



Test Report No. 8912313914

Applicant: ALVARION Ltd.

Equipment Under Test:

**BreezeMAX Broadband Wireless Access
BreezeMax Extreme CPE system (5.4 GHz)**

Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

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



ACCLASS Accreditation Services

Certificate Number: IT-1359



Test report No: 8912313914

Page 1 of 34 Pages

Title: BreezeMAX Extreme CPE (5.4 GHz)

Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

FCC ID: LKT-EXTR-CPE-50

Table of Contents

1.	Applicant information.....	2
2.	Test performance.....	2
3.	Summary of test:	3
4.	Equipment under test description.....	4
4.1	General description	4
4.2	EUT test configuration	5
5.	Test results.....	6
5.1	Transmitter characteristics.....	6
5.1.1	Peak output power test	6
5.1.2	Peak power density test § 15.407(a) (2)	9
5.1.3	Spurious emissions at antenna terminal § 15.407(b)(3)	12
5.1.4	Radiated spurious emissions test § 15.407(b)(3).....	15
5.1.5	Peak excursion test	20
5.2	Radiated emissions test according to § 15.209	23
5.3	Conducted emissions according to § 15.207	24
APPENDIX A	Photographs	27
APPENDIX B	Test equipment used.....	29
APPENDIX C	General information.....	34

**Test report No:** 8912313914

Page 2 of 34 Pages

Title: BreezeMAX Extreme CPE (5.4 GHz)**Model:** BMAX-EXTR-CPE-DIV-1D-4.9-2-A

FCC ID: LKT-EXTR-CPE-50

1. Applicant information

Applicant:	Alvarion Ltd
Address:	21A Habarzel str, Tel-Aviv, 69710, Israel
Sample for test selected by:	The customer
The dates of test:	14, 22 January, 22 June, 10-11 August 2009

Equipment under test information

Description of Equipment Under Test (EUT):	BreezeMAX Extreme CPE (5.4 GHz)
Model:	BMAX-EXTR-CPE-DIV-1D-4.9-2-A alternate name; OD210-5
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 15.407, part 1 §1.1310

Reference Documents:

CFR 47 FCC:	Rules and Regulations; Part 15. "Radio frequency devices"; Subpart C: "Intentional radiators", Subpart E: "UNII devices"
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This Test Report contains 34 pages and may be used only in full.
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This Test Report applies only to the specimen tested and may not be applied to other specimens of the same product.

**Test report No: 8912313914****Page 3 of 34 Pages****Title: BreezeMAX Extreme CPE (5.4 GHz)****Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A****FCC ID: LKT-EXTR-CPE-50**

3. Summary of test:

The EUT was found to be in compliance with requirements of: 47CFR Part 15 section 15.407

Transmitter characteristics	Subclasses
Peak output power	15.407(a)(2)
Peak power spectral density	15.407(a)(2)
Spurious emissions at antenna terminal	15.407(b)(3)
Out of band spurious emissions radiated	15.205, 15.407(b)(3)
Peak excursion test	15.407(a)(6)
Conducted emissions on AC power line	15.407(b)(6)
Unwanted radiated emissions below 1 GHz	15.407(b)(6)

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



Test report No: 8912313914

Page 4 of 34 Pages

Title: BreezeMAX Extreme CPE (5.4 GHz)

Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

FCC ID: LKT-EXTR-CPE-50

4. Equipment under test description.

*The customer provided description.

4.1 General description

BreezeMAX Extreme 5x is a high capacity, IP services oriented Broadband Wireless Access system. BreezeMAX Extreme 5x is digital modulated TDD system operating in the 4900MHz up to 5950MHz band. The system contains a Base station unit and a Subscriber unit.

Subscriber unit configuration:

The basic system configuration is a two-box configuration that contains Indoor unit that contains a power supply and an Ethernet 10/100BaseT (RJ 45) interface. Outdoor unit containing the entire radio and digital section.

A single CAT5 cable connecting the indoor and outdoor unit serves for carrying the data as well as for transferring power, management and control signals.

The subscriber indoor unit is a single power supply (55VDC) and Ethernet 10/100BaseT (RJ 45) interface.

EUT technical characteristics

Transmitter technical characteristics.		Note	
Stand-alone/fixed use			
Assigned frequency range	5.470 GHz – 5.725 GHz	-	
Operating frequency range	5.475 GHz – 5.720 GHz	-	
RF channel spacing	5 MHz	-	
Maximum rated output power	21 dBm	-	
Type of modulation	4QAM, 16QAM, 64QAM	-	
Type of multiplexing	OFDM	-	
Modulating test signal (baseband)	PRBS	-	
Maximum transmitter duty cycle in normal use	34%	-	
Transmitter duty cycle supplied for test	34%	-	
Antenna information			
Type	Manufacturer	Model	Gain
Internal	Caltronics	3943	17 dBi

Test report No: 8912313914

Page 5 of 34 Pages

Title: BreezeMAX Extreme CPE (5.4 GHz)

Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

FCC ID: LKT-EXTR-CPE-50

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

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

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

Where:

Pt - The transmitted power (EIRP) (mW)

r - The distance from the unit. (cm)

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

Pt- the transmitted power which is equal to the output power 7.2 dBm plus internal antenna gain 17 dBi . The maximum EIRP = 24.2 dBm = 269 mW

Maximum allowed distance “r”, where RF exposure limits may not be exceeded = $\text{SQRT}(269/4\pi)$ and is more than 4.6 cm from the antenna.

4.2 EUT test configuration

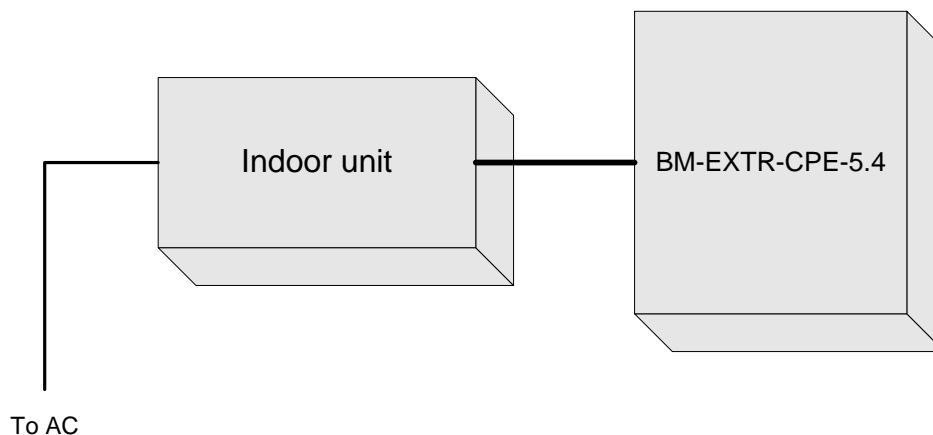


Fig. 1 BM-EXTRM-CPE-5.4 test configuration.



Test report No: 8912313914

Page 6 of 34 Pages

Title: BreezeMAX Extreme CPE (5.4 GHz)

Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

FCC ID: LKT-EXTR-CPE-50

5. Test results

5.1 Transmitter characteristics

5.1.1 Peak output power test § 15.407 (a) (2).

Method of measurement	DA 02-2138			
Operating Frequency Range	5.475 – 5.720 GHz			
Ambient Temperature	23 ⁰ C	Relative Humidity	49%	Air Pressure 1009 hPa

The peak transmit power shall not exceed the lesser of 250mW or 11dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, the transmitter conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Calculated limit is 11 + 10 log 5.48 MHz – (17-6) = 18.38 – 11 = 7.38 dBm.

