



Test Report No. 8912337336

Applicant: Alvarion Ltd

BreezeNETB 300

Model: BU/RB-B300-5X

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



ACCLASS Accreditation Services

Certificate Number: IT-1359



Test report N: 8912337336

Title: BreezeNETB 300

Model: BU/RB-B300-5X

Page 1 of 61

FCC ID: LKT-BNETB-58

Table of content

1.	Applicant information	2
2.	Test performance	2
3.	Summary of test	3
4.	Equipment under test description.	4
4.1	General description	4
5.	Environmental evaluation and exposure limit according to FCC part 1, §1.1307, §1.1310	5
6.	EUT test configuration	5
7.	Test results	6
7.1	Transmitter characteristics	6
7.1.1	Occupied 6 dB bandwidth for digitally systems.	6
7.1.2	Maximum peak conducted output power test according to §15.247 (b)(3).	8
7.1.3	Out of band conducted emissions test according to §15.247(d)	18
7.1.4	Radiated emissions out of band test according to §15.247(d), 15.205	21
7.1.5	Power spectral density of digital modulated systems according to § 15.247(e)	46
8.	Radiated emissions test according to § 15.209	49
9.	Conducted emissions according to § 15.207	51
10.	APPENDIX A	54
11.	APPENDIX B	56
12.	APPENDIX C	61



Test report N: 8912337336
Title: BreezeNETB 300
Model: BU/RB-B300-5X

Page 2 of 61

FCC ID: LKT-BNETB-58

1. Applicant information

Applicant:	Alvarion Ltd
Address:	21A Habarzel str, Tel-Aviv, 69710, Israel
Sample for test selected by:	The customer
The date of tests:	15 – 21 June 2009

Equipment under test information

Description of Equipment Under Test (EUT):	BreezeNETB 300
Model:	BU/RB-B300-5X
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 15.247, part 1 §1.1310

Reference Documents:

CFR 47 FCC:	Rules and Regulations; Part 15. "Radio frequency devices"; Subpart C: "Intentional radiators"
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This Test Report contains 61 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 N: 8912337336
Title: BreezeNETB 300
Model: BU/RB-B300-5X

Page 3 of 61

FCC ID: LKT-BNETB-58

3. Summary of test

The EUT was found to be in compliance with requirements of: 47CFR Part 15, §§ 15.247, 15.207 and 15.209.

Transmitter characteristics	Subclasses
Minimum 6 dB bandwidth	15.247(a)(2)
Maximum output power	15.247(b)(3)
Spurious emissions at antenna terminal	15.247(d)
Out of band spurious emissions radiated	15.205, 15.247(d)
Peak power spectral density	15.247(e)
Conducted emissions on AC power line	15.207
Unwanted radiated emissions below 1 GHz	15.209

Test performed by:

Mr. Michael Feldman
Test technician

Test report approved by:

Mr. Yuri Rozenberg.
Head of EMC Branch

**Test report N: 8912337336****Title: BreezeNETB 300****Model: BU/RB-B300-5X**

Page 4 of 61

FCC ID: LKT-BNETB-58

4. Equipment under test description.

*The customer provided description.

4.1 General description

The BNB-300 is designed as an adaptable platform, for high availability, high capacity and long range wireless services, in the unlicensed and licensed frequency spectrum. The platform architecture and software framework will enable various product configurations, providing a rich suite of applications and system deployment models.

The generic platform is based on a state-of-the-art technology, with robust capabilities including Orthogonal Frequency Division Multiplexing (OFDM), Time Division Duplexing (TDD) and Spectrum Management, the BNB-300 will offer line-of-sight (LOS) as well as non-line-of-sight (NLOS) operation, such as for drive through trees, foliage and around buildings.

EUT technical characteristics

Transmitter technical characteristics.		Note	
Stand-alone/fixed use			
Assigned frequency range	5725 MHz – 5850 MHz		
Operating frequency range	5730 MHz – 5845 MHz	5 MHz/10 MHz EBW	
	5740 MHz – 5840 MHz	20 MHz EBW	
	5750 MHz – 5830 MHz	40 MHz EBW	
RF channel spacing	5/10/20/40 MHz		
Maximum rated output power	18 dBm		
Antenna connection	N-type for external antenna	Professional installation	
Type of modulation	QPSK, 4QAM, 16QAM, 64QAM		
Type of multiplexing	OFDM		
Modulating test signal (baseband)	PRBS		
Antenna information			
Type	Manufacturer	Model	Gain, dBi
Dish, dual polarized	MTI	P/N 850101	28
Flat panel , dual polarized	MTI	P/N 850102	23

Test report N: 8912337336
Title: BreezeNETB 300
Model: BU/RB-B300-5X

Page 5 of 61

FCC ID: LKT-BNETB-58

5. Environmental evaluation and exposure limit according to FCC part 1, §1.1307, §1.1310

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

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

Where:

Pt - The transmitted power (EIRP) (mW)

r - The distance from the unit. (cm)

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

Pt- the transmitted power which is equal to the peak output power 23.7 dBm plus external antenna gain 28 dBi . The maximum peak EIRP = 51.7 dBm = 147910 mW

Maximum allowed distance “r”, where RF exposure limits may not be exceeded,

$r = \text{SQRT}(147910/4\pi)$ and is more than 108.6 cm from the antenna.

