FCC PART 15.247

EMI MEASUREMENT AND TEST REPORT

For

SmartBridges Pte Ltd

745, Toa Payoh Lorong 5, #04-01, HBM Building
Singapore, Singapore 319455

FCC ID: PWGSPEEDTRAP

2004-02-04

This Report Concerns:	**Equipment Type:**
☒ Original Report	Wireless Access Point

Test Engineer:	Ming Jing /
Report No.:	R0312192
Test Date:	2003-01-08
Reviewed By:	Ling Zhang /
Prepared By:	Bay Area Compliance Laboratory Corporation (BACL) 230 Commercial Street Sunnyvale, CA 94085 Tel: (408) 732-9162 Fax: (408) 732 9164

TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *SmartBridges Pte Ltd's product, FCC ID:PWGSPEEDTRAP*, or the "EUT" as referred to in this report is IEEE 802.11b compliant Access Point devices for deployment of Wireless Wide Area Networks (WWANs). The EUT can be used as an access point, client bridge, wireless bridge and wireless repeater to provide various networking functions. The EUT can provide data rates up to 11 Mbps, encryption capability of 64 bits or 128 bits to provide network security.

** The test data gathered are from a production sample, S/N: X00, provided by the manufacturer.*

Objective

This type approval report is prepared on behalf of *SmartBridges Pte Ltd* in accordance with Part 2, Subpart J, Part 15, Subparts A , C of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules for Output Power, Antenna Requirements, 6 dB Bandwidth, power spectral density, 100 kHz Bandwidth of Band Edges Measurement, Out of Band Emission, Spurious Emission, Conducted and Spurious Radiated Emission.

Related Submittal(s)/Grant(s)

No Related Submittals.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2001, 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.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Open Area Test site used by BACL to collect radiated and conducted emission measurement data is located in the back parking lot of the building at 230 Commercial Street, Sunnyvale, California, USA.

Test site at BACL 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 has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on
December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2001.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1300F2 and VCCI Registration No.: C-1298 and R-1234. 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 is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The scope of the accreditation covers the FCC Method – 47 CFR Part – Digital Devices, CISPER 22: 1997: Electromagnetic Interference – Limits and Methods of Measurement of Information Technology Equipment test methods.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
SONY	Notebook PC	SKU-3	N/A	DOC

External I/O Cabling List and Details

Cable Description	Length (M)	Port/From	To
Ethernet Cable	1.5	Eth In / PoE Outdoor	Notebook PC
Ethernet Cable	1.5	Eth Out / PoE Outdoor	XO2
Shield RF Cable	0.5	Radio Port / XO2	Antenna

Power Supply Information

Manufacturer	Description	Model	Serial Number	FCC ID
smartBridges	AC Adapter	PSU30A-8	624905	DOC

SYSTEM TEST CONFIGURATION

Justification

The host system was configured for testing according to ANSI C63.4-2001.

The EUT was tested in the normal (native) operating mode to represent *worst*-case results during the final qualification test.

EUT Exercise Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the system components. The test software, provided by the customer, is started the Windows terminal program under the Windows 98/2000/ME/XP operating system.

Once loaded, set the Tx channel to low, mid and high for testing.

Special Accessories

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

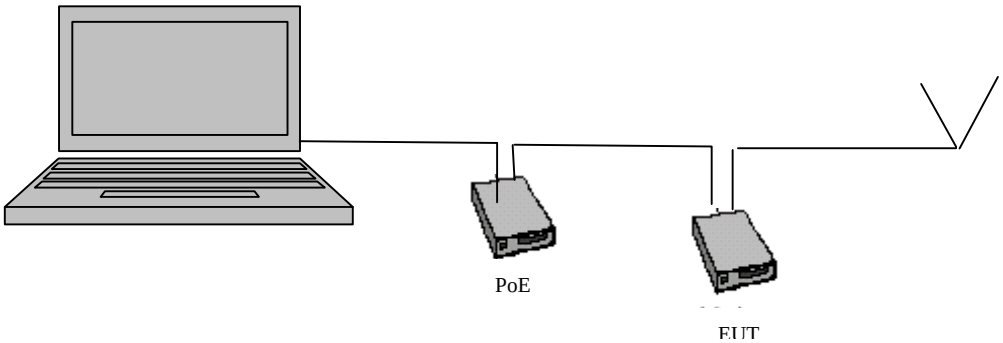
Schematics / Block Diagram

Please refer to Appendix A.

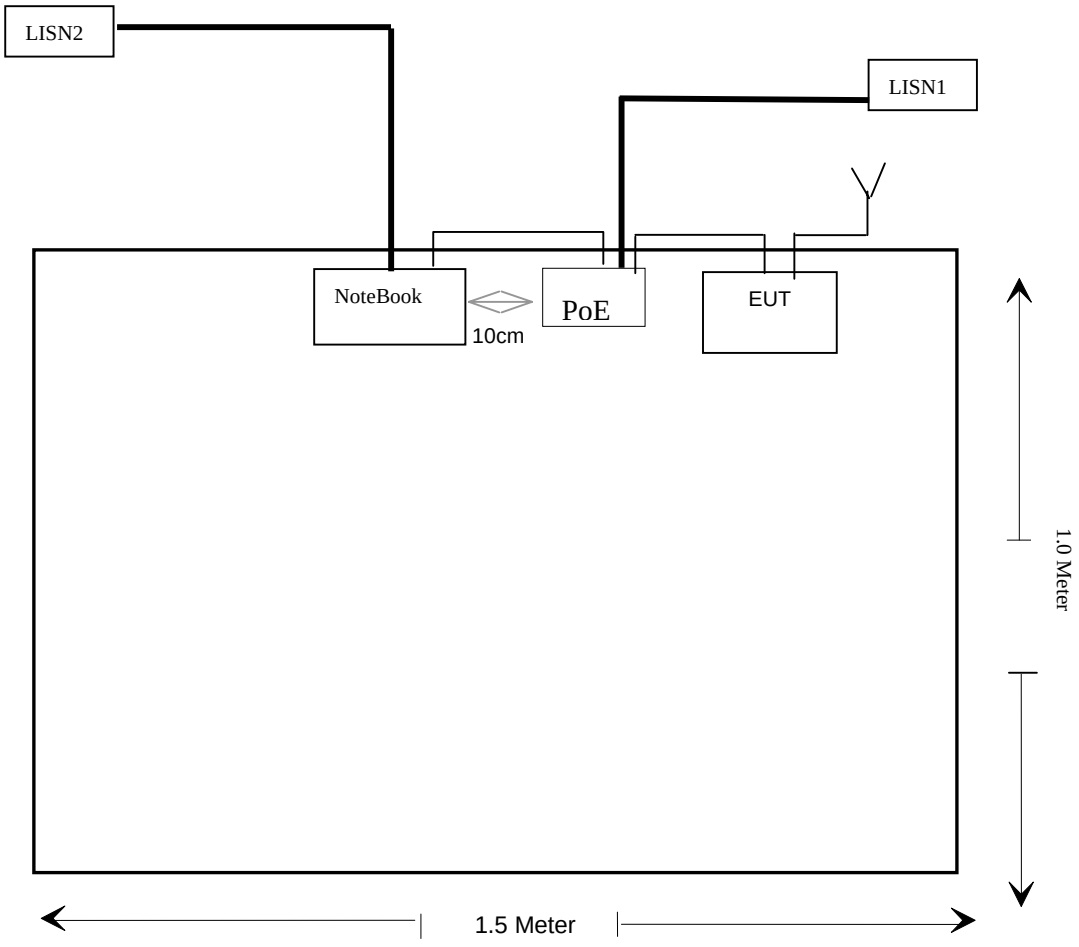
Equipment Modifications

No modifications were made to the EUT.

Configuration of Test System



Test Setup Block Diagram



SUMMARY OF TEST RESULTS

Results reported relate only to the product tested, serial number: X00.

FCC RULES	DESCRIPTION OF TEST	RESULT
§2.1093	RF Exposure	Pass
§15.203	Antenna Requirement	Pass
§ 15.207 (a)	Conducted Emissions	Pass
§15.209 (a)	Spurious Emission	Pass
§15.209 (f)	Radiated Emission	Pass
§15.247 (a)(2),	6 dB Bandwidth	Pass
§15.247 (b)(3),	Maximum Peak Output Power	Pass
§ 15.247 (c)	100 kHz Bandwidth of Frequency Band Edge	Pass
§15.247 (d),	Peak Power Spectral Density	Pass

§15.203 - ANTENNA REQUIREMENT

Standard Applicable

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.

And according to § 15.247 (1), 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.

Refer to statement below for compliance.

These antennas will be professional installed.

Antenna Connected Construction

These antennas will be professionally installed. Installer is responsible for ensuring that proper antennas are employed so that the FCC Part15C limits are not exceed.

§15.207(a) - CONDUCTED EMISSIONS

Measurement Uncertainty

All measurements involve certain levels of uncertainties. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at BACL is ±2.4 dB.

EUT Setup

The measurement was performed in the shield room, using the same setup per ANSI C63.4-2001 measurement procedure. The specification used was FCC 15 Subpart B 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.

Spectrum Analyzer Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30Mhz.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Rohde & Schwarz	Artificial LISN	ESH2-Z5	871884/039	2003-03-28
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2003-05-06

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

Test Procedure

During the conducted emission test, the power cord of the host system was connected to the auxiliary outlet of the first LISN.

Maximizing procedure was performed on the six (6) highest emissions of each modes tested to ensure EUT is compliant with all installation combination.

All data was recorded in the peak detection mode. Quasi-peak readings were only performed when an emission was found to be marginal (within -4 dBμV of specification limits). Quasi-peak readings are distinguished with a "**Qp**".

Summary of Test Results

According to the recorded data in following table, the EUT complies with the FCC Conducted margin for a Class B device, with the *worst* margin reading of:

-9.2 dB at 0.205 MHz in the Neutral mode

Environmental Conditions

Temperature:	11° C
Relative Humidity:	49%
ATM Pressure:	1100 mbar

Conducted Emissions Test Data

LINE CONDUCTED EMISSIONS				FCC PART 15 CLASS B	
Frequency MHz	Amplitude dBμV	Detector Qp/Ave/Peak	Phase Line/Neutral	Limit dBμV	Margin dB
0.205	53.8	QP	Neutral	63	-9.2
0.205	42.6	AVG	Line	53	-10.4
5.000	35.3	AVG	Line	46	-10.7
0.205	42.2	AVG	Neutral	53	-10.8
0.205	51.2	QP	Line	63	-11.8
17.400	35.6	AVG	Neutral	50	-14.4
5.000	28.5	AVG	Neutral	46	-17.5
5.000	36.7	QP	Line	56	-19.3
17.400	38.4	QP	Neutral	60	-21.6
15.600	25.2	AVG	Line	50	-24.8
5.000	31.2	QP	Neutral	56	-24.8
15.600	26.9	QP	Line	60	-33.1

Plot of Conducted Emissions Test Data

Plot(s) of Conducted Emissions Test Data is presented hereinafter as reference.

Bay Area Compliance Laboratory Corp 13. Jan 04 17:26

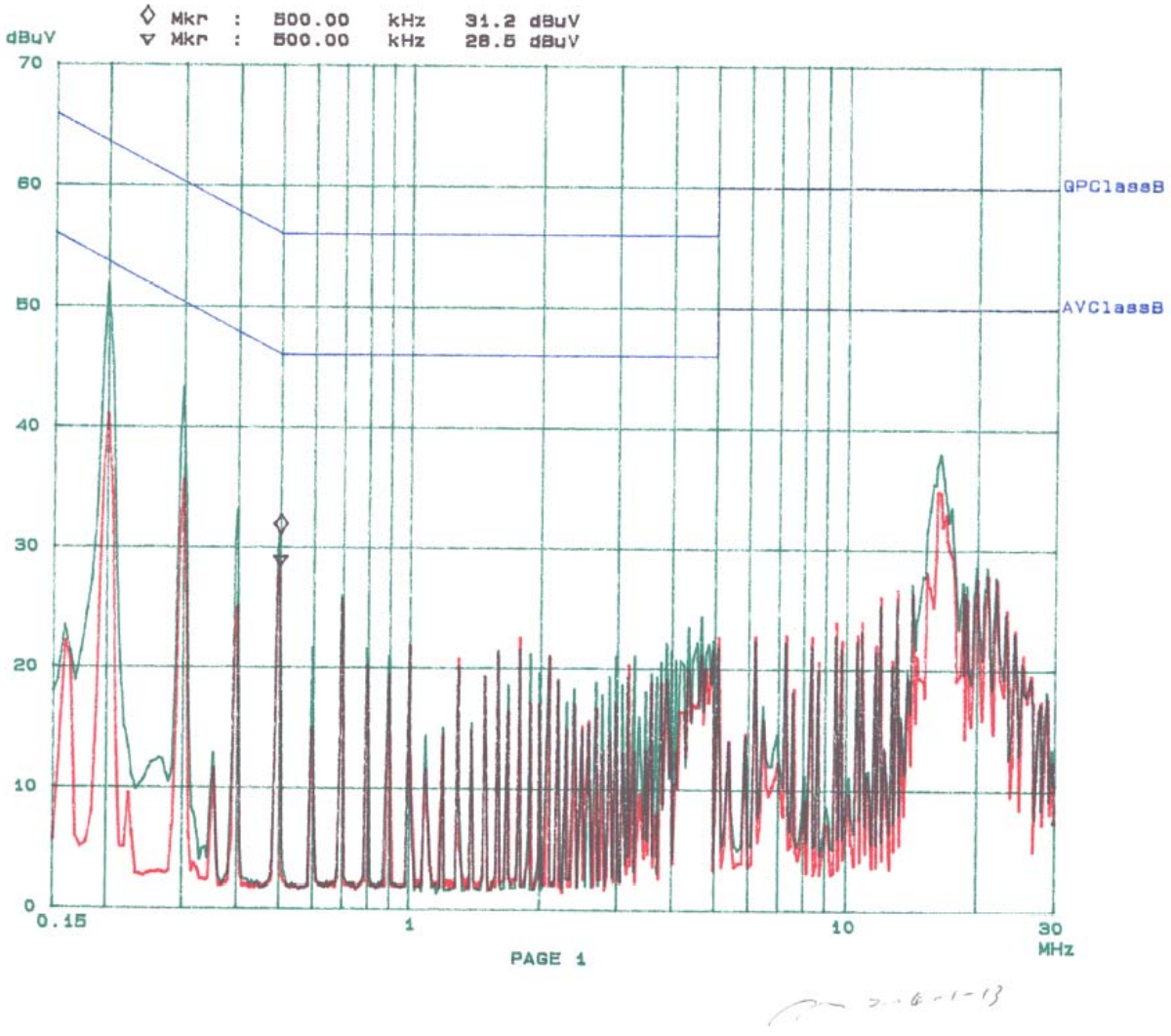
FCC B

EUT: airpoint X0
Manuf: smartBridges
Op Cond: Normal
Operator: Ming
Comment: N

Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	1M	5k	9k	QP+AV	20ms	15dBLN	OFF
1M	5M	10k	9k	QP+AV	1ms	15dBLN	OFF
5M	30M	100k	9k	QP+AV	1ms	15dBLN	OFF

