



Test Report No. 9012315196

Applicant: Alvarion Ltd

***BreezeMAX Broadband Wireless Access
BreezeMax Extreme CPE System (5.x GHz)***

Model: XTRM-SU-OD-1D-4.9-2-E

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



ACCLASS Accreditation Services

Certificate Number: IT-1359



Test report N: 9012315196

Page 1 of 58

Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

FCC ID: LKT-EXTR-CPE-49

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
5.	EUT test configuration	5
6.	Test results	6
6.1	Transmitter characteristics	6
6.1.1	Occupied 6 dB bandwidth for digitally systems.	6
6.1.2	Maximum peak output power test according to §15.247 (b)(3).	9
6.1.3	Out of band conducted emissions test according to §15.247(d)	14
6.1.4	Radiated emissions in restricted bands test according to §15.247(d), 15.205	17
6.1.5	Power spectral density of digital modulated systems according to § 15.247(e)	42
7.	Radiated emissions test according to § 15.209	45
8.	Conducted emissions according to § 15.207	47
9.	APPENDIX A	50
10.	APPENDIX B	52
11.	APPENDIX C	58



Test report N: 9012315196

Page 2 of 58

Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

FCC ID: LKT-EXTR-CPE-49

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:	31 January, 7 February 2010

Equipment under test information

Description of Equipment Under Test (EUT):	BreezeMax Extreme CPE 5.x
Model:	XTRM-SU-OD-1D-4.9-2-E
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:	47 CFR part 15.247

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 58 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: 9012315196****Page 3 of 58****Title: BreezeMax Extreme CPE 5.x****Model: XTRM-SU-OD-1D-4.9-2-E****FCC ID: LKT-EXTR-CPE-49**

3. Summary of test

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

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

**Electronics and
Telematics Laboratory**
March 11, 2010

Test performed by:

Mr. Michael Feldman
Test technician

Test report approved by:

Mr. Yuri Rozenberg.
Head of EMC Branch




Test report N: 9012315196

Page 4 of 58

Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

FCC ID: LKT-EXTR-CPE-49

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 5950 MHz 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 . Radio Input/Output is connected to two N type connectors , TX/RX and RX allowing connection to dual port antenna .

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	5.725 GHz – 5.850 GHz		-
Operating frequency range	5.7275 GHz – 5.8475 GHz		5 MHz EBW
	5.730 GHz – 5.845 GHz		10 MHz EBW
RF channel spacing	5/10 MHz		-
Maximum rated peak output power	30 dBm		-
Antenna connection	2 x N-type connectors		Professional installation
Type of modulation	4QAM, 16QAM, 64QAM		-
Type of multiplexing	OFDM		-
Modulating test signal (baseband)	PRBS		-
Antenna information			
Type	Manufacturer	Model	Gain
Omni	MTI	P/N 300709	9.5
Flat panel, dual polarized	MTI	P/N 850102	23
Parabolic, dual polarized	MTI	P/N 850101	28

Test report N: 9012315196

Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

Page 5 of 58

FCC ID: LKT-EXTR-CPE-49

5. EUT test configuration

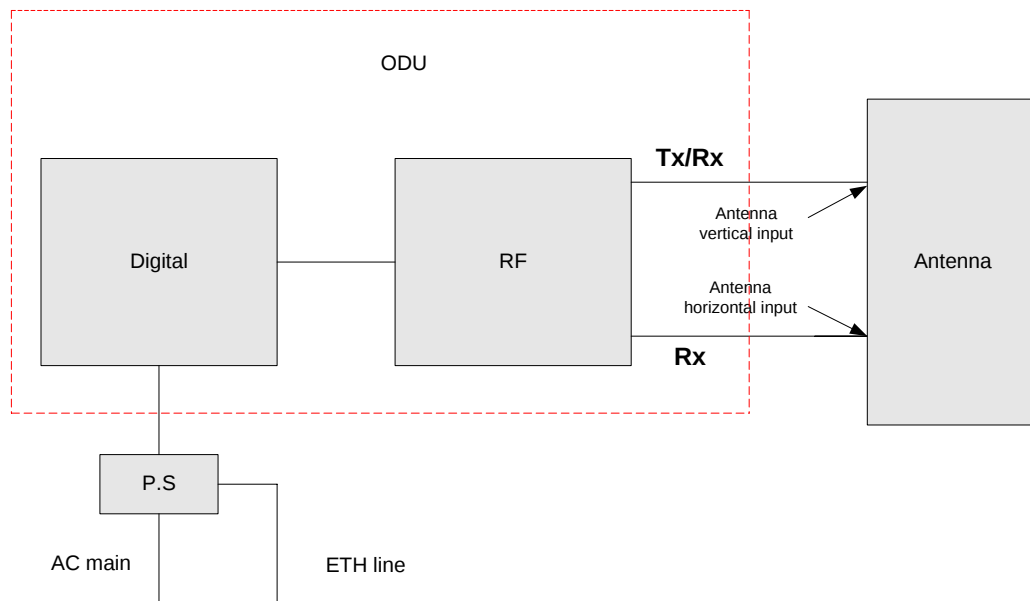


Fig. 1. EUT block diagram.

**Test report N: 9012315196****Page 6 of 58****Title: BreezeMax Extreme CPE 5.x****Model: XTRM-SU-OD-1D-4.9-2-E****FCC ID: LKT-EXTR-CPE-49****6. Test results****6.1 Transmitter characteristics****6.1.1 Occupied 6 dB bandwidth for digitally systems.**

Method of measurement FCC March 23, 2005 procedure
 Operating Frequency Range 5727.5 – 5847.5 MHz
 Ambient Temperature 21⁰ C Relative Humidity 54% Air Pressure 1010 hPa

5 MHz EBW

Carrier frequency MHz	Measured 6 dB bandwidth, MHz	Reference to plots
5727.5	4.49	#1
5787.5	4.50	#2
5847.5	4.48	#3

10 MHz EBW

Carrier frequency MHz	Measured 6 dB bandwidth, MHz	Reference to plots
5730.0	9.23	#4
5787.5	9.20	#5
5845.0	9.19	#6

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:

3	4	5	12			
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Test report N: 9012315196

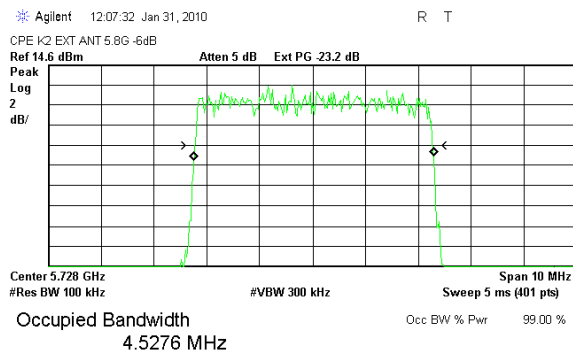
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Model: XTRM-SU-OD-1D-4.9-2-E

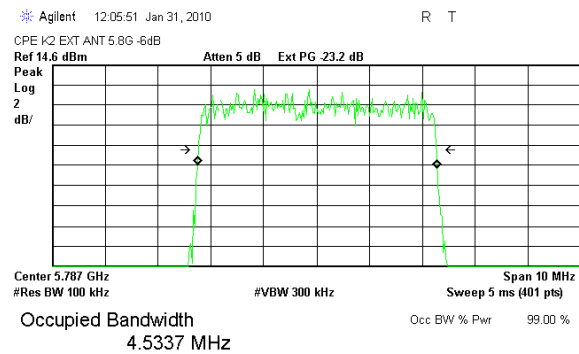
Page 7 of 58

FCC ID: LKT-EXTR-CPE-49

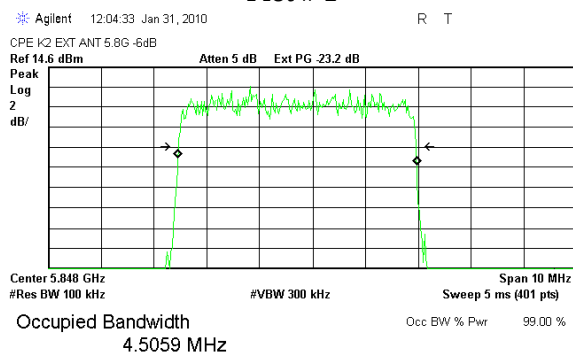
5 MHz EBW



Plot # 1



Plot # 2



Plot # 3

Transmit Freq Error
x dB Bandwidth

-287.557 kHz
4.484 MHz



Test report N: 9012315196

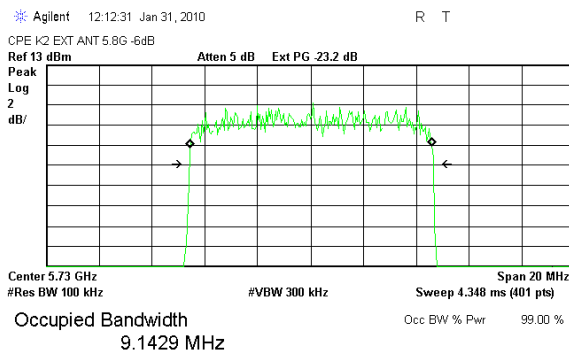
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Model: XTRM-SU-OD-1D-4.9-2-E

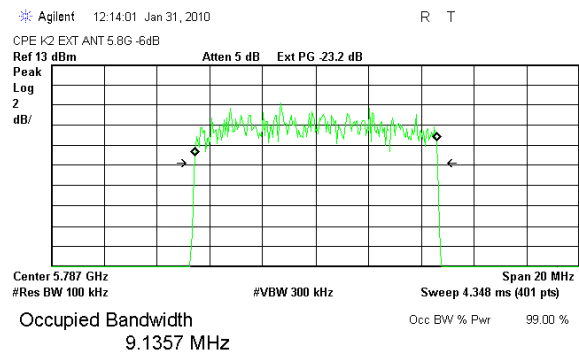
Page 8 of 58

FCC ID: LKT-EXTR-CPE-49

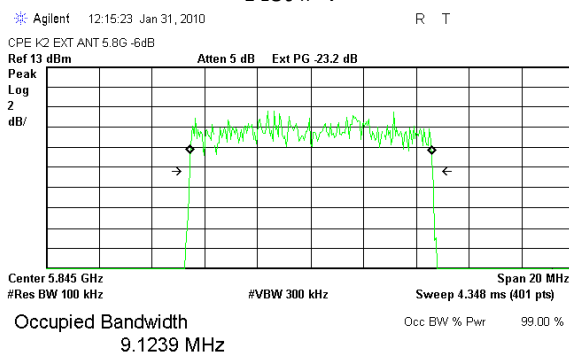
10 MH EBW.



Plot # 4



Plot # 5



Plot # 6

**Test report N: 9012315196****Page 9 of 58****Title: BreezeMax Extreme CPE 5.x****Model: XTRM-SU-OD-1D-4.9-2-E****FCC ID: LKT-EXTR-CPE-49****6.1.2 Maximum peak output power test according to §15.247 (b)(3).**

Method of measurement FCC March 23, 2005 procedure
 Operating Frequency Range 5727.5 – 5847.5 MHz
 Ambient Temperature 21° C Relative Humidity 54% Air Pressure 1010 hPa

5 MHz EBW

Carrier frequency MHz	26 dBc emission bandwidth, MHz	Peak output power, dBm	Reference to plots
5727.5	7.52	27.2	#7, 10
5787.5	8.38	27.3	#8, 11
5847.5	7.38	27.5	#9, 12

10 MHz EBW

Carrier frequency MHz	26 dBc emission bandwidth, MHz	Peak output power, dBm	Reference to plots
5730.0	10.53	27.2	#13, 16
5787.5	10.62	27.1	#14, 17
5845.0	10.50	27.0	#15, 18

LIMIT**Maximum peak output power – 1W*(30 dBm)**

*Systems operating in the 5725 - 5850 MHz band that are 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:

3	4	5	12			
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Test report N: 9012315196

Page 10 of 58

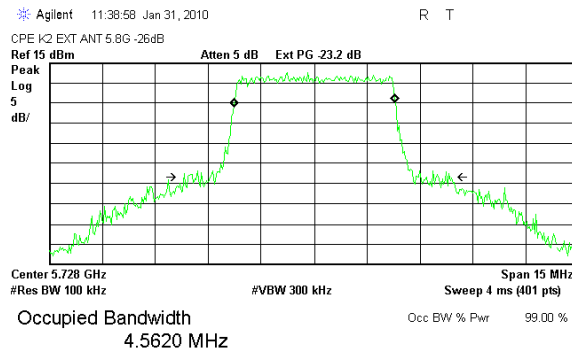
Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

FCC ID: LKT-EXTR-CPE-49

26 dBc emission bandwidth test.

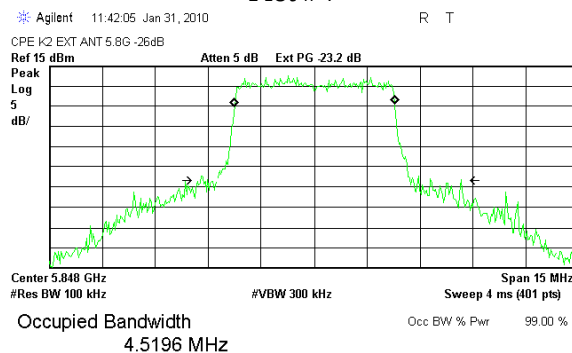
5 MHz EBW



Transmit Freq Error 22.341 kHz

x dB Bandwidth 7.527 MHz

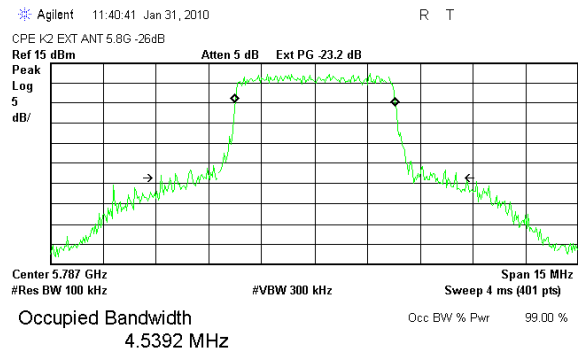
Plot # 7



Transmit Freq Error 24.104 kHz

x dB Bandwidth 7.384 MHz

Plot # 9



Transmit Freq Error 32.125 kHz

x dB Bandwidth 8.387 MHz

Plot # 8



Test report N: 9012315196

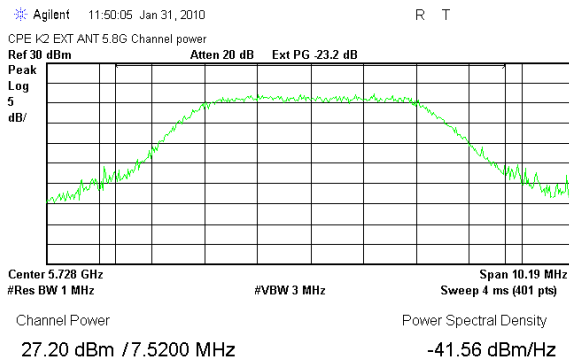
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Model: XTRM-SU-OD-1D-4.9-2-E

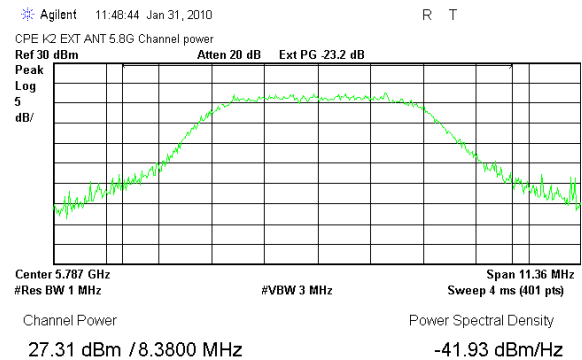
Page 11 of 58

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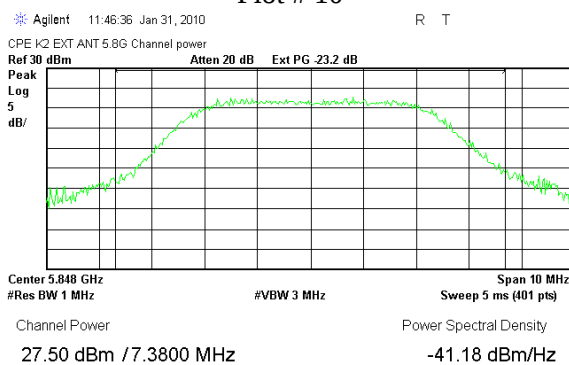
Peak output power test.



Plot # 10



Plot # 11



Plot # 12



Test report N: 9012315196

Title: BreezeMax Extreme CPE 5.x

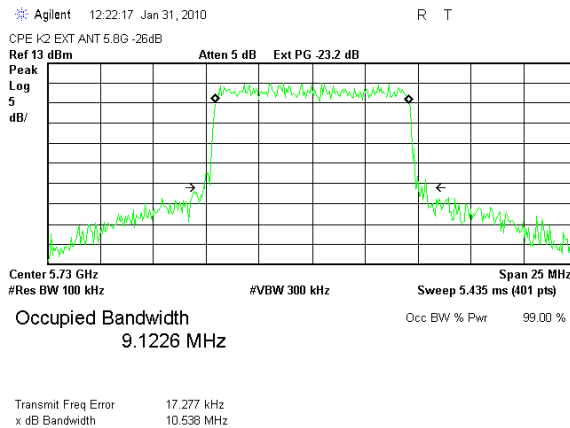
Model: XTRM-SU-OD-1D-4.9-2-E

Page 12 of 58

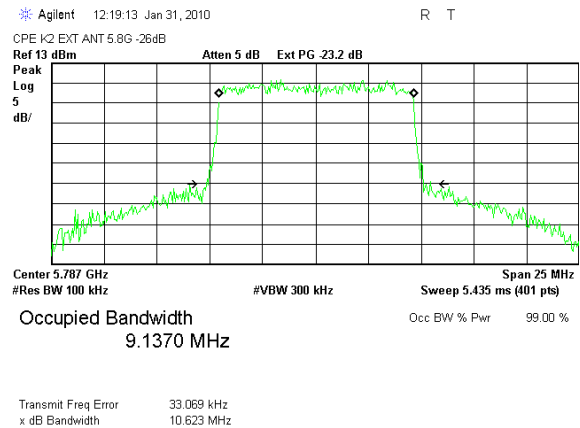
FCC ID: LKT-EXTR-CPE-49

26 dBc emission bandwidth test.

