Lab Code: 200167-0

FCC PART 15 SUBPART C

MEASUREMENT AND TEST REPORT

For

Proxim Wireless Corporation

2115 O'Nel Drive

San Jose, CA 95131, USA

FCC ID: HZB–954
Model: 954–R

Report Type:	**Product type:**
☒ Original Report	900 MHz Wireless Outdoor Router

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Report Number:	R0704243-247
Report Date:	2007-05-09
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1 GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

The *Proxim Wireless Corporation's* product, *FCCID: HZB– 954, Model: 954 -R,* or the "EUT" as referred to this report is a 900 MHz wireless outdoor router that is powered by a Power DC Injector. It is designed for fixed installation and operates in the 902 – 928 MHz frequency band. This device contains an approved Transmitter Module.

1.2 Mechanical Description

The *Proxim Wireless Corporation's* product, *FCCID: HZB– 954, model :954 -R,* or the "EUT" as referred to this report measures approximately *370mmL x 347mmW x 208mmH and weighs 2490g.*

** The test data gathered are from production sample, with serial number: S05UT09580207, provided by the manufacturer.*

1.3 Antenna Description

The antennae used are external, mobile antennae for outdoor used.

Antennae Names	Model(s)/Type(s)	
Sector Panel Antenna	P/N:	RWA-80017
	Manufacturer:	Antel, Inc.
	Frequency Range:	806 – 960 MHz
	Connector Type/ Maximum Gain	NE, E-DIN/ 17 dBd (19.15 dBi)
	Antenna Type	Sector Panel
	Measurement:	Dimension: 2450 mmL x 285 mmW x 150 mmD; Weight: 14 kg
Omnidirectional Antenna	P/N:	BCD-87010
	Manufacturer:	Antel, Inc.
	Frequency Range:	870 – 960 MHz
	Connector Type/ Maximum Gain	NE, E-DIN/ 10 dBd (12.15 dBi)
	Antenna Type	Omnidirectional
	Measurement:	Dimension: Overall 3393 mm, Radome 2893; Weight: 12 kg
Flat Panel Antenna	P/N:	MT-263006/N
	Manufacturer:	MTI Wireless Edge Ltd.
	Frequency Range:	902-928 MHz
	Connector Type/ Maximum Gain	N-type Female/12.5 dBi
	Antenna Type	Flat Panel
	Measurement:	Dimension: 450 mmL x 450 mmW x 36 mmD; Weight: 3 kg

1.4 EUT Photo

Additional photos in Exhibit C

1.5 Objective

This type of report is prepared on behalf of *Proxim Wireless Corporation* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communication Commissions rules. This EUT utilizes a Ubiquiti Networks, Inc. module and Ubiquity has authorized Proxim Wireless Corporation access to use the Ubiquiti Super Range 9 (FCC ID: SWXSR9) FCC Certification grants and any other associated testing reports, materials, and documentation needed for compliance of their device.

FCC ID: HZB–954 uses a granted module as the radio card (FCC ID: SWX-SR9) tested by MET Laboratories, Inc. in report number: EMCS18953-FCC247.

The objective is to determine the compliance of Proxim HZB-954 with FCC 15.247 for RF Exposure, Antenna Requirements, Conducted Emissions, Maximum Peak Output Power, Restricted Band and Radiated Spurious Emissions. Radiated spurious emission testing was performed for each antenna (flat panel, omni and sector panel antenna) that representing the maximum antenna gain. For Spurious Emissions at Antenna Port, 6 dB Bandwidth, 100 kHz Bandwidth of Frequency Band Edge and Power Spectral Density test results, please refer to MET Laboratories, Inc., report number: EMCS18953-FCC247.

1.6 Related Submittal(s)/Grant(s)

Please refer to the enclosed original report, which was prepared by MET Laboratories, Inc., report number: EMCS18953-FCC247 (FCC ID: SWX-SR9).

1.7 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.

1.8 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.

1.9 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 testing 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:

Channel	912 MHz	917 MHz
802.11b Data rate	11Mbps	11Mbps
802.11g Data rate	6Mbps	6Mbps

2.3 Special Accessories

There were no special accessories were required, included, or intended for use with EUT during these tests.

2.4 Equipment Modifications

No modifications were made to the EUT.

2.5 Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Dell	Laptop	PP05	N/A

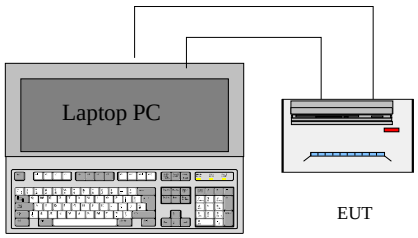
2.6 Power Supply Information

Manufacturer	Description	Model	Serial Number
Proxim	AC/DC Adaptor	DSA0151F	None

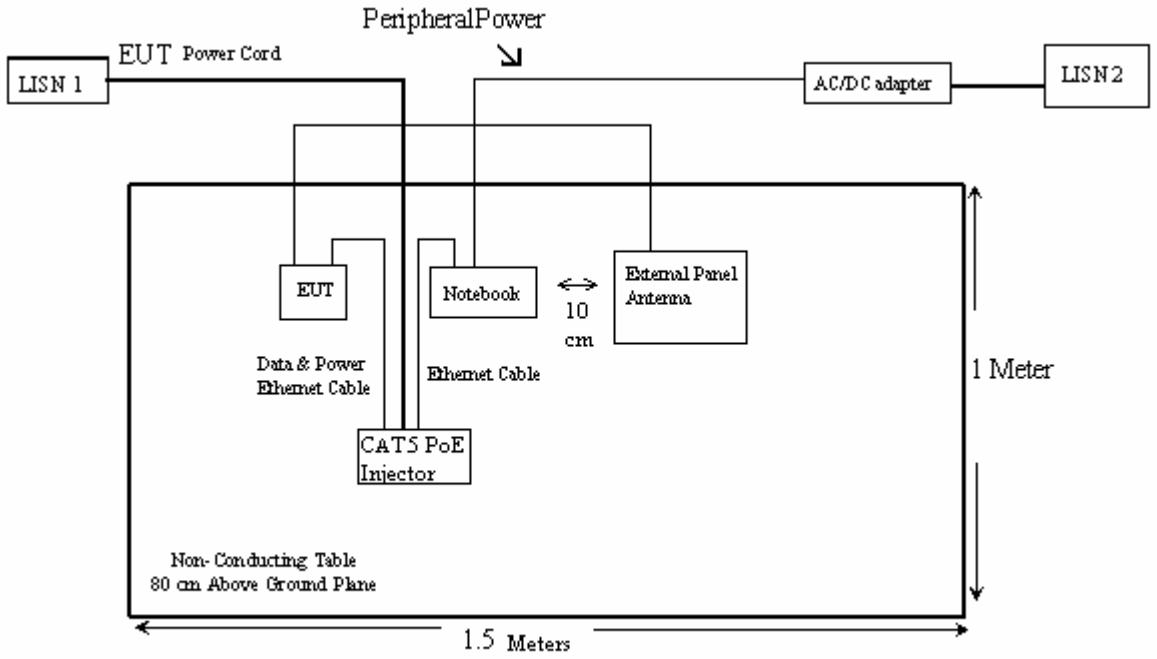
2.7 Interface Ports and Cabling

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

2.8 Configuration of Test System



2.9 Test Setup Block Diagram



3 SUMMARY OF TEST RESULTS

Results reported relate only to the product tested.

FCC Rules	Description Of Test	Result
§15.247(e)(i) §2.1091	RF Exposure	Compliant
§15.203	Antenna Requirement	Compliant
§ 15.207 (a)	Conducted Emissions	Compliant
§15.247 (b)(3)	Maximum Peak Output Power	Compliant
§15.205	Restricted Band	Compliant
§15.109, 15.209 (a) & §15.247(c)	Radiated Spurious Emissions	Compliant
§2.1051 & §15.247(d)	Spurious Emissions at Antenna Port	Note 1
§15.247 (a)(2)	6 dB Bandwidth	Note 1
§ 15.247 (c)	100 kHz Bandwidth of Frequency Band Edge	Note 1
§15.247 (d)	Power Spectral Density	Note 1

Note 1: Please see FCC ID: SWX-SR9 (MET report: EMCS18953-FCC247) for test results.

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 § 15.247 (b) (4), if transmitting antennas of directional gain greater than 6 dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.2 Result

The added antennae for this device are external, mobile antennae for outdoor used. They feature a standard antenna connection and require professional installation.

Antennae Names	Model(s)/Type(s)	
Sector Panel Antenna	P/N:	RWA-80017
	Connector Type/ Maximum Gain	NE, E-DIN/ 17 dBd (19.15 dBi)
Omnidirectional Antenna	P/N:	BCD-87010
	Connector Type/ Maximum Gain	NE, E-DIN/ 10 dBd (12.15 dBi)
Flat Panel Antenna	P/N:	MT-263006/N
	Connector Type/ Maximum Gain	N-type Female/12.5 dBi

☒ **Compliant** ☐ **N/A**

5 §15.207 - CONDUCTED EMISSIONS

5.1 Applicable Standard

As per §15.207 conducted limits, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	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.*

5.2 Test Setup

The measurement was performed at shield room, using the setup per ANSI C63.4 – 2003 measurement procedure. The specification used was FCC Class B limits.

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

The EUT was connected with LISN-1.

5.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Receiver, EMI Test	Receiver, EMI Test	ESCS30	100176	2007-03-16
LISN, Artificial Mains	LISN, Artificial Mains	ESH2-Z5	871884/039	2006-11-14

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

5.4 Test Procedure

During the conducted emissions test, the power cord of the EUT was connected to the mains outlet of the LISN-1.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the peak detection mode, quasi-peak and average. Quasi-Peak readings are distinguished with a "QP". Average readings are distinguished with an "Ave".

5.5 Environmental Conditions

Temperature:	20 °C
Relative Humidity:	40 %
ATM Pressure:	102.0 kPa

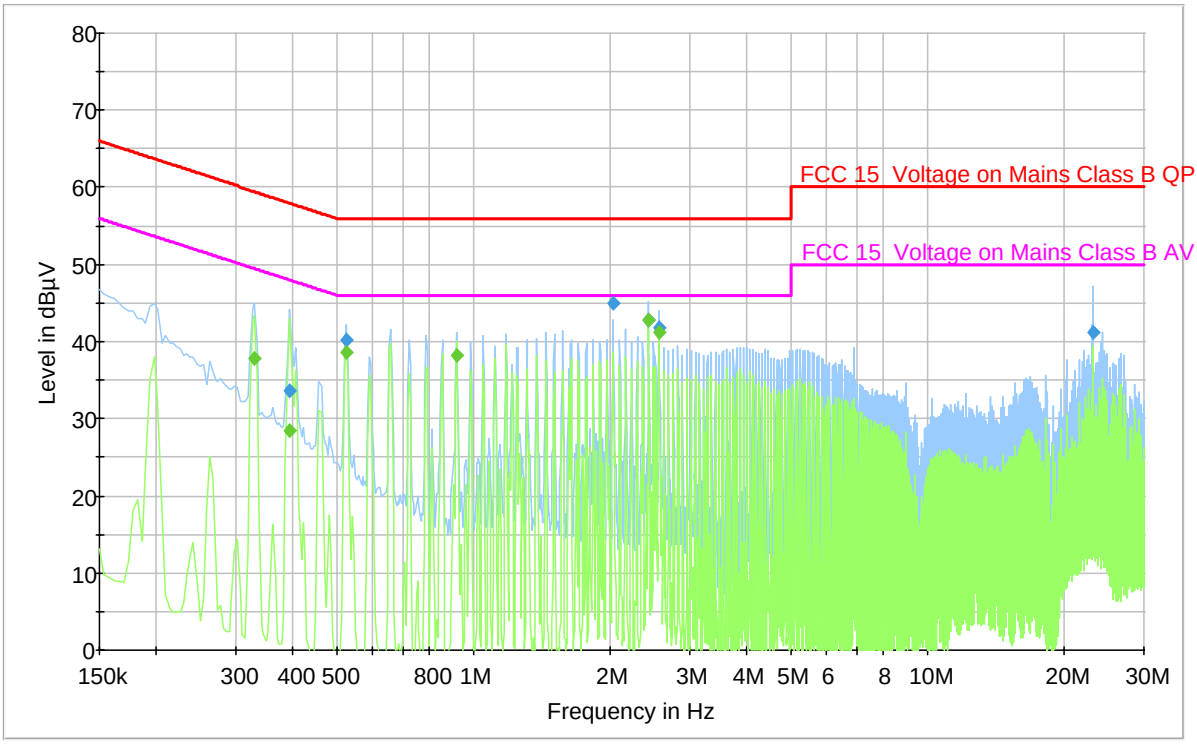
**The testing was performed by James Ma from 2007-05-08*

5.6 Summary of Test Results

According to the recorded data in following table, the EUT complied with the FCC standard's conducted emissions limits for Class B devices, with the *worst* margin reading of:

-3.2 dB at **2.4340000 MHz Line** conductor mode

120V/60 Hz Line:



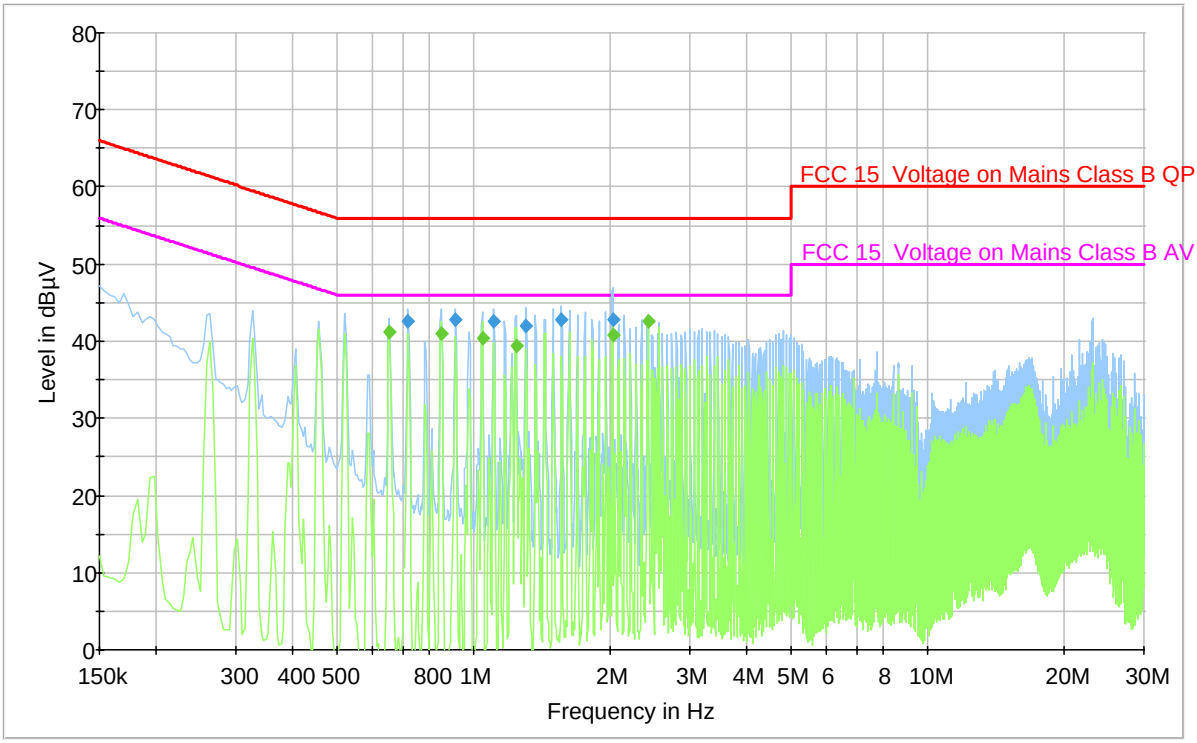
Final Measurement Quasi-Peak Detector

Frequency (MHz)	Quasi-Peak (dBµV)	Conductor (L/N)	Limit (dBµV)	Margin (dB)
2.030000	45.0	L	56.0	-11.0
2.434000	42.9	L	56.0	-13.1
2.566000	41.8	L	56.0	-14.2
0.526000	40.2	L	56.0	-15.8
23.130000	41.2	L	60.0	-18.8
0.394000	33.6	L	58.0	-24.3

Final Measurement Average Detector

Frequency (MHz)	Average (dBµV)	Conductor (L/N)	Limit (dBµV)	Margin (dB)
2.434000	42.8	L	46.0	-3.2
2.570000	41.2	L	46.0	-4.8
0.526000	38.6	L	46.0	-7.4
0.918000	38.3	L	46.0	-7.7
0.330000	37.8	L	49.5	-11.7
0.394000	28.4	L	48.0	-19.6

120V/60 Hz Neutral:



Final Measurement Quasi-Peak Detector

Frequency (MHz)	Quasi-Peak (dBµV)	Conductor (L/N)	Limit (dBµV)	Margin (dB)
1.566000	42.9	N	56.0	-13.1
0.914000	42.7	N	56.0	-13.3
2.026000	42.7	N	56.0	-13.3
0.718000	42.6	N	56.0	-13.4
1.110000	42.6	N	56.0	-13.4
1.306000	41.9	N	56.0	-14.1

Final Measurement Average Detector

Frequency (MHz)	Average (dBµV)	Conductor (L/N)	Limit (dBµV)	Margin (dB)
2.430000	42.6	N	46.0	-3.4
0.654000	41.2	N	46.0	-4.8
0.850000	40.9	N	46.0	-5.1
2.026000	40.7	N	46.0	-5.3
1.046000	40.3	N	46.0	-5.7
1.242000	39.4	N	46.0	-6.6

6 §15.247(b) - PEAK OUTPUT POWER MEASUREMENT

6.1 Applicable Standard

§15.247(b) the maximum peak output power of the intentional radiator shall not exceed the following:

§15.247(b) (3) For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

§15.247(b) (4) (i) Systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

6.2 Measurement Procedure

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to a spectrum analyzer.
3. Add a correction factor to the display.

