Test Report No. 8812300215

For ALVARION Ltd.

Equipment Under Test:

BMAX-BST-AU-ODU-TDD-3.6b
Broadband Wireless Access System

Base station.

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

ACCREDITED

Certificate No. 1487-01

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Table of Contents

1. Applicant information

Order placed by:	Alvarion Ltd
Address:	21A Habarzel str, Tel-Aviv, 69710, Israel
Sample for test selected by:	The customer
The date of test:	January 2008

Equipment under test information

Description of Equipment Under Test (EUT):	Wireless Access BreezeMAX 3.6b
Model:	BMAX-BST-AU-ODU-TDD-3.6b
Serial Number:	7239401
Manufactured by:	Alvarion Ltd

2. Test performance

Location:	SII EMC Section
Purpose of test:	Apparatus compliance verification in accordance with emission requirements
Test specifications:	47CFR part 15, part 90, part 2 §§ 2.1049, 2.1053, part 1 §1.1310

This Test Report contains 56 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.

3. Summary of test:

The EUT was found to be in compliance with requirements of: 47CFR Part 15 §§ 15.107 and 15.109 part 90 §§ 90.1321, 90.1323 and part 2 §§ 2.1049**,** 2.1055

Parameter	Subclasses
Transmitter characteristics	
99% Occupied bandwidth	2.1049
EIRP radiated power	90.1321(a)
Peak EIRP power density	90.1321(a)
Spurious emissions at antenna terminal	90.1323
Spurious emissions radiated	90.1323
Frequency stability	2.1055
Unintentional radiator	
AC main conducted emissions	15.107 class B
Radiated emissions from indoor unit	15.109 class A

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

4. Equipment under test description.

*The customer provided description.

4.1 General description

The EUT, Base station (AU), a TDD system is a part of a point-to-multipoint communication system, operating at 3650-3675 MHz frequency range.
Channel spacing is 3.5 MHz and 5MHz, OFDM modulation. The system is supporting up to 12 Mbps data rates for 10/100 Base-T (Ethernet). The EUT incorporate indoor and outdoor units.
Indoor unit (Shelf) is powered from 48VDC external power source.
The AU-IDU module connects to the AU-ODU via an IF cable. The IF cable carries full duplex data, control and management signals between the AU-IDU and the AU-ODU, as well as power (48 VDC) and 64 MHz synchronization reference clock from the AU-IDU to the AU-ODU.

EUT technical characteristics

Transmitter technical characteristics.			**Note**
Stand-alone/fixed use			
Assigned frequency range	**3650 – 3700 MHz**		
Operating frequency range	**3650 – 3675 MHz**		
RF channel spacing	**3.5 MHz, 5 MHz**		
Maximum rated output power	**23 dBm**		At transmitter 50 Ω RF output connector
Antenna connection	**Connector: N-type**		Professional installation
Transmitter 99% power bandwidth	**3.5 MHz, 5 MHz**		
Type of modulation	**BPSK, 4QAM, 16QAM, 64QAM**		
Type of multiplexing	**OFDM**		
Modulating test signal (baseband)	**PRBS**		
Maximum transmitter duty cycle in normal use	**50 %**		
Transmitter duty cycle supplied for test	**100 %**		
Antenna information			
Type	**Manufacturer**	**Model**	**Gain**
External	SMART	BS OMNI 3.6-3.8GHz	10dBi
External flat panel	TELSA	D.S 3.3-3.8GHz -65°	16.5dBi

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

Limit for power density for general population/uncontrolled exposure is 1(mW/cm^2) or
The power density calculation is $S = (Pt / 4\pi r^2)$.
Where
Pt - The transmitted power (EIRP) (mW)
r - The distance from the unit. (cm)
The 1(mW/cm^2) limit can be calculated from the above based on the following data:
Pt- the transmitted power whish is equal to the maximum EIRP:
37 dBm = 5012 mW for 5 MHz EBW and
35.4 dBm = 3467 mW for 3.5 MHz EBW.
Minimum allowed RF safety distance "r", where RF exposure limits may not be exceeded:
SQRT(5012/4π) is more than 20 cm from the unit antenna at 5 MHz EBW
SQRT(3467/4π) is more than 17 cm from the unit antenna at 3.5 MHz EBW

4.2 EUT test configuration

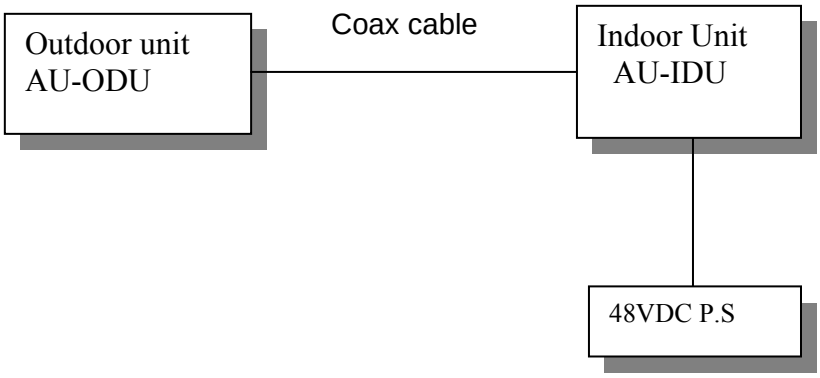


Fig. 1 Base station test setup

5. Test results

5.1 Transmitter characteristics

5.1.1 99% Occupied bandwidth according to § 2.1049

Method of measurement ANSI 63.4 §13.1.7
Operating Frequency Range 3.650 – 3.675 GHz
Ambient Temperature 22^0 C Relative Humidity 42% Air Pressure 1015 hPa

Emissions bandwidth 3.5 MHz

Carrier frequency MHz	Measured occupied bandwidth, MHz	Reference to plot number
3651.75	3.267	#1
3662.0	3.267	#2
3673.25	3.255	#3

Emissions bandwidth 5.0 MHz

Carrier frequency MHz	Measured occupied bandwidth, MHz	Reference to plot number
3652.5	4.717	#4
3662.0	4.717	#5
3672.5	4.700	#6

TEST PROCEDURE

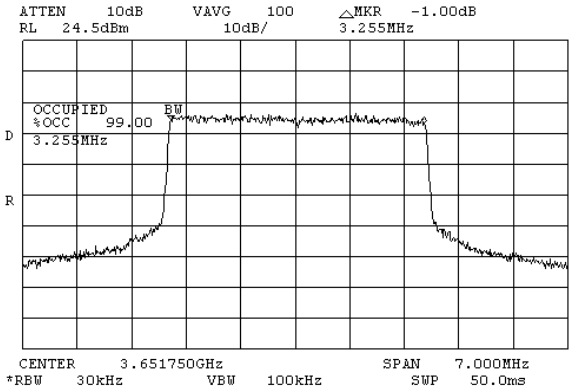
The measurements were performed in normal (transmitting) mode at all transmitted carrier (channel) frequencies of the 3.650 – 3.675 GHz frequency ranges under maximum data transfer bit rate. The EUT RF output was connected to the Spectrum Analyzer through appropriate attenuator and accounted with cable loss in SA settings.

TEST EQUIPMENT USED:

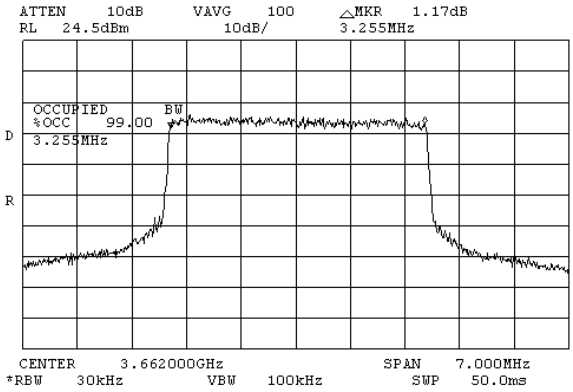
1	2	3				

Occupied bandwidth test results.

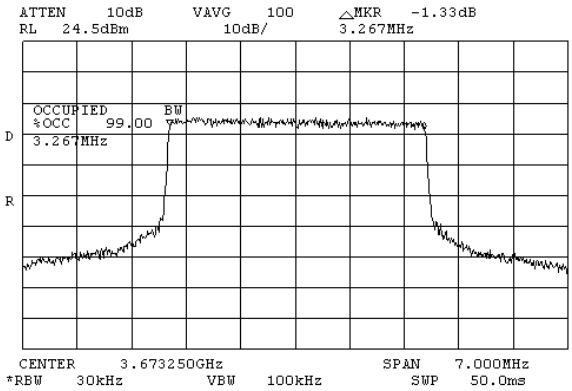
Emissions bandwidth 3.5 MHz



Plot # 1. Carrier Frequency 3651.75 MHz

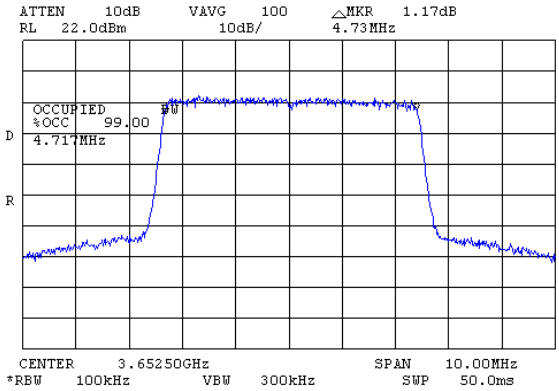


Plot # 2. Carrier Frequency 3662 MHz

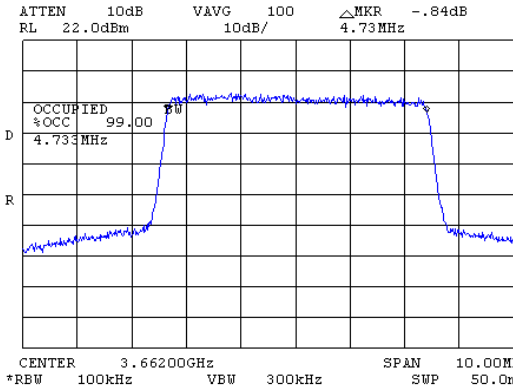


Plot # 3. Carrier Frequency 3673.25 MHz

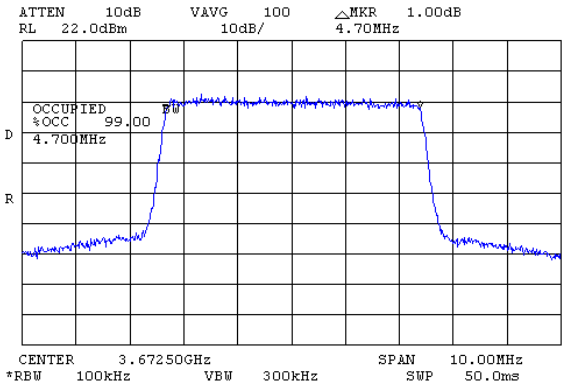
Emissions bandwidth 5.0 MHz



Plot # 4. Carrier Frequency 3652.5 MHz



Plot # 5. Carrier Frequency 3662 MHz



Plot # 6. Carrier Frequency 3672.5 MHz

5.1.2 Isotropically radiated power test § 90.1321(a)

Operating Frequency Range 3.650 – 3.675 GHz
Ambient Temperature 21^0 C Relative Humidity 59% Air Pressure 1011 hPa

The following power limits apply to the 3650 – 3700 MHz band:
Base and fixed stations are limited to 25 watts/25 MHz equivalent isotropically radiated power (EIRP). In any event, the peak EIRP power density shall not exceed 1 Watt in any one megahertz slice of spectrum .

EBW 3.5 MHz, Antenna gain 16.5 dBi

Carrier frequency MHz	Measured output power. dBm	Calculated EIRP power. dBm	FCC EIRP power limit dBm	Reference to plot number
3651.75	18.8	35.3	35.4	#7
3662.0	18.6	35.1	35.4	#8
3673.25	18.7	35.2	35.4	#9

EBW 5.0 MHz, Antenna gain 16.5 dBi

Carrier frequency MHz	Measured output power. dBm	Calculated EIRP power. dBm	FCC EIRP power limit dBm	Reference to plot number
3652.5	20.5	37.0	37.0	#10
3662.0	20.1	36.6	37.0	#11
3672.5	20.4	36.9	37.0	#12

EBW 3.5 MHz, Antenna gain 10 dBi

Carrier frequency MHz	Measured output power. dBm	Calculated EIRP power. dBm	FCC EIRP power limit dBm	Reference to plot number
3651.75	22.3	32.3	35.4	#13
3662.0	22.0	32.0	35.4	#14
3673.25	22.1	32.1	35.4	#15

EBW 5.0 MHz, Antenna gain 10 dBi

Carrier frequency MHz	Measured output power. dBm	Calculated EIRP power. dBm	FCC EIRP power limit dBm	Reference to plot number
3652.5	22.3	32.3	37.0	#16
3662.0	22.2	32.2	37.0	#17
3672.5	22.2	32.2	37.0	#18

TEST PROCEDURE

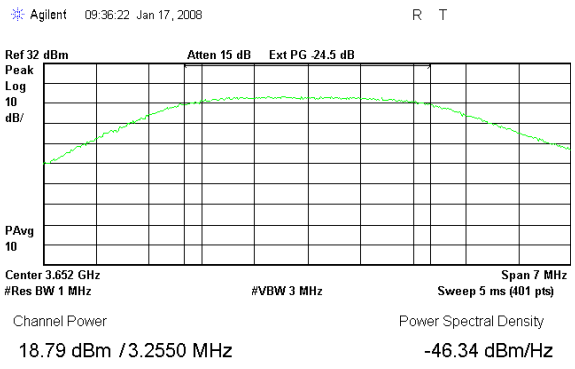
Calculation of EIRP power with external antenna was performed as follows: Plot result + Ant. gain.
The measurements were performed in normal (transmit) mode at all transmitted carrier (channel) frequencies of the 3.650 – 3.675 GHz frequency range under maximum data transfer bit rate. The EUT RF output was connected to the Spectrum Analyzer through appropriate attenuator and accounted with cable loss in SA settings.