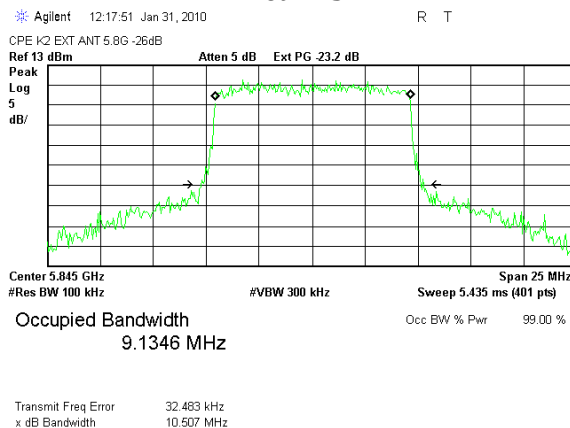
10 MHz EBW.



Plot # 13



Plot # 14



Plot # 15



Test report N: 9012315196

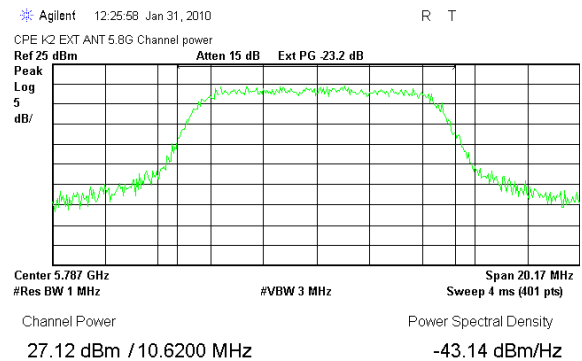
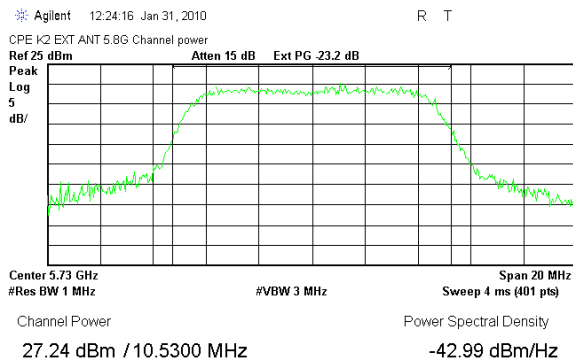
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Model: XTRM-SU-OD-1D-4.9-2-E

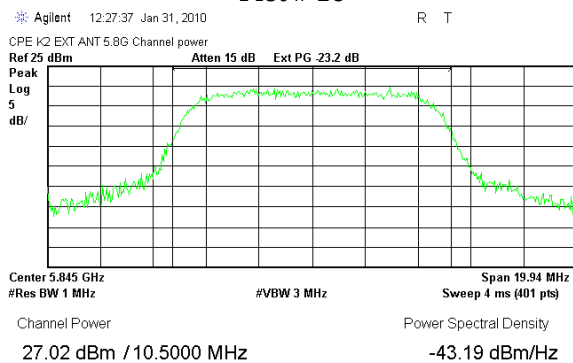
Page 13 of 58

FCC ID: LKT-EXTR-CPE-49

Peak output power test.



Plot # 16



Plot # 17

Plot # 18

**Test report N: 9012315196****Page 14 of 58****Title: BreezeMax Extreme CPE 5.x****Model: XTRM-SU-OD-1D-4.9-2-E****FCC ID: LKT-EXTR-CPE-49****6.1.3 Out of band conducted emissions test according to §15.247(d)**

Method of measurement	FCC March 23, 2005 procedure
Operating Frequency Range	5727.5 – 5847.5 MHz
Ambient Temperature	21 ⁰ C
Relative Humidity	54%
Air Pressure	1010 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 or to 40 GHz, whichever is lower. 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 ## 19-30.

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 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: 9012315196

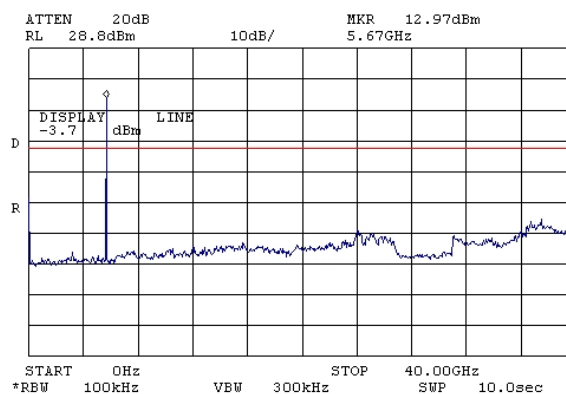
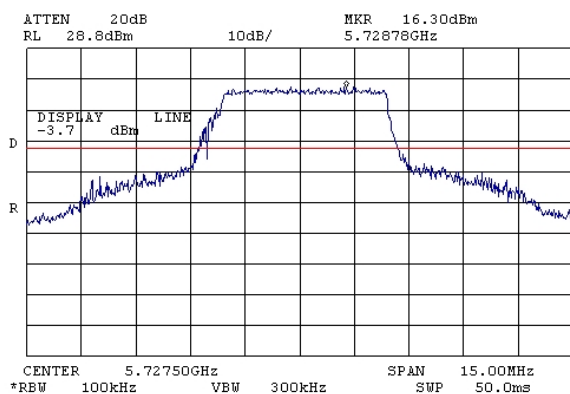
Page 15 of 58

Title: BreezeMax Extreme CPE 5.x

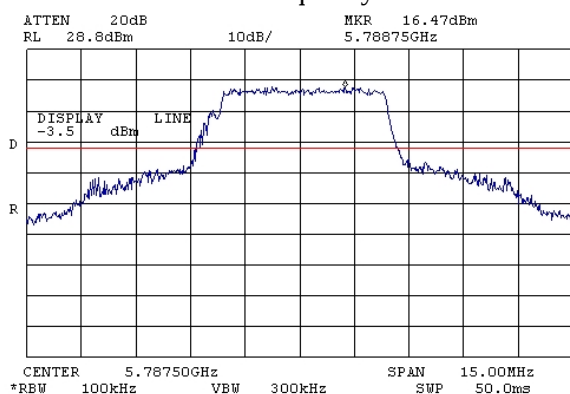
Model: XTRM-SU-OD-1D-4.9-2-E

FCC ID: LKT-EXTR-CPE-49

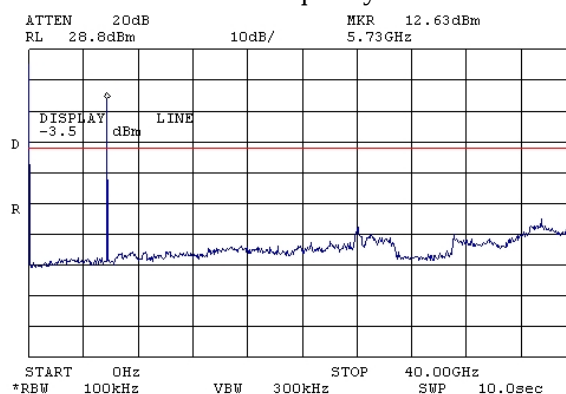
5 MHz EBW.



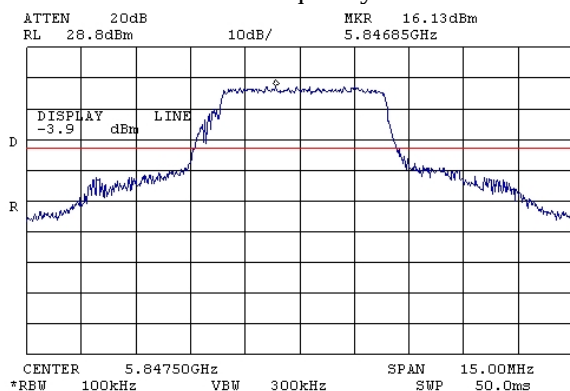
Plot # 19. Carrier frequency 5727.5 MHz



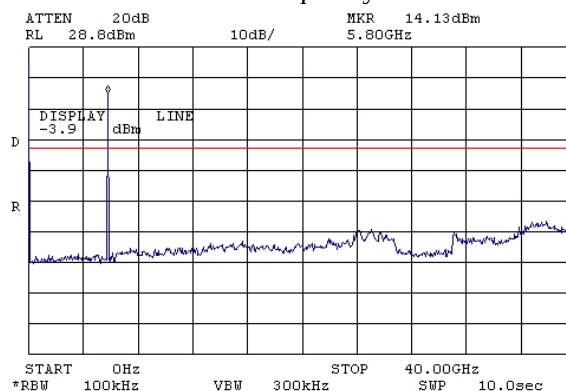
Plot # 20. Carrier frequency 5727.5 MHz



Plot # 21. Carrier frequency 5787.5 MHz



Plot # 22. Carrier frequency 5787.5 MHz



Plot # 23. Carrier frequency 5847.5 MHz

Plot # 24. Carrier frequency 5847.5 MHz



Test report N: 9012315196

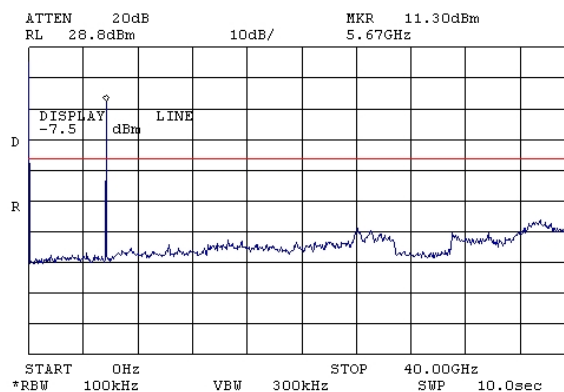
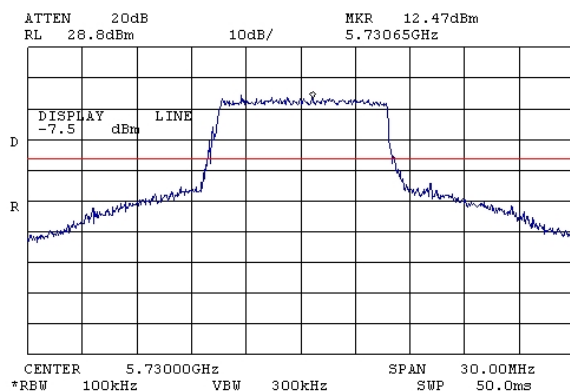
Page 16 of 58

Title: BreezeMax Extreme CPE 5.x

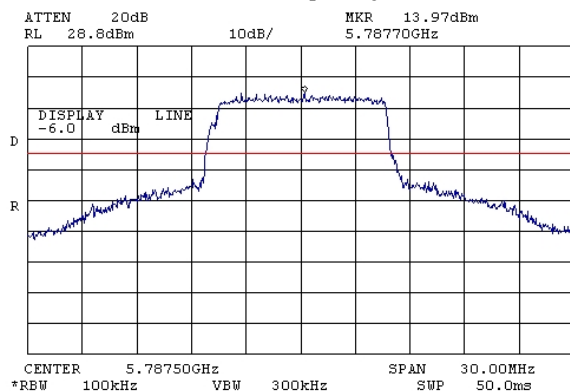
Model: XTRM-SU-OD-1D-4.9-2-E

FCC ID: LKT-EXTR-CPE-49

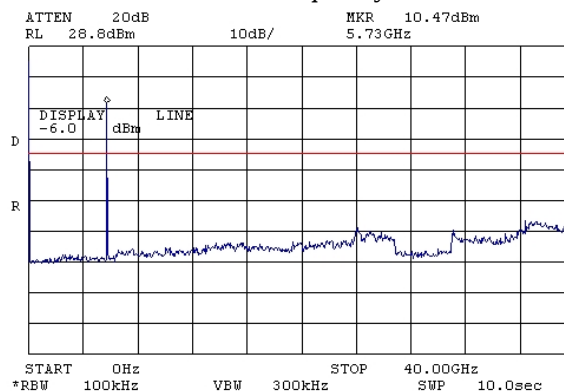
10 MHz EBW.



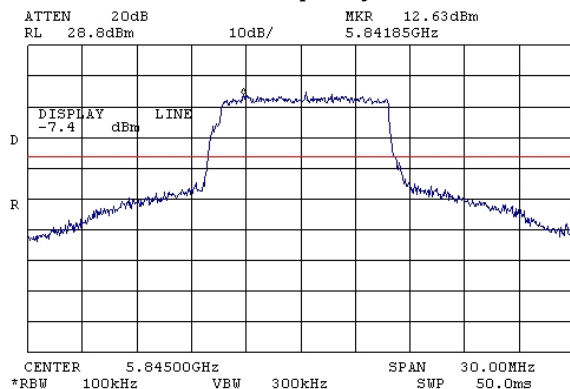
Plot # 25. Carrier frequency 5730 MHz



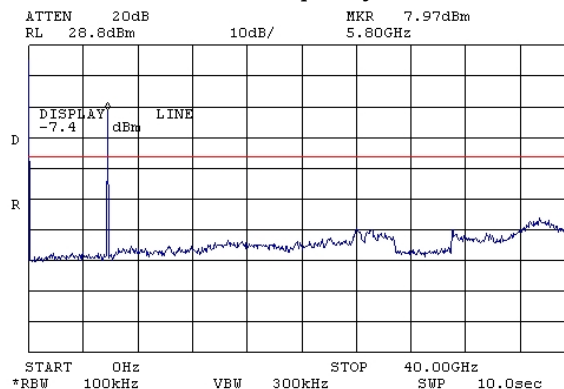
Plot # 26. Carrier frequency 5730 MHz



Plot # 27. Carrier frequency 5787.5 MHz



Plot # 28. Carrier frequency 5787.5 MHz



Plot # 29. Carrier frequency 5845 MHz

Plot # 30. Carrier frequency 5845 MHz

Test report N: 9012315196

Page 17 of 58

Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

FCC ID: LKT-EXTR-CPE-49

6.1.4 Radiated emissions test according to §15.247(d), 15.205.

Method of measurement FCC March 23, 2005 procedure
 Operating Frequency Range 5727.5 – 5847.5 MHz
 Ambient Temperature 21° C Relative Humidity 54% Air Pressure 1010 hPa

The frequency spectrum was investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz 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 found in 30 – 1000 MHz frequency range are recorded in section 5.2.

5 MHz EBW. Omni antenna.

Carrier frequency = 5727.5 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5404	62.1	74	-	11.9	Detector Peak
5438	46.4	-	54	7.6	Detector Average.

Carrier frequency = 5787.5 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5427	57.2	74	-	16.8	Detector Peak
5460	46.5	-	54	7.5	Detector Average.

Carrier frequency = 5847.5 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5337	61.4	74	-	12.6	Detector Peak
5438	46.5	-	54	7.5	Detector Average.

Test report N: 9012315196

Page 18 of 58

Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

FCC ID: LKT-EXTR-CPE-49

Flat panel antenna.

Carrier frequency = 5727.5 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5449	64.2	74	-	9.8	Detector Peak
5449	50.8	-	54	3.2	Detector Average.

Carrier frequency = 5787.5 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5337	64.3	74	-	9.7	Detector Peak
5449	50.1	-	54	3.9	Detector Average.

Carrier frequency = 5847.5 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5415	62.4	74	-	11.6	Detector Peak
5460	50.1	-	54	3.9	Detector Average.

Test report N: 9012315196

Page 19 of 58

Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

FCC ID: LKT-EXTR-CPE-49

Parabolic antenna.

Carrier frequency = 5727.5 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5304	62.7	74	-	11.3	Detector Peak
5390	48.7	-	54	5.3	Detector Average.

Carrier frequency = 5787.5 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5438	63.3	74	-	10.7	Detector Peak
5404	48.2	-	54	5.8	Detector Average.

Carrier frequency = 5847.5 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5382	62.4	74	-	11.6	Detector Peak
5438	47.4	-	54	6.6	Detector Average.

Test report N: 9012315196

Page 20 of 58

Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

FCC ID: LKT-EXTR-CPE-49

10 MHz EBW.

Omni antenna.

Carrier frequency = 5730 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5315	62.4	74	-	11.6	Detector Peak
5438	46.5	-	54	7.5	Detector Average.

Carrier frequency = 5787.5 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5371	62.8	74	-	11.2	Detector Peak
5427	46.7	-	54	7.3	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	63.0	74	-	12.6	Detector Peak
5427	46.7	-	54	7.3	Detector Average.

Test report N: 9012315196

Page 21 of 58

Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

FCC ID: LKT-EXTR-CPE-49

Flat panel antenna.

Carrier frequency = 5730 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5460	64.8	74	-	10.2	Detector Peak
5460	50.3	-	54	3.7	Detector Average.

Carrier frequency = 5787.5 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5449	63.1	74	-	10.9	Detector Peak
5449	50.9	-	54	3.1	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
5315	62.8	74	-	11.2	Detector Peak
5449	46.5	-	54	7.5	Detector Average.

Test report N: 9012315196

Page 22 of 58

Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

FCC ID: LKT-EXTR-CPE-49

Parabolic antenna.

Carrier frequency = 5730 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5415	63.4	74	-	10.6	Detector Peak
5415	48.1	-	54	5.9	Detector Average.

Carrier frequency = 5787.5 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Peak limit dB (μV/m)	Avg limit, dB (μV/m)	Margin, dB	Note
5382	63.6	74	-	10.4	Detector Peak
5404	48.6	-	54	5.4	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
5371	63.0	74	-	11.0	Detector Peak
5382	46.5	-	54	7.5	Detector Average.

