Cert. No. 1152.01
Electrical (EMC)

DATE: 29 November 2006

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

FCC EMC/Radio Test Report

for

Alvarion Ltd.

Equipment under test:

Broadband Wireless Access System

BreezeMAX 2500 Base Station (Au)
BMAX-BST-AU-ODU-HP-2.5-B*

* See customer's declaration on page 5.

Written by: _____
D. Shidlowsky, Documentation

Approved by: _____
E. Pitt, Test Engineer

Approved by: _____
I. Raz, EMC Laboratory Manager

Cert. No. 1152.01
Electrical (EMC)

Measurement/Technical Report for

Alvarion Ltd.

Broadband Wireless Access System

BreezeMAX 2500 Base Station (Au)

BMAX-BST-AU-ODU-HP-2.5-B

FCC ID: LKT-BMAX-B-B25

29 November 2006

This report concerns: Original Grant x Class II change

Class B verification ___ Class A verification_____Class I change

Equipment type: Licensed Non-Broadcast Station Transmitter

Request Issue of Grant:

__**x**__Immediately upon completion of review

Limits used:

CISPR 22 _____ Parts 15; 27 __x__

Measurement procedure used is ANSI C63.4-2003.

Substitution Method used as in ANSI/TIA-603-B: 2002

Application for Certification
prepared by:
Ishaishou Raz
ITL (Product Testing) Ltd.
Kfar Bin Nun
D.N. Shimshon 99780
Israel
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Applicant for this device:
(different from "prepared by")
Avner Ruta
Alvarion Ltd.
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1. General Information

1.1 Administrative Information

Manufacturer:	Alvarion Ltd.
Manufacturer's Address:	21A Habarzel St. Tel Aviv, 69710 Israel Tel: +972-3-645-6262 Fax: +972-3-645-6290
Manufacturer's Representative:	Avner Ruta Nissim Gabay
Equipment Under Test (E.U.T):	Broadband Wireless Access System
Equipment Model No.:	BreezeMAX 2500 Base Station (Au) BMAX-BST-AU-ODU-HP-2.5-B (See customer's declaration on following page).
Equipment Serial No.:	Not designated
Date of Receipt of E.U.T:	31.07.06
Start of Test:	31.07.06
End of Test:	21.09.06
Test Laboratory Location*:	I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780
Test Specifications:	FCC Part 15, Sub-part B, FCC Part 27, Sub-parts C, M

* Antenna port conducted tests were performed at Alvarion Ltd. under ITL's supervision.

Date:25/10/06

DECLARATION

I HEREBY DECLARE THAT THE FOLLOWING PRODUCT:

BMAX-BST-AU-ODU-HP-2.5-B

IS IDENTICAL ELECTRONICALLY, PHYSICALLY, AND MECHANICALLY TO:

BMAX-AU-ODU-HP-2.5G

Please relate to them as the same product.

Thank you
Signature

Avner Ruta
Compliance engineer

Alvarion Ltd. BreezeCOM and Floware unite
21a HaBarzel St. Tel Aviv, 69710 Israel
Main Line / Fax: 972 3 645 6262 / 6222 www.alvarion.com

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), File No. IC 4025.
6. TUV Product Services, England, ASLLAS No. 97201.
7. Nemko (Norway), Authorization No. ELA 207.

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

Base Station Equipment

The Multi Carrier, High Power, Full Duplex Base Station provides all the functionality necessary to communicate with SUs and to connect to the backbone of the Service Provider.

The Base Station comprises the following elements:

Base Station Chassis

The Base Station equipment is based on an 8U high cPCI (compact Peripheral Component Interconnect) shelf designed for installation in a 19" or 21" (ETSI) rack. This chassis has a total of nine double Euro (6U high) slots and six single Euro (3U high) slots. All the modules are hot swappable, and high availability can be provided through multiple redundancy schemes.

The six single Euro slots re intended for one or two redundant Power Interface Units (PIU) and up to four redundant Power Supply Units (PSUs).

One of the double Euro slots is dedicated to the Network Processing Unit (NPU) module, supporting a central networking and management architecture. Another double Euro slot is reserved for an optional redundant NPU (NPU redundancy support is planned for a future release).

The remaining seven double Euro slots are dedicated mainly for Access Unit (AU) indoor modules, thus enabling various future redundancy configurations.

Additionally, the Base Station chassis contains an air convection and ventilation fan tray (AVU).

Network Processing Unit (NPU)

The Network Processing Unit is the "heart" of the BreezeMAX Base Station. The NPU module serves as the central processing unit that manages the base station's components and the SUs served by it. It also aggregates the traffic from the AU modules and transfers it to the IP Backbone through a dedicated Gigabit/Fast Ethernet interface.

The NPU main functions are:

Aggregate backbone Ethernet connectivity via a 100/1000 Base-T network interface.

Traffic classification and connection establishment initiation.

Policy based data switching.

Service Level Agreements management.

RADIUS NAS, enabling centralized SUs’ authentication and services authorization by RADIUS server(s).

Centralized agent in the Base Station to manage all cell site's AUs and all registered SUs.

Base Station overall operation control, including AU diagnostic and control, PSU monitoring, AVU management and redundancy support.

Alarms management, including external alarm inputs and activation of external devices (future option).

Synchronization, including GPS antenna interface, clock and IF reference generation and distribution to the Base Station modules as well as to other collocated Base Station chassis (future option).

An SNMP agent incorporated into the NPU enables extensive In Band (IB) management of the Base Station and all its registered SUs. Out Of Band (OOB) management is supported through a dedicated 10/100 Base-T interface. A serial RS-232 port supports local configuration, monitoring and debugging.

Two NPU modules can be used to provide a 1+1 redundancy scheme. The redundancy mechanism, to be supported in future releases, will be based on a Master <-> Slave principle, where the slave is in passive mode and is constantly updating all the learning tables and networking parameters of the master card.

Access Unit (AU-IDU)

The double Euro AU-IDU module contains the WiMAX-ready MAC and modem and is responsible for the wireless network connection establishment and for bandwidth management. Each AU-IDU connects to the NPU via the back plane. In addition, each AU-IDU connects to all other AU slots via the back plane over a shared bus.

Each AU-IDU includes four channels using a common PHY and MAC that can connect to up to four outdoor radio units, according to the selected diversity mode (refer to Section 1.2.5 below for more details). The AU-IDU module connects to the AU-ODUs via Intermediate Frequency (IF) cables carrying full duplex data, control and management signals between the AU-IDU and the AU-ODU, as well as power (-48 VDC) and 64 MHz synchronization reference clock from the AU-IDU to the AU-ODU. The IF Tx and Rx frequencies are 240 MHz and 140 MHz, respectively. IDU-ODU service channel at 14 MHz serves for bi-directional control, status and management signaling.

AU-ODU-HP

The AU-ODU-HP (High Power ODU) is a full duplex multi-carrier radio unit that connects to an external antenna. It is designed to provide high system gain and interference robustness utilizing high transmit power and low noise figure. It supports a bandwidth of up to 14 MHz, enabling future options such as increased capacity through either larger channels or using an IF multiplexer.

The AU-ODU-HP provides a maximum output power of 36 dBm.

1.4 Test Methodology

Both conducted and radiated testing were 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

The 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 August 22, 2006).
I.T.L.'s EMC Laboratory is also accredited by A2LA, certificate No. 1152.01.

1.6 Measurement Uncertainty

Radiated Emission

The Open Site complies with the ±4 dB Normalized Site Attenuation requirements of ANSI C63.4-2003. In accordance with Paragraph 5.4.6.1 of this standard, this tolerance includes instrumentation calibration errors, measurement technique errors, and errors due to site anomalies.

2. Product Labeling

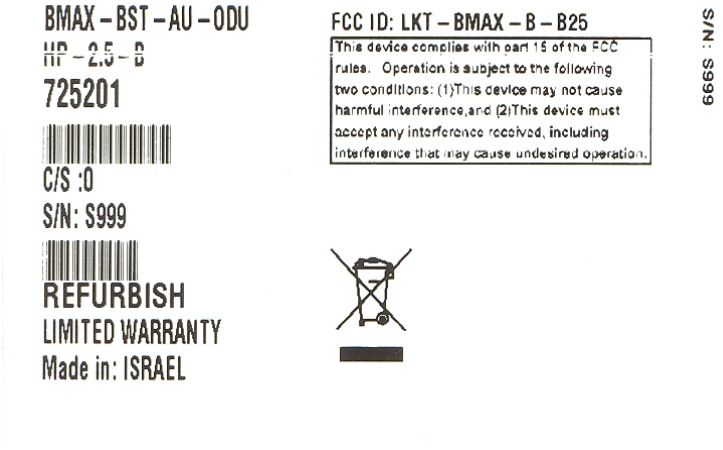

Figure 1. FCC Label

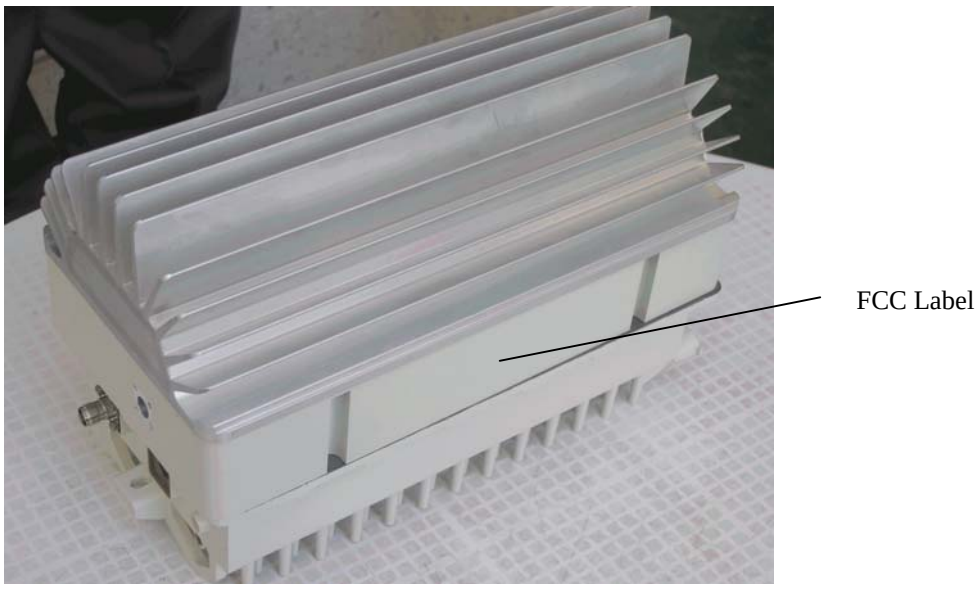

Figure 2. Location of Label on EUT

3. System Test Configuration

3.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it). The ODU was powered from the AU (Access Unit) indoor card , via coax cable containing -48DC supply voltage, IF signal and control signals.

During radio testing the antenna port N type connector was used to test radio parameters. Radio parameters control during testing were made from the Ethernet port of NPU (Network Processing Unit) located in the indoor shelf. All radio controls were made from a laptop and snmp software support . In normal use the Ethernet port connects to laptop or PC is connected to the same Ethernet port.

For emission testing the EUT's antenna port was terminated by 50 ohm impedance as required by regulation. Ethernet port was connected to a laptop exercising high speed data traffic via long UTP cable . All digital parts were activated which represented the normal use of the unit in worst-case condition.

3.2 EUT Exercise Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

On power on, processor of NPU addresses the FLASH memory and downloads the software to SDRAM where the operating system for EUT is found. The initial testing of hardware is made

And power up of AU cards. Next step is Networking registration.

ODU's are turned on and radio initialization begins.

Link setup process with CPE begins until connection to internet is established .From now the user is connected to internet . The complete cycle takes about 5 minutes . From now on software performs a routine responsible for signal level control (RF) , formatting data packets , sending and receiving data .

For conducted and radiated emission tests the digital activities described above, represent worst case condition.

3.3 Special Accessories

No special accessories were needed to achieve compliance.

3.4 Equipment Modifications

No modifications were needed to achieve compliance.

3.5 Configuration of Tested System

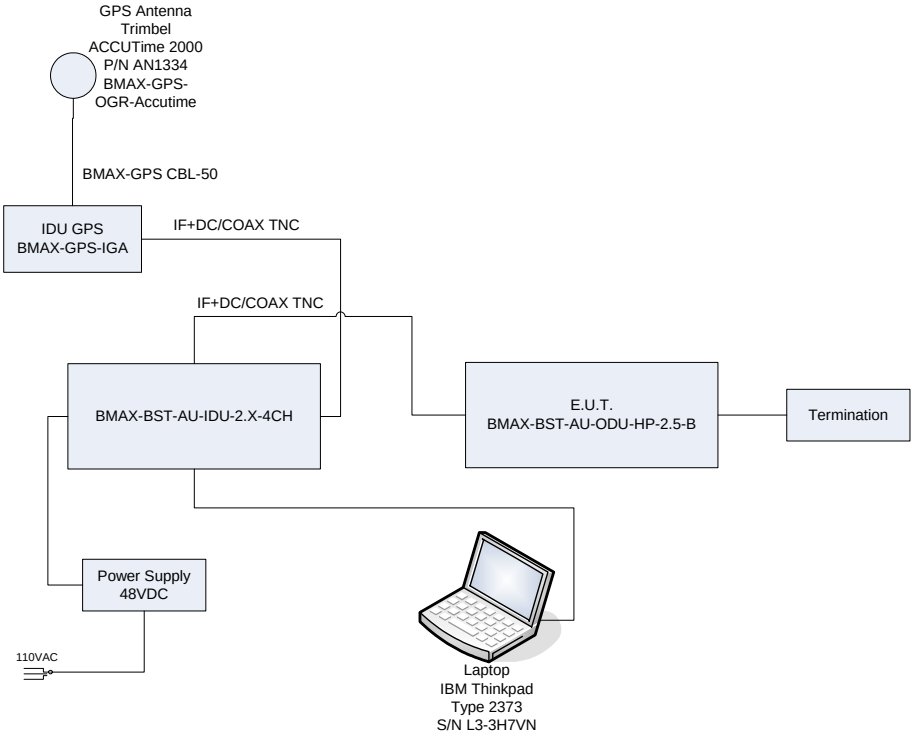

Figure 3. Tests Set-up

4. Block Diagram

4.1 Schematic Block/Connection Diagram

Intentionally blank for reasons of confidentiality.

4.2 Theory of Operation

Intentionally blank for reasons of confidentiality.

5. Radiated Emission, per FCC Part 15

5.1 Test Specification

30MHz-13000 MHz, FCC, Part 15, Subpart B

5.2 Test Procedure

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 E.U.T. highest frequency source or used frequency is $F_{LO}=F_{Car}$-140=2687.5-140= 2547.5 MHz

The frequency range 30-13000 MHz was scanned, and the list of the highest emissions was verified and updated accordingly.

