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 CPE ODU Station
BMAX-CPE-ODU-PRO-SA-2.5*

* See customer's declaration on page 6.

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 CPE ODU Station

BMAX-CPE-ODU-PRO-SA-2.5

FCC ID: LKT-BMAX-SU25

07 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 CPE ODU Station BMAX-CPE-ODU-PRO-SA-2.5 (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.

7/11/06

DECLARATION

I HEREBY DECLARE THAT THE FOLLOWING PRODUCT:

BMAX-CPE-ODU-PRO-SA-2.5

IS IDENTICAL ELECTRONICALLY, PHYSICALLY, AND MECHANICALLY TO:

BMAX-CPE-ODU-PRO-2.5G

Please relate to them as the same product.

Thank you

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

The PRO-S CPE comprises an Outdoor Unit (ODU) and an Indoor Unit (IDU). The ODU includes the modem, radio, data processing and management components of the SU. It also includes an integral high-gain flat antenna (SA models) or a connection to an external antenna (SE models), as described in the table below. “L” (Limited Performance) models of the CPEs support a limited overall throughput of 2 Mbps maximum. These L-models can be upgraded to support maximum throughput through a suitable license. The ODU connects to the IDU and to the user's equipment through a 10/100BaseT Ethernet port.

ODU Type	Description
BMAX-CPE-ODU-PRO-SA-x.x	Subscriber Outdoor Unit with an integrated vertical/horizontal polarization antenna.
BMAX-CPE-ODU-PRO-SE-x.x	Subscriber Outdoor Unit with a connection to an external antenna.
BMAX-CPE-ODU-PRO-L-SA-x.x	Subscriber Outdoor Unit with an integrated vertical/horizontal polarization antenna. The unit's total throughput is limited to 2 Mbps maximum.
BMAX-CPE-ODU-PRO-L-SE-x.x	Subscriber Outdoor Unit with a connection to an external antenna. The unit's total throughput is limited to 2 Mbps maximum.

* x.x indicates the radio band: 2.3, 2.5 or 3.5

The indoor unit is powered from the mains and connects to the ODU via a Category 5E Ethernet cable carrying the Ethernet data between the two units, as well as power (-54 VDC) and control signals to the ODU and status indications from the ODU.

There are two types of indoor units:

The BMAX-CPE-IDU-1D is the basic IDU, functioning as a simple power supply and interface unit with a 10/100BaseT Ethernet port that connects to the user's equipment.

The IDU-NG-4D1W Wireless Networking Gateway IDU provides advanced routing capabilities and can also serve as a Wireless LAN Access Point.

The IDU-1D1V and IDU-1D2V Voice Gateway IDUs provides one or two telephony ports and include a backup battery to ensure uninterrupted service during power outages.

To facilitate the configuration process, antenna alignment and performance monitoring during installation/testing, a special Y-cable is available. This enables connecting a Notebook or a PDA directly to the ODU for fast and easy completion of all the necessary operations.

An SU Alignment Unit (SAU) is also available, supporting easy and convenient antenna alignment and status verification. The SAU includes signal strength and status indicators, and a Velcro strap enabling to attach it either to a pole or on the installer's arm/wrist.

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

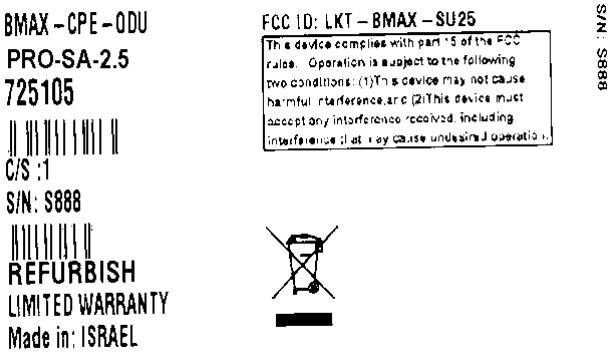

Figure 1. FCC Label

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 EUT was powered from the indoor unit via CAT5 cable containing DC supply and Ethernet data.

During radio testing the unit was configured the way that the radio port was connected to external N type antenna connector port. Radio parameters control during testing were made from the Ethernet port of the indoor unit by use of a laptop and snmp software support . In a normal use the 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 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 . Next step is Networking registration, and connection to internet. From now the user is connected to internet . The complete cycle takes about 20 seconds . 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

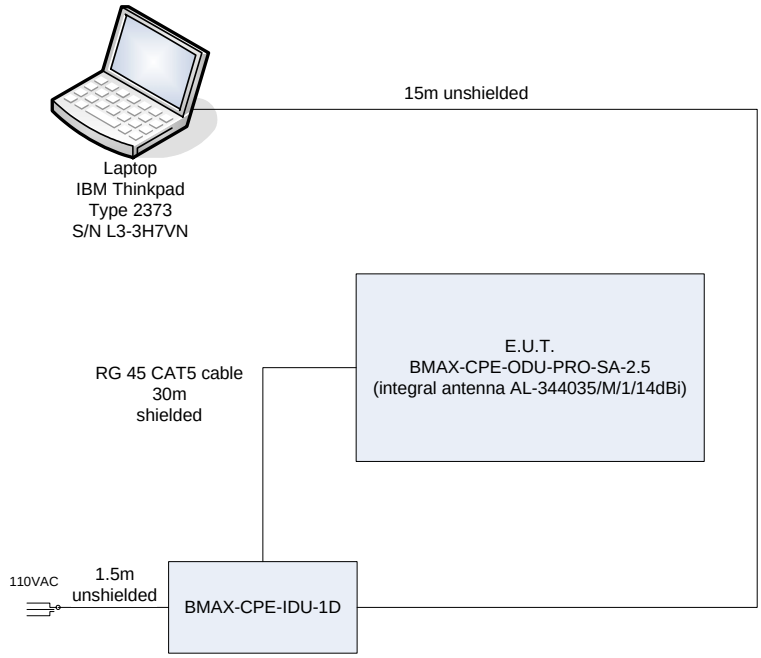

Figure 3. Tests Set-up

4. Block Diagram

4.1 Schematic Block/Connection Diagram

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4.2 Theory of Operation

Intentionally blank for reasons of Confidentiality

5. Conducted Emission From AC Mains Test Data

5.1 Test Specification

FCC, Part 15, Subpart B: Class **B**

5.2 Test Procedure

The E.U.T operation mode and test set-up are as described in Section 4. In order to minimize background noise interference, the conducted emission testing was performed inside a shielded room, with the E.U.T placed on an 0.8 meter high wooden table, 0.4 meter from the room's vertical wall.

The E.U.T was powered from 115 V AC / 60 Hz via 50 Ohm / 50 µHn Line Impedance Stabilization Network (LISN) on the phase and neutral lines. The LISN's were grounded to the shielded room ground plane (floor), and were kept at least 0.8 meters from the nearest boundary of the E.U.T

The center of the E.U.T AC cable was folded back and forth, in order to form a bundle less than 0.40 meters and a total cable length of 1 meter.

The effect of varying the position of the cables was investigated to find the configuration that produces maximum emission.

The emission voltages at the LISN's outputs were measured using a computerized receiver, complying with CISPR 16 requirements. The specification limits are loaded to the receiver via a 3.5" floppy disk and are displayed on the receiver's spectrum display.

A frequency scan between 0.15 and 30 MHz was performed at 9 kHz I.F. band width, and using peak detection.

The spectral components having the highest level on each line were measured using a quasi-peak and average detector.

5.3 Test Data

JUDGEMENT: Passed by 4.0 dB

The margin between the emission levels and the specification limit is, in the worst case, 4.5 dB for the phase line at 0.52 MHz and 4.0 dB at 20.26 MHz for the neutral line.

The EUT met the FCC Part 15, Subpart B, Class B specification requirements.

The details of the highest emissions are given in Figure 4 to Figure 9.

TEST PERSONNEL:

Tester Signature: _____ Date: 07.11.06

Typed/Printed Name: E. Pitt

Conducted Emission

E.U.T Description	Broadband Wireless Access System
Type	BreezeMAX 2500 CPE ODU Station BMAX-CPE-ODU-PRO-SA-2.5
Serial Number:	Not designated

Specification:	FCC Part 15, Subpart B, Class **B**
Lead:	Phase
Detectors:	Peak, Quasi-peak, Average

Frequency (MHz)	Peak Amplitude (dBµV)	Quasi-peak Amplitude (dBµV)	Specification (dB µV)	Pass/Fail	Margin (dB)
0.16	47.4	45.7	65.6	Pass	-19.9
0.48	41.8	40.7	56.4	Pass	-15.7
0.52	44.5	43.9	56.0	Pass	-12.1
7.53	33.8	30.0	60.0	Pass	-30.0
11.93	42.6	40.8	60.0	Pass	-19.2
21.66	46.5	45.7	60.0	Pass	-14.3

Figure 4. Conducted Emission: PHASE. Detectors: Peak, QUASI-PEAK

Frequency (MHz)	Peak Amplitude (dBµV)	Average Amplitude (dBµV)	Specification (dB µV)	Pass/Fail	Margin (dB)
0.16	47.4	39.4	55.6	Pass	-16.2
0.48	41.8	37.5	46.4	Pass	-8.9
0.52	44.5	41.5	46.0	Pass	-4.5
7.53	33.8	23.5	50.0	Pass	-26.5
11.93	42.6	37.5	50.0	Pass	-12.5
21.66	46.5	45.2	50.0	Pass	-4.8

Figure 5. Detectors: Peak, AVERAGE .

Conducted Emission

E.U.T Description	Broadband Wireless Access System
Type	BreezeMAX 2500 CPE ODU Station BMAX-CPE-ODU-PRO-SA-2.5
Serial Number:	Not designated

Specification:	FCC Part 15, Subpart B, Class **B**
Lead:	Phase
Detectors:	Peak, Quasi-peak, Average

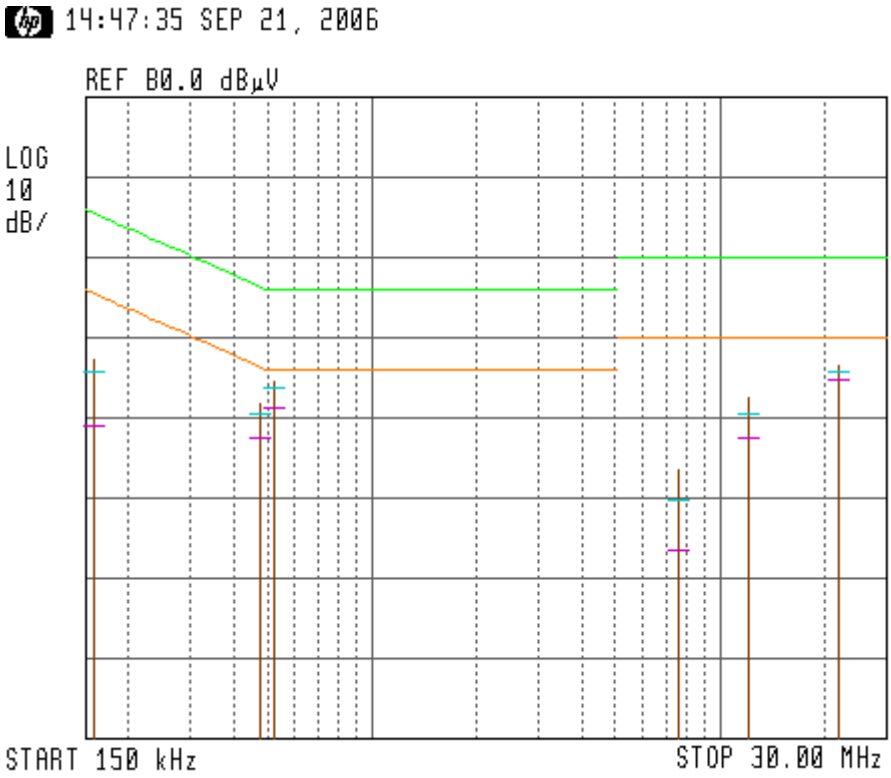

Figure 6. Detectors: Peak, Quasi-peak, Average

Notes:

1. Horizontal axis shows logarithmic frequency scale.

2. The vertical axis shows amplitude (in dB µV).

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.

