PCTEST Engineering Laboratory, Inc.

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CERTIFICATE OF COMPLIANCE

SAMSUNG Electronics Co., Ltd.
#271, Oseon-Dong, Gwangsan-Gu
Gwangju-City, 506-723, KOREA
Attention: Mr. Gi-Hyeong Lee

Dates of Tests: June 27, 2002
Test Report S/N: 15.220620618.A3L
Test Site: PCTEST Lab, Columbia MD

FCC ID	**A3LSWP1200**
APPLICANT	**SAMSUNG Electronics Co., Ltd.**

FCC Rule Part(s):	**§ 15.247; ANSI C-63.4 (1992)**
Classification:	**Digital Transmission System (DTS)**
Max Output Power:	**0.063 W / 18.0 dBm Conducted (HomePAD-Remote)**
Method/System:	**Direct Sequence System (DSS)**
Equipment Type:	**HomePAD Refrigerator**
Frequency Range:	**2412 – 2462 MHz**
Model No(s).:	**SWP-1200**

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C-63-4.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

PCTEST certifies that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862.

Randy Ortanez
President

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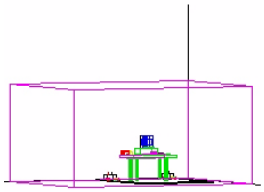
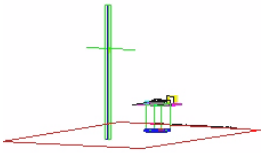
MEASUREMENT REPORT



Scope - Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.



§2983(a) General Information

Applicant Name:	**SAMSUNG Electronics Co., Ltd.**
Address:	**#271, Oseon-Dong, Gwangsan-Gu Gwangju-City, 506-723, KOREA**
Attention:	**Mr. Gi-Hyeong Lee**

- FCC ID: **A3LSWP1200**
- Class: Spread Spectrum Transceiver (DSS)
- Type: HomePAD Refrigerator
- Freq. Range: 2412 – 2462 MHz
- Method/System: Direct Sequence System (DSS)
- Model No(s): **SWP-1200**
- Max. RF Output Power: 0.063 W / 18.0 dBm Conducted
- Rule Part(s): § 15.247
- Dates of Tests: June 27, 2002
- Place of Tests: PCTEST Lab, Columbia, MD U.S.A.
- Test Report S/N: 220620618.A3L

NOTE: The receiver portion was tested and complies with Part 15B under the verification procedure.

INTRODUCTION

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz (ANSI C63.4-1992) and FCC Public Notice dated July 12, 1995 entitled "Guidance on Measurement for Direct Sequence Spread Spectrum Systems" were used in the measurement of **Samsung Spread Spectrum** HomePAD Refrigerator**.**

These measurement tests were conducted at ***PCTEST Engineering Laboratory, Inc.*** facility in New Concept Business Park, Guilford Industrial Park, Columbia, Maryland. The site address is 6660-B Dobbin Road, Columbia, MD 21045. The test site is one of the highest points in the Columbia area with an elevation of 390 feet above mean sea level. The site coordinates are 39° 11'15" N latitude and 76° 49'38" W longitude. The facility is 1.5 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. There are no FM or TV transmitters within 15 miles of the site. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4 on October 19, 1992.

PCTEST Location

The map at right shows the location of the PCTEST Lab, its proximity to the FCC Lab, the Columbia vicinity area, the Baltimore-Washington International (BWI) airport, and the city of Baltimore, and the Washington, D.C. area. (see Figure1).

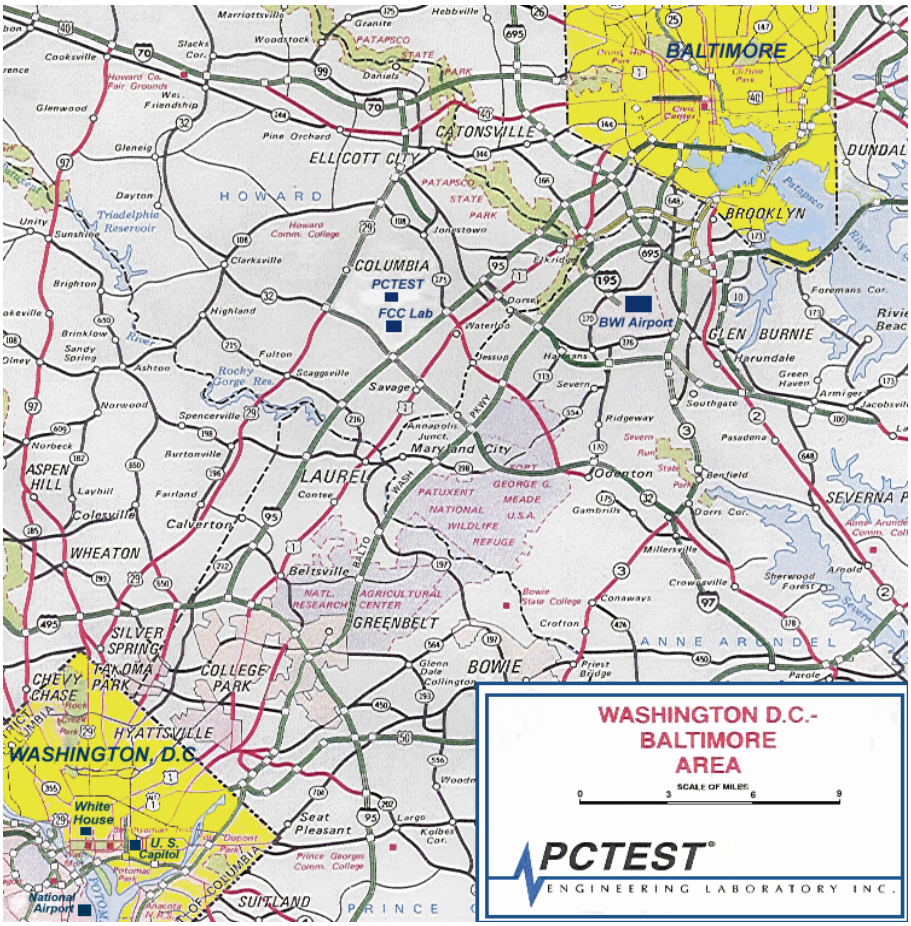


Figure 1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area.

