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 Numéro d'accréditation
 Akkreditierungsnummer

STS 024

Schweizerischer Prüfstellendienst
 Service suisse d'essai
 Swiss testing service



Report: Rapport: Bericht:	Electromagnetic compatibility		Report no: Rapport no: Bericht Nr:	16'659A*
Product name: Nom du produit: Produktname	DynaMic 3.0		Mandate no: Mandat no: Auftrag Nr:	20119913
Serial no: No de série: Seriennummer:	1121CY654 (radiated) 1121CY655 (conducted)	Model number: Numéro de modèle: Modellnummer:	Homologation 2	
Customer: Client: Kunde:	Phonak Communications SA Länggasse 17 3280 Murten Switzerland	Date of test: Date de l'essai: Prüfdatum:	May to july, 2011	

* Replaces report 16'659.

Standards / Normes / Normen		Result Résultat Ergebnis
47 CFR, Part 15	(Subpart C, Intentional radiator: §§ 15.209/247)	Pass
Industry Canada	RSS-210, Licence-exempt Radio Apparatus: Category I Equipment	Pass

Test performed by
 Essai effectué par :
 Prüfer

Mr A. Bieri

Report prepared by
 Rapport préparé par :
 Berichtersteller

Mr A. Bieri

Report controlled and approved by
 Rapport contrôlé et approuvé par :
 Bericht kontrolliert und genehmigt durch

Mr E. de Raemy

Rossens, November 29, 2011

(Issue Date / Date d'édition / Ausstelldatum)

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Main language / Langue principale / Hauptsprache : **english** / français / deutsch

The present document results from tests on a specimen and does not prejudice to the conformity of all the manufactured products.

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1. Summary of test results / Résumé des résultats d'essais / Zusammenfassung der Prüfergebnisse

✓ Pass / Réussi / Bestanden

✗ Fail / Echoué / Nicht bestanden

Ø Not applicable to this product / Pas applicable à ce produit / Nicht anwendbar für dieses Produkt

— Not tested / Pas testé / Nicht geprüft

■ No requirements / Pas d'exigence / Keine Anforderung

§	Test Type / Type d'essai / Art der Prüfung	Result / Résultat / Ergebnis
6	Emission / Emission / Störaussendung	47 CFR, Subpart C RSS-210 Issue 8
6.7	Antenna gain Gain de l'antenne Antennengewinn CFR 47 § 15.247 (c) RSS-210 § A8.4 (1)	< 1 dBi
6.2	Carrier frequency separation Séparation des porteuses des canaux Trägerfrequenzabstand CFR 47 § 15.247 (a)(1) RSS-210 § A8.1 (b)	✓
6.3	Number of hopping channels Nombre de canaux Anzahl der Kanäle CFR 47 § 15.247 (a)(1)(iii) RSS-210 § A8.1 (d)	✓
6.4	Time of occupancy (dwell time) Temps d'exposition Verweilzeit CFR 47 § 15.247 (a)(1)(iii) RSS-210 § A8.1 (d)	✓
6.1	Channel 20dB-bandwidth Bande passante 20dB 20dB-Kanalbandbreite CFR 47 § 15.247 (a)(1) RSS-210 § A8.1 (b)	320 – 390 kHz
6.5	Maximum output power (conducted) Puissance de sortie maximale (conduit) Maximale Ausgangseistung (geleitet) CFR 47 § 15.247 (b)(1) RSS-210 § A8.4 (1)	✓
6.6	Effective radiated power Puissance rayonné effective Effektiv abgestrahlte Leistung CFR 47 § 15.247 (b)(1) RSS-210 § A8.4 (1)	✓
6.8	Band-edge emission (conducted) Emissions aux bords de bande (conduit) Emission an den Bandgrenzen (geleitet) CFR 47 § 15.247 (d) RSS-210 § A8.5	✓
6.9	Band-edge emission (radiated) Emissions aux bords de bande (rayonné) Emission an den Bandgrenzen (gestrahlt) CFR 47 § 15.205 RSS-210 § A8.5	✓
6.10	Spurious emissions – conducted (transmitter) Émissions parasites – conduit (émetteur) Nebenaussendung – geleitet (Sender) CFR 47 § 15.247 (d) RSS-210 § A8.5	✓
6.11	Spurious emissions – radiated (transmitter) Émissions parasites – rayonné (émetteur) Nebenaussendung – gestrahlt (Sender) CFR 47 § 15.247 (d) CFR 47 § 15.209 (a) RSS-210 § A8.5	✓
6.12	Radiated emission – receiver Émission par rayonnement – récepteur Gestrahlte Emission – Empfänger CFR 47 § 15.109 RSS-Gen	✓
-	Conducted emission Émission par conduction Geleitete Emission CFR 47 § 15.207	Ø ¹

1. Powered with / Alimenté avec / Gespeist mit : internal battery

2. Applied standards / Normes appliquées / Verwendete Normen

47 CFR Part 15 Subpart C	Code of Federal Regulations - Title 47 - Telecommunication, Part 15, Subpart C: "Intentional Radiators"
RSS-Gen issue 3, December 2010	Spectrum Management and Telecommunications - Radio Standards Specification General Requirements and Information for the Certification of Radio Apparatus
CNR-Gen 3 ^e édition Décembre 2010	Gestion du spectre et télécommunications - Cahier des charges sur les normes radioélectriques Exigences générales et information relatives à la certification des appareils radio
RSS-210 issue 8, December 2010	Spectrum Management and Telecommunications - Radio Standards Specification Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment
CNR-210 8 ^{ème} édition, Décembre 2010	Gestion du spectre et télécommunications - Cahier des charges sur les normes radioélectriques Appareils exempts de licence (pour toutes les bandes de fréquences) : matériel de catégorie I

3. Client / Client / Kunde

Client name and address Nom et adresse du client Name und Adresse des Kunden	<i>Phonak Communications SA Länggasse 17 3280 Murten Switzerland</i>
Contact Person / Responsable / Kontaktperson	<i>Mrs Neviana Nikoloski</i>
Telephone / Téléphone / Telefon	<i>+41 26 672 96 72</i>
Fax / Télécopieur / Telefax	<i>+41 26 672 96 77</i>
E-mail / Courrier électronique / E-mail	<i>info@phonak-communications.com</i>
Mandate no / No. de mandat / Auftragsnr.	<i>20119913</i>

4. Equipment under test / Equipement à l'essai / Prüfling

4.1 Identification / Identification / Identifikation

Manufacturer name and address Nom et adresse du fabricant Name und Adresse des Herstellers	<i>Phonak Communications SA Länggasse 17 3280 Murten Switzerland</i>
Production country / Pays de fabrication / Ursprungsland	<i>Vietnam</i>
Brand name / nom de marque / Verkaufsmarke	<i>Phonak</i>
Product name / Nom du produit / Produktname	<i>DynaMic 3.0</i>
Product description / Description du produit / Produktbeschreibung	<i>Wireless microphone</i>
Model number / Numéro de modèle / Modellnummer	<i>Homologation 2</i>
Serial no / No. de série / Seriennummer	<i>1121CY654 (radiated) 1121CY655 (conducted)</i>
Software version / Version du logiciel / Softwareversion	<i>Firmware: 3.07 Application Software: 3.07</i>

Highest frequency / Fréquence la plus élevée / Höchste Frequenz	2.48 GHz (transmitter)
Supply / Alimentation / Speisung	$U = 3.7 \text{ VDC} / P_{\max} = 500 \text{ mW}$
Dimension / Dimension / Abmessung	210 mm x 40mm (h x diameter)
Weigth / Poids / Gewicht	130 g
Technical documentation Documentation technique Technische Dokumentation	None. The equipment is completely identified by the above-mentioned informations. Phonak Communications SA assures the traceability of the documentation and is responsible for the product identification.

4.2 Pictures of the EUT / Photos de l'EST / Fotos des Prüflings



DynaMic 3.0 Overview



Connector and switches



*Removed Grid and temporary antenna connector
(conducted tests)*



*Removed Grid and temporary antenna connector
(conducted tests)*



Battery

4.3 Classification / Classification / Klassierung

CFR 47 Part 15	☐ Unintentional radiator (Subpart B) ☐ Class A digital device ☐ Class B digital device ☐ The highest frequency of the internal sources of the EUT is less than 108 MHz (measurement shall be made up to 1 GHz). ☐ The highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz (measurement shall be made up to 2 GHz). ☐ The highest frequency of the internal sources of the EUT is between 500 MHz and 1 GHz (measurement shall be made up to 5 GHz). ☐ The highest frequency of the internal sources of the EUT is above 1 GHz (measurement shall be made up to 5 times the highest frequency or 40 GHz, whichever is lower). ☒ Intentional radiator (Subpart C) ☒ The highest fundamental frequency of the EUT is less than 10 GHz (measurement shall be made up to the tenth harmonic or 40 GHz, whichever is lower). ☐ The highest fundamental frequency of the of the EUT is between 10 GHz and 30 GHz (measurement shall be made up to the fifth harmonic or 100 GHz, whichever is lower). ☐ The highest fundamental frequency of the EUT is above 30 GHz (measurement shall be made up to the fifth harmonic or 200 GHz, whichever is lower).
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4.4 Ports / Accès / Anschlüsse

Port / Accès / Anschluss	Cable / Câble / Kabel			Remark / Remarque / Bemerkung
	Max. length / Longueur max. / Max. Länge	Type / Type / Typ	Screen / Blindage / Schirm	
USB	1.8 m	Micro B	Yes	To connect the battery charger
Audio input	Not defined	3.5 mm ²	No	External audio input port (stereo)

4.5 Modifications / Modifications / Angebrachte Änderungen

None

5. Test conditions / Conditions d'essai / Testbedingungen**5.1 Climatic conditions, location and date / conditions climatiques, lieu et date / klimatische Bedingungen, Ort und Datum**

Location / Lieu / Ort:	Date / Date / Datum:	Temp. / Temp. / Temp.:	Pressure / Pression / Druck [QFF]:	Rel. humidity / Humidité rel. / Rel. Luftfeuchtigkeit:
montena emc sa 1728 Rossens - Switzerland	May 18, 2011	24 °C	1022 hPa	36 %
	May 19, 2011	25 °C	1020 hPa	35 %
	May 24, 2011	25 °C	1027 hPa	32 %
	June 3, 2011	24 °C	1015 hPa	38 %
	June 7, 2011	24 °C	1009 hPa	40 %
	June 8, 2011	23 °C	1013 hPa	43 %
	June 16, 2011	25 °C	1020 hPa	43 %
	June 17, 2011	25 °C	1017 hPa	44 %
	June 22, 2011	26 °C	1022 hPa	46 %
	June 23, 2011	24 °C	1023 hPa	45 %
	July 1, 2011	24 °C	1024 hPa	32 %

5.2 Test facility and methodology / Lieu d'essai et méthodologie / Prüfort und Methodik

The alternate test site (ferrite chamber) is accepted by FCC (Reg. No. 90808).
 Conducted and radiated measurements are performed according to the ANSI C63.4 (2003) procedure.
 The open area test site is accepted by Industry Canada (Site number 3625A-1).

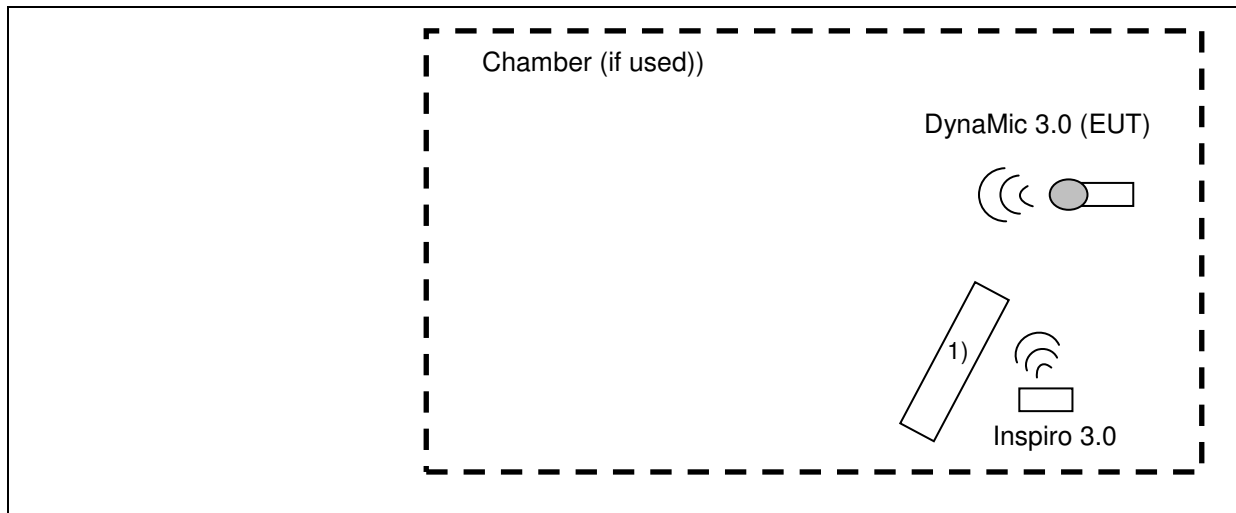
5.3 Attendant persons / Personnes présentes / Anwesende Personen**Test Engineer(s) / Ingénieur(s) d'essai / Prüfsingenieur(e) :**

Mr A. Bieri

Other(s) / Autre(s) / Andere :

Name / Nom / Name	Company / Société / Firma
Mr M. Holzer (partly present)	Phonak Communications SA

5.4 Test configuration / Configuration d'essai / Prüfkonfiguration



5.5 Operating conditions / Conditions de fonctionnement / Betriebszustand

- Continuous transmission of random datas with single frequencies (2.402, 2.440 and GHz and 2.480 GHz)
- Normal operation: Transmission of random datas with hopping frequency

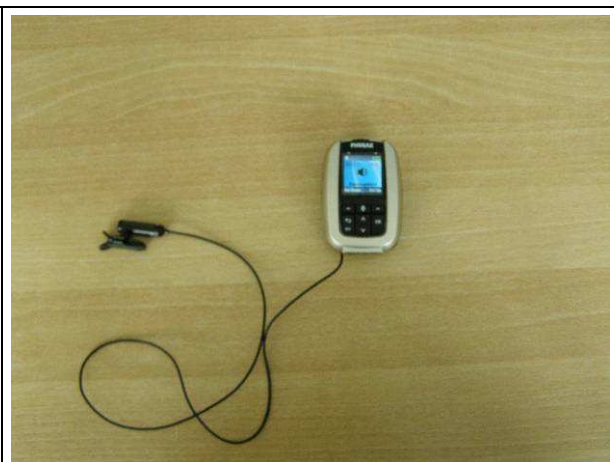
5.6 Auxiliary equipment / Matériel auxiliaire / Zusatzgeräte

The following pieces of equipment are used for the monitoring of the EUT or are necessary for the EUT but they are not part of the EUT / Les équipements suivants servent à la surveillance de l'EST ou sont indispensables au fonctionnement de celui-ci mais ne font pas partie de l'EST / Folgende Geräte werden für die Überwachung des Prüflings gebraucht oder sind notwendig für die korrekte Funktion. Sie gehören jedoch nicht zum Prüfling.

Product / Produit / Produkt	Brand / Marque / Marke	Model No.	ID	Remark / Remarque / Bemerkung
Laptop	DELL	Latitude D505	CH03MW0023-3LG0C1J	Only for programm purposes
Power supply	Agilent	E3620A	- - -	Power supply for Soundfield
Inspiro 3.0	Phonak	Homologation 6	S/N 1121CY872	Communicate with DynaMic 3.0



Laptop



Inspiro 3.0



Power supply

6. Test results

6.1 Channel 20dB-bandwidth

Introduction: Channel-bandwidth measured at -20 dBc.

Test site: ☐ anechoic chamber (foam) ☐ open test site
☐ anechoic chamber (ferrites) ☒ laboratory

Meas. uncertainty: 9kHz – 3GHz: ± 1 dB
 3GHz – 6.7GHz: ± 2.1 dB
 6.7GHz – 13.2GHz: ± 2.6 dB
 13.2GHz – 19GHz: ± 2.8 dB
 19GHz – 26.5GHz: ± 3 dB

Method: Measurement of the conducted power on the antenna connector or a test fixture.

Limit: - - -

Test set-up:



Remarks: - - -

Test equipment:

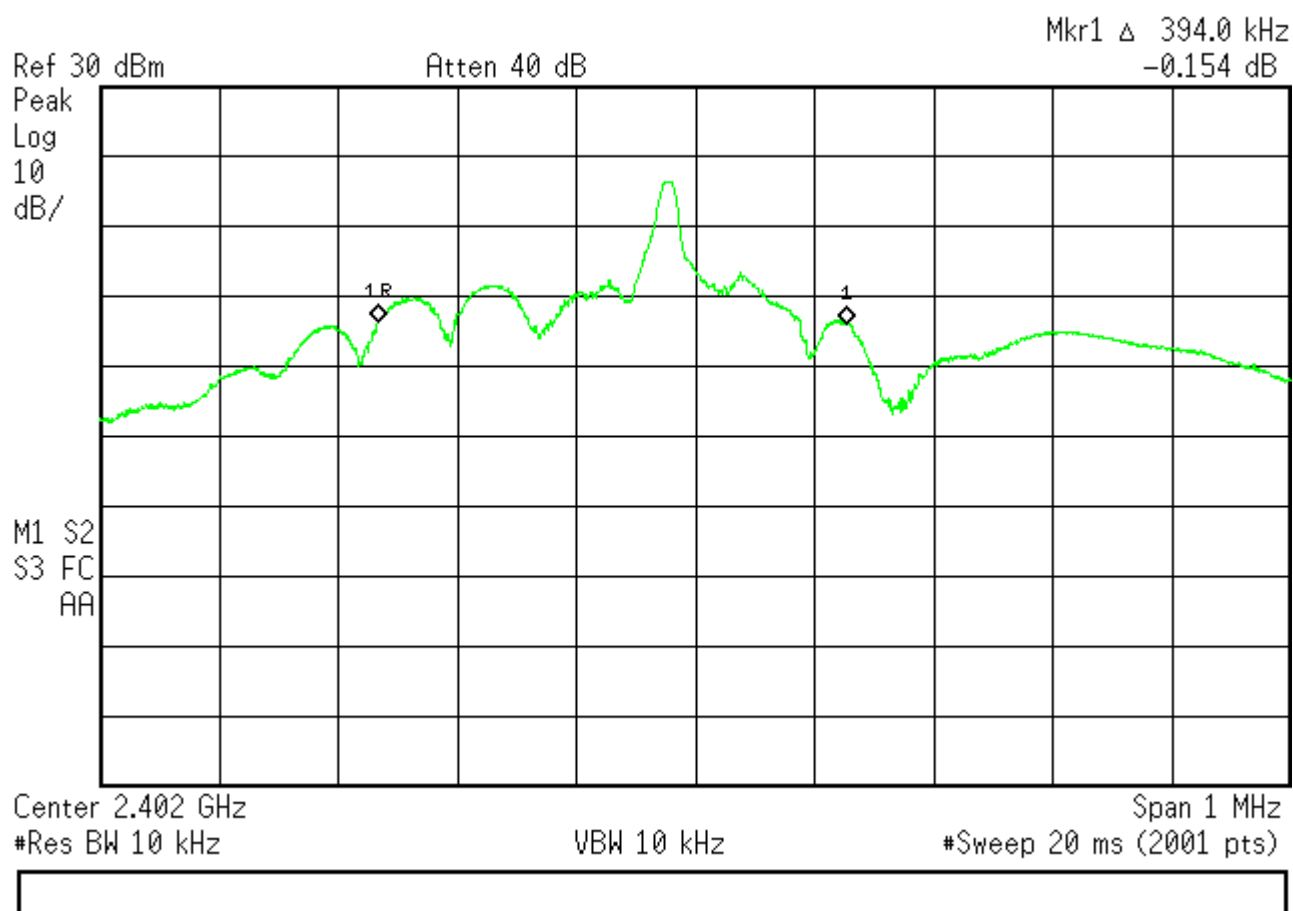
Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Cables	☒ Succoflex 50cm (8407/4)					
Power supply	☒ Battery (3.8 VDC)					

Results of the testClient: *Phonak Communications SA*Apparatus: *DynaMic 3.0*Operating mode: *Single frequencies (2.402, 2.440 and 2.480 GHz) modulated*Cables connected to the EUT: *Temporary antenna cable*Remarks: *Measured on temporary antenna connector*Modifications: ☒ None ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

frequency [GHz]	20 dB bandwidth [kHz]	Remarks
2.402000	394	---
2.441000	336.5	---
2.480000	320.5	---

Example of measurement at 2.402 GHz

* Agilent 17:53:17 Jun 16, 2011

Date of test: *June 16, 2011*
Operator: *A. Bieri*

6.2 Carrier frequency separation

Introduction: Determination of the frequency separation of two adjacent channels.

Test site: ☐ anechoic chamber (foam) ☐ open test site
☐ anechoic chamber (ferrites) ☒ laboratory

Meas. uncertainty: $\pm 2.6 \mu\text{Hz/Hz}$

Method: Measurement of the frequency separation on the antenna connector or a test fixture.