Carrier frequency MHz	Measured 26 dB bandwidth, MHz	Measured Peak output power, dBm	Reference to plots
5475	5.41	7.18	##1,4
5600	5.48	6.87	##2,5
5720	5.48	6.51	##3,6

TEST PROCEDURE

Test was conducted according to method #3 of DA 02-2138 August 2002 procedure. The measurements were performed at three transmitted carrier (channel) frequencies 5.475 GHz, 5.600 GHz and 5.720 GHz at bottom, middle and top of the 5.470 – 5.725 GHz 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 No: 8912313914

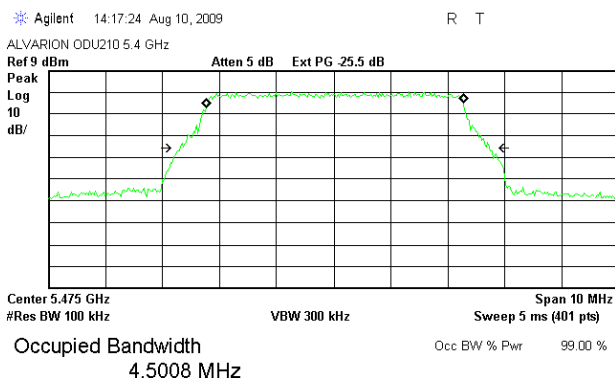
Page 7 of 34 Pages

Title: BreezeMAX Extreme CPE (5.4 GHz)

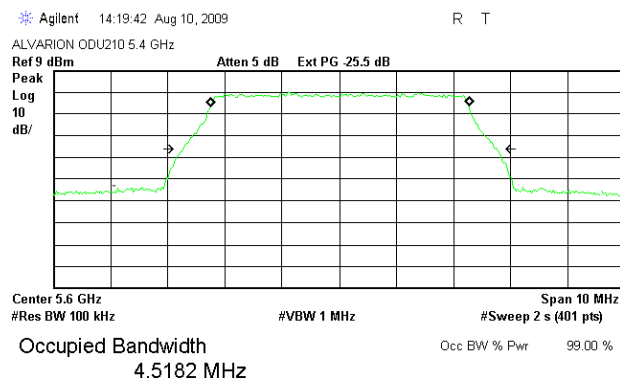
Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

FCC ID: LKT-EXTR-CPE-50

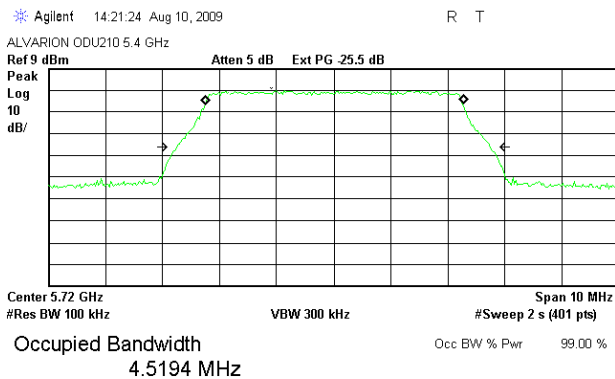
26 dB Emission bandwidth results.



Plot # 1. Carrier Frequency 5475 MHz



Plot # 2. Carrier Frequency 5600 MHz



Plot # 3. Carrier Frequency 5720 MHz



Test report No: 8912313914

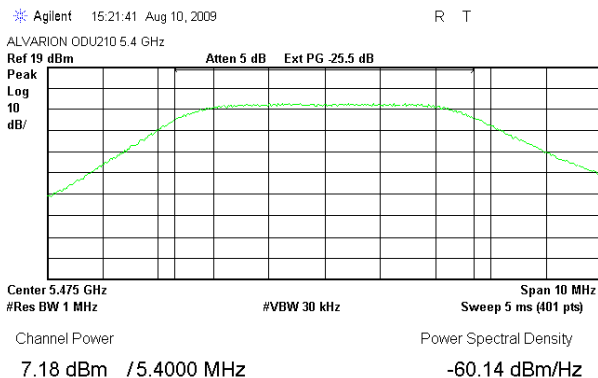
Page 8 of 34 Pages

Title: BreezeMAX Extreme CPE (5.4 GHz)

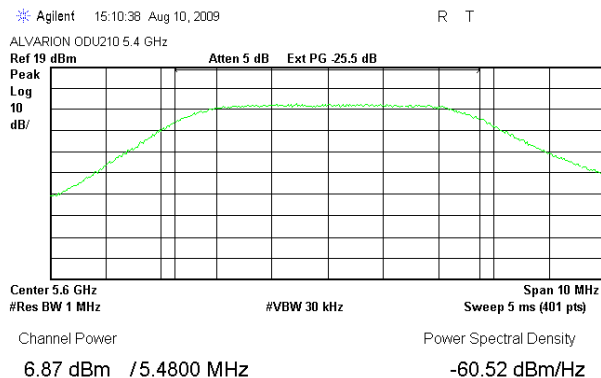
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FCC ID: LKT-EXTR-CPE-50

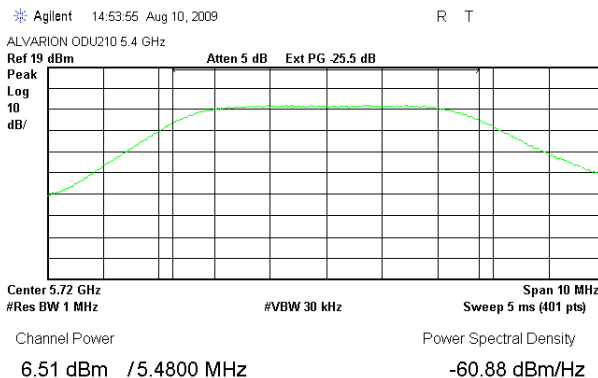
Insertion loss of external attenuator, cable and directional coupler = 25.5 dB



Plot # 4. Carrier Frequency 5475 MHz



Plot # 5. Carrier Frequency 5600 MHz



Plot # 6. Carrier Frequency 5720 MHz



Test report No: 8912313914

Page 9 of 34 Pages

Title: BreezeMAX Extreme CPE (5.4 GHz)

Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

FCC ID: LKT-EXTR-CPE-50

5.1.2 Peak power density test § 15.407(a) (2)

Method of measurement DA 02-2138
Operating Frequency Range 5.475 – 5.720 GHz
Ambient Temperature 23° C Relative Humidity 49% Air Pressure 1009 hPa

The peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, the transmitter conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Calculated limit is 11 – (17-6) = 0 dBm.

Table with 4 columns: Carrier frequency MHz, Peak power density dBm, PSD Limit dBm, Reference to plot. Rows for 5475, 5600, and 5720 MHz.

TEST PROCEDURE

The measurements were performed according to procedure DA 02-2138 August 2002 at three transmitted carrier (channel) frequencies 5.475 GHz, 5.600 GHz and 5.720 GHz at bottom, middle and top of the 5.470 GHz – 5.725 GHz 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:

Table with 7 columns, containing numbers 2, 3, 4, 5 in the first four columns.



Test report No: 8912313914

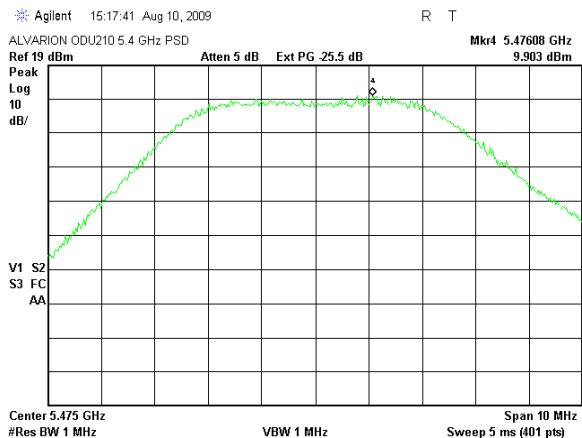
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Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

