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DATE: 16 April 2012

I.T.L. (PRODUCT TESTING) LTD.

FCC Radio Test Report

for

Corning MobileAccess

Equipment under test:

Mobile AccessHX High-Power DAS Remote Unit Outdoor

HX-C85P19L70A17-AC-B
(C85=CELL; P19=PCS; L70=LTE;A17=AWS)

Written by: _____
D. Shidlowsky, Documentation

Approved by: _____
I. Siboni, Test Engineer

Approved by: _____
I. Raz, EMC Laboratory Manager

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This report relates only to items tested.

Measurement/Technical Report for

Corning MobileAccess

Mobile AccessHX High-Power DAS Remote Unit

Outdoor

FCC ID: OJFHXC85P19L70A17

This report concerns:	Original Grant: Class II change: X Class I change:
Equipment type:	PCS Licensed Transmitter
Limits used: 47CFR Parts 2, 22, 24	

Measurement procedure used is ANSI C63.4-2003.
Substitution Method used as in ANSI/TIA-603-C: 2004

Application for Certification prepared by:

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Applicant for this device:
(different from "prepared by")

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1. General Information

1.1 Administrative Information

Manufacturer:	Corning MobileAccess
Manufacturer's Address:	8391 Old Courthouse Rd. Suite #300 Vienna, VA 22182 U.S.A. Tel: +1-541-758-2880 Fax: +1-703-848-0260
Manufacturer's Representative:	Steve Blum
Equipment Under Test (E.U.T):	Mobile AccessHX High-Power DAS Remote Unit Outdoor
Equipment Model No.:	HX-C85P19L70A17-AC-B (C85=CELL; P19=PCS; L70=LTE;A17=AWS)
Equipment Serial No.:	3B3501F
Date of Receipt of E.U.T:	01.01.12
Start of Test:	01.01.12
End of Test:	01.01.12
Test Laboratory Location:	I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780
Test Specifications:	FCC Parts 22, 24, 27

1.2 List of Accreditations

The EMC laboratory of I.T.L. is accredited by the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), Registration No. 90715.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) (Japan), Registration Numbers: C-1350, R-1285.
5. Industry Canada (Canada), IC File No.: 46405-4025; Site No. IC 4025B-1.
6. TUV Product Services, England, ASLLAS No. 97201.

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.

1.3 Product Description

The MobileAccess**HX** is a high power, Distributed Antenna System (DAS) solution for indoors or outdoors (model dependent). It is a fiber-fed, compact and scalable multi-service platform designed to provide complete RF open space coverage for large scale public venues, such as campuses, stadiums, convention centers, hotels, airports, and train stations.
HX supports multiple wireless technologies and operator services over a single broadband infrastructure. Using low loss fiber optic cabling remote units can cover distances of up to 2Km from the BTS signal sources at the head-end.
The solution can be deployed in new sites or alongside existing MobileAccess**1000** (MA1000) and/or MobileAccess**2000** (MA2000) systems, sharing a common head-end and element management system (EMS).
Alongside MA1000/MA2000 deployments, MobileAccess**HX** provides a comprehensive indoor and outdoor coverage solution for varying site requirements, supporting everything from high-rise buildings and campus topologies to stadiums and airports.

Features & Benefits:

Multi-Service Platform: Accommodates virtually any mix of wireless voice and data services, eliminating the need for separate overlay networks. Supported services and technologies include: GSM, UMTS, HSPA, LTE, EDGE, EV-DO, AWS, and more.

Cost-Effective High Power: Optimizes and reduces the number of antennas required to cover open areas by offering 33dBm (2W) composite power per frequency band.

Available in both Indoor and outdoor models – outdoor models are ingress protected whereas indoor models are field-upgradable. The combination of both provides maximum flexibility to match any deployment.

Pay-As-You-Grow Design: Can initially be deployed in dual-band, where tri-band or quad-band configurations can be enabled as needed.

Carrier-Grade Operation: Advanced signal handling and management ensures carrier-grade performance in multi-operator deployments.

Design and Deployment Flexibility:

Remote unit supports both SM and MM fiber connections.
Supports two to four wireless frequencies.

Compatible with Existing MA1000/MA2000 Deployment: Shares a common head-end and EMS in a single deployment.

System Architecture

MobileAccess**HX** provides a complete solution consisting of HX remote units at the remote locations and head-end elements that are shared with any existing MA1000/MA2000 system that is either installed or being installed at the site.
In the downlink, at the head-end, the BTS or BDA signal is conditioned by the **RIU**, ensuring a constant RF level. The conditioned signal is then converted by the Base Unit to an optical signal for transport over single or multi-mode fiber to the HX remote units, which are located at the remote locations. In the uplink, the process is reversed. The **SC-450 Controller** enables local and remote management, as well as controls all MA1000, MA2000, and HX elements from a single, centralized location.
The **MobileAccessHX Remote Unit** (indoor and outdoor models) consists of a compact enclosure that houses the RF module, power elements, and the required interfaces. The RF module supports up to four services, where two services can be enabled initially and additional services can be enabled as needed. All mobile services are combined and distributed through a single antenna port over antennas installed at the remote locations.

