

Nemko Test Report: 108368TRFWL

Applicant: BelAir Networks Inc.
603 March Road,
Ottawa, ON
K2K 2M5

Apparatus: TRM 1

FCC ID: RAR20021002

In Accordance With: FCC Part 90 Subpart M
Intelligent Transportation Systems Radio Service

Authorized By:

A handwritten signature in blue ink, appearing to read 'Sim Jagpal', is positioned above the printed name.

Sim Jagpal, Resource Manager

Date: October 9, 2008

Total Number of Pages: 39

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Section 1 : Report Summary

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 90. Conducted measurements were performed in accordance with ANSI TIA-603-B-2002. Radiated tests were conducted in accordance with ANSI C63.4-2003.

The assessment summary is as follows:

Apparatus Assessed:	TRM 1
Specification:	FCC Part 90 Subpart M
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None
Report Release History:	Original Release
Test Location:	Nemko Canada Inc. 303 River Road Ottawa, Ontario K1V 1H2
Tests Performed By:	Jason Nixon, Wireless/Telecom Specialist
Test Dates:	June 9 to 13, 2008

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contained in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

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Section 2 : Equipment Under Test

2.1 Identification of Equipment Under Test (EUT)

The following information identifies the EUT under test:

Type of Equipment:	DSRC Band radio
Brand Name:	TRM1
Model Name or Number:	B2CH100AA
Serial Number:	K000734335
Nemko Sample Number:	1
FCC ID:	RAR20021002
Date of Receipt:	June 6, 2008

2.2 Accessories

The following information identifies accessories used to exercise the EUT during testing:

Description:	Radio Chassis
Brand Name:	Belair
Model Name or Number:	Belair100
Serial Number:	AABHB6384
Nemko Sample Number:	2

2.3 EUT Description

The TRM is a multi-band/multi-application radio. Depending on the application, the radio is capable of covering various bands including:

- o 4.94-4.99 GHz Public Safety Band – Part 90 certification;
- o 5.725-5.85 GHz ISM – Part 15 certification;
- o 5.85-5.925 GHz ITS – Part 90 certification;

The TRM radio is used in the BelAir100 and BelAir200 which are multi-radio products—the BelAir100 is a 3-radio product with 1, 2 or 3 radio configurations and the BelAir200 is a 4-radio product with 1, 2, 3, or 4 radios configurations.

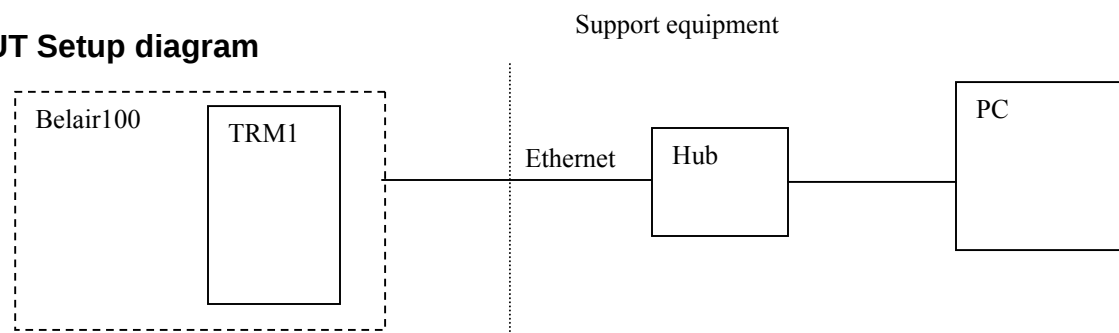
BelAir Networks is working with customers who intend to use the BelAir100 and BelAir200 products with TRM radios operating in the ITS – “Intelligent Transport System” band for the purpose of traffic monitoring and control. Today, traffic monitoring and control systems utilize various forms of technology such as ISDN, direct fiber connect, licensed and unlicensed band wireless link, to form a comprehensive network capable of transporting real-time video surveillance of traffic flow and intersections along with real-time video control information for the dynamic control of the traffic control street lights.

BelAir Networks has deployed networks employing 4.94-4.99 GHz for public safety applications ensuring that police and other security vehicles are able to gain unencumbered access to wireless LAN using the 4.9 GHz band. These same safety vehicles will gain access to the traffic monitoring video surveillance and possibly in the future, control of the street light system. In this network, the ITS band assures that traffic monitoring and control information has a dedicated frequencies for this important application. The ITS band will be used for fixed and mobile applications, enabling vehicles to connect at either 4.9 GHz (Public Safety Band) or 5.9 GHz to access the transport system monitoring/control information.

2.4 Technical Specifications of the EUT

Operating Band:	5850-5925MHz
Operating Frequency:	5860-5920MHz
Modulation:	IEEE 802.11p
Rated output power:	23dBm
EUT Operating Channels:	Channel 172 to Channel 184
Emission Designator:	G7W
Antenna Data:	10dBi antenna 15dBi antenna 19dBi antenna

2.5 EUT Setup diagram





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2.6 Operation of the EUT during testing

The EUT was operated via the ERM1_FCC_limit_Top_AK.vi labview driver which allowed for frequency and power level setting.

2.7 Modifications incorporated in the EUT

There were no modifications performed to the EUT during this assessment.

Section 3 : Test Conditions

3.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 2 Subpart J, Equipment Authorization Procedures
FCC Part 90 Private Land Mobile Radio Services
ASTM E2213-03 Standard Specification for Telecommunications and Information Exchange
Between Roadside and Vehicle Systems – 5GHz Band Dedicated Short Range
Communications (DSRC) Medium Access Control (MAC) and Physical Layer (PHY)
Specifications

3.2 Deviations From Laboratory Test Procedures

No deviations were made from laboratory test procedures.

3.3 Test Environment

All tests were performed under the following environmental conditions:

Temperature range	:	15 – 30 °C
Humidity range	:	20 - 75 %
Pressure range	:	86 - 106 kPa
Power supply range	:	+/- 5% of rated voltages

3.4 Measurement Uncertainty

Nemko Canada measurement uncertainty has been calculated using guidance of UKAS LAB 34:2003 and TIA-603-B Nov 7, 2002. All calculations have been performed to provide a confidence level of 95% and can be found in Nemko Canada document MU-003.

3.5 Test Equipment

Equipment	Manufacturer	Model No.	Asset/Serial No.	Cal. Date	Next Cal.
Spectrum Analyzer	Rohde & Schwarz	FSU46	FA001877	Jan 23/08	Jan 23/09
Signal Generator	Rohde & Schwarz	SMR40	FA001879	Aug 8/07	Aug 8/08
Temperature Chamber	Thermotron	SM-16C	FA001030	NCR	NCR
Multimeter	Fluke	16	FA001831	Jan 14/08	Jan 14/09
Air probe	Fluke	None	FA001248	NCR	NCR
Attenuator	Weinschel	47-10-34	FA001740	COU	COU
RF AMP	JCA	1-18GHz	FA002091	Oct 2/07	Oct 2/08
Horn Antenna #2	EMCO	3115	FA000825	Jan. 15/08	Jan. 15/09
Horn Antenna #1	EMCO	3115	FA000649	Feb 13/08	Feb 13/09
3m EMI Test Chamber	TDK	SAC-3	FA002047	May 06/08	May 06/09
Bilog	Sunol	JB3	FA002108	Jan. 21/08	Jan. 21/09
Flush Mount Turntable	Sunol	FM2022	FA002082	NCR	NCR
Controller	Sunol	SC104V	FA002060	NCR	NCR
Mast	Sunol	TLT2	FA002061	NCR	NCR
LISN	Rohde & Schwarz	ENV216	FA002023	Sept. 04/07	Sept. 04/08
Receiver/Spectrum Analyzer	Rohde & Schwarz	ESU 26	FA002043	Dec. 07/07	Dec. 07/08
International Power Supply	California Inst.	3001i	FA001021	Jan. 16/08	Jan. 16/09
18.0 – 26.0 GHz Amplifier	NARDA	BBS-1826N612	FA001550	COU	COU
26 – 40.0 GHz Amplifier	NARDA	DBL-2640N610	FA001556	COU	COU
18.0 – 40.0GHz Horn Antenna	EMCO	3116	FA001847	May 12/08	May 12/09

COU – Calibrate on Use

NCR – No Calibration Required

Section 4 : Results Summary

This section contains the following:

FCC Part 15 Subpart B : Test Results
FCC Part 90 Subpart M : Test Results
ASTM E2213-03 : Test Results

The column headed 'Required' indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

N No : not applicable / not relevant.

Y Yes : Mandatory i.e. the apparatus shall conform to these tests.

N/T Not Tested, mandatory but not assessed. (See Report Summary)

4.1 FCC Part 15 Subpart B : Test Results

Part 15	Test Description	Required	Result
15.107(a)	Conducted Emissions for Class B	Y	PASS
15.109(a)	Radiated Emissions for Class B	Y	PASS

4.2 FCC Part 90 Subpart M : Test Results

Clause	Test Description	Required	Result
90.377	Antenna installation requirements	Y *	PASS
90.377	Frequencies available, maximum EIRP and Antenna height	Y	PASS
2.1049	Occupied bandwidth	Y	PASS
2.1055	Frequency stability	Y	PASS

4.3 ASTM E2213-03 : Test Results

Clause	Test Description	Required	Result
8.8.5	Antenna Requirements	Y *	PASS
8.9.1	Output Power Requirement	Y	PASS
8.9.2	Transmitted spectrum mask	Y	PASS
8.9.2	Emissions at the antenna terminal	Y	PASS
8.9.2	Radiated spurious emissions	Y	PASS
8.9.4	Transmitter Centre Frequency Tolerance	Y	PASS

Notes:

- * 1. Manufacturer declared all of the antennas listed are vertically polarized and used for fixed applications.
- 2. Manufacturer declared that the antenna installation would comply with FCC rule part 90.377(b).



