

Straubing, 11 August 2006

TEST-REPORT**No. 51357-060324-4 (Edition 2)****for****IHF150FXD1 (T16)**

including the variants:

T16MT01011 Aftermarket**T16TY01011 Aftermarket Toyota****T16LX01011 Aftermarket Lexus****T16VL01011 Volvo****T16YR01011 Toyota/SWC****Bluetooth Wireless Handsfree Set**

Applicant: Motorola GmbH

Purpose of testing: To show compliance with

FCC Code of Federal Regulations,
Part 15 Subpart C, Section 15.247

Note:

The test data of this report relate only to the individual item which has been tested. This report shall not be reproduced except in full extent without the written approval of the testing laboratory.

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1. Administrative Data

Test item (EUT)	
Type designation	IHF150FXD1 (T16) including the variants T16MT01011 Aftermarket T16TY01011 Aftermarket Toyota T16LX01011 Aftermarket Lexus T16VL01011 Volvo T16YR01011 Toyota/SWC
Serial number(s):	N/A
Type of equipment:	RF Transceiver
Technical data	
Frequency range	2400 - 2483.5 MHz
Operational frequencies	79 Channels at 1 MHz spacing
Type of modulation	FHSS
Pulse frequency	N/A
Pulse width	N/A
Antenna	Integrated antenna:
Power supply	12 V DC
Applicant: (full address)	Motorola GmbH Lilienthalstraße 15 D-85579 Neubiberg
Contract identification:	
Contact person:	Mark Harris
Manufacturer:	Applicant
Application details	
Receipt of EUT:	27 April 2006
Date of test:	May 2006
Note:	The applicant required a second source of critical components to be fully tested as well. Therefore, two sets of test results are included in this test report.
Responsible for testing:	Martin Steindl
Responsible for test report:	Martin Steindl

2. Identification of Test Laboratory

DETAILS OF THE TEST LABORATORY

COMPANY NAME:	Senton GmbH EMI/EMC Test Center
ADDRESS:	Aeussere Fruhlingsstrasse 45 D-94315 Straubing Germany
LABORATORY ACCREDITATION:	DAR-Registration No. DAT-P-171/94-02
FCC TEST SITE LISTING	90926
INDUSTRY CANADA TEST SITE REGISTRATION	IC 3050
NAME FOR CONTACT PURPOSES:	Mr. Johann Roidt
TELEPHONE: (+49) (0)9421 5522-0	FAX: (+49) (0)9421 5522-99

PERSONNEL INVOLVED IN THIS TEST REPORT

LABORATORY MANAGER:	 Mr. Johann Roidt
RESPONSIBLE FOR TESTING:	 Mr. Martin Steindl
RESPONSIBLE FOR TEST REPORT:	Mr. Martin Steindl

SUMMARY OF TEST RESULTS

The tested sample complies with the requirements set forth in the **Code of Regulations Part 15 Subpart C, Section 15.247 of the Federal Communication Commission (FCC)**.

3. Operation Mode of EUT

Transmitter operating continuously,
full tests were performed on lowest, middle and highest RF channel.

4. Configuration

Configuration of the EUT

A full test setup was supplied by the applicant

Cables connected to the EUT

Not applicable

Peripheral devices connected to the EUT

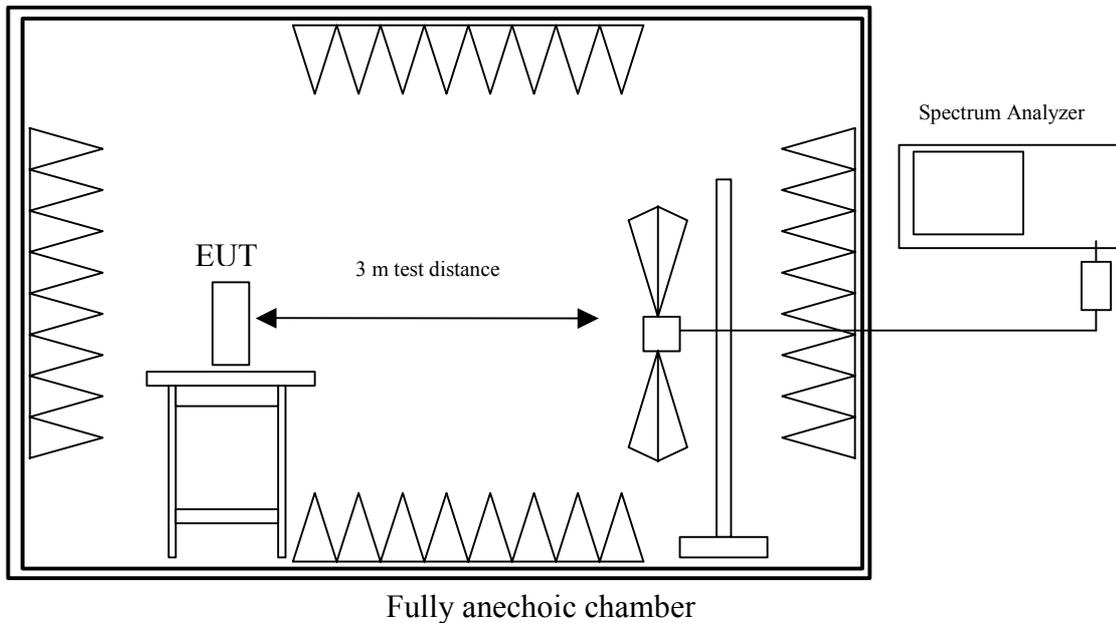
Not applicable

5. Measuring Methods

5.1. Mean power of emissions 30 MHz – 1 GHz

Rules and Specifications:	Section 15.247
Guide:	ANSI C63.4

Measurement Procedure:
 Radiated emissions are measured over the frequency range from 30 MHz to 1 GHz. Measurements were made in both the horizontal and vertical planes of polarization in a fully anechoic room using a spectrum analyzer with the detector function set to peak and resolution bandwidth set to 100 kHz. All tests were performed at a test-distance of 3 meters. Hand-held or body-worn devices are rotated through three orthogonal axes to determine which attitude and configuration produces the highest emission relative to the limit and therefore shall be used for final testing.



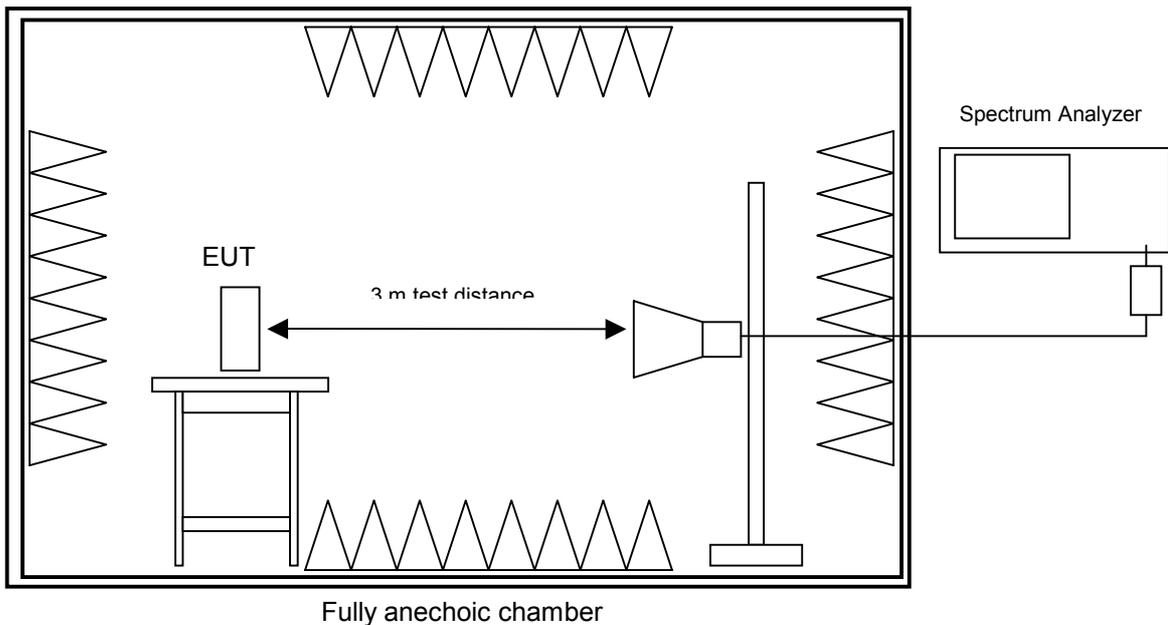
Test instruments used:

No.	Type	Model	Serial Number	Manufacturer
01	Spectrum Analyzer	FSP 30	100063	Rohde & Schwarz
113	Preamplifier	CPA9231A	3393	Schaffner
141	Trilog broadband antenna	VULB 9163	9163-188	Schwarzbeck
003	Fully anechoic room	No. 2	1452	Albatross Projects

5.2. Radiated Emission > 1 GHz

Rules and Specifications:	Section 15.247
Guide:	ANSI C63.4

Measurement Procedure:
<p>Radiated emissions are measured in the frequency range 1 GHz to 25 GHz. Resolution and video bandwidth of the spectrum analyzer are set to 1 MHz. Hand-held or body-worn devices are rotated through three orthogonal axes to determine which attitude and configuration produces the highest emission relative to the limit and therefore shall be used for final testing. Additional measurements are performed at critical frequencies with reduced span.</p> <p>EUT is rotated all around and receiving antenna is raised and lowered to find the maximum levels of emission. The cables and equipment are placed and moved within the range of position likely to find their maximum emissions.</p> <p>All tests are performed in a fully-anechoic chamber with a test-distance of 3 meters.</p> <p>If required preamplifiers are used for the whole frequency range. Special care is taken to avoid overload in transmit mode (using appropriate attenuators and filters if necessary).</p>

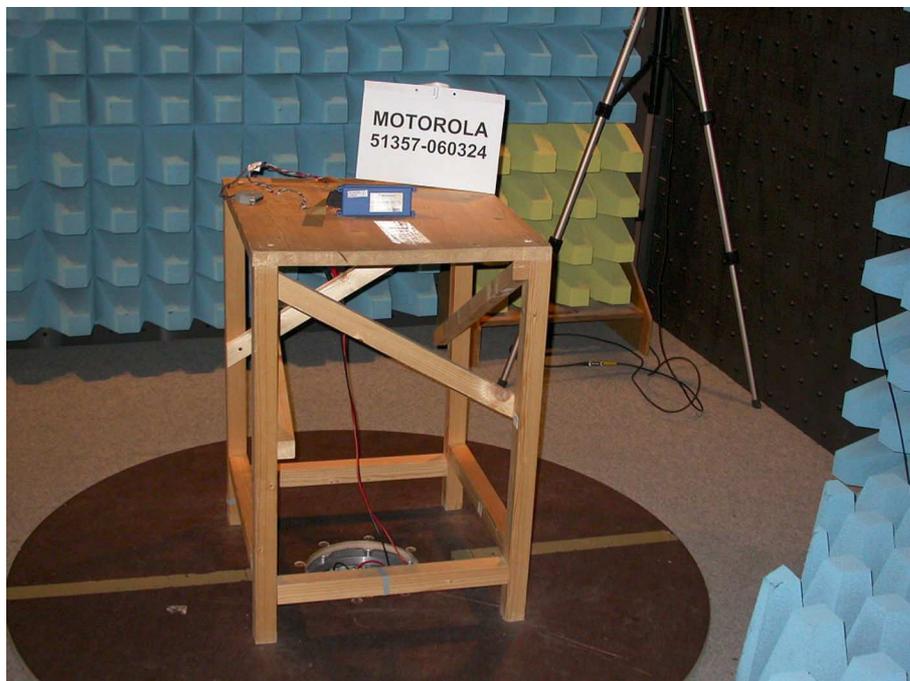


Test instruments used:

No.	Type	Model	Serial Number	Manufacturer
01	Spectrum Analyzer	FSP 30	100063	Rohde & Schwarz
143	Log. periodic antenna	3147	9112-1054	EMCO
145	Horn antenna	3115	9508-4553	EMCO
146	Horn antenna set	3160-03/-09	9112-1003	EMCO
114	Preamplifier 1-8 GHz	AFS3-00100800-32-LN	847743	Miteq
115	Preamplifier 8-18 GHz	ACO/180-3530	32641	CTT
003	Fully anechoic room	No. 2	1452	Albatross Projects

6. Photographs Taken During Testing

Test setup for radiated emission measurement 30 MHz – 25 GHz (fully anechoic room)