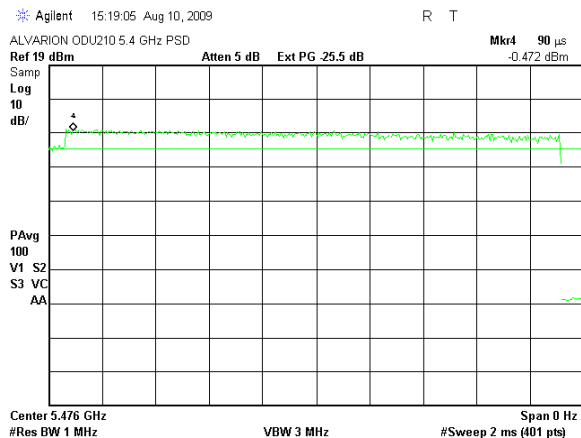
Page 10 of 34 Pages

FCC ID: LKT-EXTR-CPE-50

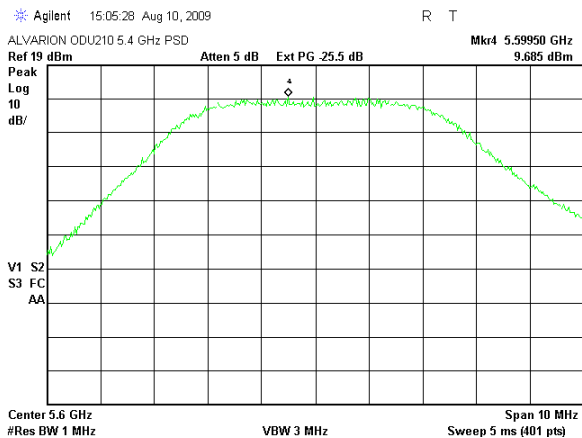
Peak power spectral density test results.



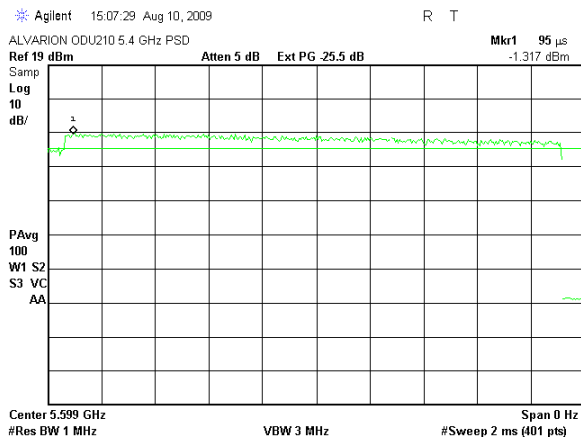
Plot # 7. Carrier Frequency 5475 MHz



Plot # 8. Carrier Frequency 5475 MHz



Plot # 9. Carrier Frequency 5600 MHz

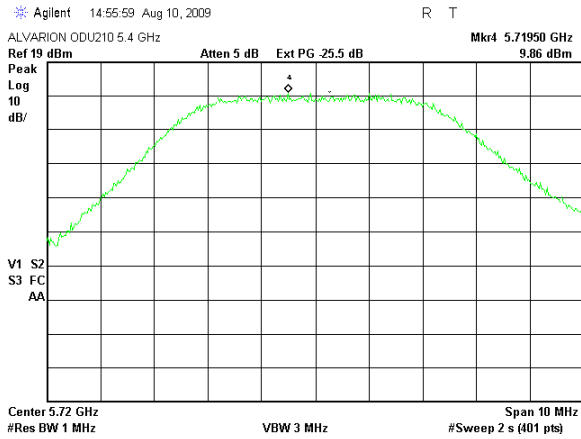


Plot # 10. Carrier Frequency 5600 MHz

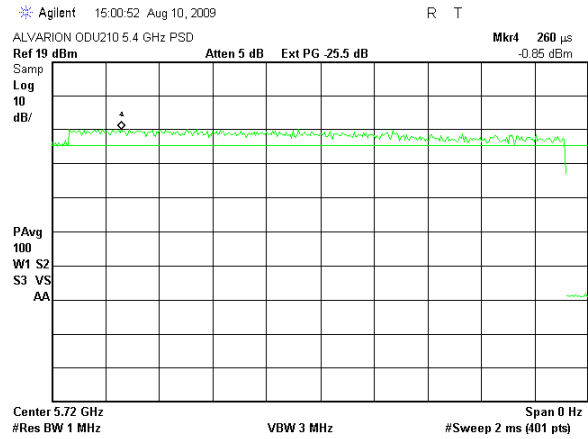


Test report No: 8912313914
Title: BreezeMAX Extreme CPE (5.4 GHz)
Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

Page 11 of 34 Pages
FCC ID: LKT-EXTR-CPE-50



Plot # 11. Carrier Frequency 5720 MHz



Plot # 12. Carrier Frequency 5720 MHz



Test report No: 8912313914

Page 12 of 34 Pages

Title: BreezeMAX Extreme CPE (5.4 GHz)

Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

FCC ID: LKT-EXTR-CPE-50

5.1.3 Spurious emissions at antenna terminal § 15.407(b)(3)

Operating Frequency Range 5.475 – 5.720 GHz
Ambient Temperature 23⁰ C Relative Humidity 49% Air Pressure 1009 hPa

The frequency spectrum was investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to the tenth harmonic of the highest fundamental frequency. The emission levels 20 dB lower than specified limit were not recorded in the tables. No emissions were found closer to limit except band-edge points.

Carrier frequency – 5475 MHz.

Frequency, MHz	Spurious emission level, dBm	EIRP limit, dBm/MHz	Margin dB	Reference to plot number
5469.9	-34.2	-27	7.2	#14

Carrier frequency – 5720 MHz.

Frequency, MHz	Spurious emission level, dBm	EIRP limit, dBm/MHz	Margin dB	Reference to plot number
5725.3	-33.0	-27	6.0	#17

LIMIT

For operation in the band 5470 - 5725 MHz all emissions outside of the band shall not exceed an EIRP of -27dBm/MHz

TEST PROCEDURE

The measurements were performed at three transmitted carrier (channel) frequencies 5.475 GHz, 5.600 GHz and 5.720 GHz at bottom, middle and top of the 5.470 GHz – 5.725 GHz 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. The worse case results were noted in the tables above.

TEST EQUIPMENT USED:

1	2	3	5			
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Test report No: 8912313914

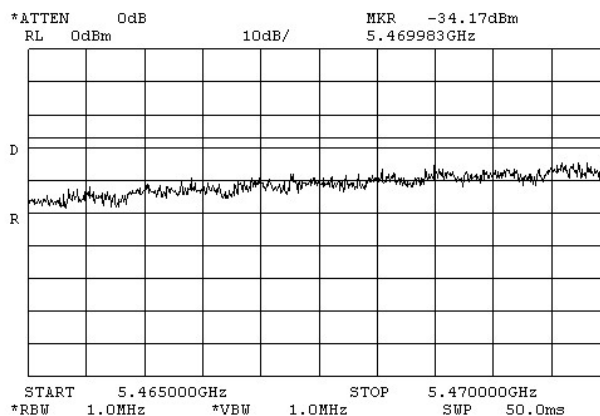
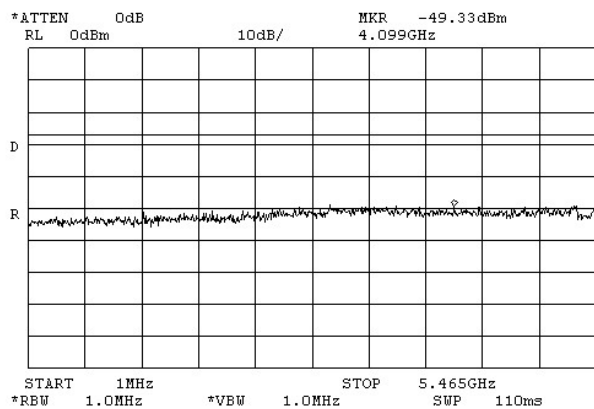
Page 13 of 34 Pages

Title: BreezeMAX Extreme CPE (5.4 GHz)

Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

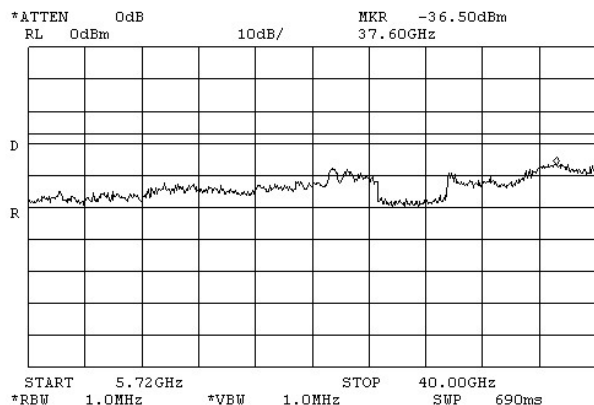
FCC ID: LKT-EXTR-CPE-50

Spurious emissions at antenna terminal.