6.3 Equipment Lists

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Spectrum Analyzer	E4446A	US44300386	2007-04-06

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

6.4 Environmental Conditions

Temperature:	22 °C
Relative Humidity:	56 %
ATM Pressure:	104.1 kPa

** The testing was performed by James Ma from 2007-05-08.*

6.5 Summary of Test Results

802.11b Mode:

Frequency (MHz)	Max Power (dBm)	Max Power (mW)	Limit (mW)	Result
912	25.20	331.13	1000	Compliant
917	25.20	331.13	1000	Compliant

802.11g Mode:

Frequency (MHz)	Max Power (dBm)	Max Power (mW)	Limit (mW)	Result
912	24.50	281.84	1000	Compliant
917	24.50	281.84	1000	Compliant

7 §15.109, §15.205, §15.209 & §15.247(c) - SPURIOUS RADIATED EMISSIONS

7.1 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 (micro volts/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 15.205(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	16.42 – 16.423	960 – 1240	4. 5 – 5. 15
0.495 – 0.505	16.69475 – 16.69525	1300 – 1427	5. 35 – 5. 46
2.1735 – 2.1905	25.5 – 25.67	1435 – 1626.5	7.25 – 7.75
4.125 – 4.128	37.5 – 38.25	1645.5 – 1646.5	8.025 – 8.5
4.17725 – 4.17775	73 – 74.6	1660 – 1710	9.0 – 9.2
4.20725 – 4.20775	74.8 – 75.2	1718.8 – 1722.2	9.3 – 9.5
6.215 – 6.218	108 – 121.94	2200 – 2300	10.6 – 12.7
6.26775 – 6.26825	123 – 138	2310 – 2390	13.25 – 13.4
6.31175 – 6.31225	149.9 – 150.05	2483.5 – 2500	14.47 – 14.5
8.291 – 8.294	156.52475 – 156.52525	2690 – 2900	15.35 – 16.2
8.362 – 8.366	156.7 – 156.9	3260 – 3267	17.7 – 21.4
8.37625 – 8.38675	162.0125 –167.17	3.332 – 3.339	22.01 – 23.12
8.41425 – 8.41475	167.72 – 173.2	3 3458 – 3 358	23.6 – 24.0
12.29 – 12.293	240 – 285	3.600 – 4.400	31.2 – 31.8
12.51975 – 12.52025	322 – 335.4		36.43 – 36.5
12.57675 – 12.57725	399.9 – 410		Above 38.6
13.36 – 13.41	608 – 614		

As Per 15.247(d),In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

7.2 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 limits.

7.3 EUT Setup

The radiated emissions tests were performed using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15C limits.

The spacing between the peripherals was 10 centimeters.

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

7.4 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Pre amplifier	8449B	3008A01978	2006-08-21
Agilent	Spectrum Analyzer	E4446A	US44300386	2007-04-06
A.R.A	Antenna Horn	DRG-118/A	1132	2006-08-17 (2 yrs)

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

7.5 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
(2) Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

7.6 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

7.7 Environmental Conditions

Temperature:	22 ° C
Relative Humidity:	56 %
ATM Pressure:	104.1 kPa

** The testing was performed by James Ma from 2007-05-08.*

7.8 Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247, and had the worst margin of:

802.11b mode

- **SECTOR PANEL ANTENNA RWA-80017 (17 dBd)**

  -5.27 dB at **3646.705 MHz** in the **Vertical** polarization for Low Channel, 1GHz – 10GHz

  -0.48 dB at **1844.978 MHz** in the **Vertical** polarization for High Channel, 1GHz – 10GHz

- **OMNI- DIRECTIONAL ANTENNA (10 dBd)**

  -5.29 dB at **3650.366 MHz** in the **Vertical** polarization for Low Channel, 1GHz – 10GHz

  -5.31 dB at **3667.721 MHz** in the **Vertical** polarization for High Channel, 1GHz – 10GHz

- **MTI FLAT PANEL DIRECTIONAL ANTENNA (12.5 dBi)**

  -5.33 dB at **3649.322 MHz** in the **Vertical** polarization for Low Channel, 1GHz – 10GHz

  -5.33 dB at **3667.664 MHz** in the **Horizontal** polarization for High Channel, 1GHz – 10GHz

802.11g mode

- **SECTOR PANEL ANTENNA RWA-80017 (17 dBd)**

  -5.0 dB at **3692.14 MHz** in the **Vertical** polarization for Low Channel, 1GHz – 10GHz

  -0.78 dB at **3689.333 MHz** in the **Vertical** polarization for High Channel, 1GHz – 10GHz

- **OMNI- DIRECTIONAL ANTENNA (10 dBd)**

  -7.15 dB at **3649.958 MHz** in the **Vertical** polarization for Low Channel, 1GHz – 10GHz

  -0.94 dB at **1833.878 MHz** in the **Vertical** polarization for High Channel, 1GHz – 10GHz

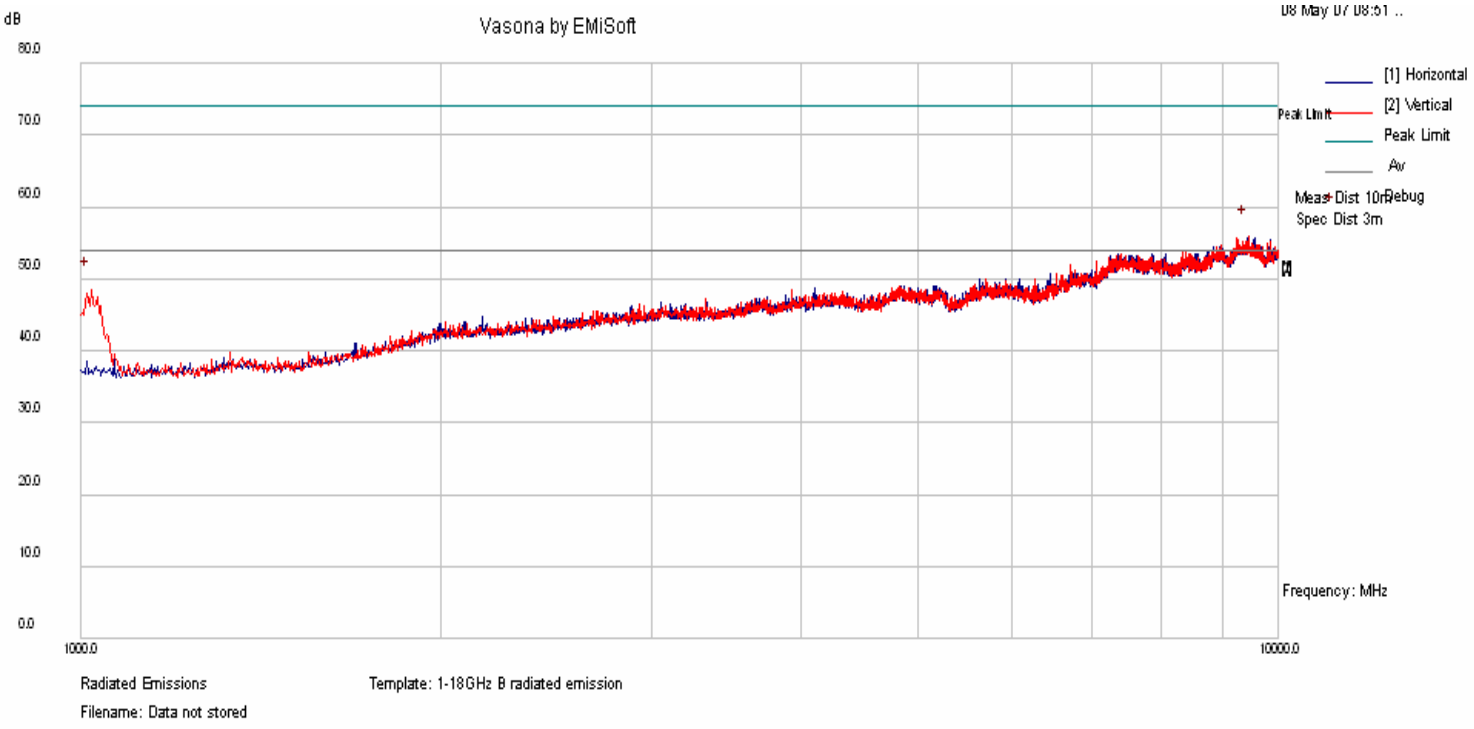
- **MTI FLAT PANEL DIRECTIONAL ANTENNA (12.5 dBi)**

  -0.39 dB at **2738.181 MHz** in the **Horizontal** polarization for Low Channel, 1GHz – 10GHz

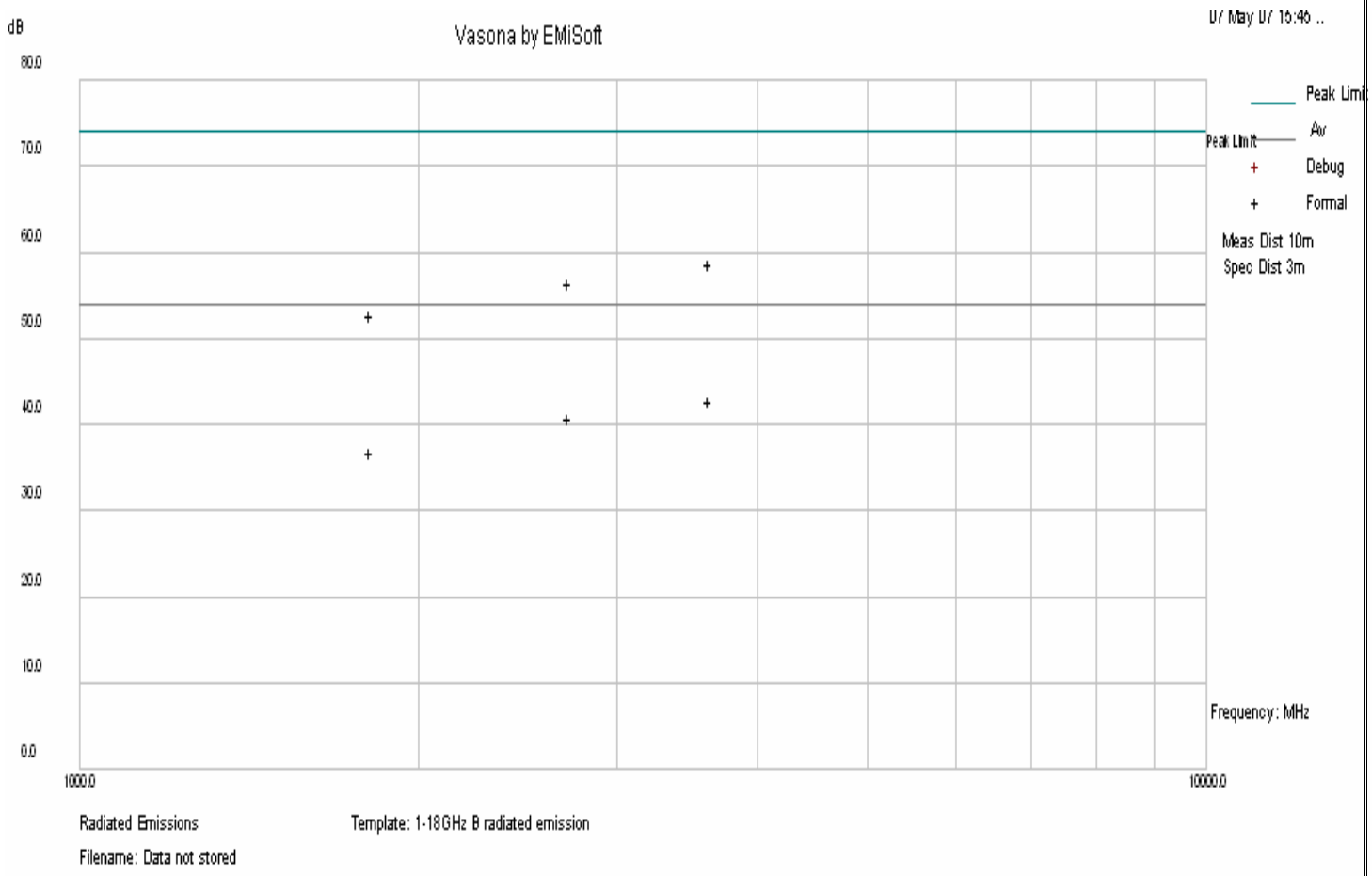
  -0.32 dB at **3694.947 MHz** in the **Vertical** polarization for High Channel, 1GHz – 10GHz

802.11b: 912 - 917 MHz

SECTOR PANEL ANTENNA RWA-80017 (17 dBd)
ERIP limit = 36 dBm; b - Mode
Low Channel = 912 MHz (25.2 dBm)
Measured at 10 meter

