60.0	10.4	Complied
28.734000	Live	52.4	60.0	7.6	Complied
29.031000	Live	50.7	60.0	9.3	Complied
29.368500	Live	48.4	60.0	11.6	Complied

#### Average Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Note(s)
25.890000	Live	43.9	50.0	6.1	Complied
26.515500	Live	47.7	50.0	2.3	Complied
26.839500	Live	42.2	50.0	7.8	Complied
27.154500	Live	43.6	50.0	6.4	Complied
27.469500	Live	43.8	50.0	6.2	Complied
27.784500	Live	44.0	50.0	6.0	Complied
28.099500	Live	45.3	50.0	4.7	Complied
28.729500	Live	46.0	50.0	4.0	Complied
29.049000	Live	42.0	50.0	8.0	Complied
29.359500	Live	46.1	50.0	3.9	Complied

#### Note(s):

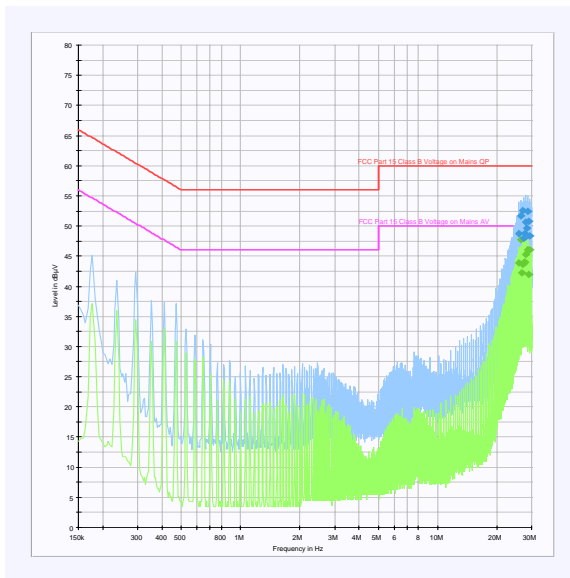
1. EUT s/no:P3 58500 100073

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**Transmitter AC Conducted Spurious Emissions (Continued)**



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

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### 7.2.2. Transmitter Minimum 6 dB Bandwidth

The EUT was configured for 6 dB bandwidth measurements as described in section 9 of this report.

#### Results for 15 MHz channel width:

Channel	Channel	Transmitter 6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
BPSK	Middle	13.707	$\geq 0.5$	13.207	Complied
QPSK	Middle	13.707	$\geq 0.5$	13.207	Complied
16 QAM	Middle	13.767	$\geq 0.5$	13.267	Complied
64QAM	Middle	13.647	$\geq 0.5$	13.147	Complied
Acquisition	Middle	14.789	$\geq 0.5$	14.289	Complied

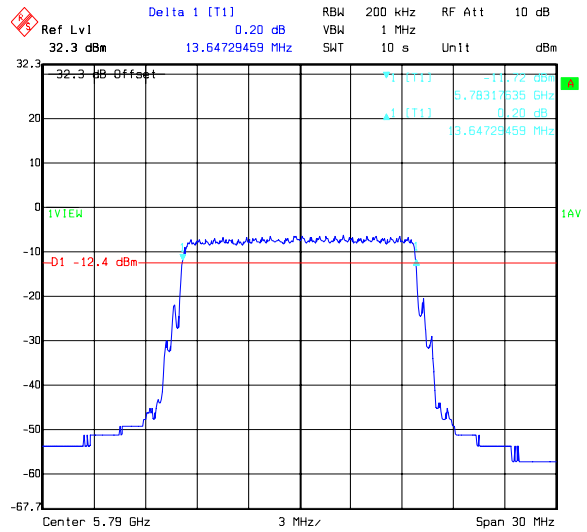
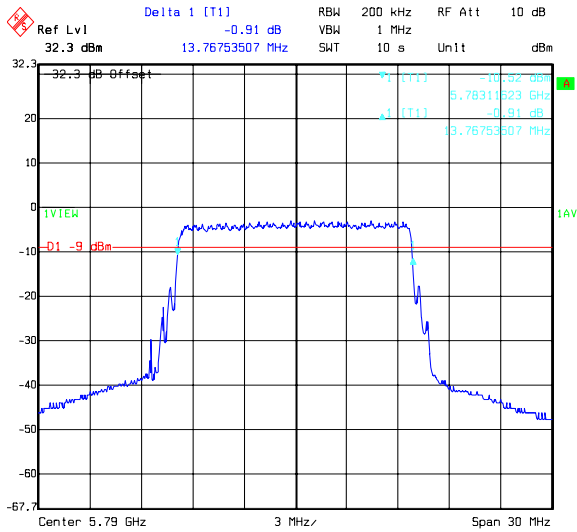
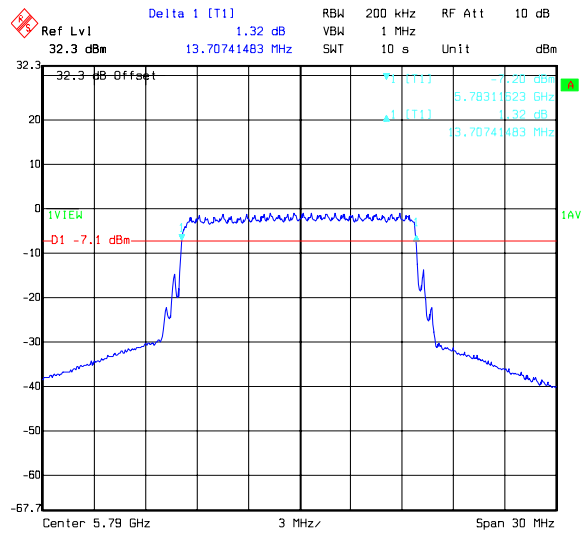
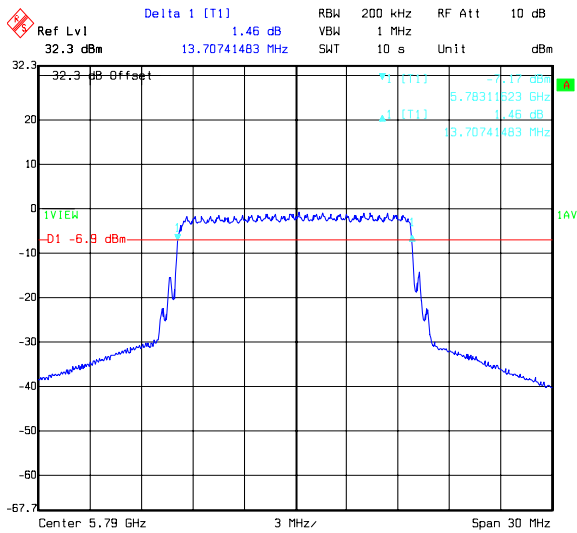
#### Note(s):

1. EUT s/no: P3 58500 1000AB

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**Transmitter Minimum 6 dB Bandwidth (Continued)**



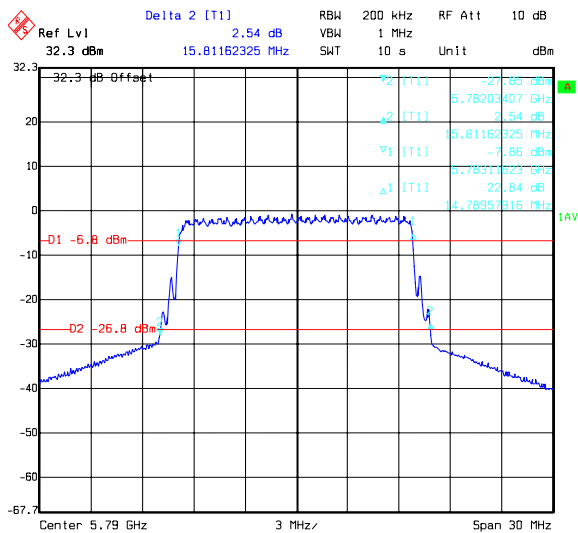
Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.



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**Transmitter Minimum 6 dB Bandwidth (Continued)**



Title: 49755JD06  
 Comment A: 6dB BANDWIDTH H PORT ACQ CENTRE CHANNEL  
 Date: 22.JAN.2008 14:02:39

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**7.2.3. Transmitter 20 dB Bandwidth**

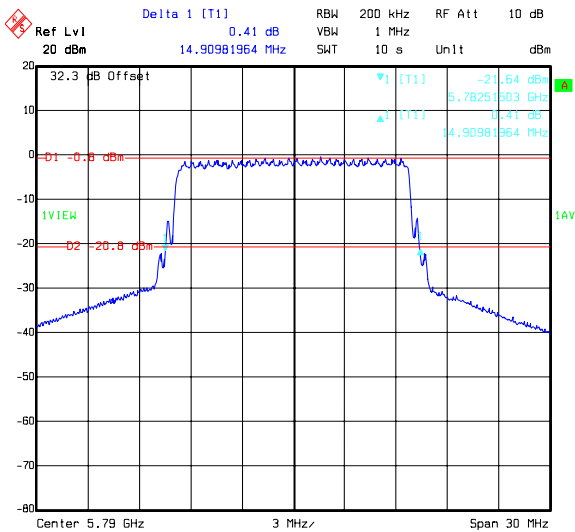
Tests were performed using the test methods detailed in Public Notice DA 00-705 (March 30, 2000)

**Results:**

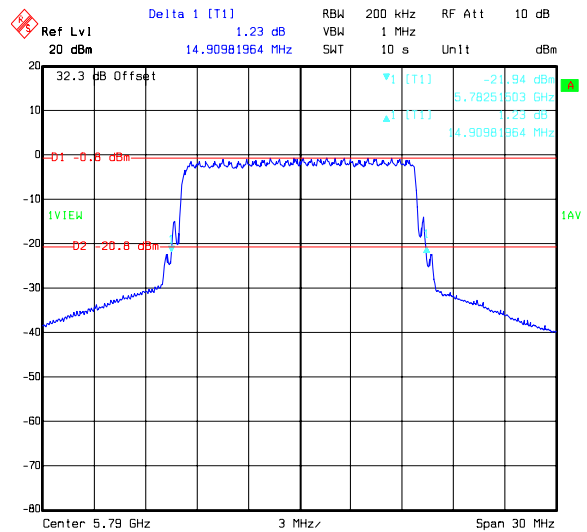
Operation Mode	Transmitter 20 dB Bandwidth (MHz)
BPSK	14.909
QPSK	14.909
16 QAM	14.789
64QAM	14.909
Acquisition	14.909

**Note(s):**

- EUT s/no: P3 58500 1000AB



Title: 49755JD06  
Comment A: 20dB BANDWIDTH H PORT BPSK CENTRE CHANNEL  
Date: 22.JAN.2008 12:11:26

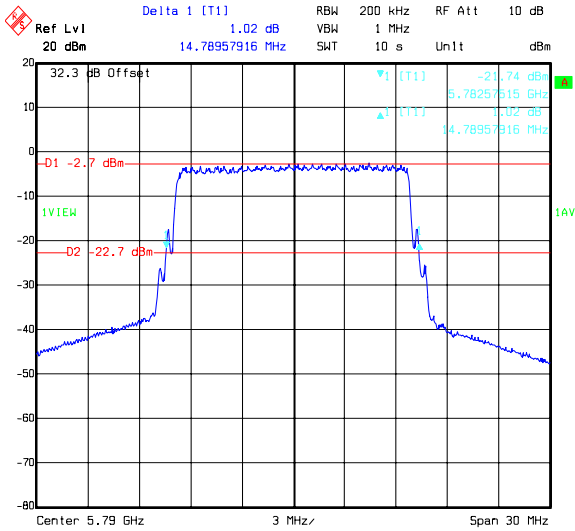


Title: 49755JD06  
Comment A: 20dB BANDWIDTH H PORT QPSK CENTRE CHANNEL  
Date: 22.JAN.2008 12:10:23

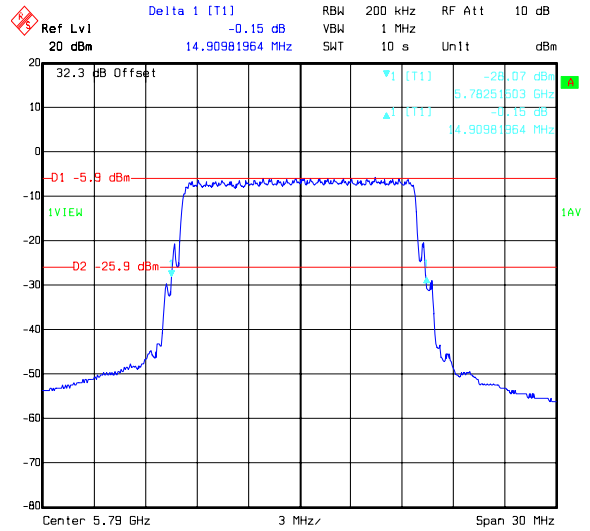
Test of: Motorola Inc.  
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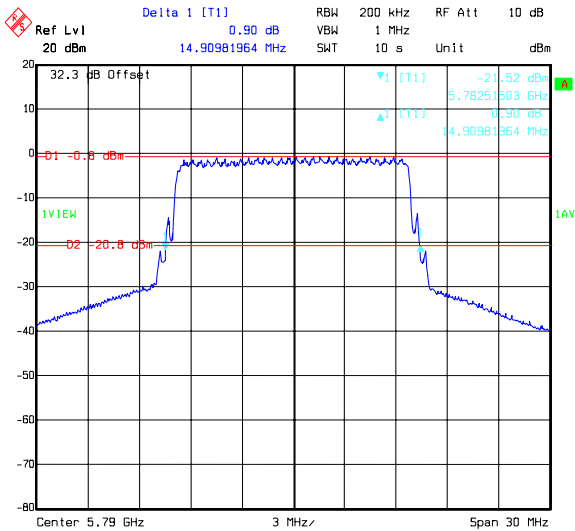
**Transmitter 20 dB Bandwidth (Continued)**



Title: 49755JD06  
Comment A: 20dB BANDWIDTH H PORT 16QAM CENTRE CHANNEL  
Date: 22.JAN.2008 12:08:17



Title: 49755JD06  
Comment A: 20dB BANDWIDTH H PORT 64QAM CENTRE CHANNEL  
Date: 22.JAN.2008 12:04:05



Title: 49755JD06  
Comment A: 20dB BANDWIDTH H PORT ACQ CENTRE CHANNEL  
Date: 22.JAN.2008 12:14:02

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**Transmitter 99% Bandwidth**

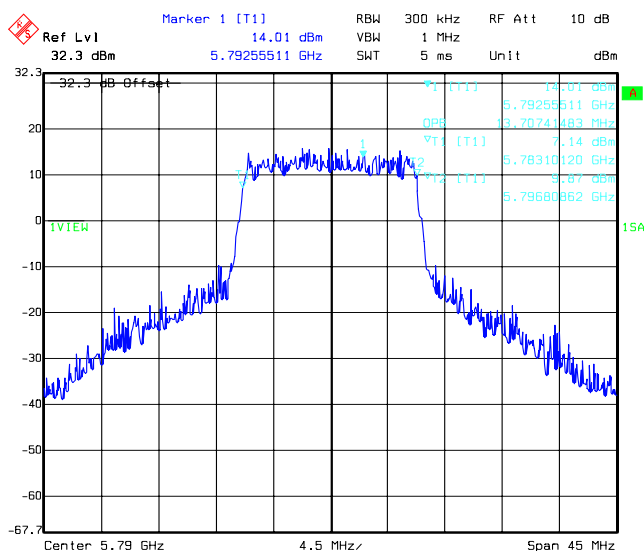
Tests were performed using the occupied bandwidth function of the spectrum analyser. The measurement bandwidths are automatically set when the spectrum analyser occupied bandwidth function is enabled.