7. List of Measurements for First Source

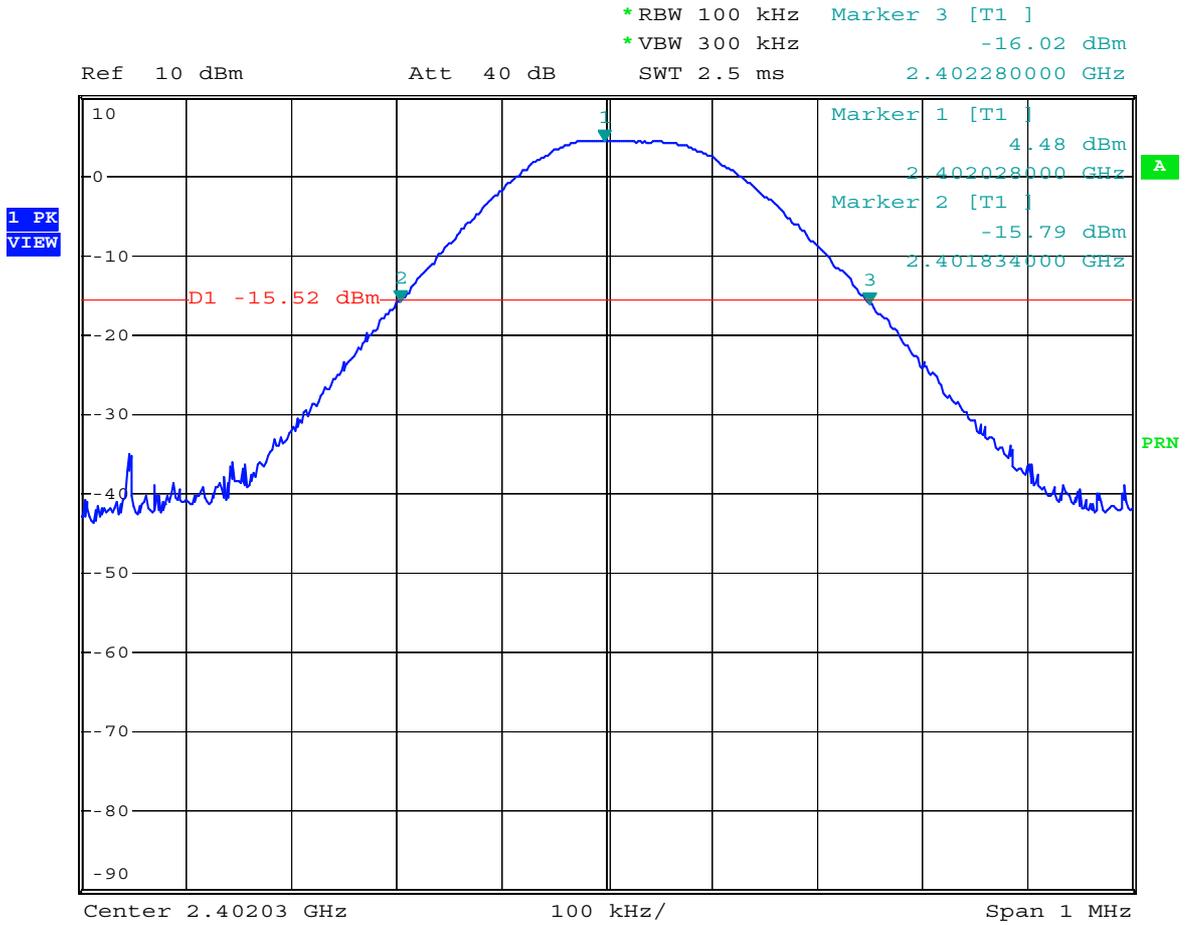
FCC Part 15 Subpart C			
Section(s):	Test	Page(s)	Result
	Transmitter:		
15.205	Restricted Bands Compliance	---	Pass
15.247 (a) (1)	Channel Bandwidth	12	Pass
15.247 (a) (1)	Hopping channel separation	16	Pass
15.247 (a) (1) (iii)	Number of Hopping Frequencies used	19	Pass
15.247 (a) (1) (iii)	Time occupancy on any channel	20	Pass
15.247 (b) (2)	Maximum Peak Output Power	22	Pass
15.247 (d)	Spurious emissions - conducted	---	N/A
15.247 (d) 15.209	Spurious emissions - radiated	26	Pass
15.203	Antenna Requirement	---	Integrated antenna
2.1093	RF Exposure Requirement	29	Pass
15.207	Conducted AC Powerline Emissions	---	N/A
	Receiver		
15.111	Spurious emissions on antenna port	---	N/A
15.109	Radiated Emissions	30	Pass

Channel Bandwidth

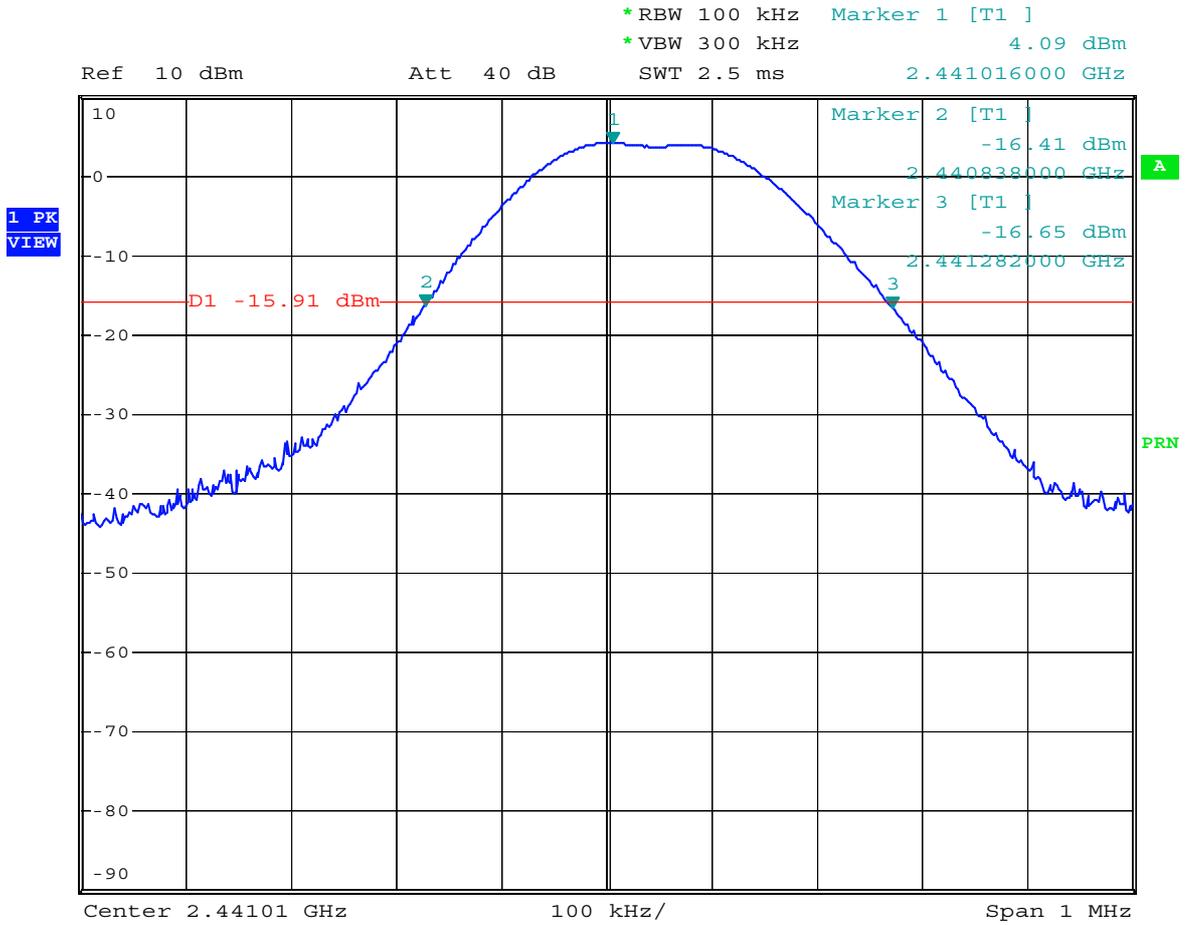
Rules and Specifications:	15.247 (a) (1)
Guide:	ANSI C63.4
Limit:	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth, whichever is greater.

Test Site:	Fully Anechoic Chamber.
Distance:	Radiated Measurement
Date of Test:	2 May 2006

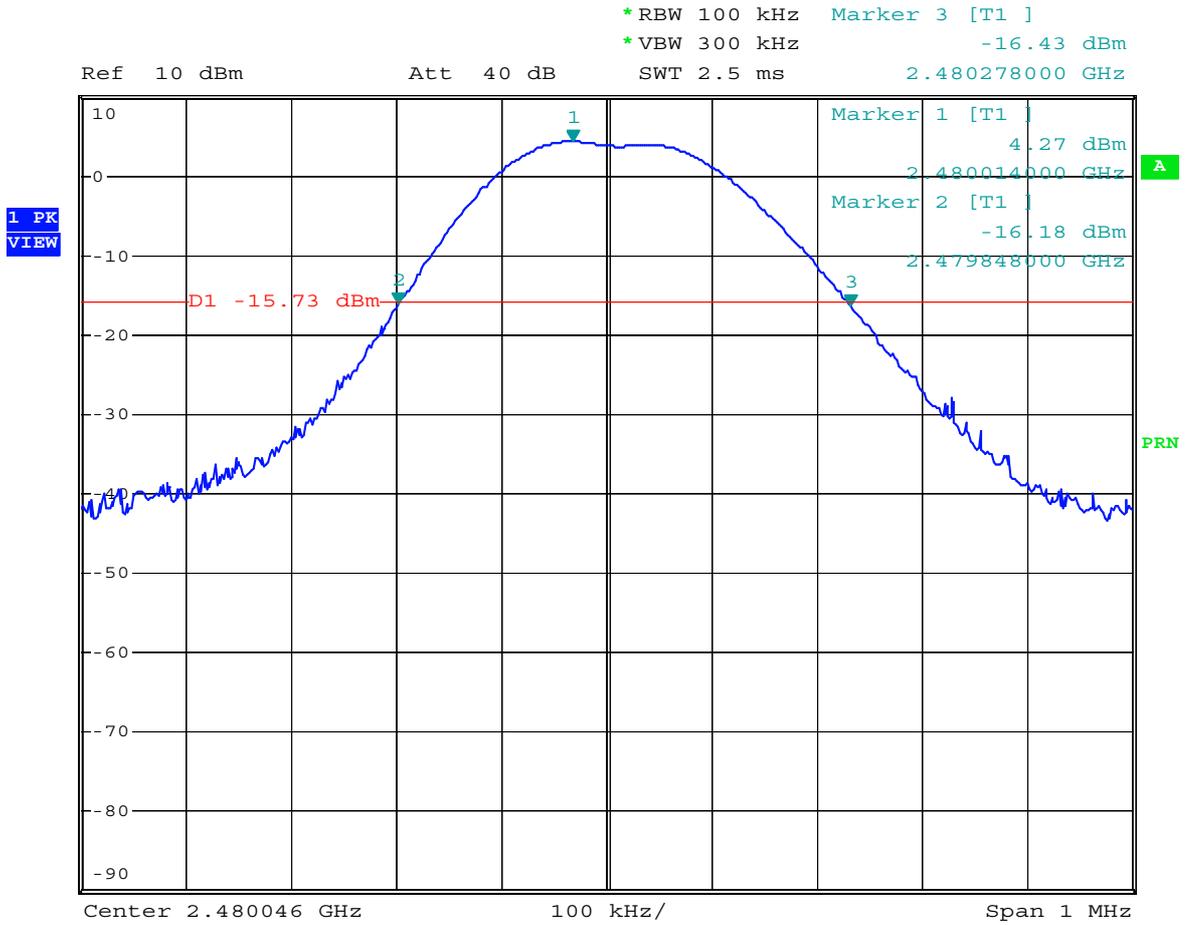
Frequency	Channel Bandwidth in kHz	Standard	Result
Low (2402 MHz)	446	< 1 MHz	pass
Middle 2441 MHz	454	< 1 MHz	pass
High 2480 MHz	430	< 1 MHz	pass



Comment: Motorola 060324: Channel Bandwidth (1st source)
Date: 2.MAY.2006 12:11:56



Comment: Motorola 060324: Channel Bandwidth (1st source)
Date: 2.MAY.2006 12:09:50