1.4 Test Methodology

Radiated testing was performed according to the procedures in ANSI C63.4: 2003. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 Test Facility

Radiated emissions tests were performed at I.T.L.'s testing facility at Kfar Bin-Nun, Israel. This site is a FCC listed test laboratory (FCC Registration No. 90715, date of listing September 3, 2009).
I.T.L.'s EMC Laboratory is also accredited by A2LA, certificate No. 1152.01.

1.6 Measurement Uncertainty

Radiated Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4) for open site 30-1000MHz:
Expanded Uncertainty (95% Confidence, K=2):
± 4.96 dB

2. System Test Configuration

2.1 Justification

This unit was originally authorized under FCC ID: OJFHXC85P19L70A17.
Due to a change in the enclosure spurious radiated emission and intermodulation tests were performed.
The test setup was configured to closely resemble the standard installation.
The EUT consists of the HX (High Power Remote Module) which is connected with the head-end DAS equipment using fiber optic cable.
The RF source signals (CELL, PCS, AWS and LTE) are represented in the setup by appropriate signal generators.
An "Exercise" SW on the computer was used to enable / disable transmission of the EUT, while the EUT output was connected to the spectrum analyzer.

The E.U.T. is available powered from AC or DC

To select the worst case host to be fully tested, an exploratory radiated emission test was performed inside the shielded room.

The units were placed on a 0.8 meter high wooden table, 1meter from the tests antenna, which was 1 m high.
Based on the exploratory radiated emission test, the AC powered configuration was selected as the "worst case" host.

2.2 EUT Exercise Software

See details original application.

2.3 Special Accessories

No special accessories were needed in order to achieve compliance.

2.4 Equipment Modifications

No modifications were needed in order to achieve compliance.