**Results:**

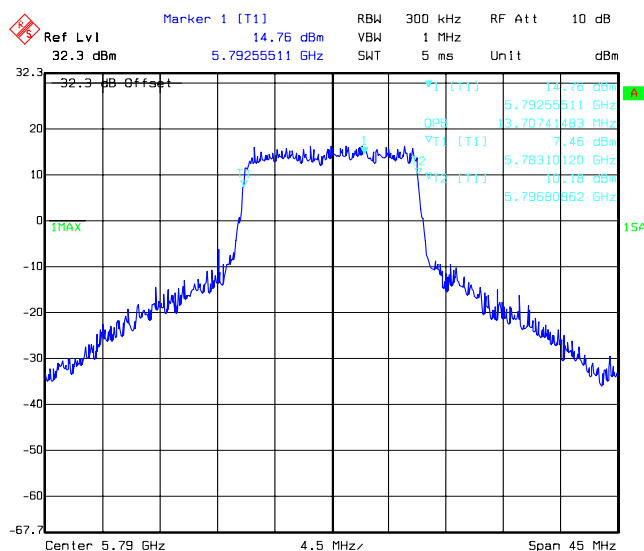
Operation Mode	Transmitter 99% Bandwidth (MHz)
BPSK	13.707
QPSK	13.707
16 QAM	13.587
64QAM	13.587
Acquisition	13.707

**Note(s):**

- EUT s/no: P3 58500 1000AB



Title: 49755JD06  
Comment A: 99% BANDWIDTH H PORT BPSK CENTRE CHANNEL  
Date: 22.JAN.2008 14:58:00

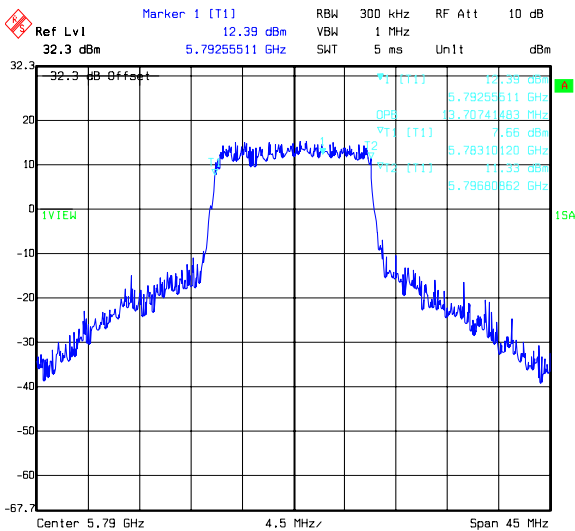
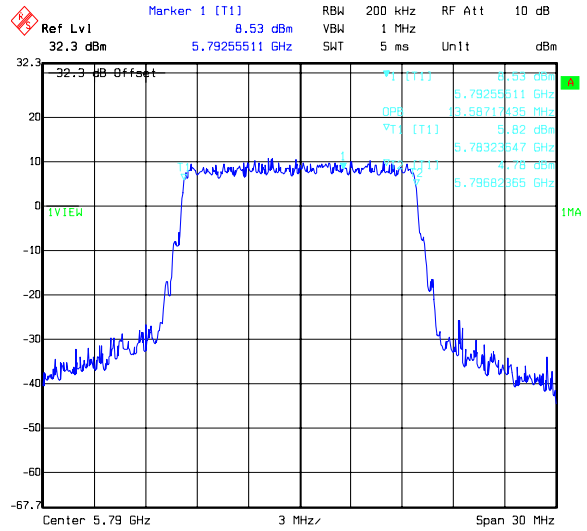
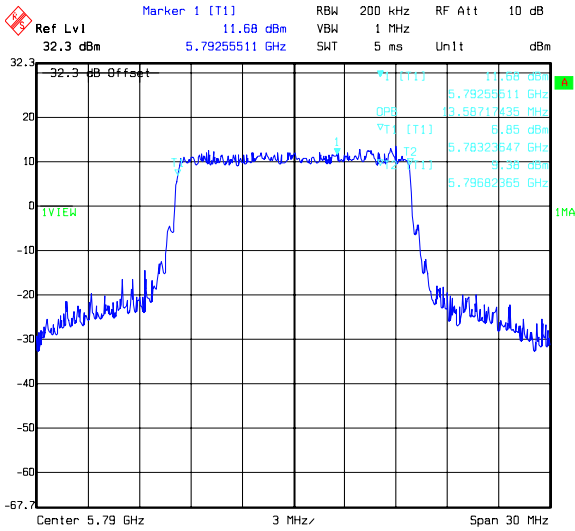


Title: 49755JD06  
Comment A: 99% BANDWIDTH H PORT QPSK CENTRE CHANNEL  
Date: 22.JAN.2008 14:57:06

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**Transmitter 99% Bandwidth (Continued)**



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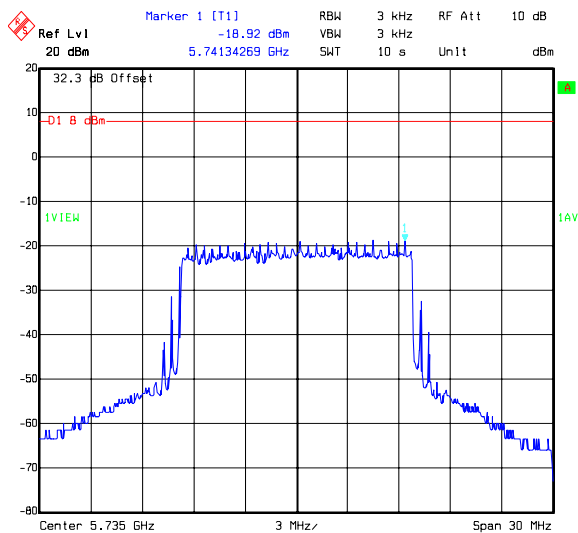
To: **FCC Part 15.247: 2007 (Subpart C)**

**7.2.4. Transmitter Peak Power Spectral Density**

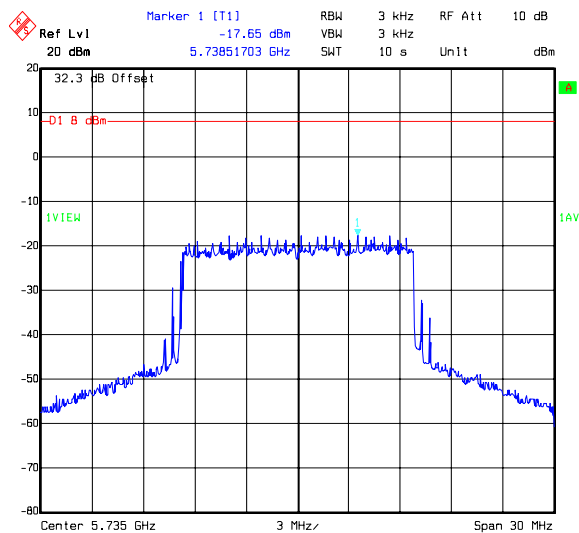
The EUT was configured for Peak Power Spectral Density measurements as described in Section 9 of this report.

**Results for QPSK 15 MHz channel**

Channel	Antenna Polarity (H/V)	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	Vertical	-18.9	8.0	26.9	Complied
Bottom	Horizontal	-17.7	8.0	25.7	Complied
Middle	Vertical	-18.8	8.0	26.8	Complied
Middle	Horizontal	-17.0	8.0	25.0	Complied
Top	Vertical	-18.4	8.0	26.4	Complied
Top	Horizontal	-16.8	8.0	24.8	Complied



Title: 49755JD06  
 Comment A: SPECTRAL POWER DENSITY V PORT BOTTOM CHANNEL QPSK  
 Date: 22.JAN.2008 11:08:37

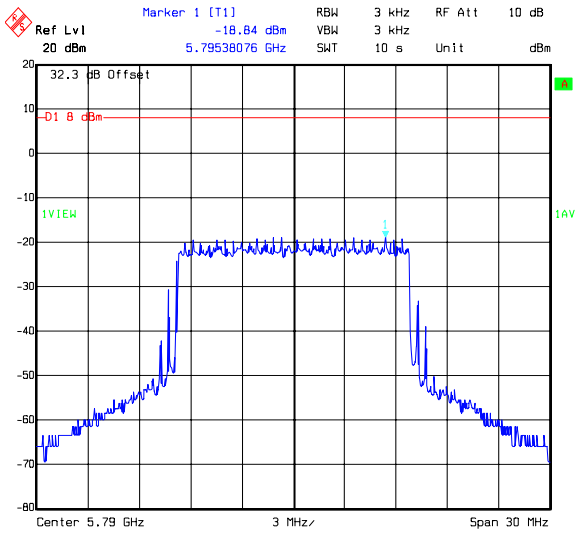


Title: 49755JD06  
 Comment A: SPECTRAL POWER DENSITY H PORT BOTTOM CHANNEL QPSK  
 Date: 22.JAN.2008 11:35:44

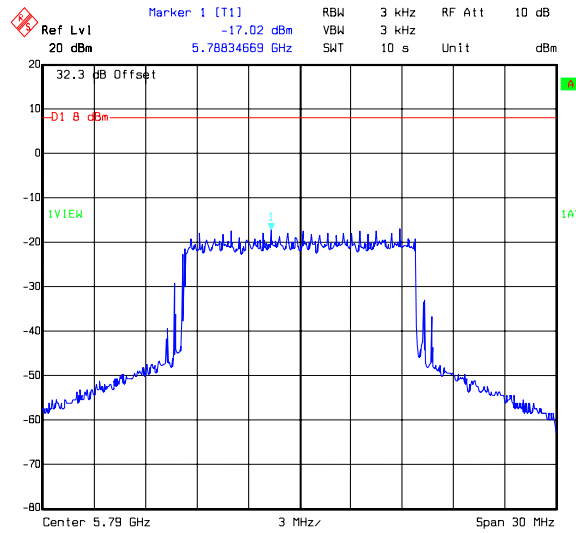
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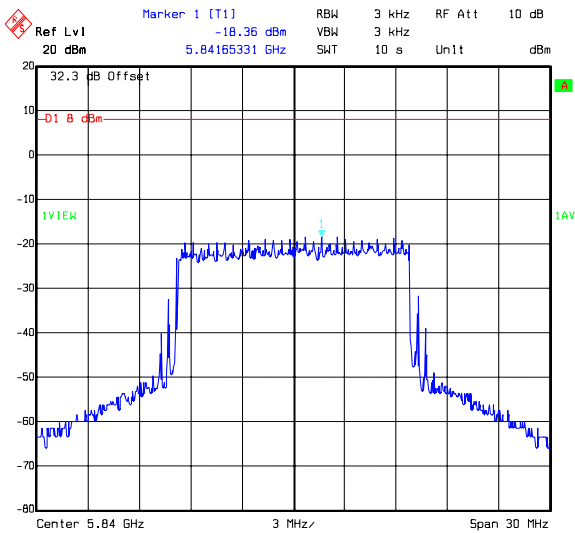
**Transmitter Peak Power Spectral Density (Continued)**



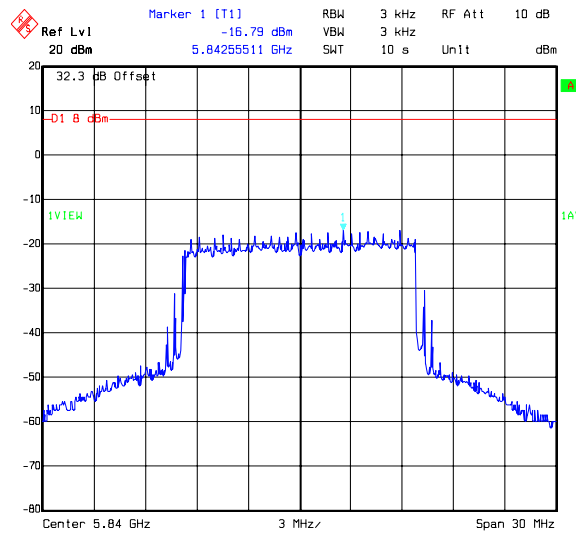
Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY V PORT CENTRE CHANNEL QPSK  
Date: 22.JAN.2008 11:09:54



Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY H PORT CENTRE CHANNEL QPSK  
Date: 22.JAN.2008 11:34:22



Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY V PORT TOP CHANNEL QPSK  
Date: 22.JAN.2008 11:10:55



Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY H PORT TOP CHANNEL QPSK  
Date: 22.JAN.2008 11:32:31

Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

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**Transmitter Peak Power Spectral Density (Continued)**

**Results for BPSK 15 MHz channel**

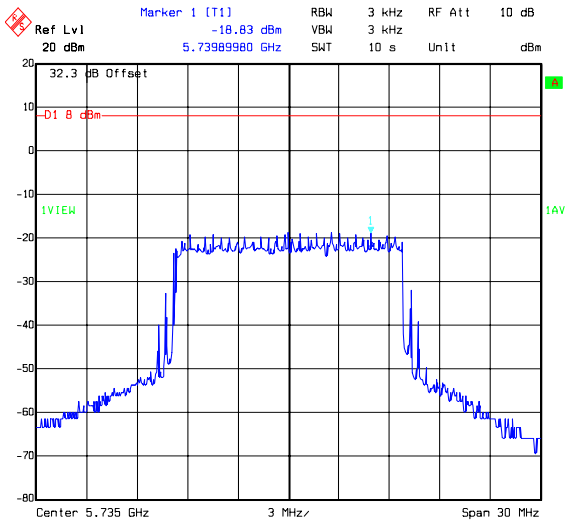
Channel	Antenna Polarity (H/V)	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	Vertical	-18.8	8.0	26.8	Complied
Bottom	Horizontal	-17.4	8.0	25.4	Complied
Middle	Vertical	-18.5	8.0	26.5	Complied
Middle	Horizontal	-16.8	8.0	24.8	Complied
Top	Vertical	-18.3	8.0	26.3	Complied
Top	Horizontal	-17.3	8.0	25.3	Complied



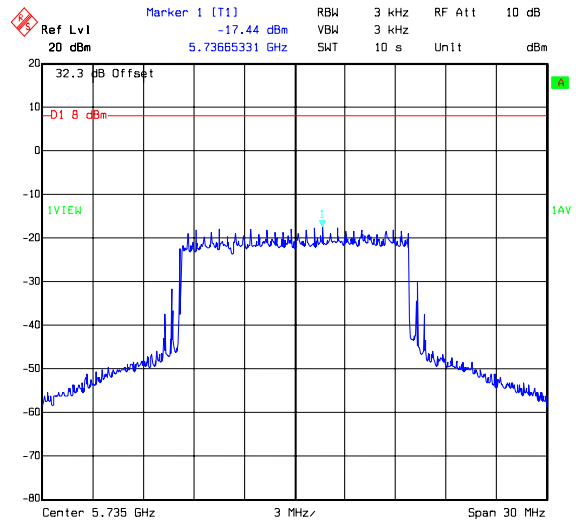
Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

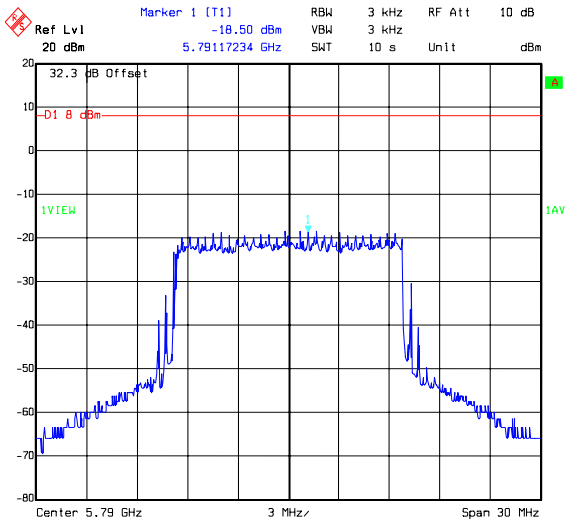
**Transmitter Peak Power Spectral Density (Continued)**



