



Test Report No. 8712353771

For ALVARION Ltd.

Equipment Under Test:

***BreezeMAX 2300
Broadband Wireless Access System***

Indoor Subscriber unit.

***From The Standards Institution
Of Israel
Industry Division
Electronics & Telematics Laboratory
EMC Section***



Certificate No. 1487-01



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Title: BreezeMax 2300 Broadband Wireless Access System

Model: BMAX-CPE- Si- E- 2.3

FCC ID: LKT-BMAX-SI23CR

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Title: BreezeMax 2300 Broadband Wireless Access System**Model:** BMAX-CPE- Si- E- 2.3

FCC ID: LKT-BMAX-SI23CR

1. Applicant information

Order placed by:	Alvarion Ltd
Address:	21A Habarzel str, Tel-Aviv, 69710, Israel
Sample for test selected by:	The customer
The date of test:	October 2007

Equipment under test information

Description of Equipment Under Test (EUT):	Transmitter BreezeMAX 2300
Model:	BMAX-CPE-Si-E-2.3
Serial Number:	NA
Manufactured by:	Alvarion Ltd

2. Test performance

Location:	SII EMC Section
Purpose of test:	Apparatus compliance verification in accordance with emission requirements
Test specifications:	47CFR part 15, part 27, part 2 §§ 2.1049, 2.1053, part 1 §1.1310

This Test Report contains 46 pages and may be used only in full.	This Test Report applies only to the specimen tested and may not be applied to other specimens of the same product.
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Title: BreezeMax 2300 Broadband Wireless Access System**Model:** BMAX-CPE- Si- E- 2.3

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3. Summary of test:

The EUT was found to be in compliance with requirements of: 47CFR Part 15 §§ 15.207 and 15.209 part 27, §§ 27.50, 27.53, 27.54 and part 2 §§ 2.1049

Parameter	Subclasses
Transmitter characteristics	
Occupied bandwidth	2.1049
Peak output power	27.50
Spurious emissions at antenna terminal	27.53
Spurious emissions radiated	27.53
Frequency stability	27.54
Conducted emissions	15.207
Radiated emissions	15.209

Test performed by: Mr. Michael Feldman test technician

Test report prepared by: Mr. Michael Feldman test technician

Test report approved by: Mr. Yuri Rozenberg. Head of EMC Branch

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4. Equipment under test description.

*The customer provided description.

4.1 General description

BreezeMAX 2300 is Alvarion's WiMAX platform for the licensed 2.3 GHz WCS frequency band. It is digital modulated TDD system operating in the 2300MHz up to 2360MHz band with OFDM modulation. The basic system configuration is a one-box configuration that contains a power supply, an Ethernet 10/100BaseT (RJ 45) interface, radio and digital section.

The Si CPE contains the 6 element beam switching antenna, covers 360 degree physically. At given time slot only one element out of six elements is selected according to internal algorithm, giving 60 deg. coverage one at given time slot. When external antenna is attached to the unit, the number of antenna elements becomes 7, and the antenna selection algorithm applies now to 7 antennas elements. Usually the external antenna will be selected as it has the best RX signal level

EUT technical characteristics

Transmitter technical characteristics.		Note	
Stand-alone/fixed use			
Assigned frequency range	2305 – 2315 MHz and 2350 – 2360 MHz		
Operating frequency range	2307.5 MHz, 2312.5 MHz, 2352.5 MHz, 2357.5 MHz		
RF channel spacing	5 MHz		
Maximum rated output power	24 dBm	At transmitter 50 Ω RF output connector	
Antenna connection	Connector: SMA	external	
Transmitter 99% power 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 information			
Type	Manufacturer	Model	Gain
Internal	Raytron	AN1351	7 dBi
Flat panel	MTI	LA3620110/s	11.5 dBi
Cable to external antenna	MTI	MT-850001/MA	2m/-3 dB @ 2.3 GHz

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4.1.1 Environmental evaluation and exposure limit according to FCC CFR 47 part 1, §1.1307, §1.1310

Limit for power density for general population/uncontrolled exposure is 1(mW/cm²) or 10 (W/m²).

The power density calculation is $S = (Pt / 4\pi r^2)$.

Where

Pt - The transmitted power (EIRP) (mW)

r - The distance from the unit. (cm)

The 1(mW/cm²) limit can be calculated from the above based on the following data:

Pt- the transmitted power which is equal to the output power (23.1-3) dBm plus external antenna gain 11.5 dBi . The maximum EIRP = 31.6 dBm = 1445 mW

Maximum allowed distance “r”, where RF exposure limits may not be exceeded, = $\text{SQRT}(1445/4\pi)$ and is more than 10.7 cm from the unit antenna.

Peak power density at worse case distance 20 cm is = $Pt/4\pi r^2 = 1.45 \text{ W}/4\pi * 0.2^2 = 2.89 \text{ W/m}^2$

That is less than 10 W/m² power density limit.

4.2 EUT test configuration

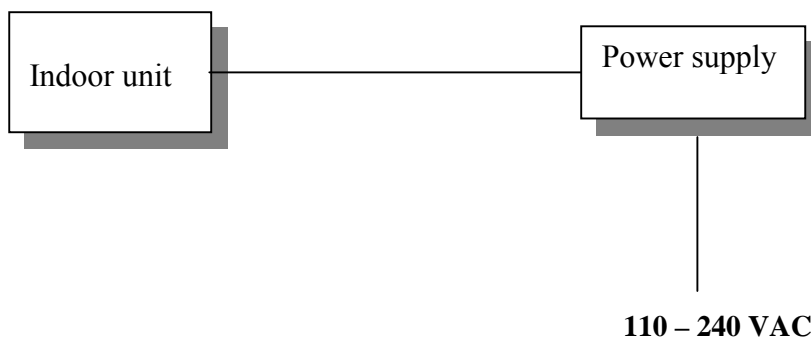


Fig. 1 Subscriber unit test setup.



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5. Test results

5.1 Transmitter characteristics

5.1.1 Occupied bandwidth according to § 2.1049

Method of measurement ANSI 63.4 §13.1.7
 Operating Frequency Range 2.305 – 2.320 GHz, 2.345 – 2.360 GHz
 Ambient Temperature 23⁰ C Relative Humidity 49% Air Pressure 1009 hPa

Carrier frequency MHz	Measured occupied bandwidth, MHz	Reference to plot number
2307.5	4.68	#1
2312.5	4.68	#2
2352.5	4.70	#3
2357.5	4.72	#4

TEST PROCEDURE

The measurements were performed in normal (transmitting) mode at all transmitted carrier (channel) frequencies of the 2.305 - 2.320 GHz and 2.345 – 2360 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	2	3				
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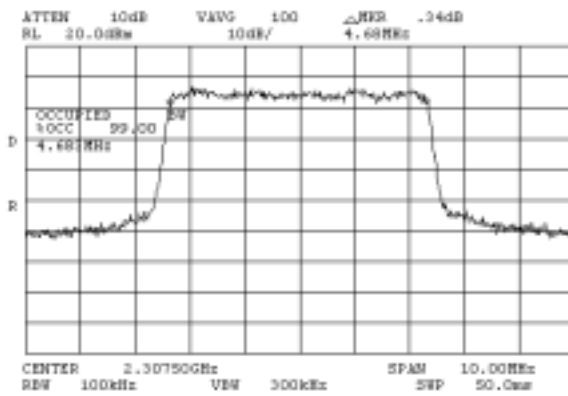
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Title: BreezeMax 2300 Broadband Wireless Access System

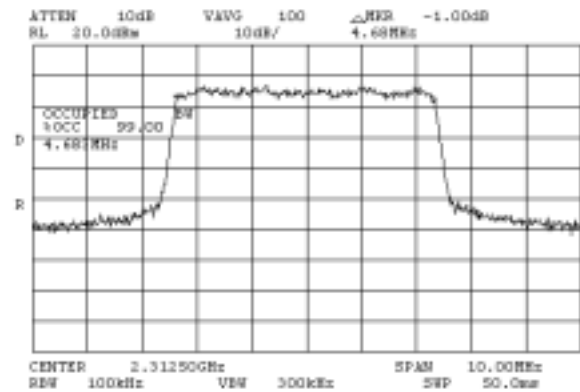
Model: BMAX-CPE- Si- E- 2.3

FCC ID: LKT-BMAX-SI23CR

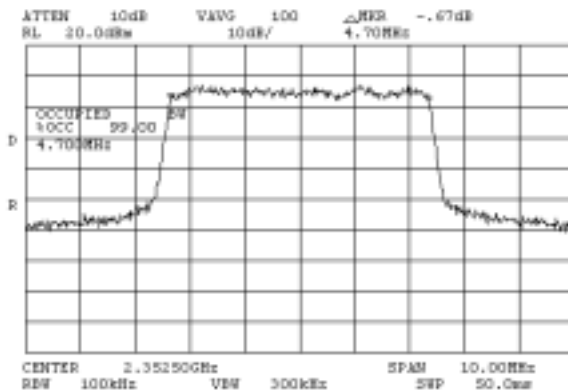
Occupied bandwidth test results.



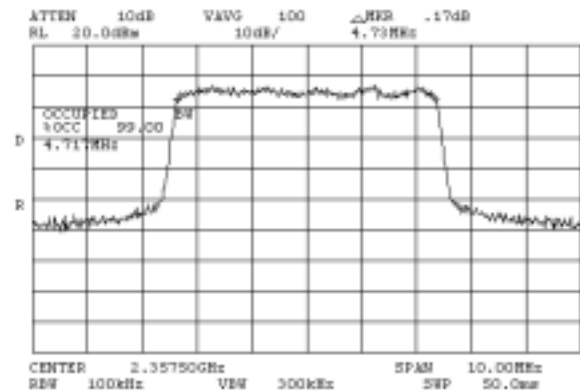
Plot # 1. Carrier Frequency 2307.5 MHz



Plot # 2. Carrier Frequency 2312.5 MHz



Plot # 3. Carrier Frequency 2352.5 MHz



Plot # 4. Carrier Frequency 2357.5 MHz



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5.1.2 Peak output power test § 27.50

Operating Frequency Range 2.305 – 2.320 GHz, 2.345 – 2.360 GHz
 Ambient Temperature 23⁰ C Relative Humidity 49% Air Pressure 1009 hPa

Carrier frequency MHz	Peak output power. dBm	Peak output power. (With external 11.5 dBi antenna gain) dBm	Reference to plot number
2307.5	22.9	31.4	#5
2312.5	23.1	31.6	#6
2352.5	23.1	31.6	#7
2357.5	22.9	31.4	#8

The following power limits apply to the 2305 – 2320 MHz and 2345 – 2360 MHz bands:
 Fixed, land, and radiolocation station transmitting are limited to 2000W (63 dBm) peak equivalent isotropically radiated power

TEST PROCEDURE

Calculation of measured output power with external antenna was performed as follows: Plot result + Ant. gain – 3 dB cable loss.

The measurements were performed in normal (transmitting) mode at all transmitted carrier (channel) frequencies of the 2.305 - 2.320 GHz and 2.345 – 2.360 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	2	3				
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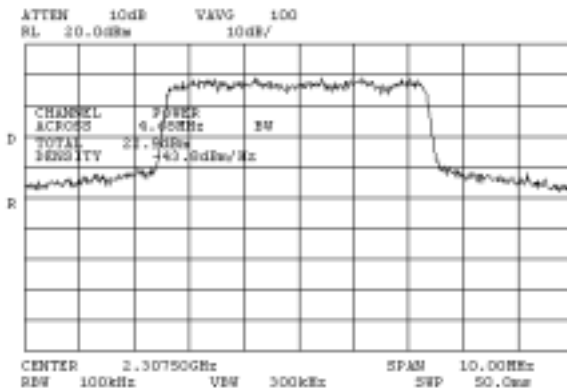
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Title: BreezeMax 2300 Broadband Wireless Access System

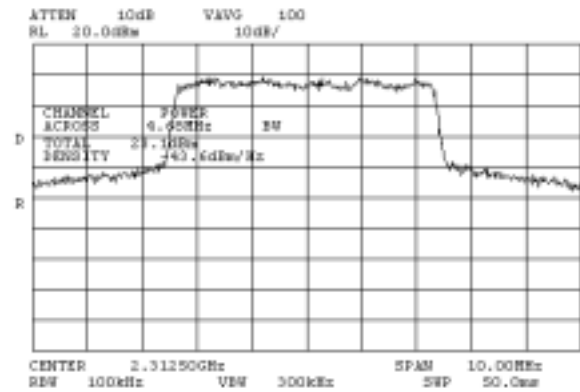
Model: BMAX-CPE- Si- E- 2.3

FCC ID: LKT-BMAX-SI23CR

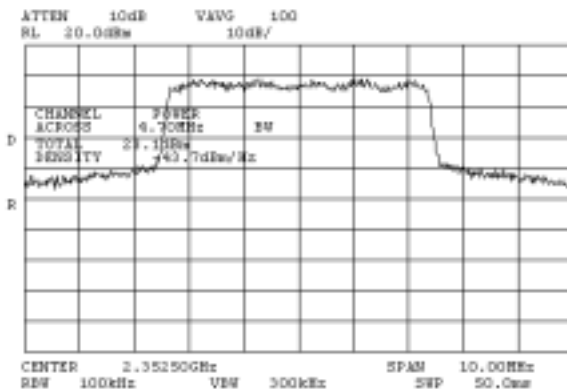
Peak output power test results.



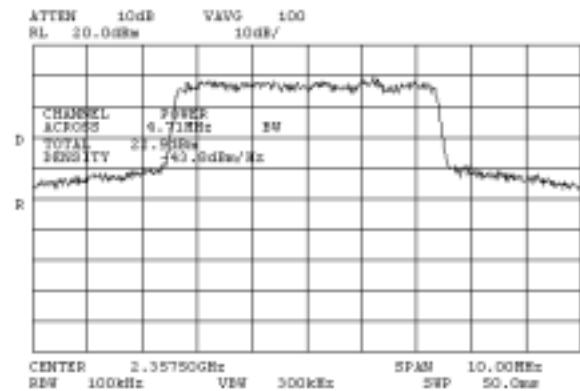
Plot # 5. Carrier Frequency 2307.5 MHz



Plot # 6. Carrier Frequency 2312.5 MHz



Plot # 7. Carrier Frequency 2352.5 MHz



Plot # 8. Carrier Frequency 2357.5 MHz

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Operating Frequency Range 2.305 – 2.320 GHz, 2.345 – 2.360 GHz
 Ambient Temperature 23⁰ C Relative Humidity 49% Air Pressure 1009 hPa

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 peak mode more than 20 dB lower than the specified limit were not recorded in the tables.