PRODUCT INFORMATION

Equipment Description:

The Equipment under test (EUT) is the **Samsung Spread Spectrum HomePAD Refrigerator** using spread spectrum direct sequence and time division duplex techniques.

Frequency Range:	2412 – 2462 MHz
Channels:	1, 6, 11
Channel Separation:	5.0 MHz
Antenna:	omni-directional antenna
Spread Spectrum Method:	Direct Sequence (DBPSK modulation)
Max RF Output Power:	0.063 W / 18.0 dBm Conducted (Refrigerator-Base/HomePAD-Remote)

CH	Rx/Tx Freq. (MHz)	CH	Rx/Tx Freq. (MHz)
1	2412.0	7	2442.0
2	2417.0	8	2447.0
3	2422.0	9	2452.0
4	2427.0	10	2457.0
5	2432.0	11	2462.0
6	2437.0		

Description of Tests

Conducted Emissions

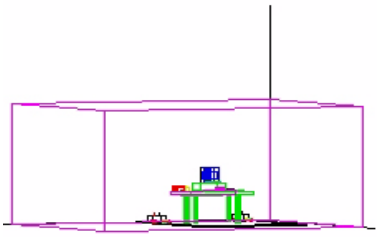


Figure 4. Shielded Enclosure Line-Conducted Test Facility

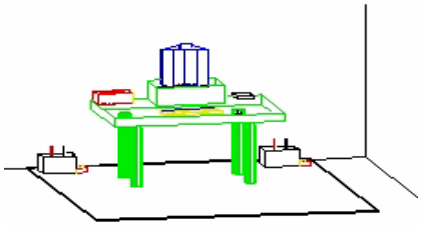


Figure 2. Line Conducted Emission Test Set-Up

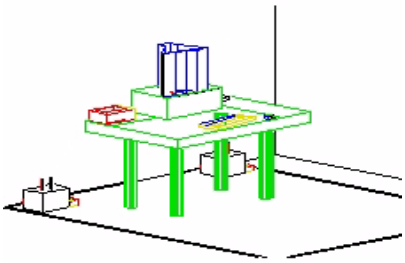


Figure 3. Wooden Table & Bonded LISNs

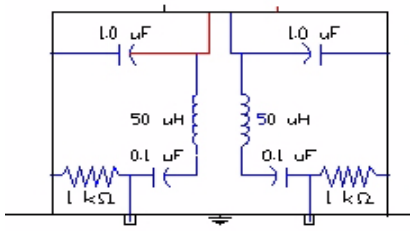


Figure 5. LISN Schematic Diagram

The line-conducted facility is located inside a 16'x20'x10' shielded enclosure. It is manufactured by Ray Proof Series 81 (see Figure 2). The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 65-6. A 1m. x 1.5m. wooden table 80cm. high is placed 40cm. away from the vertical wall and 1.5m away from the side wall of the shielded room (see Figure 3). Solar Electronics and EMCO Model 3725/2 (10kHz-30MHz) 50Ω/50μH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room (see Figure 4). The EUT is powered from the Solar LISN and the support equipment is powered from the EMCO LISN. Power to the LISNs are filtered by a high-current high-insertion loss Ray Proof power line filters (100dB 14kHz-10GHz). The purpose of the filter is to attenuate ambient signal interference and this filter is also bonded to the shielded enclosure. All electrical cables are shielded by braided tinned copper zipper tubing with inner diameter of 1/2". If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the Solar LISN. LISN schematic diagram is shown in Figure 5. All interconnecting cables more than 1 meter were shortened by non-inductive bundling (serpentine fashion) to a 1-meter length. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT. The spectrum was scanned from 450kHz to 30MHz with 20 msec. sweep time. The frequency producing the maximum level was reexamined using EMI/ Field Intensity Meter and Quasi-Peak adapter. The detector function was set to CISPR quasi-peak mode. The bandwidth of the receiver was set to 10 kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission. Each emission was maximized by: switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment, and powering the monitor from the floor mounted outlet box and the computer aux AC outlet, if applicable; whichever determined the worst-case emission. Photographs of the worst-case emission can be seen in Appendix C. Each EME reported was calibrated using the HP8640B signal generator.

