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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:	*15'799*
Product name: Nom du produit: Produktname	*SmartLink+*	Mandate no: Mandat no: Auftrag Nr:	*20098690*
Serial no: No de série: Seriennummer:	*FM part: 46 (for radiated tests)* *49 (for cond. tests)* *Bluetooth part: 50 (for radiated tests)* *51 (for cond. tests)*	Model number: Numéro de modèle: Modellnummer:	*V2*
Customer: Client: Kunde:	*Phonak Communications SA* *Länggasse 17* *CH-3280 Murten*	Date of test: Date de l'essai: Prüfdatum:	*March 31 to July 28, 2009*

Standards / Normes / Normen		Result Résultat Ergebnis
47 CFR, Part 2	(General rules and regulations : §§ 2.201, 2.202, 2.1046, 2.1047, 2.1049, 2.1053, 2.1055)	*Pass*
47 CFR, Part 95	(LPRS transmitters : §§ 95.629 (d)(2), 95.635 (c)(1), 95.639 (e))	*Pass*
47 CFR, Part 15	(Subpart C, Intentional radiator: §§ 15.207/247)	*Pass*

Test performed by
Essai effectué par :
Prüfer

Mr Erich Staub

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

Mr Erich Staub

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

Mr Jacques Ding

Rossens, August 21, 2009 (Issue Date / Date d'édition / Ausstelldatum) V2009Feb25

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

The present document results from tests on a specimen and does not prejudge 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***		***47 CFR, 2 and 95***
6.1	Designation of emission Désignation d'emission Bezeichnung der Emission	FCC 47 §2.201 FCC 47 §2.202	✓
6.2	RF power output Puissance RF HF Leistung	FCC 47 §2.1046 FCC 47 §95.639 (e)	✓
6.3	Modulation characteristics Caractéristiques de la modulation Modulationscharakteristiken	FCC 47 §2.1047	✓
6.4	Occupied bandwidth Bande passante Bandbreite	FCC 47 §2.1049 FCC 47 §95.635 (c)(1)	✓
6.5	Field strength of spurious radiation Champ émis Feldstärke der Nebenaussendung	FCC 47 §2.1053 FCC 47 §95.635 (c)(1)	✓
6.6	Frequency stability Stabilité de fréquence Frequenzstabilität	FCC 47 §2.1055 FCC 47 §95.629 (d)(2)	✓

✓ 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
7	***Emission / Emission / Störaussendung***		***47 CFR, 15.247***
7.1	Channel 20dB-bandwidth Bande passante 20dB 20dB-Kanalbandbreite	CFR 47 § 15.247 (a)(1)	916.5 kHz
7.2	Carrier frequency separation Séparation des porteuses des canaux Trägerfrequenzabstand	CFR 47 § 15.247 (a)(1)	✓
7.3	Number of hopping channels Nombre de canaux Anzahl der Kanäle	CFR 47 § 15.247 (a)(1)(iii)	✓
7.4	Time of occupancy (dwell time) Temps d'exposition Verweilzeit	CFR 47 § 15.247 (a)(1)(iii)	✓
7.5	Maximum output power (conducted) Puissance de sortie maximale (conduit) Maximale Ausgangseistung (geleitet)	CFR 47 § 15.247 (b)(1)	✓
7.6	Effective radiated power Puissance rayonné effective Effektiv abgestrahlte Leistung	CFR 47 § 15.247 (b)(1)	✓
7.7	Antenna gain Gain de l'antenne Antennengewinn	CFR 47 § 15.247 (c)	< 6 dBi
7.8	Power spectral density (conducted) Densité spéctrale de puissance (conduit) Spektrale Leisuntsdichte (geleitet)	CFR 47 § 15.247 (e)	✓
7.9	Band-edge emission (conducted) Emissions aux bords de bande (conduit) Emission an den Bandgrenzen (geleitet)	CFR 47 § 15.247 (d)	✓
7.10	Band-edge emission (radiated) Emissions aux bords de bande (rayonné) Emission an den Bandgrenzen (gestrahlt)	CFR 47 § 15.247 (d)	✓
7.11	Spurious emissions – conducted (transmitter) Émissions parasites – conduit (émetteur) Nebenaussendung – geleitet (Sender)	CFR 47 § 15.247 (d)	✓
7.12	Spurious emissions – radiated (transmitter) Émissions parasites – rayonné (émetteur) Nebenaussendung – gestrahlt (Sender)	CFR 47 § 15.247 (d)	✓
-	Conducted emission Émission par conduction Geleitete Emission	CFR 47 § 15.107/207	∅ [1]

