



**Test Report No. 9012332795**

**Applicant: ALVARION Ltd.**

**Equipment Under Test:**

**BreezeMAX 4 Motion Broadband Wireless  
Access System**

**Base station.**

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



**AClass Accreditation Services**

**Certificate Number: AT-1359**



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**Title: BreezeMax 4Motion Broadband Wireless Access System**

**Model: ODU-2305-2360-000N-38-2x2-Y-0**

**FCC ID: LKT-BMAX-2-23**

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## 1. Applicant information

<b>Applicant:</b>	Alvarion Ltd
<b>Address:</b>	21A Habarzel str, Tel-Aviv, 69710, Israel
<b>Sample for test selected by:</b>	The customer
<b>The date of test:</b>	20 - 27 June 5 July 2010

### Equipment under test information

<b>Description of Equipment Under Test (EUT):</b>	Transmitter BreezeMAX 2300
<b>Model:</b>	ODU-2305-2360-000N-38-2x2-Y-0
<b>Serial Number:</b>	NA
<b>Manufactured by:</b>	Alvarion Ltd

## 2. Test performance

<b>Location:</b>	SII EMC Section
<b>Purpose of test:</b>	Apparatus compliance verification in accordance with emission requirements
<b>Test specifications:</b>	47CFR part 15, part 27, part 2 §§ 2.1049, 2.1053, part 1 §1.1310

This Test Report contains 44 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.
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**3. Summary of test:**

**The EUT was found to be in compliance with requirements of: 47CFR part 27, §§ 27.50, 27.53, 27.54 and part 2 §§ 2.1049**

Transmitter characteristics	Subclasses
Transmitter characteristics	
Occupied bandwidth	2.1049
Peak output power	27.50
Spurious emissions at antenna terminal	27.53
Spurious emissions radiated	27.53
Frequency stability	27.54

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

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 expended uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Test description	Expanded uncertainty
<b><u>Radiated emissions</u></b> 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



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#### 4. Equipment under test description.

\*The customer provided description.

##### 4.1 General description

BreezeMax 4M 2.3 GHz is digital modulated TDD system.

The frequency range of the BMAX 4M 2.3 GHz is 2300 MHz up to 2400 MHz

Nominal output power is 38 dBm at transmitter antenna connector.

The system contains a base station unit and a subscriber unit.

The basic system configuration is a two-box configuration that contains:

1. Indoor unit that contains the IF unit, digital card, power supply and modem.
2. Outdoor unit contain the radio and digital control section unit.

The following describes the transmit path and receive path of the BMAX 4M 2300 MHz AU ODU Basic + HPA (for 2x2 ODU configuration).

The outdoor unit (ODU) is a high-power, multi-carrier radio unit that connects to one or more external antennas. The ODU is designed to provide high system gain and interference robustness utilizing high transmit power and low noise figure. It is HW-ready for supporting a bandwidth of up to 20 MHz, enabling future options. Such as increased capacity through the use of a multiplexer or wider frequency channels

##### EUT technical characteristics

Technical characteristics of transmitter.		Note
Stand-alone/fixed use	Always at distance at least 2 m from the people and public area.	
Assigned frequency range	2305 – 2320 MHz and 2345 – 2360 MHz	
Declare frequency range	2305 – 2315 MHz	
	2350 – 2360 MHz	
Operating frequencies	2307.5 - 2312.5; 2352.5 - 2357.5 MHz	
	2310 and 2355 MHz	
Antenna connection	N-Type connector	
Transmitter 99% power bandwidth	5 MHz, 10 MHz	
Type of modulation	BPSK, 4QAM, 16QAM, 64QAM	
Type of multiplexing	OFDM	
Modulating test signal (baseband)	PRBS	
Maximum transmitter duty cycle in normal use	60 %	
Transmitter duty cycle supplied for test	60 %	
Antenna information		
Type	Manufacturer	Model
Remote Tilt Panel	Argus Technologies	LPX310RT
		Gain
		18 dBi

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**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/cm<sup>2</sup>) or 10 (W/m<sup>2</sup>).

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

Where

Pt - The transmitted power (EIRP) (mW)

r - The distance from the unit. (cm)

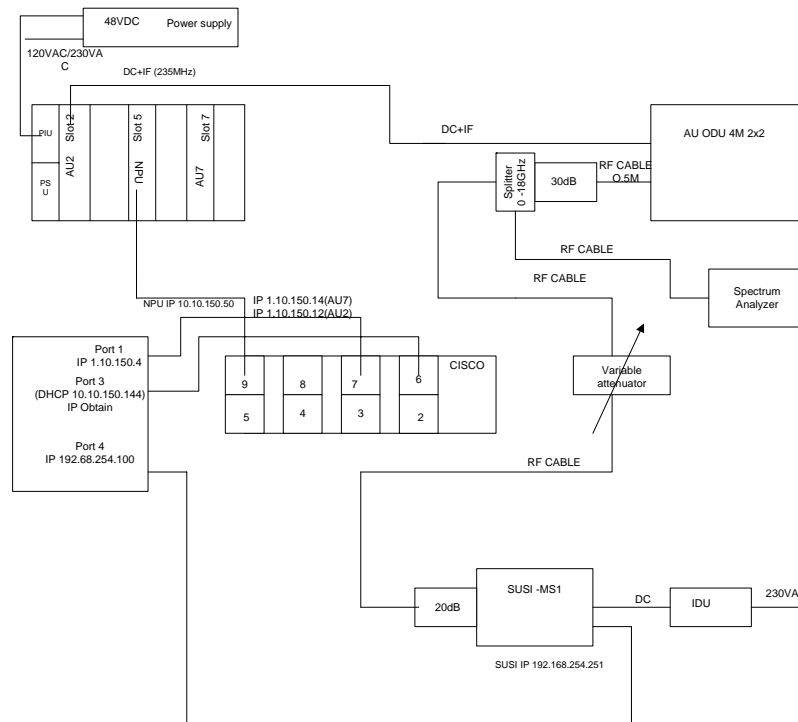
The 1(mW/cm<sup>2</sup>) limit can be calculated from the above based on the following data:

Pt- the transmitted power which is equal to the maximum EIRP = 55.6 dBm = 363078 mW

Minimum allowed distance r from the antenna were FCC RF exposure limit may not be exceeded =  $SQRT(363078/4\pi) > 1.7$  m.

**4.2 EUT configuration.**

**Setup to BMAX-4M 2x2 2x**



**Fig. 1. BMAX-AU-ODU-4M-2x2-2.3 setup configuration.**





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5. Test results

5.1 Transmitter characteristics

5.1.1 Occupied bandwidth according to § 2.1049.

Method of measurement                      ANSI 63.4 §13.1.7  
 Operating Frequency Range                2307.5 – 2312.5 MHz, 2352.5 – 2357.5 MHz  
 Ambient Temperature 21<sup>0</sup> C                Relative Humidity            47%            Air Pressure            1006 hPa

EBW, MHz	Carrier frequency, MHz	99% power emission bandwidth MHz	Reference to plot #
5.0	2307.5	4.61	1
	2312.5	4.62	2
	2352.5	4.62	3
	2357.5	4.61	4
10	2310	9.21	5
	2355	9.20	6

TEST PROCEDURE

The measurements were performed in normal (transmitting) mode at all transmitted carrier (channel) frequencies of the 2307.5 – 2312.5 MHz and 2352.5 – 2357.5 MHz frequency ranges under maximum data transfer bit rate. The EUT RF output was connected to the Spectrum Analyzer through appropriate attenuator and accounted with cable loss in SA settings.

TEST EQUIPMENT USED:

2	3	4	5			
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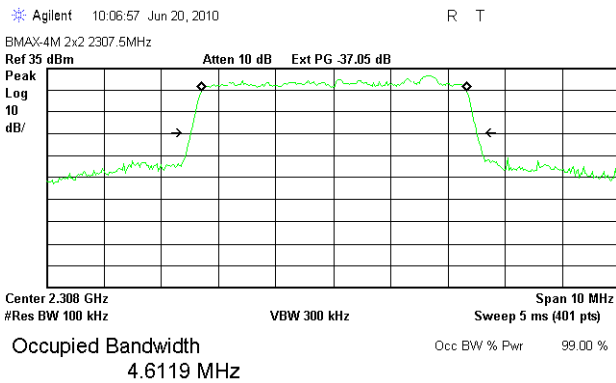
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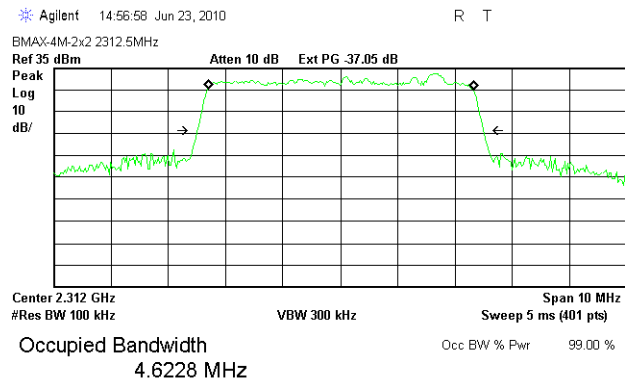
FCC ID: LKT-BMAX-2-23

Occupied bandwidth test.

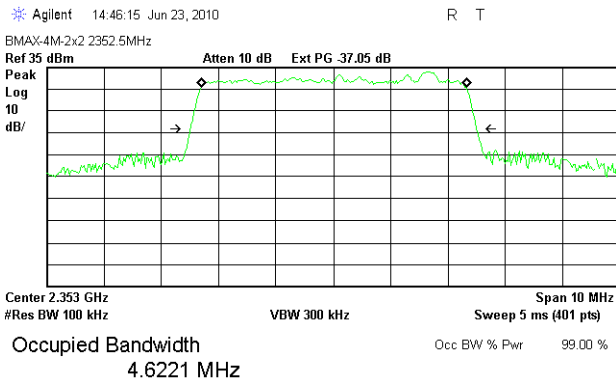
5 MHz EBW option, 99% bandwidth



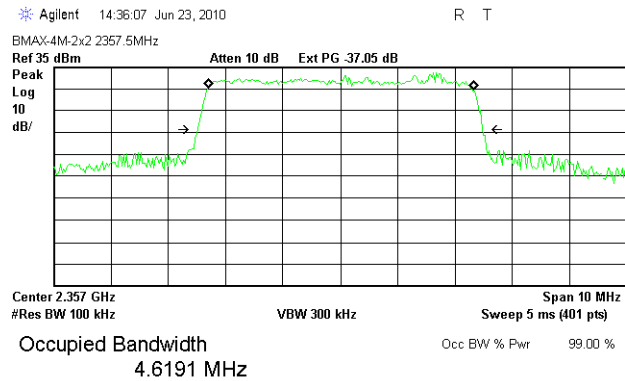
Plot # 1



Plot # 2



Plot # 3



Plot # 4

Insertion loss of external attenuator, power splitter and cable = 37.1 dB.





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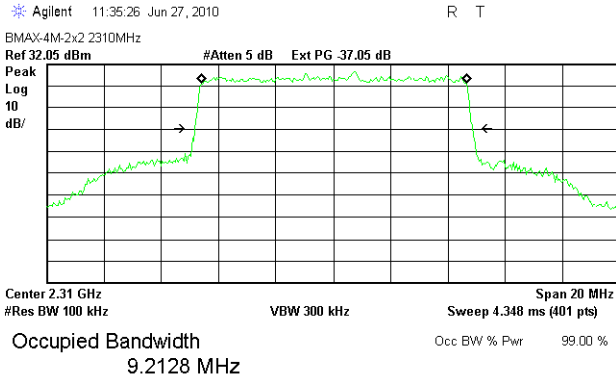
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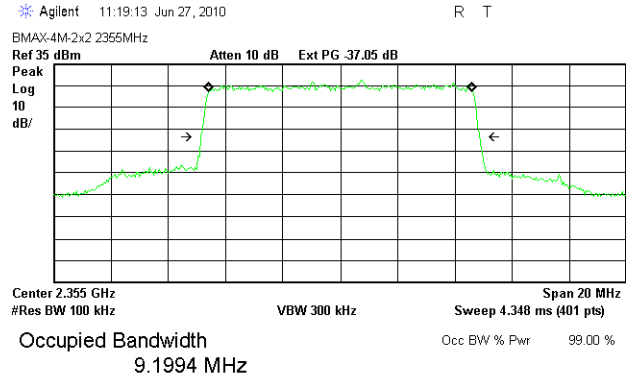
Model: ODU-2305-2360-000N-38-2x2-Y-0

FCC ID: LKT-BMAX-2-23

10 MHz EBW option, 99% bandwidth



Plot # 5



Plot # 6



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**5.1.2 Peak output power test § 27.50 (h)(1)(ii)**

Operating Frequency Range 2307.5 – 2312.5 MHz, 2352.5 – 2357.5 MHz  
 Ambient Temperature 21° C Relative Humidity 47% Air Pressure 1006 hPa

EBW, MHz	Carrier frequency, MHz	Measured peak power, dBm	*EIRP dBm	Calculated limit, dBm	Margin, dB	Reference to plots #
5.0	2307.5	37.0	55.0	69.6	14.6	7
	2312.5	37.5	55.5	69.6	14.1	8
	2352.5	37.5	55.5	69.6	14.1	9
	2357.5	36.3	54.3	69.6	15.3	10
10	2310	37.6	55.6	72.6	17.0	11
	2355	37.1	55.1	72.6	17.5	12

\*The EIRP = Peak power + Antenna gain (18 dBi)

The following power limits apply to the 2305 – 2320 MHz and 2345 – 2360 MHz bands:

The maximum EIRP in dBW in a given direction shall be determined by the following formula:

$EIRP = 33 \text{ dBW} + 10 \log (X/Y) \text{ dBW} + 10 \log (360/\text{beamwidth}) \text{ dBW}$ , where X is the actual channel width in MHz, Y is 6 MHz.

For 5 MHz channel spacing  $EIRP = 33 \text{ dBW} + 10 \log (5/6) + 10 \log (360/65^\circ) = 69.6 \text{ dBm}$ .

For 10 MHz channel spacing  $EIRP = 33 \text{ dBW} + 10 \log (10/6) \text{ dBW} + 10 \log (360/65^\circ) = 72.6 \text{ dBm}$ .

**TEST PROCEDURE**

Calculation of measured output power with external antenna was performed as follow:

Plot result + Ant. gain. The measurements were performed in normal (transmitting) mode at all transmitted carrier (channel) frequencies of the 2307.5 – 2312.5 MHz, 2352.5 – 2357.5 MHz frequency ranges under maximum data transfer bit rate. The EUT RF output was connected to the Spectrum Analyzer through appropriate attenuator and accounted with cable loss in SA settings.