TEST EQUIPMENT USED:

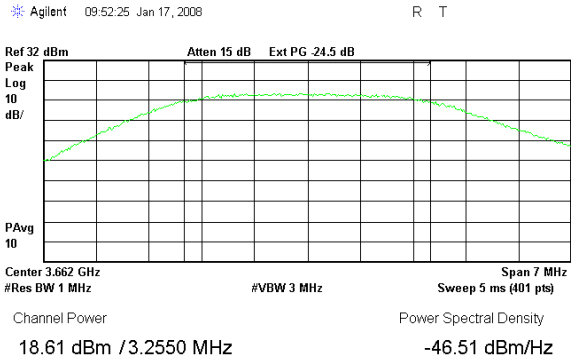
1	2	3				

Peak output power test results.

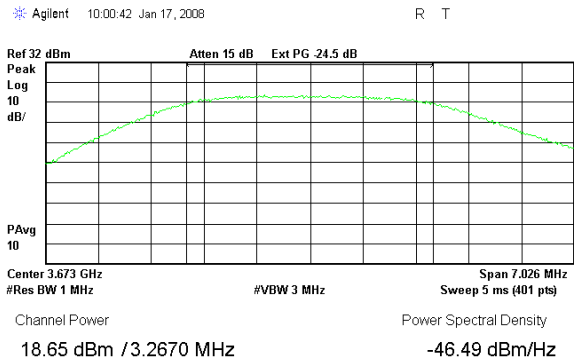
Antenna 16.5 dBi, EBW 3.5 MHz



Plot # 7. Carrier Frequency 3651.75 MHz

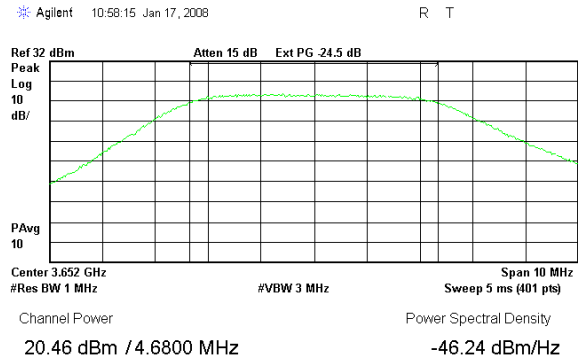


Plot # 8. Carrier Frequency 3662 MHz

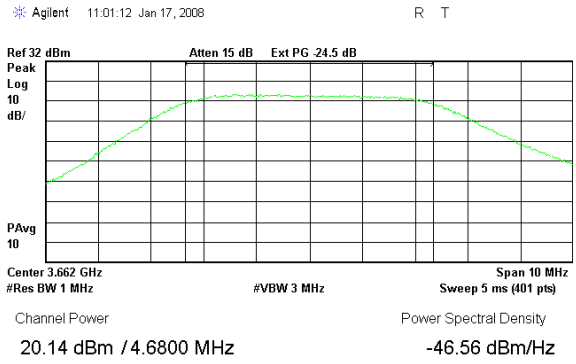


Plot # 9. Carrier Frequency 3673.25 MHz

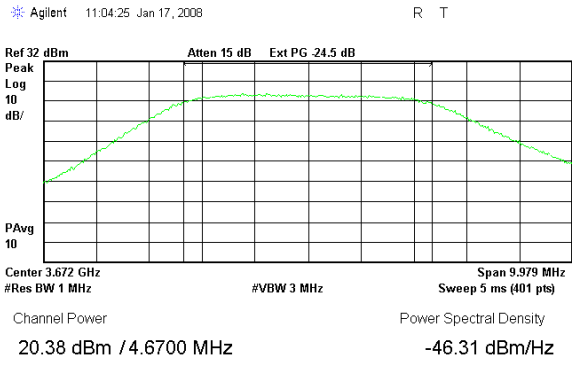
Antenna 16.5 dBi, EBW 5.0 MHz



Plot # 10. Carrier Frequency 3652.5 MHz

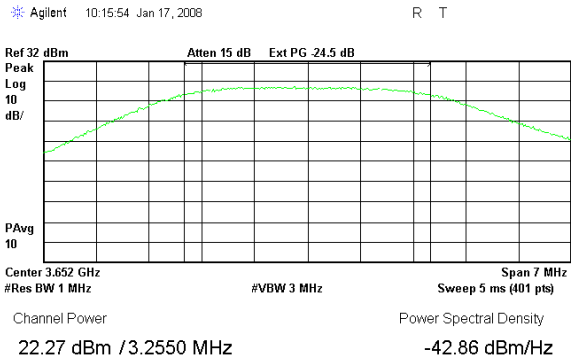


Plot # 11. Carrier Frequency 3662 MHz

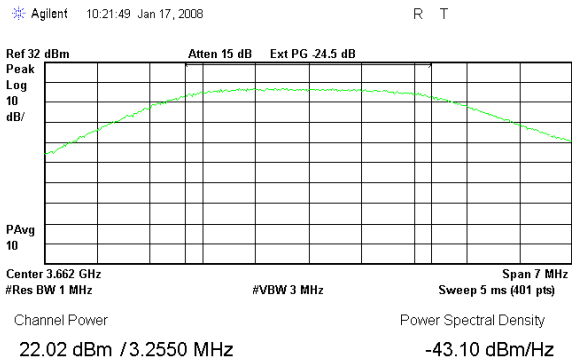


Plot # 12. Carrier Frequency 3672.5 MHz

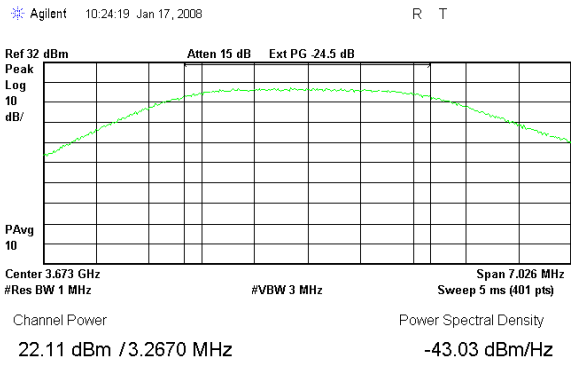
Antenna 10 dBi, EBW 3.5 MHz



Plot # 13. Carrier Frequency 3651.75 MHz

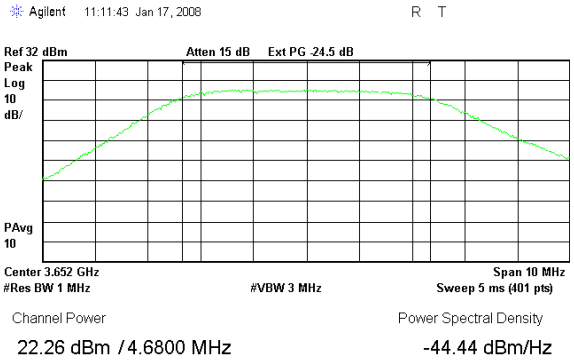


Plot # 14. Carrier Frequency 3662 MHz

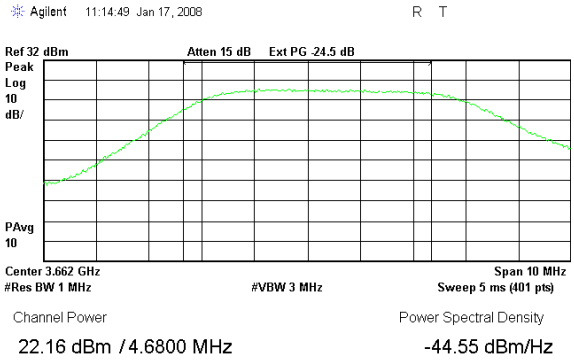


Plot # 15. Carrier Frequency 3673.25 MHz

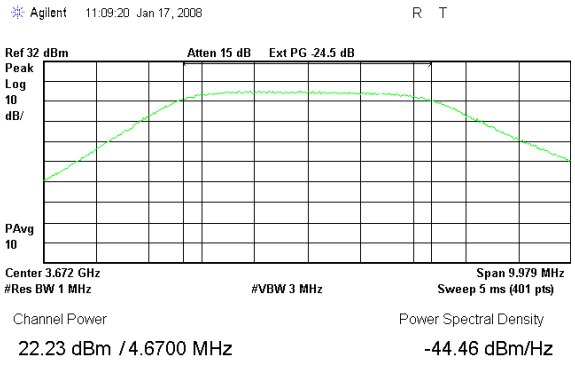
Antenna 10 dBi, EBW 5.0 MHz



Plot # 16. Carrier Frequency 3652.5 MHz



Plot # 17. Carrier Frequency 3662 MHz



Plot # 18. Carrier Frequency 3672.5 MHz

5.1.3 Peak EIRP power density test § 90.1321(a)

Operating Frequency Range 3.650 – 3.675 GHz
Ambient Temperature 21^0 C Relative Humidity 59% Air Pressure 1011 hPa

The following power limits apply to the 3650 – 3700 MHz band:
Base and fixed stations are limited to 25 watts/25 MHz equivalent isotropically radiated power (EIRP). In any event, the peak EIRP power density shall not exceed 1 Watt (30 dBm) in any one megahertz slice of spectrum .

EBW 3.5 MHz, Antenna gain 16.5 dBi

Carrier frequency MHz	Measured peak power density dBm	Calculated peak EIRP power density. dBm/ MHz	FCC peak EIRP power density limit dBm	Reference to plot number
3651.75	9.2	25.7	30.0	#19
3662.0	9.3	25.8	30.0	#20
3673.25	9.2	25.7	30.0	#21

EBW 5.0 MHz, Antenna gain 16.5 dBi

Carrier frequency MHz	Measured peak power density dBm	Calculated peak EIRP power density. dBm/ MHz	FCC peak EIRP power density limit dBm	Reference to plot number
3652.5	9.0	25.5	30.0	#22
3662.0	9.3	25.8	30.0	#23
3672.5	9.2	25.7	30.0	#24

EBW 3.5 MHz, Antenna gain 10 dBi

Carrier frequency MHz	Measured peak power density dBm	Calculated peak EIRP power density. dBm/ MHz	FCC peak EIRP power density limit dBm	Reference to plot number
3651.75	12.7	22.7	30.0	#25
3662.0	13.2	23.2	30.0	#26
3673.25	13.0	23.0	30.0	#27

EBW 5.0 MHz, Antenna gain 10 dBi

Carrier frequency MHz	Measured peak power density dBm	Calculated peak EIRP power density. dBm/ MHz	FCC peak EIRP power density limit dBm	Reference to plot number
3652.5	10.8	20.8	30.0	#28
3662.0	11.2	21.2	30.0	#29
3672.5	11.7	21.7	30.0	#30

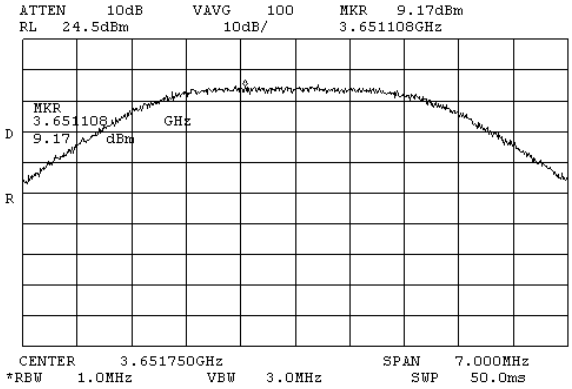
TEST PROCEDURE

Calculation of peak EIRP power density with external antenna was performed as follows: Plot result + Ant. gain.
The measurements were performed in normal (transmit) mode at all transmitted carrier (channel) frequencies of the 3.650 – 3.675 GHz frequency range under maximum data transfer bit rate. The EUT RF output was connected to the Spectrum Analyzer through appropriate attenuator and accounted with cable loss in SA settings.

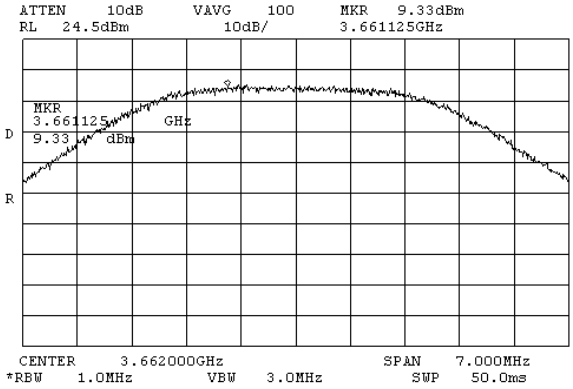
TEST EQUIPMENT USED:

