Test Report No. 8612337012

For ALVARION Ltd.

Equipment Under Test:

BreezeMAX 2300
Broadband Wireless Access System

Outdoor Subscriber unit.

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

ACCREDITED

Certificate No. 1487-01

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1 Applicant information

Company:	Alvarion Ltd.
Address:	21A Habarzel str, Tel-Aviv, 69710, Israel
The date of test:	May –June 2006

Equipment under test information

Test items:	Transmitter BreezeMAX 2300
Manufacturer:	Alvarion Ltd
Model:	BMAX-CPE-ODU-PRO-SA-2.3
Equipment serial number:	NA

2 Test performance

Location: SII EMC Section

Purpose of test: Apparatus compliance verification in accordance with emission requirements

Test specifications: 47CFR part 15, part 27, part 2 §§ 2.1049, 2.1053, part 1 §1.1310

This Test Report contains 83 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, part 27, and part 2 §§ 27.50, 27.53, 27.54, 2.1055, 15.207, and 15.209

Parameter	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
Conducted emissions	15.207
Radiated emissions	15.209

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

BreezeMAX 2300 is Alvarion's WiMAX platform for the licensed 2.3 GHz WCS frequency band. It is digital modulated TDD system operating in the 2300MHz up to 2360MHz band with OFDM modulation. The basic system configuration of SU is a two-box configuration that contains Indoors unit includes a power supply and an Ethernet 10/100BaseT (RJ 45) interface and Outdoors unit includes the integral antenna, modem, radio, data processing and management components of the SU.

EUT technical characteristics

Transmitter technical characteristics.		Note
Stand-alone/fixed use		
Assigned frequency range	**2305 – 2315 MHz and 2350 – 2360 MHz**	
Operating frequency range	**2307.5 MHz, 2312.5 MHz, 2352.5 MHz, 2357.5 MHz**	
RF channel spacing	**5 MHz**	
Maximum rated output power	**23 dBm**	At transmitter 50 Ω RF output connector
Antenna connection	**Standard connector: N-TYPE**	Professional installation
Transmitter 99% power bandwidth	**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**
Internal	MTI	AL-344035/M	14 dBi

4.2 EUT test configuration

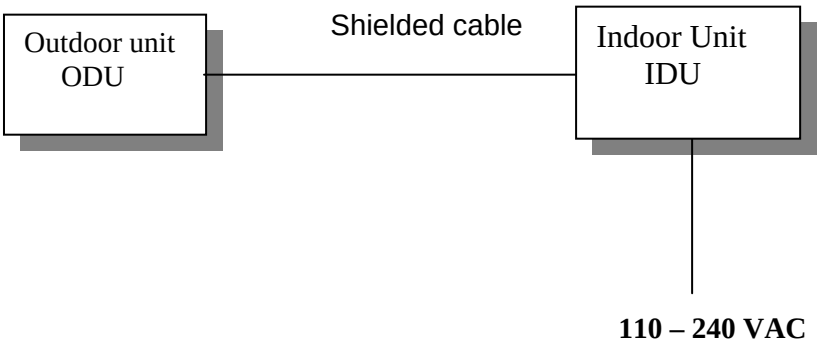


Fig. 1 Subscriber unit test setup.

5 Test results

5.1 Transmitter characteristics

5.1.1 Occupied bandwidth for digitally modulated systems according to § 2.1049

Method of measurement ANSI 63.4 §13.1.7
Ambient Temperature 23^0 C Relative Humidity 49% Air Pressure 1009 hPa
Operating Frequency Range 2.305 – 2.320 GHz, 2.345 – 2.360 GHz

Carrier frequency MHz	Measured occupied bandwidth, MHz	Reference to plot number
2307.5	4.75	#1
2312.5	4.75	#2
2352.5	4.77	#3
2357.5	4.77	#4

TEST PROCEDURE

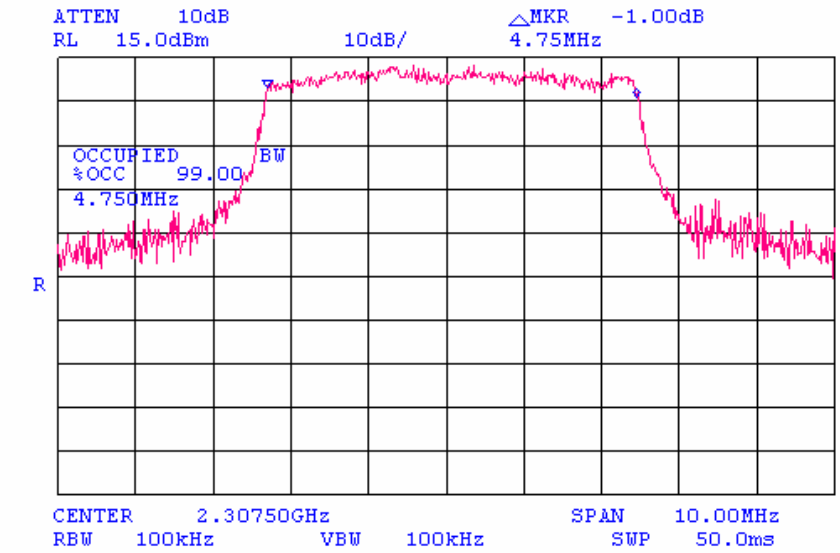
The measurements were performed in normal (transmitting) mode at all transmitted carrier (channel) frequencies of the 2.305 - 2.320 GHz and 2.345 – 2360 GHz frequency ranges under maximum data transfer bit rate.
The EUT RF output was connected to the Spectrum Analyzer through appropriate attenuator and accounted with cable loss in SA settings.

TEST EQUIPMENT USED:

1	2	3				

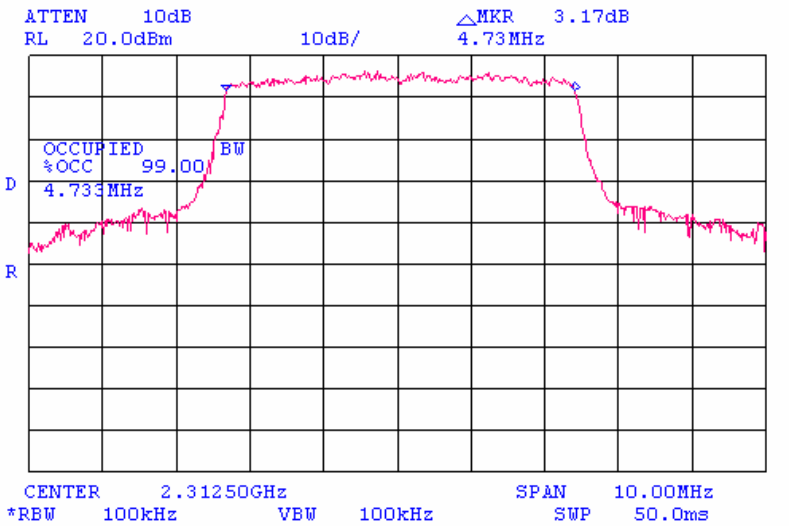
Occupied bandwidth test results.

Carrier Frequency 2307.5 MHz



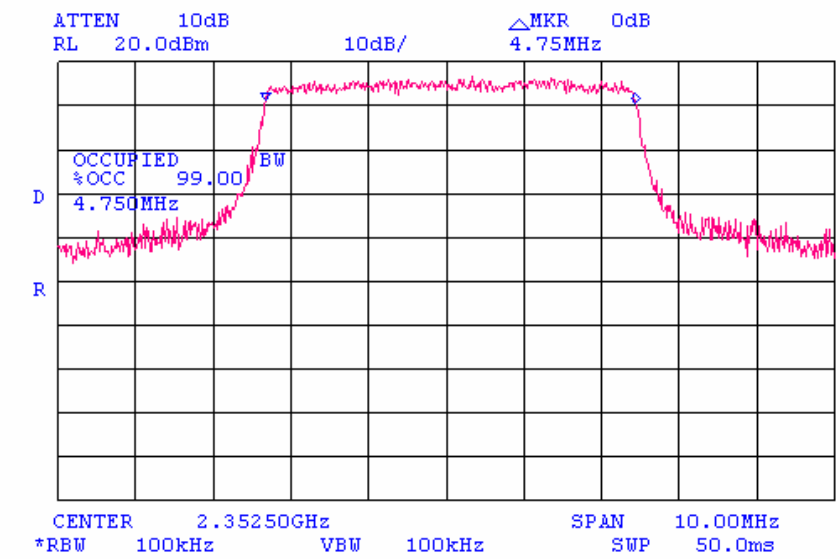
Plot # 1

Carrier Frequency 2312.5 MHz



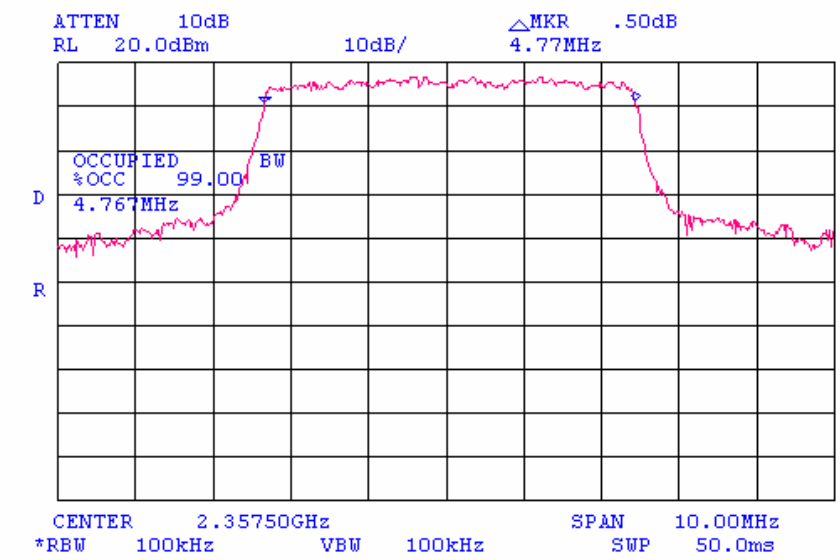
Plot # 2

Carrier Frequency 2352.5 MHz



Plot # 3

Carrier Frequency 2357.5 MHz



Plot # 4

5.1.2 Peak output power test § 27.50

Ambient Temperature 23^0 C Relative Humidity 49% Air Pressure 1009 hPa
Operating Frequency Range 2.305 – 2.320 GHz, 2.345 – 2.360 GHz

Carrier frequency MHz	Peak output power. (W/o antenna gain) dBm	Peak output power. (With antenna gain) dBm	Reference to plot number
2307.5	18.8	32.8	#5
2312.5	19.5	33.5	#6
2352.5	19.5	33.5	#7
2357.5	18.8	32.8	#8

The following power limits apply to the 2305 – 2320 MHz and 2345 – 2360 MHz bands:
Fixed, land, and radiolocation station transmitting are limited to 2000W (63 dBm) peak equivalent isotropically radiated power.

TEST PROCEDURE

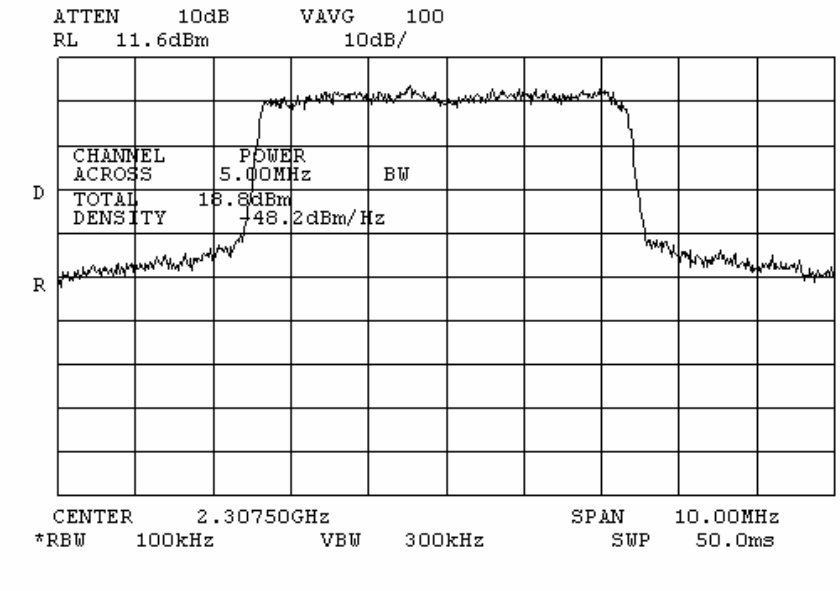
The measurements were performed in normal (transmitting) mode at all transmitted carrier (channel) frequencies of the 2.305 - 2.320 GHz and 2345 - 360 GHz frequency ranges under maximum data transfer bit rate. The EUT RF output was connected to the Spectrum Analyzer through appropriate attenuator and accounted with cable loss in SA settings.

TEST EQUIPMENT USED:

1	2	3				

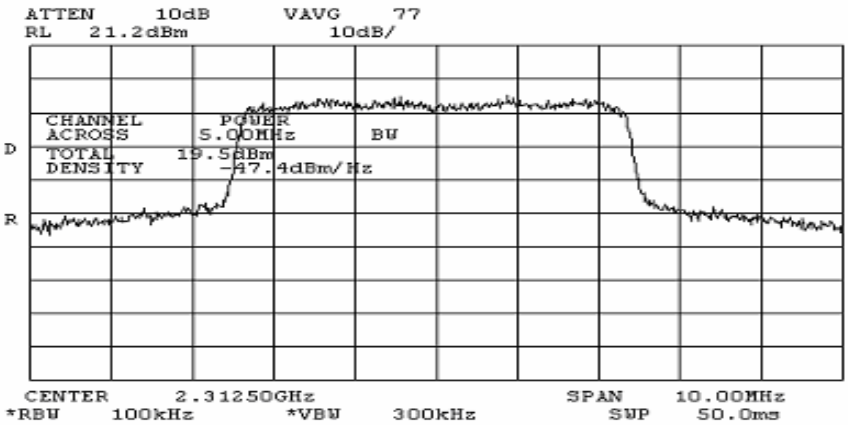
Peak output power test results.

Carrier Frequency 2307.5 MHz



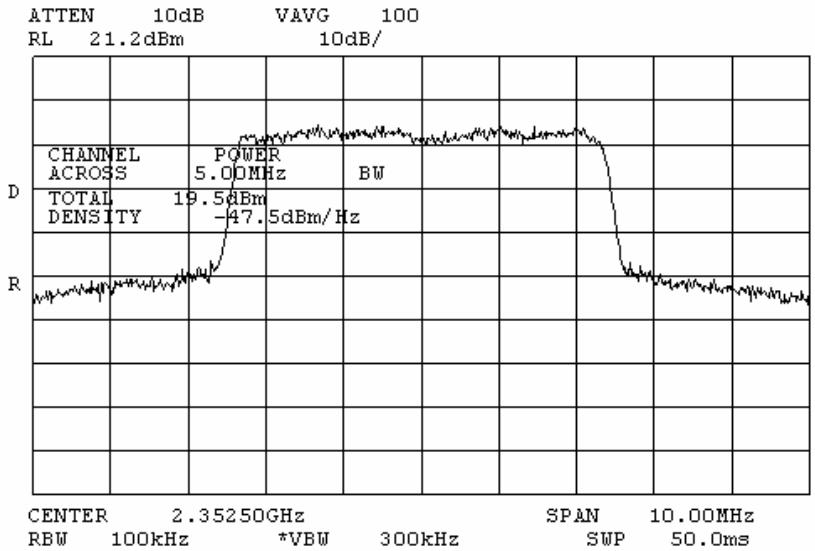
Plot # 5

Carrier Frequency 2312.5 MHz



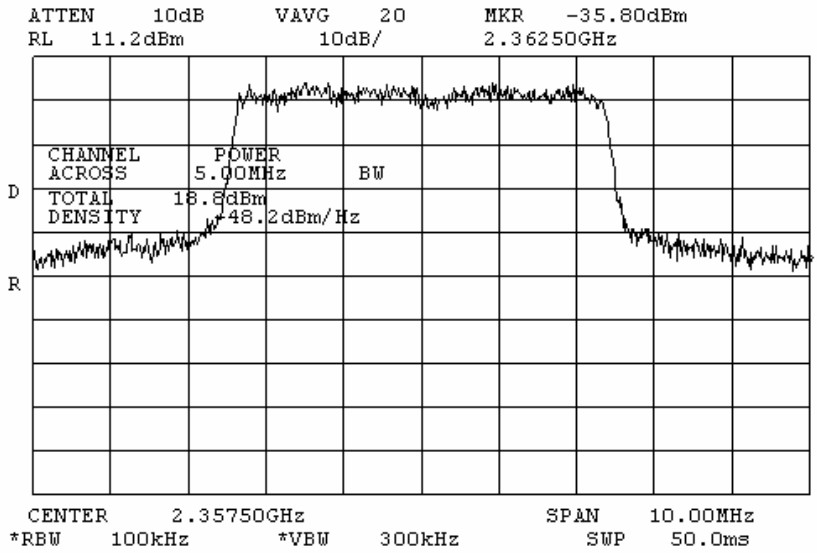
Plot # 6

Carrier Frequency 2352.5 MHz.



Plot # 7

Carrier Frequency 2357.5 MHz.



Plot # 8

5.1.3 Spurious emissions at antenna terminal § 27.53

Ambient Temperature 23^0 C Relative Humidity 49% Air Pressure 1009 hPa
Operating Frequency Range 2.305 – 2.320 GHz, 2.345 – 2.360 GHz

Carrier frequency – 2307.5 MHz.

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
2300	-45.2	-40	-5.2	#10
2305	-24.8	-13	-11.8	#12
2310	-28.3	-13	-15.3	#14
2320.9	-51.8	-50	-1.8	#15

Carrier frequency – 2312.5 MHz.

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
2309.9	-22.2	-13	-9.2	#23
2315	-23.7	-13	-10.7	#25
2320	-52.6	-50	-2.6	#26

Carrier frequency – 2352.5 MHz.

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
2345	-55.6	-50	- 5.6	#35
2349.9	-33.3.0	-13	-??	#37
2355	-27.9	-13	-14.9	#38

Carrier frequency – 2357.5 MHz.

Frequency, MHz	Spurious emission level, dBm	Spurious emissions calculated limit, dBm	Margin dB	Reference to plot number
	-	-50		#46
2355	-21.8	-13	-8.8	#48
2360	-24.8	-13	-11.8	#49

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 table above.

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+10log(P) dB - -40 dBm
On all frequencies from 2300 to 2320 MHz and 2345 to 2370 MHz by factor not less then 43+10Log(P) dB - -13 dBm.
On all frequencies from 2320 to 2345 MHz by factor not less then 80+10Log(P) dB - -50 dBm.

TEST PROCEDURE

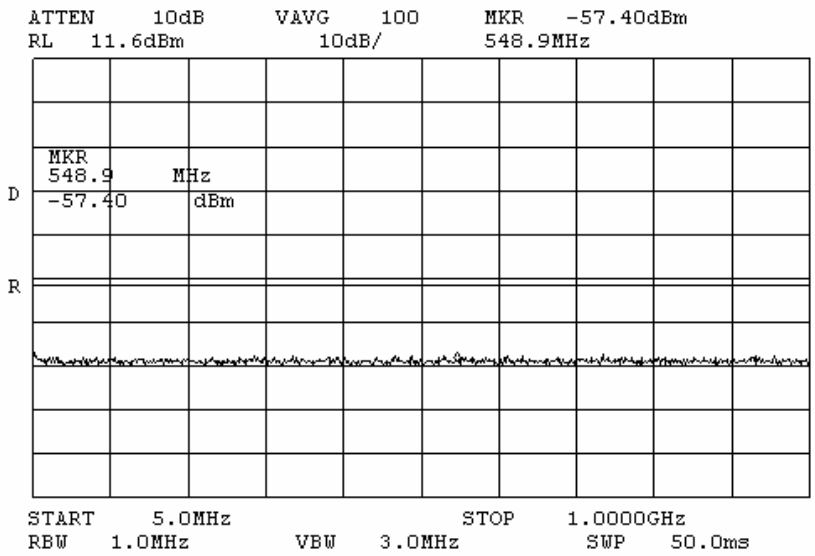
The measurements were performed in normal (transmitting) mode at all transmitted carrier (channel) frequencies of the 2.305 - 2.320 GHz and 2345 - 360 GHz frequency ranges under maximum data transfer bit rate.
The EUT RF output was connected to the Spectrum Analyzer through appropriate attenuator and accounted with cable loss in SA settings.

TEST EQUIPMENT USED:

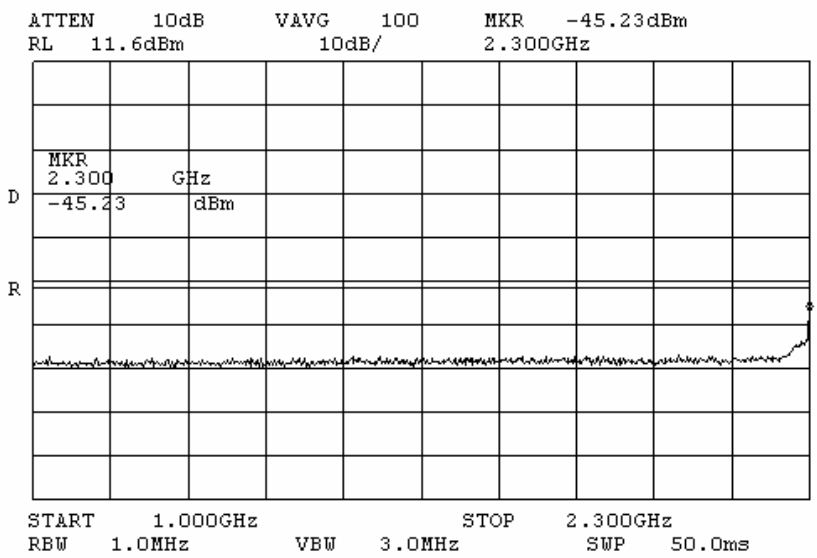
1	2	3	9			

Spurious emissions at antenna terminal test results.

Frequency carrier 2307.5 MHz.

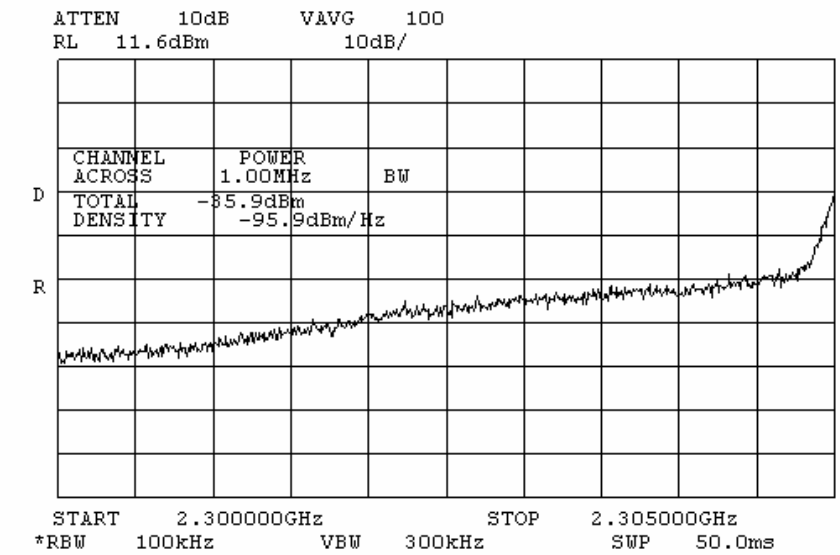


Plot # 9

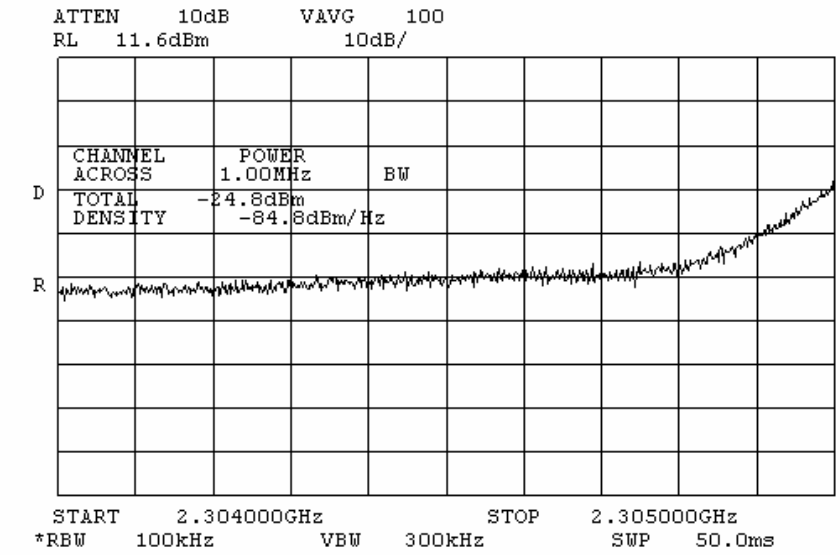


Plot # 10

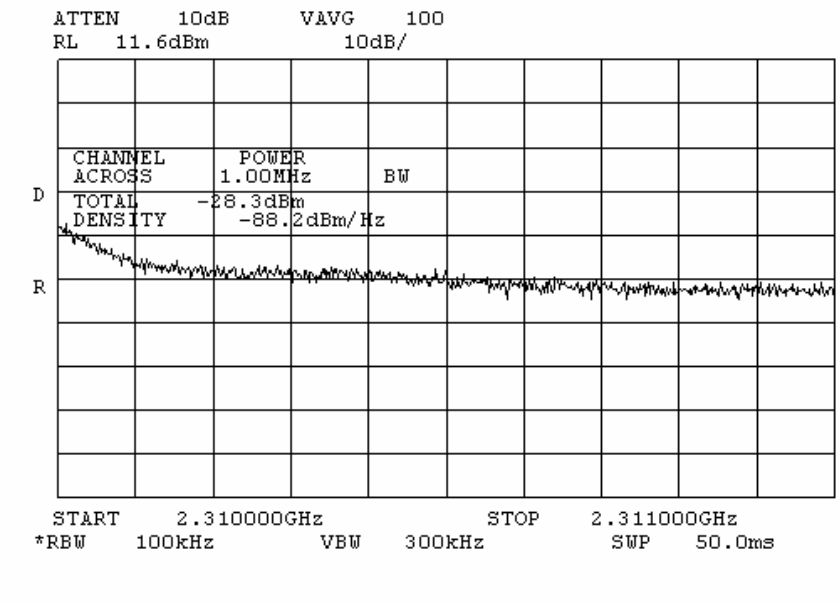
External attenuator = 30 dB
Cable loss = 1.2 dB.



