TEST REPORT
FROM
RFI GLOBAL SERVICES LTD

Test of: Motorola Point to Point Fixed Wireless Solutions Group
5.4 GHz Gemini Unit

To: FCC Part 15.407: 2006 (Subpart E)

Test Report Serial No:
RFI/RPTE2/RP48672JD01A

Supersedes Test Report Serial No:
RFI/RPTE1/RP48672JD01A

This Test Report Is Issued Under The Authority Of Andrew Brown, Operations Manager: **pp** 	
Tested By: Nigel Davison 	**Checked By: Michael Derby** **pp** 
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Issue Date: 22 November 2006	**Test Dates: 09 October 2006 to 19 October 2006**

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

Registered in England and Wales. Company number:2117901

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1. Client Information

Company Name:	Motorola Point to Point Wireless Solutions Group
Address:	Unit A1 Linhay Business Park Eastern Road Ashburton Devon TQ13 7UP UK
Contact Name:	Mr Clem Fisher

2. Equipment Under Test (EUT)

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

2.1. Identification of Equipment Under Test (EUT)

Description:	5.4GHz Microwave Fixed Link System (Master)
Brand Name:	PTP 400 Series
Model Name or Number:	PTP54400
Serial Number:	606RGQO66O
Hardware Version:	D05-R02-1
Software Version:	5450-DEV-B46+!wdog
FCC ID Number:	QWP54XX
Country of Manufacture:	UK
Date of Receipt:	9/10/06

Description:	5.4GHz Microwave Fixed Link System (Slave)
Brand Name:	Gemini
Model Name or Number:	5430BHC20 (PTP 54400)
Serial Number:	606RGQO676
Hardware Version:	D05-R02-1
Software Version:	5450-DEV-B46+!wdog
FCC ID Number:	QWP54XX
Country of Manufacture:	UK
Date of Receipt:	9/10/06

2.2. Accessories

No accessories were supplied with the EUT:

2.3. Description of EUT

The equipment under test is a 5.4GHz microwave fixed link system.

2.4. Modifications Incorporated in EUT

During the course of testing the EUT was not modified.

2.5. Additional Information Related to Testing

Power Supply Requirement:	110 VAC		
Intended Operating Environment:	Commercial		
Equipment Category:	Broadband Radio Access Network, Fixed Link.		
Type of Unit:	Base Station (Fixed Use)		
Transmit Frequency Range:	5479 MHz to 5717 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	1	5479
	Middle	10	5593
	Top	19	5717
Receive Frequency Range:	5479 MHz to 5717 MHz		
Receive Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	1	5479
	Middle	10	5593
	Top	19	5717
Maximum Power Output	3.8dBm		

2.6. Port Identification

Port	Description
1	Cat 5 Ethernet.

2.7. Support Equipment

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

Description:	Power IDU
Brand Name:	Motorola
Model Name or Number:	Canopy Power IDU
Serial Number:	0628238861
Revision:	00

Description:	Power IDU
Brand Name:	Motorola
Model Name or Number:	Canopy Power IDU
Serial Number:	0628238987
Cable Length and Type:	00

3. Test Results

Reference:	FCC Part 15.407: 2006 (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.

3.1. 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.

3.2. Definition of Measurement Equipment

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

4. Deviations from the Test Specification

There were no deviations from the test specification.

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 preformed with the EUT transceiver operating at maximum power in Acquisition, BPSK, QPSK, 16QAM and 64QAM unless otherwise stated.

5.2. Configuration and Peripherals

The EUT was tested in the following configuration:

All tests were performed with slave connected to host and controlled via laptop.

Test were performed on either the horizontal (H) or Vertical (V) ports as appropriate.

6. Summary of Test Results

Range of Measurements	Specification Reference	Port Type	Compliancy 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 Standby Spurious Emissions	Part 15.109	Enclosure	Complied
Radiated Transmitter Spurious Emissions	Part 15.209/15.407	Enclosure	Complied
AC Mains Conducted Emissions	Part 15.107/15.207	AC Mains	Complied
Dynamic Frequency Selection (DFS) - Master	Part 15.407(h)(2)	Terminal	Complied
Dynamic Frequency Selection (DFS) - Slave	Part 15.407(h)(2)	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

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.

TPC is not required as the EUT operated below 27dBm.

7.2. Test Results

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

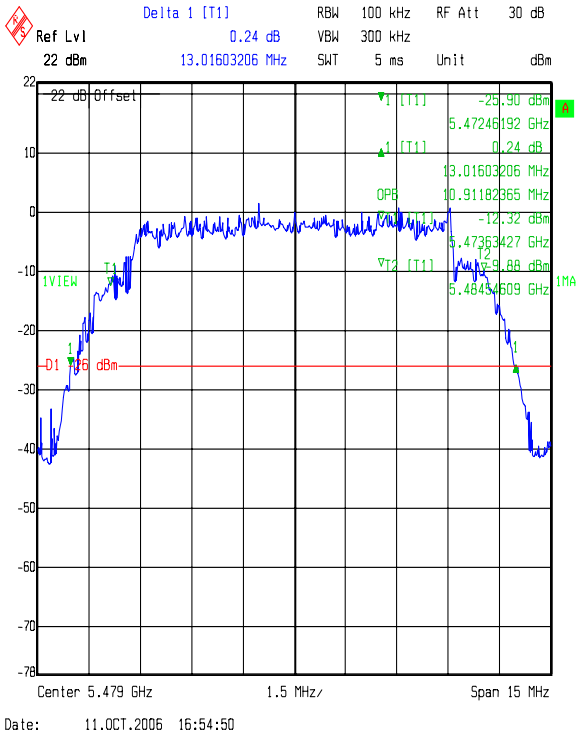
The 26dB bandwidth (B) is used elsewhere within this report for the determination of output power limits.

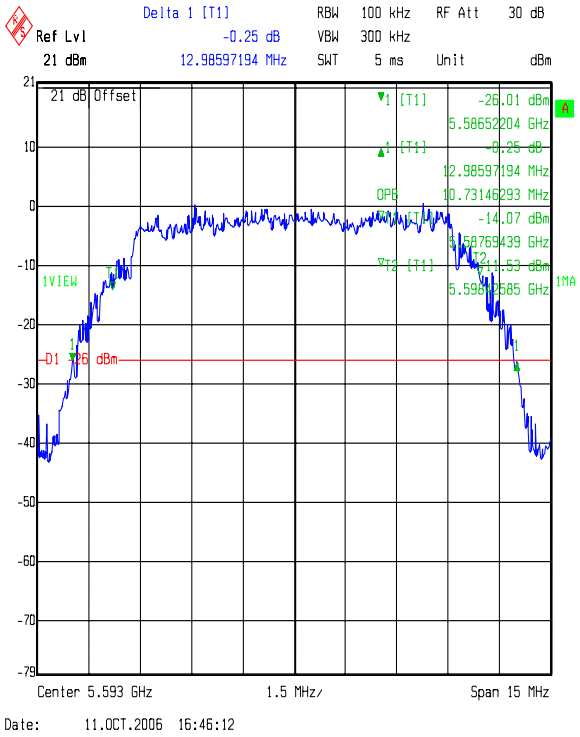
The 99% bandwidth was determined using the measurement analysers occupied bandwidth function. The 26dB bandwidth was determined by setting the analyser span to encompass the emission being measure, setting the resolution bandwidth to 1% of the emission bandwidth, setting a limit line to 26dBc and placing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

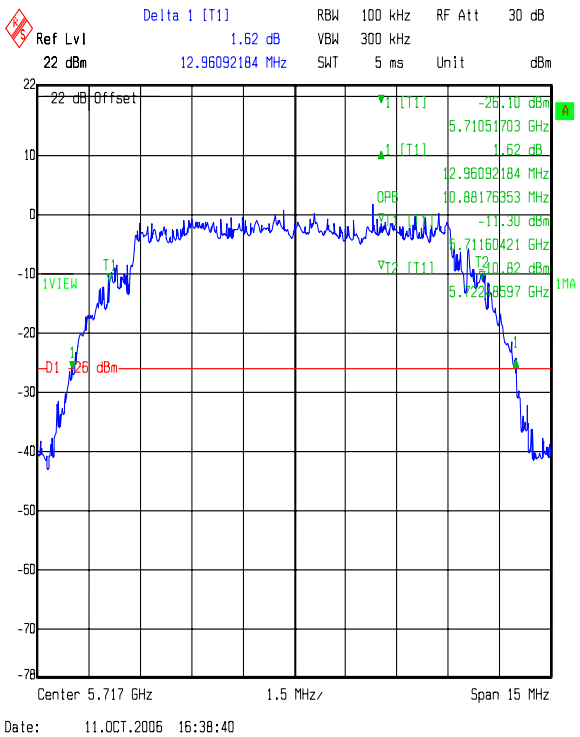
Results: Acquisition Mode

Channel	Data Rate (Mbps)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
Bottom	N/A	10.912	13.016
Middle	N/A	10.731	12.986
Top	N/A	10.882	12.961

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





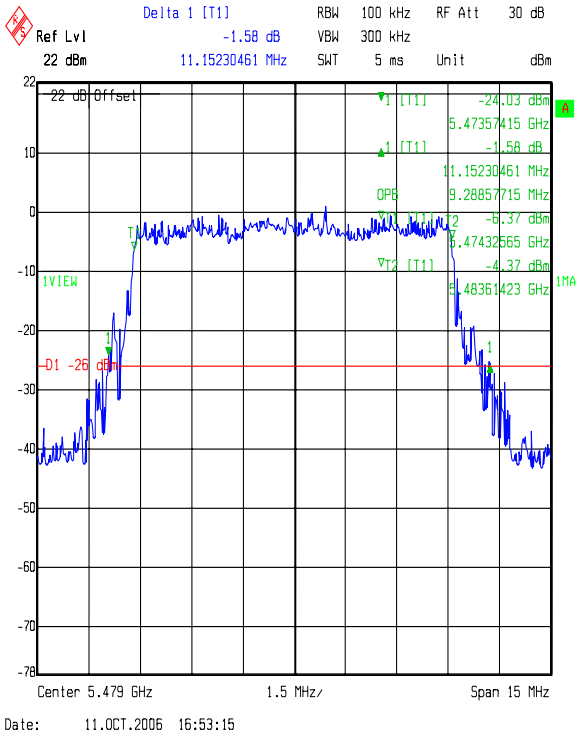


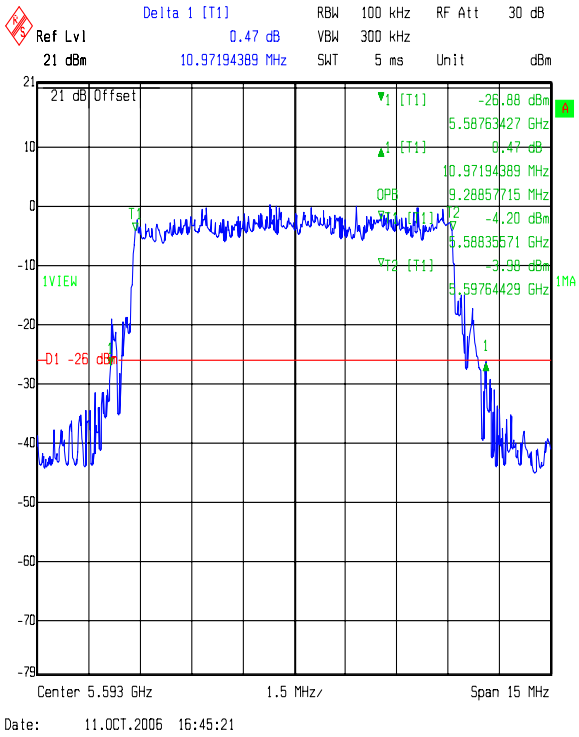
Transmitter 99% and 26 dB Bandwidths: Part 15.407(a) (Continued)

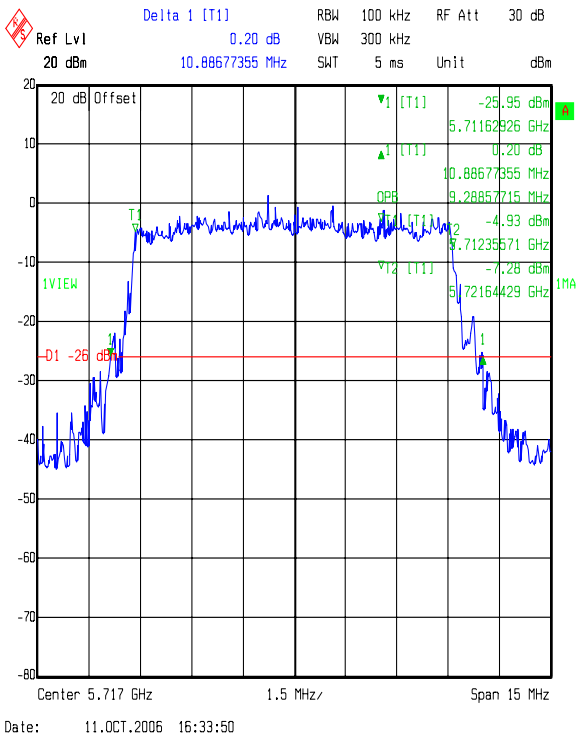
Results: BPSK Mode

Channel	Data Rate (Mbps)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
Bottom	1.67	9.289	11.152
Middle	1.67	9.289	10.972
Top	1.67	9.289	10.887

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





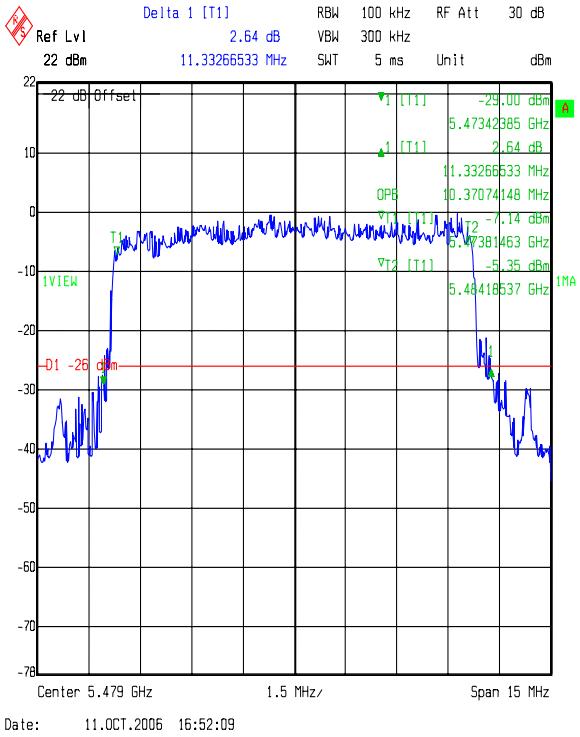


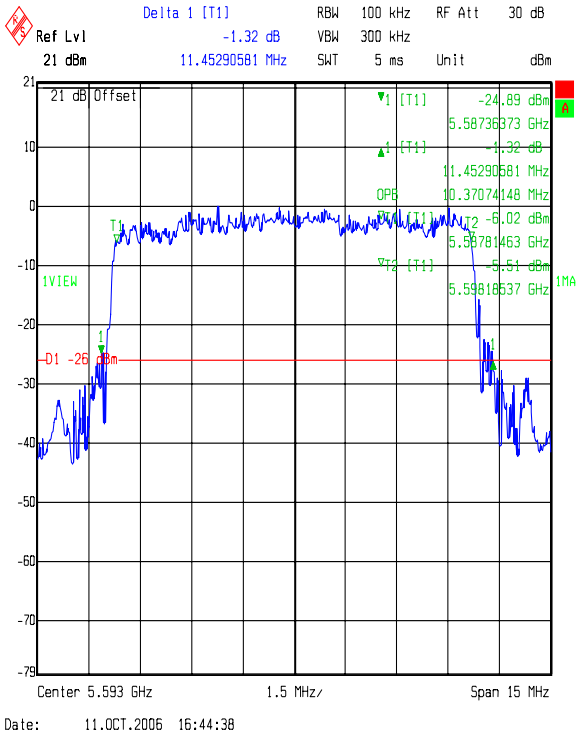
Transmitter 99% and 26 dB Bandwidths: Part 15.407(a) (Continued)

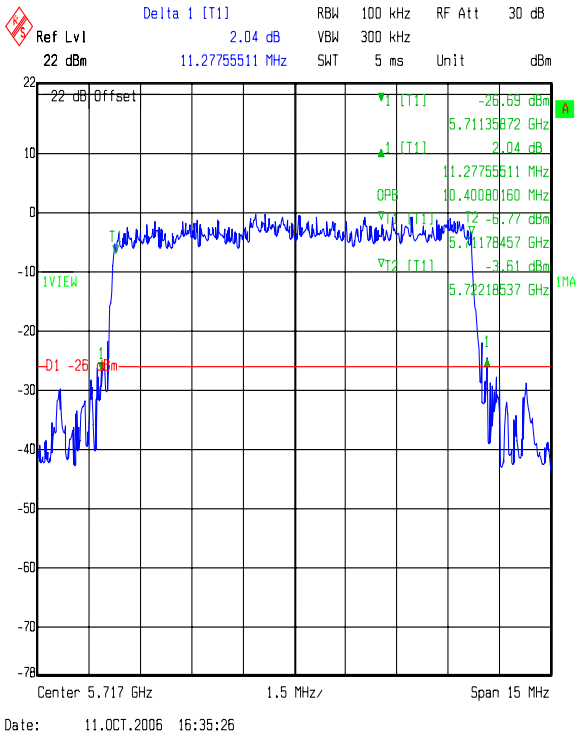
Results: QPSK Mode

Channel	Data Rate (Mbps)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
Bottom	3.75	10.371	11.333
Middle	3.75	10.371	11.453
Top	3.75	10.401	11.278

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





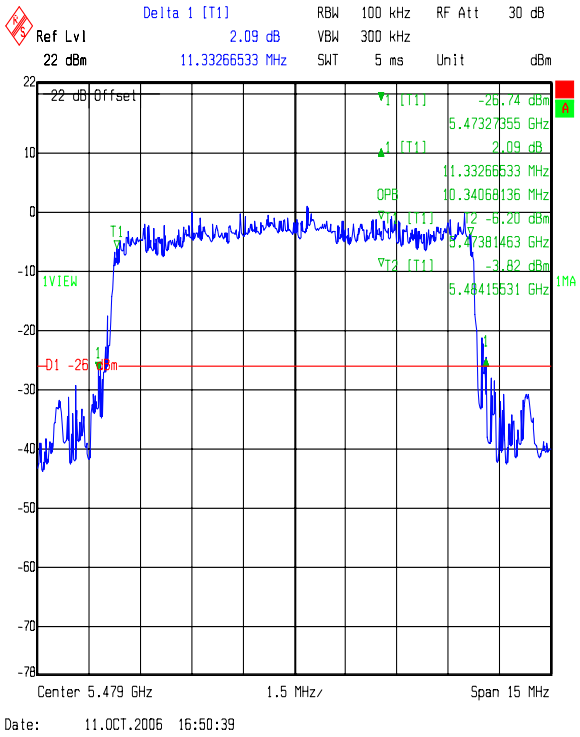


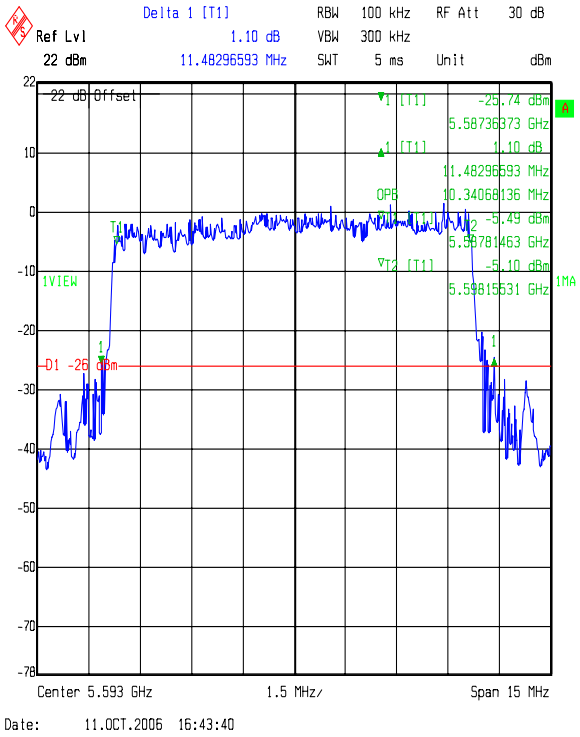
Transmitter 99% and 26 dB Bandwidths: Part 15.407(a) (Continued)

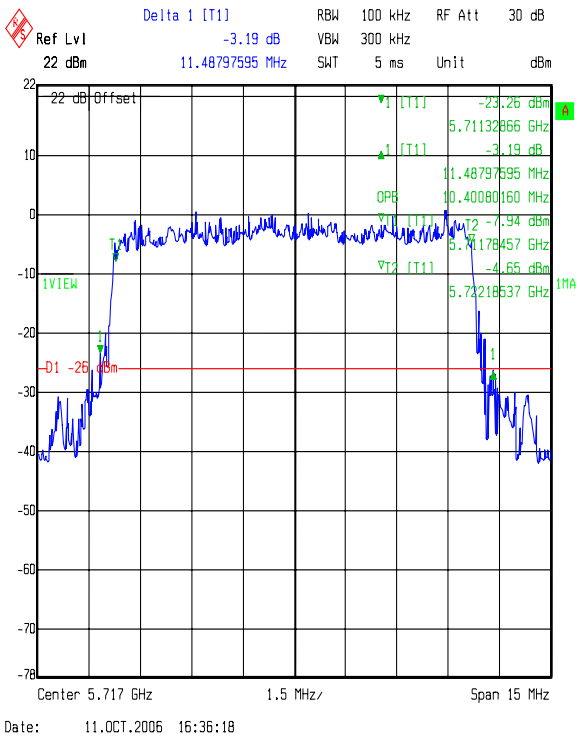
Results: 16QAM Mode

Channel	Data Rate (Mbps)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
Bottom	7.51	10.341	11.333
Middle	7.51	10.341	11.483
Top	7.51	10.401	11.484

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





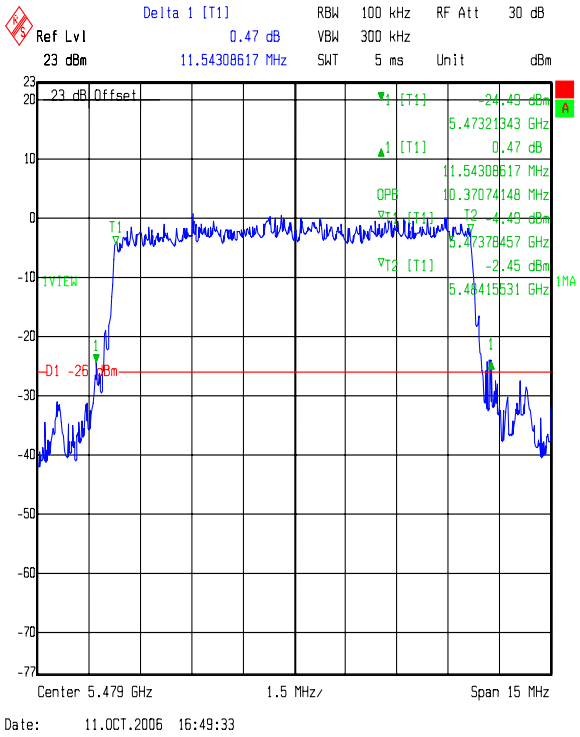


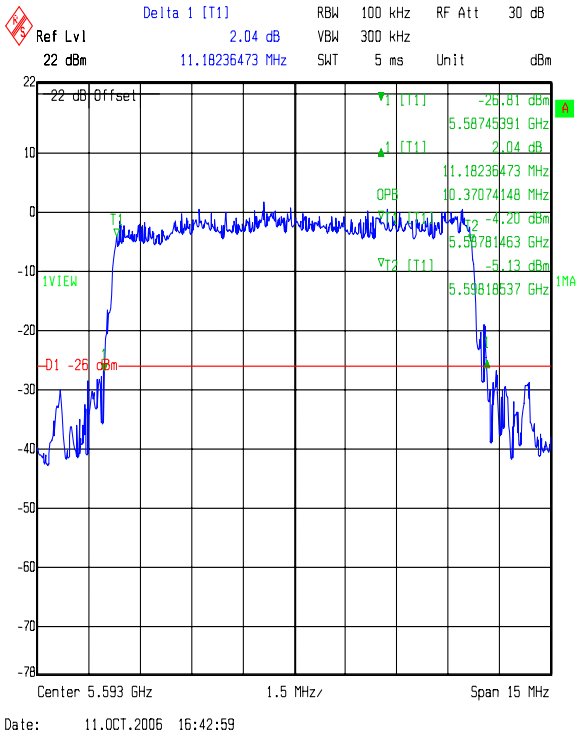
Transmitter 99% and 26 dB Bandwidths: Part 15.407(a) (Continued)

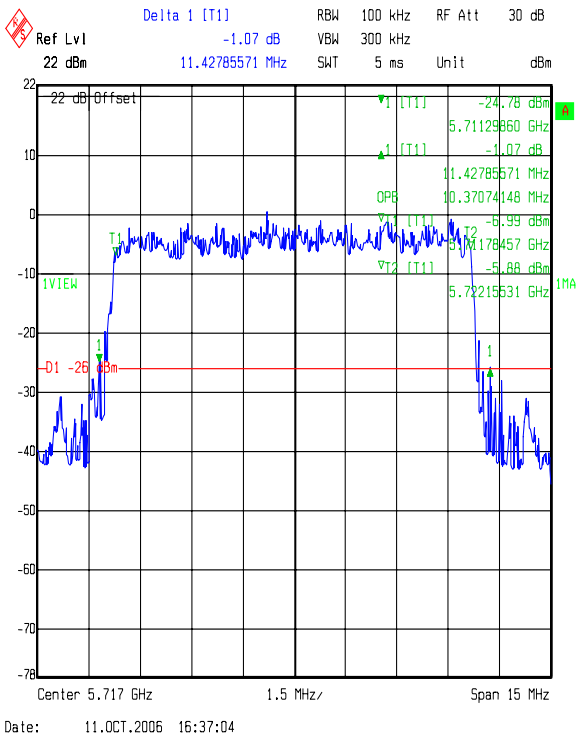
Results: 64QAM Mode

Channel	Data Rate (Mbps)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
Bottom	15.02	10.371	11.543
Middle	15.02	10.371	11.182
Top	15.02	10.371	11.427

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







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 megahertz.

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 total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signalling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

The maximum output power was measured using an average power meter. The recorded result was corrected for by the transmitter's measured duty cycle (the time the transmitter was not transmitting bursty data). The duty cycle correction factor was calculated as the log base 10 of the burst time over the period. The burst was measured as 1.41283 and the period 3.28657. The resultant correction factor was -3.7dB.

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

Results: Acquisition Mode

Min Measured B = 13MHz, Limit = 22.1 dBm, Antenna Gain = 23 dBi

The maximum output power recorded in acquisition mode is 3.0 dBm. The maximum EIRP is 3.0 + 23 dBi = 26.0 dBm. The maximum allowed radiated limit is 22.1dBm + 6dBi = 28.1 dBm. The Acquisition mode complies with a margin of 19.1dB conducted and 2.1 dB radiated.

Port H

Channel	Data Rate (Mbps)	Maximum Output Power (dBm)	Limit (dBm)	Margin (dB)
0	N/A	-0.3	22.1	22.4
10	N/A	0.1	22.1	22.0
19	N/A	-0.8	22.1	22.9

Port V

Channel	Data Rate (Mbps)	Maximum Output Power (dBm)	Limit (dBm)	Margin (dB)
0	N/A	-0.7	22.1	22.8
10	N/A	-0.2	22.1	22.3
19	N/A	-0.5	22.1	22.6

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

Composite

Channel	Data Rate (Mbps)	Maximum Output Power (dBm)	Limit (dBm)	Margin (dB)
0	N/A	2.5	22.1	19.6
10	N/A	3.0	22.1	19.1
19	N/A	2.4	22.1	19.7

Results: BPSK Mode

Min Measured B = 10.887 MHz, Limit = 21.4 dBm, Antenna Gain = 23 dBi

The maximum output power recorded in BPSK mode is 3.8 dBm. The maximum EIRP is 3.8 + 23 dBi = 26.8 dBm. The maximum allowed radiated limit is 21.4 dBm + 6dBi = 27.4 dBm. The BPSK mode complies with a margin of 17.6 dB conducted and 0.6 dB radiated.

Port H

Channel	Data Rate (Mbps)	Maximum Output Power (dBm)	Limit (dBm)	Margin (dB)
0	1.67	0.8	21.4	20.6
10	1.67	1.0	21.4	20.4
19	1.67	0.4	21.4	21.0

Port V

Channel	Data Rate (Mbps)	Maximum Output Power (dBm)	Limit (dBm)	Margin (dB)
0	1.67	0.2	21.4	21.2
10	1.67	0.6	21.4	20.8
19	1.67	0.5	21.4	20.9

Composite

Channel	Data Rate (Mbps)	Maximum Output Power (dBm)	Limit (dBm)	Margin (dB)
0	1.67	3.5	21.4	17.9
10	1.67	3.8	21.4	17.6
19	1.67	3.5	21.4	17.9

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

Results: QPSK Mode

Min Measured B = 11.278 MHz, Limit = 21.5 dBm, Antenna Gain = 23 dBi

The maximum output power recorded in QPSK mode is 3.8 dBm. The maximum EIRP is 3.8 + 23 dBi = 26.8 dBm. The maximum allowed radiated limit is 21.5 dBm + 6dBi = 27.5 dBm. The QPSK mode complies with a margin of 17.7 dB conducted and 0.7 dB radiated.

Port H

Channel	Data Rate (Mbps)	Maximum Output Power (dBm)	Limit (dBm)	Margin (dB)
0	3.75	0.7	21.5	20.8
10	3.75	0.9	21.5	20.6
19	3.75	0.4	21.5	21.1

Port V

Channel	Data Rate (Mbps)	Maximum Output Power (dBm)	Limit (dBm)	Margin (dB)
0	3.75	0.2	21.5	21.3
10	3.75	0.7	21.5	20.8
19	3.75	0.5	21.5	21.0

Composite

Channel	Data Rate (Mbps)	Maximum Output Power (dBm)	Limit (dBm)	Margin (dB)
0	3.75	3.5	21.5	18.0
10	3.75	3.8	21.5	17.7
19	3.75	3.5	21.5	18.0

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

Results: 16QAM Mode

Min measured B = 11.333 MHz, Limit = 21.5 dBm, Antenna Gain = 23 dBi

The maximum output power recorded in a 16QAM mode is 3.8 dBm. The maximum EIRP is 3.8 + 23 dBi = 26.8 dBm. The maximum allowed radiated limit is 21.5 dBm + 6dBi = 27.5 dBm. The 16QAM mode complies with a margin of 17.7 dB conducted and 0.7 dB radiated.