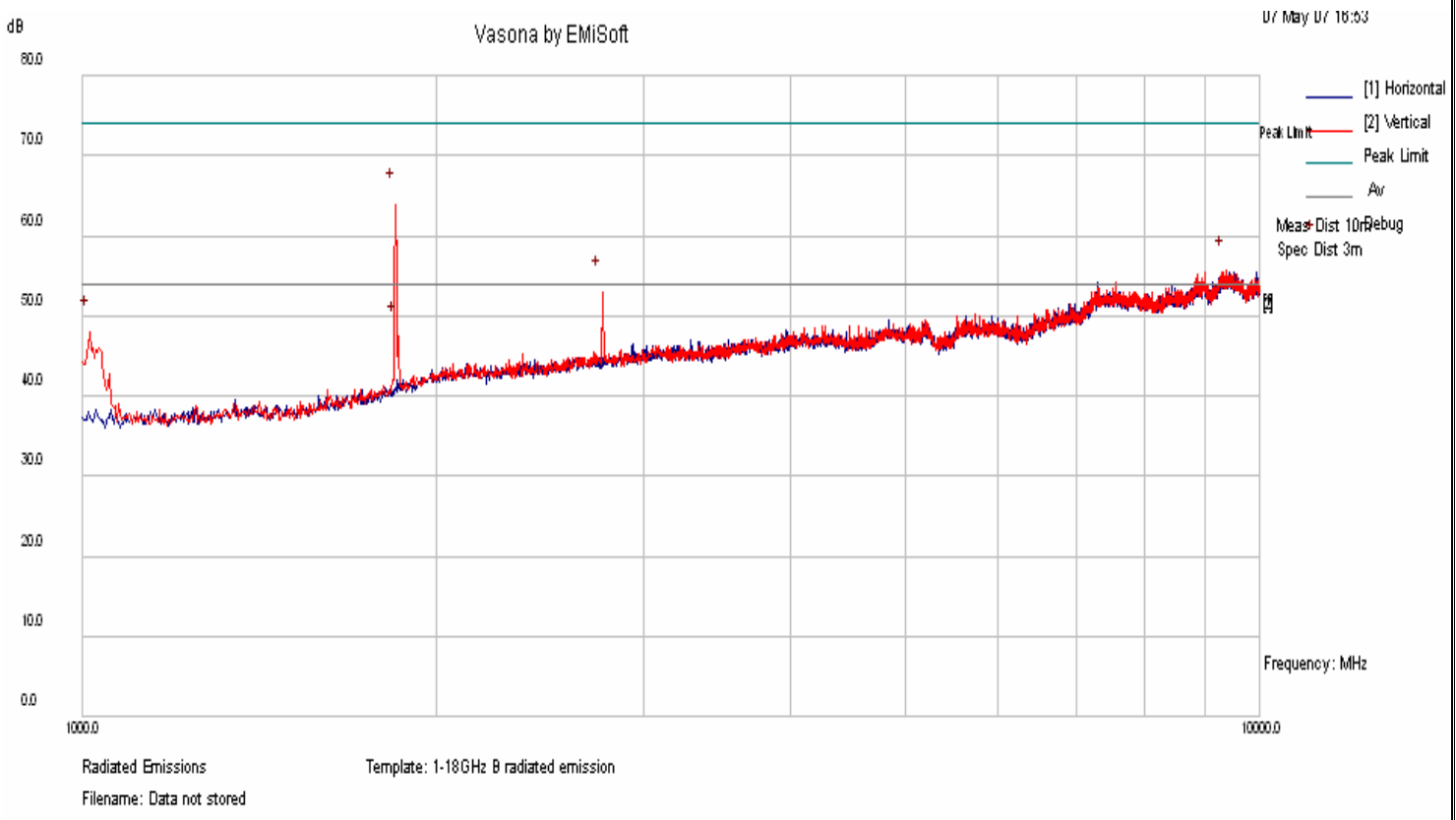


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
9455.396	26.71	11.67	17.55	55.92	10	Peak [Scan]	V	300	0	74	-8.08	Pass
1019.651	40.71	3.84	4.05	48.59	10	Peak [Scan]	V	100	0	74	-15.41	Pass

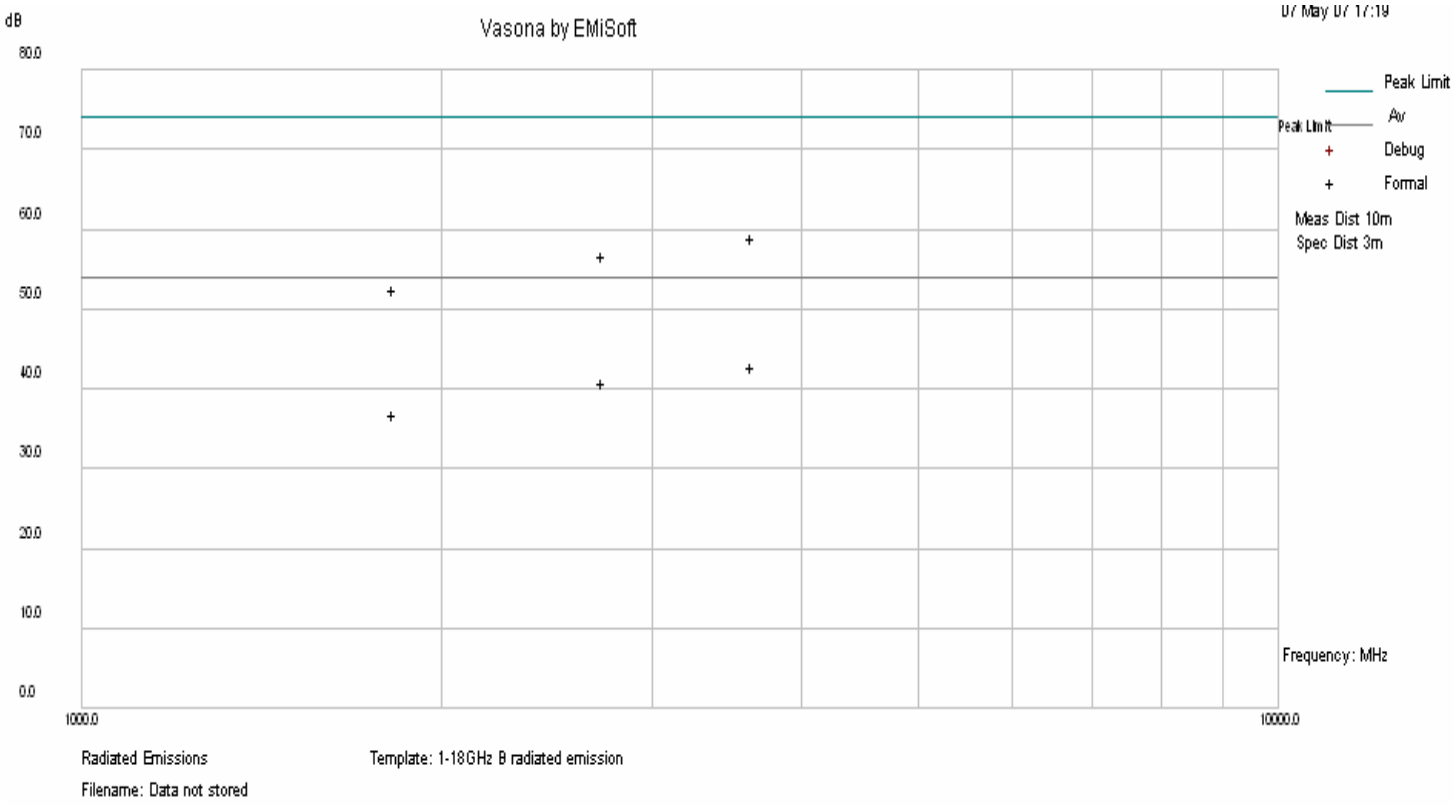


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
3646.705	25.01	7.01	6.71	38.73	10	Average Max	V	221	28	54	-5.27	Pass
2735.848	25.48	6.06	5.05	36.59	10	Average Max	H	400	0	54	-7.41	Pass
3646.705	40.92	7.01	6.71	54.64	10	Peak Max	V	221	28	74	-9.36	Pass
1826.263	24.98	4.86	2.91	32.75	10	Average Max	V	178	59	54	-11.25	Pass
2735.848	41.3	6.06	5.05	52.4	10	Peak Max	V	143	90	74	-11.6	Pass
1826.263	40.76	4.86	2.91	48.53	10	Peak Max	H	189	262	74	-15.47	Pass

SECTOR PANEL ANTENNA RWA-80017 (17 dBd)
ERIP limit = 36 dBm; b - Mode
High Channel = 917 MHz (25.2 dBm)
Measured at 10 meter

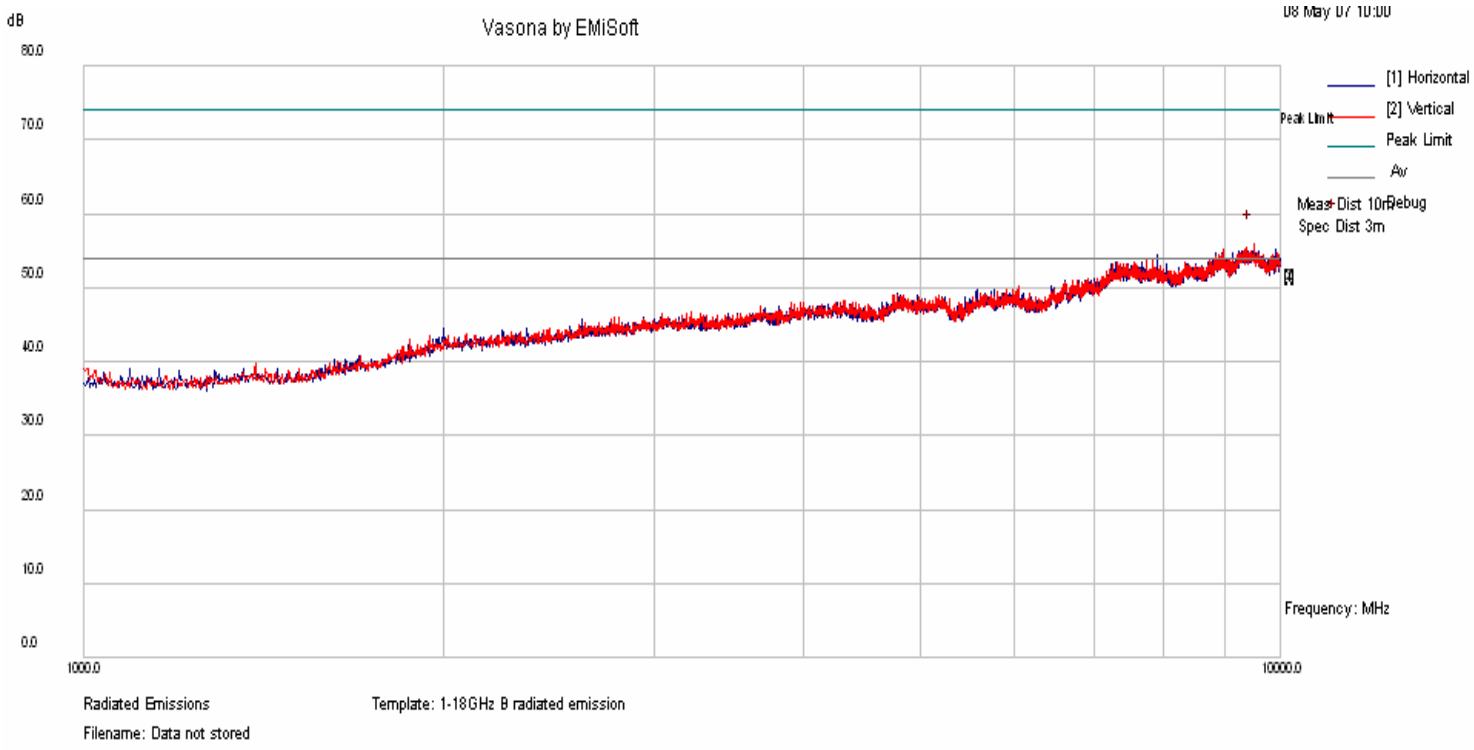


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1844.978	55.97	4.88	3.07	63.52	10	Peak [Scan]	V	100	0	74	-0.48	Pass
9376.794	26.42	11.62	17.64	55.67	10	Peak [Scan]	V	100	0	74	-8.33	Pass
2762.944	41.84	6.09	5.12	53.05	10	Peak [Scan]	V	100	0	74	-10.95	Pass
1014.036	40.18	3.83	4.08	48.09	10	Peak [Scan]	V	100	0	74	-15.91	Pass
1853.4	39.33	4.89	3.14	47.37	10	Peak [Scan]	V	100	0	74	-16.63	Pass

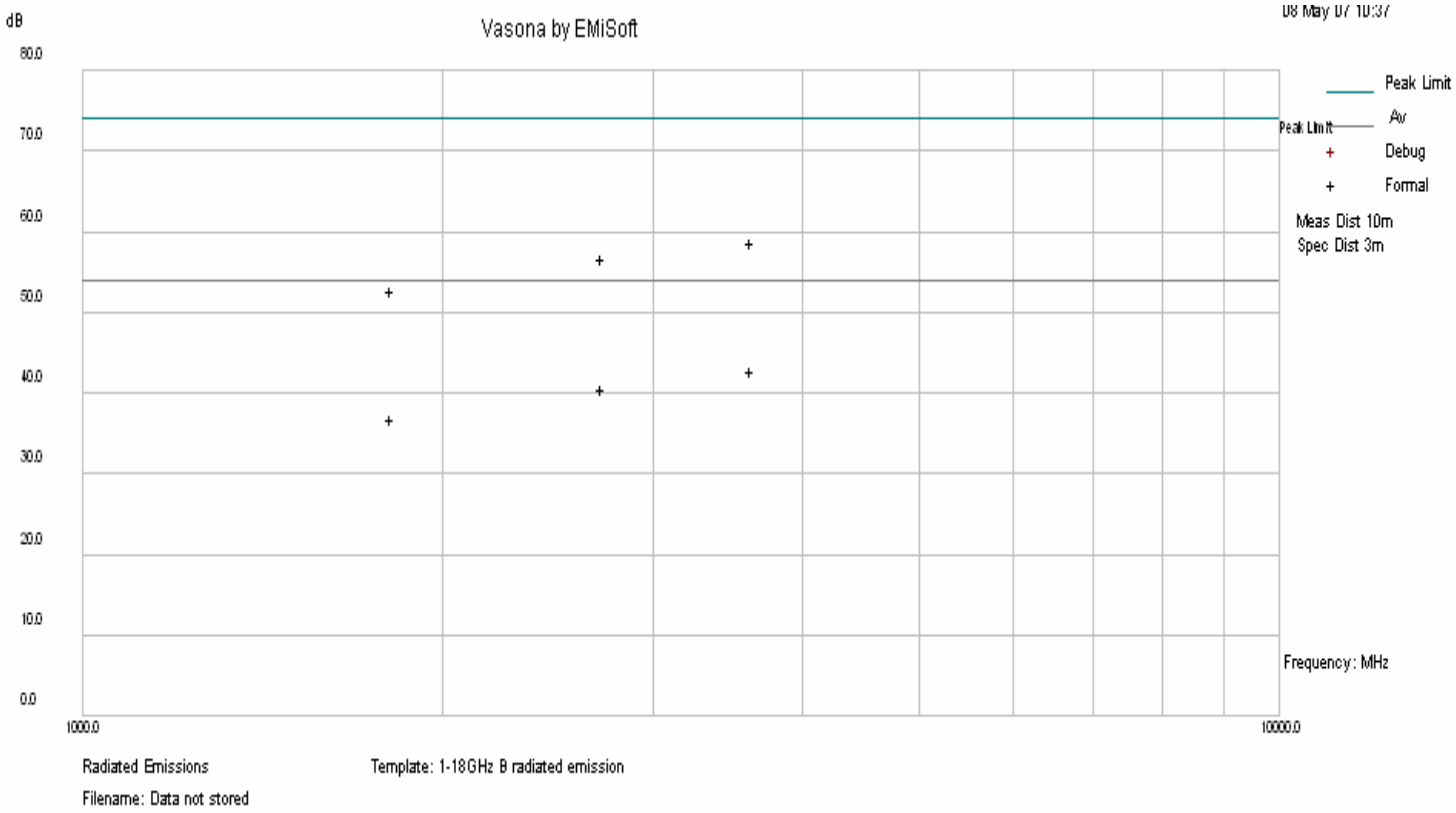


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
3667.059	24.93	7.03	6.81	38.77	10	Average Max	H	287	145	54	-5.23	Pass
2747.587	25.48	6.08	5.08	36.63	10	Average Max	H	138	115	54	-7.37	Pass
3667.059	41.02	7.03	6.81	54.85	10	Peak Max	V	195	-3	74	-9.15	Pass
1835.008	24.93	4.87	2.99	32.79	10	Average Max	V	149	244	54	-11.21	Pass
2747.587	41.38	6.08	5.08	52.54	10	Peak Max	H	138	115	74	-11.46	Pass
1835.008	40.59	4.87	2.99	48.44	10	Peak Max	H	144	155	74	-15.56	Pass

OMNI- DIRECTIONAL ANTENNA (10 dBd)
ERIP limit = 36 dBm; b - Mode
Low Channel = 912 MHz (25.2 dBm)
Measured at 10 meter

