WILKINSON) BARKER) KNAUER) LLP

2300 N STREET, NW
SUITE 700
WASHINGTON, DC 20037
TEL 202.783.4141
FAX 202.783.5851
www.wbklaw.com
PAUL J. SINDERBRAND
psinderbrand@wbklaw.com

May 9, 2008

Marlene H. Dortch
Secretary
Federal Communications Commission
445 Twelfth Street, SW
Washington, DC 20554

Re: *Amendment of Part 27 of the Commission's Rules to Govern the Operation of Wireless Communications Services in the 2.3 GHz Band* (WT Docket No. 07-293) and *Establishment of Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band* (IB Docket No. 95-91)

WRITTEN EX PARTE PRESENTATION

Dear Ms. Dortch:

In a recent *ex parte* presentation to International Bureau staff, XM Radio Inc. ("XM") and Sirius Satellite Radio Inc. ("Sirius") alleged that the WCS Coalition has "[c]ompletely ignored critical impact of signal overload."[1] That assertion could not be farther from the truth – as is evidenced by the attached report the WCS Coalition commissioned from ATECS LLC ("ATECS"), the WCS Coalition has evaluated the potential for overload and has determined that handheld Wireless Communications Service ("WCS") devices will not unreasonably impair the ability of the satellite Digital Audio Radio Service ("SDARS") subscribers to listen to their audio programming.

Of course, unlike the situation with terrestrial SDARS repeaters (for which no permanent rules have yet been adopted), the rules governing the permissible power levels of WCS mobile devices have been in place for more than a decade. Since 1997, WCS licensees have been permitted to operate mobile stations with a peak equivalent isotropically radiated power ("EIRP") of 20 watts.[2] As a practical matter, however, handheld mobile stations are constrained to operate at far lower power levels due to the Commission's rules governing human exposure to RF emissions.[3] Thus, such devices are designed to operate, at a maximum, at 250 milliwatts

[1] *See* Letter from Patrick L. Donnelly and James S. Blitz, IB Docket No. 95-91, *et al*, Attachment at 11 (filed April 25, 2008).

[2] *See* 47 C.F.R. § 27.50(a)(2).

[3] *See* 47 C.F.R. §§ 1.1310, 2.1093.

average EIRP, although with transmit power control they will usually operate at substantially lower power levels. Yet, the SDARS licensees now urge the Commission to restrict WCS handheld operations to 10 milliwatts (10 dBm) on the A and B Blocks and to 1 milliwatt (0 dBm) on the C and D Block.

The record clearly establishes that adoption of such a requirement would effectively preclude WCS service to handheld devices, and thus would be fundamentally unfair to WCS licensees.[4] While that can and should be the end of the discussion, any Commission consideration must be informed by the fact that the dramatic decrease in permissible WCS handheld power levels advocated by XM and Sirius is unnecessary to protect SDARS subscribers. Indeed, in a candid admission, Sirius has conceded that "[b]oth satellite radio licensees designed, built and deployed their systems to withstand interference that could be anticipated from Part 27-compliant systems."[5] This concession is confirmed by the attached ATECS report – the potential for "real world" interference from a handheld WCS transmitter to SDARS is quite small.

The ATECS report presents the results of actual field testing conducted by ATECS in the Atlanta, GA area to determine the susceptibility of a variety of commercially-available XM and Sirius receivers to overload interference. That testing was conducted in areas served solely by satellite, and in areas where service was provided by terrestrial repeater. The test results establish that:

- When a stationary out-of-vehicle WCS device was moved towards a stationary automobile with a roof-mounted SDARS antenna parked in a terrestrial service area, no muting occurred at all with WCS operating at 250 milliwatts or 100 milliwatts (a more typical handheld transmit level).[6]

- When a stationary out-of-vehicle WCS device was moved towards a stationary automobile with a roof-mounted SDARS antenna parked in a satellite-only service area, muting only occurred when the devices were within 4 feet (Sirius) or 13 feet (XM) with WCS operating at 250 milliwatts or 100 milliwatts. When the WCS power was reduced to 100 milliwatts, muting only occurred when the devices were within 2 feet (Sirius) or 10 feet (XM).