6. EUT test configuration

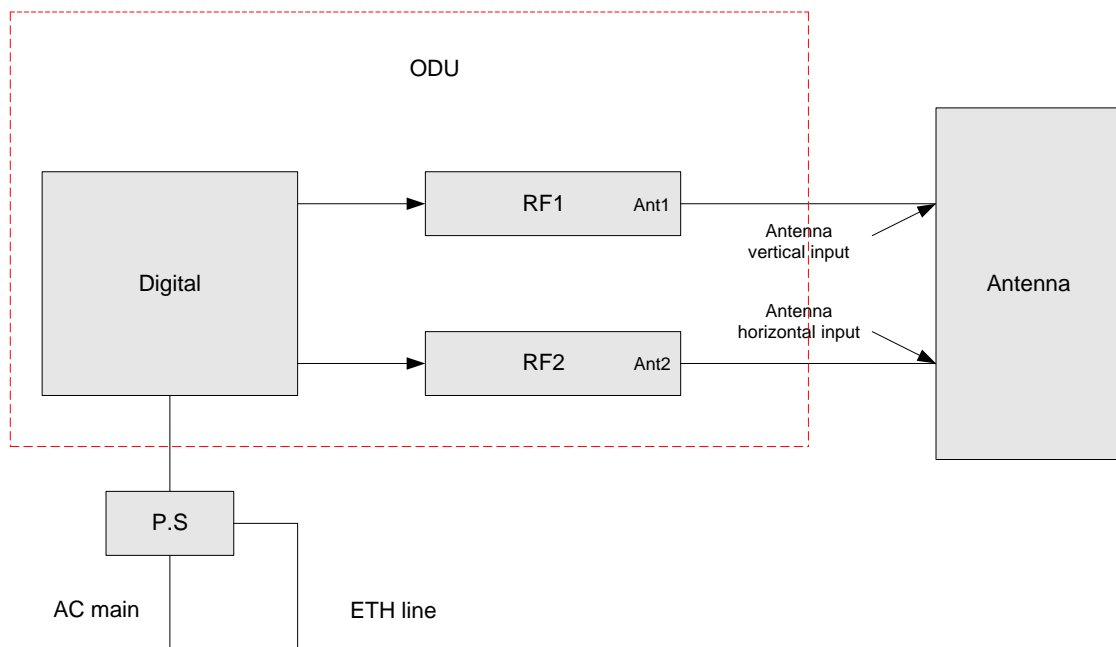


Fig. 1. EUT block diagram.



Test report N: 8912337336
Title: BreezeNETB 300
Model: BU/RB-B300-5X

7. Test results

7.1 Transmitter characteristics

7.1.1 Occupied 6 dB bandwidth for digitally systems.

Method of measurement FCC March 23, 2005 procedure
Operating Frequency Range 5730 – 5845 MHz
Ambient Temperature 23⁰ C Relative Humidity 49% Air Pressure 1011 hPa

5 MHz emission bandwidth

Carrier frequency MHz	Measured 6 dB bandwidth, MHz	Reference to plots
5730	4.496	#1
5790	4.484	#2
5845	4.477	#3

LIMIT

Minimum allowed bandwidth - 500 kHz @ 6 dBc

TEST PROCEDURE

The measurements were performed in normal (transmitting) mode of operation for carrier (channel) frequency at bottom, middle and at the top of 5725 – 5850 MHz frequency band under maximum data transfer bit rate. The EUT RF output was connected to the Spectrum Analyzer through appropriate attenuator and accounted with cable loss in SA settings.

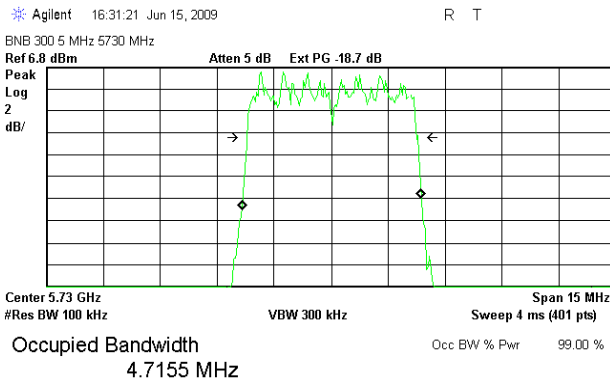
TEST EQUIPMENT USED:

2	3	4	5			
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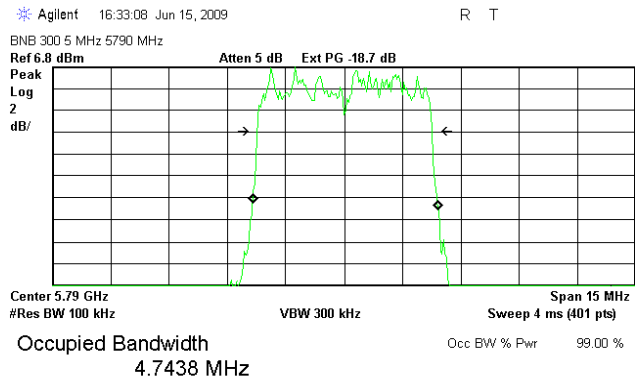
Test report N: 8912337336
Title: BreezeNETB 300
Model: BU/RB-B300-5X

FCC ID: LKT-BNETB-58



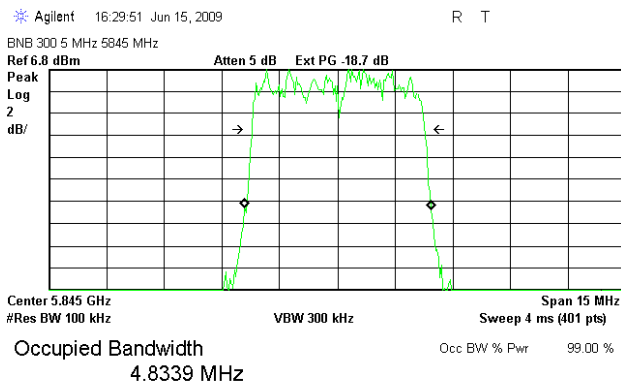
Transmit Freq Error 21.924 kHz
x dB Bandwidth 4.496 MHz

Plot # 1



Transmit Freq Error 26.341 kHz
x dB Bandwidth 4.484 MHz

Plot # 2



Transmit Freq Error 20.110 kHz
x dB Bandwidth 4.477 MHz

Plot # 3



Test report N: 8912337336
Title: BreezeNETB 300
Model: BU/RB-B300-5X

Page 8 of 61

FCC ID: LKT-BNETB-58

7.1.2 Maximum peak conducted output power test according to §15.247 (b)(3).

Method of measurement FCC March 23, 2005 procedure
 Operating Frequency Range 5730 – 5845 MHz
 Ambient Temperature 23⁰ C Relative Humidity 49% Air Pressure 1011 hPa

5 MHz emission bandwidth

Carrier frequency MHz	26 dB emission bandwidth MHz	Measured Peak output power, dBm	Reference to plots
5730	7.52	22.0	#4, 7
5790	7.73	22.5	#5, 8
5845	7.74	22.6	#6, 9

10 MHz emission bandwidth

Carrier frequency MHz	26 dB emission bandwidth MHz	Measured Peak output power, dBm	Reference to plots
5730	11.50	21.99	#10, 13
5790	11.69	22.15	#11, 14
5845	11.27	22.25	#12, 15

20 MHz emission bandwidth

Carrier frequency MHz	26 dB emission bandwidth MHz	Measured Peak output power, dBm	Reference to plots
5740	23.92	23.03	#16, 19
5780	23.23	22.97	#17, 20
5840	22.19	23.66	#18, 21



Test report N: 8912337336
Title: BreezeNETB 300
Model: BU/RB-B300-5X

40 MHz emission bandwidth

Carrier frequency MHz	26 dB emission bandwidth MHz	Measured Peak output power, dBm	Reference to plots
5750	40.58	17.9	#22, 25
5790	40.72	17.7	#23, 26
5830	40.38	18.8	#24, 27

LIMIT

For systems using digital modulation in the 5725 – 5850 MHz band: 1W (30 dBm).
Systems used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power.

