



EMC Test Report
FCC: QRF-PVE25XBY
TR-WMX 2.5 GHz CPE
Tranzeo Wireless Technologies Inc.

Testing body: Tranzeo Wireless Technologies Inc.
19473 Fraser Way,
Pitt Meadows,
BC, Canada
V3Y 2V4

Client: Tranzeo Wireless Technologies Inc.
19473 Fraser Way,
Pitt Meadows,
BC, Canada
V3Y 2V4

The test results indicated in this report refer exclusively to the equipment under test specified below. It is not permitted to transfer the results to other systems or configurations.

Order number: 95

Type of test: Testing of electromagnetic disturbances characteristics

Date the EUT was received: June 3rd, 2010

Date of test: June 3rd, 2010 to 22nd, 2010

Report No.: 062410.1

Pitt Meadows, 24th, 2010



EMC Manager: Andrew Marles



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Revision History

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1.0 General Information

1.1 EUT Description

Product Name	WiMax CPE
Company Name	Tranzeo Wireless Technologies Inc
Model No.	TR-WMX-2.3-N-W, TR-WMX-2.3-14-W
Frequency Range	2305-2320, 2345-2360, 2495-2690 MHz
Rated RF Output Power	Adjustable, 20 dBm MAX
Channel Bandwidth	3.5 and 7 MHz
Transmit Rate	20 Mbps maximum
Type of Modulation	OFDM
Antenna Type	External and integrated
Antenna Gain	24 dBi MAX
Product Software Revision	PM-WMX-3.1.78
Test Software	Mikrotik test software; RS EMC32 software
Operator Channel Selection	By software
Power Adapter	Model: AC adapter, model PA1020-180i Input: Input: 100-240V 50-60Hz, 0.4 A Output: DC 18 V, 1.1 A 20W max

Product sample tested:

Manufacturer	Model No.	Serial No.
Tranzeo Wireless	TR-WMX-2.3-N-W	TR-WMX-2.3-N-W-ENG001
Tranzeo Wireless	TR-WMX-2.3-14-W	TR-WMX-2.3-14-W-ENG001

As an IEEE 802.16 compliant wireless system, this device includes a 2.5 GHz receive function as well as 2.5 GHz digital modulation transmit function. There are no user serviceable parts inside the unit. It is factory sealed in a one-time use manner and inaccessible to the end user.

The TR-WMX-2.3 product operates at 2.5 GHz and is fitted with a standard Type N antenna connector.

The tests were performed on a production sample model to demonstrate compliance with FCC Parts 27.

Frequencies tested in report:

WCS band

Frequency (MHz)	Range (MHz)
Low	2305
Middle	2320,2345
High	2360

BRS band

Frequency (MHz)	Range (MHz)
Low	2495
Middle	2590
High	2690

1.2 Operational Description

The device is a WiMax CPE designed specifically for wireless networks. The device has an IEEE 802.16 radio and a standard type N antenna connector. The transceiver operates in the frequency bands 2305-2320, 2345-2360, and 2495-2690 MHz. The device transmits digital network data and is mounted in fixed point-to-point point installations.

The type of RF modulation is OFDM used at 2.5 GHz band. The device can transmit data at a real-world data rate of approximately 20 Mbps. The device's standard compliance ensures that it can communicate with a corresponding WiMax Base Station.

The firmware used with the device prevents the use of channels outside the specified frequency bands.

The product is used exclusively in a professionally installed, wireless network environment.

1.3 Standards Applied

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

FCC Part 27, Subpart C.

All tests have been performed in accordance with the above test standards.

1.4 EUT Testing Configuration

The model TR-WMX-2.3-N-W was tested with the highest gain antenna of each type. Data is presented for the worst case configuration only.

All radiated emissions testing were performed in a semi-anechoic chamber. This device was tested as a tabletop device. The EUT was mounted to a custom non-metallic stand to better represent a typical user installation. The EUT was connected to

a vector signal generator to imitate a real world situation. The EUT were also connected to a host PC so that it could be cycled through the various test modes and channels.

The EUT was tested in the following modes:

Standby/Receive mode: In this mode the EUT searches for and exchanges acknowledgments with client devices.

Data transfer mode: In this mode the EUT is exercised with commercially available bandwidth test software. A link is established between two PCs through the unit and the client device and data is transmitted at the highest possible rate.

1.5 Auxillary Equipment

The following auxiliary equipment and cables were used for performing the tests:

Manufacturer	Model	Description	S/N
Soyo	PW-930S	Laptop PC	6188
Tranzeo	POE-1	DC injection unit	n/a

The TR-WMX-2.3-N-W unit was tested with the antennas listed.

2.4 GHz Antennas	
Model	Description
TR-OD-24-7.5	7.5 dBi Vertical Omni
SA24-90-9	9 dBi Vertical Sector
TR-OD24-12	12 dBi Vertical Omni
TR-GD-24	24 dBi Parabolic Grid

1.6 EUT Modifications

No modifications were necessary for this unit to comply with FCC Part 27.

Overview of Test Results

Standard	Test Type	Result
FCC 27.50 (a)	Transmitter output power	PASS
FCC 27.53 (a)	Spectral Emission Mask	PASS
FCC 27.53 (g)	Occupied Bandwidth	PASS
FCC 27.53 (a)	Conducted Spurious and Harmonics	PASS
FCC 27.54	Frequency Stability	PASS
FCC 27.53	Transmitted Radiated Spurious and Harmonics	PASS
FCC 27.53	Radiated Spurious and Harmonics in Receive Mode	PASS

1.7 Test Facilities

Tranzeo Wireless Technologies Inc.
 19473 Fraser Way
 Pitt Meadows, BC V3Y 2V4
 Canada

Phone: (604) 460-6002
 Fax: (604) 460-6005

FCC registration number: 960532
 Industry Canada Number: 5238A

1.8 Test Equipment

Manufacturer	Model	Description	Serial No.	Cal Due Date
ETS-Lindgren	2165	Turntable	00043883	N/R
ETS-Lindgren	2175	Mast Motor	00077487	N/R
ETS-Lindgren	1030	Semi-Anechoic Chamber	S2014X7LH	N/A
Sunol Sciences	JB3	Antenna	A042004	02-Aug-2010
Sunol Sciences	DRH-118	Antenna	A052804	02-Aug-2010
Com-Power	LI-115	LISN	241037	30-Aug-2010
Rohde & Schwarz	FSP40	Spectrum Analyzer	100184	24-Aug-2010
Rohde & Schwarz	NRP	Power Meter	100055	02-Aug-2010
Rohde & Schwarz	ESU40	EMI Receiver	100011	29-Aug-2010
Rohde & Schwarz	SMR40	Signal Generator	100404	05-Dec-2010

Test System Details

The following auxiliary equipment and cables were used for performing the tests:

Manufacturer	Model	Description	S/N
Compaq	Presario 2100	Laptop PC	F3261CYQ
Tranzeo	POE-1	DC injection unit	n/a

1.9 Test Results

The EUT complies with FCC Part 27, Subpart C.

2.0 Transmitter output power

2.1 Test Standard

Test Requirement: FCC Part 27, Subpart C, 27.50 (a),
FCC WT Docket No. 07-293

Test Method: Guidelines for FCC Testing of 802.16e WiMAX Customer Premise Devices Operating in the BRS/EBS Band (2495 – 2690MHz).

15. Fixed customer premises equipment stations. For fixed customer premises equipment (CPE) stations transmitting in the 2305-2320 MHz band or in the 2345-2360 MHz band, the peak EIRP must not exceed 20 watts. Fixed CPE stations transmitting in the 2305-2320 MHz band or in the 2345-2360 MHz band must employ automatic transmit power control when operating so the stations operate with the minimum power necessary for successful communications. The use of outdoor antennas for CPE stations or outdoor CPE station installations operating with 2 watts or less average EIRP is prohibited.

(h) The following power limits shall apply in the BRS and EBS:

(1) Main, booster and base stations.

(i) The maximum EIRP of a main, booster or base station shall not exceed 33 dBW + 10log(X/Y) dBW, where X is the actual channel width in MHz and Y is either 6 MHz if prior to transition or the station is in the MBS following transition or 5.5 MHz if the station is in the LBS and UBS following transition, except as provided in paragraph (h)(1)(ii) of this section.

(ii) If a main or booster station sectorizes or otherwise uses one or more transmitting antennas with a non-omnidirectional horizontal plane radiation pattern, the maximum EIRP in dBW in a given direction shall be determined by the following formula: EIRP = 33 dBW + 10 log(X/Y) dBW + 10 log(360/beamwidth) dBW, where X is the actual channel width in MHz, Y is either (i) 6 MHz if prior to transition or the station is in the MBS following transition or (ii) 5.5 MHz if the station is in the LBS and UBS following transition, and beamwidth is the total horizontal plane beamwidth of the individual transmitting antenna for the station or any sector measured at the half-power points.

WCS base and fixed stations in WCS Blocks A and B (i.e., 2305-2315 and 2350-2360 MHz) will be permitted to operate with up to 2 kilowatts (kW) average EIRP per 5 megahertz

2.2 Test Limits

- (a) WCS band - maximum EIRP shall be less than 2000 watt (63 dBm);
- (b) BRS band - maximum EIRP shall be less than
 - (i) Omni-directional antennae - 63.7 dBm;

(ii) Directional antennae - 78.7 dBm.

2.3 Method of measurements

All test conditions and measurement procedures were performed in accordance with Guidelines for FCC Testing of 802.16e WiMAX Customer Premise Devices Operating in the BRS/EBS Band (2495 – 2690MHz).

2.4 Test Setup

The EUT was exercised using bandwidth test software at the highest possible data rate. The test is performed at low, middle, and high channels for the WCS and BRS frequency bands. Only worst case data is shown below.

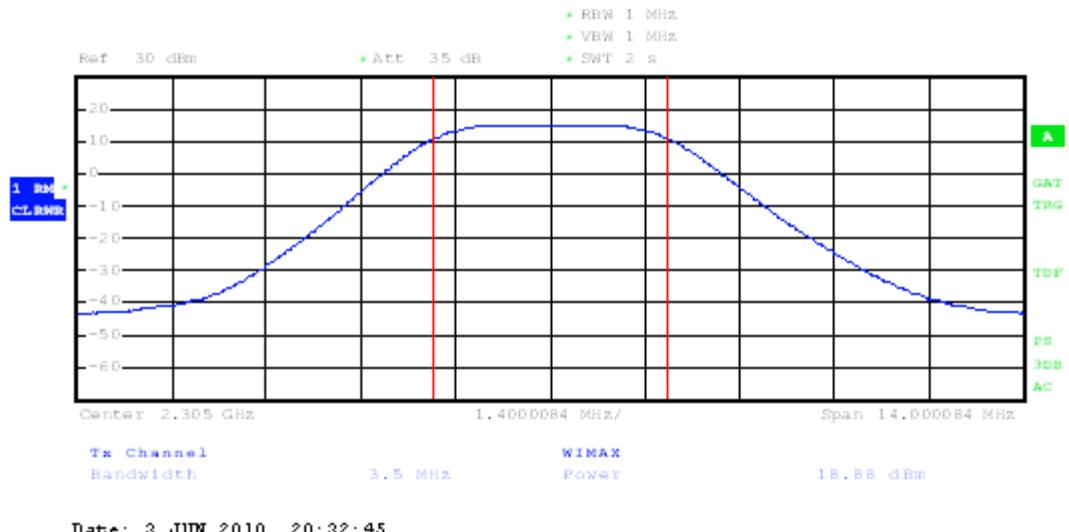
Note: For testing purposes only, to ensure worst case performance in all testing configurations, the radio is configured to transmit at the maximum possible RF power.

