Test Report No. 9012359786

Applicant: Alvarion Ltd

BreezeNETB 300

Model: BU/RB-B300D-5X-GigE

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

ACLASS®
ISO/IEC 17025 Accredited for Testing

ACLASS Accreditation Services
Certificate Number: AT-1359

42 Chaim Levanon St. Tel-Aviv 69977 Israel. Management: Tel: 972-3-6467800 Fax: 972-3-6467779 www.sii.org.il
Electronics: Tel: 972-3-6465050 Fax: 972-3-7454026 - Alarms Systems Section: Tel: 972-3-6465370 Fax: 972-3-6467262

Table of contents

1. Applicant information

Applicant:	Alvarion Ltd
Address:	21A Habarzel str, Tel-Aviv, 69710, Israel
Sample for test selected by:	The customer
The date of tests:	11 – 17 August, 13, 15 September 2010

Equipment under test information

Description of Equipment Under Test (EUT):	BreezeNETB 300
Model:	BU/RB-B300D-5X-GigE
Serial Number:	NA
Manufactured by:	Alvarion Ltd

2. Test performance

Location:	SII EMC Section
Purpose of test:	Apparatus compliance verification in accordance with emission requirements
Test specifications:	47CFR part 15.207, 15.209 part 90. 210 – 90. 215 part 1 §1.1310, RSS-210

Reference Documents:

CFR 47 FCC:	Rules and Regulations; Part 15. "Radio frequency devices"; Part. 90. Private land mobile radio services.
Radio Standard Specification (RSS) Canada	RSS-Gen, RSS-211

This Test Report contains 66 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 90, §§ 90.210, 90.213. 90.1215 and RSS-211.

Transmitter characteristics	Subclasses
Peak transmitter power	90.1215(a), RSS-111 4.1/5.3
Peak power spectral density	90.1215(b), RSS-111 4.2/5.3
Power spectral density mask	90.210(1), RSS-111 4.3/5.4
Undesired conducted emissions test	90.210 L, RSS-111 4.3/5.4
Undesired radiated emissions test	90.210 L, RSS-111 4.3/5.4
Ratio of the peak excursion test	90.1215(e)
Frequency stability test	90.213, RSS-111 5.2
Receiver spurious emission	RSS-111 5.5

Telematics Laboratory

26 October 2010

Name: Eng. Yuri Rozenberg
Position: Head of EMC Branch

Name: Michael Feldman
Position: Test Technician

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
Radiated emissions in the open field test site at 3 m measuring distance:	
30 MHz – 1.0 GHz	2 Uc (E) = ± 4.32 dB
1.0 GHz – 18 GHz	2 Uc (E) = ± 4.47 dB

4. Equipment under test description.

*The customer provided description.

4.1 General description

The BNB-300 is designed as an adaptable platform, for high availability, high capacity and long range wireless services, in the unlicensed and licensed frequency spectrum. The platform architecture and software framework will enable various product configurations, providing a rich suite of applications and system deployment models.
The generic platform is based on a state-of-the-art 802.11n technology, with robust capabilities including Orthogonal Frequency Division Multiplexing (OFDM), Multiple-Input Multiple-Output (MIMO), Time Division Duplexing (TDD) and Spectrum Management, the BNB-300 will offer line-of-sight (LOS) as well as non-line-of-sight (NLOS) operation, such as for drive through trees, foliage and around buildings.

EUT technical characteristics

Transmitter technical characteristics.			**Note**
Stand-alone/fixed use	Always at distance at least 2 m from the people and public area.		
Assigned frequency range	4940 MHz – 4990 MHz		
Operating frequency range	4945 MHz – 4985 MHz		5MHz EBW
	4950 MHz – 4980 MHz		10 MHz EBW
	4960 MHz, 4980 MHz		20 MHz EBW
RF channel spacing	5/10/20 MHz		
Maximum rated output power	9 dBm		
Antenna connection	N-type for external antenna		Professional installation
Type of modulation	QPSK, 4QAM, 16QAM, 64QAM		
Type of multiplexing	OFDM		
Modulating test signal (baseband)	PRBS		
Antenna information			
Type	Manufacturer	Model	Gain, dBi
Internal/ dual polarized	MTI	P/N 850102	23
Flat panel , dual polarized	MTI	P/N 850102	23

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

Limit for power density for general population/uncontrolled exposure is 1(mW/cm^2) or 10 (W/m^2).
The power density calculation is $S = (Pt / 4\pi r^2)$.
Where:
Pt - The transmitted power (EIRP) (mW)
r - The distance from the unit. (cm)
The limit 1(mW/cm^2) can be calculated from the above based on the following data:
Pt- the transmitted power whish is equal to the peak output power 5.81 dBm plus external antenna gain 23 dBi . The maximum peak EIRP = 28.81 dBm = 760.3 mW
Maximum allowed distance "r", where RF exposure limits may not be exceeded,
r = SQRT(760.3/4π) and is more than 8 cm from the antenna main lobe.

6. EUT test configuration

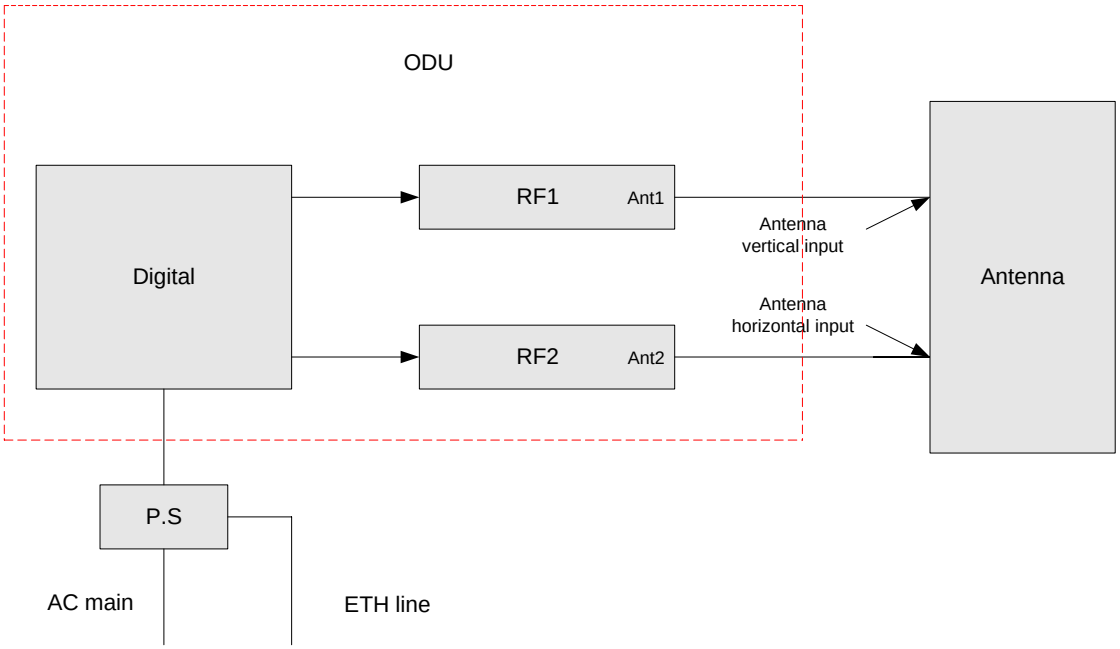


Fig. 1. EUT block diagram.