Carrier frequency – 2307.5 MHz.

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
2299.5	-51.9	-40	11.9	#12
2305.0	-21.3	-13	8.3	#14
2310.0	-23.8	-13	10.8	#16
2320.0	-51.4	-50	1.4	#18

Carrier frequency – 2312.5 MHz.

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
2309.5	-23.5	-13	-10.5	#26
2315	-29.8	-13	-16.8	#28
2320	-51.9	-50	-1.9	#30
8053	-61.6.0	-40	-21.6	#33

Carrier frequency – 2352.5 MHz.

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
2298	-48.0	-40	-8.0	#36
2320	-52.3	-50	-2.3	#39
2350	-24.8	-13	-11.8	#41
2355	-30.4	-13	-17.4	#43



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Carrier frequency – 2357.5 MHz.

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
2300	-48.3	-40	-8.3	#48
2344	-52.5	-50	-2.5	#51
2355	-24.9	-13	-11.9	#53

Measured results not noted in the tables above presented;

In 5 – 2300 MHz band present in plots ## 9, 10; ## 23, 24; ## 35, 36; ## 47, 48

In 2300 – 2320 MHz band present in plots ## 37, 49

In 2345 - 2360 MHz band present in plots ## 19, 31,

In 2370 – 24000 MHz band present in plots ## 20 - 22; ## 32 – 34; ## 44 – 46, ## 54 - 56

LIMIT

For operation in the bands 2305 –2320 MHz and 2345 – 2360 MHz, the power of any emissions outside the licensee’s frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by the following amounts:

Below 2300 MHz and above 2370 MHz by factor not less then $70+10\log(P)$ dB - -40 dBm

On all frequencies from 2300 to 2320 MHz and 2345 to 2370 MHz by factor not less then $43+10\log(P)$ dB - -13 dBm.

On all frequencies from 2320 to 2345 MHz by factor not less then $80+10\log(P)$ dB - -50 dBm.

TEST PROCEDURE

The measurements were performed in normal (transmitting) mode at all transmitted carrier (channel) frequencies of the 2305 - 2320 MHz and 2345 -2360 MHz 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	2	3	9			
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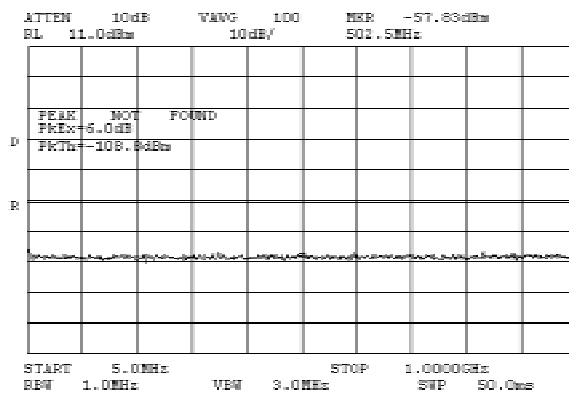
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Model: BMAX-CPE- Si- E- 2.3

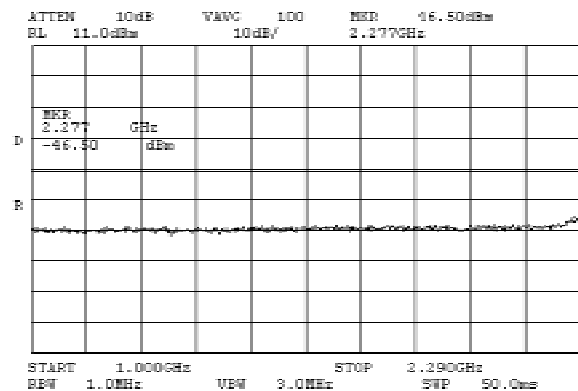
FCC ID: LKT-BMAX-SI23CR

Spurious emissions at antenna terminal test results.

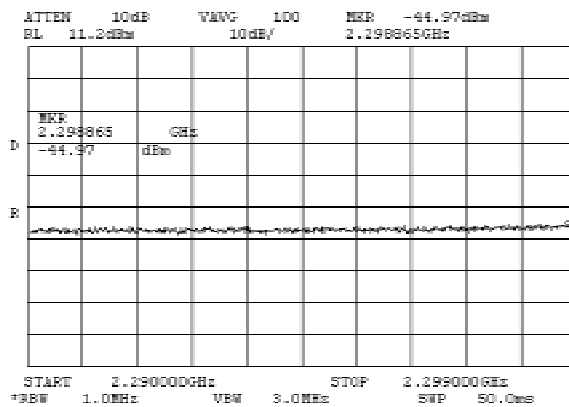
Frequency carrier 2307.5 MHz.



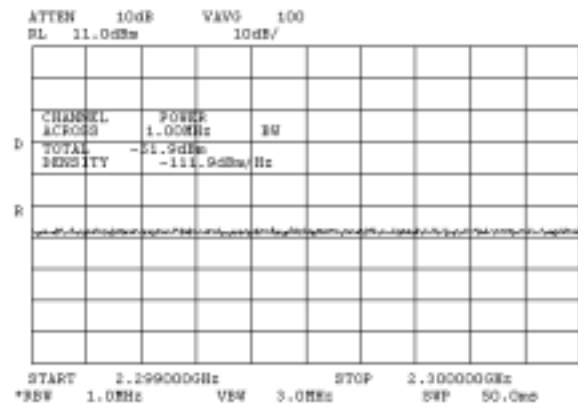
Plot # 9



Plot # 10



Plot # 11



Plot # 12.

Used external attenuator = 20 dB
Cable loss = 1.2 dB.



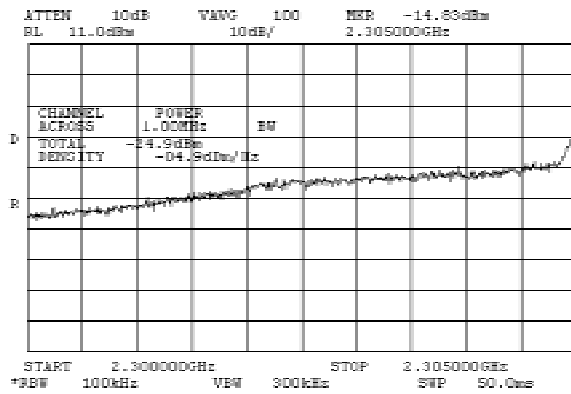
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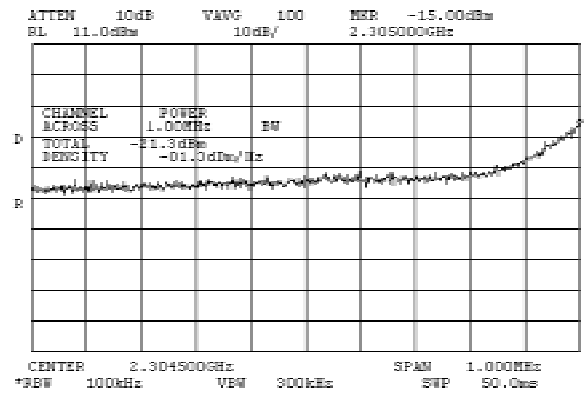
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Model: BMAX-CPE- Si- E- 2.3

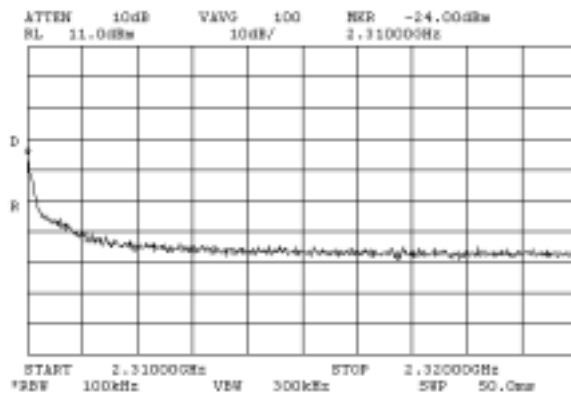
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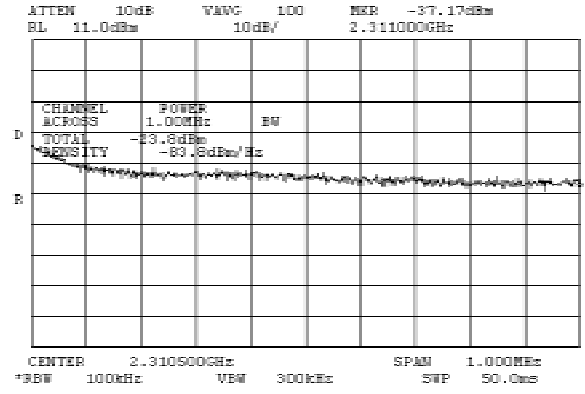
Plot # 13



Plot # 14



Plot # 15.



Plot # 16



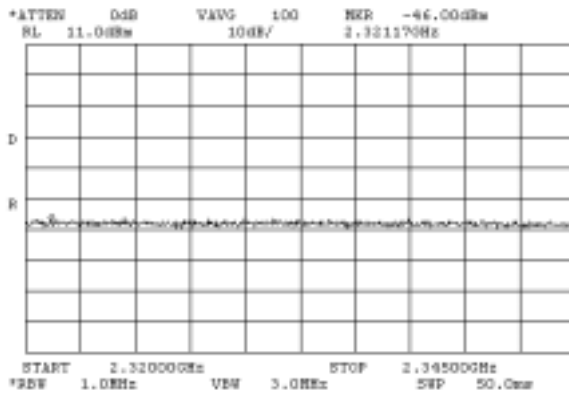
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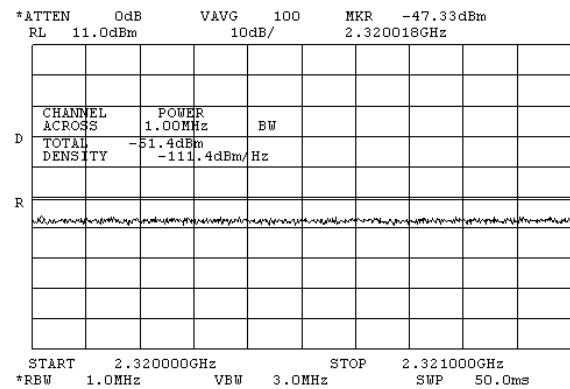
Title: BreezeMax 2300 Broadband Wireless Access System

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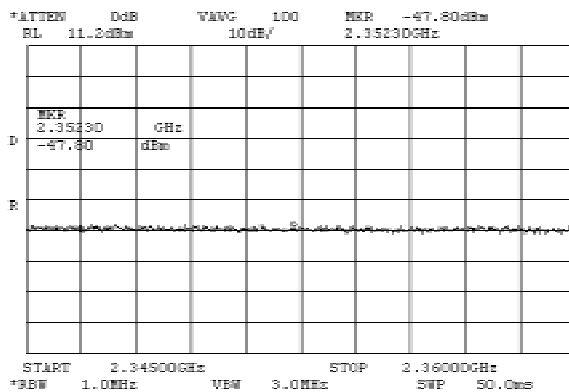
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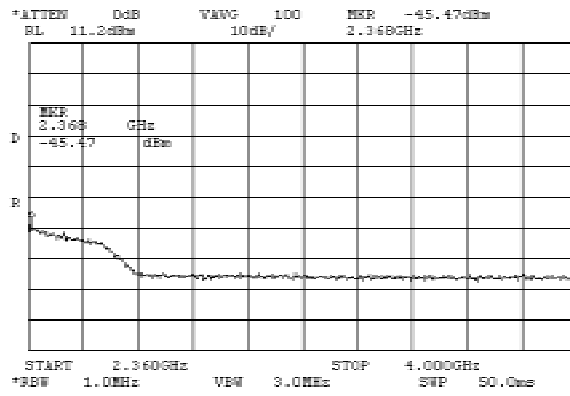
Plot # 17.