2.4.1

Test Setup Block Diagram



2.5 Test Results



WCS and BRS band

Mode OFDM/ Channel BW = 3.5 MHz					
Frequency, MHz	Measurement, dBm	Antenna Gain, dBi	EIRP, dBm	Limit, dBm/1MHz	Result
2305	18.88	24	42.88	71.7	Pass
2320	19.13		43.13		Pass
2345	19.41		43.41		Pass
2360	19.16		43.13		Pass
2495	19.16		43.13		Pass
2590	19.07		43.07		Pass
2690	19.28		43.28		Pass

Mode OFDM/ Channel BW = 7 MHz					
Frequency, MHz	Measurement, dBm	Antenna Gain, dBi	EIRP, dBm	Limit, dBm/1MHz	Result
2305	20.03	24	44.03	71.7	Pass
2320	20.41		44.41		Pass
2345	20.32		44.32		Pass
2360	20.07		44.07		Pass
2495	21.20		45.20		Pass
2590	20.81		44.81		Pass
2690	20.60		44.60		Pass

3.0 Spectral Emission Mask

3.1 Test Standard

Test Requirement: FCC Part 27, Subpart C, 27.53 (a),
WT Docket No. 07-293, May 20, 2010

Test Method: Guidelines for FCC Testing of 802.16e WiMAX Customer Premise Devices Operating in the BRS/EBS Band (2495 – 2690MHz).

27.53 (a) For operations in the bands 2305–2320 MHz and 2345–2360 MHz, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by the following amounts:

...(3) For fixed, land, mobile, radiolocation land and radiolocation mobile stations: By a factor not less than $43 + 10 \log (p)$ dB on all frequencies between 2300 and 2320 MHz and on all frequencies between 2345 and 2370 MHz that are outside the licensed bands of operation;

4) Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or less, but at least one percent of the emission bandwidth of the fundamental emission of the transmitter, provided the measured energy is integrated over a 1 MHz bandwidth;

...(1) For BRS and EBS stations, the power of any emissions outside the licensee's frequency bands of operation shall be attenuated below the transmitter power (P) measured in watts. BRS and EBS stations that are not in compliance with the standards below, after receiving a documented interference complaint from an adjacent channel licensee, have 60 days to coordinate with the affected licensee and meet a mutual resolution before both parties employ a more rigorous emission mask.

...(2) For fixed and temporary fixed digital stations, the attenuation shall be not less than $43 + 10 \log (P)$ dB, unless a documented interference complaint is received from an adjacent channel licensee.

3.2 Test Limits

The out of band attenuation limit is -13dBm.

3.3 Method of measurement

All test conditions and measurement procedures were performed in accordance with Guidelines for FCC Testing of 802.16e WiMAX Customer Premise Devices Operating in the BRS/EBS Band (2495 – 2690MHz).

3.4 Test Setup

This test is performed conducted. The measurement equipment is connected directly to the antenna port of the EUT.

The test is performed at low, middle, and high channels for the WCS and BRS frequency bands. Only worst case data is shown below.

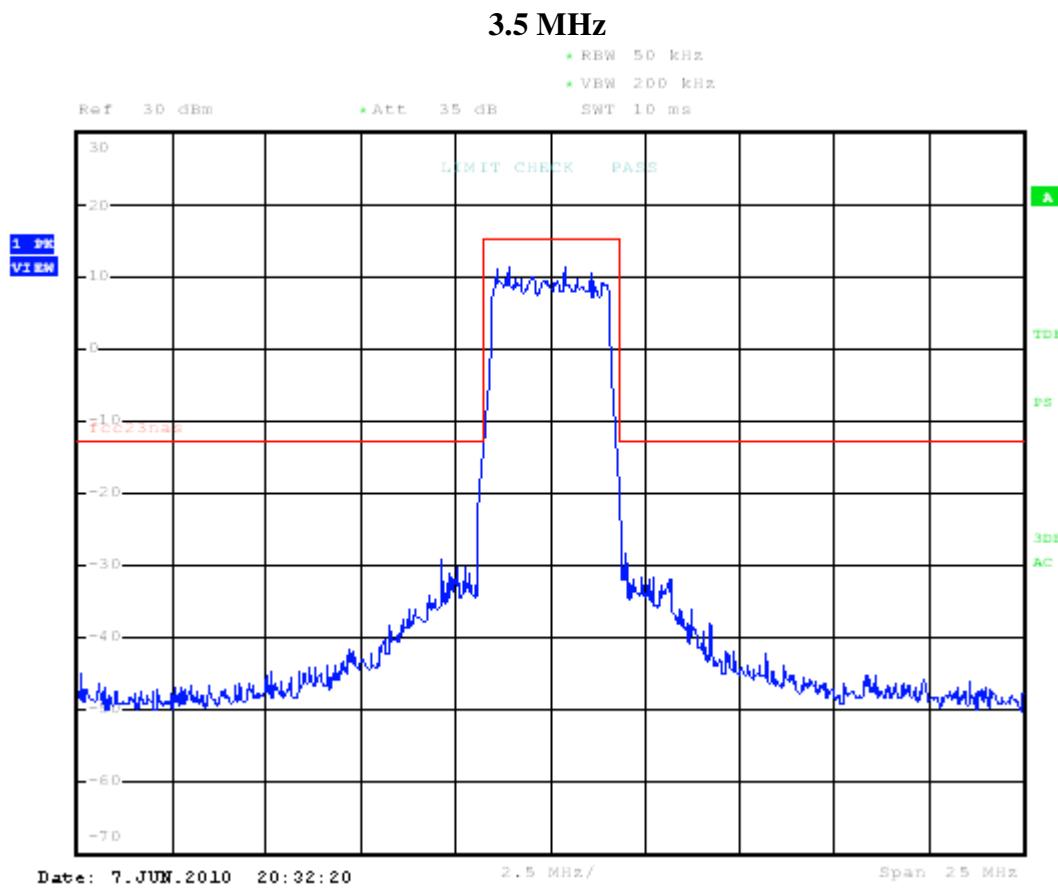
Note: For testing purposes only, to ensure worst case performance in all testing configurations, the radio is configured to transmit at the maximum possible RF power.