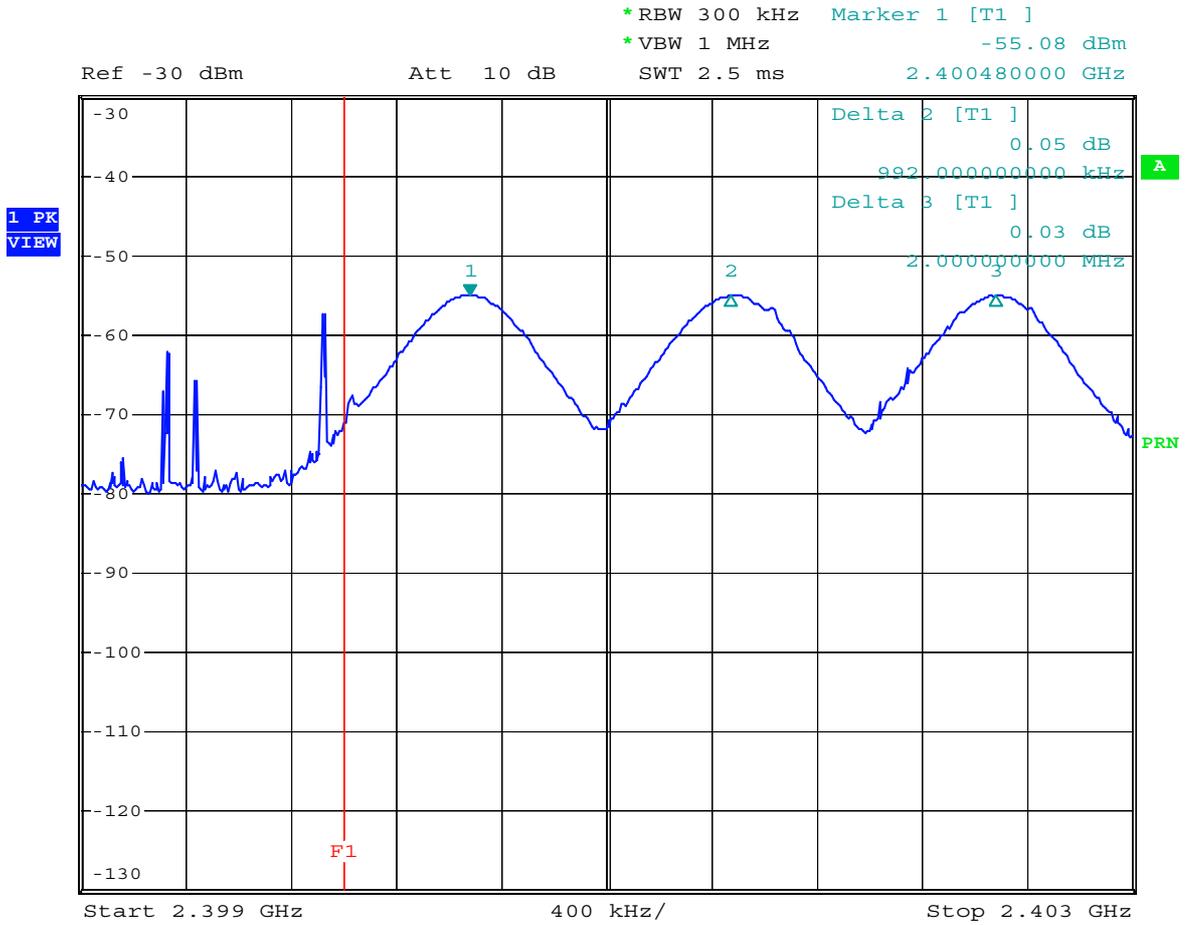
Comment: Motorola 060324: Channel Bandwidth (1st source)
Date: 2.MAY.2006 12:16:45

Hopping Channel Separation

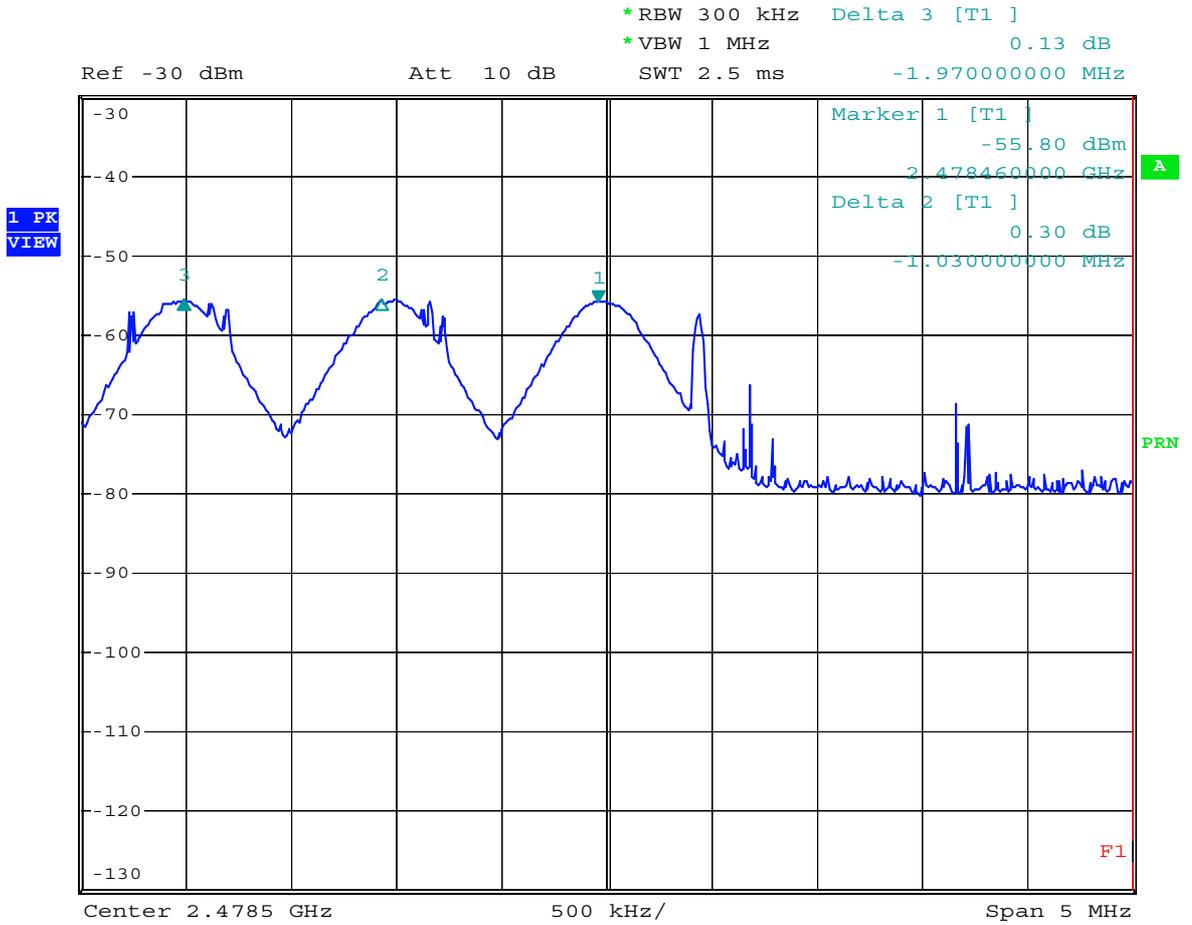
Rules and Specifications:	15.247 (a) (1)
Guide:	ANSI C63.4
Limit:	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth, whichever is greater.

Test Site:	Fully Anechoic Chamber
Distance:	Radiated Measurement
Date of Test:	2 May 2006

Channel Frequency	Measured	Required	Result
2402 MHz	0.992 MHz	> 464 kHz	Pass
2441 MHz		> 454 kHz	Pass
2480 MHz	1.030 MHz	> 430 kHz	Pass



Comment: Motorola 060324: Hopping Frequency Separation (1st source)
Date: 2.MAY.2006 12:01:27



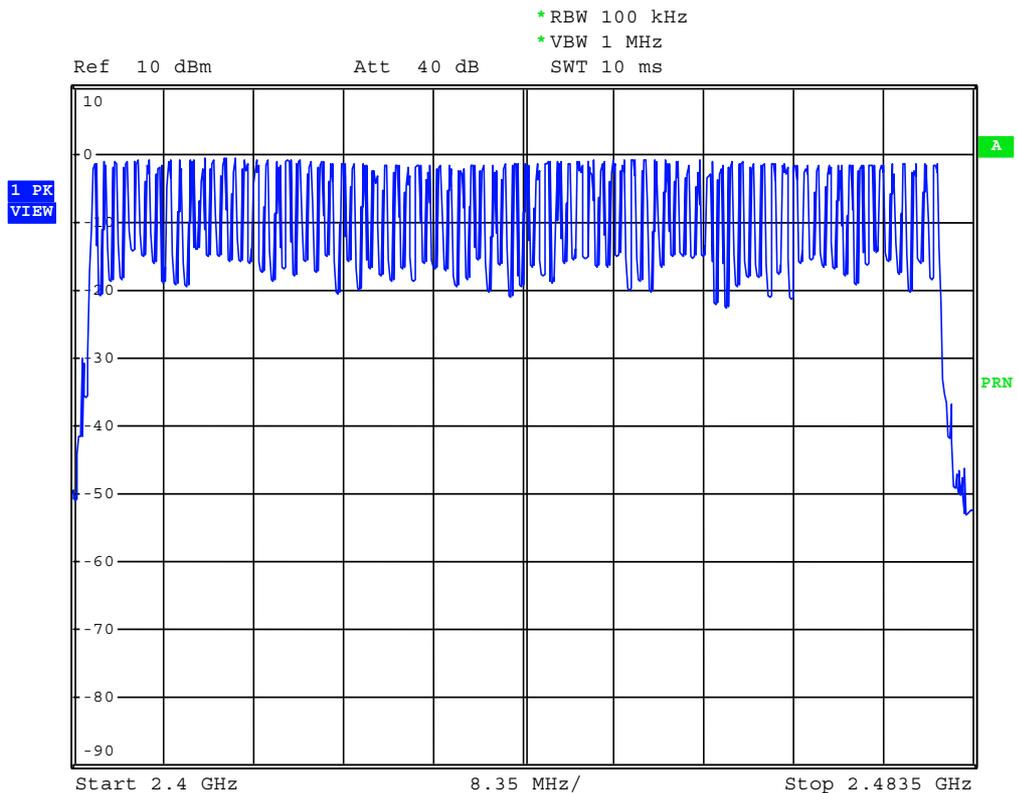
Comment: Motorola 060324: Hopping Frequency Separation (1st source)
Date: 2.MAY.2006 12:03:51

Number of Hopping Frequencies used

Rules and Specifications:	15.247 (a) (1) (iii)
Guide:	ANSI C63.4
Limit:	Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 non-overlapping channels.

Test Site:	Fully Anechoic Chamber
Distance:	Radiated Measurement
Date of Test:	2 May 2006

Number of Hopping Frequencies		Result
Measured	Required	
79	15	Pass

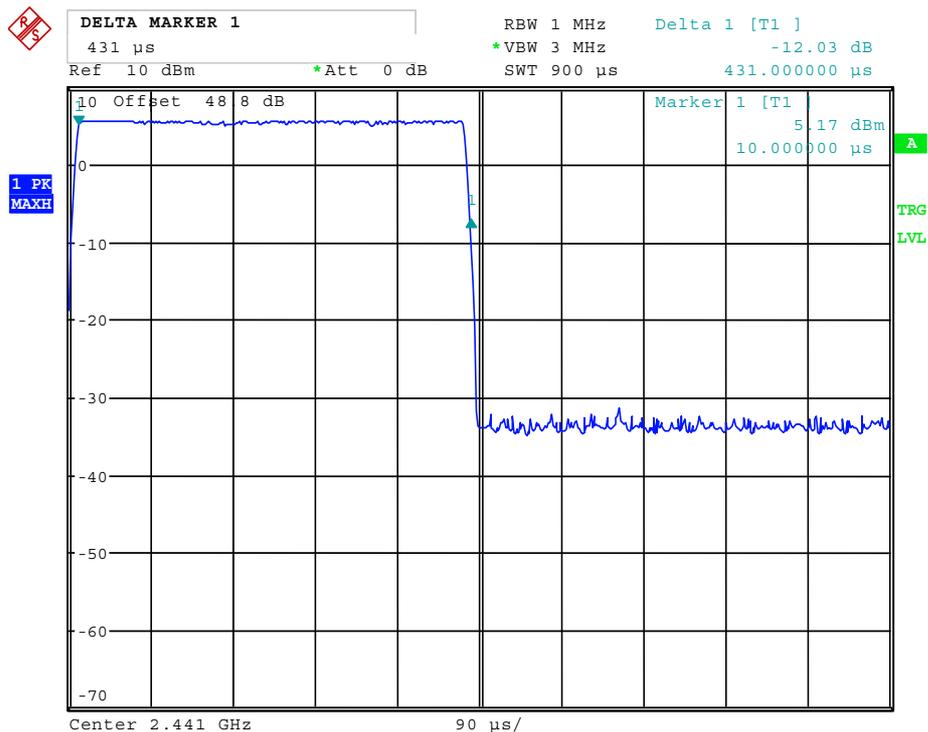


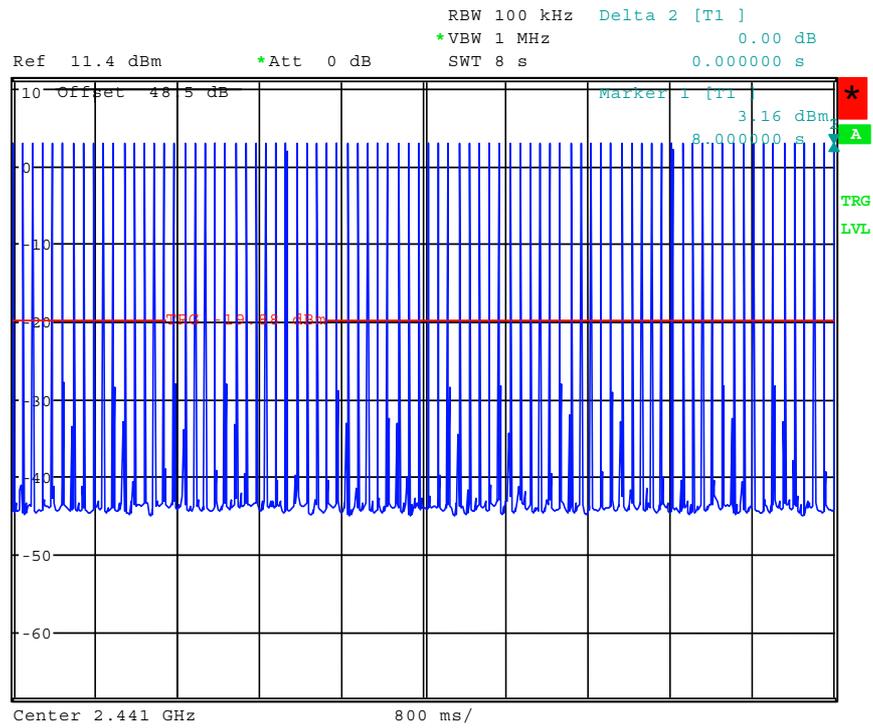
Time Occupancy on any Channel

Rules and Specifications:	15.247 (a) (1) (iii)
Guide:	ANSI C63.4
Limit:	The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