TEST PROCEDURE

The measurements were performed in normal (transmitting) mode of operation for carrier (channel) frequency at bottom, middle and the top of the 5725 – 5850 MHz frequency band under maximum data transfer bit rate. The EUT RF output was connected to the Spectrum Analyzer through appropriate attenuator and accounted with cable loss in SA settings.

TEST EQUIPMENT USED:

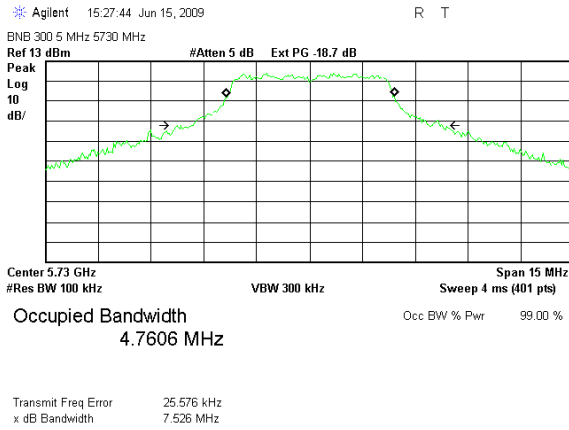
2	3	4	5			
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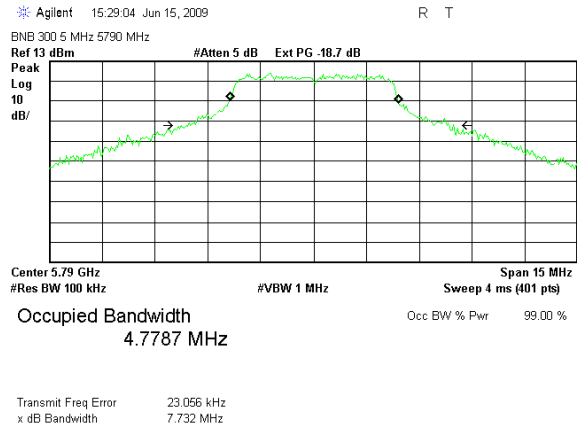
Test report N: 8912337336
Title: BreezeNETB 300
Model: BU/RB-B300-5X

FCC ID: LKT-BNETB-58

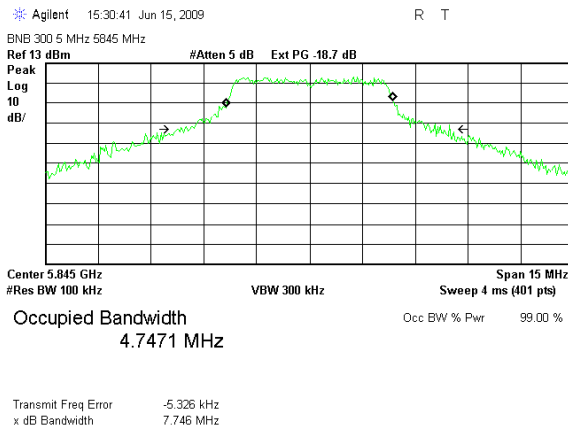
5 MHz EBW option, 26 dB bandwidth test result



Plot # 4



Plot # 5



Plot # 6

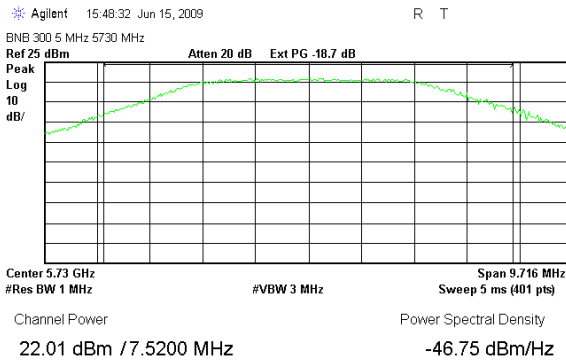


Test report N: 8912337336
Title: BreezeNETB 300
Model: BU/RB-B300-5X

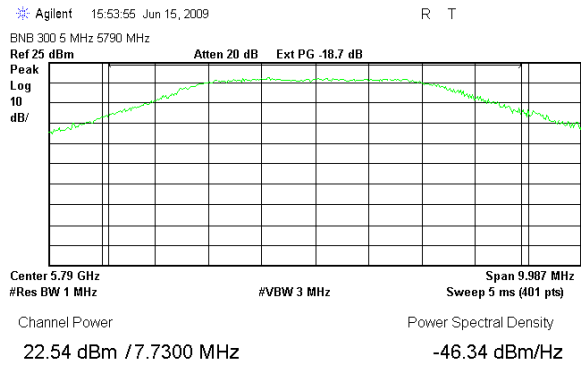
Page 11 of 61

FCC ID: LKT-BNETB-58

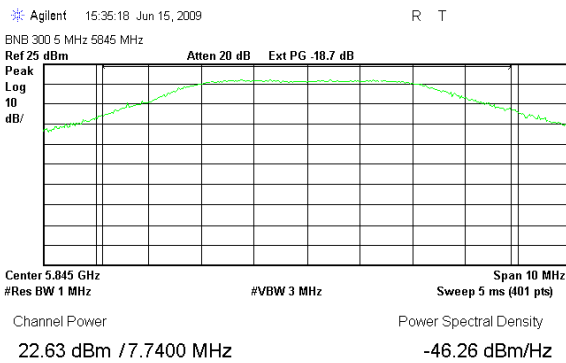
5 MHz EBW option. Peak output power results



