

REV	Δ	Description	Sheet Effected	Date	Drawn	Checked
A				09.06.04	D.Lanuel	S.Cohen

EMC Laboratory

GigAccess 900

**Manufactured by
WaveIP Ltd.**

EMC Test Report

According FCC Part 15 Requirements

JUNE 2004

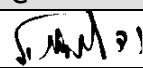
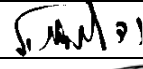
	Function/Title	Name	Signature	Date
Prepared by	Test Engineer	D.Lanuel		09.06.04
Checked by	Test Engineer	D.Lanuel		08.06.04
Approved by	EMC Lab. Manager	S.Cohen		08.06.04

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1 GENERAL Information

a. Description of equipment under test.

Equipment Under Test:	GigAccess 900
FCCID	QQ2-GA900
Manufacturer:	WaveIP.
Serial Numbers:	00-50-C2-1C-C3-3D
Mode of Operation:	TX MODE
Operating frequency:	902-928MHZ
Year of Manufacture:	2004

b. Applicant Information:

Applicant:	WaveIP Ltd.
Applicant Address	TAVOR Building YOKNEAM
Telephone:	+972-4-9937333
FAX:	+972-4-9592614
The testing was observed by:	Yoram Singer
following applicant's personnel:	Yoram Singer

c. Test Performance:

Date of reception for testing:	10.04.04
Dates of testing	11.04.04-20.04.04
Test Laboratory Location	TADIRAN EMC LAB , Hashoftim 26 Holon 58102 ISRAEL Tel: 972-3-5574476 Fax: 972-3-5575320

Applicable EMC Specification:	Federal Communication Commission (FCC), Code of Federal Regulations 47, FCC Docket 89-103,Part 15: Radio Frequency Devices, Sections 15.109, 15.209 & 15.207, 15.205, 15.247.
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2 Test Summary and Signatures.

TADIRAN EMC Laboratory has completed testing of E.U.T in accordance with the requirements of the FCC 15.247

The E.U.T was found to comply with the requirements of the FCC Part 15.247 Regulations given below

Test Description	Specification Reference	Date of Testing	Test Report Paragraph	Compliance PASS/FAIL
Occupied 6db bandwidth	15.247 (a) (2)	16/05/04	4	PASS
Max peak output power	15.247 (b) (3)	07/06/04	5	PASS
Out of band Conducted emission	15.247 (c)	16/05/04	6	PASS
Spurious emission radiated In Restricted band	15.209 15.205(a ,c)	13.05/04- 18.05.04	7	PASS
Peak power spectral density	15.247 (d)	16.05.04	8	PASS
Unintentional radiated emission	15.109	23.05.04	9	PASS
Power leads Conducted emission	15.207, 15.107	13.05.04	10	PASS

a. **Test performed by:**

Mr. D. Lanuel Test Engineer



b. **Test Report prepared by:**

Mr. D. Lanuel Test Engineer



c. **Test Report Approved by:**

Mr. Samuel Cohen EMC Lab. Manager



3 EUT Description

a. General

Model Number(s): GigAccess 900

Brief Description (Purpose of Device):

GigAccess™ 900 is WaveIP's wireless point-to-point and point-to-multipoint broadband communication system. The basic subsystem is composed of a single sector, which consists of an AU (Access Unit) and up to 64 SUs (Subscriber Units). Each sector is a stand-alone communication network operating on a star topology with a gateway to the WAN, which allows two-way communication between the SUs and the WAN via the AU. A Sector may be divided into sub sectors, which are consecutive to the SUs within the sector. GigAccess™ 900 system allows operators that provide IP services using GigAccess™ (at 2.4 GHz band) to extend the reach of their system and provide services to clusters of customers that cannot otherwise be reached due to being obstructed by heavy foliage or other obstacles existing in rural areas.

For detailed description see GigAccess™ 900 User Guide.

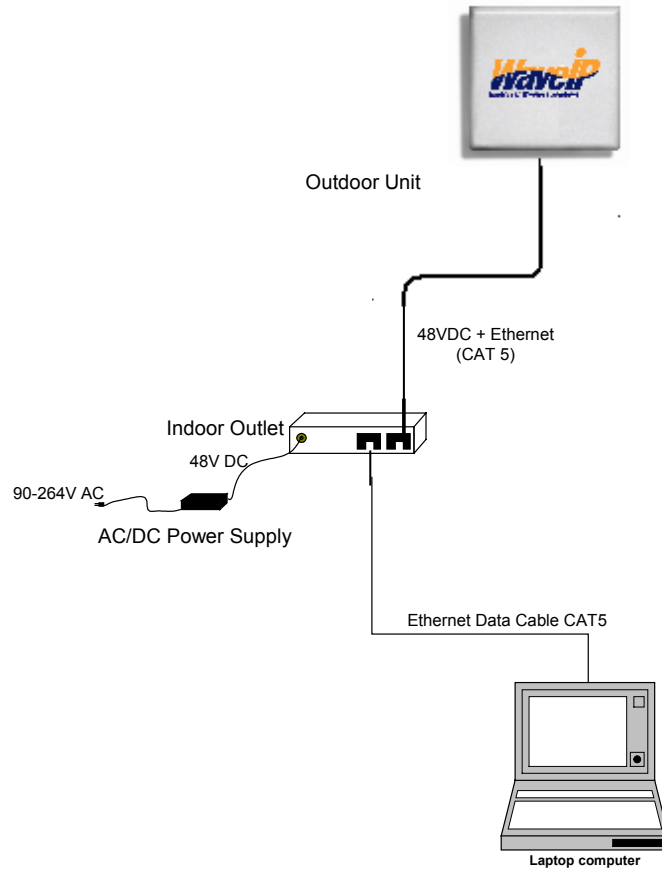
b. General Information:

- (1) Intended Environment: Outdoor
- (2) Operating Temperature Range: -20°C - +55°C
- (3) Physical Dimensions of Unit: 190 x 190 x 30 mm (with 6.5 dBi integrated antenna)

Table 1 EUT ports and lines

Port type	Port description	Connector type	Quantity	Cable type description	Cable length, m	Connect ed to
GigAccess Data input	Ethernet 802.3	RJ45	2	CAT 5 Shielded	Up to 100m	Indoor Outlet output
GigAccess Power input	48V DC	RJ45	2	CAT 5 Shielded	Up to 100m	Indoor Outlet output
Indoor Outlet data input	Ethernet 802.3	RJ45	1	CAT 5 Shielded	Up to 100m	Computer NIC
Indoor Outlet power input	48V DC	DC Jack	1	DC standard	2m	AC/DC Unit output
AC/DC Unit input	90-264V AC	AC Jack	1	AC standard	2m	Power Wall Socket

Figure 1 EUT test configuration



c. RF Software Version: PCB-V6

d. Transmitter description

(1) Radio Specifications

Operating Frequency	902-928MHz ISM band
Output Power	Up to 30dbm (at antenna port)
RF Waveform	Direct Sequence Spread spectrum(DSSS)
Number of Channel	7
RF Cannel Spacing	1MHz
Type of modulation	DQOSK, 16CCK1, 256 CCK
Data Rate	11 Mbps, 5.5 Mbps

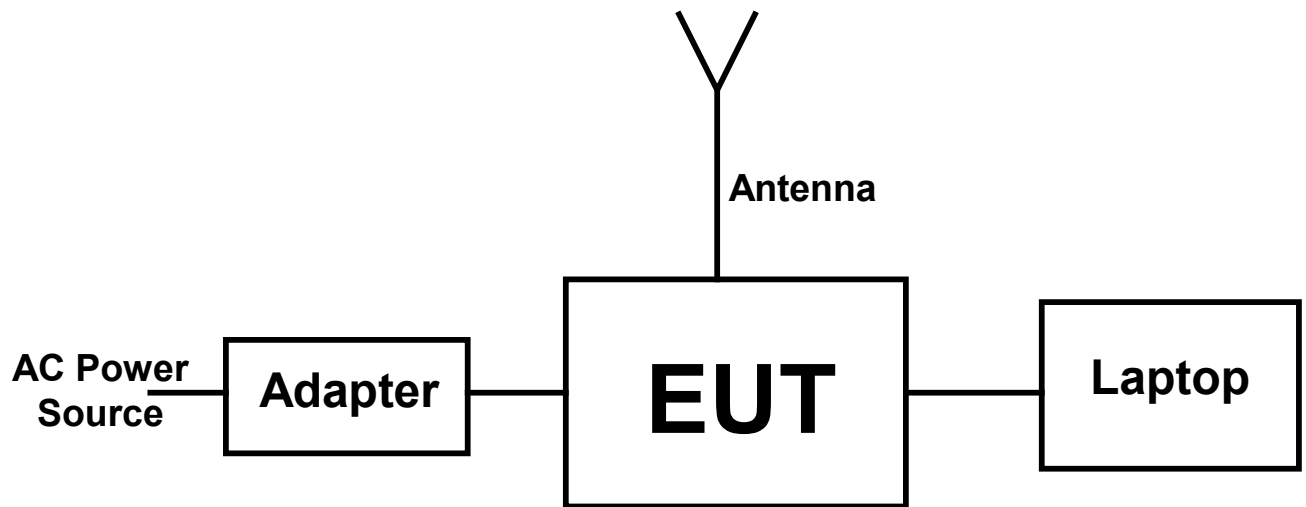
(2) External, Integrated Antennas Technical characteristics

Antenna Type	Model	Gain (db)
Flat Panel Integrated	MTI-262002/C/A	6.5
Flat Panel	MTI-263006/N	12.5
Omni Directional	MTI-263003/NV	8
Selector Directional	MTI-264003/NV	14

**(3) Transmitter Power Source
Adapter 220VAC/12VDC**

e. **E.U.T Test Configuration**

EUT test configuration is shown in figure bellow



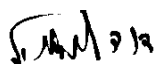
f. **E.U.T Mode of Operation description**

- (1) Transmit 30dbm-912MHz
- (2) Transmit 30dbm-915MHz
- (3) Transmit 30dbm-918MHz
- (4) Standby

4 Occupied Bandwidth for DSSS System According to 15.247(a) (2)

E.U.T:	GigAccess 900	S/N:00-50C2-1C-C3-3D
Test Method:	ANSI 63.4	
Date:	16/05/04	
Relative Humidity:	32%	
Ambient Temperature:	23c	
Air Pressure:	1046hpa	

Testing Engineer: D.Lanuel


Date 08/06/04

a. Test Results Summary & Conclusions

The E.U.T was found in compliance with OCCUPIED BANDWIDTH

b. Limits of bandwidth

The test unit shall meet the limits of Table 4.b

Table 4.b Limits For Bandwidth

Operating Frequency (MHz)	Minimum allowed bandwidth
902 - 928	≥500KHz for 6dbc

c. Test Results

Table 4.c Bandwidth Test Result

Frequency (MHz)	Bandwidth (MHz)	Bandwidth Max Limit(KHz)	Plot Results	PASS/ FAIL
912	11.875	≥500KHz	Plot-1	PASS
			Plot-2	
915	9.75		Plot-3	PASS
			Plot-4	
918	11.125		Plot-5	PASS
			Plot-6	

d. Test Instrumentation and Equipment

Table 4.d Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/05
Broadband Antenna	BTA-L	FRANKONIA	10.04.06
20db attenuator	2525-200	ATM	18.03.06

e. Test Procedure

The EUT output was connected to the spectrum analyzer through 40db attenuator,
The test set up are shown in figure 4e bellow

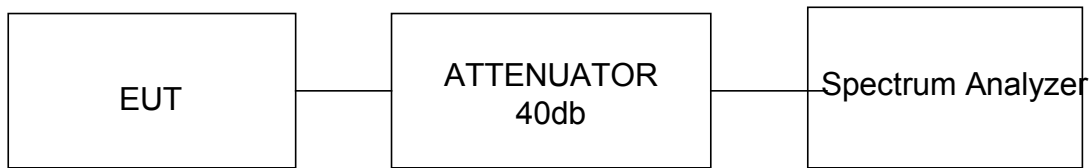
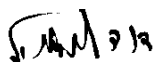


Figure 4e Test Setup for Occupied Bandwidth test

5 Maximum peak output power test according 15.247(b)(3)

E.U.T:	GigAccess 900	S/N:00-50C2-1C-C3-3D
Test Method:	ANSI 63.4	
Date:	07/06/04	
Relative Humidity:	32%	
Ambient Temperature:	23c	
Air Pressure:	1046hpa	
Test Setup:	Figure 6.c.1	

Testing Engineer: D.Lanuel


Date 08/06/04

a. Test Results Summary & Conclusions

The E.U.T was found in compliance with peak output power requirement

b. Limits

The test unit shall meet the limits of Table 5.b.

Table 5.b Limits For Fundamental

Operating frequency range (MHz)	Peak Max Limits(dbm)
902 - 928	30 (1W)

c. Test Results

Table 5.c Peak output power Result

Frequency (MHz)	Peak Result	peak Limits	Margine (dB)	Plots Result	Pass/Fail
912MHz	29.88*	30dbm (1W)	0.12	Plot-7	PASS
915MHz	29.54*		0.46	Plot-8	PASS
918MHz	29.67*		0.33	Plot-9	PASS

*See calculation bellow-based on test procedure paragraph 5e

(1) 912MHz peak power calculation –based on plot-7

- a) *BW correction factor is:* $10\log 6\text{db BW of emission/ analyzer RBW}$
- b) $10\log 11.3/3=5.75$
- c) *Output power:* $24.13+5.75=29.88$

(2) 915MHz peak power calculation –based on plot-8

- a) *BW correction factor is:* $10\log 6\text{db BW of emission/ analyzer RBW}$
- b) $10\log 9.95/3=5.2$
- c) *Output power:* $24.52+5.2=29.54$

(3) 918MHz peak power calculation –based on plot-9

- a) *BW correction factor is:* $10\log 6\text{db BW of emission/ analyzer RBW}$
- b) $10\log 10.65/3=5.5$
- c) *Output power:* $24.17+5.5=29.67$

d. **Test Instrumentation and Equipment**

Table5.d Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/05
Broadband Antenna	BTA-L	FRANKONIA	10.04.06
20db attenuator	2525-200	ATM	18.03.06

e. Test Procedure

- (1) Spectrum analyzer measured the transmitter peak output power while the RBW of analyzer is 3MHz and the RBW of transmitter is 20MHz.
- (2) When the analyzer RBW is not large enough as required. the peak output power procedure is as follows:
 - a) *Set the RBW and VBW to the maximum available.*
 - b) *Set the band limit to 6db*
 - c) *Set sweep to automatic*
 - d) *Set the span just enough to capture the emission*
 - e) *Use the peak detector on max hold*
 - f) *Set the analyzer on linear mode display*
 - g) *Let the emission stabilize before making a final reading*

BW correction factor is: $10\log 6\text{db BW of emission/analyzer RBW}$

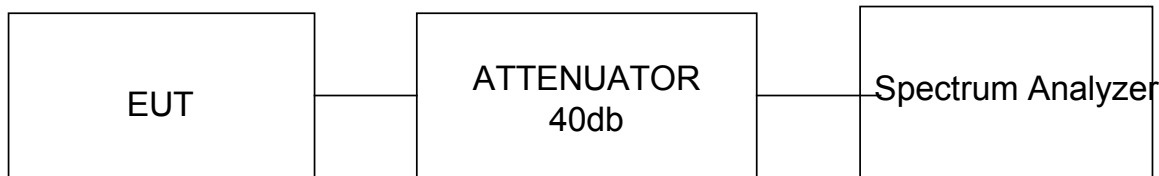


Figure 5e Test Setup for Peak output power

6 Out of band conducted emission test according to 15.247(c)

E.U.T:	GigAccess 900	S/N:00-50C2-1C-C3-3D
Test Method:	ANSI 63.4	
Date:	16/05/04	
Relative Humidity:	29%	
Ambient Temperature:	21c	
Air Pressure:	1053hpa	
Test Setup:	Figure 6.c.1	

Testing Engineer: D.Lanuel



Date 08/06/04

a. Test Results Summary & Conclusions

The E.U.T was found in compliance with Out of band conducted emission test according to 15.247(c)

b. Limits of out of band conducted emission according to 15.247 (c)

The test unit shall meet the limits of Table 9.b.

Table 6.b Limits For 15.231(b)

Frequency range(MHz)	Limits (dB μ V/m)
0.009 – 9200	110 (20db below peak power)

c. Test Results

Table 6.c Results For 15.231(b)

Operating Frequency (MHz)	Frequency range (MHz)	Results (dB μ V/m)	Plots Result
915MHz	0.009 – 9200	All emission were found Min 30db below the specified limits	10 - 19

d. **Test Instrumentation and Equipment**

Table 6.d Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/05
20db attenuator	2525-200	ATM	18.03.06

e. **Test Procedure**

The EUT output was connected to the spectrum analyzer through 40db attenuator. The test set up is shown in figure 6e bellow.

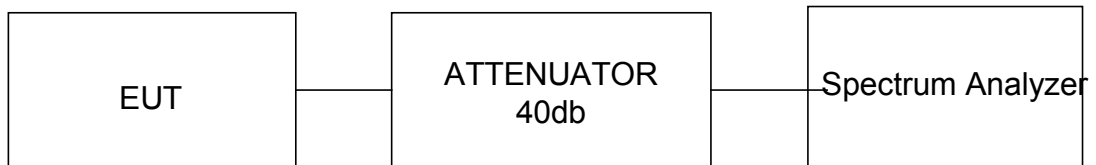


Figure 6e Test Setup for Conducted emission

7 Radiated emission in restricted bands test according 15.247(c), 15.205 and 15.209

E.U.T:	GigAccess 900	S/N:00-50C2-1C-C3-3D
Test Method:	ANSI 63.4	
Date:	13/05/04	
Relative Humidity:	32%	
Ambient Temperature:	23c	
Air Pressure:	1046hpa	
Test Setup:	Figure 6.c.1	

Testing Engineer: D.Lanuel



Date 08/06/04

a. Test Results Summary & Conclusions

The E.U.T was found in compliance with radiated emission restricted band test

- b. **Limit:** Radiated emission, which fall in the restricted bandwidth must comply with 15.209(a) Limits. See limits in table 8c bellow.

Table 7.b Limits For 15.209 Class B equipment

Frequency Range (MHz)	Quasi-peak Limits (dB μ V/m)
0.009 – 1.705	128 - 70
1.705 - 30	70
30 - 88	40
88 - 216	43
216 - 960	46
960 - 2000	54

c. Results
(1) Preliminary Results
Table 7.c1 Preliminary test results

Configuration	Transmitting Frequency	Frequency Range	Plots Results	PASS/FAIL
6dbi antenna Integrated	912MHz	9KHz-9.2GHz	20 - 27	PASS
	915MHz		28 - 34	PASS
	918MHz		34 - 42	PASS
14dbi Sector Directional antenna	912MHz		42 - 50	PASS
	915MHz		51 - 58	PASS
	918MHz		59 - 66	PASS
12.5dbi Flat Panel Antenna	912MHz		67 - 73	PASS
	915MHz		74 - 80	PASS
	918MHz		81 - 87	PASS
8dbi Omni Directional antenna	912MHz		88 - 95	PASS
	915MHz		96 - 103	PASS
	918MHz		104 - 11	PASS

(2) Final Test Results
Table 7c2 Six Highest

Freq. (MHz)	Transmitting Frequency	Peak Reading (dbμV/m)	Limit (dbμV/m)	Margin (db)	Polarity Ver/Hor	Height m
34.57	912MHz	33.3	40	6.7	V	1.3
34.57	915MHz	30	40	10	V	1.3
34.54	918MHz	30.1	40	9.9	V	1.3

d. Test Instrumentation and Equipment
Table 7.d Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/05
Double Ridge Guide Antenna(1-18GHz)	3105	EMCO	24.04.05
Broadband Antenna	BTA-L	FRANKONIA	10.04.05
Low Noise Amplifier (0-1GHz)	AM-1300-N	MITEQ	14.01.05
Low Noise Amplifier (1-4GHz)	AMM 003N	AVANTEK	14.01.05
Low Noise Amplifier (2-6GHz)	MWA-02060	ELISRA	14.01.05
Low Noise Amplifier (6-18GHz)	MWA-06180	ELISRA	14.01.05
Low pass filter 100MHz	LD110	FSY	17.04.05
Low pass filter 700MHz	360A	HP	18.05.05
Band reject filter 902 – 928MHz	BRF 900	TADIRAN	20.05.05
Attenuator 20db	2525-20	ATW	18.03.06
Attenuator 3db	AN9146	WEINSCHEL	23.06.05
Attenuator 6db	AP2542	WEINSCHEL	23.06.05

e. Test Procedure

(1) -General

- a) The test was performed with transmitter operating 3-carrier frequency, F_{min} -912MHz, F_{center} -915MHz, F_{max} -918MHz.*
- b) The test was performed according tests setup in paragraph 7e(4)*

(2) Preliminary test procedure

- a) The measuring system block diagram is shown in Figure 7.a.1.*
- b) E.U.T orientation and antenna position shown in Figure 7.a.2*

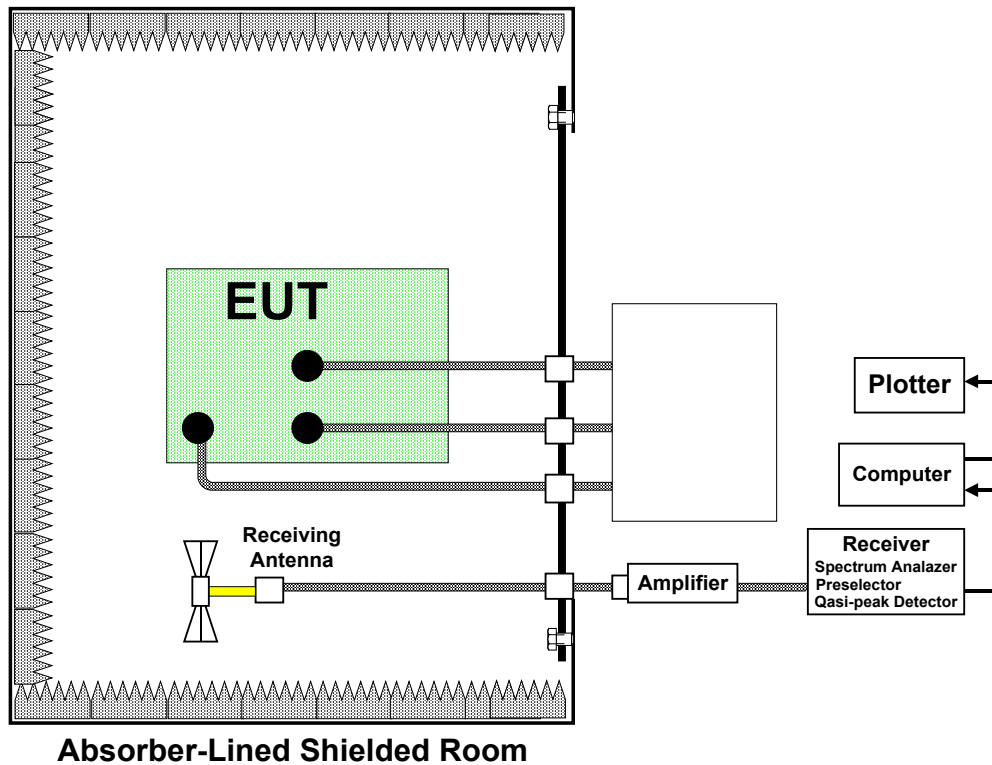


Figure 7.e.1

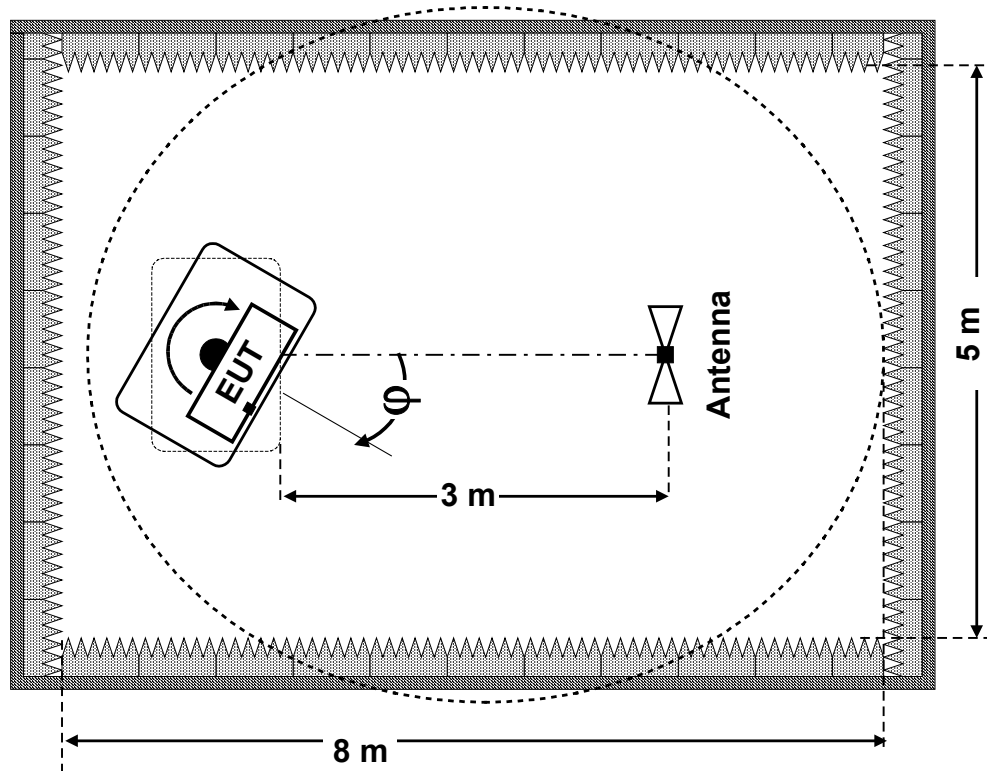


Figure 7.e.2

- c) Maintain setup in absorber-lined shielded room as shown in Figures 4.a.1, 4.a.2
- d) Turn on the E.U.T and allow sufficient time for stabilization.
- e) Monitor the frequency range of interest at a fixed antenna height and E.U.T azimuth.
- f) Rotate the E.U.T 360° to maximize the suspected highest amplitude signal.
- g) Move the antenna over its full-allowed range of travel to maximize the suspected highest amplitude signal.
- h) Change the polarity of the antenna and repeat step d and e. compare the result suspected highest amplitude signal with that found for the other polarity. Select and note the higher of the two signals. The signal is termed the highest observed signal with the respect to the limit.
- i) Repeat testing for each operational mode of the E.U.T.
- j) Choose six highest emissions relative to limit and record antenna heights and polarities, E.U.T configuration for each emission frequency.
- k) Perform measurements for selected frequencies using quasi-peak detector.

(3) Final test procedure

- a) The measuring system block diagram shown in Figure 7.e.3
- b) E.U.T orientation and antenna position shown in Figure 7.e.4

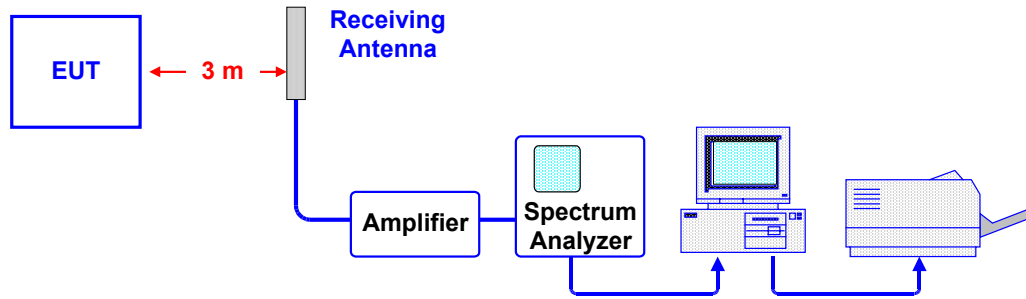


Figure 7.e.3

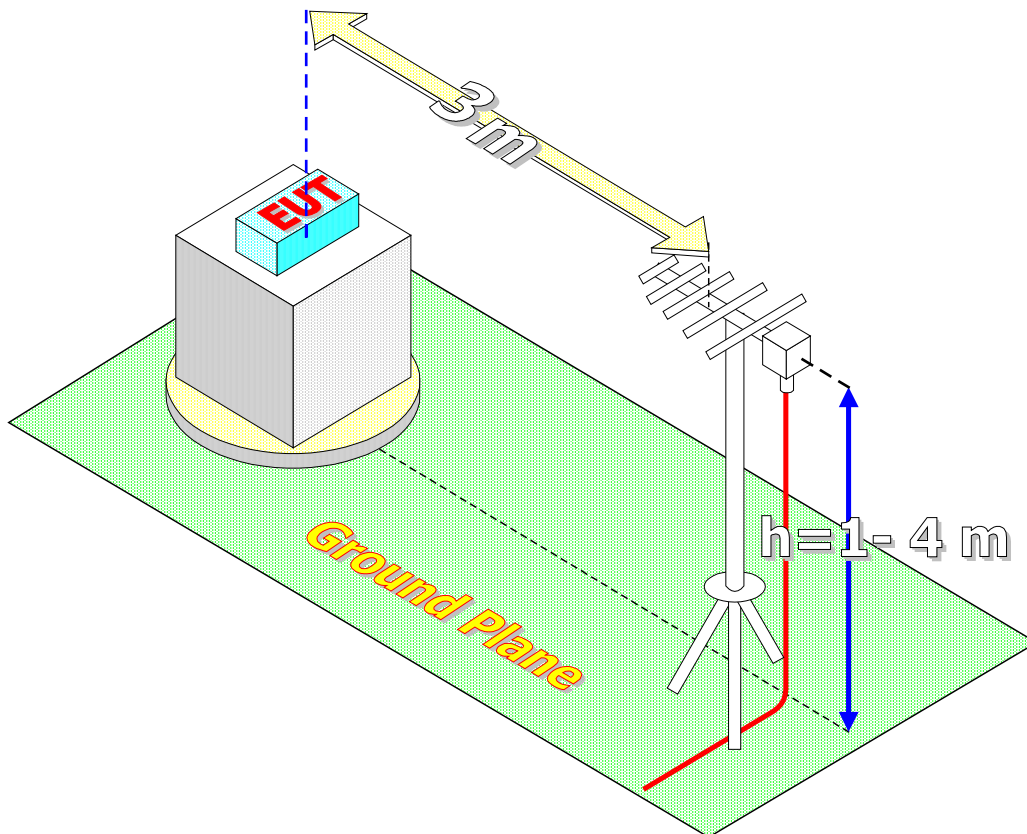


Figure 7.e.4

(4) Tests Setup

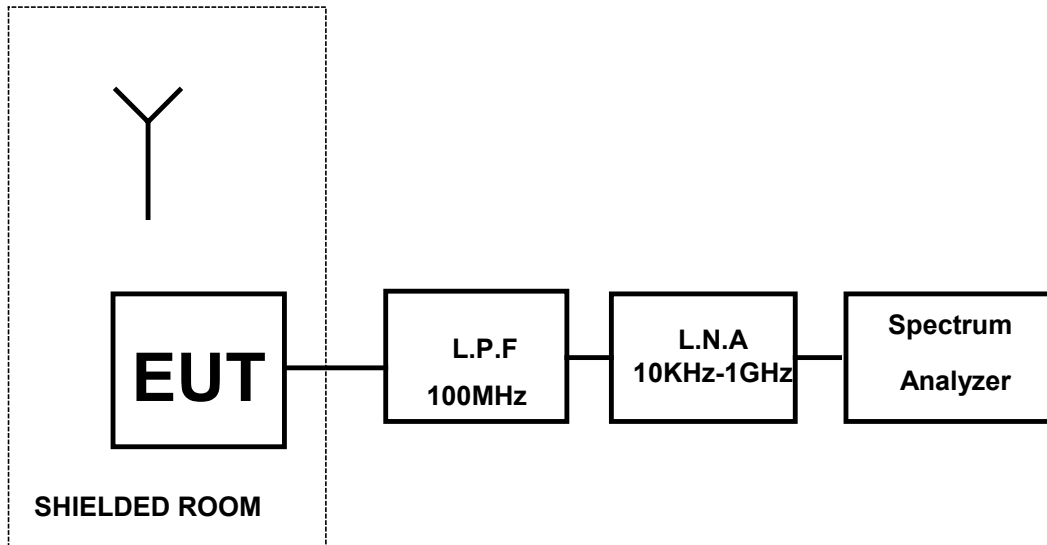


Figure 7.e.5 Radiated emission Test setup for freq range of 10KHz – 100MHz

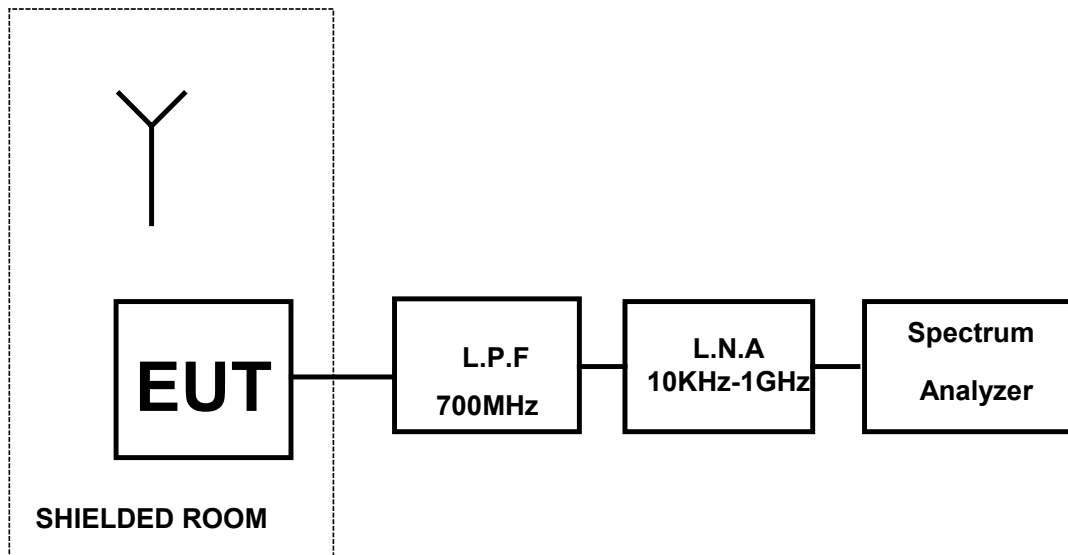


Figure 7.e.6 Radiated emission Test setup for freq range of 100MHz – 700MHz

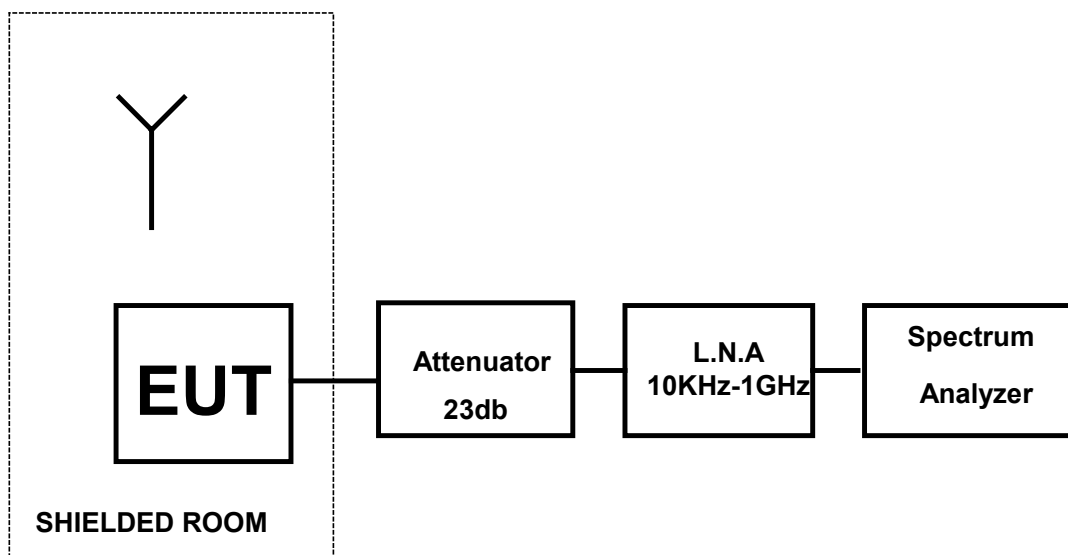


Figure 7.e.7 Radiated emission Test setup for freq range of 960MHz – 1GHz

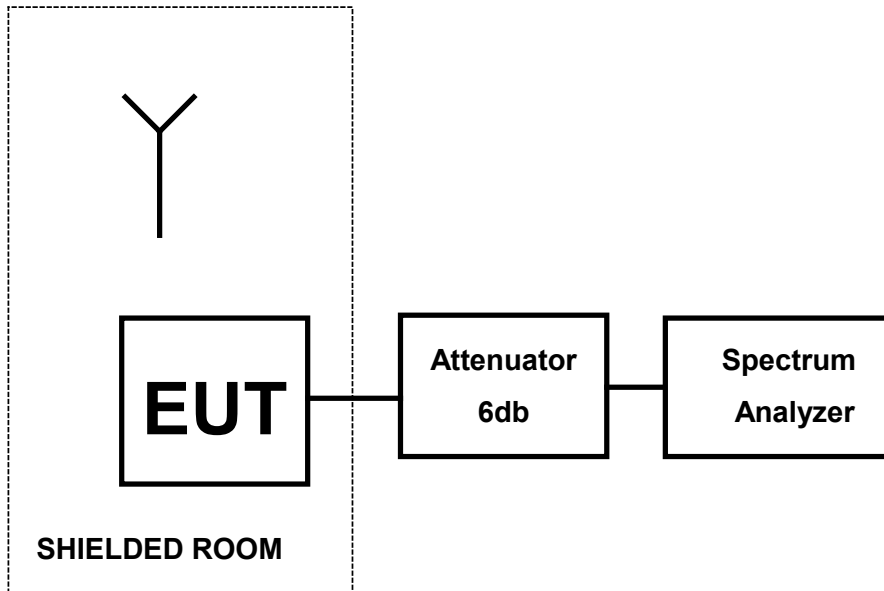


Figure 7.e.8 Radiated emission Test setup for freq range of 1GHz – 2GHz

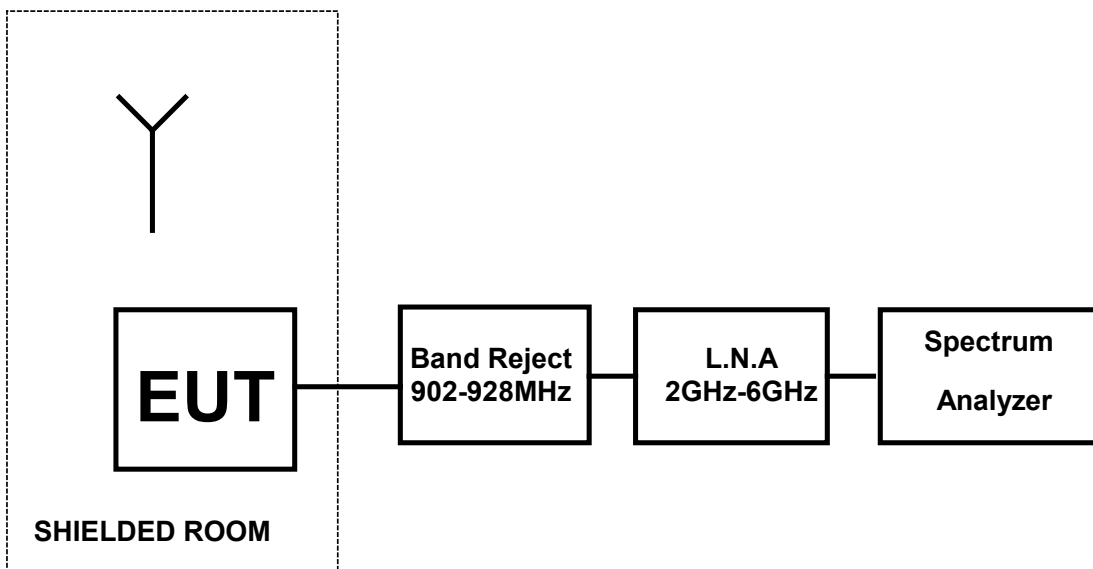


Figure 7.e.9 Radiated emission Test setup for freq range of 2GHz – 6GHz

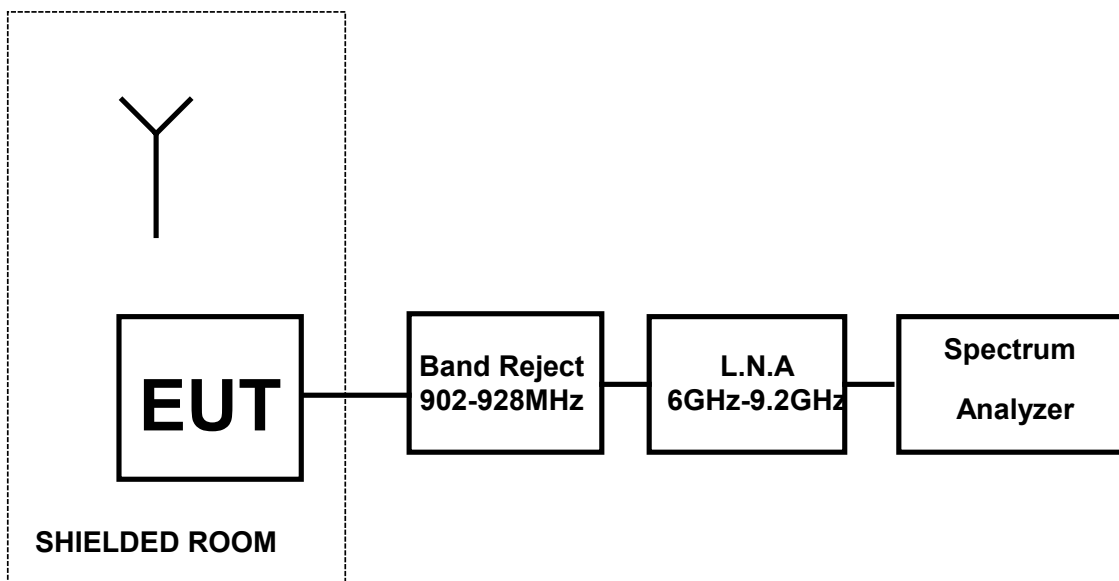
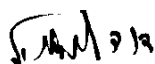


Figure 7.e.10 Radiated emission Test setup for freq range of 6GHz – 9.2GHz

8 Peak power spectral density of DSSS according 15.247d

E.U.T:	GigAccess 900	S/N:00-50C2-1C-C3-3D
Test Method:	ANSI 63.4	
Date:	16/05/04	
Relative Humidity:	29%	
Ambient Temperature:	21c	
Air Pressure:	1053hpa	
Test Setup:	Figure 6.c.1	

Testing Engineer: D.Lanuel



Date 08/06/04

a. Test Results Summary & Conclusions

The E.U.T was found in compliance peak power spectral density test

b. Limit

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

c. Test Results

Carrier Frequency(MHz)	Measured peak power spectral density(dbm/3KHz)	Plots
912	1.7 (108.7dbuV)	112, 113
915	2.3(109.3dbuV)	114,115
918	0.1(107.1dbuV)	116,117

d. Test Instrumentation and Equipment

Table 8.d Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/05
Broadband Antenna	BTA-L	FRANKONIA	10.04.06
20db attenuator	2525-200	ATM	18.03.06

e. Procedure

The EUT RF output was connected to the spectrum analyzer through 40db attenuator according to test setup bellow.