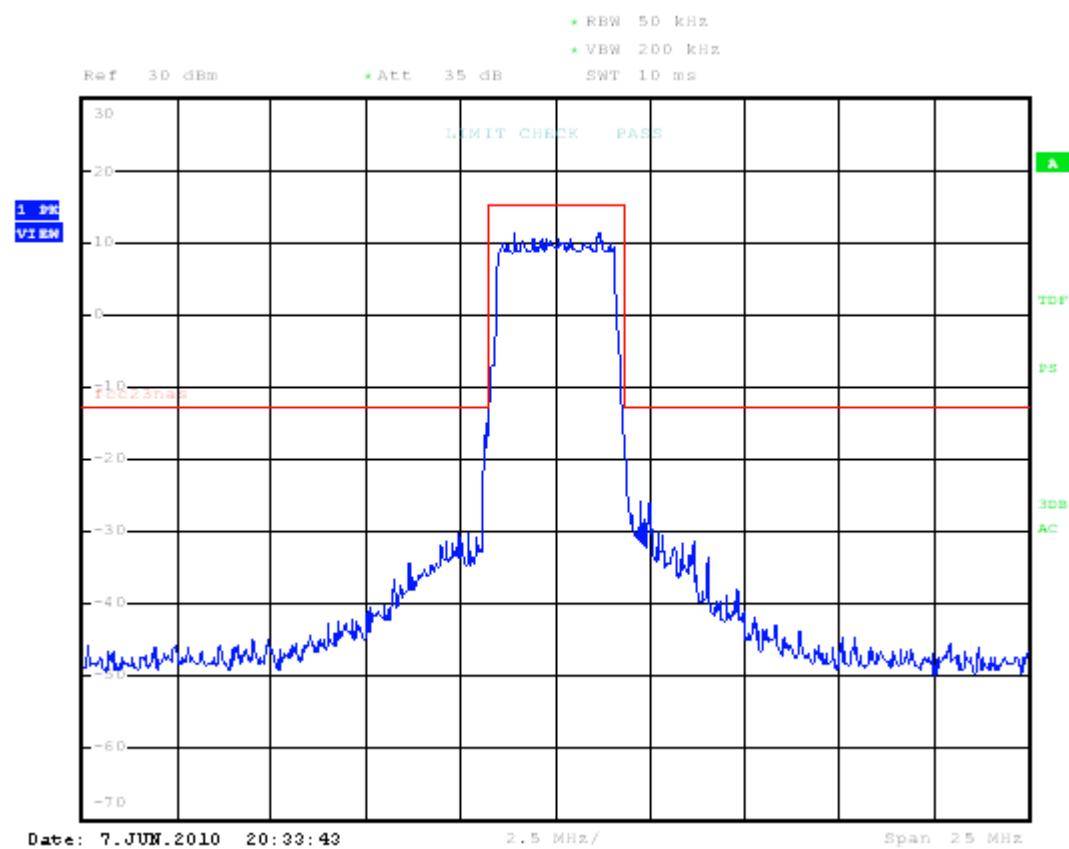
3.4.1 Test Setup Block Diagram

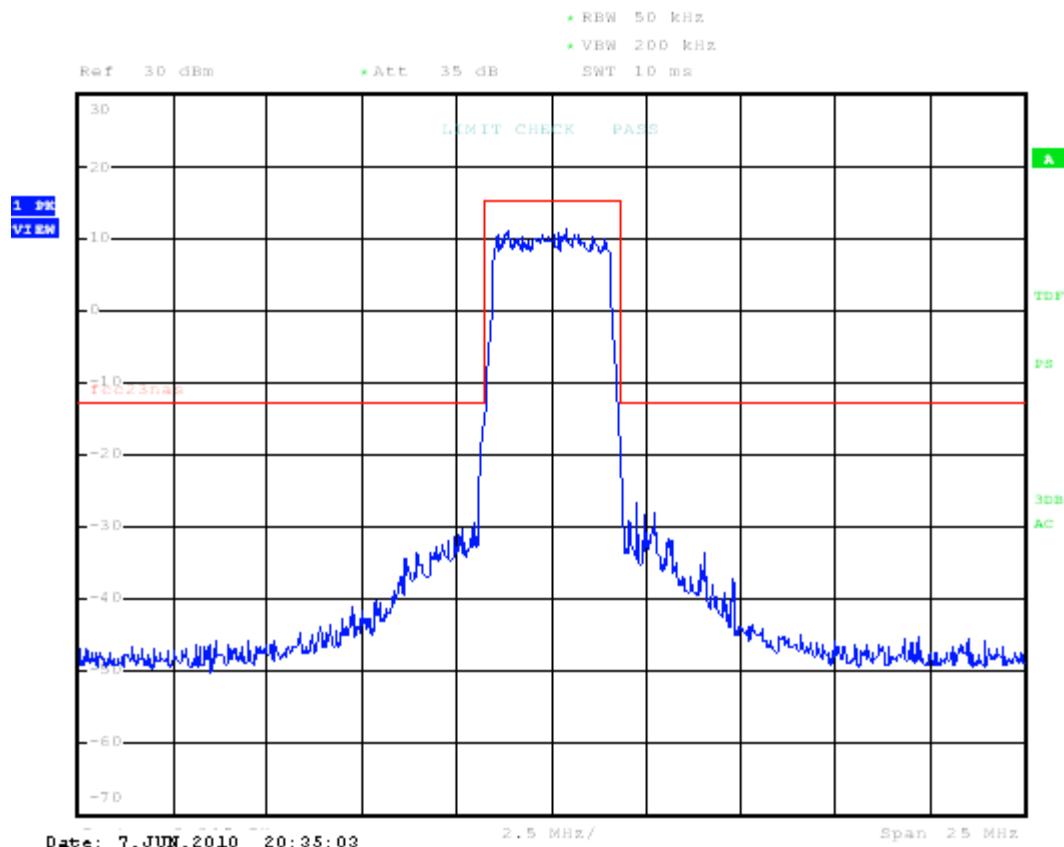


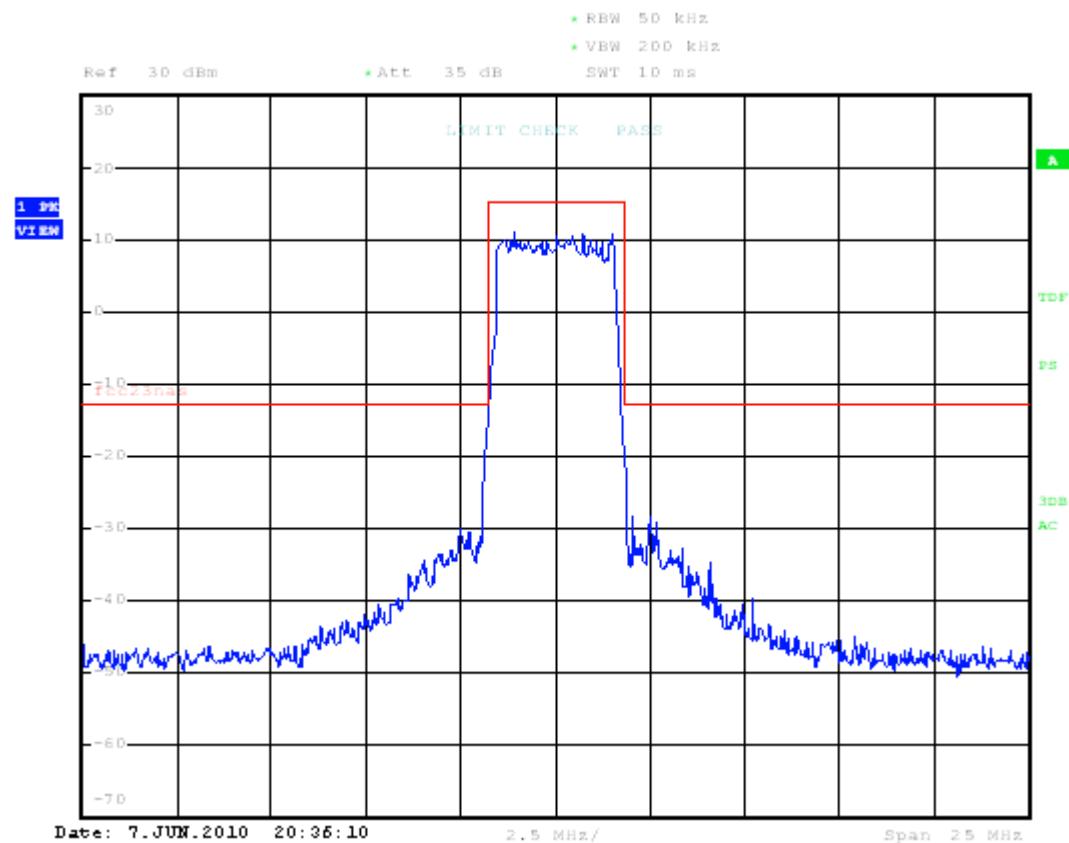
3.5 Test Results

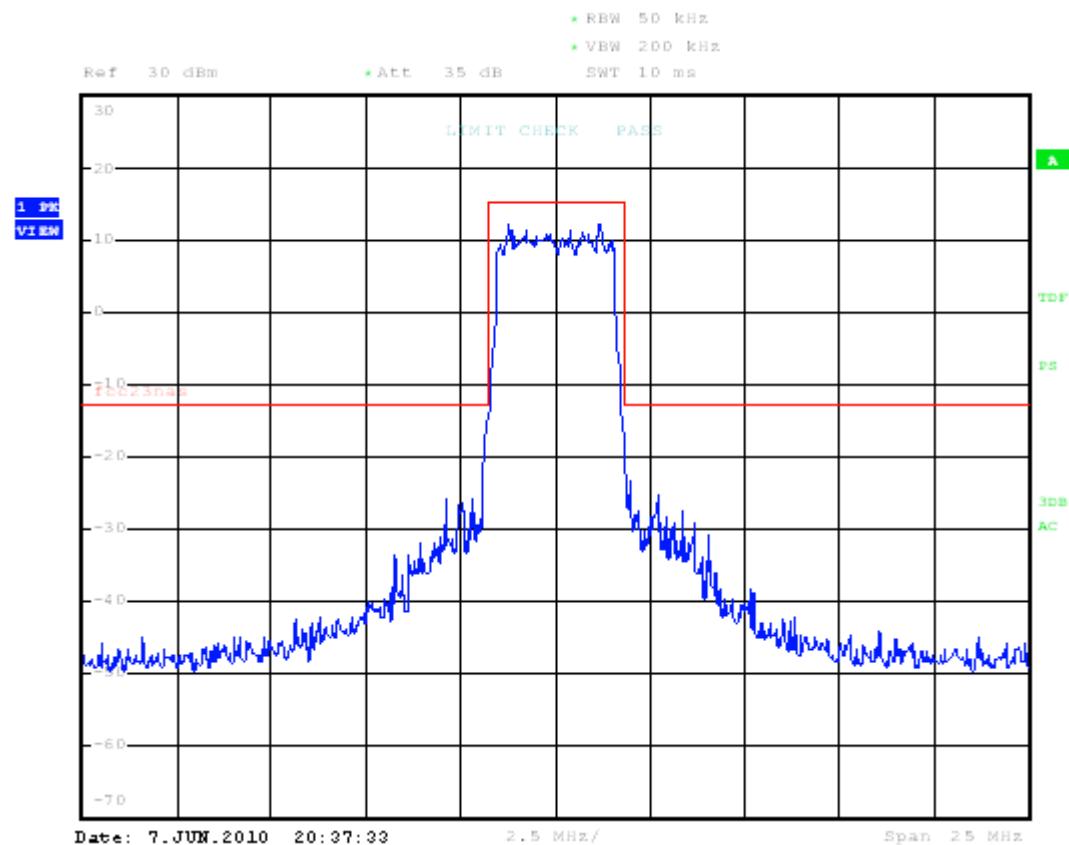
WCS and BRS band

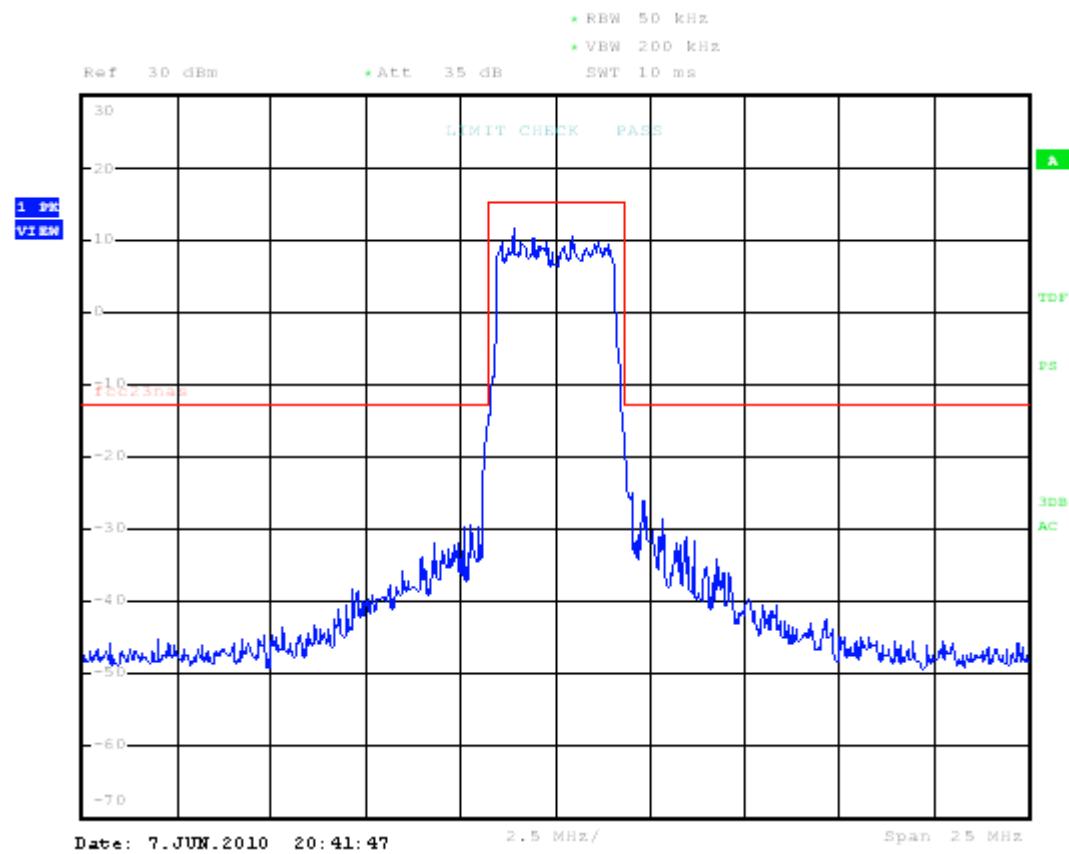


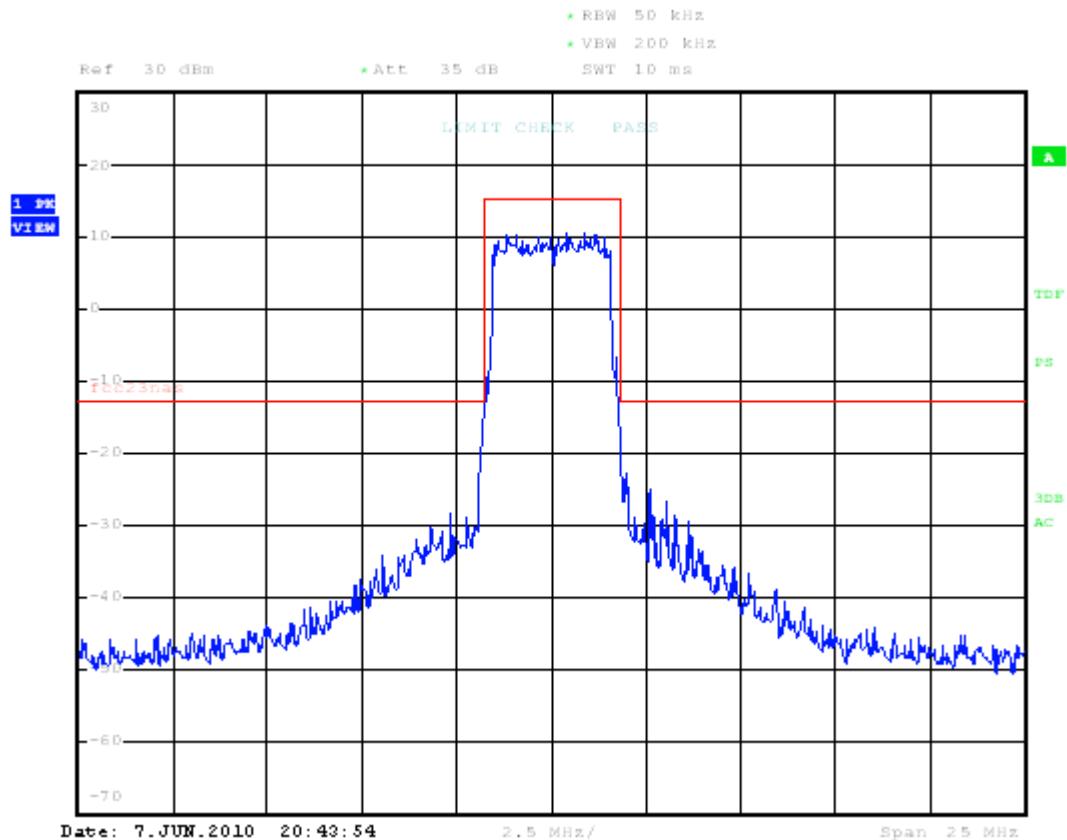




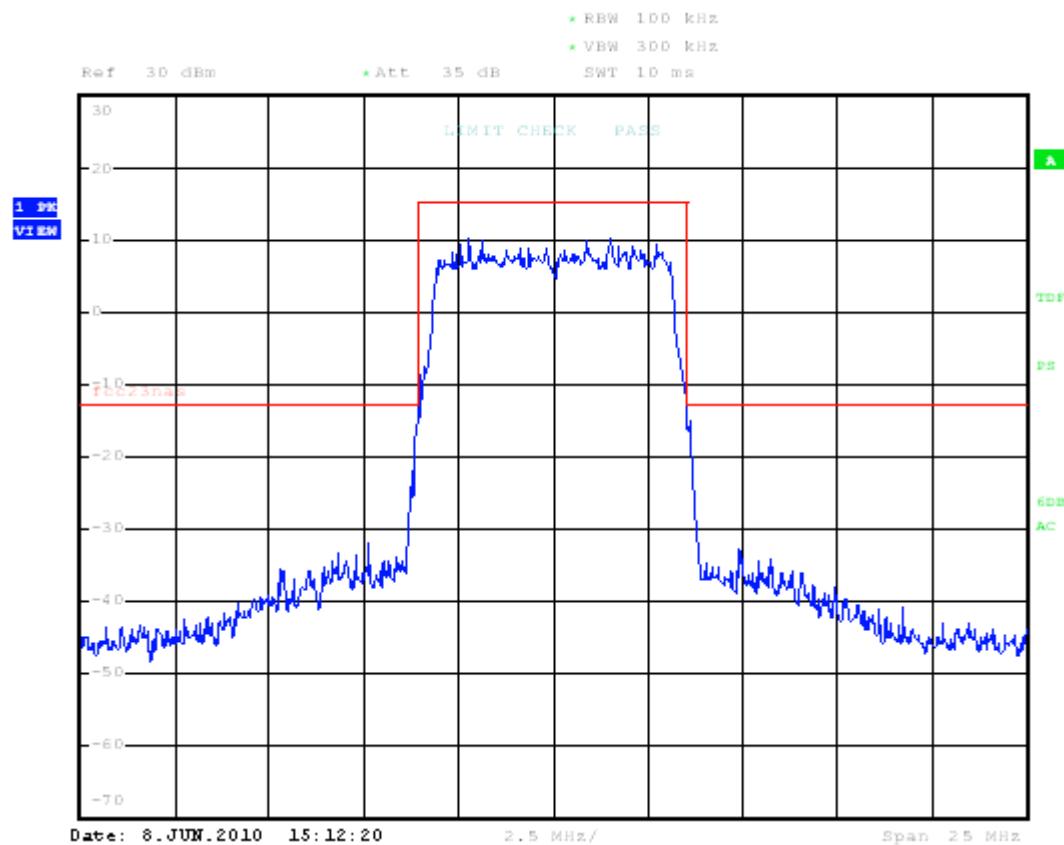


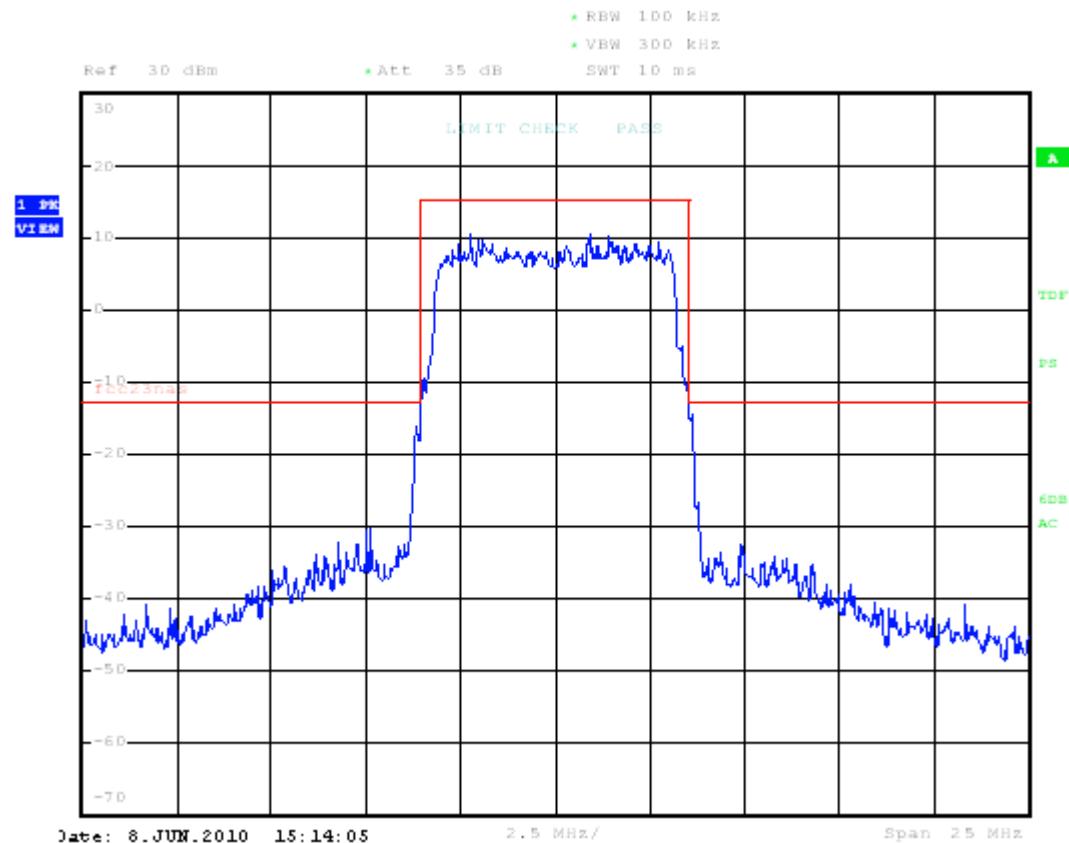


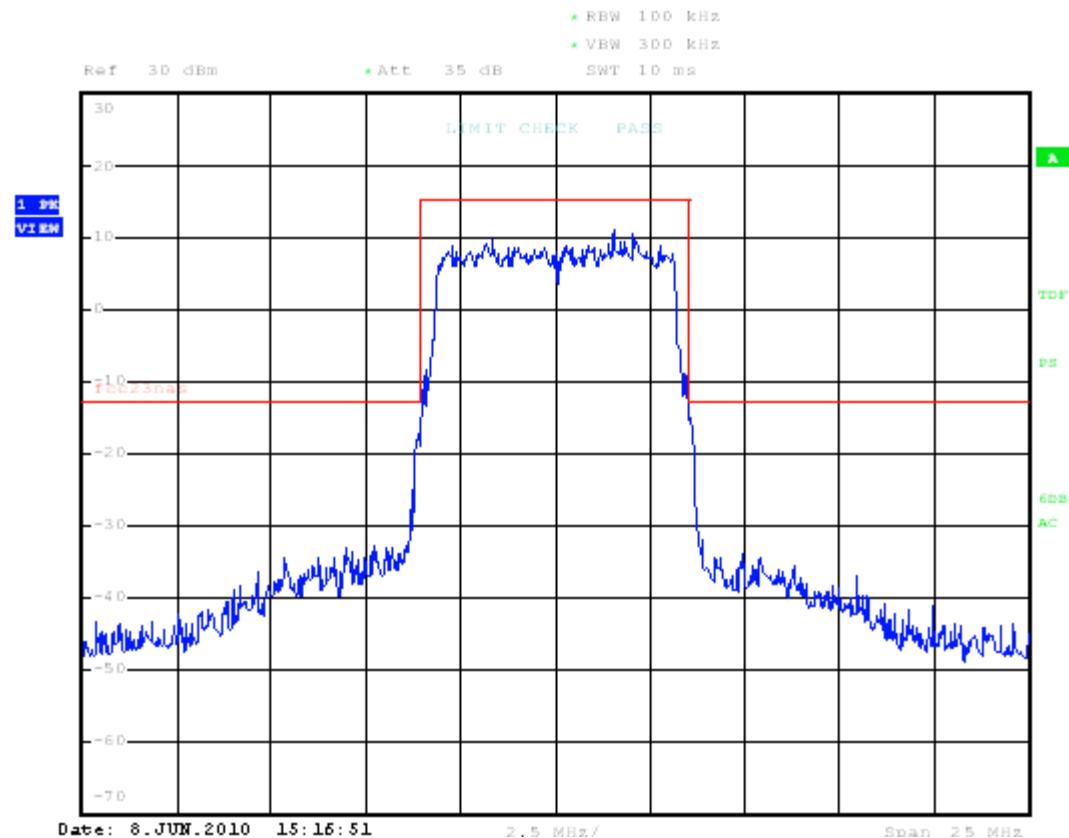


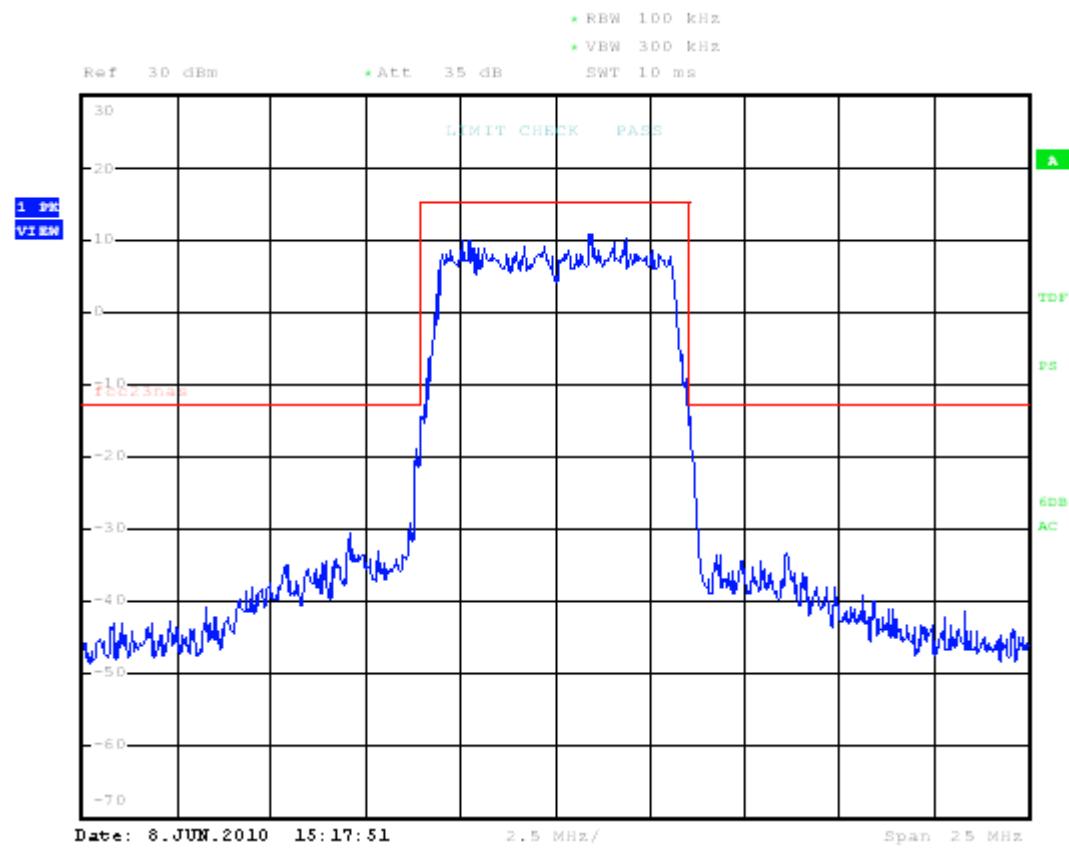


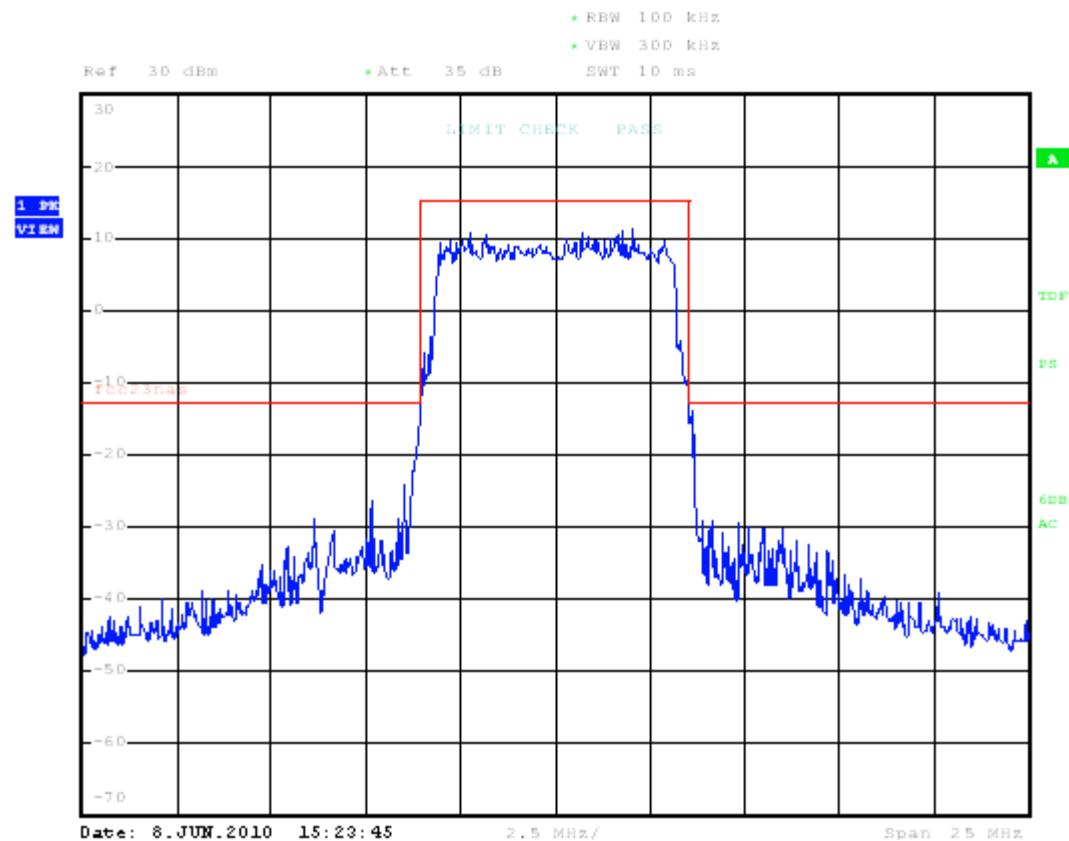
7 MHz

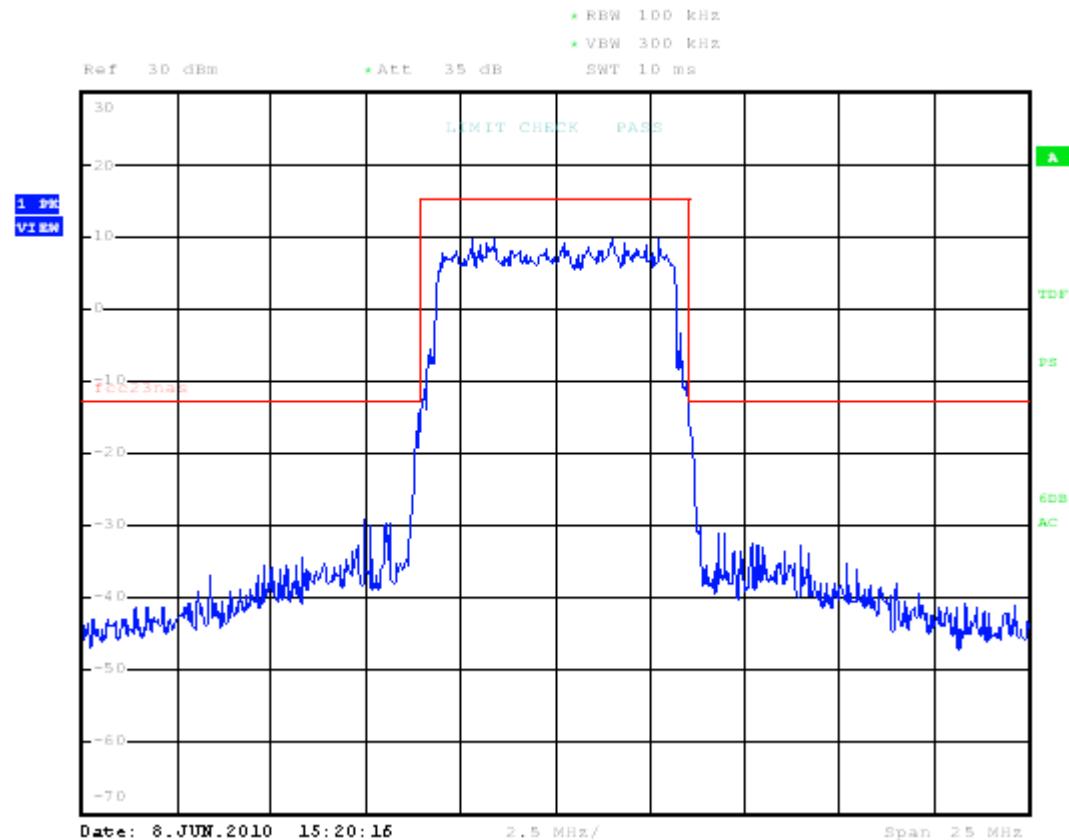


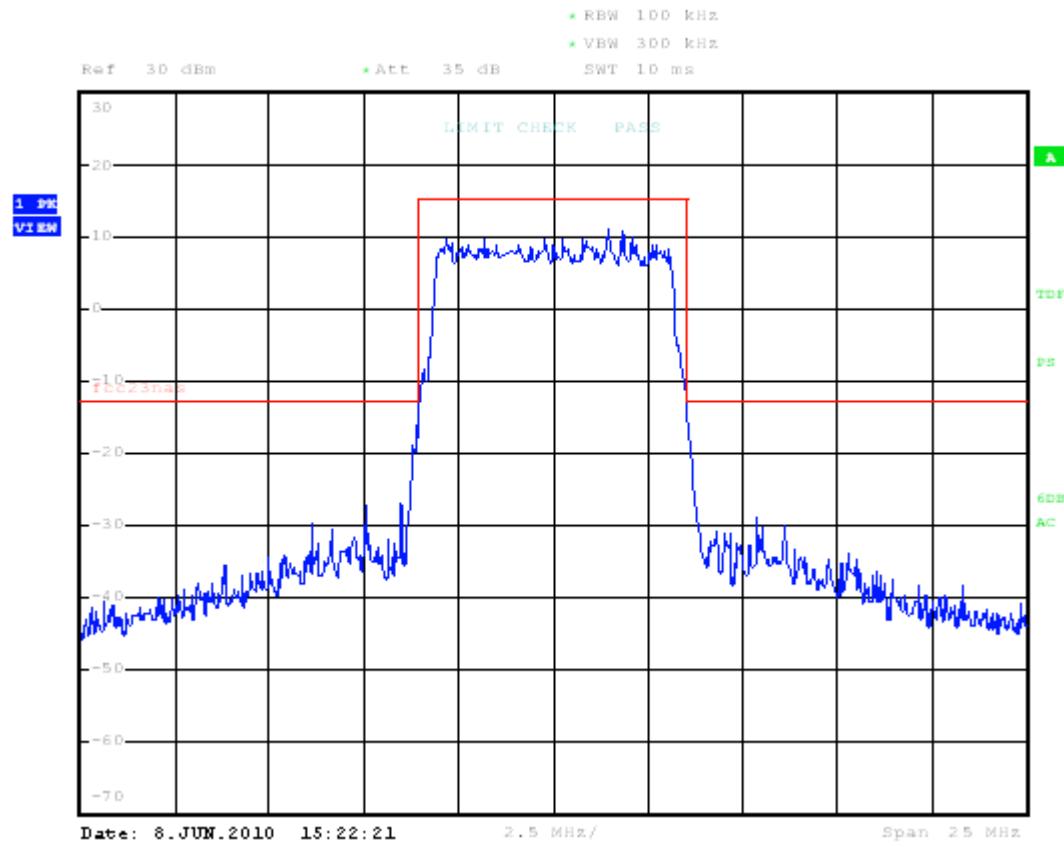












4.0 Occupied Bandwidth

4.1 Test Standard

Test Requirement: FCC Part 27, Subpart C, 27.53 (a),
WT Docket No. 07-293, May 20, 2010

Test Method: Guidelines for FCC Testing of 802.16e WiMAX Customer Premise Devices Operating in the BRS/EBS Band (2495 – 2690MHz).

27.53 (g)(1) The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

4.2 Test Limits

All emissions are attenuated at least 26 dB below the transmitter power.