The emissions were measured using a computerized EMI receiver complying to CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

In the frequency range 2.9-13 GHz, a spectrum analyzer including a low noise amplifier was used. The test distance was 3 meters. During peak measurements, the I.F. bandwidth was 1 MHz, and video bandwidth 3 MHz. During average measurements, the I.F. bandwidth was 1 MHz and video bandwidth was 100 Hz.

The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization. Verification of the E.U.T emissions was based on the following methods: turning the E.U.T on and off; using a frequency span less than 10 MHz; observation of the signal level during turntable rotation. (Background noise is not affected by the rotation of the E.U.T.)

The emissions were measured at a distance of 3 meters.

5.3 Test Data

JUDGEMENT: Passed by 3.8 dB

The E.U.T met the requirements of the FCC Part 15, Subpart B, Class B specification.

The margin between the emission level and the specification limit is 3.8 dB in the worst case at the frequency of 399.92 MHz, horizontal polarization.

In the band 2.9 – 13 GHz, the emission levels were more than 20 dB below the specification limit.

The details of the highest emissions are given in Figure 4 to Figure 13.

TEST PERSONNEL:

Tester Signature: _____ Date: 08.11.06

Typed/Printed Name: E. Pitt

Radiated Emission

E.U.T Description	Broadband Wireless Access System
Type	BreezeMAX 2500 Base Station (Au) BMAX-BST-AU-ODU-HP-2.5-B
Serial Number:	Not designated

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Horizontal
Antenna: 3 meters distance

Frequency range: 30 MHz to 1000 MHz
Detectors: Peak, Quasi-peak

Frequency (MHz)	Peak Amp (dBµV/m)	QP Amp (dBµV/m)	Correction (dB)	Specification (dBµV/m)	Margin (dB)
138.27	43.6	42.1	14.0	54.0	-11.9
276.80	42.5	39.3	21.5	56.9	-17.6
399.92	54.4	53.1	19.1	56.9	-3.8
704.02	45.7	42.2	24.7	56.9	-14.7
799.82	49.2	45.8	25.8	56.9	-11.1
924.02	48.8	44.8	28.1	56.9	-12.1

Figure 4. Radiated Emission. Antenna Polarization: HORIZONTAL. Detectors: Peak, Quasi-peak

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description	Broadband Wireless Access System
Type	BreezeMAX 2500 Base Station (Au) BMAX-BST-AU-ODU-HP-2.5-B
Serial Number:	Not designated

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Horizontal
Antenna: 3 meters distance

Frequency range: 30 MHz to 1000 MHz
Detectors: Peak, Quasi-peak

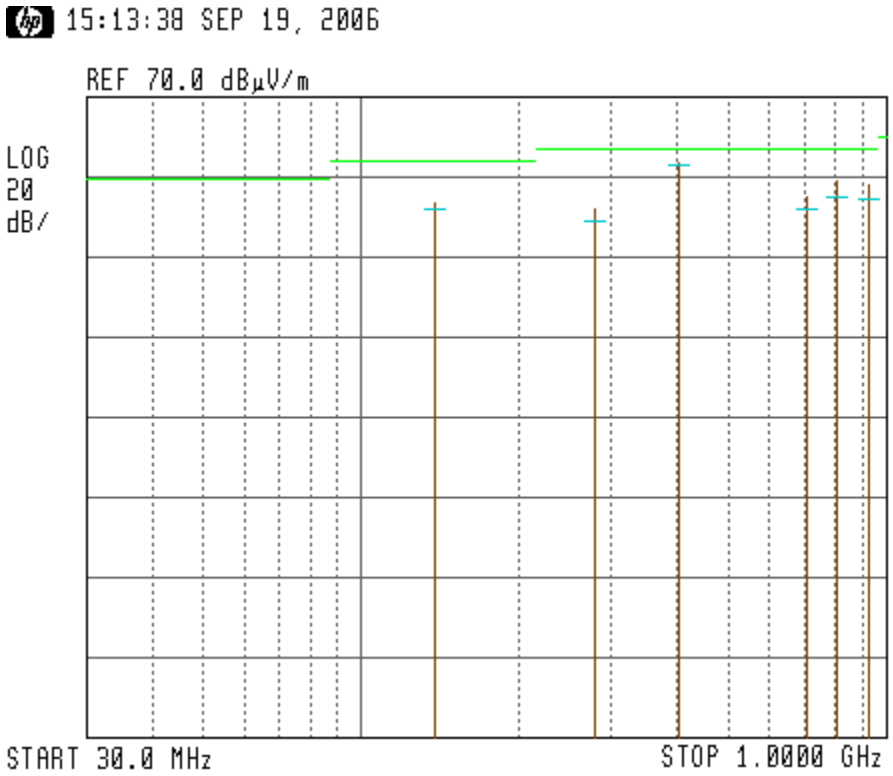

Figure 5. Radiated Emission. Antenna Polarization: HORIZONTAL Detectors: Peak, Quasi-peak

Note:

1. *Horizontal axis shows logarithmic frequency scale.*
2. *The vertical axis shows amplitude (in dB µV/m).*
3. *Peak detection is designated by the top of each vertical line.*
4. *Quasi-peak detection is designated by the first dash mark (from the top) of each vertical line.*

Radiated Emission

E.U.T Description	Broadband Wireless Access System
Type	BreezeMAX 2500 Base Station (Au) BMAX-BST-AU-ODU-HP-2.5-B
Serial Number:	Not designated

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Horizontal
Antenna: 3 meters distance
Frequency range: 1.0 GHz to 2.9 GHz
Detectors: Peak

Frequency (MHz)	Peak Amp (dBµV/m)	Correction (dB)	Specification (dBµV/m)	Margin (dB)
1152.00	56.5	32.9	74.0	-17.5
1287.00	54.9	34.1	74.0	-19.1
1408.00	55.0	35.1	74.0	-19.0
1485.00	55.0	35.8	74.0	-19.0
1536.00	54.8	36.2	74.0	-19.2
2176.00	50.4	41.0	74.0	-23.6

Figure 6. Radiated Emission. Antenna Polarization: HORIZONTAL. Detectors: Peak

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description	Broadband Wireless Access System
Type	BreezeMAX 2500 Base Station (Au) BMAX-BST-AU-ODU-HP-2.5-B
Serial Number:	Not designated

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Horizontal
Antenna: 3 meters distance
Frequency range: 1.0 GHz to 2.9 GHz
Detectors: Average

Frequency (MHz)	Avg Amp (dBµV/m)	Correction (dB)	Specification (dBµV/m)	Margin (dB)
1152.00	43.95	32.9	54.0	-10.0
1287.00	43.52	34.1	54.0	-10.5
1408.00	41.60	35.1	54.0	-12.4
1485.00	42.84	35.8	54.0	-11.2
1536.00	42.50	36.2	54.0	-11.5
2176.00	37.85	41.0	54.0	-16.2

Figure 7. Radiated Emission. Antenna Polarization: HORIZONTAL. Detectors: Average

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description	Broadband Wireless Access System
Type	BreezeMAX 2500 Base Station (Au) BMAX-BST-AU-ODU-HP-2.5-B
Serial Number:	Not designated

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Horizontal
Antenna: 3 meters distance

Frequency range: 1.0 GHz to 2.9 GHz
Detectors: Peak, Average

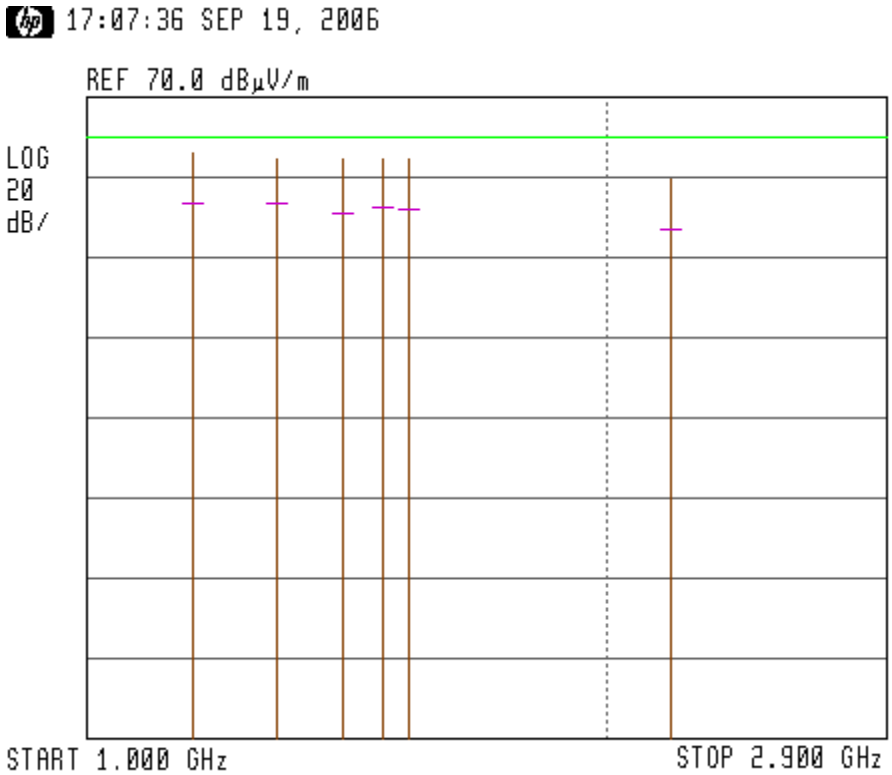

Figure 8. Radiated Emission. Antenna Polarization: HORIZONTAL Detectors: Peak, Average

Note:

1. *Horizontal axis shows logarithmic frequency scale.*
2. *The vertical axis shows amplitude (in dB µV/m).*
3. *Peak detection is designated by the top of each vertical line.*
4. *Average detection is designated by the first dash mark (from the top) of each vertical line.*

Radiated Emission

E.U.T Description: Broadband Wireless Access System
Type: BreezeMAX 2500 Base Station (Au)
BMAX-BST-AU-ODU-HP-2.5-B
Serial Number: Not designated

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Vertical
Antenna: 3 meters distance
Frequency range: 30 MHz to 1000 MHz
Detectors: Peak, Quasi-peak

Frequency (MHz)	Peak Amp (dBµV/m)	QP Amp (dBµV/m)	Correction (dB)	Specification (dBµV/m)	Margin (dB)
64.00	38.7	36.5	10.1	49.5	-13.0
128.02	35.3	32.3	13.5	54.0	-21.7
399.92	51.7	50.4	19.1	56.9	-6.5
429.03	36.9	32.6	19.5	56.9	-24.3
599.90	40.6	35.1	23.9	56.9	-21.8
799.81	52.5	50.0	25.8	56.9	-6.9

Figure 9. Radiated Emission. Antenna Polarization: VERTICAL. Detectors: Peak, Quasi-peak

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description	Broadband Wireless Access System
Type	BreezeMAX 2500 Base Station (Au) BMAX-BST-AU-ODU-HP-2.5-B
Serial Number:	Not designated

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Vertical
Antenna: 3 meters distance

Frequency range: 30 MHz to 1000 MHz
Detectors: Peak, Quasi-peak

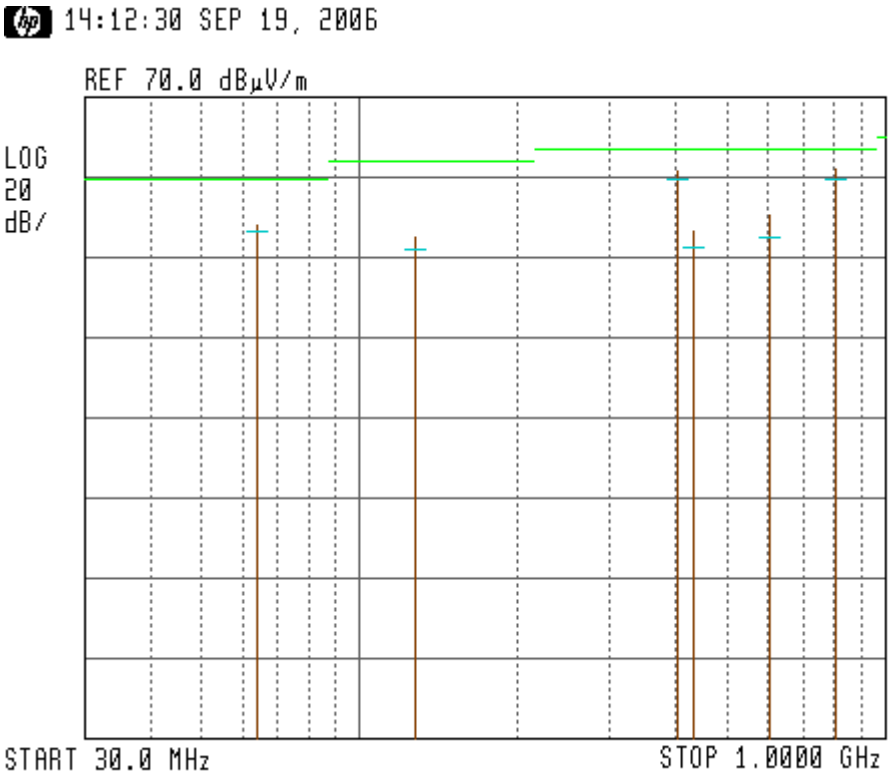

Figure 10. Radiated Emission. Antenna Polarization: VERTICAL. Detectors: Peak, Quasi-peak

Note:

1. *Horizontal axis shows logarithmic frequency scale.*
2. *The vertical axis shows amplitude (in dB µV/m).*
3. *Peak detection is designated by the top of each vertical line.*
4. *Quasi-peak detection is designated by the first dash mark (from the top) of each vertical line.*

Radiated Emission

E.U.T Description	Broadband Wireless Access System
Type	BreezeMAX 2500 Base Station (Au) BMAX-BST-AU-ODU-HP-2.5-B
Serial Number:	Not designated

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Vertical
Antenna: 3 meters distance
Frequency range: 1.0 GHz to 2.9 GHz
Detectors: Peak

Frequency (MHz)	Peak Amp (dBµV/m)	Correction (dB)	Specification (dBµV/m)	Margin (dB)
1055.99	53.6	32.1	74.0	-20.4
1485.00	55.8	35.8	74.0	-18.2
1881.00	58.4	38.8	74.0	-15.6
2079.00	56.2	40.4	74.0	-17.8
2111.99	54.8	40.6	74.0	-19.2
2360.00	57.1	42.2	74.0	-16.9

Figure 11. Radiated Emission. Antenna Polarization: VERTICAL. Detectors: Peak

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description	Broadband Wireless Access System
Type	BreezeMAX 2500 Base Station (Au) BMAX-BST-AU-ODU-HP-2.5-B
Serial Number:	Not designated

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Vertical Frequency range: 1.0 GHz to 2.9 GHz