Final Measurement: x QP / + AV
Meas Time: 1 s
Subranges: 25
Acc Margin: 6dB



PAGE 1

3-6-1-13

Bay Area Compliance Laboratory Corp 08. Jan 04 15:30

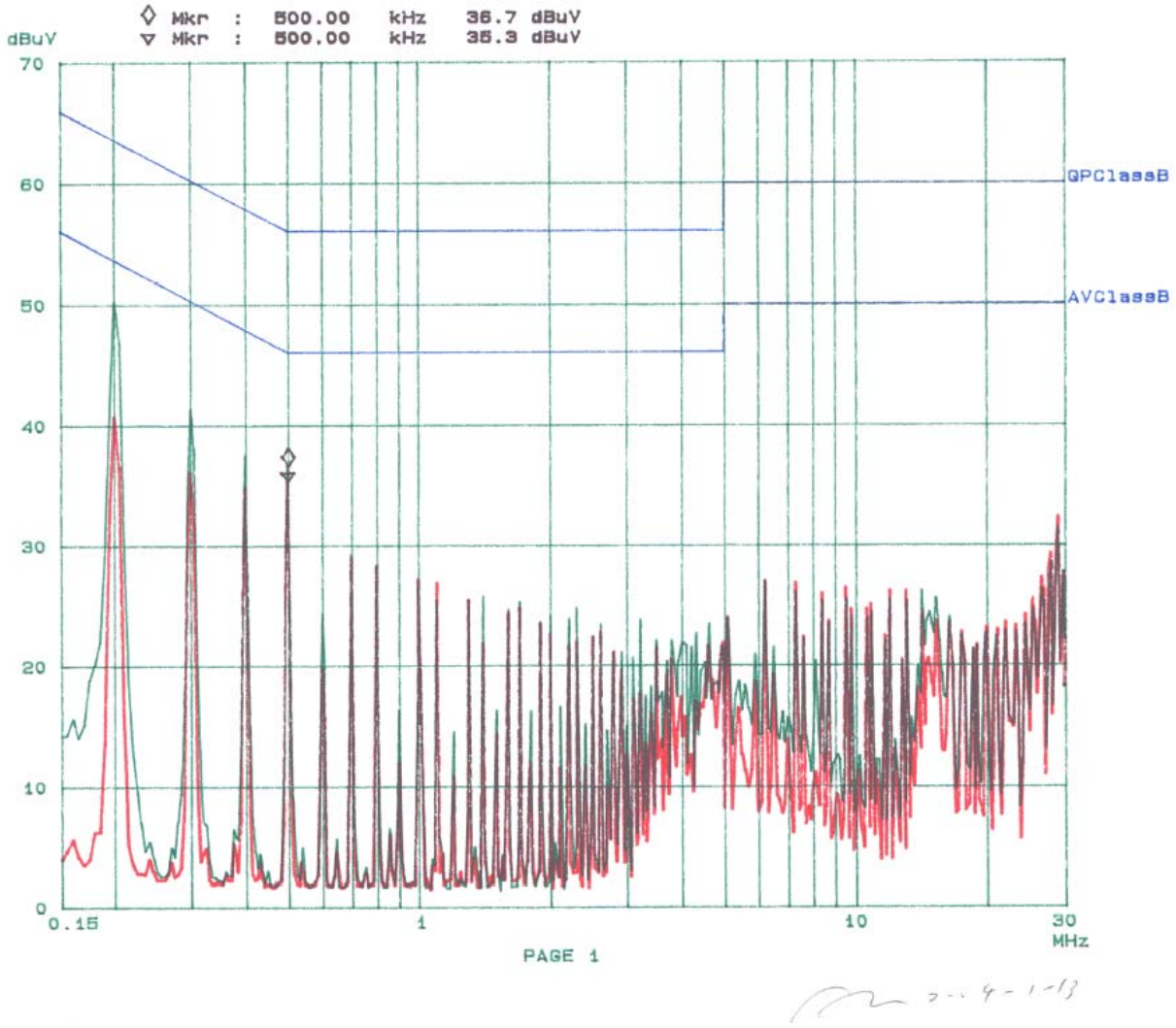
Class B

EUT: airPoint XO
Manuf: SmartBridges
Op Cond: Normal
Operator: Ming
Comment: L

Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	1M	5k	9k	QP+AV	20ms	15dBLN	OFF
1M	5M	10k	9k	QP+AV	1ms	15dBLN	OFF
5M	30M	100k	9k	QP+AV	1ms	15dBLN	OFF

Final Measurement: x QP / + AV
Meas Time: 1 s
Subranges: 25
Acc Margin: 6dB



PAGE 1

§15.209(a) - SPURIOUS EMISSION

Standard Applicable

According to §15.209 (a), except as provided elsewhere in the subpart of 15.209, 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., §§ 15.231 and 15.241

Measurement Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set the SA on Max-Hold Mode, and then keep the EUT in transmitting mode. Record all the signals from each channel until each one has been recorded.
4. Set the SA on View mode and then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

Equipment Lists

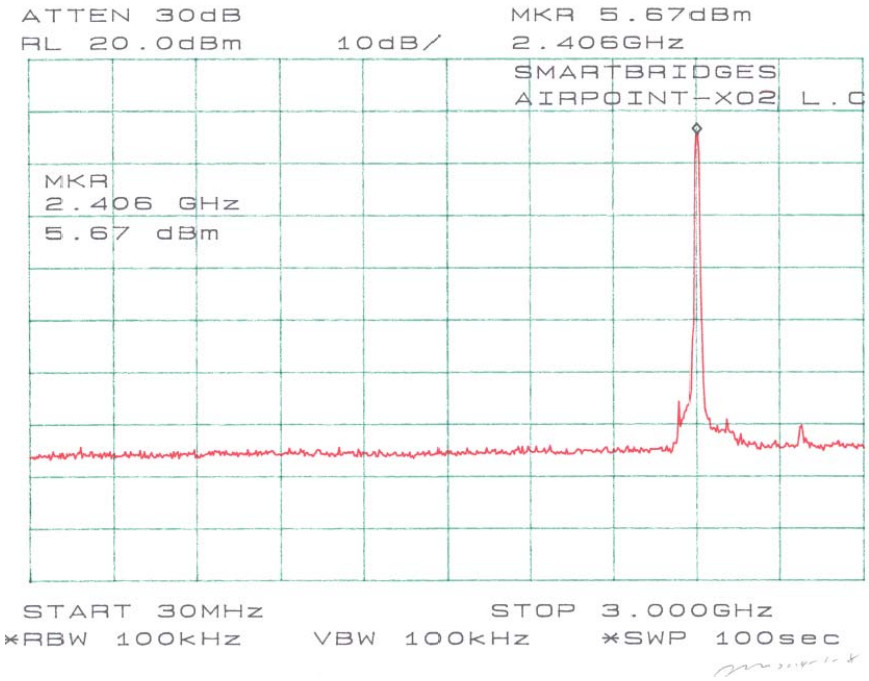
Manufacturer	Model No.	Description	Calibration Date
HP	8565EC	Spectrum Analyzer	2003-01-22

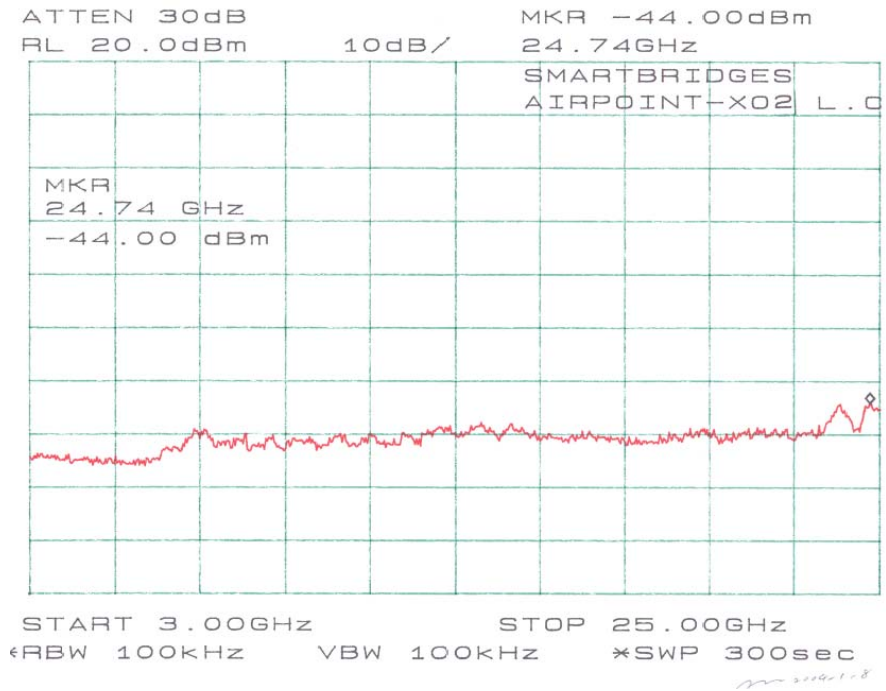
Measurement Result

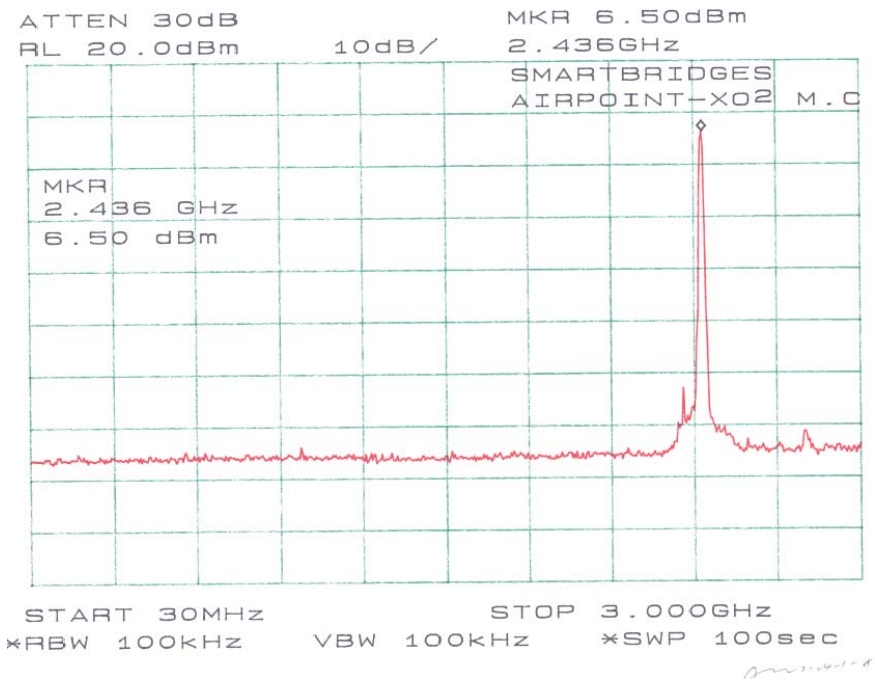
Please refer to following pages for plots of spurious emission.

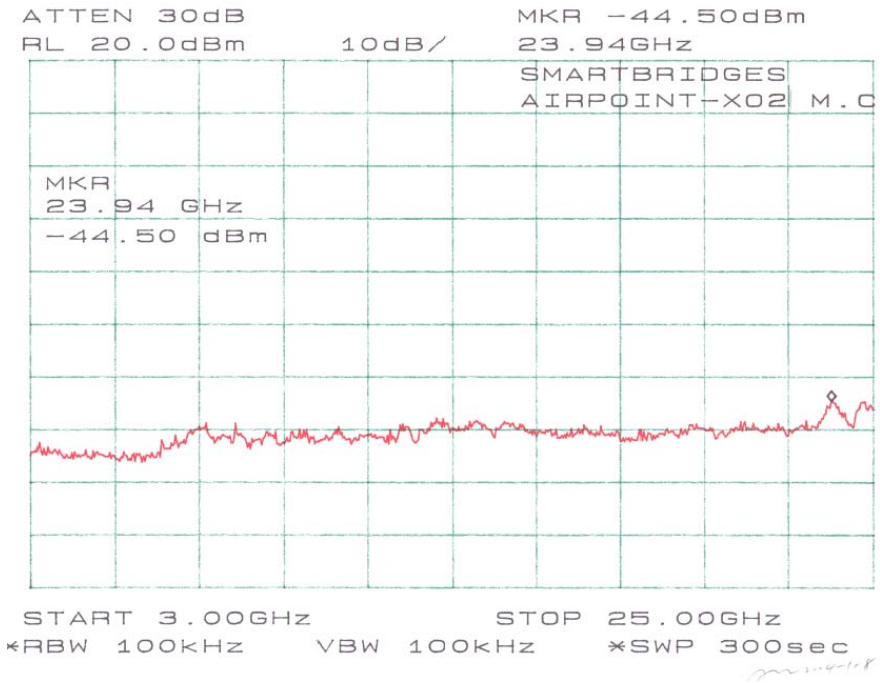
Environmental Conditions

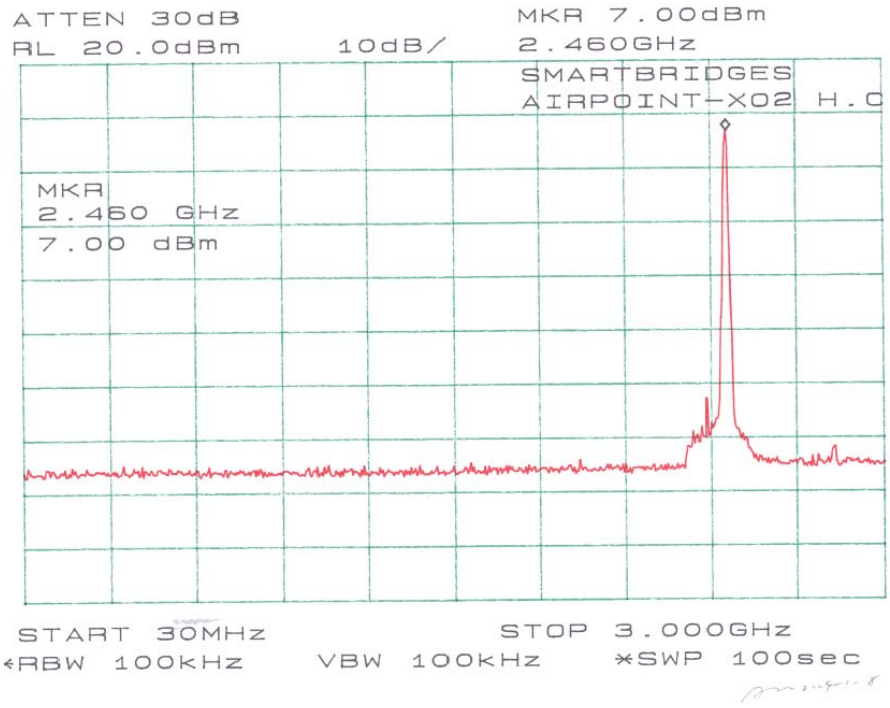
Temperature:	11° C
Relative Humidity:	49%
ATM Pressure:	1100 mbar

