Lab Code: 200167-0

FCC PART 15 SUBPART 407

MEASUREMENTAND TEST REPORT

For

Proxim Wireless Corporation

2115 O'Nel Drive
San Jose, CA 95131, USA

FCC ID: HZB-5054-LR
Model: 5054-R-LR

This Report Concerns: ☒ Class II Permissive Change Report	**Product type:** Outdoor Wireless Point To Multi Point Router
Test Engineer:	James Ma
Report Number:	R0701104-407
Report Date:	2007-01-15
Reviewed By:	Hans Mellberg, VP of Engineering
Prepared By: (ct)	**Bay Area Compliance Laboratories Corp.** 1274 Anvilwood Ave. Sunnyvale, CA 94089, USA Tel: (408) 732-9162 Fax: (408) 732 9164

TABLE OF CONTENTS

1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

This BACL measurement and test report has been prepared on behalf of *Proxim Wireless Corporation's* product, *FCCID: HZB-5054-LR*, model: *5054-R-LR* Outdoor Wireless Point To Multi Point Router, or the EUT as referred to in the rest of this report. The EUT is a NII capable device. For the NII part (802.11a), the frequency range is 5250.00 – 5350.00 MHz, maximum output power is 165.58 mW.

** The test data gathered are from a production sample serial number: 05UT47700093 which is provided by the manufacturer.*

1.2 EUT Photo

Additional EUT photos in Exhibit C

1.3 Mechanical Description

The *Proxim Wireless Corporation's* product, *FCCID: HZB-5054-LR* measures approximately 370mm (L) x 348mm (W) x 208mm (H) and weighs 4.2kg.

1.4 Objective

This type approval report is prepared on behalf of *Proxim Wireless Corporation in* accordance with Part 2, Subpart J, Part 15, Subparts A, B, C and E of the Federal Communication Commissions rules.

The objective is to determine continued compliance with FCC 15.407 Standard's limits rules for Antenna Requirements and Radiated Spurious Emissions after the class II permissive change made by *Proxim Wireless Corporation.*

FCC ID: HZB-5054-LR is identical to the device of the same FCC ID tested by BACL in project R0605231 except for an additional external antenna and a filter board (installed in-line with the external antenna port to suppress out of band spurious emissions) have been added to the EUT.

1.5 Related Submittal(s)/Grant(s)

This Permissive Change II report has been compiled on behalf of *Proxim Wireless Corporation* and contains only those tests preformed to verify continued compliance after the modifications detailed in the objective were made. The original FCC ID: *HZB-5054-LR* was granted in July 2006. Please refer to Bay Area Compliance Laboratories Corp. project number: R0605231 for complete tests and their results.

1.6 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.4-2003, 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.

1.7 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the values ranging from $\pm$2.0 dB for Conducted Emissions tests and $\pm$4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

Detailed instrumentation measurement uncertainties can be found in BACL Corp. report QAP-018.

1.8 Test Facility

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at its facility in Sunnyvale, California, USA.

The test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11, 1997 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the test methods and procedures set forth in ANSI C63.4-2003 & TIA/EIA-603.

The Federal Communications Commission and Voluntary Control Council for Interference have the reports on file and they are listed under FCC registration number: 90464 and VCCI Registration No.: R-2463 and C-2698. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL Corp. is a National Institute of Standards and Technology (NIST) accredited laboratory under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm.

2 - SYSTEM TEST CONFIGURATION

2.1 Justification

The host system was configured for testing according to ANSI C63.4-2003.

The EUT was tested in the Continuous Transmitting operating mode to represent *worst*-case results during the final qualification test.

2.2 EUT Exercise Software

The EUT is programmed with the following data rate settings that were used during testing:

For 5250 – 5350 MHz (W53)

20MHz rate/channel:

	5260MHz	5300MHz	5320MHz
802.11a Data rate	9 Mbps	9 Mbps	9 Mbps

2.3 Special Accessories

As shown in following test setup block diagram, all interface cables used for compliance testing are shielded. The host PC and the peripherals featured shielded metal connectors.