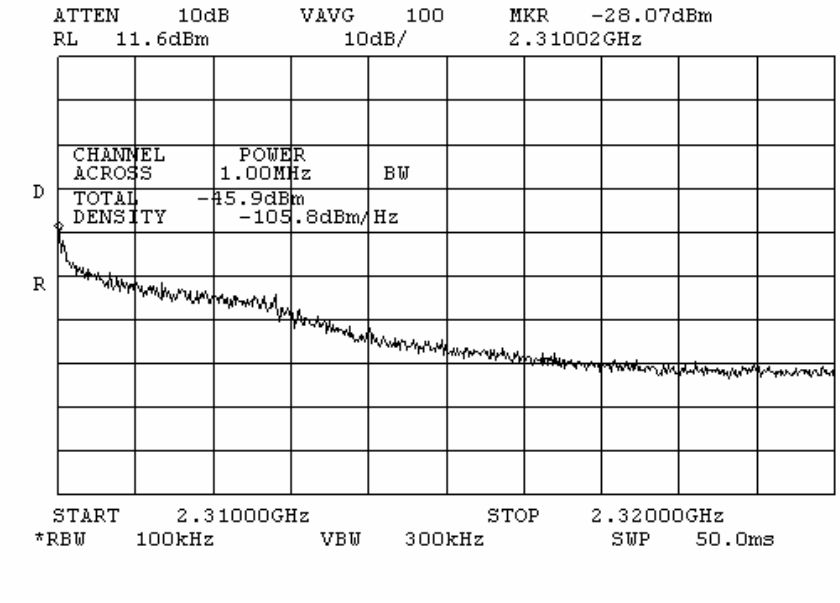
Plot # 11



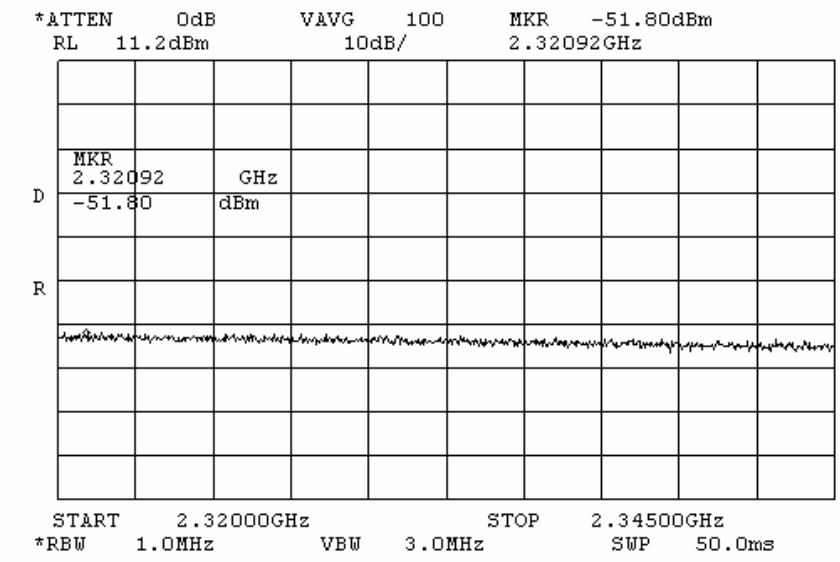
Plot # 12



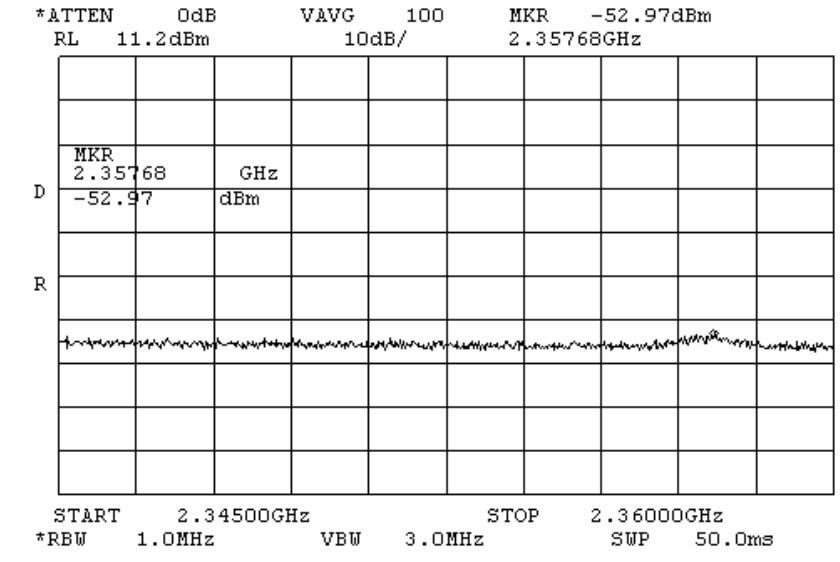
Plot # 13



Plot # 14



Plot # 15



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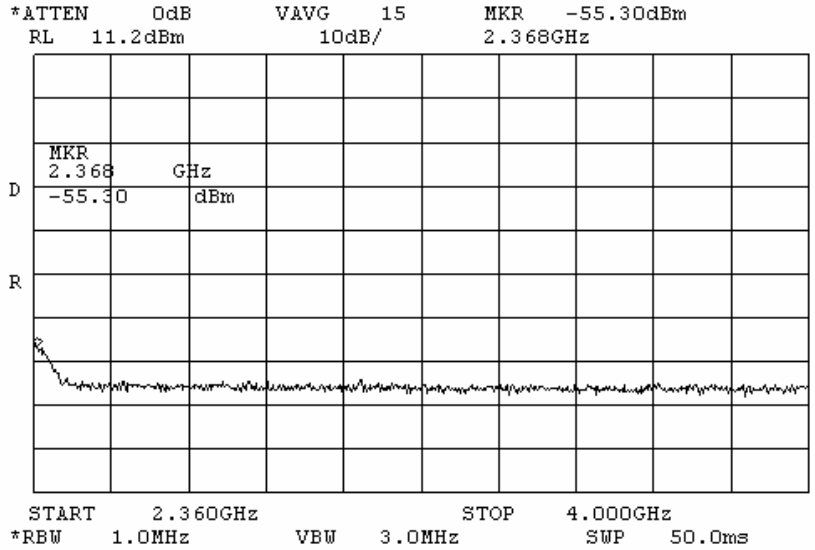
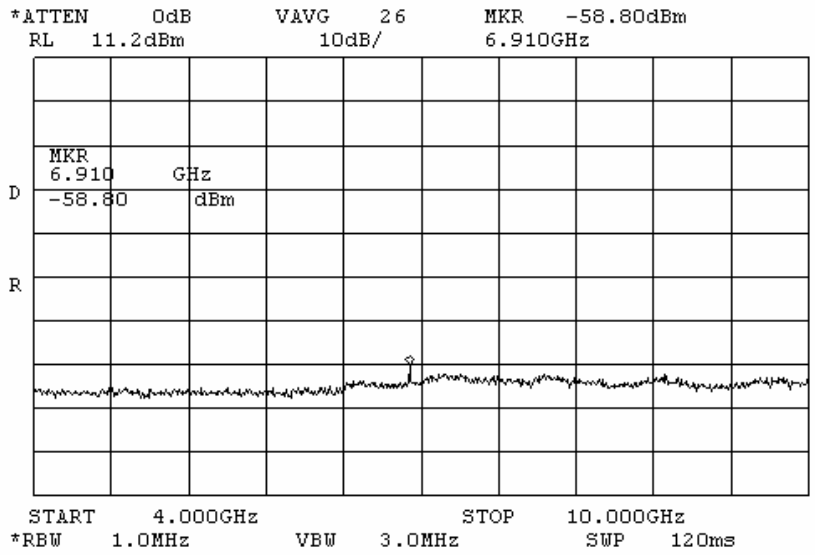
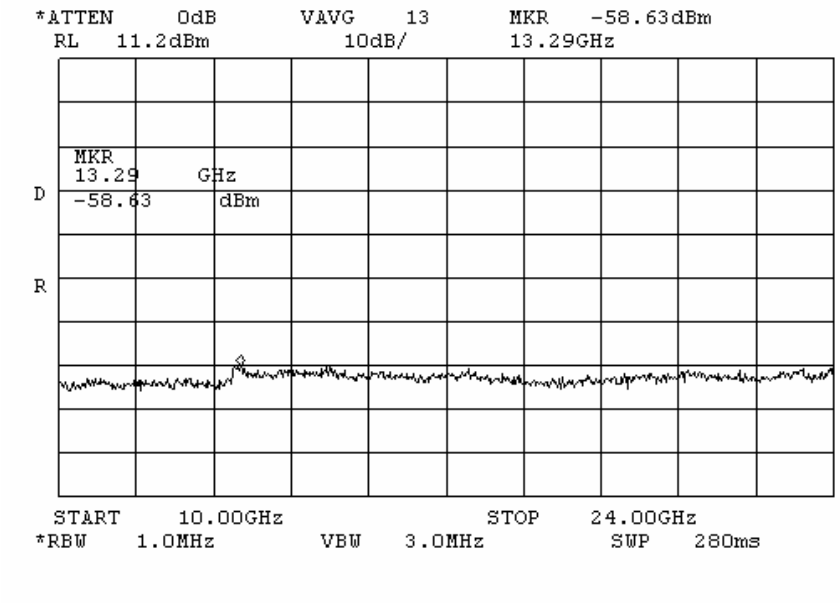


Plot # 17

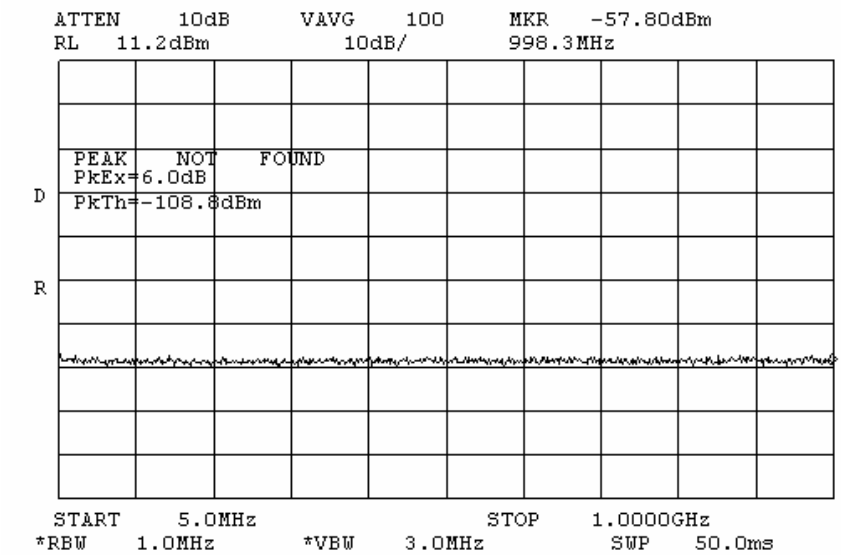


Plot # 18

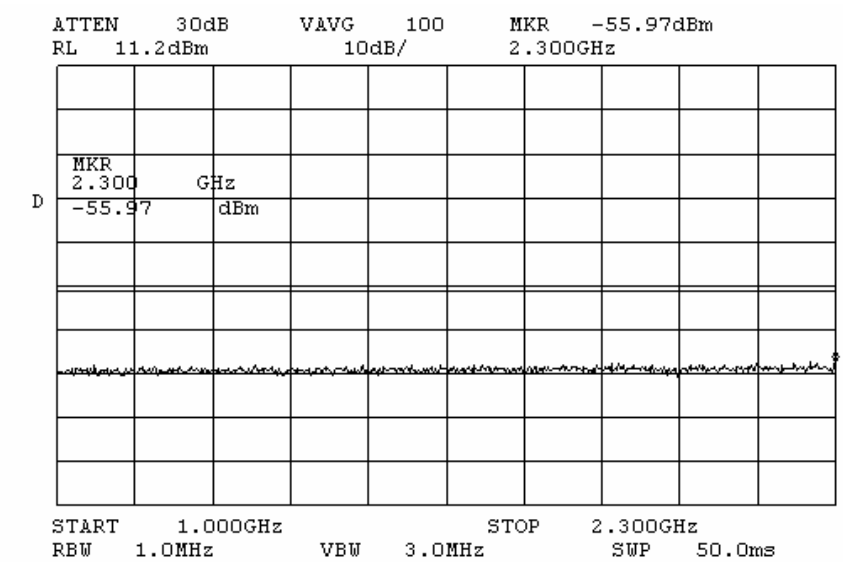

*ATTEN 0dB
VAVG 13
MKR -58.63dBm
RL 11.2dBm
10dB/
13.29GHz
MKR
13.29 GHz
D
-58.63 dBm
R
START 10.00GHz
STOP 24.00GHz
*RBW 1.0MHz
VBW 3.0MHz
SWP 280ms

Plot # 19

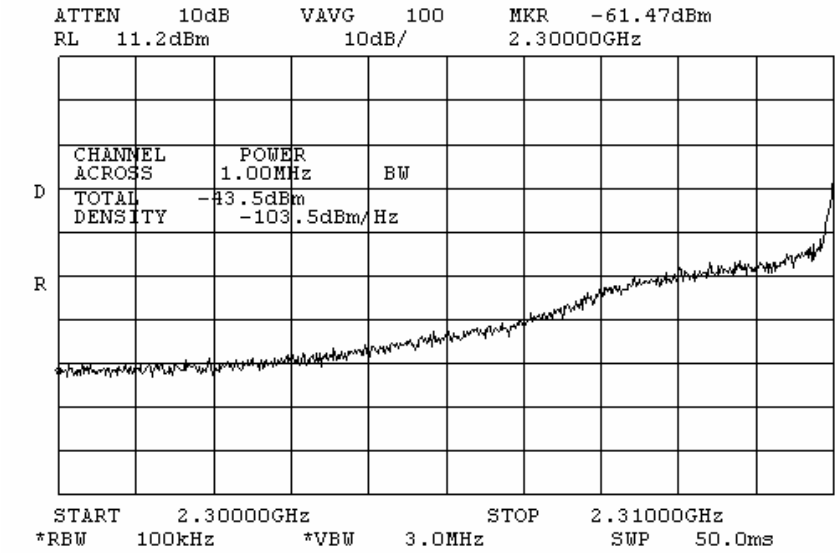
Frequency carrier 2312.5 MHz.



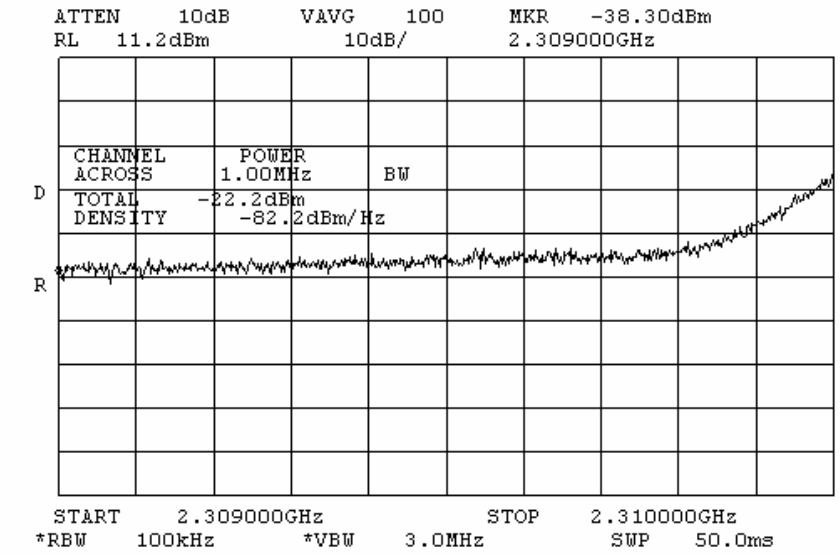
Plot # 20



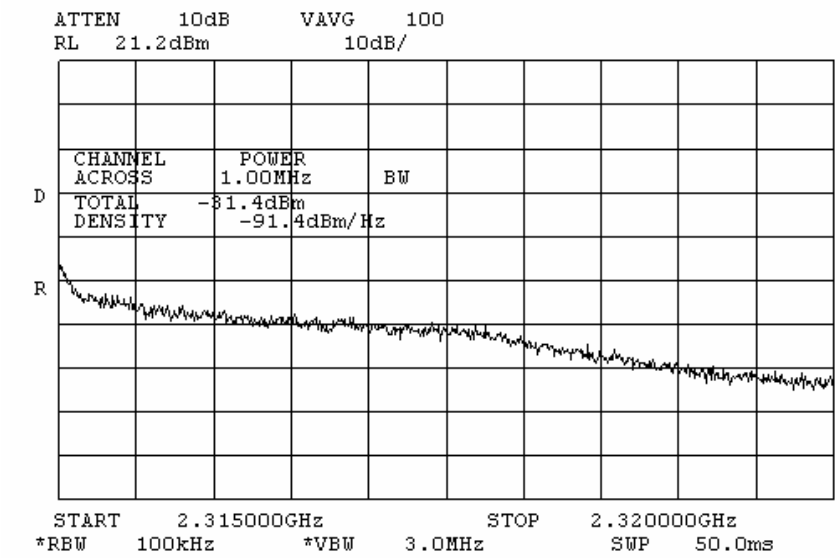
Plot # 21



Plot # 22



Plot # 23



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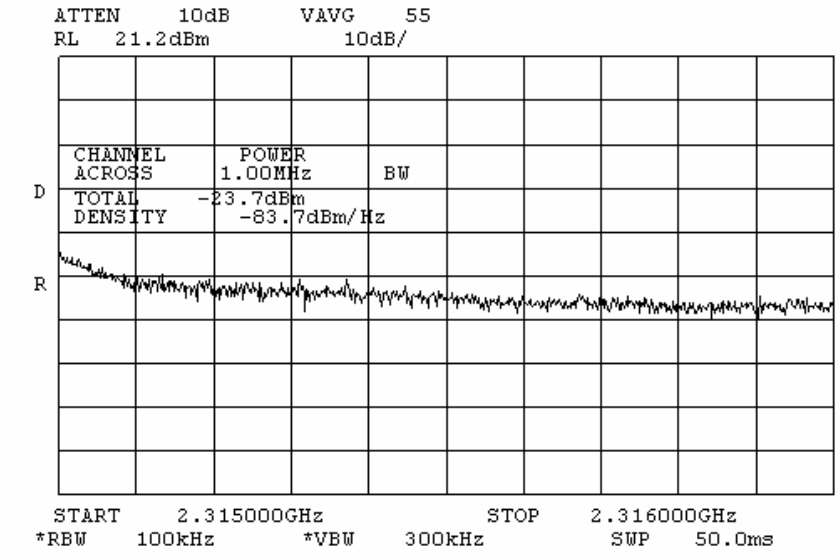
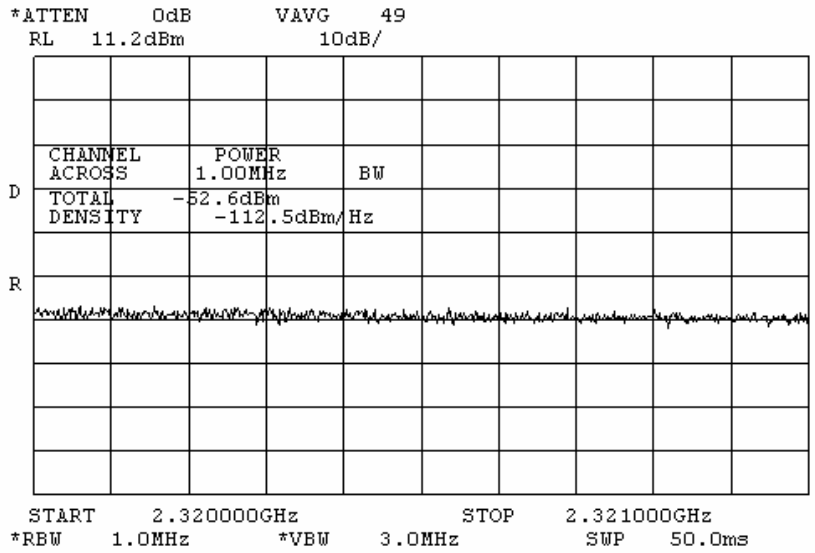
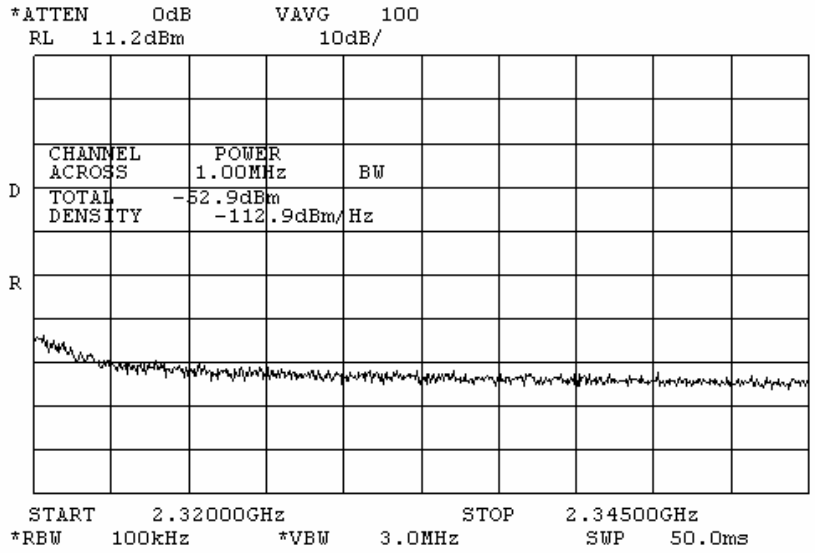