5. Average detection is designated by the second dash mark (from the top) of each vertical line.

Conducted Emission

E.U.T Description	Broadband Wireless Access System
Type	BreezeMAX 2500 CPE ODU Station BMAX-CPE-ODU-PRO-SA-2.5
Serial Number:	Not designated

Specification:	FCC Part 15, Subpart B, Class **B**
Lead:	Neutral
Detectors:	Peak, Quasi-peak, Average

Frequency (MHz)	Peak Amplitude (dB µV)	Quasi-peak Amplitude (dB µV)	Specification (dB µV)	Pass/Fail	Margin (dB)
0.16	47.7	45.6	65.5	Pass	-19.9
0.26	42.0	39.0	61.3	Pass	-22.3
0.48	41.5	40.3	56.4	Pass	-16.1
6.85	32.8	30.8	60.0	Pass	-29.2
14.21	42.8	40.8	60.0	Pass	-19.2
20.26	47.7	46.9	60.0	Pass	-13.1

Figure 7. Detectors: Peak, QUASI-PEAK

Frequency (MHz)	Peak Amplitude (dBµV)	Average Amplitude (dBµV)	Specification (dB µV)	Pass/Fail	Margin (dB)
0.16	47.7	42.0	55.6	Pass	-13.6
0.26	42.0	34.9	51.3	Pass	-16.4
0.48	41.5	37.3	46.4	Pass	-9.1
6.85	32.8	29.4	50.0	Pass	-20.6
14.21	42.8	39.5	50.0	Pass	-10.5
20.26	47.7	46.0`	50.0	Pass	-4.0

Figure 8. Detectors: Peak, AVERAGE

Conducted Emission

E.U.T Description	Broadband Wireless Access System
Type	BreezeMAX 2500 CPE ODU Station BMAX-CPE-ODU-PRO-SA-2.5
Serial Number:	Not designated

Specification:	FCC Part 15, Subpart B, Class **B**
Lead:	Neutral
Detectors:	Peak, Quasi-peak, Average

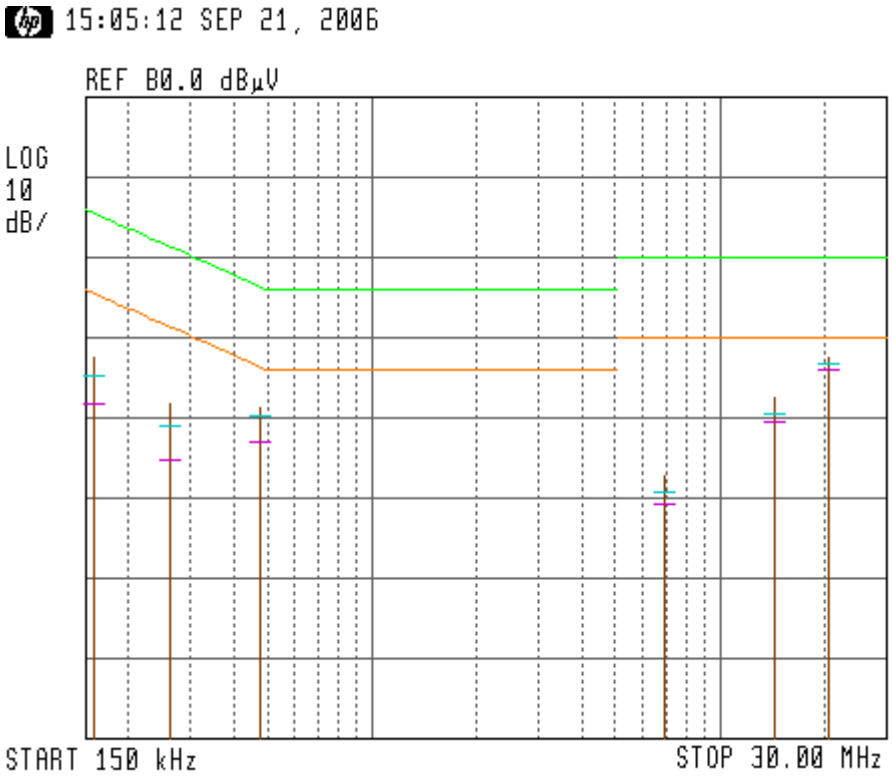

Figure 9 Conducted Emission: NEUTRAL
Detectors: Peak, Quasi-peak, Average

Notes:

1. Horizontal axis shows logarithmic frequency scale.

2. The vertical axis shows amplitude (in dB µV).

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.

5. Average detection is designated by the second dash mark (from the top) of each vertical line.

5.4 Test Instrumentation Used, Conducted Measurement

Instrument	Manufacturer	Model	Serial No.	Calibration	Period
LISN	Fischer	FCC-LISN-2A	127	March 20, 2006	1 year
LISN	Fischer	FCC-LISN-2A	128	March 20, 2006	1 year
Receiver	HP	85420E/85422E	3427A00103/34	March 22, 2006	1 year
Printer	HP	ThinkJet2225	2738508357	N/A	N/A

6. Radiated Emission, per FCC Part 15

6.1 Test Specification

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

6.2 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.

6.3 Test Data

JUDGEMENT: Passed by 4.9 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 4.9 dB in the worst case at the frequency of 426.17 MHz, vertical polarization.

In the band 1 – 13 GHz, the emission levels were more than 20 dB below the specification limit.

The details of the highest emissions are given in Figure 10 to Figure 13.

TEST PERSONNEL:

Tester Signature: _____ Date: 07.11.06

Typed/Printed Name: E. Pitt

Radiated Emission

E.U.T Description	Broadband Wireless Access System
Type	BreezeMAX 2500 CPE ODU Station BMAX-CPE-ODU-PRO-SA-2.5
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)
167.06	39.4	38.0	15.1	43.6	-5.6
200.47	41.0	37.6	17.1	43.5	-5.9
300.74	37.6	34.5	15.6	46.0	-11.5
334.14	39.6	37.7	16.8	46.0	-8.3
367.54	39.1	35.2	18.0	46.0	-10.8
467.78	39.5	35.1	20.0	46.0	-10.9

Figure 10. 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 CPE ODU Station BMAX-CPE-ODU-PRO-SA-2.5
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

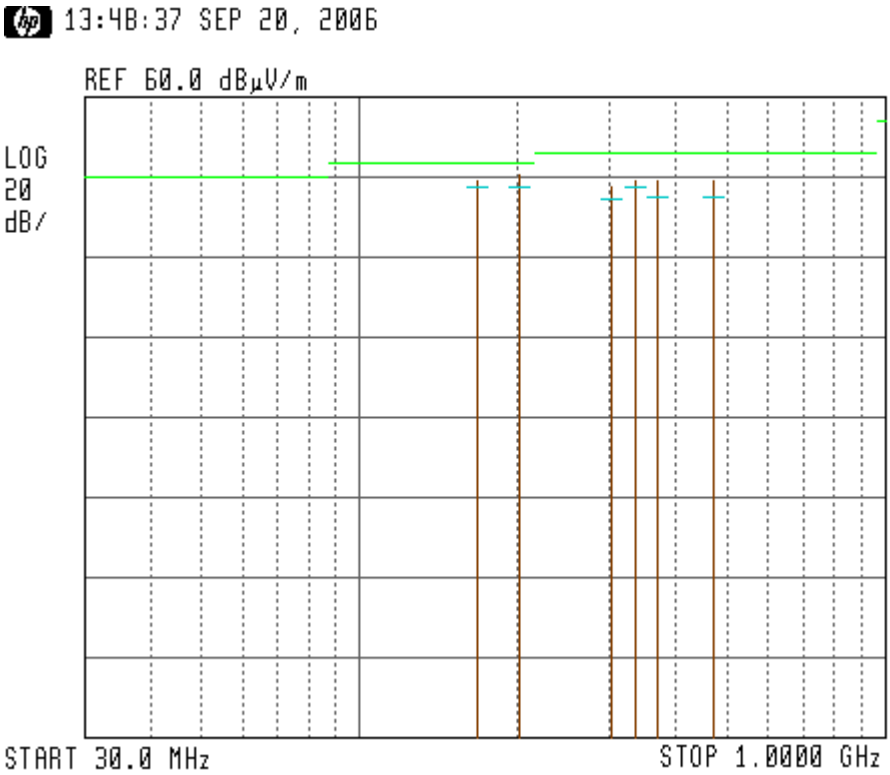

Figure 11. Radiated Emission. Antenna Polarization: HORIZONTAL Detectors: Peak, Quasi-peak

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 CPE ODU Station BMAX-CPE-ODU-PRO-SA-2.5
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)
167.06	37.9	33.5	15.1	43.6	-10.1
200.49	38.0	35.3	17.1	43.5	-8.2
367.53	36.2	30.2	18.0	46.0	-15.8
426.17	41.8	41.1	19.4	46.0	-4.9
467.79	34.9	31.6	20.0	46.0	-14.4
601.41	36.4	30.7	23.9	46.0	-15.3

Figure 12. 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 CPE ODU Station BMAX-CPE-ODU-PRO-SA-2.5
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

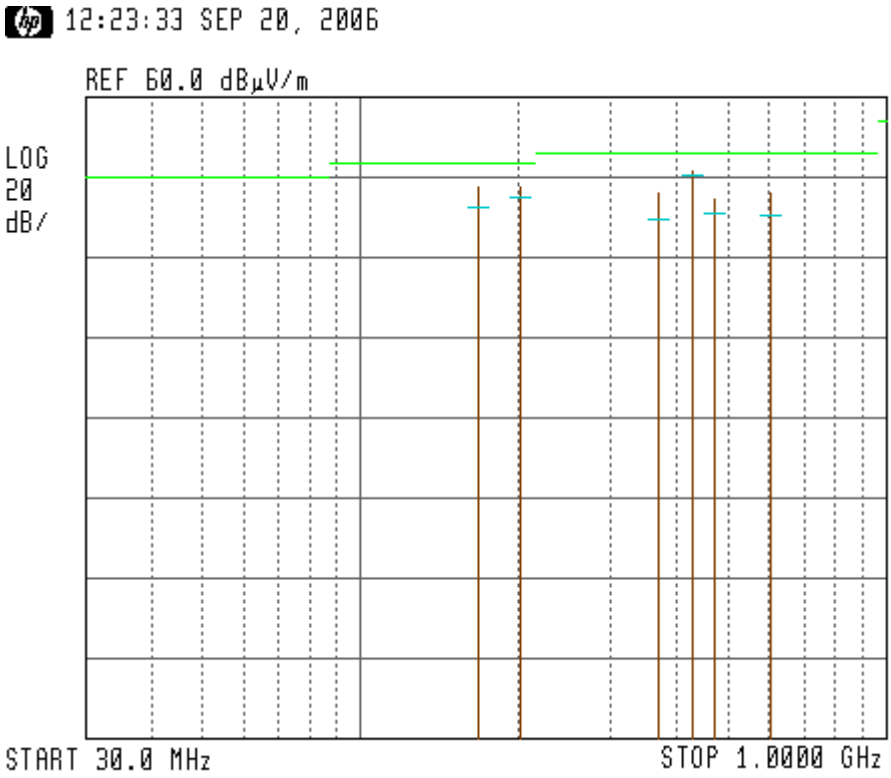

Figure 13. Radiated Emission. Antenna Polarization: VERTICAL. Detectors: Peak, Quasi-peak

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.*

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
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
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

6.5 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.

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

7.1 Test Specification

FCC, Part 27.53 (l), FCC Part 2.1053

7.2 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 (2496-2690 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.

7.3 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: 07.11.06

Typed/Printed Name: E. Pitt

7.4 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

8. Antenna Gain

The antenna gain is 14 dBi.

TERMINAL STATION ANTENNA

2.3 – 2.7 GHz

VERTICAL & HORIZONTAL POLARIZATION

AN1350

ELECTRICAL	
FREQUENCY RANGE	2.3 - 2.7 GHz
GAIN	14 dBi
VSWR	1.9:1 (max)
3 dB AZIMUTH BEAMWIDTH	33° (typ)
POLARIZATION	Linear Vertical@ Horizontal
ELEVATION BEAMWIDTH	27° (typ)
SIDELOBES LEVEL	TS2 (ETSI EN 301 525 v1.1.1)
CROSS POLARIZATION	TS2 (ETSI EN 301 525 v1.1.1)
F/B RATIO	TS2 (ETSI EN 301 525 v1.1.1)
INPUT IMPEDANCE	50 (ohm)
INPUT POWER	6W (max)

9. 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 1.2 meters in the worst case.