Limit: Minimum 25 kHz or 20 dB bandwidth of the hopping channel

Test set-up:

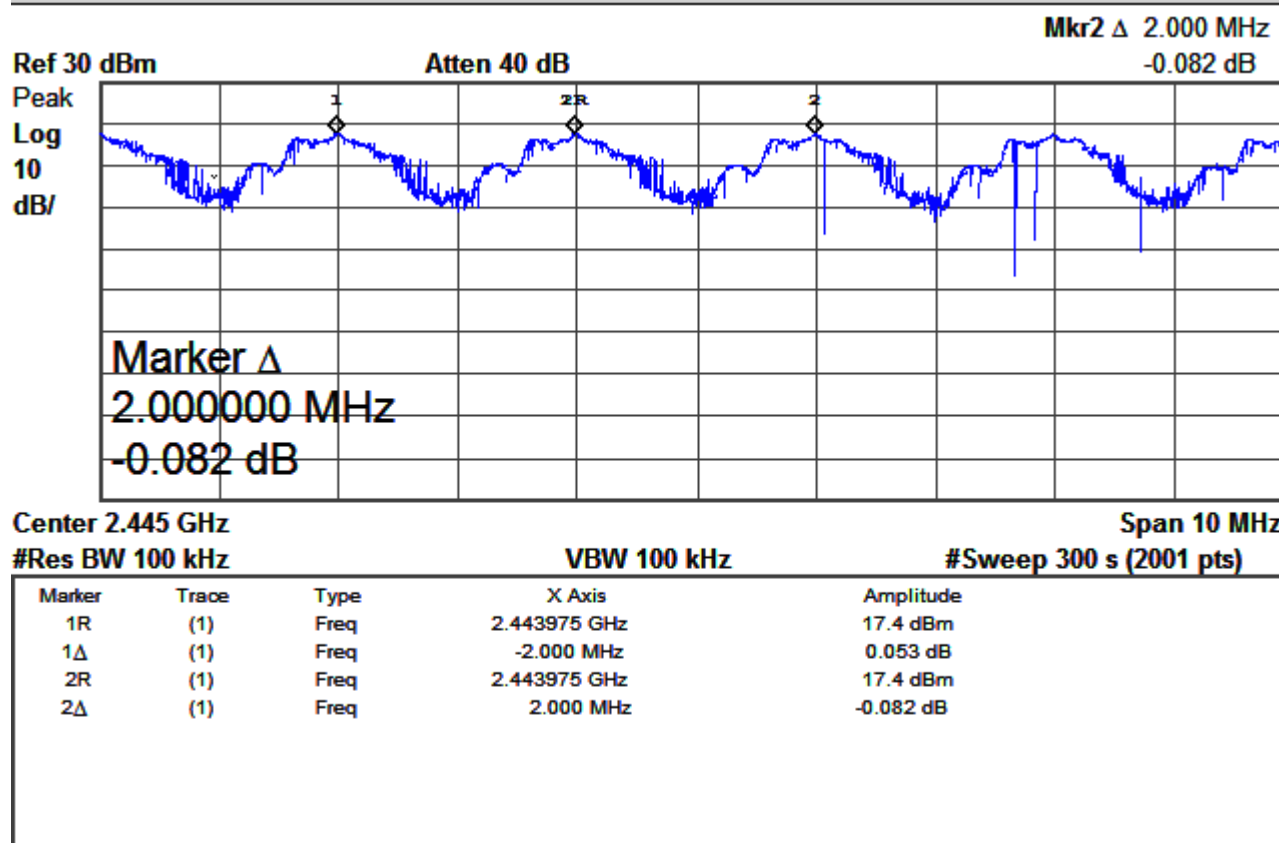


Remarks: ---

Test equipment:

Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Cables	☒ Succoflex 1m (8407/4)					
Power supply	☒ Battery (3.8 VDC)					

Result:	☒ pass	☐ fail	☐ not applicable	☐ not tested
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Results of the testClient: *Phonak Communications SA*Apparatus: *DynaMic 3.0*Operating mode: *Continuously hopping*Cables connected to the EUT: *Temporary antenna cable*Remarks: *Measured on temporary antenna connector*Modifications: ☒ None ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5**Carrier frequency separation = 2 MHz**Date of test: *June 23, 2011*
Operator: *A. Bieri*

6.3 Number of hopping channels

Introduction: Number of hopping channels used in the frequency hopping system.

Test site: ☐ anechoic chamber (foam) ☐ open test site
☐ anechoic chamber (ferrites) ☒ laboratory

Meas. uncertainty: $\pm 2.6 \mu\text{Hz/Hz}$

Method: Measurement of the frequency separation on the antenna connector or a test fixture.

Limit: At least 15 channels

Test set-up:

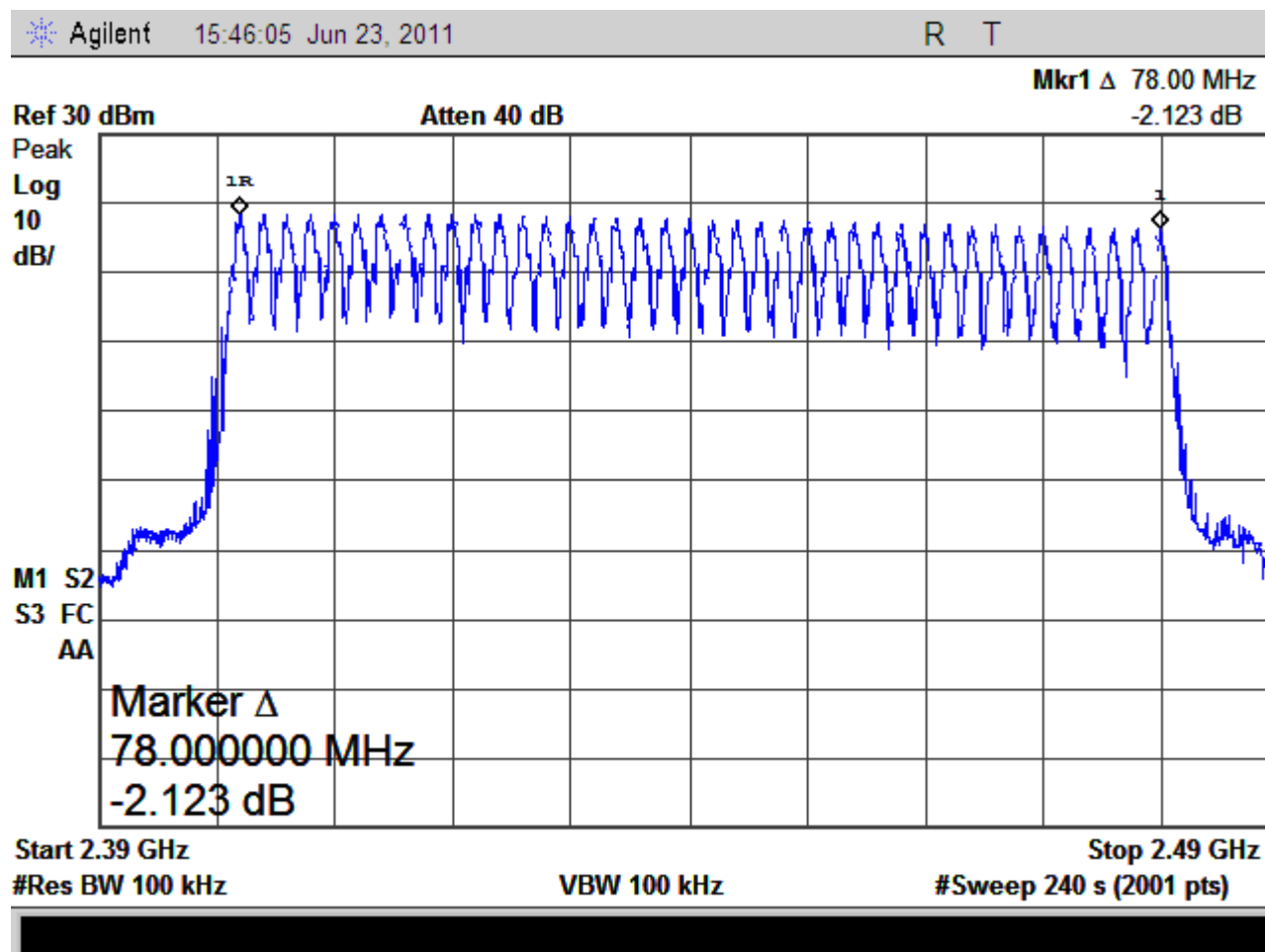


Remarks: ---

Test equipment:

Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Cables	☒ Succoflex 1m (8407/4)					
Power supply	☒ Battery (3.8 VDC)					

Result:	☒ pass	☐ fail	☐ not applicable	☐ not tested
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Results of the testClient: *Phonak Communications SA*Apparatus: *DynaMic 3.0*Operating mode: *Continuously hopping*Cables connected to the EUT: *Temporary antenna cable*Remarks: *Measured on temporary antenna connector*Modifications: ☒ None ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Number of hopping channels = 40

Date of test: *June 23, 2011*
Operator: *A. Bieri*

6.4 Time of occupancy (dwell time)

Introduction: Average duration during which the system stays on one channel.

Test site: ☐ anechoic chamber (foam) ☐ open test site
☐ anechoic chamber (ferrites) ☒ laboratory

Meas. uncertainty: $\pm 2.6 \mu\text{Hz/Hz}$

Method: Measurement on the antenna connector or a test fixture.

Limit: The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

Test set-up:



Remarks: ---

Test equipment:

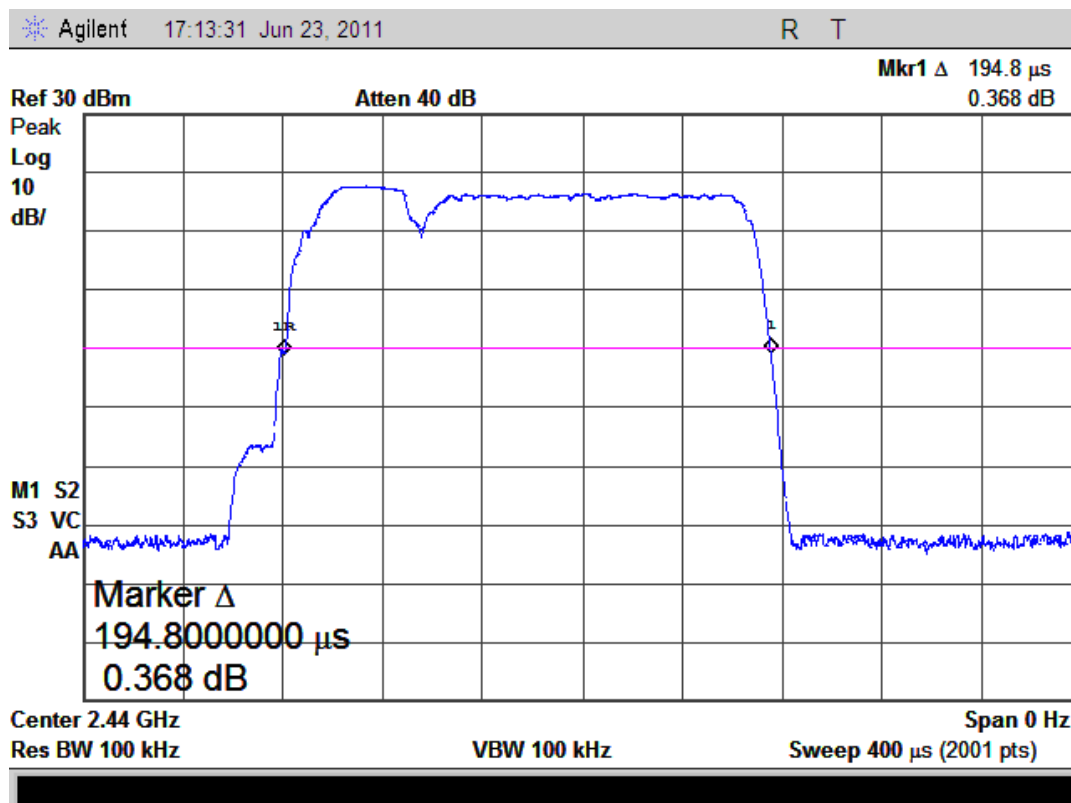
Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Cables	☒ Succoflex 1m (8407/4)					
Power supply	☒ Battery (3.8 VDC)					

Result:	☒ pass	☐ fail	☐ not applicable	☐ not tested
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Results of the testClient: *Phonak Communications SA*Apparatus: *DynaMic 3.0*Operating mode: *Continuously hopping*Cables connected to the EUT: *Temporary antenna cable*Remarks: *Measured on temporary antenna connector*Modifications: ☒ None ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5**Calculation based on informations from Phonak Communications and measurement of the puls duration**

Number of channels 40

(see § 6.3):

Period of observation: $\text{Number of channels} \times 0.4 \text{ s} = 40 \times 0.4 \text{ s} = 16 \text{ s}$ Single occupancy time during one hop (measured): $194.8 \mu\text{s}$ Pulses in 2.9h: $2^{16} \times 40 \times 10 = 26214400$ Pulses in 16 s: $(\text{Pulses in 2.9h} / 2.9) / 3600 \times 16 \text{ s} = 40175.3$ Pulse in 16 s of one channel: $\text{Pulses in 16 s} / \text{Number of channels} = 1004.4$ Time of occupancy: $\text{Pulse in 16 s of one channel} \times \text{occupancy time} = 1004.4 \times 194.8 \mu\text{s} = 0.196 \text{ s}$ **RESULT** $0.196 \text{ s} < 0.4 \text{ s} \Rightarrow$ **Pass****Example of the occupancy time during one hop at frequency 2.44 GHz**Date of test: *June 23, 2011*
Operator: *A: Bieri*

6.5 Maximum output power (conducted)

Test site: ☐ anechoic chamber (foam) ☐ open test site
☐ anechoic chamber (ferrites) ☒ laboratory

Meas. uncertainty: 9kHz – 3GHz: ± 1 dB
 3GHz – 6.7GHz: ± 2.1 dB
 6.7GHz – 13.2GHz: ± 2.6 dB
 13.2GHz – 19GHz: ± 2.8 dB
 19GHz – 26.5GHz: ± 3 dB

Test method: Measurement of the conducted power on the antenna connector or a test fixture.

Limit: Maximum 0.125 Watt (= 21 dBm) for systems using antennas with directional gains that do not exceed 6 dBi. If antennas with directional gains exceeding 6 dBi are used, the maximum peak output power shall be reduced as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test set-up:



Remarks: - - -

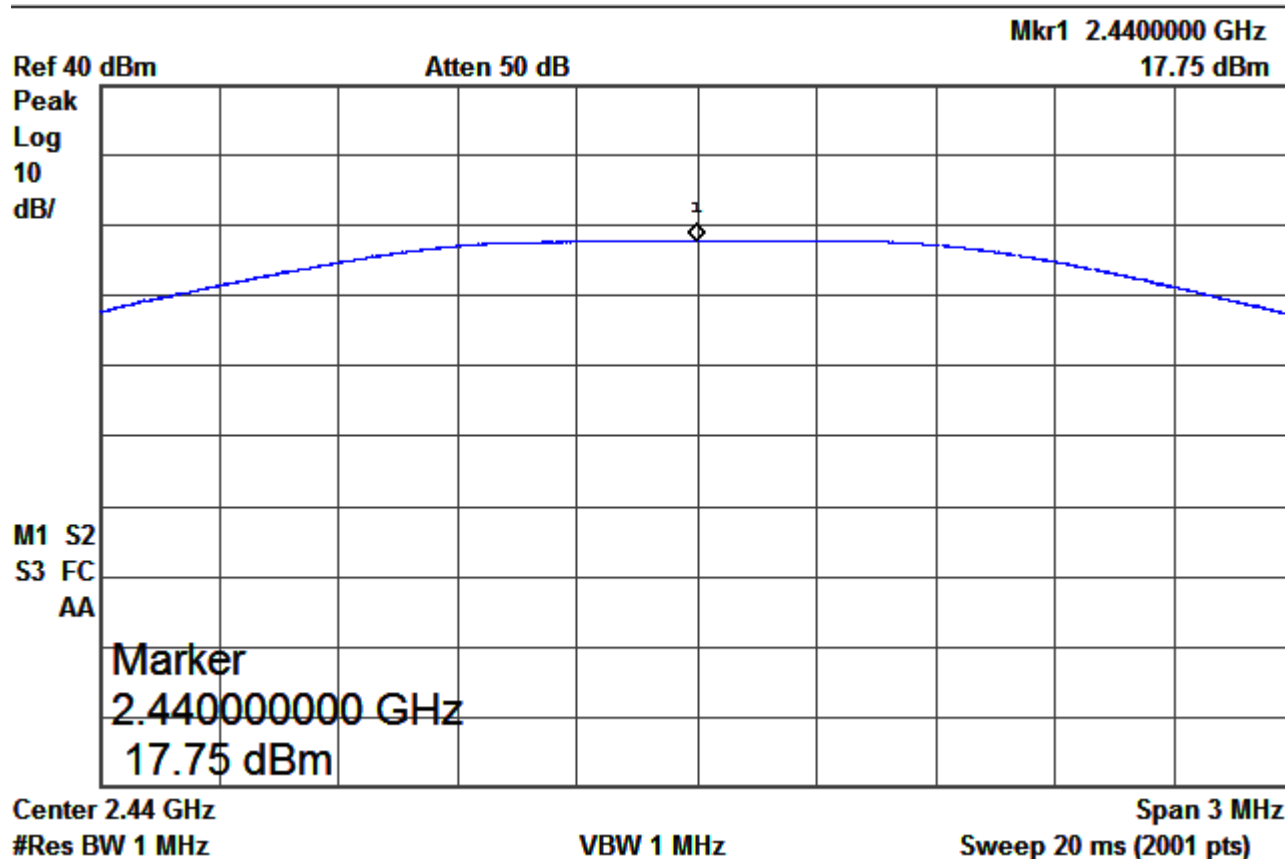
Test equipment:

Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Cables	☒ Succoflex 1m (8407/4)					
Power supply	☒ Battery (3.8 VDC)					

Result:	☒ pass	☐ fail	☐ not applicable	☐ not tested
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Results of the testClient: *Phonak Communications SA*Apparatus: *DynaMic 3.0*Operating mode: *Single frequencies (2.402, 2.440 and 2.480 GHz) modulated*Cables connected to the EUT: *Temporary antenna cable*Remarks: *Measured on temporary antenna connector*Modifications: ☒ None ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

f normal [GHz]	Temp [°C]	U [V]	P [dBm]	Limit [dBm]	Remarks	Pass Yes No	
2.402	23.9	3.8	17.18	21		☒	☐
2.440	23.9	3.8	17.75	21	<i>Worst case</i>	☒	☐
2.480	23.9	3.8	16.15	21		☒	☐

Example of measurement at 2.440 GHz

Date of test: *June 20, 2011*
 Operator: *A. Bieri*

6.6 Effective isotropic radiated power (radiated)

Introduction: The effective radiated power is the power radiated by the antenna of an interrogator in its direction of maximum gain under specified conditions of measurement.

Test site: ☐ anechoic chamber (ferrites) ☒ anechoic chamber (foam)

Distance: ☒ 1 m ☐ 3 m ☐ 10 m ☐ 30 m

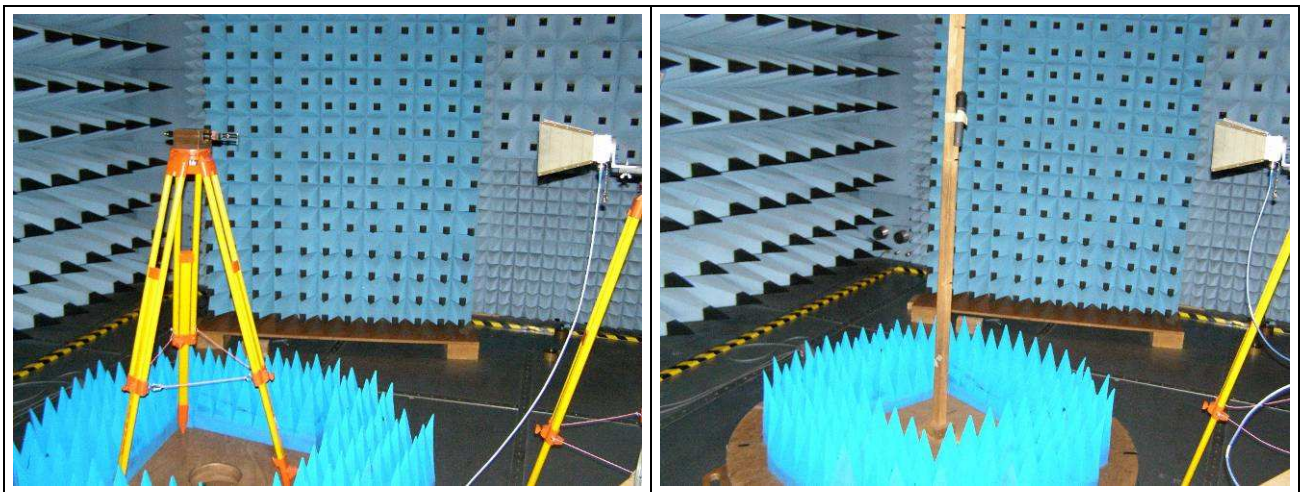
Position of EUT: 1.5 m (height of the equipment under test above floor)

Meas. uncertainty: ± 1.34 dB ($f < 300$ MHz) / ± 1.61 dB ($f > 300$ MHz)

Test method: The electromagnetic disturbance radiated by the equipment is measured using a spectrum analyser and a wide band antenna. The ERP / EIRP values are determined replacing the EUT by a substitution antenna (dipole or other). The limits on the plots represent the equivalent field levels for the required power limits.

Limit: Maximum 125 mW (= 21 dBm).

Test set-up:



Remarks: ---

Test equipment:

Spectrum analyser	☐ 88-14	☐ 90-26	☐ 94-24	☐ 02-06	☐ 03-45	☒ 07-53
Antenna (horn)	☒ 90-24	☐ 98-12	☐ 98-13	☐ 07-31		
HF-wattmeter	☐ 95-97	☐ 01-15	☐ 01-17	☒ 03-07	☐ 04-96	☐ 05-20
Thermocouple detector	☐ 07-03	☒ 09-03	☐ 09-04	☐ 10-27	☐ 10-28	
Substitution antenna	☐ 89-01	☒ 00-52				
Diode detector	☐ 99-26	☐ 99-27				
Oscilloscope	☐ 90-14	☐ 93-85	☐ 93-86	☐ 01-20	☐ 04-06	☐ 04-50
Multimeter	☐ 03-22	☐ 04-47	☐ 04-104	☐ 04-105	☐ 06-51	☐ 06-52
Temperature probe	☐ 91-11	☐ 03-05	☐ 05-34			
Frequency generator	☐ 88-23	☐ 00-42	☐ 03-39	☒ 04-03	☐ 04-89	☐ 05-78
Cables	☒ 10-53	☒ 10-54				

Result: ☒ pass ☐ fail ☐ not applicable ☐ not tested

Results of the testClient: *Phonak Communications SA*Apparatus: *DynaMic 3.0*Operating mode: *Single frequencies (2.402, 2.440 and 2.480 GHz) modulated*

Cables connected to the EUT: - - -

 Remarks:

- Centre of Tx antenna at 1.5 m height about floor
- RBW = VBW = 1MHz; Det = Peak

 Modifications:
 ☒ None
 ☐ 1
 ☐ 2
 ☐ 3
 ☐ 4
 ☐ 5

f [GHz]	Measurement with EUT		Power at substitution ant.		Meas. with subst. ant.	Parameters of substitution ant.		Result			Remarks
	E [dBm]	preamp [dB]	P [dBm]	factor [dB]	P [dBm]	gain [dB]	att. Cable [dB]	corr. [dB]	P EIRP [dBm]	P EIRP [W]	
2.402	-16.8	0.0	-1.712	0	-31.42	2.15	0	31.858	15.068	32.12 mW	Vertical
2.402	-21.2	0.0	-1.712	0	-31.5	2.15	0	31.938	10.738	11.85 mW	Horizontal
2.440	-15.5	0.0	-1.7	0	-32.01	2.15	0	32.46	16.95	49.55 mW	Vertical
2.440	-18.8	0.0	-1.7	0	-32.18	2.15	0	32.63	13.86	24.32 mW	Horizontal
2.480	-16.4	0.0	-1.7	0	-32.97	2.15	0	33.42	16.99	50.00 mW	Vertical
2.480	-19.9	0.0	-1.7	0	-33.05	2.15	0	33.5	13.62	23.01 mW	Horizontal

 Date of test: *May 24, 2011*
 Operator: *A. Bieri*

6.7 Antenna gain

Introduction: Determination of the antenna gain.