**Test report N: 9012315196****Page 23 of 58****Title: BreezeMax Extreme CPE 5.x****Model: XTRM-SU-OD-1D-4.9-2-E****FCC ID: LKT-EXTR-CPE-49****TEST PROCEDURE**

The tests were performed for three type antennas Omni, Flat panel and Parabolic and two emissions bandwidths at bottom, middle and top of the 5725 – 5850 MHz frequency band under maximum data transfer bit rate. To find maximum radiation the turntable was rotated 360°, measuring antenna height was changed from 1 to 4 m, and the antennas polarization was changed from vertical to horizontal.

LIMIT

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

Radiated emissions, which fall in the restricted bands, must comply with the radiated emissions limit specified in Section 15.205(c).

TEST EQUIPMENT USED:

1	5	6	7	8	14	
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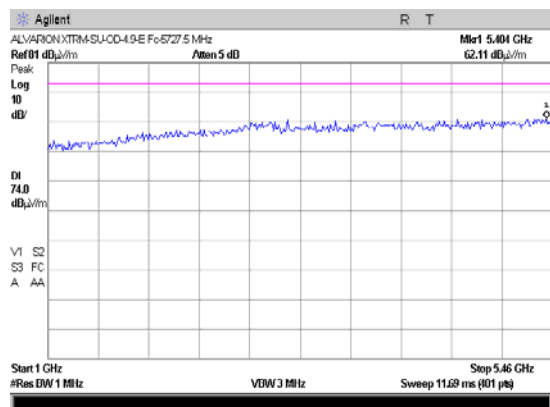
Test report N: 9012315196

Page 24 of 58

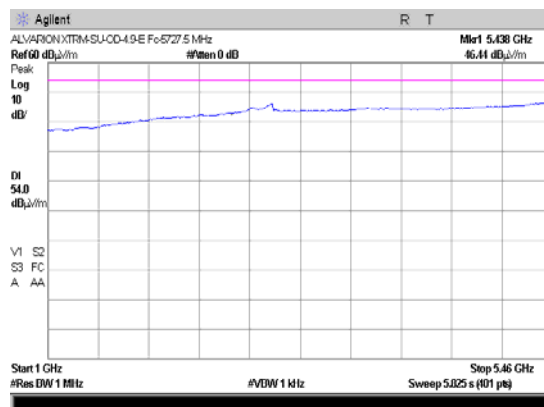
Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

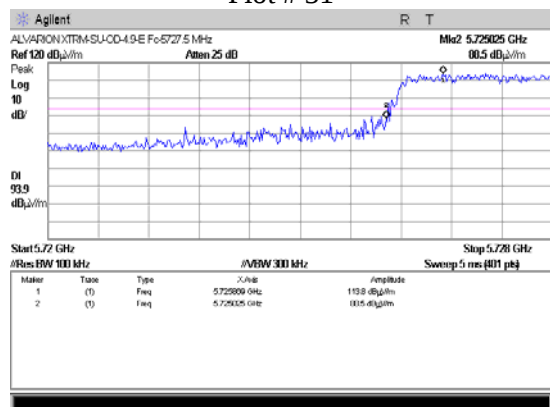
FCC ID: LKT-EXTR-CPE-49

5 MHz EBW**Antenna Omni - 9.5 dBi gain.****Carrier frequency – 5727.5 MHz**

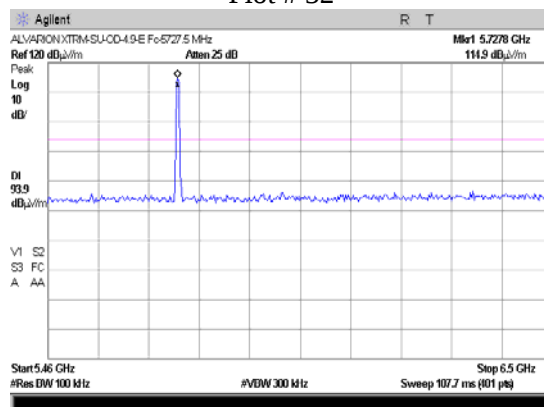
Plot # 31



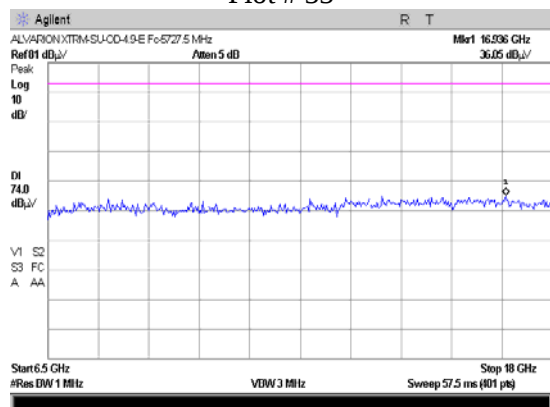
Plot # 32



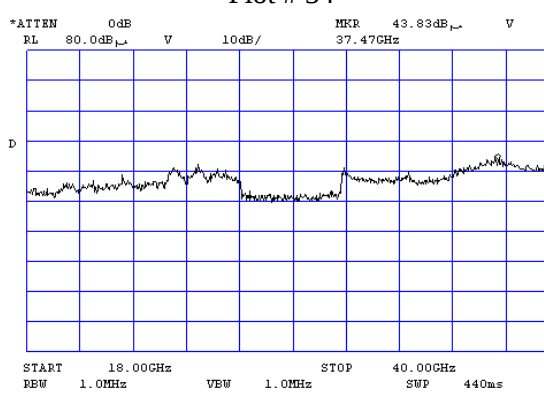
Plot # 33



Plot # 34



Plot # 35



Plot # 36



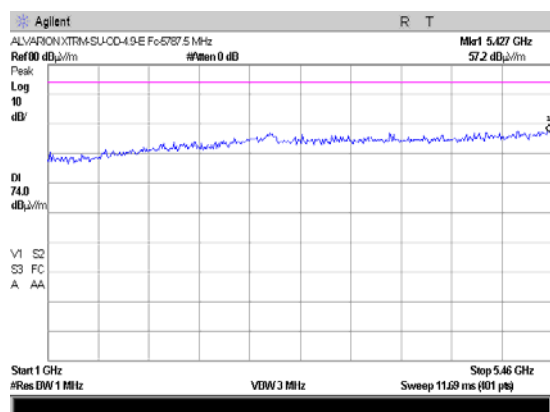
Test report N: 9012315196

Page 25 of 58

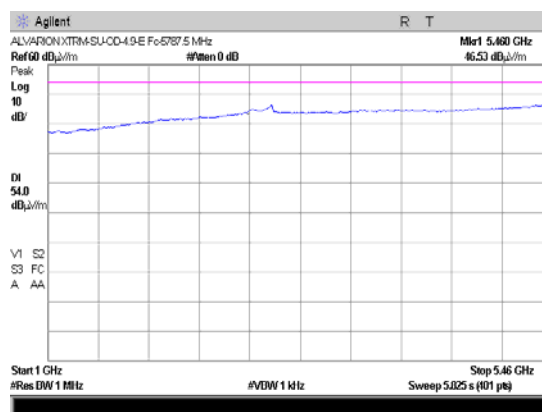
Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

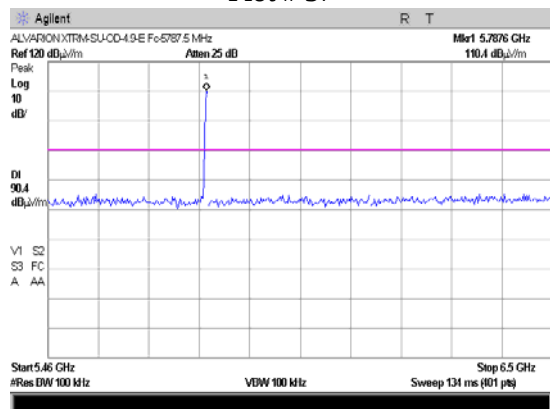
FCC ID: LKT-EXTR-CPE-49

Carrier frequency – 5787.5 MHz

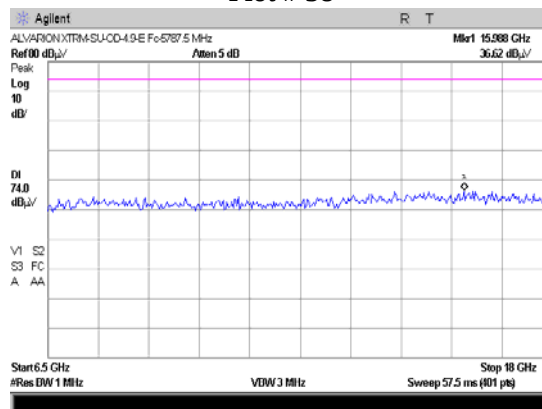
Plot # 37



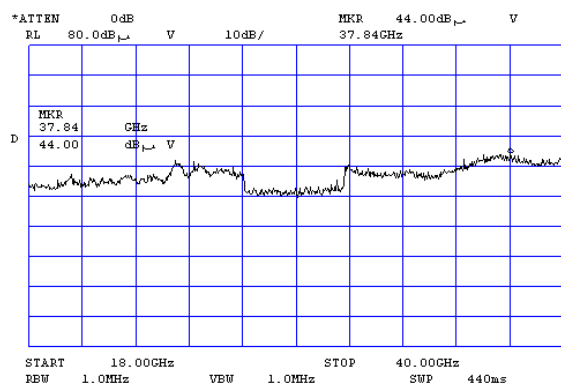
Plot # 38



Plot # 39



Plot # 40



Plot # 41



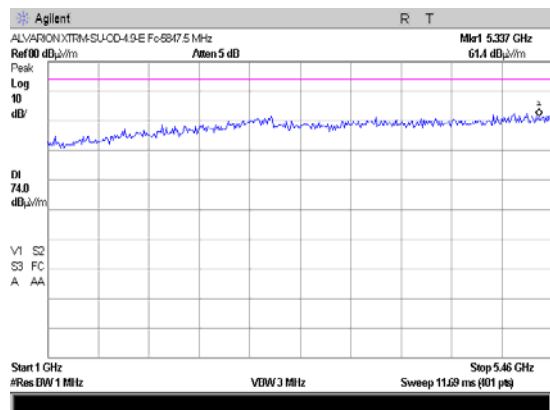
Test report N: 9012315196

Page 26 of 58

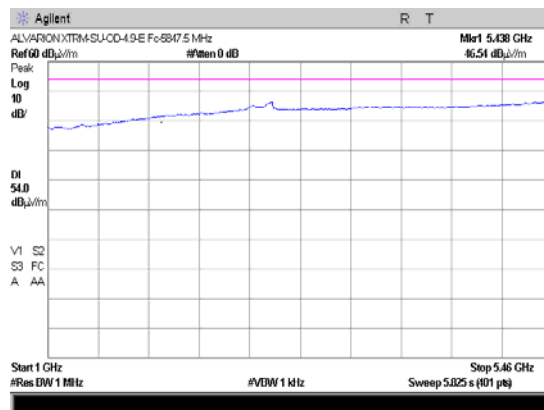
Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

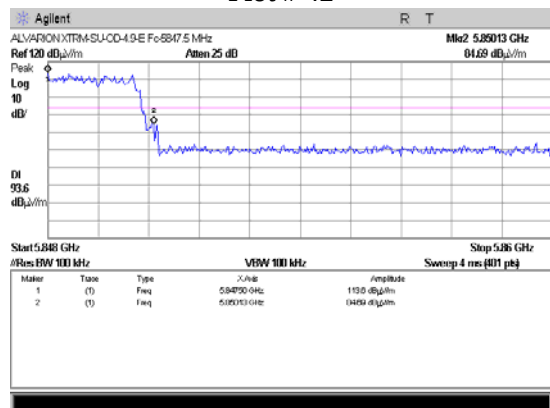
FCC ID: LKT-EXTR-CPE-49

Carrier frequency – 5847.5 MHz

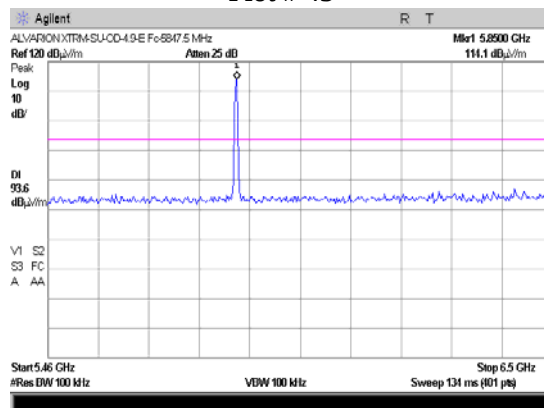
Plot # 42



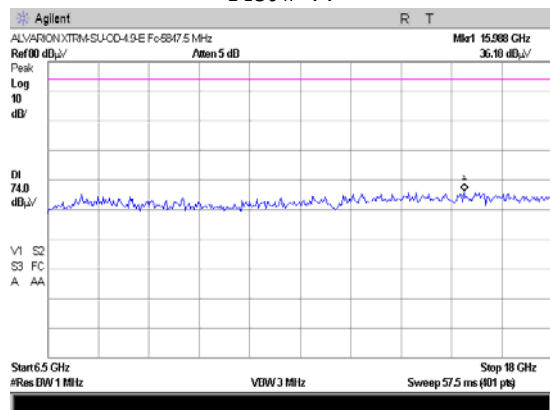
Plot # 43



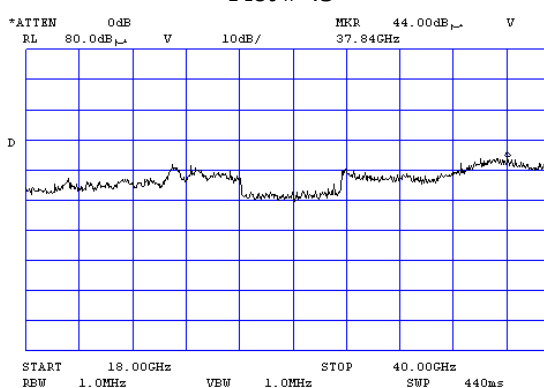
Plot # 44



Plot # 45



Plot # 46



Plot # 47



Test report N: 9012315196

Title: BreezeMax Extreme CPE 5.x

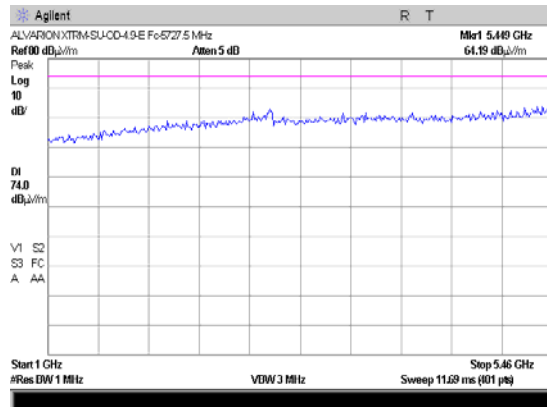
Model: XTRM-SU-OD-1D-4.9-2-E

Page 27 of 58

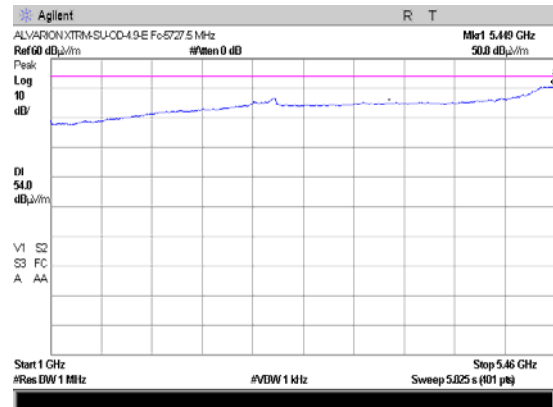
FCC ID: LKT-EXTR-CPE-49

Flat panel antenna – 23 dBi gain.