Port H

Channel	Data Rate (Mbps)	Maximum Output Power (dBm)	Limit (dBm)	Margin (dB)
0	7.51	0.8	21.5	20.7
10	7.51	0.9	21.5	20.6
19	7.51	0.4	21.5	21.1

Port V

Channel	Data Rate (Mbps)	Maximum Output Power (dBm)	Limit (dBm)	Margin (dB)
0	7.51	0.2	21.5	21.3
10	7.51	0.7	21.5	20.8
19	7.51	0.5	21.5	21.0

Composite

Channel	Data Rate (Mbps)	Maximum Output Power (dBm)	Limit (dBm)	Margin (dB)
0	7.51	3.5	21.5	18.0
10	7.51	3.8	21.5	17.7
19	7.51	3.5	21.5	18.0

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

Results: 64QAM Mode

Min Measured B = 11.182 MHz, Limit = 21.5 dBm, Antenna Gain = 23 dBi

The maximum output power recorded in 64QAM mode is 3.8 dBm. The maximum EIRP is 3.8 + 23 dBi = 26.8 dBm. The maximum allowed radiated limit is 21.5 dBm + 6dBi = 27.5 dBm. The 64QAM mode complies with a margin of 17.7 dB conducted and 0.7 dB radiated.

Port H

Channel	Data Rate (Mbps)	Maximum Output Power (dBm)	Limit (dBm)	Margin (dB)
0	15.02	0.8	21.5	20.7
10	15.02	0.9	21.5	20.6
19	15.02	0.4	21.5	21.1

Port V

Channel	Data Rate (Mbps)	Maximum Output Power (dBm)	Limit (dBm)	Margin (dB)
0	15.02	0.2	21.5	21.3
10	15.02	0.7	21.5	20.8
19	15.02	0.5	21.5	21.0

Composite

Channel	Data Rate (Mbps)	Maximum Output Power (dBm)	Limit (dBm)	Margin (dB)
0	15.02	3.5	21.5	18.0
10	15.02	3.8	21.5	17.7
19	15.02	3.5	21.5	18.0

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 megahertz 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 spectrum analyser used a gated function so that no intervals where the transmitter was off were introduced into the final result.

The measurement was performed in accordance with DA 02-2138 Peak Power Spectral Density (PPSD) method 2.

Results: Acquisition Mode

Antenna Gain = 23 dBi

The maximum power spectral density recorded in acquisition mode is -6.5 dBm/MHz. The maximum radiated power spectral density EIRP is -6.5 + 23 dBi = 16.5 dBm. The maximum allowed radiated limit is 11.0 dBm/MHz + 6dBi = 17.0 dBm. The Acquisition mode complies with a margin of 17.5 dB conducted and 0.5 dB radiated.

Port H

Channel	Data Rate (Mbps)	Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
Bottom	N/A	-10.7	11.0	21.7
Middle	N/A	-9.2	11.0	20.2
Top	N/A	-10.9	11.0	21.9

Port V

Channel	Data Rate (Mbps)	Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
Bottom	N/A	-11.0	11.0	22.0
Middle	N/A	-9.8	11.0	20.8
Top	N/A	-10.7	11.0	21.7

Composite

Channel	Data Rate (Mbps)	Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
Bottom	N/A	-7.9	11.0	18.9
Middle	N/A	-6.5	11.0	17.5
Top	N/A	-7.8	11.0	18.8

Note(s):

1. The power spectral density for the acquisition mode was measured using the spectrum analysers channel power function.

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

Results: BPSK Mode

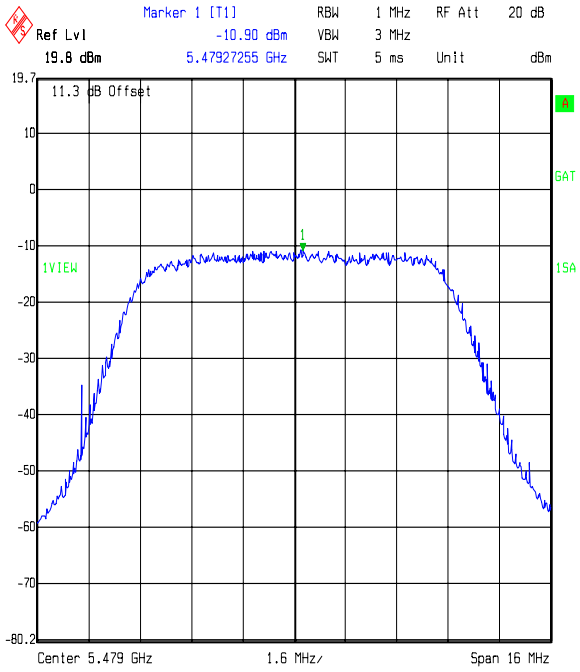
Antenna Gain = 23 dBi

The maximum power spectral density recorded in BPSK mode is -6.7 dBm/MHz. The maximum radiated power spectral density EIRP is -6.7 + 23 dBi = 16.3 dBm/MHz. The maximum allowed radiated limit is 11.0 dBm/MHz + 6dBi = 17.0 dBm. The BPSK mode complies with a margin of 17.7 dB conducted and 0.7 dB radiated.

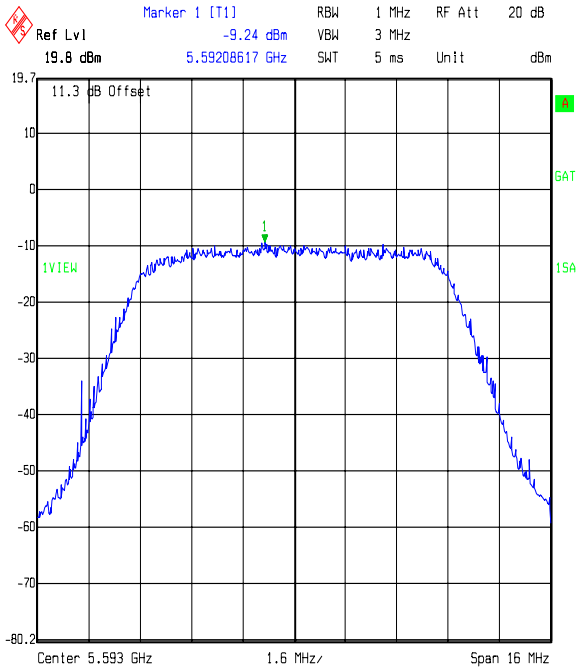
Port H

Channel	Data Rate (Mbps)	Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
Bottom	1.67	-10.9	11.0	21.9
Middle	1.67	-9.2	11.0	20.2
Top	1.67	-10.7	11.0	21.7

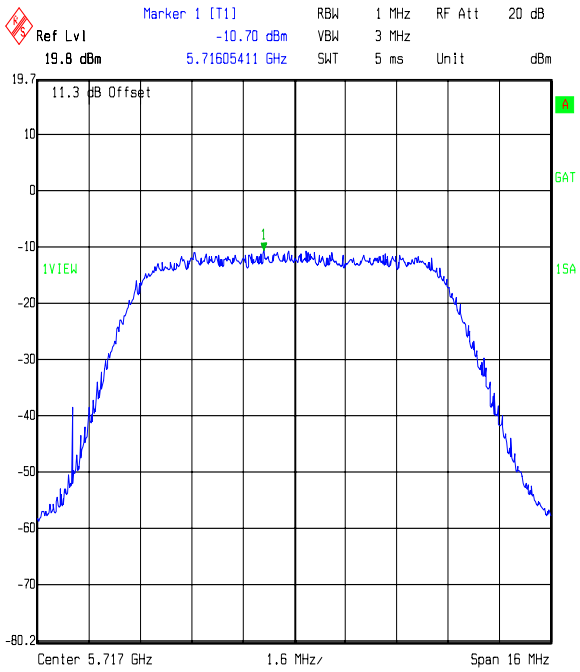
Peak Power Spectral Density: Part 15.407(a)(2) (Continued)



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Bottom Channel -BPSK
Date: 18.OCT.2006 14:36:34



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Middle Channel -BPSK
Date: 18.OCT.2006 14:40:58



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Top Channel -BPSK
Date: 18.OCT.2006 16:15:22

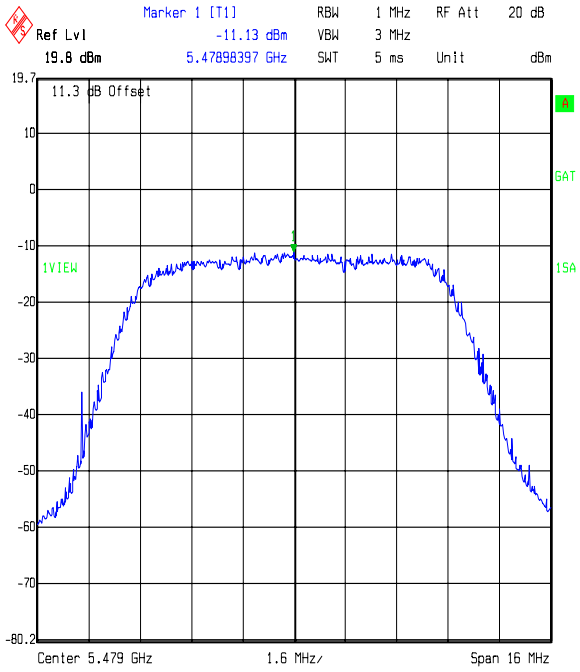
Peak Power Spectral Density: Part 15.407(a)(2) (Continued)

Results: BPSK Mode

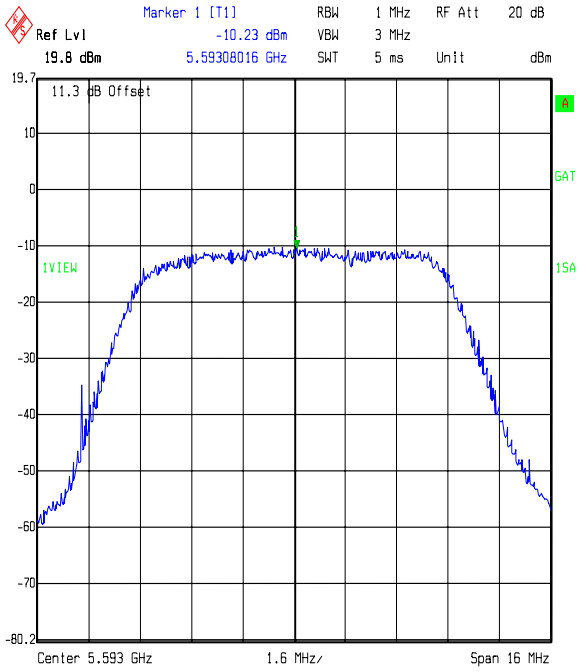
Port V

Channel	Data Rate (Mbps)	Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
Bottom	1.67	-11.1	11.0	22.1
Middle	1.67	-10.2	11.0	21.2
Top	1.67	-10.5	11.0	21.5

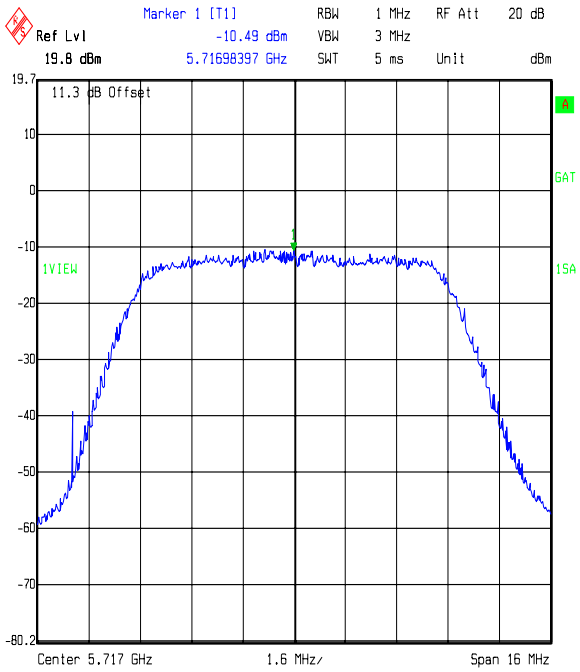
Peak Power Spectral Density: Part 15.407(a)(2) (Continued)



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Bottom Channel - BPSK
Date: 18.OCT.2006 14:29:46



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Mid Channel -BPSK
Date: 18.OCT.2006 15:12:10



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Top Channel - BPSK
Date: 18.OCT.2006 16:03:55

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

Results: BPSK Mode

Composite

Channel	Data Rate (Mbps)	Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
Bottom	1.67	-8.0	11.0	19.0
Middle	1.67	-6.7	11.0	17.7
Top	1.67	-7.6	11.0	18.6

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

Results: QPSK Mode

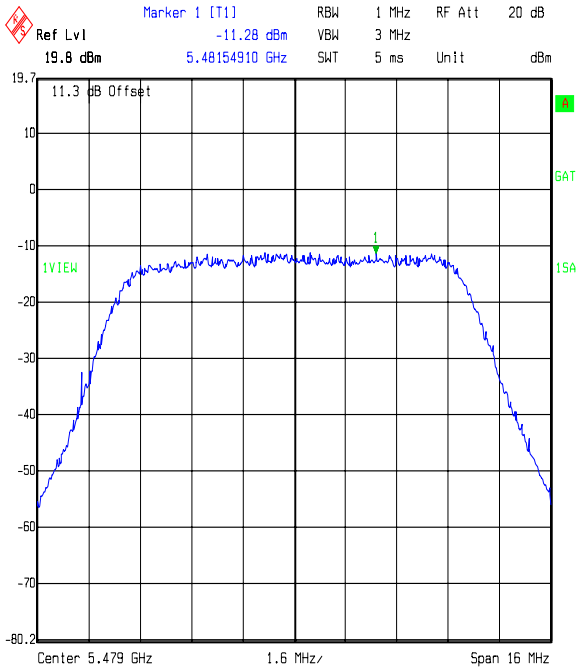
Antenna Gain = 23 dBi

The maximum power spectral density recorded in QPSK mode is -7.2 dBm/MHz. The maximum radiated power spectral density EIRP is -7.2 + 23 dBi = 15.8 dBm/MHz. The maximum allowed radiated limit is 11.0 dBm/MHz + 6dBi = 17.0 dBm. The QPSK mode complies with a margin of 18.2 dB conducted and 1.2 dB radiated.

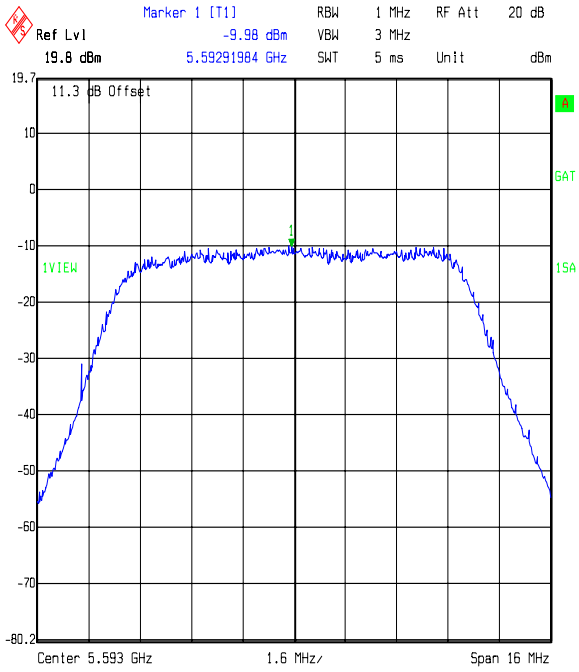
Port H

Channel	Data Rate (Mbps)	Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
Bottom	3.75	-11.3	11.0	22.3
Middle	3.75	-10.0	11.0	21.0
Top	3.75	-11.3	11.0	22.3

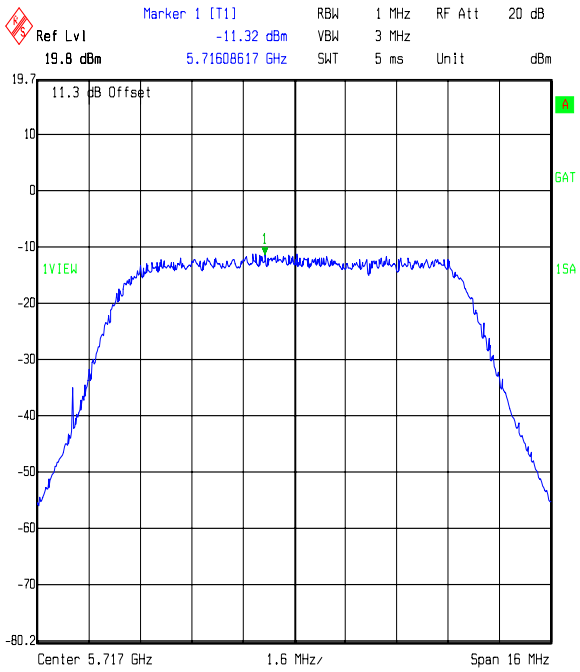
Peak Power Spectral Density: Part 15.407(a)(2) (Continued)



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Bottom Channel -QPSK
Date: 18.OCT.2006 14:35:31



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Middle Channel -QPSK
Date: 18.OCT.2006 14:41:50



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Top Channel -QPSK
Date: 18.OCT.2006 16:12:36

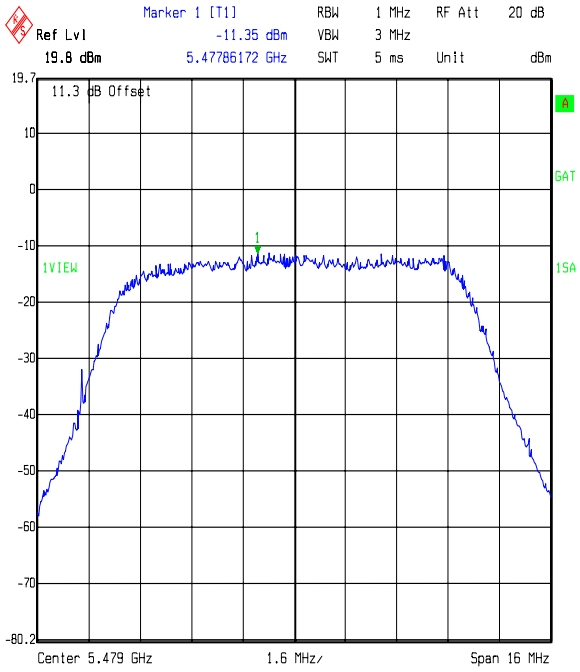
Peak Power Spectral Density: Part 15.407(a)(2) (Continued)

Results: QPSK Mode

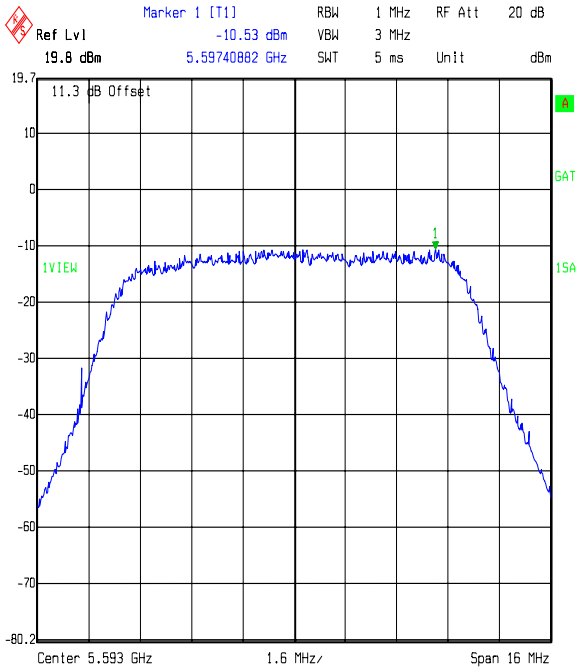
Port V

Channel	Data Rate (Mbps)	Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
Bottom	3.75	-11.4	11.0	22.4
Middle	3.75	-10.5	11.0	21.5
Top	3.75	-10.6	11.0	21.6

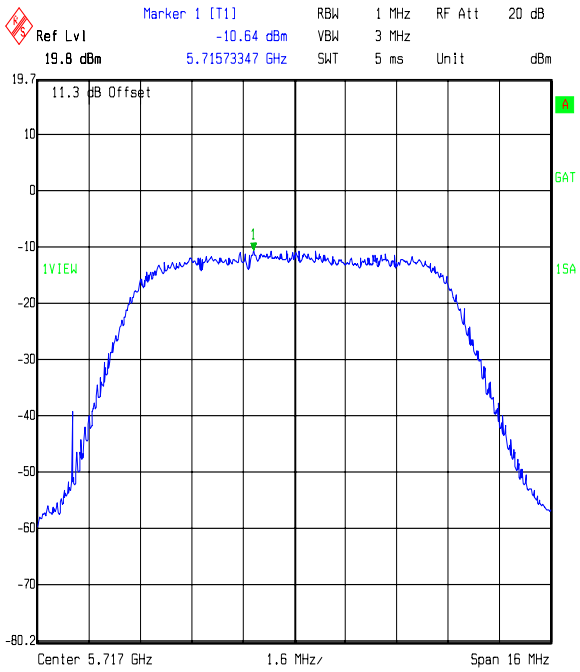
Peak Power Spectral Density: Part 15.407(a)(2) (Continued)



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Bottom Channel - QPSK
Date: 18.OCT.2006 14:30:59



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Middle Channel -QPSK
Date: 18.OCT.2006 14:46:06



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Top Channel - QPSK
Date: 18.OCT.2006 16:06:48

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

Results: QPSK Mode

Composite

Channel	Data Rate (Mbps)	Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
Bottom	3.75	-8.3	11.0	19.3
Middle	3.75	-7.2	11.0	18.2
Top	3.75	-8.0	11.0	19.0

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

Results: 16QAM Mode

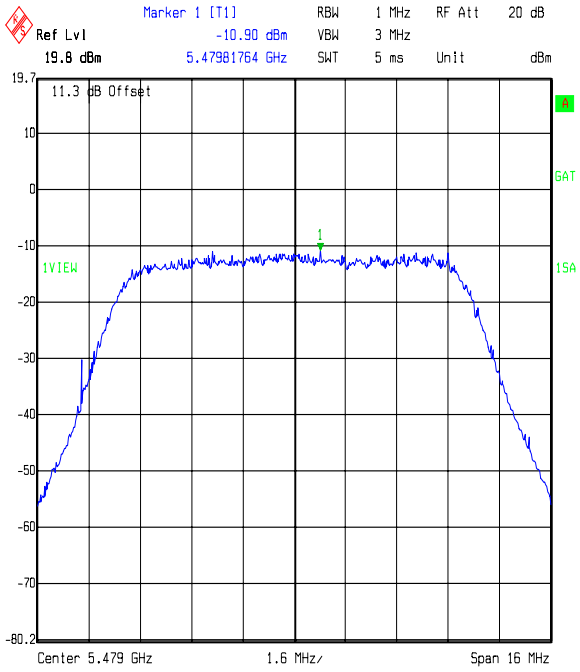
Antenna Gain = 23 dBi

The maximum power spectral density recorded in 16QAM mode is -7.1 dBm/MHz. The maximum radiated power spectral density EIRP is -7.1 + 23 dBi = 15.7 dBm/MHz. The maximum allowed radiated limit is 11.0 dBm/MHz + 6dBi = 17.0 dBm. The 16QAM mode complies with a margin of 18.1 dB conducted and 1.3 dB radiated.

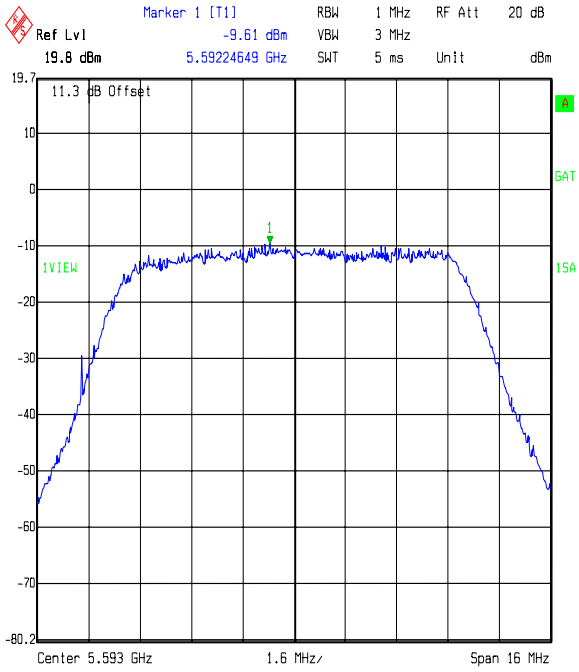
Port H

Channel	Data Rate (Mbps)	Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
Bottom	7.51	-10.9	11.0	21.9
Middle	7.51	-9.6	11.0	20.6
Top	7.51	-11.3	11.0	22.3

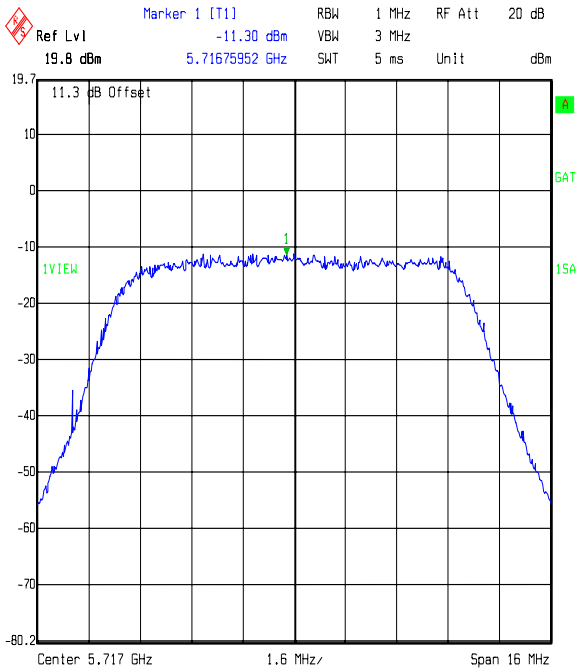
Peak Power Spectral Density: Part 15.407(a)(2) (Continued)



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Bottom Channel - 16QAM
Date: 18.OCT.2006 14:34:24



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Middle Channel -16QAM
Date: 18.OCT.2006 14:42:46



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Top Channel - 16QAM
Date: 18.OCT.2006 16:11:52

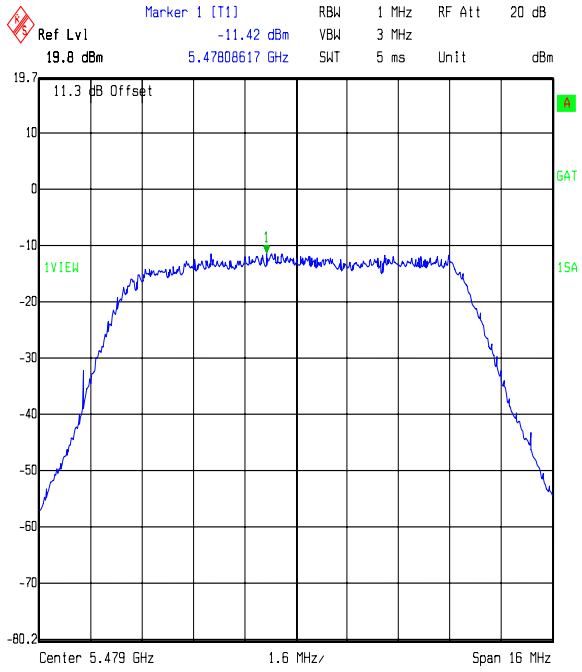
Peak Power Spectral Density: Part 15.407(a)(2) (Continued)

Results: 16QAM Mode

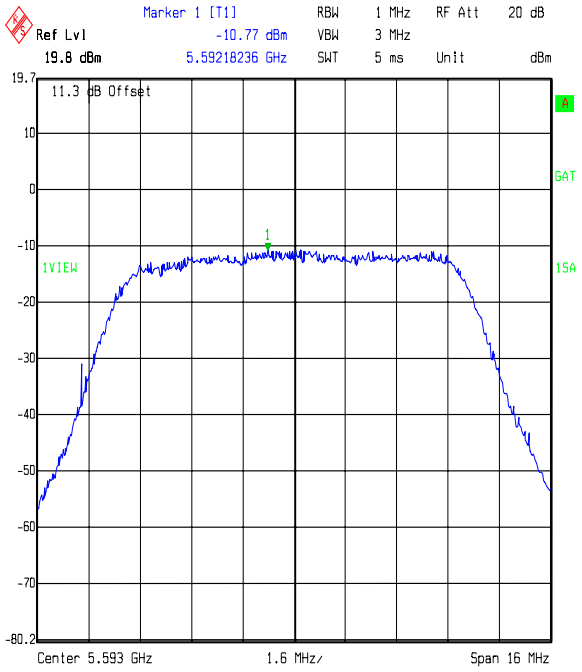
Port V

Channel	Data Rate (Mbps)	Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
Bottom	7.51	-11.4	11.0	22.4
Middle	7.51	-10.8	11.0	21.8
Top	7.51	-11.3	11.0	22.3

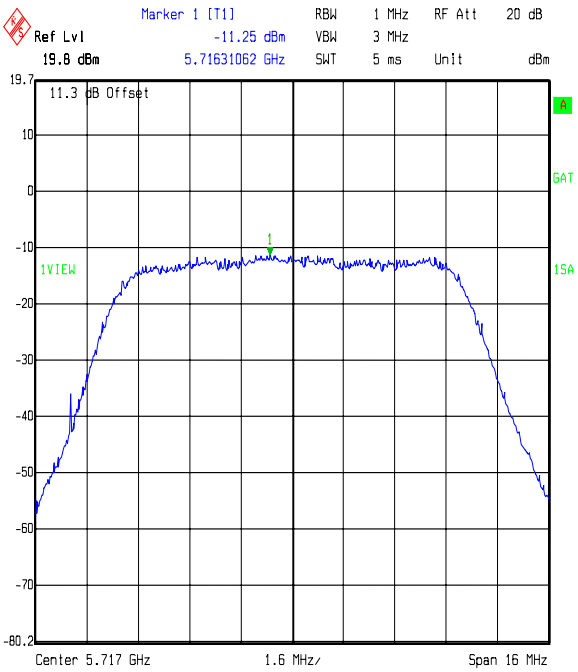
Peak Power Spectral Density: Part 15.407(a)(2) (Continued)



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Bottom Channel - 16QAM
Date: 18.OCT.2006 14:31:40



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Middle Channel -16QAM
Date: 18.OCT.2006 14:45:08



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Top Channel - 16QAM
Date: 18.OCT.2006 16:07:58

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

Results: 16QAM Mode

Composite

Channel	Data Rate (Mbps)	Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
Bottom	7.51	-8.1	11.0	19.1
Middle	7.51	-7.1	11.0	18.1
Top	7.51	-8.3	11.0	19.3

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

Results: 64QAM Mode

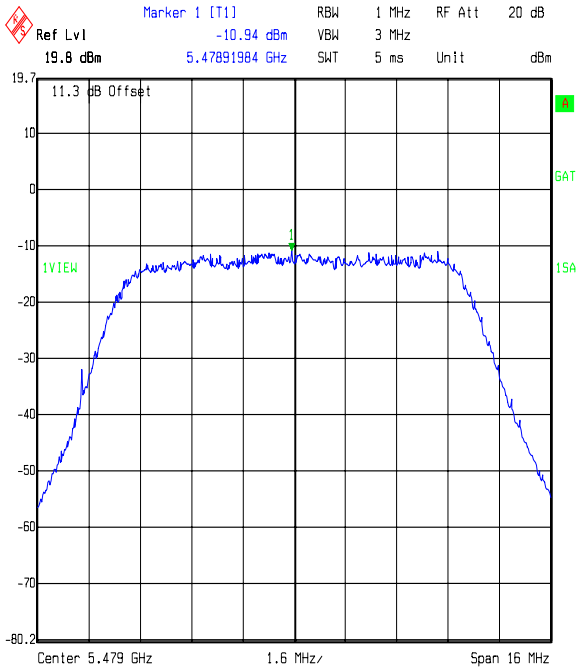
Antenna Gain = 23 dBi

The maximum power spectral density recorded in 64QAM mode is -6.9 dBm/MHz. The maximum radiated power spectral density EIRP is -6.9 + 23 dBi = 16.1 dBm/MHz. The maximum allowed radiated limit is 11.0 dBm/MHz + 6dBi = 17.0 dBm. The 64QAM mode complies with a margin of 17.8 dB conducted and 0.9 dB radiated.