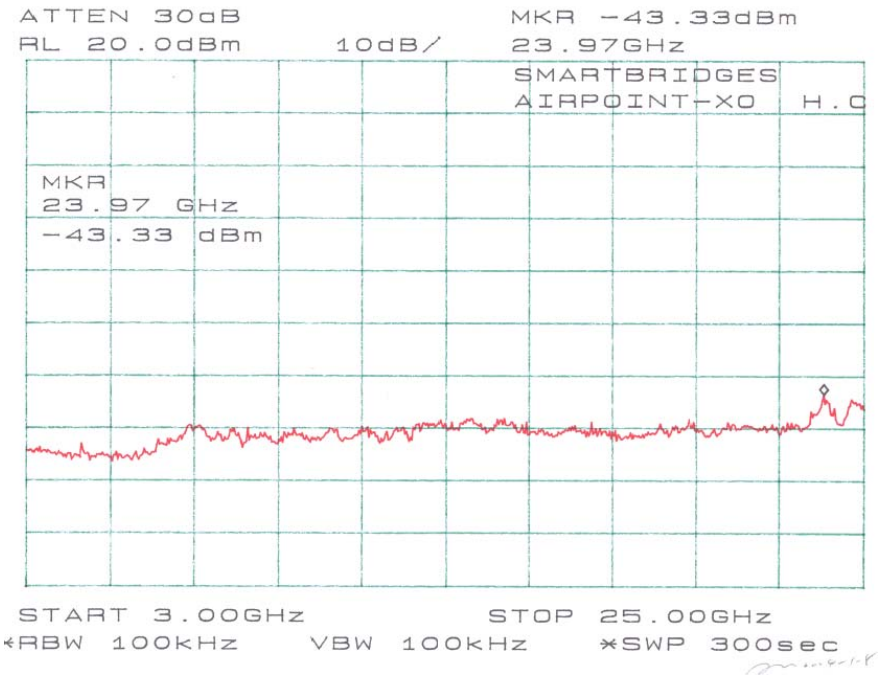

ATTEN 30dB
RL 20.0dBm
10dB/
MKR 5.67dBm
2.406GHz
SMARTBRIDGES
AIRPOINT-X02 L.C
MKR
2.406 GHz
5.67 dBm
START 30MHz
STOP 3.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 100sec


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -44.00dBm
24.74GHz
SMARTBRIDGES
AIRPOINT-X02 L.C
MKR
24.74 GHz
-44.00 dBm
START 3.00GHz
STOP 25.00GHz
*RBW 100kHz
VBW 100kHz
*SWP 300sec


ATTEN 30dB
RL 20.0dBm
10dB/
MKR 6.50dBm
2.436GHz
SMARTBRIDGES
AIRPOINT-X02 M.C
MKR
2.436 GHz
6.50 dBm
START 30MHz
STOP 3.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 100sec


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -44.50dBm
23.94GHz
SMARTBRIDGES
AIRPOINT-X02 M.C
MKR
23.94 GHz
-44.50 dBm
START 3.00GHz
STOP 25.00GHz
*RBW 100kHz
VBW 100kHz
*SWP 300sec


ATTEN 30dB
RL 20.0dBm
10dB/
MKR 7.00dBm
2.460GHz
SMARTBRIDGES
AIRPOINT-X02 H.C
MKR
2.460 GHz
7.00 dBm
START 30MHz
STOP 3.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 100sec


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -43.33dBm
23.97GHz
SMARTBRIDGES
AIRPOINT-XO H.C
MKR
23.97 GHz
-43.33 dBm
START 3.00GHz
STOP 25.00GHz
*RBW 100kHz
VBW 100kHz
*SWP 300sec

§15.209(f) - SPURIOUS RADIATED EMISSION

Measurement Uncertainty

All measurements involve certain levels of uncertainties. 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 best estimate of the uncertainty of a radiation emissions measurement at BACL is ±4.0 dB.

According to §15.205, except as shown 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	399.9 – 410	4.5 – 5.15
[1]0.495 – 0.505	16.69475 – 16.69525	608 – 614	5.35 – 5.46
2.1735 – 2.1905	16.80425 – 16.80475	960 – 1240	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1300 – 1427	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1645.5 – 1646.5	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1660 – 1710	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2200 – 2300	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2310 – 2390	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	2655 – 2900	22.01 – 23.12
8.41425 – 8.41475	162.0125 – 167.17	3260 – 3267	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3332 – 3339	31.2 – 31.8
12.51975 – 12.57725	240 – 285	3345.8 – 3358	36.43 – 36.5
13.36 – 13.41	322 – 335.4	3600 – 4400	([2])

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510MHz
[2] Above 38.6

Except as provided in paragraph (d) and (e), the filed strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

According to §15.209, the device shall meet radiated emission general requirements.

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

Frequency of Emission (MHz)	Field Strength (Microvolts/meter)	dB (dBμV/meter)
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup accordance with the ANSI C63.4-2001. The specification used was the FCC 15.209 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.

Spectrum Analyzer Setup

According to FCC Rules, 47 CFR, Section 15.33, the frequency was investigated from 30 to 1000 MHz.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Range	***RBW***	***Video B/W***
Below 30MHz	10kHz	10kHz
30 – 1000MHz	100kHz	100kHz
Above 1000MHz	1MHz	1MHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
HP	Spectrum Analyzer	8568B	2601A02165	2003-07-03
HP	Amplifier	8447E	2944A10187	2003-09-23
HP	Quasi-Peak Adapter	85650A	3019A05393	2003-06-13
A.H. System	Horn Antenna	SAS-200/571	2455-261	2003-01-08
EMCO	Biconical Antenna	3110B	9309-1165	2003-10-11
EMCO	Log Periodic Antenna	3146	2101	2003-10-11

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

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.

All data was recorded in the peak detection mode. Quasi-peak readings performed only when an emission was found to be marginal (within -4 dBμV of specification limits), and are distinguished with a "**Qp**" in the data table.

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:

Corr. Ampl. = 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 -7dBμV means the emission is 7dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. - FCC 15.209 Limit

Summary of Test Results

According to the data in following tables, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.207 and 15.247, and had the worst margin of:

Environmental Conditions

Temperature:	11° C
Relative Humidity:	49%
ATM Pressure:	1100 mbar

Antenna 1: WISP 24013-120PTNF 13 dBi 120 degree, Sector panel

-2.1 dB at **2384.10 MHz** in the **Vertical** polarization, Low Channel

-17.9 dB at **4874.00 MHz** in the **Vertical** polarization, Middle Channel

-5.4 dB at **2486.50 MHz** in the **Vertical** polarization, High Channel

-5.6 dB at **572.01 MHz** in the **Horizontal** polarization, Unwanted Emission

Antenna 2: WISP 24014-90PTNF 14dBi 90 degree, Sector panel

-1.9 dB at **2384.10 MHz** in the **Vertical** polarization, Low Channel

-17.5 dB at **4874.00 MHz** in the **Vertical** polarization, Middle Channel

-5.2 dB at **2486.50 MHz** in the **Vertical** polarization, High Channel

-5.5 dB at **572.01 MHz** in the **Horizontal** polarization, Unwanted Emission

Antenna 3: WISP 24024 PTNF 24dBi Parabolic Grid

-3.3 dB at **2384.10 MHz** in the **Vertical** polarization, Low Channel

-18.3 dB at **4874.00 MHz** in the **Vertical** polarization, Middle Channel

-5.7 dB at **2486.50 MHz** in the **Vertical** polarization, High Channel

-6.1 dB at **572.01 MHz** in the **Horizontal** polarization, Unwanted Emission

Antenna 4: PAWOD24-12 12 dBi Omni Directional

-3.1 dB at **2384.10 MHz** in the **Vertical** polarization, Low Channel

-18.1 dB at **4874.00 MHz** in the **Vertical** polarization, Middle Channel

-5.7 dB at **2486.50 MHz** in the **Vertical** polarization, High Channel

-6.3 dB at **572.01 MHz** in the **Horizontal** polarization, Unwanted Emission

Antenna 5: PAWSA24-16 16.5dBi Horizontally Polarized 90 Degree Sector

-3.1 dB at **2384.10 MHz** in the **Horizontal** polarization, Low Channel

-18.0 dB at **4874.00 MHz** in the **Horizontal** polarization, Middle Channel

-5.0 dB at **2486.50 MHz** in the **Horizontal** polarization, High Channel

-5.2 dB at **572.01 MHz** in the **Horizontal** polarization, Unwanted Emission

Antenna 6: PAWDC24-HD-PFIP 24dBi Die Cast

-1.9 dB at **2384.10 MHz** in the **Vertical** polarization, Low Channel

-16.7 dB at **4874.00 MHz** in the **Vertical** polarization, Middle Channel

-4.9 dB at **2486.50 MHz** in the **Vertical** polarization, High Channel

-4.3 dB at **572.01 MHz** in the **Horizontal** polarization, Unwanted Emission

Antenna 7: PAWODH24-13 13dBi Horizontally Polarized Sector

-2.7 dB at **2384.10 MHz** in the **Horizontal** polarization, Low Channel

-18.0 dB at **4874.00 MHz** in the **Horizontal** polarization, Middle Channel

-5.2 dB at **2486.50 MHz** in the **Horizontal** polarization, High Channel

-4.8 dB at **572.01 MHz** in the **Horizontal** polarization, Unwanted Emission

Antenna 8: PAWSA24-17 17dBi Vertically Polarized 90 Degree Sector

-2.1 dB at **2384.10 MHz** in the **Vertical** polarization, Low Channel

-17.8 dB at **4874.00 MHz** in the **Vertical** polarization, Middle Channel

-5.3 dB at **2486.50 MHz** in the **Vertical** polarization, High Channel

-5.1 dB at **572.01 MHz** in the **Horizontal** polarization, Unwanted Emission

Antenna 9: PAWSA24-16 16.5 dBi Vertically Polarized 120 Degree Sector

-2.2 dB at **2384.10 MHz** in the **Vertical** polarization, Low Channel

-18.0 dB at **4874.00 MHz** in the **Vertical** polarization, Middle Channel

-5.4 dB at **2486.50 MHz** in the **Vertical** polarization, High Channel

-5.3 dB at **572.01 MHz** in the **Horizontal** polarization, Unwanted Emission

Radiated Emission Test Result

Antenna 1: WISP 24013 – 120PTNF, 13dBi 120 Degree, Sector Panel

Indicated			Table	Antenna		Correction Factor			Corrected Amplitude	FCC 15 Subpart C	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/V	Antenna dBμV/m	Cable DB	Amp. DB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
Low Channel, 1-25GHz											
2412.00	115.6	FUND/PEAK	0	1.2	V	28.1	3.4	35.2	111.9		
2412.00	96.5	FUND/PEAK	270	1.5	H	28.1	3.4	35.2	92.8		
2412.00	108.7	FUND/AVE	0	1.2	V	28.1	3.4	35.2	104.9		
2412.00	89.3	FUND/AVE	270	1.5	H	28.1	3.4	35.2	85.6		
2384.10	55.7	AVE	0	1.2	V	28.1	3.4	35.2	52.0	54	-2.1
2384.10	67.9	PEAK	0	1.2	V	28.1	3.4	35.2	64.2	74	-9.9
2384.10	47.9	AVE	0	1.5	H	28.1	3.4	35.2	44.2	54	-9.9
4824.00	31.5	AVE	30	1.5	V	32.5	4.9	33.0	35.9	54	-18.1
4824.00	30.7	AVE	90	1.3	H	32.5	4.9	33.0	35.1	54	-18.9
2384.10	58.8	PEAK	0	1.5	H	28.1	3.4	35.2	55.1	74	-19.0
4824.00	43.8	PEAK	30	1.5	V	32.5	4.9	33.0	48.2	74	-25.8
4824.00	42.6	PEAK	90	1.3	H	32.5	4.9	33.0	47.0	74	-27.0

Antenna 1: WISP 24013 – 120PTNF, 13dBi 120 Degree, Sector Panel (Continued)