Calculation of Maximum Permissible Exposure (MPE)

Based on Section 1.1307(b)(1) Requirements

(a) FCC limits at 2593 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 74.13mW (Peak) (18.7 dBm)

G_T- Antenna Gain, 25.12 = 14 dBi

R- Distance from Transmitter using 1.2m worst case

(c) The peak power density is :

$$S_p = \frac{74.12 \times 25.12}{4\pi(120)^2} = 0.01\frac{mW}{cm^2}$$

(d) The E.U.T. transmission in actual worst case is 50%.

The average power over 30 minutes is:

$$P_{AV} = \frac{74.13 \times 50}{100} = 37.07 mW$$

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

$$S_{AV} = \frac{37.07 \times 25.12}{4\pi(120)^2} = 0.005\frac{mW}{cm^2}$$

(f) This is 2 orders of magnitude below the FCC limit.

10. APPENDIX A - CORRECTION FACTORS

10.1 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".

10.2 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.

10.3 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.

10.4 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".*

10.5 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".*

10.6 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".*

10.7 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

10.8 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			

10.9 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

10.10 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

11. Alvarion Test report

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Test Report No. BMAX2500-004

For ALVARION Ltd.

Equipment Under Test:

Broadband Wireless Access System
Name: BreezeMAX 2500 CPE ODU station
Model: BMAX-CPE-ODU-PRO-SA-2.5

	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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12. Applicant information

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

Equipment under test information

Test items:	Subscriber unit of BreezeMAX 2500 System.
Manufacturer:	Alvarion Ltd
Model:	BMAX-CPE-ODU-PRO-SA-2.5
Equipment serial number:	N/A

13. 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) (2) , part 27.50 (h) (4) part 27.53 (4) ,part 27.54 part 2.1049, 2.1046 ,2.1055

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14. 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	08 2006	
Output power	27.50(h) (2) 2.1046	08 2006	
Spurious emissions at antenna terminal	27.53	08 2006	
Frequency stability	27.54 2.1055	08 2006	

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15. Equipment Under Test description

15.1 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 2496MHz up to 2690MHz band with OFDM modulation. The basic system configuration of SU is a two-box configuration that contains Indoors unit includes a power supply and an Ethernet 10/100BaseT (RJ 45) interface and Outdoors unit includes the integral antenna, modem, radio, data processing and management components of the SU.

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	**2496MHz-2690MHz**		
Operating frequency range	**2498.5MHz-2687.5MHz**		
RF channel spacing	**5 MHz**		
Maximum rated output power	**19 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**
Integral	**M.T.I**	**AL-344035/M**	**14 dBi**

15.2 EUT test configuration

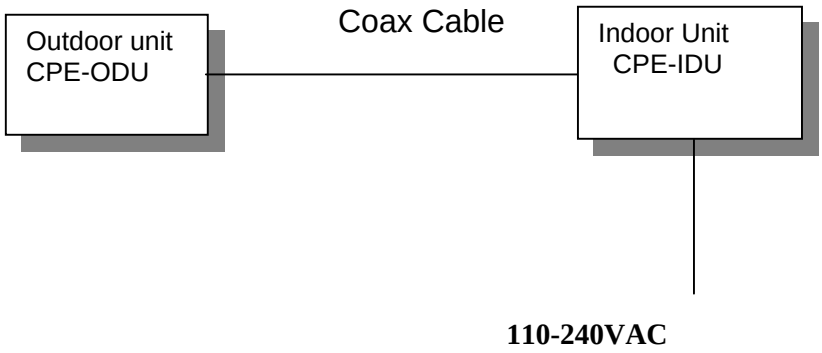

Figure 14Base station test setup

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16. Test results

16.1 Transmitter characteristics

16.1.1. 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		2.496 – 2.690 GHz			

Table 2Occupied bandwidth

Carrier frequency MHz	Measured occupied bandwidth, MHz	Reference to Figure number
2498.5	4.74	#2
2593.0	4.70	#3
2687.5	4.60	#4

TEST PROCEDURE

The measurements were performed in transmitting mode at 3 transmitted carrier (minimum, middle and maximum) of the 2496MHz-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				

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Occupied bandwidth test results.

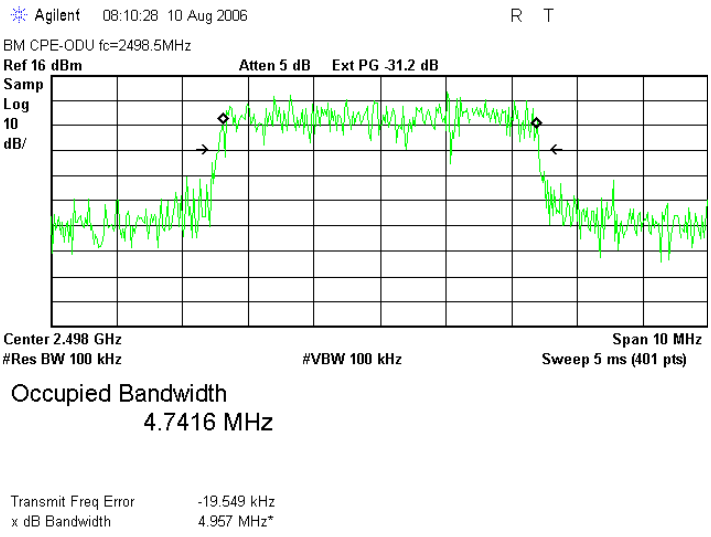

Figure 15Carrier Frequency 2498.5 MHz

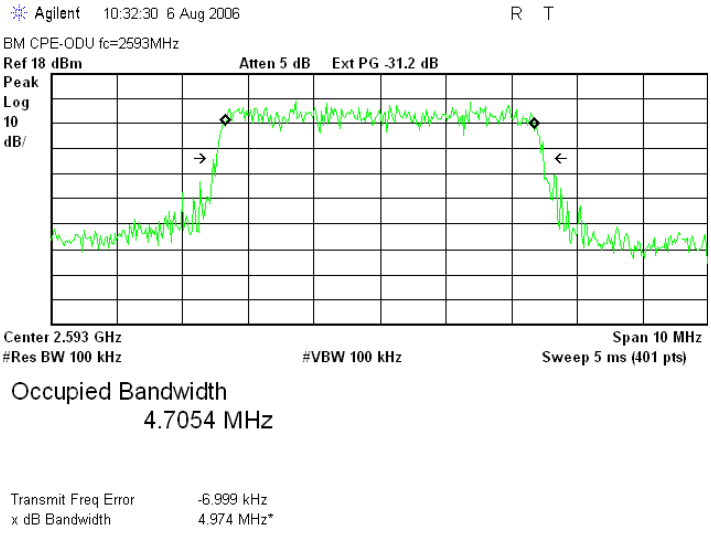

Figure 16Carrier Frequency 2593 MHz

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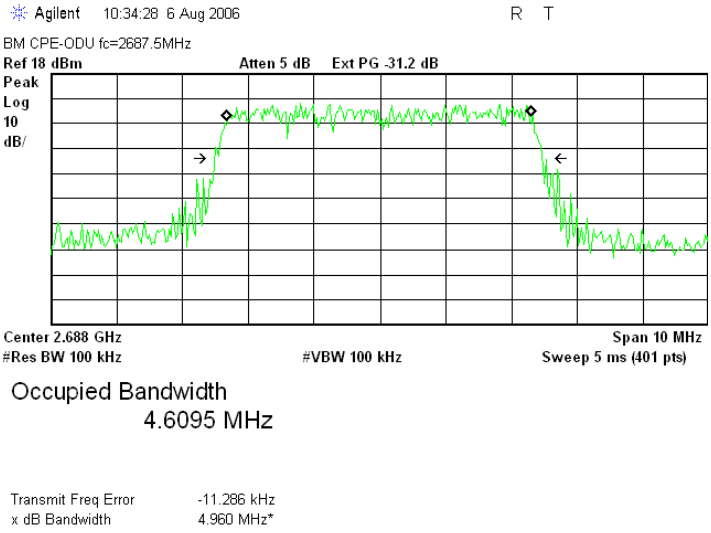

Figure 17Carrier Frequency 2687.5 MHz

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16.1.2. Output power test § 27.50(h)(2),2.1046

Ambient Temperature 23^0 C Relative Humidity 49% Air Pressure 1009 hPa
Operating Frequency Range 2496 – 2690 MHz

Table 3Output power test § 27.50

Carrier frequenc **MHz**	Output power. **dBm**	**Limit output power dBm**	**Reference to plot number**
2498.5	18.7	19	#5
2593.0	18.6	19	#6
2687.5	18.6	19	#7

The following power limits apply to the 2496 – 2690 MHz bands:

Fixed station transmitting are limited to 2W (33 dBm) peak equivalent isotropically radiated power.
Output power at antenna connector =EIRP-Gant=33dBm-14dBi=19dBm

TEST PROCEDURE

The measurements were performed in transmitting mode at 3 transmitted carrier (minimum, middle and maximum) of the 2.496 - 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	4	5				

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Output power test results.

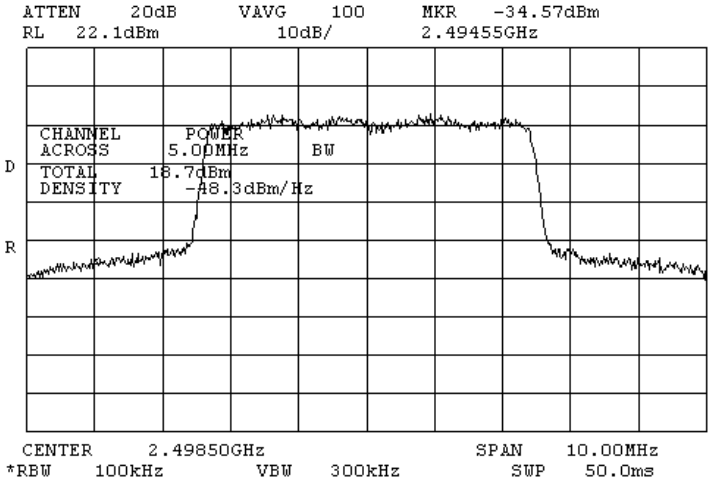

Figure 18Carrier Frequency 2498.5 MHz

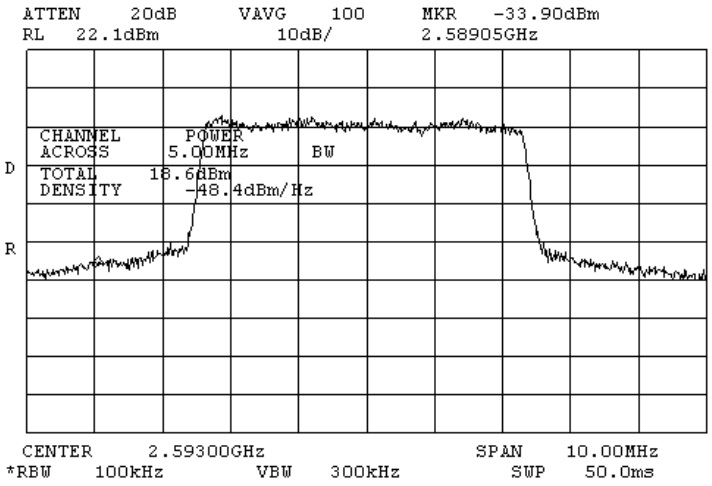

Figure 19Carrier Frequency 2593.0 MHz

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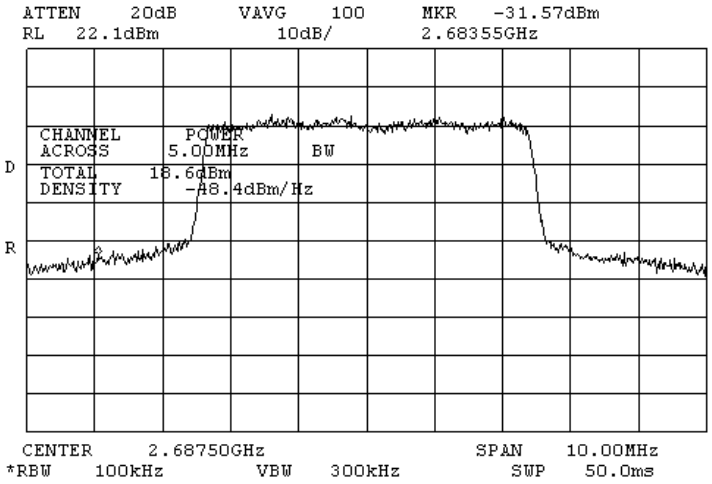

Figure 20Carrier Frequency 2687.5 MHz.