4.3 Method of measurements

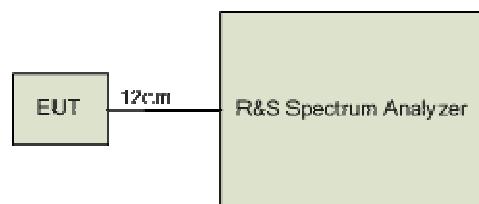
All test conditions and measurement procedures were performed in accordance with Guidelines for FCC Testing of 802.16e WiMAX Customer Premise Devices Operating in the BRS/EBS Band (2495 – 2690MHz).

4.4 Test Setup

This test is performed conducted. The measurement equipment is connected directly to the antenna port of the EUT.

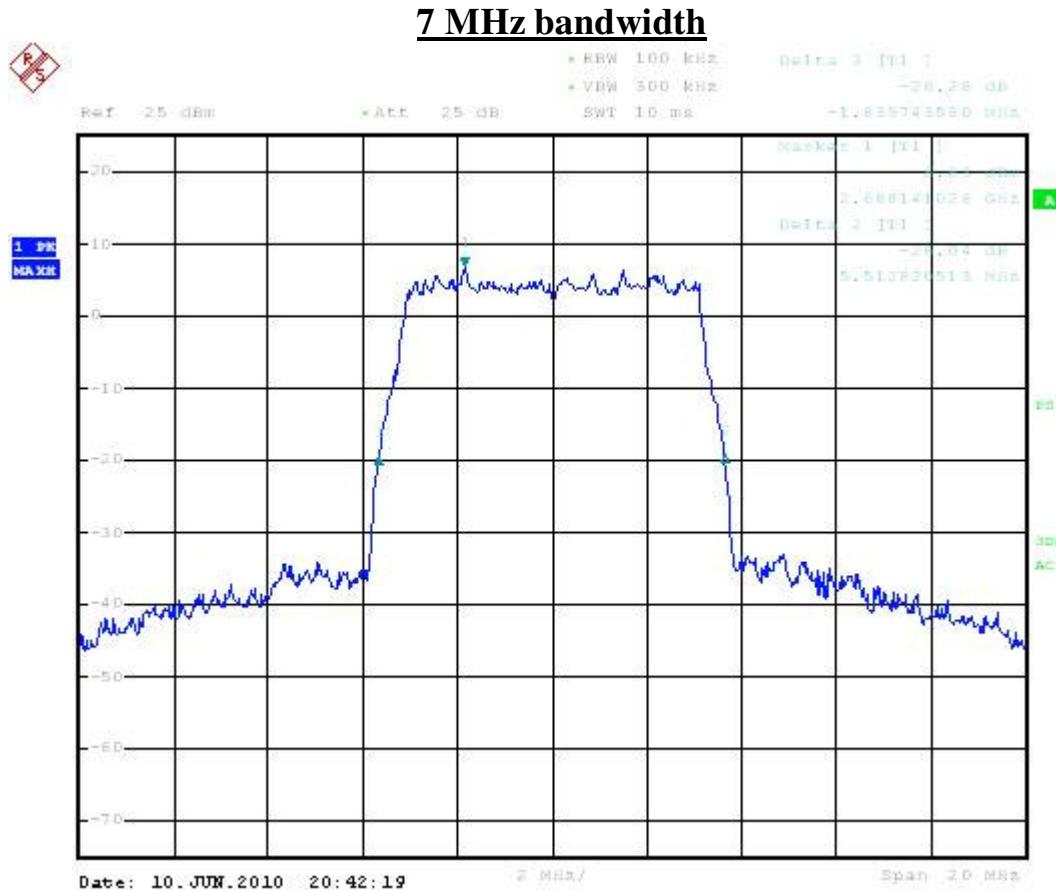
The test is performed at low, middle, and high channel for the WCS and BRS frequency band.

4.4.1 Test Setup Block Diagram



4.5 Test Results, 26 dB Occupied Bandwidth





7.5.1 Data Table – Occupied Bandwidth

3.5 MHz bandwidth

Frequency, MHz	Occupied Bandwidth, MHz
2305	3.2051
2320	3.0211
2345	3.0251
2360	3.0379
2495	3.0283
2590	3.0298
2690	3.0365

7 MHz bandwidth

Frequency, MHz	Occupied Bandwidth, MHz
2305	7.3333
2320	7.3438
2345	7.3514
2360	7.3579
2495	7.3198
2590	7.3291
2690	7.3427

5.0 Conducted Spurious and Harmonics

5.1 Test Standard

Test Requirement: FCC Part 27, Subpart C, 27.53 (a),
FCC WT Docket No. 07-293