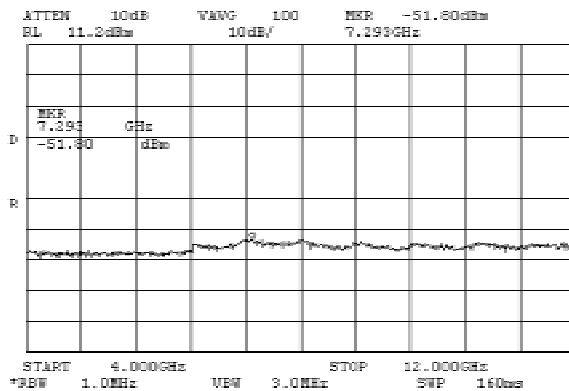
Plot # 18



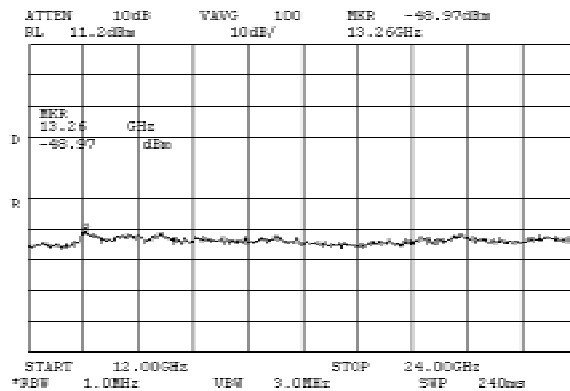
Plot # 19



Plot # 20



Plot # 21



Plot # 22



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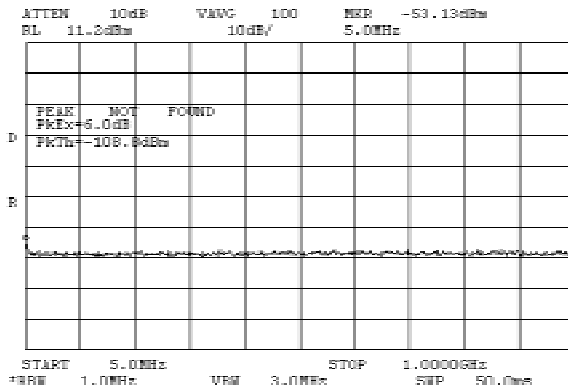
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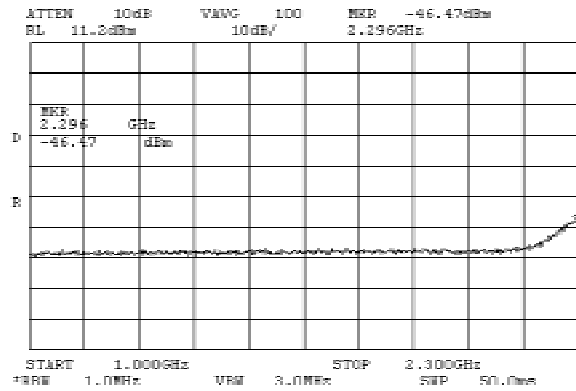
Model: BMAX-CPE- Si- E- 2.3

FCC ID: LKT-BMAX-SI23CR

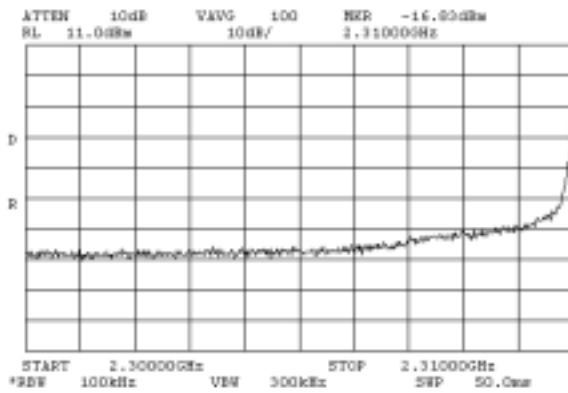
Frequency carrier 2312.5 MHz.



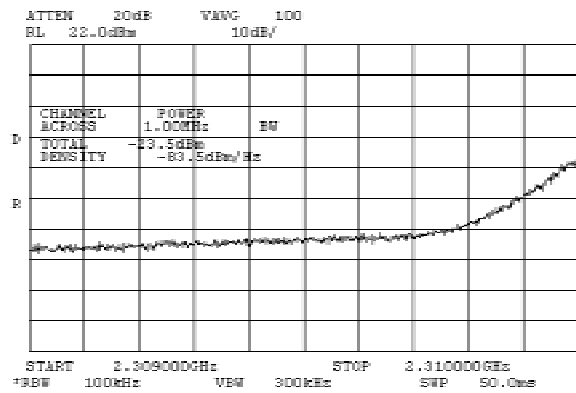
Plot # 23



Plot # 24.



Plot # 25.



Plot # 26



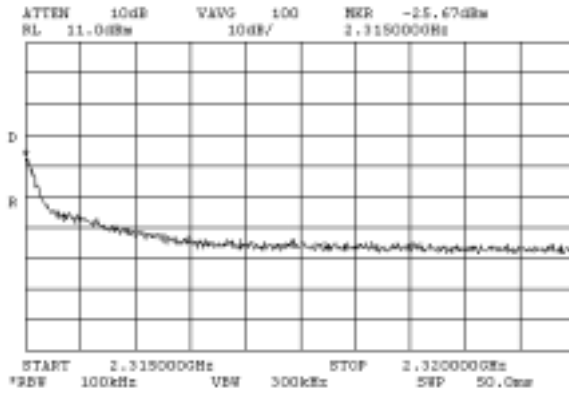
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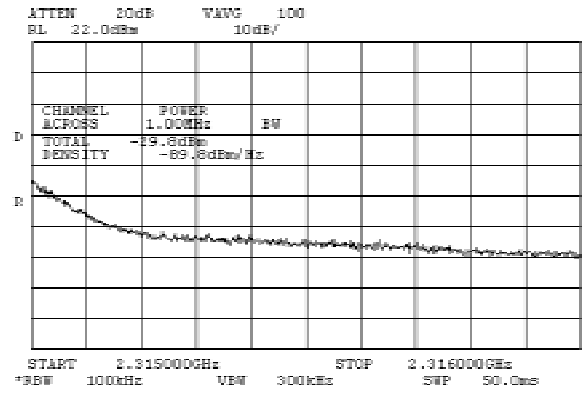
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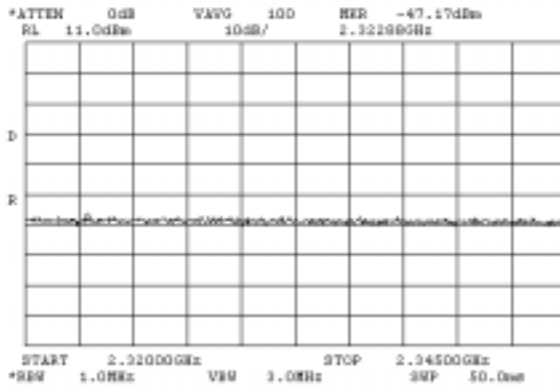
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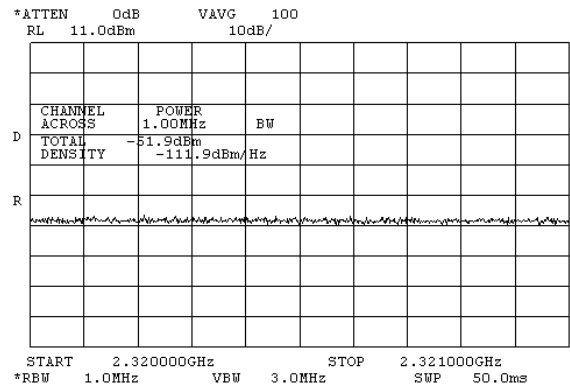
Plot # 27.



Plot # 28.



Plot # 29.



Plot # 30



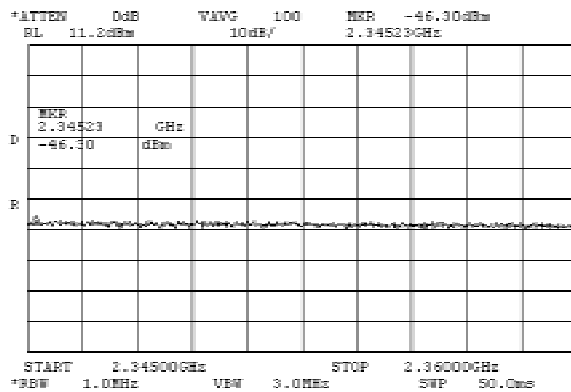
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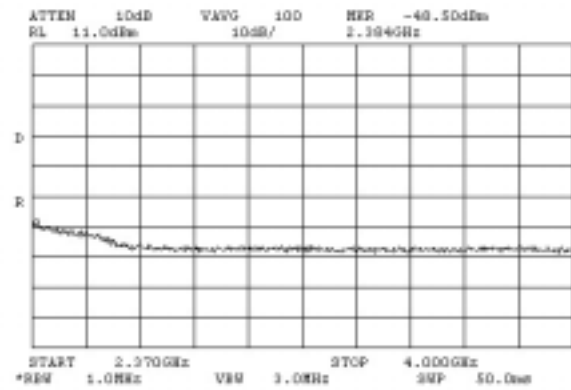
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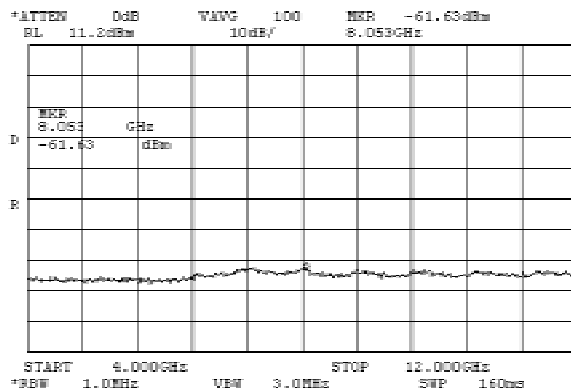
FCC ID: LKT-BMAX-SI23CR



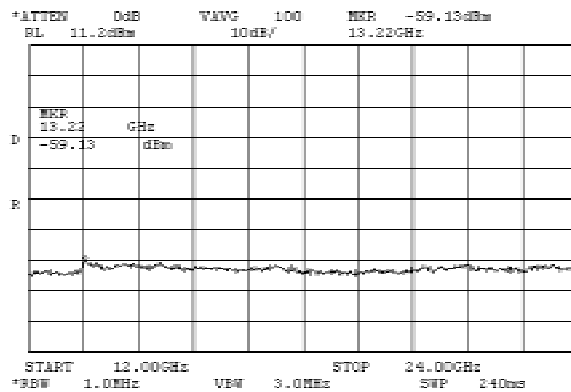
Plot # 31.



Plot # 32.



Plot # 33.



Plot # 34



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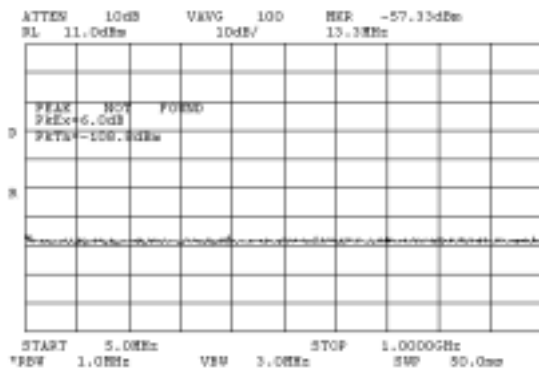
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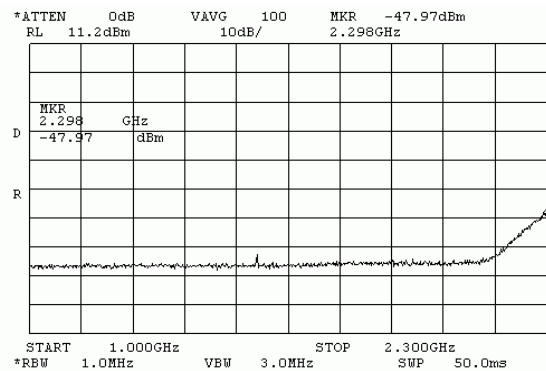
Model: BMAX-CPE- Si- E- 2.3

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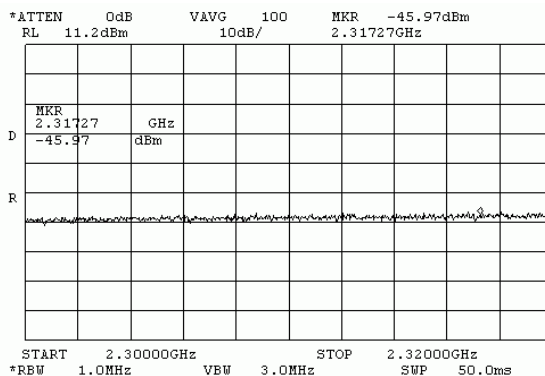
Frequency carrier 2352.5 MHz



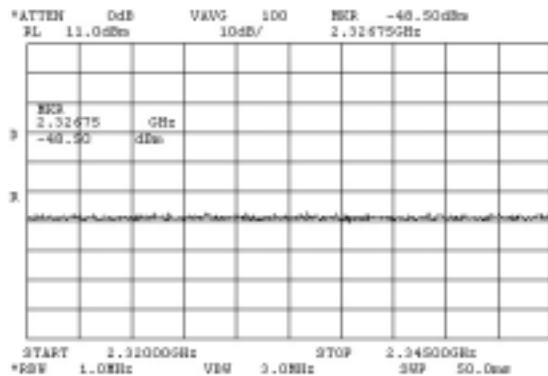
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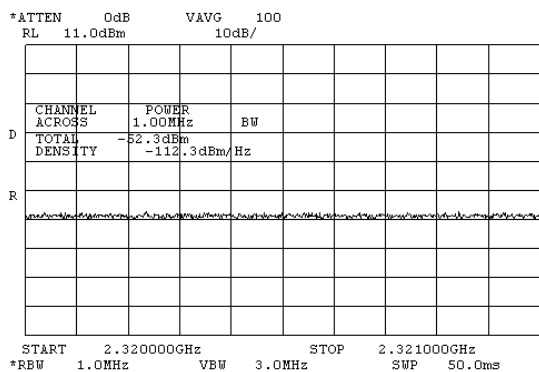
Plot # 36.