7. Test results

7.1 Transmitter characteristics

7.1.1 Peak transmit power test according to §90.1215(a)(b).

Method of measurement FCC part 2.1049
Operating Frequency Range 4945 - 4985 MHz
Ambient Temperature 23^0 C Relative Humidity 49% Air Pressure 1011 hPa

EBW, MHz	Carrier frequency MHz	99% emission bandwidth, MHz	Peak output power, dBm	Calculated peak output power limit, dBm	Margin, dBm	Reference to plot #
5	4945	5.13	-1.0	0	1.0	1, 4
	4965	5.08	-0.48	0	0.48	2, 5
	4985	5.00	-0.60	0	0.60	3, 6
10	4950	9.31	-0.05	3.0	3.05	7, 10
	4965	9.40	-0.50	3.0	3.50	8, 11
	4980	9.16	-2.34	3.0	5.34	9, 12
20	4960	18.22	5.81	6.0	0.19	13, 15
	4980	17.96	3.81	6.0	2.19	14, 16

LIMIT

Channel bandwidth, MHz	Low power transmitter limit, dBm	Calculated transmitter power limit, dBm
5	14	0
10	17	3.0
20	20	6.0

The peak power in table above is limited to 9 dBi antenna gain. The peak transmit power should be reduced by the amount in dB that the antenna gain exceed 9 dBi.
For used antenna 23 dBi peak transmit power was calculated as P_{BW} – (23 – 9)

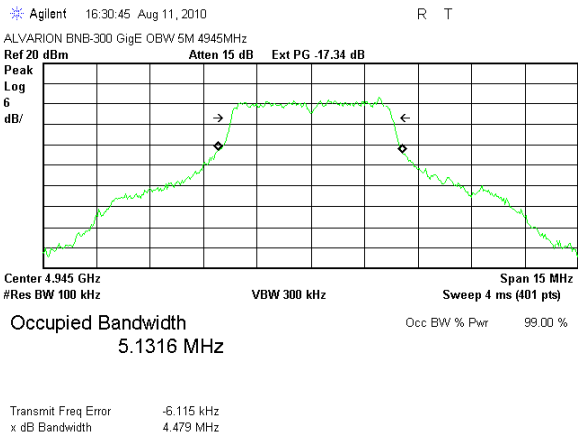
TEST PROCEDURE

The measurements were performed in normal (transmitting) mode of operation for carrier (channel) frequency at bottom, middle and the top of the 4940 - 4990 MHz frequency band under maximum data transfer bit rate. The EUT RF output was connected to the Spectrum Analyzer through appropriate attenuator and accounted with cable loss in SA settings. The 99% EBW measurements were performed with RBW = 1% of EBW and VBW>RBW.

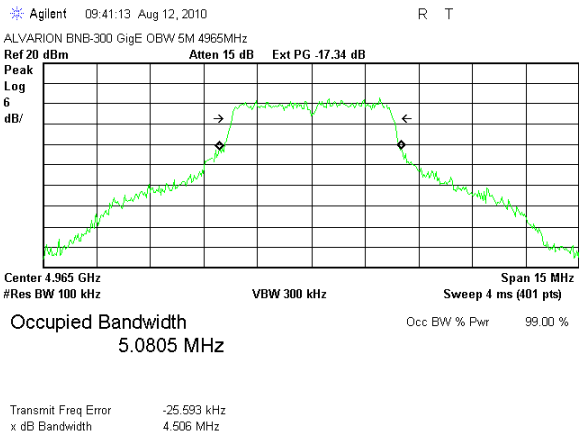
TEST EQUIPMENT USED:

2	3	4	5			

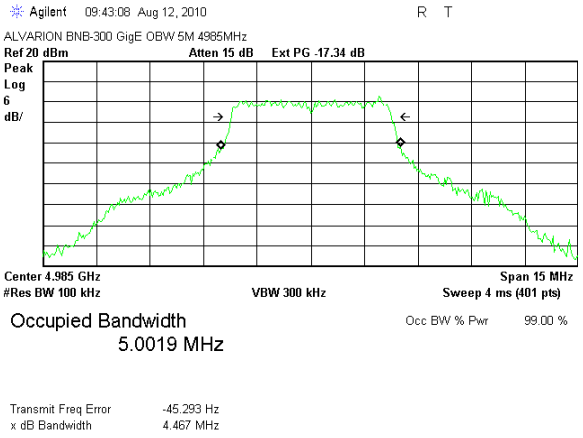
5 MHz EBW option, 99% bandwidth



Plot # 1

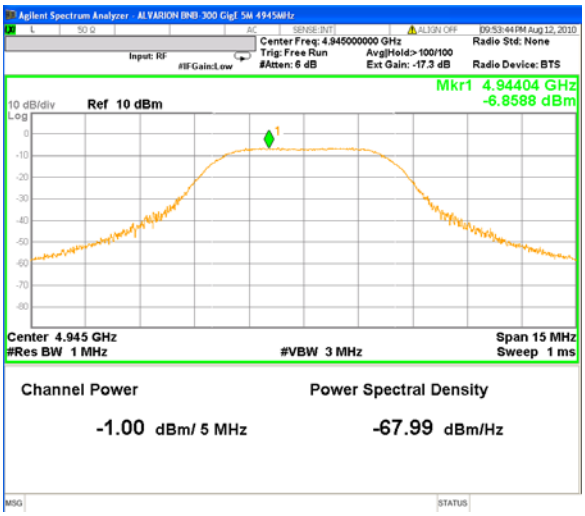


Plot # 2

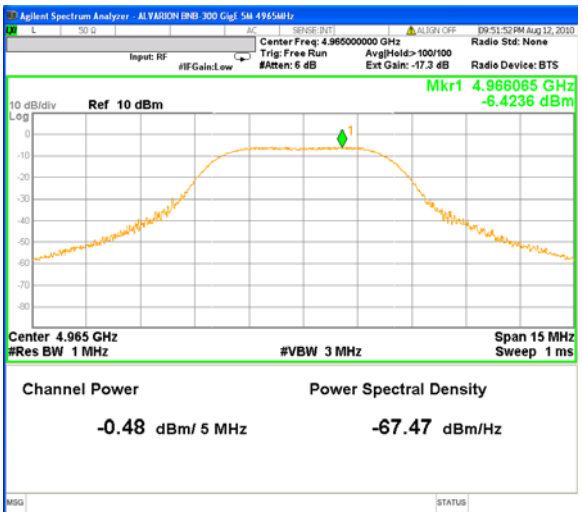


Plot # 3

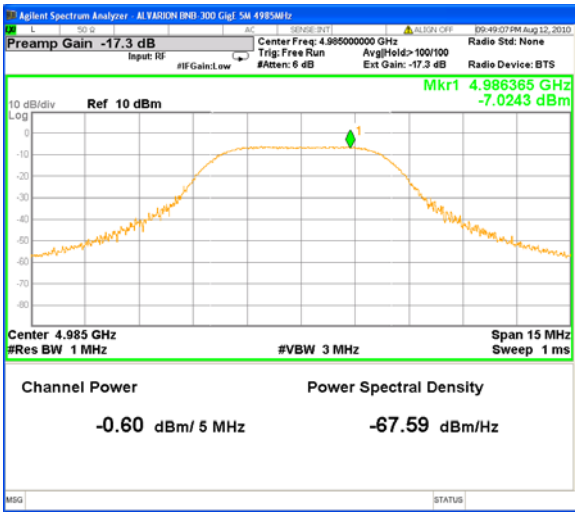
5 MHz EBW option. Peak output power results