Test Method: Guidelines for FCC Testing of 802.16e WiMAX Customer Premise Devices Operating in the BRS/EBS Band (2495 – 2690MHz)

(a) For operations in the bands 2305–2320 MHz and 2345–2360 MHz, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by the following amounts:

(3) For fixed, land, mobile, radiolocation land and radiolocation mobile stations: By a factor ... not less than $43 + 10 \log (p)$ dB on all frequencies between 2300 and 2320 MHz and on all frequencies between 2345 and 2370 MHz that are outside the licensed bands of operation;

(4) Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or less, but at least one percent of the emission bandwidth of the fundamental emission of the transmitter, provided the measured energy is integrated over a 1 MHz bandwidth;

(l) For BRS and EBS stations, the power of any emissions outside the licensee's frequency bands of operation shall be attenuated below the transmitter power (P) measured in watts.

(2) For fixed and temporary fixed digital stations, the attenuation shall be not less than $43 + 10 \log (P)$ dB, unless a documented interference complaint is received from an adjacent channel licensee

(6) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater.

5.2 Test Limits

WCS and BRS band: ≥ 33 dBc. This means that harmonics and spurious outside the licensee's band should not exceed -13 dBm.

5.3 Method of measurements

All test conditions and measurement procedures were performed in accordance with Guidelines for FCC Testing of 802.16e WiMAX Customer Premise Devices Operating in the BRS/EBS Band (2495 – 2690MHz).

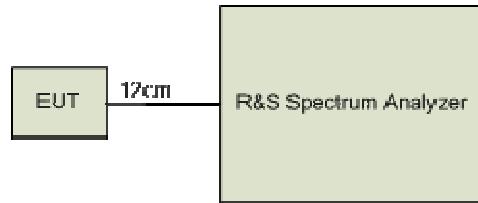
5.4 Test Setup – Spurious Emissions

Conducted measurements are made on the EUT to ensure compliance with the required emission levels. Conducted scans are used to determine compliance with the 33 dBc limit for emissions outside of the operational frequency band.

The DUT was exercised using data transmitting mode at the highest possible transmit rate. The test is performed at low, middle, and high channels for the WCS and BRS frequency band. Only worst case data is shown below.