The test was performed with transmitter operating 3-carrier frequency, Fmin-912MHz, Fcenter-915MHz, Fmax-918MHz.

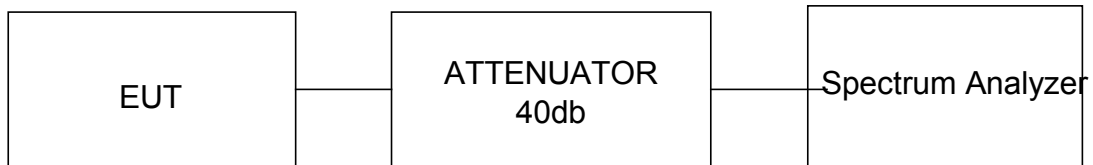
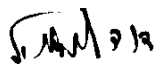


Figure 5e Test Setup for peak power spectral density

9 Unintentional radiated emission test according to 15.109

E.U.T: GigAccess 900 S/N:00-50C2-1C-C3-3D
 Test Method: ANSI 63.4
 Date: 02/06/03
 Relative Humidity: 29%
 Ambient Temperature: 21c
 Air Pressure: 1053hpa
 Test Setup: Figure 6.c.1

Testing Engineer: D.Lanuel



Date 15/06/03

a. Test Results Summary & Conclusions

The E.U.T was found in compliance with unintentional radiated emission requirements.

b. Limit:

Unintentional radiated emission must comply with 15.109 Limits. See limits in table 10c below.

Table 9.B Limits For 15.109 Class B equipment

Frequency Range (MHz)	Quasi-peak Limits (dB μ V/m)
30 - 88	40
88 - 216	43
216 - 960	46
960 - 2000	54

c. Test Results

Table 9.c1 .Preliminary test results

Configuration	Antenna Polarization	Frequency Range(MHz)	Plots Results	PASS/FAIL
6dbi antenna Integrated	Both	30-1000	118	PASS
		1-2.8GHz	119	PASS
		2.8 – 6GHz	120	PASS
		6GHz – 9.2GHz	-	PASS

Table 10.C Six Highest 15.109

Freq. (MHz)	QP Reading (db μ V/m)	QP Limit (db μ V/m)	Margin (db)	Compliance PASS/FAIL	Plots
33.652	26.2	40	13.8	PASS	118
33.181	30.9	40	9.1	PASS	
747.995	41.8	46	4.2	PASS	
835.998	39	46	7	PASS	

d. Test Instrumentation and Equipment

Table 10.d Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/05
Double Ridge Guide Antenna(1-18GHz)	3105	EMCO	24.04.05
Broadband Antenna(30-1000MHz)	BTA-L	FRANKONIA	10.04.05
Low Noise Amplifier (0-1GHz)	AM-1300-N	MITEQ	14.01.05
Low Noise Amplifier (1-4GHz)	SMC-09	MITEQ	14.01.05
Low Noise Amplifier (2-6GHz)	SMC-09	MITEQ	14.01.05
Low Noise Amplifier (6-10GHz)	SMC-09	MITEQ	14.01.05

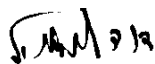
e. Procedure

The EUT output was connected to the spectrum analyzer through appropriate low noise amplifier while the EUT is in STBY mode.

10 Conducted emission test according to 15.207.15.107

E.U.T:	GigAccess 900	S/N:00-50C2-1C-C3-3D
Test Method:	ANSI 63.4	
Date:	02/06/03	
Relative Humidity:	29%	
Ambient Temperature:	21c	
Air Pressure:	1053hpa	
Test Setup:	Figure 6.c.1	

Testing Engineer: D.Lanuel



Date 15/06/03

a. Test Results Summary & Conclusions

The E.U.T was found in compliance with conducted emission power leads requirements.

b. Limit:

Conducted emission must comply with 15.107 Limits. See limits in table 10b bellow.

Table 10.b Limits For 15.209 Class B equipment

Frequency (MHz)	Quasi-peak Limits (dB μ V/m)
0.15 – 0.5	66-56
0.5 - 5	56
5 - 30	60

c. Test Results –P LOTS 122,123

The Emissions are at least 20db below the unintentional limits

d. Test Instrumentation and Equipment

Table 10.d Test Instrumentation and Equipment

Item	Model	Manufacturer	Next Date Calibration
Spectrum Analyzer	8593E	HP	31/01/05
LISN	DC-AC-20A/01	TADIRAN	N.P.C.R
20DB attenuator	2525	ATM	18.03.06

e. Procedure

(1) -General

The AC adapter of EUT was connected to the AC power through the LISN.

The procedure was performed according the "test procedure" paragraph

(2) set up

a) Calibration setup shown in Figure CE-1.

b) The testing setup shown in Figure CE-2.

c) configurations for Equipment and cable are shown in Figure CE-3.

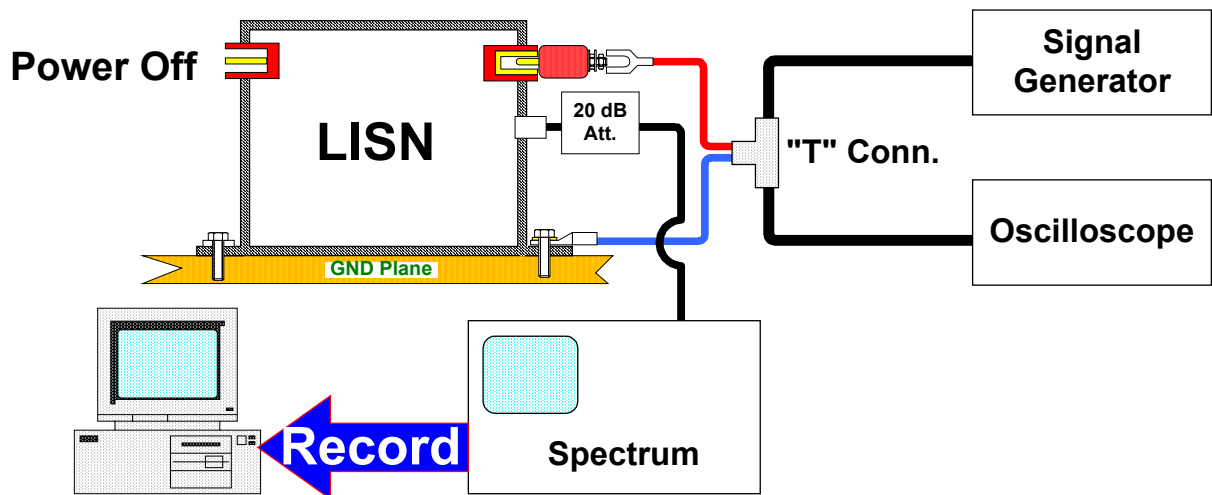


Figure CE-1

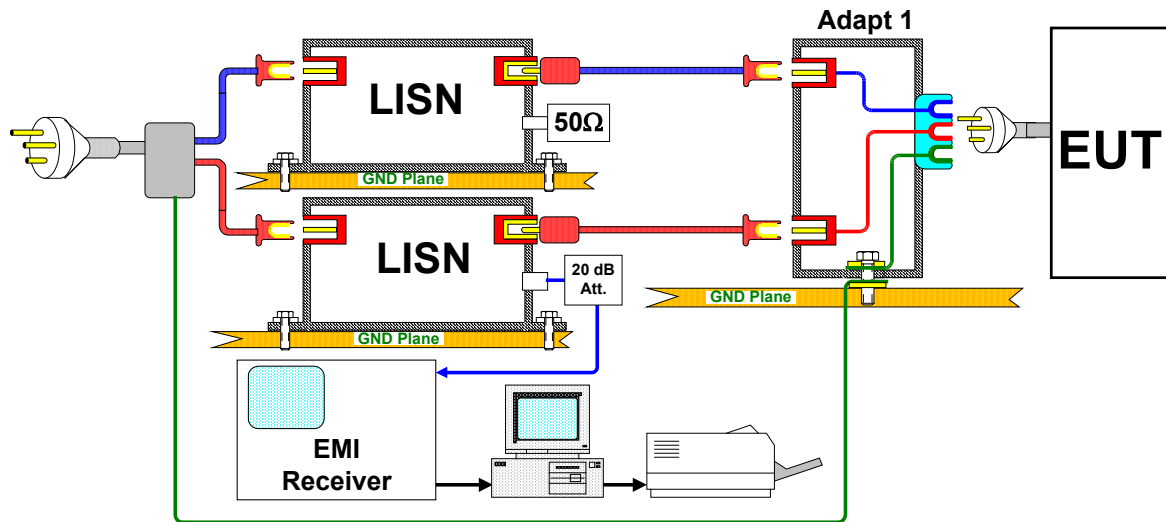


Figure CE-2

(3) Test Procedure

The test procedure shall be as follows:

(4) Calibration.

Perform the measured system check using the calibration setup shown in Figure CE-1.

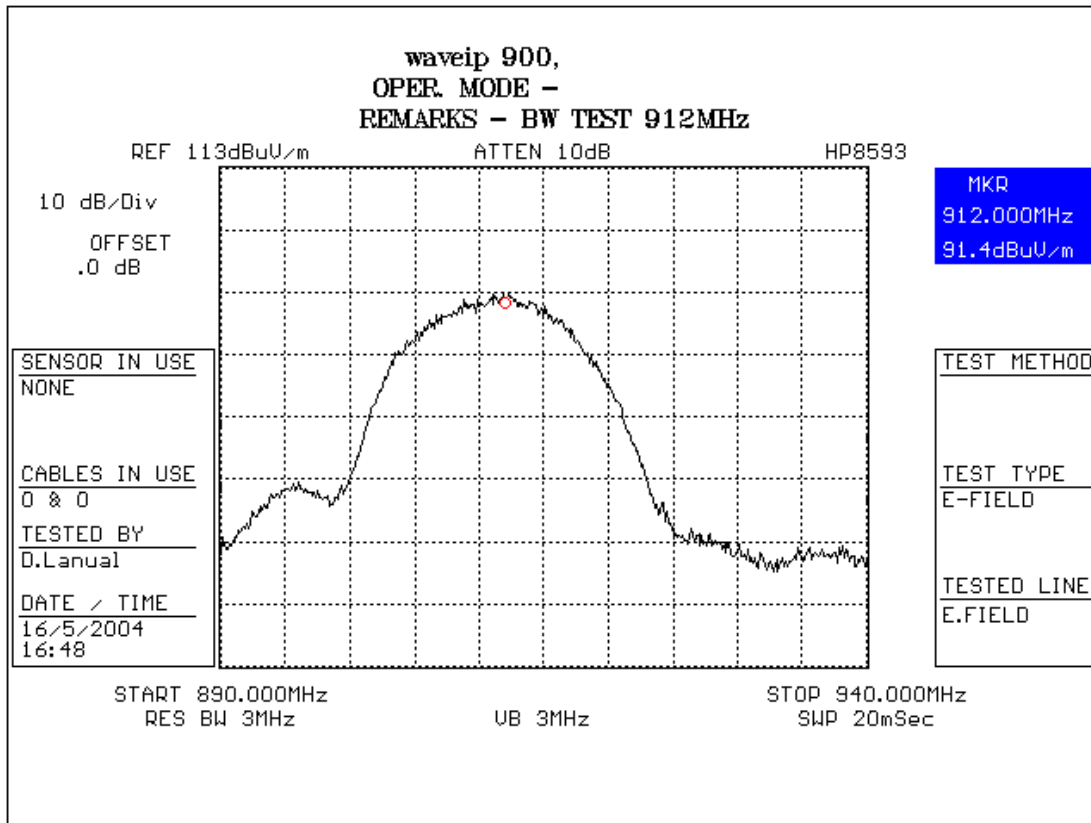
- Turn on the measurement equipment and allow sufficient time for stabilization.
- Apply the calibrated signal level, which is 6 dB below the limit given in Table 1 at 500kHz and 29 MHz to the power output terminal of LISN.
- Scan the spectrum analyzer for each frequency in the same manner as a normal data scan. Verify that the spectrum analyzer indicates a level within ± 3 dB of injected level. Correction factor shall be applied for LISN and 20 dB for attenuator.

(5) E.U.T Testing. Perform emission data scan using the measurement setup shown in Figures CE-2

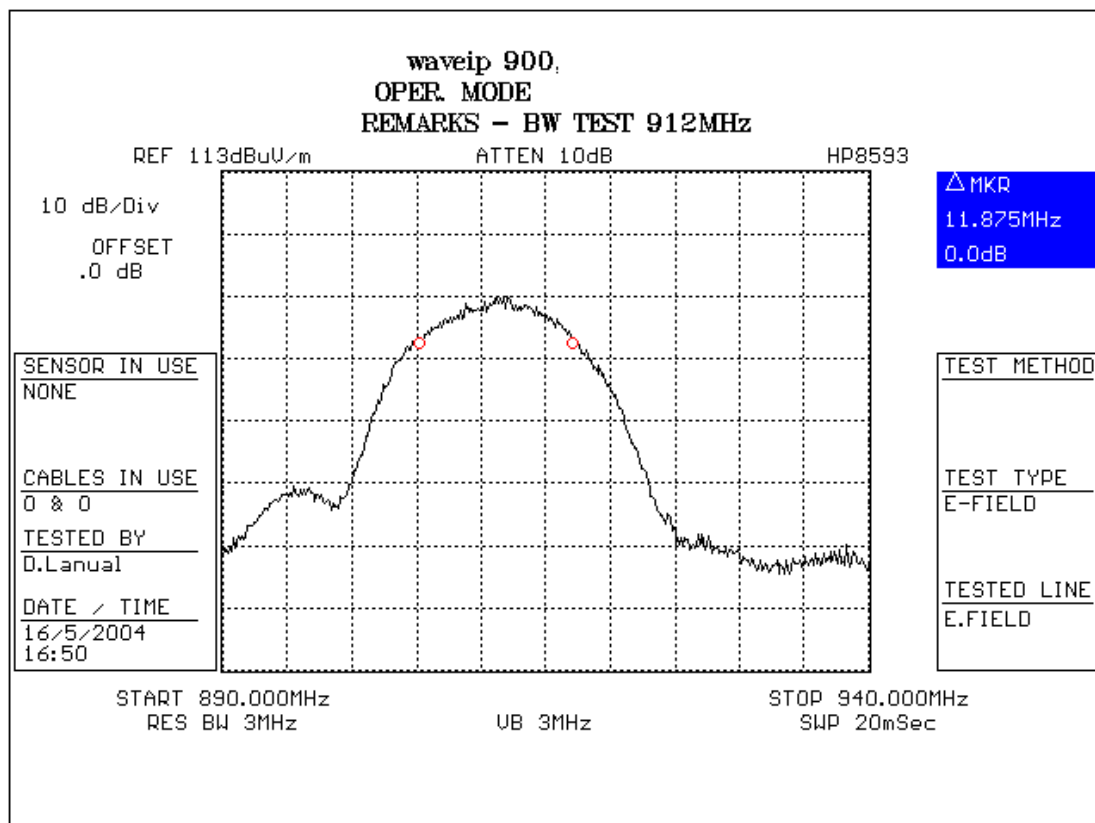
- Turn on the E.U.T to operational mode and allow sufficient time for stabilization.
- Select (Phase) lead for testing.
- Scan the spectrum analyzer over the applicable frequency range
- Repeat (2) and (3) for (Neutral) lead.
- Choose six highest emissions relative to limit and fill Table CE-3.
- Perform measurements for selected frequencies using quasi-peak detector.