Method: The antenna gain is the difference of the radiated power EIRP of § 6.6 and the conducted power of § 6.5.

frequency [GHz]	Conducted power [dBm]	Radiated power EIRP [dBm]	Antenna gain [dBi]	Remarks
2.402000	17.18	15.068	-2.11	- - -
2.442000	17.75	16.95	-0.80	- - -
2.480000	16.15	16.99	0.84	- - -

Date of test: June 2011
Operator: A. Bieri

6.8 Band-edge emission (conducted)

Test site: ☐ anechoic chamber (foam) ☐ open test site
☐ anechoic chamber (ferrites) ☒ laboratory

Meas. uncertainty: 9kHz – 3GHz: ± 1 dB
 3GHz – 6.7GHz: ± 2.1 dB
 6.7GHz – 13.2GHz: ± 2.6 dB
 13.2GHz – 19GHz: ± 2.8 dB
 19GHz – 26.5GHz: ± 3 dB

Test method: Measurement of the conducted power on the antenna connector or a test fixture.

Limit: In any 100 kHz bandwidth outside the frequency band, the radio frequency power shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. This requirement applies to hopping mode on and off.

Test set-up:

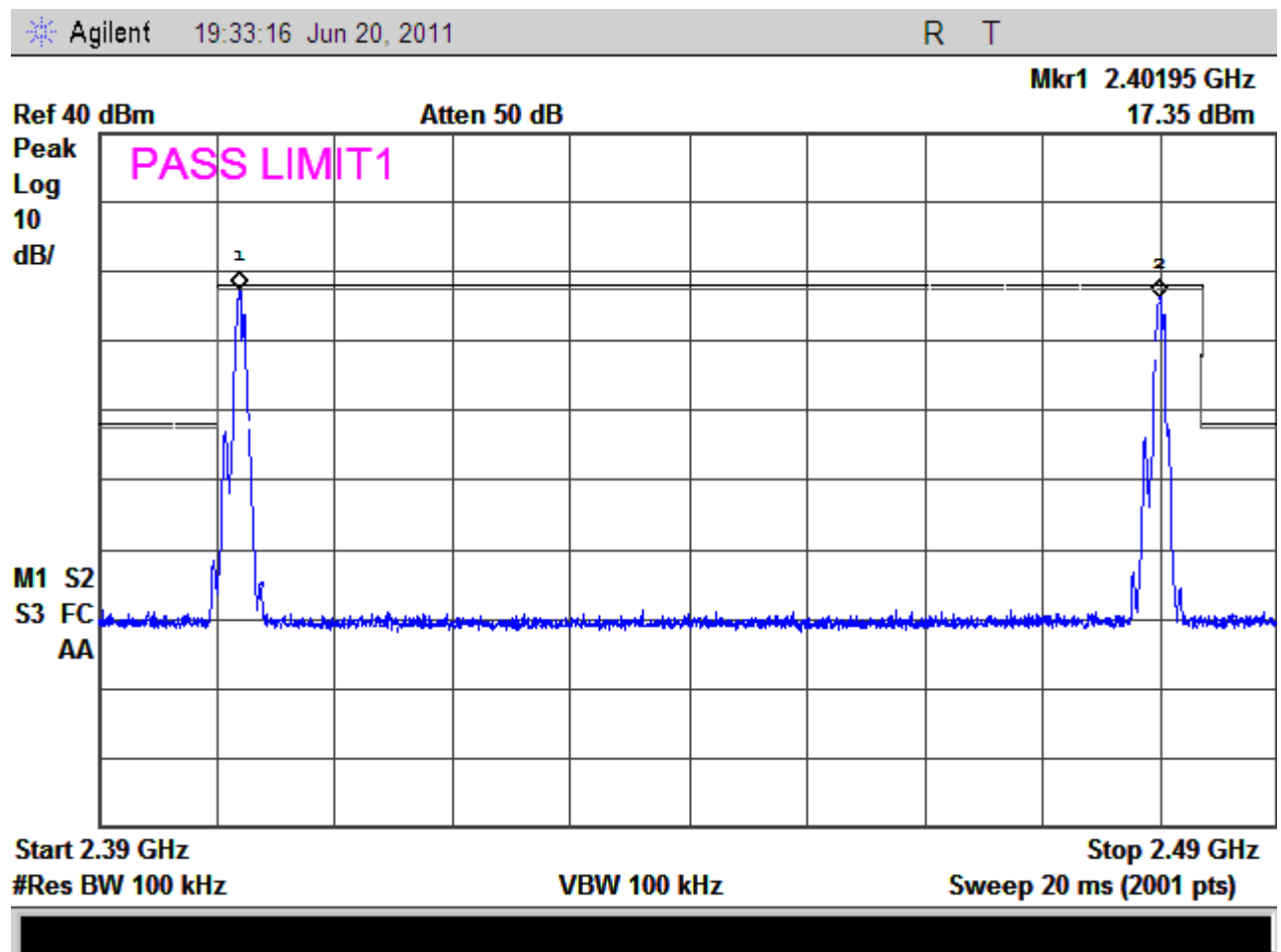


Remarks: - - -

Test equipment:

Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Cables	☒ Succoflex 0.5m (7833/4)					
Power supply	☒ Battery (3.8 VDC)					

Result: ☒ pass ☐ fail ☐ not applicable ☐ not tested

Results of the testClient: *Phonak Communications SA*Apparatus: *DynaMic 3.0*Operating mode: *Single frequencies (2.402 and 2.480 GHz) modulated*Cables connected to the EUT: *Temporary antenna cable*Remarks: *Measured on temporary antenna connector*Modifications: ☒ None ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5Date of test: *June 20, 2011*
Operator: *A. Bieri*

6.9 Band-edge emission (radiated)

Test site: ☐ anechoic chamber (ferrites) ☐ open test site
☒ anechoic chamber (foam) ☐

Meas. distance: ☒ 1 m ☐ 3 m ☐ 10 m ☐ 30 m

Meas. uncertainty: ± 4.7 dB

Position of EUT: 1.5 m (height above floor of equipment under test)

Measuring method: The carrier radiated by the equipment is measured using a spectrum analyser and a wide band antenna. The antenna is placed at the same height as the EUT successively with horizontal and vertical polarisations. The turning table is operated through 360° during the measurements. The recordings are carried out taking into account the maximum value of all the disturbances appearing while the apparatus is under test. The peak values are recorded continuously on the graph. The values exceeding a limit are remeasured manually using a receiver.

Limit: In any 100 kHz bandwidth outside the frequency band, the radio frequency power shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

Modifications: ☒ None ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Test set-up:



Remarks: Limit values expressed in dBμV/m and transformed to a measuring distance of 1m (factor used = 20 dB/decade) if necessary
 e.g.: for $f = 2.39$ GHz the limit is $500 \mu\text{V/m}$ at 3 m (FCC 15.209);

$$20 \log \left(\frac{500 \frac{\mu\text{V}}{\text{m}}}{1 \frac{\mu\text{V}}{\text{m}}} \right) + 20 \log \left(\frac{3 \text{ m}}{1 \text{ m}} \right) = 63.5 \frac{\text{dB}\mu\text{V}}{\text{m}} \text{ at } 1 \text{ m}$$

Test equipment:

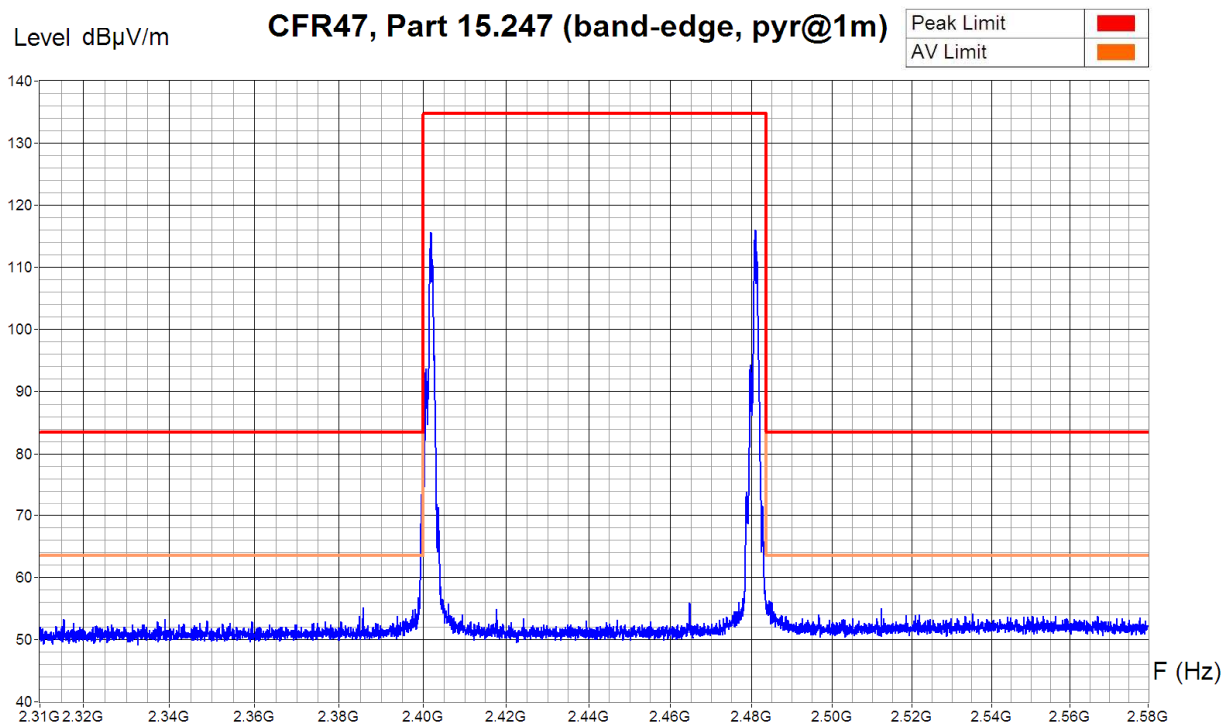
Spectrum analyser	☐ 88-14	☐ 90-26	☐ 94-24	☐ 02-06	☐ 03-45	☒ 07-53
Preamplifier	☐ 90-01	☐ 95-86	☐ 05-56	☐ 05-59	☐ 05-62	☒ 05-87
Antenna (horn)	☒ 90-24	☐ 98-12	☐ 98-13	☐ 07-31		
Cables	☒ Succoflex 1m (67688/4)					
Filter	☒ 10-68 (bandpass at 2.4 GHz)					

Result: ☒ pass ☐ fail ☐ not applicable ☐ not tested

Measurement Type : Radiated Field
Polarisation : Horizontal
Table Angle : 0 - 360°
Antenna Height : 1.5 m



Equipment Under Test : DynaMic 3.0
Set-Up : See picture
Operating Conditions : Min. / Max. hopping frequency modulated
Remarks : Peak measure
With filter 10-68



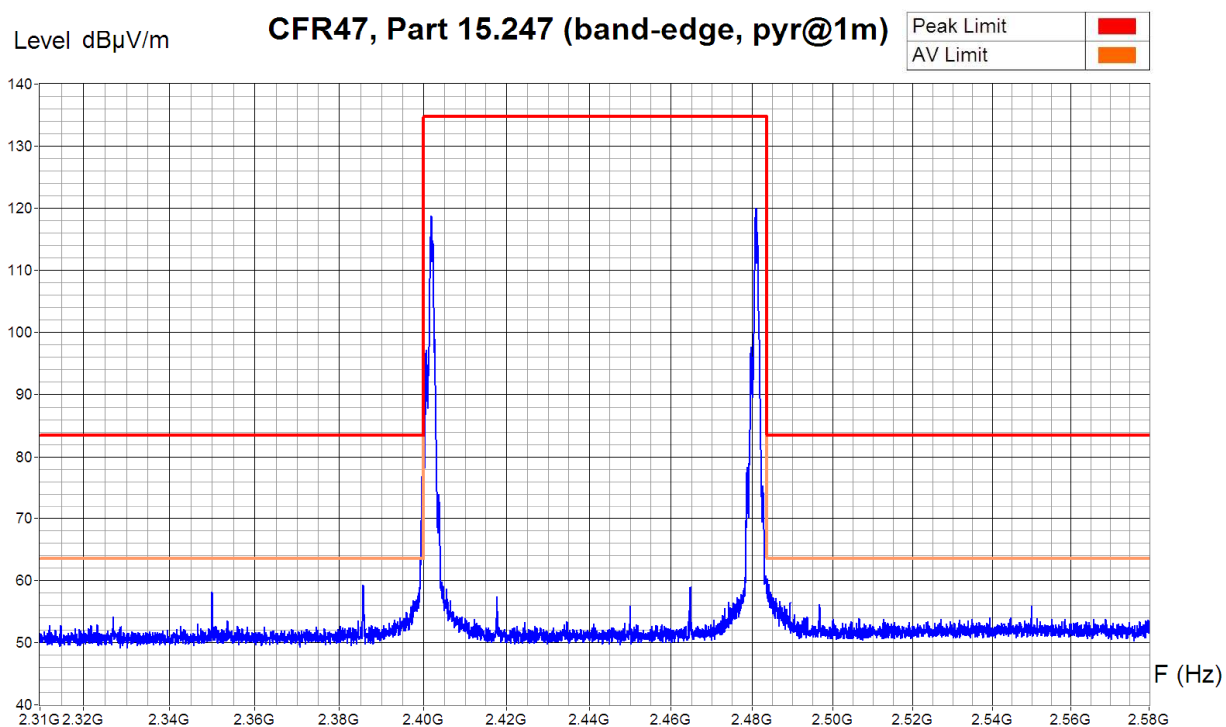
Zone	2.31 GHz - 2.58
Video Bandwidth	100 KHz
Resol Bandwidth	100 KHz

Operator: BiA
Date/Time: 19.05.2011 18:25
Filename:
010_rad_hor_CFR47_BandEdge.
png/.txt

Measurement Type : Radiated Field
Polarisation : Vertical
Table Angle : 0 - 360°
Antenna Height : 1.5 m



Equipment Under Test : DynaMic 3.0
Set-Up : See picture
Operating Conditions : Min. / Max. hopping frequency modulated
Remarks : peak measure



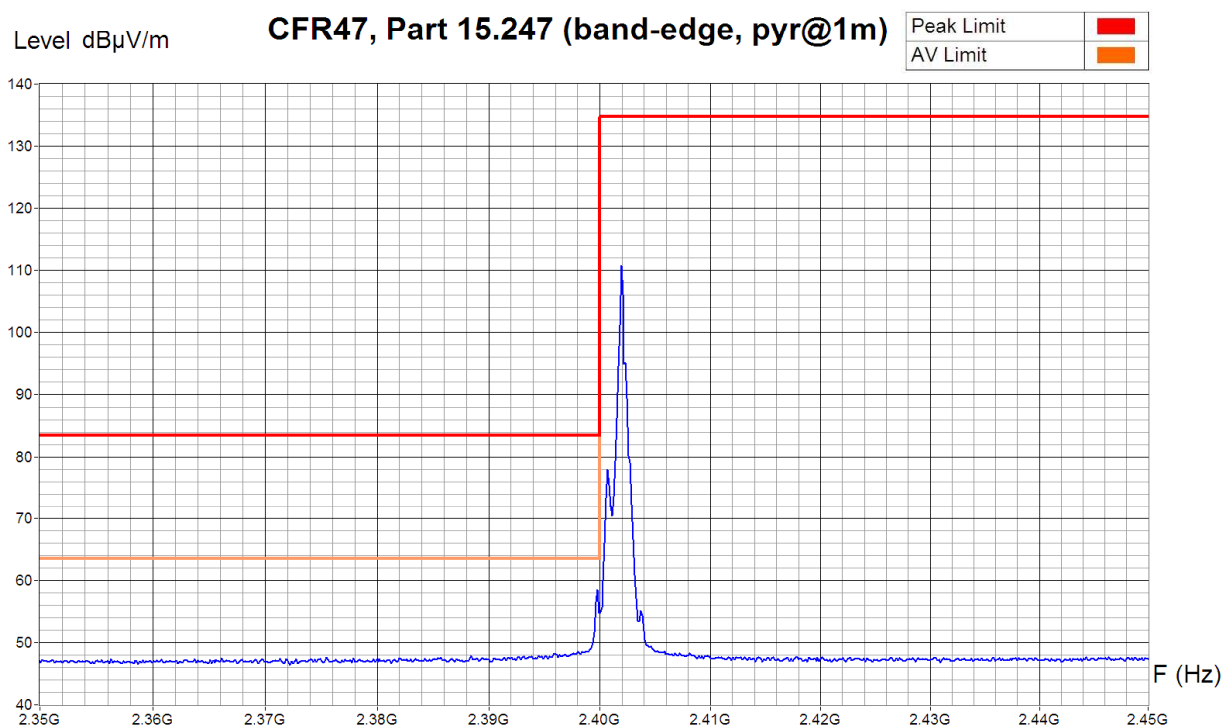
Zone	2.31 GHz - 2.58
Video Bandwidth	100 KHz
Resol Bandwidth	100 KHz

Operator: BIA
Date/Time: 19.05.2011 17:02
Filename:
010_rad_ver_CFR47_BandEdge.
png/.txt

Measurement Type : Radiated Field
Polarisation : Horizontal
Table Angle : Worst case position
Antenna Height : 1.5 m



Equipment Under Test : DynaMic 3.0
Set-Up : See picture
Operating Conditions : Single frequency 2.402 GHz modulated
Remarks : Pwr. Avg measurement, ST = 30s
With filter 10-68 and 30 dB Atten. at PreAmpli input



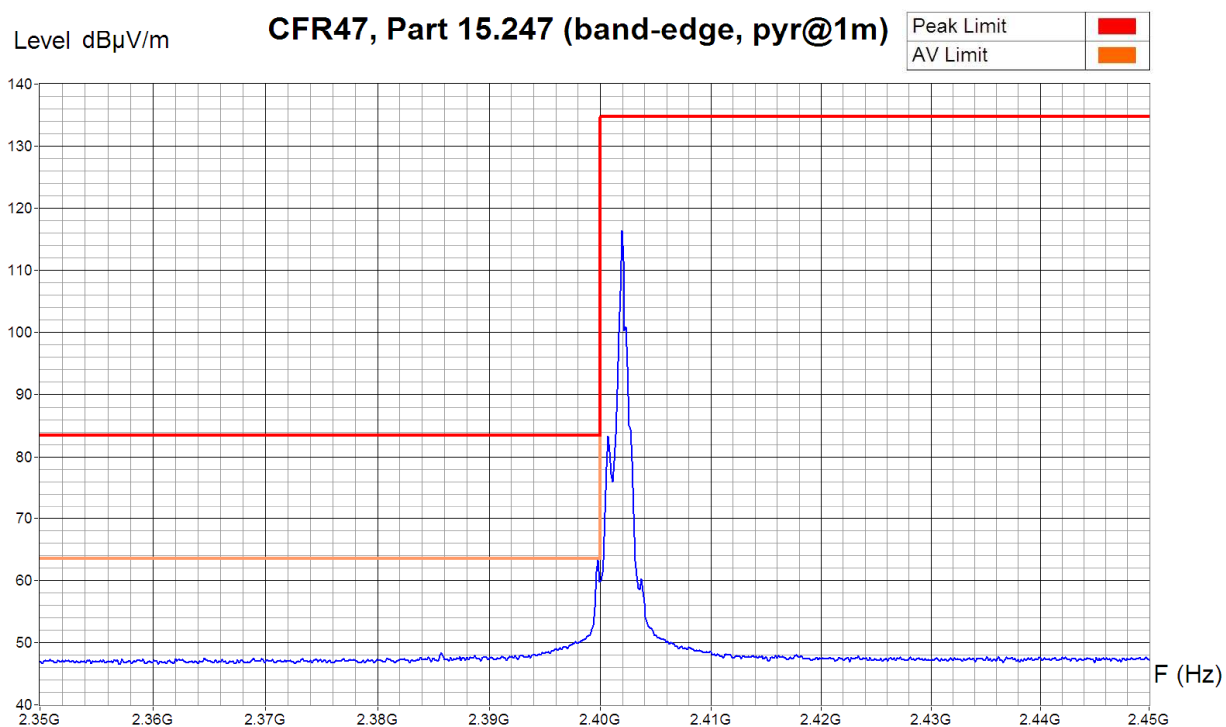
Zone	2.31 GHz - 2.58
Video Bandwidth	1 MHz
Resol Bandwidth	100 KHz

Operator: BiA
Date/Time: 01.07.2011 15:03
Filename:
010a_rad_hor_CFR47_BandEdge
_Avg_2402GHz.png/.txt

Measurement Type : Radiated Field
 Polarisation : Vertical
 Table Angle : Worst case position
 Antenna Height : 1.5 m



Equipment Under Test : DynaMic 3.0
 Set-Up : See picture
 Operating Conditions : Single frequency 2.402 GHz modulated
 Remarks : Pwr. Avg measurement, ST = 30s
 With filter 10-68 and 30 dB Atten. at PreAmpli input



Zone	2.31 GHz - 2.58
Video Bandwidth	1 MHz
Resol Bandwidth	100 KHz

Operator: BIA
 Date/Time: 01.07.2011 15:09
 Filename:
 010a_rad_ver_CFR47_BandEdge
 _Avg_2402GHz.png/.txt

6.10 Spurious emission (conducted – 9 kHz to 26.5 GHz)

Test site: ☐ anechoic chamber (foam) ☐ open test site
☐ anechoic chamber (ferrites) ☒ laboratory

Meas. uncertainty: 9kHz – 3GHz: ± 1 dB
 3GHz – 6.7GHz: ± 2.1 dB
 6.7GHz – 13.2GHz: ± 2.6 dB
 13.2GHz – 19GHz: ± 2.8 dB
 19GHz – 26.5GHz: ± 3 dB

Test method: Measurement of the conducted power on the antenna connector or a test fixture.