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16.1.3. Spurious emissions at antenna terminal § 27.53(4)

Ambient Temperature 23^0 C Relative Humidity 49% Air Pressure 1009 hPa
Operating Frequency Range 2.496 – 2.690 GHz

Table 4 Spurious emissions (Carrier frequencies – 2498.5 MHz.)

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to Figure number
2450-2490.5	-43.23	-13	18.23	#10
2490.5-2494	-24.73	-13	11.73	#11
2494-2495	-27.9	-13	14.9	#12
2495-2496	-22.7	-13	9.7	#13
2501-2502	-24.5	-13	11.5	#14
2502-2503	-28.0	-13	15.0	#15
2503-2506.5	-24.73	-13	11.73	#16
2506.5-2600	-43.9	-13	18.9	#17

Table 5 Spurious emissions(Carrier frequencies – 2593 MHz.)

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to Figure number
2500-2585	-44.8	-13	19.8	#23
2585-2588.5	-23.63	-13	9.63	#24
2588.5-2589.5	-29.4	-13	16.4	#25
2589.5-2590.5	-22.6	-13	9.6	#26
2595.5-2596.5	-26.0	-13	13.0	#27
2597.5-2601	-25.63	-13	12.63	#29
2601-2700	-48.8	-13	23.8	#30

Table 6 Spurious emissions(Carrier frequencies – 2687.5 MHz.)

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to Figure number
2675-2679.5	-46.97	-13	21.97	#36
2679.5-2683	-23.8	-13	10.8	#37
2683-2684	-29.5	-13	16.5	#38
2684-2685	-24.4	-13	11.4	#39
2690-2691	-26.6	-13	13.6	#40
2692-2695.5	-24.13	-13	11.13	#42
2695.5-4000	-51.47	-13	26.47	#43

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* The frequency spectrum was investigated from the lowest radio frequency signal generated in the equipment, without going below 5MHz, 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: 08-45
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 2496 –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 2.496 - 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	4	5				

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Spurious emissions at antenna terminal test results.

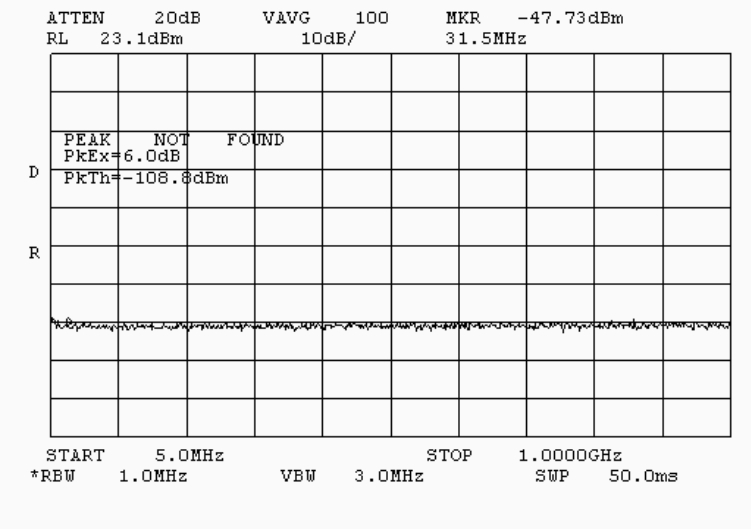

Figure 21 Frequency carriers 2498.5 MHz.

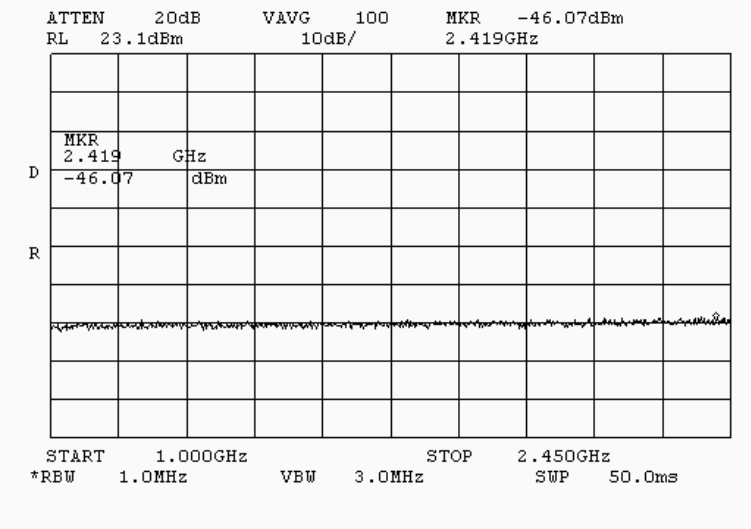

Figure 22 Frequency carriers 2498.5 MHz.

External attenuator = 20 dB Cable loss = 1.2 dB.

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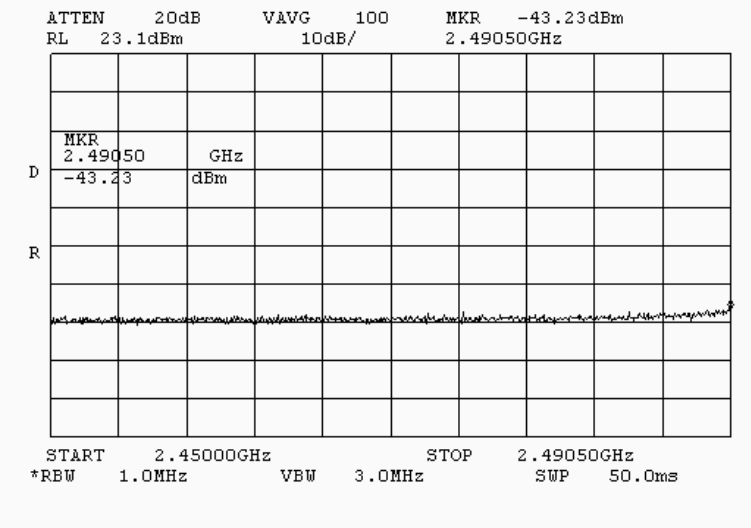

Figure 23 Frequency carriers 2498.5 MHz.

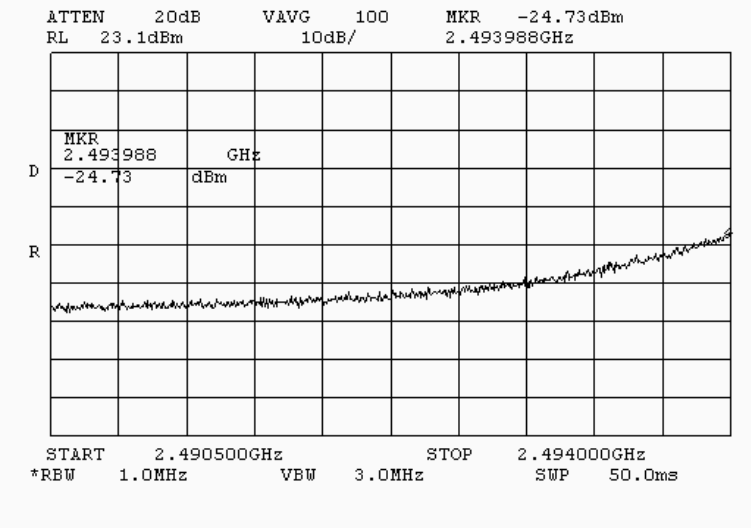

Figure 24 Frequency carriers 2498.5 MHz.

External attenuator = 20 dB Cable loss = 1.2 dB.

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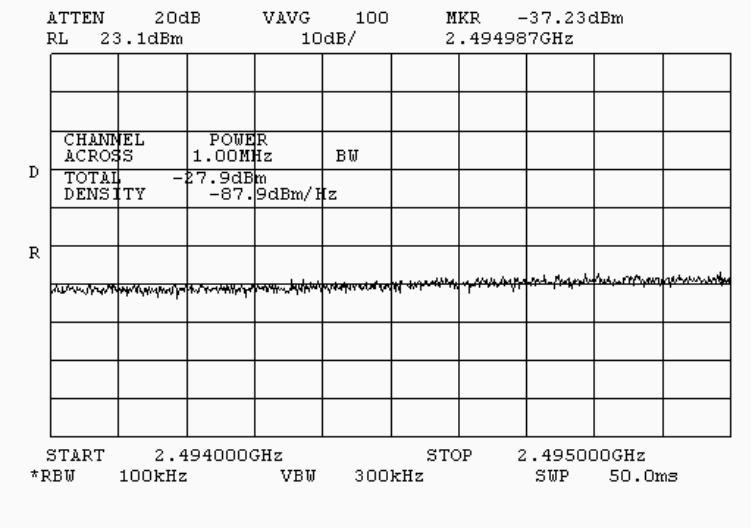

Figure 25 Frequency carriers 2498.5 MHz.

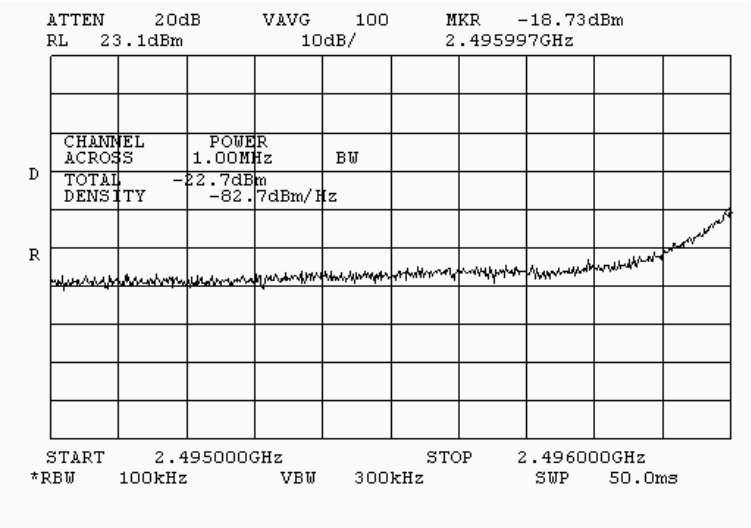

Figure 26 Frequency carriers 2498.5 MHz.

External attenuator = 20 dB Cable loss = 1.2 dB.

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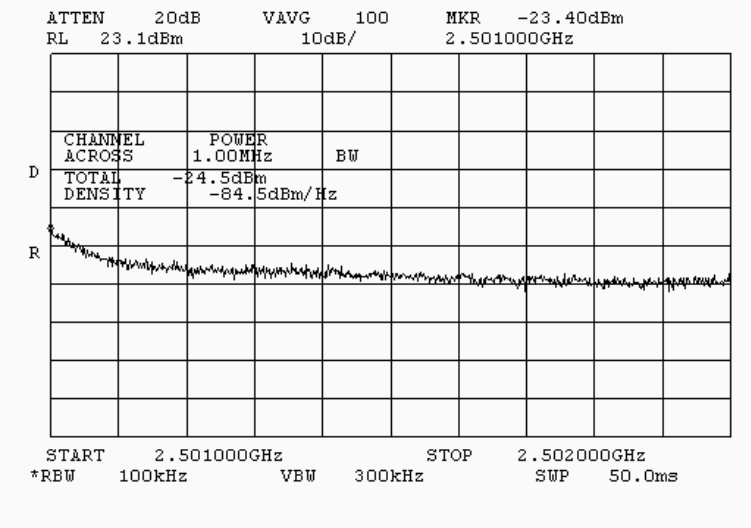

Figure 27 Frequency carriers 2498.5 MHz.