Plot # 4



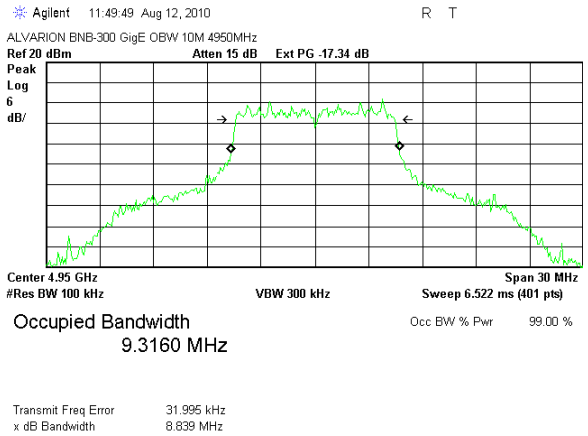
Plot # 5



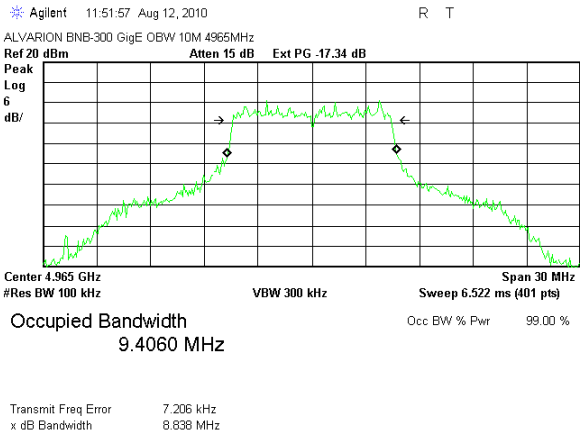
Plot # 6

Insertion loss of external attenuator, power splitter and cable = 17.3 dB

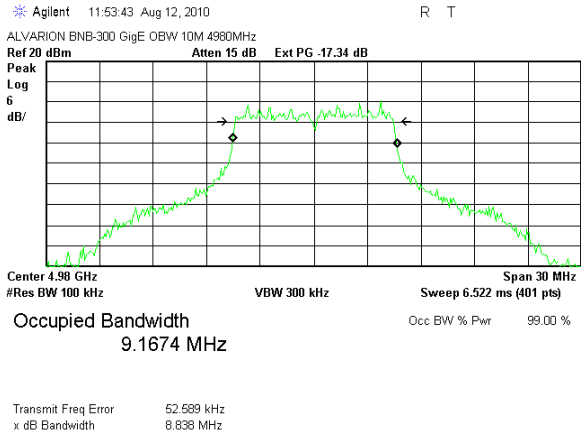
10 MHz EBW option, 99% bandwidth



Plot # 7



Plot # 8

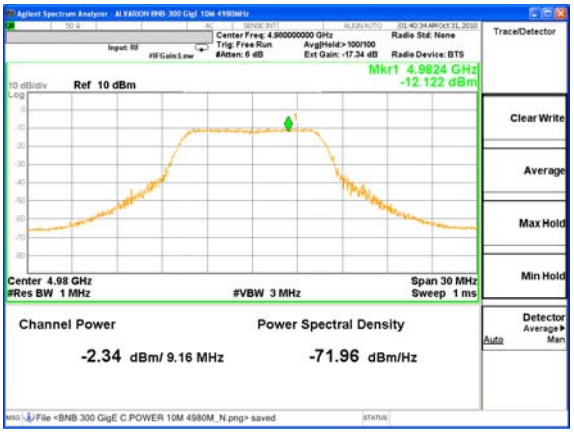


Plot # 9

10 MHz EBW option. Peak output power results

Plot # 10

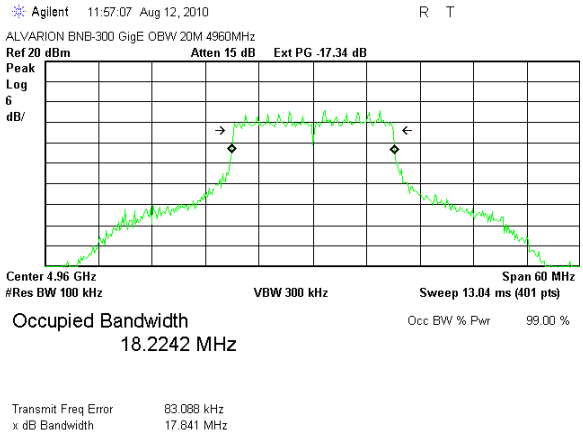
Plot # 11



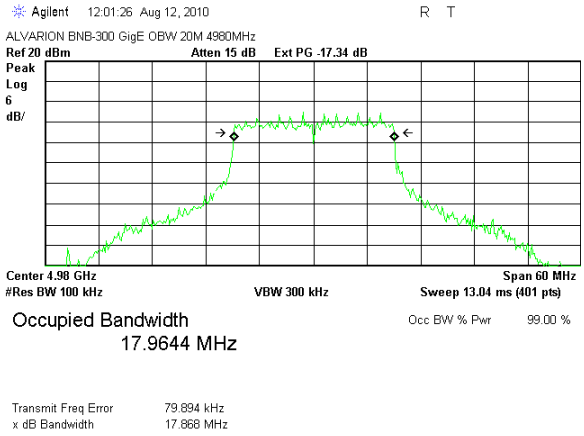
Plot # 12

Insertion loss of external attenuator, power splitter and cable = 17.3 dB

20 MHz EBW option, 99% bandwidth

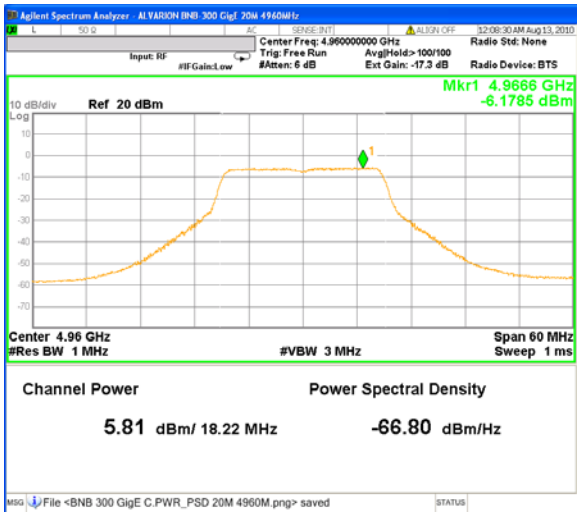


Plot # 13

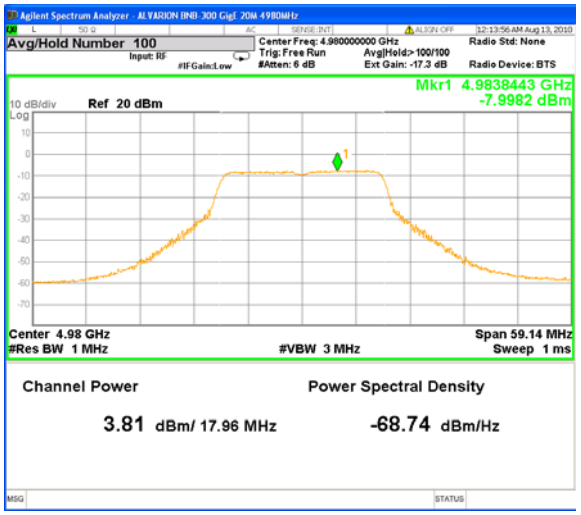


Plot # 14

20 MHz EBW option. Peak output power



Plot # 15



Plot # 16

Insertion loss of external attenuator, power splitter and cable = 17.3 dB

7.1.2 Peak power spectral density of low power devises test according to §90.1215(b).

Method of measurement FCC p.90.1215 (d)
Operating Frequency Range 4945 - 4985 MHz
Ambient Temperature 23^0 C Relative Humidity 49% Air Pressure 1011 hPa

EBW, MHz	Carrier frequency MHz	Measured PSD, dBm	Calculated PSD limit, dBm	Margin, dBm	Reference to plot #
5	4945	-6.85	0	6.85	4
	4965	-6.42	0	6.42	5
	4985	-7.0	0	7.0	6
10	4950	-8.56	3.0	11.5	10
	4965	-9.62	3.0	12.6	11
	4980	-12.1	3.0	15.1	12
20	4960	-6.17	6.0	0.17	15
	4980	-7.99	6.0	1.99	16

LIMIT

The power spectral density is limited to 8 dBm/MHz. The power spectral density should be reduced by the amount in dB that the antenna gain exceeds 9 dBi.
For used antenna 23 dBi power spectral density limit was calculated as PSD limit – (23 – 9) = 8 – (23-9) = -6.0 dBm/MHz

TEST PROCEDURE

The measurements were performed in normal (transmitting) mode of operation for carrier (channel) frequency at bottom, middle and the top of the 4940 - 4990 MHz frequency band under maximum data transfer bit rate. The EUT RF output was connected to the Spectrum Analyzer through appropriate attenuator and accounted with cable loss in SA settings.

TEST EQUIPMENT USED:

2	3	4	5			

7.1.3 Power spectral density mask according to §90.210(1).

Method of measurement		FCC part 90.210 (1)(7)			
Operating Frequency Range		4945 - 4985 MHz			
Ambient Temperature	23^0 C	Relative Humidity	49%	Air Pressure	1011 hPa

LIMIT

Test was performed according to limitation of part 90.210 emission mask L.
The power spectral density of any emissions must be attenuated below the output power of the transmitter as follows:
On any frequency removed from assigned frequency between 0 – 45% - 0 dB
On any frequency removed from assigned frequency between 45 – 50% - 10 dB
On any frequency removed from assigned frequency between 50 – 55% - 20 dB
On any frequency removed from assigned frequency between 55 – 100% - 28 dB
On any frequency removed from assigned frequency between 100 – 150% -40 dB
On any frequency removed from assigned frequency above 150% - 40 dB.