- When an in-vehicle WCS device was tested against a roof-mounted SDARS antenna it proved irrelevant whether the two vehicles were in motion or were

[4] *See* Reply Comments of WCS Coalition, WT Docket No. 07-293, *et al*, at 38 (filed Mar. 17, 2008).

[5] Comments of Sirius Satellite Radio Inc, WT Docket No. 07-293, *et al*, at 17 (Feb. 14, 2008).

[6] The record shows that when a 250 milliwatt (24 dBm) device is equipped with transmit power control, it will operate at 100 milliwatts (20 dBm) approximately 95% of the time. *See, e.g.* Comments of WCS Coalition, WT Docket No. 07-293, *et al*, at 15 (filed Feb. 14, 2008).

stationary -- even in satellite-only coverage areas, no muting occurred at 250 milliwatts.

- When a stationary out-of-vehicle WCS device was tested against a roof-mounted SDARS antenna on a vehicle in motion at less than 20 miles per hour, even in satellite-only coverage areas, no muting occurred at 250 milliwatts.

These results are particularly remarkable because the testing was conducted without the benefit of transmit power control, with the WCS device operated with an unrealistic 100% duty cycle, and without the sorts of obstructions between the WCS device and the SDARS reception antenna that would be expected under "real world" conditions (*e.g.* other pedestrians or automobiles).

The bottom line is simple: XM and Sirius have known of the maximum permissible power for WCS handheld devices for more than a decade, have correctly recognized, as demonstrated by ATECS, that interference is not a material risk, and have designed their receivers accordingly. Their current call for dramatic reductions in permissible WCS mobile power levels is a transparent ploy to advance a private agenda at odds with the Commission's objectives.

Pursuant to Sections 1.1206(b)(1) and 1.49(f) of the Commission's Rules, this letter is being filed electronically with the Commission via the Electronic Comment Filing System. Should you have any questions regarding this presentation, please contact the undersigned.

Respectfully submitted,

/s/ Paul J. Sinderbrand

Paul J. Sinderbrand

Counsel to the WCS Coalition

Attachment

cc (by email): Helen Domenici
Julius Knapp
Kris Monteith
Sue McNeil
Roderick Porter
Joel Taubenblatt
Roger Noel
David Hu
Stephen Duall
Robert Nelson

Steven Spaeth
Shabnam Javid
Rosalee Chiara
Ira Keltz
Jay Jackson
Moslem Sawez
James Blitz
Patrick Donnelly

WCS Test Report

WCS Impact Testing with Navini WiMAX CPE

Prepared by:

15042 Prairie Place
Broomfield CO 80020
303-550-6413
www.atecs.biz

WIRELESS TELECOMMUNICATIONS CONSULTANTS

Table of Contents

1.0 EXECUTIVE SUMMARY 3

2.0 BACKGROUND 4

3.0 TEST METHODOLOGY 5

4.0 TEST EQUIPMENT 5
- 4.1 SDARS Off-the-shelf CPE 5
- 4.2 Navini CPE Test Fixture 5
- 4.3 Additional Test Equipment - Calibration 6
- 4.4 CPE Configuration 6

5.0 RESULTS 7
- 5.1 Out-of-Vehicle 7
- 5.2 In-Vehicle 8
- 5.3 Vehicle to Vehicle/Pedestrian 9

6.0 CONCLUSIONS 10

APPENDIX A 11

1.0 EXECUTIVE SUMMARY

Field testing was performed to determine the impact of Wireless Communication Service (WCS) WiMAX Customer Premise Equipment (CPE) upon SDARS (Satellite Digital Audio Radio Service) receivers. The objective of this testing was to determine the distance and power necessary to cause muting (i.e. no audio output) at the SDARS receiver across two WCS channels in overlapping terrestrial-repeater/satellite coverage and satellite-only coverage. Testing was performed in the Atlanta, GA metro area using the scenarios listed in Table 1.0.1.