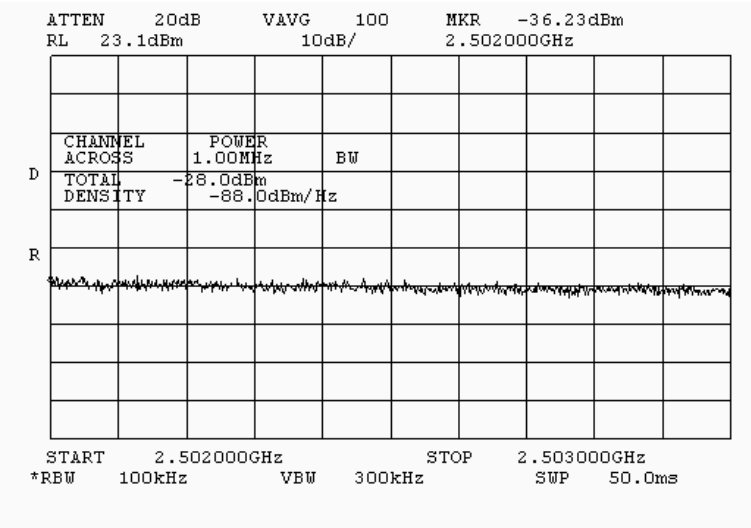

Figure 28 Frequency carriers 2498.5 MHz.

External attenuator = 20 dB Cable loss = 1.2 dB.

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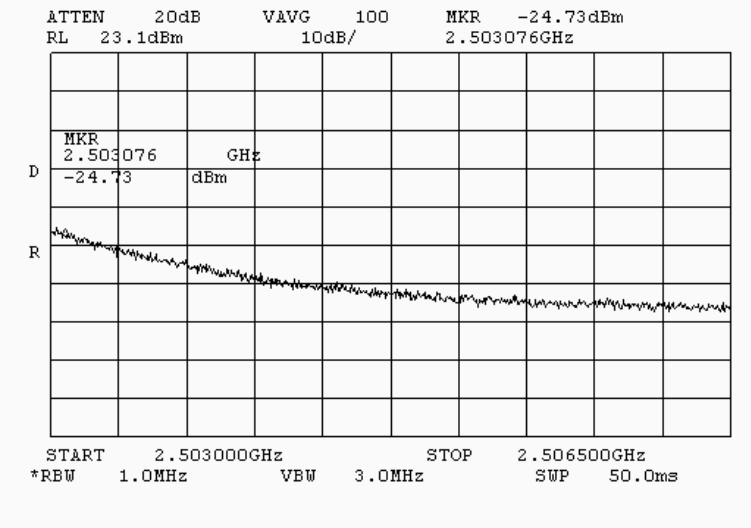

Figure 29 Frequency carriers 2498.5 MHz.

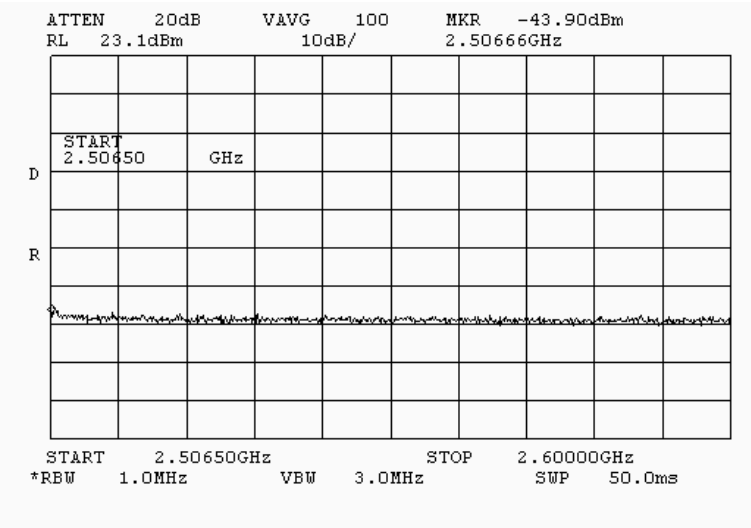

Figure 30 Frequency carriers 2498.5 MHz.

External attenuator = 20 dB Cable loss = 1.2 dB

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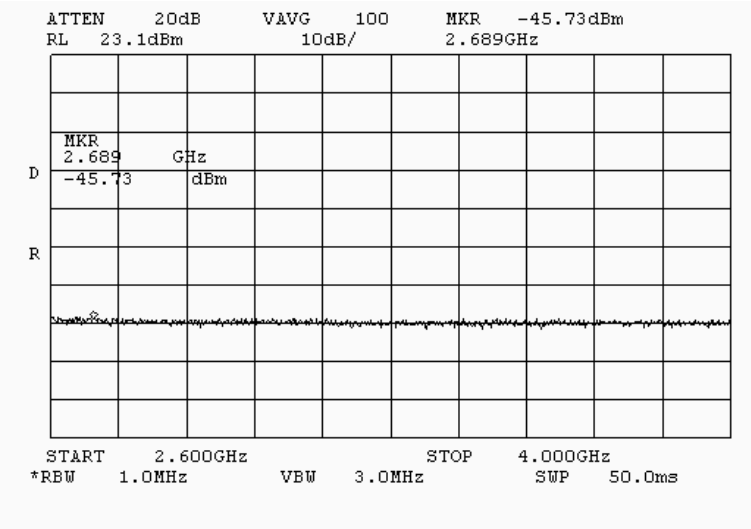

Figure 31 Frequency carriers 2498.5 MHz.

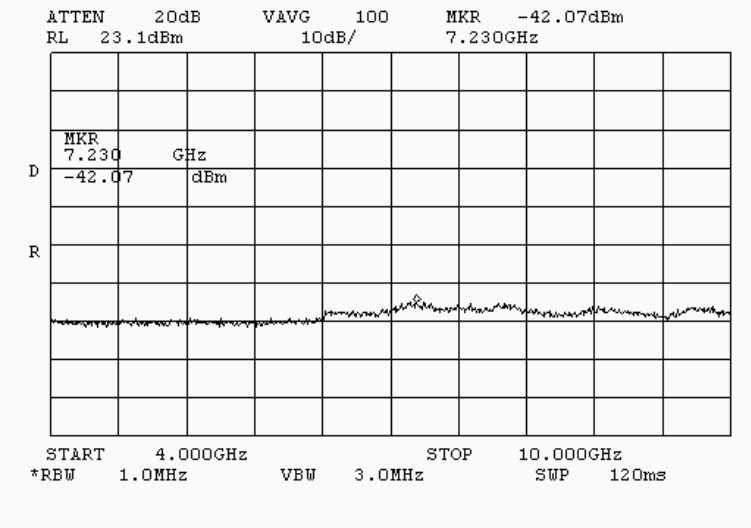

Figure 32 Frequency carriers 2498.5 MHz.

External attenuator = 20 dB Cable loss = 1.2 dB

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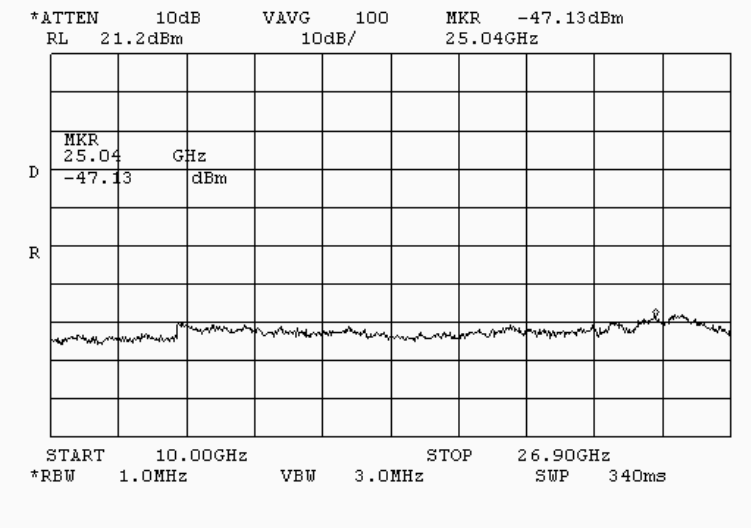

Figure 33 Frequency carriers 2498.5 MHz.

External attenuator = 20 dB Cable loss = 1.2 dB

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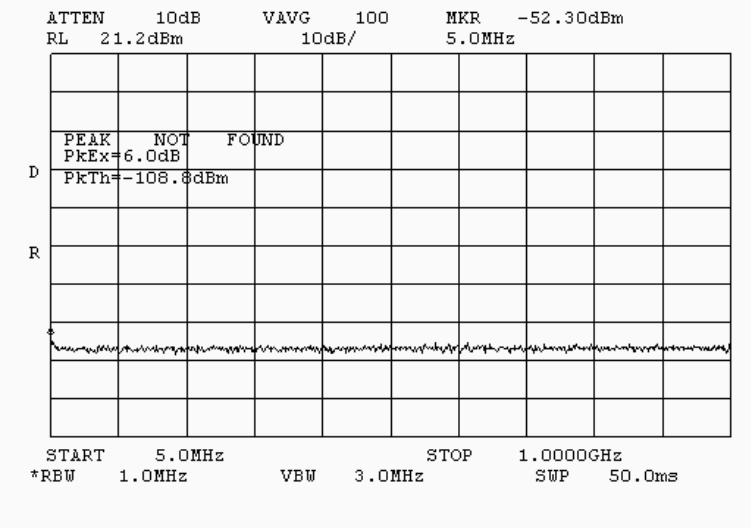

Figure 34 Frequency carriers 2593 MHz.

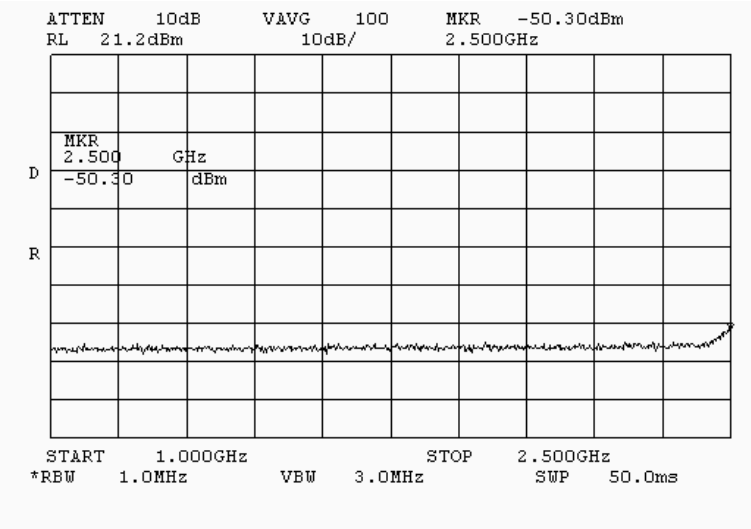

Figure 35 Frequency carriers 2593 MHz.

External attenuator = 20 dB Cable loss = 1.2 dB

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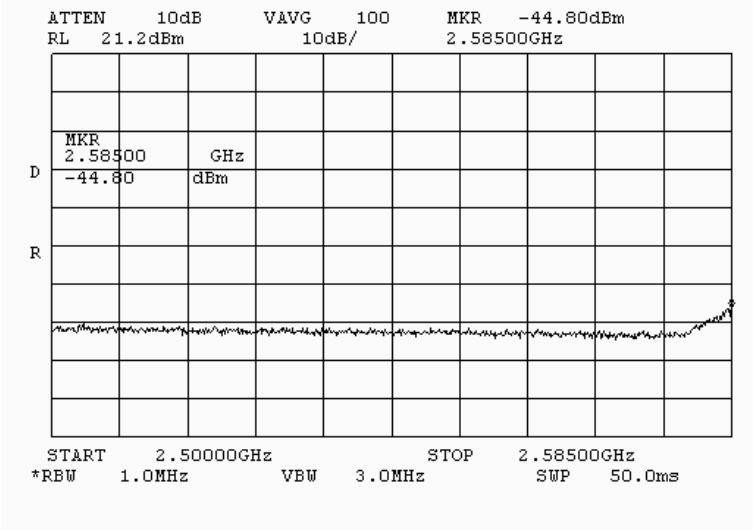

Figure 36 Frequency carriers 2593 MHz.