11 Plots

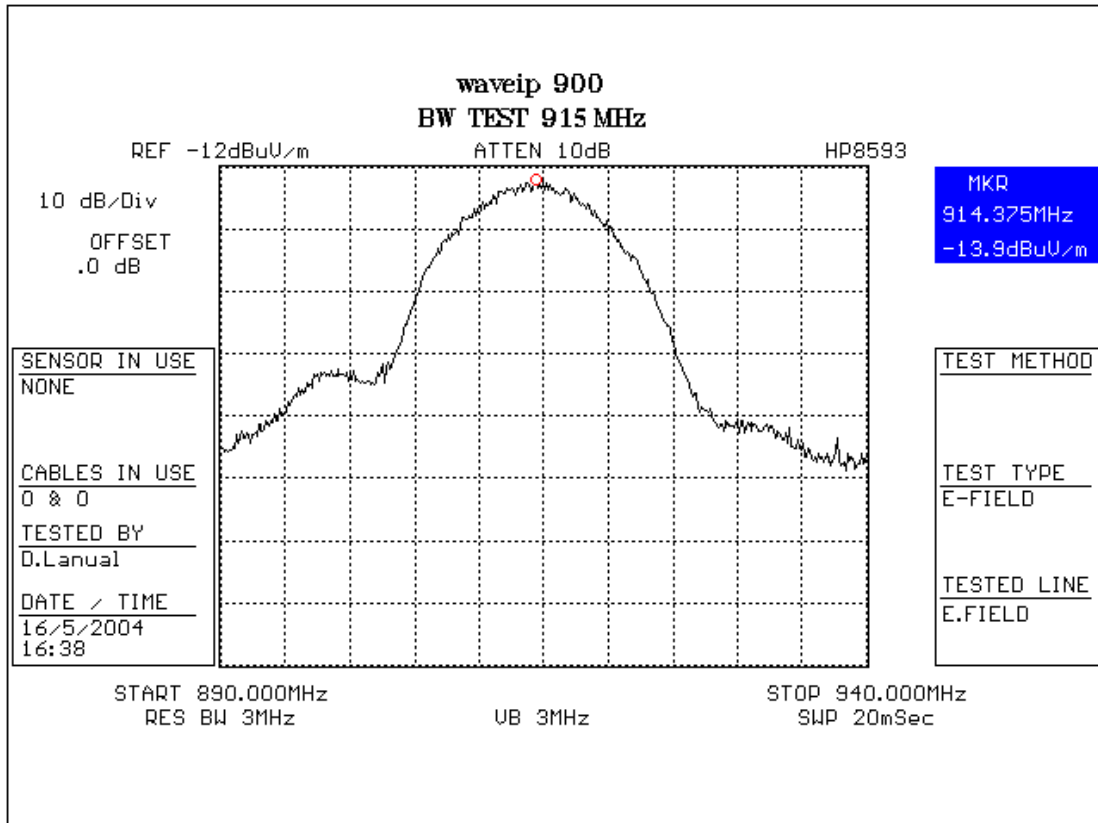
a. Occupied bandwidth plots 1-6



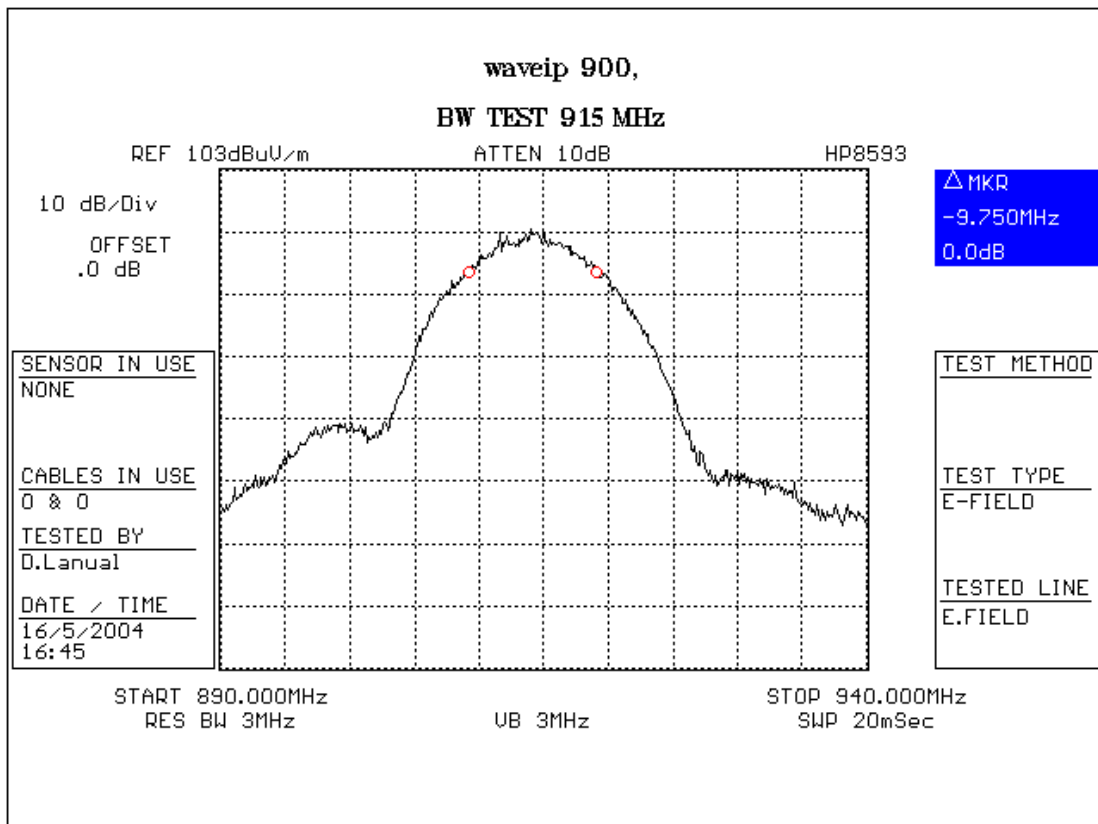
Plot / 1



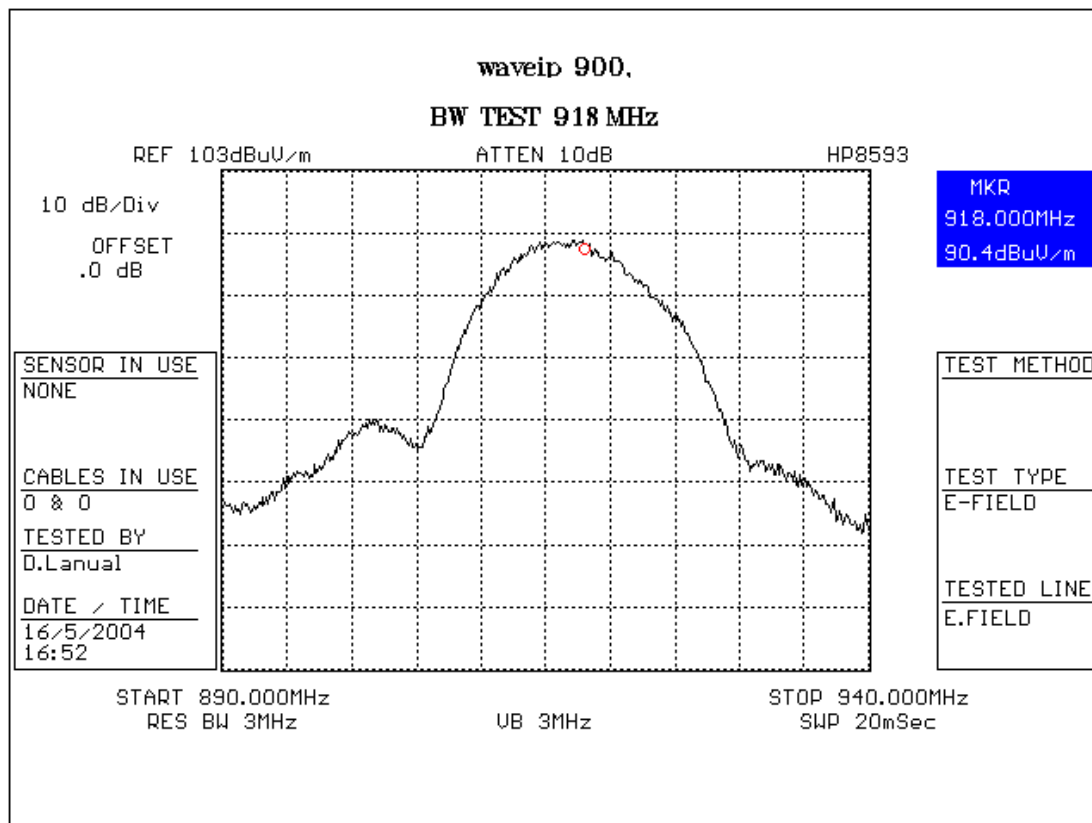
Plot / 2



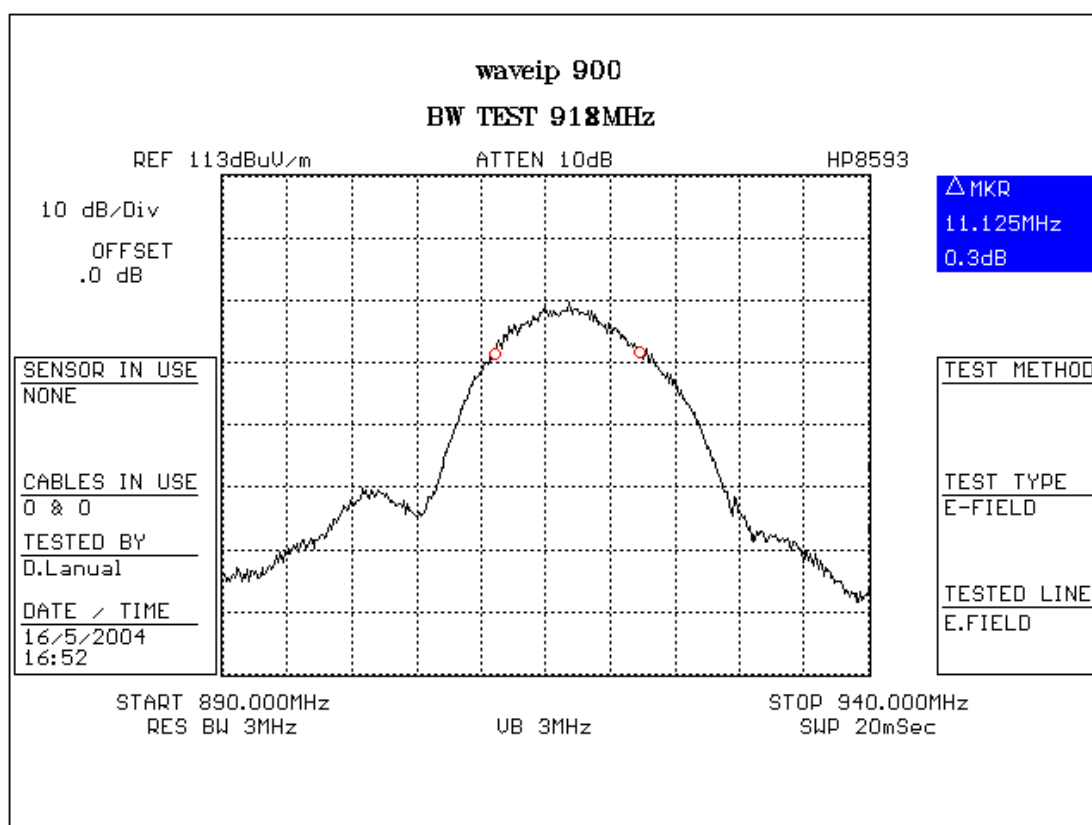
Plot / 3



Plot / 4

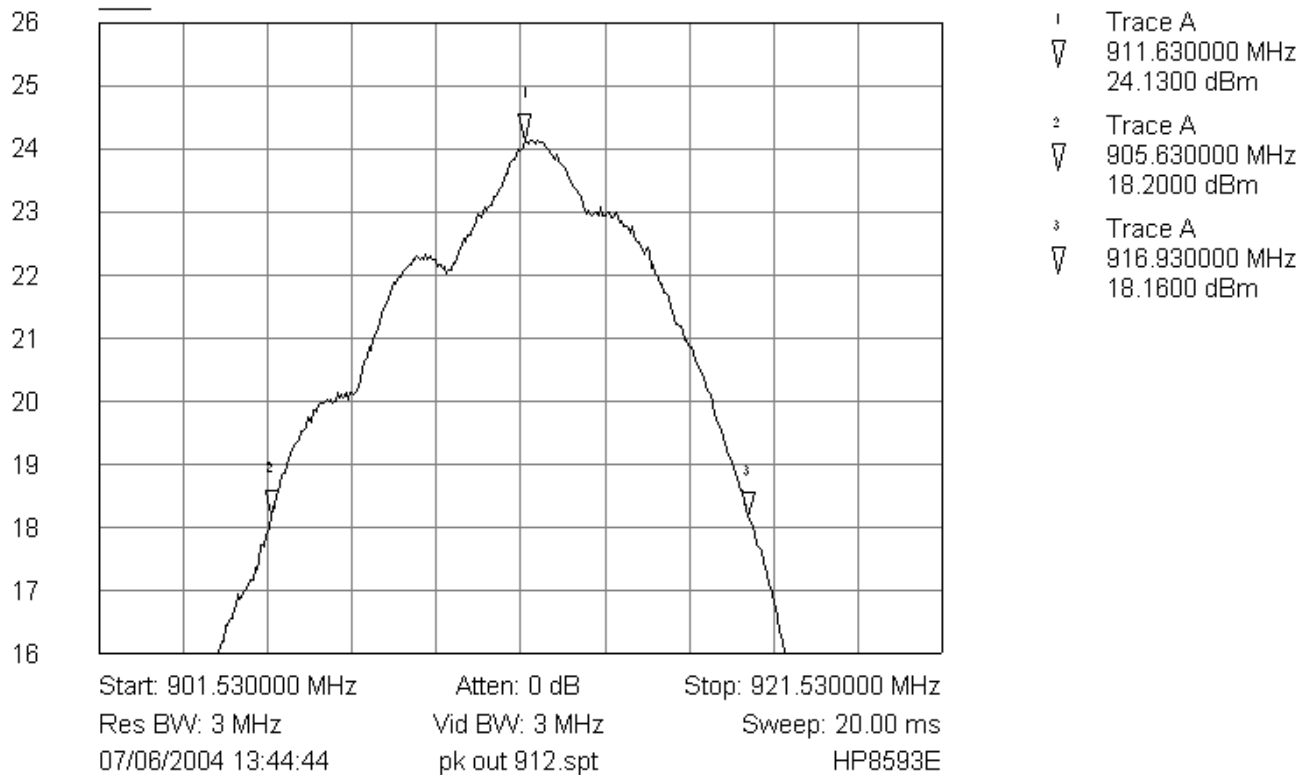


Plot / 5

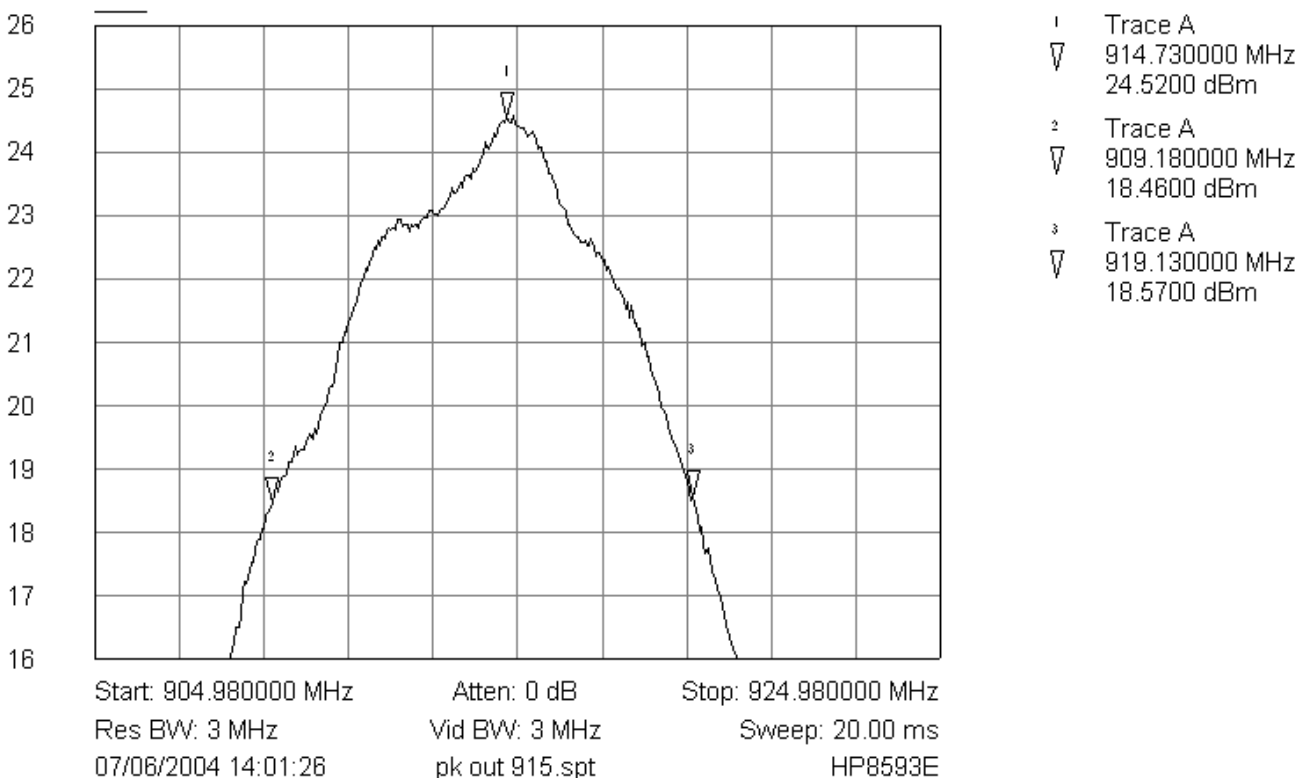


Plot / 6

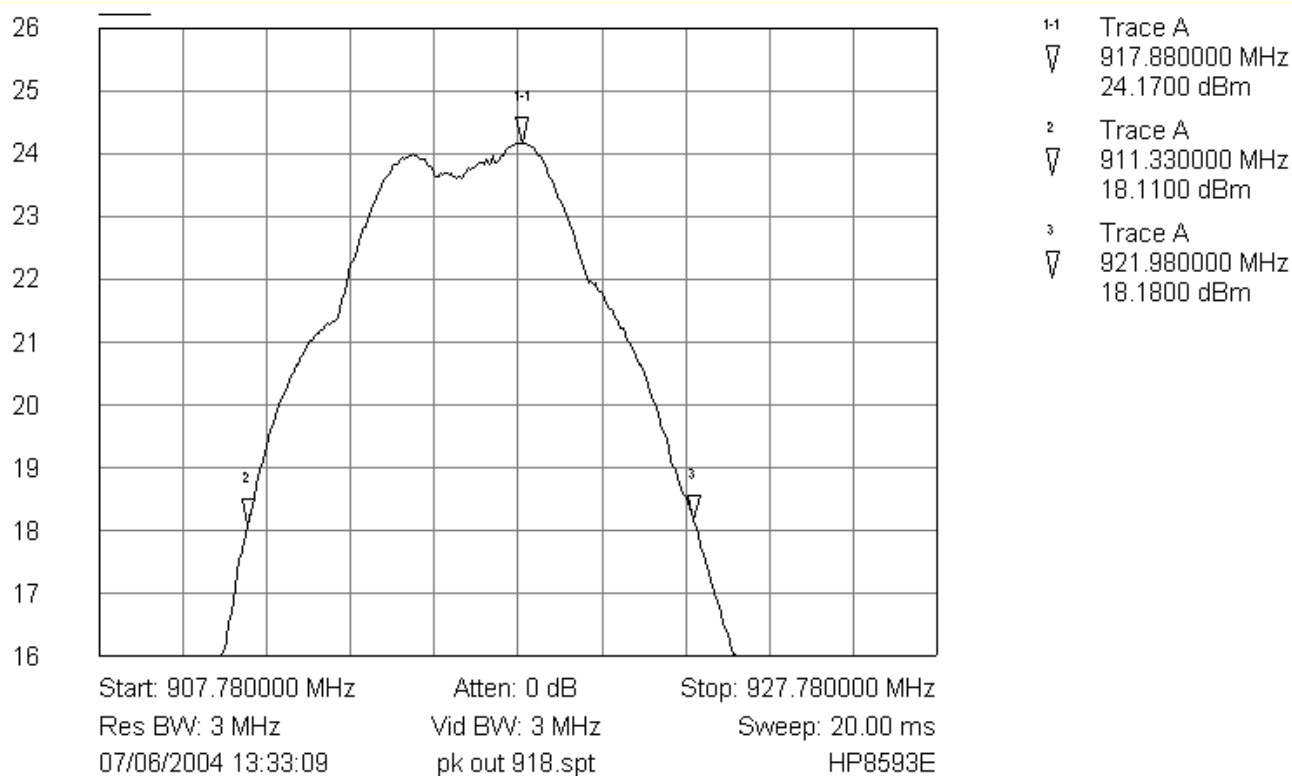
b. Maximum peak output power plots 7-9



Plot / 7

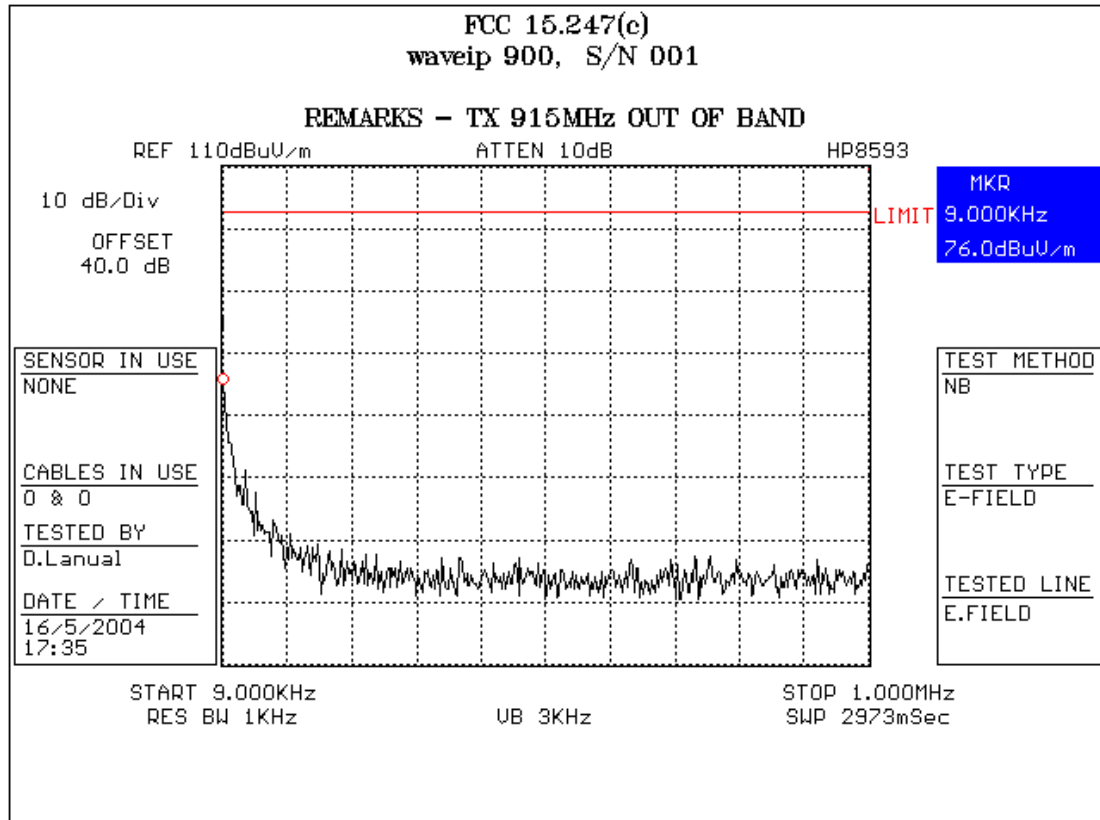


Plot / 8

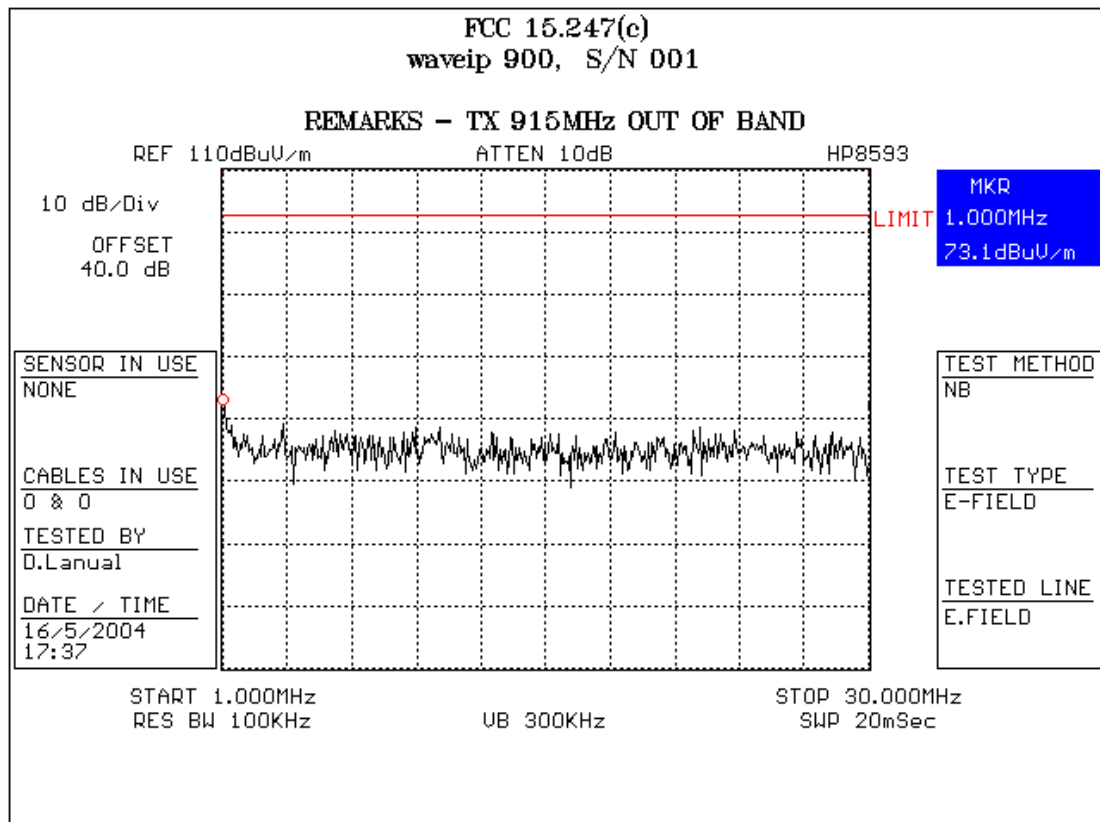


Plot / 9

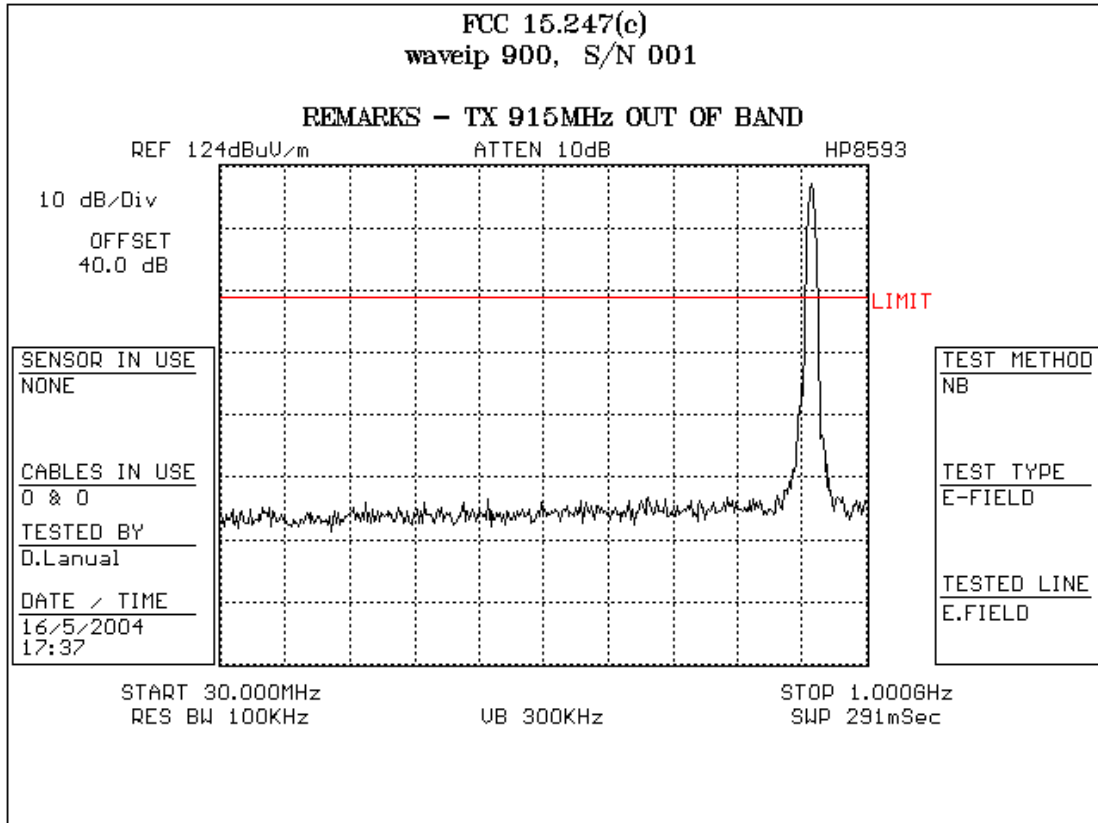
c. Out of band emission 10 - 19



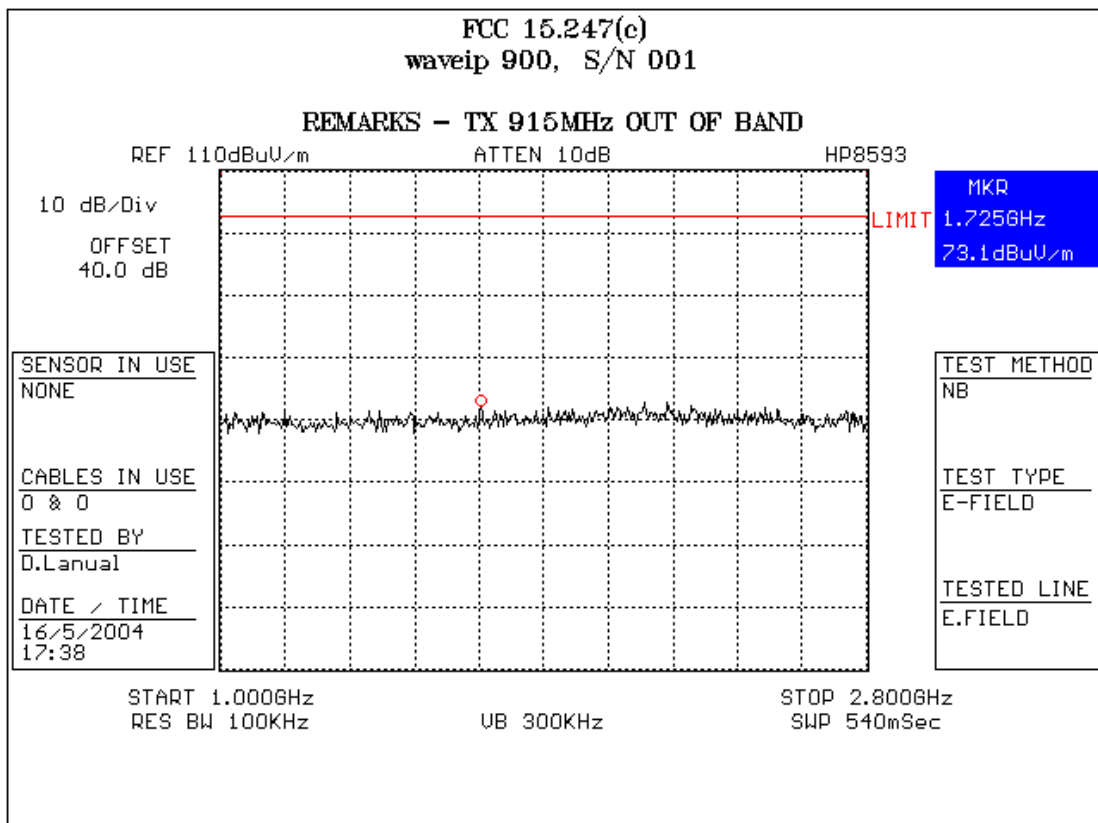
Plot / 10



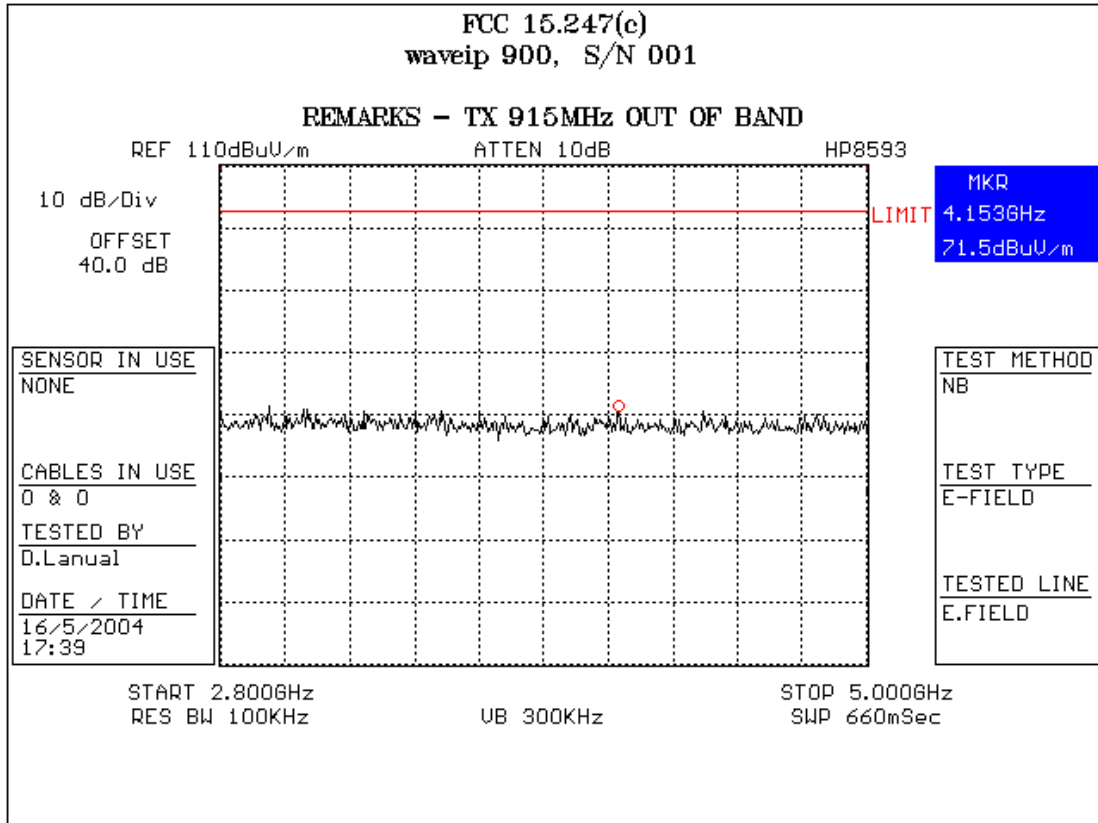
Plot / 11



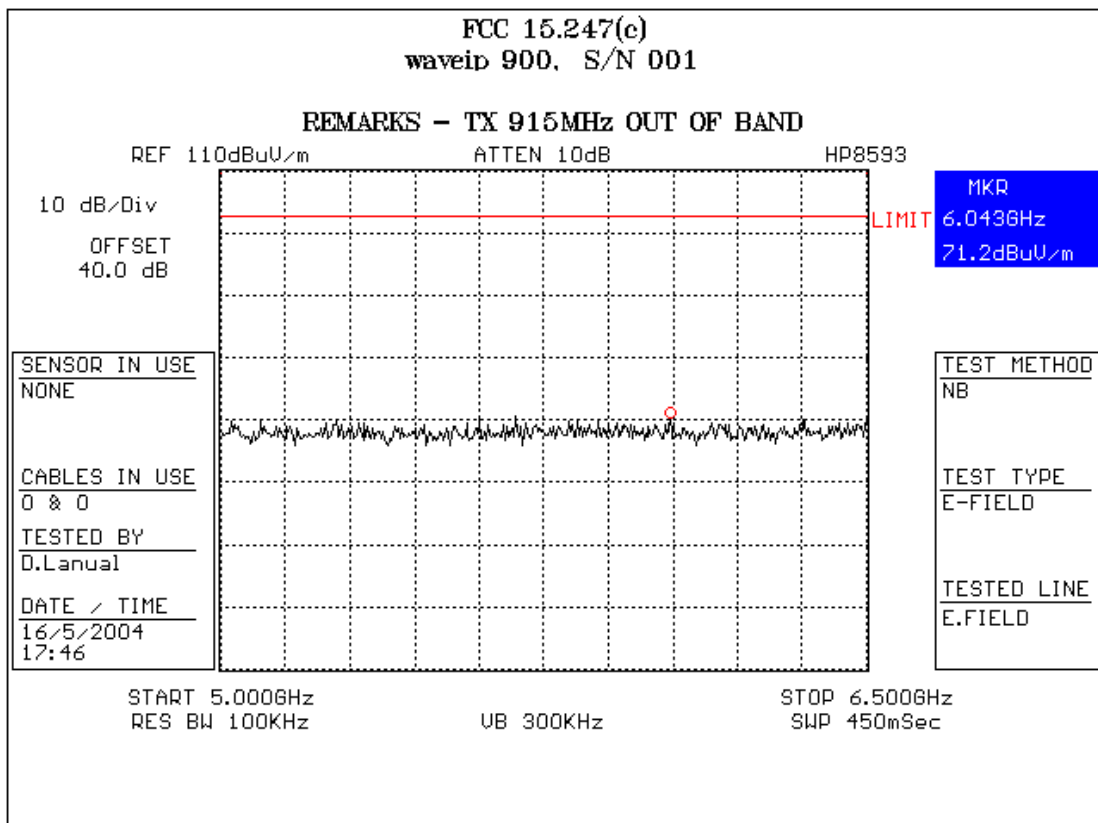
Plot / 12



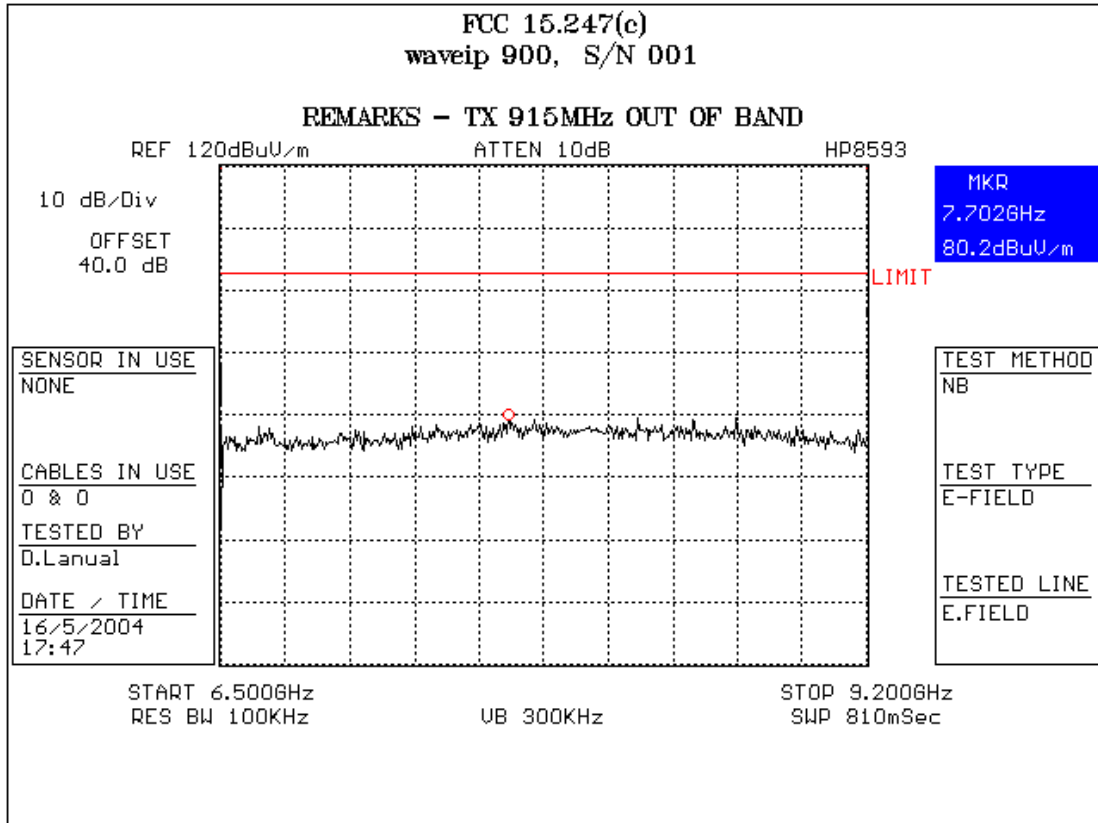
Plot / 13



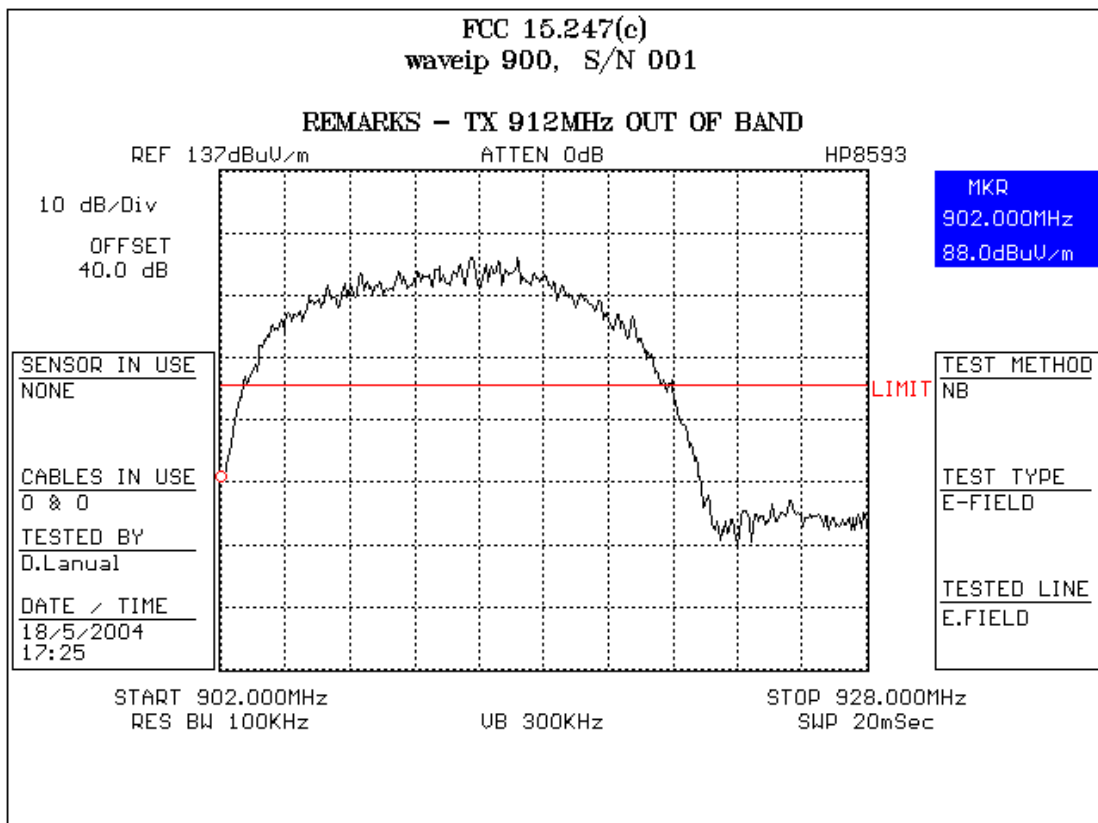
Plot / 14



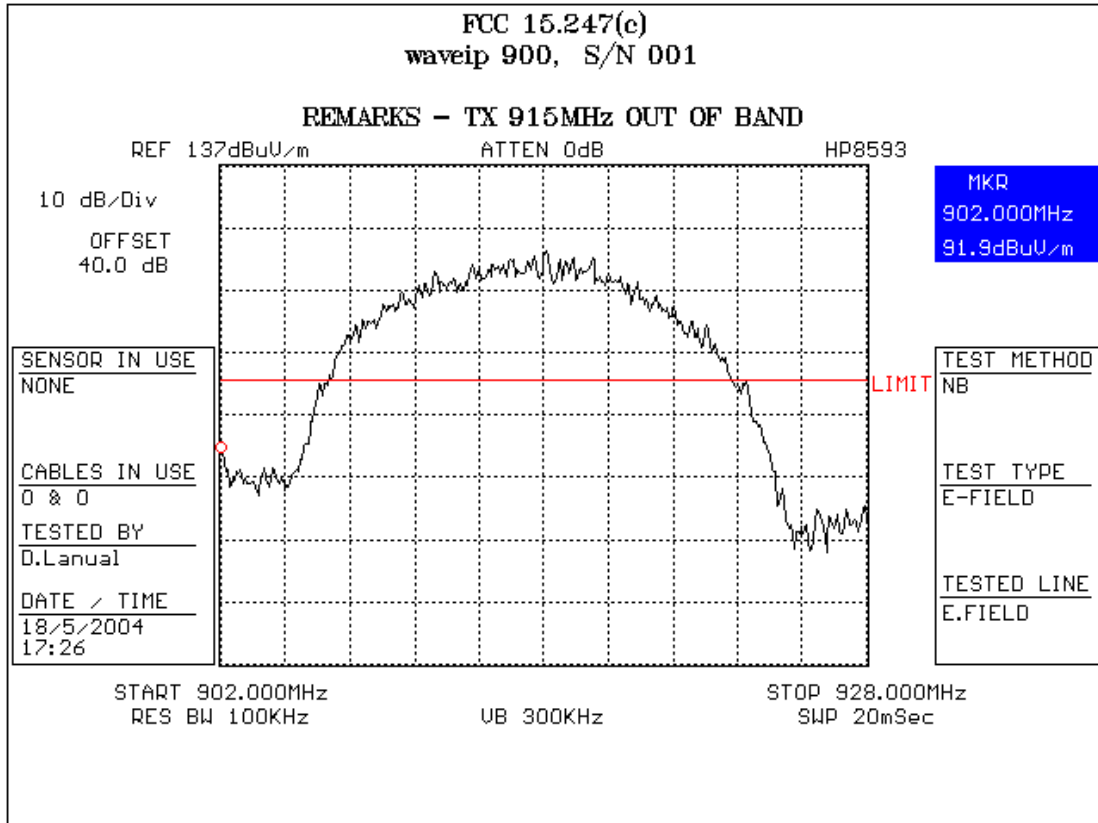
Plot / 15



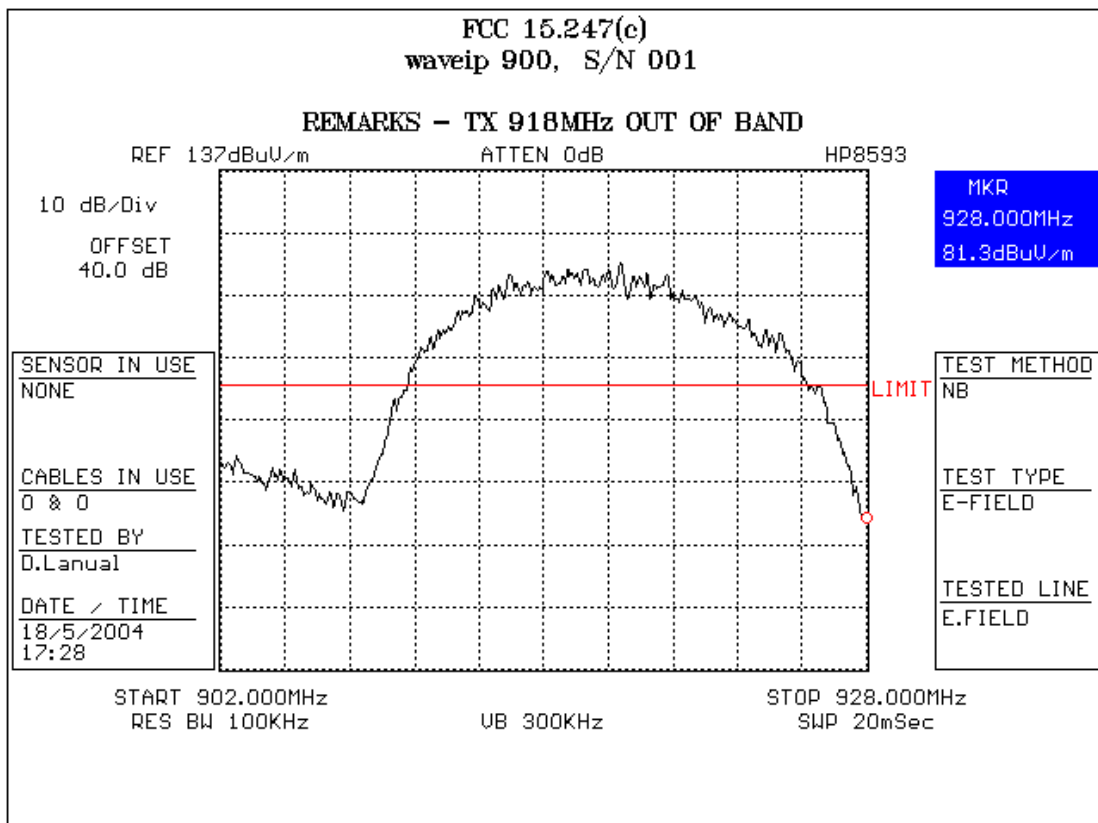
Plot / 16



Plot / 17



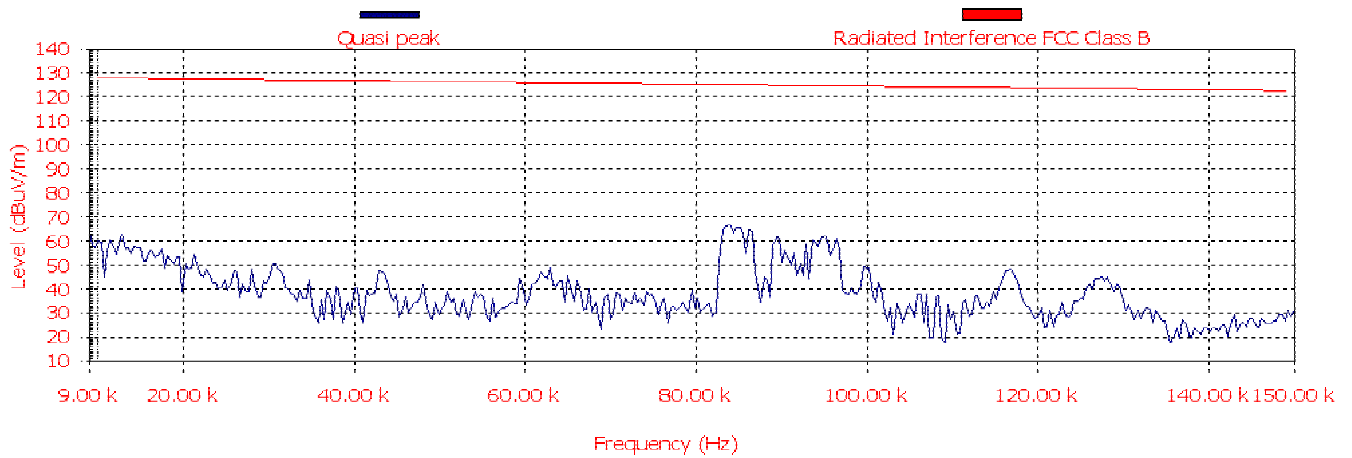
Plot / 18



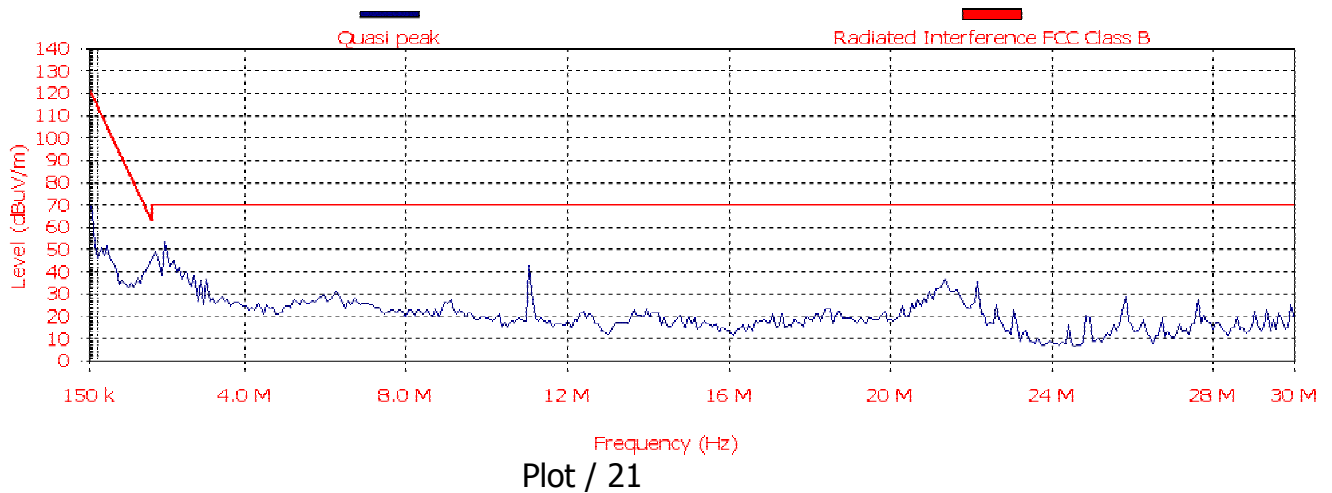
Plot / 19

(1) Radiated spurious Emission in restricted band Transmit Frequency **912MHz Antenna-Integrated 6dbi plots 20 - 27**

Analyzer setting: VBW-1K, RBW-1MHz, QP detector



Analyzer setting: VBW-9K, RBW-1MHz, QP detector



EUT File:

N:\COMMON\WAVE-IP-n\GogACCES-900\Data\Wavelp.EUT

Order Number:

EUT

Name: GigAccess 900MHz

Serial Number: 00-50-C2-1C-C3-3D

Client

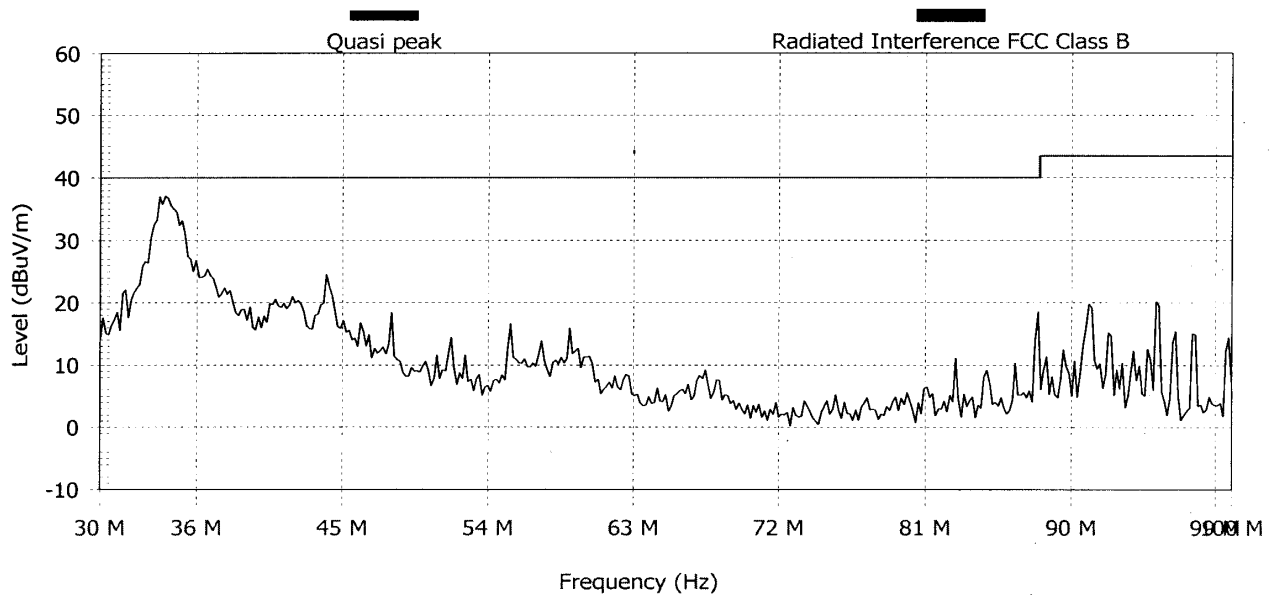
Name: WaveIP

Contact Person: Yoram Singer

Radiated Emission

Description: 93) FCC 15.205 RESTRICTED 30-100MHz 912 6dbi integral
From 30 MHz to 100 MHz

Graph:



Detected Peaks:

Nr	Frequency (MHz)	Type	PK (dBuV/m)	QP (dBuV/m)	QP Limit (dBuV/m)	QP Diff (dBuV/m)	QP Pass	Pass	Angle (degrees)	Height (m)	H/V
1	34.577	Cont. BB	37.7	33.3	40.0	-6.7	Pass	Pass	240	1	H
2	33.646	Disc.	34.1	33.3	40.0	-6.7	Pass	Pass	240	1	H
3	34.098	Disc.	34.4	33.8	40.0	-6.2	Pass	Pass	240	1	H
4	34.581	Cont.	34.3	33.2	40.0	-6.8	Pass	Pass	240	1	H

Settings:

Antenna: Horizontal at 3.0 m

Ref. Level: 90.0 dBuV/m Att: 0 dB. RBW: 120 kHz. VBW: 1000 kHz. Sweep time: 20 ms.

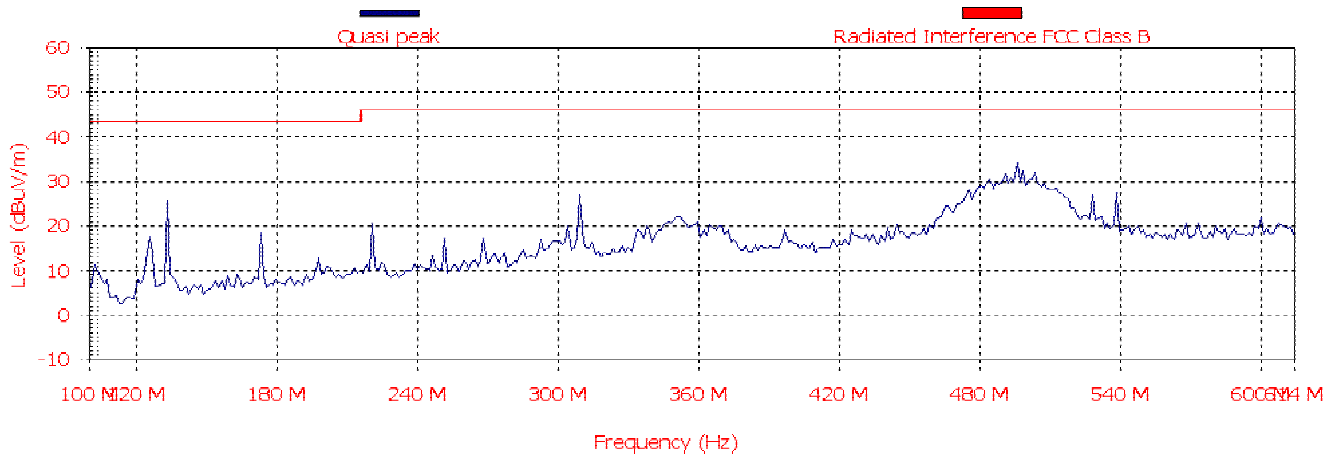
Detect all peaks above 6 dB below the limit lines with a maximum of 6 peaks.

Measure the peaks with the quasi-peak detector

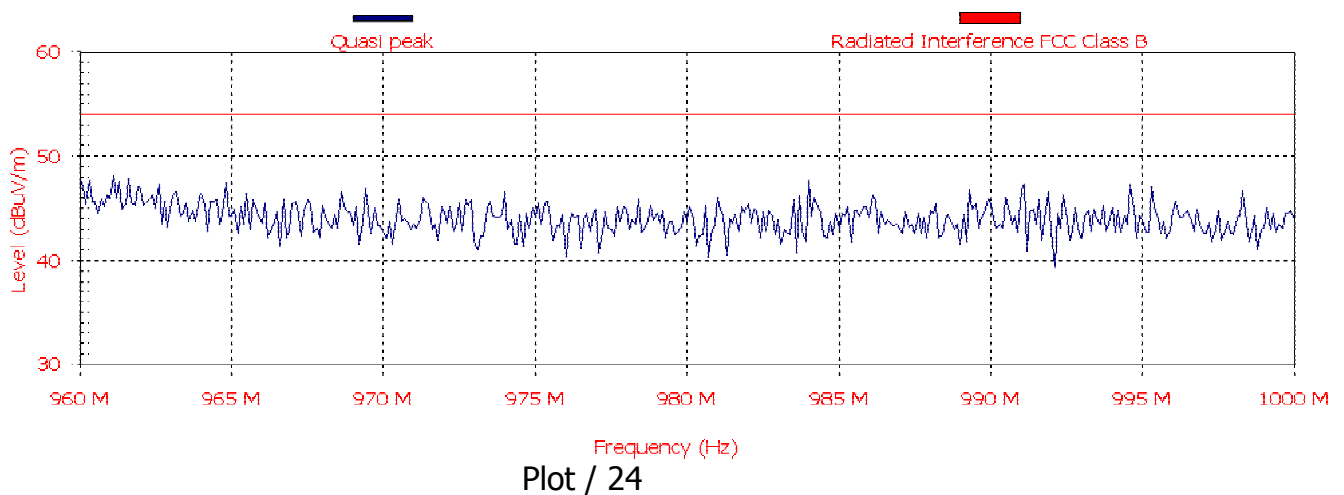
Note:

Plot / 22

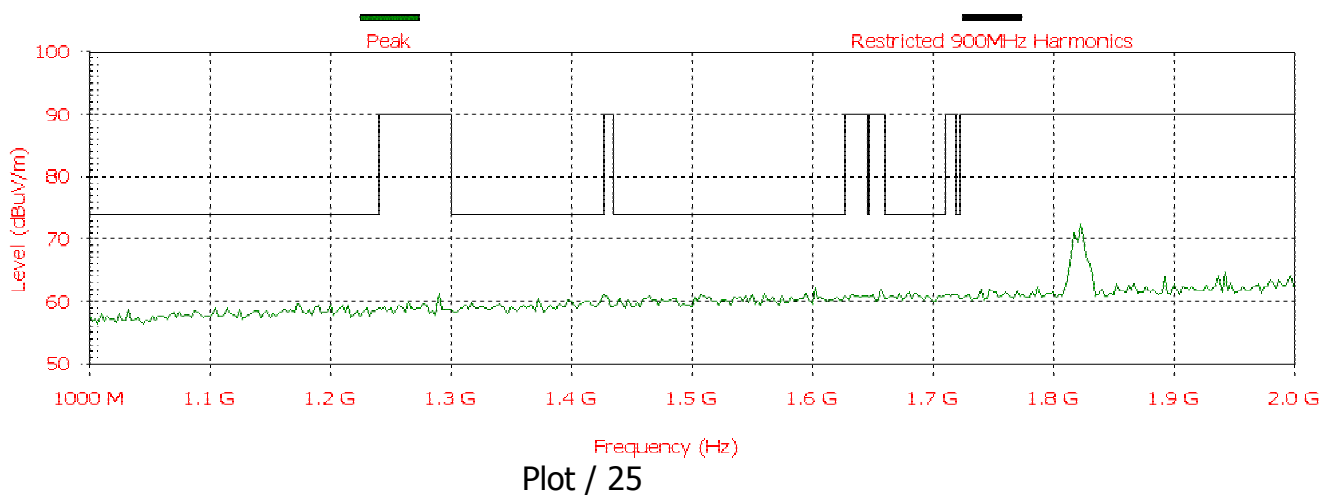
Analyzer setting: VBW-120K, RBW-1MHz, QP detector



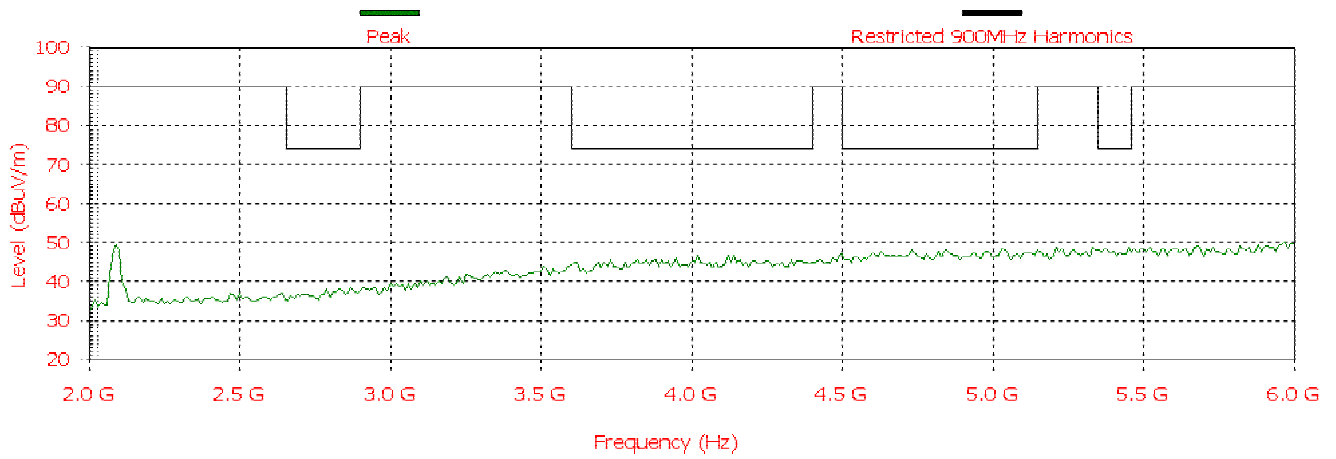
Analyzer setting: VBW-120K, RBW-1MHz, QP detector



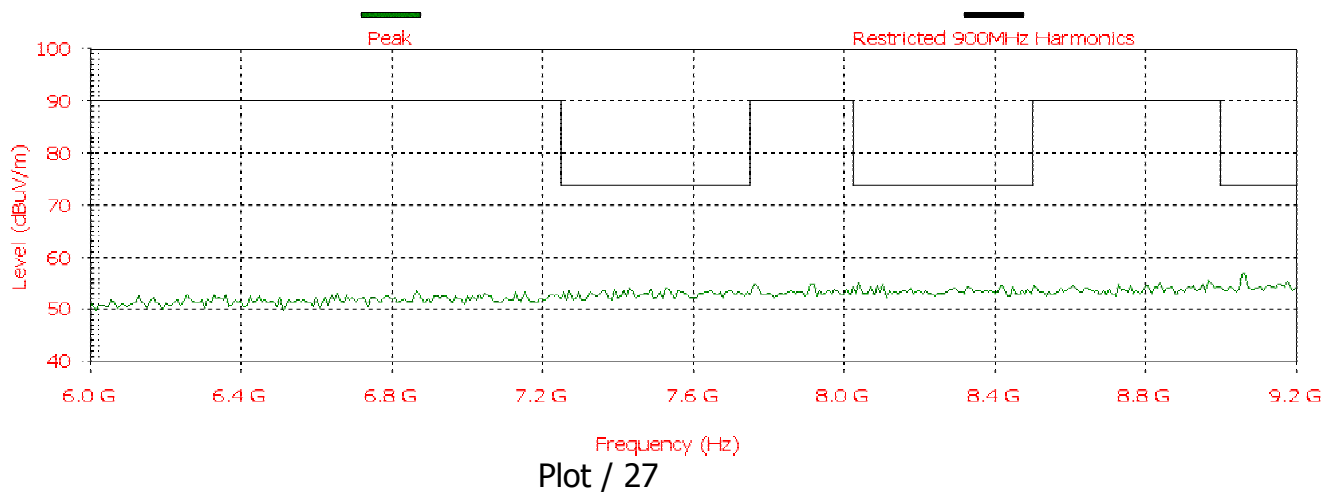
Analyzer setting: VBW-1M, RBW-3MHz, peak detector