Table 1.0.1 Field Test Matrix

Interfering Source (by Frequency Band)	Type of CPE	Victim Receiver (by service)			
		XM terrestrial	Sirius terrestrial	XM satellite	Sirius satellite
WCS A Upper	WiMAX CPE	x	x	x	x
WCS B Lower	WiMAX CPE	x	x	x	x

Field testing was performed using active SDARS (XM and Sirius) antennas mounted on the roof of a vehicle 48" from the rear bumper of the vehicle. A spectrum analyzer was used in conjunction with the XM receiver (using internal diagnostic mode) and the Sirius receiver (using external signal bar indicator) to determine the SDARS signal source. Typical SDARS terrestrial repeater signal strength ranged from -85 dBm to -95 dBm. A minimum of two satellites were visible for overlapping terrestrial-repeater/satellite coverage and satellite-only coverage testing.

A Navini LMX Test Fixture based on the Navini Networks Ripwave desktop modem Model 2305-2360 LMX E, FCC ID PL6-2305-MDM06-C2 was used as the WCS WiMAX CPE. The Navini Test Fixture is capable of maintaining a fixed, continuous transmit power and center frequency with an 80+10log P emissions mask. Average effective isotropic radiated powers (EIRP) of 250mW and 100mW were used to characterize impacts on terrestrial and satellite-only coverage. We chose 100mW average EIRP for testing since it was the lowest level at which the test fixture could operate effectively in this test. All testing was conducted in the same horizontal plane of the SDARS antennas. The Test Fixture has an omnidirectional radiation pattern in the horizontal plane.

Results show that no muting could be induced in SDARS overlapping terrestrial-repeater/satellite coverage at 250mW and 100mW respectively even when there was less than 2 feet of separation between the SDARS antenna and WCS WiMAX CPE as shown in Table 1.0.2.

In SDARS satellite-only coverage muting was induced at 250mW at distances of 4 to 13 ft and at 100mW at distances of 2 to 10 feet as shown in Table 1.0.3.

Table 1.0.2 Out-of-Vehicle Results with Terrestrial Repeater

TERRESTRIAL REPEATER COVERAGE										
	2305 MHz WCS		2320 MHz SDARS 2345 MHz						WCS 2360 MHz	
	CPE Tx 2313-15 MHz (B lower)		Sirius			XM			CPE Tx 2350-52 MHz (A upper)	
	250 mW	100 mW	S1	Ter	S2	S1/S2a	Ter	S1/S2b	100 mW	250 mW
XM	no muting	no muting	4.2 MHz	4.1 MHz	4.2 MHz	3.7 MHz	5.1 MHz	3.7 MHz	no muting	no muting
Sirius	no muting	no muting							no muting	no muting

Table 1.0.3 Out-of-Vehicle Results with Satellite Only

SATELLITE COVERAGE										
	2305 MHz WCS		2320 MHz SDARS 2345 MHz						WCS 2360 MHz	
	CPE Tx 2313-15 MHz (B lower)		Sirius			XM			CPE Tx 2350-52 MHz (A upper)	
	250 mW	100 mW	S1	Ter	S2	S1/S2a	Ter	S1/S2b	100 mW	250 mW
XM	13 ft	7 ft	4.2 MHz	4.1 MHz	4.2 MHz	3.7 MHz	5.1 MHz	3.7 MHz	10 ft	10 ft
Sirius	4 ft	2 ft							2 ft	4 ft

2.0 BACKGROUND

SDARS and WCS services are in adjacent frequency bands as shown in Table 2.0.1 per Federal Communication Commission (FCC) spectrum allocation.

Service	Frequency (MHz)
WCS A Lower	2305 to 2310
WCS B Lower	2310 to 2315
WCS C	2315 to 2320
SDARS Sirius	2320 to 2332.5
SDARS XM	2332.5 to 2345
WCS D	2345 to 2350
WCS A Upper	2350 to 2355
WCS B Upper	2355 to 2360

Table 2.0.1 SDARS and WCS frequency bands

SDARS receivers (XM and Sirius) may be impaired (i.e. receiver degradation which results in audio muting) by nearby WCS WiMAX CPE's while transmitting in the uplink. In effort to quantify the distance at which the audio muting occurs, a field test has been crafted to measure such 'muting distances' using off-the-shelf equipment for SDARS receivers and a WCS WiMAX CPE in operational coverage from SDARS networks under typical satellite and terrestrial repeater coverage conditions.

