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Test laboratory accredited according to ISO 17025 by the Swiss Accreditation Service SAS
Laboratoire d'essai accrédité selon ISO 17025 par le Service d'accréditation suisse SAS
Prüflabor akkreditiert nach ISO 17025 durch die Schweizerische Akkreditierungsstelle SAS

Registration number
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:	14'517
Product name: Nom du produit: Produktname	FloWatch Control-Unit-TGB / EASYBAND Control-Unit		Mandate no: Mandat no: Auftrag Nr:	20066887
Serial no: No de série: Seriennummer:	06002	Model number: Numéro de modèle: Modellnummer:	FW-CU-TGB	
Customer: Client: Kunde:	EndoArt SA PSE-B CP 115 CH-1015 Lausanne	Date of test: Date de l'essai: Prüfdatum:	March 15 and June 6, 2006	

Standards / Normes / Normen	Result Résultat Ergebnis
CFR 47, Part 15, Subpart C, Intentional radiator, § 15.227	Pass
RSS-310, Low-power licence-exempt radiocommunication devices: Category II	Pass

Test performed by
Essai effectué par :
Prüfer

Mr Erich Staub

Test report prepared by
Rapport d'essai préparé par :
Berichtersteller

Mr Erich Staub

Test report controlled and approved by
Rapport d'essai contrôlé et approuvé par :
Prüfbericht kontrolliert und genehmigt durch

Mr André Trabold

Rossens, June 20, 2006

(Issue Date / Date d'édition / Ausstelldatum)

V2006Mar7

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. - Le présent document résulte d'essais sur un spécimen. Il ne préjuge pas de la conformité de l'ensemble des produits fabriqués à l'objet essayé. - Dieser Bericht beinhaltet die Prüfergebnisse eines Mustergerätes. Es kann daraus nicht auf die Übereinstimmung der Seriegeräte mit dem Mustergerät geschlossen werden.

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

✓ Pass / Réussi / Bestanden

✗ Fail / Echoué / Nicht bestanden

∅ 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	
6.1	Conducted emission Émission par conduction Geleitete Emission CFR 47 § 15.207 RSS-Gen § 7.2.2	✓
6.2	Conducted emission – Carrier Émission par conduction – Porteuse Geleitete Emission – Träger CFR 47 § 15.207	✓
6.3	Radiated emission – Carrier Émission par rayonnement – Porteuse Gestahlte Emission – Träger CFR 47 § 15.227 RSS-310 § 3.7	✓
6.4	Radiated emission – H-field Émission par rayonnement – Champ H Gestahlte Emission – H-Feld CFR 47 § 15.209 RSS-310 Table 4	✓
6.5	Radiated emission – EM-field Émission par rayonnement – Champ EM Gestahlte Emission – EM-Feld CFR 47 § 15.209 RSS-310 Table 3	✓

2. Applied standards / Normes appliquées / Verwendete Normen

47 CFR Part 15 Subpart C	Code of Federal Regulations - Telecommunication, FCC Part 15, Subpart C: "Intentional Radiators"
RSS-Gen	Spectrum Management and Telecommunications - Radio Standards Specification General Requirements and Information for the Certification of Radiocommunication Equipment
CNR-Gen	Gestion du spectre et télécommunications - Cahier des charges sur les normes radioélectriques Exigences générales et information relatives à la certification du matériel de radiocommunication
RSS-310	Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category II Equipment
CNR-310	Gestion du spectre et télécommunications - Cahier des charges sur les normes radioélectriques Dispositifs de radiocommunication de faible puissance, exempts de licence (pour toutes les bandes de fréquences) : matériel de catégorie II

3. Client / Client / Kunde

Client name and address Nom et adresse du client Name und Adresse des Kunden	EndoArt SA PSE-B CP 115 CH-1015 Lausanne
Contact Person / Responsable / Kontaktperson	Mr Jean-Charles Montavon
Telephone / Téléphone / Telefon	+41 21 693 84 78
Fax / Télécopieur / Telefax	+41 21 693 84 79
E-mail / Courrier électronique / E-mail	Jean-charles.montavon@endoart.ch
Mandate no / no mandat no / Auftragsnr.	20066887

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	EndoArt SA PSE-B CP 115 CH-1015 Lausanne
Production country / Pays de fabrication / Ursprungsland	Switzerland
Brand name / nom de marque / Verkaufsmarke	EndoArt SA
Product name / Nom du produit / Produktname	FloWatch Control-Unit-TGB / EASYBAND Control-Unit
Product description / Description du produit / Produktbeschreibung	The FloWatch Control-Unit-TGB and EASYBAND Control-Unit (referred to as the EUT in this report) are remote control units used to adjust gastric banding devices by means of coupled inductive loops. The equipment consists of a control unit, which can be supplied by an external medical power supply, and an external antenna applied on the patient's skin when an adjustment of the implant is required. The maximum coupling distance between the implant and the external antenna is about 4 cm. The control unit comprises a RF transmitter which operates at 27.000 MHz.

Model number / Numéro de modèle / Modellnummer	FW-CU-TGB
Serial no / No. de série / Seriennummer	06002
Software version / Version du logiciel / Softwareversion	6.041
Highest frequency / Fréquence la plus élevée / Höchste Frequenz	27 MHz
Supply / Alimentation / Speisung	Mascot 9920 : $U = 100 - 240 \text{ VAC} / f = 50 - 60 \text{ Hz} / I_{\text{max}} = 0.9\text{A}$
Technical documentation Documentation technique Technische Dokumentation	<i>None. The equipment is completely identified by its reference and serial numbers according to quality system of the manufacturer (ISO13485:2003).</i>

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



General view



View with ports



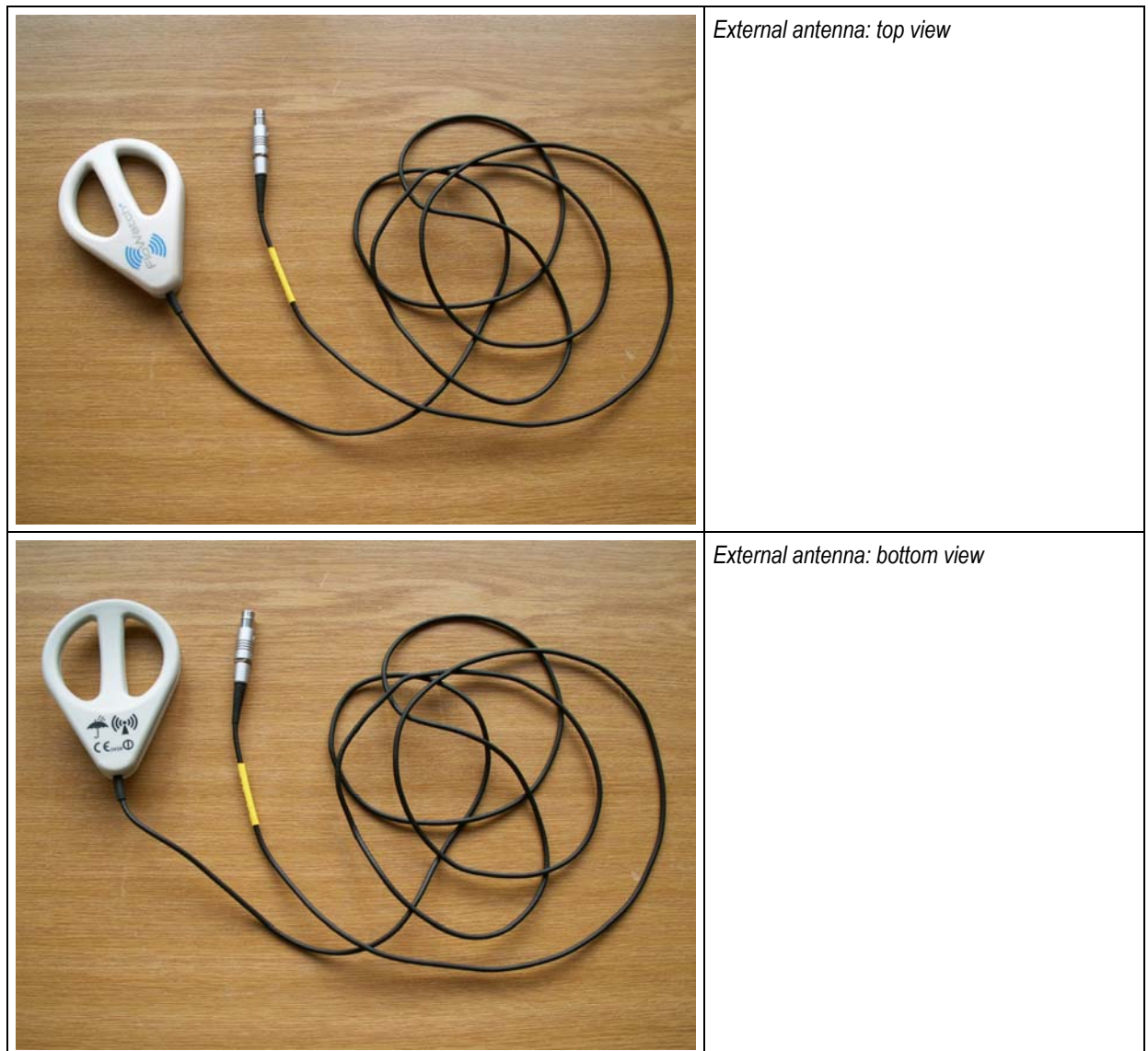
Marking plate



External AC/DC supply



External AC/DC supply: markings



4.3 Classification / Classification / Klassierung

- Intentional radiator (27MHz)

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	
Primary supply	N. A.	L, N, PE	none	Connected to external AC/DC supply
External antenna	2 m	---	Yes	connected to external antenna

4.5 Modifications / Modifications / Angebrachte Änderungen

None

5. Test conditions / Conditions d'essai / Testbedingungen

5.1 Climatic conditions / conditions climatiques / klimatische Bedingungen

Temperature / Température / Temperatur:	22 - 24	°C
Pressure / Pression / Druck:	960	hPa
Relative humidity / Humidité relative / Relative Luftfeuchtigkeit:	23 - 35	%

5.2 Location and Date / Lieu et date / Ort und Datum

Test period / Date des essais / Datum der Prüfungen:	March 15 and June 6, 2006
Location / Lieu / Ort:	montena emc sa zone industrielle CH-1728 Rossens

5.3 Test facility and Methodology

*The alternate test site (ferrite chamber) is accepted by FCC (Reg. No. 0009508433).
Conducted and radiated measurements are performed according to the ANSI C63.4 (2003) procedure.*

