


**TEST REPORT
FROM
RFI GLOBAL SERVICES LTD**

Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

Test Report Serial No:
RFI/RPTE1/RP49756JD05A

This Test Report Is Issued Under The Authority Of Steve Flocks, Radio Performance Group Service Leader:	
Checked By: Steve Flocks	Report Copy No: PDF01
Issue Date: 26 March 2008	Test Dates: 14 February 2008 to 21 February 2008 and 26 February 2008 to 27 February 2008

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1. Client Information

Company Name:	Motorola Inc.
Address:	Unit A1 Linhay Business Park Eastern Road Ashburton Devon TQ13 7UP
Contact Name:	Mr C Fisher
Contact Number:	01364 655509
E-Mail Address:	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 5.4 GHz band Wireless Ethernet Bridge.

2.2. Identification of Equipment Under Test (EUT)

Description:	Wireless Ethernet Bridge
Brand Name:	PTP Range
Model Name or Number:	PTP54500
Serial Number:	54500-20005C
Hardware Version Number:	P3
Software Version Number:	PTP500-B555
FCC ID Number:	QWP54500
Country of Manufacture:	Germany
Date of Receipt:	21 January 2008

Description:	Power In Door Unit - PIDU
Brand Name:	PTP Range
Model Name or Number:	E083105AM
Serial Number:	0652503042
Hardware Version Number:	Not Applicable
Software Version Number:	Not Applicable
FCC ID Number:	Not Applicable
Country of Manufacture:	China
Date of Receipt:	21 January 2008

2.3. Modifications Incorporated in the EUT

The client changed the software on 26-02-2008 to correct a problem with Transmit Power Control (TPC) at temperature extremes. The software was changed from PTP500-B500 to PTP500-B555. Regression testing was performed on power measurements as required and the results are included in this report. No other measurements were affected by this change.

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2.4. Support Equipment

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

Description:	Wireless Ethernet Bridge
Brand Name:	PTP Range
Model Name or Number:	PTP54500
Serial Number:	54500-20005D
Cable Length and Type:	1 m, Coaxial
Connected to port	RF (for conducted tests)

Description:	6 foot dia. parabolic dish with feeder
Brand Name:	Andrew
Model Name or Number:	P6F-52-DETSS
Serial Number:	None stated
Cable Length and Type:	2 m, coaxial
Connected to Port:	RF (for radiated tests)

Description:	Integral antenna
Brand Name:	Mars
Model Name or Number:	MA-WS57-30R
Serial Number:	7381
Cable Length and Type:	Not applicable
Connected to Port:	RF

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

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2.5. Additional Information Related to Testing

Intended Operating Environment:	Residential, Commercial and Light Industry		
Equipment Category:	Microwave fixed radio link		
Type of Unit:	Base Station Transceiver		
Power Supply Requirement:	Nominal 110 V, 60 Hz AC Mains Supply		
Transmit Frequency Range:	5480 MHz to 5715 MHz		
Transmit Channels Tested:	Channel Description	Channel Number	Channel Frequency (MHz)
	Bottom	Not Applicable	5480
	Middle	Not Applicable	5600
	Top	Not Applicable	5715
Receive Frequency Range:	5480 MHz to 5715 MHz		
Receive Channels Tested:	Channel Description	Channel Number	Channel Frequency (MHz)
	Bottom	Not Applicable	5480
	Middle	Not Applicable	5600
	Top	Not Applicable	5715

2.6. Port Identification

Port	Description	Type
1	RF output (Vertical)	N type male
2	RF output (Horizontal)	N type male
3	ODU to PIDU interface	CAT5 terminated in RJ45
4	PIDU Mains	C8
5	PIDU LAN	RJ45

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3. Test Specification, Methods and Procedures

3.1. Test Specification

Reference:	FCC Part 15.407: 2007 (Subpart E)
Title:	Code of Federal Regulations, Part 15.407 (47CFR15) Unlicensed National Information Infrastructure (U-NII) devices operating in the 5.15-5.35 GHz, 5.47-5.725 GHz and 5.725-5.825 GHz bands.

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 of the EUT during Testing

5.1. Operating Modes

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

- Testing was performed with the EUT transceiver operating in Acquisition, BPSK, QPSK, 16QAM and 64QAM modes unless otherwise stated.
- The EUT was tested exclusively in the transceiver mode only as the device was unable to operate in a standby/receive only mode.
- At maximum Tx and normal output powers on bottom, centre and top channels.

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 54500 unit to establish a radio link for all conducted emissions. The EUT was tested in all supported modulation modes.
- As appropriate for each test, the EUT was tested either with both RF ports terminated with 50 ohm loads or one RF port terminated and the other port connected to a 6ft dish antenna by coaxial cable, or the integral antenna was fitted as required for radiated emissions. A laptop PC used to configure and monitor the EUT during testing via the ethernet port.
- No receiver tests were performed as the EUT only operates in transceiver mode.
- EUT s/no: P3 54500 20005C used for all conducted and radiated tests.
- EUT s/no: P3 54500 20005D used to support radio link in conducted mode tests.
- The final radiated measurements below 1 GHz were performed with an antenna fitted to the EUT. The antenna was a dish antenna, of 6 foot (182 cm) diameter and also repeated with an integral antenna.

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6. Summary of Test Results

Range of Measurements	FCC Part 15 Reference	Port Type	Compliance Status
Transmitter 99% and 26 dB Bandwidth	Part 15.407(a)	Terminal	Complied
Maximum Conducted Output Power	Part 15.407(a)	Terminal	Complied
Peak Power Spectral Density	Part 15.407(a)	Terminal	Complied
Peak Excursion	Part 15.407(a)(6)	Terminal	Complied
Conducted Transmitter Spurious Emissions	Part 15.407	Terminal	Complied
Radiated Transmitter Spurious Emissions	Part 15.209/15.407	Enclosure	Complied
AC Mains Conducted Emissions	Part 15.207	AC Mains	Complied
Transmit Power Control	Part 15.407(h)(1)	Terminal	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 99% and 26 dB Bandwidths: Part 15.407(a)

The 26dB bandwidth (B) is used elsewhere within this report for the determination of output power limits.

The 99% bandwidth was determined using the measurement analysers occupied bandwidth function. The 26dB bandwidth was determined by setting the analyser span to encompass the emission being measure, setting the resolution bandwidth to 1% of the emission bandwidth, setting a limit line to 26dBc and placing a delta marker where the envelope intercepted the display line. This resulted in the 26dB bandwidth. The procedure was reproduced for each modulation type.

The results shown are for tests made on the H port. Checks were made on the V port and similar results were obtained as both ports are electrically identical.

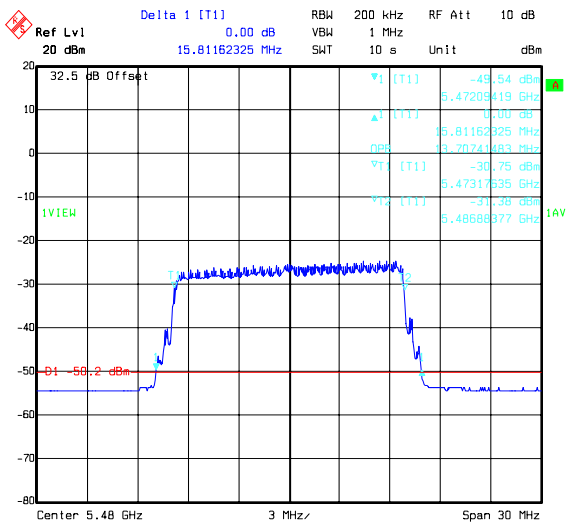
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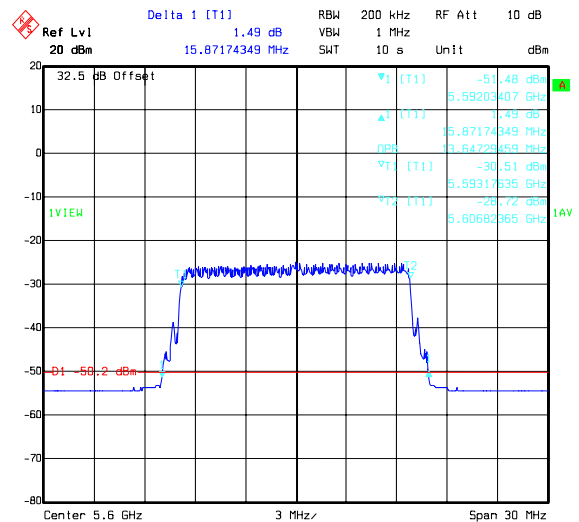
Transmitter 99% and 26 dB Bandwidths: Part 15.407(a) (Continued)

Results: Acquisition Mode

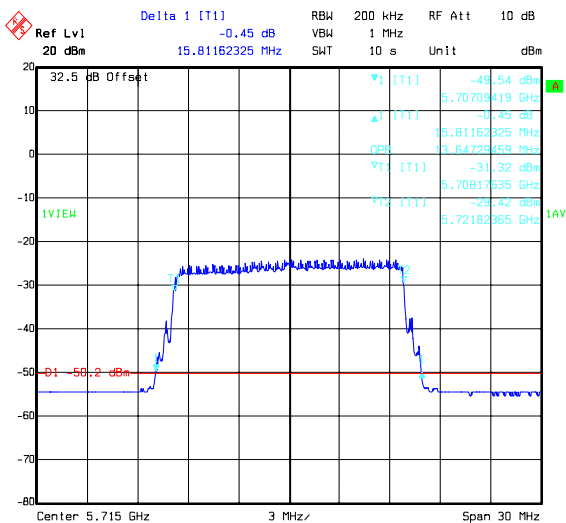
Channel	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
Bottom	13.707	15.811
Middle	13.647	15.871
Top	13.647	15.811



Title: 49756JD05
Comment A: BANDWIDTH H PORT ACQ BOTTOM CHANNEL
Date: 18.FEB.2008 11:07:26



Title: 49756JD05
Comment A: BANDWIDTH H PORT ACQ CENTRE CHANNEL
Date: 18.FEB.2008 11:05:40



Title: 49756JD05
Comment A: BANDWIDTH H PORT ACQ TOP CHANNEL
Date: 18.FEB.2008 11:02:42

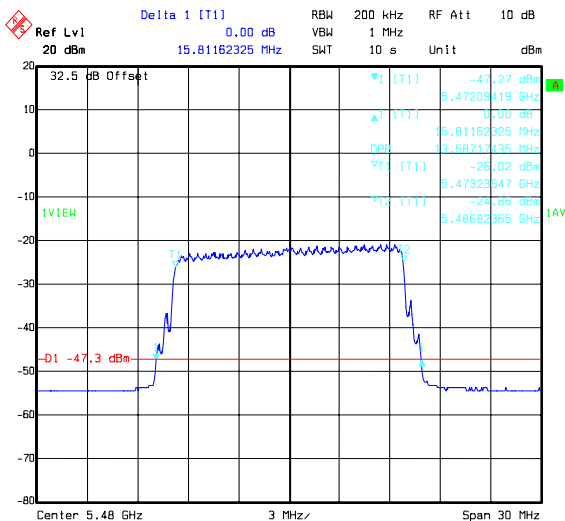
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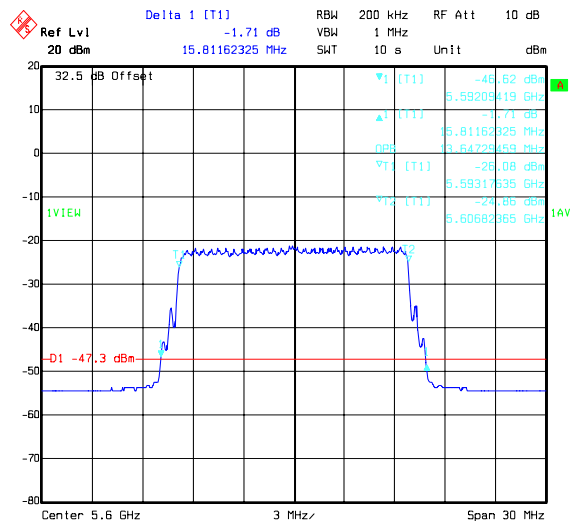
Transmitter 99% and 26 dB Bandwidths: Part 15.407(a) (Continued)

Results: BPSK Mode

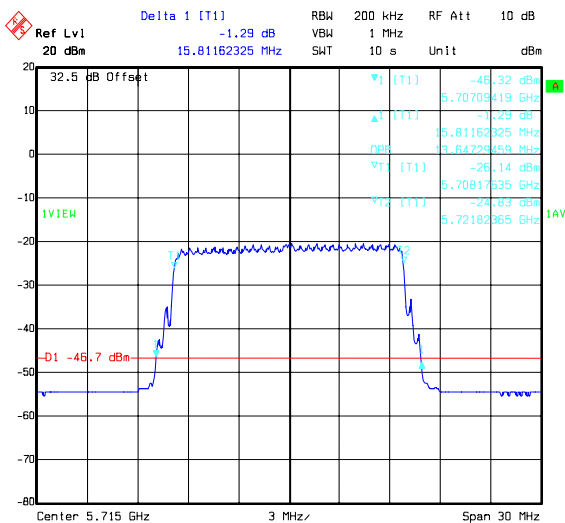
Channel	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
Bottom	13.587	15.811
Middle	13.647	15.811
Top	13.647	15.811



Title: 49756JD05
Comment A: BANDWIDTH H PORT BPSK BOTTOM CHANNEL
Date: 18.FEB.2008 10:55:07



Title: 49756JD05
Comment A: BANDWIDTH H PORT BPSK CENTRE CHANNEL
Date: 18.FEB.2008 10:57:06



Title: 49756JD05
Comment A: BANDWIDTH H PORT BPSK TOP CHANNEL
Date: 18.FEB.2008 10:59:20

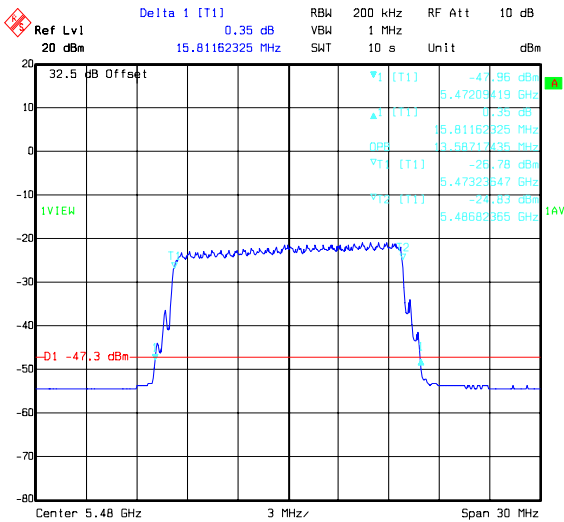
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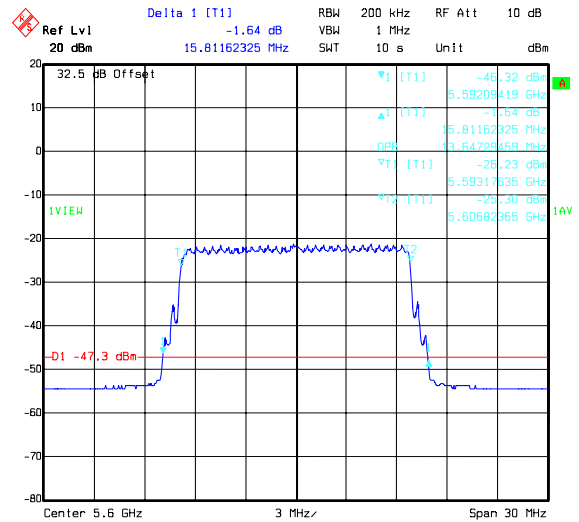
Transmitter 99% and 26 dB Bandwidths: Part 15.407(a) (Continued)

Results: QPSK Mode

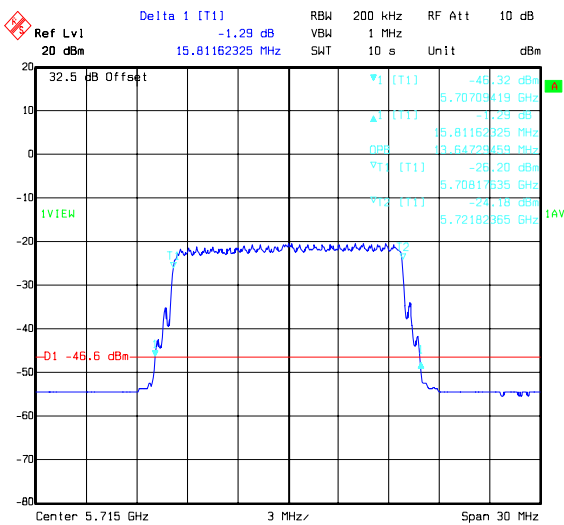
Channel	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
Bottom	13.587	15.811
Middle	13.647	15.811
Top	13.647	15.811