**TEST EQUIPMENT USED:**

2	3	4	5			
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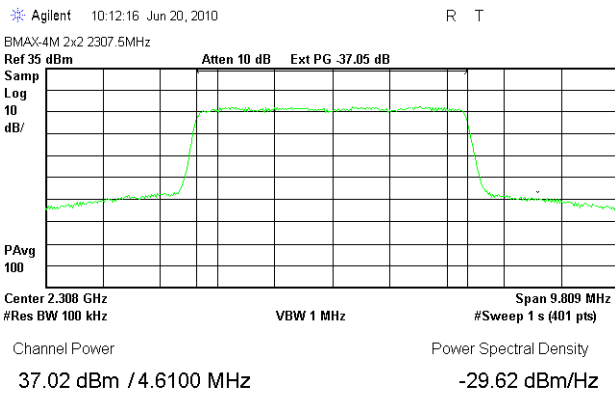
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Model: ODU-2305-2360-000N-38-2x2-Y-0

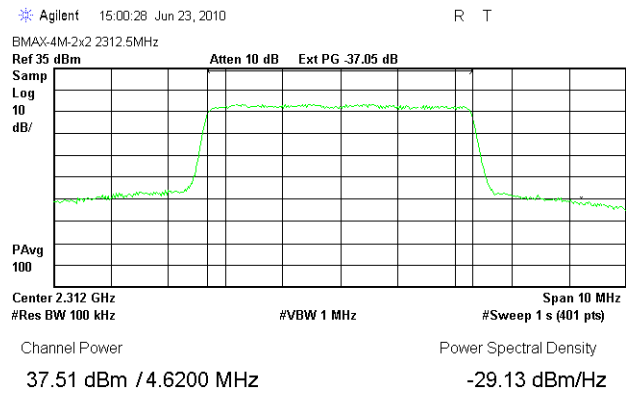
FCC ID: LKT-BMAX-2-23

Output power test results.

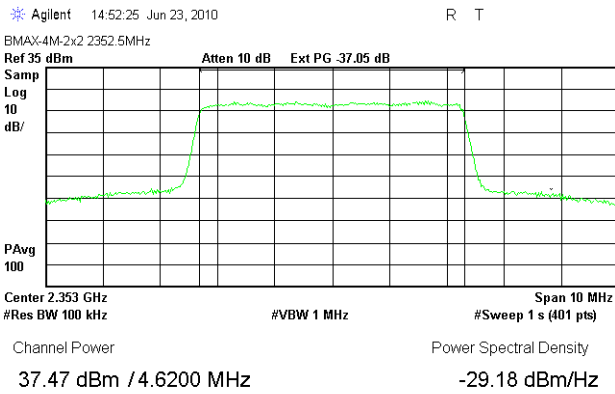
5 MHz EBW option.



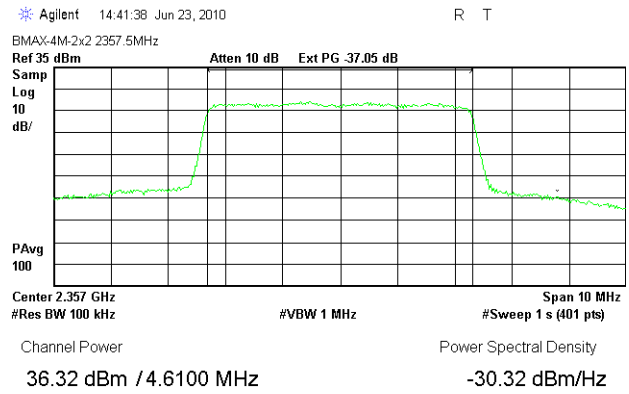
Plot # 7



Plot # 8



Plot # 9



Plot # 10

Insertion loss of external attenuator, power splitter and cable = 37.1 dB.



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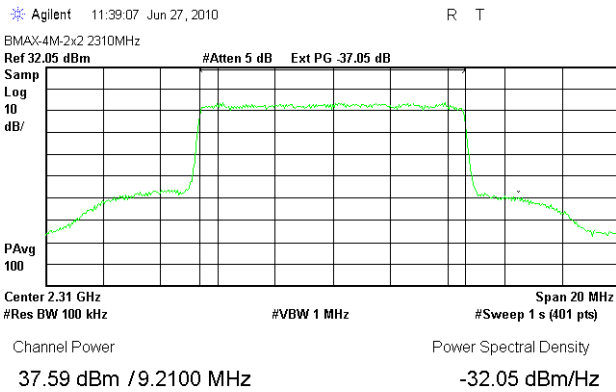
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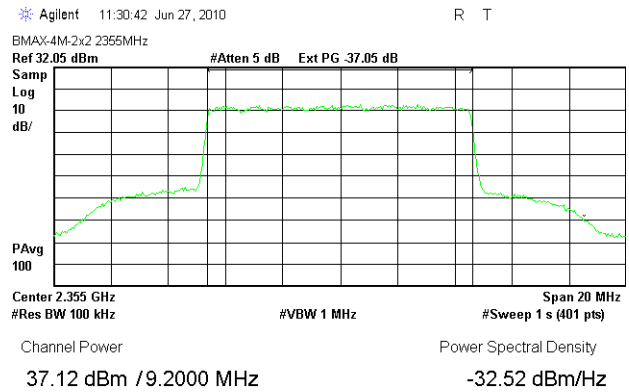
**Model: ODU-2305-2360-000N-38-2x2-Y-0**

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10 MHz EBW option.



Plot # 11



Plot # 12



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### 5.1.3 Spurious emissions at antenna terminal § 27.53

Operating Frequency Range      2307.5 – 2312.5 MHz, 2352.5 – 2357.5 MHz  
 Ambient Temperature      21<sup>0</sup> C      Relative Humidity      47%      Air Pressure      1006 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. No emissions except at band-edge points were found. The undesired emission more than 20 dB lower than the specified limit was not recorded in the tables.

The worse case results were found:

EBW, MHz	Carrier frequency, MHz	Measured frequency, MHz	Measured level, dBm	Specified limit, dBm	Margin, dB	Reference to plot #
5.0	2307.5	2305	-14.3	-13.0	1.3	15
		2310	-13.8	-13.0	0.8	17
		2322	-54.6	-50.0	4.6	18
	2312.5	2310	-14.7	-13.0	1.7	24
		2315	-14.7	-13.0	1.7	26
		2320	-51.4	-50.0	1.4	28
	2352.5	2345	-51.2	-50.0	1.2	35
		2350	-14.0	-13.0	1.0	37
		2355	-14.0	-13.0	1.0	39
	2357.5	2344.9	-52.5	-50.0	2.5	44
		2355	-16.6	-13.0	3.6	45
		2360	-14.2	-13.0	1.2	47
10.0	2310	2305	-15.6	-13.0	1.6	52
		2315	-17.7	-13.0	4.7	54
		2320	-51.0	-50.0	1.0	56
	2355	2345	-51.8	-50.0	1.8	62
		2350	-15.8	-13.0	2.8	64
		2360	-18.1	-13.0	5.1	66



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**LIMIT**

For operation in the bands 2305 –2320 MHz and 2345 – 2360 MHz, the power of any emissions outside the licensee’s frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by the following amounts:

Below 2300 MHz and above 2370 MHz by factor not less then  $70+10\log(P)$  dB = -40 dBm.

On all frequencies from 2300 to 2320 MHz and from 2345 to 2370 MHz by factor not less then  $43+10\log(P)$  dB = -13 dBm.

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

**TEST PROCEDURE**

The measurements were performed in normal (transmitting) mode at all transmitted carrier (channel) frequencies of the 2307.5 – 2312.5 MHz and 2352.5 – 2357.5 MHz frequency ranges under maximum data transfer bit rate. The EUT RF output was connected to the Spectrum Analyzer through appropriate attenuator and accounted with cable loss in SA settings.

**TEST EQUIPMENT USED:**

1	3	5	9			
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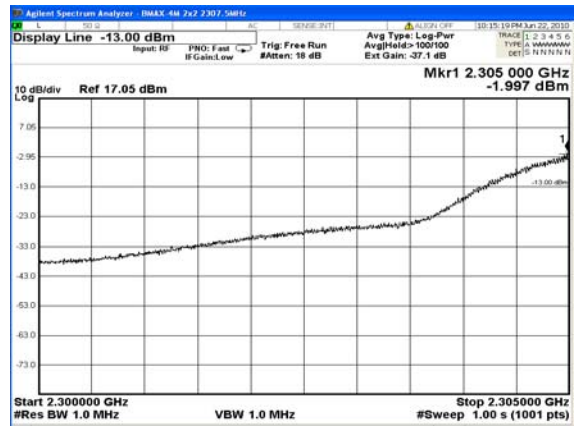
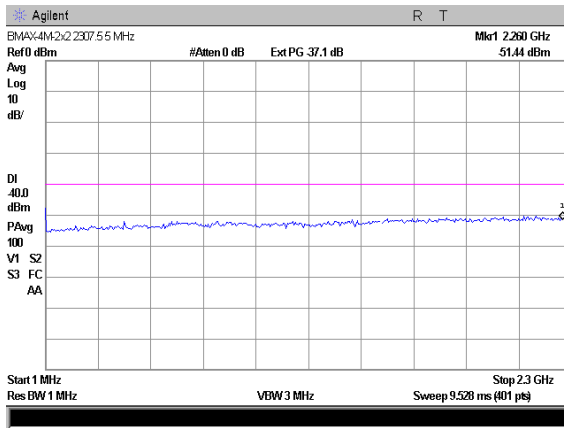
Title: BreezeMax 4Motion Broadband Wireless Access System

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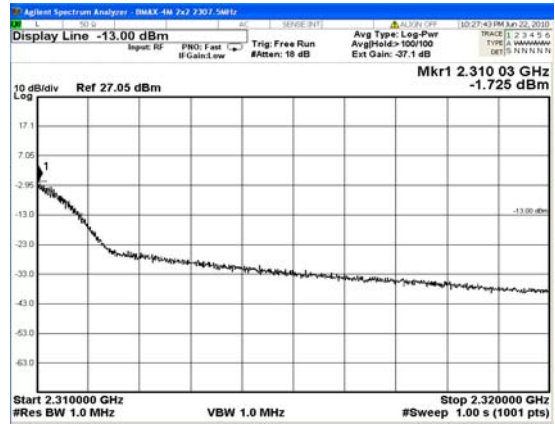
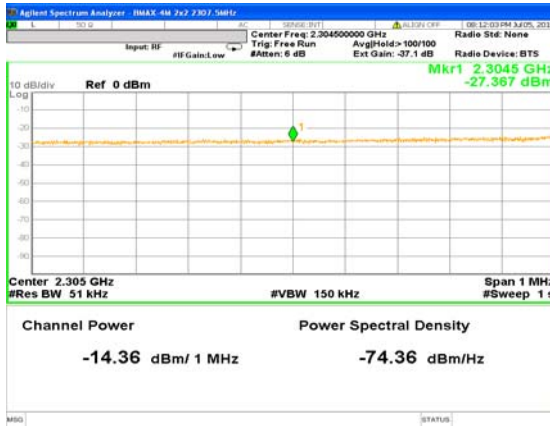
Spurious emissions at antenna terminal.

Carrier frequency 2307.5 MHz.



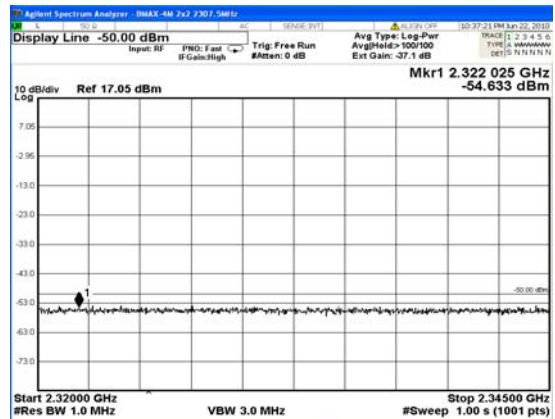
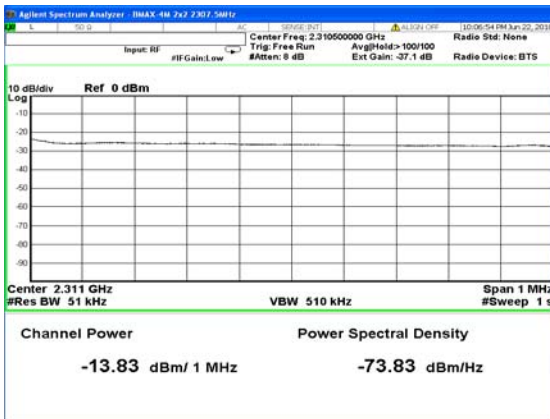
Plot # 13

Plot # 14



Plot # 15.

Plot # 16



Plot # 17.

Plot # 18



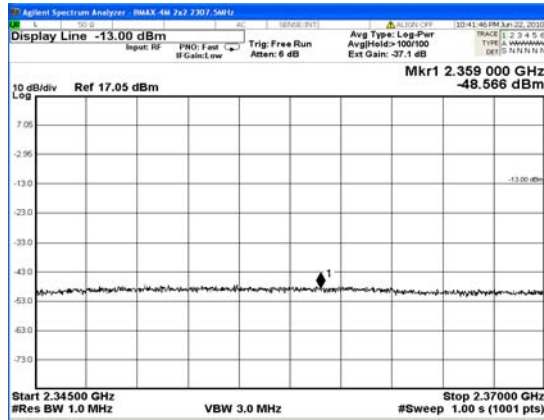
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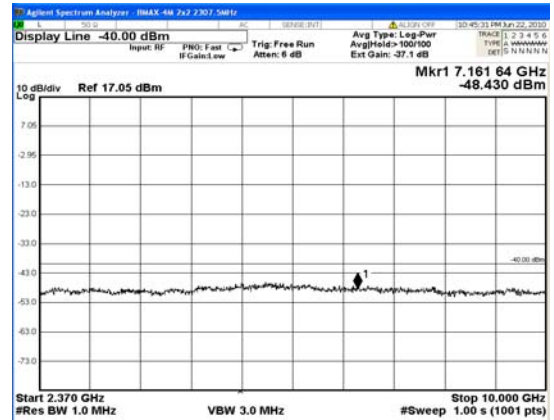
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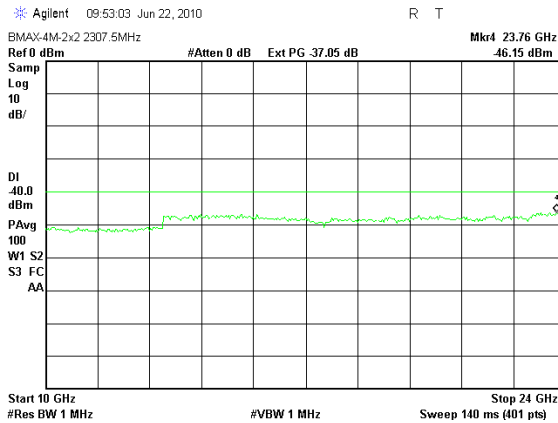
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Plot # 19



Plot # 20



Plot # 21.