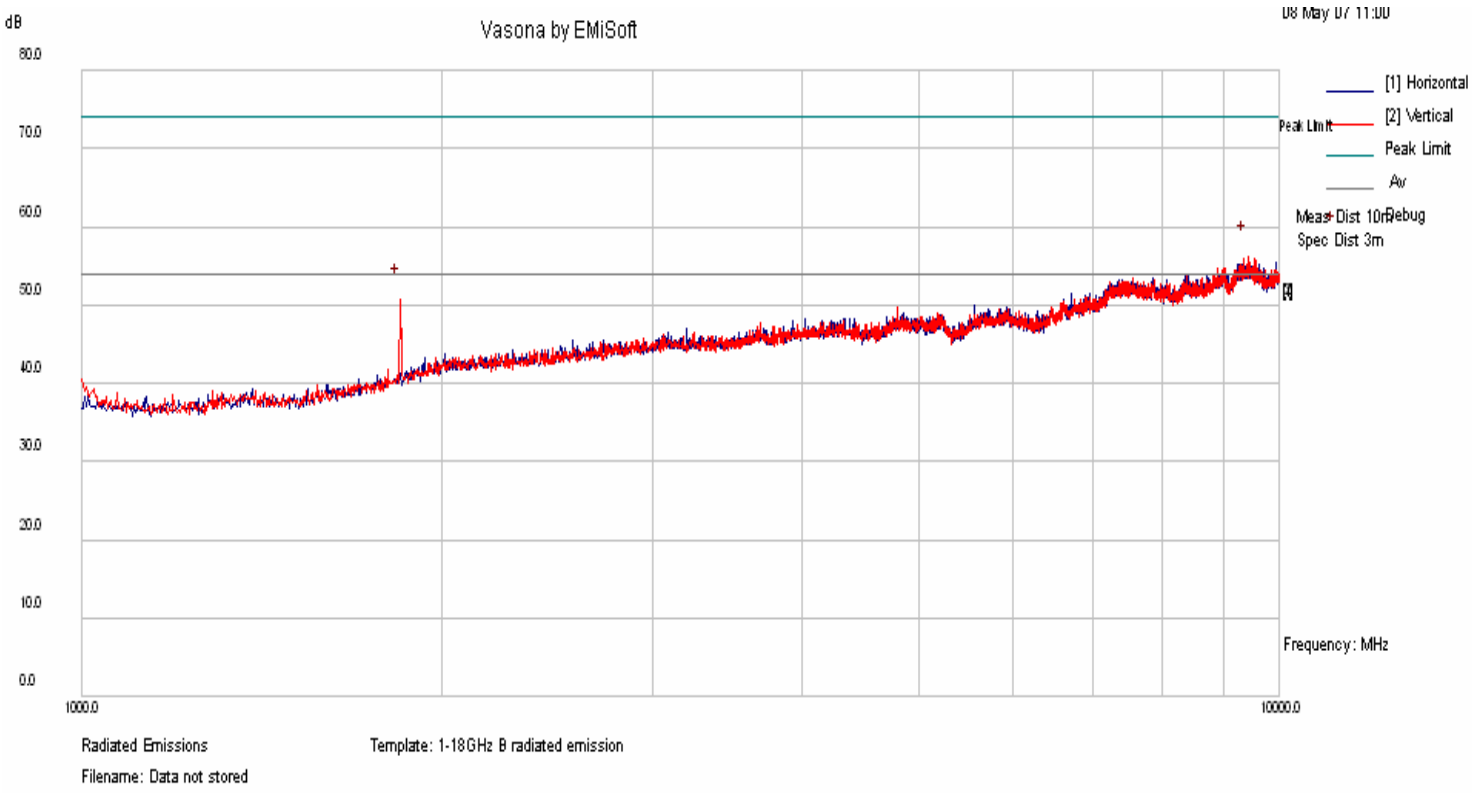


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
9519.963	26.74	11.71	17.51	55.96	10	Peak [Scan]	V	100	0	74	-8.04	Pass

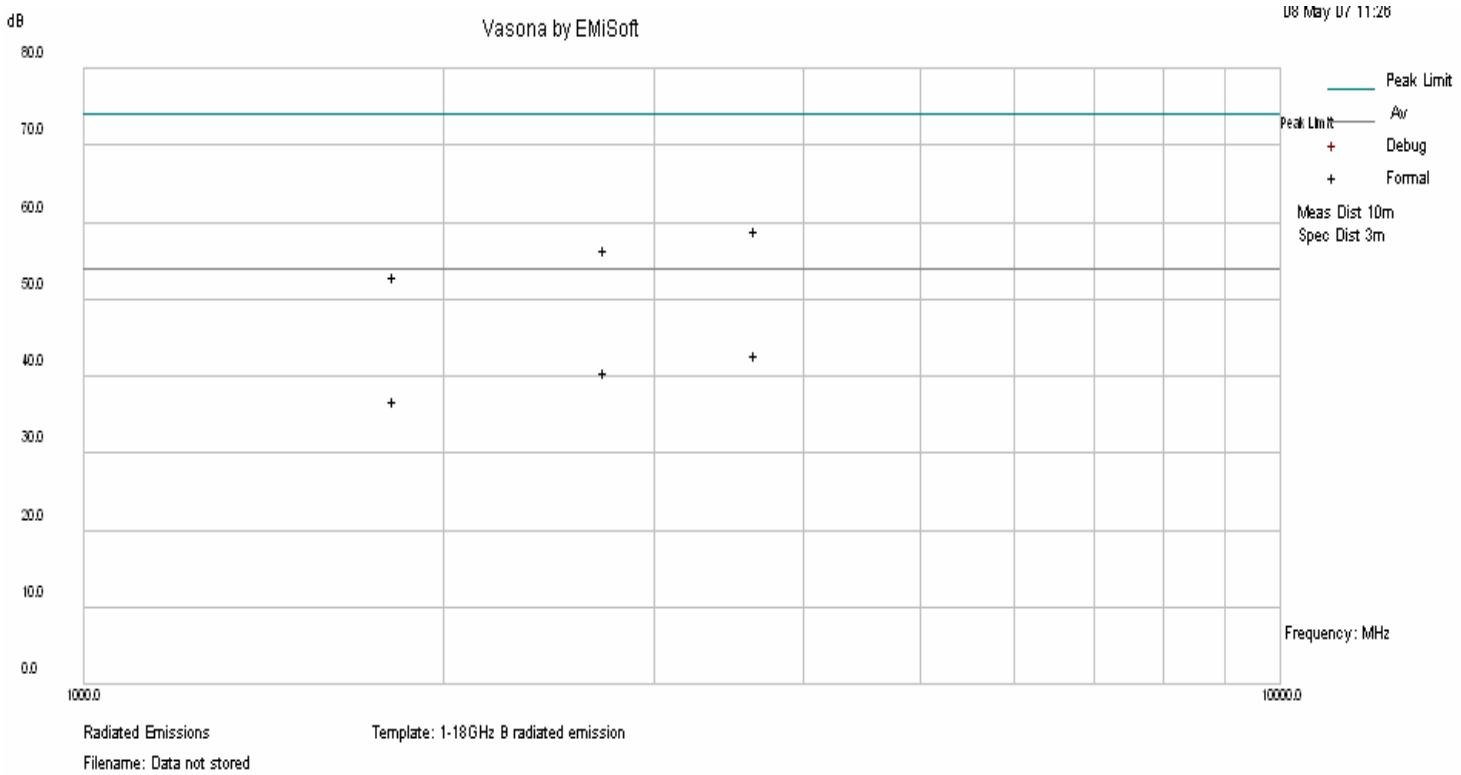


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
3650.366	24.97	7.01	6.73	38.71	10	Average Max	V	170	7	54	-5.29	Pass
2736.187	25.36	6.06	5.05	36.47	10	Average Max	V	369	78	54	-7.53	Pass
3650.366	40.75	7.01	6.73	54.49	10	Peak Max	H	215	313	74	-9.51	Pass
2736.187	41.56	6.06	5.05	52.67	10	Peak Max	V	369	78	74	-11.33	Pass
1824.869	24.85	4.85	2.9	32.6	10	Average Max	V	342	254	54	-11.4	Pass
1824.869	40.84	4.85	2.9	48.6	10	Peak Max	V	342	254	74	-15.4	Pass

OMNI- DIRECTIONAL ANTENNA (10 dBd)
ERIP limit = 36 dBm; b - Mode
Low Channel = 917 MHz (25.2 dBm)
Measured at 10 meter

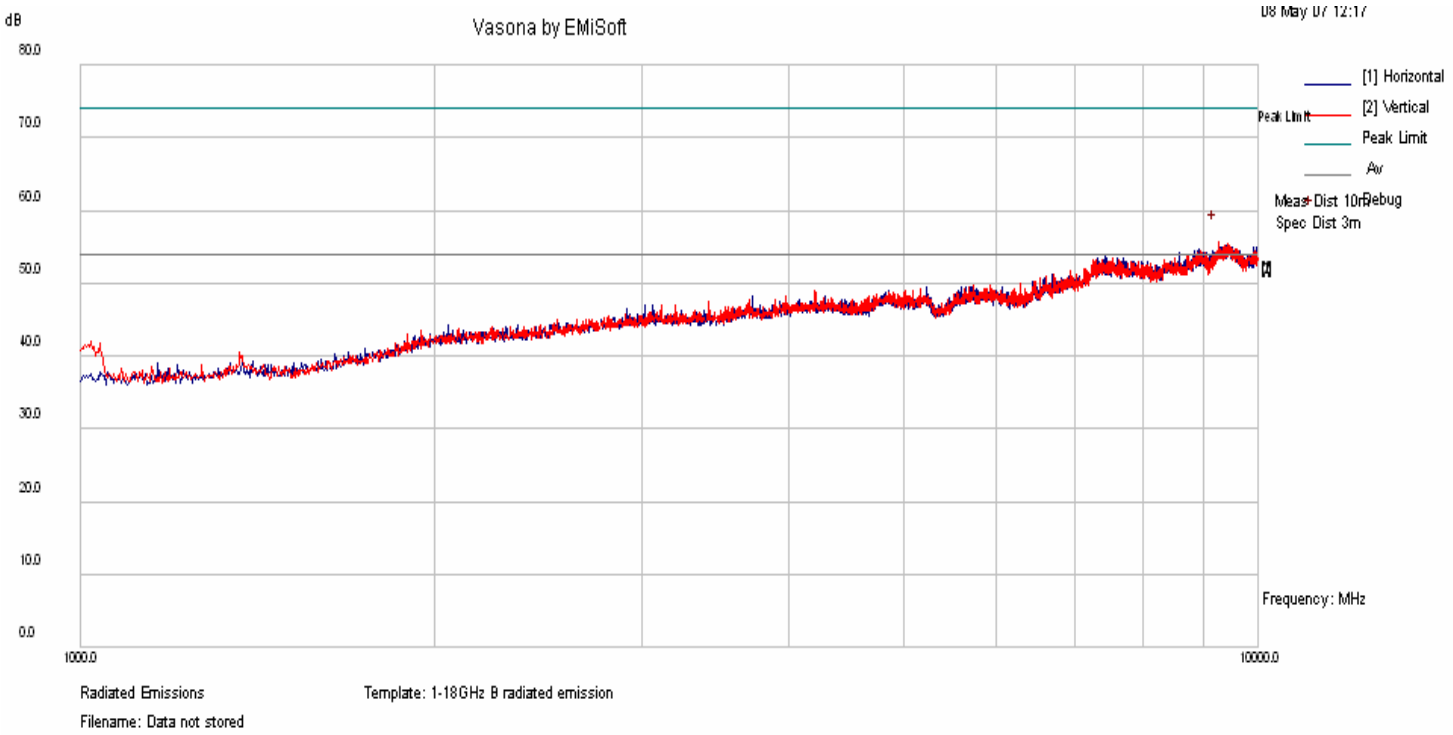


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
9430.131	26.95	11.65	17.58	56.18	10	Peak [Scan]	V	200	0	74	-7.82	Pass
1844.978	42.84	4.88	3.07	50.79	10	Peak [Scan]	V	300	0	74	-13.21	Pass

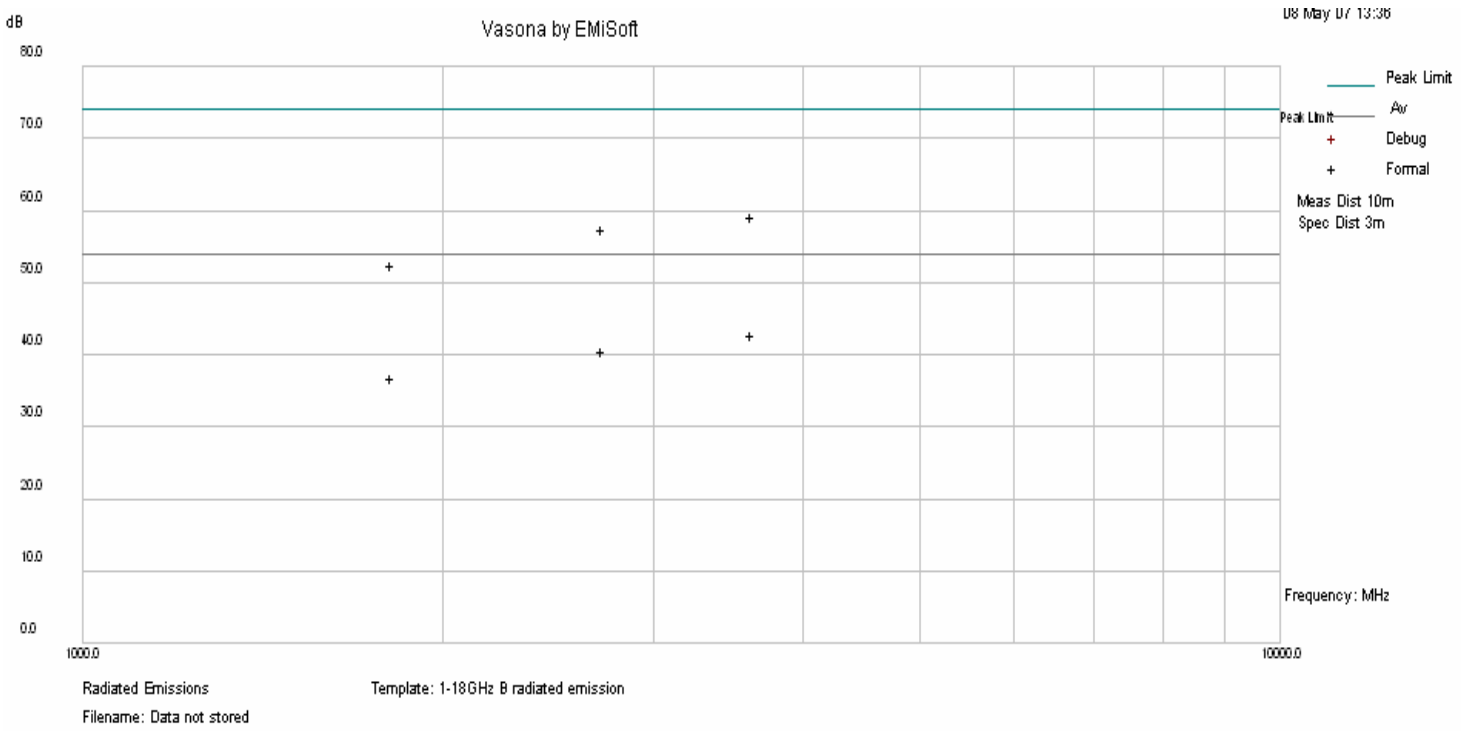


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
3667.721	24.85	7.03	6.81	38.69	10	Average Max	V	350	347	54	-5.31	Pass
2751.332	25.36	6.08	5.09	36.53	10	Average Max	H	189	143	54	-7.47	Pass
3667.721	41.02	7.03	6.81	54.85	10	Peak Max	H	286	317	74	-9.15	Pass
1831.293	24.87	4.86	2.96	32.69	10	Average Max	H	360	174	54	-11.31	Pass
2751.332	41.28	6.08	5.09	52.45	10	Peak Max	V	251	207	74	-11.55	Pass
1831.293	41.08	4.86	2.96	48.9	10	Peak Max	H	360	174	74	-15.1	Pass

MTI FLAT PANEL DIRECTIONAL ANTENNA (12.5 dBi)
ERIP limit = 36 dBm; b - Mode
Low Channel = 912 MHz (25.2 dBm)
Measured at 10 meter