Limit: In any 100 kHz bandwidth outside the frequency band, the radio frequency power shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

Test set-up:



Remarks: - - -

Test equipment:

Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Cables	☒ Succoflex 0.5m (8407/4)					
Power supply	☒ Battery (3.8 VDC)					

Result:	☒ pass	☐ fail	☐ not applicable	☐ not tested
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Results of the testClient: *Phonak Communications SA*Apparatus: *DynaMic 3.0*Operating mode:

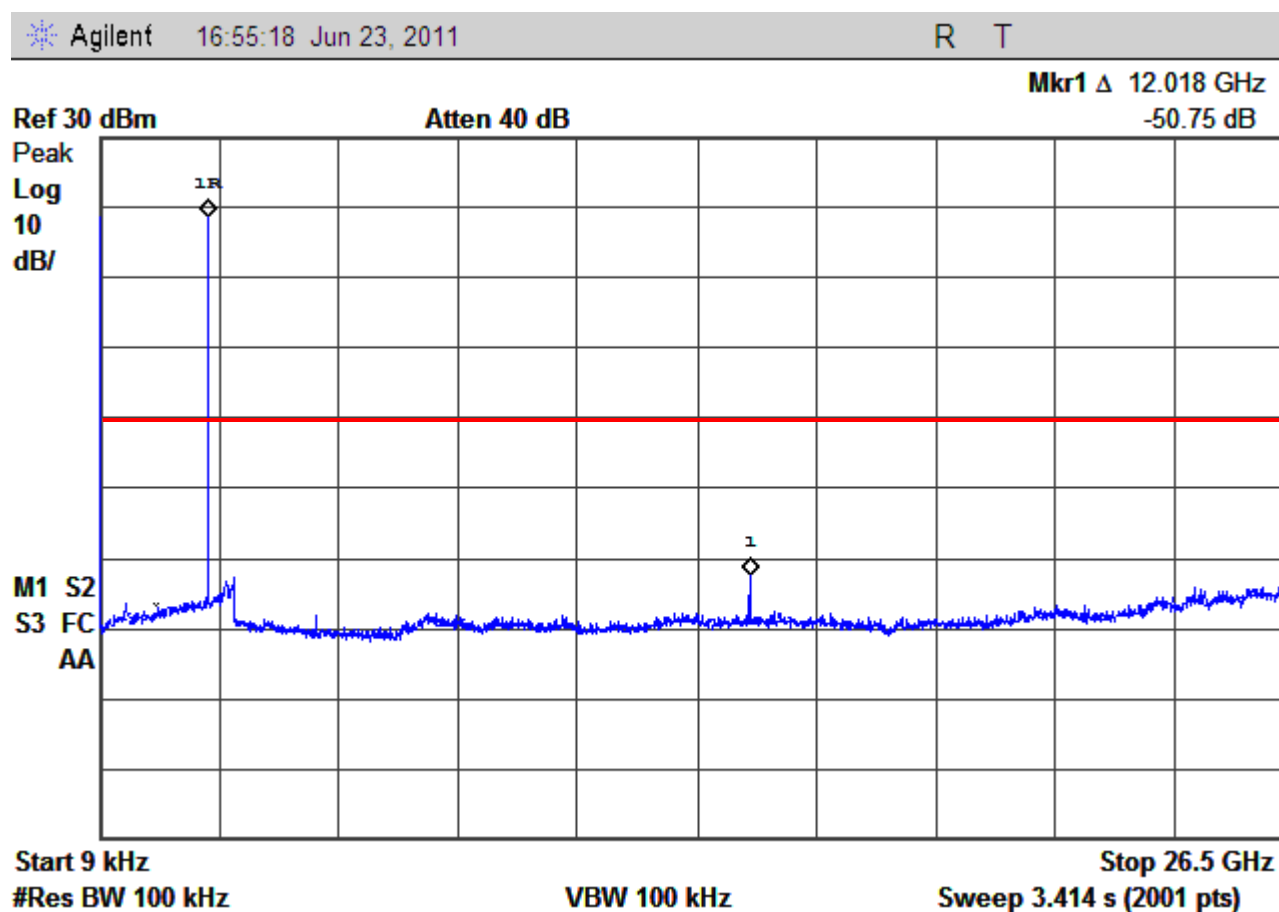
- *Single frequency (2.402 GHz, 2.441 GHz, 2.48 GHz)*
- *Modulated*

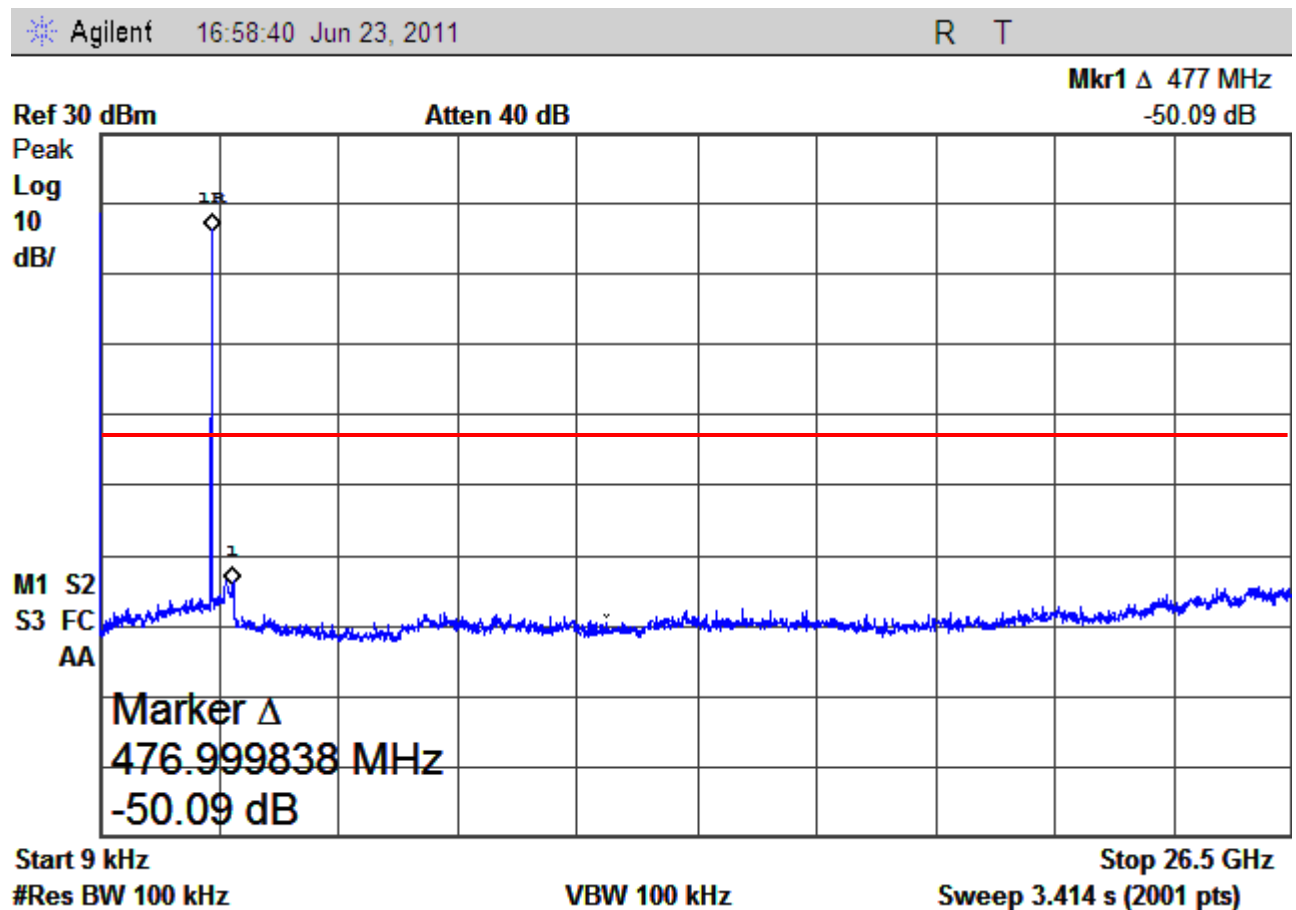
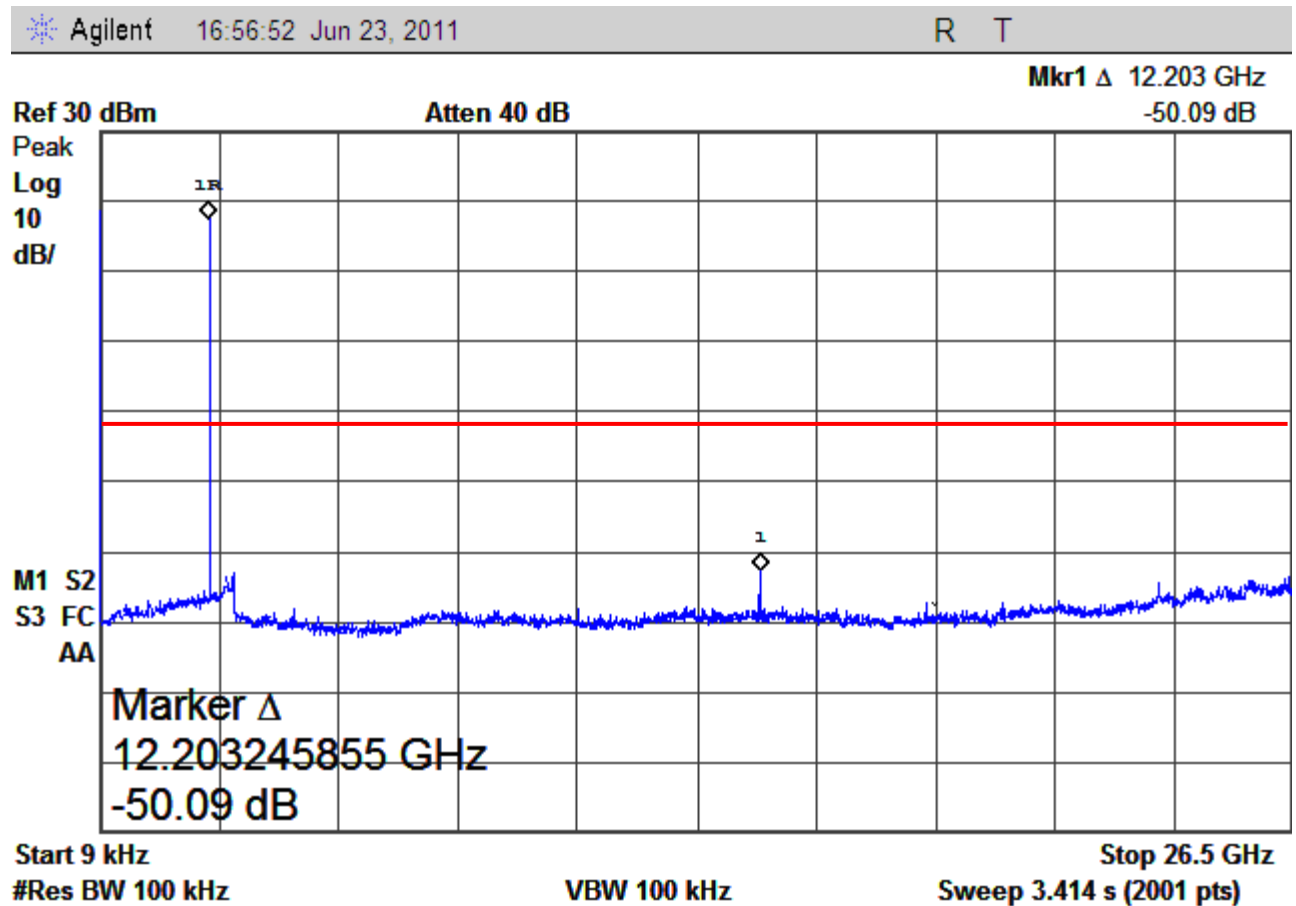
Cables connected to the EUT:

- *Temporary antenna cable*

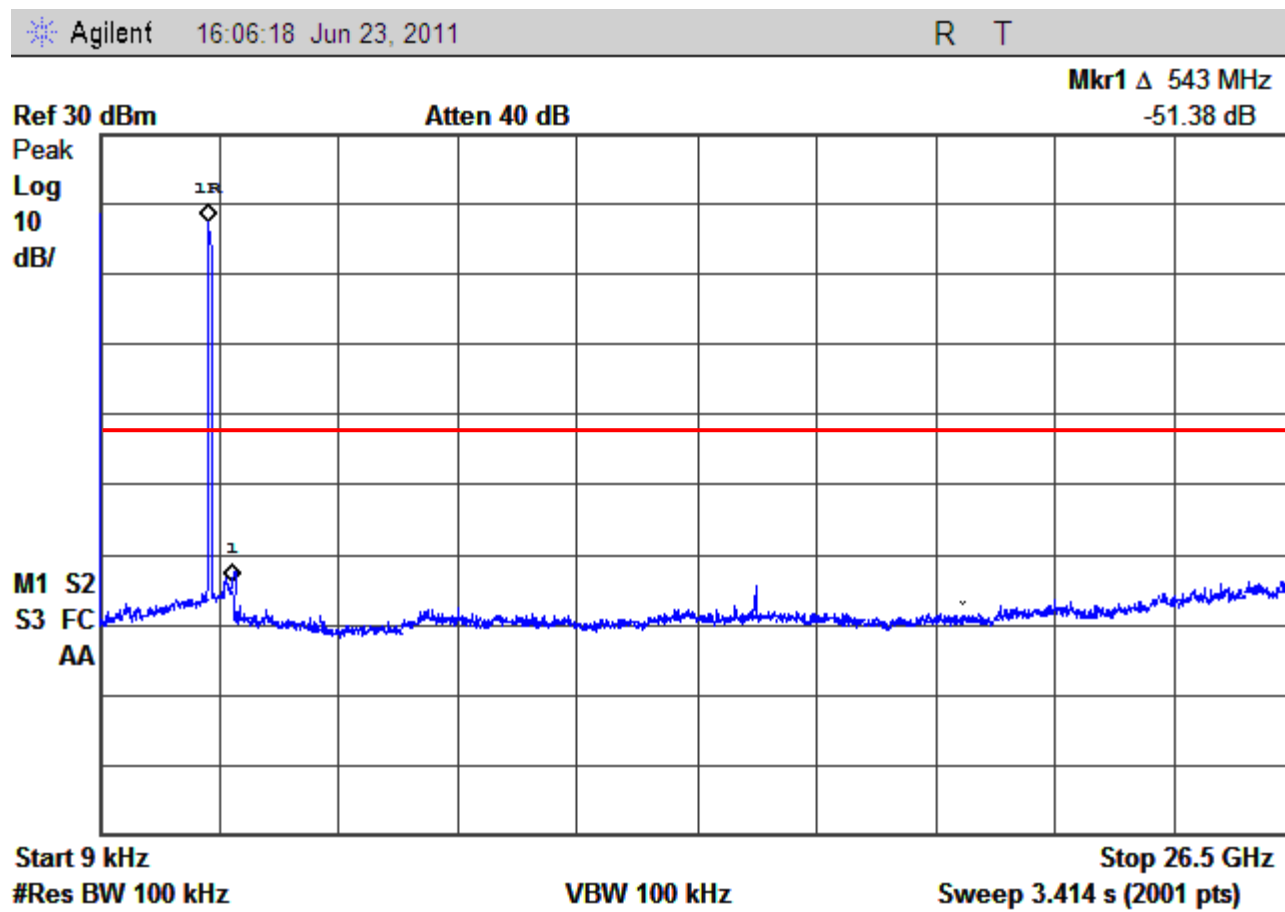
Remarks:

- *Measured on temporary antenna connector*
- *Limits: Spurious emission must be 30 dB below the transmitter frequency emission*

Modifications: ☒ None ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5**Measurement of all three single frequencies on the following plots**



Measurement of all hopping channels on the following plot



Date of test: June 23, 2011
Operator: A. Bieri

6.11 Spurious emission transmit mode - radiated**6.11.1 30 MHz to 1 GHz**

Test site: ☐ anechoic chamber (foam) ☐ open test site
☒ anechoic chamber (ferrites) ☐

Distance: ☒ 3 m ☐ 10 m ☐ 30 m

Position of EUT: 1.5 m (height of the equipment under test above floor)

Meas. uncertainty: ± 4.6 dB (30 - 300 MHz) / ± 3.7 dB (300 - 1000 MHz)

Test method: The electromagnetic disturbance radiated by the equipment is measured using a spectrum analyser and a wide band antenna. The antenna is moved from 1 to 4 m in height successively with horizontal and vertical polarisations. The turning table is operated through 360° during the measurements. The recordings are carried out taking into account the maximum value of all the disturbances appearing while the apparatus is under test. The peak values are recorded continuously on the graph. The values exceeding a limit are remeasured manually using a receiver.

Modifications: ☒ None ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Test set-up:

Remarks: Limit values expressed in dBμV/m and transformed to a measuring distance of 3m (factor used = 20 dB/decade) if necessary
 e.g.: for $f = 40$ MHz the limit is 100 μV/m at 3 m;

$$20 \log \left(\frac{100 \frac{\mu V}{m}}{1 \frac{\mu V}{m}} \right) = 40 \frac{dB \mu V}{m} \text{ at } 3m$$

Test equipment:

Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 10-70
Receiver	☐ 85-04	☐ 90-43	☐ 94-35	☒ 10-70		
Preamplifier	☐ 90-01	☐ 95-86	☐ 05-56	☒ 05-59	☐ 05-62	
Antenna (bilog)	☒ 94-03	☐ 05-38				
Cables	☒ 06-01 (+A, +B)					

Result: ☒ pass ☐ fail ☐ not applicable ☐ not tested

Measurement Type : Radiated Field
 Polarisation : Horizontal
 Table Angle : 0 - 360°
 Antenna Height : 1 - 4m

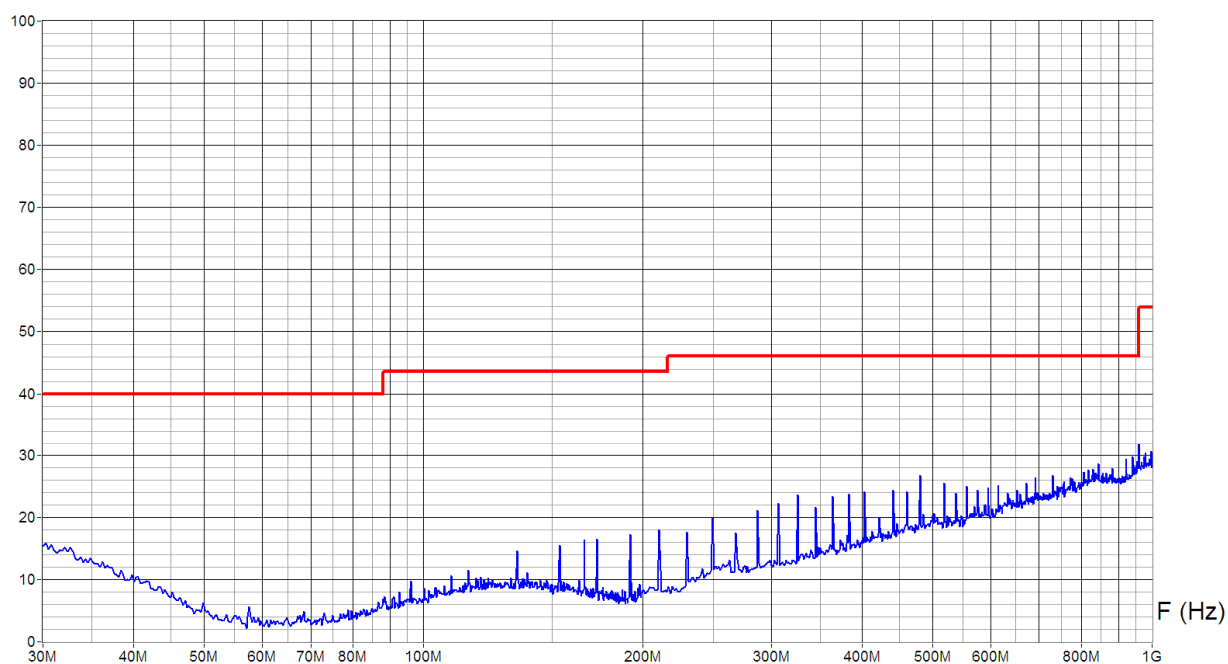


Equipment Under Test : DynaMic 3.0
 Set-Up : See picture
 Operating Conditions : Normal operation
 Remarks :

Level dB μ V/m

CFR47, Part 15.209/247 (fe@3m)