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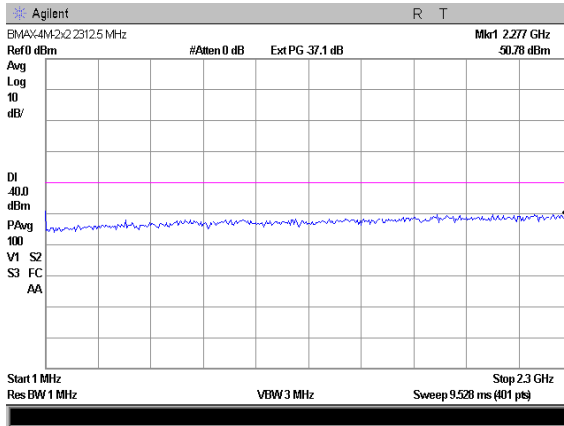
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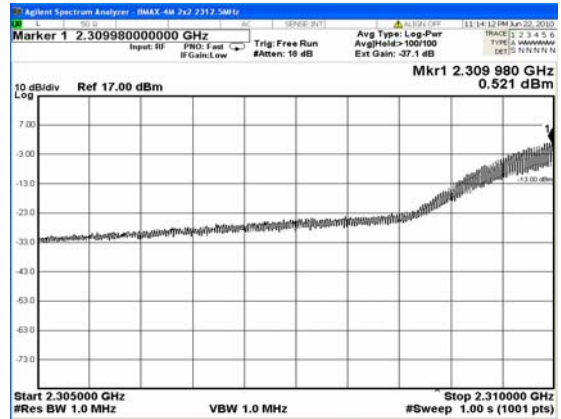
Model: ODU-2305-2360-000N-38-2x2-Y-0

FCC ID: LKT-BMAX-2-23

Carrier frequency 2312.5 MHz.



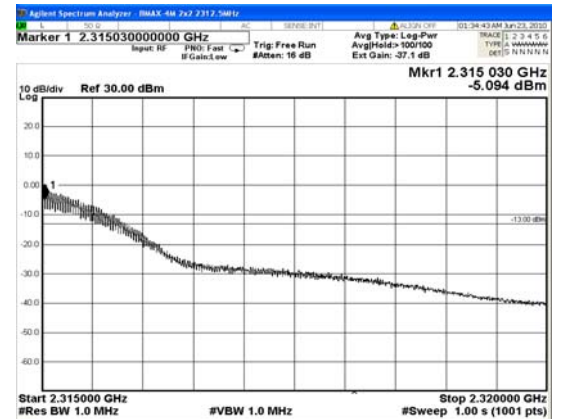
Plot # 22



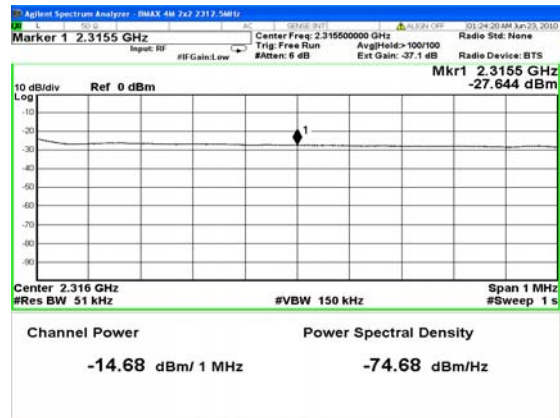
Plot # 23



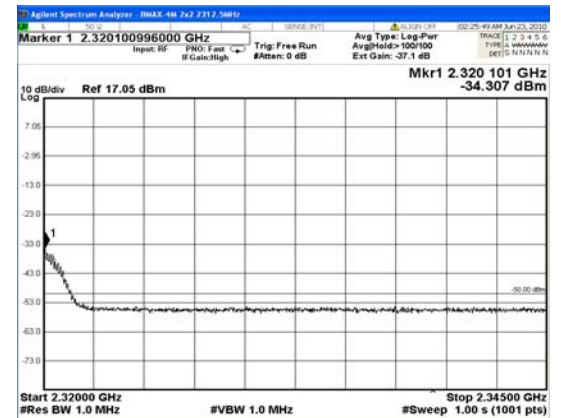
Plot # 24.



Plot # 25



Plot # 26.



Plot # 27



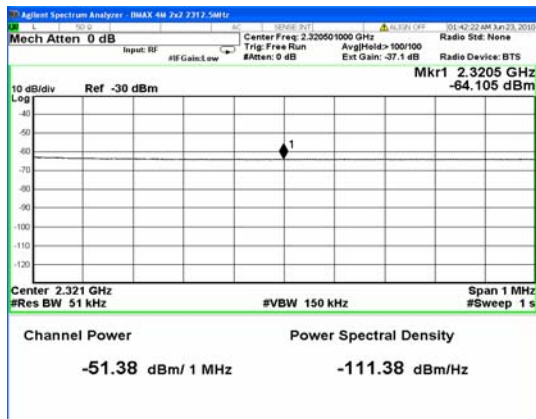
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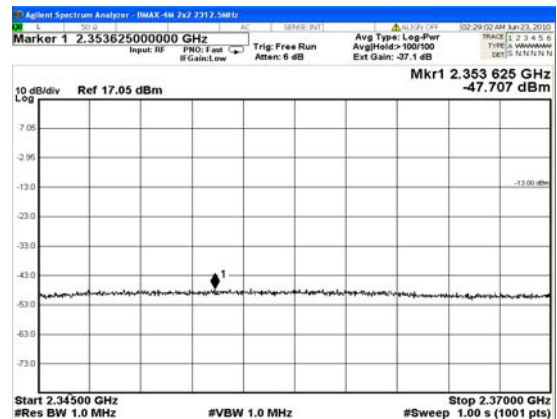
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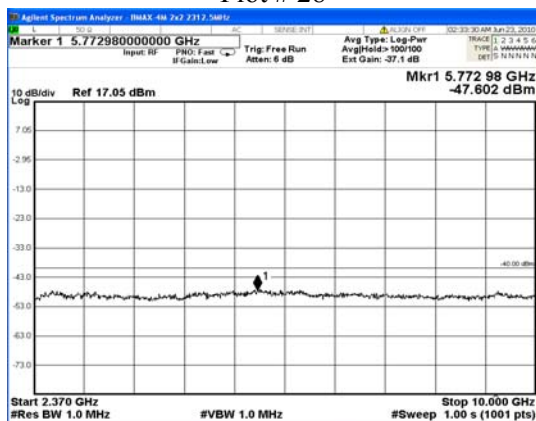
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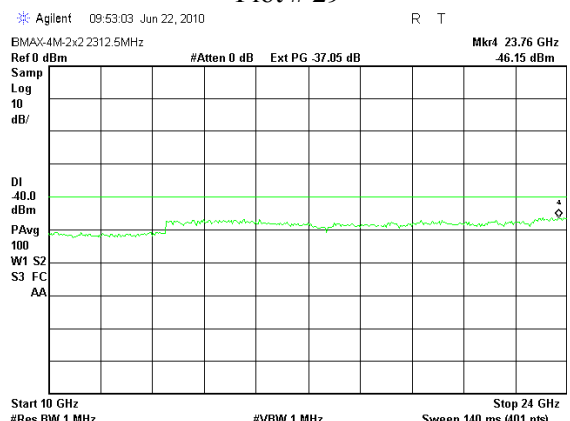
Plot # 28



Plot # 29



Plot # 30.



Plot # 31





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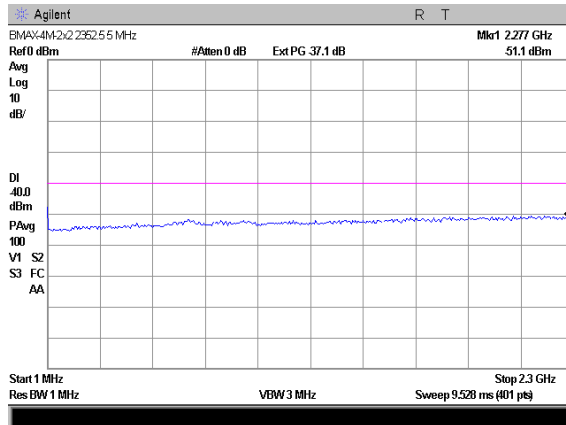
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Title: BreezeMax 4Motion Broadband Wireless Access System

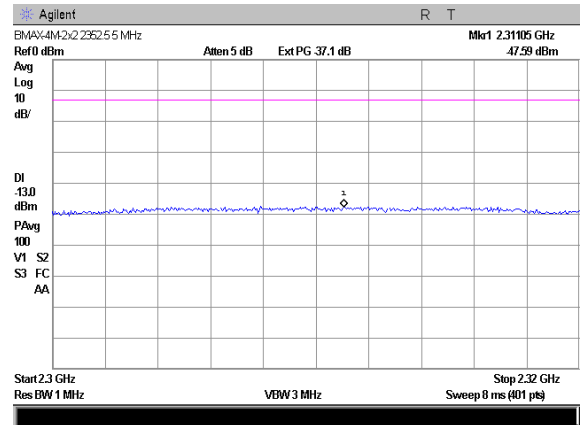
Model: ODU-2305-2360-000N-38-2x2-Y-0

FCC ID: LKT-BMAX-2-23

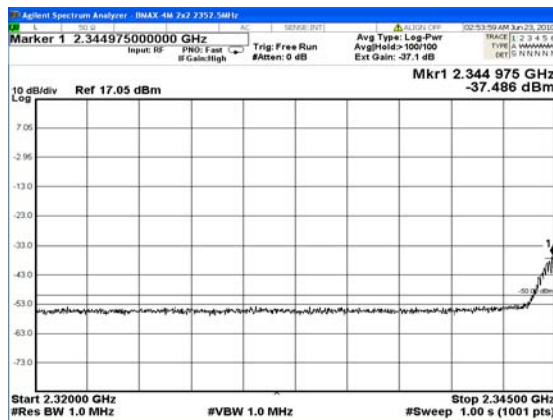
Carrier frequency 2352.5 MHz.



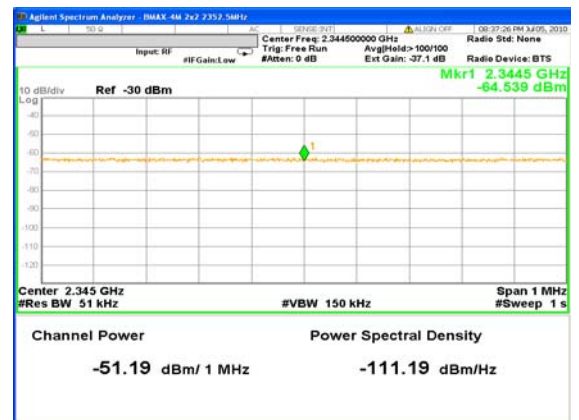
Plot # 32



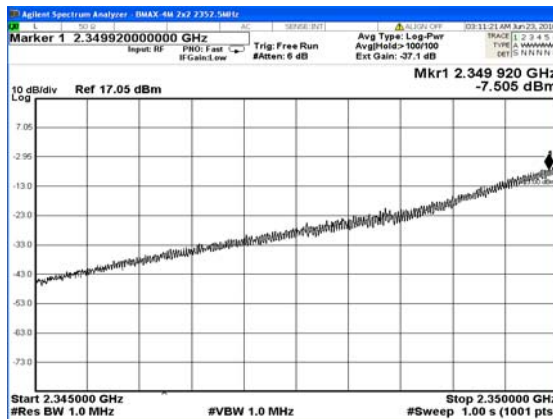
Plot # 33



Plot # 34.



Plot # 35



Plot # 36



Plot # 37



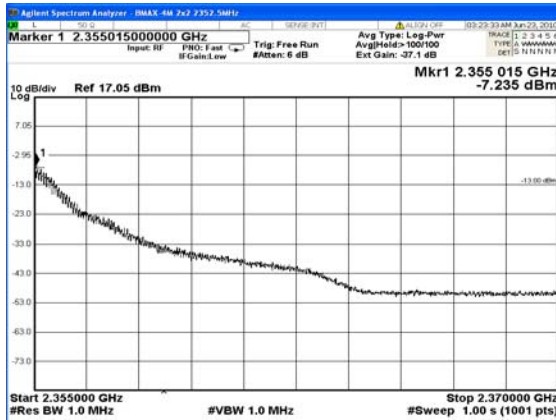
Test report No: 9012332795

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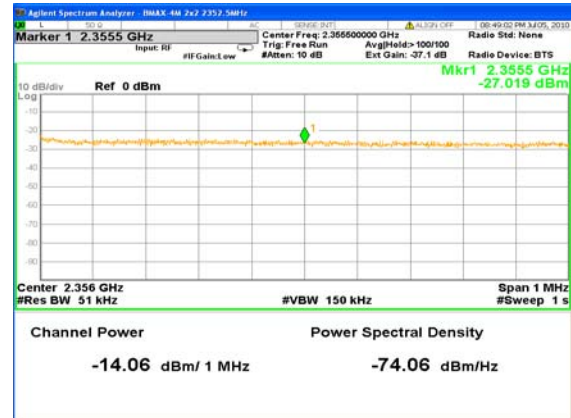
Title: BreezeMax 4Motion Broadband Wireless Access System

Model: ODU-2305-2360-000N-38-2x2-Y-0

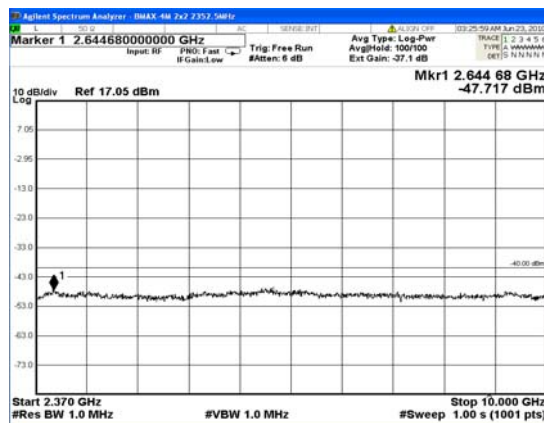
FCC ID: LKT-BMAX-2-23



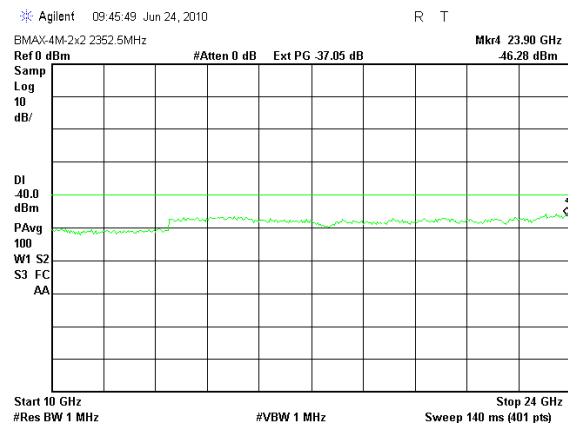
Plot # 38.