5.4 Persons present / Personnes présentes / Anwesende Personen

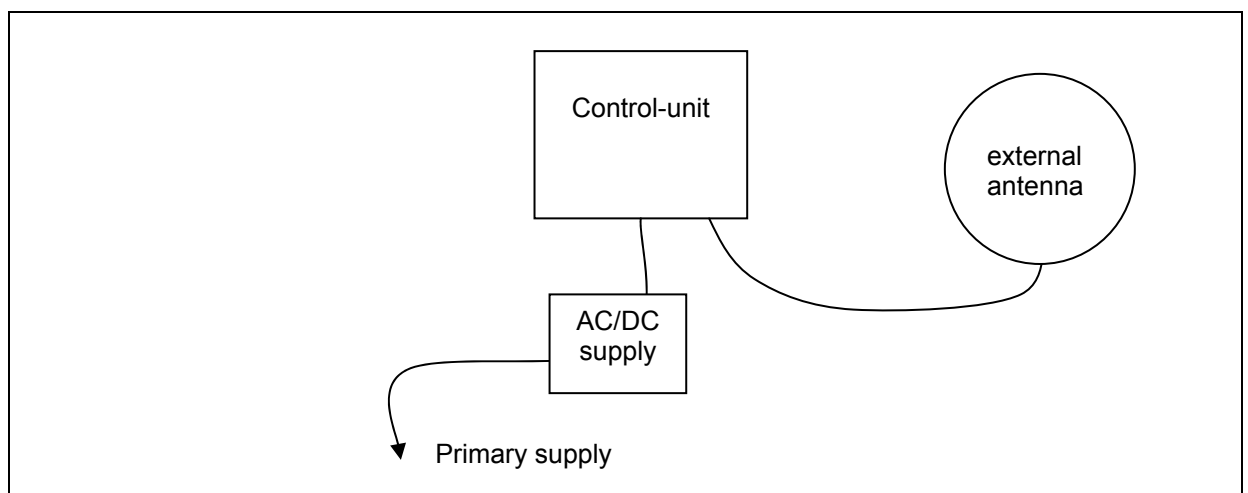
Test Engineer(s) / Ingénieur(s) d'essai / Prüflingenieur(e) :

Mr Erich Staub

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

Name / Nom / Name	Company / Société / Firma
<i>Mr Jean-Charles Montavon</i>	<i>EndoArt SA</i>

5.5 Test configuration / Configuration d'essai / Prüfkonfiguration



5.6 Operating conditions / Conditions de fonctionnement / Betriebszustand

- *Normal continuous mode with implant and standard output level*
- *The external coupling antenna (EA) is used in horizontal position.*

5.7 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 tested with 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'essai / 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
Strength test equipment	Endoart SA	---	L53	---



Strength test equipment, implant placed in saline solution to simulate human body.

6. Emission tests

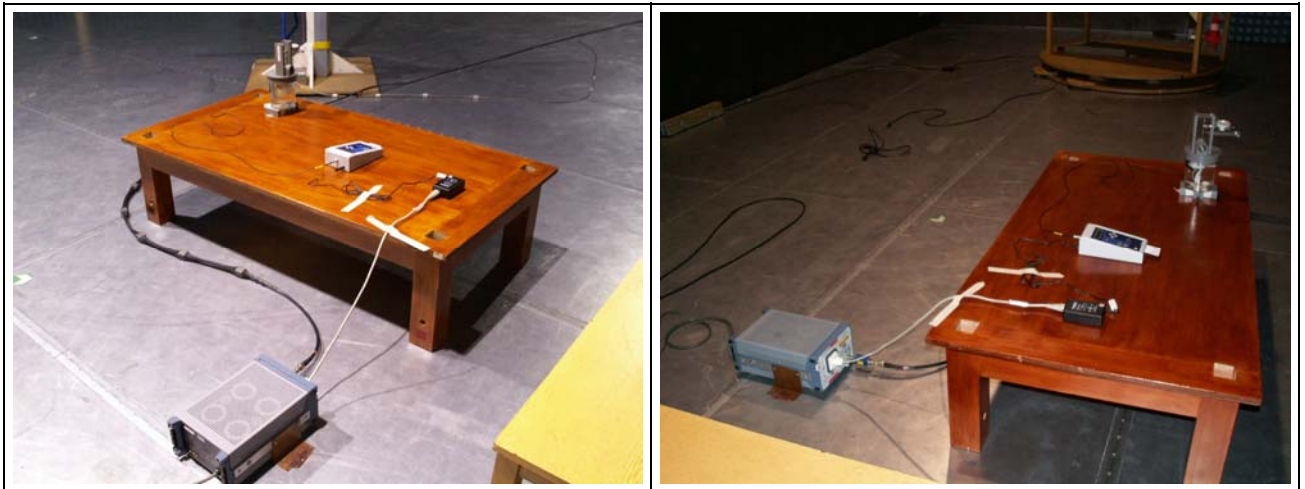
6.1 Conducted emission - Interference voltage

Test site: anechoic chamber (foam) shielded room
 anechoic chamber (ferrites) laboratory
 open test site

Meas. uncertainty: +/- 1.6 dB

Measuring method: The conducted disturbance is measured using a spectrum analyser and a line impedance substitution network (LISN). The measurement of the voltage against the earth is carried out successively. The peak values are recorded continuously on the graph. The values that exceed the limit are remeasured with a measuring receiver.

Test set-up:



Remarks: *Tested with antenna attached. The limit does not apply to the intentional signal at 27 MHz.*

Test equipment:

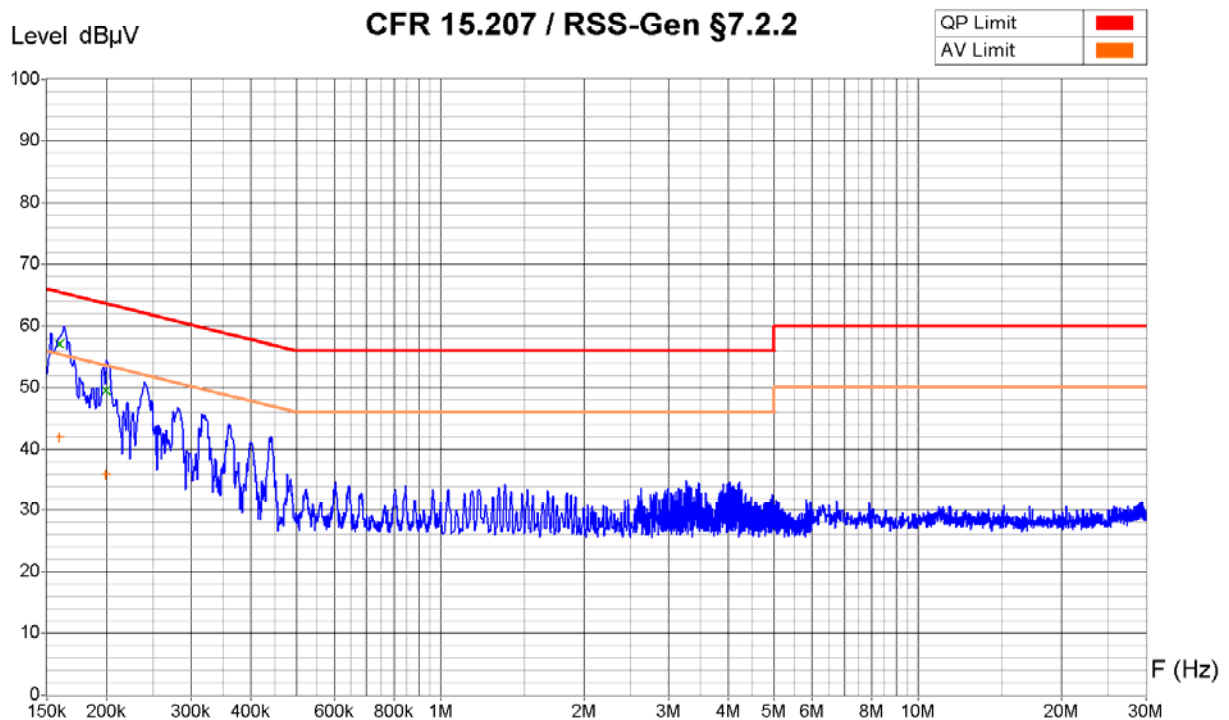
Spectrum analyser	<input type="checkbox"/> 88-14	<input type="checkbox"/> 90-26	<input type="checkbox"/> 94-24	<input type="checkbox"/> 02-06	<input checked="" type="checkbox"/> 03-45	<input type="checkbox"/> 03-57
Receiver	<input type="checkbox"/> 85-12	<input type="checkbox"/> 90-11	<input checked="" type="checkbox"/> 94-34	<input type="checkbox"/> 04-28		
LISN	<input type="checkbox"/> 85-13	<input type="checkbox"/> 90-08	<input type="checkbox"/> 94-36	<input type="checkbox"/> 94-40	<input type="checkbox"/> 95-12	<input checked="" type="checkbox"/> 00-43
	<input type="checkbox"/> 04-04	<input type="checkbox"/> 04-05	<input type="checkbox"/>			
Protection 10 dB	<input checked="" type="checkbox"/> 91-45	<input type="checkbox"/> 91-44	<input type="checkbox"/> 95-30	<input type="checkbox"/> 95-33	<input type="checkbox"/> 95-35	<input type="checkbox"/> 95-36
	<input type="checkbox"/> 96-38	<input type="checkbox"/> included in LISN				
Protection 20 dB	<input type="checkbox"/> 91-46	<input type="checkbox"/> 95-33	<input type="checkbox"/> 95-38	<input type="checkbox"/> included in LISN		
.....					