Plot # 13. Carrier Frequency 5475 MHz

Plot # 14. Carrier Frequency 5475 MHz



Plot # 15. Carrier Frequency 5475 MHz



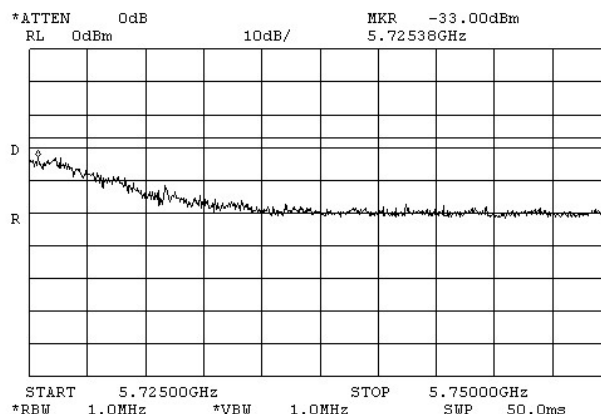
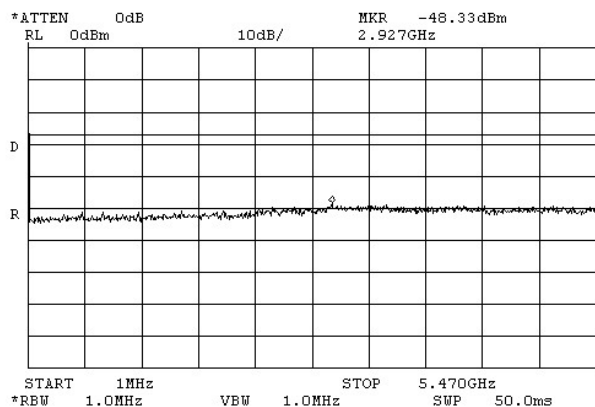
Test report No: 8912313914

Page 14 of 34 Pages

Title: BreezeMAX Extreme CPE (5.4 GHz)

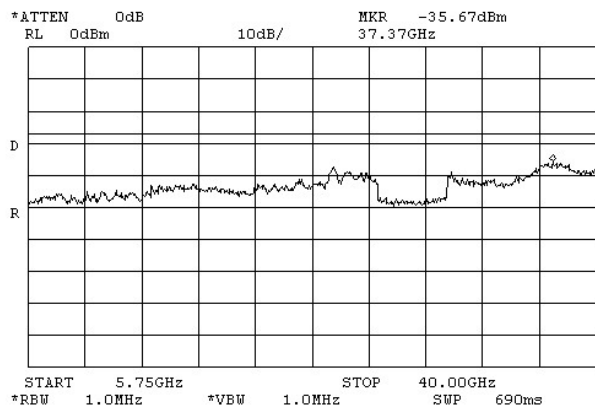
Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

FCC ID: LKT-EXTR-CPE-50



Plot # 16. Carrier Frequency 5720 MHz

Plot # 17. Carrier Frequency 5720 MHz



Plot # 18. Carrier Frequency 5720 MHz

**Test report No: 8912313914****Page 15 of 34 Pages****Title: BreezeMAX Extreme CPE (5.4 GHz)****Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A****FCC ID: LKT-EXTR-CPE-50****5.1.4 Radiated spurious emissions test § 15.407(b) (3)**

Operating Frequency Range 5.475 – 5.720 GHz
 Ambient Temperature 23⁰ C Relative Humidity 49% Air Pressure 1009 hPa

Carrier Frequency 5475 MHz

Frequency, MHz	Radiated emissions, dBm	Limit, dBm	Margin, dB	Reference to Plot number
5469.9	-32.3	-27.0	5.3	#21
6494.2	-37.4	-27.0	10.4	#22

Carrier Frequency 5600 MHz

Frequency, MHz	Radiated emissions, dBm	Limit, dBm	Margin, dB	Reference to Plot number
5381	-37.3	-27.0	10.3	#26
5792.8	-36.1	-27.0	9.1	#27

Carrier Frequency 5720 MHz

Frequency, MHz	Radiated emissions, dBm	Limit, dBm	Margin, dB	Reference to Plot number
5470	-35.9	-27.0	8.9	#31
5725.2	-35.8	-27.0	8.8	#32

All emissions in 6.5 – 40 GHz frequency band were found under the Spectrum Analyzer noise floor and at least 40 dB under the specified limit.



Test report No: 8912313914

Page 16 of 34 Pages

Title: BreezeMAX Extreme CPE (5.4 GHz)

Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

FCC ID: LKT-EXTR-CPE-50

TEST PROCEDURE

The frequency spectrum was investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to the tenth harmonic of the highest fundamental frequency. The emission levels of the EUT more than 20 dB lower than the specified limit were not recorded in the tables. For the test results refer to the tables and plots in this section.

Substitution method.

The measurements were performed according to ANSI/TIA-603-C-2004 section 2.2.12 test method. Investigation of transmitter spurious emissions was performed. EUT was replaced by generator and substitution antenna. Level calculated from generator output level, substitution antenna gain and loss of connected cable was compared with the limit. Measurements were performed with internal antenna in 3 carrier frequencies 5475 MHz; 5600 MHz; and 5720 MHz.

LIMIT

For transmitters operating in the 5.47 – 5.725 GHz band: all emissions outside of the 5.47 – 5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz.

TEST EQUIPMENT USED:

1	5	6	7	8	9	12	13	14
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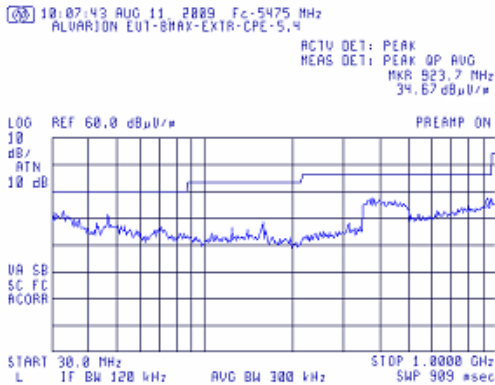


Test report No: 8912313914
Title: BreezeMAX Extreme CPE (5.4 GHz)
Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

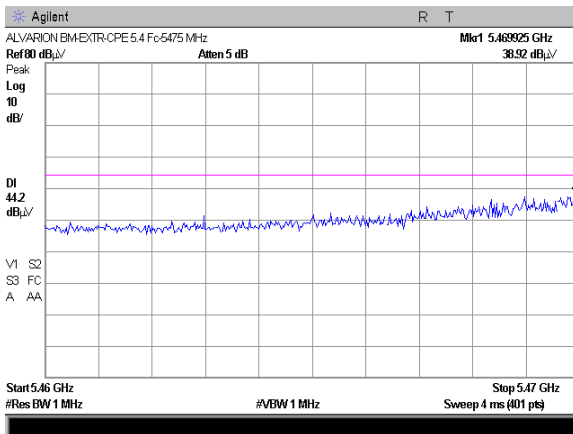
Page 17 of 34 Pages

FCC ID: LKT-EXTR-CPE-50

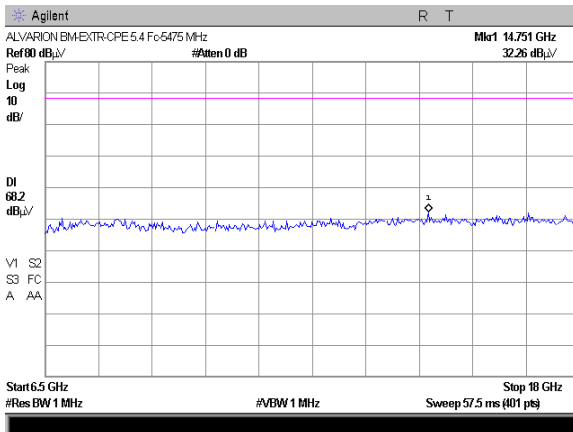
Frequency carrier 5475 MHz.