2.5 Configuration of Tested System

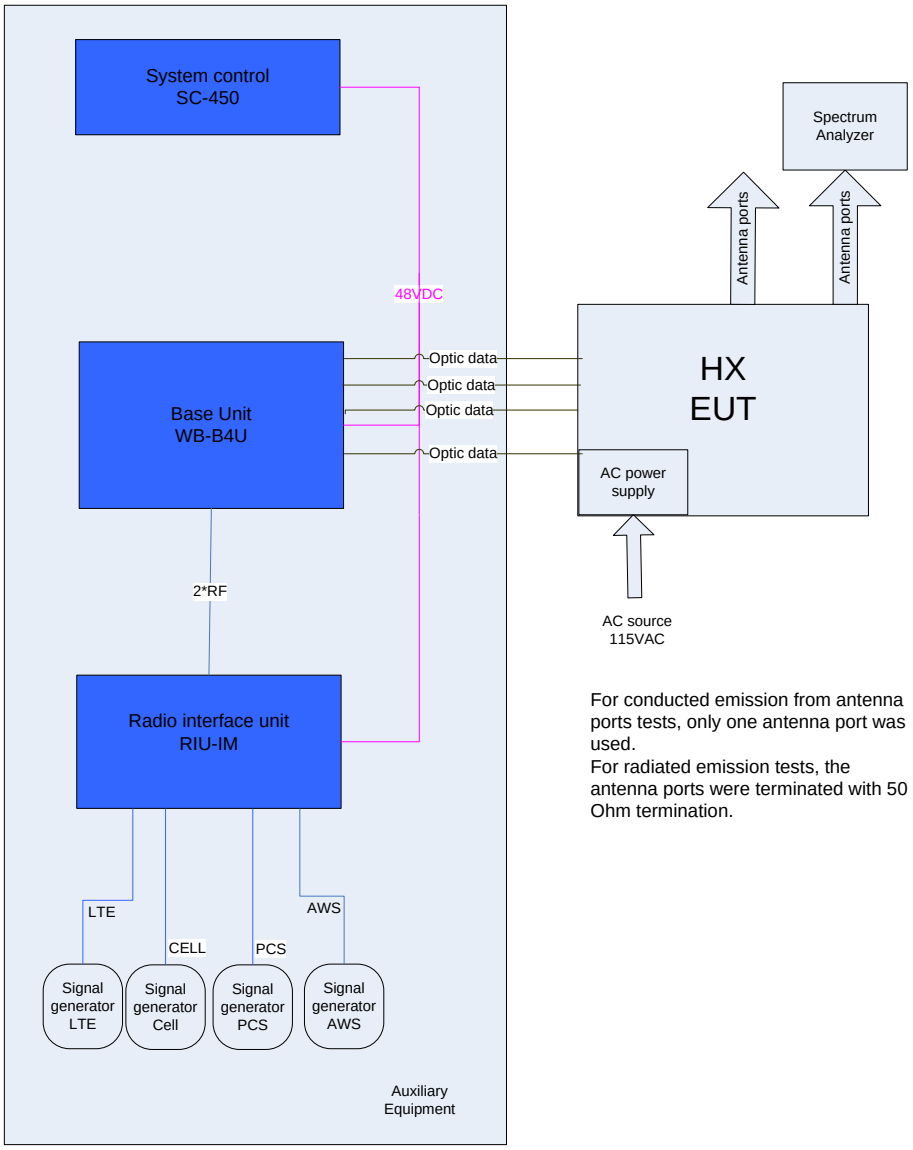

Figure 1. Tests Set-up

3. Radiated Measurement Test Set-ups Photo

Figure 2. DC Exploratory Radiated Emission Test

Figure 3. AC Exploratory Radiated Emission Test

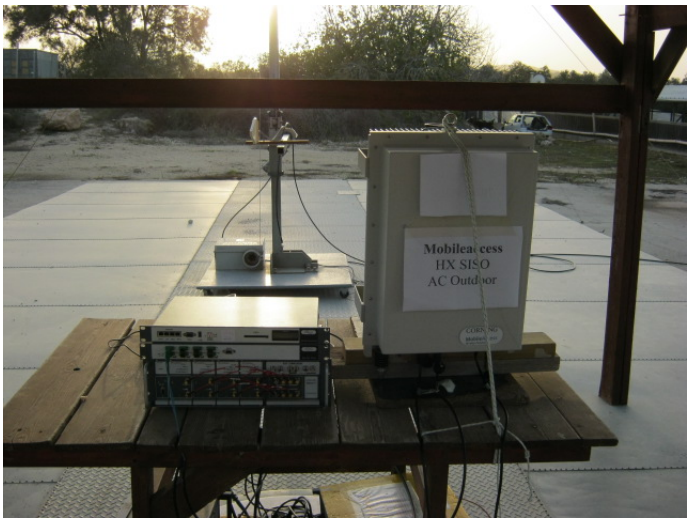

Figure 4. Radiated Emission Test

4. Spurious Radiated Emission CELL

4.1 Test Specification

FCC Part 22, Section 917; FCC Part 2.1053

4.2 Test Procedure

The test method was based on ANSI/TIA-603-C: 2004, Section 2.2.12 Unwanted Emissions: Radiated Spurious.
The power of any emission outside of the authorized operating frequency ranges (869 - 894 MHz) must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB, yielding –13dBm.

(a) The E.U.T. operation mode and test set-up are as described in Section 3. A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 1.5 meters above the ground. The configuration tested is shown in Figure 3.1.
The frequency range 9 kHz-20 GHz was scanned, and the list of the highest emissions was verified and updated accordingly.
The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.
The emissions were measured at a distance of 3 meters.

(b) The E.U.T. was replaced by a substitution antenna (dipole 30MHz-1GHz, Horn Antenna above 1GHz) driven by a signal generator. The height was readjusted for maximum reading. The signal generator level was adjusted to obtain the same reading on the EMI receiver as in step (a).
The signals observed in step (a) were converted to radiated power using:
P_d(dBm) = P_g(dBm) – Cable Loss (dB) + Substitution Antenna Gain (dB)
P_d = Dipole equivalent power (result).
P_g = Signal generator output level.

4.3 Test Results

Judgment: Passed by 35.9 dB

The E.U.T met the requirements of the FCC Part 22, Section 917;

FCC Part 2.1053 specifications.

TEST PERSONNEL:

Tester Signature: _____ Date: 16.04.12

Typed/Printed Name: I. Siboni

Spurious Radiated Emission CELL

Carrier Channel (MHz)	Freq. (MHz)	Antenna Pol.	Maximum Peak Level (dBµV/m)	Signal Generator RF Output (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Effective Radiated Power Level (dBm)	Spec. (dBm)	Margin (dB)
870.20	1740.4	V	48.6	-52.21	5.45	7.64	-50.02	-13.0	-37.02
870.20	1740.4	H	46.8	-53.84	5.45	7.64	-51.65	-13.0	-38.65
881.00	1762.0	V	48.8	-50.99	5.6	7.66	-48.93	-13.0	-35.93
881.00	1762.0	H	46.7	-53.35	5.6	7.66	-51.29	-13.0	-38.29
892.80	1785.6	V	45.7	-54.09	5.6	7.66	-52.03	-13.0	-38.03
892.80	1785.6	H	47.5	-52.55	5.6	7.66	-50.49	-13.0	-37.49