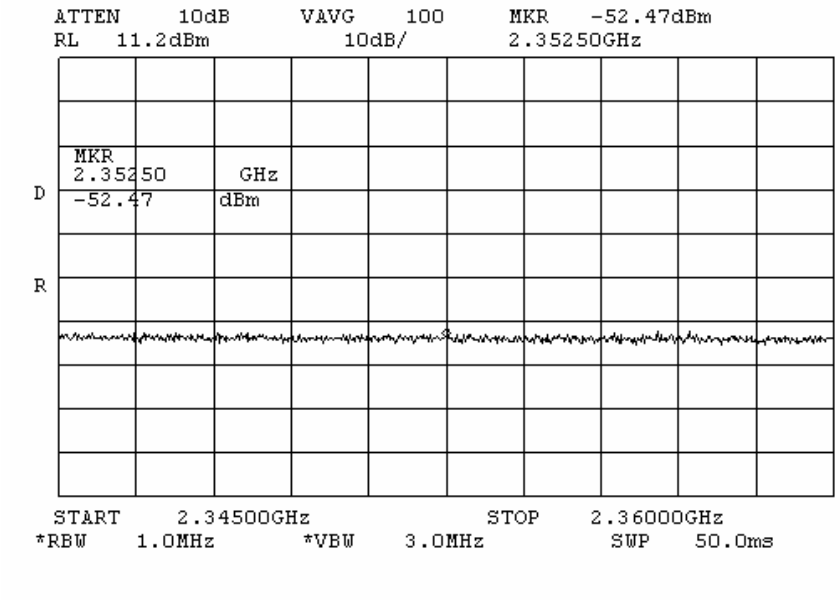
Plot # 25



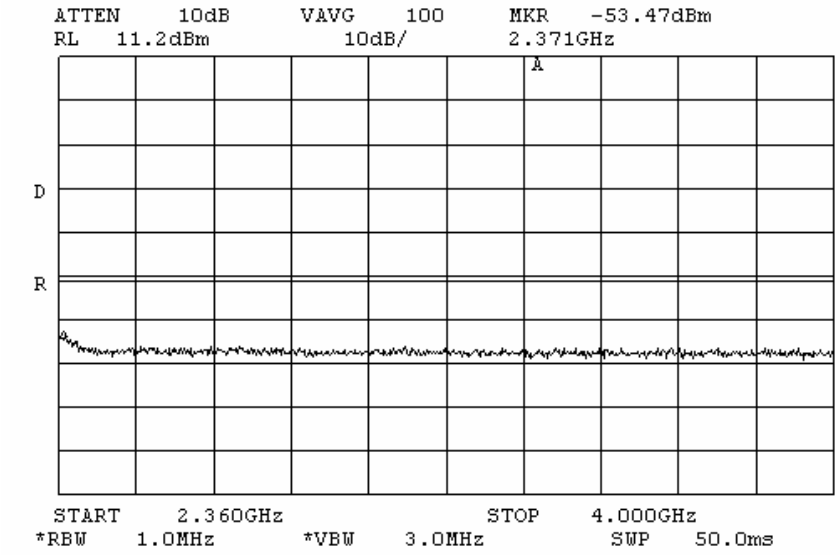
Plot # 26



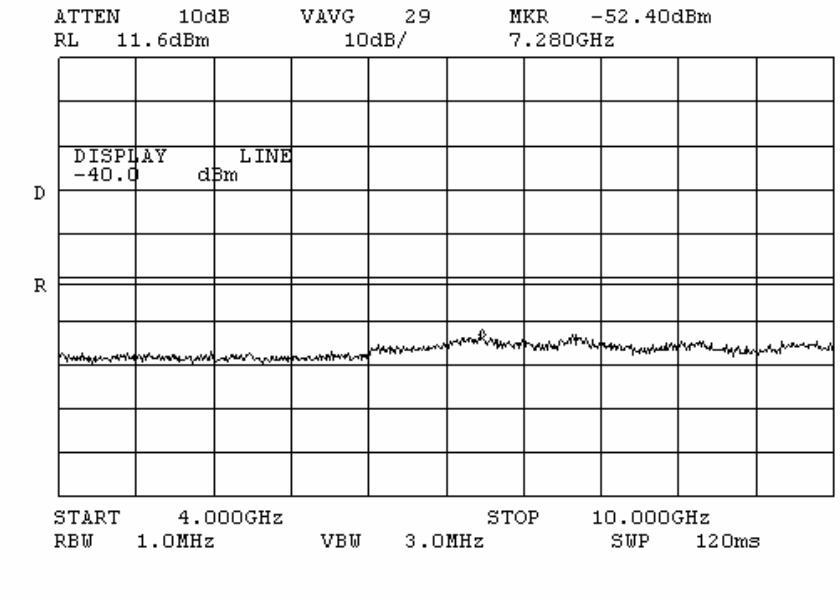
Plot # 27



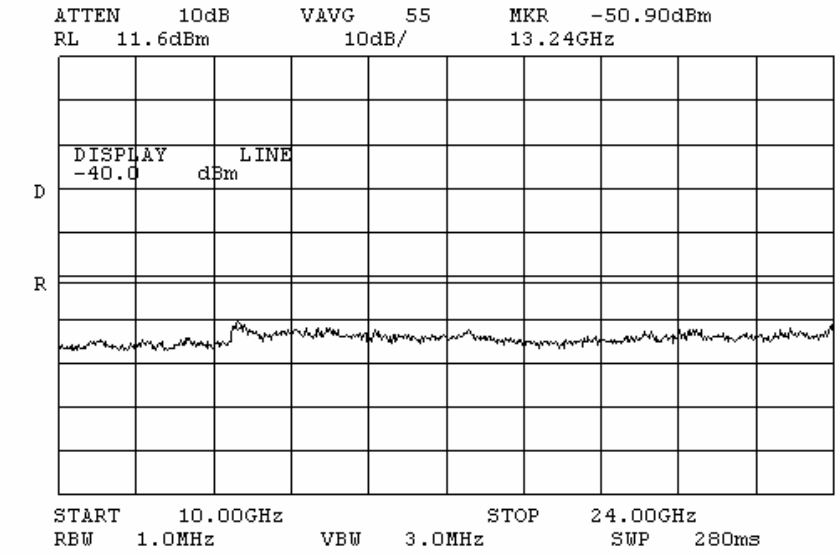
Plot # 28



Plot # 29

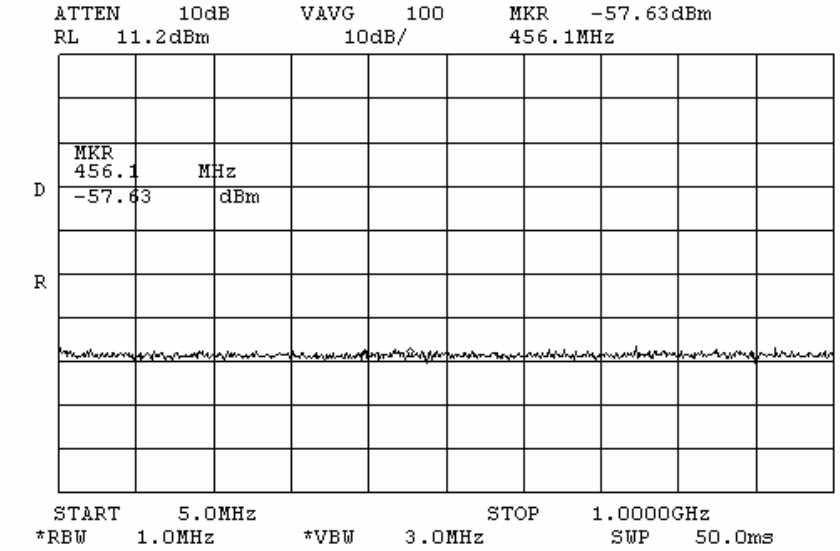


Plot # 30

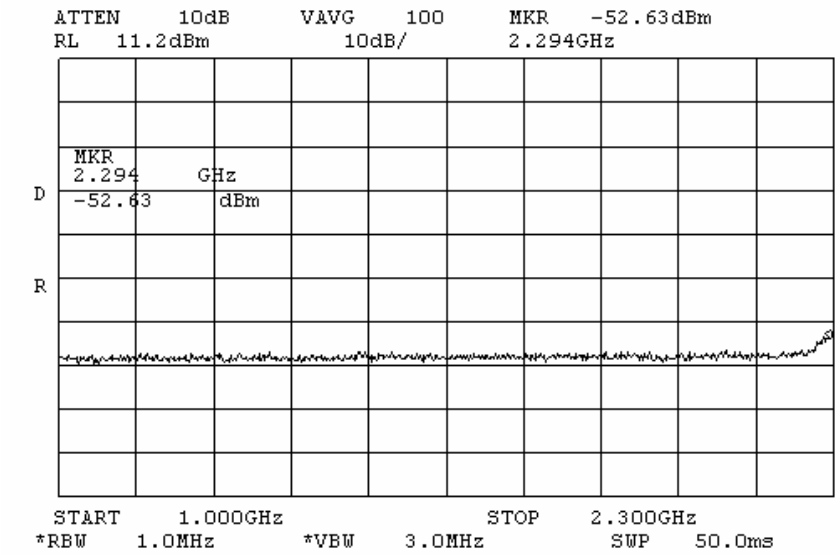


Plot # 31

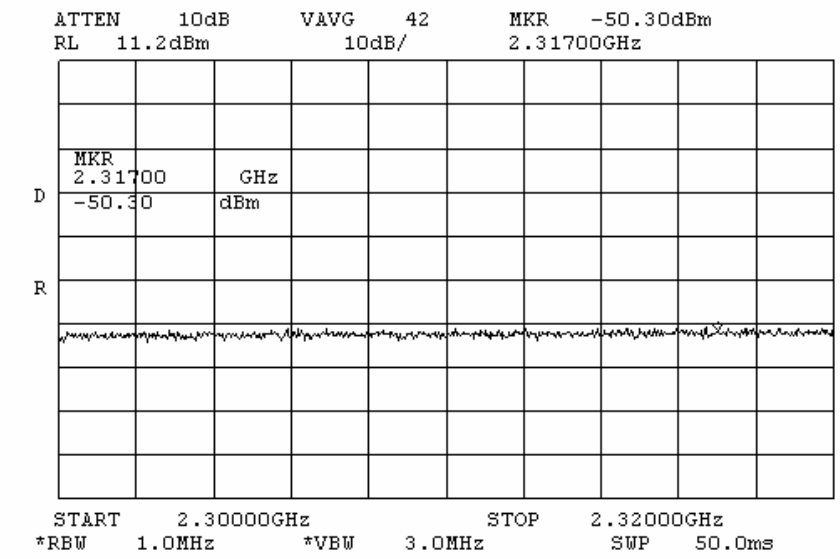
Frequency carrier 2352.5 MHz



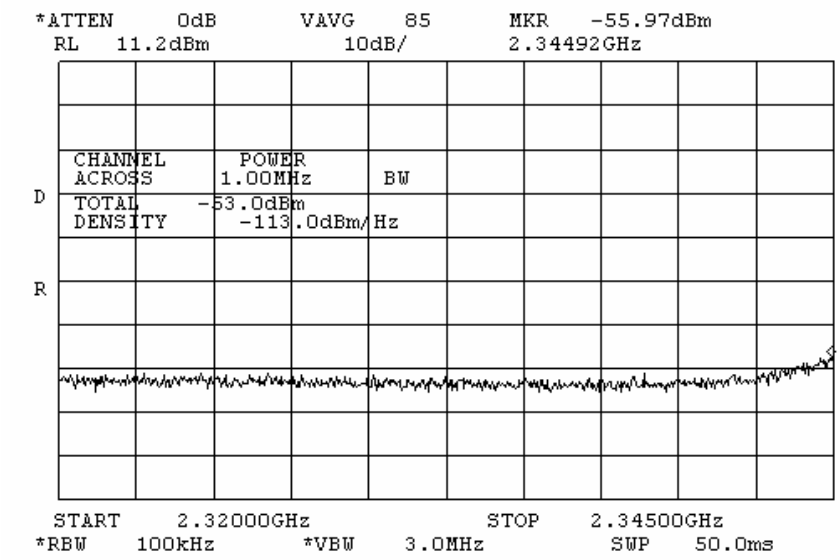
Plot # 32



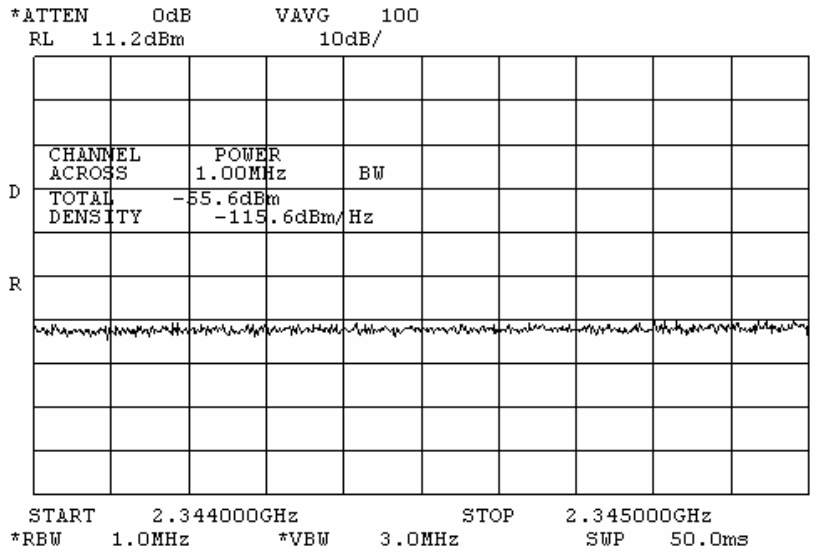
Plot # 33



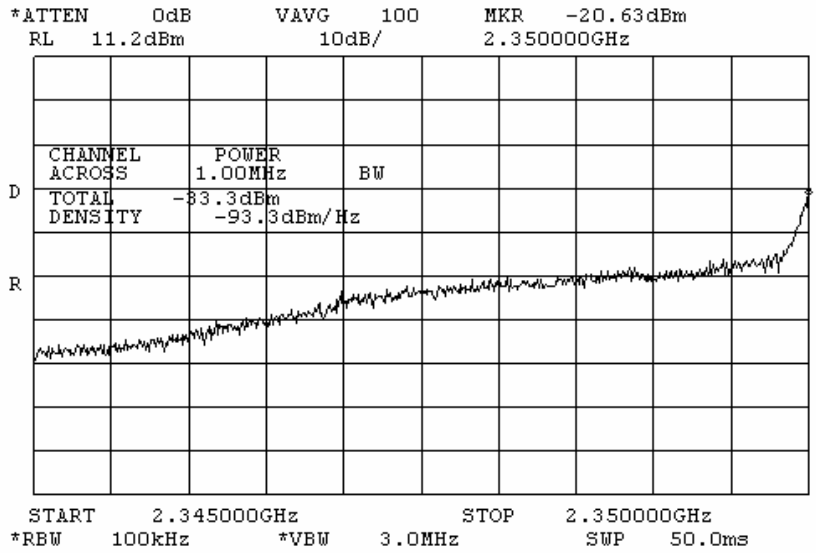
Plot # 34



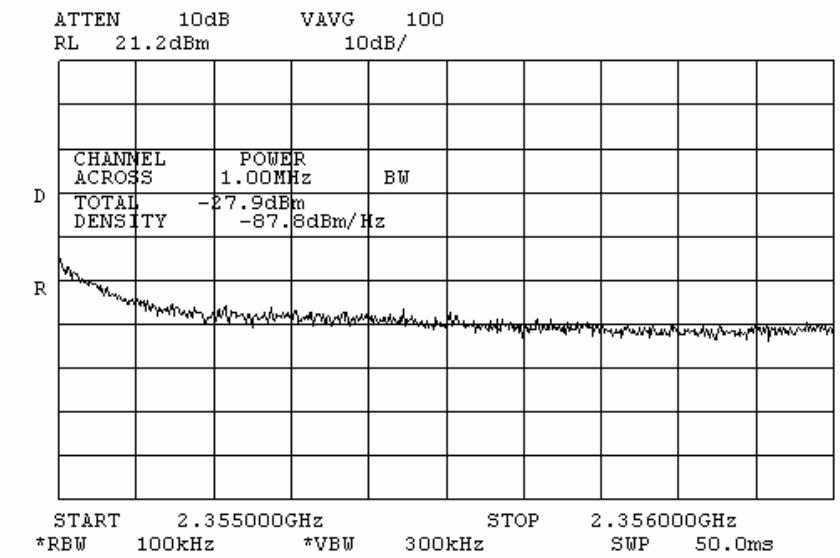
Plot # 35



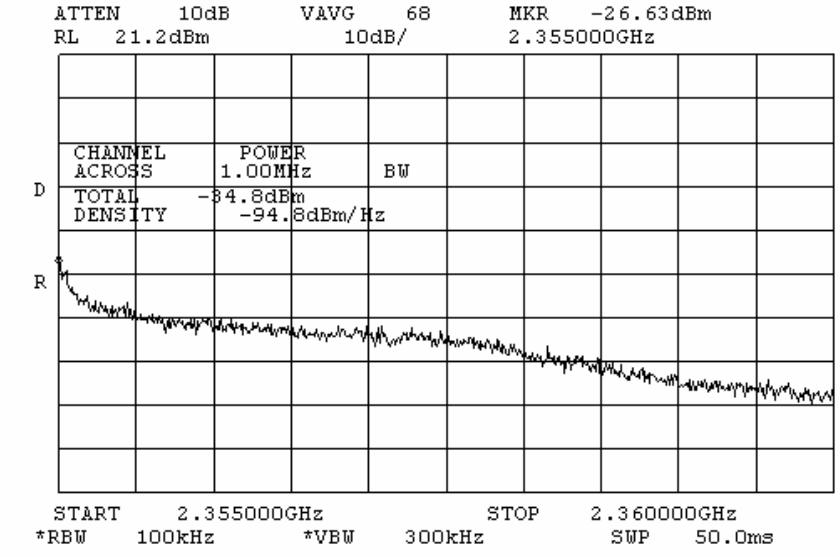
Plot # 36



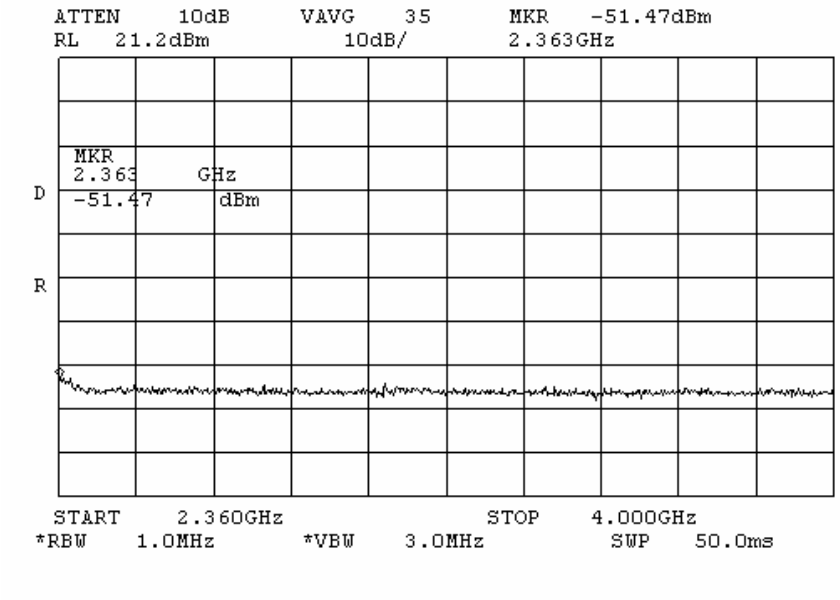
Plot # 37



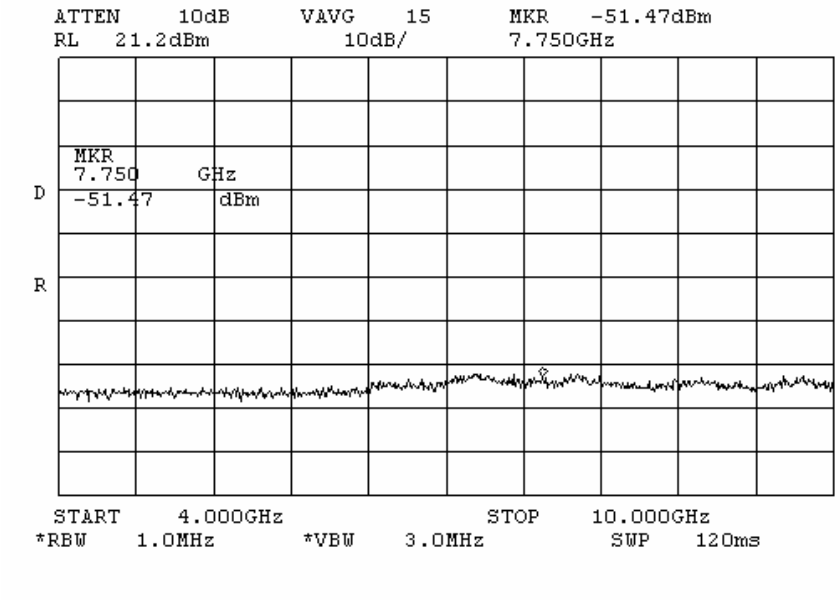
Plot # 38



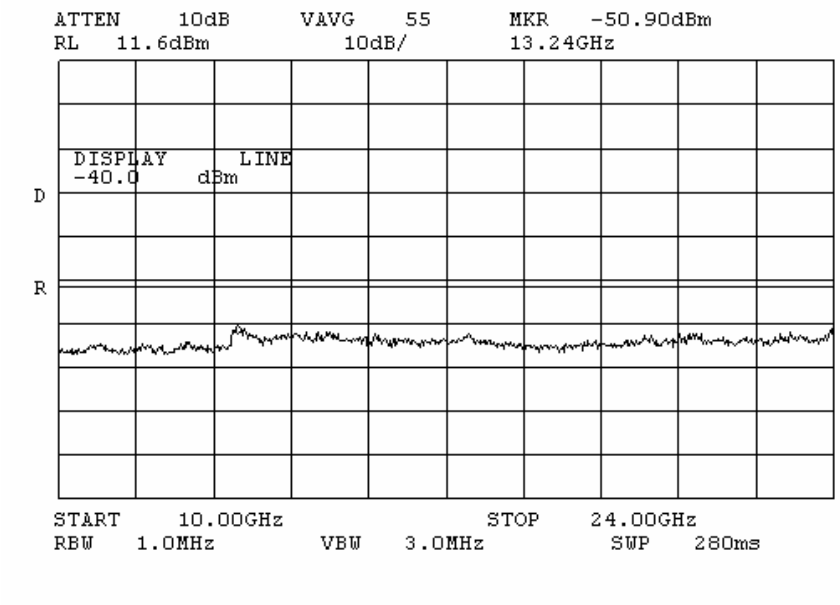
Plot # 39



Plot # 40

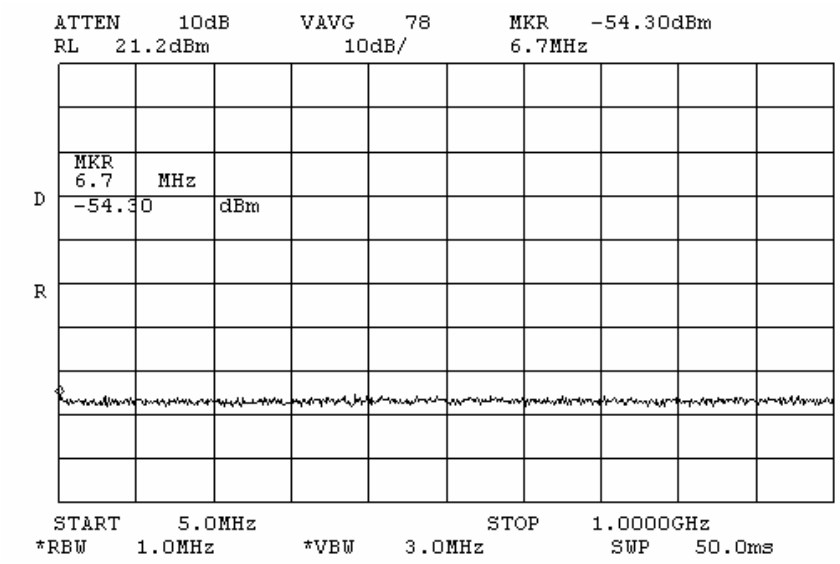


Plot # 41

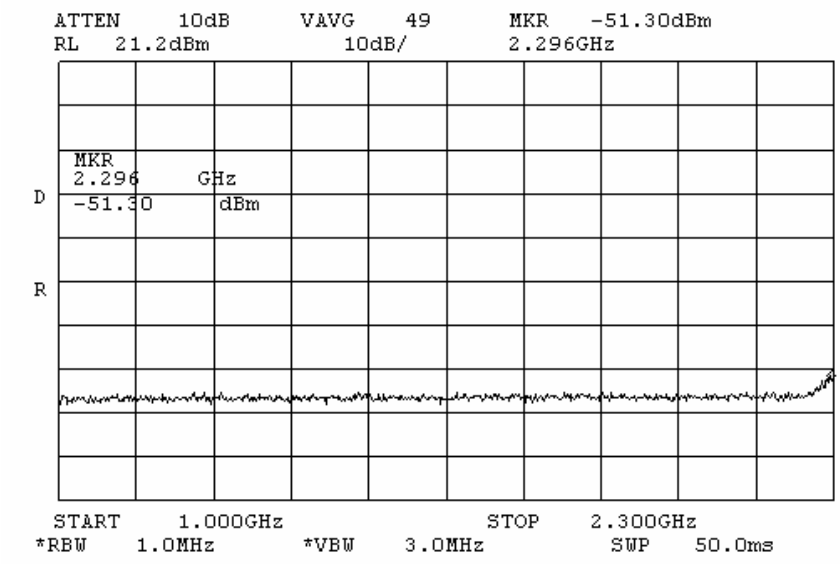

ATTEN 10dB
VAVG 55
MKR -50.90dBm
RL 11.6dBm
10dB/
13.24GHz
DISPLAY LINE
-40.0 dBm
D
R
START 10.00GHz
STOP 24.00GHz
RBW 1.0MHz
VBW 3.0MHz
SWP 280ms