2.4 Equipment Modifications

No modifications were made to the EUT.

2.5 Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Dell	Laptop PC	PP05	N/A

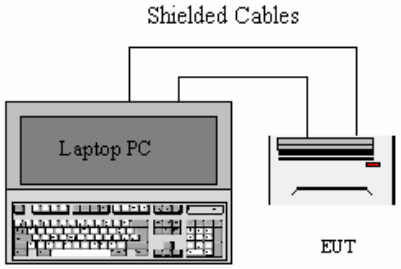
2.6 External I/O Cabling List and Details

Cable Description	Length (M)	Port/From	To
Shielded Cable	1.0	RJ45 Port / EUT	RJ45 Port / Laptop PC
Shielded Cable	1.0	RS232 Port / EUT	RS232 Port / Laptop PC
Shielded RF Cable	1.0	RF Port / EUT	Antenna

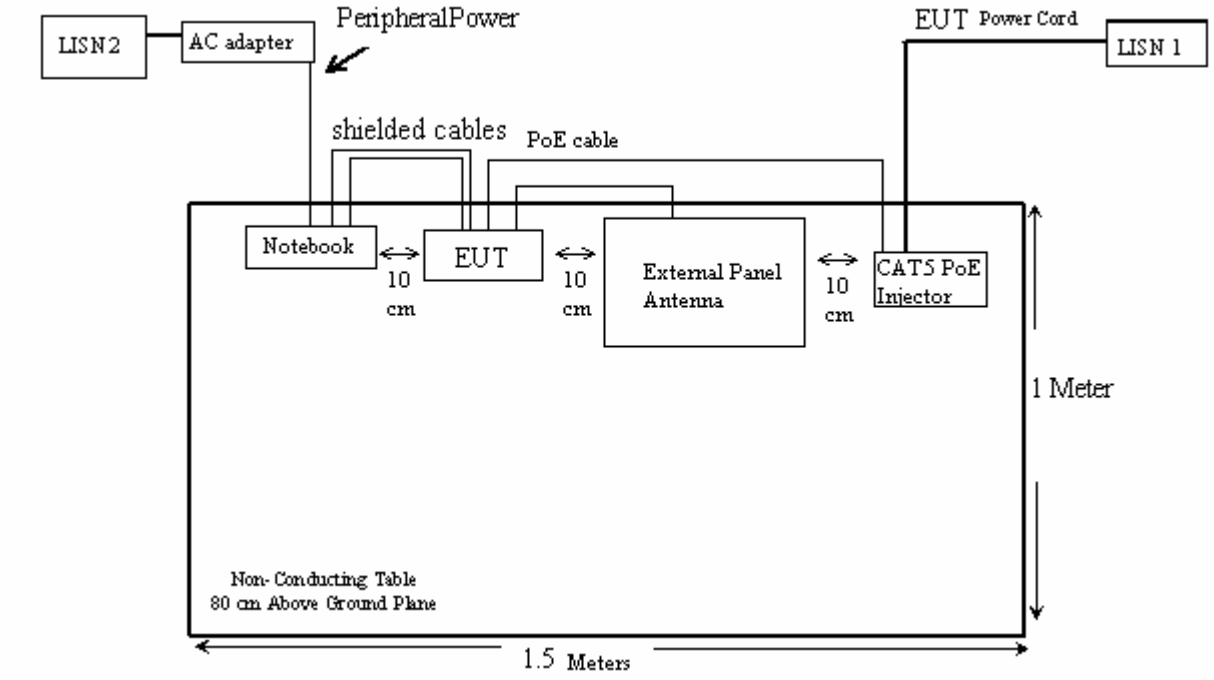
2.7 Power Supply Information

Manufacturer	Description	Model	Serial Number	FCC ID
Proxim	AC/DC Adapter	DSA0151F	None	None

2.8 Configuration of Test System



2.9 Test Setup Block Diagram Add antenna



3 - SUMMARY OF TEST RESULTS

Results reported relate only to the product tested.