Result: pass fail not applicable not tested

Measurement Type : Voltage Interference
 Supply : Line 1
 Other :



Equipment Under Test : FW-CU-TGB 06002 with EA 03047
 Set-Up : Supply 115VAC/60Hz; antenna cable
 Operating Conditions : Standby
 Remarks : EA in horizontal position



Zone	150 KHz - 1 MHz	1 MHz - 6 MHz	6 MHz - 30 MHz
Video Bandwidth	10 KHz	10 KHz	10 KHz
Resol Bandwidth	9 KHz	9 KHz	9 KHz

Receiver Measures

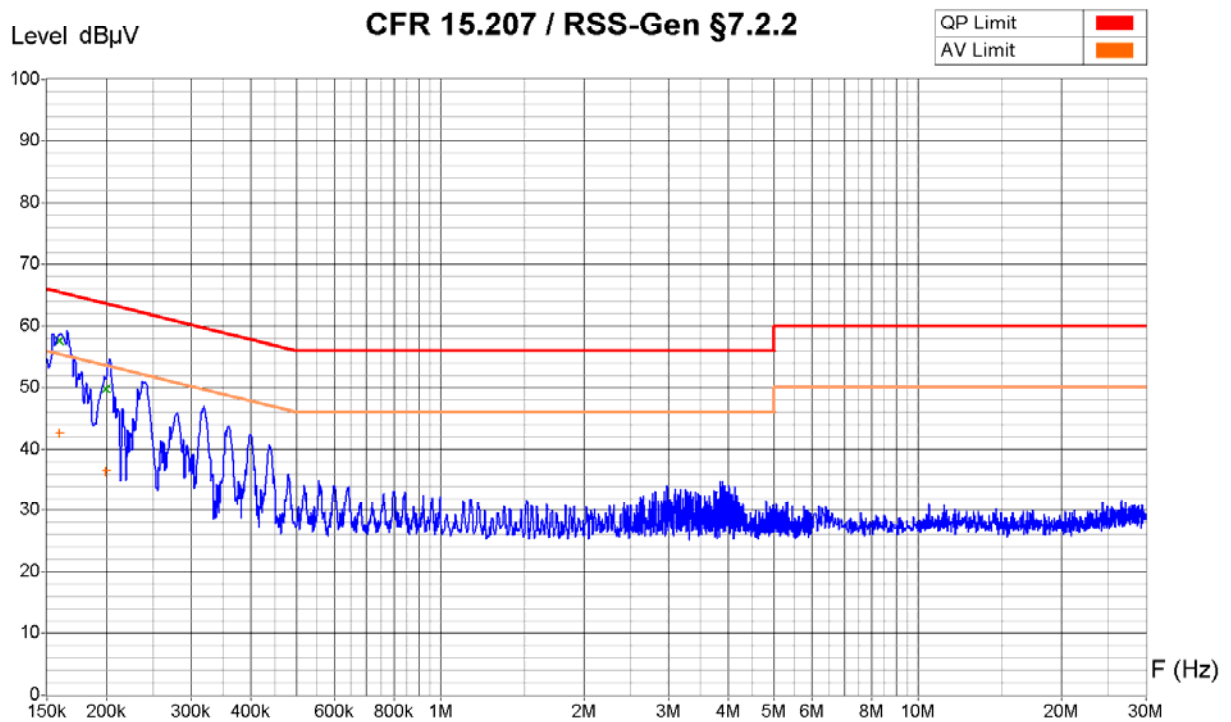
Frequency	Peak	QuasiPeak (x)	Average (+)	QP Margin
159 KHz	59.1 dBµV	57.1 dBµV	42.0 dBµV	8.4 dB
199 KHz	52.5 dBµV	49.5 dBµV	36.0 dBµV	14.1 dB

Operator: E. Staub
 Date/Time: 15.03.06 17:08
 Filename:
 20066887_TGB_ec_0001.png/.txt

Measurement Type : Voltage Interference
 Supply : Neutral
 Other :



Equipment Under Test : FW-CU-TGB 06002 with EA 03047
 Set-Up : Supply 115VAC/60Hz; antenna cable
 Operating Conditions : Standby
 Remarks : EA in horizontal position



Zone	150 KHz - 1 MHz	1 MHz - 6 MHz	6 MHz - 30 MHz
Video Bandwidth	10 KHz	10 KHz	10 KHz
Resol Bandwidth	9 KHz	9 KHz	9 KHz

Receiver Measures

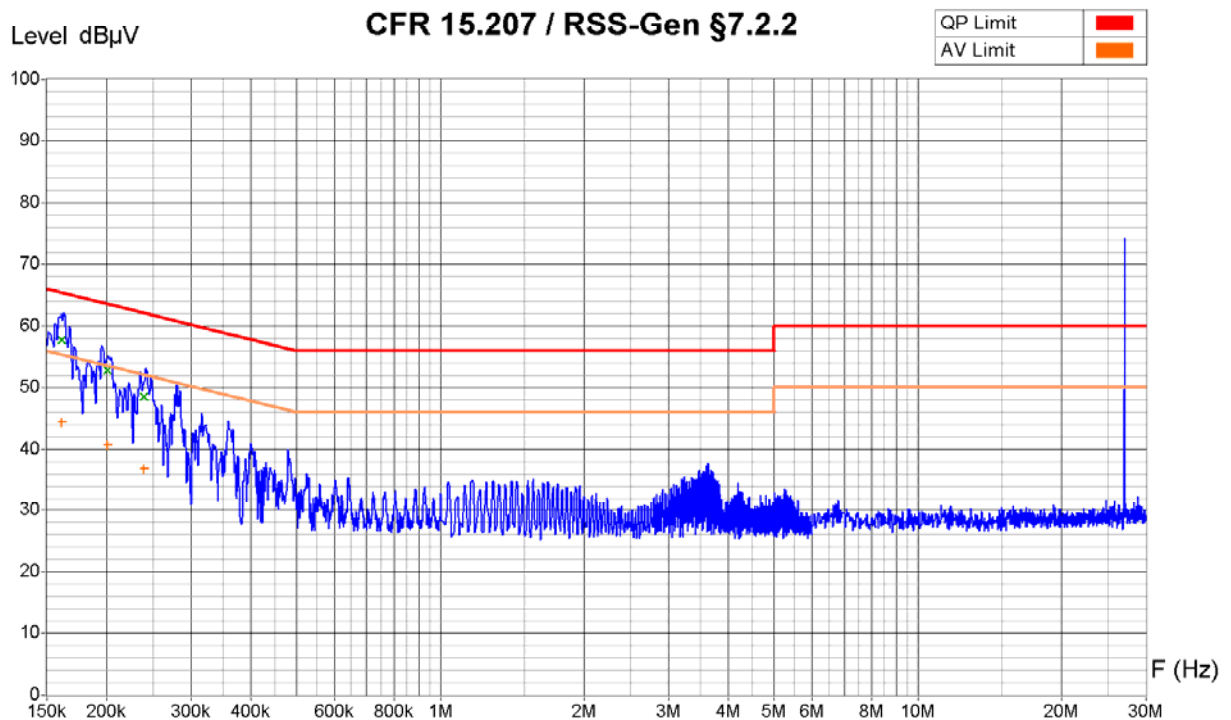
Frequency	Peak	QuasiPeak (x)	Average (+)	QP Margin
159 KHz	59.7 dBµV	57.6 dBµV	42.7 dBµV	7.9 dB
199 KHz	52.9 dBµV	49.8 dBµV	36.5 dBµV	13.9 dB

Operator: E. Staub
 Date/Time: 15.03.06 17:03
 Filename:
 20066887_TGB_ec_000n.png/.txt

Measurement Type : Voltage Interference
 Supply : Line 1
 Other :



Equipment Under Test : FW-CU-TGB 06002 with EA 03047
 Set-Up : Supply 115VAC/60Hz; antenna cable
 Operating Conditions : Normal, continuous mode with implant FW-TGB 11047; output level 1.5W
 Remarks : EA in horizontal position



Zone	150 KHz - 1 MHz	1 MHz - 6 MHz	6 MHz - 30 MHz
Video Bandwidth	10 KHz	10 KHz	10 KHz
Resol Bandwidth	9 KHz	9 KHz	9 KHz

Receiver Measures

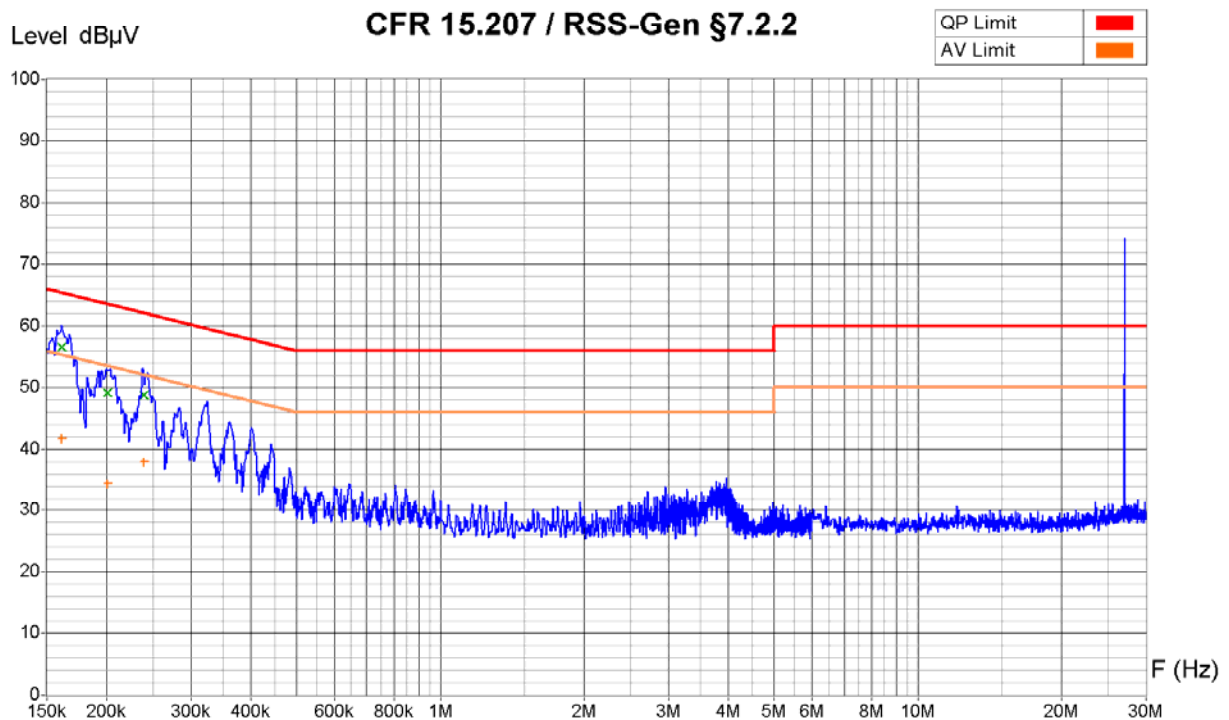
Frequency	Peak	QuasiPeak (x)	Average (+)	QP Margin
161 KHz	60.8 dBµV	57.7 dBµV	44.4 dBµV	7.7 dB
201 KHz	56.0 dBµV	52.8 dBµV	40.8 dBµV	10.7 dB
239 KHz	50.9 dBµV	48.5 dBµV	36.9 dBµV	13.6 dB

Operator: E. Staub
 Date/Time: 15.03.06 17:12
 Filename:
 20066887_TGB_ec_0011.png/.txt

Measurement Type : Voltage Interference
 Supply : Neutral
 Other :



Equipment Under Test : FW-CU-TGB 06002 with EA 03047
 Set-Up : Supply 115VAC/60Hz; antenna cable
 Operating Conditions : Normal, continuous mode with implant FW-TGB 11047; output level 1.5W
 Remarks : EA in horizontal position



Zone	150 KHz - 1 MHz	1 MHz - 6 MHz	6 MHz - 30 MHz
Video Bandwidth	10 KHz	10 KHz	10 KHz
Resol Bandwidth	9 KHz	9 KHz	9 KHz