Plot # 42

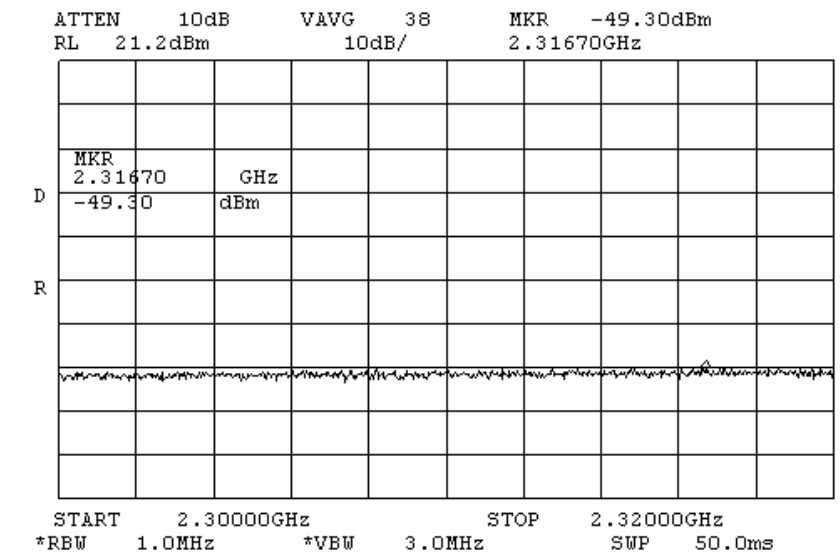
Frequency carrier 2357.5 MHz



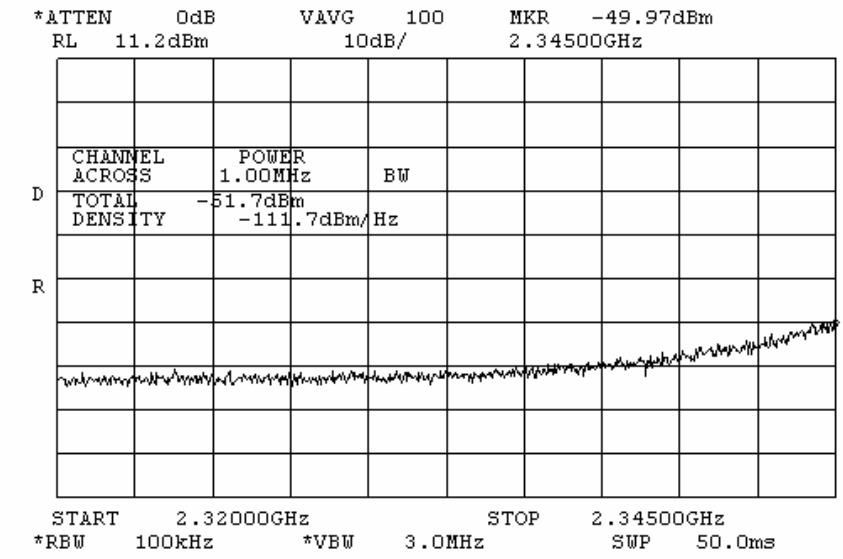
Plot # 43



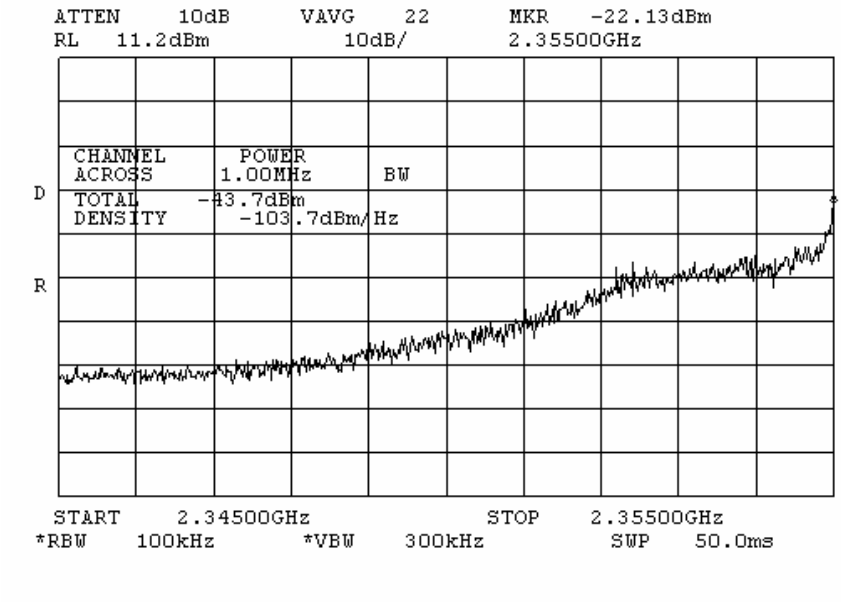
Plot # 44



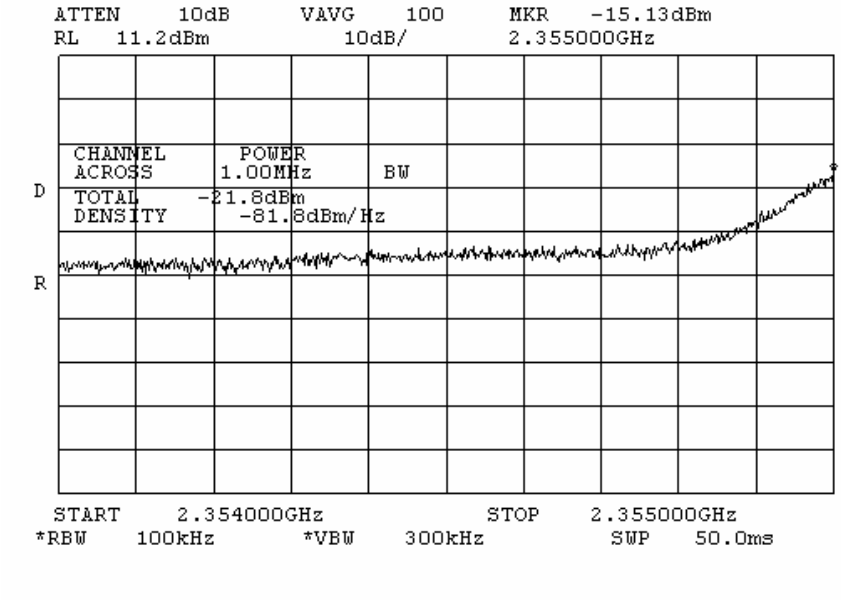
Plot # 45



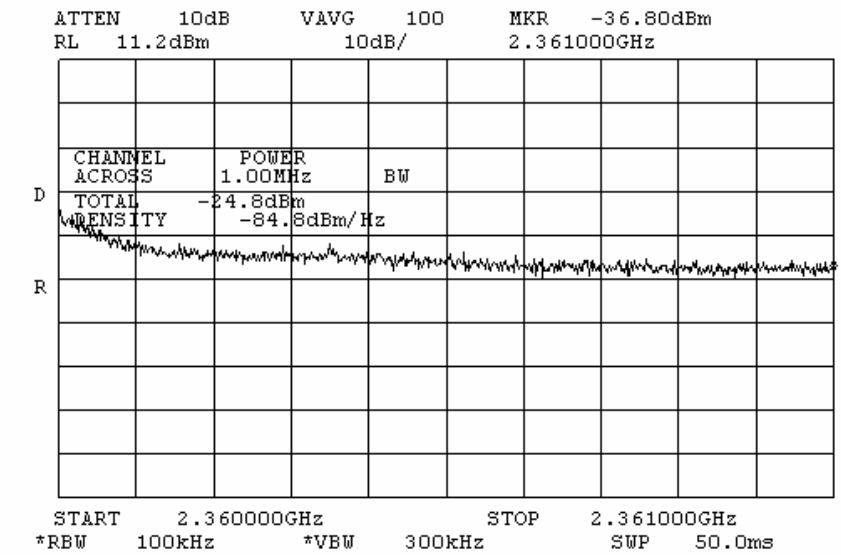
Plot # 46



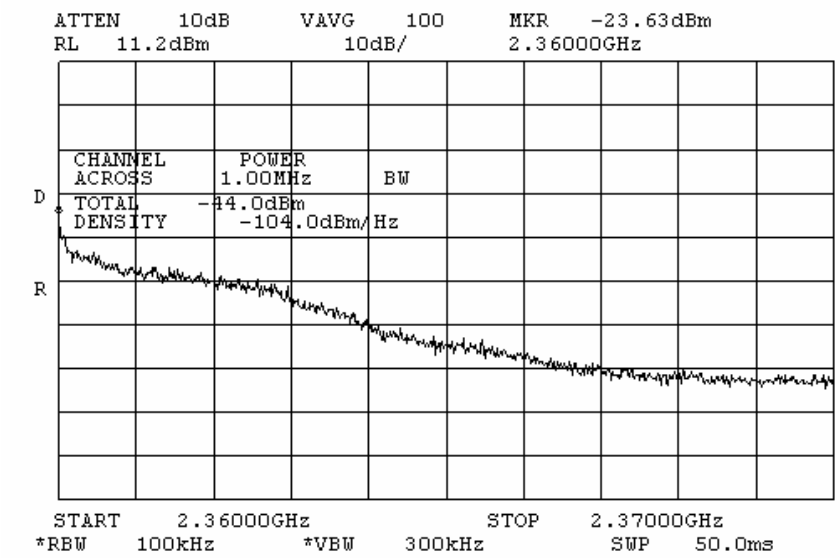
Plot # 47



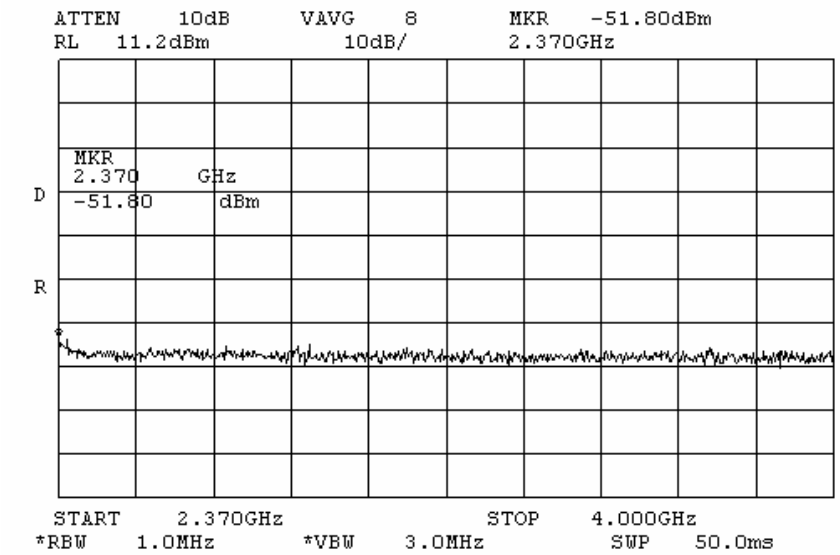
Plot # 48



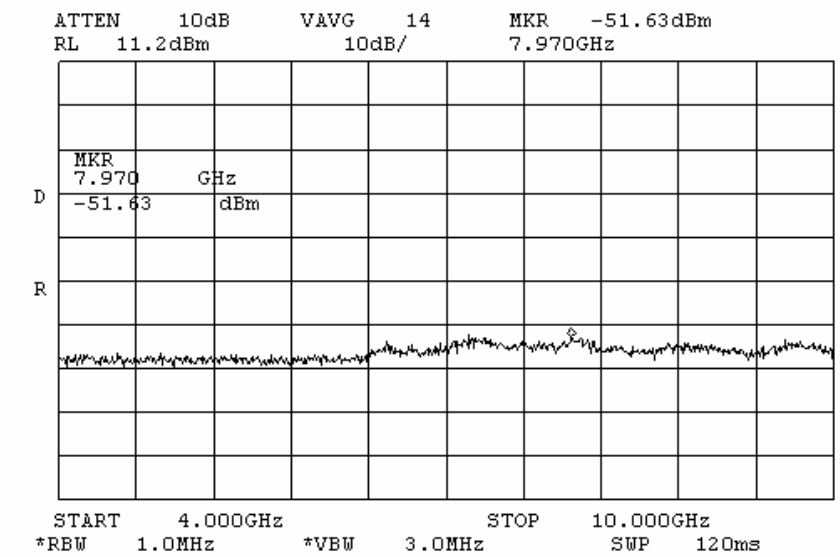
Plot # 49



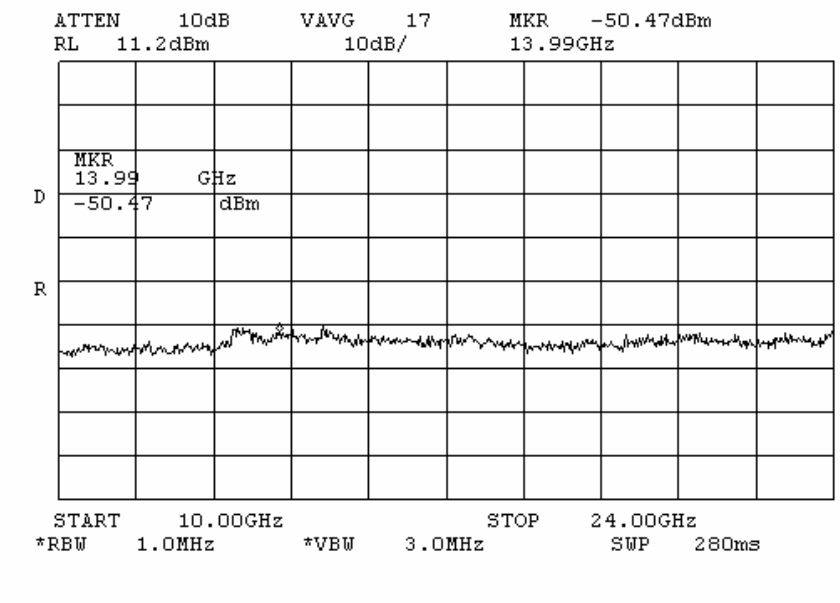
Plot # 50



Plot # 51



Plot # 52


ATTEN 10dB
VAVG 17
MKR -50.47dBm
RL 11.2dBm
10dB/
13.99GHz
MKR
13.99 GHz
D
-50.47 dBm
R
START 10.00GHz
STOP 24.00GHz
*RBW 1.0MHz
*VBW 3.0MHz
SWP 280ms

Plot # 53

5.1.4 Radiated emissions, radiated according to §§ 2.1053, 27.53

Ambient Temperature - 23^0 C Relative Humidity - 49% Air Pressure - 1009 hPa
Operating Frequency Range 2.305 – 2.360 GHz.

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 Plots in this section.

Carrier frequency = 2307.5 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Limit, dBm/dB (μV/m)	Margin, dB	Note	Reference to Plot number
2304.8	79.1	-13/82.2	3.1		56
2310	79.2	-13/82.2	3.0		58
2320	31.8	-50/45.2	13.4		59
23910	20.9	-40/65.2@1m		Noise floor	62

Carrier frequency = 2312.5 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Limit, dBm/dB (μV/m)	Margin, dB	Note	Reference to Plot number
2309.9	77.0	-13/82.2	3.9		66
2315	78.9	-13/82.2	5.2		68
2320	36.0	-50/45.2	8.7		69
23740	19.9	-40/65.2@1m		Noise floor	72

Carrier frequency = 2352.5 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Limit, dBm/dB (μV/m)	Margin, dB	Note	Reference to Plot number
2344.8	39.3	-50/45.2	5.9		76
2349.9	78.3	-13/82.2	3.9		78
2355	77.1	-13/82.2	5.1		80
23910	20.7	-40/65.2@1m		Noise floor	82

Carrier frequency = 2357.5 MHz

Frequency, MHz	Radiated emissions, dB (μV/m)	Limit, dBm/dB (μV/m)	Margin, dB	Note	Reference to Plot number
2321.5	36.0	-50/45.2	9.2		86
2355	77.0	-13/82.2	5.2		88
2360	76.1	-13/82.2	6.1		89
23910	20.3	-40/65.2@1m		Noise floor	91

TEST PROCEDURE

The test was performed with transmitter operating in 4 carrier frequencies 2307.5 MHz; 2312.5 MHz; 2352.5 MHz and 2357.5 MHz with internal antenna.
The EUT was placed on a wooden 80 cm height turntable. The measurements were performed at 1 and 3 m test distance. To find maximum radiation the turntable was rotated 360°, measuring antenna height was changed from 1 to 4 m, and the antennas polarization was changed from vertical to horizontal.

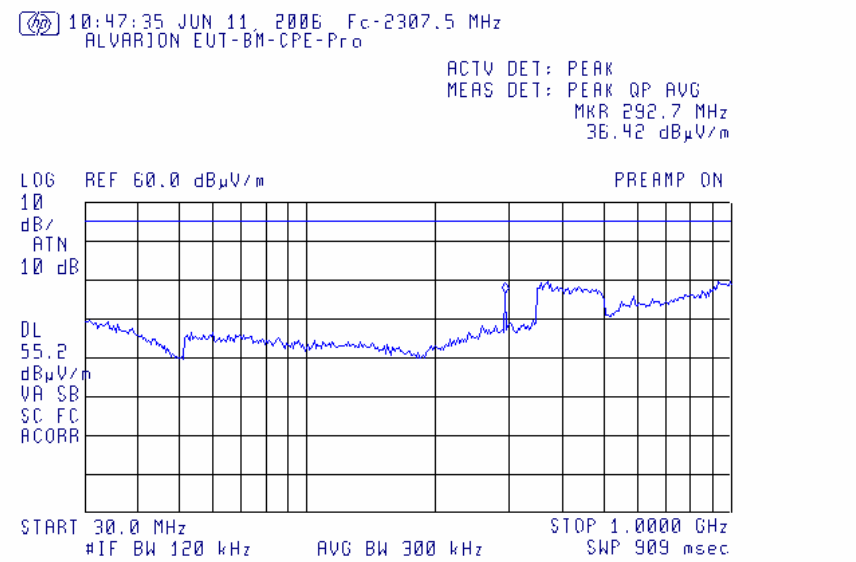
LIMIT

Below 2300 MHz and above 2370 MHz by factor not less then 70+10log(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 then 43+10Log(P) dB =
-13 dBm@ 82.2 dBμV/m at 3m distance. On all frequencies from 2320 to 2345 MHz by factor not less then 80+10Log(P) dB - -50 dBm@ 45.2 dBμV/m at 3m distance.

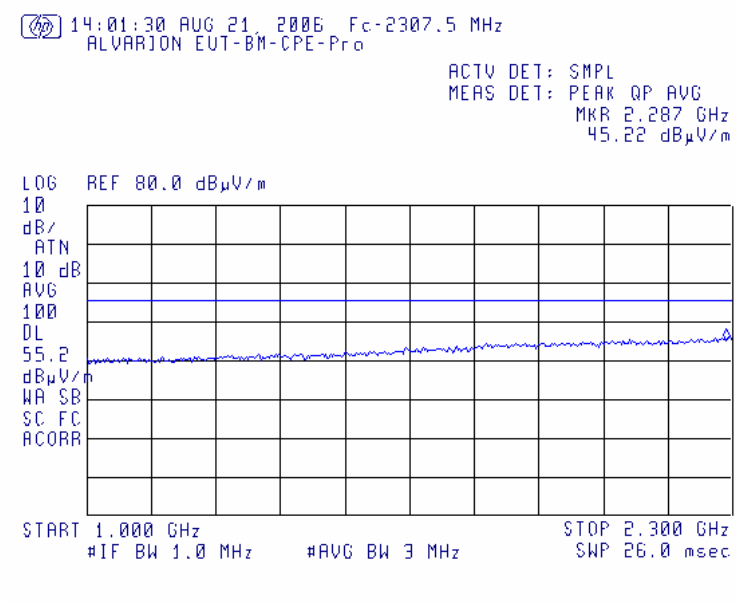
TEST EQUIPMENT USED:

3	4	5	6	9	12	

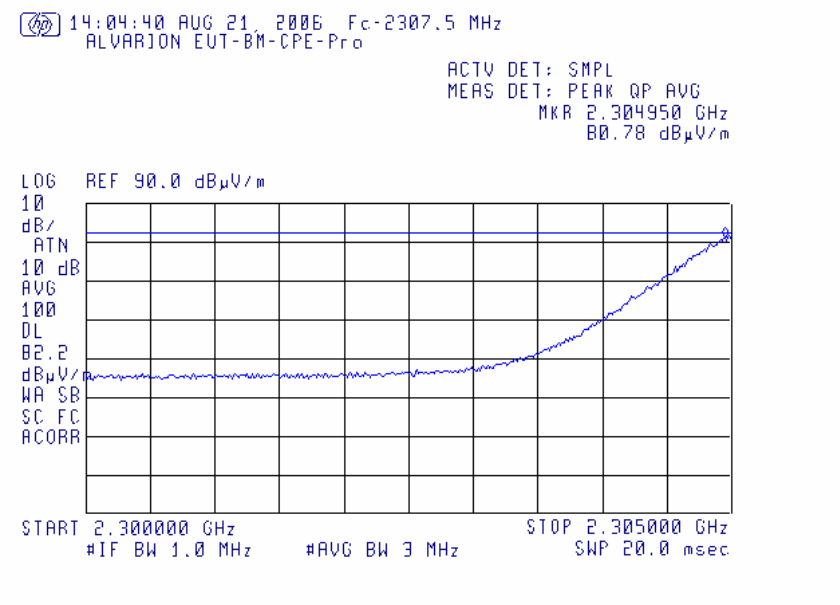
Frequency carrier 2307.5 MHz.