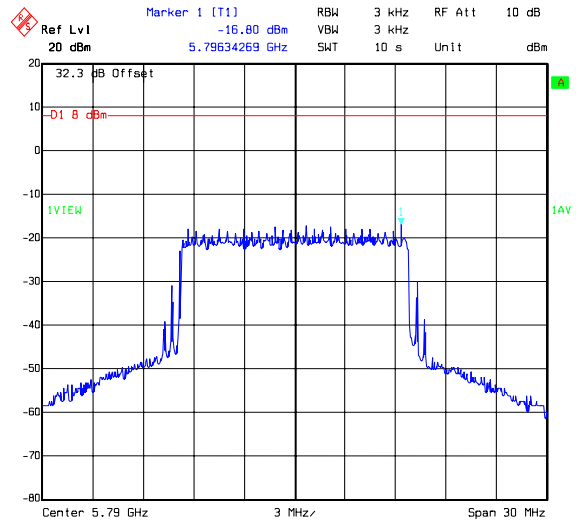
Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY V PORT BOTTOM CHANNEL BPSK  
Date: 22.JAN.2008 11:14:43



Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY H PORT BOTTOM CHANNEL BPSK  
Date: 22.JAN.2008 11:27:48



Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY V PORT CENTRE CHANNEL BPSK  
Date: 22.JAN.2008 11:13:31

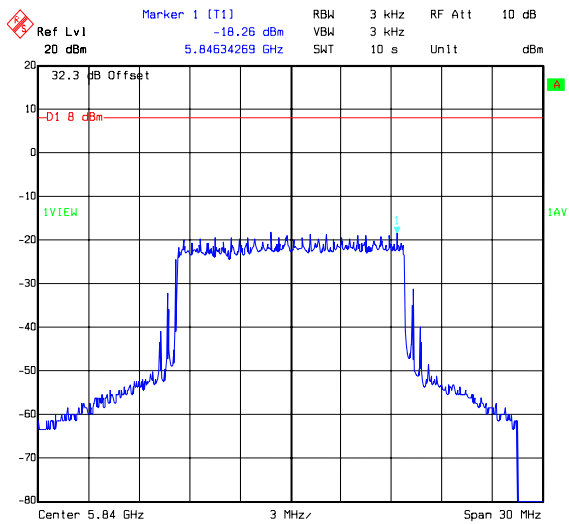


Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY H PORT CENTRE CHANNEL BPSK  
Date: 22.JAN.2008 11:29:35

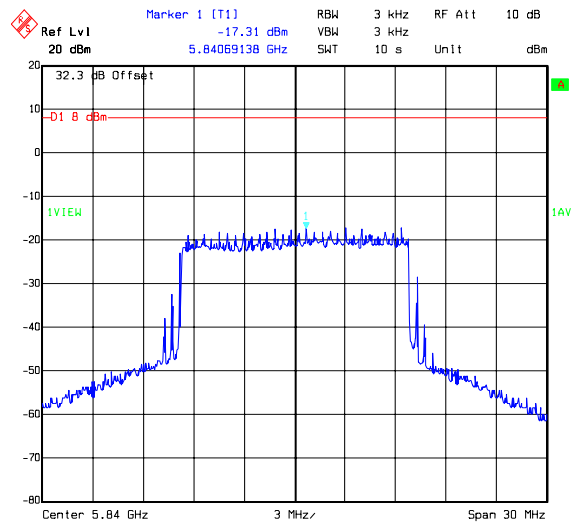
Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

**Transmitter Peak Power Spectral Density (Continued)**



Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY V PORT TOP CHANNEL BPSK  
Date: 22.JAN.2008 11:12:12



Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY H PORT TOP CHANNEL BPSK  
Date: 22.JAN.2008 11:30:54

Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

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**Transmitter Peak Power Spectral Density (Continued)**

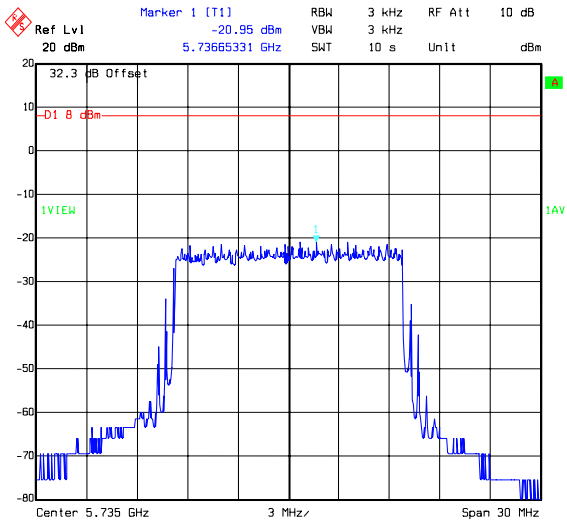
**Results for 16QAM 15 MHz Channel**

Channel	Antenna Polarity (H/V)	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	Vertical	-21.0	8.0	29.0	Complied
Bottom	Horizontal	-19.7	8.0	27.7	Complied
Middle	Vertical	-20.6	8.0	28.6	Complied
Middle	Horizontal	-19.6	8.0	27.8	Complied
Top	Vertical	-20.6	8.0	28.6	Complied
Top	Horizontal	-19.9	8.0	27.9	Complied

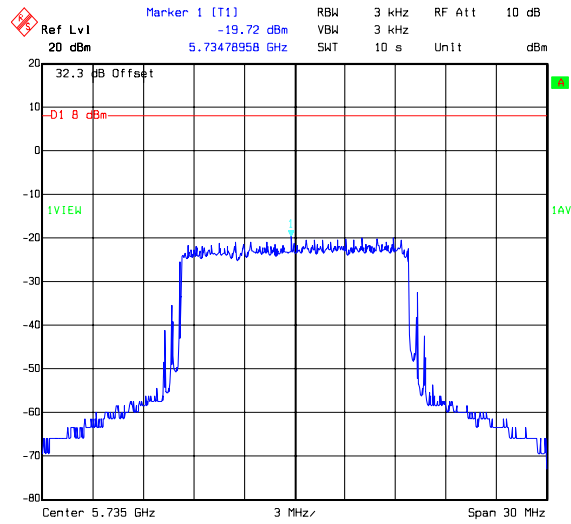
Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

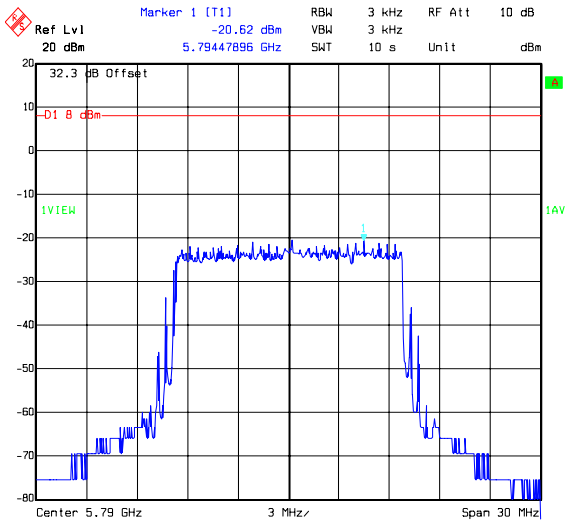
**Transmitter Peak Power Spectral Density (Continued)**



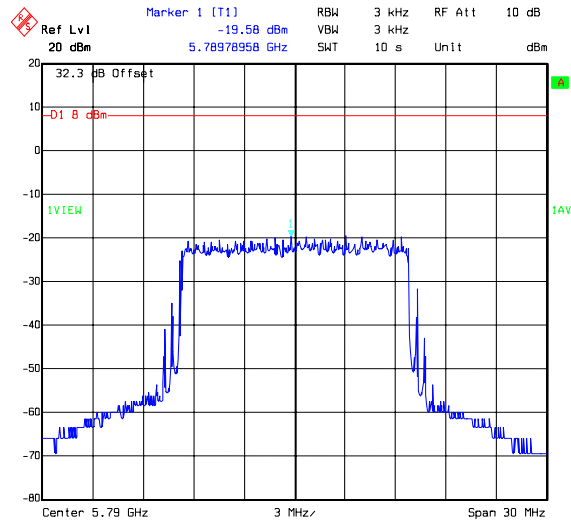
Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY V PORT BOTTOM CHANNEL 160AM  
Date: 22.JAN.2008 11:06:49



Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY H PORT BOTTOM CHANNEL 160AM  
Date: 22.JAN.2008 11:38:25



Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY V PORT CENTRE CHANNEL 160AM  
Date: 22.JAN.2008 11:05:39

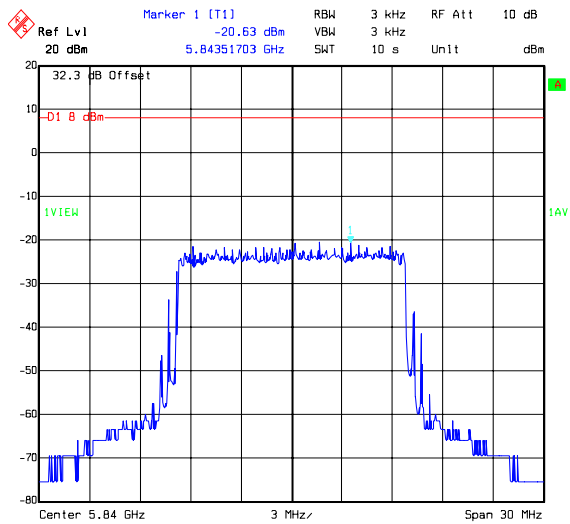


Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY H PORT CENTRE CHANNEL 160AM  
Date: 22.JAN.2008 11:39:33

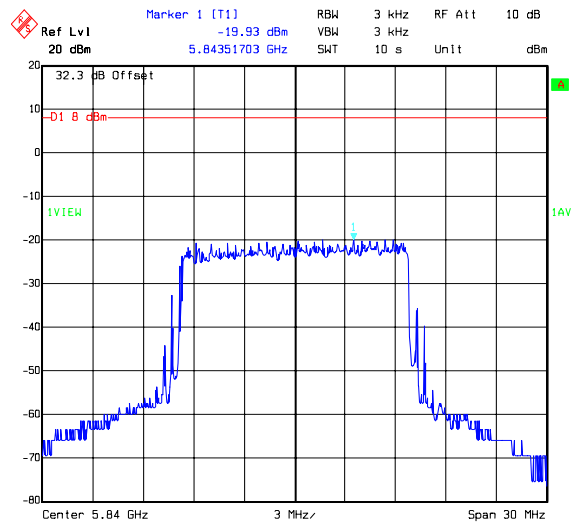
Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

**Transmitter Peak Power Spectral Density (Continued)**



Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY V PORT TOP CHANNEL 160AM  
Date: 22.JAN.2008 11:04:01



Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY H PORT TOP CHANNEL 160AM  
Date: 22.JAN.2008 11:41:00

Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

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**Transmitter Peak Power Spectral Density (Continued)**

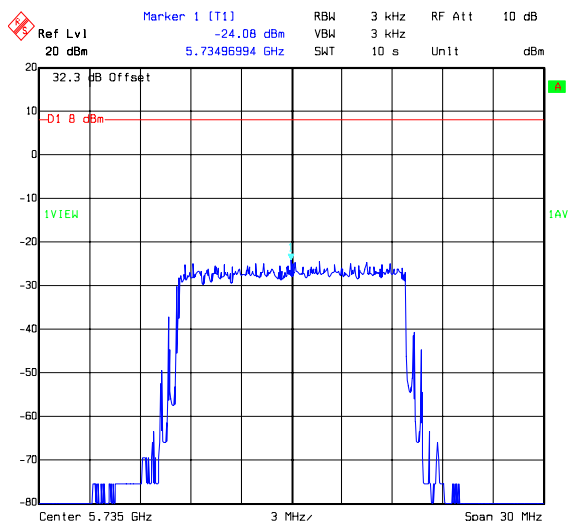
**Results for 64QAM 15 MHz Channel**

Channel	Antenna Polarity (H/V)	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	Vertical	-24.1	8.0	32.1	Complied
Bottom	Horizontal	-23.5	8.0	31.5	Complied
Middle	Vertical	-24.0	8.0	32.0	Complied
Middle	Horizontal	-22.2	8.0	30.2	Complied
Top	Vertical	-23.4	8.0	31.4	Complied
Top	Horizontal	-22.9	8.0	30.9	Complied

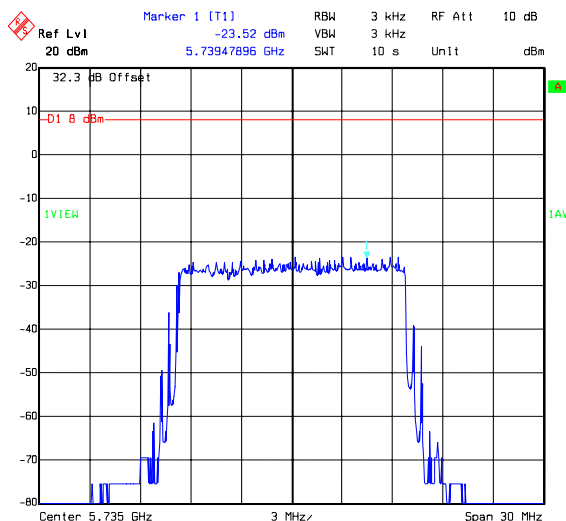
Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

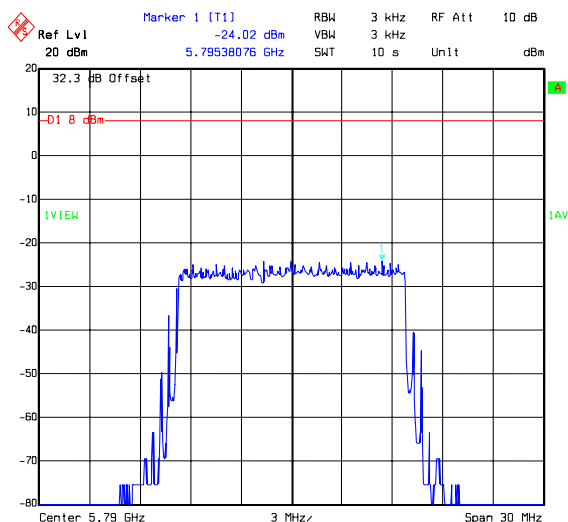
**Transmitter Peak Power Spectral Density (Continued)**



Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY V PORT BOTTOM CHANNEL 640AM  
Date: 22.JAN.2008 10:55:41



Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY H PORT BOTTOM CHANNEL 640AM  
Date: 22.JAN.2008 11:45:53



Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY V PORT CENTRE CHANNEL 640AM  
Date: 22.JAN.2008 10:59:21

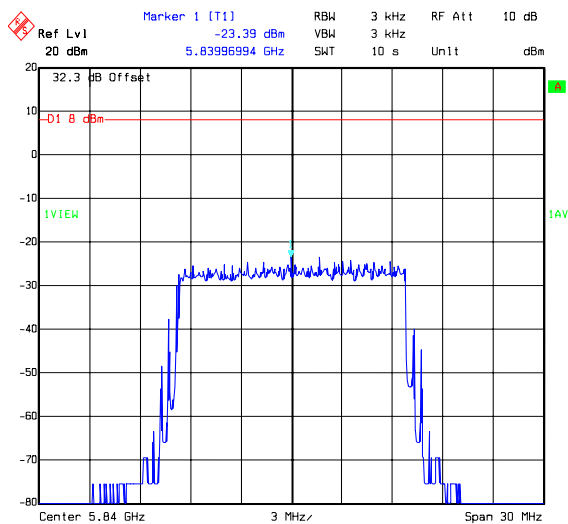


Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY H PORT CENTRE CHANNEL 640AM  
Date: 22.JAN.2008 11:44:29