Plot # 37



Plot # 38



Plot # 39



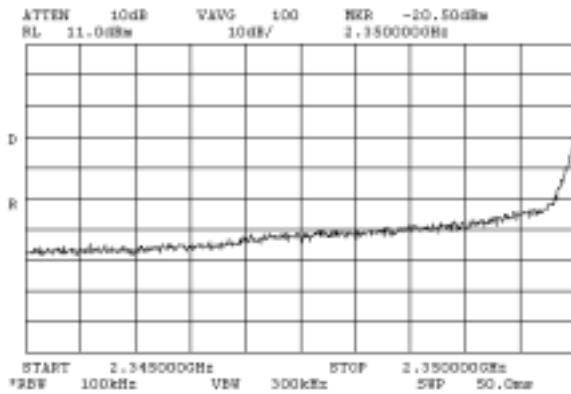
Test report No: 8712353771

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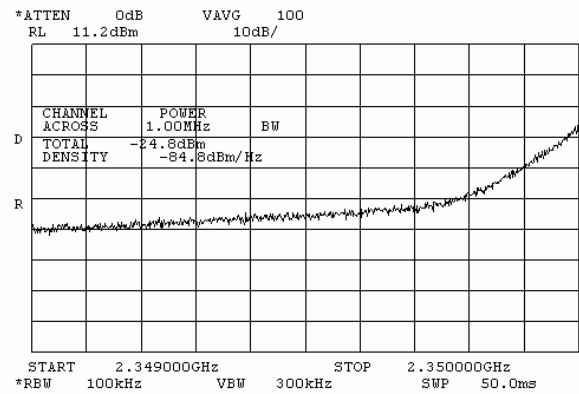
Title: BreezeMax 2300 Broadband Wireless Access System

Model: BMAX-CPE- Si- E- 2.3

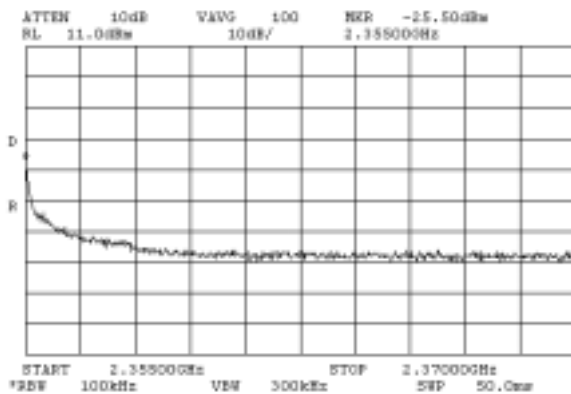
FCC ID: LKT-BMAX-SI23CR



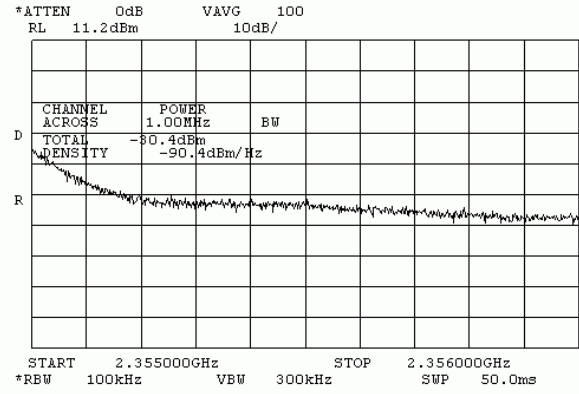
Plot # 40



Plot # 41



Plot # 42.



Plot # 43



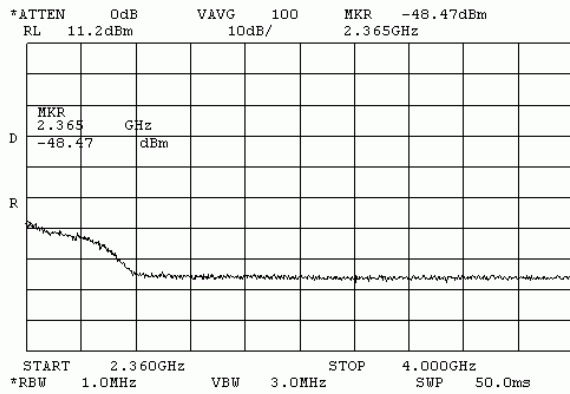
Test report No: 8712353771

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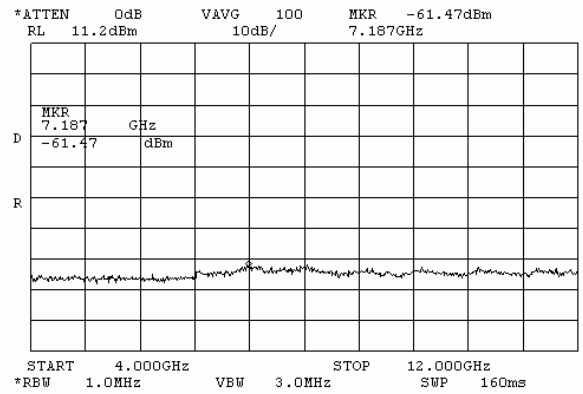
Title: BreezeMax 2300 Broadband Wireless Access System

Model: BMAX-CPE- Si- E- 2.3

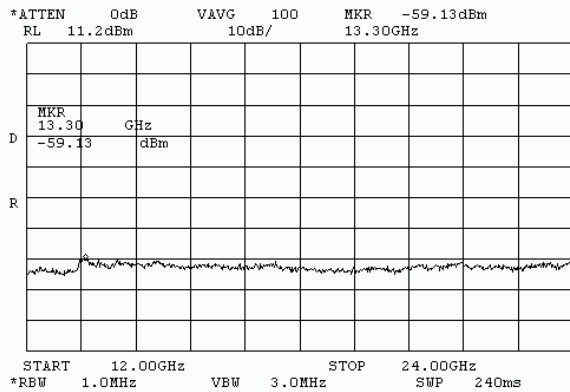
FCC ID: LKT-BMAX-SI23CR



Plot # 44



Plot # 45



Plot # 46



Test report No: 8712353771

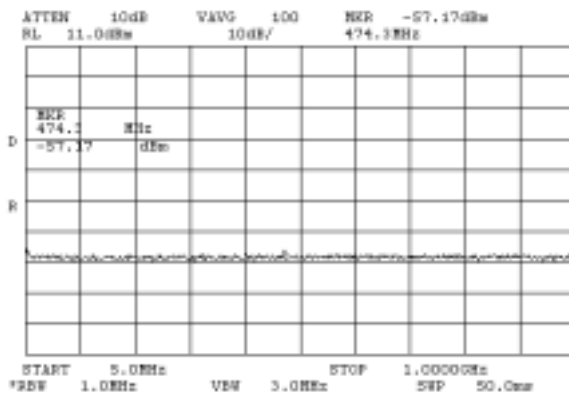
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Title: BreezeMax 2300 Broadband Wireless Access System

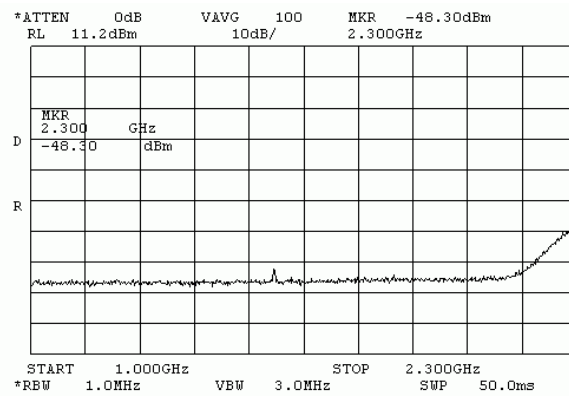
Model: BMAX-CPE- Si- E- 2.3

FCC ID: LKT-BMAX-SI23CR

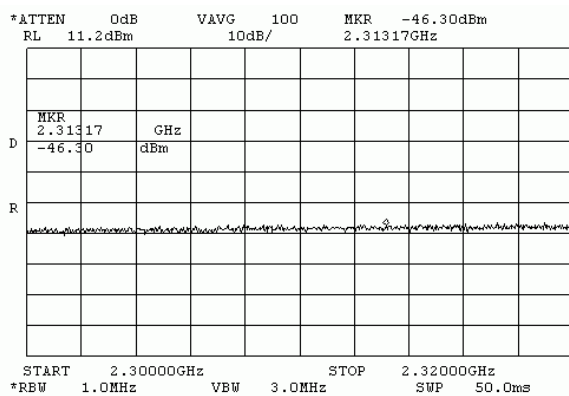
Frequency carrier 2357.5 MHz



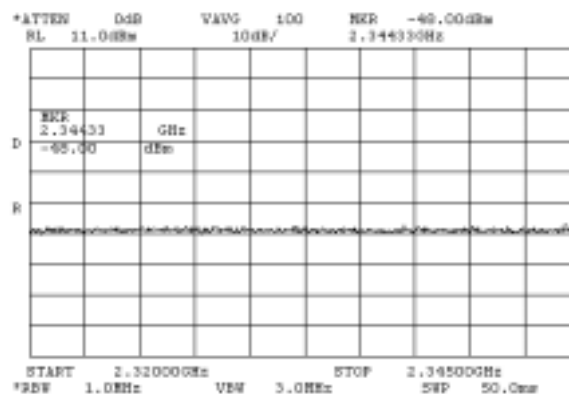
Plot # 47



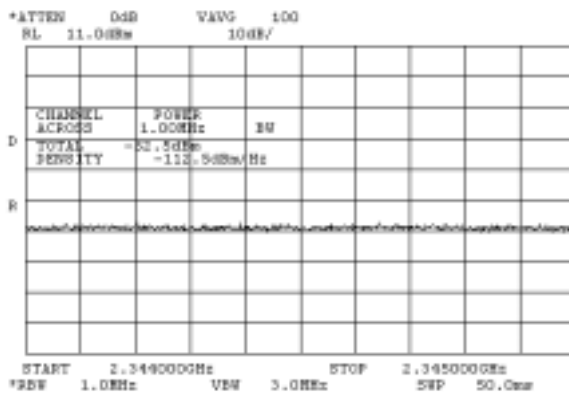
Plot # 48



Plot # 49



Plot # 50.



Plot # 51.



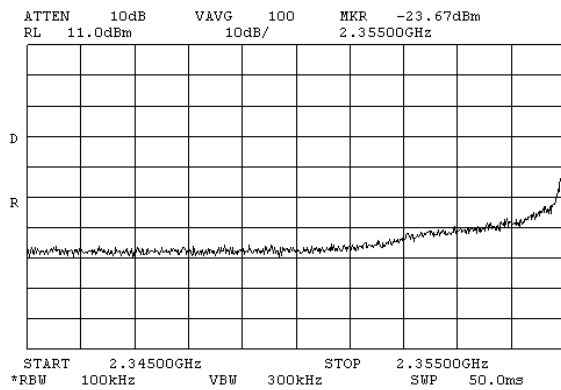
Test report No: 8712353771

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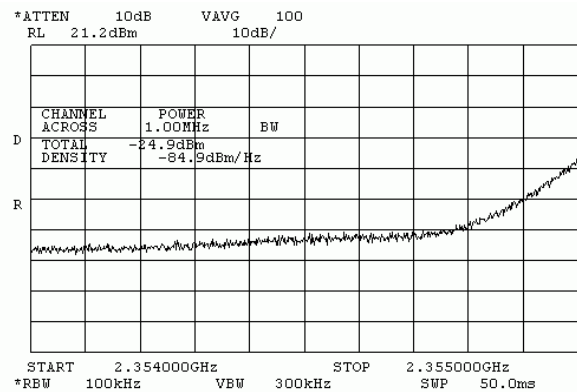
Title: BreezeMax 2300 Broadband Wireless Access System

Model: BMAX-CPE- Si- E- 2.3

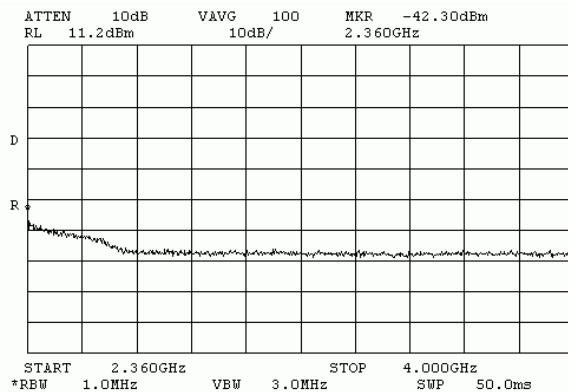
FCC ID: LKT-BMAX-SI23CR



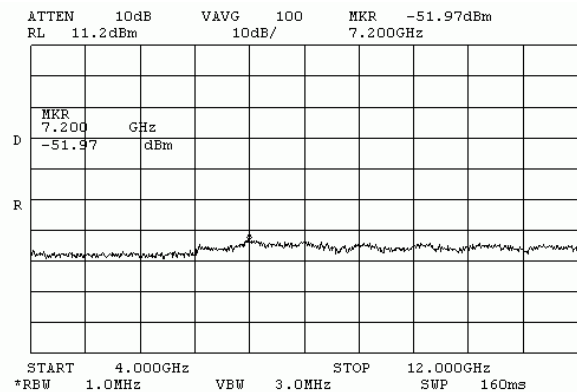
Plot # 52



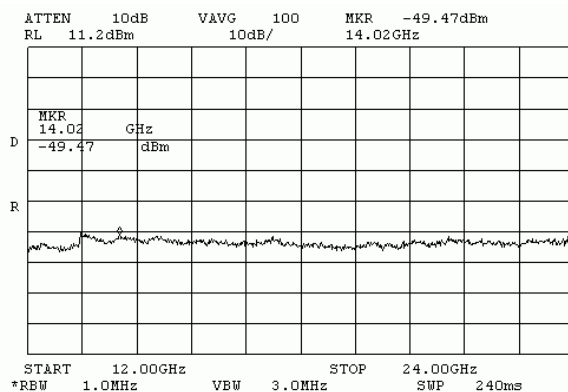
Plot # 53



Plot # 54



Plot # 55



Plot # 56

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Title: BreezeMax 2300 Broadband Wireless Access System

Model: BMAX-CPE- Si- E- 2.3

FCC ID: LKT-BMAX-SI23CR

5.1.4 Radiated emissions according to §§ 2.1053, 27.53

Operating Frequency Range 2.305 – 2.320 GHz, 2.345 – 2.360 GHz
 Ambient Temperature 23⁰ C Relative Humidity 49% Air Pressure 1009 hPa

Carrier frequency = 2307.5 MHz

Frequency, MHz	Radiated emissions, dBm/dB (µV/m)	Limit, dBm/dB (µV/m)	Margin, dB	Note	Reference to Plot number
2305	-35.9/59.3	-13/82.2	22.9		#60
2310	-37.3/57.9	-13/82.2	24.3		#62
2331	-63.7/31.5	-50/45.2	13.7		#63
15120	21.1	-40/65.2@1m		Noise floor	#66

Carrier frequency = 2312.5 MHz

Frequency, MHz	Radiated emissions, dBm/dB (µV/m)	Limit, dBm/dB (µV/m)	Margin, dB	Note	Reference to Plot number
2310	-36.4/58.8	-13/82.2	23.4		#70
2315	-37.0/58.2	-13/82.2	24.0		#72
2330	-64.4/30.8	-50/45.2	14.4		#73
15120	21.0	-40/65.2@1m		Noise floor	#76

Carrier frequency = 2352.5 MHz

Frequency, MHz	Radiated emissions, dBm/dB (µV/m)	Limit, dBm/dB (µV/m)	Margin, dB	Note	Reference to Plot number
2343	-64.4/30.8	-50/45.2	14.4		#80
2350	-34.2/61.0	-13/82.2	21.2		#82
2355	-36.2/59.0	-13/82.2	23.2		#84
23780	22.1	-40/65.2@1m	-	Noise floor	#86

**Test report No: 8712353771****Page 24 of 46 Pages****Title: BreezeMax 2300 Broadband Wireless Access System****Model: BMAX-CPE- Si- E- 2.3****FCC ID: LKT-BMAX-SI23CR****Carrier frequency = 2357.5 MHz**

Frequency, MHz	Radiated emissions, dBm/dB (μ V/m)	Limit, dBm/dB (μ V/m)	Margin, dB	Note	Reference to Plot number
2330.7	-65.1/30.1	-50/45.2	15.1		#90
2355	-34.3/60.9	-13/82.2	21.3		#92
2360	-36.1/59.1	-13/82.2	23.1		#94
23430	22.0	-40/65.2@1m	-	Noise floor	#96

Measured results not noted in the tables above presented:

In 5 – 2300 MHz band present in plots ## 57, 58; ## 67, 68; ## 77, 78; ## 87, 88

In 2300 – 2320 MHz band present in plots ## 79, 89

In 2345 - 2370 MHz band present in plots ## 64, 74,

In 2370 – 24000 MHz band present in plots # 65, # 75; # 85, # 95

TEST PROCEDURE

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 more than 20 dB lower than the specified limit were not recorded in the tables. For the test results refer to the tables and plots in this section.