Description of Tests (Continued)

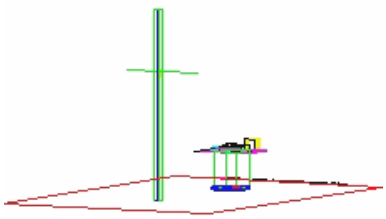


Figure 6. 3-Meter Test Site

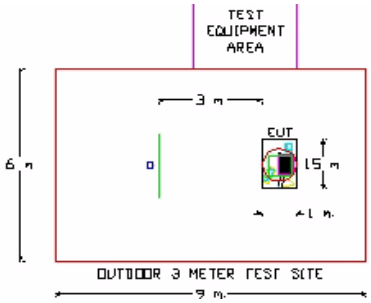


Figure 7. Dimensions of Outdoor Test Site

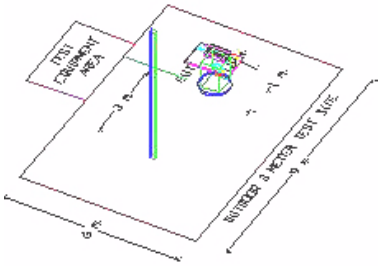


Figure 8. Turntable and System Setup

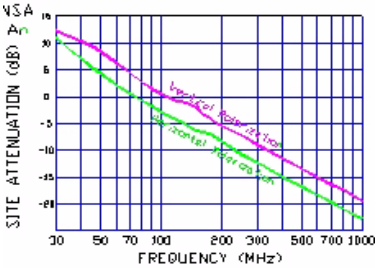


Figure 9. Normalized Site Attenuation Curves (H&V)

Radiated Emissions

Preliminary measurements were made indoors at 1 meter using broadband antennas, broadband amplifier, and spectrum analyzer to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30 to 200 MHz using biconical antenna and from 200 to 1000 MHz using log-spiral antenna. Above 1 GHz, linearly polarized double ridge horn antennas were used.

Final measurements were made outdoors at 3-meter test range using Roberts™ Dipole antennas or horn antenna (see Figure 6). The test equipment was placed on a wooden and plastic bench situated on a 1.5 x 2 meter area adjacent to the measurement area (see Figure 7). Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined and investigated using EMI/Field Intensity Meter and Quasi-Peak Adapter. The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 100kHz or 1 MHz depending on the frequency or type of signal.

The half-wave dipole antenna was tuned to the frequency found during preliminary radiated measurements. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8-meter high non-metallic 1 x 1.5 meter table (see Figure 8). The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment, and powering the monitor from the floor mounted outlet box and the computer aux AC outlet, if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission. Photographs of the worst-case emission can be seen in Appendix C. Each EME reported was calibrated using the HP8640B signal generator. The Theoretical Normalized Site Attenuation Curves for both horizontal and vertical polarization are shown in Figure 9.

§ 15.205 Restricted Bands

Special attention is made for the EUT's harmonic and spurious radiated emission in the restricted bands of operation. The EUT was tested from 9kHz and up to the tenth harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. Above 1 GHz, average measurements was used using RBW 1 MHz – VBW 10Hz and linearly polarized horn antennas. In addition, peak measurements were taken to ensure that the peak levels are not more than 20dB above the average limit. All out of band emissions, other than those created by the spreading sequence, data sequence, and the carrier modulation must not exceed the limits show in Table 2 per 15.209.

Frequency (MHz)	F/S (UV/m)	Meas. Dist. (Meters)
0.009-0.490	2400/F (kHz)	300
0.490-1.705	24000/F (kHz)	30
1.705-30.00	30	30
30.0-88.0	100	3
88.0-216.0	150	3
216.0-960.0	200	3
Above 960	500	3

Tab. 2. Radiated Emission Limits Per 15.209

Test Equipment

HP 8566B	**Spectrum Analyzer 100Hz-22HGHz**
HP83017A	**Microwave Analyzer 40dB Gain (0.5 – 26.5 GHz)**
HP 3784A	**Digital Transmission Analyzer**
EMCO 3115	**Horn Antenna (1 – 18GHz)**
HP 8495A	**20dB Attenuator (DC-40GHz) 0-70dB**
HP 8493B	**10dB Attenuator**
MicroCoax Cables	**Low Loss Microwave Cables (1-26.5 GHz)**
CDI Dipoles	**Dipole Antennas (30 – 1000 MHz)**

§ 15.203 Antenna Requirement

An intentional radiator antenna shall be designed to ensure that no antenna other that that furnished by the applicant can 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 this requirement.

The SAMSUNG **SWP-1200** unit complies with the requirement of §15.203. The antenna is a **permanently attached omni-directional antenna.**

CONCLUSION

There are no provisions for connection to an external antenna. The unit meets the Antenna Requirements of §15.203.

§15.247(a)(2) – Direct Sequence Bandwidth (HomePAD-Remote Unit)

Res. Bandwidth =	100 kHz (5dB/div)
Vid. BW =	100 kHz
Span =	30 MHz
Ref. Level	- 40 dBm
Sweep	10ms

(see attached spectrum plots)

FREQ (MHz)	Channel	6dB Bandwidth (MHz)
2412	1	10.49
2437	6	9.68
2462	11	9.47

Table 3. 6dB Bandwidth measurements

Minimum Standard – The transmitter shall have a minimum 6dB bandwidth of 500Hz (0.5 MHz).

These are conducted measurements.

REMARKS:

PASS

§15.247(b) Maximum Peak Output Power (HomePAD-Remote Unit)

Minimum Standard – The maximum peak output power of the transmitter shall not exceed 1 watt. Radiated power measurements were teaken at 3 meters with a power meter.

Max. Power Peak + Atten = dBm ⇒ Watts

FREQ (MHz)	Channel	Power Output (dBm)	Power Output (mW)
2412	1	18.0	63.0
2437	6	18.0	63.0
2462	11	18.0	63.0

Table 4. Output Power Measurements

REMARKS:

PASS

The table above was derived by taking EIRP reading with a peak power meter using the signal substitution method ensuring that the turn table azimuth and antenna height have been adjusted for the maximum power.

