

**montena**

montena emc sa

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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:	16'158
Product name: Nom du produit: Produktname	Dynamic Soundfield Digi Master 5000		Mandate no: Mandat no: Auftrag Nr:	20099136
Serial no: No de série: Seriennummer:	103C09118	Model number: Numéro de modèle: Modellnummer:	Digi Master 5000	
Customer: Client: Kunde:	Phonak Communications SA Länggasse 17 3280 Murten Switzerland	Date of test: Date de l'essai: Prüfdatum:	March to July, 2010	

Standards / Normes / Normen	Result Résultat Ergebnis
47 CFR, Part 15 (Subpart C, Intentional radiator: §§ 15.207/247)	Pass

Test performed by
 Essai effectué par :
 Prüfer

Mr A. Bieri, Mr E. Staub

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

Mr A. Bieri, Mr E. Staub

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

Mr E. de Raemy

Rossens, July 19, 2010

(Issue Date / Date d'édition / Ausstelldatum)

V2009Dec22

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.

q:\mandats\2009\20099136_phonak_soundfield\cem-radiolrap_20099136_fcc_16158.doc

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Foreword / Avant-propos / Vorwort

The vertical and the horizontal antenna part are identical and sends the data alternately (never together), therefore the most measurements (see remarks at each chapter) were executed only with one antenna (typically horizontal antenna).

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, 15.247
6.1	Channel 20dB-bandwidth Bande passante 20dB 20dB-Kanalbandbreite	CFR 47 § 15.247 (a)(1) 308 – 544 kHz
6.2	Carrier frequency separation Séparation des porteuses des canaux Trägerfrequenzabstand	CFR 47 § 15.247 (a)(1) ✓
6.3	Number of hopping channels Nombre de canaux Anzahl der Kanäle	CFR 47 § 15.247 (a)(1)(iii) ✓
6.4	Time of occupancy (dwell time) Temps d'exposition Verweilzeit	CFR 47 § 15.247 (a)(1)(iii) ✓
6.5	Maximum output power (conducted) Puissance de sortie maximale (conduit) Maximale Ausgangseistung (geleitet)	CFR 47 § 15.247 (b)(1) ✓
6.6	Effective radiated power Puissance rayonné effective Effektiv abgestrahlte Leistung	CFR 47 § 15.247 (b)(1) ✓
6.7	Antenna gain Gain de l'antenne Antennengewinn	CFR 47 § 15.247 (c) 7.9 dBi
6.8	Power spectral density (conducted) Densité spectrale de puissance (conduit) Spektrale Leistungsichte (geleitet)	CFR 47 § 15.247 (e) ✓
6.9	Band-edge emission (conducted) Emissions aux bords de bande (conduit) Emission an den Bandgrenzen (geleitet)	CFR 47 § 15.247 (d) ✓
6.10	Band-edge emission (radiated) Emissions aux bords de bande (rayonné) Emission an den Bandgrenzen (gestrahlt)	CFR 47 § 15.205 ✓
6.11	Spurious emissions – conducted (transmitter) Émissions parasites – conduit (émetteur) Nebenaussendung – geleitet (Sender)	CFR 47 § 15.247 (d) ✓
6.13	Spurious emissions – radiated (transmitter) Émissions parasites – rayonné (émetteur) Nebenaussendung – gestrahlt (Sender)	CFR 47 § 15.209 ✓
6.14	Radiated emission – receiver Émission par rayonnement – récepteur Gestrahlte Emission – Empfänger	CFR 47 § 15.109 ✓
6.	Emission / Emission / Störaussendung	47 CFR, 15.207
6.12	Conducted emission Émission par conduction Geleitete Emission	CFR 47 § 15.207 ✓

2. Applied standards / Normes appliquées / Verwendete Normen

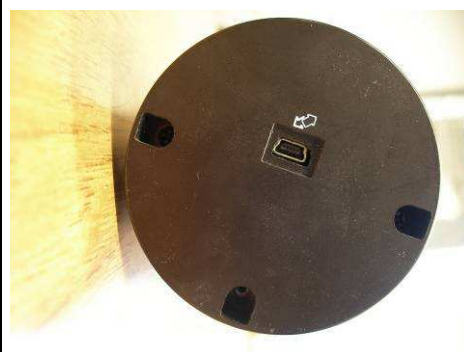
47 CFR Part 15 Subpart C	Code of Federal Regulations - Title 47 - Telecommunication, Part 15, Subpart C: "Intentional Radiators"
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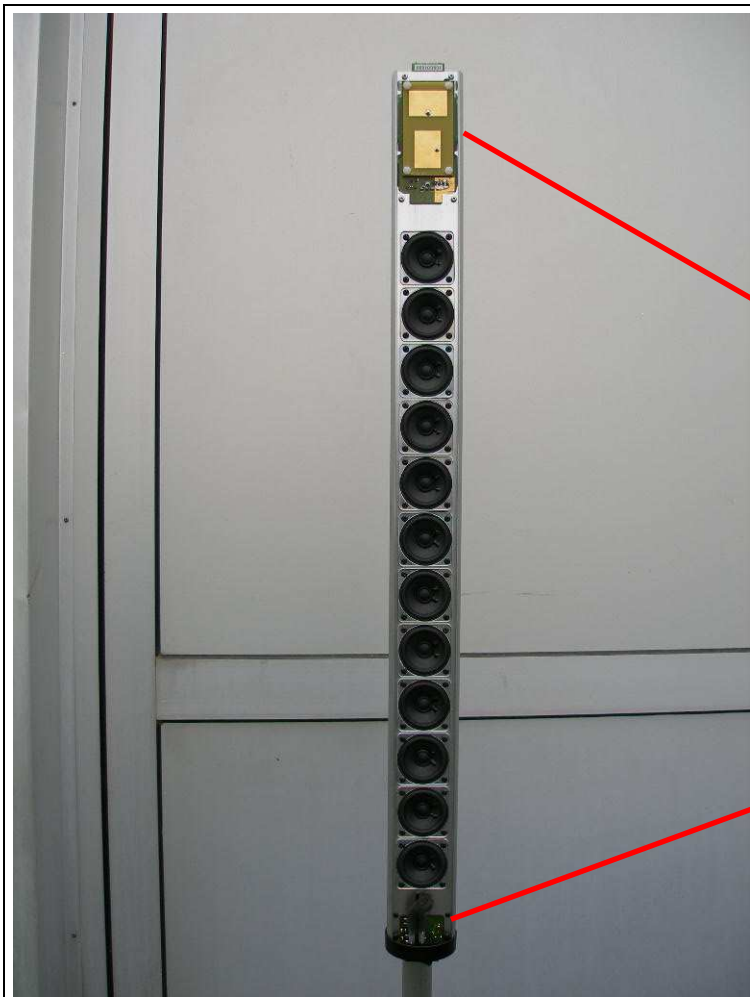
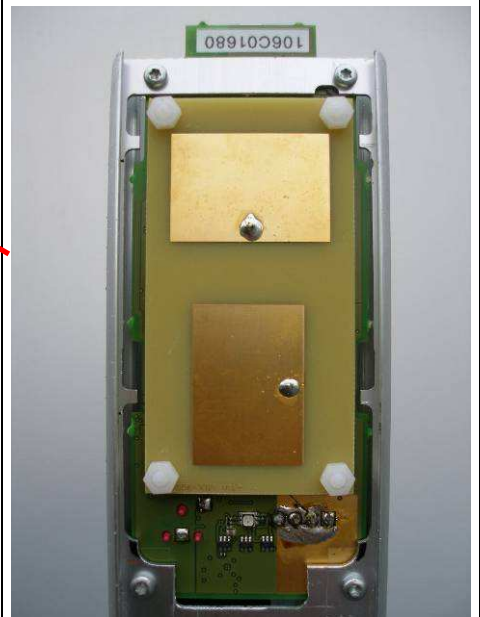
3. Client / Client / Kunde

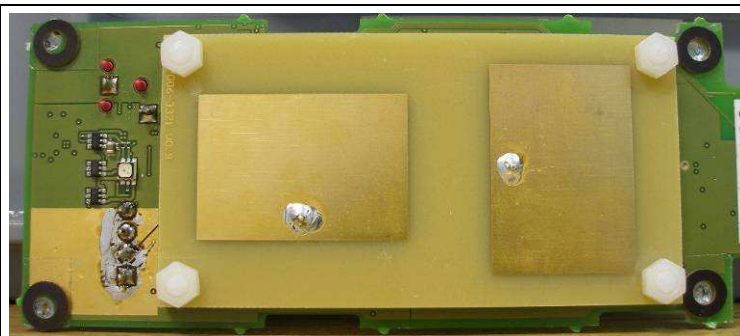
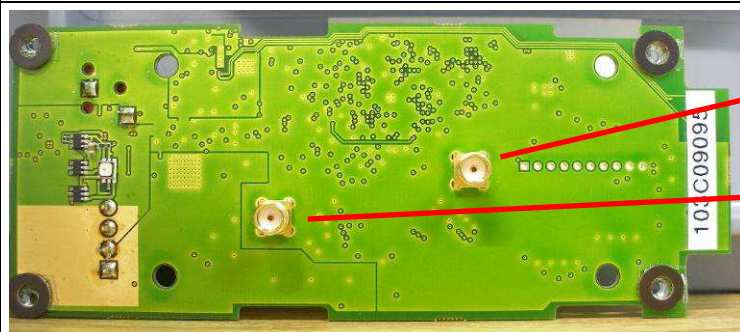
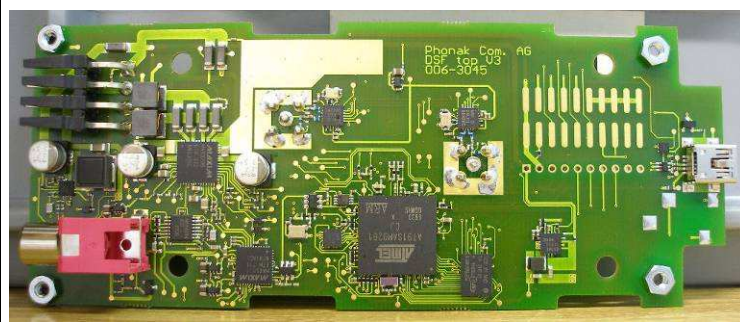
Client name and address Nom et adresse du client Name und Adresse des Kunden	<i>Phonak Communications SA Länggasse 17 3280 Murten Switzerland</i>
Contact Person / Responsable / Kontaktperson	<i>Mr Stefan Gysin</i>
Telephone / Téléphone / Telefon	<i>+41 26 672 96 38</i>
Fax / Télécopieur / Telefax	<i>+41 26 672 93 80</i>
E-mail / Courrier électronique / E-mail	<i>Stefan.gysin@phonak.com</i>
Mandate no / No. de mandat / Auftragsnr.	<i>20099136</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>China</i>
Brand name / nom de marque / Verkaufsmarke	<i>Phonak</i>
Product name / Nom du produit / Produktname	<i>Dynamic Soundfield Digi Master 5000</i>
Product description / Description du produit / Produktbeschreibung	<i>Wireless speaker for sound field voice reinforcement systems in classrooms</i>
Model number / Numéro de modèle / Modellnummer	<i>Digi Master 5000</i>
Serial no / No. de série / Seriennummer	<i>103C09118</i>
Software version / Version du logiciel / Softwareversion	<i>255.1.002</i>
Highest frequency / Fréquence la plus élevée / Höchste Frequenz	<i>2.48 GHz</i>
Supply / Alimentation / Speisung	<i>$U = 100 - 240 \text{ VAC} / P_{\max} = 65 \text{ W} / f = 50/60 \text{ Hz}$</i>
Technical documentation Documentation technique Technische Dokumentation	<i>None. The equipment is completely identified by its serial no. according to ISO 9001</i>

4.2 Pictures of the EUT / Photos de l'EST / Fotos des Prüflings*General view with I/O ports*

*Inside view loudspeaker array and PCB's**Power supply*

*RF circuit with patch antennas**RF circuit for conducted measurements with temporary antenna connectors**Vertical antenna**Horizontal antenna*

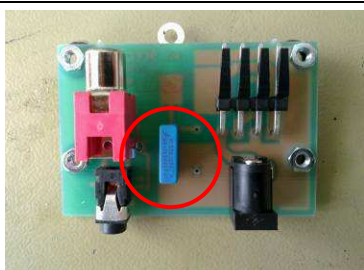
4.3 Classification / Classification / Klassierung

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	
Mains 100 – 240 VAC 50/60 Hz	---	L and N	none	---
Audio In	< 30 m	2 wired	none	Audio input port

4.5 Modifications / Modifications / Angebrachte Änderungen

		Supplemental connection between the system ground and the metallic housing via a 3.3nF Y-capacitor.
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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 CH-1728 Rossens	March – May, 2010	20 - 23 °C	1005 – 1038 hPa	30 – 41 %
	July 16 and 18, 2010	22 – 26 °C	1017 – 1024 hPa	48 – 51 %

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

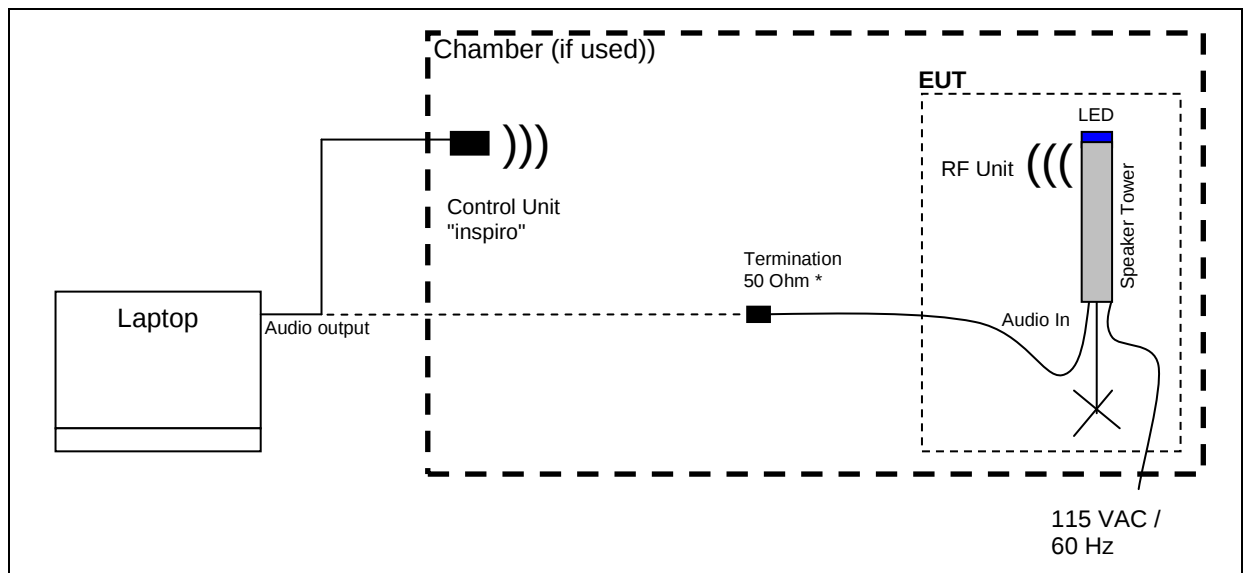
Test Engineer(s) / Ingénieur(s) d'essai / Prüfsingenieur(e) :

Mr A. Bieri, Mr E. Staub

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

Name / Nom / Name	Company / Société / Firma
Mr Stefan Gysin	Phonak Communications SA

5.4 Test configuration / Configuration d'essai / Prüfkonfiguration



* and ----- = Only used/connected with analog audio signal (Mode audio input cable)

5.5 Operating conditions / Conditions de fonctionnement / Betriebszustand

- *Mode RF: Powered with 115 Vac / 60 Hz; Endless signal pink noise (with 85dB spl at 1m distance) and with pseudorandom frequency hopping 2.402 MHz – 2.482MHz. Audio cable connected and with 50 Ohm terminated.*
- *Mode audio input cable: Powered with 115 Vac / 60 Hz; Endless signal pink noise (with 85dBspl at 1m distance), audio cable connected, without RF communication.*

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
Control unit "inspiro"	Phonak	- - -	15398	Unit to control the dynamic soundfield
Laptop	HP	Compaq 6710b	- - -	For programming purposes only

		Control unit "inspiro"
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6. 47 CFR 15.247 / 15.109 / 15.207 Measurements

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: Measured at start- stop and midi frequency (2.402 GHz, 2.440GHz and 2.480GHz)

Test equipment:

Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Cables	☒ Succoflex 1m (8407/4)					
Power supply	☒ 99-07					

Results of the test

Client: *Phonak Communications SA*

Apparatus: *Dynamic Soundfield Digi Master 5000*

Operating mode: *Single frequency (2.402, 2.441 and 2.48 GHz)*

Cables connected to the EUT:

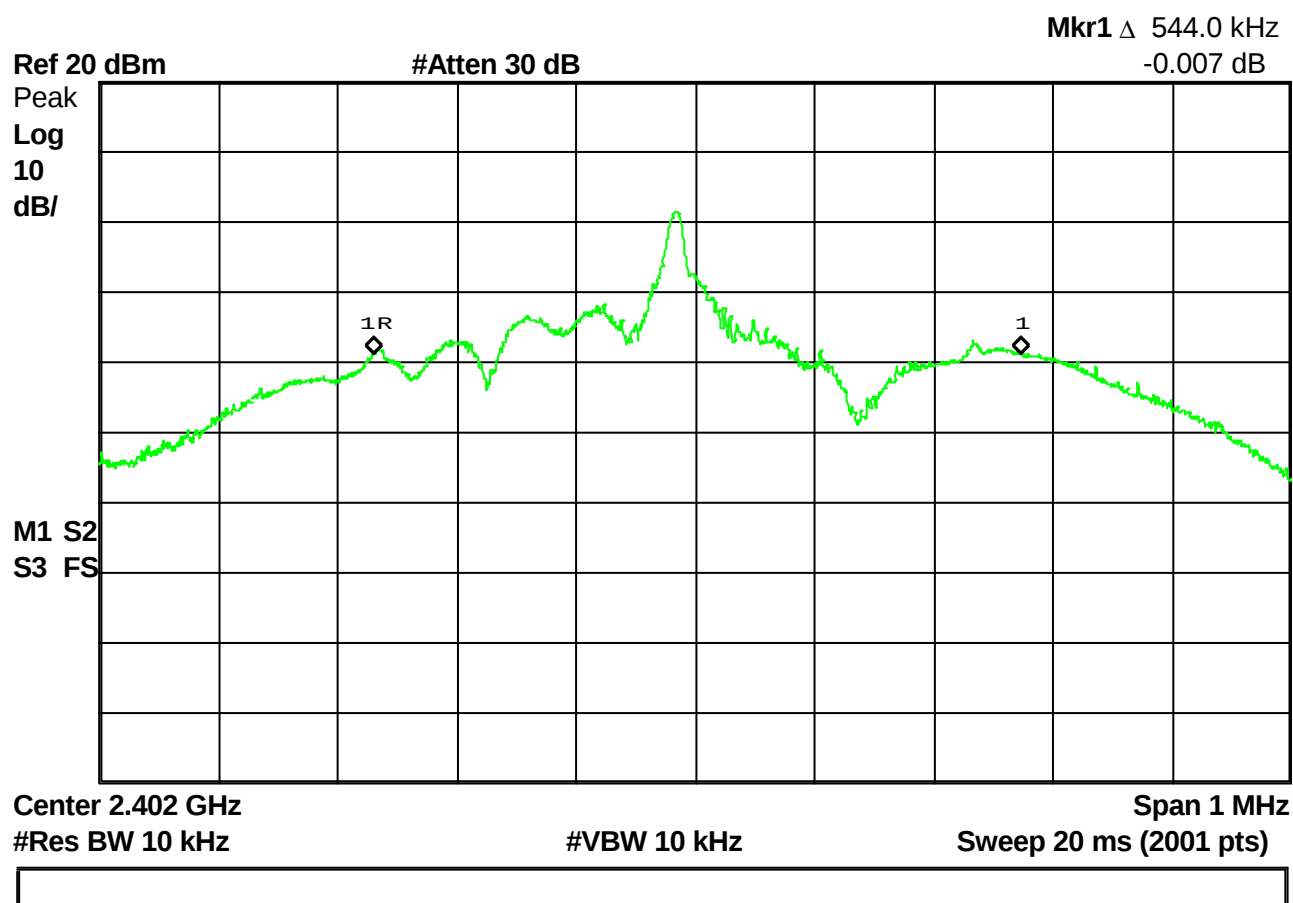
- *DC supply*
- *Temporary antenna cable*

Remarks: *Measured on temporary antenna connector (horizontal)*

frequency [GHz]	20 dB bandwidth [kHz]	Remarks
2.402000	544	---
2.441000	311	---
2.480000	308	---

Example of measurement at 2.402 GHz

Agilent 17:29:54 Apr 27, 2010



Date of test: *April 27, 2010*
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: 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: Minimum 25 kHz or 20 dB bandwidth of the hopping channel (544 kHz, see § 6.1)

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	☒ 99-07					

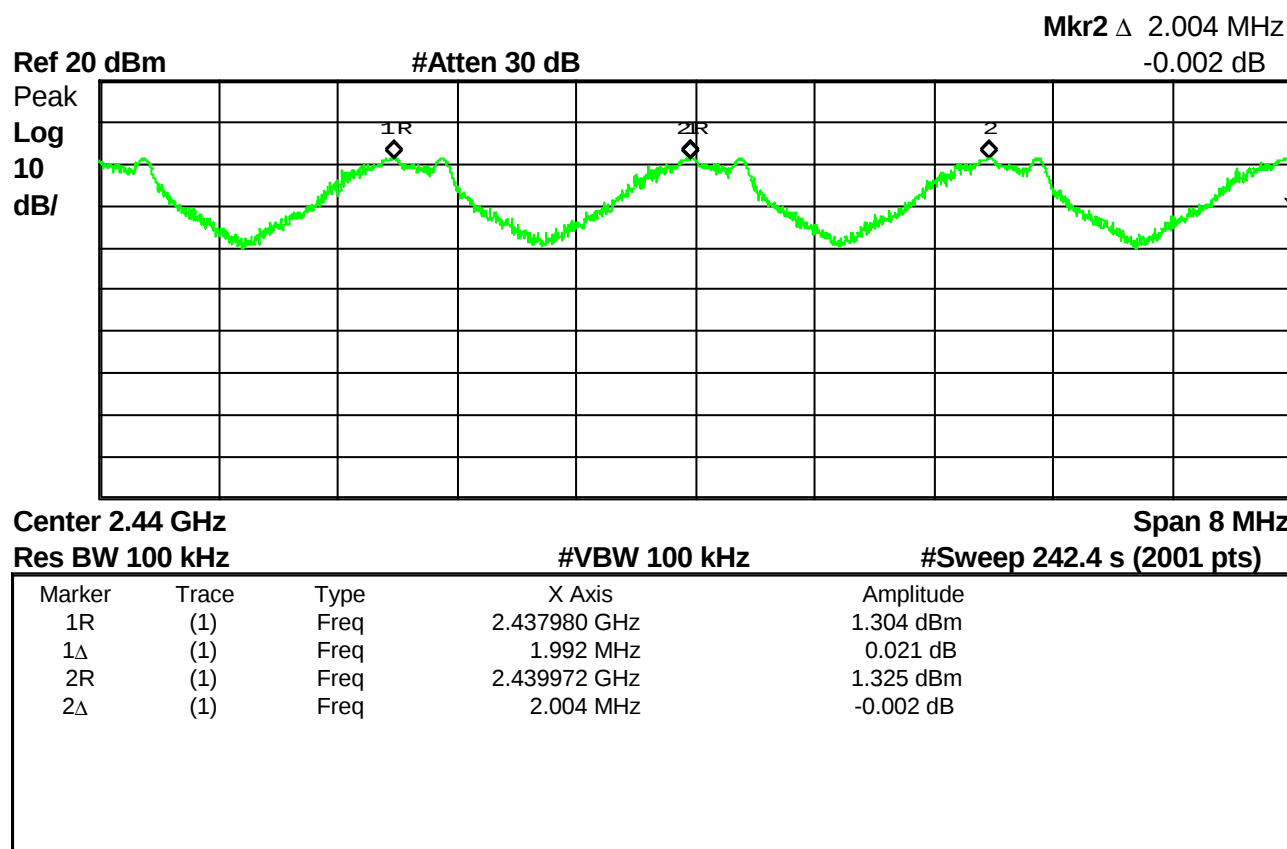
Result:	☒ pass	☐ fail	☐ not applicable	☐ not tested
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Results of the testClient: *Phonak Communications SA*Apparatus: *Dynamic Soundfield Digi Master 5000*Operating mode: *Continuously hopping*Cables connected to the EUT:

- *DC supply*
- *Temporary antenna cable*

Remarks: *Measured on temporary antenna connector (horizontal)*

❄ Agilent 16:14:40 Apr 27, 2010



Carrier frequency separation = 2 MHz

Date of test: *April 27, 2010*
Operator: *A. Bieri*

6.3 Number of hopping channels

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

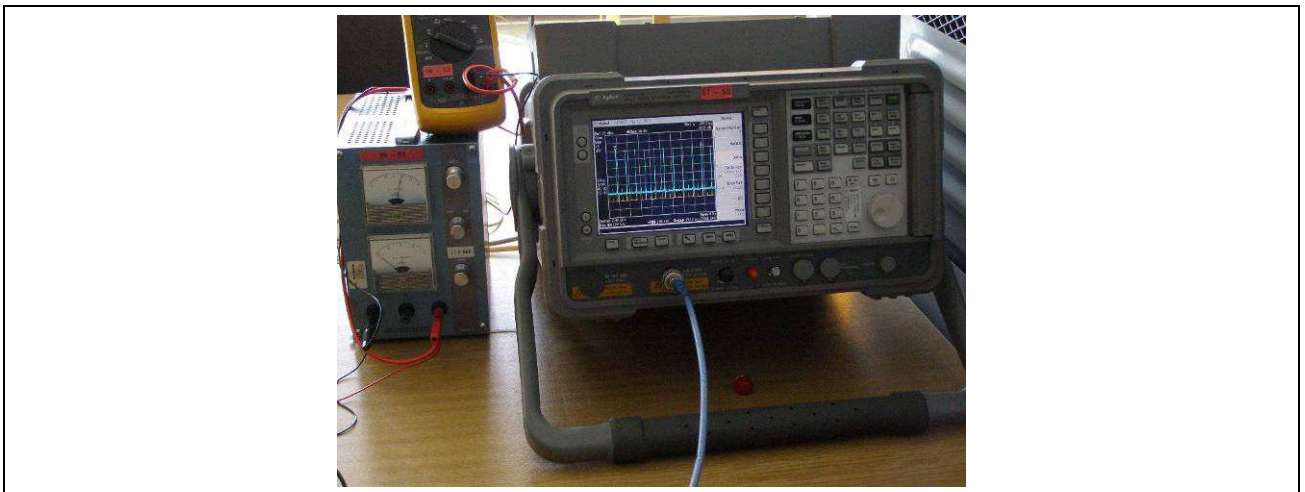
Test site: ☐ anechoic chamber (foam) ☐ open test site
☐ anechoic chamber (ferrites) ☒ laboratory

Meas. uncertainty: 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: 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	☒ 99-07					