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

2. Applied standards / Normes appliquées / Verwendete Normen

47 CFR Part 2 (USA)	Code of Federal Regulations - Telecommunication, FCC Part 2 – Frequency allocations and radio treaty matters; General rules and regulations
47 CFR Part 95 (USA)	Code of Federal Regulations - Telecommunication, FCC Part 95 - Personal Radio Sevices
47 CFR Part 15 Subpart C (USA)	Code of Federal Regulations - Telecommunication, FCC Part 15, Subpart C: "Intentional Radiators"

3. Client / Client / Kunde

Client name and address Nom et adresse du client Name und Adresse des Kunden	*Phonak Communications SA* *Länggasse 17* *CH-3280 Murten*
Contact Person / Responsable / Kontaktperson	*Mrs Neviana Nikoloski*
Telephone / Téléphone / Telefon	*+41 26 672 96 72*
Fax / Télécopieur / Telefax	*+41 26 672 96 77*
E-mail / Courrier électronique / E-mail	*info@phonak-communications.com*
Mandate no / No. de mandat / Auftragsnr.	*20098690*

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

4.1 Identification / Identification / Identifikation

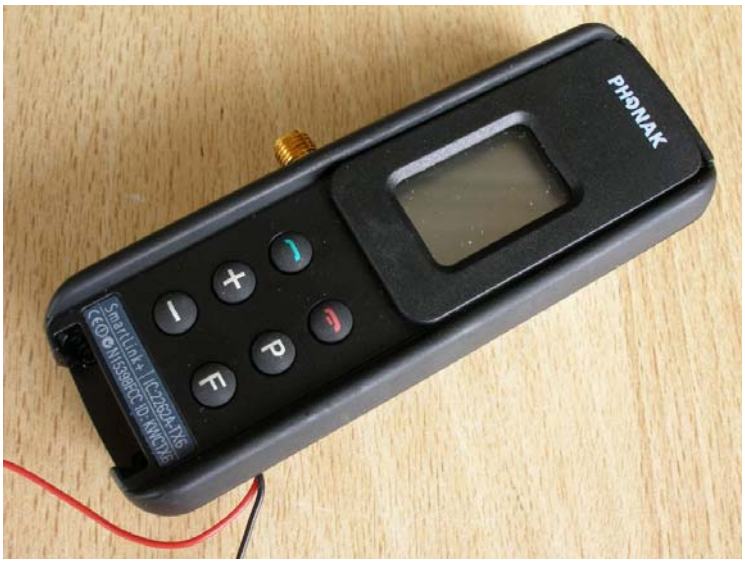
Manufacturer name and address Nom et adresse du fabricant Name und Adresse des Herstellers	*Phonak Communications SA* *Länggasse 17* *CH-3280 Murten*
Production country / Pays de fabrication / Ursprungsland	*Switzerland*
Brand name / nom de marque / Verkaufsmarke	*Phonak*
Product name / Nom du produit / Produktname	*SmartLink+*
Product description / Description du produit / Produktbeschreibung	*FM transmitter with built-in microphones and bluetooth connectivity to a mobile phone for people with hearing losses. Audio signals are captured with the microphones, transmitted via bluetooth from a mobile phone or connected directly to the audio input of the adaptor and transmitted via FM and the neck loop or integral antenna to the hearing aids. Buttons on the front and rear side allow to control different functions.*
Model number / Numéro de modèle / Modellnummer	*V2*
Serial no / No. de série / Seriennummer	*FM part: 46 (for radiated tests)* *49 (for cond. tests)* *Bluetooth part: 50 (for radiated tests)* *51 (for cond. tests)*
Software version / Version du logiciel / Softwareversion	*0.3.0*