1	2	3				

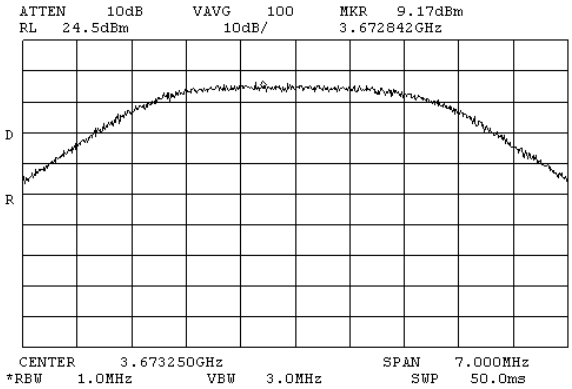
Antenna 16.5 dBi, bandwidth 3.5 MHz



Plot # 19. Carrier Frequency 3651.75 MHz

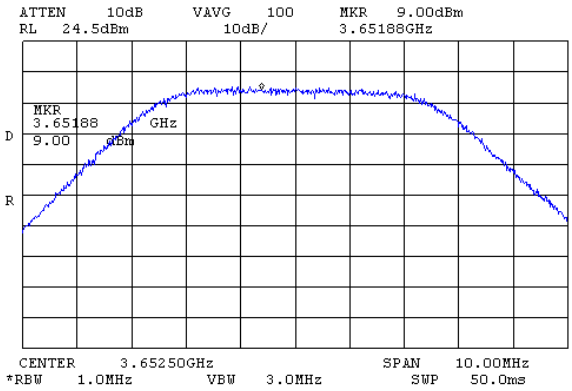


Plot # 20. Carrier Frequency 3662 MHz

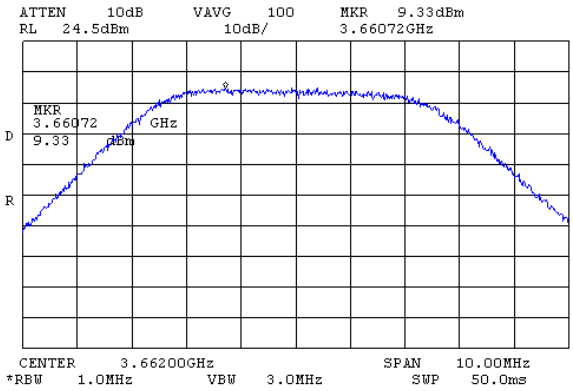


Plot # 21. Carrier Frequency 3673.25 MHz

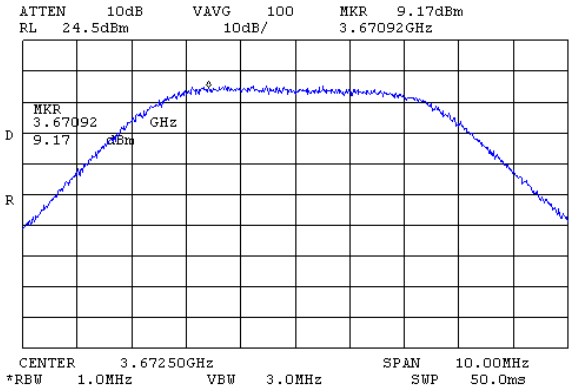
Antenna 16.5 dBi, bandwidth 5.0 MHz



Plot # 22. Carrier Frequency 3652.5 MHz

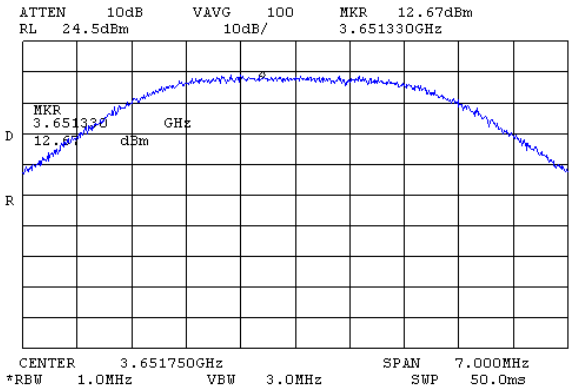


Plot # 23. Carrier Frequency 3662MHz

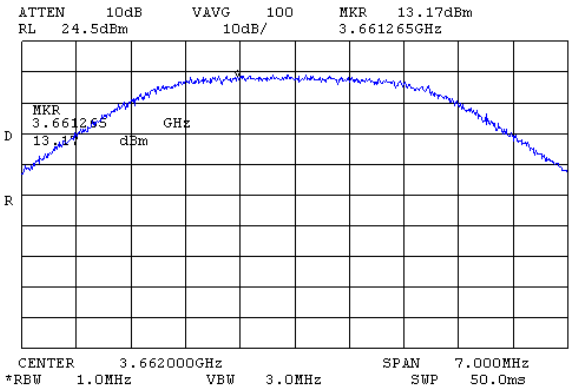


Plot # 24. Carrier Frequency 3672.5 MHz

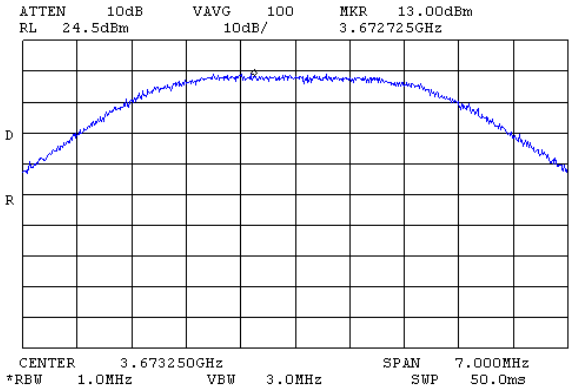
Antenna 10 dBi, bandwidth 3.5 MHz



Plot # 25. Carrier Frequency 3651.75 MHz

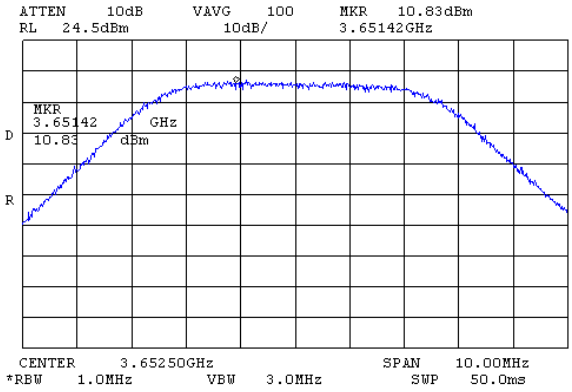


Plot # 26. Carrier Frequency 3662 MHz

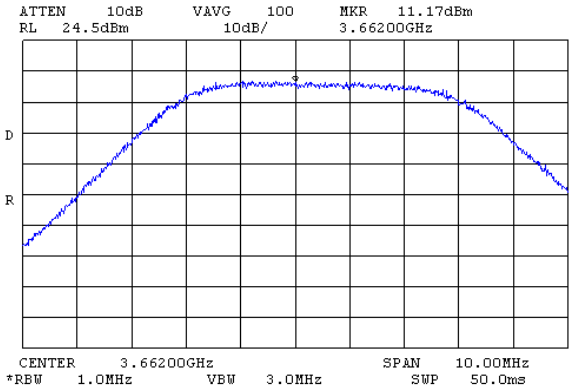


Plot # 27. Carrier Frequency 3673.25 MHz

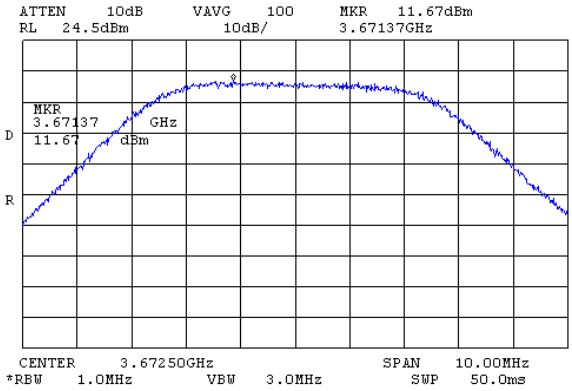
Antenna 10 dBi, bandwidth 5.0 MHz



Plot # 28. Carrier Frequency 3652.5 MHz



Plot # 29. Carrier Frequency 3662 MHz



Plot # 30. Carrier Frequency 3672.5 MHz

5.1.4 Spurious emissions at antenna terminal § 90.1323, 2.1051

Operating Frequency Range	3.650 – 3.675 GHz				
Ambient Temperature	21^0 C	Relative Humidity	59%	Air Pressure	1011 hPa

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

EBW 3.5 MHz, Carrier frequency – 3651.75 MHz.

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
3650	-21.1	-13	8.1	#34
3653.5	-22.9	-13	9.9	#36

Carrier frequency – 3662 MHz.

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
3660.25	-22.6	-13	-9.6	#42
3663.75	-24.6	-13	-11.6	#44

Carrier frequency – 3673.25 MHz.

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
3671.5	-21.6	-13	8.6	#50
3676	-23.6	-13	10.6	#52

Measured results not noted in the tables above presented:
In 5 – 3650 MHz band present in plots ## 31, 32; ## 39, 40; ## 47, 48
In 3660 – 37000 MHz band present in plots ## 37, 38; ## 45, 46; ## 53, 54

EBW 5.0 MHz, Carrier frequency – 3652.5 MHz.

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
3650	-20.6	-13	-8.3	#58
3655	-22.5	-13	-9.5	#60

Carrier frequency – 3662 MHz.

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
3659.5	-20.6	-13	-8.3	#66
3665.5	-23.3	-13	-10.3	#68

Carrier frequency – 3672.5 MHz.

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
3670	-21.5	-13	-8.5	#74
3655	-24.0	-13	-11.0	#76

Measured results not noted in the tables above presented:
In 5 – 3660 MHz band present in plots ## 55, 56; ## 63, 64; ## 71, 72
In 3660 – 37000 MHz band present in plots ## 61, 62; ## 69, 70; ## 77, 78

LIMIT

For operation in the 3650 – 3700 MHz band, the power of any emissions outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43+10Log(P) dB = -13 dBm.

TEST PROCEDURE

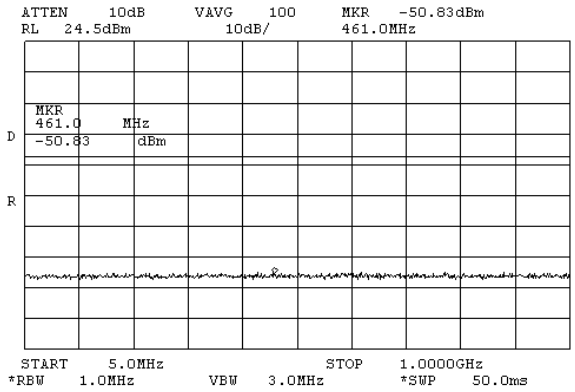
The measurements were performed in normal (transmit) mode at maximum allowed output power at all transmitted carrier (channel) frequencies of the 3650 - 3675 MHz frequency range under maximum data transfer bit rate. The EUT RF output was connected to the Spectrum Analyzer through appropriate attenuator and accounted with cable loss in SA settings.

TEST EQUIPMENT USED:

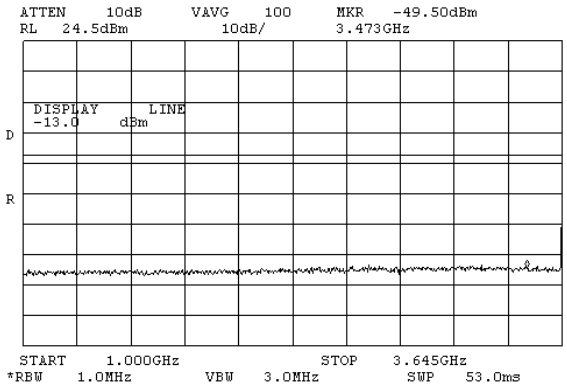
1	2	3	9			

Spurious emissions at antenna terminal test results.

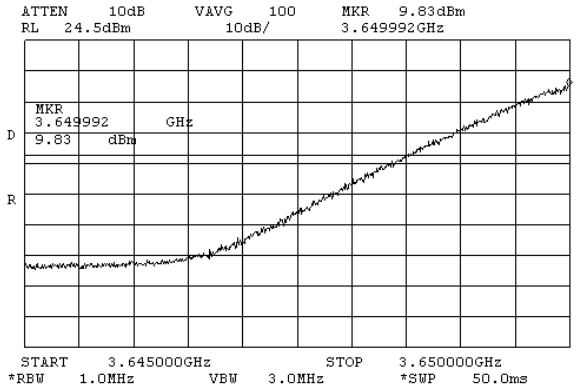
EBW 3.5 MHz **Frequency carrier 3651.75MHz**



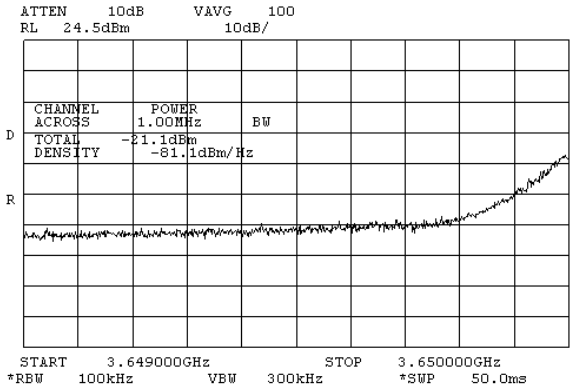
Plot # 31



Plot # 32

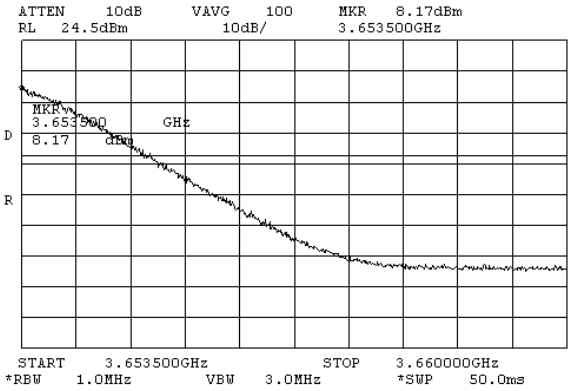


Plot # 33

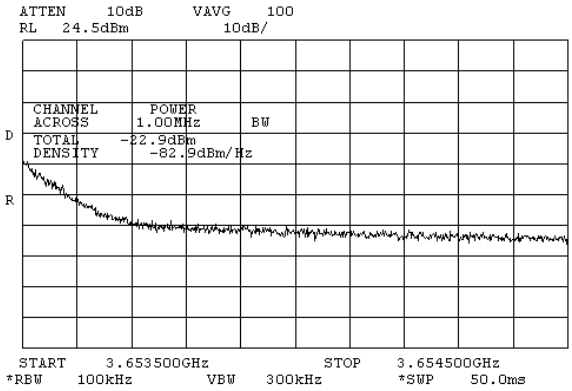


Plot # 34.