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Specification: FCC Part 90 Subpart M

Appendix A : Part 15 Subpart B Test Results

Clause 15.107(a) Conducted Emissions

Frequency of Conducted limit (dB μ V)		
Emission (MHz)	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

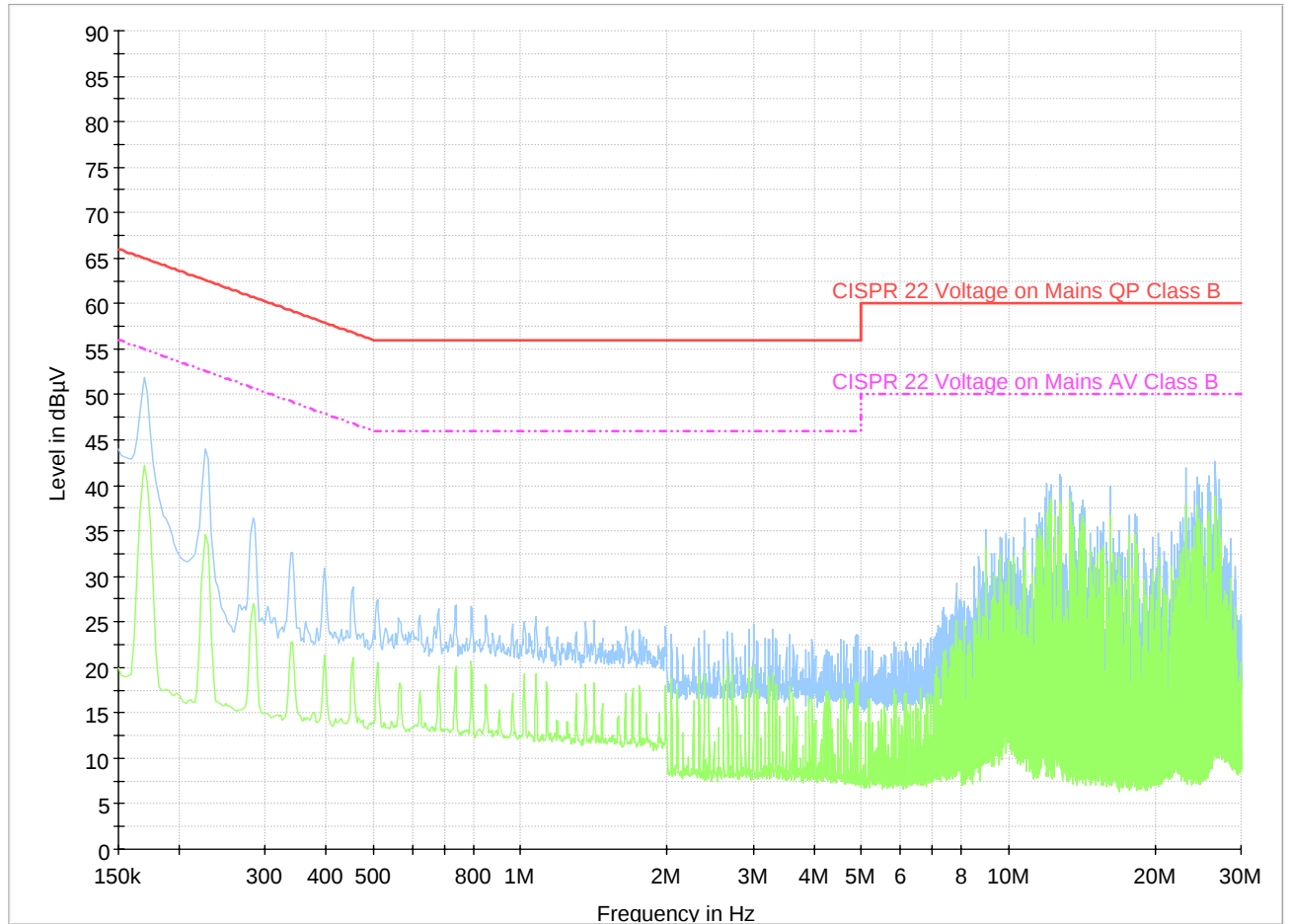
* Decreases with the logarithm of the frequency.

Test Results: Pass

Additional Observations:

All plots were obtained using a sweeping receiver with an IF of 9kHz using a Peak and Average detector. The plots have been corrected with the cable loss and LISN loss to show compliance.

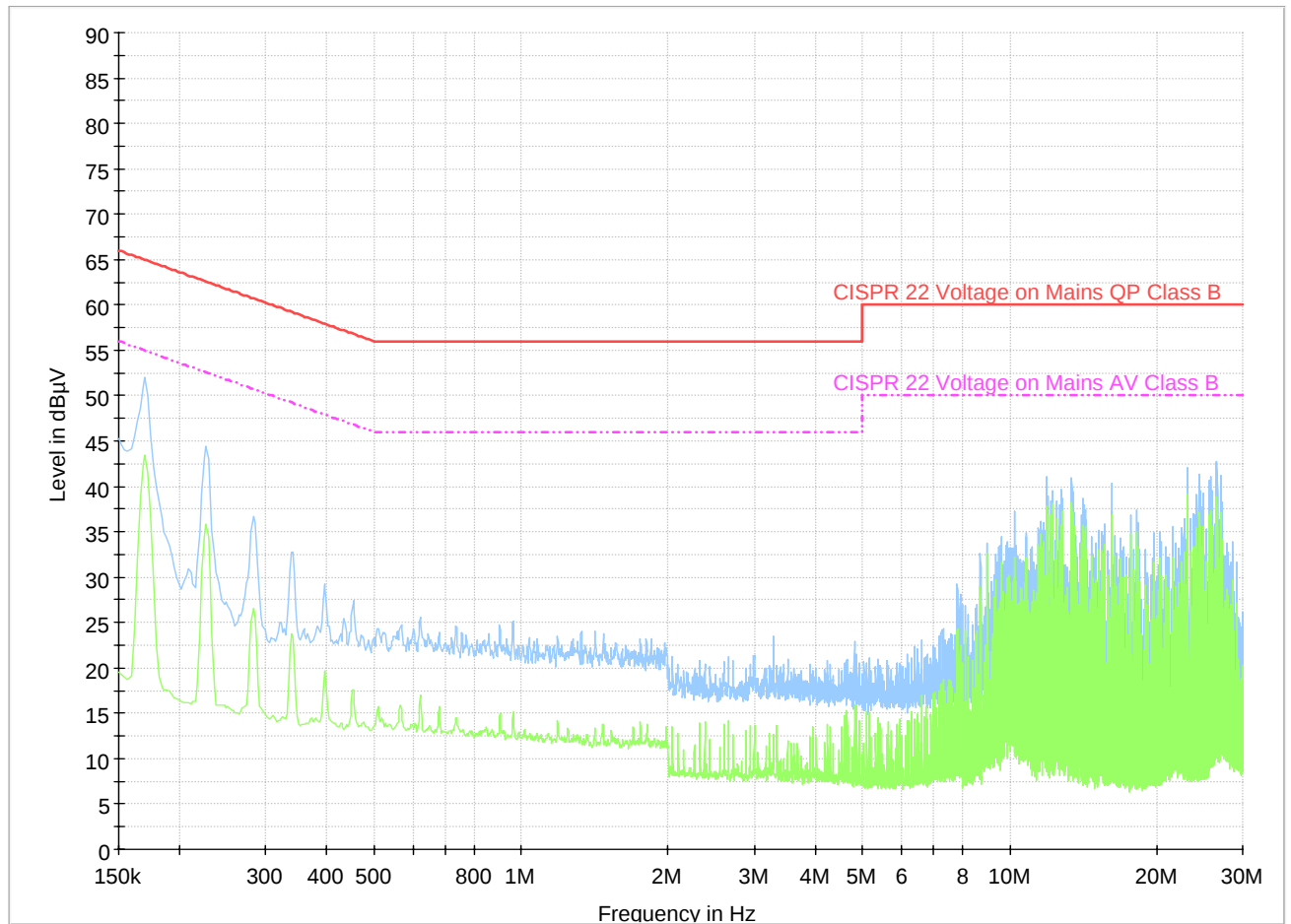
Phase



AC Powerline Conducted - Line

— CISPR 22 Voltage on Mains QP Class B.LimitLine	- - - CISPR 22 Voltage on Mains AV Class B.LimitLine
— Peak Detector Pre-scan	— Average Detector Pre-scan

Neutral



AC Powerline Conducted - Neutral

— CISPR 22 Voltage on Mains QP Class B.LimitLine

— CISPR 22 Voltage on Mains AV Class B.LimitLine

— Peak Detector Pre-scan

— Average Detector Pre-scan

Clause 15.109(a) Radiated Emissions

Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of Emission (MHz)	Field Strength (microvoltsmeter)
30 - 88	100
88 - 216	150
216 - 960	200
Above 960	500

Test Results: Pass

Additional Observations:

The test would be conducted at 3meter open area test site.

EUT receiver mode would be evaluated.

The frequency range would be start from 30MHz to at least 5 times the tunable or local oscillator frequency, whichever is higher, without exceeding 40GHz.

The measurement would be performed using a Quasi-peak detector with 100kHz RBW/VBW below 1GHz and average detector with 1MHz RBW/VBW above 1GHz at a distance of 3 meters.

Final measurements include the Corr. Value, which is a value of cable loss, antenna factor and amplifier gain(if required).



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APPENDIX A : PART 15 SUBPART B TEST RESULTS

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Frequency MHz	Antenna height cm	Polarity	Turntable position deg	Corr. dB	MaxPeak dBμV/m	Limit dBμV/m	Margin dB
346.500000	100.0	H	127.0	16.7	38.8	46	7.2
375.030000	100.0	H	225.0	17.3	42.1	46	3.9
404.250000	100.0	V	282.0	17.7	43.1	46	2.9
500.010000	100.0	H	58.0	19.9	37.6	46	8.4
625.020000	150.0	H	35.0	22.0	38.7	46	7.3
627.000000	300.0	H	21.0	22.1	40.0	46	6
675.000000	300.0	H	46.0	22.5	37.7	46	8.3
693.000000	300.0	H	60.0	22.8	39.8	46	6.2
808.500000	200.0	H	160.0	24.4	38.5	46	7.5
891.000000	200.0	H	211.0	25.0	40.7	46	5.3
924.000000	200.0	H	70.0	25.5	43.8	46	2.2
956.970000	200.0	H	232.0	26.1	40.9	46	5.1
263.430000	100.0	H	164.0	14.6	37.7	46	8.3
275.010000	99.9	H	171.0	15.1	39.0	46	7
264.000000	104.0	H	175.0	14.7	37.6	46	8.4
125.010000	311.0	H	126.0	15.0	40.0	43.5	3.5
288.540000	317.0	H	282.0	15.3	15.7	46	30.3
47.160000	144.0	V	87.0	9.4	27.1	40	12.9
55.590000	119.0	V	221.0	8.0	22.8	40	17.2
47.820000	100.0	V	242.0	9.1	35.4	40	4.6
150.000000	99.9	V	263.0	13.9	37.3	43.5	6.2
45.720000	100.0	V	106.0	10.0	30.0	40	10
250.020000	155.0	V	195.0	13.7	44.0	46	2
57.870000	114.0	V	350.0	8.1	20.7	40	19.3
1212.7000	100.0	H	113.0	-17.7	44.3	54	9.7
1484.8000	150.0	V	166.0	-17.0	36.8	54	17.2
1748.8000	150.0	H	172.0	-15.5	47.7	54	6.3
2904.1000	100.0	H	197.0	-10.5	46.8	54	7.2

Appendix B : Part 90 and ASTM E2213-03 Test Results

Clause 2.1055 Frequency Stability

§2.1055 Measurements required: Frequency stability.