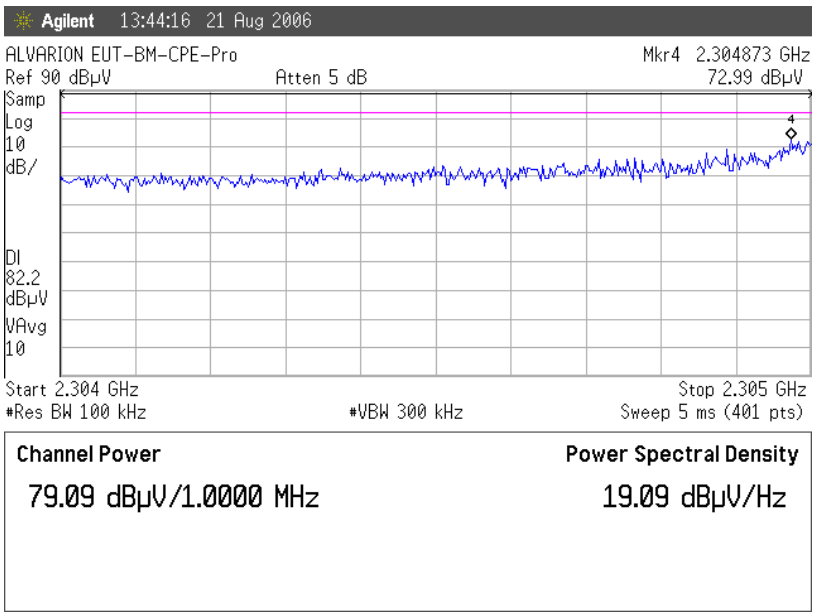
Plot # 54



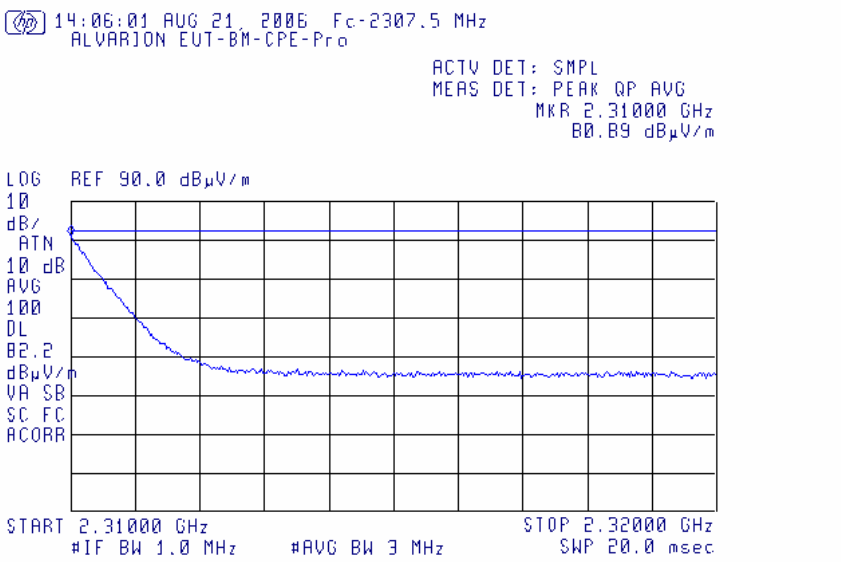
Plot # 55



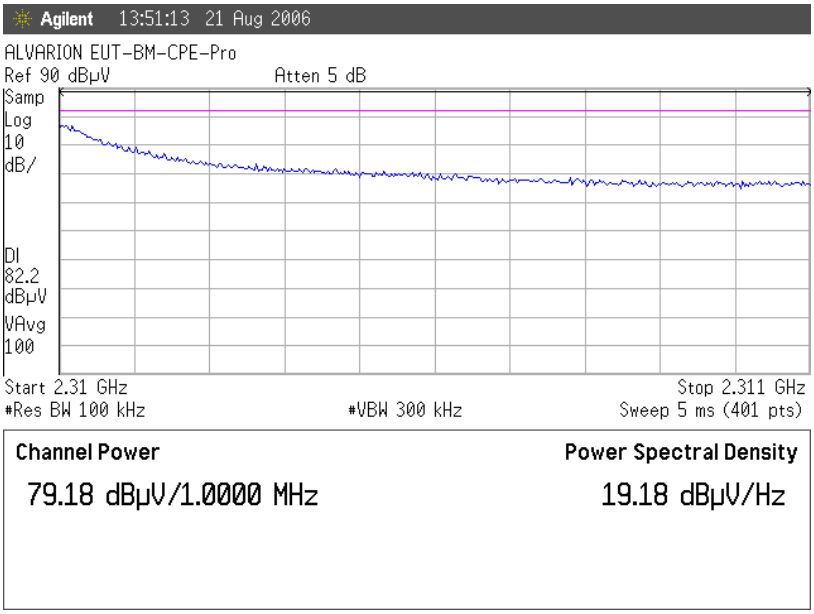
Plot # 56



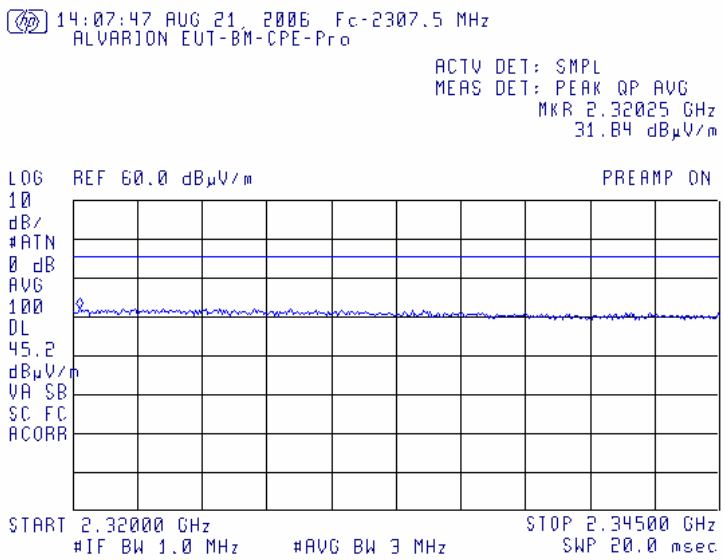
Plot # 57



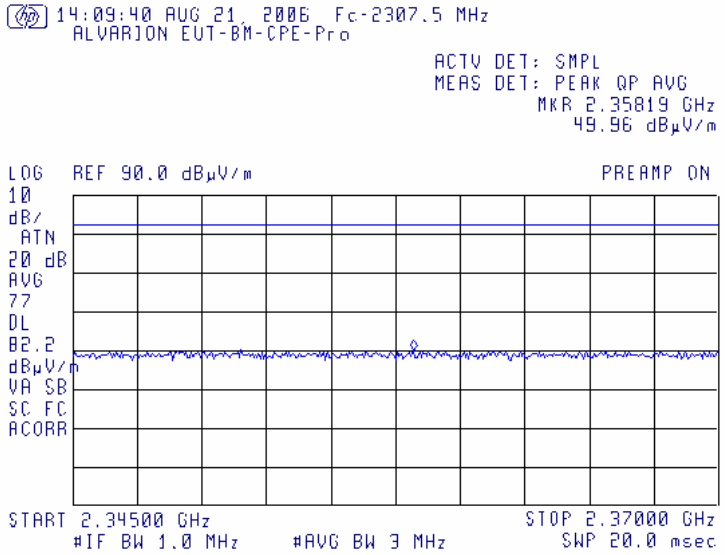
Plot # 58



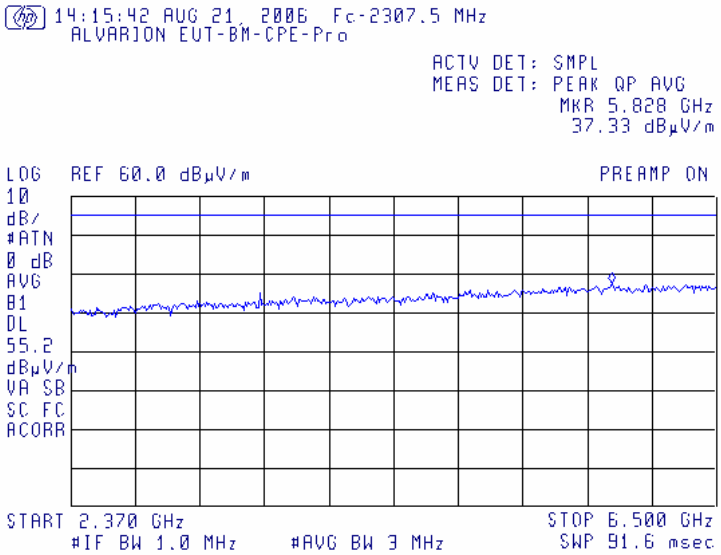
Plot # 59



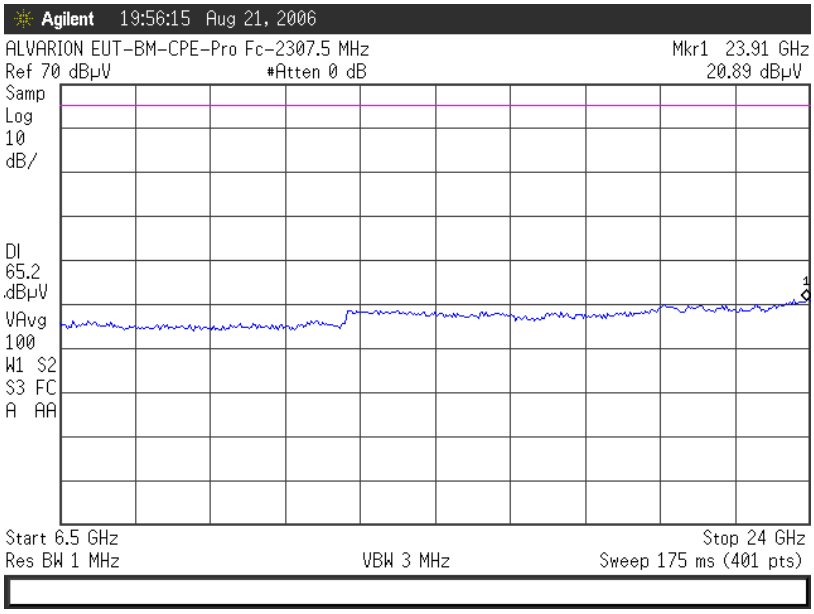
Plot # 60



Plot # 61

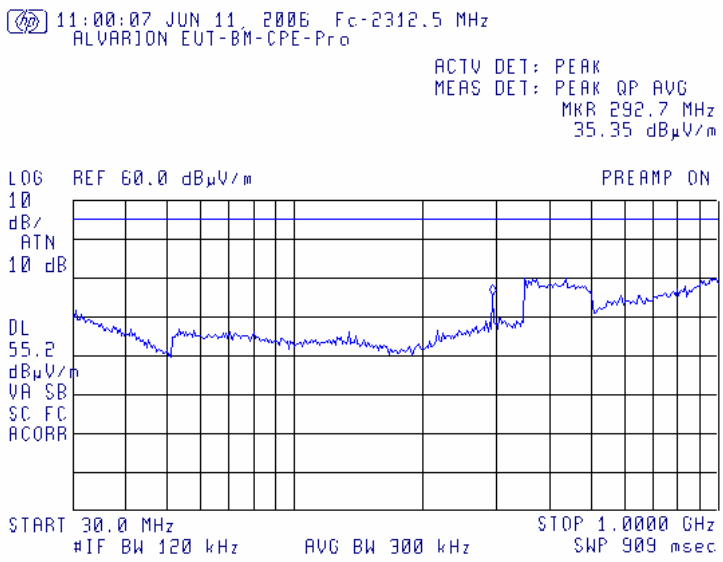


Plot # 62

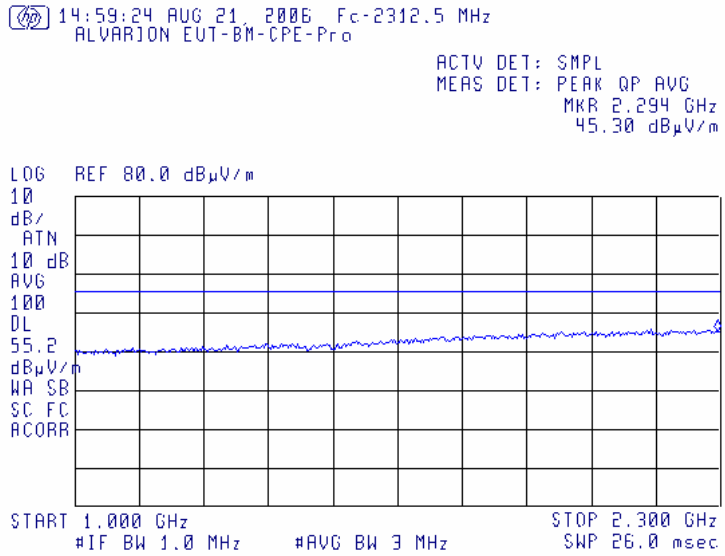


Plot # 63

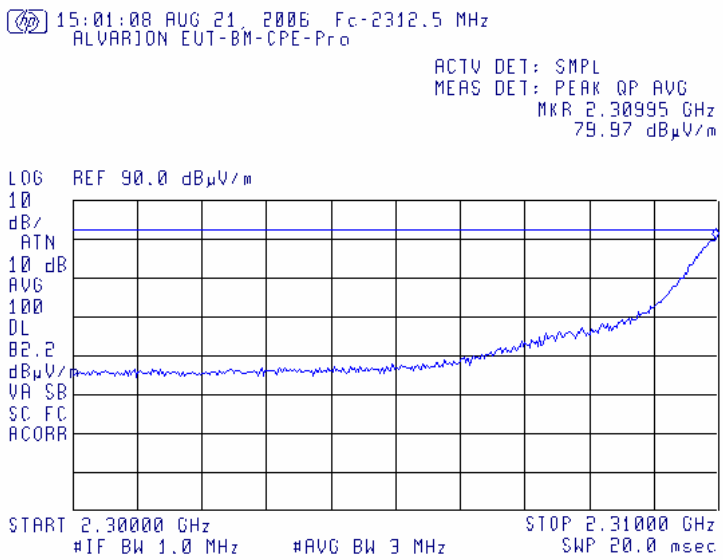
Frequency carrier 2312.5 MHz.



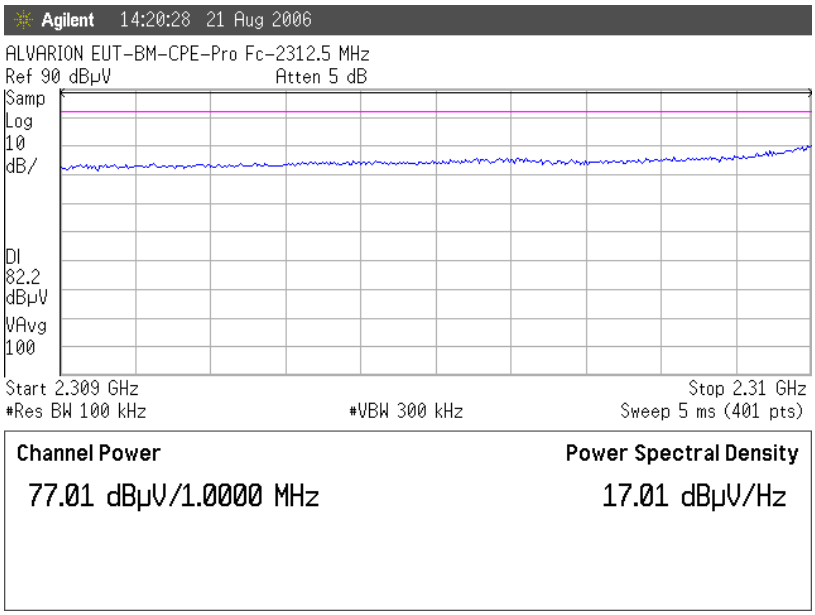
Plot # 64



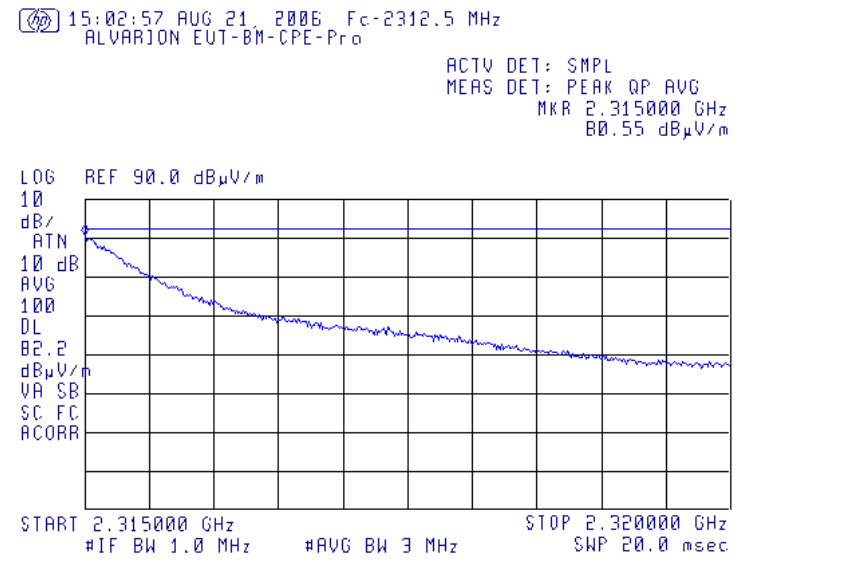
Plot # 65



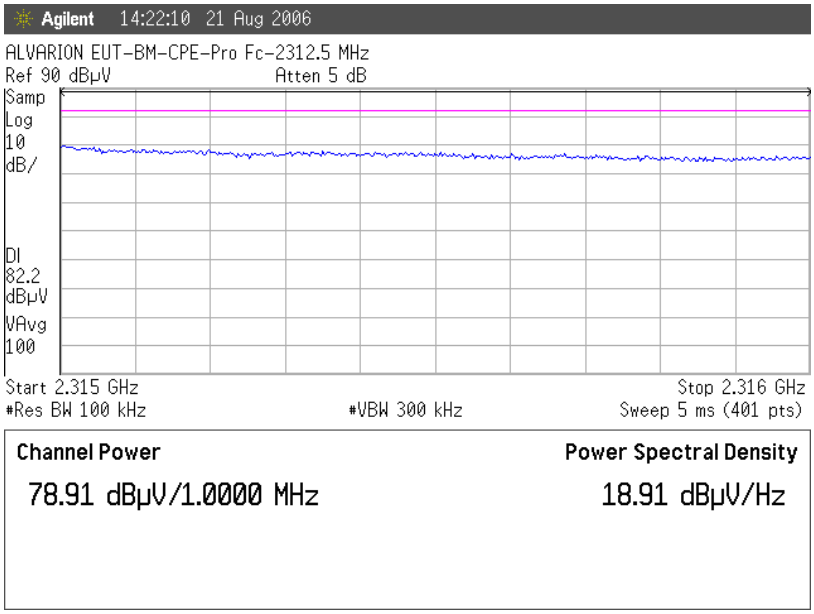
Plot # 66



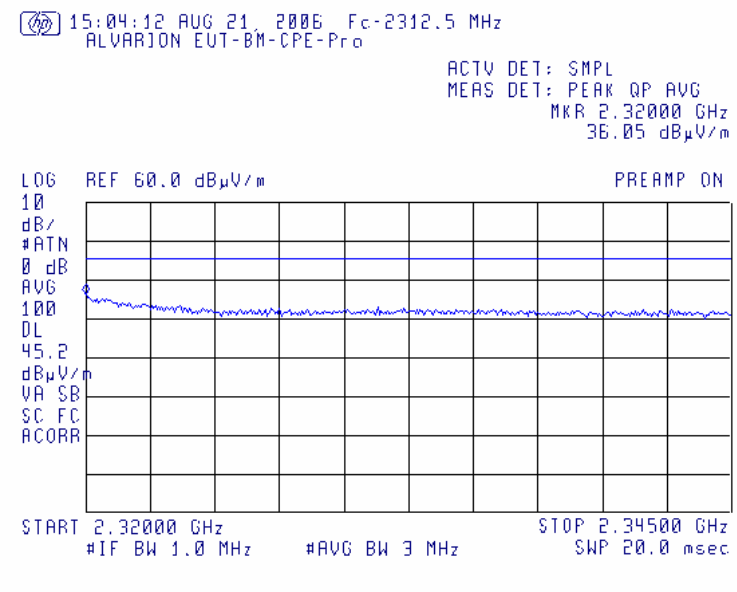
Plot # 67



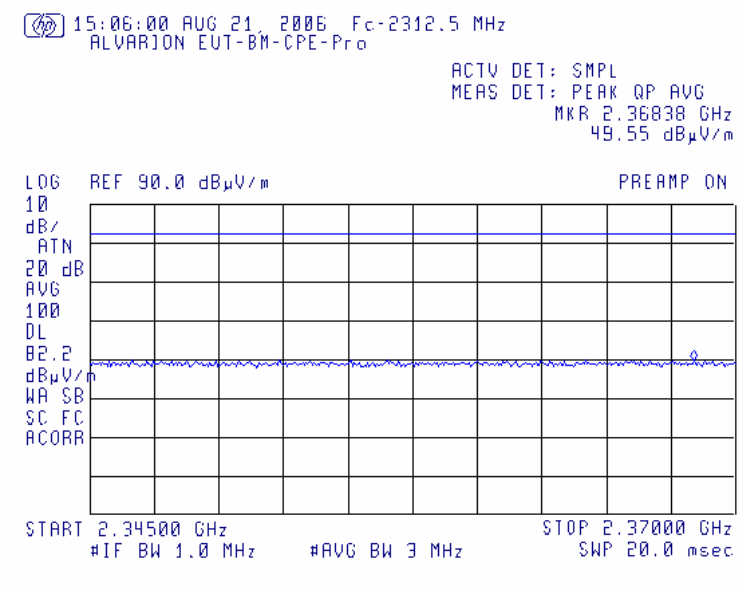
Plot # 68



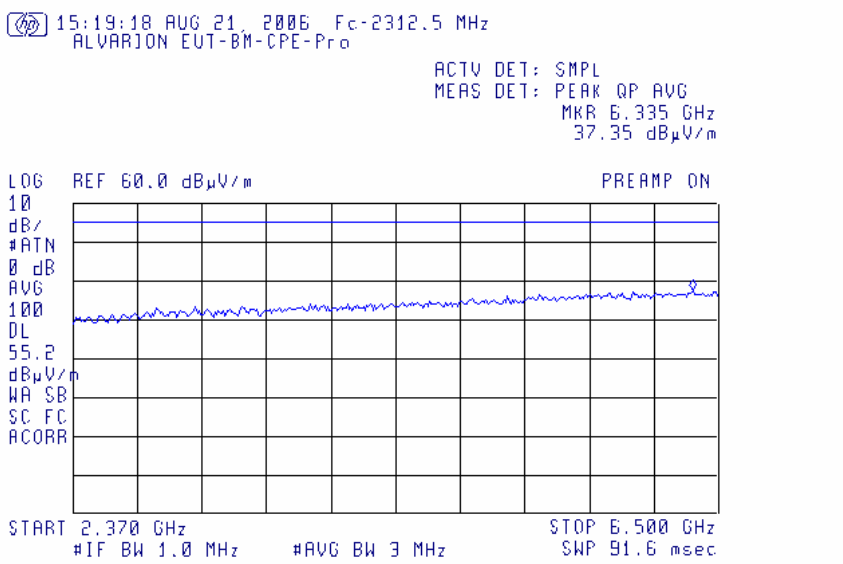
Plot # 69



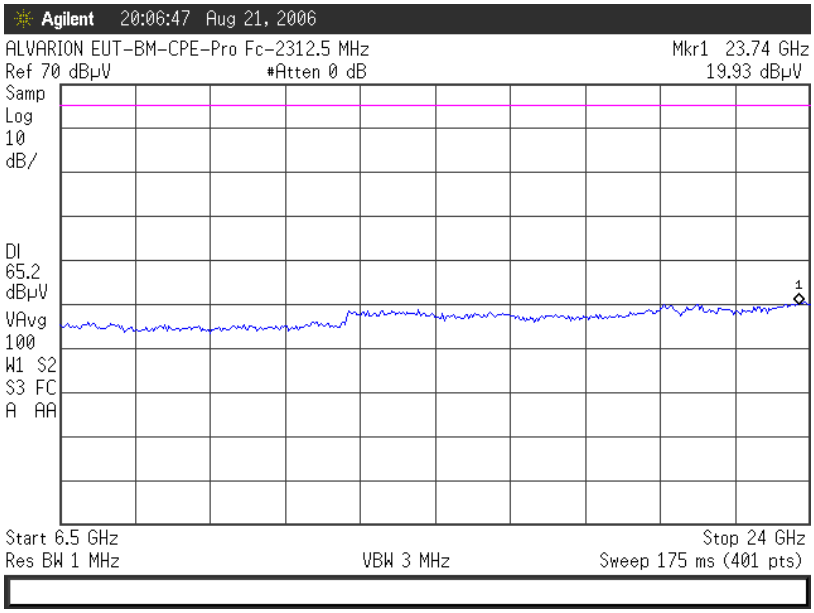
Plot # 70



Plot # 71

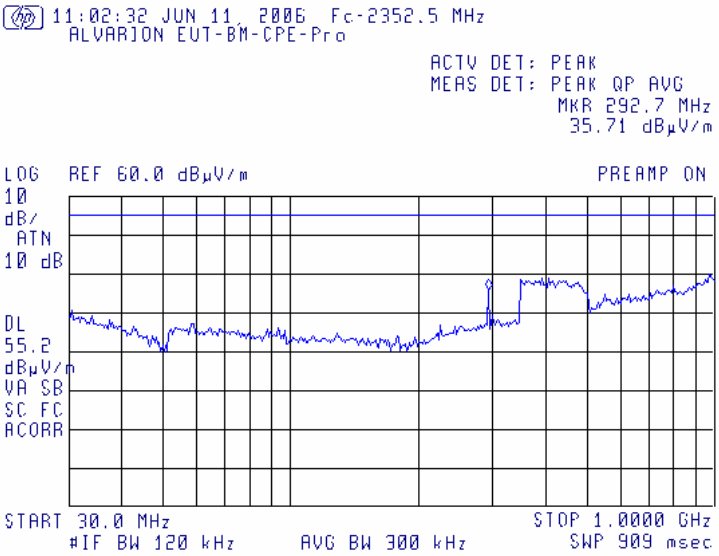


Plot # 72

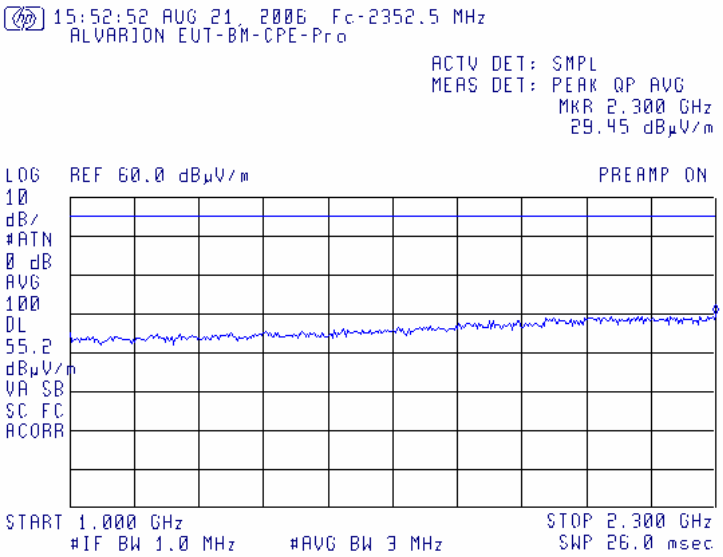


Plot # 73

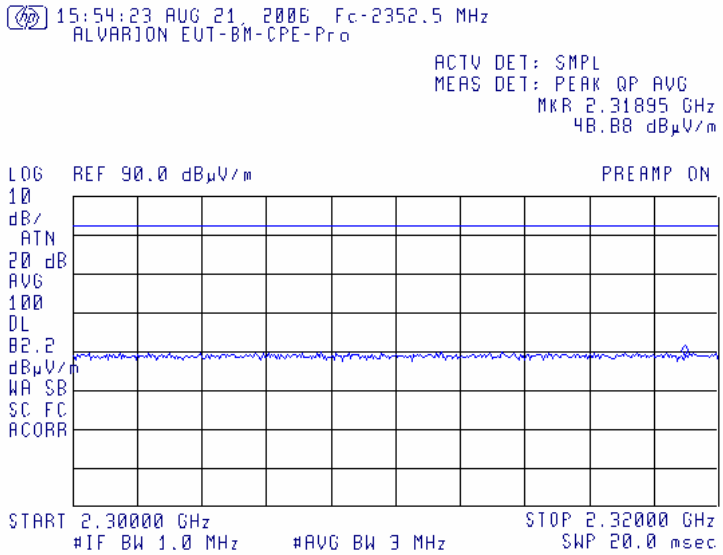
Frequency carrier 2352.5 MHz.