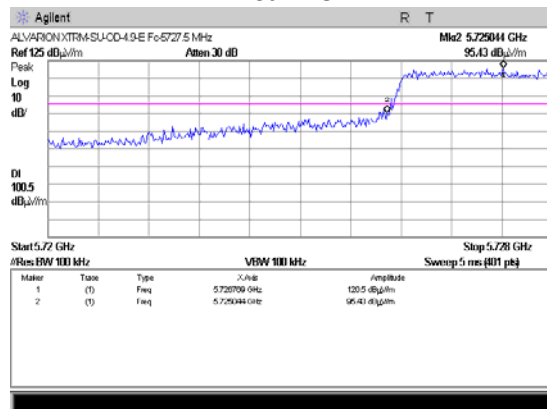
Carrier frequency – 5727.5 MHz



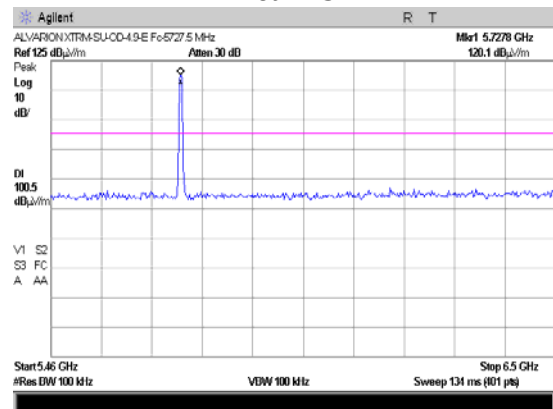
Plot # 48



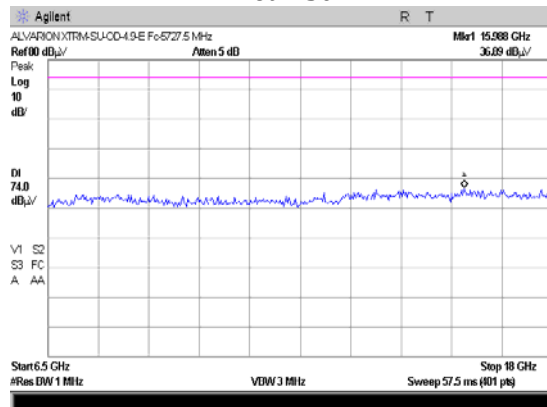
Plot # 49



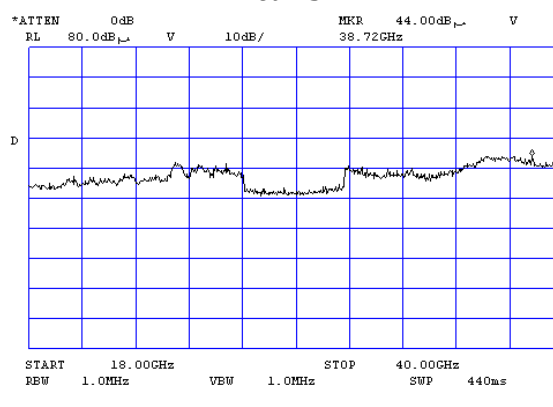
Plot # 50



Plot # 51



Plot # 52



Plot # 53



Test report N: 9012315196

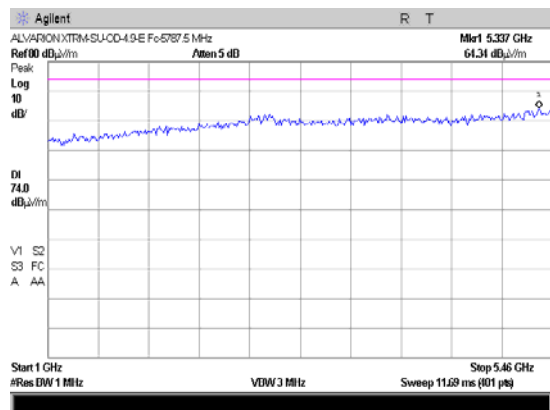
Page 28 of 58

Title: BreezeMax Extreme CPE 5.x

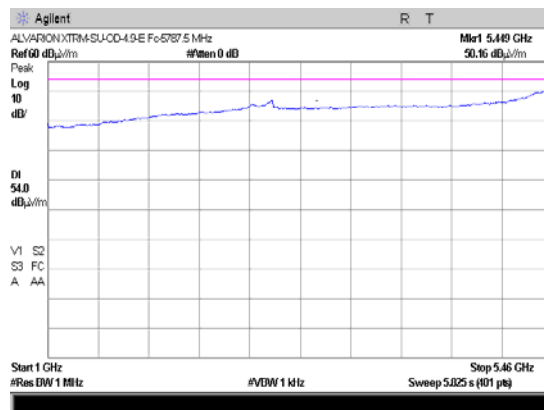
Model: XTRM-SU-OD-1D-4.9-2-E

FCC ID: LKT-EXTR-CPE-49

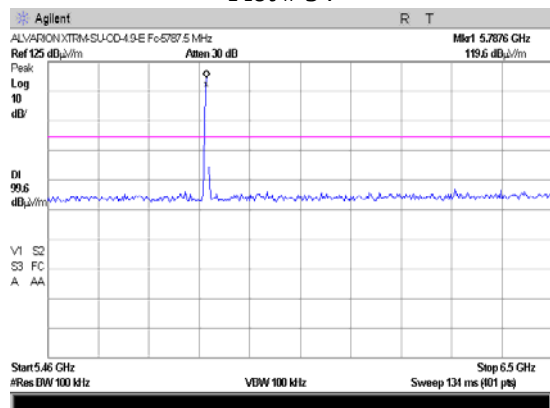
Carrier frequency – 5787.5 MHz



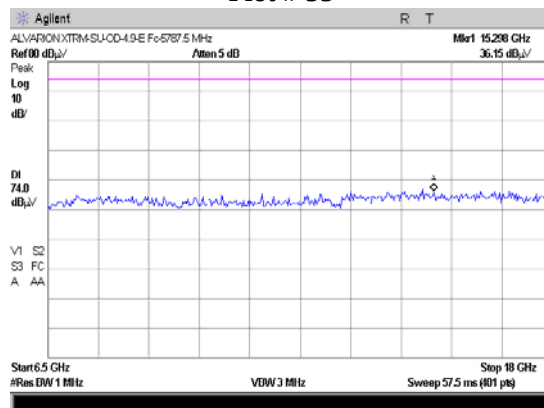
Plot # 54



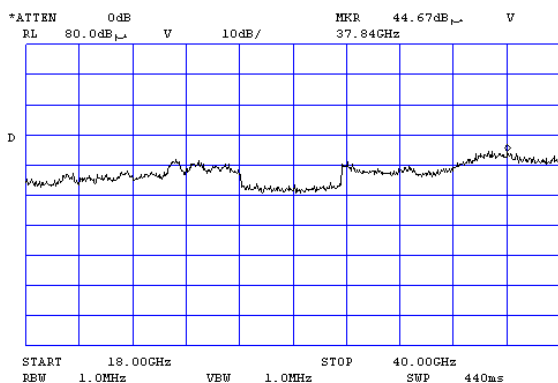
Plot # 55



Plot # 56



Plot # 57



Plot # 58



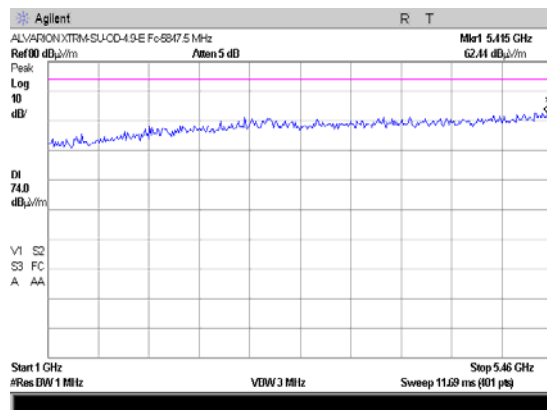
Test report N: 9012315196

Page 29 of 58

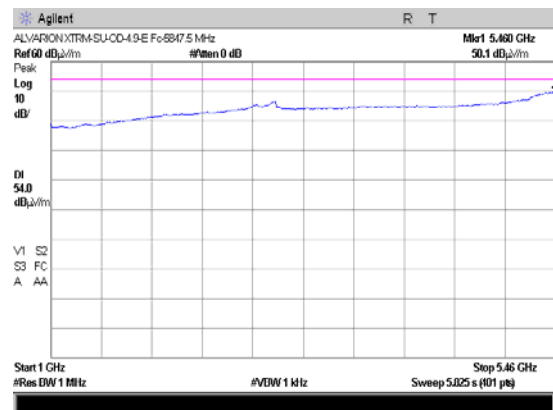
Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

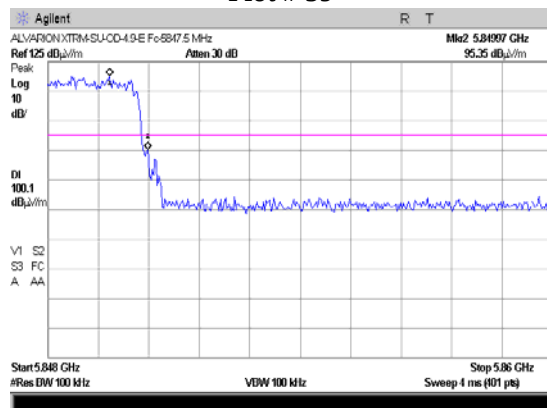
FCC ID: LKT-EXTR-CPE-49

Carrier frequency – 5847.5 MHz

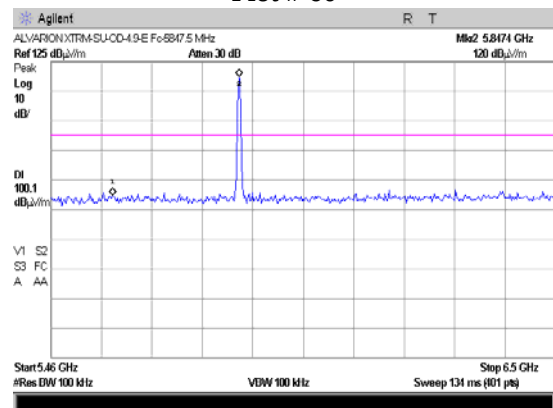
Plot # 59



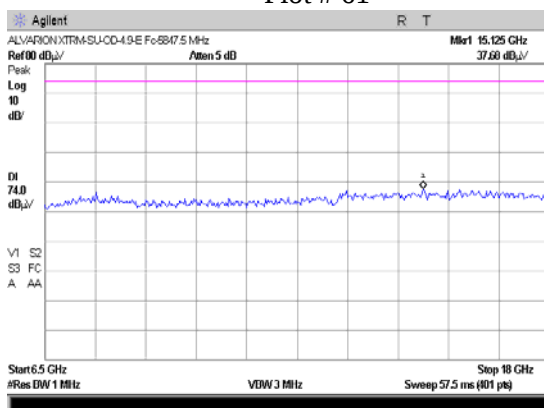
Plot # 60



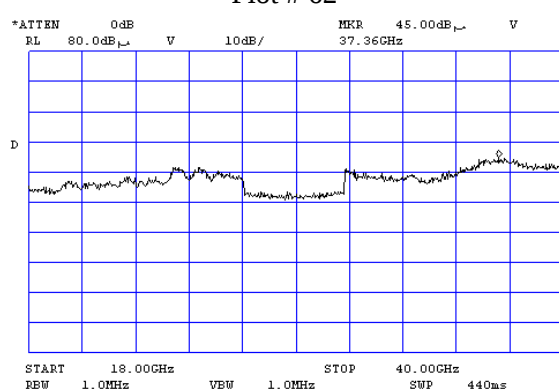
Plot # 61



Plot # 62



Plot # 63



Plot # 64



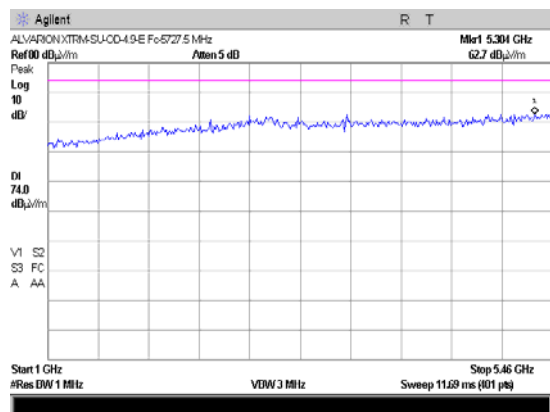
Test report N: 9012315196

Title: BreezeMax Extreme CPE 5.x

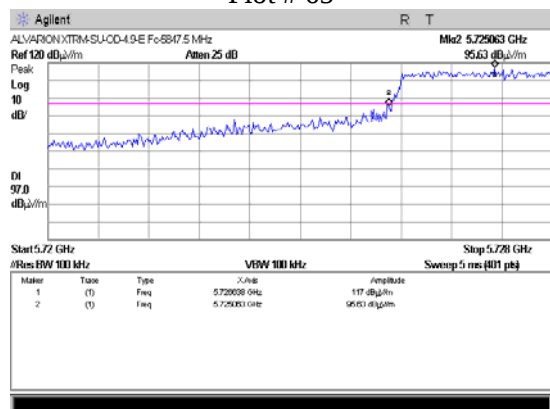
Model: XTRM-SU-OD-1D-4.9-2-E

Page 30 of 58

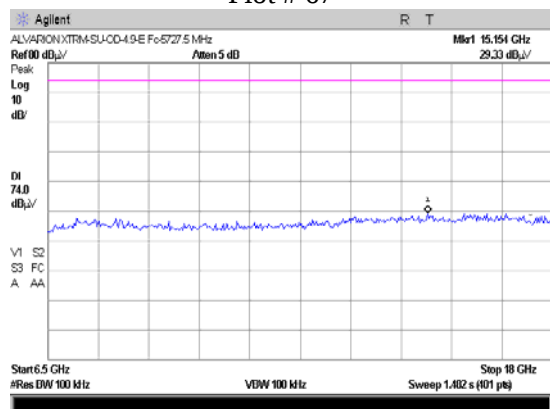
FCC ID: LKT-EXTR-CPE-49

Parabolic antenna – 28 dBi gain.Carrier frequency – 5727.5 MHz

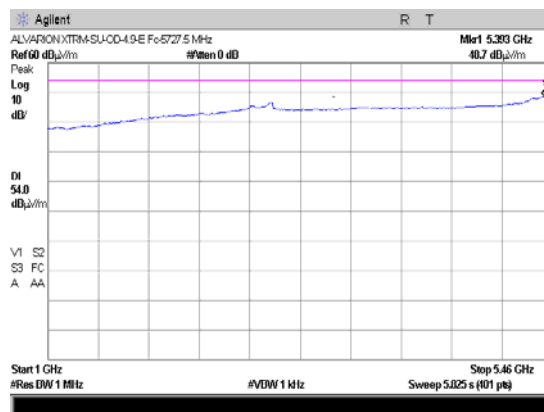
Plot # 65



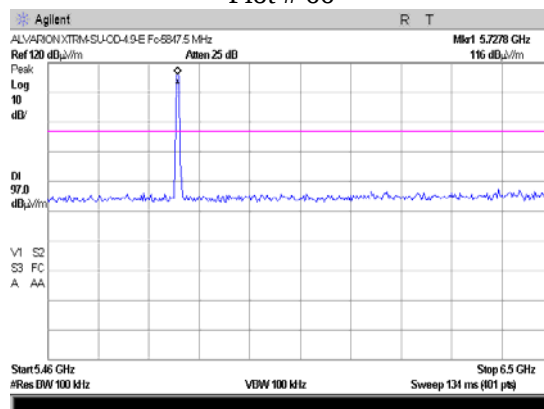
Plot # 67



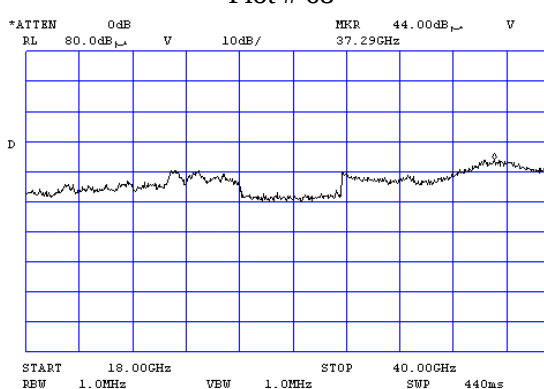
Plot # 69



Plot # 66



Plot # 68



Plot # 70



Test report N: 9012315196

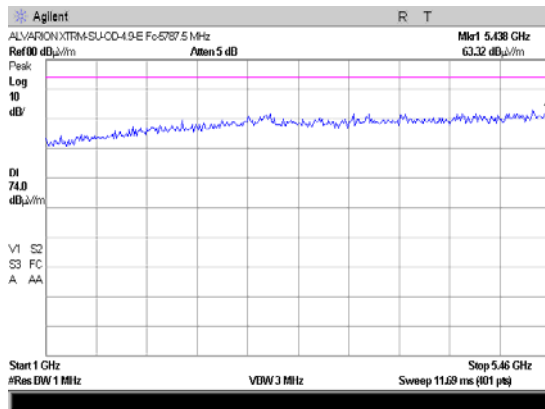
Page 31 of 58

Title: BreezeMax Extreme CPE 5.x

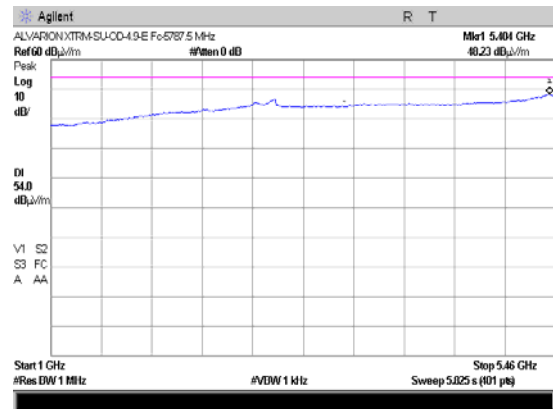
Model: XTRM-SU-OD-1D-4.9-2-E

FCC ID: LKT-EXTR-CPE-49

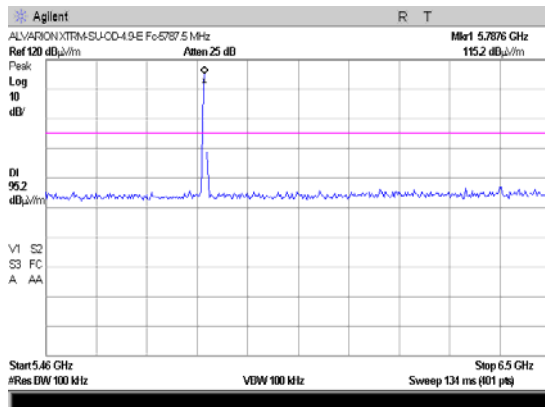
Carrier frequency – 5787.5 MHz



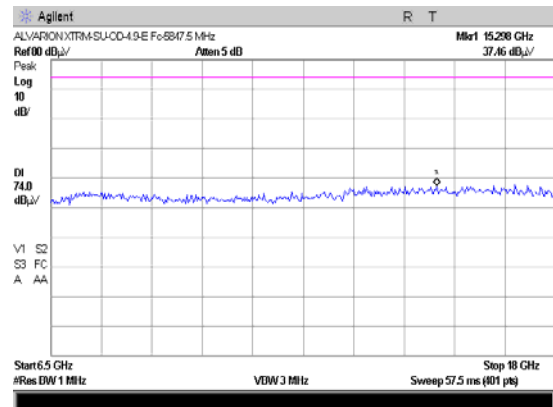
Plot # 71



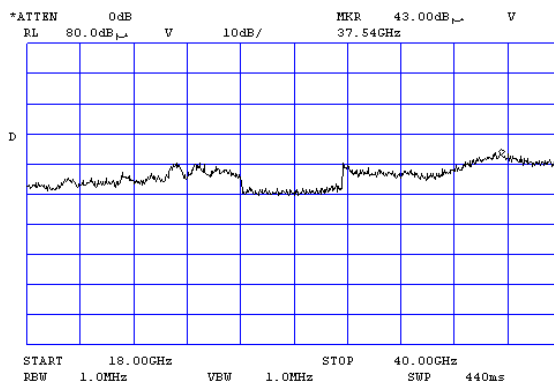
Plot # 72



Plot # 73



Plot # 74



Plot # 75



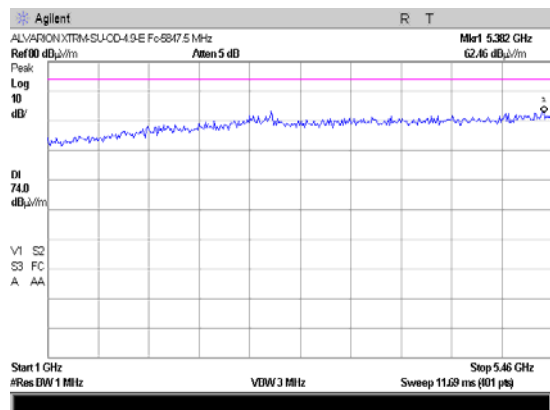
Test report N: 9012315196

Page 32 of 58

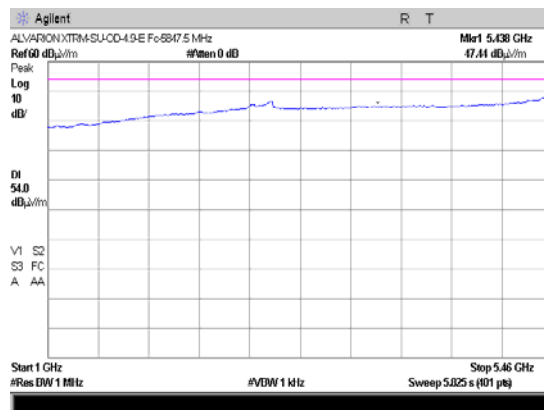
Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