Plot # 7



Plot # 8



Plot # 9

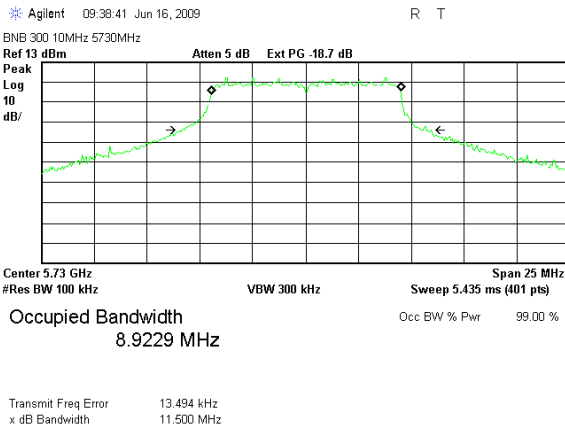
Insertion loss of external attenuator, directional coupler and cable = 18.7 dB



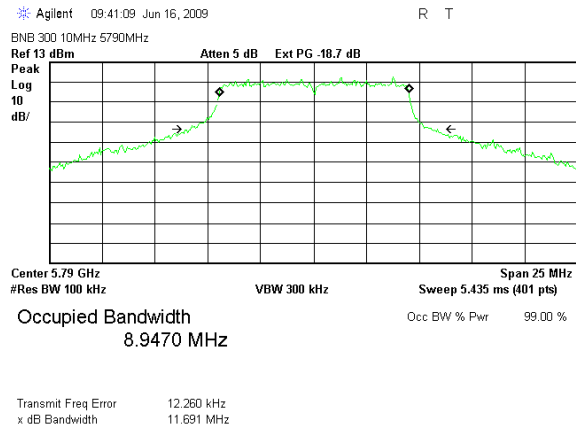
Test report N: 8912337336
Title: BreezeNETB 300
Model: BU/RB-B300-5X

FCC ID: LKT-BNETB-58

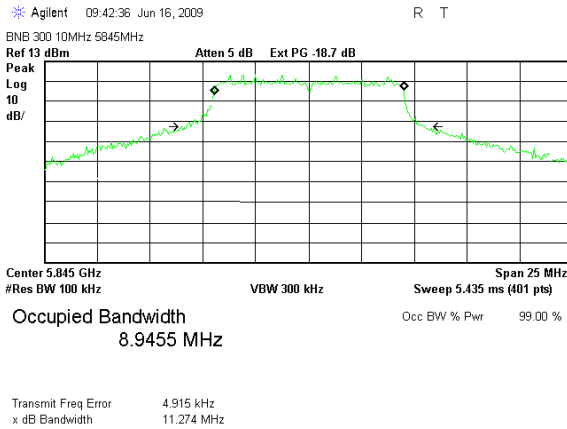
10 MHz EBW option, 26 dB bandwidth test result



Plot # 10



Plot # 11



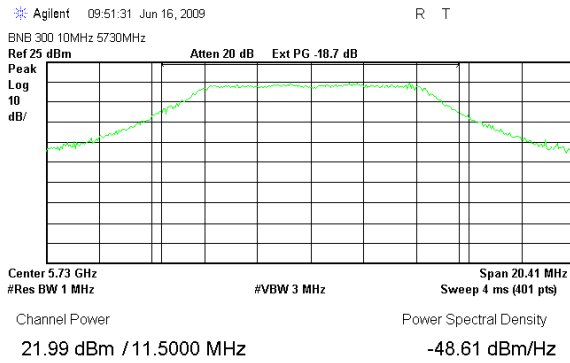
Plot # 12



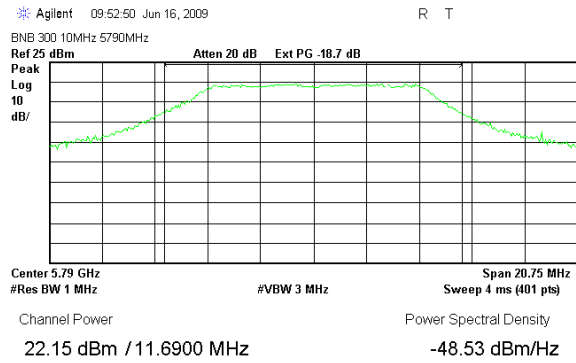
Test report N: 8912337336
Title: BreezeNETB 300
Model: BU/RB-B300-5X

FCC ID: LKT-BNETB-58

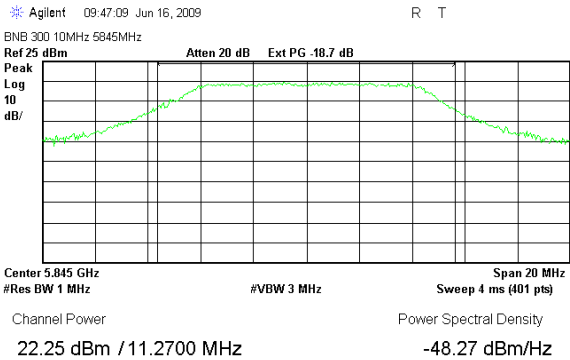
10 MHz EBW option. Peak output power results



Plot # 13



Plot # 14



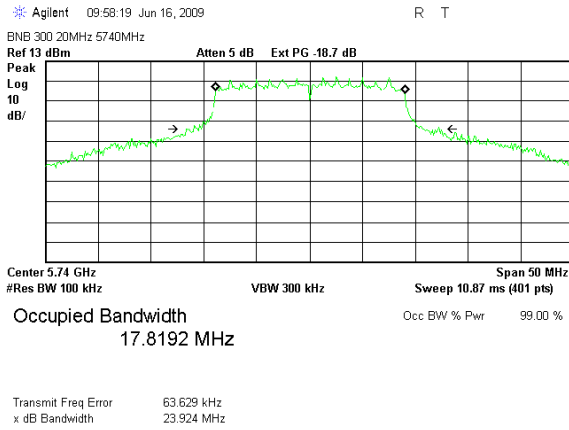
Plot # 15



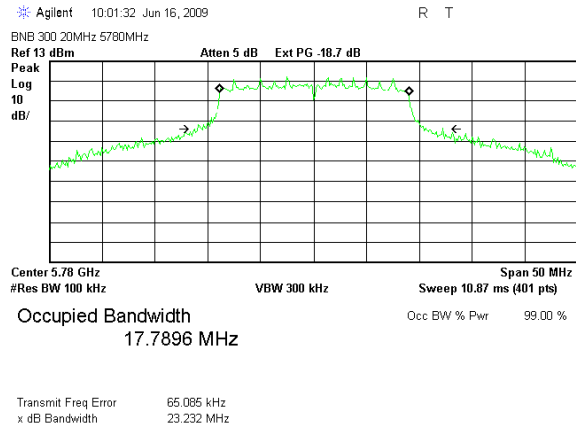
Test report N: 8912337336
Title: BreezeNETB 300
Model: BU/RB-B300-5X