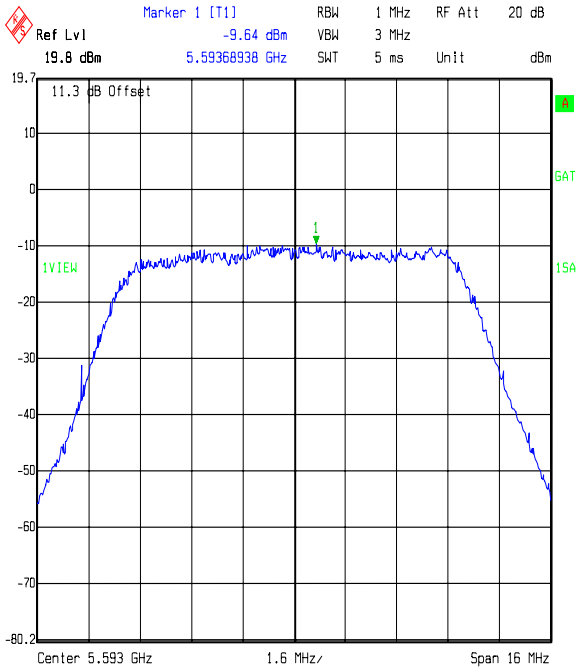
Port H

Channel	Data Rate (Mbps)	Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
Bottom	15.02	-10.9	11.0	21.9
Middle	15.02	-9.6	11.0	20.6
Top	15.02	-11.3	11.0	22.3

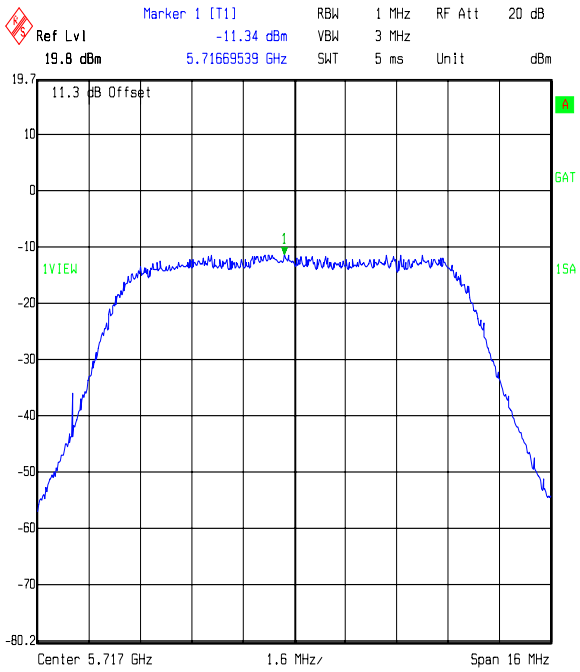
Peak Power Spectral Density: Part 15.407(a)(2) (Continued)



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Bottom Channel - 64QAM
Date: 18.OCT.2006 14:33:33



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Middle Channel -64QAM
Date: 18.OCT.2006 14:43:29



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Top Channel - 64QAM
Date: 18.OCT.2006 16:10:07

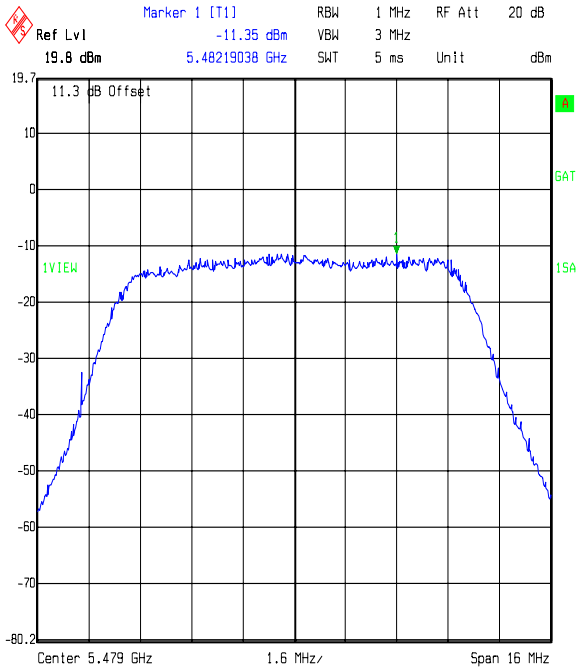
Peak Power Spectral Density: Part 15.407(a)(2) (Continued)

Results: 64QAM Mode

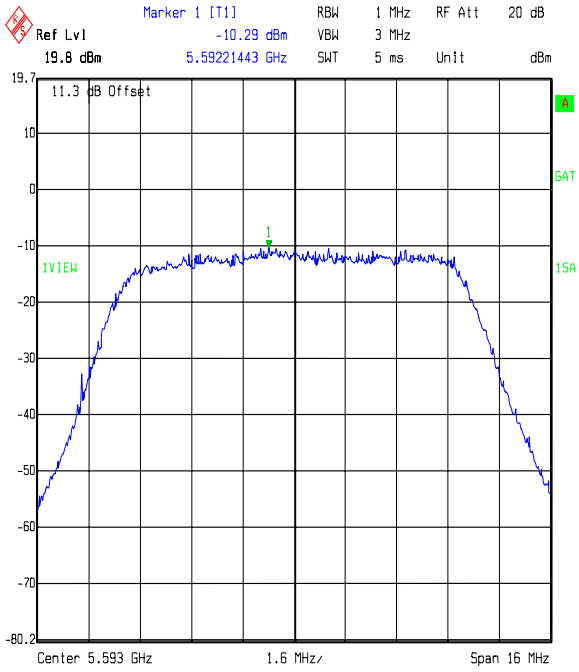
Port V

Channel	Data Rate (Mbps)	Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
Bottom	15.02	-11.4	11.0	22.4
Middle	15.02	-10.3	11.0	21.3
Top	15.02	-11.1	11.0	22.1

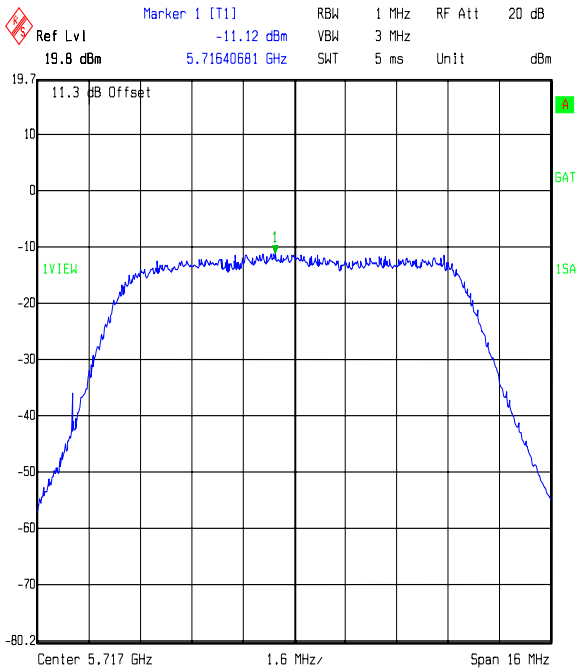
Peak Power Spectral Density: Part 15.407(a)(2) (Continued)



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Bottom Channel - 64QAM
Date: 18.OCT.2006 14:32:50



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Middle Channel -64QAM
Date: 18.OCT.2006 14:44:28



Title: Power Spectral Density for Motorola JN: 48672
Comment A: Top Channel - 64QAM
Date: 18.OCT.2006 16:08:42

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

Results: 64QAM Mode

Composite

Channel	Data Rate (Mbps)	Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
Bottom	15.02	-8.1	11.0	19.1
Middle	15.02	-6.9	11.0	17.8
Top	15.02	-8.2	11.0	19.2

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.

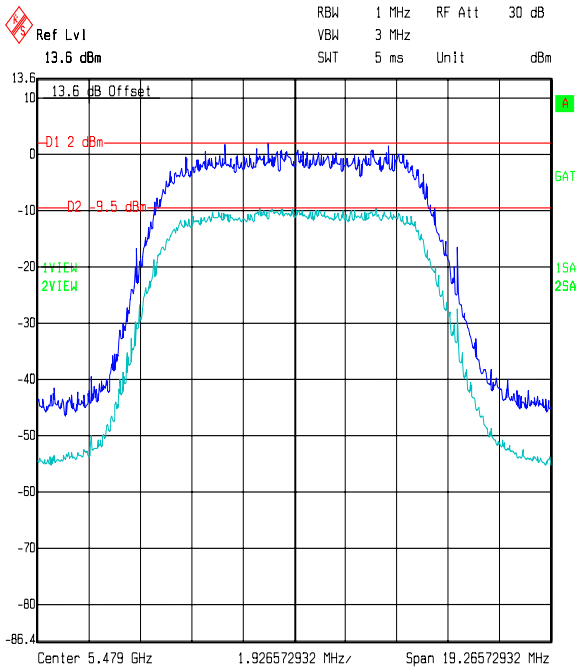
Peak Excursion was performed on the 'H' antenna port only. The rationale for this was that both ports exhibited very similar behaviour as they are electrically identical. A plot of 64QAM has been included with the 64QAM 'H' plots for comparison and support of the rationale.

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

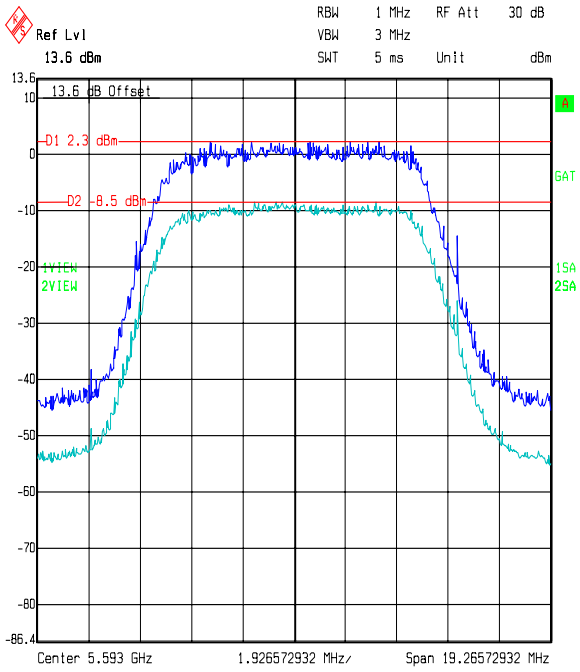
Results: Acquisition Mode

Channel	Data Rate (Mbps)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Bottom	N/A	11.5	13.0	1.5
Middle	N/A	10.8	13.0	2.2
Top	N/A	10.8	13.0	2.2

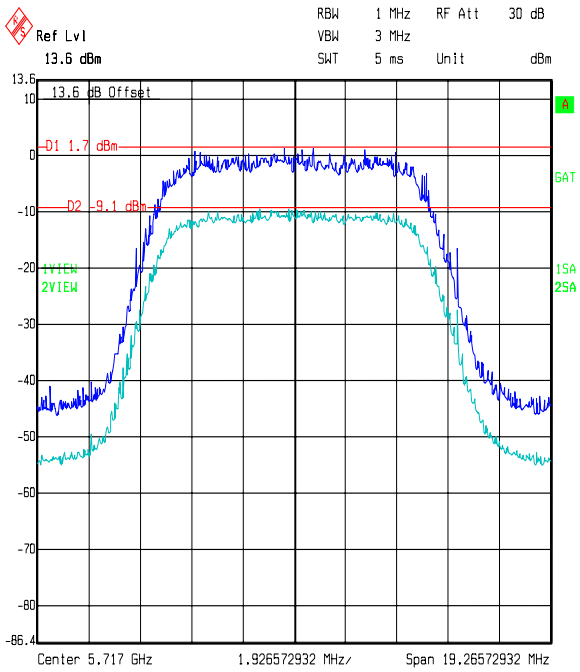
Peak Excursion: Part 15.407(a)(6) (Continued)



Title: Peak Excursion for Motorola JN: 48672JD02
Comment A: ACQ Bot Channel PORT H
Date: 12.OCT.2006 14:36:42



Title: Peak Excursion for Motorola JN: 48672JD02
Comment A: ACQ Mid Channel PORT H
Date: 12.OCT.2006 14:40:37



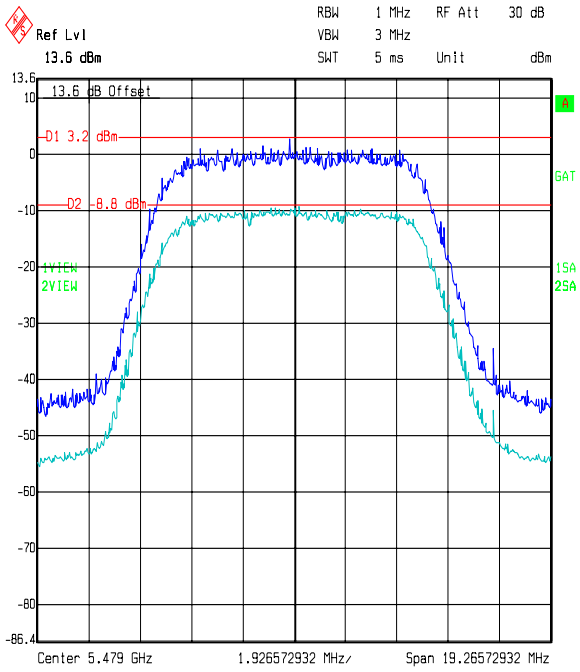
Title: Peak Excursion for Motorola JN: 48672JD02
Comment A: ACQ Top Channel PORT H
Date: 12.OCT.2006 14:44:57

Peak Excursion: Part 15.407(a)(6) (Continued)

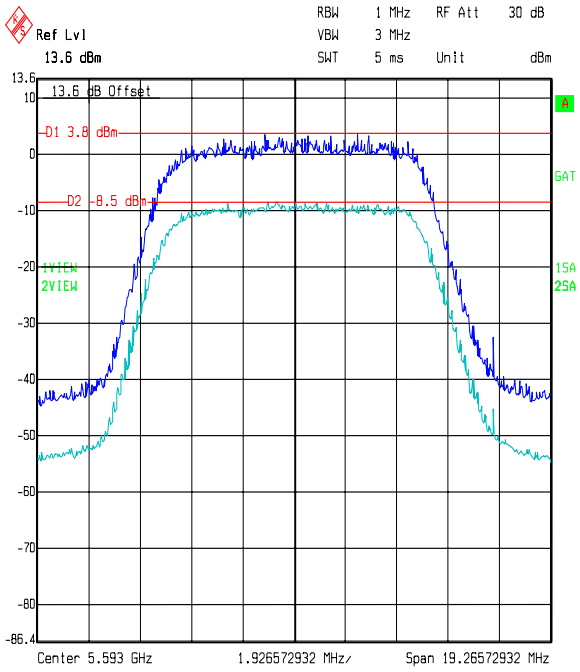
Results: BPSK Mode

Channel	Data Rate (Mbps)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Bottom	1.67	12.0	13.0	1.0
Middle	1.67	12.3	13.0	0.7
Top	1.67	11.3	13.0	1.7

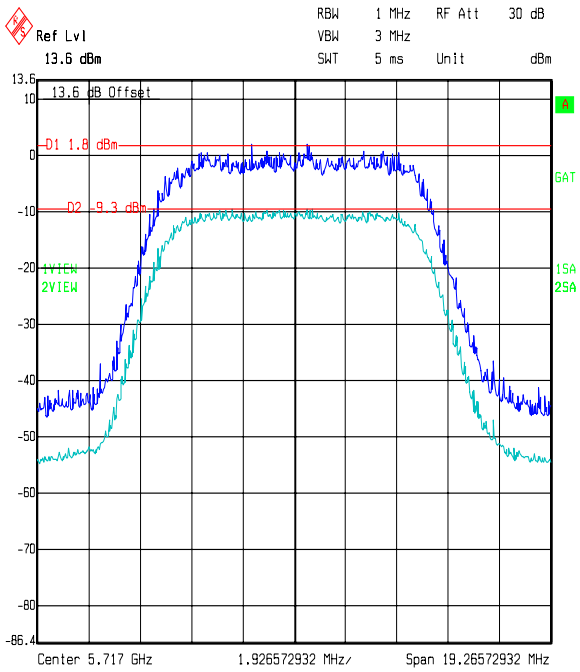
Peak Excursion: Part 15.407(a)(6) (Continued)



Title: Peak Excursion for Motorola JN: 48672JD02
Comment A: BPSK Bot Channel PORT H
Date: 12.OCT.2006 13:45:34



Title: Peak Excursion for Motorola JN: 48672JD02
Comment A: BPSK Mid Channel PORT H
Date: 12.OCT.2006 13:39:20



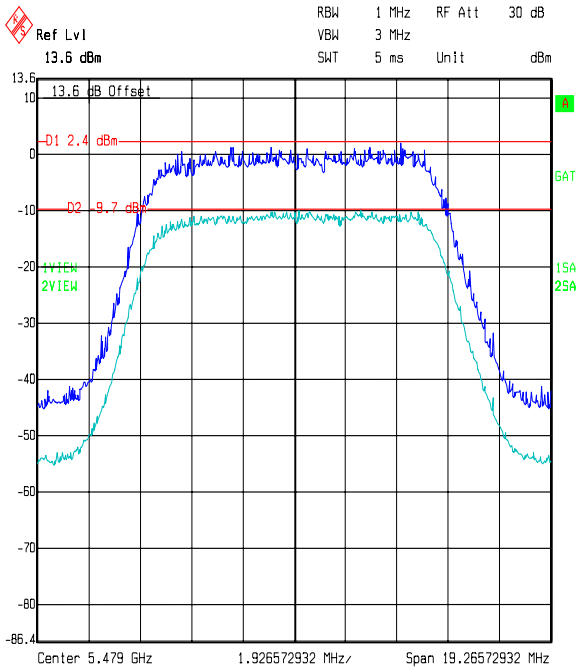
Title: Peak Excursion for Motorola JN: 48672JD02
Comment A: BPSK Top Channel PORT H
Date: 12.OCT.2006 13:15:54

Peak Excursion: Part 15.407(a)(6) (Continued)

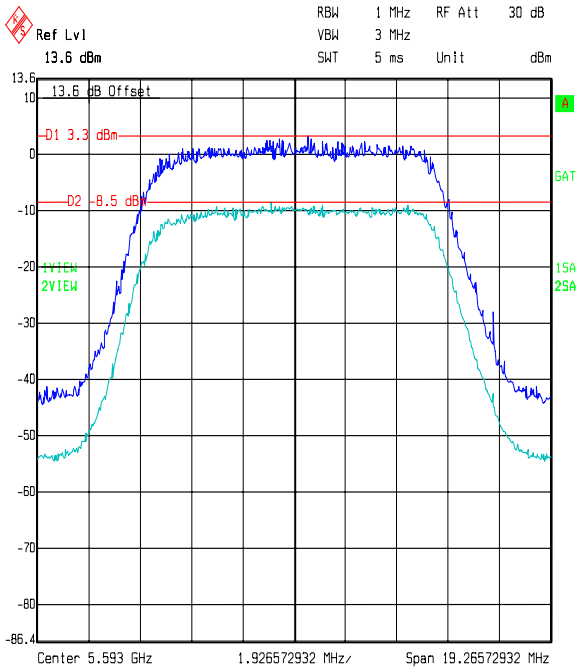
Results: QPSK Mode

Channel	Data Rate (Mbps)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Bottom	3.75	12.1	13.0	0.9
Middle	3.75	11.8	13.0	1.2
Top	3.75	11.6	13.0	1.4

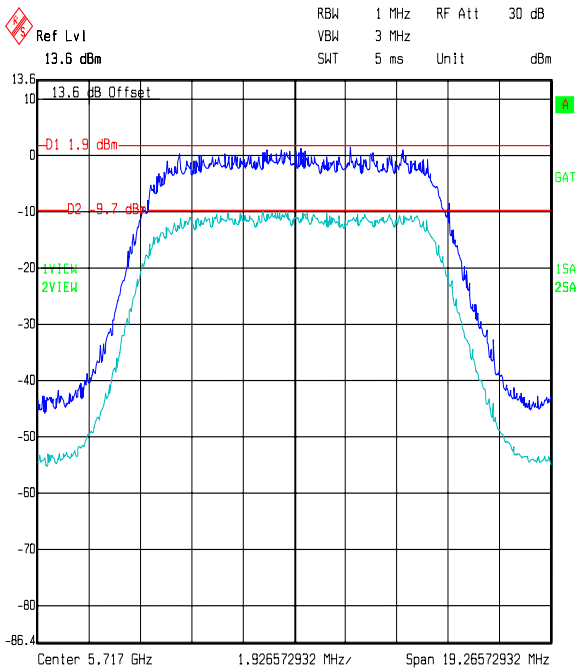
Peak Excursion: Part 15.407(a)(6) (Continued)



Title: Peak Excursion for Motorola JN: 48672JD02
Comment A: QPSK Bot Channel PORT H
Date: 12.OCT.2006 13:47:08



Title: Peak Excursion for Motorola JN: 48672JD02
Comment A: QPSK Mid Channel PORT H
Date: 12.OCT.2006 13:37:40



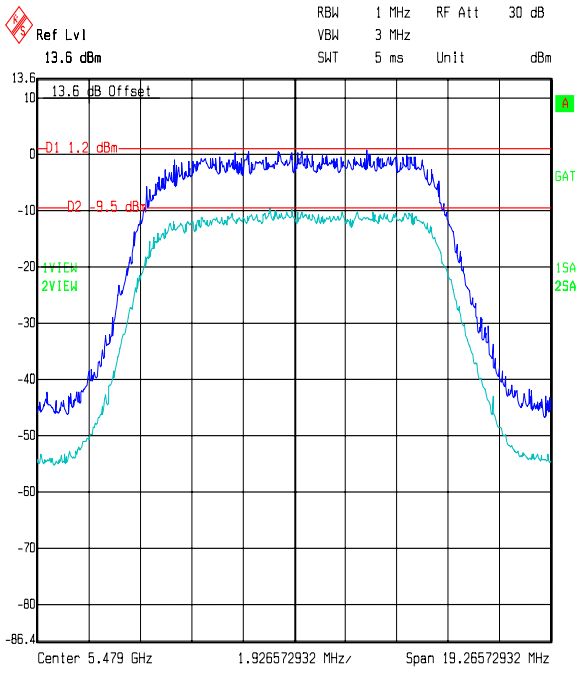
Title: Peak Excursion for Motorola JN: 48672JD02
Comment A: QPSK Top Channel PORT H
Date: 12.OCT.2006 13:24:41

Peak Excursion: Part 15.407(a)(6) (Continued)

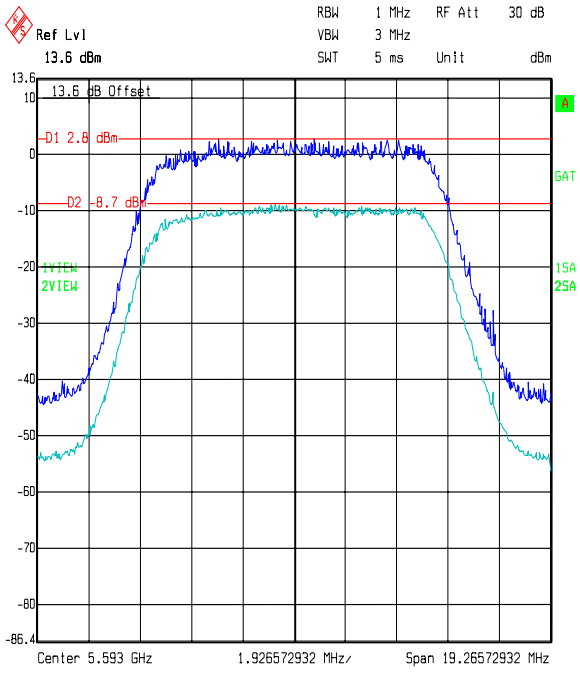
Results: 16QAM Mode

Channel	Data Rate (Mbps)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Bottom	7.51	10.7	13.0	2.3
Middle	7.51	11.5	13.0	1.5
Top	7.51	11.9	13.0	1.1

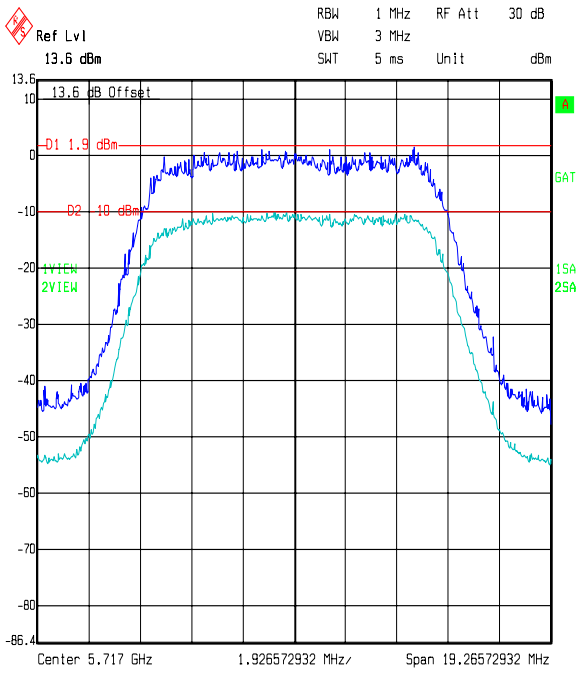
Peak Excursion: Part 15.407(a)(6) (Continued)



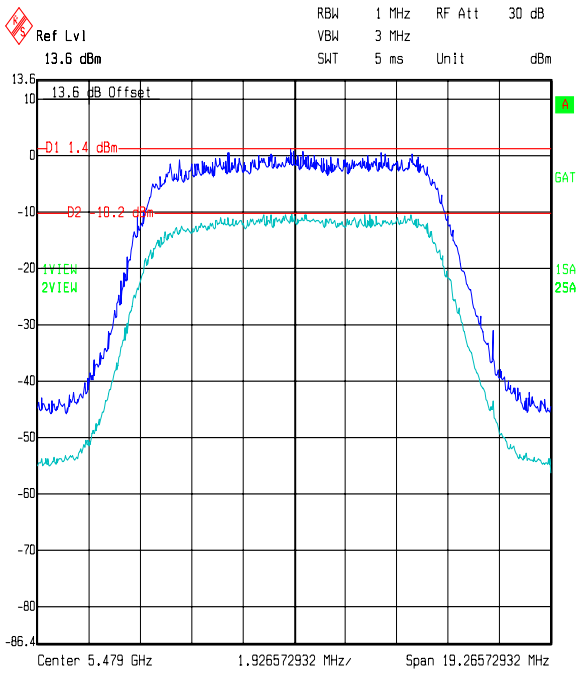
Title: Peak Excursion for Motorola JN: 48672JD02
Comment A: 16QAM Bot Channel PORT H
Date: 12.OCT.2006 13:50:28



Title: Peak Excursion for Motorola JN: 48672JD02
Comment A: 16QAM Mid Channel PORT H
Date: 12.OCT.2006 13:35:36



Title: Peak Excursion for Motorola JN: 48672JD02
Comment A: 16QAM Top Channel PORT H
Date: 12.OCT.2006 13:26:56



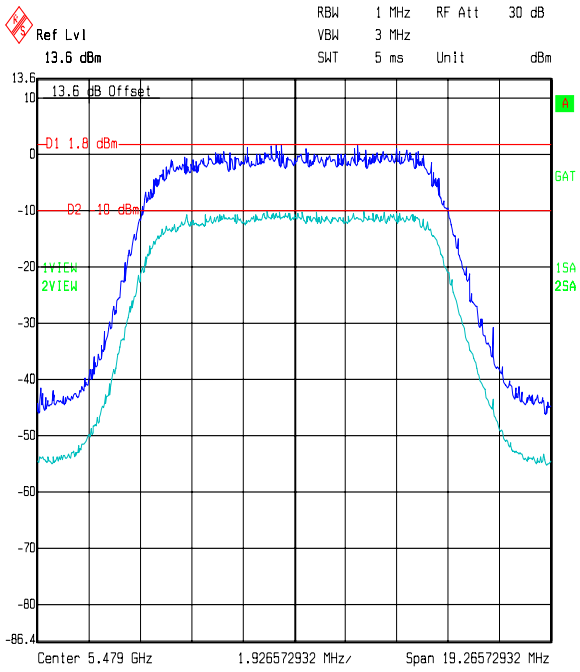
Title: Peak Excursion for Motorola JN: 48672JD02
Comment A: 64QAM Bot Channel PORT V
Date: 12.OCT.2006 13:57:38

Peak Excursion: Part 15.407(a)(6) (Continued)

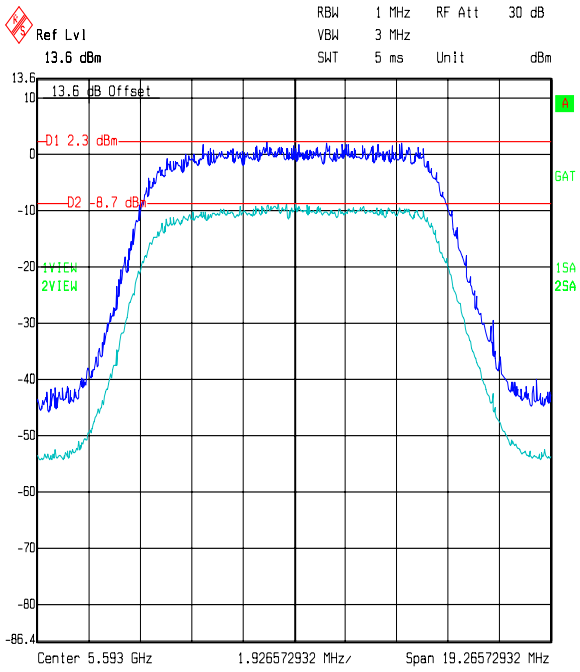
Results: 64QAM Mode

Channel	Data Rate (Mbps)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Bottom	15.02	11.8	13.0	1.2
Middle	15.02	11.0	13.0	2.0
Top	15.02	12.2	13.0	0.8

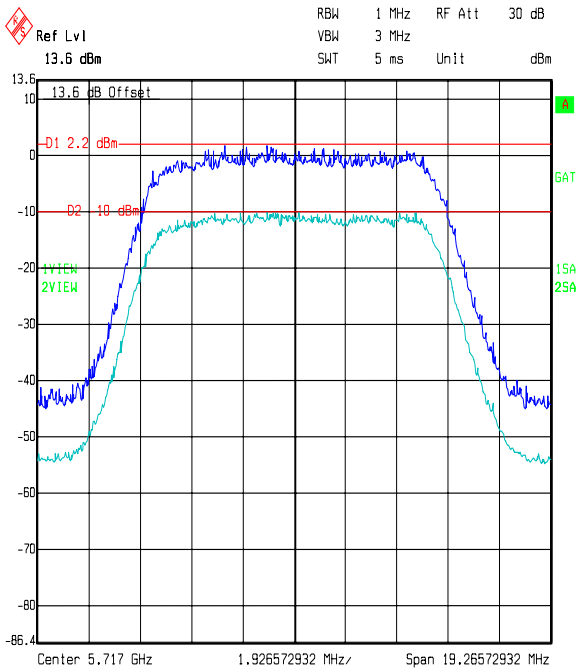
Peak Excursion: Part 15.407(a)(6) (Continued)



Title: Peak Excursion for Motorola JN: 48672JD02
Comment A: 64QAM Bot Channel PORT H
Date: 12.OCT.2006 13:53:18



Title: Peak Excursion for Motorola JN: 48672JD02
Comment A: 64QAM Mid Channel PORT H
Date: 12.OCT.2006 13:33:46



Title: Peak Excursion for Motorola JN: 48672JD02
Comment A: 64QAM Top Channel PORT H
Date: 12.OCT.2006 13:28:48

7.2.5. Conducted Transmitter Spurious Emissions: Part 15.407

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 -27dBm - 23dBi + 6dBi = -44dBm/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 thus all measurements were made in this mode.