- (a) The frequency stability shall be measured with variation of ambient temperature as follows:
 (1) From -30° to +50° centigrade for all equipment except that specified in paragraphs (a)(2) and (3) of this section
 (b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10° centigrade through the range.
 (d) The frequency stability shall be measured with variation of primary supply voltage as follows:
 (1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

ASTM E2213-03 Clause 8.9.4 Transmitter Center Frequency Tolerance

The transmitted center frequency tolerance shall be ± 10 ppm maximum for RSUs and ± 10 ppm maximum for OBUs.

ASTM E2213-03 Clause 8.8.6 Operation Temperature Range

Transmit and Receive Operating Temperature Range—Three temperature ranges for full-operation compliance to the OFDM PHY are specified.

Type 1, defined as from 0 to 40°C, is designated for office environments.

Type 2, defined as from -20 to 50°C, and

Type 3, defined as from -30 to 70°C, are designated for industrial environments.

A fourth temperature range is added for DSRC operation. Type 4, defined as from -40 to 85°C, is designated for automotive environments.

Test Results: Pass

Condition	Frequency (Hz)	Offset (Hz)	Offset (ppm)
+85°C	5879989761.4	-15436.0	-2.6
+70°C	5879992486.1	-12711.3	-2.2
+60°C	5880000850.1	-4347.3	-0.7
+50°C	5880001294.2	-3903.2	-0.7
+40°C	5880004684.7	-512.7	-0.1
+30°C	5880006472.0	1274.6	0.2
+20°C, +15% Voltage	5880005077.1	-120.3	0.0
+20°C	5880005197.4	—	—
+20°C, -15% Voltage	5880006346.3	1148.9	0.2
+10°C	5880004879.9	-317.5	-0.1
0°C	5880008376.1	3178.7	0.5
-10°C	5880018614.3	13416.9	2.3
-20°C	5880017621.3	12423.9	2.1
-30°C	5880022480.0	17282.6	2.9
-40°C	5880022652.9	17455.5	3.0

Clause 90.377 Frequencies available, maximum EIRP and Antenna height

(b) Frequencies available for assignment to eligible applicants within the 5850-5925 MHz band for RSUs and the maximum EIRP permitted for an RSU with an antenna height not exceeding 8 meters above the roadway bed surface are specified in the table below. Where two EIRP limits are given, the higher limit is permitted only for state or local governmental entities.

Channel No.	Frequency range (MHz)	Max. EIRP (dBm)	Channel use
170	5850-5855		Reserved
172	5855-5865	33	Service Channel2
174	5865-5875	33	Service Channel
175	5865-5885	23	Service Channel3
176	5875-5885	33	Service Channel
178	5885-5895	33/44.8	Control Channel
180	5895-5905	23	Service Channel
181	5895-5915	23	Service Channel3
182	5905-5915	23	Service Channel
184	5915-5925	33/40	Service Channel4

ASTM E2213-03 Clause 8.9.1 Output Power Requirement

8.9.1.1 The maximum allowable Effective Isotropic Radiated Power (EIRP) in accordance with FCC regulations is 44.8 dBm (30 W). However, most devices are expected to use much less power. The maximum output power for a device is 28.8 dBm (750 mW). A device is allowed to transmit more power to overcome cable losses to the antenna as long as the antenna input power does not exceed 28.8 dBm and the EIRP does not exceed 44.8 dBm. However, specific channels and categories of uses have additional limitations.

8.9.1.2 Public Safety and Private RSU installations operating in Channels 172, 174, 175, and 176 are used to implement small and medium range operations. RSU installation transmissions in Channels 172,174, and 176 shall not exceed 28.8 dBm antenna input power and 33 dBm EIRP. RSU installation transmissions in Channel 175 shall not exceed 10 dBm antenna input power and 23 dBm EIRP.

8.9.1.3 Public Safety RSU installation transmissions in Channel 178 shall not exceed 28.8 dBm antenna input power and 44.8 dBm EIRP. Private RSU installation transmissions in Channel 178 shall not exceed 28.8 dBm antenna input power and 33 dBm EIRP.

8.9.1.4 The DSRC Channels 180, 181, and 182 are used to implement small zone operations. Public Safety and Private RSU installation in these channels shall not exceed 10 dBm antenna input power and 23 dBm EIRP. These installations shall also use an antenna with a minimum 6 dBi gain. Interfering emissions from an RSU installation in these channels shall not exceed a maximum received power level of -76dBm at 15 m from the installation being evaluated. The received power level is measured at 1.2 m above ground level with a 0 dBi antenna.

Test Results: Pass

10MHz Channel

Channel	Frequency (MHz)	Power Setting	Measured Power (dBm)	Antenna Gain (dBi)	Measured EIRP (dBm)	Limit (dBm)
172	5860	31	21.94	10	31.94	33.0
174	5870	31	21.86	10	31.86	33.0
176	5880	31	21.96	10	31.96	33.0
178	5890	31	21.73	10	31.73	33.0
180	5900	12	12.16	10	22.16	23.0
182	5910	12	11.89	10	21.89	23.0
184	5920	31	21.76	10	31.76	33.0
172	5860	20	17.50	15	32.50	33.0
174	5870	20	17.53	15	32.53	33.0
176	5880	20	17.57	15	32.57	33.0
178	5890	20	17.50	15	32.50	33.0
172	5860	14	13.89	19	32.89	33.0
174	5870	14	13.81	19	32.81	33.0
176	5880	14	13.85	19	32.85	33.0
178	5890	14	13.92	19	32.92	33.0

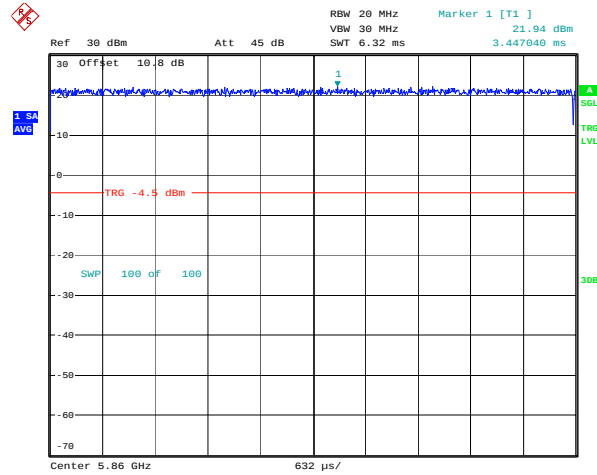
20MHz Channel

Channel	Frequency (MHz)	Power Setting	Measured Power (dBm)	Antenna Gain (dBi)	Measured EIRP (dBm)	Limit (dBm)
175	5875	14	12.92	10	22.92	23.0
181	5905	14	12.54	10	22.54	23.0
175	5875	33 Low Power	7.76	15	22.76	23.0
175	5875	23 Low Power	3.79	19	22.79	23.0

All measurements were performed using FCC Public Notice DA 02-2138 for UNII band Power measurement methods, Power Method 2.

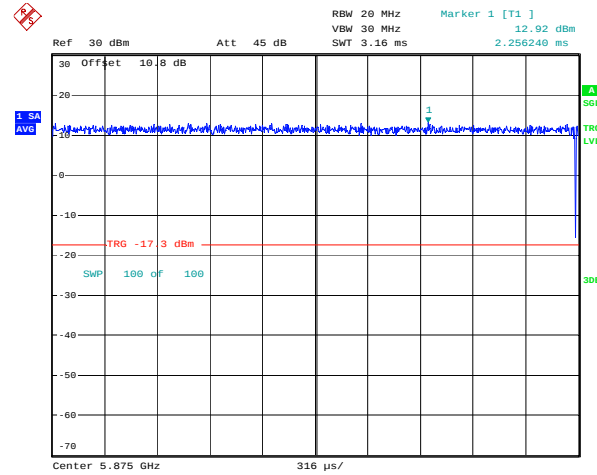
Only Highest power plots for each bandwidth and antenna gain are shown as worst case results.

10dBi Antenna
10MHz Channel



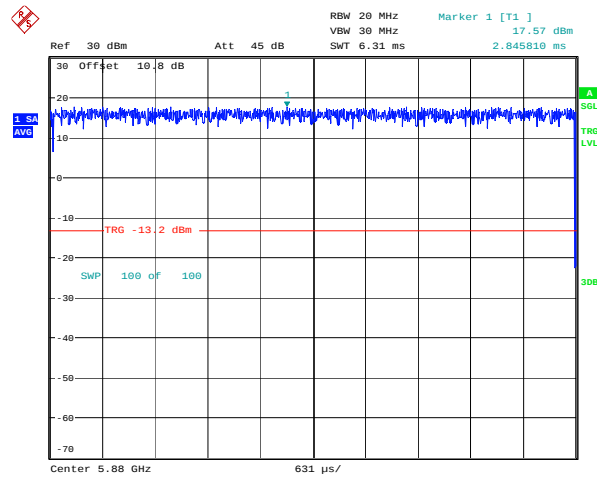
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20MHz Channel



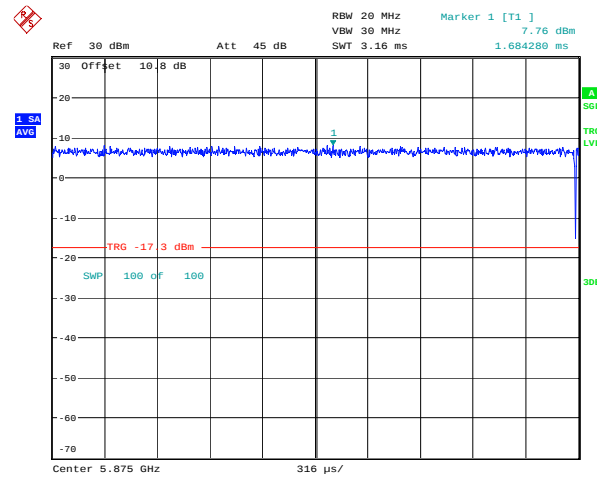
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15dBi Antenna
10MHz Channel



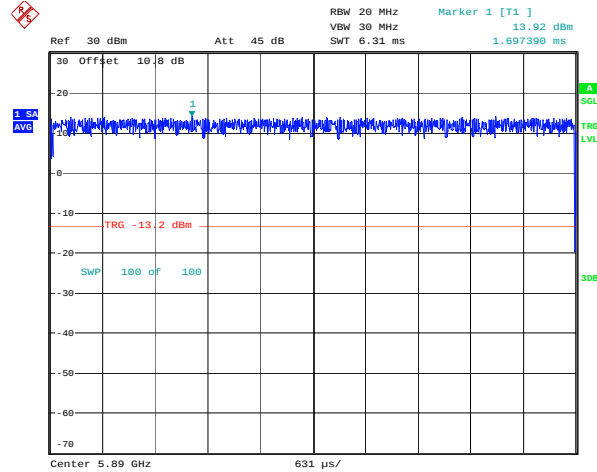
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20MHz Channel



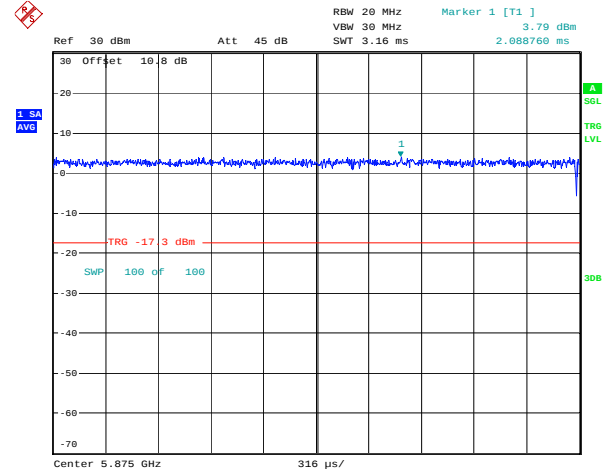
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19dBi Antenna
10MHz Channel



Date: 9.JUN.2008 16:55:35

20MHz Channel



Date: 9.JUN.2008 17:17:54



Nemko Canada Inc.