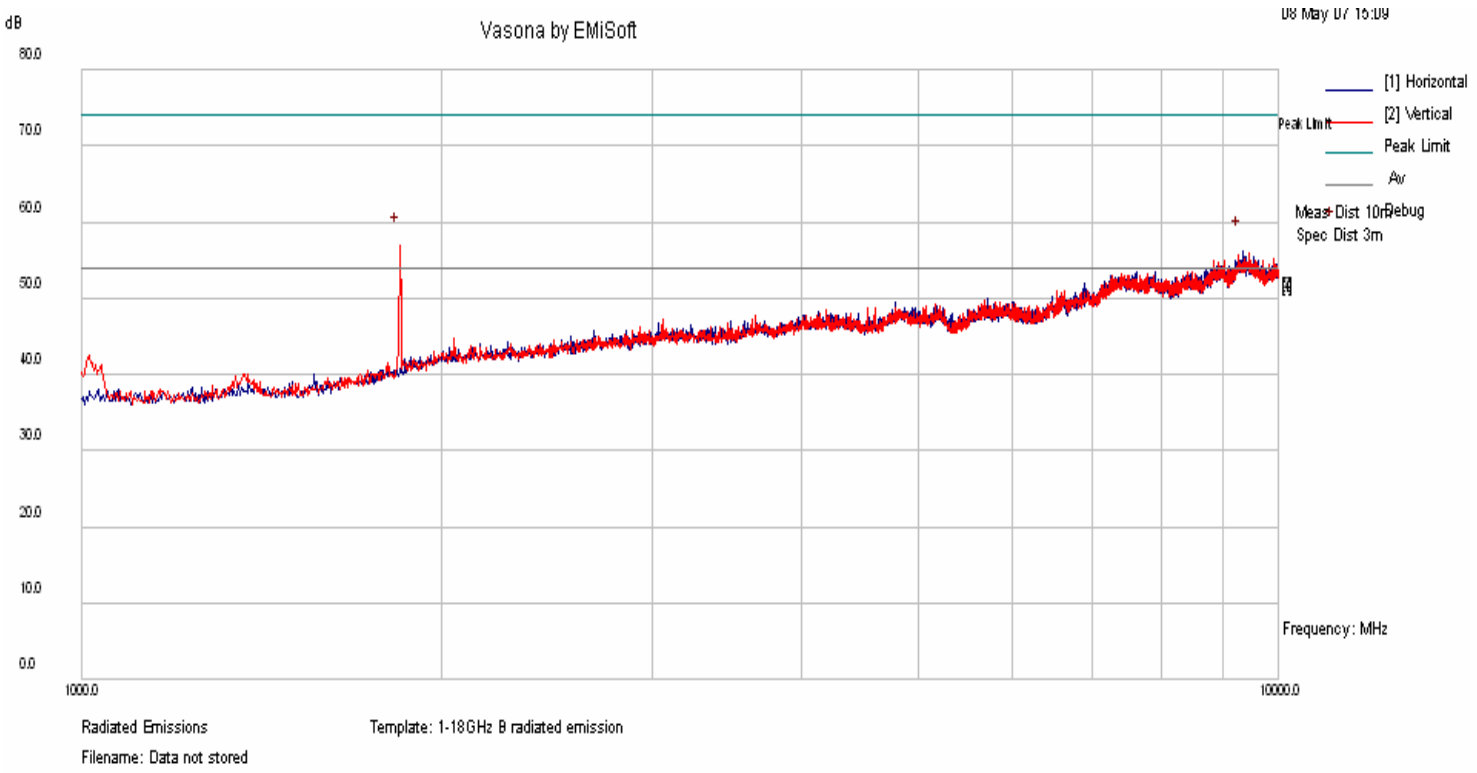


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
9264.504	26.32	11.54	17.77	55.63	10	Peak [Scan]	V	200	0	74	-8.37	Pass

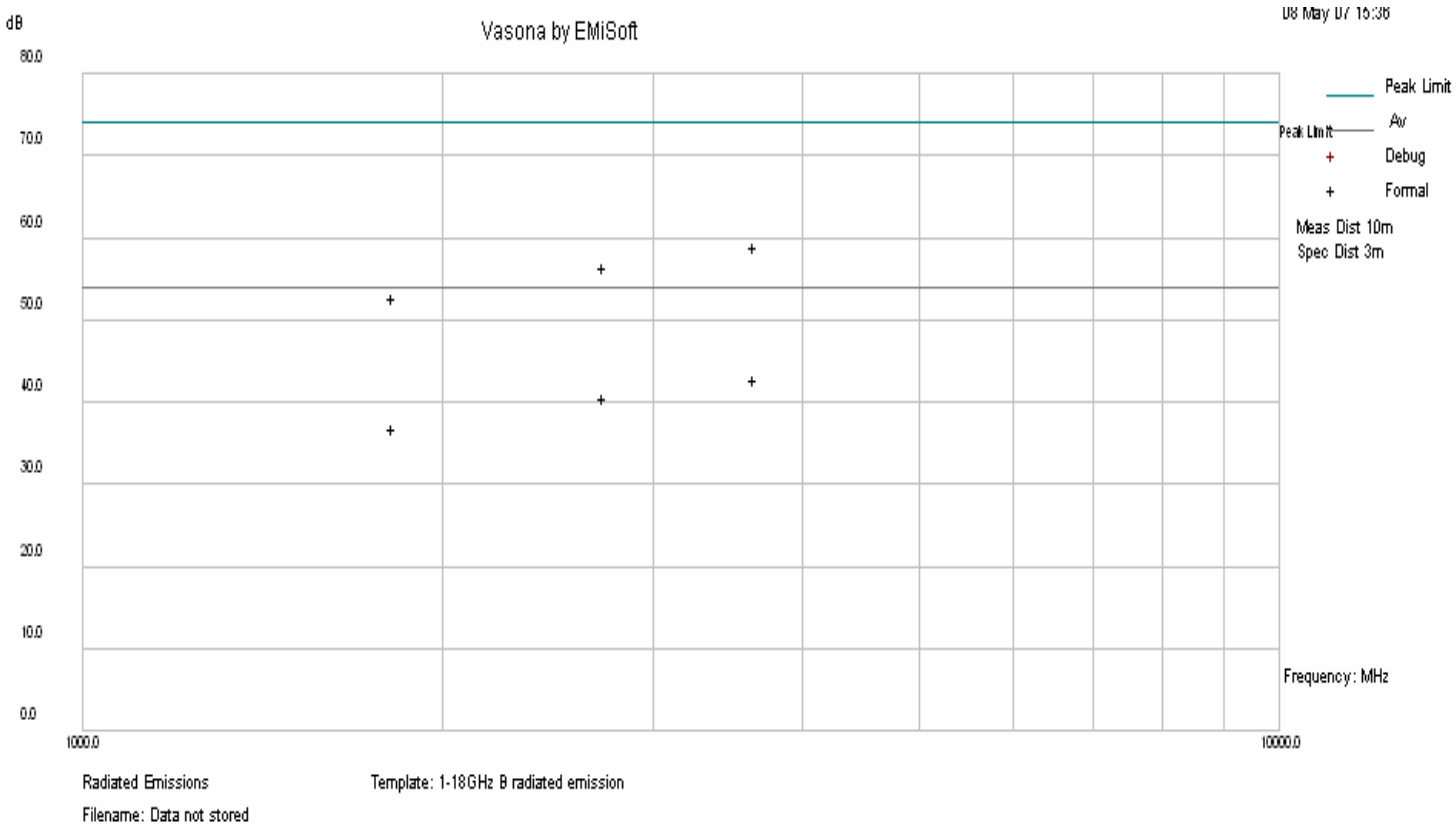


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
3649.322	24.94	7.01	6.73	38.67	10	Average Max	V	384	323	54	-5.33	Pass
2737.11	25.35	6.06	5.05	36.46	10	Average Max	V	99	316	54	-7.54	Pass
3649.322	41.44	7.01	6.73	55.18	10	Peak Max	V	384	323	74	-8.82	Pass
2737.11	42.17	6.06	5.05	53.29	10	Peak Max	H	181	218	74	-10.71	Pass
1823.748	24.93	4.85	2.89	32.67	10	Average Max	H	198	40	54	-11.33	Pass
1823.748	40.64	4.85	2.89	48.38	10	Peak Max	H	198	40	74	-15.62	Pass

MTI FLAT PANEL DIRECTIONAL ANTENNA (12.5 dBi)
ERIP limit = 36 dBm; b - Mode
Low Channel = 917 MHz (25.2 dBm)
Measured at 10 meter



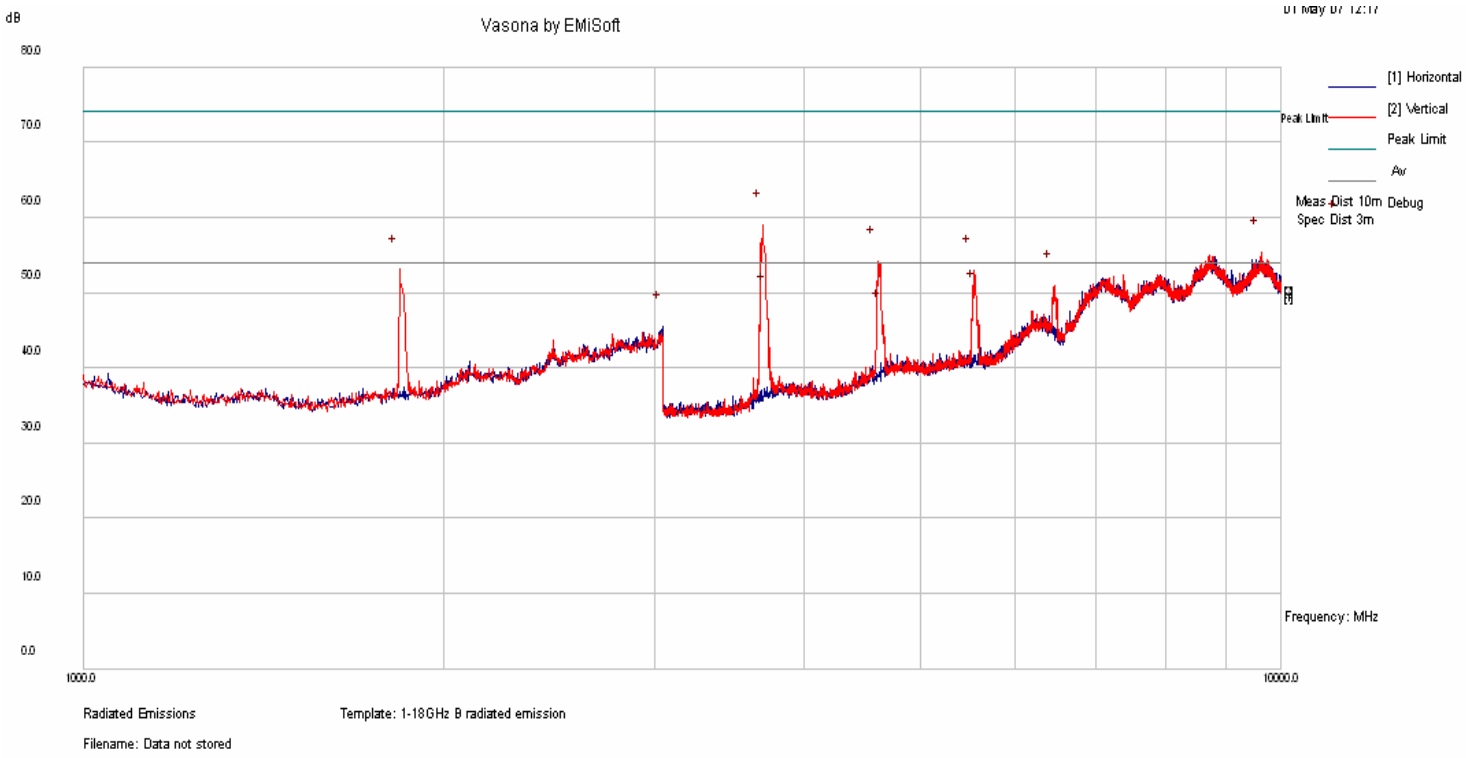
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1844.978	48.87	4.88	3.07	56.82	10	Peak [Scan]	V	300	0	74	-7.18	Pass
9340.299	27.03	11.59	17.68	56.31	10	Peak [Scan]	H	200	0	74	-7.69	Pass



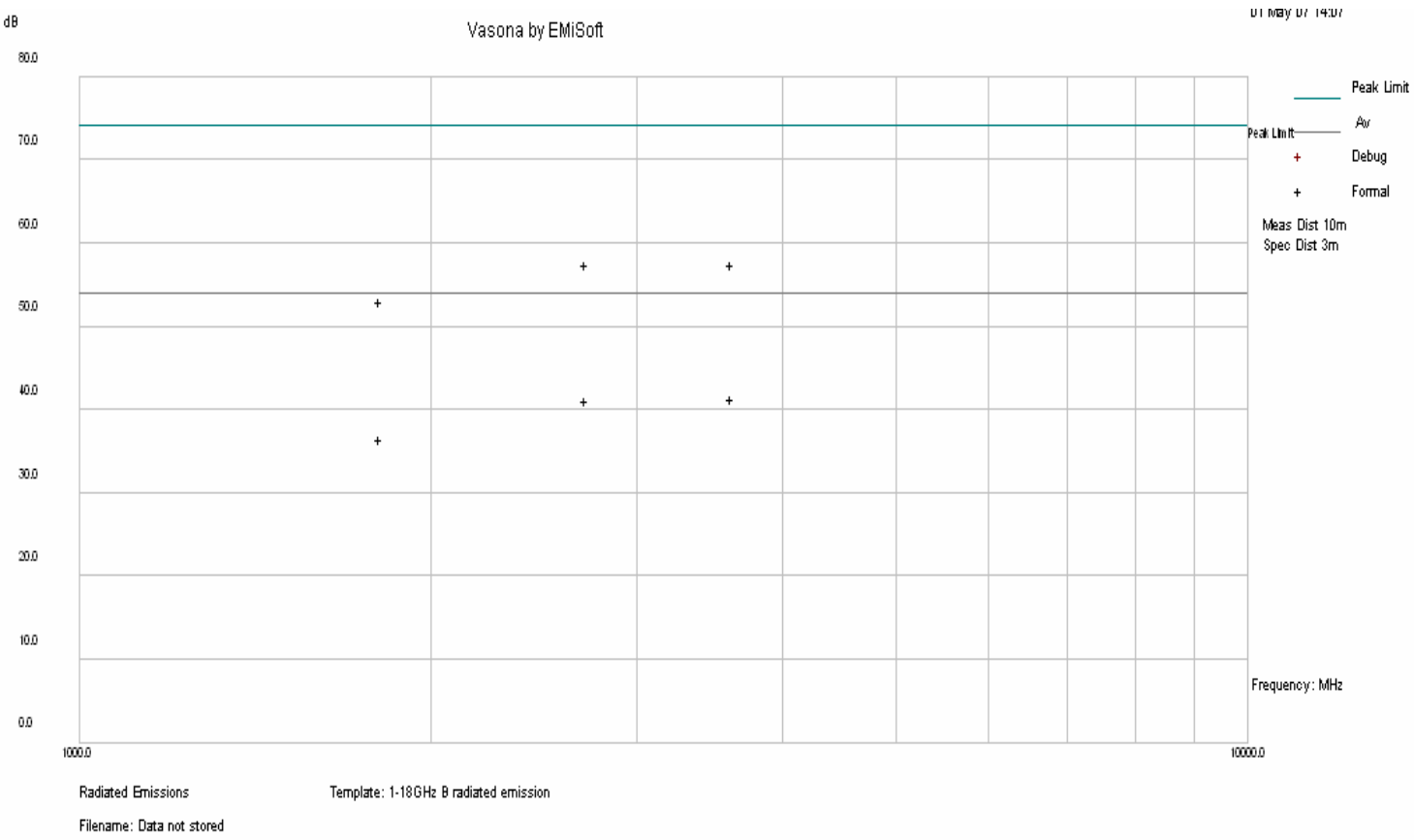
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
3667.664	24.83	7.03	6.81	38.67	10	Average Max	H	265	269	54	-5.33	Pass
2751.292	25.37	6.08	5.09	36.54	10	Average Max	V	245	124	54	-7.46	Pass
3667.664	40.9	7.03	6.81	54.74	10	Peak Max	V	259	39	74	-9.26	Pass
1832.438	24.86	4.86	2.97	32.69	10	Average Max	H	285	363	54	-11.31	Pass
2751.292	41.25	6.08	5.09	52.41	10	Peak Max	H	217	306	74	-11.59	Pass
1832.438	40.89	4.86	2.97	48.72	10	Peak Max	H	285	363	74	-15.28	Pass