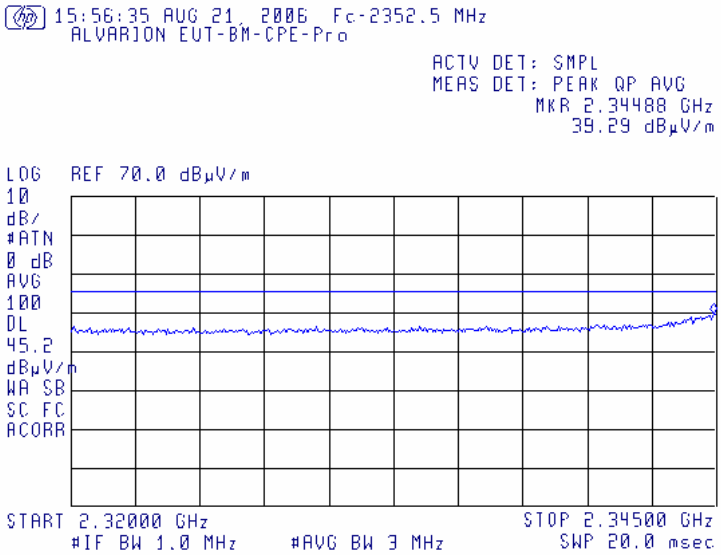
Plot # 74



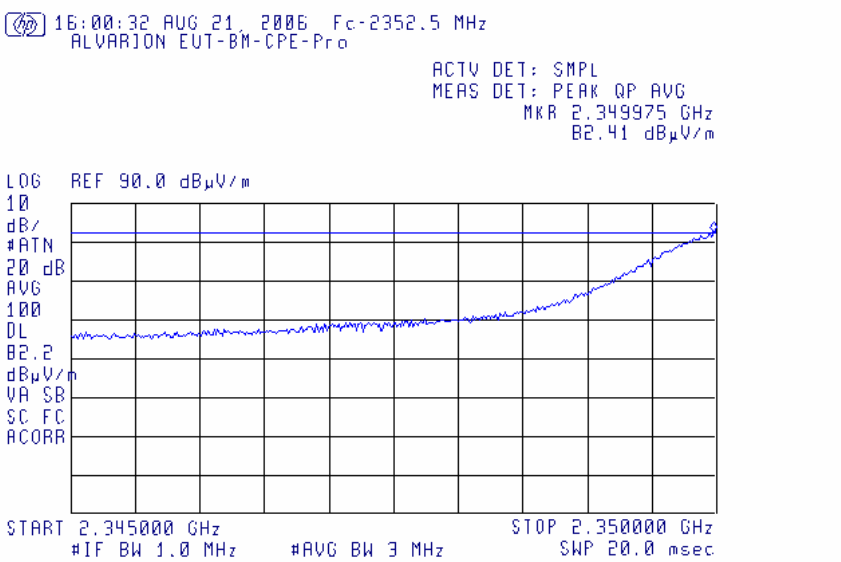
Plot # 75



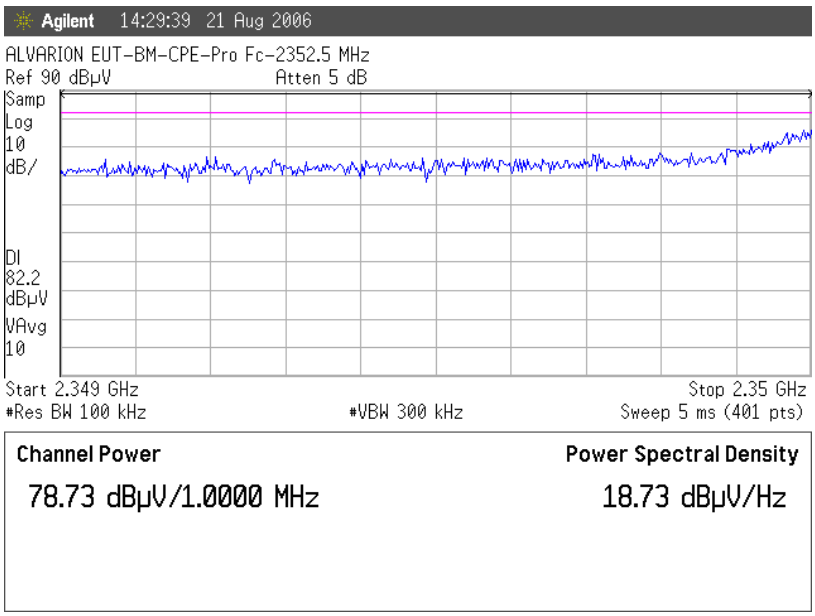
Plot # 76



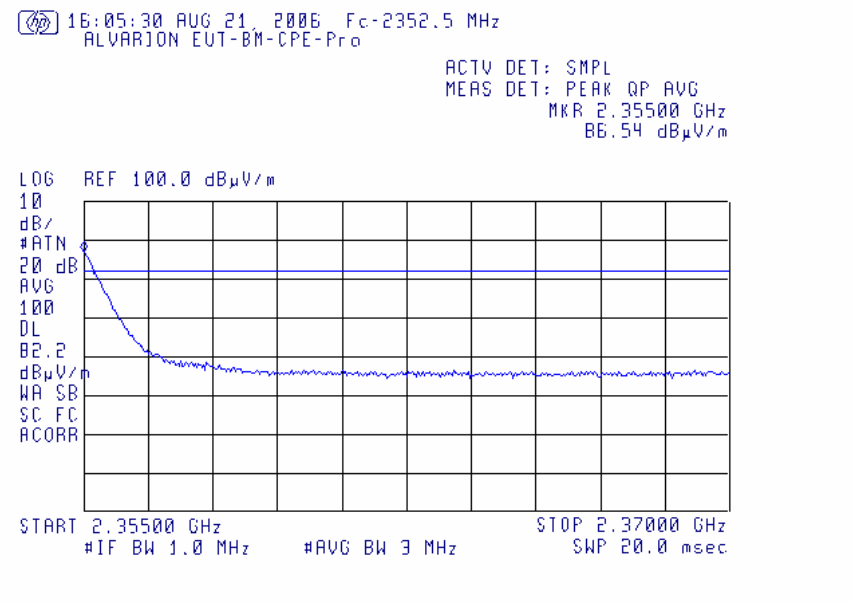
Plot # 77



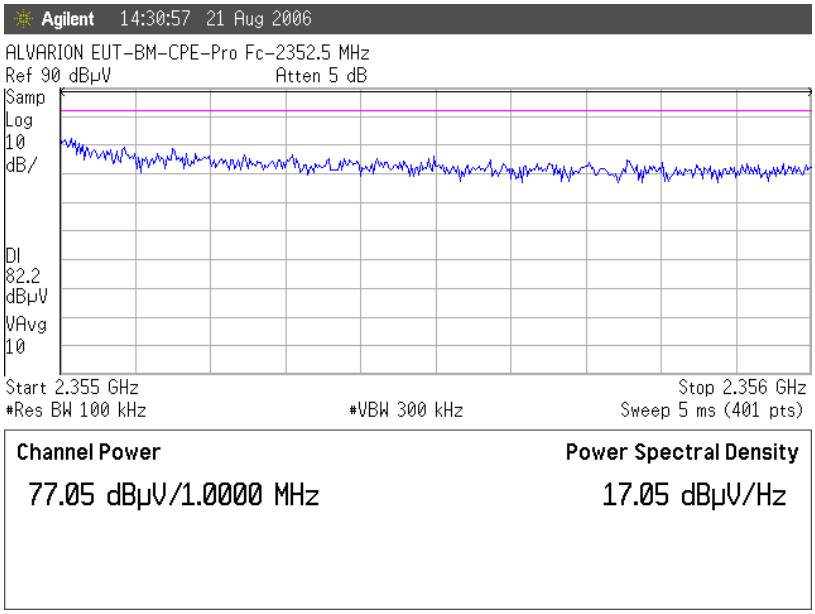
Plot # 78



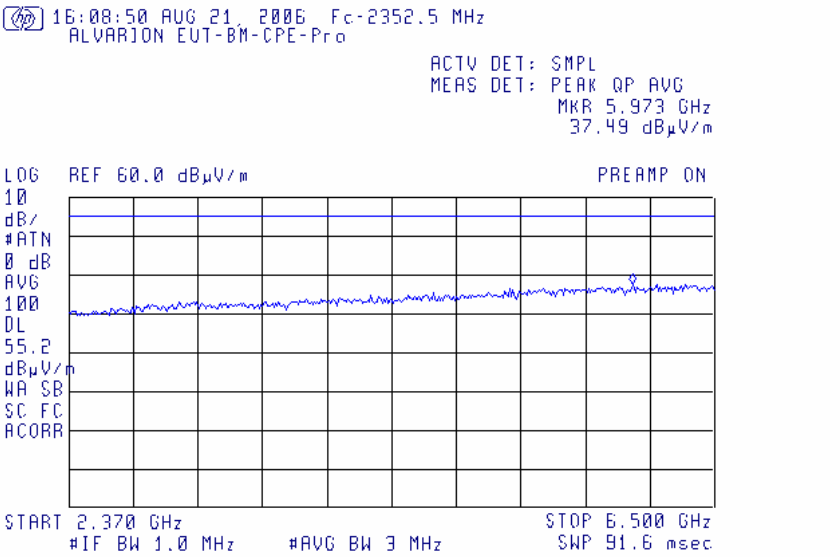
Plot # 79



Plot # 80



Plot # 81



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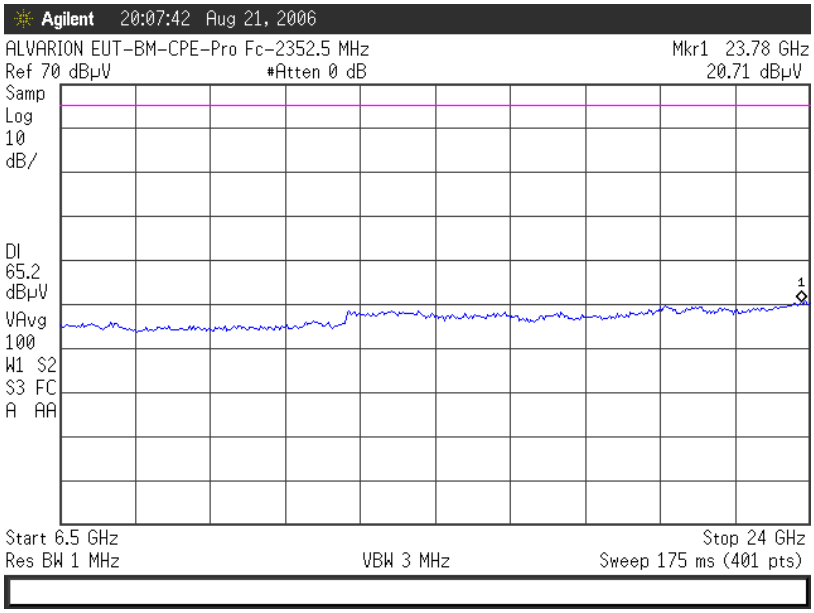
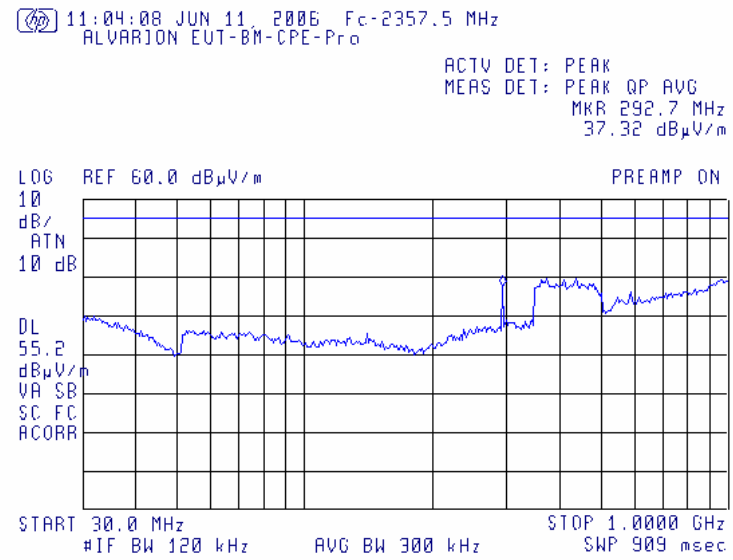


Plot # 83

Frequency carrier 2357.5 MHz.



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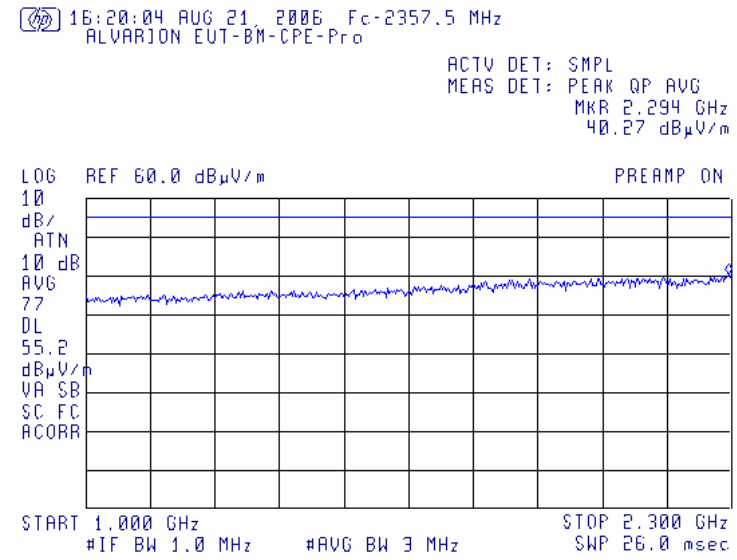

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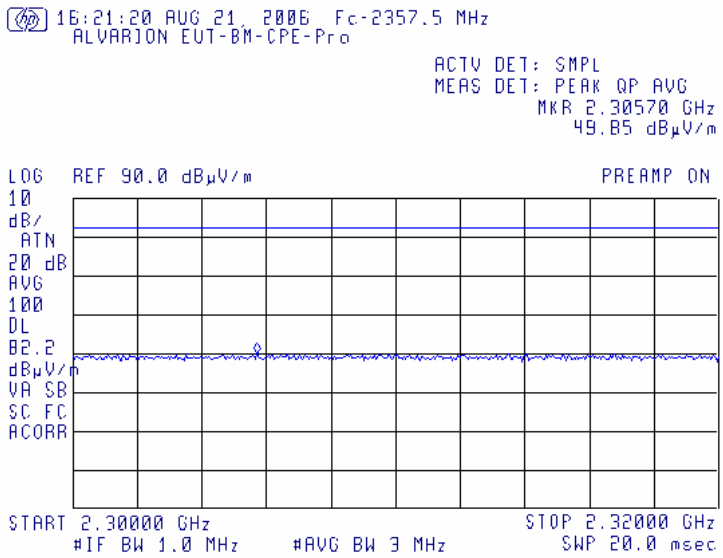
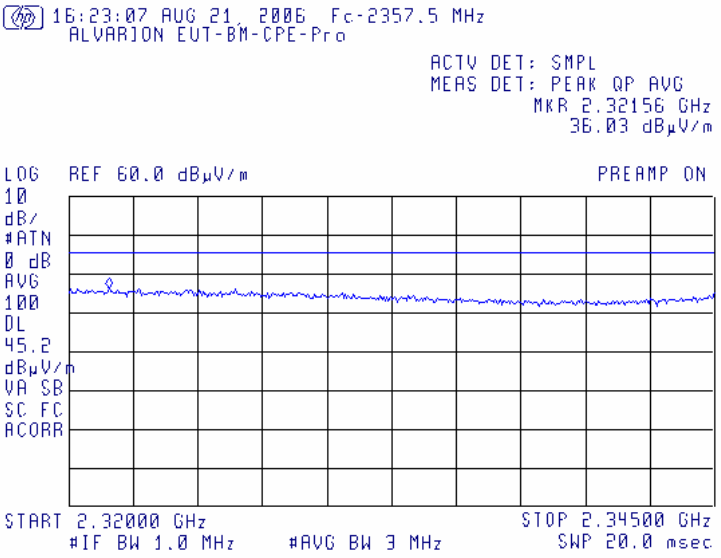


Plot # 86



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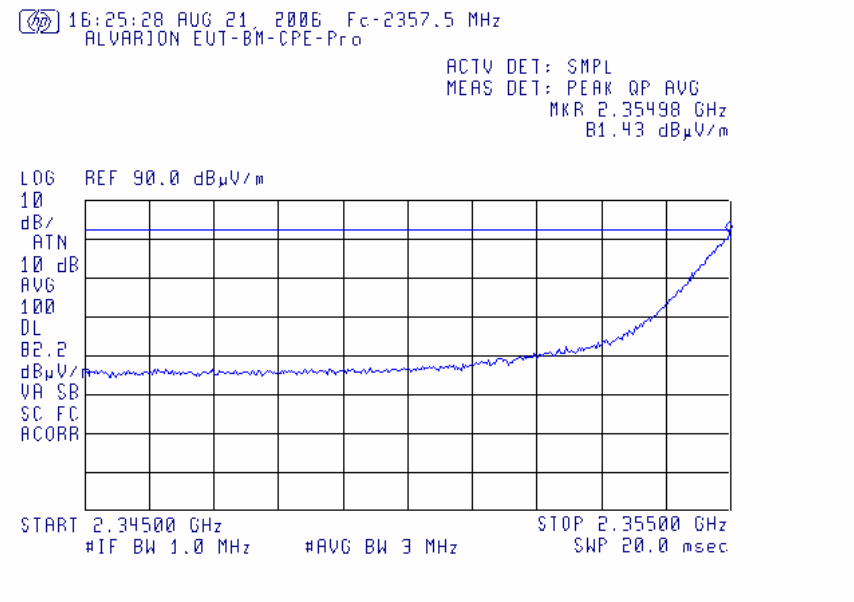
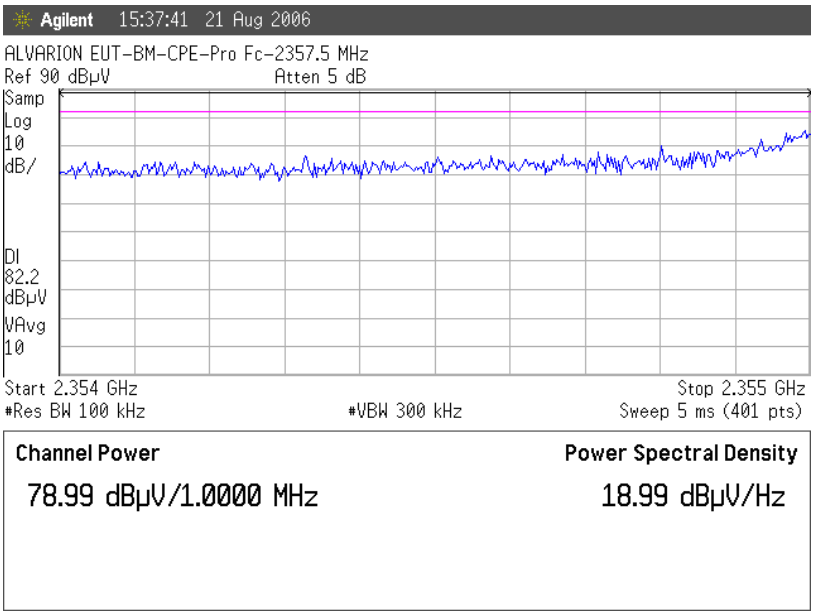
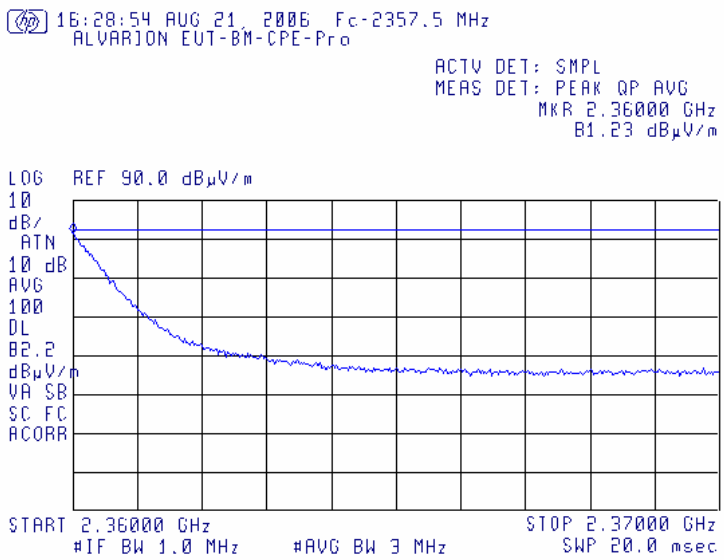
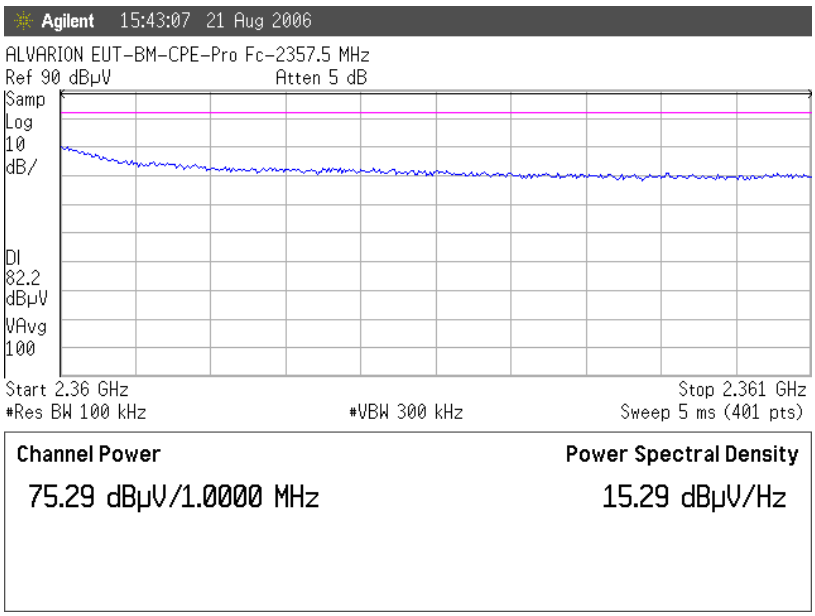