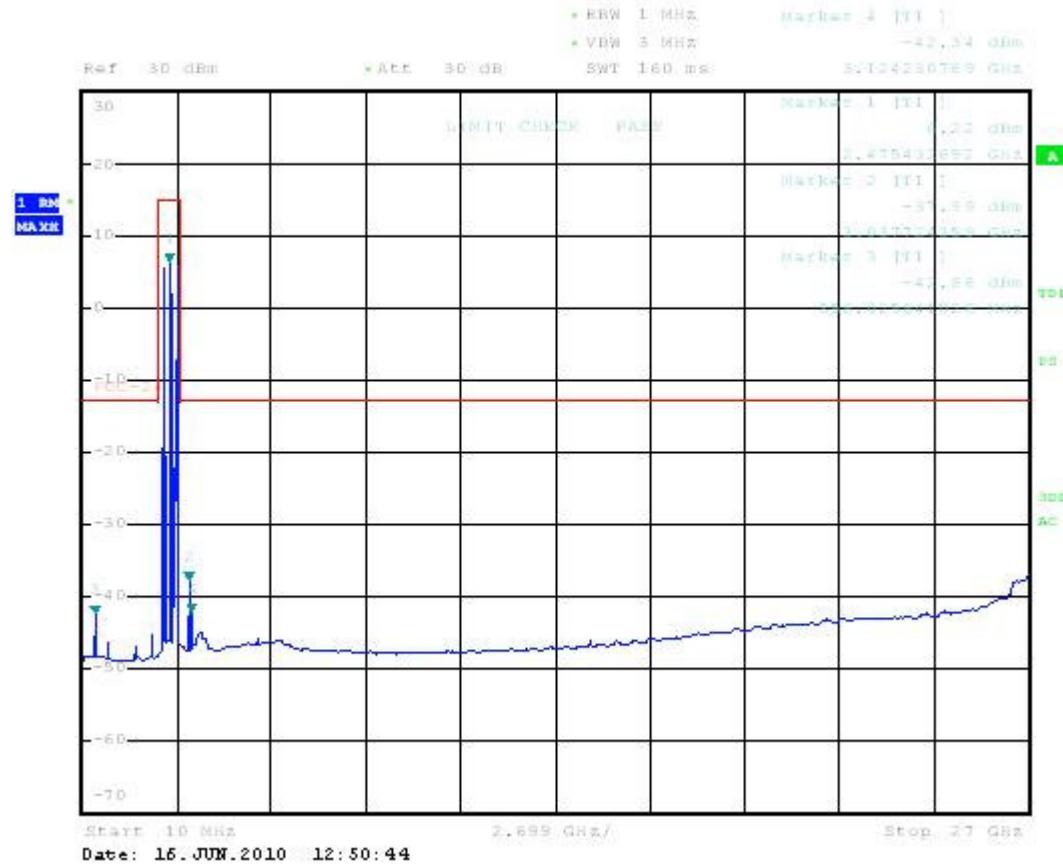
Note: For testing purposes only, to ensure worst case performance in all configurations, the radio is configured to transmit at the maximum possible RF power.

5.4.1 Test Setup Block Diagram – Conducted Measurements (Harmonics)



5.5 Test Results

5.5.1 Test Results 27.53–Harmonics and Spurious -33 dBc



The above plot shows the worst case conducted output of the transmitter. It should be noted that the EUT is not transmitting on all channels simultaneously. All conducted harmonics are ≥ 33 dBc. No other emissions were detected within 33 dB of the limit.

6.0 Frequency Stability

6.1 Test Standard

Test Requirement: FCC Part 27, Subpart C, 27.54,
FCC WT Docket No. 07-293

Test Method: Guidelines for FCC Testing of 802.16e WiMAX Customer Premise Devices Operating in the BRS/EBS Band (2495 – 2690MHz)

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

6.2 Test Limits

Find two frequencies for which the output power P is 10dB below the maximum output power. Measure frequency error in ppm units.

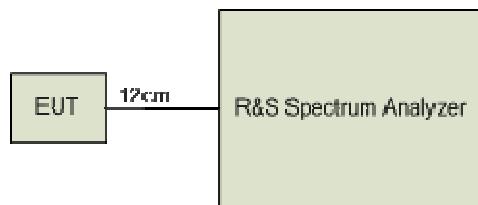
6.3 Method of measurements

All test conditions and measurement procedures were performed in accordance with Guidelines for FCC Testing of 802.16e WiMAX Customer Premise Devices Operating in the BRS/EBS Band (2495 – 2690MHz).

6.4 Test Setup

Conducted measurements are made on the DUT to ensure compliance with the test methodology. The test is performed at low, middle, and high channels.

6.4.1 Test Setup Block Diagram – Conducted Measurements)



Test Results

See Appendix in the end of this report.

7.0 Radiated Spurious and Harmonics in Receive Mode

7.1 Test Standard

Test Requirement: FCC Part 27, Subpart C, 27.53,
WT Docket No. 07-293, May 20, 2010
ANSI C 63.4

Test Method: Guidelines for FCC Testing of 802.16e WiMAX Customer Premise Devices Operating in the BRS/EBS Band (2495 – 2690MHz)

This test measures the total radiated spurious and harmonics emissions of the device when it is working in a wireless receive ONLY operation.

7.2 Test Limits

30-88MHz	40dbuV / m (equivalent to -55dBm / 1MHz)
88-216MHz	43.5dbuV / m (equivalent to -51.5dBm / 1MHz)
216-960MHz	46dbuV / m (equivalent to -49dBm / 1MHz)
Above 960MHz	54dbuV / m (equivalent to -41dBm / 1MHz)

7.3 Method of measurements

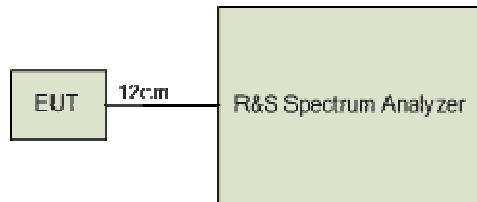
All test conditions and measurement procedures were performed in accordance with ANSI C 63.4 and Guidelines for FCC Testing of 802.16e WiMAX Customer Premise Devices Operating in the BRS/EBS Band (2495 – 2690MHz).

7.4 Test Setup

This test is performed radiated. The measurement equipment is connected directly to the antenna port of the EUT.

The test is performed for the low and high frequencies..

7.4.1 Test Setup Block Diagram



7.5 Test Results

Bandwidth, MHz	Operating Frequency, MHz	Frequency of emission, MHz	Level of emission, dBm	Level of emission, dB μ V/m
3.5	2305	326.0	-42.66	64.34
		3037.7	-37.99	69.01
		3124.2	-42.34	64.66
		325.4	-42.69	64.31
	2360	3037.5	-38.11	68.89
		3124.1	-42.44	64.56
		326.1	-42.68	64.32
		3037.8	-38.12	68.88
	2495	3124.3	-42.32	64.68
		325.7	-42.70	64.3
		3037.9	-38.10	68.9
		3124.4	-42.33	64.67
7	2690	326.0	-42.71	64.29
		3037.8	-38.09	68.91
		3124.7	-42.37	64.63
		326.2	-42.72	64.28
	2360	3037.7	-38.13	68.87
		3124.4	-42.39	64.61
		326.5	-42.69	64.31
		3036.5	-38.18	68.82
	2495	3124.8	-42.39	64.61
		326.0	-42.68	64.32
		3036.6	-38.21	68.79
		3124.4	-42.40	64.6

8.0 RF Exposure Evaluation

Test Requirement: FCC 1.1310; IC RSS-102 Issue 2, Section 4

FCC 1.1310 states the criteria listed in the table below shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in Section 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of Section 2.1093 of this chapter. Further information on evaluating compliance with these limits can be found in the FCC's OST/OET Bulletin Number 65, "Evaluating Compliance with FCC-Specified Guidelines for Human Exposure to Radiofrequency Radiation".

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time
(A) Limits for Occupational/Control Exposures				
300-1500	--	--	F/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/Uncontrolled Exposures				
300-1500	--	--	F/1500	6
1500-100,000	--	--	1	30

8.1 EUT Operating Condition

The maximum antenna gain is 24 dBi at 3.3 - 3.5 GHz.

8.2 Method of measurements

All test conditions and measurement procedures were performed in accordance with FCC 1.1310.

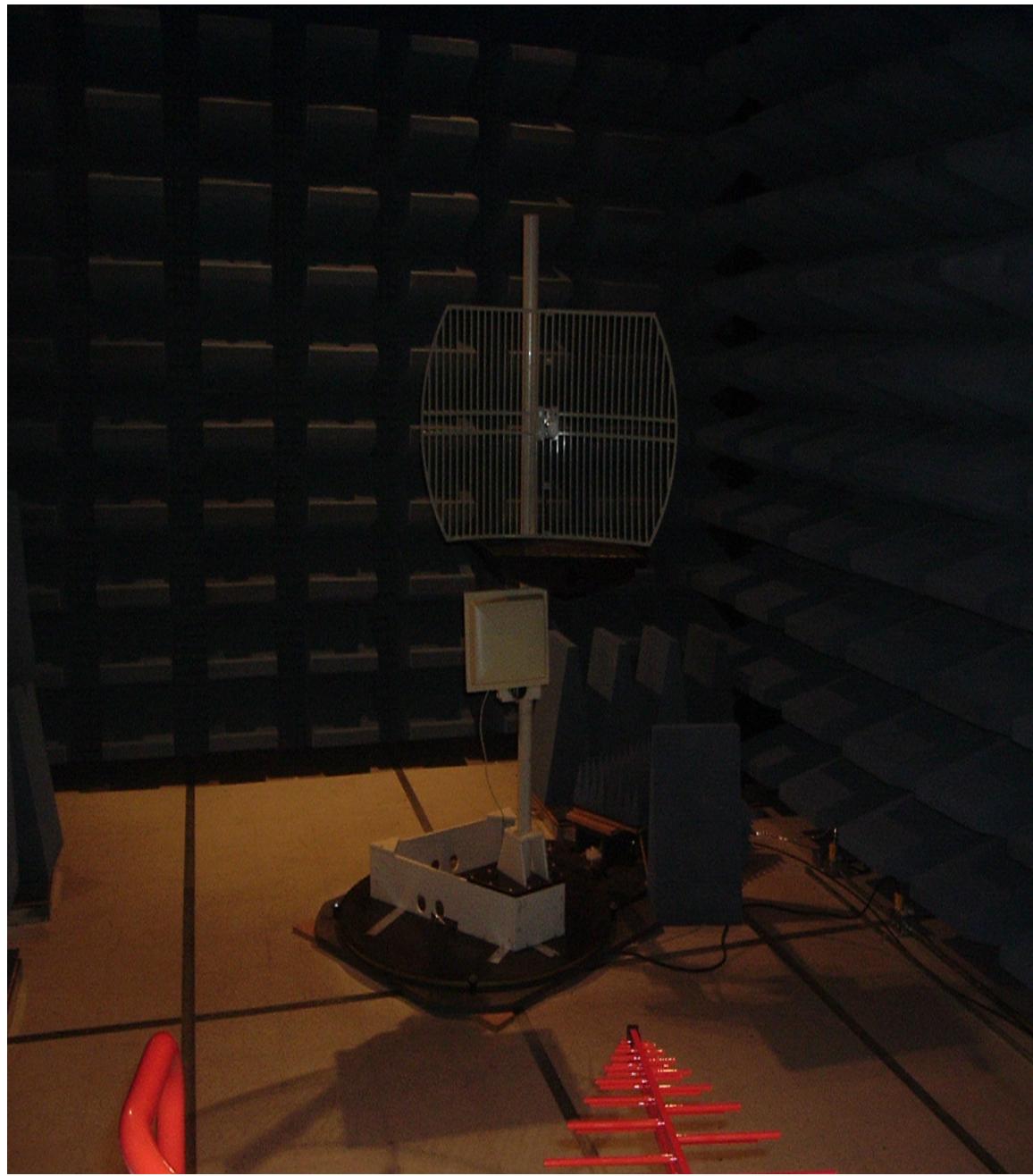
8.3 RF exposure evaluation distance calculation