3.0 TEST METHODOLOGY

The field test used off-the-shelf CPE's from SDARS and a WCS WiMAX CPE transmitting at fixed power levels. Field test locations were selected where SDARS network service is offered in both overlapping terrestrial-repeater/satellite coverage and satellite-only coverage scenarios listed in Table 1.0.1. Typical SDARS repeater coverage was between -85 dBm to -95 dBm. Overlapping terrestrial-repeater/satellite coverage testing was performed in open areas where two satellites each for XM and Sirius were visible in addition to the terrestrial repeaters.

The WCS Test Fixture is a Navini WiMAX CPE identical to a commercial desktop modem with the exception that a live base station was not required to transmit. Transmit power levels of 250mW and 100mW average EIRP were selected to simulate cell-edge and in-cell coverage conditions. The WCS Test Fixture was configured and operated by Navini personnel. The SDARS networks were XM and Sirius terrestrial and satellite networks with respective CPE. Field tests were conducted in 'out-of-vehicle' and 'in-vehicle' scenarios. 'Out-of-vehicle' tests consisted of the SDARS antennas positioned on the roof of the vehicle and the WCS WiMAX CPE in the same horizontal plane of the SDARS antennas at varying distances. 'In-vehicle' tests consisted of the SDARS antennas positioned on the roof of the vehicle and the WCS WiMAX CPE inside the same vehicle positioned either in the front passenger seat or the rear passenger seat.

Field measurements were taken to determine the distance at which audio muting occurred. Field testing using off-the-shelf equipment was used to create "real world" conditions to determine a distance between WCS WiMAX CPE's and active SDARS antennas at which muting consistently occurs.

4.0 TEST EQUIPMENT

This section lists the CPE and test equipment used to conduct the field test.

4.1 SDARS Off-the-shelf CPE

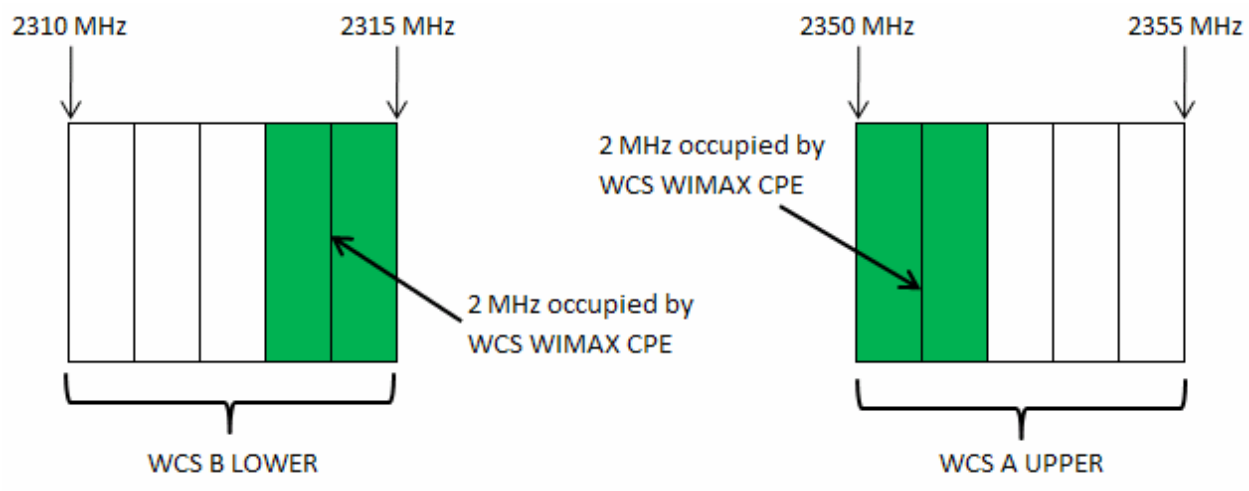
XM Delphi – XM - Delphi SkyFi 10113
XM Delphi – XM - Delphi SkyFi 10000
Sirius Satellite Radio Stiletto 100
Sirius Satellite Radio Sportster

4.2 Navini CPE Test Fixture

Navini Networks Ripwave WiMAX Desktop Modem Test Fixture, Model 2305-2360 LMX E, FCC ID PL6-2305-MDM06-C2

Atlanta Area – A upper & B lower – enabled for a 2 MHz wide channel nearest SDARS band.