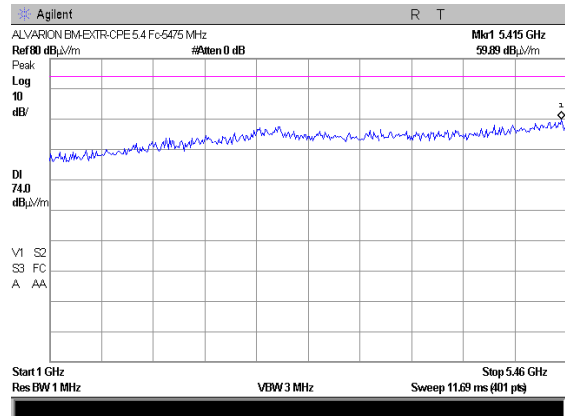
Plot # 19



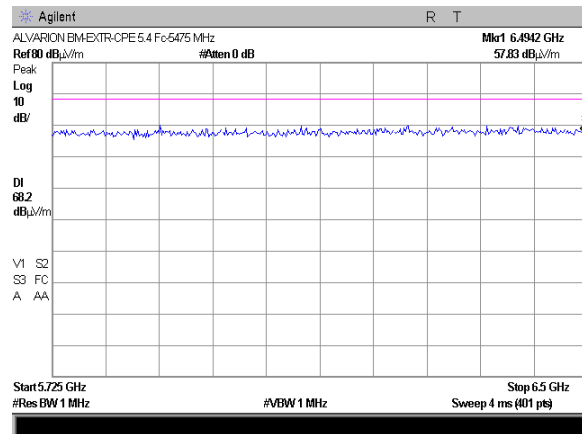
Plot # 21



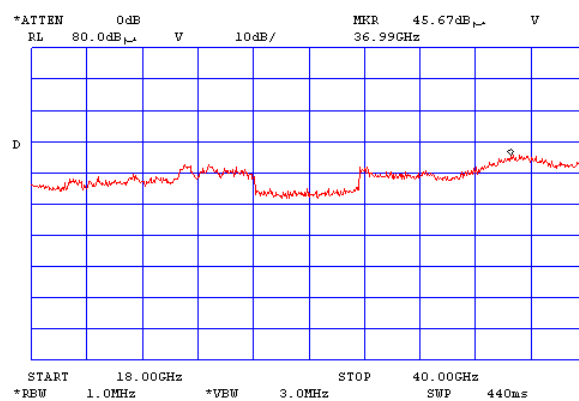
Plot # 23



Plot # 20



Plot # 22



Plot # 24



Test report No: 8912313914

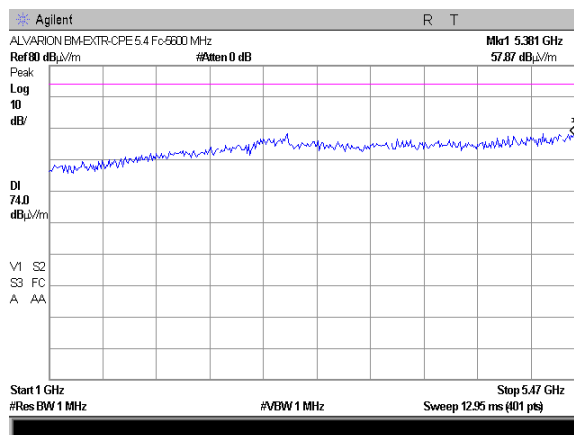
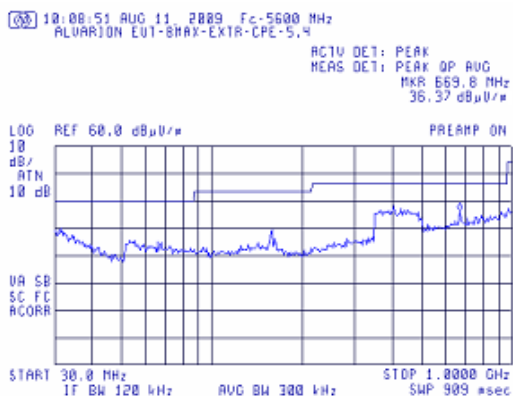
Page 18 of 34 Pages

Title: BreezeMAX Extreme CPE (5.4 GHz)

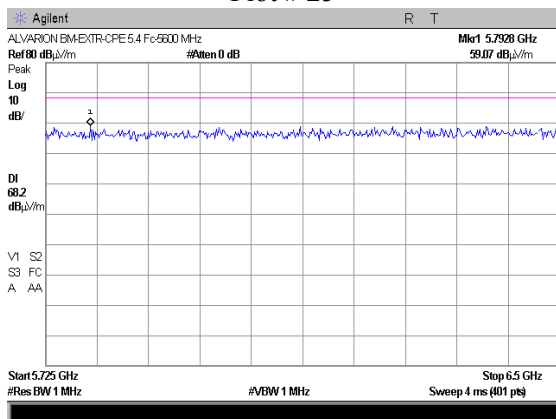
Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

FCC ID: LKT-EXTR-CPE-50

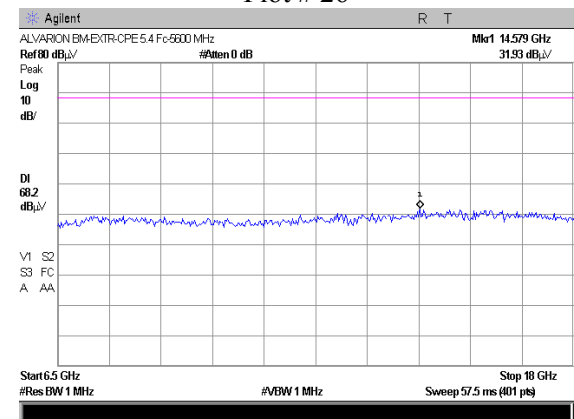
Frequency carrier 5600 MHz.



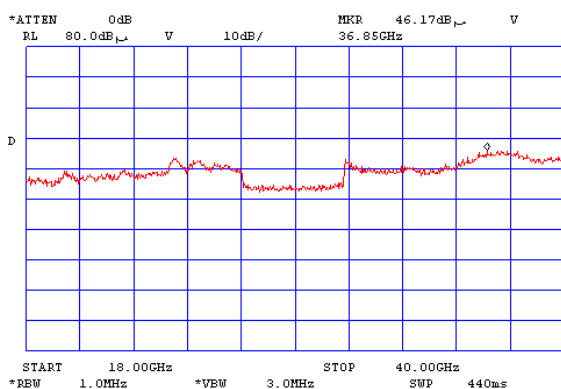
Plot # 25



Plot # 26



Plot # 27



Plot # 28

Plot # 29



Test report No: 8912313914

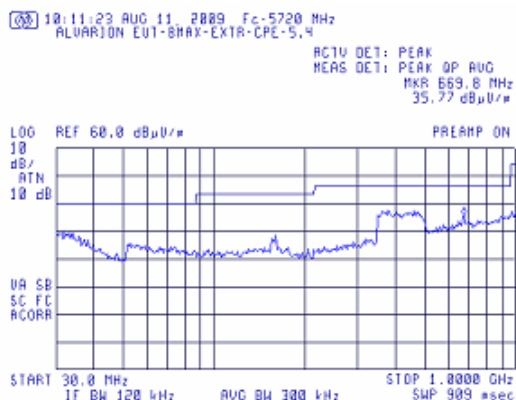
Page 19 of 34 Pages

Title: BreezeMAX Extreme CPE (5.4 GHz)