Indicated			Table	Antenna		Correction Factor			Corrected Amplitude	FCC 15 Subpart C	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/V	Antenna dBμV/m	Cable DB	Amp. DB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
Middle Channel, 1-25GHz											
2437.00	117.1	FUND/PEAK	0	1.5	V	28.1	3.4	35.2	113.4		
2437.00	99.5	FUND/PEAK	30	1.2	H	28.1	3.4	35.2	95.8		
2437.00	109.8	FUND/AVE	0	1.5	V	28.1	3.4	35.2	106.1		
2437.00	92.6	FUND/AVE	30	1.2	H	28.1	3.4	35.2	88.9		
4874.00	31.7	AVE	60	1.3	V	32.5	4.9	33.0	36.1	54	-17.9
4874.00	30.9	AVE	90	1.2	H	32.5	4.9	33.0	35.3	54	-18.7
4874.00	44.1	PEAK	60	1.3	V	32.5	4.9	33.0	48.5	74	-25.5
4874.00	42.8	PEAK	90	1.2	H	32.5	4.9	33.0	47.2	74	-26.8
High Channel, 1-25GHz											
2462.00	115.3	FUND/PEAK	0	1.5	V	28.1	3.4	35.2	111.6		
2462.00	99.4	FUND/PEAK	0	1.2	H	28.1	3.4	35.2	95.7		
2462.00	108.2	FUND/AVE	0	1.5	V	28.1	3.4	35.2	104.5		
2462.00	92.1	FUND/AVE	0	1.2	H	28.1	3.4	35.2	88.4		
2486.50	52.4	AVE	0	1.5	V	28.1	3.4	35.2	48.7	54	-5.4
2486.50	61.9	PEAK	0	1.5	V	28.1	3.4	35.2	58.2	74	-15.9
2486.50	41.7	AVE	90	1.8	H	28.1	3.4	35.2	38.0	54	-16.1
4924.00	31.5	AVE	60	1.0	V	32.5	4.9	33.0	35.9	54	-18.1
4924.00	30.4	AVE	30	1.5	H	32.5	4.9	33.0	34.8	54	-19.2
4924.00	43.9	PEAK	60	1.0	V	32.5	4.9	33.0	48.3	74	-25.7
4924.00	42.6	PEAK	30	1.5	H	32.5	4.9	33.0	47.0	74	-27.0
2486.50	50.5	PEAK	90	1.8	H	28.1	3.4	35.2	46.8	74	-27.3

Indicated			Table	Antenna		Correction Factor			FCC 15 Subpart B	
Frequency MHz	Ampl. dBμV/m	Direction Degree	Height Meter	Polar H/V	Antenna dBμV/m	Cable Loss dBμV/m	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
572.01	46.8	180	1.2	H	19.3	3.0	28.7	40.4	46	-5.6
479.57	45.6	140	1.2	H	17.8	3.1	28.2	38.3	46	-7.7
194.73	46.1	290	1.5	V	13.7	2.1	28.5	33.4	43.5	-10.1
390.15	45.9	210	1.8	V	16.4	2.5	28.9	35.9	46	-10.1
360.03	42.7	270	1.5	V	15.5	2.4	28.7	31.9	46	-14.1
265.00	40.8	310	1.2	H	13.4	2.2	28.2	28.2	46	-17.8
290.00	37.8	180	1.2	V	13.7	2.3	28.2	25.6	46	-20.4

Antenna 2: WISP 24014 – 90PTNF, 14dBi 90 Degree, Sector Panel

INDICATED			TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC 15 SUBPART C	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dBμV/m	Cable DB	Amp. DB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
Low Channel, 1-25GHz											
2412.00	115.8	FUND/PEAK	0	1.5	V	28.1	3.4	35.2	112.1		
2412.00	99.1	FUND/PEAK	30	1.2	H	28.1	3.4	35.2	95.4		
2412.00	109.2	FUND/AVE	0	1.5	V	28.1	3.4	35.2	105.5		
2412.00	91.8	FUND/AVE	30	1.2	H	28.1	3.4	35.2	88.1		
2384.10	55.9	AVE	0	1.5	V	28.1	3.4	35.2	52.2	54	-1.9
2384.10	48.2	AVE	30	1.5	H	28.1	3.4	35.2	44.5	54	-9.6
2384.10	68.1	PEAK	0	1.5	V	28.1	3.4	35.2	64.4	74	-9.7
4824.00	31.8	AVE	60	1.8	V	32.5	4.9	33.0	36.2	54	-17.8
2384.10	59.2	PEAK	30	1.5	H	28.1	3.4	35.2	55.5	74	-18.6
4824.00	30.9	AVE	180	1.2	H	32.5	4.9	33.0	35.3	54	-18.7
4824.00	44.1	PEAK	60	1.8	V	32.5	4.9	33.0	48.5	74	-25.5
4824.00	42.7	PEAK	180	1.2	H	32.5	4.9	33.0	47.1	74	-26.9
Middle Channel, 1-25GHz											
2437.00	117.5	FUND/PEAK	0	1.2	V	28.1	3.4	35.2	113.8		
2437.00	100.6	FUND/PEAK	0	1.5	H	28.1	3.4	35.2	96.9		
2437.00	100.1	FUND/AVE	0	1.2	V	28.1	3.4	35.2	96.4		
2437.00	93.2	FUND/AVE	0	1.5	H	28.1	3.4	35.2	89.5		
4874.00	32.1	AVE	120	1.5	V	32.5	4.9	33.0	36.5	54	-17.5
4874.00	31.3	AVE	310	1.6	H	32.5	4.9	33.0	35.7	54	-18.3
4874.00	44.6	PEAK	120	1.5	V	32.5	4.9	33.0	49.0	74	-25.0
4874.00	42.9	PEAK	310	1.6	H	32.5	4.9	33.0	47.3	74	-26.7

Antenna 2: WISP 24014 – 90PTNF, 14dBi 90 Degree, Sector Panel (Continued)

Indicated			Table	Antenna		Correction Factor			Corrected Amplitude	FCC 15 Subpart C	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dBμV/m	Cable DB	Amp. DB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
High Channel, 1-25GHz											
2462.00	117.6	FUND/PEAK	0	1.2	V	28.1	3.4	35.2	113.9		
2462.00	100.8	FUND/PEAK	30	1.5	H	28.1	3.4	35.2	97.1		
2462.00	110.2	FUND/AVE	0	1.2	V	28.1	3.4	35.2	106.5		
2462.00	93.5	FUND/AVE	30	1.5	H	28.1	3.4	35.2	89.8		
2486.50	52.6	AVE	0	1.6	V	28.1	3.4	35.2	48.9	54	-5.2
2486.50	68.2	PEAK	0	1.6	V	28.1	3.4	35.2	64.5	74	-9.6
2486.50	41.9	AVE	30	1.5	H	28.1	3.4	35.2	38.2	54	-15.9
4924.00	32.2	AVE	290	1.5	V	32.5	4.9	33.0	36.6	54	-17.4
4924.00	31.1	AVE	130	1.8	H	32.5	4.9	33.0	35.5	54	-18.5
4924.00	44.7	PEAK	290	1.5	V	32.5	4.9	33.0	49.1	74	-24.9
4924.00	42.8	PEAK	130	1.8	H	32.5	4.9	33.0	47.2	74	-26.8
2486.50	50.8	PEAK	30	1.5	H	28.1	3.4	35.2	47.1	74	-27.0

Indicated			Table	Antenna		Correction Factor			FCC 15 Subpart B	
Frequency MHz	Ampl. dBμV/m	Direction Degree	Height Meter	Polar H/V	Antenna dBμV/m	Cable Loss dBμV/m	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
572.01	46.9	0	1.2	H	19.3	3.0	28.7	40.5	46	-5.5
479.57	45.7	180	1.2	H	17.8	3.1	28.2	38.4	46	-7.6
390.15	46.1	210	1.8	V	16.4	2.5	28.9	36.1	46	-9.9
194.73	46.2	270	1.5	V	13.7	2.1	28.5	33.5	43.5	-10.0
360.03	42.8	270	1.5	V	15.5	2.4	28.7	32.0	46	-14.0
265.00	40.7	330	1.2	H	13.4	2.2	28.2	28.1	46	-17.9
290.00	37.9	150	1.2	V	13.7	2.3	28.2	25.7	46	-20.3

Note:

FUND = Fundamental
AVG = average

Antenna 3: WISP 24024 PTNF, 24dBi Parabolic Grid

INDICATED			TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC 15 SUBPART C	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dBμV/m	Cable DB	Amp. DB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
Low Channel, 1-25GHz											
2412.00	110.7	FUND/PEAK	0	1.5	V	28.1	3.4	35.2	107.0		
2412.00	103.3	FUND/PEAK	0	1.2	H	28.1	3.4	35.2	99.6		
2412.00	102.9	FUND/AVE	0	1.5	V	28.1	3.4	35.2	99.2		
2412.00	95.5	FUND/AVE	0	1.2	H	28.1	3.4	35.2	91.8		
2384.10	54.5	AVE	0	1.5	V	28.1	3.4	35.2	50.8	54	-3.3
2384.10	66.7	PEAK	0	1.5	V	28.1	3.4	35.2	63.0	74	-11.1
2384.10	46.6	AVE	0	1.5	H	28.1	3.4	35.2	42.9	54	-11.2
4824.00	30.8	AVE	90	1.8	V	32.5	4.9	33.0	35.2	54	-18.8
4824.00	30.1	AVE	15	1.2	H	32.5	4.9	33.0	34.5	54	-19.5
2384.10	57.4	PEAK	0	1.5	H	28.1	3.4	35.2	53.7	74	-20.4
4824.00	42.9	PEAK	90	1.8	V	32.5	4.9	33.0	47.3	74	-26.7
4824.00	41.7	PEAK	15	1.2	H	32.5	4.9	33.0	46.1	74	-27.9
Middle Channel, 1-25GHz											
2437.00	111.8	FUND/PEAK	0	1.2	V	28.1	3.4	35.2	108.1		
2437.00	103.6	FUND/PEAK	0	1.5	H	28.1	3.4	35.2	99.9		
2437.00	103.9	FUND/AVE	0	1.2	V	28.1	3.4	35.2	100.2		
2437.00	95.7	FUND/AVE	0	1.5	H	28.1	3.4	35.2	92.0		
4874.00	31.3	AVE	60	1.5	V	32.5	4.9	33.0	35.7	54	-18.3
4874.00	30.5	AVE	210	1.6	H	32.5	4.9	33.0	34.9	54	-19.1
4874.00	43.5	PEAK	60	1.5	V	32.5	4.9	33.0	47.9	74	-26.1
4874.00	42.2	PEAK	210	1.6	H	32.5	4.9	33.0	46.6	74	-27.4

Antenna 3: WISP 24024 PTNF, 24dBi Parabolic Grid (Continued)

Indicated			Table	Antenna		Correction Factor			Corrected Amplitude	FCC 15 Subpart C	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dBμV/m	Cable DB	Amp. DB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
High Channel, 1-25GHz											
2462.00	111.5	FUND/PEAK	0	1.2	V	28.1	3.4	35.2	107.8		
2462.00	103.3	FUND/PEAK	30	1.5	H	28.1	3.4	35.2	99.6		
2462.00	103.5	FUND/AVE	0	1.2	V	28.1	3.4	35.2	99.8		
2462.00	95.2	FUND/AVE	30	1.5	H	28.1	3.4	35.2	91.5		
2486.50	52.1	AVE	0	1.6	V	28.1	3.4	35.2	48.4	54	-5.7
2486.50	61.6	PEAK	0	1.6	V	28.1	3.4	35.2	57.9	74	-16.2
2486.50	41.3	AVE	30	1.5	H	28.1	3.4	35.2	37.6	54	-16.5
4924.00	31.2	AVE	310	1.5	V	32.5	4.9	33.0	35.6	54	-18.4
4924.00	30.3	AVE	270	1.8	H	32.5	4.9	33.0	34.7	54	-19.3
4924.00	43.3	PEAK	310	1.5	V	32.5	4.9	33.0	47.7	74	-26.3
4924.00	42.1	PEAK	270	1.8	H	32.5	4.9	33.0	46.5	74	-27.5
2486.50	50.3	PEAK	30	1.5	H	28.1	3.4	35.2	46.6	74	-27.5

Indicated			Table	Antenna		Correction Factor			FCC 15 Subpart B	
Frequency MHz	Ampl. dBμV/m	Direction Degree	Height Meter	Polar H/V	Antenna dBμV/m	Cable Loss dBμV/m	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
572.01	46.3	310	1.2	H	19.3	3.0	28.7	39.9	46	-6.1
479.57	45.1	15	1.2	H	17.8	3.1	28.2	37.8	46	-8.2
194.73	45.9	240	1.5	V	13.7	2.1	28.5	33.2	43.5	-10.3
390.15	45.7	210	1.8	V	16.4	2.5	28.9	35.7	46	-10.3
360.03	42.5	180	1.5	V	15.5	2.4	28.7	31.7	46	-14.3
265.00	40.2	290	1.2	H	13.4	2.2	28.2	27.6	46	-18.4
290.00	37.6	0	1.2	V	13.7	2.3	28.2	25.4	46	-20.6

Note:

FUND = Fundamental
AVG = average

Antenna 4: PAWOD24-12 12 dBi Omni Directional

Indicated			Table	Antenna		Correction Factor			Corrected Amplitude	FCC 15 Subpart C	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dBμV/m	Cable DB	Amp. DB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
Low Channel, 1-25GHz											
2412.00	113.1	FUND/PEAK	0	1.5	V	28.1	3.4	35.2	109.4		
2412.00	96.9	FUND/PEAK	30	1.2	H	28.1	3.4	35.2	93.2		
2412.00	105.2	FUND/AVE	0	1.5	V	28.1	3.4	35.2	101.5		
2412.00	89.1	FUND/AVE	30	1.2	H	28.1	3.4	35.2	85.4		
2384.10	54.7	AVE	0	1.5	V	28.1	3.4	35.2	51.0	54	-3.1
2384.10	66.8	PEAK	0	1.5	V	28.1	3.4	35.2	63.1	74	-11.0
2384.10	46.8	AVE	30	1.5	H	28.1	3.4	35.2	43.1	54	-11.0
4824.00	31.2	AVE	90	1.8	V	32.5	4.9	33.0	35.6	54	-18.4
4824.00	30.4	AVE	210	1.2	H	32.5	4.9	33.0	34.8	54	-19.2
2384.10	57.6	PEAK	30	1.5	H	28.1	3.4	35.2	53.9	74	-20.2
4824.00	43.1	PEAK	90	1.8	V	32.5	4.9	33.0	47.5	74	-26.5
4824.00	41.9	PEAK	210	1.2	H	32.5	4.9	33.0	46.3	74	-27.7
Middle Channel, 1-25GHz											
2437.00	112.9	FUND/PEAK	90	1.2	V	28.1	3.4	35.2	109.2		
2437.00	95.3	FUND/PEAK	30	1.5	H	28.1	3.4	35.2	91.6		
2437.00	105.2	FUND/AVE	90	1.2	V	28.1	3.4	35.2	101.5		
2437.00	87.5	FUND/AVE	30	1.5	H	28.1	3.4	35.2	83.8		
4874.00	31.5	AVE	0	1.5	V	32.5	4.9	33.0	35.9	54	-18.1
4874.00	30.7	AVE	180	1.6	H	32.5	4.9	33.0	35.1	54	-18.9
4874.00	43.6	PEAK	0	1.5	V	32.5	4.9	33.0	48.0	74	-26.0
4874.00	42.3	PEAK	180	1.6	H	32.5	4.9	33.0	46.7	74	-27.3

