



Test Report No. 8612329133

For ALVARION Ltd.

Equipment Under Test:

BreezeMAX 2300

Broadband Wireless Access System

Base station (AU)

***From The Standards Institution
Of Israel***

Industry Division

Electronics & Telematics Laboratory

EMC Section



Certificate No. 1487-01



Test report No: 8612329133

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Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23

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1 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: Base station BreezeMAX 2300
Manufacturer: Alvarion Ltd
Model: BMAX-BST-AU-ODU-HP-2.3
Equipment serial number: NA
GPS receiver and antenna
Model: BMAX-GPS-OGR
GPS adaptor
Model: BMAX-GPS-IGA

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 75 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.

**Test report No: 8612329133****Page 4 of 75 Pages****Title: BreezeMAX2300 Broadband Wireless Access System****Model: BMAX-BST-AU- ODU-HP-2.3****FCC ID: LKT-BMAX-BA23****3 Summary of test:**

The EUT was found to be in compliance with requirements of: 47CFR Part 15, part 27, and part 2 §§ 27.50, 27.53, 27.54, 2.1055, 15.107, and 15.109

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
Unintentional radiation	
Conducted emissions	15.107 class B
Radiated emissions	15.109 class A

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 Base station -AU outdoor unit contain the radio {Basic + HPA} and digital control section unit. The AU comprises an Indoor Unit (IDU) and an Outdoor Unit (ODU). The AU-IDU module connects to the AU-ODU via an Intermediate Frequency (IF) cable. The IF cable carries full duplex data, control and management signals between the AU-IDU and the AU-ODU, as well as power (48 VDC) and 64 MHz synchronization reference clock from the AU-IDU to the AU-ODU.

EUT technical characteristics

Transmitter technical characteristics.			Note
Stand-alone/fixed use			
Assigned frequency range	2305 – 2320 MHz and 2345 – 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	40 dBm		At transmitter 50 Ω RF output connector
Antenna connection	Standard connector: N-TYPE		Professional installation
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
Sector	TELSA	723214	17 dBi
Sector	CUSHCRAFT	J23017V00-60N	16.5 dBi



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4.2 EUT test configuration

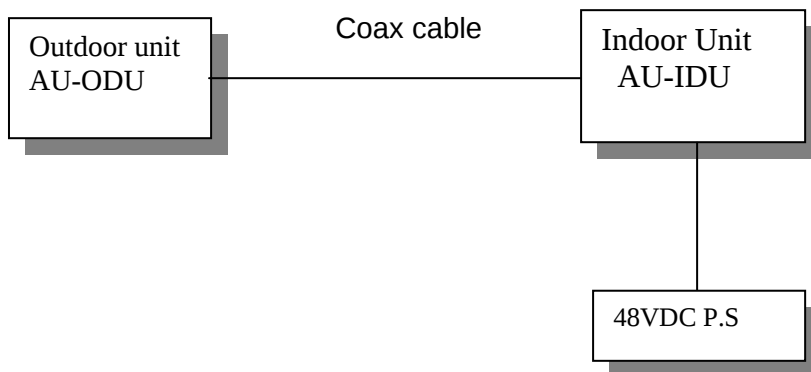


Fig. 1 Base station test setup

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5 Test results

5.1 Transmitter characteristics

5.1.1 Occupied bandwidth for digitally modulated systems according to § 2.1049

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

Carrier frequency MHz	Measured occupied bandwidth, MHz	Reference to plot number
2307.5	4.75	#1
2312.5	4.73	#2
2352.5	4.73	#3
2357.5	4.77	#4

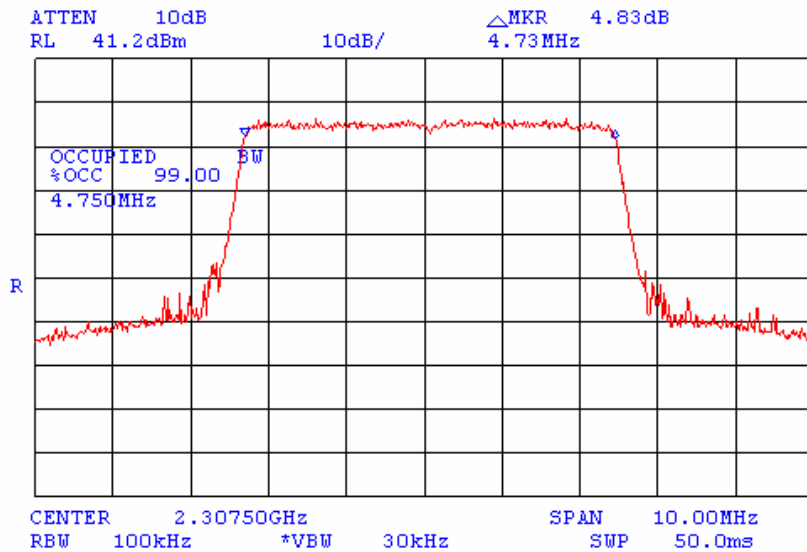
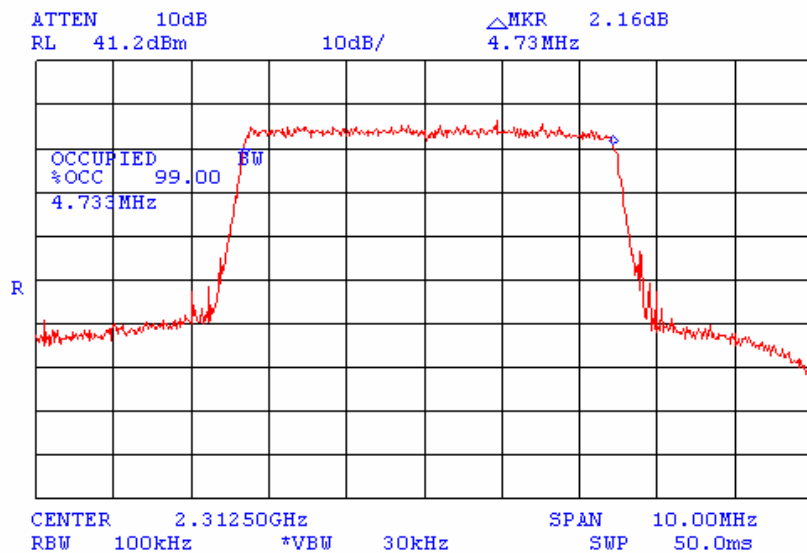
TEST PROCEDURE

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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**Test report No: 8612329133****Page 8 of 75 Pages****Title: BreezeMAX2300 Broadband Wireless Access System****Model: BMAX-BST-AU- ODU-HP-2.3****FCC ID: LKT-BMAX-BA23****Occupied bandwidth test results.****Carrier Frequency 2307.5 MHz****Plot # 1****Carrier Frequency 2312.5 MHz****Plot # 2**



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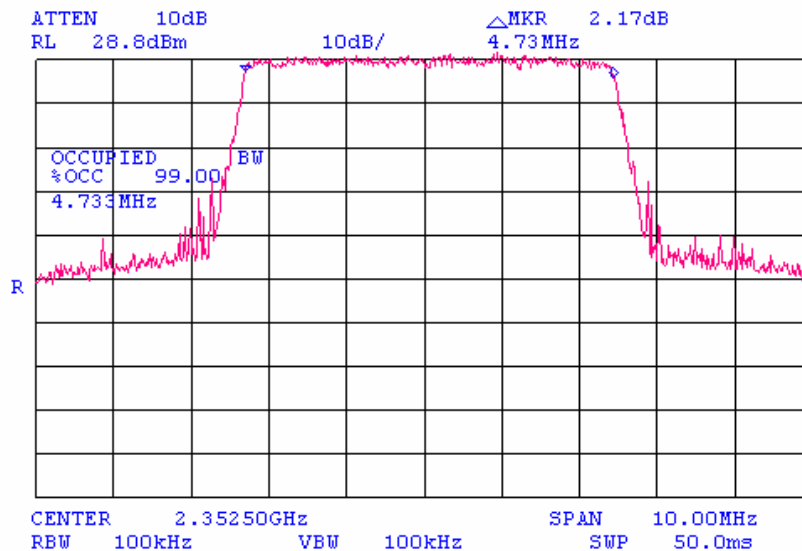
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Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

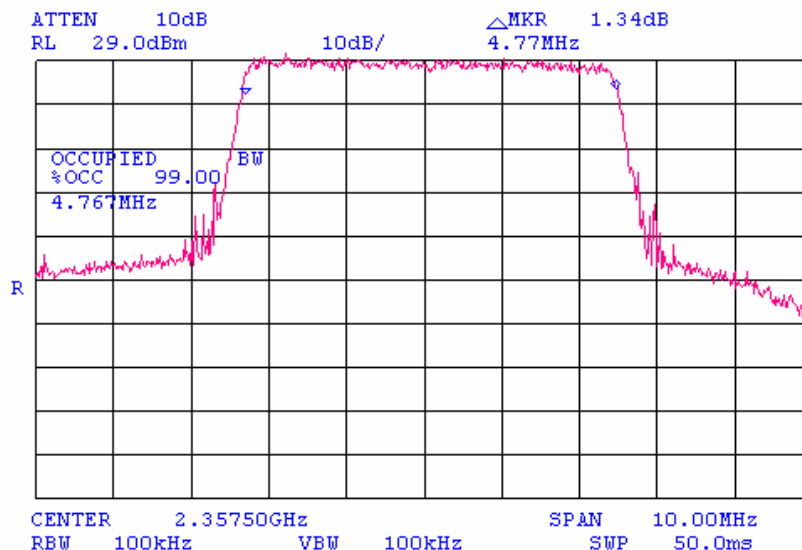
FCC ID: LKT-BMAX-BA23

Carrier Frequency 2352.5 MHz



Plot # 3

Carrier Frequency 2357.5 MHz



Plot # 4

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

Carrier frequency MHz	Peak output power. (W/o antenna gain) dBm	Peak output power. (With antenna gain) dBm	Reference to plot number
2307.5	36.0	53.0	#5
2312.5	36.1	53.1	#6
2352.5	35.8	52.8	#7
2357.5	36.0	53.0	#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

The measurements were performed in normal (transmitting) mode at all transmitted carrier (channel) frequencies of the 2.305 - 2.320 GHz and 2345 - 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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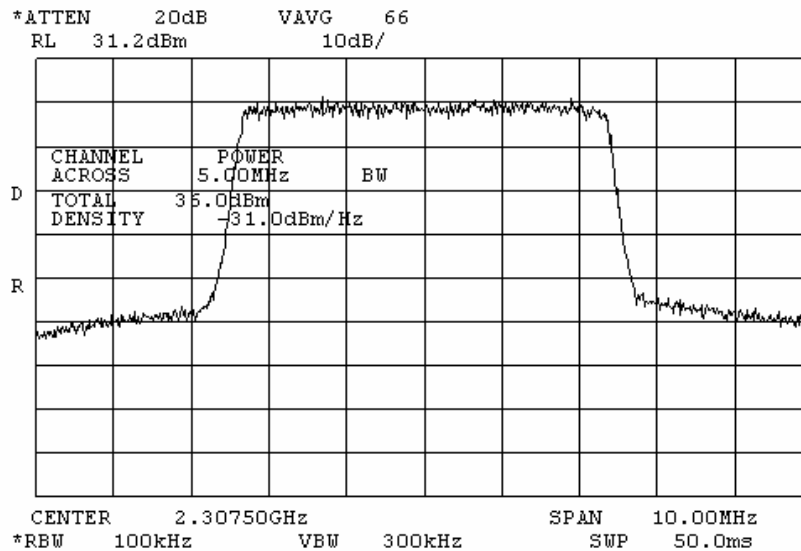
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Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23

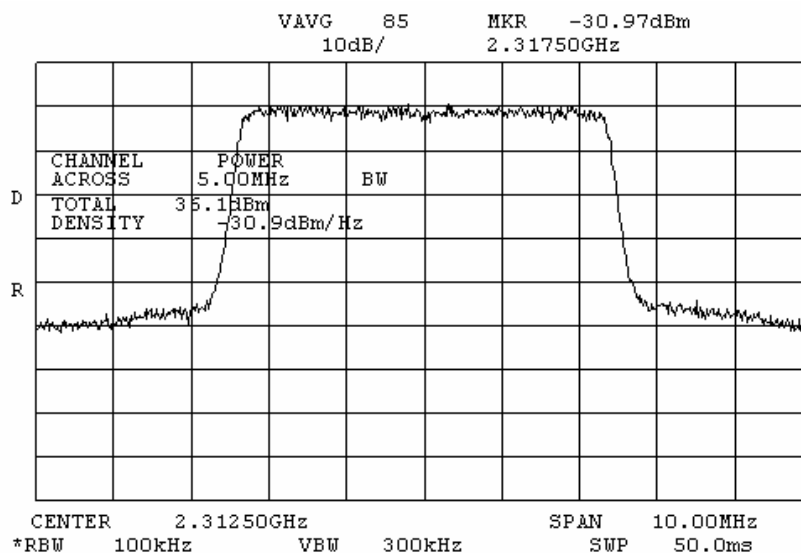
Peak output power test results.

Carrier Frequency 2307.5 MHz



Plot # 5

Carrier Frequency 2312.5 MHz



Plot # 6



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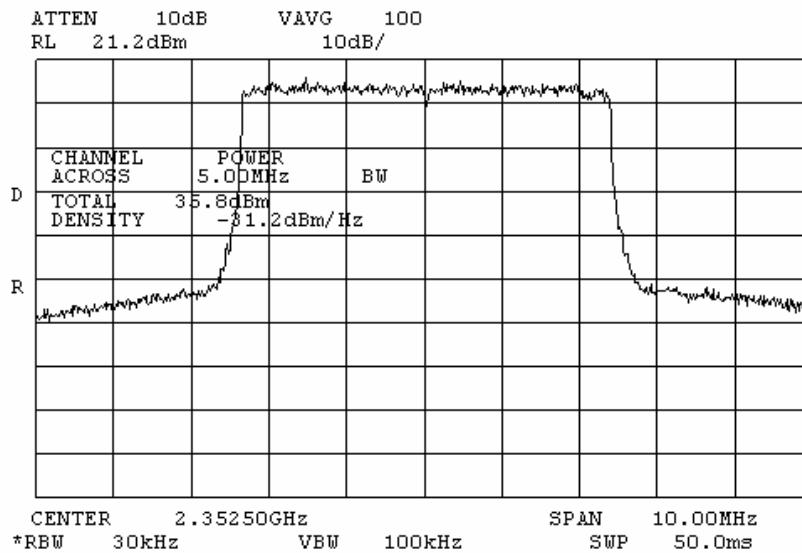
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Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

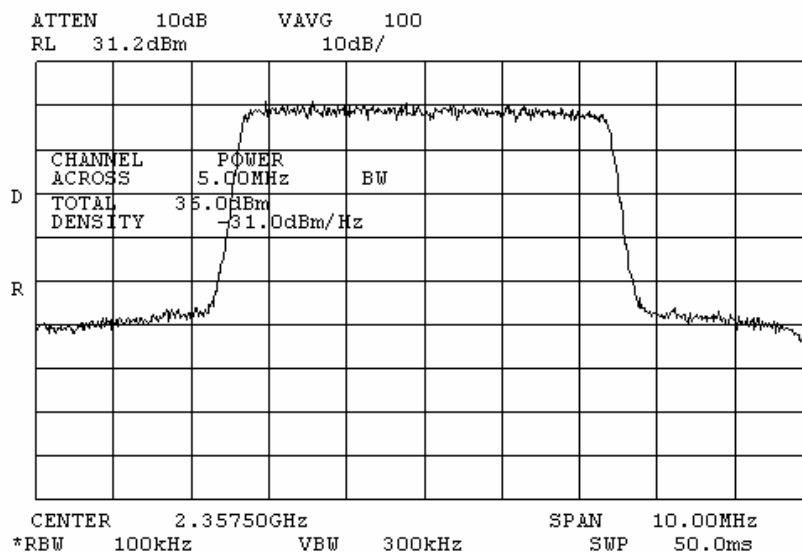
FCC ID: LKT-BMAX-BA23

Carrier Frequency 2352.5 MHz.



Plot # 7

Carrier Frequency 2357.5 MHz.



Plot # 8

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

Carrier frequency – 2307.5 MHz.

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
351.6	-41.13	-40	-1.13	#9
2304	-15.8	-13	-2.8	#12
2312	-29.3	-13	-15.3	#14
2320	-52.3	-50	-2.3	#15

Carrier frequency – 2312.5 MHz.

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
356.6	-40.63	-40	- 0.63	#20
2309.9	-16.8	-13	- 3.8	#23
2315	-17.3	-13	-4.3	#24
2320	-50.3	-50	-0.3	#26

Carrier frequency – 2352.5 MHz.

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
396.4	-40.13	-40	- 8.5	#32
2344.9	-53.0	-50	- 3.0	#35
2349.9	-15.3	-13	-2.3	#38
2355	-15.6	-13	-2.6	#39

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Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
2300	-45.5	-40	- 5.5	#45
2344.7	-53.13	-50	-3.1	#47
2355	-15.8	-13	-2.8	#49
2360	-16.6	-13	-3.6	#50

* 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 table above. For the test results refer to Plots XXX

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 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 than $70+10\log(P)$ dB - -40 dBm

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.

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

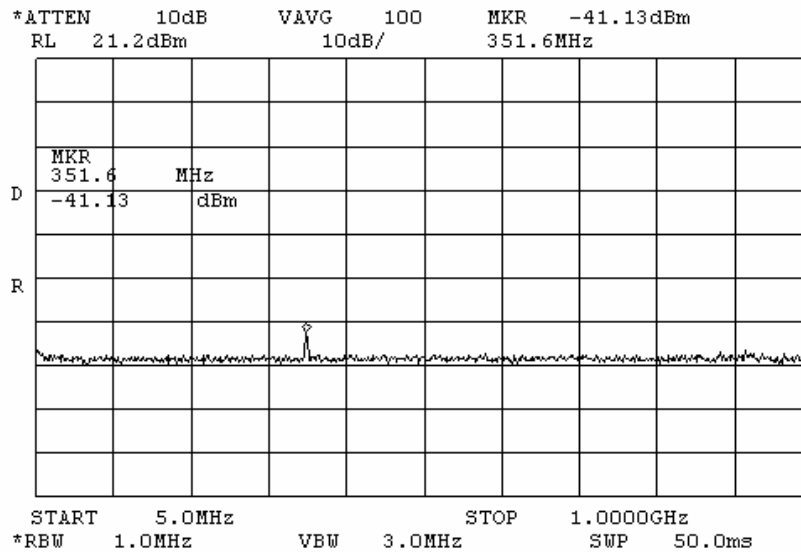
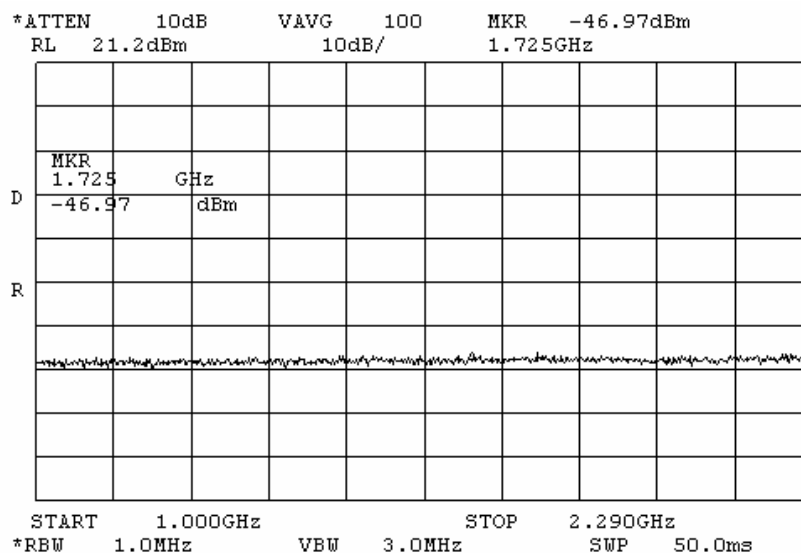
TEST PROCEDURE

The measurements were performed in normal (transmitting) mode at all transmitted carrier (channel) frequencies of the 2.305 - 2.320 GHz and 2345 - 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	9			
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External attenuator = 30 dB

Cable loss = 1.2 dB.