Report Number: 108368TRFWL

Specification: FCC Part 90 Subpart M

Clause 2.1049 Occupied Bandwidth

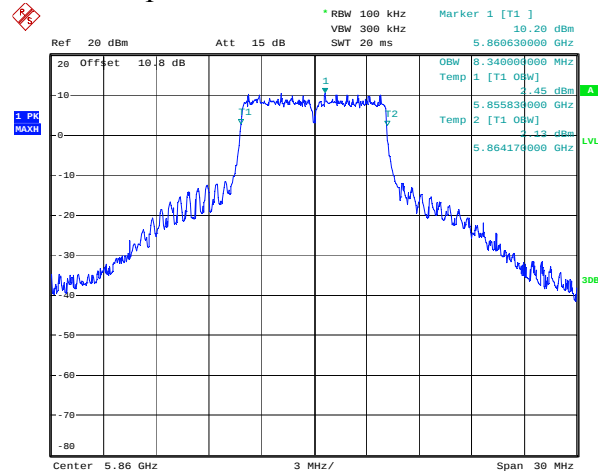
The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:

Test Results: Pass

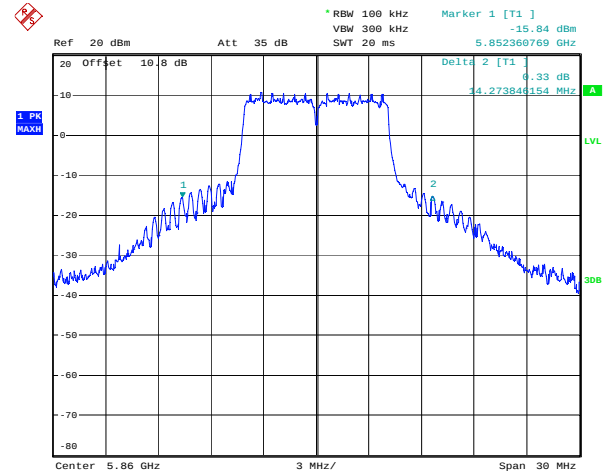
Additional Observations:

All measurements were performed at Maximum Output Power.

5860MHz
99% Occupied bandwidth



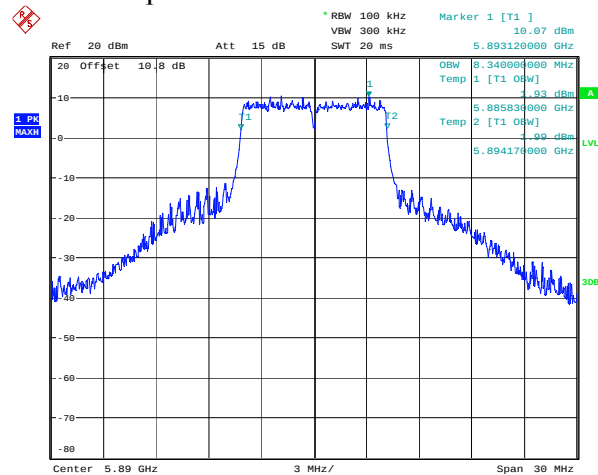
26dB Bandwidth



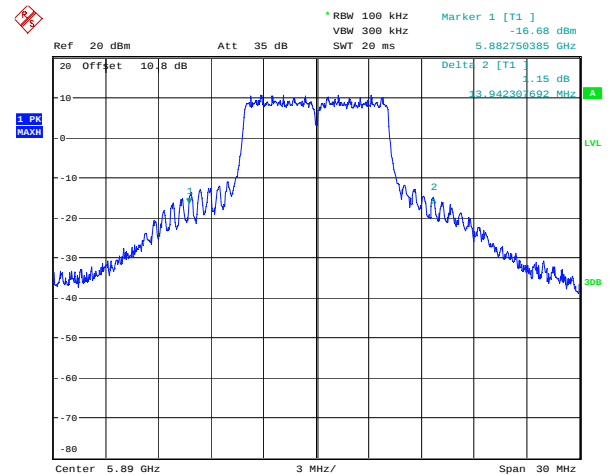
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5890MHz
99% Occupied bandwidth