FCC RULES	DESCRIPTION OF TEST	RESULT
§2.1091, §15.407 (f)	RF Exposure Requirement	Compliant
§15.203	Antenna Requirement	Compliant
§15.209(a), §15.407(b)(5), §15.407(b)(6)	Spurious Radiated Emissions	Compliant
§ 15.205	Restricted Bands	Compliant
§ 15.207(a)	AC Line Conduction	N/A*
§ 2.1051	Spurious Emissions At Antenna Terminals	N/A*
§15.407	- 26 dB Bandwidth	N/A*
§15.407(a)(2)	RF Output Power	N/A*
§15.407(a)(2)	Peak Power Spectral Density	N/A*
§15.407(a)(6)	Peak Excursion	N/A*
§15.407(b)	Out of Band Emission	Compliant
§15.407(c)	Discontinue Transmitting with Absence of Data or Operational Failure	N/A*
§ 15.407(g)	Frequency Stability	N/A*
§ 15.407 (h)	TPC & DFS	N/R*

*: Please refer to BACL's project# R0605231 for original test data and photographs.

4 - §15.203 - ANTENNA REQUIREMENT

4.1 Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

And according to § 15.407 (a)(1) and (a)(2), if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Result: The added antenna for this device is an external antenna with the gain of 28.5 dBi. It features a standard antenna connection and requires professional installation.

Antenna listed below is used for this report:

Frequency	Type	Gain (dBi)	Model
5 GHz	Panel Antenna	28.5	FPA5250D24-N

Additional Antenna Information:

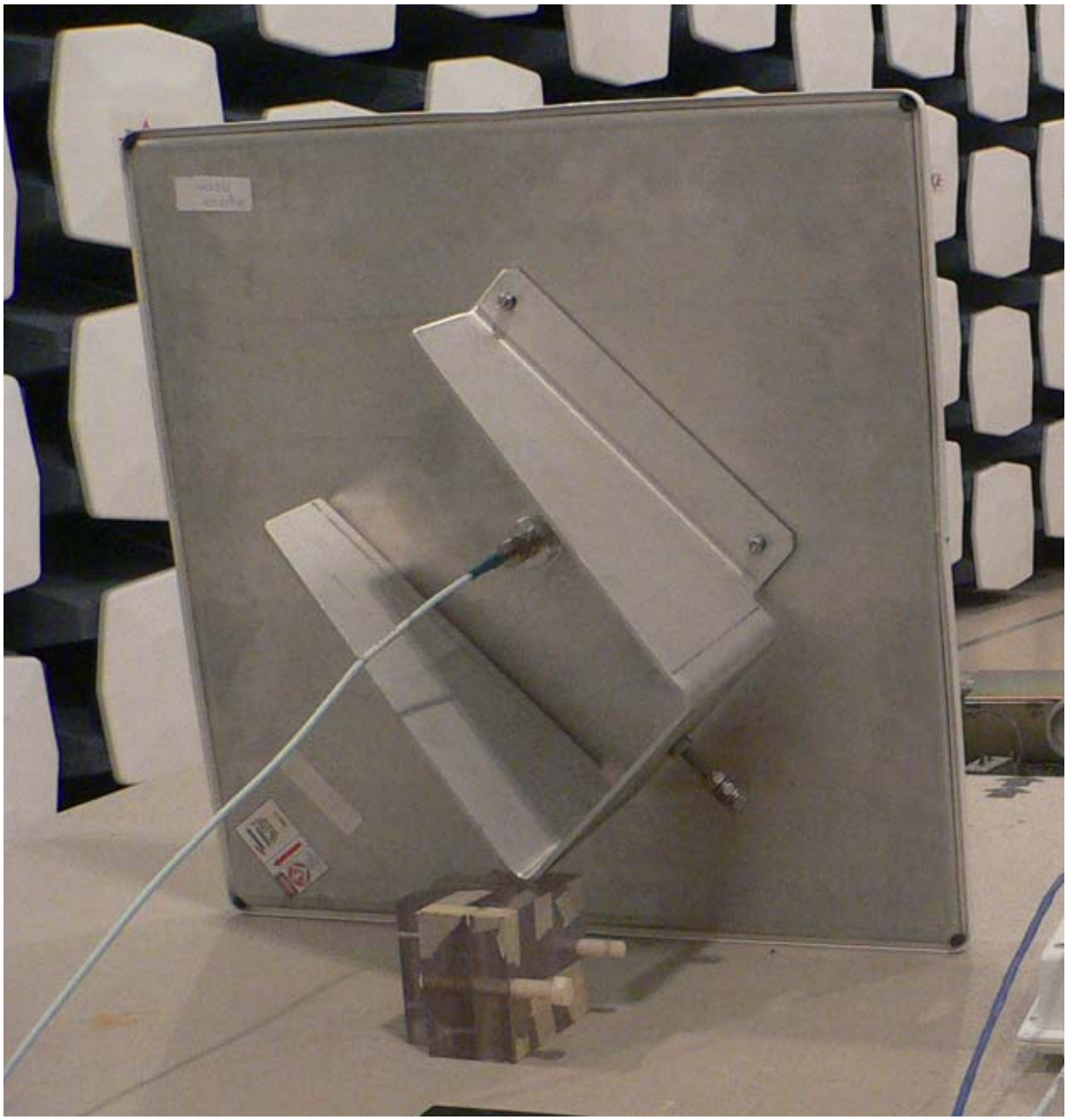
EIRP limit = 30dBm for part 15.407.