Title: 49756JD05
 Comment A: BANDWIDTH H PORT QPSK BOTTOM CHANNEL
 Date: 18.FEB.2008 10:52:46



Title: 49756JD05
 Comment A: BANDWIDTH H PORT QPSK CENTRE CHANNEL
 Date: 18.FEB.2008 10:50:54



Title: 49756JD05
 Comment A: BANDWIDTH H PORT QPSK TOP CHANNEL
 Date: 18.FEB.2008 10:47:51

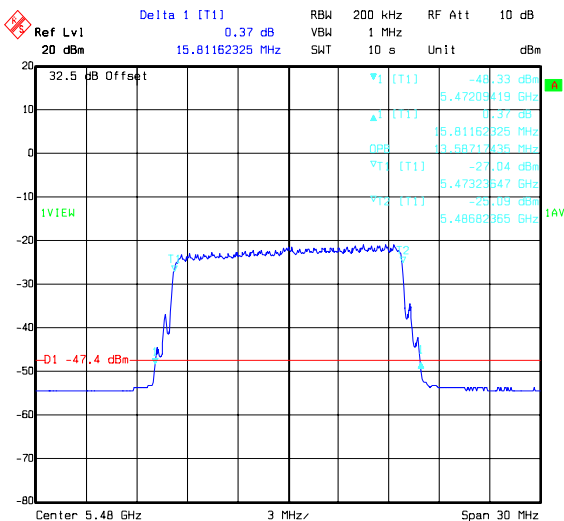
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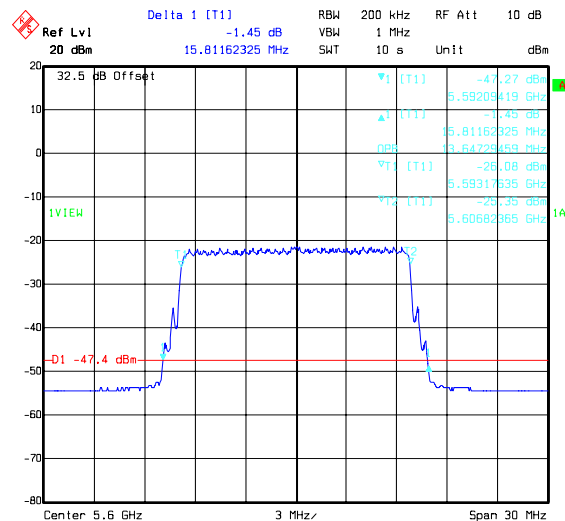
Transmitter 99% and 26 dB Bandwidths: Part 15.407(a) (Continued)

Results: 16QAM Mode

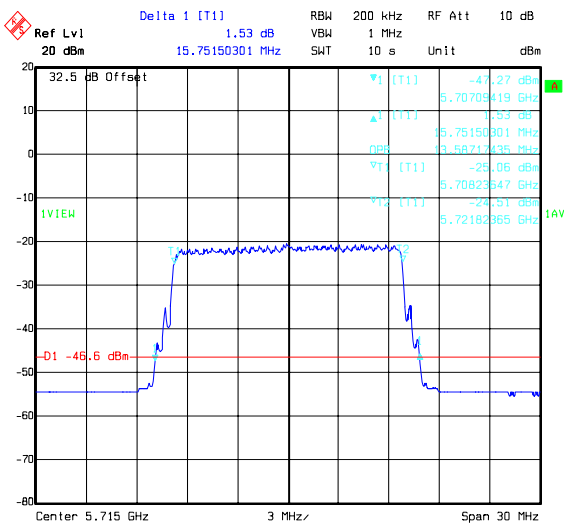
Channel	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
Bottom	13.587	15.811
Middle	13.647	15.811
Top	13.587	15.751



Title: 49756JD05
 Comment A: BANDWIDTH H PORT 16QAM BOTTOM CHANNEL
 Date: 18.FEB.2008 10:37:51



Title: 49756JD05
 Comment A: BANDWIDTH H PORT 16QAM CENTRE CHANNEL
 Date: 18.FEB.2008 10:40:10



Title: 49756JD05
 Comment A: BANDWIDTH H PORT 16QAM TOP CHANNEL
 Date: 18.FEB.2008 10:44:25

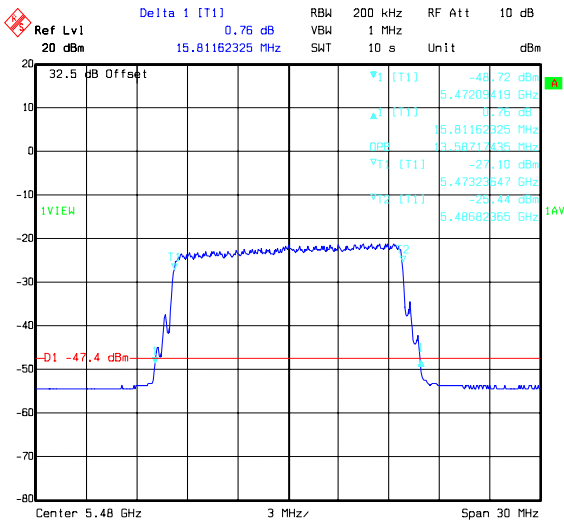
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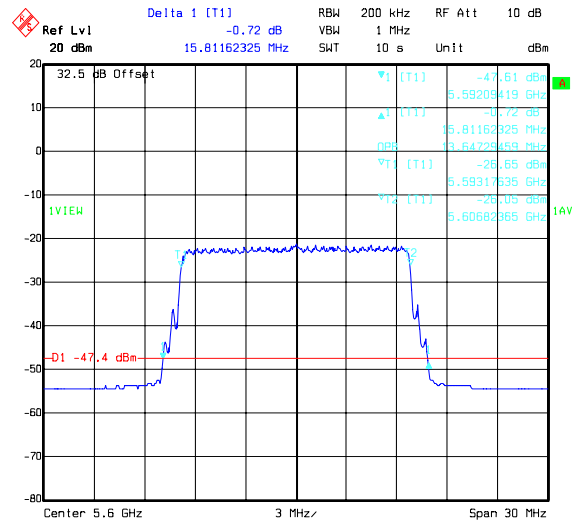
Transmitter 99% and 26 dB Bandwidths: Part 15.407(a) (Continued)

Results: 64QAM Mode

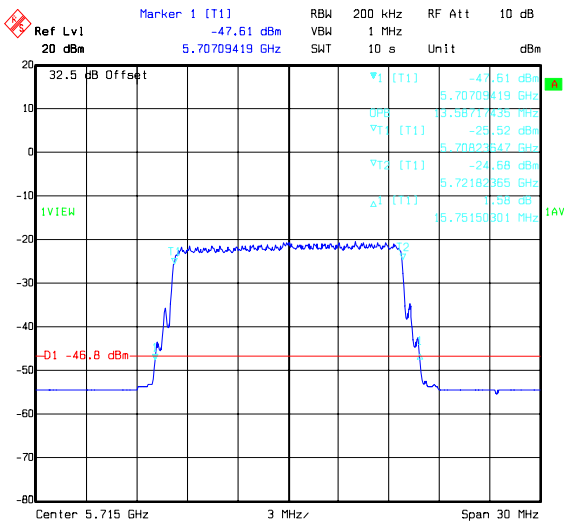
Channel	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
Bottom	13.587	15.811
Middle	13.647	15.811
Top	13.587	15.751



Title: 49756JD05
 Comment A: BANDWIDTH H PORT 64QAM BOTTOM CHANNEL
 Date: 18.FEB.2008 10:35:06



Title: 49756JD05
 Comment A: BANDWIDTH H PORT 64QAM CENTRE CHANNEL
 Date: 18.FEB.2008 10:31:54



Title: 49756JD05
 Comment A: BANDWIDTH H PORT 64QAM TOP CHANNEL
 Date: 18.FEB.2008 10:28:28

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7.2.2. Maximum Conducted Output Power: Part 15.31(e)/15.407(a)(2)

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10log B, where B is the 26 dB emission bandwidth in MHz.

For transmitting antennas of directional gain greater than 6 dBi the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum output power was measured using an average power meter on both ports. The recorded result was corrected for by the transmitter's measured duty cycle (the time the transmitter was not transmitting burst data). The duty cycle correction factor was calculated as the log base 10 of the burst time over the period.

The burst for BPSK, QPSK, 16QAM and 64QAM was measured as 1.312ms and the period 2.725ms. The resultant duty cycle correction factor was -3.0dB.

The burst for Acquisition Mode was measured as 1.302ms and the period 3.096ms. The resultant duty cycle correction factor was -5.2dB.

The EUT was also tested at 85% and at 115% of 110V. There was no variation in conducted output power over these extremes.

Conducted Power Limits for Integral Antenna

Measured 26 dB bandwidth = 15.8 MHz

$11 \text{ dBm} + 10\log 15.8 = 23 \text{ dBm}$

Stated Antenna Gain = 23 dBi

Antenna Gain – 6 dBi = 17 dBi

Limit = 23 dBm – 17 dB = 6 dBm

Conducted Power Limits for Parabolic Dish Antenna with cable

Measured 26dB bandwidth = 15.8 MHz

$11 \text{ dBm} + 10\log 15.8 = 23 \text{ dBm}$

Stated Antenna Gain = 34.9 dBi

Stated Cable Loss = 1 dB

Stated Antennas Gain – Stated Cable Loss = 33.9 dBi

$33.9 \text{ dBi} - 6 \text{ dBi} = 27.9 \text{ dBi}$

Limit = 23 dBm – 27.9 dB = -4.9 dBm

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Maximum Conducted Output Power: Part 15.31(e)/15.407(a)(2) (Continued)

Bottom channel – Integral Antenna

Maximum Mean Output Power (dBm)				Limit	Margin
Mode	Port H	Port V	Aggregate	(dBm)	(dB)
ACQ	1.2	1.0	4.1	6.0	1.9
BPSK	1.3	0.9	4.1	6.0	1.9
QPSK	1.4	0.9	4.2	6.0	1.8
16QAM	1.3	0.9	4.1	6.0	1.9
64QAM	1.4	0.9	4.2	6.0	1.8

Centre channel – Integral Antenna

Maximum Mean Output Power (dBm)				Limit	Margin
Mode	Port H	Port V	Aggregate	(dBm)	(dB)
ACQ	2.0	1.7	4.9	6.0	1.1
BPSK	1.8	1.6	4.7	6.0	1.3
QPSK	1.8	1.7	4.8	6.0	1.2
16QAM	1.9	1.7	4.8	6.0	1.2
64QAM	1.9	1.7	4.8	6.0	1.2

Top channel – Integral Antenna

Maximum Mean Output Power (dBm)				Limit	Margin
Mode	Port H	Port V	Aggregate	(dBm)	(dB)
ACQ	2.1	1.5	4.8	6.0	1.2
BPSK	2.0	1.4	4.7	6.0	1.3
QPSK	2.0	1.4	4.7	6.0	1.3
16QAM	2.1	1.4	4.8	6.0	1.2
64QAM	2.1	1.4	4.8	6.0	1.2

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Maximum Conducted Output Power: Part 15.31(e)/15.407(a)(2) (Continued)

Bottom channel – Parabolic Dish Antenna

Maximum Mean Output Power (dBm)				Limit	Margin
Mode	Port H	Port V	Aggregate	(dBm)	(dB)
ACQ	-8.3	-9.4	-5.8	-4.9	0.9
BPSK	-8.3	-9.7	-5.9	-4.9	1.0
QPSK	-8.3	-9.7	-5.9	-4.9	1.0
16QAM	-8.3	-10.0	-6.1	-4.9	1.2
64QAM	-8.3	-9.4	-5.8	-4.9	0.9

Centre channel – Parabolic Dish Antenna

Maximum Mean Output Power (dBm)				Limit	Margin
Mode	Port H	Port V	Aggregate	(dBm)	(dB)
ACQ	-7.7	-8.5	-5.1	-4.9	0.2
BPSK	-7.8	-8.6	-5.2	-4.9	0.3
QPSK	-7.7	-8.6	-5.1	-4.9	0.2
16QAM	-7.7	-8.5	-5.1	-4.9	0.2
64QAM	-7.7	-8.5	-5.1	-4.9	0.2

Top channel – Parabolic Dish Antenna

Maximum Mean Output Power (dBm)				Limit	Margin
Mode	Port H	Port V	Aggregate	(dBm)	(dB)
ACQ	-7.6	-8.5	-5.0	-4.9	0.1
BPSK	-7.7	-8.7	-5.2	-4.9	0.3
QPSK	-7.7	-8.7	-5.2	-4.9	0.3
16QAM	-7.7	-8.6	-5.1	-4.9	0.2
64QAM	-7.7	-8.6	-5.1	-4.9	0.2

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7.2.3. Peak Power Spectral Density: Part 15.407(a)(2)

The peak power spectral density shall not exceed 11 dBm in any 1 MHz band.

For transmitting antennas of directional gain greater than 6 dBi the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The power spectral density for all modes was measured using the spectrum analyser channel power function. The channel width was set to 1MHz and measurement frequency centred on the highest part of the carrier. The measurement bandwidths are set automatically by the spectrum analyser.

ACQ measurements were taken with a different RF level offset as the duty cycle differs from other modulation types.

Measurements on both ports were made and similar results were obtained. Only H port plots are shown in this report.

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Peak Power Spectral Density: Part 15.407(a)(2) (Continued)

Bottom channel – Integral Antenna

Maximum Mean Output Power (dBm)				Limit	Margin
Mode	Port H	Port V	Aggregate	(dBm)	(dB)
ACQ	-15.9	-15.8	-12.8	11.0	23.8
BPSK	-14.2	-14.6	-11.4	11.0	22.4
QPSK	-14.3	-14.6	-11.4	11.0	22.4
16QAM	-14.1	-14.6	-11.3	11.0	22.3
64QAM	-14.3	-14.7	-11.5	11.0	22.5

Centre channel – Integral Antenna

Maximum Mean Output Power (dBm)				Limit	Margin
Mode	Port H	Port V	Aggregate	(dBm)	(dB)
ACQ	-15.6	-15.5	-12.5	11.0	23.5
BPSK	-13.7	-13.9	-10.8	11.0	21.8
QPSK	-13.7	-13.9	-10.8	11.0	21.8
16QAM	-13.8	-13.9	-10.8	11.0	21.8
64QAM	-14.0	-14.0	-11.0	11.0	22.0

Top channel – Integral Antenna

Maximum Mean Output Power (dBm)				Limit	Margin
Mode	Port H	Port V	Aggregate	(dBm)	(dB)
ACQ	-14.8	-15.2	-12.0	11.0	23.0
BPSK	-13.0	-13.6	-10.3	11.0	21.3
QPSK	-13.0	-13.6	-10.3	11.0	21.3
16QAM	-13.1	-13.6	-10.3	11.0	21.3
64QAM	-13.2	-13.7	-10.4	11.0	21.4

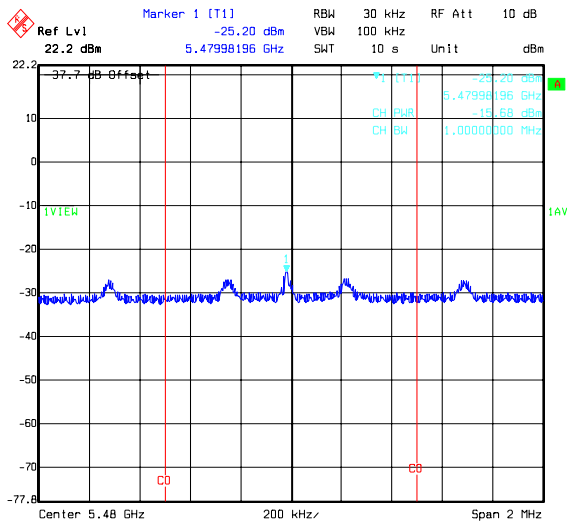
Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