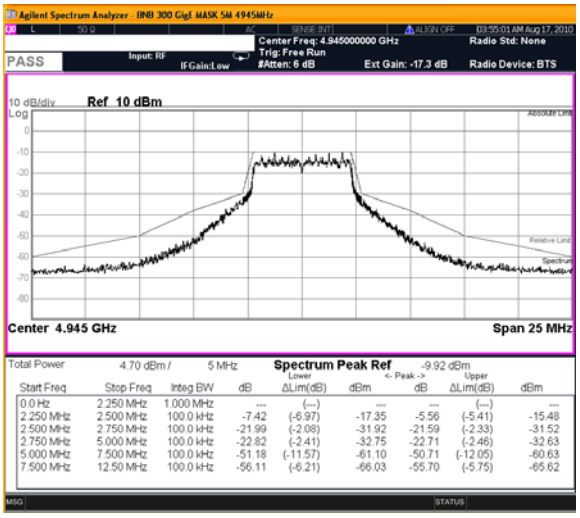
TEST PROCEDURE

The measurements were performed in normal (transmitting) mode of operation for carrier (channel) frequency at bottom, middle and the top of the 4940 - 4990 MHz frequency band under maximum data transfer bit rate. The EUT RF output was connected to the Spectrum Analyzer through appropriate attenuator and accounted with cable loss in SA settings. The Emission mask measurements were performed with RBW = at least 1% of EBW and VBW = 30 kHz.

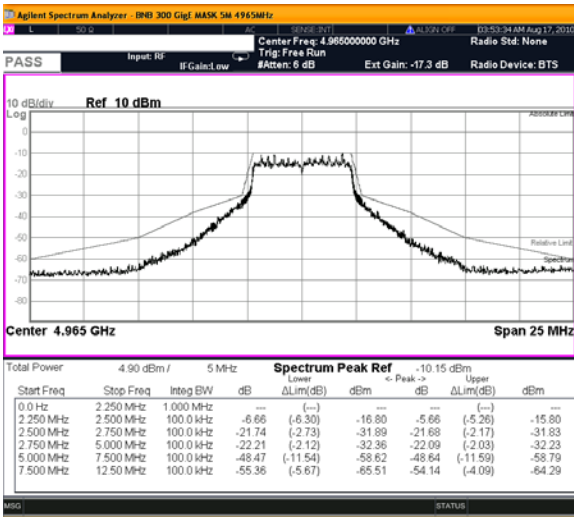
TEST EQUIPMENT USED:

3	4	5	15			

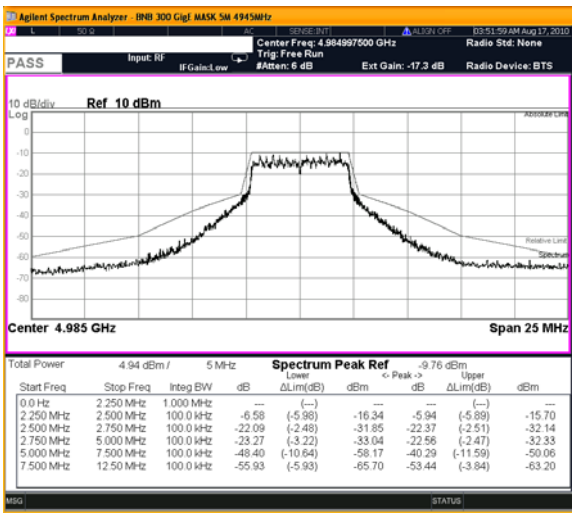
5 MHz emission bandwidth



Plot # 17

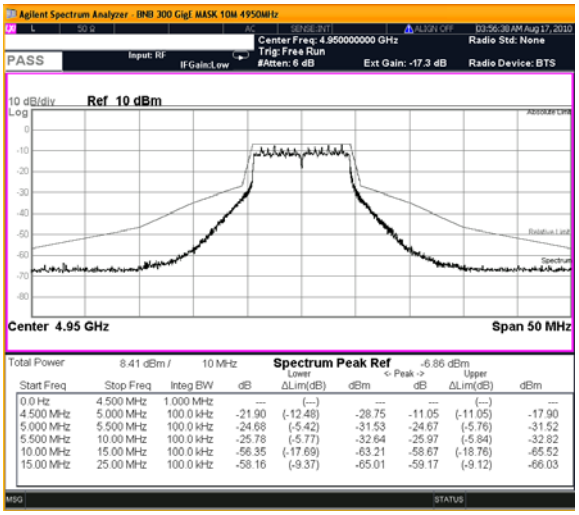


Plot # 18

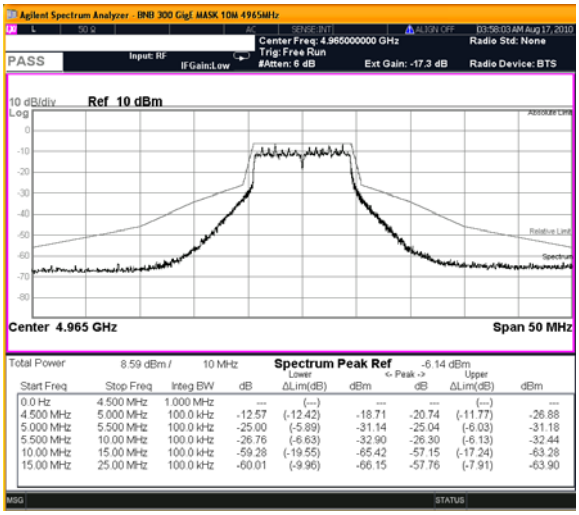


Plot # 19

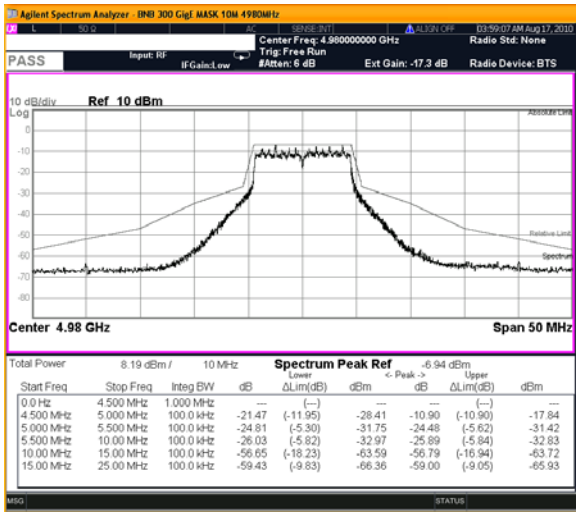
10 MHz emission bandwidth



Plot # 20

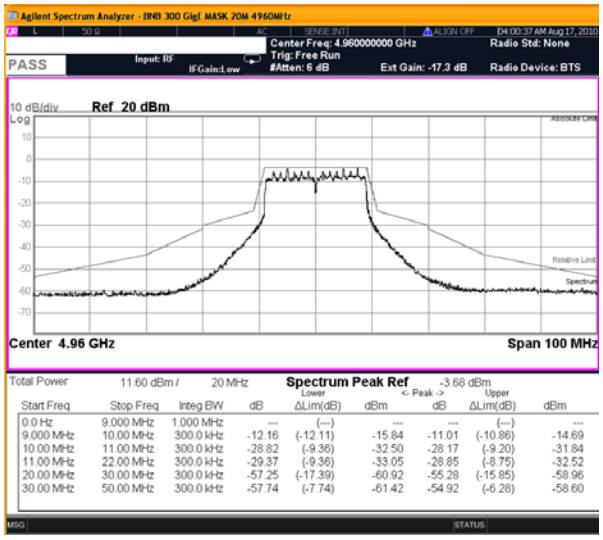


Plot # 21

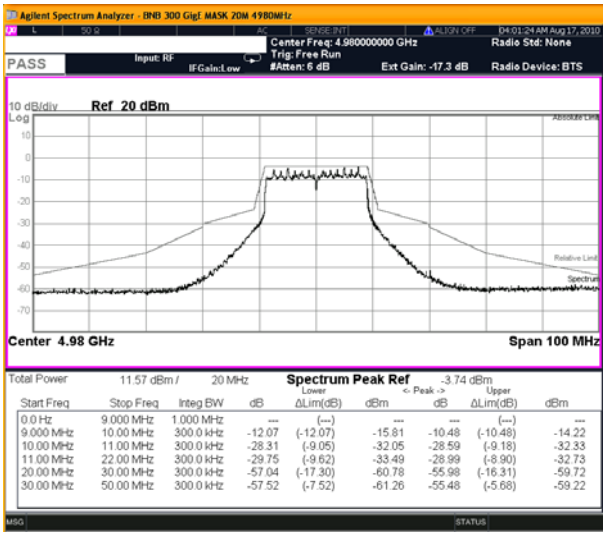


Plot # 22

20 MHz EBW option



Plot # 23



Plot # 24

7.1.4 Undesired conducted emissions test according to § 90.210 L

Method of measurement		FCC part 90.210 (1)(7)			
Operating Frequency Range		4945 - 4985 MHz			
Ambient Temperature	23^0 C	Relative Humidity	49%	Air Pressure	1009 hPa

The frequency spectrum was investigated from the lowest radio frequency signal generated in the equipment up to 40 GHz. The emission levels of the EUT in peak mode more than 20 dB lower than the specified limit were not recorded in the table. For the test results refer to plots ## 25-64 in this section.