Plot # 88

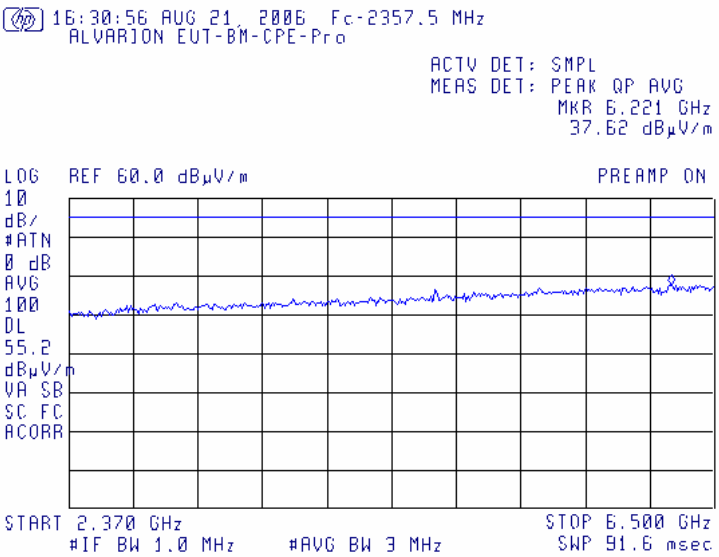


Plot # 89

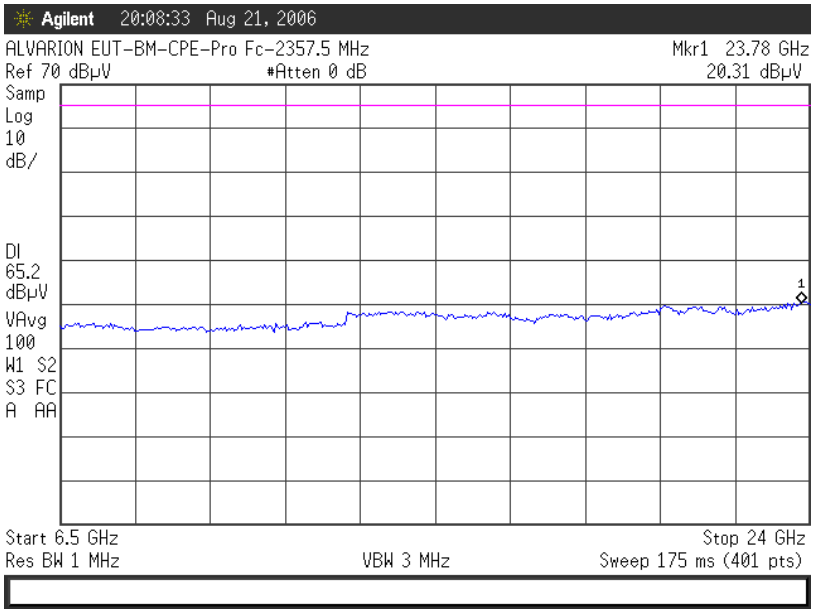

16:28:54 AUG 21, 2006 Fc-2357.5 MHz
ALVARION EUT-BM-CPE-Pro
ACTV DET: SMPL
MEAS DET: PEAK QP AVG
MKR 2.36000 GHz
81.23 dBµV/m
LOG REF 90.0 dBµV/m
10
dB/
ATN
10 dB
AVG
100
DL
82.2
dBµV/m
VA SB
SC FC
ACORR
START 2.36000 GHz
STOP 2.37000 GHz
#IF BW 1.0 MHz
#AVG BW 3 MHz
SWP 20.0 msec


Agilent 15:43:07 21 Aug 2006
ALVARION EUT-BM-CPE-Pro Fc-2357.5 MHz
Ref 90 dBµV
Atten 5 dB
Samp
Log
10
dB/
DI
82.2
dBµV
VAvg
100
Start 2.36 GHz
Stop 2.361 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 5 ms (401 pts)
Channel Power
75.29 dBµV/1.0000 MHz
Power Spectral Density
15.29 dBµV/Hz

Plot # 90



Plot # 91



Plot # 92

5.1.5 Frequency stability test according to § 27.54

Ambient Temperature 23^0 C Relative Humidity 49% Air Pressure 1009 hPa
Operating Frequency Range 2.305 – 2.360 GHz.

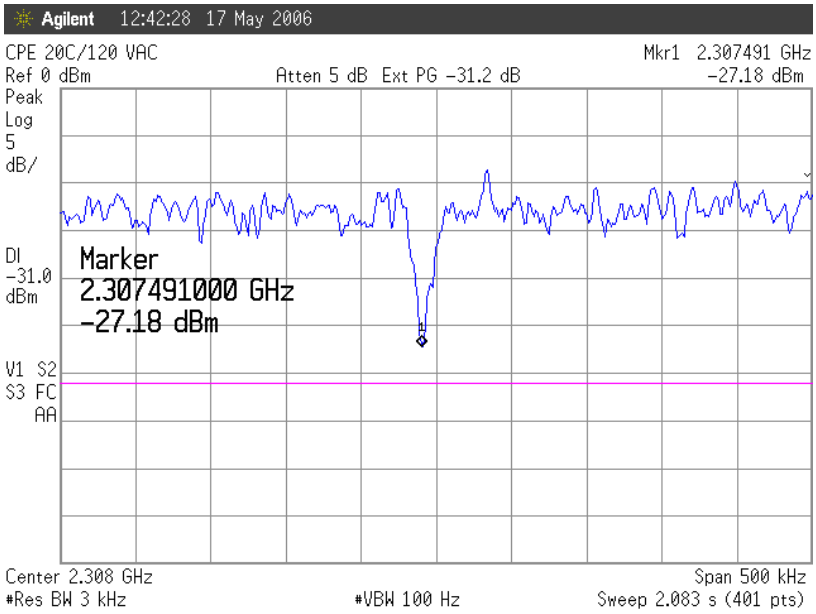
TEST CONDITIONS		Frequency stability test result			
Test temperature	Test voltage	Carrier frequency 2307.5 MHz	Carrier frequency 2312.5 MHz	Carrier frequency 2352.5 MHz	Carrier frequency 2357.5 MHz
+20°C	Vnom (100%)	2307.491	2312.490	2352.491	2357.491
-30°C	Vmin (85%)	2307.504	2312.503	2352.503	2357.503
	Vmax (115%)	2307.504	2312.503	2352.503	2357.503
+50°C	Vmin (85%)	2307.485	2312.485	2352.485	2357.485
	Vmax (115%)	2307.486	2312.485	2352.485	2357.485

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 temperature in climatic chamber was varied from
-30ºC to +50ºC and input voltage was changed from 85% of nominal to 115% in turn. Frequency changes were noted in table above.

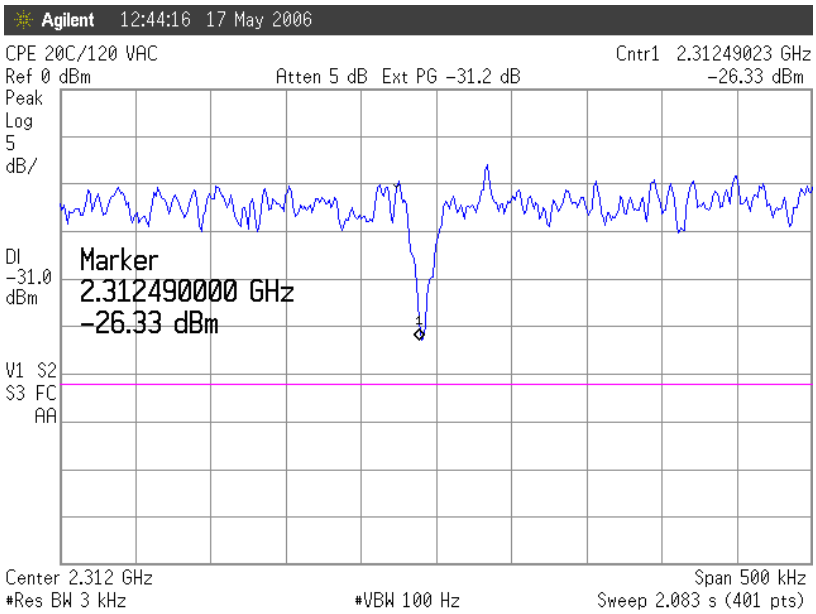
LIMIT
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

TEST EQUIPMENT USED:

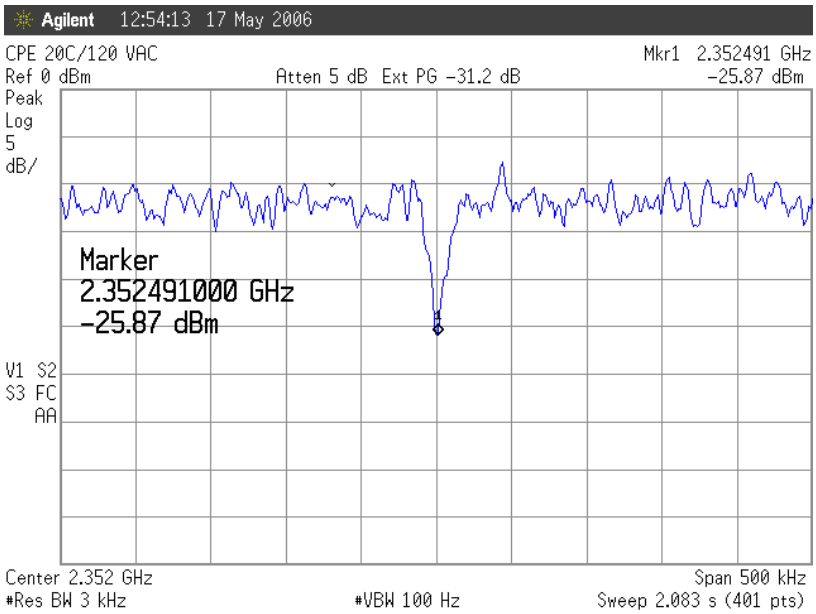
2	9	12				



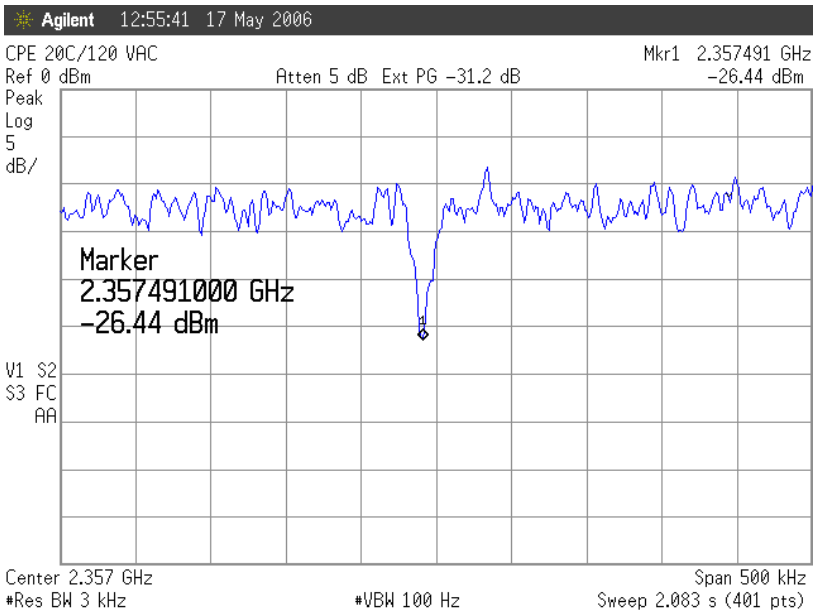
Plot # 93



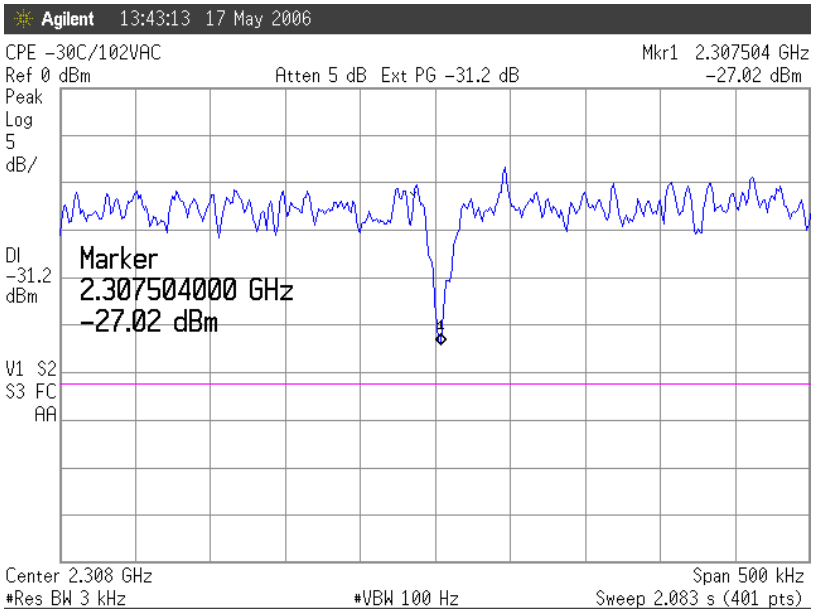
Plot # 94



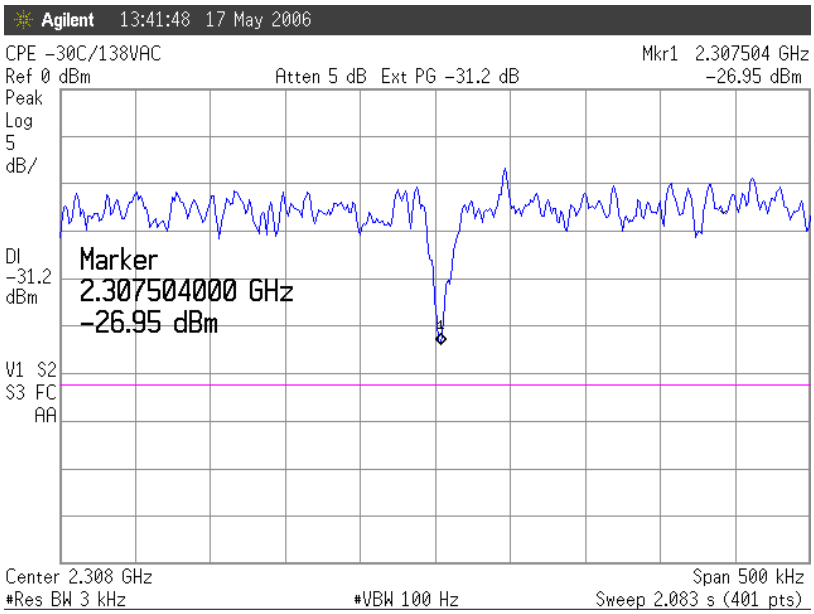
Plot # 95



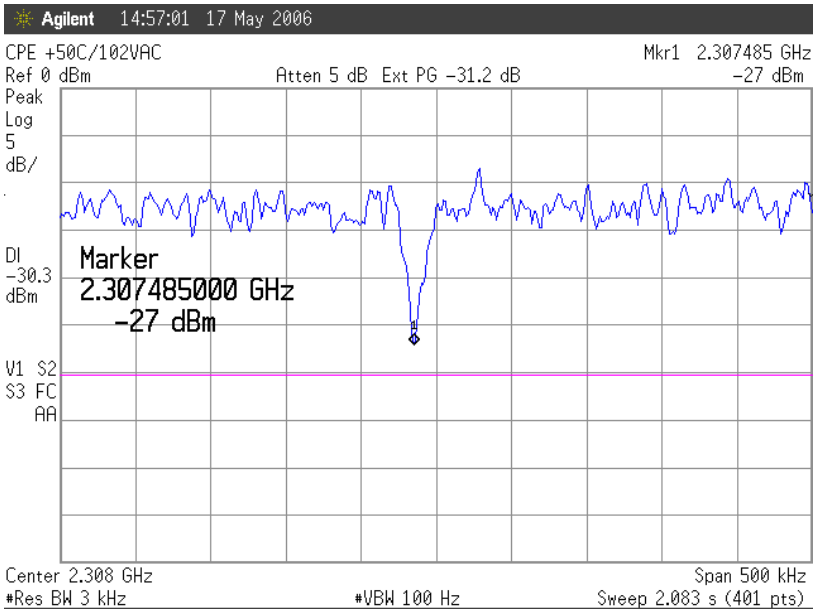
Plot # 96



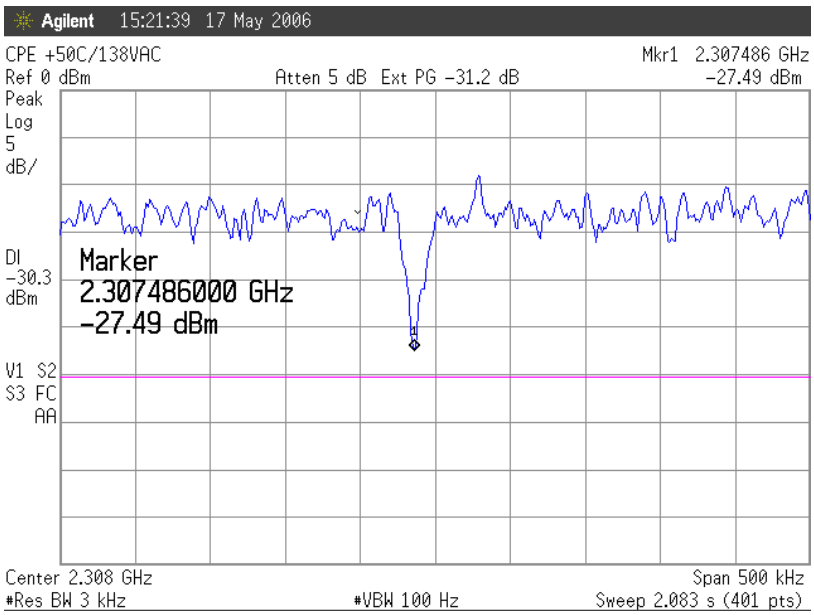
Plot # 97



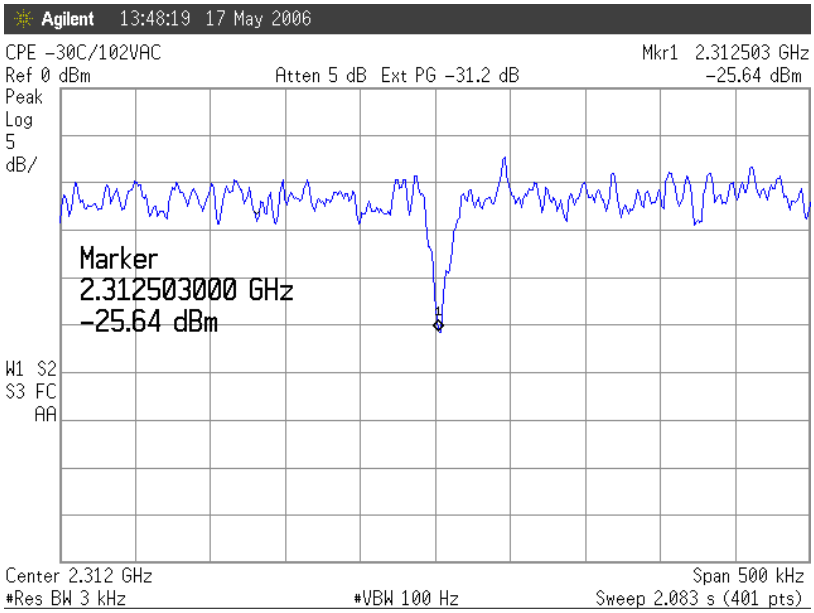
Plot # 98



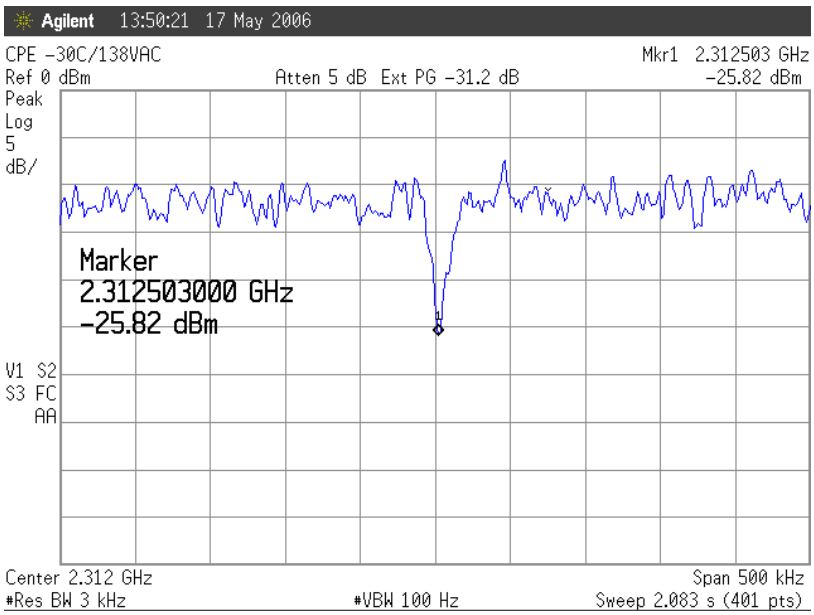
Plot # 99



Plot # 100



Plot # 101



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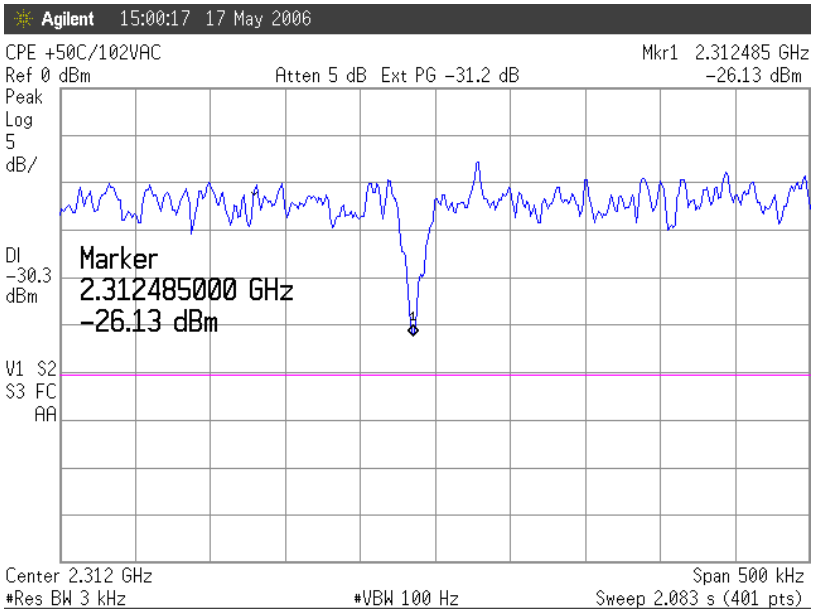
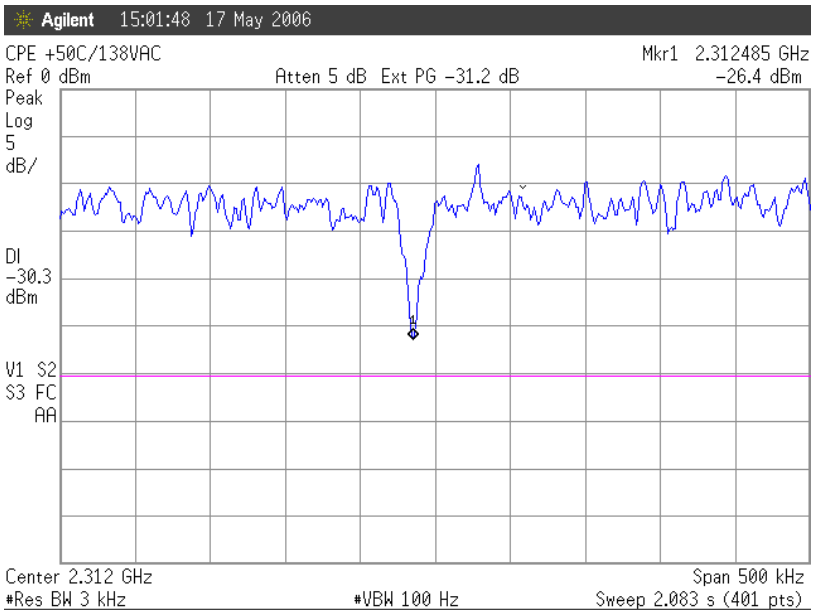