Receiver Measures

Frequency	Peak	QuasiPeak (x)	Average (+)	QP Margin
161 KHz	58.9 dBµV	56.6 dBµV	41.8 dBµV	8.8 dB
201 KHz	53.2 dBµV	49.2 dBµV	34.4 dBµV	14.4 dB
239 KHz	51.0 dBµV	48.8 dBµV	38.0 dBµV	13.3 dB

Operator: E. Staub
 Date/Time: 15.03.06 17:16
 Filename:
 20066887_TGB_ec_001n.png/.txt

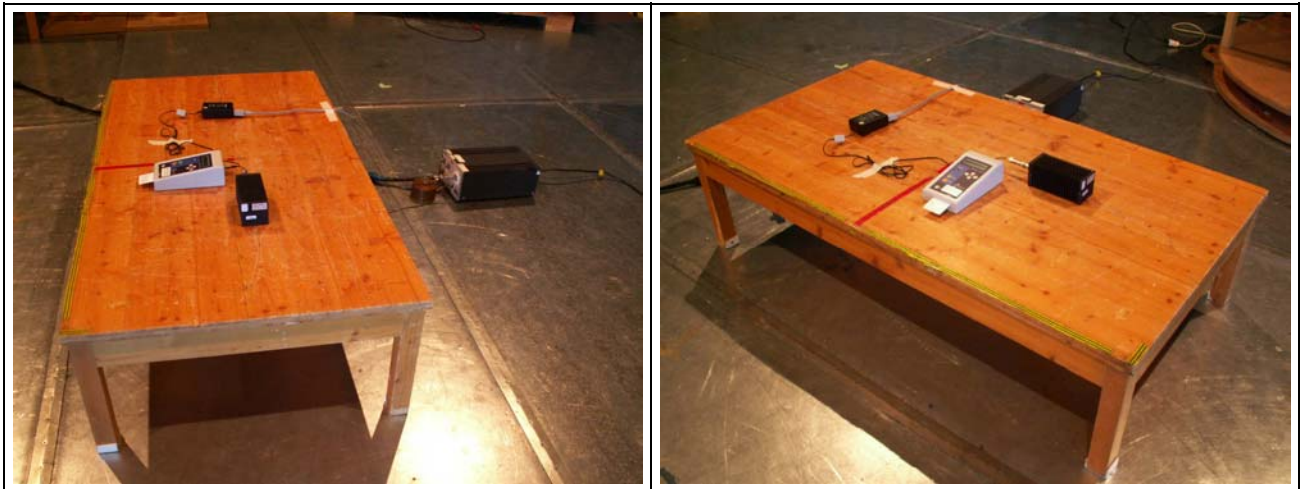
6.2 Conducted emission - Interference voltage (in band)

Test site: anechoic chamber (foam) shielded room
 anechoic chamber (ferrites) laboratory
 open test site

Meas. uncertainty: +/- 1.6 dB

Measuring method: The conducted disturbance is measured using a spectrum analyser and a line impedance substitution network (LISN). The measurement of the voltage against the earth is carried out successively. The peak values are recorded continuously on the graph. The values that exceed the limit are remeasured with a measuring receiver.

Test set-up:



Remarks: *Tested with dummy load in the fundamental emission band.*

Test equipment:

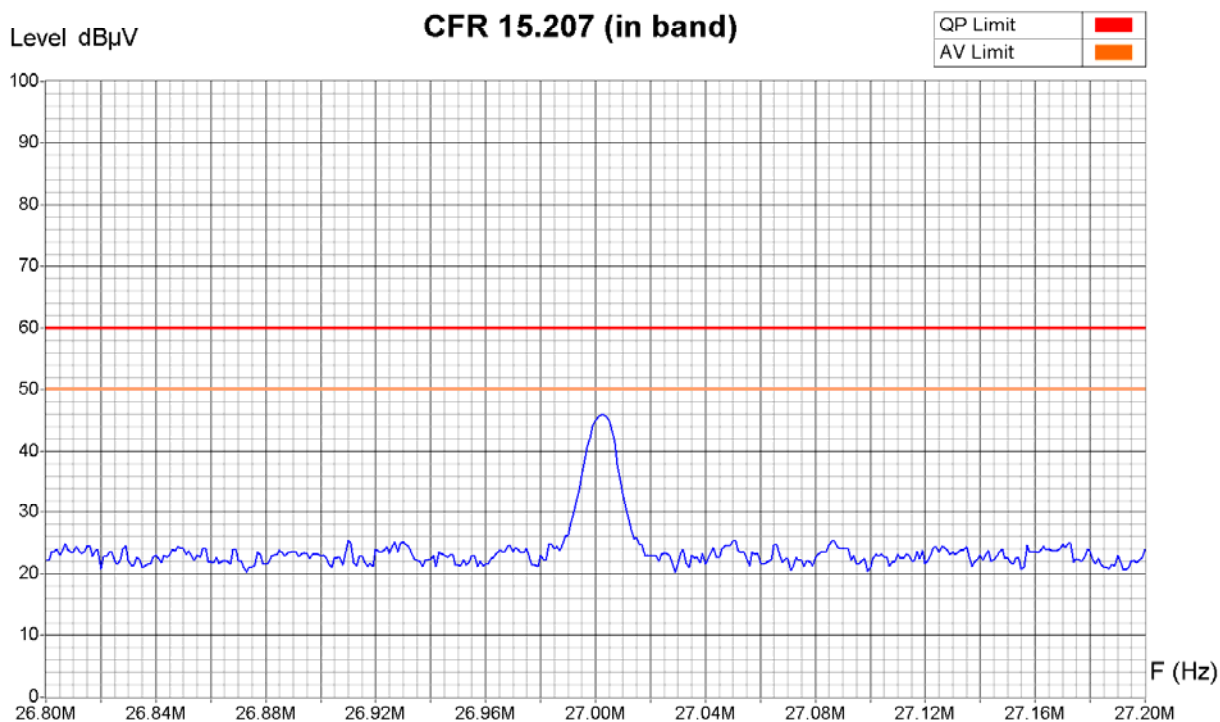
Spectrum analyser	<input type="checkbox"/> 88-14	<input type="checkbox"/> 90-26	<input type="checkbox"/> 94-24	<input type="checkbox"/> 02-06	<input type="checkbox"/> 03-45	<input checked="" type="checkbox"/> 03-57
Receiver	<input type="checkbox"/> 85-12	<input type="checkbox"/> 90-11	<input type="checkbox"/> 94-34	<input type="checkbox"/> 04-28		
LISN	<input type="checkbox"/> 85-13	<input type="checkbox"/> 90-08	<input type="checkbox"/> 94-36	<input type="checkbox"/> 94-40	<input type="checkbox"/> 95-12	<input checked="" type="checkbox"/> 00-43
	<input type="checkbox"/> 04-04	<input type="checkbox"/> 04-05	<input type="checkbox"/>			
Protection 10 dB	<input type="checkbox"/> 91-45	<input type="checkbox"/> 91-44	<input type="checkbox"/> 95-30	<input type="checkbox"/> 95-33	<input type="checkbox"/> 95-35	<input type="checkbox"/> 95-36
	<input type="checkbox"/> 96-38	<input checked="" type="checkbox"/> included in LISN				
Protection 20 dB	<input type="checkbox"/> 91-46	<input type="checkbox"/> 95-33	<input type="checkbox"/> 95-38	<input type="checkbox"/> included in LISN		
Load	<input checked="" type="checkbox"/> 05-13					

Result: pass fail not applicable not tested

Measurement Type : Voltage Interference
 Supply : Line 1
 Other :



Equipment Under Test : FW-CU-TGB 06002
 Set-Up : Supply 115VAC/60Hz; antenna cable (10 cm)
 Operating Conditions : Normal, continuous mode with dummy load; output level 1.5W
 Remarks :



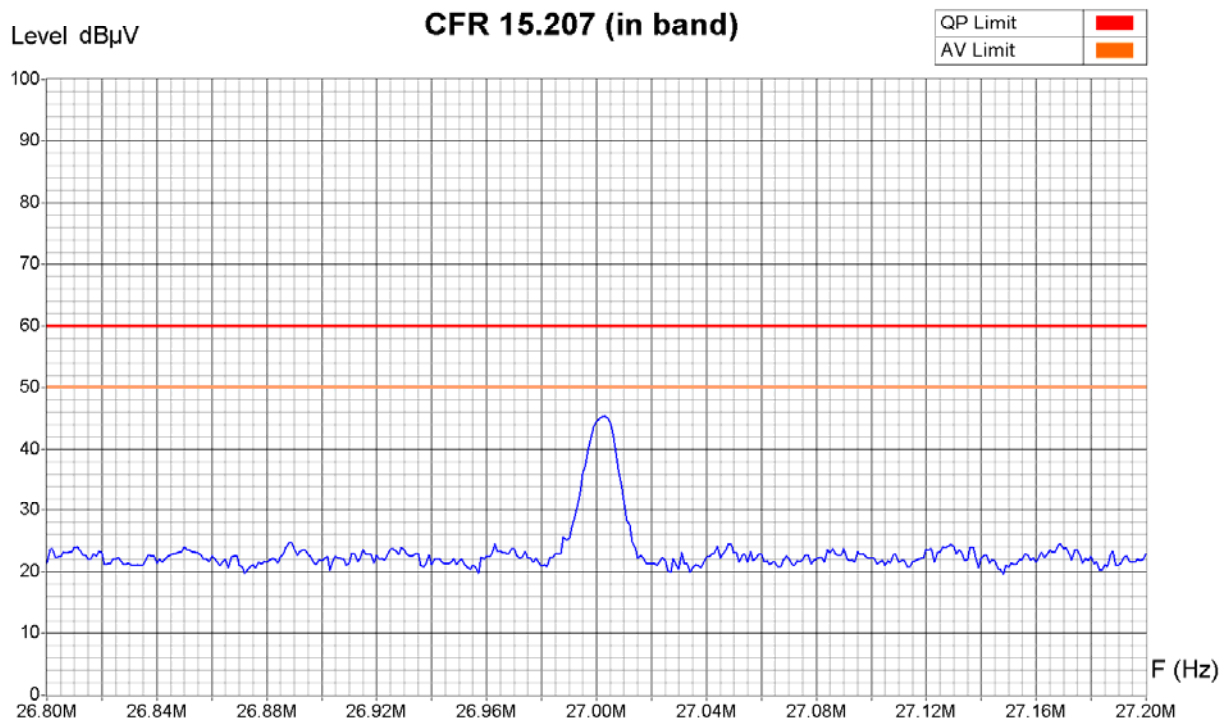
Zone	26.80 MHz - 27.20
Video Bandwidth	10 KHz
Resol Bandwidth	9 KHz

Operator:	E. Staub
Date/Time:	06.06.06 16:44
Filename:	20066887_TGB_ec_0021.png/.txt

Measurement Type : Voltage Interference
 Supply : Neutral
 Other :



Equipment Under Test : FW-CU-TGB 06002
 Set-Up : Supply 115VAC/60Hz; antenna cable (10 cm)
 Operating Conditions : Normal, continuous mode with dummy load; output level 1.5W
 Remarks :



Zone	26.80 MHz - 27.20
Video Bandwidth	10 KHz
Resol Bandwidth	9 KHz

Operator:	E. Staub
Date/Time:	06.06.06 16:48
Filename:	20066887_TGB_ec_002n.png/.txt

6.3 Carrier - Radiated magnetic field

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

Meas. distance: 3 m 10 m 30 m m

Meas. uncertainty: ± 2.8 dB (10 m)

Position of EUT: 0.8 m (height above floor of equipment under test)

Measuring method: The magnetic disturbance radiated by the equipment under test is measured using a spectrum analyser and a wide band magnetic antenna. The center of the antenna is placed at 1 m of height, first in the direction of the apparatus under test, then at 90° to the apparatus and if required also horizontally. If possible the turning table is operated through 360° during the measurement. The recording is carried out taking into account the maximum value of the disturbance appearing during the functioning of the apparatus under test. The peak values are recorded continuously on a graph. The values exceeding the limits are remeasured using a measuring receiver.