Antenna: 3 meters distance Detectors: Average

Frequency (MHz)	Avg Amp (dBµV/m)	Correction (dB)	Specification (dBµV/m)	Margin (dB)
1055.99	42.6	32.1	54.0	-11.4
1485.00	43.1	35.8	54.0	-10.9
1881.00	46.4	38.8	54.0	-7.6
2079.00	46.0	40.4	54.0	-8.0
2111.99	42.5	40.6	54.0	-11.5
2360.00	45.0	42.2	54.0	-9.0

Figure 12. Radiated Emission. Antenna Polarization: VERTICAL. Detectors: Average

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Radiated Emission

E.U.T Description	Broadband Wireless Access System
Type	BreezeMAX 2500 Base Station (Au) BMAX-BST-AU-ODU-HP-2.5-B
Serial Number:	Not designated

Specification: FCC Part 15, Subpart B, Class B

Antenna Polarization: Vertical
Antenna: 3 meters distance

Frequency range: 1.0 GHz to 2.9 GHz
Detectors: Peak, Average

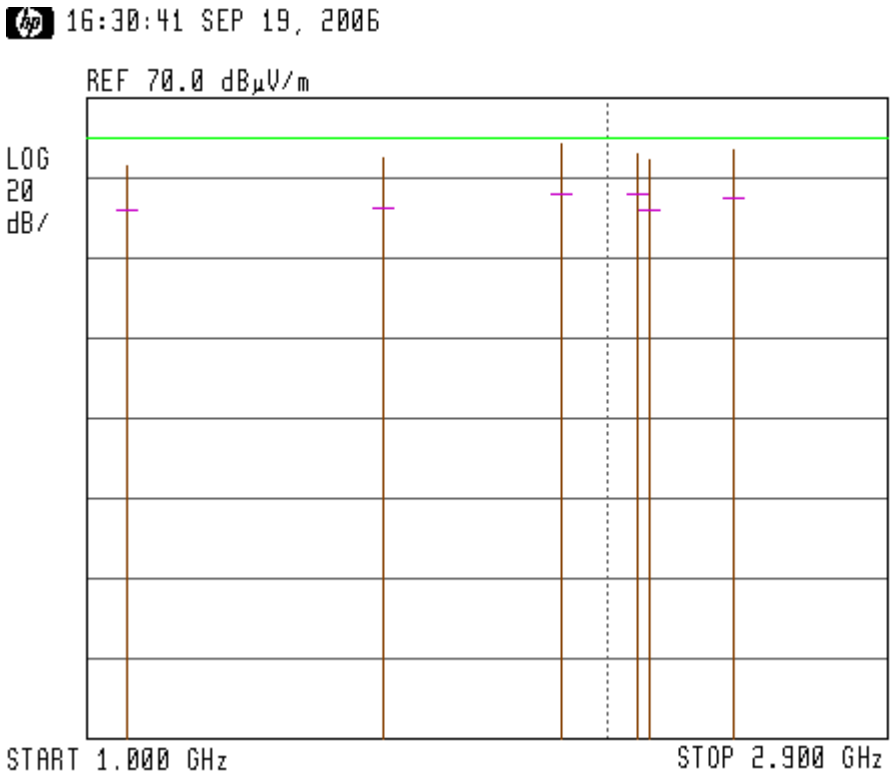

Figure 13. Radiated Emission. Antenna Polarization: VERTICAL Detectors: Peak, Average

Note:

1. *Horizontal axis shows logarithmic frequency scale.*
2. *The vertical axis shows amplitude (in dB µV/m).*
3. *Peak detection is designated by the top of each vertical line.*
4. *Average detection is designated by the first dash mark (from the top) of each vertical line.*

5.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3411A00102	March 22, 2006	1 year
RF Section	HP	85420E	3427A00103	March 22, 2006	1 year
Antenna Bioconical	ARA	BCD 235/B	1041	March 19, 2006	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	November 17, 2005	1 year
Antenna-Log Periodic	A.H.System	SAS-200/511	253	January 24, 2005	2 year
Double Ridged Waveguide Horn Antenna	EMCO	3115	29845	March 15, 2006	2 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	October 16, 2005	1 year
Spectrum Analyzer	HP	8592L	3926A01204	February 6, 2006	1 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

5.5 Field Strength Calculation

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors" data disk, using the following equation:

$$FS = RA + AF + CF$$

FS:	Field Strength [dBμv/m]
RA:	Receiver Amplitude [dBμv]
AF:	Receiving Antenna Correction Factor [dB/m]
CF:	Cable Attenuation Factor [dB]

No external pre-amplifiers are used in the frequency range up to 2.9 GHz.

6. Out of Band Emissions (Radiated) per FCC 27.53

6.1 Test Specification

FCC, Part 27.53 (l), FCC Part 2.1053

6.2 Test Procedure

The test method was based on ANSI/TIA-603-C, Unwanted Emissions: Radiated Spurious. The power of any emission outside of the authorized operating frequency ranges (2590-2690 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.
The frequency range 9 kHz-27 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:
EIRP(dBm) = P_g(dBm) – Cable Loss (dB) + Substitution Antenna Gain (dBi)
P_g = Signal generator output level.

6.3 Test Data

JUDGEMENT: Passed

The E.U.T met the requirements of the FCC, Part 27.53(l), FCC Part 2.1053 specifications.

The signals in the band 9.0 kHz – 27.0 GHz were below the spectrum analyzer noise level, which is at least 40dB below the specification limit.

TEST PERSONNEL:

Tester Signature: _____ Date: 08.11.06

Typed/Printed Name: E. Pitt

6.4 Test Instrumentation Used, Radiated Measurements

Instrument	Manufacturer	Model	Serial Number	Calibration	Period
EMI Receiver	HP	85422E	3411A00102	March 22, 2006	1 year
RF Section	HP	85420E	3427A00103	March 22, 2006	1 year
Active Loop Antenna	EMCO	6502	9506-2950	October 17, 2005	1 year
Antenna Bioconical	ARA	BCD 235/B	1041	March 19, 2006	1 year
Antenna Log Periodic	ARA	LPD-2010/A	1038	November 17, 2005	1 year
Antenna-Log Periodic	A.H.System	SAS-200/511	253	January 24, 2005	2 year
Double Ridged Waveguide Horn Antenna	EMCO	3115	29845	March 15, 2006	2 year
Horn Antenna	ARA	SWH-28	1007	October 28, 2005	2 year
Horn Antenna	Narda	V637	0410	November 19, 2004	2 year
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013	October 16, 2005	1 year
Low Noise Amplifier	Sophia Wireless	LNA28-B	232	February 8, 2006	1 year
Spectrum Analyzer	HP	8592L	3926A01204	February 6, 2006	1 year
Signal Generator	HP	8648C	3623A04126	April 6, 2005	1 year
Signal Generator	HP	86722	2352A03681	February 6, 2006	1 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

7. Antenna Gain

The antenna gain is 17 dBi.

ELECTRICAL	
FREQUENCY RANGE	2.3 - 2.7 GHz
GAIN	17 dBi
VSWR	1.5:1 (max)
3 dB AZIMUTH BEAMWIDTH	65° (typ)
POLARIZATION	Dual Slant ±45°
ELEVATION BEAMWIDTH	7° ± 2°
INTERPORT ISOLATION	>25dB
CROSS POLARIZATION	ESTI EN 302 085 class CS2
F/B RATIO	ESTI EN 302 085 class CS2
INPUT IMPEDANCE	50 (ohm)
INPUT POWER	20W (max)
LIGHTNING PROTECTION	DC Grounded

8. R.F Exposure/Safety

The E.U.T. is a fixed installation transmitter. The typical distance between the E.U.T. and the general population is 2.0 meters.

Calculation of Maximum Permissible Exposure (MPE)

Based on Section 1.1307(b)(1) Requirements

(a) FCC limits at 2640 MHz is: $1\frac{mW}{cm^2}$

Using table 1 of Section 1.1310 limit for general population/uncontrolled exposures, the above level is an average over 30 minutes.

(b) The power density produced by the E.U.T. is

$$S = \frac{P_t G_t}{4\pi R^2}$$

P_t- Transmitted Power 4.074W (Peak) (36.1 dBm)

G_T- Antenna Gain, 50.12 = 17 dBi

R- Distance from Transmitter using 2m worst case

(c) The peak power density is :

$$S_p = \frac{4074 \times 50.12}{4\pi (200)^2} = 0.41 \frac{mW}{cm^2}$$

(d) The E.U.T. transmission in actual worst case is 70%.

The average power over 30 minutes is:

$$P_{AV} = \frac{4074 \times 70}{100} = 2852\, mW$$

(e) The averaged power density of the E.U.T. is:

$$S_{AV} = \frac{2852 \times 50.12}{4\pi (200)^2} = 0.28 \frac{mW}{cm^2}$$

(f) This is below the FCC limit.

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 and 10 meter ranges

3 meter range

FREQUENCY (MHz)	AFE (dB/m)
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
120.0	11.5
130.0	11.7
140.0	12.1
150.0	12.6
160.0	12.8
170.0	13
180.0	13.5
190.0	14
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

10 meter range

FREQUENCY (MHz)	AFE (dB/m)
30.0	12.1
40.0	10.6
50.0	10.6
60.0	8.9
70.0	8.5
80.0	9.6
90.0	9.4
100.0	9.6
110.0	10.3
120.0	10.7
130.0	12.6
140.0	12.7
150.0	12.7
160.0	13.8
170.0	13.7
180.0	14.9
190.0	13.4
200.0	13.1
210.0	14.0
220.0	14.5
230.0	15.8
240.0	16.0
250.0	16.6
260.0	16.7
270.0	18.3
280.0	18.5
290.0	19.3
300.0	20.9

NOTES:

1. *Antenna serial number is 1041.*
2. *The above list is located in file 41BC10M1.ANT on the disk marked "Radiated Emissions Tests EMI Receiver".*

9.7 Correction factors for ACTIVE LOOP ANTENNA

Model 6502
S/N 9506-2950

FREQUENCY	Magnetic Antenna Factor	Electric Antenna Factor
(MHz)	(dB)	(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

9.8 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			

9.9 Correction factors for Horn Antenna

Model: SWH-28
at 1 meter range.

FREQUENCY (GHz)	AFE (dB /m)	Gain (dB1)
18.0	40.3	16.1
19.0	40.3	16.3
20.0	40.3	16.1
21.0	40.3	16.3
22.0	40.4	16.8
23.0	40.5	16.4
24.0	40.5	16.6
25.0	40.5	16.7
26.0	40.6	16.4

9.10 Correction factors for Horn Antenna

Model: V637

FREQUENCY (GHz)	AFE (dB /m)	Gain (dB1)
26.0	43.6	14.9
27.0	43.7	15.1
28.0	43.8	15.3
29.0	43.9	15.5
30.0	43.9	15.8
31.0	44.0	16.0
32.0	44.1	16.2
33.0	44.1	16.4
34.0	44.1	16.7
35.0	44.2	16.9
36.0	44.2	17.1
37.0	44.2	17.4
38.0	44.2	17.6
39.0	44.2	17.8
40.0	44.2	18.0

10. Alvarion Test report

Alvarion Ltd
21A HaBarzel Street
Tel Aviv 69710 ISRAEL
Tel: + 972-3-6456262
Fax: + 972-3-6456290
www.alvarion.com

Test Report No. BMAX2500-002

For ALVARION Ltd.

Equipment Under Test:

Broadband Wireless Access System
Name: BreezeMAX 2500
Base station(AU)
Model: BMAX-BST-AU-ODU-HP-2.5-B

	Function/Title	Name	Signature	Date
Prepared By	Q&C Eng.	Nissim Gabbay		September 2006
Approved by	Q&C Team Manager	Avner Ruta		September 2006

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Alvarion Ltd
21A HaBarzel Street
Tel Aviv 69710 ISRAEL
Tel: + 972-3-6456262
Fax: + 972-3-6456290
www.alvarion.com

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11. Applicant information

Company:	Alvarion Ltd.
Address:	21A Habarzel str,Tel-Aviv, 69710, Israel
The date of test:	September 2006

Equipment under test information

Test items:	Base station of BreezeMAX 2500 System.
Manufacturer:	Alvarion Ltd
Model:	BMAX-BST-AU-ODU-HP-2.5-B
Equipment serial number:	N/A

12. Test performance

Location: Alvarion Q&C Section

Purpose of test: Apparatus compliance verification in accordance with emission requirements

Test specifications: 47CFR, part 27 part 27.50 (h) (1) , part 27.50 (h) (4) part 27.53 (2) ,part 27.54 part 2.1049, 2.1046 ,2.1055

13. Summary of test:

The EUT was found to be in compliance with requirements of: part 27, and part 2 §§ 27.50, 27.53, 27.54, 2.1055, 2.1046, 2.1049

Parameter	Subclasses	Date tested	Remarks
Transmitter characteristics			
Occupied bandwidth	2.1049	09.2006	
Peak output power	27.50(h) (1) 2.1046	09.2006	
Power spectral density	27.50(h) (4)	09.2006	
Spurious emissions at antenna terminal	27.53	09.2006	
Frequency stability	27.54 2.1055	09.2006	

14. Equipment Under Test description

14.1 General description

BreezeMAX 2500 is Alvarion's WiMAX platform for the licensed 2.5 GHz MMDS frequency band.
It is digital modulated TDD system operating in the 2590MHz up to 2690MHz band with OFDM modulation. The Base station -AU outdoor unit contain the radio {Basic + HPA} and digital control section unit. The AU comprises an Indoor Unit (IDU) and an Outdoor Unit (ODU). The AU-IDU module connects to the AU-ODU via an Intermediate Frequency (IF) cable. The IF cable carries full duplex data, control and management signals between the AU-IDU and the AU-ODU, as well as power (48 VDC) and 64 MHz synchronization reference clock from the AU-IDU to the AU-ODU.