The worse case results were found:

EBW, MHz	Carrier frequency, MHz	Measured frequency, MHz	Measured level, dBm	Relative 40 dBc limit, dBm	Margin, dB	Reference to plot #
5	4945	4940	-45.9	-36.0	9.9	27
		4953	-44.4	-36.0	8.4	28
	4965	4958	-54.1	-36.3	17.8	32
		5190	-47.6	-36.3	11.3	33
	4985	4978	-45.8	-35.6	10.2	37
		4993	-48.6	-35.6	13.0	38
10	4950	4940	-47.8	-37.1	10.7	42
		5234	-46.6	-37.1	9.5	43
	4965	4950	-55.4	-37.8	17.6	47
		5181	-47.4	-37.8	9.6	48
	4980	4912	-56.4	-38.0	18.4	52
		4990	-42.9	-38.0	4.9	53
20	4960	4940	-48.1	-40.3	8.2	57
		5266	-47.5	-40.3	7.2	58
	4980	4861	-58.5	-45.9	12.6	62
		5220	-54.6	-45.9	8.7	63

LIMIT

The power spectral density of any emissions must be attenuated below the output power of the transmitter as follow:
On any frequency removed from assigned frequency above 150% - 40 dB.

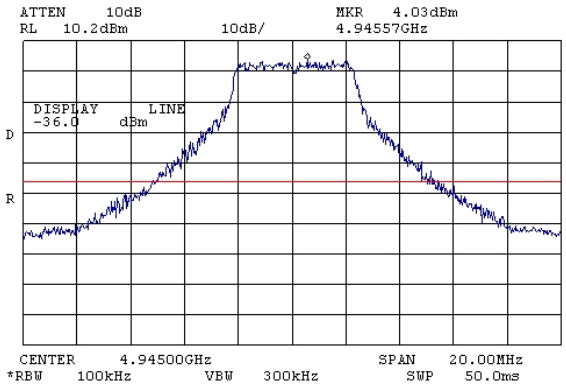
TEST PROCEDURE

The test was performed at worse case emission bandwidth and output power options. The measurements were performed in normal (transmitting) mode of operation for carrier (channel) frequency at bottom, middle and the top of the 4940 - 4990 MHz frequency band under maximum data transfer bit rate. The EUT RF output was connected to the Spectrum Analyzer through appropriate attenuator and accounted with cable loss in SA settings**.** The measurements were performed with RBW = at least 1% of EBW and VBW > RBW.

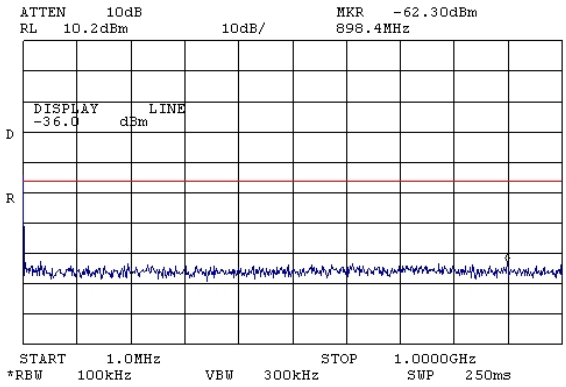
TEST EQUIPMENT USED:

1	3	4	5			

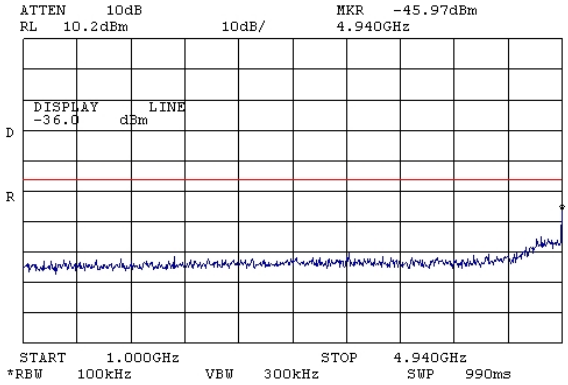
5 MHz emission bandwidth. Carrier frequency 4945 MHz.



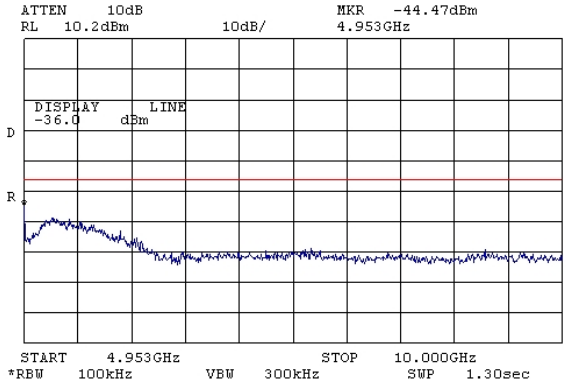
Plot # 25



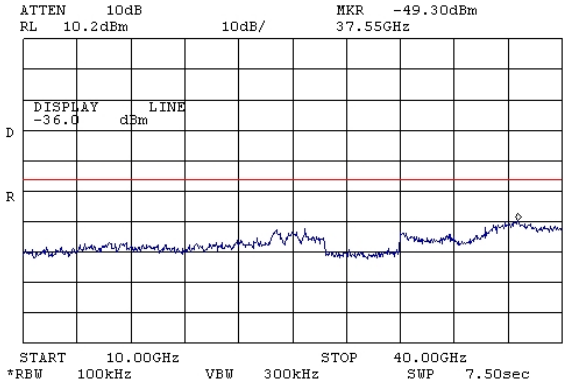
Plot # 26



Plot # 27

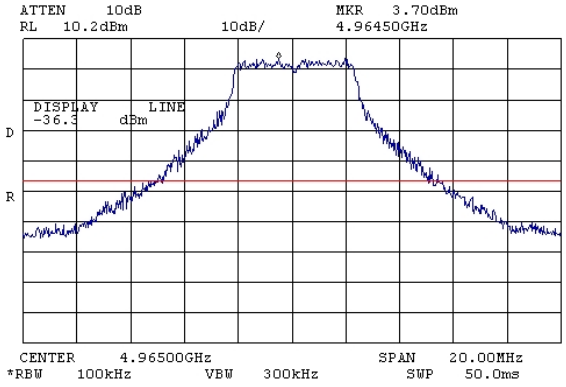


Plot # 28

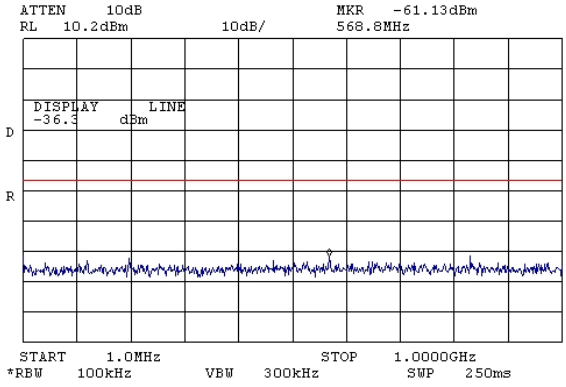


Plot # 29

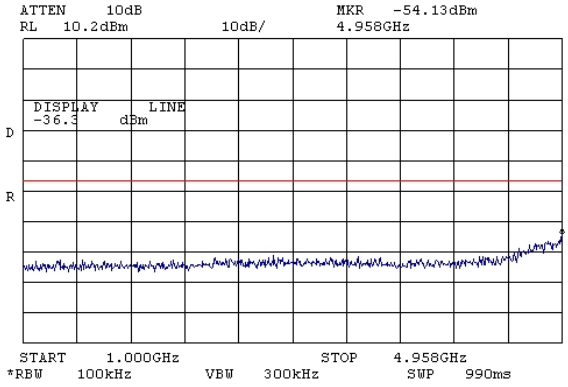
5 MHz emission bandwidth. Carrier frequency 4965 MHz.