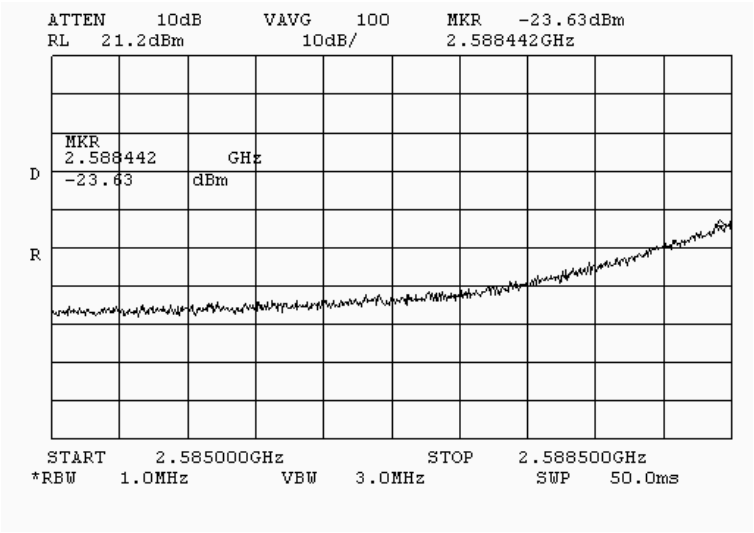

Figure 37 Frequency carriers 2593 MHz.

External attenuator = 20 dB Cable loss = 1.2 dB

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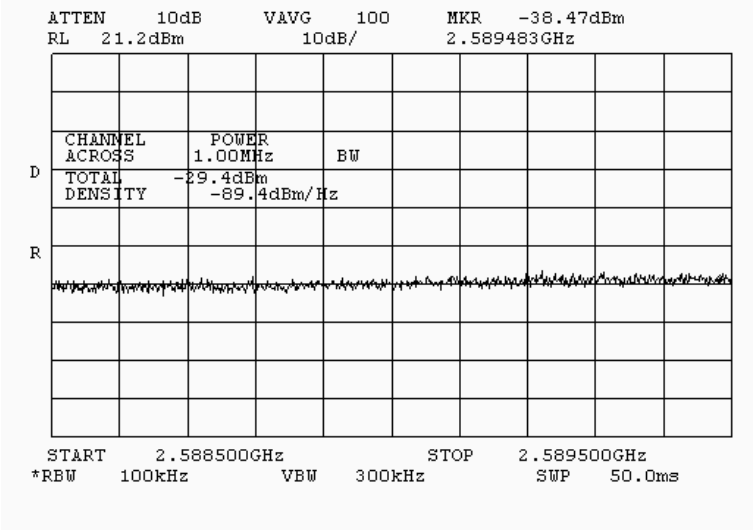

Figure 38 Frequency carriers 2593 MHz.

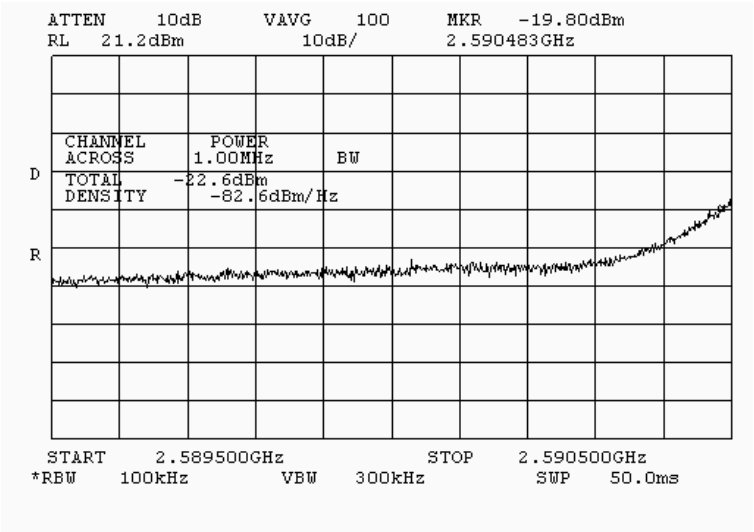

Figure 39 Frequency carriers 2593 MHz.

External attenuator = 20 dB Cable loss = 1.2 dB

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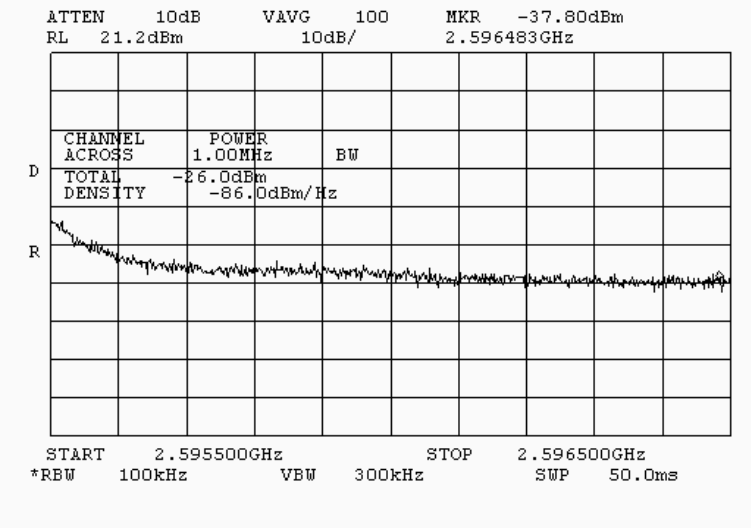

Figure 40 Frequency carriers 2593 MHz.

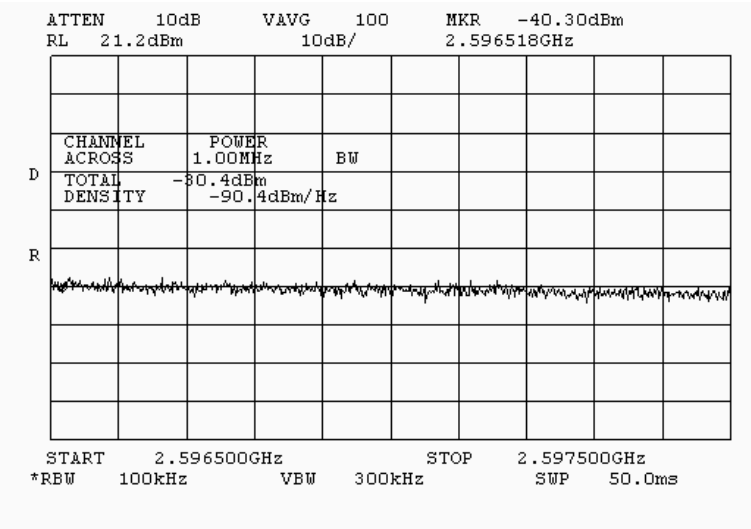

Figure 41 Frequency carriers 2593 MHz.

External attenuator = 20 dB Cable loss = 1.2 dB

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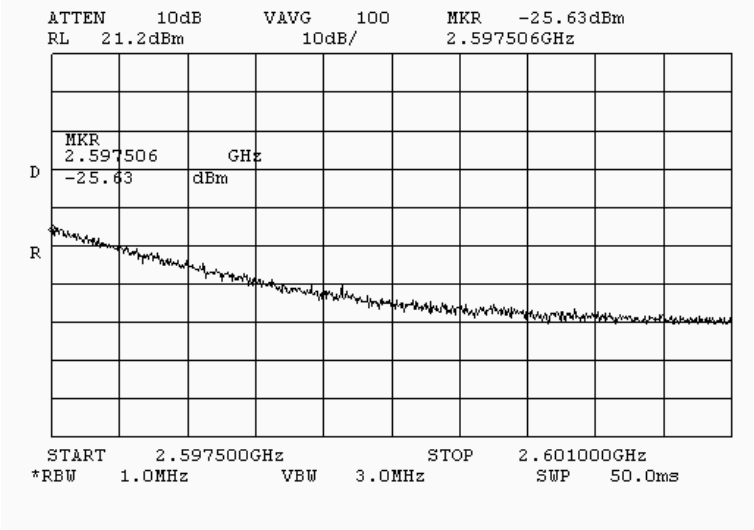

Figure 42 Frequency carriers 2593 MHz.

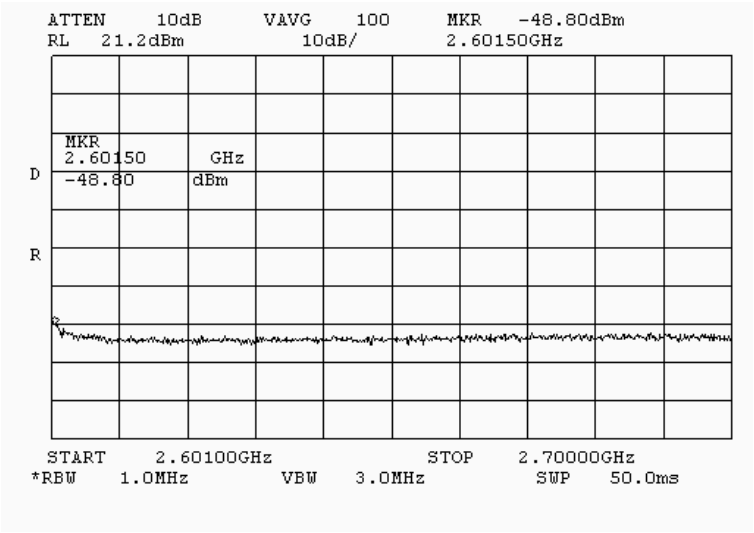

Figure 43 Frequency carriers 2593 MHz.

External attenuator = 20 dB Cable loss = 1.2 dB

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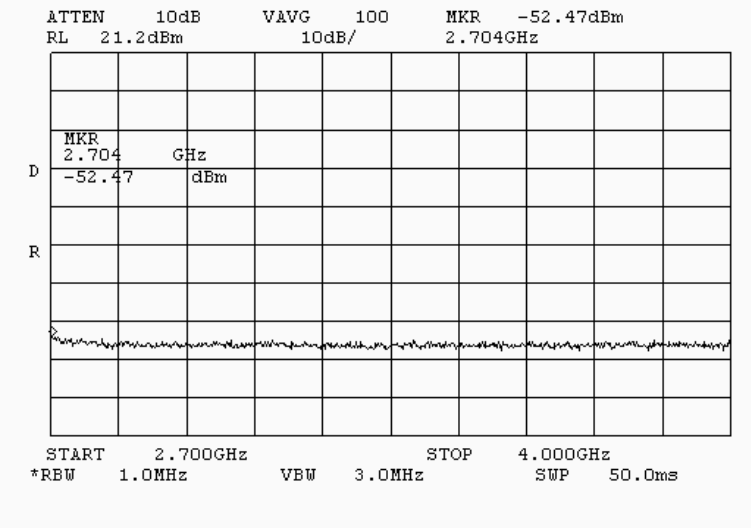

Figure 44 Frequency carriers 2593 MHz.

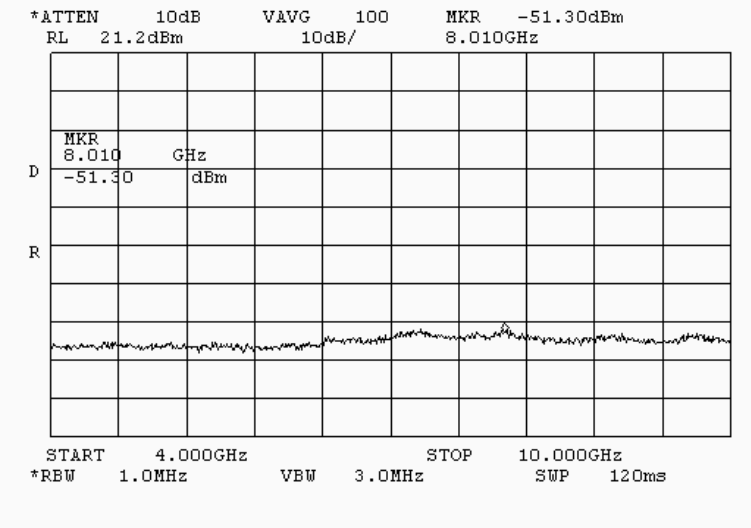

Figure 45 Frequency carriers 2593 MHz.