Table 1EUT technical characteristics

Transmitter technical characteristics.			Note
Stand-alone/fixed use			Always at a distance more than 2 m from all people
Assigned frequency range	**2590MHz-2690MHz**		
Operating frequency range	**2592.5MHz-2687.5MHz**		
RF channel spacing	**5 MHz**		
Maximum rated output power	**36 dBm**		At transmitter 50 Ω RF output connector
Antenna connection	**Standard connector:** N-TYPE		Professional installation
Channel Bandwidth	**5 MHz**		
Type of modulation	BPSK, 4QAM, 16QAM, 64QAM		
Type of multiplexing	**OFDM**		
Modulating test signal (baseband)	**PRBS**		
Maximum transmitter duty cycle in normal use	**50 %**		
Transmitter duty cycle supplied for test	**100 %**		
Antenna technical characteristics			
Type	**Manufacturer**	**Model**	**Gain**
Sector	**TELSA**	**723214**	**17dBi**
Base Station	**CUSHCRAFT**	**J23017V00-60N**	**16.5dBi**

14.2 EUT test configuration

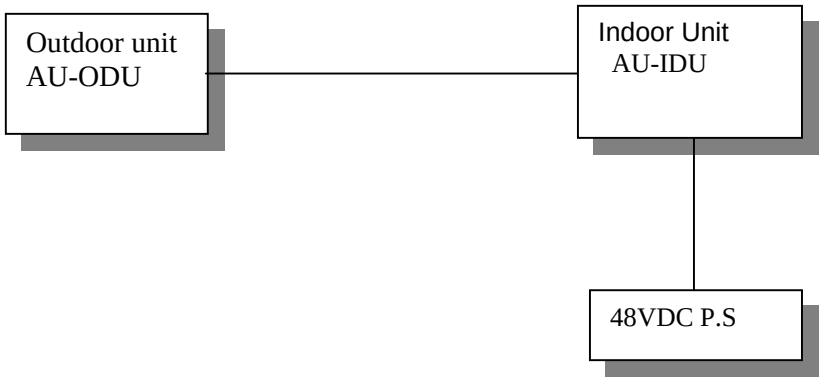

Figure 14Base station test setup

15. Test results

15.1 Transmitter characteristics

15.1.1. Occupied bandwidth according to § 2.1049

Method of measurement		ANSI 63.4 §13.1.7			
Ambient Temperature	23^0 C	Relative Humidity	49%	Air Pressure	1009 hPa
Operating Frequency Range		2.590 – 2.690 GHz			

Table 2Occupied bandwidth

Carrier frequency MHz	Measured occupied bandwidth, MHz	Reference to Figure number
2592.5	4.72	#2
2640.0	4.73	#3
2687.5	4.70	#4

TEST PROCEDURE

The measurements were performed in transmitting mode at 3 transmitted carrier (minimum, middle and maximum) of the 2590MHz-2690MHz frequency ranges under maximum data transfer bit rate.
The EUT RF output was connected to the Spectrum Analyzer through appropriate attenuator and accounted with cable loss in SA settings.

TEST EQUIPMENT USED:

1	3	5				

Occupied bandwidth test results.

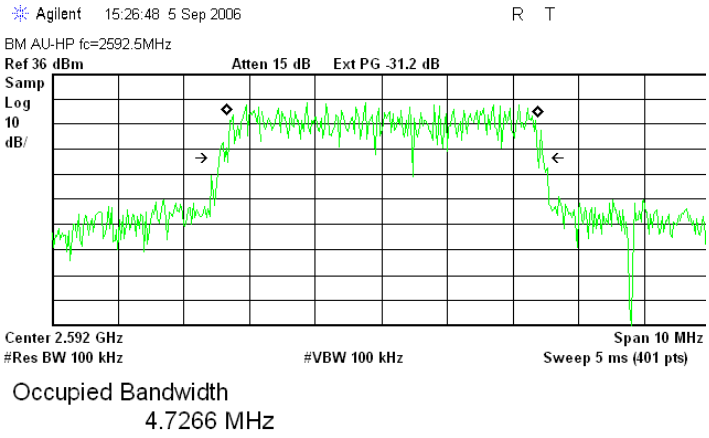

Figure 15Carrier Frequency 2592.5 MHz

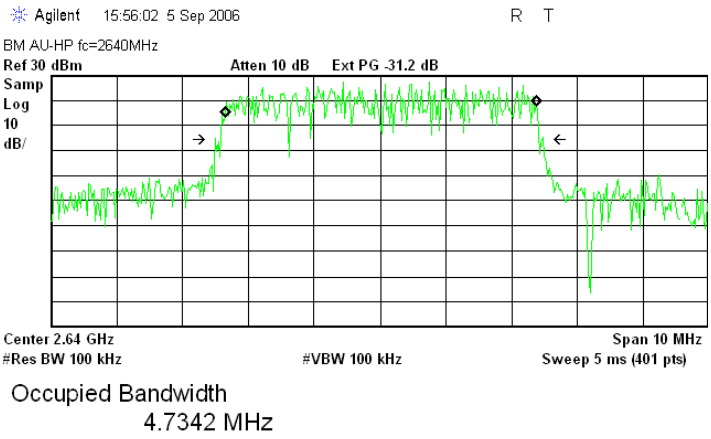

Figure 16Carrier Frequency 2640 MHz

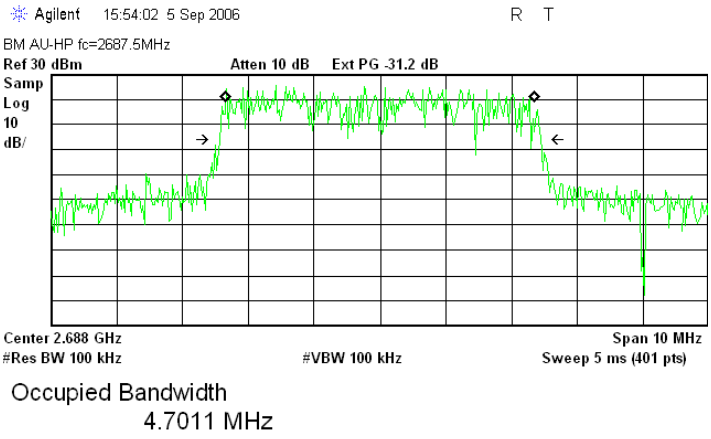

Figure 17Carrier Frequency 2687.5 MHz

15.1.2. Output power test § 27.50(h)(1),2.1046

Ambient Temperature 23^0 C Relative Humidity 49% Air Pressure 1009 hPa
Operating Frequency Range 2.590GHz-2.690GHz

Table 3Output power test § 27.50

Carrier frequency **MHz**	Average output power. (W/o antenna gain) **dBm**	Limit output power. **dBm**	Average output power. (With antenna gain) **dBm**
2592.5	36.1	63.0	52.6
2640.0	36.0	63.0	52.5
2687.5	36.1	63.0	52.6

The following power limits apply to the 2496 – 2602 MHz bands:

EIRP=33dBW+10log(5/6)+10log(360/60)=80dBm
Peak output power=EIRP-Gant=80-17=63dBm

Where channel width 5MHz

3dB Beamwidth azimuth of antenna is 60º

TEST PROCEDURE

The measurements were performed in transmitting mode at 3 transmitted carrier (minimum, middle and maximum) of the 2.590 - 2.690 GHz frequency ranges under maximum data transfer bit rate.
The EUT RF output was connected to the Spectrum Analyzer through appropriate attenuator and accounted with cable loss in SA settings.

TEST EQUIPMENT USED:

2	3	5				

Output power test results.

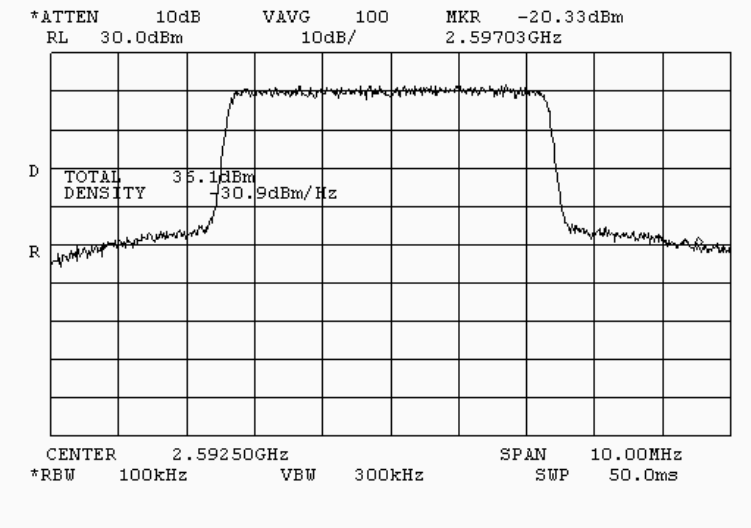

Figure 18Carrier Frequency 2592.5 MHz

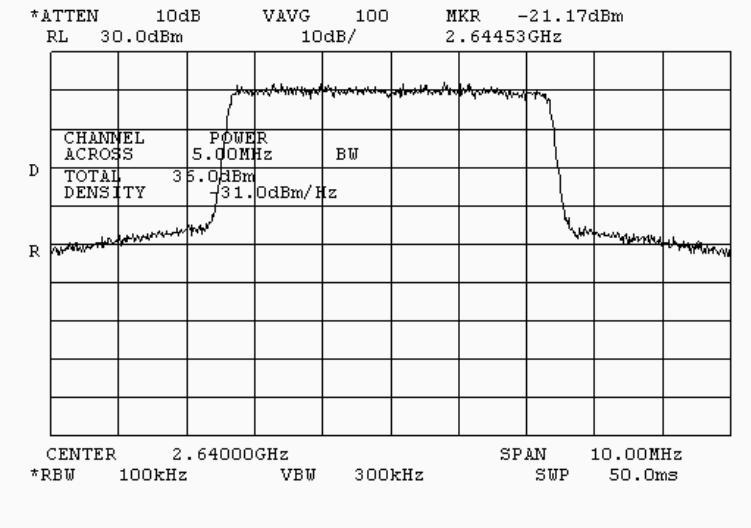

Figure 19Carrier Frequency 2640.0 MHz

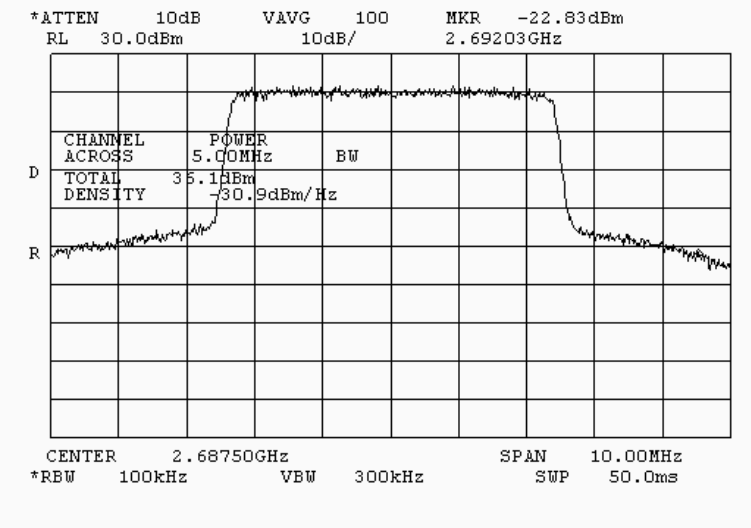

Figure 20Carrier Frequency 2687.5 MHz.

15.1.3. Power spectral density § 27.50(h)(4)

Table 4Power spectral density § 27.50

Carrier frequency **MHz**	Power spectral density **dBm**	**Reference to Figure number**
2592.5	19.96	#8
2640.0	19.16	#9
2687.5	18.04	#10

The following power limits apply to the 2590 – 2690 MHz bands:
EIRP within any 100KHz segment of 5MHz channel =2000/50=40W=46dBm
Power spectral density at the antenna connector =46dBm-17dBi=29dBm/100KHz

TEST PROCEDURE

The measurements were performed in transmitting mode at 3 transmitted carrier (minimum, middle and maximum) of the 2.590 - 2.690 GHz frequency ranges under maximum data transfer bit rate.
The EUT RF output was connected to the Spectrum Analyzer through appropriate attenuator and accounted with cable loss in SA settings.

TEST EQUIPMENT USED:

1	3	5				

Power density test results.

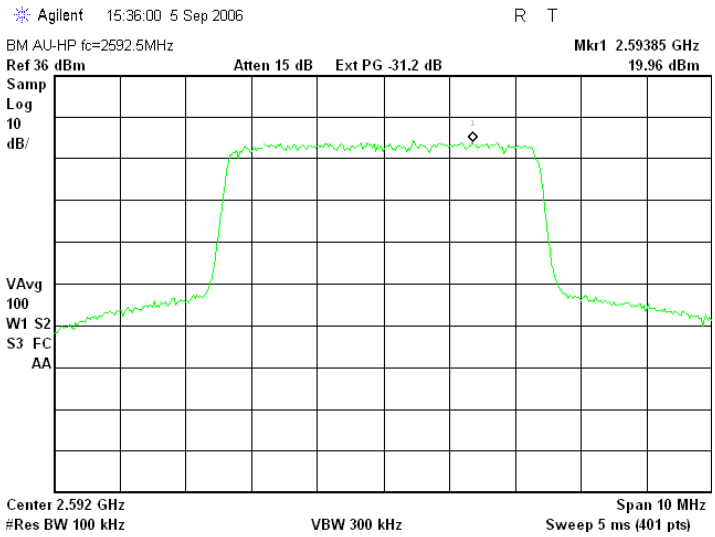

Figure 21Carrier Frequency 2592.5 MHz

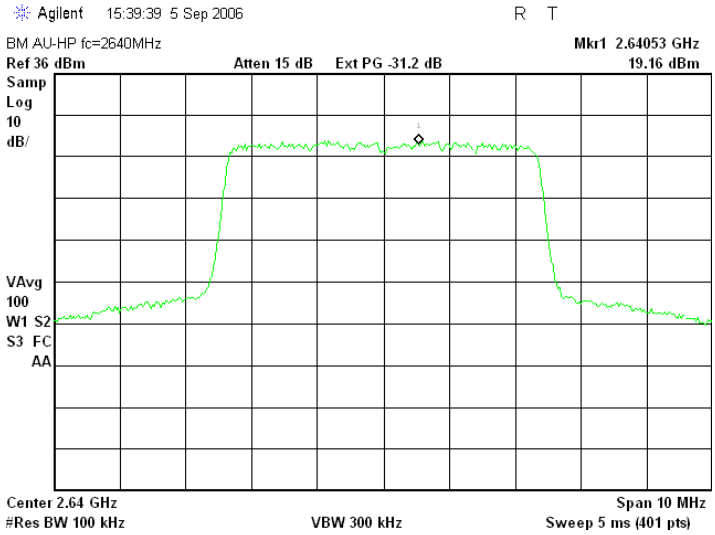

Figure 22Carrier Frequency 2640 MHz

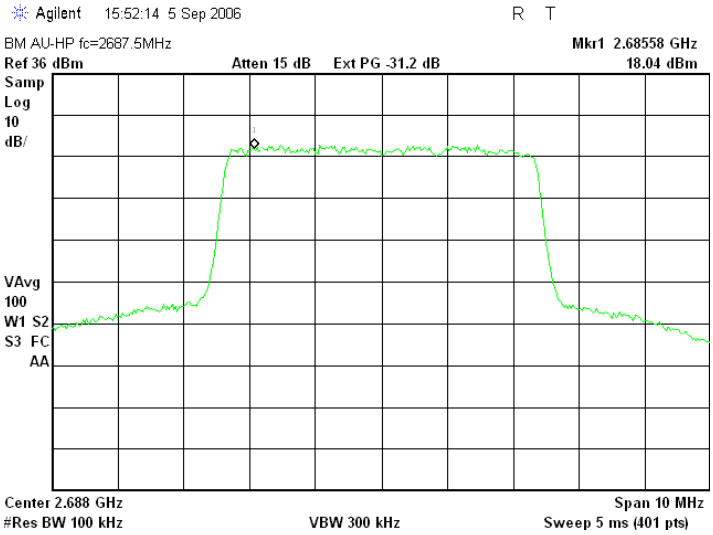

Figure 23Carrier Frequency 2687.5 MHz

15.1.4. Spurious emissions at antenna terminal § 27.53(2)

Ambient Temperature 23^0 C Relative Humidity 49% Air Pressure 1009 hPa
Operating Frequency Range 2.590 – 2.690 GHz

Table 5 Spurious emissions (Carrier frequency – 2592.5 MHz.)