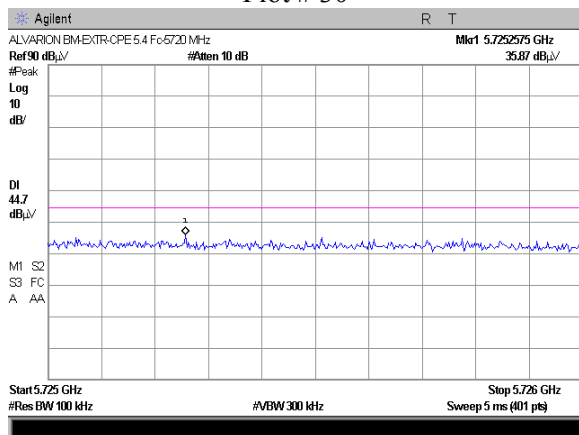
Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

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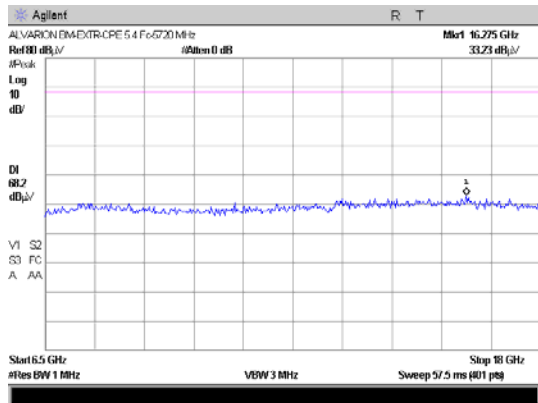
Frequency carrier 5720 MHz.



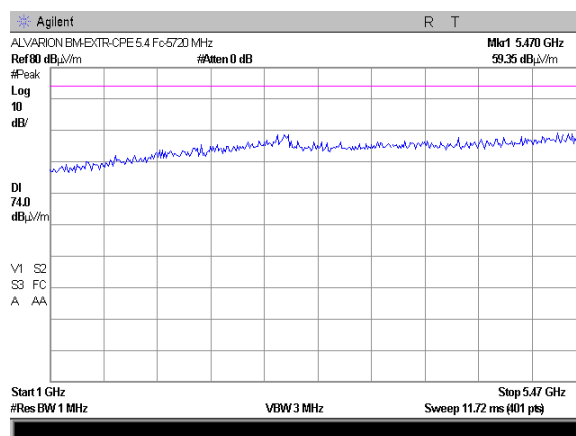
Plot # 30



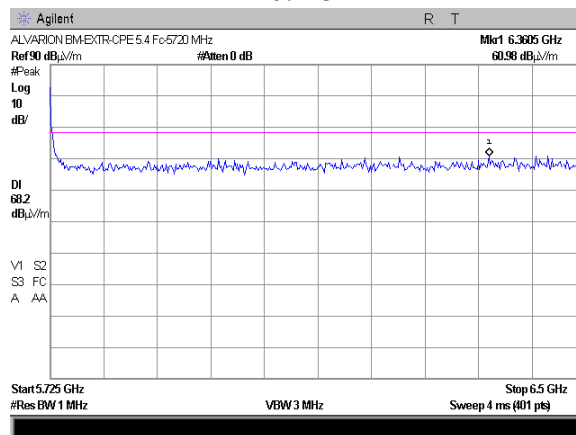
Plot # 32



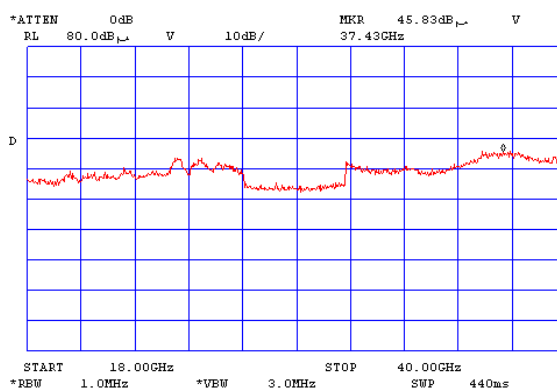
Plot # 34



Plot # 31



Plot # 33



Plot # 35



Test report No: 8912313914

Page 20 of 34 Pages

Title: BreezeMAX Extreme CPE (5.4 GHz)

Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

FCC ID: LKT-EXTR-CPE-50

5.1.5 Peak excursion test

Method of measurement	DA 02-2138				
Operating Frequency Range	5.475 – 5.720 GHz				
Ambient Temperature	23 ⁰ C	Relative Humidity	49%	Air Pressure	1009 hPa

The measurements were performed at three transmitted carrier (channel) frequencies 5.475 GHz, 5.600 GHz and 5.720 GHz at bottom, middle and top of the 5.470 GHz – 5.725 GHz frequency range under maximum data transfer bit rate. The trace #1 was performed with RBW= 1 MHz and VBW = 3 MHz. The trace #2 was performed with RBW= 1 MHz and VBW $\geq 1/T = 1/1.92$ ms = 1 kHz where T is transmission pulse duration from plot #39.

Carrier frequency MHz	Measured ratio of the PEME dB	The limit of PEME ratio dB	Reference to plot
5475	12.3	13.0	#36
5600	12.3	13.0	#37
5720	12.7	13.0	#38

REQUIREMENT

The ratio of the peak excursion of the modulation envelope (PEME) to the peak transmit power shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less as required in sec. 15.407 (a) (6).

TEST SAMMARY

Transmitter meets standard requirement.
 Test result present in plot # 36 for carrier frequency 5475 MHz
 Test result present in plot # 37 for carrier frequency 5600 MHz
 Test result present in plot # 38 for carrier frequency 5720 MHz

TEST EQUIPMENT USED:

2	3	4	5			
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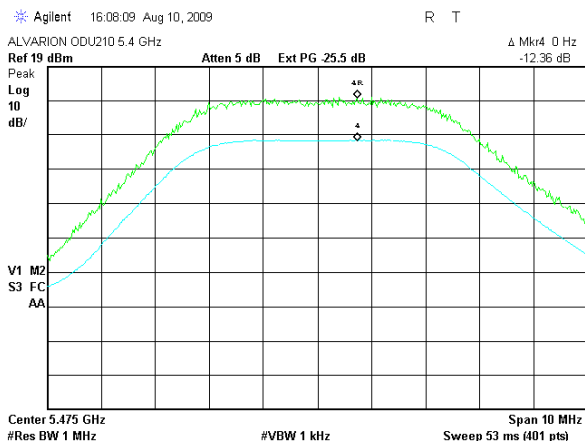
Test report No: 8912313914

Title: BreezeMAX Extreme CPE (5.4 GHz)

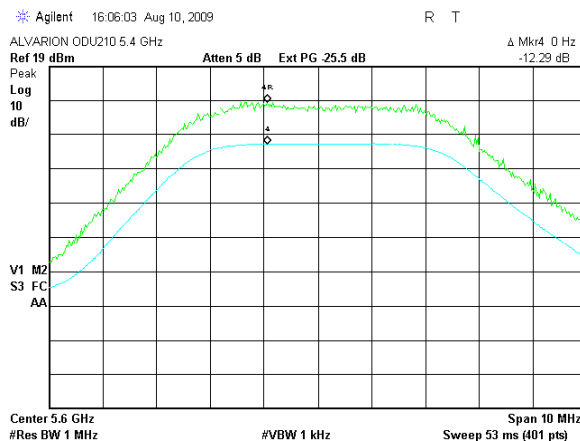
Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