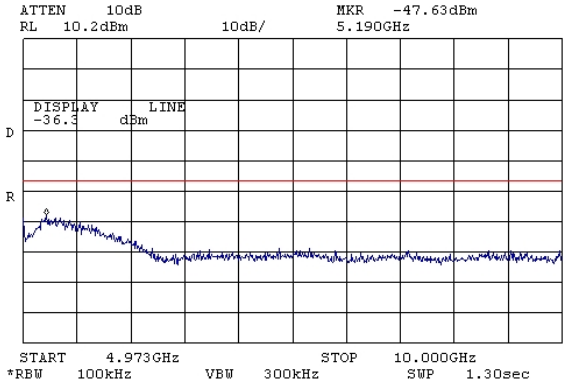
Plot # 30



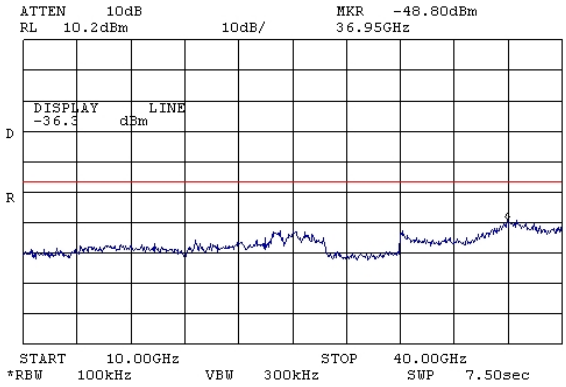
Plot # 31



Plot # 32

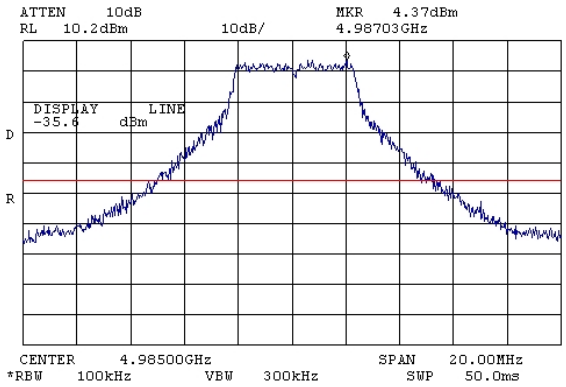


Plot # 33

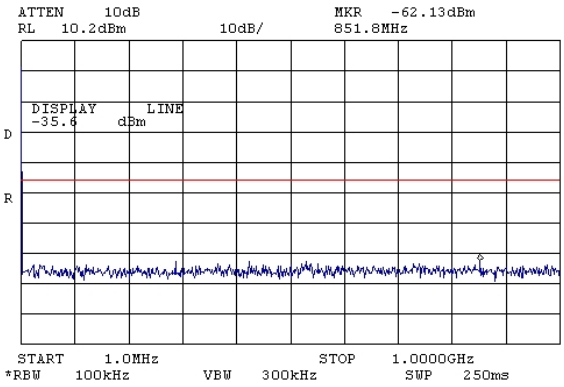


Plot # 34

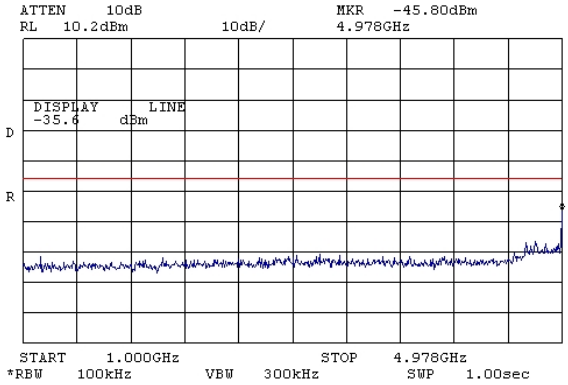
5 MHz emission bandwidth. Carrier frequency 4985 MHz



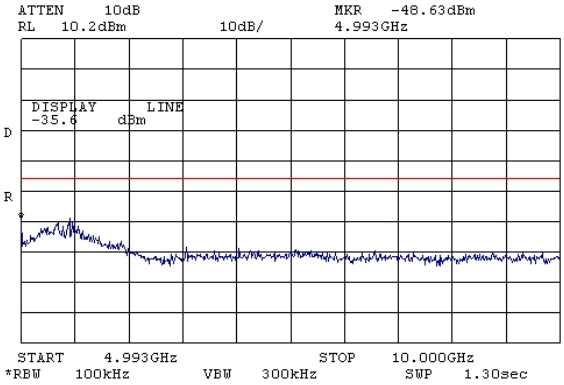
Plot # 35



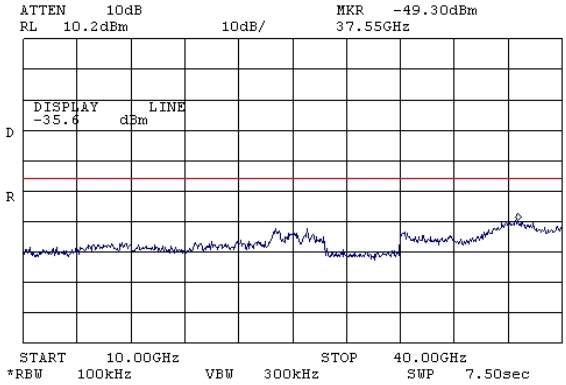
Plot # 36



Plot # 37

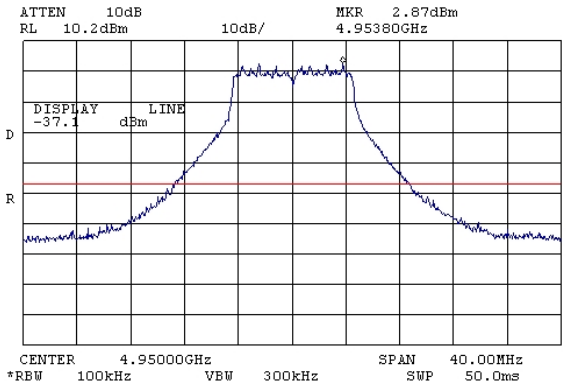


Plot # 38

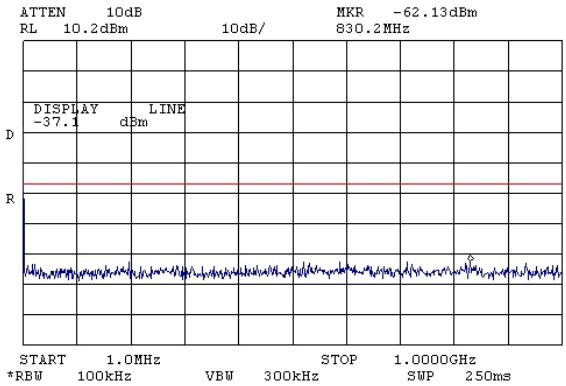


Plot # 39

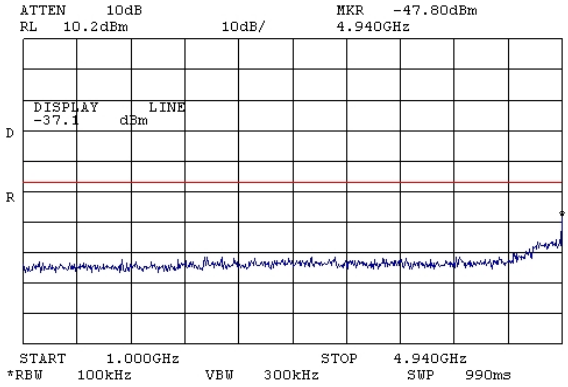
10 MHz emission bandwidth. Carrier frequency 4950 MHz