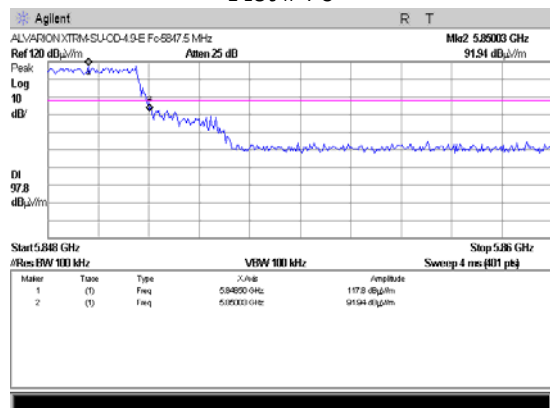
FCC ID: LKT-EXTR-CPE-49

Carrier frequency – 5847.5 MHz

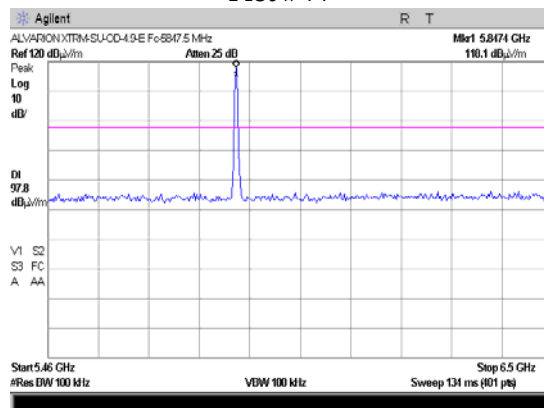
Plot # 76



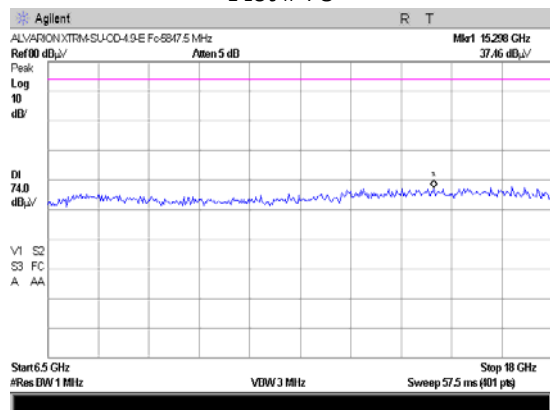
Plot # 77



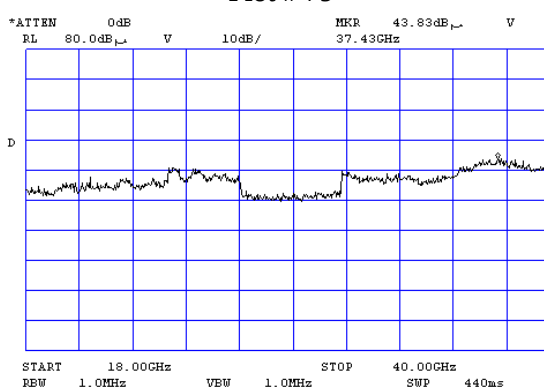
Plot # 78



Plot # 79



Plot # 80



Plot # 81



Test report N: 9012315196

Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

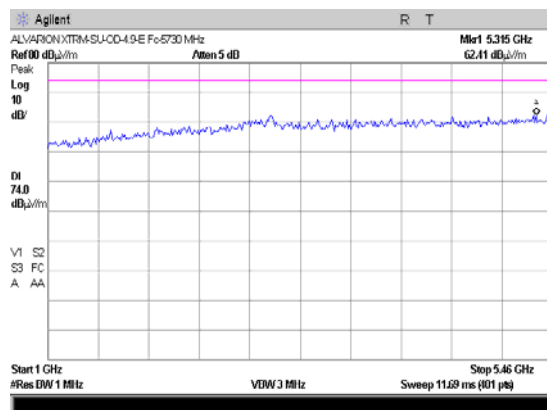
Page 33 of 58

FCC ID: LKT-EXTR-CPE-49

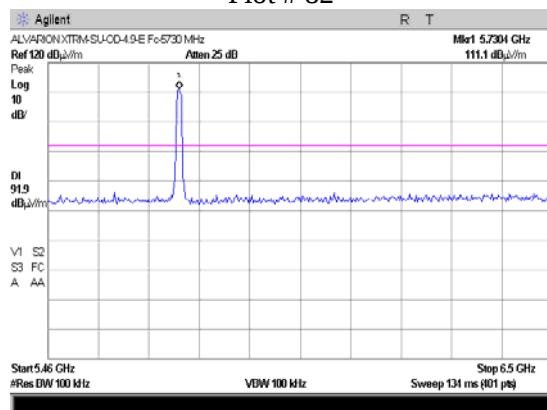
10 MHz EBW

Antenna Omni - 9.5 dBi gain.

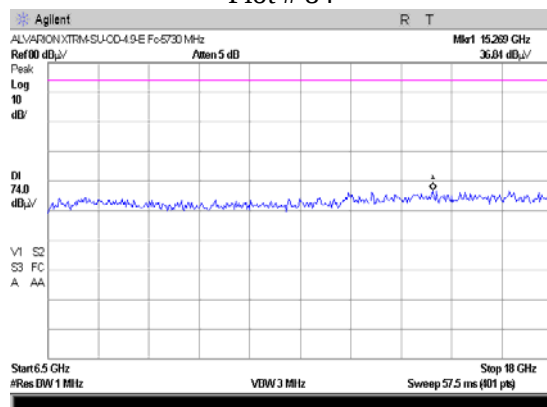
Carrier frequency – 5730 MHz



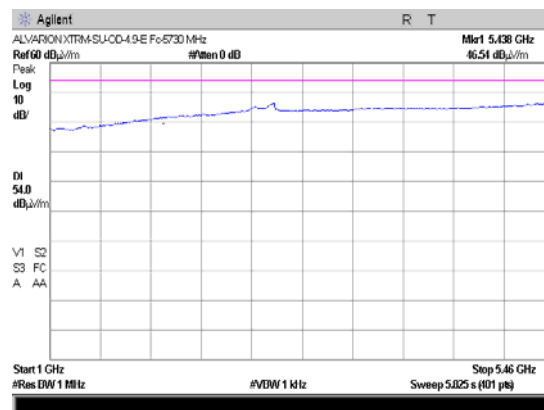
Plot # 82



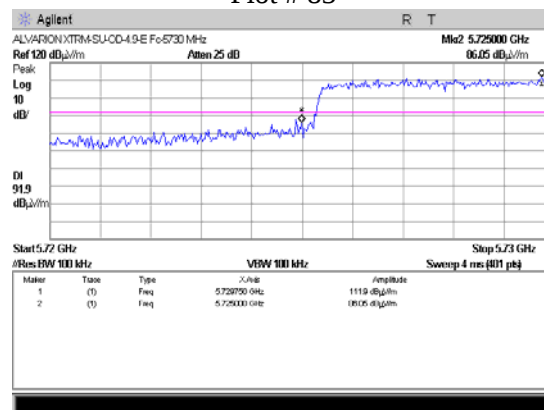
Plot # 84



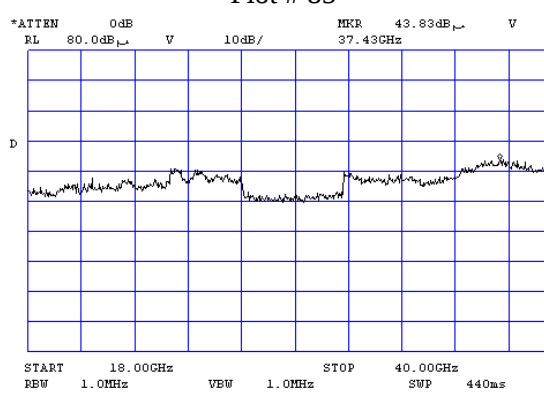
Plot # 86



Plot # 83



Plot # 85



Plot # 87



Test report N: 9012315196

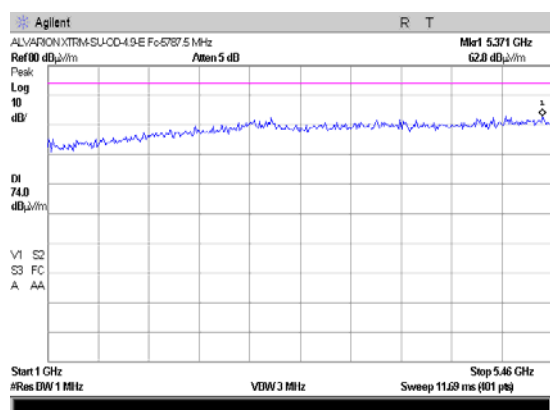
Page 34 of 58

Title: BreezeMax Extreme CPE 5.x

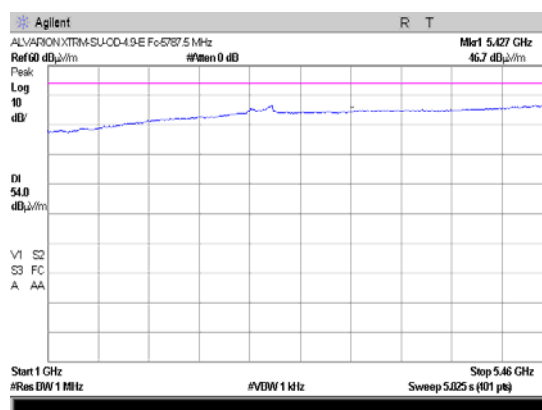
Model: XTRM-SU-OD-1D-4.9-2-E

FCC ID: LKT-EXTR-CPE-49

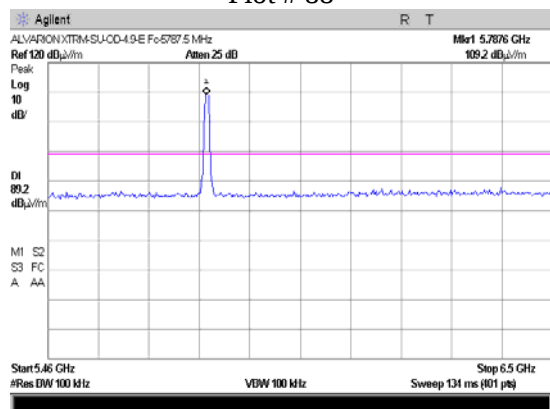
Carrier frequency – 5787.5 MHz



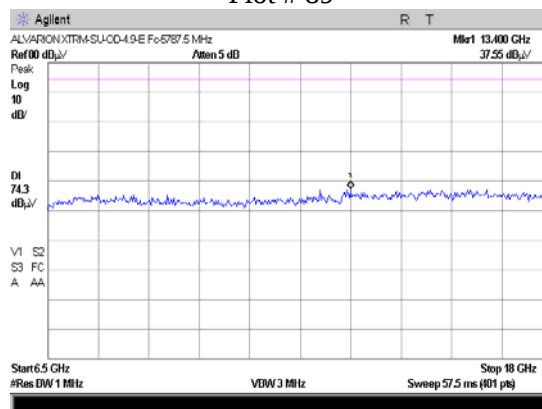
Plot # 88



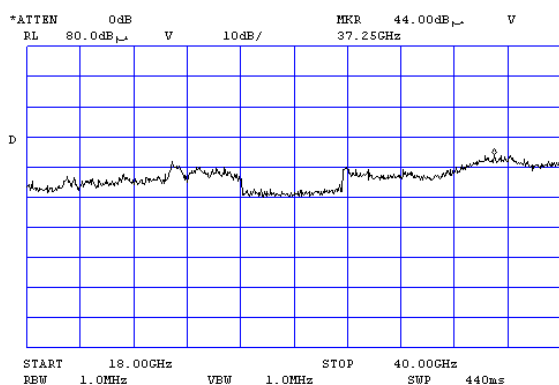
Plot # 89



Plot # 90



Plot # 91



Plot # 92



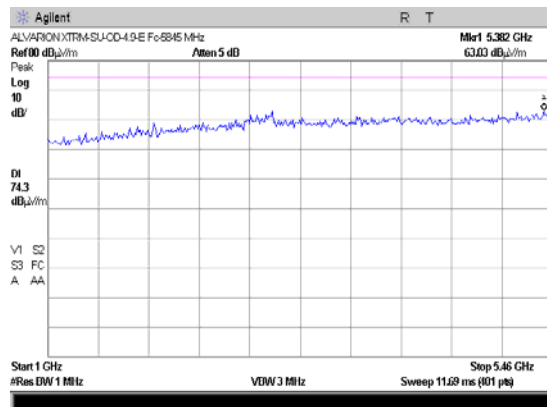
Test report N: 9012315196

Page 35 of 58

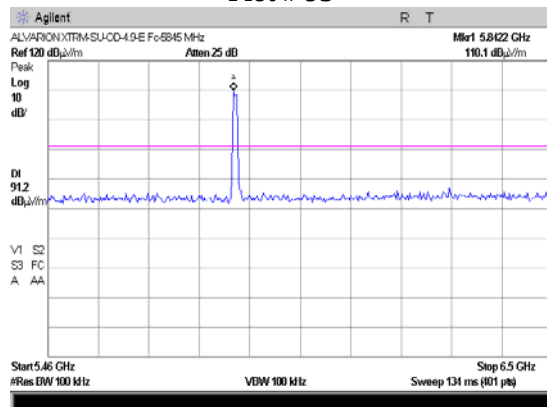
Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