§15.247(c) Power Density (HomePAD-Remote Unit)

Minimum Standard – The transmitted power density averaged over any 1 second interval shall not be greater than 8dBm in any 3kHz bandwidth within these bands.

Res. Bandwidth =	3 kHz (7dB/div)
Vid. BW =	3 kHz
Span =	40 kHz
Ref. Level	- 50dBm
Sweep	1000 sec

Peak + Atten = dBm ⇒ (Limit < 8dBm)

FREQ (MHz)	Channel	Power Density (dBm)
2412	1	- 12.4
2437	6	- 13.1
2462	11	- 11.5

Table 5. Output Power Density Data.

Minimum Standard – The transmitter power density average over and 1 second interval shall not be greater than 8dBm in any 3 kHz BW within these bands. These are conducted measurements.

REMARKS:

PASS

The table above was derived first by taking EIRP reading with a peak power meter using the signal substitution method ensuring that the turn table azimuth and antenna height have been adjusted for the maximum power. A spectrum analyzer with the RBW and VBW = 3 kHz is then used in place of the power meter to obtain a raw reading of the power density. A second signal substitution is done to obtain the Power Density level.

2.5G Power Density for HomePAD-Remote Unit

FREQ. (MHz)	Level* (dBm)	AFCL** (dB)	POL (H/V)	(dBμV/m)	F/S (μV/m)	(W)	(dBm)
2412	- 56.88	32.7	V	82.82	13835.7	5.74E^-05	-12.409
2437	- 57.70	32.8	V	82.10	12735.0	4.87E^-05	- 13.129
2462	- 56.20	32.9	V	83.70	15310.9	7.03E^-05	-11.529

RADIATED MEASUREMENTS (FUNDAMENTAL & HARMONICS)

A. Transmitter Portion (HomePAD-Remote Unit)

Operating Frequency: 2412 MHz (1 Mbps)

Distance of Measurements: 3 meters

Channel: 1

FREQ. (MHz)	Level* (dBm)	AFCL (dB)	POL (H/V)	DET QP/AVG	F/S (µV/m)	F/S (dBµV/m)	Margin (dB)
2412	- 26.50	32.70	V	Peak	457088	113.2	n/a
4824	- 101.5	40.39	V	Peak	197.015	45.89	8.110
7236	- 106.5	47.42	V	Peak	248.886	47.92	65.28
9648	< - 120						
12060	< - 120						

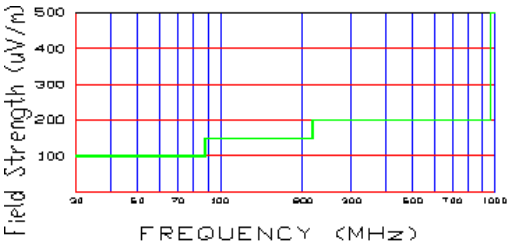


Figure 10. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

NOTES:

1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)

2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz

3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz

4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.

5. The antenna is manipulated through typical positions, polarity and length during the tests.

6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.

7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.

8. < - 120 are below the analyzer floor level.

RADIATED Measurements (Fundamental & Harmonics)

B. Transmitter Portion (HomePAD-Remote Unit)

Operating Frequency: 2437 MHz (1 Mbps)

Distance of Measurements: 3 meters

Channel: 6

FREQ. (MHz)	Level* (dBm)	AFCL (dB)	POL (H/V)	DET QP/AVG	F/S (µV/m)	F/S (dBµV/m)	Margin (dB)
2437	- 26.55	32.8	V	Peak	459727	113.25	n/a
4874	- 101.0	40.5	V	Peak	211.349	46.50	7.5
7311	- 105.9	48.0	V	Peak	285.102	49.10	4.9
9748	< - 120						
12185	< - 120						

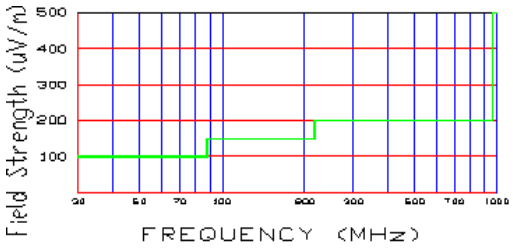


Figure 11. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

NOTES:

1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)

2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz

3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz

4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.

5. The antenna is manipulated through typical positions, polarity and length during the tests.

6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.

7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.

8. < - 120 are below the analyzer floor level.

RADIATED Measurements (Fundamental & Harmonics) (CONT.)

C. Transmitter Portion (HomePAD-Remote Unit)

Operating Frequency: 2462 MHz (1 Mbps)

Distance of Measurements: 3 meters

Channel: 11

FREQ. (MHz)	Level* (dBm)	AFCL (dB)	POL (H/V)	DET QP/AVG	F/S (µV/m)	F/S (dBµV/m)	Margin (dB)
2462	- 26.70	32.9	V	Peak	457088	113.2	n/a
4924	- 100.9	40.7	V	Peak	218.776	46.80	7.2
7386	- 105.5	48.2	V	Peak	305.492	49.70	4.3
9848	< - 120						
12310	< - 120						

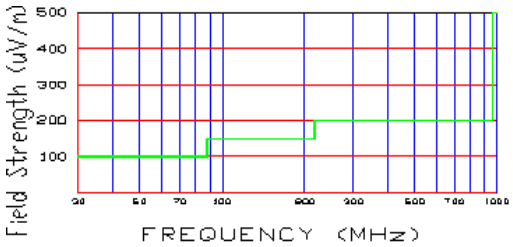


Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

NOTES:

1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)

2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz

3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz

4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.

5. The antenna is manipulated through typical positions, polarity and length during the tests.

6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.