Plot # 39



Plot # 40



Plot # 41





Test report No: 9012332795

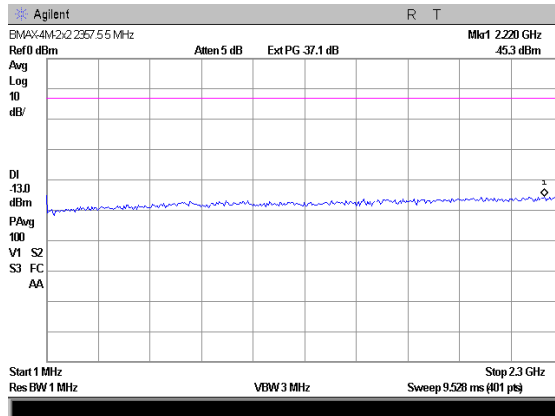
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Title: BreezeMax 4Motion Broadband Wireless Access System

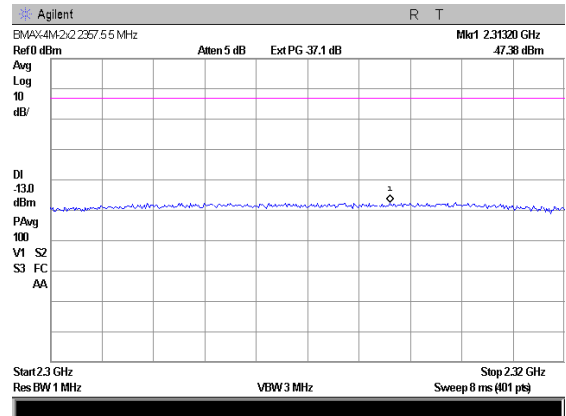
Model: ODU-2305-2360-000N-38-2x2-Y-0

FCC ID: LKT-BMAX-2-23

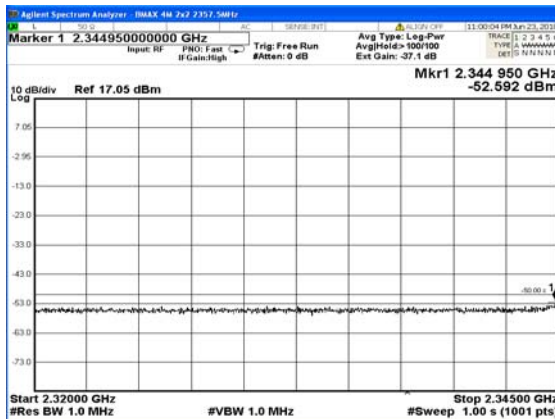
Carrier frequency 2357.5 MHz.



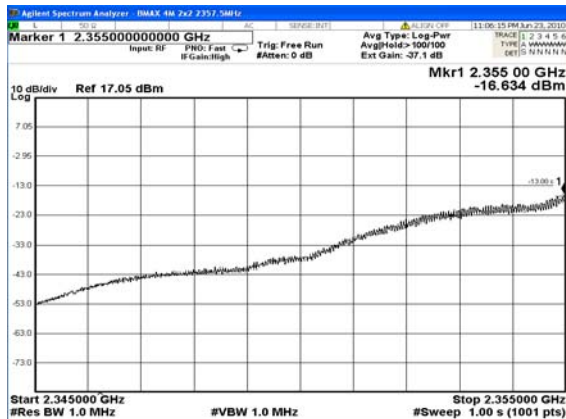
Plot # 42



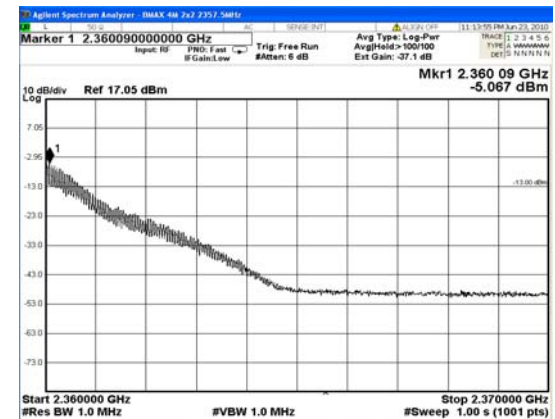
Plot # 43



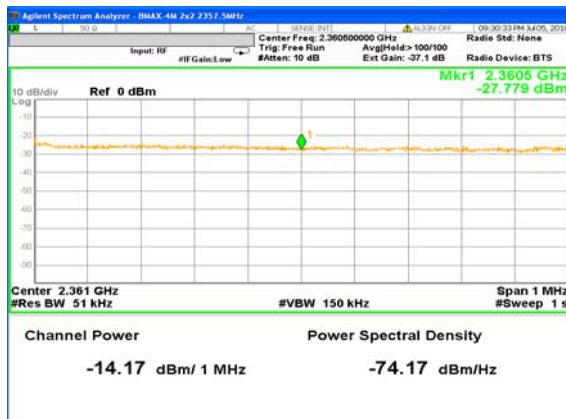
Plot # 44.



Plot # 45



Plot # 46



Plot # 47



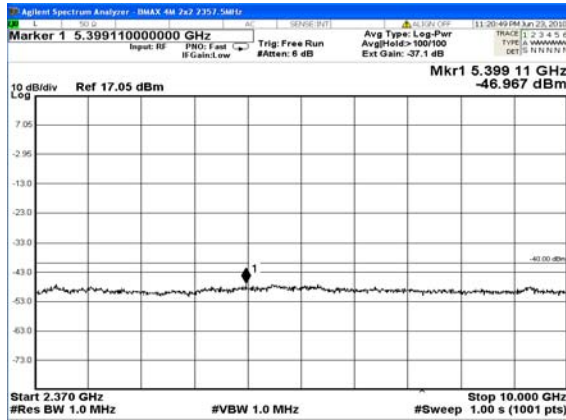
Test report No: 9012332795

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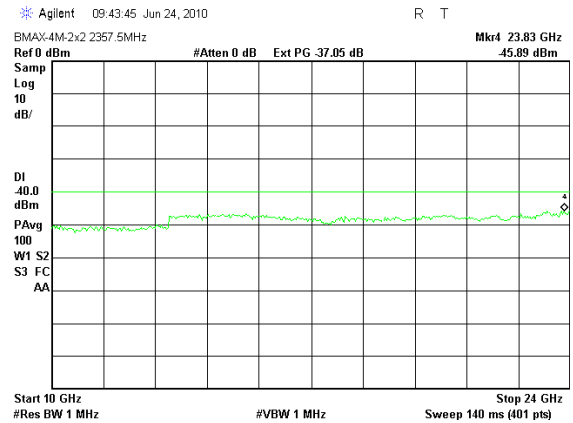
Title: Breeze 4Motion Broadband Wireless Access System

Model: ODU-2305-2360-000N-38-2x2-Y-0

FCC ID: LKT-BMAX-2-23



Plot # 48



Plot # 49



Test report No: 9012332795

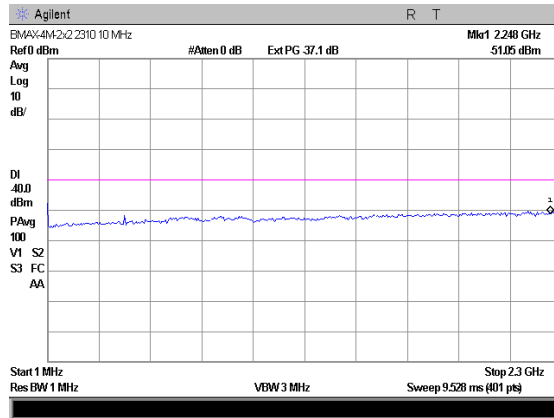
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Title: BreezeMax 4Motion Broadband Wireless Access System

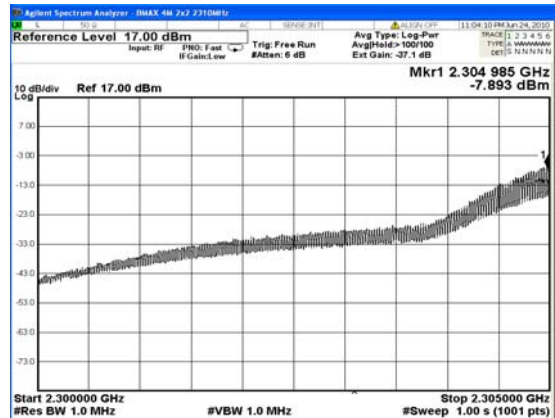
Model: ODU-2305-2360-000N-38-2x2-Y-0

FCC ID: LKT-BMAX-2-23

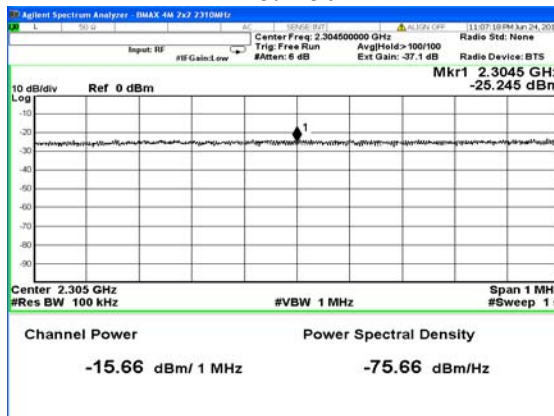
Carrier frequency 2310 MHz.



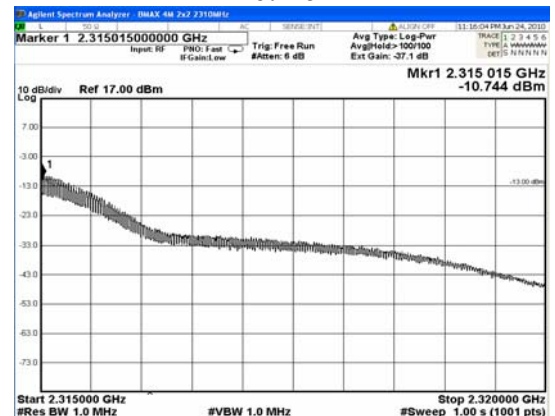
Plot # 50



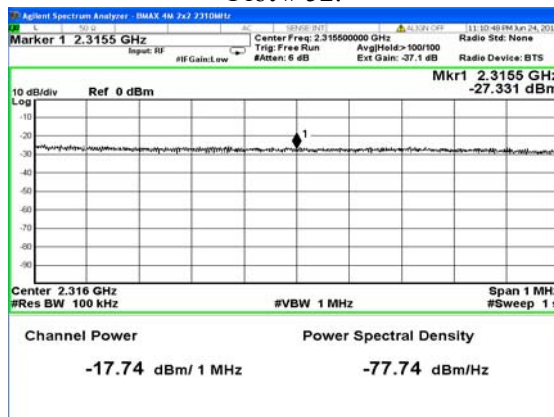
Plot # 51



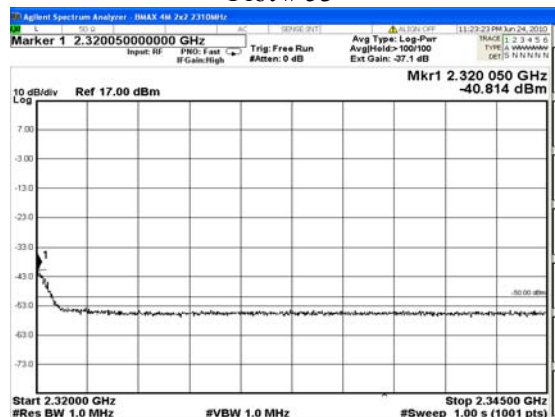
Plot # 52.



Plot # 53



Plot # 54



Plot # 55



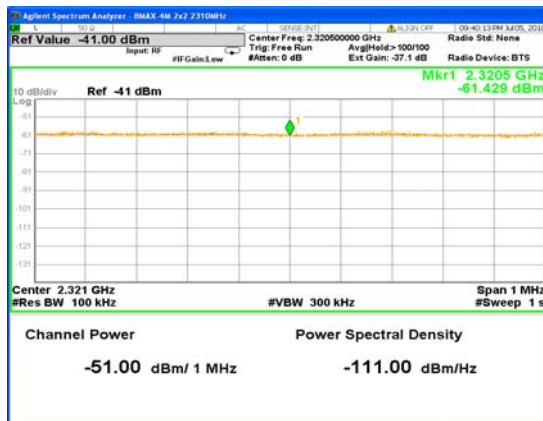
Test report No: 9012332795

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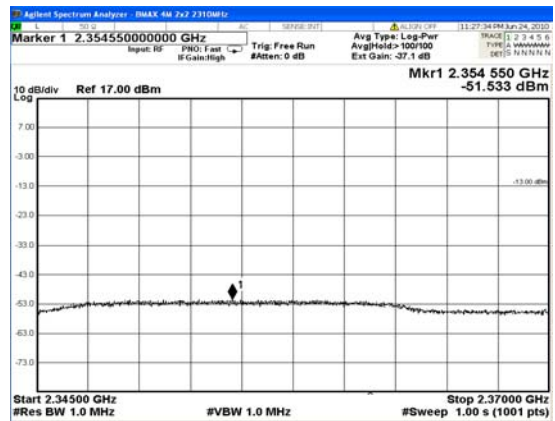
Title: BreezeMax 4Motion Broadband Wireless Access System

Model: ODU-2305-2360-000N-38-2x2-Y-0

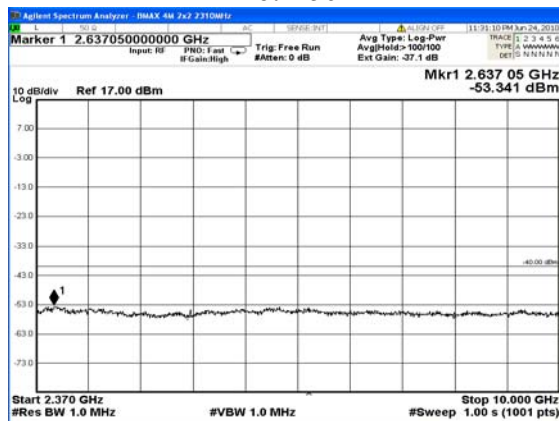
FCC ID: LKT-BMAX-2-23



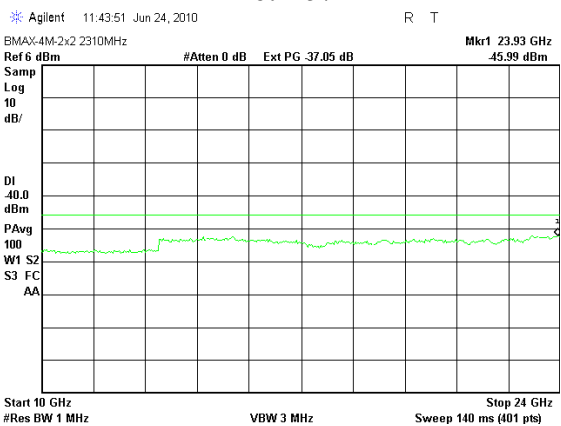
Plot # 56



Plot # 57



Plot # 58.