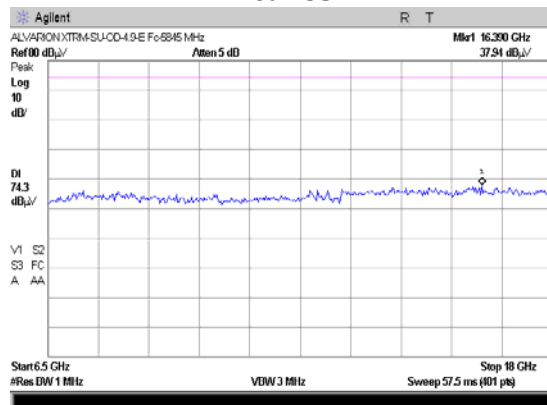
FCC ID: LKT-EXTR-CPE-49

Carrier frequency – 5845 MHz

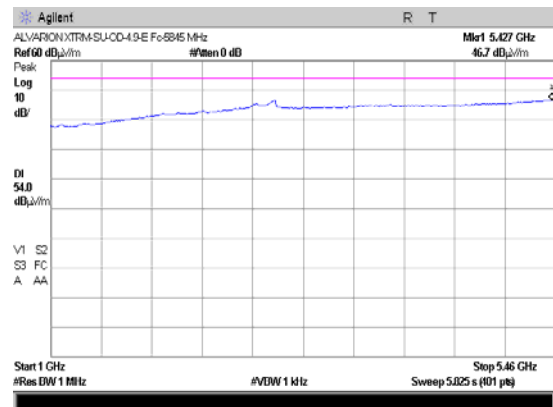
Plot # 93



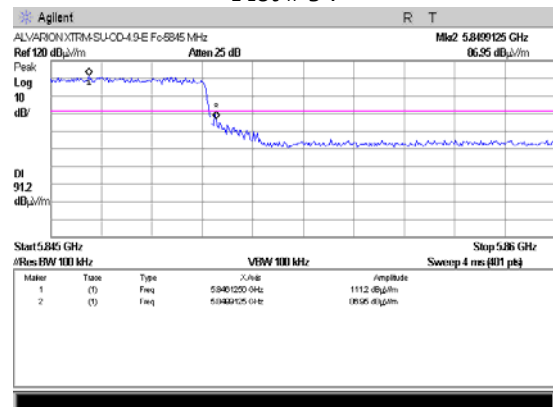
Plot # 95



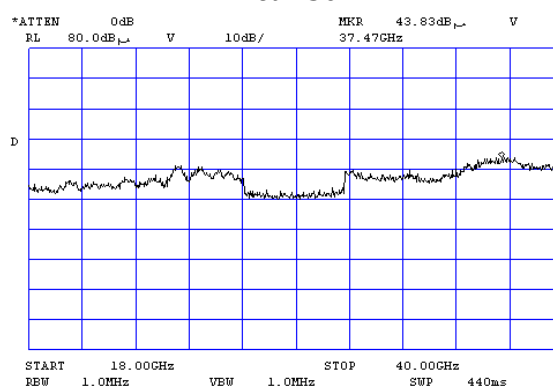
Plot # 97



Plot # 94



Plot # 96



Plot # 98



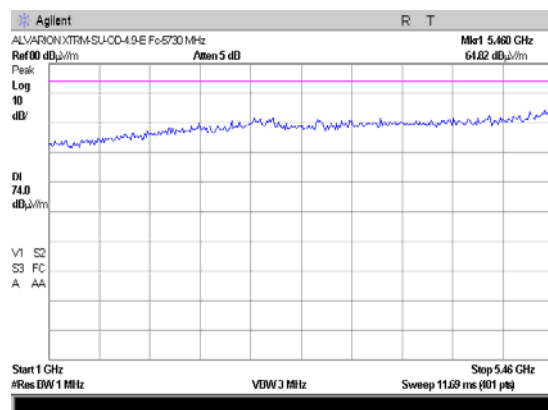
Test report N: 9012315196

Title: BreezeMax Extreme CPE 5.x

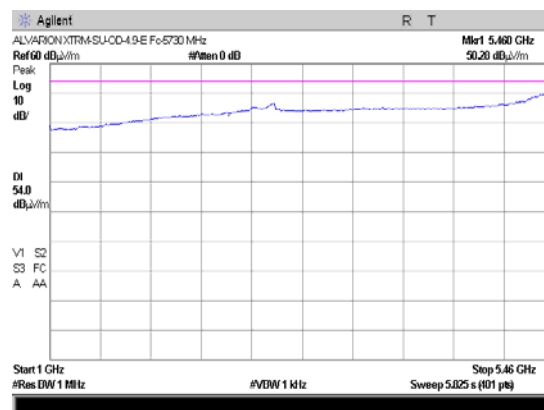
Model: XTRM-SU-OD-1D-4.9-2-E

Page 36 of 58

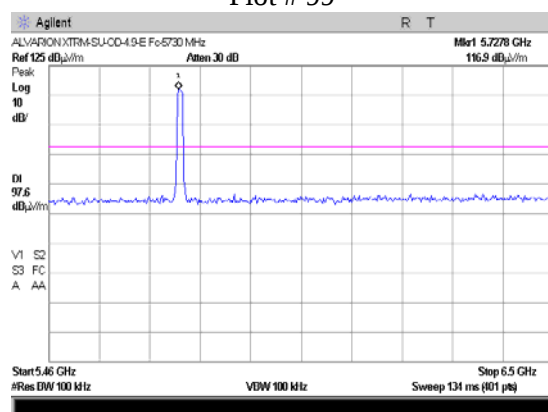
FCC ID: LKT-EXTR-CPE-49

Flat panel antenna – 23 dBi gain.Carrier frequency – 5730 MHz.

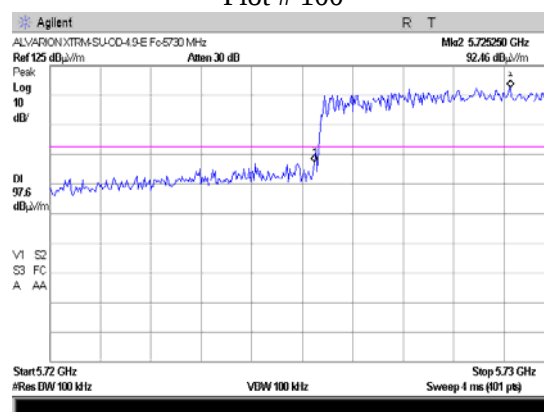
Plot # 99



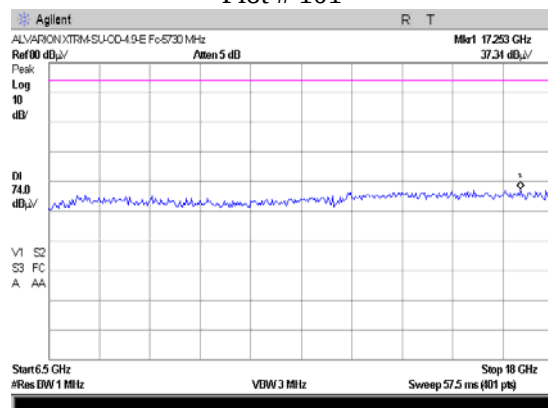
Plot # 100



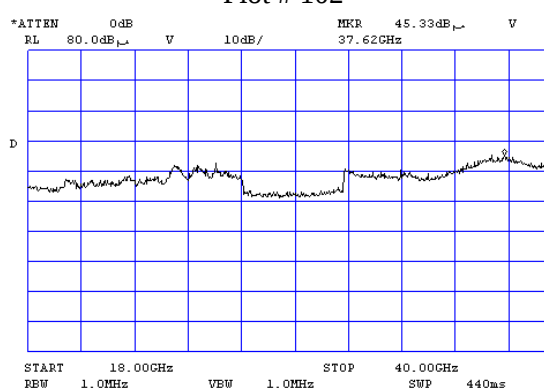
Plot # 101



Plot # 102



Plot # 103



Plot # 104

Test report N: 9012315196

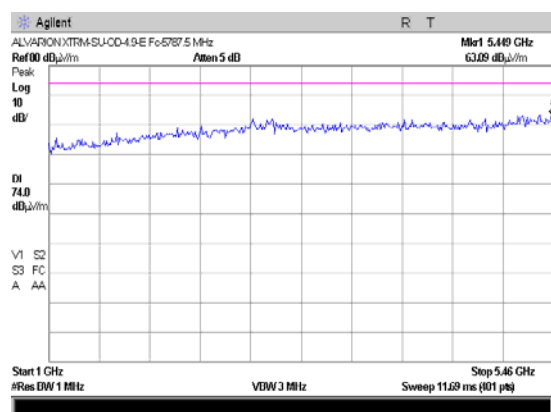
Page 37 of 58

Title: BreezeMax Extreme CPE 5.x

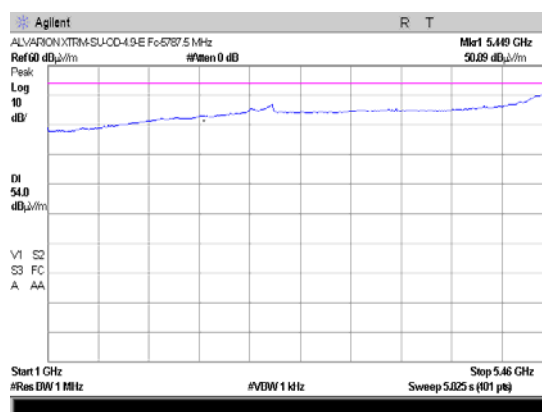
Model: XTRM-SU-OD-1D-4.9-2-E

FCC ID: LKT-EXTR-CPE-49

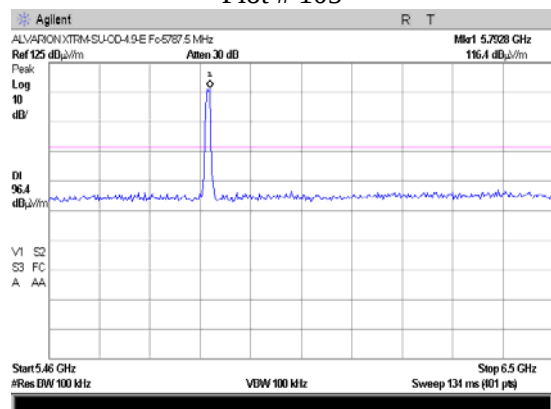
Carrier frequency – 5787.5 MHz



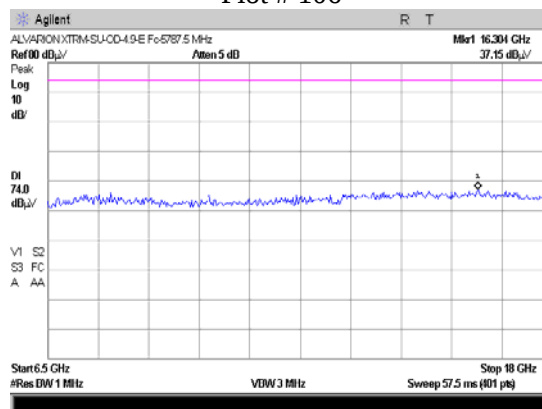
Plot # 105



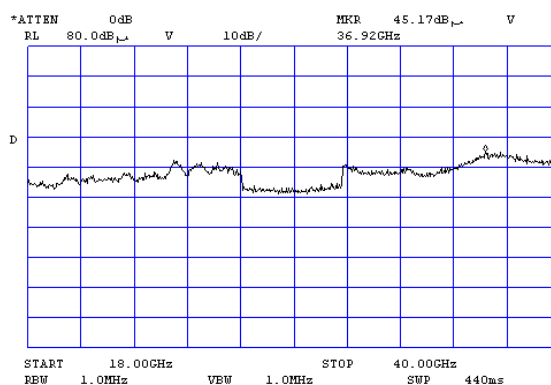
Plot # 106



Plot # 107



Plot # 108



Plot # 109



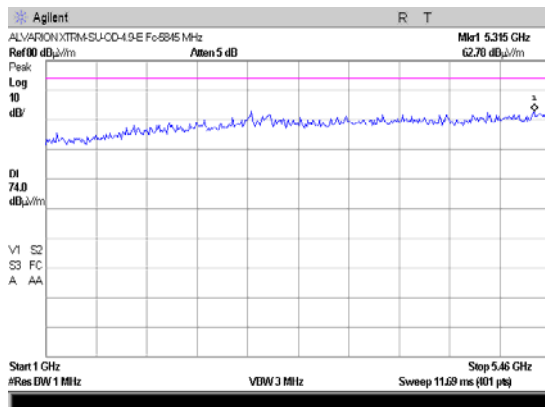
Test report N: 9012315196

Page 38 of 58

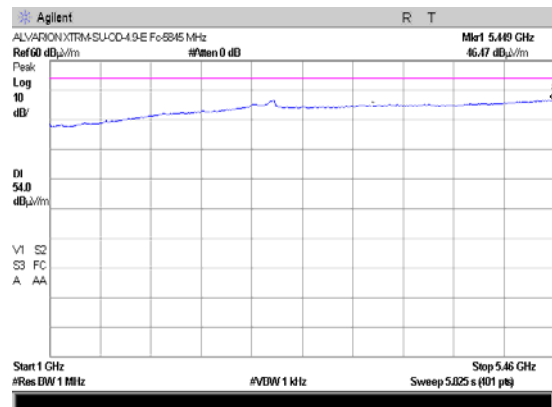
Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

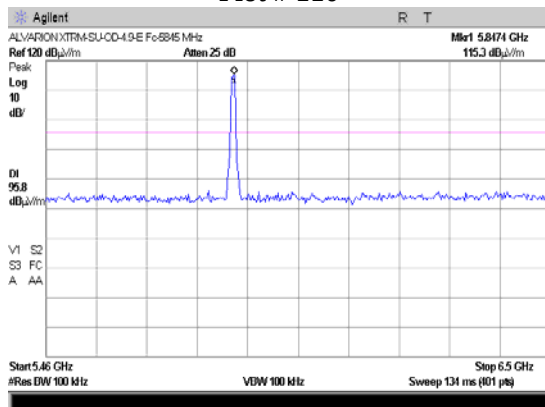
FCC ID: LKT-EXTR-CPE-49

Carrier frequency – 5845 MHz

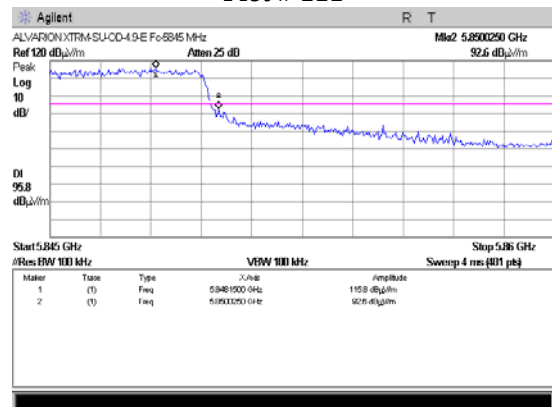
Plot # 110



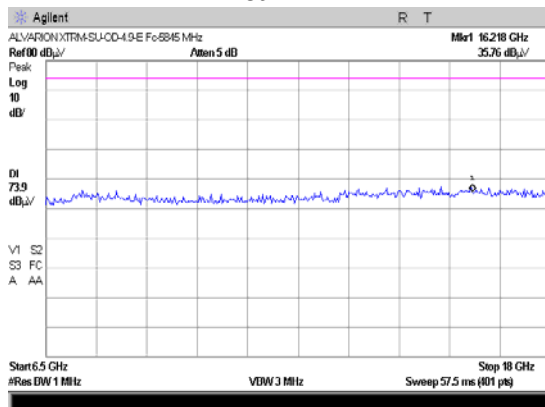
Plot # 111



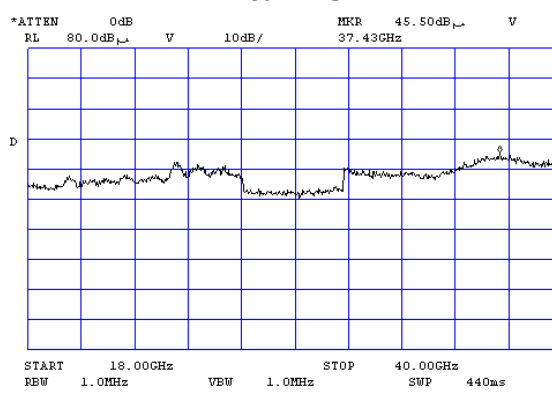
Plot # 112



Plot # 113



Plot # 114



Plot # 115



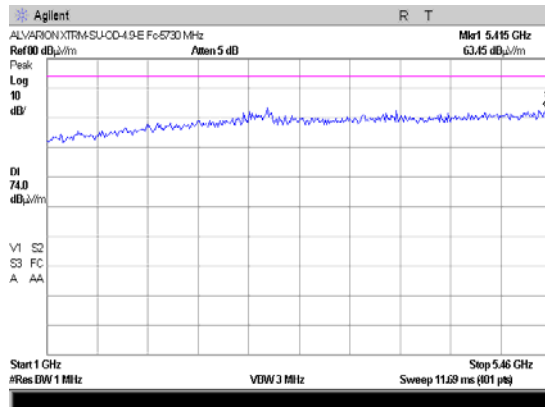
Test report N: 9012315196

Page 39 of 58

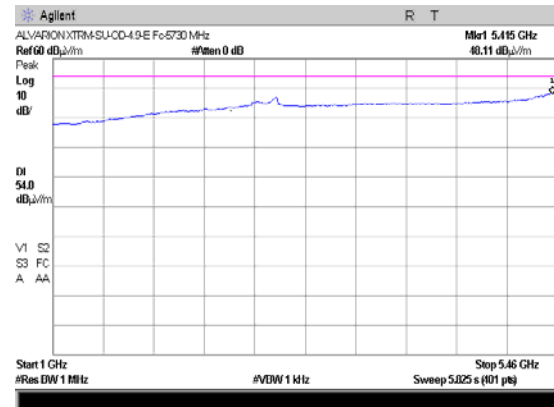
Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

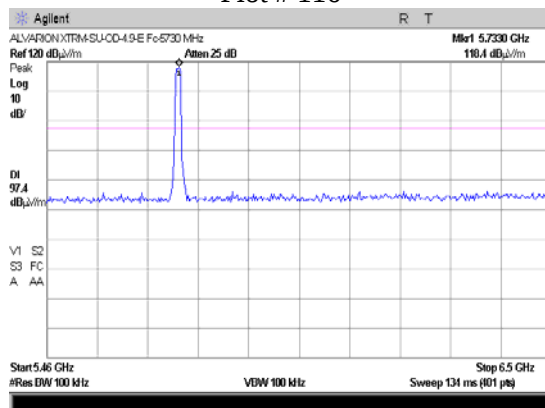
FCC ID: LKT-EXTR-CPE-49

Parabolic antenna – 28 dBi gain.Carrier frequency – 5730 MHz.