External attenuator = 20 dB Cable loss = 1.2 dB

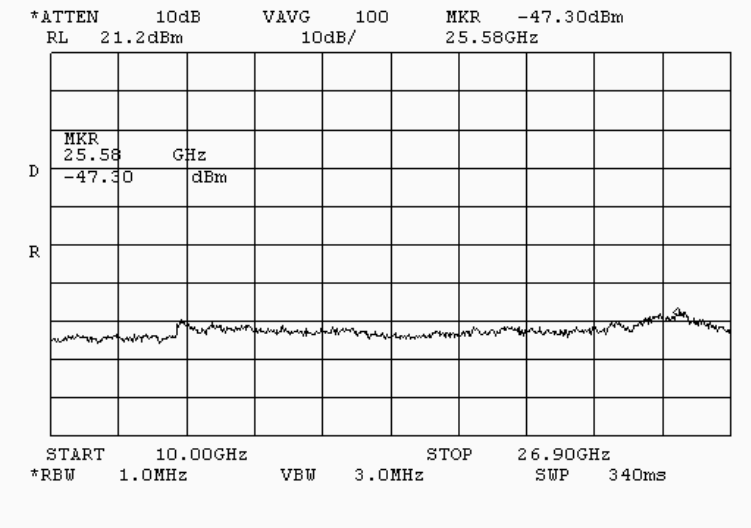

Figure 46 Frequency carriers 2593 MHz.

External attenuator = 20 dB Cable loss = 1.2 dB

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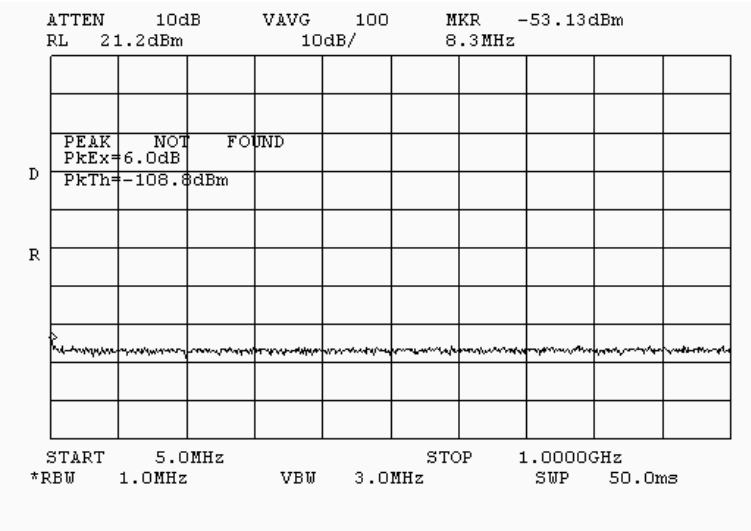

Figure 47 Frequency carriers 2687.5 MHz

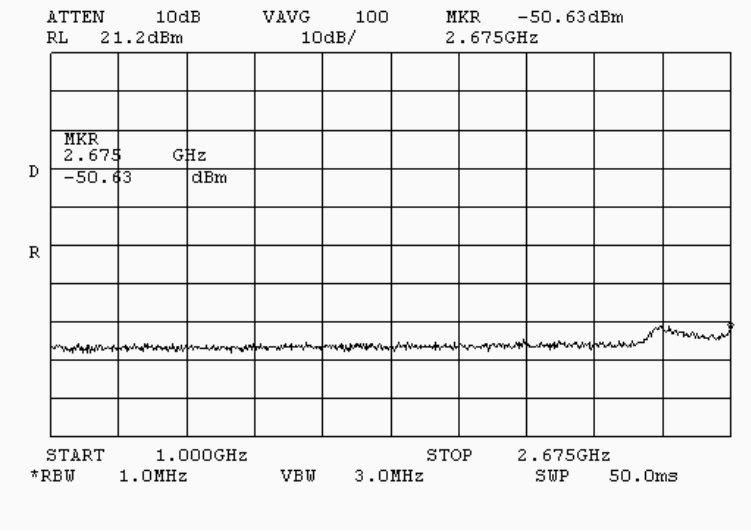

Figure 48 Frequency carriers 2687.5 MHz

External attenuator = 20 dB Cable loss = 1.2 dB

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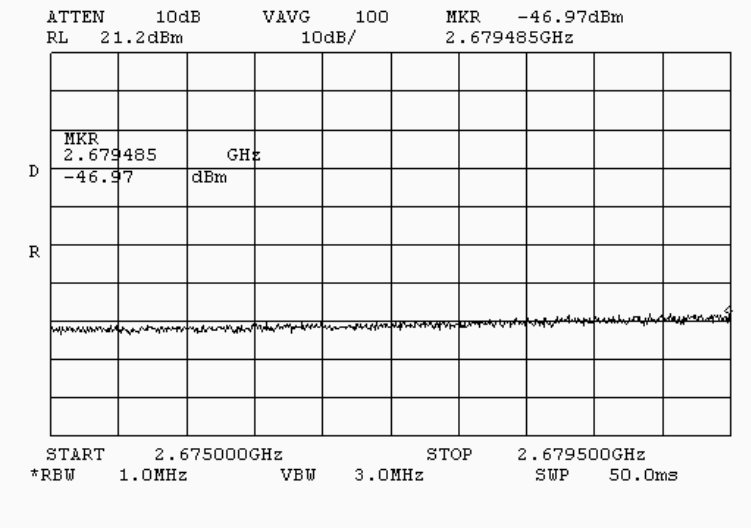

Figure 49 Frequency carriers 2687.5 MHz

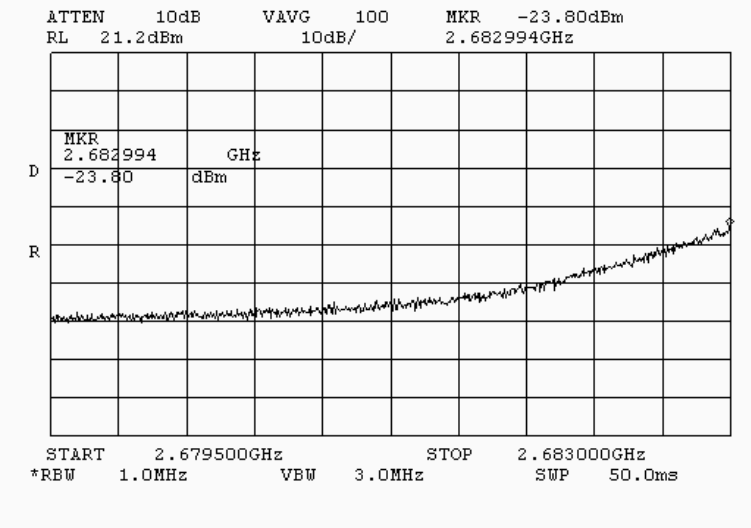

Figure 50 Frequency carriers 2687.5 MHz

External attenuator = 20 dB Cable loss = 1.2 dB

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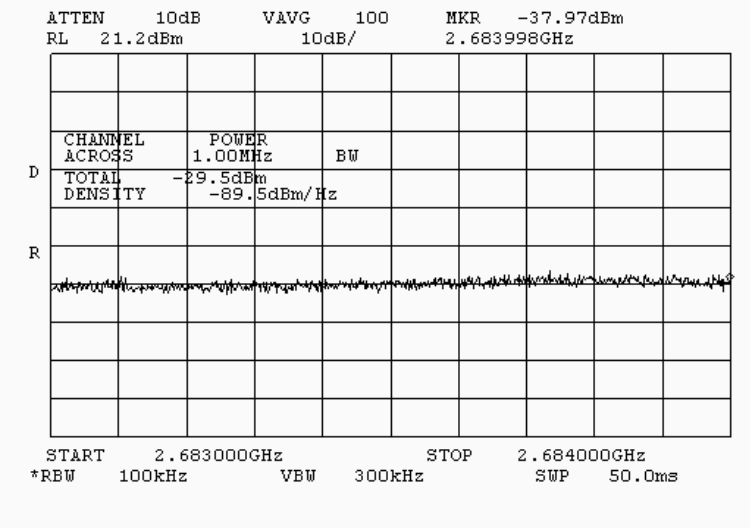

Figure 51 Frequency carriers 2687.5 MHz

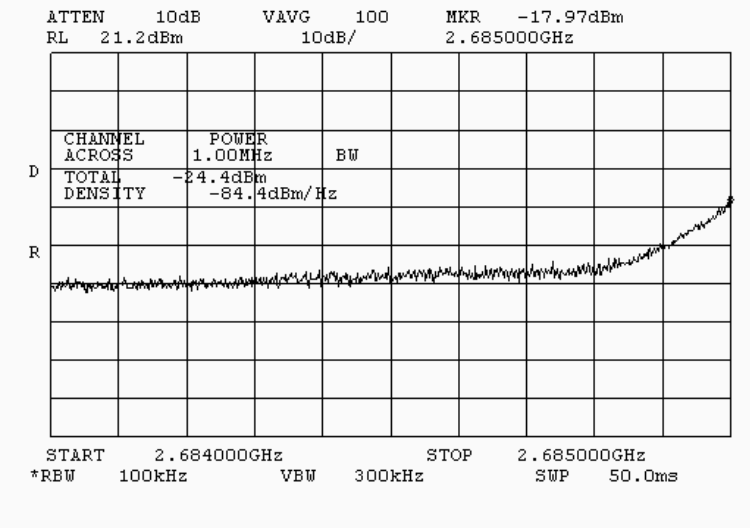

Figure 52 Frequency carriers 2687.5 MHz

External attenuator = 20 dB Cable loss = 1.2 dB

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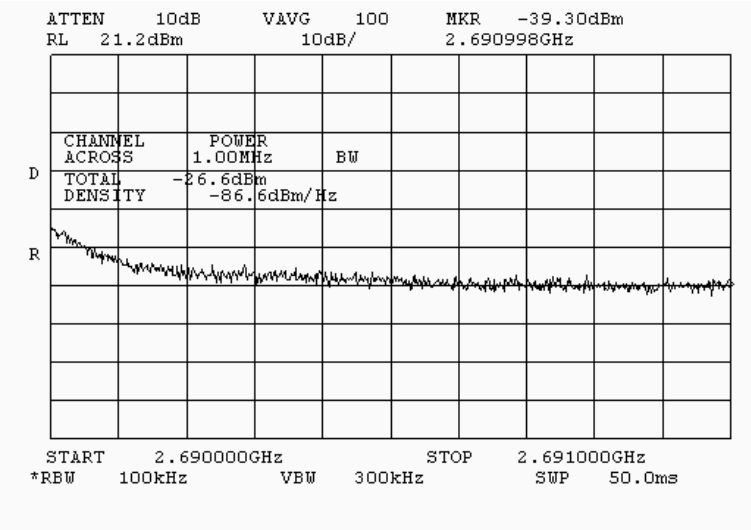

Figure 53 Frequency carriers 2687.5 MHz

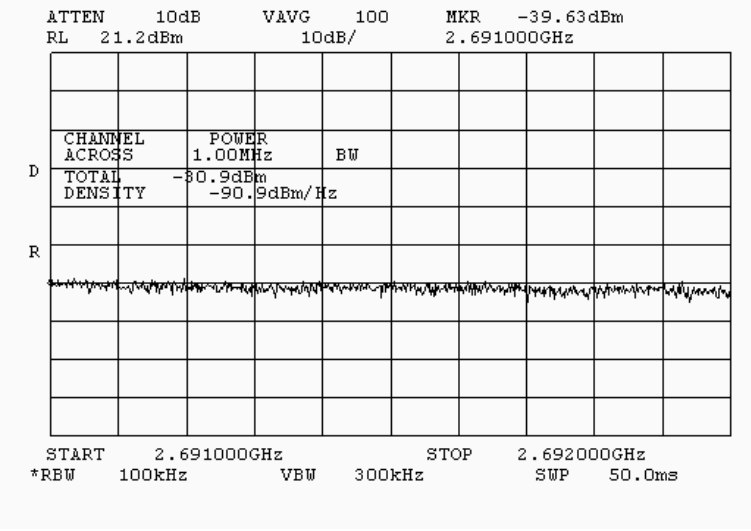

Figure 54 Frequency carriers 2687.5 MHz

External attenuator = 20 dB Cable loss = 1.2 dB

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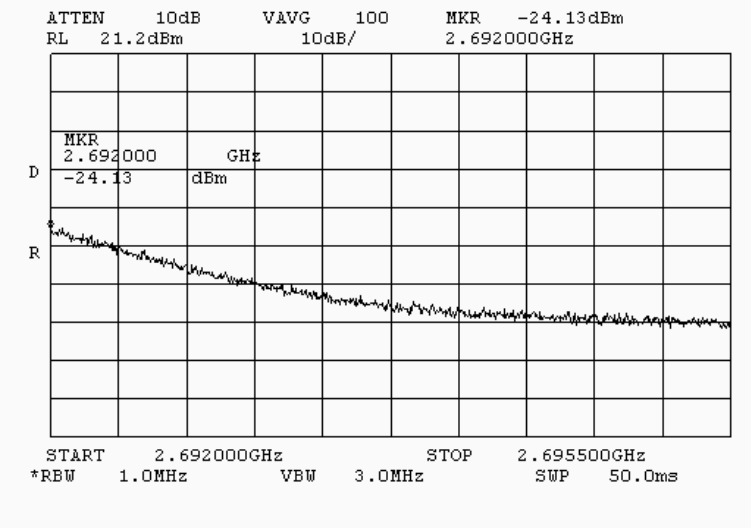