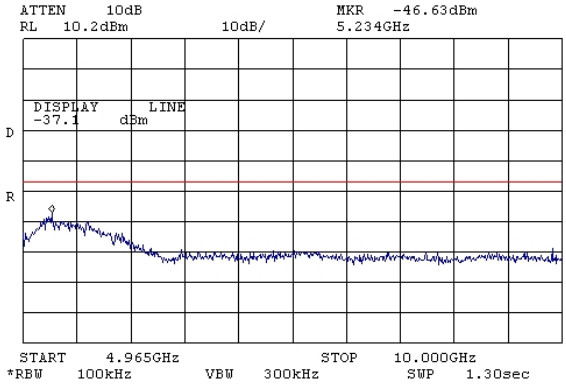
Plot # 40



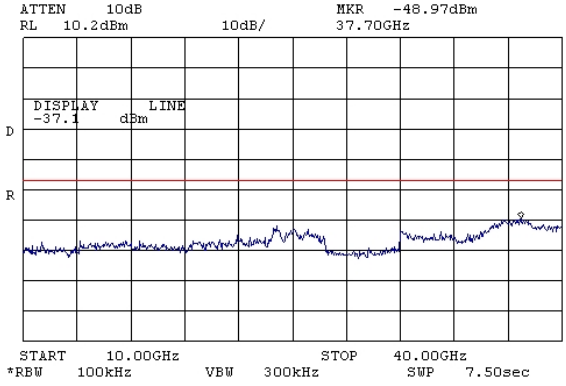
Plot # 41



Plot # 42



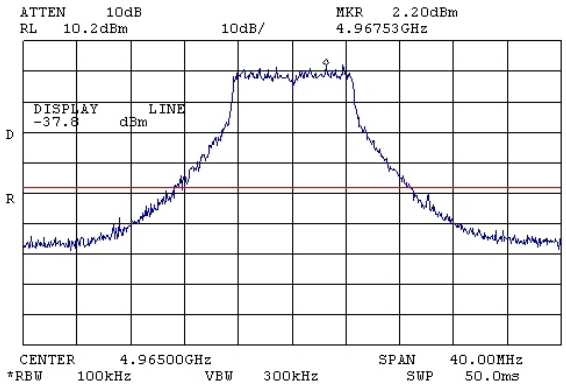
Plot # 43



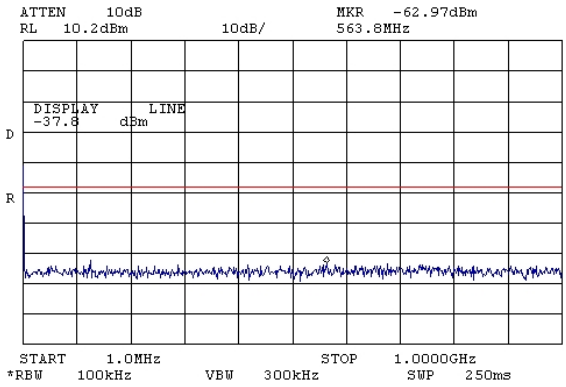
Plot # 44

10 MHz emission bandwidth.

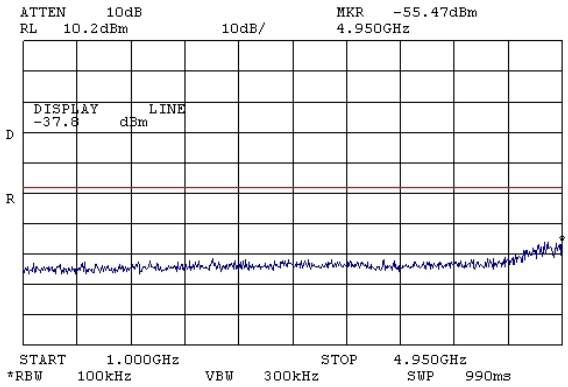
Carrier frequency 4965 MHz



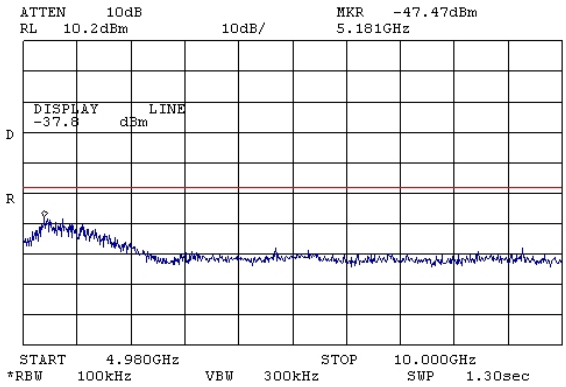
Plot # 45



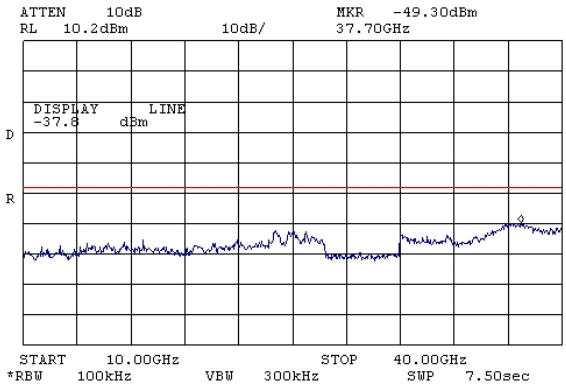
Plot # 46



Plot # 47



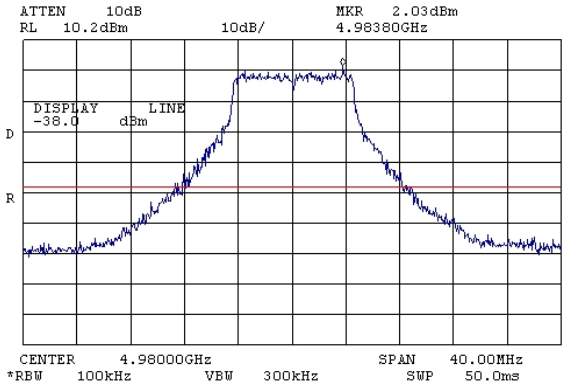
Plot # 48



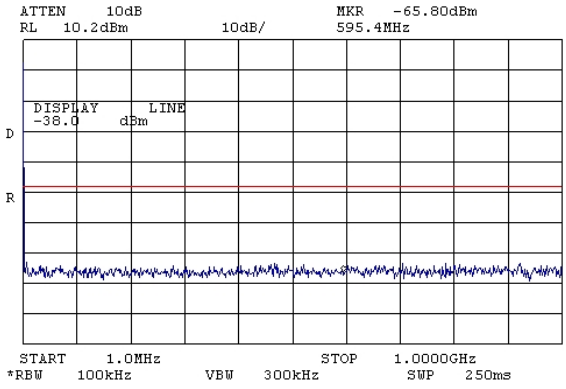
Plot # 49

10 MHz emission bandwidth.

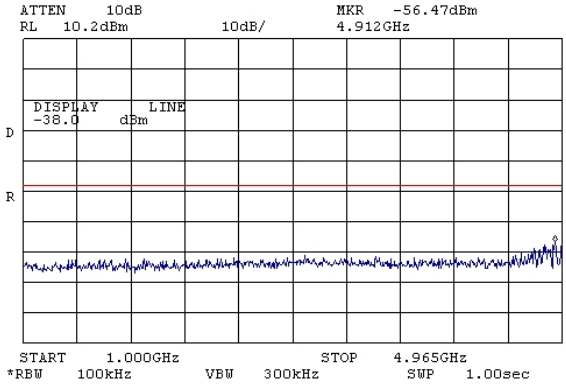
Carrier frequency 4980 MHz



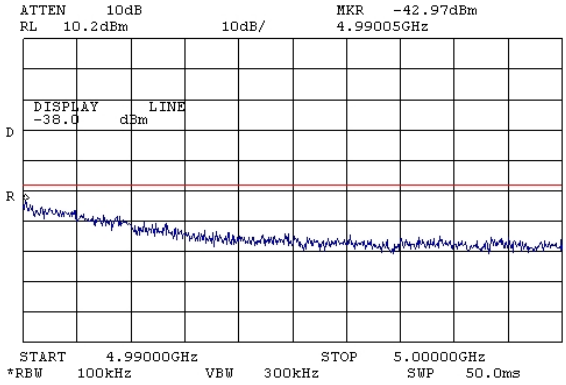
Plot # 50