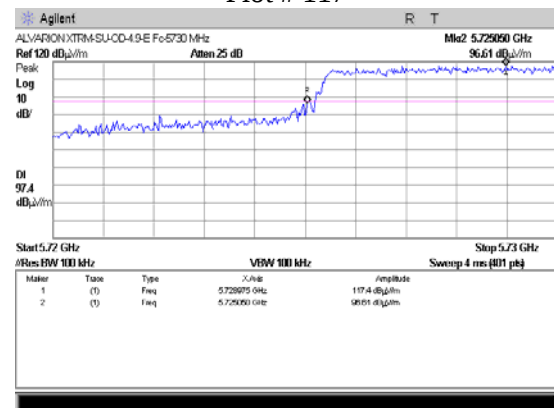
Plot # 116



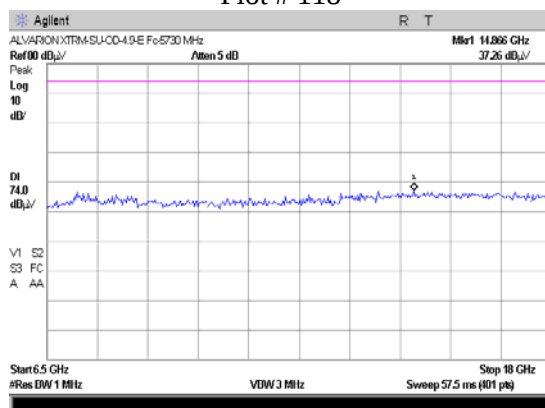
Plot # 117



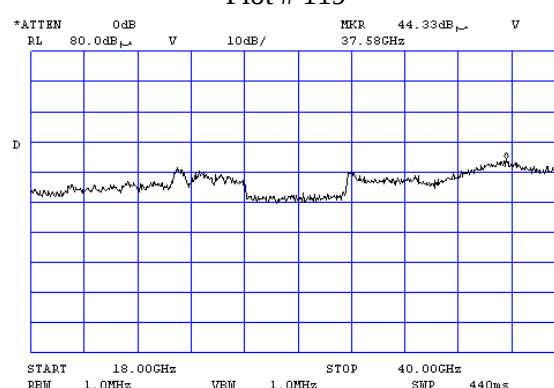
Plot # 118



Plot # 119



Plot # 120



Plot # 121



Test report N: 9012315196

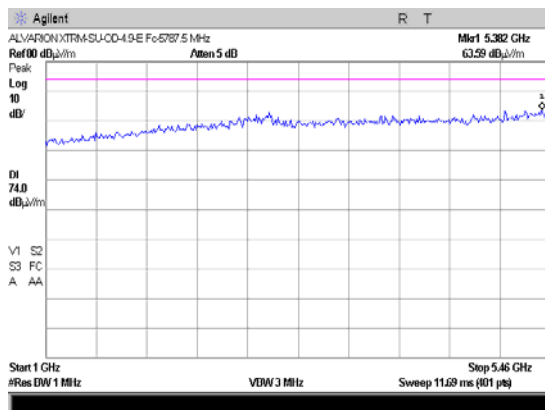
Page 40 of 58

Title: BreezeMax Extreme CPE 5.x

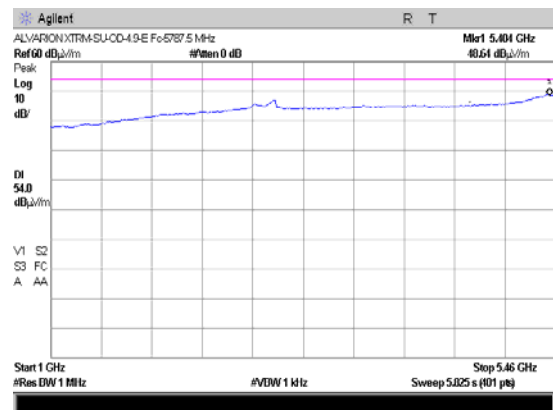
Model: XTRM-SU-OD-1D-4.9-2-E

FCC ID: LKT-EXTR-CPE-49

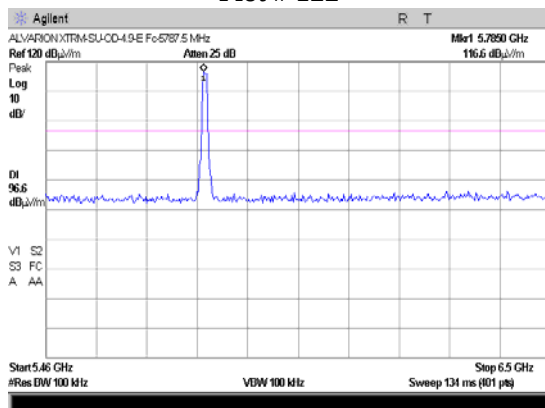
Carrier frequency – 5787.5 MHz



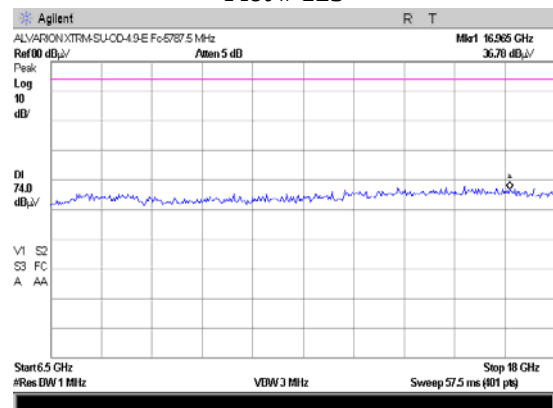
Plot # 122



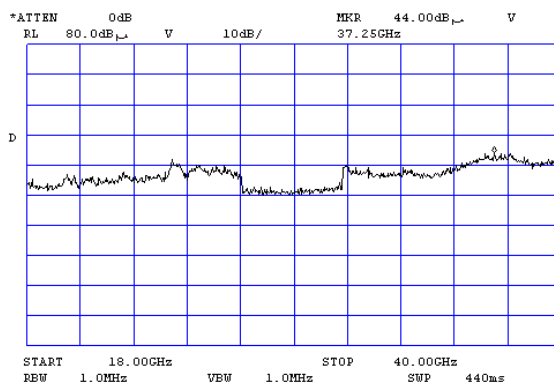
Plot # 123



Plot # 124



Plot # 125



Plot # 126



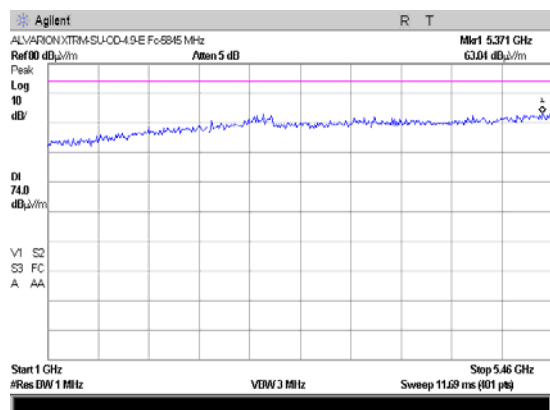
Test report N: 9012315196

Page 41 of 58

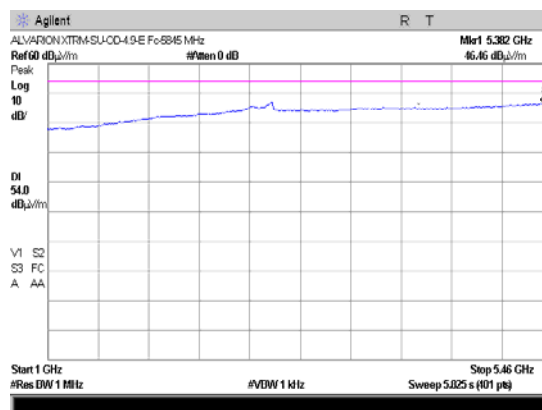
Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

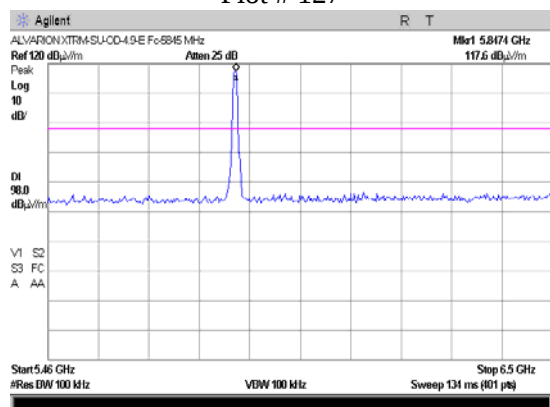
FCC ID: LKT-EXTR-CPE-49

Carrier frequency – 5845 MHz

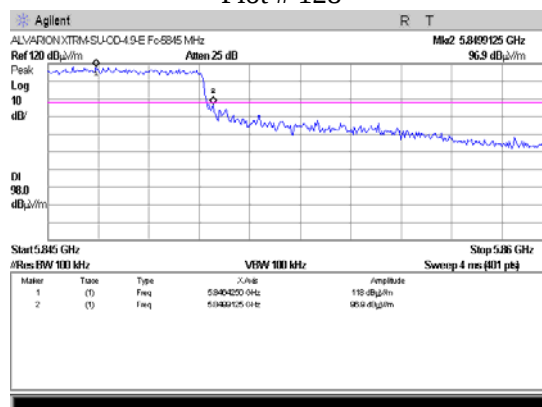
Plot # 127



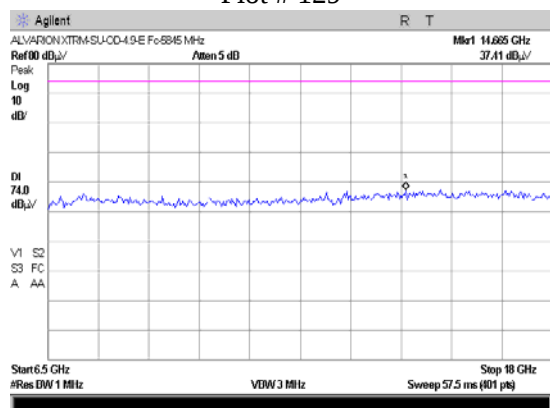
Plot # 128



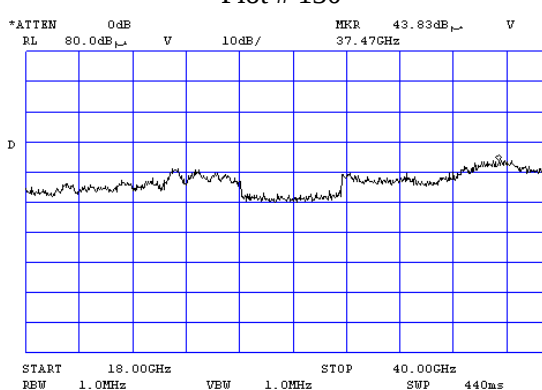
Plot # 129



Plot # 130



Plot # 131



Plot # 132

**Test report N: 9012315196****Page 42 of 58****Title: BreezeMax Extreme CPE 5.x****Model: XTRM-SU-OD-1D-4.9-2-E****FCC ID: LKT-EXTR-CPE-49****6.1.5 Power spectral density of digital modulated systems according to § 15.247(e)**

Method of measurement FCC March 23, 2005 procedure
 Operating Frequency Range 5727.5 – 5847.5 MHz
 Ambient Temperature 21° C Relative Humidity 54% Air Pressure 1010 hPa

5 MHz EBW

Carrier frequency MHz	Measured PSD dBm	Specified limit dBm	Reference to plots
5727.5	-4.64	8	#20
5787.5	-4.37	8	#22
5847.5	-4.41	8	#24

10 MHz EBW

Carrier frequency MHz	Measured PSD dBm	Specified limit dBm	Reference to plots
5730.0	-7.38	8	#26
5787.5	-6.65	8	#28
5845.0	-7.62	8	#30

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

LIMIT

The peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST EQUIPMENT USED:

3	4	5	12			
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Test report N: 9012315196

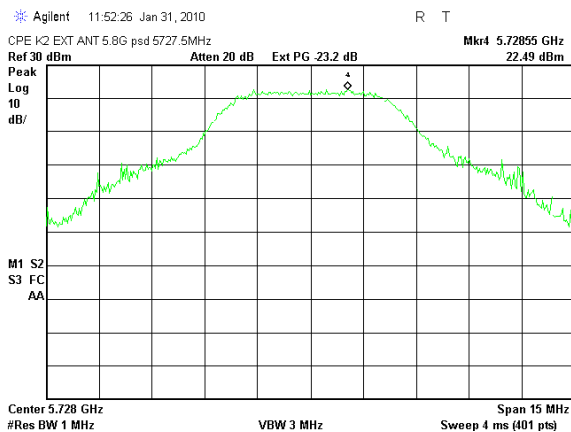
Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

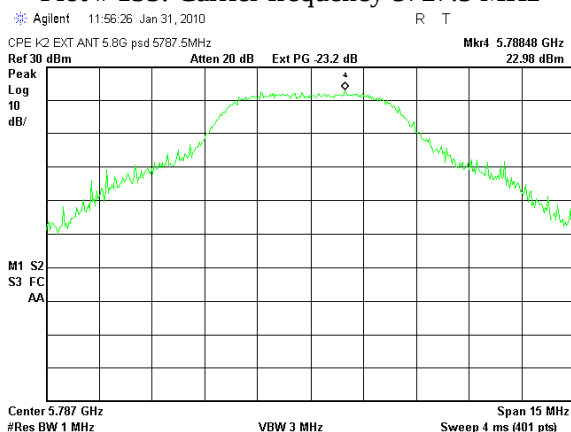
Page 43 of 58

FCC ID: LKT-EXTR-CPE-49

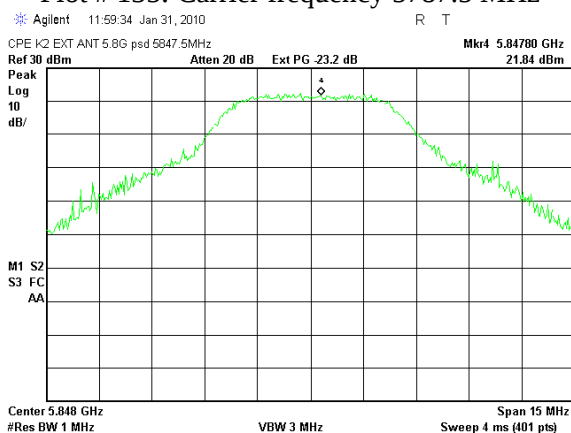
5 MHz EBW



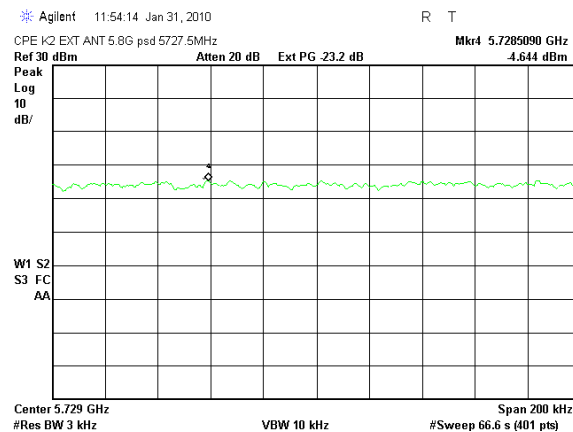
Plot # 133. Carrier frequency 5727.5 MHz



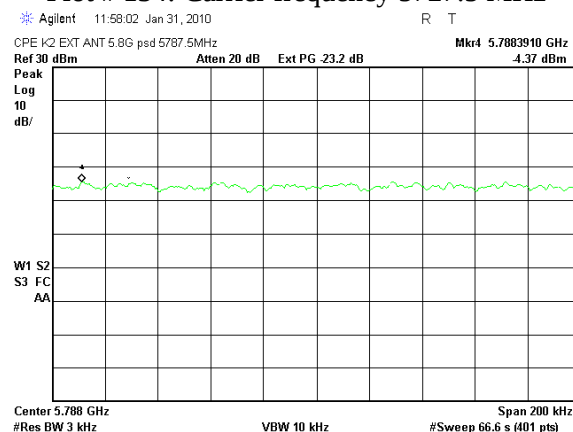
Plot # 135. Carrier frequency 5787.5 MHz



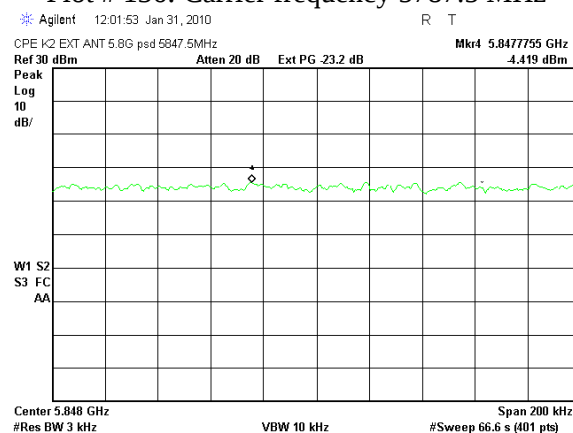
Plot # 137. Carrier frequency 5847.5 MHz



Plot # 134. Carrier frequency 5727.5 MHz



Plot # 136. Carrier frequency 5787.5 MHz



Plot # 138. Carrier frequency 5847.5 MHz



Test report N: 9012315196

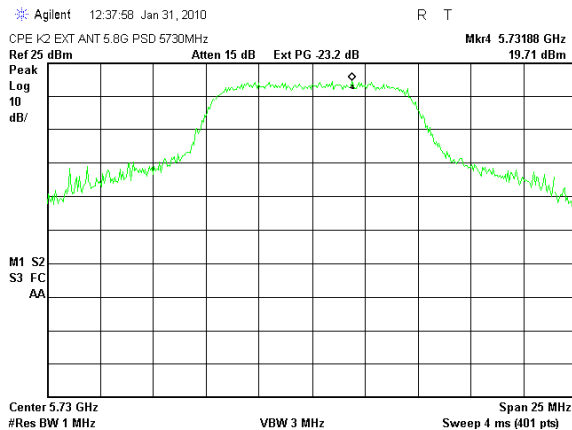
Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