FCC ID: LKT-BNETB-58

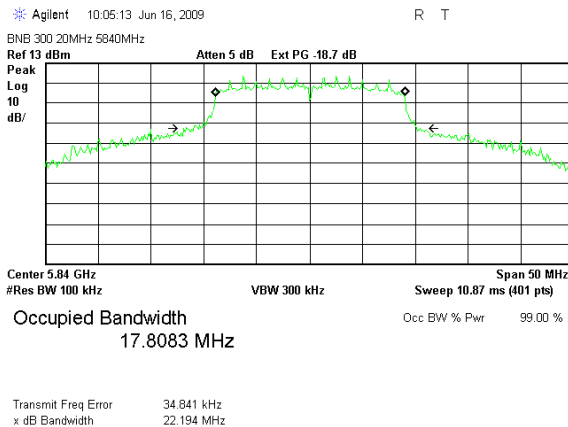
20 MHz EBW option, 26 dB bandwidth test result



Plot # 16



Plot # 17



Plot # 18

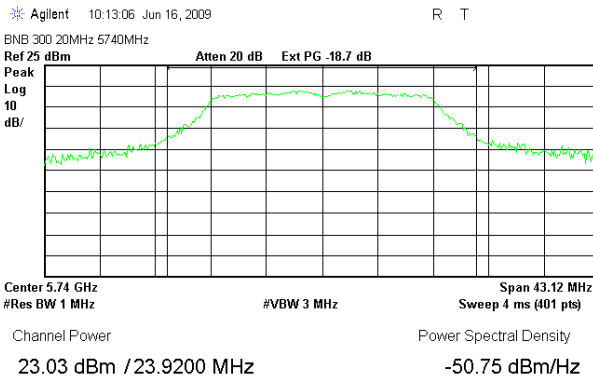


Test report N: 8912337336
Title: BreezeNETB 300
Model: BU/RB-B300-5X

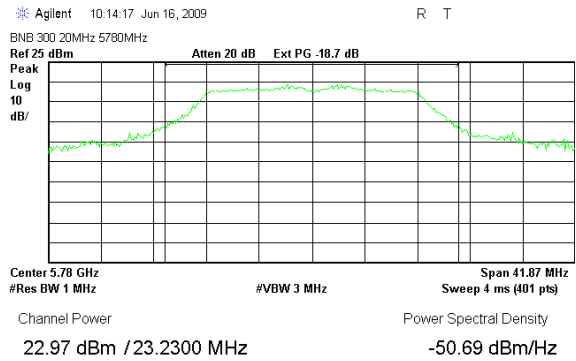
Page 15 of 61

FCC ID: LKT-BNETB-58

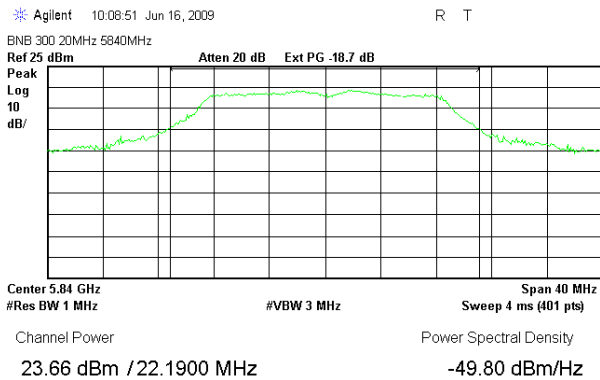
20 MHz EBW option. Peak output power results



Plot # 19



Plot # 20



Plot # 21

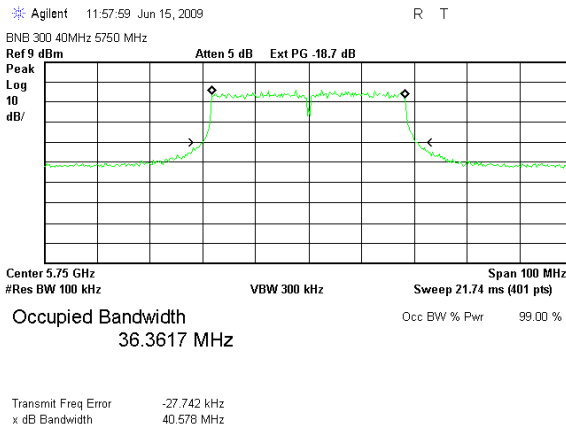
Insertion loss of external attenuator, directional coupler and cable = 18.7 dB



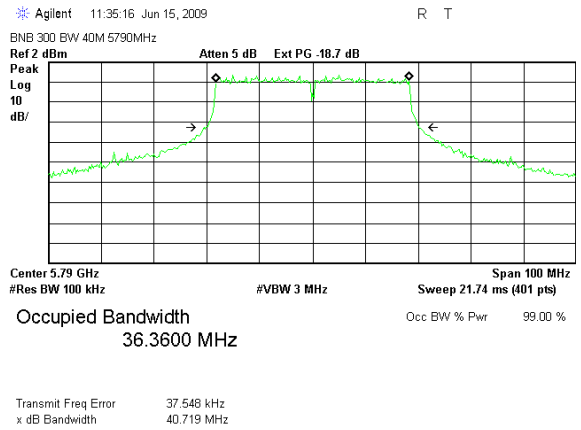
Test report N: 8912337336
Title: BreezeNETB 300
Model: BU/RB-B300-5X

FCC ID: LKT-BNETB-58

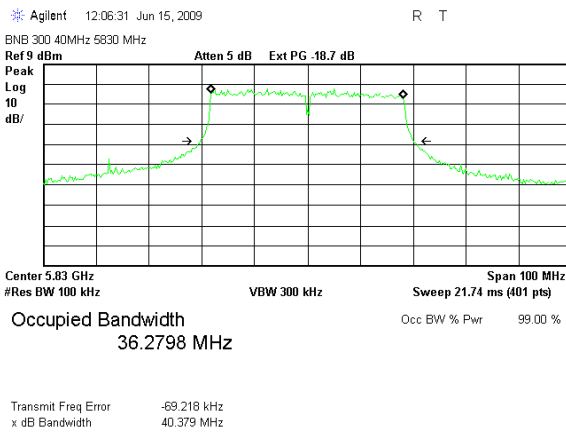
40 MHz BW option, 26 dB bandwidth test result