Figure 5 Test Results Table

Spurious Radiated Emission CELL

4.4 Test Instrumentation Used, Radiated Measurements CELL

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	December 12, 2011	1 year
RF Section	HP	85420E	3705A00248	December 12, 2011	1 year
Active Loop Antenna	Emco	6502	2950	November 13, 2011	1 year
Antenna Bioconical	ARA	BCD 235/B	1041	December 12, 2011	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	March 23, 2011	1 year
Antenna Log Periodic	A.H. Systems	SAS-200/511	253	January 27, 2011	2 years
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	ThinkJet 2225	2738508357.0	N/A	N/A
Spectrum Analyzer	RHODE & SCHWARZ	FSL	10-300191865	October 30, 2011	1 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	November 5, 2011	1 year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	January 4, 2011	1 year
Signal Generator	HP	E4432B ESG-D	GB40050702	July 21, 2010	2 years
Signal Generator	HP	E4438C ESG	MY45091956	January 22, 2010	2 years
Double Ridged Waveguide Horn Antenna	EMCO	3115	29845	March 14, 2010	2 years

5. Spurious Radiated Emission PCS

5.1 Test Specification

FCC, Part 24, Subpart E Section 238, FCC Part 2.1053

5.2 Test Procedure

The test method was based on ANSI/TIA-603-C: 2004, Section 2.2.12 Unwanted Emissions: Radiated Spurious.
The power of any emission outside of the authorized operating frequency ranges (1930-1990 MHz) must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB, yielding –13dBm.

(a) The E.U.T. operation mode and test set-up are as described in Section 3. A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 1.5 meters above the ground. The configuration tested is shown in Figure 3.1.
The frequency range 9 kHz-20 GHz was scanned, and the list of the highest emissions was verified and updated accordingly.
The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.
The emissions were measured at a distance of 3 meters.

(c) The E.U.T. was replaced by a substitution antenna (dipole 30MHz-1GHz, Horn Antenna above 1GHz) driven by a signal generator. The height was readjusted for maximum reading. The signal generator level was adjusted to obtain the same reading on the EMI receiver as in step (a).
The signals observed in step (a) were converted to radiated power using:
P_d(dBm) = P_g(dBm) – Cable Loss (dB) + Substitution Antenna Gain (dB)
P_d = Dipole equivalent power (result).
P_g = Signal generator output level.

5.3 Test Results

Judgment: Passed by 29.45 dB

The E.U.T met the requirements of the FCC, Part 24, Subpart E, Section 238; FCC Part 2.1053 specifications.

TEST PERSONNEL:

Tester Signature: _____ Date: 16.04.12

Typed/Printed Name: I. Siboni

Spurious Radiated Emission PCS

Carrier Channel (MHz)	Freq. (MHz)	Antenna Pol.	Maximum Peak Level (dBµV/m)	Signal Generator RF Output (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Effective Radiated Power Level (dBm)	Spec. (dBm)	Margin (dB)
1931.2	3862.4	V	51.15	-50.67	4.3	8.62	-46.35	-13.0	-33.35
1931.2	3862.4	H	51.15	-49.81	4.3	8.62	-45.49	-13.0	-32.49
1960.0	3920.0	V	52.46	-49.36	4.3	8.62	-45.04	-13.0	-32.04
1960.0	3920.0	H	50.59	-50.37	4.3	8.62	-46.05	-13.0	-33.05
1993.8	3987.6	V	51.95	-50.35	4.3	8.6	-46.05	-13.0	-33.05
1993.8	3987.6	H	54.6	-46.75	4.3	8.6	-42.45	-13.0	-29.45

Figure 6 Test Results Table

Spurious Radiated Emission PCS

5.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	December 12, 2011	1 year
RF Section	HP	85420E	3705A00248	December 12, 2011	1 year
Active Loop Antenna	Emco	6502	2950	November 13, 2011	1 year
Antenna Bioconical	ARA	BCD 235/B	1041	December 12, 2011	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	March 23, 2011	1 year
Antenna Log Periodic	A.H. Systems	SAS-200/511	253	January 27, 2011	2 years
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	ThinkJet 2225	2738508357.0	N/A	N/A
Spectrum Analyzer	RHODE & SCHWARZ	FSL	10-300191865	October 30, 2011	1 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	November 5, 2011	1 year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	January 4, 2011	1 year
Signal Generator	HP	E4432B ESG-D	GB40050702	July 21, 2010	2 years
Signal Generator	HP	E4438C ESG	MY45091956	January 22, 2010	2 years
Double Ridged Waveguide Horn Antenna	EMCO	3115	29845	March 14, 2010	2 years

6. Spurious Radiated Emission LTE

6.1 Test Specification

FCC, Part 27, Subpart C Section 27.53 (g)

6.2 Test Procedure

The test method was based on ANSI/TIA-603-C: 2004, Section 2.2.12 Unwanted Emissions: Radiated Spurious.
The power of any emission outside of the authorized operating frequency ranges (728-758 MHz) must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB, yielding –13dBm.

(a) The E.U.T. operation mode and test set-up are as described in Section 3. A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The configuration tested is shown in Figure 1.