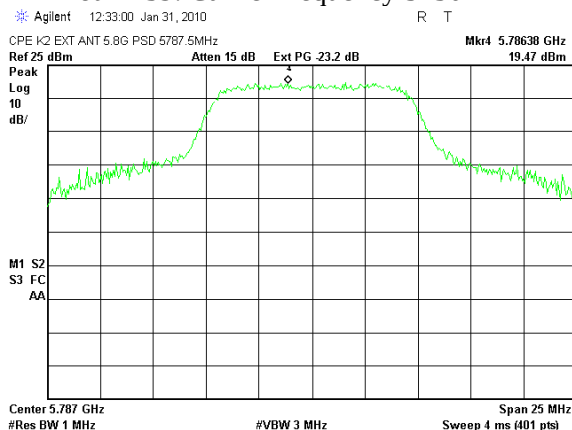
Page 44 of 58

FCC ID: LKT-EXTR-CPE-49

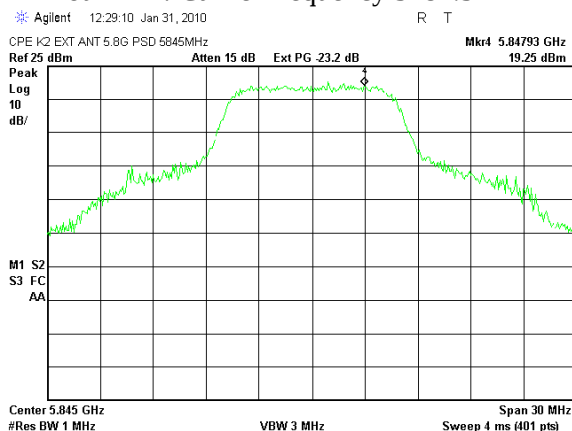
10 MHz EBW



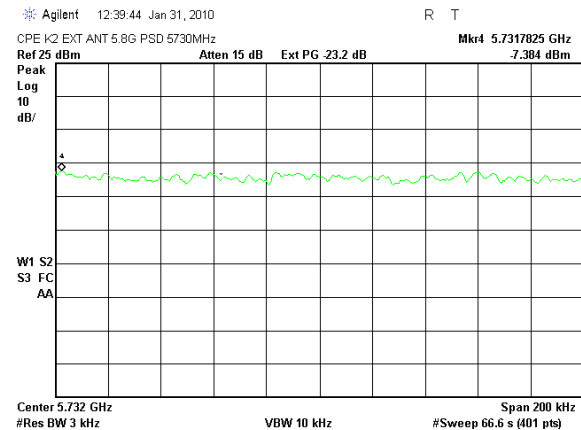
Plot # 139. Carrier frequency 5730 MHz



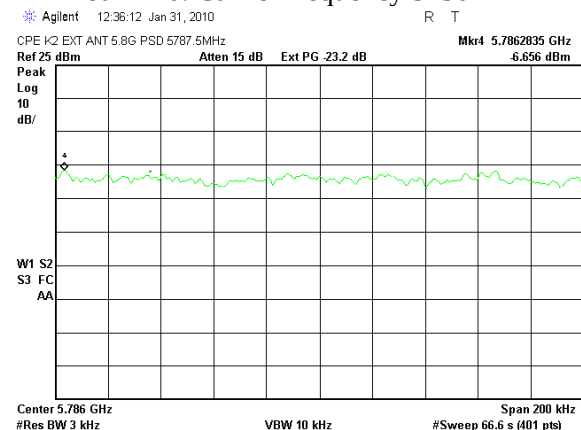
Plot # 141. Carrier frequency 5787.5 MHz



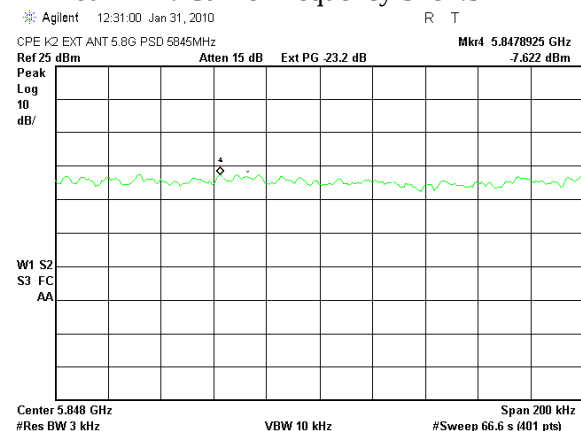
Plot # 143. Carrier frequency 5845 MHz



Plot # 140. Carrier frequency 5730 MHz



Plot # 142. Carrier frequency 5787.5 MHz



Plot # 144. Carrier frequency 5845 MHz

**Test report N: 9012315196****Page 45 of 58****Title: BreezeMax Extreme CPE 5.x****Model: XTRM-SU-OD-1D-4.9-2-E****FCC ID: LKT-EXTR-CPE-49****7. Radiated emissions test according to § 15.209**

Method of measurement	ANSI 63.4 §13.1.4				
Operating Frequency Range	5727.5 – 5847.5 MHz				
Ambient Temperature	21 ⁰ C	Relative Humidity	54%	Air Pressure	1010 hPa

TEST DESCRIPTION:

The measurements were performed at the Open Area Test Site at a 10 m test distance. 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 and 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. Measurements below 1000 MHz were performed according to FCC p.15.35 (a) with CISPR quasi-peak detector.

REQUIREMENTS:

EUT radiated emission shall not exceed value required in section 15.209

TEST RESULT:

Test results are presented in the table #1.

Results more than 20 dB under the limit were not inserted in the table.

**Test report N: 9012315196****Page 46 of 58****Title: BreezeMax Extreme CPE 5.x****Model: XTRM-SU-OD-1D-4.9-2-E****FCC ID: LKT-EXTR-CPE-49****Table 1. Radiated emission test results**

No	Frequency (MHz)	Antenna Polariz. V/H	Antenna Height (m)	Turn- table Angle (°)	QP emission level Note 1 (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
1	45.8	V	1.0	336	27.4	40.0	12.6
2	275.0	H	3.2	280	28.2	46.0	17.8
3	300.0	H	3.0	301	29.1	46.0	16.9
4	400.0		2.2	247	28.7	46.0	17.3
5	440.0		2.2	254	31.5	46.0	14.5
6	749.9	H	1.0	345	38.6	46.0	7.4

Emission level = E reading (dBμV) + Cable loss (dB) + Antenna Factor (dB/m) + 10 dB.

Note 1: Where 10 dB is an extrapolation distance factor.

For Cable Loss and Antenna Factor refer to Appendix 2.

TEST EQUIPMENT USED:

8	14					
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**Test report N: 9012315196****Page 47 of 58****Title: BreezeMax Extreme CPE 5.x****Model: XTRM-SU-OD-1D-4.9-2-E****FCC ID: LKT-EXTR-CPE-49****8. Conducted emissions according to § 15.207**

Method of measurement ANSI 63.4 §13.1.3
Operating Frequency Range 5727.5 – 5847.5 MHz
Ambient Temperature 21⁰ C Relative Humidity 54% Air Pressure 1008 hPa

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

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

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

TEST RESULTS:

Test results are shown at tables and plots # 145 for line Phase and # 146 for line Neutral.

TEST EQUIPMENT USED:

9	10	11				
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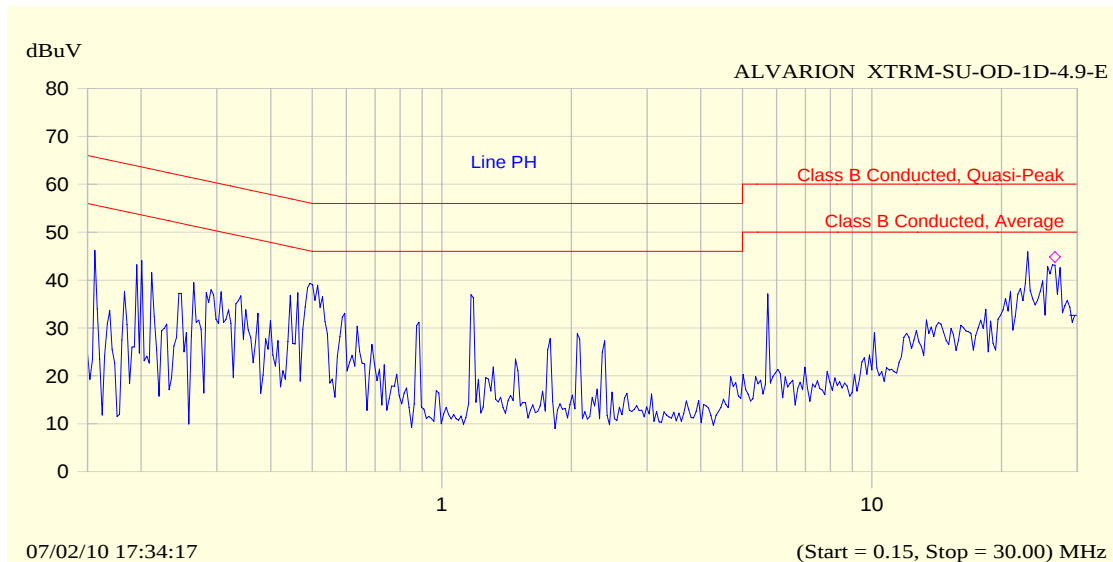
Test report N: 9012315196

Page 48 of 58

Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

FCC ID: LKT-EXTR-CPE-49



Plot # 145. Conducted emissions test. Line Phase .

Frequency MHz	Peak dB μ V	QP dB μ V	QP Limit dB	Margin dB	Avg dB μ V	Avg limit dB	Margin dB
0.297	42.2	39.4	60.3	-20.9	34.8	50.3	-15.5
0.462	40.9	39.7	56.7	-16.9	25.9	46.7	-20.8
1.194	38.3	37.6	56.0	-18.4	35.6	46.0	-10.4
2.092	31.8	30.6	56.0	-25.4	28.5	46.0	-17.5
23.128	46.5	45.9	60.0	-14.1	42.6	50.0	-7.4
26.608	44.8	44.3	60.0	-15.7	41.6	50.0	-8.4

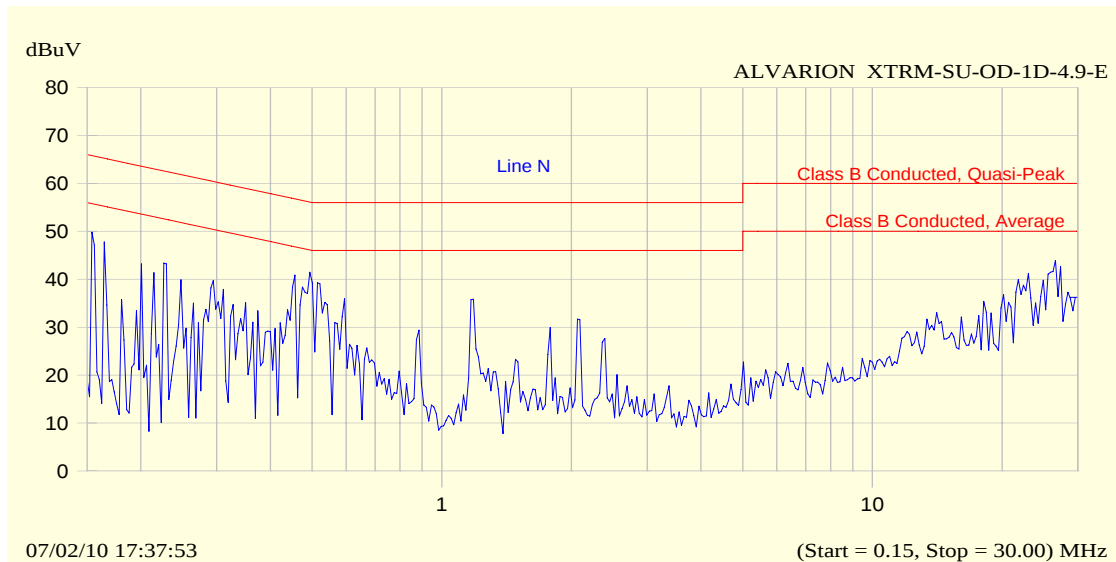
Test report N: 9012315196

Page 49 of 58

Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

FCC ID: LKT-EXTR-CPE-49



Plot # 146. Conducted emissions test. Line Neutral .

Frequency MHz	Peak dB μ V	QP dB μ V	QP Limit dB	Margin dB	Avg dB μ V	Avg limit dB	Margin dB
0.297	42.7	40.2	60.3	-20.1	35.5	50.3	-14.9
0.462	42.2	40.4	56.7	-16.2	29.5	46.7	-17.2
1.194	39.1	38.3	56.0	-17.7	36.2	46.0	-9.8
2.092	32.7	31.6	56.0	-24.4	29.7	46.0	-16.3
23.128	46.0	45.3	60.0	-14.7	41.9	50.0	-8.1
26.608	45.2	44.1	60.0	-15.9	41.4	50.0	-8.6

Test report N: 9012315196

Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

Page 50 of 58

FCC ID: LKT-EXTR-CPE-49

9. APPENDIX A

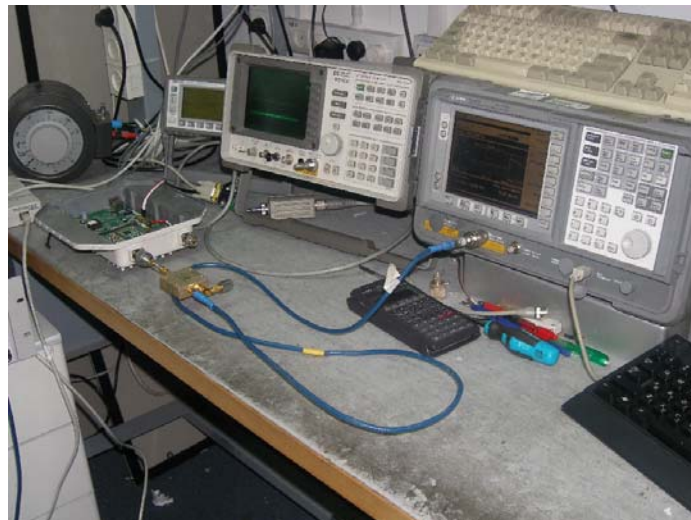


Photo #1. RF conducted emissions test setup.

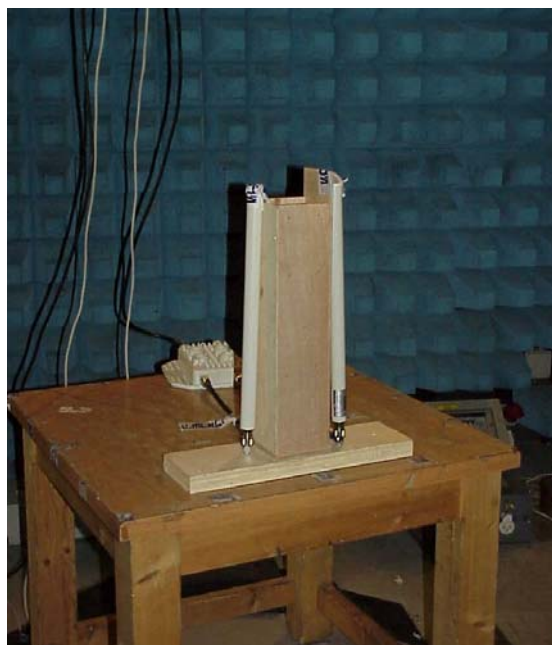


Photo #2. Test setup in anechoic chamber. Antenna Omni.

Test report N: 9012315196

Page 51 of 58

Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

FCC ID: LKT-EXTR-CPE-49



Photo #3. Test setup in anechoic chamber. Antenna Flat panel.



Photo #4. Test setup in anechoic chamber with parabolic antenna.

**Test report N: 9012315196****Page 52 of 58****Title: BreezeMax Extreme CPE 5.x****Model: XTRM-SU-OD-1D-4.9-2-E****FCC ID: LKT-EXTR-CPE-49****APPENDIX B**

The test equipment has been calibrated according to its recommended procedures and it is within the manufacturer's published limit of error.

The laboratory calibrates its standards by a third party (traceable to NIST, USA) on a regular basis according to the equipment manufacturer requirements.

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 set (2,3,10,20 dB) DC - 18 GHz	M/A-COM	2082	1650	Aug 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	October 2010
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	Spectrum analyzer 10 KHz-26.5 GHz	HP	E7405A	SII 4944	April 2010
10	EMI Receiver 9 kHz-6.5 GHz	HP	8546A+85460A	SII 4068	April 2010
11	Spectrum analyzer 20 Hz - 13.6 GHz	Ajilent	MXA 9020A	MY48010501	June 2010
12	LISN 9 kHz – 30 MHz	FCC	LISN 250-32-4-16	SII5023	October 2010
13	Transient limiter 0.009-200 MHz	HP	11947A	3107105	October 2010
14	Cable RF 4m	Huber-Suhner	Sucoflex 104PE	21329/4PE	October 2010
15	Cable RF 0.5m	Huber-Suhner	Multiflex 141	520201	October 2010
16	Active Loop antenna 10 kHz – 30 MHz	EMCO	6502	SII 4874	October 2010

**Test report N: 9012315196****Page 53 of 58****Title: BreezeMax Extreme CPE 5.x****Model: XTRM-SU-OD-1D-4.9-2-E****FCC ID: LKT-EXTR-CPE-49****Measurement uncertainty**

Were relevant, the following measurement uncertainty level have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Test description	Expanded uncertainty
<u>Radiated emissions</u> in the open field test site at 3 m measuring distance: 30 MHz – 1.0 GHz 1.0 GHz – 18 GHz	 2 Uc (E) = ± 4.32 dB 2 Uc (E) = ± 4.47 dB

**Test report N: 9012315196****Page 54 of 58****Title: BreezeMax Extreme CPE 5.x****Model: XTRM-SU-OD-1D-4.9-2-E****FCC ID: LKT-EXTR-CPE-49****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 N: 9012315196

Page 55 of 58

Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

FCC ID: LKT-EXTR-CPE-49

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 N: 9012315196

Page 56 of 58

Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

FCC ID: LKT-EXTR-CPE-49

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; 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 N: 9012315196

Page 57 of 58

Title: BreezeMax Extreme CPE 5.x

Model: XTRM-SU-OD-1D-4.9-2-E

FCC ID: LKT-EXTR-CPE-49

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 N: 9012315196****Page 58 of 58****Title: BreezeMax Extreme CPE 5.x****Model: XTRM-SU-OD-1D-4.9-2-E****FCC ID: LKT-EXTR-CPE-49**

10. APPENDIX C

Abbreviations and acronyms

The following abbreviations and acronyms are applicable to this test report:

AC	alternating current
cm	centimeter
dB	decibel
dBm	decibel referred to one milliwatt
dB(μ V)	decibel referred to one microvolt
dB(μ V/m)	decibel referred to one microvolt per meter
EMC	electromagnetic compatibility
EUT	equipment under test
GHz	gigahertz
H	height
Hz	hertz
kHz	kilohertz
L	length
LNA	low noise amplifier
m	meter
Mbps	megabit per second
MHz	megahertz
NA	not applicable
OFDM	Orthogonal Frequency Division Multiple Access
PRBS	pseudo random binary sequence
QP	quasi-peak
RF	radio frequency
RE	radiated emission
rms	root mean square
W	width

Specification references

47 CFR part 15: 2009

Radio Frequency Devices.

ANSI C63.2: 1996

American National Standard for Instrumentation
Electromagnetic Noise and Field Strength, 10 kHz to 40
GHz Specifications.

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