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to Figure number
2587-2588	-23.7	-13	-10.7	#15
2588-2589	-19.9	-13	-6.3	#16
2589-2590	-13.7	-13	-0.7	#17
2595-2596	-13.8	-13	-0.8	#18
2596-2597	-18.6	-13	-5.6	#19
2597-2598	-20.9	-13	-7.9	#20

Table 6 Spurious emissions (Carrier frequency – 2640 MHz.)

Frequency, MHz	Spurious emission level, DBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to Figure number
2634.5-2635.5	-21.4	-13	-8.4	#29
2635.5-2636.5	-19.4	-13	-6.4	#30
2636.5-2637.5	-13.9	-13	-0.9	#31
2642.5-2643.5	-14.3	-13	-1.3	#32
2643.5-2644.5	-20.0	-13	-7.0	#33
2644.5	-31.63	-13	-18.63	#34

Table 7 Spurious emissions (Carrier frequency – 2687.5 MHz.)

Frequency, MHz	Spurious emission level, DBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to Figure number
2683-2684	-22.3	-13	-9.3	#44
2684-2685	-13.9	-13	-0.9	#45
2690-2691	-15.2	-13	-2.2	#46
2691-2692	-24.4	-13	-11.4	#47
2692-2693	-28.5	-13	-15.5	#48

* The frequency spectrum was investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to the tenth harmonic of the highest fundamental frequency. The emission levels of the EUT in average mode 20 dB lower than the specified limit were not recorded in the table above. For the test results refer to Plots in figures: 11-51
The EUT RF output was connected to the Spectrum Analyzer through appropriate attenuator and accounted with cable loss in SA settings.

LIMIT

For operation in the bands 2590 –2690 MHz, the power of any emissions outside the licensed frequency band(s) of operation shall be attenuated outside of permitted frequency band ,measured in watts, as follow: 43+10log(P) dB =-13 dBm

TEST PROCEDURE

The measurements were performed in transmitting mode at 3 transmitted carrier (minimum, middle and maximum)of the 2.590 - 2.690 GHz frequency ranges under maximum data transfer bit rate.
The EUT RF output was connected to the Spectrum Analyzer through appropriate attenuator and accounted with cable loss in SA settings.

TEST EQUIPMENT USED:

2	3	5				

Spurious emissions at antenna terminal test results.

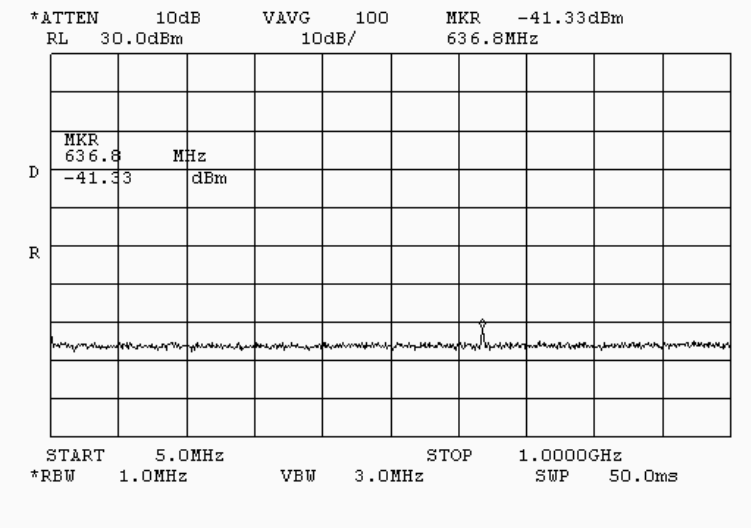

Figure 24Frequency carrier 2592.5 MHz.

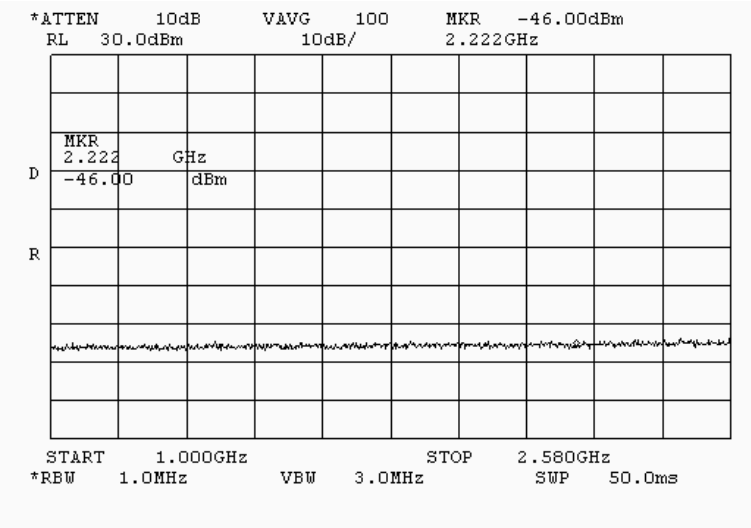

Figure 25Frequency carrier 2592.5 MHz.

External attenuator = 30 dB Cable loss = 1.2 dB.

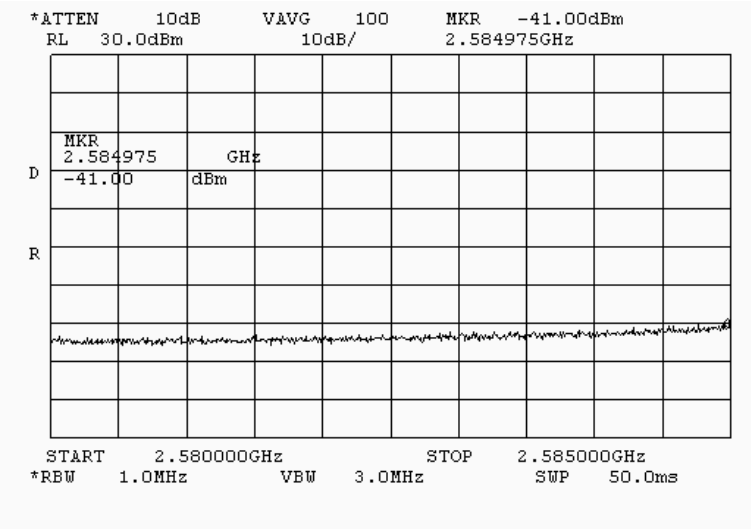

Figure 26Frequency carrier 2592.5 MHz.

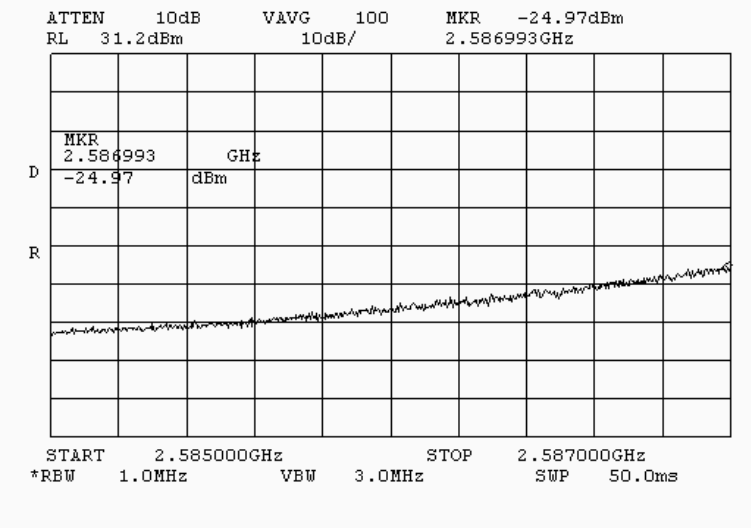

Figure 27Frequency carrier 2592.5 MHz.

External attenuator = 30 dB Cable loss = 1.2 dB.

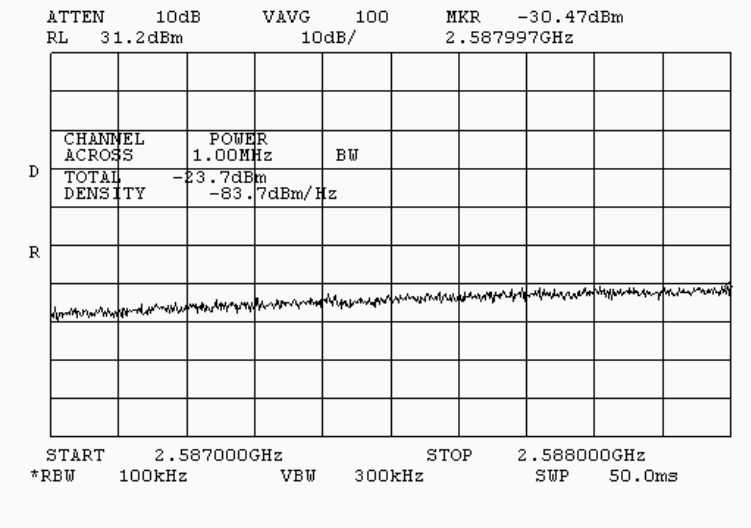

Figure 28Frequency carrier 2592.5 MHz.

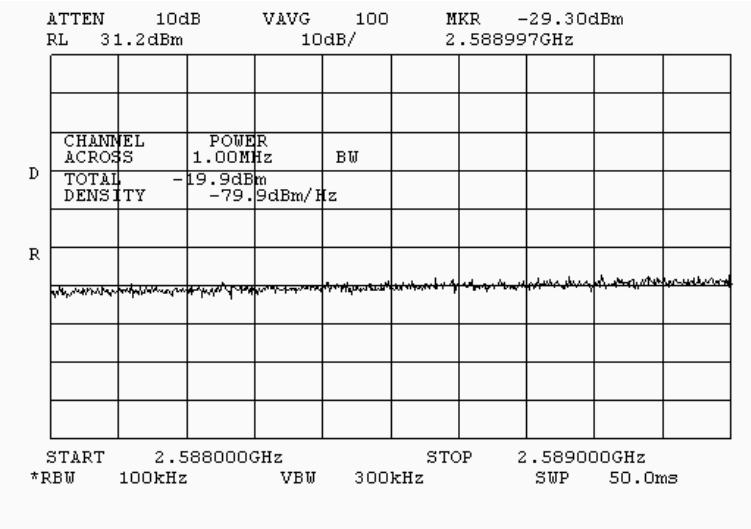

Figure 29Frequency carrier 2592.5 MHz.

External attenuator = 30 dB Cable loss = 1.2 dB.

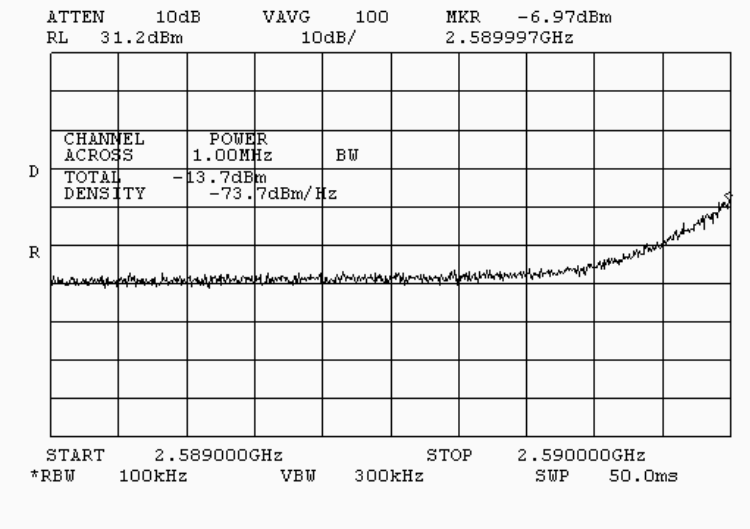

Figure 30Frequency carrier 2592.5 MHz.

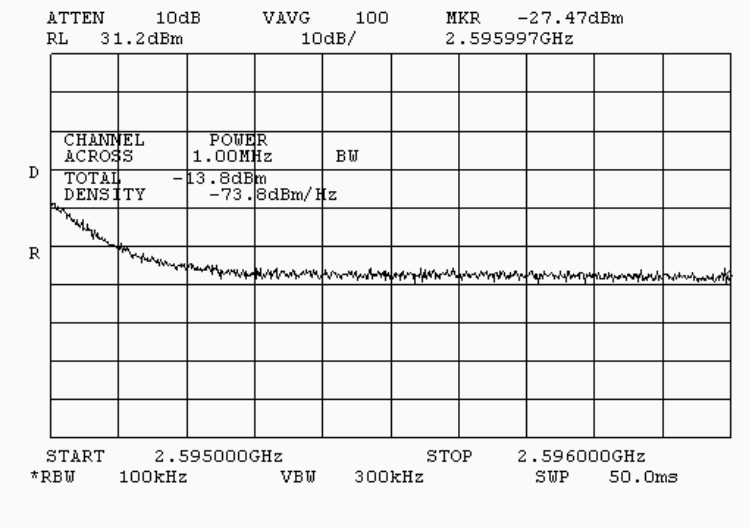

Figure 31Frequency carrier 2592.5 MHz.

External attenuator = 30 dB Cable loss = 1.2 dB.

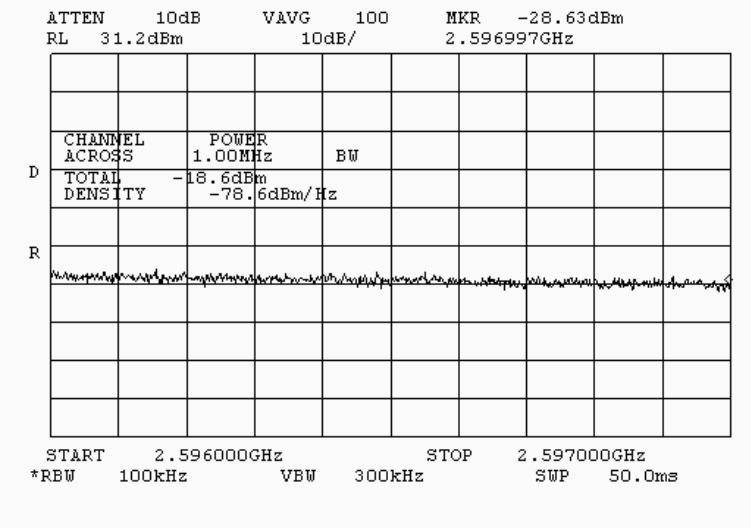

Figure 32Frequency carrier 2592.5 MHz.