(b) The frequency range 9 kHz-20 GHz was scanned, and the list of the highest emissions was verified and updated accordingly.
The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.
The emissions were measured at a distance of 3 meters.

(b) The E.U.T. was replaced by a substitution antenna (dipole 30MHz-1GHz, Horn Antenna above 1GHz) driven by a signal generator. The height was readjusted for maximum reading. The signal generator level was adjusted to obtain the same reading on the EMI receiver as in step (a).
The signals observed in step (a) were converted to radiated power using:
P_d(dBm) = P_g(dBm) – Cable Loss (dB) + Substitution Antenna Gain (dB)
P_d = Dipole equivalent power (result).
P_g = Signal generator output level.

6.3 Test Results

JUDGEMENT: Passed by 38.47 dB

The E.U.T met the requirements of the FCC, Part 27, Subpart C, Section 27.53 (g) specifications.

TEST PERSONNEL:

Tester Signature: _____ Date: 16.04.12

Typed/Printed Name: I. Siboni

Spurious Radiated Emission LTE

Carrier Channel (MHz)	Freq. (MHz)	Antenna Pol.	Maximum Peak Level (dBµV/m)	Signal Generator RF Output (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Effective Radiated Power Level (dBm)	Spec. (dBm)	Margin (dB)
733	1466	V	46.98	-54.31	5.15	7.6	-51.86	-13.0	-38.86
733	1466	H	45.5	-55.93	5.15	7.6	-53.48	-13.0	-40.48
747	1494	V	47.37	-53.92	5.15	7.6	-51.47	-13.0	38.47
747	1494	H	45.0	-56.43	5.15	7.6	-53.98	-13.0	-40.98
753	1506	V	45.4	-55.89	5.15	7.6	-53.44	-13.0	-40.44
753	1506	H	44.5	-56.93	5.15	7.6	-54.48	-13.0	-41.48

Figure 7 Test Results Table

Spurious Radiated Emission LTE

6.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	December 12, 2011	1 year
RF Section	HP	85420E	3705A00248	December 12, 2011	1 year
Active Loop Antenna	Emco	6502	2950	November 13, 2011	1 year
Antenna Bioconical	ARA	BCD 235/B	1041	December 12, 2011	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	March 23, 2011	1 year
Antenna Log Periodic	A.H. Systems	SAS-200/511	253	January 27, 2011	2 year
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	ThinkJet 2225	2738508357.0	N/A	N/A
Spectrum Analyzer	RHODE & SCHWARZ	FSL	10-300191865	October 30, 2011	1 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	November 5, 2011	1 year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	January 4, 2011	1 year
Signal Generator	HP	E4432B ESG-D	GB40050702	July 21, 2010	2 years
Signal Generator	HP	E4438C	MY42082734	July 21, 2010	2 years
Double Ridged Waveguide Horn Antenna	EMCO	3115	29845	March 14, 2010	2 years

7. Spurious Radiated Emission AWS

7.1 Test Specification

FCC, Part 27, Subpart C Section 27.53 (g)

7.2 Test Procedure

The test method was based on ANSI/TIA-603-C: 2004, Section 2.2.12 Unwanted Emissions: Radiated Spurious.
The power of any emission outside of the authorized operating frequency ranges (2110-2155 MHz) must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB, yielding –13dBm.

(a) The E.U.T. operation mode and test set-up are as described in Section 2. A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The configuration tested is shown in Figure 1.

(b) The frequency range 9 kHz-20 GHz was scanned, and the list of the highest emissions was verified and updated accordingly.
The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization. The emissions were measured at a distance of 3 meters.

(c) The E.U.T. was replaced by a substitution antenna (dipole 30MHz-1GHz, Horn Antenna above 1GHz) driven by a signal generator. The height was readjusted for maximum reading. The signal generator level was adjusted to obtain the same reading on the EMI receiver as in step (a).
The signals observed in step (a) were converted to radiated power using:
$P_d(dBm) = P_g(dBm) – Cable\ Loss\ (dB) + Substitution\ Antenna\ Gain\ (dB)$
P_d = Dipole equivalent power (result).
P_g = Signal generator output level.

7.3 Test Results

JUDGEMENT: Passed by 32.02 dB

The E.U.T met the requirements of the FCC, Part 27, Subpart C, Section 27.53 (g) specifications.