802.11g: 912 - 917 MHz

SECTOR PANEL ANTENNA RWA-80017 (17 dBd)
ERIP limit = 36 dBm; g Mode - Channel BW = 20 MHz
Low Channel = 912 MHz (24.5 dBm)
Measured at 10 meter

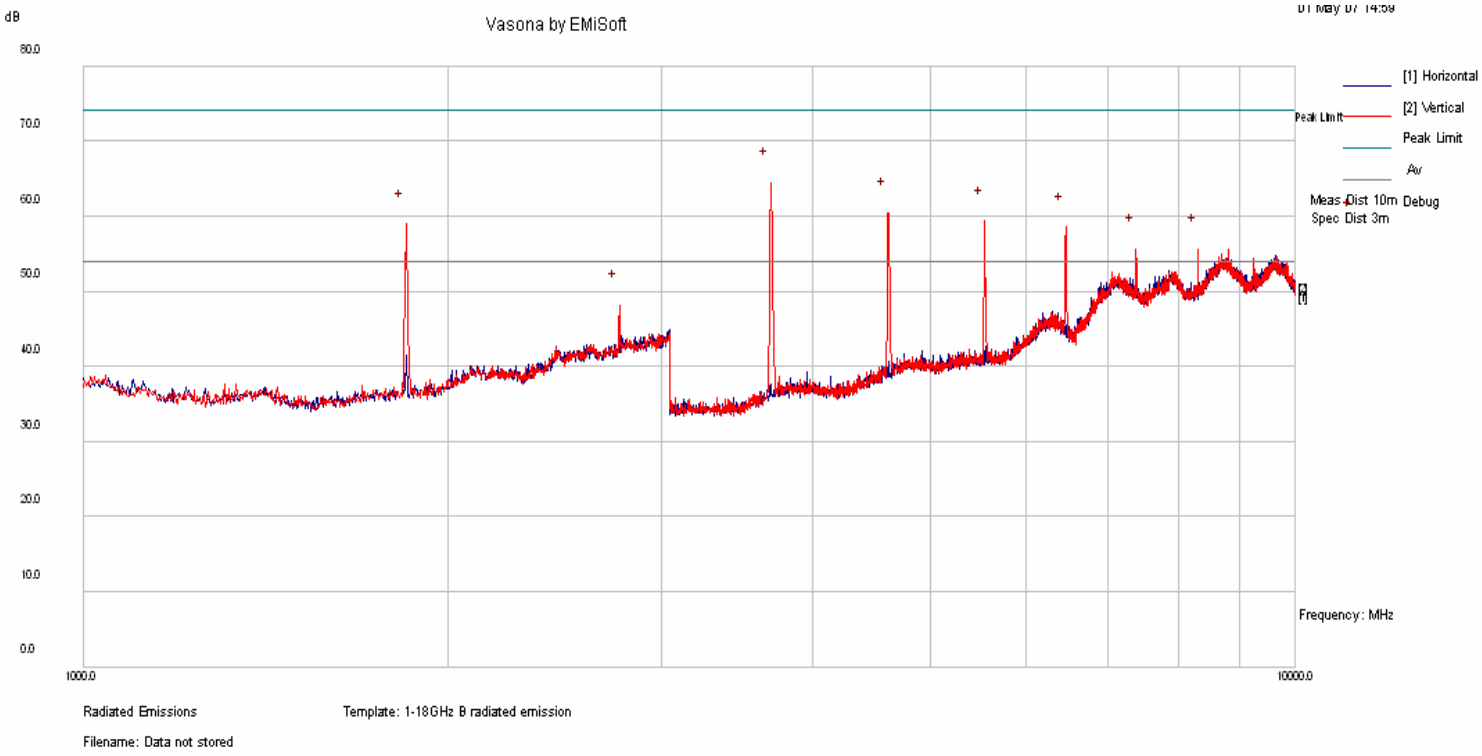


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
3692.14	45.02	7.05	6.92	59	10	Peak [Scan]	V	100	0	74	-5	Pass
9618.216	25.98	11.78	17.57	55.32	10	Peak [Scan]	V	400	0	74	-8.68	Pass
4604.492	36.5	7.97	9.72	54.18	10	Peak [Scan]	V	100	0	74	-9.82	Pass
1836.556	45.2	4.87	3	53.07	10	Peak [Scan]	V	100	0	74	-10.93	Pass
5530.88	32.4	8.72	11.78	52.9	10	Peak [Scan]	V	100	0	74	-11.1	Pass
6465.689	27.3	9.5	14.16	50.96	10	Peak [Scan]	V	100	0	74	-13.04	Pass
5572.988	27.63	8.76	11.89	48.27	10	Peak [Scan]	V	100	0	74	-15.73	Pass
3725.827	33.69	7.09	7.07	47.85	10	Peak [Scan]	V	100	0	74	-16.15	Pass
4649.407	27.73	8.01	9.93	45.66	10	Peak [Scan]	V	100	0	74	-18.34	Pass
3046.475	33.26	6.4	5.76	45.42	10	Peak [Scan]	H	200	0	74	-18.58	Pass

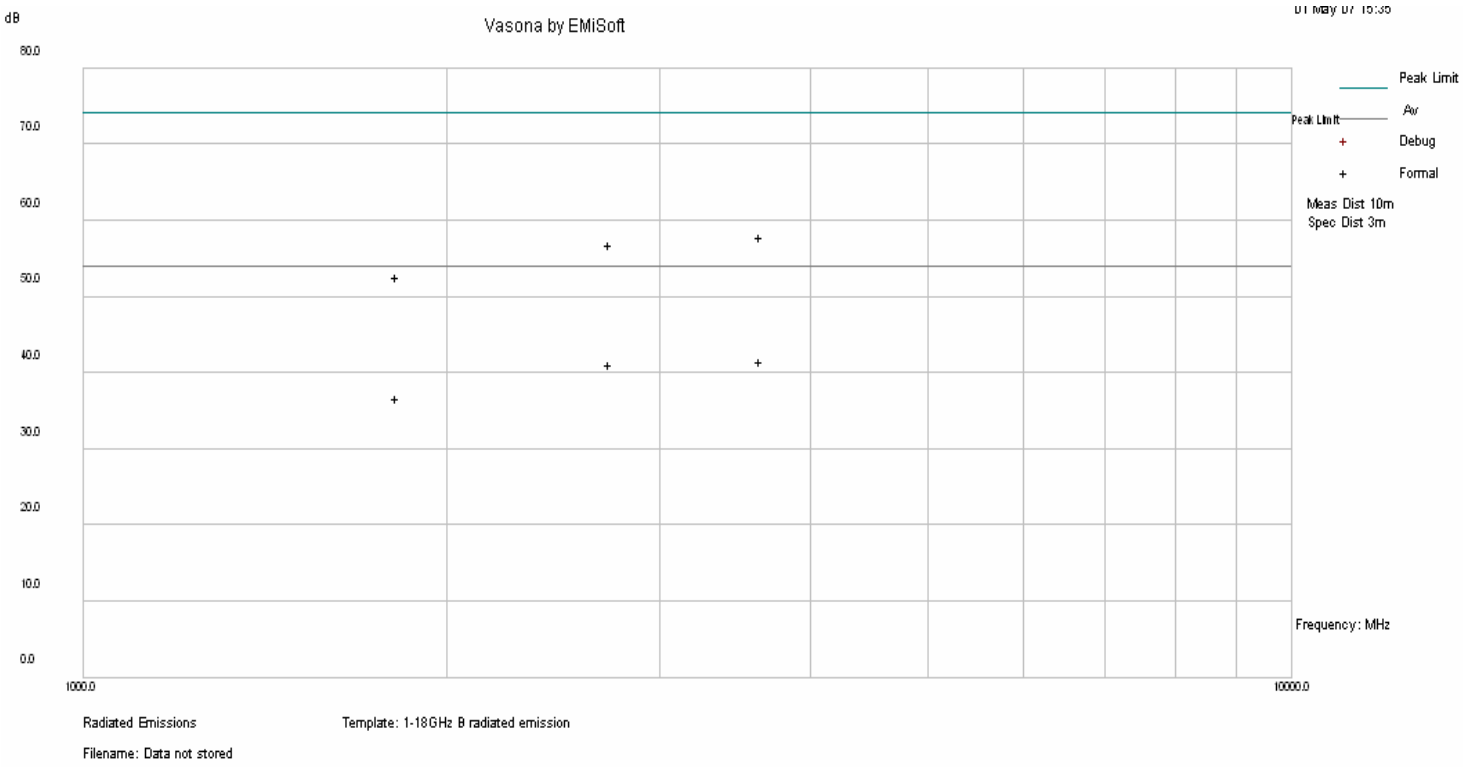


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
3649.697	23.12	7.01	6.73	36.86	10	Average Max	V	247	35	54	-7.14	Pass
2739.211	25.5	6.07	5.05	36.62	10	Average Max	V	199	341	54	-7.38	Pass
2739.211	41.9	6.07	5.05	53.02	10	Peak Max	V	199	341	74	-10.98	Pass
3649.697	39.15	7.01	6.73	52.89	10	Peak Max	H	299	337	74	-11.11	Pass
1823.973	24.3	4.85	2.89	32.05	10	Average Max	H	364	-2	54	-11.95	Pass
1823.973	40.74	4.85	2.89	48.48	10	Peak Max	V	201	243	74	-15.52	Pass

SECTOR PANEL ANTENNA RWA-80017 (17 dBd)
ERIP limit = 36 dBm; g Mode - Channel BW = 20 MHz
Low Channel = 917 MHz (24.5 dBm)
Measured at 10 meter

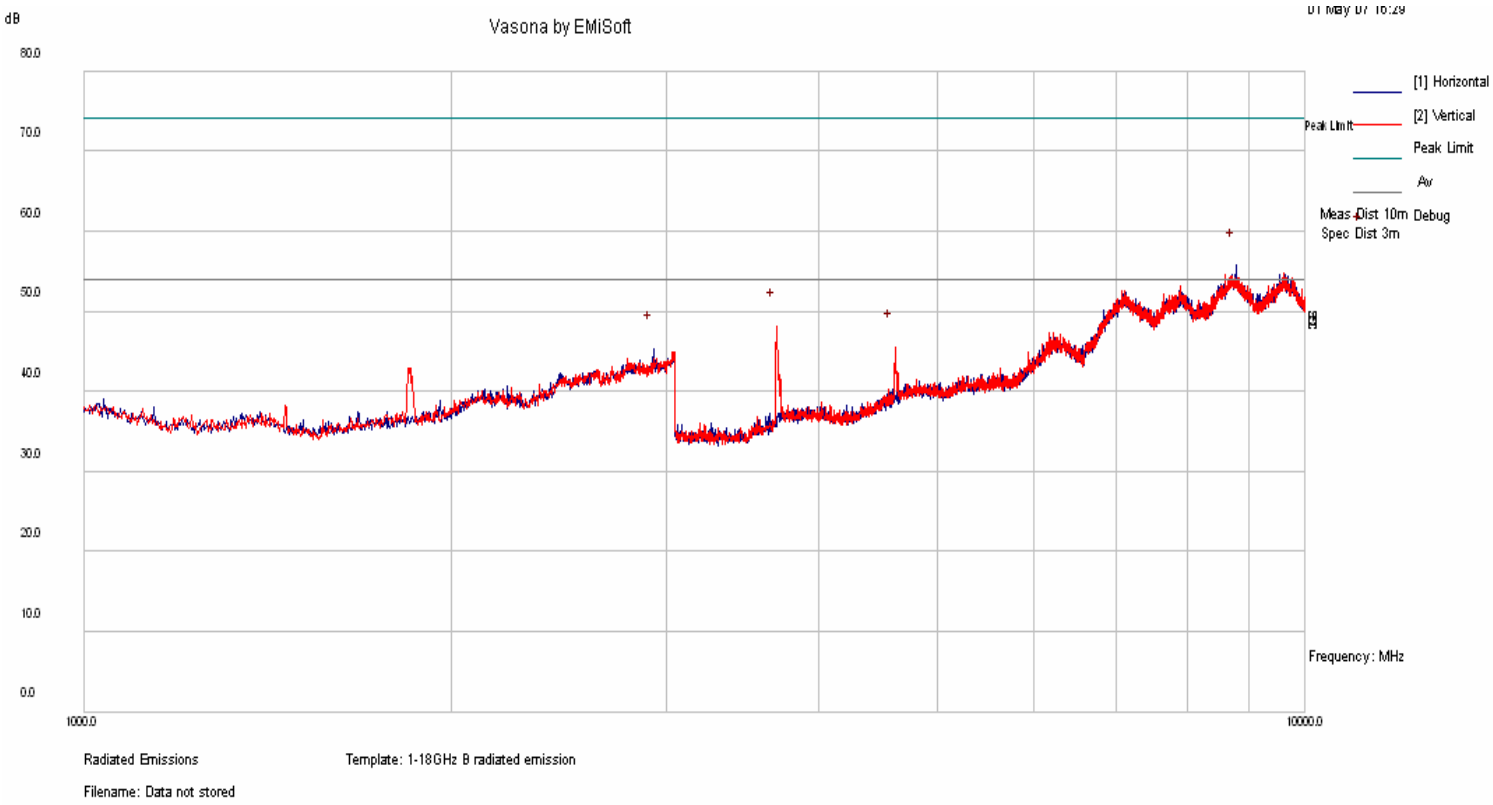


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
3689.333	50.56	7.05	6.91	63.22	10	Peak [Scan]	V	300	0	74	-0.78	Pass
4610.106	42.69	7.97	9.75	60.41	10	Peak [Scan]	V	300	0	74	-3.59	Pass
5539.301	38.77	8.73	11.81	59.31	10	Peak [Scan]	V	300	0	74	-4.69	Pass
1844.978	50.93	4.88	3.07	58.88	10	Peak [Scan]	V	300	0	74	-5.12	Pass
6465.689	34.83	9.5	14.16	58.49	10	Peak [Scan]	V	300	0	74	-5.51	Pass
8310.044	27.7	10.92	17.03	55.65	10	Peak [Scan]	V	300	0	74	-8.35	Pass
7383.656	29.68	10.21	15.74	55.64	10	Peak [Scan]	V	300	0	74	-8.36	Pass
2768.559	36.89	6.1	5.13	48.12	10	Peak [Scan]	V	300	0	74	-15.88	Pass