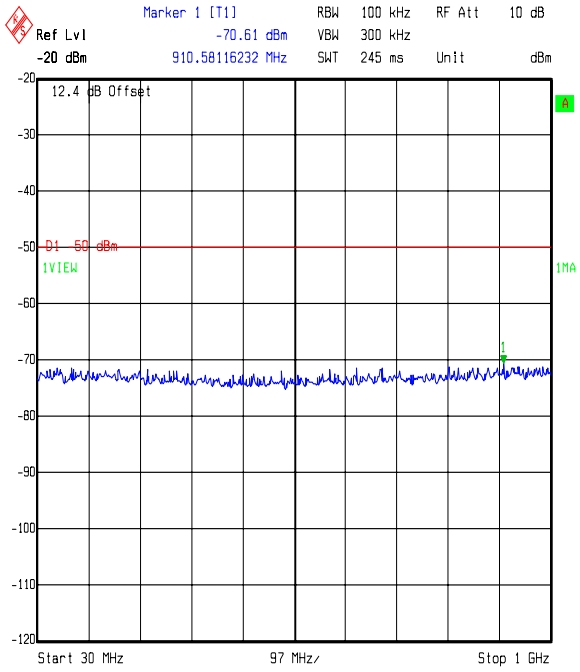
Testing was performed up to 40GHz.

Results: BPSK Mode

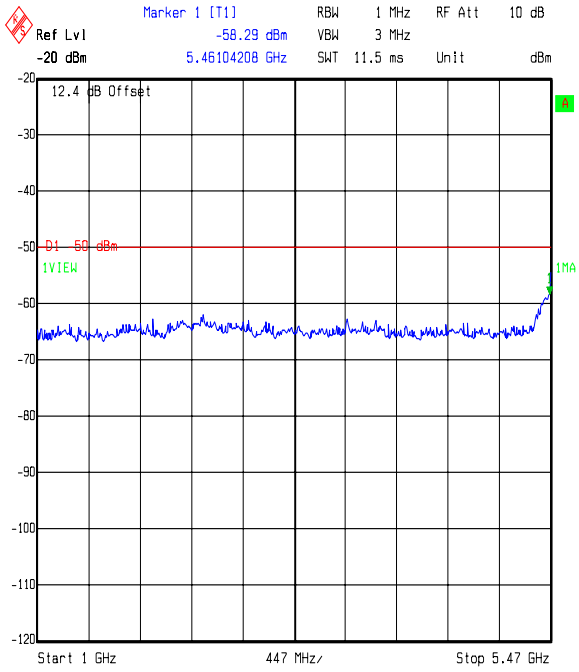
Bottom Channel

Frequency (MHz)	Data Rate (Mbps)	Peak Emission Level (dBm)	Limit (dBm/MHz)	Margin (dB)
5461.042	1.67	-58.3	-44.0	14.3
6943.788	1.67	-58.0	-44.0	14.0
36755.000	1.67	-61.3	-44.0	17.3

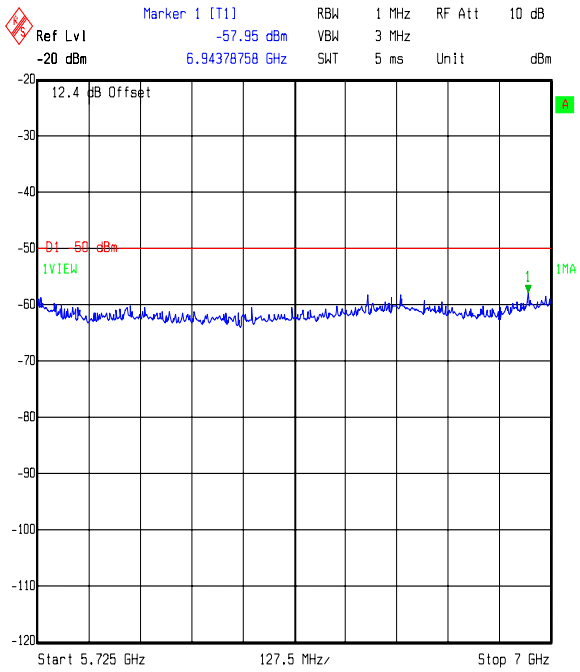
Conducted Transmitter Spurious Emissions: Part 15.407 (Continued)



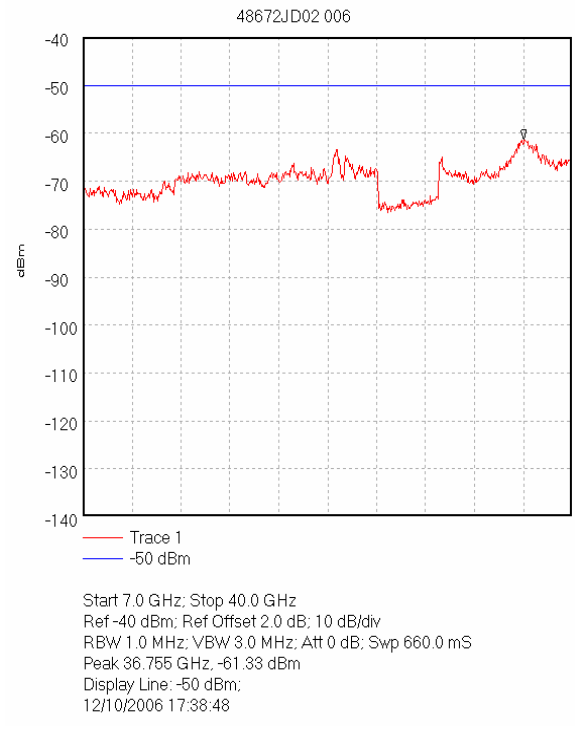
Title: Conducted Emissions for Motorola JN: 48672JD02
Comment A: BPSK Bot Channel PORT H
Date: 12.OCT.2006 16:15:06



Title: Conducted Emissions for Motorola JN: 48672JD02
Comment A: BPSK Bot Channel PORT H
Date: 12.OCT.2006 16:11:58



Title: Conducted Emissions for Motorola JN: 48672JD02
Comment A: BPSK Bot Channel PORT H
Date: 12.OCT.2006 16:10:21



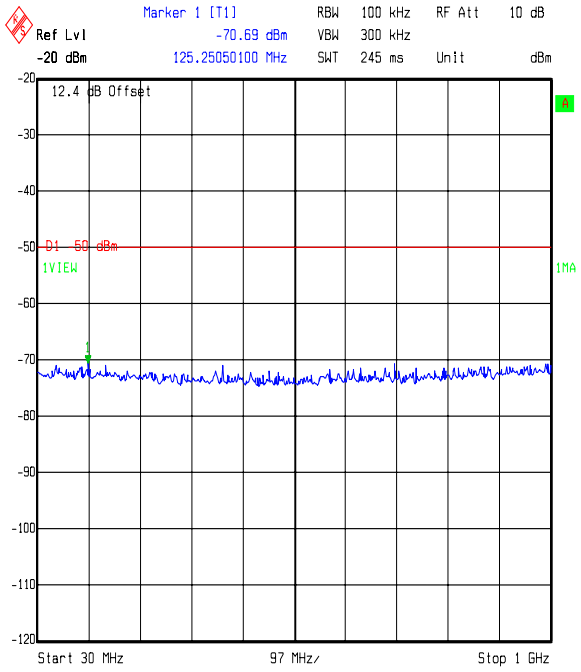
Conducted Transmitter Spurious Emissions: Part 15.407 (Continued)

Results: BPSK Mode

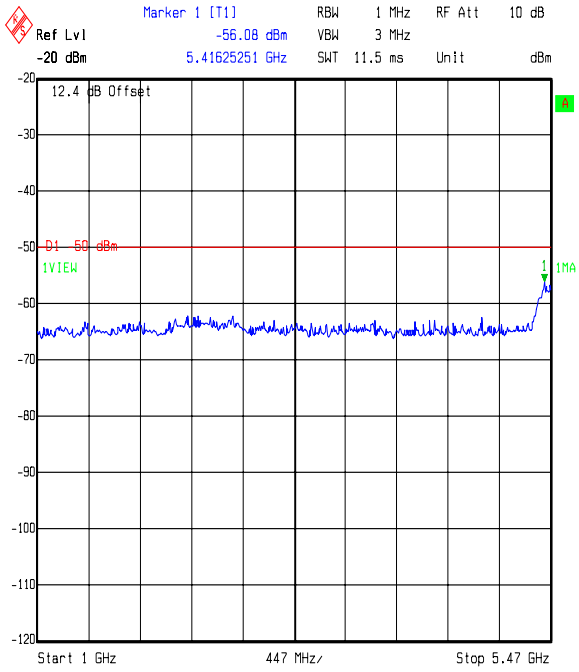
Top Channel

Frequency (MHz)	Data Rate (Mbps)	Peak Emission Level (dBm)	Limit (dBm/MHz)	Margin (dB)
5416.262	1.67	-56.1	-44.0	12.1
5770.040	1.67	-57.5	-44.0	13.5
36975.000	1.67	-60.5	-44.0	16.5

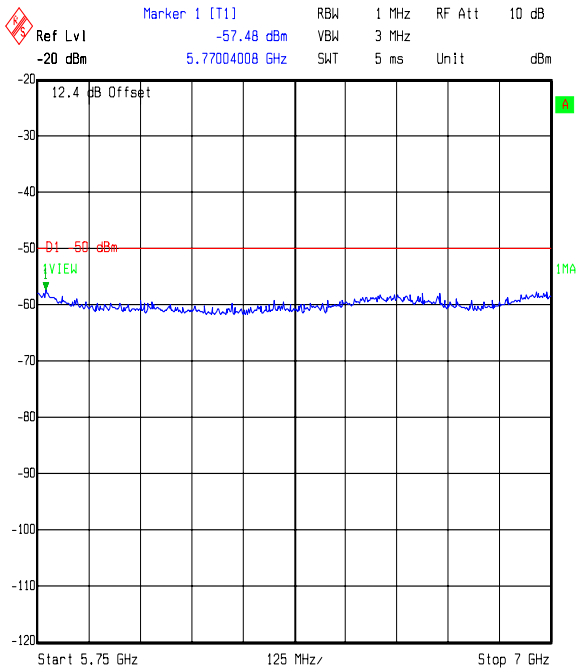
Conducted Transmitter Spurious Emissions: Part 15.407 (Continued)



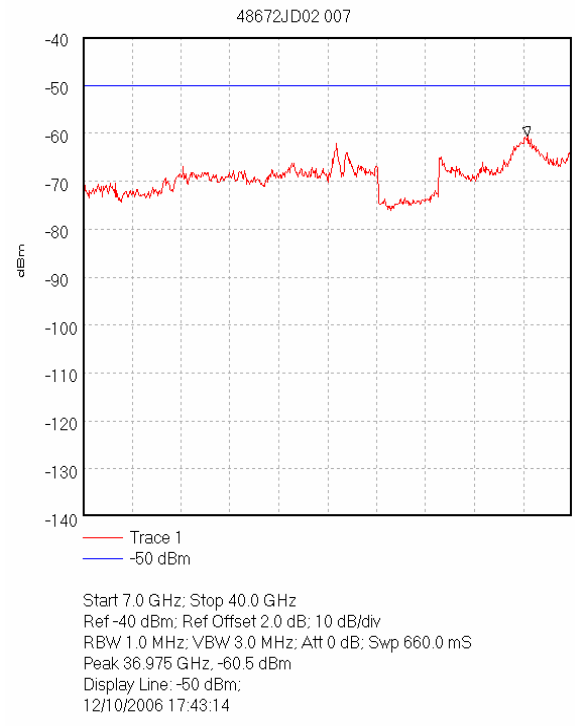
Title: Conducted Emissions for Motorola JN: 48672JD02
Comment A: BPSK Top Channel PORT H
Date: 12.OCT.2006 15:48:15



Title: Conducted Emissions for Motorola JN: 48672JD02
Comment A: BPSK Top Channel PORT H
Date: 12.OCT.2006 15:53:44



Title: Conducted Emissions for Motorola JN: 48672JD02
Comment A: BPSK Top Channel PORT H
Date: 12.OCT.2006 15:57:40

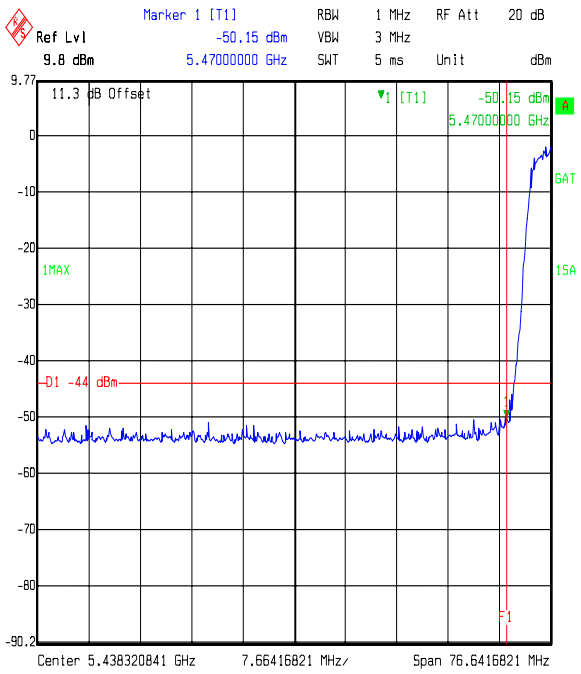


Conducted Transmitter Spurious Emissions: Part 15.407 (Continued)

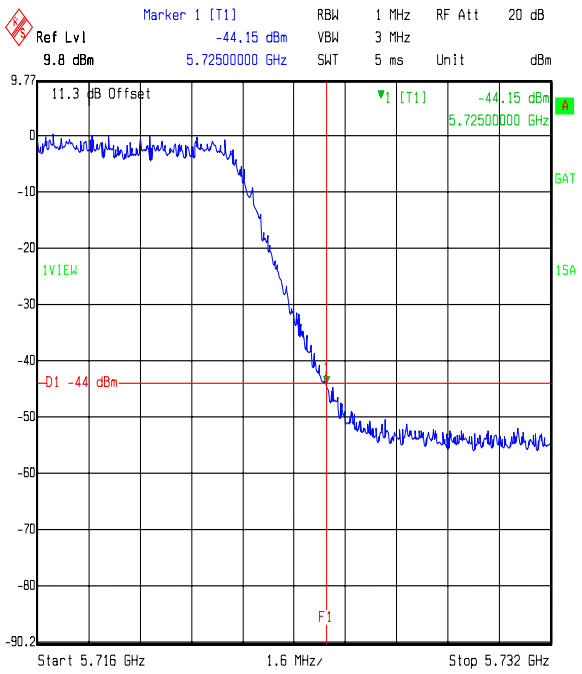
Results: BPSK Mode

Band Edge

Frequency (MHz)	Data Rate (Mbps)	Peak Emission Level (dBm)	Limit (dBm/MHz)	Margin (dB)
5470.000	1.67	-50.2	-44.0	6.2
5725.000	1.67	-44.2	-44.0	0.2



Title: Spurious Emissions - Lower Band Edge for Motorola JN: 48672
Comment A: Lower Channel - BPSK
Date: 19.OCT.2006 10:55:20



Title: Spurious Emissions - Lower Band Edge for Motorola JN: 48672
Comment A: Upper Channel - BPSK
Date: 19.OCT.2006 10:58:12

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.

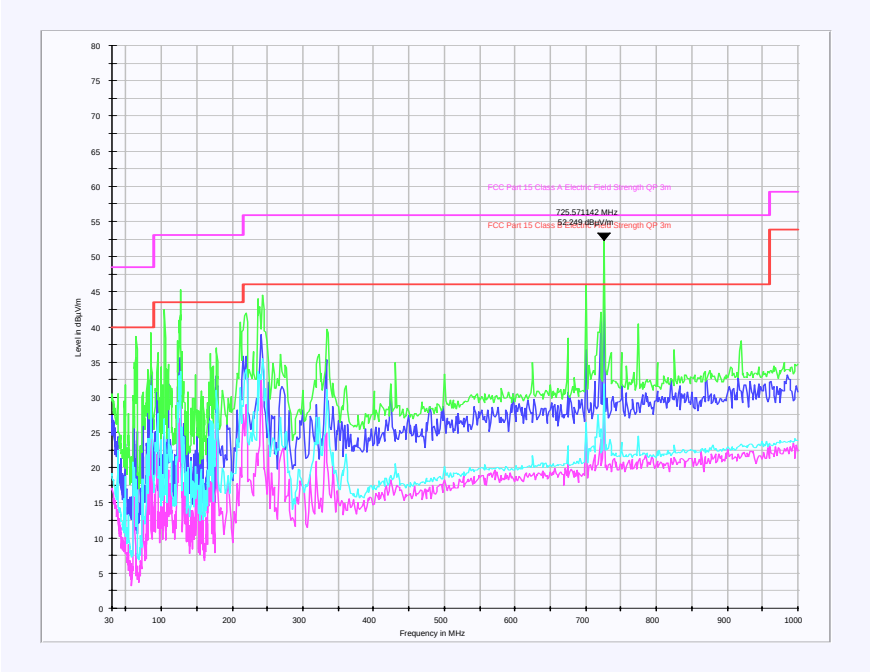
For frequencies above 1000 MHz where a horn antenna was used, height searching was performed to locate the optimal height of the horn with respect to the EUT. At this point the horn was locked off and the turntable was again rotated through 360° to maximise the target signal.

Results:

Top/Bottom Channels

Frequency (MHz)	Antenna Polarity	Q-P Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
64.569	Vertical	18.3	40.0	21.7
84.709	Vertical	15.5	40.0	24.5
104.549	Vertical	37.3	43.5	6.2
127.395	Vertical	17.7	43.5	25.8
211.222	Vertical	19.0	43.5	24.5
235.872	Vertical	30.4	46.0	15.6
332.825	Vertical	22.4	46.0	23.6
700.922	Vertical	41.0	46.0	5.0
725.571	Vertical	36.5	46.0	9.5
774.870	Vertical	25.3	46.0	20.7

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



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

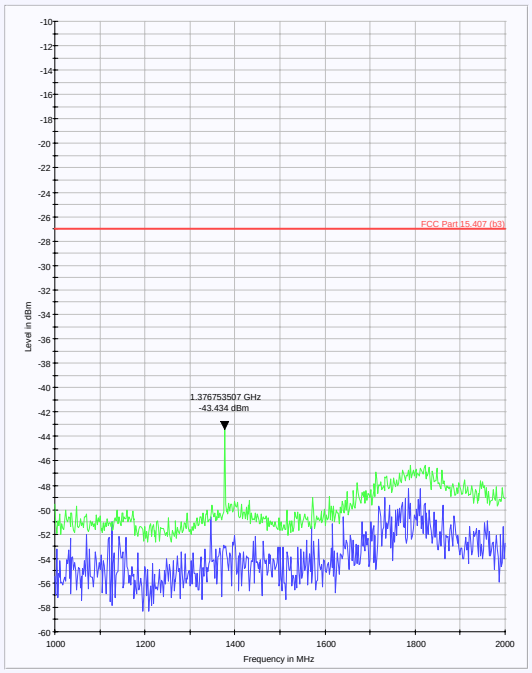
Average Electric Field Strength Measurements (1GHz to 40GHz)

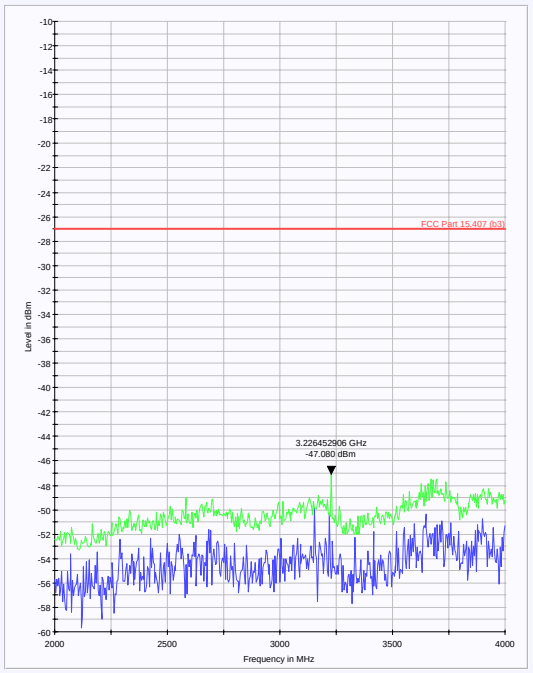
Results:

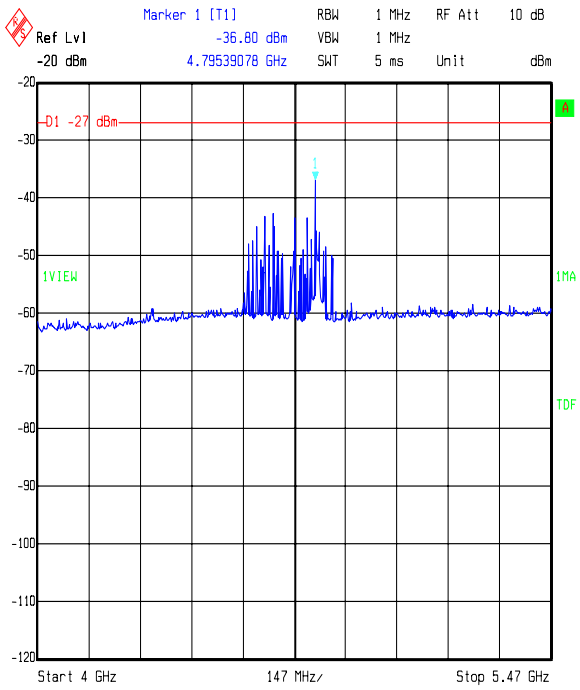
Bottom/Middle/Top Channel

Frequency (MHz)	Antenna Polarity	Level (dBm/MHz)	Limit (dBm/MHz)	Margin (dB)
1376.754	Vertical	-49.5	-27	22.5
1376.754	Vertical	-50.0	-27	23.0
1376.754	Vertical	-49.3	-27	22.3
4614.972	Vertical	-45.4	-27	18.4
4710.431	Vertical	-41.1	-27	14.1
4794.980	Vertical	-41.3	-27	14.3
9333.166	Vertical	-40.2	-27	13.2
14384.820	Vertical	-36.4	-27	9.4
14384.770	Vertical	-35.2	-27	8.2
14384.770	Vertical	-35.5	-27	8.5

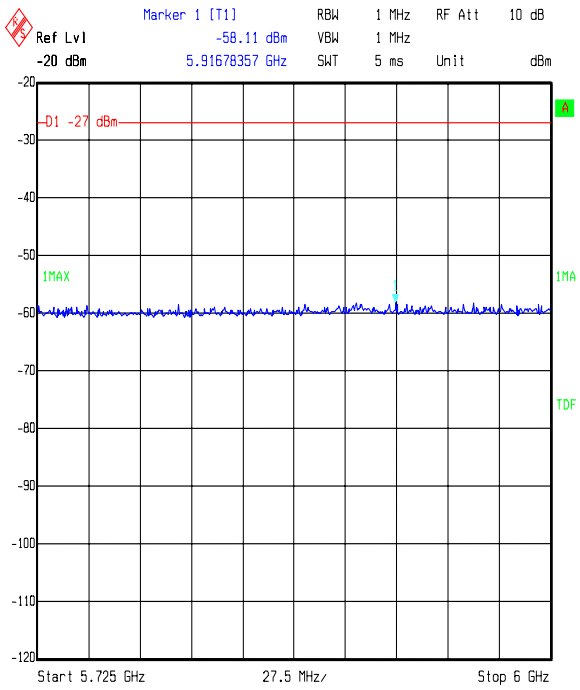
Radiated Intentional Spurious Emissions: Part 15.209/15.407 (Continued)





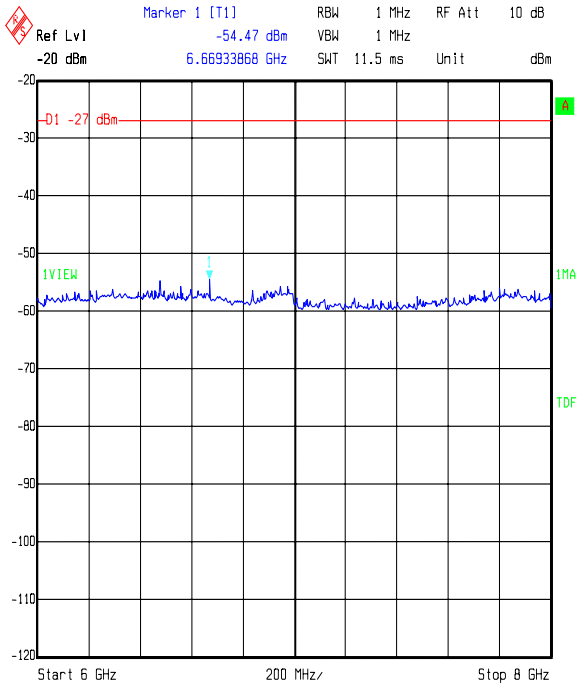


Comment A: Test No 48672JD02 Radiated Spurious Emissions
Date: 10.OCT.2006 10:52:35

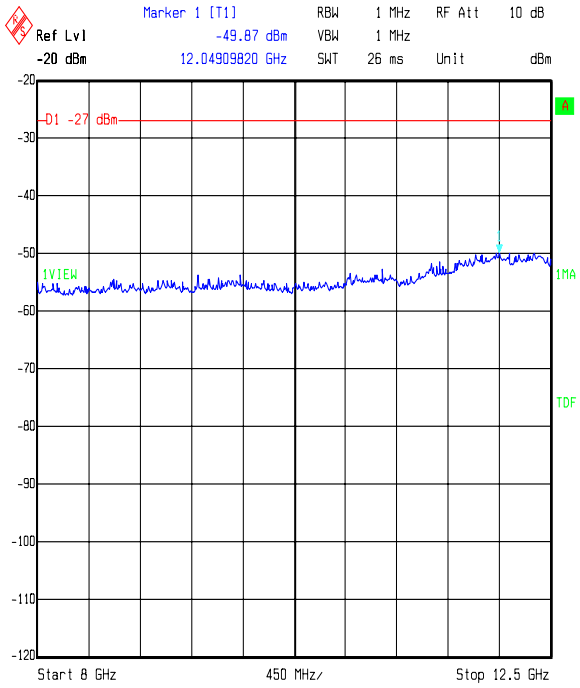


Comment A: Test No 48672JD02 Radiated Spurious Emissions
Date: 10.OCT.2006 11:32:46

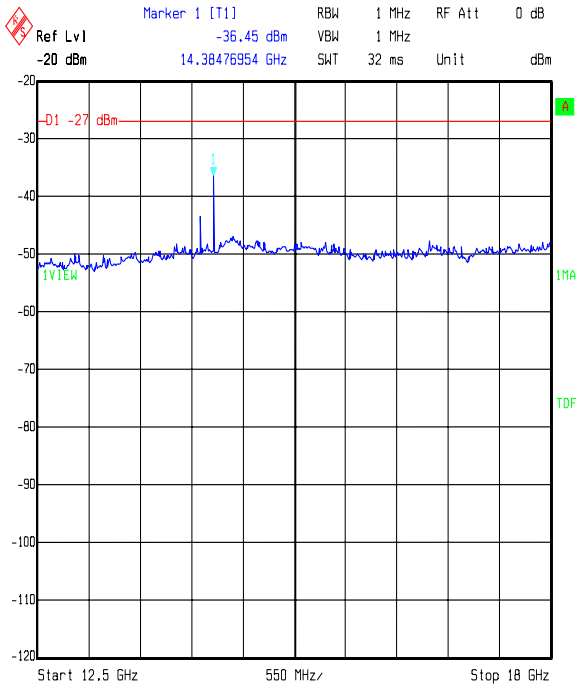
Radiated Intentional Spurious Emissions: Part 15.209/15.407 (Continued)



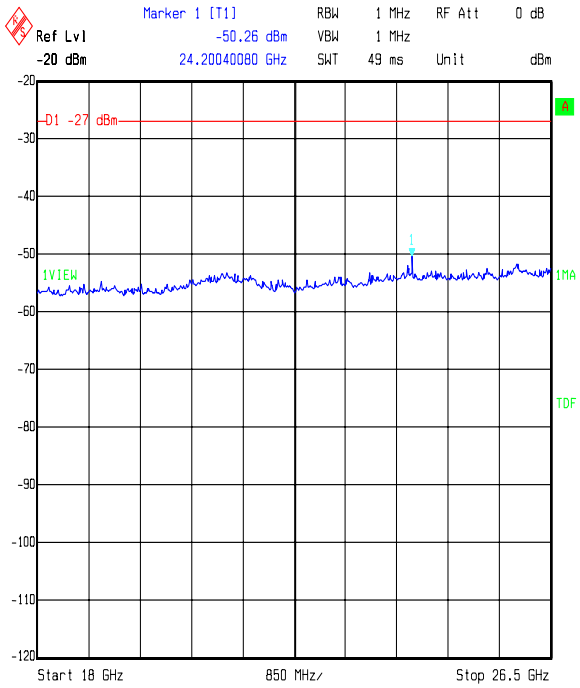
Comment A: Test No 48672JD02 Radiated Spurious Emissions
Date: 10.OCT.2006 11:44:11