Test Site:	Fully Anechoic Chamber.
Distance:	Radiated Measurement
Date of Test:	2 May 2006

Time occupancy	Measured	Required	Result
	300 x 0.431 ms = 129.3 ms within a 30 seconds period	< 0.4 seconds within a 30 second period	Pass





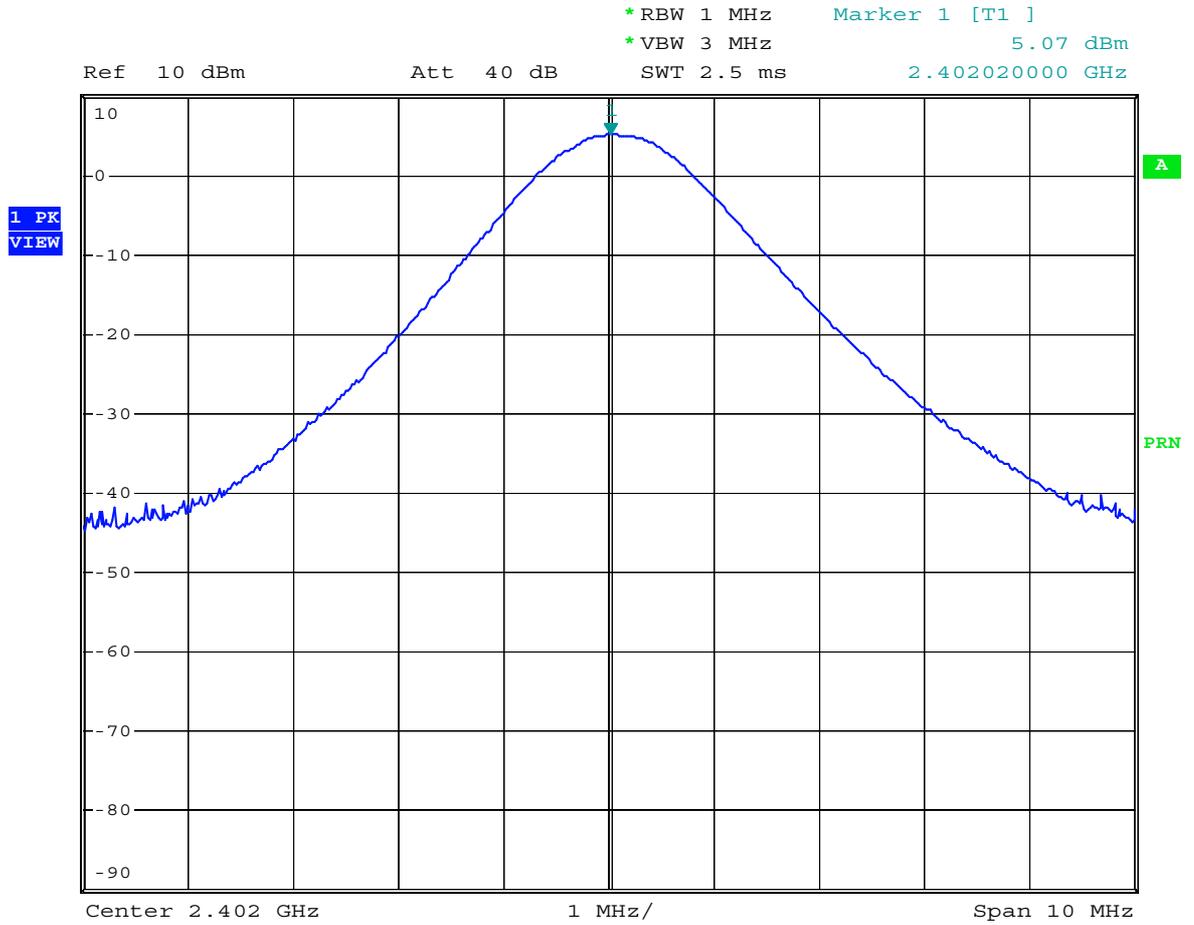
Maximum Peak Output Power

Rules and Specifications:	15.247 (b) (1)
Guide:	ANSI C63.4
Limit:	For frequency hopping systems operating in the 2400 -2483.5 MHz band: 1 watt for systems employing at least 75 hopping channels

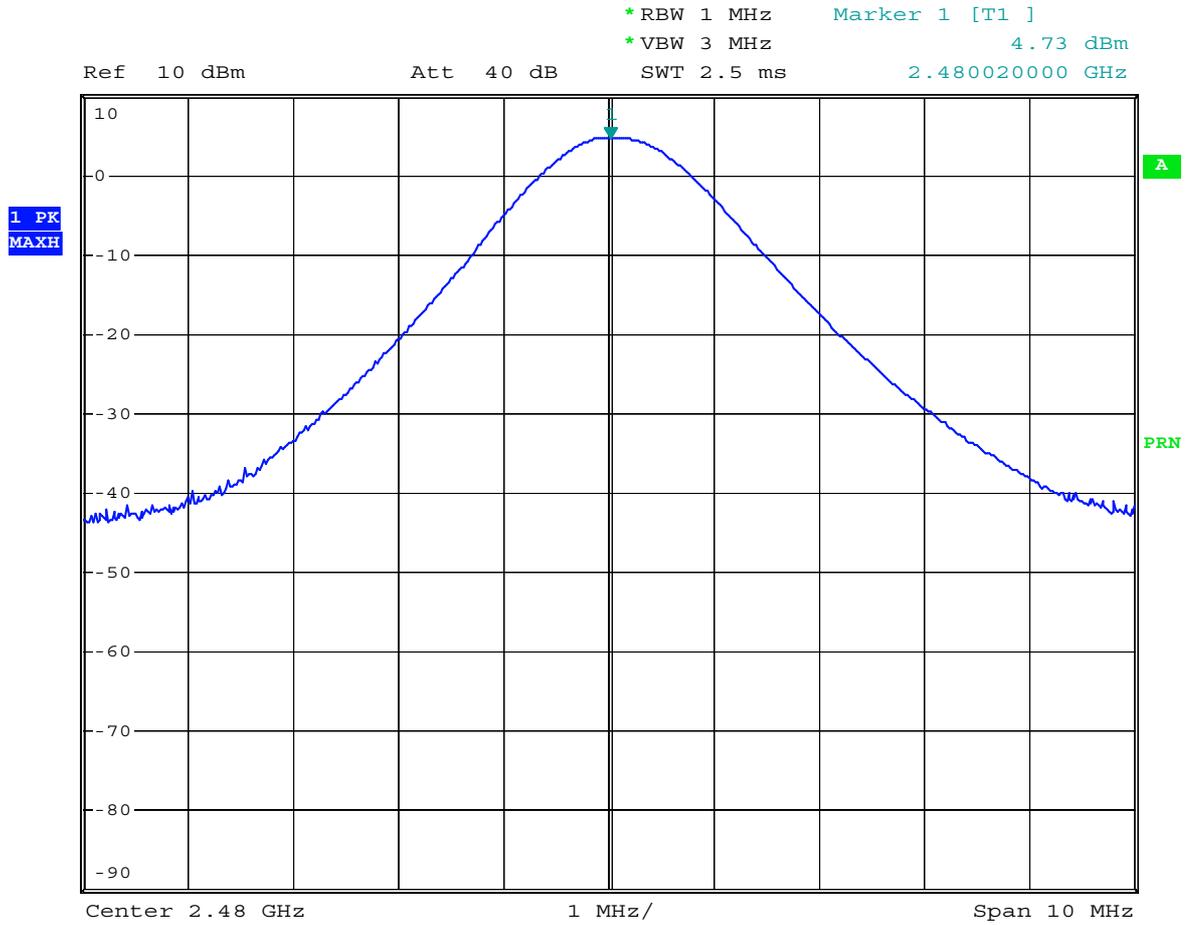
Test Site:	Fully Anechoic Chamber
Distance:	Conducted Measurement
Date of Test:	2 May 2006

Radiated Measurement

Frequency	Output Power in dBm	Output Power in W	Standard	Result
Low (2402 MHz)	5.01	0.00317	≤1.0W	Pass
Middle 2441 MHz	4.79	0.00301	≤1.0W	Pass
High 2480 MHz	4.96	0.00313	≤1.0W	Pass



Comment: Motorola 060324: Carrier Power (1st source)
Date: 2.MAY.2006 15:38:02



Comment: Motorola 060324: Carrier Power (1st source)
Date: 2.MAY.2006 15:39:49

Spurious Emissions – Radiated Measurement

Rules and Specifications:	15.247 (d)
Guide:	ANSI C63.4
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

Test Site:	Open Area Test Site (< 1GHz), Fully anechoic room (>1 GHz)
Tested Frequency:	TX mode, lowest frequency channel
Distance:	Radiated Measurement
Date of Test:	4 May 2006, 5 May 2006
Result:	Test passed

Frequency (MHz)	Antenna Polarization	Detector	Receiver Reading (dBµV)	Correction Factor (dB/m)	Pulse Train Correction (dB)	Final Value (dBµV/m)	Limit (dBµV/m)	Margin (dB)
540.050	horizontal	Quasi-Peak	15.3	21.0		36.3	83.3	47.0
660.060	horizontal	Quasi-Peak	14.2	23.4		37.6	83.3	45.7
780.065	horizontal	Quasi-Peak	15.1	24.3		39.4	83.3	43.9
900.076	horizontal	Quasi-Peak	12.3	26.5		38.8	83.3	44.5
1258.000	horizontal	Peak	15.8	28.8		44.5	54.0	9.5
1798.000	horizontal	Peak	13.5	31.3		44.7	83.3	38.5
2404.000	vertical	Peak	69.9	33.4		103.3		
4805.000	horizontal	Peak	9.3	34.3		43.5	54.0	10.5

Frequencies < 1 GHz were measured with a quasi-peak detector
 Frequencies > 1 GHz were measured with a peak detector

Sample calculation of field strength values:

$$\text{Field Strength (dBµV/m)} = \text{Analyzer Reading (dBµV)} + \text{Correction Factor (dB/m)}$$

Spurious Emissions – Radiated Measurement

Rules and Specifications:	15.247 (d)
Guide:	ANSI C63.4
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

Test Site:	Open Area Test Site (< 1GHz), Fully anechoic room (>1 GHz)
Tested Frequency:	TX mode, middle frequency channel
Distance:	Radiated Measurement
Date of Test:	4 May 2006, 5 May 2006
Result:	Test passed

Frequency (MHz)	Antenna Polarization	Detector	Receiver Reading (dBμV)	Correction Factor (dB/m)	Pulse Train Correction (dB)	Final Value (dBμV/m)	Limit (dBμV/m)	Margin (dB)
540.050	horizontal	Quasi-Peak	15.3	21.0		36.3	82.3	46.0
660.060	horizontal	Quasi-Peak	14.2	23.4		37.6	82.3	44.7
780.065	horizontal	Quasi-Peak	15.1	24.3		39.4	82.3	42.9
900.076	horizontal	Quasi-Peak	12.3	26.5		38.8	82.3	43.5
2440.000	horizontal	Peak	59.7	33.5		93.2		
4881.000	horizontal	Peak	9.1	34.3		43.4	54.0	10.6

Frequencies < 1 GHz were measured with a quasi-peak detector

Frequencies > 1 GHz were measured with a peak detector

Sample calculation of field strength values:

$$\text{Field Strength (dB}\mu\text{V/m)} = \text{Analyzer Reading (dB}\mu\text{V)} + \text{Correction Factor (dB/m)}$$

Spurious Emissions – Radiated Measurement

Rules and Specifications:	15.247 (d)
Guide:	ANSI C63.4
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

Test Site:	Open Area Test Site (< 1GHz), Fully anechoic room (>1 GHz)
Tested Frequency:	TX mode, highest frequency channel
Distance:	Radiated Measurement
Date of Test:	4 May 2006, 5 May 2006
Result:	Test passed