Plot # 59





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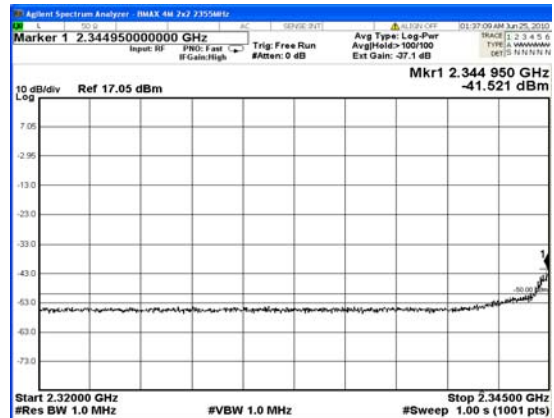
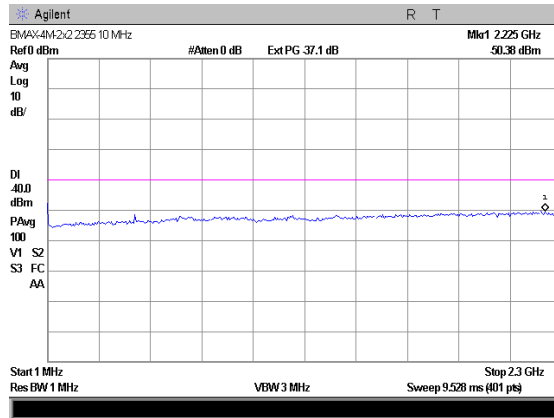
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Title: BreezeMax 4Motion Broadband Wireless Access System

Model: ODU-2305-2360-000N-38-2x2-Y-0

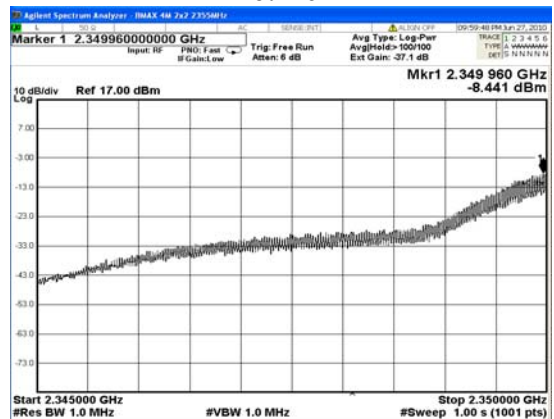
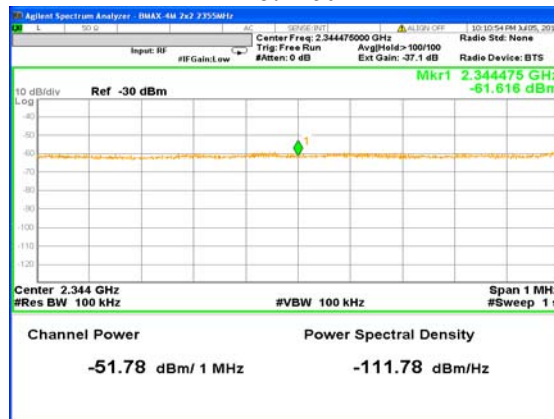
FCC ID: LKT-BMAX-2-23

Carrier frequency 2355 MHz.



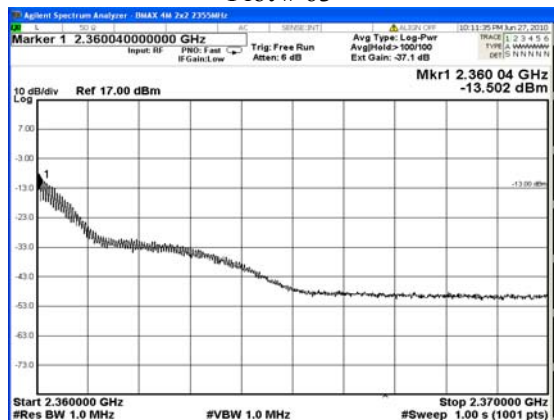
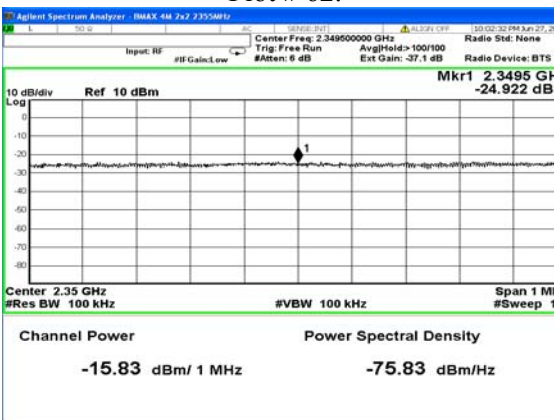
Plot # 60

Plot # 61



Plot # 62.

Plot # 63



Plot # 64

Plot # 65



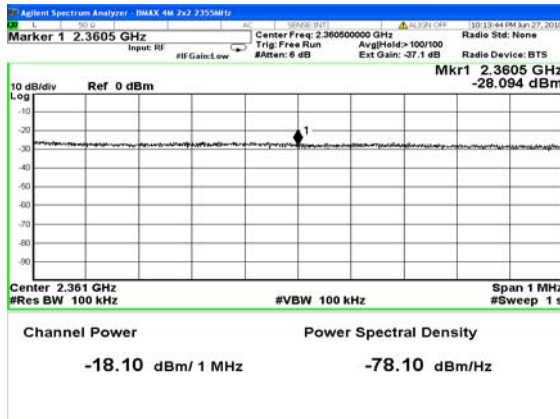
Test report No: 9012332795

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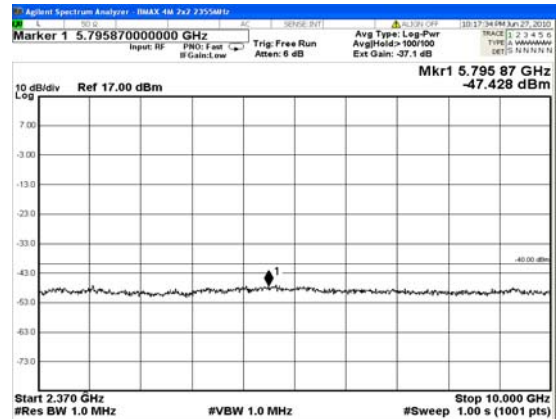
Title: BreezeMax 4Motion Broadband Wireless Access System

Model: ODU-2305-2360-000N-38-2x2-Y-0

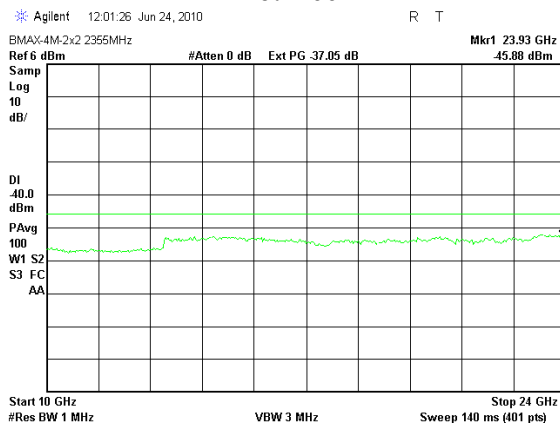
FCC ID: LKT-BMAX-2-23



Plot # 66



Plot # 67



Plot # 68.





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**Title: BreezeMax 4Motion Broadband Wireless Access System**

**Model: ODU-2305-2360-000N-38-2x2-Y-0**

**FCC ID: LKT-BMAX-2-23**

**5.1.4 Radiated emissions test according to §§ 2.1053, 27.53**

Operating Frequency Range      2307.5 – 2312.5 MHz, 2352.5 – 2357.5 MHz  
 Ambient Temperature    21° C      Relative Humidity      48%      Air Pressure      1006 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. No emissions except at band-edge points were found.

For the test results refer to the table and plots in this section.

EBW, MHz	Carrier frequency, MHz	Measured frequency, MHz	Measured level, dBm	Specified limit, dBm	Margin, dB	Reference to plot #
5.0	2307.5	2304.9	-30.8	-13.0	17.8	71
		2310.0	-31.3	-13.0	18.3	72
		2340.9	-62.8	-50.0	12.8	73
	2312.5	2310	-30.9	-13.0	17.9	79
		2315	-33.3	-13.0	20.3	80
		2336.7	-63.3	-50.0	13.3	81
	2352.5	2337.2	-63.3	-50.0	13.3	88
		2349.9	-32.0	-13.0	19.0	89
		2355	-33.0	-13.0	20.0	90
	2357.5	2327.8	-63.5	-50.0	13.5	96
		2355	-35.2	-13.0	22.2	97
		2360	-33.0	-13.0	20.0	98
10.0	2310	2305	-38.4	-13.0	25.4	103
		2315	-42.3	-13.0	29.3	104
		2334.4	-63.4	-50.0	13.4	105
	2355	2340.3	-63.0	-50.0	13.0	112
		2350	-37.6	-13.0	24.6	113
		2360	-40.5	-13.0	27.5	114

**LIMIT**

Any emissions outside of the licensee’s frequency band(s) of operation shall be attenuated below the transmitter power (P) by the following amount:

Below 2300 MHz and above 2370 MHz by factor not less than  $70+10 \log(P)$  dB = -40 dBm@ 55.2 dBµV/m at 3m distance.

On all frequencies from 2300 to 2320 MHz and 2345 to 2370 MHz by factor not less than  $43+10\log(P)$  dB = -13 dBm@ 82.2 dBµV/m at 3m distance.

On all frequencies from 2320 to 2345 MHz by factor not less than  $80+10\log(P)$  dB = -50 dBm@ 45.2 dBµV/m at 3m distance.



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**Title: BreezeMax 4Motion Broadband Wireless Access System**

**Model: ODU-2305-2360-000N-38-2x2-Y-0**

**FCC ID: LKT-BMAX-2-23**

## TEST PROCEDURE

### Substitution method.

The measurements were performed according to ANSI/TIA-603-C-2004 section 2.2.12 test method. Investigation of transmitter spurious emissions was performed. EUT was replaced by generator and substitution antenna. Level calculated from generator output level, substitution antenna gain and connected cable loss was compared with the limit. Transmitter was operated in follow carrier frequencies 2307.5, 2312.5, 2352.5 and 2357.5 MHz for 5 MHz EBW and in 2310, 2355 MHz for 10 MHz EBW.

### TEST EQUIPMENT USED:

5	6	7	8	9	10	13	15
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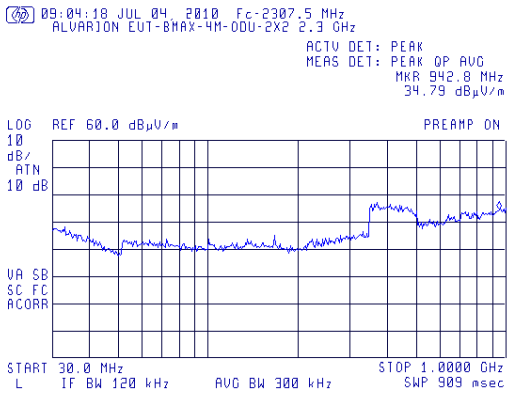
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Title: BreezeMax 4Motion Broadband Wireless Access System

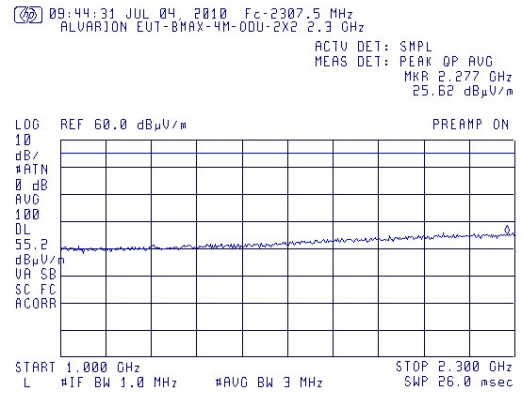
Model: ODU-2305-2360-000N-38-2x2-Y-0

FCC ID: LKT-BMAX-2-23

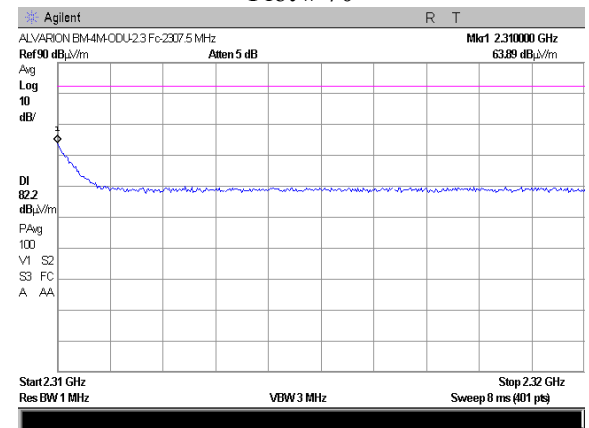
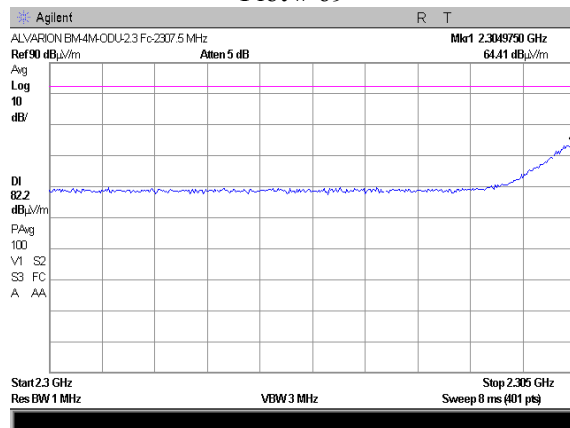
Carrier frequency 2307.5 MHz.



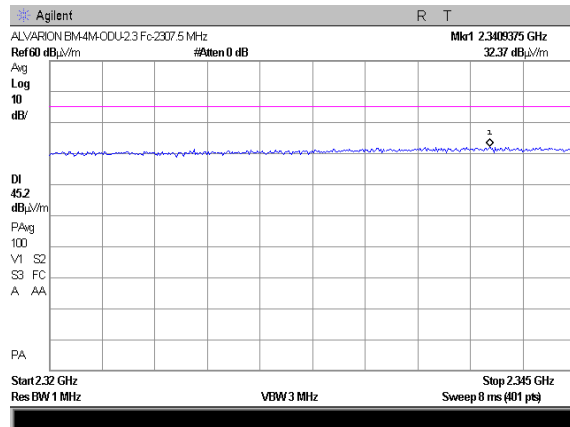
Plot # 69



Plot # 70

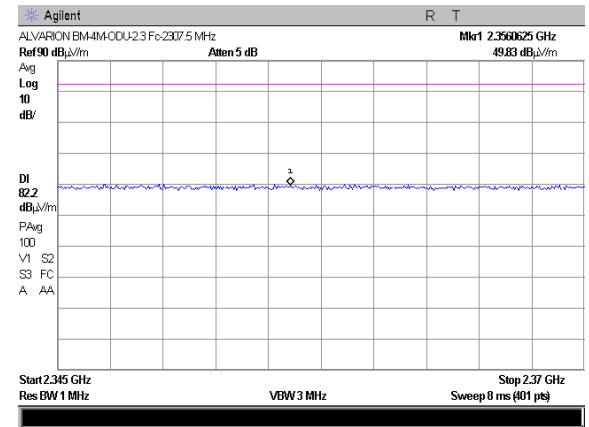


Plot # 71.



Plot # 73.