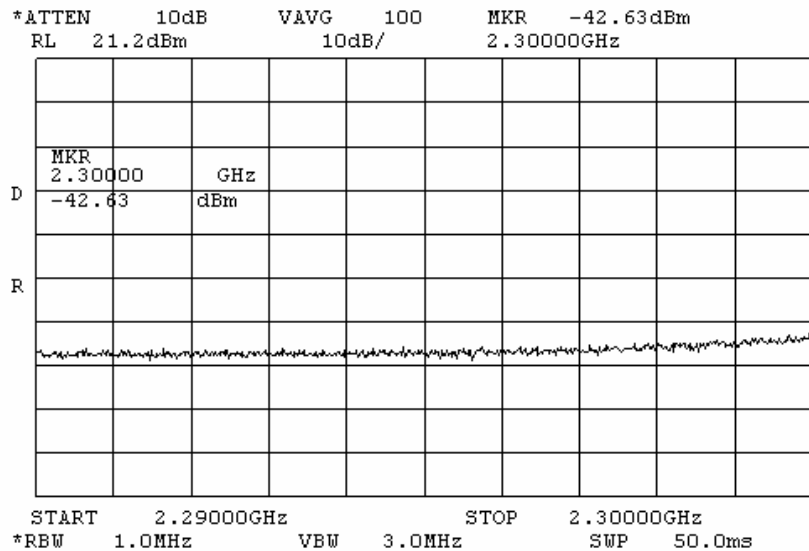
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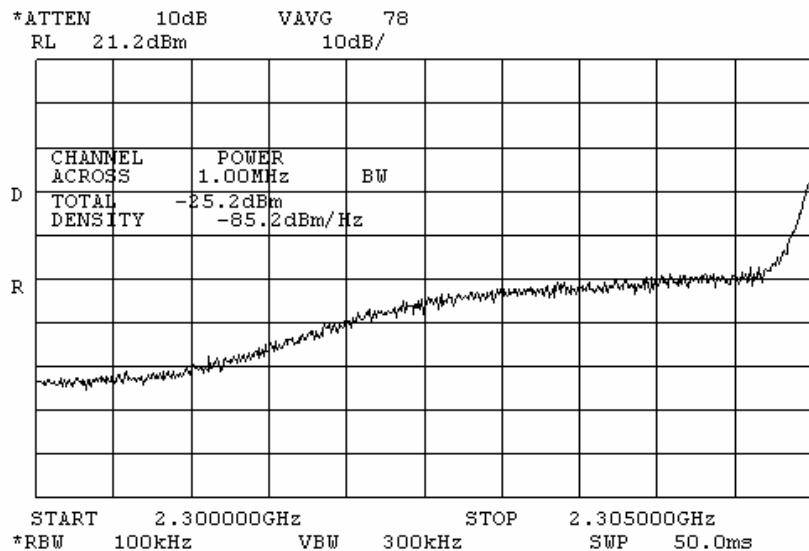
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23



Plot # 11



Plot # 12



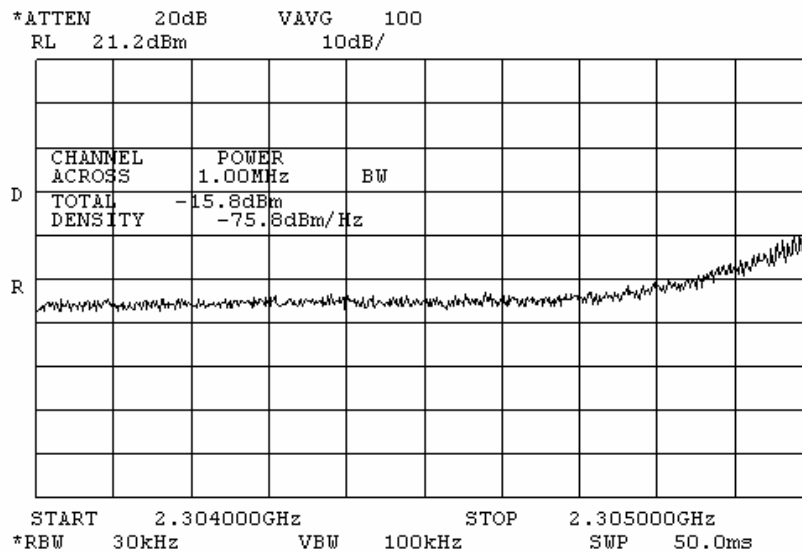
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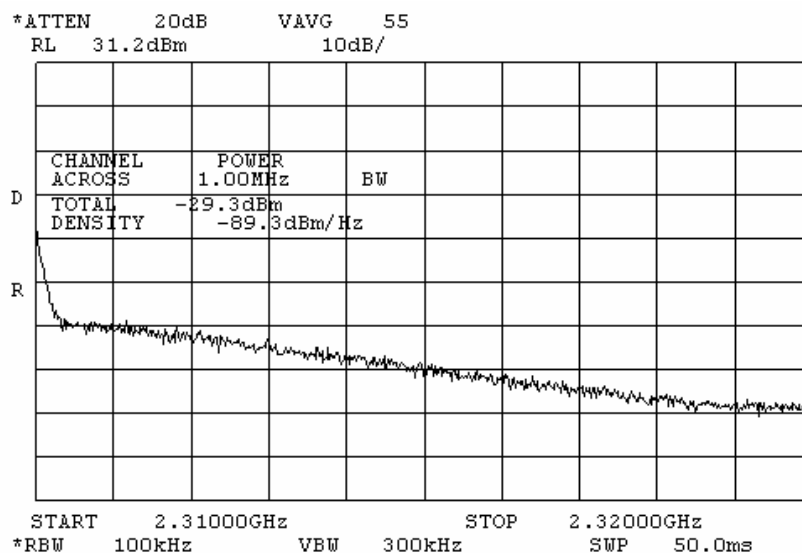
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23



Plot # 13



Plot # 14



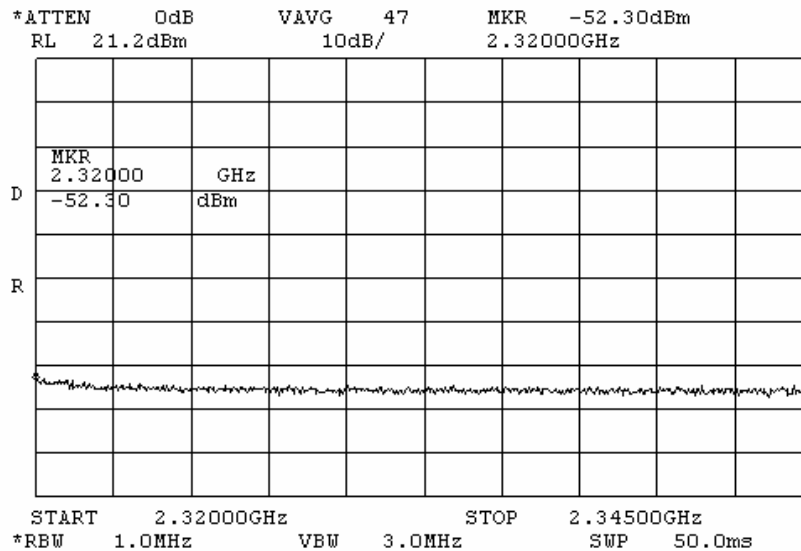
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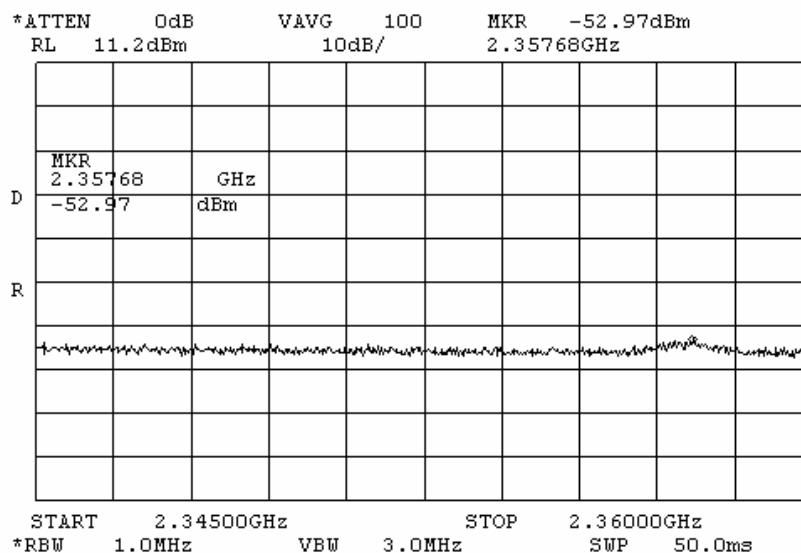
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23



Plot # 15



Plot # 16



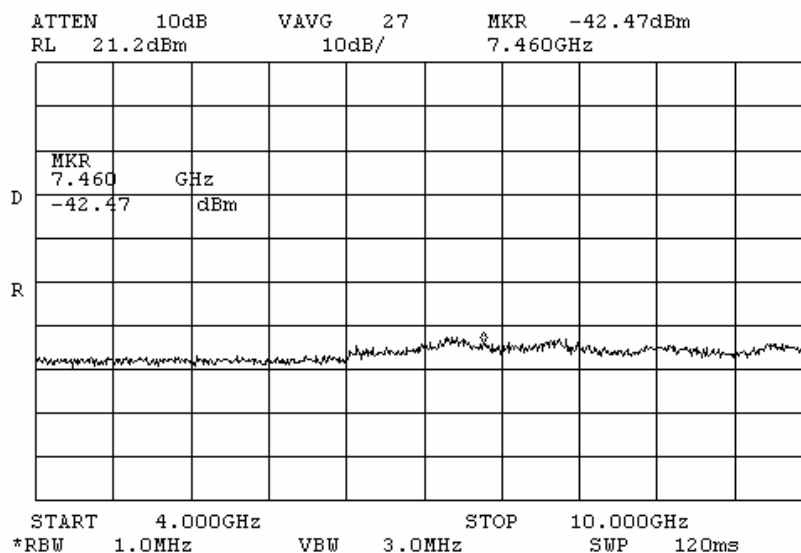
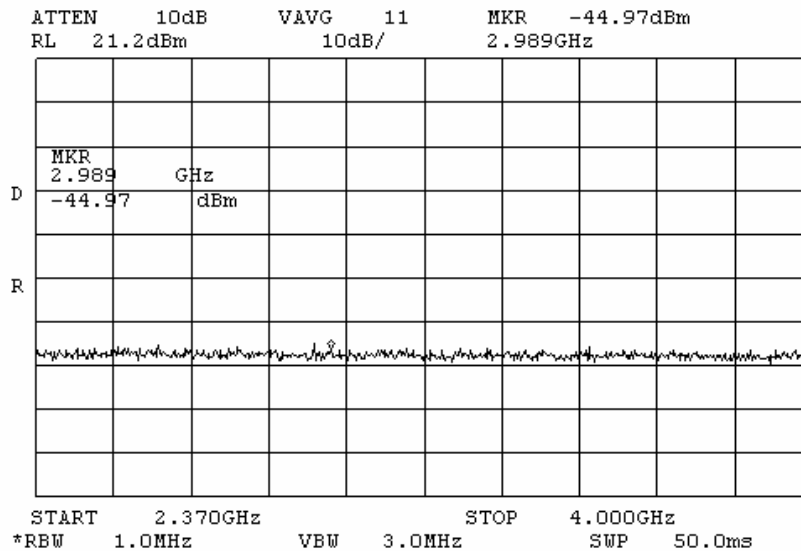
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Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23





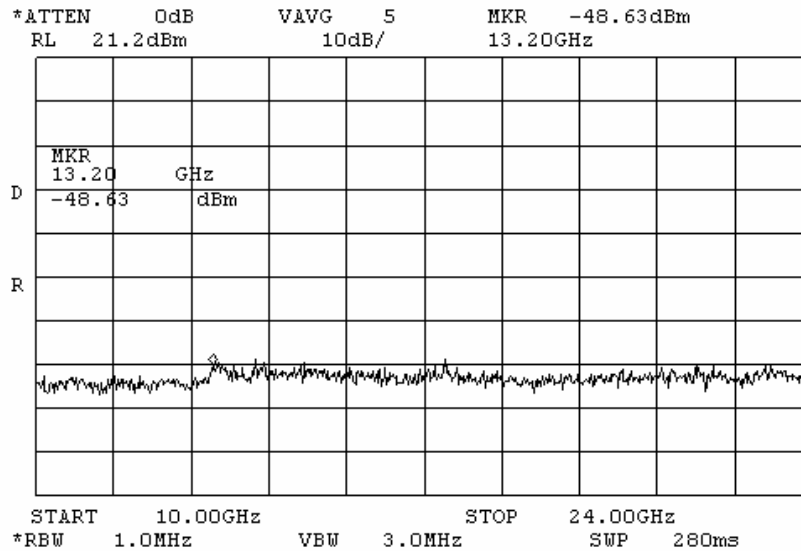
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Title: BreezeMAX2300 Broadband Wireless Access System

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Plot # 19



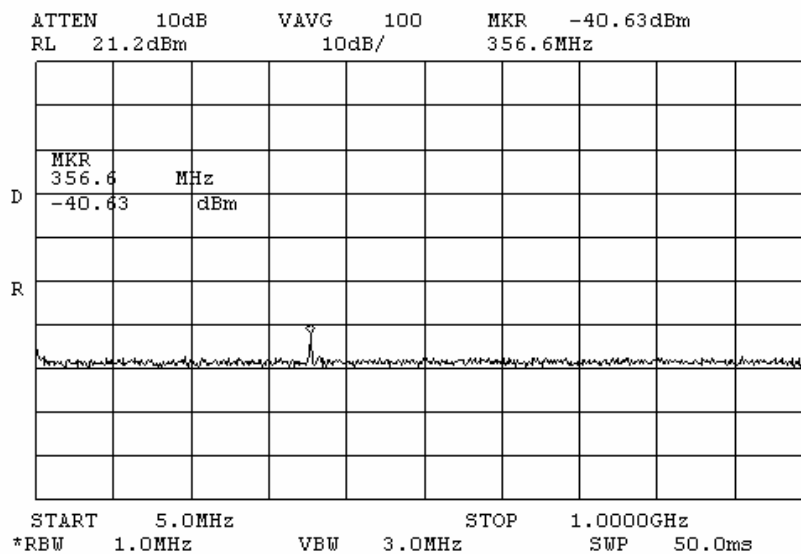
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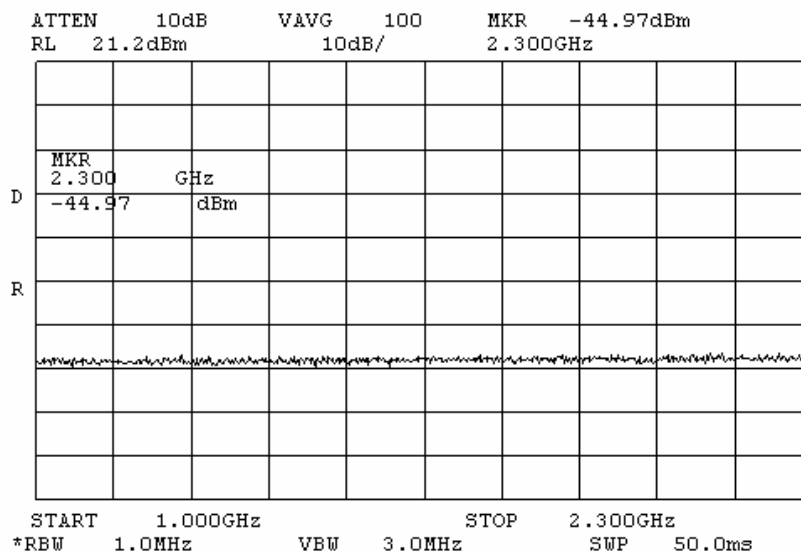
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23

Frequency carrier 2312.5 MHz.

Plot # 20



Plot # 21



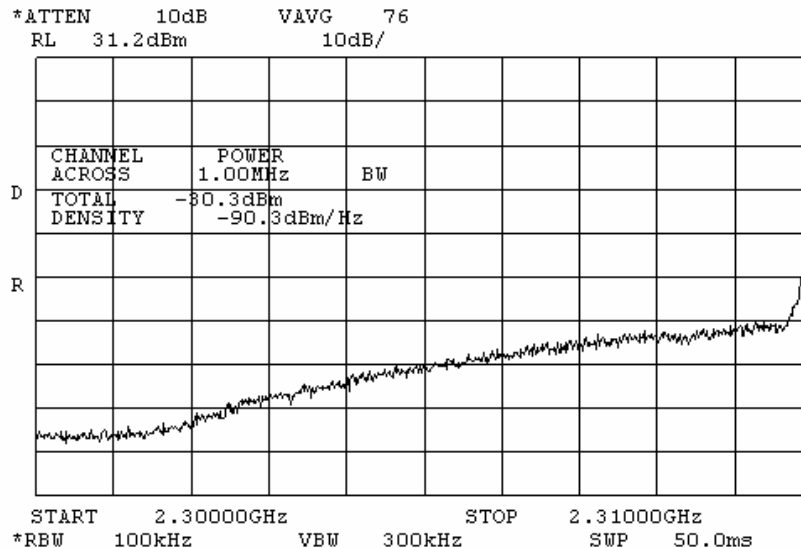
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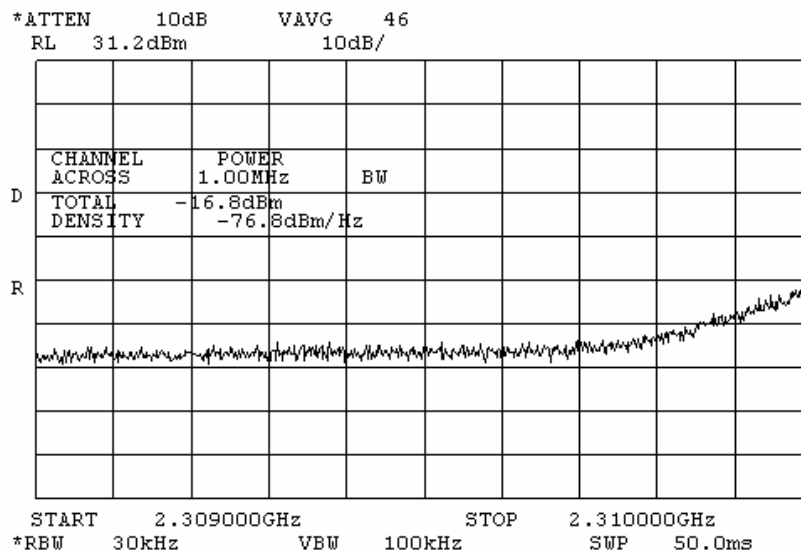
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23



Plot # 22



Plot # 23



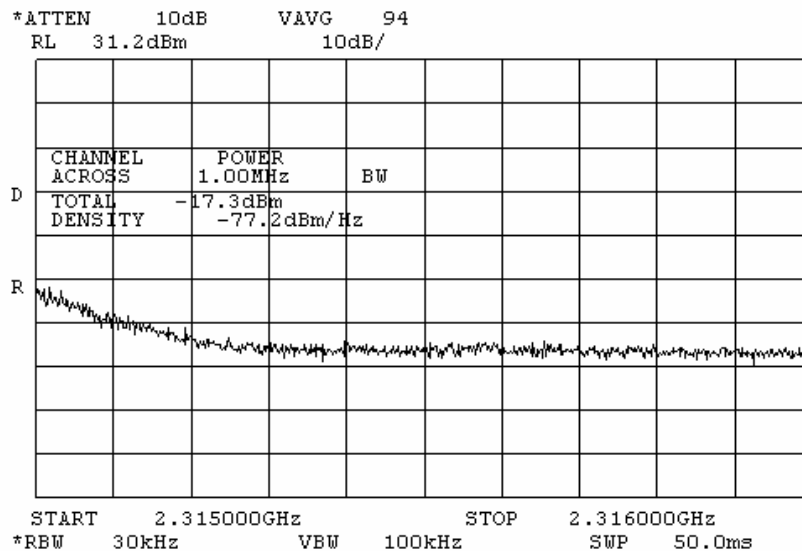
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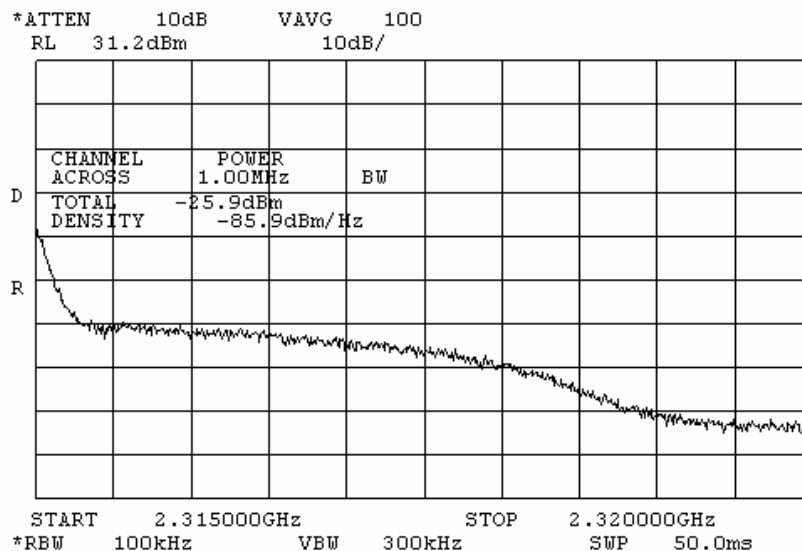
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23



Plot # 24



Plot # 25



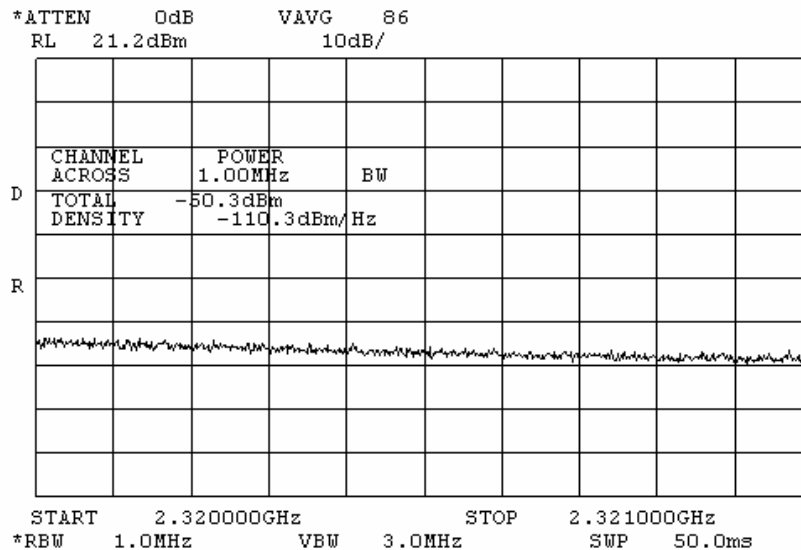
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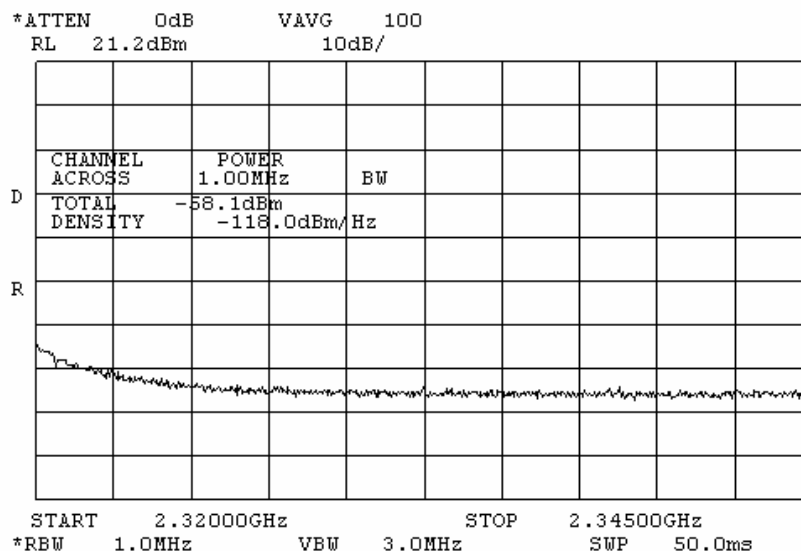
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23