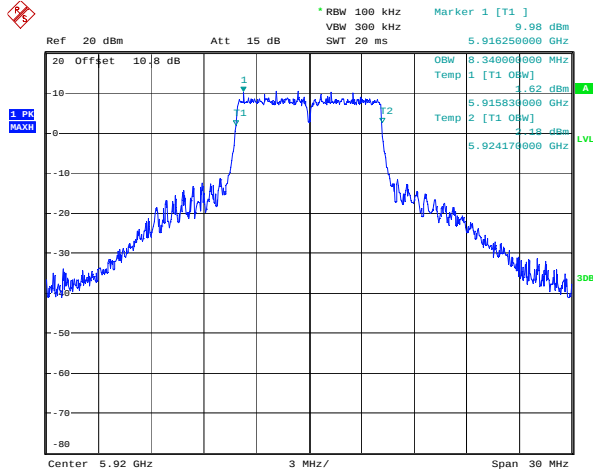
26dB Bandwidth



Date: 9.JUN.2008 15:59:22

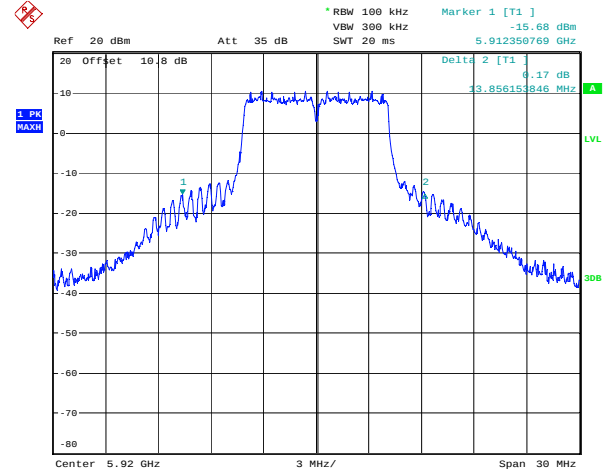
Date: 9.JUN.2008 15:58:58

5920MHz
99% Occupied bandwidth



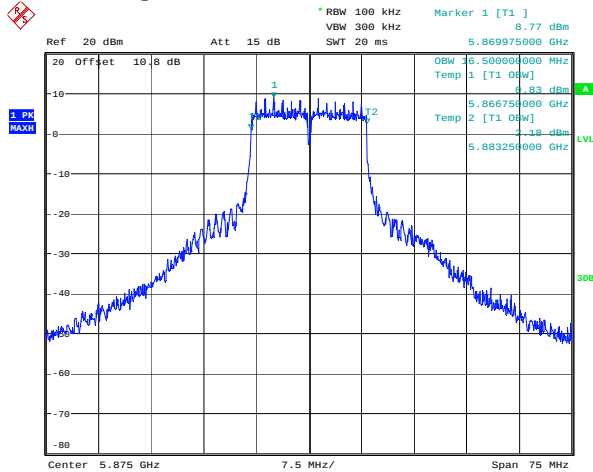
Date: 9 JUN.2008 16:00:11

26dB Bandwidth



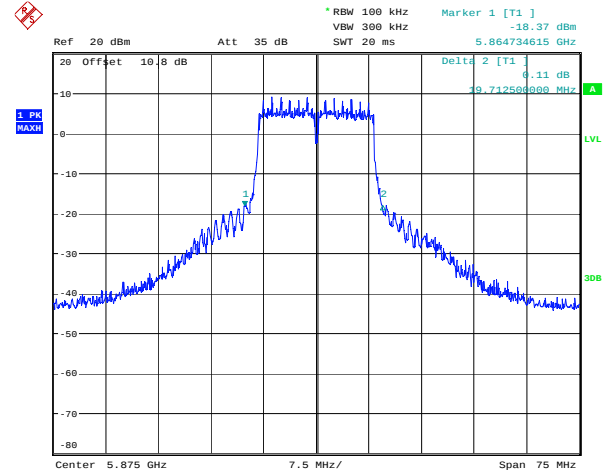
Date: 9 JUN.2008 16:00:52

5875MHz
99% Occupied bandwidth



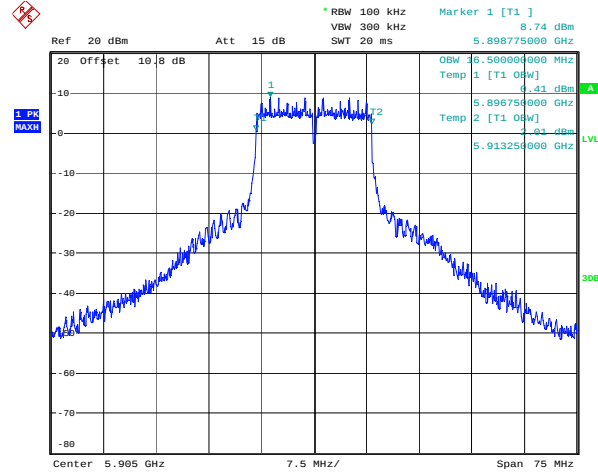
Date: 9 JUN.2008 16:02:03

26dB Bandwidth



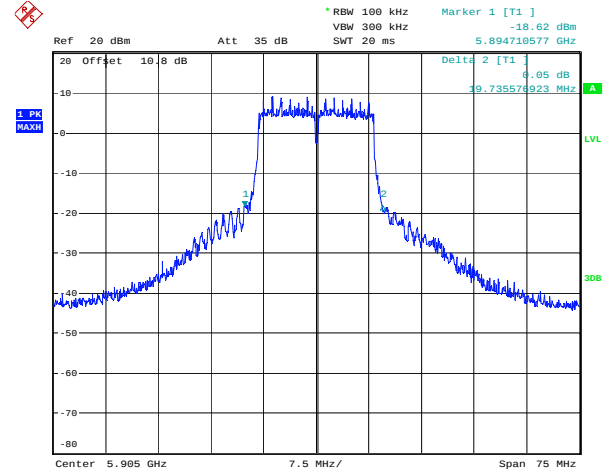
Date: 9 JUN.2008 16:02:45

5905MHz
99% Occupied bandwidth



Date: 9.JUN.2008 16:03:40

26dB Bandwidth



Date: 9.JUN.2008 16:04:17

ATSM E2213-03 Clause 8.9.2 Transmit Spectrum Mask

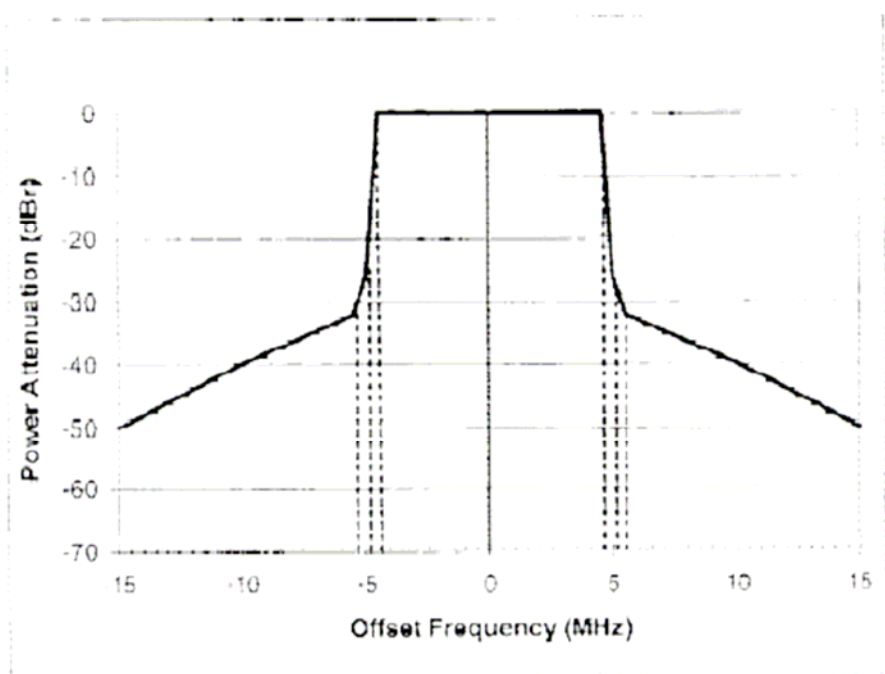
8.9.2.1 The DSRC transmitted spectrum mask is relative to the device class of operation. The power in the transmitted spectrum for all DSRC devices shall be -25 dBm or less within 100 kHz outside all channel and band edges. This will be accomplished by attenuating the transmitted signal 100 kHz outside the channel and band edges by $55 + 10\log(P)$ dB, where P is the total transmitted power in watts. The transmitted spectral density of the transmitted signal for all devices shall fall within the spectral mask, as detailed in Table 10.5 The measurements shall be made using a 100 kHz resolution bandwidth and a 30 kHz video bandwidth. 8.9.2.2 The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges. Additional filtering that supplements the filtering provided by the transmitter may be needed for some antenna/transmitter combinations.

8.9.2.2 The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges. Additional filtering that supplements the filtering provided by the transmitter may be needed for some antenna/transmitter combinations.

Table 10.DSRC Spectrum Mask

Reduction in Power Spectrum Density, dBr

Class	± 4.5 MHz offset	± 5.0 MHz offset	± 5.5 MHz offset	± 10 MHz offset	± 15 MHz offset
A	0	-10	-20	-28	-40
B	0	-16	-20	-28	-40
C	0	-26	-32	-40	-50
D	0	-35	-45	-55	-65



Test Results: Pass

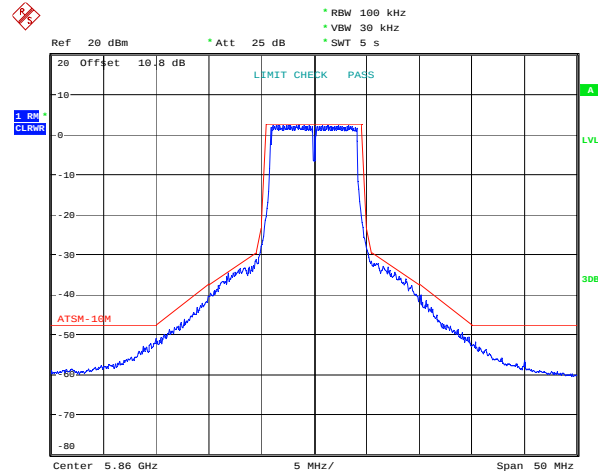
Additional Observations:

20MHz channel masks were assessed as an aggregate of two 10MHz channels.