Plot # 72



Plot # 74



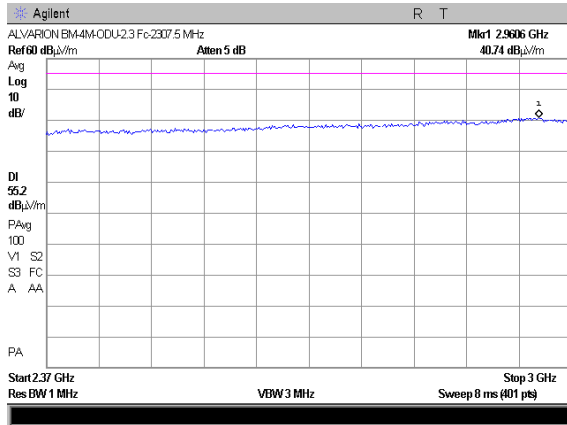
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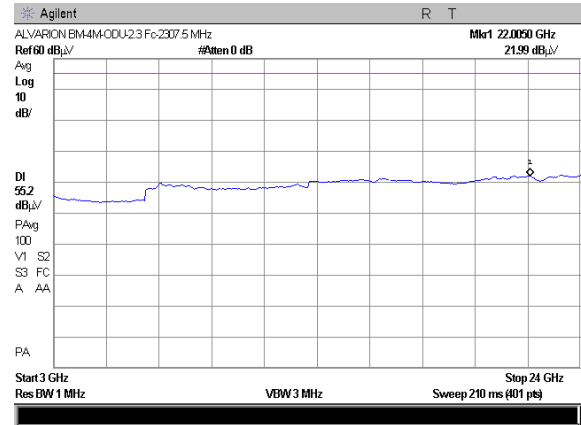
Title: BreezeMax 4Motion Broadband Wireless Access System

Model: ODU-2305-2360-000N-38-2x2-Y-0

FCC ID: LKT-BMAX-2-23

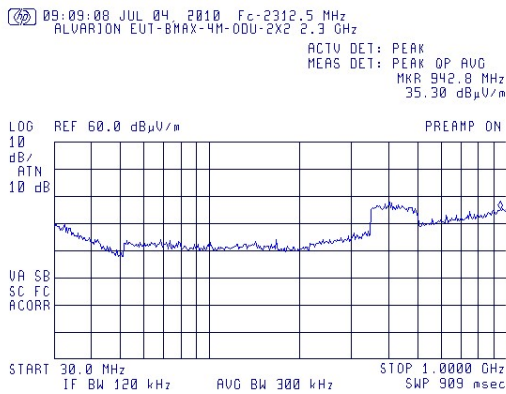


Plot # 75.

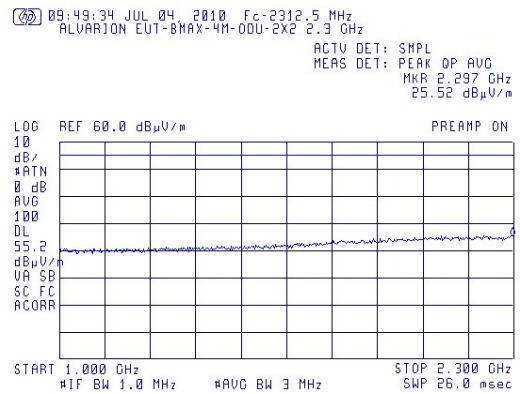


Plot # 76

Carrier frequency 2312.5 MHz.



Plot # 77.



Plot # 78



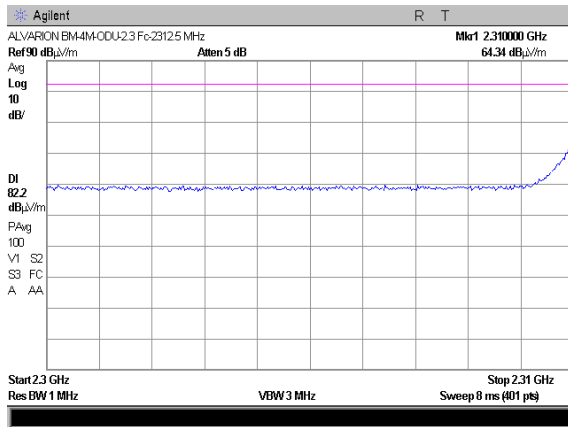
Test report No: 9012332795

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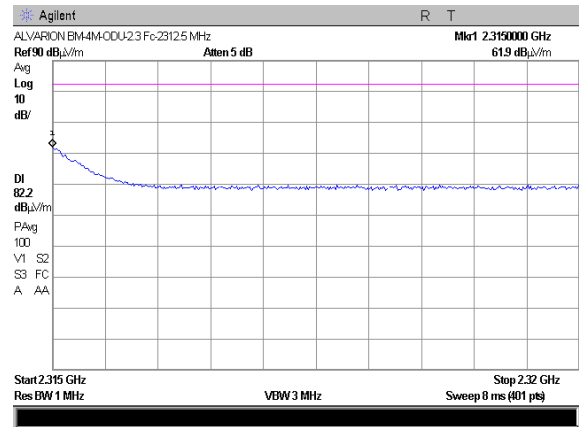
Title: BreezeMax 4Motion Broadband Wireless Access System

Model: ODU-2305-2360-000N-38-2x2-Y-0

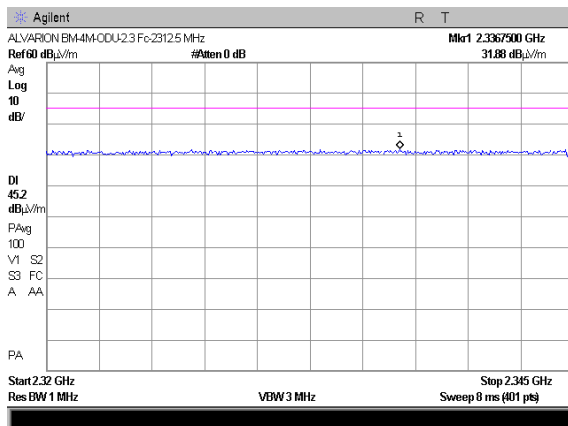
FCC ID: LKT-BMAX-2-23



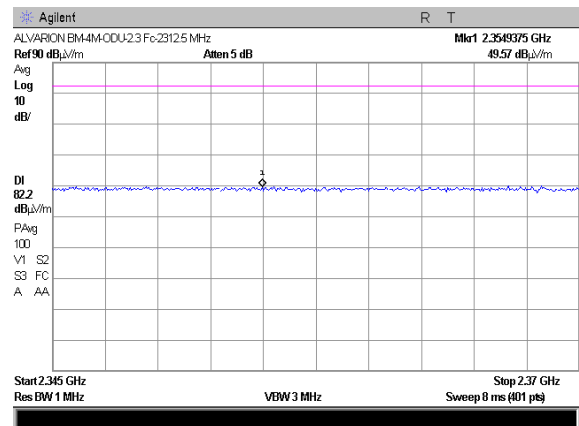
Plot # 79



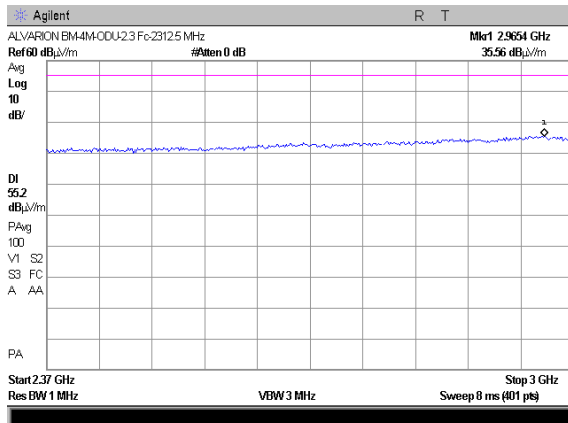
Plot # 80



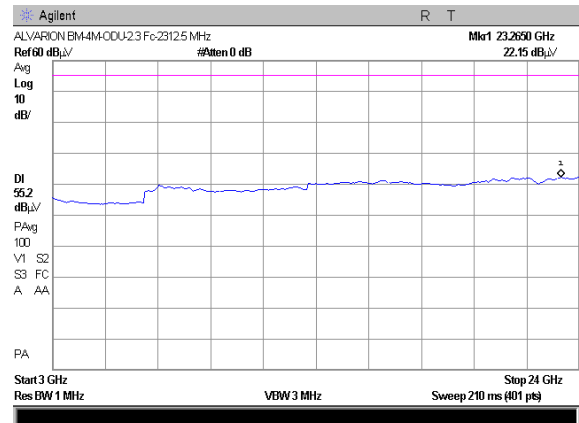
Plot # 81.



Plot # 82



Plot # 83.



Plot # 84





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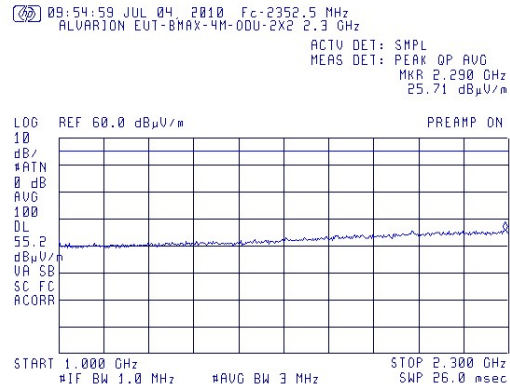
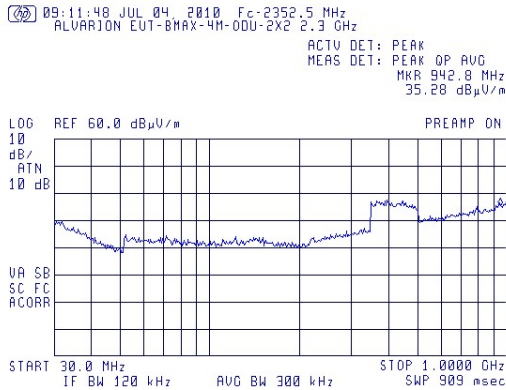
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Title: BreezeMax 4Motion Broadband Wireless Access System

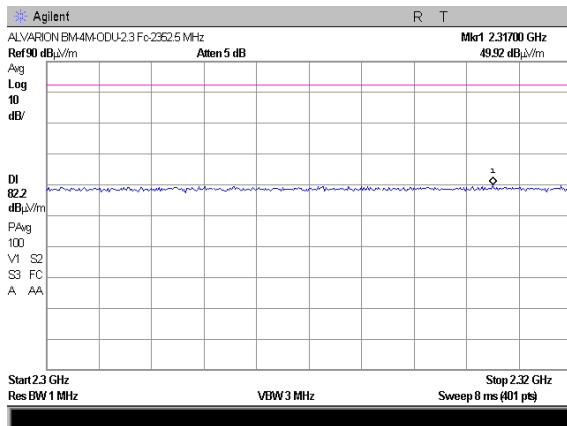
Model: ODU-2305-2360-000N-38-2x2-Y-0

FCC ID: LKT-BMAX-2-23

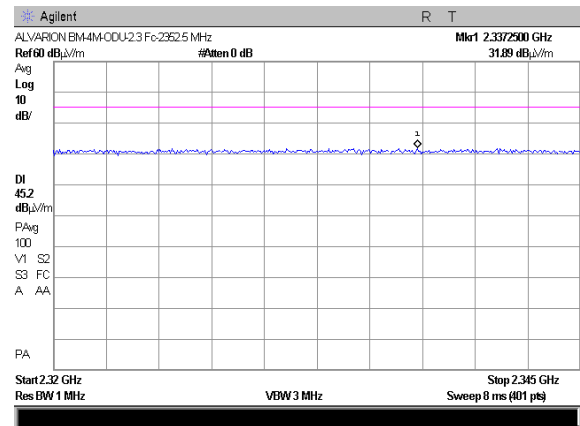
Carrier frequency 2352.5 MHz.



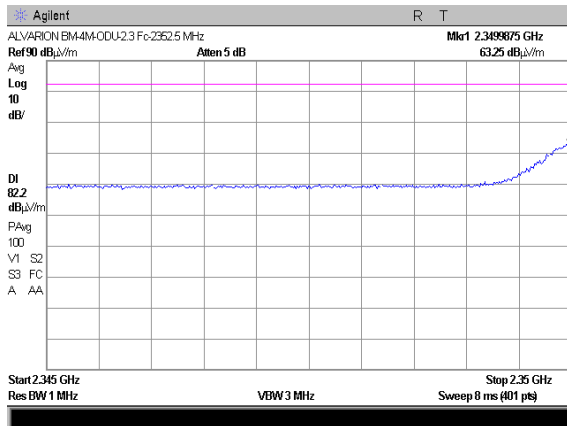
Plot # 85.



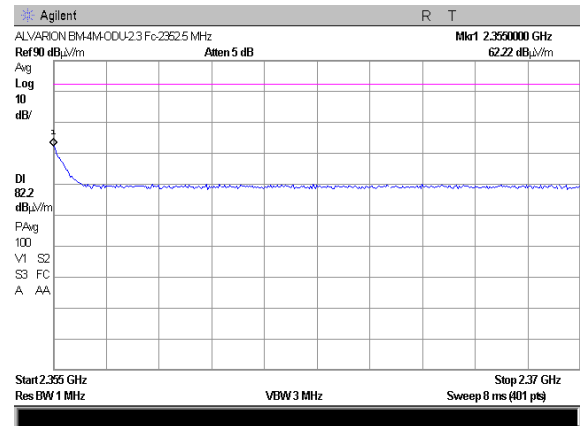
Plot # 86



Plot # 87



Plot # 88



Plot # 89.

Plot # 90



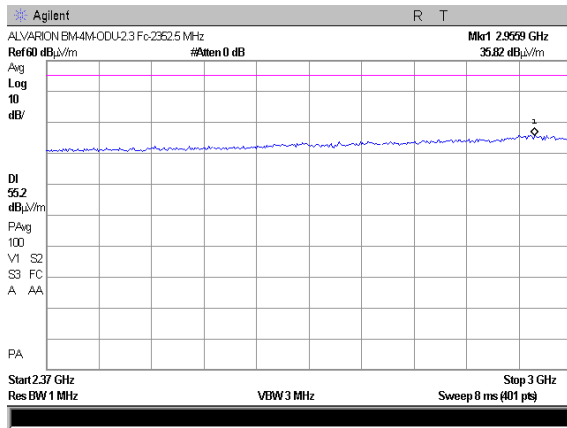
Test report No: 9012332795

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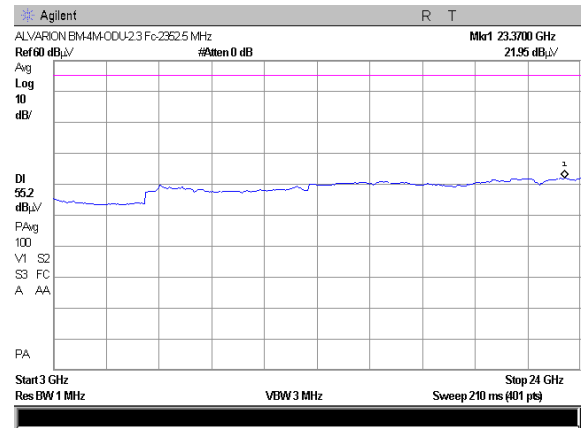
Title: BreezeMax 4Motion Broadband Wireless Access System

Model: ODU-2305-2360-000N-38-2x2-Y-0

FCC ID: LKT-BMAX-2-23

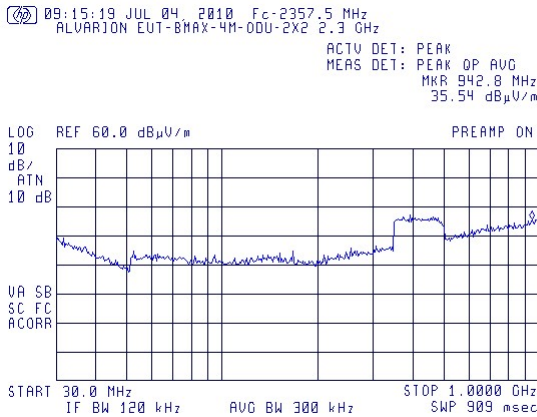


Plot # 91.