Figure 4.2.1 2 MHz Occupied in 5 MHz B Lower and A Upper Channels



4.3 Additional Test Equipment - Calibration

Rohde & Schwarz FSH6 Spectrum Analyzer
Rohde & Schwarz SMJ 100A Vector Signal Generator

4.4 CPE Configuration

Navini: Transmit powers of 250mW and 100mW average EIRP, channels at band edge with WiMAX format sub carrier modulation of QPSK using external 2.1 dBi omni antenna

XM: Active Receive mode; Satellite/Terrestrial selection, bit error rate (BER) and automatic gain control (AGC)

Sirius: Active receive mode; no diagnostic mode available

5.0 RESULTS

This section presents the results, analysis, and data of the field test.

5.1 Out-of-Vehicle

Field testing was performed using an active SDARS (XM and Sirius) CPE antenna mounted on the roof of a vehicle 48" from the rear bumper as shown in Figure 5.1.1. The WCS WiMAX CPE (Navini Test Fixture) was at various distances and average EIRP outside the vehicle.

Figure 5.1.1 SDARS antenna location –Vehicle Roof

Figure 5.1.2 WCS CPE Test Fixture Calibration

Figure 5.1.3 Plane of WCS CPE to SDARS Antenna

Out-of-Vehicle tests were performed with the WCS WiMAX CPE in the same horizontal plane as the SDARS antenna mounted on the roof of the vehicle. A fixed transmit power and frequency were configured into the WCS WiMAX CPE and verified using a spectrum analyzer. Beginning at a distance far enough away where no impact to the C/N or BER was observed on the XM receiver in diagnostic mode, the WCS WiMAX CPE was moved incrementally closer until muting was observed. The WCS WiMAX CPE was backed away from the SDARS antenna incrementally until clear audio was regained. The WCS WiMAX CPE was then moved incrementally towards the SDARS antenna until muting was again observed. For each incremental position the WCS WiMAX CPE was held stationary for a time greater than the buffer of the SDARS receiver to allow the buffer to be impacted or cleared of interference. This process was repeated until a maximum distance to mute was repeatably found and this distance measured.

In SDARS terrestrial-repeater coverage no muting could be induced at 250mW average EIRP and 100mW average EIRP respectively even when there was less than 2 feet of separation between the SDARS antenna and WCS WiMAX CPE as shown in Table 1.0.2.

In SDARS satellite-only coverage muting was induced at 250mW average EIRP at distances of 4 to 13 ft and at 100mW at distances of 2 to 10 feet as shown in Table 1.0.3.

5.2 In-Vehicle

In-Vehicle tests were performed inside the same vehicle as the SDARS receivers. Two locations were chosen to mimic typical uses of a WCS WiMAX CPE. The first location was the right ear of the passenger to mimic a mobile handset. The second location was the center of the rear passenger seat to mimic a PC card being used in a laptop. No muting was observed with SDARS

terrestrial repeater coverage. One instance of muting was noted with SDARS satellite only coverage when operating at 250mW average EIRP at WCS B lower band.

Table 5.2.1 In-Vehicle Results Terrestrial Coverage

In-Vehicle TERRESTRIAL REPEATER COVERAGE										
	2305 MHz WCS		2320 MHz SDARS 2345 MHz						WCS 2360 MHz	
	CPE Tx 2313-15 MHz (B lower)		Sirius			XM			CPE Tx 2350-52 MHz (A upper)	
	250 mW	100 mW	S1	Ter	S2	S1/S2a	Ter	S1/S2b	100 mW	250 mW
XM-Pass	no muting	no muting	4.2 MHz	4.1 MHz	4.2 MHz	3.7 MHz	5.1 MHz	3.7 MHz	no muting	no muting
XM-Rear	no muting	no muting							no muting	no muting
Sirius-Pass	no muting	no muting							no muting	no muting
Sirius-Rear	no muting	no muting							no muting	no muting