Comment A: Test No 48672JD02 Radiated Spurious Emissions
Date: 10.OCT.2006 12:53:56

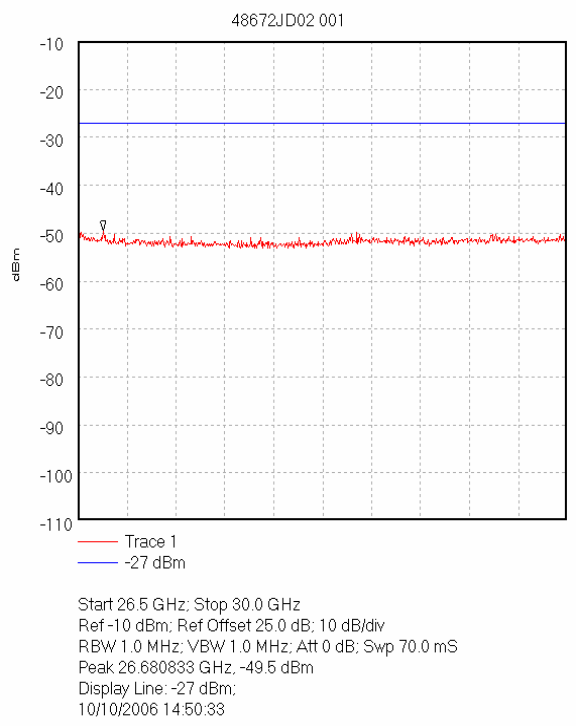


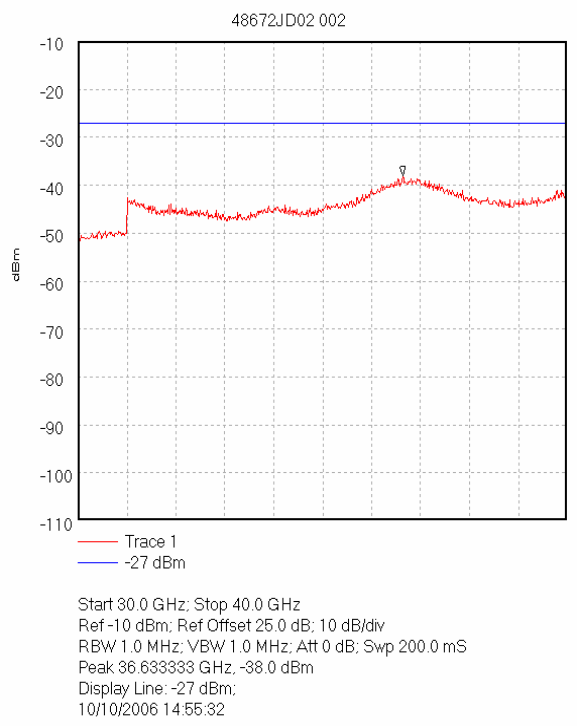
Comment A: Test No 48672JD02 Radiated Spurious Emissions
Date: 10.OCT.2006 13:03:20



Comment A: Test No 48672JD02 Radiated Spurious Emissions
Date: 10.OCT.2006 14:15:04

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





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

Results:

Quasi-Peak Detector Measurements on Live and Neutral Lines

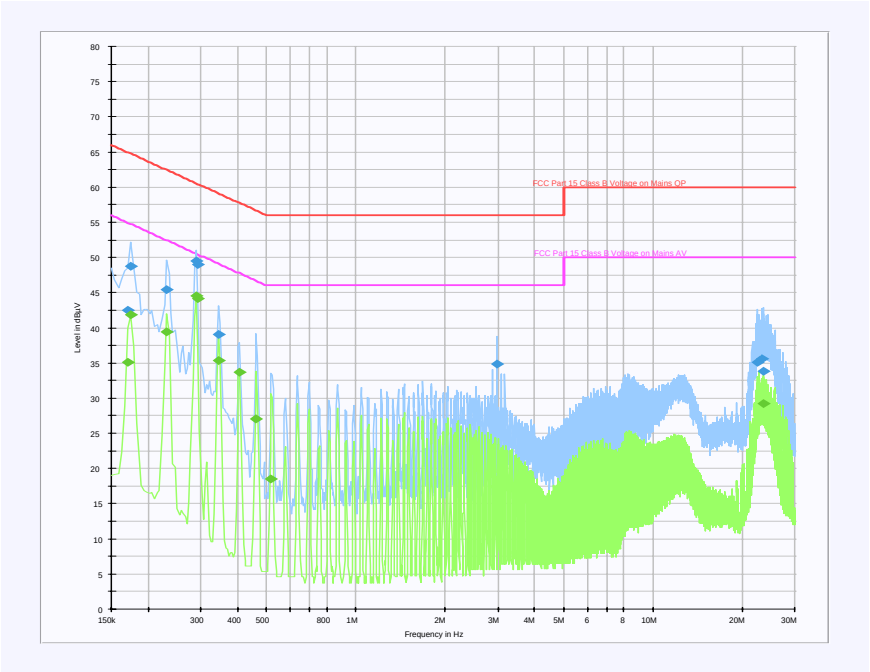
Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.170000	Live	42.5	65.0	22.6	Complied
0.174000	Live	48.7	64.8	16.1	Complied
0.230000	Live	45.4	62.4	17.0	Complied
0.290000	Live	49.5	60.5	11.0	Complied
0.294000	Live	49.0	60.4	11.4	Complied
0.346000	Live	39.0	59.1	20.1	Complied
2.978000	Neutral	34.8	56.0	21.2	Complied
22.542000	Neutral	35.2	60.0	24.8	Complied
23.174000	Live	35.6	60.0	24.4	Complied
23.486000	Live	33.8	60.0	26.2	Complied

Test of: Motorola Point to Point Fixed Wireless Solutions Group
5.4 GHz Gemini Unit
To: FCC Part 15.407: 2006 (Subpart E)

AC Conducted Emissions: Part 15.207 (Continued)

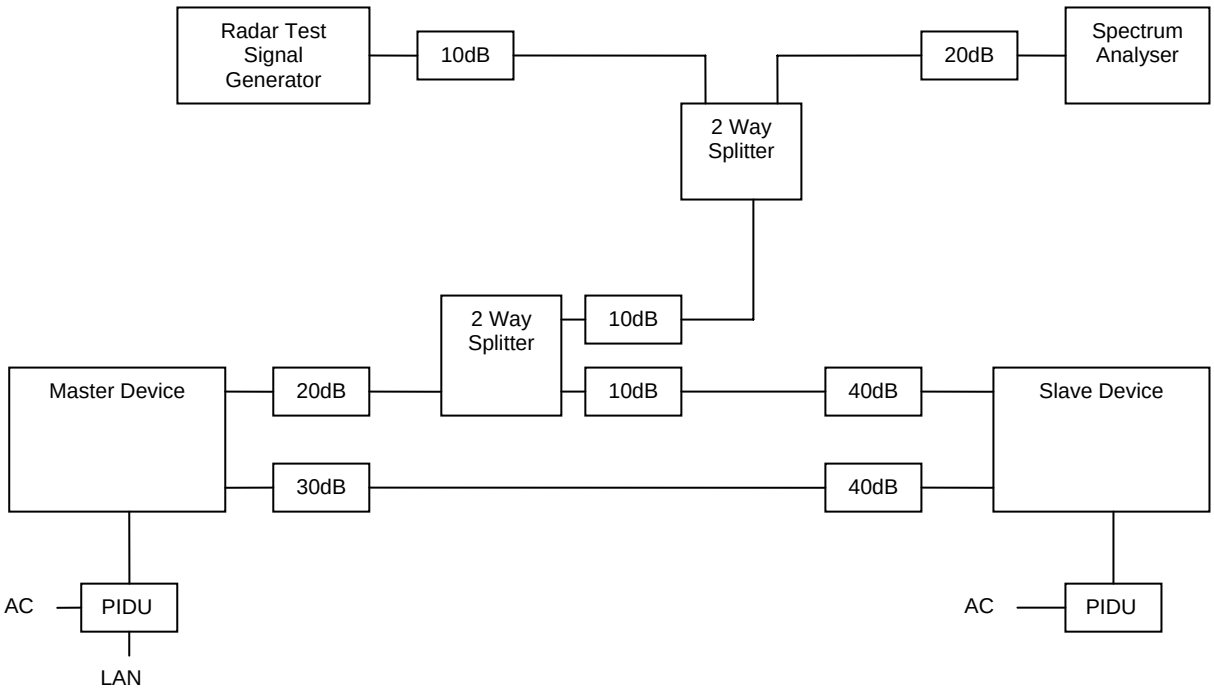
Average Detector Measurements on Live and Neutral Lines

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.170000	Live	35.1	20.0	35.1	Complied
0.174000	Live	41.9	12.9	41.9	Complied
0.230000	Live	39.4	13.0	39.4	Complied
0.290000	Live	44.5	6.0	44.5	Complied
0.294000	Live	44.1	6.3	44.1	Complied
0.346000	Live	35.3	13.8	35.3	Complied
0.406000	Live	33.6	14.1	33.6	Complied
0.462000	Live	27.1	19.6	27.1	Complied
0.518000	Live	18.5	27.5	18.5	Complied
23.482000	Neutral	29.2	20.8	29.2	Complied

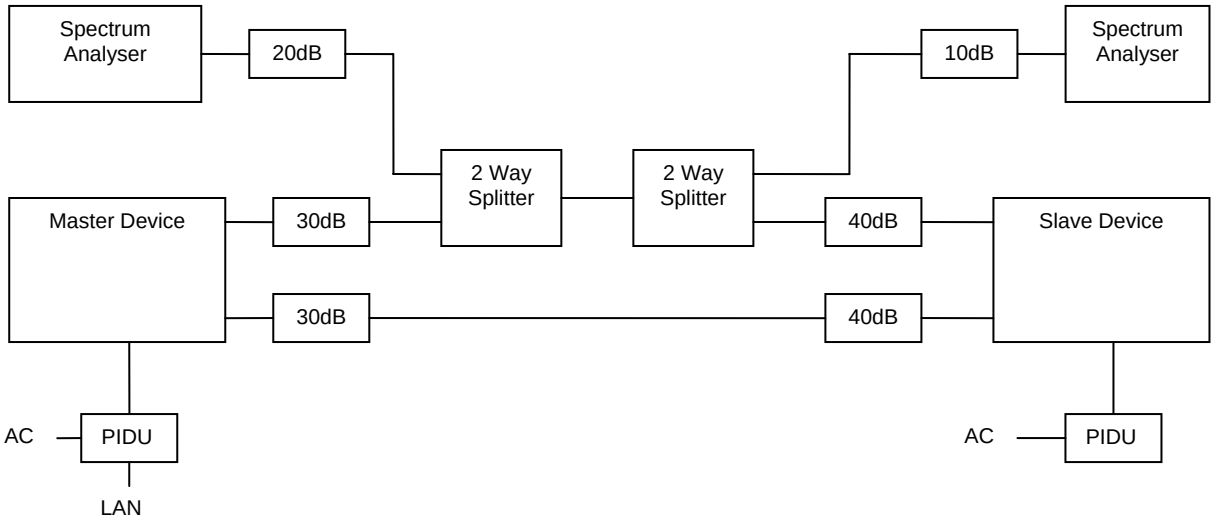


7.2.8. Dynamic Frequency Selection (DFS) Part 15.407- Master Device

Setup Diagram – UUT – Master, Radar Injection at Master.



Setup Diagram – UUT – Slave, Radar Injection at Master.



Dynamic Frequency Selection (DFS) Part 15.407- Master Device (Continued)

- It should be noted that the frequency range for the splitters were slightly outside the frequency range of the EUT. This meant the system setup was calibrated on an individual frequency basis.
- The EUT uses a TDD structure which carries IP protocol. As such the EUT was treat as an IP based system and in line with the FCC recommendation the NTIA designated MPEG test file was transferred form Master to Slave during the testing.
- The Master Device uses DFS. The Slave does not.
- The maximum conducted output power is 3.8dBm measured and 26.8dBm EIRP.
- The antenna gain of the antenna to be employed is 23dBi
- The middle channel was selected for the purpose of all the DFS testing.
- DFS Detection Threshold. = -64dBm
- Antenna Gain = +23dBi
- Setup variances = 1dB
- Calculated DFS Detection Threshold for test purposes = -64+23+1 = -40dBm
- The antenna port impedance was 50 ohms.
- TPC is not applicable as the device operates below 27dBm
- Maximum measured power was 26.8dBm

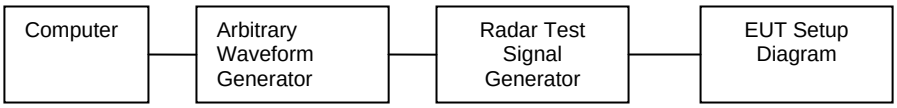
Dynamic Frequency Selection (DFS) Part 15.407- Master Device (Continued)

Radar calibration procedure.

The system was configured as per the above shown diagram with all ports terminated into there respective loads. The EUT was substituted with a power meter and the radar test signal generator adjusted so that the required DFS threshold was observed on the power meter. The EUT was then re-connected.

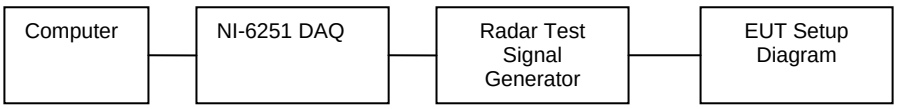
Each radar waveform used was fired multiple times and monitored in the time domain on a spectrum analyser. The maximum worse case calculated uncertainty of the pulses was 4%.

Radar 1 to 4 Setup Block Diagram



The radar patterns 1 through 4 are generated using National Instruments Labview. The test patterns are downloaded to the arbitrary waveform memory via GPIB where they are played back as required using manual trigger. The arbitrary waveform generator is connected to the pulse modulation input of the radar test signal generator. The radar test signal generator is set for pulse modulation, the nominal frequency is set and the level set to the required DFS threshold plus any offsets for system losses.

Radar 5 Long Pulse Radar Setup Block Diagram



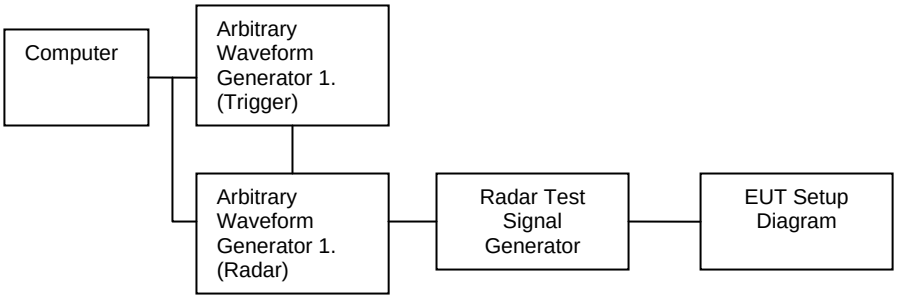
The long pulse radar pattern 5 was generated using National Instruments Labview.

The program randomly chooses a burst count, number of pulses, chirp width and PRI. The program constructs the waveform in accordance with FCC 06-96 Clause 6.2.

The waveform is played back through a National Instrument DAQ card. The DAQ card is connected to the pulse modulation input of the radar test signal generator via a BNC breakout box. The radar test signal generator is set for pulse modulation, the nominal frequency is set and the level set to the required DFS threshold plus any offsets for system losses.

Dynamic Frequency Selection (DFS) Part 15.407- Master Device (Continued)

Radar 6 Setup Frequency Hopping Waveform Diagram

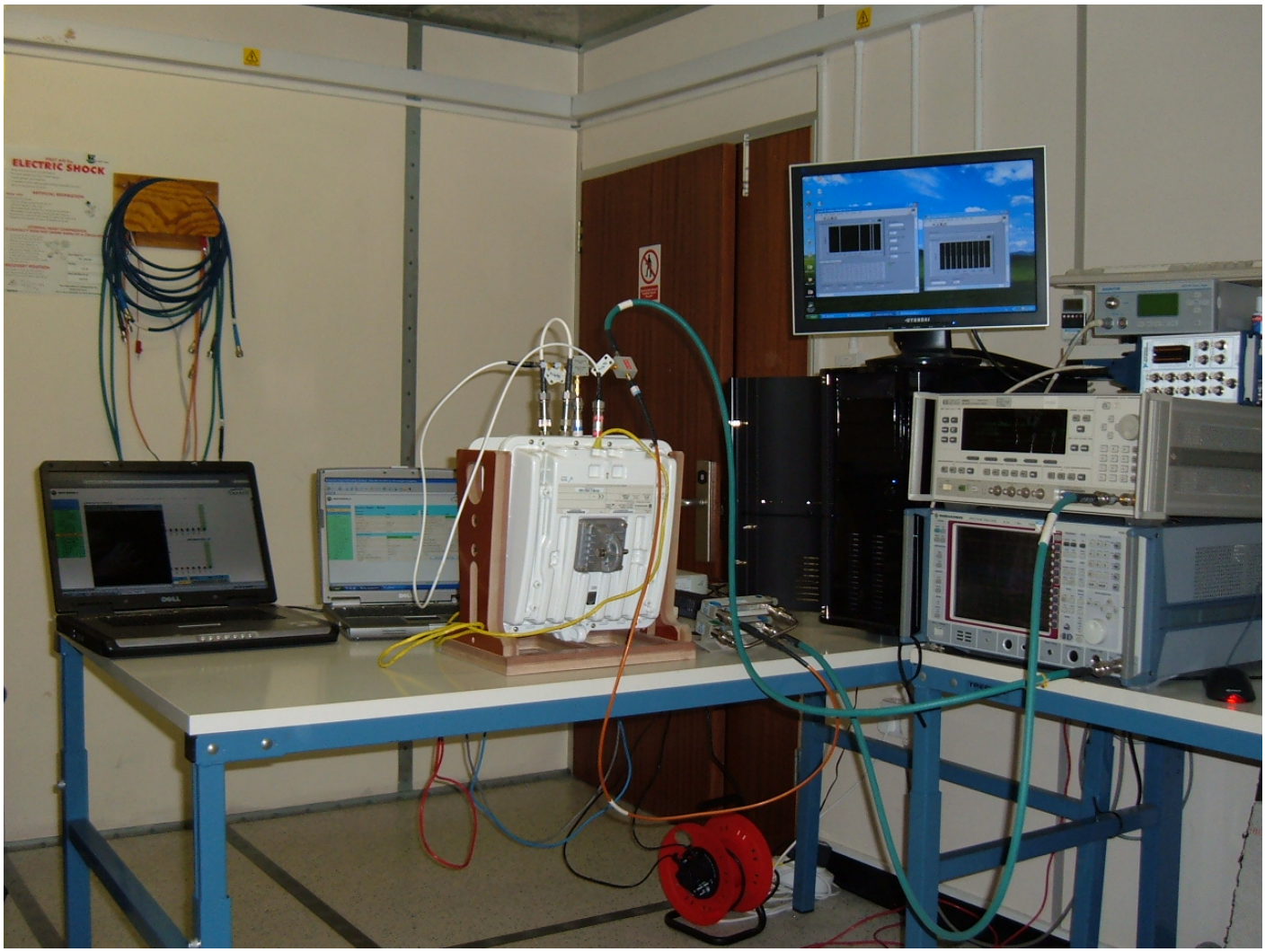


The frequency hopping radar pattern 6 was generated using National Instruments Labview. The application generated a random without replacement frequency list between 5250 – 5724MHz. The first 100 frequencies were then selected as the test sequence. The sequence was then searched for a hit within the stated detection bandwidth, If a detection is not observed then a new random sequence is created until at least one detection occurs. All hits within the detection bandwidth are then flattened to the same frequency but left at the unique time intervals at which the hit occurred according to FCC 06-967.4.1.3 Fig 12. This 100 frequency segment is played out of the first arbitrary waveform generator to the trigger of the second arbitrary waveform generator. The second arbitrary waveform generator is setup with a 1uS pulse and 333uS PRI cycling a 9 pulses per hop according to FCC 06-96 Table 7. The Second arbitrary waveform generator is then used to pulse modulate the radar test signal generator.

The waveforms for all radars can be observed further down in this report.

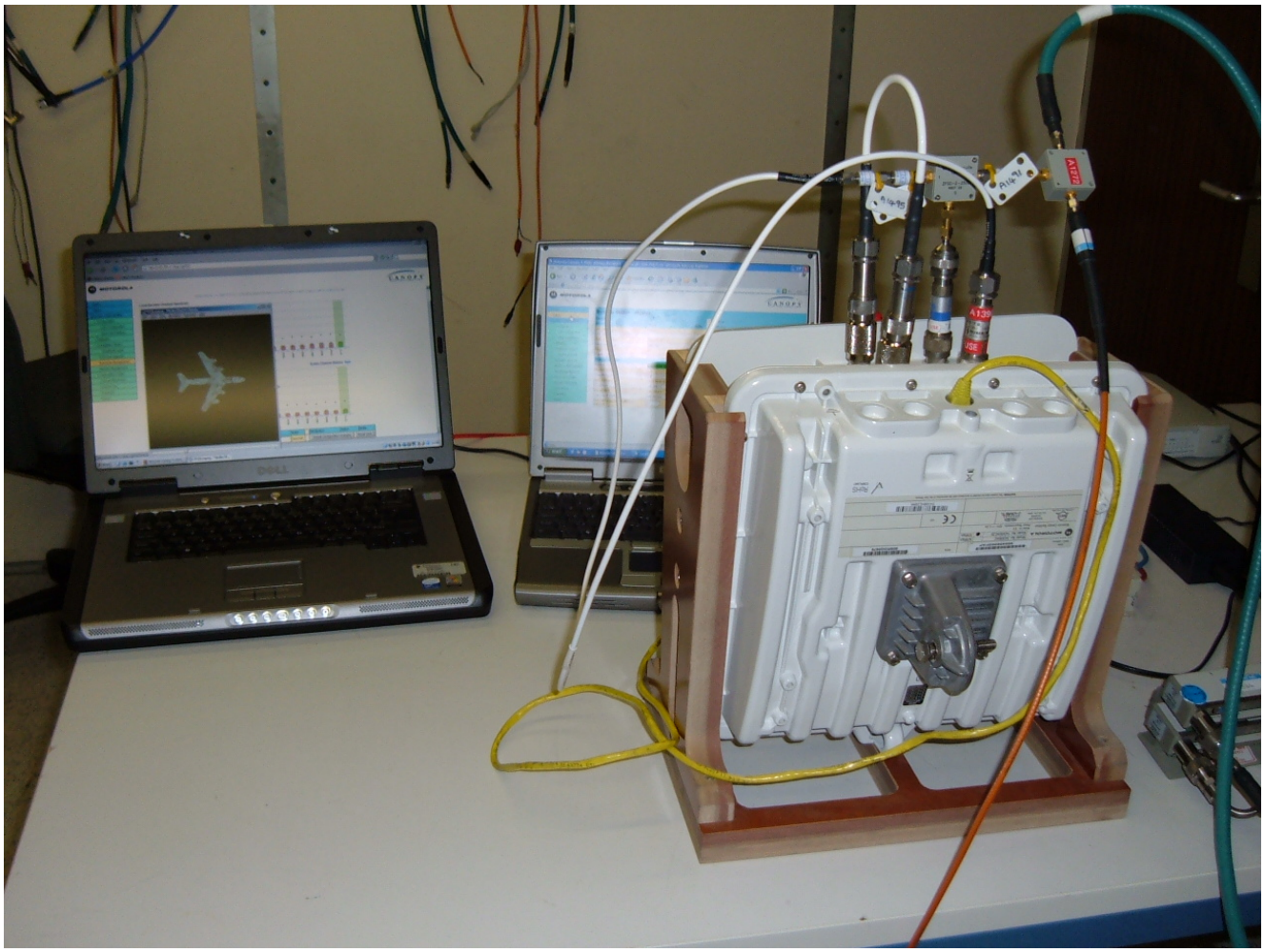
Dynamic Frequency Selection (DFS) Part 15.407- Master Device (Continued) – Setup Photos

Overall Setup.



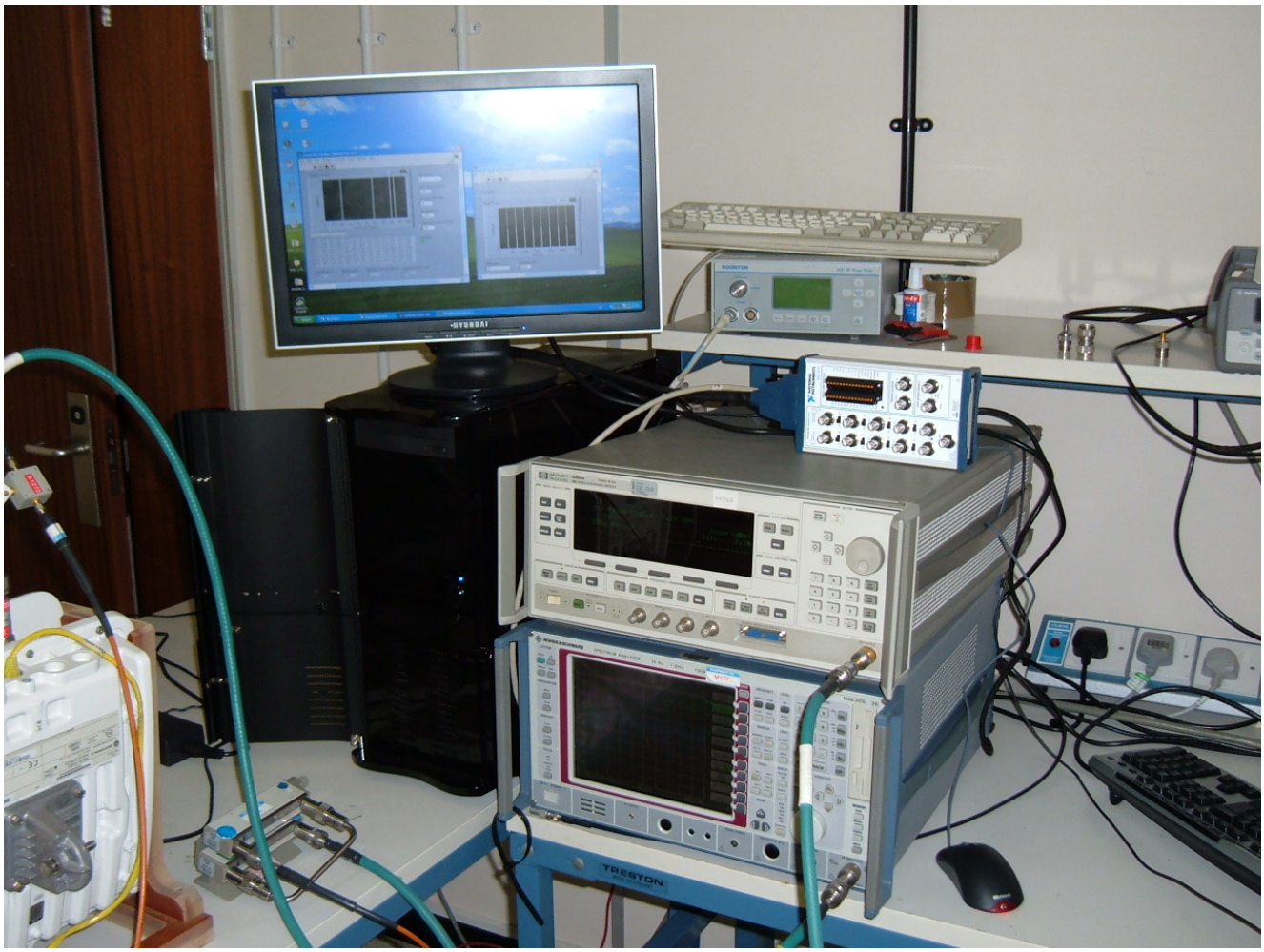
Dynamic Frequency Selection (DFS) Part 15.407- Master Device (Continued) – Setup Photos

Close Up.



Dynamic Frequency Selection (DFS) Part 15.407- Master Device (Continued) – Setup Photos

Setup Showing PC used and test equipment used.



7.2.9. Channel Availability Check Time

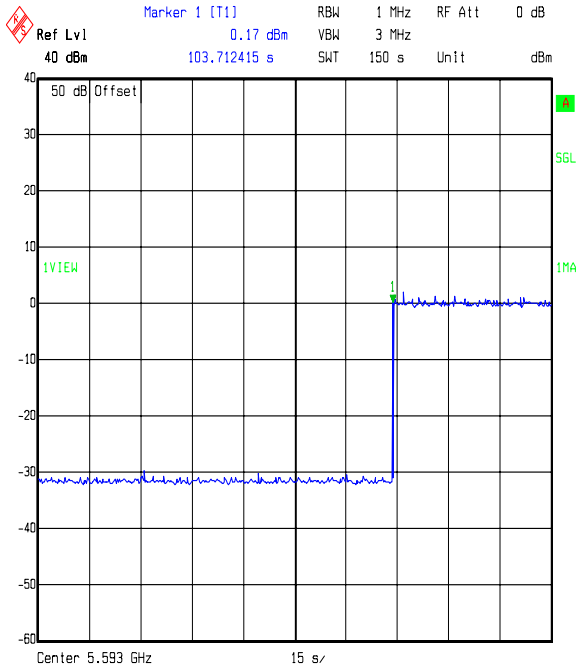
The Initial Channel Availability Check Time tests that the UUT does not emit beacon, control, or data signals on the test Channel until the power-up sequence has been completed and the U-NII device checks for Radar Waveforms for one minute on the test Channel. This test does not use any Radar Waveforms and only needs to be performed one time.

A U-NII device shall check if there is a radar system already operating on the channel before it can initiate a transmission on a channel and when it has to move to a new channel. The U-NII device may start using the channel if no radar signal with a power level greater than the interference threshold values listed above is detected within 60 seconds.

Result:

Power up was initiated and the Tx output monitored on a spectrum analyser until the Tx came active.

Power up and Channel Availability Check Time (s)	Channel Availability Check Time Limit(s)	Margin (s)	Status
103	60	43	Complied



7.2.10. Radar Burst at the Beginning of the Channel Availability Check Time

Defines the procedure to verify successful radar detection on the test Channel during a period equal to the Channel Availability Check Time and avoidance of operation on that Channel when a radar Burst with a level equal to the DFS Detection Threshold + 1 dB occurs at the beginning of the Channel Availability Check Time.

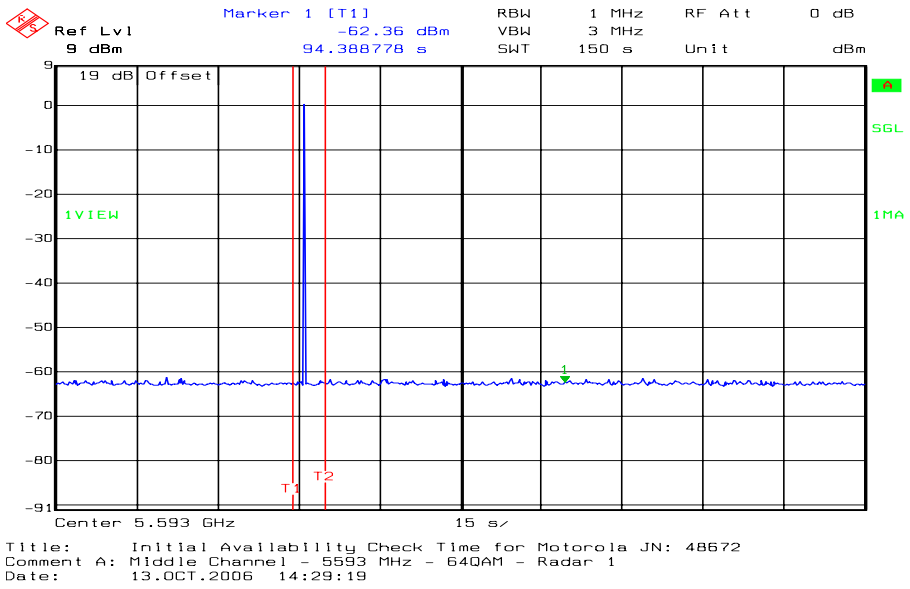
Result:

The total time for the EUT to power up and perform the channel availability check time is 104s.

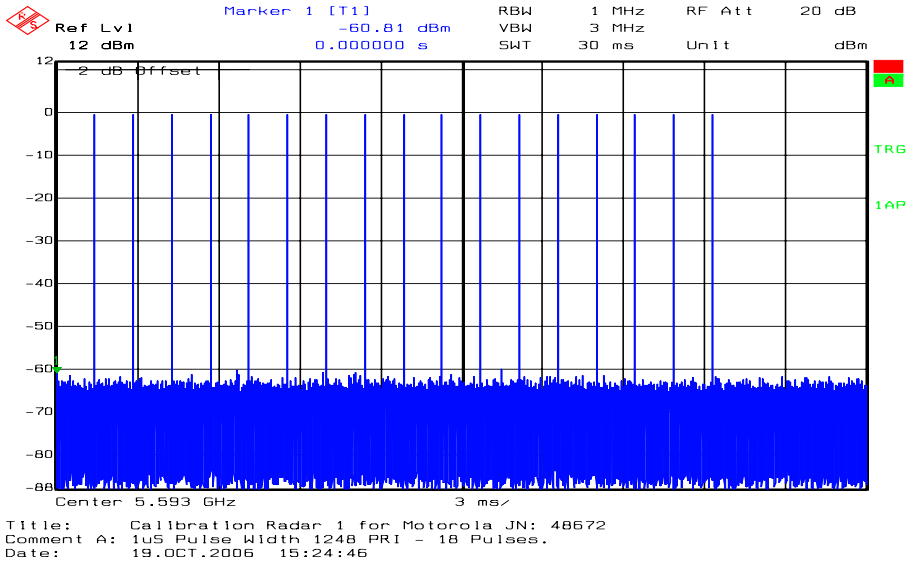
104s – 60s = the start of the channel availability check time.

The check time = 6s

It can be seen from the plot below that no transmission occurred after the 104s once the radar had been fired. Total plot time is 150s.



Radar Burst at the Beginning of the Channel Availability Check Time (Continued)



Parameters for simulated radar used.

Radar #1	Pulse Width (µS)	PRI (µS)	Number of Pulses
	1	1428	18

7.2.11. Radar Burst at the End of the Channel Availability Check Time

Define the procedure to verify successful radar detection on the test Channel during a period equal to the Channel Availability Check Time and avoidance of operation on that Channel when a radar Burst with a level equal to the DFS Detection Threshold + 1dB occurs at the end of the Channel Availability Check Time.

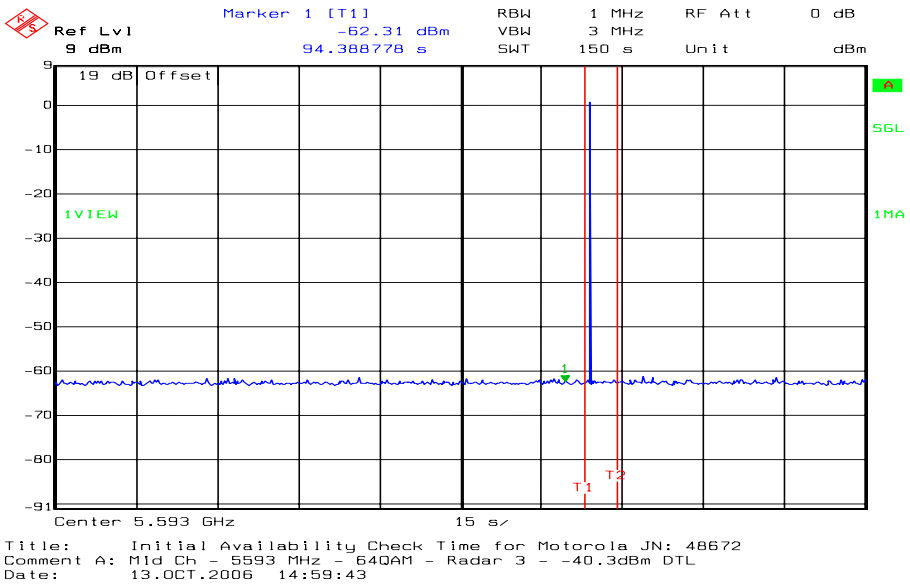
Results:

The total time for the EUT to power up and perform the channel availability check time is 104s.

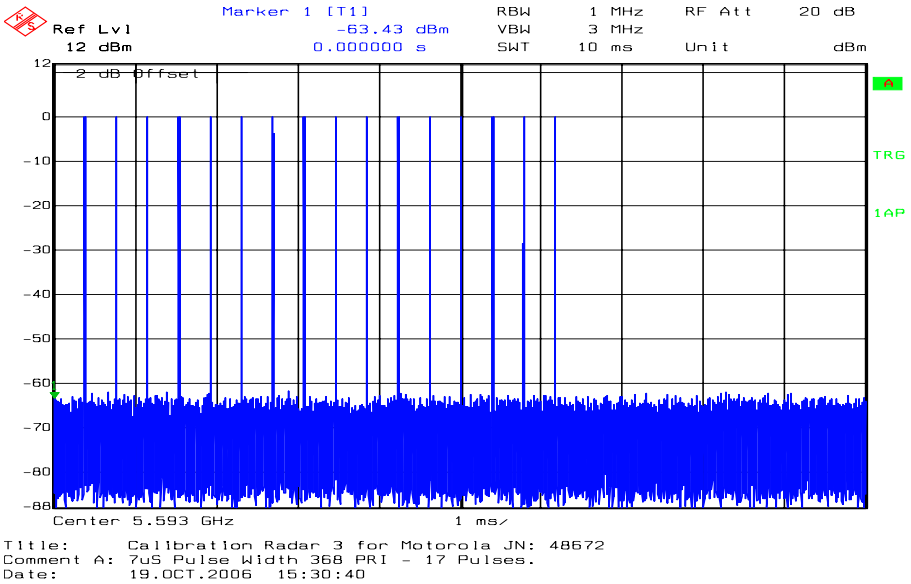
104s – 6s = the start of end of the channel availability check time.

The check time = 6s

It can be seen from the plot below that no transmission occurred once the radar had been fired. Total plot time is 150s.



Radar Burst at the End of the Channel Availability Check Time (Continued)



Parameters for simulated radar used.

Radar #3	Pulse Width (µS)	PRI (µS)	Number of Pulses
	7	368	17

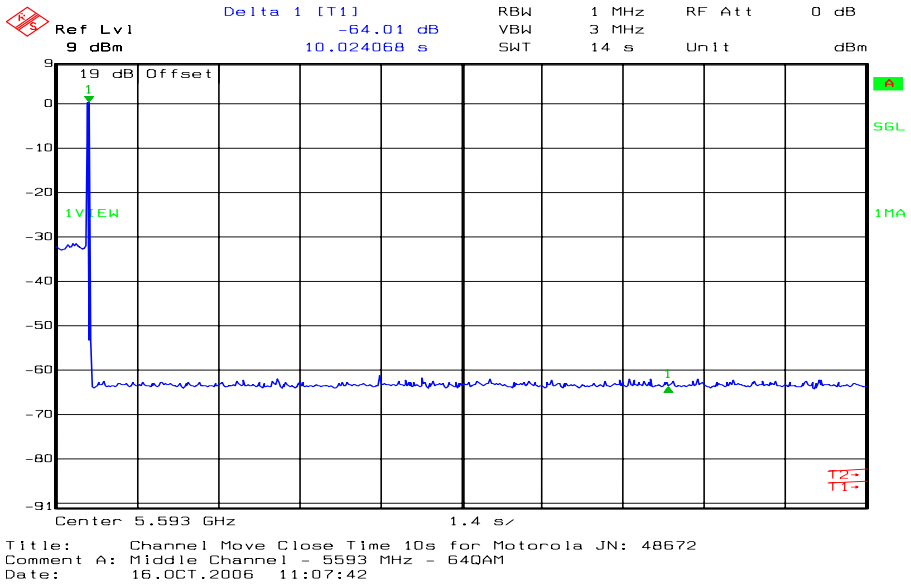
7.2.12. Channel Move/Closing Time

Channel Move Time. After a radars presence is detected, all transmissions shall cease on the operating channel within 10 seconds. Transmissions during this period shall consist of normal traffic for a maximum of 200 ms after detection of the radar signal. In addition, intermittent management and control signals can be sent during the remaining time to facilitate vacating the operating channel.

All channel move times occurred within the radar burst and thus the result would have been negative. As such, only plots are submitted showing that the move time was less than 200mS. It should also be noted that no further EUT transmissions took place after the EUT ceased first transmission.

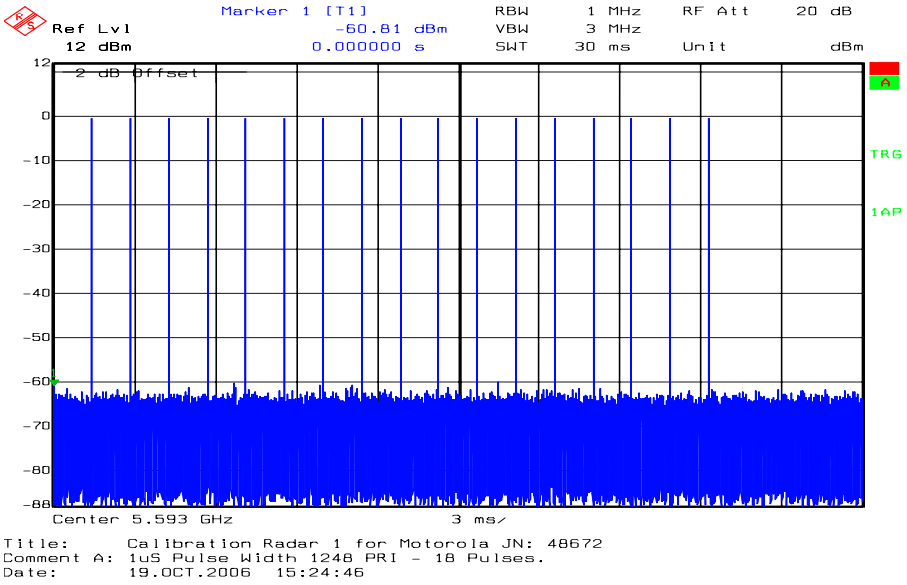
Results: Radar #1

Channel move time is taken from the time the radar burst ceases transmission, The EUT stopped transmitting within the radar burst and thus the move time is could not be computed however, it can be seen from the plots that the EUT ceased transmission within 1/10 of a division from the beginning of the radar burst, 1/10 of a division equates to 140mS which is less than 200mS (The limit) and thus compliance can be seen. No further transmission took place during the 10s period after the burst shown by the markers.



Channel Move/Closing Time (Continued)

Parameters for simulated radar used.

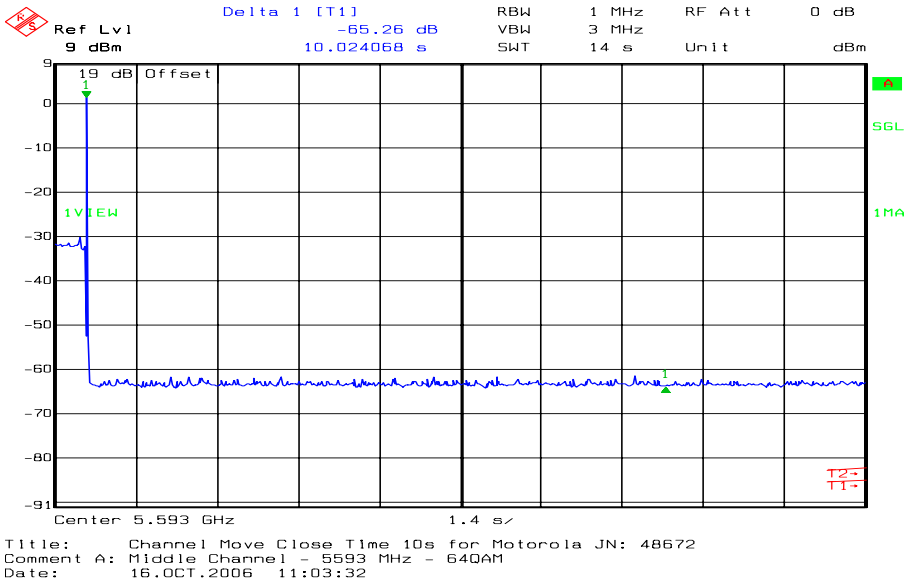


Radar #1	Pulse Width (µS)	PRI (µS)	Number of Pulses
	1	1428	18

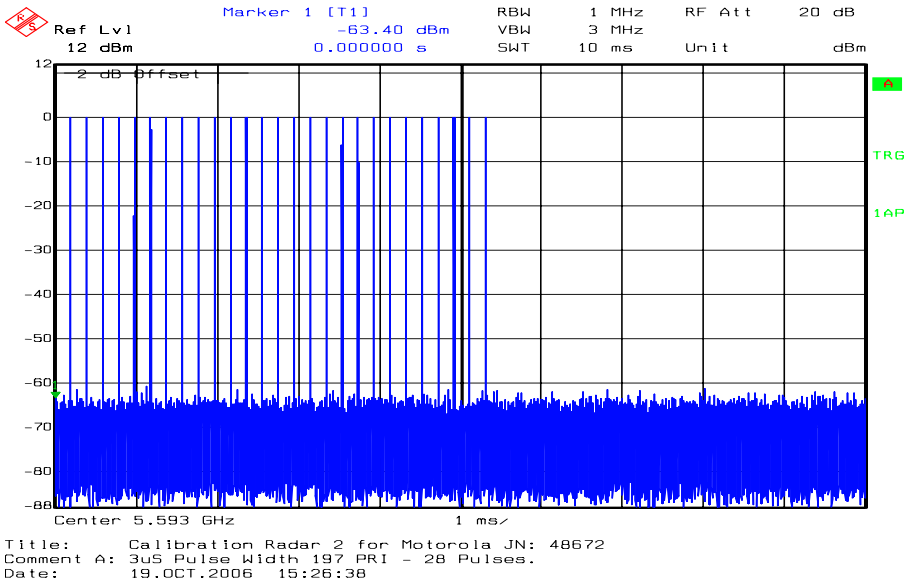
Channel Move/Closing Time (Continued)

Results: Radar #2

The EUT stopped transmitting within the radar burst and thus the move time is could not be computed however, it can be seen from the plots that the EUT ceased transmission within 1/10 of a division from the beginning of the radar burst, 1/10 of a division equates to 140mS which is less than 200mS (The limit) and thus compliance can be seen. No further transmission took place during the 10s period after the burst shown by the markers.



Parameters for simulated radar used.

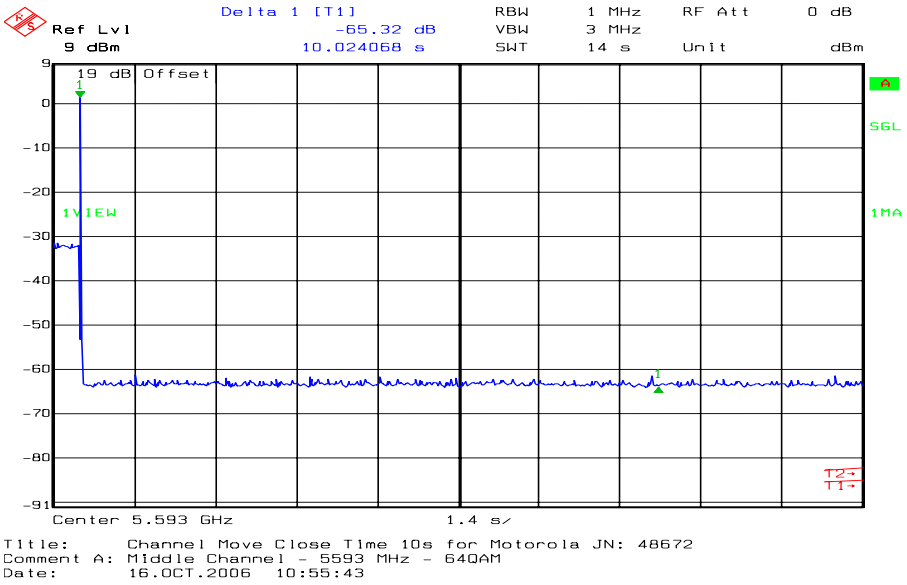


Radar #2	Pulse Width (µS)	PRI (µS)	Number of Pulses
	3	197	28

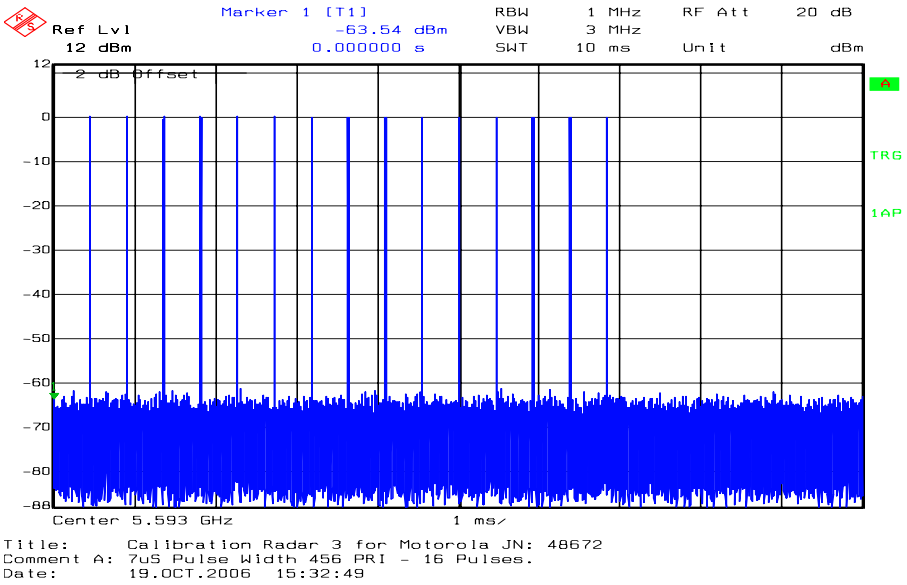
Channel Move/Closing Time (Continued)

Results: Radar #3

The EUT stopped transmitting within the radar burst and thus the move time is could not be computed however, it can be seen from the plots that the EUT ceased transmission within 1/10 of a division from the beginning of the radar burst, 1/10 of a division equates to 140mS which is less than 200mS (The limit) and thus compliance can be seen. No further transmission took place during the 10s period after the burst shown by the markers.



Parameters for simulated radar used.

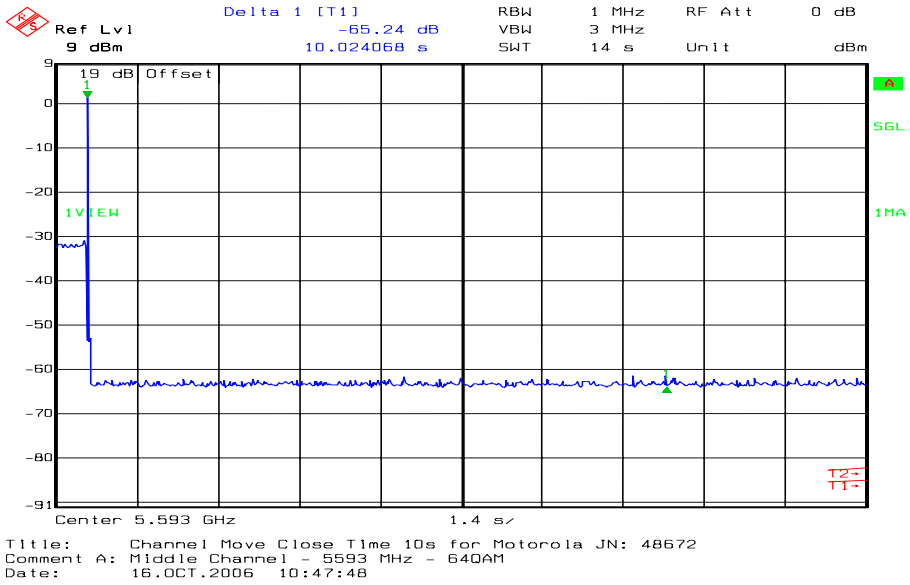


Radar #3	Pulse Width (µS)	PRI (µS)	Number of Pulses
	7	456	16

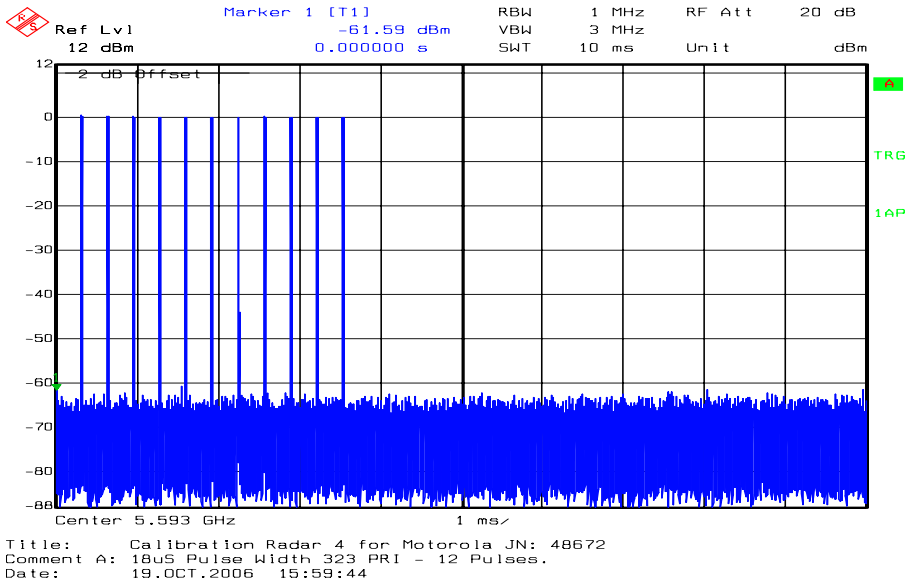
Channel Move/Closing Time (Continued)

Results: Radar #4

The EUT stopped transmitting within the radar burst and thus the move time is could not be computed however, it can be seen from the plots that the EUT ceased transmission within 1/10 of a division from the beginning of the radar burst, 1/10 of a division equates to 140mS which is less than 200mS (The limit) and thus compliance can be seen. No further transmission took place during the 10s period after the burst shown by the markers.



Parameters for simulated radar used.

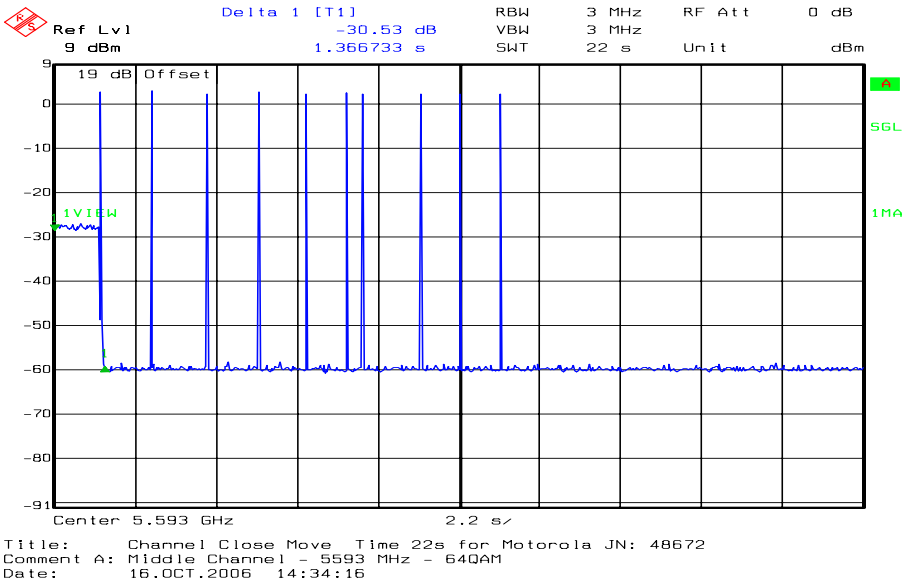


Radar #4	Pulse Width (µS)	PRI (µS)	Number of Pulses
	18	323	12

Channel Move/Closing Time (Continued)

Results: Radar #5

The EUT stopped transmitting within the radar burst and thus the move time is could not be computed however, it can be seen from the plot below that the move time is better than -11 seconds. The limit being +200mS.



Parameters for simulated radar used.

Radar #5, Chirp Frequency 12MHz

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	2	56	1180	N/A
2	3	71	1704	1343
3	1	69	N/A	N/A
4	2	63	939	N/A
5	3	88	1395	1407
6	2	54	1225	N/A
7	2	63	1089	N/A
8	1	79	N/A	N/A
9	2	53	1817	N/A
10	1	88	N/A	N/A

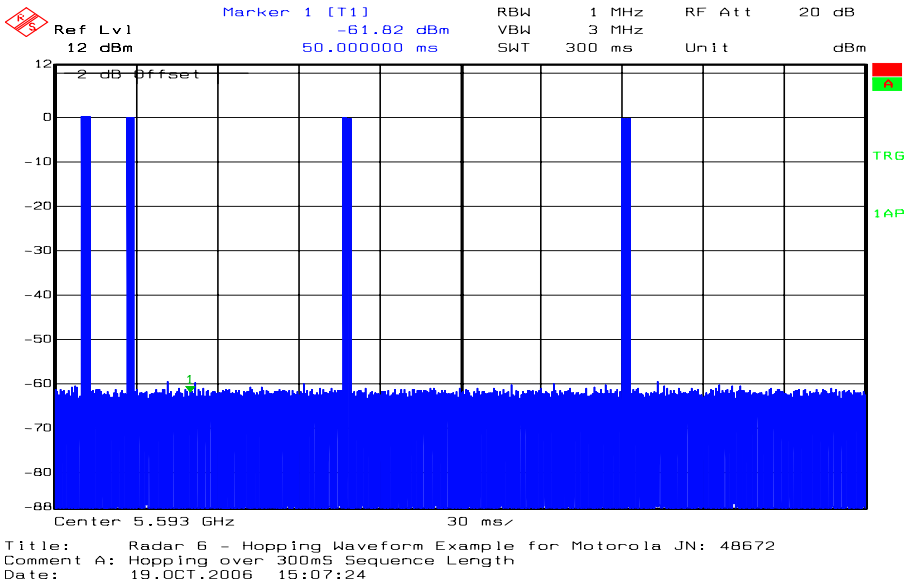
Channel Move/Closing Time (Continued)

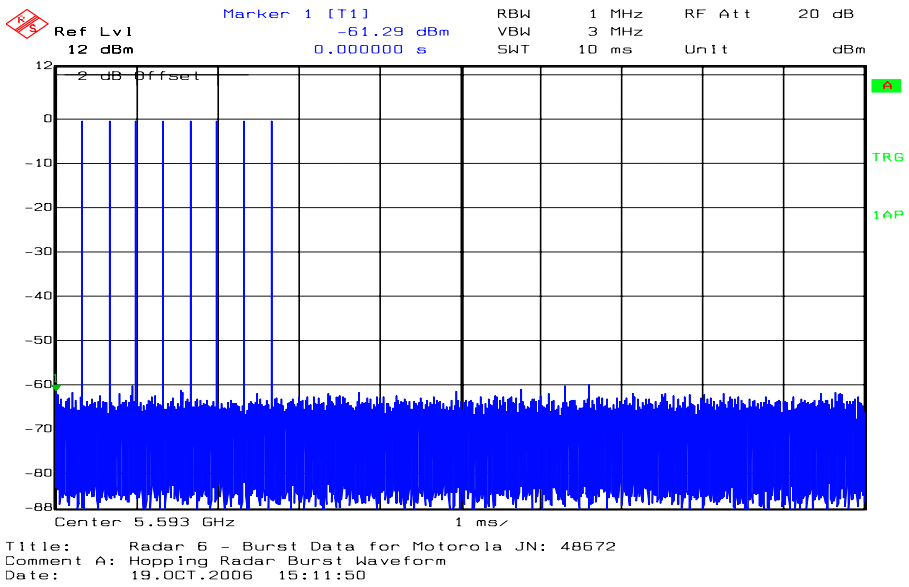
Results: Radar #6

The EUT stopped transmitting within the first radar burst and thus the move time is could not be computed however, it can be seen from the plots that the EUT ceased transmission within 1/10 of a division from the beginning of the radar burst, 1/10 of a division equates to 140mS which is less than 200mS (The limit) and thus compliance can be seen. No further transmission took place during the 10s period after the burst shown by the markers.

It can be seen below that there were 4 hops of the radar burst captured in the channel bandwidth of the EUT.

Parameters for simulated radar used.