10MHz Channel

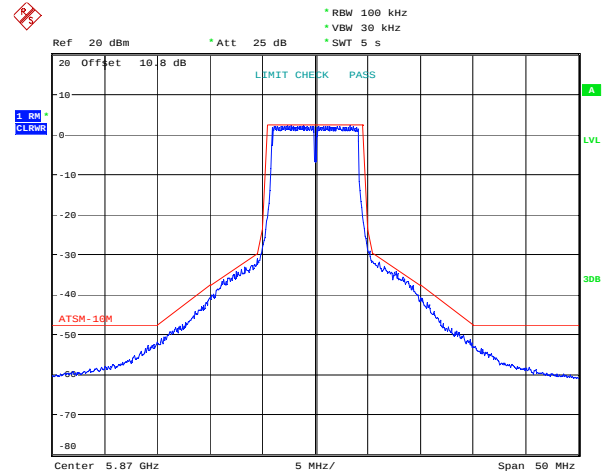
10dBi Antenna

5860MHz



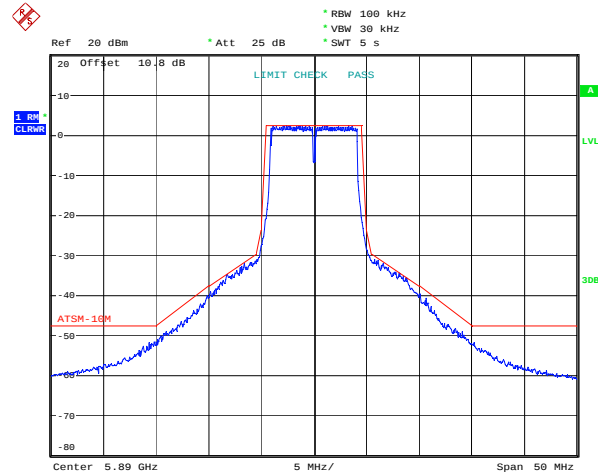
Date: 9 JUN.2008 18:40:45

5870MHz



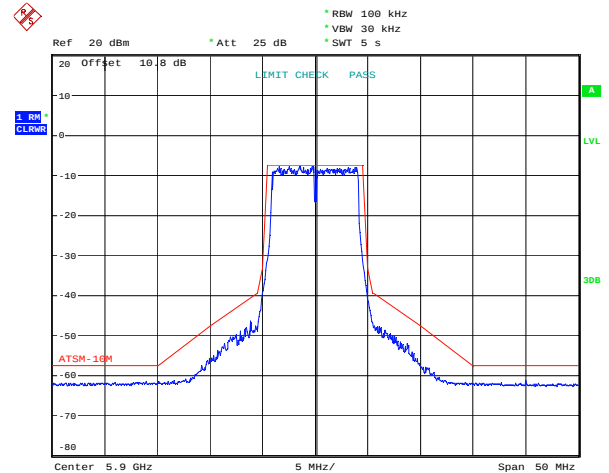
Date: 9 JUN.2008 18:42:01

5890MHz



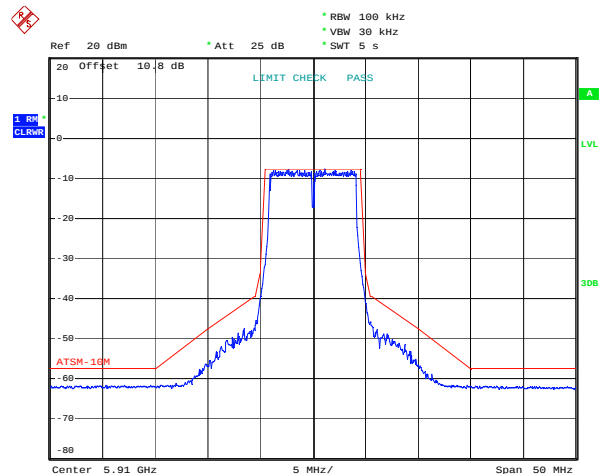
Date: 9 JUN.2008 18:43:07

5900MHz



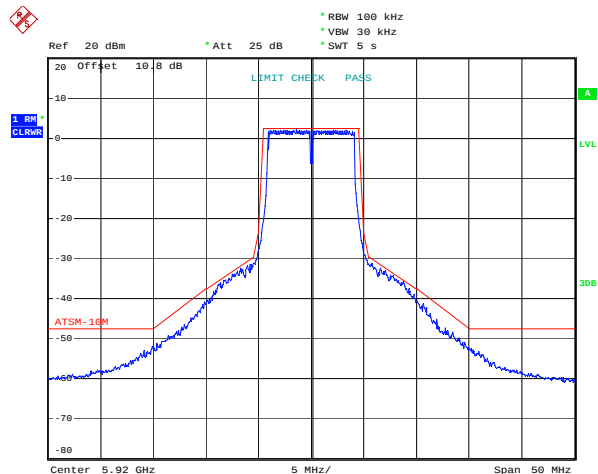
Date: 9 JUN.2008 18:45:44

5910MHz



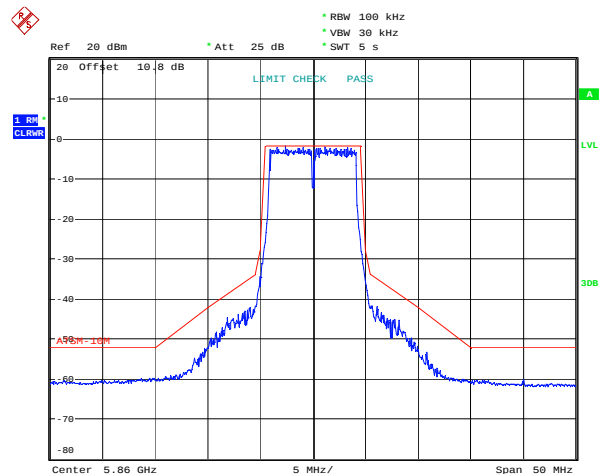
Date: 9.JUN.2008 18:46:42

5920MHz



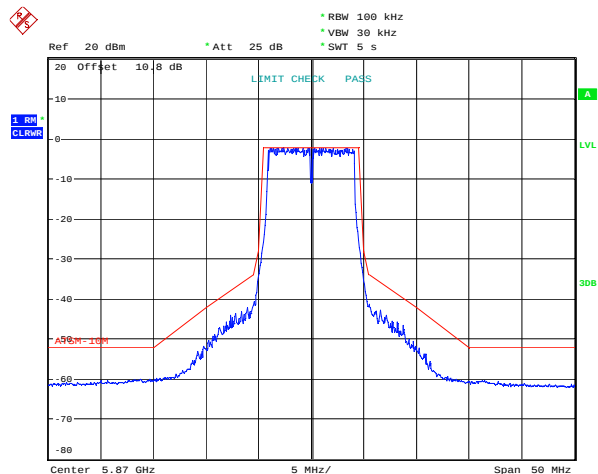
Date: 9.JUN.2008 18:44:21

15dBi Antenna 5860MHz



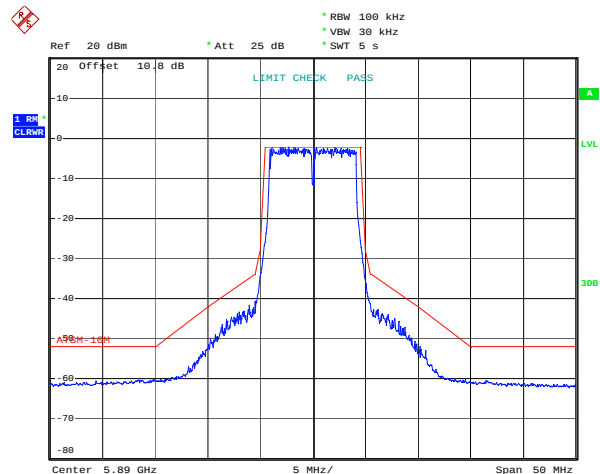
Date: 9.JUN.2008 18:50:08

5870MHz



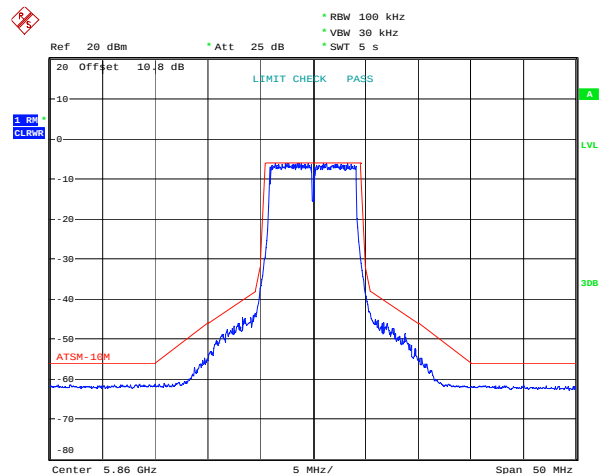
Date: 9.JUN.2008 18:49:30

5890MHz



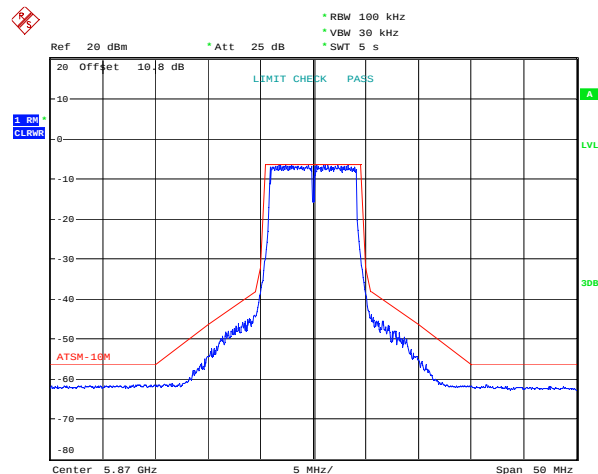
Date: 9.JUN.2008 18:47:34

19dBi Antenna
5860MHz



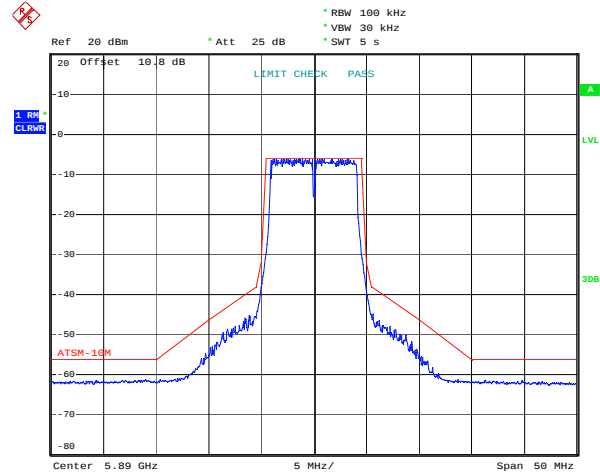
Date: 9.JUN.2008 18:50:52

5870MHz



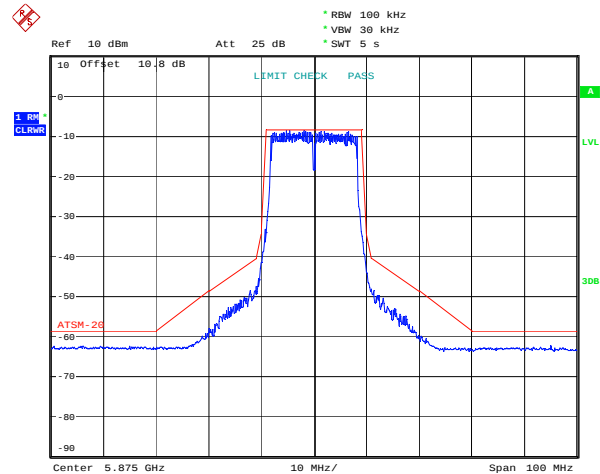
Date: 9.JUN.2008 18:51:36

5890MHz



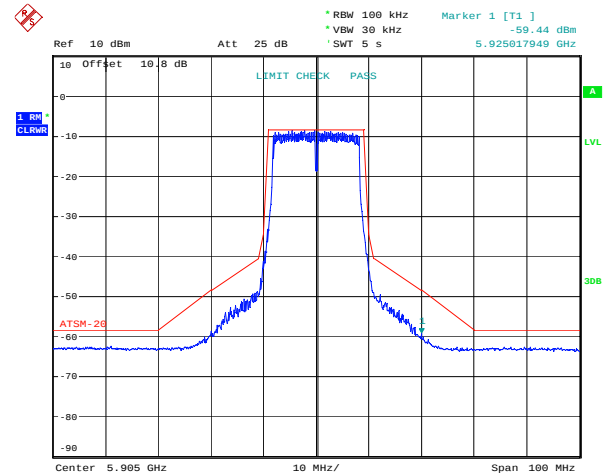
Date: 9 JUN. 2008 18:52:27

20MHz Channel 10dBi Antenna 5875MHz



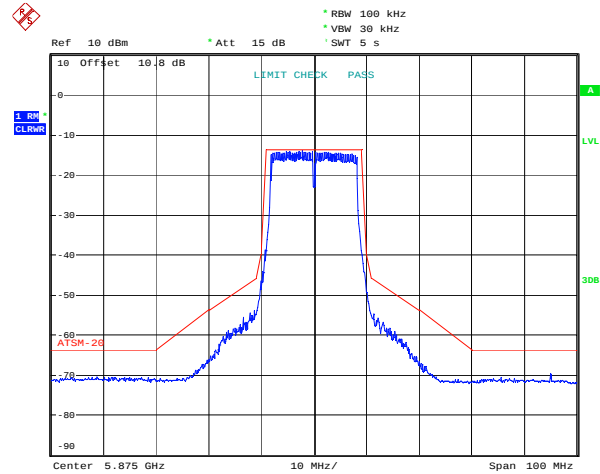
Date: 9 JUN. 2008 19:17:59

5905MHz



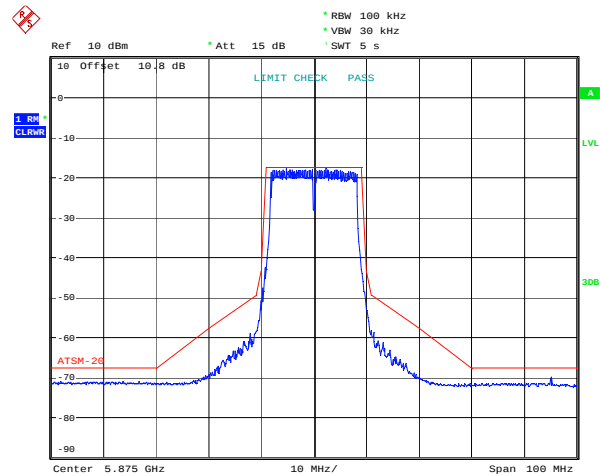
Date: 9 JUN. 2008 19:16:52

15dBi Antenna
5875MHz



Date: 9 JUN.2008 19:19:03

19dBi Antenna
5875MHz



Date: 9 JUN.2008 19:19:52

ASTM E2213-03 Clause 8.9.2 Spurious Emissions at the antenna terminal

8.9.2.1 The DSRC transmitted spectrum mask is relative to the device class of operation. The power in the transmitted spectrum for all DSRC devices shall be -25 dBm or less within 100 kHz outside all channel and band edges. This will be accomplished by attenuating the transmitted signal 100 kHz outside the channel and band edges by $55 + 10\log(P)$ dB, where P is the total transmitted power in watts. The transmitted spectral density of the transmitted signal for all devices shall fall within the spectral mask, as detailed in Table 10.5 The measurements shall be made using a 100 kHz resolution bandwidth and a 30 kHz video bandwidth. 8.9.2.2 The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges. Additional filtering that supplements the filtering provided by the transmitter may be needed for some antenna/ transmitter combinations.