When using this antenna the conducted power must be reduced to meet the limit above.

Antennae listed below were used for previous BACL report number: R0605231

Frequency	Type	Gain (dBi)	Model
5 GHz	Panel Antenna	7.0	Orinoco 5 GHz – 1086-PA50-7
	Sector	17.0	5054-SA60-17

Antenna Photo



5 - §15.209(a), §15.407(b) (5), §15.407(b)(6)- SPURIOUS RADIATED EMISSIONS

5.1 Applicable Standard

As per 15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz.

As per 15.209(a): Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As Per 15.407(a)(1) & (a)(2): for the 5.25-5.35 GHz band, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

As Per 15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 – 0.110 0.495 – 0.505 2.1735 – 2.1905 4.125 – 4.128 4.17725 – 4.17775 4.20725 – 4.20775 6.215 – 6.218 6.26775 – 6.26825 6.31175 – 6.31225 8.291 – 8.294 8.362 – 8.366 8.37625 – 8.38675 8.41425 – 8.41475 12.29 – 12.293 12.51975 – 12.52025 12.57675 – 12.57725 13.36 – 13.41	16.42 – 16.423 16.69475 – 16.69525 25.5 – 25.67 37.5 – 38.25 73 – 74.6 74.8 – 75.2 108 – 121.94 123 – 138 149.9 – 150.05 156.52475 – 156.52525 156.7 – 156.9 162.0125 –167.17 167.72 – 173.2 240 – 285 322 – 335.4 399.9 – 410 608 – 614	960 – 1240 1300 – 1427 1435 – 1626.5 1645.5 – 1646.5 1660 – 1710 1718.8 – 1722.2 2200 – 2300 2310 – 2390 2483.5 – 2500 2690 – 2900 3260 – 3267 3.332 – 3.339 3 3458 – 3 358 3.600 – 4.400	4. 5 – 5. 15 5. 35 – 5. 46 7.25 – 7.75 8.025 – 8.5 9.0 – 9.2 9.3 – 9.5 10.6 – 12.7 13.25 – 13.4 14.47 – 14.5 15.35 – 16.2 17.7 – 21.4 22.01 – 23.12 23.6 – 24.0 31.2 – 31.8 36.43 – 36.5 Above 38.6

5.2 Test Setup

The radiated emissions tests were performed in the 3-meter open area test site, using the setup in accordance with ANSI C63.4-2003. The specification used was the FCC 15 Subpart C and E limits.

The spacing between the peripherals was 10 centimetres.

External I/O cables were draped along the edge of the test table and bundle when necessary.