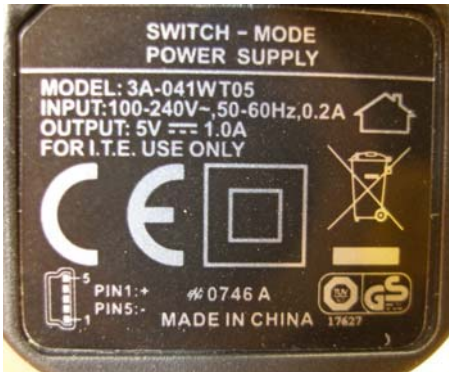
Highest frequency / Fréquence la plus élevée / Höchste Frequenz	*FM carrier between 214 MHz to 219.975 MHz* *Bluetooth carrier between 2402 MHz to 2480 MHz*
Supply / Alimentation / Speisung	*U = 3.7 VDC internal Lithium-Ion battery*
Technical documentation Documentation technique Technische Dokumentation	*None. The equipment is completely identified by its serial no. according to ISO 9001.*

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

	*SmartLink+ with adaptor and external antenna*
	*SmartLink+ for radiated measurements (without external antenna)*

	*SmartLink+ for radiated measurements (FM part): markings*
	*SmartLink+ for conducted measurements (FM part)*
	*SmartLink+ for conducted measurements (FM part): markings*

	*SmartLink+ for radiated measurements (Bluetooth part): markings*
	*SmartLink+ for conducted measurements (Bluetooth part)*
	*SmartLink+ for conducted measurements (Bluetooth part): markings*

	*Adaptor*
	*Power supply* 

4.3 Classification / Classification / Klassierung

CFR 47 Part 15 (bluetooth part)	☐ 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).

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**	
Neck loop antenna	*1 m*	*1 wire*	*none*	*- - -*
External AC/DC adaptor	*1.85 m*	*1 wires*	*none*	*Connected to SmartLink+ via the adaptor*
External audio	*2 m*	*3 wires*	*none*	*Connected to SmartLink+ via the adaptor*

4.5 Modifications / Modifications / Angebrachte Änderungen

None

5. Test conditions / Conditions d'essai / Testbedingungen

5.1 Climatic conditions, location and date / conditions climatiques, lieu et date / klimatische Bedingungen, Ort und Datum

Location / Lieu / Ort:	Date / Date / Datum:	Temp. / Temp. / Temp.:	Pressure / Pression / Druck [QFF]:	Rel. humidity / Humidité rel. / Rel. Luftfeuchtigkeit:
montena emc sa CH-1728 Rossens	*March 31 to April 3, 2009*	*20 - 23 °C*	*1015 – 1022 hPa*	*31 - 35 %*
	April 9 to 27, 2009	*20 - 25 °C*	*1003 – 1020 hPa*	*30 - 36 %*
	July 28, 2009	*24 °C*	*1015 hPa*	*52 %*

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. 0009508433). *Conducted and radiated measurements are performed according to the ANSI C63.4 (2003) procedure.*

5.3 Attendant persons / Personnes présentes / Anwesende Personen

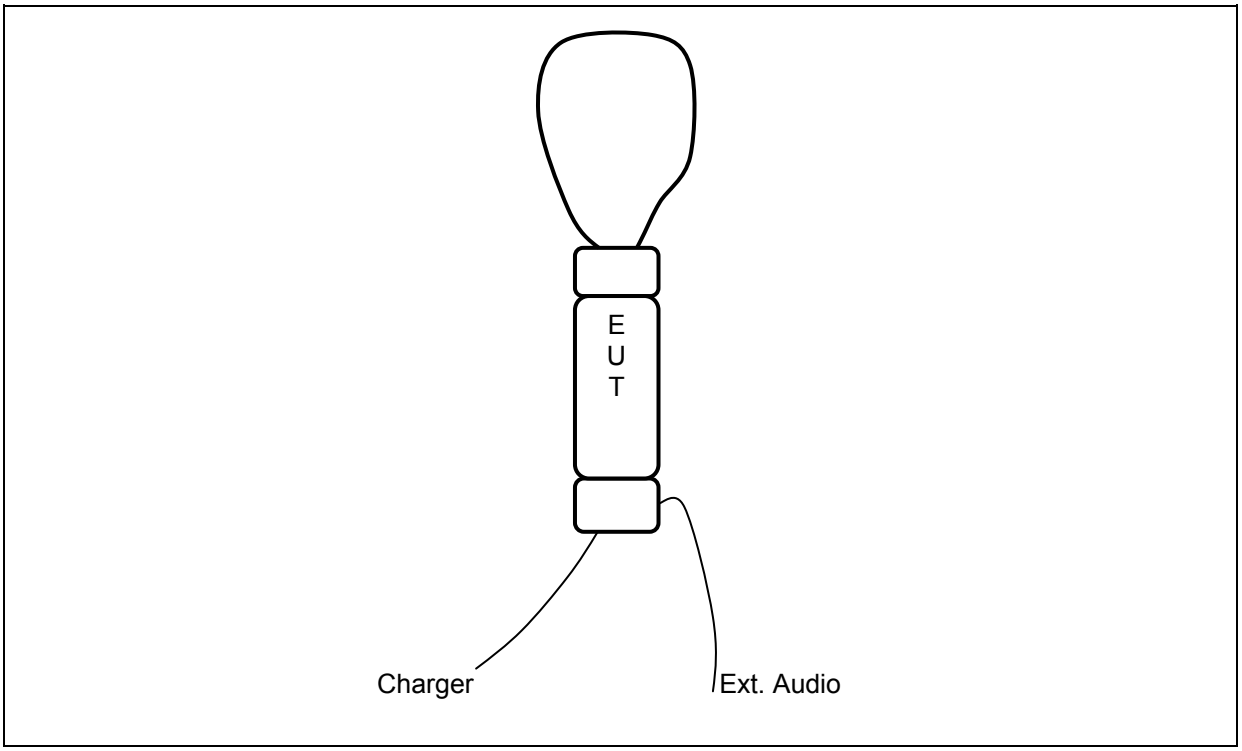
Test Engineer(s) / Ingénieur(s) d'essai / Prüfingenieur(e) :