Plot # 22



Plot # 23



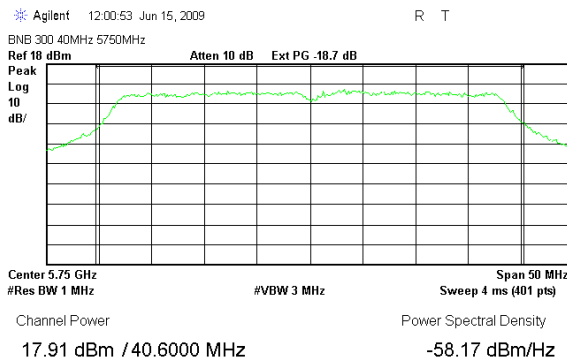
Plot # 24



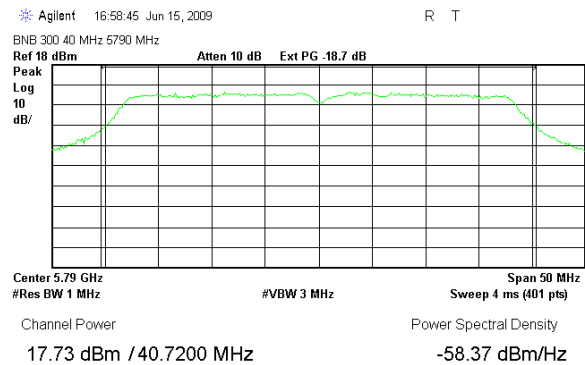
Test report N: 8912337336
Title: BreezeNETB 300
Model: BU/RB-B300-5X

FCC ID: LKT-BNETB-58

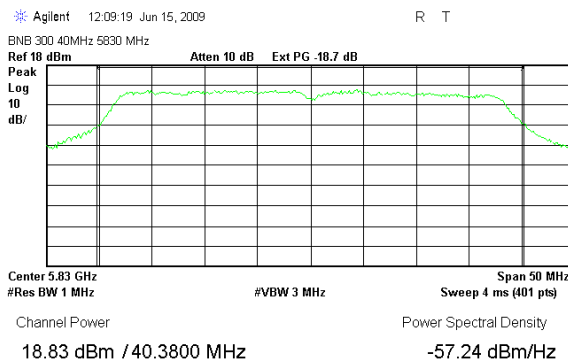
40 MHz BW option. Peak output power results



Plot # 25



Plot # 26



Plot # 27

Insertion loss of external attenuator, directional coupler and cable = 18.7 dB



Test report N: 8912337336
Title: BreezeNETB 300
Model: BU/RB-B300-5X

Page 18 of 61

FCC ID: LKT-BNETB-58

7.1.3 Out of band conducted emissions test according to §15.247(d)

Method of measurement	FCC March 23, 2005 procedure				
Operating Frequency Range	5730 – 5845 MHz				
Ambient Temperature	23 ⁰ C	Relative Humidity	49%	Air Pressure	1009 hPa

The frequency spectrum was investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz and up to 40 GHz. The emission levels of the EUT in peak mode more than 20 dB lower than the specified limit were not recorded in the table. For the test results refer to plots ## 31-42 in this section.

LIMIT

In any 100 kHz bandwidth, outside the frequency band, in which the intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

TEST PROCEDURE

The test was performed at worse case emission bandwidth and output power options. The measurements were performed in normal (transmitting) mode of operation for carrier (channel) frequency at bottom, middle and the top of the 5725 – 5850 MHz frequency band under maximum data transfer bit rate. The EUT RF output was connected to the Spectrum Analyzer through appropriate attenuator and accounted with cable loss in SA settings

TEST EQUIPMENT USED:

1	3	4	5			
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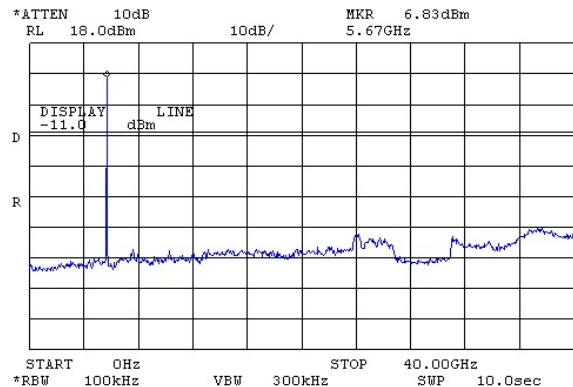
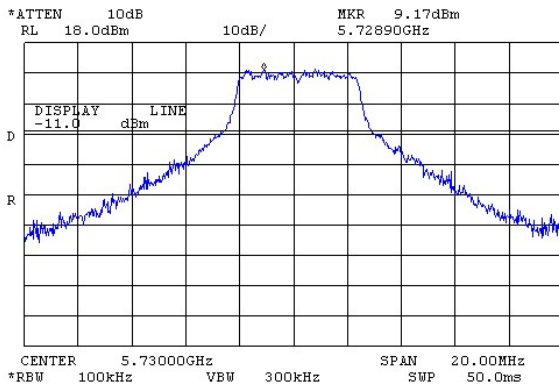