Test set-up:



Remarks:

- Carrier also measured at supply voltage ± 15%.
- Limit values expressed in dBµA/m (factor used = 377 Ω = -51.5 dB = free-space wave impedance) and transformed to a measuring distance of 3m (factor used = 40 dB/decade) if necessary
 e.g.: for f = 27MHz the limit is 10'000µV/m at 3 m;
 $20 \log_{10} (10'000\mu V/m) - 20 \log_{10} (377 \Omega) = 28.5 \text{ dB}\mu A/m \text{ at } 3 \text{ m}$

 for f = 26.7MHz the limit is 30µV/m at 30 m;
 $20 \log_{10} (30\mu V/m) - 20 \log_{10} (377\Omega) + 40 \log_{10} (30m/3m) = 18 \text{ dB}\mu A/m \text{ at } 3m$

Test equipment:

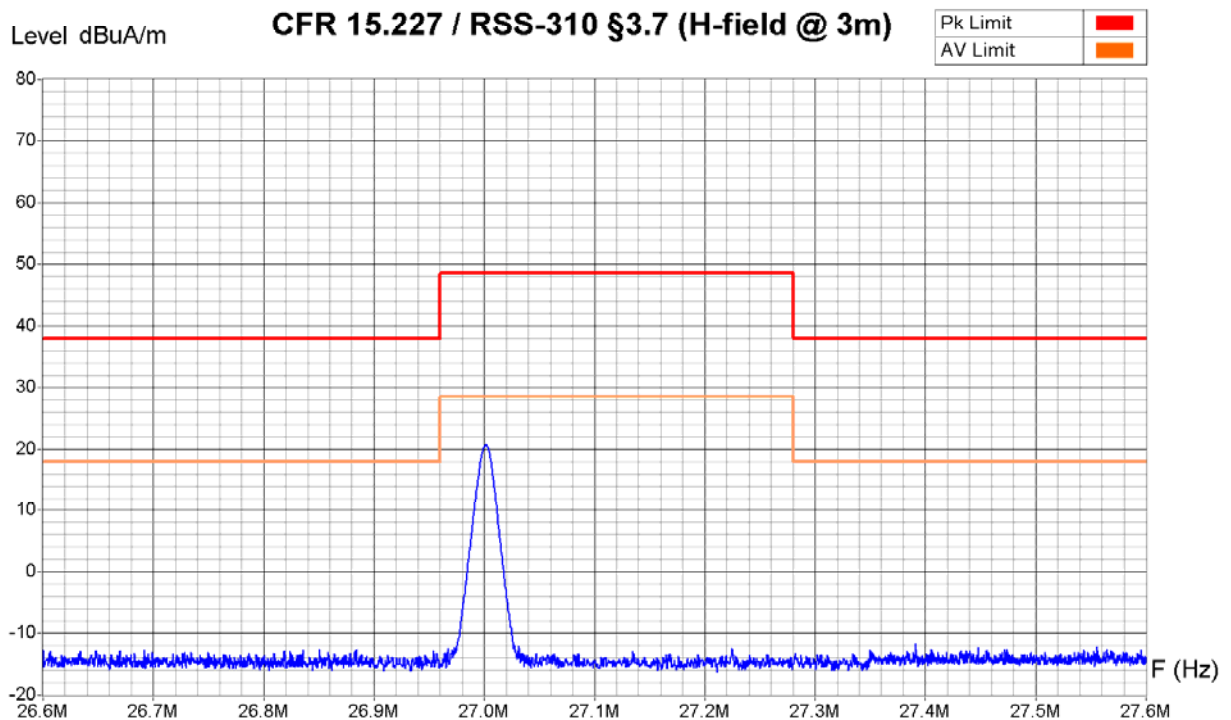
Spectrum analyser	<input type="checkbox"/> 88-14	<input type="checkbox"/> 90-26	<input type="checkbox"/> 94-24	<input type="checkbox"/> 02-06	<input checked="" type="checkbox"/> 03-45	<input type="checkbox"/> 03-57
Receiver	<input type="checkbox"/> 85-12	<input type="checkbox"/> 90-11	<input checked="" type="checkbox"/> 94-34	<input type="checkbox"/> 04-28	<input type="checkbox"/>	
Preamplifier	<input type="checkbox"/> 90-01	<input type="checkbox"/> 95-86	<input type="checkbox"/> 05-56	<input type="checkbox"/> 05-59	<input type="checkbox"/> 05-62	<input type="checkbox"/> 05-87
Antenna (typ: magnetic)	<input checked="" type="checkbox"/> 90-25	<input type="checkbox"/> 90-28	<input type="checkbox"/> 99-32	<input type="checkbox"/>		
.....					

Result: pass fail not applicable not tested

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



Equipment Under Test : FW-CU-TGB 06002 with EA 03047
 Set-Up : Supply 115VAC/60Hz; antenna cable
 Operating Conditions : Normal, continuous mode with implant FW-TGB 11047; output level 1.5W
 Remarks : EA 03047 in horizontal position



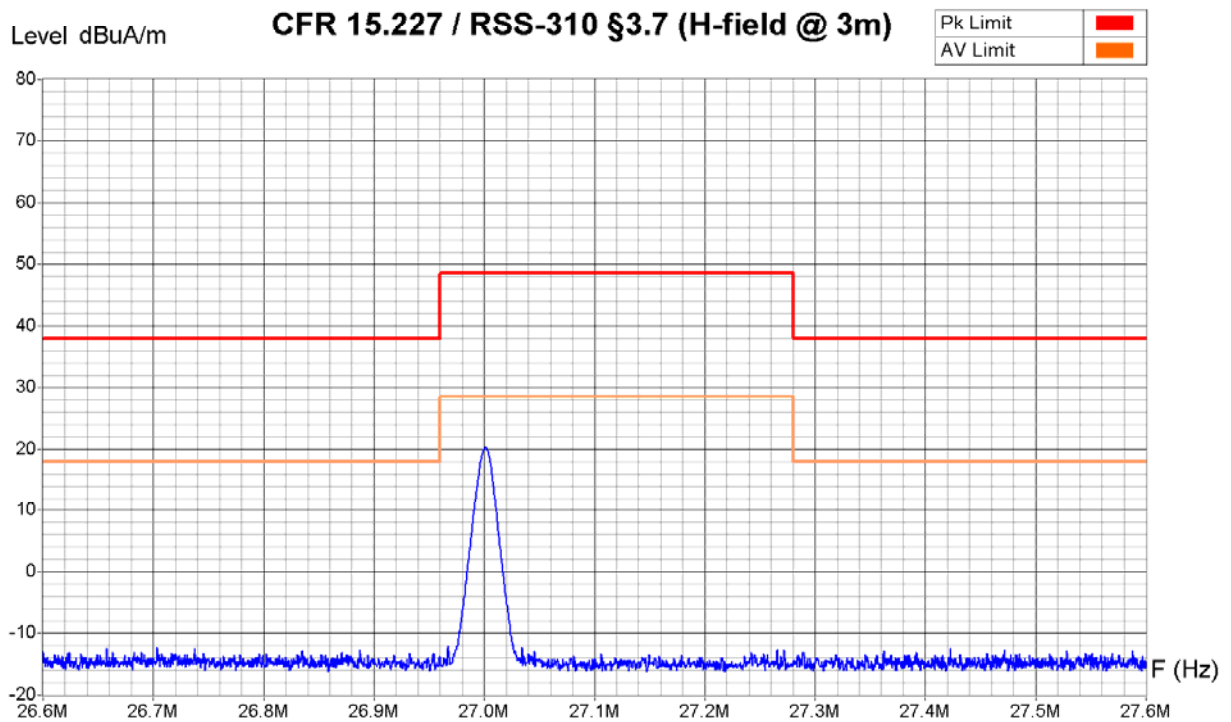
Zone	26.60 MHz - 26.90	26.90 MHz - 27.35	27.35 MHz - 27.60
Video Bandwidth	10 KHz	10 KHz	10 KHz
Resol Bandwidth	10 KHz	10 KHz	10 KHz

Operator: E. Staub
 Date/Time: 15.03.06 11:01
 Filename:
 20066887_TGB_erh_carrier_002h
 o.png/.txt

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



Equipment Under Test : FW-CU-TGB 06002 with EA 03047
 Set-Up : Supply 97VAC/60Hz; antenna cable
 Operating Conditions : Normal, continuous mode with implant FW-TGB 11047; output level 1.5W
 Remarks : EA 03047 in horizontal position