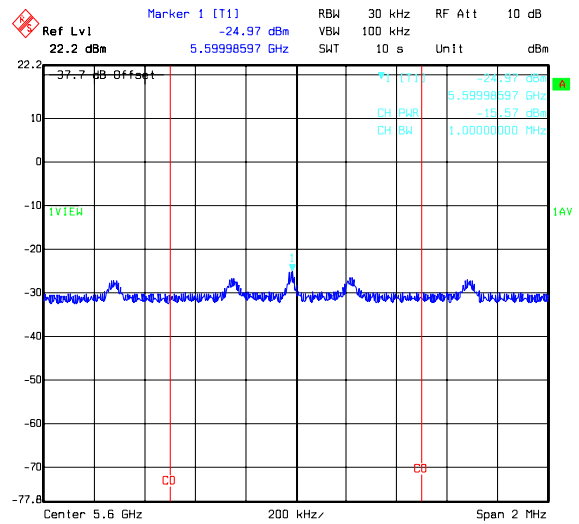
Peak Power Spectral Density: Part 15.407(a)(2) (Continued)

Results: Acquisition Mode Integral Antenna

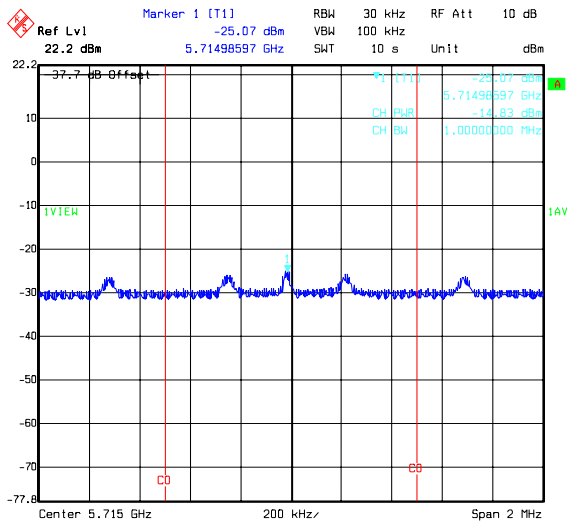
Port H Plots



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT ACQ BOTTOM CHANNEL
Date: 19.FEB.2008 09:42:34



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT ACQ CENTRE CHANNEL
Date: 19.FEB.2008 09:39:39



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT ACQ TOP CHANNEL
Date: 19.FEB.2008 09:37:52

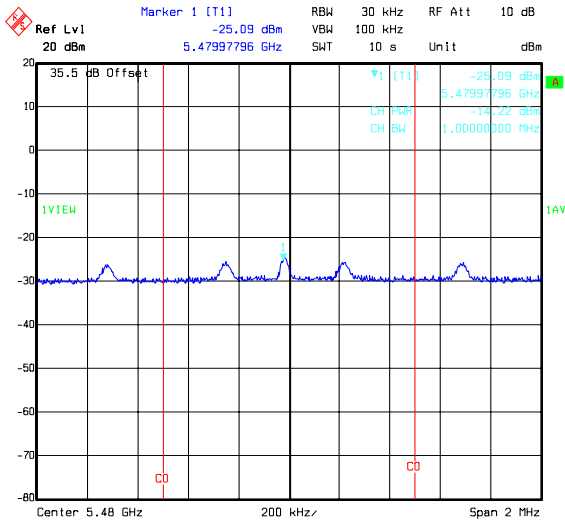
Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

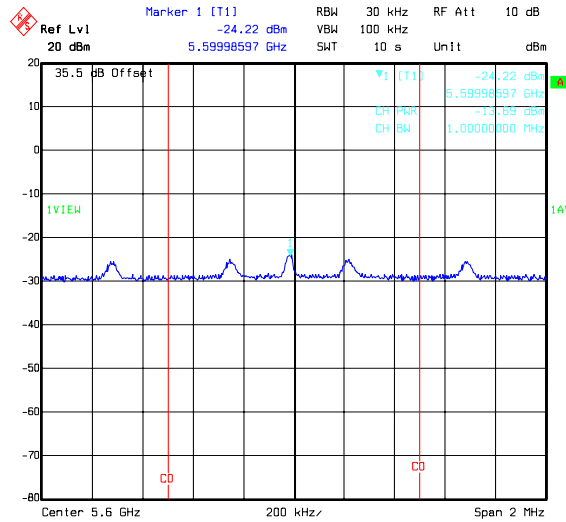
Peak Power Spectral Density: Part 15.407(a)(2) (Continued)

Results: BPSK Integral Antenna

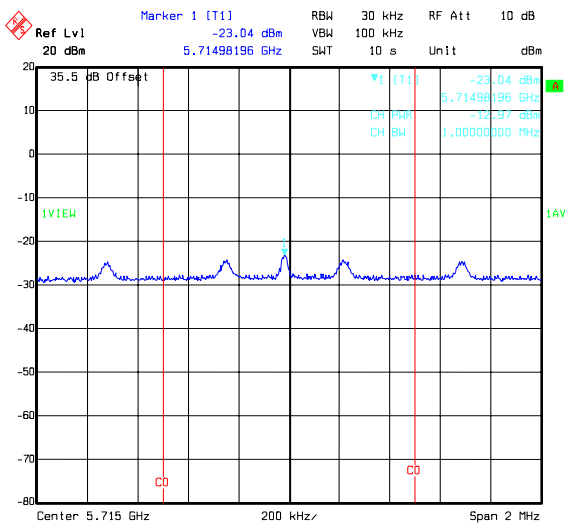
Port H Plots



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT BPSK BOTTOM CHANNEL
Date: 19.FEB.2008 09:54:54



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT BPSK CENTRE CHANNEL
Date: 19.FEB.2008 10:06:56



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT BPSK TOP CHANNEL
Date: 19.FEB.2008 10:11:38

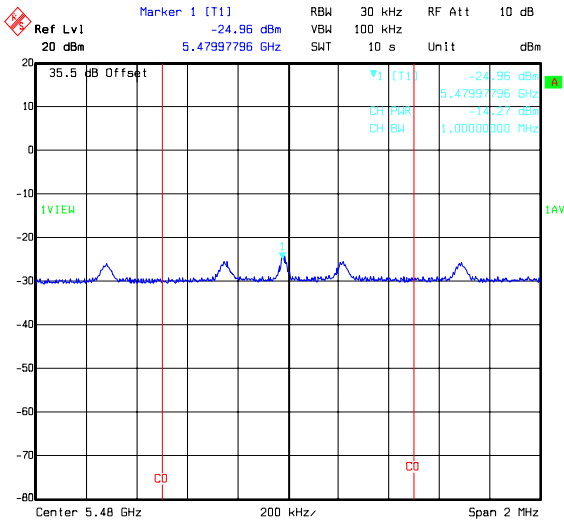
Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

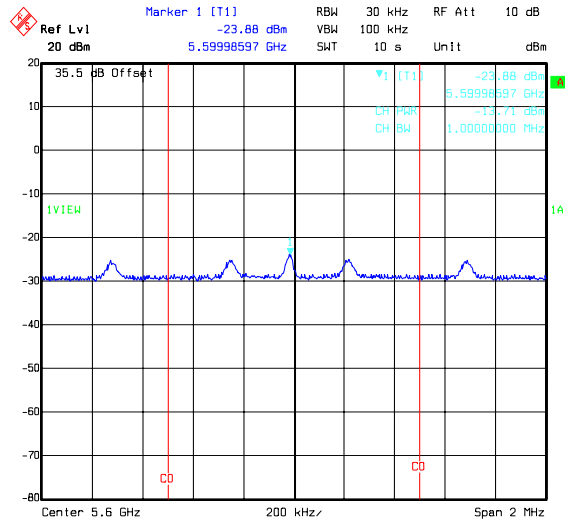
Peak Power Spectral Density: Part 15.407(a)(2) (Continued)

Results: QPSK Integral Antenna

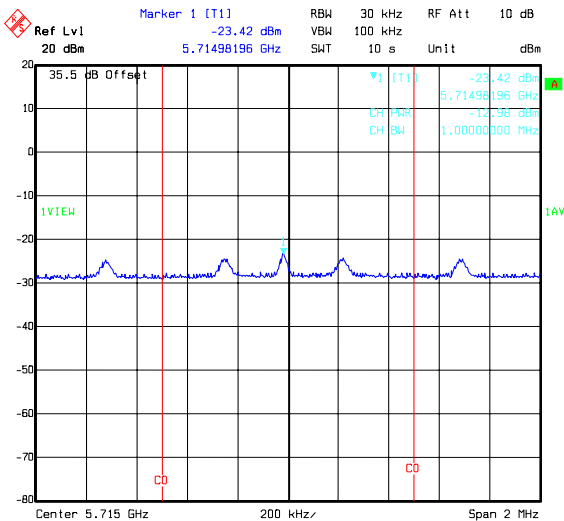
Port H Plots



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT QPSK BOTTOM CHANNEL
Date: 19.FEB.2008 09:53:53



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT QPSK CENTRE CHANNEL
Date: 19.FEB.2008 10:05:35



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT QPSK TOP CHANNEL
Date: 19.FEB.2008 10:13:27

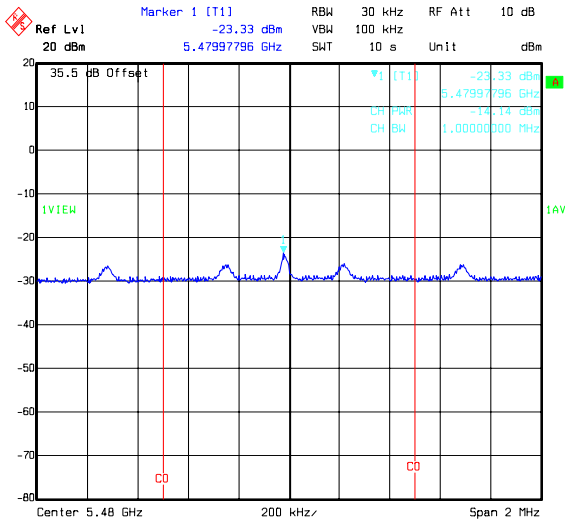
Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

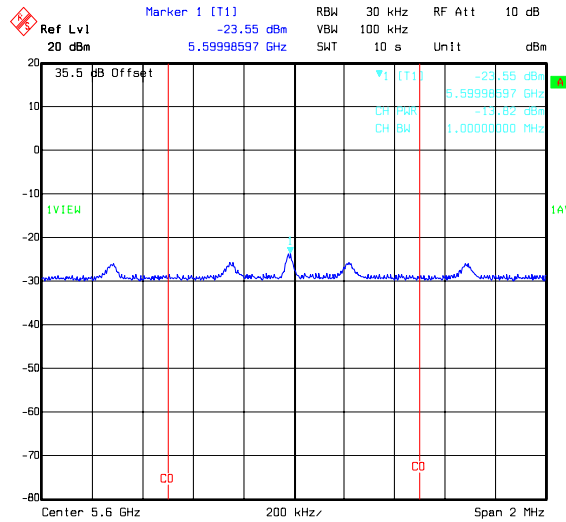
Peak Power Spectral Density: Part 15.407(a)(2) (Continued)

Results: 16QAM Integral Antenna

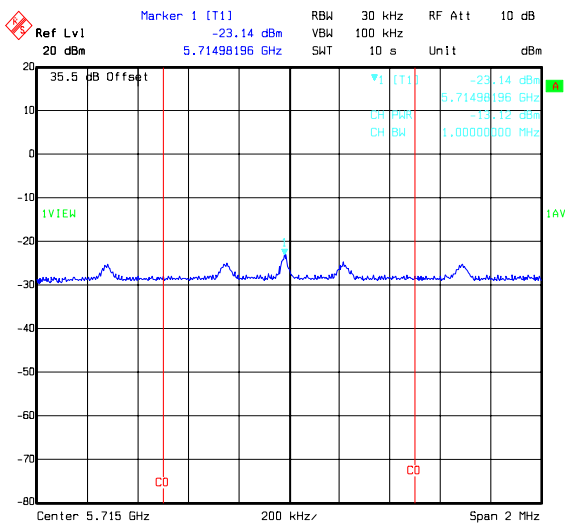
Port H Plots



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT 16QAM BOTTOM CHANNEL
Date: 19.FEB.2008 09:49:49



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT 16QAM CENTRE CHANNEL
Date: 19.FEB.2008 10:02:14



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT 16QAM TOP CHANNEL
Date: 19.FEB.2008 10:16:25

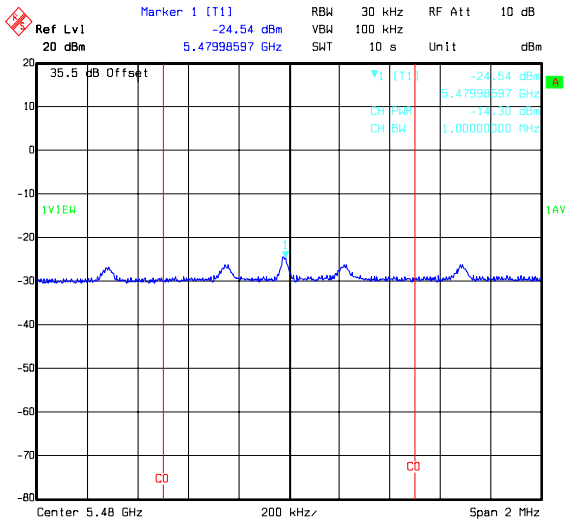
Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

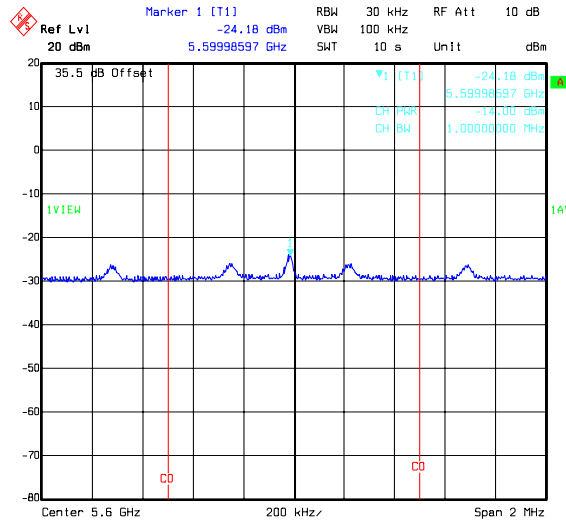
Peak Power Spectral Density: Part 15.407(a)(2) (Continued)

Results: 64QAM Integral Antenna

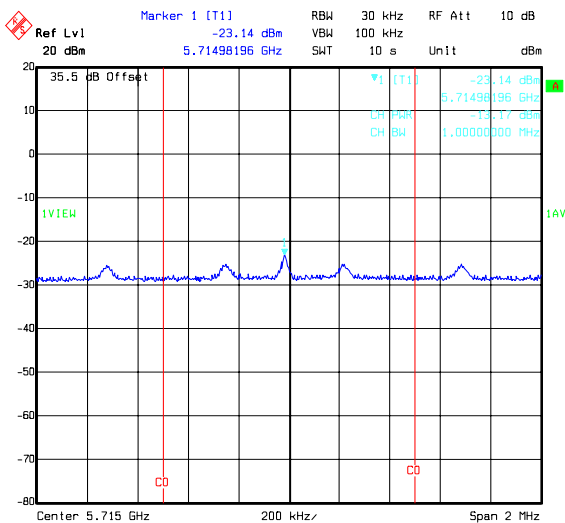
Port H Plots



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT 64QAM BOTTOM CHANNEL
Date: 19.FEB.2008 09:56:18



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT 64QAM CENTRE CHANNEL
Date: 19.FEB.2008 09:56:15



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT 64QAM TOP CHANNEL
Date: 19.FEB.2008 10:18:39

Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

Peak Power Spectral Density: Part 15.407(a)(2) (Continued)

Bottom channel – Parabolic Dish Antenna

Maximum Mean Output Power (dBm)				Limit	Margin
Mode	Port H	Port V	Aggregate	(dBm)	(dB)
ACQ	-25.0	-26.0	-22.5	11.0	33.5
BPSK	-24.0	-24.4	-21.2	11.0	32.2
QPSK	-24.0	-24.3	-21.1	11.0	32.1
16QAM	-24.1	-24.3	-21.2	11.0	32.2
64QAM	-24.1	-24.4	-21.2	11.0	32.2