Antenna 4: PAWOD24-12 12 dBi Omni Directional (Continued)

Indicated			Table	Antenna		Correction Factor			Corrected Amplitude	FCC 15 Subpart C	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dBμV/m	Cable DB	Amp. DB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
High Channel, 1-25GHz											
2462.00	113.4	FUND/PEAK	60	1.2	V	28.1	3.4	35.2	109.7		
2462.00	98.3	FUND/PEAK	30	1.5	H	28.1	3.4	35.2	94.6		
2462.00	105.6	FUND/AVE	60	1.2	V	28.1	3.4	35.2	101.9		
2462.00	90.7	FUND/AVE	30	1.5	H	28.1	3.4	35.2	87.0		
2486.50	52.1	AVE	60	1.6	V	28.1	3.4	35.2	48.4	54	-5.7
2486.50	41.9	AVE	30	1.5	H	28.1	3.4	35.2	38.2	54	-15.9
2486.50	61.7	PEAK	60	1.6	V	28.1	3.4	35.2	58.0	74	-16.1
4924.00	31.6	AVE	0	1.5	V	32.5	4.9	33.0	36.0	54	-18.0
4924.00	30.7	AVE	15	1.8	H	32.5	4.9	33.0	35.1	54	-18.9
4924.00	43.7	PEAK	0	1.5	V	32.5	4.9	33.0	48.1	74	-25.9
4924.00	42.3	PEAK	15	1.8	H	32.5	4.9	33.0	46.7	74	-27.3
2486.50	50.3	PEAK	30	1.5	H	28.1	3.4	35.2	46.6	74	-27.5

Indicated			Table	Antenna		Correction Factor			FCC 15 Subpart B	
Frequency MHz	Ampl. dBμV/m	Direction Degree	Height Meter	Polar H/V	Antenna dBμV/m	Cable Loss dBμV/m	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
572.01	46.1	90	1.2	H	19.3	3.0	28.7	39.7	46	-6.3
479.57	44.9	120	1.2	H	17.8	3.1	28.2	37.6	46	-8.4
390.15	45.5	310	1.8	V	16.4	2.5	28.9	35.5	46	-10.5
194.73	45.2	270	1.5	V	13.7	2.1	28.5	32.5	43.5	-11.0
360.03	42.2	250	1.5	V	15.5	2.4	28.7	31.4	46	-14.6
265.00	40.1	180	1.2	H	13.4	2.2	28.2	27.5	46	-18.5
290.00	37.4	0	1.2	V	13.7	2.3	28.2	25.2	46	-20.8

Note:

FUND = Fundamental
AVG = average

Antenna 5: PAWSA24-16 16.5 dBi Horizontally Polarized 90 Degree Sector

Indicated			Table	Antenna		Correction Factor			Corrected Amplitude	FCC 15 Subpart C	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/V	Antenna dBμV/m	Cable DB	Amp. DB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
Low Channel, 1-25GHz											
2412.00	91.8	FUND/PEAK	0	1.5	V	28.1	3.4	35.2	88.1		
2412.00	119.2	FUND/PEAK	0	1.2	H	28.1	3.4	35.2	115.5		
2412.00	83.7	FUND/AVE	0	1.5	V	28.1	3.4	35.2	80.0		
2412.00	111.3	FUND/AVE	0	1.2	H	28.1	3.4	35.2	107.6		
2384.10	54.7	AVE	0	1.5	H	28.1	3.4	35.2	51.0	54	-3.1
2384.10	46.8	AVE	0	1.5	V	28.1	3.4	35.2	43.1	54	-11.0
2384.10	66.2	PEAK	0	1.5	H	28.1	3.4	35.2	62.5	74	-11.6
4824.00	31.2	AVE	310	1.2	H	32.5	4.9	33.0	35.6	54	-18.4
4824.00	30.4	AVE	270	1.8	V	32.5	4.9	33.0	34.8	54	-19.2
2384.10	57.1	PEAK	0	1.5	V	28.1	3.4	35.2	53.4	74	-20.7
4824.00	43.3	PEAK	310	1.2	H	32.5	4.9	33.0	47.7	74	-26.3
4824.00	42.1	PEAK	270	1.8	V	32.5	4.9	33.0	46.5	74	-27.5
Middle Channel, 1-25GHz											
2437.00	93.7	FUND/PEAK	0	1.5	V	28.1	3.4	35.2	90.0		
2437.00	119.5	FUND/PEAK	0	1.8	H	28.1	3.4	35.2	115.8		
2437.00	85.6	FUND/AVE	0	1.5	V	28.1	3.4	35.2	81.9		
2437.00	111.3	FUND/AVE	0	1.8	H	28.1	3.4	35.2	107.6		
4874.00	31.6	AVE	90	1.6	H	32.5	4.9	33.0	36.0	54	-18.0
4874.00	30.9	AVE	30	1.5	V	32.5	4.9	33.0	35.3	54	-18.7
4874.00	43.9	PEAK	90	1.6	H	32.5	4.9	33.0	48.3	74	-25.7
4874.00	42.7	PEAK	30	1.5	V	32.5	4.9	33.0	47.1	74	-26.9

Antenna 5: PAWSA24-16 16.5 dBi Horizontally Polarized 90 Degree Sector (Continued)

Indicated			Table	Antenna		Correction Factor			Corrected Amplitude	FCC 15 Subpart C	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dBμV/m	Cable DB	Amp. DB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
High Channel, 1-25GHz											
2462.00	95.3	FUND/PEAK	0	1.2	V	28.1	3.4	35.2	91.6		
2462.00	119.4	FUND/PEAK	0	1.5	H	28.1	3.4	35.2	115.7		
2462.00	87.1	FUND/AVE	0	1.2	V	28.1	3.4	35.2	83.4		
2462.00	111.2	FUND/AVE	0	1.5	H	28.1	3.4	35.2	107.5		
2486.50	52.8	AVE	0	1.5	H	28.1	3.4	35.2	49.1	54	-5.0
2486.50	62.2	PEAK	0	1.5	H	28.1	3.4	35.2	58.5	74	-15.6
2486.50	41.9	AVE	0	1.6	V	28.1	3.4	35.2	38.2	54	-15.9
4924.00	31.9	AVE	270	1.8	H	32.5	4.9	33.0	36.3	54	-17.7
4924.00	31.1	AVE	180	1.5	V	32.5	4.9	33.0	35.5	54	-18.5
4924.00	43.7	PEAK	270	1.8	H	32.5	4.9	33.0	48.1	74	-25.9
4924.00	42.8	PEAK	180	1.5	V	32.5	4.9	33.0	47.2	74	-26.8
2486.50	50.6	PEAK	0	1.6	V	28.1	3.4	35.2	46.9	74	-27.2

Indicated			Table	Antenna		Correction Factor			FCC 15 Subpart B	
Frequency MHz	Ampl. dBμV/m	Direction Degree	Height Meter	Polar H/V	Antenna dBμV/m	Cable Loss dBμV/m	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
572.01	47.2	180	1.2	H	19.3	3.0	28.7	40.8	46	-5.2
479.57	45.7	120	1.2	H	17.8	3.1	28.2	38.4	46	-7.6
390.15	46.1	15	1.8	V	16.4	2.5	28.9	36.1	46	-9.9
194.73	46.2	230	1.5	V	13.7	2.1	28.5	33.5	43.5	-10.0
360.03	42.9	60	1.5	V	15.5	2.4	28.7	32.1	46	-13.9
265.00	40.7	180	1.2	H	13.4	2.2	28.2	28.1	46	-17.9
290.00	38.1	0	1.2	V	13.7	2.3	28.2	25.9	46	-20.1

Note:

FUND = Fundamental
AVG = average

Antenna 6: PAWDC24-HD-PFIP 24 dBi Die Cast

INDICATED			TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC 15 SUBPART C	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dBμV/m	Cable DB	Amp. DB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
Low Channel, 1-25GHz											
2412.00	122.1	FUND/PEAK	0	1.5	V	28.1	3.4	35.2	118.4		
2412.00	100.3	FUND/PEAK	0	1.2	H	28.1	3.4	35.2	96.6		
2412.00	115.2	FUND/AVE	0	1.5	V	28.1	3.4	35.2	111.5		
2412.00	92.7	FUND/AVE	0	1.2	H	28.1	3.4	35.2	89.0		
2384.10	55.9	AVE	0	1.5	V	28.1	3.4	35.2	52.2	54	-1.9
2384.10	48.4	AVE	0	1.5	H	28.1	3.4	35.2	44.7	54	-9.4
2384.10	68.2	PEAK	0	1.5	V	28.1	3.4	35.2	64.5	74	-9.6
4824.00	32.7	AVE	150	1.8	V	32.5	4.9	33.0	37.1	54	-16.9
4824.00	31.5	AVE	290	1.2	H	32.5	4.9	33.0	35.9	54	-18.1
2384.10	59.3	PEAK	0	1.5	H	28.1	3.4	35.2	55.6	74	-18.5
4824.00	44.2	PEAK	150	1.8	V	32.5	4.9	33.0	48.6	74	-25.4
4824.00	43.1	PEAK	290	1.2	H	32.5	4.9	33.0	47.5	74	-26.5
Middle Channel, 1-25GHz											
2437.00	123.3	FUND/PEAK	0	1.5	V	28.1	3.4	35.2	119.6		
2437.00	101.4	FUND/PEAK	0	1.8	H	28.1	3.4	35.2	97.7		
2437.00	115.6	FUND/AVE	0	1.5	V	28.1	3.4	35.2	111.9		
2437.00	93.5	FUND/AVE	0	1.8	H	28.1	3.4	35.2	89.8		
4874.00	32.9	AVE	30	1.5	V	32.5	4.9	33.0	37.3	54	-16.7
4874.00	31.7	AVE	90	1.6	H	32.5	4.9	33.0	36.1	54	-17.9
4874.00	44.5	PEAK	30	1.5	V	32.5	4.9	33.0	48.9	74	-25.1
4874.00	43.4	PEAK	90	1.6	H	32.5	4.9	33.0	47.8	74	-26.2

Antenna 6: PAWDC24-HD-PFIP 24 dBi Die Cast (Continued)

INDICATED			TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC 15 SUBPART C	
Frequency MHz	Ampl. dBμV /m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dBμV/m	Cable DB	Amp. DB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
High Channel, 1-25GHz											
2462.00	123.1	FUND/PEAK	0	1.2	V	28.1	3.4	35.2	119.4		
2462.00	94.2	FUND/PEAK	0	1.5	H	28.1	3.4	35.2	90.5		
2462.00	116.4	FUND/AVE	0	1.2	V	28.1	3.4	35.2	112.7		
2462.00	87.5	FUND/AVE	0	1.5	H	28.1	3.4	35.2	83.8		
2486.50	52.9	AVE	0	1.6	V	28.1	3.4	35.2	49.2	54	-4.9
2486.50	42.3	AVE	0	1.5	H	28.1	3.4	35.2	38.6	54	-15.5
2486.50	62.2	PEAK	0	1.6	V	28.1	3.4	35.2	58.5	74	-15.6
4924.00	32.7	AVE	120	1.5	V	32.5	4.9	33.0	37.1	54	-16.9
4924.00	31.5	AVE	290	1.8	H	32.5	4.9	33.0	35.9	54	-18.1
4924.00	44.3	PEAK	120	1.5	V	32.5	4.9	33.0	48.7	74	-25.3
4924.00	43.2	PEAK	290	1.8	H	32.5	4.9	33.0	47.6	74	-26.4
2486.50	50.8	PEAK	0	1.5	H	28.1	3.4	35.2	47.1	74	-27.0

Indicated			Table	Antenna		Correction Factor			FCC 15 Subpart B	
Frequency MHz	Ampl. dBμV/m	Direction Degree	Height Meter	Polar H/V	Antenna dBμV/m	Cable Loss dBμV/m	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
572.01	48.1	0	1.2	H	19.3	3.0	28.7	41.7	46	-4.3
479.57	45.9	110	1.2	H	17.8	3.1	28.2	38.6	46	-7.4
390.15	46.2	180	1.8	V	16.4	2.5	28.9	36.2	46	-9.8
194.73	46.1	30	1.5	V	13.7	2.1	28.5	33.4	43.5	-10.1
360.03	43.6	60	1.5	V	15.5	2.4	28.7	32.8	46	-13.2
265.00	40.9	90	1.2	H	13.4	2.2	28.2	28.3	46	-17.7
290.00	38.5	15	1.2	V	13.7	2.3	28.2	26.3	46	-19.7

Note:

FUND = Fundamental
AVG = average

Antenna 7: PAWODH24-13 13dBi Horizontally Polarized Sector

INDICATED			TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC 15 SUBPART C	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dBμV/m	Cable DB	Amp. DB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
Low Channel, 1-25GHz											
2412.00	93.8	FUND/PEAK	0	1.8	V	28.1	3.4	35.2	90.1		
2412.00	113.7	FUND/PEAK	0	1.6	H	28.1	3.4	35.2	110.0		
2412.00	85.1	FUND/AVE	0	1.8	V	28.1	3.4	35.2	81.4		
2412.00	106.1	FUND/AVE	0	1.6	H	28.1	3.4	35.2	102.4		
2384.10	55.1	AVE	0	1.5	H	28.1	3.4	35.2	51.4	54	-2.7
2384.10	67.4	PEAK	0	1.5	H	28.1	3.4	35.2	63.7	74	-10.4
2384.10	47.2	AVE	0	1.3	V	28.1	3.4	35.2	43.5	54	-10.6
4824.00	31.3	AVE	180	1.2	H	32.5	4.9	33.0	35.7	54	-18.3
2384.10	58.5	PEAK	0	1.3	V	28.1	3.4	35.2	54.8	74	-19.3
4824.00	30.1	AVE	60	1.8	V	32.5	4.9	33.0	34.5	54	-19.5
4824.00	43.2	PEAK	180	1.2	H	32.5	4.9	33.0	47.6	74	-26.4
4824.00	41.9	PEAK	60	1.8	V	32.5	4.9	33.0	46.3	74	-27.7
Middle Channel, 1-25GHz											
2437.00	96.9	FUND/PEAK	0	1.5	V	28.1	3.4	35.2	93.2		
2437.00	115.9	FUND/PEAK	0	1.8	H	28.1	3.4	35.2	112.2		
2437.00	88.7	FUND/AVE	0	1.5	V	28.1	3.4	35.2	85.0		
2437.00	107.4	FUND/AVE	0	1.8	H	28.1	3.4	35.2	103.7		
4874.00	31.6	AVE	80	1.6	H	32.5	4.9	33.0	36.0	54	-18.0
4874.00	30.3	AVE	30	1.5	V	32.5	4.9	33.0	34.7	54	-19.3
4874.00	43.5	PEAK	80	1.6	H	32.5	4.9	33.0	47.9	74	-26.1
4874.00	42.1	PEAK	30	1.5	V	32.5	4.9	33.0	46.5	74	-27.5