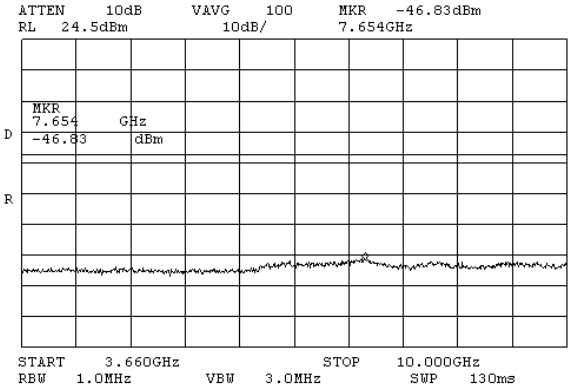
External attenuator +cable loss = 24.5 dB



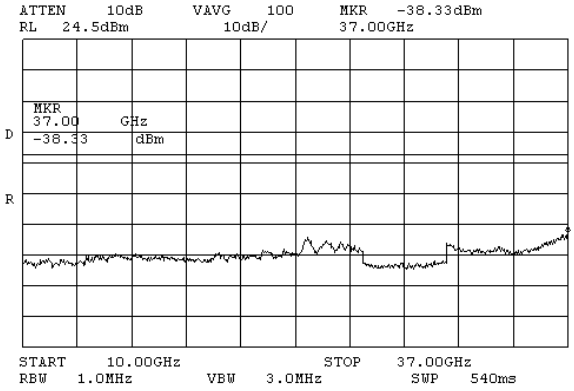
Plot # 35



Plot # 36

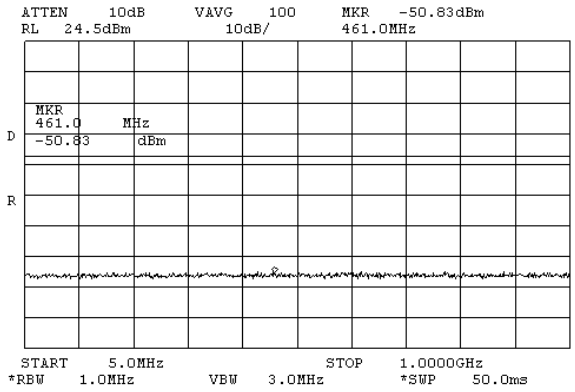


Plot # 37.

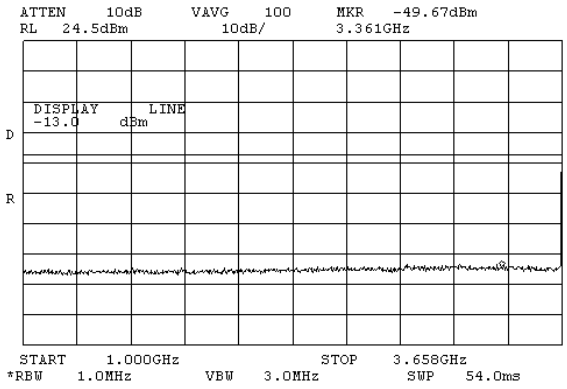


Plot # 38

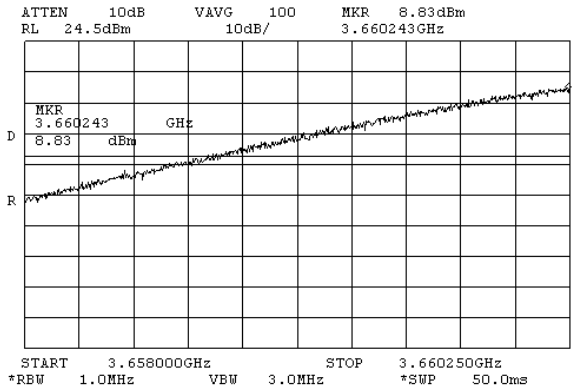
Carrier frequency 3662 MHz



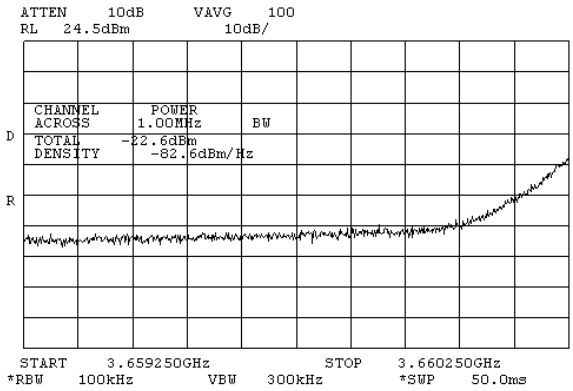
Plot # 39.



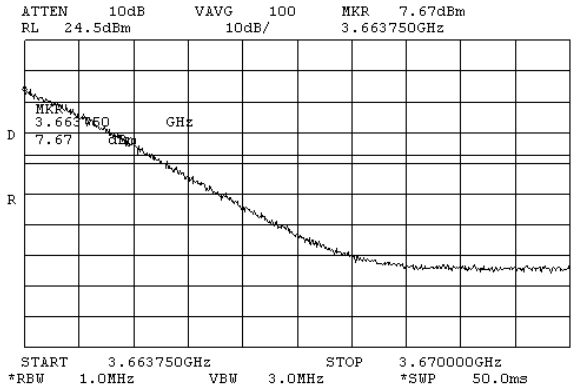
Plot # 40



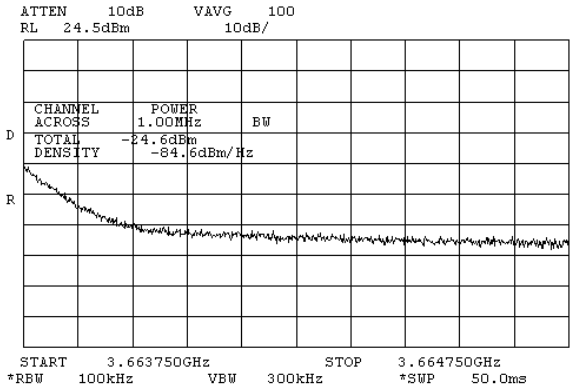
Plot # 41



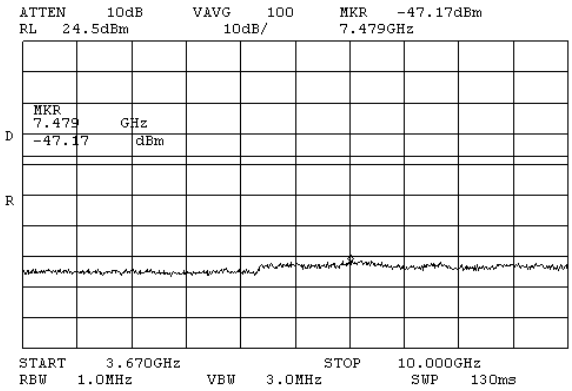
Plot # 42



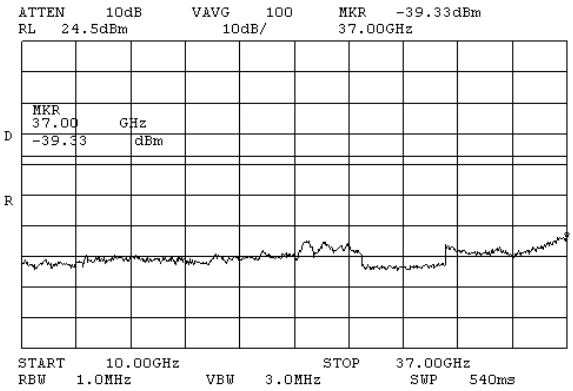
Plot # 43



Plot # 44

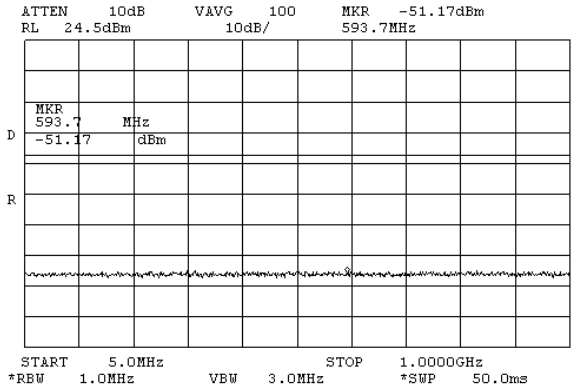


Plot # 45

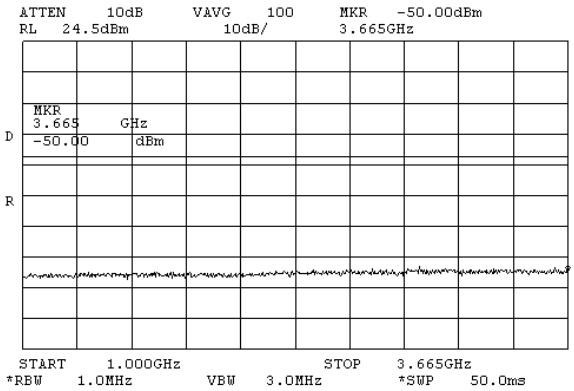


Plot # 46.

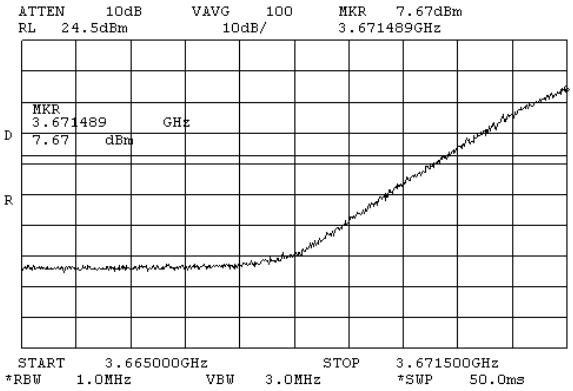
Carrier frequency 3673.25 MHz



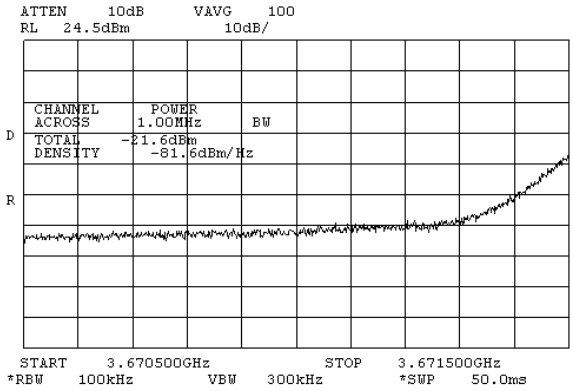
Plot # 47.



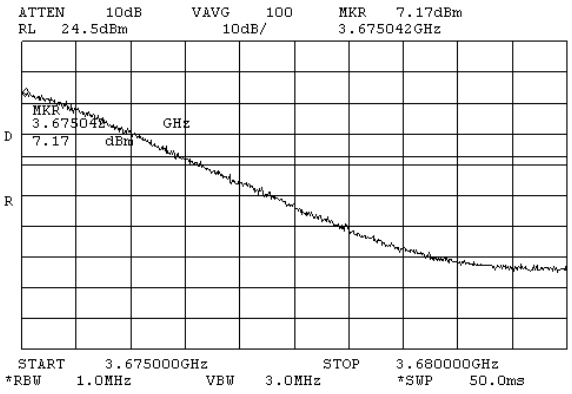
Plot # 48.



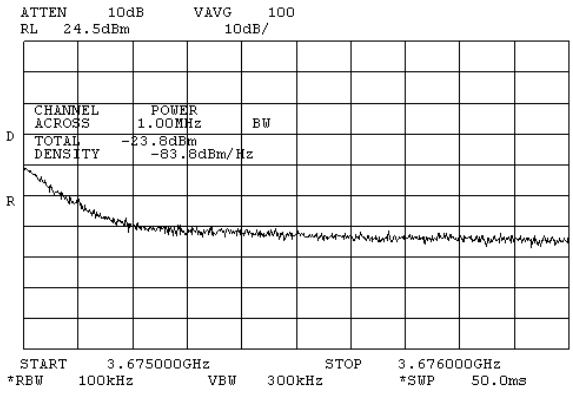
Plot # 49.



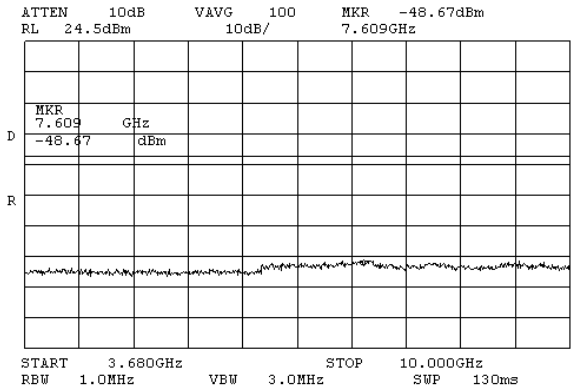
Plot # 50.



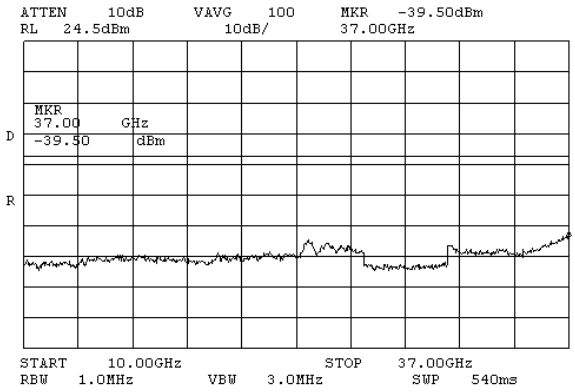
Plot # 51



Plot # 52

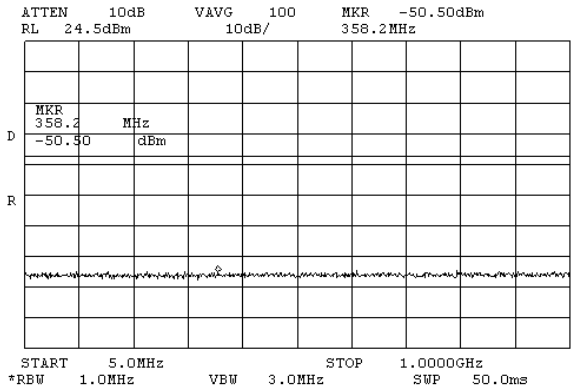


Plot # 53.

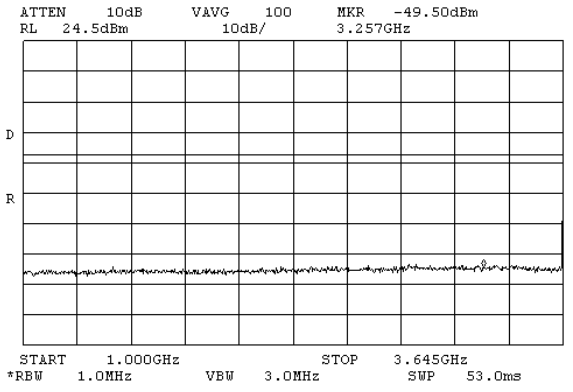


Plot # 54.