Frequency (MHz)	Antenna Polarization	Detector	Receiver Reading (dBμV)	Correction Factor (dB/m)	Pulse Train Correction (dB)	Final Value (dBμV/m)	Limit (dBμV/m)	Margin (dB)
540.050	horizontal	Quasi-Peak	15.3	21.0		36.3	82.9	46.6
660.060	horizontal	Quasi-Peak	14.2	23.4		37.6	82.9	45.3
780.065	horizontal	Quasi-Peak	15.1	24.3		39.4	82.9	43.5
900.076	horizontal	Quasi-Peak	12.3	26.5		38.8	82.9	44.1
2482.000	horizontal	Peak	60.0	33.6		93.6		
4960.800	horizontal	Peak	10.1	34.4		44.5	54.0	9.5

Frequencies < 1 GHz were measured with a quasi-peak detector

Frequencies > 1 GHz were measured with a peak detector

Sample calculation of field strength values:

$$\text{Field Strength (dB}\mu\text{V/m)} = \text{Analyzer Reading (dB}\mu\text{V)} + \text{Correction Factor (dB/m)}$$

RF Exposure

Rules and Specifications:	15.247 (b) (4)
Guide:	OET Bulletin 65, Edition 97-01
Limit:	According to §15.247(b)(4) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
1500-15000	---	---	1.0	30

f = frequency in MHz

MPE Prediction of MPE according to equation from page 19 of OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density

P = power input to antenna

G = power gain of the antenna relativ to an isotropic radiator

R = Distance to the center of radiation of the antenna

Maximum output power: **5.07 dBm = 3.21 mW**
Prediction distance: **20 cm**
Antenna gain: **3.5 dB = 2.24**

Power density at 20 cm: **0.00143 mW/cm²**

Test Result:	Pass
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Spurious Radiation Measurement

Rules and Specifications:	15.109,	
Guide:	ANSI C63.4	
Limit:	Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated at least 50 dB below the level of the fundamental or to the general radiated emission limits below, whichever is the lesser attenuation	
	Frequency of Emission (MHz)	Field Strength (microvolts/meter)
	30 - 88	100
	88 - 216	150
	216 - 960	200
	Above 960	500

Tested Frequency:	RX Mode, middle RF Channel
Test Site:	Open Area Test Site (< 1 GHz), Fully anechoic chamber (> 1 GHz)
Distance:	3 Meter
Result:	Test passed

Frequency (MHz)	Antenna Polarization	Detector	Receiver Reading (dBμV)	Correction Factor (dB/m)	Final Value (dBμV/m)	Limit (dBμV/m)	Margin (dB)
540.050	horizontal	Quasi-Peak	15.3	21.0	36.3	46.0	9.7
660.060	horizontal	Quasi-Peak	14.2	23.4	37.6	46.0	8.4
780.065	horizontal	Quasi-Peak	15.1	24.3	39.4	46.0	6.6
900.076	horizontal	Quasi-Peak	12.3	26.5	38.8	46.0	7.2
1798.000	horizontal	Peak	13.1	31.3	44.3	54.0	9.7
2476.000	vertical	Peak	11.6	33.6	45.2	54.0	8.8

Sample calculation of field strength values:

$$\text{Field Strength (dB}\mu\text{V/m)} = \text{Analyzer Reading (dB}\mu\text{V)} + \text{Correction Factor (dB/m)}$$

8. List of Measurements for Second Source

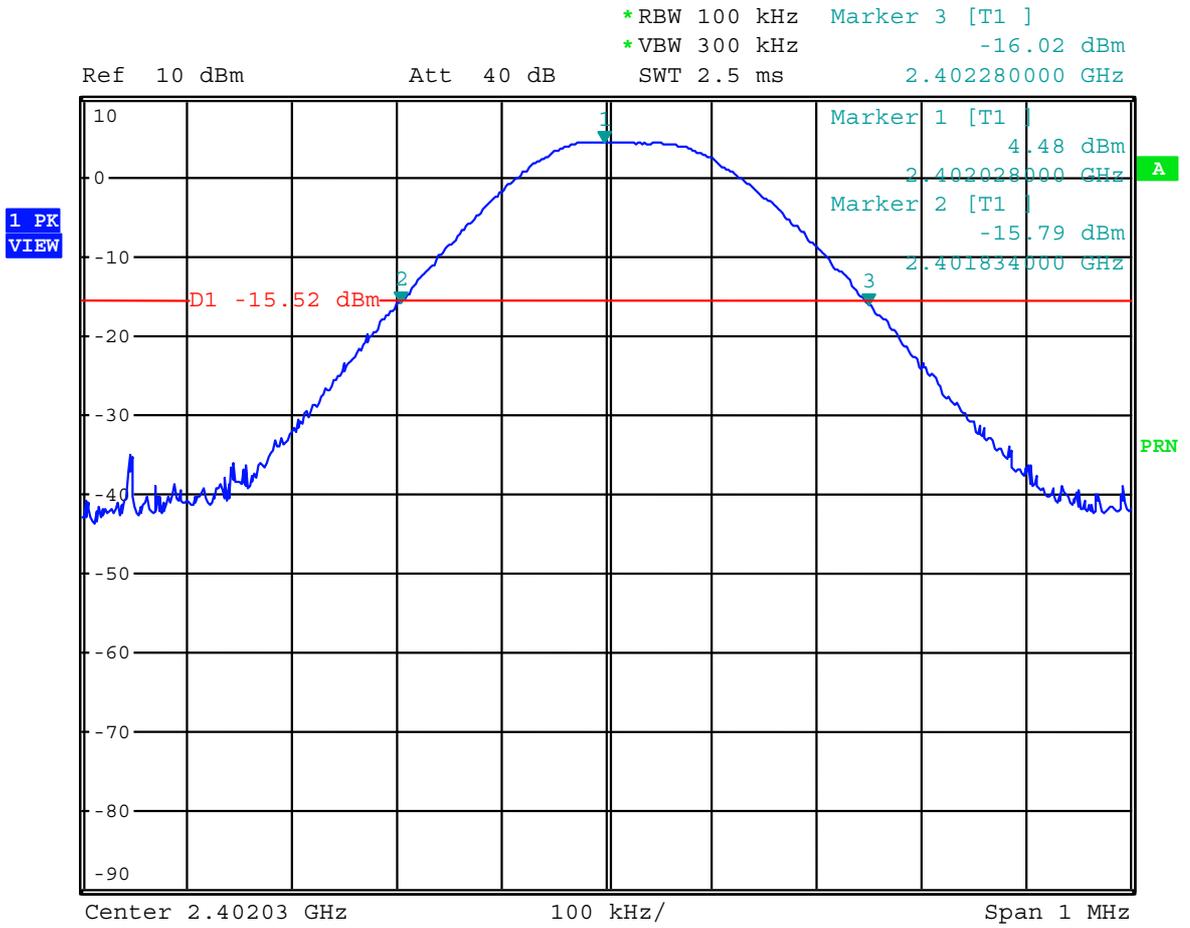
FCC Part 15 Subpart C			
Section(s):	Test	Page(s)	Result
	Transmitter:		
15.205	Restricted Bands Compliance	---	Pass
15.247 (a) (1)	Channel Bandwidth	32	Pass
15.247 (a) (1)	Hopping channel separation	36	Pass
15.247 (a) (1) (iii)	Number of Hopping Frequencies used	39	Pass
15.247 (a) (1) (iii)	Time occupancy on any channel	40	Pass
15.247 (b) (2)	Maximum Peak Output Power	42	Pass
15.247 (d)	Spurious emissions - conducted	---	N/A
15.247 (d) 15.209	Spurious emissions - radiated	46	Pass
15.203	Antenna Requirement	---	Integrated Antenna
2.1093	RF Exposure Requirement	49	Pass
15.207	Conducted AC Powerline Emissions	---	N/A
	Receiver		
15.111	Spurious emissions on antenna port	---	N/A
15.109	Radiated Emissions	50	Pass

Channel Bandwidth

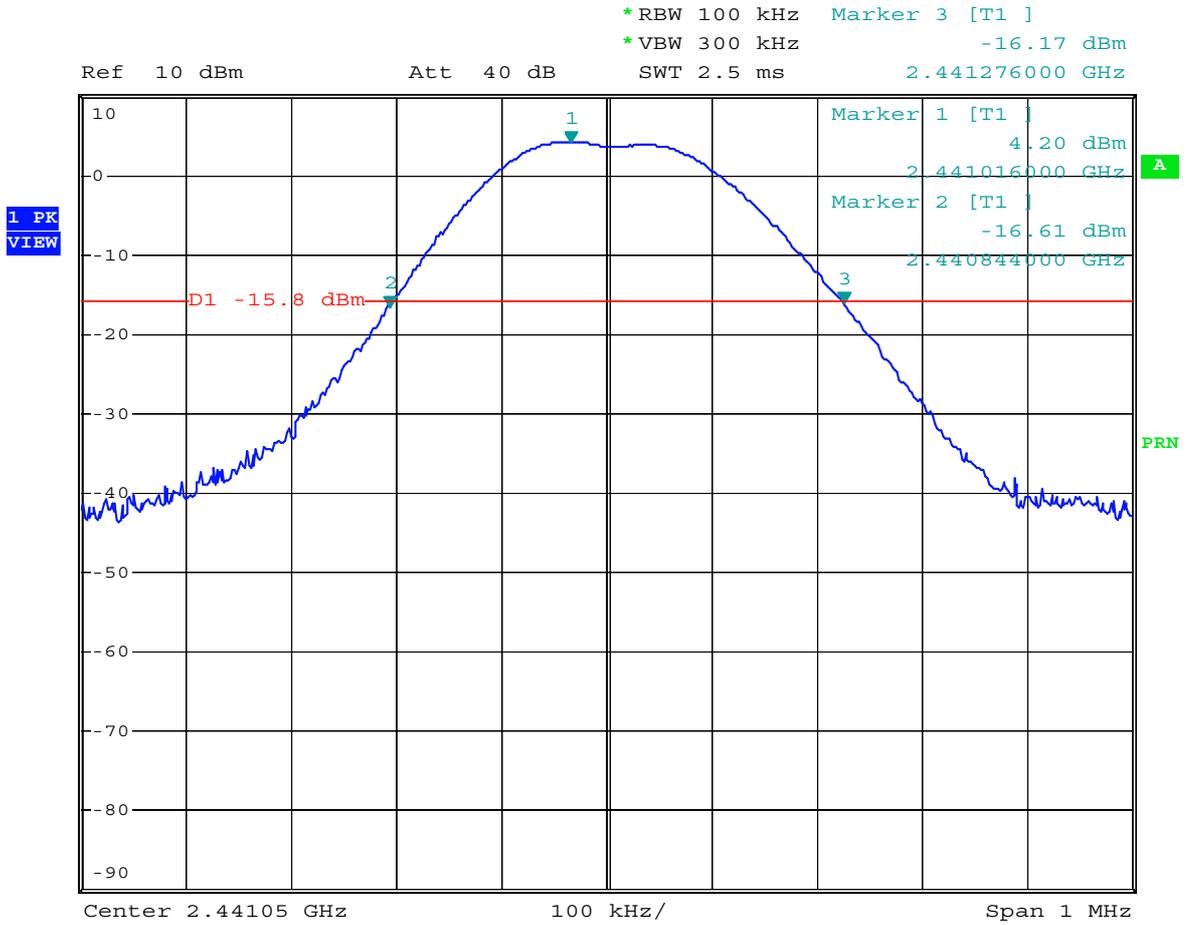
Rules and Specifications:	15.247 (a) (1)
Guide:	ANSI C63.4
Limit:	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth, whichever is greater.