5.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Sonoma	Amplifier, Pre	317	260407	2006-03-20
Sunol Science	30Mhz ~ 2 GHz Antenna	JB1	A03105-3	2006-03-15
A.R.A	Antenna, Horn, DRG	DRG-118/A	1132	2005-08-17*
Agilent	Analyzer, Spectrum	E4446A	US44300386	2006-03-06
HP	Pre, Amplifier (1 ~ 26.5 GHz)	8449B	3147A00400	2006-08-21

Statement of Traceability: BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.
* 2 year calibration cycle

5.4 Test Procedure

For the radiated emissions test, the EUT, and all support equipment power cords was connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 mete, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

The spectrum analyzer or receiver is set as:

Below 1000MHz:

RBW = 100 kHz / VBW = 300 kHz / Sweep = Auto

Above 1000MHz:

(1) Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto

Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

5.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corrected Amplitude = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit.
The equation for margin calculation is as follows:

Margin = Corrected Amplitude - FCC Limit

Environmental Conditions

Temperature:	21° C
Relative Humidity:	78%
ATM Pressure:	1022 mbar

The testing was performed by James Ma on 2007-01-11.

5.6 Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Title 47, Part 15 section 15.205, 15.209 and Subpart E 15.407 standard's limits, and had the worst margin of:

UNII Band II Summary of Results

-9.2 dB at **21040.00 MHz** in the **Vertical** polarization, for Low Channel

-10.0 dB at **21200.00 MHz** in the **Vertical** polarization, for Middle Channel

-10.1 dB at **21280.00 MHz** in the **Vertical** polarization, for High Channel

Please refer to the following table and plots for specific test result details

Antenna information for Panel Antenna 28.5 dBi

EIRP limit = 30dBm for part 15.407.

When using this antenna the conducted power must be reduced to meet the limit above.

Run # 1 Radiated Harmonic and Spur Emission 802.11a (Panel Antenna 28.5 dBi)

Run # 1- 1 :Final scan 1GHz -40GHz , (Lowest channel. : 5260 MHz)

Frequency (MHz)	Reading (dBuV)	Azimuth Degrees	Antenna Height Meters	Polarization (H / V)	Antenna Factor (dB/m)	Cable Loss (dB)	Amplifier Gain (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Comments
21040.00	27.7	180	2.0	V	43.4	4.3	30.7	44.8	54	-9.2	Ave
21040.00	27.4	90	2.0	H	43.4	4.3	30.7	44.5	54	-9.5	Ave
15780.00	30.0	180	2.0	V	40.4	5.1	31.8	43.6	54	-10.4	Ave
15780.00	29.5	90	2.0	H	40.4	5.1	31.8	43.1	54	-10.9	Ave
10520.00	29.3	50	1.7	V	38.7	3.9	33.2	38.8	54	-15.2	Ave
10520.00	28.2	180	2.3	H	38.7	3.9	33.2	37.7	54	-16.3	Ave
15780.00	42.1	90	2.0	V	40.4	5.1	31.8	55.7	74	-18.3	Peak
15780.00	41.3	180	2.0	H	40.4	5.1	31.8	54.9	74	-19.1	Peak
21040.00	34.3	90	2.0	V	43.4	4.3	30.7	51.4	74	-22.6	Peak
1593.00	42.0	180	2.0	V	24.8	1.0	36.3	31.4	54	-22.6	Ave
21040.00	32.6	180	2.0	H	43.4	4.3	30.7	49.7	74	-24.3	Peak
10520.00	40.0	50	1.7	V	38.7	3.9	33.2	49.5	74	-24.5	Peak
10520.00	38.4	180	2.3	H	38.7	3.9	33.2	47.9	74	-26.1	Peak
1593.00	36.3	90	2.0	H	24.8	1.0	36.3	25.7	54	-28.3	Ave
1593.00	55.7	90	2.0	V	24.8	1.0	36.3	45.1	74	-28.9	Peak
1593.00	52.5	180	2.0	H	24.8	1.0	36.3	41.9	74	-32.1	Peak

Run # 1- 2 :Final scan 1GHz -40GHz , (Middle channel. : 5300 MHz)