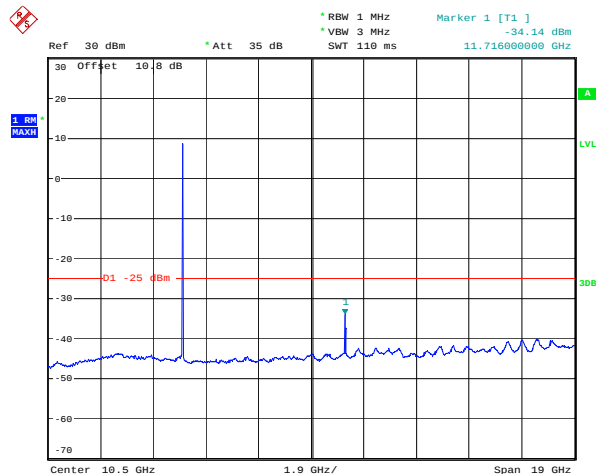
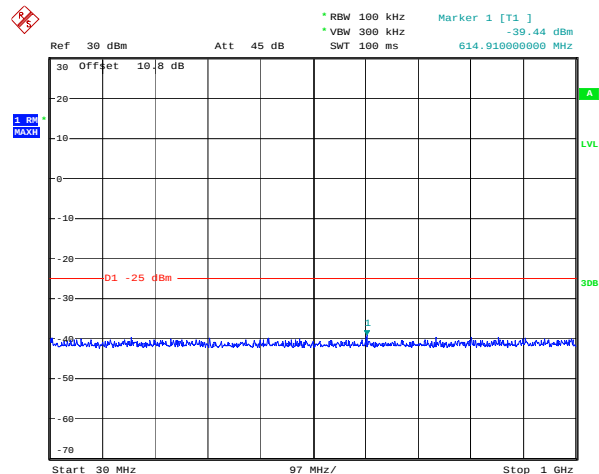
8.9.2.2 The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges. Additional filtering that supplements the filtering provided by the transmitter may be needed for some antenna/ transmitter combinations.

Test Results: Pass

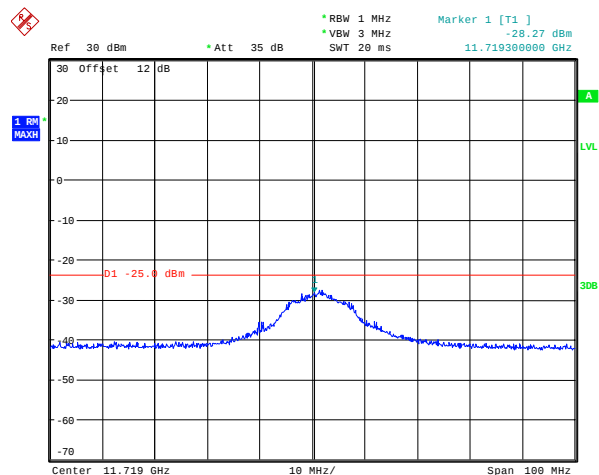
Additional Observations:

Testing was performed on Low, Mid and High channels at maximum conducted power.

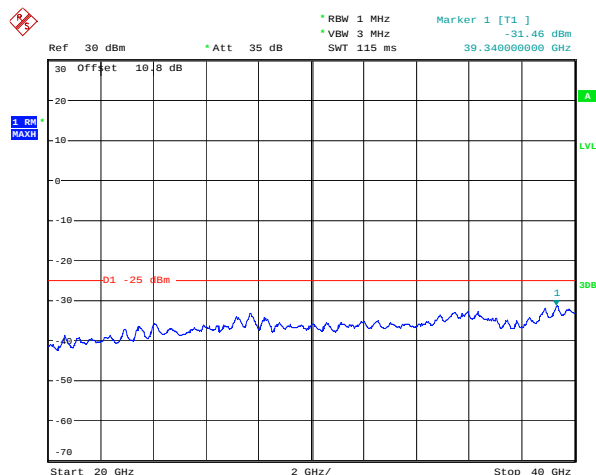
5860MHz



Date: 9.JUN.2008 19:48:47

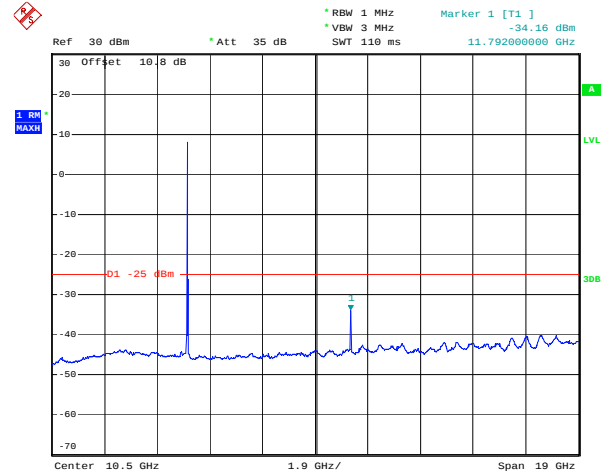
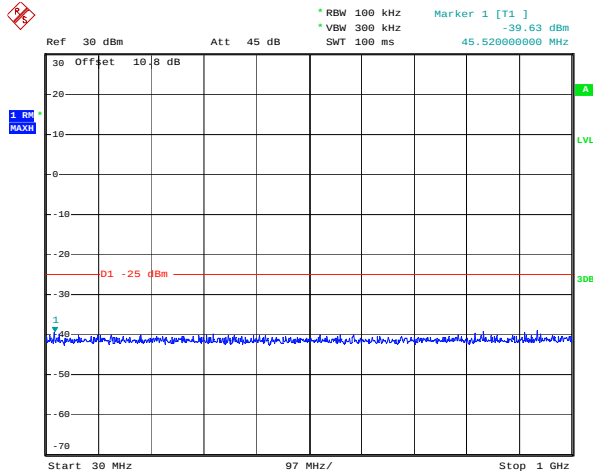


Date: 9.JUN.2008 20:00:55

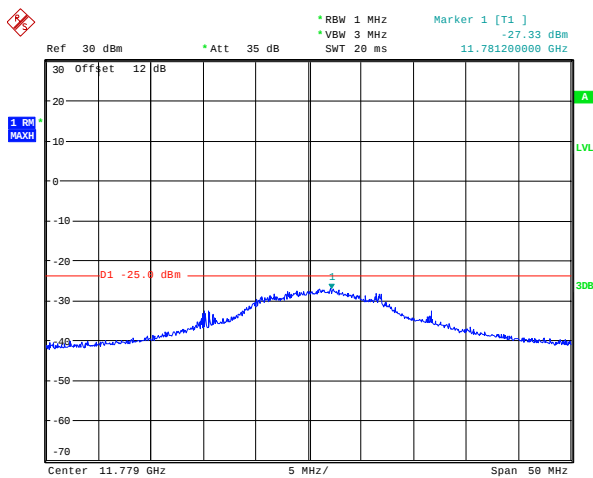


Date: 9.JUN.2008 20:01:14

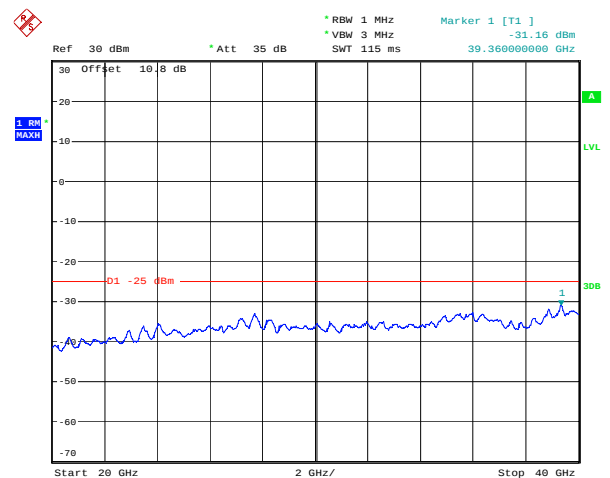
5890MHz



Date: 9 JUN.2008 19:50:24

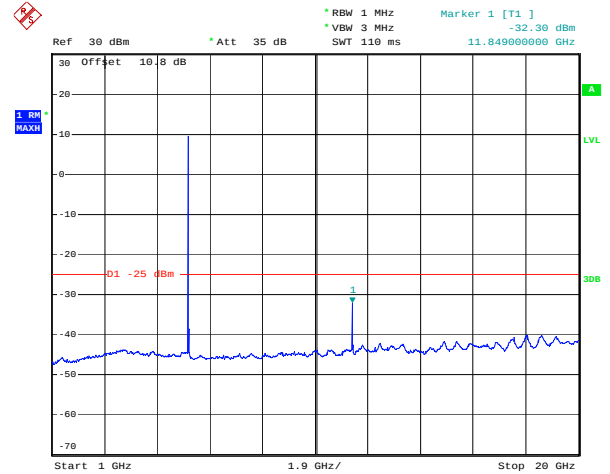
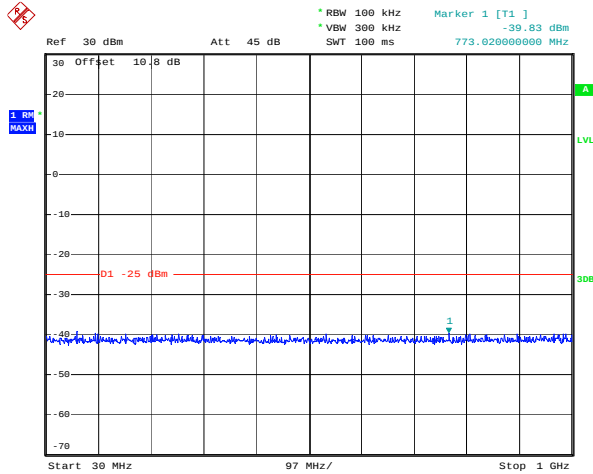