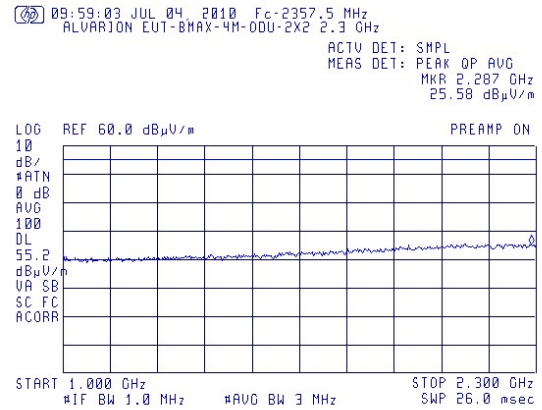


Plot # 92

**Carrier frequency 2357.5 MHz.**



Plot # 93.



Plot # 94



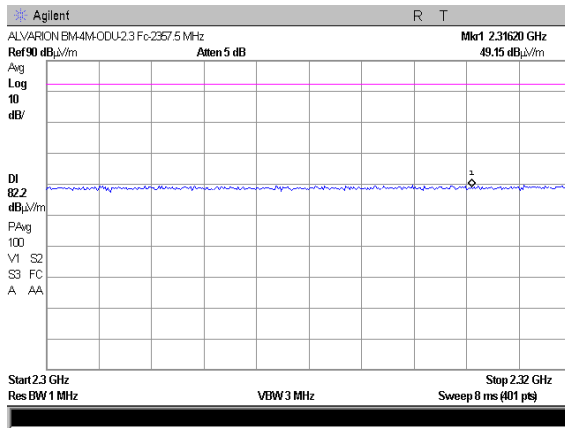
Test report No: 9012332795

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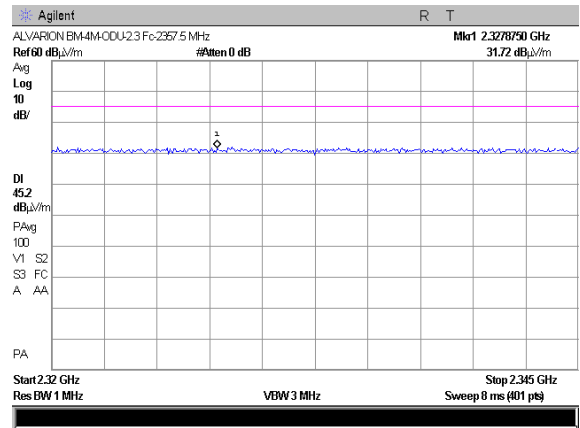
Title: BreezeMax 4Motion Broadband Wireless Access System

Model: ODU-2305-2360-000N-38-2x2-Y-0

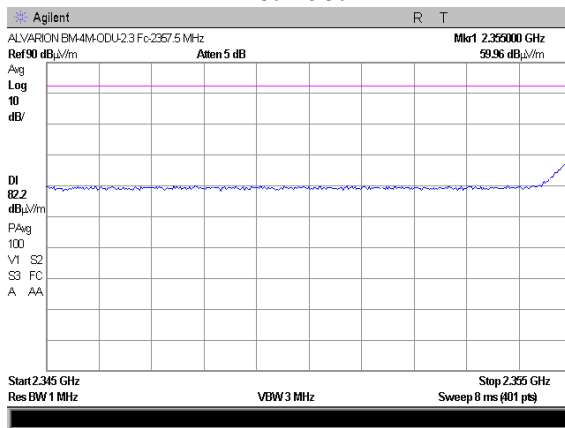
FCC ID: LKT-BMAX-2-23



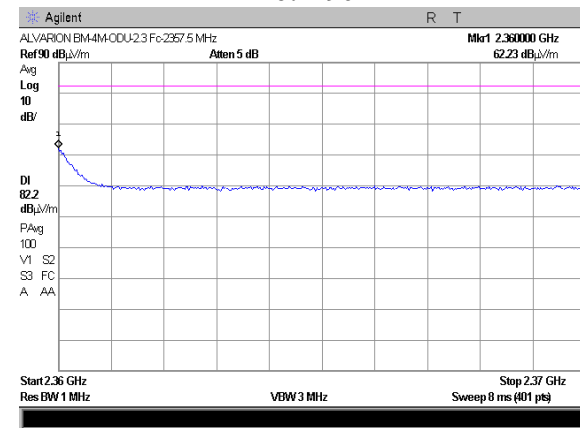
Plot # 95.



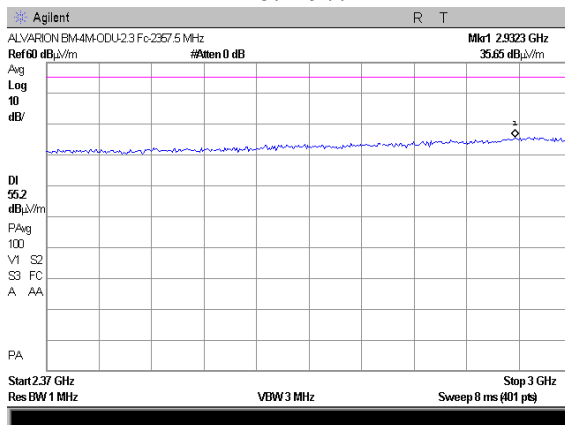
Plot # 96



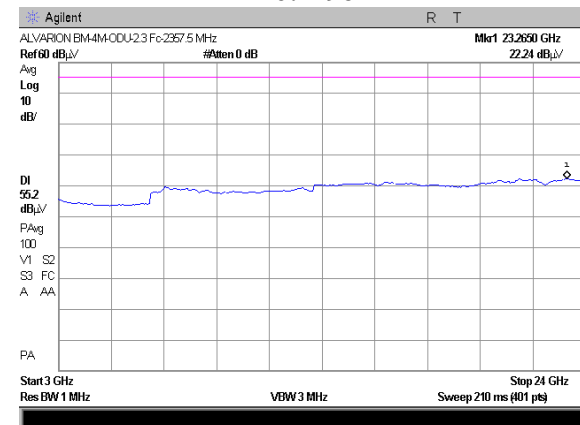
Plot # 97.



Plot # 98



Plot # 99.



Plot # 100



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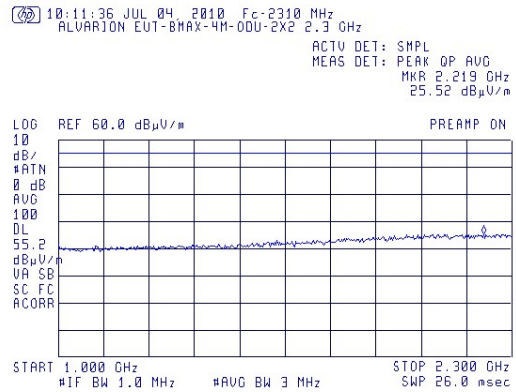
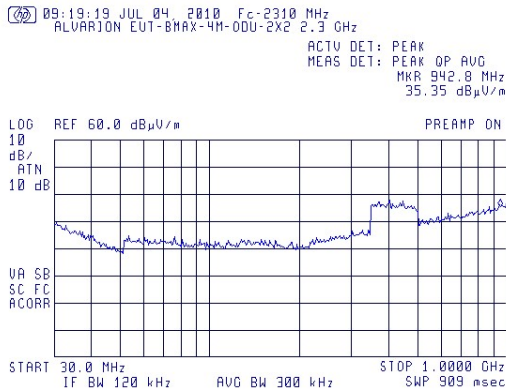
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Title: BreezeMax 4Motion Broadband Wireless Access System

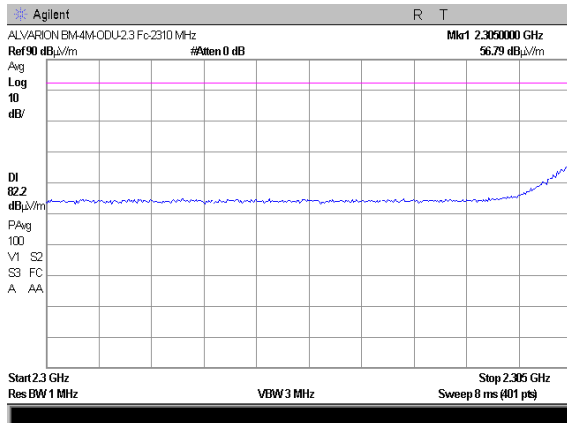
Model: ODU-2305-2360-000N-38-2x2-Y-0

FCC ID: LKT-BMAX-2-23

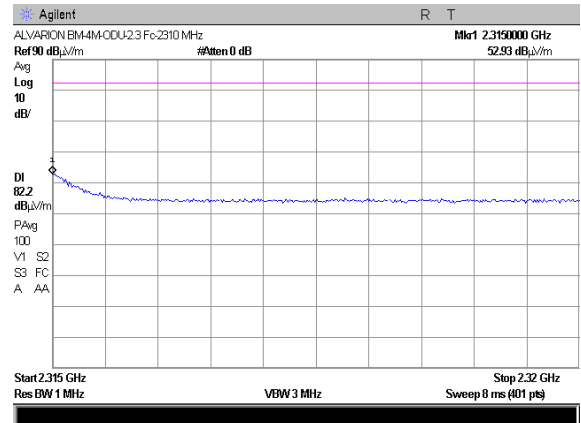
Carrier frequency 2310 MHz.



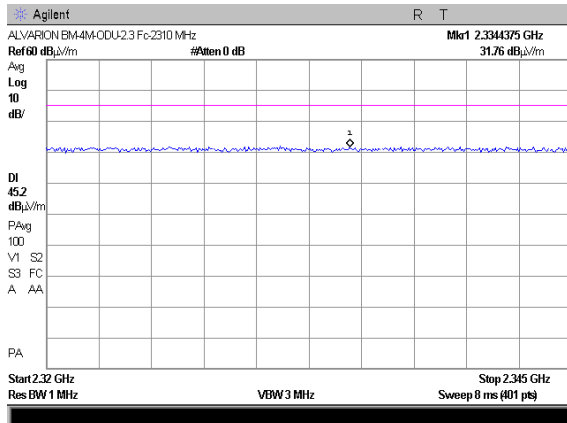
Plot # 101.



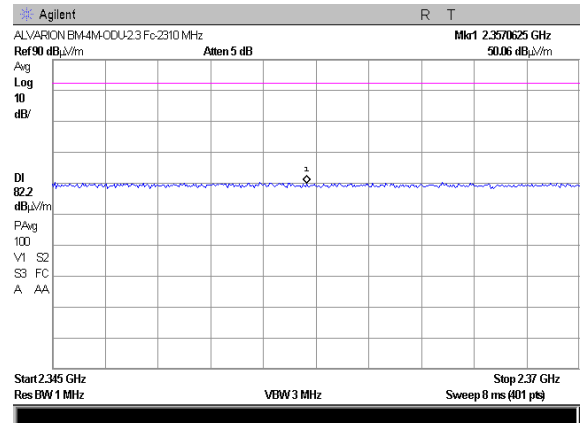
Plot # 102



Plot # 103.



Plot # 104



Plot # 105.

Plot # 106



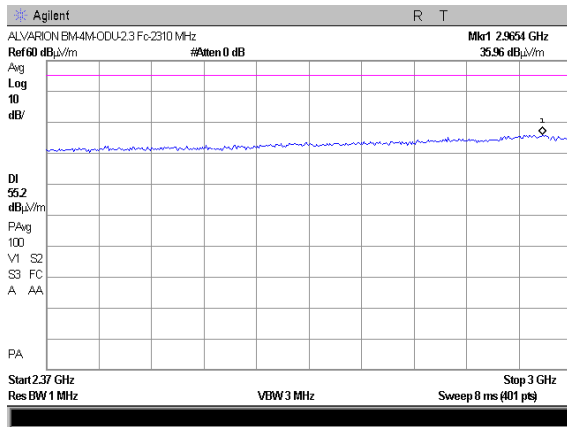
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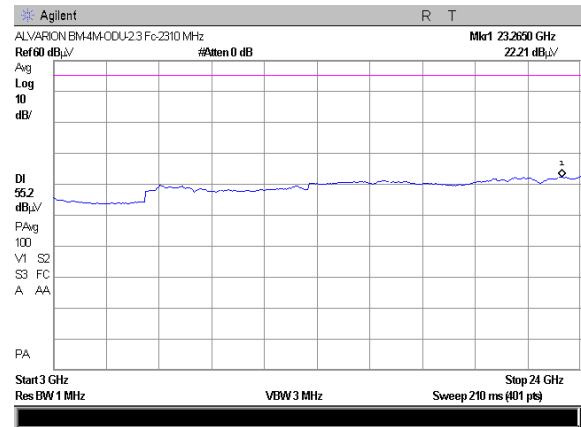
Title: BreezeMax 4Motion Broadband Wireless Access System

Model: ODU-2305-2360-000N-38-2x2-Y-0

FCC ID: LKT-BMAX-2-23

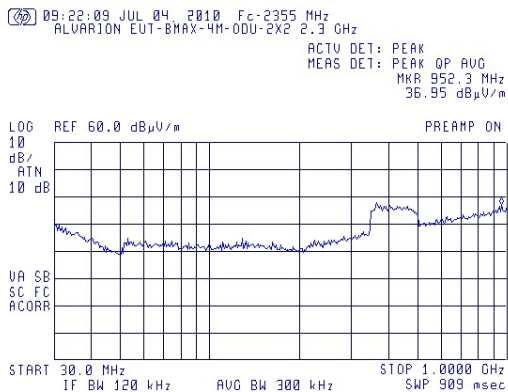


Plot # 107.

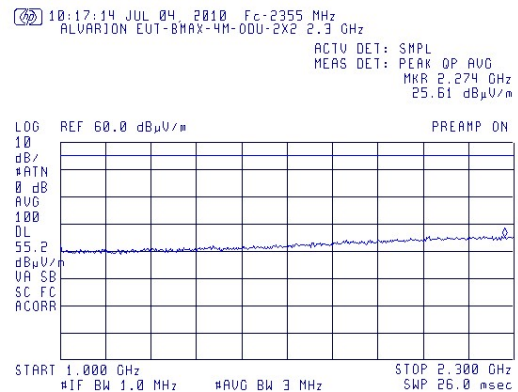


Plot # 108

**Carrier frequency 2355 MHz.**



Plot # 109.