Page 21 of 34 Pages

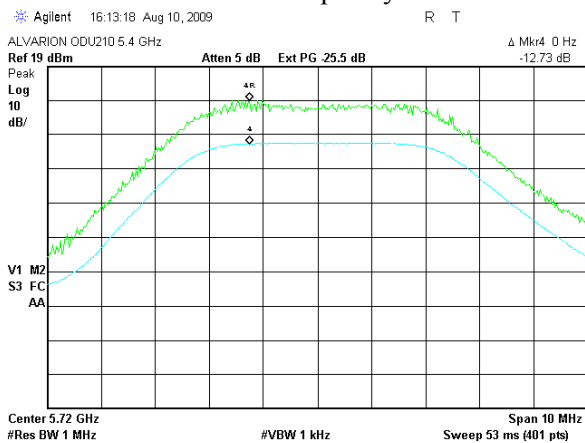
FCC ID: LKT-EXTR-CPE-50



Plot # 36. Carrier Frequency 5475 MHz



Plot # 37. Carrier Frequency 5600 MHz



Plot # 38. Carrier Frequency 5720 MHz



Test report No: 8912313914

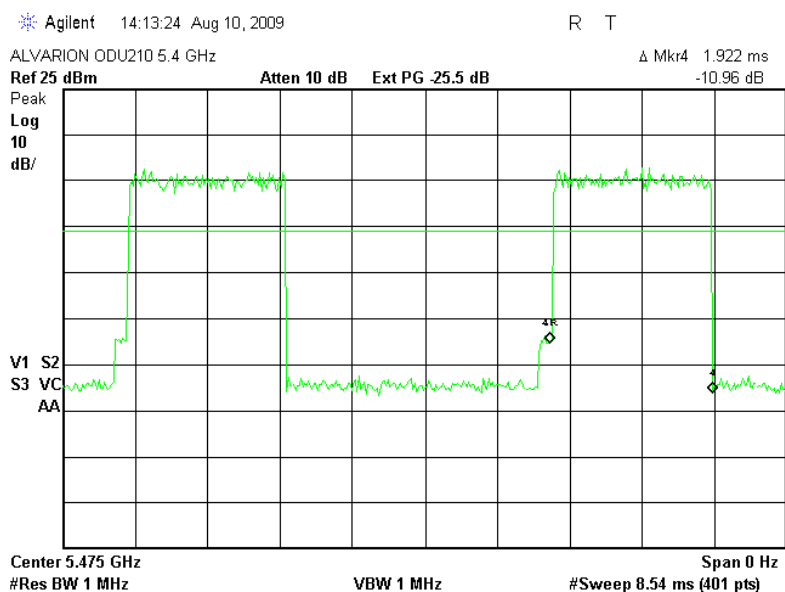
Page 22 of 34 Pages

Title: BreezeMAX Extreme CPE (5.4 GHz)

Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

FCC ID: LKT-EXTR-CPE-50

Video bandwidth was calculated from maximum usable pulse duration T, shown in plot.
 $VBW \geq 1/T = 1/1.92 \text{ ms} = 0.52 \text{ kHz}$. Calculated VBW = 1 kHz.



Plot # 39. Pulse duration of transmission.



Test report No: 8912313914

Page 23 of 34 Pages

Title: BreezeMAX Extreme CPE (5.4 GHz)

Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

FCC ID: LKT-EXTR-CPE-50

5.2 Radiated emissions test according to § 15.209

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

TEST DESCRIPTION:

Test was performed at the Open Area Test Site at a 10 m measurement distance. 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 Biconilog antenna 30 MHz-2 GHz frequency range was used. The frequency range was investigated from 30 MHz to 1.0 GHz. The measurements were performed at each frequency at which the signal was 10 dB below the limit or less. The received 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:

Spurious radiated emission shall not exceed value required in section 15.209

Test results are presented in Table 1.

Table 1. Radiated emission test results

No	Frequency (MHz)	Antenna Polariz. V/H	Antenna Height (m)	Turn-table Angle (°)	Emission Level Note 1 (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
1	200	V	1.0	77	29.3	43.5	14.2
2	600	H	1.2	104	34.2	46.0	11.8
3	700	H	1.0	85	34.4	46.0	11.6
4	750	H	1.0	51	39.2	46.0	6.8

Note 1: Emission level = E Reading (dBμV) + 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 B.

TEST EQUIPMENT USED:

8	12					
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Test report No: 8912313914

Page 24 of 34 Pages

Title: BreezeMAX Extreme CPE (5.4 GHz)

Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

FCC ID: LKT-EXTR-CPE-50

5.3 Conducted emissions according to § 15.207

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

Conducted emissions limit.

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

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

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

TEST RESULT:

Test results are shown at plots # 40 for line Phase and # 41 for line Neutral.

TEST EQUIPMENT USED:

9	10	11				
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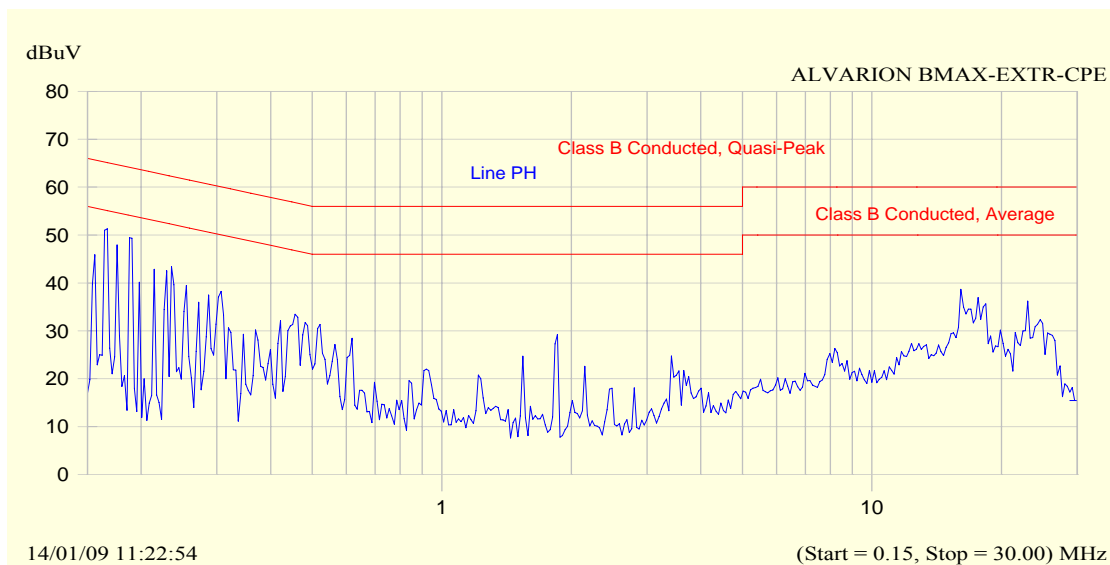
Test report No: 8912313914

Page 25 of 34 Pages

Title: BreezeMAX Extreme CPE (5.4 GHz)

Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

FCC ID: LKT-EXTR-CPE-50



Frequency MHz	Peak dBuV	QP dBuV	QP Limit dB	QP-QP limit dB	Avg dBuV	Avg Limit dB	Avg-Avg limit dB
0.202	45.3	44.0	63.5	-19.5	29.8	53.5	-23.7
0.471	36.1	32.6	56.5	-23.9	20.5	46.5	-26.0
1.865	31.2	30.1	56.0	-25.9	29.4	46.0	-16.6
17.692	38.5	37.6	60.0	-22.4	35.7	50.0	-14.3
18.242	38.6	37.4	60.0	-22.6	35.2	50.0	-14.8

Plot # 40. Conducted emissions test. Line PH.