Frequency (MHz)	Reading (dBuV)	Azimuth Degrees	Antenna Height Meters	Polarization (H / V)	Antenna Factor (dB/m)	Cable Loss (dB)	Amplifier Gain (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Comments
21200.00	26.9	180	2.0	V	43.4	4.3	30.7	44.0	54	-10.0	Ave
21200.00	26.4	90	2.0	H	43.4	4.3	30.7	43.5	54	-10.5	Ave
15900.00	29.1	270	2.4	V	40.4	5.1	31.8	42.7	54	-11.3	Ave
15900.00	28.6	180	2.1	H	40.4	5.1	31.8	42.2	54	-11.8	Ave
10600.00	29.5	270	2.4	V	38.7	3.9	33.2	39.0	54	-15.0	Ave
10600.00	28.8	180	2.2	H	38.7	3.9	33.2	38.3	54	-15.7	Ave
15900.00	41.3	270	2.4	V	40.4	5.1	31.8	54.9	74	-19.1	Peak
15900.00	39.3	180	2.3	H	40.4	5.1	31.8	52.9	74	-21.1	Peak
21200.00	34.1	90	2.0	V	43.4	4.3	30.7	51.2	74	-22.8	Peak
21200.00	33.8	180	2.0	H	43.4	4.3	30.7	50.9	74	-23.1	Peak
10600.00	39.4	270	2.4	V	38.7	3.9	33.2	48.9	74	-25.1	Peak
10600.00	38.9	180	2.2	H	38.7	3.9	33.2	48.4	74	-25.6	Peak
1593.00	38.1	180	2.0	V	24.8	1.0	36.3	27.5	54	-26.5	Ave
1593.00	37.2	90	2.0	H	24.8	1.0	36.3	26.6	54	-27.4	Ave
1593.00	51.4	90	2.0	V	24.8	1.0	36.3	40.8	74	-33.2	Peak
1593.00	50.6	180	2.0	H	24.8	1.0	36.3	40.0	74	-34.0	Peak

Run # 1- 3 :Final scan 1GHz -40GHz , (Highest channel. : 5320 MHz)

Frequency (MHz)	Reading (dBuV)	Azimuth Degrees	Antenna Height Meters	Polarization (H / V)	Antenna Factor (dB/m)	Cable Loss (dB)	Amplifier Gain (dB)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Comments
21280.00	26.8	180	2.0	V	43.4	4.3	30.7	43.9	54	-10.1	Ave
21280.00	26.4	90	2.0	H	43.4	4.3	30.7	43.5	54	-10.5	Ave
15960.00	28.7	270	2.4	V	40.4	5.1	31.8	42.3	54	-11.7	Ave
15960.00	28.5	90	2.1	H	40.4	5.1	31.8	42.1	54	-11.9	Ave
10640.00	28.3	270	2.4	V	38.7	3.9	33.2	37.8	54	-16.2	Ave
10640.00	28.0	90	2.1	H	38.7	3.9	33.2	37.5	54	-16.5	Ave
21280.00	36.5	90	2.0	V	43.4	4.3	30.7	53.6	74	-20.4	Peak
21280.00	36.4	180	2.0	H	43.4	4.3	30.7	53.5	74	-20.5	Peak
15960.00	39.3	270	2.4	V	40.4	5.1	31.8	52.9	74	-21.1	Peak
15960.00	38.8	90	2.1	H	40.4	5.1	31.8	52.4	74	-21.6	Peak
1595.00	41.4	180	2.0	V	24.8	1.0	36.3	30.8	54	-23.2	Ave
1595.00	40.1	90	2.0	H	24.8	1.0	36.3	29.5	54	-24.5	Ave
10640.00	38.8	270	2.4	V	38.7	3.9	33.2	48.3	74	-25.7	Peak
10640.00	38.1	90	2.1	H	38.7	3.9	33.2	47.6	74	-26.4	Peak
1595.00	54.6	90	2.0	V	24.8	1.0	36.3	44.0	74	-30.0	Peak
1595.00	53.2	180	2.0	H	24.8	1.0	36.3	42.6	74	-31.4	Peak

END OF REPORT