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

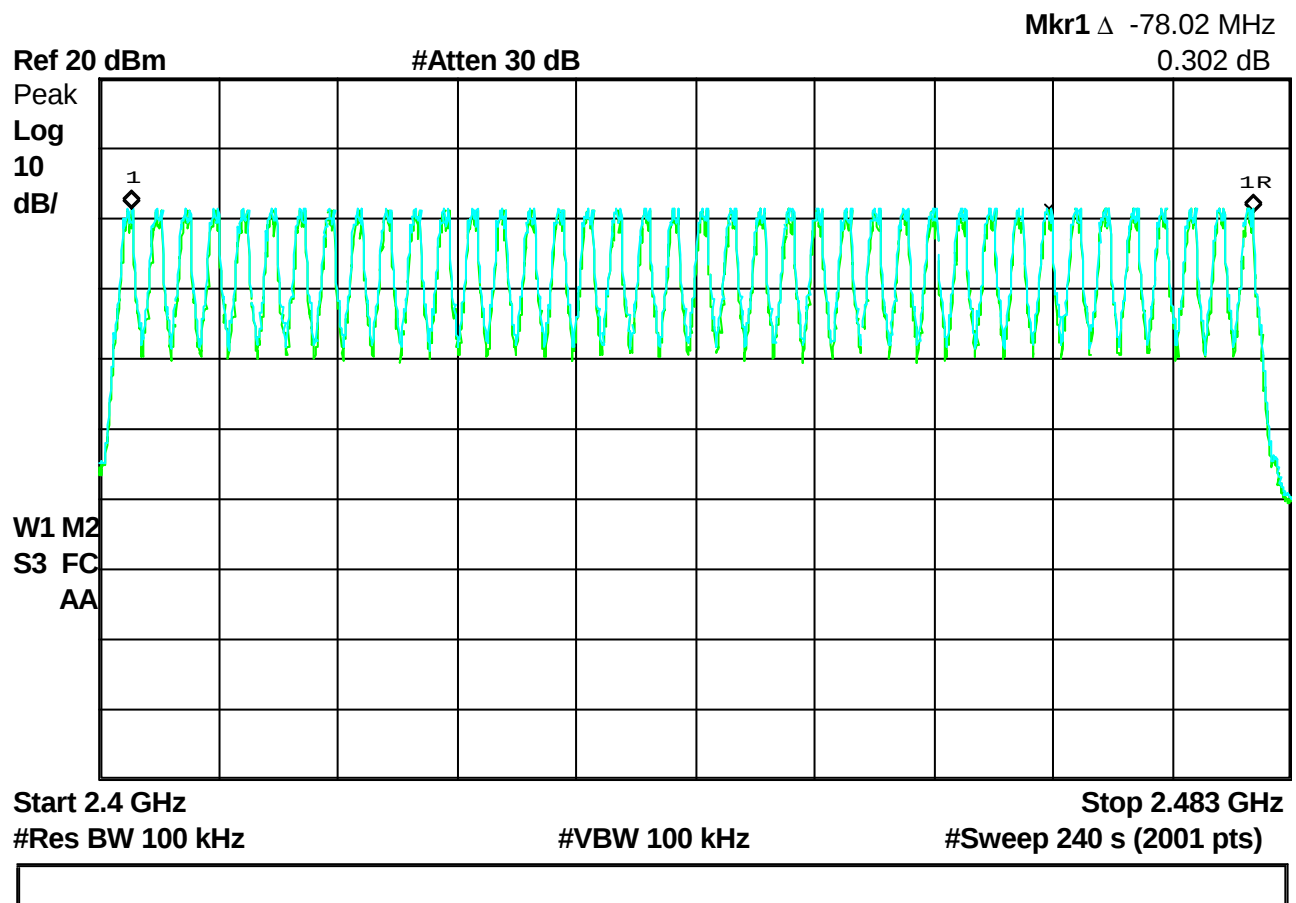
Results of the testClient: *Phonak Communications SA*Apparatus: *Dynamic Soundfield Digi Master 5000*Operating mode: *Continuously hopping*

Cables connected to the EUT:

- *DC supply*
- *Temporary antenna cable*

Remarks: *Measured on temporary antenna connector (horizontal)*

✱ Agilent 09:08:39 Apr 27, 2010



Number of hopping channels = 40

Date of test: April 27, 2010
Operator: A. Bieri

6.4 Time of occupancy (dwell time)

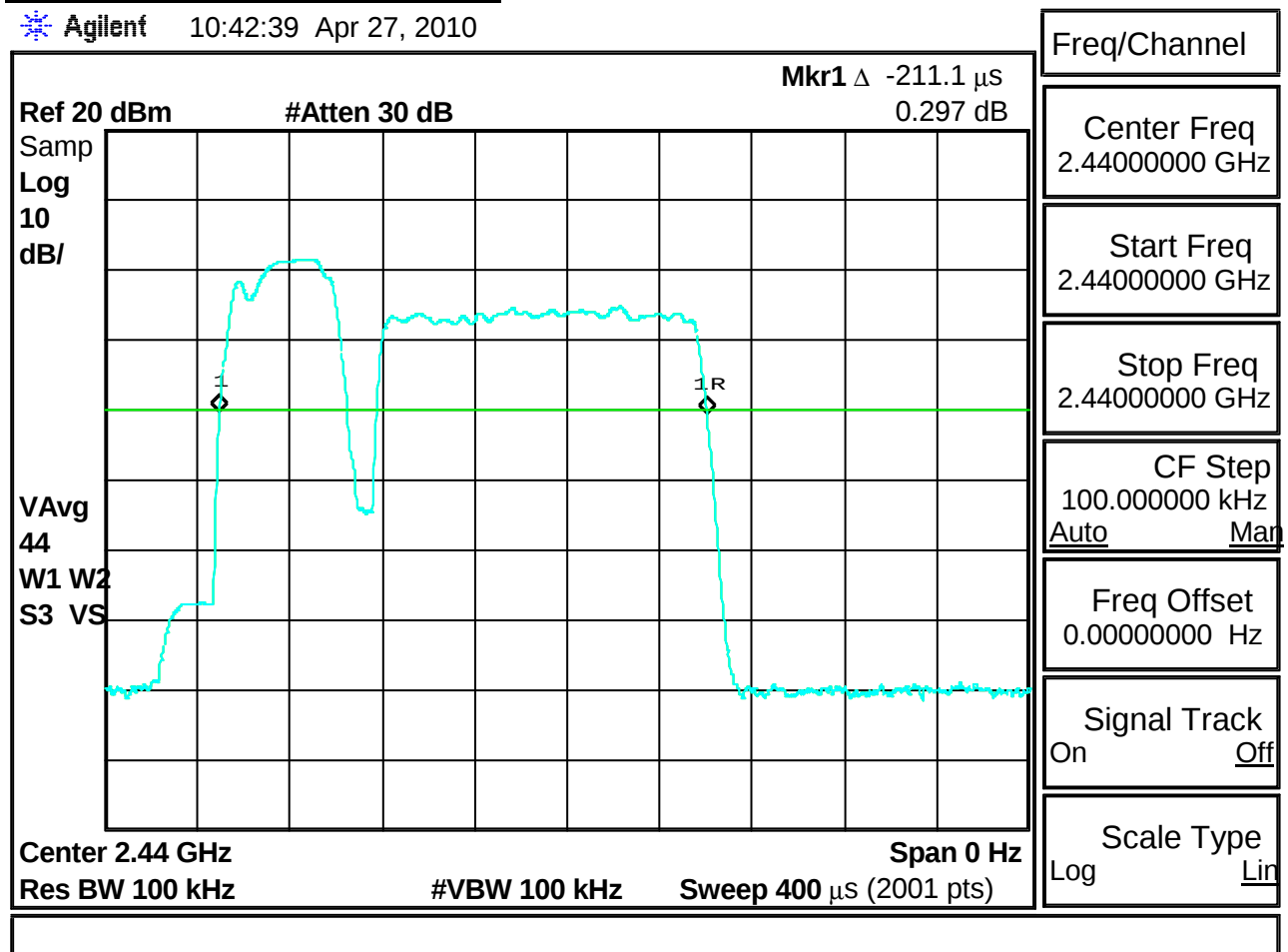
Introduction: Average duration during which the system stays on one channel.

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.

Calculation: Measured numbers of channels: 40
 Calculation of period: Number of channels * 0.4 s = 40 * 0.4s = 16 s
 Measured duration of occupancy time: 211.1 μ s
 Measured repetitions in a time of 288.3 ms (random): 9
 $\rightarrow 288.3\text{ms} / 9 = \text{all } 32.033\text{ms sends the transmitter for } 211.1\mu\text{s}$
 In a period of 16 seconds: $(16\text{s}/0.032\text{s}) * 0.0002111\text{s} = 0.1054\text{s}$
 0.1054 seconds < 0.4 seconds $\rightarrow$ **Pass**

Example of puls duration at frequency 2.44 GHz

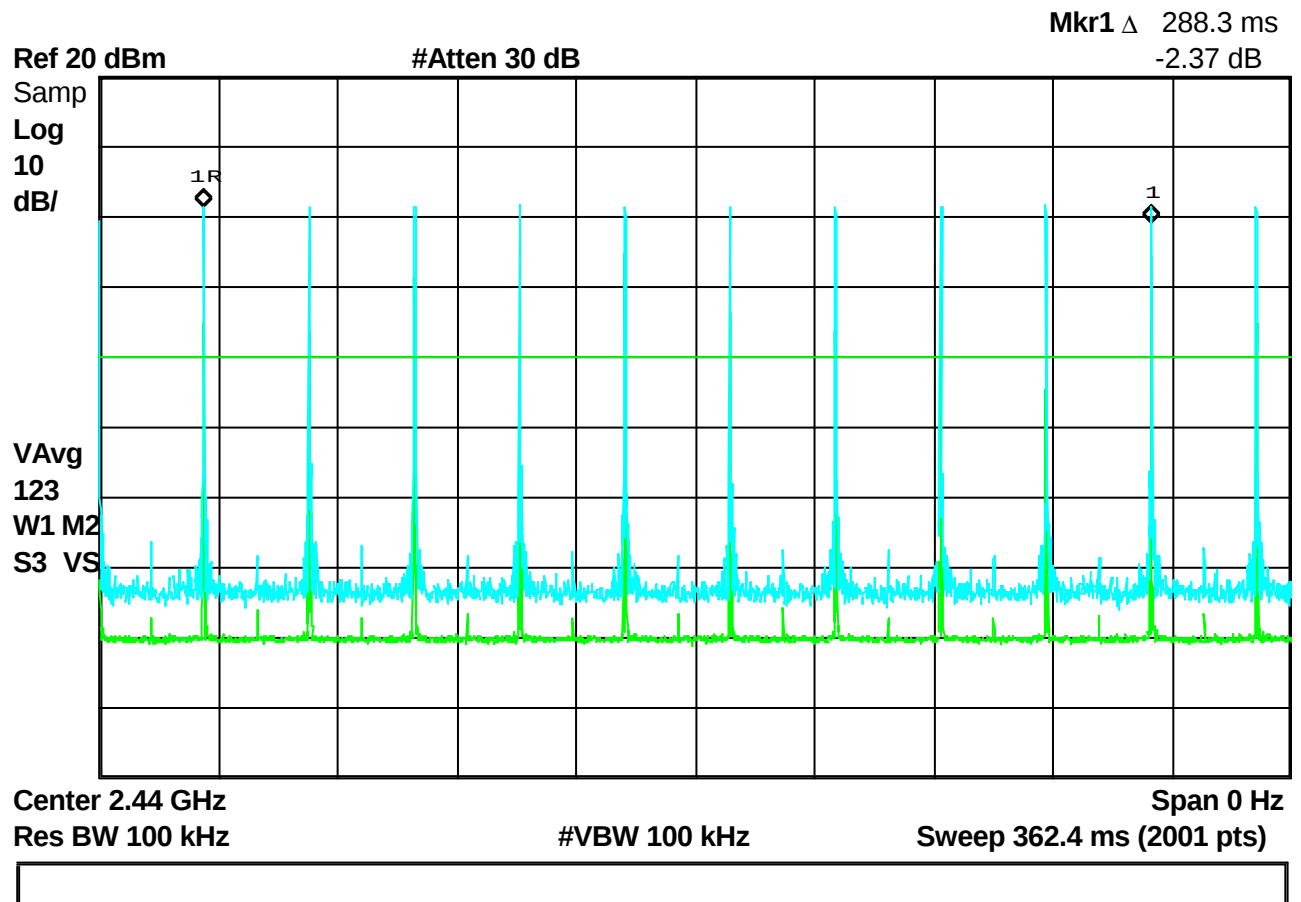
Agilent 10:42:39 Apr 27, 2010



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

Example of repeating of sequence at 2.440 GHz

✱ Agilent 10:45:33 Apr 27, 2010



Date of test: April 27, 2010
Operator: A. Bieri

6.5 Maximum output power (conducted)

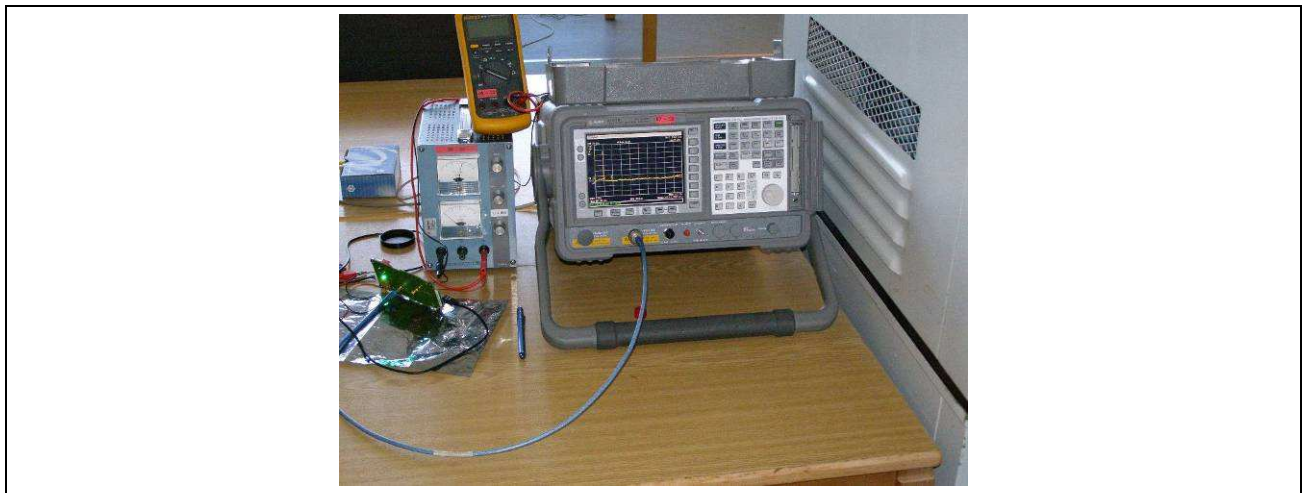
Test site: ☐ anechoic chamber (foam) ☐ open test site
☐ anechoic chamber (ferrites) ☒ laboratory

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). With antenna gain results,
 21 dBm – (7.9-6) dB = **19.1 dBm (81.3 mW)**

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	☒ 99-07					

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

Results of the test

Client: *Phonak Communications SA*

Apparatus: *Dynamic Soundfield Digi Master 5000*

Operating mode: *Single frequency (2.402, 2.44 and 2.48 GHz)*

Cables connected to the EUT:

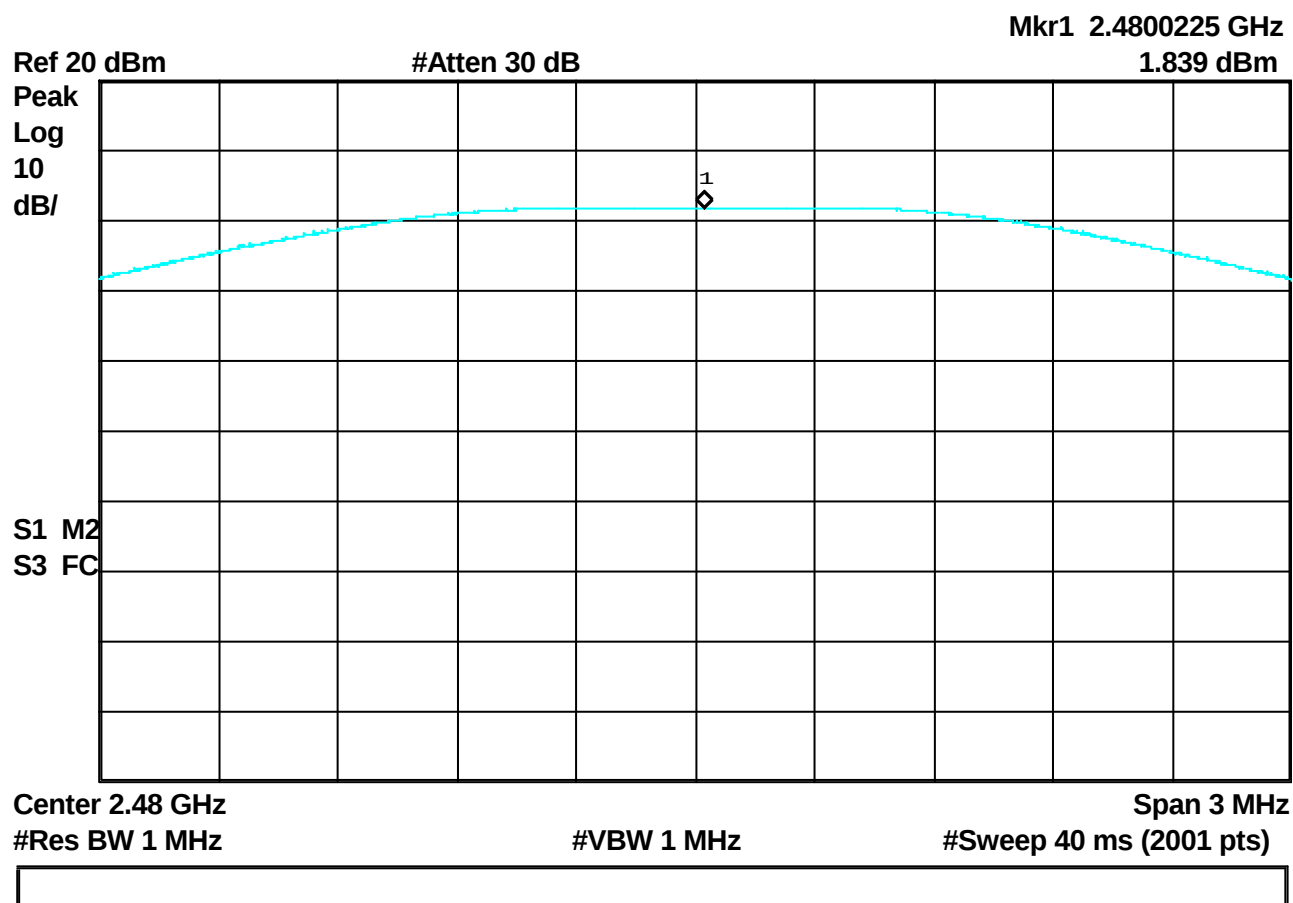
- *DC supply*
- *Temporary antenna cable*

Remarks: *Measured on temporary antenna connector (horizontal)*

f normal [GHz]	Temp [°C]	U [V]	P [dBm]	Limit [dBm]	Remarks	Pass Yes No	
2.402	23.9	19	1.76	19.1	Limit: worst case of the 3 measured frequency	☒	☐
2.440	23.9	19	1.78	19.1	Limit: worst case of the 3 measured frequency	☒	☐
2.480	23.9	19	1.84	19.1	Limit: worst case of the 3 measured frequency	☒	☐

Example of measurement at 2.48 GHz

 Agilent 15:43:36 Apr 27, 2010



Date of test: *April 27, 2010*
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: ☐ 30 m ☐ 10 m ☐ 3 m ☒ 1 m

Position of EUT: 1.8 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 0.125 Watt (= 20.97 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	☐ 90-29	☐ 98-12	☐ 98-13	☐	
HF-wattmeter	☐ 95-97	☐ 01-15	☐ 01-17	☐ 03-07	☒ 04-96	☐ 05-20
Thermocouple detector	☐ 92-03	☐ 04-01	☐ 05-74	☐ 05-88	☐ 07-03	☒ 2010-28
Substitution antenna	☐ 89-01	☒ 00-52	☐			
Diode detector	☐ 99-26	☐ 99-27				
Oscilloscope	☐ 90-14 ☐ 05-22	☐ 93-85 ☐ 05-28	☐ 93-86	☐ 01-20	☐ 04-06	☐ 04-50
Multimeter	☐ 89-07 ☐ 04-47	☐ 90-38 ☐ 04-104	☐ 92-25 ☐ 04-105	☐ 94-51 ☐	☐ 02-03	☐ 03-22
Temperature probe	☐ 91-11	☐ 03-05	☐ 05-34			
Frequency generator	☐ 88-23	☐ 00-42	☐ 03-39	☒ 04-03	☐ 05-78	☐ 07-02
Cables	☒ Succoflex 5m (47143/4)			☒ Succoflex 5m (47141/4)		

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

Results of the test

Client: *Phonak Communications SA*

Apparatus: *Dynamic Soundfield Digi Master 5000*

Operating mode: *Single frequency (2.402, 2.44 and 2.48 GHz)*

Cables connected to the EUT: *Power supply*

Remarks:

- *Centre of Tx antenna at 1.8 m*
- *RBW = VBW = 100 kHz; Det = Peak*

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	-25.5	0.0	0	0	-31.19	2.15	0	33.34	7.89	6.15 mW	Vertical
2.402	-24.1	0.0	0	0	-29.48	2.15	0	31.63	7.49	5.61 mW	Horizontal
2.440	-24.1	0.0	0	0	-31.63	2.15	0	33.78	9.68	9.29 mW	Vertical
2.440	-24.3	0.0	0	0	-30.87	2.15	0	33.02	8.68	7.38 mW	Horizontal
2.480	-24.6	0.0	0	0	-30.82	2.15	0	32.97	8.39	6.90 mW	Vertical
2.480	-24.3	0.0	0	0	-30.24	2.15	0	32.39	8.06	6.40 mW	Horizontal

Date of test: *April 30, 2010*
 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	1.76	7.89	6.13	- - -
2.440000	1.78	9.68	7.90	- - -
2.480000	1.84	8.39	6.55	- - -

Date of test: *April 30, 2010*
Operator: *A. Bieri*

6.8 Power spectral density (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: For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band.

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	☒ 99-07					

Result:	☒ pass	☐ fail	☐ not applicable	☐ not tested
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Results of the test

Client: *Phonak Communications SA*

Apparatus: *Dynamic Soundfield Digi Master 5000*

Operating mode: *Single frequency (2.402, 2.44 and 2.48 GHz)*

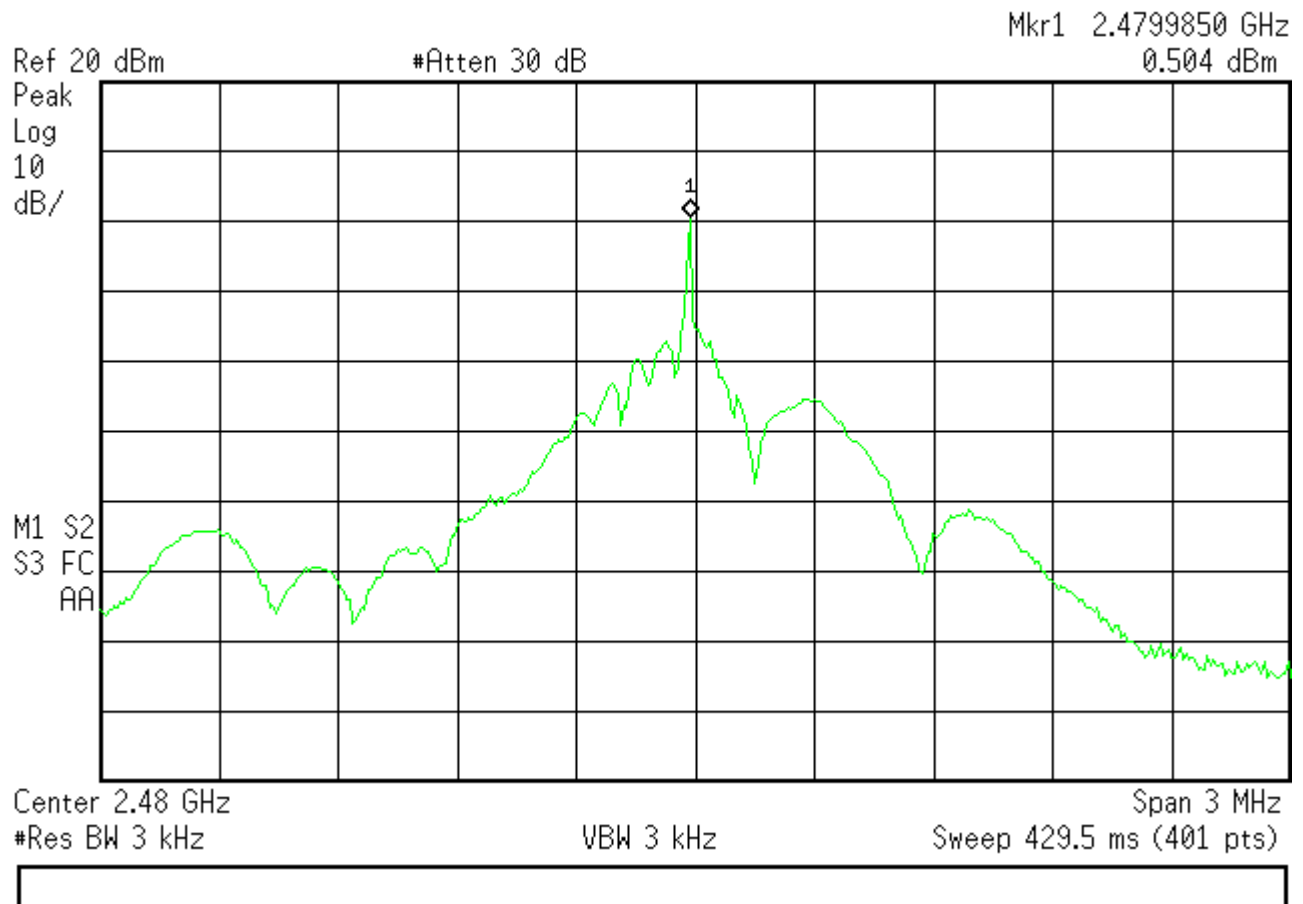
Cables connected to the EUT:

- *DC supply*
- *Temporary antenna cable*

Remarks: *Measured on temporary antenna connector (horizontal)*

Example of measurement at 2.48 GHz

 **Agilent** 16:22:23 Apr 28, 2010



Maximal power spectral density (at $f = 2.48$ GHz) = 0.504 dBm / 3 kHz.