QP Limit



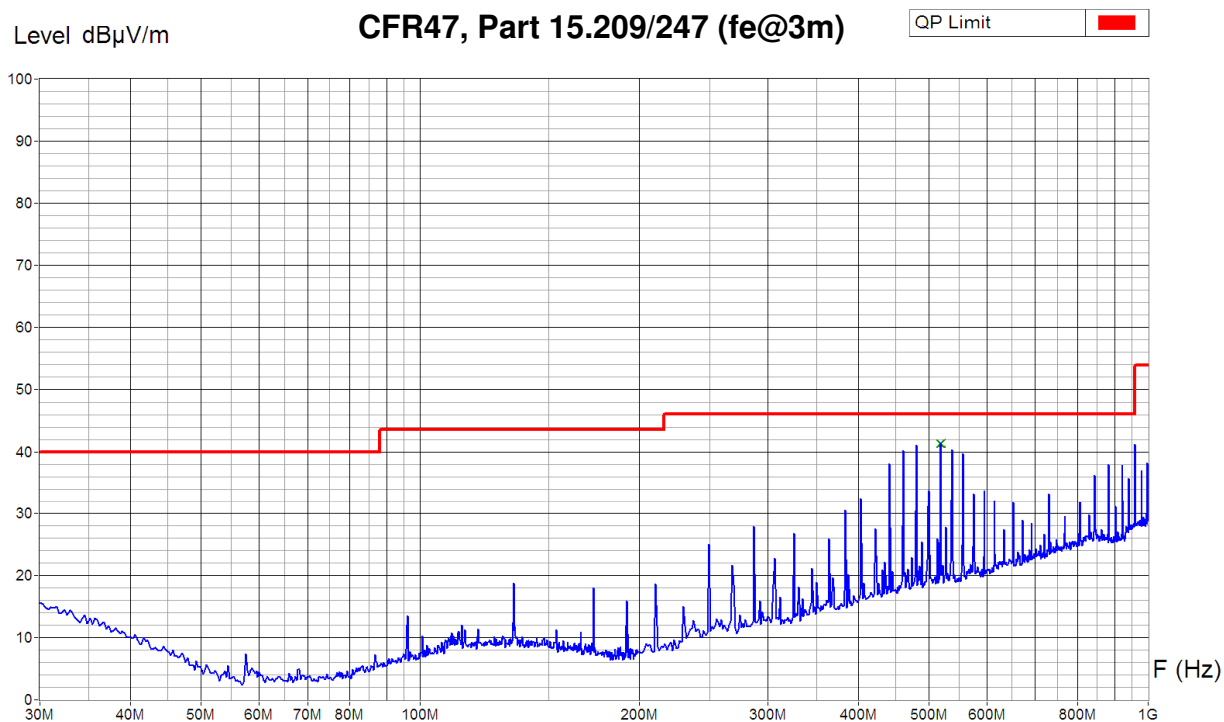
Zone	30 MHz - 199 MHz	199 MHz - 1 GHz
Video Bandwidth	300 KHz	300 KHz
Resol Bandwidth	100 KHz	100 KHz

Operator: BIA
 Date/Time: 18.05.2011 14:54
 Filename:
 001_rad_hor_30-
 1000MHz_CFR47_3m.png/.txt

Measurement Type : Radiated Field
Polarisation : Vertical
Table Angle : 0 - 360°
Antenna Height : 1 - 4m



Equipment Under Test : DynaMic 3.0
Set-Up : See picture
Operating Conditions : Normal operation
Remarks :



Zone	30 MHz - 199 MHz	199 MHz - 1 GHz
Video Bandwidth	300 KHz	300 KHz
Resol Bandwidth	100 KHz	100 KHz

Receiver Measures

Frequency	Peak	QuasiPeak (x)	Average (+)	QP Margin
518.40 MHz	43.2 dB μ V/m	41.3 dB μ V/m	40.9 dB μ V/m	4.7 dB

Operator: BiA
Date/Time: 18.05.2011 14:42
Filename:
001_rad_ver_30-
1000MHz_CFR47_3m.png/.txt

6.11.2 1 GHz to 18 GHz

Test site: ☐ anechoic chamber (ferrites) ☒ anechoic chamber (foam)

Distance: ☒ 1 m ☐ 3 m ☐ 10 m ☐ 30 m

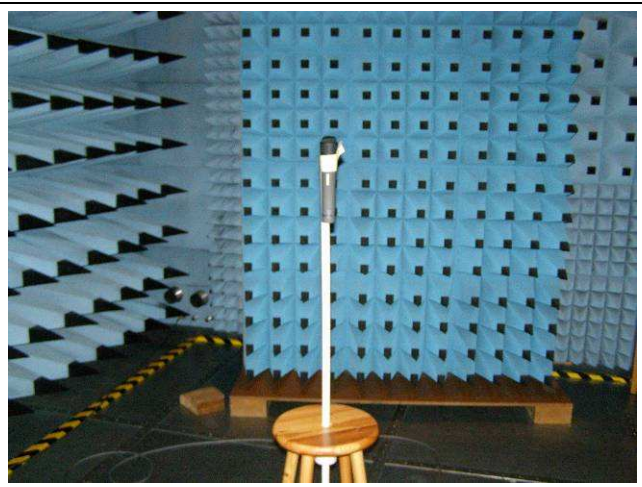
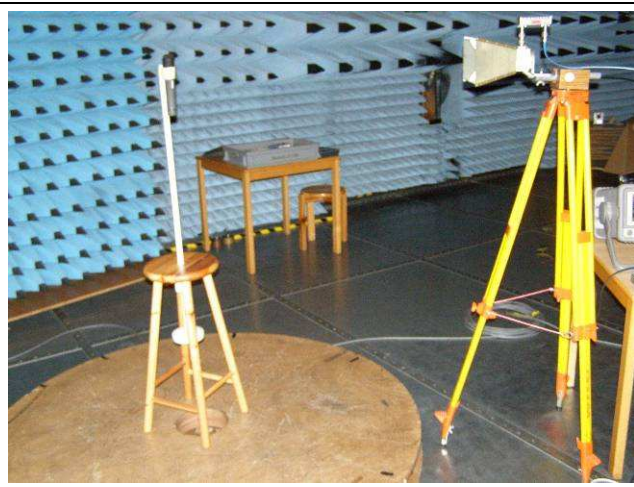
Position of EUT: 1.5 m (height of the equipment under test above floor)

Meas. uncertainty: ± 4.7 dB

Test method: The electromagnetic disturbance radiated by the equipment is measured using a spectrum analyser and a wide band antenna. The antenna is placed at the same height as the EUT successively with horizontal and vertical polarisations. The turning table is operated through 360° during the measurements. The recordings are carried out taking into account the maximum value (peak) of all the disturbances appearing while the apparatus is under test.

Modifications: ☒ None ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Test set-up:



Remarks:

- For all peak measurements: RBW = VBW = 1 MHz (except the range 17-18 GHz)
- For all average measurements: RBW = 1 MHz; VBW = 3 MHz (except the range 17-18 GHz)
- Limit values expressed in dBμV/m and transformed to a measuring distance of 1m (factor used = 20 dB/decade) if necessary
e.g.: for f = 1 GHz the limit is 500 μV/m at 3 m;

$$20 \log \left(\frac{500 \frac{\mu V}{m}}{1 \frac{\mu V}{m}} \right) + 20 \log \left(\frac{3m}{1m} \right) = 63.5 \frac{dB\mu V}{m} \text{ at } 1m$$

Test equipment:

Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Preamplifier	☒ 05-56	☒ 05-87				
Antenna (horn)	☒ 90-24	☐ 07-31				
Cables	☒ Succoflex 1m (67688/4) + 0.5m (7833/4)					
Filters	☒ 10-65	☒ 10-66	☒ 11-08	☒ 801-KF (980901-001)		

Measurement Type : Radiated Field
Polarisation : Horizontal
Table Angle : 0- 360°
Antenna Height : 1-4 m

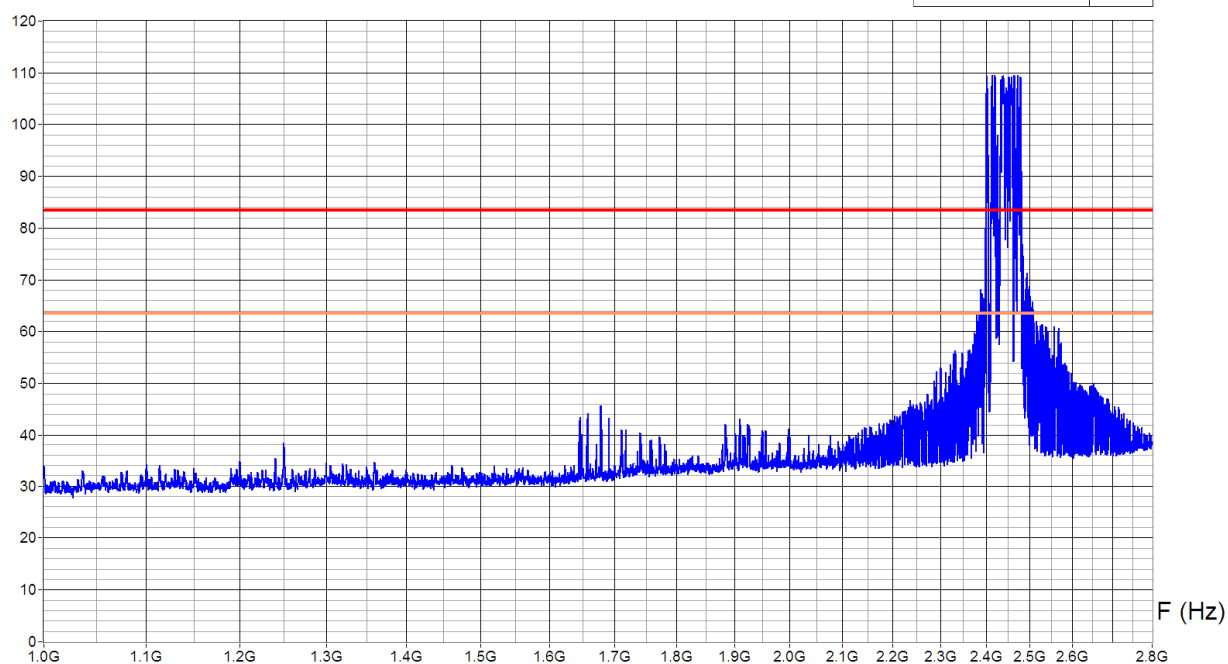


Equipment Under Test : DynaMic 3.0
Set-Up : See picture
Operating Conditions : Normal operation
Remarks : Without filter

Level dB μ V/m

CFR47, Part 15.209/247 (pyr@1m)

Peak Limit	█
AV Limit	█



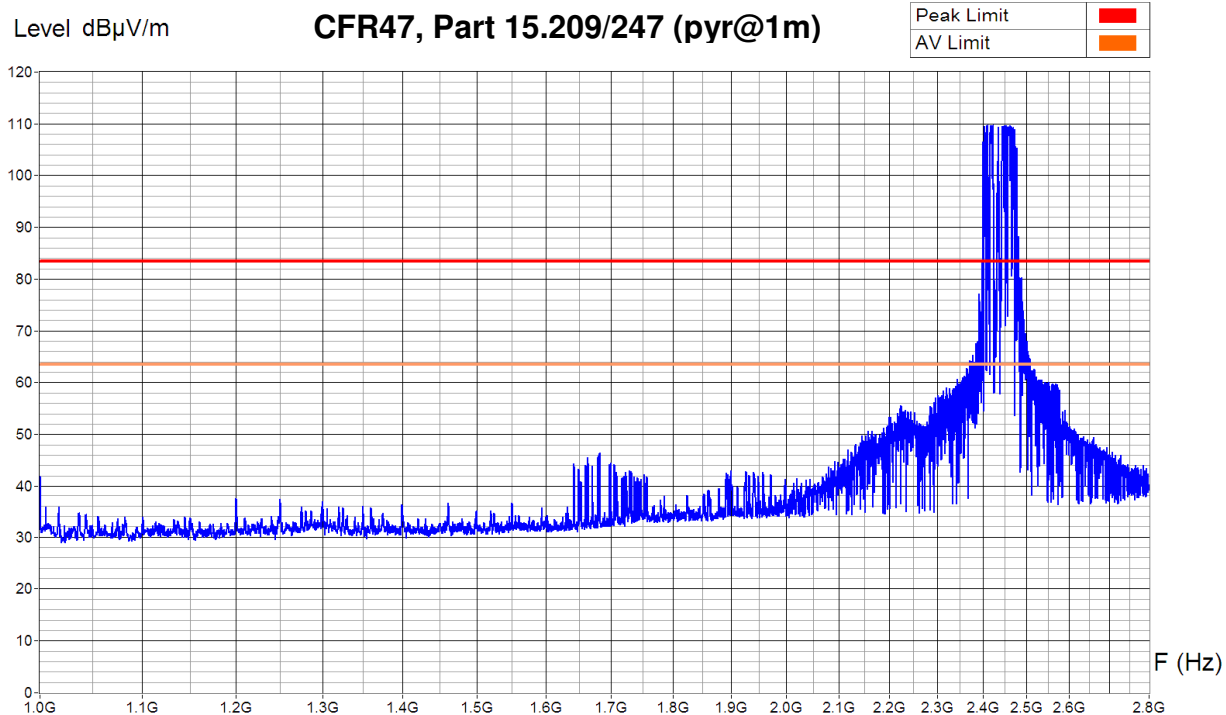
Zone	1 GHz - 2.80 GHz
Video Bandwidth	1 MHz
Resol Bandwidth	1 MHz

Operator: BiA
Date/Time: 19.05.2011 16:35
Filename:
008_rad_hor_CFR47_1m_1_2-
8GHz.png/.txt

Measurement Type : Radiated Field
Polarisation : Vertical
Table Angle : 0- 360°
Antenna Height : 1-4 m



Equipment Under Test : DynaMic 3.0
Set-Up : See picture
Operating Conditions : Normal operation
Remarks : Without filter



Zone	1 GHz - 2.80 GHz
Video Bandwidth	1 MHz
Resol Bandwidth	1 MHz

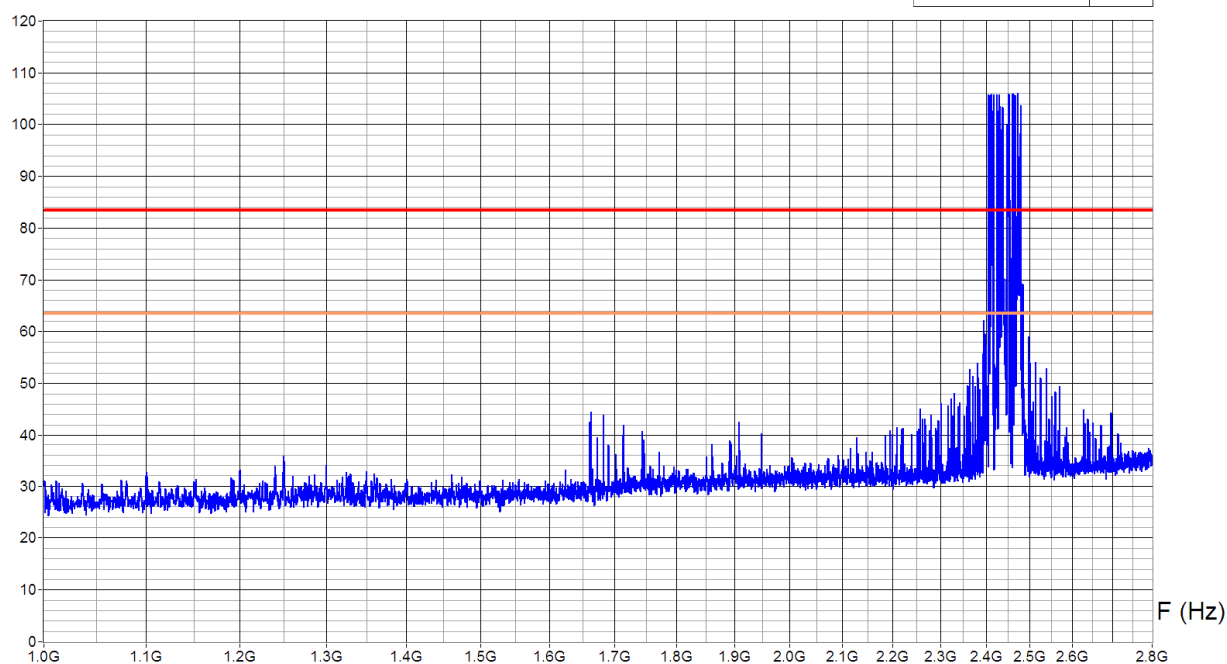
Operator: BIA
Date/Time: 19.05.2011 16:45
Filename:
008_rad_ver_CFR47_1m_1_2-
8GHz.png/.txt

Measurement Type : Radiated Field
 Polarisation : Horizontal
 Table Angle : 0- 360°
 Antenna Height : 1-4 m

 Equipment Under Test : DynaMic 3.0
 Set-Up : See picture
 Operating Conditions : Normal operation
 Remarks : Without filter
 Average measure

Level dB μ V/m**CFR47, Part 15.209/247 (pyr@1m)**

Peak Limit	█
AV Limit	█



Zone	1 GHz - 2.80 GHz
Video Bandwidth	3 MHz
Resol Bandwidth	1 MHz

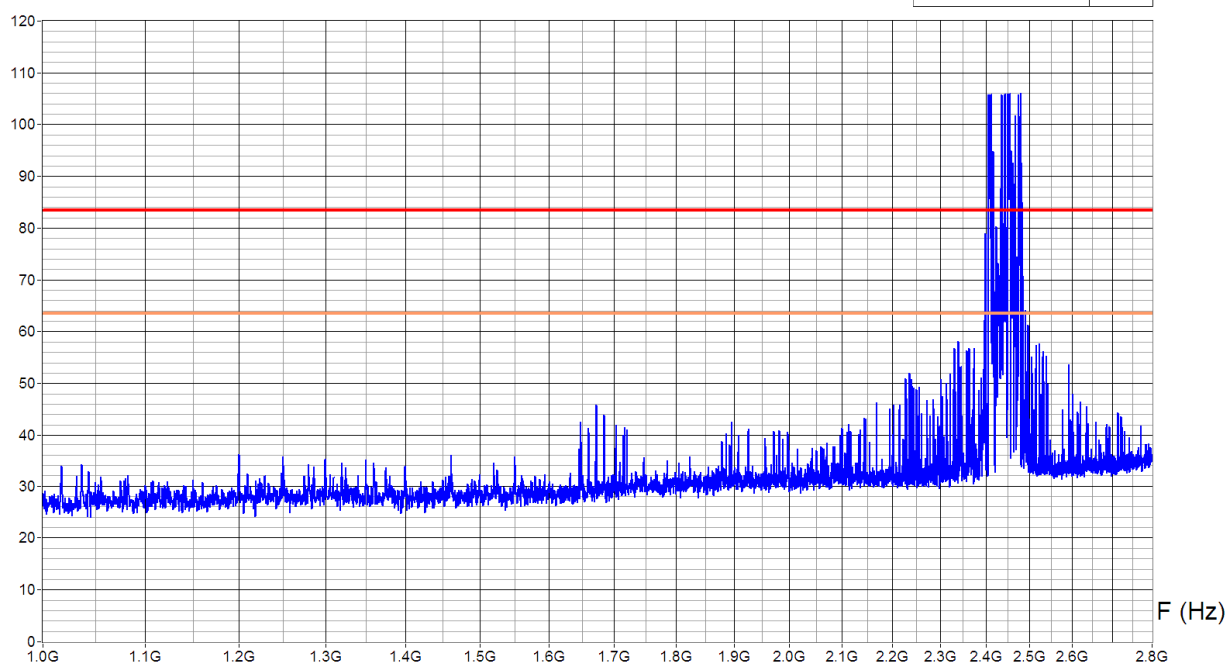
Operator: BiA
 Date/Time: 19.05.2011 16:38
 Filename:
 008_rad_hor_CFR47_1m_1_2-
 8GHz_Avg.png/.txt

Measurement Type : Radiated Field
 Polarisation : Vertical
 Table Angle : 0- 360°
 Antenna Height : 1-4 m

 Equipment Under Test : DynaMic 3.0
 Set-Up : See picture
 Operating Conditions : Normal operation
 Remarks : Without filter
 Average measure

Level dB μ V/m**CFR47, Part 15.209/247 (pyr@1m)**

Peak Limit	█
AV Limit	█



Zone	1 GHz - 2.80 GHz
Video Bandwidth	3 MHz
Resol Bandwidth	1 MHz

Operator: BIA
 Date/Time: 19.05.2011 16:41
 Filename:
 008_rad_ver_CFR47_1m_1_2-
 8GHz_Avg.png/.txt

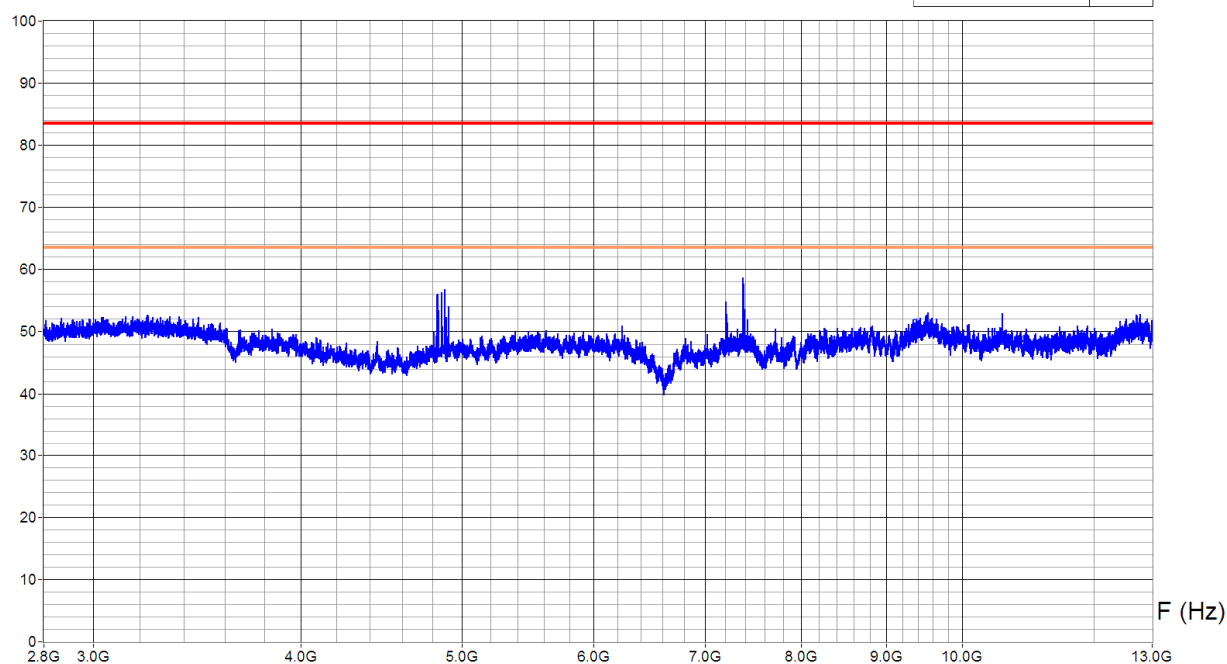
Measurement Type : Radiated Field
Polarisation : Horizontal
Table Angle : 0- 360°
Antenna Height : 1-4 m