Test report N: 8912337336
Title: BreezeNETB 300
Model: BU/RB-B300-5X

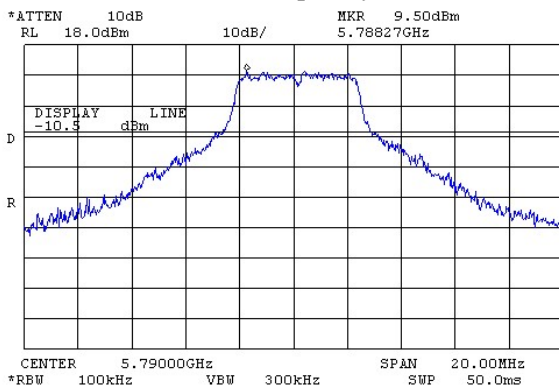
Page 19 of 61

FCC ID: LKT-BNETB-58

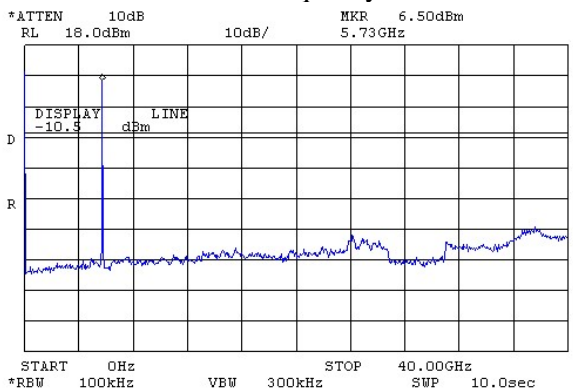
5 MHz emission bandwidth



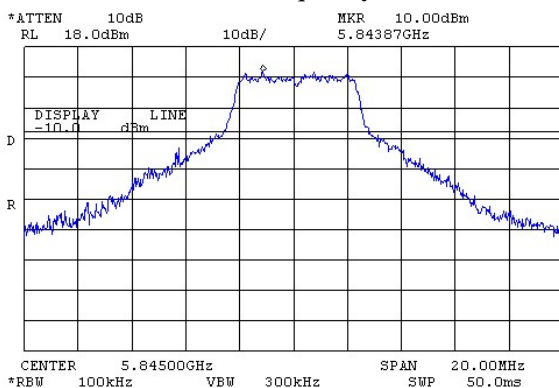
Plot # 28. Carrier frequency 5730 MHz.



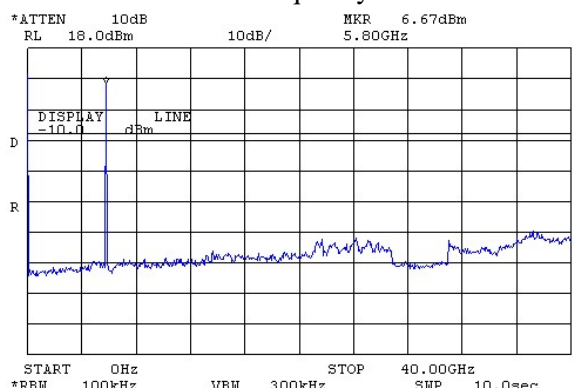
Plot # 29. Carrier frequency 5730 MHz..



Plot # 30. Carrier frequency 5790 MHz.



Plot # 31. Carrier frequency 5790 MHz.



Plot # 32. Carrier frequency 5845 MHz

Plot # 33. Carrier frequency 5845 MHz



Test report N: 8912337336

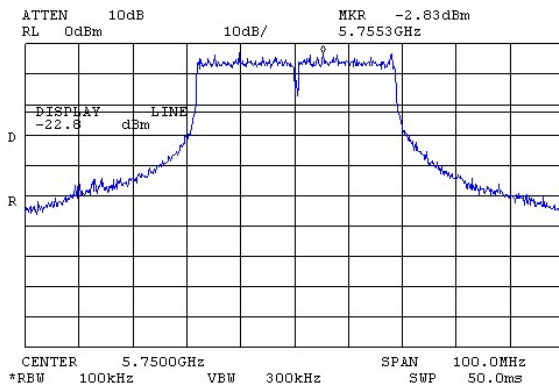
Title: BreezeNETB 300

Model: BU/RB-B300-5X

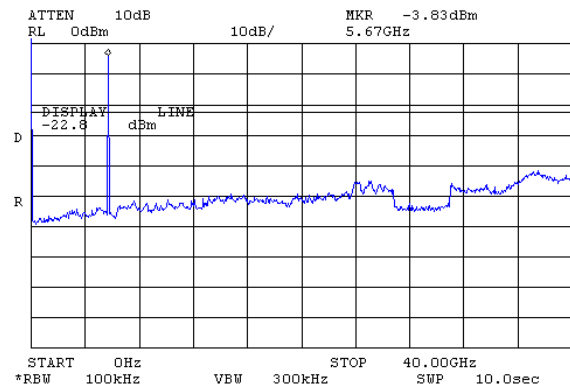
Page 20 of 61

FCC ID: LKT-BNETB-58

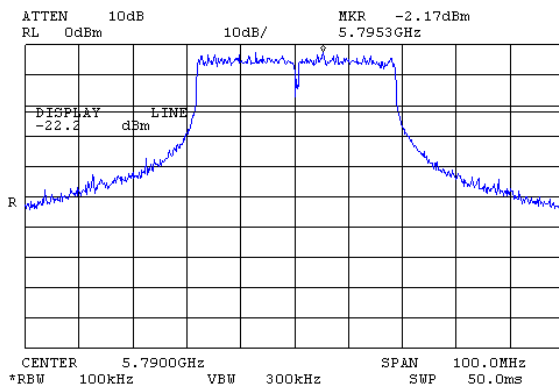
40 MHz emission bandwidth



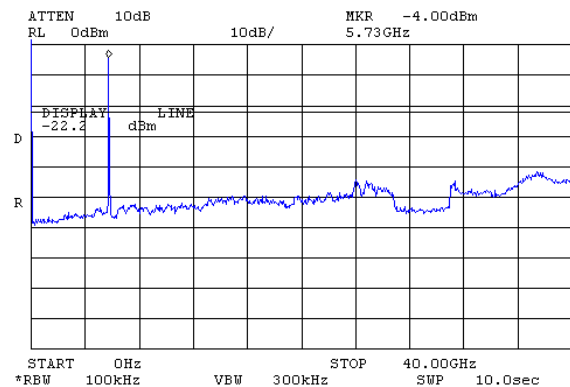
Plot # 34. Carrier frequency 5730 MHz.



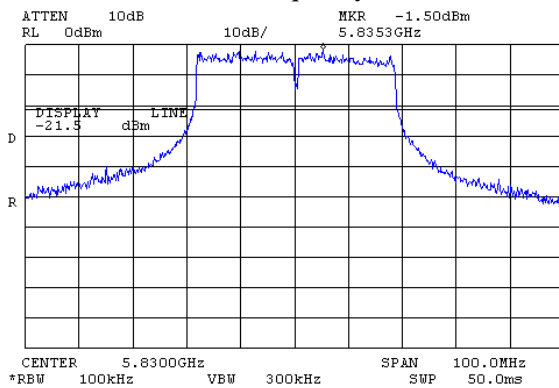
Plot # 35. Carrier frequency 5730 MHz.