Date of test: *April 28, 2010*
Operator: *A. Bieri*

6.9 Band-edge emission (conducted)

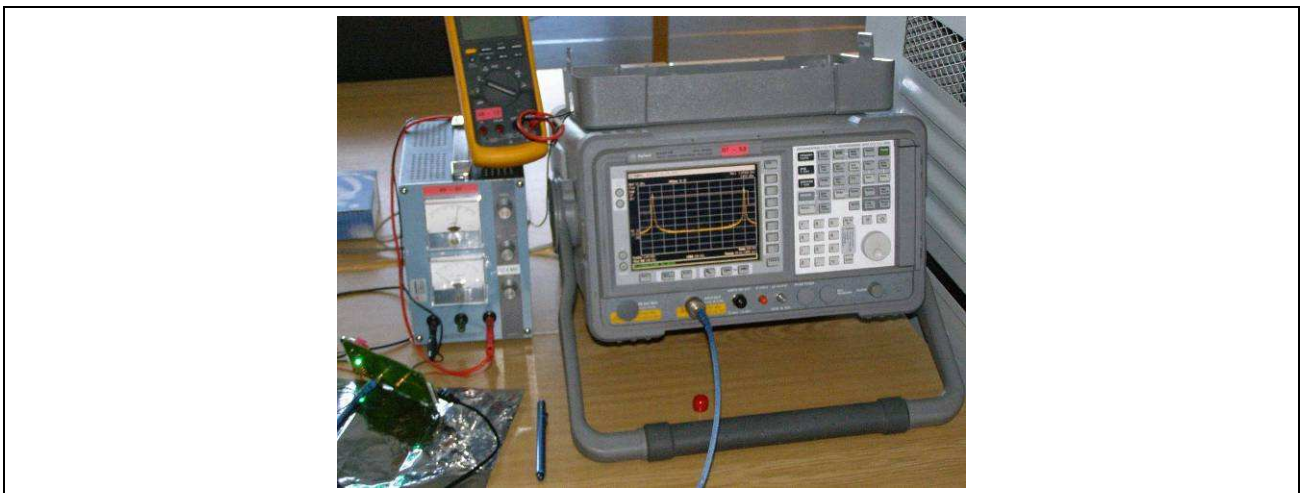
Test site: ☐ anechoic chamber (foam) ☐ open test site
☐ anechoic chamber (ferrites) ☒ laboratory

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

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	☒ 09-07					

Result:	☒ pass	☐ fail	☐ not applicable	☐ not tested
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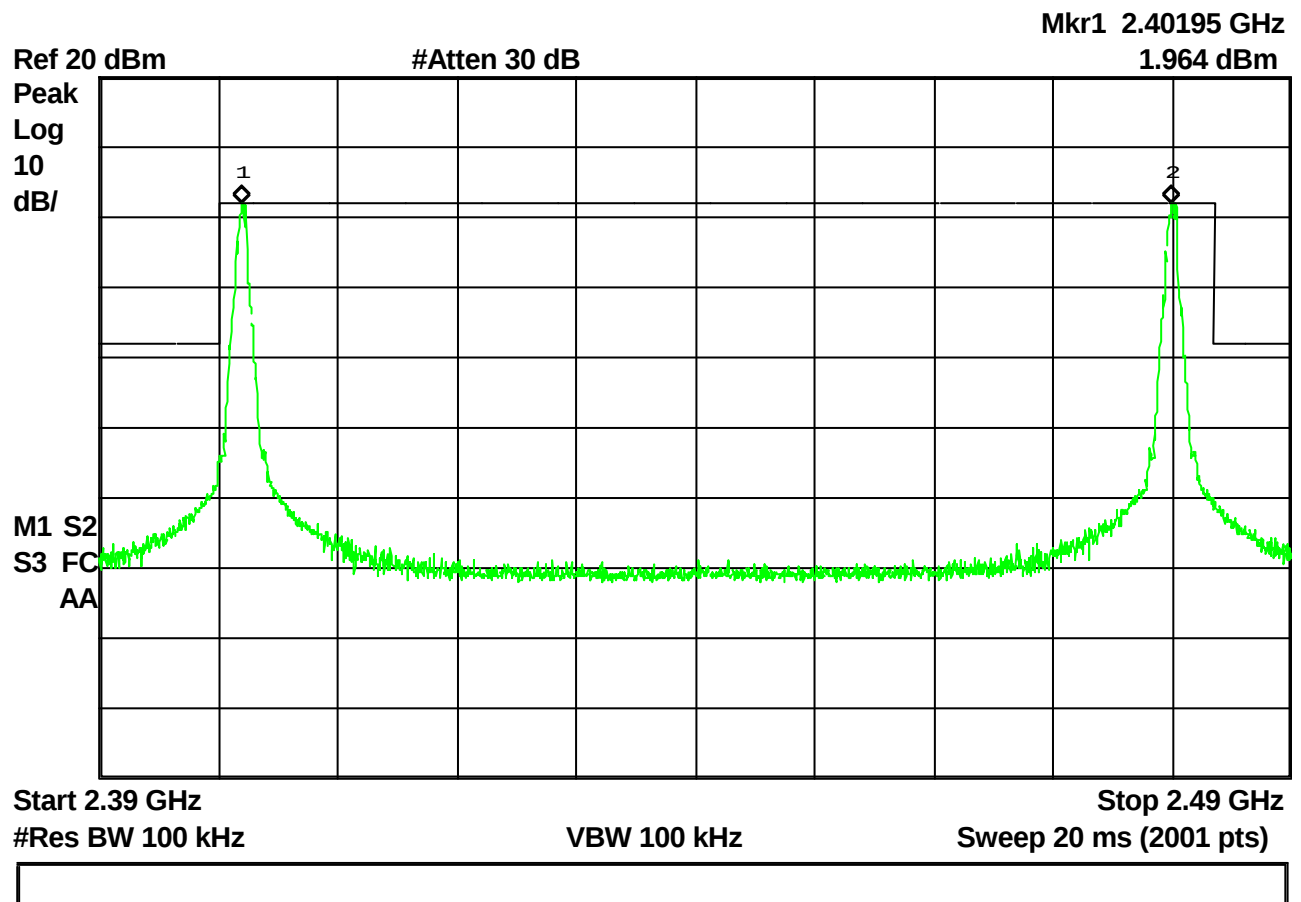
Results of the testClient: *Phonak Communications SA*Apparatus: *Dynamic Soundfield Digi Master 5000*Operating mode: *Hopping on / off (2.402 and 2.48 GHz)*

Cables connected to the EUT:

- DC supply
- Temporary antenna cable

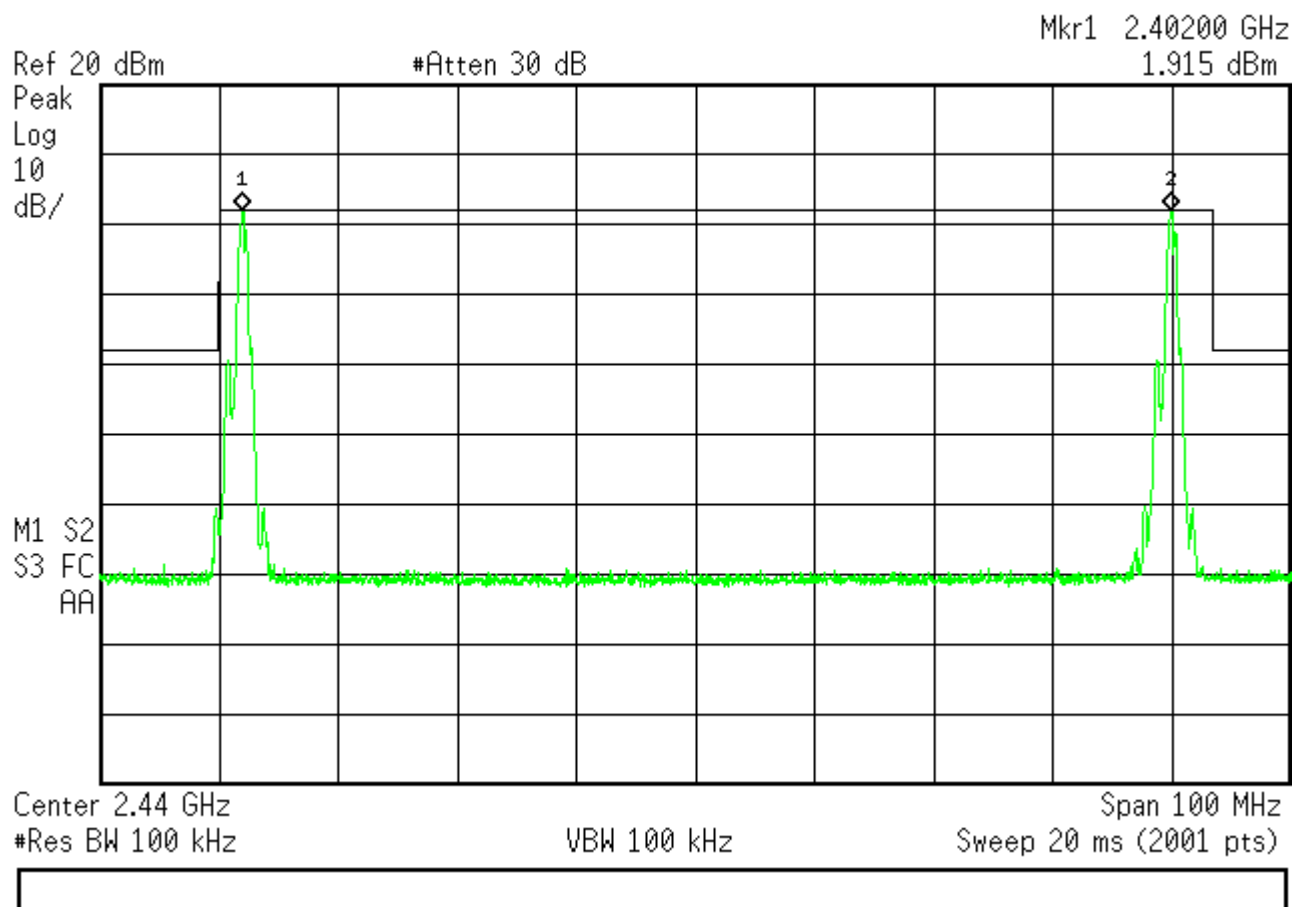
Remarks: *Measured on temporary antenna connector (horizontal)***Hopping on**

✱ Agilent 10:39:32 Apr 28, 2010



Hopping off

* Agilent 13:01:21 Apr 29, 2010



Date of test: April 28, 2010
Operator: A. Bieri

6.10 Band-edge emission (radiated)

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

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

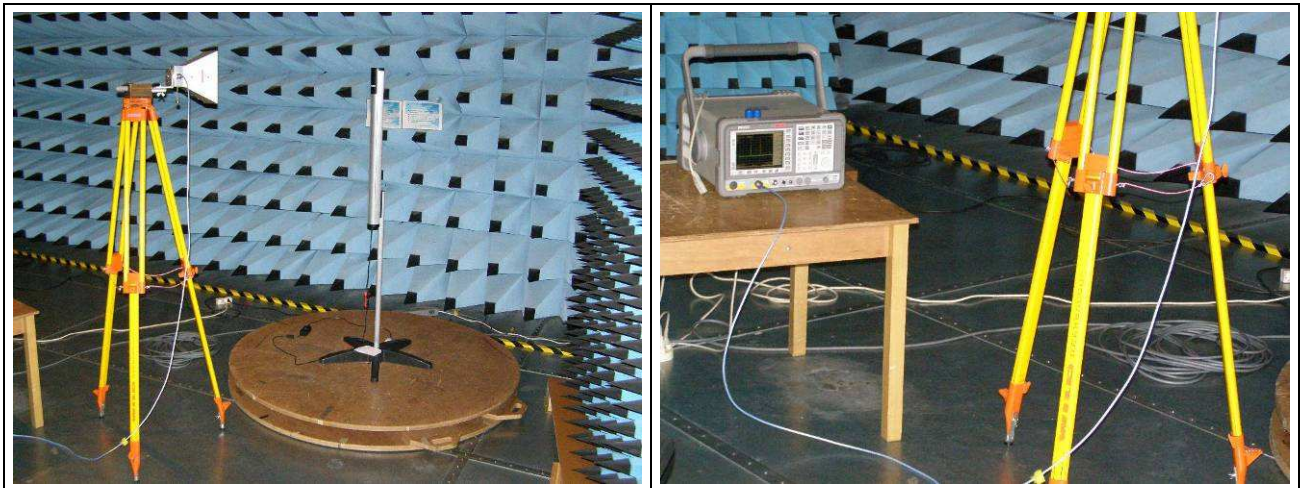
Meas. uncertainty: ± 4.7 dB

Position of EUT: 0.15 m (height above floor of equipment under test)
 1.8 m (height of transmitter/receiver)

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

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 µV/m at 3 m (FCC 15.209);

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

Test equipment:

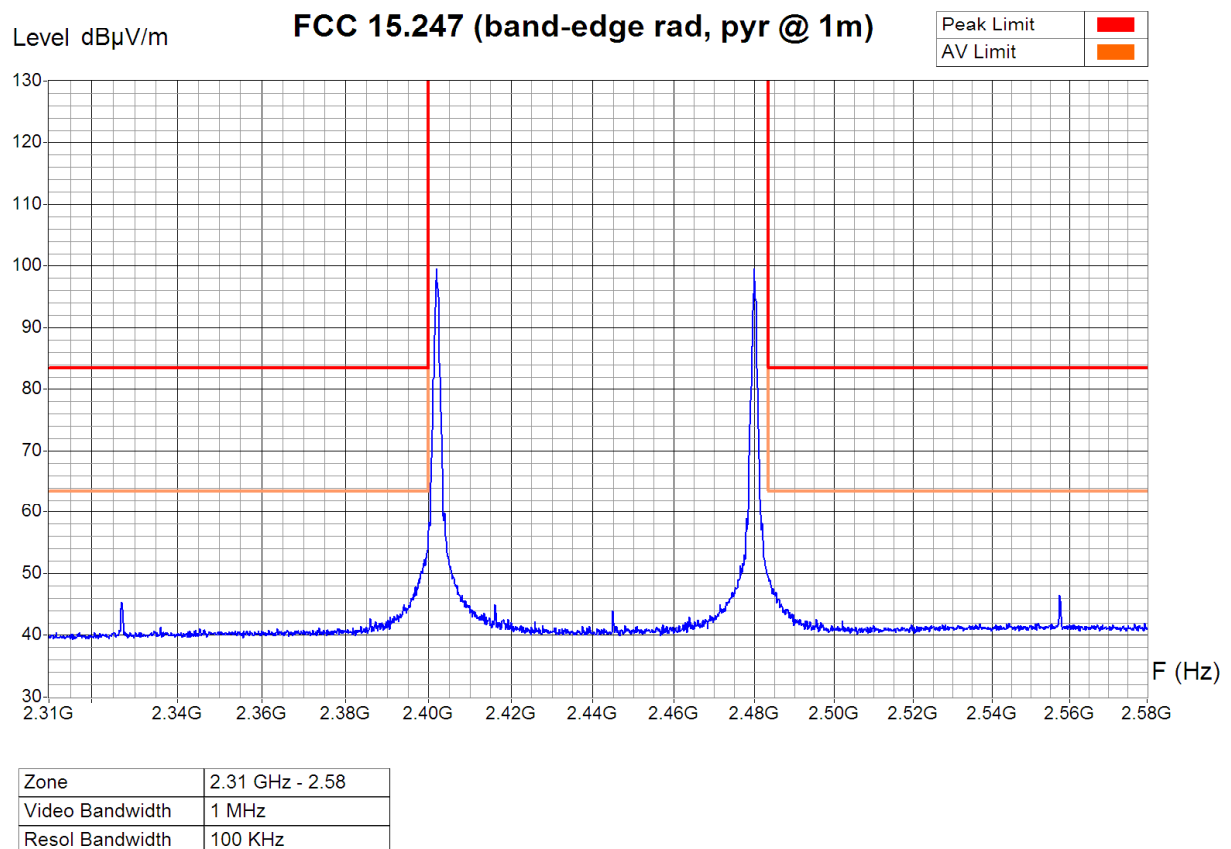
Spectrum analyser	☐ 88-14	☐ 90-26	☐ 94-24	☒ 02-06	☐ 03-45	☐ 07-53
Receiver	☐ 85-04	☐ 90-43	☐ 04-29			
Preamplifier	☐ 90-01	☐ 95-86	☐ 05-56	☐ 05-59	☐ 05-62	☐ 05-87
Antenna (horn)	☒ 90-24	☐ 90-29	☐ 98-12	☐ 98-13	☐	
Cables	☒ Succoflex 5m (47143/4)					

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

Measurement Type : Radiated Field
Polarisation : Horizontal
Table Angle : 0 - 360 °
Antenna Height : 1.8 m



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Hopping with 2.402 and 2.480 GHz, average measurement
Remarks : Powered with 115 VAC / 60 Hz

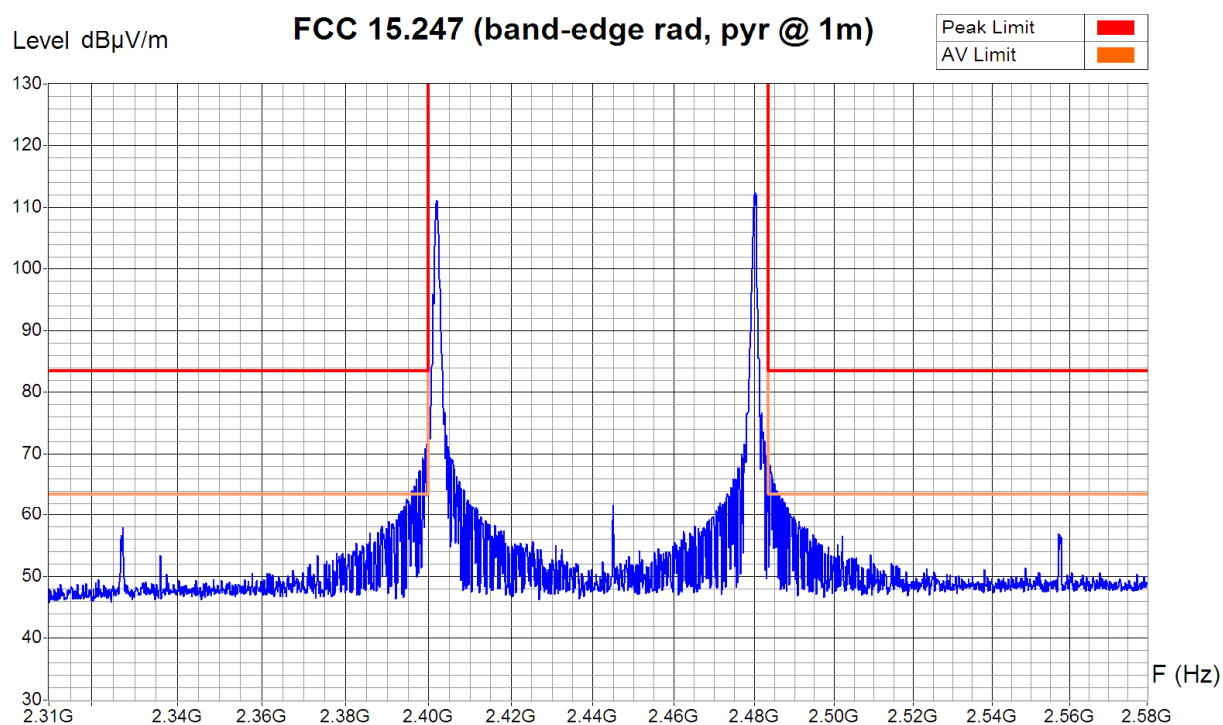


Operator: BiA
Date/Time: 30.04.2010 13:55
Filename:
040_rad_hor_BandEdgeRF_High
Low_Average_1m.png/.txt

Measurement Type : Radiated Field
Polarisation : Horizontal
Table Angle : 0 - 360 °
Antenna Height : 1.8 m



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Hopping with 2.402 and 2.480 GHz, peak measurement,
Remarks : Powered with 115 VAC / 60 Hz



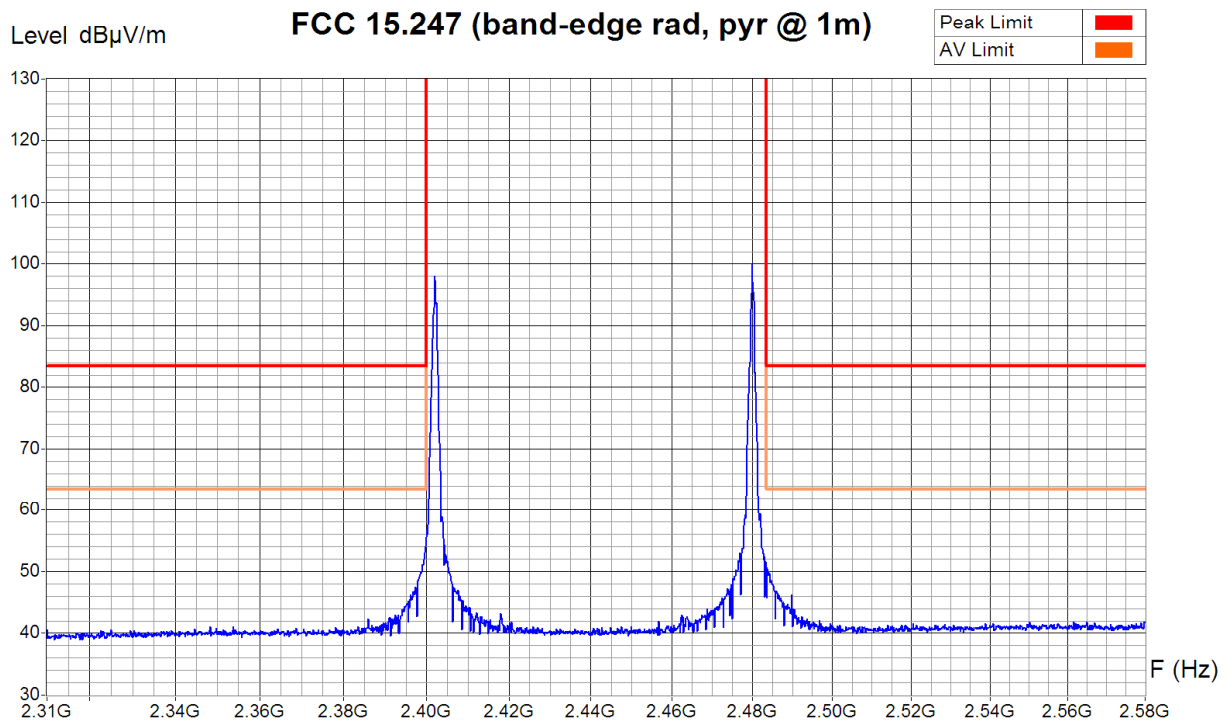
Zone	2.31 GHz - 2.58
Video Bandwidth	100 KHz
Resol Bandwidth	100 KHz

Operator: BiA
Date/Time: 30.04.2010 13:59
Filename:
040_rad_hor_BandEdgeRF_High
Low_Peak_1m.png/.txt

Measurement Type : Radiated Field
Polarisation : Vertical
Table Angle : 0 - 360 °
Antenna Height : 1.8 m



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Hopping with 2.402 and 2.480 GHz, average measurement,
Remarks : Powered with 115 VAC / 60 Hz



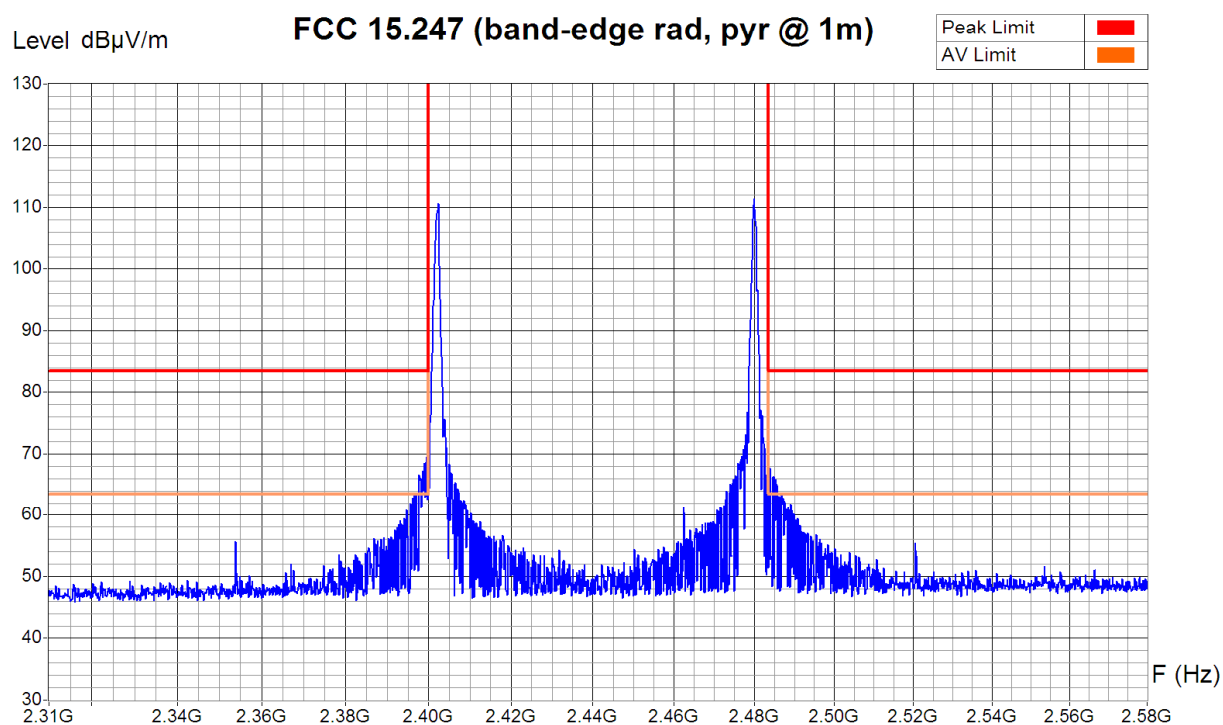
Zone	2.31 GHz - 2.58
Video Bandwidth	1 MHz
Resol Bandwidth	100 KHz

Operator: BiA
Date/Time: 30.04.2010 12:42
Filename:
040_rad_ver_BandEdgeRF_HighL
ow_Average_1m.png/.txt

Measurement Type : Radiated Field
Polarisation : Vertical
Table Angle : 0 - 360 °
Antenna Height : 1.8 m



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Hopping with 2.402 and 2.480 GHz, peak measurement,
Remarks : Powered with 115 VAC / 60 Hz



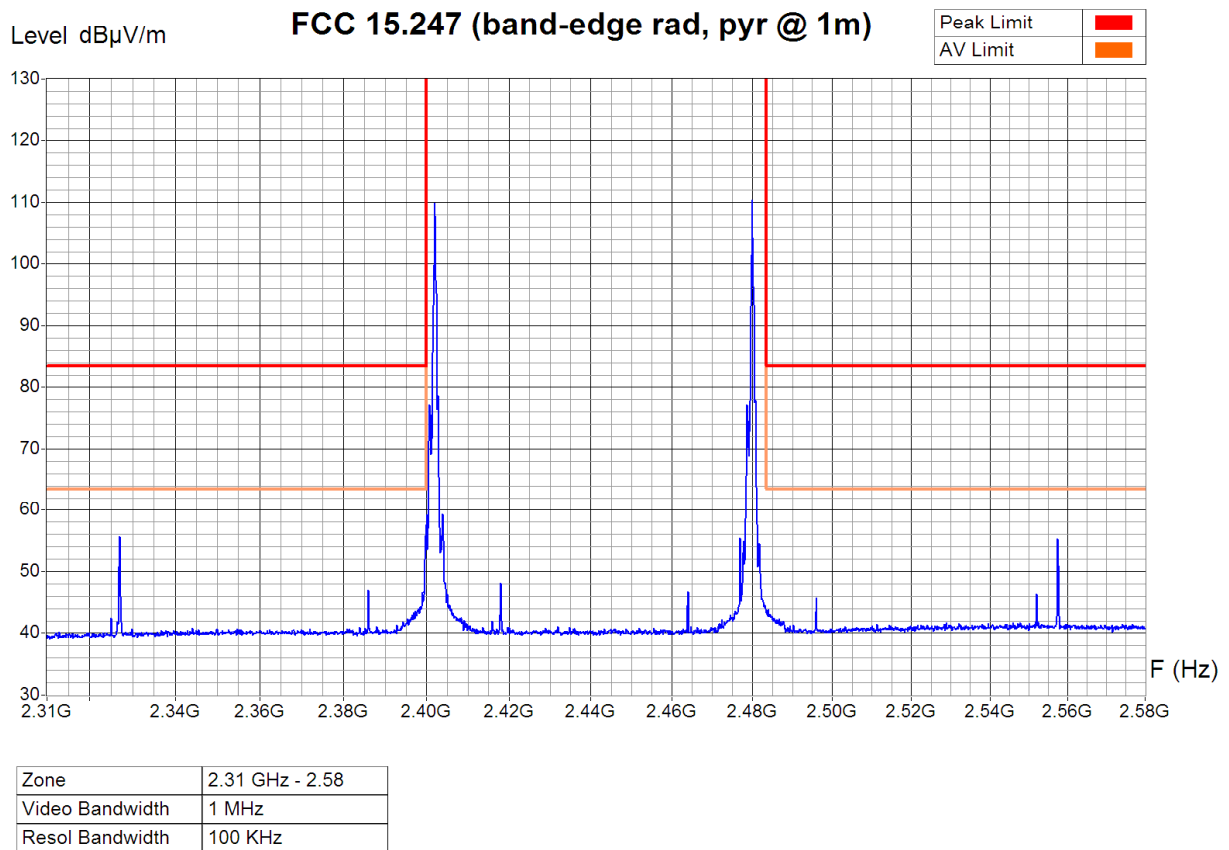
Zone	2.31 GHz - 2.58
Video Bandwidth	100 KHz
Resol Bandwidth	100 KHz

Operator: BiA
Date/Time: 30.04.2010 12:37
Filename:
040_rad_ver_BandEdgeRF_HighL
ow_Peak_1m.png/.txt

Measurement Type : Radiated Field
Polarisation : Horizontal
Table Angle : 0 - 360 °
Antenna Height : 1.8 m



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Singel frequency (2.402 and 2.480 GHz), average measurement,
Remarks : Powered with 115 VAC / 60 Hz

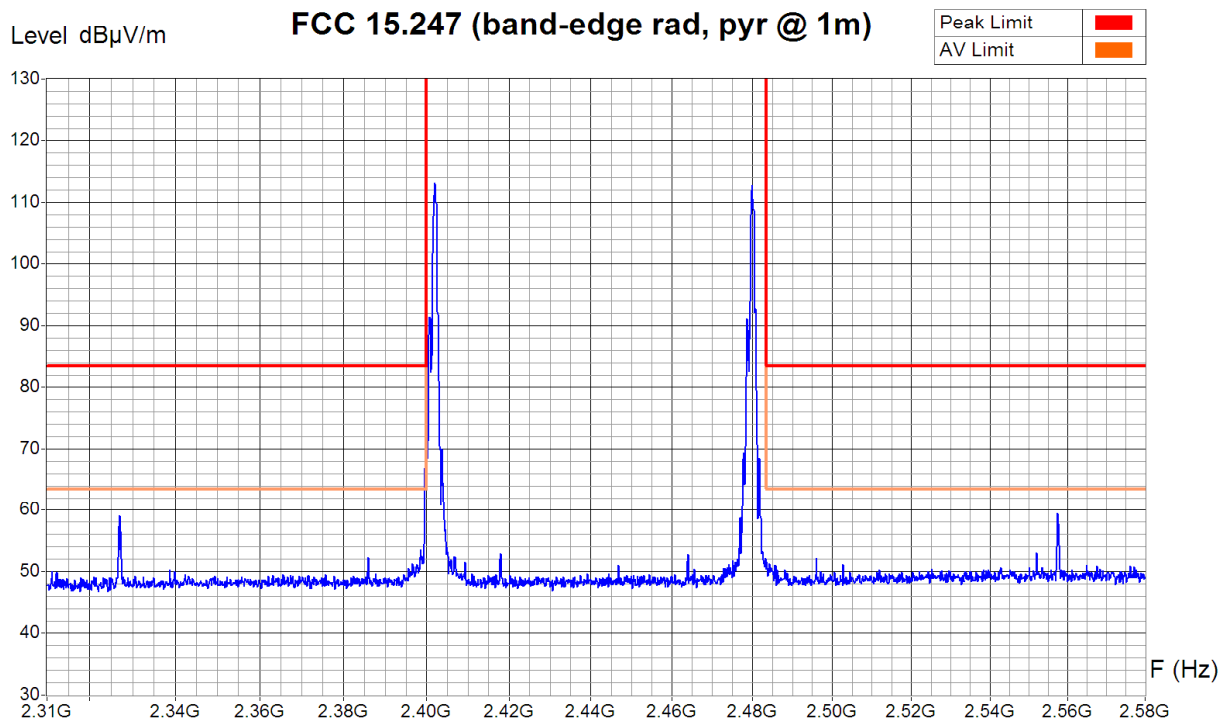


Operator: BiA
Date/Time: 30.04.2010 14:37
Filename:
041_rad_hor_BandEdgeRF_Singl
e_Average_1m.png/.txt

Measurement Type : Radiated Field
Polarisation : Horizontal
Table Angle : 0 - 360 °
Antenna Height : 1.8 m



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Singel frequency (2.402 and 2.480 GHz), peak measurement.
Remarks : Powered with 115 VAC / 60 Hz



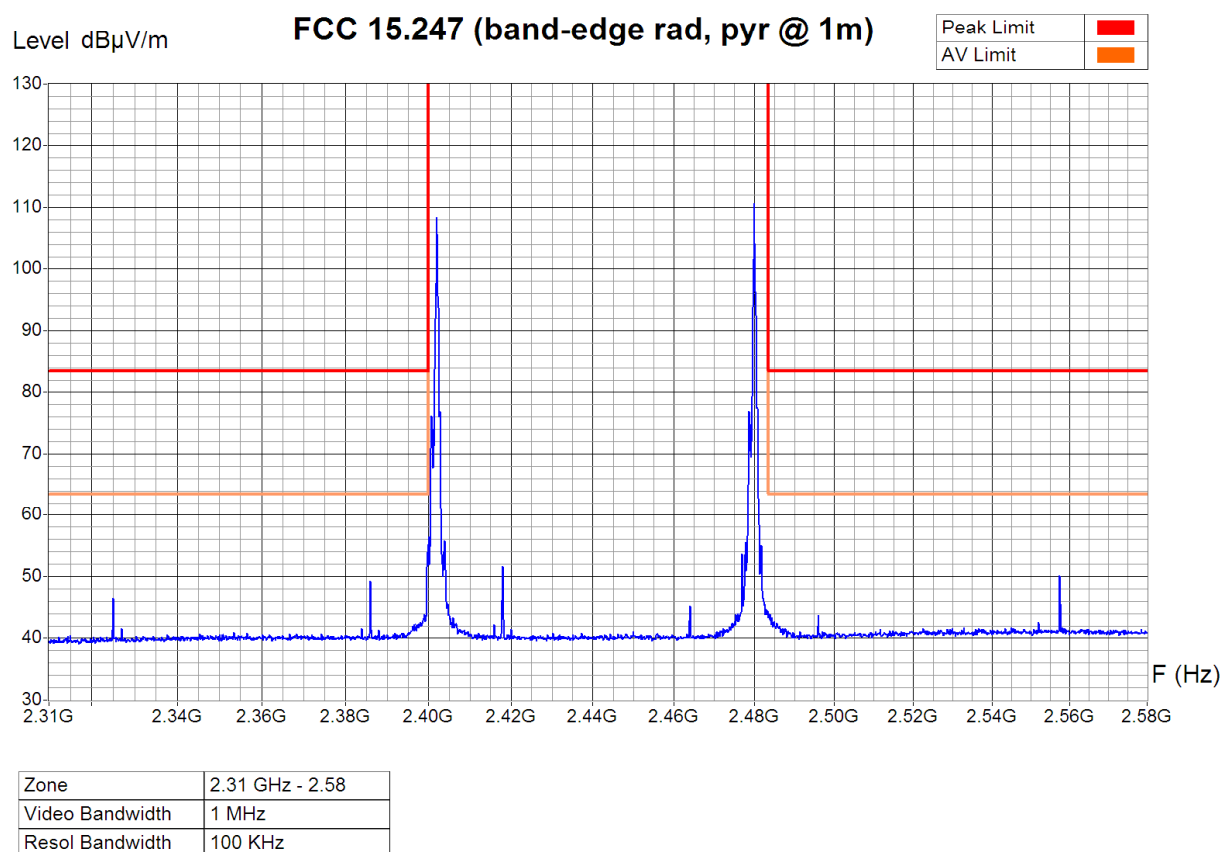
Zone	2.31 GHz - 2.58
Video Bandwidth	100 KHz
Resol Bandwidth	100 KHz

Operator: BiA
Date/Time: 30.04.2010 14:13
Filename:
041_rad_hor_BandEdgeRF_Singl
e_Peak_1m.png/.txt

Measurement Type : Radiated Field
 Polarisation : Vertical
 Table Angle : 0 - 360 °
 Antenna Height : 1.8 m



Equipment Under Test : Dynamic Soundfield
 Set-Up : See picture
 Operating Conditions : Singel frequency (2.402 and 2.480 GHz), average measurement,
 Remarks : Powered with 115 VAC / 60 Hz

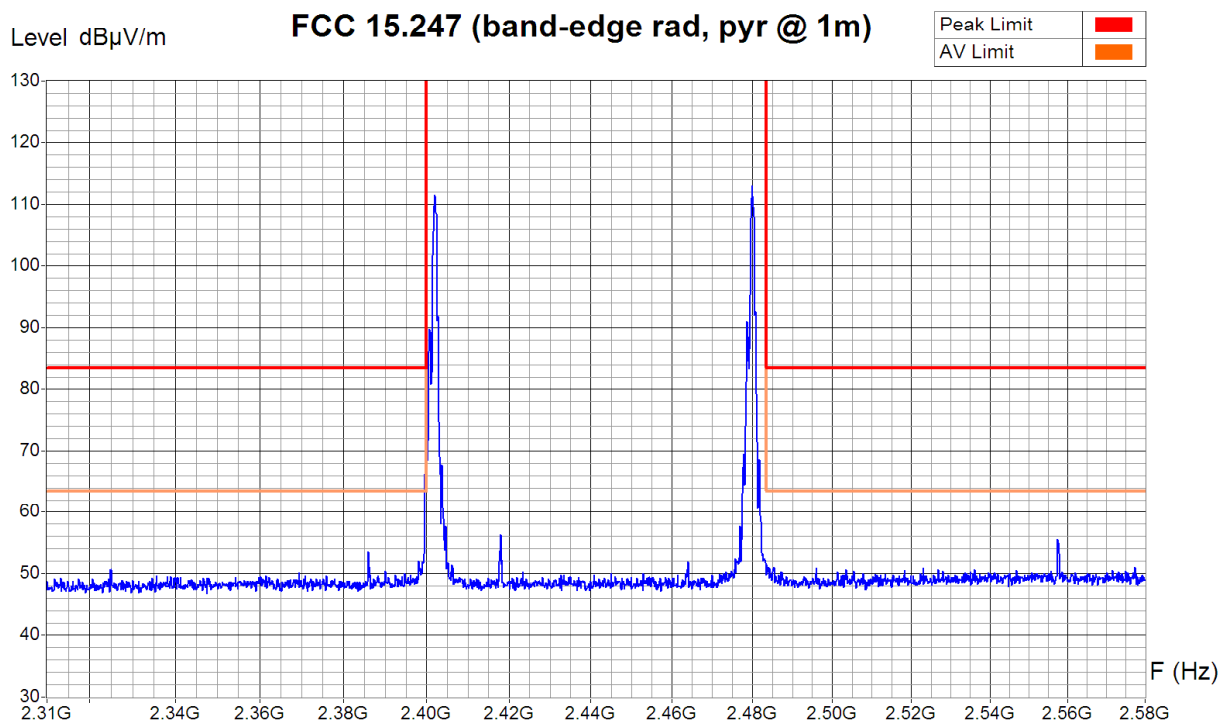


Operator: BiA
 Date/Time: 30.04.2010 14:31
 Filename:
 041_rad_ver_BandEdgeRF_Singl
 e_Average_1m.png/.txt

Measurement Type : Radiated Field
Polarisation : Vertical
Table Angle : 0 - 360 °
Antenna Height : 1.8 m



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Singel frequency (2.402 and 2.480 GHz), peak measurement.
Remarks : Powered with 115 VAC / 60 Hz



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

Operator: BiA
Date/Time: 30.04.2010 14:21
Filename:
041_rad_ver_BandEdgeRF_Singl
e_Peak_1m.png/.txt

6.11 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: - - -

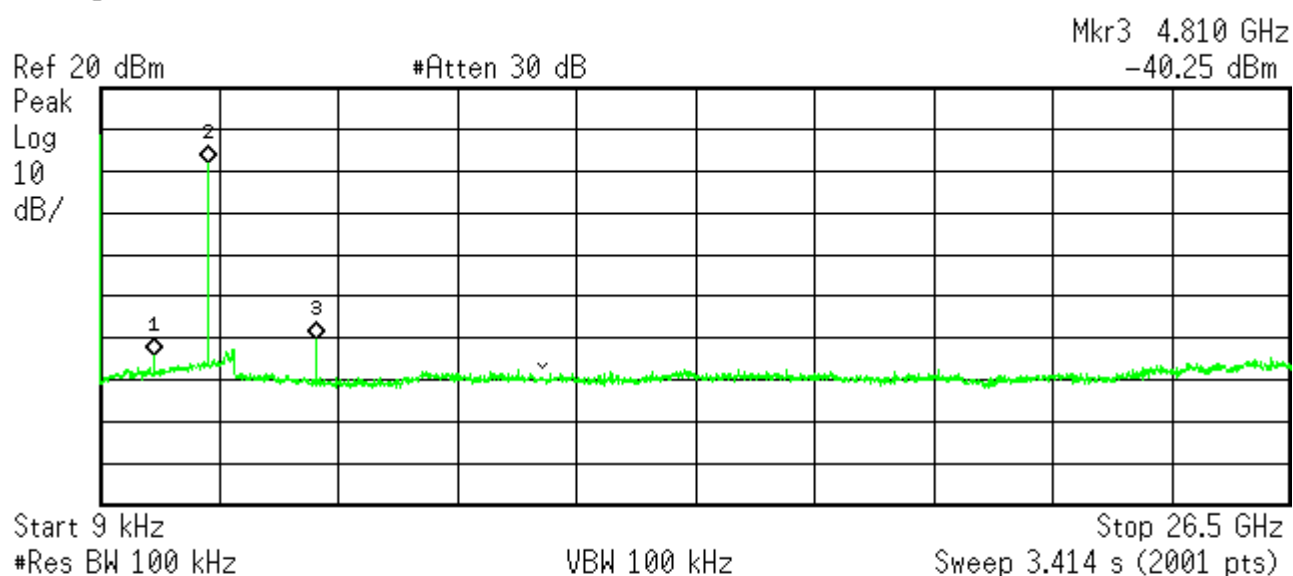
Test equipment:

Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Cables	☒ Succoflex 1m (8407/4)					
Power supply	☒ 99-07					

Result:	☒ pass	☐ fail	☐ not applicable	☐ not tested
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Results of the testClient: *Phonak Communications SA*Apparatus: *Dynamic Soundfield Digi Master 5000*Operating mode: • *Single frequency (at 2.402 GHz, 2.44 GHz, 2.48 GHz) and hopping on (2.402 – 2.48 GHz)*Cables connected to the EUT: • *DC supply*
• *Temporary antenna cable*Remarks: • *Measured on temporary antenna connector (horizontal)***Measurement of single frequency 2.402 GHz on the following plot**

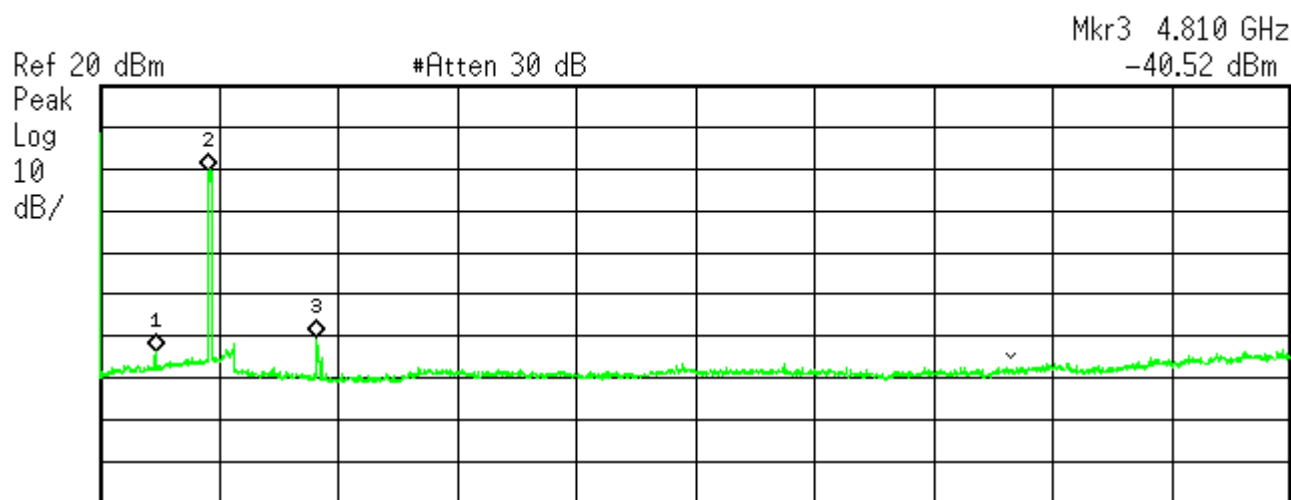
* Agilent 11:10:33 Apr 28, 2010



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	1.206 GHz	-44.11 dBm
2	(1)	Freq	2.398 GHz	1.893 dBm
3	(1)	Freq	4.810 GHz	-40.25 dBm

Measurement of all hopping frequencies on the following plot

* Agilent 11:20:19 Apr 28, 2010



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	1.232 GHz	-43.72 dBm
2	(1)	Freq	2.412 GHz	-0.508 dBm
3	(1)	Freq	4.810 GHz	-40.52 dBm

Date of test: April 28, and July 15, 2010
Operator: A. Bieri

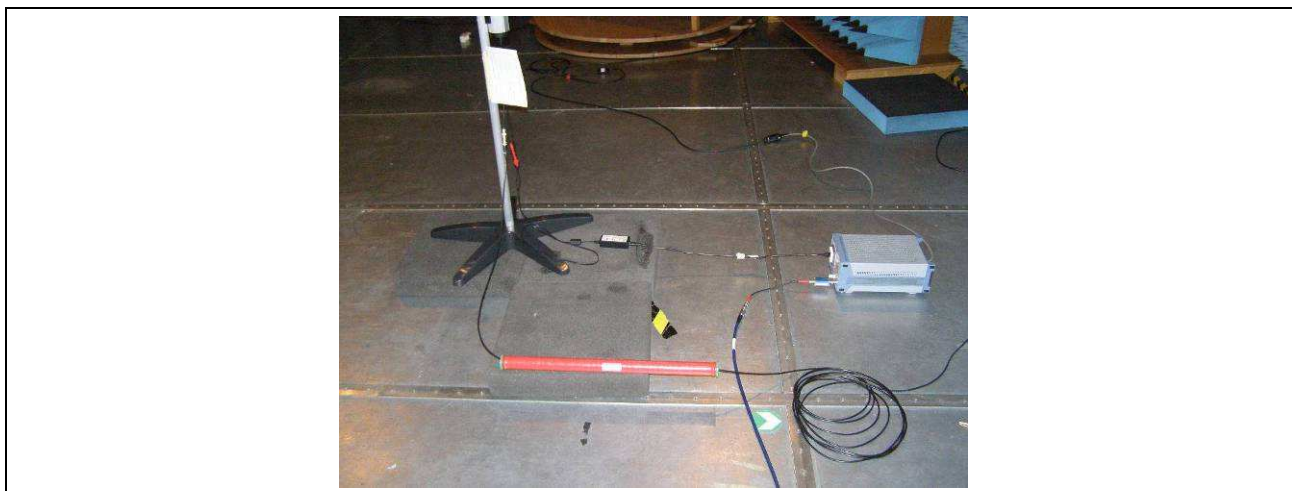
6.12 Conducted emission - Interference voltage

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

Meas. uncertainty: ± 3.6 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: ---

Test equipment:

Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☐ 07-53
Receiver	☐ 85-12	☐ 90-11	☒ 94-34	☐ 04-28	☐ 06-29	
LISN	☐ 85-13 ☐ 04-04	☐ 90-08 ☐ 04-05	☐ 94-36 ☐	☐ 94-40	☐ 95-12	☒ 00-43
Protection 10 dB	☒ 91-45 ☐ 96-38	☐ 91-44 ☐ included in LISN	☐ 95-30	☐ 95-33	☐ 95-35	☐ 95-36
Protection 20 dB	☐ 91-46	☐ 95-33	☐ 95-38	☐ included in LISN		
Cables	☒ 06-00					

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

Measurement Type : Voltage Interference
 Supply : Line 1
 Other : Height: 10cm

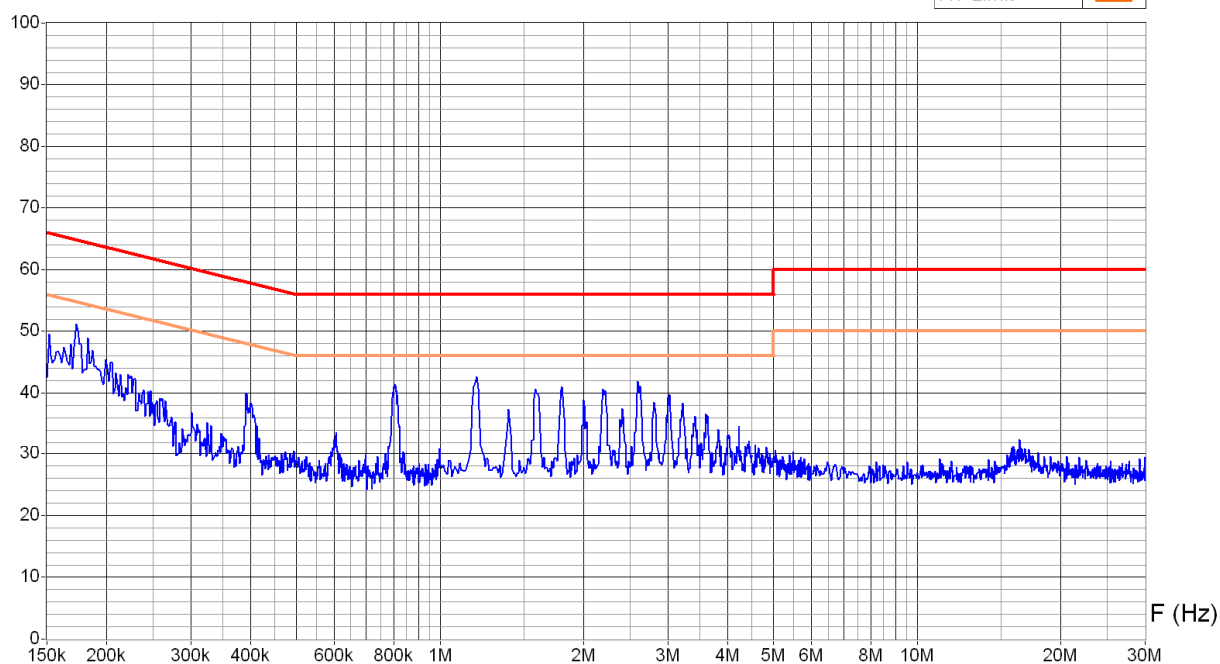


Equipment Under Test : Dynamic Soundfield
 Set-Up : See picture
 Operating Conditions : Standard use as wireless speaker with pink noise (Output level: 85 dBspl) @ 1m
 Remarks : RF communication at 2.4 GHz, powered with 115 Vac / 60 Hz

Level dB μ V

FCC 15.207

QP Limit	█
AV Limit	█



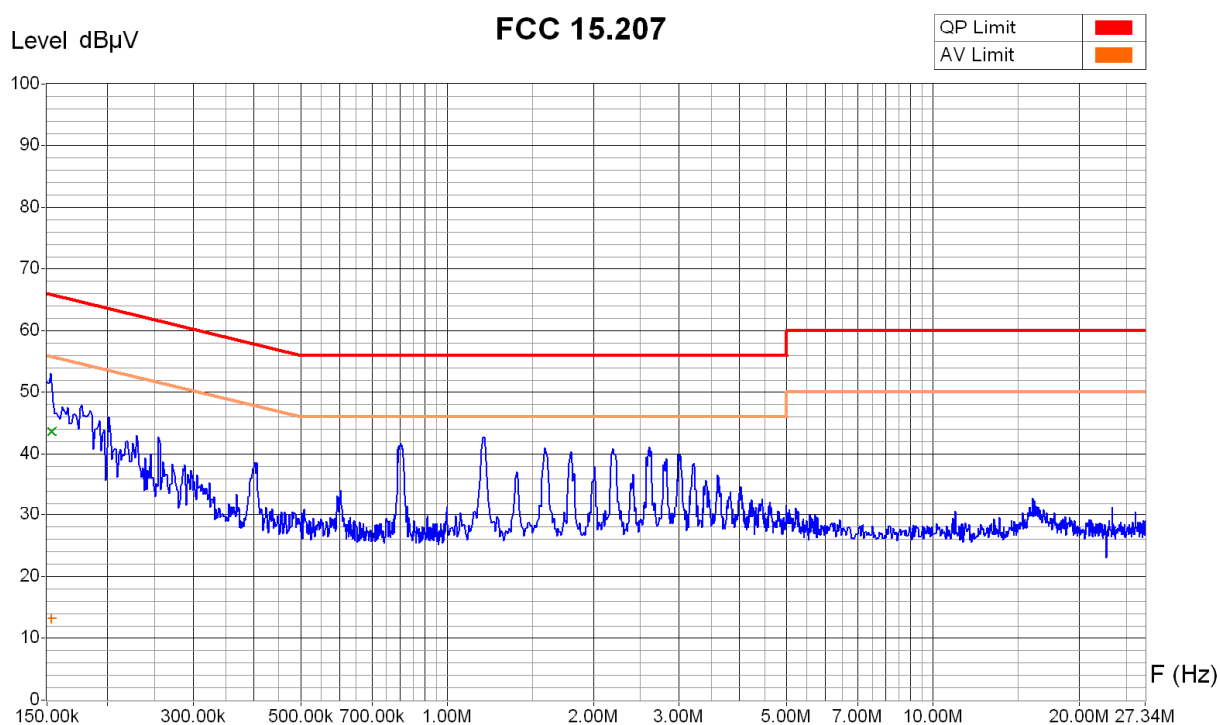
Zone	150 KHz - 1 MHz	1 MHz - 6 MHz	6 MHz - 30 MHz
Video Bandwidth	10 KHz	10 KHz	10 KHz
Resol Bandwidth	9 KHz	9 KHz	9 KHz

Operator: BiA
 Date/Time: 13.04.2010 14:58
 Filename:
 020_cu_FCC15-207_L1_115V.pn
 g/.txt

Measurement Type : Voltage Interference
 Supply : Neutral
 Other : Height: 10cm



Equipment Under Test : Dynamic Soundfield
 Set-Up : See picture
 Operating Conditions : Standard use as wireless speaker with pink noise (Output level: 85 dBspl) @ 1m
 Remarks : RF communication at 2.4 GHz, powered with 115 Vac / 60 Hz



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

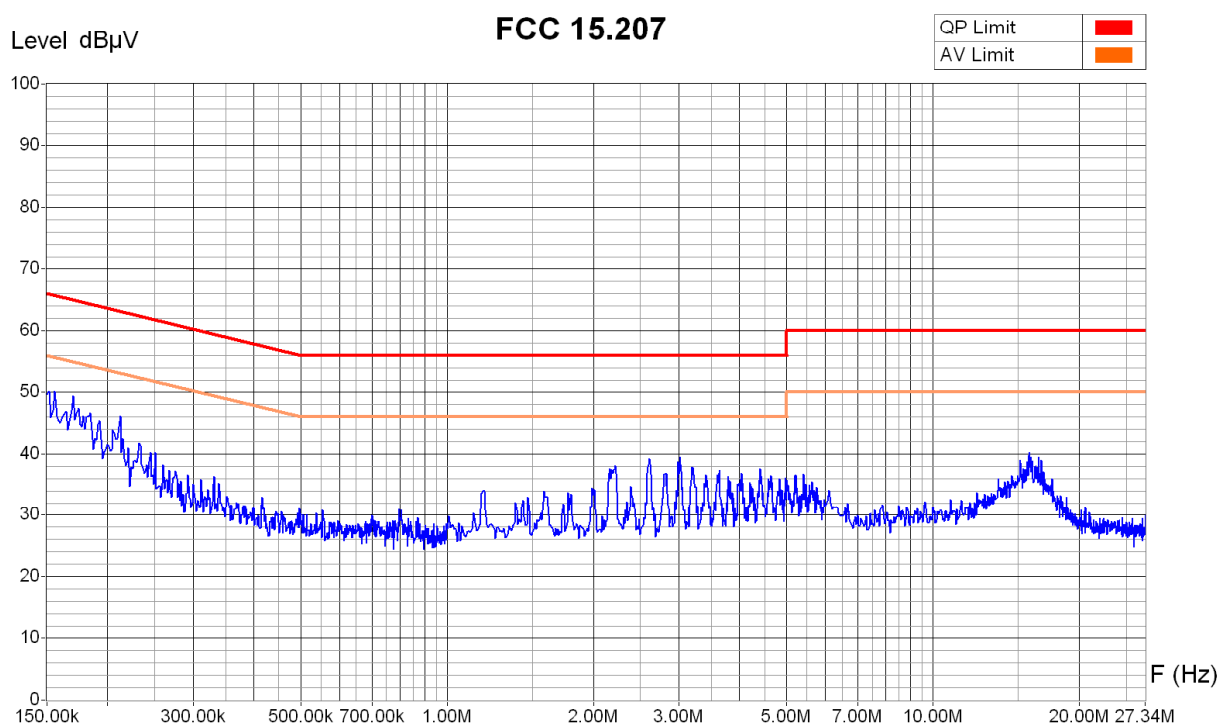
Frequency	Peak	QuasiPeak (x)	Average (+)	QP Margin
153.25 KHz	54.4 dB μ V	43.7 dB μ V	13.3 dB μ V	22.2 dB

Operator: BiA
 Date/Time: 13.04.2010 15:09
 Filename:
 020_cu_FCC15-207_N_115V.png/
 .txt

Measurement Type : Voltage Interference
 Supply : Line 1
 Other : Height: 10cm



Equipment Under Test : Dynamic Soundfield
 Set-Up : See picture
 Operating Conditions : Use as speaker connected to audio cable (pink noise, output level: 85 dBspl @ 1m)
 Remarks : Powered with 115 Vac / 60 Hz



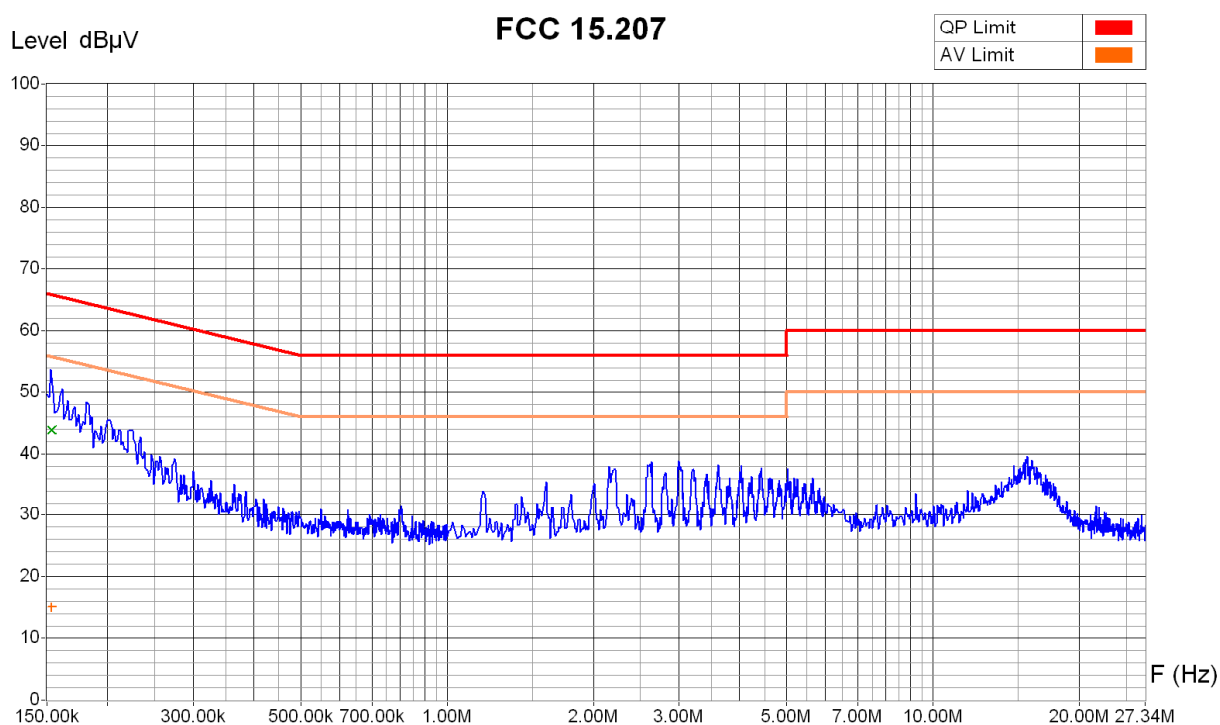
Zone	150 KHz - 1 MHz	1 MHz - 6 MHz	6 MHz - 30 MHz
Video Bandwidth	10 KHz	10 KHz	10 KHz
Resol Bandwidth	9 KHz	9 KHz	9 KHz

Operator: BiA
 Date/Time: 13.04.2010 15:28
 Filename:
 022_cu_FCC15-207_Cable_L1_11
 5V.png/.txt

Measurement Type : Voltage Interference
 Supply : Neutral
 Other : Height: 10cm



Equipment Under Test : Dynamic Soundfield
 Set-Up : See picture
 Operating Conditions : Use as speaker connected to audio cable (pink noise, output level: 85 dBspl @ 1m)
 Remarks : Powered with 115 Vac / 60 Hz



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
153.19 KHz	52.6 dBμV	44.0 dBμV	15.1 dBμV	21.9 dB

Operator: BiA
 Date/Time: 13.04.2010 15:17
 Filename:
 022_cu_FCC15-207_Cable_N_11
 5V.png/.txt

6.13 Spurious emission – radiated (transmit- / receive mode)**6.13.1 Radiated emission - Electromagnetic field (radiated – 30 MHz to 1 GHz)**

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

Distance: ☐ 30 m ☐ 10 m ☒ 3 m ☐

Position of EUT: 0.15 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.

Test set-up:



Remarks: 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:

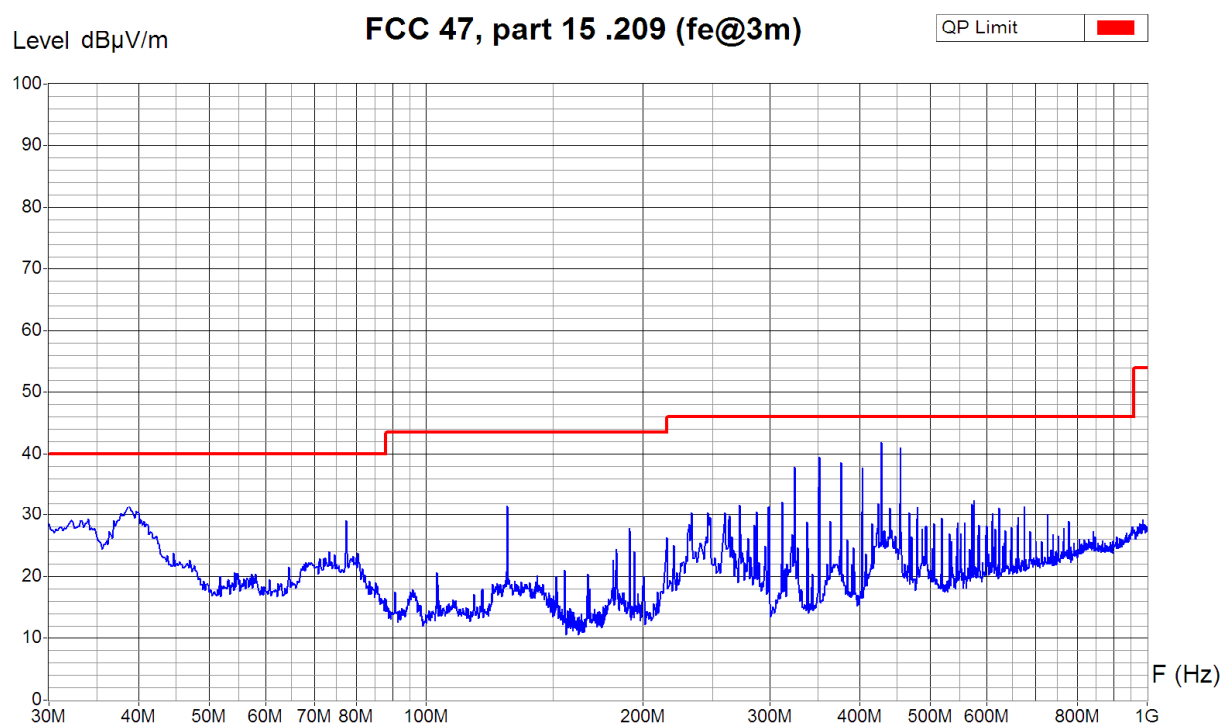
Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☒ 03-45	☐ 05-39	☐ 07-53
Receiver	☐ 85-04	☐ 90-43	☒ 94-35	☐ 04-29		
Preamplifier	☐ 90-01	☐ 95-86	☐ 05-56	☒ 05-59	☐ 05-62	☐
Antenna (bilog)	☒ 94-03	☐ 05-38	☐			
Cables	☒ 06-01	☒ 117	☒ 143	☒ 144		

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

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



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Use as speaker, connected with audio cable (pink noise output-level: 85dBspl @
Remarks : Powered with 115 VAC / 60 Hz



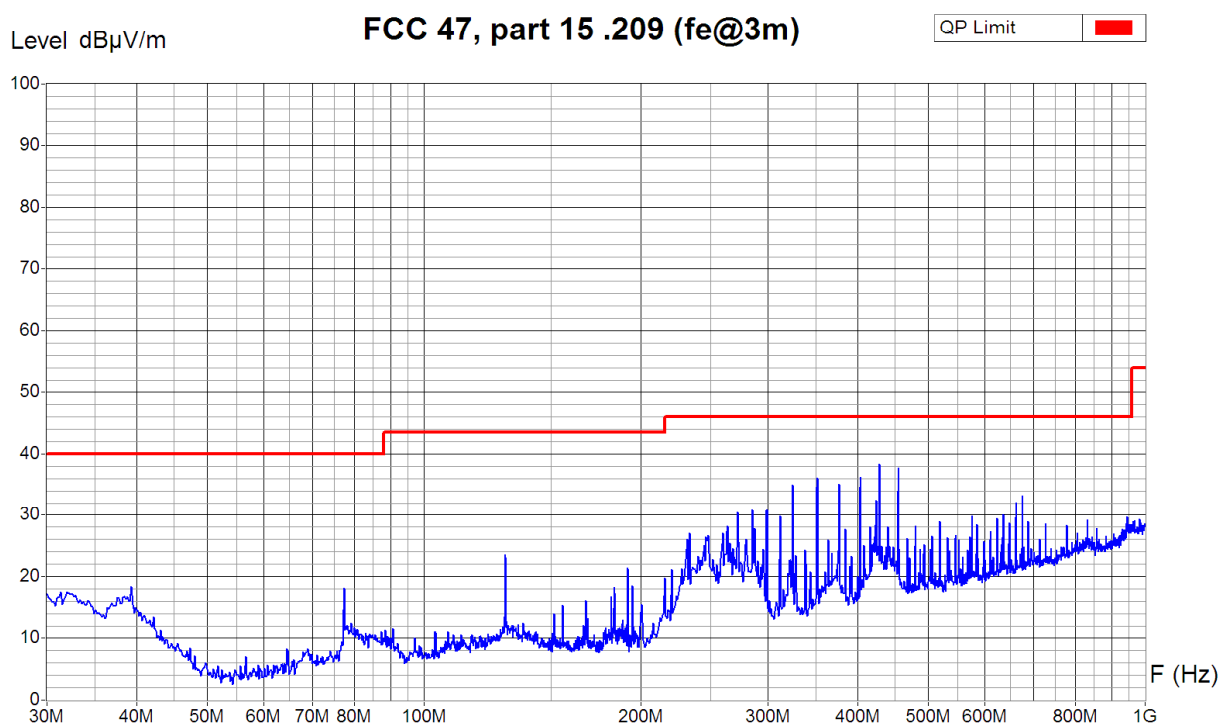
Zone	30 MHz - 199 MHz	199 MHz - 1 GHz
Video Bandwidth	100 KHz	100 KHz
Resol Bandwidth	100 KHz	100 KHz

Operator: BiA
Date/Time: 29.04.2010 19:40
Filename:
036_rad_ver_FCC_3m_115V_Cab
le.png/.txt

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



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Use as speaker, connected with audio cable (pink noise output-level: 85dBspl @
Remarks : Powered with 115 VAC / 60 Hz



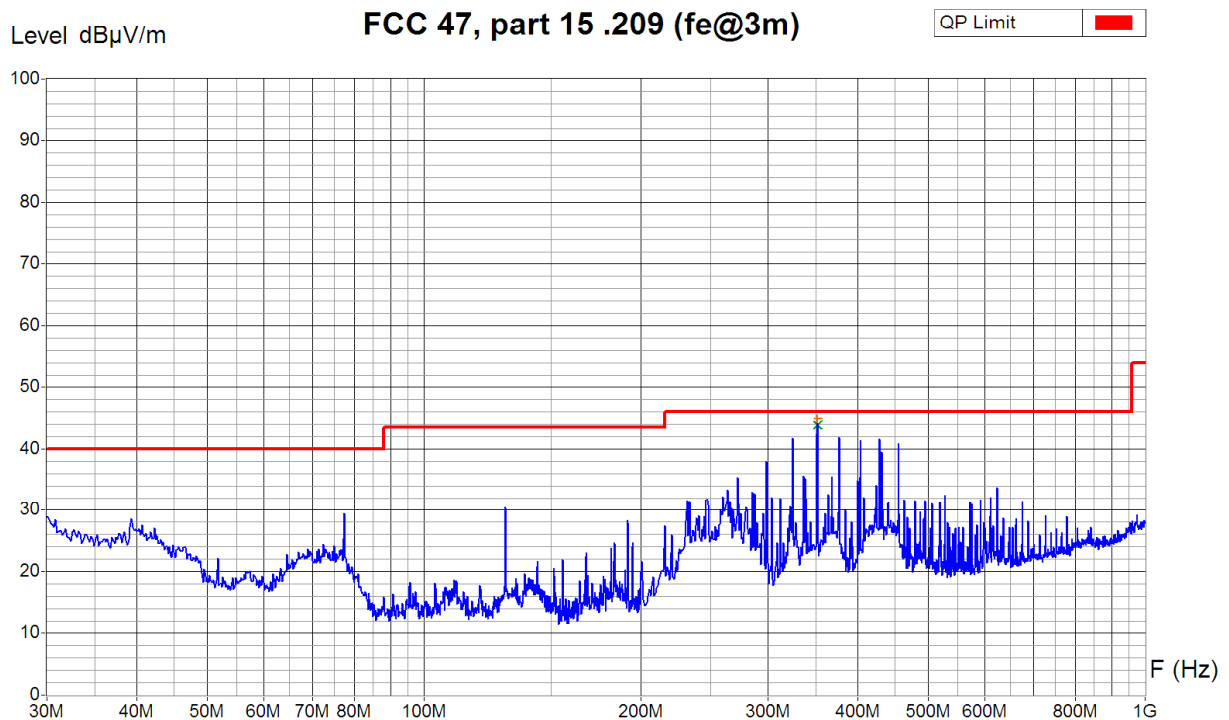
Zone	30 MHz - 199 MHz	199 MHz - 1 GHz
Video Bandwidth	100 KHz	100 KHz
Resol Bandwidth	100 KHz	100 KHz

Operator: BiA
Date/Time: 29.04.2010 19:52
Filename:
036_rad_hor_FCC_3m_115V_Cab
le.png/.txt

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



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Standard use as wireless speaker (pink noise output-level: 85dBspl @ 1m)
Remarks : Powered with 115 VAC / 60 Hz, audio cable connected and terminated with 50 Ohm resistor, RF communication at 2.4 GHz



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

Receiver Measures

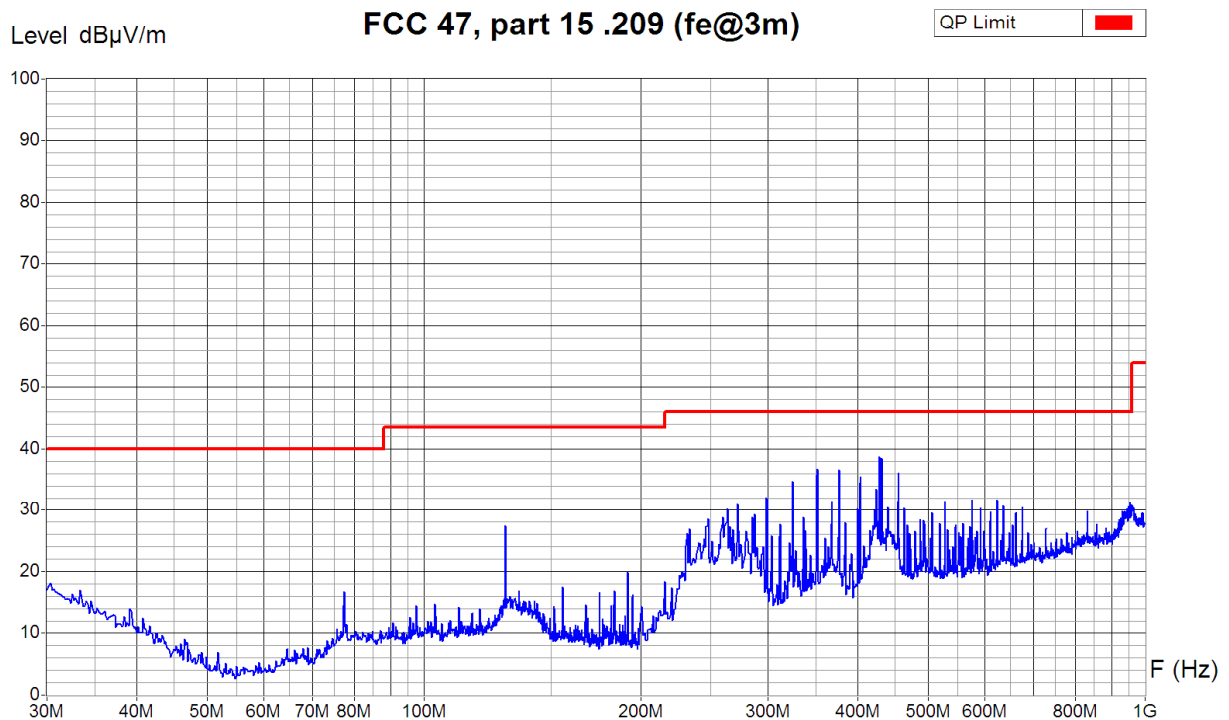
Frequency	Peak	QuasiPeak (x)	Average (+)	QP Margin
351.01 MHz	44.5 dB μ V/m	43.9 dB μ V/m	45.0 dB μ V/m	2.6 dB

Operator: BiA
Date/Time: 29.04.2010 20:12
Filename:
036_rad_ver_FCC_3m_115V_RF.
png/.txt

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



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Standard use as wireless speaker (pink noise output-level: 85dBspl @ 1m)
Remarks : Powered with 115 VAC / 60 Hz, audio cable connected and terminated with 50 Ohm resistor, RF communication at 2.4 GHz



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

Operator: BiA
Date/Time: 29.04.2010 20:02
Filename:
036_rad_hor_FCC_3m_115V_RF.
png/.txt

6.13.2 Radiated emission - Electromagnetic field (radiated – 1 GHz to 18 GHz)Test site: ☒ anechoic chamber (ferrites) ☐ anechoic chamber (foam)Distance: ☐ 30 m ☐ 10 m ☐ 3 m ☒ 1 m

Position of EUT: 0.15 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.

Test set-up:



Remarks:

- 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 $f = 1$ GHz the limit is 500 μ V/m at 3 m;

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

- Tested with antenna attached. The limit does not apply to the intentional signal at 2.4 GHz.

Test equipment:

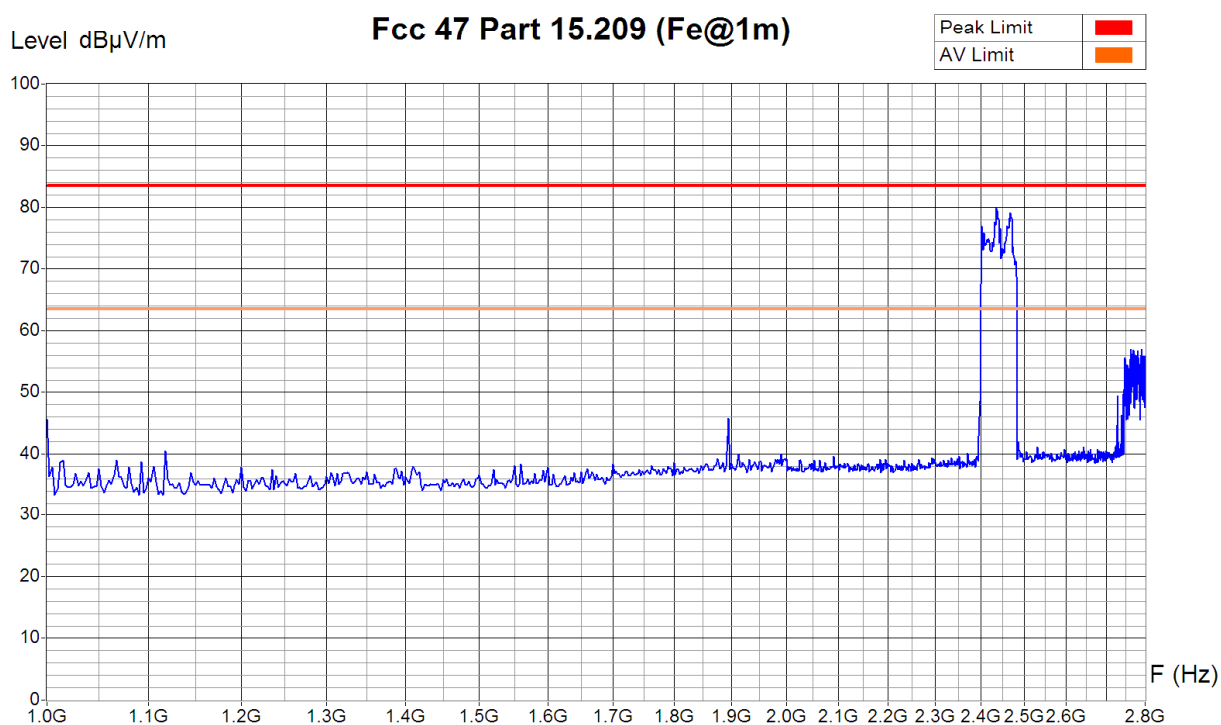
Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Preamplifier	☒ 05-56	☒ 05-87	☐			
Antenna (horn)	☒ 90-24	☐ 07-31	☐			
Cables	☒ Succoflex 4m (222093/4) + 1m (67688/4)					

Result:	☒ pass	☐ fail	☐ not applicable	☐ not tested
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Measurement Type : Radiated Field
Polarisation : Horizontal
Table Angle : 0 - 360 °
Antenna Height : 1 - 4m



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Standard use as wireless speaker with pink noise (Output- Level: 85 dBspl @ 1m)
Remarks : RF communication at 2.4 GHz



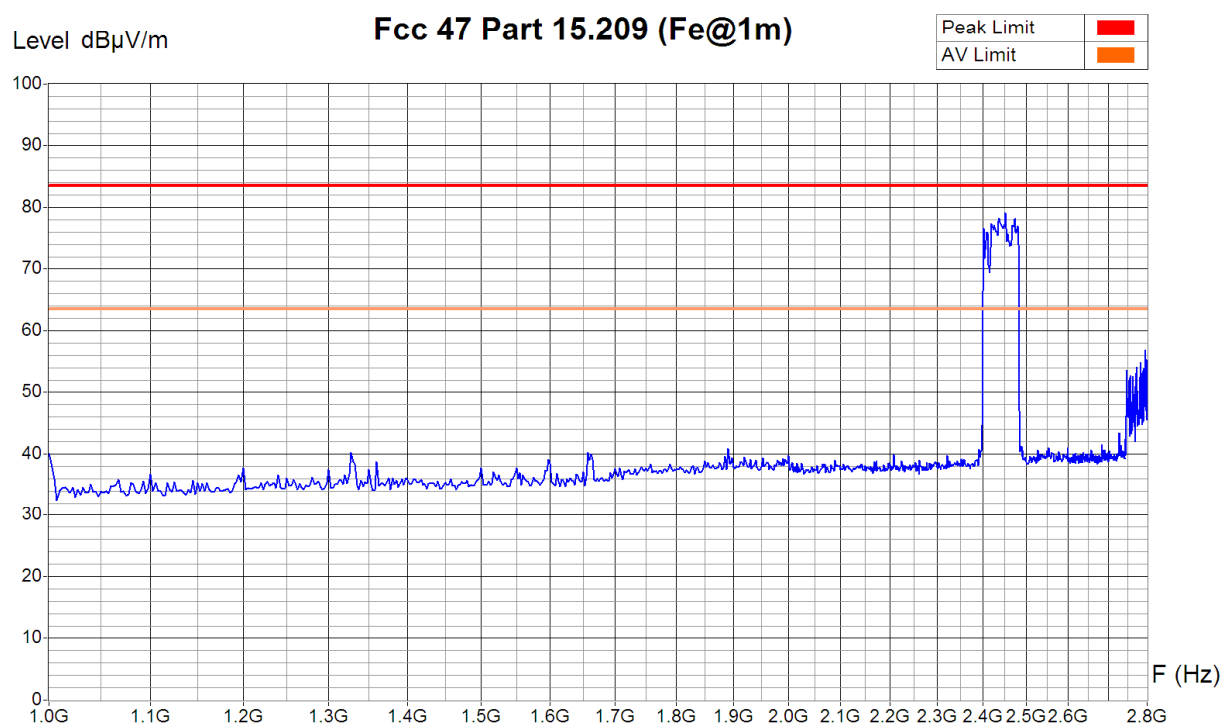
Zone	1 GHz - 2 GHz	2 GHz - 2.60 GHz	2.60 GHz - 2.80
Video Bandwidth	1 MHz	1 MHz	1 MHz
Resol Bandwidth	1 MHz	1 MHz	1 MHz

Operator: BiA
Date/Time: 25.03.2010 16:01
Filename:
005_rad_FCC15-209_1m_1_2-8g
_Hor.png/.txt

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



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Standard use as wireless speaker with pink noise (Output- Level: 85 dBspl @ 1m)
Remarks : RF communication at 2.4 GHz



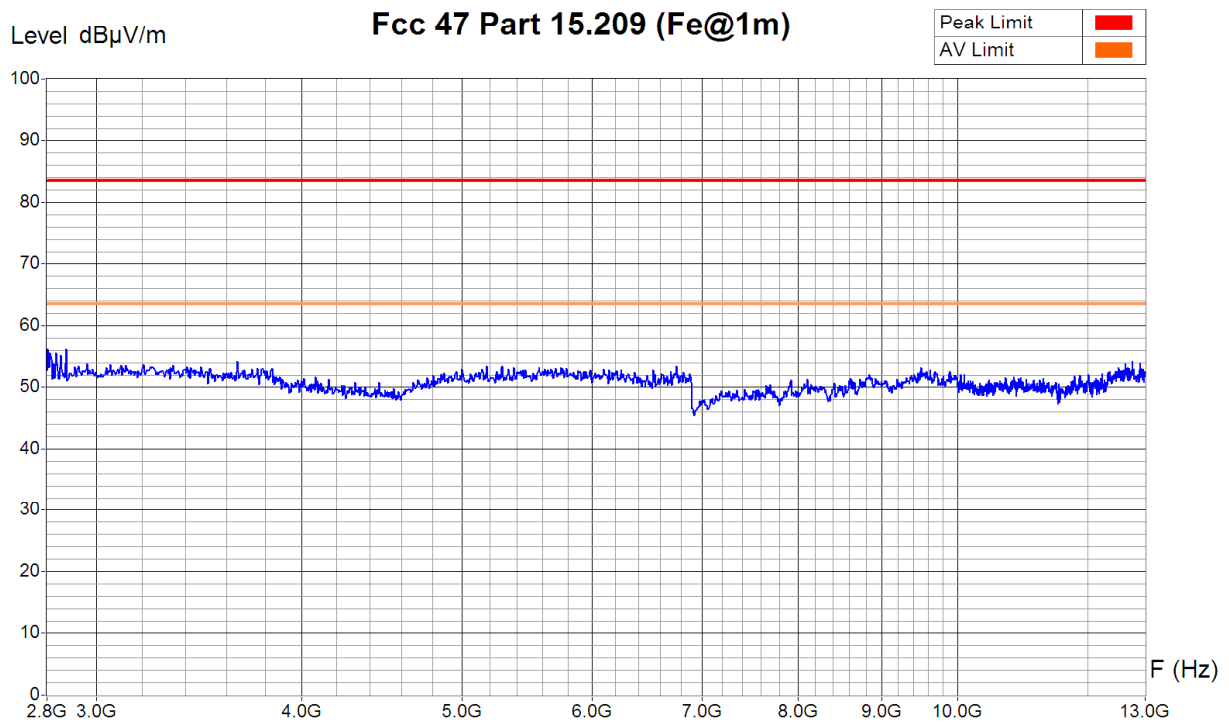
Zone	1 GHz - 2 GHz	2 GHz - 2.60 GHz	2.60 GHz - 2.80
Video Bandwidth	1 MHz	1 MHz	1 MHz
Resol Bandwidth	1 MHz	1 MHz	1 MHz

Operator: BiA
Date/Time: 25.03.2010 17:03
Filename:
005_rad_FCC15-209_1m_1_2-8g
_Ver.png/.txt

Measurement Type : Radiated Field
Polarisation : Horizontal
Table Angle : 0 - 360 °
Antenna Height : 1.8 m



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Standard use as wireless speaker with pink noise (Output- Level: 85 dBspl @ 1m)
Remarks : RF communication at 2.4 GHz



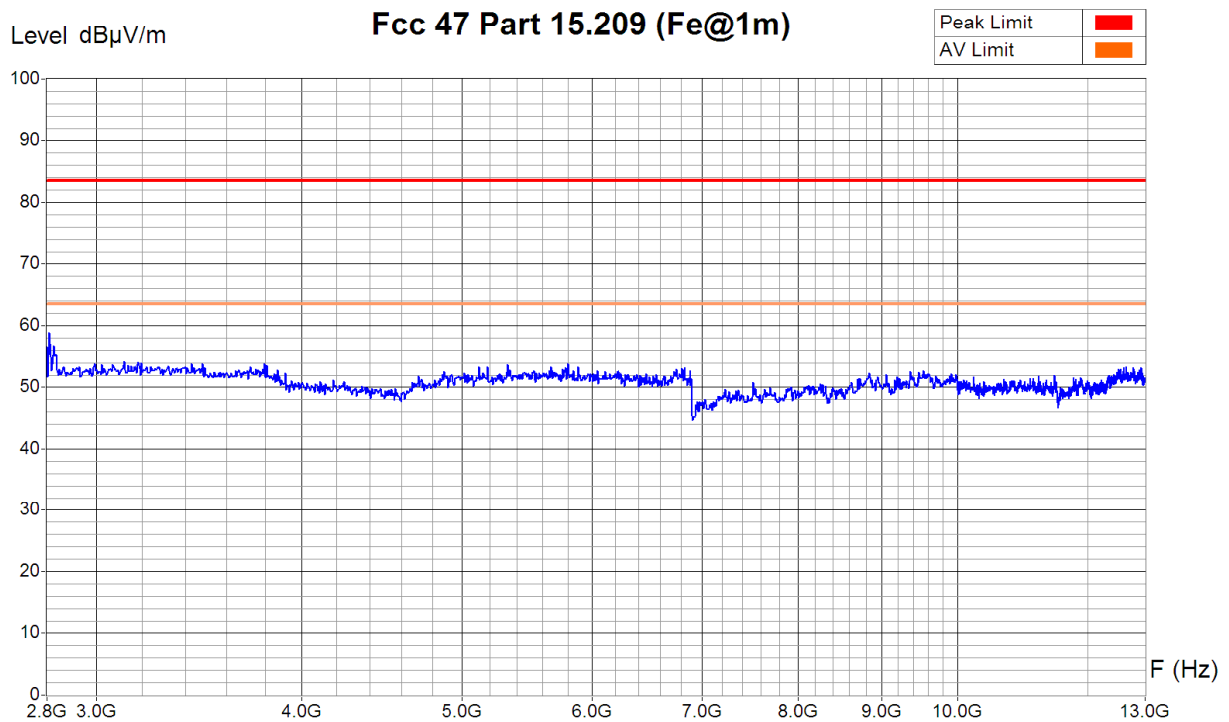
Zone	2.80 GHz - 4.60	4.60 GHz - 6.90	6.90 GHz - 10 GHz	10 GHz - 11.50 GHz	11.50 GHz - 13 GHz
Video Bandwidth	1 MHz	1 MHz	300 KHz	300 KHz	300 KHz
Resol Bandwidth	1 MHz	1 MHz	300 KHz	300 KHz	300 KHz

Operator: BiA
Date/Time: 26.03.2010 10:10
Filename:
006_rad_FCC15-209_1m_2-8_13
g_Hor.png/.txt

Measurement Type : Radiated Field
Polarisation : Vertical
Table Angle : 0 - 360 °
Antenna Height : 1.8 m



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Standard use as wireless speaker with pink noise (Output- Level: 85 dBspl @ 1m)
Remarks : RF communication at 2.4 GHz



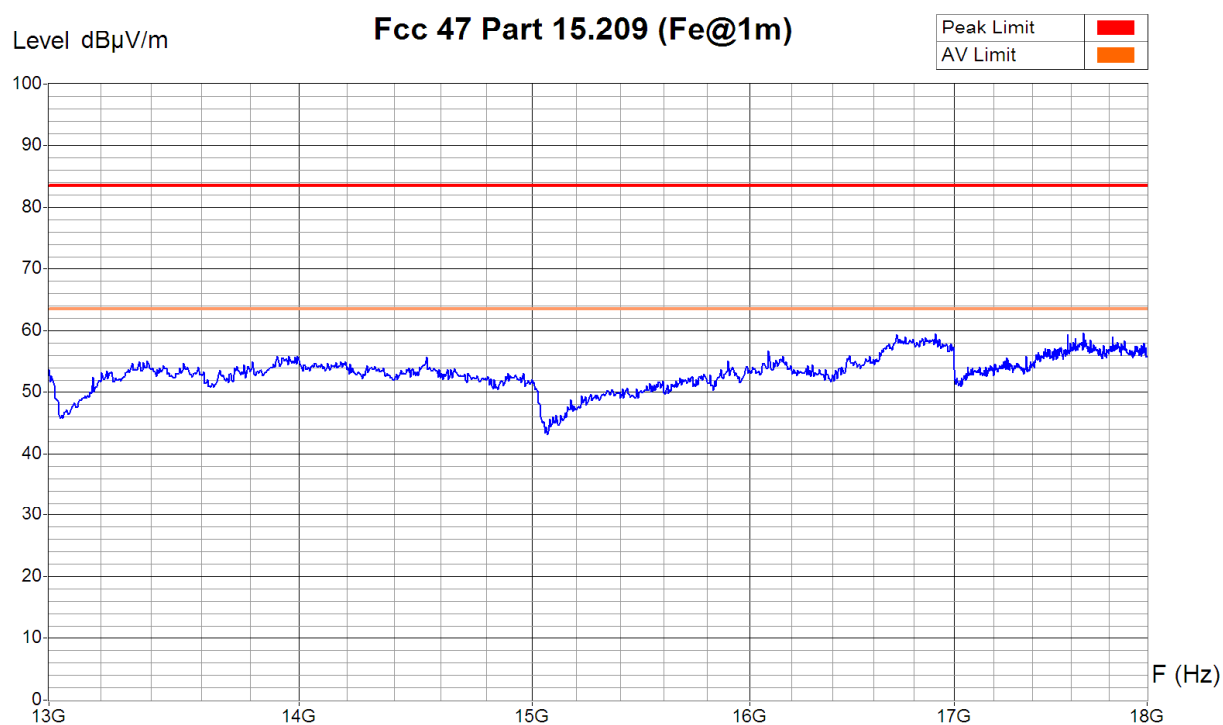
Zone	2.80 GHz - 4.60	4.60 GHz - 6.90	6.90 GHz - 10 GHz	10 GHz - 11.50 GHz	11.50 GHz - 13 GHz
Video Bandwidth	1 MHz	1 MHz	300 KHz	300 KHz	300 KHz
Resol Bandwidth	1 MHz	1 MHz	300 KHz	300 KHz	300 KHz

Operator: BiA
Date/Time: 26.03.2010 10:04
Filename:
006_rad_FCC15-209_1m_2-8_13
g_Ver.png/.txt

Measurement Type : Radiated Field
 Polarisation : Horizontal
 Table Angle : 0 - 360 °
 Antenna Height : 1.8 m



Equipment Under Test : Dynamic Soundfield
 Set-Up : See picture
 Operating Conditions : Standard use as wireless speaker with pink noise (Output- Level: 85 dBspl @ 1m)
 Remarks : RF communication at 2.4 GHz



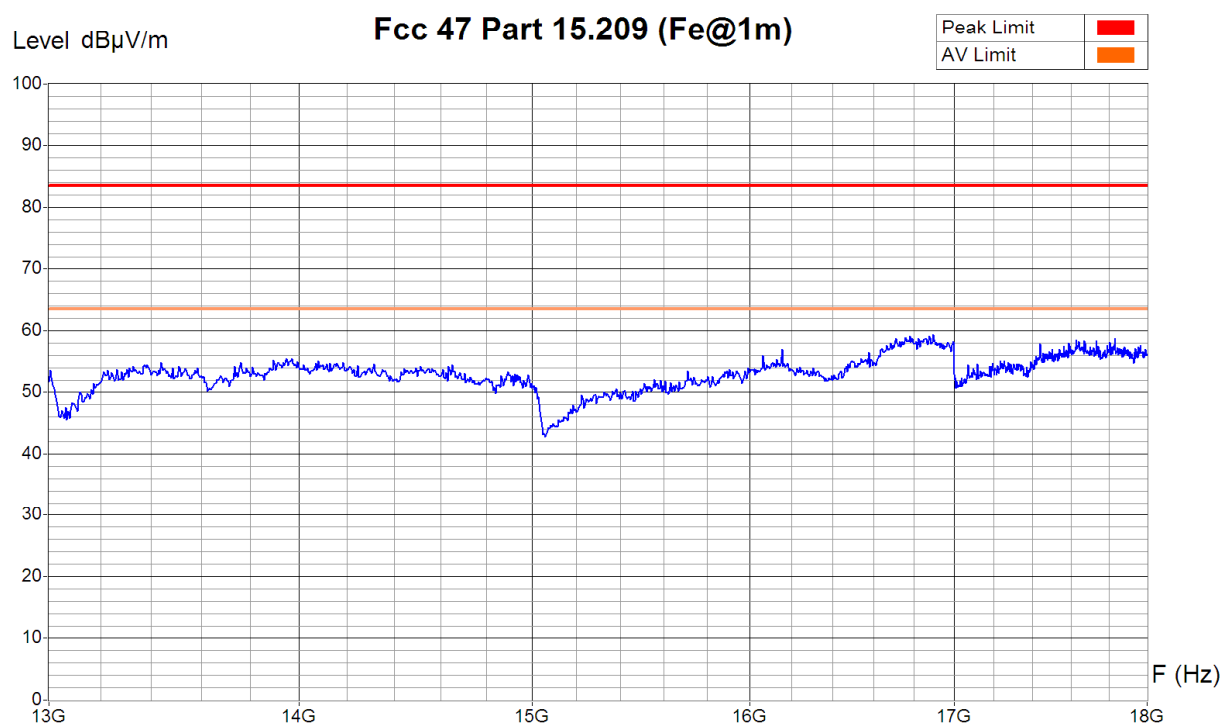
Zone	13 GHz - 15 GHz	15 GHz - 17 GHz	17 GHz - 18 GHz
Video Bandwidth	1 MHz	1 MHz	300 KHz
Resol Bandwidth	1 MHz	1 MHz	300 KHz

Operator: BiA
 Date/Time: 26.03.2010 10:24
 Filename:
 007_rad_FCC15-209_1m_13-18g
 _Hor.png/.txt

Measurement Type : Radiated Field
 Polarisation : Vertical
 Table Angle : 0 - 360 °
 Antenna Height : 1.8 m



Equipment Under Test : Dynamic Soundfield
 Set-Up : See picture
 Operating Conditions : Standard use as wireless speaker with pink noise (Output- Level: 85 dBspl @ 1m)
 Remarks : RF communication at 2.4 GHz



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: 26.03.2010 10:28
 Filename:
 007_rad_FCC15-209_1m_13-18g
 _Ver.png/.txt

6.13.3 Radiated emission - Electromagnetic field (radiated – 18 GHz to 26.5 GHz)Test site: ☒ anechoic chamber (foam) ☐ anechoic chamber (ferrites)Distance: ☐ 30 m ☐ 10 m ☐ 3 m ☒ 1 m

Position of EUT: 0.15 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.

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:

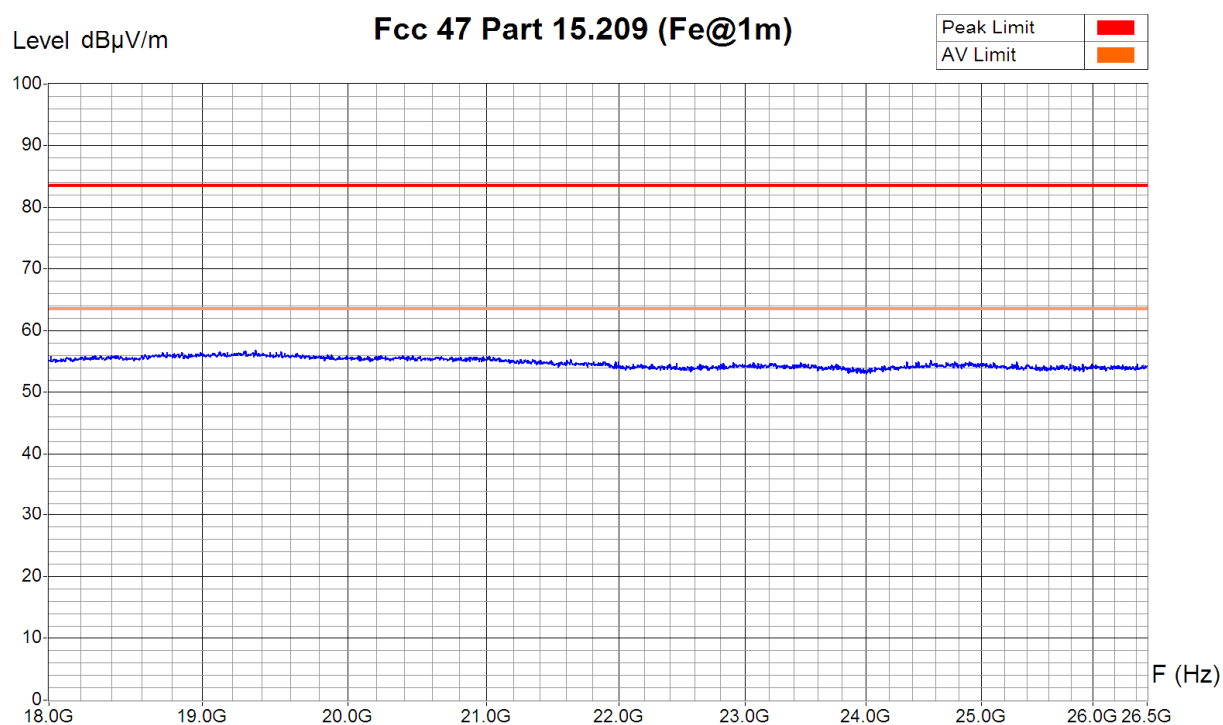
Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Antenna (horn)	☒ 3160-09	☐				
External mixer	☒ 11970K					
Cables	☒ Succoflex 2 m (70435/4) + 1 m (8407/4) + 1 m (67688/4)					

Result:	☒ pass	☐ fail	☐ not applicable	☐ not tested
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Measurement Type : Radiated Field
Polarisation : Horizontal
Table Angle : 0 - 360 °
Antenna Height : 1.8 m



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Standard use as wireless speaker with pink noise (Output- Level: 85 dBspl @ 1m)
Remarks : RF communication at 2.4 GHz



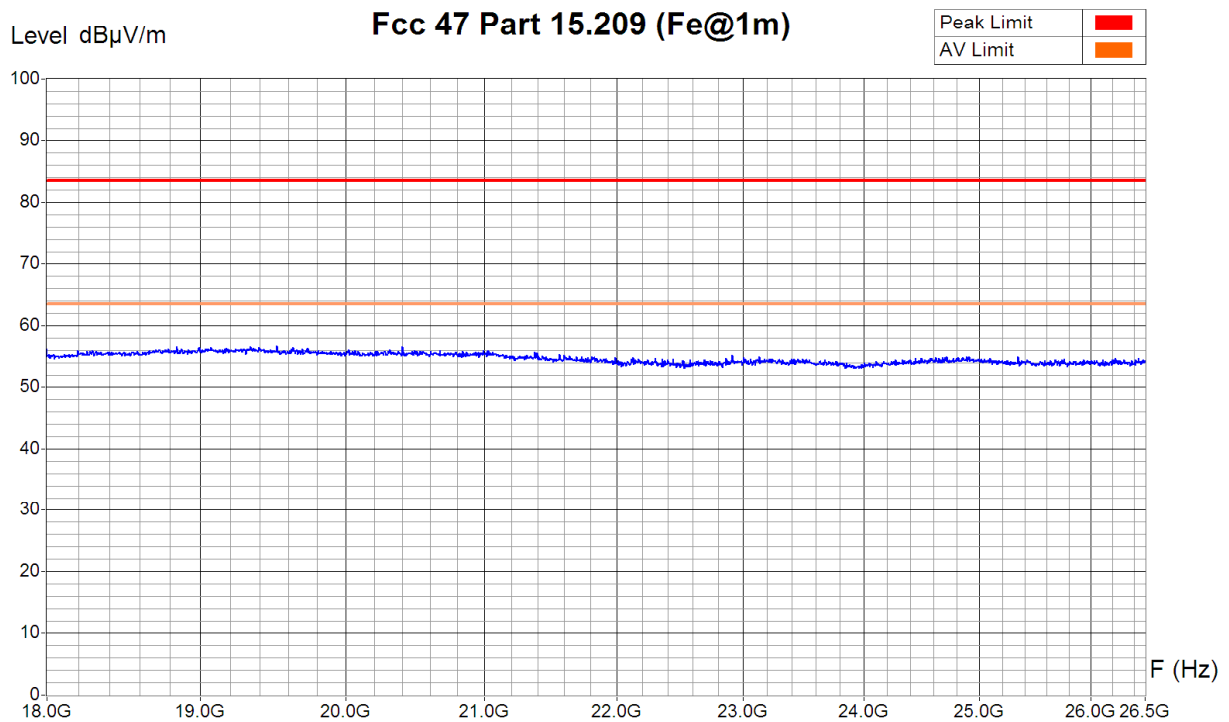
Zone	18 GHz - 19.70 GHz	19.70 GHz - 21.40	21.40 GHz - 23.10	23.10 GHz - 24.80	24.80 GHz - 26.50
Video Bandwidth	1 MHz	1 MHz	1 MHz	1 MHz	1 MHz
Resol Bandwidth	100 KHz	100 KHz	100 KHz	100 KHz	100 KHz

Operator: BiA
Date/Time: 26.03.2010 11:59
Filename:
008_rad_FCC15-209_1m_18_26-5
g_Hor.png/.txt

Measurement Type : Radiated Field
Polarisation : Vertical
Table Angle : 0 - 360 °
Antenna Height : 1.8 m



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Standard use as wireless speaker with pink noise (Output- Level: 85 dBspl @ 1m)
Remarks : RF communication at 2.4 GHz



Zone	18 GHz - 19.70 GHz	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	1 MHz
Resol Bandwidth	100 KHz	100 KHz	100 KHz	100 KHz	100 KHz

Operator: BiA
Date/Time: 26.03.2010 11:52
Filename:
008_rad_FCC15-209_1m_18_26-5
g_Ver.png/.txt

6.14 Spurious emission – radiated (receive mode)**6.14.1 Radiated emission - Electromagnetic field (radiated – 30 MHz to 1 GHz)**

Test site: ☐ anechoic chamber (foam) ☐ open test site
☒ anechoic chamber (ferrites) ☐
 Distance: ☐ 30 m ☐ 10 m ☒ 3 m ☐
 Position of EUT: 0.15 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.

Test set-up:



Remarks: 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:

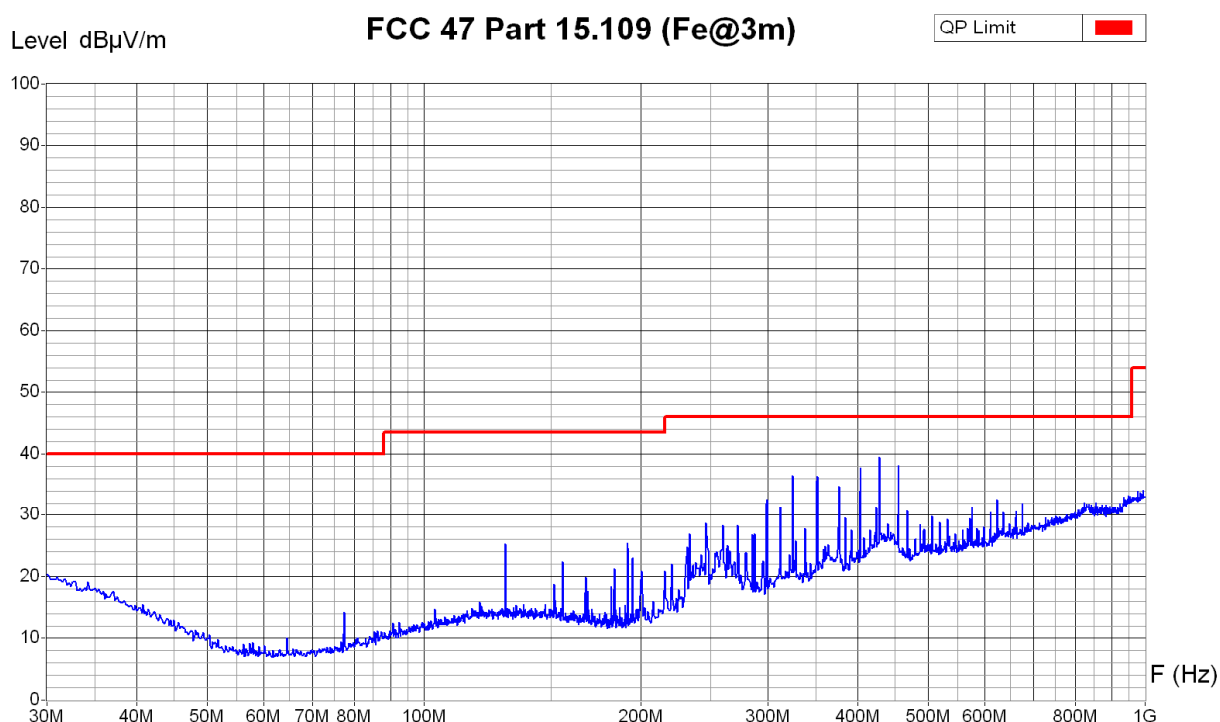
Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☒ 03-45	☐ 05-39	☐ 07-53
Receiver	☐ 85-04	☐ 90-43	☒ 94-35	☐ 04-29		
Preamplifier	☐ 90-01	☐ 95-86	☐ 05-56	☒ 05-59	☐ 05-62	☐
Antenna (bilog)	☒ 94-03	☐ 05-38	☐			
Cables	☒ 06-01	☒ 117	☒ 143	☒ 144		

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 Soundfield
Set-Up : See picture
Operating Conditions : Receiving mode with horizontal antenna f = 2.402 GHz
Remarks : Powered with 115 VAC / 60 Hz
Cables connected: Power supply and audio



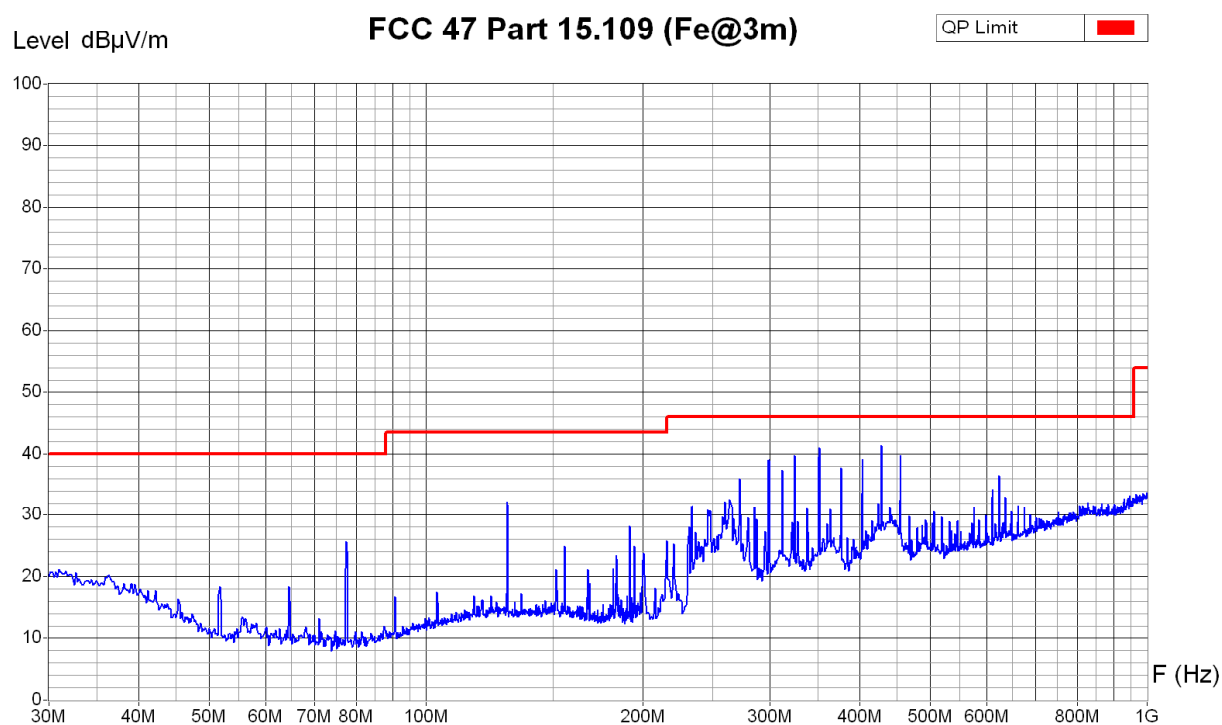
Zone	30 MHz - 199 MHz	199 MHz - 1 GHz
Video Bandwidth	100 KHz	100 KHz
Resol Bandwidth	100 KHz	100 KHz

Operator: BiA
Date/Time: 16.07.2010 18:40
Filename:
050_rad_FCC15-109_3m_f2402_3
0-1000_hor.png/.txt

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



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Receiving mode with horizontal antenna f = 2.402 GHz
Remarks : Powered with 115 VAC / 60 Hz
Cables connected: Power supply and audio



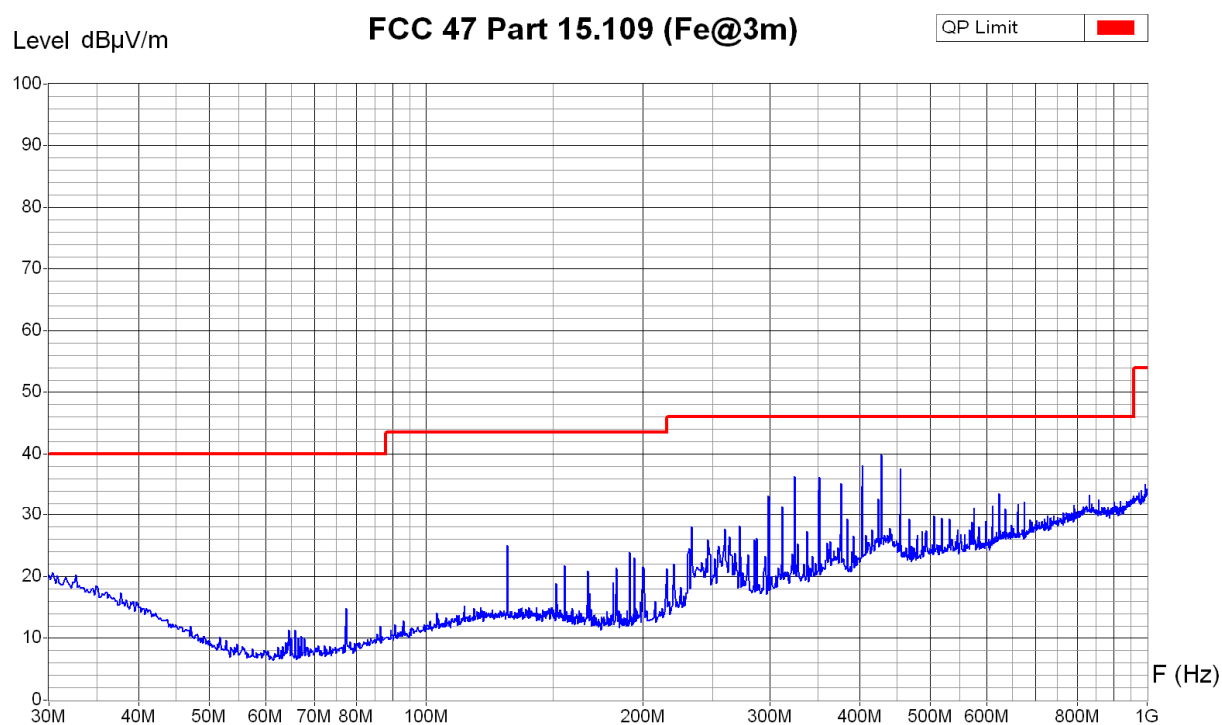
Zone	30 MHz - 199 MHz	199 MHz - 1 GHz
Video Bandwidth	100 KHz	100 KHz
Resol Bandwidth	100 KHz	100 KHz

Operator: BiA
Date/Time: 16.07.2010 18:51
Filename:
050_rad_FCC15-109_3m_f2402_3
0-1000_Ver.png/.txt

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



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Receiving mode with horizontal antenna f = 2.480 GHz
Remarks : Powered with 115 VAC / 60 Hz
Cables connected: Power supply and audio



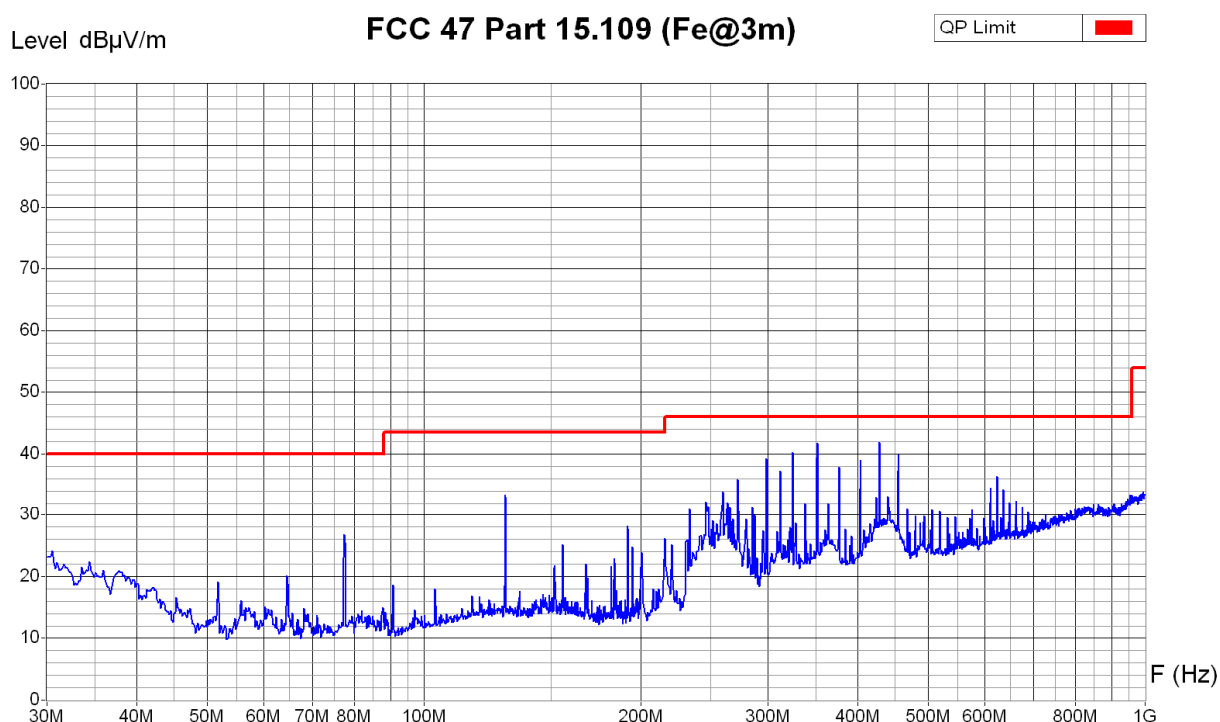
Zone	30 MHz - 199 MHz	199 MHz - 1 GHz
Video Bandwidth	100 KHz	100 KHz
Resol Bandwidth	100 KHz	100 KHz

Operator: BiA
Date/Time: 16.07.2010 18:18
Filename:
051_rad_FCC15-109_3m_f2480_3
0-1000_hor.png/.txt

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



Equipment Under Test : Dynamic Soundfield
 Set-Up : See picture
 Operating Conditions : Receiving mode with horizontal antenna f = 2.480 GHz
 Remarks : Powered with 115 VAC / 60 Hz
 Cables connected: Power supply and audio



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

Operator: BiA
 Date/Time: 16.07.2010 18:09
 Filename:
 051_rad_FCC15-109_3m_f2480_3
 0-1000_ver.png/.txt

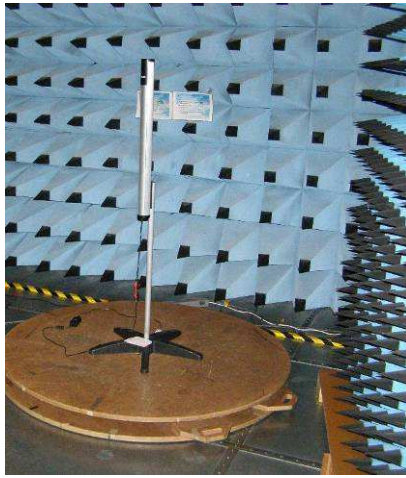
6.14.2 Radiated emission - Electromagnetic field (radiated – 1 GHz to 18 GHz)Test site: ☐ anechoic chamber (ferrites) ☒ anechoic chamber (foam)Distance: ☐ 30 m ☐ 10 m ☐ 3 m ☒ 1 m

Position of EUT: 0.15 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.

Test set-up:



Remarks:

- 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 $f = 1$ 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:

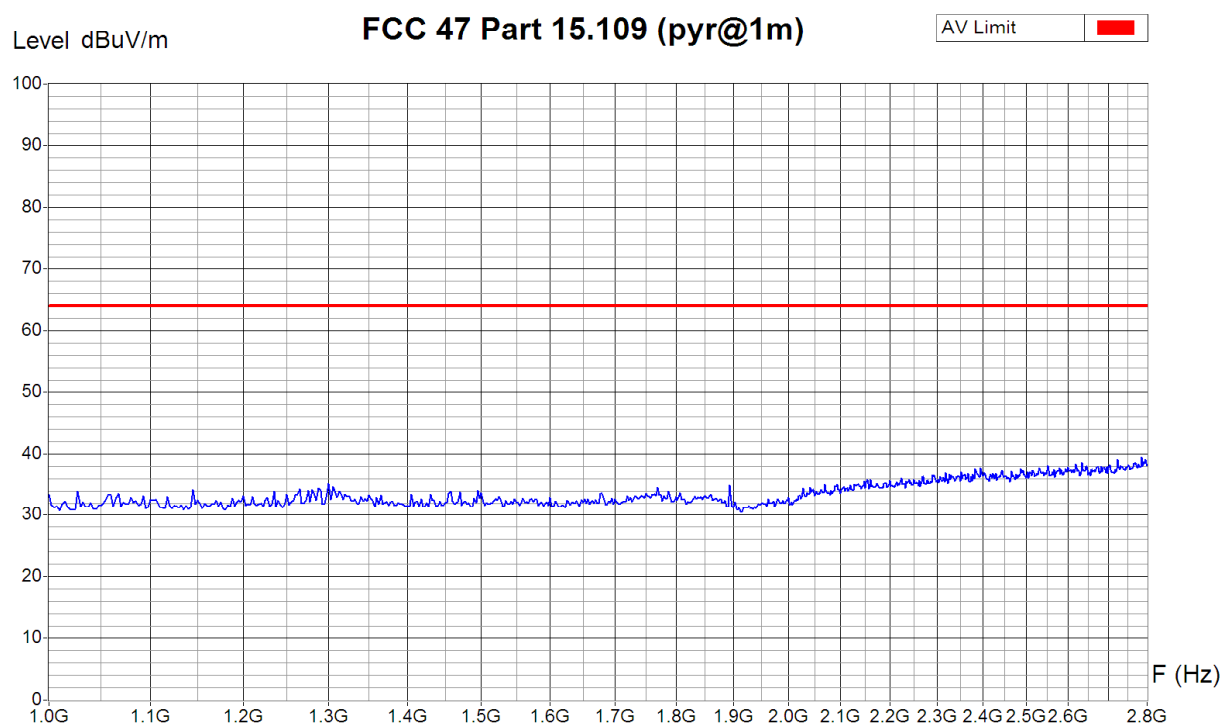
Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Preamplifier	☒ 05-56	☒ 05-87	☐			
Antenna (horn)	☒ 90-24	☐ 07-31	☐			
Cables	☒ Succoflex 4m (222093/4) + 1m (67688/4)					

Result:	☒ pass	☐ fail	☐ not applicable	☐ not tested
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Measurement Type : Radiated Field
Polarisation : Horizontal
Table Angle : 0 - 360°
Antenna Height : 1 - 4 m



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Receiving mode with horizontal antenna f = 2.402 GHz
Remarks : Powered with 115 VAC / 60 Hz
Cables connected: Power supply and audio



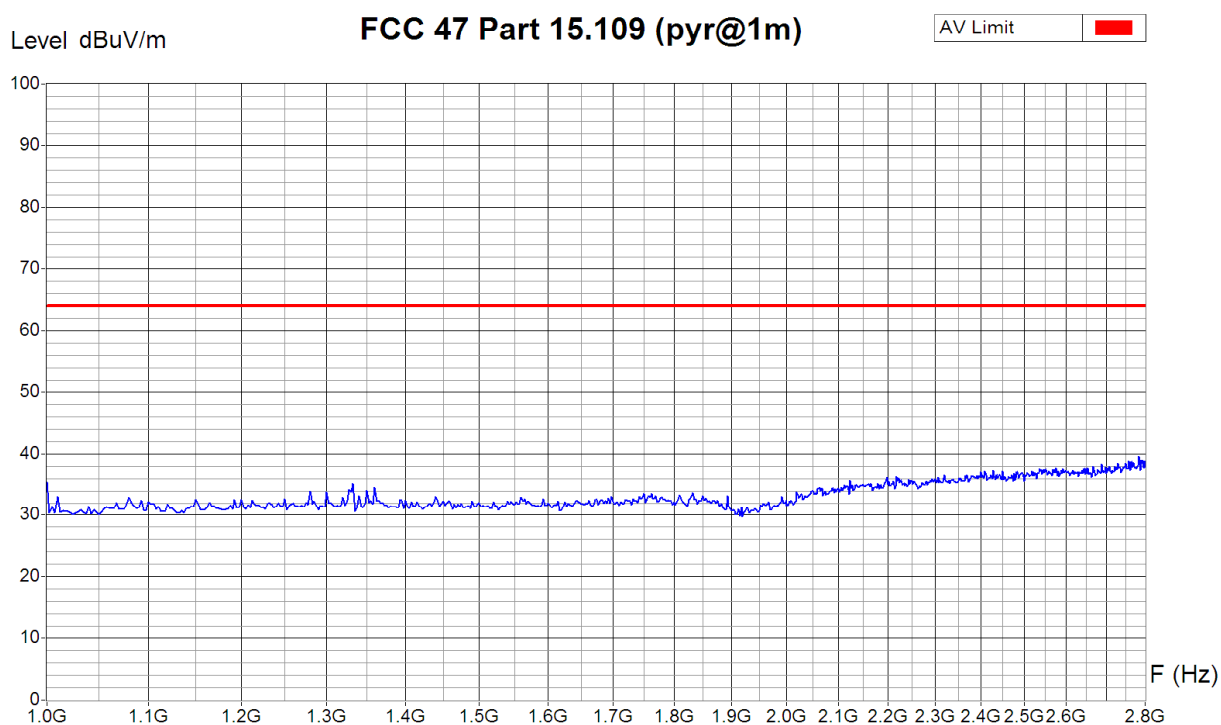
Zone	1 GHz - 2 GHz	2 GHz - 2.80 GHz
Video Bandwidth	1 MHz	1 MHz
Resol Bandwidth	1 MHz	1 MHz

Operator: BiA
Date/Time: 16.07.2010 20:09
Filename:
055_FCC15-109_1m_f2402_1-2-8
GHz_hor.png/.txt

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



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Receiving mode with horizontal antenna f = 2.402 GHz
Remarks : Powered with 115 VAC / 60 Hz
Cables connected: Power supply and audio



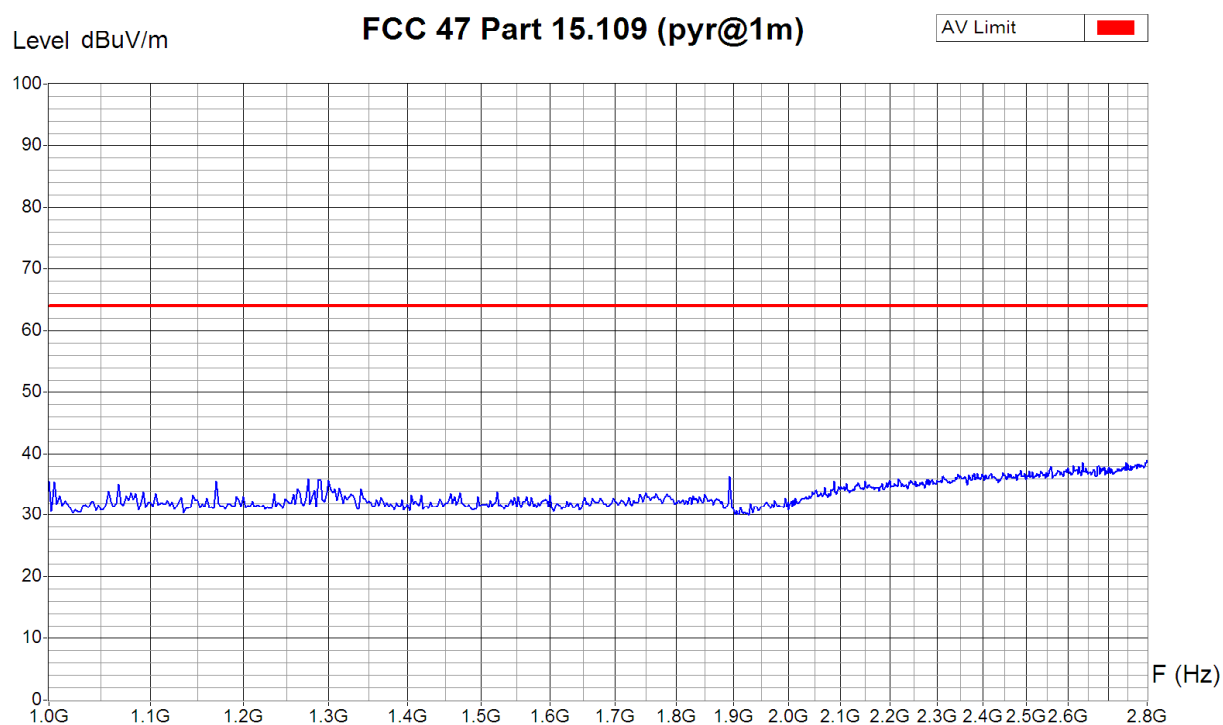
Zone	1 GHz - 2 GHz	2 GHz - 2.80 GHz
Video Bandwidth	1 MHz	1 MHz
Resol Bandwidth	1 MHz	1 MHz

Operator: BiA
Date/Time: 16.07.2010 20:26
Filename:
055_FCC15-109_1m_f2402_1-2-8
GHz_ver.png/.txt

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



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Receiving mode with horizontal antenna f = 2.480 GHz
Remarks : Powered with 115 VAC / 60 Hz
Cables connected: Power supply and audio



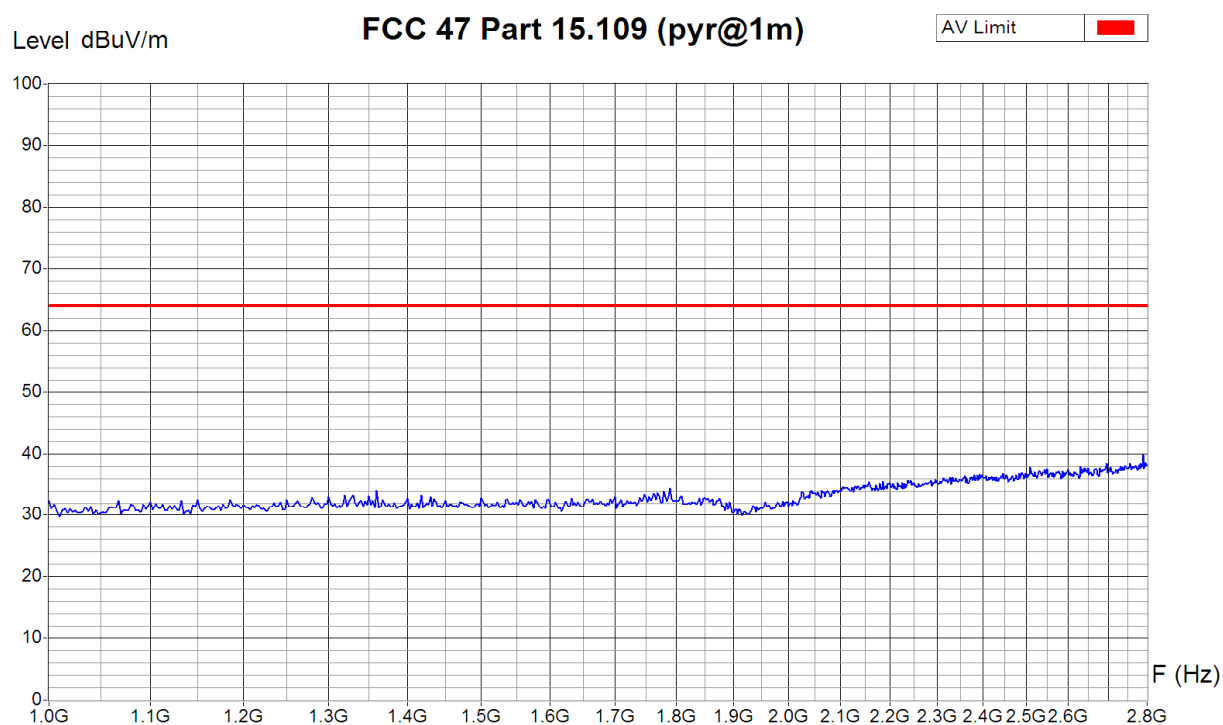
Zone	1 GHz - 2 GHz	2 GHz - 2.80 GHz
Video Bandwidth	1 MHz	1 MHz
Resol Bandwidth	1 MHz	1 MHz

Operator: BiA
Date/Time: 16.07.2010 20:43
Filename:
056_FCC15-109_1m_f2480_1-2-8
GHz_hor.png/.txt

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



Equipment Under Test : Dynamic Soundfield
 Set-Up : See picture
 Operating Conditions : Receiving mode with horizontal antenna f = 2.480 GHz
 Remarks : Powered with 115 VAC / 60 Hz
 Cables connected: Power supply and audio



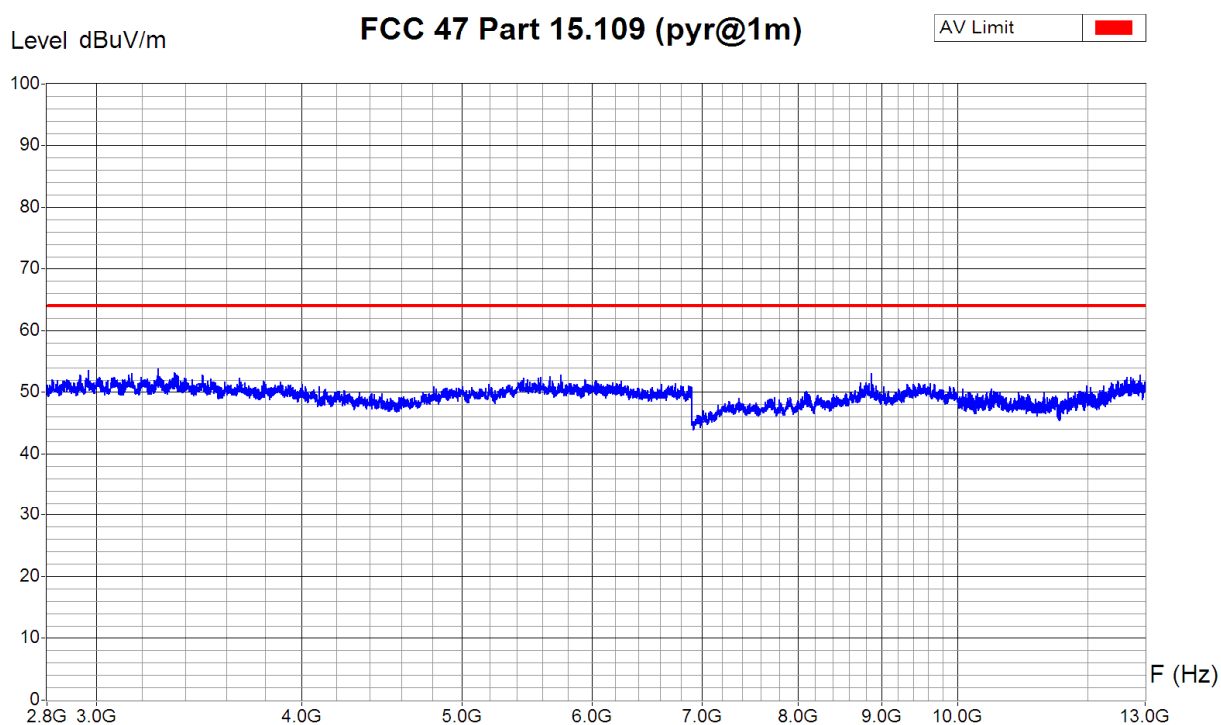
Zone	1 GHz - 2 GHz	2 GHz - 2.80 GHz
Video Bandwidth	1 MHz	1 MHz
Resol Bandwidth	1 MHz	1 MHz

Operator: BiA
 Date/Time: 16.07.2010 20:35
 Filename:
 056_FCC15-109_1m_f2480_1-2-8
 GHz_ver.png/.txt

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



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Receiving mode with horizontal antenna f = 2.402 GHz
Remarks : Powered with 115 VAC / 60 Hz
Cables connected: Power supply and audio



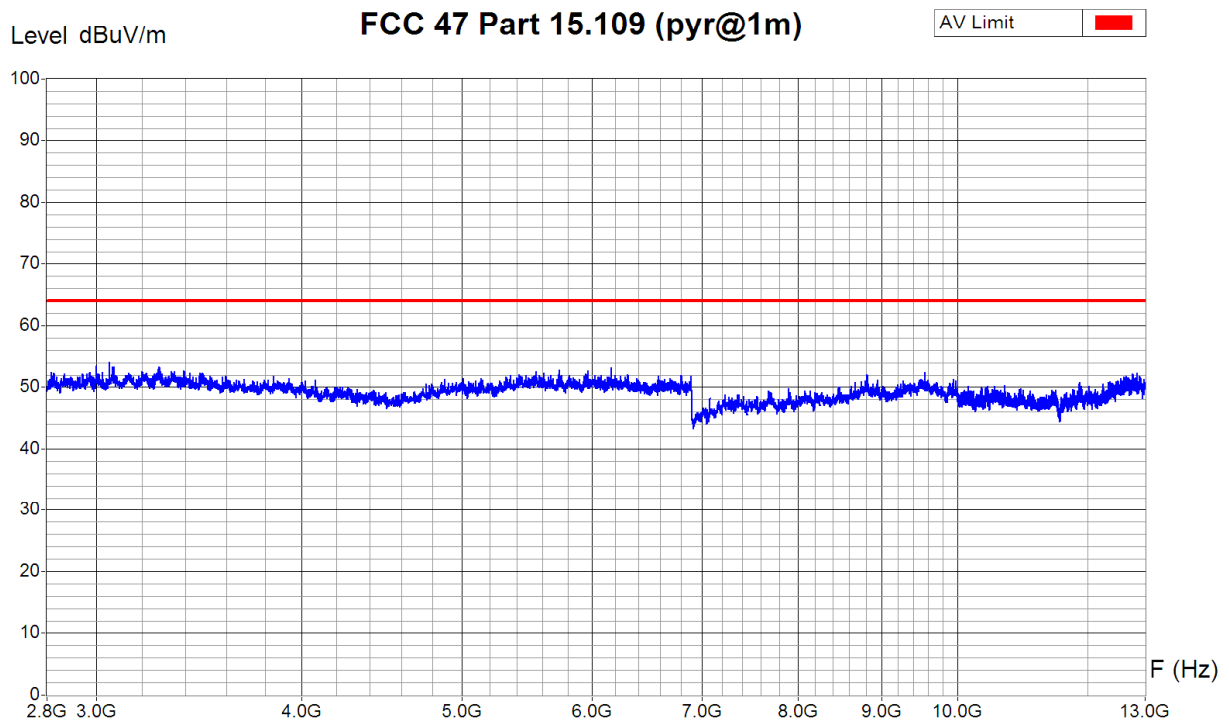
Zone	2.80 GHz - 4.60	4.60 GHz - 6.90	6.90 GHz - 10 GHz	10 GHz - 11.50 GHz	11.50 GHz - 13 GHz
Video Bandwidth	1 MHz	1 MHz	300 KHz	300 KHz	300 KHz
Resol Bandwidth	1 MHz	1 MHz	300 KHz	300 KHz	300 KHz

Operator: BiA
Date/Time: 18.07.2010 14:41
Filename:
057_FCC15-109_1m_f2402_2-8_1
3GHz_hor.png/.txt

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



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Receiving mode with horizontal antenna f = 2.402 GHz
Remarks : Powered with 115 VAC / 60 Hz
Cables connected: Power supply and audio



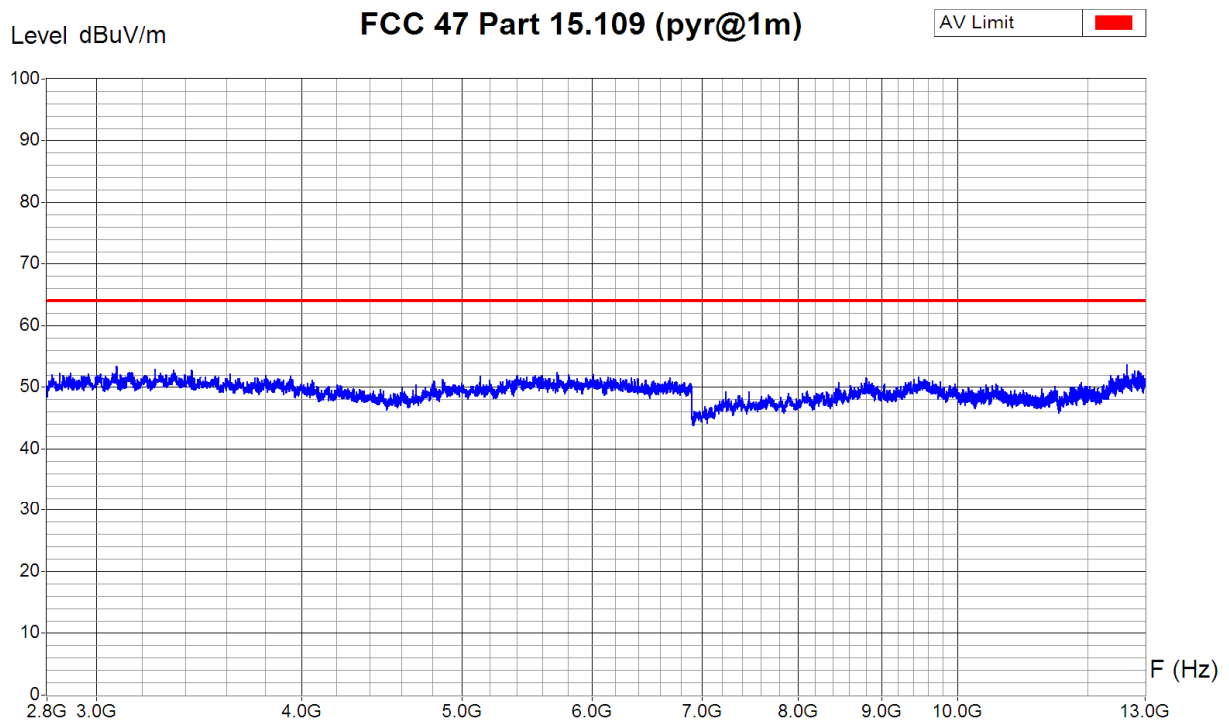
Zone	2.80 GHz - 4.60	4.60 GHz - 6.90	6.90 GHz - 10 GHz	10 GHz - 11.50 GHz	11.50 GHz - 13 GHz
Video Bandwidth	1 MHz	1 MHz	300 KHz	300 KHz	300 KHz
Resol Bandwidth	1 MHz	1 MHz	300 KHz	300 KHz	300 KHz

Operator: BiA
Date/Time: 18.07.2010 14:56
Filename:
057_FCC15-109_1m_f2402_2-8_1
3GHz_ver.png/.txt

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



Equipment Under Test : Dynamic Soundfield
 Set-Up : See picture
 Operating Conditions : Receiving mode with horizontal antenna f = 2.480 GHz
 Remarks : Powered with 115 VAC / 60 Hz
 Cables connected: Power supply and audio



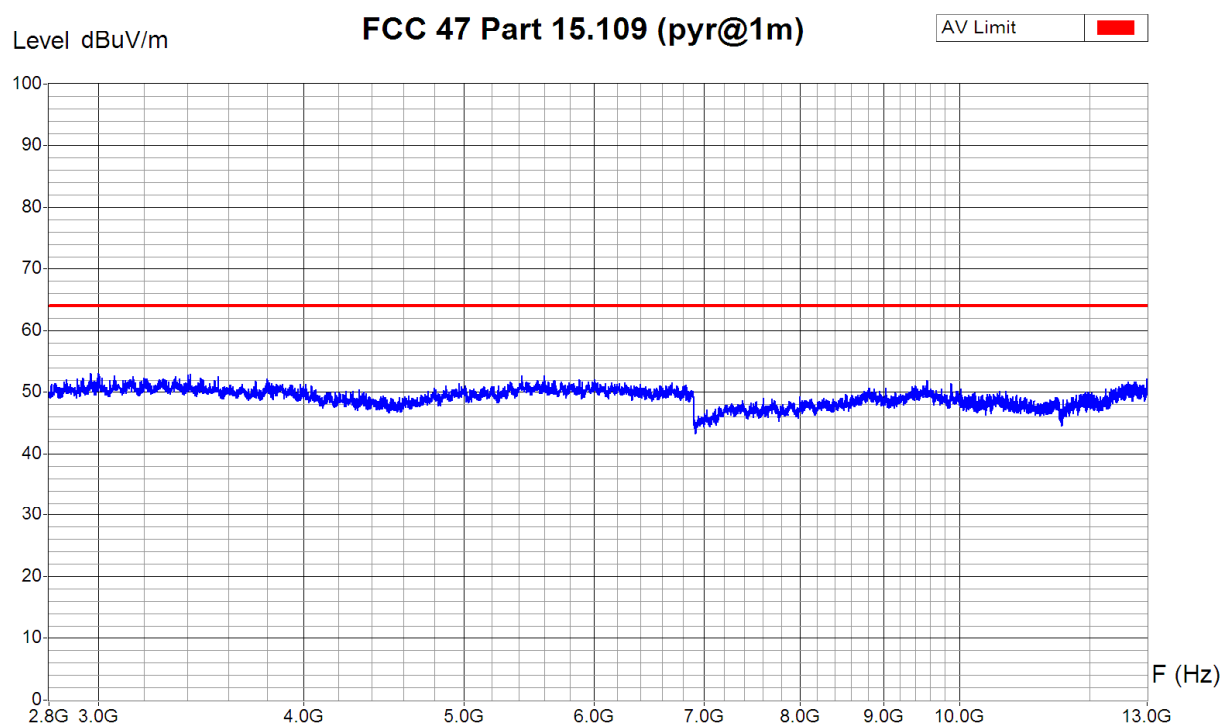
Zone	2.80 GHz - 4.60	4.60 GHz - 6.90	6.90 GHz - 10 GHz	10 GHz - 11.50 GHz	11.50 GHz - 13 GHz
Video Bandwidth	1 MHz	1 MHz	300 KHz	300 KHz	300 KHz
Resol Bandwidth	1 MHz	1 MHz	300 KHz	300 KHz	300 KHz

Operator: BiA
 Date/Time: 18.07.2010 15:23
 Filename:
 058_FCC15-109_1m_f2480_2-8_1
 3GHz_hor.png/.txt

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



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Receiving mode with horizontal antenna f = 2.480 GHz
Remarks : Powered with 115 VAC / 60 Hz
Cables connected: Power supply and audio



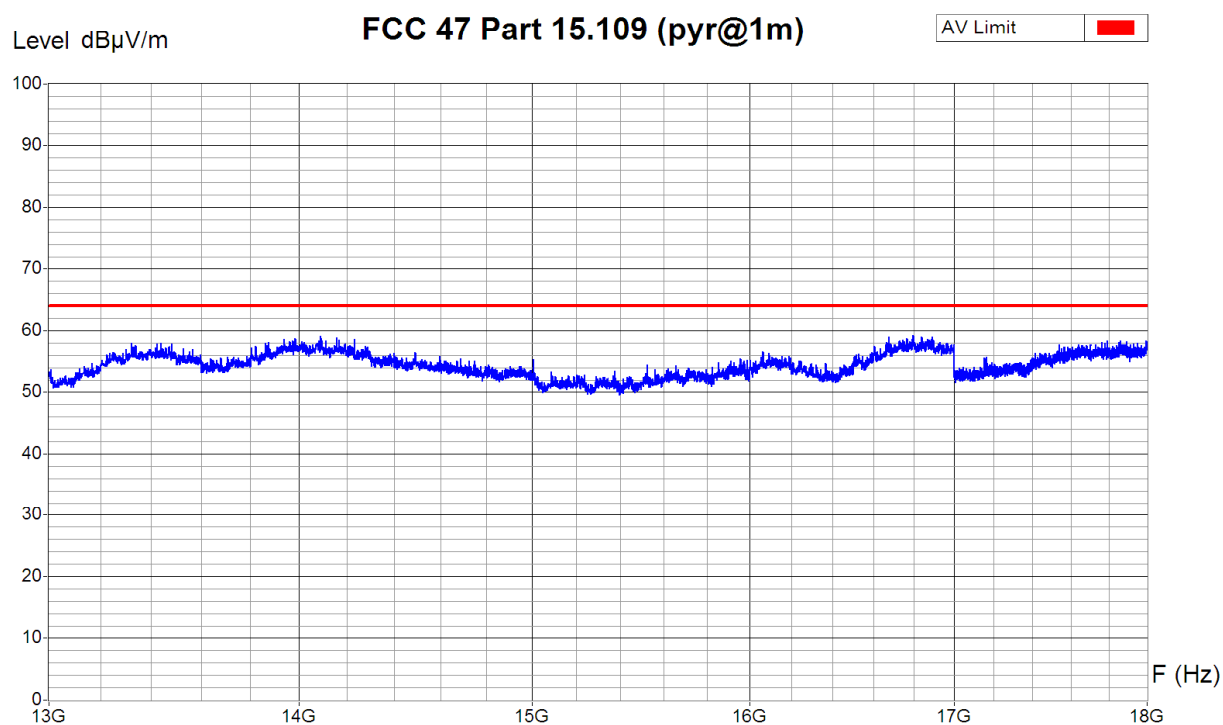
Zone	2.80 GHz - 4.60	4.60 GHz - 6.90	6.90 GHz - 10 GHz	10 GHz - 11.50 GHz	11.50 GHz - 13 GHz
Video Bandwidth	1 MHz	1 MHz	300 KHz	300 KHz	300 KHz
Resol Bandwidth	1 MHz	1 MHz	300 KHz	300 KHz	300 KHz

Operator: BiA
Date/Time: 18.07.2010 15:14
Filename:
058_FCC15-109_1m_f2480_2-8_1
3GHz_ver.png/.txt

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



Equipment Under Test : Dynamic Soundfield
 Set-Up : See picture
 Operating Conditions : Receiving mode with horizontal antenna f = 2.480 GHz
 Remarks : Powered with 115 VAC / 60 Hz
 Cables connected: Power supply and audio



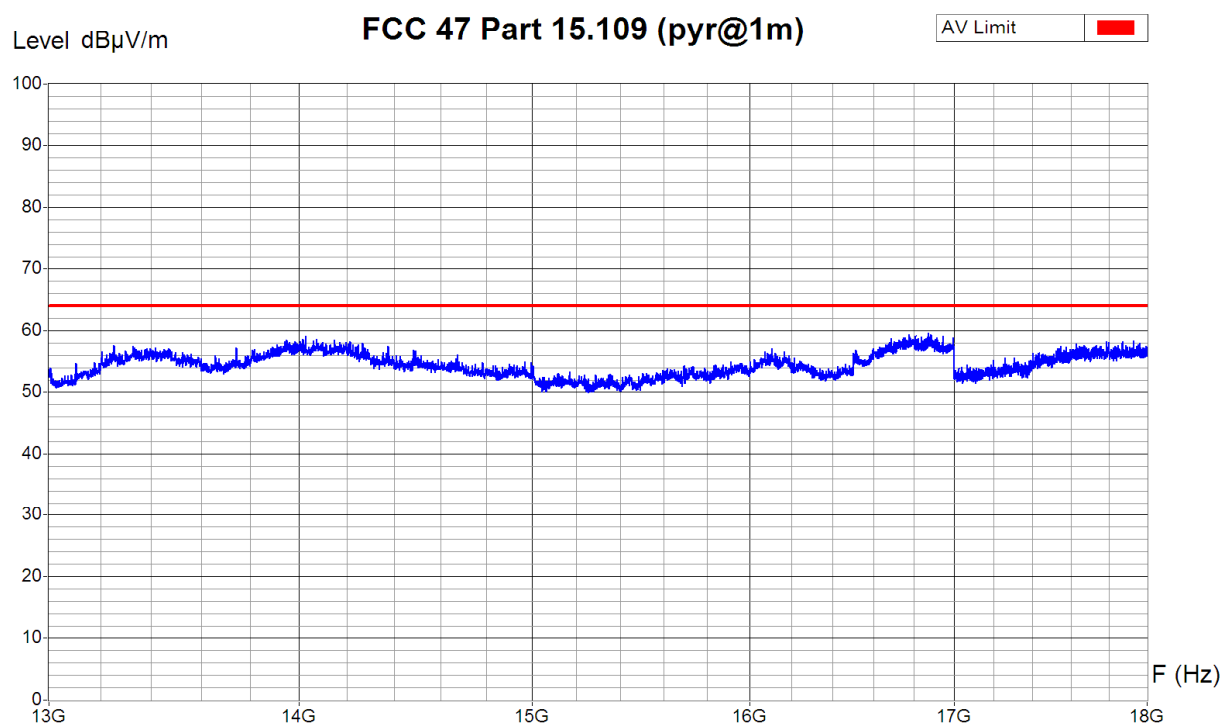
Zone	13 GHz - 15 GHz	15 GHz - 17 GHz	17 GHz - 18 GHz
Video Bandwidth	1 MHz	1 MHz	300 KHz
Resol Bandwidth	1 MHz	1 MHz	300 KHz

Operator: BiA
 Date/Time: 18.07.2010 15:38
 Filename:
 059_FCC15-109_1m_f2480_13_1
 8GHz_hor.png/.txt

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



Equipment Under Test : Dynamic Soundfield
 Set-Up : See picture
 Operating Conditions : Receiving mode with horizontal antenna f = 2.480 GHz
 Remarks : Powered with 115 VAC / 60 Hz
 Cables connected: Power supply and audio



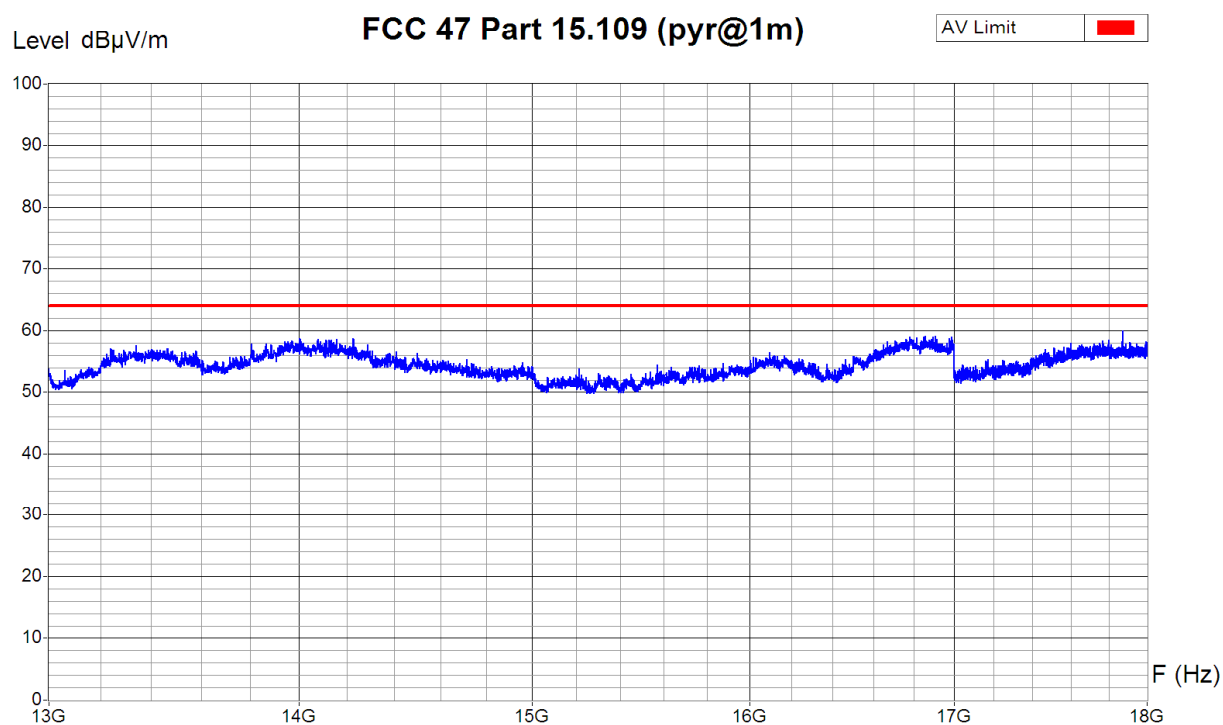
Zone	13 GHz - 15 GHz	15 GHz - 17 GHz	17 GHz - 18 GHz
Video Bandwidth	1 MHz	1 MHz	300 KHz
Resol Bandwidth	1 MHz	1 MHz	300 KHz

Operator: BiA
 Date/Time: 18.07.2010 15:46
 Filename:
 059_FCC15-109_1m_f2480_13_1
 8GHz_ver.png/.txt

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



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Receiving mode with horizontal antenna $f = 2.402$ GHz
Remarks : Powered with 115 VAC / 60 Hz
Cables connected: Power supply and audio



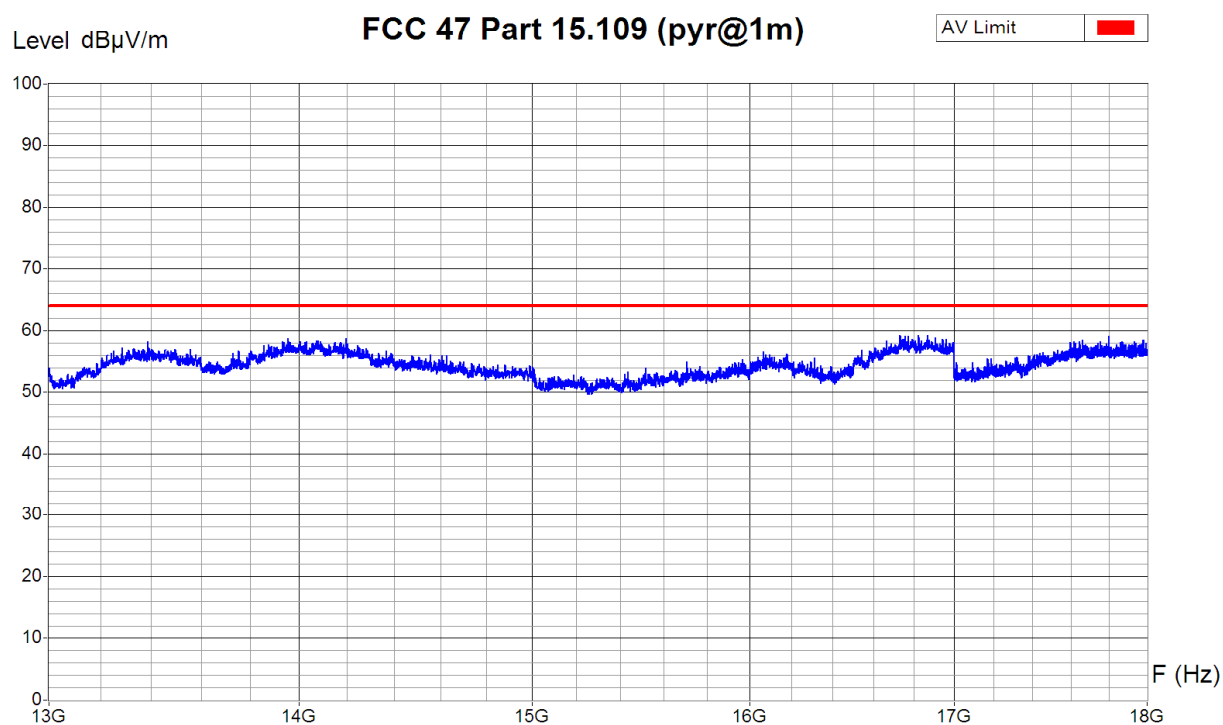
Zone	13 GHz - 15 GHz	15 GHz - 17 GHz	17 GHz - 18 GHz
Video Bandwidth	1 MHz	1 MHz	300 KHz
Resol Bandwidth	1 MHz	1 MHz	300 KHz

Operator: BiA
Date/Time: 18.07.2010 15:56
Filename:
060_FCC15-109_1m_f2402_13_1
8GHz_hor.png/.txt

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



Equipment Under Test : Dynamic Soundfield
 Set-Up : See picture
 Operating Conditions : Receiving mode with horizontal antenna f = 2.402 GHz
 Remarks : Powered with 115 VAC / 60 Hz
 Cables connected: Power supply and audio



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: 18.07.2010 15:51
 Filename:
 060_FCC15-109_1m_f2402_13_1
 8GHz_ver.png/.txt

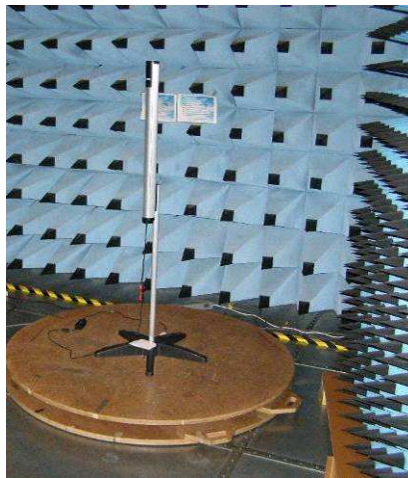
6.14.3 Radiated emission - Electromagnetic field (radiated – 18 GHz to 26.5 GHz)Test site: ☒ anechoic chamber (foam) ☐ anechoic chamber (ferrites)Distance: ☐ 30 m ☐ 10 m ☐ 3 m ☒ 1 m

Position of EUT: 0.15 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.

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:

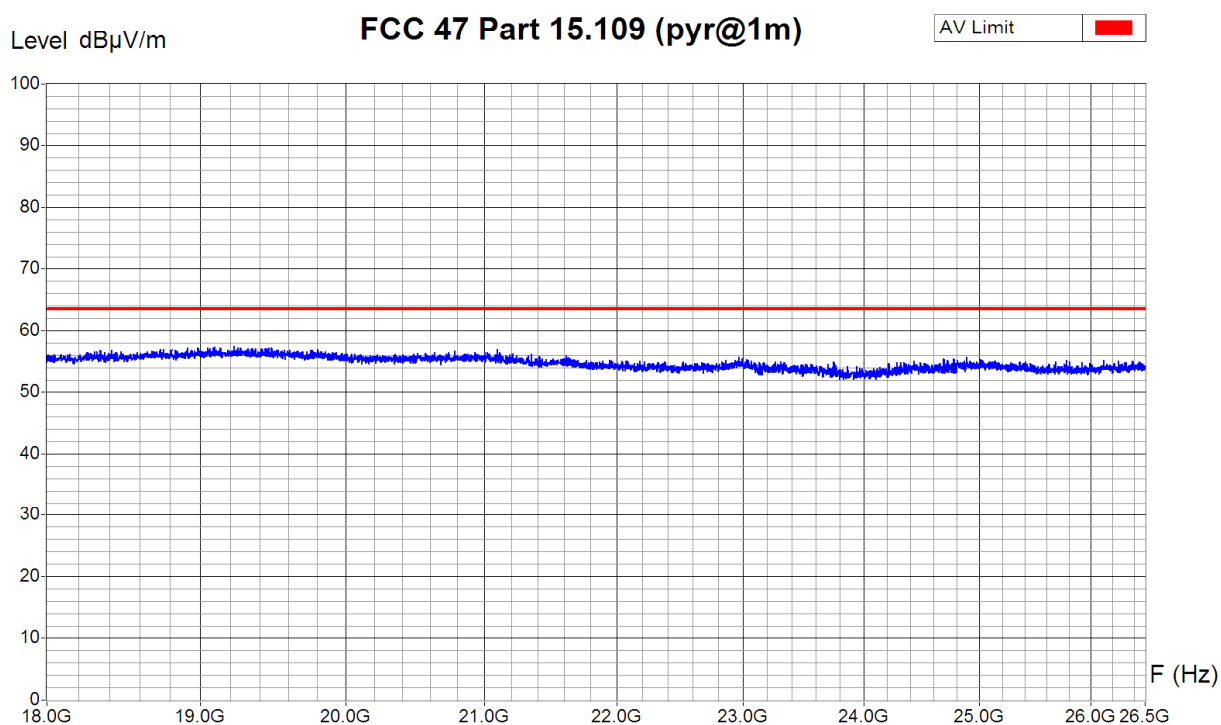
Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Antenna (horn)	☒ 3160-09	☐				
External mixer	☒ 11970K					
Cables	☒ Succoflex 2 m (70435/4) + 1 m (8407/4) + 1 m (67688/4)					

Result:	☒ pass	☐ fail	☐ not applicable	☐ not tested
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Measurement Type : Radiated Field
Polarisation : Horizontal
Table Angle : 0 - 360°
Antenna Height : 1.8 m



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Receiving mode with horizontal antenna f = 2.402 GHz
Remarks : Powered with 115 VAC / 60 Hz
Cables connected: Power supply and audio



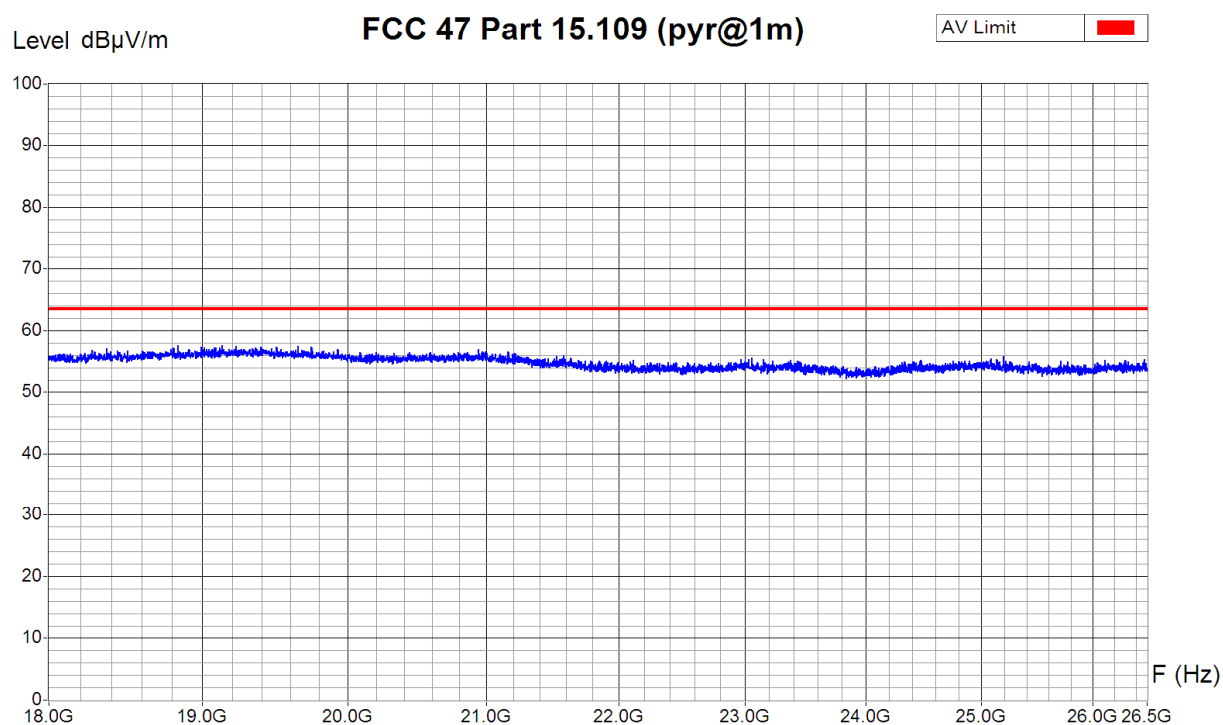
Zone	18 GHz - 19.70 GHz	19.70 GHz - 21.40	21.40 GHz - 23.10	23.10 GHz - 24.80	24.80 GHz - 26.50
Video Bandwidth	1 MHz	1 MHz	1 MHz	1 MHz	1 MHz
Resol Bandwidth	100 KHz	100 KHz	100 KHz	100 KHz	100 KHz

Operator: BiA
Date/Time: 18.07.2010 16:51
Filename:
061_FCC15-109_1m_f2402_18_2
6_5GHz_hor.png/.txt

Measurement Type : Radiated Field
Polarisation : Vertical
Table Angle : 0 - 360°
Antenna Height : 1.8 m



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Receiving mode with horizontal antenna f = 2.402 GHz
Remarks : Powered with 115 VAC / 60 Hz
Cables connected: Power supply and audio



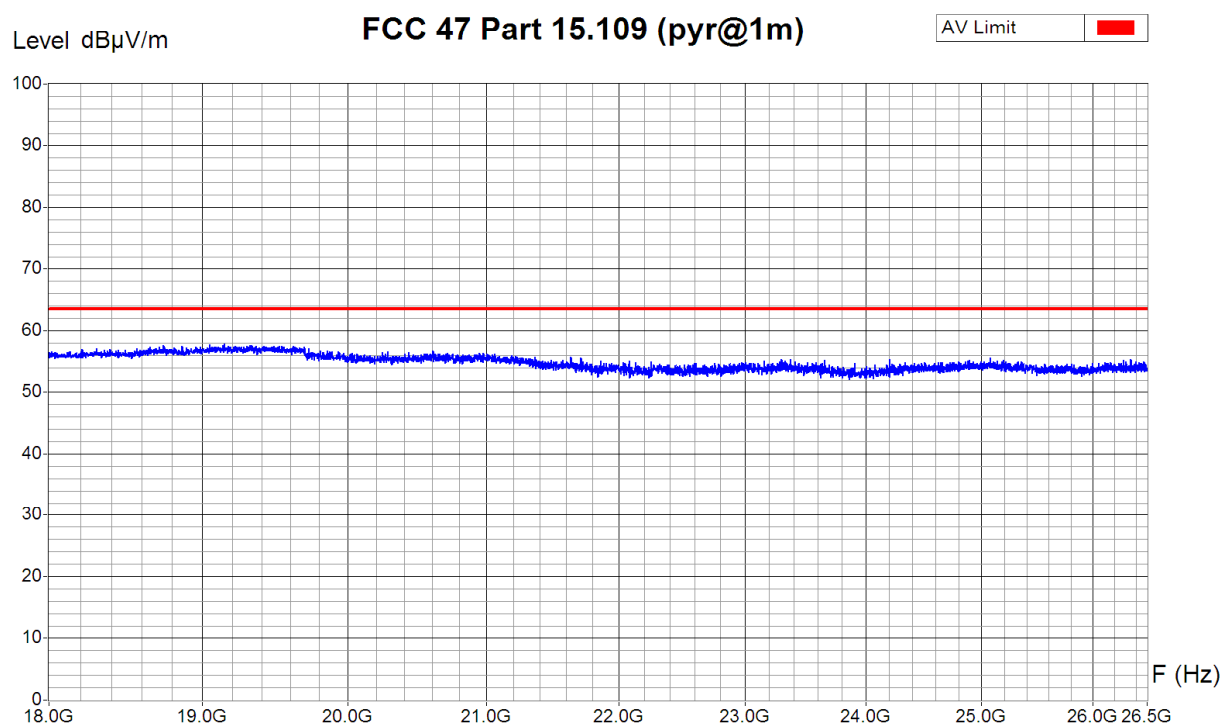
Zone	18 GHz - 19.70 GHz	19.70 GHz - 21.40	21.40 GHz - 23.10	23.10 GHz - 24.80	24.80 GHz - 26.50
Video Bandwidth	1 MHz	1 MHz	1 MHz	1 MHz	1 MHz
Resol Bandwidth	100 KHz	100 KHz	100 KHz	100 KHz	100 KHz

Operator: BiA
Date/Time: 18.07.2010 16:55
Filename:
061_FCC15-109_1m_f2402_18_2
6_5GHz_ver.png/.txt

Measurement Type : Radiated Field
 Polarisation : Horizontal
 Table Angle : 0 - 360°
 Antenna Height : 1.8 m



Equipment Under Test : Dynamic Soundfield
 Set-Up : See picture
 Operating Conditions : Receiving mode with horizontal antenna f = 2.480 GHz
 Remarks : Powered with 115 VAC / 60 Hz
 Cables connected: Power supply and audio



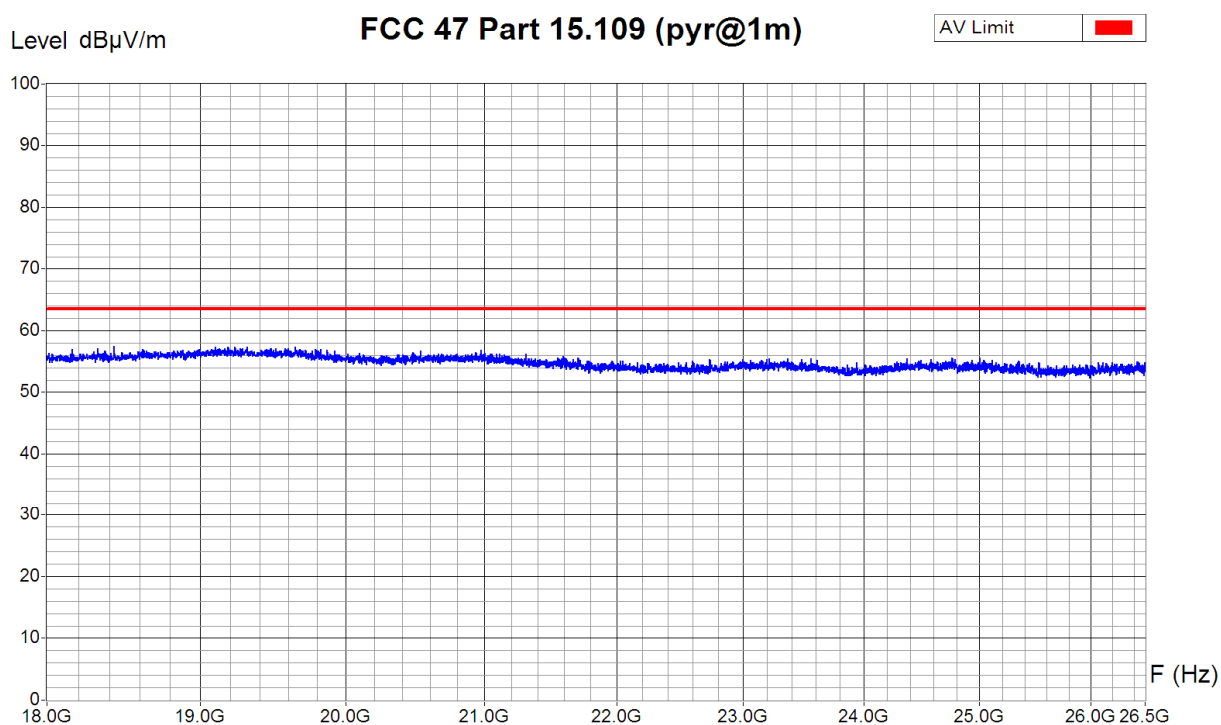
Zone	18 GHz - 19.70 GHz	19.70 GHz - 21.40	21.40 GHz - 23.10	23.10 GHz - 24.80	24.80 GHz - 26.50
Video Bandwidth	1 MHz	1 MHz	1 MHz	1 MHz	1 MHz
Resol Bandwidth	100 KHz	100 KHz	100 KHz	100 KHz	100 KHz

Operator: BiA
 Date/Time: 18.07.2010 17:04
 Filename:
 062_FCC15-109_1m_f2480_18_2
 6_5GHz_hor.png/.txt

Measurement Type : Radiated Field
Polarisation : Vertical
Table Angle : 0 - 360°
Antenna Height : 1.8 m



Equipment Under Test : Dynamic Soundfield
Set-Up : See picture
Operating Conditions : Receiving mode with horizontal antenna f = 2.480 GHz
Remarks : Powered with 115 VAC / 60 Hz
Cables connected: Power supply and audio



Zone	18 GHz - 19.70 GHz	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	1 MHz
Resol Bandwidth	100 KHz	100 KHz	100 KHz	100 KHz	100 KHz

Operator: BiA
Date/Time: 18.07.2010 16:59
Filename:
062_FCC15-109_1m_f2480_18_2
6_5GHz_ver.png/.txt