Analyzer setting: VBW-1M, RBW-3MHz, Peak detector

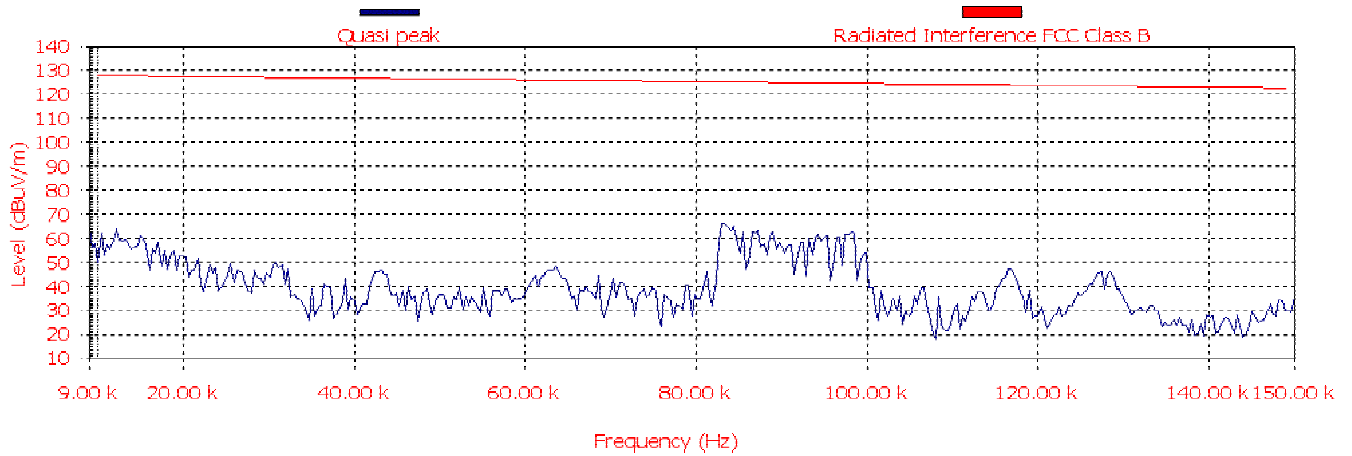


Analyzer setting: VBW-1M, RBW-3MHz, Peak detector

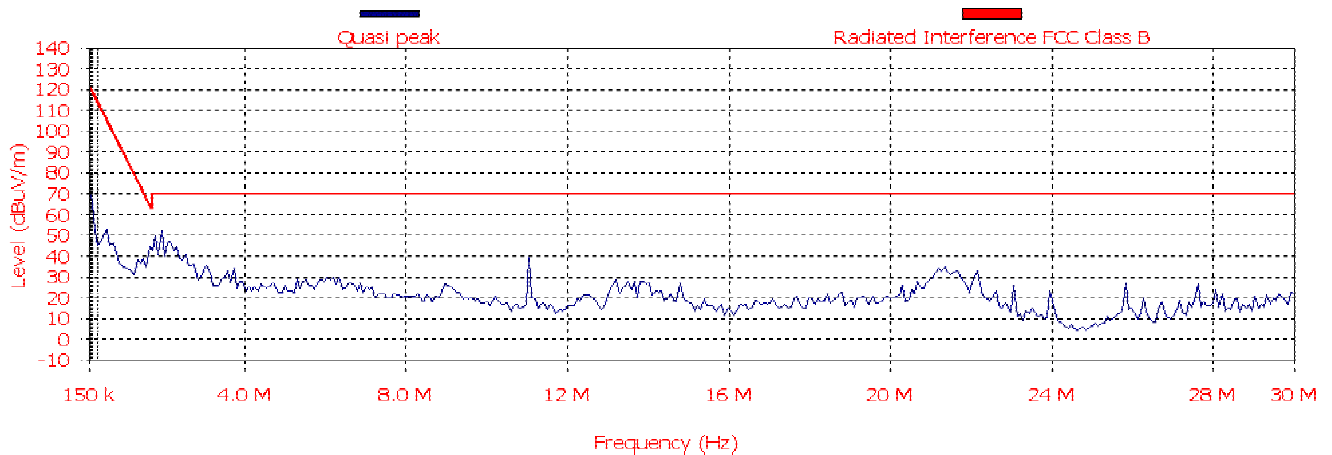


(2) Radiated spurious Emission in restricted band Transmit Frequency **915MHz Antenna-Integrated 6dbi plots 28 - 34**

Analyzer setting: VBW-1K, RBW-1MHz, QP detector



Analyzer setting: VBW-9K, RBW-1MHz, QP detector



EUT File:

N:\COMMON\WAVE-IP-n\GogACCES-900\Data\WaveIp.EUT

Order Number:

EUT

Name: GigAccess 900MHz

Serial Number: 00-50-C2-1C-C3-3D

Client

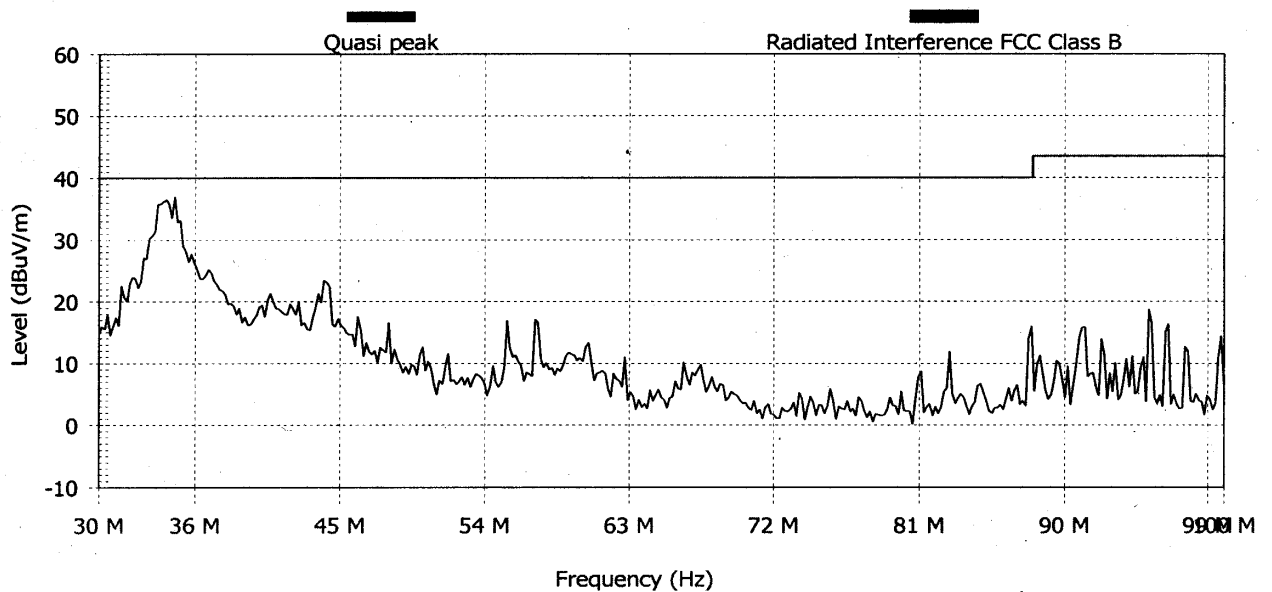
Name: WaveIP

Contact Person: Yoram Singer

Radiated Emission

Description: 92) FCC 15.205 RESTRICTED 30-100MHz 915 6dbi integral
From 30 MHz to 100 MHz

Graph:



Detected Peaks:

Nr	Frequency (MHz)	Type	PK (dBuV/m)	QP (dBuV/m)	QP Limit (dBuV/m)	QP Diff (dBuV/m)	QP Pass	Pass	Angle (degrees)	Height (m)	H/V
1	34.196	Disc.	36.1	30.0	40.0	-10.0	Pass	Pass	240	1	H
2	33.675	Cont.	35.7	31.7	40.0	-8.3	Pass	Pass	240	1	H
3	34.571	Cont. BB	36.6	32.3	40.0	-7.7	Pass	Pass	240	1	H

Settings:

Antenna: Horizontal at 3.0 m

Ref. Level: 90.0 dBuV/m Att: 0 dB. RBW: 120 kHz. VBW: 1000 kHz. Sweep time: 20 ms.

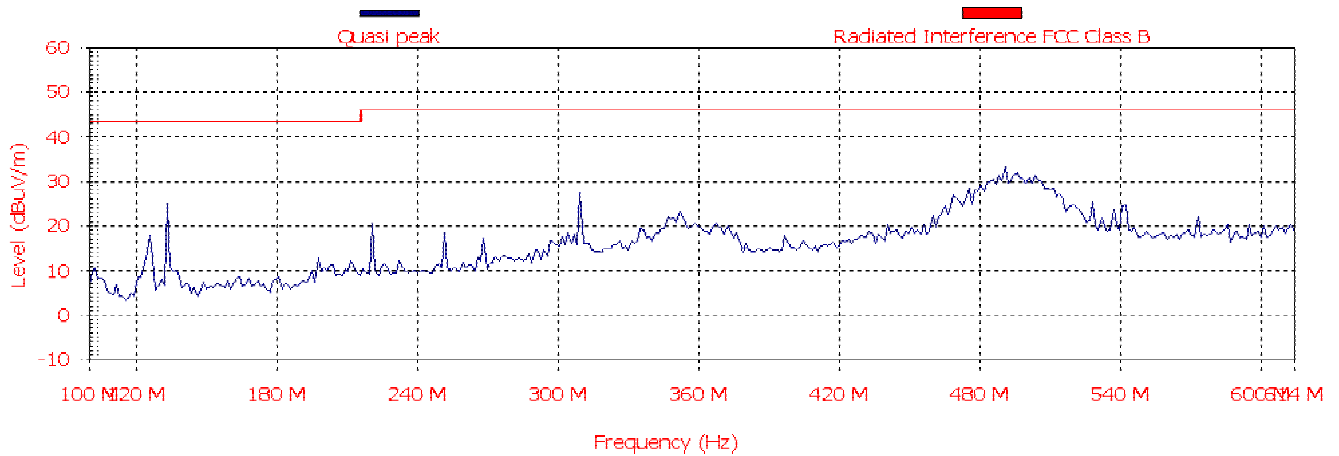
Detect all peaks above 6 dB below the limit lines with a maximum of 6 peaks.

Measure the peaks with the quasi-peak detector

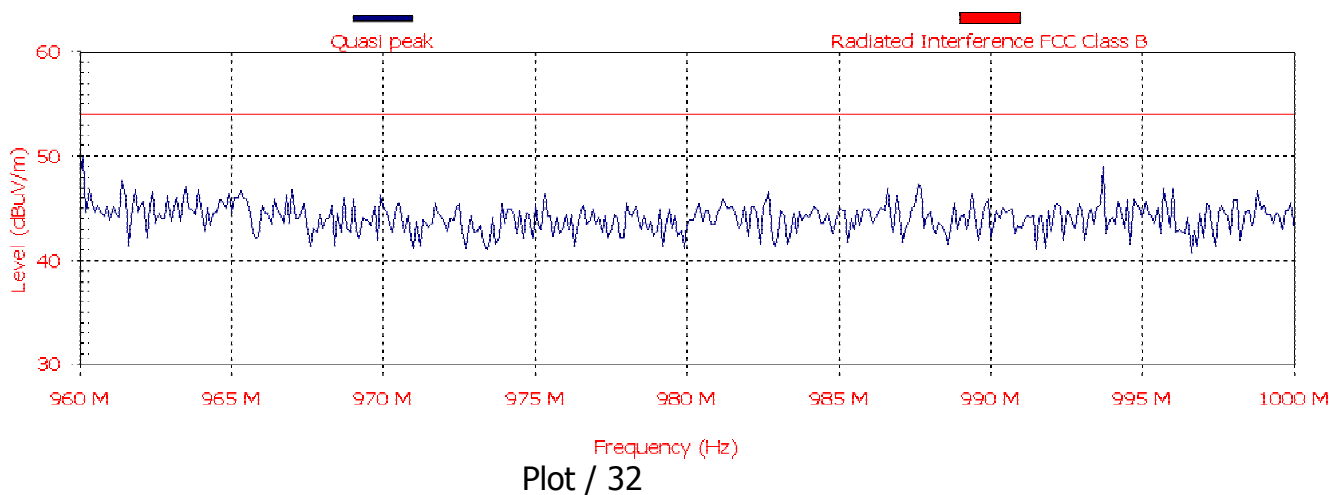
Note:

Plot / 30

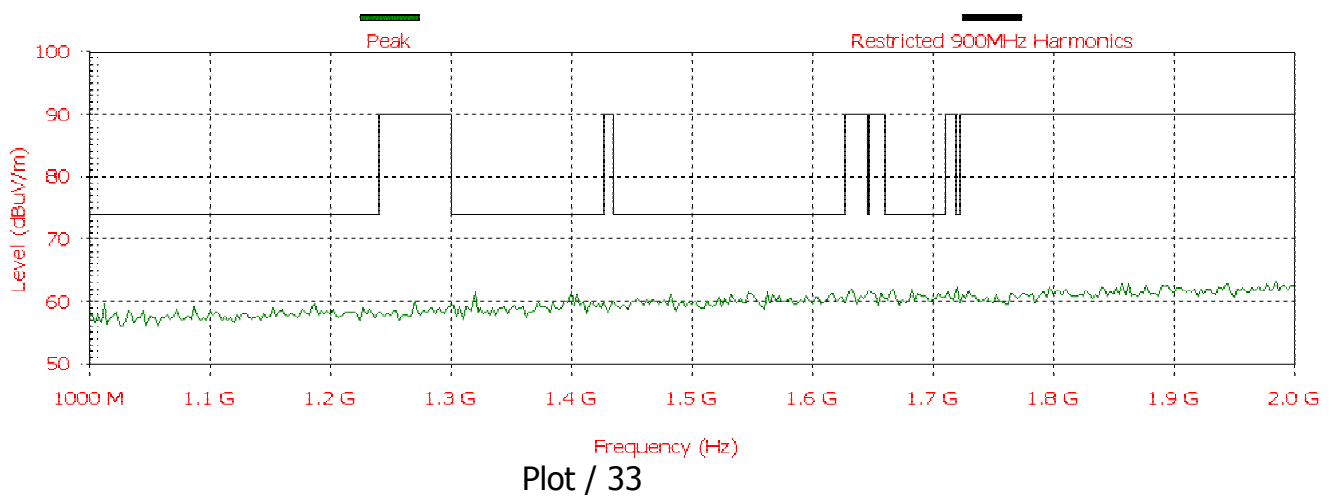
Analyzer setting: VBW-120K, RBW-1MHz, QP detector



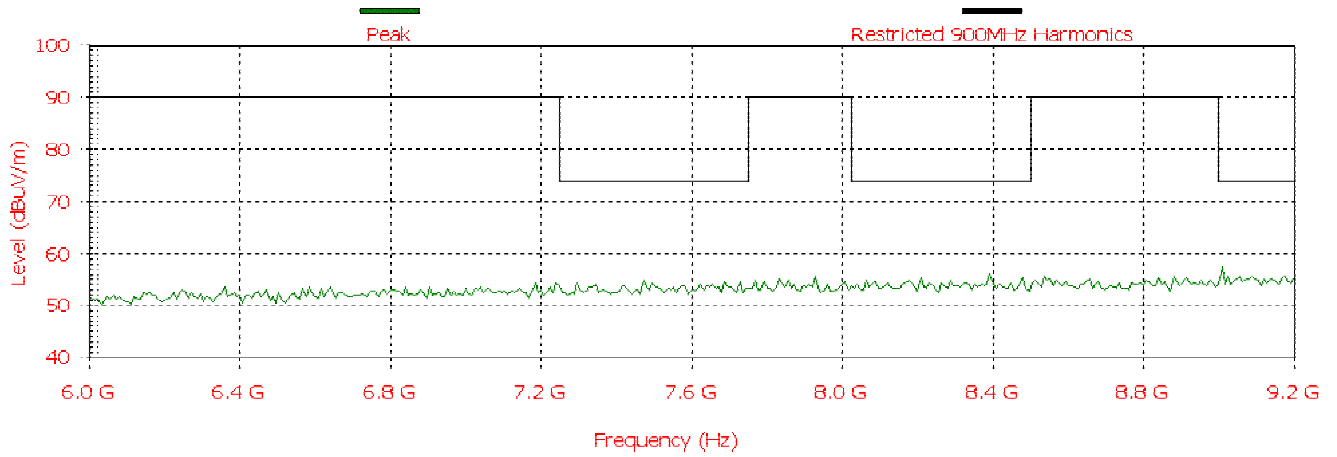
Analyzer setting: VBW-120K, RBW-1MHz, QP detector



Analyzer setting: VBW-1M, RBW-3MHz, Peak detector



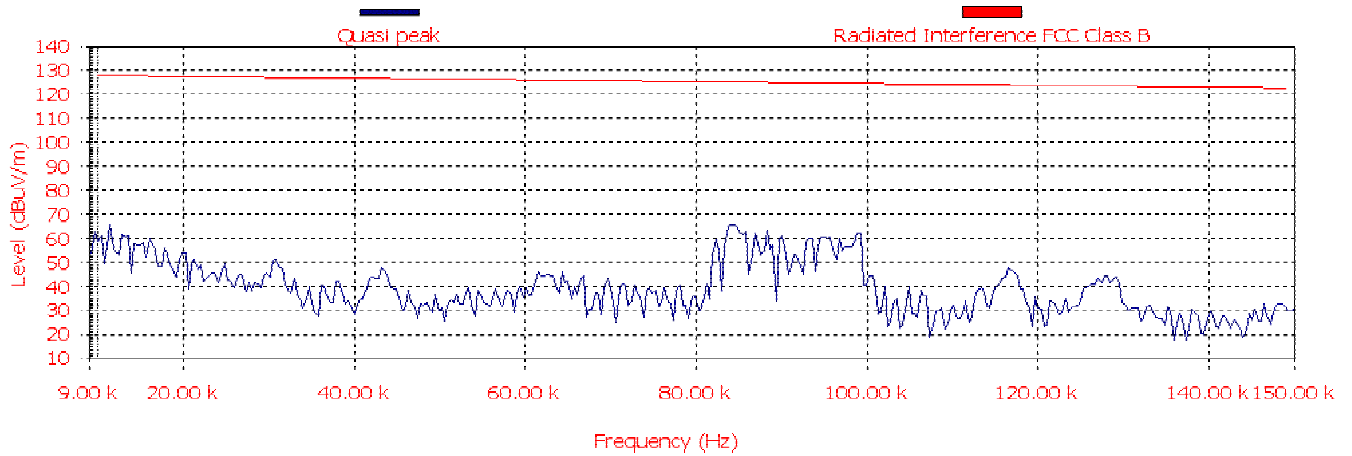
Analyzer setting: VBW-1M, RBW-3MHz, Peak detector



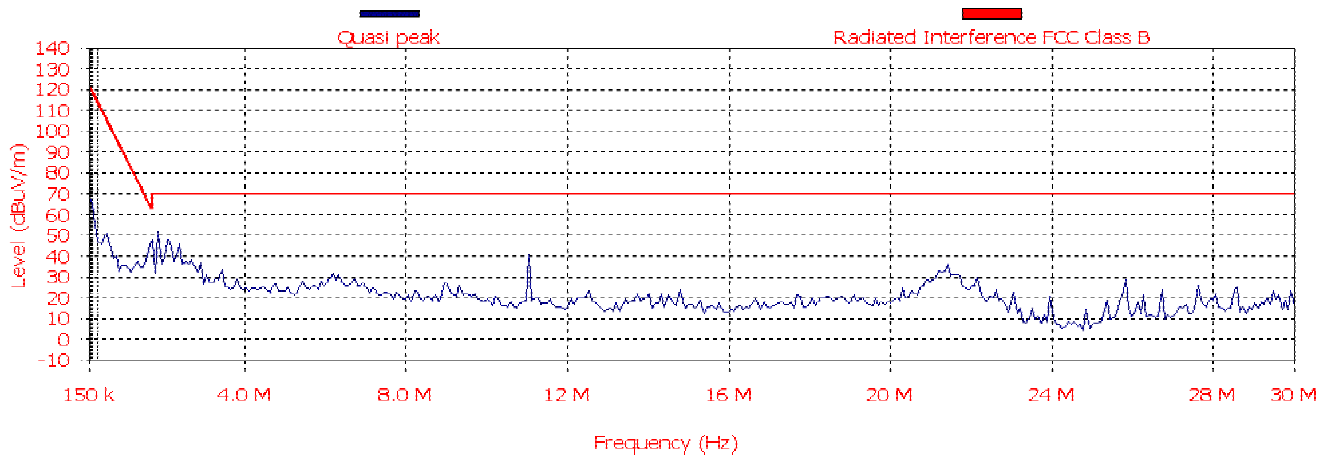
Plot / 34

(3) Radiated spurious Emission in restricted band Transmit Frequency **918MHz Antenna-Integrated 6dbi plots 35 - 42**

Analyzer setting: VBW-1K, RBW-1MHz, QP detector



Analyzer setting: VBW-9K, RBW-1MHz, QP detector



EUT File:

N:\COMMON\WAVE-IP-n\GogACCES-900\Data\WaveIp.EUT

Order Number:

EUT

Name: GigAccess 900MHz

Serial Number: 00-50-C2-1C-C3-3D

Client

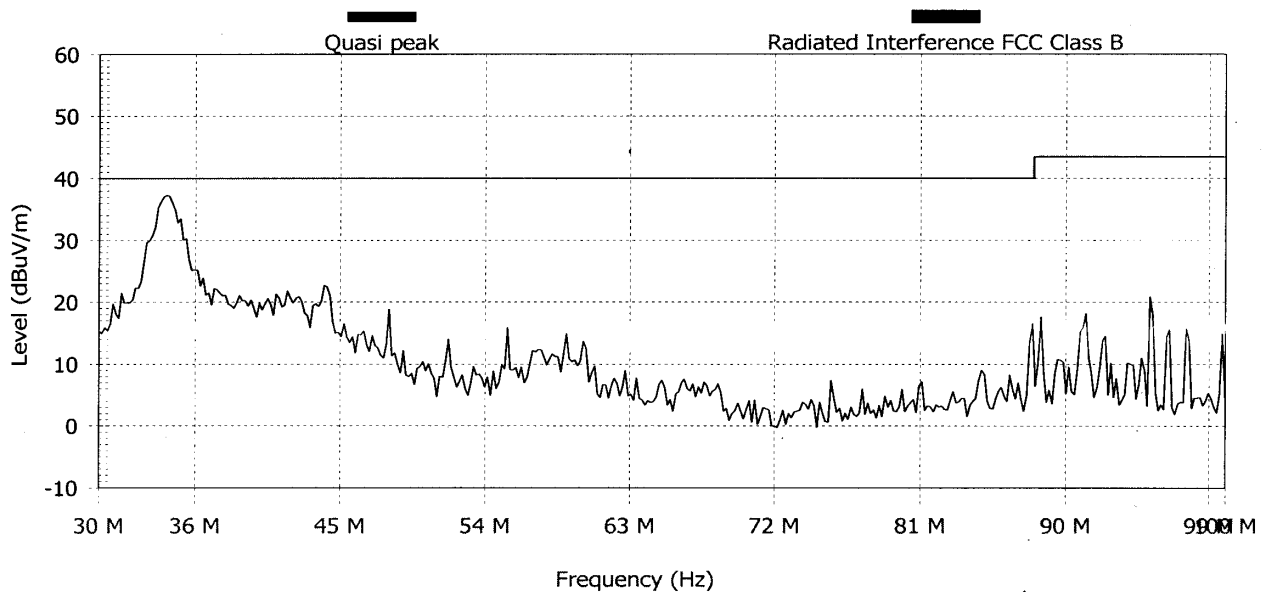
Name: WaveIP

Contact Person: Yoram Singer

Radiated Emission

Description: 94) FCC 15.205 RESTRICTED 30-100MHz 918 6dbi integral
From 30 MHz to 100 MHz

Graph:



Detected Peaks:

Nr	Frequency (MHz)	Type	PK (dBuV/m)	QP (dBuV/m)	QP Limit (dBuV/m)	QP Diff (dBuV/m)	QP Pass	Pass	Angle (degrees)	Height (m)	H/V
1	33.966	Disc.	35.4	34.1	40.0	-5.9	Pass	Pass	240	1	H
2	34.541	Cont. BB	37.5	30.1	40.0	-9.9	Pass	Pass	240	1	H

Settings:

Antenna: Horizontal at 3.0 m

Ref. Level: 90.0 dBuV/m Att: 0 dB. RBW: 120 kHz. VBW: 1000 kHz. Sweep time: 20 ms.

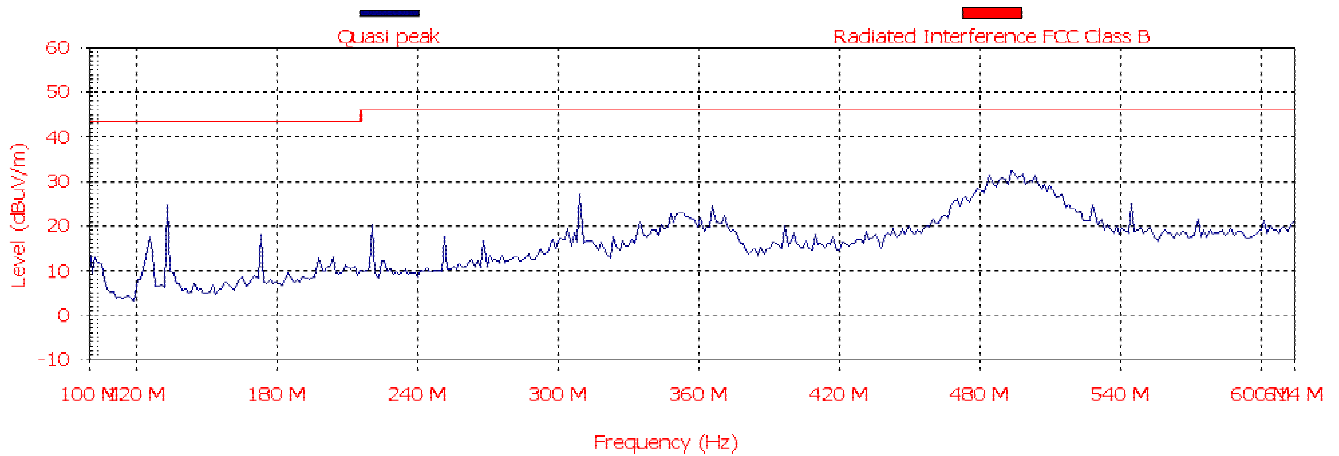
Detect all peaks above 6 dB below the limit lines with a maximum of 6 peaks.

Measure the peaks with the quasi-peak detector

Note:

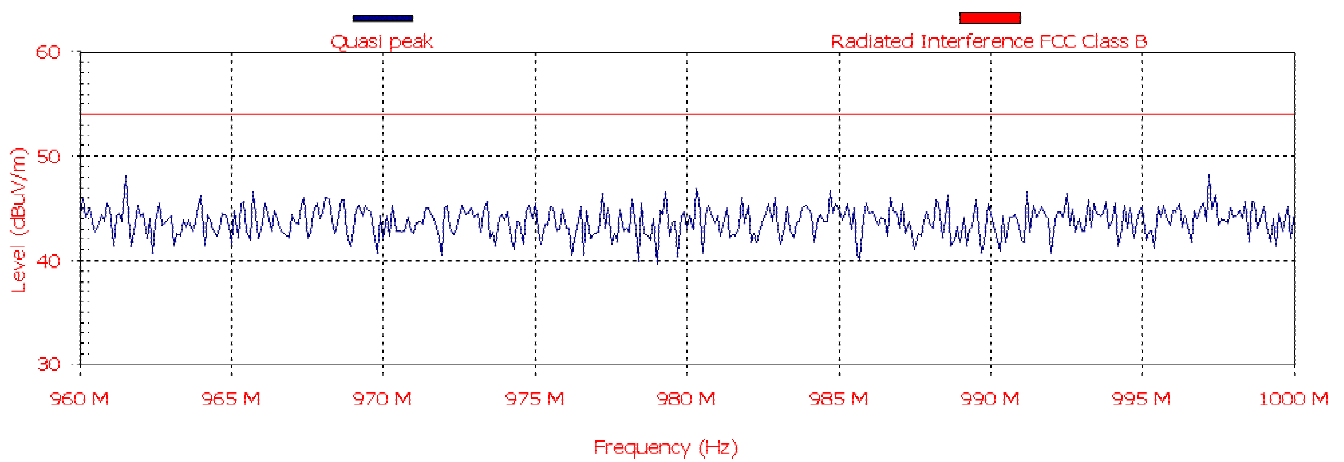
Plot / 37

Analyzer setting: VBW-120K, RBW-1MHz, QP detector



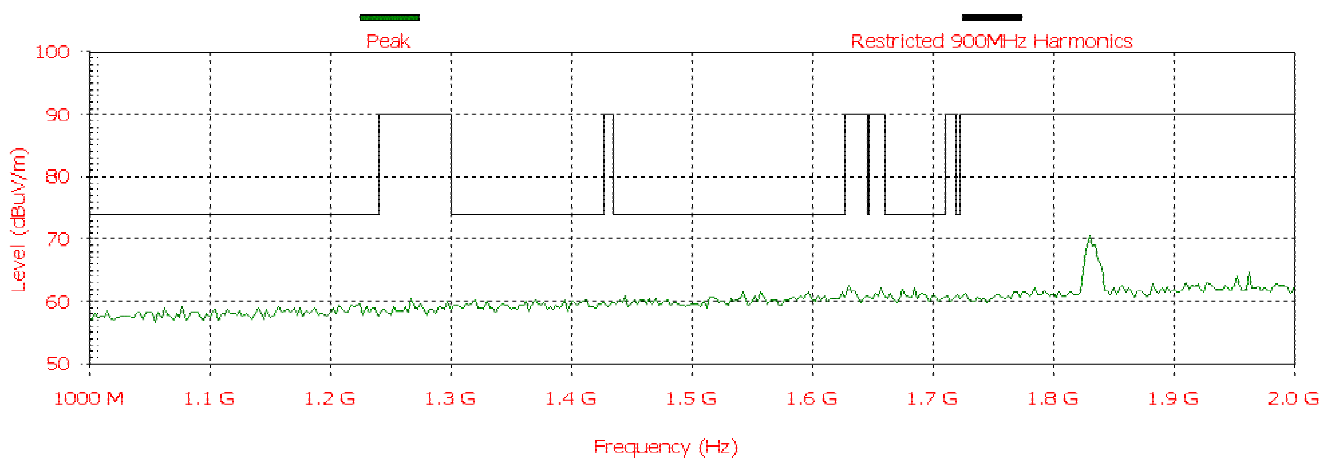
Plot / 38

Analyzer setting: VBW-120K, RBW-1MHz, QP detector



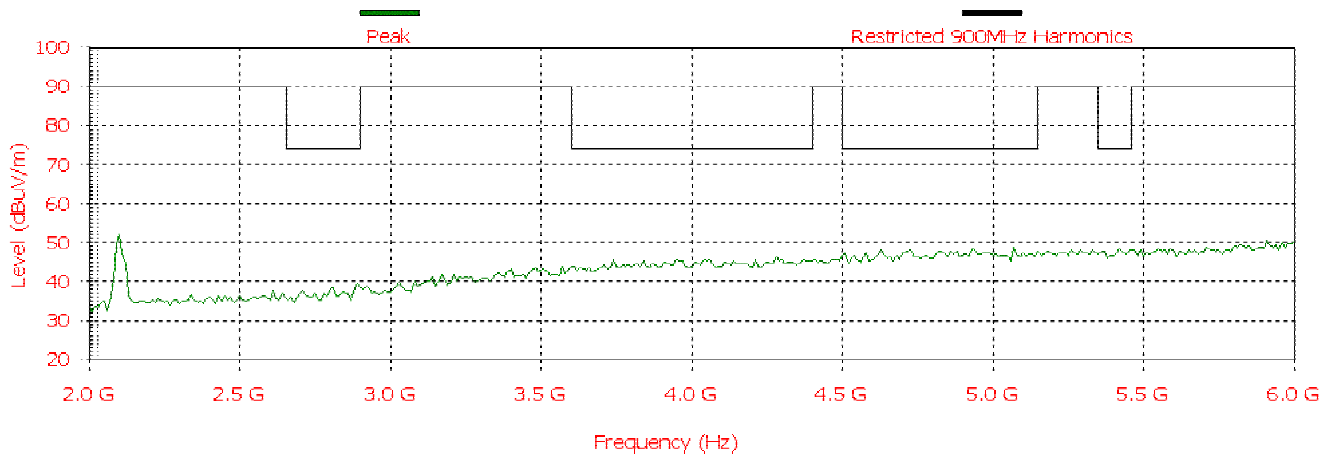
Plot / 39

Analyzer setting: VBW-1M, RBW-3MHz, Peak detector



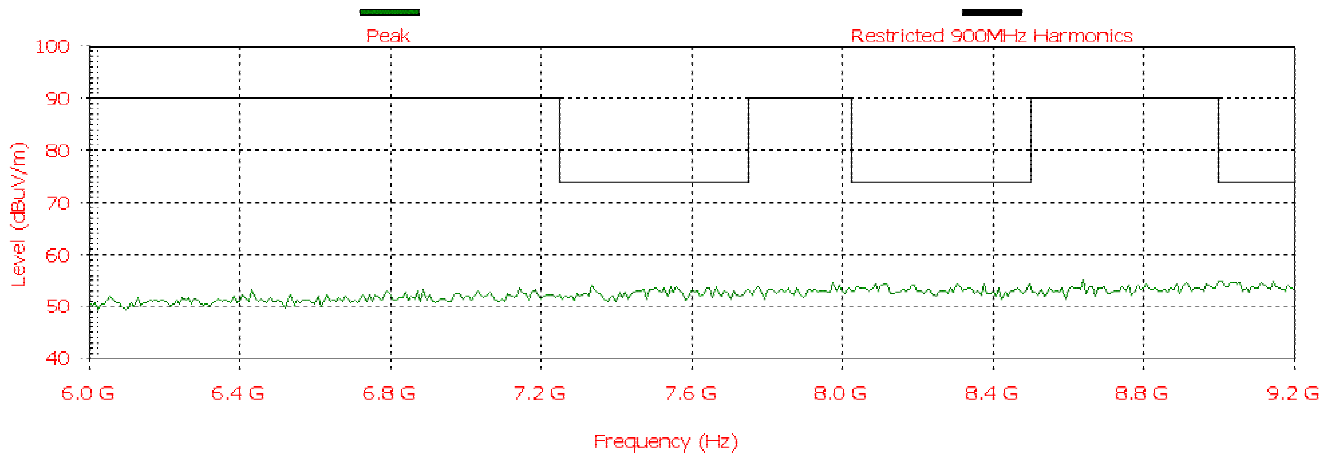
Plot / 40

Analyzer setting: VBW-1M, RBW-3MHz, Peak detector



Plot / 41

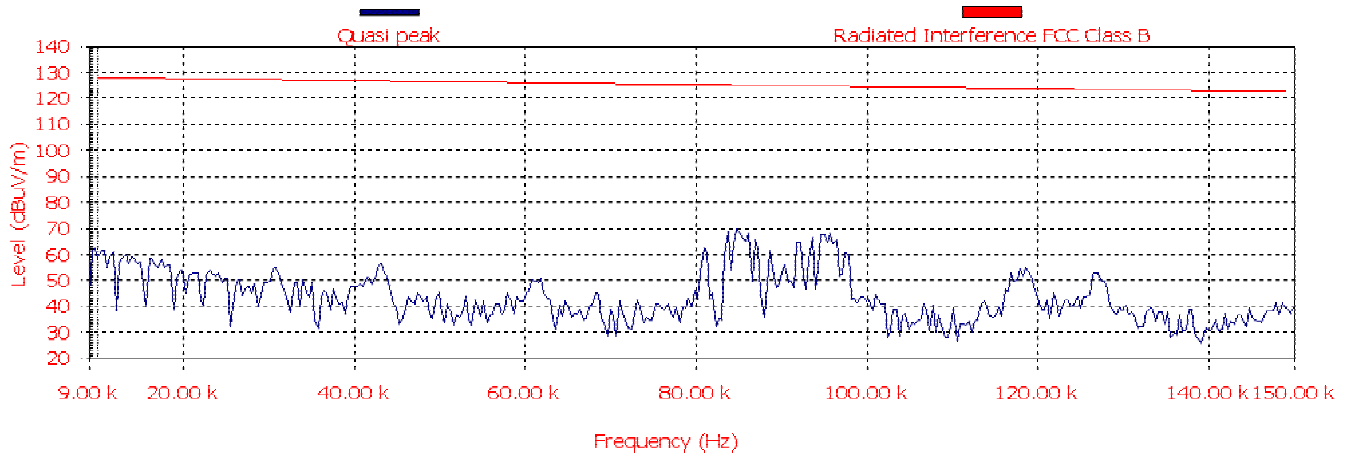
Analyzer setting: VBW-1M, RBW-3MHz, Peak detector



Plot / 42

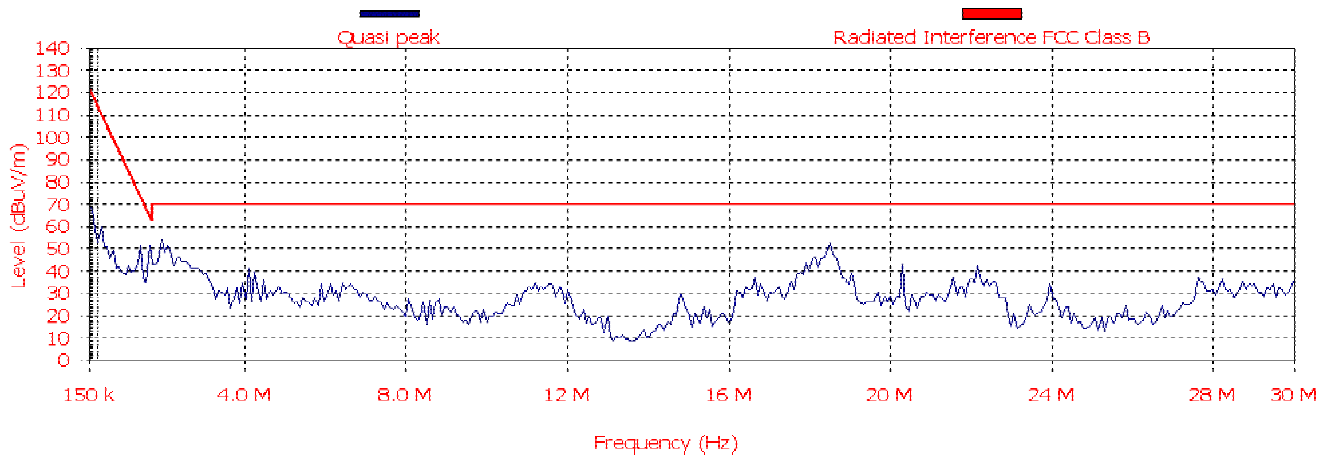
(4) Radiated spurious Emission in restricted band Transmit Frequency **912MHz Antenna-Sect Extern 14dbi plots 43 - 50**

Analyzer setting: VBW-1K, RBW-1MHz, QP detector



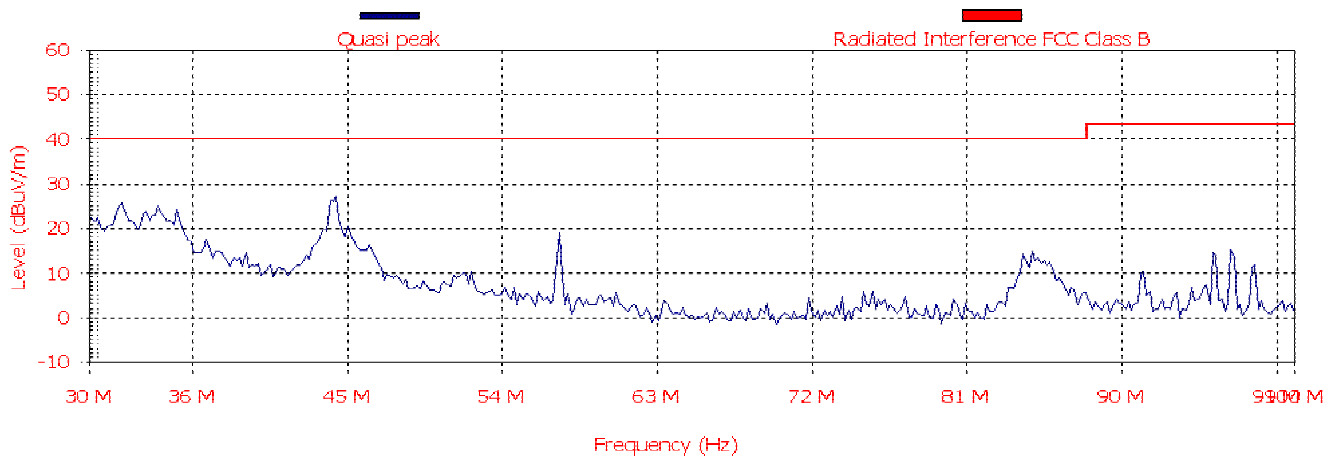
Plot / 43

Analyzer setting: VBW-9K, RBW-1MHz, QP detector



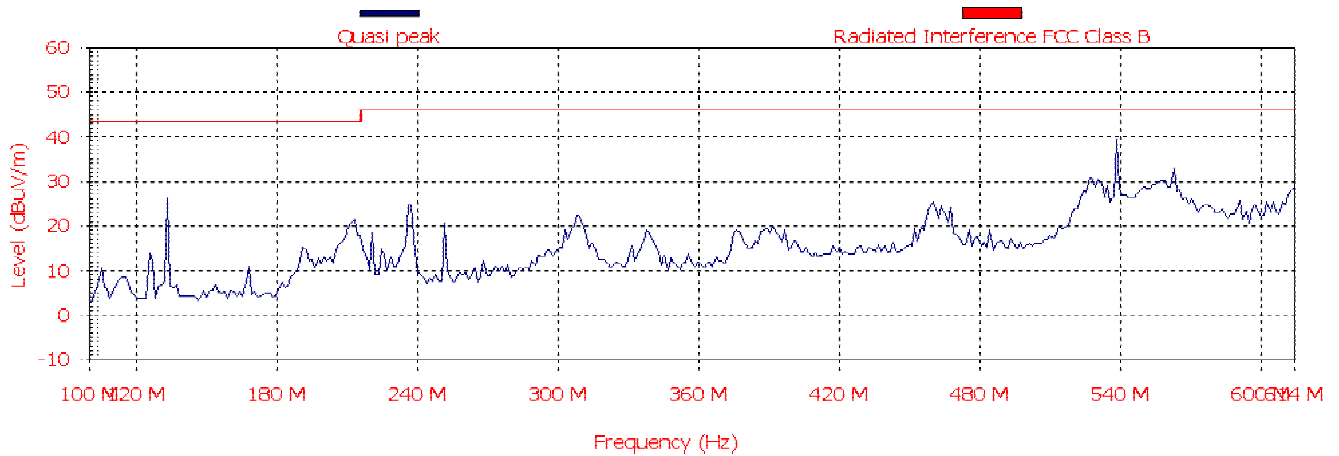
Plot / 44

Analyzer setting: VBW-120K, RBW-1MHz, QP detector

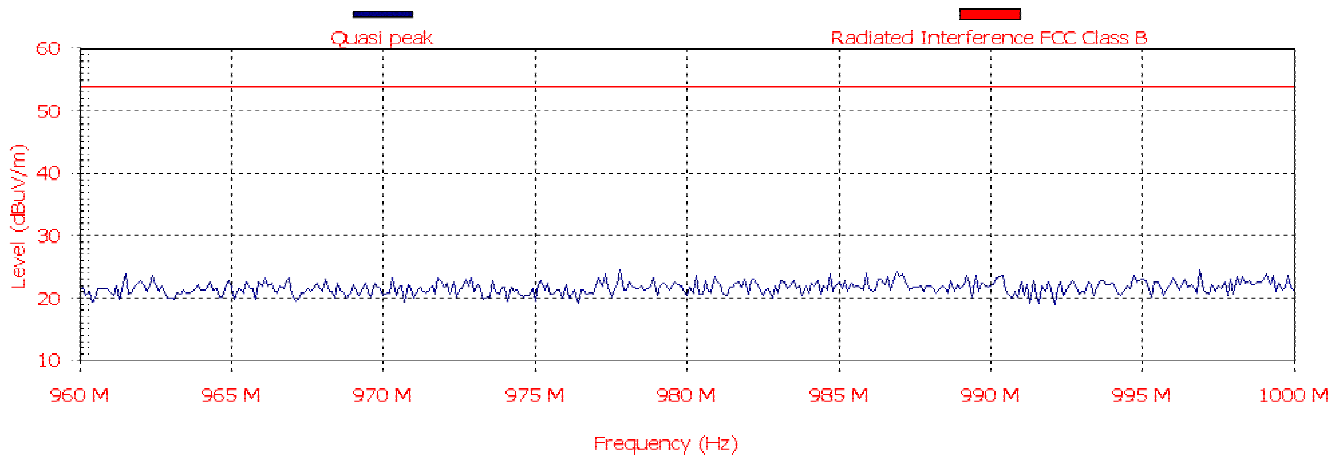


Plot / 45

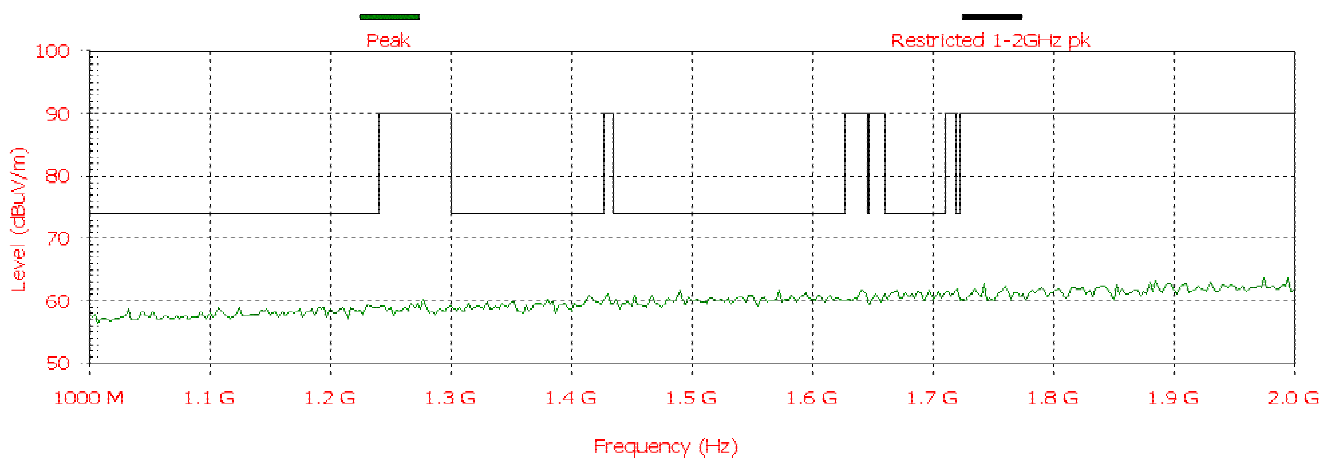
Analyzer setting: VBW-120K, RBW-1MHz, QP detector