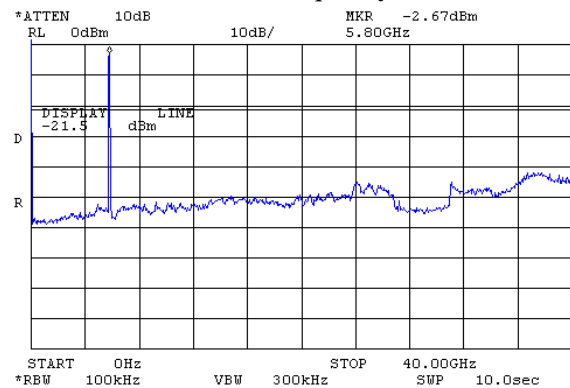
Plot # 36. Carrier frequency 5787.5 MHz



Plot # 37. Carrier frequency 5787.5 MHz



Plot # 38. Carrier frequency 5845 MHz



Plot # 39. Carrier frequency 5845 MHz

Test report N: 8912337336
Title: BreezeNETB 300
Model: BU/RB-B300-5X

Page 21 of 61

FCC ID: LKT-BNETB-58

7.1.4 Radiated emissions out of band test according to §15.247(d), 15.205

Method of measurement FCC March 23, 2005 procedure
 Operating Frequency Range 5730 – 5845 MHz
 Ambient Temperature 23⁰ C Relative Humidity 56% Air Pressure 1011 hPa

The frequency spectrum was investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz and up to 40 GHz. 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 tables and plots in this section. Test results in 30 – 1000 MHz frequency range are recorded in section 5.2.

External dish antenna

5 MHz emission bandwidth

Carrier frequency 5730 MHz

Frequency, MHz	Radiated emissions, dB (µV/m)	Peak limit dB (µV/m)	Avg limit, dB (µV/m)	Margin, dB	Note
5393	64.0	74	-	10.0	Detector peak
5393	50.6	-	54	3.4	Detector Average.

Carrier frequency 5790 MHz

Frequency, MHz	Radiated emissions, dB (µV/m)	Peak limit dB (µV/m)	Avg limit, dB (µV/m)	Margin, dB	Note
5415	64.3	74	-	9.7	Detector peak
5382	51.0	-	54	3.0	Detector Average.

Carrier frequency 5845 MHz

Frequency, MHz	Radiated emissions, dB (µV/m)	Peak limit dB (µV/m)	Avg limit, dB (µV/m)	Margin, dB	Note
5382	65.6	74	-	8.4	Detector peak
5382	46.4	-	54	7.6	Detector Average.

Test report N: 8912337336
Title: BreezeNETB 300
Model: BU/RB-B300-5X

Page 22 of 61

FCC ID: LKT-BNETB-58

10 MHz emission bandwidth

Carrier frequency 5730 MHz

Frequency, MHz	Radiated emissions, dB (µV/m)	Peak limit dB (µV/m)	Avg limit, dB (µV/m)	Margin, dB	Note
5372	65.1	74	-	8.9	Detector peak
5394	49.6	-	54	4.4	Detector Average.

Carrier frequency 5790 MHz

Frequency, MHz	Radiated emissions, dB (µV/m)	Peak limit dB (µV/m)	Avg limit, dB (µV/m)	Margin, dB	Note
5393	63.5	74	-	10.5	Detector peak
5404	49.9	-	54	4.1	Detector Average.

Carrier frequency 5845 MHz

Frequency, MHz	Radiated emissions, dB (µV/m)	Peak limit dB (µV/m)	Avg limit, dB (µV/m)	Margin, dB	Note
5382	64.8	74	-	9.2	Detector peak
5393	49.1	-	54	4.9	Detector Average.

Test report N: 8912337336

Page 23 of 61

Title: BreezeNETB 300

Model: BU/RB-B300-5X

FCC ID: LKT-BNETB-58

40 MHz emission bandwidth

Carrier frequency 5750 MHz

Frequency, MHz	Radiated emissions, dB (µV/m)	Peak limit dB (µV/m)	Avg limit, dB (µV/m)	Margin, dB	Note
5404	70.7	74	-	3.3	Detector peak
5384	50.7	-	54	3.3	Detector Average.

Carrier frequency 5790 MHz

Frequency, MHz	Radiated emissions, dB (µV/m)	Peak limit dB (µV/m)	Avg limit, dB (µV/m)	Margin, dB	Note
5393	65.4	74	-	8.6	Detector peak
5382	51.4	-	54	2.6	Detector Average.

Carrier frequency 5830 MHz

Frequency, MHz	Radiated emissions, dB (µV/m)	Peak limit dB (µV/m)	Avg limit, dB (µV/m)	Margin, dB	Note
5371	64.9	74	-	9.1	Detector peak
5382	46.3	-	54	7.7	Detector Average.

Test report N: 8912337336
Title: BreezeNETB 300
Model: BU/RB-B300-5X

Page 24 of 61

FCC ID: LKT-BNETB-58

External flat panel antenna.

5 MHz emission bandwidth

Carrier frequency 5730 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5360	63.8	74	-	10.2	Detector peak
5148	50.1	-	54	3.9	Detector Average.

Carrier frequency 5790 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5360	64.1	74	-	9.9	Detector peak
5114	50.8	-	54	3.2	Detector Average.

Carrier frequency 5845 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5415	63.2	74	-	10.8	Detector peak
5114	49.3	-	54	4.7	Detector Average.

Test report N: 8912337336

Page 25 of 61

Title: BreezeNETB 300

Model: BU/RB-B300-5X

FCC ID: LKT-BNETB-58

10 MHz emission bandwidth

Carrier frequency 5730 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5148	63.7	74	-	10.3	Detector peak
5148	49.6	-	54	4.4	Detector Average.

Carrier frequency 5790 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5148	63.9	74	-	10.1	Detector peak
5148	50.3	-	54	3.7	Detector Average.

Carrier frequency 5845 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5415	63.2	74	-	10.8	Detector peak
5148	50.3	-	54	3.7	Detector Average.

Test report N: 8912337336
Title: BreezeNETB 300
Model: BU/RB-B300-5X

Page 26 of 61

FCC ID: LKT-BNETB-58

40 MHz emission bandwidth

Carrier frequency 5750 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5360	65.5	74	-	9.5	Detector peak
5393	51.0	-	54	3.0	Detector Average.

Carrier frequency 5790 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5150	68.3	74	-	5.7	Detector peak
5406	50.9	-	54	3.1	Detector Average.

Carrier frequency 5830 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5371	63.8	74	-	10.2	Detector peak
5116	48.0	-	54	6.0	Detector Average.