EBW 5.0 MHz **Carrier frequency 3652.5 MHz**

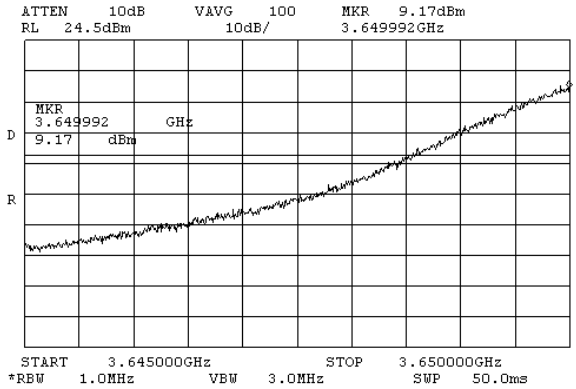


Plot # 55

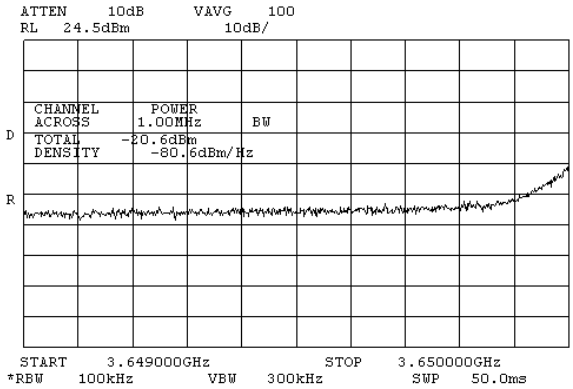


Plot # 56.

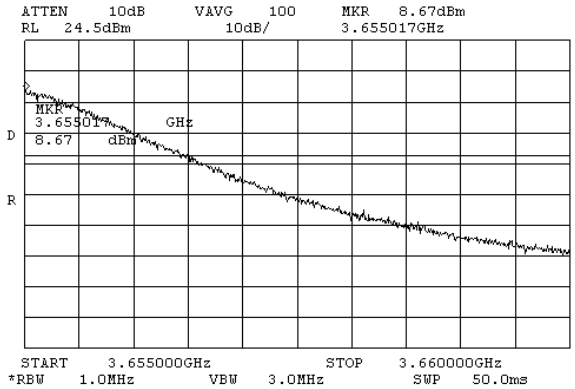
Test report No: 8812300215 **Page 30 of 56 Pages**
Title: BreezeMax 3.6 Broadband Wireless Access System
Model: BMAX-BST-AU-ODU-TDD-3.6b **FCC ID: LKT-BMAX-BA36**



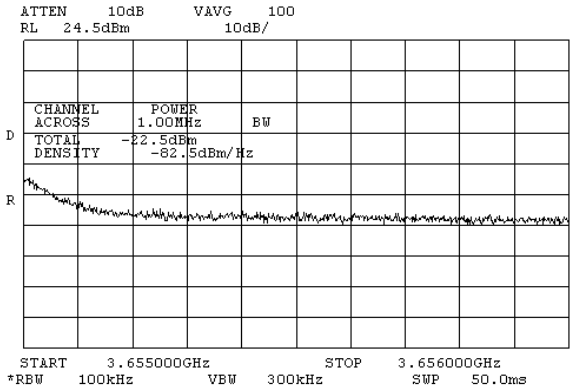
Plot # 57



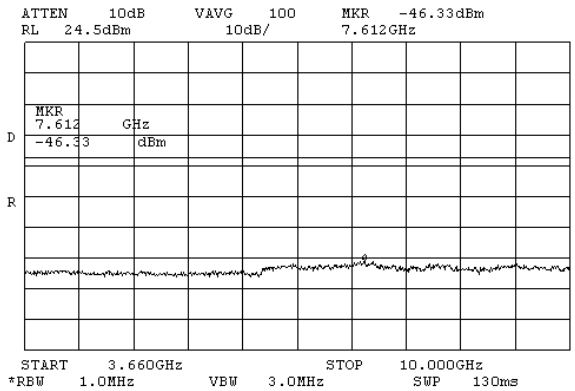
Plot # 58.



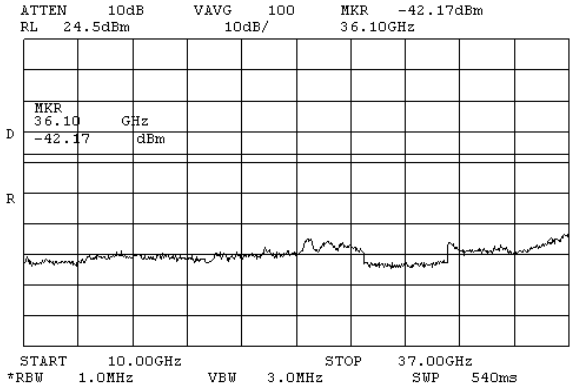
Plot # 59



Plot # 60

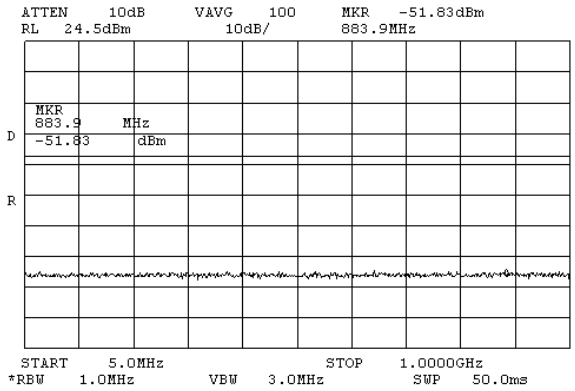


Plot # 61

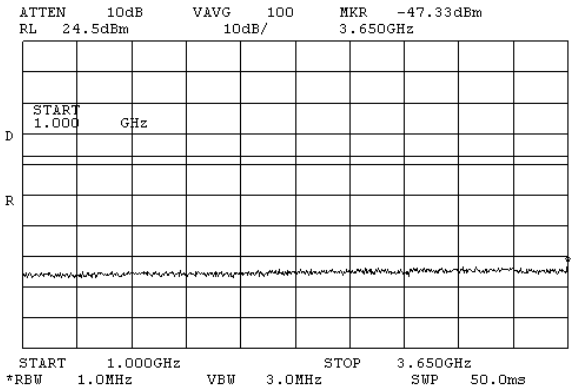


Plot # 62

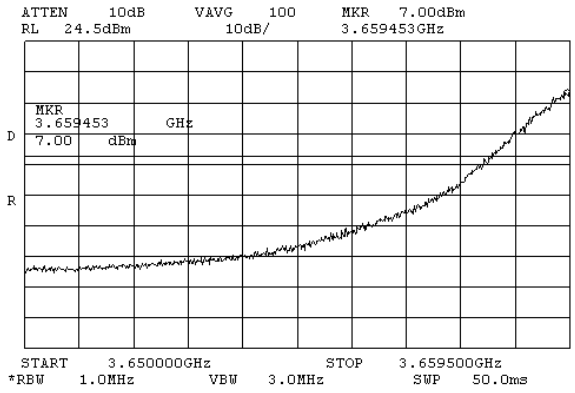
Carrier frequency 3662 MHz



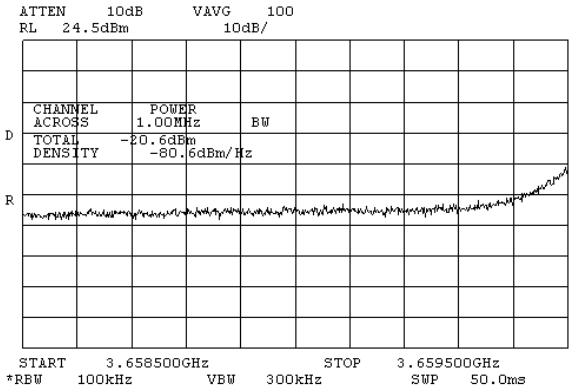
Plot # 63



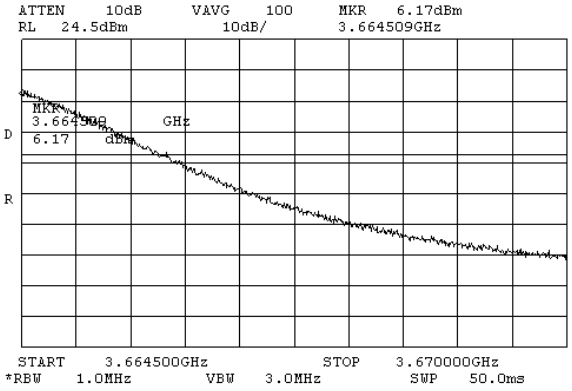
Plot # 64



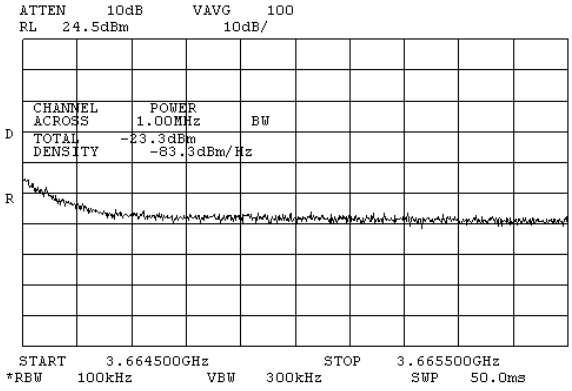
Plot # 65.



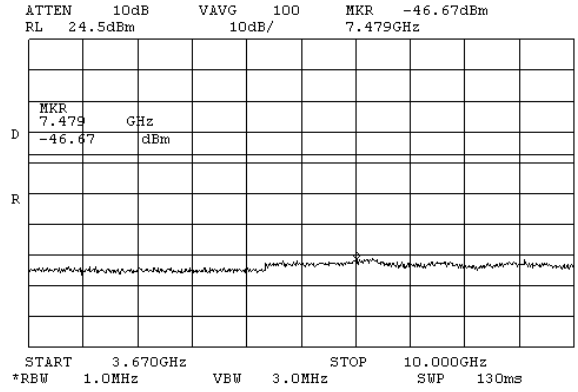
Plot # 66



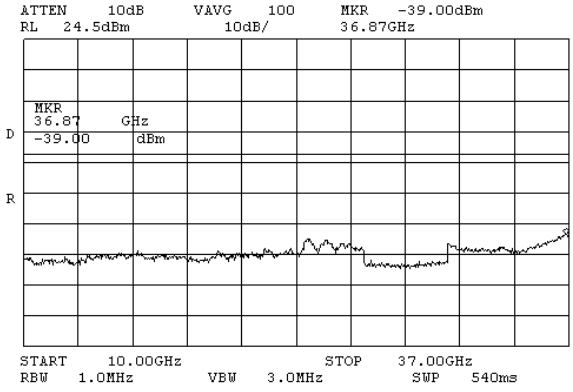
Plot # 67



Plot # 68

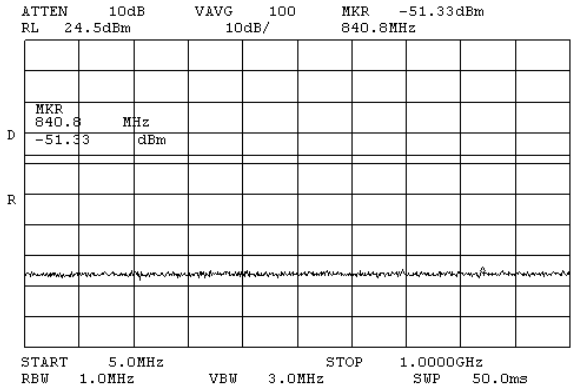


Plot # 69

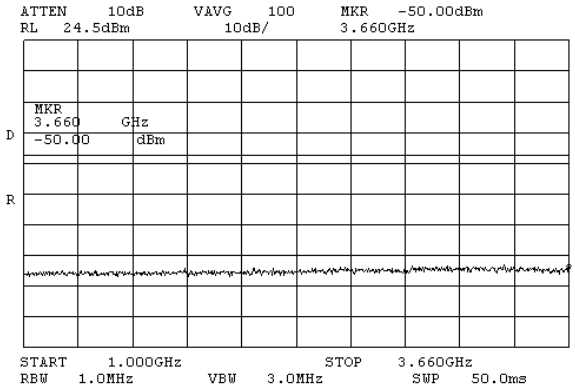


Plot # 70

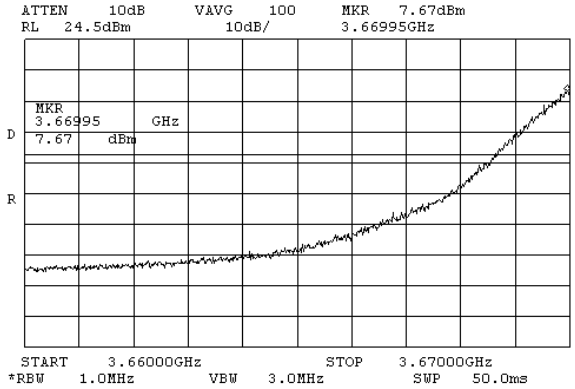
Carrier frequency 3672.5 MHz



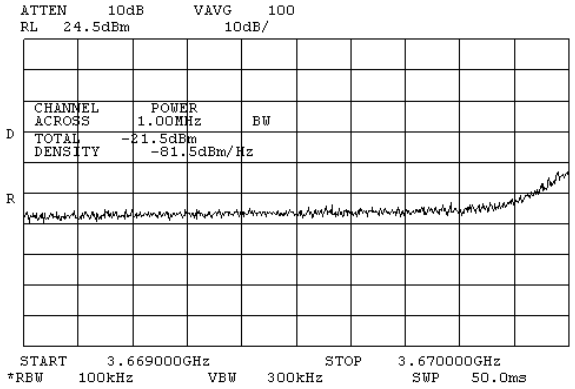
Plot # 71



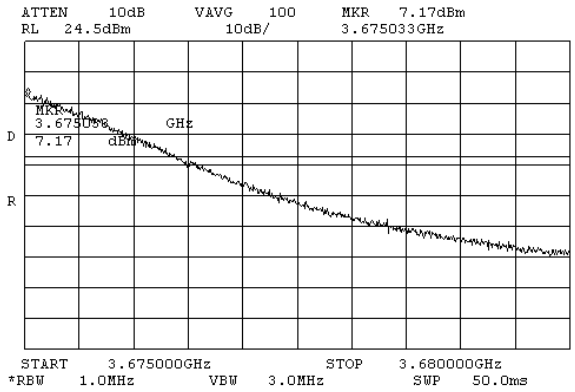
Plot # 72



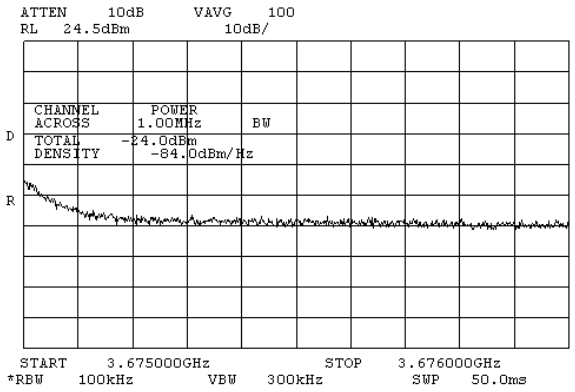
Plot # 73



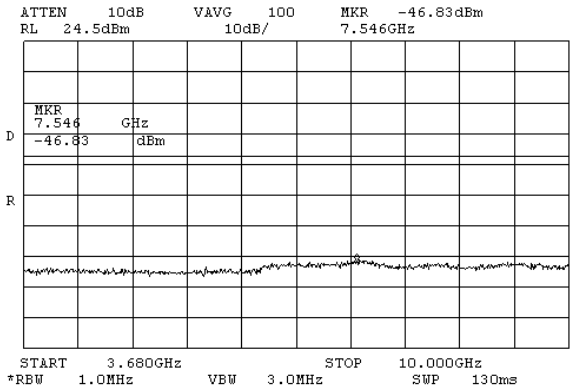
Plot # 74.