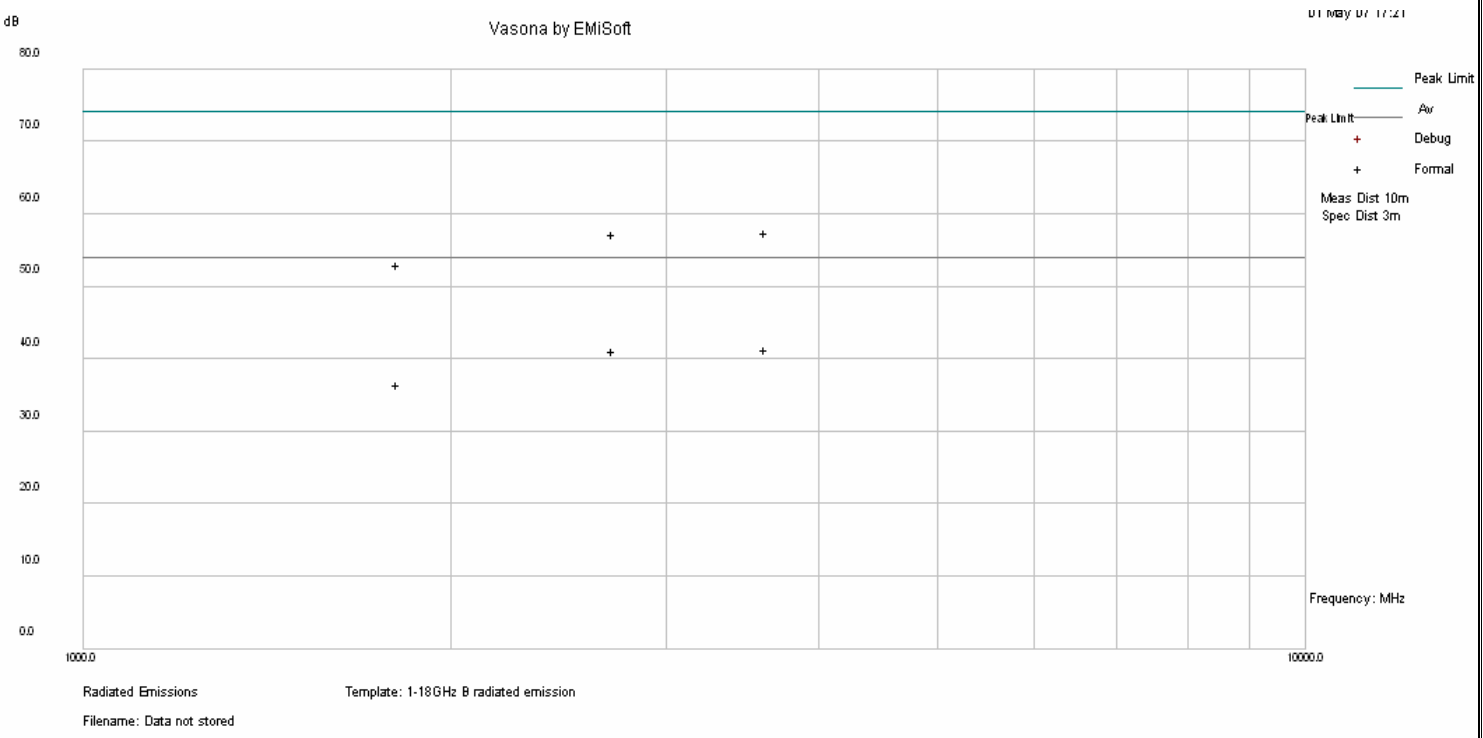


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
3670.31	23.24	7.03	6.82	37.09	10	Average Max	V	288	-2	54	-6.91	Pass
2750.463	25.49	6.08	5.08	36.65	10	Average Max	V	320	99	54	-7.35	Pass
3670.31	39.45	7.03	6.82	53.3	10	Peak Max	H	277	132	74	-10.7	Pass
2750.463	41.18	6.08	5.08	52.34	10	Peak Max	H	189	154	74	-11.66	Pass
1834.202	24.27	4.87	2.98	32.11	10	Average Max	V	115	115	54	-11.89	Pass
1834.202	40.24	4.87	2.98	48.09	10	Peak Max	V	115	115	74	-15.91	Pass

OMNI- DIRECTIONAL ANTENNA (10 dBd)
ERIP limit = 36 dBm; g Mode - Channel BW = 20 MHz
Low Channel = 912 MHz (24.5 dBm)
Measured at 10 meter

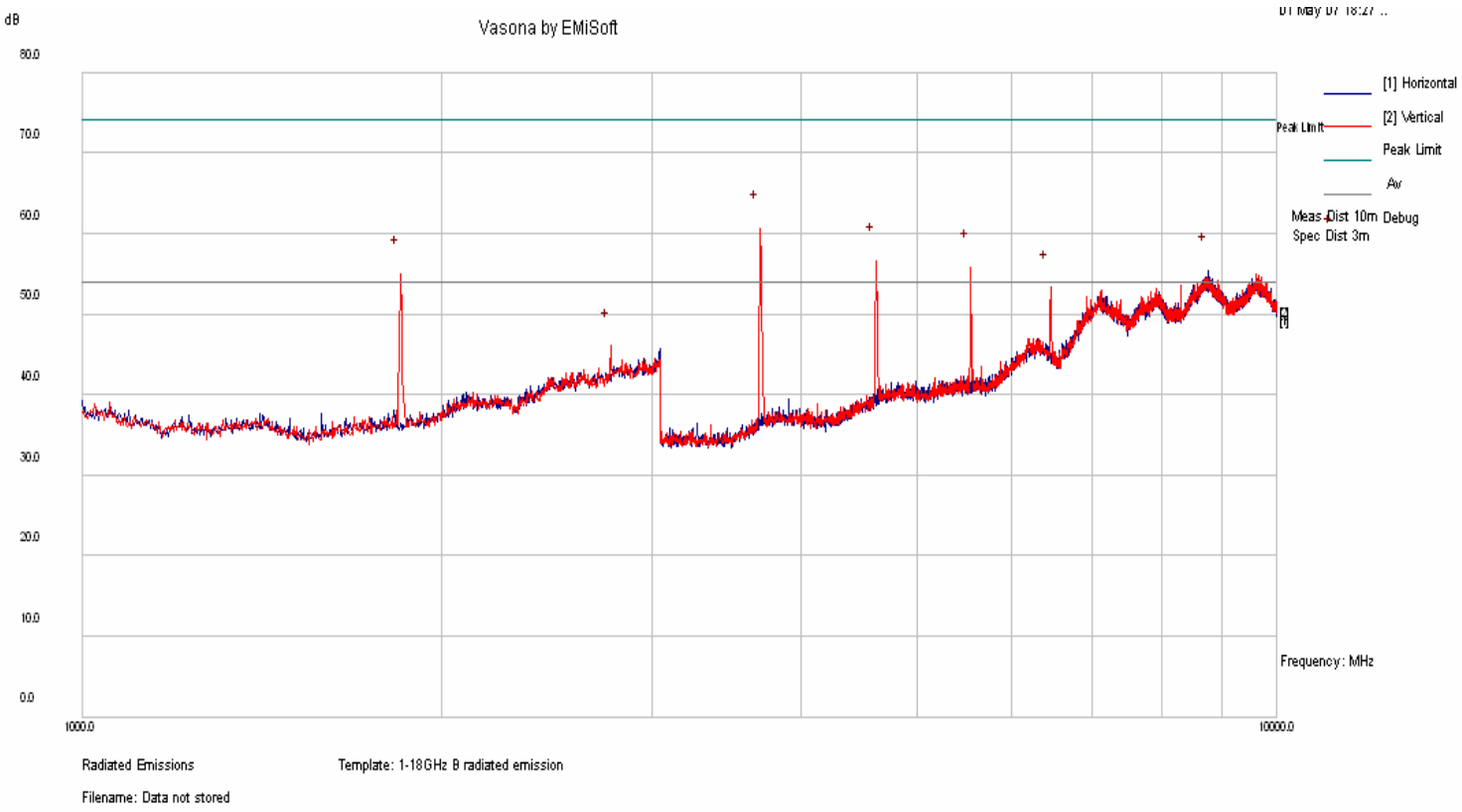


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
8778.852	26.7	11.22	17.73	55.65	10	Peak [Scan]	H	400	0	74	-8.35	Pass
3692.14	34.18	7.05	6.92	48.15	10	Peak [Scan]	V	300	0	74	-15.85	Pass
4615.721	27.74	7.98	9.77	45.49	10	Peak [Scan]	V	300	0	74	-18.51	Pass
2931.379	33.44	6.28	5.56	45.27	10	Peak [Scan]	H	400	0	74	-18.73	Pass

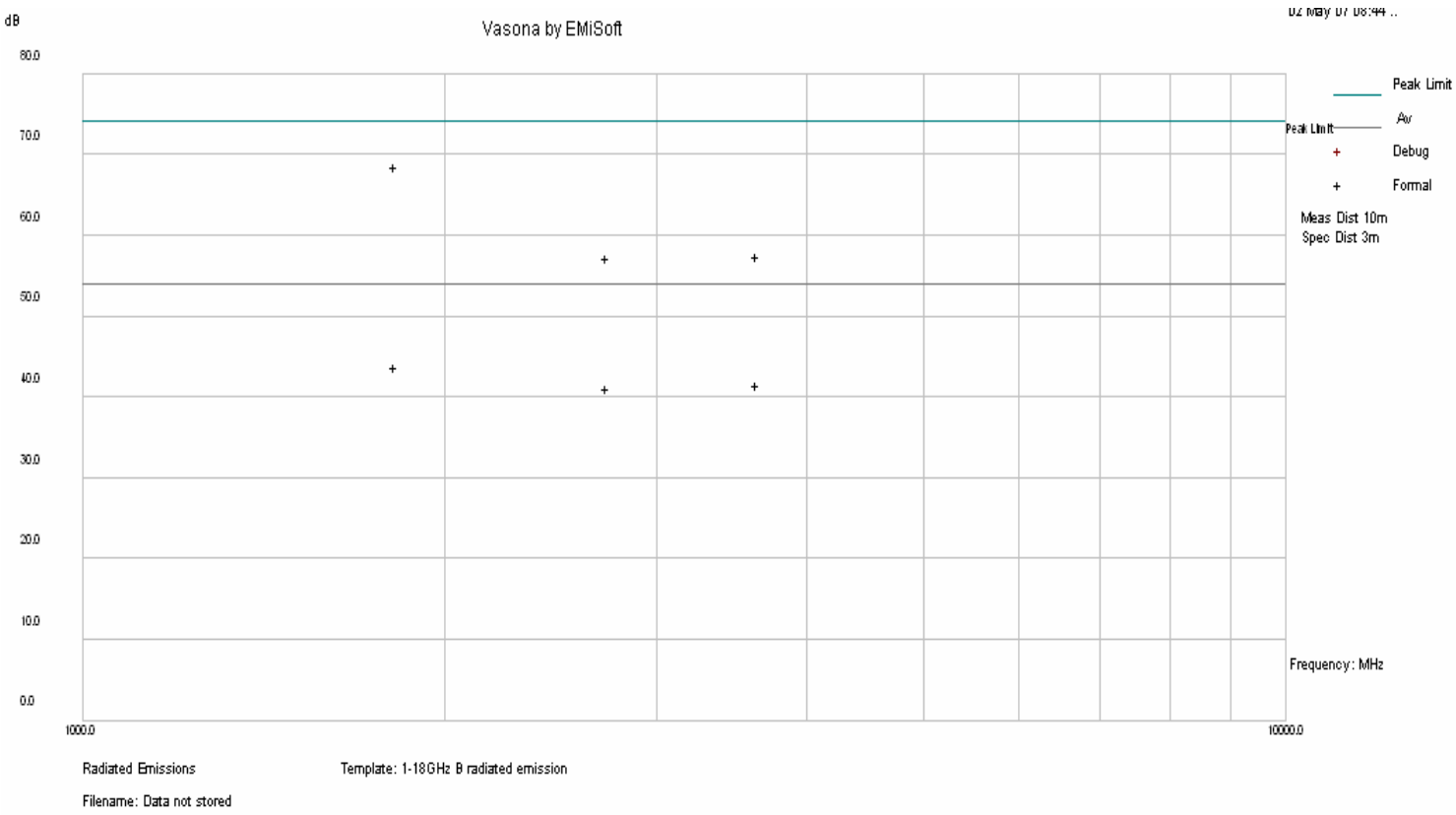


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
3649.958	23.11	7.01	6.73	36.85	10	Average Max	V	306	39	54	-7.15	Pass
2734.815	25.55	6.06	5.04	36.65	10	Average Max	V	99	282	54	-7.35	Pass
3649.958	39.27	7.01	6.73	53.01	10	Peak Max	H	251	323	74	-10.99	Pass
2734.815	41.62	6.06	5.04	52.73	10	Peak Max	H	344	179	74	-11.27	Pass
1822.508	24.32	4.85	2.88	32.05	10	Average Max	H	207	246	54	-11.95	Pass
1822.508	40.73	4.85	2.88	48.46	10	Peak Max	H	207	246	74	-15.54	Pass

OMNI- DIRECTIONAL ANTENNA (10 dBd)
ERIP limit = 36 dBm; g Mode - Channel BW = 20 MHz
Low Channel = 917 MHz (24.5 dBm)
Measured at 10 meter

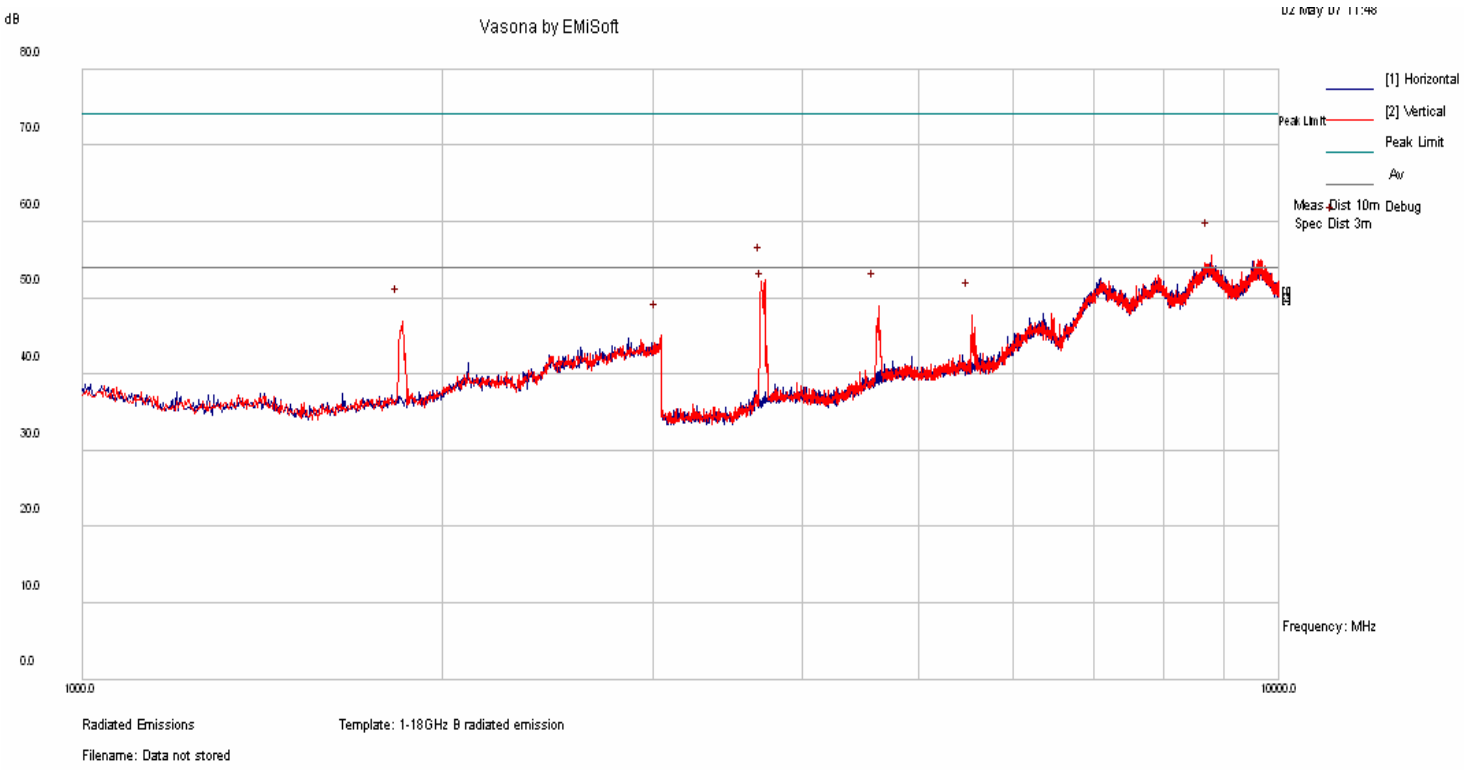


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
3694.947	46.64	7.06	6.93	60.63	10	Peak [Scan]	V	200	0	74	-3.37	Pass
4618.528	38.87	7.98	9.79	56.64	10	Peak [Scan]	V	200	0	74	-7.36	Pass
5542.109	35.22	8.73	11.81	55.77	10	Peak [Scan]	V	200	0	74	-8.23	Pass
8764.816	26.43	11.21	17.7	55.34	10	Peak [Scan]	H	200	0	74	-8.66	Pass
1847.785	47.04	4.88	3.09	55.01	10	Peak [Scan]	V	200	0	74	-8.99	Fail
6462.882	29.6	9.5	14.15	53.25	10	Peak [Scan]	V	200	0	74	-10.75	Pass
2771.366	34.75	6.1	5.14	45.99	10	Peak [Scan]	V	300	0	74	-18.01	Pass