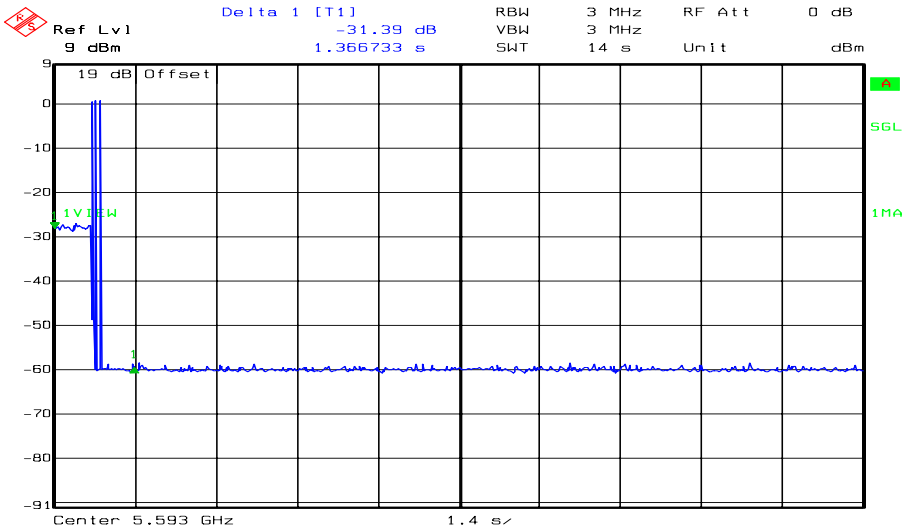




Radar #6 Burst Data	Pulse Width (µS)	PRI (µS)	Number of Pulses
	1	333	9

Channel Move/Closing Time (Continued)

Results:

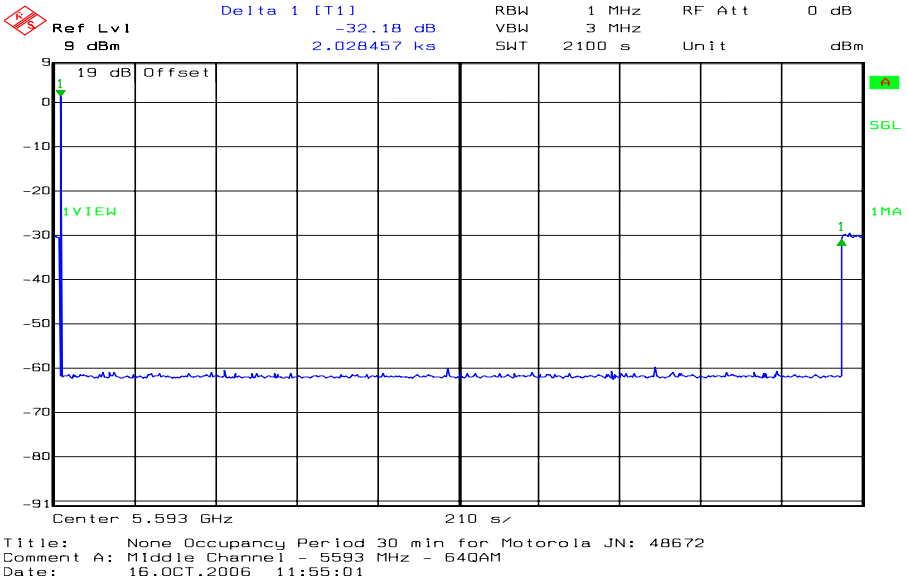


7.2.13. Non Occupancy Period

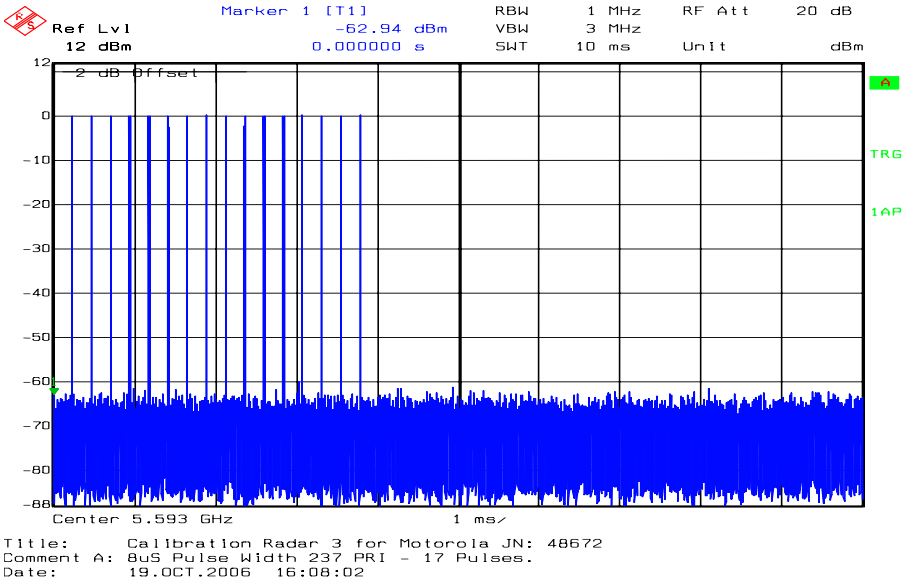
Non occupancy period. A channel that has been flagged as containing a radar system, either by a channel availability check or in-service monitoring, is subject to a none occupancy period of at least 30 minutes. The non-occupancy period starts at the time when the radar system is detected.

Results:

The non occupancy period is taken from the end of the move time. The EUT stopped transmitting upon detection of the radar. No further transmission took place for at least 33 minutes confirming that during the none-occupancy period of 30 minutes is met.



Parameters for simulated radar used.



	Pulse Width (µS)	PRI (µS)	Number of Pulses
Radar #3	8	237	17

7.2.14. UNII Detection Bandwidth

The contiguous frequency spectrum over which a U-NII device detects a Radar Waveform above the DFS Detection Threshold.

The EUT was configured as described in the setup section above. The radar test signal was injected into the EUT at its centre frequency, only the centre frequency was tested as all channels has the same declared bandwidth. If detection occurred then it was flagged with a '1' in the following table. If detection did not occur then it was flagged with a '0'. This process was repeated at least 10 times. The test frequency was then varied in 1MHz steps across 11 MHz which is greater then the 99% emission bandwidth repeating the above procedure until the detection rate fell below 90%. The highest and lowest frequencies where detection was greater than or equal to 90% occurred was recorded as F_L and $F_{H.}$

The detection bandwidth was then calculated based on the point 80% detection rate occurred. It can be seen that there was a 100% detection throughout the emission bandwidth and thus the detection bandwidth is equal to the emission bandwidth.

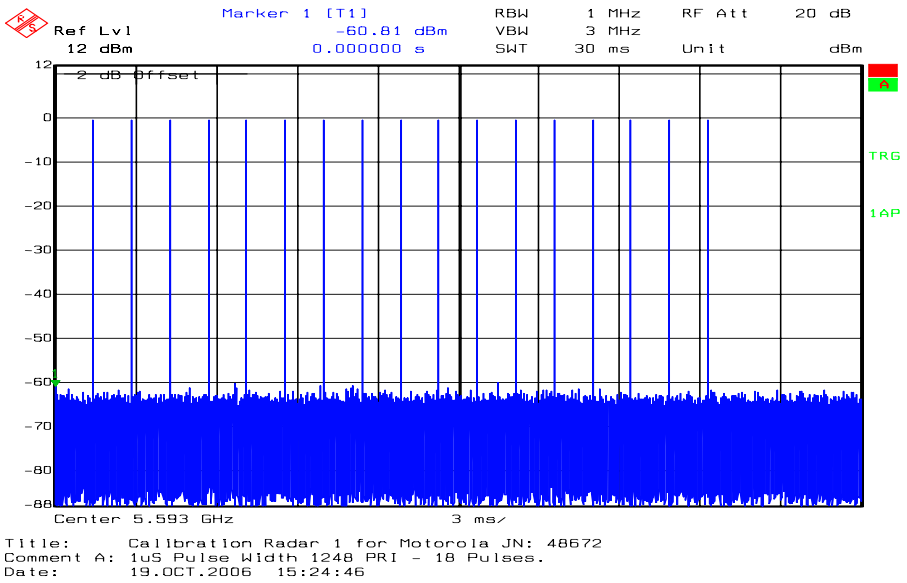
The U-NII detection bandwidth Is the calculated as $F_H - F_{L.}$

To comply, the U-NII bandwidth must be at least 80% of the EUT 99% emission bandwidth.

The maximum 99% measured emission bandwidth was reported as 10.912MHz and 100% detection was archived over this range, thus the detection bandwidth exceeded the emission bandwidth.

Offset	Radar Freq	Trial										Detection Rate (%)
		1	2	3	4	5	6	7	8	9	10	
-5	5588 (F_L)	1	1	1	1	1	1	1	1	1	1	100
-4	5589	1	1	1	1	1	1	1	1	1	1	100
-3	5590	1	1	1	1	1	1	1	1	1	1	100
-2	5591	1	1	1	1	1	1	1	1	1	1	100
-1	5592	1	1	1	1	1	1	1	1	1	1	100
0	5593	1	1	1	1	1	1	1	1	1	1	100
1	5594	1	1	1	1	1	1	1	1	1	1	100
2	5595	1	1	1	1	1	1	1	1	1	1	100
3	5596	1	1	1	1	1	1	1	1	1	1	100
4	5597	1	1	1	1	1	1	1	1	1	1	100
5	5598 (F_H)	1	1	1	1	1	1	1	1	1	1	100

UNII Detection Bandwidth (Continued)



Radar #1	Pulse Width (µS)	PRI (µS)	Number of Pulses
	1	1248	18

7.2.15. Statistical Analysis

Aggregate for all short pulse waveforms = (100 + 100 + 100 +100)/4 = 100%

Radar 1 - 100% Detection				
Trial#	Pulse Width (µS)	Pri (µS)	Pulses /Burst	Detection
1	1	1428	18	1
2	1	1428	18	1
3	1	1428	18	1
4	1	1428	18	1
5	1	1428	18	1
6	1	1428	18	1
7	1	1428	18	1
8	1	1428	18	1
9	1	1428	18	1
10	1	1428	18	1
11	1	1428	18	1
12	1	1428	18	1
13	1	1428	18	1
14	1	1428	18	1
15	1	1428	18	1
16	1	1428	18	1
17	1	1428	18	1
18	1	1428	18	1
19	1	1428	18	1
20	1	1428	18	1
21	1	1428	18	1
22	1	1428	18	1
23	1	1428	18	1
24	1	1428	18	1
25	1	1428	18	1
26	1	1428	18	1
27	1	1428	18	1
28	1	1428	18	1
29	1	1428	18	1
30	1	1428	18	1

Radar 2 - 100% Detection				
Trial#	Pulse Width (µS)	Pri (µS)	Pulses /Burst	Detection
1	3	208	24	1
2	2	160	25	1
3	3	193	24	1
4	4	225	27	1
5	1	194	26	1
6	1	225	25	1
7	3	151	26	1
8	3	181	28	1
9	1	200	24	1
10	4	175	26	1
11	2	161	25	1
12	1	200	26	1
13	2	152	28	1
14	4	227	28	1
15	5	172	23	1
16	4	218	29	1
17	3	209	24	1
18	3	217	28	1
19	1	185	26	1
20	4	182	27	1
21	2	212	26	1
22	5	220	26	1
23	1	211	25	1
24	3	158	25	1
25	3	167	25	1
26	4	160	26	1
27	1	167	26	1
28	4	168	25	1
29	3	160	23	1
30	5	179	29	1

Statistical Analysis (Continued)

Radar 3 - 100% Detection				
Trial#	Pulse Width (µS)	Pri (µS)	Pulses /Burst	Detection
1	9	420	16	1
2	7	229	16	1
3	9	472	17	1
4	9	456	16	1
5	8	382	18	1
6	7	295	18	1
7	10	235	16	1
8	8	486	17	1
9	7	275	17	1
10	7	284	17	1
11	10	238	17	1
12	8	451	17	1
13	8	434	16	1
14	8	322	17	1
15	8	312	17	1
16	10	412	16	1
17	8	370	17	1
18	7	204	17	1
19	6	278	17	1
20	9	357	16	1
21	9	403	18	1
22	9	444	18	1
23	9	350	17	1
24	8	384	16	1
25	10	281	17	1
26	9	398	17	1
27	7	265	18	1
28	9	255	18	1
29	8	482	17	1
30	6	425	17	1

Radar 4 - 100% Detection				
Trial#	Pulse Width (µS)	Pri (µS)	Pulses /Burst	Detection
1	14	447	12	1
2	18	468	15	1
3	13	224	12	1
4	15	411	13	1
5	20	433	13	1
6	14	234	15	1
7	13	204	15	1
8	20	359	15	1
9	15	210	14	1
10	14	209	13	1
11	16	326	14	1
12	13	395	14	1
13	12	233	15	1
14	18	461	13	1
15	16	209	14	1
16	12	350	16	1
17	12	205	12	1
18	18	427	14	1
19	18	351	14	1
20	14	387	12	1
21	11	465	15	1
22	16	384	12	1
23	18	209	15	1
24	12	447	15	1
25	17	203	14	1
26	17	381	12	1
27	18	380	15	1
28	13	269	15	1
29	19	470	14	1
30	11	298	15	1

Statistical Analysis (Continued)

Radar 5 - 100% Detection			
Trial#	Table	Detection	Chirp(MHz)
1	1	1	16
2	2	1	13
3	3	1	8
4	4	1	12
5	5	1	6
6	6	1	5
7	7	1	8
8	8	1	17
9	9	1	12
10	10	1	8
11	11	1	13
12	12	1	6
13	13	1	16
14	14	1	5
15	15	1	12
16	16	1	11
17	17	1	8
18	18	1	19
19	19	1	5
20	20	1	12
21	21	1	16
22	22	1	7
23	23	1	12
24	24	1	17
25	25	1	15
26	26	1	18
27	27	1	20
28	28	1	9
29	29	1	10
30	30	1	14

Radar 6 - 100% Detection		
Trial#	Frq in band	Detection
1	2	1
2	3	1
3	1	1
4	1	1
5	2	1
6	2	1
7	3	1
8	3	1
9	2	1
10	2	1
11	3	1
12	2	1
13	3	1
14	4	1
15	3	1
16	2	1
17	1	1
18	3	1
19	2	1
20	2	1
21	1	1
22	3	1
23	1	1
24	1	1
25	2	1
26	2	1
27	3	1
28	3	1
29	2	1
30	2	1

Statistical Analysis (Continued)

The following 30 tables list the parameters calculated for the long pulse radar waveform 5 calculated in labview.

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	2	74	1394	0
2	2	92	1735	0
3	3	71	1685	1839
4	3	96	1841	1141
5	2	59	1038	0
6	2	73	1595	0
7	3	92	1419	1115
8	3	72	1003	1907
9	2	60	1082	0

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	2	52	1607	0
2	2	66	1389	0
3	2	93	1283	0
4	3	52	1004	1051
5	2	56	1500	0
6	1	100	0	0
7	2	68	1235	0
8	1	78	0	0
9	3	94	971	1160
10	2	97	1278	0
11	3	59	1073	1156
12	1	95	0	0
13	1	58	0	0

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	2	61	1223	0
2	2	62	1259	0
3	2	57	1473	0
4	3	84	1876	1170
5	2	77	1362	0
6	2	54	1281	0
7	1	77	0	0
8	2	81	1881	0
9	2	71	1465	0
10	3	67	1783	1528
11	2	80	1821	0
12	2	51	1663	0
13	2	62	1516	0
14	1	63	0	0
15	2	60	1633	0
16	1	74	0	0

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	2	61	1223	0
2	2	62	1259	0
3	2	57	1473	0
4	3	84	1876	1170
5	2	77	1362	0
6	2	54	1281	0
7	1	77	0	0
8	2	81	1881	0
9	2	71	1465	0
10	3	67	1783	1528
11	2	80	1821	0
12	2	51	1663	0
13	2	62	1516	0
14	1	63	0	0
15	2	60	1633	0
16	1	74	0	0

Statistical Analysis (Continued)

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	3	100	1826	1034
2	2	73	1279	0
3	2	79	1865	0
4	2	97	1116	0
5	1	62	0	0
6	3	62	1476	988
7	2	63	1226	0
8	3	85	1201	1533
9	3	66	1020	1353
10	1	93	0	0
11	3	55	1856	1807

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	1	89	0	0
2	3	92	1711	960
3	3	70	1532	1888
4	3	56	1641	1223
5	2	91	1187	0
6	3	62	1032	1656
7	2	78	1066	0
8	3	90	1085	1088
9	3	98	1281	1758
10	3	86	1328	1840
11	3	90	1325	1270
12	2	74	1181	0
13	1	95	0	0
14	1	69	0	0
15	2	66	1343	0
16	2	56	1847	0
17	2	65	1662	0
18	3	67	1795	1721
19	1	81	0	0

Statistical Analysis (Continued)

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	2	68	1680	0
2	2	99	1028	0
3	2	72	1649	0
4	2	58	1887	0
5	2	60	1610	0
6	1	56	0	0
7	3	71	1877	1032
8	3	70	1181	1578
9	2	88	1206	0
10	2	61	1640	0

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	2	90	945	0
2	1	61	0	0
3	2	96	1615	0
4	3	52	1286	1794
5	1	98	0	0
6	2	76	968	0
7	2	55	1249	0
8	2	77	1909	0
9	1	57	0	0
10	2	64	1299	0

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
0	3	71	1822	1738
1	2	84	1682	0
2	2	93	1637	0
3	3	82	1784	1253
4	2	66	1217	0
5	2	53	1726	0
6	2	89	1566	0
7	2	70	1072	0

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	2	87	1448	0
2	2	84	1857	0
3	3	52	1371	1122
4	3	94	1398	1705
5	1	83	0	0
6	2	72	1311	0
7	3	82	1015	1119
8	1	89	0	0
9	3	97	1137	1402
10	2	64	1568	0
11	1	88	0	0
12	2	51	1019	0
13	2	66	1608	0
14	2	72	1557	0
15	1	77	0	0
16	2	91	1325	0

Statistical Analysis (Continued)

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	3	67	1322	1241
2	2	97	1629	0
3	1	51	0	0
4	1	69	0	0
5	1	56	0	0
6	1	52	0	0
7	2	66	1395	0
8	2	50	1876	0
9	1	74	0	0
10	3	61	1285	1003
11	2	90	1512	0

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	2	88	1166	0
2	2	77	943	0
3	2	81	1399	0
4	2	95	1675	0
5	1	98	0	0
6	1	58	0	0
7	3	71	1473	994
8	3	78	1316	1174
9	1	50	0	0
10	2	97	1516	0
11	3	64	1531	1042
12	2	81	1054	0
13	2	56	1000	0
14	2	52	1811	0
15	2	87	1185	0
16	1	74	0	0
17	2	77	1784	0
18	2	73	1112	0
19	2	73	1255	0

Statistical Analysis (Continued)

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	1	51	0	0
2	3	85	1135	1557
3	1	97	0	0
4	2	71	1760	0
5	1	91	0	0
6	3	94	1772	1462
7	3	59	1231	1678
8	2	82	1437	0
9	3	91	1151	916
10	1	92	0	0
11	2	77	1491	0
12	1	85	0	0
13	1	78	0	0
14	2	68	991	0
15	3	76	1329	1310
16	2	76	1299	0
17	3	53	1206	1901
18	2	99	999	0

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	2	89	1121	0
2	2	66	1190	0
3	2	60	1151	0
4	2	90	1678	0
5	2	90	1733	0
6	3	62	1306	1124
7	2	94	1118	0
8	1	85	0	0
9	1	85	0	0
10	2	99	926	0
11	1	90	0	0
12	2	97	1206	0
13	2	84	1637	0
14	2	98	1602	0
15	2	96	1740	0
16	1	50	0	0
17	1	98	0	0

Statistical Analysis (Continued)

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	2	96	1718	0
2	2	77	1414	0
3	2	99	990	0
4	2	100	1431	0
5	2	95	1182	0
6	1	69	0	0
7	3	70	1848	1287
8	2	51	1317	0
9	3	67	1530	1297

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Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	3	92	1351	1099
2	2	92	1849	0
3	2	78	1046	0
4	1	78	0	0
5	2	79	1124	0
6	2	68	1636	0
7	2	56	978	0
8	2	54	1800	0
9	2	70	1154	0
10	2	65	1733	0
11	2	87	1165	0
12	2	51	953	0
13	2	82	1729	0

Statistical Analysis (Continued)

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	1	78	0	0
2	2	74	1514	0
3	2	68	1064	0
4	1	92	0	0
5	1	62	0	0
6	2	56	1161	0
7	3	64	1093	1766
8	2	74	1368	0
9	2	61	961	0
10	3	81	1122	1551
11	3	68	1280	1733
12	2	61	1735	0
13	3	57	1558	1884
14	2	64	1338	0
15	1	54	0	0
16	2	72	981	0

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	1	85	0	0
2	3	80	1757	1321
3	1	78	0	0
4	1	81	0	0
5	3	66	1108	1879
6	3	57	1204	1071
7	2	85	1288	0
8	3	87	1520	1064
9	1	58	0	0
10	1	67	0	0
11	2	52	1172	0
12	1	58	0	0
13	1	82	0	0
14	3	52	1036	1021
15	2	79	1070	0
16	2	74	966	0
17	3	87	1342	1395
18	1	82	0	0
19	3	85	1526	1804
20	2	64	1589	0

Statistical Analysis (Continued)

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	2	94	1156	0
2	3	75	1483	1437
3	2	54	1876	0
4	1	76	0	0
5	1	55	0	0
6	3	95	1278	1265
7	3	53	1789	1205
8	2	85	1168	0
9	2	64	1001	0
10	2	60	1072	0
11	2	80	1312	0
12	2	54	1508	0
13	2	69	1765	0
14	1	90	0	0
15	2	62	1003	0

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	3	59	980	1743
2	2	53	1909	0
3	3	70	1038	993
4	1	50	0	0
5	2	65	1723	0
6	3	59	1195	1687
7	2	63	1789	0
8	2	64	1291	0
9	1	74	0	0
10	2	83	1191	0
11	2	56	1746	0
12	2	77	1829	0
13	3	70	1868	1765
14	2	54	1893	0
15	2	84	1172	0
16	1	86	0	0
17	1	96	0	0

Statistical Analysis (Continued)

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	3	91	1799	1449
2	2	91	1617	0
3	3	88	1169	1876
4	2	81	1166	0
5	2	55	1839	0
6	1	99	0	0
7	1	95	0	0
8	2	63	1309	0
9	3	82	1216	1355
10	3	85	1098	1589
11	1	69	0	0
12	2	61	1438	0
13	3	60	1310	974
14	1	65	0	0
15	2	61	1260	0
16	2	53	1130	0

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	1	60	0	0
2	2	65	1705	0
3	2	93	1220	0
4	1	76	0	0
5	3	69	1573	1750
6	1	93	0	0
7	3	86	1258	1231
8	1	91	0	0
9	2	96	1648	0

Statistical Analysis (Continued)

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	2	88	1487	0
2	1	69	0	0
3	3	83	1669	989
4	3	78	1476	1115
5	1	84	0	0
6	3	96	1673	1033
7	2	64	1487	0
8	2	71	1280	0

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	3	67	1692	1872
2	2	55	1518	0
3	1	52	0	0
4	2	86	1525	0
5	2	55	1397	0
6	2	84	1876	0
7	2	88	1209	0
8	3	58	1069	1940
9	2	54	1167	0
10	1	71	0	0
11	1	95	0	0
12	3	86	1284	1388

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	2	80	1783	0
2	2	65	1703	0
3	3	84	1826	1678
4	3	75	1099	1627
5	2	99	941	0
6	2	81	1716	0
7	2	75	1473	0
8	1	76	0	0
9	3	66	1501	1152
10	1	59	0	0
11	3	99	1104	1542
12	2	58	1483	0
13	2	66	1753	0
14	1	62	0	0
15	1	80	0	0
16	3	55	1791	1776
17	1	55	0	0

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	2	73	1372	0
2	3	64	1001	1230
3	1	55	0	0
4	3	76	1289	1410
5	2	66	1848	0
6	2	64	1582	0
7	1	82	0	0
8	2	91	1776	0
9	2	53	1902	0
10	1	59	0	0

Statistical Analysis (Continued)

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	1	96	0	0
2	2	65	989	0
3	1	99	0	0
4	1	83	0	0
5	2	93	1765	0
6	1	77	0	0
7	2	75	1090	0
8	3	59	962	1663
9	2	54	1919	0
10	2	60	1663	0
11	3	63	1278	1833
12	1	61	0	0

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	1	64	0	0
2	1	84	0	0
3	1	53	0	0
4	2	90	929	0
5	1	92	0	0
6	2	69	1167	0
7	1	53	0	0
8	2	69	1850	0
9	1	53	0	0

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	2	74	1580	0
2	2	62	1440	0
3	3	62	1431	1481
4	1	71	0	0
5	2	86	1067	0
6	3	89	1889	1699
7	2	94	1504	0
8	2	92	1853	0
9	2	59	1202	0
10	3	57	1847	1552
11	2	60	1305	0
12	2	96	1730	0
13	3	70	1776	977
14	3	92	1844	997
15	3	83	1599	1282
16	2	90	1335	0

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	1	54	0	0
2	3	63	1335	1362
3	1	75	0	0
4	2	56	965	0
5	3	64	1503	1805
6	2	93	1832	0
7	1	91	0	0
8	3	66	1095	1408
9	3	52	987	1585
10	2	95	1682	0
11	1	52	0	0
12	2	70	1365	0
13	3	63	1194	1399
14	2	66	1123	0
15	2	60	1684	0
16	3	74	1001	1087
17	2	87	1451	0
18	2	91	1654	0

7.2.16. Dynamic Frequency Selection (DFS) Part 15.407(h)(2)- Slave Device

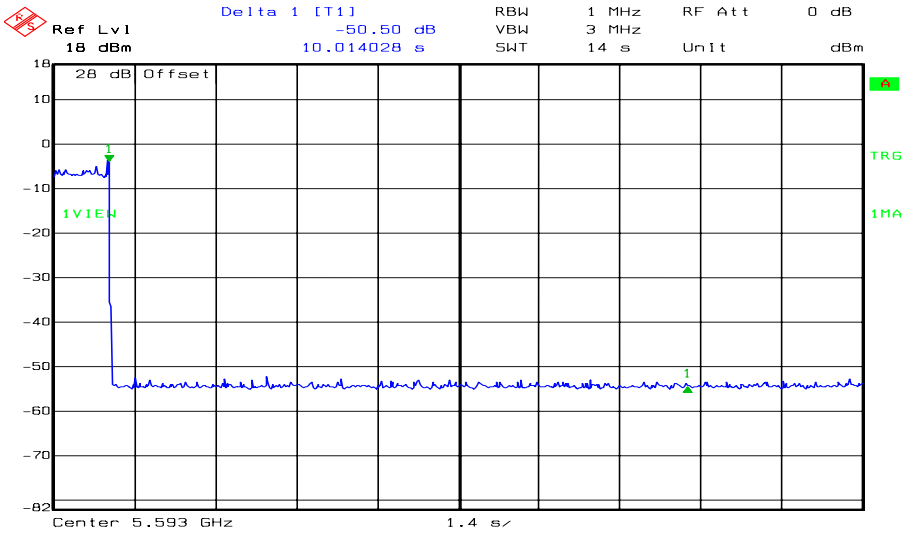
7.2.16.1. Channel Move/Closing Time

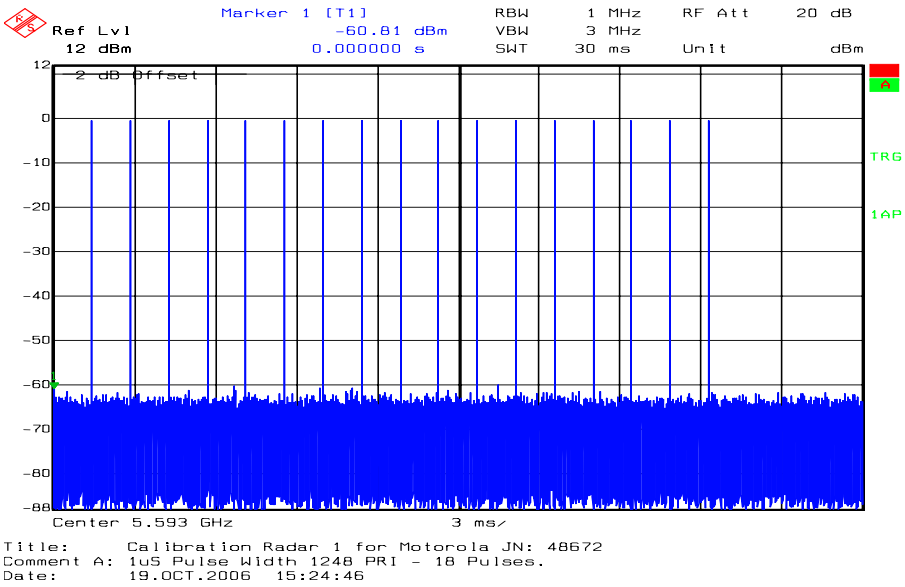
The only required testing for clients without radar detection is Channel closing transmission time and Channel Move time.

The EUT was configured as shown in Setup Diagram – UUT – Slave, Radar Injection at Master.

Results: Radar #1

The EUT stopped transmitting within the first radar burst and thus the move time is could not be computed however, it can be seen from the plots that the EUT ceased transmission within 1/10 of a division from the beginning of the radar burst, 1/10 of a division equates to 140mS which is less than 200mS (The limit) and thus compliance can be seen. No further transmission took place during the 10s period after the burst shown by the markers.



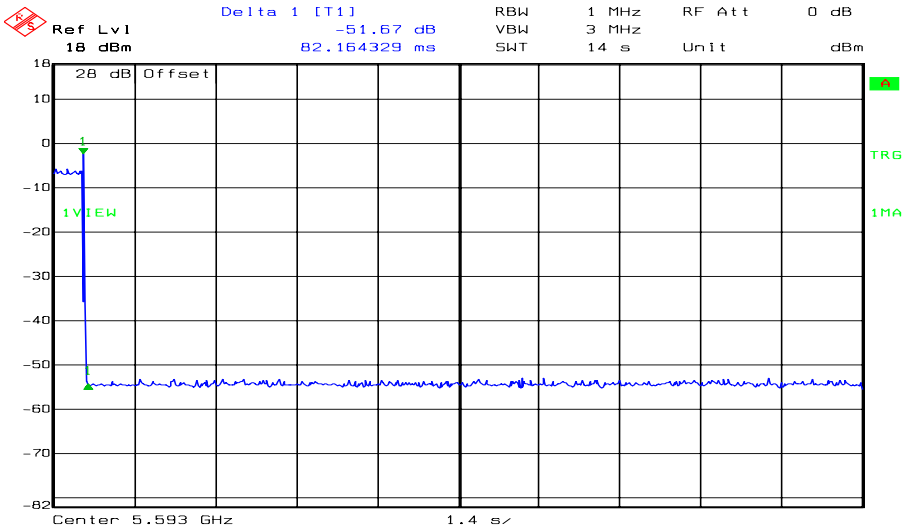


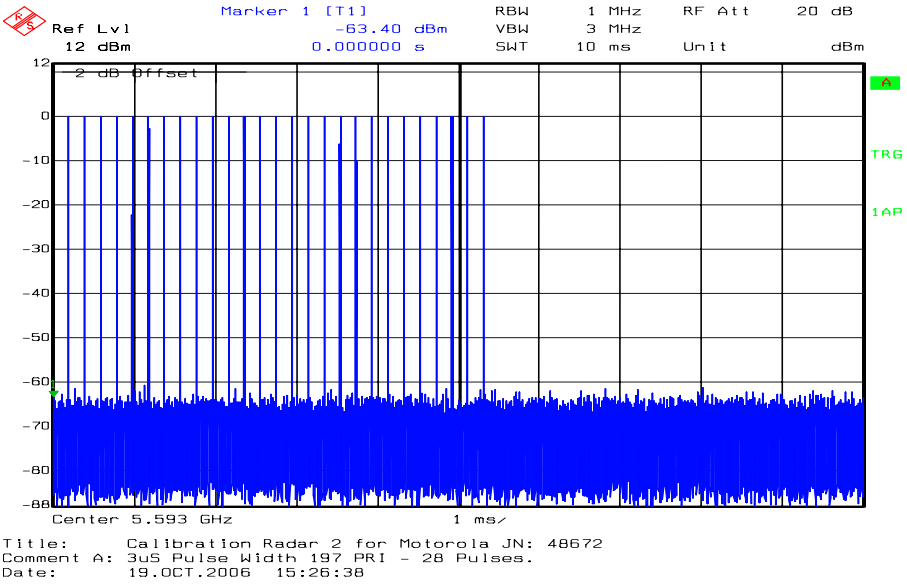
Radar #1	Pulse Width (µS)	PRI (µS)	Number of Pulses
	1	1248	18

Channel Move/Closing Time (Continued)

Results: Radar #2

The EUT stopped transmitting within the first radar burst and thus the move time is could not be computed however, it can be seen from the plots that the EUT ceased transmission within 1/10 of a division from the beginning of the radar burst, 1/10 of a division equates to 140mS which is less than 200mS (The limit) and thus compliance can be seen. No further transmission took place during the 10s period after the burst shown by the markers.