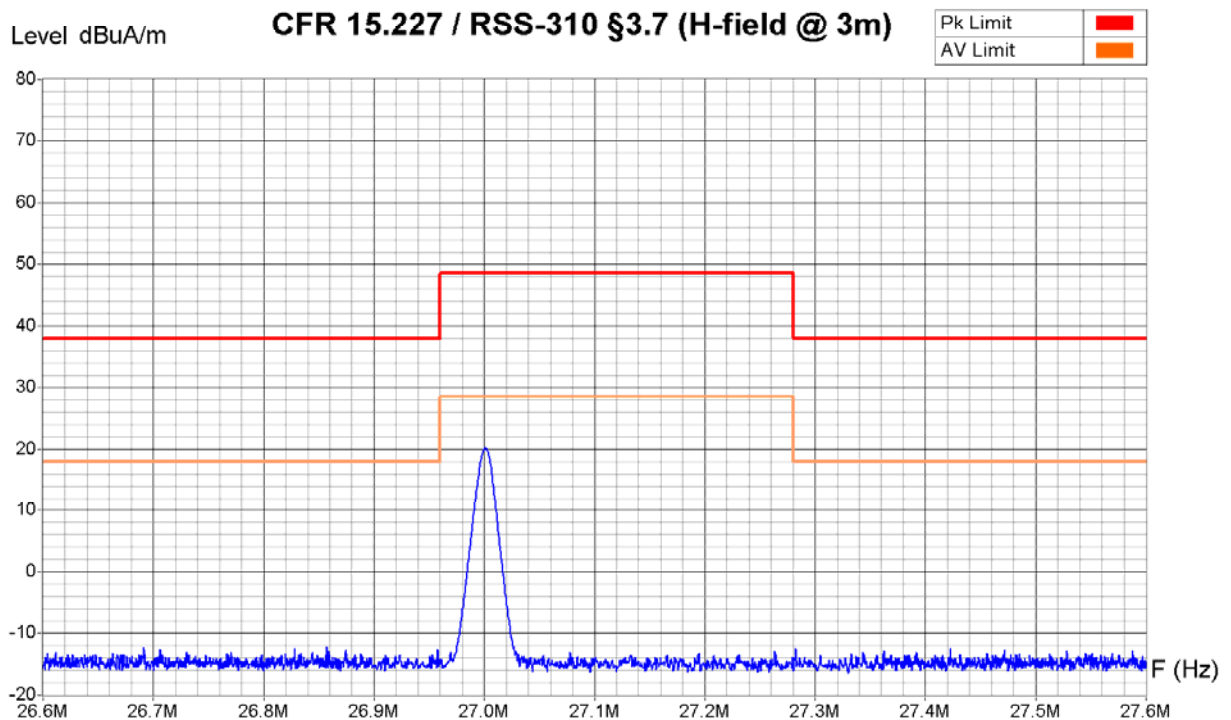
Zone	26.60 MHz - 26.90	26.90 MHz - 27.35	27.35 MHz - 27.60
Video Bandwidth	10 KHz	10 KHz	10 KHz
Resol Bandwidth	10 KHz	10 KHz	10 KHz

Operator: E. Staub
 Date/Time: 15.03.06 11:16
 Filename:
 20066887_TGB_erh_carrier_002h
 o_b.png/.txt

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



Equipment Under Test : FW-CU-TGB 06002 with EA 03047
 Set-Up : Supply 133VAC/60Hz; antenna cable
 Operating Conditions : Normal, continuous mode with implant FW-TGB 11047; output level 1.5W
 Remarks : EA 03047 in horizontal position



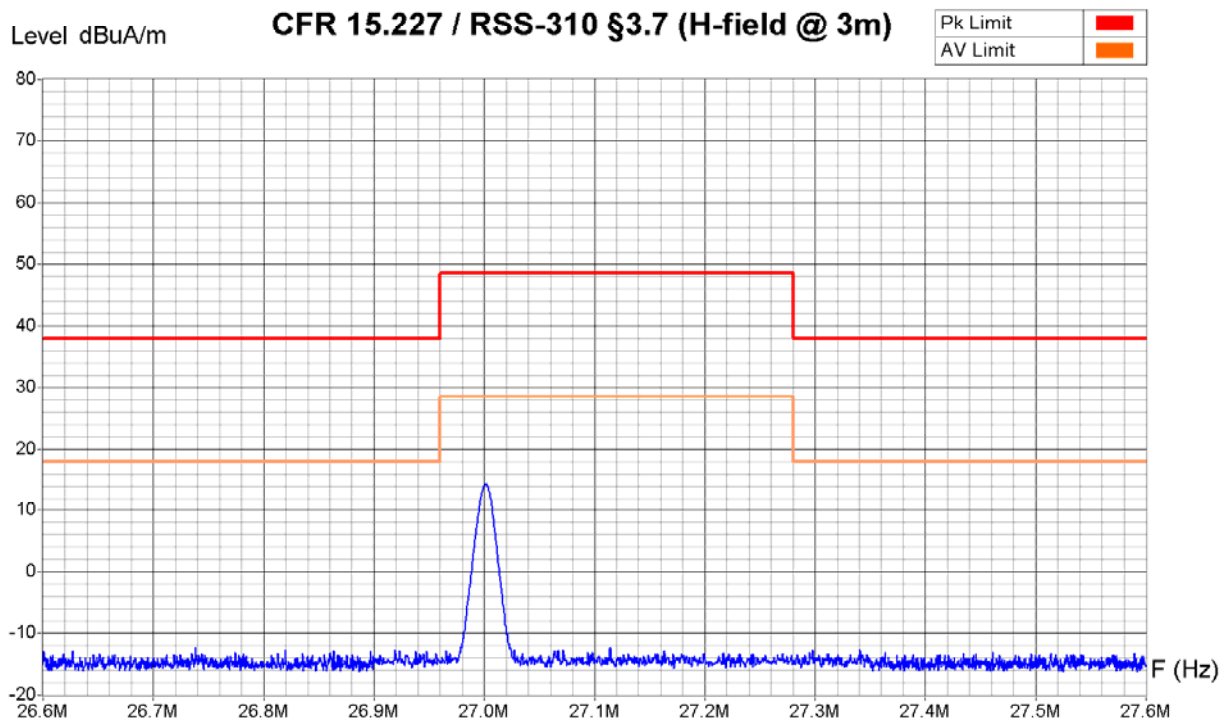
Zone	26.60 MHz - 26.90	26.90 MHz - 27.35	27.35 MHz - 27.60
Video Bandwidth	10 KHz	10 KHz	10 KHz
Resol Bandwidth	10 KHz	10 KHz	10 KHz

Operator: E. Staub
 Date/Time: 15.03.06 11:21
 Filename:
 20066887_TGB_erh_carrier_002h
 o_c.png/.txt

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



Equipment Under Test : FW-CU-TGB 06002 with EA 03047
 Set-Up : Supply 115VAC/60Hz; antenna cable
 Operating Conditions : Normal, continuous mode with implant FW-TGB 11047; output level 1.5W
 Remarks : EA 03047 in horizontal position



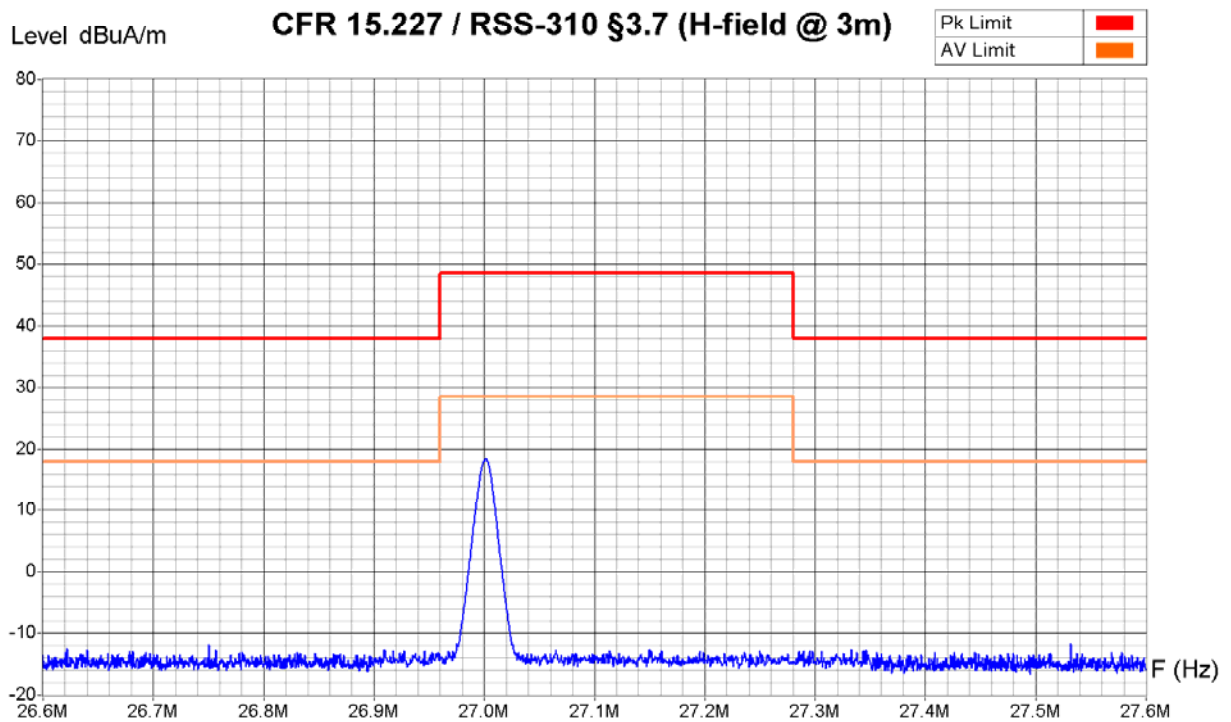
Zone	26.60 MHz - 26.90	26.90 MHz - 27.35	27.35 MHz - 27.60
Video Bandwidth	10 KHz	10 KHz	10 KHz
Resol Bandwidth	10 KHz	10 KHz	10 KHz

Operator: E. Staub
 Date/Time: 15.03.06 11:54
 Filename:
 20066887_TGB_erh_carrier_002p
 a.png/.txt

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



Equipment Under Test : FW-CU-TGB 06002 with EA 03047
 Set-Up : Supply 115VAC/60Hz; antenna cable
 Operating Conditions : Normal, continuous mode with implant FW-TGB 11047; output level 1.5W
 Remarks : EA 03047 in horizontal position



Zone	26.60 MHz - 26.90	26.90 MHz - 27.35	27.35 MHz - 27.60
Video Bandwidth	10 KHz	10 KHz	10 KHz
Resol Bandwidth	10 KHz	10 KHz	10 KHz

Operator: E. Staub
 Date/Time: 15.03.06 11:59
 Filename:
 20066887_TGB_erh_carrier_002p
 e.png/.txt

6.4 Radiated emission - Magnetic field

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

Meas. distance: 3 m 10 m 30 m m

Meas. uncertainty: ± 2.8 dB (10 m)

Position of EUT: 0.8 m (height above floor of equipment under test)

Measuring method: The magnetic disturbance radiated by the equipment under test is measured using a spectrum analyser and a wide band magnetic antenna. The center of the antenna is placed at 1 m of height, first in the direction of the apparatus under test, then at 90° to the apparatus and if required also horizontally. If possible the turning table is operated through 360° during the measurement. The recording is carried out taking into account the maximum value of the disturbance appearing during the functioning of the apparatus under test. The peak values are recorded continuously on a graph. The values exceeding the limits are remeasured using a measuring receiver.