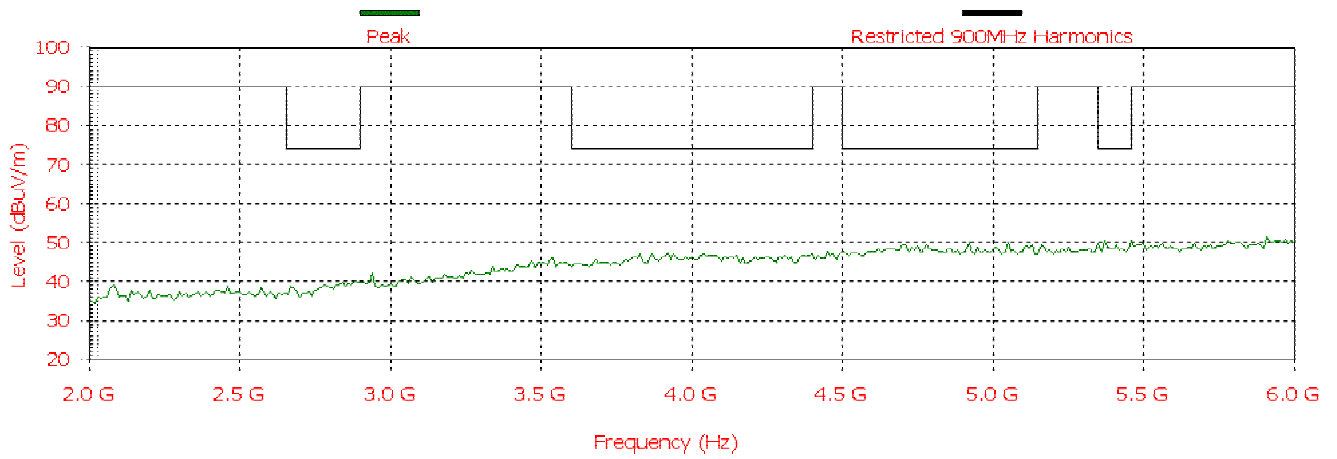
Analyzer setting: VBW-120K, RBW-1MHz, QP detector



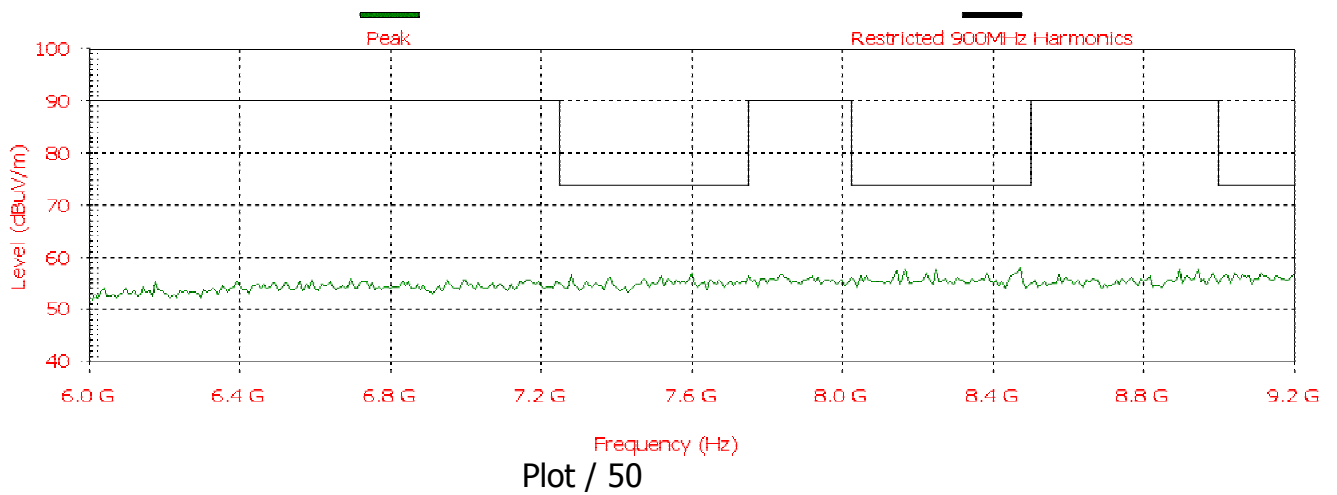
Analyzer setting: VBW-1M, RBW-3MHz, Peak detector



Analyzer setting: VBW-1M, RBW-3MHz, Peak detector

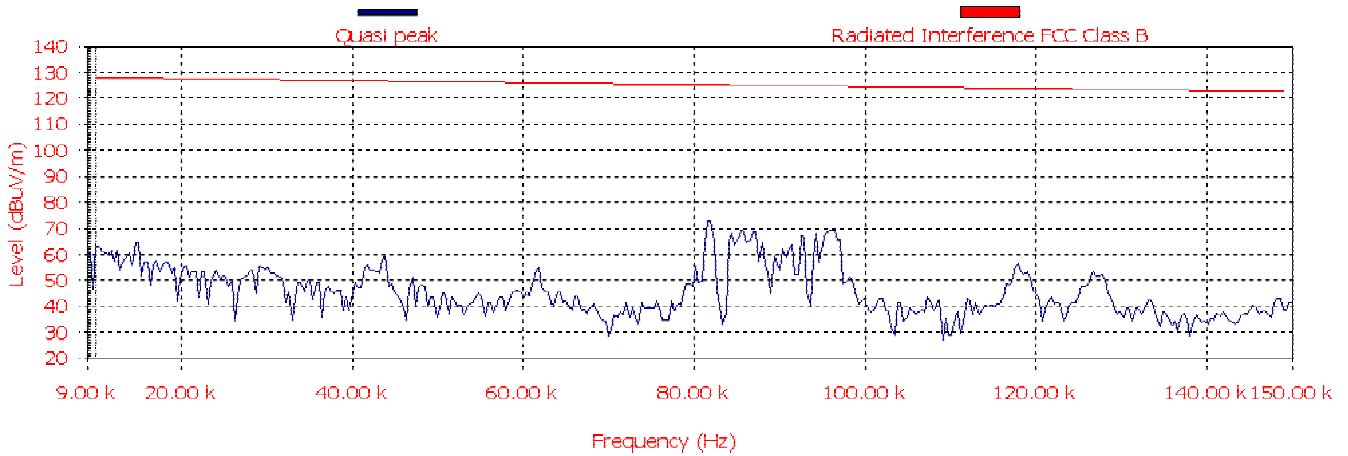


Analyzer setting: VBW-1M, RBW-3MHz, Peak detector

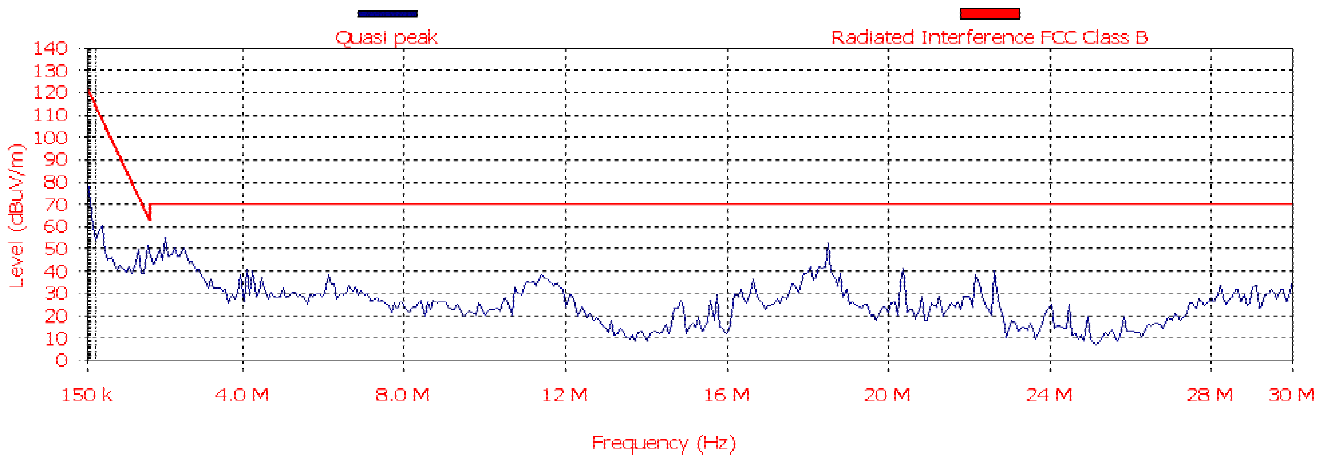


(5) Radiated spurious Emission in restricted band Transmit Frequency **915MHz Antenna-Sect Extern 14db plots 51 - 58i**

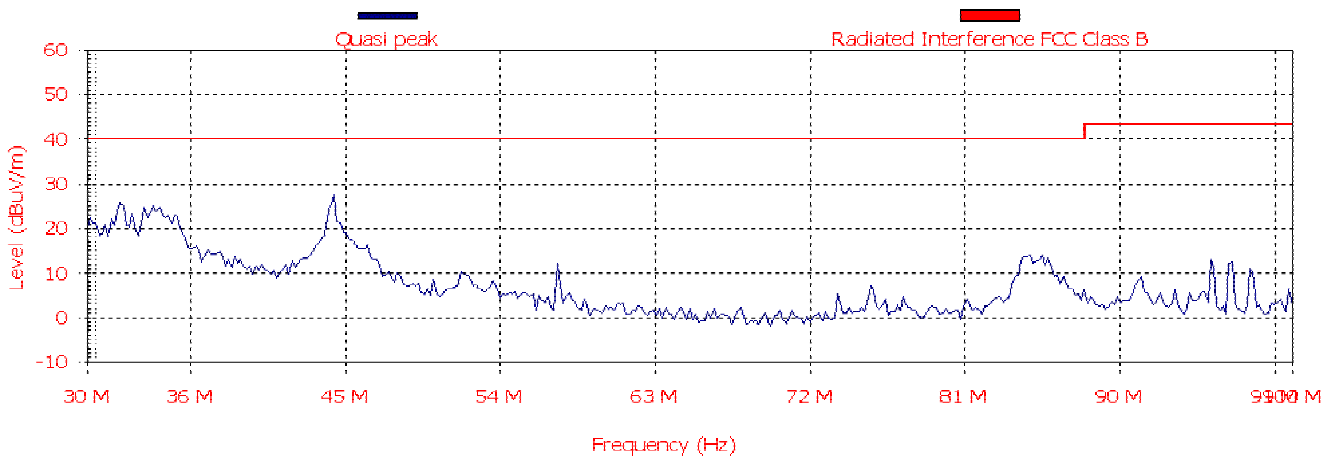
Analyzer setting: VBW-1K, RBW-1MHz, QP detector



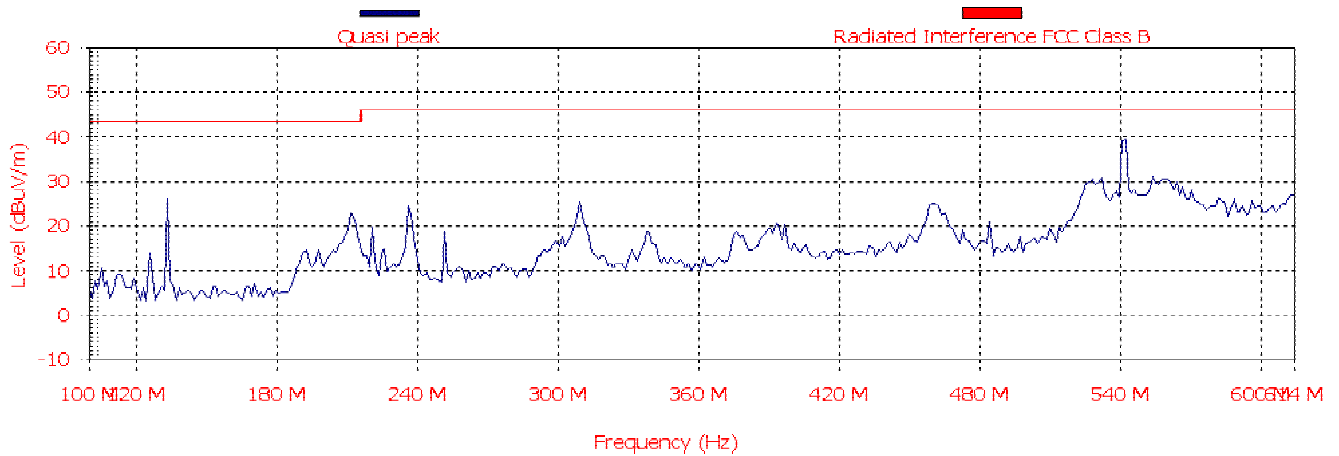
Analyzer setting: VBW-9K, RBW-1MHz, QP detector



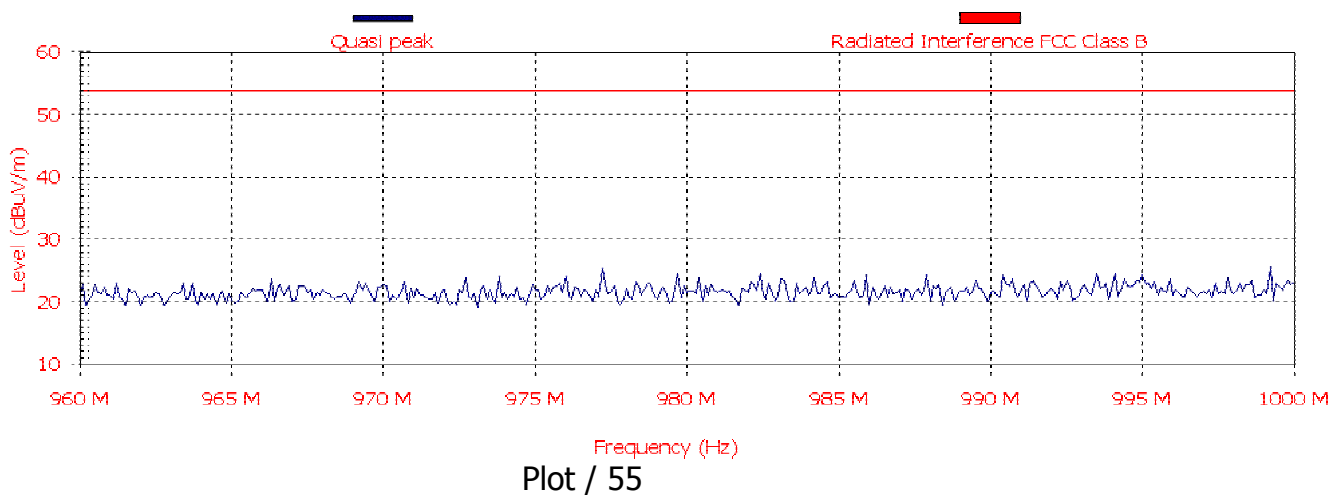
Analyzer setting: VBW-120K, RBW-1MHz, QP detector



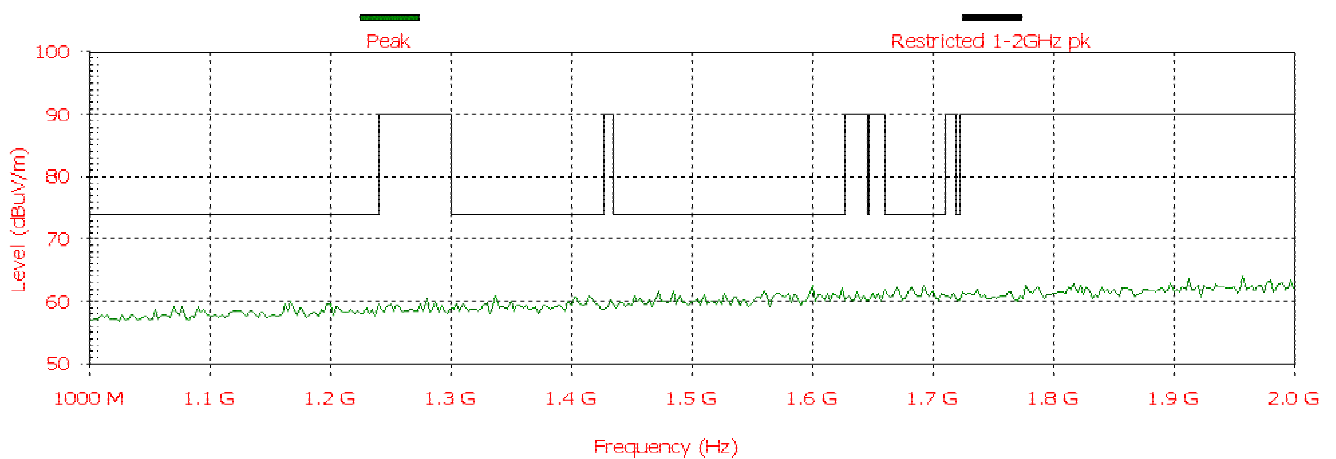
Analyzer setting: VBW-9K, RBW-1MHz, QP detector



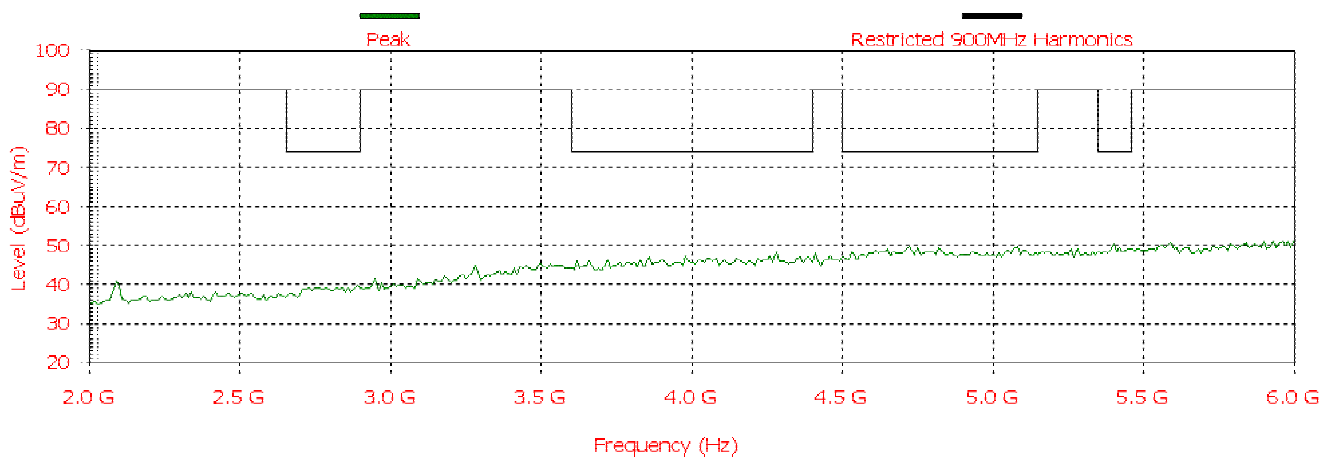
Analyzer setting: VBW-9K, RBW-1MHz, QP detector



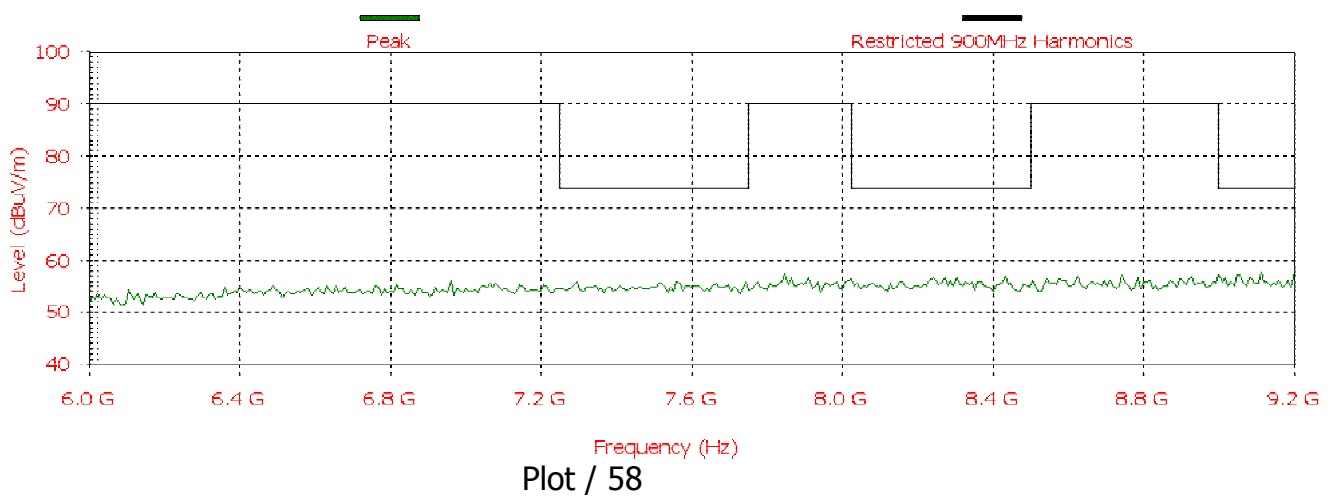
Analyzer setting: VBW-1M, RBW-3MHz, Peak detector



Analyzer setting: VBW-1M, RBW-3MHz, Peak detector

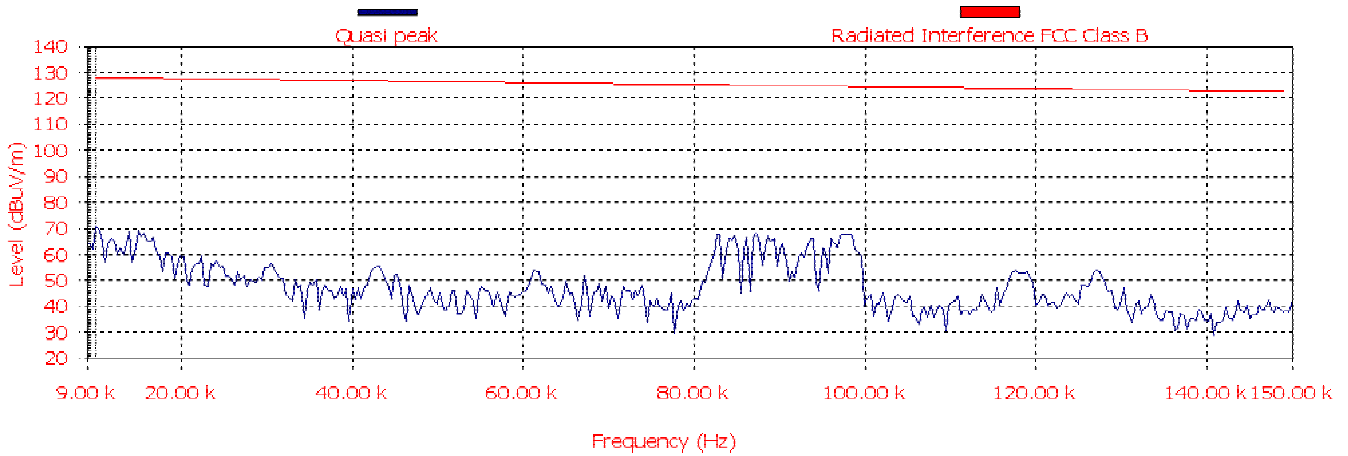


Analyzer setting: VBW-1M, RBW-3MHz, Peak detector



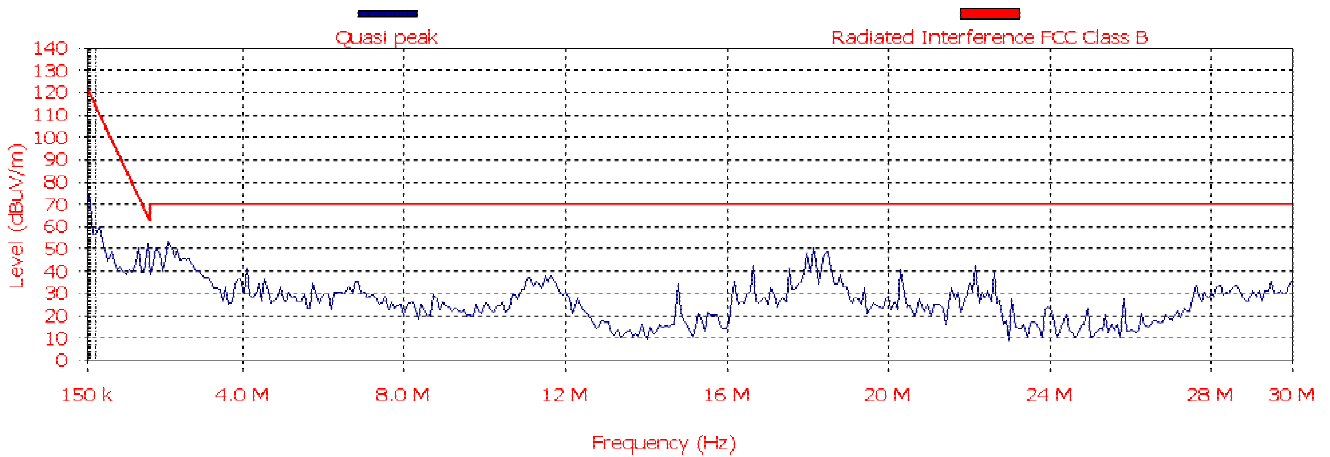
(6) Radiated spurious Emission in restricted band Transmit Frequency **918MHz Antenna-Sect Extern 14dbi plots 59 - 66**

Analyzer setting: VBW-1K, RBW-1MHz, QP detector



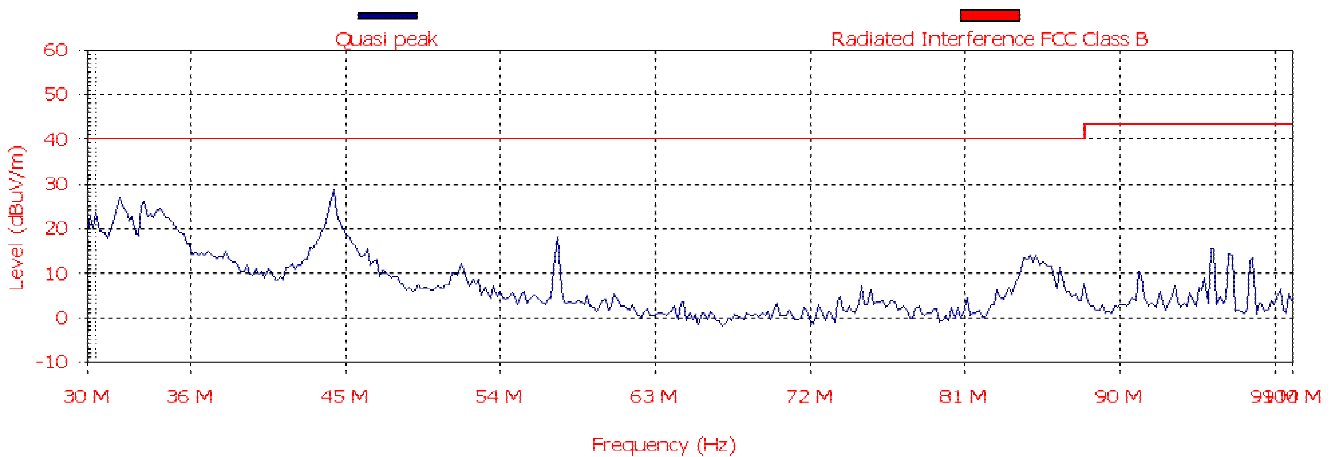
Plot / 59

Analyzer setting: VBW-9K, RBW-1MHz, QP detector



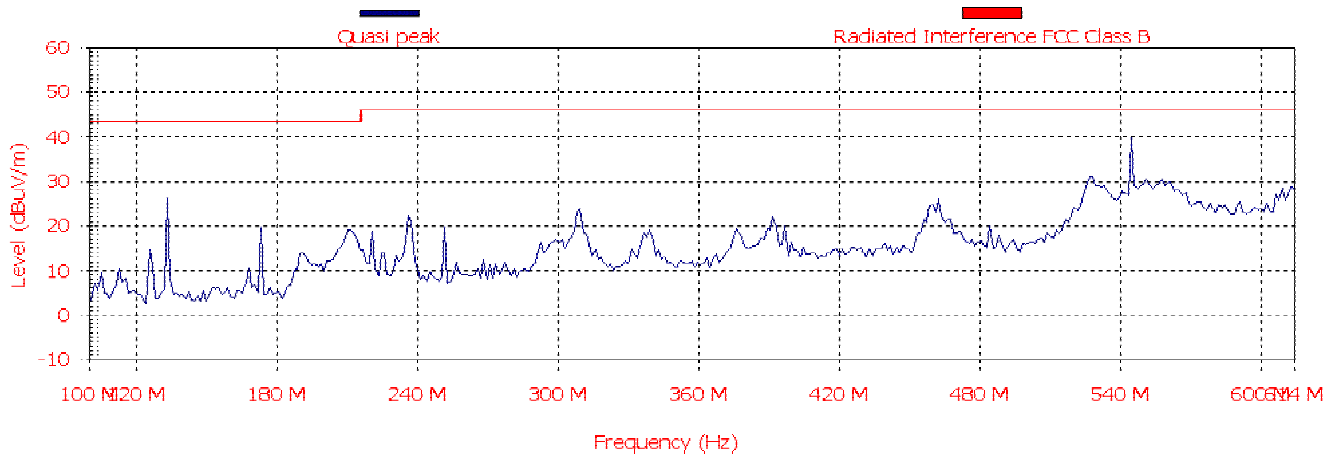
Plot / 60

Analyzer setting: VBW-120K, RBW-1MHz, QP detector

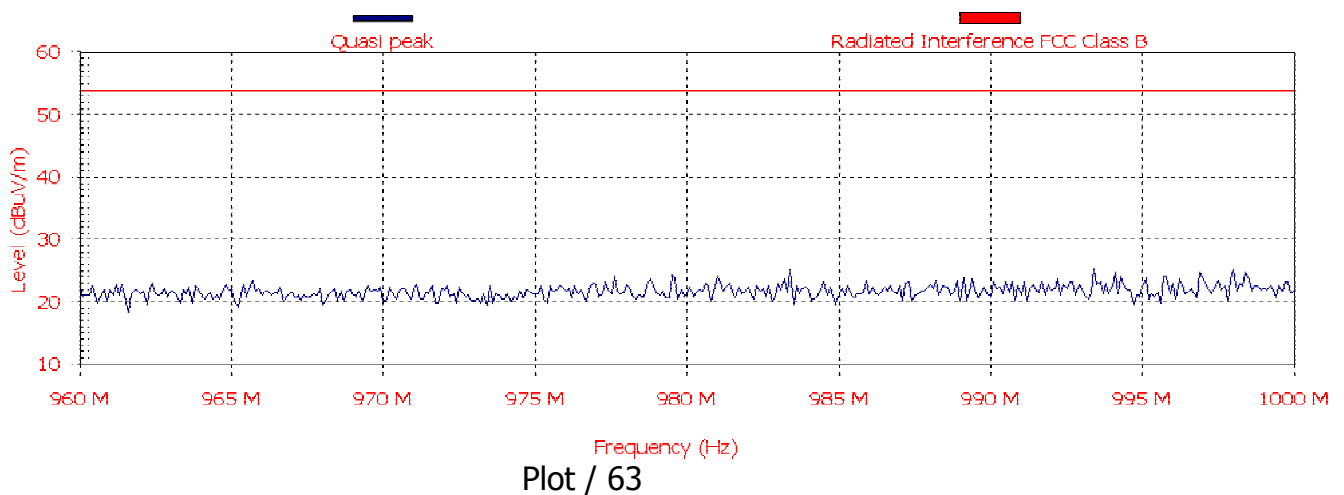


Plot / 61

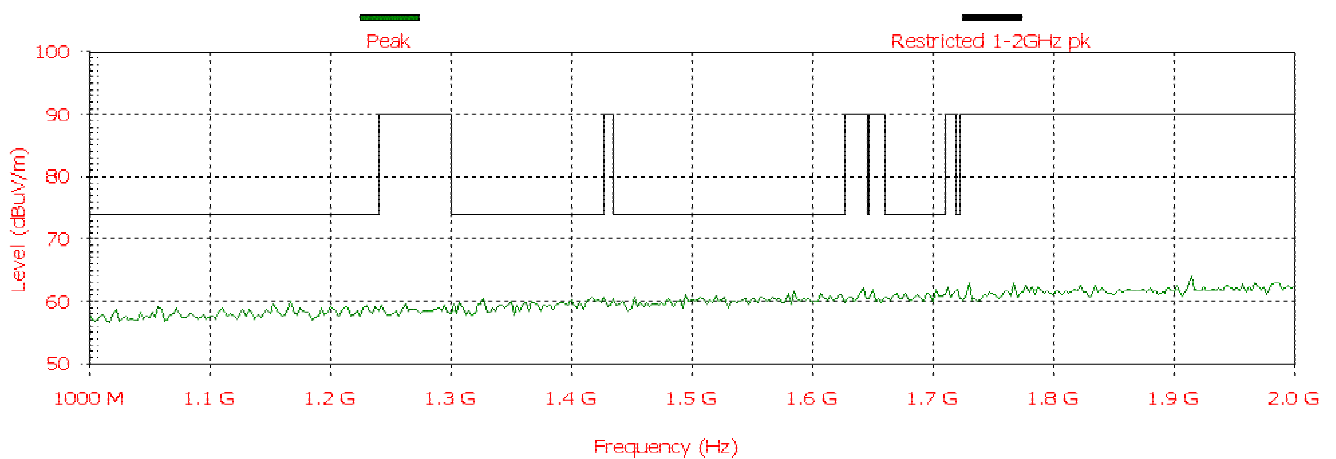
Analyzer setting: VBW-1K, RBW-1MHz, QP detector



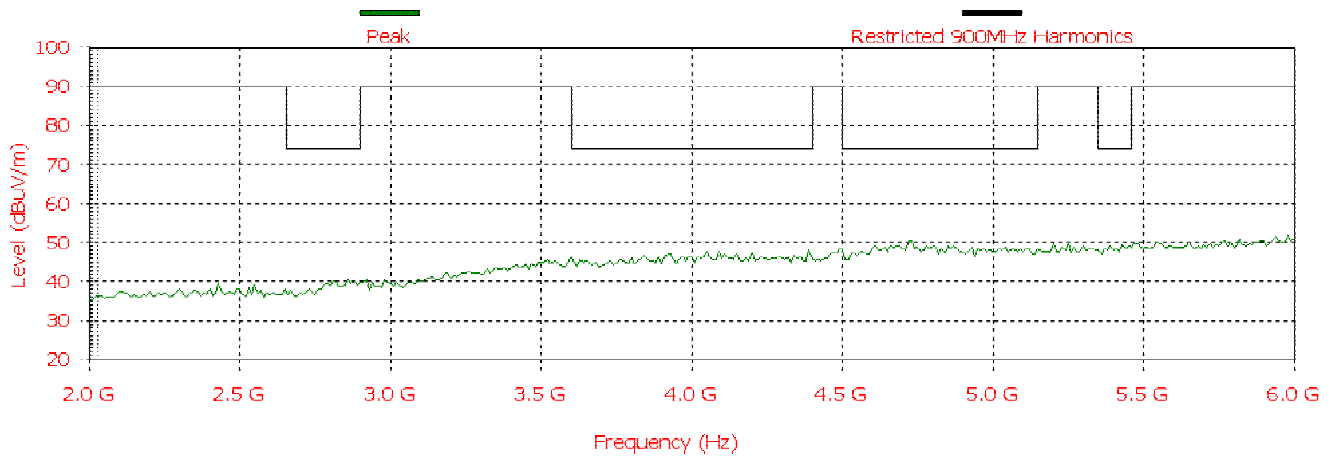
Analyzer setting: VBW-1K, RBW-1MHz, QP detector



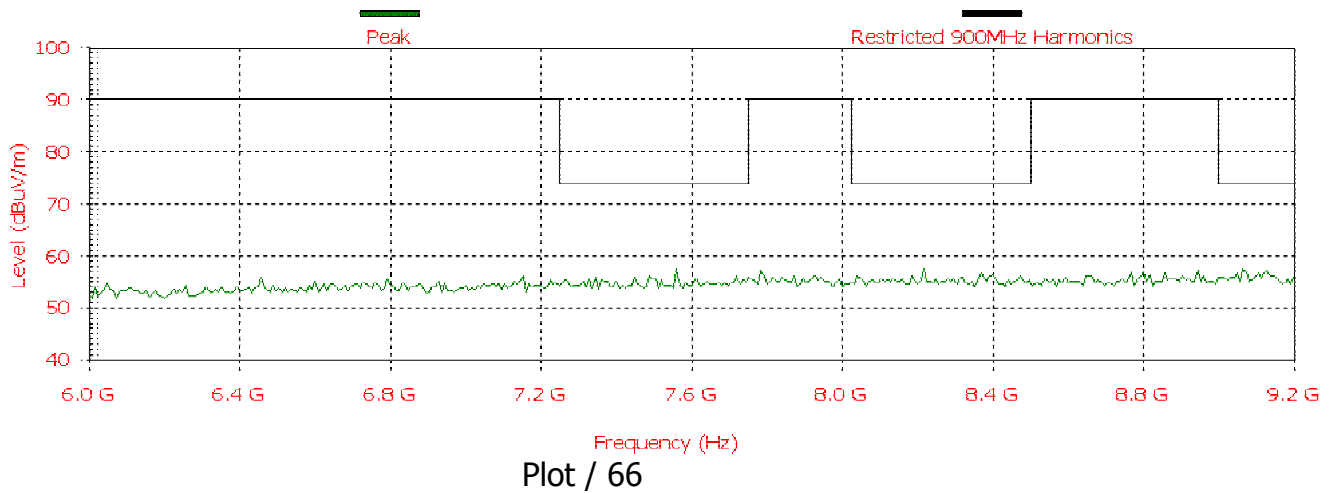
Analyzer setting: VBW-1M, RBW-3MHz, Peak detector