Plot # 26



Plot # 27



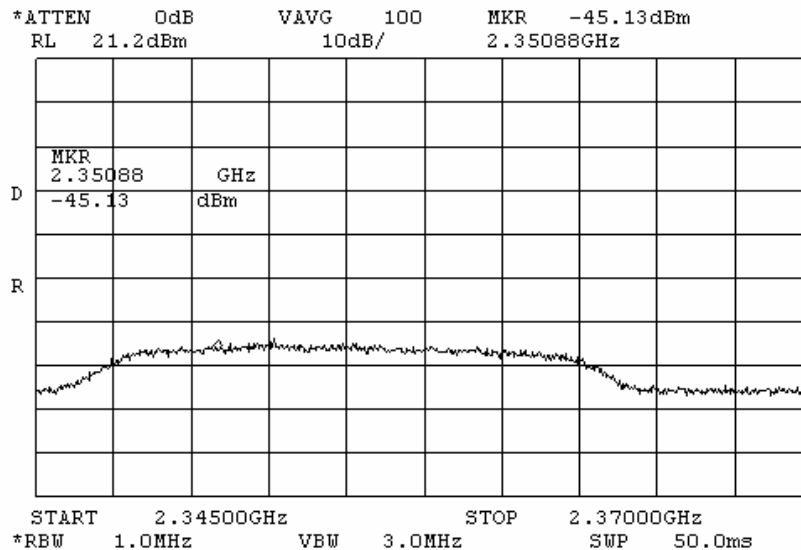
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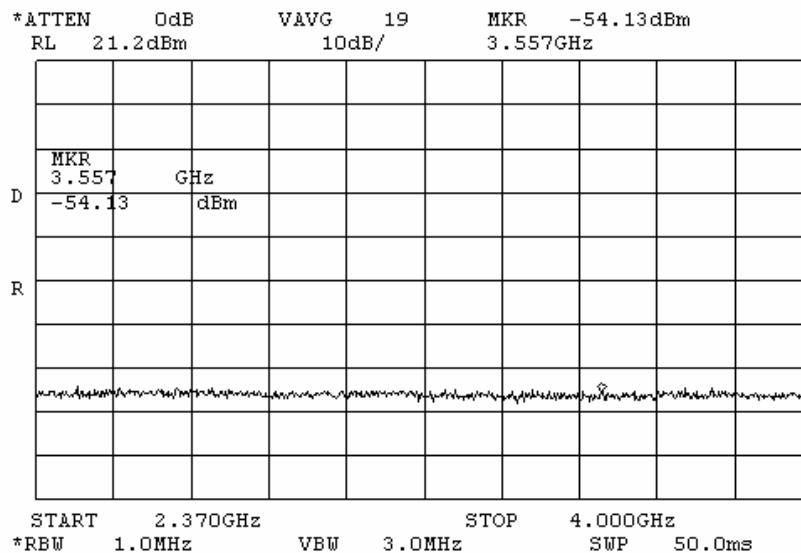
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23



Plot # 28



Plot # 29



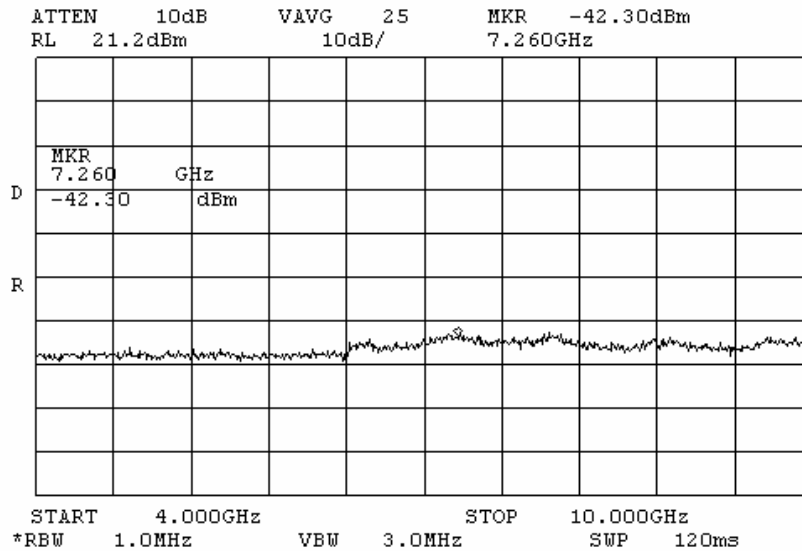
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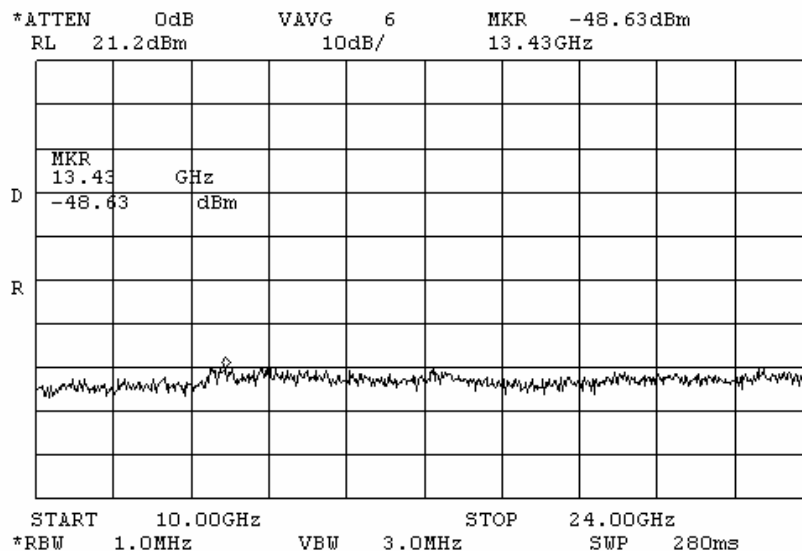
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23



Plot # 30



Plot # 31



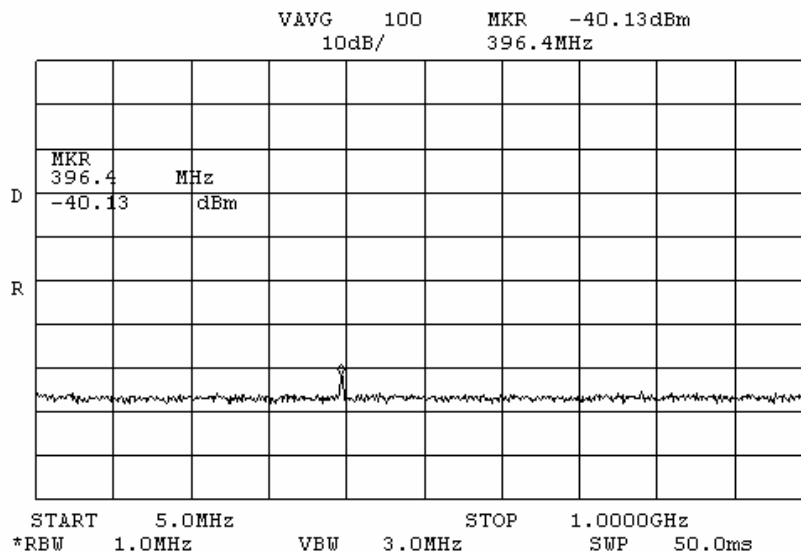
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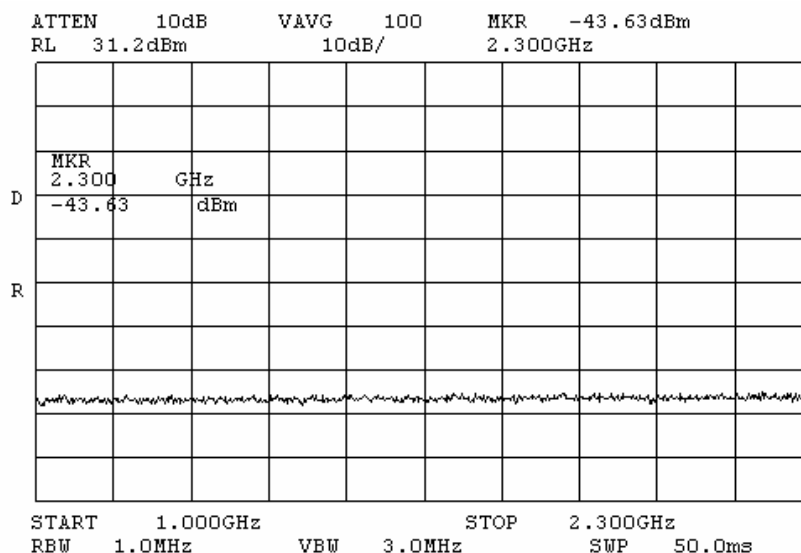
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23

Frequency carrier 2352.5 MHz

Plot # 32



Plot # 33



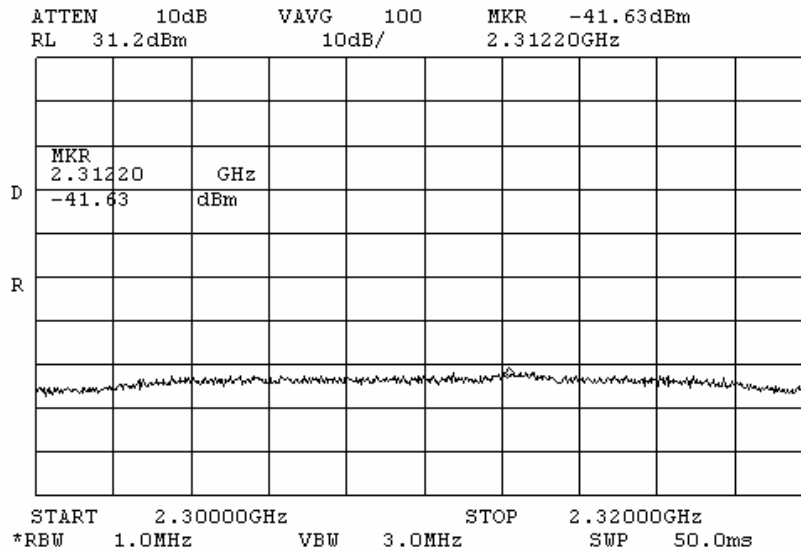
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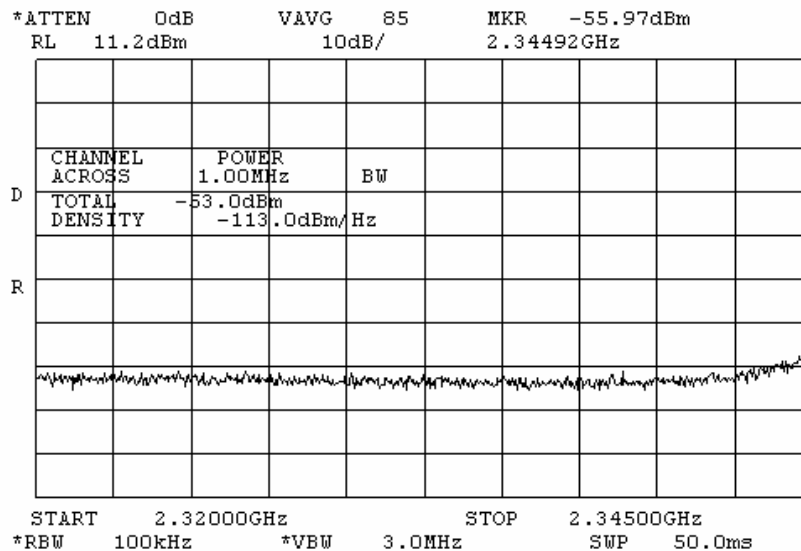
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

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Plot # 34



Plot # 35



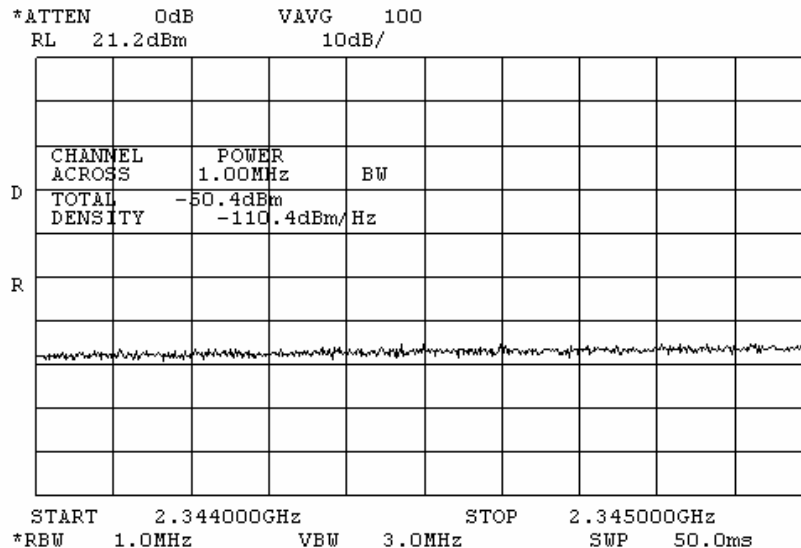
Test report No: 8612329133

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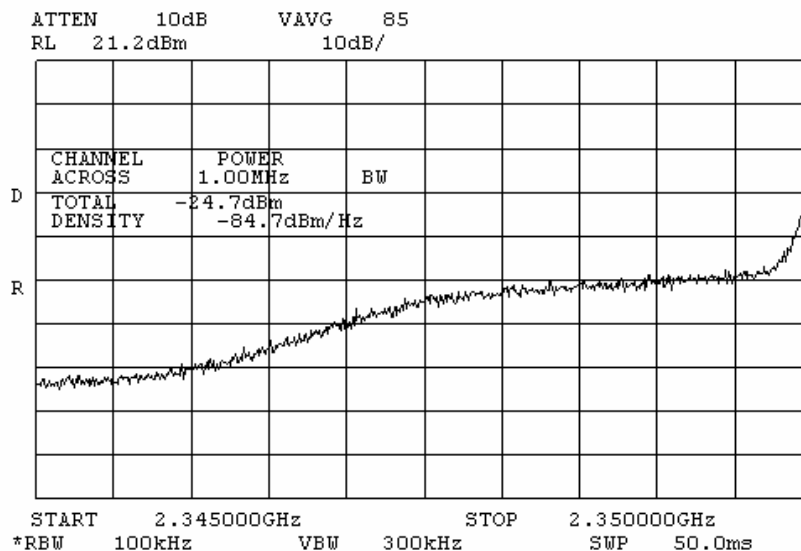
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23



Plot # 36



Plot # 37



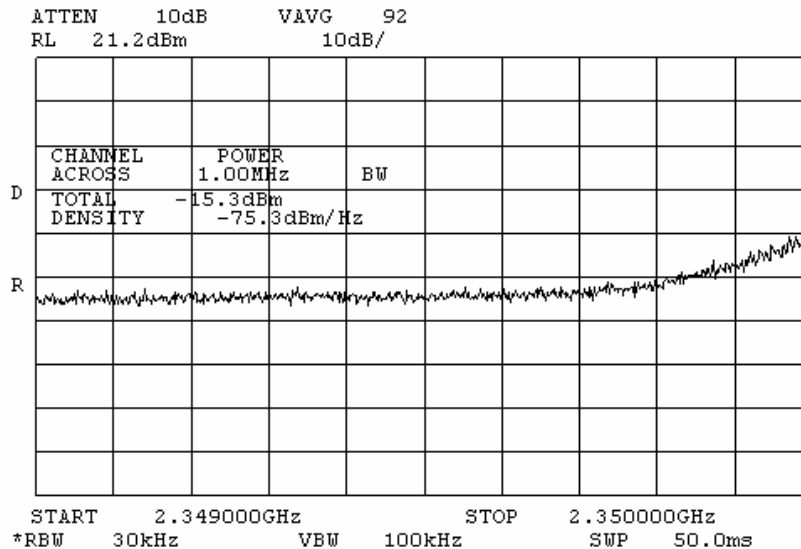
Test report No: 8612329133

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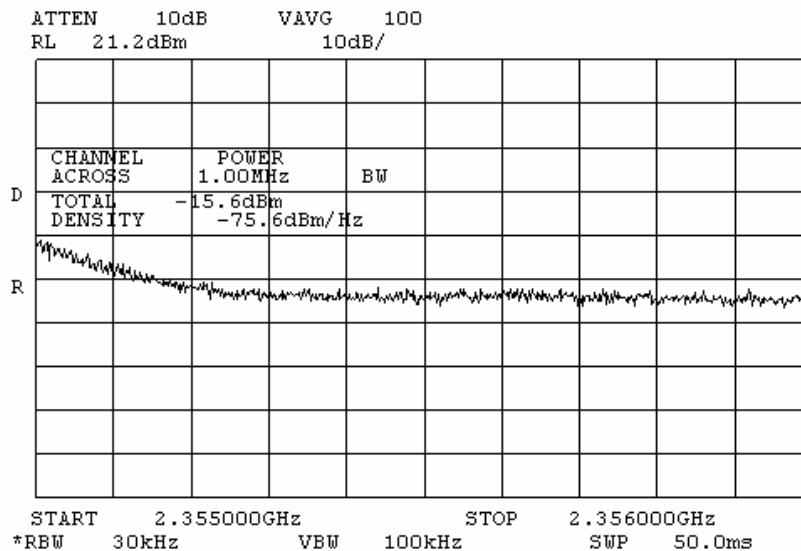
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23



Plot # 38



Plot # 39



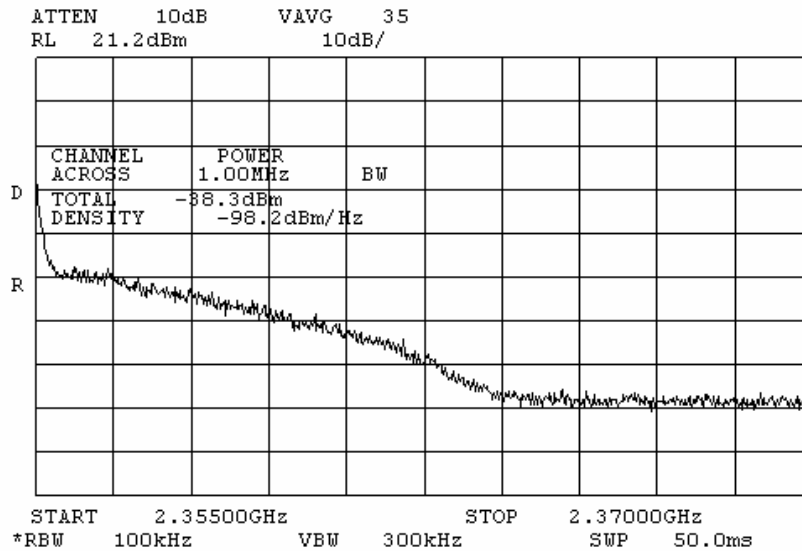
Test report No: 8612329133

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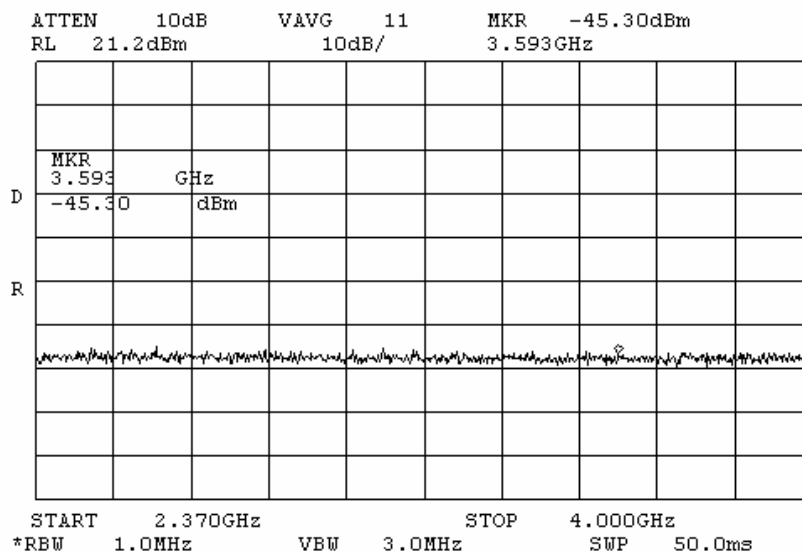
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