Antenna 7: PAWODH24-13 13dBi Horizontally Polarized Sector (Continued)

Indicated			Table	Antenna		Correction Factor			Corrected Amplitude	FCC 15 Subpart C	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dBμV/m	Cable DB	Amp. DB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
High Channel, 1-25GHz											
2462.00	96.7	FUND/PEAK	0	1.2	V	28.1	3.4	35.2	93.0		
2462.00	116.8	FUND/PEAK	0	1.5	H	28.1	3.4	35.2	113.1		
2462.00	88.5	FUND/AVE	0	1.2	V	28.1	3.4	35.2	84.8		
2462.00	108.6	FUND/AVE	0	1.5	H	28.1	3.4	35.2	104.9		
2486.50	52.6	AVE	0	1.5	H	28.1	3.4	35.2	48.9	54	-5.2
2486.50	62.1	PEAK	0	1.5	H	28.1	3.4	35.2	58.4	74	-15.7
2486.50	41.7	AVE	0	1.6	V	28.1	3.4	35.2	38.0	54	-16.1
4924.00	31.7	AVE	270	1.8	H	32.5	4.9	33.0	36.1	54	-17.9
4924.00	30.2	AVE	120	1.5	V	32.5	4.9	33.0	34.6	54	-19.4
4924.00	43.6	PEAK	270	1.8	H	32.5	4.9	33.0	48.0	74	-26.0
2486.50	50.5	PEAK	0	1.6	V	28.1	3.4	35.2	46.8	74	-27.3
4924.00	41.9	PEAK	120	1.5	V	32.5	4.9	33.0	46.3	74	-27.7

Indicated			Table	Antenna		Correction Factor			FCC 15 Subpart B	
Frequency MHz	Ampl. dBμV/m	Direction Degree	Height Meter	Polar H/V	Antenna dBμV/m	Cable Loss dBμV/m	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
572.01	47.6	270	1.2	H	19.3	3.0	28.7	41.2	46	-4.8
479.57	45.1	110	1.2	H	17.8	3.1	28.2	37.8	46	-8.2
390.15	45.8	60	1.8	V	16.4	2.5	28.9	35.8	46	-10.2
194.73	45.3	230	1.5	V	13.7	2.1	28.5	32.6	43.5	-10.9
360.03	43.2	90	1.5	V	15.5	2.4	28.7	32.4	46	-13.6
265.00	40.2	70	1.2	H	13.4	2.2	28.2	27.6	46	-18.4
290.00	38.4	0	1.2	V	13.7	2.3	28.2	26.2	46	-19.8

Note:

FUND = Fundamental
AVG = average

Antenna 8: PAWSA24-17 17 dBi Vertically Polarized 90 Degree Sector

Indicated			Table	Antenna		Correction Factor			Corrected Amplitude	FCC 15 Subpart C	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/V	Antenna dBμV/m	Cable DB	Amp. DB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
Low Channel, 1-25GHz											
2412.00	117.2	FUND/PEAK	0	1.8	V	28.1	3.4	35.2	113.5		
2412.00	98.9	FUND/PEAK	0	1.6	H	28.1	3.4	35.2	95.2		
2412.00	110.2	FUND/AVE	0	1.8	V	28.1	3.4	35.2	106.5		
2412.00	91.2	FUND/AVE	0	1.6	H	28.1	3.4	35.2	87.5		
2384.10	55.7	AVE	0	1.3	V	28.1	3.4	35.2	52.0	54	-2.1
2384.10	48.1	AVE	0	1.5	H	28.1	3.4	35.2	44.4	54	-9.7
2384.10	67.8	PEAK	0	1.3	V	28.1	3.4	35.2	64.1	74	-10.0
4824.00	31.9	AVE	90	1.8	V	32.5	4.9	33.0	36.3	54	-17.7
4824.00	30.9	AVE	120	1.2	H	32.5	4.9	33.0	35.3	54	-18.7
2384.10	58.9	PEAK	0	1.5	H	28.1	3.4	35.2	55.2	74	-18.9
4824.00	44.2	PEAK	90	1.8	V	32.5	4.9	33.0	48.6	74	-25.4
4824.00	42.8	PEAK	120	1.2	H	32.5	4.9	33.0	47.2	74	-26.8
Middle Channel, 1-25GHz											
2437.00	118.7	FUND/PEAK	0	1.5	V	28.1	3.4	35.2	115.0		
2437.00	97.6	FUND/PEAK	0	1.8	H	28.1	3.4	35.2	93.9		
2437.00	111.5	FUND/AVE	0	1.5	V	28.1	3.4	35.2	107.8		
2437.00	90.2	FUND/AVE	0	1.8	H	28.1	3.4	35.2	86.5		
4874.00	31.8	AVE	180	1.5	V	32.5	4.9	33.0	36.2	54	-17.8
4874.00	31.1	AVE	210	1.6	H	32.5	4.9	33.0	35.5	54	-18.5
4874.00	44.3	PEAK	180	1.5	V	32.5	4.9	33.0	48.7	74	-25.3
4874.00	42.9	PEAK	210	1.6	H	32.5	4.9	33.0	47.3	74	-26.7

Antenna 8: PAWSA24-17 17 dBi Vertically Polarized 90 Degree Sector (Continued)

Indicated			Table	Antenna		Correction Factor			Corrected Amplitude	FCC 15 Subpart C	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dBμV/m	Cable DB	Amp. DB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
High Channel, 1-25GHz											
2462.00	118.2	FUND/PEAK	0	1.2	V	28.1	3.4	35.2	114.5		
2462.00	98.1	FUND/PEAK	0	1.5	H	28.1	3.4	35.2	94.4		
2462.00	111.4	FUND/AVE	0	1.2	V	28.1	3.4	35.2	107.7		
2462.00	91.3	FUND/AVE	0	1.5	H	28.1	3.4	35.2	87.6		
2486.50	52.5	AVE	0	1.6	V	28.1	3.4	35.2	48.8	54	-5.3
2486.50	62.1	PEAK	0	1.6	V	28.1	3.4	35.2	58.4	74	-15.7
2486.50	41.9	AVE	0	1.5	H	28.1	3.4	35.2	38.2	54	-15.9
4924.00	31.6	AVE	170	1.5	V	32.5	4.9	33.0	36.0	54	-18.0
4924.00	30.0	AVE	290	1.8	H	32.5	4.9	33.0	34.4	54	-19.6
4924.00	44.1	PEAK	170	1.5	V	32.5	4.9	33.0	48.5	74	-25.5
4924.00	42.7	PEAK	290	1.8	H	32.5	4.9	33.0	47.1	74	-26.9
2486.50	50.8	PEAK	0	1.5	H	28.1	3.4	35.2	47.1	74	-27.0

Indicated			Table	Antenna		Correction Factor			FCC 15 Subpart B	
Frequency MHz	Ampl. dBμV/m	Direction Degree	Height Meter	Polar H/V	Antenna dBμV/m	Cable Loss dBμV/m	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
572.01	47.3	270	1.2	H	19.3	3.0	28.7	40.9	46	-5.1
479.57	45.7	110	1.2	H	17.8	3.1	28.2	38.4	46	-7.6
390.15	45.9	60	1.8	V	16.4	2.5	28.9	35.9	46	-10.1
194.73	45.5	210	1.5	V	13.7	2.1	28.5	32.8	43.5	-10.7
360.03	43.5	90	1.5	V	15.5	2.4	28.7	32.7	46	-13.3
265.00	40.3	80	1.2	H	13.4	2.2	28.2	27.7	46	-18.3
290.00	38.6	0	1.2	V	13.7	2.3	28.2	26.4	46	-19.6

Note:

FUND = Fundamental
AVG = average

Antenna 9: PAWSA24-16 16.5 Vertically Polarized 120 Degree Sector

Indicated			Table	Antenna		Correction Factor			Corrected Amplitude	FCC 15 Subpart C	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/V	Antenna dBμV/m	Cable DB	Amp. DB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
Low Channel, 1-25GHz											
2412.00	114.2	FUND/PEAK	0	1.8	V	28.1	3.4	35.2	110.5		
2412.00	92.8	FUND/PEAK	0	1.6	H	28.1	3.4	35.2	89.1		
2412.00	107.1	FUND/AVE	0	1.8	V	28.1	3.4	35.2	103.4		
2412.00	85.5	FUND/AVE	0	1.6	H	28.1	3.4	35.2	81.8		
2384.10	55.6	AVE	0	1.3	V	28.1	3.4	35.2	51.9	54	-2.2
2384.10	47.8	AVE	0	1.5	H	28.1	3.4	35.2	44.1	54	-10.0
2384.10	67.6	PEAK	0	1.3	V	28.1	3.4	35.2	63.9	74	-10.2
4824.00	31.7	AVE	320	1.8	V	32.5	4.9	33.0	36.1	54	-17.9
4824.00	30.8	AVE	30	1.2	H	32.5	4.9	33.0	35.2	54	-18.8
2384.10	58.7	PEAK	0	1.5	H	28.1	3.4	35.2	55.0	74	-19.1
4824.00	44.1	PEAK	320	1.8	V	32.5	4.9	33.0	48.5	74	-25.5
4824.00	42.6	PEAK	30	1.2	H	32.5	4.9	33.0	47.0	74	-27.0
Middle Channel, 1-25GHz											
2437.00	116.9	FUND/PEAK	0	1.5	V	28.1	3.4	35.2	113.2		
2437.00	93.1	FUND/PEAK	0	1.8	H	28.1	3.4	35.2	89.4		
2437.00	109.7	FUND/AVE	0	1.5	V	28.1	3.4	35.2	106.0		
2437.00	85.4	FUND/AVE	0	1.8	H	28.1	3.4	35.2	81.7		
4874.00	31.6	AVE	60	1.5	V	32.5	4.9	33.0	36.0	54	-18.0
4874.00	30.8	AVE	210	1.6	H	32.5	4.9	33.0	35.2	54	-18.8
4874.00	44.2	PEAK	60	1.5	V	32.5	4.9	33.0	48.6	74	-25.4
4874.00	42.7	PEAK	210	1.6	H	32.5	4.9	33.0	47.1	74	-26.9

Antenna 9: PAWSA24-16 16.5 Vertically Polarized 120 Degree Sector (Continued)

Indicated			Table	Antenna		Correction Factor			Corrected Amplitude	FCC 15 Subpart C	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dBμV/m	Cable DB	Amp. DB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
High Channel, 1-25GHz											
2462.00	115.3	FUND/PEAK	0	1.2	V	28.1	3.4	35.2	111.6		
2462.00	93.1	FUND/PEAK	0	1.5	H	28.1	3.4	35.2	89.4		
2462.00	107.9	FUND/AVE	0	1.2	V	28.1	3.4	35.2	104.2		
2462.00	86.2	FUND/AVE	0	1.5	H	28.1	3.4	35.2	82.5		
2486.50	52.4	AVE	0	1.6	V	28.1	3.4	35.2	48.7	54	-5.4
2486.50	61.9	PEAK	0	1.6	V	28.1	3.4	35.2	58.2	74	-15.9
2486.50	41.7	AVE	0	1.5	H	28.1	3.4	35.2	38.0	54	-16.1
4924.00	31.4	AVE	180	1.5	V	32.5	4.9	33.0	35.8	54	-18.2
4924.00	30.0	AVE	270	1.8	H	32.5	4.9	33.0	34.4	54	-19.6
4924.00	43.9	PEAK	180	1.5	V	32.5	4.9	33.0	48.3	74	-25.7
4924.00	42.5	PEAK	270	1.8	H	32.5	4.9	33.0	46.9	74	-27.1
2486.50	50.7	PEAK	0	1.5	H	28.1	3.4	35.2	47.0	74	-27.1

Indicated			Table	Antenna		Correction Factor			FCC 15 Subpart B	
Frequency MHz	Ampl. dBμV/m	Direction Degree	Height Meter	Polar H/V	Antenna dBμV/m	Cable Loss dBμV/m	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
572.01	47.1	270	1.2	H	19.3	3.0	28.7	40.7	46	-5.3
479.57	45.3	110	1.2	H	17.8	3.1	28.2	38.0	46	-8.0
390.15	45.7	60	1.8	V	16.4	2.5	28.9	35.7	46	-10.3
194.73	45.4	230	1.5	V	13.7	2.1	28.5	32.7	43.5	-10.8
360.03	43.4	90	1.5	V	15.5	2.4	28.7	32.6	46	-13.4
265.00	40.1	70	1.2	H	13.4	2.2	28.2	27.5	46	-18.5
290.00	38.5	0	1.2	V	13.7	2.3	28.2	26.3	46	-19.7

Note:

FUND = Fundamental
AVG = average

§15.247(a)(2) – 6 DB BANDWIDTH

Standard Applicable

According to §15.247(a)(2), for direct sequence systems, the minimum 6dB bandwidth shall be at least 500 kHz.

Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth. (6 dB bandwidth for DTS)
4. Repeat above procedures until all frequencies measured were complete.