Analyzer setting: VBW-1M, RBW-3MHz, Peak detector

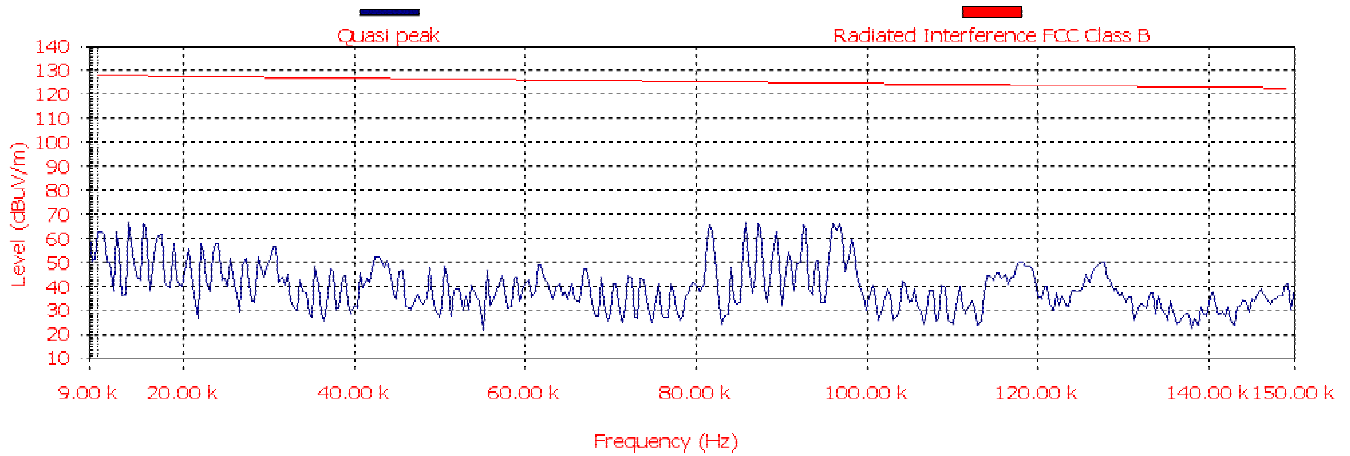


Analyzer setting: VBW-1M, RBW-3MHz, Peak detector



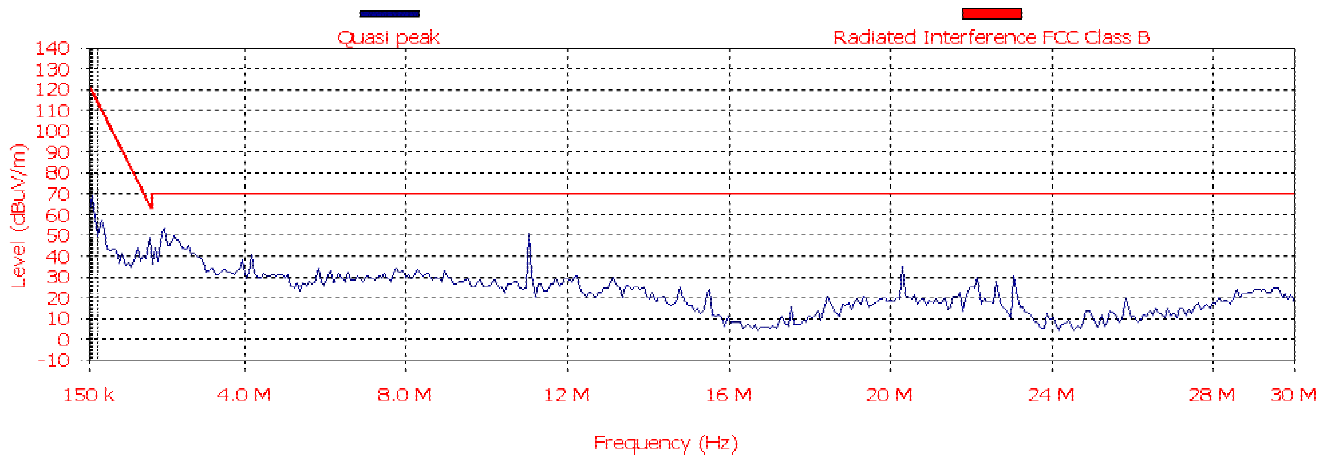
(7) Radiated spurious Emission in restricted band Transmit Frequency **912MHz Antenna-Sq**
Extern 12.5dbi plots 67 - 73

Analyzer setting: VBW-1K, RBW-1MHz, QP detector



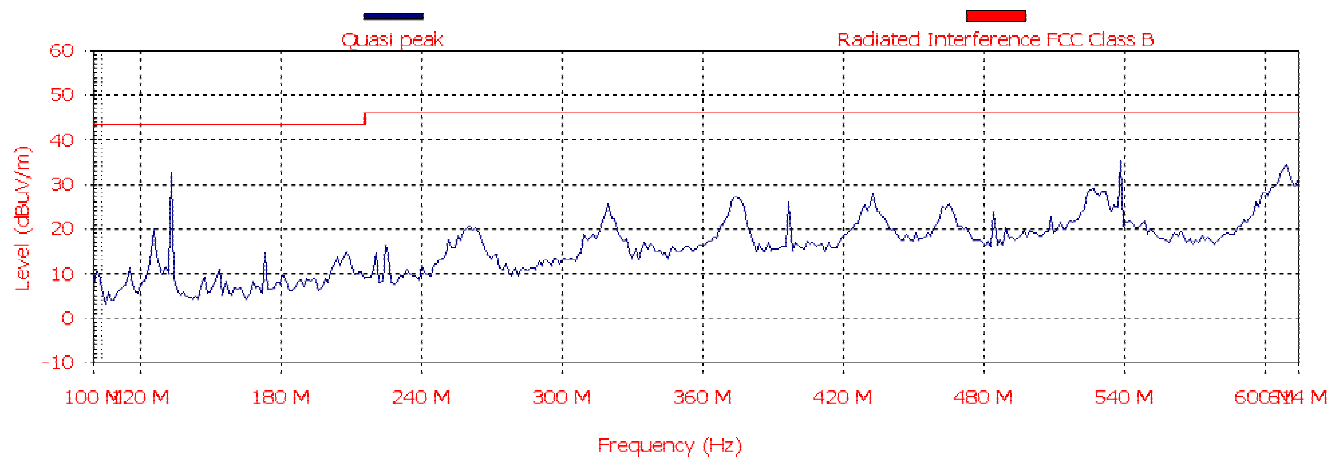
Plot / 67

Analyzer setting: VBW-9K, RBW-1MHz, QP detector



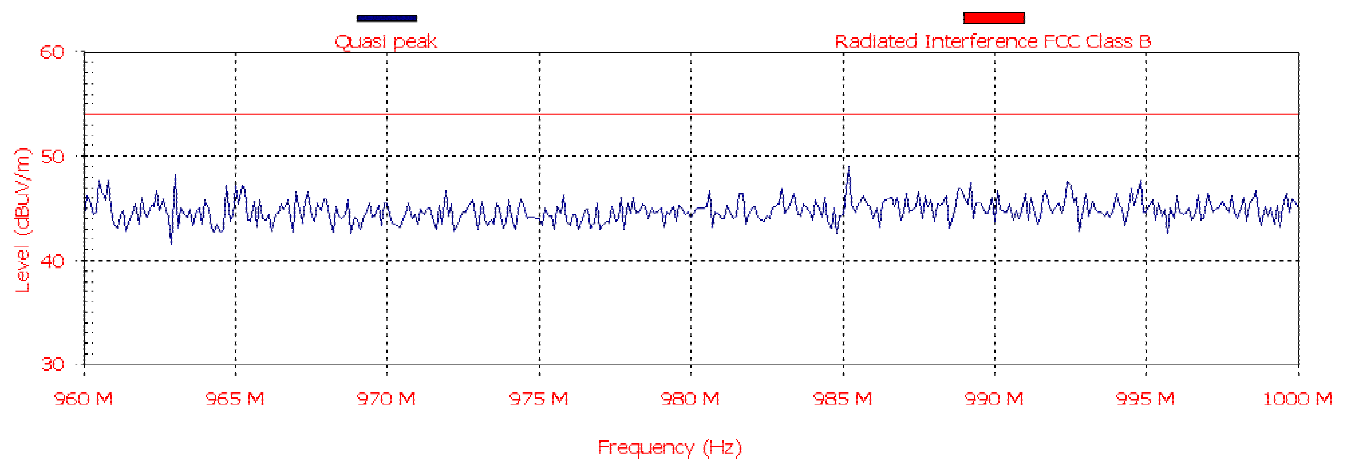
Plot / 68

Analyzer setting: VBW-120K, RBW-1MHz, QP detector



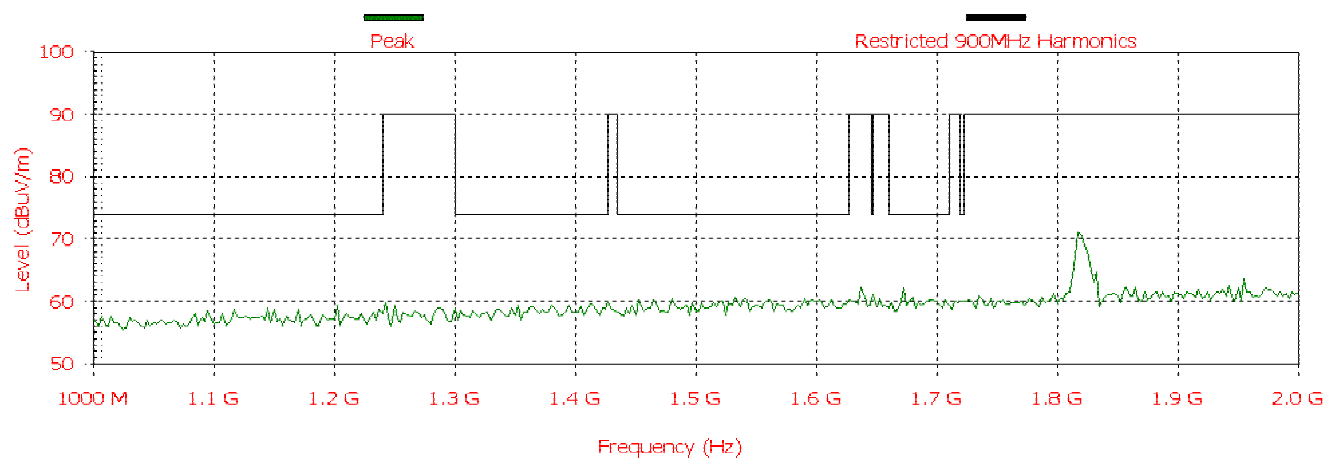
Plot / 69

Analyzer setting: VBW-120K, RBW-1MHz, QP detector



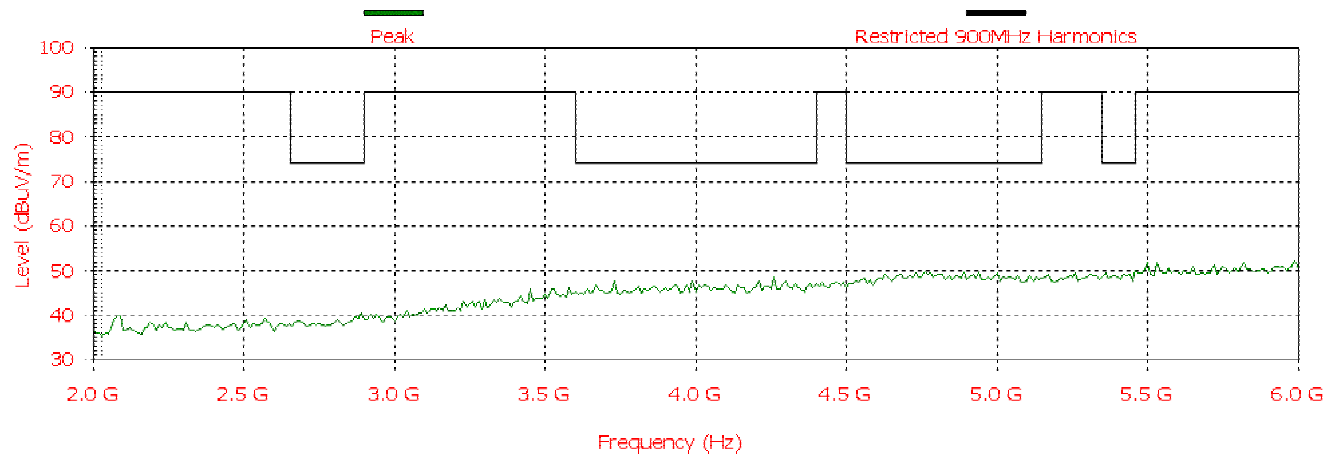
Plot / 70

Analyzer setting: VBW-1M, RBW-3MHz, Peak detector



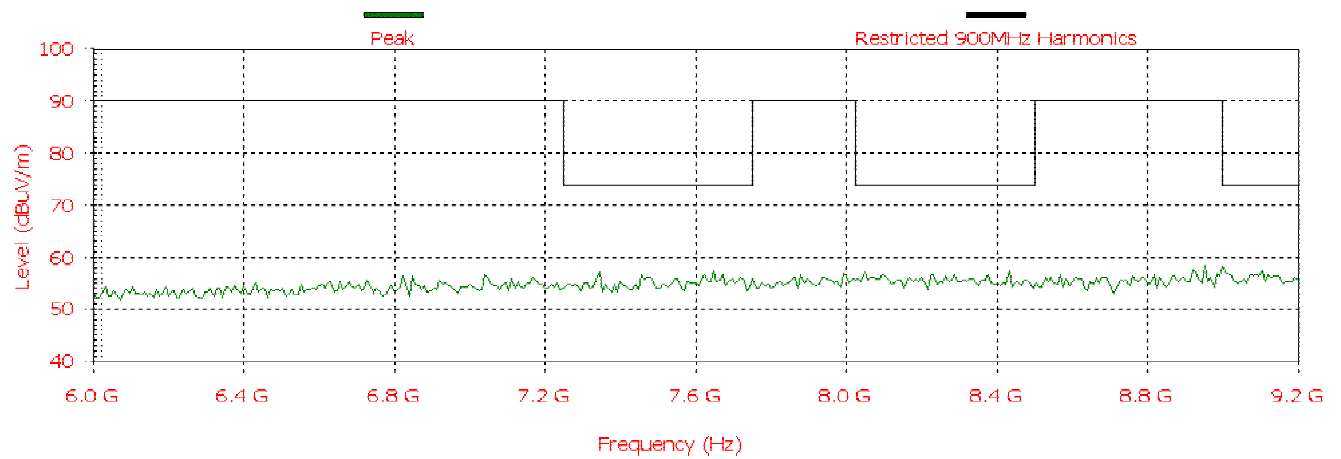
Plot / 71

Analyzer setting: VBW-1M, RBW-3MHz, Peak detector



Plot / 72

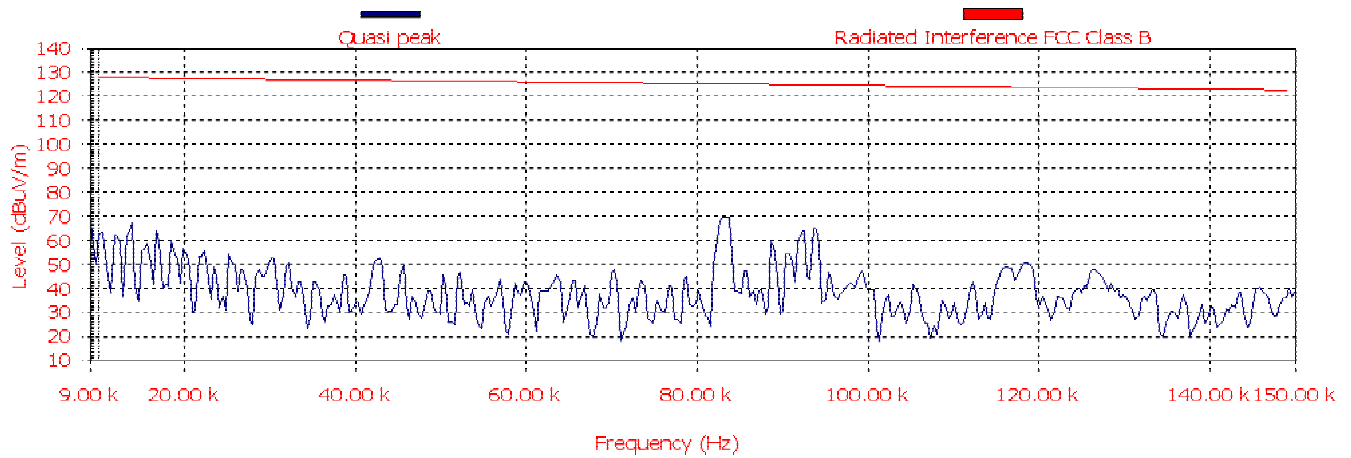
Analyzer setting: VBW-1M, RBW-3MHz, Peak detector



Plot / 73

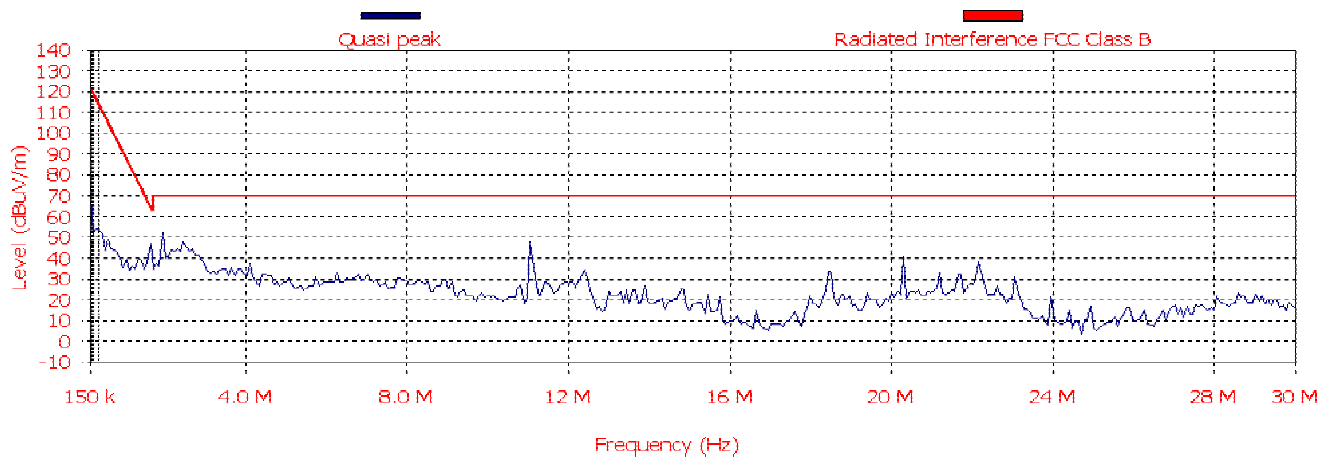
(8) Radiated spurious Emission in restricted band Transmit Frequency **915MHz Antenna-Sq**
Extern 12.5dbi plots 74 - 80

Analyzer setting: VBW-1K, RBW-1MHz, QP detector



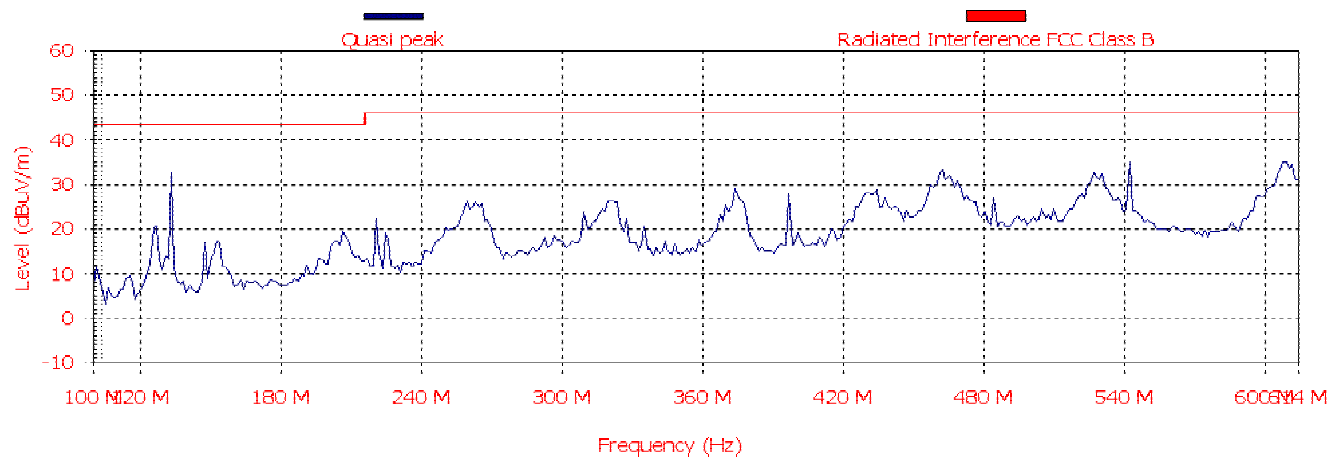
Plot / 74

Analyzer setting: VBW-9K, RBW-1MHz, QP detector



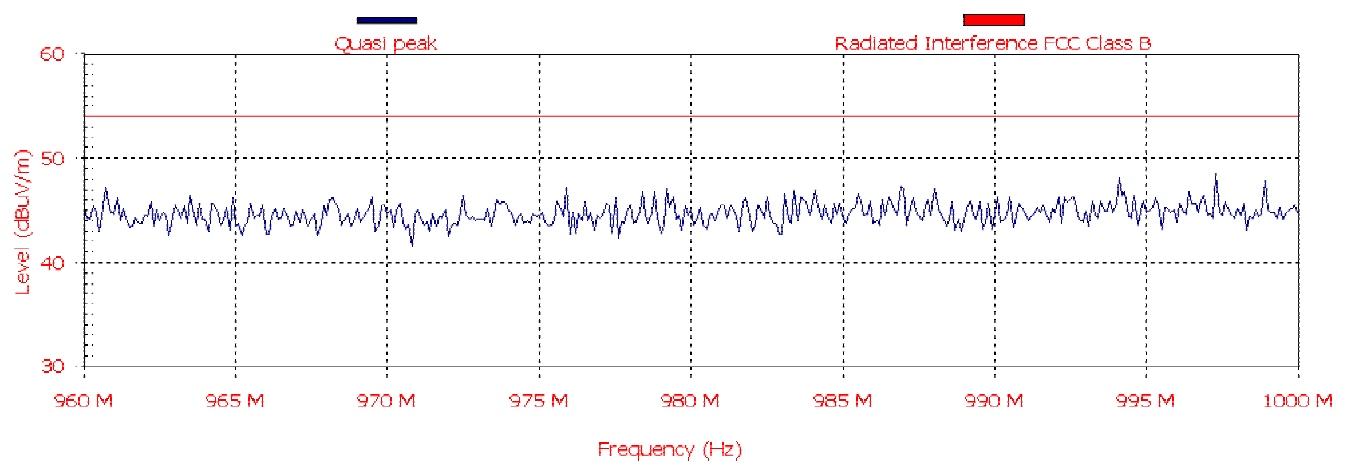
Plot / 75

Analyzer setting: VBW-120K, RBW-1MHz, QP detector



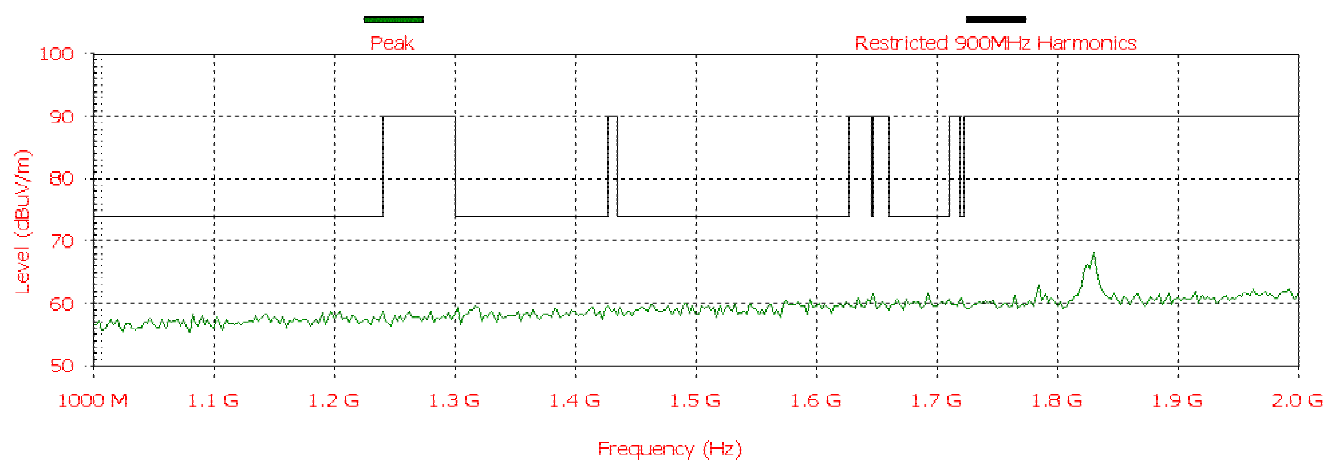
Plot / 76

Analyzer setting: VBW-120K, RBW-1MHz, QP detector



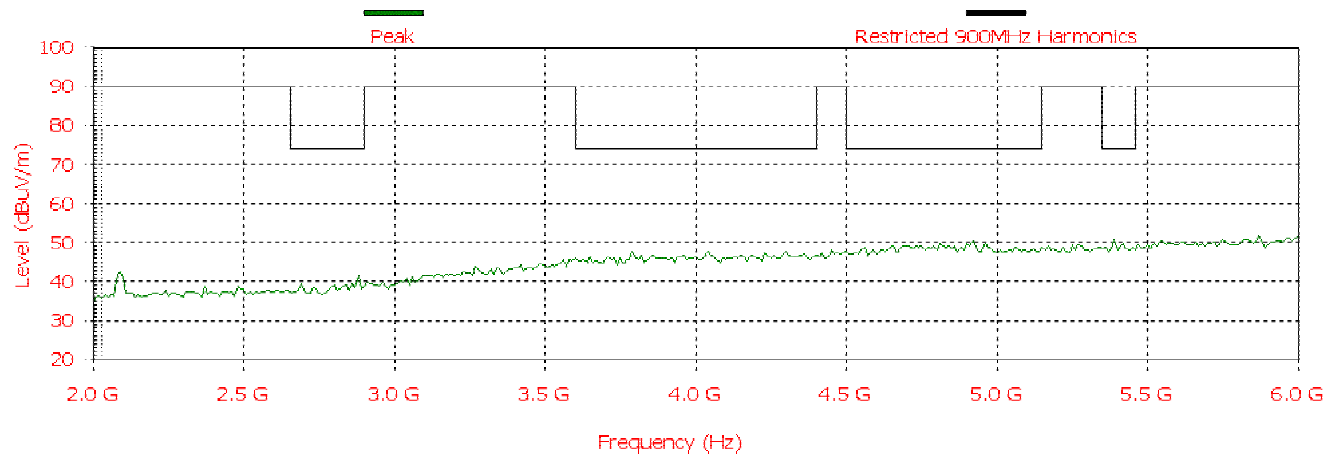
Plot / 77

Analyzer setting: VBW-1M, RBW-3MHz, Peak detector



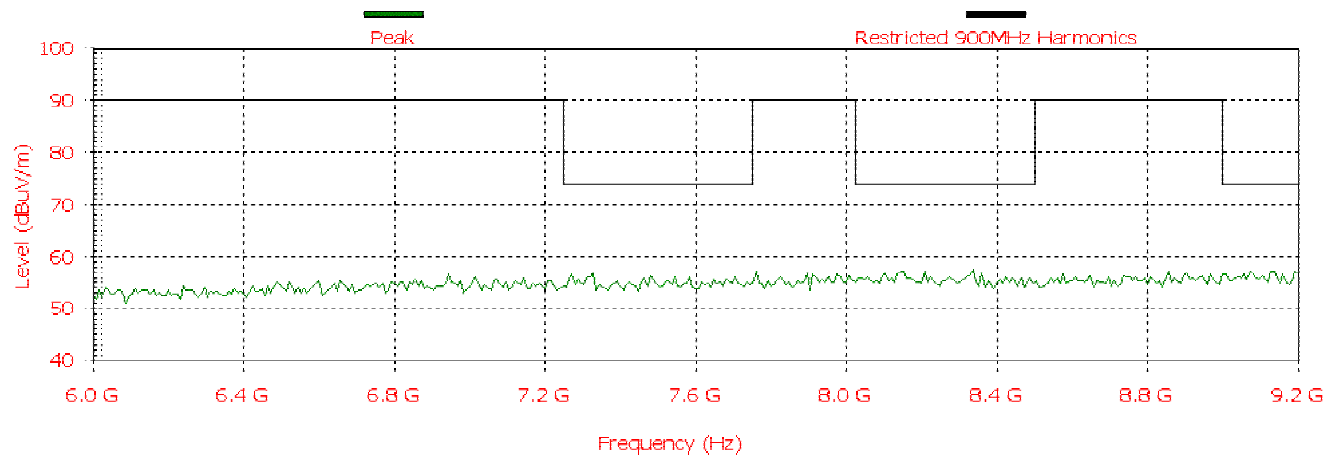
Plot / 78

Analyzer setting: VBW-1M, RBW-3MHz, Pea detector



Plot / 79

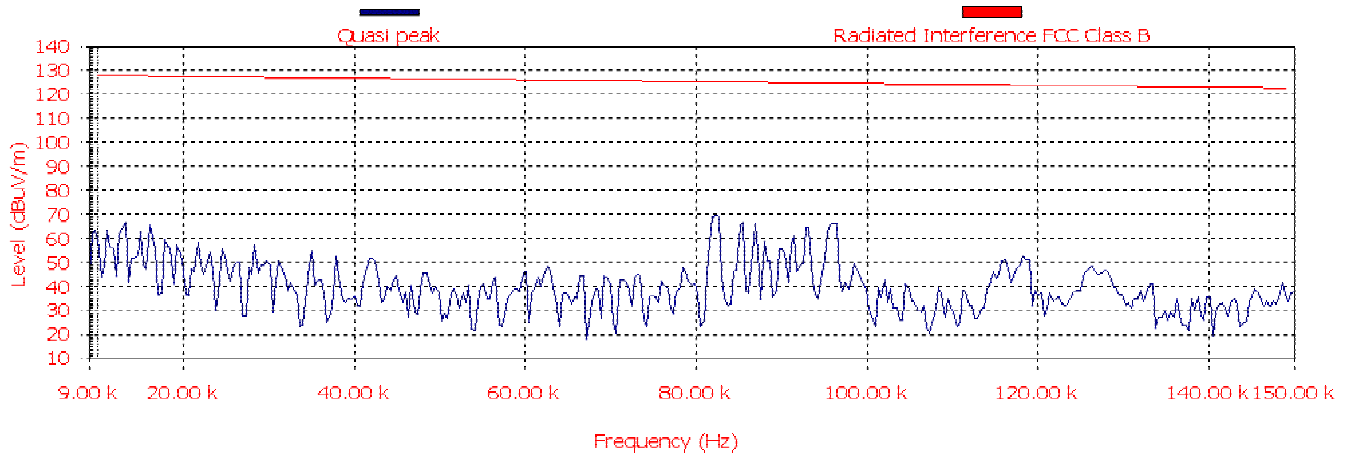
Analyzer setting: VBW-1M, RBW-3MHz, Peak detector



Plot / 80

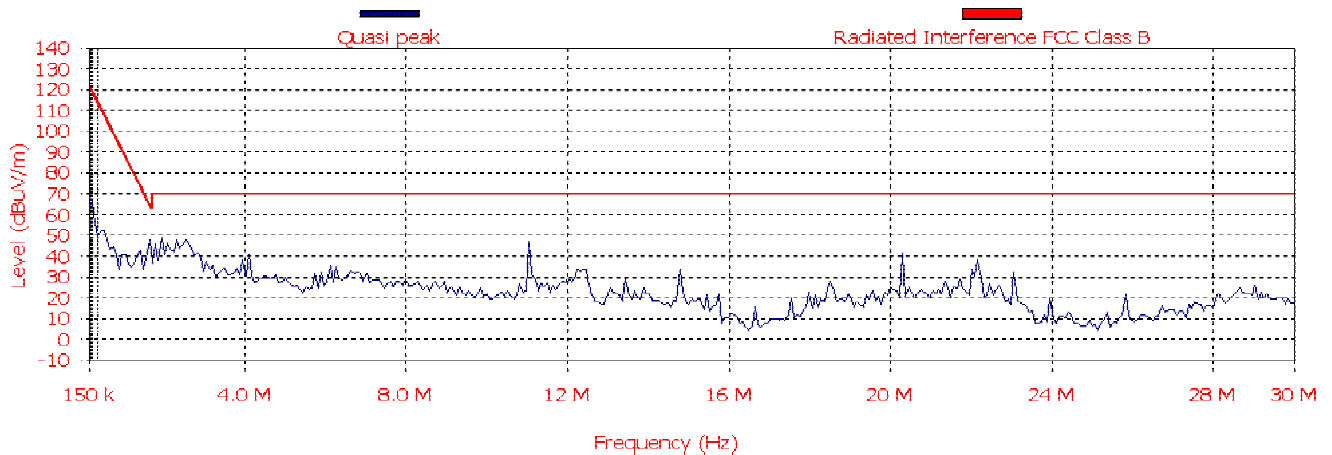
(9) Radiated spurious Emission in restricted band Transmit Frequency **918MHz Antenna-Sq**
Extern 12.5dbi plots 81 - 87

Analyzer setting: VBW-1K, RBW-1MHz, QP detector



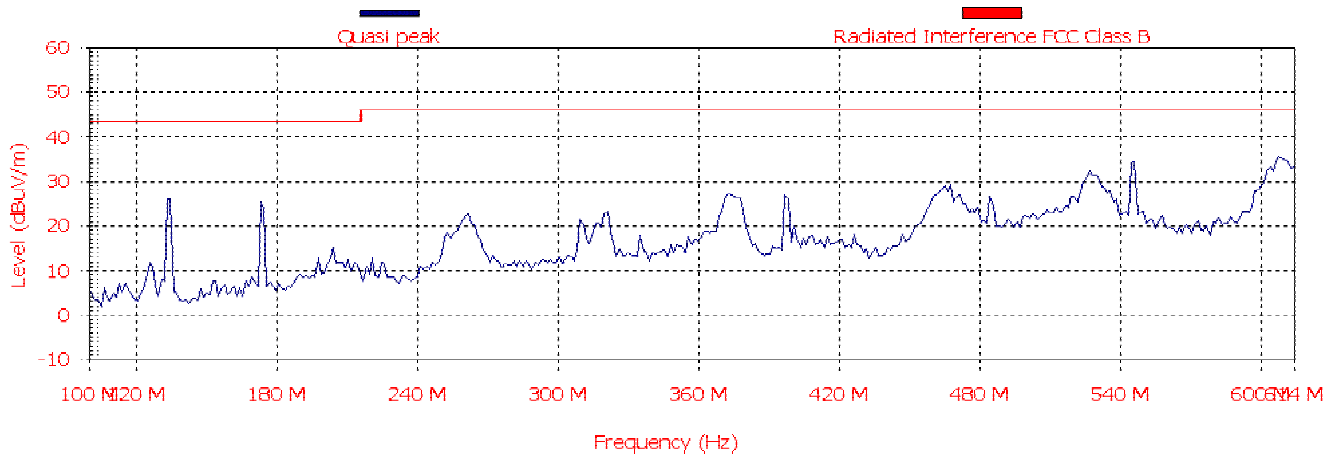
Plot / 81

Analyzer setting: VBW-9K, RBW-1MHz, QP detector

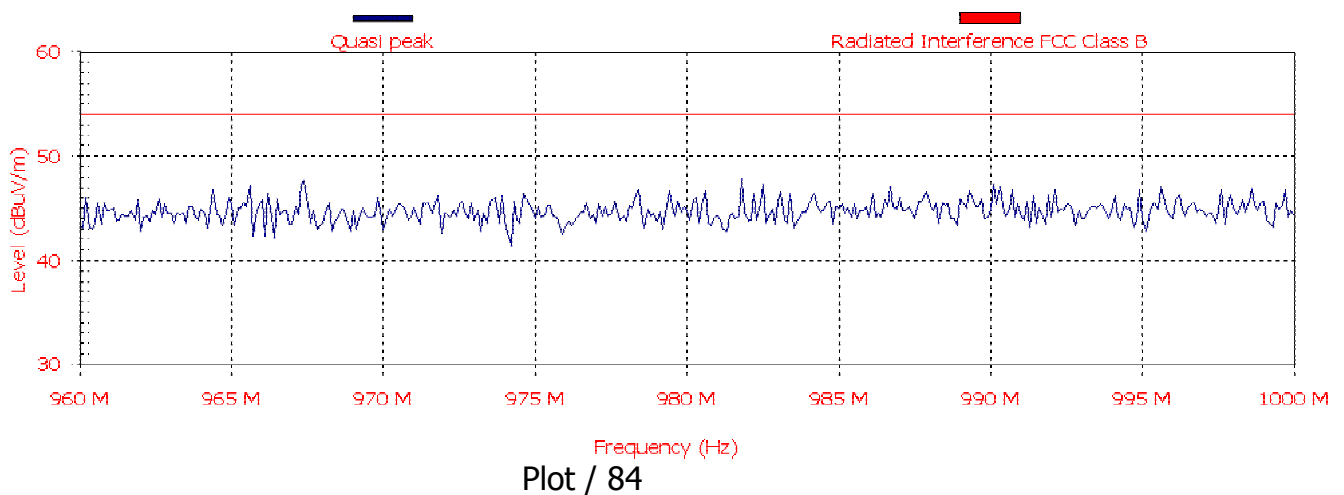


Plot / 82

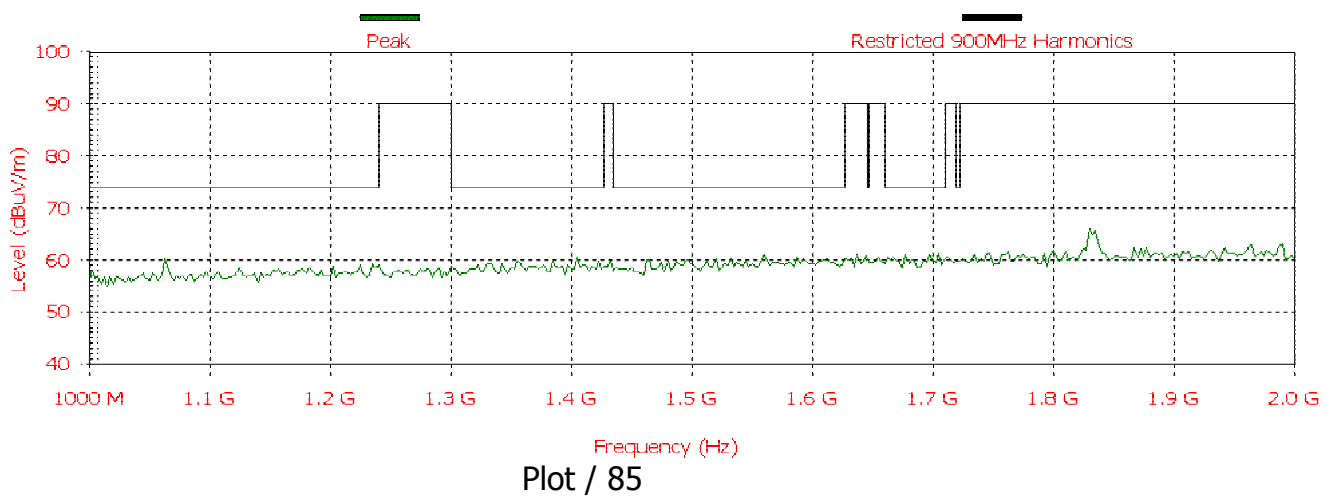
Analyzer setting: VBW-120K, RBW-1MHz, QP detector



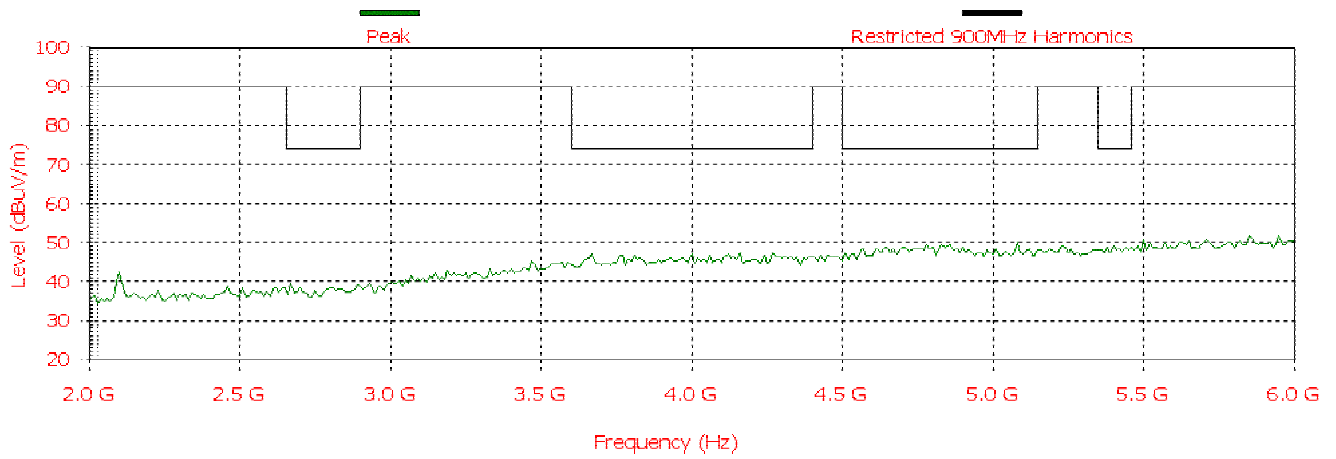
Analyzer setting: VBW-120K, RBW-1MHz, QP detector



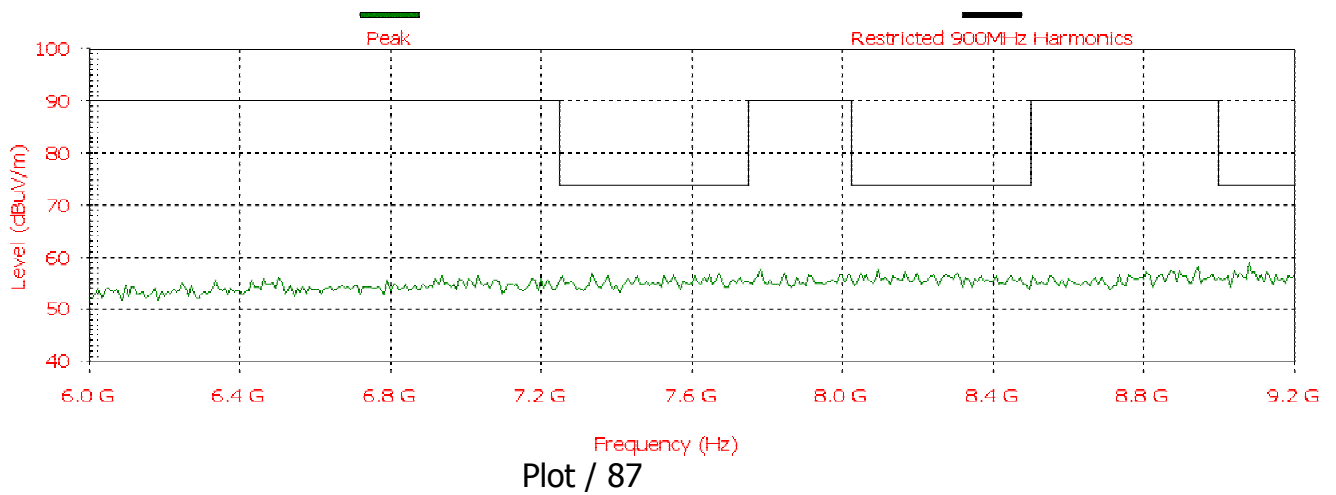
Analyzer setting: VBW-1M, RBW-3MHz, Peak detector