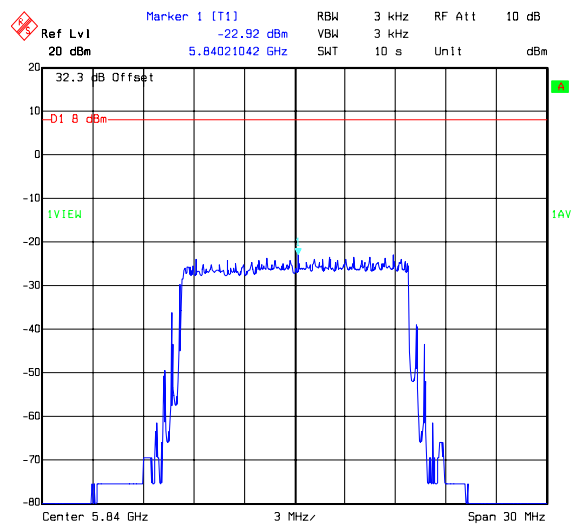
Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

**Transmitter Peak Power Spectral Density (Continued)**



Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY V PORT TOP CHANNEL 640AM  
Date: 22.JAN.2008 11:00:38



Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY H PORT TOP CHANNEL 640AM  
Date: 22.JAN.2008 11:42:33



Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

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**Transmitter Peak Power Spectral Density: (Continued)**

**Results for ACQ 15 MHz Channel**

Channel	Antenna Polarity (H/V)	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	Vertical	-18.8	8.0	26.8	Complied
Bottom	Horizontal	-17.6	8.0	25.6	Complied
Middle	Vertical	-18.2	8.0	26.2	Complied
Middle	Horizontal	-17.3	8.0	25.3	Complied
Top	Vertical	-18.3	8.0	26.3	Complied
Top	Horizontal	-17.2	8.0	25.2	Complied

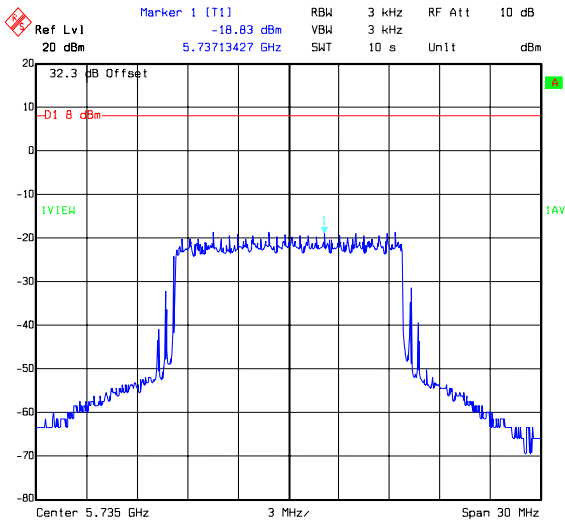
**Note(s):**

1. EUT s/no: P3 58500 1000AB

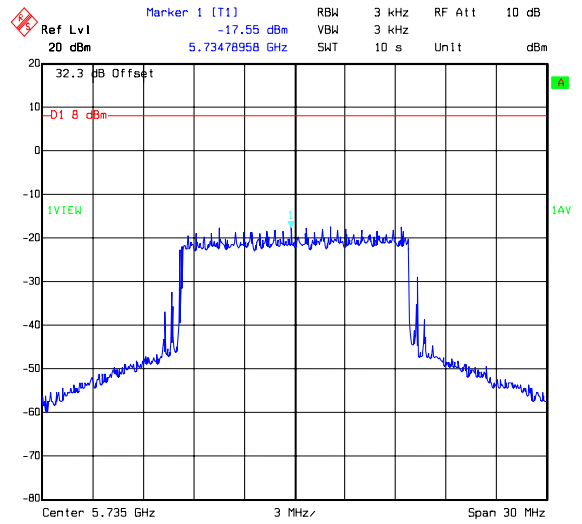
Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

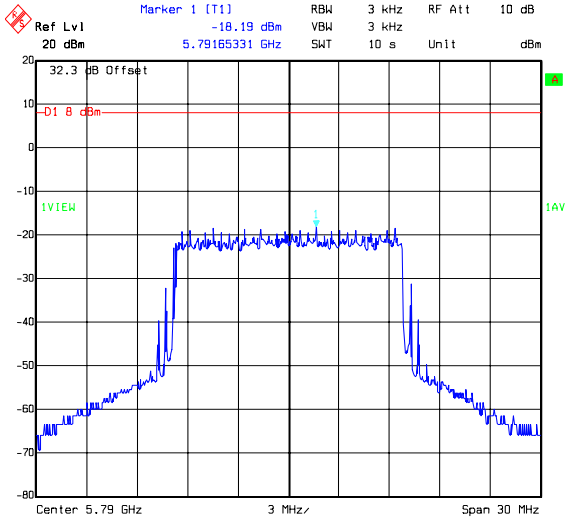
**Transmitter Peak Power Spectral Density (Continued)**



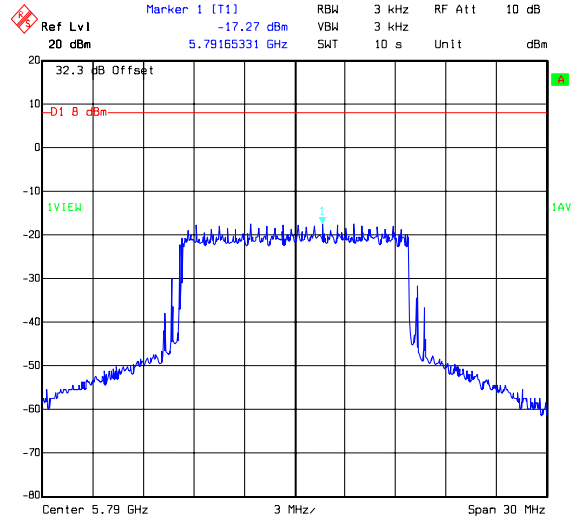
Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY V PORT BOTTOM CHANNEL ACQ MODE  
Date: 22.JAN.2008 11:17:10



Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY H PORT BOTTOM CHANNEL ACQ MODE  
Date: 22.JAN.2008 11:26:16



Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY V PORT CENTRE CHANNEL ACQ MODE  
Date: 22.JAN.2008 11:18:36

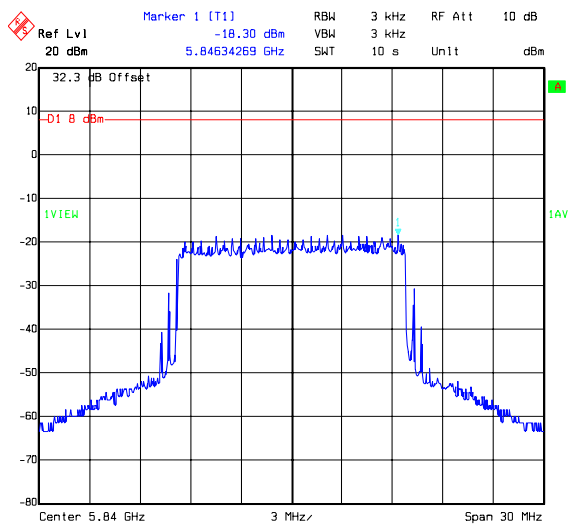


Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY H PORT CENTRE CHANNEL ACQ MODE  
Date: 22.JAN.2008 11:24:38

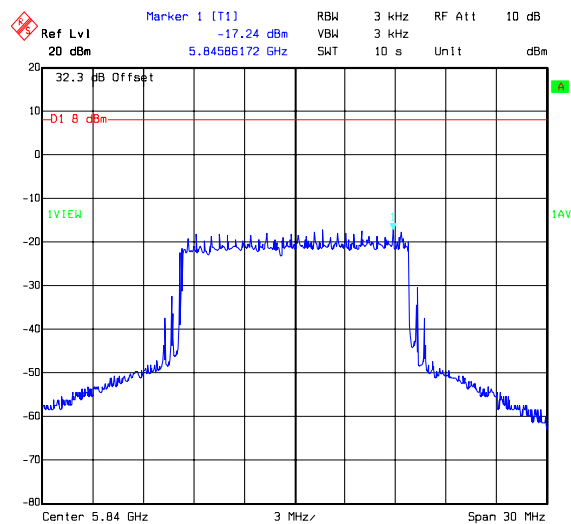
Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

**Transmitter Peak Power Spectral Density (Continued)**



Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY V PORT TOP CHANNEL ACQ MODE  
Date: 22.JAN.2008 11:20:32



Title: 49755JD06  
Comment A: SPECTRAL POWER DENSITY H PORT TOP CHANNEL ACQ MODE  
Date: 22.JAN.2008 11:23:18

Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

### 7.2.5. Transmitter Maximum Peak Output Power

Tests were performed using the test methods detailed in Public Notice DA 00-705 (March 30, 2000), ANSI TIA-603-C-2004 and FCC CFR Part 2.

#### Results:

#### Results for QPSK (15 MHz channel bandwidth)

Channel	Conducted RF O/P Power at Horizontal Polarity Port (dBm)	Conducted RF O/P Power at Vertical Polarity Port (dBm)	Total Combined Conducted RF O/P Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	21.3	20.9	24.1	30.0	5.9	Complied
Middle	22.6	22.1	25.4	30.0	4.6	Complied
Top	22.4	22.0	25.2	30.0	4.8	Complied

#### Results for BPSK (15 MHz channel bandwidth)

Channel	Conducted RF O/P Power at Horizontal Polarity Port (dBm)	Conducted RF O/P Power at Vertical Polarity Port (dBm)	Total Combined Conducted RF O/P Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	21.5	21.3	24.4	30.0	5.6	Complied
Middle	23.9	23.3	26.6	30.0	3.4	Complied
Top	22.6	22.1	25.4	30.0	4.6	Complied

#### Results for 16QAM (15 MHz channel bandwidth)

Channel	Conducted RF O/P Power at Horizontal Polarity Port (dBm)	Conducted RF O/P Power at Vertical Polarity Port (dBm)	Total Combined Conducted RF O/P Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	20.4	19.9	23.2	30.0	6.8	Complied
Middle	20.6	19.9	23.3	30.0	6.7	Complied
Top	20.3	19.9	23.1	30.0	6.9	Complied

Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

**Transmitter Maximum Peak Output Power (Continued)**

**Results for 64QAM (15 MHz channel bandwidth) – Old software version**

Channel	Conducted RF O/P Power at Horizontal Polarity Port (dBm)	Conducted RF O/P Power at Vertical Polarity Port (dBm)	Total Combined Conducted RF O/P Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	16.9	16.4	19.7	30.0	10.3	Complied
Middle	17.4	19.8	21.7	30.0	8.3	Complied
Top	16.8	16.1	19.5	30.0	10.5	Complied

**Results for 64QAM (15 MHz channel bandwidth) - New software version**

Channel	Conducted RF O/P Power at Horizontal Polarity Port (dBm)	Conducted RF O/P Power at Vertical Polarity Port (dBm)	Total Combined Conducted RF O/P Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	18.2	17.1	20.7	30.0	9.3	Complied
Middle	18.5	17.0	20.8	30.0	9.2	Complied
Top	18.1	16.8	20.5	30.0	9.5	Complied

Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

### Transmitter Maximum Peak Output Power (Continued)

#### Results for ACQ (15 MHz channel bandwidth)

Channel	Conducted RF O/P Power at Horizontal Polarity Port (dBm)	Conducted RF O/P Power at Vertical Polarity Port (dBm)	Total Combined Conducted RF O/P Power (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	20.6	20.0	23.3	30.0	6.7	Complied
Middle	20.9	20.1	23.5	30.0	6.5	Complied
Top	21.7	22.1	24.9	30.0	5.1	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).
2. The Client changed the software version to V.01 after all testing was completed. The software change increased the 64QAM Maximum Peak Output Power by 1dB. All other 64QAM Transmitter tests were re-verified with the new software version and no changes were noted from the previous version of software. Where there was a change between old and new software versions, the two result sets are included in this report and identified by the "Old Software Version" (PTP500-B456) and "New Software Version" (V.01) label.
3. The transmitter maximum output powers were reduced by the Client as follows to enable the EUT to comply with Conducted Band Edge limits as shown in Section 7.3 of this Report. Bottom channel (5735 MHz) and for BPSK and QPSK modulations, the power was reduced by 2 dB relative to other central channels. Top channel (5840 MHz) and for BPSK modulation, the power was reduced by 1 dB relative to other central channels.
4. EUT s/no: P3 58500 1000AB.

Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

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### 7.2.6. Transmitter Conducted Emissions

Tests were performed using the test methods detailed in Public Notice DA 00-705 (March 30, 2000) and FCC CFR Part 2.

#### Results:

##### Top Channel

Frequency (MHz)	Peak Emission Level (dBm)	Peak Emission Level (dBc)	Limit (dBc)	Margin (dB)	Result
37051.102	-39.1	-37.7	-31.4	6.3	Complied

#### Note(s):

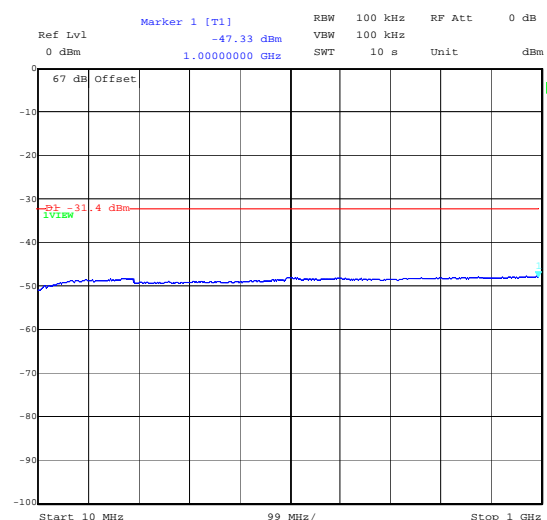
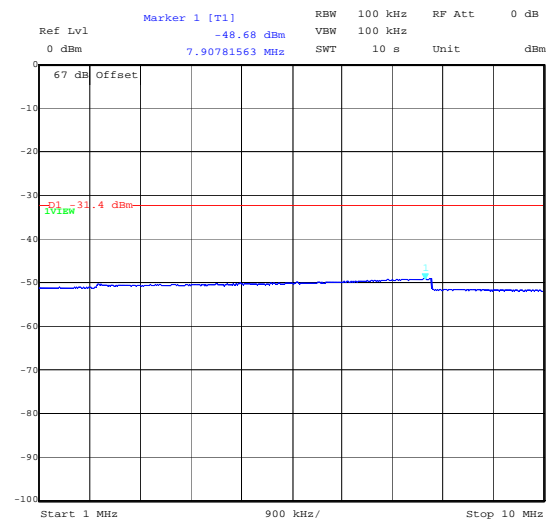
1. *No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above.*

Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

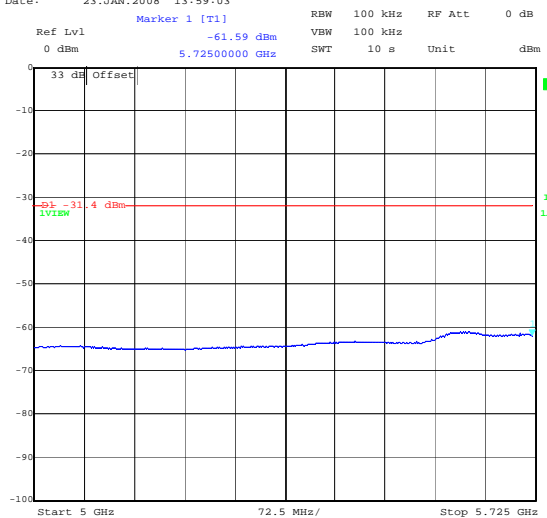
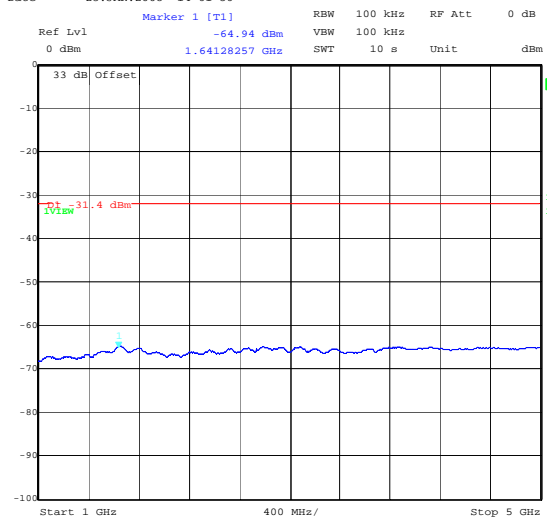
**Transmitter Conducted Emissions (Continued)**