Equipment Under Test : DynaMic 3.0
Set-Up : See picture
Operating Conditions : Normal operation
Remarks : With filter 10-65 and 10-66 and 11-08 (6.88 - 15 GHz)

Level dB μ V/m**CFR47, Part 15.209/247 (pyr@1m)**

Peak Limit	█
AV Limit	█



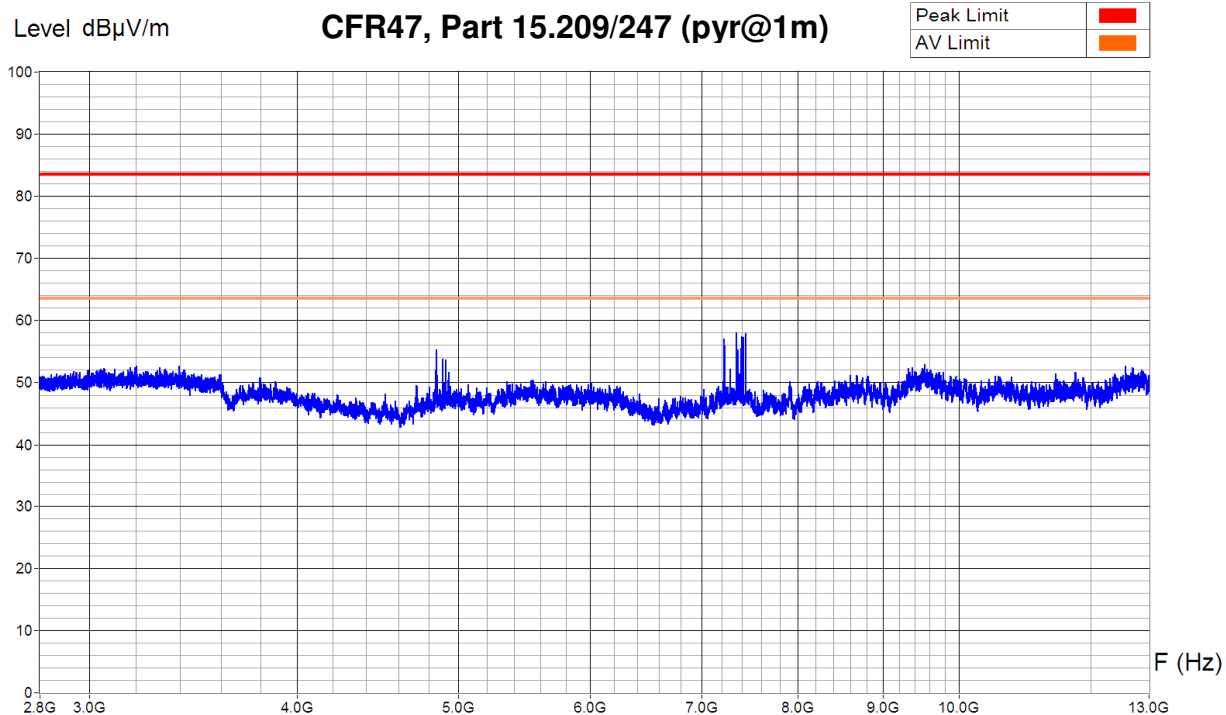
Zone	2.80 GHz - 3.60
Video Bandwidth	1 MHz
Resol Bandwidth	1 MHz

Operator: BiA
Date/Time: 09.06.2011 15:28
Filename:
006_rad_hor_CFR47_1m_2-
8_13GHz.png/.txt

Measurement Type : Radiated Field
 Polarisation : Vertical
 Table Angle : 0- 360°
 Antenna Height : 1.5 m



Equipment Under Test : DynaMic 3.0
 Set-Up : See picture
 Operating Conditions : Normal operation
 Remarks : With filter 10-65 and 10-66 and 11-08 (6.88 - 15 GHz)



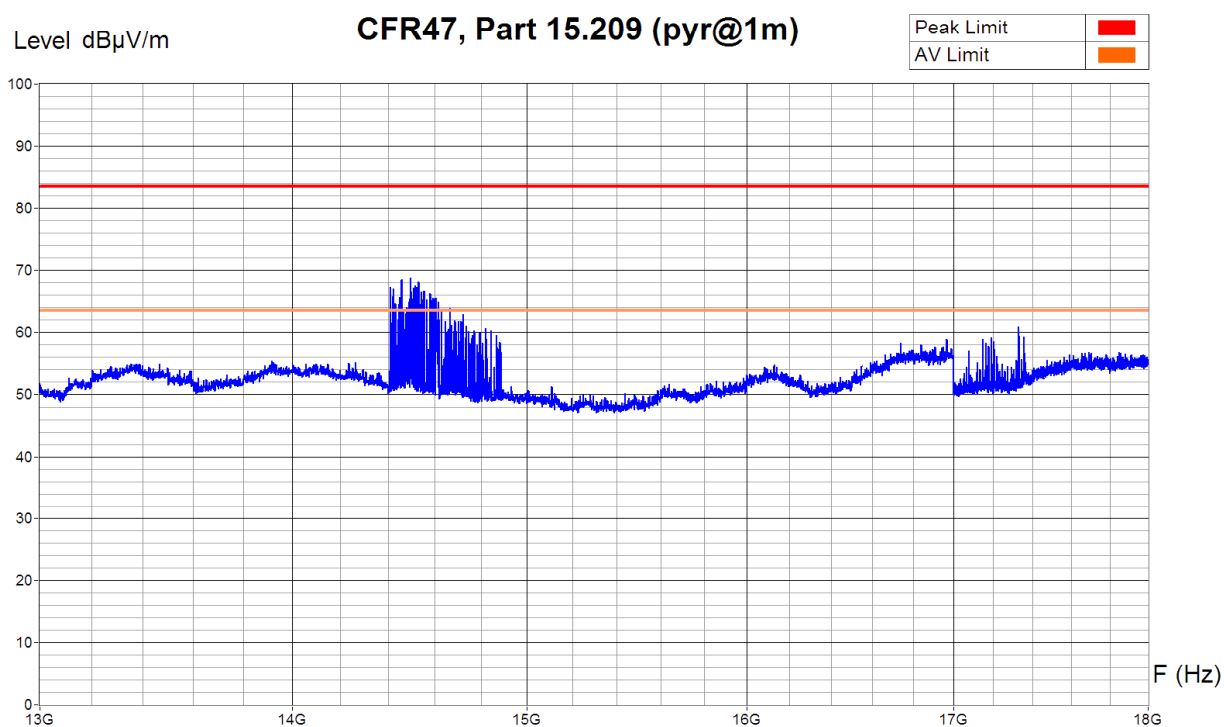
Zone	2.80 GHz - 3.60
Video Bandwidth	1 MHz
Resol Bandwidth	1 MHz

Operator: BIA
 Date/Time: 09.06.2011 15:25
 Filename:
 006_rad_ver_CFR47_1m_2-
 8_13GHz.png/.txt

Measurement Type : Radiated Field
 Polarisation : Horizontal
 Table Angle : 0- 360°
 Antenna Height : 1.5 m



Equipment Under Test : DynaMic 3.0
 Set-Up : See picture
 Operating Conditions : Normal operation
 Remarks : With filter 11-08 and 801-kF



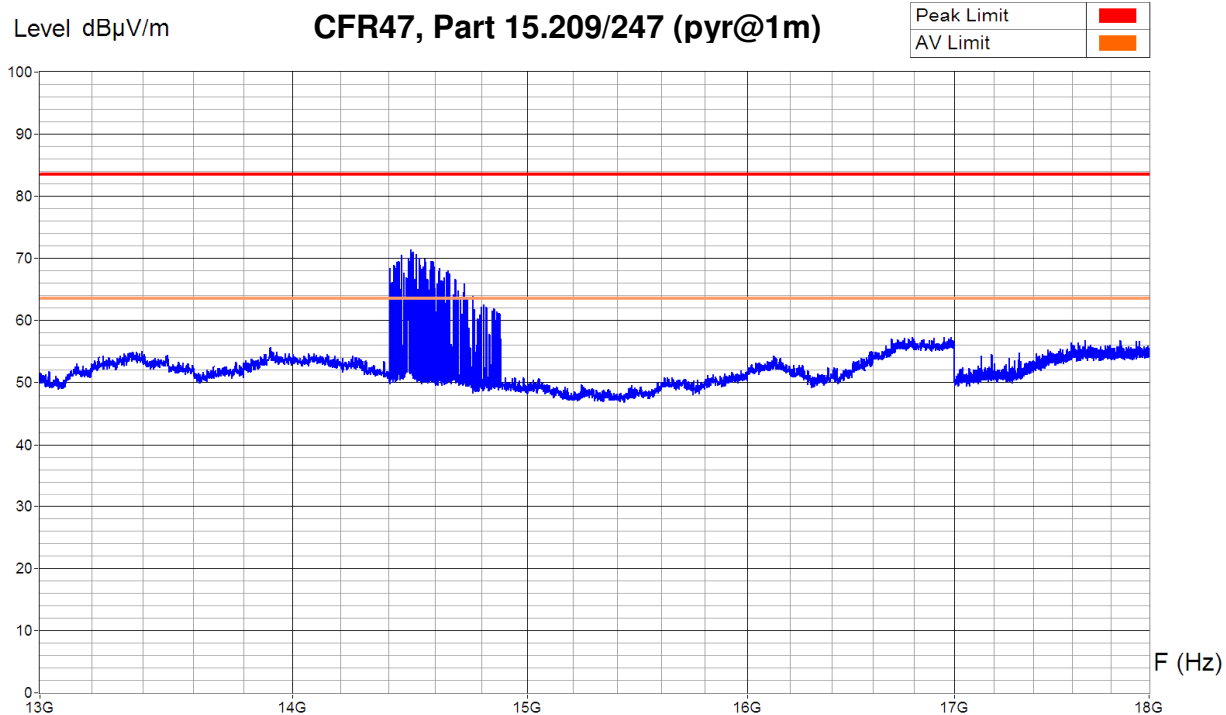
Zone	13 GHz - 15 GHz	15 GHz - 17 GHz	17 GHz - 18 GHz
Video Bandwidth	1 MHz	1 MHz	300 KHz
Resol Bandwidth	1 MHz	1 MHz	300 KHz

Operator: BiA
 Date/Time: 08.06.2011 17:01
 Filename:
 007_rad_hor_CFR47_1m_13-18GHz.png/.txt

Measurement Type : Radiated Field
 Polarisation : Vertical
 Table Angle : 0- 360°
 Antenna Height : 1.5 m



Equipment Under Test : DynaMic 3.0
 Set-Up : See picture
 Operating Conditions : Normal operation
 Remarks : With filter 11-08 and 801-KF



Zone	13 GHz - 15 GHz	15 GHz - 17 GHz	17 GHz - 18 GHz
Video Bandwidth	1 MHz	1 MHz	300 KHz
Resol Bandwidth	1 MHz	1 MHz	300 KHz

Operator: BIA
 Date/Time: 08.06.2011 17:12
 Filename:
 007_rad_ver_CFR47_1m_13-
 18GHz.png/.txt

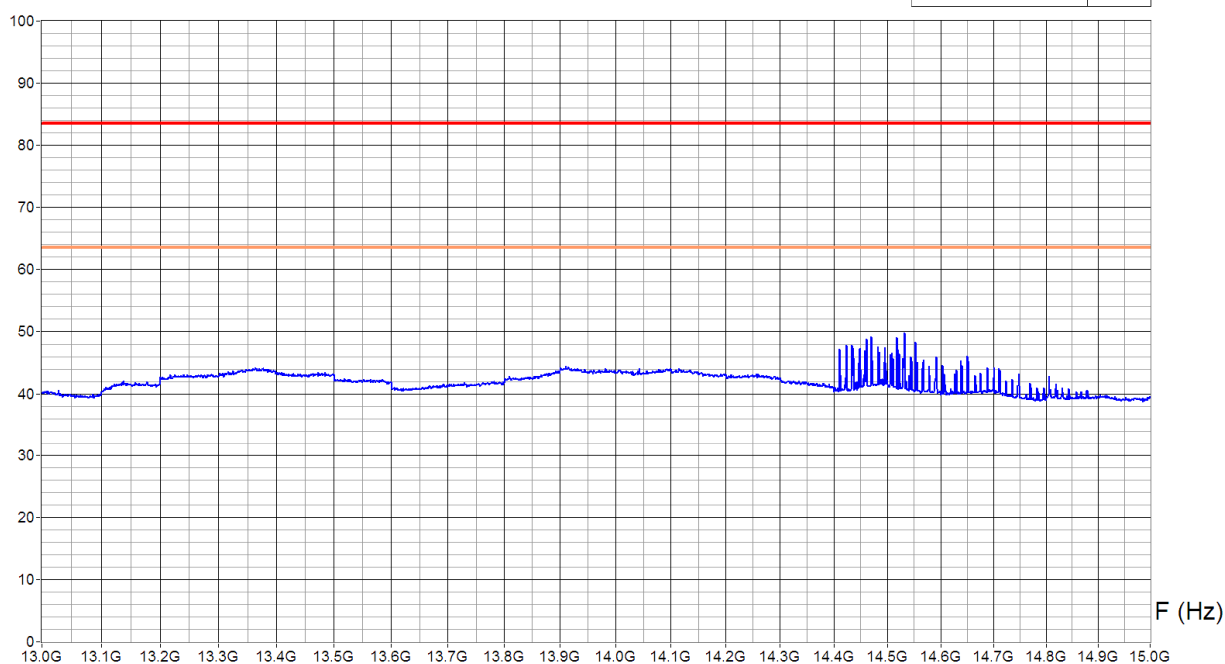
Measurement Type : Radiated Field
Polarisation : Horizontal
Table Angle : 0- 360°
Antenna Height : 1.5 m



Equipment Under Test : DynaMic 3.0
Set-Up : See picture
Operating Conditions : Normal operation
Remarks : With filter 11-08
Pwr, Avg, measurement (sweep time; 10 s, RBW = 1 MHz)

Level dB μ V/m**CFR47, Part 15.209/247 (pyr@1m)**

Peak Limit	█
AV Limit	█



Zone	13 GHz - 15 GHz
Video Bandwidth	3 MHz
Resol Bandwidth	1 MHz

Operator: BiA
Date/Time: 08.06.2011 16:56
Filename:
007_rad_hor_CFR47_1m_13-
15GHz_Avg.png/.txt

Measurement Type : Radiated Field
Polarisation : Horizontal
Table Angle : 0- 360°
Antenna Height : 1.5 m

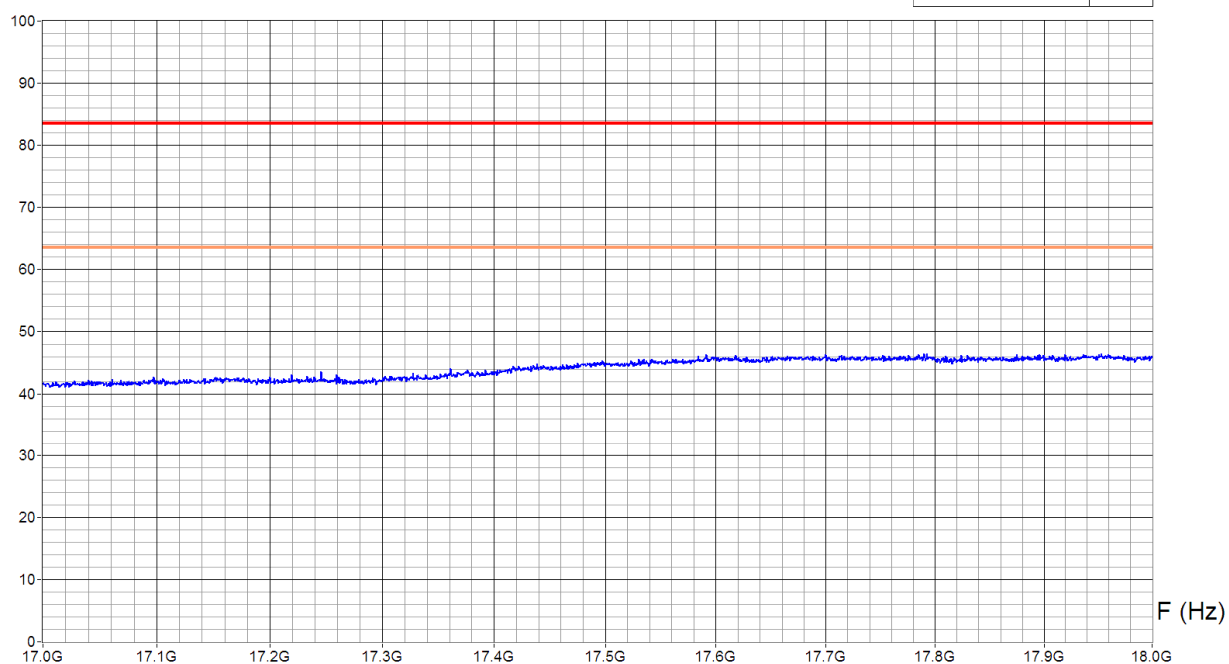


Equipment Under Test : DynaMic 3.0
Set-Up : See picture
Operating Conditions : Normal operation
Remarks : With filter 801-kF
Pwr, Avg, measurement (sweptime; 5 s, RBW = 1 MHz)

Level dBµV/m

CFR47, Part 15.209/247 (pyr@1m)

Peak Limit	█
AV Limit	█



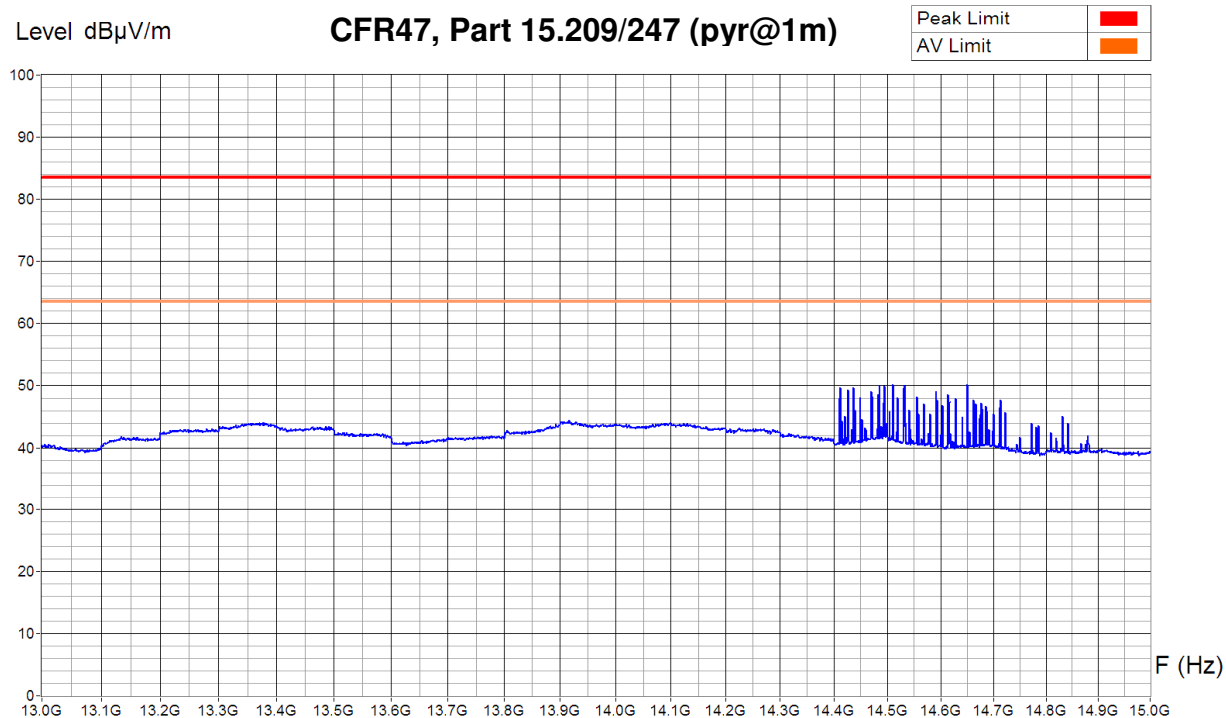
Zone	17 GHz - 18 GHz
Video Bandwidth	3 MHz
Resol Bandwidth	300 KHz

Operator: BIA
Date/Time: 08.06.2011 17:05
Filename:
007_rad_hor_CFR47_1m_17-
18GHz_Avg.png/.txt

Measurement Type : Radiated Field
Polarisation : Vertical
Table Angle : 0- 360°
Antenna Height : 1.5 m



Equipment Under Test : DynaMic 3.0
Set-Up : See picture
Operating Conditions : Normal operation
Remarks : With filter 11-08
Pwr, Avg, measurement (sweep time; 10 s, RBW = 1 MHz)



Zone	13 GHz - 15 GHz
Video Bandwidth	3 MHz
Resol Bandwidth	1 MHz

Operator: BiA
Date/Time: 08.06.2011 16:47
Filename:
007_rad_ver_CFR47_1m_13-
15GHz_Avg.png/.txt

6.11.3 18 GHz to 26.5 GHz

Test site: ☒ anechoic chamber (foam) ☐ anechoic chamber (ferrites)

Distance: ☒ 1 m ☐ 3 m ☐ 10 m ☐ 30 m

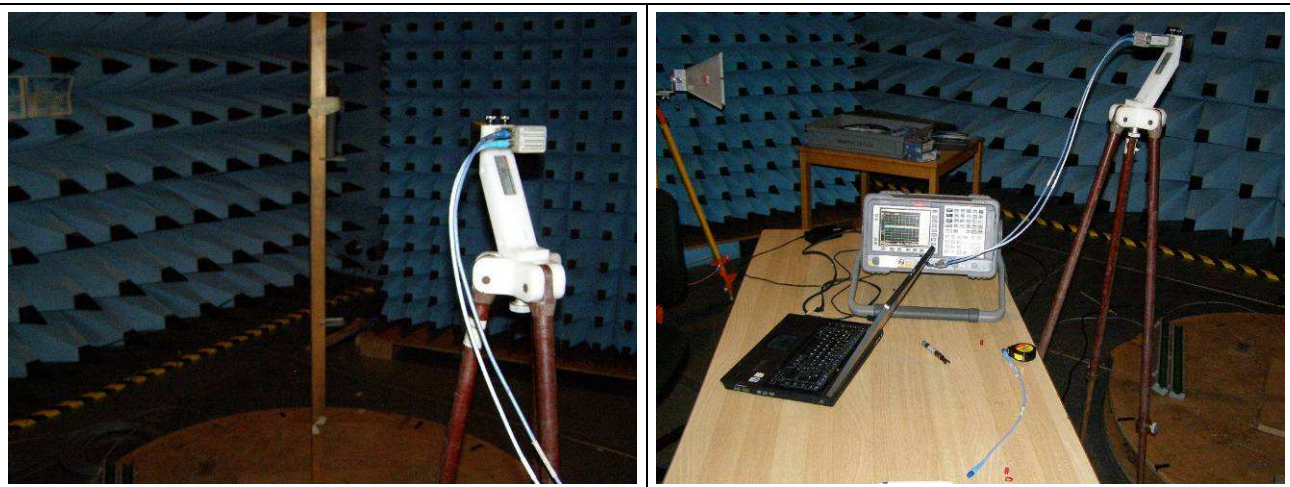
Position of EUT: 1.5 m (height of the equipment under test above floor)

Meas. uncertainty: ± 4.7 dB

Test method: The electromagnetic disturbance radiated by the equipment is measured using a spectrum analyser and a wide band antenna. The antenna is placed at the same height as the EUT successively with horizontal and vertical polarisations. The turning table is operated through 360° during the measurements. The recordings are carried out taking into account the maximum value (peak) of all the disturbances appearing while the apparatus is under test.