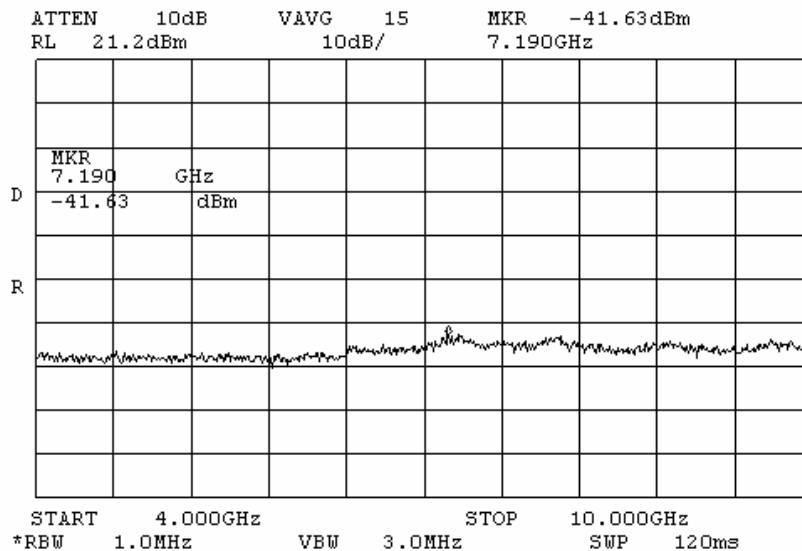
FCC ID: LKT-BMAX-BA23



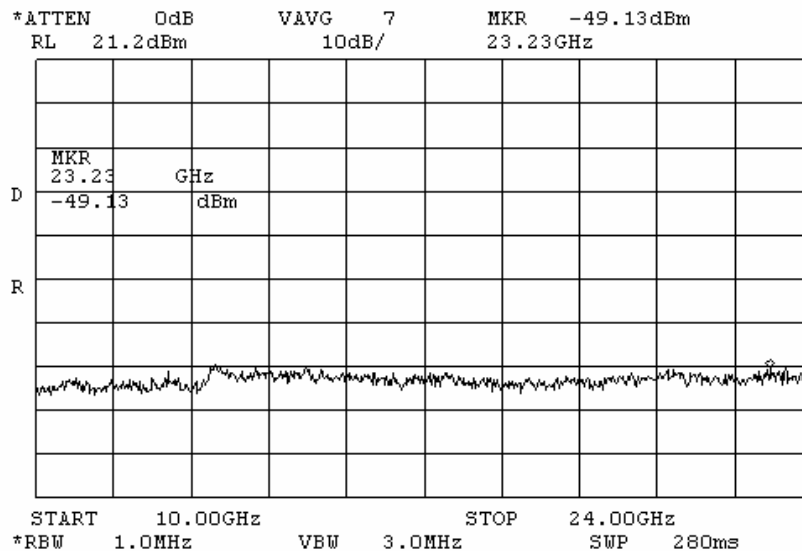
Plot # 40



Plot # 41

**Test report No: 8612329133****Page 32 of 75 Pages****Title: BreezeMAX2300 Broadband Wireless Access System****Model: BMAX-BST-AU- ODU-HP-2.3****FCC ID: LKT-BMAX-BA23**

Plot # 42



Plot # 43



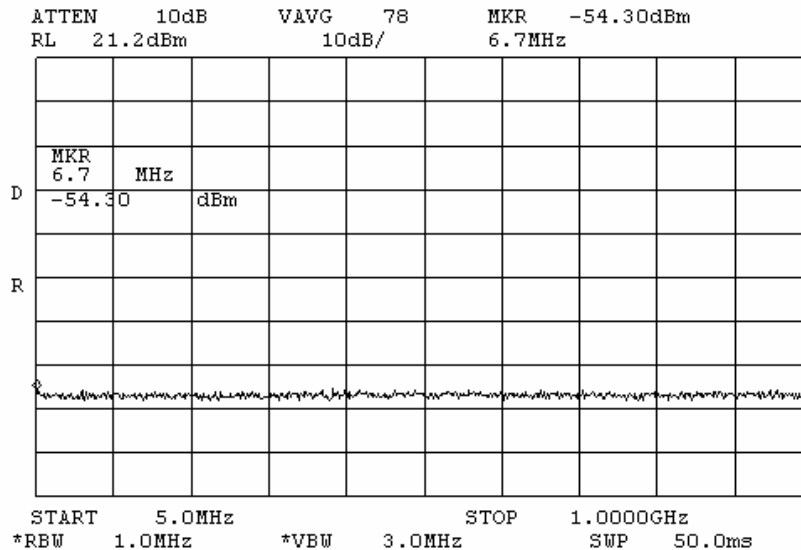
Test report No: 8612329133

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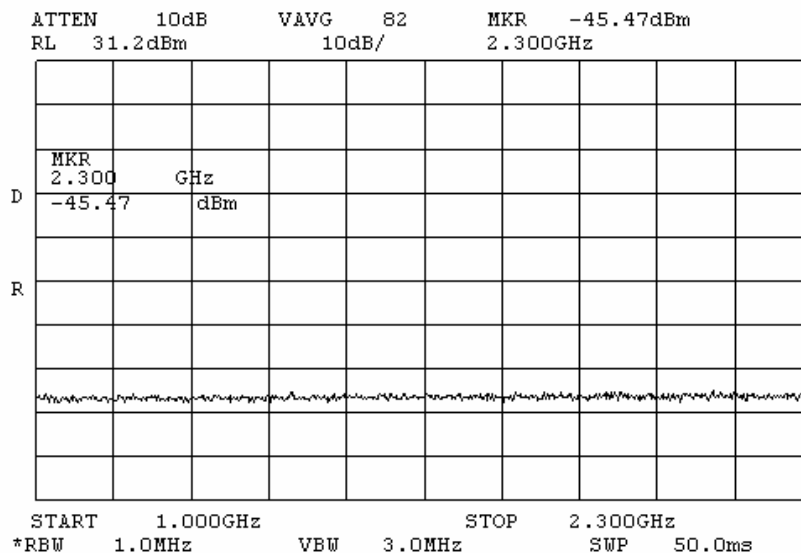
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23

Frequency carrier 2357.5 MHz

Plot # 44



Plot # 45



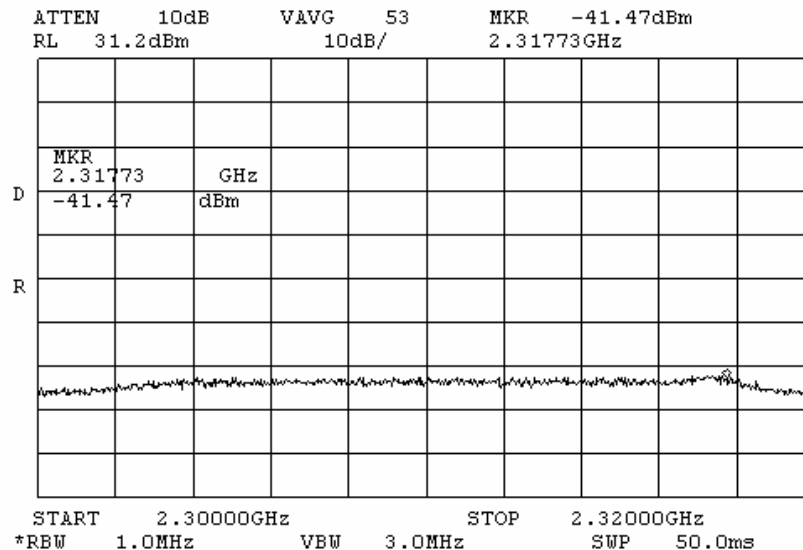
Test report No: 8612329133

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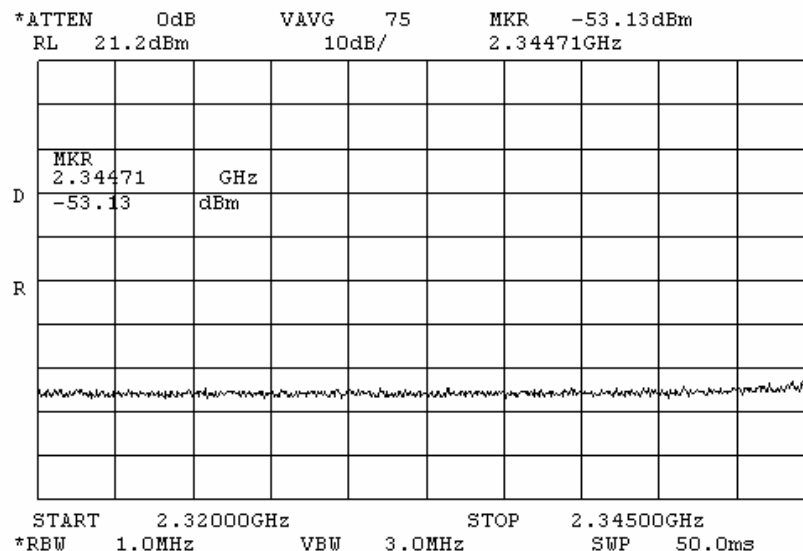
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23



Plot # 46



Plot # 47



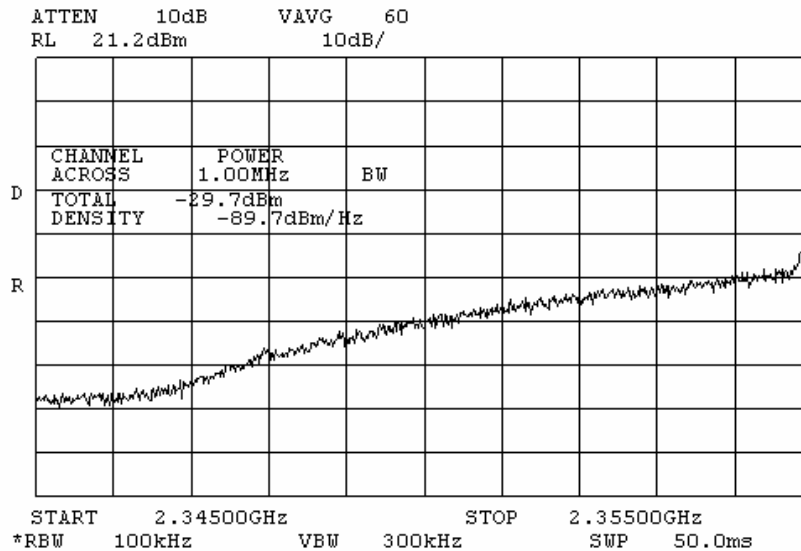
Test report No: 8612329133

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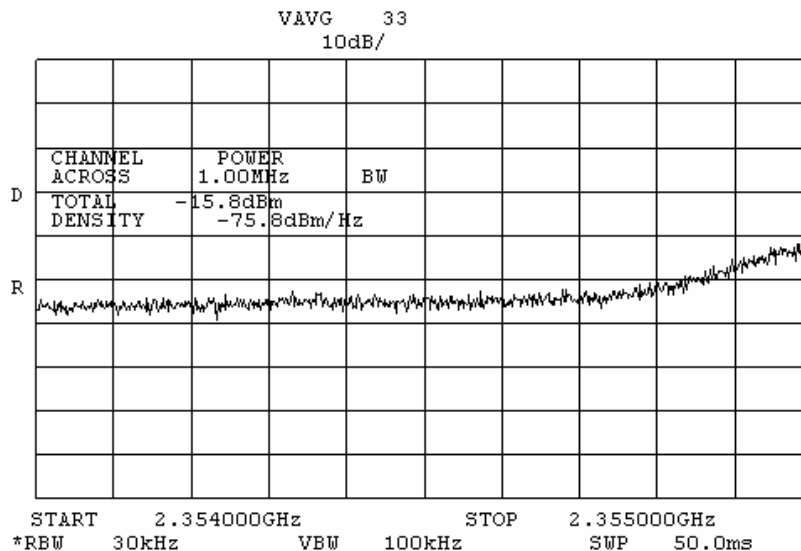
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23



Plot # 48



Plot # 49



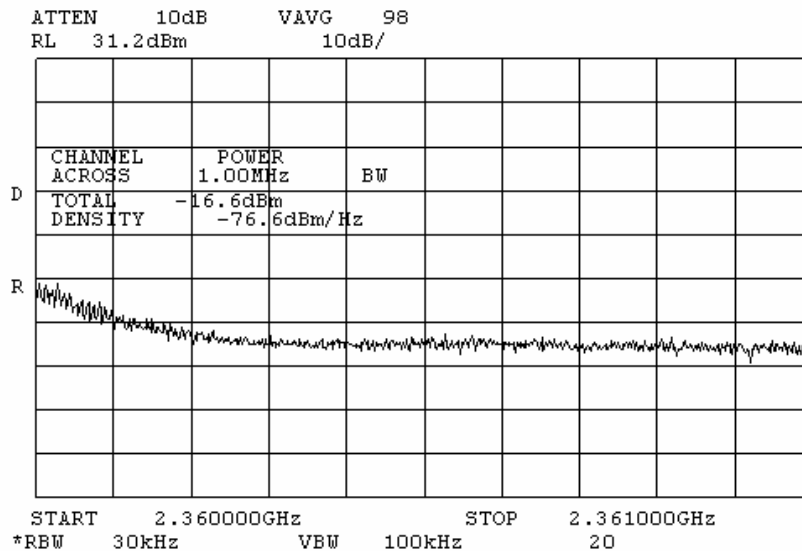
Test report No: 8612329133

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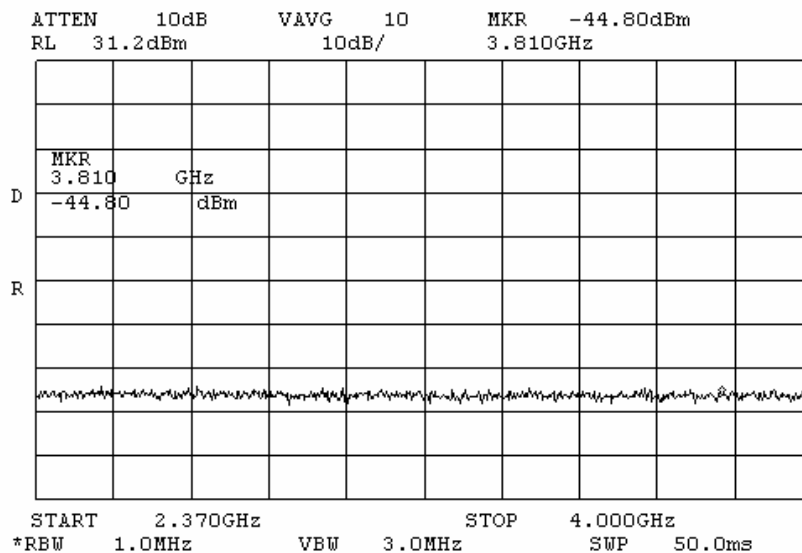
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23



Plot # 50



Plot # 51



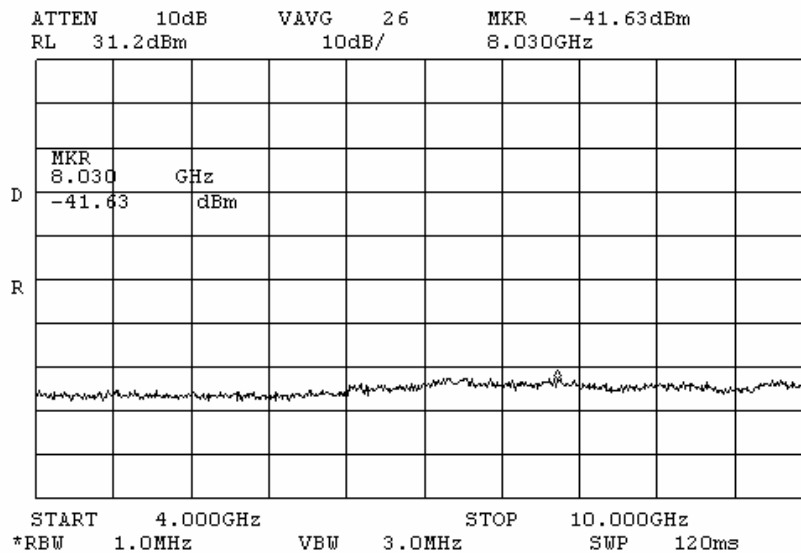
Test report No: 8612329133

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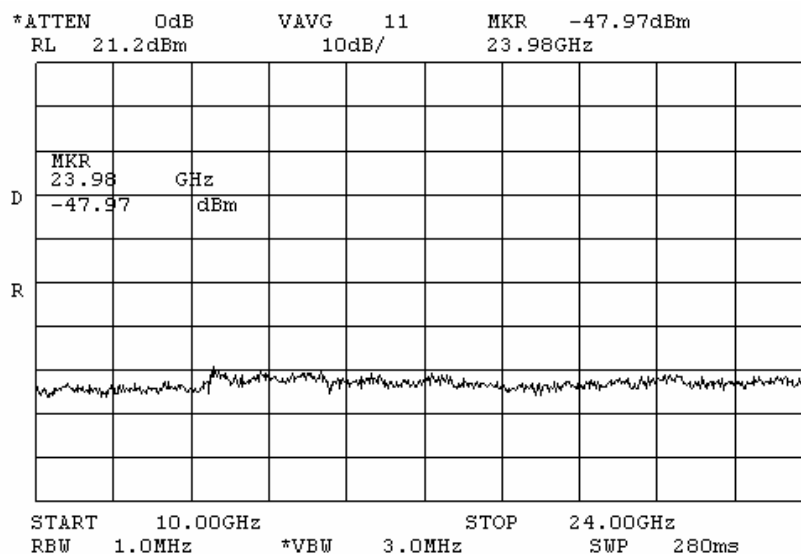
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23



Plot # 52



Plot # 53

**Test report No: 8612329133****Page 38 of 75 Pages****Title: BreezeMAX2300 Broadband Wireless Access System****Model: BMAX-BST-AU- ODU-HP-2.3****FCC ID: LKT-BMAX-BA23****5.1.4 Radiated emissions according to §§ 2.1053, 27.53**

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

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 Plots in this section.

Carrier frequency = 2307.5 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Limit, dBm/dB (μV/m)	Margin, dB	Note	Reference to Plot number
2.082	39.2	-40/55.2	16.0		55
2339	29.4	-50/45.2	15.8		57
23906	20.12	-40/65.2@1m		Noise floor	60

Carrier frequency = 2312.5 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Limit, dBm/dB (μV/m)	Margin, dB	Note	Reference to Plot number
2277	39.4	-40/55.2	-15.8		62
2327	30	-50/45.2	-15.2		64
23780	20.4	-40/65.2@1m		Noise floor	67

Carrier frequency = 2352.5 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Limit, dBm/dB (μV/m)	Margin, dB	Note	Reference to Plot number
2164	35.9	-40/55.2	-19.3		69
2334	29.4	-50/45.2	-15.8		71
23780	20.2	-40/65.2@1m		Noise floor	74

**Test report No: 8612329133****Page 39 of 75 Pages****Title: BreezeMAX2300 Broadband Wireless Access System****Model: BMAX-BST-AU- ODU-HP-2.3****FCC ID: LKT-BMAX-BA23****Carrier frequency = 2357.5 MHz**

Frequency, MHz	Radiated emissions, dB (μV/m)	Limit, dBm/dB (μV/m)	Margin, dB	Note	Reference to Plot number
2268	35.3	-40/55.2	-19.9		76
2325	29.7	-50/45.2	-15.5		78
23780	20.3	-40/65.2@1m		Noise floor	81

TEST PROCEDURE

The test was performed with transmitter operating in 4 carrier frequencies 2307.5 MHz; 2312.5 MHz; 2352.5 MHz and 2357.5 MHz.

The EUT was placed on a wooden 80 cm height turntable. The measurements were performed in Max hold mode at 1 and 3 m test distance. To find maximum radiation the turntable was rotated 360°, measuring antenna height was changed from 1 to 4 m, and the antennas polarization was changed from vertical to horizontal.

LIMIT

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

TEST EQUIPMENT USED:

3	4	5	6	9	12	
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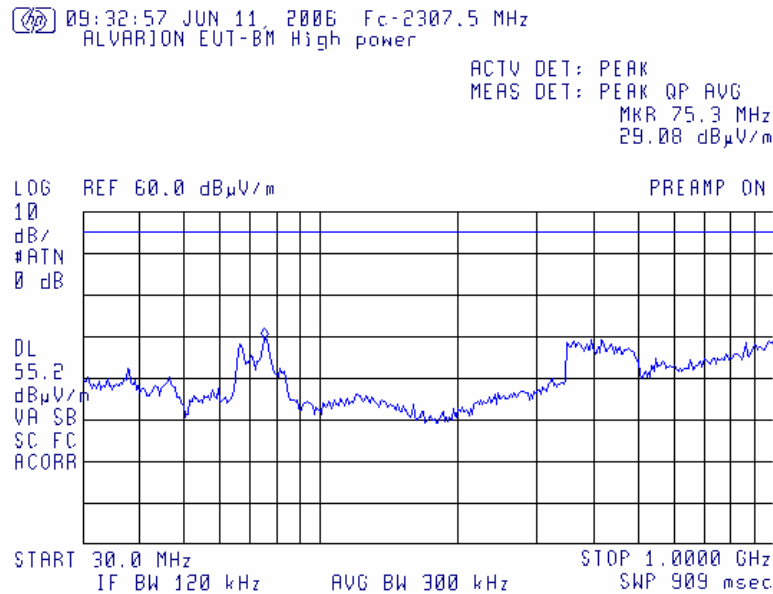
Test report No: 8612329133

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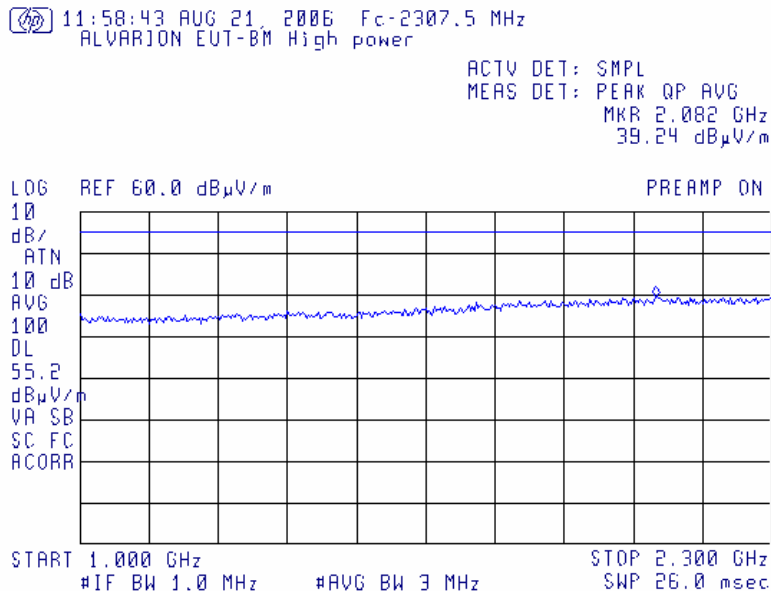
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23



Plot # 54



Plot # 55



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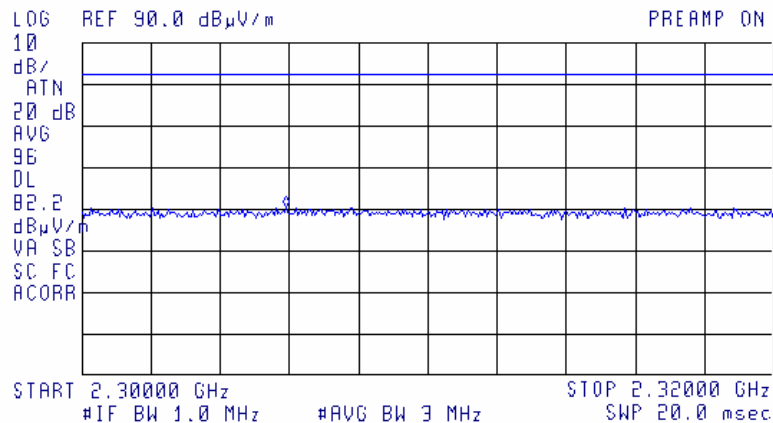
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23

12:05:34 AUG 21, 2006 Fc-2307.5 MHz
ALVARION EUT-BM High power

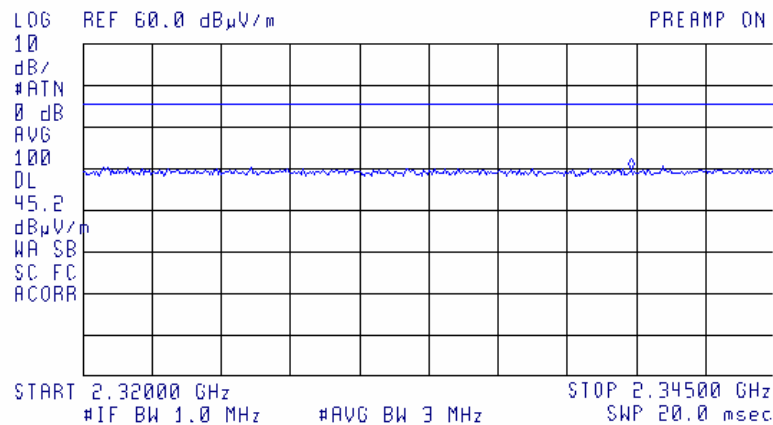
ACTV DET: SMPL
MEAS DET: PEAK QP AVG
MKR 2.30590 GHz
50.17 dB μ V/m



Plot # 56

12:07:49 AUG 21, 2006 Fc-2307.5 MHz
ALVARION EUT-BM High power

ACTV DET: SMPL
MEAS DET: PEAK QP AVG
MKR 2.33981 GHz
29.46 dB μ V/m



Plot # 57



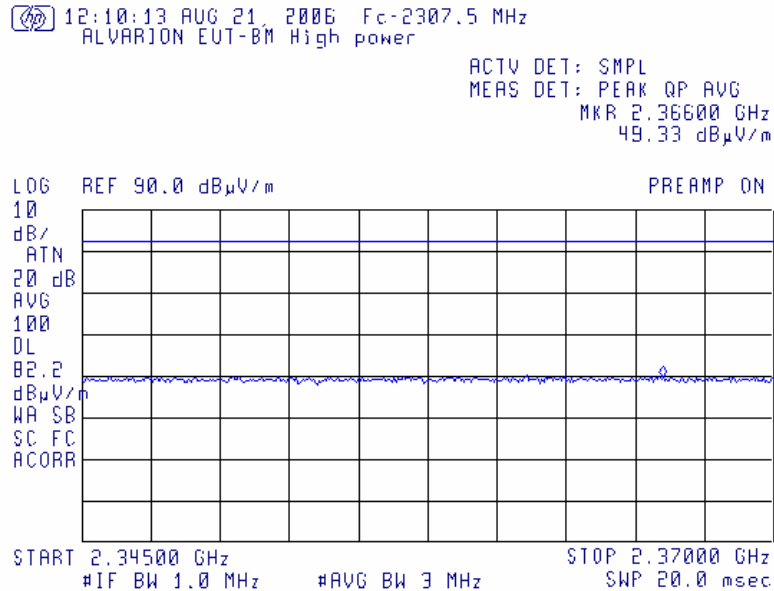
Test report No: 8612329133

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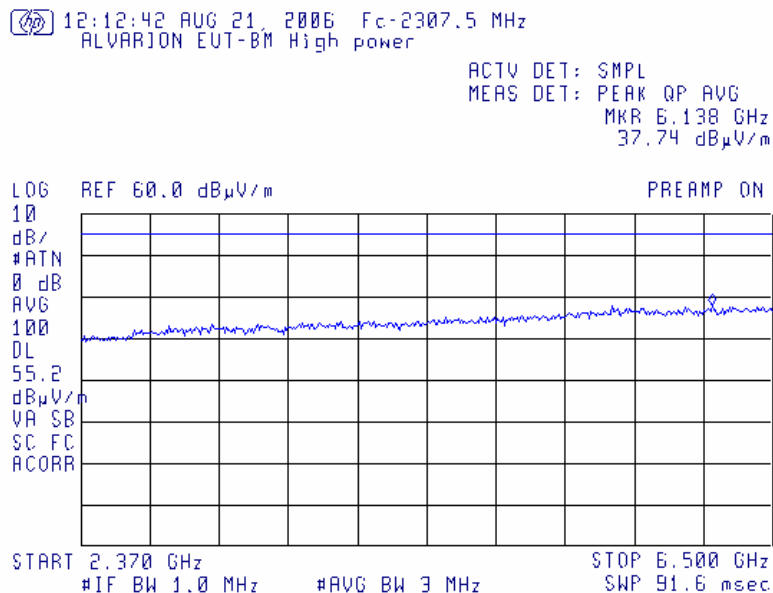
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23



Plot # 58



Plot # 59



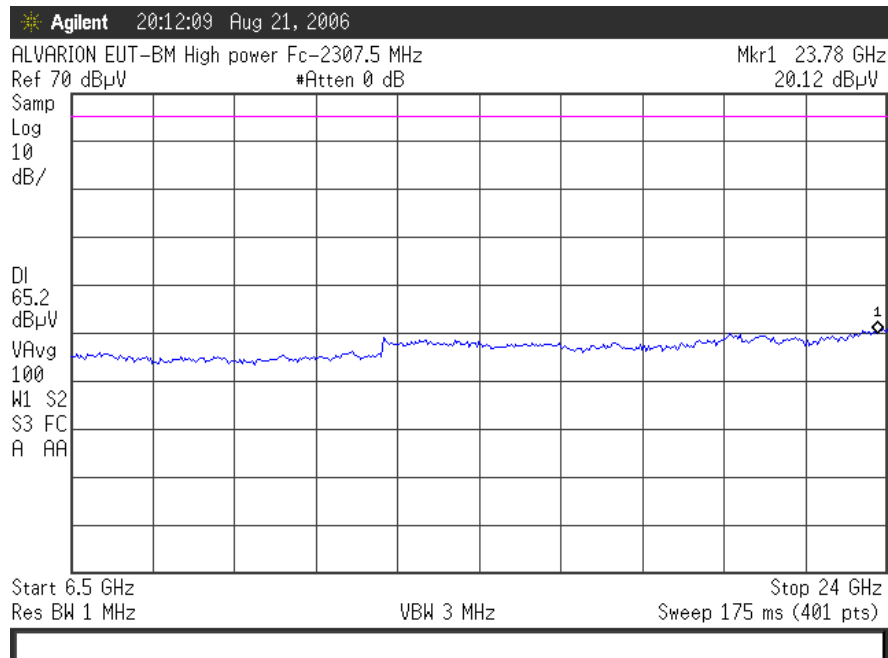
Test report No: 8612329133

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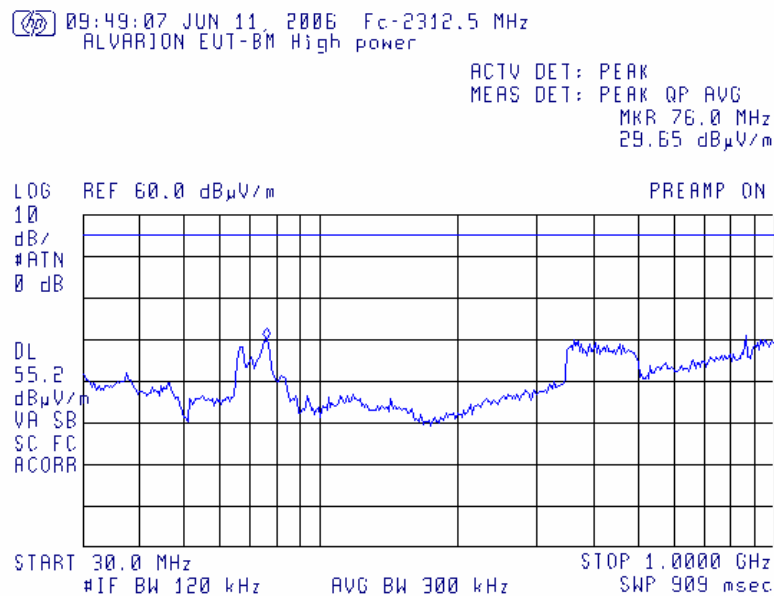
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23



Plot # 60



Plot # 61



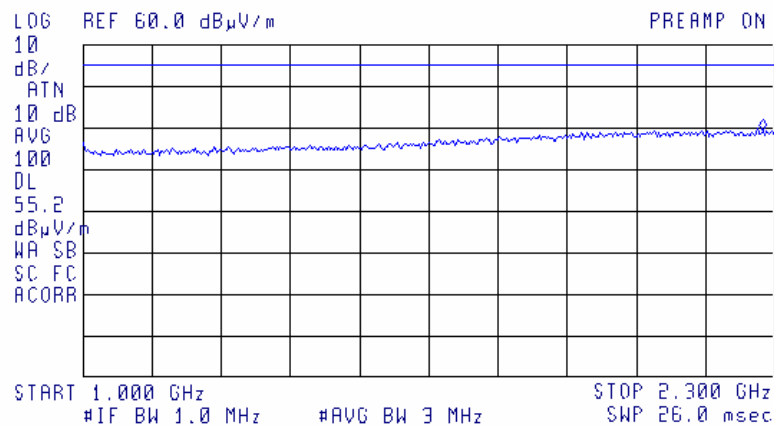
Test report No: 8612329133

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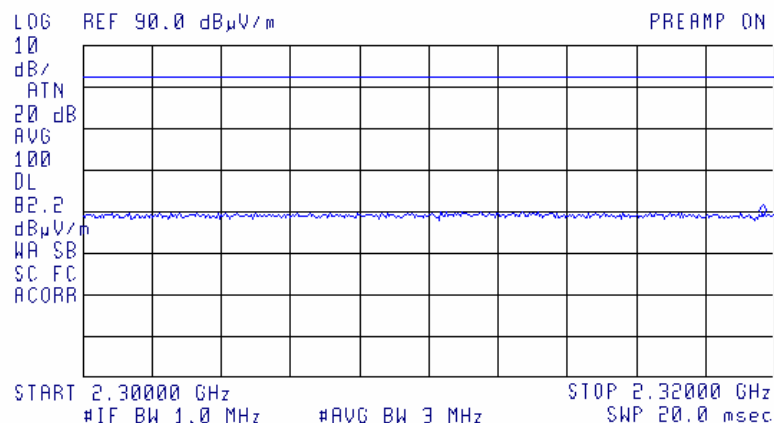
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23

12:17:57 AUG 21, 2006 Fc=2312.5 MHz
ALVARION EUT-BM High powerACTV DET: SMPL
MEAS DET: PEAK QP AVG
MKR 2.277 GHz
39.37 dB μ V/m

Plot # 62

12:19:27 AUG 21, 2006 Fc=2312.5 MHz
ALVARION EUT-BM High powerACTV DET: SMPL
MEAS DET: PEAK QP AVG
MKR 2.31965 GHz
48.95 dB μ V/m

Plot # 63



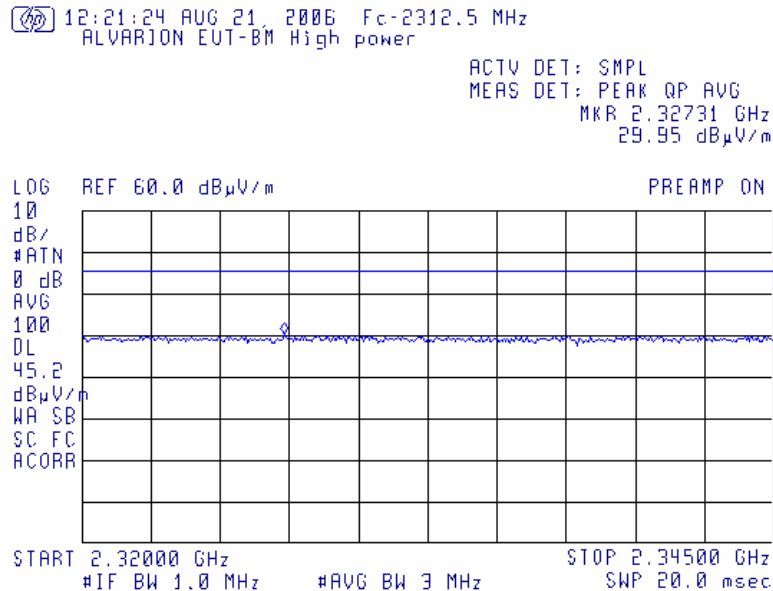
Test report No: 8612329133

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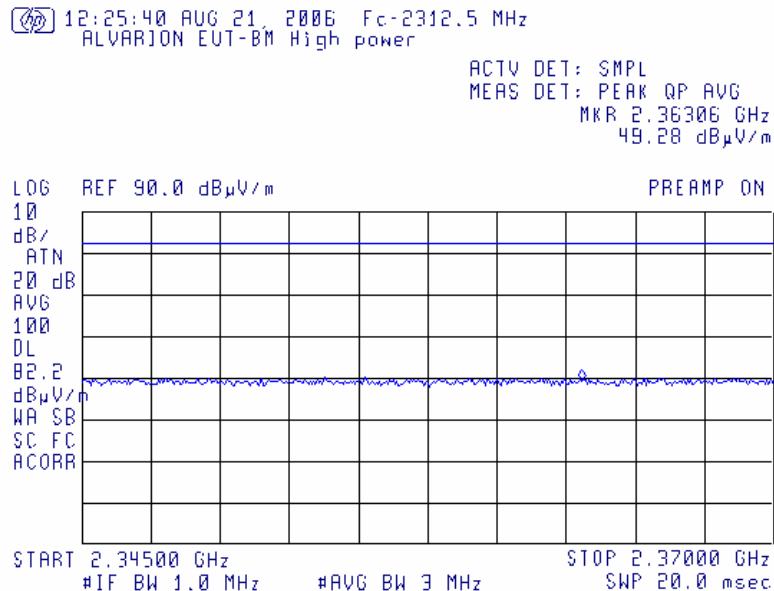
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23



Plot # 64



Plot # 65



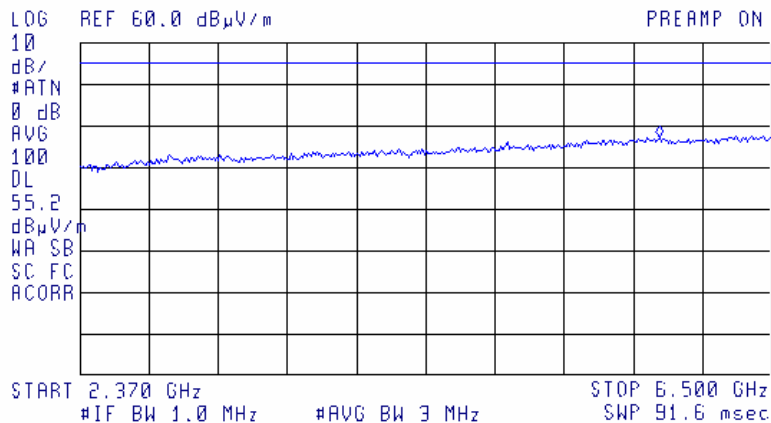
Test report No: 8612329133

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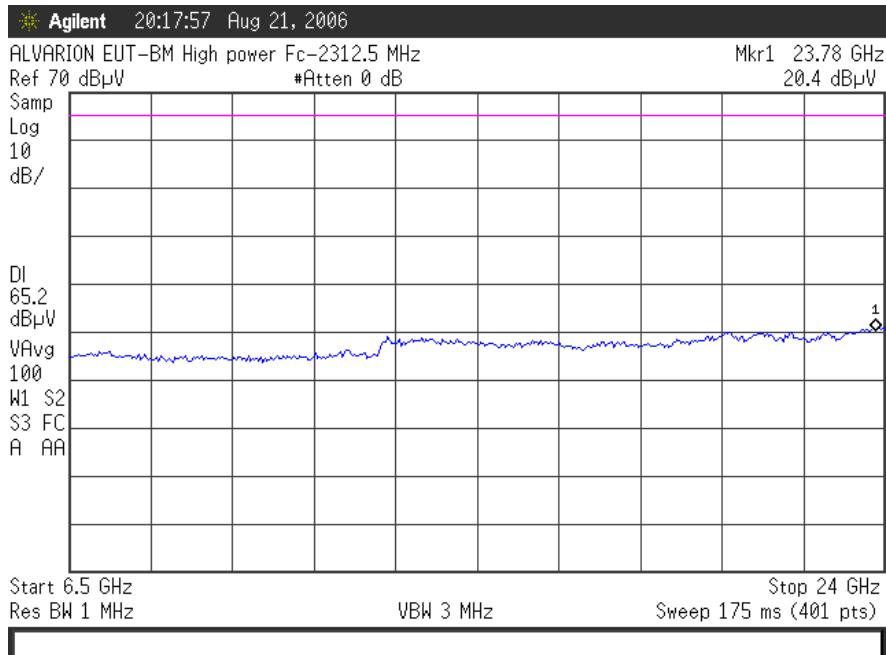
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23

12:29:18 AUG 21, 2006 Fc-2312.5 MHz
ALVARION EUT-BM High powerACTV DET: SMPL
MEAS DET: PEAK QP AVG
MKR 5.828 GHz
37.26 dBμV/m

Plot # 66



Plot # 67



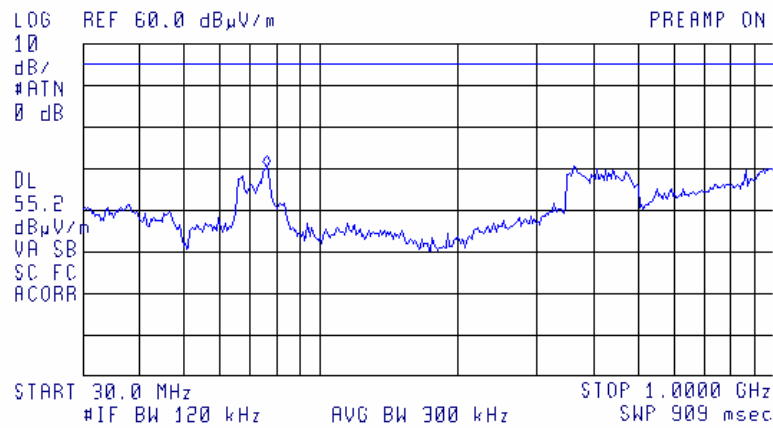
Test report No: 8612329133

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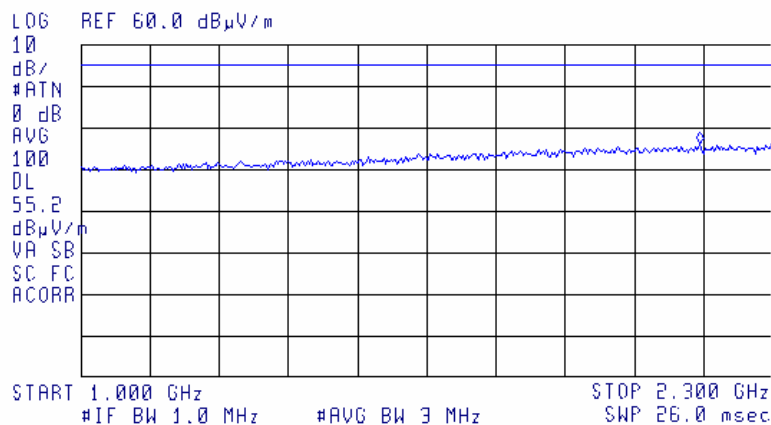
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23

09:52:52 JUN 11, 2006 Fc-2352.5 MHz
ALVARION EUT-BM High powerACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 76.0 MHz
30.13 dB μ V/m

Plot # 68

12:31:54 AUG 21, 2006 Fc-2352.5 MHz
ALVARION EUT-BM High powerACTV DET: SMPL
MEAS DET: PEAK QP AVG
MKR 2.164 GHz
35.89 dB μ V/m

Plot # 69



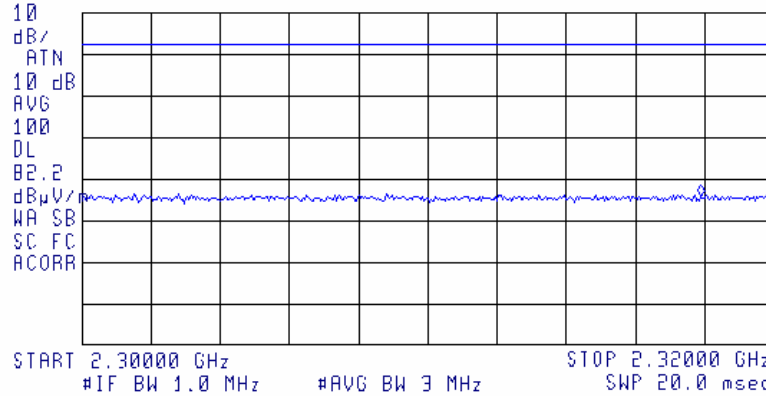
Test report No: 8612329133

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Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

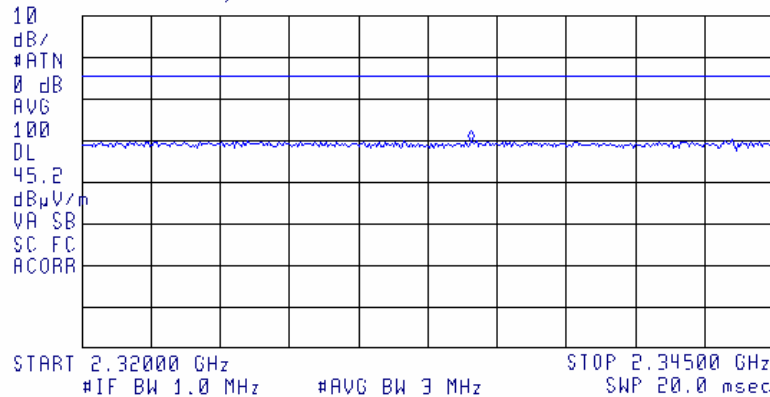
FCC ID: LKT-BMAX-BA23

12:33:57 AUG 21, 2006 Fc-2352.5 MHz
ALVARION EUT-BM High powerACTV DET: SMPL
MEAS DET: PEAK QP AVG
MKR 2.31790 GHz
45.53 dB μ V/mLOG REF 90.0 dB μ V/m

Plot # 70

12:36:37 AUG 21, 2006 Fc-2352.5 MHz
ALVARION EUT-BM High powerACTV DET: SMPL
MEAS DET: PEAK QP AVG
MKR 2.33406 GHz
29.43 dB μ V/mLOG REF 60.0 dB μ V/m

PREAMP ON



Plot # 71



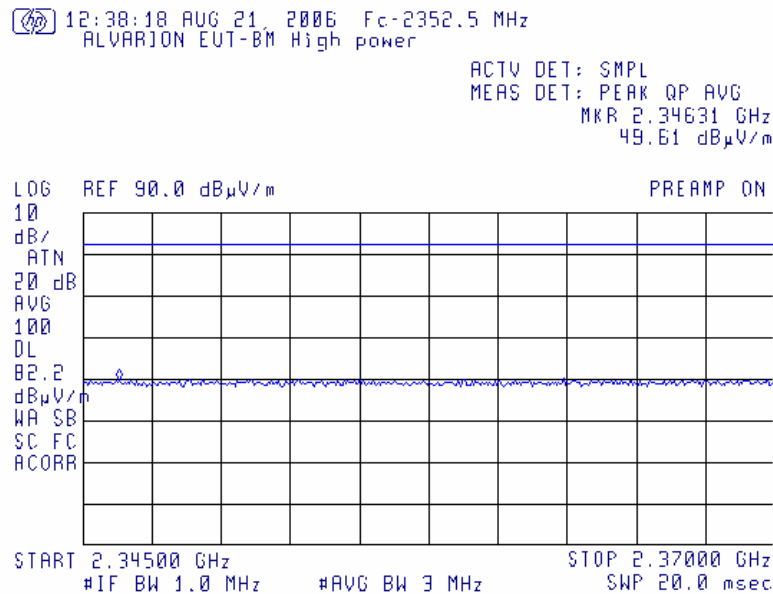
Test report No: 8612329133

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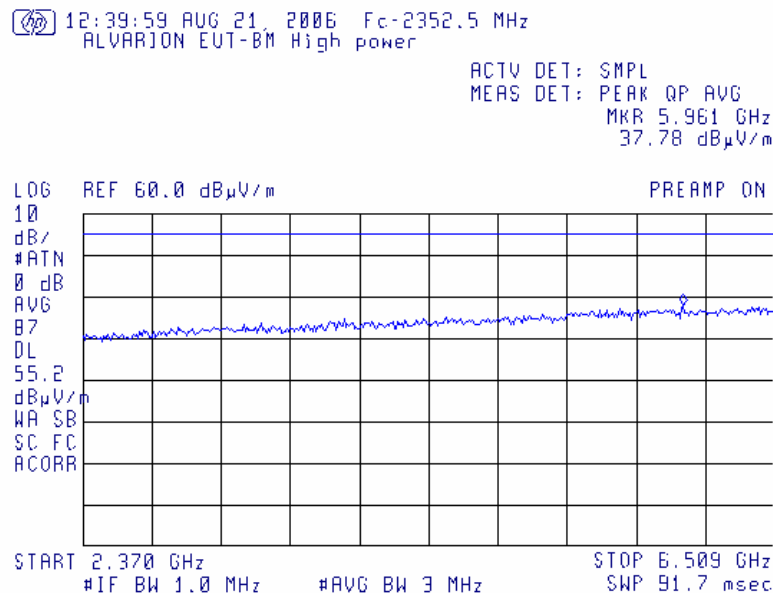
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

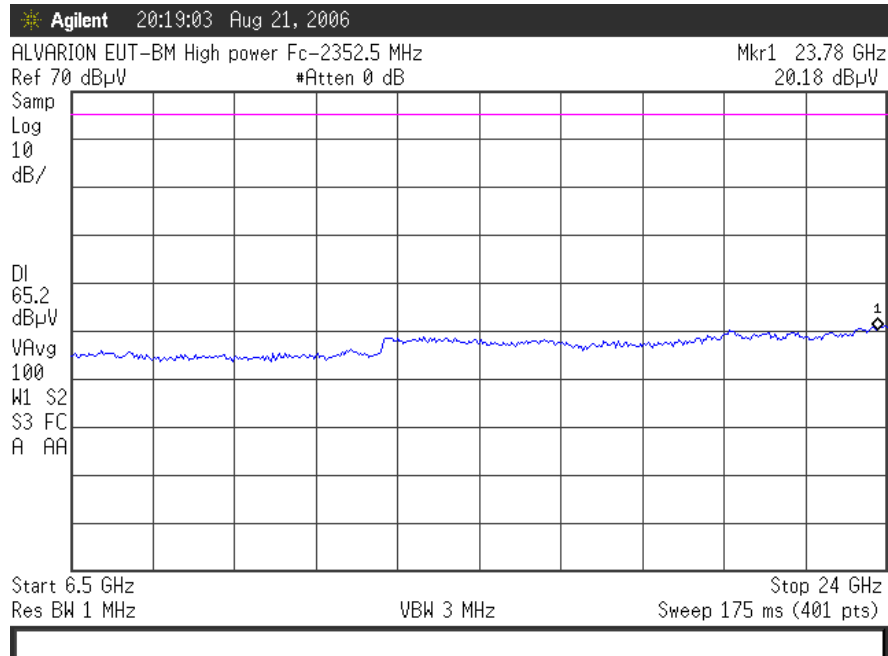
FCC ID: LKT-BMAX-BA23



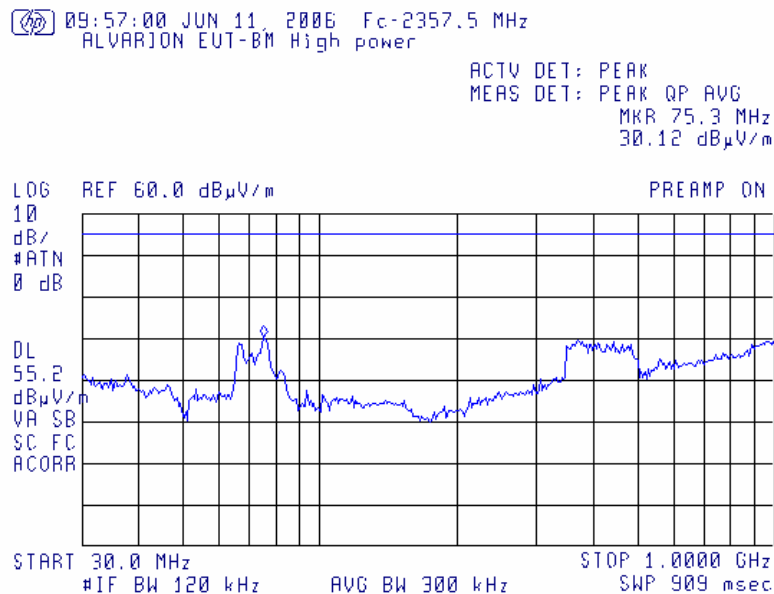
Plot # 72



Plot # 73

**Test report No: 8612329133****Page 50 of 75 Pages****Title: BreezeMAX2300 Broadband Wireless Access System****Model: BMAX-BST-AU- ODU-HP-2.3****FCC ID: LKT-BMAX-BA23**

Plot # 74



Plot # 75



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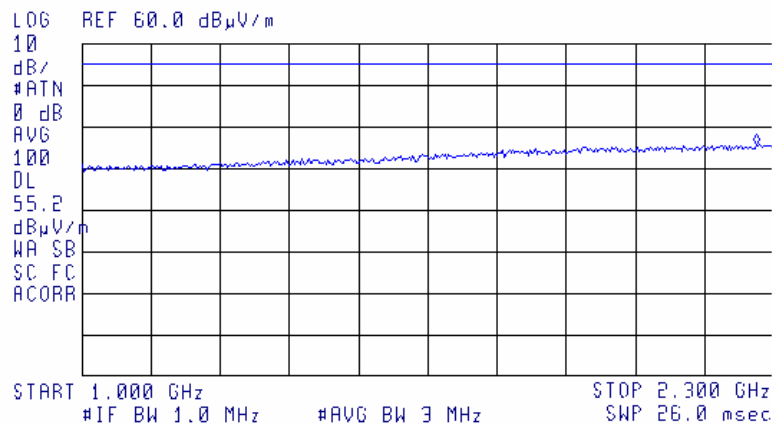
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23

12:42:44 AUG 21, 2006 Fc-2357.5 MHz
ALVARION EUT-BM High power

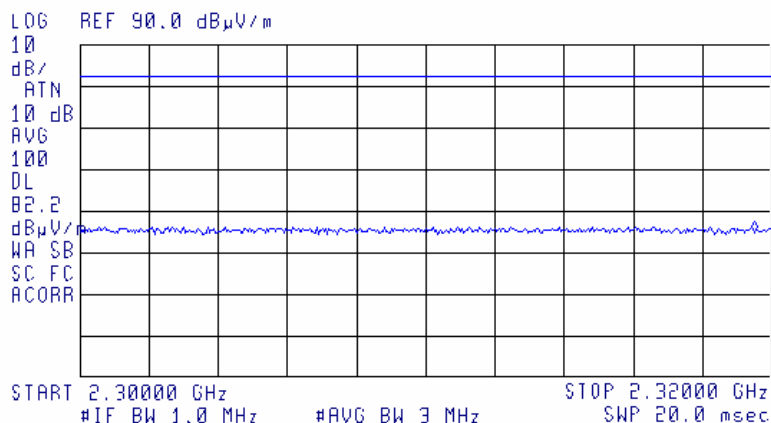
ACTV DET: SMPL
MEAS DET: PEAK QP AVG
MKR 2.268 GHz
35.34 dB μ V/m



Plot # 76

12:45:26 AUG 21, 2006 Fc-2357.5 MHz
ALVARION EUT-BM High power

ACTV DET: SMPL
MEAS DET: PEAK QP AVG
MKR 2.31950 GHz
44.54 dB μ V/m



Plot # 77



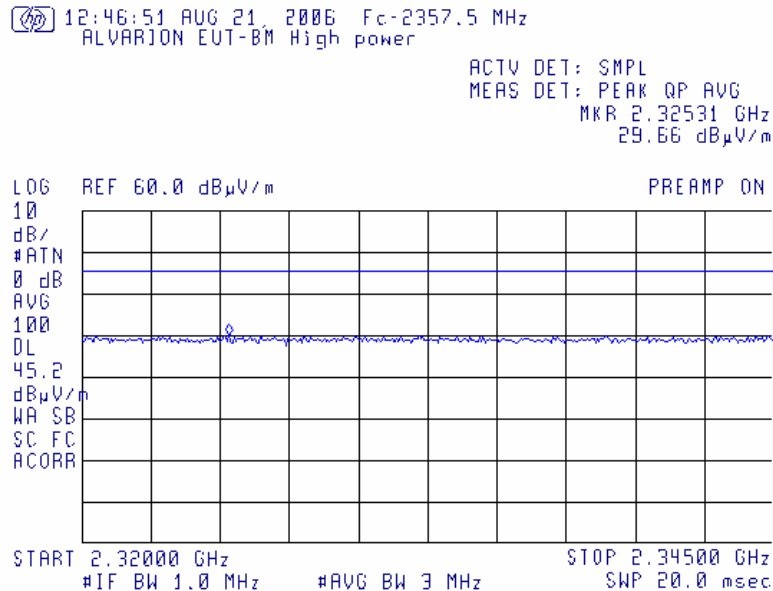
Test report No: 8612329133

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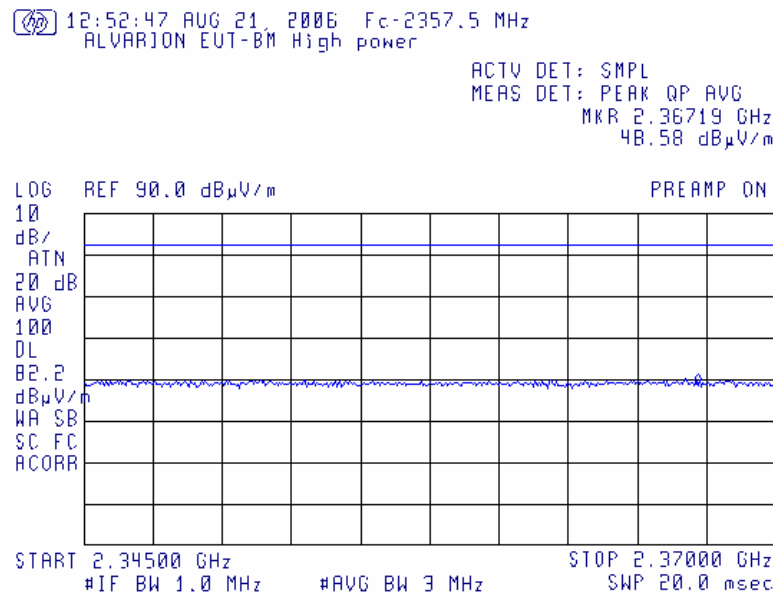
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23



Plot # 78



Plot # 79



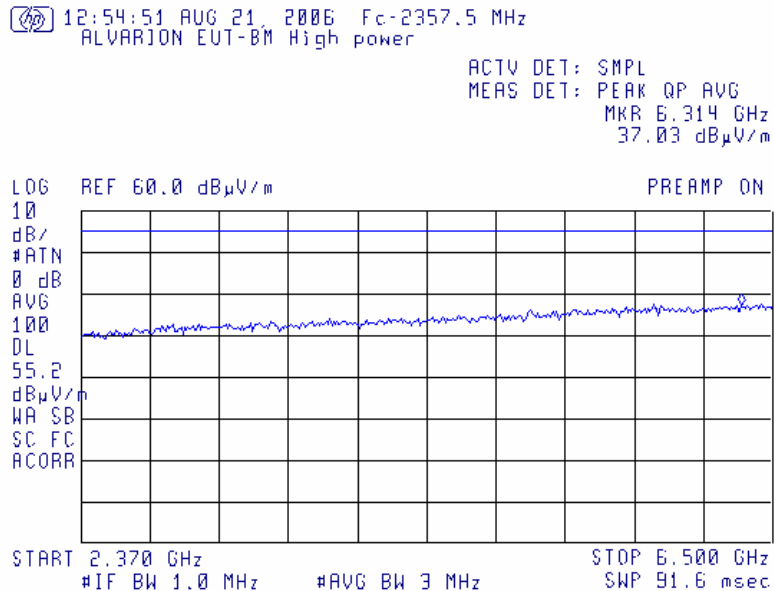
Test report No: 8612329133

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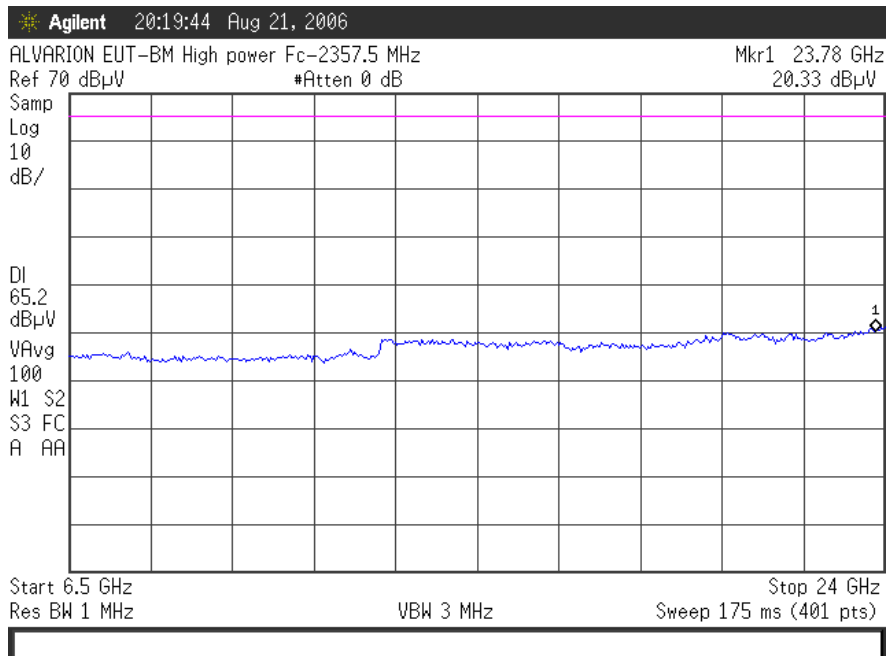
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23



Plot # 80



Plot # 81

**Test report No: 8612329133****Page 54 of 75 Pages****Title: BreezeMAX2300 Broadband Wireless Access System****Model: BMAX-BST-AU- ODU-HP-2.3****FCC ID: LKT-BMAX-BA23****5.1.5 Frequency stability test according to § 27.54**

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

TEST CONDITIONS		Frequency stability test result			
		Carrier frequency 2307.5 MHz	Carrier frequency 2312.5 MHz	Carrier frequency 2352.5 MHz	Carrier frequency 2357.5 MHz
+20°C	Vnom (100%)	2307.498	2312.498	2352.498	2357.499
-30°C	Vmin (85%)	2307.499	2312.498	2352.499	2357.499
	Vmax (115%)	2307.498	2312.498	2352.499	2357.498
+50°C	Vmin (85%)	2307.500	2312.499	2352.499	2357.499
	Vmax (115%)	2307.500	2312.499	2352.499	2357.499

TEST PROCEDURE

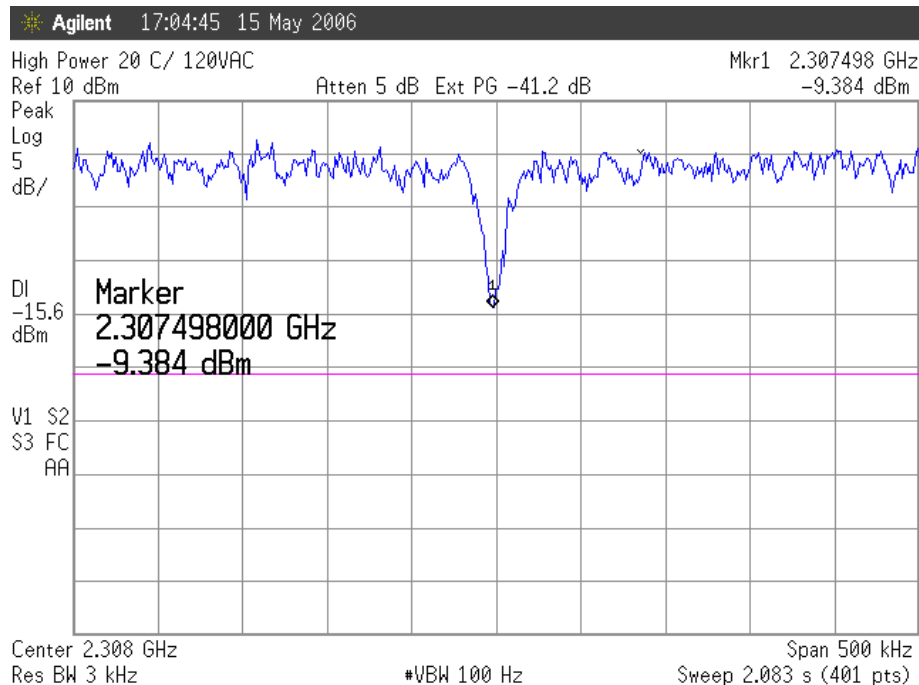
The EUT was placed in a climatic chamber and allowed to stabilize at 20°C temperature and nominal voltage for at list 15 min. The reference carrier frequency was taken. The temperature in climatic chamber was varied from -30°C to +50°C and input voltage was changed from 85% of nominal to 115% in turn.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

LIMIT

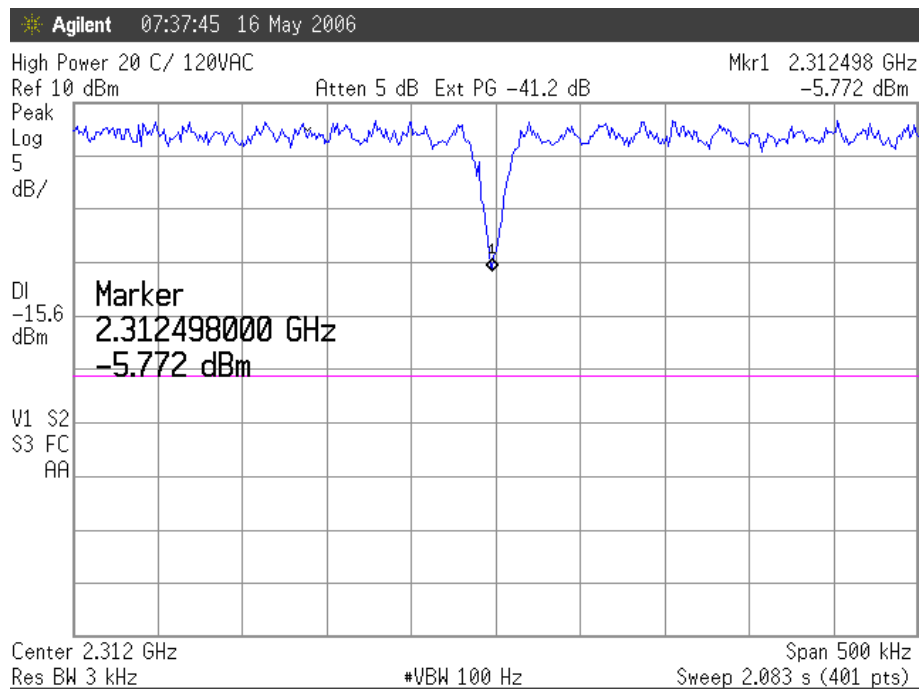
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

TEST EQUIPMENT USED:

2	9	12				
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Plot # 82



Plot # 83



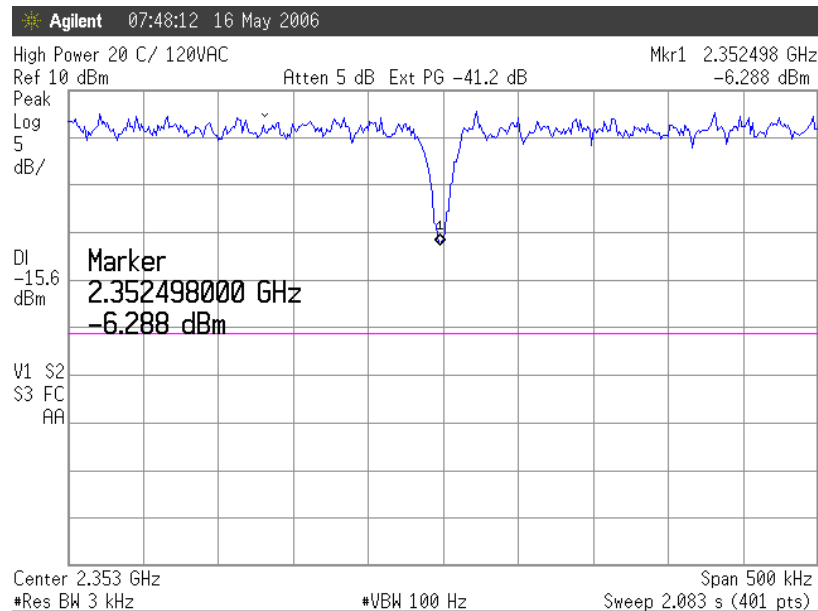
Test report No: 8612329133

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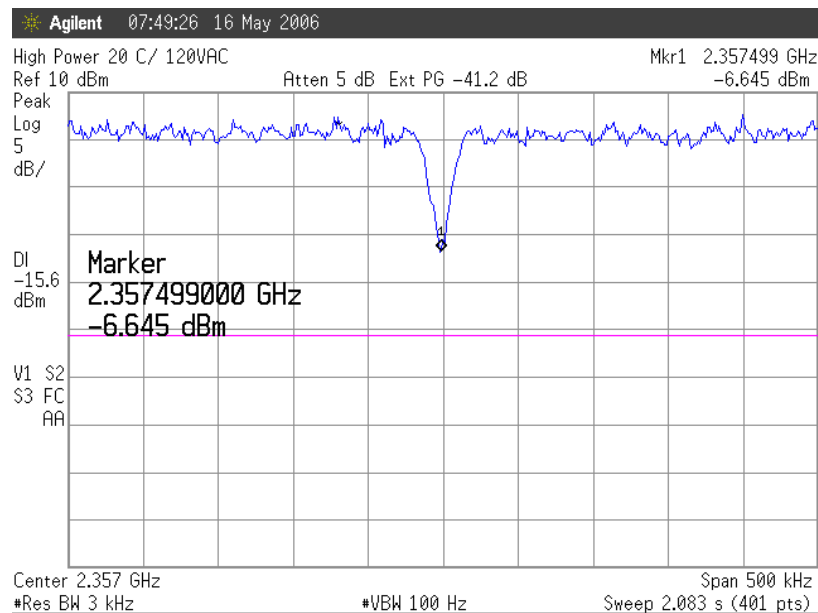
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

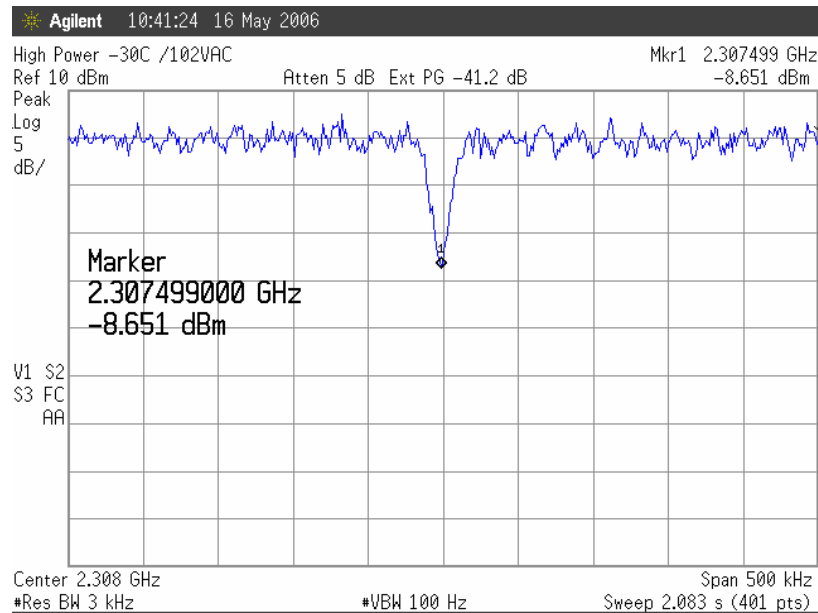
FCC ID: LKT-BMAX-BA23



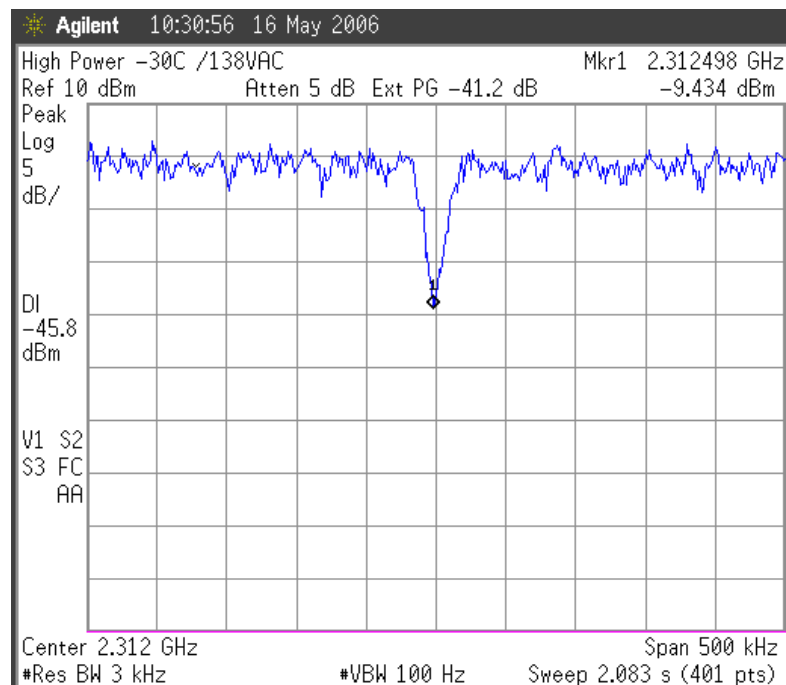
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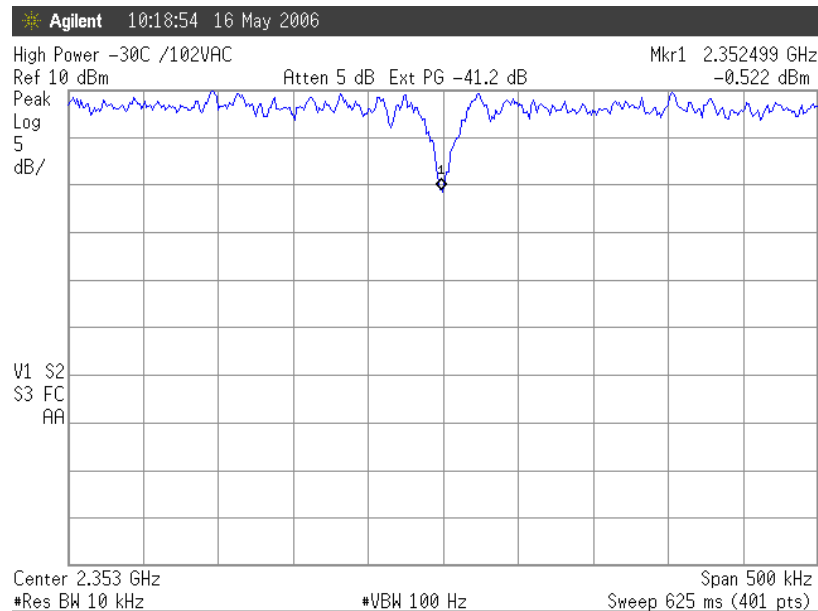
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**Test report No: 8612329133****Page 57 of 75 Pages****Title: BreezeMAX2300 Broadband Wireless Access System****Model: BMAX-BST-AU- ODU-HP-2.3****FCC ID: LKT-BMAX-BA23**

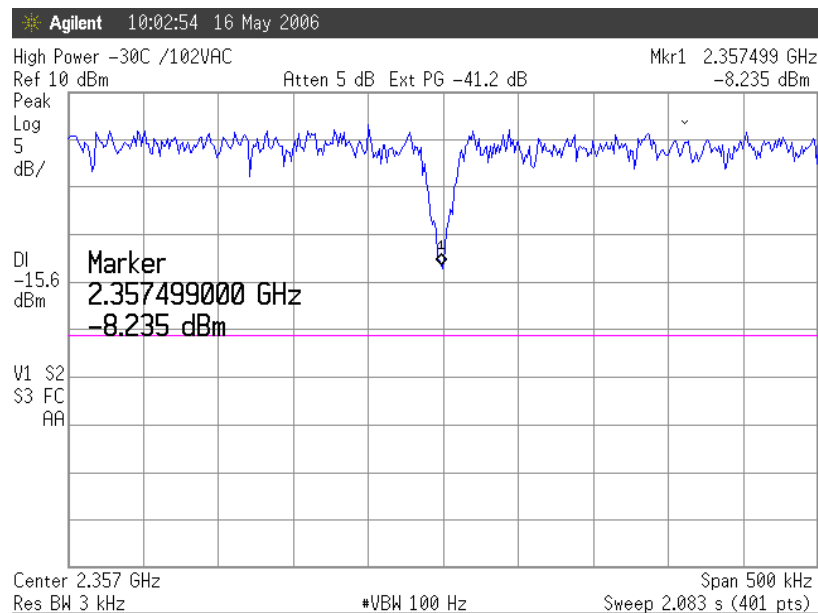
Plot # 86



Plot # 87

**Test report No: 8612329133****Page 58 of 75 Pages****Title: BreezeMAX2300 Broadband Wireless Access System****Model: BMAX-BST-AU- ODU-HP-2.3****FCC ID: LKT-BMAX-BA23**

Plot # 88



Plot # 89



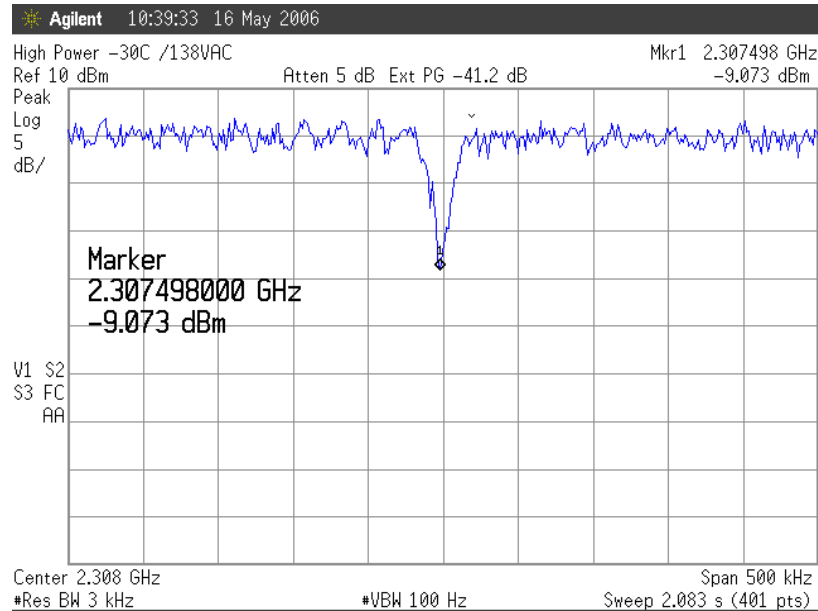
Test report No: 8612329133

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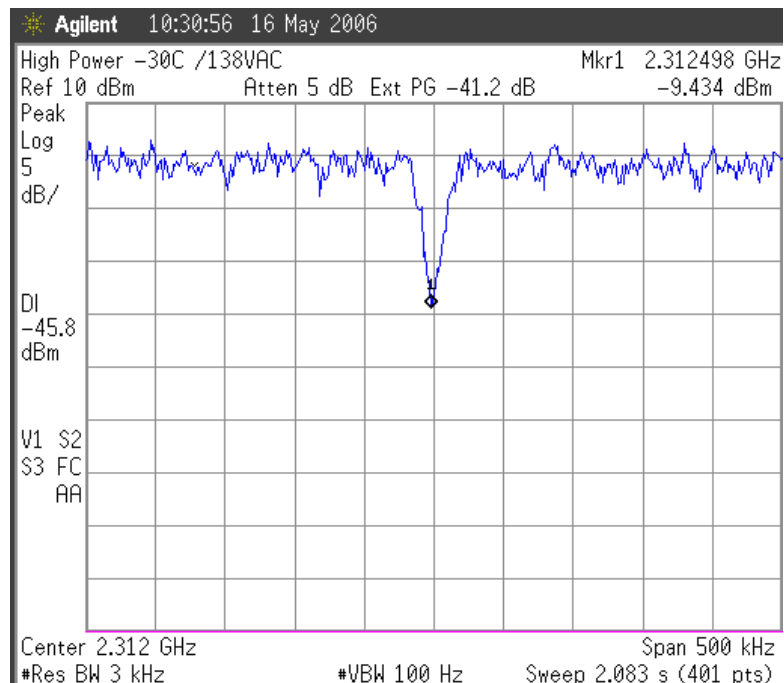
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

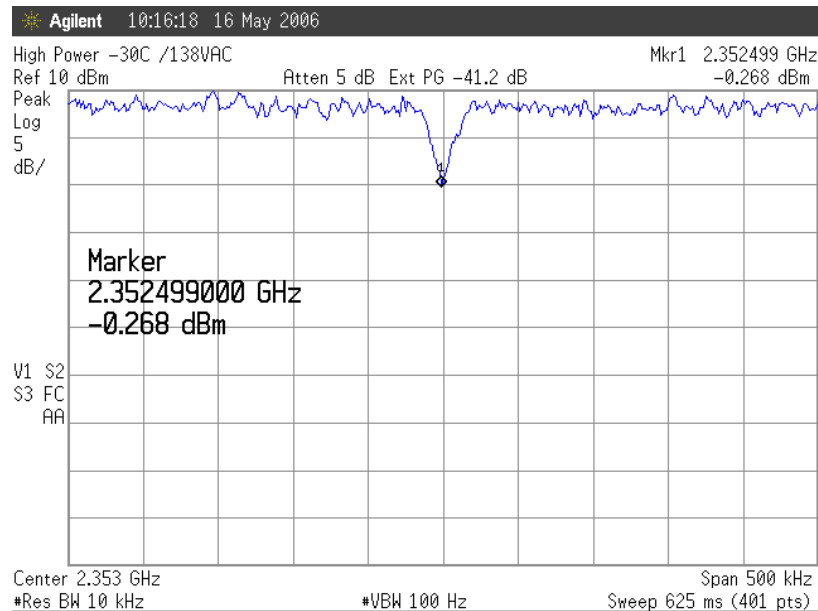
FCC ID: LKT-BMAX-BA23



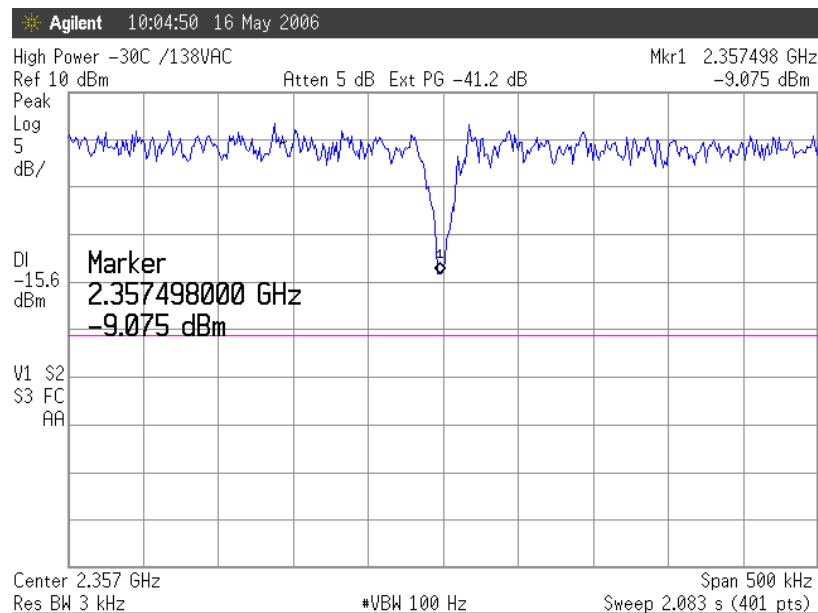
Plot # 90



Plot # 91

**Test report No: 8612329133****Page 60 of 75 Pages****Title: BreezeMAX2300 Broadband Wireless Access System****Model: BMAX-BST-AU- ODU-HP-2.3****FCC ID: LKT-BMAX-BA23**

Plot # 92



Plot # 93



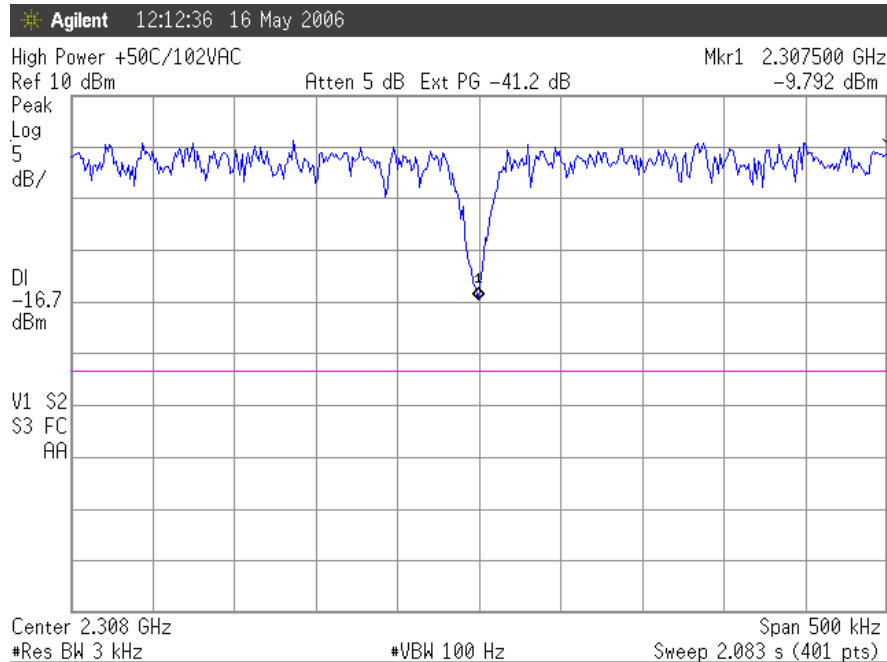
Test report No: 8612329133

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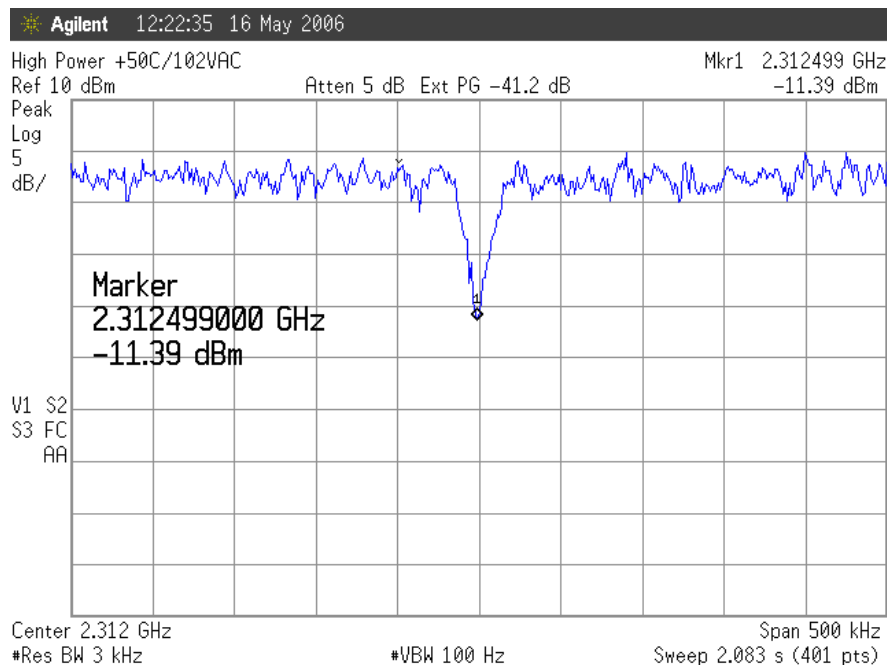
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Model: BMAX-BST-AU- ODU-HP-2.3

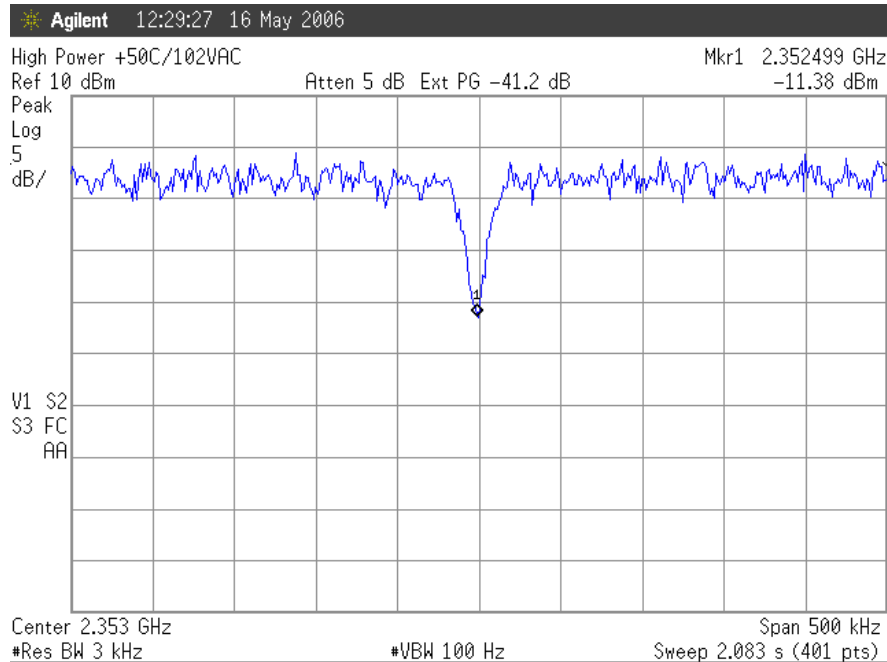
FCC ID: LKT-BMAX-BA23



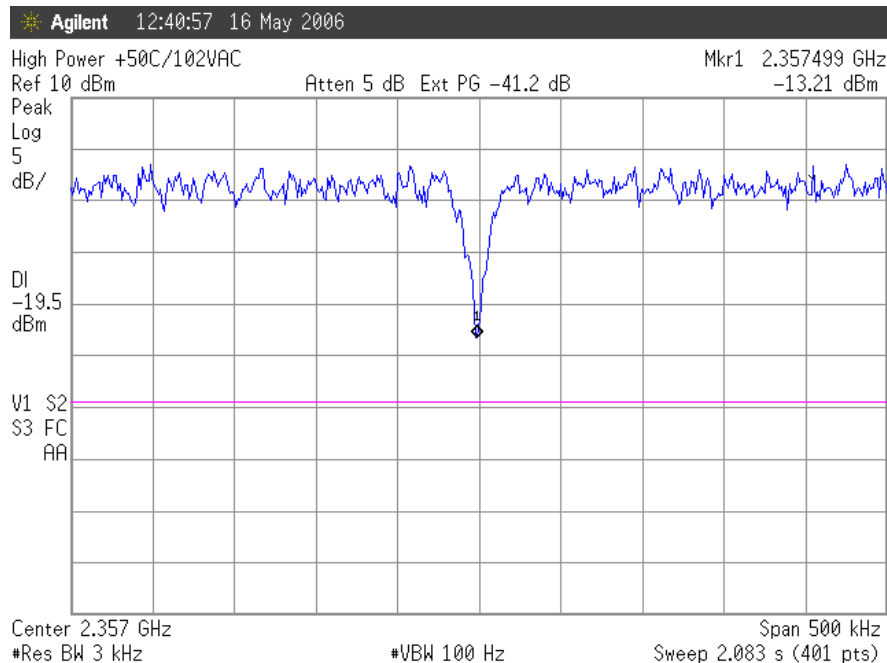
Plot # 94



Plot # 95

**Test report No: 8612329133****Page 62 of 75 Pages****Title: BreezeMAX2300 Broadband Wireless Access System****Model: BMAX-BST-AU- ODU-HP-2.3****FCC ID: LKT-BMAX-BA23**

Plot # 96



Plot # 97



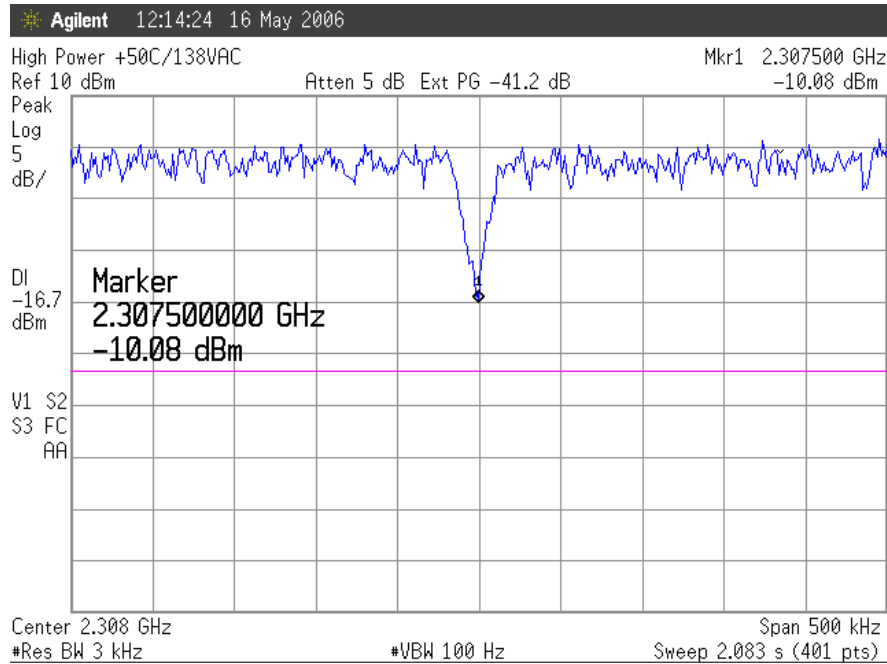
Test report No: 8612329133

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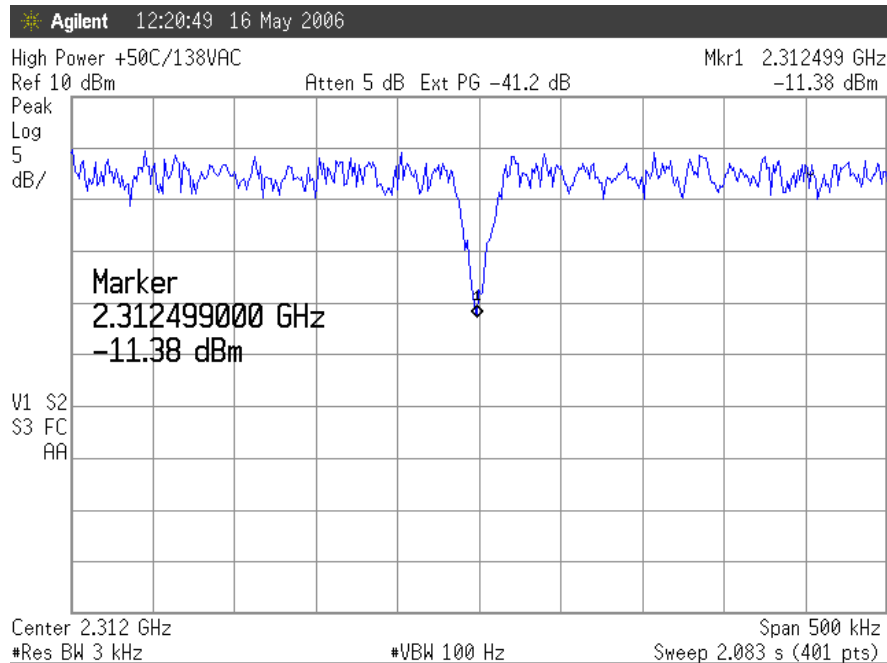
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Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23



Plot # 98



Plot # 99



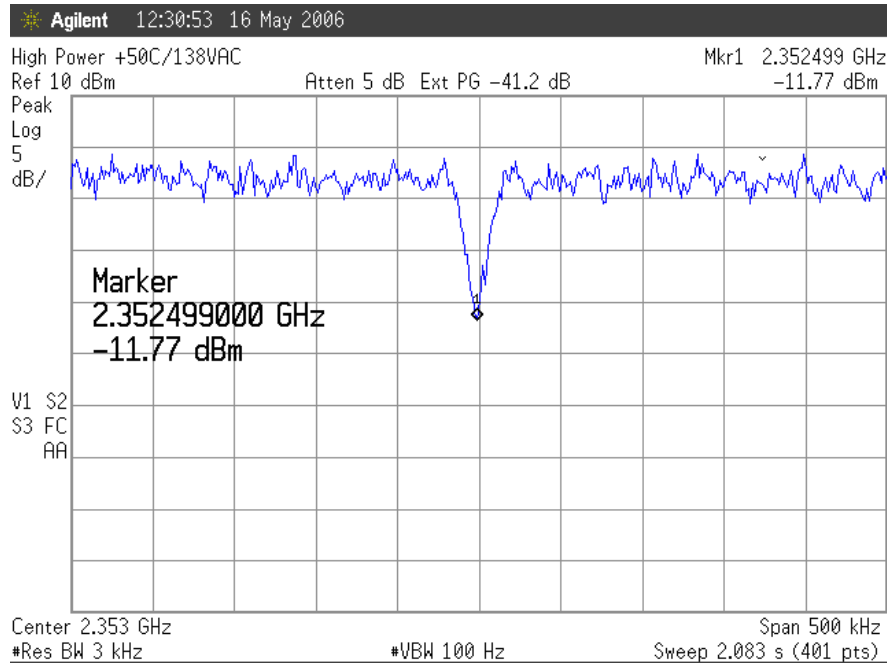
Test report No: 8612329133

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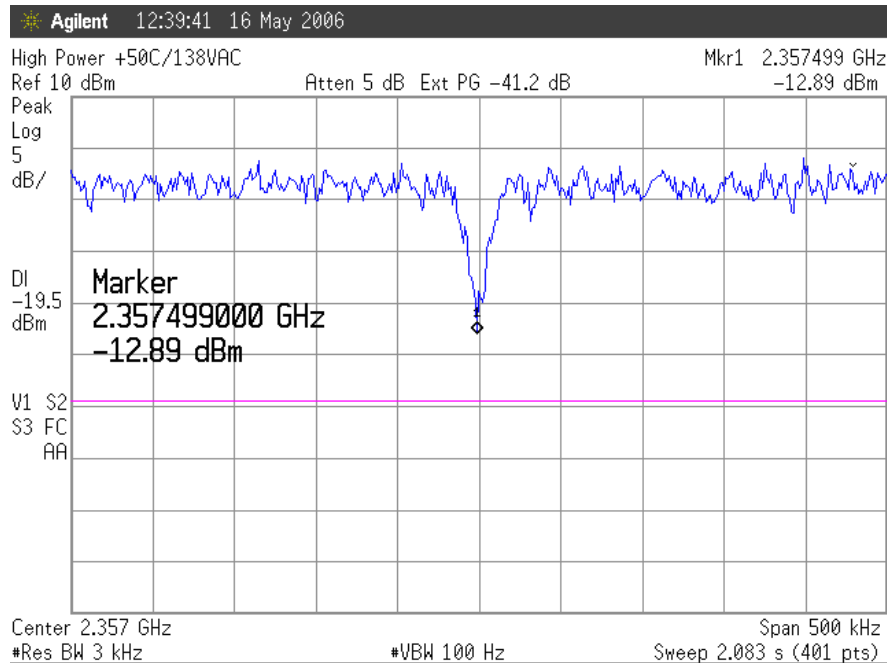
Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23



Plot # 100



Plot # 101

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5.2 Radiated emissions test according to § 15.109

Method of measurement	ANSI 63.4 §13.1.4
Date	5, June 2006
Ambient Temperature	24 ⁰ 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 were 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 15.109 (b) class A

Radiated emissions test result:

Test results are presented in Table 1.

Test equipment used

5	9				
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**Test report No: 8612329133****Page 66 of 75 Pages****Title: BreezeMAX2300 Broadband Wireless Access System****Model: BMAX-BST-AU- ODU-HP-2.3****FCC ID: LKT-BMAX-BA23****Table 1. Radiated emission test results**

Frequency (MHz)	Turn- table Angle (°)	Antenna Polariz.	Antenna Height (m)	Emission Level (dB μ V/m)	Limit @ 10 m (dB μ V/m)	Margin Note 2 (dB)	Results
65.7	189	V	110	21.4	39.0	17.6	Pass
110.9	210	V	115	23.9	43.5	19.6	Pass
119.1	208	V	115	25.8	43.5	17.7	Pass
165.7	19	V	110	23.8	43.5	19.7	Pass
399.9	287	V	110	42.3	46.5	4.2	Pass
799.8	72	H	120	37.8	46.5	8.7	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 § 15.107

Method of measurement ANSI 63.4 §13.1.3
Ambient Temperature 23⁰ C
Relative Humidity 49%
Air Pressure 1006 hPa

Frequency, MHz	Class B equipment, 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 results:

Test results are shown at plots # 1 for line Phase and # 2 for line Neutral

Test equipment used

8	9	10			
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Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23

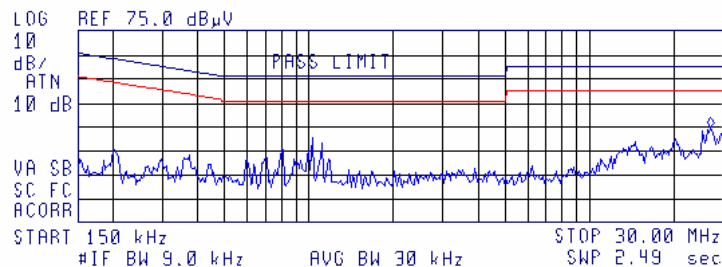
Conducted emissions test. 120V AC. Plot # 1

14:34:52 JUN 04, 2006 BST-IDU Line PH

ALVARION EUT-BMAX 2300

Signal	Freq (MHz)	PK Amp	QP Amp	AV Amp	QPΔL2
1	0.949431	32.0	30.0	20.9	-16.0
2	1.027972	31.2	26.5	12.1	-19.5
3	1.111900	30.1	27.6	19.9	-18.4
4	19.899919	32.5	29.2	23.2	-20.8
5	26.638203	39.1	31.1	19.7	-18.9

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 26.63 MHz
34.51 dBμV



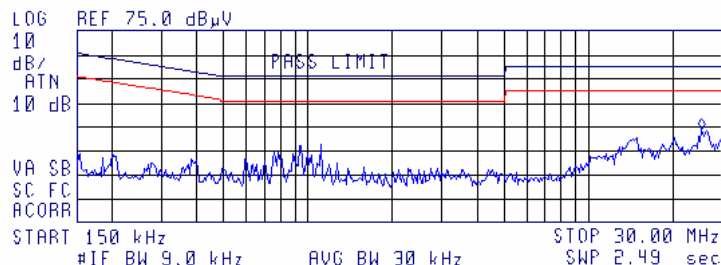
Conducted emissions test. 120V AC. Plot # 2

14:39:30 JUN 04, 2006 BST-IDU Line N

ALVARION EUT-BMAX 2300

Signal	Freq (MHz)	PK Amp	QP Amp	AV Amp	QPΔL2
1	0.948759	30.8	29.1	20.4	-16.9
2	1.034039	29.2	24.6	11.3	-21.4
3	14.578255	32.1	29.2	20.5	-20.8
4	19.904036	32.5	29.5	23.0	-20.5
5	26.439231	33.4	29.1	21.2	-20.9

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 25.13 MHz
34.14 dBμV



Test report No: 8612329133**Page** 69 of 75 Pages**Title:** BreezeMAX2300 Broadband Wireless Access System**Model:** BMAX-BST-AU- ODU-HP-2.3**FCC ID:** LKT-BMAX-BA23**APPENDIX A****Photo 1. Outdoor unit. Test setup****Photo 2. Indoor unit. Test setup on OATS**

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Title: BreezeMAX2300 Broadband Wireless Access System

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Photo 3. High power amplifier, cavity filter, base unit PCB.



Photo 4. Basic unit internal 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	8563E	A01508	May 2007
2	Attenuators 30 dB DC - 18 GHz	Weinshel Engineering	33-30-34	A3451	Aug 2006
3	Cable RF 1m	Huber-Suhner	Sucoflex 104	21324/4PE	Aug 2006
4	Double Ridged Guide Antenna 1 – 18 GHz	EMCO	3115	5802	March 2007
5	Antenna Biconilog 30 – 2000 MHz	Schaffner-Chase	CBL6112B	S/N 2531	Dec 2006
6	EMI Receiver 9 kHz-6.5 GHz	HP	8546A+8546 0A	SII 4068	March 2007
7	LISN 9 kHz – 30 MHz	FCC	LISN 250-32-4-16	SII5023	Feb 2007
8	Transient limiter 0.009-200 MHz	HP	11947A	3107105	March 2007
9	Spectrum analyzer 10 KHz-26.5 GHz	HP	E7405A	SII 4944	Feb 2007
10	Attenuator 50 Ohm 30 dB DC-18 GHz	HP	8491B	50655	May 2007
11	Cable RF 3m	Huber-Suhner	Sucoflex 104PE	21328/4PE	Aug 2006

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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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For Biconilog Antenna, Model Number: CBL-6112B, S/N: 2531
10 m Calibration

Frequency (MHz)	Antenna Factor (dB/m)	Frequency (MHz)	Antenna Factor (dB/m)	Frequency (MHz)	Antenna Factor (dB/m)	Frequency (MHz)	Antenna Factor (dB/m)
Vertical Polarization				Horizontal Polarization			
26.00	20.77	625.00	19.10	26.00	20.39	625.00	19.08
28.00	19.77	650.00	19.20	28.00	19.15	650.00	19.26
30.00	18.72	675.00	19.05	30.00	18.29	675.00	19.12
40.00	14.76	700.00	19.26	40.00	12.64	700.00	19.11
50.00	8.32	725.00	19.73	50.00	7.99	725.00	19.49
60.00	6.15	750.00	20.11	60.00	5.95	750.00	19.94
70.00	6.49	775.00	20.41	70.00	6.04	775.00	20.07
80.00	7.26	800.00	20.50	80.00	7.60	800.00	20.18
90.00	8.83	825.00	20.57	90.00	9.07	825.00	20.36
100.00	10.55	850.00	20.73	100.00	10.34	850.00	20.57
110.00	11.38	875.00	20.92	110.00	11.12	875.00	20.83
120.00	11.71	900.00	20.79	120.00	11.46	900.00	20.74
130.00	11.57	925.00	21.02	130.00	11.47	925.00	21.17
140.00	11.09	950.00	21.32	140.00	11.15	950.00	21.11
150.00	10.46	975.00	21.76	150.00	10.50	975.00	21.52
160.00	9.82	1,000.00	21.97	160.00	9.86	1,000.00	21.64
170.00	9.52	1,050.00	22.55	170.00	9.58	1,050.00	22.02
180.00	9.18	1,100.00	22.47	180.00	9.28	1,100.00	22.16
190.00	8.90	1,150.00	22.78	190.00	9.54	1,150.00	22.44
200.00	9.11	1,200.00	22.77	200.00	9.82	1,200.00	22.86
225.00	9.70	1,250.00	23.36	225.00	10.42	1,250.00	23.37
250.00	12.41	1,300.00	23.90	250.00	12.43	1,300.00	23.86
275.00	12.81	1,350.00	24.19	275.00	13.19	1,350.00	24.02
300.00	13.37	1,400.00	24.42	300.00	13.48	1,400.00	24.42
325.00	13.70	1,450.00	24.83	325.00	13.73	1,450.00	24.61
350.00	14.45	1,500.00	24.88	350.00	14.61	1,500.00	25.02
375.00	14.90	1,550.00	24.85	375.00	15.15	1,550.00	25.27
400.00	15.63	1,600.00	25.06	400.00	15.74	1,600.00	25.27
425.00	16.38	1,650.00	25.55	425.00	16.52	1,650.00	25.50
450.00	16.43	1,700.00	26.20	450.00	16.54	1,700.00	25.48
475.00	17.28	1,750.00	26.45	475.00	17.28	1,750.00	26.35
500.00	17.41	1,800.00	26.58	500.00	17.47	1,800.00	26.51
525.00	17.35	1,850.00	27.30	525.00	17.31	1,850.00	26.63
550.00	18.97	1,900.00	27.96	550.00	18.64	1,900.00	27.04
575.00	18.87	1,950.00	27.80	575.00	18.60	1,950.00	27.13
600.00	18.82	2,000.00	27.73	600.00	19.04	2,000.00	27.20



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Title: BreezeMAX2300 Broadband Wireless Access System

Model: BMAX-BST-AU- ODU-HP-2.3

FCC ID: LKT-BMAX-BA23

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

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