Date: 9 JUN.2008 19:58:14

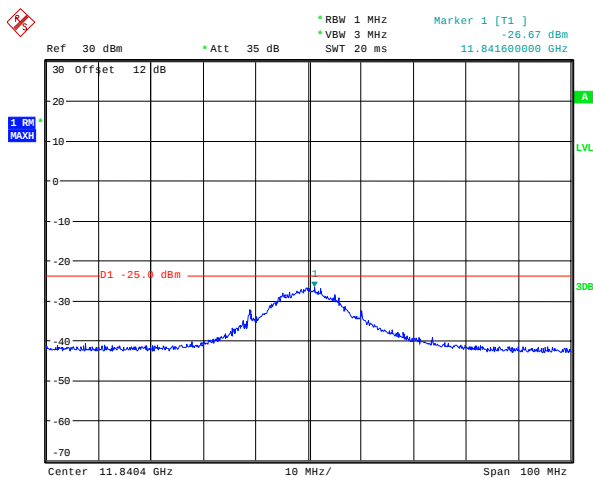


Date: 9 JUN.2008 20:04:36

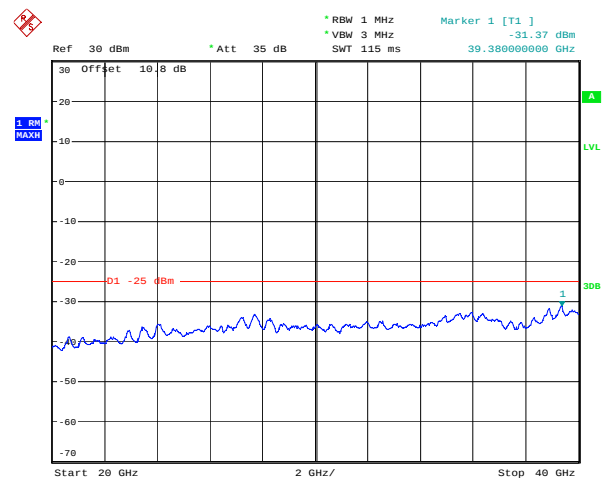
5920MHz



Date: 9 JUN.2008 19:53:09

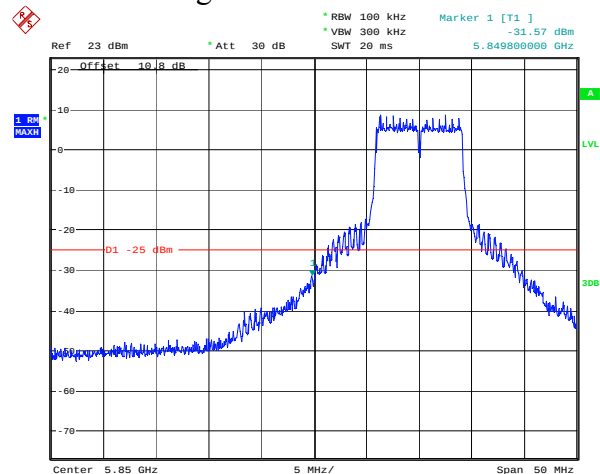


Date: 9 JUN.2008 19:54:00



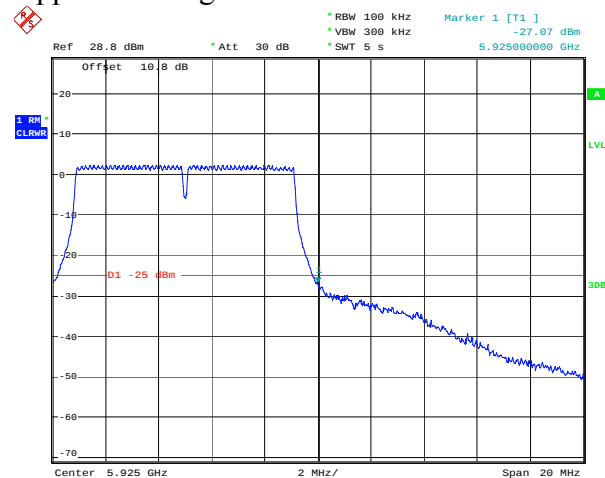
Date: 9 JUN.2008 20:06:04

Bandedge results Lower bandedge



Date: 13.JUN.2008 19:01:05

Upper Bandedge



Date: 9.JUN.2008 20:41:29

ASTM E2213-03 Clause 8.9.2 Radiated Spurious Emissions

8.9.2.1 The DSRC transmitted spectrum mask is relative to the device class of operation. The power in the transmitted spectrum for all DSRC devices shall be -25 dBm or less within 100 kHz outside all channel and band edges. This will be accomplished by attenuating the transmitted signal 100 kHz outside the channel and band edges by $55 + 10\log(P)$ dB, where P is the total transmitted power in watts. The transmitted spectral density of the transmitted signal for all devices shall fall within the spectral mask, as detailed in Table 10.5 The measurements shall be made using a 100 kHz resolution bandwidth and a 30 kHz video bandwidth. 8.9.2.2 The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges. Additional filtering that supplements the filtering provided by the transmitter may be needed for some antenna/ transmitter combinations.

8.9.2.2 The transmitted spectral mask for class A, B, C, and D devices are shown in Figs. 12-15. In addition, all DSRC site installations shall limit the EIRP in the transmitted spectrum to -25 dBm or less in the 100 kHz at the channel edges and the band edges. Additional filtering that supplements the filtering provided by the transmitter may be needed for some antenna/ transmitter combinations.

Test Results: Pass

Additional Observations:

Measurements were performed with the EUT transmitting on Low, Mid and High channels.

The spectrum was search from 30MHz to 40GHz.

Measurements were performed using an RMS detector with 100kHz/300kHz RBW/VBW below 1GHz and 1MHz/3MHz above 1GHz.

Measurements up to 18GHz were performed at 3m and measurements above 18GHz were performed at 1m.

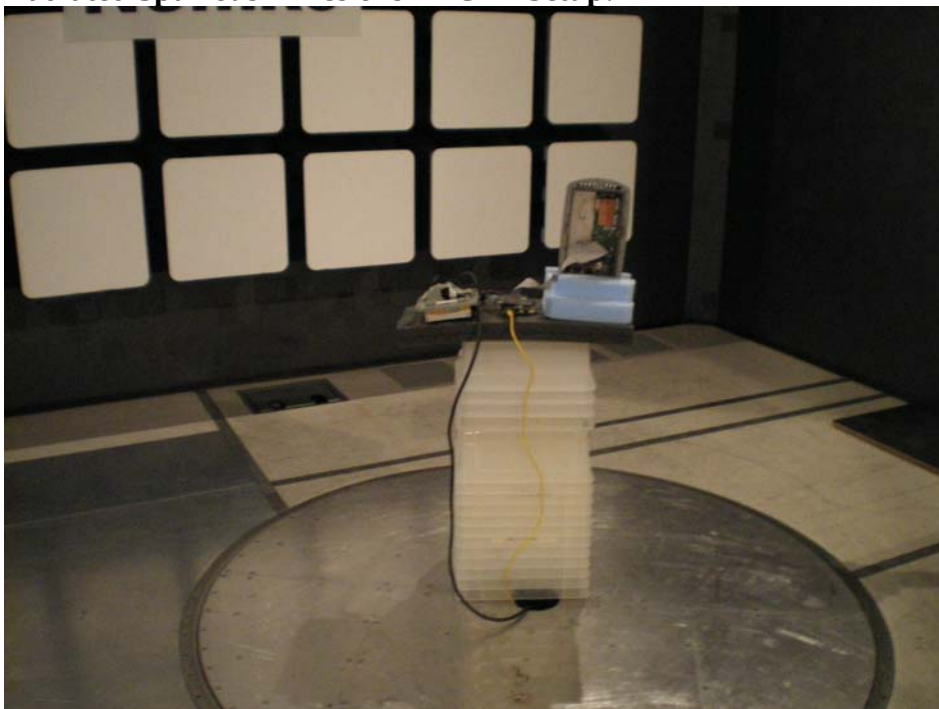
Frequency (MHz)	Pol. (V/H)	Rx Level (dBm)	Sub. Level (dBm)	Antenna Gain (dBi)	Emission Level (dBm)	Limit (dBm)
11720.325	V	-46.55	-41.26	12.7	-28.56	-25
11720.325	H	-50.98	-45.46	12.6	-32.86	-25
11760.075	V	-49.03	-41.12	12.7	-28.42	-25
11760.075	H	-50.28	-42.15	12.6	-29.55	-25
11840.150	V	-52.74	-37.90	12.7	-25.20	-25
11840.150	H	-55.09	-39.80	12.6	-27.20	-25

Appendix B : Setup Photographs

Radiated Spurious Emissions < 1GHz Setup:



Radiated Spurious Emissions > 1GHz Setup:

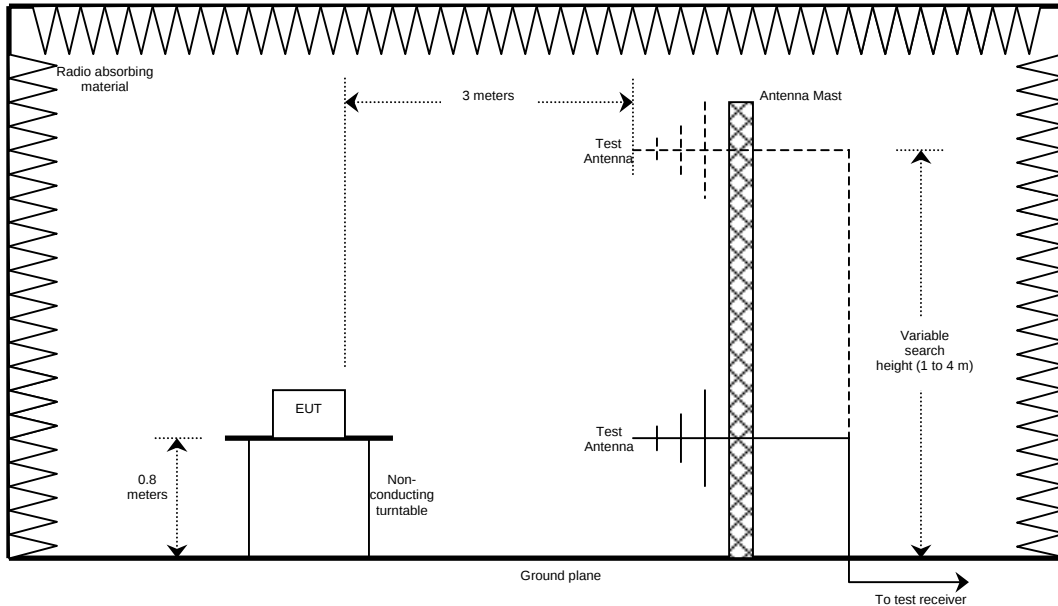


Conducted Emissions Setup:

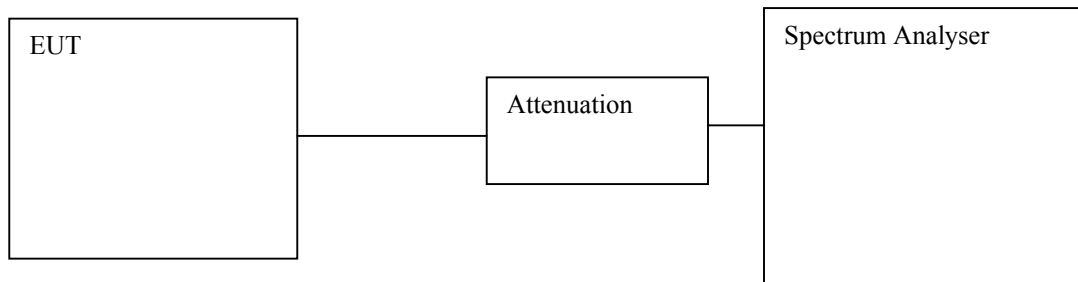


Appendix C : Block Diagram of Test Setups

Test Site For Radiated Emissions



Conducted Emissions, Output power, Occupied Bandwidth



Frequency Stability