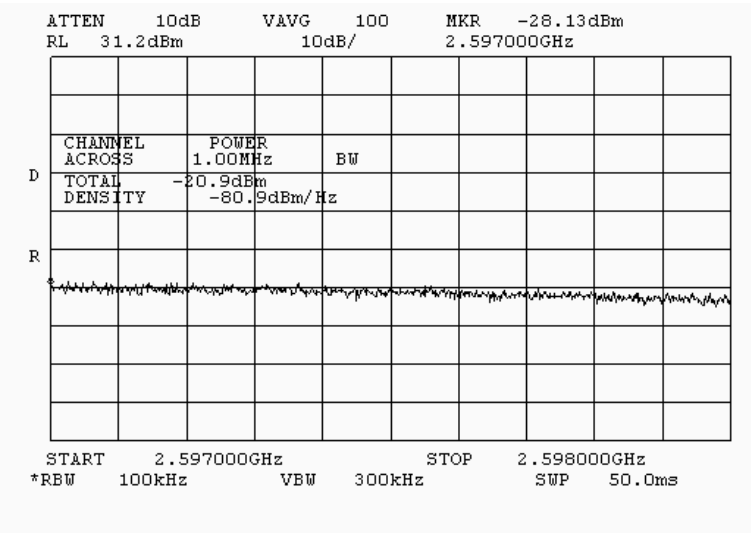

Figure 33Frequency carrier 2592.5 MHz.

External attenuator = 30 dB Cable loss = 1.2 dB

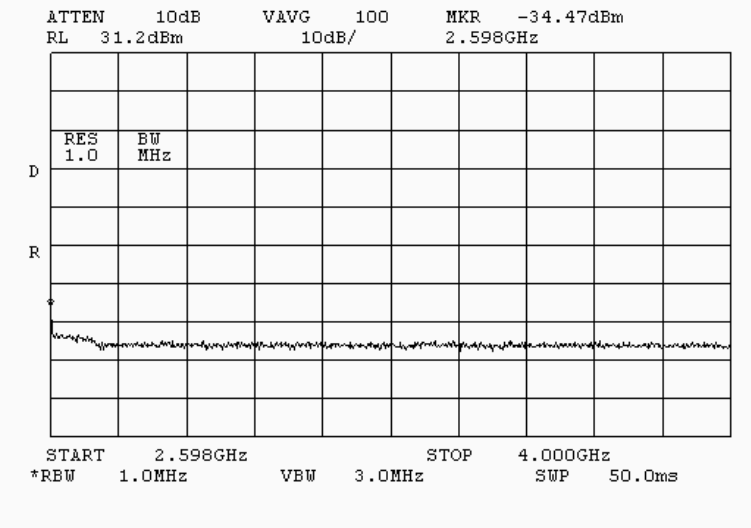

Figure 34Frequency carrier 2592.5 MHz.

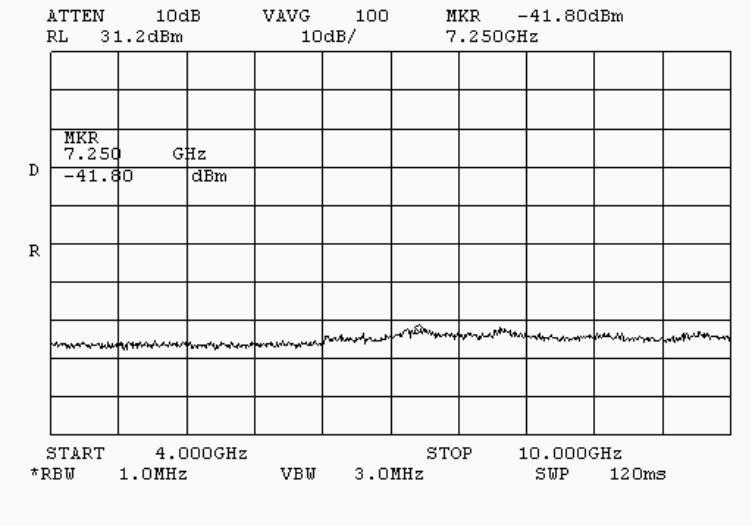

Figure 35Frequency carrier 2592.5 MHz.

External attenuator = 30 dB Cable loss = 1.2 dB

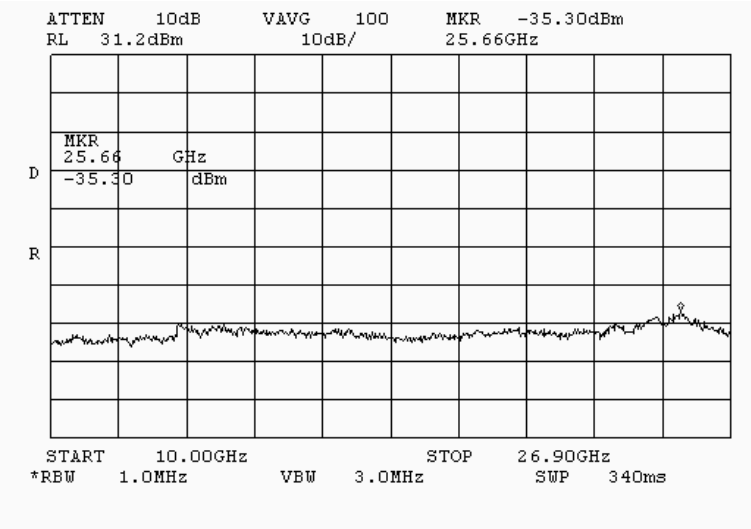

Figure 36Frequency carrier 2592.5 MHz.

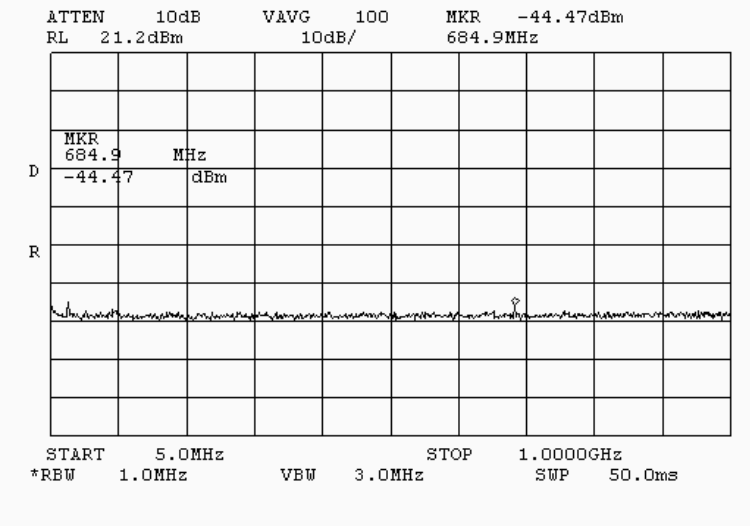

Figure 37Frequency carrier 2640 MHz.

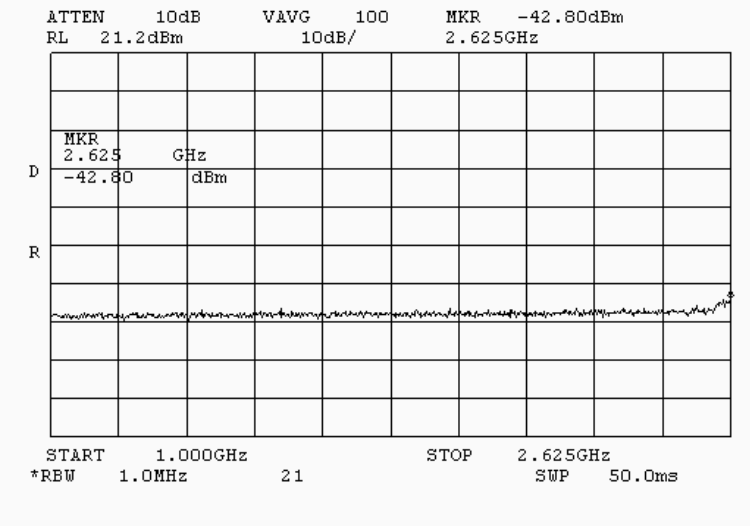

Figure 38Frequency carrier 2640 MHz.

External attenuator = 30 dB Cable loss = 1.2 dB

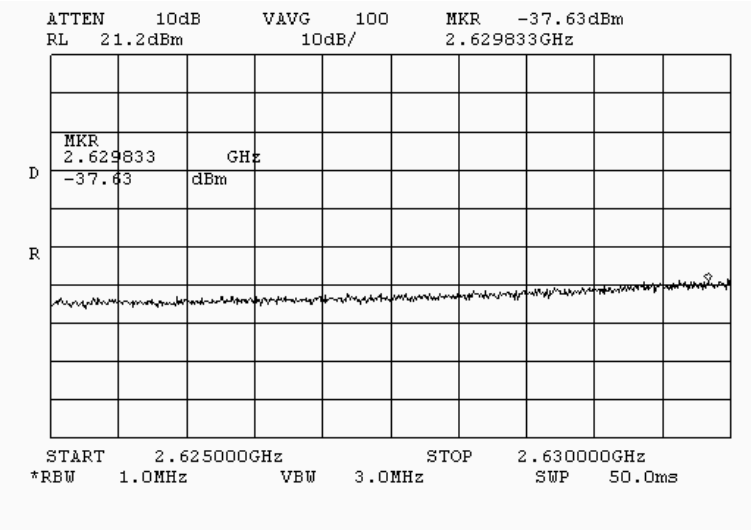

Figure 39Frequency carrier 2640 MHz.

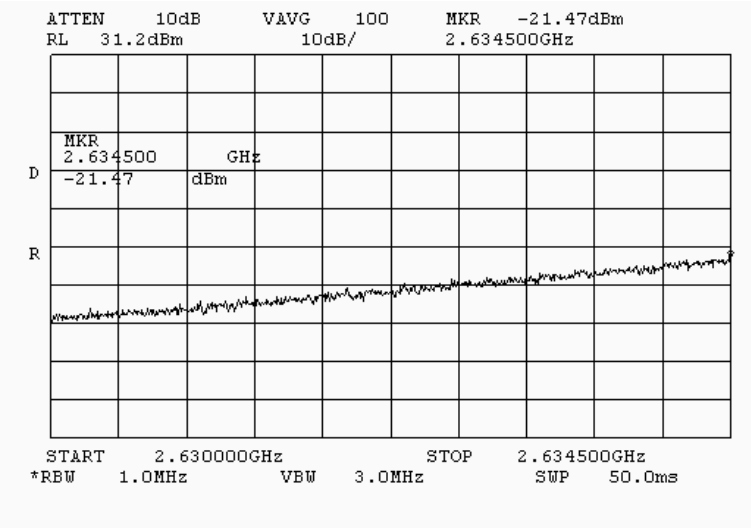

Figure 40Frequency carrier 2640 MHz.

External attenuator = 30 dB Cable loss = 1.2 dB

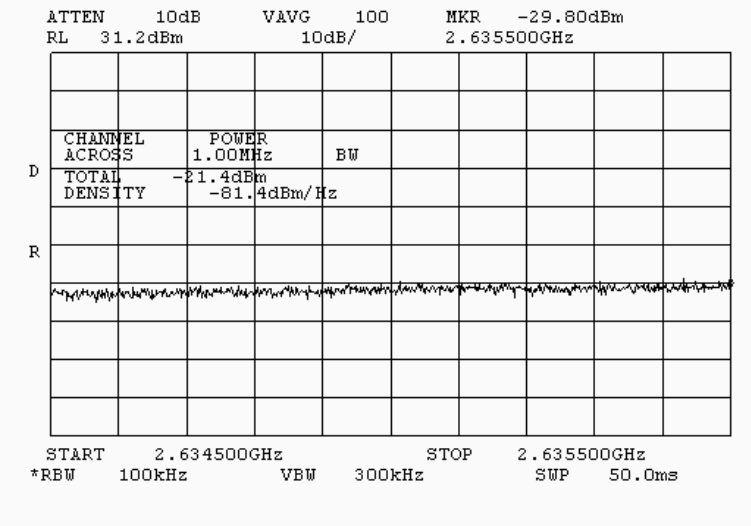

Figure 41Frequency carrier 2640 MHz.

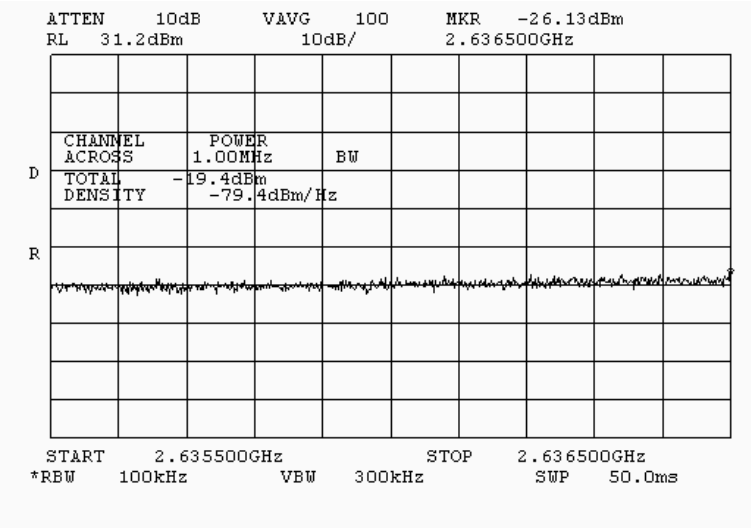

Figure 42Frequency carrier 2640 MHz.

External attenuator = 30 dB Cable loss = 1.2 dB

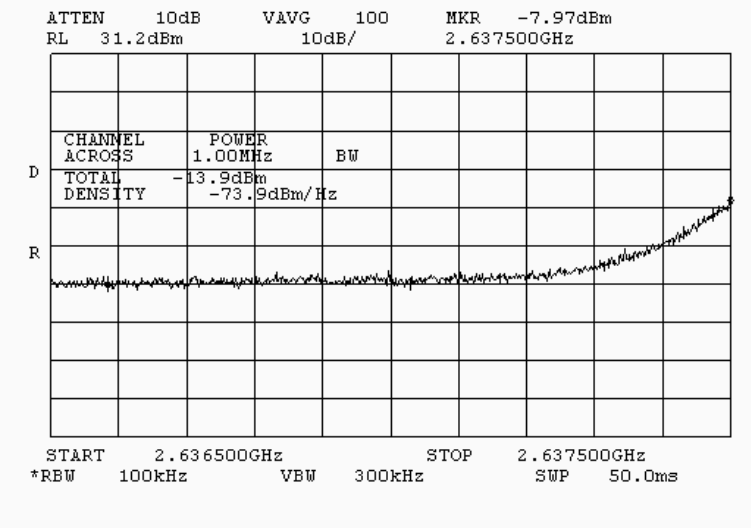

Figure 43Frequency carrier 2640 MHz.