TEST PERSONNEL:

Tester Signature: _____ Date: 16.04.12

Typed/Printed Name: I. Siboni

Spurious Radiated Emission AWS

Carrier Channel (MHz)	Freq. (MHz)	Antenna Pol.	Maximum Peak Level (dBµV/m)	Signal Generator RF Output (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Effective Radiated Power Level (dBm)	Spec. (dBm)	Margin (dB)
2111.2	4222.4	V	52.69	-50.7	4.45	9.12	-46.03	-13.0	-36.03
2111.2	4222.4	H	49.77	-53.38	4.45	9.12	-48.71	-13.0	-35.71
2135.0	4270	V	54.01	-50.06	4.45	9.38	-45.13	-13.0	-32.13
2135.0	4270	H	47.6	-56.01	4.45	9.38	-51.08	-13.0	-48.08
2153.8	4307.6	V	54.12	-49.95	4.45	9.38	-45.02	-13.0	-32.02
2153.8	4307.6	H	53.22	-50.39	4.45	9.38	-45.46	-13.0	-32.46

Figure 8 Test Results Table

Spurious Radiated Emission AWS

7.4 Test Instrumentation Used, Radiated Measurements AWS

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	December 12, 2011	1 year
RF Section	HP	85420E	3705A00248	December 12, 2011	1 year
Active Loop Antenna	Emco	6502	2950	November 13, 2011	1 year
Antenna Bioconical	ARA	BCD 235/B	1041	December 12, 2011	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	March 23, 2011	1 year
Antenna Log Periodic	A.H. Systems	SAS-200/511	253	January 27, 2011	2 years
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	ThinkJet 2225	2738508357.0	N/A	N/A
Spectrum Analyzer	RHODE & SCHWARZ	FSL	10-300191865	October 30, 2011	1 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	November 5, 2011	1 year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	January 4, 2011	1 year
Signal Generator	HP	E4432B ESG-D	GB40050702	July 21, 2010	2 years
Signal Generator	HP	E4438C ESG	MY45091956	January 22, 2010	2 years
Double Ridged Waveguide Horn Antenna	EMCO	3115	29845	March 14, 2010	2 years

8. Intermodulation Radiated

8.1 Test procedure

The test method was based on ANSI/TIA-603-C: 2004, Section 2.2.12 Unwanted Emissions: Radiated Spurious.
The power of any emission outside of the authorized operating frequency ranges (728-758; 2110-2155 MHz) must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB, yielding –13dBm.

(a) The E.U.T. operation mode and test set-up are as described in Section 2.
A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground.
The configuration tested is shown in Figure 1.

The E.U.T. was operated in Downlink mode at 4 different channels at center frequency of each band at the same time, transmitting at CW signal.

(b) The frequency range 9 kHz-25 GHz was scanned, and the list of the highest emissions was verified and updated accordingly.
The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.
The emissions were measured at a distance of 3 meters.

(d) The E.U.T. was replaced by a substitution antenna (dipole 30MHz-1GHz, Horn Antenna above 1GHz) driven by a signal generator. The height was readjusted for maximum reading. The signal generator level was adjusted to obtain the same reading on the EMI receiver as in step (a).
The signals observed in step (a) were converted to radiated power using:
P_d(dBm) = P_g(dBm) – Cable Loss (dB) + Substitution Antenna Gain (dB)
P_d = Dipole equivalent power (result).
P_g = Signal generator output level.

8.2 Test Results

JUDGEMENT: Passed
TEST PERSONNEL:

Tester Signature: _____ Date: 16.04.12

Typed/Printed Name: I. Siboni

Intermodulation Radiated

Carrier Channel (MHz)	Freq. (MHz)	Antenna Pol.	Maximum Peak Level (dBµV/m)	Signal Generator RF Output (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Effective Radiated Power Level (dBm)	Spec. (dBm)	Margin (dB)
2*747+881	2375	V	53.2	-47.49	7.4	8.26	-46.63	-13.0	-33.63
2*747+881	2375	H	52.58	-48.3	7.4	8.26	-47.44	-13.0	-34.44
2*747-881	613	V	26.16	-70.18	3.2	0.97	-72.41	-13.0	-59.41
2*747-881	613	H	26.04	-71.67	3.2	0.97	-73.9	-13.0	-60.9
2*881-747	1015	V	39.20	-62.59	4.2	5.4	-61.39	-13.0	-48.39
2*881-747	1015	H	40.75	-60.7	4.2	5.4	-59.5	-13.0	-46.5
2*881+747	2509	V	54.1	-46.66	7.7	8.4	-45.96	-13.0	-32.96
2*881+747	2509	H	54.57	-47.04	7.7	8.4	-46.34	-13.0	-33.34
3*747-2*881	579	V	27.10	-69.24	3.2	0.97	-71.47	-13.0	-58.47
3*747-2*881	579	H	25.85	-71.86	3.2	0.97	-74.09	-13.0	-61.09
3*881-2*747	1149	V	41.30	-60.19	4.45	5.84	-58.8	-13.0	-45.8
3*881-2*747	1149	H	41.92	-59.59	4.45	5.84	-58.2	-13.0	-45.2
2*1960-2135	1785	V	48.87	-50.92	5.6	7.66	-48.86	-13.0	-35.86
2*1960-2135	1785	H	47.85	-52.2	5.6	7.66	-50.14	-13.0	-37.14
2*2135-1960	2310	V	51.25	-50.33	7.1	8.12	-49.31	-13.0	-36.31
2*2135-1960	2310	H	51.79	-50.59	7.1	8.12	-49.57	-13.0	-36.57
3*2135-2*1960	2485	V	53.64	-47.12	7.7	8.4	-46.42	-13.0	-33.42
3*2135-2*1960	2485	H	53.62	-47.99	7.7	8.4	-47.29	-13.0	-34.29
2*2135-3*1960	1610	V	45.82	-55.18	5.3	7.62	-52.86	-13.0	-39.86
2*2135-3*1960	1610	H	46.21	-55.23	5.3	7.62	-52.91	-13.0	-39.91