7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.

8. < - 120 are below the analyzer floor level.

RADIATED Measurements (Fundamental & Harmonics) (CONT.)

D. Transmitter Portion (HomePAD-Remote Unit)

Operating Frequency: 2412 MHz (2 Mbps)

Distance of Measurements: 3 meters

Channel: 1

FREQ. (MHz)	Level* (dBm)	AFCL (dB)	POL (H/V)	DET QP/AVG	F/S (µV/m)	F/S (dBµV/m)	Margin (dB)
2412	- 26.50	32.70	V	Peak	457088	113.2	n/a
4824	- 101.2	40.39	V	Peak	203.939	46.19	7.810
7236	- 106.1	47.42	V	Peak	260.615	48.32	64.88
9648	< - 120						
12060	< - 120						

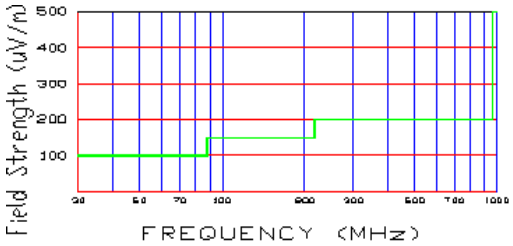


Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

NOTES:

1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)

2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz

3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz

4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.

5. The antenna is manipulated through typical positions, polarity and length during the tests.

6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.

7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.

8. < - 120 are below the analyzer floor level.

RADIATED Measurements (Fundamental & Harmonics) (CONT.)

D. Transmitter Portion (HomePAD-Remote Unit)

Operating Frequency: 2437 MHz (2 Mbps)

Distance of Measurements: 3 meters

Channel: 6

FREQ. (MHz)	Level* (dBm)	AFCL (dB)	POL (H/V)	DET QP/AVG	F/S (µV/m)	F/S (dBµV/m)	Margin (dB)
2437	- 26.55	32.8	V	Peak	459727	113.25	n/a
4874	- 99.50	40.5	V	Peak	251.189	48.00	6.0
7311	- 105.7	48.0	V	Peak	291.743	49.30	4.7
9748	< - 120						
12185	< - 120						

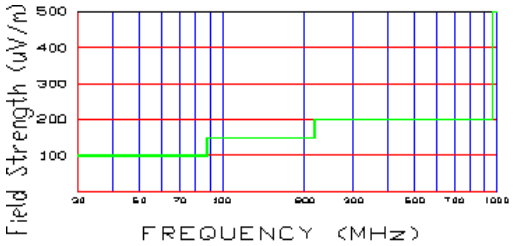


Figure 12. Restricted band harmonics and spurious limits.

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5. The antenna is manipulated through typical positions, polarity and length during the tests.

6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.

7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.

8. < - 120 are below the analyzer floor level.

RADIATED Measurements (Fundamental & Harmonics) (CONT.)

D. Transmitter Portion (HomePAD-Remote Unit)

Operating Frequency: 2462 MHz (2 Mbps)

Distance of Measurements: 3 meters

Channel: 11

FREQ. (MHz)	Level* (dBm)	AFCL (dB)	POL (H/V)	DET QP/AVG	F/S (µV/m)	F/S (dBµV/m)	Margin (dB)
2462	- 26.70	32.9	V	Peak	457088	113.2	n/a
4924	- 99.50	40.7	V	Peak	257.040	48.20	5.8
7386	- 105.5	48.2	V	Peak	305.492	49.70	4.3
9848	< - 120						
12310	< - 120						

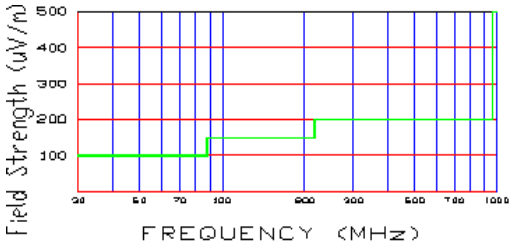

Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

NOTES:

1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)

2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz

3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz

4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.

5. The antenna is manipulated through typical positions, polarity and length during the tests.

6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.

7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.

8. < - 120 are below the analyzer floor level.

RADIATED Measurements (Fundamental & Harmonics) (CONT.)

D. Transmitter Portion (HomePAD-Remote Unit)

Operating Frequency: 2412 MHz (5.5 Mbps)

Distance of Measurements: 3 meters

Channel: 1

FREQ. (MHz)	Level* (dBm)	AFCL (dB)	POL (H/V)	DET QP/AVG	F/S (µV/m)	F/S (dBµV/m)	Margin (dB)
2412	- 26.50	32.70	V	Peak	457088	113.2	n/a
4824	- 100.0	40.39	V	Peak	234.153	47.39	6.610
7236	- 105.1	47.42	V	Peak	292.415	49.32	63.88
9648	< - 120						
12060	< - 120						

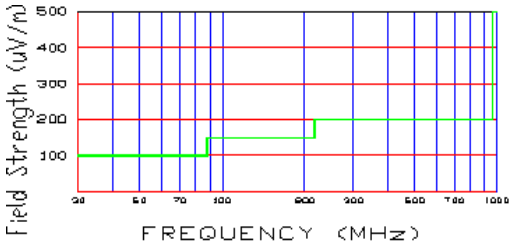

Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

NOTES:

1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)

2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz

3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz

4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.

5. The antenna is manipulated through typical positions, polarity and length during the tests.

6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.

7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.

8. < - 120 are below the analyzer floor level.

RADIATED Measurements (Fundamental & Harmonics) (CONT.)