Table 5.2.2 In-Vehicle Results Satellite Only Coverage

In- Vehicle SATELLITE COVERAGE										
	2305 MHz WCS		2320 MHz SDARS 2345 MHz						WCS 2360 MHz	
	CPE Tx 2313-15 MHz (B lower)		Sirius			XM			CPE Tx 2350-52 MHz (A upper)	
	250 mW	100 mW	S1	Ter	S2	S1/S2a	Ter	S1/S2b	100 mW	250 mW
XM-Pass	no muting	no muting	4.2 MHz	4.1 MHz	4.2 MHz	3.7 MHz	5.1 MHz	3.7 MHz	no muting	no muting
XM-Rear	no muting	no muting							no muting	mute
Sirius-Pass	no muting	no muting							no muting	no muting
Sirius-Rear	no muting	no muting							no muting	no muting

5.3 Vehicle to Vehicle/Pedestrian

Vehicle-to-Vehicle and Vehicle-to-Pedestrian testing were performed with three scenarios.

1. Mobile vehicles passing in opposite directions within 8 feet of separation
2. Stationary vehicles within 8ft similar to a stop light or heavy traffic
3. Mobile vehicle to stationary pedestrian with antenna located by ear within 8 feet of separation.

In each case the WCS WiMAX CPE was fixed to 250mW average EIRP. Speeds of the mobile vehicle housing the SDARS receivers did not exceed 20 mph (miles per hour). In each case no muting was observed.

Table 5.3.1 Vehicle to Vehicle/Pedestrian at 250mW Satellite Only Coverage

SATELLITE COVERAGE												
	2305 MHz WCS			2320 MHz SDARS 2345 MHz						WCS 2360 MHz		
	CPE Tx 2313-15 MHz (B lower)			Sirius			XM			CPE Tx 2350-52 MHz (A upper)		
	Vehicle to Vehicle Mobile	Vehicle to Vehicle Stationary	Vehicle to Pedestrian Mobile	S1	Ter	S2	S1/S2a	Ter	S1/S2b	Vehicle to Vehicle Mobile	Vehicle to Vehicle Stationary	Vehicle to Pedestrian Mobile
XM	no muting	no muting	no muting	4.2 MHz	4.1 MHz	4.2 MHz	3.7 MHz	5.1 MHz	3.7 MHz	no muting	no muting	no muting
Sirius	no muting	no muting	no muting							no muting	no muting	no muting

6.0 CONCLUSIONS

In typical terrestrial SDARS coverage (-85 dBm to -95 dBm) the WCS WiMAX CPE did not induce muting at 250mW and 100mW average EIRP while outside of the vehicle in the same horizontal plane as the SDARS antennas mounted on the roof of the vehicle. WCS WiMAX CPE located inside a vehicle with SDARS CPE mounted on the rooftop also does not interfere while in terrestrial SDARS coverage. No muting could be induced inside the vehicle at 250mW and 100mW average EIRP in typical usage areas (i.e. antenna at right passenger ear mimicking handset usage and antenna at lap level in rear center passenger seat mimicking a laptop in a car).

A WCS WiMAX CPE at 250mW average EIRP in the same horizontal plane of the SDARS antenna is a worst case scenario. This replicates cell-edge conditions and is less probable than the 100mW average EIRP case, especially for systems designed with in-building penetration losses since the outdoor CPE is not experiencing these losses. Average EIRP less than 250mW from a WCS WiMAX CPE is the norm within the majority of the cell coverage due to power control.

In typical SDARS satellite-only coverage the WCS WiMAX CPE induced muting at distances of 2 to 13 feet outside the vehicle in the same horizontal plane as the SDARS antennas mounted on the roof of the vehicle. Sirius experienced muting at 4 feet with the WCS WiMAX CPE at 250mW average EIRP and 2 feet at 100mW average EIRP. XM experienced muting at 10 to 13 feet with the WCS WiMAX CPE at 250mW average EIRP and 7 to 10 feet at 100mW average EIRP. Inside the vehicle using the antenna positions of antenna at right passenger ear and antenna at lap level of rear center passenger seat, only one instance of muting of XM was induced at 250mW average EIRP. In this case the WCS antenna was positioned directly below the XM antenna on the roof of the vehicle operating in the B upper band.