Figure 9 Test Results Table

Intermodulation Radiated

8.3 Test Instrumentation Used, Radiated Measurements Intermodulation

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3906A00276	December 12, 2011	1 year
RF Section	HP	85420E	3705A00248	December 12, 2011	1 year
Active Loop Antenna	Emco	6502	2950	November 13, 2011	1 year
Antenna Bioconical	ARA	BCD 235/B	1041	December 12, 2011	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	March 23, 2011	1 year
Antenna Log Periodic	A.H. Systems	SAS-200/511	253	January 27, 2011	2 years
Antenna Mast	ARA	AAM-4A	1001	N/A	N/A
Turntable	ARA	ART-1001/4	1001	N/A	N/A
Mast & Table Controller	ARA	ACU-2/5	1001	N/A	N/A
Printer	HP	ThinkJet 2225	2738508357.0	N/A	N/A
Spectrum Analyzer	RHODE & SCHWARZ	FSL	10-300191865	October 30, 2011	1 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	November 5, 2011	1 year
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232	January 4, 2011	1 year
Signal Generator	HP	E4432B ESG-D	GB40050702	July 21, 2010	2 years
Signal Generator	Agilent	E4438C	MY45091956	January 22, 2010	2 years
Signal Generator	HP	E4438C	MY42082734	July 21, 2010	2 years
Signal Generator	HP	83731B	US37100653	February 21, 2011	1 year
Double Ridged Waveguide Horn Antenna	EMCO	3115	29845	March 14, 2010	2 years

9. APPENDIX A - CORRECTION FACTORS

9.1 Correction factors for CABLE

from EMI receiver to test antenna at 3 meter range.

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.3
20.0	0.6
30.0	0.8
40.0	0.9
50.0	1.1
60.0	1.2
70.0	1.3
80.0	1.4
90.0	1.6
100.0	1.7
150.0	2.0
200.0	2.3
250.0	2.7
300.0	3.1
350.0	3.4
400.0	3.7
450.0	4.0
500.0	4.3
600.0	4.7
700.0	5.3
800.0	5.9
900.0	6.3
1000.0	6.7

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
1200.0	7.3
1400.0	7.8
1600.0	8.4
1800.0	9.1
2000.0	9.9
2300.0	11.2
2600.0	12.2
2900.0	13.0

NOTES:

1. The cable type is RG-214.

2. The overall length of the cable is 27 meters.

3. The above data is located in file 27MO3MO.CBL on the disk marked "Radiated Emission Tests EMI Receiver".

9.2 Correction factors for CABLE from EMI receiver to test antenna at 3 meter range.

FREQUENCY (GHz)	CORRECTION FACTOR (dB)
1.0	1.2
2.0	1.6
3.0	2.0
4.0	2.4
5.0	3.0
6.0	3.4
7.0	3.8
8.0	4.2
9.0	4.6
10.0	5.0
12.0	5.8

NOTES:

1. The cable type is RG-8.

2. The overall length of the cable is 10 meters.

9.3 Correction factors for CABLE

from spectrum analyzer to test antenna above 2.9 GHz

FREQUENCY (GHz)	CORRECTION FACTOR (dB)	FREQUENCY (GHz)	CORRECTION FACTOR (dB)
1.0	1.9	14.0	9.1
2.0	2.7	15.0	9.5
3.0	3.5	16.0	9.9
4.0	4.2	17.0	10.2
5.0	4.9	18.0	10.4
6.0	5.5	19.0	10.7
7.0	6.0	20.0	10.9
8.0	6.5	21.0	11.2
9.0	7.0	22.0	11.6
10.0	7.5	23.0	11.9
11.0	7.9	24.0	12.3
12.0	8.3	25.0	12.6
13.0	8.7	26.0	13.0

NOTES:

1. The cable type is SUCOFLEX 104 E manufactured by SUHNER.

2. The cable is used for measurements above 2.9 GHz.

3. The overall length of the cable is 10 meters.

9.4 Correction factors for LOG PERIODIC ANTENNA

Type LPD 2010/A
at 3 and 10 meter ranges.