D. Transmitter Portion (HomePAD-Remote Unit)

Operating Frequency: 2437 MHz (5.5 Mbps)

Distance of Measurements: 3 meters

Channel: 6

FREQ. (MHz)	Level* (dBm)	AFCL (dB)	POL (H/V)	DET QP/AVG	F/S (µV/m)	F/S (dBµV/m)	Margin (dB)
2437	- 26.55	32.8	V	Peak	459727	113.25	n/a
4874	- 98.80	40.5	V	Peak	272.27	48.700	5.3
7311	- 105.0	48.0	V	Peak	316.228	50.000	4.0
9748	< - 120						
12185	< - 120						

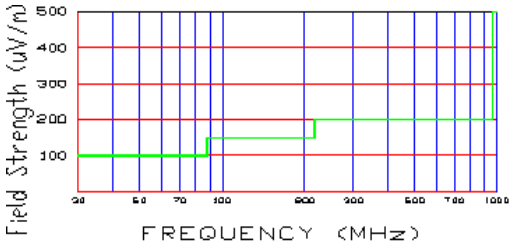

Figure 12. Restricted band harmonics and spurious limits.

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RADIATED Measurements (Fundamental & Harmonics) (CONT.)

D. Transmitter Portion (HomePAD-Remote Unit)

Operating Frequency: 2462 MHz (5.5 Mbps)

Distance of Measurements: 3 meters

Channel: 11

FREQ. (MHz)	Level* (dBm)	AFCL (dB)	POL (H/V)	DET QP/AVG	F/S (µV/m)	F/S (dBµV/m)	Margin (dB)
2462	- 26.70	32.9	V	Peak	457088	113.2	n/a
4924	- 99.60	40.7	V	Peak	254.097	48.10	5.9
7386	- 105.4	48.2	V	Peak	309.030	49.80	4.2
9848	< - 120						
12310	< - 120						

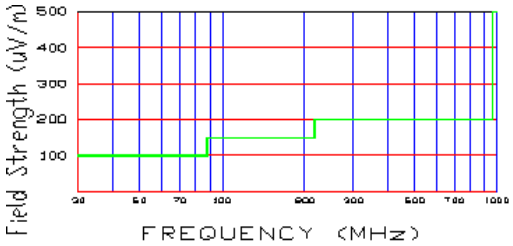

Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

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6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.

7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.

8. < - 120 are below the analyzer floor level.

RADIATED Measurements (Fundamental & Harmonics) (CONT.)

D. Transmitter Portion (HomePAD-Remote Unit)

Operating Frequency: 2412 MHz (11 Mbps)

Distance of Measurements: 3 meters

Channel: 1

FREQ. (MHz)	Level* (dBm)	AFCL (dB)	POL (H/V)	DET QP/AVG	F/S (µV/m)	F/S (dBµV/m)	Margin (dB)
2412	- 26.50	32.70	V	Peak	457088	113.2	n/a
4824	- 99.20	40.39	V	Peak	256.744	48.19	5.810
7236	- 103.8	47.42	V	Peak	339.625	50.62	62.58
9648	< - 120						
12060	< - 120						

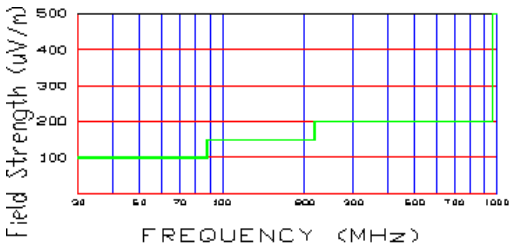

Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

NOTES:

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6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.

7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.

8. < - 120 are below the analyzer floor level.

RADIATED Measurements (Fundamental & Harmonics) (CONT.)

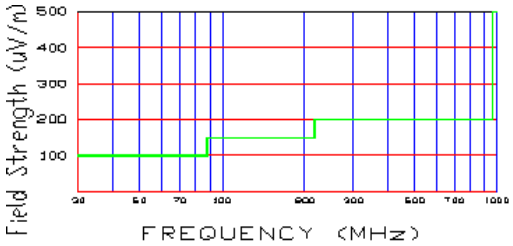
D. Transmitter Portion (HomePAD-Remote Unit)

Operating Frequency: 2437 MHz (11 Mbps)

Distance of Measurements: 3 meters

Channel: 6

FREQ. (MHz)	Level* (dBm)	AFCL (dB)	POL (H/V)	DET QP/AVG	F/S (µV/m)	F/S (dBµV/m)	Margin (dB)
2437	- 26.55	32.8	V	Peak	459727	113.25	n/a
4874	- 98.50	40.5	V	Peak	281.838	49.00	5.0
7311	- 104.0	48.0	V	Peak	354.813	51.00	3.0
9748	< - 120						
12185	< - 120						



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8. < - 120 are below the analyzer floor level.

RADIATED Measurements (Fundamental & Harmonics) (CONT.)

D. Transmitter Portion (HomePAD-Remote Unit)

Operating Frequency: 2462 MHz (11 Mbps)

Distance of Measurements: 3 meters

Channel: 11

FREQ. (MHz)	Level* (dBm)	AFCL (dB)	POL (H/V)	DET QP/AVG	F/S (µV/m)	F/S (dBµV/m)	Margin (dB)
2462	- 26.70	32.9	V	Peak	457088	113.2	n/a
4924	- 98.50	40.7	V	Peak	288.403	49.20	4.8
7386	- 104.5	48.2	V	Peak	342.768	50.70	3.3
9848	< - 120						
12310	< - 120						

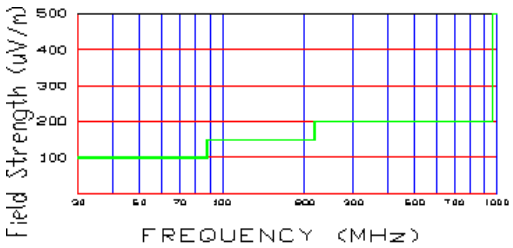

Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

NOTES:

1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)

2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz

3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz

4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.