Substitution method.

The measurements were performed according to ANSI/TIA-603-C-2004 section 2.2.12 test method. Investigation of transmitter spurious emissions was performed. EUT was replaced by generator and substitution antenna. Level calculated from generator output level, substitution antenna gain and connected cable loss was compared with the limit. Transmitter was operated with internal antenna in 4 carrier frequencies 2307.5 MHz; 2312.5 MHz; 2352.5 MHz and 2357.5 MHz.

LIMIT

Any emissions outside the licensee's frequency band(s) of operation shall be attenuated:

Below 2300 MHz and above 2370 MHz by factor not less than $70+10 \log(P)$ dB = -40 dBm@ 55.2 dB μ V/m at 3m distance. On all frequencies from 2300 to 2320 MHz and 2345 to 2370 MHz by factor not less than $43+10\log(P)$ dB = -13 dBm@ 82.2 dB μ V/m at 3m distance. On all frequencies from 2320 to 2345 MHz by factor not less than $80+10\log(P)$ dB - -50 dBm@ 45.2 dB μ V/m at 3m distance.

TEST EQUIPMENT USED:

1	3	4	5	6	12	
---	---	---	---	---	----	--



Test report No: 8712353771

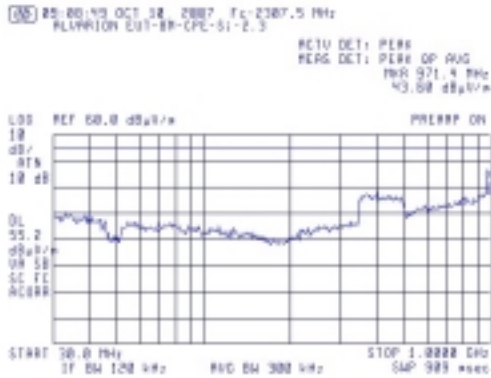
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Title: BreezeMax 2300 Broadband Wireless Access System

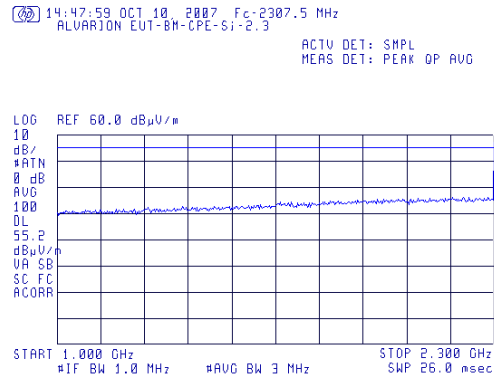
Model: BMAX-CPE- Si- E- 2.3

FCC ID: LKT-BMAX-SI23CR

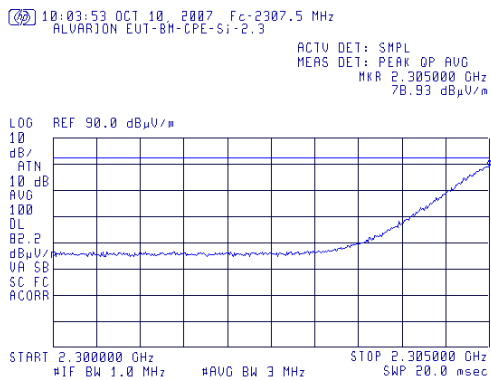
Frequency carrier 2307.5 MHz.



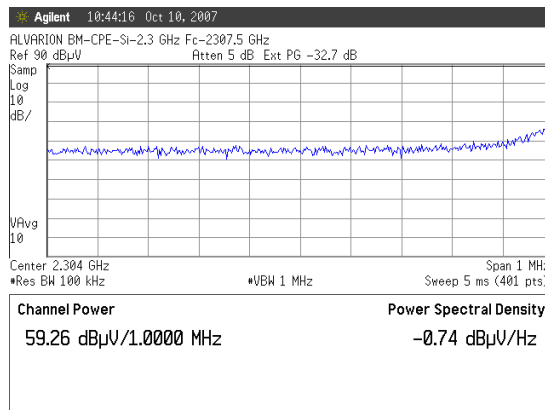
Plot # 57



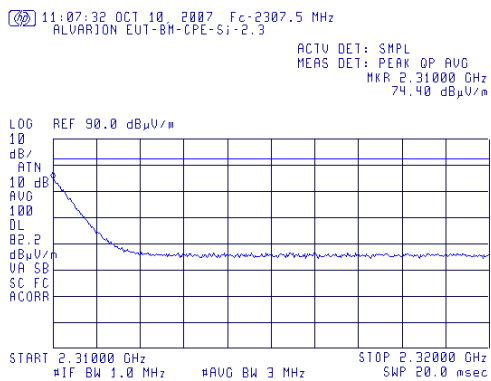
Plot # 58



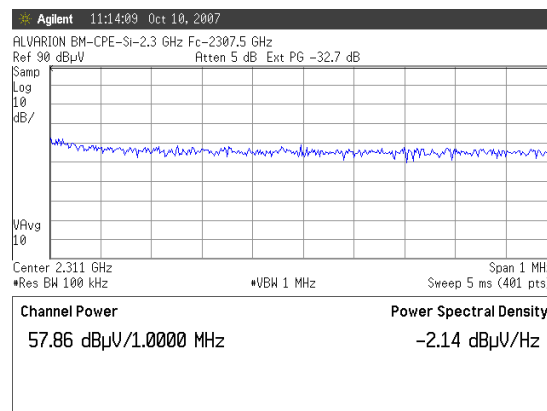
Plot # 59



Plot # 60



Plot # 61



Plot # 62



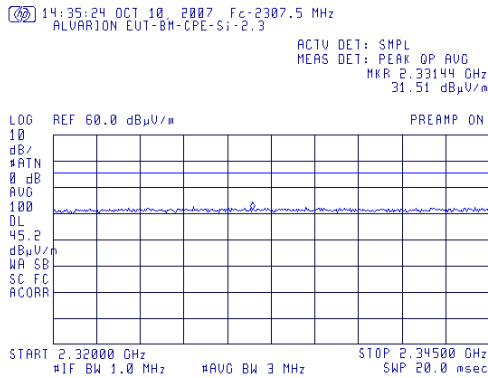
Test report No: 8712353771

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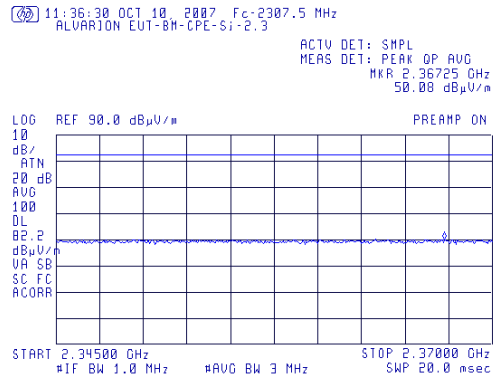
Title: BreezeMax 2300 Broadband Wireless Access System

Model: BMAX-CPE- Si- E- 2.3

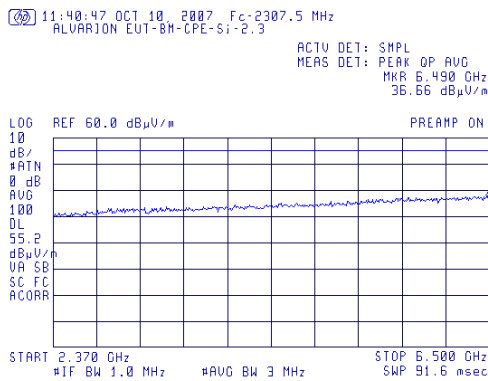
FCC ID: LKT-BMAX-SI23CR



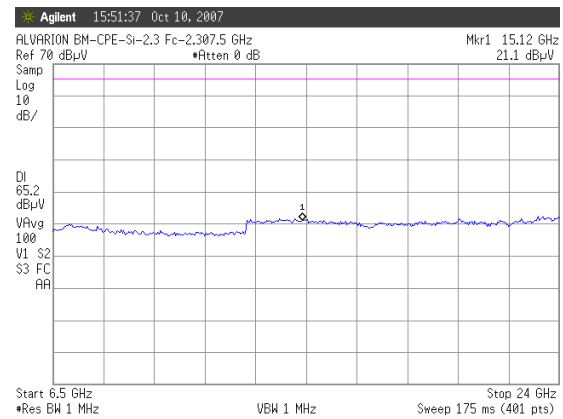
Plot # 63



Plot # 64



Plot # 65



Plot # 66



Test report No: 8712353771

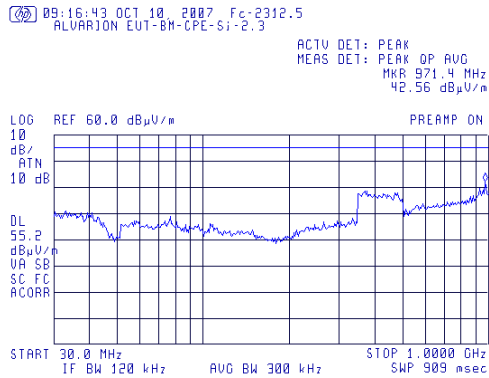
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Title: BreezeMax 2300 Broadband Wireless Access System

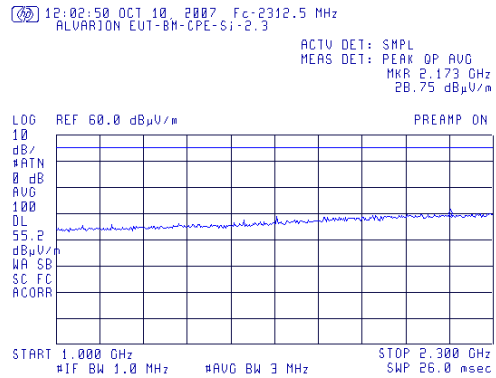
Model: BMAX-CPE- Si- E- 2.3

FCC ID: LKT-BMAX-SI23CR

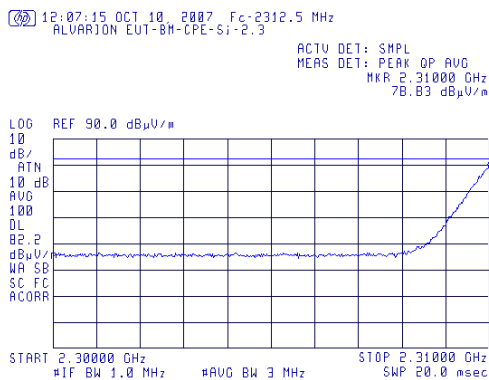
Frequency carrier 2312.5 MHz.