Frequency, MHz	Output Power to Antenna, dBm	Antenna Gain, dBi	EIRP, dBm	Distance, cm
2305	20.03	24	44.03	44.8
2320	20.41		44.41	46.9
2345	20.32		44.32	46.4
2360	20.07		44.07	45.1
2495	21.20		45.20	51.3
2590	20.81		44.81	49.1
2690	20.60		44.60	47.9

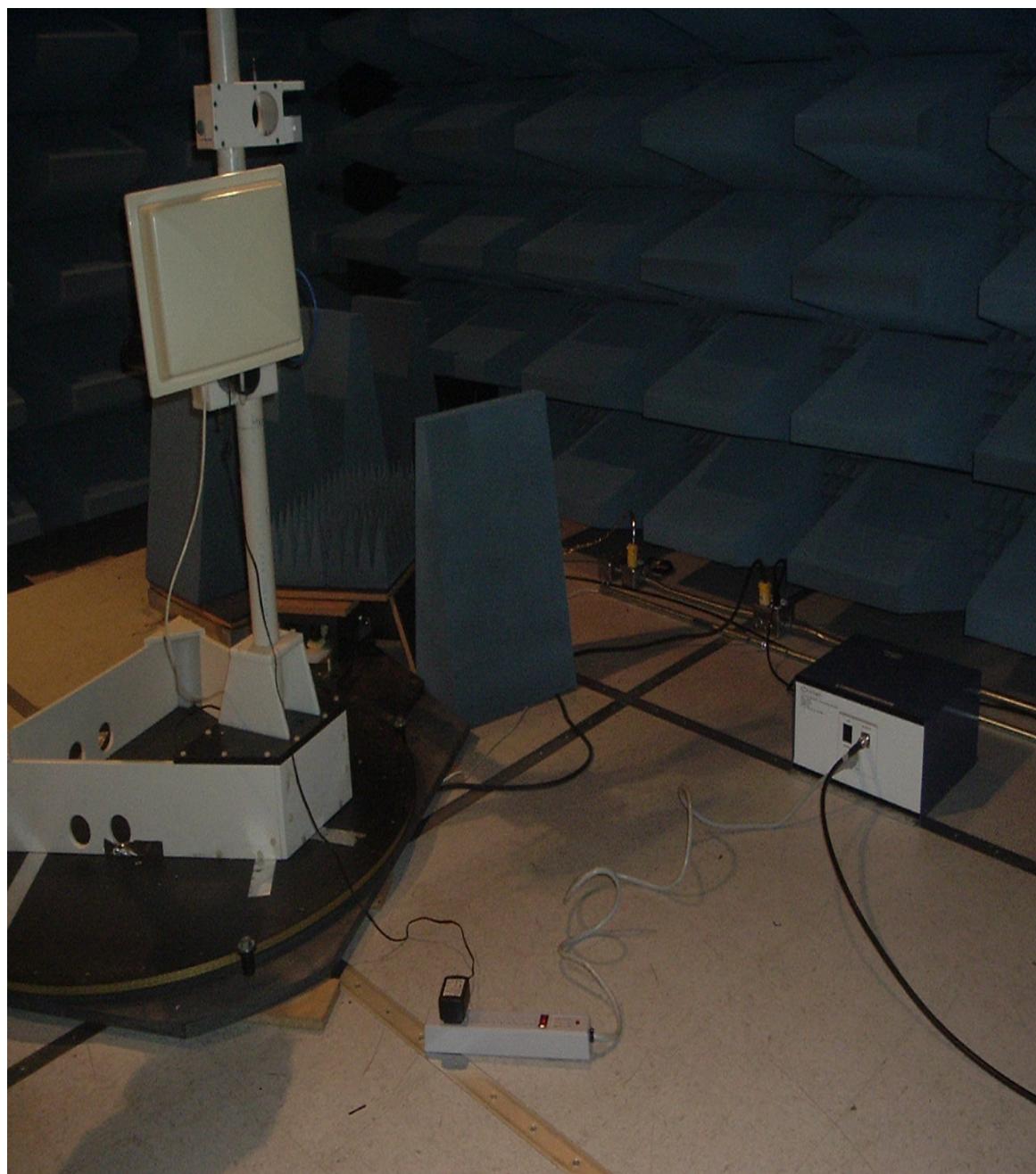
As shown above, the minimum distance where the MPE limit is reached is 51.3 cm for the EUT.

9.0 Test Photos

9.1 Radiated Emission Setup



9.2 Conducted Emission Setup



10.0**Appendix****3.5 MHz**

Temperature	F1	F2	FCntr	Fdev, kHz	PPM Limit	Voltage, V	Frequency, MHz
20	2.493297000	2.496635000	2.494966000	-34.0	49.90	18	2495
20	2.493397000	2.496619000	2.495008000	8.0	49.90	15	2495
20	2.493397000	2.496644000	2.495020500	20.5	49.90	24	2495
-50	2.493397000	2.496619000	2.495008000	8.0	49.90	18	2495
-50	2.303433000	2.306619000	2.305026000	26.0	46.10	18	2305
-50	2.688841000	2.691160000	2.690000500	0.5	53.80	18	2690
-40	2.493443000	2.496619000	2.495031000	31.0	49.90	18	2495
-40	2.303341000	2.306619000	2.304980000	-20.0	46.10	18	2305
-40	2.688403000	2.691603000	2.690003000	3.0	53.80	18	2690
-30	2.303413000	2.306619000	2.305016000	16.0	46.10	18	2305
-30	2.493395000	2.496619000	2.495007000	7.0	49.90	18	2495
-30	2.688413000	2.691619000	2.690016000	16.0	53.80	18	2690
-20	2.303397000	2.306629000	2.305013000	13.0	46.10	18	2305
-20	2.493413000	2.496619000	2.495016000	16.0	49.90	18	2495
-20	2.688415000	2.691635000	2.690025000	25.0	53.80	18	2690
-10	2.303397000	2.306619000	2.305008000	8.0	46.10	18	2305
-10	2.493413000	2.496610000	2.495011500	11.5	49.90	18	2495
-10	2.688413000	2.691635000	2.690024000	24.0	53.80	18	2690
0	2.303307000	2.306619000	2.304963000	-37.0	46.10	18	2305
0	2.493397000	2.496619000	2.495008000	8.0	49.90	18	2495
0	2.688412000	2.691619000	2.690015500	15.5	53.80	18	2690
10	2.303397000	2.306619000	2.305008000	8.0	46.10	18	2305
10	2.493397000	2.496620000	2.495008500	8.5	49.90	18	2495
10	2.688413000	2.691619000	2.690016000	16.0	53.80	18	2690
20	2.303377000	2.306619000	2.304998000	-2.0	46.10	18	2305
20	2.493413000	2.496619000	2.495016000	16.0	49.90	18	2495
20	2.688413000	2.691655000	2.690034000	34.0	53.80	18	2690
30	2.303397000	2.306619000	2.305008000	8.0	46.10	18	2305
30	2.493413000	2.496616000	2.495014500	14.5	49.90	18	2495
30	2.688413000	2.691635000	2.690024000	24.0	53.80	18	2690
40	2.303394000	2.306619000	2.305006500	6.5	46.10	18	2305
40	2.493413000	2.496619000	2.495016000	16.0	49.90	18	2495
40	2.688413000	2.691675000	2.690044000	44.0	53.80	18	2690
50	2.303397000	2.306619000	2.305008000	8.0	46.10	18	2305
50	2.493367000	2.496619000	2.494993000	-7.0	49.90	18	2495
50	2.688357000	2.691634000	2.689995500	-4.5	53.80	18	2690

7 Mhz

Temperature	F1	F2	FCntr	Fdev, kHz	PPM Limit	Voltage, V	Frequency, MHz
20	2.491762000	2.498205000	2.494983500	-16.5	49.90	18	2495
20	2.491762000	2.498205000	2.494983500	-16.5	49.90	15	2495
20	2.491762000	2.498205000	2.494983500	-16.5	49.90	24	2495
-50	2.301730000	2.308237000	2.304983500	-16.5	46.10	28	2305
-50	2.491762000	2.498205000	2.494983500	-16.5	49.90	18	2495
-50	2.686762000	2.693237000	2.689999500	-0.5	53.80	24	2690
-40	2.301762000	2.308237000	2.304999500	-0.5	46.10	18	2305
-40	2.491762000	2.498237000	2.494999500	-0.5	49.90	18	2495
-40	2.686762000	2.693237000	2.689999500	-0.5	53.80	18	2690
-30	2.301762000	2.308237000	2.304999500	-0.5	46.10	18	2305
-30	2.491762000	2.498237000	2.494999500	-0.5	49.90	18	2495
-30	2.686762000	2.693237000	2.689999500	-0.5	53.80	18	2690
-20	2.301762000	2.308237000	2.304999500	-0.5	46.10	18	2305
-20	2.491762000	2.498237000	2.494999500	-0.5	49.90	18	2495
-20	2.686762000	2.693237000	2.689999500	-0.5	53.80	18	2690
-10	2.301762000	2.308237000	2.304999500	-0.5	46.10	18	2305
-10	2.491762000	2.498237000	2.494999500	-0.5	49.90	18	2495
-10	2.686762000	2.693237000	2.689999500	-0.5	53.80	18	2690
0	2.301762000	2.308237000	2.304999500	-0.5	46.10	18	2305
0	2.491762000	2.498237000	2.494999500	-0.5	49.90	18	2495
0	2.686762000	2.693237000	2.689999500	-0.5	53.80	18	2690
10	2.301762000	2.308237000	2.304999500	-0.5	46.10	18	2305
10	2.491762000	2.498237000	2.494999500	-0.5	49.90	18	2495
10	2.686762000	2.693237000	2.689999500	-0.5	53.80	18	2690
20	2.301762000	2.308237000	2.304999500	-0.5	46.10	18	2305
20	2.491762000	2.498237000	2.494999500	-0.5	49.90	18	2495
20	2.686762000	2.693237000	2.689999500	-0.5	53.80	18	2690
30	2.301762000	2.308237000	2.304999500	-0.5	46.10	18	2305
30	2.491762000	2.498237000	2.494999500	-0.5	49.90	18	2495
30	2.686762000	2.693237000	2.689999500	-0.5	53.80	18	2690
40	2.301762000	2.308237000	2.304999500	-0.5	46.10	18	2305
40	2.491762000	2.498237000	2.494999500	-0.5	49.90	18	2495
40	2.686762000	2.693237000	2.689999500	-0.5	53.80	18	2690
50	2.301762000	2.308237000	2.304999500	-0.5	46.10	18	2305
50	2.491762000	2.498237000	2.494999500	-0.5	49.90	18	2495
50	2.686762000	2.693237000	2.689999500	-0.5	53.80	18	2690