Analyzer setting: VBW-1M, RBW-3MHz, Peak detector

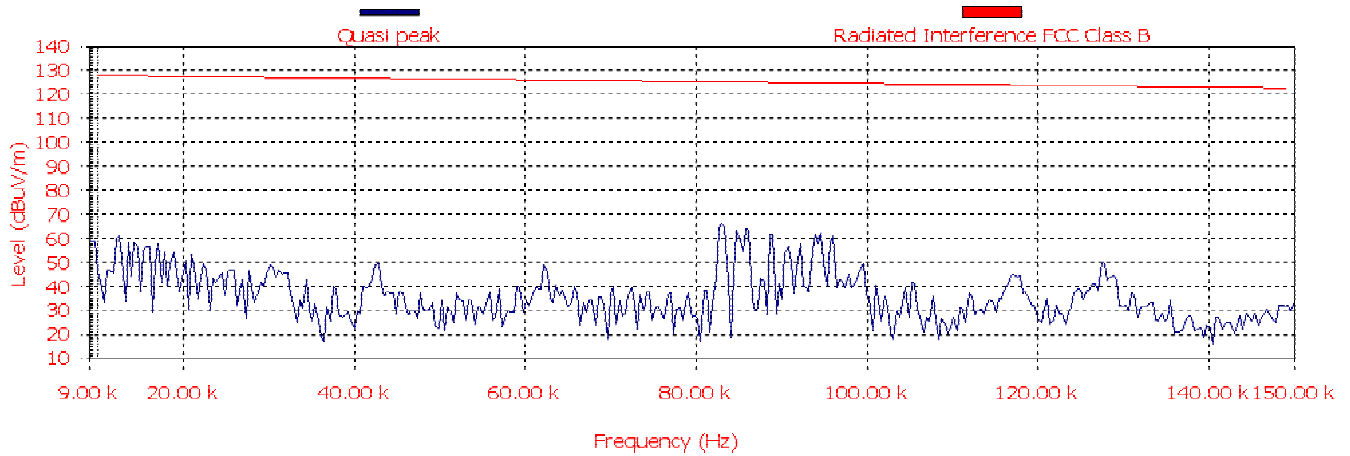


Analyzer setting: VBW-1M, RBW-3MHz, Peak detector

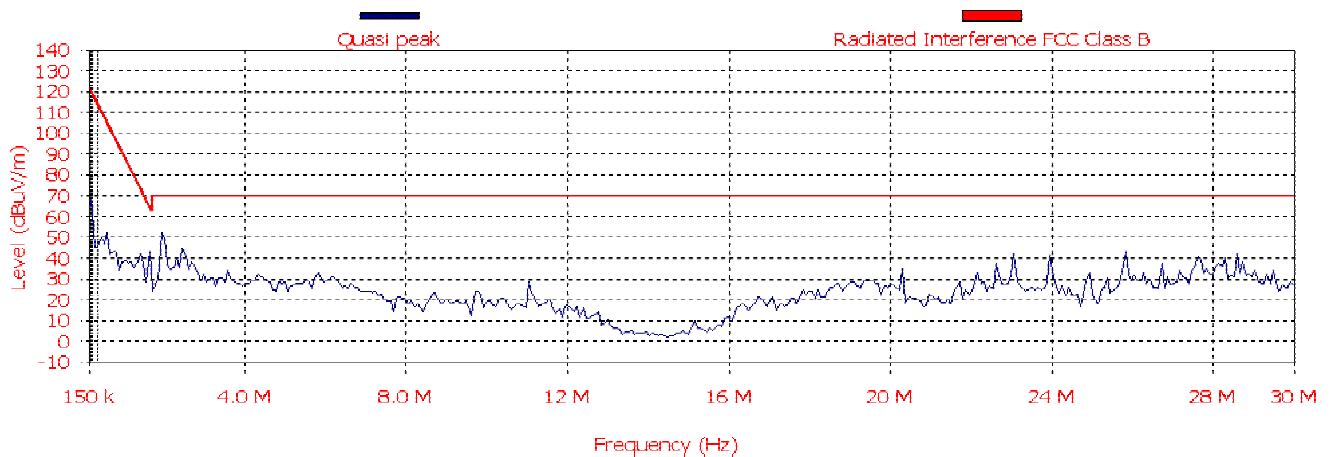


(10) Radiated spurious Emission in restricted band Transmit Frequency **912MHz Antenna-Omni 8dbi plots 88 - 95**

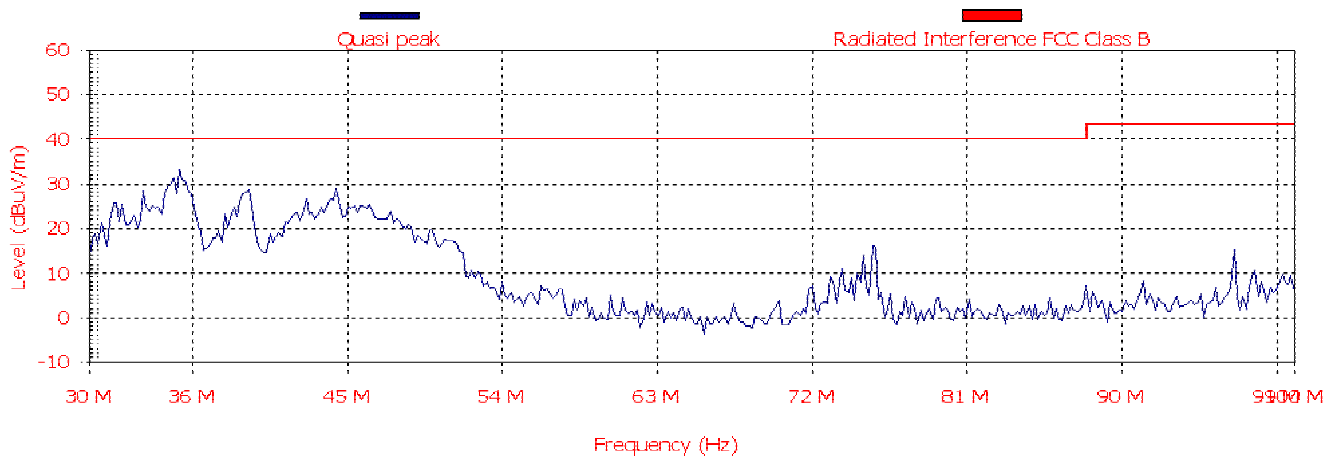
Analyzer setting: VBW-1K, RBW-1MHz, QP detector



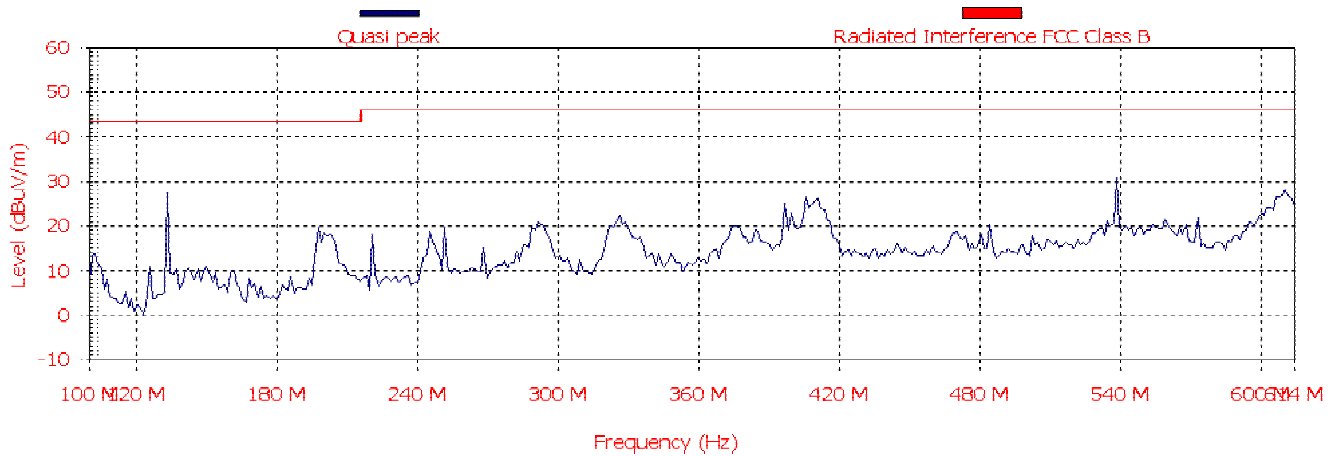
Analyzer setting: VBW-9K, RBW-1MHz, QP detector



Analyzer setting: VBW-120K, RBW-1MHz, QP detector

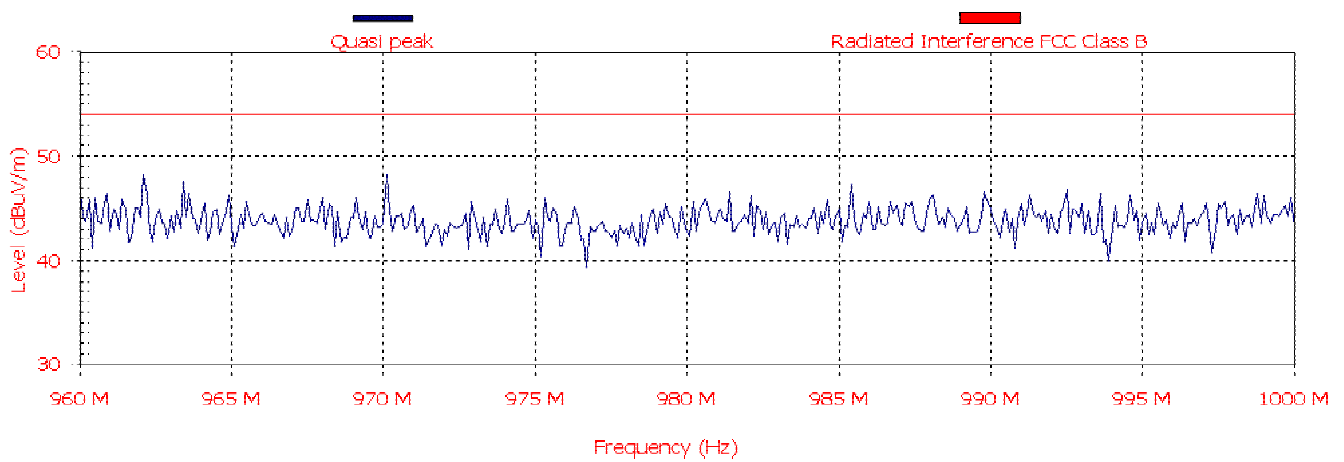


Analyzer setting: VBW-120K, RBW-1MHz, QP detector



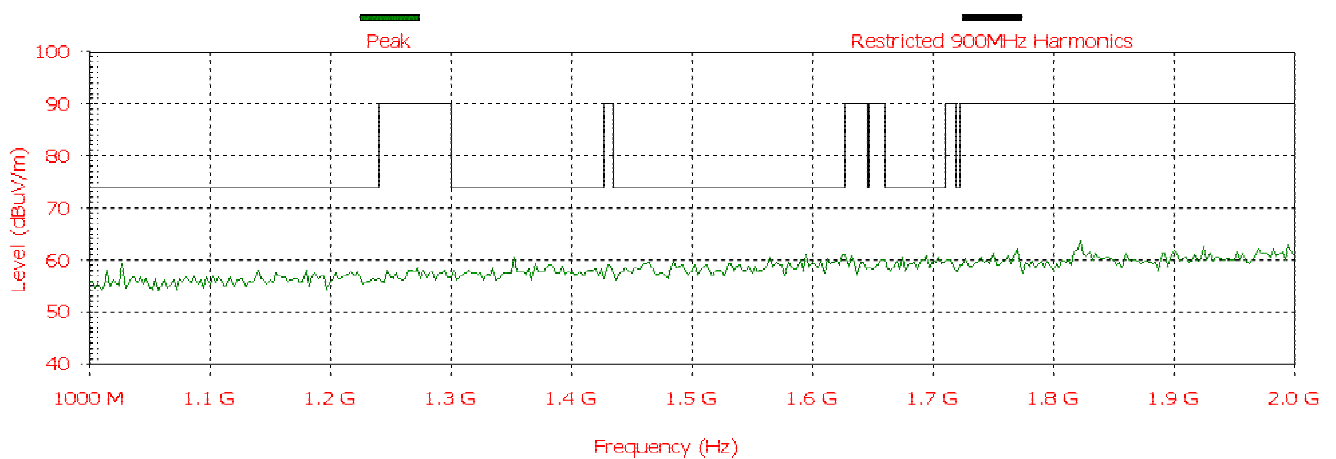
Plot / 91

Analyzer setting: VBW-120K, RBW-1MHz, QP detector



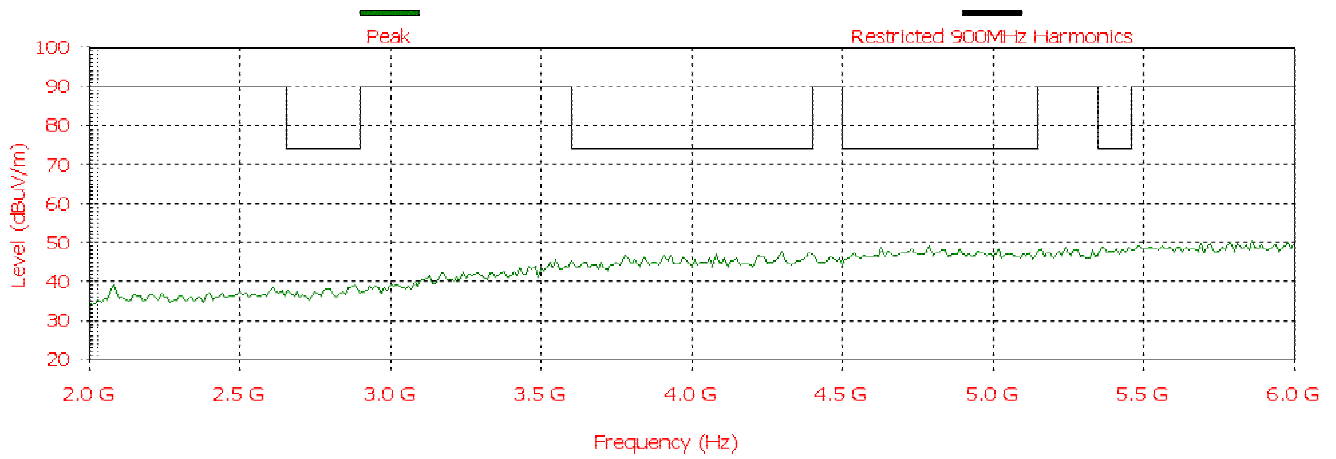
Plot / 92

Analyzer setting: VBW-1M, RBW-3MHz, Peak detector

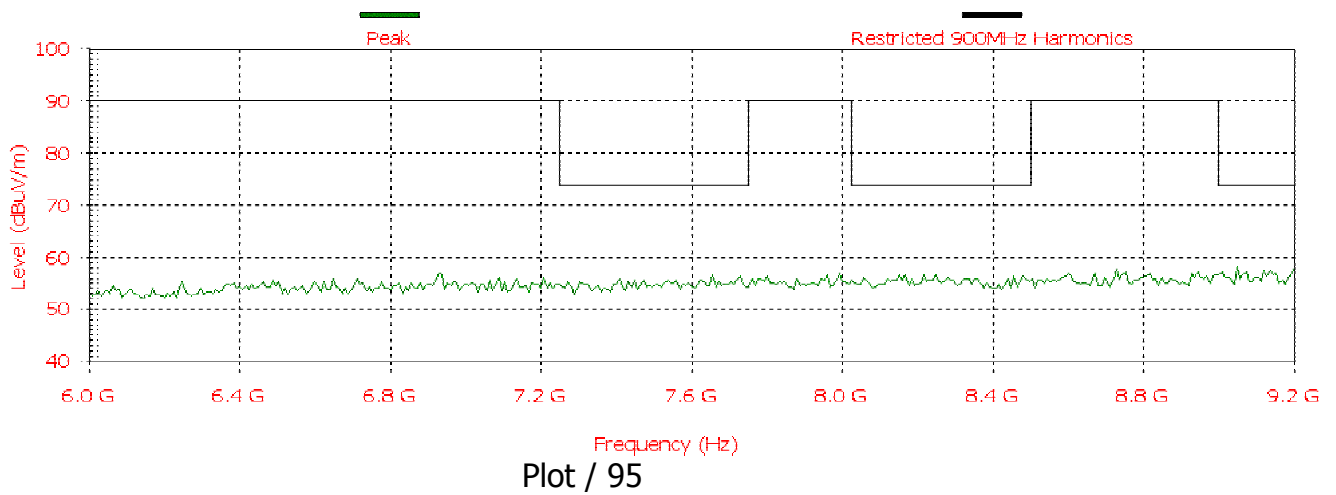


Plot / 93

Analyzer setting: VBW-1M, RBW-3MHz, Peak detector

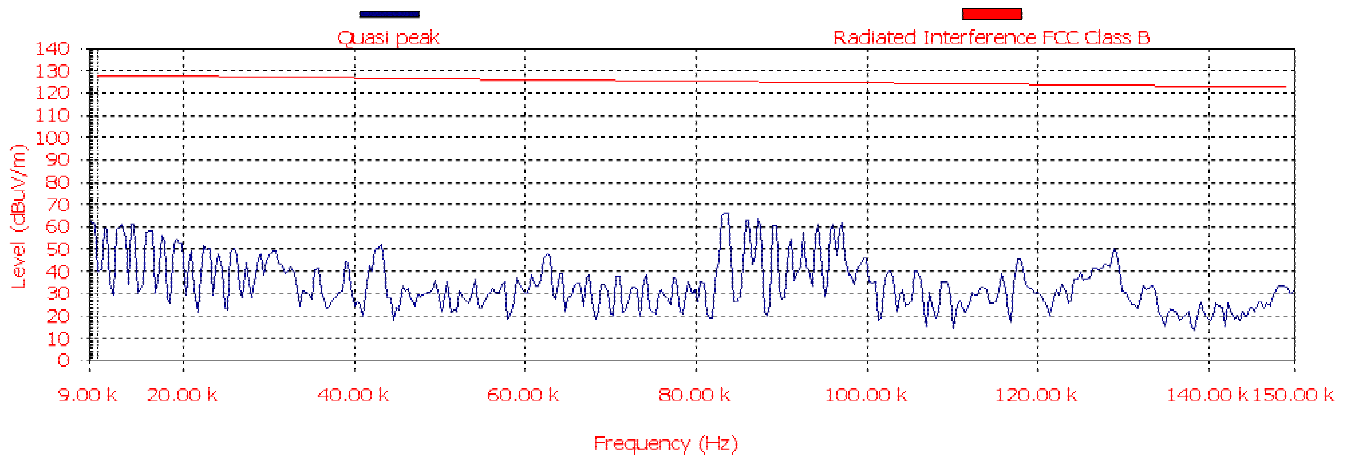


Analyzer setting: VBW-1M, RBW-3MHz, Peak detector



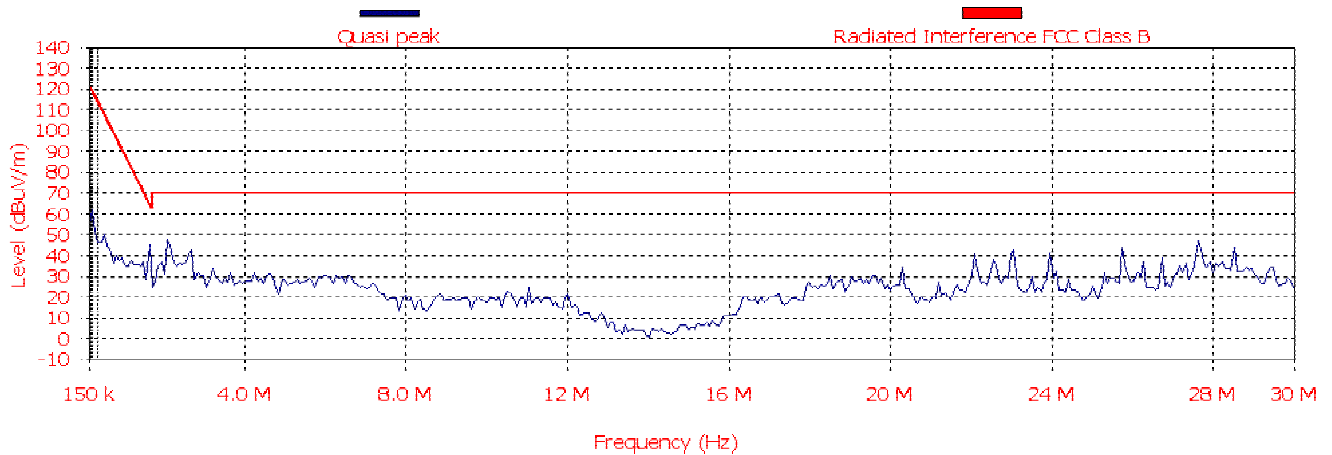
(11) Radiated spurious Emission in restricted band Transmit Frequency **915MHz Antenna-Omni 8dbi plots 96 - 103**

Analyzer setting: VBW-1K, RBW-1MHz, QP detector



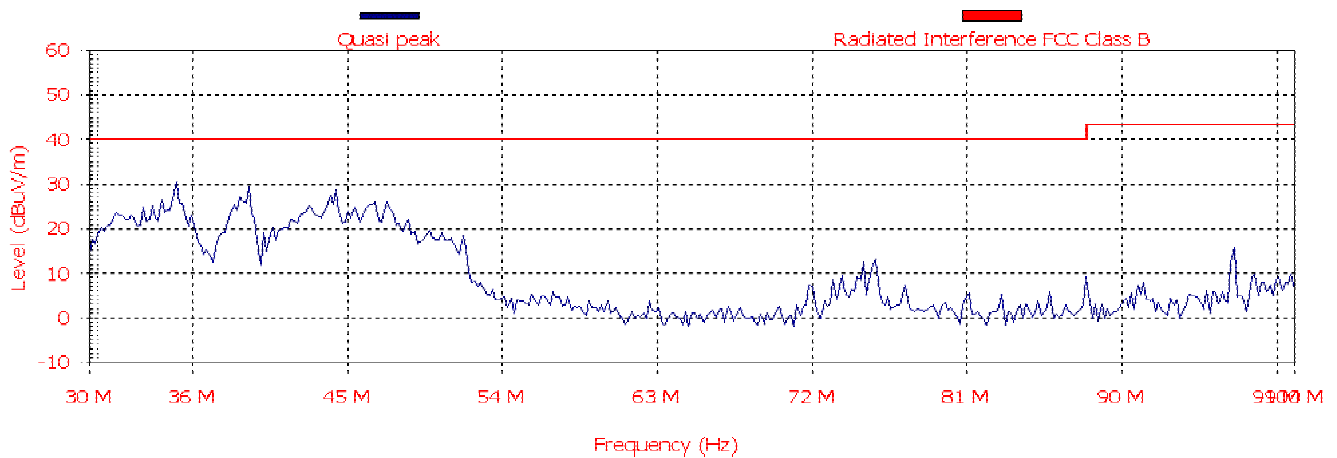
Plot / 96

Analyzer setting: VBW-9K, RBW-9MHz, QP detector



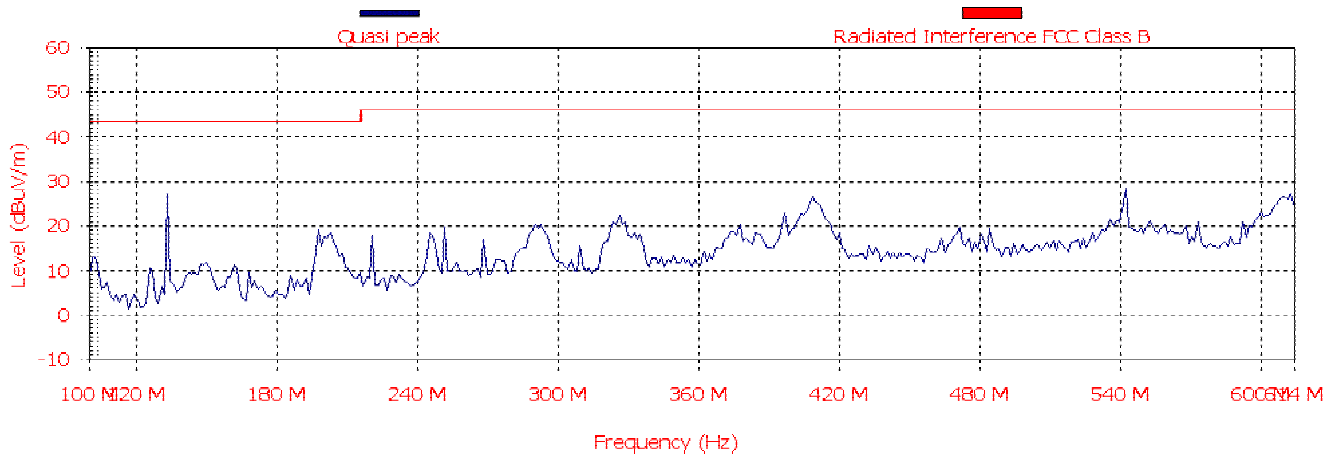
Plot / 97

Analyzer setting: VBW-120K, RBW-1MHz, QP detector

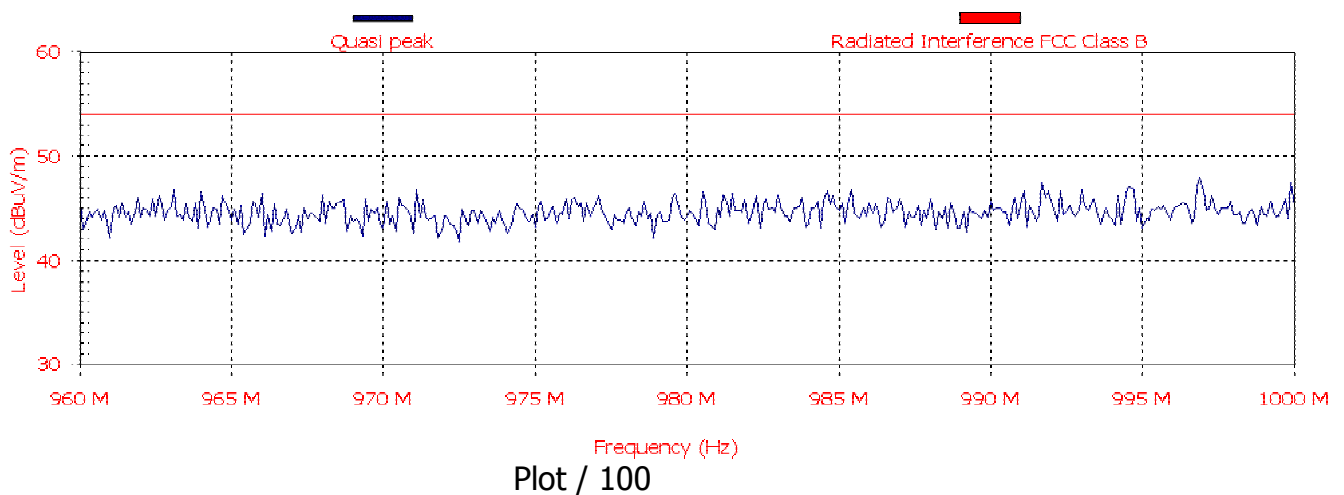


Plot / 98

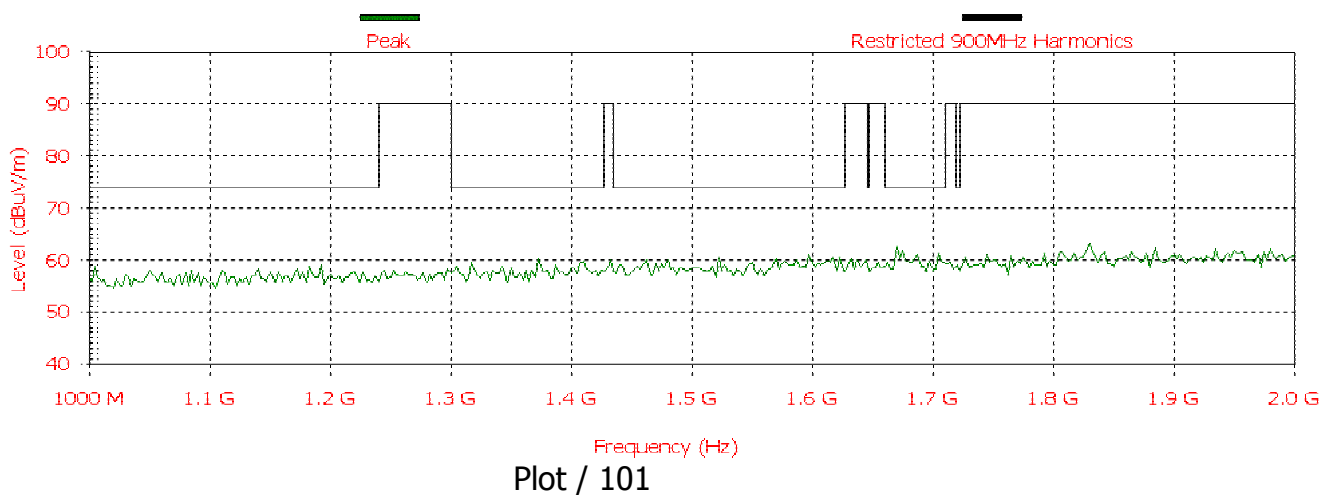
Analyzer setting: VBW-120K, RBW-1MHz, QP detector



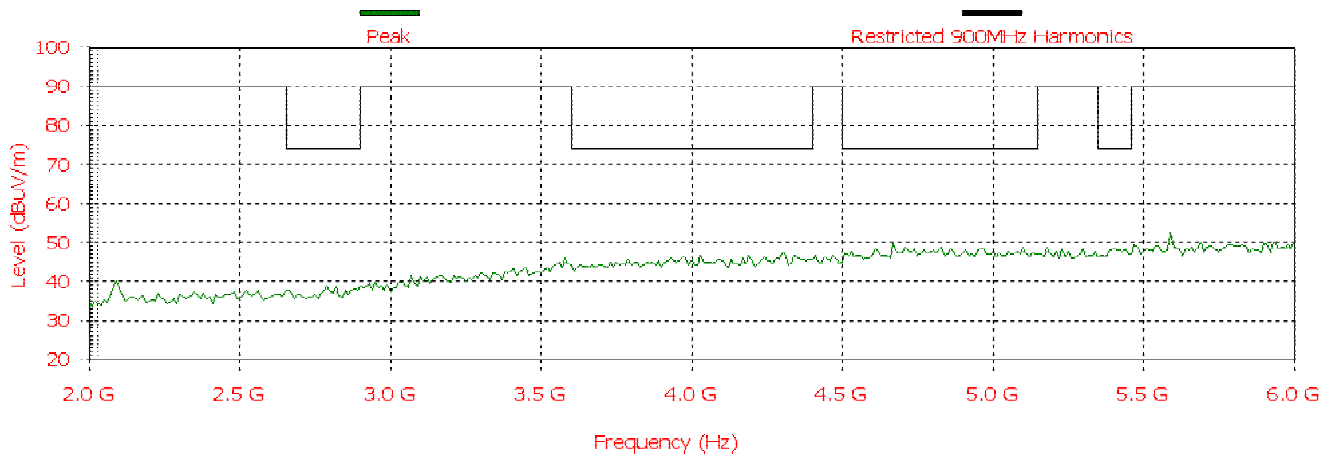
Analyzer setting: VBW-120K, RBW-1MHz, QP detector



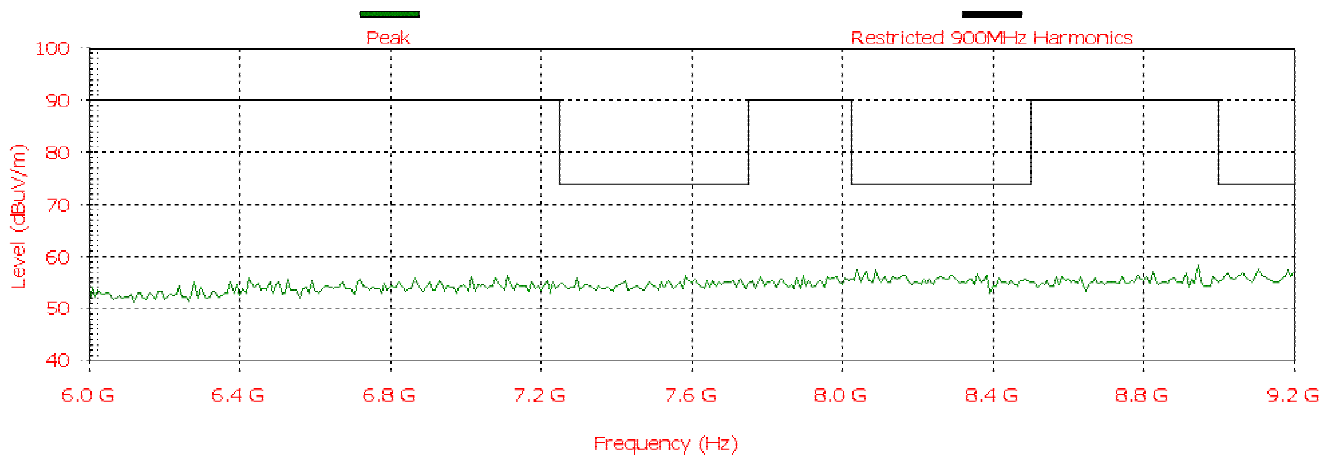
Analyzer setting: VBW-1M, RBW-3MHz, Peak detector



Analyzer setting: VBW-1M, RBW-3MHz, Peak detector

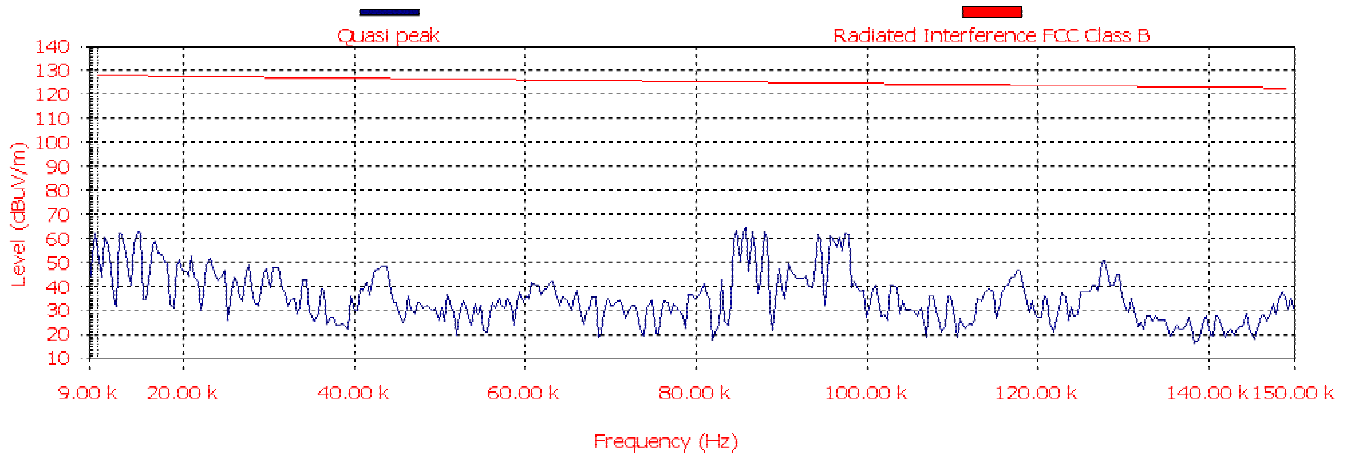


Analyzer setting: VBW-1M, RBW-3MHz, Peak detector

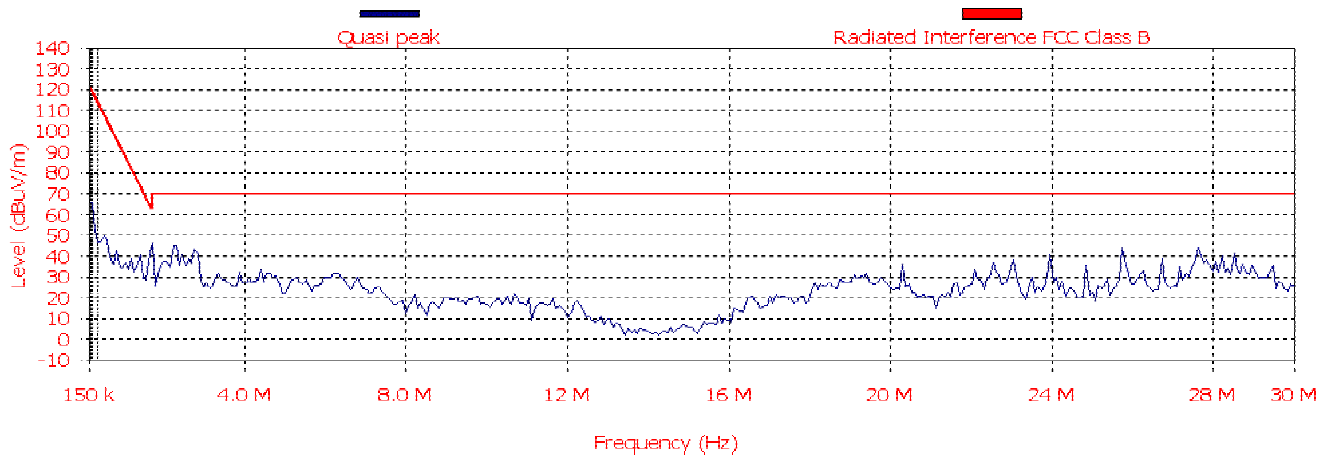


(12) Radiated spurious Emission in restricted band Transmit Frequency **918MHz Antenna-Omni 8dbi plots 104 - 111**

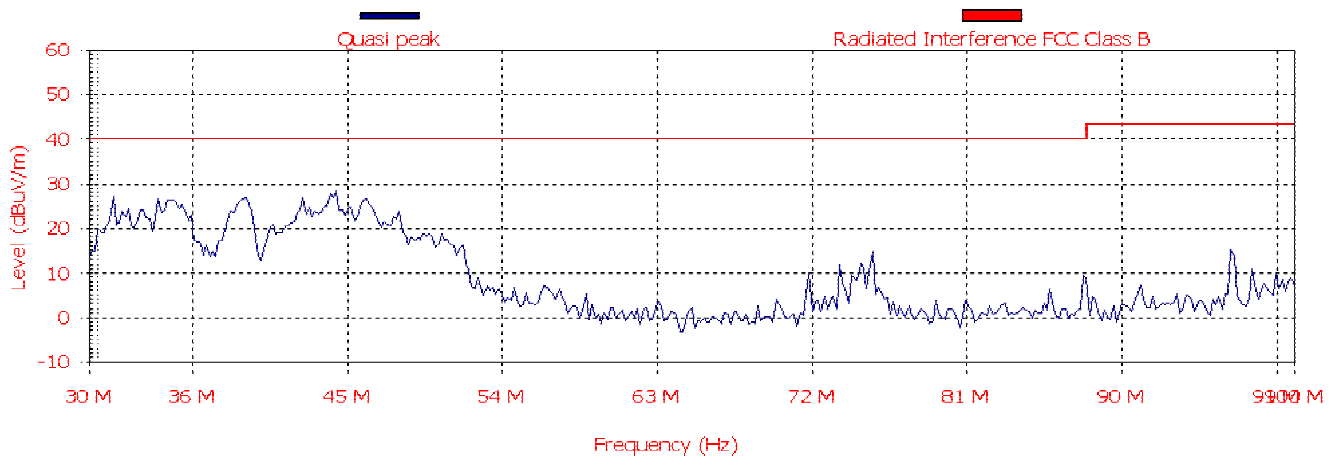
Analyzer setting: VBW-1K, RBW-1MHz, QP detector



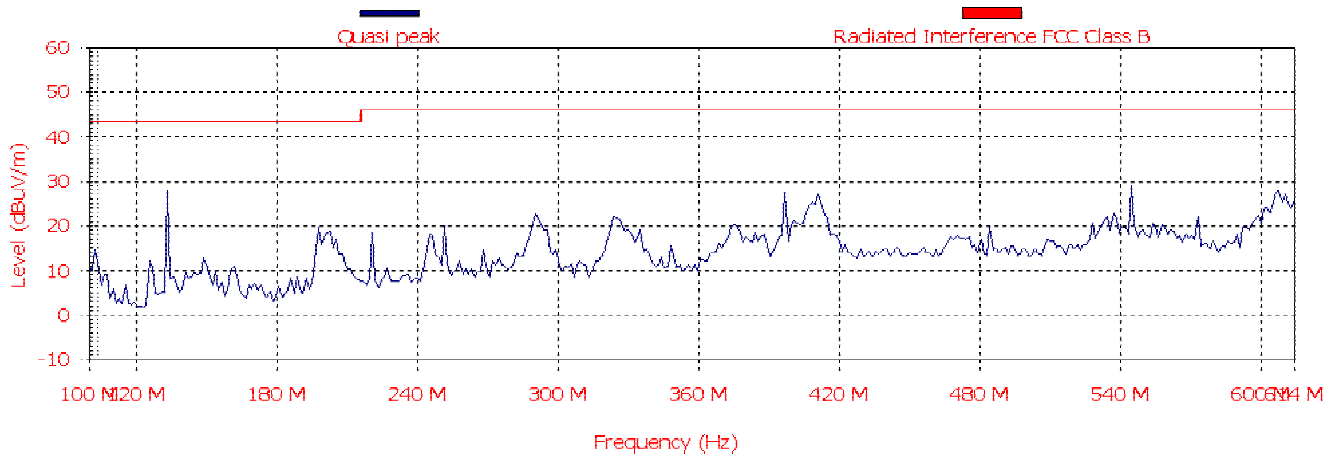
Analyzer setting: VBW-9K, RBW-1MHz, QP detector