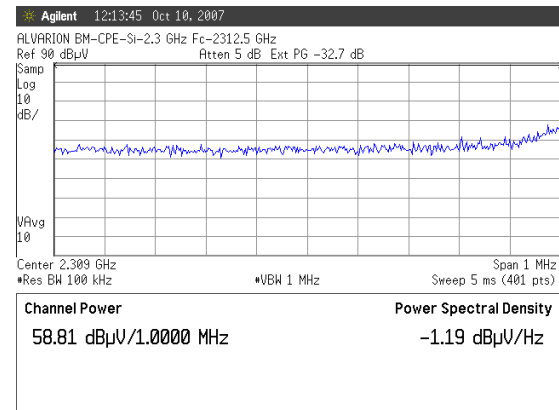
Plot # 67



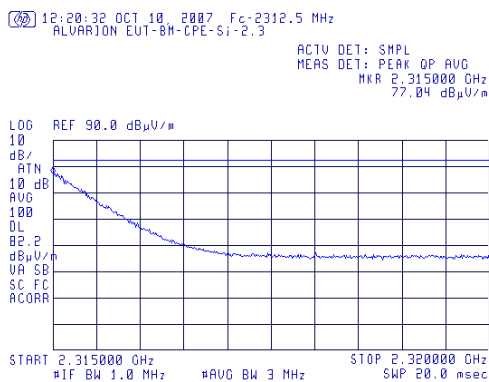
Plot # 68



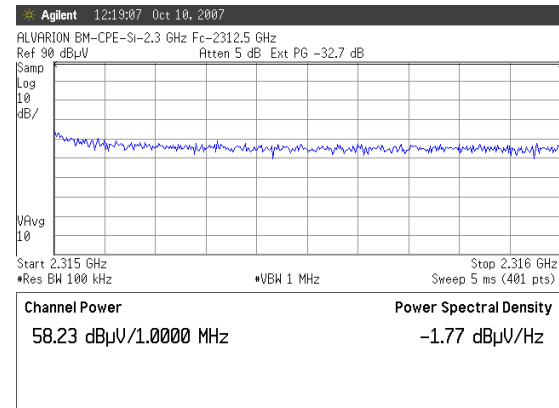
Plot # 69



Plot # 70



Plot # 71



Plot # 72



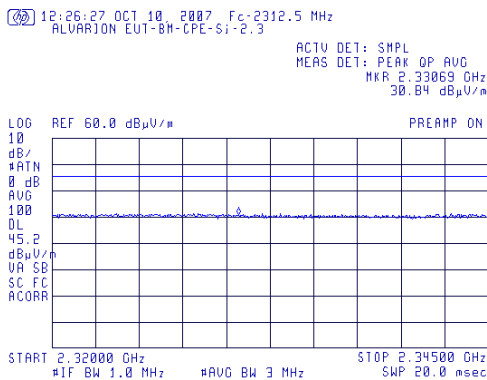
Test report No: 8712353771

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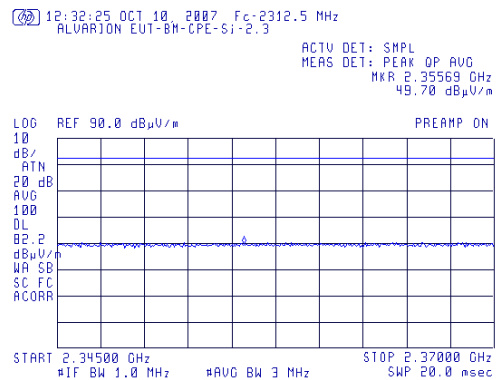
Title: BreezeMax 2300 Broadband Wireless Access System

Model: BMAX-CPE- Si- E- 2.3

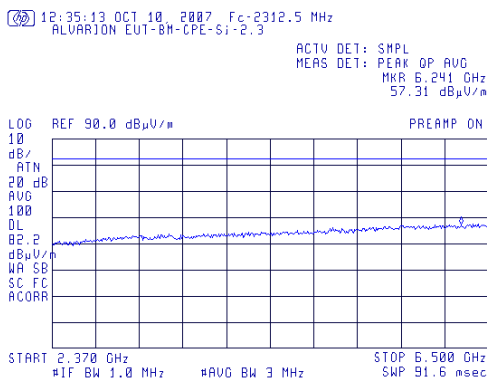
FCC ID: LKT-BMAX-SI23CR



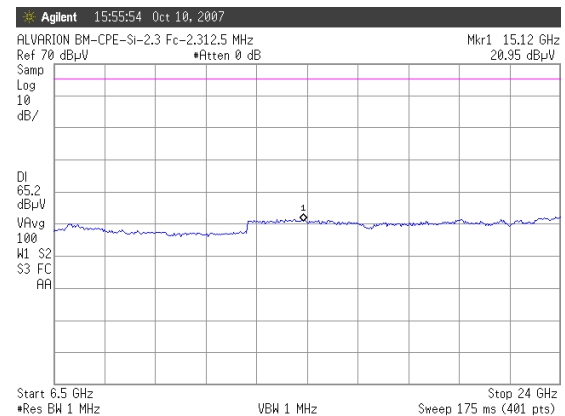
Plot # 73



Plot # 74



Plot # 75



Plot # 76



Test report No: 8712353771

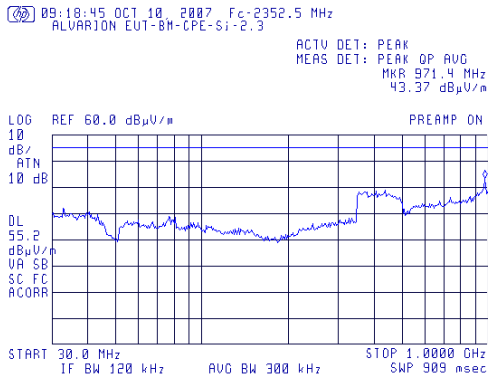
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Title: BreezeMax 2300 Broadband Wireless Access System

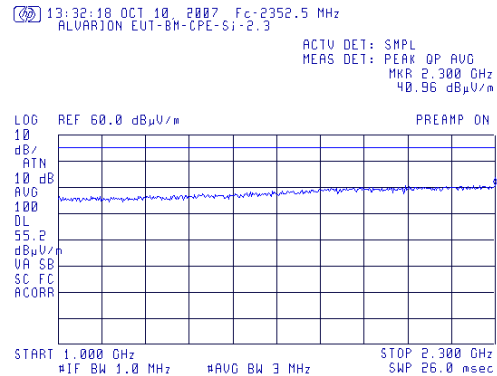
Model: BMAX-CPE- Si- E- 2.3

FCC ID: LKT-BMAX-SI23CR

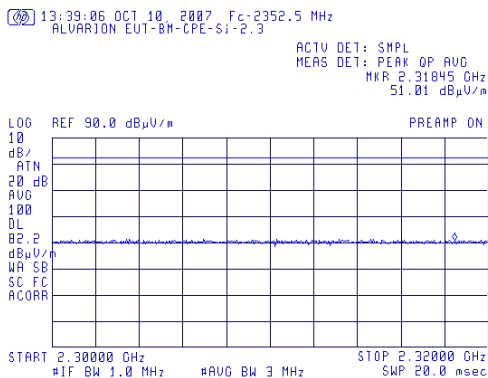
Frequency carrier 2352.5 MHz



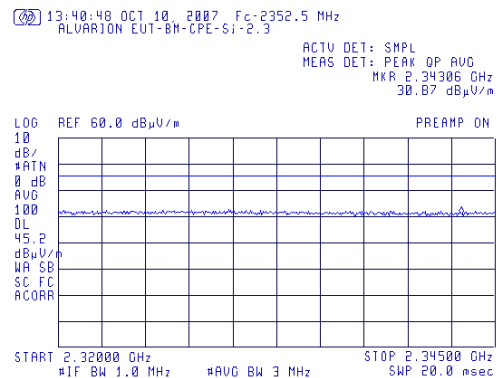
Plot # 77



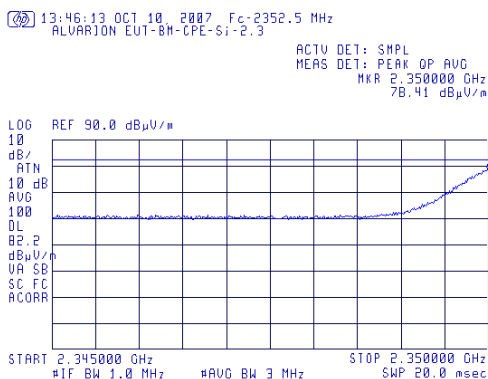
Plot # 78



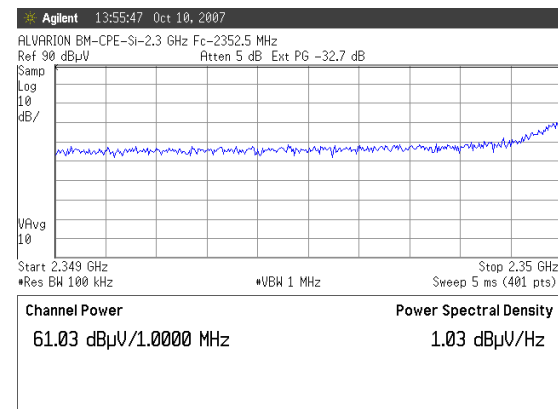
Plot # 79



Plot # 80



Plot # 81



Plot # 82



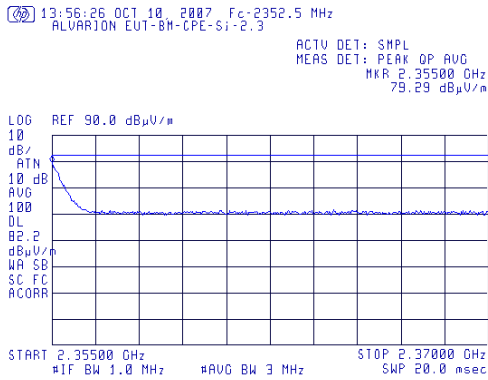
Test report No: 8712353771

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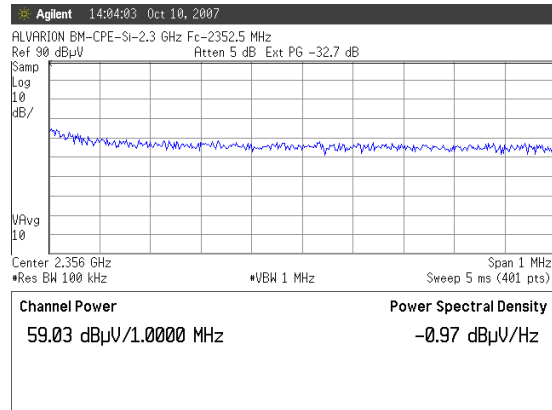
Title: BreezeMax 2300 Broadband Wireless Access System

Model: BMAX-CPE- Si- E- 2.3

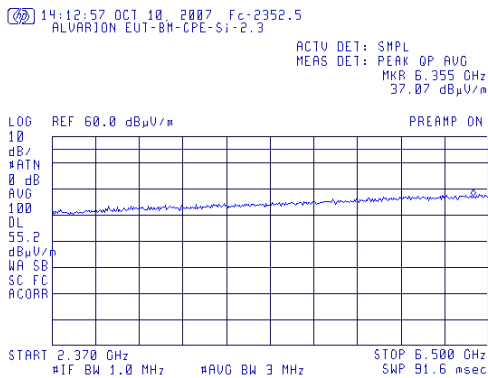
FCC ID: LKT-BMAX-SI23CR



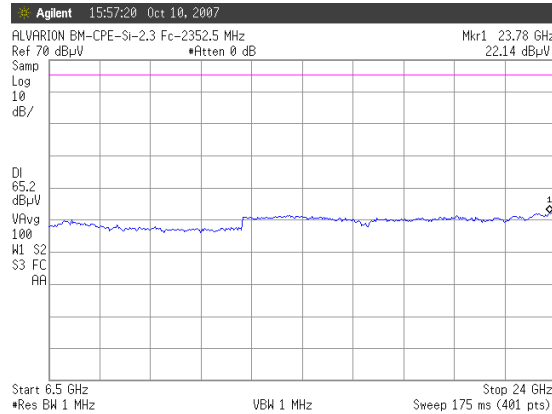
Plot # 83



Plot # 84



Plot # 85



Plot # 86



Test report No: 8712353771

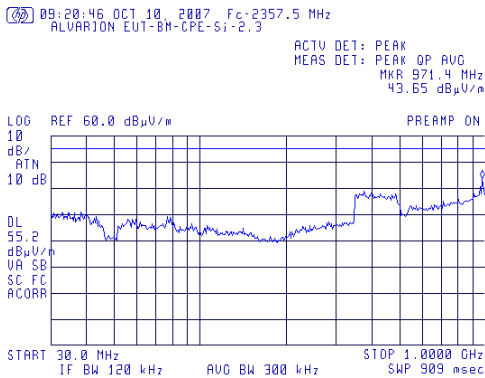
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Title: BreezeMax 2300 Broadband Wireless Access System