Mr Erich Staub

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

Name / Nom / Name	Company / Société / Firma
Mr Martin Brügger (partly)	*Phonak Communications SA*

5.4 Test configuration / Configuration d'essai / Prüfkonfiguration



5.5 Operating conditions / Conditions de fonctionnement / Betriebszustand

Continuously transmitting on one of the following frequencies:
FM part: 214 MHz, 216.0125 MHz, 219.975 MHz
Bluetooth part: 2402 MHz, 2441 MHz, 2480 MHz

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 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.

None

6. 47 CFR Parts 2 and 95

6.1 Designiation of emission

Standard:	United States: 47 CFR "Code of Federal Regulations" – Telecommunication ☒ FCC Part 2, Subpart C: Emission: §2.201 and §2.202
Introduction:	A system of designating emission, modulation and transmission characteristics shall be employed. (a) Emissions are designated according to their classification and their necessary bandwidth. (b) A minimum of three symbols are used to describe the basic characteristics of radio waves. (c) Four symbols are used to describe the necessary bandwidth.
Necessary bandwidth:	For a given class of emission, the minimum value of the occupied bandwidth sufficient to ensure the transmission of information at the rate and with the quality required for the system employed, under specified conditions.
	$B_n = 2M + 2D$ B_n = necessary bandwidth M = maximum modulation frequency (audio) = 6 kHz D = Peak frequency deviation = 5.8 kHz
	B_n = 24 kHz
Basic characteristics:	F3E F : frequency modulation 3 : a single channel containing analogue information E : telephony (including sound broadcasting)
Designation of emission:	24K0F3E

6.2 RF power output

Standard: United States: 47 CFR "Code of Federal Regulations" – Telecommunication
☒ FCC Part 2, Subpart J: Certification: §2.1046
☒ FCC Part 95, Subpart E: Technical regulations: §95.639(e)
Limit for LPRS = 100 mW = 20 dBm

Distance: ☐ 30 m ☐ 10 m ☒ 3 m ☐ .....

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

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

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

Test method: The antenna is moved from 1 to 4 m in height. 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 device under test has specific type of antenna and, therefore, the effective radiated power (ERP) was measured instead of the output power. The ERP is defined as the equivalent radiated power of a dipole.

Test set-up:

Remarks: - - -

Test equipment:

Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☒ 03-45	☐ 05-39	☐ 07-53
Antenna (bilog)	☒ 94-03	☐ 05-38	☐			
HF-wattmeter	☐ 95-97	☐ 01-15	☐ 01-17	☒ 03-07	☐ 04-96	☐ 05-20
Thermocouple detector	☐ 92-03	☐ 05-74	☐ 05-88	☒ 07-03	☐	
Substitution antenna	☒ 89-01	☐ 00-52	☐			
Frequency generator	☐ 88-23	☐ 00-42	☐ 03-39	☐ 04-03	☐ 04-89	☒ 05-78
Cables	☐ 06-00	☒ 06-01	☐			