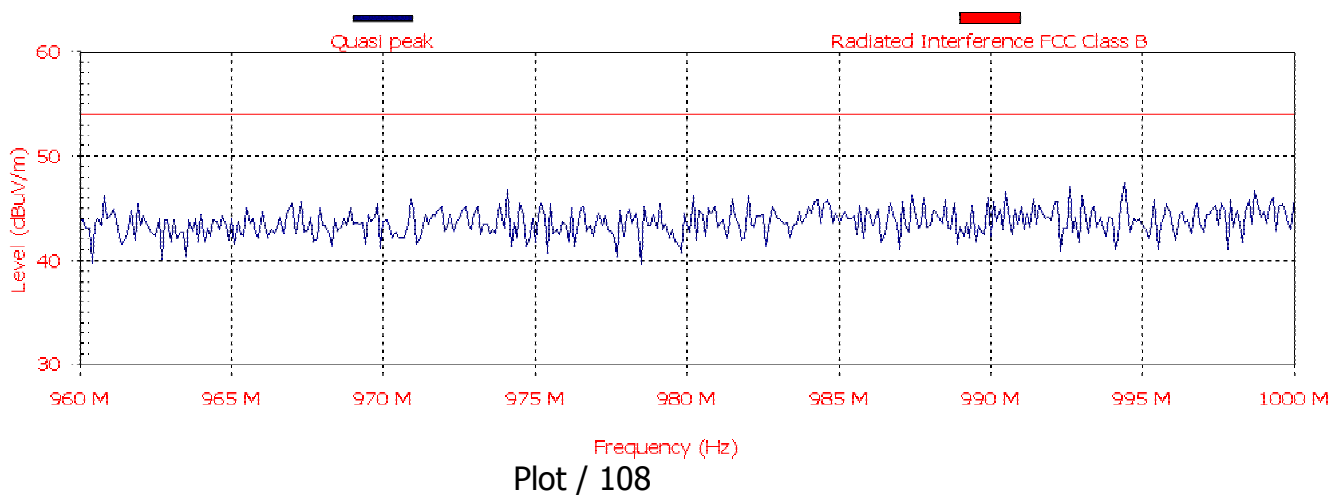
Analyzer setting: VBW-120K, RBW-1MHz, QP detector



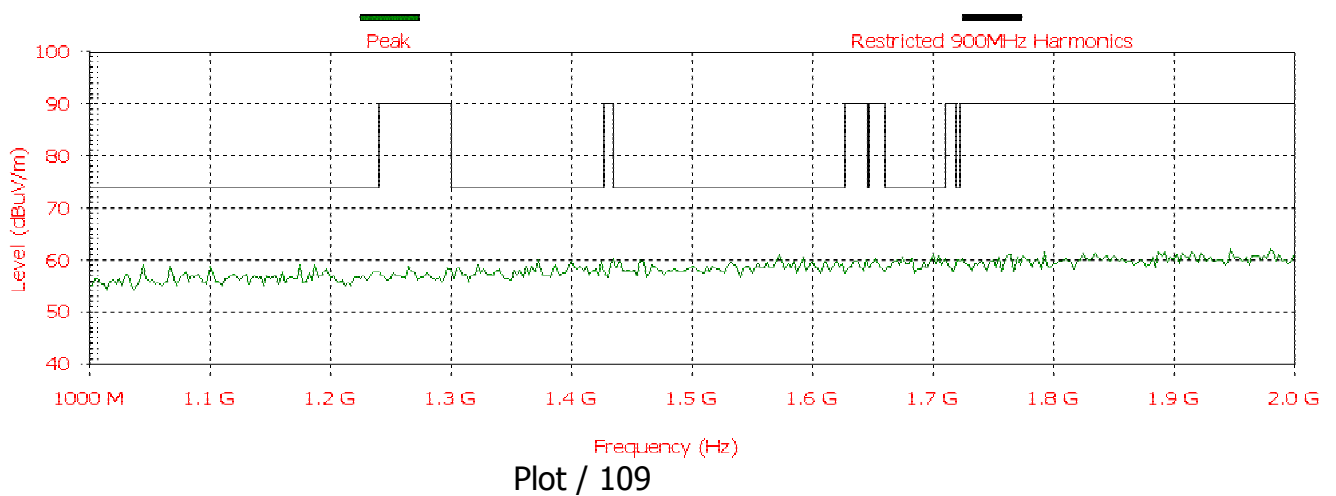
Analyzer setting: VBW-120K, RBW-1MHz, QP detector



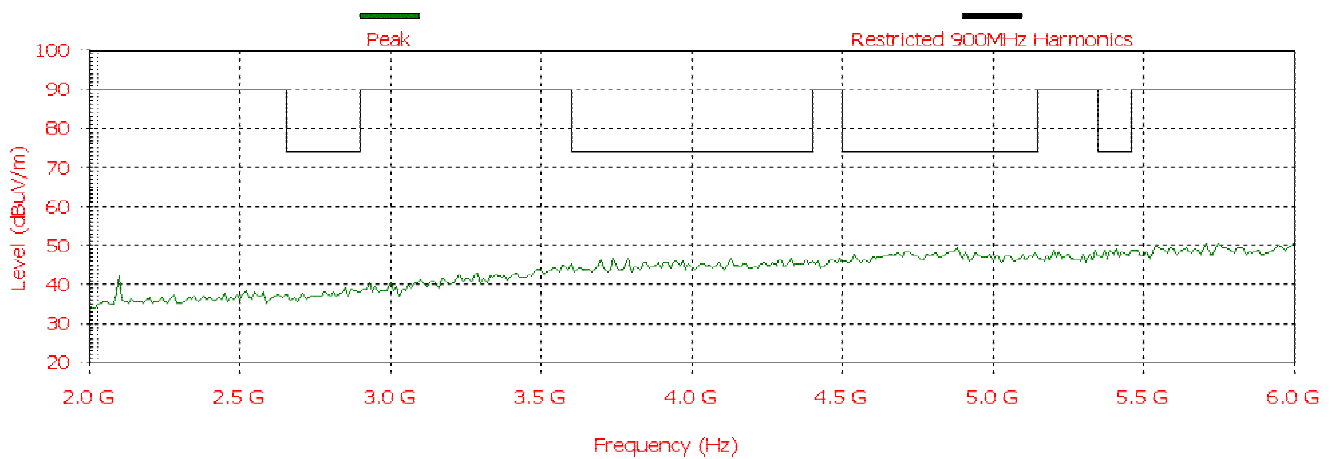
Analyzer setting: VBW-120K, RBW-1MHz, QP detector



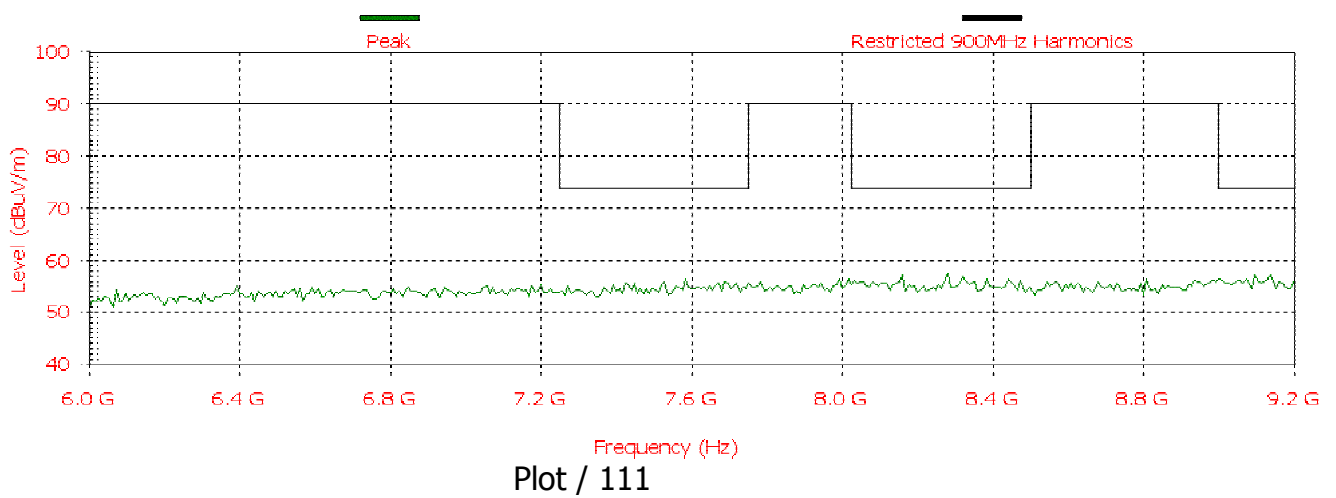
Analyzer setting: VBW-1M, RBW-3MHz, Peak detector



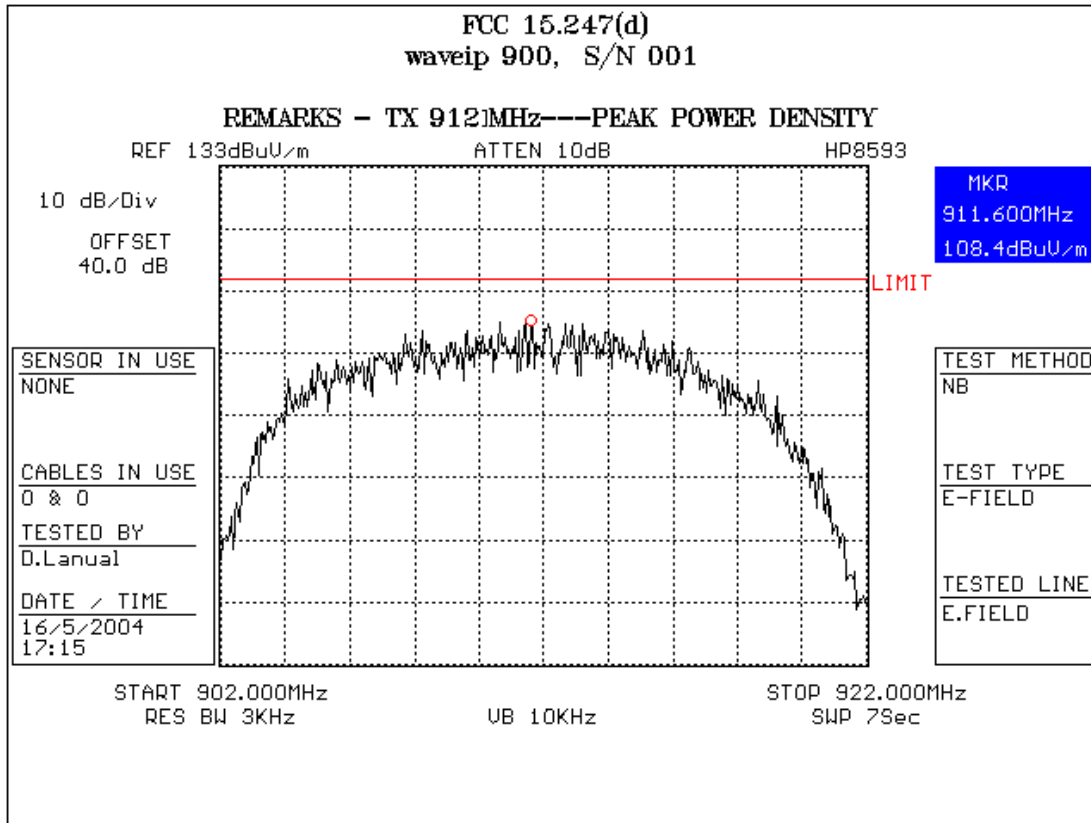
Analyzer setting: VBW-1M, RBW-3MHz, Peak detector



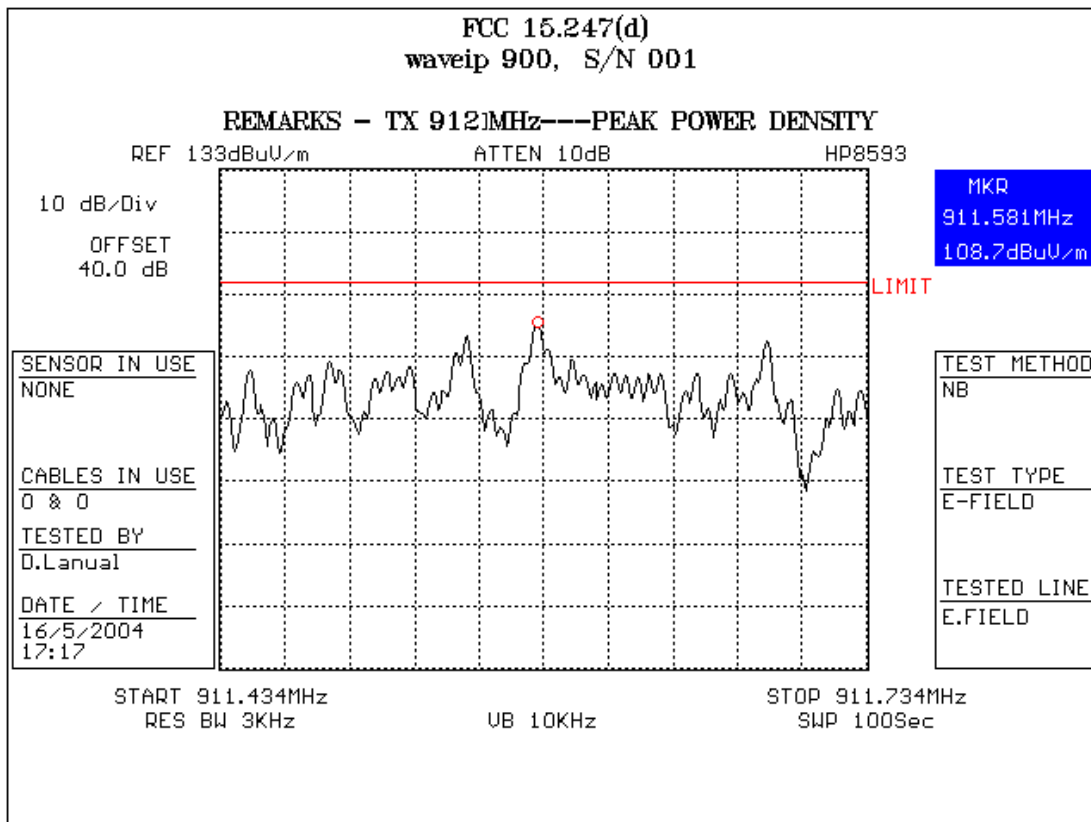
Analyzer setting: VBW-1M, RBW-3MHz, Peak detector



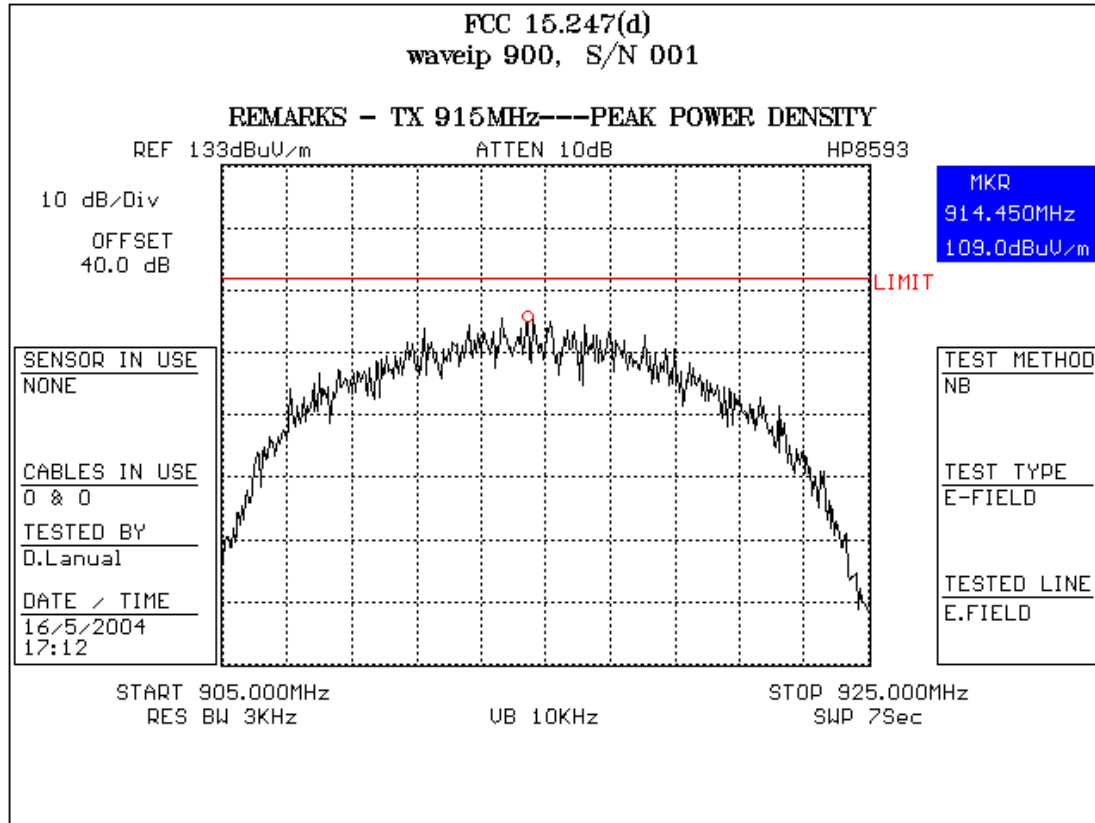
(13) Peak power spectral density of DSSS according 15.247d plots 112 - 117



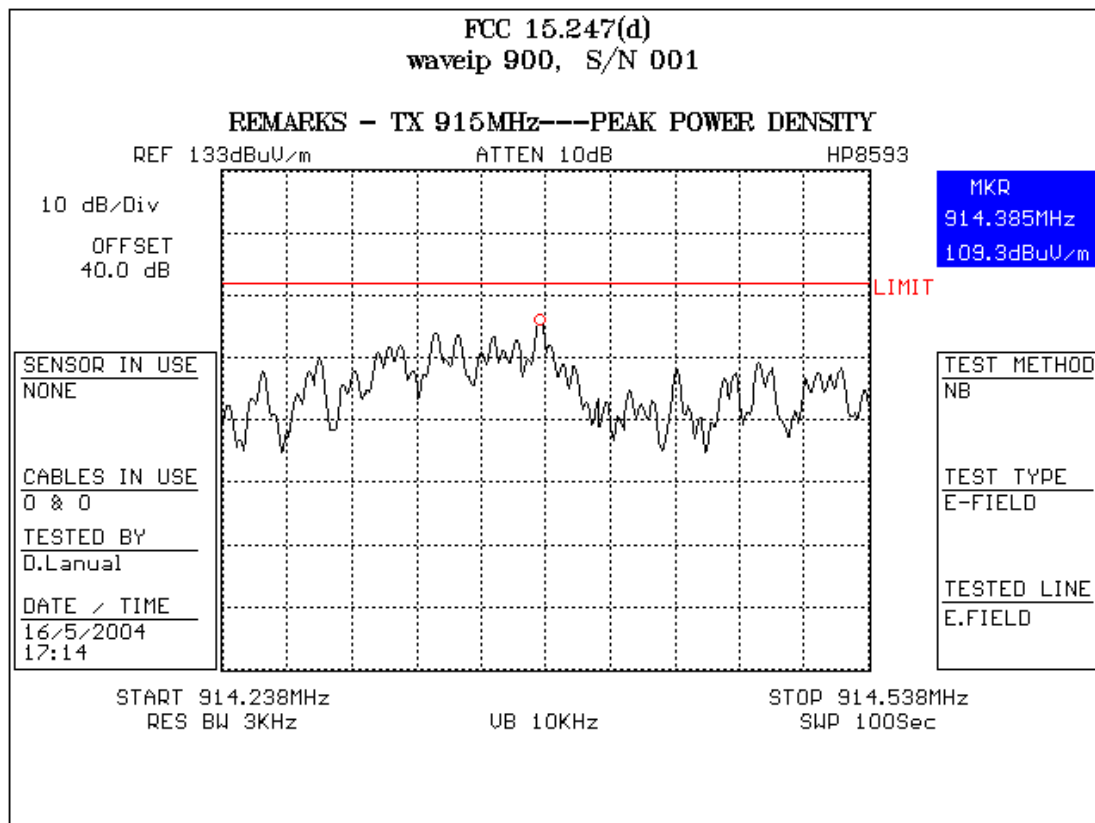
Plot / 112



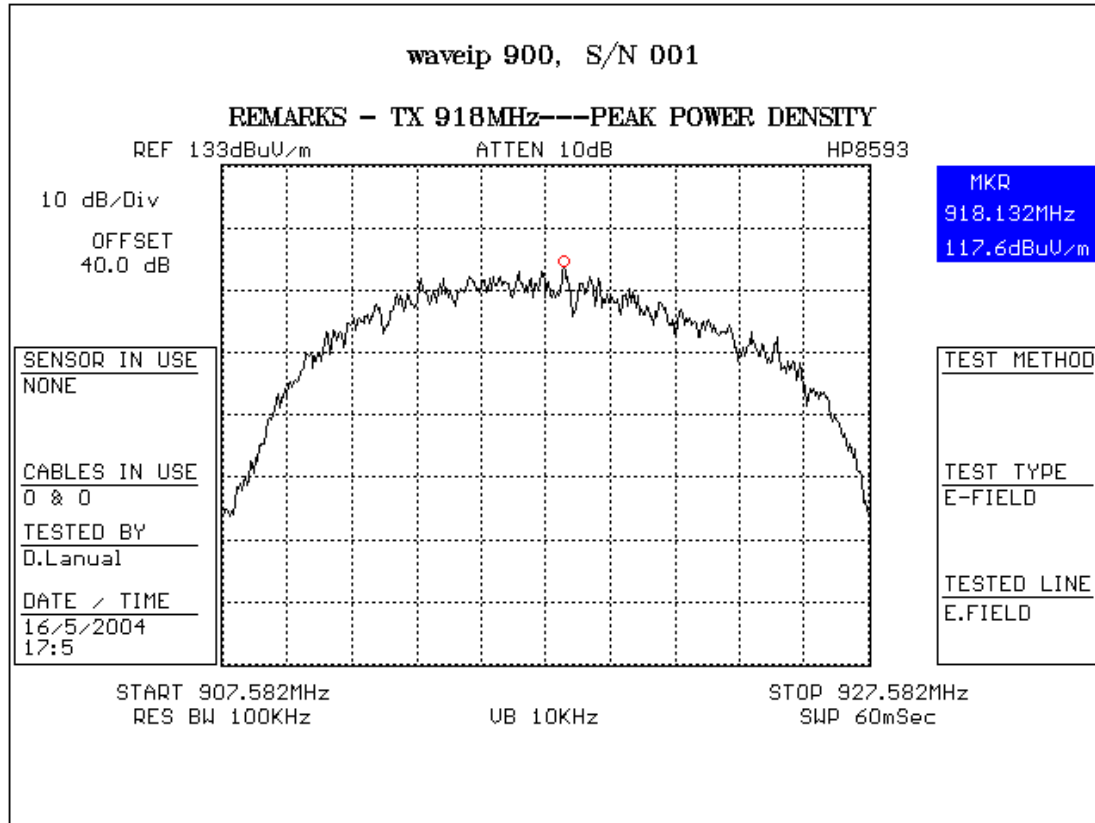
Plot / 113



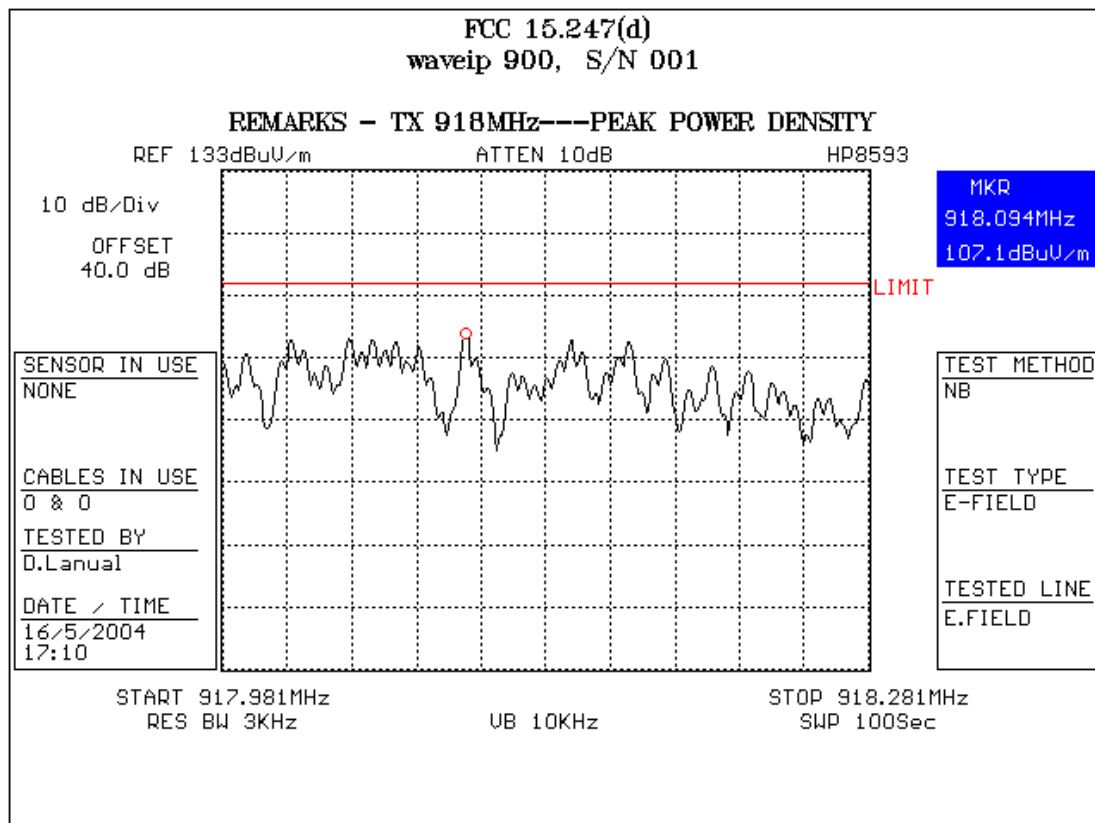
Plot / 114



Plot / 115



Plot / 116



Plot / 117

(14) Unintentional Radiated Emission Plots

EUT File:

N:\COMMON\WAVE-IP-n\GogACCES-900\Data\WaveIp.EUT

Order Number:

EUT

Name: GigAccess 900MHz

Serial Number: 00-50-C2-1C-C3-3D

Client

Name: WaveIP

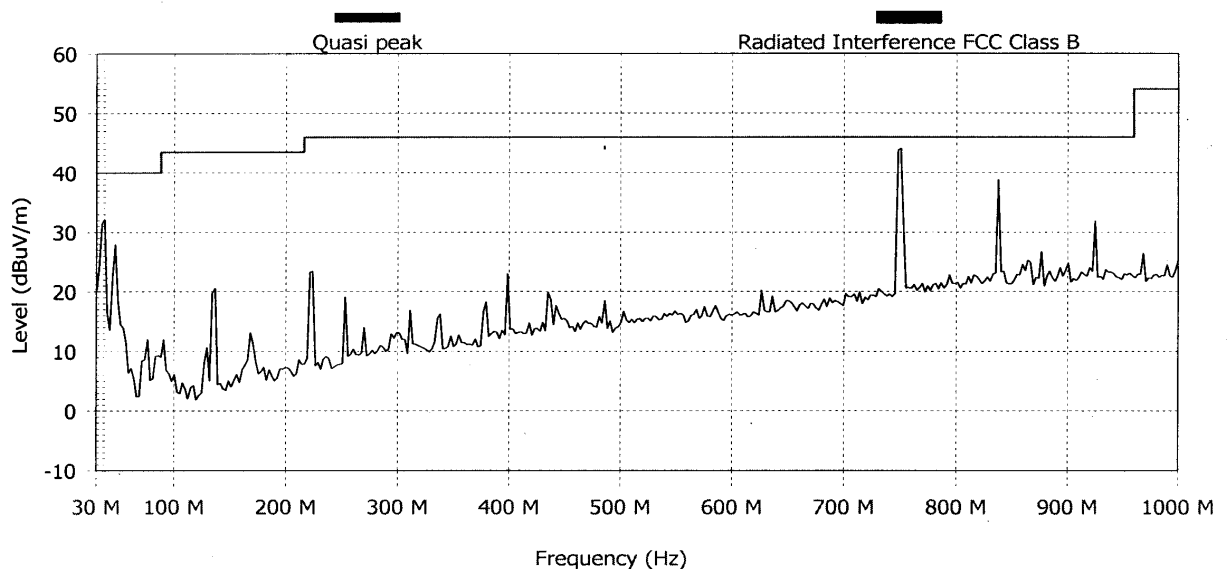
Contact Person: Yoram Singer

Radiated Emission

Description: 119) FCC 30-1000MHz STBY

From 30 MHz to 1000 MHz

Graph:



Detected Peaks:

Nr	Frequency (MHz)	Type	PK (dBuV/m)	QP (dBuV/m)	QP Limit (dBuV/m)	QP Diff (dBuV/m)	QP Pass	Pass	Angle (degrees)	Height (m)	H/V
1	33.652	Disc. BB	32.9	26.2	40.0	-13.8	Pass	Pass	0	1	V
2	33.181	Disc. BB	33.7	30.9	40.0	-9.1	Pass	Pass	235	1	H
3	747.995	Cont. NB	43.4	41.8	46.0	-4.2	Pass	Pass	5	1	H
4	835.998	Cont. NB	39.8	39.0	46.0	-7.0	Pass	Pass	240	1	H

Settings:

Antenna: Both Polarizations at 3.0 m

Ref. Level: 70.0 dBuV/m Att: 0 dB. RBW: 120 kHz. VBW: 1000 kHz. Sweep time: 202.0830078

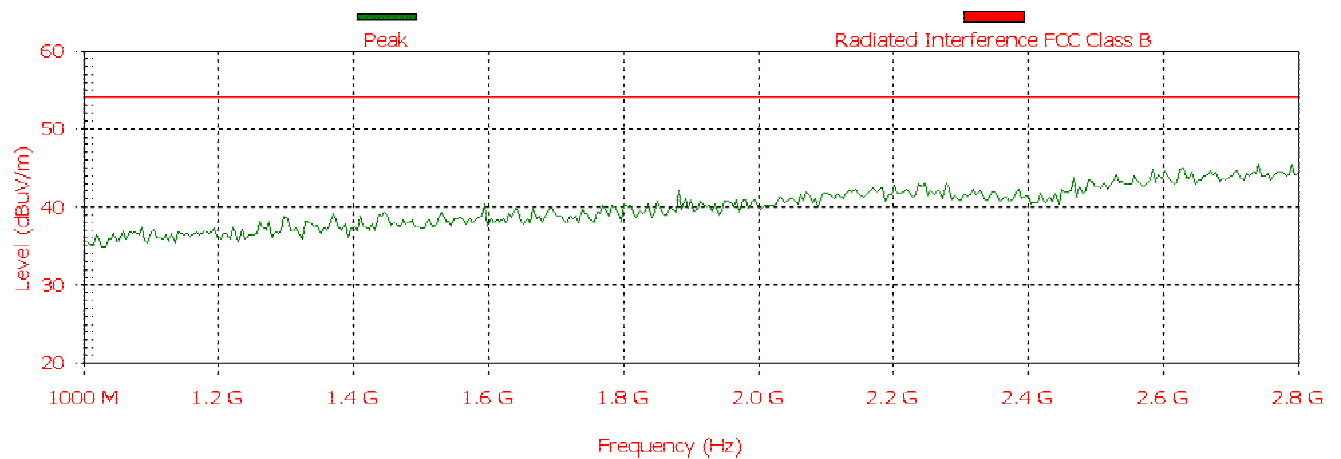
Detect all peaks above 10 dB below the limit lines with a maximum of 6 peaks.

Measure the peaks with the quasi-peak detector

Note:

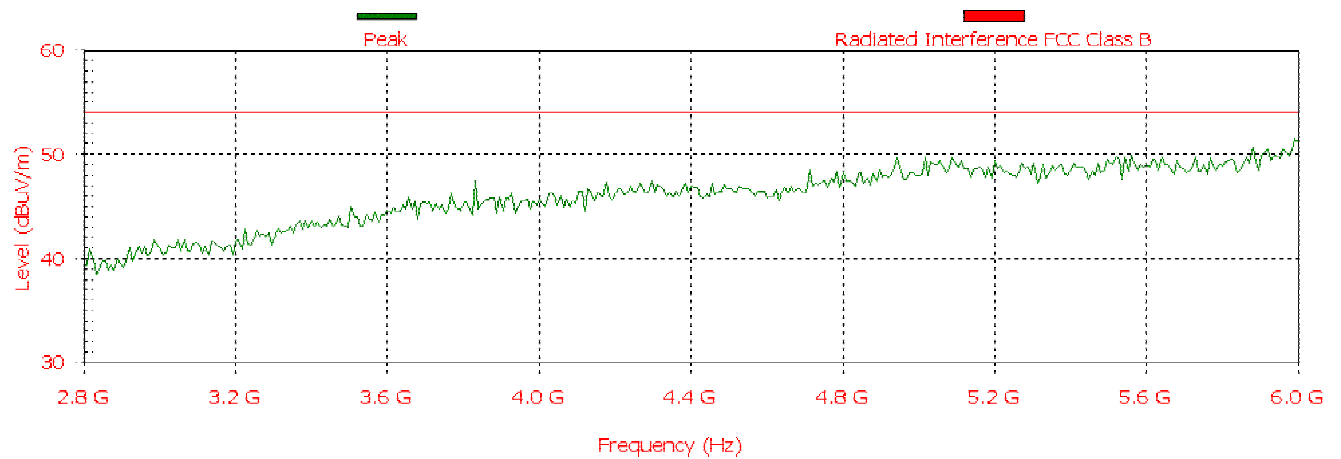
Plot / 118

Analyzer setting: VBW-9KHz, RBW-3MHz, Q.Peak detector



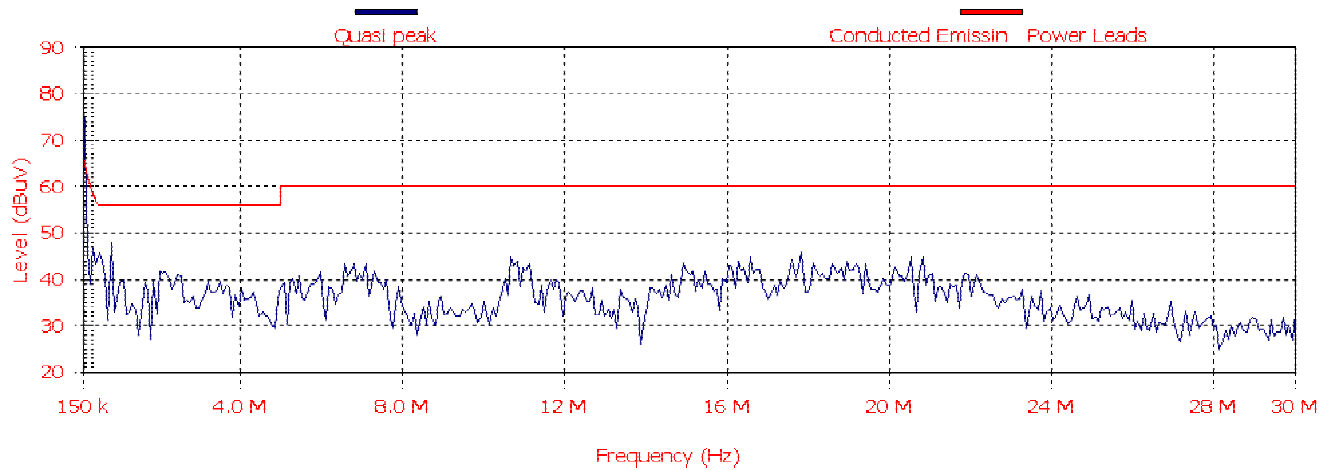
Plot / 119

Analyzer setting: VBW-9KHz, RBW-3MHz, Q.Peak detector



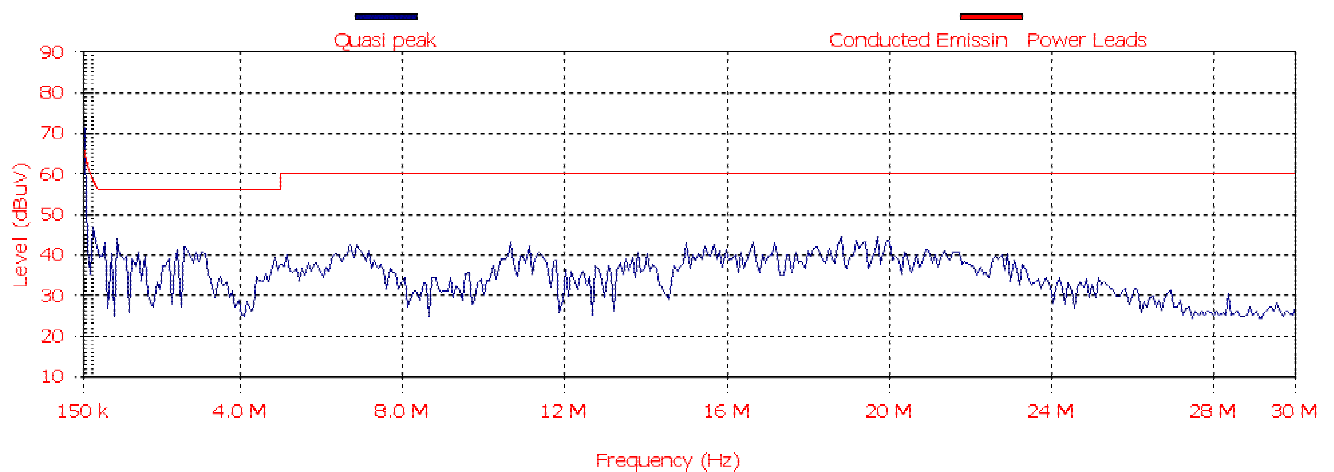
Plot / 120

(15) Conducted Emission on Neutral lead RBW-9KHz VBW-1000KHz QP Detector



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(16) Conducted Emission on Phase lead RBW-9KHz VBW-1000KHz QP Detector

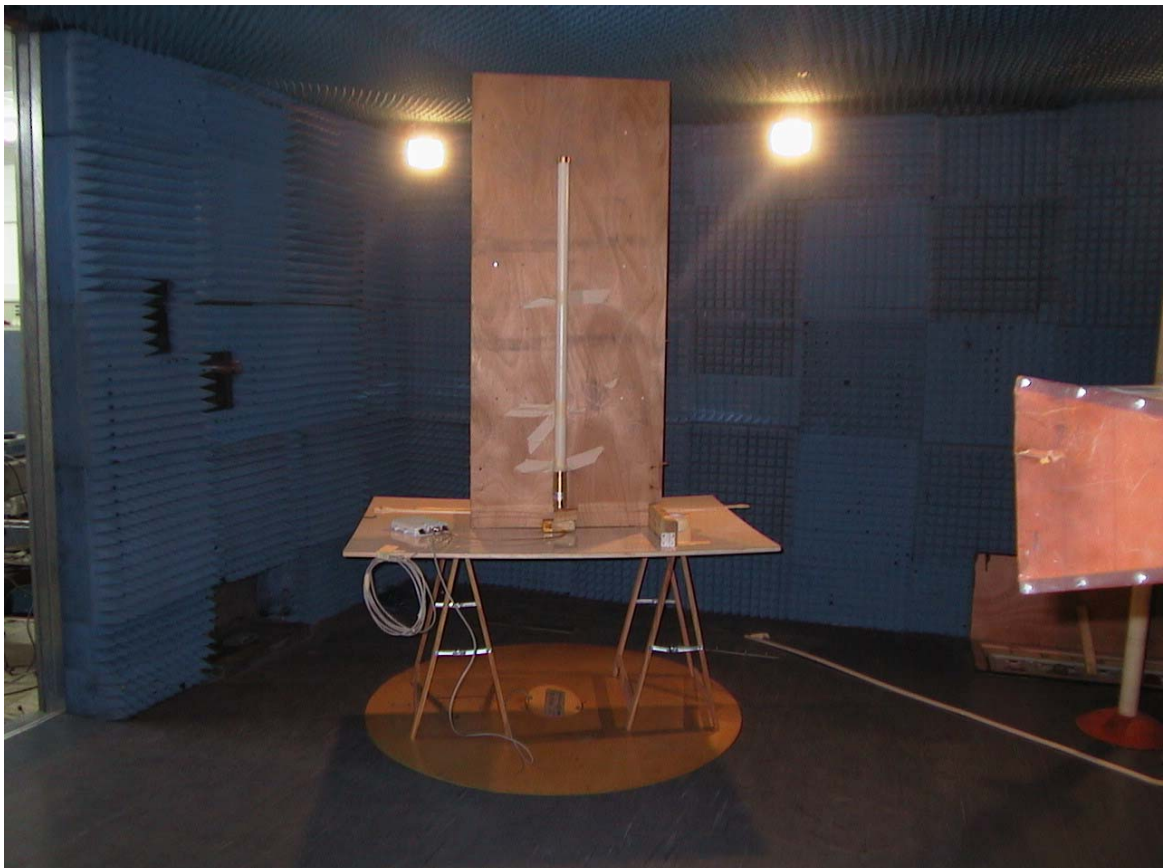


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12 PICTURES







13 CORRECTION FACTORS

Correction Factor for **line impedance stabilization network** model DC-AC-20A-01

Frequency (KHz)	Correction Factor (db)
10	4.4
20	1.6
30	0.8
40	0.4
50	0.3
60	0.25
70	0.15
100	0.1
200	0

DOUBLE RIDGE HORN Model 3105 S/N:00-50C2-1C-C3-3D 2052 Antenna Factor

Frequency (MHz)	Ant. Factor (db/m)
1000	24.4
2000	26.2
3000	30
4000	32.6
5000	33.8
6000	34.9
7000	36.2
8000	36.9
9000	37.8
10000	38.4
11000	39.1
12000	40.1
13000	42
14000	40.6
15000	39.3
16000	40.3

Antenna Factor for broadband antenna model BTA-L S/N:00-50C2-1C-C3-3D 980045L

Frequency (KHz)	Ant. Factor (db/m)	Frequency (KHz)	Ant. Factor (db/m)
30	19.05	300	14.35
32	19.13	310	14.28
34	18.74	320	14.43
36	18.03	330	14.13
38	16.61	340	14.48
40	15.44	350	14.89
45	13.66	360	15.12
50	11.52	370	15.70
55	10.04	380	15.78
60	7.68	390	16.22
65	6.11	400	16.45
70	5.47	425	16.99
75	5.98	450	17.59
80	6.86	475	17.28
85	7.20	500	17.69
90	7.47	525	18.91
95	7.23	550	19.06
100	7.20	575	18.20
105	7.30	600	18.87
110	7.37	625	18.81
115	7.02	650	19.64
120	6.82	675	19.92
125	7.05	700	20.66
130	7.83	725	21.08
135	9.61	750	21.53
140	7.93	775	22.39
145	8.03	800	22.66
150	8.29	825	22.87
160	8.72	850	22.65
170	9.18	875	23.12
180	9.05	900	23.70
190	9.80	925	23.40
200	10.61	950	23.43
210	10.34	975	23.30
220	11.21	1000	24.02
230	11.69		
240	11.62		
250	11.85		
260	12.45		
270	13.16		
280	13.48		
290	13.74		

14 Abbreviations and Acronyms

The following abbreviations and acronyms are applicable in this document

BW	Bandwidth
db	Decibel
EMI	Electromagnetic interference
E.U.T	Equipment under test
LISN	Line impedance stabilization network
RBW	Resolution band width
S/N	Serial number
VBW	Video bandwidth