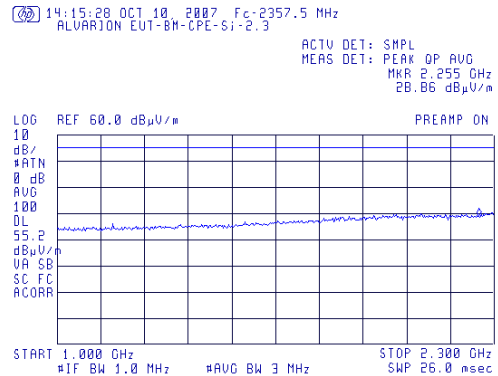
Model: BMAX-CPE- Si- E- 2.3

FCC ID: LKT-BMAX-SI23CR

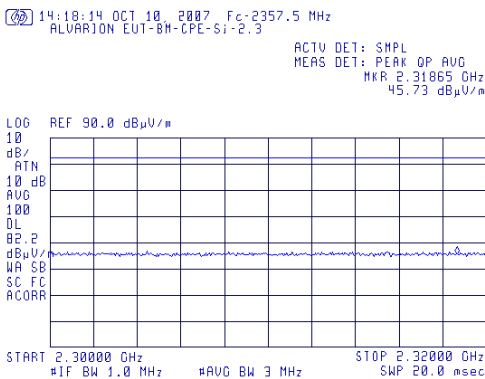
Frequency carrier 2357.5 MHz



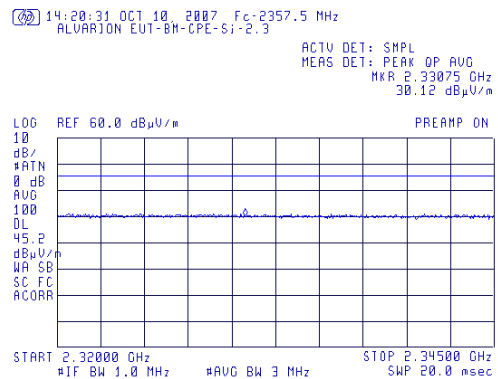
Plot # 87



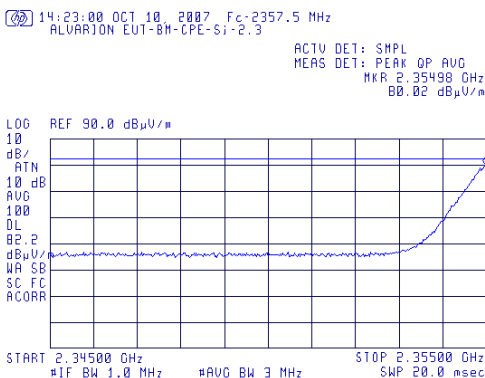
Plot # 88



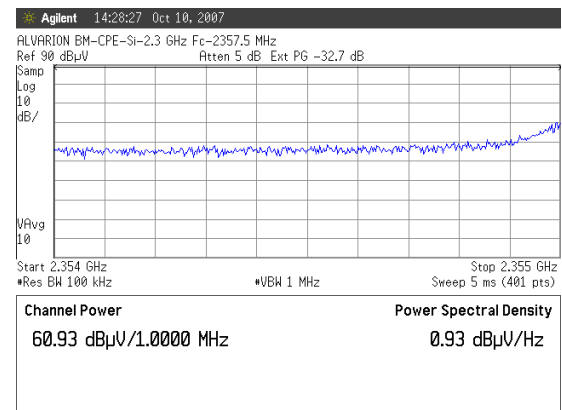
Plot # 89



Plot # 90



Plot # 91



Plot # 92



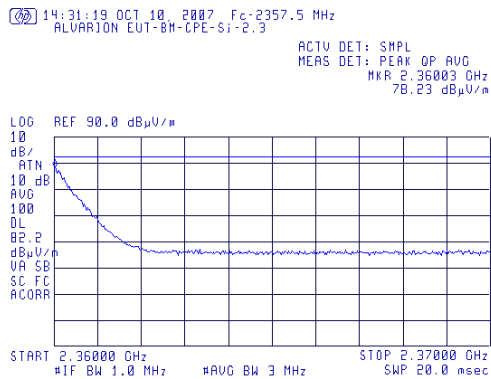
Test report No: 8712353771

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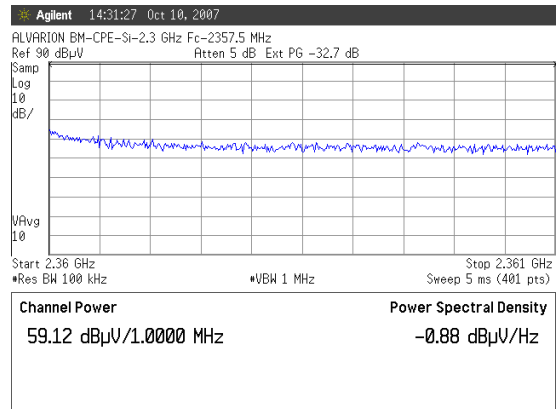
Title: BreezeMax 2300 Broadband Wireless Access System

Model: BMAX-CPE- Si- E- 2.3

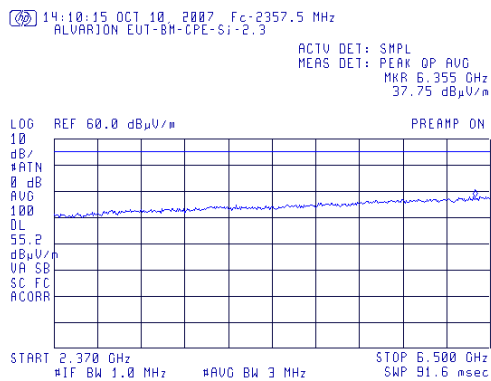
FCC ID: LKT-BMAX-SI23CR



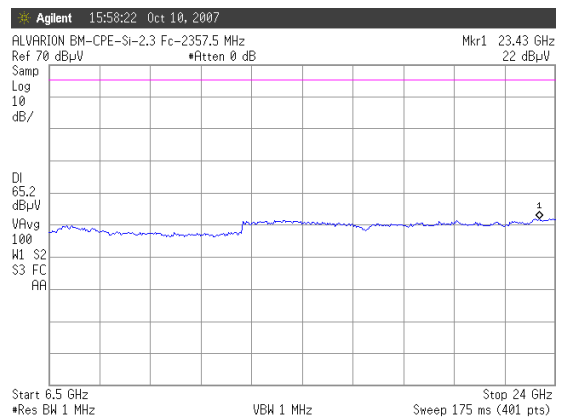
Plot # 93



Plot # 94



Plot # 95



Plot # 96



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Title: BreezeMax 2300 Broadband Wireless Access System	
Model: BMAX-CPE- Si- E- 2.3	FCC ID: LKT-BMAX-SI23CR

5.1.5 Frequency stability test according to § 27.54

Operating Frequency Range 2.305 – 2.320 GHz, 2.345 – 2.360 GHz
 Ambient Temperature 23⁰ C Relative Humidity 49% Air Pressure 1009 hPa

TEST CONDITIONS		Carrier frequency, 2307.5 MHz	Carrier frequency, 2357.5 MHz
Test temperature	Test voltage(AC)		
+25°C	Vmin (97.75)	2.307481070	2.357478300
	Vmax (132.25)	2.307480000	2.357478800
-5°C	Vnom (115)	2.307494920	2.357494270
+5°C	Vnom (115)	2.307492000	2.357491290
+15°C	Vnom (115)	2.307488800	2.357488300
+25°C	Vnom (115)	2.307480710	2.357480440
+35°C	Vnom (115)	2.307476570	2.357475640
+45°C	Vnom (115)	2.307472320	2.357471600

TEST PROCEDURE

The EUT was placed in a climatic chamber and allowed to stabilize at 25°C temperature and nominal voltage for at list 15 min. The reference carrier frequency was taken. The input voltage was changed from 85% of nominal to 115%. Frequency changes were noted. The temperature in climatic chamber was varied from -5°C to +45°C. Measured frequencies were noted in table above.

LIMIT

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

TEST SUMMERY

Transmitter carrier frequency stay within the authorized frequency bands 2.300 - 2.370 GHz.

TEST EQUIPMENT USED:

1	3	12				
---	---	----	--	--	--	--



Test report No: 8712353771	Page 34 of 46 Pages
Title: BreezeMax 2300 Broadband Wireless Access System	
Model: BMAX-CPE- Si- E- 2.3	FCC ID: LKT-BMAX-SI23CR

5.2 Radiated emissions test according to § 15.209

Method of measurement ANSI 63.4 §13.1.4
 Ambient Temperature 24⁰ C Relative Humidity 55% Air Pressure 1012 hPa

TEST DESCRIPTION:

The measurements were performed at the Open Area Test Site. The test configuration is shown in Fig.1. The EUT was arranged on a wooden table 0.8 m placed on the turn - table. The measurements were performed at a 10 m measurement distance. The Biconilog 30 MHz-2 GHz antenna was used. The frequency range was investigated from 30 MHz to 1 GHz. The measurements were performed at each frequency at which the signal was 10 dB below the limit or less. The level was maximized by initially rotating turntable through 360°, varying the antenna height between 1 m and 4 m, rerouting EUT cables and changing antenna polarization from vertical to horizontal.

REQUIREMENTS:

EUT radiated emission shall not exceed value required in section 15.209

TEST RESULT:

Test results are presented in Table 1.
 Results more than 20 dB under the limit were not inserted in the table.

Test equipment used

1	6	7			
---	---	---	--	--	--

**Test report No: 8712353771****Page 35 of 46 Pages****Title: BreezeMax 2300 Broadband Wireless Access System****Model: BMAX-CPE- Si- E- 2.3****FCC ID: LKT-BMAX-SI23CR****Table 1. Radiated emission test results**

Frequency (MHz)	Antenna Polariz	Turn- table Angle (°)	Antenna Height (m)	Emission Level Note 1 (dB μ V/m)	Limit @ 3m (dB μ V/m)	Margin Note 2 (dB)	Results
250.0	H	132	3.5	28.6	46	17.4	Pass
256.0	H	174	2.8	28.8	46	17.6	Pass
588.0	H	12	1.0	27.4	46	18.6	Pass
686.0	H	183	1.0	29.6	46	16.4	Pass

Note 1: Emission level = E Reading (dB μ V) + Cable loss (dB) + Antenna Factor (dB/m) + 10 dB

Where 10 dB is an extrapolation distance factor.

For Cable Loss and Antenna Factor refer to Appendix 2.

Note 2: Margin (dB) = Limit (dB μ V/m) – Emission level (dB μ V/m)



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5.3 Conducted emissions according to § 15.207

Method of measurement ANSI 63.4 §13.1.3
 Ambient Temperature 23⁰ C Relative Humidity 52% Air Pressure 1008 hPa

Frequency, MHz	dB (µV)	
	QP	AVRG
0.15 - 0.5	66 - 56*	56 - 46*
0.5 - 5	56	46
5 - 30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

EUT was placed on a wooden table in a shielded chamber at a height of 80 cm from the floor and 40 cm from the vertical reference plane. The measurements were performed at mains terminals by means of LISN, connected to spectrum analyzer in the frequency range as referred to in the table above. The measurements were made with quasi-peak and average (CISPR) detectors. The position of the EUT cables was varied to determine maximum emission level.

TEST RESULT:

Test results are shown at plots # 96, 97 for line Phase and # 98, 99 for line Neutral.

Test equipment used

8	9	10			
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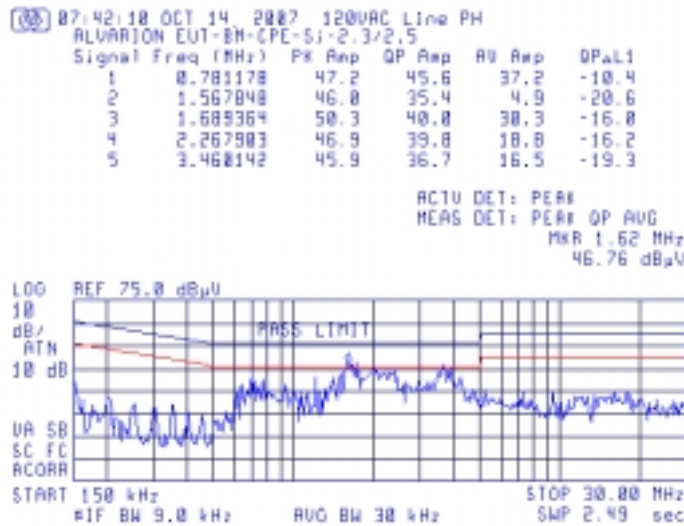
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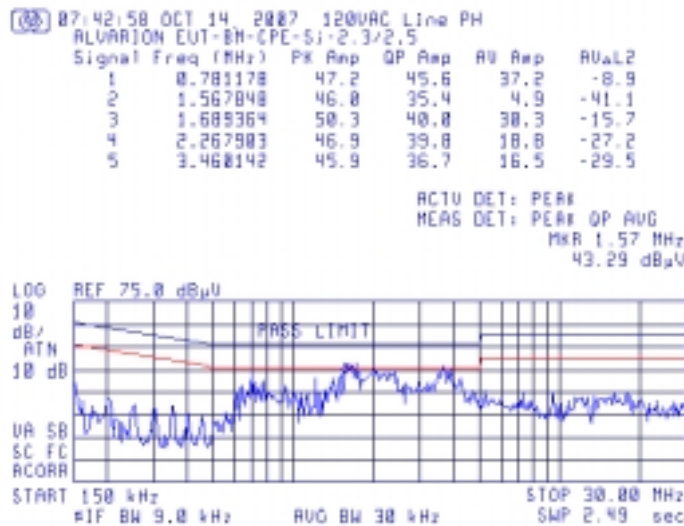
Title: BreezeMax 2300 Broadband Wireless Access System

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Plot # 97. Conducted emissions test. Q.Peak detector.



Plot # 98. Conducted emissions test. Average detector.

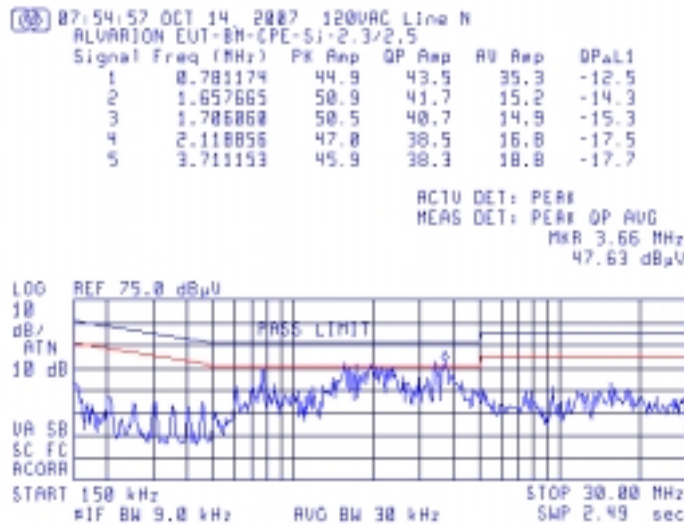
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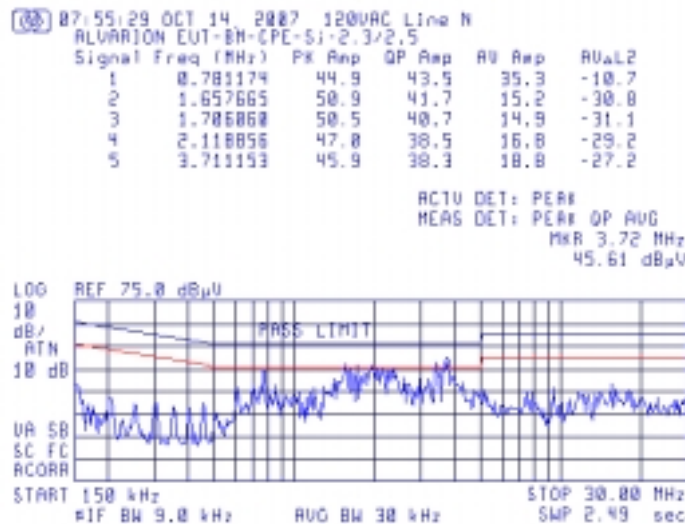
Title: BreezeMax 2300 Broadband Wireless Access System

Model: BMAX-CPE- Si- E- 2.3

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Plot # 99. Conducted emissions test. Q.Peak detector.



Plot # 100. Conducted emissions test. Average detector.