Test Site:	Fully Anechoic Chamber.
Distance:	Radiated Measurement
Date of Test:	2 May 2006

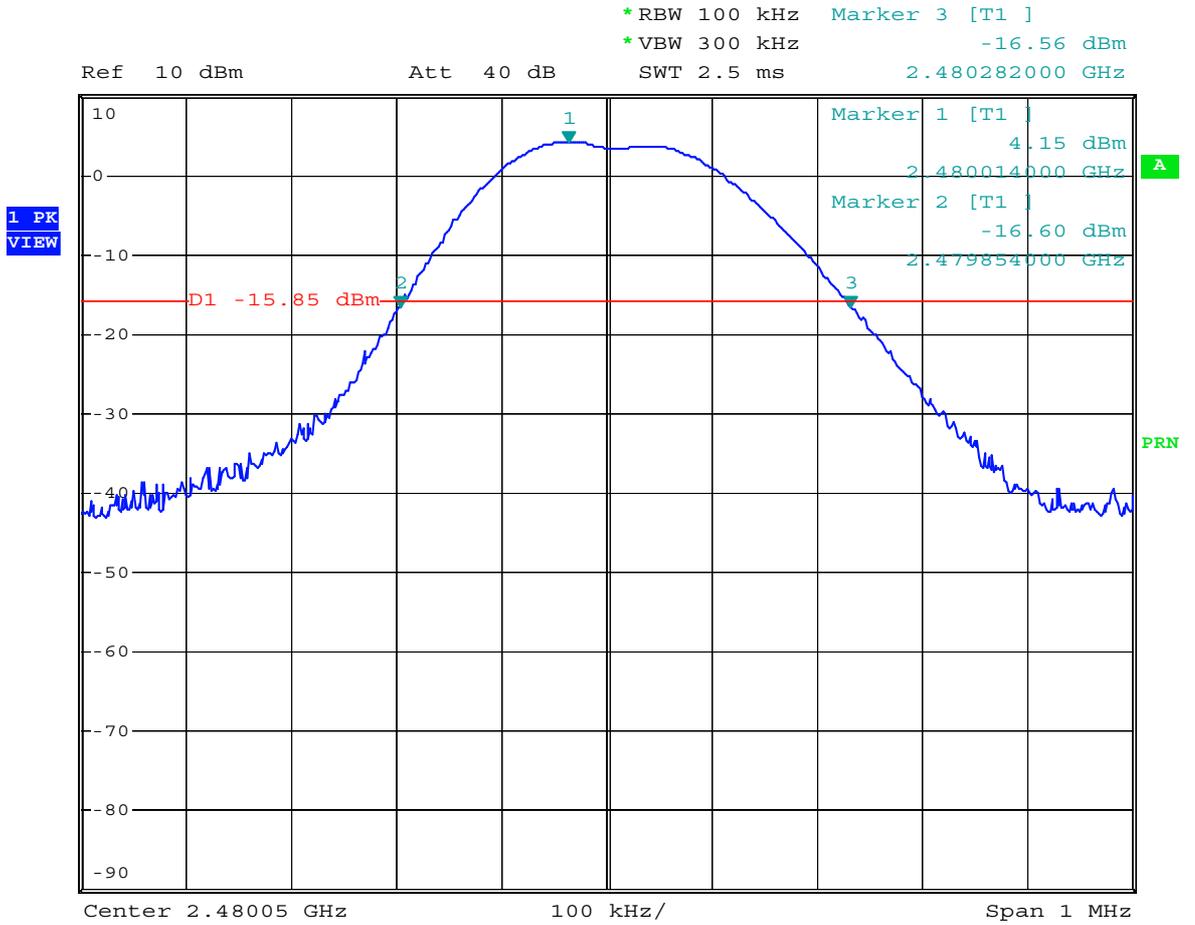
Frequency	Channel Bandwidth in kHz	Standard	Result
Low (2402 MHz)	446	< 1 MHz	pass
Middle 2441 MHz	432	< 1 MHz	pass
High 2480 MHz	428	< 1 MHz	pass



Comment: Motorola 060324: Channel Bandwidth (2st source)
Date: 2.MAY.2006 12:11:56



Comment: Motorola 060324: Channel Bandwidth (2nd source)
Date: 2.MAY.2006 15:59:06



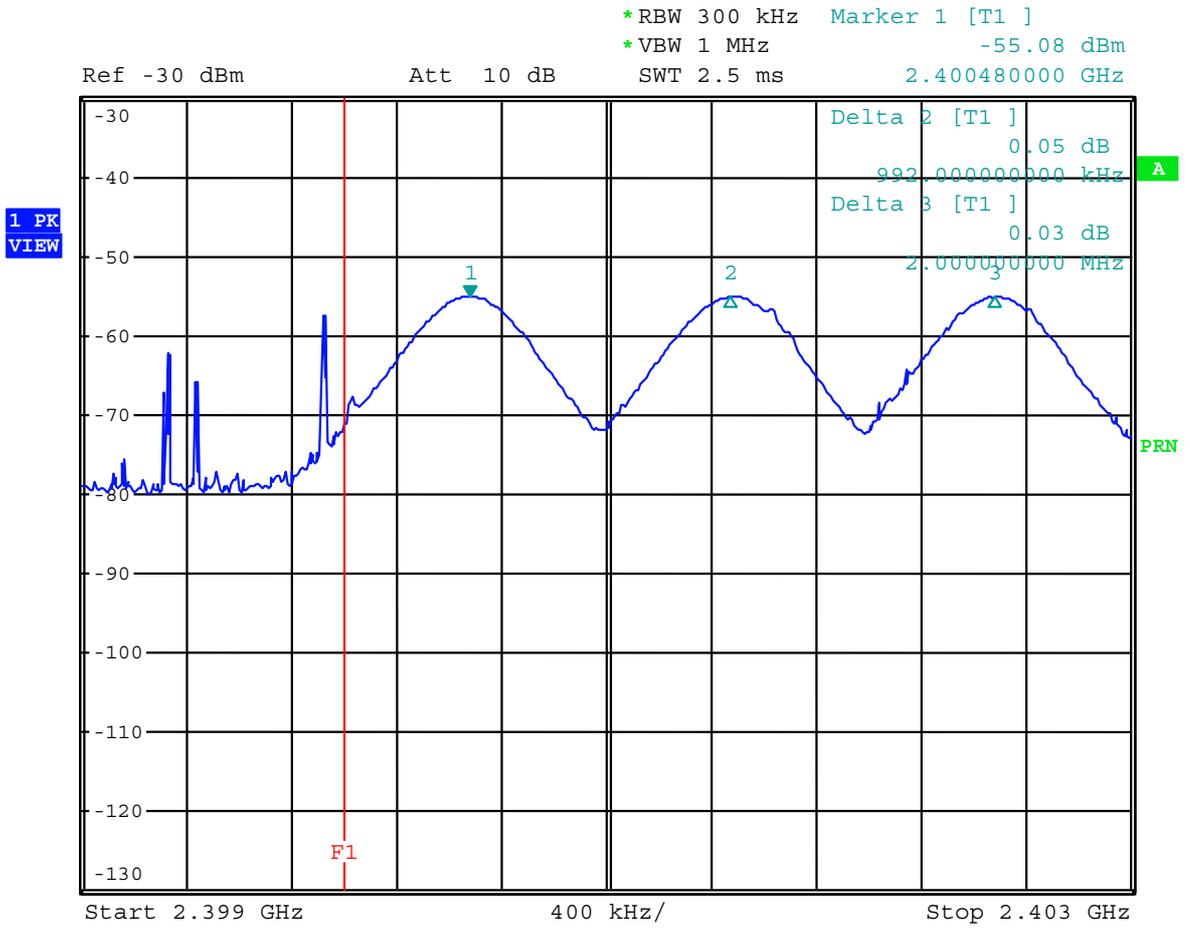
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Date: 2.MAY.2006 15:57:35

Hopping Channel Separation

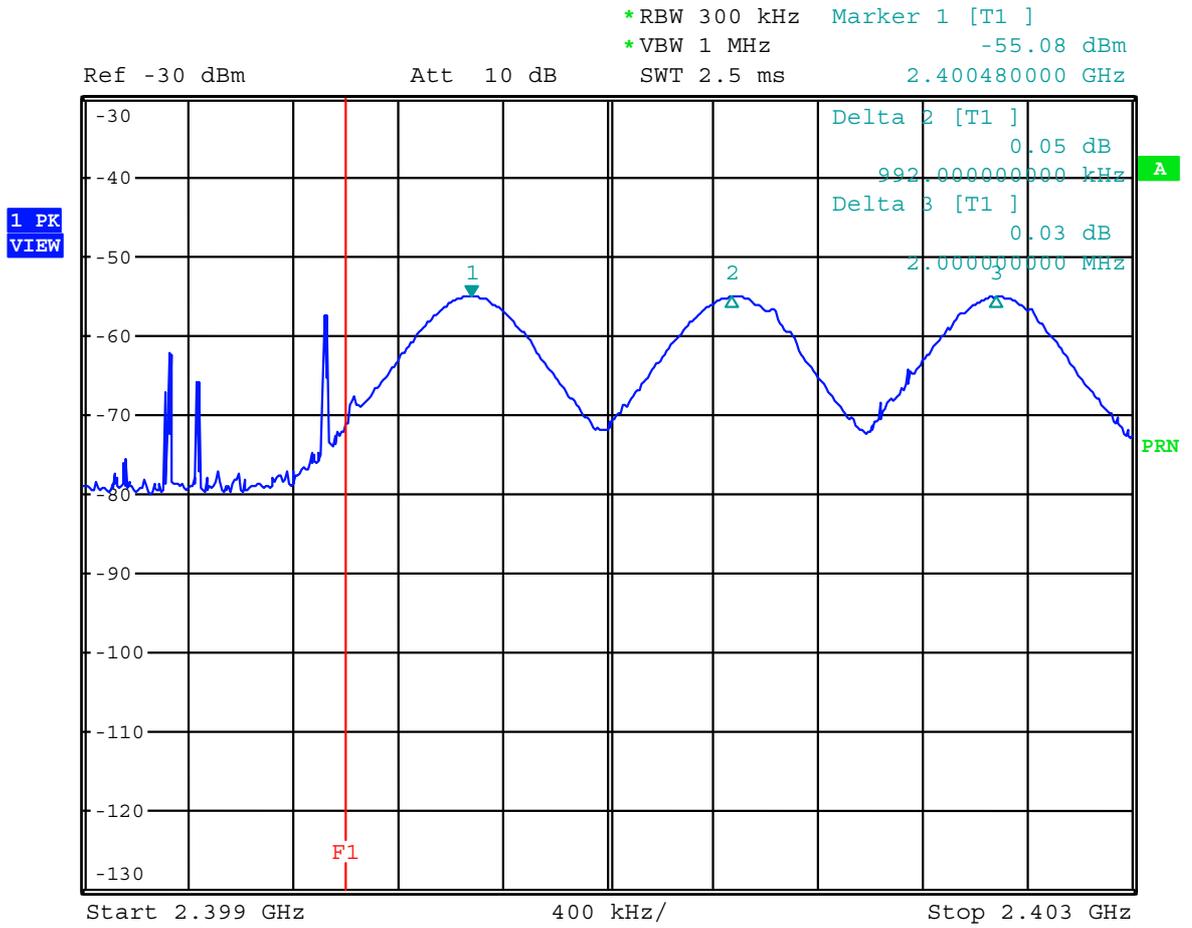
Rules and Specifications:	15.247 (a) (1)
Guide:	ANSI C63.4
Limit:	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth, whichever is greater.

Test Site:	Fully Anechoic Chamber
Distance:	Radiated Measurement
Date of Test:	2 May 2006

Channel Frequency	Measured	Required	Result
2402 MHz	0.992 MHz	> 464 kHz	Pass
2441 MHz		> 454 kHz	Pass
2480 MHz	1.030 MHz	> 430 kHz	Pass



Comment: Motorola 060324: Hopping Frequency Separation (2nd source)
Date: 2.MAY.2006 12:01:27



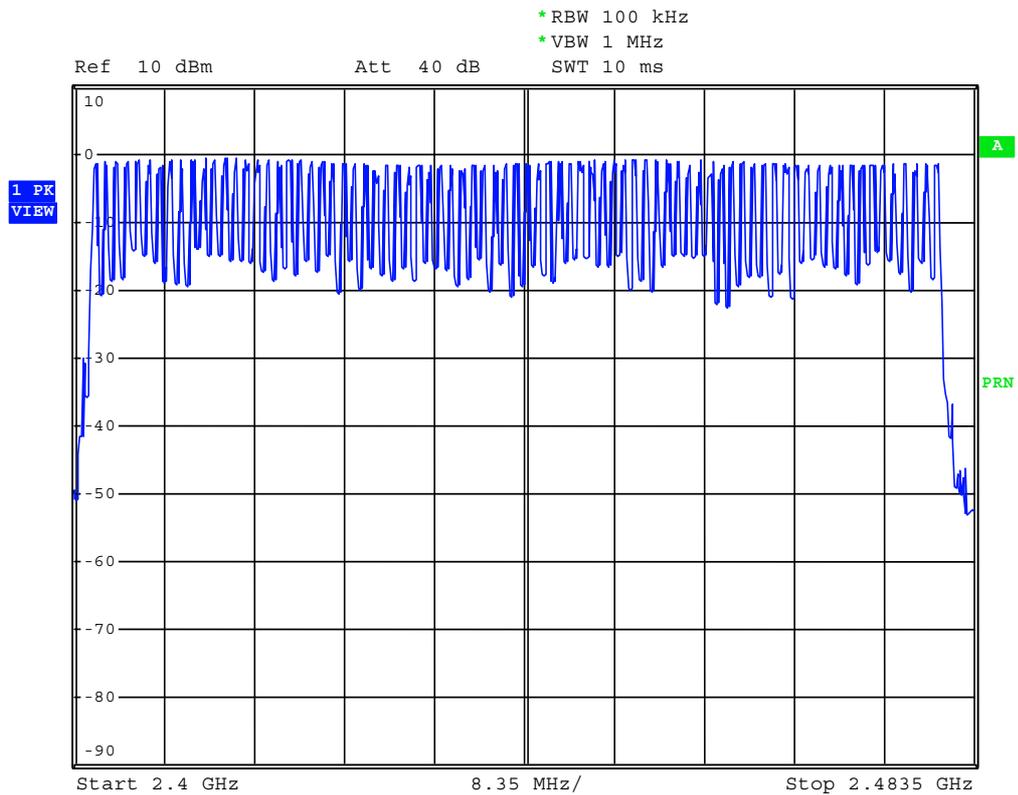
Comment: Motorola 060324: Hopping Frequency Separation (2nd source)
Date: 2.MAY.2006 12:01:27

Number of Hopping Frequencies used

Rules and Specifications:	15.247 (a) (1) (iii)
Guide:	ANSI C63.4
Limit:	Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 non-overlapping channels.