Vehicle-to-vehicle and vehicle-to-pedestrian cases did not induce muting at 250mW average EIRP under satellite only coverage conditions. In mobile situations the time the victim is exposed to the interferer is too low to impact SDARS buffering. In stationary situations vehicle attenuation eliminates overload. Even at shorter distances while stationary the probability of 250mW average EIRP is low due to power control.

For further information contact:

Mark Poletti
Sr Partner
ATECS LLC
markpo@atecs.biz
303-550-6413
www.atecs.biz

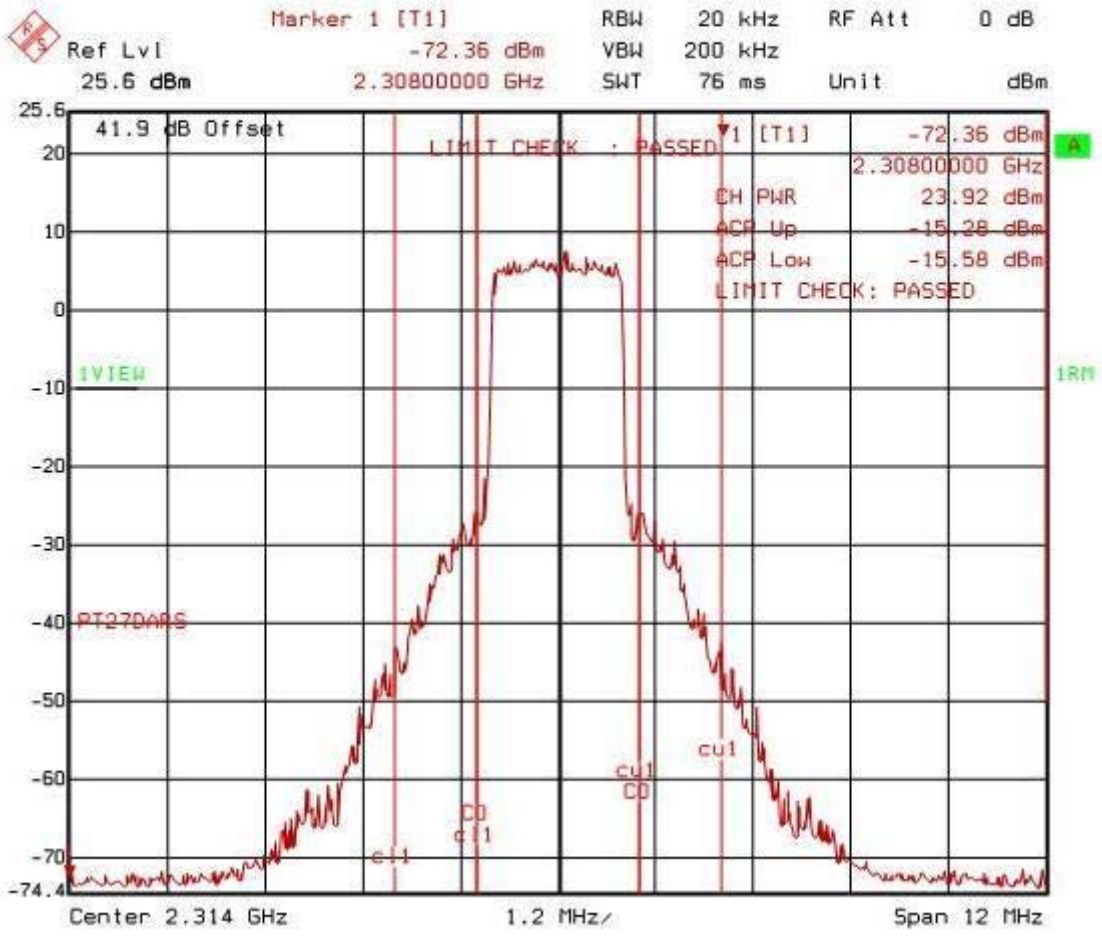
APPENDIX A

WCS WiMAX CPE Out of Band Emissions with 2MHz Channel at 250mW

EQUIPMENT: *2305 – 2360 LMX E*

A & B Low Bands, 802.16e Mode

24.16dBm
2314MHz, GC=171

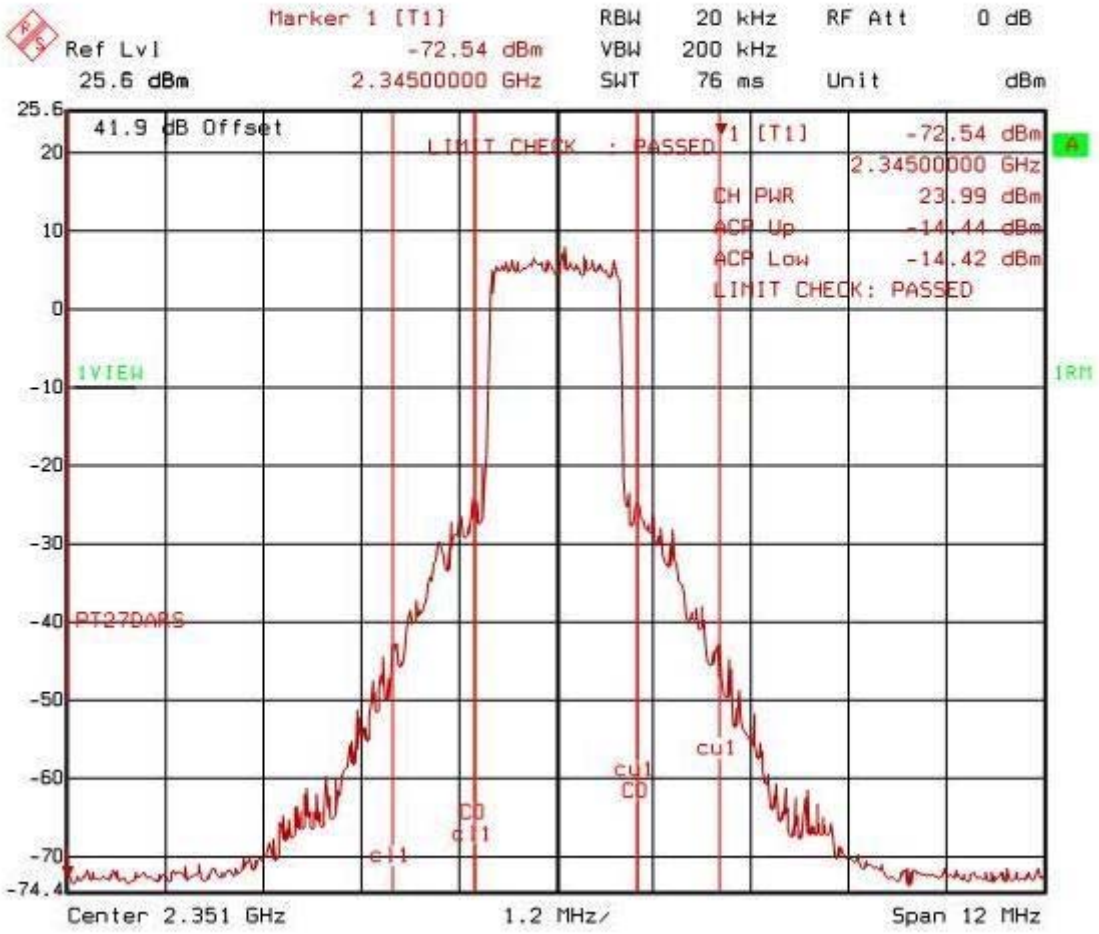


Reference: FCC Part 27 compliance test for Navini Networks Model 2305-2360 LMX equipment

EQUIPMENT: *2305 – 2360 LMXE*

A & B High Bands, 802.16e Mode

24.3dBm
2351MHz, GC=175



Reference: FCC Part 27 compliance test for Navini Networks Model 2305-2360 LMX equipment