**Horizontal Antenna Port**



Title: 49755JD06  
Comment A: TX CONDUCTED EMISSIONS H PORT BPSK TOP CHANNEL  
Date: 23.JAN.2008 14:01:50

Title: 49755JD06  
Comment A: TX CONDUCTED EMISSIONS H PORT BPSK TOP CHANNEL  
Date: 23.JAN.2008 13:59:03



Title: 49755JD06  
Comment A: TX CONDUCTED EMISSIONS H PORT BPSK TOP CHANNEL  
Date: 23.JAN.2008 13:56:17

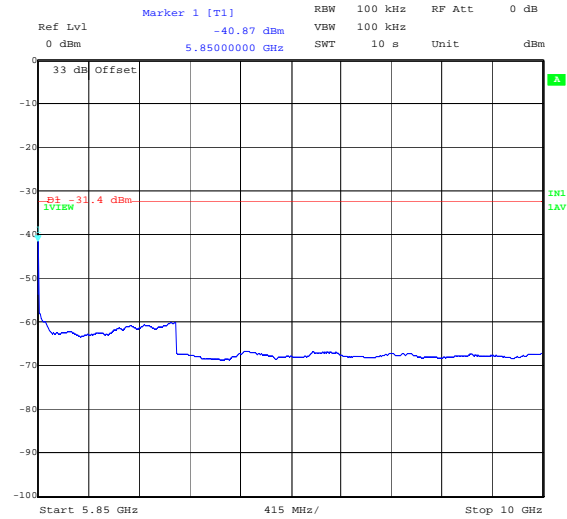
Title: 49755JD06  
Comment A: TX CONDUCTED EMISSIONS H PORT BPSK TOP CHANNEL  
Date: 23.JAN.2008 13:48:31



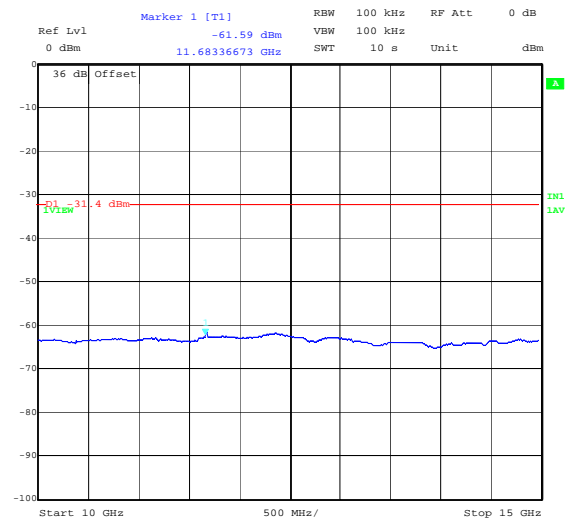
Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

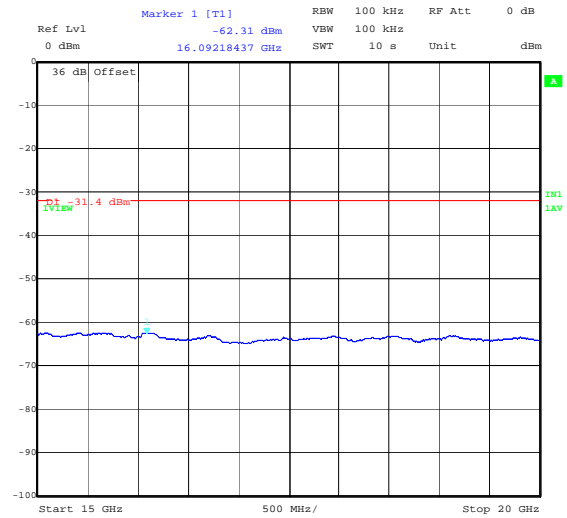
**Transmitter Conducted Emissions (Continued)**



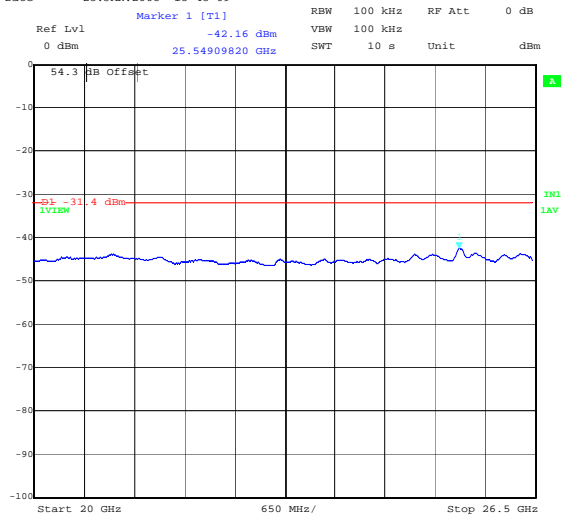
Title: 49755JD06  
Comment A: TX CONDUCTED EMISSIONS H PORT BPSK TOP CHANNEL  
Date: 23.JAN.2008 13:44:49



Title: 49755JD06  
Comment A: TX CONDUCTED EMISSIONS H PORT BPSK TOP CHANNEL  
Date: 23.JAN.2008 13:43:09



Title: 49755JD06  
Comment A: TX CONDUCTED EMISSIONS H PORT BPSK TOP CHANNEL  
Date: 23.JAN.2008 13:41:48

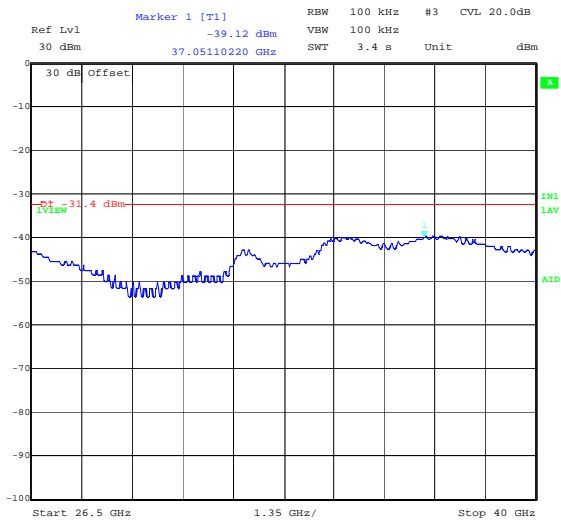


Title: 49755JD06  
Comment A: TX CONDUCTED EMISSIONS H PORT BPSK TOP CHANNEL  
Date: 23.JAN.2008 13:40:17

Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

**Transmitter Conducted Emissions (Continued)**



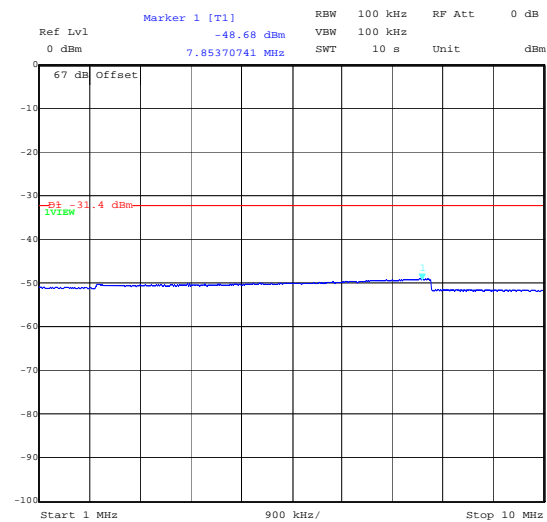
Title: 49755JD06  
Comment A: TX CONDUCTED EMISSIONS H PORT BPSK TOP CHANNEL  
Date: 23.JAN.2008 14:59:17

Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

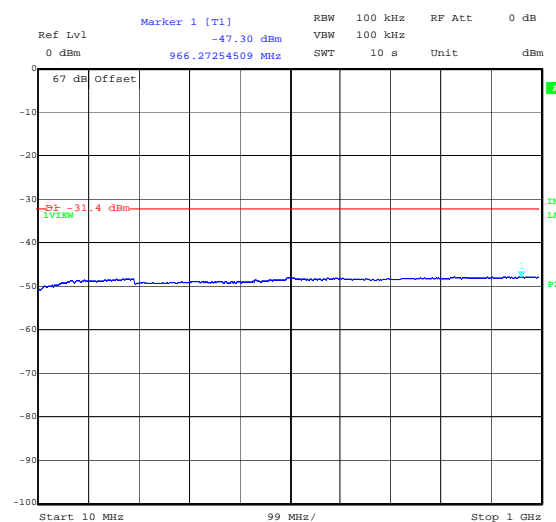
To: FCC Part 15.247: 2007 (Subpart C)

**Transmitter Conducted Emissions (Continued)**

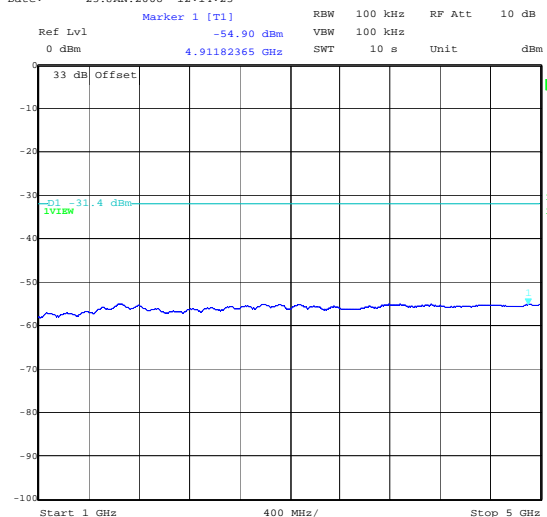
**Vertical Antenna Port**



Title: 49755JD06  
Comment A: TX CONDUCTED EMISSIONS V PORT BPSK TOP CHANNEL  
Date: 23.JAN.2008 12:14:23



Title: 49755JD06  
Comment A: TX CONDUCTED EMISSIONS V PORT BPSK TOP CHANNEL  
Date: 23.JAN.2008 12:12:36



Title: 49755JD06  
Comment A: TX CONDUCTED EMISSIONS V PORT BPSK TOP CHANNEL  
Date: 23.JAN.2008 11:57:00



Title: 49755JD06  
Comment A: TX CONDUCTED EMISSIONS V PORT BPSK TOP CHANNEL  
Date: 23.JAN.2008 12:04:15

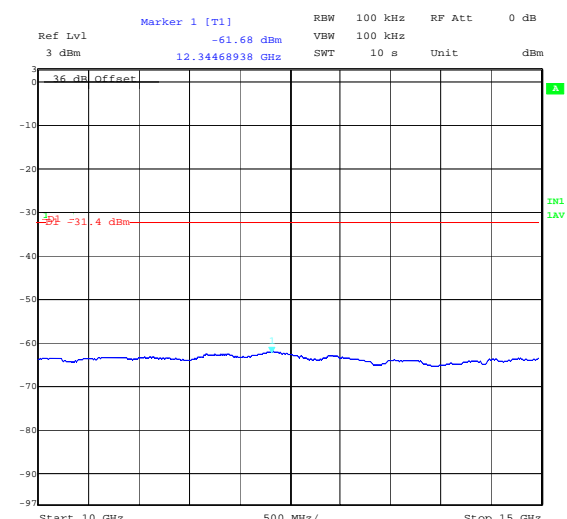
Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

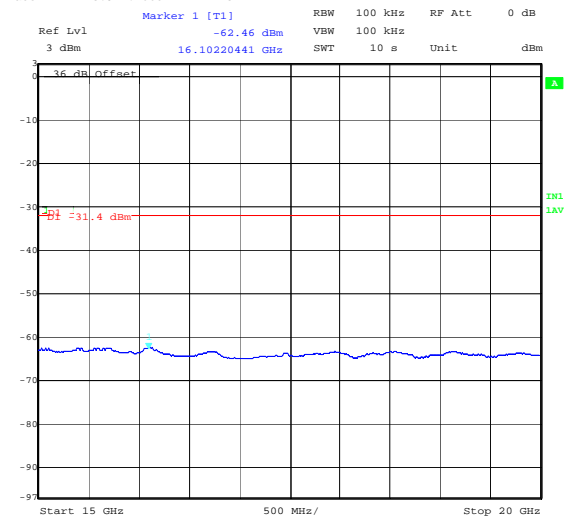
**Transmitter Conducted Emissions (Continued)**



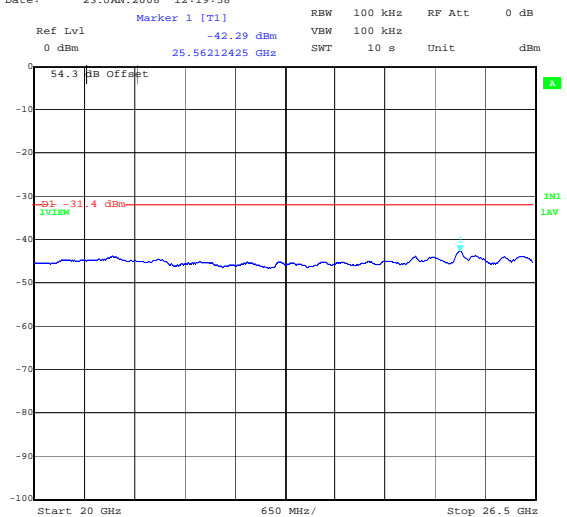
Title: 49755JD06  
Comment A: TX CONDUCTED EMISSIONS V PORT BPSK TOP CHANNEL  
Date: 23.JAN.2008 12:17:23



Title: 49755JD06  
Comment A: TX CONDUCTED EMISSIONS V PORT BPSK TOP CHANNEL  
Date: 23.JAN.2008 12:19:58



Title: 49755JD06  
Comment A: TX CONDUCTED EMISSIONS V PORT BPSK TOP CHANNEL  
Date: 23.JAN.2008 12:21:10

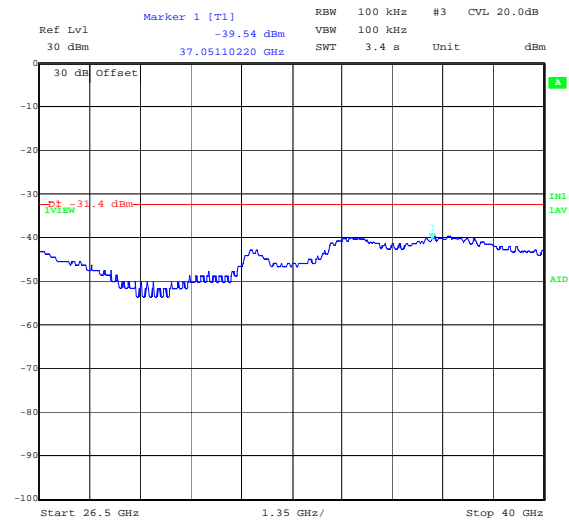


Title: 49755JD06  
Comment A: TX CONDUCTED EMISSIONS V PORT BPSK TOP CHANNEL  
Date: 23.JAN.2008 12:23:43

Test of: Motorola Inc.  
 PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

**Transmitter Conducted Emissions (Continued)**



Title: 49755JD06  
 Comment A: TX CONDUCTED EMISSIONS V PORT BPSK TOP CHANNEL  
 Date: 23.JAN.2008 15:03:26

**Note(s):**

1. *\*Note: No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above.*
2. *EUT s/no: P3 58500 1000AB.*

Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

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### Transmitter Radiated Emissions

Tests were performed using the test methods detailed in ANSI C63.4 Section 8 and Public Notice DA 00-705 (March 30, 2000).

### Electric Field Strength Measurements: 30 to 1000 MHz

EUT was connected to an Andrew P6F-52-DET 6 foot diameter parabolic antenna with feeder.

#### Top Channel

Frequency (MHz)	Antenna Polarity	Q-P Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
53.752	Vertical	34.8	40.0	5.2	Complied
57.133	Vertical	34.9	40.0	5.1	Complied
467.725	Horizontal	35.0	46.0	11.0	Complied
500.000	Horizontal	41.0	46.0	5.0	Complied

### Electric Field Strength Measurements: 30 to 1000 MHz

EUT was connected to a Mars MA-WS57-30R integral antenna.

#### Top Channel

Frequency (MHz)	Antenna Polarity	Q-P Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
53.752	Vertical	32.3	40.0	7.7	Complied
57.133	Vertical	37.1	40.0	2.9	Complied
467.725	Horizontal	34.8	46.0	11.2	Complied
500.000	Horizontal	41.0	46.0	5.0	Complied

#### Note(s):

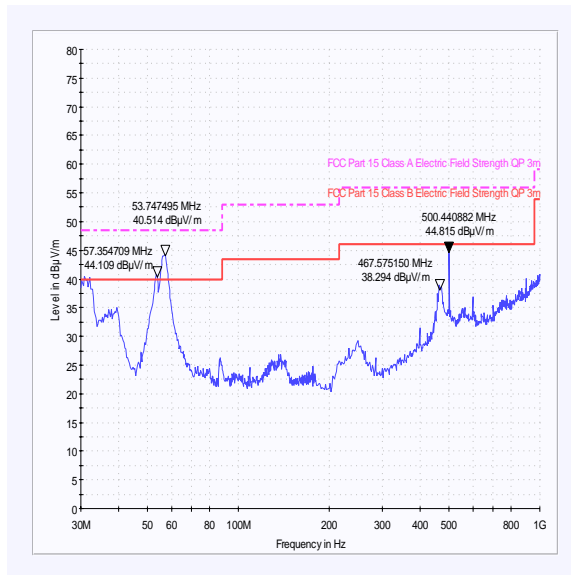
1. EUT s/no: P3 58500 100073

Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

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**Transmitter Radiated Emissions (Continued)**



The pre-scan plot is shown above. The final measurements were carried out with both antennas as supplied by the client.

Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

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### Transmitter Radiated Emissions (Continued)

### Electric Field Strength Measurements (Frequency Range: 1 to 40 GHz – including Transmitter Band Edge Radiated Emissions)

#### Highest Peak Level: Top Channel

Frequency (GHz)	Antenna Polarity	Detector Level (dB $\mu$ V)	Transducer Factor (dB)	Actual Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
3.831663	Vertical	50.8	-3.5	47.3	54.0	6.7	Complied

#### Note(s):

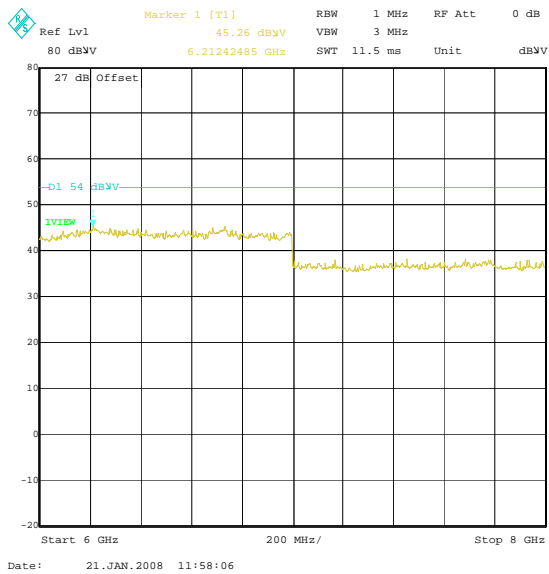
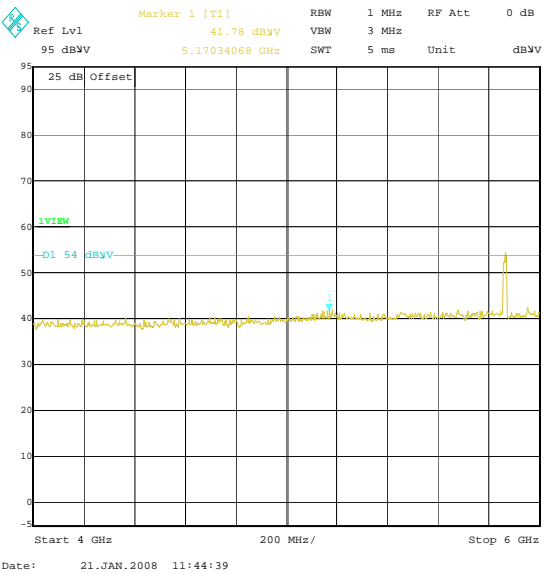
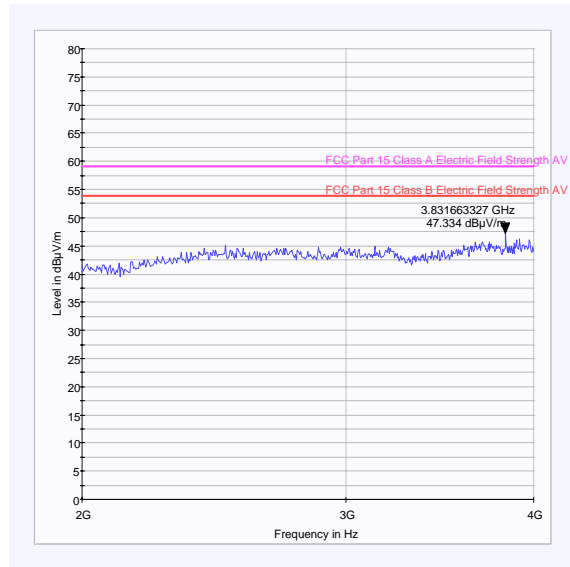
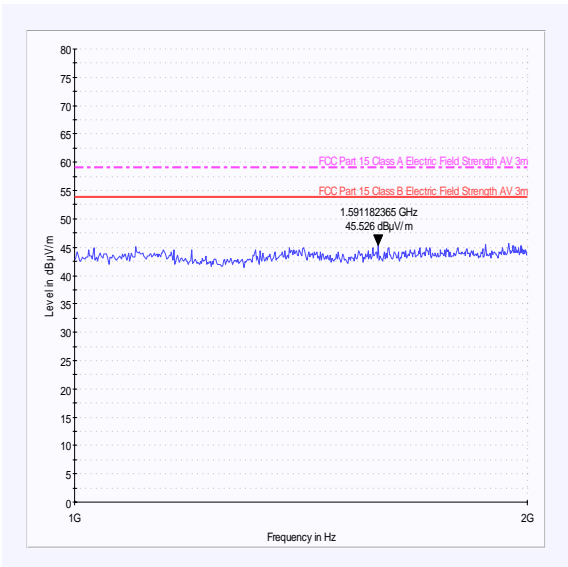
1. The fundamental is shown on the 4 to 6 GHz plot.
2. No spurious emissions were detected above the noise floor (including the band edges) of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above. Note: The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.
3. EUT s/no: P3 58500 100073 with Mars MA-WS57-30R integral antenna.
4. No emissions were observed above the system noise floor across the required range of frequencies and at the band edges.



Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

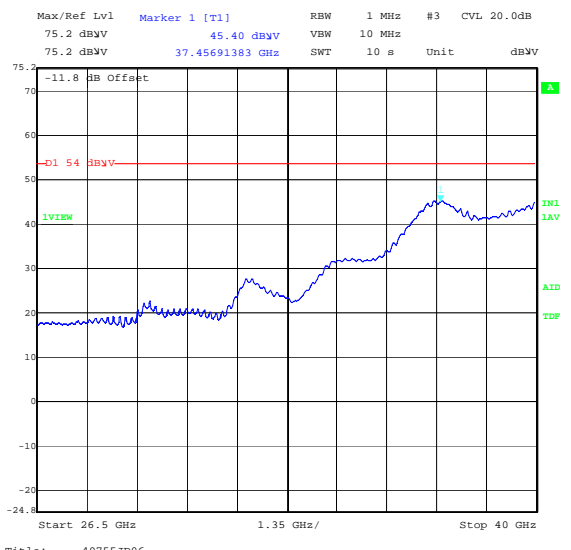
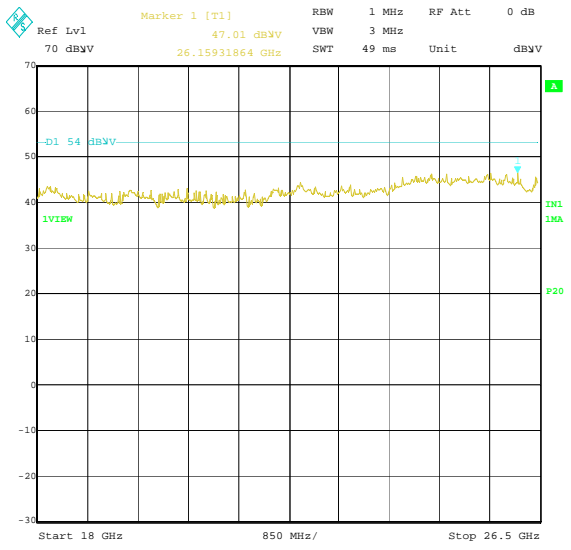
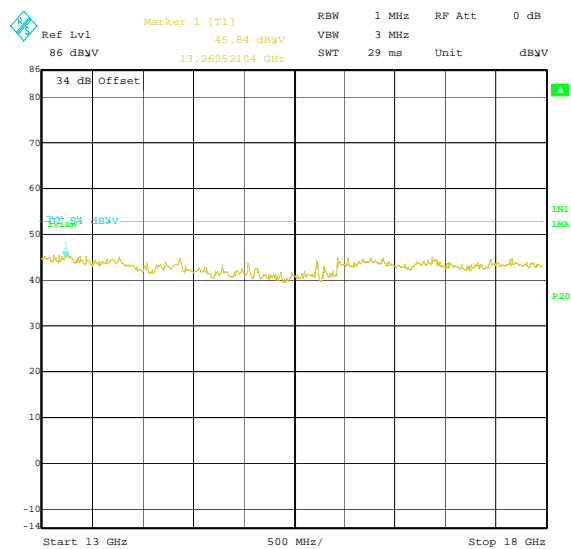
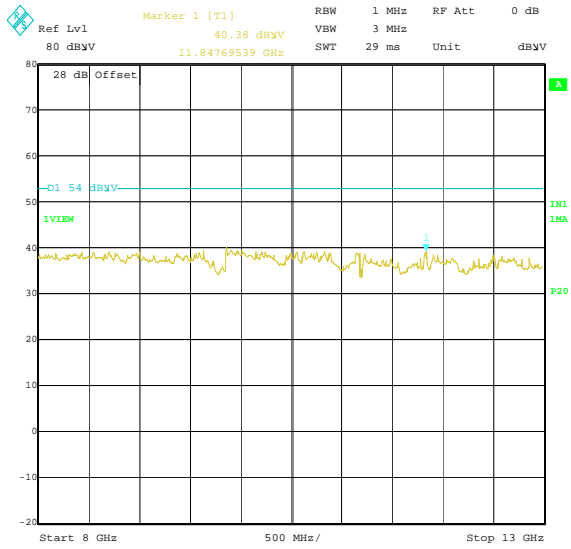
**Transmitter Radiated Emissions: Section 15.247(d) and 15.209(a) (Continued)**



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

Test of: Motorola Inc.  
 PTP 58500 (WB2855, WB2856)  
 To: FCC Part 15.247: 2007 (Subpart C)

**Transmitter Radiated Emissions (Continued)**



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

Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

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### **7.3. Transmitter Band Edge Conducted Emissions**

Tests were performed using the test methods detailed in Public Notice DA 00-705 (March 30, 2000) and FCC CFR Part 2.

#### **Results:**

#### **Results: QPSK (15 MHz channel width)**

Frequency (MHz)	Antenna Polarity (H/V)	Peak Emission Level (dBm)	Peak Emission Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725	Horizontal	-37.3	-32.5	-30.0	2.5	Complied
5850	Horizontal	-36.6	-33.8	-30.0	3.8	Complied
5725	Vertical	-42.5	-36.7	-30.0	6.7	Complied
5850	Vertical	-35.9	-33.8	-30.0	3.8	Complied

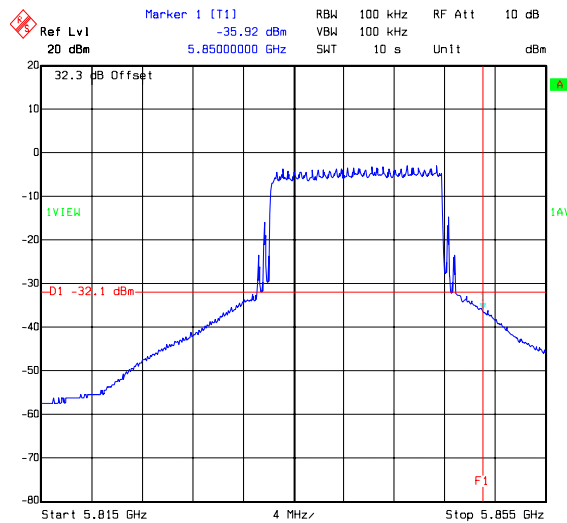
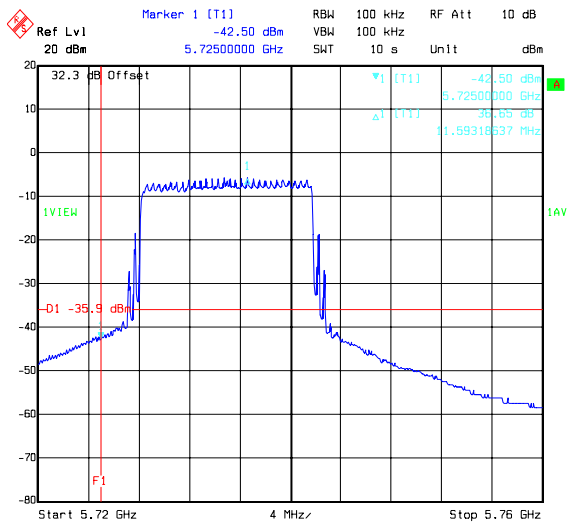
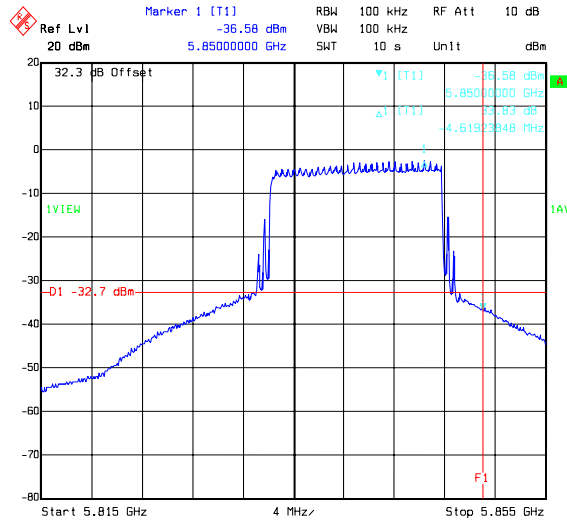
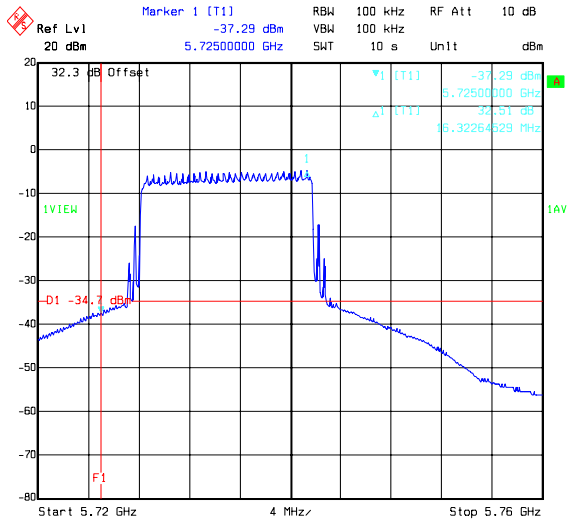
#### **Note(s):**

1. EUT s/no: P3 58500 1000AB.
2. The following test results were taken with the EUT transmitting at maximum output power as detailed in Section 7.2.5 of this report unless otherwise stated.

Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

**Transmitter Band Edge Conducted Emissions (Continued)**



Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

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**Transmitter Band Edge Conducted Emissions (Continued)**

**Results:**

**Results: BPSK (15 MHz channel width)**

Frequency (MHz)	Antenna Polarity (H/V)	Peak Emission Level (dBm)	Peak Emission Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725	Horizontal	-37.8	-33.1	-30.0	3.1	Complied
5850	Horizontal	-36.4	-33.5	-30.0	3.5	Complied
5725	Vertical	-41.6	-36.0	-30.0	6.0	Complied
5850	Vertical	-37.0	-34.9	-30.0	4.9	Complied

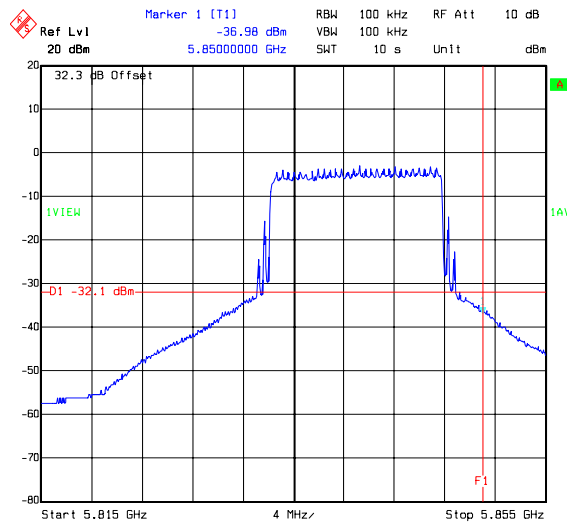
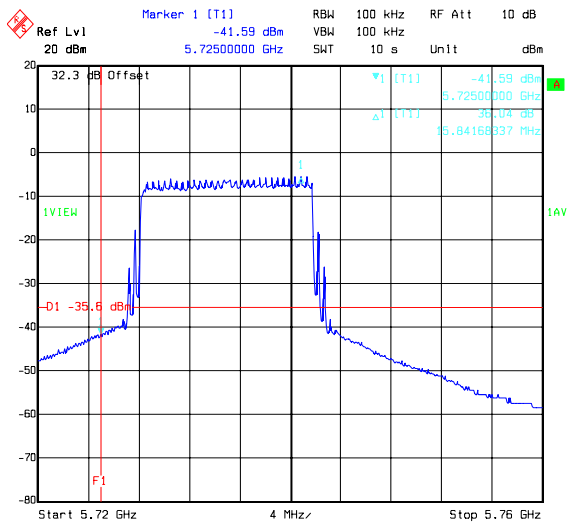
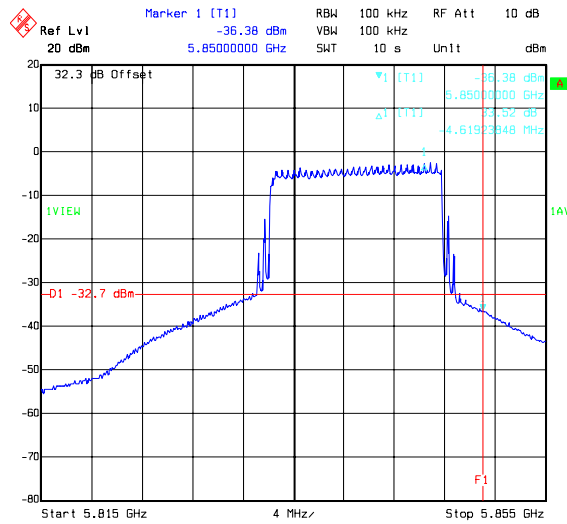
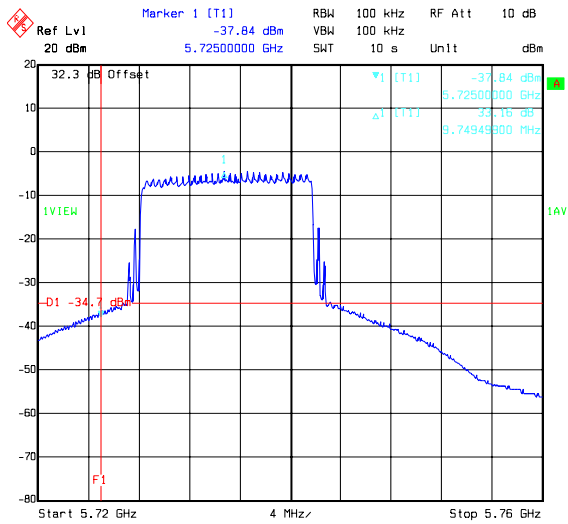
**Note(s):**

1. EUT s/no: P3 58500 1000AB

Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

**Transmitter Band Edge Conducted Emissions (Continued)**



Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

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### Transmitter Band Edge Conducted Emissions (Continued)

#### Results:

#### Results: 16QAM (15 MHz channel width)

Frequency (MHz)	Antenna Polarity (H/V)	Peak Emission Level (dBm)	Peak Emission Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725	Horizontal	-41.6	-35.8	-30.0	5.8	Complied
5850	Horizontal	-45.7	-39.8	-30.0	9.8	Complied
5725	Vertical	-45.7	-38.9	-30.0	8.9	Complied
5850	Vertical	-45.2	-39.7	-30.0	9.7	Complied

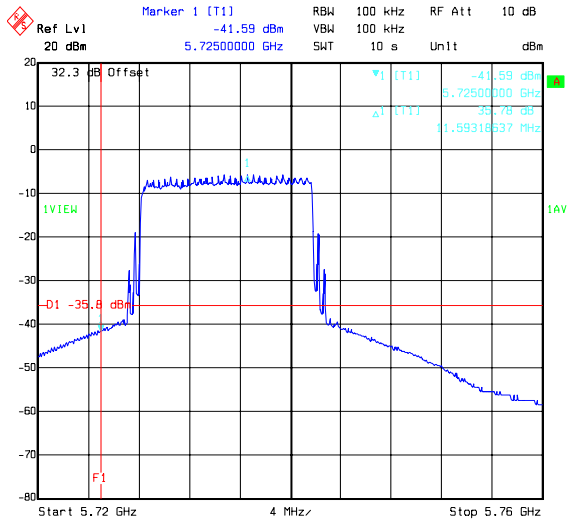
#### Note(s):

1. EUT s/no: P3 58500 1000AB

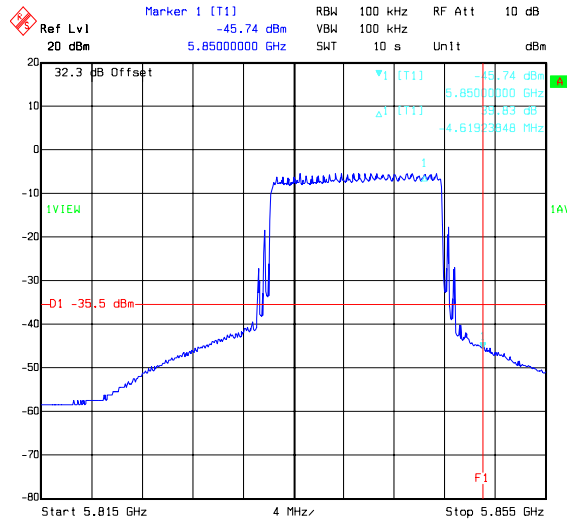
Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

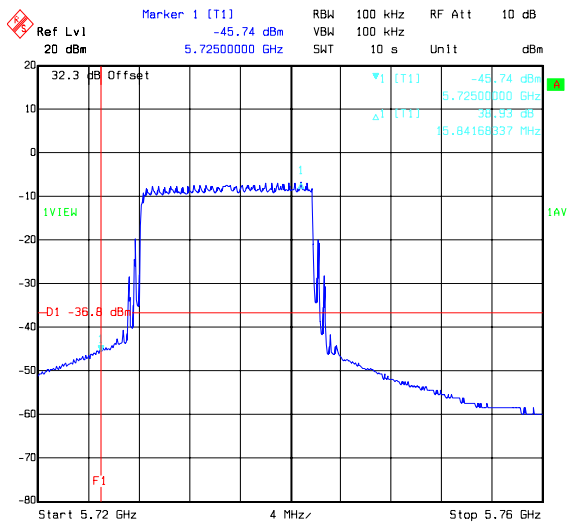
**Transmitter Band Edge Conducted Emissions (Continued)**



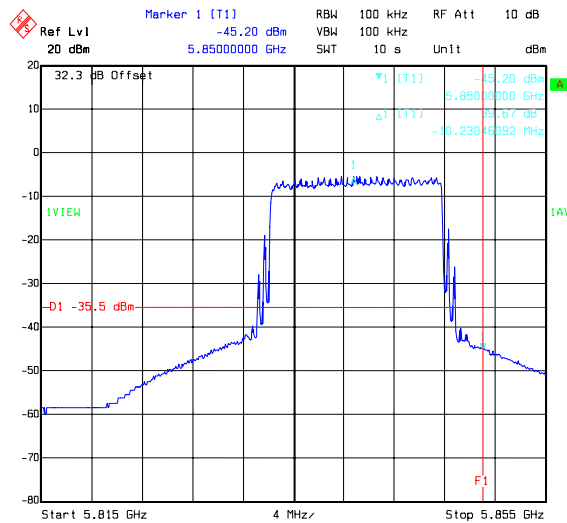
Title: 49755JD06  
Comment A: LOWER BAND EDGE H PORT 15 MHz CHANNEL 16QAM  
Date: 22.JAN.2008 10:20:10



Title: 49755JD06  
Comment A: UPPER BAND EDGE H PORT 15 MHz CHANNEL 16QAM  
Date: 22.JAN.2008 08:12:52



Title: 49755JD06  
Comment A: LOWER BAND EDGE V PORT 15 MHz CHANNEL 16QAM  
Date: 22.JAN.2008 10:15:41



Title: 49755JD06  
Comment A: UPPER BAND EDGE V PORT 15 MHz CHANNEL 16QAM  
Date: 21.JAN.2008 16:35:19



Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

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**Transmitter Band Edge Conducted Emissions (Continued)**

**Results: 64QAM (15 MHz channel width)**

Frequency (MHz)	Antenna Polarity (H/V)	Peak Emission Level (dBm)	Peak Emission Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725	Horizontal	-49.5	-41.1	-30.0	11.1	Complied
5850	Horizontal	-52.6	-44.3	-30.0	14.3	Complied
5725	Vertical	-52.6	-43.7	-30.0	13.7	Complied
5850	Vertical	-51.5	-43.8	-30.0	13.8	Complied

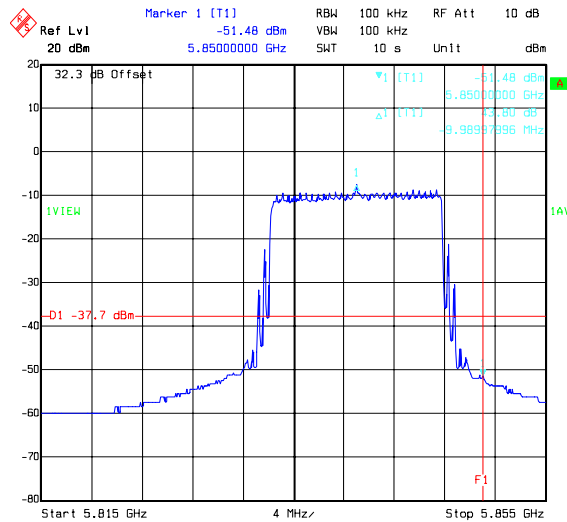
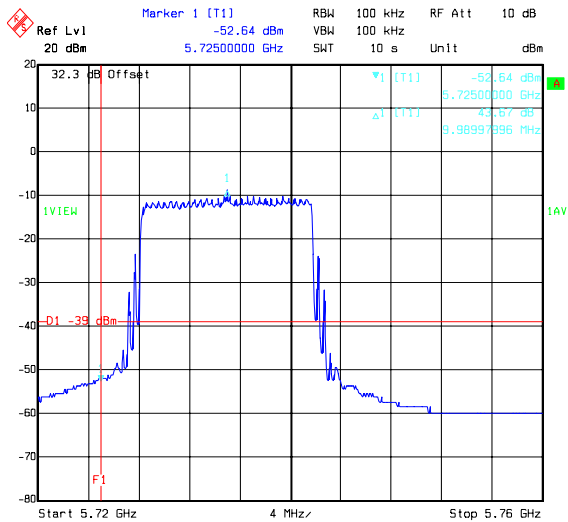
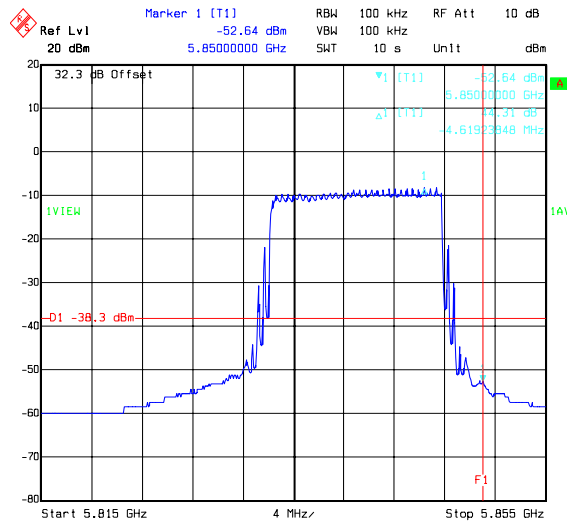
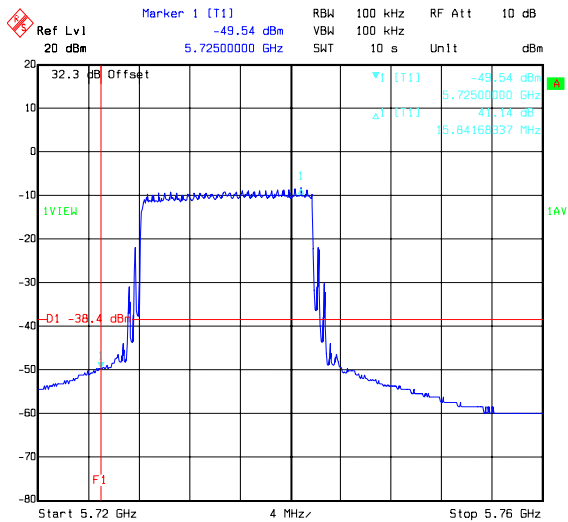
**Note(s):**

1. EUT s/no: P3 58500 1000AB

Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

**Transmitter Band Edge Conducted Emissions (Continued)**



Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

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**Transmitter Band Edge Conducted Emissions (Continued)**

**Results: Acquisition (15 MHz channel width)**

Frequency (MHz)	Antenna Polarity (H/V)	Peak Emission Level (dBm)	Peak Emission Level (dBc)	Limit (dBc)	Margin (dB)	Result
5725	Horizontal	-37.0	-32.4	-30.0	2.4	Complied
5850	Horizontal	-39.6	-33.0	-30.0	3.0	Complied
5725	Vertical	-41.8	-36.2	-30.0	6.2	Complied
5850	Vertical	-42.5	-35.2	-30.0	5.2	Complied

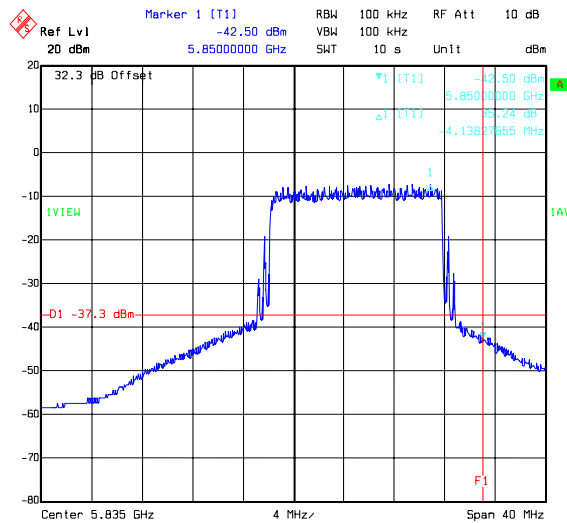
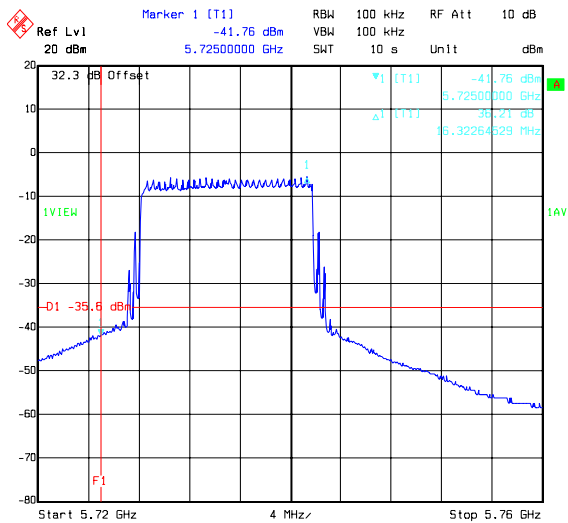
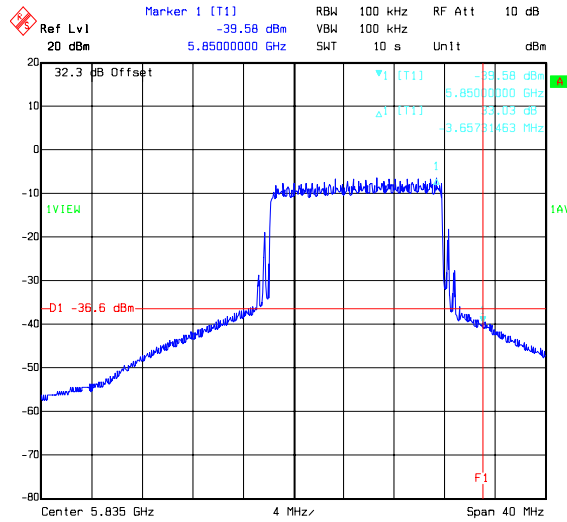
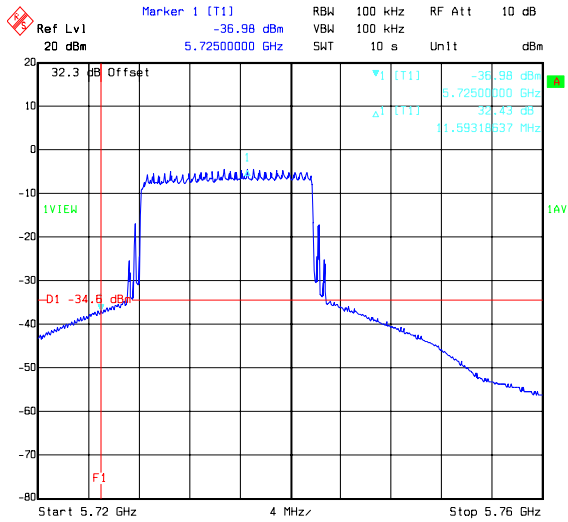
**Note(s):**

1. EUT s/no: P3 58500 1000AB.

Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

**Transmitter Band Edge Conducted Emissions (Continued)**

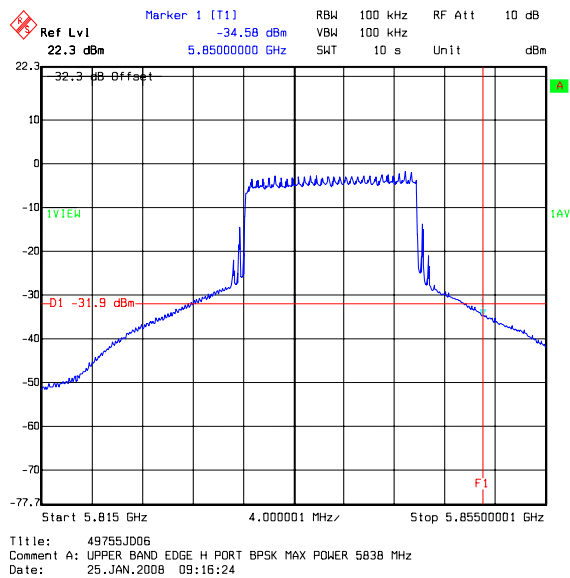
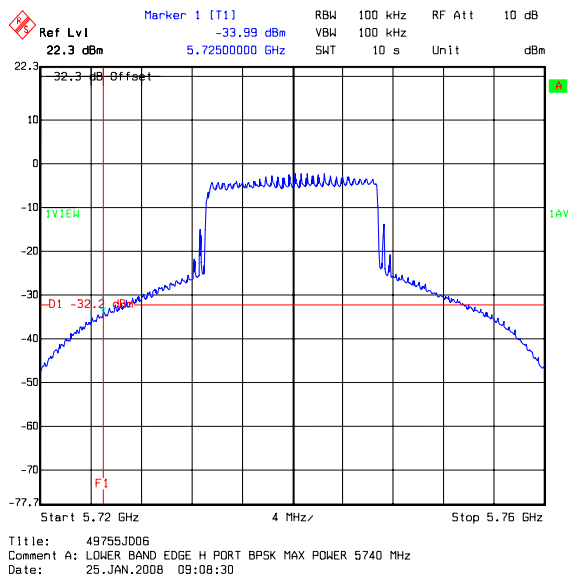


Test of: Motorola Inc.  
PTP 58500 (WB2855, WB2856)

To: FCC Part 15.247: 2007 (Subpart C)

### Transmitter Band Edge Conducted Emissions (Continued)

Band edge plots taken with the EUT transmitting at maximum power and the EUT frequency changed to demonstrate the amount the carrier has to be moved away from the band edge in order to comply with the requirements of the Standard.



### Note(s):

1. Band edge levels were exceeded using nominal power setting and BPSK modulation, therefore the power was reduced on the top and bottom channels in order to comply. Tests were also carried out to show how far the carrier needed to be offset from the band edge with the EUT transmitting at full power before compliance was met.
2. The default bottom channel is 5735 MHz and the EUT power had to be reduced by 2 dB in order to meet compliance. The closest frequency to the lower band edge that the EUT can transmit at full power and show compliance is 5740 MHz.
3. The default top channel is 5840 MHz and the EUT power had to be reduced by 1 dB in order to meet compliance. The closest frequency to the upper band edge that the EUT can transmit at full power and show compliance is 5838 MHz.

Test of: **Motorola Inc.**  
**PTP 58500 (WB2855, WB2856)**

To: **FCC Part 15.247: 2007 (Subpart C)**

## **8. Measurement Uncertainty**

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.

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

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

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".

<b>Measurement Type</b>	<b>Range</b>	<b>Confidence Level (%)</b>	<b>Calculated Uncertainty</b>
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	1 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	1 MHz to 1000 MHz	95%	+/- 5.26 dB
Radiated Spurious Emissions	1 GHz to 40 GHz	95%	+/- 2.94 dB

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.

Test of: **Motorola Inc.**  
**PTP 58500 (WB2855, WB2856)**  
To: **FCC Part 15.247: 2007 (Subpart C)**

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## **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 110V 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:

<b>Receiver Function</b>	<b>Initial Scan</b>	<b>Final Measurements</b>
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

Test of: **Motorola Inc.**  
**PTP 58500 (WB2855, WB2856)**

To: **FCC Part 15.247: 2007 (Subpart C)**

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## **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 dB $\mu$ V plus cable loss and antenna factor.



Test of: **Motorola Inc.**  
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### **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 was 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)

### **9.4. Minimum 6 dB Bandwidth**

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

Prior to testing being performed a suitable RF attenuator and cable was 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 200 kHz was used, which is approximates to 1% of the 6 dB bandwidth. A video bandwidth of 1000 kHz 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.

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### **9.5. Transmitter 20 dB Bandwidth**

The EUT and spectrum analyser was configured as for transmitter conducted antenna port emissions.

To determine the occupied bandwidth, a resolution bandwidth of 200 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 as for conducted antenna port emissions measurements.

Prior to testing being performed a suitable RF attenuator and cable was 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 and spectrum analyser were configured as 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, cable and a duty cycle correction of 3.3 dB were entered as an offset into a wideband 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 a wideband power meter.

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### Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A028	Antenna	Eaton	91888-2	304	08 Jun 2006	36
A031	Antenna	Eaton	91889-2	557	08 Jun 2006	36
A067	Line Impedance Stabilization Network	Rohde & Schwarz	ESH3-Z5	890603/002	23 Apr 2007	12
A1227	Pre Amplifier	Agilent	8449B	3008A01566	03 Sep 2007	12
A1368	Directional Coupler	Pasternack Enterprises.	PE2214-10	None	Calibrated before use	-
A1392	Attenuator	HUBER + SUHNER AG	757456	6820.17.B	Calibrated before use	-
A174	Waveguide Transition	Flann Microwave Ltd	22094-KF20	211	Calibration not required	-
A1785	Low Noise Amplifier	Farran Technology	FLNA-28-30	FTL 6483	Calibrated before use	12
A1829	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100671	16 Jan 2008	12
A253	Antenna	Flann Microwave	12240-20	128	17 Nov 2006	36
A254	Antenna	Flann Microwave	14240-20	139	17 Nov 2006	36
A255	Antenna	Flann Microwave	16240-20	519	17 Nov 2006	36
A256	Antenna	Flann Microwave	18240-20	400	17 Nov 2006	36
A259	Antenna	Chase	CBL6111	1513	13 Mar 2007	12
A288	Antenna	Chase	CBL6111A	1589	Calibrated as part of system	-
A366	Isolator	MRI	FRR-400	169	Calibration not required	-
A392	Attenuator	Suhner	6803.17.B	None	Calibration not required	-
A436	Antenna	Flann	20240-20	330	24 Apr 2006	36
C1121	Cable	Rosenberger	FA210A103 0005050	1704 34844-02	Calibrated before use	-

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**Test Equipment Used (Continued)**

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
C1192	Cable	Rosenburg	FA210A101 5M3030	27141-07	Calibrated before use	-
C1262	Cable	Rosenberger	FA210A007 5008080	49356-2	Calibrated before use	-
C1265	Cable	Rosenberger	FA210A102 0007070	49317-01	Calibrated before use	-
C340	Cable	Andrews	None	None	Calibrated before use	-
C454	Cable	Rosenberger	RG142XX- 001-RFIB	C454- 10081998	Calibrated before use	-
C461	Cable	Rosenberger	UFA210A-1- 1182- 704704	98H0305	Calibrated before use	-
M023	Test Receiver	Rohde & Schwarz	ESVP	872 991/027	24 Apr 2007	12
M024	Spectrum Monitor	Rohde & Schwarz	EZM	873 952/006	Calibrated before use	-
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016	15 Aug 2007	12
M1273	Test Receiver	Rhode & Schwarz	ESIB 26	100275	20 Feb 2007	12
M1390	Harmonic Mixer	Farran Technology	WHMP 28	FTL1677B	Calibrated before use	-
S201	Open Area Test Site	RFI	1	None	25 May 2007	12
S207	Site 7	RFI	7	None	Calibration not required	12
S209	Anechoic Chamber	RFI	9	None	Verified before use	-

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

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## **Appendix 2. Test Configuration Drawings**

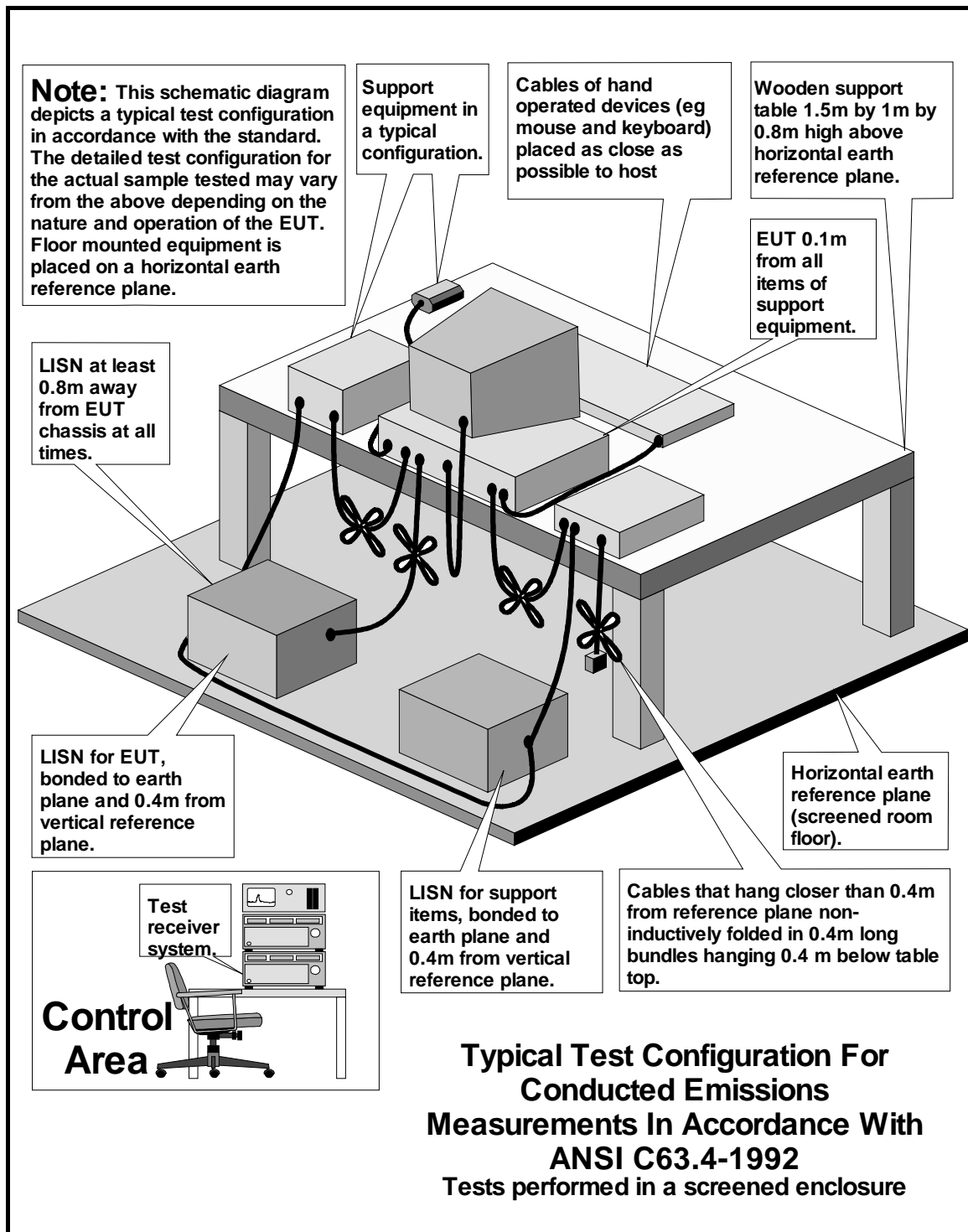
This appendix contains the following drawings:

Drawing Reference Number	Title
DRG\49755JD06\EMICON	Test configuration for measurement of conducted emissions.
DRG\49755JD06\EMIRAD	Test configuration for measurement of radiated emissions.

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**DRG\49755JD06\EMICON**



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**DRG\49755JD06\EMIRAD**