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APPENDIX A Photographs

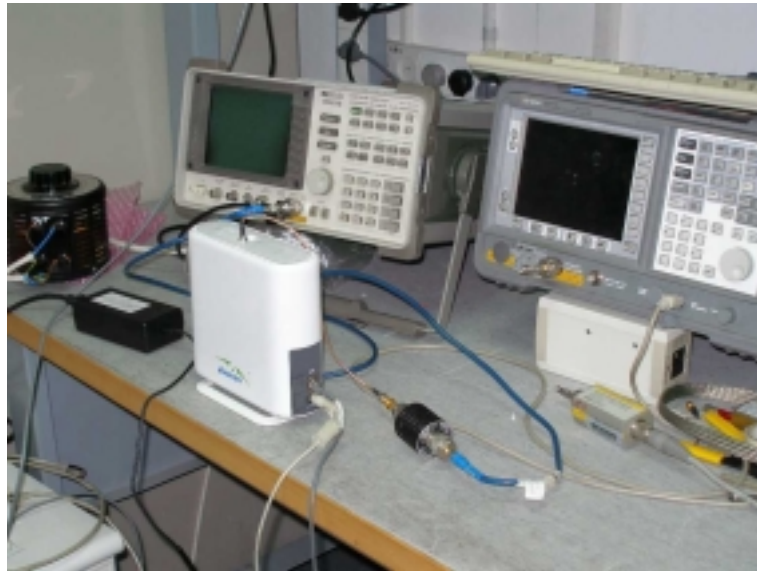


Photo 1. Conducted measurements. Test setup.



Photo 2. Test setup on OATS.

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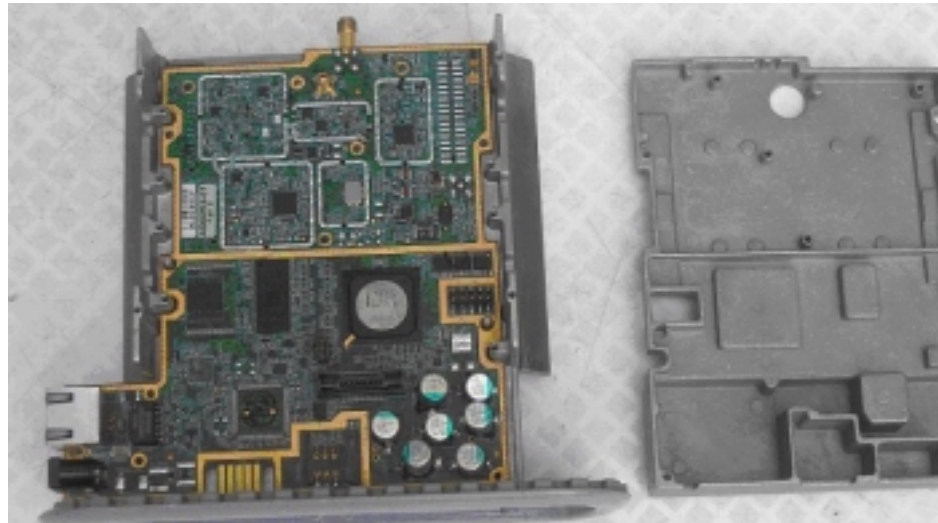


Photo 3. Component side view.

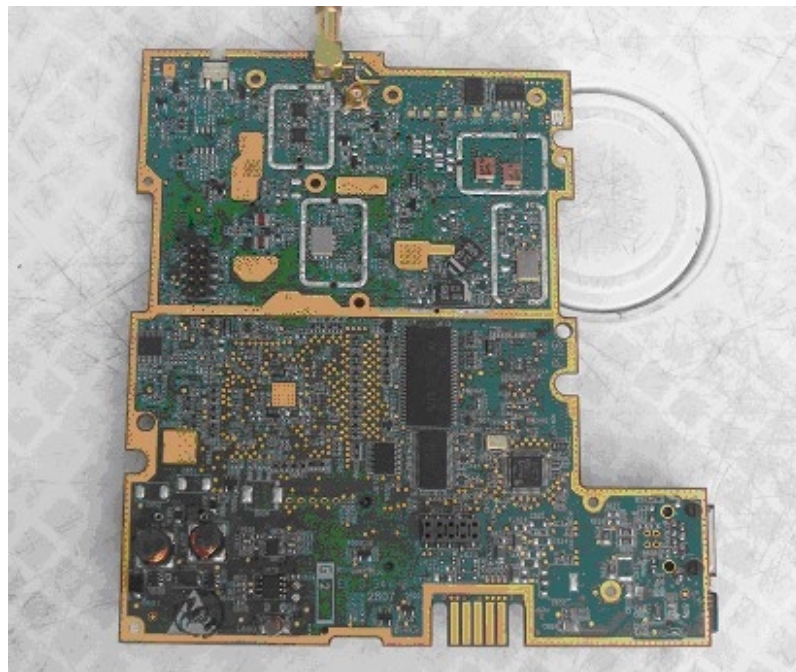


Photo 4. Component side view.

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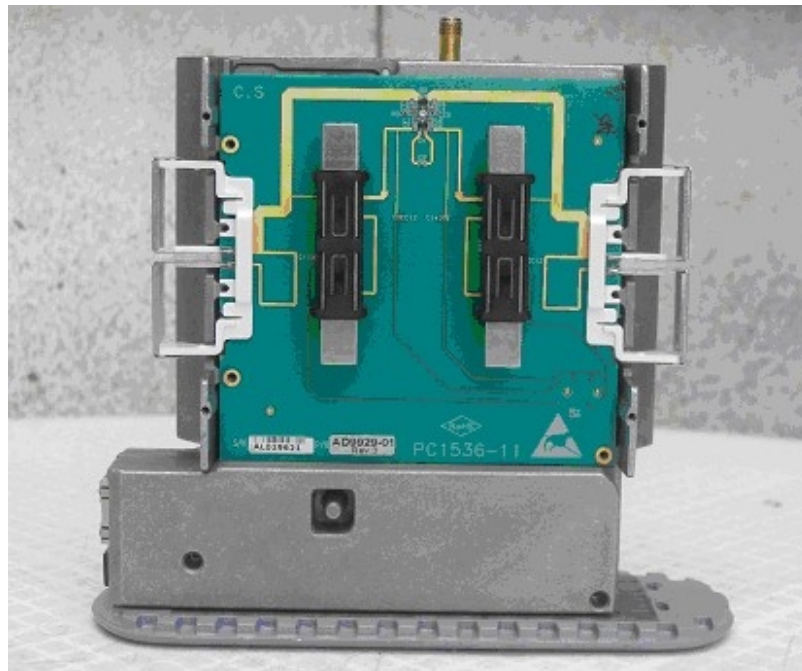


Photo 5. Internal antenna view.

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No	Description	Manufacturer information			Due Calibration date
		Name	Model No	Serial No	
1	Spectrum Analyzer 9 kHz - 26.5 GHz	HP	8564E	3650A00701	June 2008
2	Spectrum Analyzer 9 kHz - 26.5 GHz	Adjilent	4407B	US40241729	July 2008
3	Attenuators 20 dB DC - 18 GHz	Weinshel Engineering	33-30-34	A3451	Aug 2008
4	Cable RF 1m	Huber-Suhner	Sucoflex 104	21324/4PE	Aug 2008
5	Double Ridged Guide Antenna 1 – 18 GHz	EMCO	3115	5802	March 2008
6	Antenna Biconilog 30 – 2000 MHz	Schaffner- Chase	CBL6112B	S/N 23181	May 2008
7	EMI Receiver 9 kHz-6.5 GHz	HP	8546A+8546 0A	SII 4068	April 2008
8	LISN 9 kHz – 30 MHz	FCC	LISN 250- 32-4-16	SII5023	Feb 2008
9	Transient limiter 0.009-200 MHz	HP	11947A	3107105	March 2008
10	Spectrum analyzer 10 KHz-26.5 GHz	HP	E7405A	SII 4944	March 2008
11	Attenuator 50 Ohm 3 dB DC-18 GHz	HP	8491B	50655	May 2008
12	Cable RF 3m	Huber-Suhner	Sucoflex 104PE	21328/4PE	Aug 2008

**Test report No: 8712353771****Page 43 of 46 Pages****Title: BreezeMax 2300 Broadband Wireless Access System****Model: BMAX-CPE- Si- E- 2.3****FCC ID: LKT-BMAX-SI23CR****Cable Loss (10m cable + Mast)**

Point	Frequency (MHz)	Cable Loss (dB)	Point	Frequency (MHz)	Cable Loss (dB)
1	30	0.53	21	1000	3.68
2	50	0.75	22	1100	3.82
3	100	1.08	23	1200	4.07
4	150	1.39	24	1300	4.24
5	200	1.61	25	1400	4.43
6	250	1.752	26	1500	4.6
7	300	2.00	27	1600	4.7
8	350	2.15	28	1700	4.85
9	400	2.26	29	1800	4.98
10	450	2.383	30	1900	5.19
11	500	2.52	31	2000	5.34
12	550	2.606	32	2100	5.51
13	600	2.75	33	2200	5.69
14	650	2.856	34	2300	5.89
15	700	3.06	35	2400	6.07
16	750	3.201	36	2500	6.22
17	800	3.27	37	2600	6.28
18	850	3.38	38	2700	6.41
19	900	3.46	39	2800	6.53
20	950	3.55	40	2900	6.84



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Title: BreezeMax 2300 Broadband Wireless Access System

Model: BMAX-CPE- Si- E- 2.3

FCC ID: LKT-BMAX-SI23CR

Biconilog Antenna, Model Number: CBL-6112D, S/N: 23181.

No.	f / MHz)	AF / dB/m	f / MHz)	AF / dB/m	f / MHz)	AF / dB/m	f / MHz)	AF / dB/m
1	30	17.90	170	9.40	530	17.70	1040	22.20
2	32	16.70	175	9.00	540	18.25	1060	22.50
3	34	15.55	180	8.50	550	18.60	1080	22.50
4	36	14.35	185	8.45	560	14.45	1100	22.40
5	38	13.30	190	8.60	570	18.40	1120	22.60
6	40	12.20	195	8.85	580	18.50	1140	22.45
7	42	11.05	200	8.95	590	18.60	1160	22.50
8	44	9.95	205	8.80	600	18.60	1180	22.40
9	46	8.90	210	8.50	610	18.80	1200	22.80
10	48	8.05	215	8.20	620	18.99	1220	22.95
11	50	7.30	220	8.50	630	19.05	1240	23.10
12	52	6.80	225	9.00	640	19.23	1260	23.40
13	54	6.45	230	9.65	650	19.10	1280	23.35
14	56	6.00	235	10.30	660	19.13	1300	23.62
15	58	5.70	240	11.00	670	19.04	1320	23.64
16	60	5.45	245	11.60	680	19.00	1340	23.86
17	62	5.30	250	12.00	690	19.17	1360	23.95
18	64	5.20	255	12.45	700	19.28	1380	23.90
19	66	5.30	260	12.85	710	19.25	1400	24.45
20	68	5.30	265	12.50	720	19.45	1420	24.74
21	70	5.35	270	12.45	730	19.75	1440	24.93
22	72	5.50	275	12.40	740	19.95	1460	25.03
23	74	5.80	280	12.55	750	20.07	1480	25.45
24	76	6.00	285	12.65	760	19.85	1500	25.30
25	78	6.60	290	12.75	770	19.80	1520	25.25
26	80	6.70	295	12.95	780	19.85	1540	25.36
27	82	7.15	300	13.00	790	19.95	1560	25.58
28	84	7.60	310	13.35	800	20.05	1580	25.50
29	86	8.10	320	13.75	810	20.10	1600	25.65
30	88	8.50	330	13.85	820	20.35	1620	25.60
31	90	8.90	340	14.10	830	20.40	1640	25.70
32	92	9.20	350	14.50	840	20.35	1660	25.83
33	94	9.75	360	14.70	850	20.46	1680	25.97
34	96	9.95	370	14.90	860	20.39	1700	26.10
35	98	10.20	380	15.10	870	20.29	1720	26.25
36	100	10.50	390	15.45	880	20.24	1740	26.04
37	105	11.25	400	16.00	890	20.35	1760	26.14
38	110	11.70	410	16.40	900	20.55	1780	26.20
39	115	11.70	420	16.70	910	20.45	1800	26.40
40	120	11.80	430	16.35	920	20.60	1820	26.64
41	125	11.80	440	16.30	930	20.60	1840	26.86
42	130	11.70	450	16.30	940	20.66	1860	27.12
43	135	11.35	460	16.70	950	20.88	1880	27.00
44	140	10.95	470	17.05	960	21.11	1900	27.25
45	145	10.35	480	17.20	970	20.93	1920	27.36
46	150	10.05	490	17.30	980	21.03	1940	27.68
47	155	9.70	500	17.40	990	21.05	1960	27.10
48	160	9.70	510	17.50	1000	21.10	1980	27.06
49	165	9.45	520	17.60	1020	21.40	2000	27.25



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Antenna Factor

Double Ridged Guide Antenna mfr EMCO model 3115 1m calibration

Point	Frequency (MHz)	Antenna Factor (dB/m)
1	1000	23.9
2	2000	28.3
3	3000	31.0
4	4000	33.1
5	4500	32.5
6	5000	32.4
7	6000	53.7
8	6500	35.6
9	7000	36.4
10	7500	36.9
11	8000	37.0
12	8500	38.0
13	9000	38.6
14	9500	38.4
15	10000	38.4
16	10500	38.4
17	11000	38.9
18	11500	39.6
19	12000	39.4
20	12500	39.2
21	13000	40.3
22	13500	41.0
23	14000	41.2
24	14500	41.3
25	15000	40.0
26	15500	38.0
27	16000	38.1
28	16500	40.3
29	17000	42.2
30	17500	44.6
31	18000	46.2

Cable Loss

Type: Sucoflex 104PE; Ser.No.21328/4PE; 3 m length

Point	Frequency (GHz)	Cable Loss (dB)
0	0.0-1.8	1.67
1	1.8 – 3.6	2.39
2	3.6 – 5.4	3.04
3	5.4-7.2	3.58
4	7.2-9.0	4.06
5	9.0-10.8	4.49
6	10.8-12.6	4.91
7	12.6-14.4	5.31
8	14.4-16.2	5.66
9	16.2-18.00	6.01

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APPENDIX C General information.

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(μ V)	decibel referred to one microvolt
dB(μ 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 15: 2006	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
ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communication Equipment Measurement and Performance.