Test set-up:



Remarks:

- The limit does not apply to the intentional signal at 27 MHz.
- Limit values expressed in dBµA/m (factor used = 377 Ω = -51.5 dB = free-space wave impedance) and transformed to a measuring distance of 3m (factor used = 40 dB/decade) if necessary
 e.g.: for f = 9kHz the limit is 2400/9µV/m at 300 m;
 $20 \log_{10} (2400/9\mu V/m) - 20 \log_{10} (377 \Omega) + 40 \log_{10} (300m/3m) = 77 \text{ dB}\mu A/m \text{ at } 3m$

 for f = 30MHz the limit is 30µV/m at 30 m;
 $20 \log_{10} (30\mu V/m) - 20 \log_{10} (377\Omega) + 40 \log_{10} (30m/3m) = 18 \text{ dB}\mu A/m \text{ at } 3m$

Test equipment:

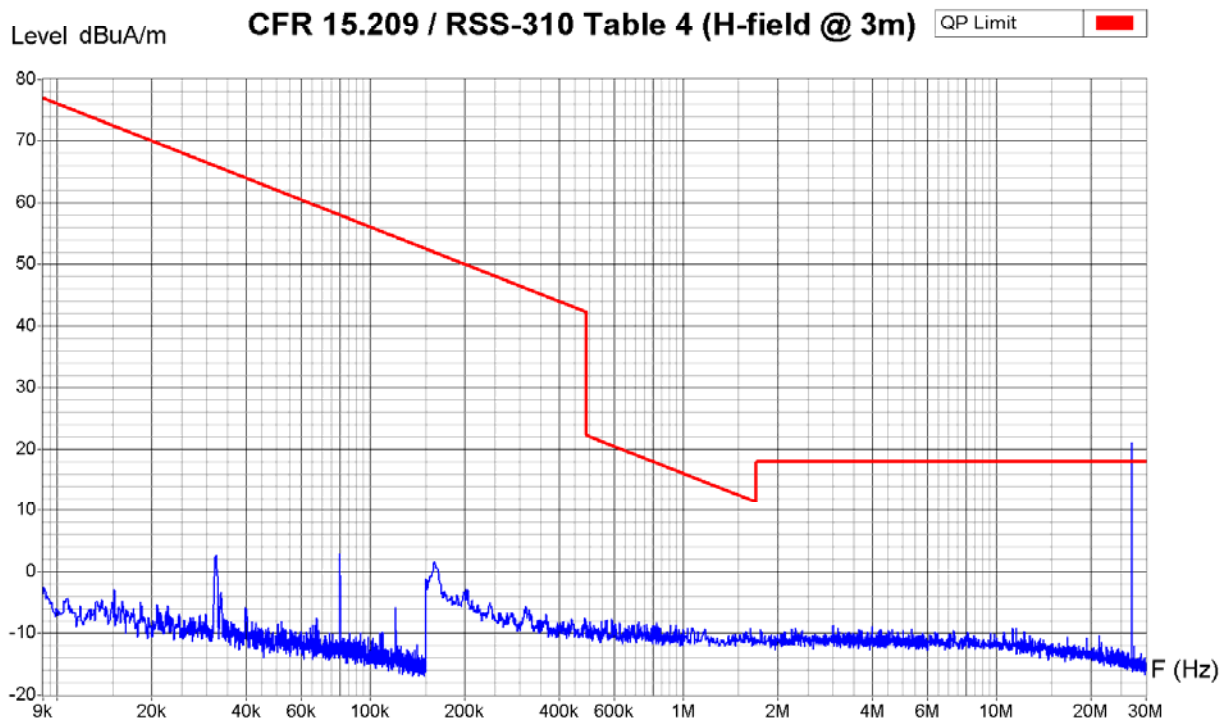
Spectrum analyser	<input type="checkbox"/> 88-14	<input type="checkbox"/> 90-26	<input type="checkbox"/> 94-24	<input type="checkbox"/> 02-06	<input checked="" type="checkbox"/> 03-45	<input type="checkbox"/> 03-57
Receiver	<input type="checkbox"/> 85-12	<input type="checkbox"/> 90-11	<input checked="" type="checkbox"/> 94-34	<input type="checkbox"/> 04-28	<input type="checkbox"/>	
Preamplifier	<input type="checkbox"/> 90-01	<input type="checkbox"/> 95-86	<input type="checkbox"/> 05-56	<input type="checkbox"/> 05-59	<input type="checkbox"/> 05-62	<input type="checkbox"/> 05-87
Antenna (typ: magnetic)	<input checked="" type="checkbox"/> 90-25	<input type="checkbox"/> 90-28	<input type="checkbox"/> 99-32	<input type="checkbox"/>		
.....					

Result: pass fail not applicable not tested

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



Equipment Under Test : FW-CU-TGB 06002 with EA 03047
 Set-Up : Supply 115VAC/60Hz; antenna cable
 Operating Conditions : Normal, continuous mode with implant FW-TGB 11047; output level 1.5W
 Remarks : EA 03047 in horizontal position



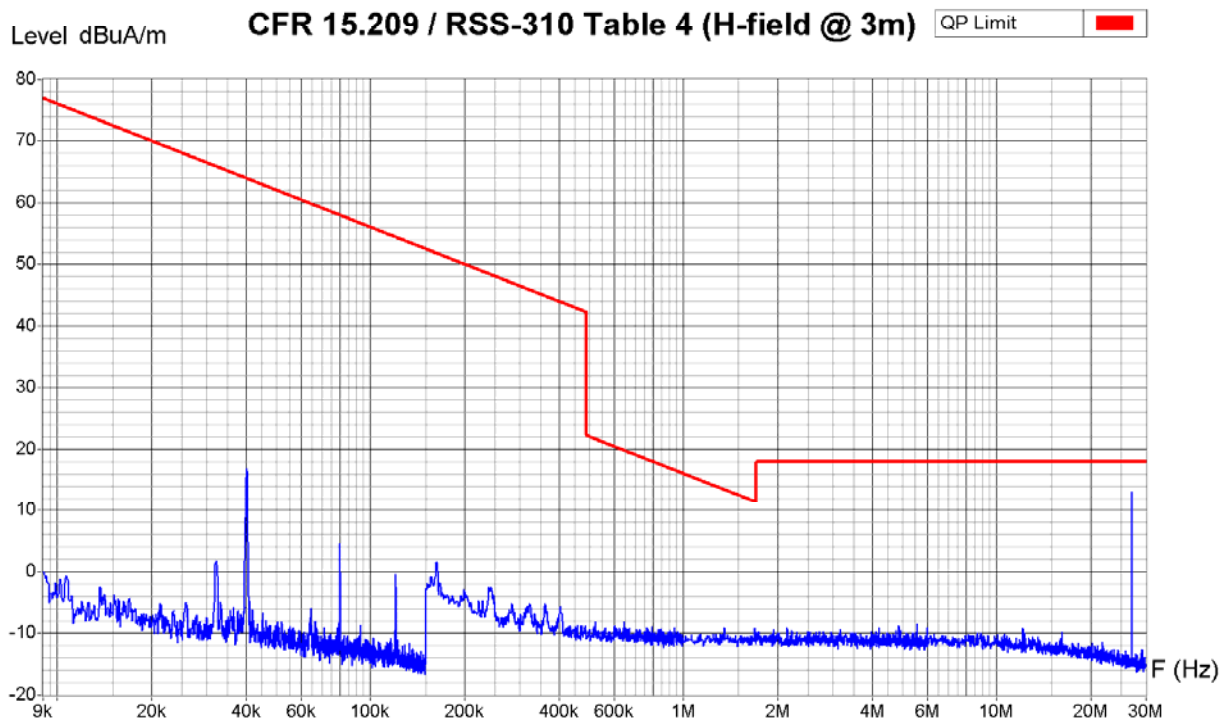
Zone	9 KHz - 80 KHz	150 KHz - 1 MHz	1 MHz - 6 MHz	6 MHz - 30 MHz	80 KHz - 150 KHz
Video Bandwidth	300 Hz	10 KHz	10 KHz	10 KHz	300 Hz
Resol Bandwidth	300 Hz	10 KHz	10 KHz	10 KHz	300 Hz

Operator: E. Staub
 Date/Time: 15.03.06 13:43
 Filename:
 20066887_TGB_erh_carrier_003h
 o.png/.txt

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



Equipment Under Test : FW-CU-TGB 06002 with EA 03047
 Set-Up : Supply 115VAC/60Hz; antenna cable
 Operating Conditions : Normal, continuous mode with implant FW-TGB 11047; output level 1.5W
 Remarks : EA 03047 in horizontal position



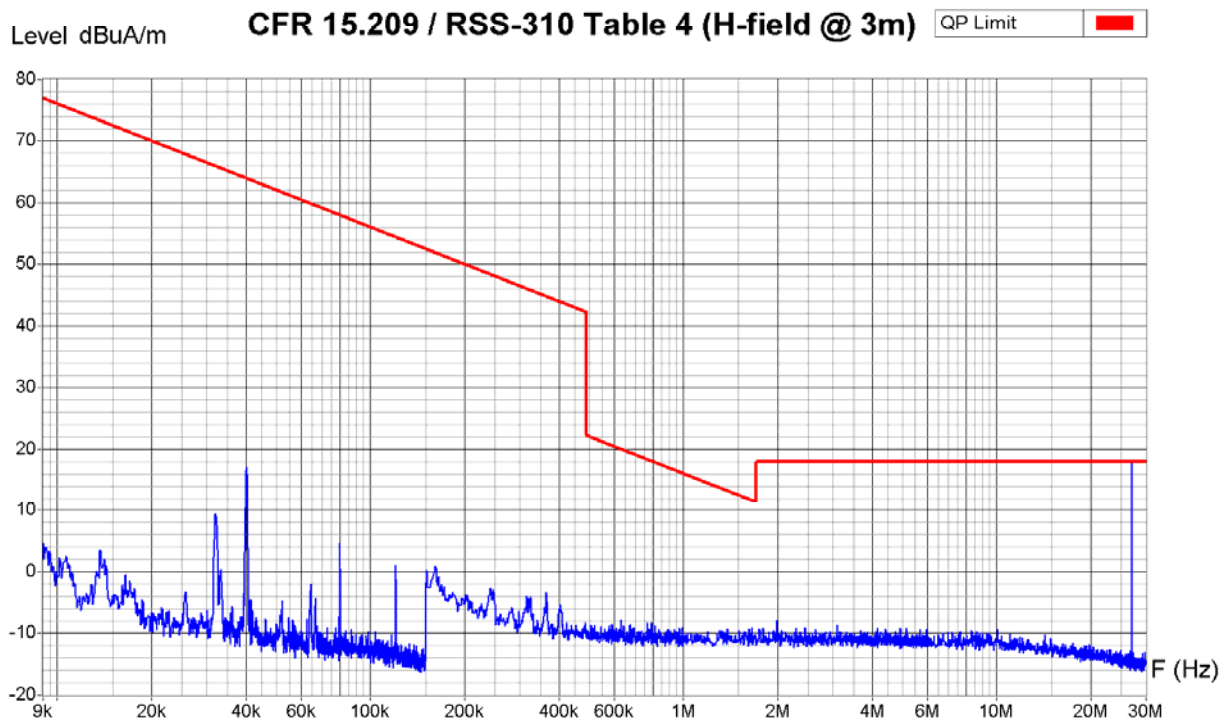
Zone	9 KHz - 80 KHz	150 KHz - 1 MHz	1 MHz - 6 MHz	6 MHz - 30 MHz	80 KHz - 150 KHz
Video Bandwidth	300 Hz	10 KHz	10 KHz	10 KHz	300 Hz
Resol Bandwidth	300 Hz	10 KHz	10 KHz	10 KHz	300 Hz