Equipment Lists

Manufacturer	Model No.	Description	Calibration Date
HP	8565EC	Spectrum Analyzer	2003-01-22

Measurement Result

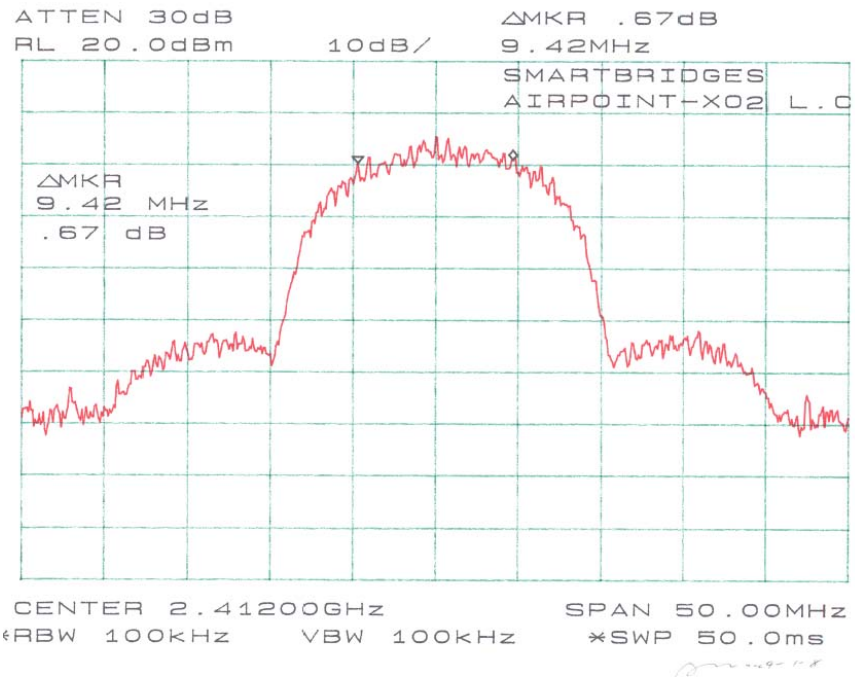
Environmental Conditions

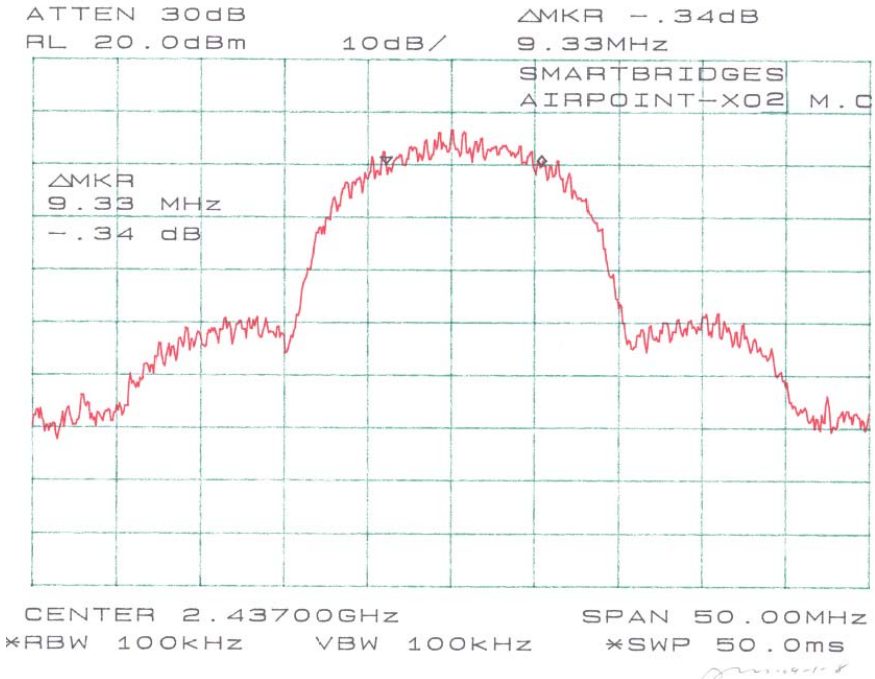
Temperature:	11° C
Relative Humidity:	49%
ATM Pressure:	1100 mbar

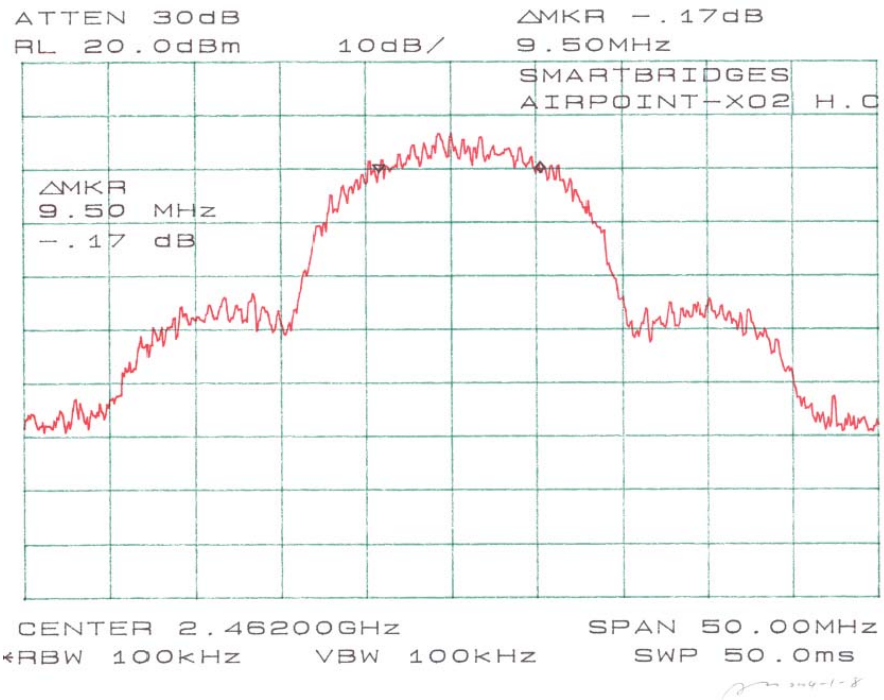
Test Result

Channel	Frequency (MHz)	Measured (MHz)	Measured (kHz)	Standard (kHz)	Result
Low	2412	9.42	9420	≥ 500	Pass
Mid	2437	9.33	9330	≥ 500	Pass
High	2462	9.50	9500	≥ 500	Pass

Plots of 6dB Bandwidth






ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -.17dB
9.50MHz
SMARTBRIDGES
AIRPOINT-X02 H.C
ΔMKR
9.50 MHz
-.17 dB
CENTER 2.46200GHz
SPAN 50.00MHz
RBW 100kHz
VBW 100kHz
SWP 50.0ms

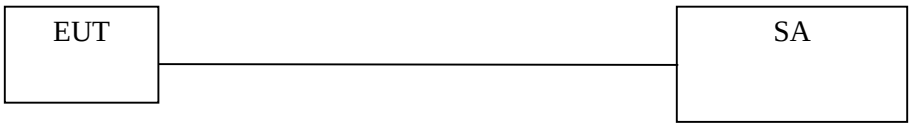
§15.247(b)(3) - PEAK OUTPUT POWER MEASUREMENT

Standard Applicable

According to §15.247(b) (3), for systems using digital modulation in 2400-2483.5 MHz: 1 Watt

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.



Equipment Lists

Manufacturer	Model No.	Description	Calibration Date
HP	8565EC	Spectrum Analyzer	2003-01-22

Measurement Result

Environmental Conditions

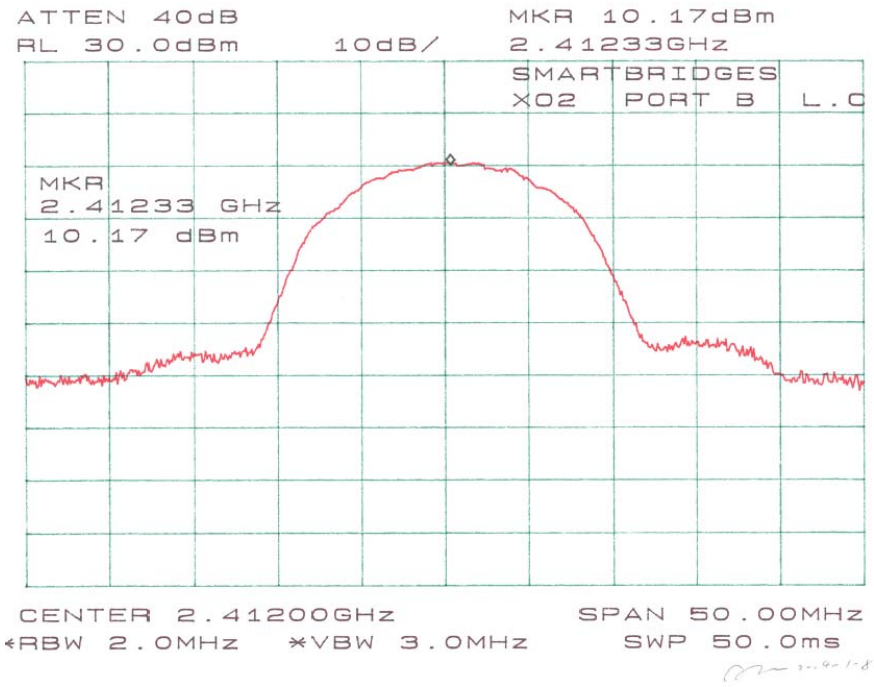
Temperature:	11° C
Relative Humidity:	49%
ATM Pressure:	1100 mbar

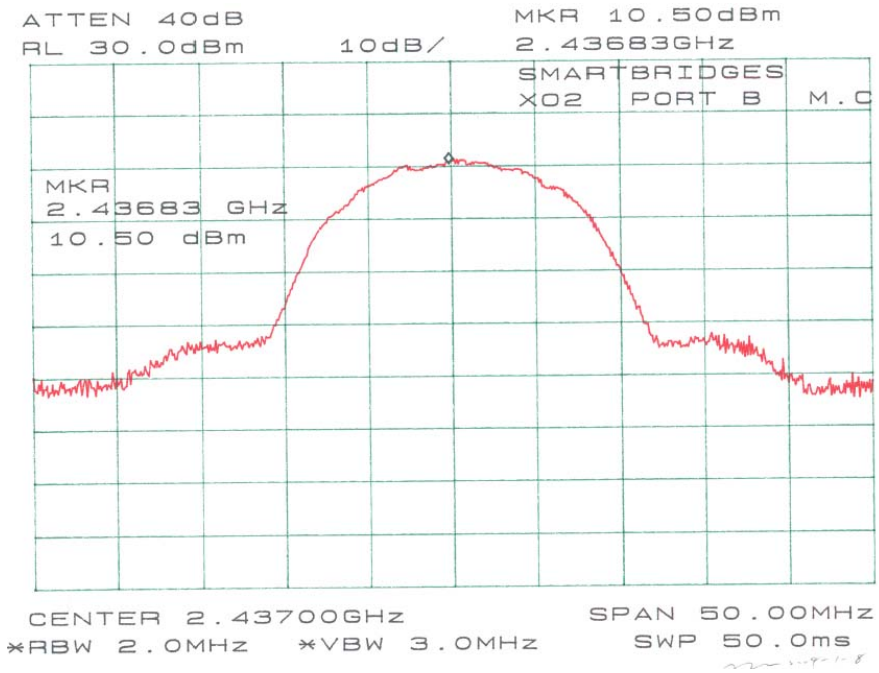
Test Data for Output Power

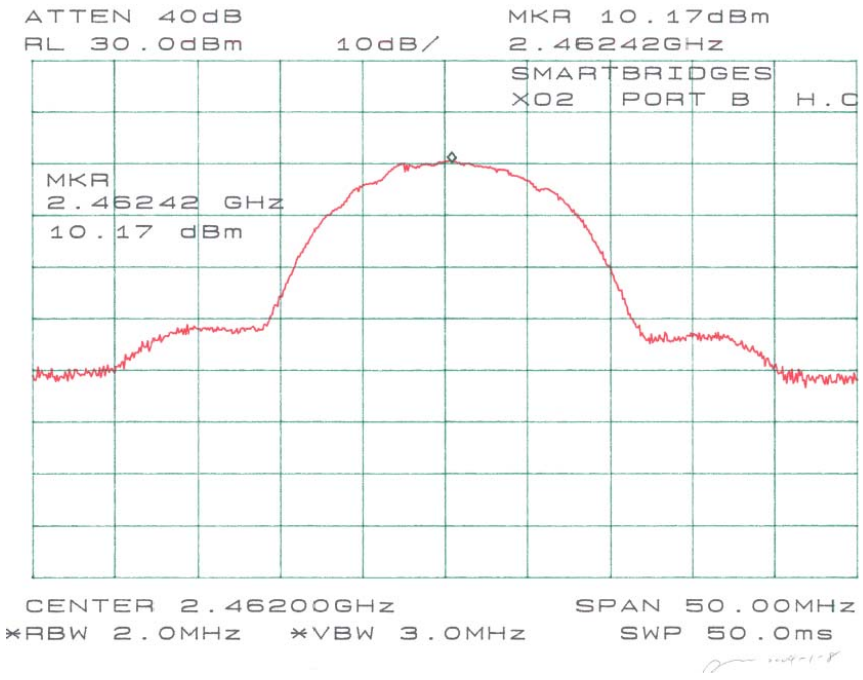
Channel	Frequency (MHz)	RF Power (dBm)	Correction Factor (dB)	Corrected RF Power (dBm)	Corrected RF Power (W)	Limit
Low (Ch1)	2412	10.17	6.77	16.94	0.049	1W (30dBm)
Mid (Ch7)	2437	10.50	6.77	17.27	0.053	1W (30dBm)
High (Ch11)	2462	10.17	6.77	16.94	0.049	1W (30dBm)

Note: Correction Factor = $10\text{Log}(BW_{6dB}/RBW) = 10\text{Log}(9.5/2) = 6.77$ dB

Plots of Peak Output Power






ATTEN 40dB
RL 30.0dBm
10dB/
MKR 10.17dBm
2.46242GHz
SMARTBRIDGES
XO2 PORT B H.C
MKR
2.46242 GHz
10.17 dBm
CENTER 2.46200GHz
SPAN 50.00MHz
*RBW 2.0MHz
*VBW 3.0MHz
SWP 50.0ms

§15.247(c) - 100 KHZ BANDWIDTH OF BAND EDGES

Standard Applicable

According to §15.247(c), in *any* 100 kHz bandwidth outside the frequency bands in which the spread spectrum 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. 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)).

Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Equipment Lists

Manufacturer	Model No.	Description	Calibration Date
HP	8565EC	Spectrum Analyzer	2003-01-22

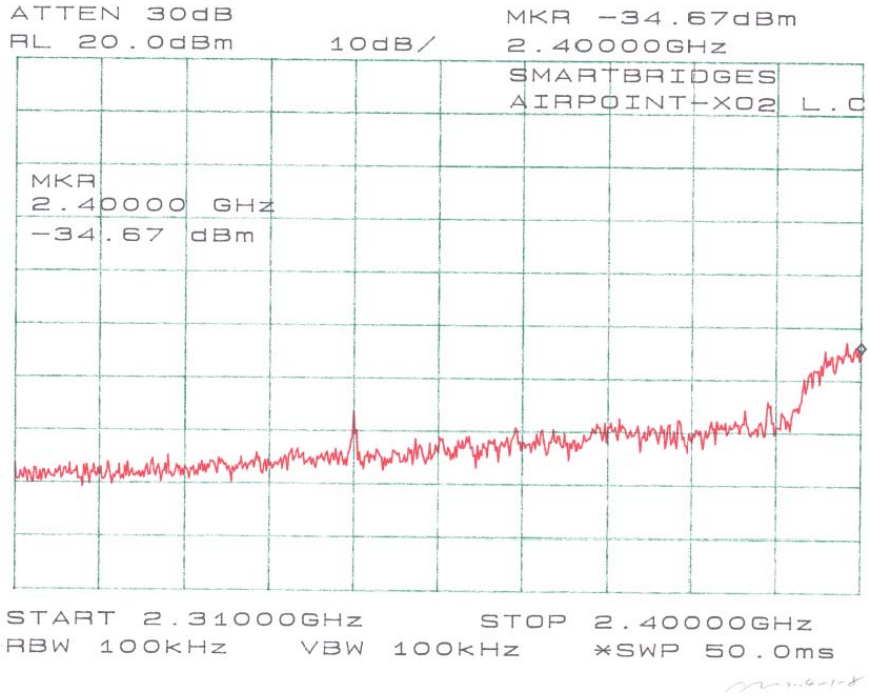
Measure Results

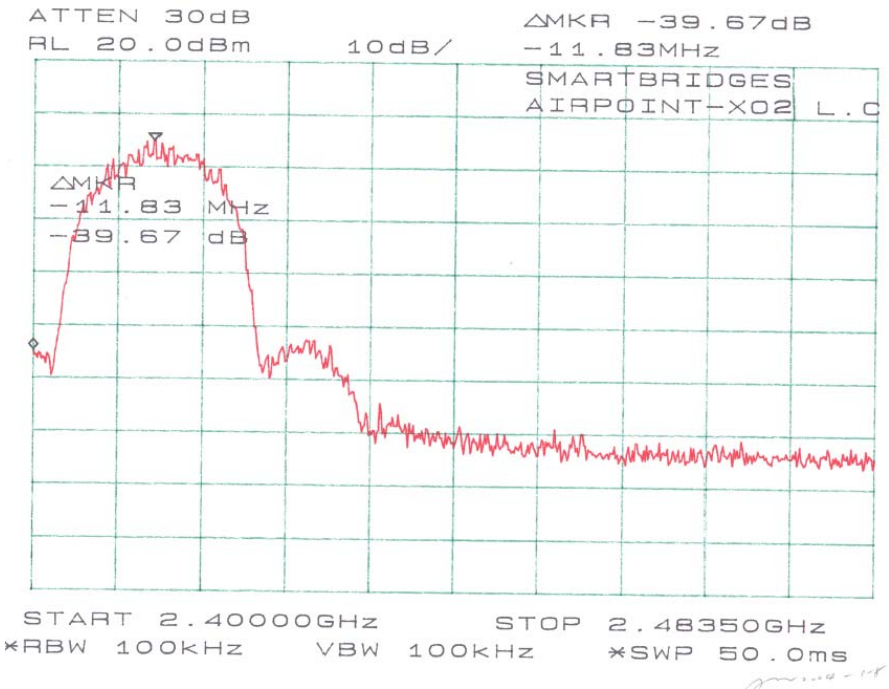
Environmental Conditions

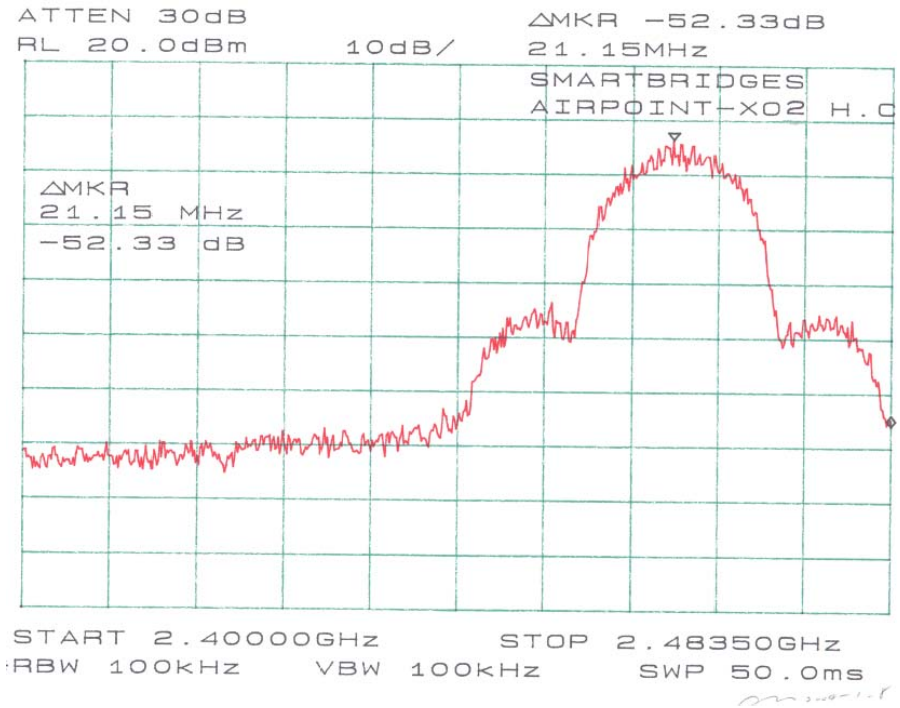
Temperature:	11° C
Relative Humidity:	49%
ATM Pressure:	1100 mbar

Please refer to following pages for plots of band edge.

Plots of Band Edge






ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -52.33dB
21.15MHz
SMARTBRIDGES
AIRPOINT-X02 H.C
ΔMKR
21.15 MHz
-52.33 dB
START 2.40000GHz
STOP 2.48350GHz
RBW 100kHz
VBW 100kHz
SWP 50.0ms

§15.247(d) - POWER SPECTRAL DENSITY

Standard Applicable

According to §15.247 (d), for direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of SA on any frequency be measured and set SA to 6MHz span mode. And then, set RBW and VBW of spectrum analyzer to proper value. (DTS)
4. Adjust the center frequency of SA on any frequency be measured and set SA to 50MHz span mode. And then, set RBW and VBW of spectrum analyzer to proper value. (UNII)
5. Repeat above procedures until all frequencies measured were complete.

Equipment Lists

Manufacturer	Model No.	Description	Calibration Date
HP	8565EC	Spectrum Analyzer	2003-01-22

Measurement Results

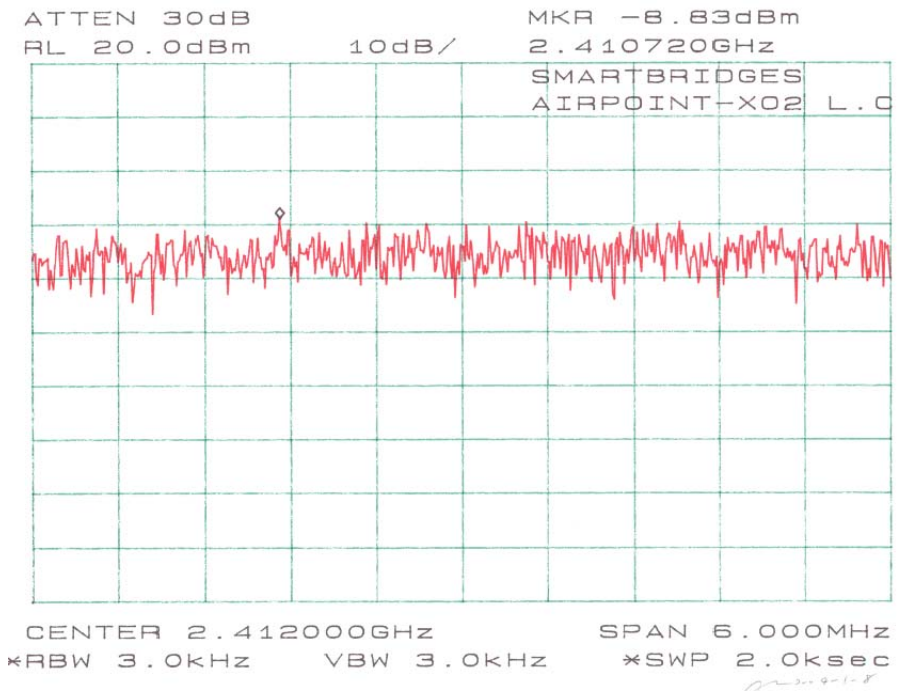
Environmental Conditions

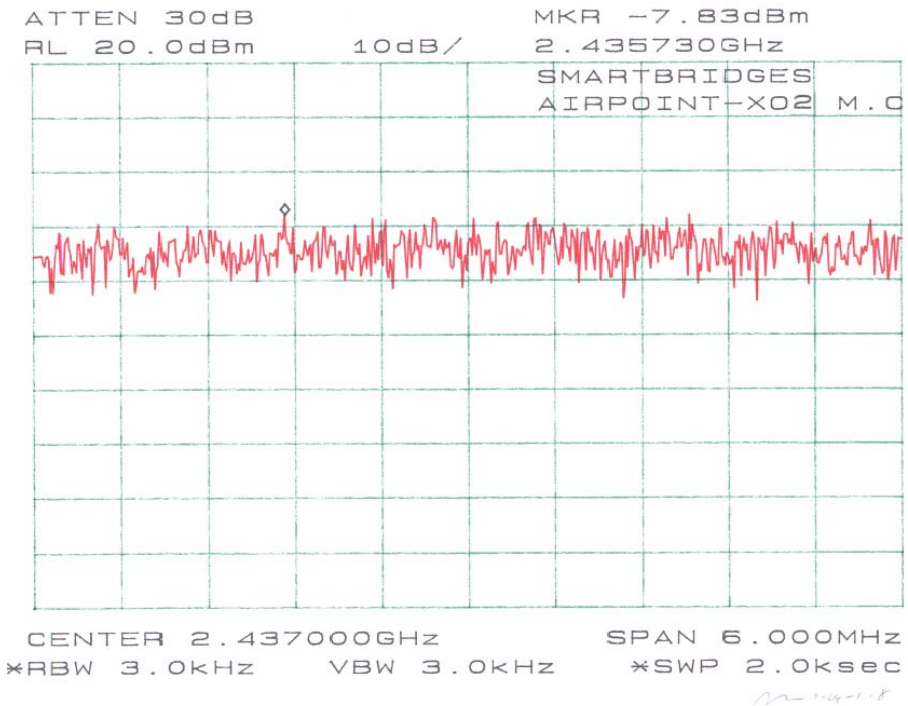
Temperature:	11° C
Relative Humidity:	49%
ATM Pressure:	1100 mbar

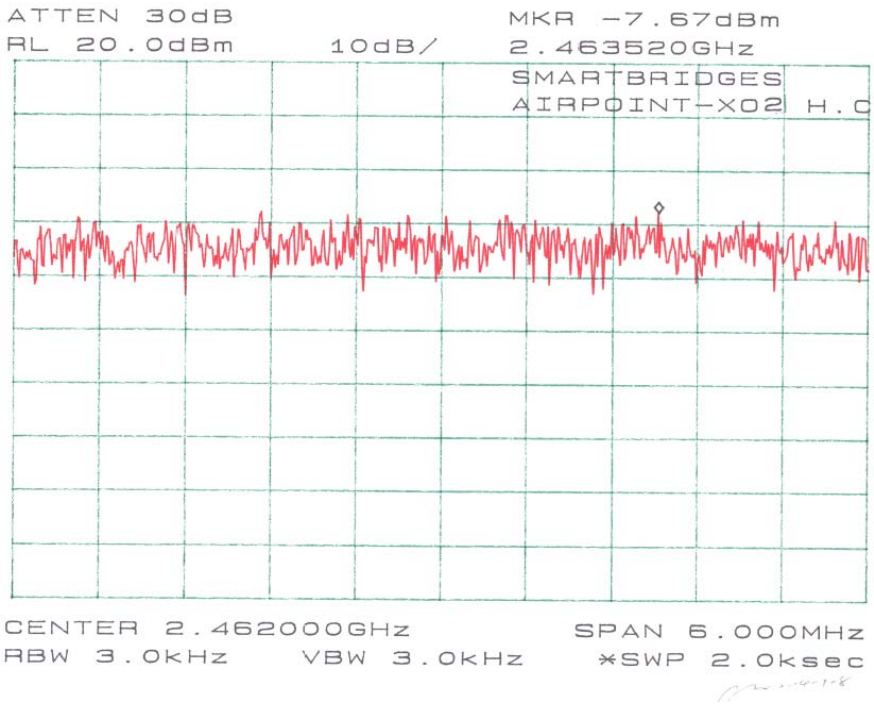
Test Result

Channel	Frequency (MHz)	Peak Power Spectral Density (dBm)	Standard (dBm)	Result
Low	2412	-8.83	≤ 8	Pass
Mid	2437	-7.83	≤ 8	Pass
High	2462	-7.67	≤ 8	Pass

Plots of Power Spectral Density






ATTEN 30dB
RL 20.0dBm
10dB/
MKR -7.67dBm
2.463520GHz
SMARTBRIDGES
AIRPOINT-X02 H.C
CENTER 2.462000GHz
SPAN 6.000MHz
RBW 3.0kHz
VBW 3.0kHz
*SWP 2.0ksec