Test Site:	Fully Anechoic Chamber
Distance:	Radiated Measurement
Date of Test:	2 May 2006

Number of Hopping Frequencies		Result
Measured	Required	
79	15	Pass

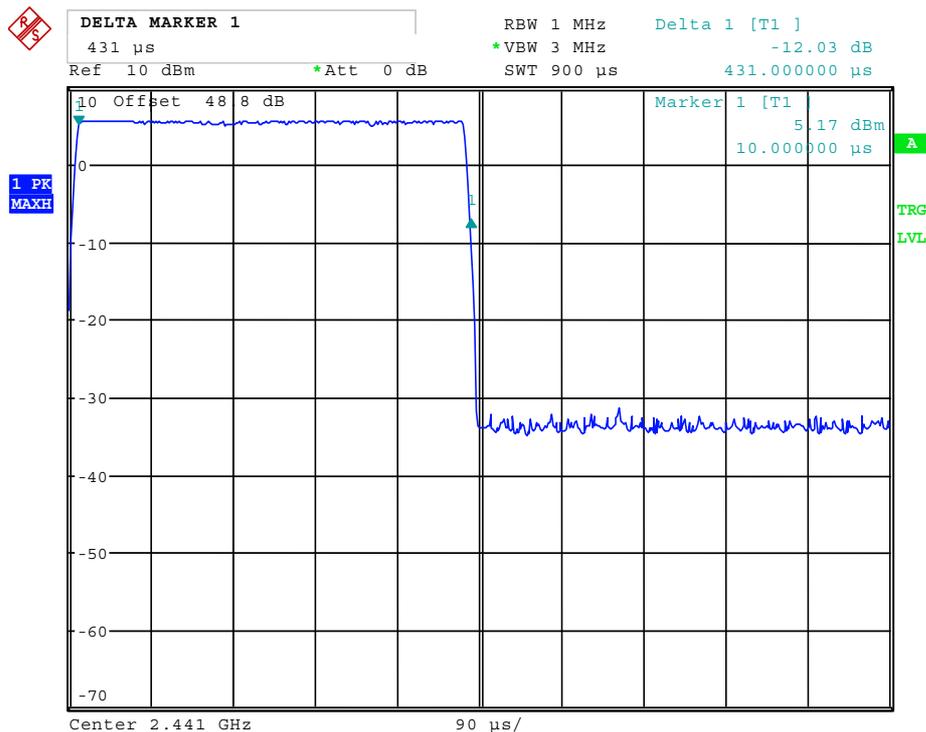


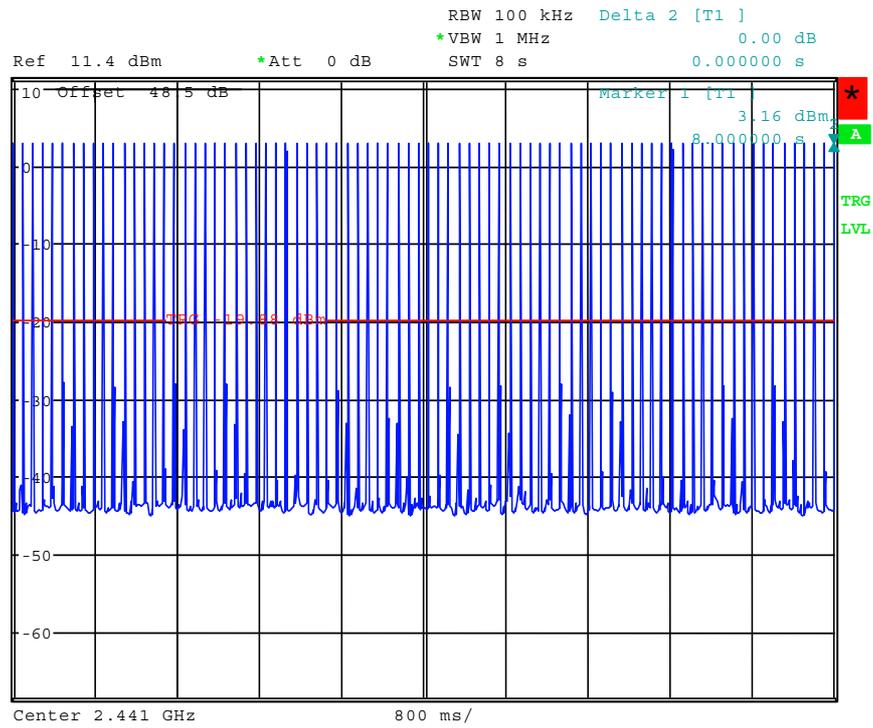
Time Occupancy on any Channel

Rules and Specifications:	15.247 (a) (1) (iii)
Guide:	ANSI C63.4
Limit:	The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

Test Site:	Fully Anechoic Chamber.
Distance:	Radiated Measurement
Date of Test:	2 May 2006

Time occupancy	Measured	Required	Result
	300 x 0.431 ms = 129.3 ms within a 30 seconds period	< 0.4 seconds within a 30 second period	Pass





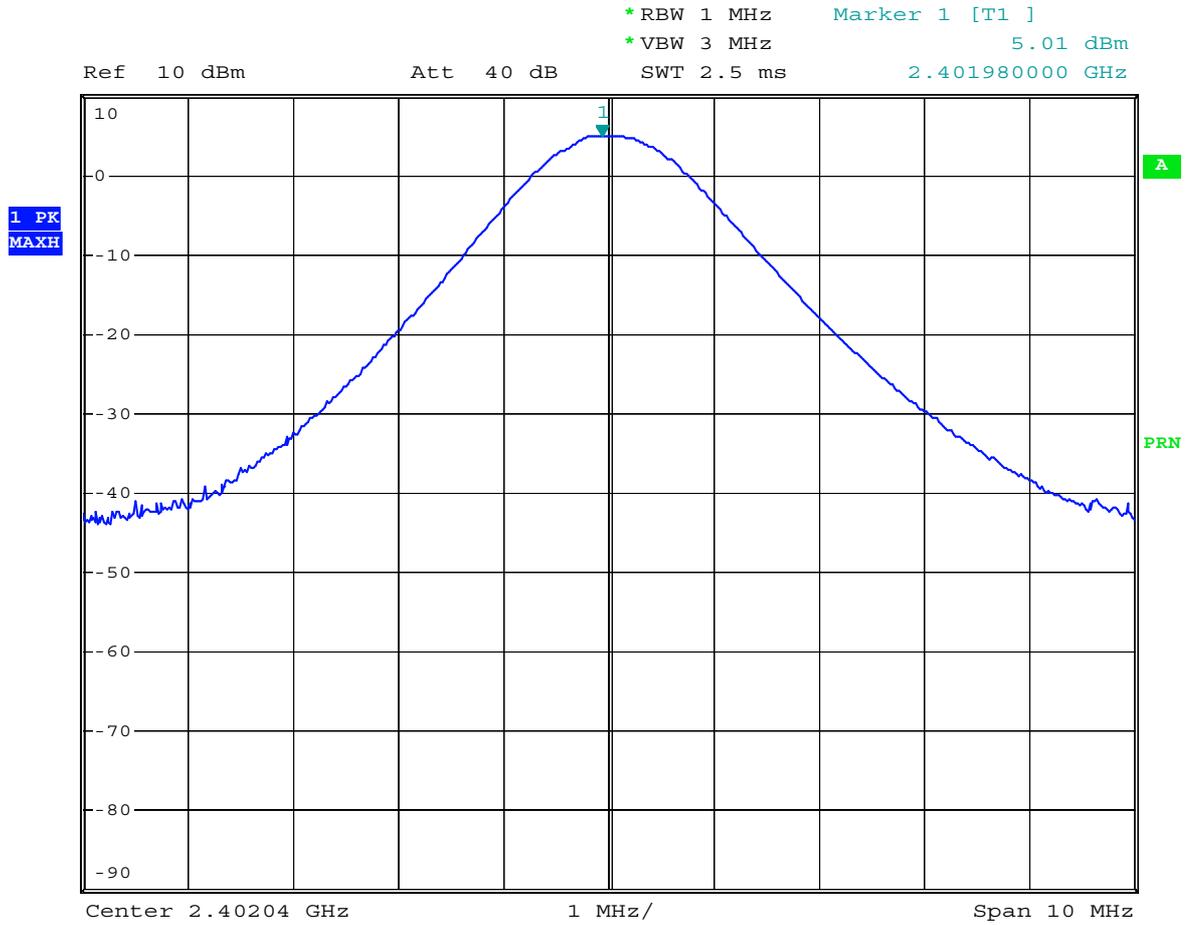
Maximum Peak Output Power

Rules and Specifications:	15.247 (b) (1)
Guide:	ANSI C63.4
Limit:	For frequency hopping systems operating in the 2400 -2483.5 MHz band: 1 watt for systems employing at least 75 hopping channels

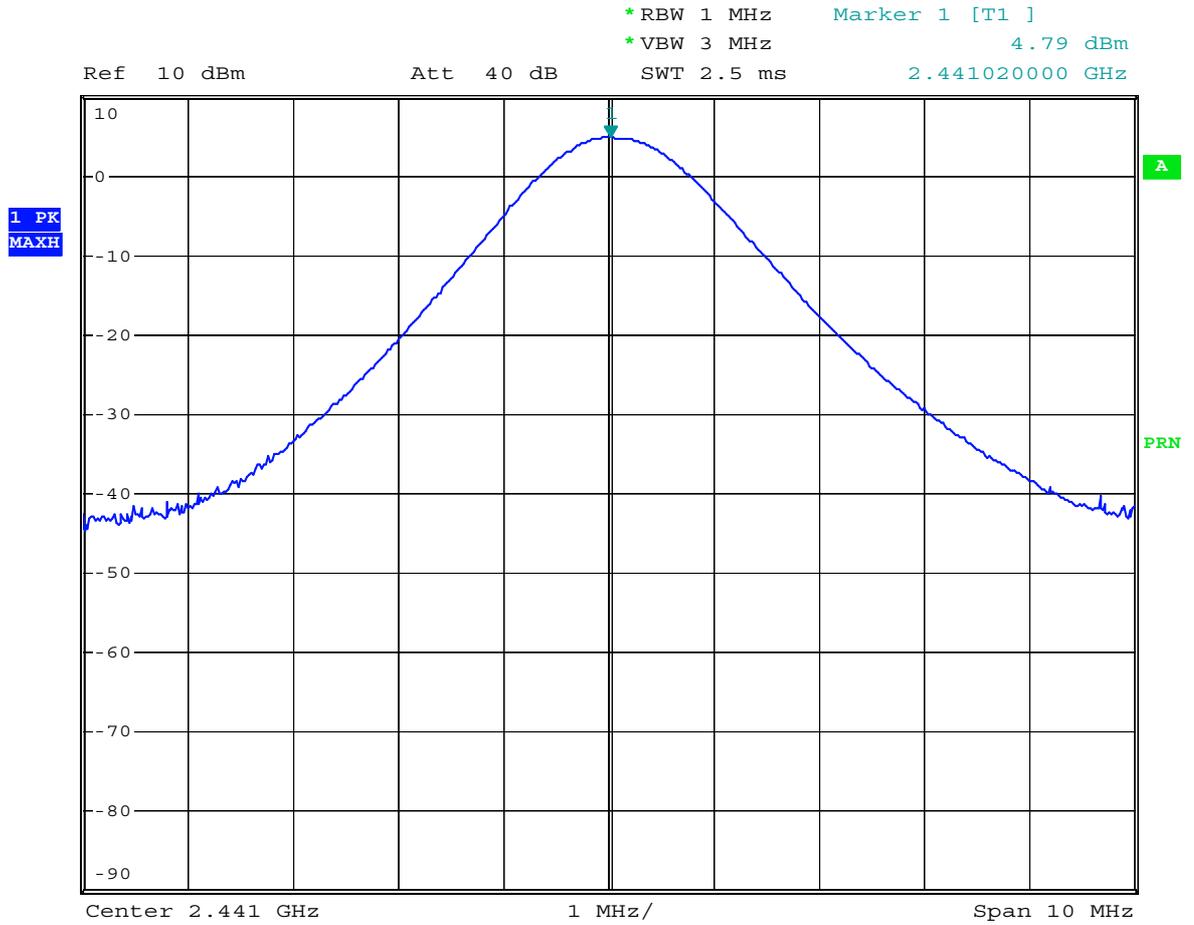
Test Site:	Fully Anechoic Chamber
Distance:	Conducted Measurement
Date of Test:	2 May 2006