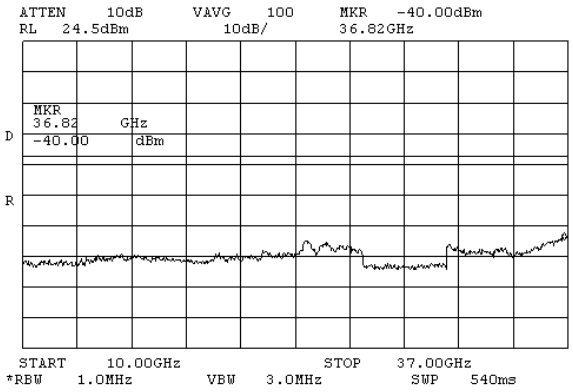
Plot # 75.



Plot # 76.



Plot # 77.



Plot # 78.

5.1.5 Radiated emissions test according to §§ 90.1323, 2.1053

Operating Frequency Range 3.650 – 3.675 GHz
Ambient Temperature 21^0 C Relative Humidity 59% Air Pressure 1011 hPa

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

EBW 3.5 MHz, Carrier frequency – 3651.75 MHz.

Frequency, MHz	Radiated emissions, dBm/dB (μV/m)	Limit, dBm/dB (μV/m)	Margin, dB	Reference to plot number
3650	-28.2/67.0	-13/82.2	15.2	#81
3653.5	-30.1/65.1	-13/82.2	17.1	#83

Carrier frequency – 3662 MHz.

Frequency, MHz	Radiated emissions, dBm/dB (μV/m)	Limit, dBm/dB (μV/m)	Margin, dB	Reference to plot number
3660.2	-30.2/65.0	-13/82.2	17.2	#87
3663.8	-33.4/61.8	-13/82.2	20.4	#89

Carrier frequency – 3673.25 MHz.

Frequency, MHz	Radiated emissions, dBm/dB (μV/m)	Limit, dBm/dB (μV/m)	Margin, dB	Reference to plot number
3671.5	-33.4/62.8	-13/82.2	20.4	#93
3675	-35.6/59.6	-13/82.2	22.6	#95

Measured results not noted in the tables above presented:
In 5 – 3660 MHz band present in plots ## 79, 80; ## 85, 86; ## 91, 92
In 3654 – 37000 MHz band present in plots ## 82, 84; ## 88, 90; ## 94, 96

EBW 5.0 MHz, Carrier frequency – 3652.5 MHz.

Frequency, MHz	Radiated emissions, dBm/dB (μV/m)	Limit, dBm/dB (μV/m)	Margin, dB	Reference to plot number
3650	-32.3/62.9	-13/82.2	19.3	#99
3655	-32.8/60.4	-13/82.2	19.8	#101

Carrier frequency – 3662 MHz.

Frequency, MHz	Radiated emissions, dBm/dB (μV/m)	Limit, dBm/dB (μV/m)	Margin, dB	Reference to plot number
3659.5	-33.4/61.8	-13/82.2	20.4	#105
3664.5	-36.2/59.0	-13/82.2	23.2	#107

Carrier frequency – 3672.5 MHz.

Frequency, MHz	Radiated emissions, dBm/dB (μV/m)	Limit, dBm/dB (μV/m)	Margin, dB	Reference to plot number
3670	-35.6/59.6	-13/82.2	22.6	#111
3675	-38.9/56.3	-13/82.2	25.9	#113

Measured results not noted in the tables above presented:
In 5 – 3660 MHz band present in plots ## 97, 98; ## 103, 104; ## 77, 78; ## 109, 110
In 3670 – 37000 MHz band present in plots ## 100, 102; ## 106, 108; ## 112, 114

TEST PROCEDURE

Substitution method.

The measurements were performed according to ANSI/TIA-603-C-2004 section 2.2.12 test method. Investigation of transmitter spurious emissions was performed. EUT was replaced by generator and substitution antenna. Level calculated from generator output level, substitution antenna gain and connected cable loss was compared with the limit. Transmitter was operated at low, middle and high carrier frequencies in 3650 – 3675 MHz frequency range.

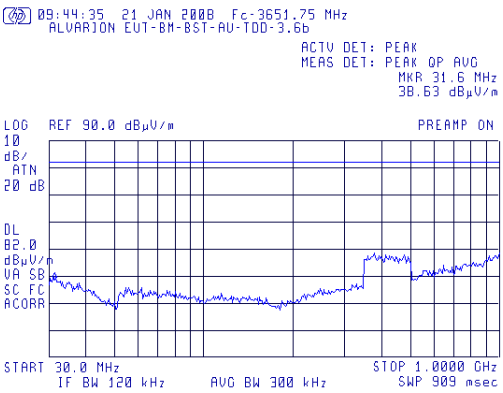
LIMIT

For operation in the 3650 – 3700 MHz band, the power of any emissions outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43+10Log(P) dB = -13 dBm (correspondent to 82.2 dBµV/m field strength at 3m distance).

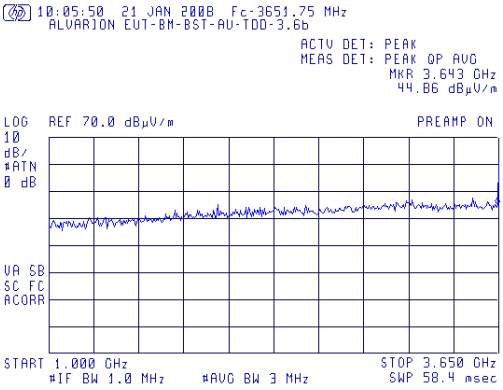
TEST EQUIPMENT USED:

1	3	4	5	6	12	

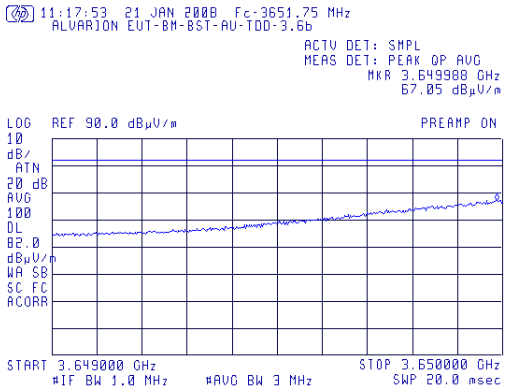
EBW 3.5 MHz **Frequency carrier 3651.75MHz**



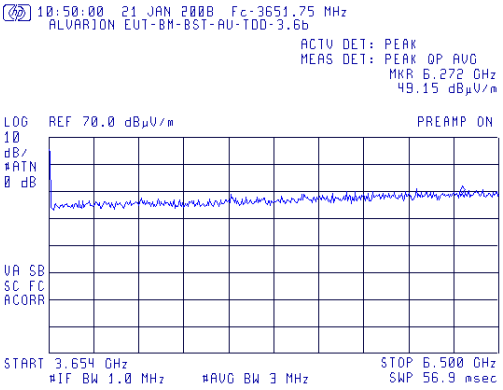
Plot # 79



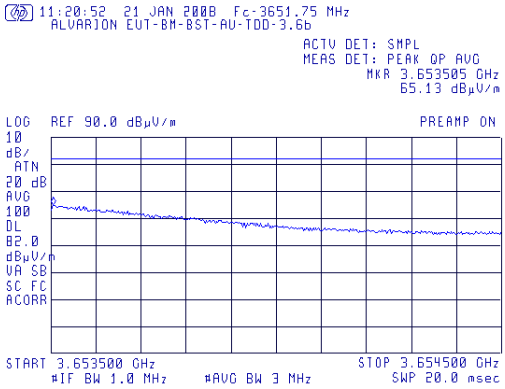
Plot # 80



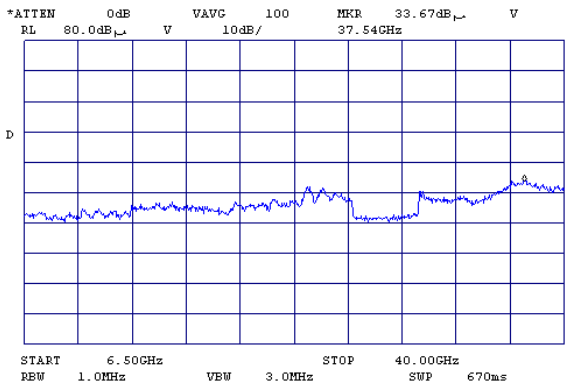
Plot # 81



Plot # 82

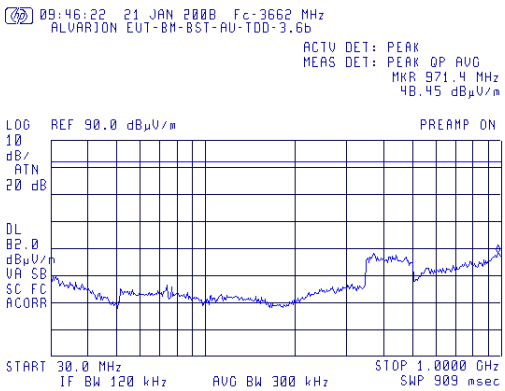


Plot # 83

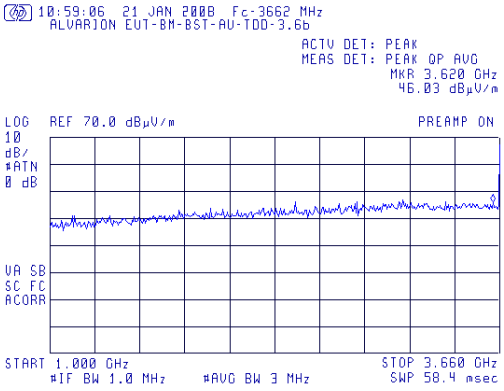


Plot # 84

Frequency carrier 3662 MHz

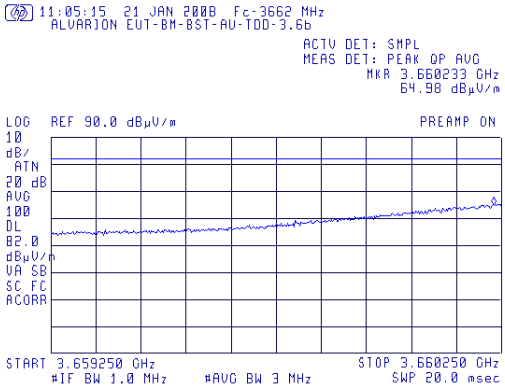


Plot # 85

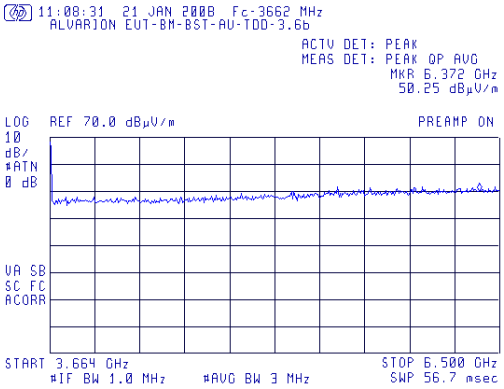


Plot # 86

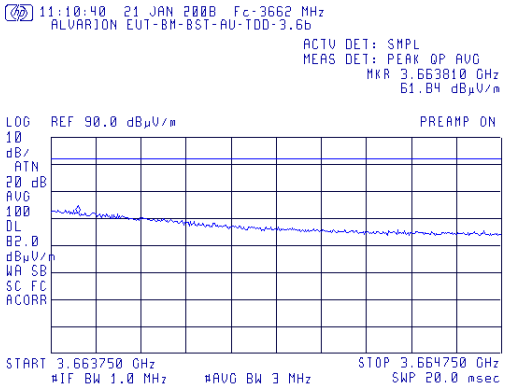
Test report No: 8812300215 **Page 40 of 56 Pages**
Title: BreezeMax 3.6 Broadband Wireless Access System
Model: BMAX-BST-AU-ODU-TDD-3.6b **FCC ID: LKT-BMAX-BA36**