5. The antenna is manipulated through typical positions, polarity and length during the tests.

6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.

7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.

8. < - 120 are below the analyzer floor level.

RADIATED Measurements (Restricted Band)

Transmitter Portion (HomePAD-Remote Unit)

Operating Frequency: 2462 MHz (11 Mbps)

Distance of Measurements: 3 meters

Channel(s): 11

FREQ. (MHz)	Level* (dBm)	AFCL (dB)	POL (H/V)	DET QP/AVG	F/S (µV/m)	F/S (dBµV/m)	Margin (dB)
2483.9	- 93.3	33.0	V	- 48.529	216.272	46.7	- 7.3
2484.4	- 94.6	33.0	V	- 49.829	186.209	45.4	- 8.6
2484.5	- 96.4	33.1	V	- 51.529	153.109	43.7	- 10.3
2486.1	- 93.6	33.1	V	- 48.729	211.349	46.5	- 7.5
2491.3	- 91.0	33.2	V	- 46.029	288.403	49.2	- 4.8
2495.0	- 92.3	33.2	V	- 47.329	248.313	47.9	- 6.1

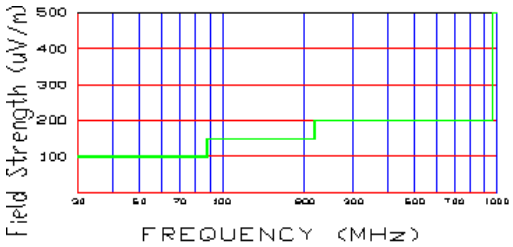

Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

NOTES:

1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)

2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz

3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz

4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.

5. The antenna is manipulated through typical positions, polarity and length during the tests.

6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.

7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.

8. < - 120 are below the analyzer floor level.

RADIATED Measurements (Restricted Band)

Transmitter Portion (HomePAD-Remote Unit)

Operating Frequency: 2462 MHz (5.5 Mbps)

Distance of Measurements: 3 meters

Channel(s): 11

FREQ. (MHz)	Level* (dBm)	AFCL (dB)	POL (H/V)	DET QP/AVG	F/S (µV/m)	F/S (dBµV/m)	Margin (dB)
2483.9	- 95.0	33.0	V	- 50.229	177.828	45.0	- 9.0
2448.3	- 95.6	33.0	V	- 50.829	165.959	44.4	- 9.6
2484.5	- 98.2	33.1	V	- 53.329	124.421	41.9	- 12.1
2486.1	- 94.1	33.1	V	- 49.229	199.526	46.0	- 9.0
2491.3	- 93.0	33.2	V	- 48.029	229.087	47.2	- 8.9
2491.0	- 99.7	33.2	V	- 54.729	105.925	40.5	- 13.5

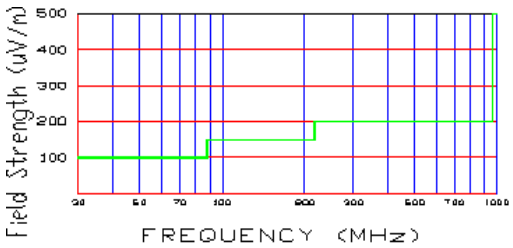

Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

NOTES:

1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)

2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz

3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz

4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.

5. The antenna is manipulated through typical positions, polarity and length during the tests.

6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.

7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.

8. < - 120 are below the analyzer floor level.

RADIATED Measurements (Restricted Band)

Transmitter Portion (HomePAD-Remote Unit)

Operating Frequency: 2462 MHz (2 Mbps)

Distance of Measurements: 3 meters

Channel(s): 11

FREQ. (MHz)	Level* (dBm)	AFCL (dB)	POL (H/V)	DET QP/AVG	F/S (µV/m)	F/S (dBµV/m)	Margin (dB)
2483.7	- 95.3	33.0	V	- 50.529	171.791	44.7	- 9.3
2484.4	- 93.8	33.0	V	- 49.029	204.174	46.2	- 8.9
2484.6	- 98.0	33.1	V	- 53.129	127.35	42.1	- 11.9
2486.2	- 94.2	33.1	V	- 49.329	197.242	45.9	- 8.1
2491.0	- 94.0	33.2	V	- 49.029	204.174	46.2	- 9.0
2492.0	- 101.0	33.2	V	- 56.029	91.2011	39.2	- 14.8

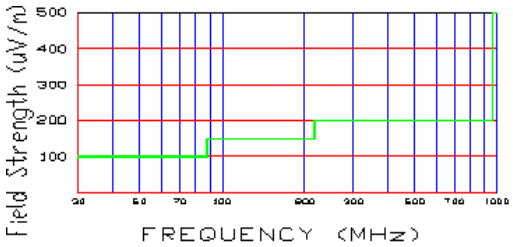

Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

NOTES:

1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)

2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz

3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz

4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.

5. The antenna is manipulated through typical positions, polarity and length during the tests.

6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.

7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.

8. < - 120 are below the analyzer floor level.