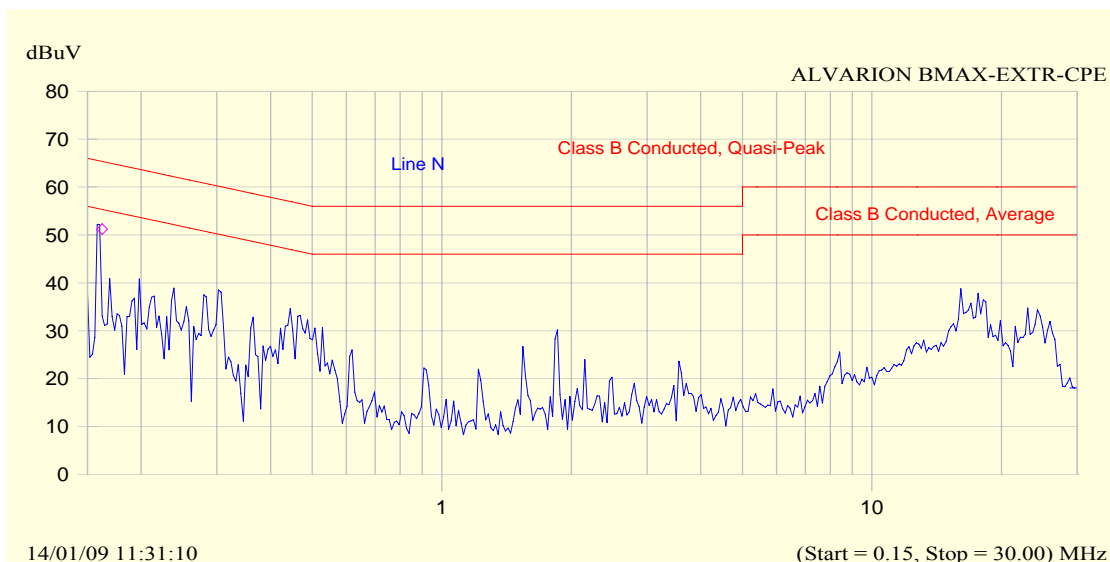
Test report No: 8912313914

Page 26 of 34 Pages

Title: BreezeMAX Extreme CPE (5.4 GHz)

Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

FCC ID: LKT-EXTR-CPE-50



Frequency MHz	Peak dBuV	QP dBuV	QP Limit dB	QP-QP limit dB	Avg dBuV	Avg Limit dB	Avg-Avg limit dB
0.162	51.2	48.8	65.3	-16.6	36.8	55.3	-18.5
0.471	35.7	31.9	56.5	-24.6	19.3	46.5	-27.2
1.866	31.8	30.1	56.0	-25.9	29.5	46.0	-16.5
17.692	39.4	37.8	60.0	-22.2	35.7	50.0	-14.3
18.241	39.5	37.7	60.0	-22.3	35.4	50.0	-14.6

Plot # 41. Conducted emissions test. Line N

Test report No: 8912313914**Page 27 of 34 Pages****Title:** BreezeMAX Extreme CPE (5.4 GHz)**Model:** BMAX-EXTR-CPE-DIV-1D-4.9-2-A**FCC ID:** LKT-EXTR-CPE-50**APPENDIX A Photographs**

Photo #1. Spurious emissions investigation test in Anechoic chamber.

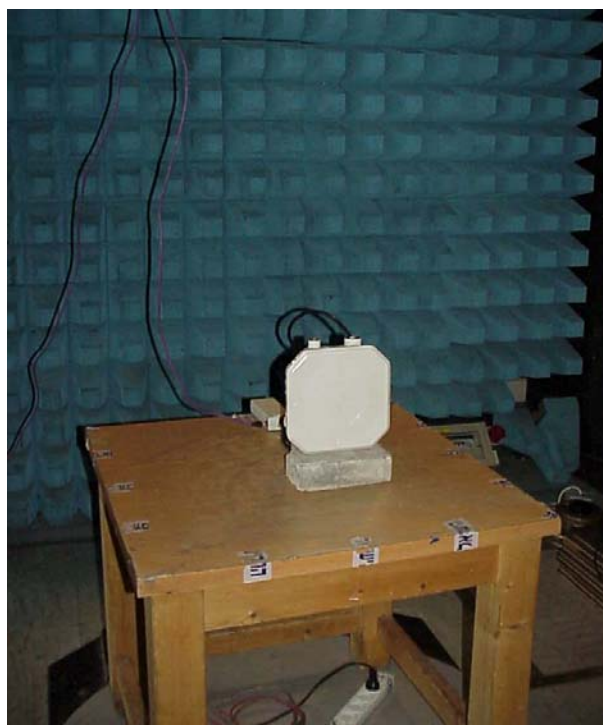


Photo #2. Radiated emissions test setup.

Test report No: 8912313914

Title: BreezeMAX Extreme CPE (5.4 GHz)

Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

Page 28 of 34 Pages

FCC ID: LKT-EXTR-CPE-50



Photo 3. Radiated emissions test setup on OATS.



Photo 4. Outdoor unit. Internal view.

**Test report No: 8912313914****Page 29 of 34 Pages****Title: BreezeMAX Extreme CPE (5.4 GHz)****Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A****FCC ID: LKT-EXTR-CPE-50****APPENDIX B Test equipment used****Test equipment used**

No	Description	Manufacturer information			Due Calibration date
		Name	Model No	Serial No	
1	Spectrum Analyzer 9 kHz - 40 GHz	HP	8565E	3835A01359	June 2010
2	Spectrum Analyzer 9 kHz - 26.5 GHz	Adjilent	4407B	US40241729	June 2010
3	Attenuators 20 dB DC – 8.5 GHz	Aeroflex/ Weinshel	33-30-34	A3451	June 2010
4	Power splitter 1.7 – 9 GHz	Mini-Circuits	ZN2PD-9G	0142	June 2010
5	Cable RF 1m	Huber-Suhner	Sucoflex 104	21324/4PE	December 2009
6	Double Ridged Guide Antenna 1 – 18 GHz	EMCO	3115	5802	Aug 2010
7	Broadband Horn antenna 15 – 40 GHz	Schwarzbeck Mess-Electronik	BBHA 9170	9170-341	Aug 2010
8	Antenna Biconilog 30 – 2000 MHz	Schaffner-Chase	CBL6112B	S/N 23181	Aug 2010
9	EMI Receiver 9 kHz-6.5 GHz	HP	8546A+8546 0A	SII 4068	April 2010
10	LISN 9 kHz – 30 MHz	FCC	LISN 250- 32-4-16	SII5023	October 2009
11	Transient limiter 0.009-200 MHz	HP	11947A	3107105	October 2009
12	Spectrum analyzer 9 KHz-26.5 GHz	HP	E7405A	SII 4944	April 2010
13	Cable RF 4m	Huber-Suhner	Sucoflex 104PE	21328/4PE	December 2009
14	RF Generator 10 MHz-20 GHz	Anritsu	68347B	SII 4898	March 2010



Test report No: 8912313914

Page 30 of 34 Pages

Title: BreezeMAX Extreme CPE (5.4 GHz)

Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

FCC ID: LKT-EXTR-CPE-50

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



Test report No: 8912313914

Page 31 of 34 Pages

Title: BreezeMAX Extreme CPE (5.4 GHz)

Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

FCC ID: LKT-EXTR-CPE-50

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



Test report No: 8912313914

Page 32 of 34 Pages

Title: BreezeMAX Extreme CPE (5.4 GHz)

Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A

FCC ID: LKT-EXTR-CPE-50

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	33.7
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; 4 m length

Point	Frequency (GHz)	Cable Loss (dB)
1	0.0-1.0	1.7
2	1.0- 3.5	3.2
3	3.5- 5.5	4.0
4	5.5 - 7.5	4.7
5	7.5 - 9.5	5.3
6	9.5 - 10.5	5.6
7	10.5 - 12.5	6.2
8	12.5 - 14.5	6.8
9	14.5 - 16.5	7.5
10	16.5 - 18.0	8.1

**Test report No: 8912313914****Page 33 of 34 Pages****Title: BreezeMAX Extreme CPE (5.4 GHz)****Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A****FCC ID: LKT-EXTR-CPE-50**

Antenna Factor
Broadband Horn Antenna model BBHA 9170 1m calibration

Point	Frequency (GHz)	Antenna Factor (dB/m)
1	15.0	38.5
2	16.0	37.7
3	17.0	38.1
4	18.0	37.9
5	19.0	38.0
6	20.0	38.0
7	21.0	37.9
8	22.0	38.2
9	23.0	39.6
10	24.0	39.6
11	25.0	39.3
12	26.0	39.5
13	27.0	39.6
14	28.0	39.6
15	30.0	40.1
16	32.0	41.2
17	34.0	41.5
18	35.0	41.9
19	36.0	42.2
20	38.0	43.8
21	40.0	43.2

**Test report No: 8912313914****Page 34 of 34 Pages****Title: BreezeMAX Extreme CPE (5.4 GHz)****Model: BMAX-EXTR-CPE-DIV-1D-4.9-2-A****FCC ID: LKT-EXTR-CPE-50**

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: 2008	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.