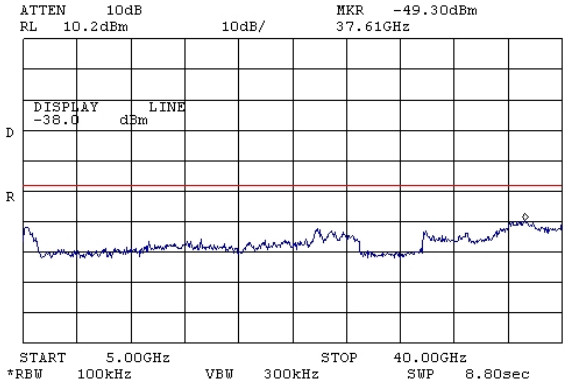
Plot # 51



Plot # 52



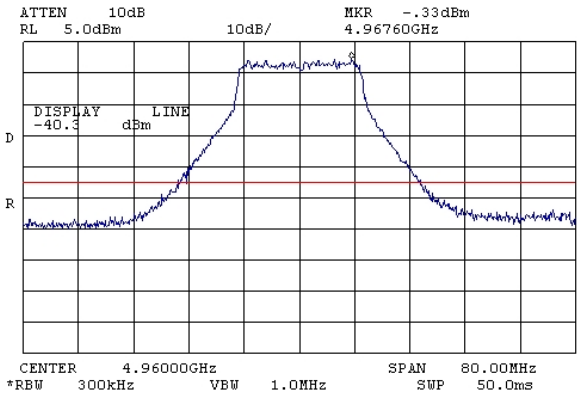
Plot # 53



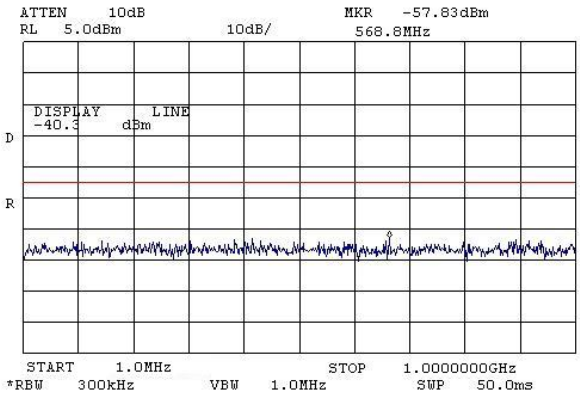
Plot # 54

20 MHz emission bandwidth.

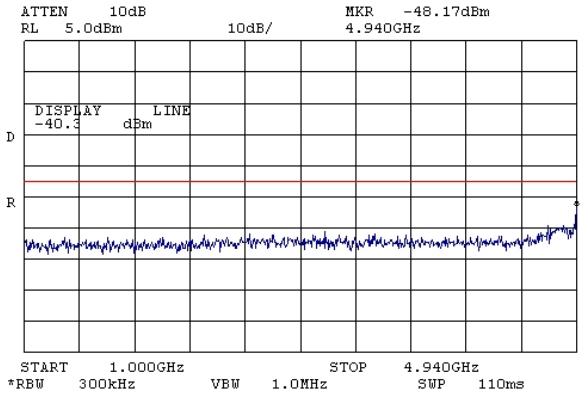
Carrier frequency 4960 MHz



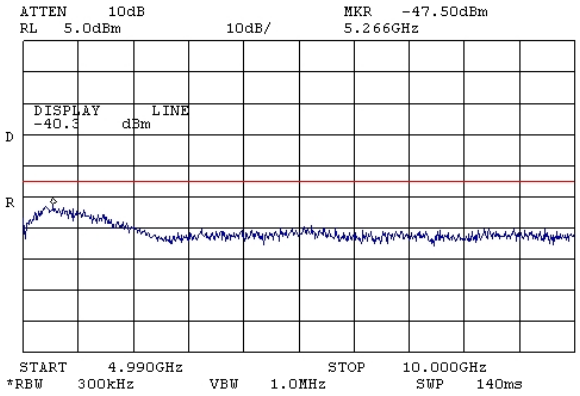
Plot # 55



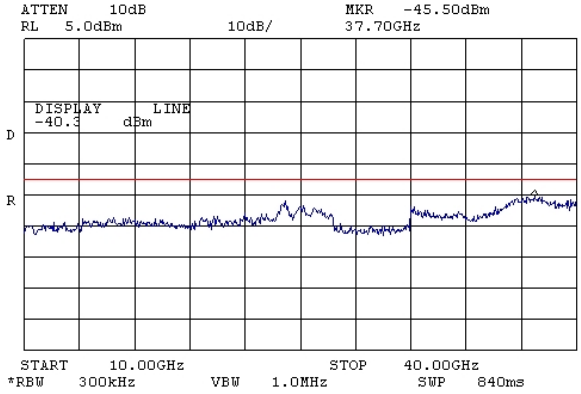
Plot # 56



Plot # 57

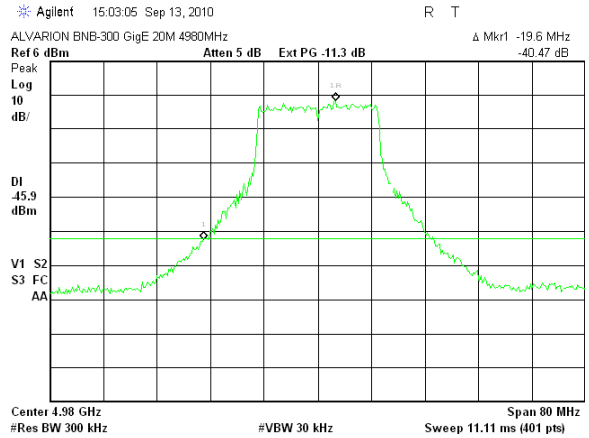


Plot # 58

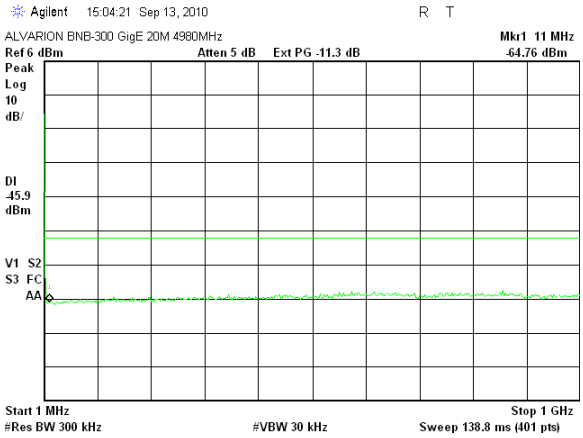


Plot # 59

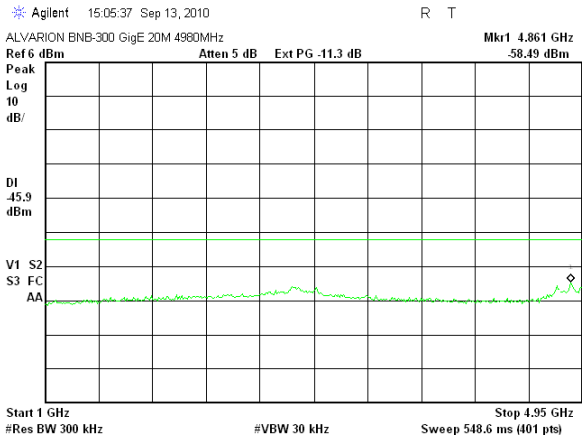
Carrier frequency 4980 MHz



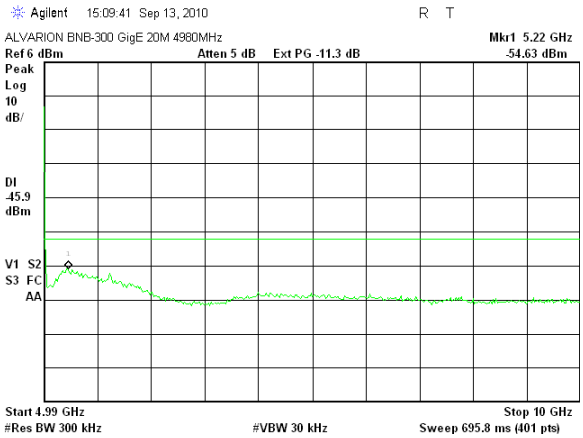
Plot # 60



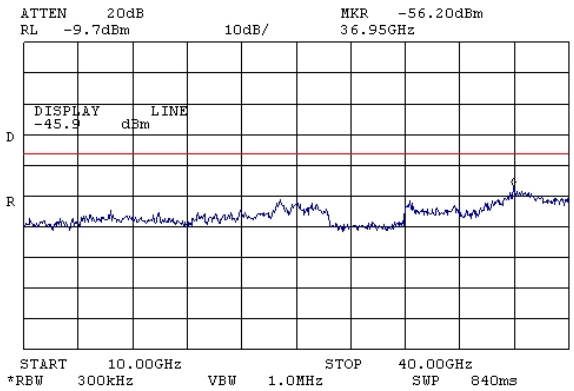
Plot # 61



Plot # 62



Plot # 63



Plot # 64