Modifications: ☒ None ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Test set-up:



- Remarks:
- Detector = Power Average
 - Limit values expressed in dBµV/m and transformed to a measuring distance of 1m (factor used = 20 dB/decade) if necessary
e.g.: for $f = 18$ GHz the limit is $500 \mu\text{V/m}$ at 3 m;

$$20 \log \left(\frac{500 \frac{\mu\text{V}}{\text{m}}}{1 \frac{\mu\text{V}}{\text{m}}} \right) + 20 \log \left(\frac{3 \text{ m}}{1 \text{ m}} \right) = 63.5 \frac{\text{dB}\mu\text{V}}{\text{m}} \text{ at } 1 \text{ m}$$

Test equipment:

Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Antenna (horn)	☒ 98-12					
External mixer	☒ 11970K					
Cables	☒ 10-50	☒ 10-61				

Result: ☒ pass ☐ fail ☐ not applicable ☐ not tested

Measurement Type : Radiated Field
 Polarisation : Horizontal
 Table Angle : 0- 360°
 Antenna Height : 1.5m

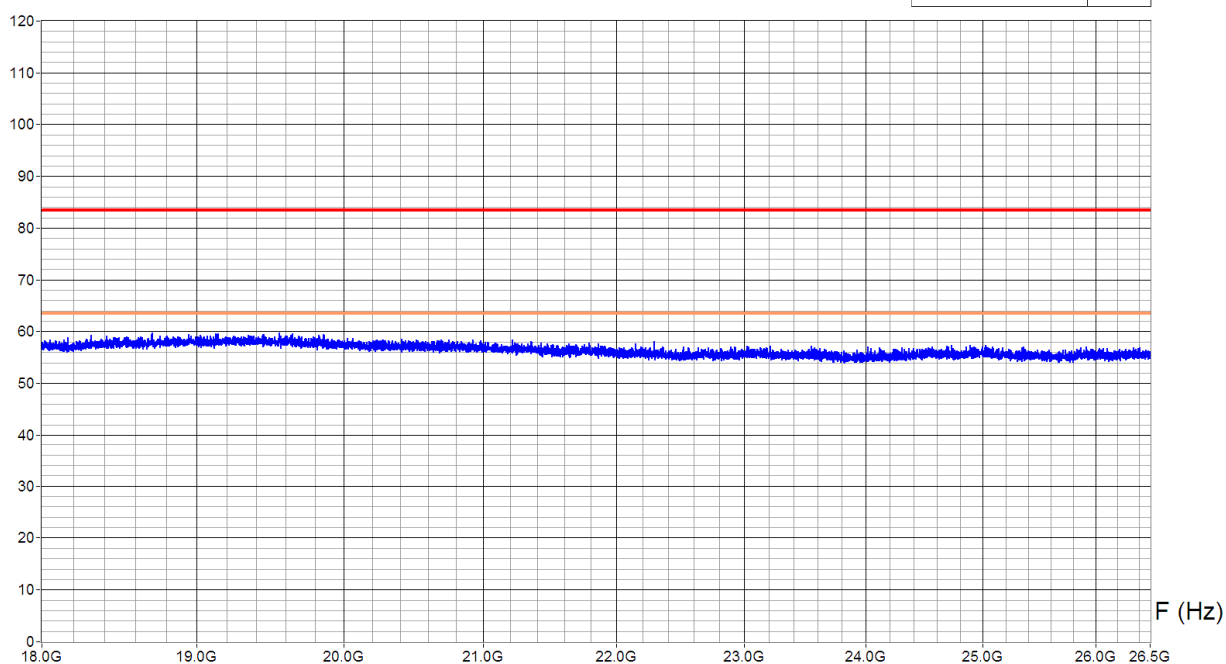
 Equipment Under Test : DynaMic 3.0
 Set-Up : See picture
 Operating Conditions : Normal operation
 Remarks : Without filter
 Average measurement
 EUT height: 1.5m



Level dBμV/m

CFR47, Part 15.209/247 (pyr@1m)

Peak Limit	█
AV Limit	█

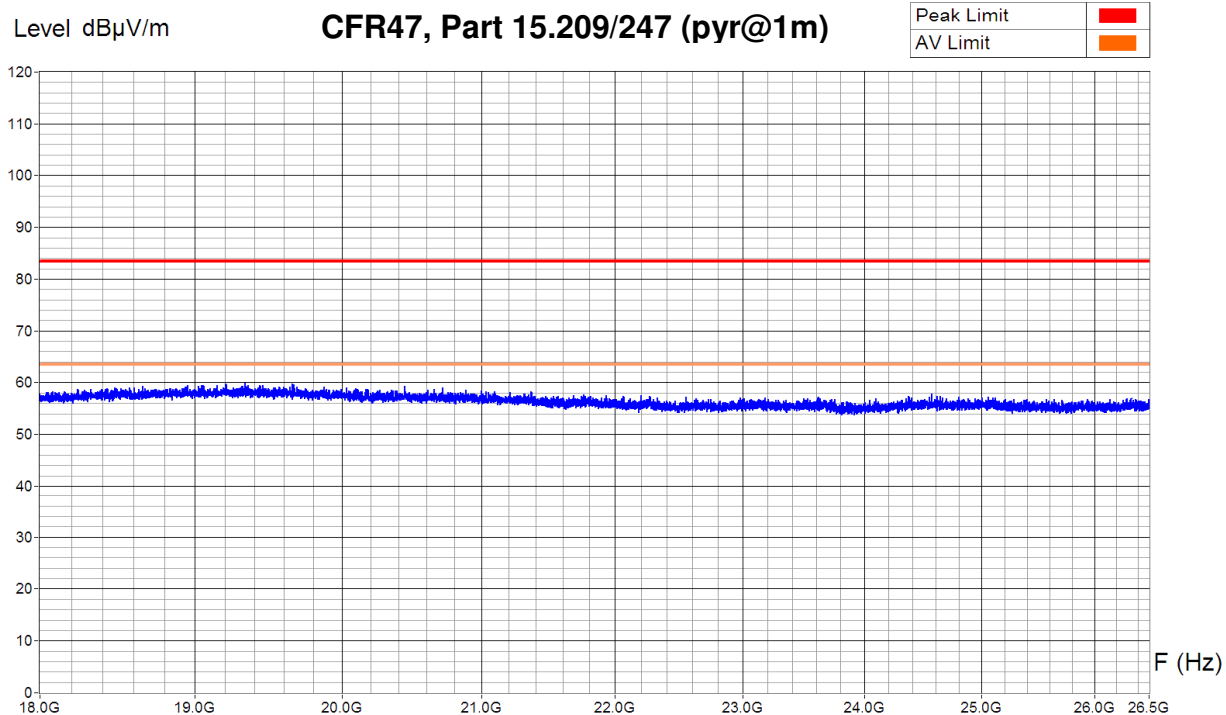


Zone	19.70 GHz - 21.40	21.40 GHz - 23.10	23.10 GHz - 24.80	24.80 GHz - 26.50
Video Bandwidth	1 MHz	1 MHz	1 MHz	1 MHz
Resol Bandwidth	100 KHz	100 KHz	100 KHz	100 KHz

Operator: BiA
 Date/Time: 03.06.2011 15:22
 Filename:
 030_rad_hor_FCC_1m_18-
 26GHz_Normaloperation.png/.txt

Measurement Type : Radiated Field
 Polarisation : Vertical
 Table Angle : 0- 360°
 Antenna Height : 1.5m

 Equipment Under Test : DynaMic 3.0
 Set-Up : See picture
 Operating Conditions : Normal operation
 Remarks : Without filter
 Average measurement
 EUT height: 1.5m



Zone	19.70 GHz - 21.40	21.40 GHz - 23.10	23.10 GHz - 24.80	24.80 GHz - 26.50
Video Bandwidth	1 MHz	1 MHz	1 MHz	1 MHz
Resol Bandwidth	100 KHz	100 KHz	100 KHz	100 KHz

Operator: BIA
 Date/Time: 03.06.2011 15:29
 Filename:
 030_rad_ver_FCC_1m_18-
 26GHz_Normaloperation.png/.txt

6.12 Spurious emission receive - radiated**6.12.1 30 MHz to 1 GHz**

Test site: ☐ anechoic chamber (foam) ☐ open test site
☒ anechoic chamber (ferrites) ☐

Distance: ☒ 3 m ☐ 10 m ☐ 30 m

Position of EUT: 1.5 m (height of the equipment under test above floor)

Meas. uncertainty: ± 4.6 dB (30 - 300 MHz) / ± 3.7 dB (300 - 1000 MHz)

Test method: The electromagnetic disturbance radiated by the equipment is measured using a spectrum analyser and a wide band antenna. The antenna is moved from 1 to 4 m in height successively with horizontal and vertical polarisations. The turning table is operated through 360° during the measurements. The recordings are carried out taking into account the maximum value of all the disturbances appearing while the apparatus is under test. The peak values are recorded continuously on the graph. The values exceeding a limit are remeasured manually using a receiver.

Modifications: ☒ None ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Test set-up:



- Remarks:
- Standby means: Special receiver mode, not possible in final product only prepared for this measurements
 - Limit values expressed in dB μ V/m and transformed to a measuring distance of 3m (factor used = 20 dB/decade) if necessary
e.g.: for $f = 40$ MHz the limit is 100 μ V/m at 3 m;

$$20 \log \left(\frac{100 \frac{\mu V}{m}}{1 \frac{\mu V}{m}} \right) = 40 \frac{dB \mu V}{m} \text{ at } 3m$$

Test equipment:

Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☒ 03-45	☐ 05-39	☒ 10-70
Receiver	☐ 85-04	☐ 90-43	☐ 94-35	☒ 10-70		
Preamplifier	☐ 90-01	☐ 95-86	☐ 05-56	☒ 05-59	☐ 05-62	
Antenna (bilog)	☒ 94-03	☐ 05-38				
Cables	☒ 06-01 (+A, +B)					

Result: ☒ pass ☐ fail ☐ not applicable ☐ not tested

Measurement Type : Radiated Field
 Polarisation : Horizontal
 Table Angle : 0 - 360°
 Antenna Height : 1 - 4 m

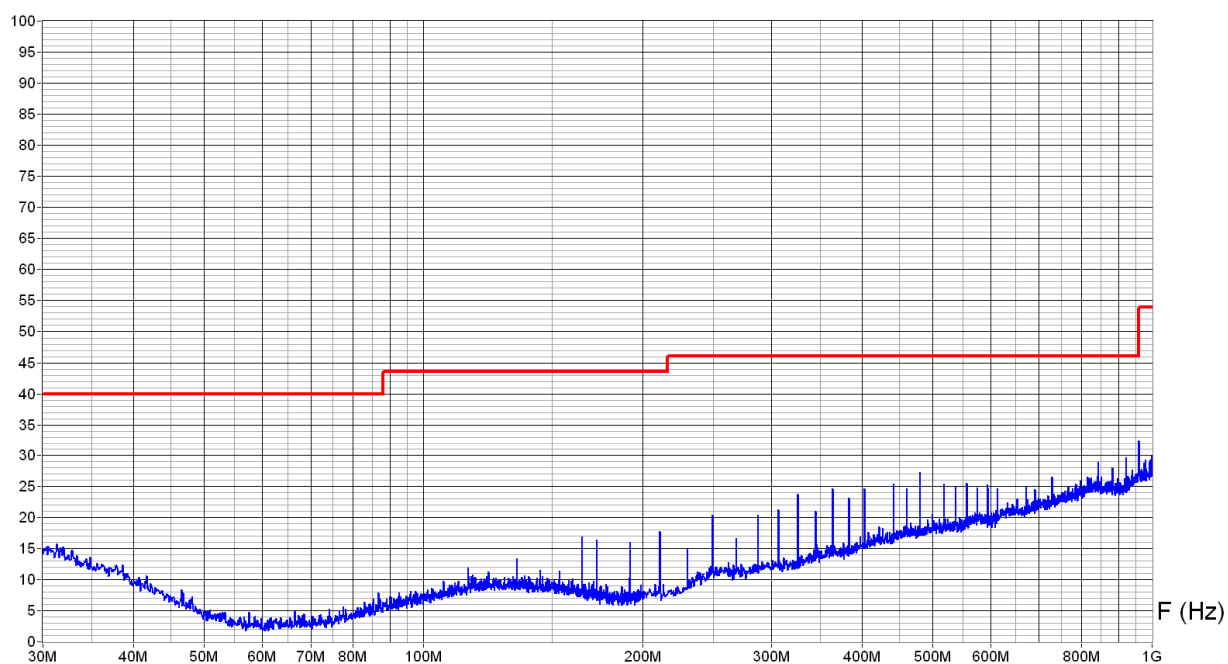


Equipment Under Test : DynaMic 3.0
 Set-Up : See picture
 Operating Conditions : Standby
 Remarks :

Level dB μ V/m

CFR47, Part 15.109 (fe@3m)

QP Limit



Zone	30 MHz - 199 MHz	199 MHz - 1 GHz
Video Bandwidth	300 KHz	300 KHz
Resol Bandwidth	100 KHz	100 KHz

Operator: BiA
 Date/Time: 08.06.2011 17:49
 Filename:
 001_rad_hor_CFR47_30-
 1000MHz_3m_Standby.png/.txt

Measurement Type : Radiated Field
 Polarisation : Vertical
 Table Angle : 0 - 360°
 Antenna Height : 1 - 4 m

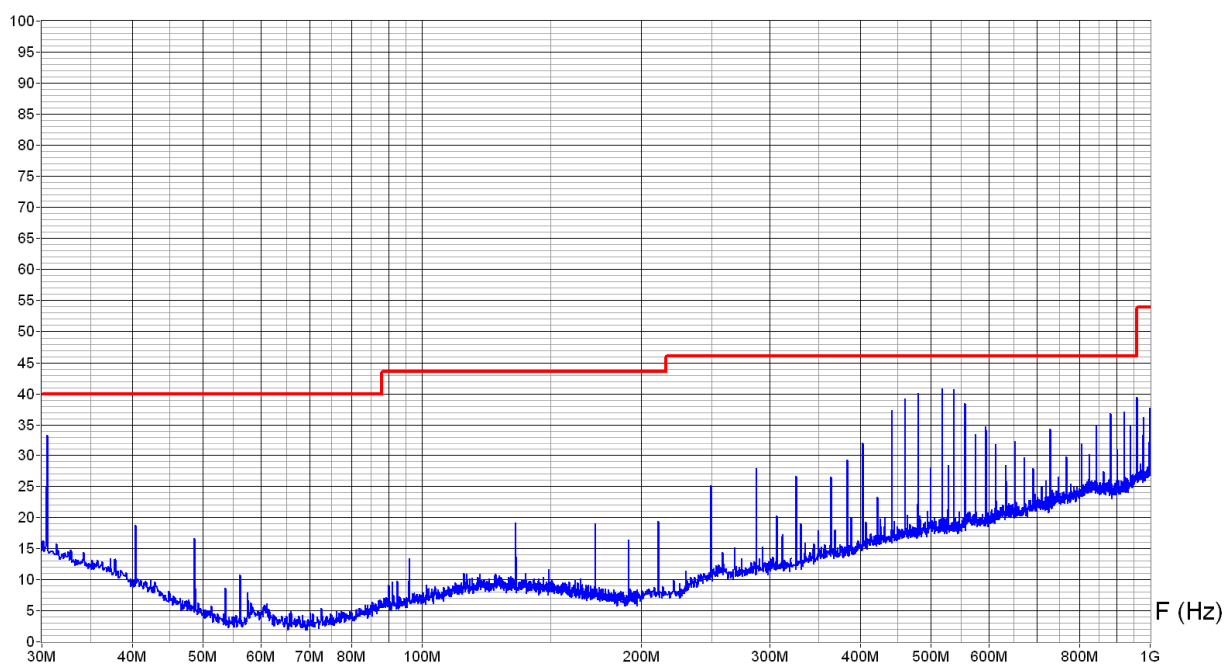


Equipment Under Test : DynaMic 3.0
 Set-Up : See picture
 Operating Conditions : Standby
 Remarks :

Level dB μ V/m

CFR47, Part 15.109 (fe@3m)

QP Limit



Zone	30 MHz - 199 MHz	199 MHz - 1 GHz
Video Bandwidth	300 KHz	300 KHz
Resol Bandwidth	100 KHz	100 KHz

Operator: BiA
 Date/Time: 08.06.2011 17:41
 Filename:
 001_rad_ver_CFR47_30-
 1000MHz_3m_Standby.png/.txt

6.12.2 1 GHz to 18 GHz

Test site: ☐ anechoic chamber (ferrites) ☒ anechoic chamber (foam)

Distance: ☒ 1 m ☐ 3 m ☐ 10 m ☐ 30 m

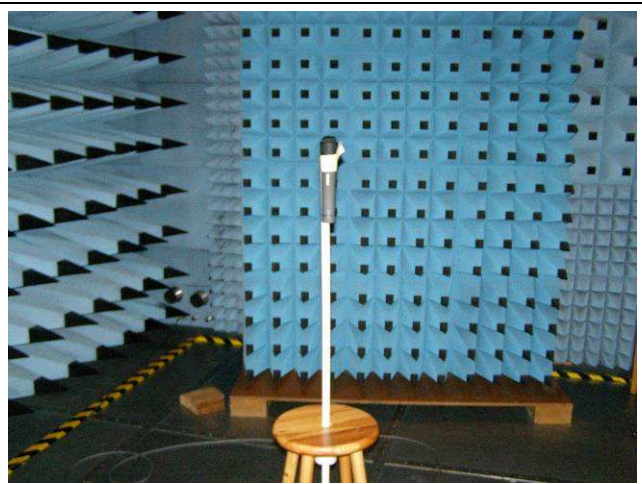
Position of EUT: 1.5 m (height of the equipment under test above floor)

Meas. uncertainty: ± 4.7 dB

Test method: The electromagnetic disturbance radiated by the equipment is measured using a spectrum analyser and a wide band antenna. The antenna is placed at the same height as the EUT successively with horizontal and vertical polarisations. The turning table is operated through 360° during the measurements. The recordings are carried out taking into account the maximum value (peak) of all the disturbances appearing while the apparatus is under test.