Distance of 3 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.1
250.0	10.2
300.0	12.5
400.0	15.4
500.0	16.1
600.0	19.2
700.0	19.4
800.0	19.9
900.0	21.2
1000.0	23.5

Distance of 10 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.0
250.0	10.1
300.0	11.8
400.0	15.3
500.0	15.6
600.0	18.7
700.0	19.1
800.0	20.2
900.0	21.1
1000.0	23.2

NOTES:

1. *Antenna serial number is 1038.*
2. *The above lists are located in file number 38M3O.ANT for a 3 meter range, and file number 38M100.ANT for a 10 meter range.*
3. *The files mentioned above are located on the disk marked "Radiated Emission Test EMI Receiver".*

9.5 Correction factors for LOG PERIODIC ANTENNA

Type SAS-200/511
at 3 meter range.

FREQUENCY (GHz)	ANTENNA FACTOR (dB)
1.0	24.9
1.5	27.8
2.0	29.9
2.5	31.2
3.0	32.8
3.5	33.6
4.0	34.3
4.5	35.2
5.0	36.2
5.5	36.7
6.0	37.2
6.5	38.1

FREQUENCY (GHz)	ANTENNA FACTOR (dB)
7.0	38.6
7.5	39.2
8.0	39.9
8.5	40.4
9.0	40.8
9.5	41.1
10.0	41.7
10.5	42.4
11.0	42.5
11.5	43.1
12.0	43.4
12.5	44.4
13.0	44.6

NOTES:

1. *Antenna serial number is 253.*
2. *The above lists are located in file number SAS3M0.ANT for a 3 meter range.*
3. *The files mentioned above are located on the disk marked "Antenna Factors".*

9.6 Correction factors for BICONICAL ANTENNA

Type BCD-235/B, at 3 meter range

FREQUENCY (MHz)	AFE (dB/m)
20.0	19.4
30.0	14.8
40.0	11.9
50.0	10.2
60.0	9.1
70.0	8.5
80.0	8.9
90.0	9.6
100.0	10.3
110.0	11.0
120.0	11.5
130.0	11.7
140.0	12.1
150.0	12.6
160.0	12.8
170.0	13.0
180.0	13.5
190.0	14.0
200.0	14.8
210.0	15.3
220.0	15.8
230.0	16.2
240.0	16.6
250.0	17.6
260.0	18.2
270.0	18.4
280.0	18.7
290.0	19.2
300.0	19.9
310	20.7
320	21.9
330	23.4
340	25.1
350	27.0

NOTES:

1. Antenna serial number is 1041.

2. The above list is located in file 19BC10M1.ANT on the disk marked "Radiated Emissions Tests EMI Receiver".

9.7 Correction factors for Double-Ridged Waveguide Horn

Model: 3115, S/N 29845
at 3 meter range.

FREQUENCY (GHz)	ANTENNA FACTOR (dB 1/m)	ANTENNA Gain (dBi)	FREQUENCY (GHz)	ANTENNA FACTOR (dB 1/m)	ANTENNA Gain (dBi)
1.0	24.8	5.4	10.0	38.8	11.4
1.5	26.1	7.6	10.5	38.9	11.8
2.0	28.6	7.7	11.0	39.0	12.1
2.5	29.8	8.4	11.5	39.6	11.8
3.0	31.4	8.4	12.0	39.8	12.0
3.5	32.4	8.7	12.5	39.6	12.5
4.0	33.7	8.6	13.0	40.0	12.5
4.5	33.4	9.9	13.5	39.8	13.0
5.0	34.5	9.7	14.0	40.2	13.0
5.5	35.1	9.9	14.5	40.6	12.9
6.0	35.4	10.4	15.0	41.3	12.4
6.5	35.6	10.8	15.5	39.5	14.6
7.0	36.2	10.9	16.0	38.8	15.5
7.5	37.3	10.4	16.5	40.0	14.6
8.0	37.7	10.6	17.0	41.4	13.4
8.5	38.3	10.5	17.5	44.8	10.3
9.0	38.5	10.8	18.0	47.2	8.1
9.5	38.7	11.1			

9.8 Correction factors for ACTIVE LOOP ANTENNA

Model 6502
S/N 9506-2950

FREQUENCY (MHz)	Magnetic Antenna Factor (dB)	Electric Antenna Factor (dB)
.009	-35.1	16.4
.010	-35.7	15.8
.020	-38.5	13.0
.050	-39.6	11.9
.075	-39.8	11.8
.100	-40.0	11.6
.150	-40.0	11.5
.250	-40.0	11.6
.500	-40.0	11.5
.750	-40.1	11.5
1.000	-39.9	11.7
2.000	-39.5	12.0
3.000	-39.4	12.1
4.000	-39.7	11.9
5.000	-39.7	11.8
10.000	40.2	11.3
15.000	-40.7	10.8
20.000	-40.5	11.0
25.000	-41.3	10.2
30.000	42.3	9.2