Radiated Measurement

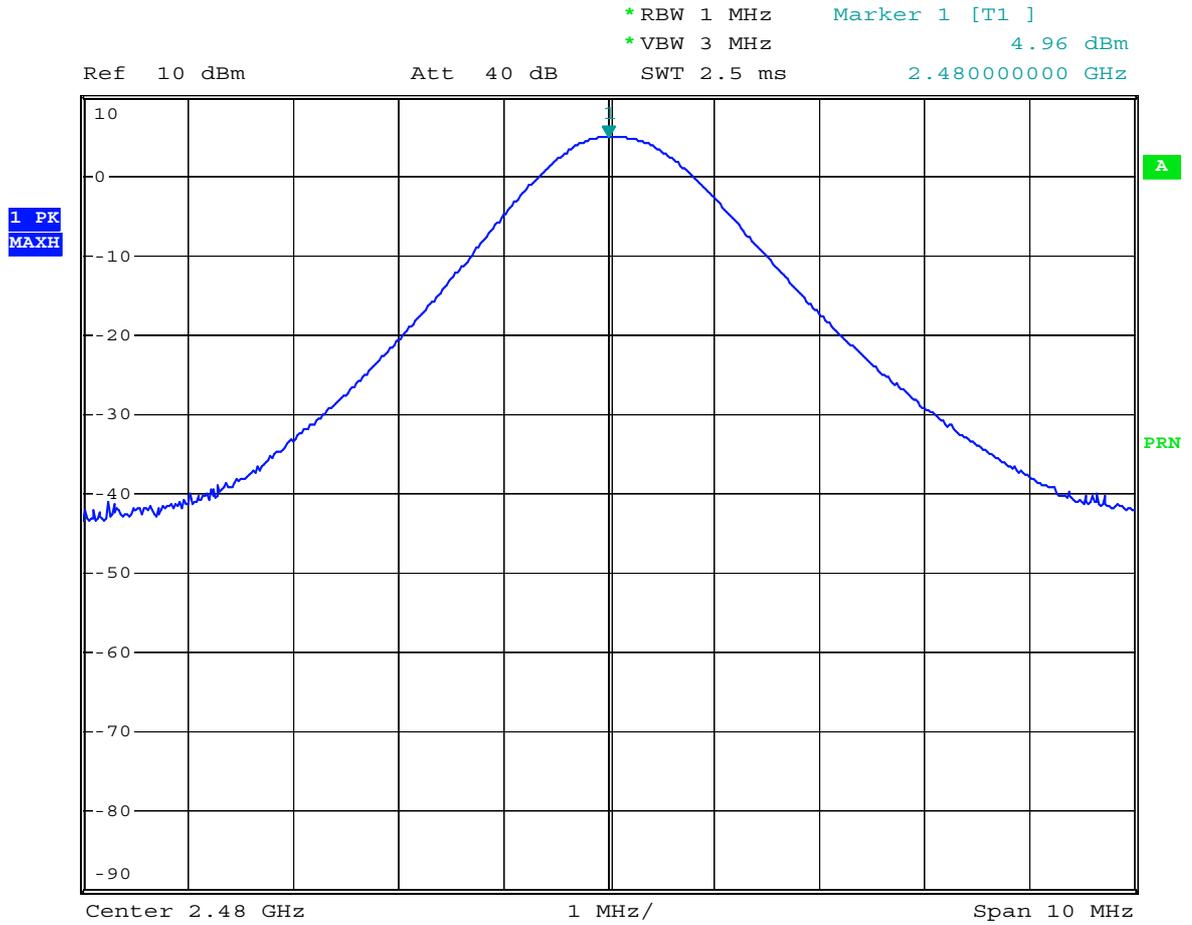
Frequency	Output Power in dBm	Output Power in W	Standard	Result
Low (2402 MHz)	5.01	0.00321	≤1.0W	Pass
Middle 2441 MHz	4.79	0.00296	≤1.0W	Pass
High 2480 MHz	4.96	0.00297	≤1.0W	Pass



Comment: Motorola 060324: Carrier Power (2nd source)
Date: 2.MAY.2006 15:50:29



Comment: Motorola 060324: Carrier Power (2nd source)
Date: 2.MAY.2006 15:50:02



Comment: Motorola 060324: Carrier Power (2nd source)
Date: 2.MAY.2006 15:49:32

Spurious Emissions – Radiated Measurement

Rules and Specifications:	15.247 (d)
Guide:	ANSI C63.4
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

Test Site:	Open Area Test Site (< 1GHz), Fully anechoic room (>1 GHz)
Tested Frequency:	TX mode, lowest frequency channel
Distance:	Radiated Measurement
Date of Test:	4 May 2006, 5 May 2006
Result:	Test passed

Frequency (MHz)	Antenna Polarization	Detector	Receiver Reading (dBµV)	Correction Factor (dB/m)	Pulse Train Correction (dB)	Final Value (dBµV/m)	Limit (dBµV/m)	Margin (dB)
300.022	horizontal	Quasi-Peak	15.7	15.8		31.5	83.6	52.1
360.030	horizontal	Quasi-Peak	21.9	17.7		39.6	83.6	44.0
540.040	horizontal	Quasi-Peak	16.4	21.0		37.4	83.6	46.2
660.050	horizontal	Quasi-Peak	15.0	23.4		38.4	83.6	45.2
780.060	horizontal	Quasi-Peak	14.7	24.3		39.0	83.6	44.6
2404.000	horizontal	Peak	58.4	33.4		91.8		

Frequencies < 1 GHz were measured with a quasi-peak detector

Frequencies > 1 GHz were measured with a peak detector

Sample calculation of field strength values:

$$\text{Field Strength (dBµV/m)} = \text{Analyzer Reading (dBµV)} + \text{Correction Factor (dB/m)}$$

Spurious Emissions – Radiated Measurement

Rules and Specifications:	15.247 (d)
Guide:	ANSI C63.4
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

Test Site:	Open Area Test Site (< 1GHz), Fully anechoic room (>1 GHz)
Tested Frequency:	TX mode, middle frequency channel
Distance:	Radiated Measurement
Date of Test:	4 May 2006, 5 May 2006
Result:	Test passed

Frequency (MHz)	Antenna Polarization	Detector	Receiver Reading (dBμV)	Correction Factor (dB/m)	Pulse Train Correction (dB)	Final Value (dBμV/m)	Limit (dBμV/m)	Margin (dB)
300.022	horizontal	Quasi-Peak	15.7	15.8		31.5	83.0	51.5
360.030	horizontal	Quasi-Peak	21.9	17.7		39.6	83.0	43.4
540.040	horizontal	Quasi-Peak	16.4	21.0		37.4	83.0	45.6
660.050	horizontal	Quasi-Peak	15.0	23.4		38.4	83.0	44.6
780.060	horizontal	Quasi-Peak	14.7	24.3		39.0	83.0	44.0
1258.000	horizontal	Peak	16.6	28.8		45.4	54.0	8.6
2440.000	horizontal	Peak	59.0	33.5		92.5		
4881.000	horizontal	Peak	7.7	34.3		42.1	54.0	12.0

Frequencies < 1 GHz were measured with a quasi-peak detector

Frequencies > 1 GHz were measured with a peak detector

Sample calculation of field strength values:

$$\text{Field Strength (dB}\mu\text{V/m)} = \text{Analyzer Reading (dB}\mu\text{V)} + \text{Correction Factor (dB/m)}$$

Spurious Emissions – Radiated Measurement

Rules and Specifications:	15.247 (d)
Guide:	ANSI C63.4
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

Test Site:	Open Area Test Site (< 1GHz), Fully anechoic room (>1 GHz)
Tested Frequency:	TX mode, highest frequency channel
Distance:	Radiated Measurement
Date of Test:	4 May 2006, 5 May 2006
Result:	Test passed

Frequency (MHz)	Antenna Polarization	Detector	Receiver Reading (dBµV)	Correction Factor (dB/m)	Pulse Train Correction (dB)	Final Value (dBµV/m)	Limit (dBµV/m)	Margin (dB)
300.022	horizontal	Quasi-Peak	15.7	15.8		31.5	83.6	52.1
360.030	horizontal	Quasi-Peak	21.9	17.7		39.6	83.6	44.0
540.040	horizontal	Quasi-Peak	16.4	21.0		37.4	83.6	46.2
660.050	horizontal	Quasi-Peak	15.0	23.4		38.4	83.6	45.2
780.060	horizontal	Quasi-Peak	14.7	24.3		39.0	83.6	44.6
1258.000	horizontal	Peak	16.6	28.8		45.3	54.0	8.7
2482.000	horizontal	Peak	58.4	33.6		92.0		
4960.800	horizontal	Peak	10.2	34.4		44.6	54.0	9.4
7010.900	horizontal	Peak	9.0	38.8		47.8	83.6	35.8

Frequencies < 1 GHz were measured with a quasi-peak detector

Frequencies > 1 GHz were measured with a peak detector

Sample calculation of field strength values:

$$\text{Field Strength (dBµV/m)} = \text{Analyzer Reading (dBµV)} + \text{Correction Factor (dB/m)}$$

RF Exposure

Rules and Specifications:	15.247 (b) (4)
Guide:	OET Bulletin 65, Edition 97-01
Limit:	According to §15.247(b)(4) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
1500-15000	---	---	1.0	30

f = frequency in MHz

MPE Prediction of MPE according to equation from page 19 of OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density

P = power input to antenna

G = power gain of the antenna relativ to an isotropic radiator

R = Distance to the center of radiation of the antenna

Maximum output power:

5.01 dBm = 3.17 mW

Prediction distance:

20 cm

Antenna gain:

3.5 dB = 2.24

Power density at 20 cm:

0.00141 mW/cm²

Test Result:	Pass
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Spurious Radiation Measurement

Rules and Specifications:	15.109,	
Guide:	ANSI C63.4	
Limit:	Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated at least 50 dB below the level of the fundamental or to the general radiated emission limits below, whichever is the lesser attenuation	
	Frequency of Emission (MHz)	Field Strength (microvolts/meter)
	30 - 88	100
	88 - 216	150
	216 - 960	200
	Above 960	500

Tested Frequency:	RX Mode, middle RF Channel
Test Site:	Open Area Test Site (< 1 GHz), Fully anechoic chamber (> 1 GHz)
Distance:	3 Meter
Result:	Test passed

Frequency (MHz)	Antenna Polarization	Detector	Receiver Reading (dBμV)	Correction Factor (dB/m)	Final Value (dBμV/m)	Limit (dBμV/m)	Margin (dB)
300.022	horizontal	Quasi-Peak	15.7	15.8	31.5	46.0	14.5
360.030	horizontal	Quasi-Peak	21.9	17.7	39.6	46.0	6.4
540.040	horizontal	Quasi-Peak	16.4	21.0	37.4	46.0	8.6
660.050	horizontal	Quasi-Peak	15.0	23.4	38.4	46.0	7.6
780.060	horizontal	Quasi-Peak	14.7	24.3	39.0	46.0	7.0
1261.333	horizontal	Peak	15.8	28.8	44.6	54.0	9.4
1317.333	horizontal	Peak	14.8	29.0	43.8	54.0	10.2
2450.150	vertical	Peak	11.0	33.5	44.5	54.0	9.6

Sample calculation of field strength values:

Field Strength (dBμV/m) = Analyzer Reading (dBμV) + Correction Factor (dB/m)

9. Referenced Regulations

All tests were performed with reference to the following regulations and standards:

<input checked="" type="checkbox"/>	CFR 47 Part 2	Code of Federal Regulations Part 2 (Frequency allocation and radio treaty matters; General rules and regulations) of the Federal Communication Commission (FCC)	October 10, 2004
<input checked="" type="checkbox"/>	CFR 47 Part 15	Code of Federal Regulations Part 15 (Radio Frequency Devices) of the Federal Communication Commission (FCC)	September 19, 2005
<input checked="" type="checkbox"/>	ANSI C63.4	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	December 11, 2003 (published on January 30, 2004)
<input type="checkbox"/>	RSS-Gen	Radio Standards Specification RSS-Gen Issue 1 containing General Requirements and Information for the Certification of Radiocommunication Equipment, published by Industry Canada	September 2005
<input type="checkbox"/>	RSS-210	Radio Standards Specification RSS-210 Issue 6 for Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment, published by Industry Canada	September 2005
<input type="checkbox"/>	RSS-310	Radio Standards Specification RSS-310 Issue 1 for Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands): Category II Equipment, published by Industry Canada	September 2005
<input type="checkbox"/>	RSS-102	Radio Standards Specification RSS-102 Issue 2: Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)	November 2005
<input type="checkbox"/>	ICES-003	Interference-Causing Equipment Standard ICES-003 Issue 4 for Digital Apparatus, published by Industry Canada	February 7, 2004
<input checked="" type="checkbox"/>	CISPR 22	Third Edition of the International Special Committee on Radio Interference (CISPR), Pub. 22, "Information Technology Equipment – Radio Disturbance Characteristics – Limits and Methods of Measurement"	1997
<input type="checkbox"/>	CAN/CSA-CEI/IEC CISPR 22	Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment	2002
<input type="checkbox"/>	TRC-43	Notes Regarding Designation of Emission (Including Necessary Bandwidth and Classification), Class of Station and Nature of Service, published by Industry Canada	October 9, 1982

10. Charts taken during testing

Test sheets are attached as a separate file

"Additional Test Sheets for Report No. 51357-060324-4/-5".