Modifications: ☒ None ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Test set-up:



Remarks:

- For all peak measurements: RBW = VBW = 1 MHz (except the range 17-18 GHz)
- For all average measurements: RBW = 1 MHz; VBW = 3 MHz (except the range 17-18 GHz)
- Limit values expressed in dBμV/m and transformed to a measuring distance of 1m (factor used = 20 dB/decade) if necessary
e.g.: for f = 1 GHz the limit is 500 μV/m at 3 m;

$$20 \log \left(\frac{500 \frac{\mu V}{m}}{1 \frac{\mu V}{m}} \right) + 20 \log \left(\frac{3m}{1m} \right) = 63.5 \frac{dB\mu V}{m} \text{ at } 1m$$

Test equipment:

Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Preamplifier	☒ 05-56	☒ 05-87				
Antenna (horn)	☒ 90-24	☐ 07-31				
Cables	☒ Succoflex 1m (67688/4) + 0.5m (7833/4)					
Filters	☒ 10-65	☒ 10-66	☒ 11-08	☒ 801-KF (980901-001)		

Result: ☒ pass ☐ fail ☐ not applicable ☐ not tested

Measurement Type : Radiated Field
Polarisation : Horizontal
Table Angle : 0- 360°
Antenna Height : 1.5 m

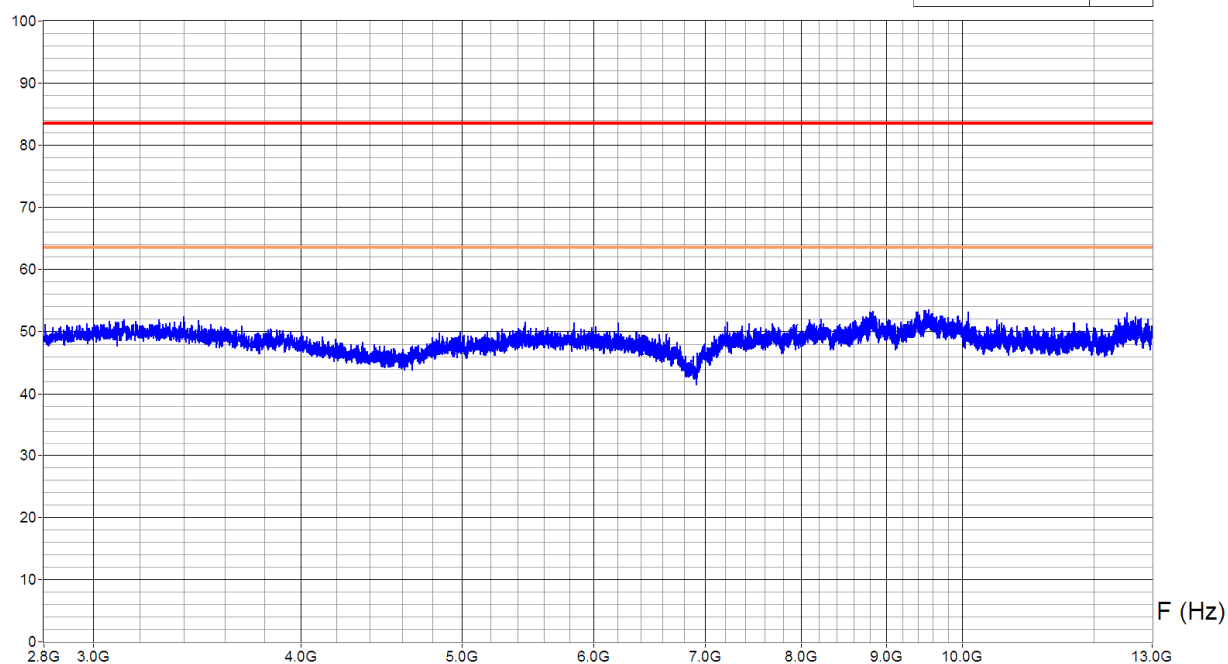


Equipment Under Test : DynaMic 3.0
Set-Up : See picture
Operating Conditions : Standby
Remarks :

Level dB μ V/m

CFR47, Part 15.109 (pyr@1m)

Peak Limit	█
AV Limit	█



Zone	2.80 GHz - 6.90	6.90 GHz - 10 GHz	10 GHz - 13 GHz
Video Bandwidth	1 MHz	1 MHz	1 MHz
Resol Bandwidth	1 MHz	1 MHz	1 MHz

Operator: BiA
Date/Time: 07.06.2011 15:30
Filename:
006_rad_hor_CFR47_1m_2-
8_13GHz_Standby.png/.txt

Measurement Type : Radiated Field
Polarisation : Vertical
Table Angle : 0- 360°
Antenna Height : 1.5 m

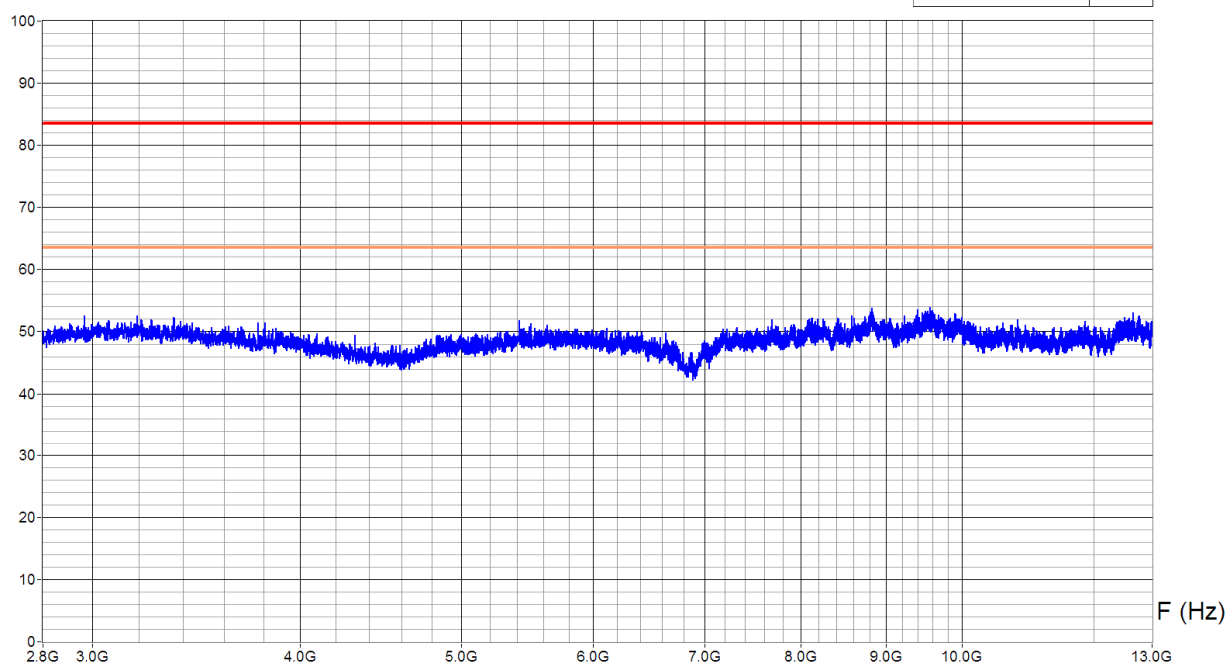


Equipment Under Test : DynaMic 3.0
Set-Up : See picture
Operating Conditions : Standby
Remarks :

Level dB μ V/m

CFR47, Part 15.109 (pyr@1m)

Peak Limit	█
AV Limit	█



Zone	2.80 GHz - 6.90	6.90 GHz - 10 GHz	10 GHz - 13 GHz
Video Bandwidth	1 MHz	1 MHz	1 MHz
Resol Bandwidth	1 MHz	1 MHz	1 MHz

Operator: BIA
Date/Time: 07.06.2011 15:26
Filename:
006_rad_ver_CFR47_1m_2-
8_13GHz_Standby.png/.txt

Measurement Type : Radiated Field
Polarisation : Horizontal
Table Angle : 0- 360°
Antenna Height : 1.5 m

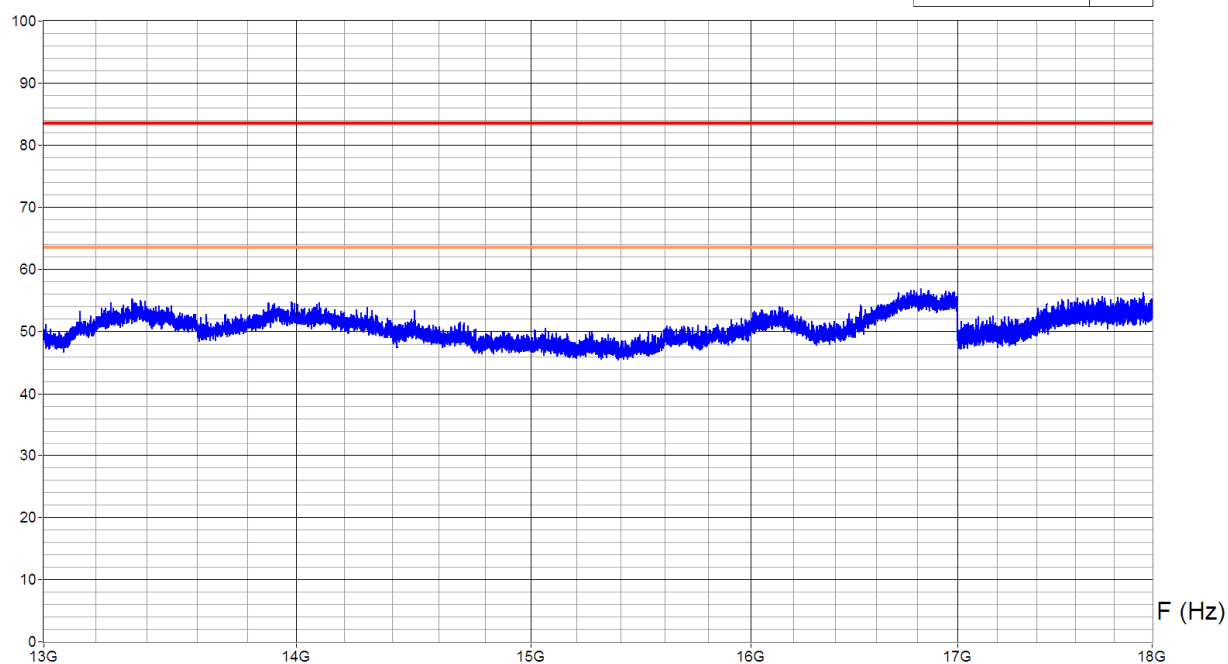


Equipment Under Test : DynaMic 3.0
Set-Up : See picture
Operating Conditions : Standby
Remarks :

Level dB μ V/m

CFR47, Part 15.109 (pyr@1m)

Peak Limit	█
AV Limit	█



Zone	13 GHz - 15 GHz	15 GHz - 17 GHz	17 GHz - 18 GHz
Video Bandwidth	1 MHz	1 MHz	300 KHz
Resol Bandwidth	1 MHz	1 MHz	300 KHz

Operator: BiA
Date/Time: 07.06.2011 15:34
Filename:
007_rad_hor_CFR47_1m_13-
18GHz_Standby.png/.txt

Measurement Type : Radiated Field
 Polarisation : Vertical
 Table Angle : 0- 360°
 Antenna Height : 1.5 m

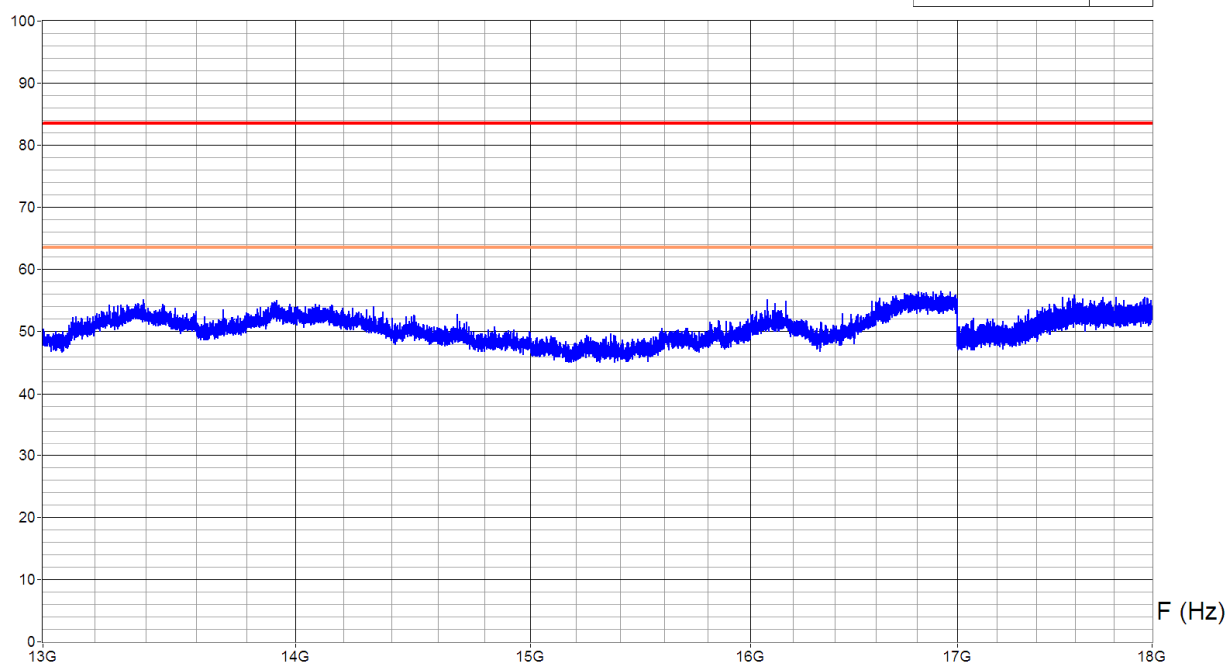


Equipment Under Test : DynaMic 3.0
 Set-Up : See picture
 Operating Conditions : Standby
 Remarks :

Level dB μ V/m

CFR47, Part 15.109 (pyr@1m)

Peak Limit	█
AV Limit	█



Zone	13 GHz - 15 GHz	15 GHz - 17 GHz	17 GHz - 18 GHz
Video Bandwidth	1 MHz	1 MHz	300 KHz
Resol Bandwidth	1 MHz	1 MHz	300 KHz

Operator: BIA
 Date/Time: 07.06.2011 15:40
 Filename:
 007_rad_ver_CFR47_1m_13-
 18GHz_Standby.png/.txt

6.12.3 18 GHz to 26.5 GHz

Test site: ☒ anechoic chamber (foam) ☐ anechoic chamber (ferrites)

Distance: ☒ 1 m ☐ 3 m ☐ 10 m ☐ 30 m

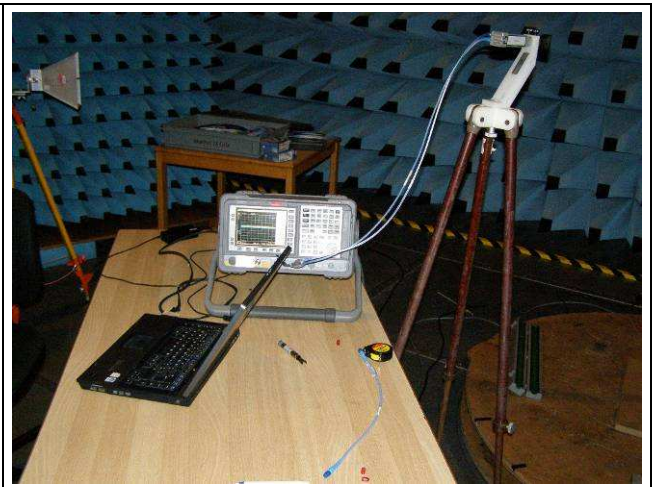
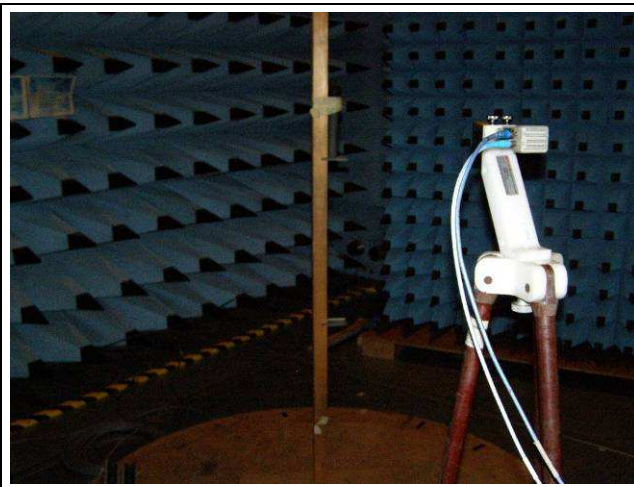
Position of EUT: 1.5 m (height of the equipment under test above floor)

Meas. uncertainty: ± 4.7 dB

Test method: The electromagnetic disturbance radiated by the equipment is measured using a spectrum analyser and a wide band antenna. The antenna is placed at the same height as the EUT successively with horizontal and vertical polarisations. The turning table is operated through 360° during the measurements. The recordings are carried out taking into account the maximum value (peak) of all the disturbances appearing while the apparatus is under test.

Modifications: ☒ None ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Test set-up:



Remarks:

- Detector = Average
- Limit values expressed in dB μ V/m and transformed to a measuring distance of 1m (factor used = 20 dB/decade) if necessary
e.g.: for $f = 18$ GHz the limit is 500 μ V/m at 3 m;

$$20 \log \left(\frac{500 \frac{\mu V}{m}}{1 \frac{\mu V}{m}} \right) + 20 \log \left(\frac{3m}{1m} \right) = 63.5 \frac{dB\mu V}{m} \text{ at } 1m$$

Test equipment:

Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Antenna (horn)	☒ 3160-09					
External mixer	☒ 11970K					
Cables	☒ Succoflex 1 m (8416/4) + 1 m (8407/4)					

Result: ☒ pass ☐ fail ☐ not applicable ☐ not tested

Measurement Type : Radiated Field
 Polarisation : Horizontal
 Table Angle : 0- 360°
 Antenna Height : 1.5m

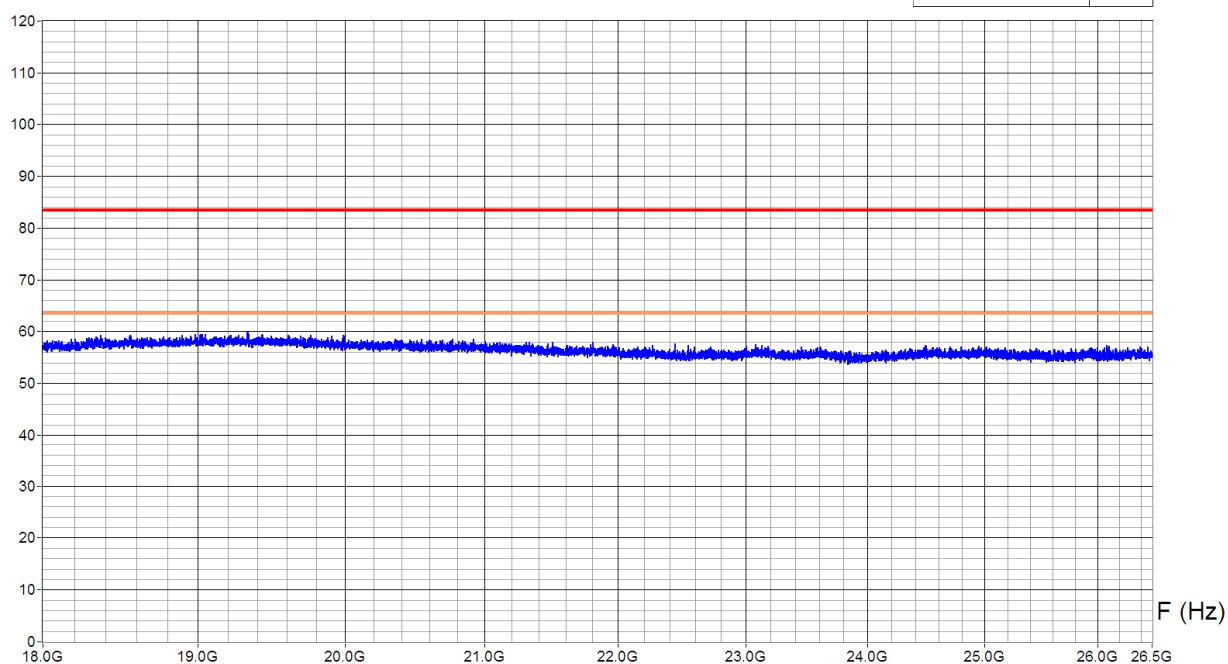
 Equipment Under Test : DynaMic 3.0
 Set-Up : See picture
 Operating Conditions : Standby
 Remarks : Without filter
 Average measurement
 EUT height: 1.5m



Level dBµV/m

CFR47, Part 15.109 (pyr@1m)

Peak Limit	█
AV Limit	█



Zone	19.70 GHz - 21.40	21.40 GHz - 23.10	23.10 GHz - 24.80	24.80 GHz - 26.50
Video Bandwidth	1 MHz	1 MHz	1 MHz	1 MHz
Resol Bandwidth	100 KHz	100 KHz	100 KHz	100 KHz

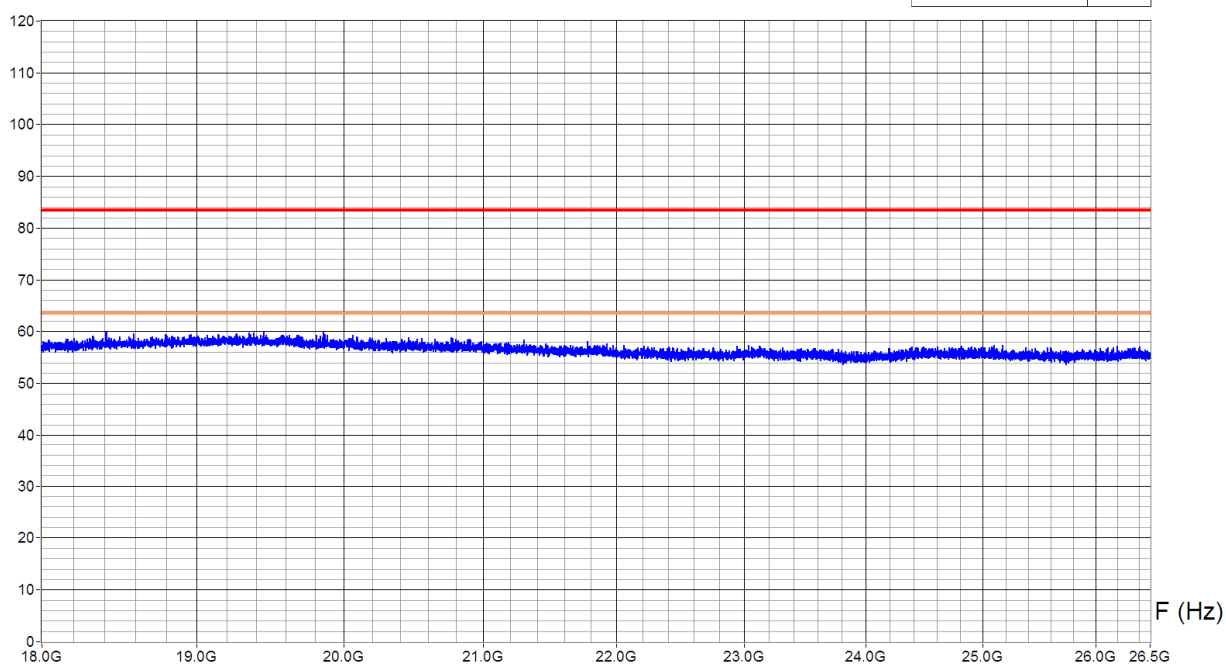
Operator: BIA
 Date/Time: 03.06.2011 15:49
 Filename:
 031_rad_hor_FCC_1m_18-
 26GHz_Standby.png/.txt

Measurement Type : Radiated Field
 Polarisation : Vertical
 Table Angle : 0- 360°
 Antenna Height : 1.5m

 Equipment Under Test : DynaMic 3.0
 Set-Up : See picture
 Operating Conditions : Standby
 Remarks : Without filter
 Average measurement
 EUT height: 1.5m

Level dB μ V/m**CFR47, Part 15.109 (pyr@1m)**

Peak Limit	█
AV Limit	█



Zone	19.70 GHz - 21.40	21.40 GHz - 23.10	23.10 GHz - 24.80	24.80 GHz - 26.50
Video Bandwidth	1 MHz	1 MHz	1 MHz	1 MHz
Resol Bandwidth	100 KHz	100 KHz	100 KHz	100 KHz

Operator: BiA
 Date/Time: 03.06.2011 15:36
 Filename:
 031_rad_ver_FCC_1m_18-
 26GHz_Standby.png/.txt