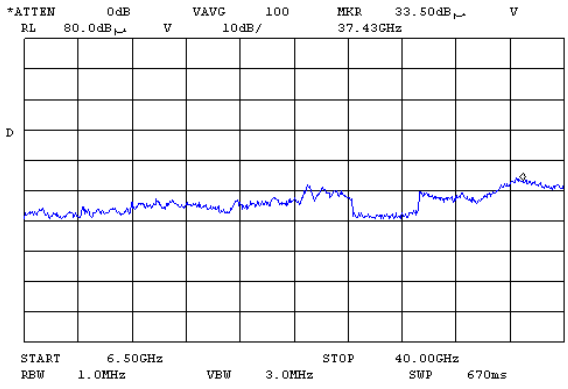
Plot # 87



Plot # 88

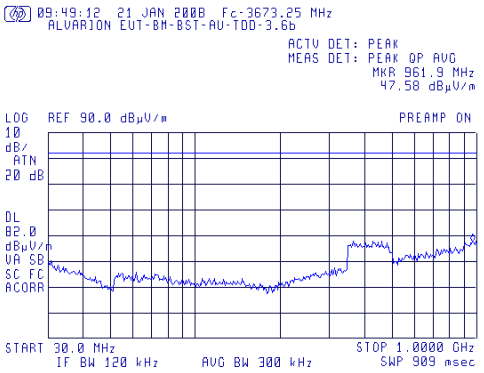


Plot # 89

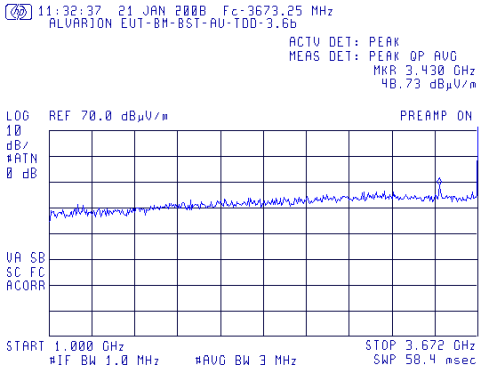


Plot # 90

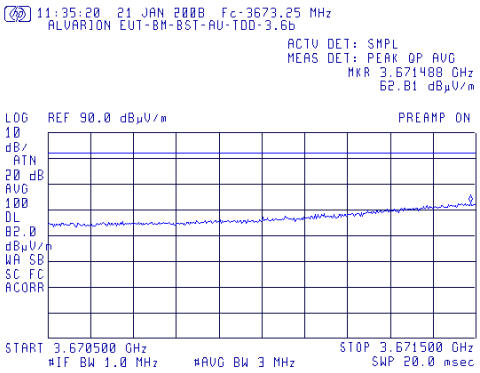
Frequency carrier 3673.25 MHz



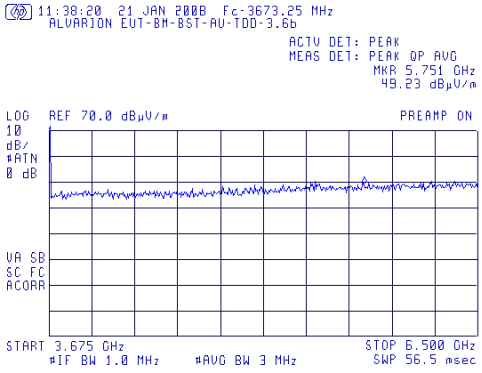
Plot # 91



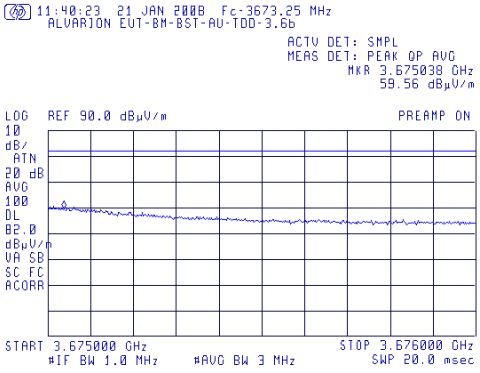
Plot # 92



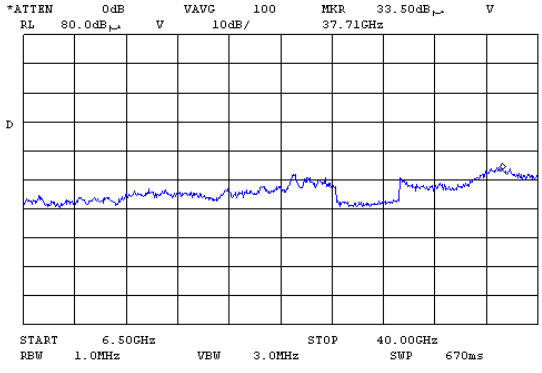
Plot # 93



Plot # 94



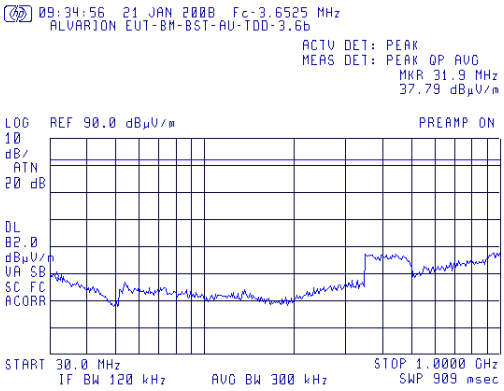
Plot # 95



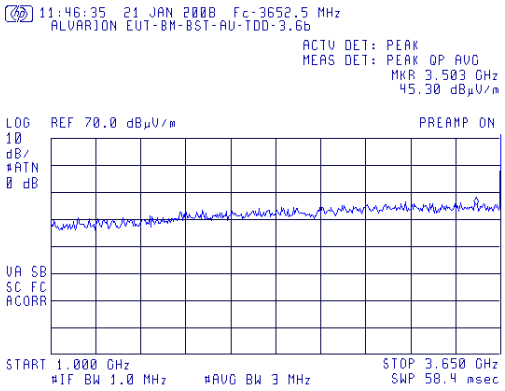
Plot # 96

Test report No: 8812300215 **Page 42 of 56 Pages**
Title: BreezeMax 3.6 Broadband Wireless Access System
Model: BMAX-BST-AU-ODU-TDD-3.6b **FCC ID: LKT-BMAX-BA36**

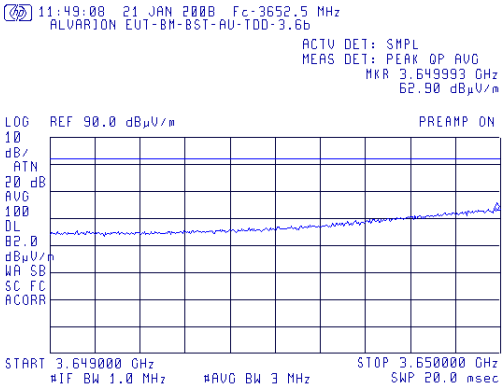
EBW 5.0 MHz **Carrier frequency 3652.5 MHz**



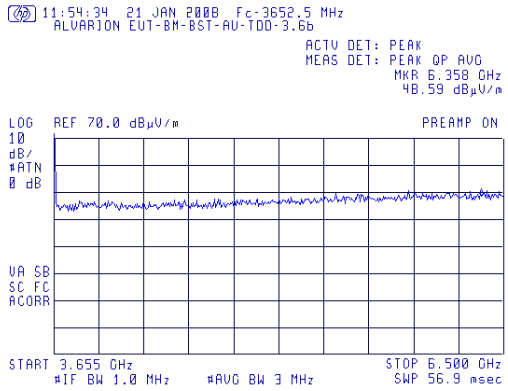
Plot # 97



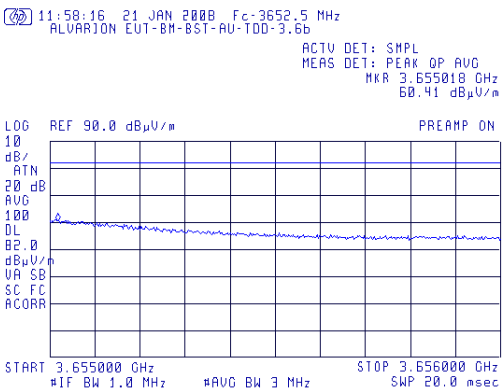
Plot # 98



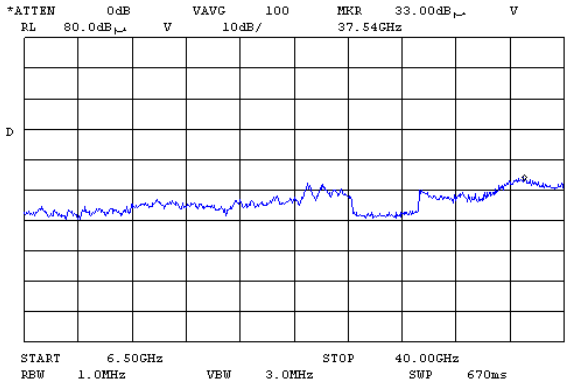
Plot # 99



Plot # 100



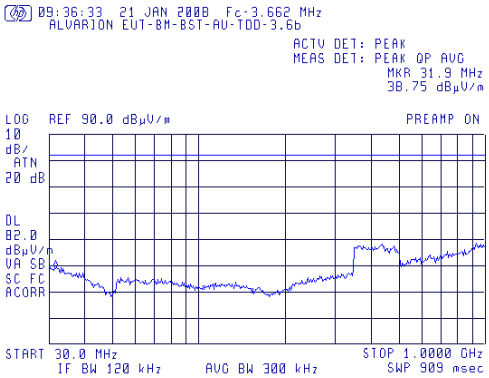
Plot # 101



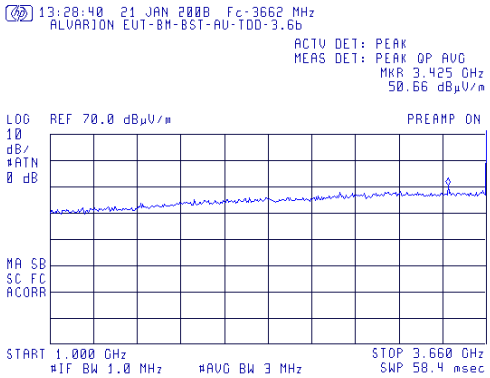
Plot # 102

Test report No: 8812300215 **Page 43 of 56 Pages**
Title: BreezeMax 3.6 Broadband Wireless Access System
Model: BMAX-BST-AU-ODU-TDD-3.6b **FCC ID: LKT-BMAX-BA36**