Operator: E. Staub
 Date/Time: 15.03.06 12:25
 Filename:
 20066887_TGB_erh_carrier_003p
 a.png/.txt

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



Equipment Under Test : FW-CU-TGB 06002 with EA 03047
 Set-Up : Supply 115VAC/60Hz; antenna cable
 Operating Conditions : Normal, continuous mode with implant FW-TGB 11047; output level 1.5W
 Remarks : EA 03047 in horizontal position



Zone	9 KHz - 80 KHz	150 KHz - 1 MHz	1 MHz - 6 MHz	6 MHz - 30 MHz	80 KHz - 150 KHz
Video Bandwidth	300 Hz	10 KHz	10 KHz	10 KHz	300 Hz
Resol Bandwidth	300 Hz	10 KHz	10 KHz	10 KHz	300 Hz

Operator: E. Staub
 Date/Time: 15.03.06 12:17
 Filename:
 20066887_TGB_erh_carrier_003p
 e.png/.txt

6.5 Radiated emission - Electromagnetic field

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

Distance: 30 m 10 m 3 m

Position of EUT: 0.8 m (height of the equipment under test above floor)

Meas. uncertainty: ± 6 dB (30 - 300 MHz) / ± 5.4 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.

Test set-up:



Remarks: e.g.: for $f = 40\text{MHz}$ the limit is $100\mu\text{V/m}$ at 3 m;
 $20 \log_{10} (100\mu\text{V/m}) = 40 \text{ dB}\mu\text{V/m}$ at 3 m

Test equipment:

Spectrum analyser	<input type="checkbox"/> 88-14	<input type="checkbox"/> 90-26	<input type="checkbox"/> 94-24	<input type="checkbox"/> 02-06	<input checked="" type="checkbox"/> 03-45	<input type="checkbox"/> 03-57
Receiver	<input type="checkbox"/> 85-04	<input type="checkbox"/> 90-43	<input checked="" type="checkbox"/> 94-35			
Preamplifier	<input type="checkbox"/> 90-01	<input type="checkbox"/> 95-86	<input type="checkbox"/> 05-56	<input type="checkbox"/> 05-59	<input type="checkbox"/> 05-62	<input checked="" type="checkbox"/> „Turgi“
Antenna (biconical)	<input type="checkbox"/> 82-02	<input type="checkbox"/> 87-05	<input type="checkbox"/> 87-16	<input type="checkbox"/> 91-05	<input type="checkbox"/> 94-37	
Antenna (log-per)	<input type="checkbox"/> 88-20	<input type="checkbox"/> 90-30	<input type="checkbox"/> 91-35	<input type="checkbox"/> 94-64		
Antenna (bilog)	<input checked="" type="checkbox"/> 94-03	<input type="checkbox"/> 05-38	<input type="checkbox"/>			
Antenna (horn)	<input type="checkbox"/> 90-24	<input type="checkbox"/> 90-29	<input type="checkbox"/> 98-12	<input type="checkbox"/> 98-13	<input type="checkbox"/>	
.....

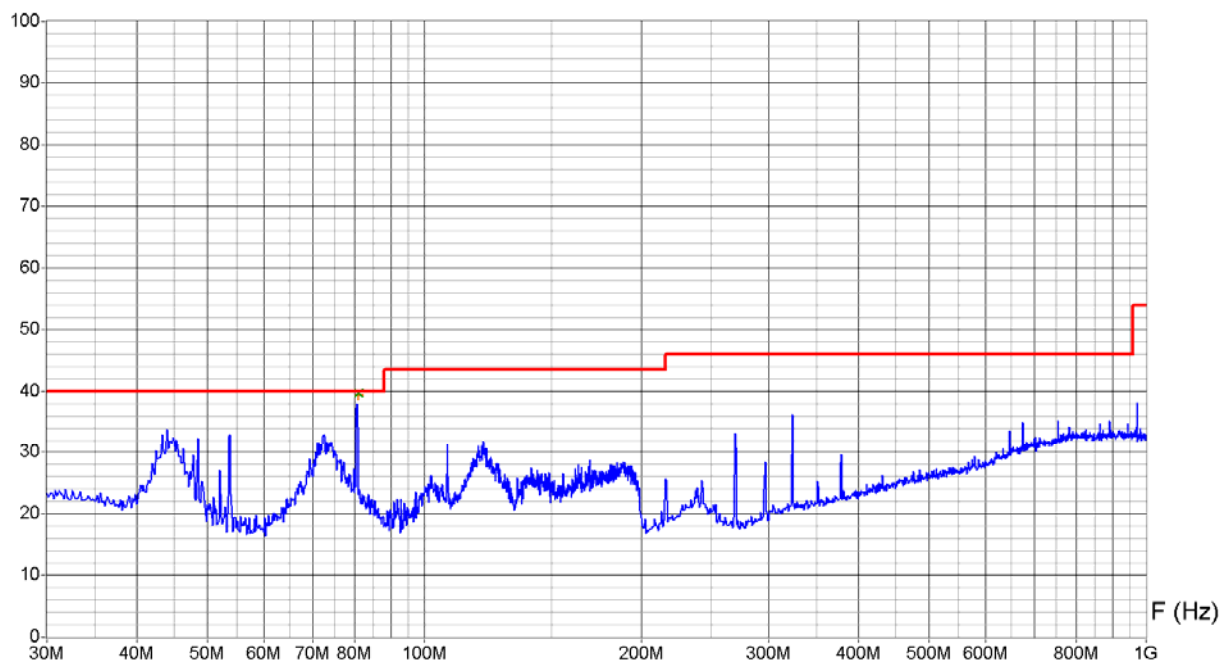
Result: pass fail not applicable not tested

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



Equipment Under Test : FW-CU-TGB 06002 with EA 03047
 Set-Up : Supply 115VAC/60Hz; antenna cable
 Operating Conditions : Normal, continuous mode with implant FW-TGB 11047; output level 1.5W
 Remarks : EA in horizontal position
 Antenna cable on turn table

Level dBuV/m **CFR 15.209 / RSS-310 Tab 3 (EM-field @ 3m)** QP Limit



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

Receiver Measures

Frequency	Peak	QuasiPeak (x)	Average (+)	QP Margin
81.02 MHz	41.2 dBuV/m	39.7 dBuV/m	39.3 dBuV/m	0.3 dB

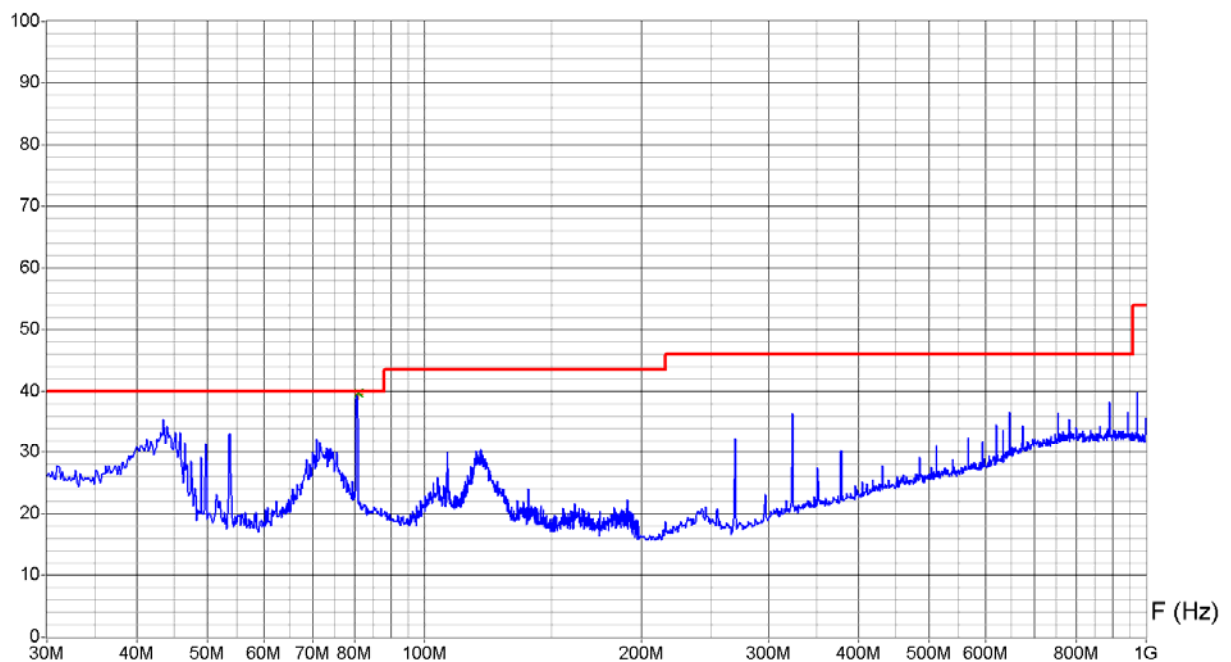
Operator: E. Staub
 Date/Time: 15.03.06 16:16
 Filename:
 20066887_TGB_erem_006h.png/
 .txt

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



Equipment Under Test : FW-CU-TGB 06002 with EA 03047
 Set-Up : Supply 115VAC/60Hz; antenna cable
 Operating Conditions : Normal, continuous mode with implant FW-TGB 11047; output level 1.5W
 Remarks : EA in horizontal position
 Antenna cable on turn table

Level dBuV/m **CFR 15.209 / RSS-310 Tab 3 (EM-field @ 3m)** QP Limit



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

Receiver Measures

Frequency	Peak	QuasiPeak (x)	Average (+)	QP Margin
81.02 MHz	40.3 dBuV/m	39.8 dBuV/m	39.5 dBuV/m	0.2 dB

Operator: E. Staub
 Date/Time: 15.03.06 16:30
 Filename:
 20066887_TGB_erem_006v.png/
 .txt