RADIATED Measurements (Restricted Band)

Transmitter Portion (HomePAD-Remote Unit)

Operating Frequency: 2462 MHz (1 Mbps)

Distance of Measurements: 3 meters

Channel(s): 11

FREQ. (MHz)	Level* (dBm)	AFCL (dB)	POL (H/V)	DET QP/AVG	F/S (µV/m)	F/S (dBµV/m)	Margin (dB)
2483.6	- 94.0	33.0	V	- 49.229	199.526	46.0	- 9.7
2484.2	- 96.0	33.0	V	- 51.229	158.489	44.0	- 10.0
2484.5	- 95.9	33.1	V	- 51.029	162.181	44.2	- 9.8
2486.0	- 91.6	33.1	V	- 46.729	266.073	48.5	- 8.6
2491.3	- 95.4	33.2	V	- 50.429	173.780	44.8	- 9.2
2492.0	- 93.3	33.2	V	- 48.329	221.309	46.9	- 14.0

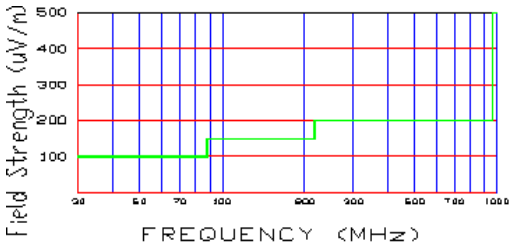

Figure 12. Restricted band harmonics and spurious limits.

Above 1 GHz limit is 500 uV/m (54dBu/m)

NOTES:

1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)

2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz

3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz

4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.

5. The antenna is manipulated through typical positions, polarity and length during the tests.

6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.

7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.

8. < - 120 are below the analyzer floor level.

TEST EQUIPMENT

Type	Model	Cal. Due Date	S/N
Microwave Spectrum Analyzer	HP 8566B (100Hz-22GHz)	12/05/02	3638A08713
Microwave Spectrum Analyzer	HP 8566B (100Hz-22GHz)	04/17/03	2542A11898
Spectrum Analyzer/Tracking Gen.	HP 8591A (9kHz-1.8GHz)	06/02/03	3144A02458
Spectrum Analyzer	HP 8591A (9kHz-1.8GHz)	10/15/02	3108A02053
Spectrum Analyzer	HP 8594A (9kHz-2.9GHz)	11/02/02	3051A00187
Signal Generator*	HP 8640B (500Hz-1GHz)	06/02/03	2232A19558
Signal Generator*	HP 8640B (500Hz-1GHz)	06/02/03	1851A09816
Signal Generator*	Rohde & Schwarz (0.1-1000MHz)	09/11/02	894215/012
Ailtech/Eaton Receiver	NM 37/57A-SL (30-1000MHz)	04/12/03	0792-03271
Ailtech/Eaton Receiver	NM 37/57A (30-1000MHz)	03/11/03	0805-03334
Ailtech/Eaton Receiver	NM 17/27A (0.1-32MHz)	09/17/02	0608-03241
Quasi-Peak Adapter	HP 85650A	08/09/02	2043A00301
Ailtech/Eaton Adapter	CCA-7 CISPR/ANSI QP Adapter	03/11/03	0194-04082
RG58 Coax Test Cable	No. 167		n/a
Harmonic/Flicker Test System	HP 6841A (IEC 555-2/3)		3531A00115
Broadband Amplifier (2)	HP 8447D		1145A00470, 1937A03348
Broadband Amplifier	HP 8447F		2443A03784
Transient Limiter	HP 11947A (9kHz-200MHz)		2820A00300
Horn Antenna	EMCO Model 3115 (1-18GHz)		9704-5182
Horn Antenna	EMCO Model 3115 (1-18GHz)		9205-3874
Horn Antenna	EMCO Model 3116 (18-40GHz)		9203-2178
Biconical Antenna (4)	Eaton 94455/Eaton 94455-1/Singer 94455-1/Compliance Design 1295, 1332, 0355		
Log-Spiral Antenna (3)	Ailtech/Eaton 93490-1		0608, 1103, 1104
Roberts Dipoles	Compliance Design (1 set) A100		5118
Ailtech Dipoles	DM-105A (1 set)		33448-111
EMCO LISN (2)	3816/2		1077, 1079
EMCO LISN	3725/2		2009
Microwave Preamplifier 40dB Gain	HP 83017A (0.5-26.5GHz)		3123A00181
Microwave Cables	MicroCoax (1.0-26.5GHz)		
Ailtech/Eaton Receiver	NM37/57A-SL		0792-03271
Spectrum Analyzer	HP 8591A		3034A01395
Modulation Analyzer	HP 8901A		2432A03467
NTSC Pattern Generator	Leader 408		0377433
Noise Figure Meter	HP 8970B		3106A02189
Noise Figure Meter	Ailtech 7510		TE31700
Noise Generator	Ailtech 7010		1473
Microwave Survey Meter	Holaday Model 1501 (2.450GHz)		80931
Digital Thermometer	Extech Instruments 421305		426966
Attenuator	HP 8495A (0-70dB) DC-4GHz		
Bi-Directional Coax Coupler	Narda 3020A (50-1000MHz)		
Shielded Screen Room	RF Lindgren Model 26-2/2-0		6710 (PCT270)
Shielded Semi-Anechoic Chamber	Ray Proof Model S81		R2437 (PCT278)
Environmental Chamber	Associated Systems Model 1025 (Temperature/Humidity)		PCT285

* Calibration traceable to the National Institute of Standards and Technology (NIST).

Conclusion

The data collected shows that the **SAMSUNG HomePAD Refrigerator FCC ID: A3LSWP1200** complies with Part 15C of the FCC Rules.