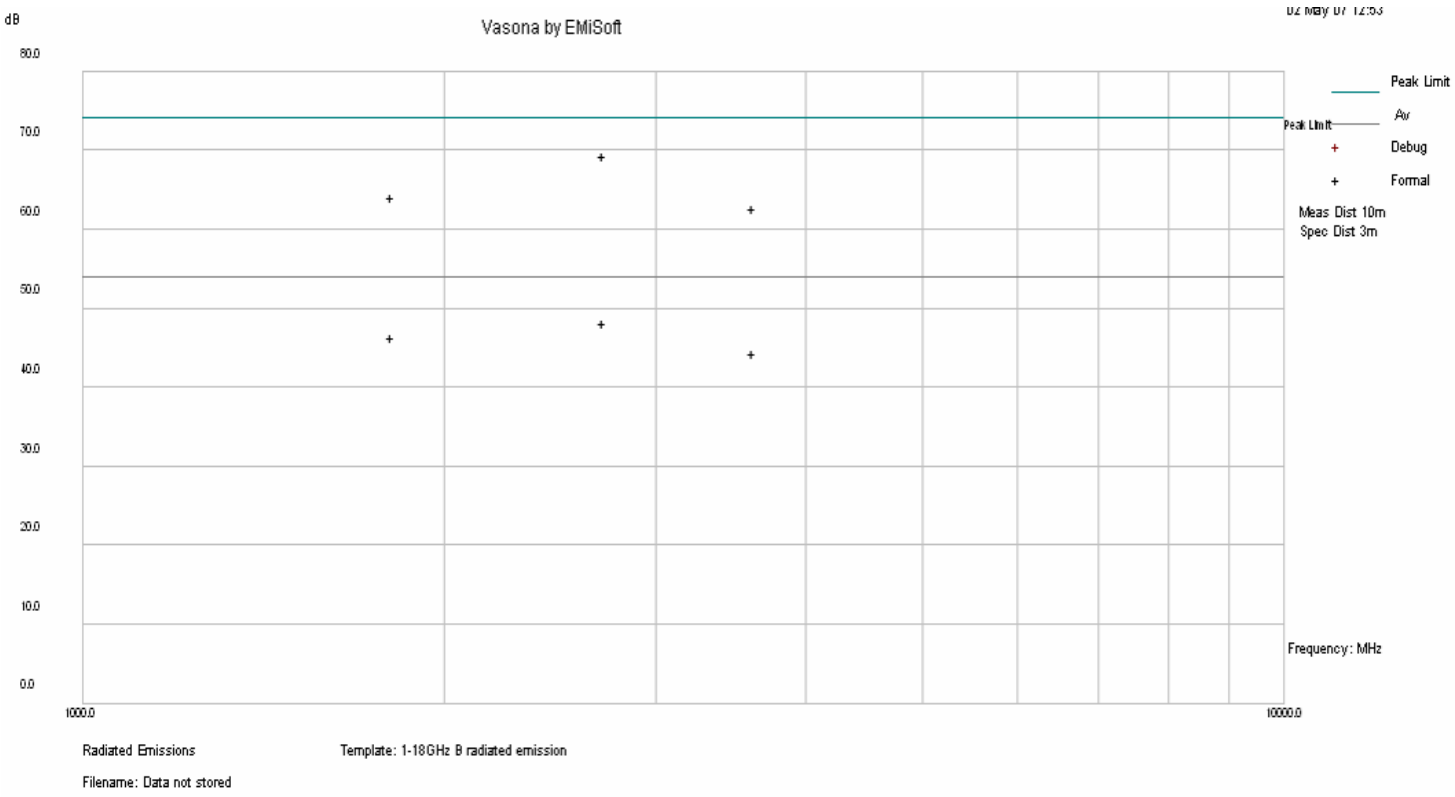


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1833.878	56.21	4.87	2.98	63.06	10	Peak Max	V	308	260	74	-0.94	Pass
1833.878	31.36	4.87	2.98	39.2	10	Average Max	V	308	260	54	-4.8	Pass
3668.819	23.19	7.03	6.81	37.03	10	Average Max	V	199	308	54	-6.97	Pass
2753.68	25.49	6.08	5.09	36.66	10	Average Max	V	302	236	54	-7.34	Pass
3668.819	39.06	7.03	6.81	52.9	10	Peak Max	V	199	308	74	-11.1	Pass
2753.68	41.57	6.08	5.09	52.75	10	Peak Max	V	302	236	74	-11.25	Pass

MTI FLAT PANEL DIRECTIONAL ANTENNA (12.5 dBi)
ERIP limit = 36 dBm; g Mode - Channel BW = 20 MHz
High Channel = 912 MHz (24.5 dBm)
Measured at 10 meter

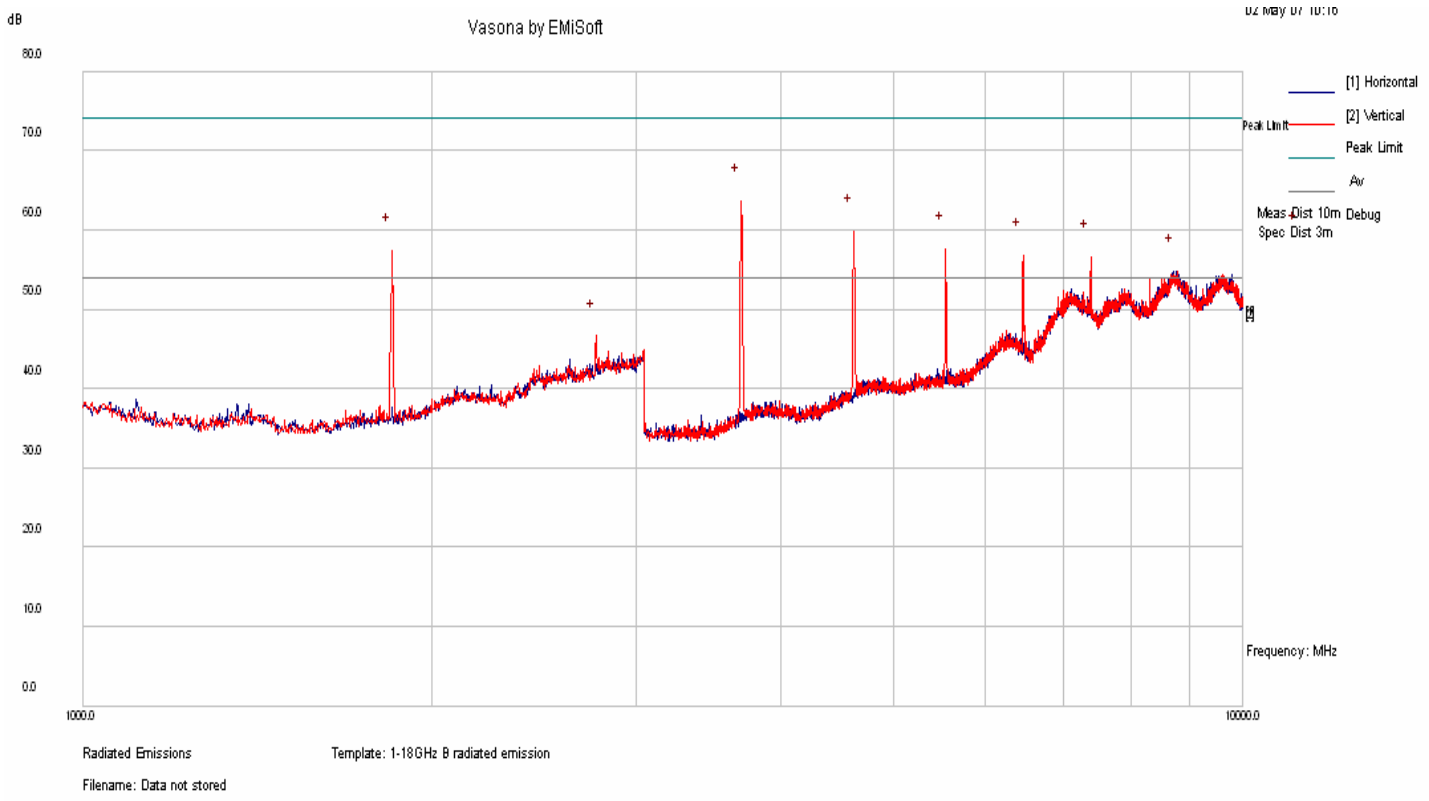


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
8781.659	26.66	11.22	17.73	55.61	10	Peak [Scan]	V	100	0	74	-8.39	Pass
3717.405	38.17	7.08	7.03	52.29	10	Peak [Scan]	V	300	0	74	-11.71	Pass
4624.142	31.17	7.98	9.81	48.96	10	Peak [Scan]	V	300	0	74	-15.04	Pass
3723.019	34.75	7.09	7.06	48.9	10	Peak [Scan]	V	300	0	74	-15.1	Pass
5542.109	27.21	8.73	11.81	47.75	10	Peak [Scan]	V	300	0	74	-16.25	Pass
1850.593	38.9	4.89	3.12	46.91	10	Peak [Scan]	V	300	0	74	-17.09	Pass
3043.668	32.84	6.4	5.76	44.99	10	Peak [Scan]	V	400	0	74	-19.01	Pass

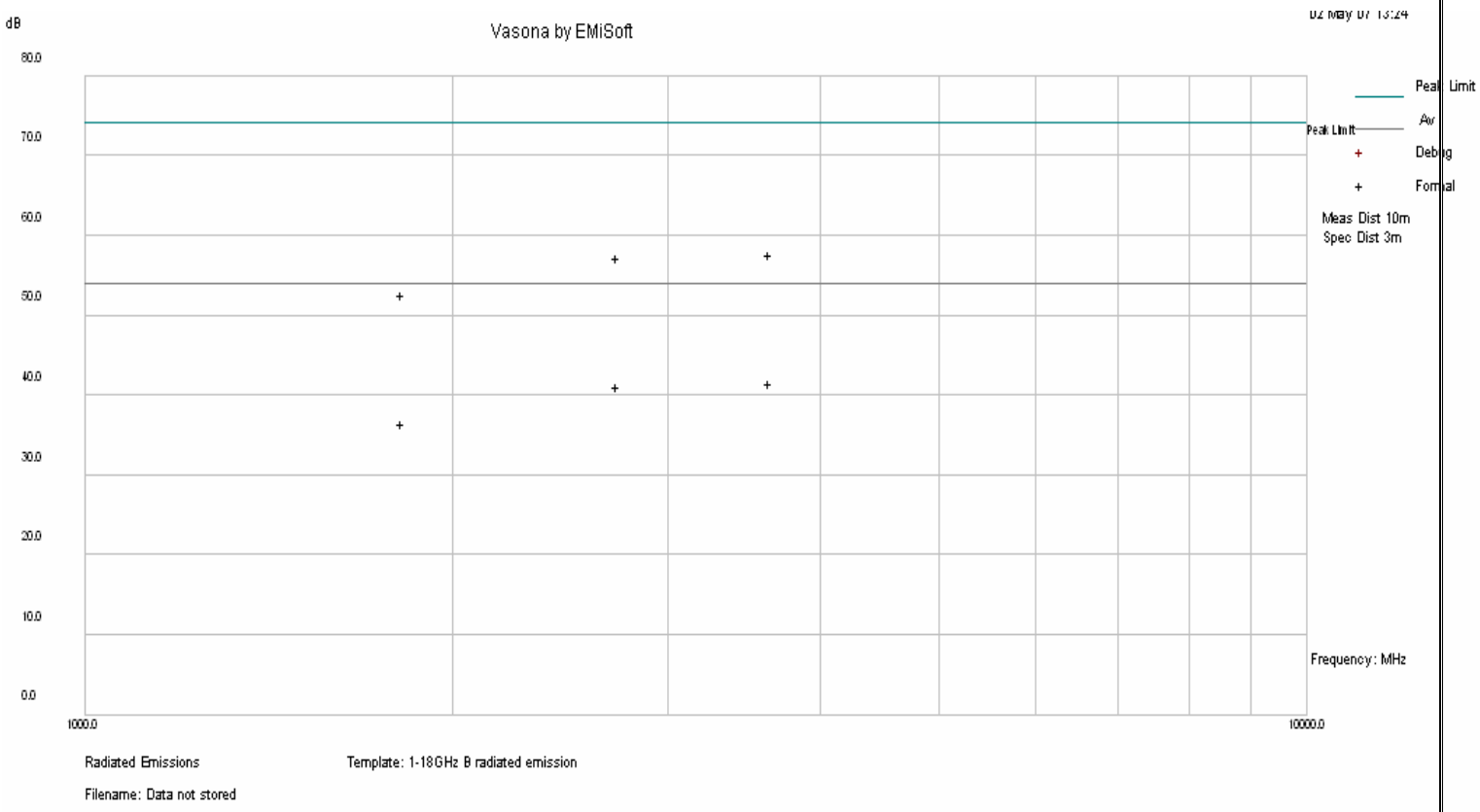


Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
2738.181	32.5	6.06	5.05	43.61	10	Average Max	H	362	63	54	-0.39	Pass
2738.181	53.78	6.06	5.05	63.5	10	Peak Max	H	362	63	74	-0.5	Pass
1823.176	34.13	4.85	2.89	41.86	10	Average Max	V	306	363	54	-2.14	Pass
3646.558	26.2	7.01	6.71	39.92	10	Average Max	H	145	282	54	-4.08	Pass
1823.176	51.91	4.85	2.89	59.65	10	Peak Max	V	306	363	74	-4.35	Pass
3646.558	44.41	7.01	6.71	58.13	10	Peak Max	H	145	282	74	-5.87	Pass

MTI FLAT PANEL DIRECTIONAL ANTENNA (12.5 dBi)
ERIP limit = 36 dBm; g Mode - Channel BW = 20 MHz
High Channel = 917 MHz (24.5 dBm)
Measured at 10 meter



Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
3694.947	49.69	7.06	6.93	63.68	10	Peak [Scan]	V	300	0	74	-0.32	Pass
4618.528	42.1	7.98	9.79	59.86	10	Peak [Scan]	V	300	0	74	-4.14	Pass
5539.301	37.07	8.73	11.81	57.6	10	Peak [Scan]	V	300	0	74	-6.4	Pass
1847.785	49.4	4.88	3.09	57.38	10	Peak [Scan]	V	300	0	74	-6.62	Pass
6465.689	33.07	9.5	14.16	56.73	10	Peak [Scan]	V	300	0	74	-7.27	Pass
7392.077	30.56	10.22	15.75	56.53	10	Peak [Scan]	V	300	0	74	-7.47	Pass
8750.78	25.9	11.2	17.68	54.78	10	Peak [Scan]	H	300	0	74	-9.22	Pass
2771.366	35.34	6.1	5.14	46.58	10	Peak [Scan]	V	300	0	74	-17.42	Pass



Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dB	Distance Factor dB	Measurement Type	Pol (H/V)	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
3666.119	23.23	7.03	6.8	37.06	10	Average Max	V	175	107	54	-6.94	Pass
2751.19	25.47	6.08	5.09	36.64	10	Average Max	V	328	274	54	-7.36	Pass
3666.119	39.37	7.03	6.8	53.19	10	Peak Max	H	322	148	74	-10.81	Pass
2751.19	41.58	6.08	5.09	52.74	10	Peak Max	V	328	274	74	-11.26	Pass
1834.579	24.24	4.87	2.98	32.09	10	Average Max	V	401	351	54	-11.91	Pass
1834.579	40.24	4.87	2.98	48.09	10	Peak Max	V	401	351	74	-15.91	Pass

END OF REPORT