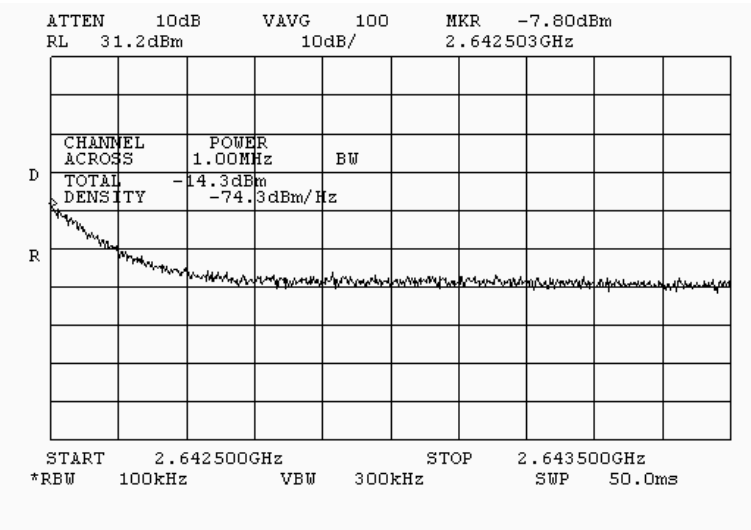

Figure 44Frequency carrier 2640 MHz.

External attenuator = 30 dB Cable loss = 1.2 dB

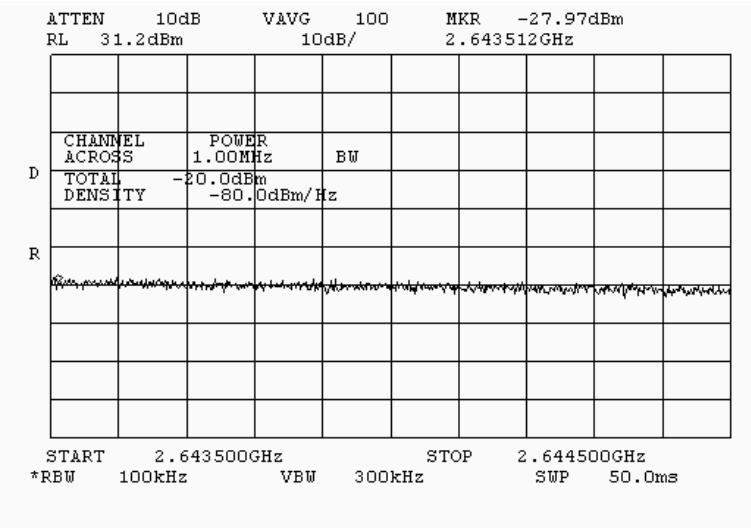

Figure 45Frequency carrier 2640 MHz.

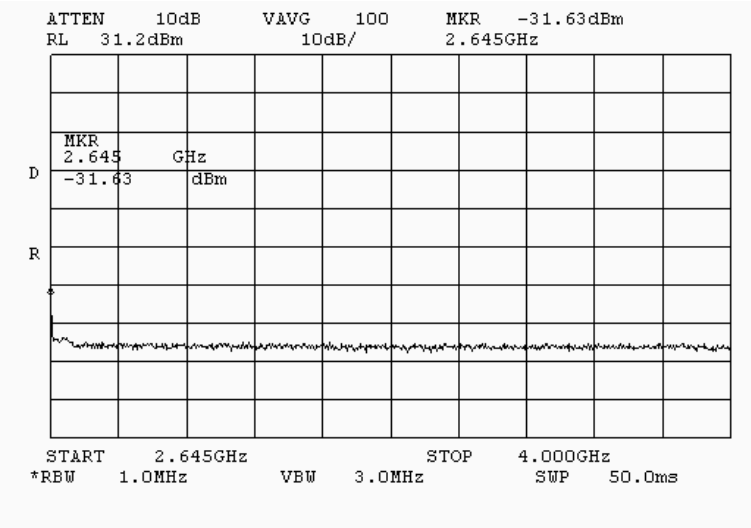

Figure 46Frequency carrier 2640 MHz.

External attenuator = 30 dB Cable loss = 1.2 dB

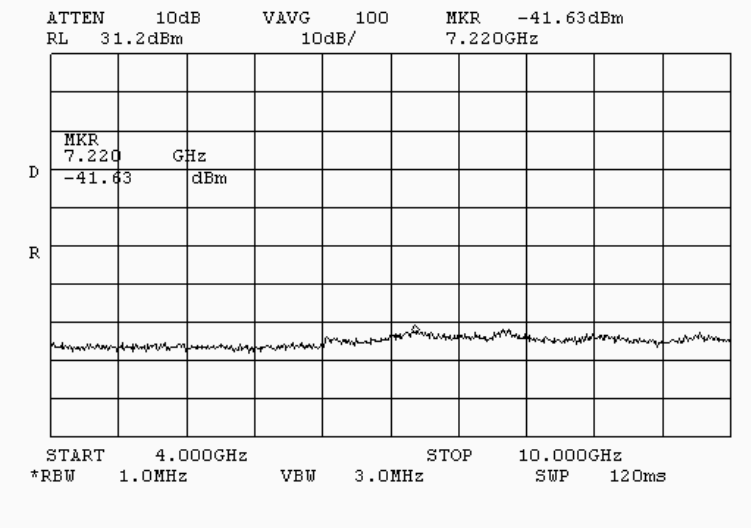

Figure 47Frequency carrier 2640 MHz.

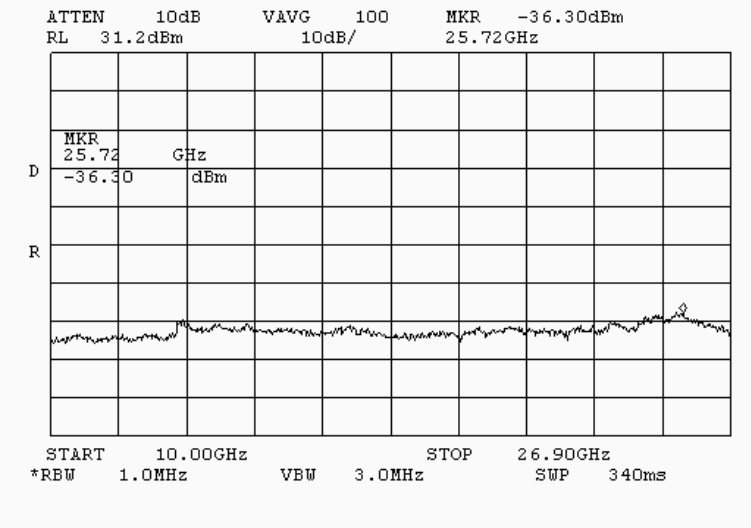

Figure 48Frequency carrier 2640 MHz.