Figure 55 Frequency carriers 2687.5 MHz

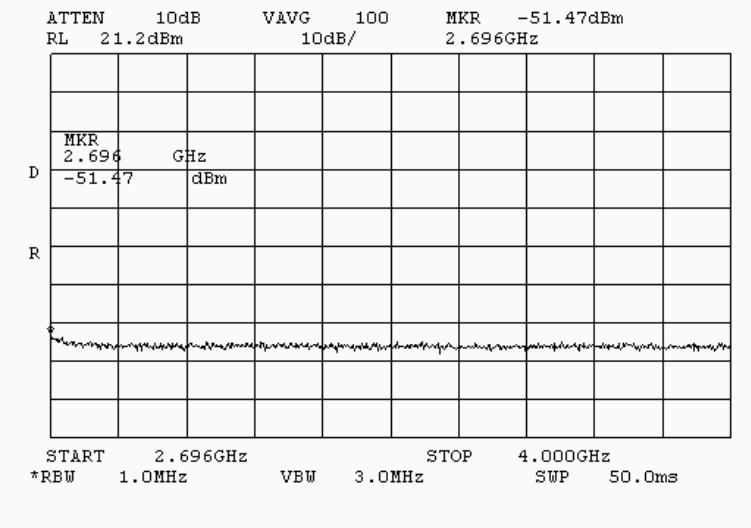

Figure 56 Frequency carriers 2687.5 MHz

External attenuator = 20 dB Cable loss = 1.2 dB

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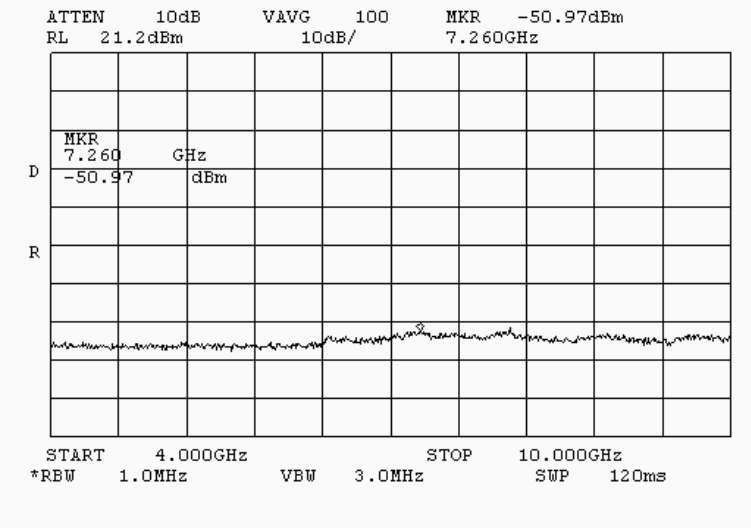

Figure 57 Frequency carriers 2687.5 MHz

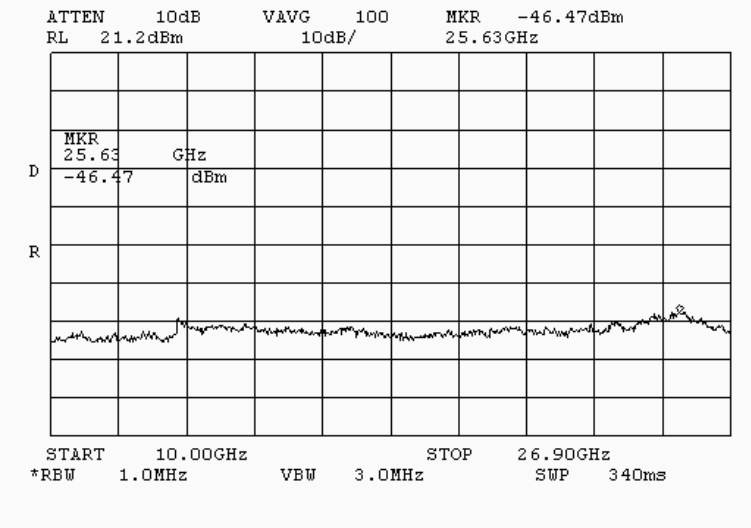

Figure 58 Frequency carriers 2687.5 MHz

External attenuator = 20 dB Cable loss = 1.2 dB

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16.1.4. Frequency stability test according to § 27.54,2.1055

Ambient Temperature 23^0 C Relative Humidity 49% Air Pressure 1009 hPa
Operating Frequency Range 2.496 – 2.690 GHz.

Nominal voltage=115VAC

Table 7Frequency stability test according to § 27.54

Temperature	Extreme Voltage/VAC	Frequency Low/GHz	Frequency High/GHz
-30ºC	97.75	2.498507090	2.687510590
	132.25	2.498507880	2.687509820
-20ºC	97.75	2.498514540	2.687515580
	132.25	2.498514640	2.687515740
-10ºC	97.75	2.498512380	2.687512950
	132.25	2.498512350	2.687513010
0ºC	97.75	2.498505850	2.687506560
	132.25	2.498505970	2.687506500
10ºC	97.75	2.498502260	2.687502180
	132.25	2.498502310	2.687502240
20ºC	97.75	2.498494260	2.687494120
	132.25	2.498494400	2.687494180
30ºC	97.75	2.498488280	2.687487430
	132.25	2.498488390	2.687487340
40ºC	97.75	2.498486950	2.687486150
	132.25	2.498487030	2.687486140
50ºC	97.75	2.498485520	2.687484410
	132.25	2.498485500	2.687484370

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	4	5	6			

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17. APPENDIX A Photos

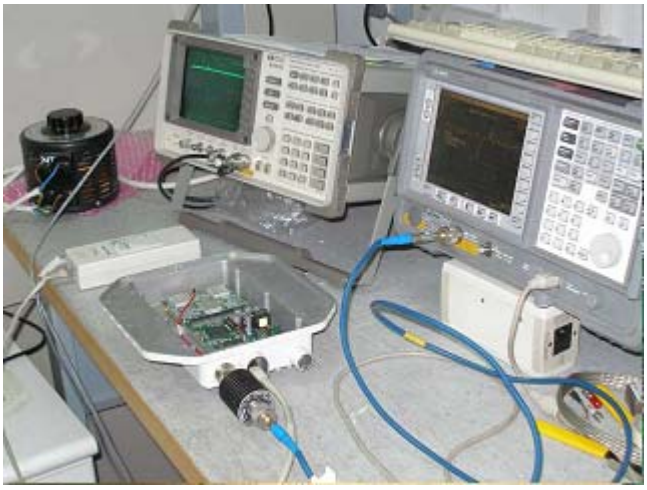

Photo1 Outdoors unit. Test setup

Photo 2 CPE external view

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Photo 3 CPE open cover . Components view

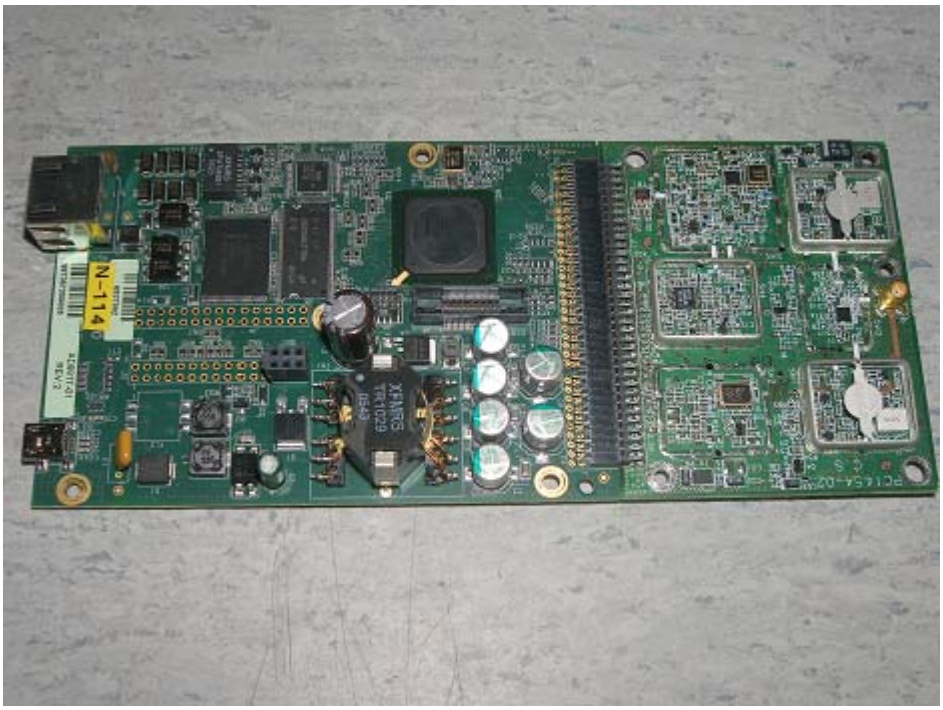

Photo 4 PCB component side

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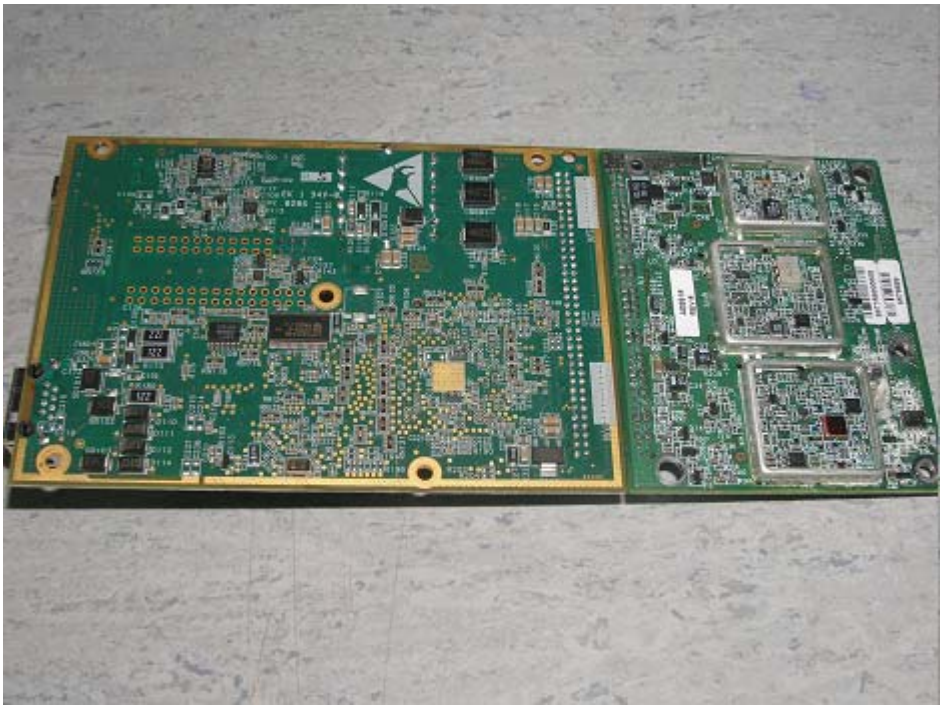

Photo 5 PCB print side

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18. APPENDIX B Equipment used

Table 8Test 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

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19. 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