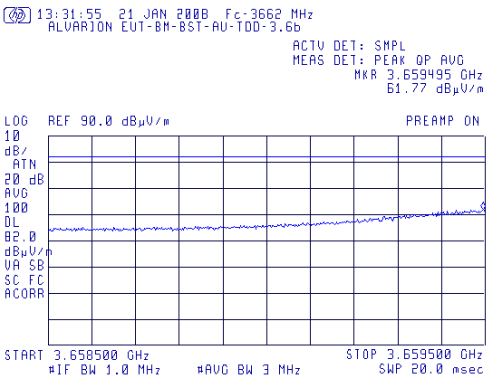
Carrier frequency 3662 MHz



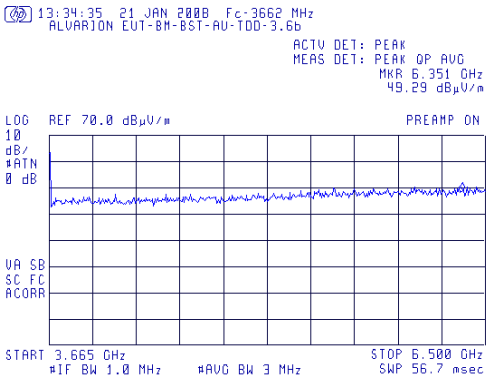
Plot # 103



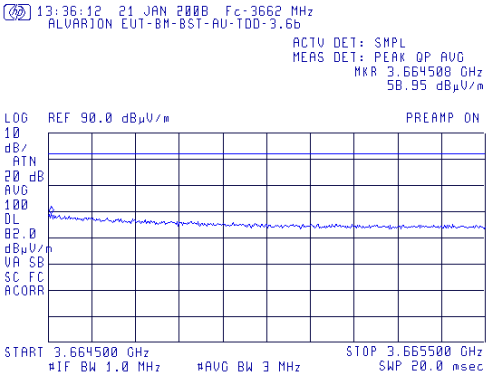
Plot # 104



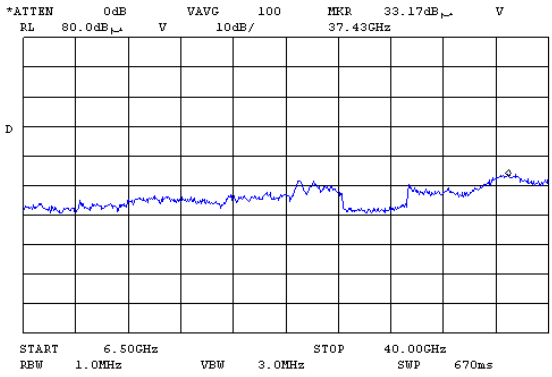
Plot # 105



Plot # 106

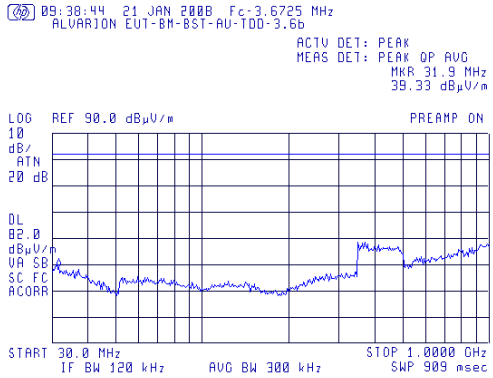


Plot # 107

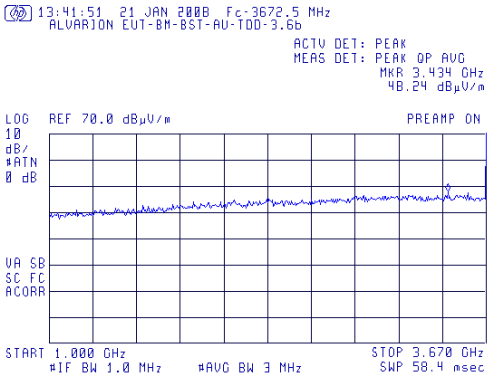


Plot # 108

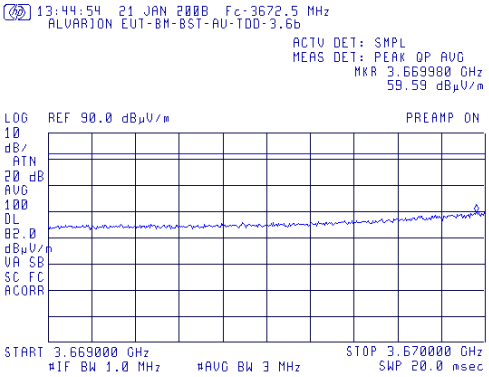
Carrier frequency 3672.5 MHz



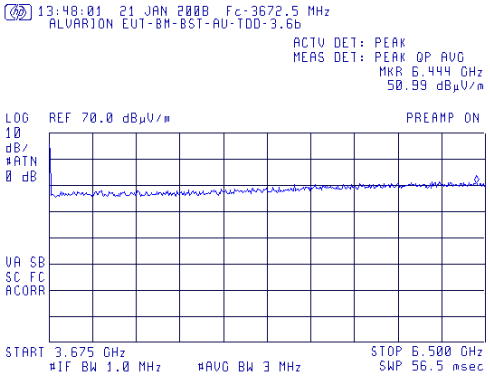
Plot # 109



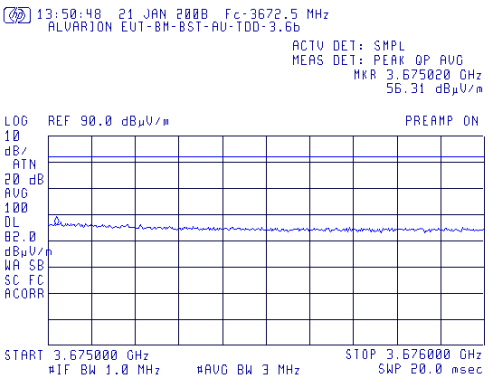
Plot # 110



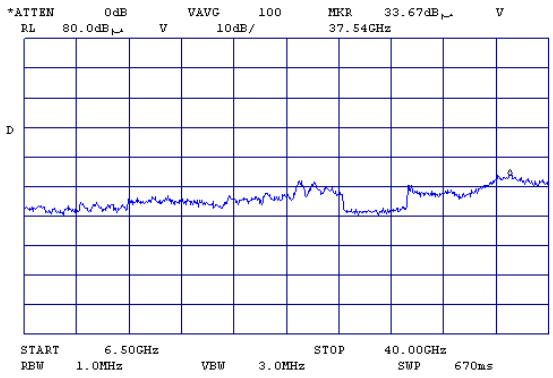
Plot # 111



Plot # 112



Plot # 113



Plot # 114

5.1.6 Frequency stability test according to § 2.1055

Operating Frequency Range 3.650 – 3.675 GHz
Ambient Temperature 22^0 C Relative Humidity 56% Air Pressure 1009 hPa

TEST CONDITIONS		Carrier frequency, 3651.75 MHz	Carrier frequency, 3673.25 MHz
Test temperature	**Test voltage(DC)**		
+20°C	Vnom (48)	3.651748580	3.673248550
	Vmin (40.8)	3.651748510	3.673248500
	Vmax (55.2)	3.651748580	3.673245620
-30°C	Vnom (48)	3.651748640	3.673248530
-20°C	Vnom (48)	3.651748560	3.673245790
-10°C	Vnom (48)	3.651748520	3.673248610
+0°C	Vnom (48))	3.651745750	3.673245810
+10°C	Vnom (48)	3.651748630	3.673248540
+30°C	Vnom (48)	3.651745810	3.673245740
+40°C	Vnom (48)	3.651745760	3.673248600
+50°C	Vnom (48)	3.651745800	3.673248570

TEST PROCEDURE

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

LIMIT

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

TEST SUMMERY

Transmitter carrier frequency stay within the authorized frequency bands 3.650 – 3.675 GHz.

TEST EQUIPMENT USED:

1	3	12				

5.2 Radiated emissions test according to § 15.109 class A

Method of measurement		ANSI 63.4 §13.1.4			
Ambient Temperature	21^0 C	Relative Humidity	59%	Air Pressure	1008 hPa

TEST DESCRIPTION:

The measurements were performed at the Open Area Test Site. The test configuration is shown in Fig.1. The EUT was arranged on a wooden table 0.8 m placed on the turn - table.
The measurements were performed at a 10 m measurement distance. The Biconilog 30 MHz-2 GHz antenna was used. The frequency range was investigated from 30 MHz to 1 GHz. The measurements were performed at each frequency at which the signal was 10 dB below the limit or less. The level was maximized by initially rotating turntable through 360°, varying the antenna height between 1 m and 4 m, rerouting EUT cables and changing antenna polarization from vertical to horizontal.

REQUIREMENTS:

EUT radiated emission shall not exceed value required in section 15.109 class A.

TEST RESULT:

Test results are presented in Table 1.

Test equipment used

1	6	7			

Table 1. Radiated emission test results

Frequency (MHz)	Antenna Polariz V/H	Turn-table Angle (°)	Antenna Height (m)	Emission Level Note 1 (dBμV/m)	Limit @ 10m (dBμV/m)	Margin Note 2 (dB)	Results
400.0	H	1.4	118	44.3	46.0	1.7	Pass
640.0	H	1.3	19	44.0	46.0	2.0	Pass
799.8	H	1.0	151	35.6	46.0	10.4	Pass
891.0	H	1.0	303	33.1	46.0	12.9	Pass
896.0	H	1.0	236	39.5	46.0	6.5	Pass
960.0	H	1.0	231	35.8	46.0	10.2	Pass

Note 1: Emission level = E Reading (dBμV) + Cable loss (dB) + Antenna Factor (dB/m).
For Cable Loss and Antenna Factor refer to Appendix 2.

Note 2: Margin (dB) = Limit (dBμV/m) – Emission level (dBμV/m)

5.3 Conducted emissions according to § 15.107 class B

Method of measurement ANSI 63.4 §13.1.3
Ambient Temperature 23^0 C Relative Humidity 52% Air Pressure 1008 hPa

Limit FCC section 15.107 class B.

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

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

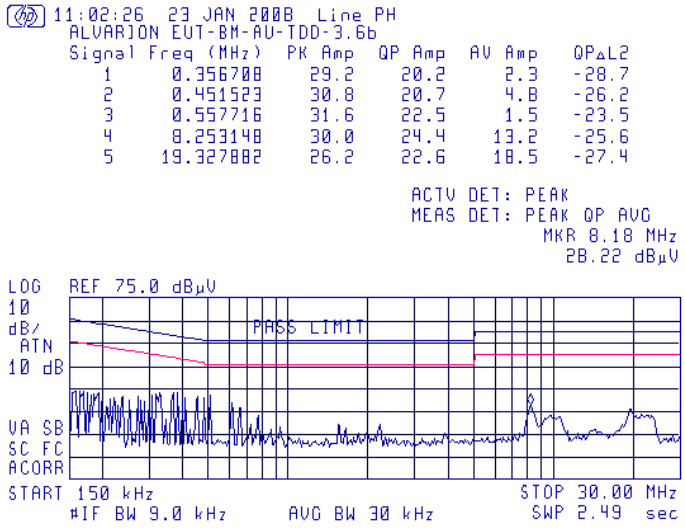
EUT was placed on a wooden table in a shielded chamber at a height of 80 cm from the floor and 40 cm from the vertical reference plane. The EUT was connected to auxiliary power supply and the measurements were performed at mains terminals by means of LISN, connected to spectrum analyzer in the frequency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

TEST RESULT:

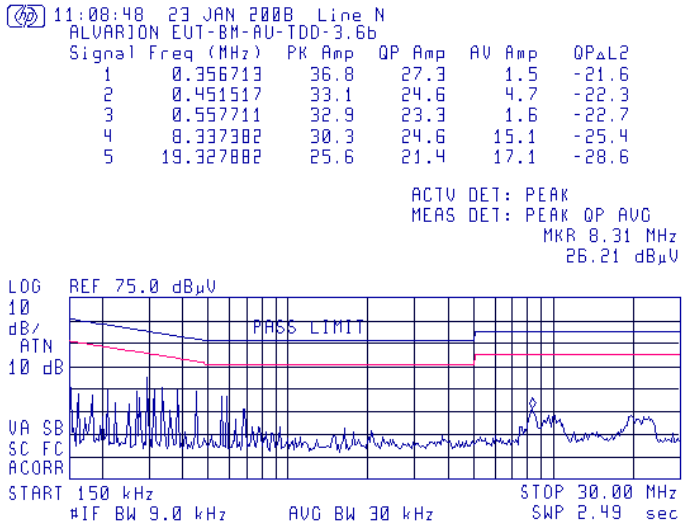
EUT meets requirements of section 15.107.
Test results are shown at plots # 115 for line Phase and # 116 for line Neutral.

Test equipment used

8	9	10			



Plot # 115. Conducted emissions test. Line Phase



Plot # 116. Conducted emissions test. Line Neutral

APPENDIX A Photographs

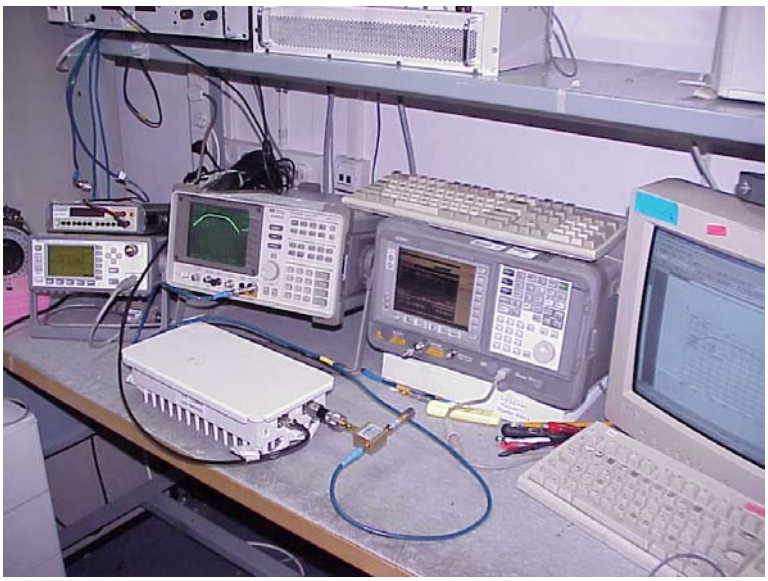


Photo 1. Measurements at antenna terminal. Test setup.

Photo 2. Test setup on OATS.

Photo 3. Component side view.

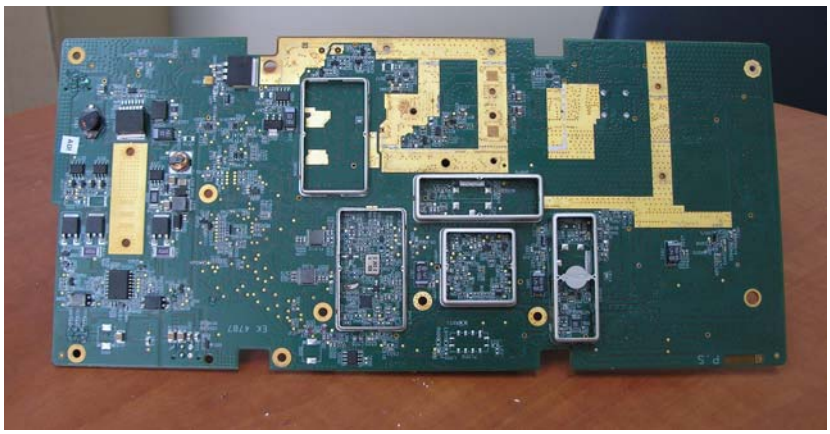


Photo 4. Print side view.

APPENDIX B Test equipment used

Test equipment used

No	Description	Manufacturer information			Due Calibration date
		Name	Model No	Serial No	
1	Spectrum Analyzer 9 kHz - 50 GHz	HP	8564E	3720A00699	October 2008
2	Spectrum Analyzer 9 kHz - 26.5 GHz	Adjilent	E4407B	US40241729	October 2008
3	Attenuators 20 dB DC - 18 GHz	Weinshel Engineering	33-30-34	A3451	Aug 2008
4	Cable RF 1m	Huber-Suhner	Sucoflex 104	21324/4PE	Aug 2008
5	Double Ridged Guide Antenna 1 – 18 GHz	EMCO	3115	5802	March 2008
6	Antenna Biconilog 30 – 2000 MHz	Schaffner-Chase	CBL6112B	S/N 23181	May 2008
7	EMI Receiver 9 kHz-6.5 GHz	HP	8546A+8546 0A	SII 4068	April 2008
8	LISN 9 kHz – 30 MHz	FCC	LISN 250-32-4-16	SII5023	March 2008
9	Transient limiter 0.009-200 MHz	HP	11947A	3107105	March 2008
10	Spectrum analyzer 10 KHz-26.5 GHz	HP	E7405A	SII 4944	March 2008
11	Attenuator 50 Ohm 3 dB DC-18 GHz	HP	8491B	50655	May 2008
12	Cable RF 3m	Huber-Suhner	Sucoflex 104PE	21328/4PE	Aug 2008

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

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

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

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

Cable Loss
Type: Sucoflex 104PE; Ser.No.21328/4PE; 3 m length

Point	Frequency (GHz)	Cable Loss (dB)
0	0.0-1.8	1.67
1	1.8 – 3.6	2.39
2	3.6 – 5.4	3.04
3	5.4-7.2	3.58
4	7.2-9.0	4.06
5	9.0-10.8	4.49
6	10.8-12.6	4.91
7	12.6-14.4	5.31
8	14.4-16.2	5.66
9	16.2-18.00	6.01

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

Specification references

47 CFR part 15: 2006	Radio Frequency Devices
ANSI C63.4: 2003	American National Standard for Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI/TIA-603-C: 2004	Land Mobile FM or PM Communication Equipment Measurement and Performance.