External attenuator = 30 dB Cable loss = 1.2 dB

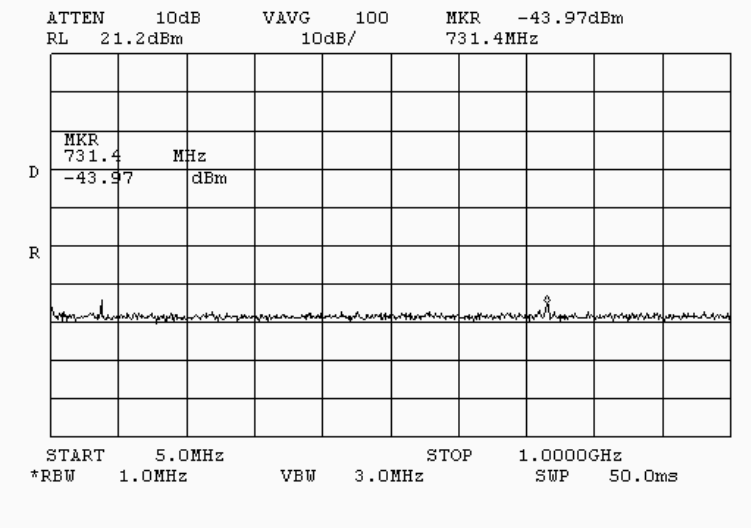

Figure 49Frequency carrier 2687.5 MHz

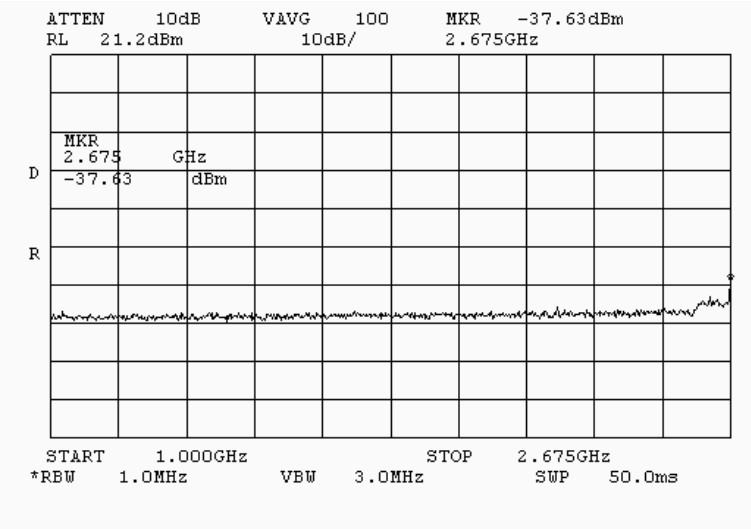

Figure 50Frequency carrier 2687.5 MHz

External attenuator = 30 dB Cable loss = 1.2 dB

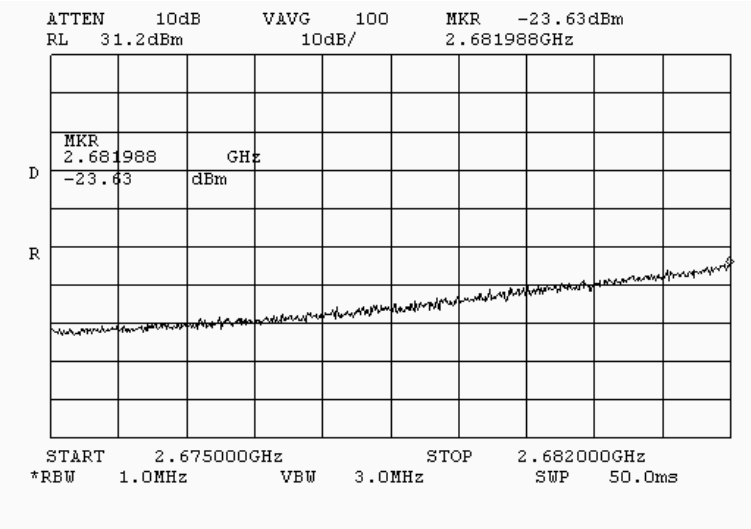

Figure 51 Frequency carrier 2687.5 MHz

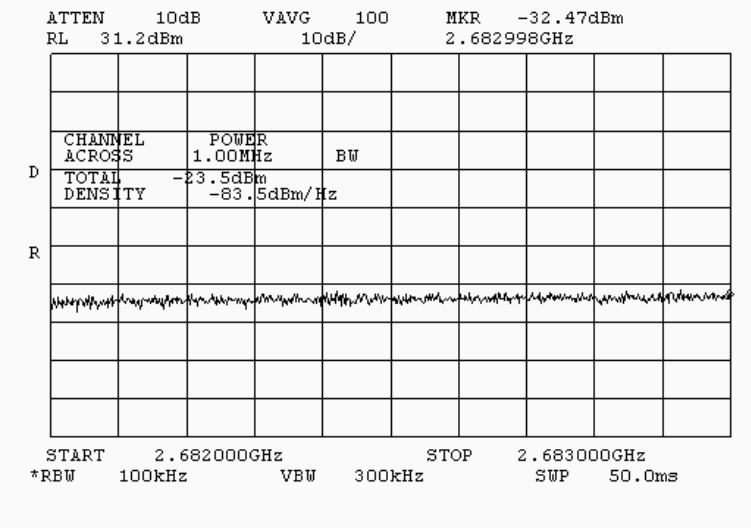

Figure 52 Frequency carrier 2687.5 MHz

External attenuator = 30 dB Cable loss = 1.2 dB

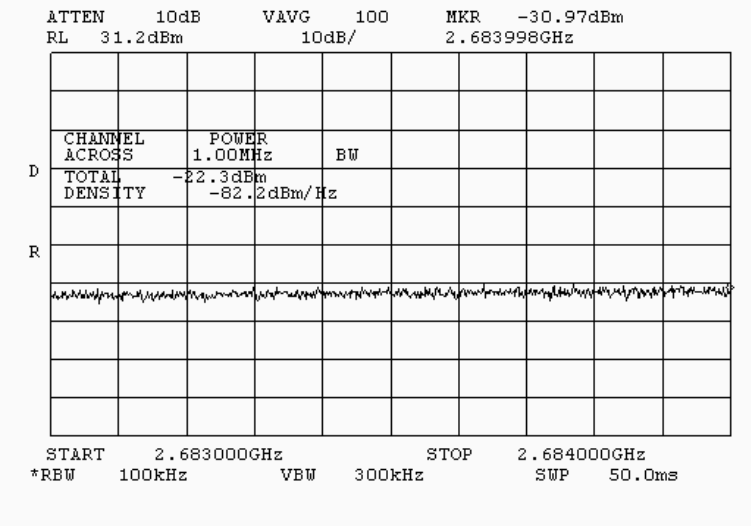

Figure 53Frequency carrier 2687.5 MHz

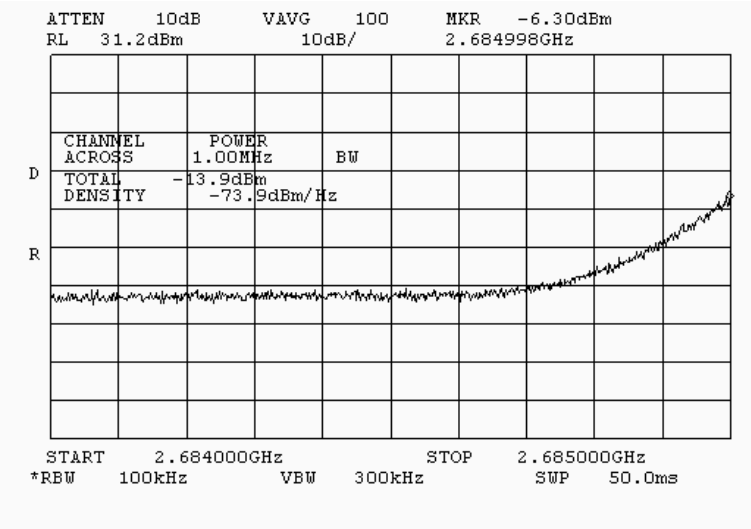

Figure 54Frequency carrier 2687.5 MHz

External attenuator = 30 dB Cable loss = 1.2 dB

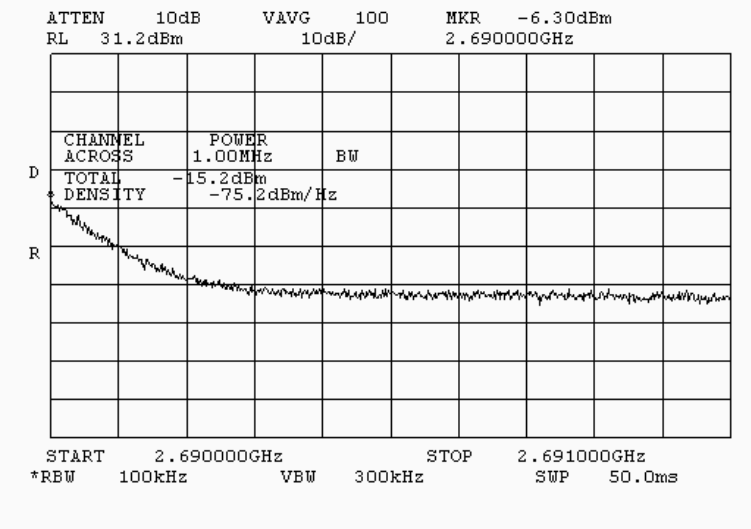

Figure 55Frequency carrier 2687.5 MHz

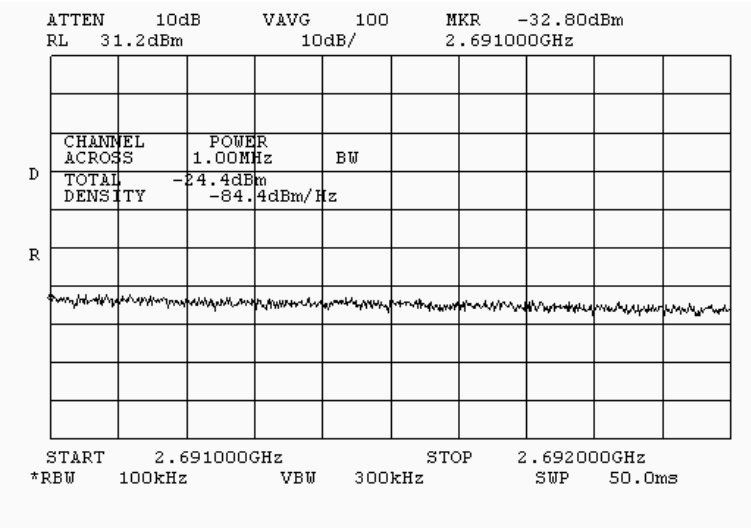

Figure 56Frequency carrier 2687.5 MHz

External attenuator = 30 dB Cable loss = 1.2 dB

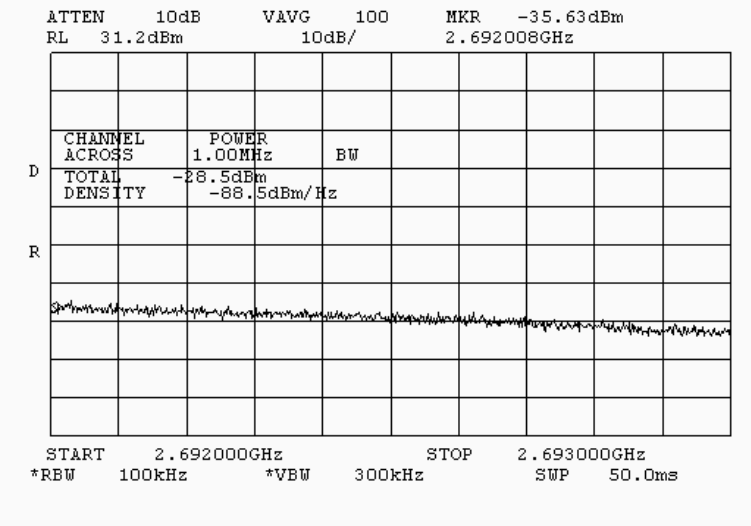

Figure 57Frequency carrier 2687.5 MHz

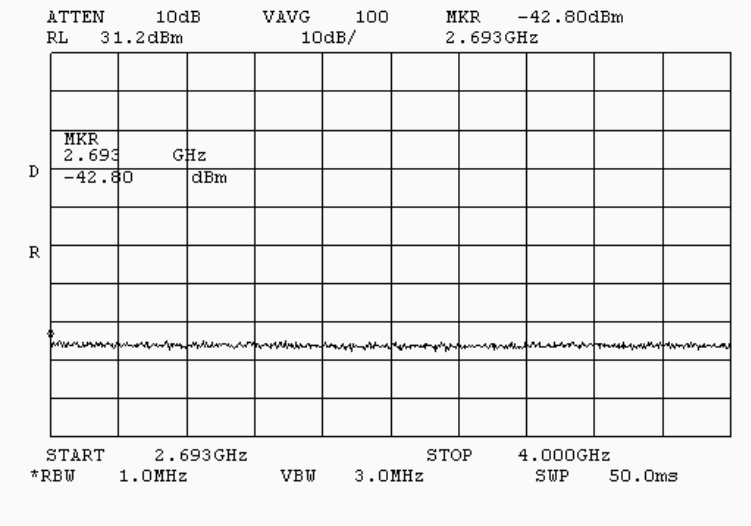

Figure 58Frequency carrier 2687.5 MHz

External attenuator = 30 dB Cable loss = 1.2 dB

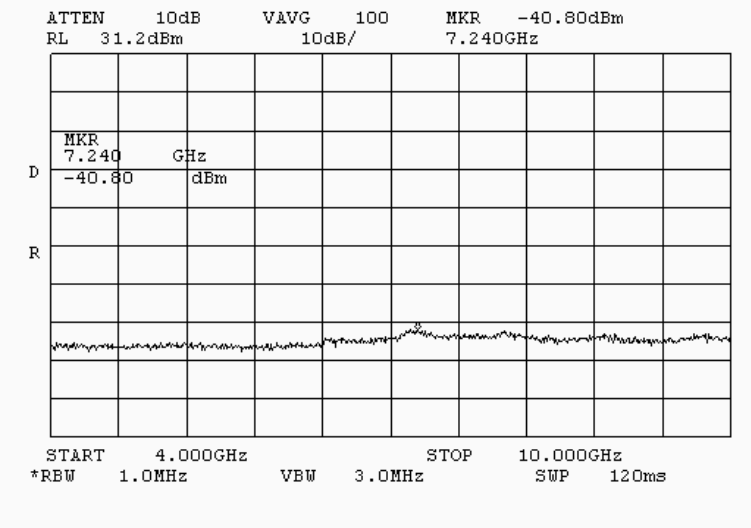

Figure 59Frequency carrier 2687.5 MHz

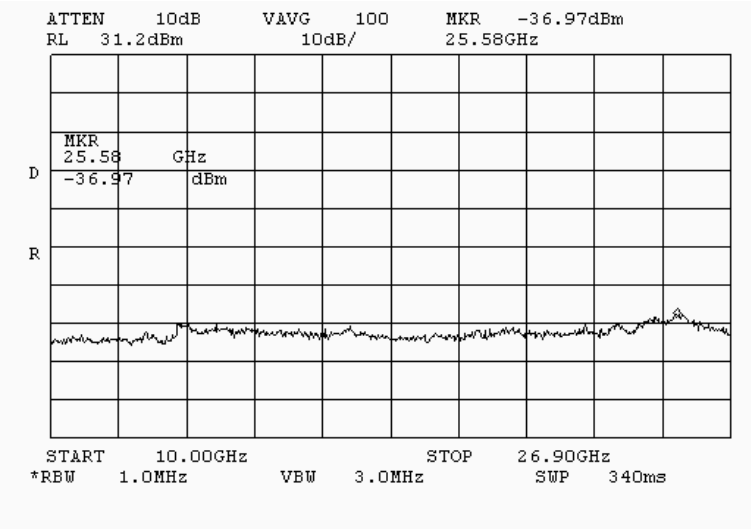

Figure 60Frequency carrier 2687.5 MHz

External attenuator = 30 dB Cable loss = 1.2 dB

15.1.5. Frequency stability test according to § 27.54,2.1055

Ambient Temperature 23^0 C Relative Humidity 49% Air Pressure 1009 hPa
Operating Frequency Range 2.590 – 2.690 GHz.

Nominal voltage=115VAC

Table 8Frequency stability test according to § 27.54

Temperature	Extreme Voltage/VAC	Frequency Low/GHz	Frequency High/GHz
-30ºC	97.75	2.592497610	2.687497470
	132.25	2.592497600	2.687497490
-20ºC	97.75	2.592497600	2.687497500
	132.25	2.592497580	2.687497500
-10ºC	97.75	2.592497620	2.687497530
	132.25	2.592497630	2.687497540
0ºC	97.75	2.592497680	2.687497560
	132.25	2.592497680	2.687497590
10ºC	97.75	2.592497700	2.687497600
	132.25	2.592497680	2.687497620
20ºC	97.75	2.592497750	2.687497650
	132.25	2.592497770	2.687497660
30ºC	97.75	2.592497740	2.687497650
	132.25	2.592497720	2.687497650
40ºC	97.75	2.592497750	2.687497660
	132.25	2.592497750	2.687497660
50ºC	97.75	2.592497760	2.687497670
	132.25	2.592497610	2.687497470

TEST PROCEDURE
The EUT was placed in a climatic chamber and allowed to stabilize at 20ºC temperature and nominal voltage for at list 15 min. The reference carrier frequency was taken. The temperature in climatic chamber was varied from -30ºC to +50ºC and input voltage was changed from 85% of nominal to 115% in turn. Frequency changes were noted in table above.

LIMIT

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

TEST EQUIPMENT USED:

1	3	5	6			

16. APPENDIX A Photos

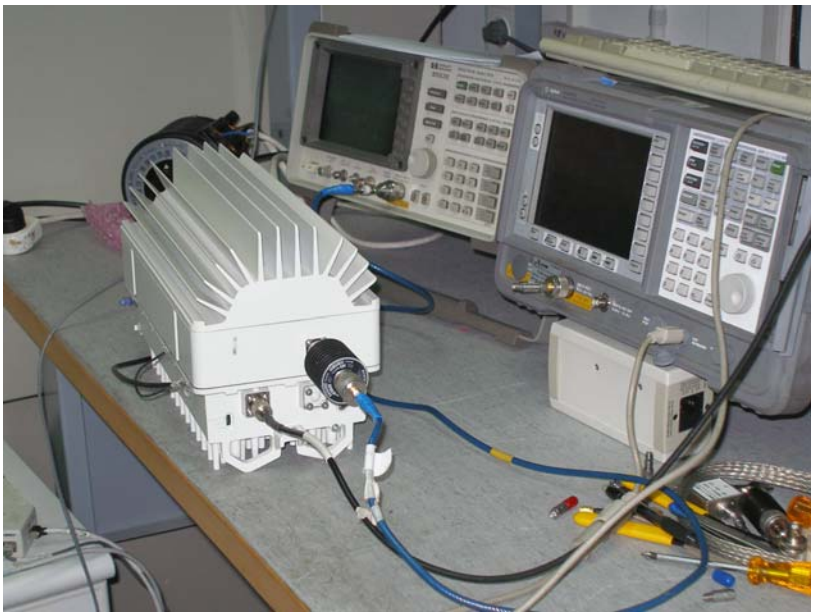

Photo1 Outdoors unit. Test setup

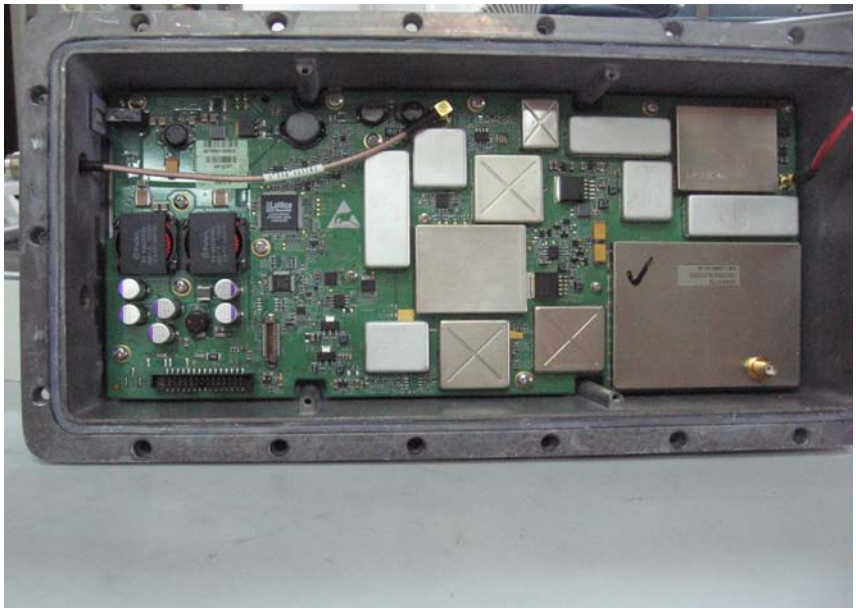

Photo 2Basic unit PCB open cover CS

Photo 3 Power amplifiers PCB, open cover CS

Photo 4Cavity filter top view

17. APPENDIX B Equipment used

Table 9Test equipment used

No	Description	Manufacturer information			Due Calibration date
		Name	Model No	Serial No	
1	Spectrum Analyzer 9 kHz - 26.5 GHz	Agilent	E4407B	40241724	July 2007
2	Spectrum analyzer 9 KHz-40 GHz	HP	8563E	A01508	July 2007
3	Attenuators 30 dB DC - 18 GHz	Weinshell Engineering	33-30-34	A3451	July 2007
4	Attenuators 20 dB DC - 18 GHz	MACOM	2082-6043-20	NA	July 2007
5	Cable RF 2m	Huber-Suhner	Sucoflex 104	21324/4PE	NA
6	Variable Voltage Transformer	SLIDEUP	SB-2 500VA	980227	NA

18. APPENDIX C Abbreviations

Abbreviations and acronyms

The following abbreviations and acronyms are applicable to this test report:

AC	alternating current
cm	centimeter
dB	decibel
dBm	decibel referred to one milliwatt
dB(V)	decibel referred to one microvolt
dB(V/m)	decibel referred to one microvolt per meter
EMC	electromagnetic compatibility
EUT	equipment under test
GHz	gigahertz
H	height
Hz	hertz
kHz	kilohertz
L	length
LNA	low noise amplifier
m	meter
Mbps	megabit per second
MHz	megahertz
NA	not applicable
OFDM	Orthogonal Frequency Division Multiple Access
PRBS	pseudo random binary sequence
QP	quasi-peak
RF	radio frequency
RE	radiated emission
rms	root mean square
W	width

Specification references

47 CFR part 2, Part 27	Radio Frequency Devices
ANSI C63.4: 2003	American National Standard for Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz