



Test Report No. 8812307226

For ALVARION Ltd.

Equipment Under Test:

***BMAX CPE-ODU-PRO-TDD-3.6
Broadband Wireless Access System***

Outdoor 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 3.6 Broadband Wireless Access System

Model: BMAX-CPE-ODU-PRO-TDD-3.6

FCC ID: LKT-BMAX-SU36

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Title: BreezeMax 3.6 Broadband Wireless Access System

Model: BMAX-CPE-ODU-PRO-TDD-3.6

FCC ID: LKT-BMAX-SU36

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:	January 2008

Equipment under test information

Description of Equipment Under Test (EUT):	Wireless Access BreezeMAX 3.65
Model:	BMAX-CPE-ODU-PRO-TDD-3.6
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 90, part 2 §§ 2.1049, 2.1053, part 1 §1.1310

This Test Report contains 52 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 3.6 Broadband Wireless Access System

Model: BMAX-CPE-ODU-PRO-TDD-3.6

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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 90 §§ 90.1321, 90.1323 and part 2 §§ 2.1049

Parameter	Subclasses
Transmitter characteristics	
99% Occupied bandwidth	2.1049
EIRP radiated power	90.1321(a)
Peak EIRP power density	90.1321(a)
Spurious emissions at antenna terminal	90.1323
Spurious emissions radiated	90.1323
Frequency stability	2.1055
AC main 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

The EUT, Subscriber unit (CPE ODU), a TDD system is a part of a point-to-multipoint communication system, operating at 3.65 GHz band (3650-3675 MHz) with OFDM modulation. Channel spacing is 3.5 MHz and 5 MHz. The system supports up to 12 Mbps data rates for 10/100 Base-T (Ethernet). The basic system configuration of CPE is a two-box configuration that contains Indoors unit and Outdoor unit .The indoor unit includes a power supply and an Ethernet 10/100BaseT (RJ 45) interface. The Outdoor unit includes the integral antenna, modem, radio, data processing and management components of the CPE.

EUT technical characteristics

Transmitter technical characteristics.		Note
Stand-alone/fixed use		
Assigned frequency range	3650 – 3700 MHz	
Operating frequency range	3650 – 3675 MHz	
RF channel spacing	3.5 MHz, 5 MHz	
Maximum rated output power	23 dBm	At transmitter 50 Ω RF output connector
Antenna connection	Connector: SMA	Internal antenna
Transmitter 99% power bandwidth	3.5 MHz, 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
Internal	MTI	TS CPE PRO 3.3-3.8GHz
		Gain
		16.5dBi

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4.1.1 Environmental evaluation and exposure limit according to FCC § 90.1217 part 1, §1.1307, §1.1310

Limit for power density for general population/uncontrolled exposure is $1(\text{mW}/\text{cm}^2)$.

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

Where

P_t - The transmitted power (EIRP) (mW)

r - The distance from the unit. (cm)

The $1(\text{mW}/\text{cm}^2)$ limit can be calculated from the above based on the following data:

P_t - the transmitted power which is equal to the maximum EIRP:

37 dBm = 5012 mW for 5 MHz EBW and

35.4 dBm = 3467 mW for 3.5 MHz EBW.

Minimum allowed RF safety distance “ r ”, where RF exposure limits may not be exceeded:

$\text{SQRT}(5012/4\pi)$ is more than 20 cm from the unit antenna at 5 MHz EBW

$\text{SQRT}(3467/4\pi)$ is more than 17 cm from the unit antenna at 3.5 MHz EBW

4.2 EUT test configuration

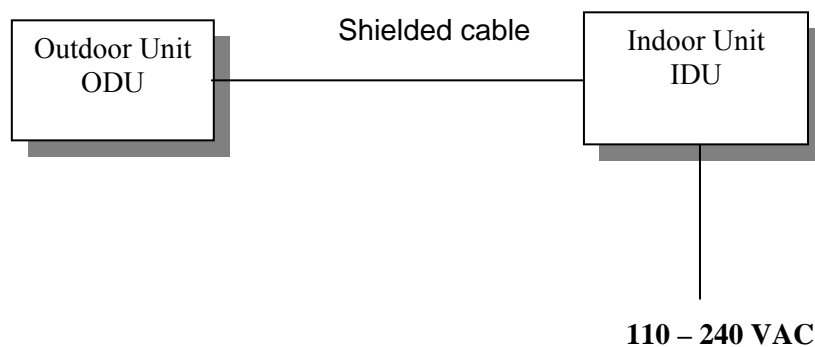


Fig. 1 Subscriber unit test setup.



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5. Test results

5.1 Transmitter characteristics

5.1.1 99% Occupied bandwidth according to § 2.1049

Method of measurement ANSI 63.4 §13.1.7
 Operating Frequency Range 3.650 – 3.675 GHz
 Ambient Temperature 21⁰ C Relative Humidity 52% Air Pressure 1009 hPa

Emissions bandwidth 3.5 MHz

Carrier frequency MHz	Measured occupied bandwidth, MHz	Reference to plot number
3651.75	3.267	#1
3662	3.267	#2
3673.25	3.267	#3

Emissions bandwidth 5.0 MHz

Carrier frequency MHz	Measured occupied bandwidth, MHz	Reference to plot number
3652.5	4.733	#4
3662	4.733	#5
3672.5	4.733	#6

TEST PROCEDURE

The measurements were performed in normal (transmitting) mode at all transmitted carrier (channel) frequencies of the 3.650 – 3.675 GHz frequency range 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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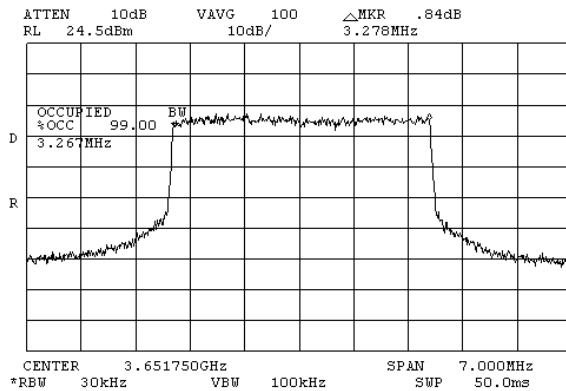
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Model: BMAX-CPE-ODU-PRO-TDD-3.6

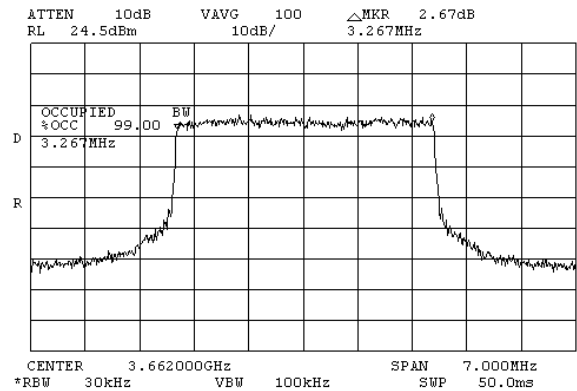
FCC ID: LKT-BMAX-SU36

Occupied bandwidth test results.

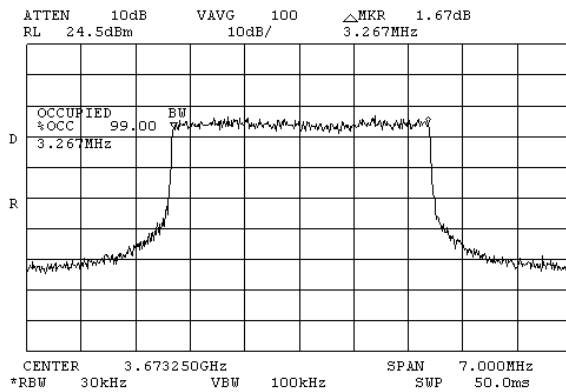
3.5 MHz bandwidth



Plot # 1. Carrier Frequency 3651.75 MHz



Plot # 2. Carrier Frequency 3662 MHz



Plot # 3. Carrier Frequency 3673.25 MHz



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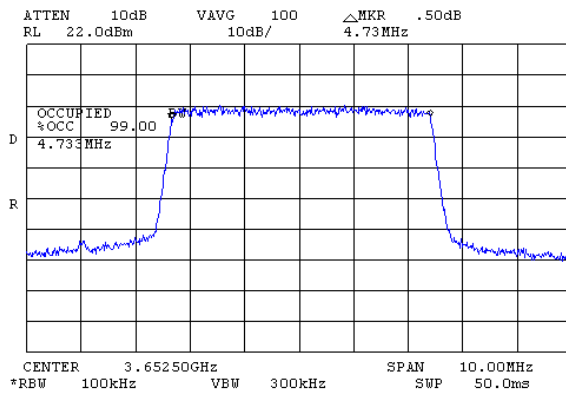
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Title: BreezeMax 3.6 Broadband Wireless Access System

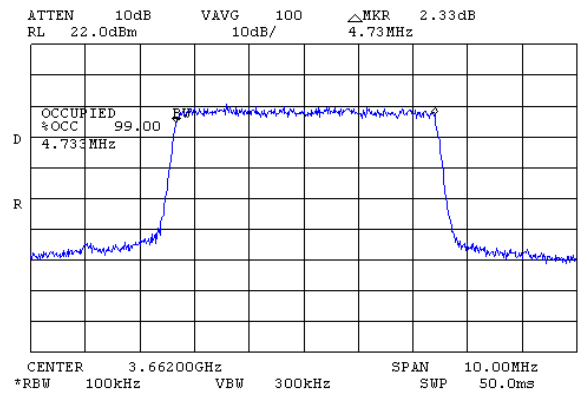
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FCC ID: LKT-BMAX-SU36

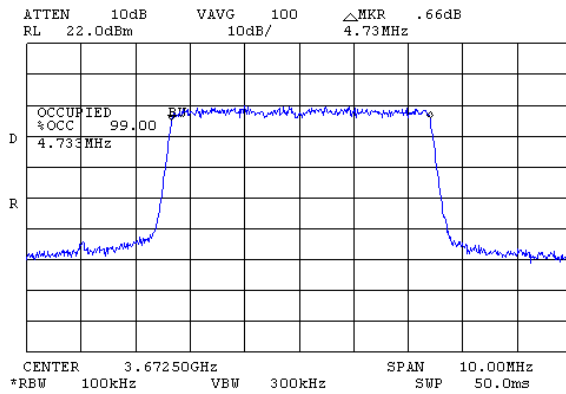
5.0 MHz bandwidth



Plot # 4. Carrier Frequency 3652.5 MHz



Plot # 5. Carrier Frequency 3662 MHz



Plot # 6. Carrier Frequency 3672.5 MHz



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5.1.2 EIRP output power test § 90.1321(a)

Operating Frequency Range 3.650 – 3.675 GHz
 Ambient Temperature 21⁰ C Relative Humidity 59% Air Pressure 1008 hPa

The following power limits apply to the 3650 – 3675 MHz band:
 Base and fixed stations are limited to 25 watts/25 MHz equivalent isotropically radiated power (EIRP). In any event, the peak EIRP power density shall not exceed 1 Watt in any one megahertz slice of spectrum .

EBW 3.5 MHz, Antenna gain 16.5 dBi

Carrier frequency MHz	Measured output power. dBm	Calculated EIRP power. dBm	FCC EIRP power limit dBm	Reference to plot number
3651.75	18.9	35.4	35.4	#7
3662.0	18.5	35.0	35.4	#8
3673.25	18.7	35.2	35.4	#9

EBW 5.0 MHz, Antenna gain 16.5 dBi

Carrier frequency MHz	Measured output power. dBm	Calculated EIRP power. dBm	FCC EIRP power limit dBm	Reference to plot number
3652.5	20.5	37.0	37.0	#10
3662.0	20.3	36.8	37.0	#11
3672.5	20.3	36.8	37.0	#12

TEST PROCEDURE

Calculation of measured EIRP power with internal antenna was performed as follows:
 Plot result + Ant. gain.

The measurements were performed in normal (transmitting) mode at all transmitted carrier (channel) frequencies of the 3.650 – 3.675 GHz frequency range 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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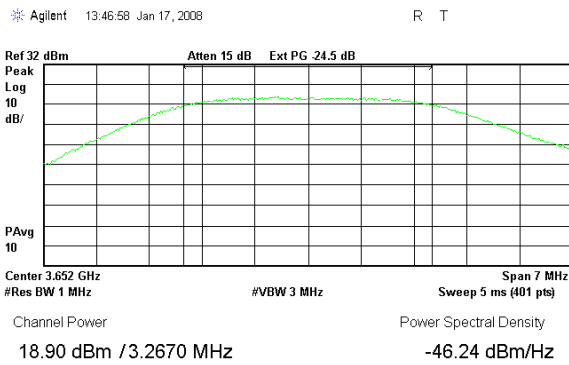
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Model: BMAX-CPE-ODU-PRO-TDD-3.6

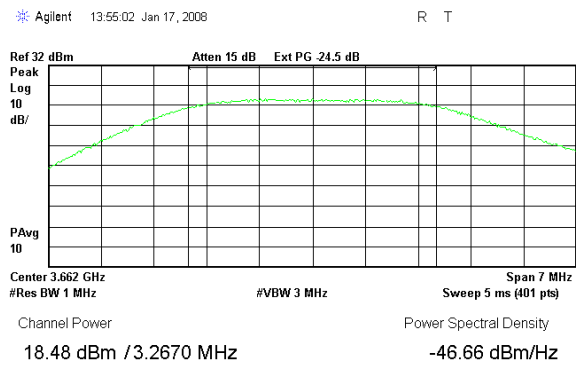
FCC ID: LKT-BMAX-SU36

Peak output power test results.

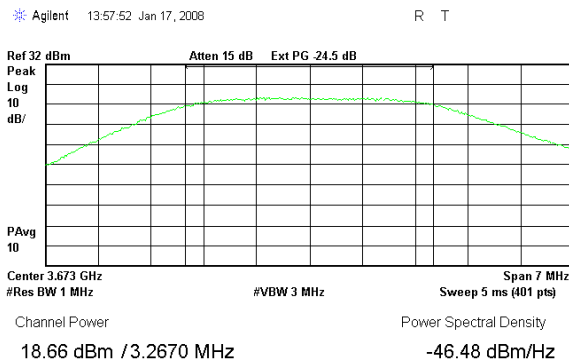
3.5 MHz bandwidth



Plot # 7. Carrier Frequency 3651.75 MHz



Plot # 8. Carrier Frequency 3662 MHz



Plot # 9. Carrier Frequency 3673.25 MHz



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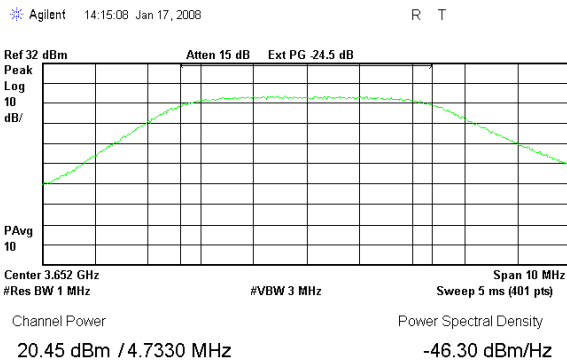
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Title: BreezeMax 3.6 Broadband Wireless Access System

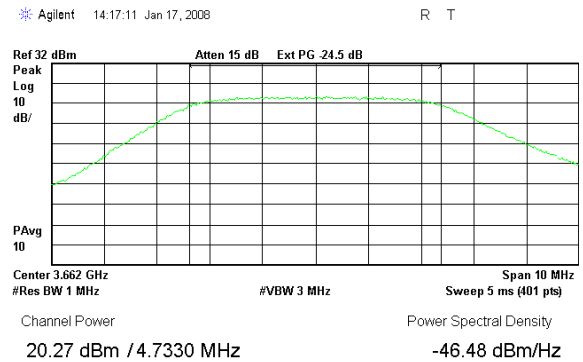
Model: BMAX-CPE-ODU-PRO-TDD-3.6

FCC ID: LKT-BMAX-SU36

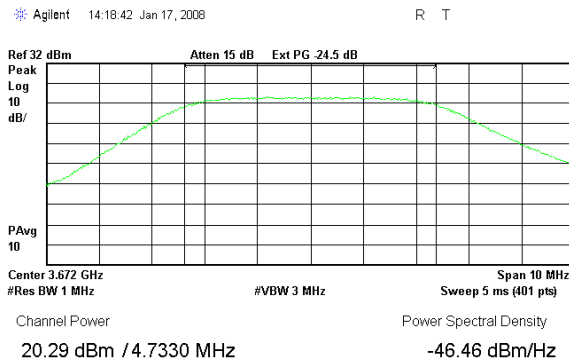
5.0 MHz bandwidth



Plot # 10. Carrier Frequency 3652.5 MHz



Plot # 11. Carrier Frequency 3662 MHz



Plot # 12. Carrier Frequency 3672.5 MHz



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5.1.3 Peak EIRP power density test § 90.1321(a)

Operating Frequency Range 3.650 – 3.675 GHz
 Ambient Temperature 21⁰ C Relative Humidity 56% Air Pressure 1009 hPa

The following power limits apply to the 3650 – 3675 MHz band:
 Base and fixed stations are limited to 25 watts/25 MHz equivalent isotropically radiated power (EIRP). In any event, the peak EIRP power density shall not exceed 1 Watt (30 dBm) in any one megahertz slice of spectrum .

EBW 3.5 MHz, Antenna gain 16.5 dBi

Carrier frequency MHz	Measured peak power density dBm	Calculated peak EIRP power density. dBm/ MHz	FCC peak EIRP power density limit dBm	Reference to plot number
3651.75	10.0	26.5	30.0	#13
3662.0	9.3	25.8	30.0	#14
3673.25	9.5	26.0	30.0	#15

EBW 5.0 MHz, Antenna gain 16.5 dBi

Carrier frequency MHz	Measured peak power density dBm	Calculated peak EIRP power density. dBm/ MHz	FCC peak EIRP power density limit dBm	Reference to plot number
3652.5	10.3	26.8	30.0	#16
3662.0	9.5	26.0	30.0	#17
3672.5	10.2	26.7	30.0	#18

TEST PROCEDURE

Calculation of measured peak EIRP power density was performed as follows:
 Plot result + Ant. gain.

The measurements were performed in normal (transmitting) mode at all transmitted carrier (channel) frequencies of the 3.650 – 3.675 GHz frequency range 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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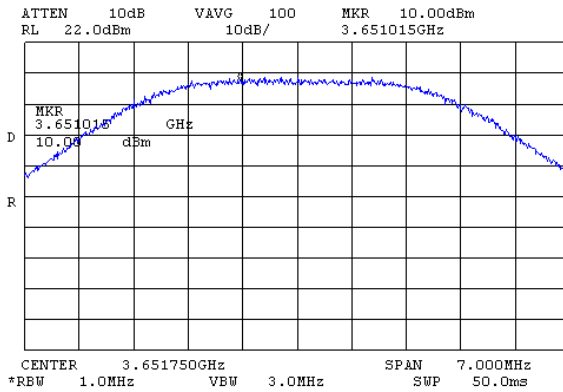
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Title: BreezeMax 3.6 Broadband Wireless Access System

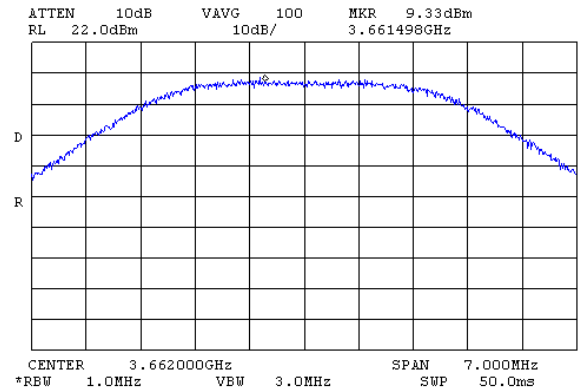
Model: BMAX-CPE-ODU-PRO-TDD-3.6

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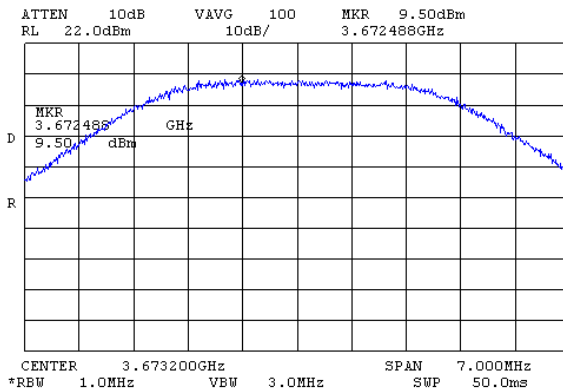
3.5 MHz bandwidth



Plot # 13. Carrier Frequency 3651.75 MHz



Plot # 14. Carrier Frequency 3662 MHz



Plot # 15. Carrier Frequency 3673.25 MHz



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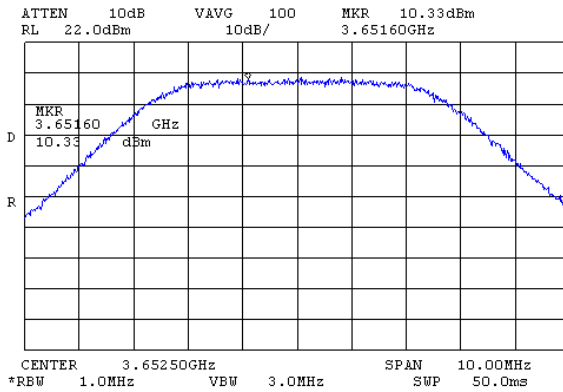
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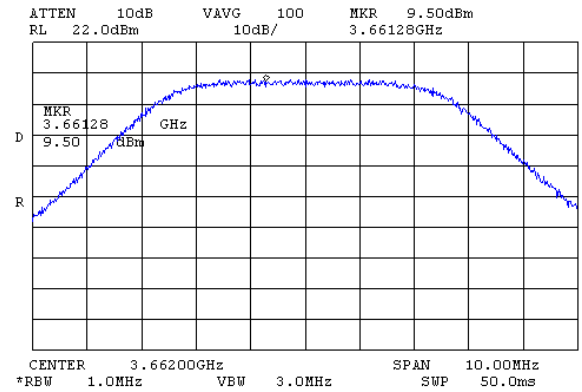
Model: BMAX-CPE-ODU-PRO-TDD-3.6

FCC ID: LKT-BMAX-SU36

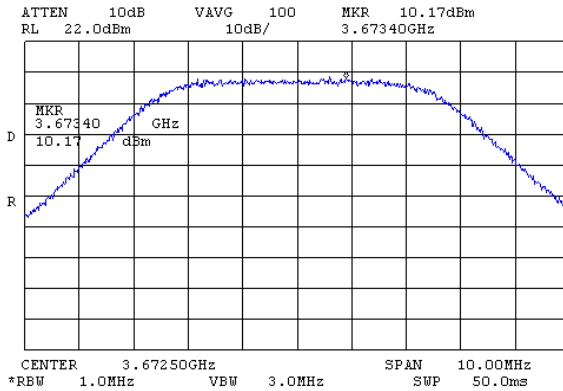
5.0 MHz bandwidth



Plot # 16. Carrier Frequency 3652.5 MHz



Plot # 17. Carrier Frequency 3662 MHz



Plot # 18. Carrier Frequency 3672.5 MHz



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5.1.3 Spurious emissions at antenna terminal §§ 90.1323, 2.1051

Operating Frequency Range 3.650 – 3.675 GHz
 Ambient Temperature 21⁰ C Relative Humidity 59% Air Pressure 1011 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.

EBW 3.5 MHz, Carrier frequency – 3651.75 MHz.

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
3650	-19.9	-13	6.9	#24
3653.5	-23.0	-13	10.0	#26

Carrier frequency – 3662 MHz.

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
3660.25	-21.1	-13	8.1	#33
3663.75	-24.4	-13	11.4	#35

Carrier frequency – 3673.25 MHz.

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
3671.5	-21.8	-13	8.8	#41
3676	-24.7	-13	11.7	#43

Measured results not noted in the tables above presented:

In 5 – 3650 MHz band present in plots ## 19 - 22; ## 29 - 31; ## 38, 39

In 3655 – 37000 MHz band present in plots ## 25 - 28; ## 36, 37; ## 44, 45



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EBW 5.0 MHz, Carrier frequency – 3652.5 MHz.

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
3650	-22.8	-13	9.8	#49
3655	-24.5	-13	11.5	#51

Carrier frequency – 3662 MHz.

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
3659.5	-22.9	-13	-9.9	#57
3664.5	-24.7	-13	-11.7	#59

Carrier frequency – 3672.5 MHz.

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
3670	-22.9	-13	9.9	#65
3675	-24.2	-13	-11.2	#67

Measured results not noted in the tables above presented:

In 5 – 3660 MHz band present in plots ## 55, 56; ## 63, 64; ## 71, 72

In 3660 – 37000 MHz band present in plots ## 61, 62; ## 69, 70; ## 77, 78

LIMIT

For operation in the 3650 – 3700 MHz band, 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 at least $43+10\text{Log}(P)$ dB = -13 dBm.

TEST PROCEDURE

The measurements were performed in normal (transmitting) mode at all transmitted carrier (channel) frequencies of the 3650 - 3675 MHz frequency range 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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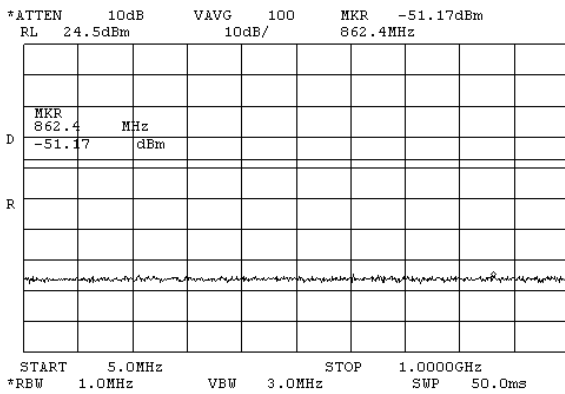
Model: BMAX-CPE-ODU-PRO-TDD-3.6

FCC ID: LKT-BMAX-SU36

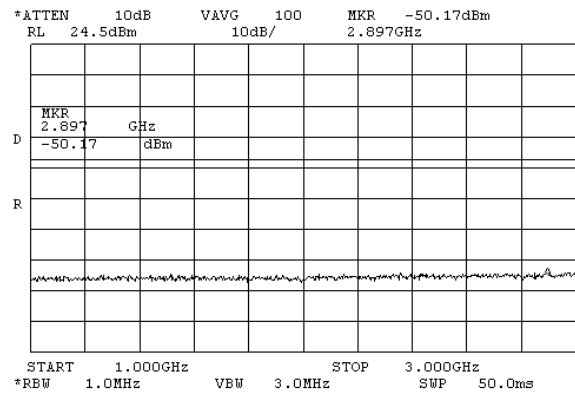
Spurious emissions at antenna terminal test results.

EBW 3.5 MHz

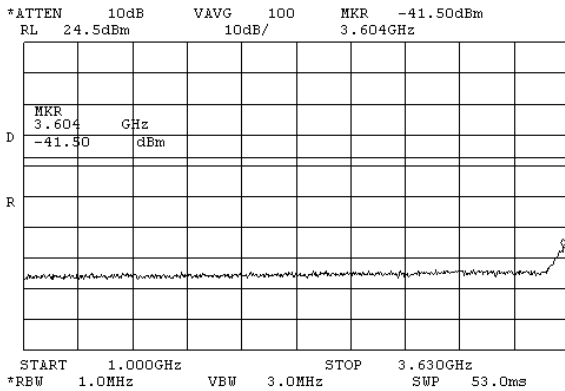
Frequency carrier 3651.75MHz



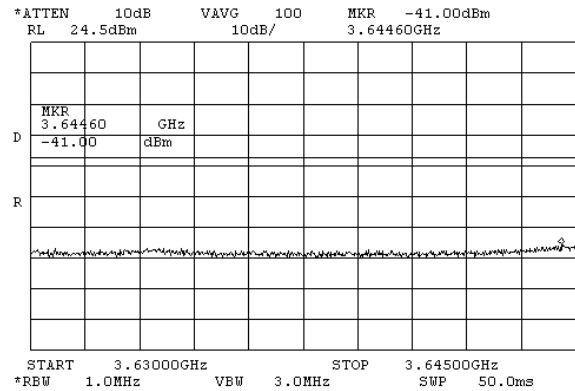
Plot # 19



Plot # 20



Plot # 21



Plot # 22.

External attenuator +cable loss = 24.5 dB



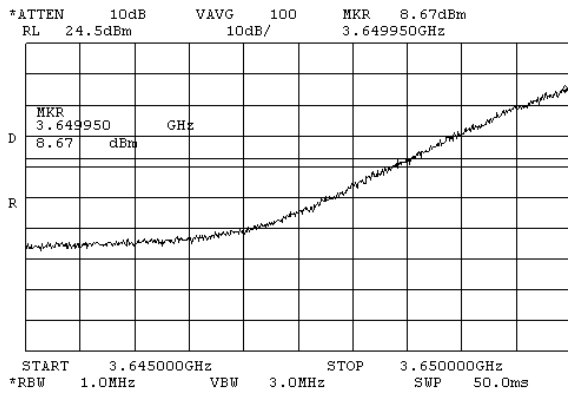
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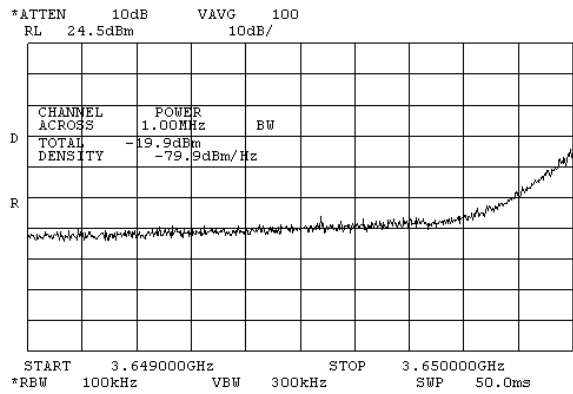
Title: BreezeMax 3.6 Broadband Wireless Access System

Model: BMAX-CPE-ODU-PRO-TDD-3.6

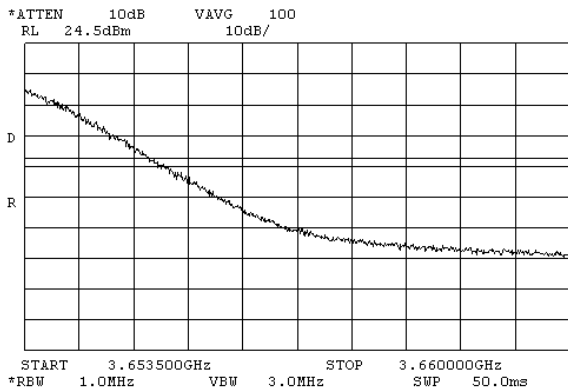
FCC ID: LKT-BMAX-SU36



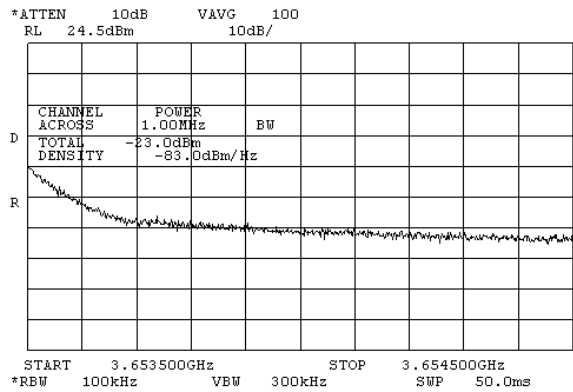
Plot # 23



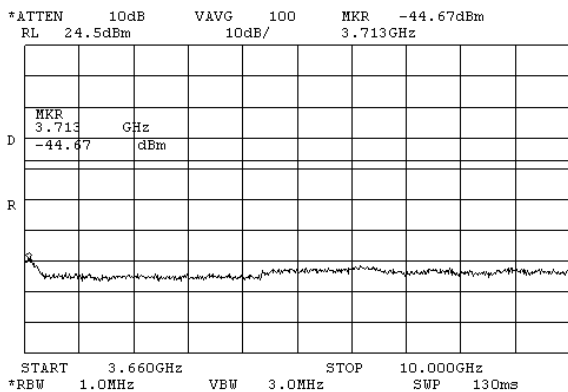
Plot # 24



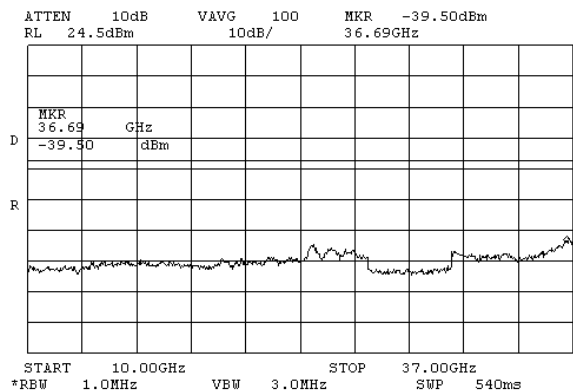
Plot # 25.



Plot # 26



Plot # 27.



Plot # 28



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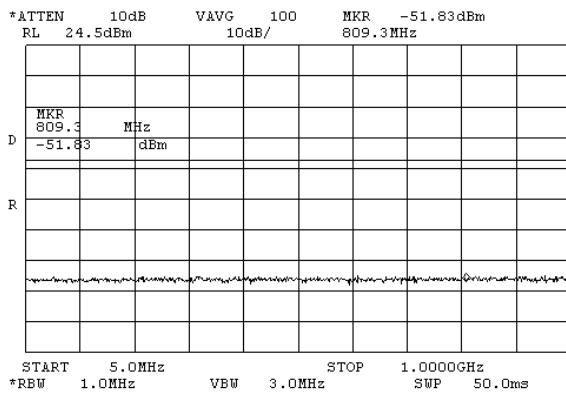
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Title: BreezeMax 3.6 Broadband Wireless Access System

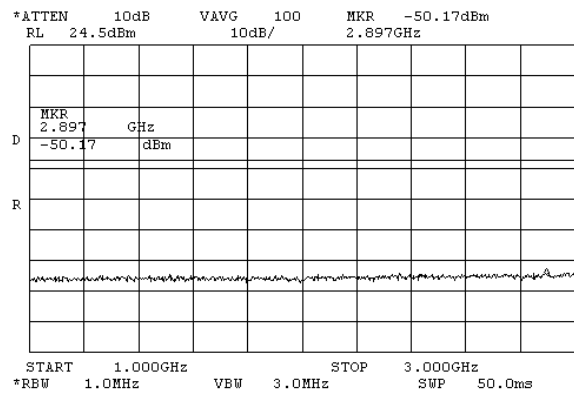
Model: BMAX-CPE-ODU-PRO-TDD-3.6

FCC ID: LKT-BMAX-SU36

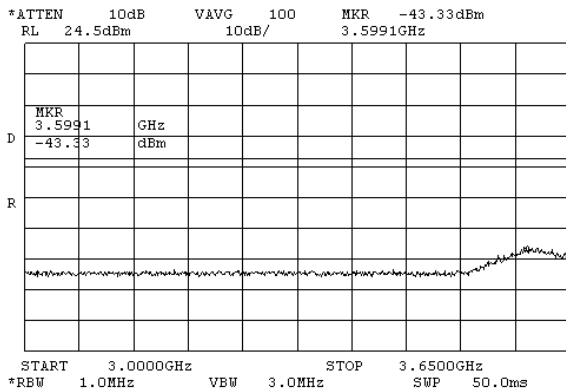
Carrier frequency 3662 MHz



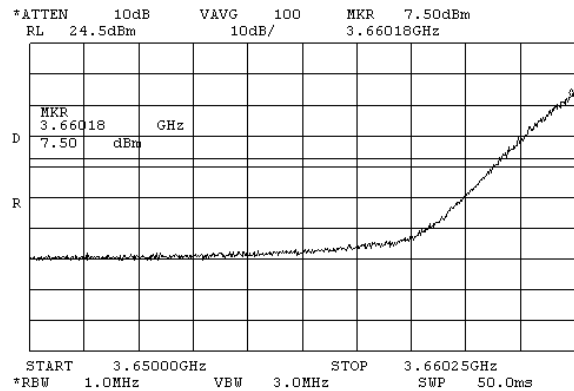
Plot # 29



Plot # 30.



Plot # 31.



Plot # 32



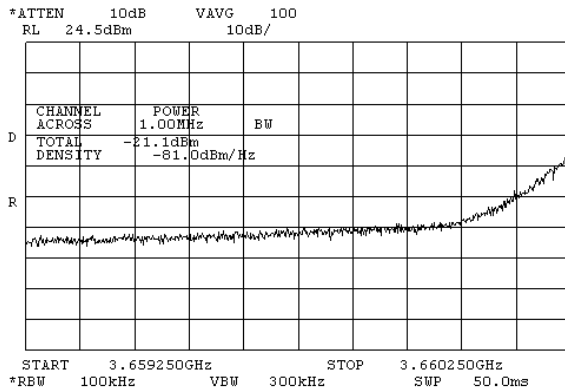
Test report No: 8812307226

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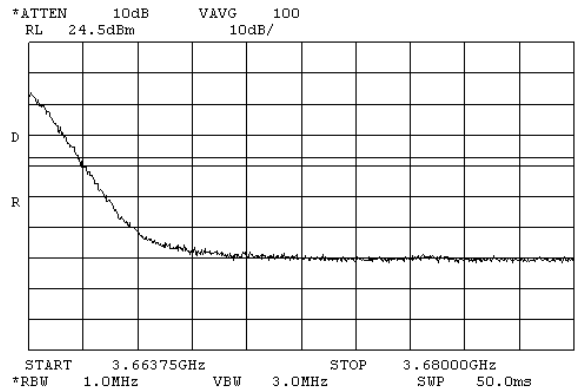
Title: BreezeMax 3.6 Broadband Wireless Access System

Model: BMAX-CPE-ODU-PRO-TDD-3.6

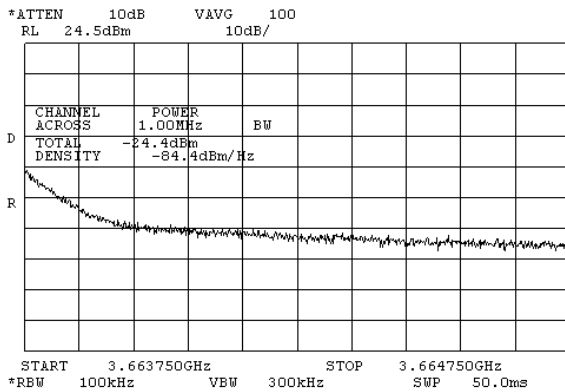
FCC ID: LKT-BMAX-SU36



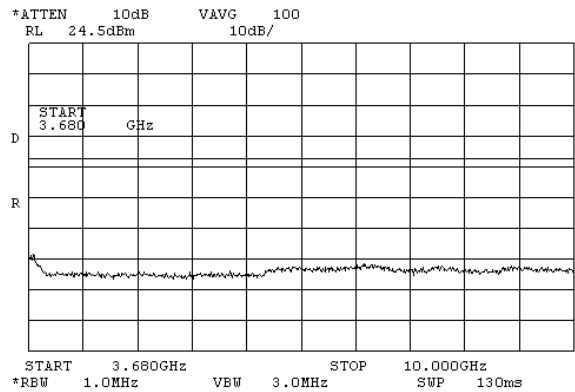
Plot # 33.



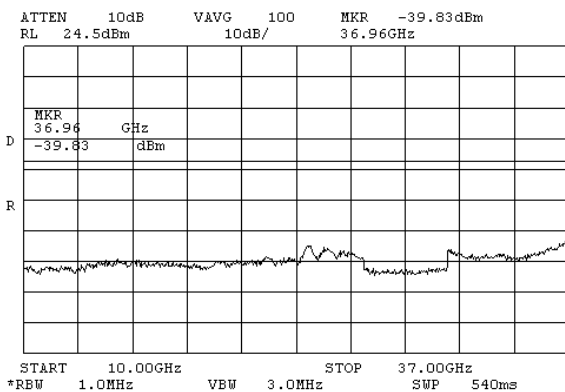
Plot # 34.



Plot # 35.



Plot # 36



Plot # 37.



Test report No: 8812307226

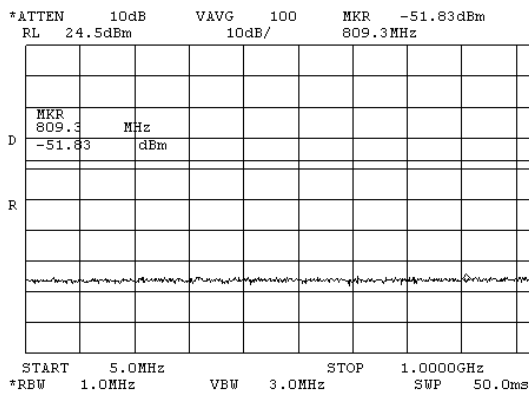
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Title: BreezeMax 3.6 Broadband Wireless Access System

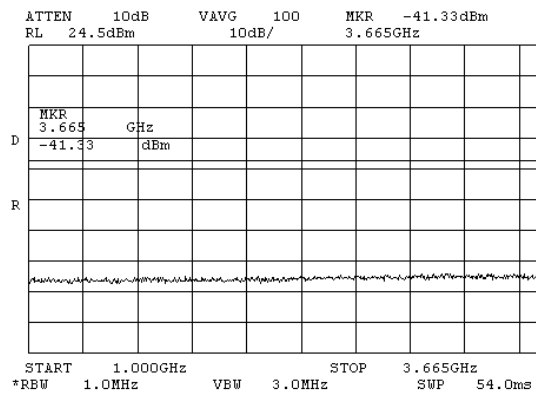
Model: BMAX-CPE-ODU-PRO-TDD-3.6

FCC ID: LKT-BMAX-SU36

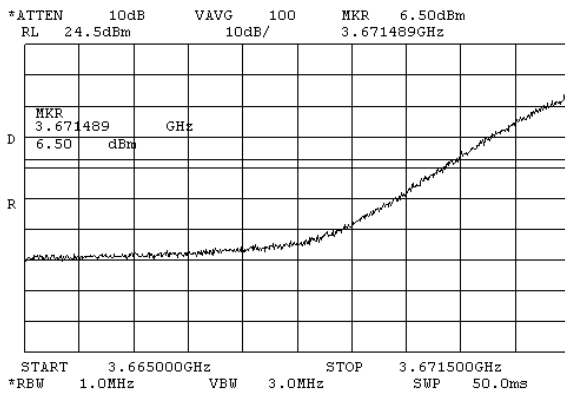
Carrier frequency 3673.25 MHz



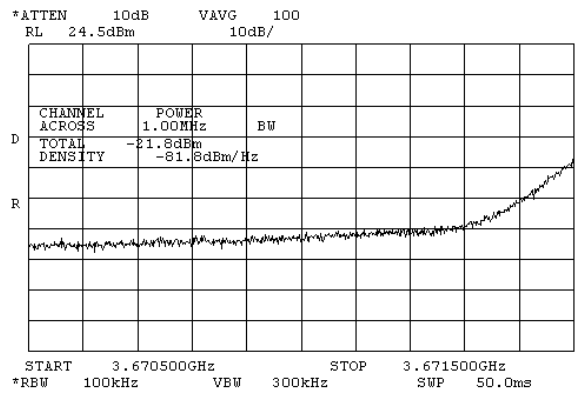
Plot # 38



Plot # 39.



Plot # 40



Plot # 41



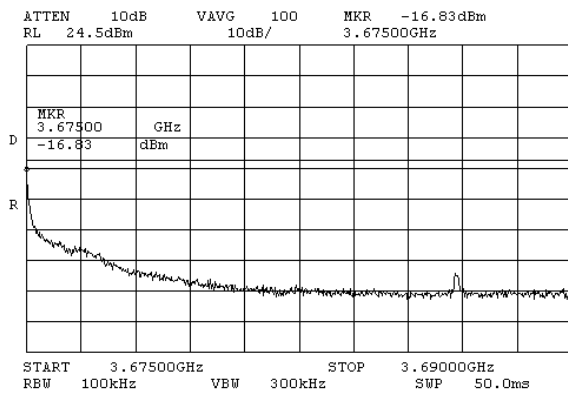
Test report No: 8812307226

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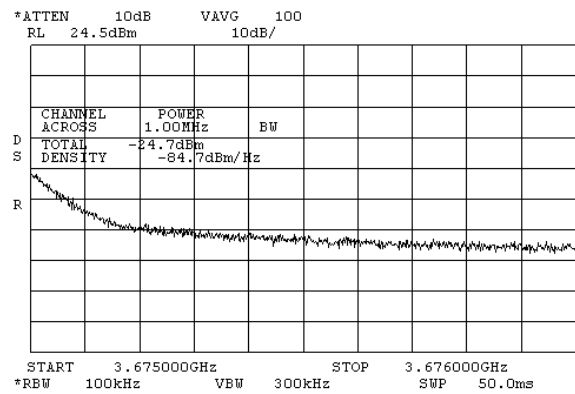
Title: BreezeMax 3.6 Broadband Wireless Access System

Model: BMAX-CPE-ODU-PRO-TDD-3.6

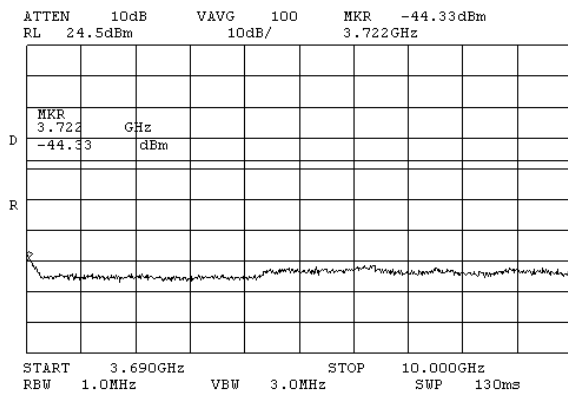
FCC ID: LKT-BMAX-SU36



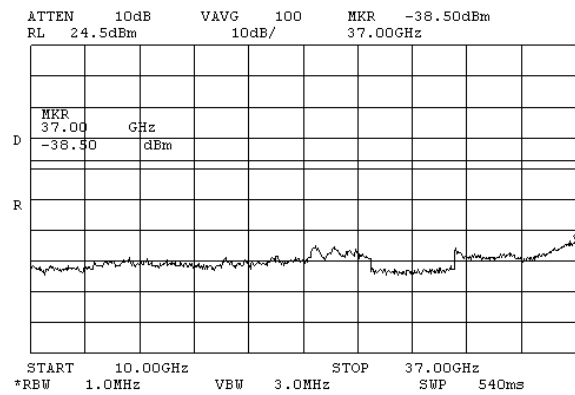
Plot # 42



Plot # 43



Plot # 44.



Plot # 45



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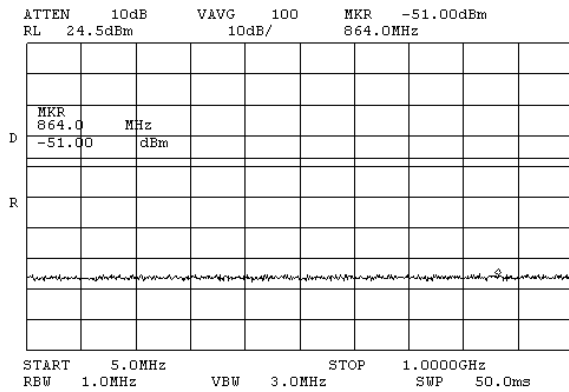
Title: BreezeMax 3.6 Broadband Wireless Access System

Model: BMAX-CPE-ODU-PRO-TDD-3.6

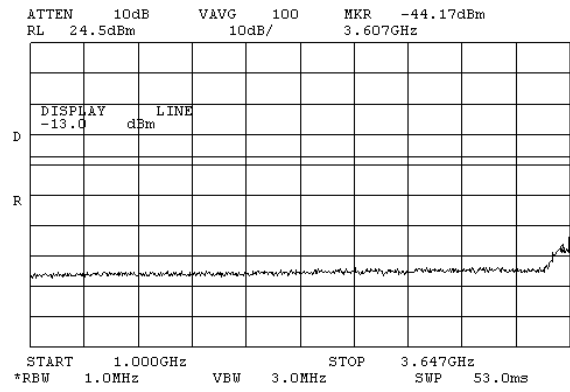
FCC ID: LKT-BMAX-SU36

EBW 5.0 MHz

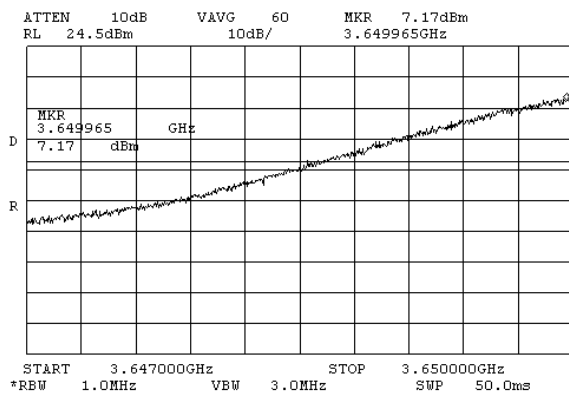
Carrier frequency 3652.5 MHz



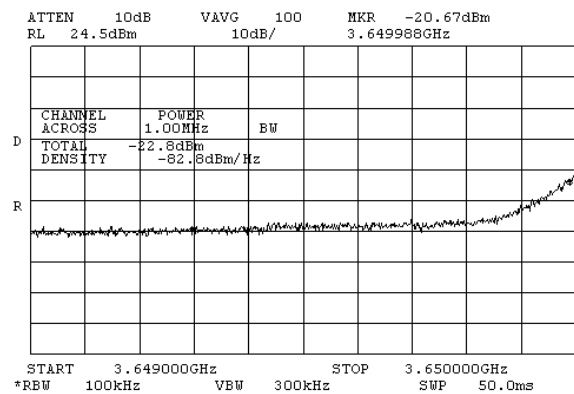
Plot # 46



Plot # 47



Plot # 48



Plot # 49



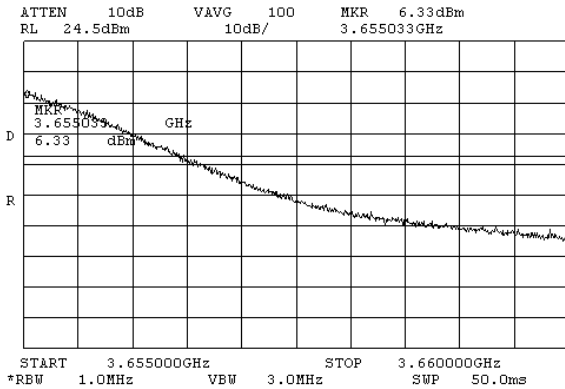
Test report No: 8812307226

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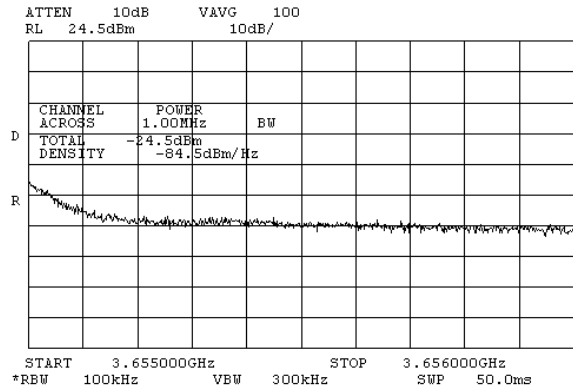
Title: BreezeMax 3.6 Broadband Wireless Access System

Model: BMAX-CPE-ODU-PRO-TDD-3.6

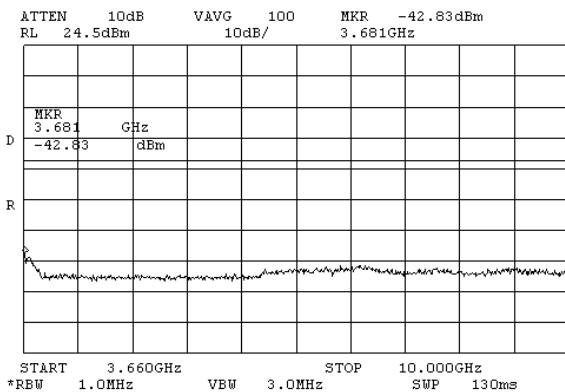
FCC ID: LKT-BMAX-SU36



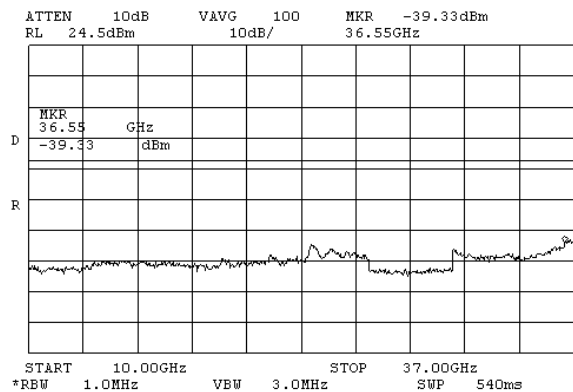
Plot # 50



Plot # 51



Plot # 52



Plot # 53.



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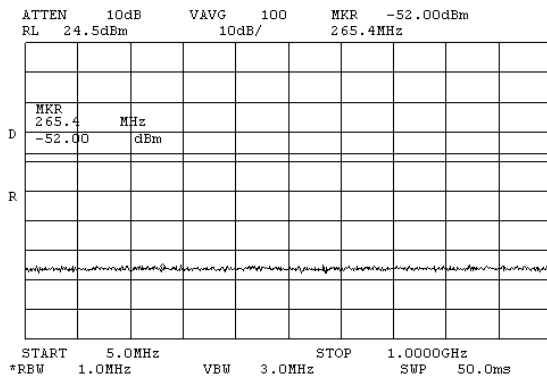
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Title: BreezeMax 3.6 Broadband Wireless Access System

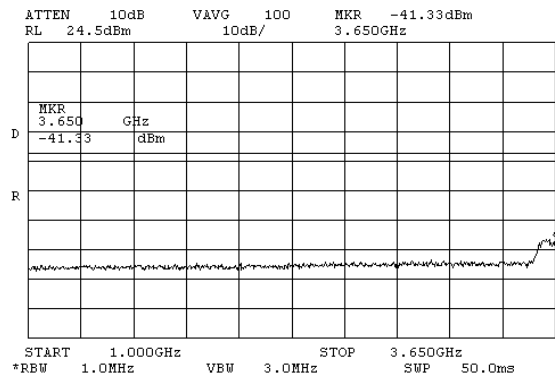
Model: BMAX-CPE-ODU-PRO-TDD-3.6

FCC ID: LKT-BMAX-SU36

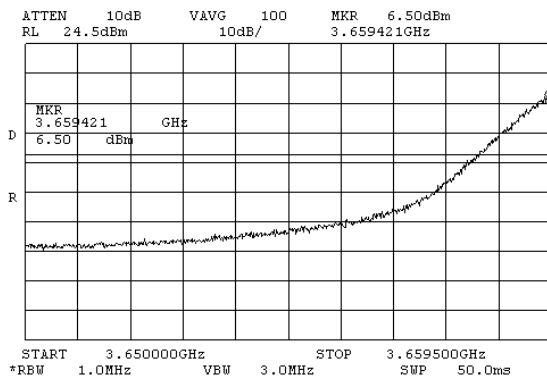
Carrier frequency 3662 MHz



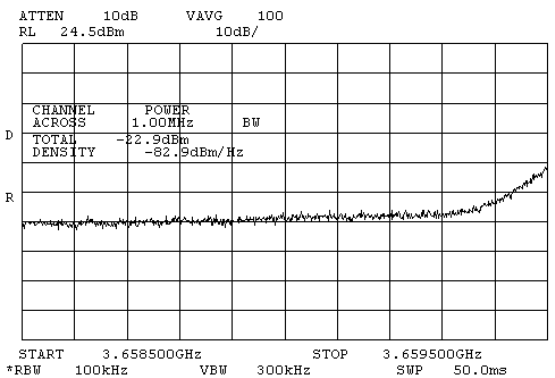
Plot # 54



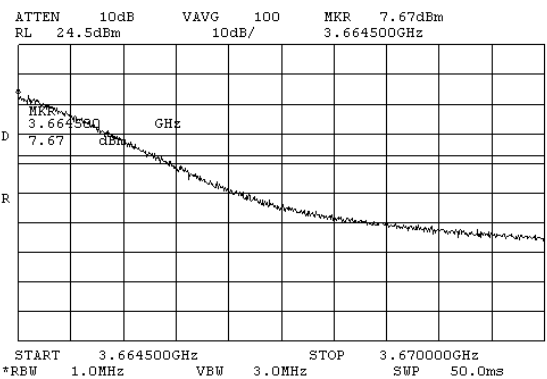
Plot # 55



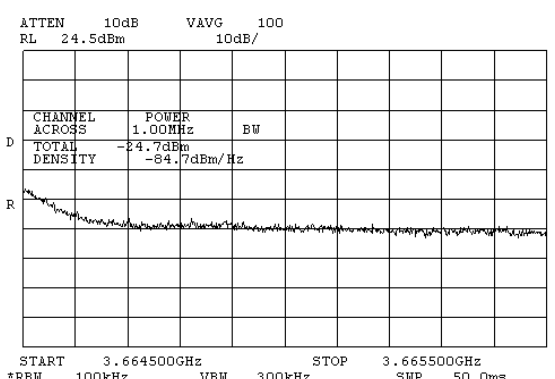
Plot # 56



Plot # 57



Plot # 58



Plot # 59



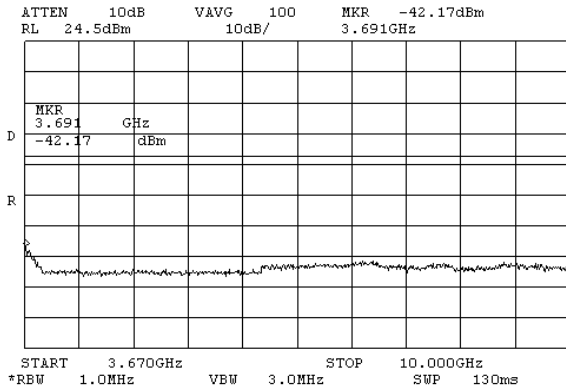
Test report No: 8812307226

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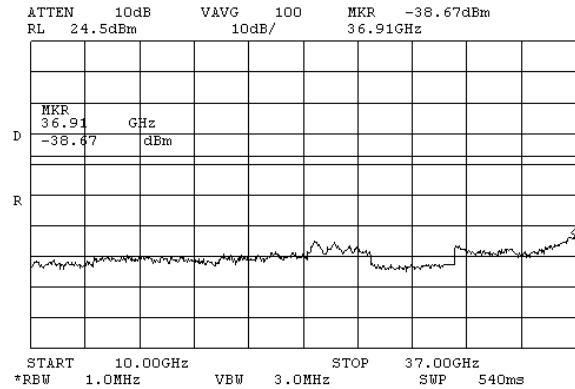
Title: BreezeMax 3.6 Broadband Wireless Access System

Model: BMAX-CPE-ODU-PRO-TDD-3.6

FCC ID: LKT-BMAX-SU36

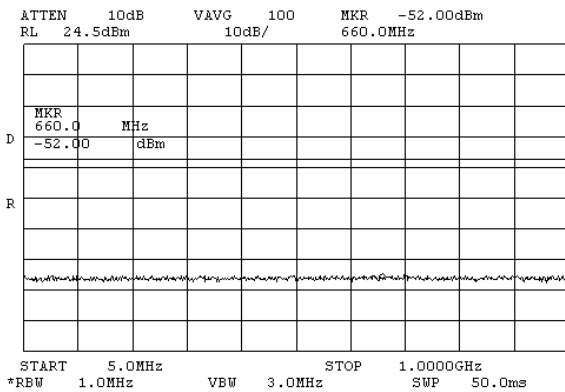


Plot # 60

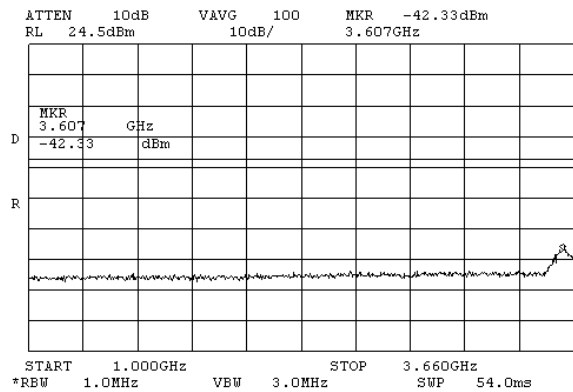


Plot # 61

Carrier frequency 3672.5 MHz



Plot # 62



Plot # 63



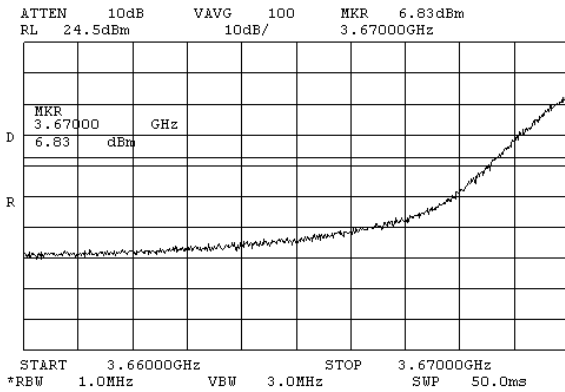
Test report No: 8812307226

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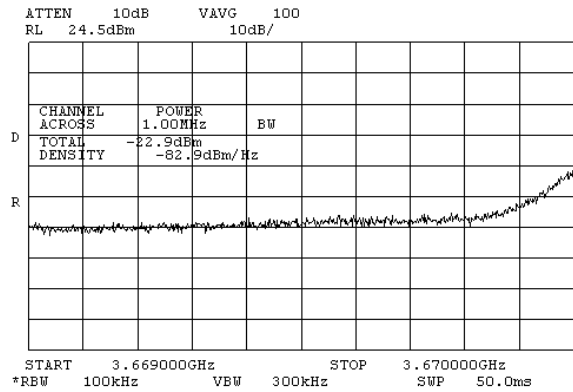
Title: BreezeMax 3.6 Broadband Wireless Access System

Model: BMAX-CPE-ODU-PRO-TDD-3.6

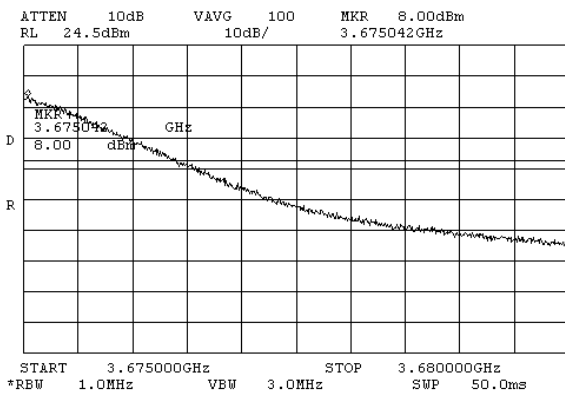
FCC ID: LKT-BMAX-SU36



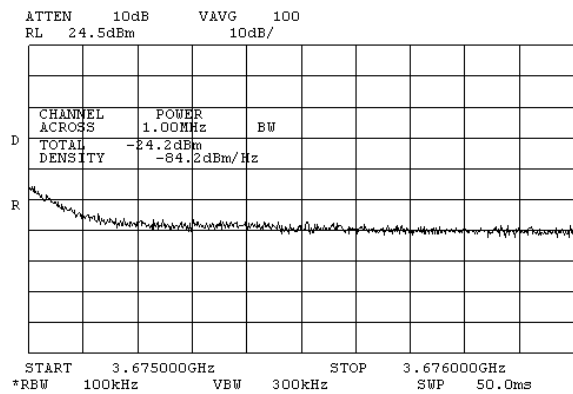
Plot # 64



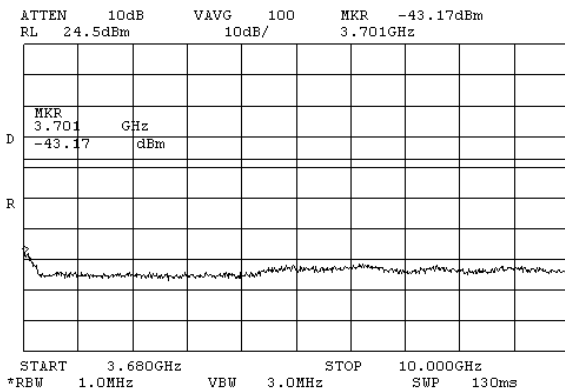
Plot # 65



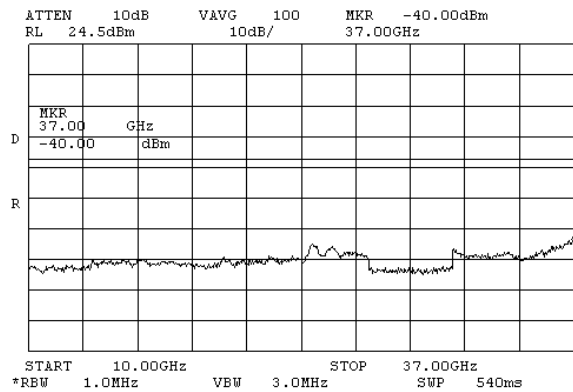
Plot # 66



Plot # 67



Plot # 68



Plot # 69



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Title: BreezeMax 3.6 Broadband Wireless Access System

Model: BMAX-CPE-ODU-PRO-TDD-3.6

FCC ID: LKT-BMAX-SU36

5.1.4 Radiated emissions test according to §§ 90.1323, 2.1053.

Operating Frequency Range 3.650 – 3.675 GHz
 Ambient Temperature 21⁰ C Relative Humidity 56% Air Pressure 1008 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 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.

EBW 3.5 MHz, Carrier frequency – 3651.75 MHz.

Frequency, MHz	Radiated emissions, dBm/dB (µV/m)	Limit, dBm/dB (µV/m)	Margin, dB	Reference to plot number
3650	-33.1/62.1	-13/82.2	20.1	#73
3653.5	-31.2/64.0	-13/82.2	18.2	#75

Carrier frequency – 3662 MHz.

Frequency, MHz	Radiated emissions, dBm/dB (µV/m)	Limit, dBm/dB (µV/m)	Margin, dB	Reference to plot number
3660.2	-29.9/64.7	-13/82.2	16.9	#79
3663.8	-31.5/63.7	-13/82.2	18.5	#81

Carrier frequency – 3673.25 MHz.

Frequency, MHz	Radiated emissions, dBm/dB (µV/m)	Limit, dBm/dB (µV/m)	Margin, dB	Reference to plot number
3671.5	-30.1/65.1	-13/82.2	17.1	#86
3675	-31.3/63.9	-13/82.2	18.3	#88

Measured results not noted in the tables above presented:

In 5 – 3670 MHz band present in plots # 70, 71; ## 78, 79; ## 85, 86

In 3660 – 37000 MHz band present in plots ## 76, 77; ## 83, 84; ## 90, 91

**Test report No: 8812307226****Page 29 of 52 Pages****Title: BreezeMax 3.6 Broadband Wireless Access System****Model: BMAX-CPE-ODU-PRO-TDD-3.6****FCC ID: LKT-BMAX-SU36****EBW 5.0 MHz, Carrier frequency – 3652.5 MHz.**

Frequency, MHz	Radiated emissions, dBm/dB (μ V/m)	Limit, dBm/dB (μ V/m)	Margin, dB	Reference to plot number
3650	-31.5/63.7	-13/82.2	18.5	#93
3655	-31.7/63.5	-13/82.2	18.7	#95

Carrier frequency – 3662 MHz.

Frequency, MHz	Radiated emissions, dBm/dB (μ V/m)	Limit, dBm/dB (μ V/m)	Margin, dB	Reference to plot number
3659.5	-31.6/63.6	-13/82.2	18.6	#100
3664.5	-31.8/63.4	-13/82.2	18.8	#102

Carrier frequency – 3672.5 MHz.

Frequency, MHz	Radiated emissions, dBm/dB (μ V/m)	Limit, dBm/dB (μ V/m)	Margin, dB	Reference to plot number
3670	-31.7/63.5	-13/82.2	18.7	#107
3675	-32.1/63.1	-13/82.2	19.1	#109

Measured results not noted in the tables above presented:

In 5 – 3670 MHz band present in plots ## 92, 93; ## 99, 100; ## 106, 107

In 3680 – 37000 MHz band present in plots ## 97, 98; ## 104, 105; ## 111, 112



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Title: BreezeMax 3.6 Broadband Wireless Access System

Model: BMAX-CPE-ODU-PRO-TDD-3.6

FCC ID: LKT-BMAX-SU36

TEST PROCEDURE

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 at low, middle and high carrier frequencies in 3650 – 3675 MHz frequency range.

LIMIT

For operation in the 3650 – 3700 MHz band, 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 at least $43+10\text{Log}(P)$ dB = -13 dBm (correspondent to 82.2 dB μ V/m field strength at 3m distance).

TEST EQUIPMENT USED:

1	3	4	5	6	12	
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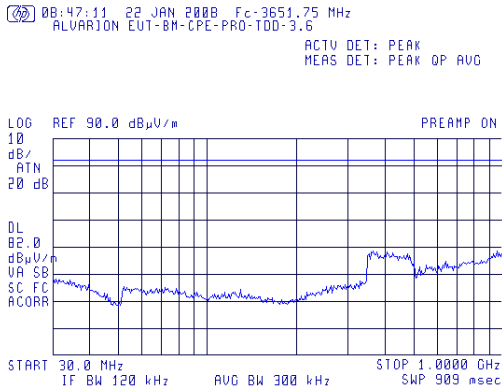
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Title: BreezeMax 3.6 Broadband Wireless Access System

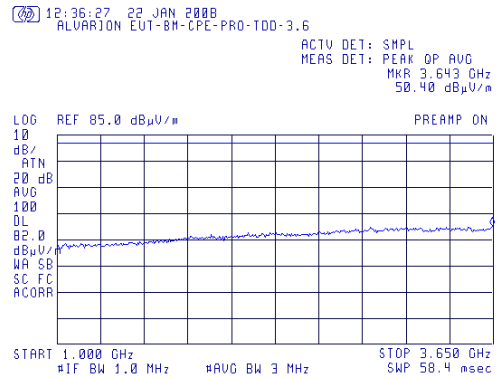
Model: BMAX-CPE-ODU-PRO-TDD-3.6

FCC ID: LKT-BMAX-SU36

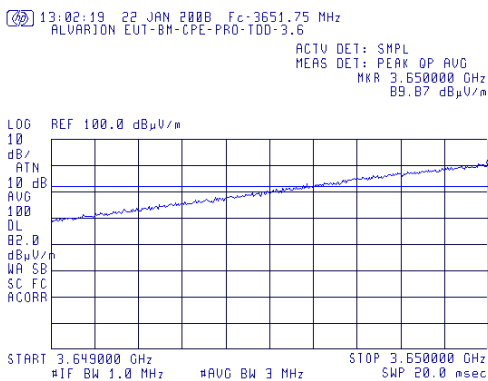
Frequency carrier 3651.75 MHz



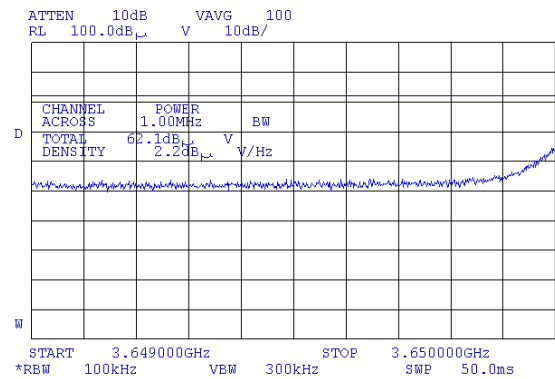
Plot # 70



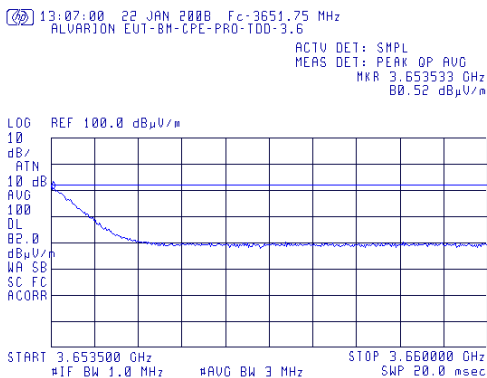
Plot # 71



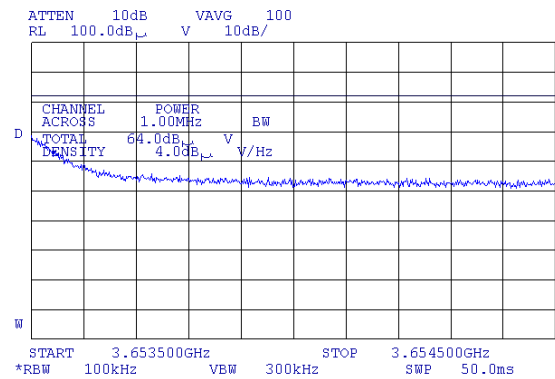
Plot # 72



Plot # 73



Plot # 74



Plot # 75



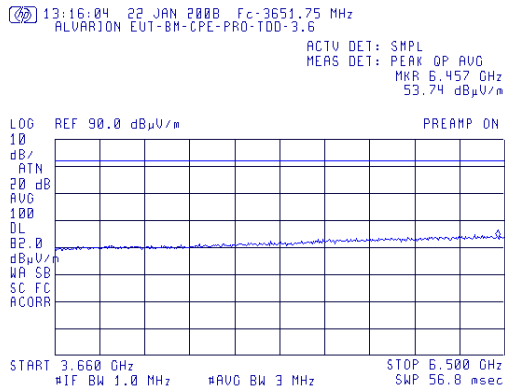
Test report No: 8812307226

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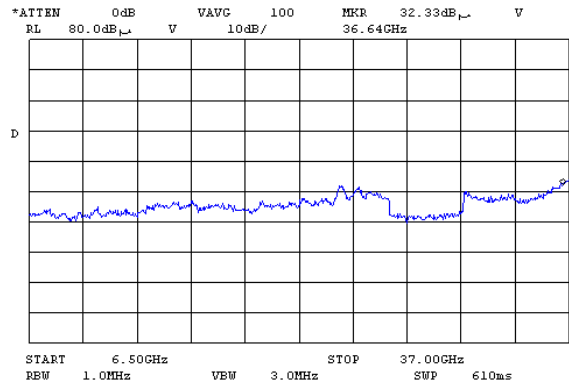
Title: BreezeMax 3.6 Broadband Wireless Access System

Model: BMAX-CPE-ODU-PRO-TDD-3.6

FCC ID: LKT-BMAX-SU36

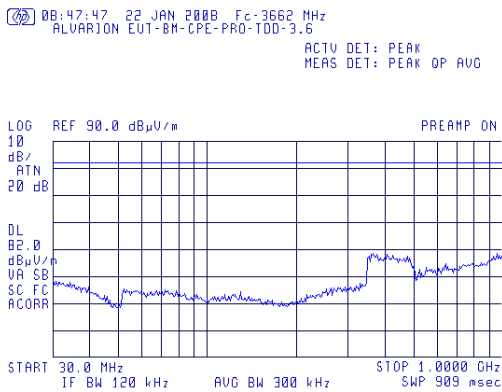


Plot # 76

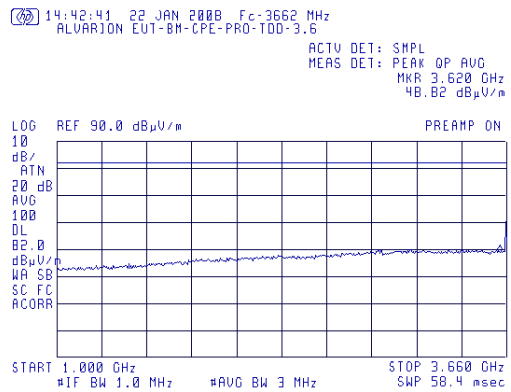


Plot # 77

Frequency carrier 3662 MHz



Plot # 78



Plot # 79



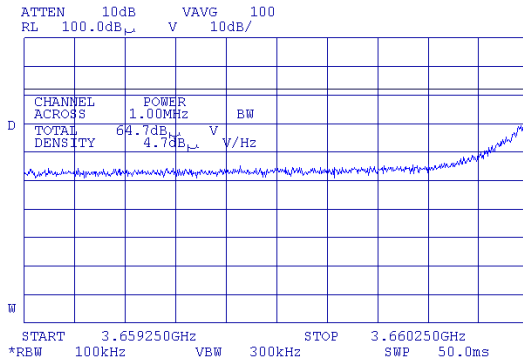
Test report No: 8812307226

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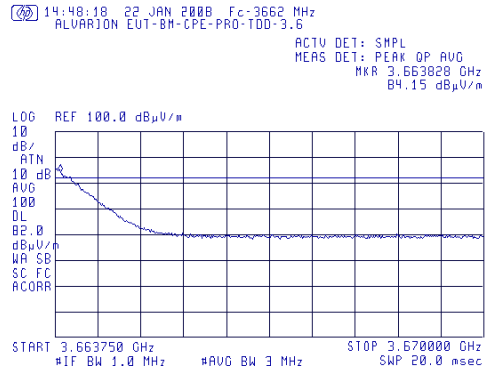
Title: BreezeMax 3.6 Broadband Wireless Access System

Model: BMAX-CPE-ODU-PRO-TDD-3.6

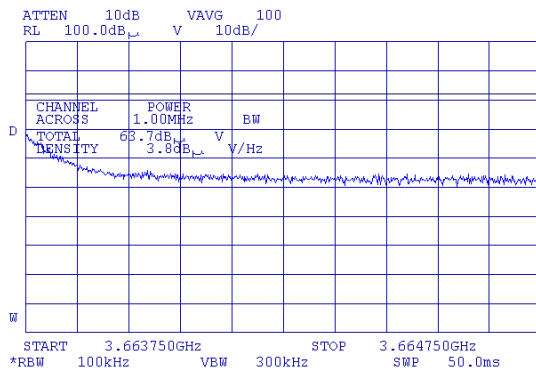
FCC ID: LKT-BMAX-SU36



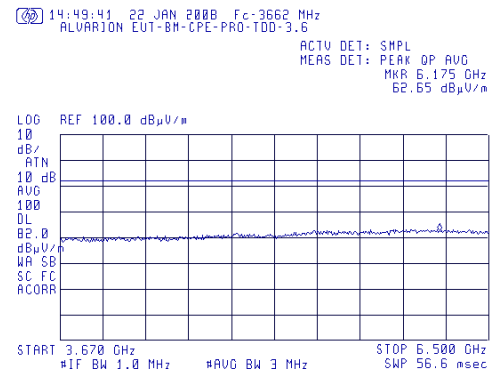
Plot # 80



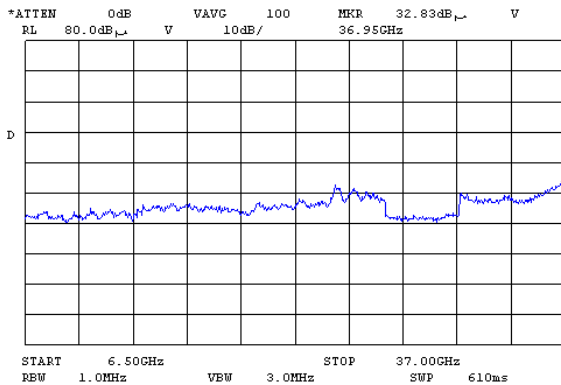
Plot # 81



Plot # 82



Plot # 83



Plot # 84



Test report No: 8812307226

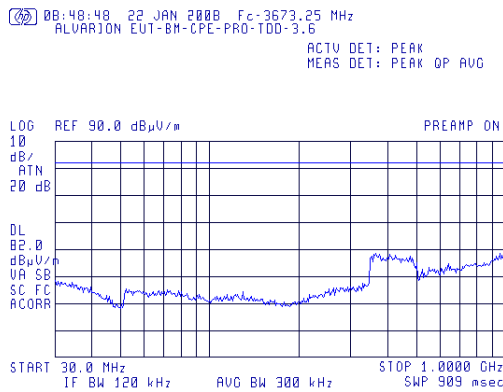
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Title: BreezeMax 3.6 Broadband Wireless Access System

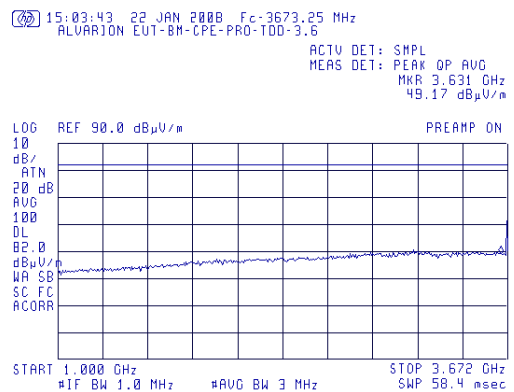
Model: BMAX-CPE-ODU-PRO-TDD-3.6

FCC ID: LKT-BMAX-SU36

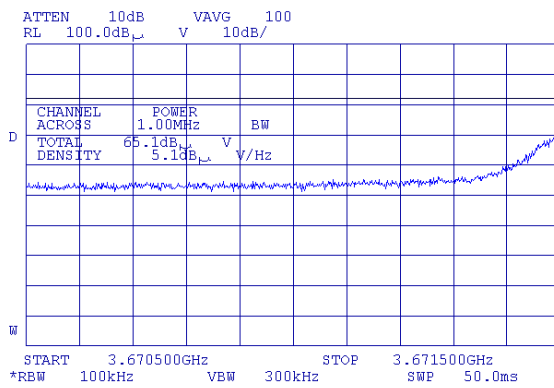
Frequency carrier 3673.25 MHz



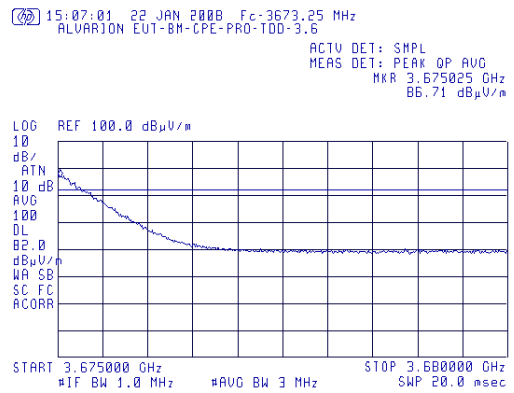
Plot # 85



Plot # 86



Plot # 87



Plot # 88



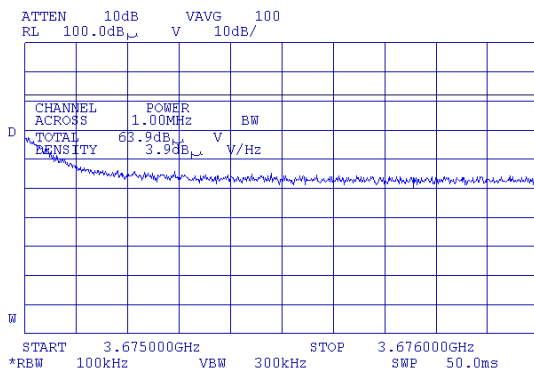
Test report No: 8812307226

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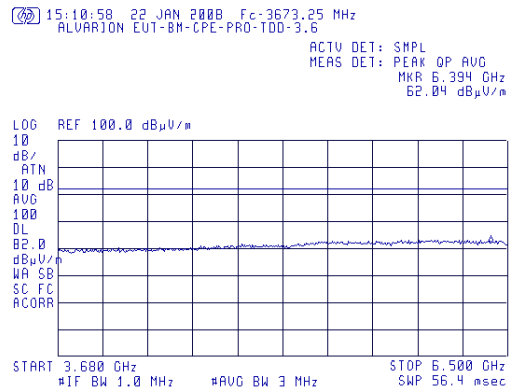
Title: BreezeMax 3.6 Broadband Wireless Access System

Model: BMAX-CPE-ODU-PRO-TDD-3.6

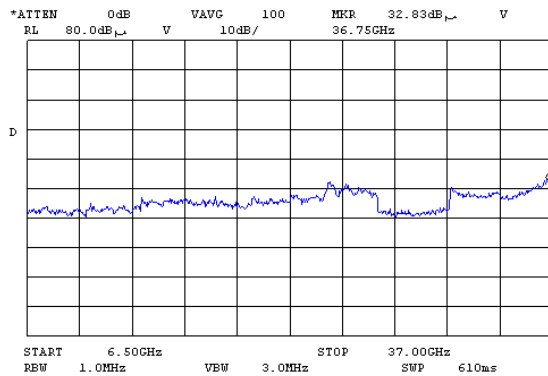
FCC ID: LKT-BMAX-SU36



Plot # 89



Plot # 90



Plot # 91



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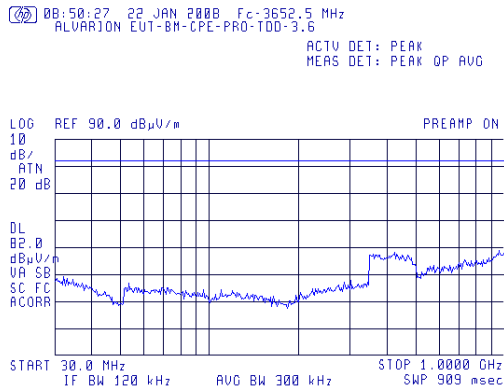
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Model: BMAX-CPE-ODU-PRO-TDD-3.6

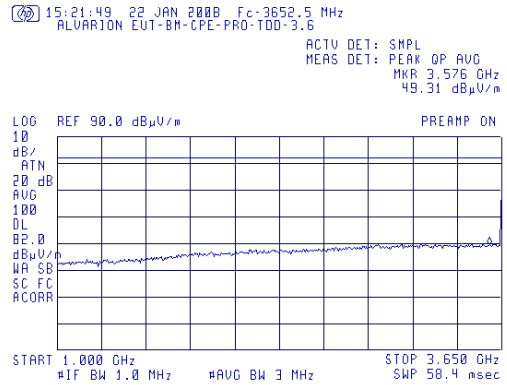
FCC ID: LKT-BMAX-SU36

EBW 5.0 MHz

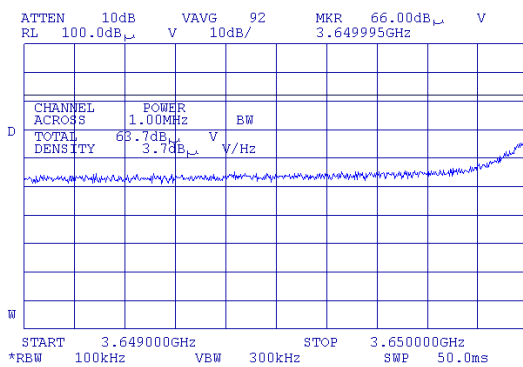
Carrier frequency 3652.5 MHz



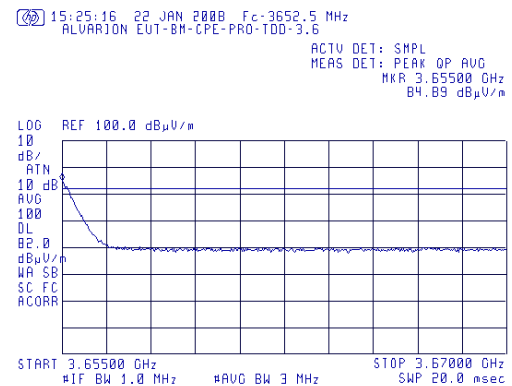
Plot # 92



Plot # 93



Plot # 94



Plot # 95



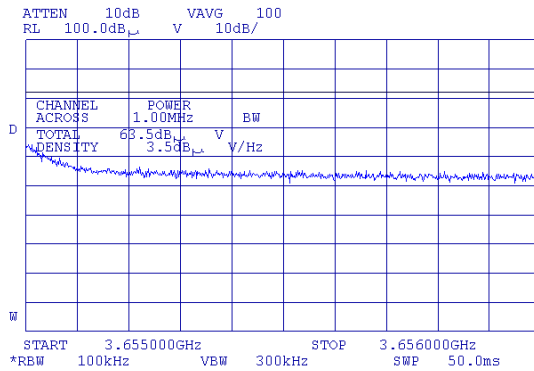
Test report No: 8812307226

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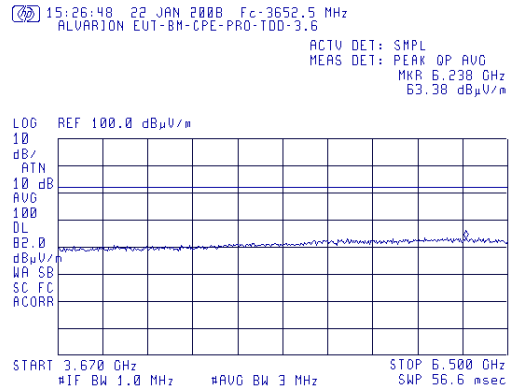
Title: BreezeMax 3.6 Broadband Wireless Access System

Model: BMAX-CPE-ODU-PRO-TDD-3.6

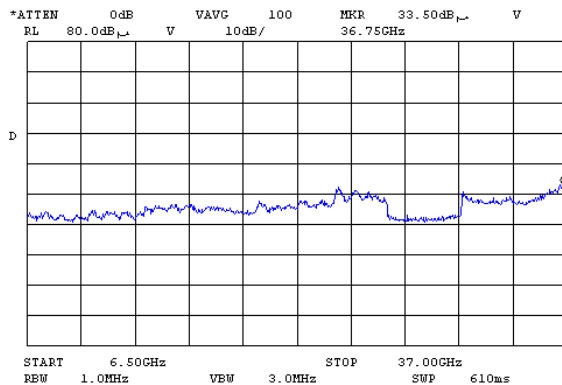
FCC ID: LKT-BMAX-SU36



Plot # 96



Plot # 97



Plot # 98



Test report No: 8812307226

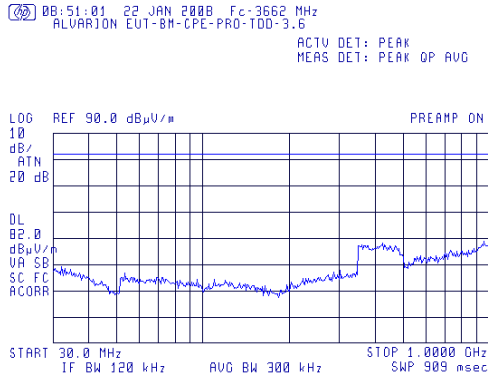
Page 38 of 52 Pages

Title: BreezeMax 3.6 Broadband Wireless Access System

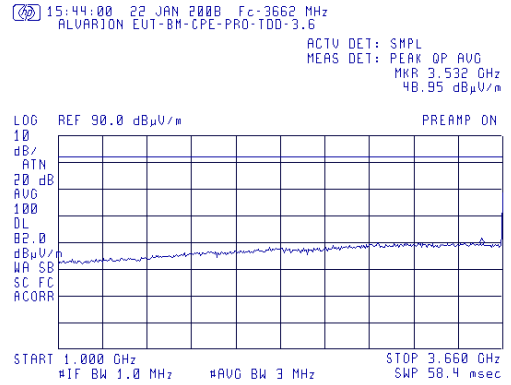
Model: BMAX-CPE-ODU-PRO-TDD-3.6

FCC ID: LKT-BMAX-SU36

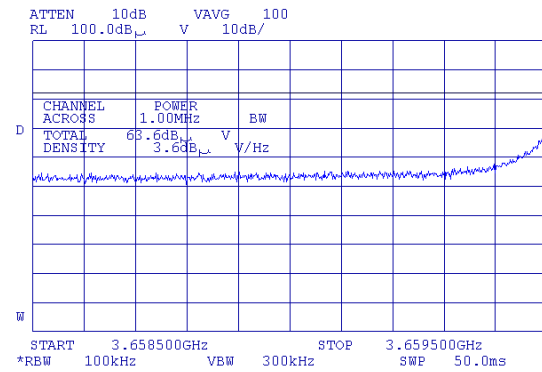
Carrier frequency 3662 MHz



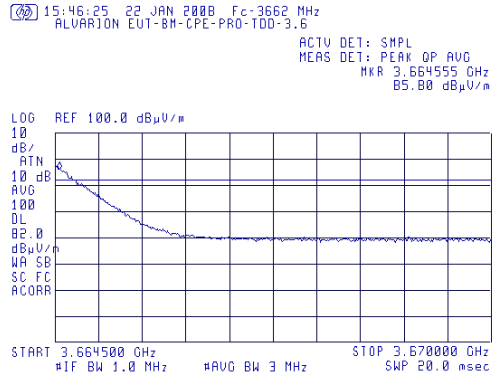
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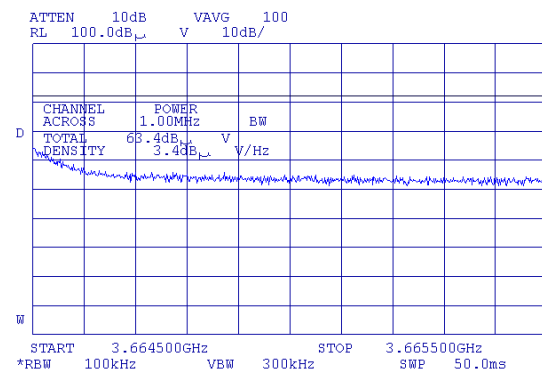
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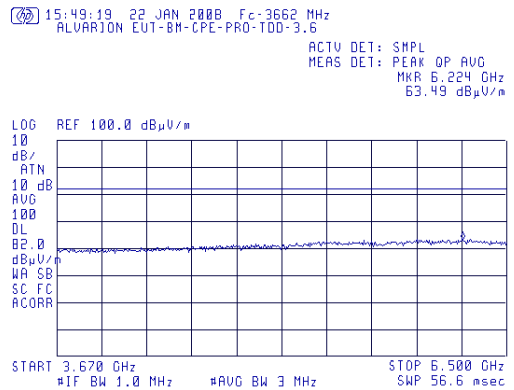
Plot # 101



Plot # 102



Plot # 103



Plot # 104



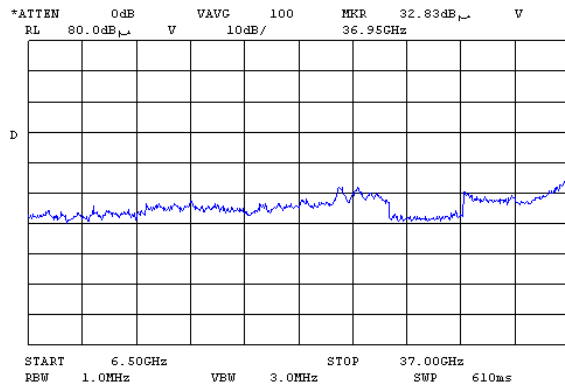
Test report No: 8812307226

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Title: BreezeMax 3.6 Broadband Wireless Access System

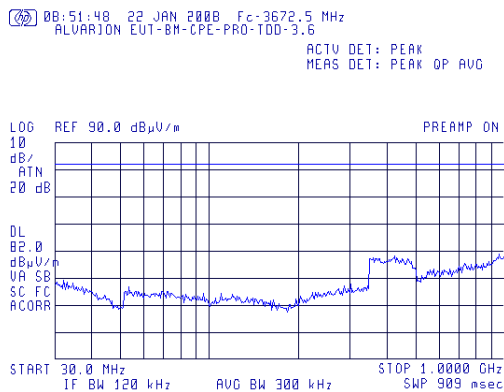
Model: BMAX-CPE-ODU-PRO-TDD-3.6

FCC ID: LKT-BMAX-SU36

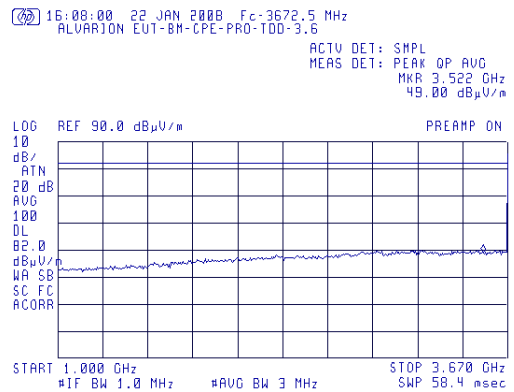


Plot # 105

Carrier frequency 3672.5 MHz



Plot # 106



Plot # 107



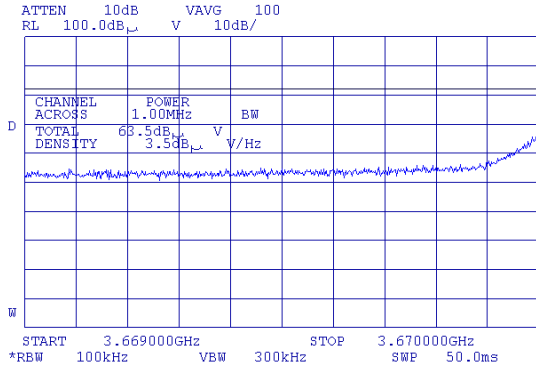
Test report No: 8812307226

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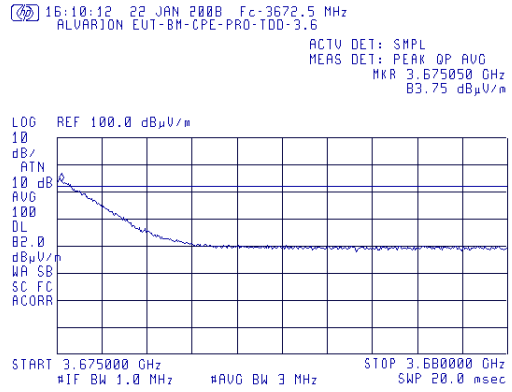
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Model: BMAX-CPE-ODU-PRO-TDD-3.6

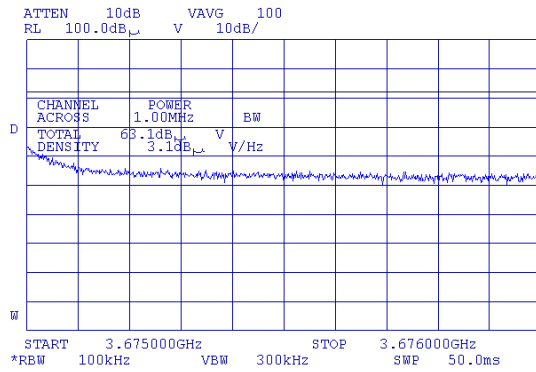
FCC ID: LKT-BMAX-SU36



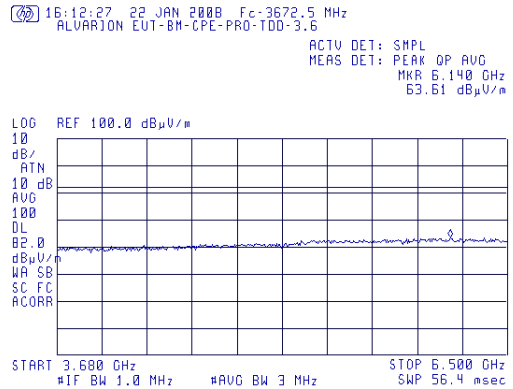
Plot # 108



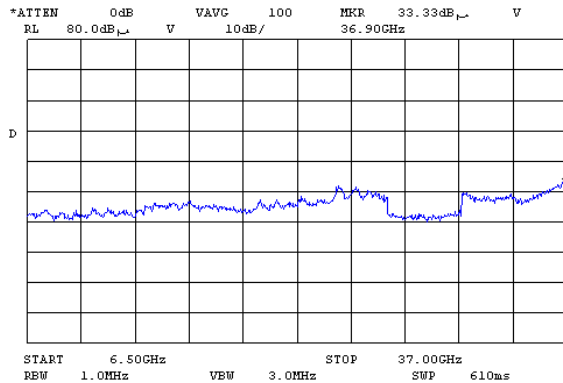
Plot # 109



Plot # 110



Plot # 111



Plot # 112



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5.1.5 Frequency stability test according to § 2.1055

Operating Frequency Range 3.650 – 3.675 GHz
 Ambient Temperature 20° C Relative Humidity 56% Air Pressure 1008 hPa

TEST CONDITIONS		Carrier frequency, 3652.5 MHz	Carrier frequency, 3672.5 MHz
Test temperature	Test voltage(AC)		
+20°C	Vnom (115)	3.652497500	3.672469600
	Vmin (97.7)	3.652491390	3.672490060
	Vmax (132.2)	3.652490830	3.672490310
-30°C	Vnom (115)	3.652491320	3.672491660
-20°C	Vnom (115)	3.652502650	3.672502650
-10°C	Vnom (115)	3.652504690	3.672504390
+0°C	Vnom (115)	3.652505830	3.672505790
+10°C	Vnom (115)	3.652500290	3.672500670
+30°C	Vnom (115)	3.652493550	3.672494210
+40°C	Vnom (115)	3.652489580	3.672488550
+50°C	Vnom (115)	3.652484460	3.672485610

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 input voltage was changed from 85% of nominal to 115%. Frequency changes were noted. The temperature in climatic chamber was varied from -30°C to +50°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 3.650 – 3.675 GHz.

TEST EQUIPMENT USED:

1	3	12				
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Title: BreezeMax 3.6 Broadband Wireless Access System	
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5.2 Radiated emissions test according to § 15.209

Method of measurement ANSI 63.4 §13.1.4
Ambient Temperature 21⁰ C Relative Humidity 59% Air Pressure 1011 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 and Double Ridged Guide 1 GHz – 18 GHz antenna were used. The frequency range was investigated from 30 MHz to 2.0 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:

EUT meets requirements of section 15.209
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: 8812307226****Page 43 of 52 Pages****Title: BreezeMax 3.6 Broadband Wireless Access System****Model: BMAX-CPE-ODU-PRO-TDD-3.6****FCC ID: LKT-BMAX-SU36****Table 1. Radiated emission test results**

Frequency (MHz)	Antenna Polariz	Antenna Height (m)	Turn- table Angle (°)	Emission Level Note 1 (dB μ V/m)	Limit @ 3 m (dB μ V/m)	Margin Note 2 (dB)	Results
67.3	V	1.1	144	34.8	40.0	5.2	Complies
72.7	V	1.0	39	30.1	40.0	9.9	Complies
79.1	V	1.0	35	32.6	40.0	7.4	Complies
99.8	V	1.0	303	31.2	43.5	12.3	Complies
164.7	V	1.0	236	24.8	43.5	18.7	Complies
352.0	H	2.2	81	35.0	46.0	11.0	Complies
1216.0	H	1.8	38	34.5	54.0	19.5	Complies

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 test according to § 15.207

Method of measurement ANSI 63.4 §13.1.3
Ambient Temperature 21° C Relative Humidity 59% Air Pressure 1007 hPa

Limit FCC section 15.207.

Table with 3 columns: Frequency (MHz), QP, and AVRG. Rows include frequency ranges 0.15-0.5, 0.5-5, and 5-30 MHz with corresponding dB values.

* 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.

TEST RESULT:

EUT meets requirements of section 15.207. Test results are shown at plots # 113 for line Phase and # 114 for line Neutral.

Test equipment used

Table with 6 columns, containing numbers 8, 9, 10 and empty cells.



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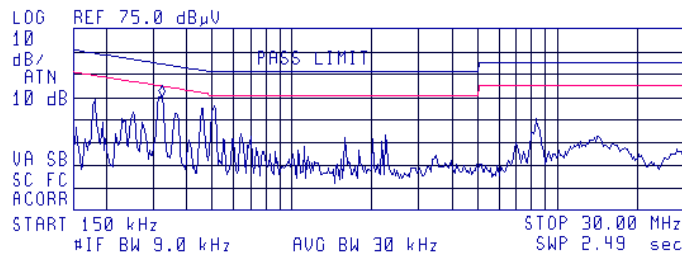
Model: BMAX-CPE-ODU-PRO-TDD-3.6

FCC ID: LKT-BMAX-SU36

11:35:51 23 JAN 2008 Line PH
ALVARION EUT-BM-CPE-PRO-TDD-3.6

Signal Freq (MHz)	PK Amp	QP Amp	AV Amp	AV Δ L2
1	0.255265	38.1	37.2	37.0 -14.6
2	0.322553	51.6	50.0	44.3 -5.3
3	0.371416	40.1	38.4	34.5 -14.1
4	0.476747	42.8	40.5	29.3 -17.2
5	0.505528	41.6	38.7	28.7 -17.3

ACTV DET: PEAK
MEAS DET: PEAK OP AVG
MKR 320 kHz
45.53 dB μ V

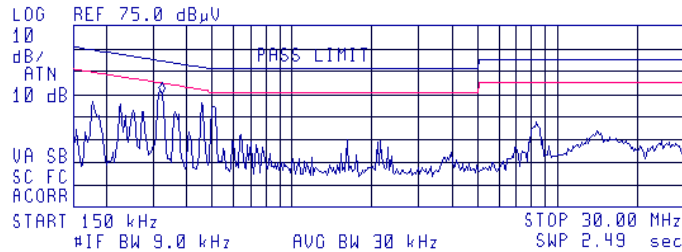


Plot # 113. Conducted emissions test. Line Phase

11:45:27 23 JAN 2008 Line N
ALVARION EUT-BM-CPE-PRO-TDD-3.6

Signal Freq (MHz)	PK Amp	QP Amp	AV Amp	AV Δ L2
1	0.255267	37.1	36.2	36.1 -15.5
2	0.322732	51.0	49.3	44.2 -5.5
3	0.371422	40.0	38.3	34.3 -14.2
4	0.474174	42.4	40.9	33.6 -12.9
5	0.504722	40.6	37.1	27.5 -18.5

ACTV DET: PEAK
MEAS DET: PEAK OP AVG
MKR 320 kHz
45.42 dB μ V



Plot # 114. Conducted emissions test. Line Neutral

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APPENDIX A Photographs

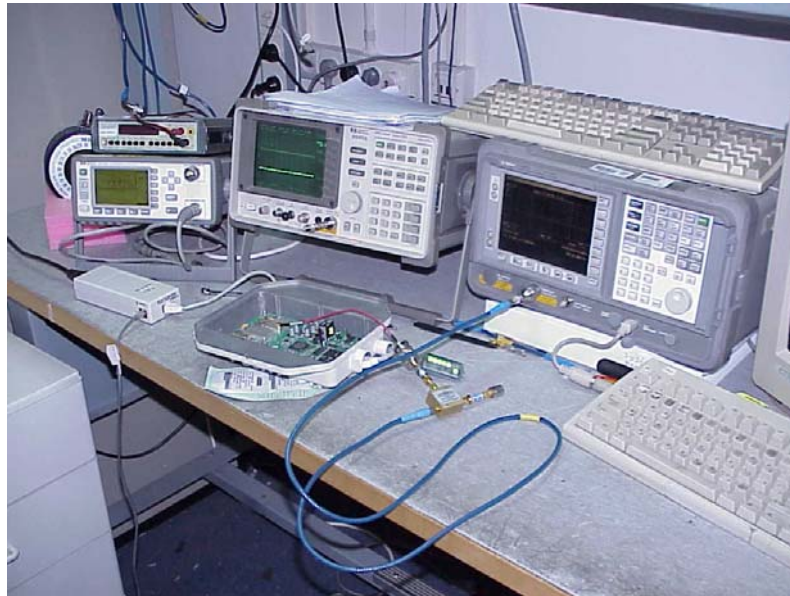


Photo 1. Conducted measurements. Test setup.

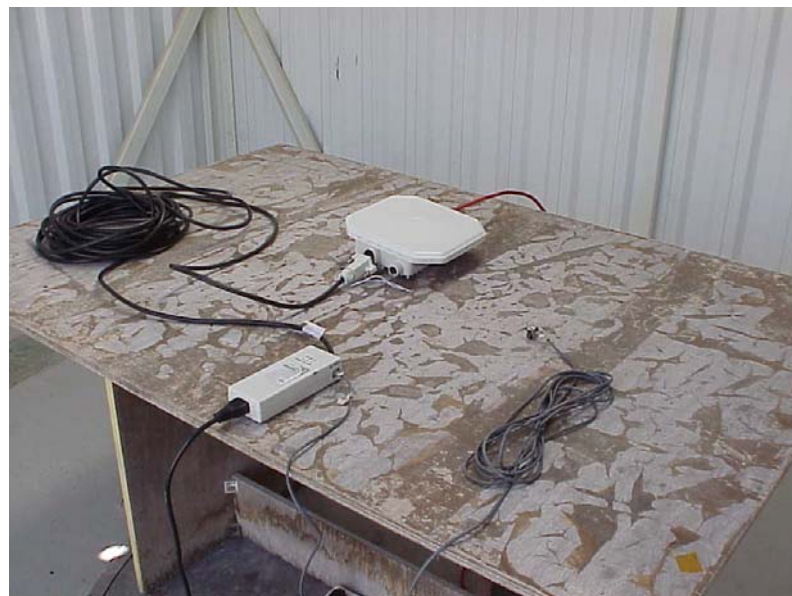


Photo 2. Test setup on OATS.

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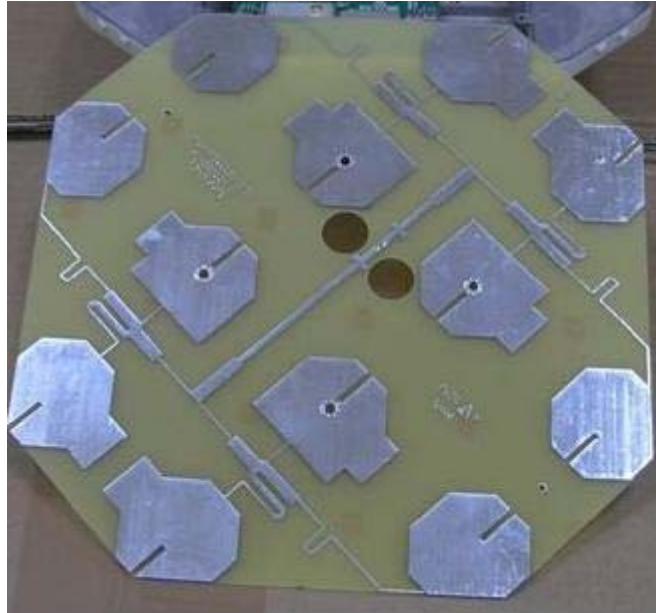


Photo 3. Internal antenna view.



Photo 4. Internal view.

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No	Description	Manufacturer information			Due Calibration date
		Name	Model No	Serial No	
1	Spectrum Analyzer 9 kHz - 50 GHz	HP	8564E	3720A00699	October 2008
2	Spectrum Analyzer 9 kHz - 26.5 GHz	Adjilent	E4407B	US40241729	October 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



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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 3.6 Broadband Wireless Access System

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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.