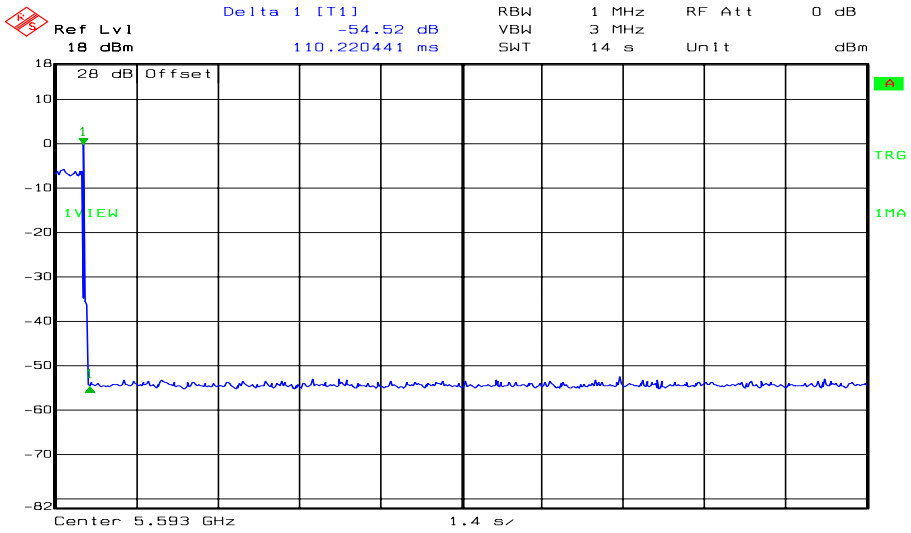


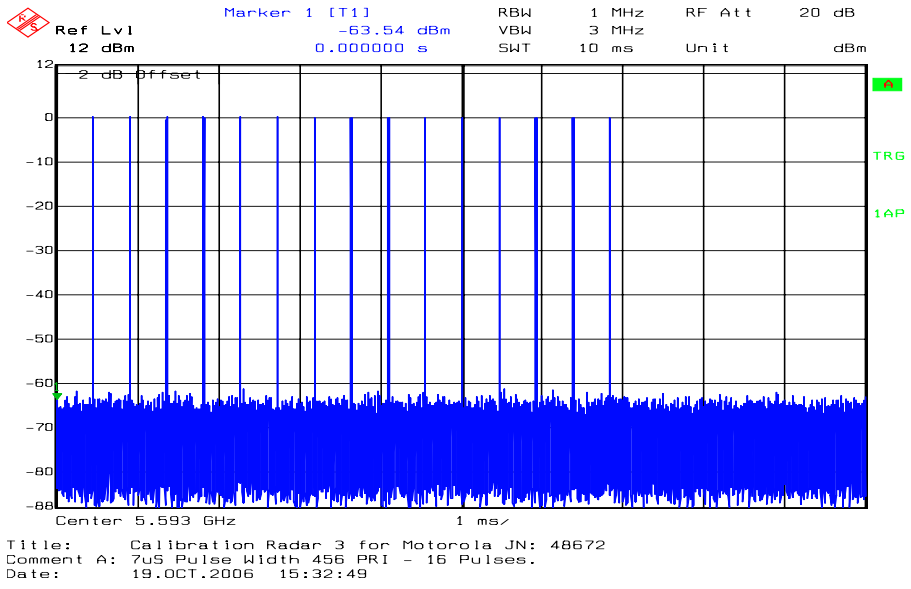
Radar #2	Pulse Width (µS)	PRI (µS)	Number of Pulses
	3	197	28

Channel Move/Closing Time (Continued)

Results: Radar #3

The EUT stopped transmitting within the first radar burst and thus the move time is could not be computed however, it can be seen from the plots that the EUT ceased transmission within 1/10 of a division from the beginning of the radar burst, 1/10 of a division equates to 140mS which is less than 200mS (The limit) and thus compliance can be seen. No further transmission took place during the 10s period after the burst shown by the markers.



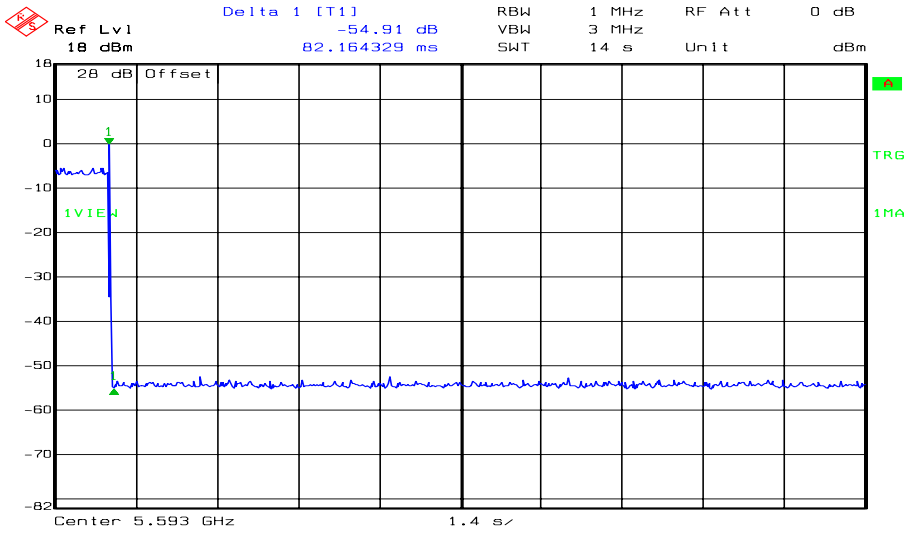


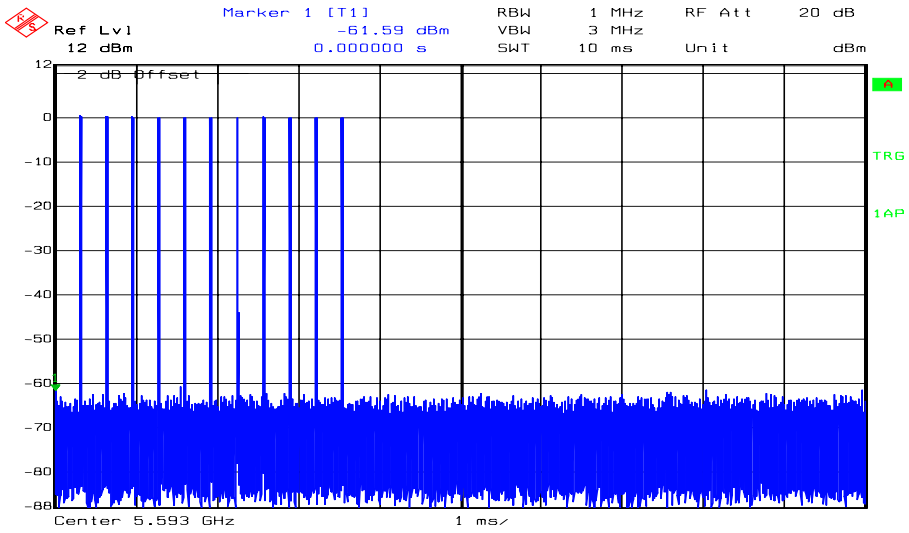
Radar #3	Pulse Width (µS)	PRI (µS)	Number of Pulses
	7	456	16

Channel Move/Closing Time (Continued)

Results: Radar #4

The EUT stopped transmitting within the first radar burst and thus the move time is could not be computed however, it can be seen from the plots that the EUT ceased transmission within 1/10 of a division from the beginning of the radar burst, 1/10 of a division equates to 140mS which is less than 200mS (The limit) and thus compliance can be seen. No further transmission took place during the 10s period after the burst shown by the markers.



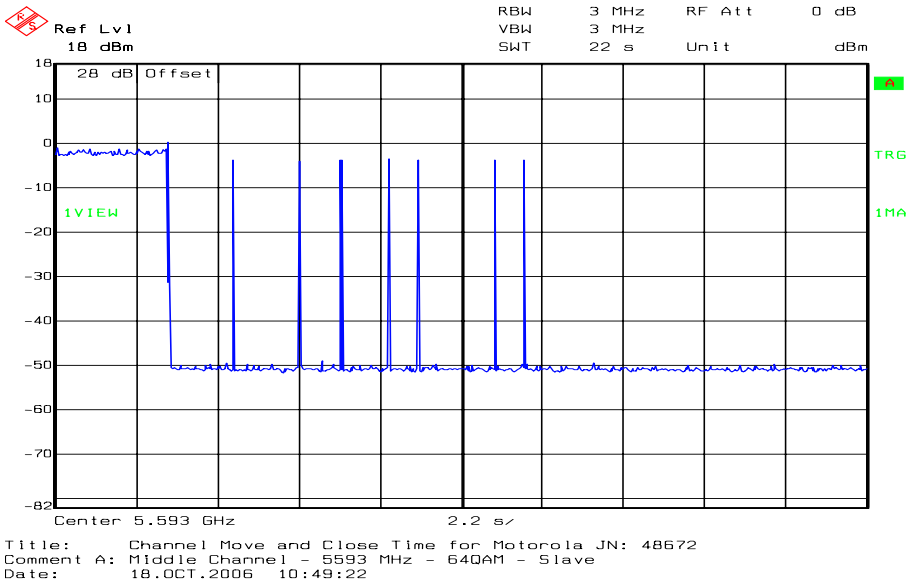


Radar #4	Pulse Width (µS)	PRI (µS)	Number of Pulses
	18	323	12

Channel Move/Closing Time (Continued)

Results: Radar #5

The EUT stopped transmitting within the radar burst and thus the move time is could not be computed however, it can be seen from the plot below that the move time is better than -11 seconds. The limit being +200mS.



Radar #5, Chirp Frequency 8MHz

Burst	Pulses/Burst	Pulse Width (µS)	PRI 1 (µS)	PRI 2 (µS)
1	3	51	1458	998
2	3	97	1196	1444
3	1	57	N/A	N/A
4	2	92	1862	N/A
5	3	77	1049	1301
6	2	54	1019	N/A
7	2	58	1330	N/A
8	2	64	1767	N/A

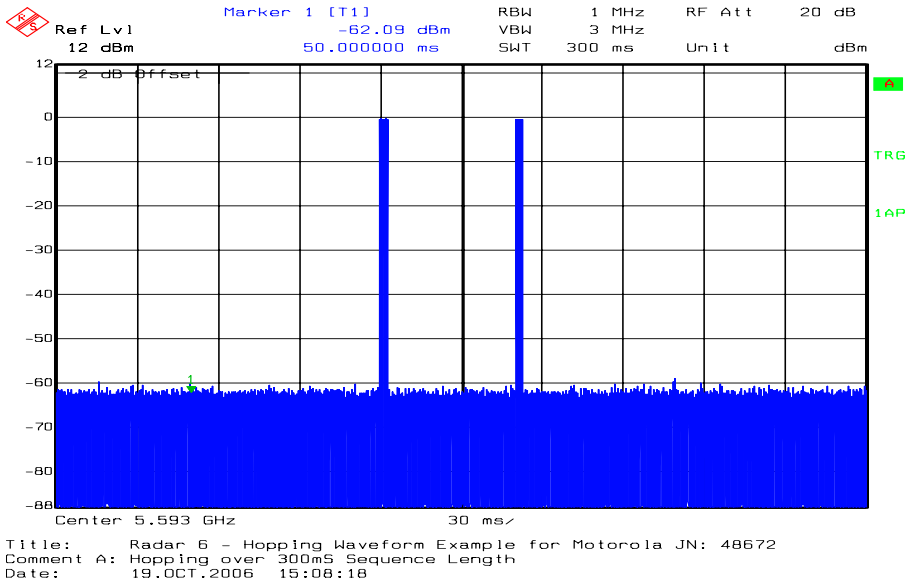
Channel Move/Closing Time (Continued)

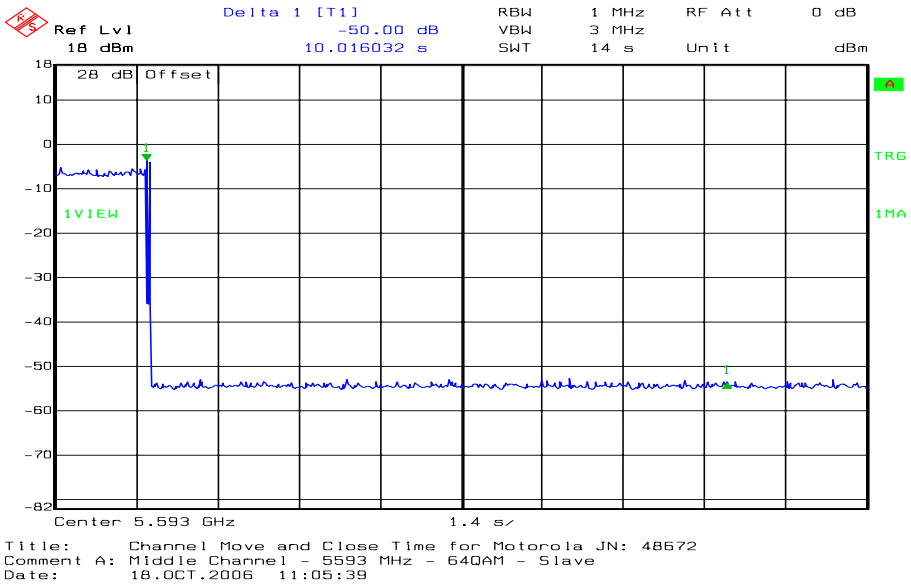
Results: Radar #6

The EUT stopped transmitting within the first radar burst and thus the move time is could not be computed however, it can be seen from the plots that the EUT ceased transmission within 1/10 of a division from the beginning of the radar burst, 1/10 of a division equates to 140mS which is less than 200mS (The limit) and thus compliance can be seen. No further transmission took place during the 10s period after the burst shown by the markers.

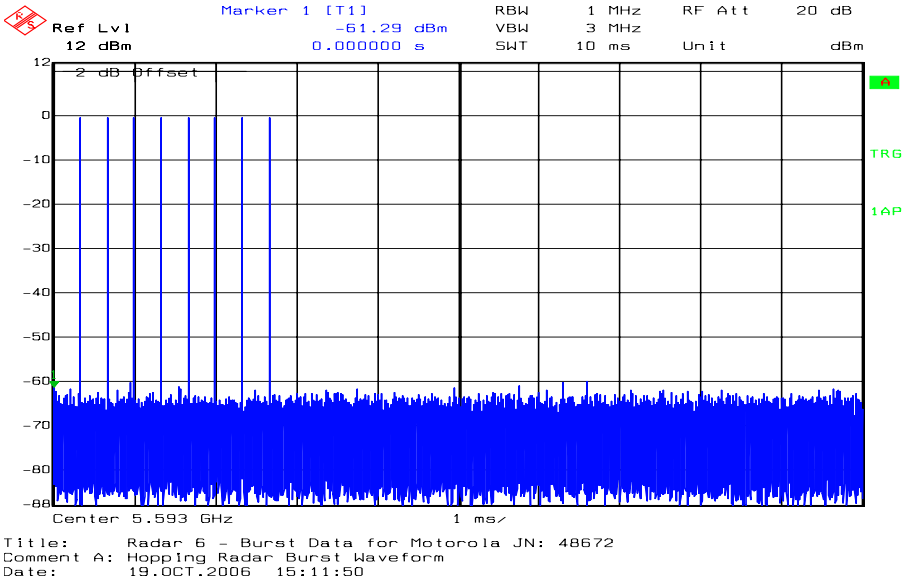
It can be seen below that there were 2 hops of the radar burst captured in the channel bandwidth of the EUT.

Parameters for simulated radar used.





Channel Move/Closing Time (Continued)



Radar #6 Burst Data	Pulse Width (µS)	PRI (µS)	Number of Pulses
	1	333	9

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
Dynamic Frequency Selection (DFS) - Amplitude	95%	0.3 dB
Dynamic Frequency Selection (DFS) - Time	95%	4%

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.

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A028	Horn Antenna	Eaton	91888-2	304	08 June 2006	36
A031	2 to 4 GHz Eaton Horn Antenna	Eaton	91889-2	557	08 June 2006	36
A1037	Chase Bilog Antenna	Chase EMC Ltd	CBL6112B	2413	26 Jan. 2006	12
A1069	ESH3-Z5	Rohde & Schwarz	ESH3-Z5	837469/012	31 Jan. 2006	12
A1088	Termination	Suhner	Nil	5627C	Cal before use	12
A1272	Power splitter	mini circuits	ZFRSC-42	002	Cal before use	12
A1275	Power splitter	mini circuits	ZFSC-2-2500	001	Cal before use	12
A1360	ESH3-Z2 Pulse Limiter	Rohde & Schwarz	ESH3-Z2	A1360-20112003	06 Sept. 2006	12
A1391	10dB/18GHz/50Ohm Attenuator	HUBER + SUHNER AG	757987	6810.17.B	Cal before use	12
A1392	20dB/18GHz/50Ohm Attenuator	HUBER + SUHNER AG	757456	6820.17.B	Cal before use	12
A1393	20dB/18GHz/50Ohm Attenuator	HUBER + SUHNER AG	757456	6820.17.B	Cal before use	12
A1396	10dB/18GHz/50Ohm Attenuator	HUBER + SUHNER AG	757987	6810.17.B	Cal before use	12
A1491	FSC 96341	M/A	FSC 96341	2082-6173-10	Cal before use	12
A1492	FSC 96341	M/A	FSC96341	2082-6173-10	Cal before use	12
A1495	FSC 96341	M/A	FSC 96341	2082-6146-06	Cal before use	12
A1496	FSC 96341	M/A	FSC 96341	2083-6146-06	Cal before use	12
A1534	Preamplifier 1-26.5 GHz	Hewlett Packard	8449B OPT H02	3008A00405	Cal before use	12
A1536	Variable Attenuators	Hwelett Packard	9494B & 9496B	3308A30801 & 3308A19649	Cal before use	12
A244	20 dB Attenuator	Schaffner	6820-17-B	None	Cal before use	12
A254	WG 14 Microwave Horn	Flann Microwave	14240-20	139	06 Oct. 2006	36
A255	WG 16 Microwave Horn	Flann Microwave	16240-20	519	06 Oct. 2006	36

Test Equipment Used (Continued)

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A428	WG 12 horn	Flann	12240-20	134	06 Oct. 2006	36
A430	WG 18 horn	Flann	18240-20	425	06 Oct. 2006	36
A435	WG 22 horn	Flann	22240-20	400	21 July 2006	36
C1081	Cable 2m	Rosenberger	FA210A102 0M5050	28463-2	14 Feb. 2006	12
C1082	Cable 2m	Rosenberger	FA210A102 0M5050	28463-1	Cal before use	12
C1111	Cable	Semflex Inc.	X116BFSX1 0080	0337	05 May 2006	12
C1153	SMA cable	The Workhorse	WHU26-3636-060	None	Cal before use	12
C1154	SMA cable	The Workhorse	WHU26-3636-060	None	Cal before use	12
C1164	1.5m N-type Cable	Rosenberger Micro-Coax	FA210A101 5007070	43188-1	Cal before use	12
C1166	2m N-Type Cable	Rosenberger Micro-Coax	FA210A102 0007070	43189-02	Cal before use	12
C1180	BNC cable	RS Components	284-3792	0	Cal before use	12
C1182	BNC cable	RS Components	284-3809	0	Cal before use	12
C1192	SMA Cable	Rosenberger	FA210A101 5M3030	27141-07	28 April 2006	12
C151	Cable	Rosenberger	UFA210A-1-1181-70x70	None	22 Sept. 2006	12
C160	Cables	Rosenberger	UFA210A-1-1181-70x70	None	29 Jan. 2006	12
C348	Cable	Rosenberger	UFA210A-1-1181-70x70	2993	29 Jan. 2006	12

Test Equipment Used (Continued)

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
C363	BNC Cable	Rosenberger	RG142	None	29 Jan. 2006	12
C433	Cable	Not stated	Not stated	Not stated	30 Jan. 2006	12
G0547	Function / Arbitrary Waveform Generator	Agilent Technologies	33220A	MY44003336	14 Mar. 2006	12
G0550	15 MHz Function/Arbitrary Waveform Generator	Hewlett Packard	33120A	US36005697	Cal before Use	-
M1122	40 GHz Peak Power Sensor	Boonton Electronics	57340	3297	17 May 2006	12
M1123	RF Power Meter	Boonton	4531	138201	17 May 2006	12
M1178	Thermo-Hygro	RS	212-124	N/A	11 Feb. 2006	12
M1242	FSEM30 Spectrum Analyser	Rohde & Schwarz, Inc.	FSEM30	845986_022	22 Sept. 2006	12
M1252	HP 83640A 40 GHz Signal Generator	HP	83640A	3119A00489	10 Aug 2006	12
M1263	ESIB7	Rohde & Schwarz	ESIB7	100265	12 Jan. 2006	12
M1264	Thermo Hygro	RS	212-124	0	18 Feb. 2006	12
M1266	Thermo Hygro	RS	212-124	0	18 Feb. 2006	12
M1269	True RMS Multimeter	Fluke	179	90250210	16 Feb. 2006	12
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016	07 Aug 2006	12
M295	HP 8564E	Hewlett Packard	8564E	3846A01561	19 Dec. 2005	12
S202	Site 2	RFI	2	S202-15011990	25 Sept 2006	12
S212	Site 12	RFI	12		Cal before use	-

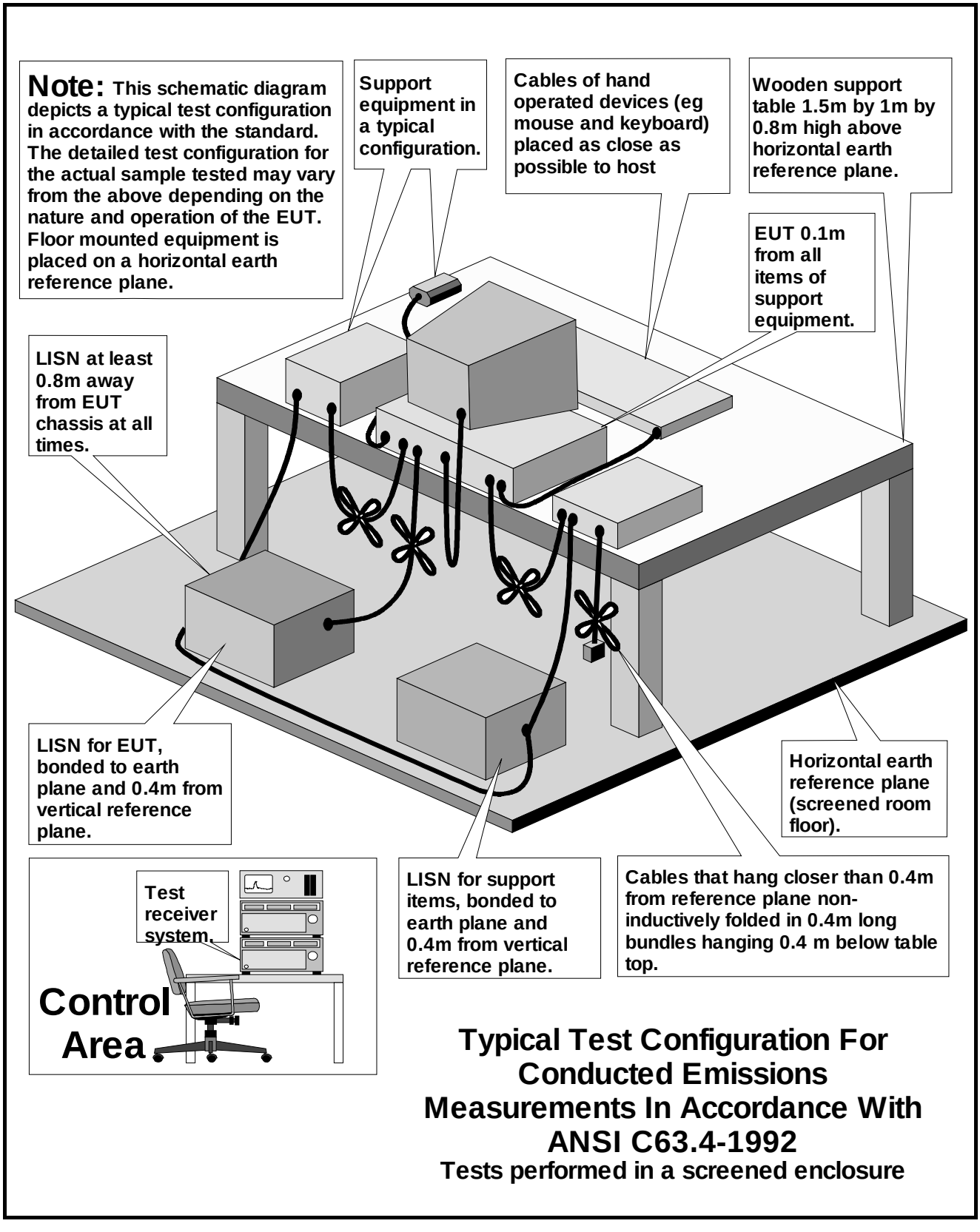
NB In accordance with UKAS requirements, all the measurement equipment is on a calibration schedule.

Appendix 2. Test Configuration Drawings

This appendix contains the following drawings:

Drawing Reference Number	Title
DRG\48672JD02\EMICON	Test configuration for measurement of conducted emissions.
DRG\48672JD02\EMIRAD	Test configuration for measurement of radiated emissions.

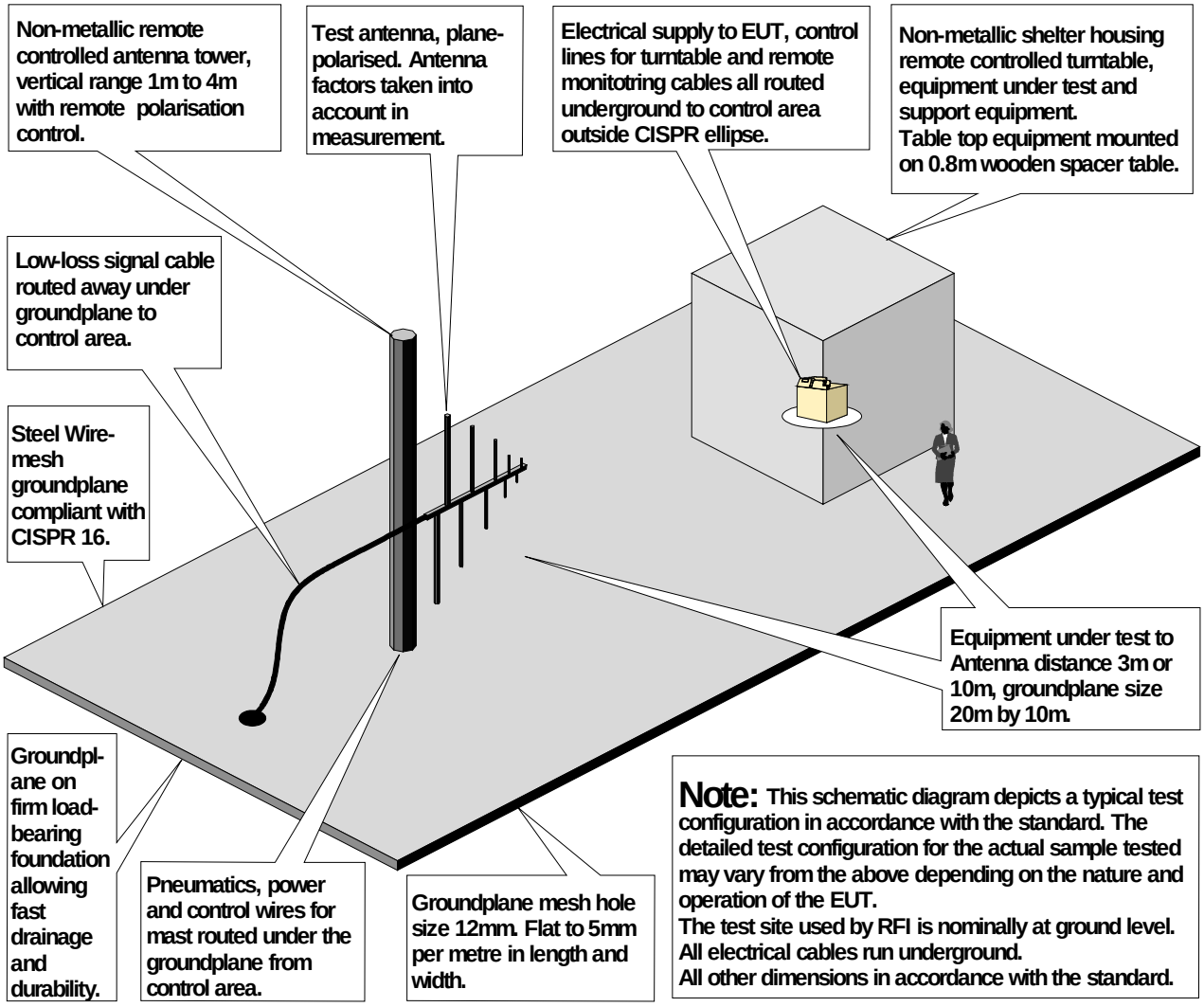
DRG\48672JD02\EMICON



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

Tests performed in a screened enclosure

DRG\48672JD02\EMIRAD



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

Test Configuration For Radiated Emissions Measurements

Reflection-free area: >60m by 52m (CISPR ellipse)

Groundplane Earthed

Control room outside CISPR ellipse