Plot # 103



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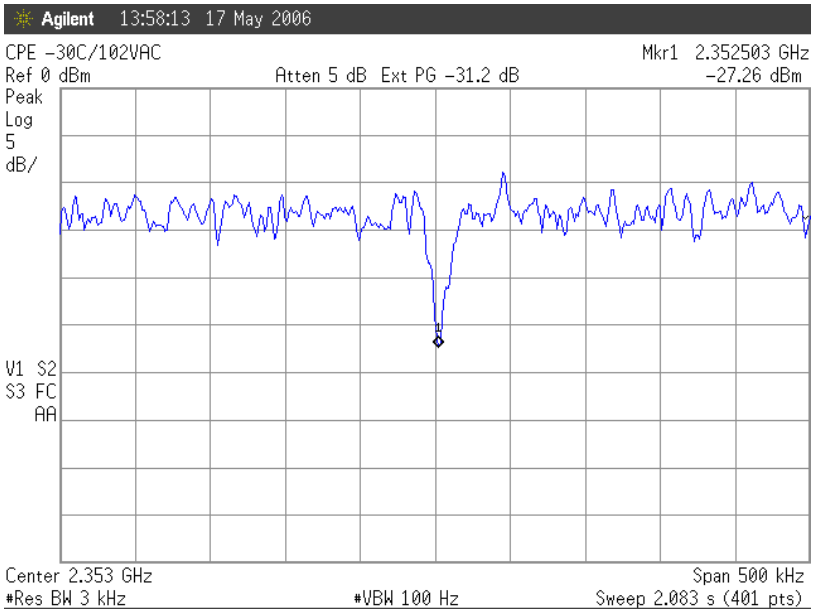
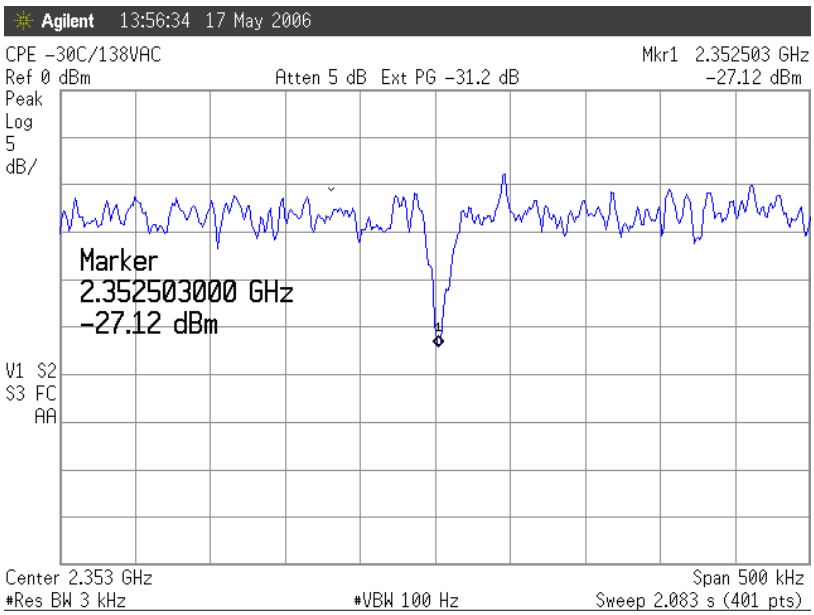
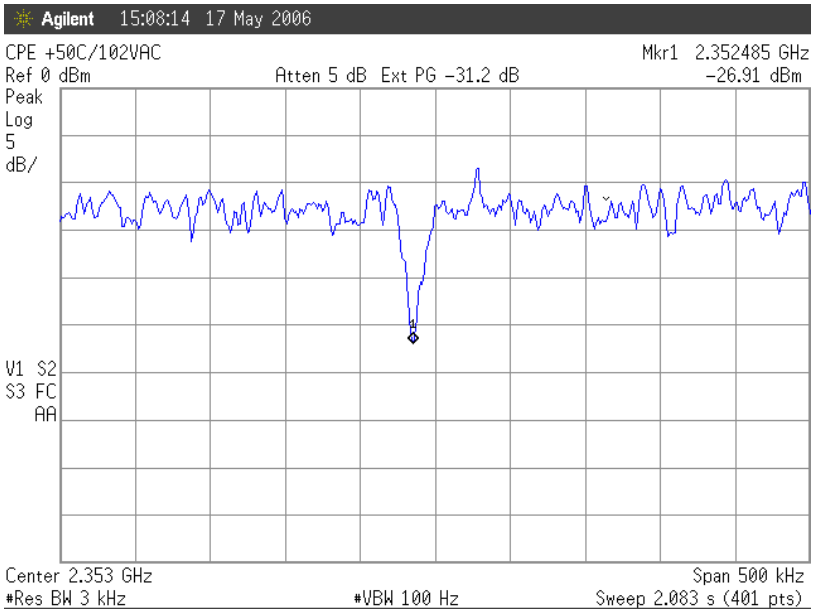


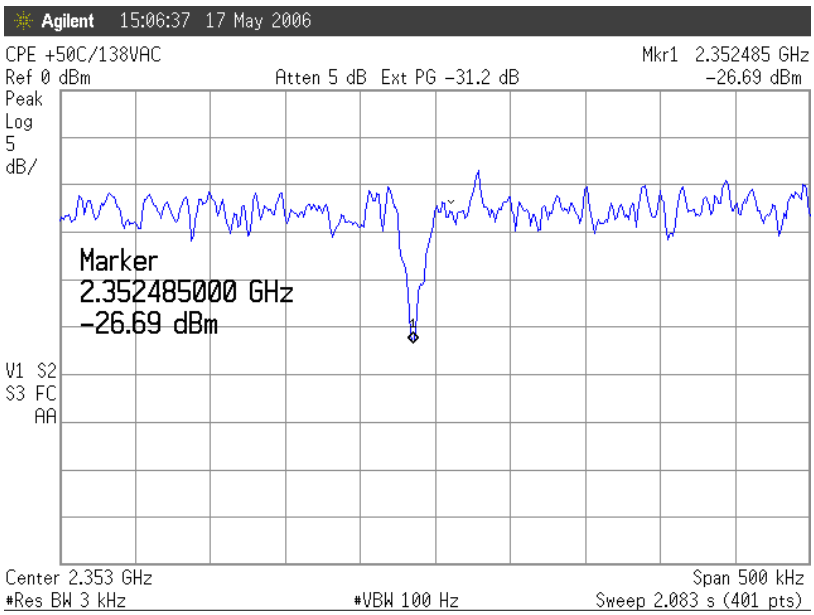
Plot # 105



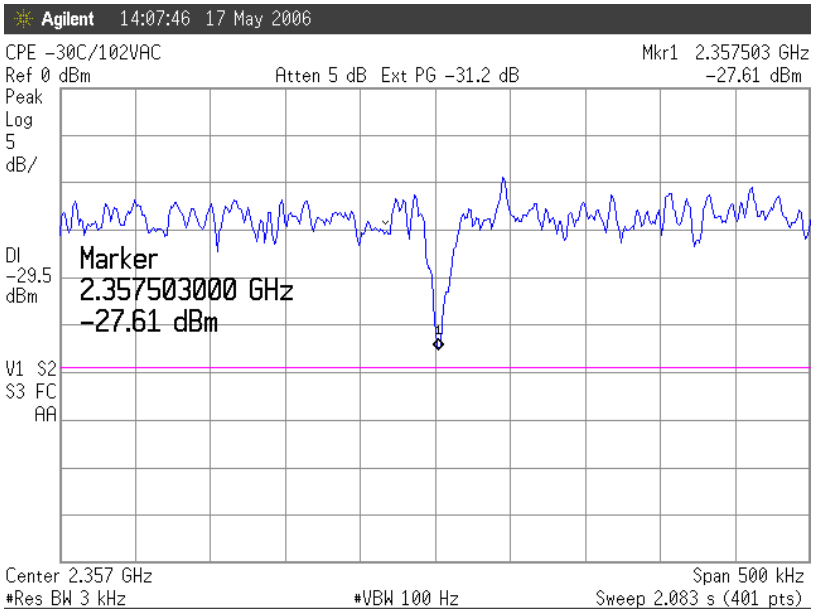
Plot # 106



Plot # 107



Plot # 108



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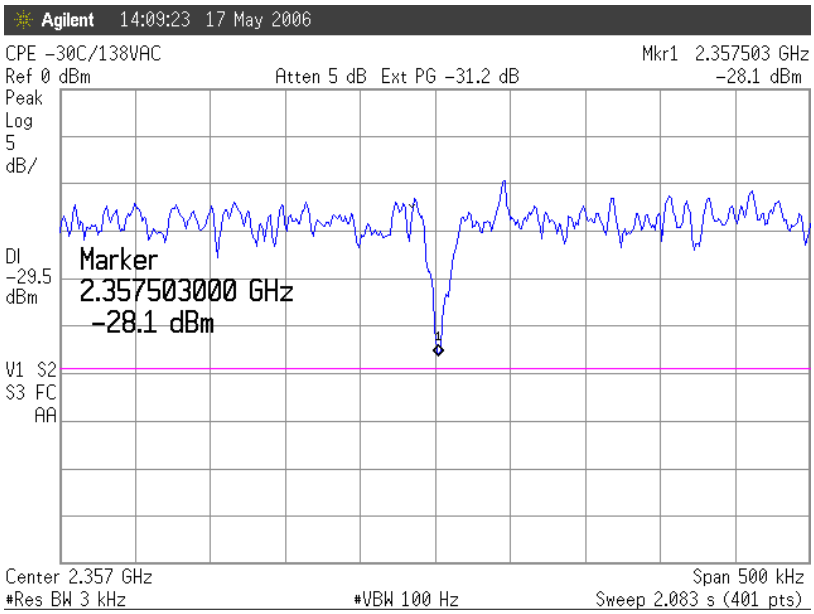
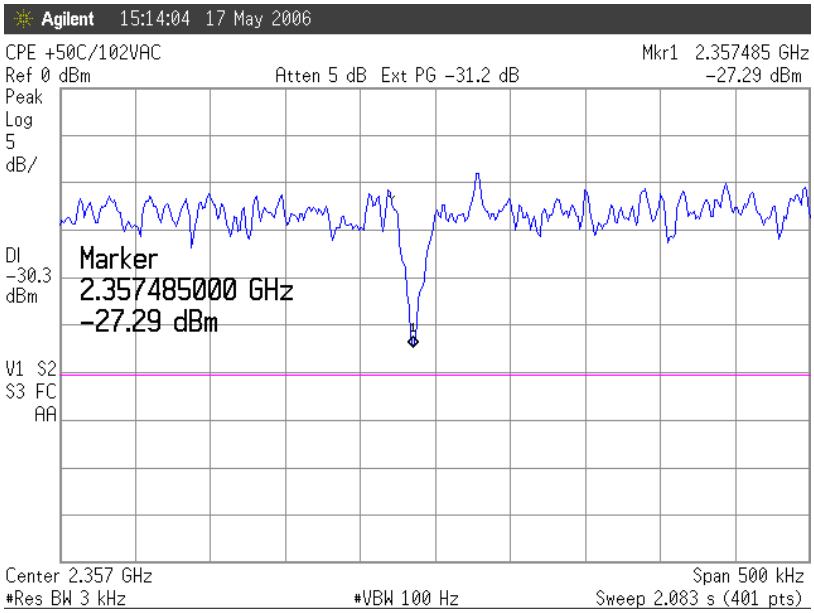
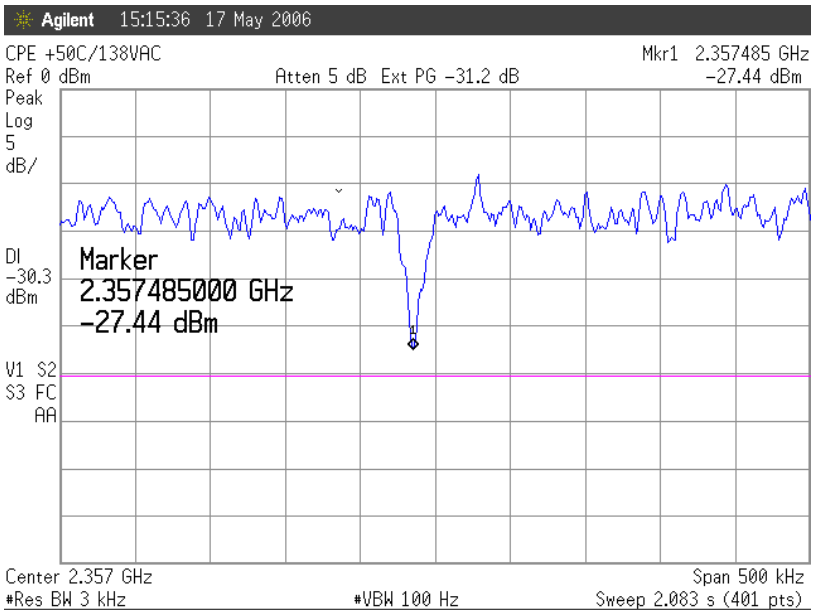


Plot # 110



Plot # 111



Plot # 112

5.2 Radiated emissions test according to § 15.209

Method of measurement	ANSI 63.4 §13.1.4
Date	5, June 2006
Ambient Temperature	24^0 C
Relative Humidity	55 %
Air Pressure	1012 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 15.209

Radiated emissions test result:
Test results are presented in Table 1.

Test equipment used

5	9				

Table 1. Radiated emission test results

Frequency (MHz)	Turn-table Angle (°)	Antenna Polariz.	Antenna Height (cm)	Emission Level Note 1 (dBμV/m)	Limit @ 3m (dBμV/m)	Margin Note 2 (dB)	Results
55.28	358	V	115	30.9	40	9.1	Pass
110.8	149	V	115	34.4	43.5	6.1	Pass
175.5	274	V	115	36.0	43.5	7.5	Pass
224.0	160	V	110	32.2	43.5	11.3	Pass
249.0	357	H	239	33.1	46	12.9	Pass
588.8	53	H	201	38.8	46	7.2	Pass

Note 1: Emission level = E Reading (dBμV) + Cable loss (dB) + Antenna Factor (dB/m) + 10 dB
Where 10 dB is an extrapolation distance factor.
For Cable Loss and Antenna Factor refer to Appendix 2.

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

5.3 Conducted emissions according to § 15.207

Method of measurement ANSI 63.4 §13.1.3
Ambient Temperature 23^0 C
Relative Humidity 49%
Air Pressure 1006 hPa

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

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

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

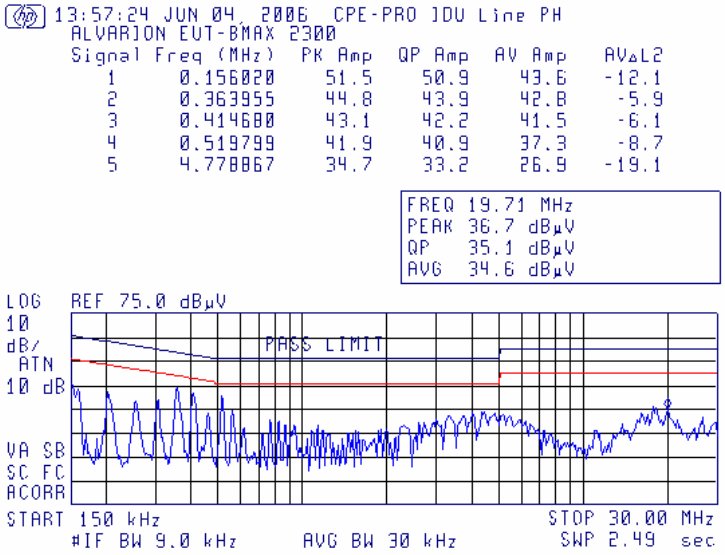
Test results:

Test results are shown at plots # 1 for line Phase and # 2 for line Neutral

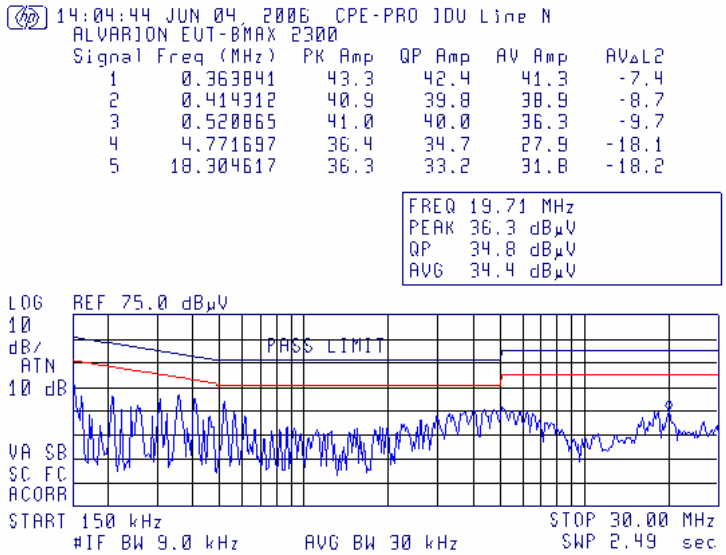
Test equipment used

8	9	10			

Conducted emissions test. 120V AC. Plot # 1



Conducted emissions test. 120V AC. Plot # 2



APPENDIX A

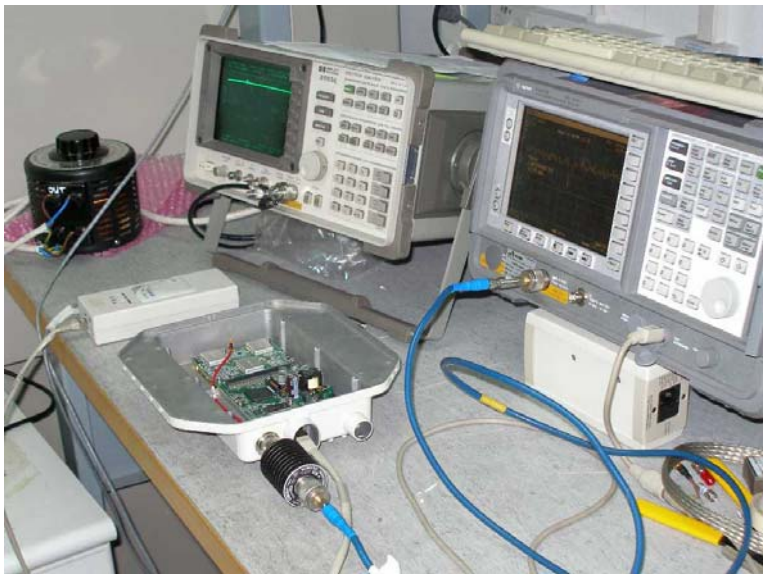


Photo 1. Outdoor unit. Test setup

Photo 2. Test setup on OATS

Photo 3. Outdoors unit top view.

Photo 4. Outdoors unit bottom view.

Photo 5. Outdoor unit. Internal view.

APPENDIX B

Test equipment used

No	Description	Manufacturer information			Due Calibration date
		Name	Model No	Serial No	
1	Spectrum Analyzer 9 kHz - 26.5 GHz	HP	8563E	A01508	May 2007
2	Attenuators 30 dB DC - 18 GHz	Weinshel Engineering	33-30-34	A3451	Aug 2006
3	Cable RF 1m	Huber-Suhner	Sucoflex 104	21324/4PE	Aug 2006
4	Double Ridged Guide Antenna 1 – 18 GHz	EMCO	3115	5802	March 2007
5	Antenna Biconilog 30 – 2000 MHz	Schaffner-Chase	CBL6112B	S/N 2531	Dec 2006
6	EMI Receiver 9 kHz-6.5 GHz	HP	8546A+8546 0A	SII 4068	March 2007
7	LISN 9 kHz – 30 MHz	FCC	LISN 250-32-4-16	SII5023	Feb 2007
8	Transient limiter 0.009-200 MHz	HP	11947A	3107105	March 2007
9	Spectrum analyzer 10 KHz-26.5 GHz	HP	E7405A	SII 4944	Feb 2007
10	Attenuator 50 Ohm 30 dB DC-18 GHz	HP	8491B	50655	May 2007
11	Cable RF 3m	Huber-Suhner	Sucoflex 104PE	21328/4PE	Aug 2006

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

For Biconilog Antenna, Model Number: CBL-6112B, S/N: 2531
10 m Calibration

Frequency (MHz)	Antenna Factor (dB/m)	Frequency (MHz)	Antenna Factor (dB/m)	Frequency (MHz)	Antenna Factor (dB/m)	Frequency (MHz)	Antenna Factor (dB/m)
Vertical Polarization				**Horizontal Polarization**			
26.00	20.77	625.00	19.10	26.00	20.39	625.00	19.08
28.00	19.77	650.00	19.20	28.00	19.15	650.00	19.26
30.00	18.72	675.00	19.05	30.00	18.29	675.00	19.12
40.00	14.76	700.00	19.26	40.00	12.64	700.00	19.11
50.00	8.32	725.00	19.73	50.00	7.99	725.00	19.49
60.00	6.15	750.00	20.11	60.00	5.95	750.00	19.94
70.00	6.49	775.00	20.41	70.00	6.04	775.00	20.07
80.00	7.26	800.00	20.50	80.00	7.60	800.00	20.18
90.00	8.83	825.00	20.57	90.00	9.07	825.00	20.36
100.00	10.55	850.00	20.73	100.00	10.34	850.00	20.57
110.00	11.38	875.00	20.92	110.00	11.12	875.00	20.83
120.00	11.71	900.00	20.79	120.00	11.46	900.00	20.74
130.00	11.57	925.00	21.02	130.00	11.47	925.00	21.17
140.00	11.09	950.00	21.32	140.00	11.15	950.00	21.11
150.00	10.46	975.00	21.76	150.00	10.50	975.00	21.52
160.00	9.82	1,000.00	21.97	160.00	9.86	1,000.00	21.64
170.00	9.52	1,050.00	22.55	170.00	9.58	1,050.00	22.02
180.00	9.18	1,100.00	22.47	180.00	9.28	1,100.00	22.16
190.00	8.90	1,150.00	22.78	190.00	9.54	1,150.00	22.44
200.00	9.11	1,200.00	22.77	200.00	9.82	1,200.00	22.86
225.00	9.70	1,250.00	23.36	225.00	10.42	1,250.00	23.37
250.00	12.41	1,300.00	23.90	250.00	12.43	1,300.00	23.86
275.00	12.81	1,350.00	24.19	275.00	13.19	1,350.00	24.02
300.00	13.37	1,400.00	24.42	300.00	13.48	1,400.00	24.42
325.00	13.70	1,450.00	24.83	325.00	13.73	1,450.00	24.61
350.00	14.45	1,500.00	24.88	350.00	14.61	1,500.00	25.02
375.00	14.90	1,550.00	24.85	375.00	15.15	1,550.00	25.27
400.00	15.63	1,600.00	25.06	400.00	15.74	1,600.00	25.27
425.00	16.38	1,650.00	25.55	425.00	16.52	1,650.00	25.50
450.00	16.43	1,700.00	26.20	450.00	16.54	1,700.00	25.48
475.00	17.28	1,750.00	26.45	475.00	17.28	1,750.00	26.35
500.00	17.41	1,800.00	26.58	500.00	17.47	1,800.00	26.51
525.00	17.35	1,850.00	27.30	525.00	17.31	1,850.00	26.63
550.00	18.97	1,900.00	27.96	550.00	18.64	1,900.00	27.04
575.00	18.87	1,950.00	27.80	575.00	18.60	1,950.00	27.13
600.00	18.82	2,000.00	27.73	600.00	19.04	2,000.00	27.20

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

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