Centre channel – Parabolic Dish Antenna

Maximum Mean Output Power (dBm)				Limit	Margin
Mode	Port H	Port V	Aggregate	(dBm)	(dB)
ACQ	-25.1	-25.3	-22.2	11.0	33.2
BPSK	-25.6	-26.2	-22.9	11.0	33.9
QPSK	-25.8	-26.2	-23.0	11.0	34.0
16QAM	-25.8	-26.0	-22.9	11.0	33.9
64QAM	-25.9	-25.4	-22.6	11.0	33.6

Top channel – Parabolic Dish Antenna

Maximum Mean Output Power (dBm)				Limit	Margin
Mode	Port H	Port V	Aggregate	(dBm)	(dB)
ACQ	-25.5	-24.9	-22.2	11.0	33.2
BPSK	-25.1	-25.8	-22.4	11.0	33.4
QPSK	-25.1	-25.9	-22.5	11.0	33.5
16QAM	-25.1	-25.9	-22.5	11.0	33.5
64QAM	-25.2	-26.0	-22.6	11.0	33.6

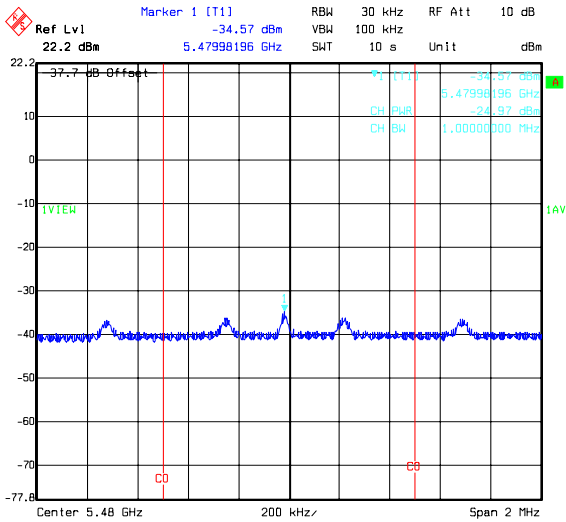
Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

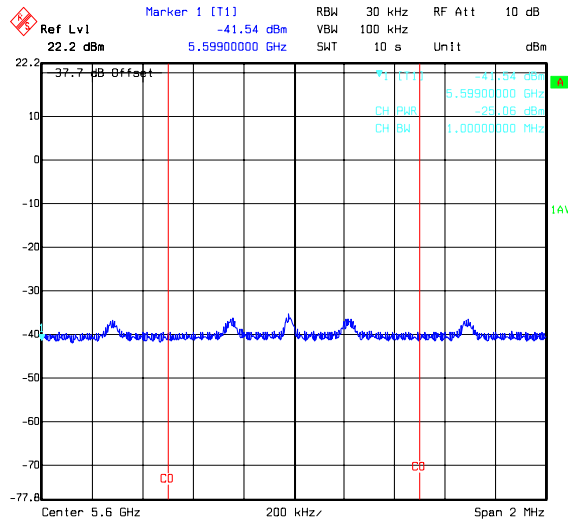
Peak Power Spectral Density: Part 15.407(a)(2) (Continued)

Results: Acquisition Mode Parabolic Dish Antenna

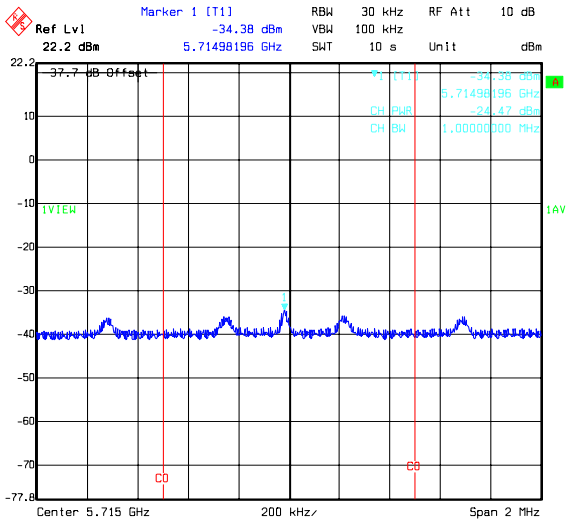
Port H Plots



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT ACQ BOTTOM CHANNEL
Date: 19.FEB.2008 09:25:47



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT ACQ CENTRE CHANNEL
Date: 19.FEB.2008 09:30:41



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT ACQ TOP CHANNEL
Date: 19.FEB.2008 09:31:42

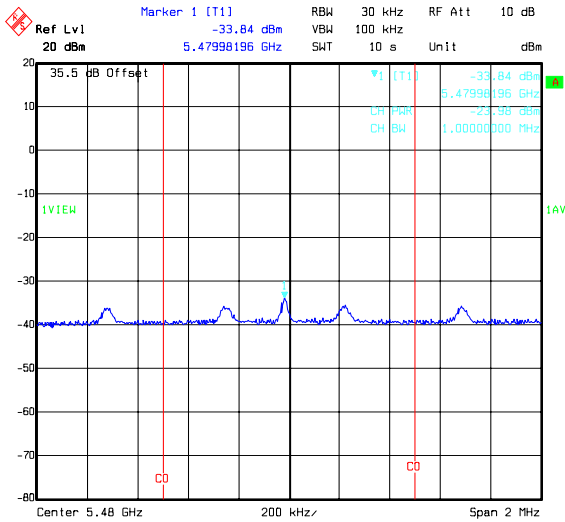
Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

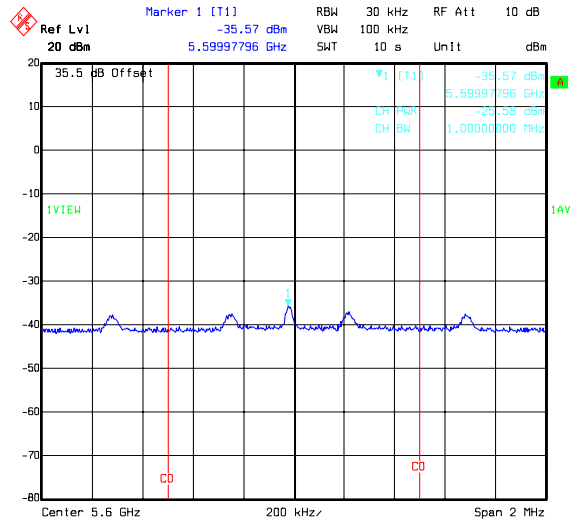
Peak Power Spectral Density: Part 15.407(a)(2) (Continued)

Results: BPSK Parabolic Dish Antenna

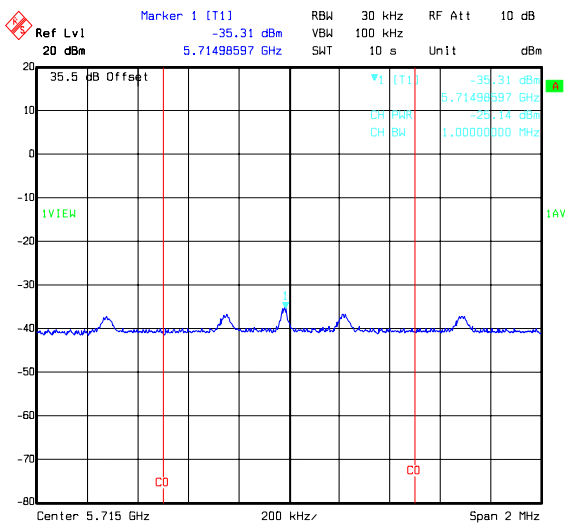
Port H Plots



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT BPSK BOTTOM CHANNEL
Date: 19.FEB.2008 08:38:35



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT BPSK CENTRE CHANNEL
Date: 19.FEB.2008 08:41:32



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT BPSK TOP CHANNEL
Date: 19.FEB.2008 08:54:05

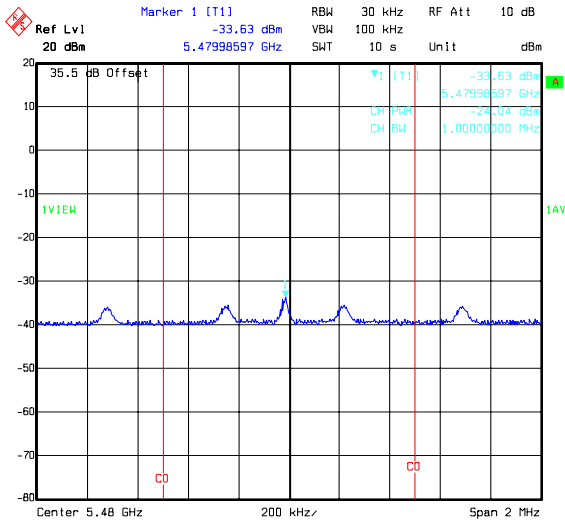
Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

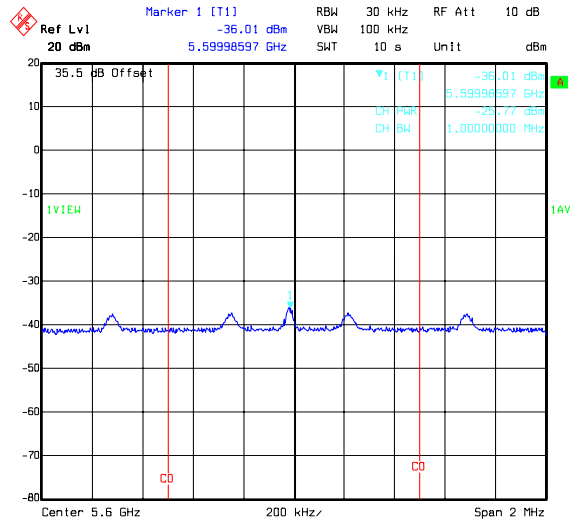
Peak Power Spectral Density: Part 15.407(a)(2) (Continued)

Results: QPSK Parabolic Dish Antenna

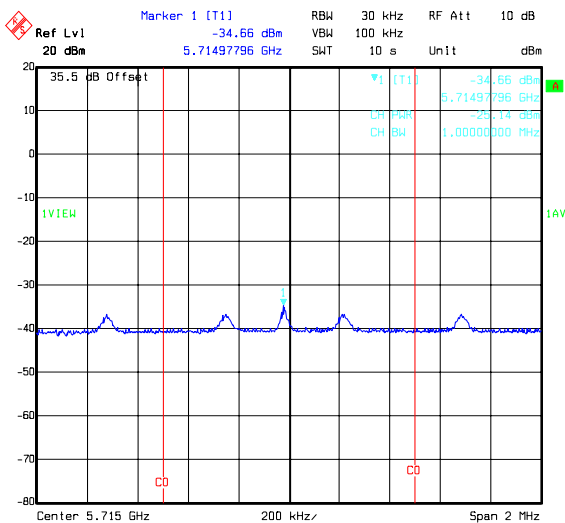
Port H Plots



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT QPSK BOTTOM CHANNEL
Date: 19.FEB.2008 08:37:30



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT QPSK CENTRE CHANNEL
Date: 19.FEB.2008 08:43:56



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT QPSK TOP CHANNEL
Date: 19.FEB.2008 08:52:07

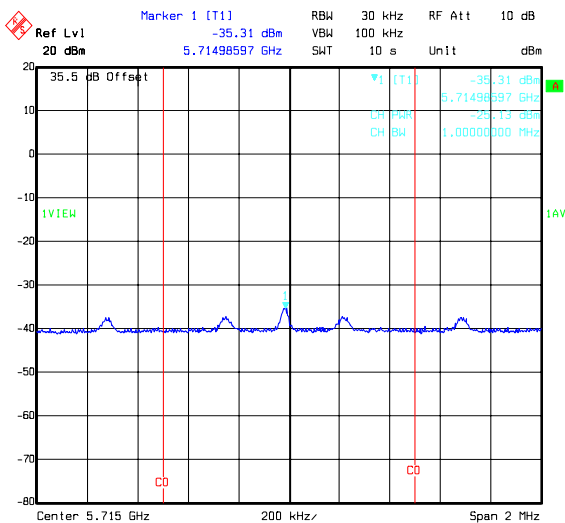
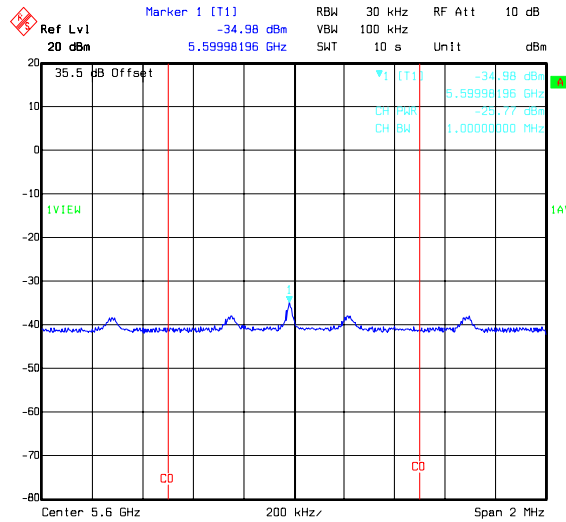
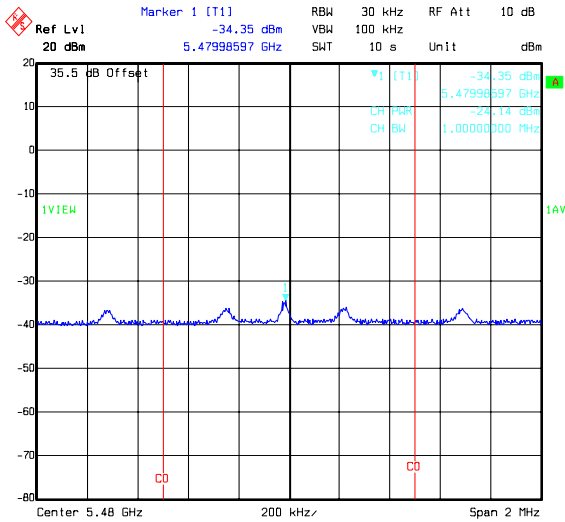
Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

Peak Power Spectral Density: Part 15.407(a)(2) (Continued)

Results: 16QAM Parabolic Dish Antenna

Port H Plots



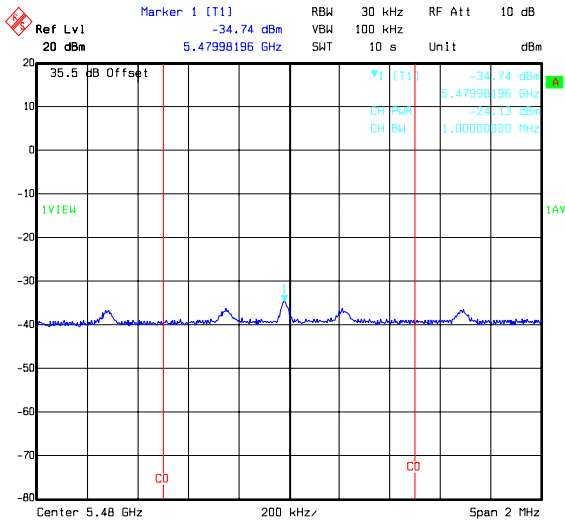
Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

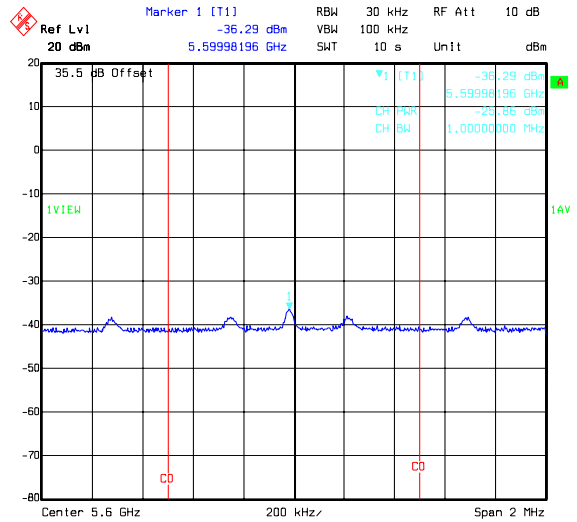
Peak Power Spectral Density: Part 15.407(a)(2) (Continued)

Results: 64QAM Parabolic Dish Antenna

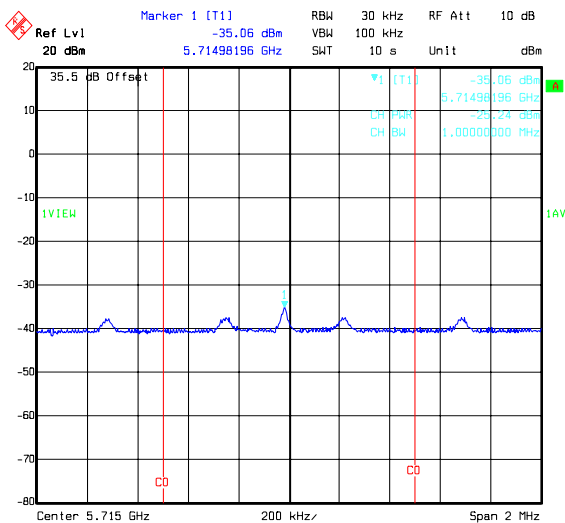
Port H Plots



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT 64QAM BOTTOM CHANNEL
Date: 19.FEB.2008 09:02:25



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT 64QAM CENTRE CHANNEL
Date: 19.FEB.2008 08:58:59



Title: 49756JD05
Comment A: PEAK POWER SPECTRAL DENSITY H PORT 64QAM TOP CHANNEL
Date: 19.FEB.2008 08:32:08

Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

7.2.4. Peak Excursion: Part 15.407(a)(6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

The EUT was transmitting at the highest operational power.

Peak Excursion measurements were performed on both antenna ports. Plots are shown for the H port only. Numerical results are shown for both ports.

The measurement was performed in accordance with DA 02-2138 Peak Excursion Measurement.

Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

Peak Excursion: Part 15.407(a)(6) H port results (Continued)

Results: Acquisition H Port

Channel	Ratio (dB)	Limit (dB)	Margin (dB)	Result
Bottom	9.9	<13.0	3.1	Complied
Middle	9.1	<13.0	3.9	Complied
Top	10.0	<13.0	3.0	Complied

Results: BPSK H Port

Channel	Ratio (dB)	Limit (dB)	Margin (dB)	Result
Bottom	10.3	<13.0	3.3	Complied
Middle	10.0	<13.0	3.0	Complied
Top	10.3	<13.0	3.3	Complied

Results: QPSK H port

Channel	Ratio (dB)	Limit (dB)	Margin (dB)	Result
Bottom	9.9	<13.0	3.1	Complied
Middle	9.9	<13.0	3.1	Complied
Top	9.9	<13.0	3.1	Complied

Results: 16QAM H port

Channel	Ratio (dB)	Limit (dB)	Margin (dB)	Result
Bottom	9.2	<13.0	3.8	Complied
Middle	9.6	<13.0	3.4	Complied
Top	10.3	<13.0	2.7	Complied

Results: 64QAM H port

Channel	Ratio (dB)	Limit (dB)	Margin (dB)	Result
Bottom	9.1	<13.0	3.9	Complied
Middle	10.8	<13.0	2.2	Complied
Top	9.4	<13.0	3.6	Complied

Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

Peak Excursion: Part 15.407(a)(6) V port results (Continued)

Results: Acquisition V Port

Channel	Ratio (dB)	Limit (dB)	Margin (dB)	Result
Bottom	9.6	<13.0	3.4	Complied
Middle	9.7	<13.0	3.3	Complied
Top	8.9	<13.0	4.1	Complied

Results: BPSK V Port

Channel	Ratio (dB)	Limit (dB)	Margin (dB)	Result
Bottom	10.8	<13.0	2.2	Complied
Middle	10.0	<13.0	3.0	Complied
Top	9.1	<13.0	3.9	Complied

Results: QPSK V Port

Channel	Ratio (dB)	Limit (dB)	Margin (dB)	Result
Bottom	9.1	<13.0	3.9	Complied
Middle	9.7	<13.0	3.3	Complied
Top	9.2	<13.0	3.8	Complied

Results: 16QAM V Port

Channel	Ratio (dB)	Limit (dB)	Margin (dB)	Result
Bottom	10.4	<13.0	2.6	Complied
Middle	9.6	<13.0	3.4	Complied
Top	9.3	<13.0	3.7	Complied

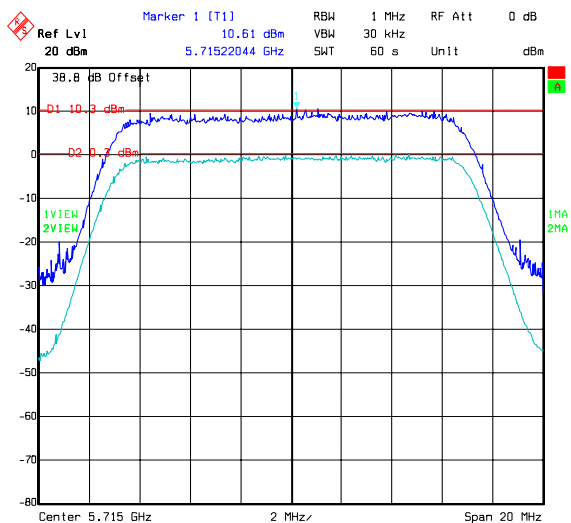
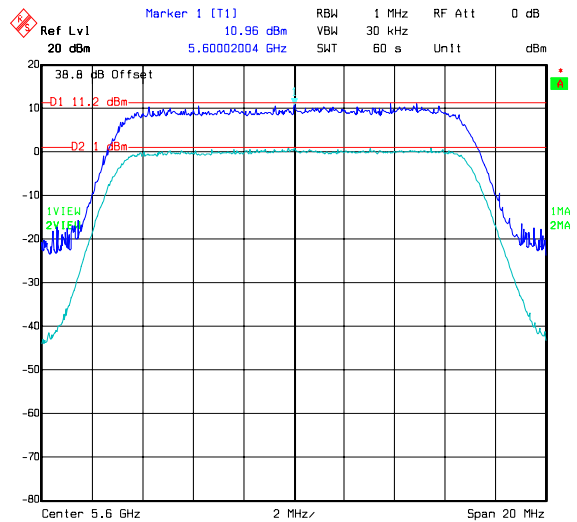
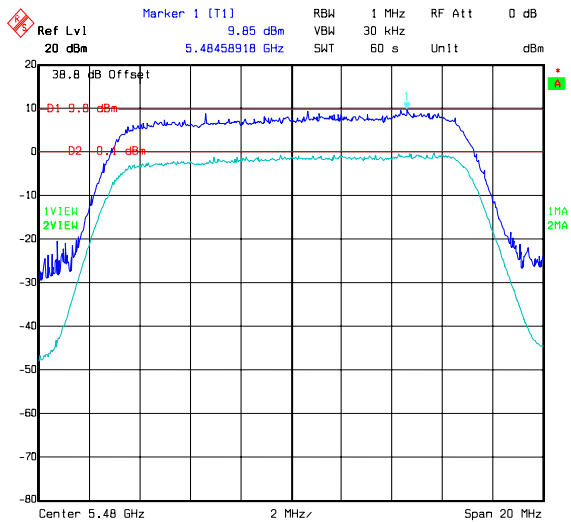
Results: 64QAM V Port

Channel	Ratio (dB)	Limit (dB)	Margin (dB)	Result
Bottom	9.6	<13.0	3.4	Complied
Middle	10.7	<13.0	2.3	Complied
Top	10.9	<13.0	2.1	Complied

Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

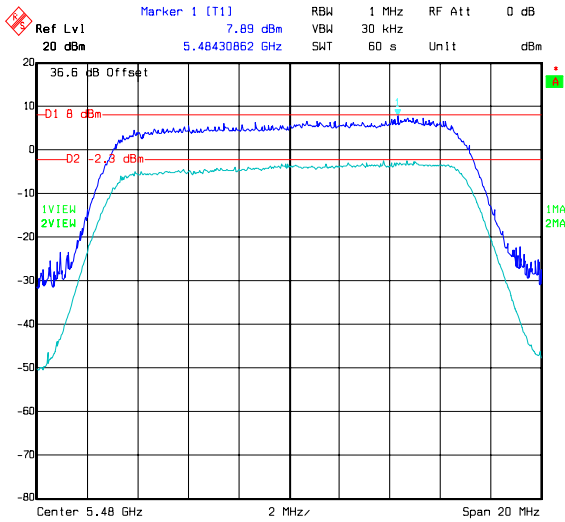
Peak Excursion: Part 15.407(a)(6) Acquisition mode H port (Continued)



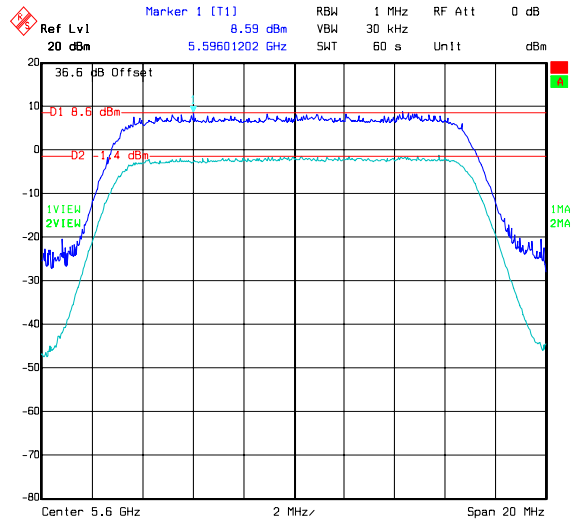
Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

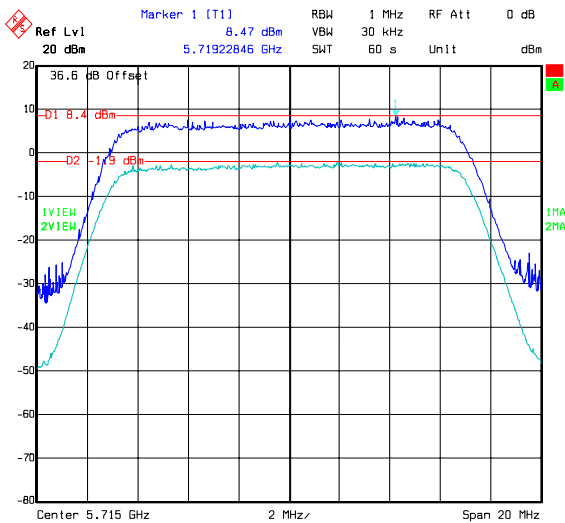
Peak Excursion: Part 15.407(a)(6) BPSK H port (Continued)



Title: 49756JD05
Comment A: PEAK EXCURSION BPSK BOTTOM CHANNEL
Date: 20.FEB.2008 11:38:06



Title: 49756JD05
Comment A: PEAK EXCURSION BPSK CENTRE CHANNEL
Date: 20.FEB.2008 11:45:30

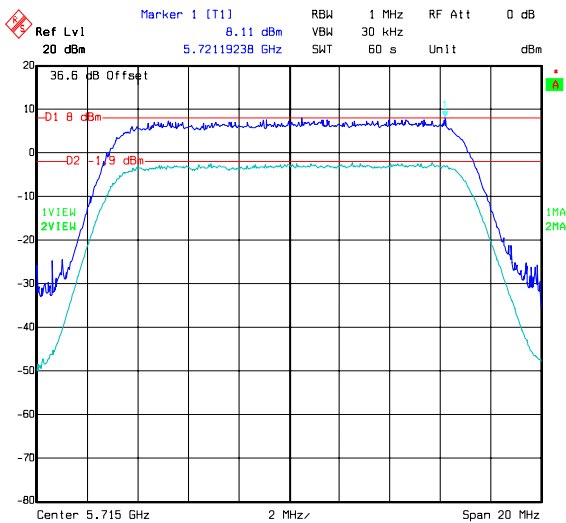
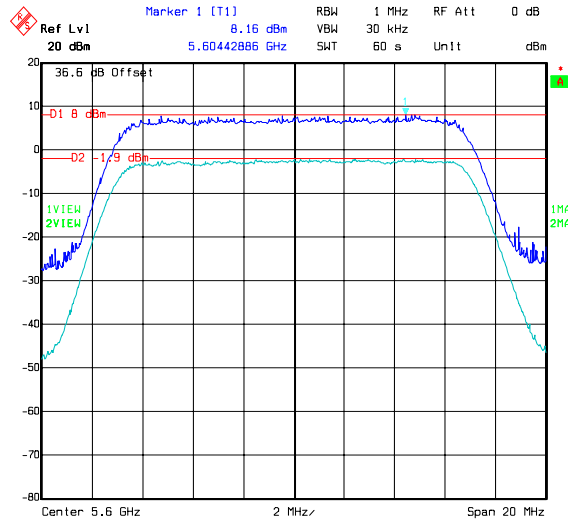
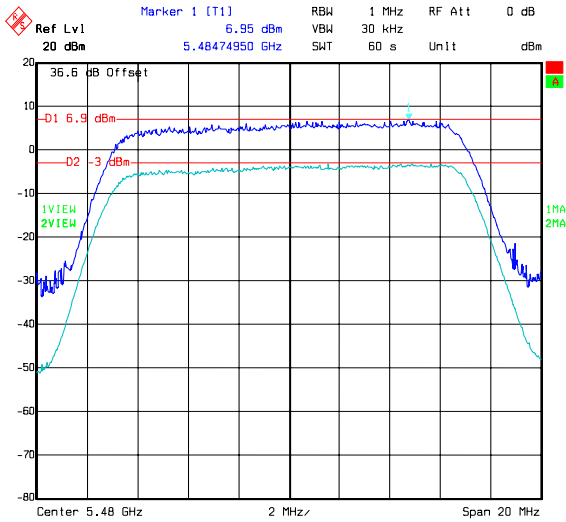


Title: 49756JD05
Comment A: PEAK EXCURSION BPSK TOP CHANNEL
Date: 20.FEB.2008 11:51:31

Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

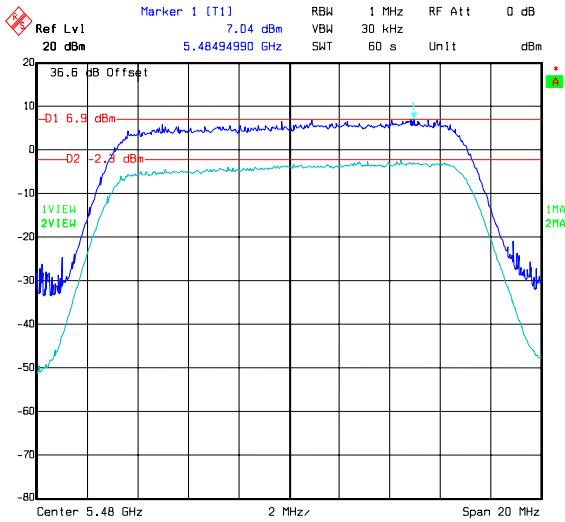
Peak Excursion: Part 15.407(a)(6) QPSK H port (Continued)



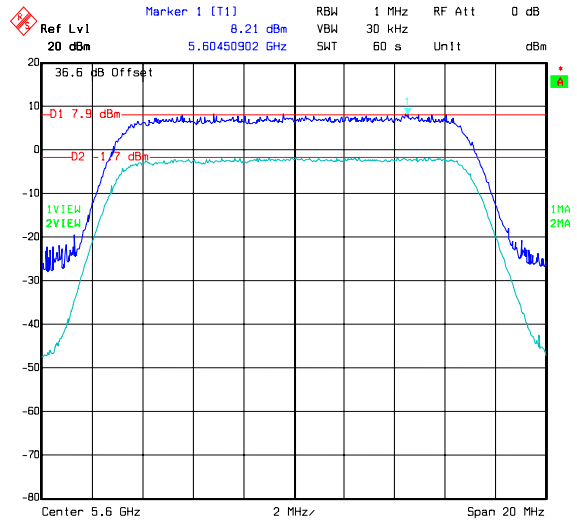
Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

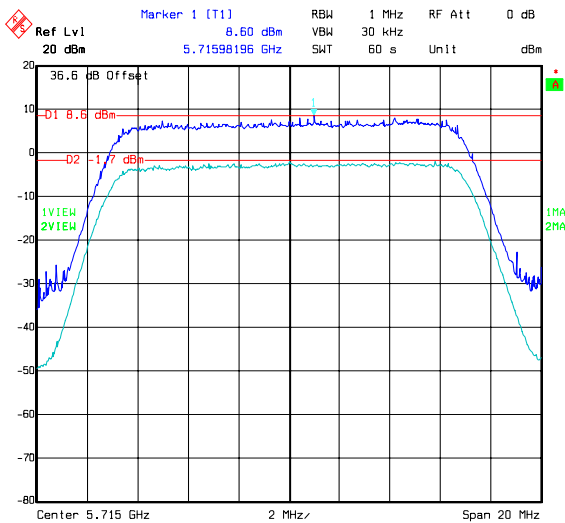
Peak Excursion: Part 15.407(a)(6) 16QAM H port (Continued)



Title: 49756JD05
Comment A: PEAK EXCURSION 16QAM BOTTOM CHANNEL
Date: 20.FEB.2008 12:18:04



Title: 49756JD05
Comment A: PEAK EXCURSION 16QAM CENTRE CHANNEL
Date: 20.FEB.2008 12:22:18

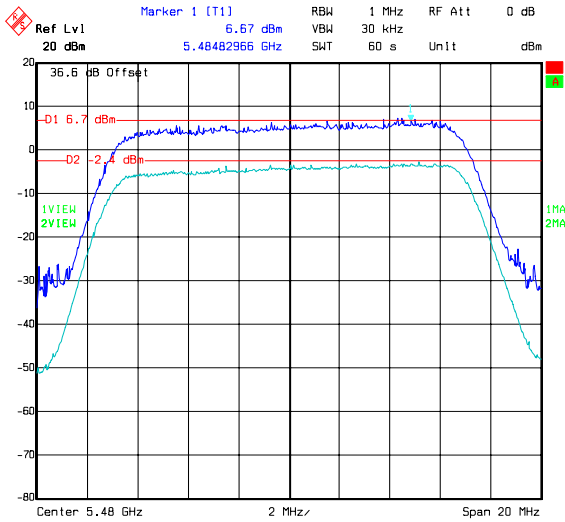


Title: 49756JD05
Comment A: PEAK EXCURSION 16QAM TOP CHANNEL
Date: 20.FEB.2008 12:26:31

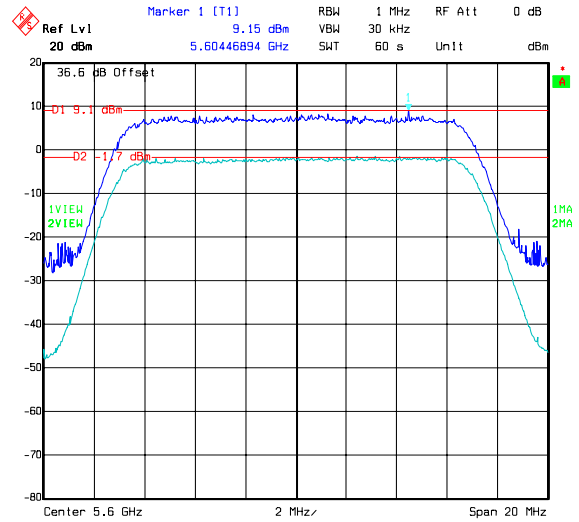
Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

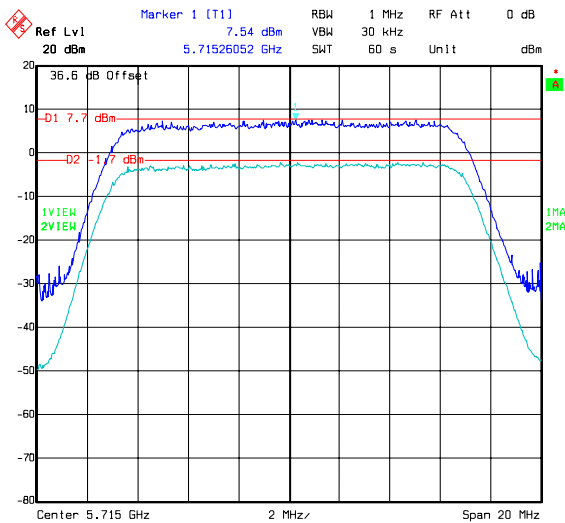
Peak Excursion: Part 15.407(a)(6) 64QAM H port (Continued)



Title: 49756JD05
Comment A: PEAK EXCURSION 64QAM BOTTOM CHANNEL
Date: 20.FEB.2008 13:33:55



Title: 49756JD05
Comment A: PEAK EXCURSION 64QAM CENTRE CHANNEL
Date: 20.FEB.2008 13:24:31



Title: 49756JD05
Comment A: PEAK EXCURSION 64QAM TOP CHANNEL
Date: 20.FEB.2008 13:20:09

Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

7.2.5. Conducted Transmitter Spurious Emissions: Part 15.407 (b)(3)

For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz.

Only spurious emissions within 20dB of the limit need be reported.

The limit shown in the table below is calculated as $-27\text{dBm} - 23\text{dBi} + 6\text{dBi} = -44\text{dBm/MHz}$

-27dBm/MHz is the EIRP limit assuming a 0dBi gain antenna. The declared antenna gain is 23dBi, 6dBi is the allowed antenna gain before conducted power requires reduction.

Conducted spurious emissions were performed on the 'H' antenna port only as the 'V' antenna port is electrically identical.

The worse case mode of operation for conducted spurious emission was using BPSK modulation and therefore all measurements were made in this mode.

Testing was performed up to 40GHz.

Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

Conducted Transmitter Spurious Emissions: Part 15.407 (Continued)

Results: BPSK Mode

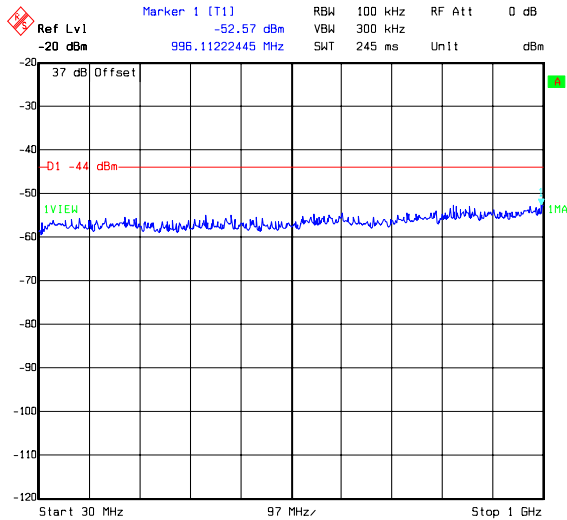
Bottom Channel

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm/MHz)	Margin (dB)
5880.005	-50.1	-44.0	6.1

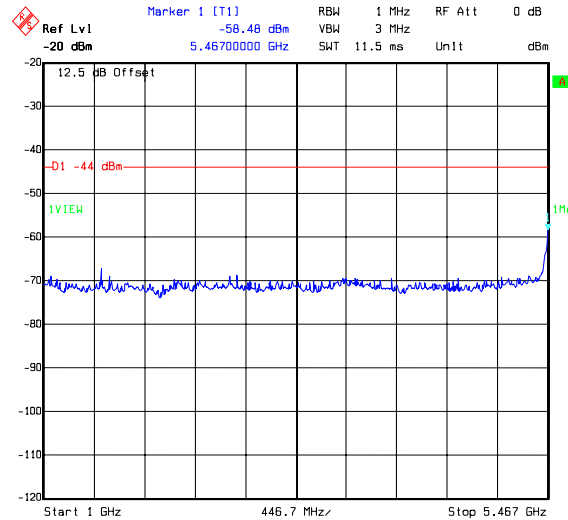
Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

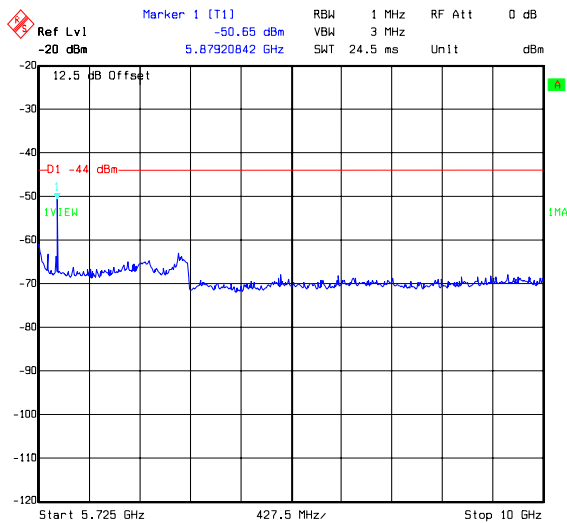
Conducted Transmitter Spurious Emissions: Part 15.407 (Continued)



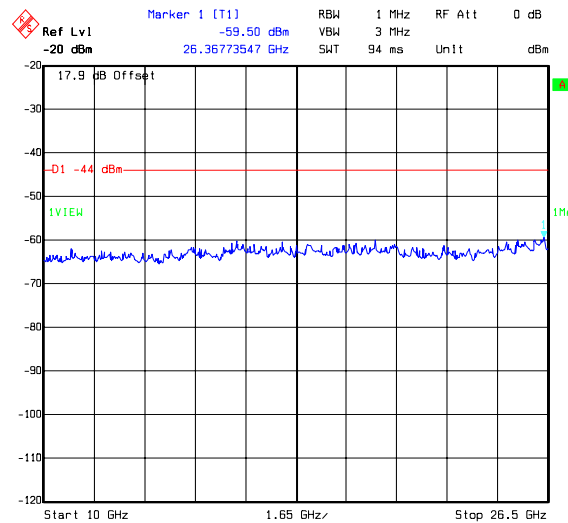
Title: 49756JD05
Comment A: CONDUCTED TX SPURIOUS EMISSIONS H PORT BPSK BOTTOM CH
Date: 21.FEB.2008 10:35:24



Title: 49756JD05
Comment A: CONDUCTED TX SPURIOUS EMISSIONS H PORT BPSK BOTTOM CH
Date: 21.FEB.2008 10:33:28



Title: 49756JD05
Comment A: CONDUCTED TX SPURIOUS EMISSIONS H PORT BPSK BOTTOM CH
Date: 21.FEB.2008 10:26:38

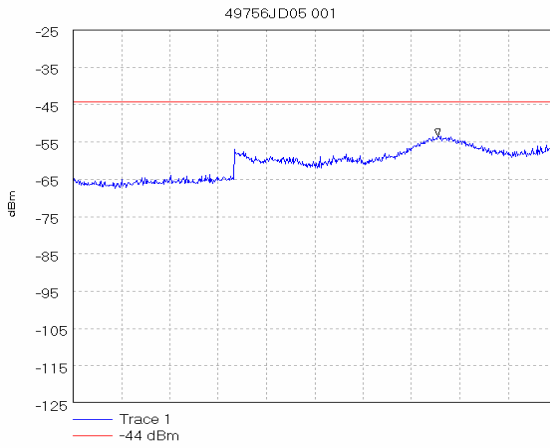


Title: 49756JD05
Comment A: CONDUCTED TX SPURIOUS EMISSIONS H PORT BPSK BOTTOM CH
Date: 21.FEB.2008 10:23:53

Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

Conducted Transmitter Spurious Emissions: Part 15.407 (Continued)



Start 26.5 GHz; Stop 40.0 GHz
Ref -24.8 dBm; Ref Offset -15.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 3.0 MHz; Att 0 dB; Swp 270.0 mS
Peak 36.693 GHz, -53.3 dBm
Limit/Mask: Limit Test Passed
Tested by site7 21/02/2008 13:43:18

Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

Conducted Transmitter Spurious Emissions: Part 15.407 (Continued)

Results: BPSK Mode

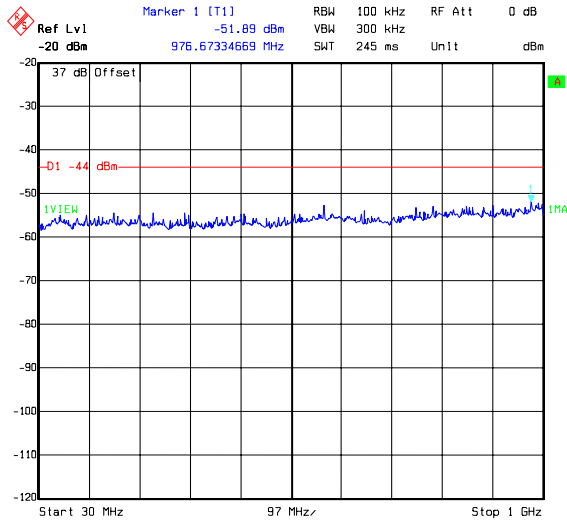
Top Channel

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm/MHz)	Margin (dB)
5470.000	-59.7	-44.0	15.7

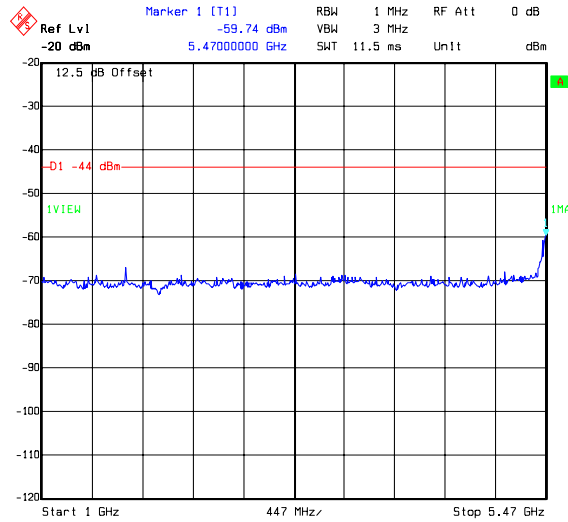
Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

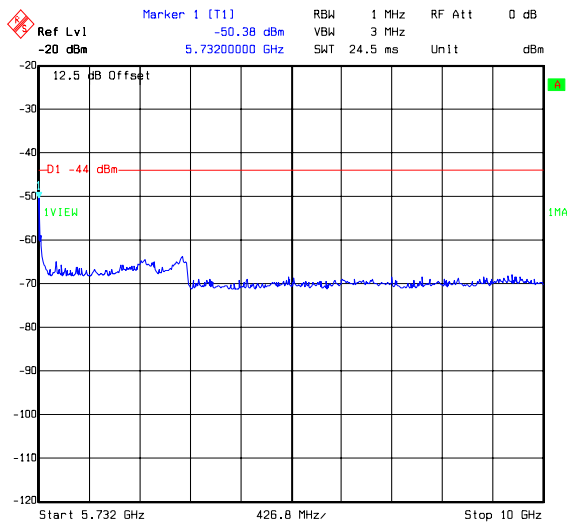
Conducted Transmitter Spurious Emissions: Part 15.407 (Continued)



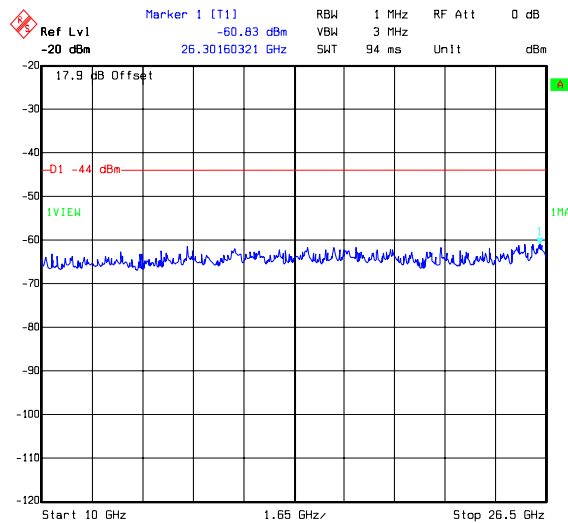
Title: 49756JD05
Comment A: CONDUCTED TX SPURIOUS EMISSIONS H PORT BPSK TOP CH
Date: 21.FEB.2008 09:26:11



Title: 49756JD05
Comment A: CONDUCTED TX SPURIOUS EMISSIONS H PORT BPSK TOP CH
Date: 21.FEB.2008 09:33:02



Title: 49756JD05
Comment A: CONDUCTED TX SPURIOUS EMISSIONS H PORT BPSK TOP CH
Date: 21.FEB.2008 09:39:09

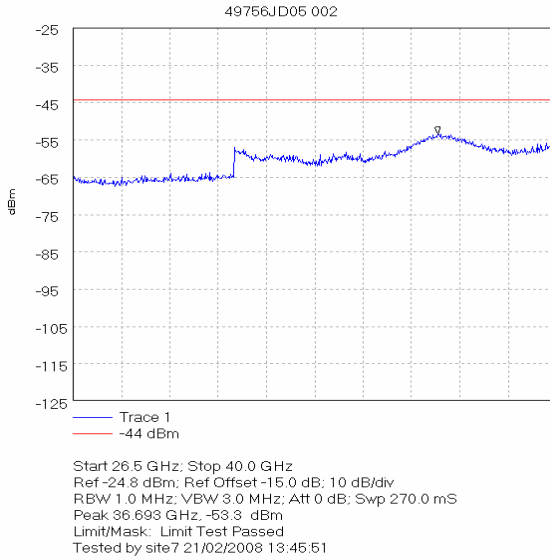


Title: 49756JD05
Comment A: CONDUCTED TX SPURIOUS EMISSIONS H PORT BPSK TOP CH
Date: 21.FEB.2008 09:41:28

Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

Conducted Transmitter Spurious Emissions: Part 15.407 (Continued)



Test of: Motorola Inc.
PTP 54500

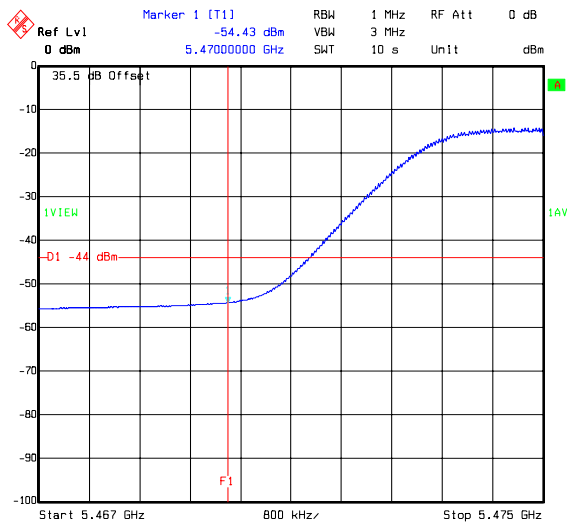
To: FCC Part 15.407: 2007 (Subpart E)

Conducted Transmitter Spurious Emissions: Part 15.407 (Continued)

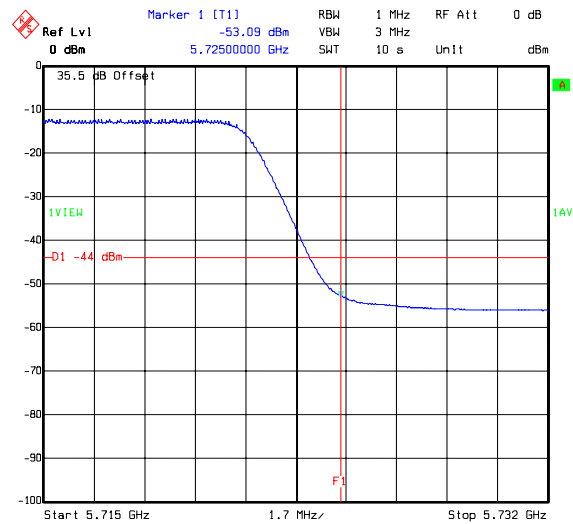
Results: BPSK Mode

Band Edge

Frequency (MHz)	Peak Emission Level (dBm)	Limit (dBm/MHz)	Margin (dB)
5470.000	-54.4	-44.0	10.4
5725.000	-53.1	-44.0	9.1



Title: 49756JD05
Comment A: CONDUCTED LOWER BAND EDGE H PORT BPSK TOP CH
Date: 21.FEB.2008 10:19:31



Title: 49756JD05
Comment A: CONDUCTED UPPER BAND EDGE H PORT BPSK TOP CH
Date: 21.FEB.2008 09:54:51

Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

7.2.6. Radiated Intentional Spurious Emissions: Part 15.209/15.407

Electric Field Strength Measurements (30MHz to 1GHz)

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.

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.

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.

Results:

Top/Bottom Channels Parabolic Dish Antenna

Frequency (MHz)	Antenna Polarity	Q-P Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
39.148	Vertical	38.5	40.0	1.5
80.000	Horizontal	25.3	40.0	14.7
500.000	Vertical	43.6	46.0	2.4

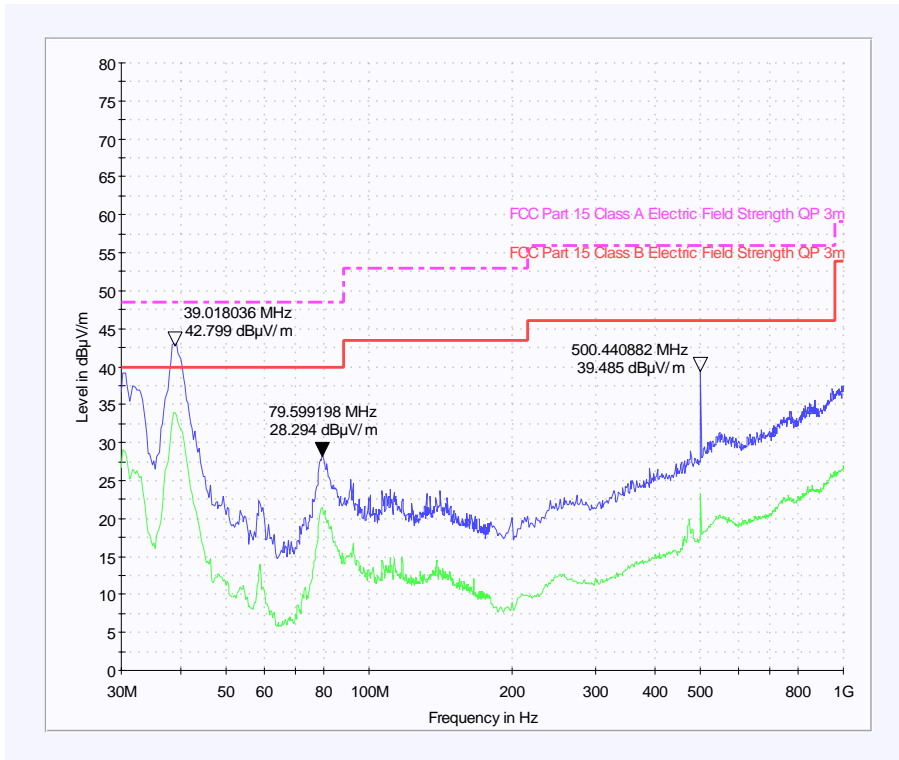
Top/Bottom Channels Integral Antenna

Frequency (MHz)	Antenna Polarity	Q-P Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
39.148	Horizontal	36.6	40.0	3.4
80.000	Vertical	19.9	40.0	20.1
500.000	Vertical	42.7	46.0	3.3

Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

Radiated Intentional Spurious Emissions: Part 15.209/15.407 (Continued)



Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

Radiated Intentional Spurious Emissions: Part 15.209/15.407 (Continued)

Average Electric Field Strength Measurements (1GHz to 40GHz)

Results:

Bottom/Middle/Top Channel

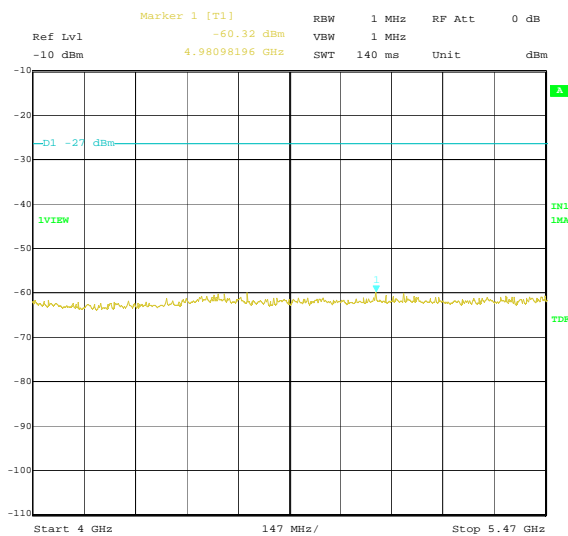
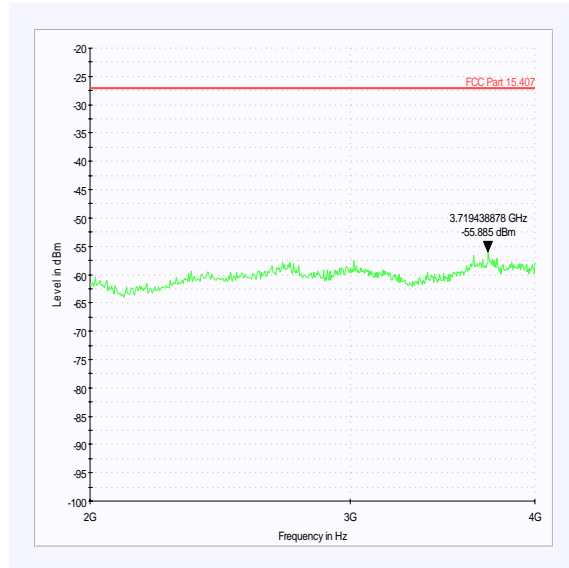
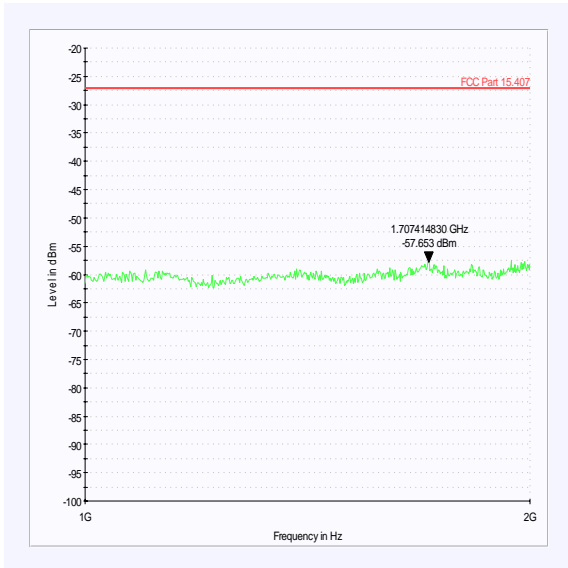
Frequency (MHz)	Antenna Polarity	Level (dBm/MHz)	Limit (dBm/MHz)	Margin (dB)
25886.773	Vertical	-41.7	-27.0	14.7

**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.*

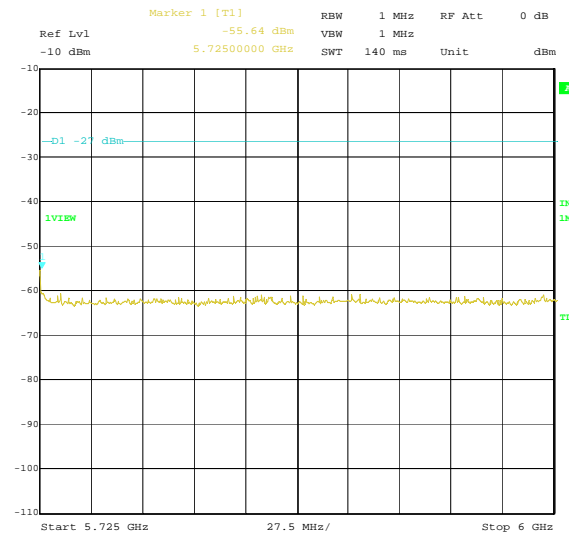
Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

Radiated Intentional Spurious Emissions: Part 15.209/15.407 (Continued)



Title: 49756JD05
Comment A: TX RADIATED SPURIOUS EMISSIONS
Date: 14.FEB.2008 10:41:54

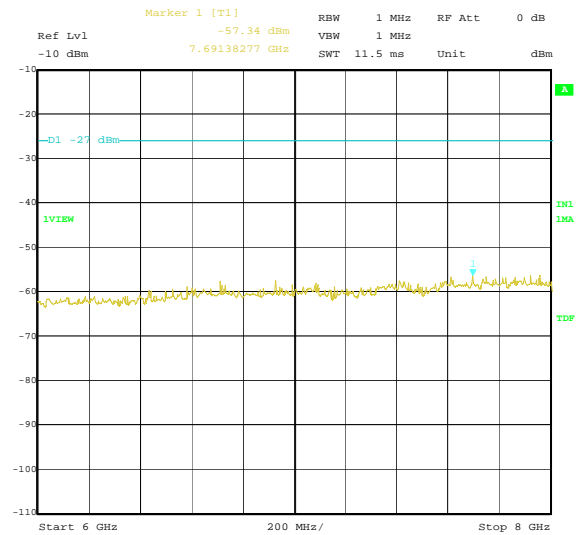


Title: 49756JD05
Comment A: TX RADIATED SPURIOUS EMISSIONS
Date: 14.FEB.2008 10:57:58

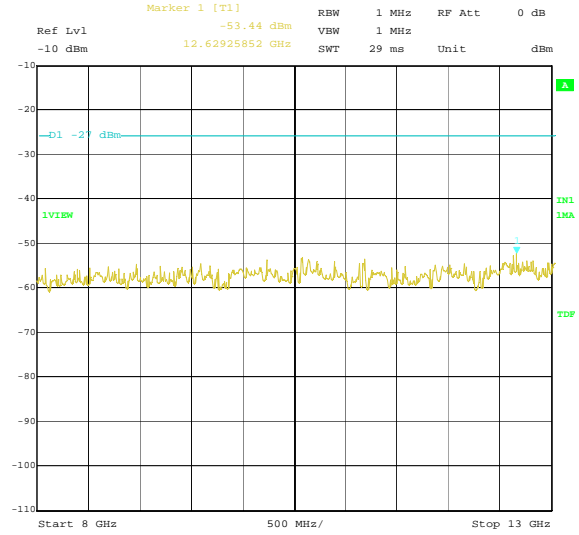
Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

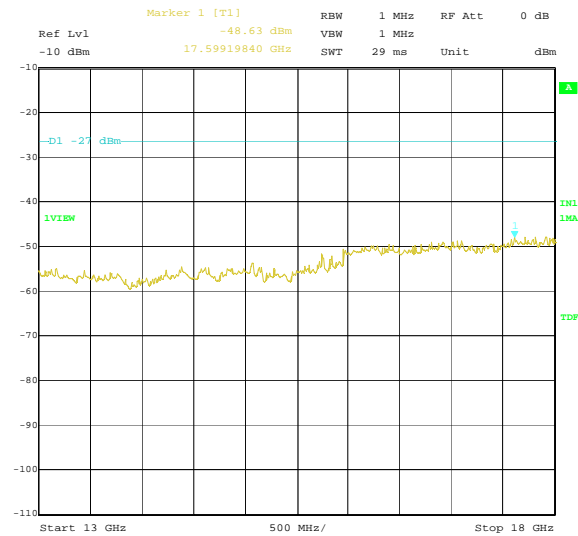
Radiated Intentional Spurious Emissions: Part 15.209/15.407 (Continued)



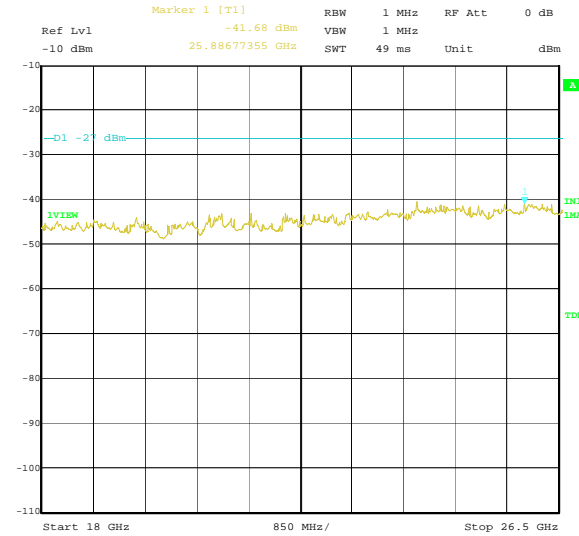
Title: 49756JD05
Comment A: TX RADIATED SPURIOUS EMISSIONS
Date: 14.FEB.2008 11:03:23



Title: 49756JD05
Comment A: TX RADIATED SPURIOUS EMISSIONS
Date: 14.FEB.2008 11:20:54



Title: 49756JD05
Comment A: TX RADIATED SPURIOUS EMISSIONS
Date: 14.FEB.2008 11:24:13

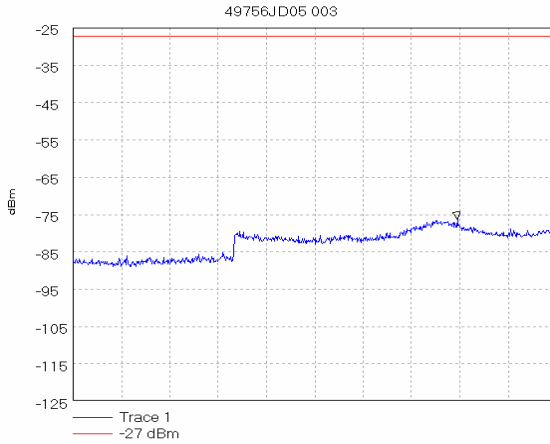


Title: 49756JD05
Comment A: TX RADIATED SPURIOUS EMISSIONS
Date: 14.FEB.2008 11:29:40

Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

Radiated Intentional Spurious Emissions: Part 15.209/15.407 (Continued)



Start 26.5 GHz; Stop 40.0 GHz
Ref -24.8 dBm; Ref Offset -15.0 dB; 10 dB/div
RBW 1.0 MHz; VBW 3.0 MHz; Att 0 dB; Swp 270.0 mS
Peak 37.233 GHz, -75.97 dBm
Limit/Mask: Limit Test Passed
Tested by site7 21/02/2008 13:54:21

Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

7.2.7. AC Conducted Emissions: Part 15.207

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:

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

Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

AC Conducted Emissions: Part 15.207 (Continued)

Quasi-Peak Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.178000	Live	45.5	64.6	19.1	Complied
0.238000	Live	43.8	62.2	18.4	Complied
0.298000	Live	42.8	60.3	17.5	Complied
24.062000	Live	37.8	60.0	22.2	Complied
24.702000	Neutral	38.0	60.0	22.0	Complied
25.658000	Live	38.2	60.0	21.8	Complied
26.314000	Live	38.1	60.0	21.9	Complied
26.634000	Live	37.4	60.0	22.6	Complied
26.938000	Live	37.2	60.0	22.8	Complied
27.594000	Live	38.7	60.0	21.3	Complied

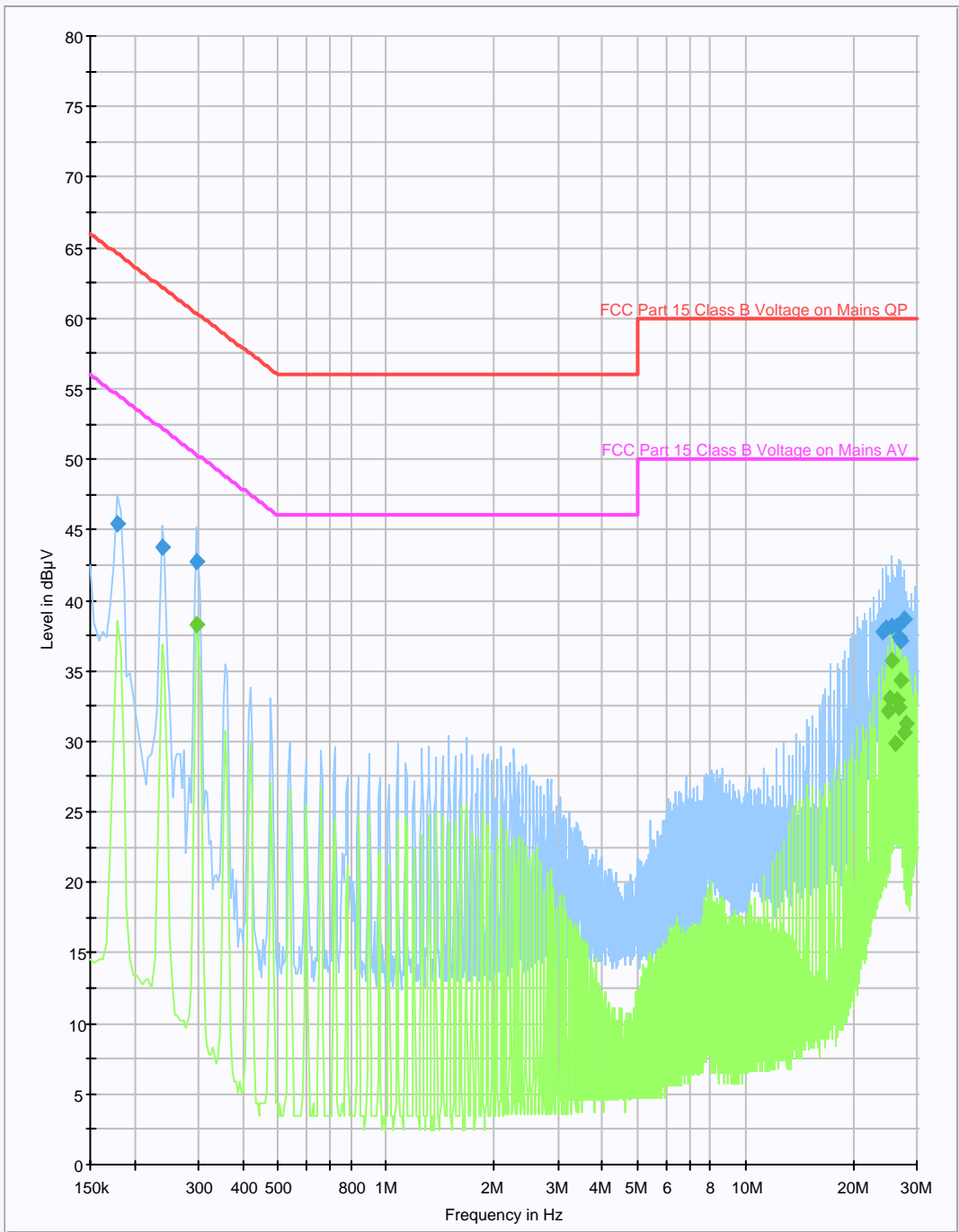
Average Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.298000	Live	38.3	50.3	12.0	Complied
25.030000	Live	32.2	50.0	17.8	Complied
25.350000	Live	33.0	50.0	17.0	Complied
25.670000	Live	35.8	50.0	14.2	Complied
25.994000	Live	29.9	50.0	20.1	Complied
26.314000	Live	32.9	50.0	17.1	Complied
26.634000	Live	32.5	50.0	17.5	Complied
26.954000	Live	34.4	50.0	15.6	Complied
27.598000	Live	30.7	50.0	19.3	Complied
27.918000	Live	31.3	50.0	18.7	Complied

Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

AC Conducted Emissions: Part 15.207 - Continued



Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

7.2.8. Transmit Power Control (TPC) 15.407(h)(1)

U-NII devices operating in the 5.25-5.35 GHz band and the 5.47-5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm.

For this test, the power level was reduced from the network management tool running on the support PC connected to the EUT and the corresponding power measured. It was also demonstrated that the transmit power level automatically decreased as the received level increased and vice versa.

The TPC minimum output power was measured using an average power meter on both ports. The recorded result was corrected for by the transmitter's measured duty cycle (the time the transmitter was not transmitting burst data). The duty cycle correction factor was calculated as the log base 10 of the burst time over the period.

The burst for BPSK, QPSK, 16QAM and 64QAM was measured as 1.312ms and the period 2.725ms. The resultant duty cycle correction factor was -3.0dB.

There is no TPC in Acquisition mode as the duplex radio link is not established and therefore the receive level from the distant end cannot be measured.

The EUT was also tested at 85% and at 115% of 110V. There was no variation in conducted output power over these extremes.

Conducted Power Limits for Parabolic Dish Antenna with cable using TPC

Measured 26dB bandwidth = 15.8 MHz

$11 \text{ dBm} + 10\log 15.8 = 23 \text{ dBm}$

Stated Antenna Gain = 34.9 dBi

Stated Cable Loss = 1 dB

Stated Antennas Gain – Stated Cable Loss = 33.9 dBi

$33.9 \text{ dBi} - 6 \text{ dBi} = 27.9 \text{ dBi}$

Requirement that TPC power is at least 6 dB less than maximum power

Limit = $23 \text{ dBm} - 27.9 \text{ dBi} - 6 \text{ dB} = -10.9 \text{ dBm}$

Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

Transmit Power Control (TPC) 15.407(h)(1) (Continued)

Results: Complied

Bottom channel – Integral Antenna

Maximum Mean Output Power (dBm)				Limit	Margin
Mode	Port H	Port V	Aggregate	(dBm)	(dB)
ACQ	N/A	N/A	N/A	N/A	N/A
BPSK	-18.8	-19.0	-15.9	-10.9	5.0
QPSK	-17.1	-18.9	-14.9	-10.9	4.0
16QAM	-16.9	-18.7	-14.7	-10.9	3.8
64QAM	-17.2	-18.1	-14.6	-10.9	3.7

Centre channel – Integral Antenna

Maximum Mean Output Power (dBm)				Limit	Margin
Mode	Port H	Port V	Aggregate	(dBm)	(dB)
ACQ	N/A	N/A	N/A	N/A	N/A
BPSK	-16.0	-20.6	-14.7	-10.9	3.8
QPSK	-16.1	-20.6	-14.8	-10.9	3.9
16QAM	-16.2	-20.6	-14.9	-10.9	4.0
64QAM	-16.1	-20.6	-14.8	-10.9	3.9

Top channel – Integral Antenna

Maximum Mean Output Power (dBm)				Limit	Margin
Mode	Port H	Port V	Aggregate	(dBm)	(dB)
ACQ	N/A	N/A	N/A	N/A	N/A
BPSK	-14.5	-20.0	-13.4	-10.9	2.5
QPSK	-14.4	-20.3	-13.4	-10.9	2.5
16QAM	-14.3	-20.1	-13.3	-10.9	2.4
64QAM	-14.4	-20.0	-13.3	-10.9	2.4

Test of: Motorola Inc.
PTP 54500

To: FCC Part 15.407: 2007 (Subpart E)

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”.

Measurement Type	Confidence Level (%)	Calculated Uncertainty
Transmitter 99% and 26 dB Bandwidth	95%	11.4 ppm
Maximum Conducted Output Power	95%	0.3 dB
Average Output Power	95%	0.3 dB
Peak Power Spectral Density	95%	0.3 dB
Peak Excursion	95%	0.3 dB
Conducted Transmitter Spurious Emissions	95%	0.5 dB
Radiated Standby Spurious Emissions	95%	2.9 dB
Radiated Transmitter Spurious Emissions	95%	2.9 dB
AC Mains Conducted Emissions	95%	3.94 dB
Transmit Power Control (TPC)	95%	0.3 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 54500

To: FCC Part 15.407: 2007 (Subpart E)

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A004	Line Impedance Stabilization Network	Rohde & Schwarz	ESH3-Z5	890 604/027	23 Apr 2007	12
A028	Antenna	Eaton	91888-2	304	08 Jun 2006	36
A031	Antenna	Eaton	91889-2	557	08 Jun 2006	36
A1430	Waveguide Transition	LRL	WC28sma	383	Calibration not required	-
A1534	Pre Amplifier	Hewlett Packard	8449B OPT H02	3008A00405	Calibrated before use	12
A203	Antenna	Flann Microwave Ltd	22240-20	343	21 Jul 2006	36
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
A435	Antenna	Flann	22240-20	400	21 Jul 2006	36
A436	Antenna	Flann	20240-20	330	24 Apr 2006	36
C1164	Cable	Rosenberger Micro-Coax	FA210A101500 7070	43188-1	Calibrated before use	-
C1167	Cable	Rosenberger Micro-Coax	FA210A103000 7070	43190-01	Calibrated before use	-
C1192	Cable	Rosenburg	FA210A1015M 3030	27141-07	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	-
M1242	Spectrum Analyser	Rohde & Schwarz, Inc.	FSEM30	845986/022	29 Nov 2007	12
M1253	Spectrum Analyser	HP	8564E	3442A00262	Calibrated before use	-
M1267	Thermal Power Sensor	Rohde and Schwarz	NRV-Z52	100155	20 Mar 2007	12
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016	15 Aug 2007	12

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Test Equipment Used – Continued

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
M1273	Test Receiver	Rhode & Schwarz	ESIB 26	100275	20 Feb 2007	12
M199	Power Meter	Rohde & Schwarz	NRVS	827023/075	19 Mar 2007	12
S201	Open Area Test Site	RFI	1	None	25 May 2007	12
S202	Site 2	RFI	2	S202-15011990	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

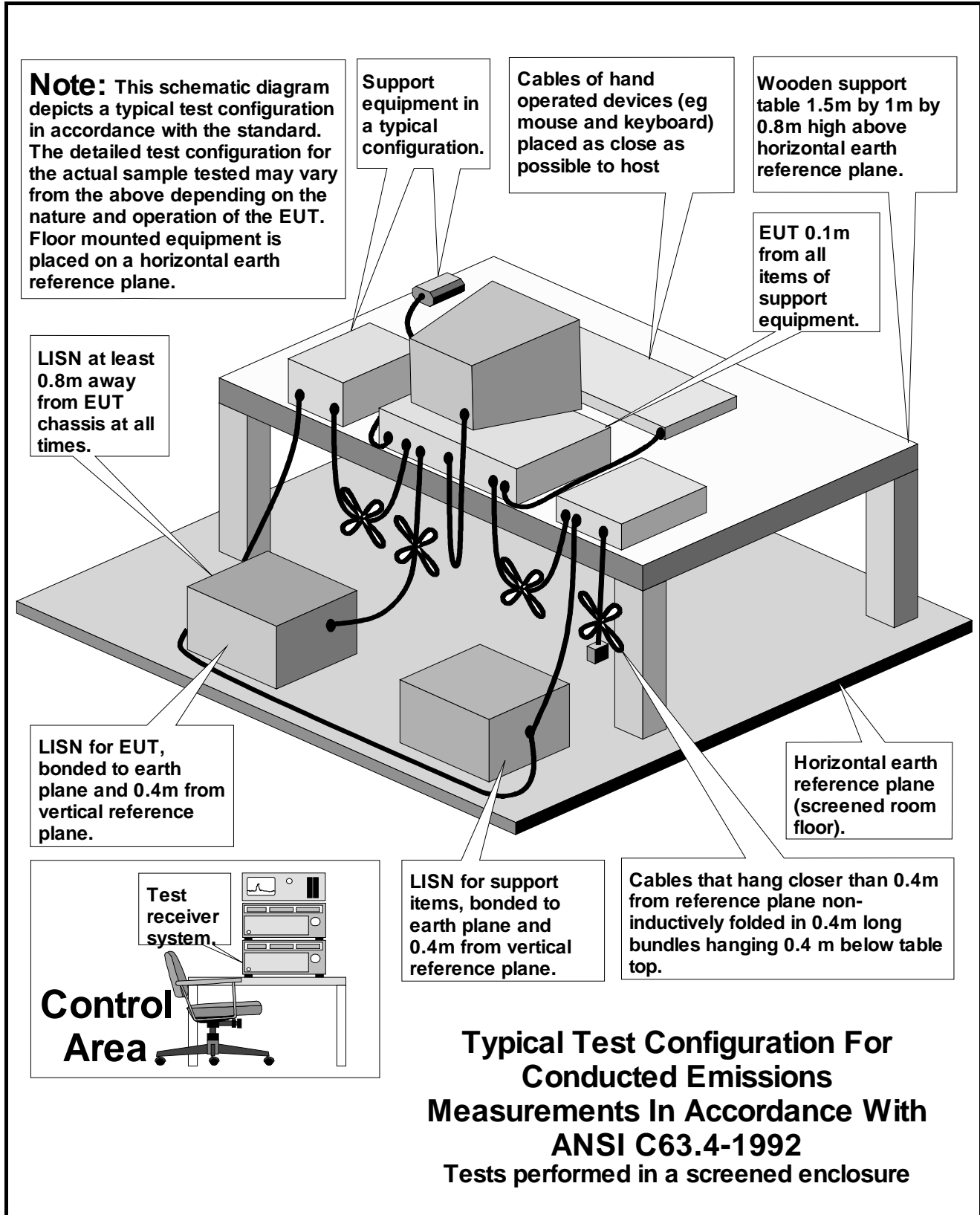
This appendix contains the following drawings:

Drawing Reference Number	Title
DRG\49756JD05\EMICON	Test configuration for measurement of conducted emissions.
DRG\49756JD05\EMIRAD	Test configuration for measurement of radiated emissions.

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DRG\49756JD05\EMICON



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DRG\49756JD05\EMIRAD