Plot # 110





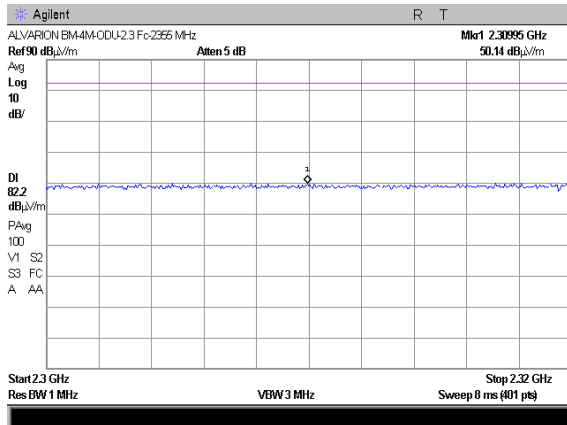
Test report No: 9012332795

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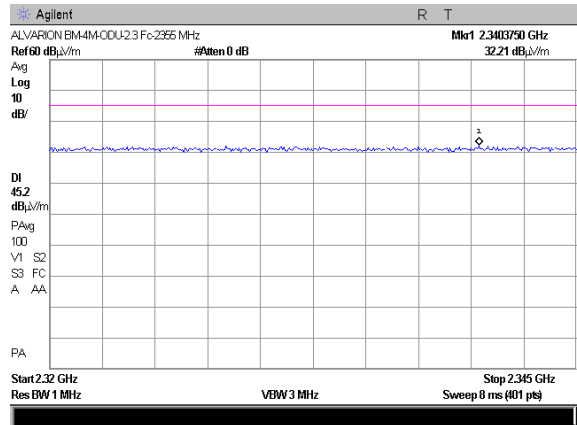
Title: BreezeMax 4Motion Broadband Wireless Access System

Model: ODU-2305-2360-000N-38-2x2-Y-0

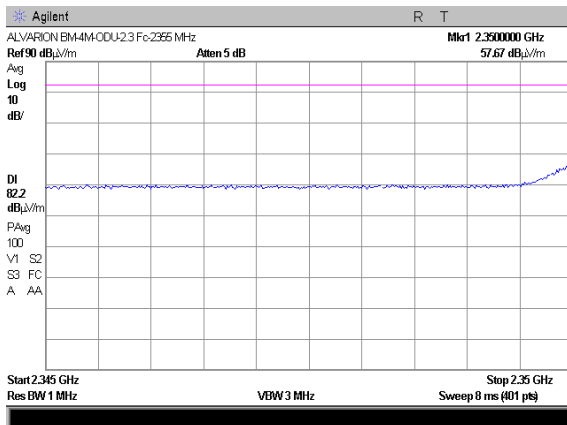
FCC ID: LKT-BMAX-2-23



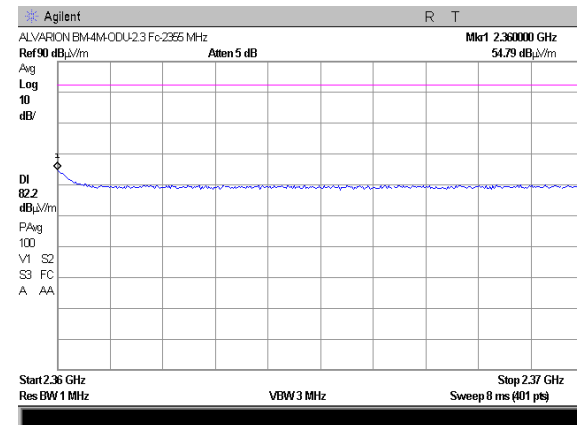
Plot # 111.



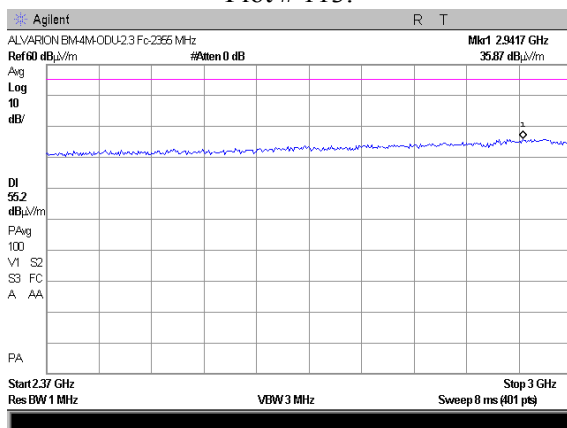
Plot # 112



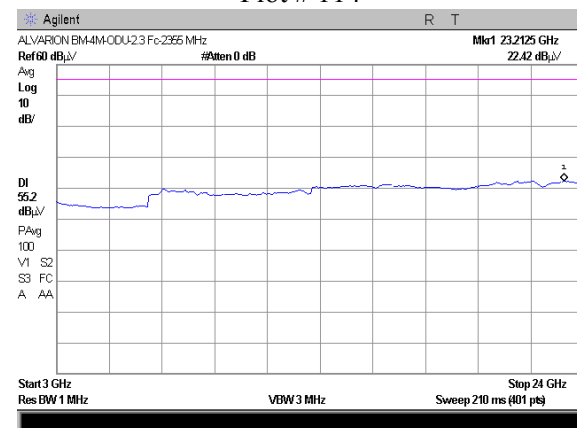
Plot # 113.



Plot # 114



Plot # 115.



Plot # 116



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5.1.5 Frequency stability test according to § 27.54

Operating Frequency Range 2307.5 – 2312.5 MHz, 2352.5 – 2357.5 MHz
Ambient Temperature 21° C Relative Humidity 49% Air Pressure 1008 hPa

Table with 6 columns: TEST CONDITIONS, Test temperature, Test voltage(AC), Lowest TX frequency 2307.5 MHz, Frequency deviation (ppm), Highest TX frequency 2357.5MHz, Frequency deviation (ppm). Rows include temperatures from +20°C to +50°C and -30°C.

TEST PROCEDURE

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

LIMIT

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

TEST SUMMARY

Transmitter carrier frequencies stay within the authorized frequency bands 2307.5 – 2312.5 MHz and 2352.5 – 2357.5 MHz.

TEST EQUIPMENT USED:

Table with 7 empty cells for equipment details.

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**Title: BreezeMax 4Motion Broadband Wireless Access System**

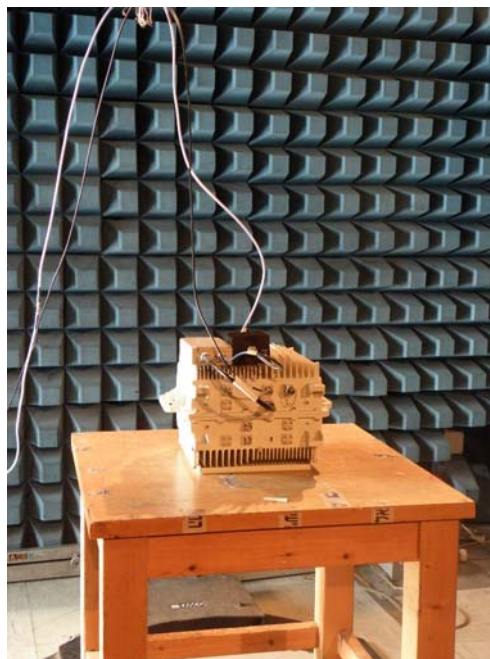
**Model: ODU-2305-2360-000N-38-2x2-Y-0**

**FCC ID: LKT-BMAX-2-23**

## APPENDIX A      Photographs



**Photo 1. Conducted measurements. Test setup.**



**Photo 2. Measurement of radiated emission. EUT front view.**

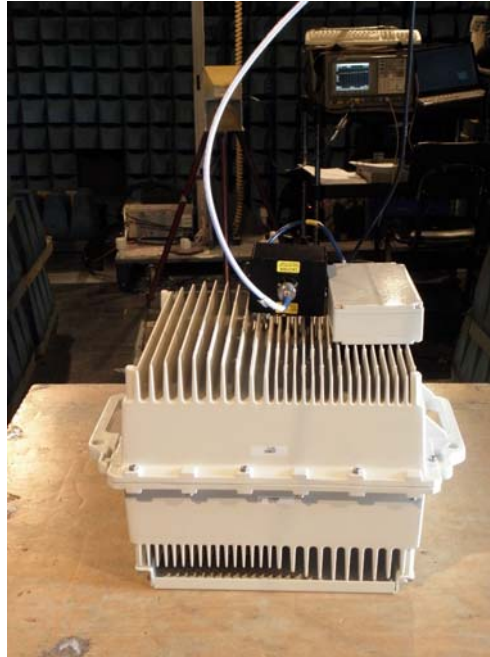
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**Photo 3. Measurement of radiated emission. EUT rear view.**

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No	Description	Manufacturer information			Due Calibration date
		Name	Model No	Serial No	
1	Spectrum Analyzer MXA 20 Hz – 13.6 GHz	HP	N9020A	MY48010682	June 2011
2	Spectrum Analyzer 9 kHz - 26.5 GHz	Agilent	4407B	US40241729	June 2011
3	Attenuator 30 dB 50W	Inmet	64671	18N50W-30	June 2011
4	Power splitter DC – 18 GHz	Mini-Circuits	ZFRSC-183-S	SQ037601003	June 2011
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 2011
10	EMI Receiver 9 kHz-6.5 GHz	HP	8546A+85460A	SII 4068	April 2011
11	LISN 9 kHz – 30 MHz	FCC	LISN 250-32-4-16	SII5023	October 2010
12	Transient limiter 0.009-200 MHz	HP	11947A	3107105	October 2010
13	Cable RF 4m	Huber-Suhner	Sucoflex 104PE	21328/4PE	October 2010
14	Cable RF 0.5m	Huber-Suhner	Multiflex 141	520201	October 2010
15	Active Loop antenna 10 kHz – 30 MHz	EMCO	6502	SII 4874	October 2010



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Point	Frequency (MHz)	Cable Loss (dB)	Point	Frequency (MHz)	Cable Loss (dB)
1	30	0.53	21	1000	3.68
2	50	0.75	22	1100	3.82
3	100	1.08	23	1200	4.07
4	150	1.39	24	1300	4.24
5	200	1.61	25	1400	4.43
6	250	1.752	26	1500	4.6
7	300	2.00	27	1600	4.7
8	350	2.15	28	1700	4.85
9	400	2.26	29	1800	4.98
10	450	2.383	30	1900	5.19
11	500	2.52	31	2000	5.34
12	550	2.606	32	2100	5.51
13	600	2.75	33	2200	5.69
14	650	2.856	34	2300	5.89
15	700	3.06	35	2400	6.07
16	750	3.201	36	2500	6.22
17	800	3.27	37	2600	6.28
18	850	3.38	38	2700	6.41
19	900	3.46	39	2800	6.53
20	950	3.55	40	2900	6.84



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**Biconilog Antenna, Model Number: CBL-6112D, S/N: 23181.**

No.	f / MHz)	AF / dB/m	f / MHz)	AF / dB/m	f / MHz)	AF / dB/m	f / MHz)	AF / dB/m
1	30	17.90	170	9.40	530	17.70	1040	22.20
2	32	16.70	175	9.00	540	18.25	1060	22.50
3	34	15.55	180	8.50	550	18.60	1080	22.50
4	36	14.35	185	8.45	560	14.45	1100	22.40
5	38	13.30	190	8.60	570	18.40	1120	22.60
6	40	12.20	195	8.85	580	18.50	1140	22.45
7	42	11.05	200	8.95	590	18.60	1160	22.50
8	44	9.95	205	8.80	600	18.60	1180	22.40
9	46	8.90	210	8.50	610	18.80	1200	22.80
10	48	8.05	215	8.20	620	18.99	1220	22.95
11	50	7.30	220	8.50	630	19.05	1240	23.10
12	52	6.80	225	9.00	640	19.23	1260	23.40
13	54	6.45	230	9.65	650	19.10	1280	23.35
14	56	6.00	235	10.30	660	19.13	1300	23.62
15	58	5.70	240	11.00	670	19.04	1320	23.64
16	60	5.45	245	11.60	680	19.00	1340	23.86
17	62	5.30	250	12.00	690	19.17	1360	23.95
18	64	5.20	255	12.45	700	19.28	1380	23.90
19	66	5.30	260	12.85	710	19.25	1400	24.45
20	68	5.30	265	12.50	720	19.45	1420	24.74
21	70	5.35	270	12.45	730	19.75	1440	24.93
22	72	5.50	275	12.40	740	19.95	1460	25.03
23	74	5.80	280	12.55	750	20.07	1480	25.45
24	76	6.00	285	12.65	760	19.85	1500	25.30
25	78	6.60	290	12.75	770	19.80	1520	25.25
26	80	6.70	295	12.95	780	19.85	1540	25.36
27	82	7.15	300	13.00	790	19.95	1560	25.58
28	84	7.60	310	13.35	800	20.05	1580	25.50
29	86	8.10	320	13.75	810	20.10	1600	25.65
30	88	8.50	330	13.85	820	20.35	1620	25.60
31	90	8.90	340	14.10	830	20.40	1640	25.70
32	92	9.20	350	14.50	840	20.35	1660	25.83
33	94	9.75	360	14.70	850	20.46	1680	25.97
34	96	9.95	370	14.90	860	20.39	1700	26.10
35	98	10.20	380	15.10	870	20.29	1720	26.25
36	100	10.50	390	15.45	880	20.24	1740	26.04
37	105	11.25	400	16.00	890	20.35	1760	26.14
38	110	11.70	410	16.40	900	20.55	1780	26.20
39	115	11.70	420	16.70	910	20.45	1800	26.40
40	120	11.80	430	16.35	920	20.60	1820	26.64
41	125	11.80	440	16.30	930	20.60	1840	26.86
42	130	11.70	450	16.30	940	20.66	1860	27.12
43	135	11.35	460	16.70	950	20.88	1880	27.00
44	140	10.95	470	17.05	960	21.11	1900	27.25
45	145	10.35	480	17.20	970	20.93	1920	27.36
46	150	10.05	490	17.30	980	21.03	1940	27.68
47	155	9.70	500	17.40	990	21.05	1960	27.10
48	160	9.70	510	17.50	1000	21.10	1980	27.06
49	165	9.45	520	17.60	1020	21.40	2000	27.25



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**Antenna Factor**

**Double Ridged Guide Antenna mfr EMCO model 3115 1m calibration**

Point	Frequency (MHz)	Antenna Factor (dB/m)
1	1000	23.9
2	2000	28.3
3	3000	31.0
4	4000	33.1
5	4500	32.5
6	5000	32.4
7	6000	53.7
8	6500	35.6
9	7000	36.4
10	7500	36.9
11	8000	37.0
12	8500	38.0
13	9000	38.6
14	9500	38.4
15	10000	38.4
16	10500	38.4
17	11000	38.9
18	11500	39.6
19	12000	39.4
20	12500	39.2
21	13000	40.3
22	13500	41.0
23	14000	41.2
24	14500	41.3
25	15000	40.0
26	15500	38.0
27	16000	38.1
28	16500	40.3
29	17000	42.2
30	17500	44.6
31	18000	46.2

**Cable Loss**

**Type: Sucoflex 104PE; Ser.No.21328/4PE; 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

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## APPENDIX C General information.

### Abbreviations and acronyms

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

AC	alternating current
cm	centimeter
dB	decibel
dBm	decibel referred to one milliwatt
dB( $\mu$ V)	decibel referred to one microvolt
dB( $\mu$ 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 27: 2009	Miscellaneous Wireless Communications Services
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.