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

Results of the test

Client: *Phonak Communications SA*

Apparatus: *SmartLink+*

Operating mode:
- *modulated*

Cables connected to the EUT:
- *Charger*
- *Ext. audio*

Remarks: - - -

	Measurement with EUT		Power at substitution		Meas. with	Parameters of substitution ant.		Result			Remarks
f [MHz]	E [dBm]	preamp [dB]	P [dBm]	factor [dB]	P [dBm]	gain [dB]	att. Cable [dB]	corr. [dB]	P ERP [dBm]	P ERP [W]	
214.0000	*-15.0*	*0.0*	*-0.06*	*0*	*-32.3*	*-10*	*0*	*22.24*	*7.24*	*5.30 mW*	- - -
216.0125	*-14.2*	*0.0*	*-0.06*	*0*	*-32*	*-10*	*0*	*21.94*	*7.74*	*5.94 mW*	- - -
219.9750	*-14.1*	*0.0*	*-0.07*	*0*	*-31.4*	*-10*	*0*	*21.33*	*7.23*	*5.28 mW*	- - -

Date of test: *April 3, 2009*
Operator: *Erich Staub*

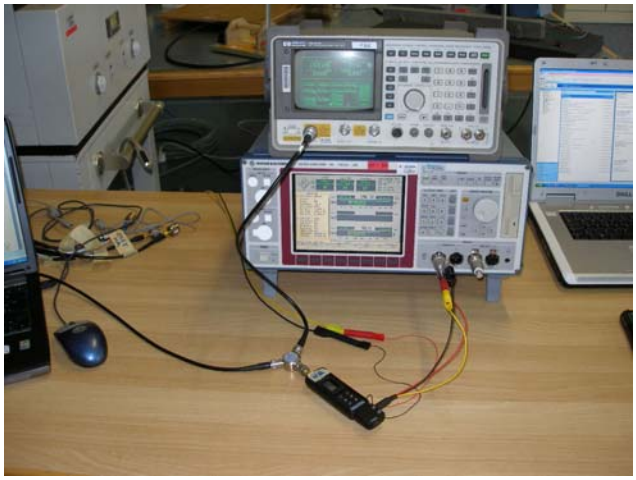
6.3 Modulation characteristics

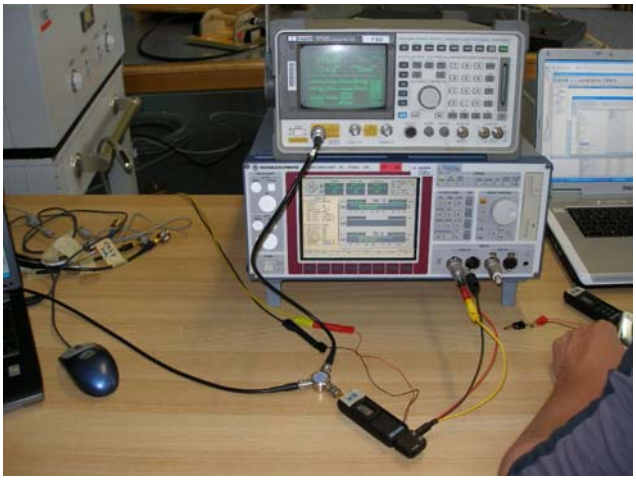
Standard: United States: 47 CFR "Code of Federal Regulations" - Telecommunication
☒ FCC Part 2, Subpart J: Certification: §2.1047

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

Test method: Measurement of the frequency at the antenna connector or a test fixture.

Test set-up:





Remarks:	- - -

Test equipment:

RF communication test set	☐ 88-23	☐ 94-06	☐ 00-42	☐ 03-39	☒ HP8920B (Phonak)	
Générateur LF	☒ 07-25 (UPL)					
Oscilloscope numérique	☐ 90-14	☐ 93-85	☐ 93-86	☐ 01-20	☐ 04-06	☐ 04-50
	☐ 05-22	☐ 05-28				
Power divider	☒ 6 dB					
Power supply	☒ 04-31					

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

Results of the test

Client: *Phonak Communications SA*

Apparatus: *SmartLink+*

Remarks:
- *TX = 216.0125 MHz;*
- *Audio signal injected on both channels (right and left) simultaneously*
- *Audio detector = Peak +-Max*

Frequency response of audio circuit:

An audio signal at 1 kHz is adjusted for a 100 % rated FM deviation (= 16 mV rms). While maintaining the same amplitude, the frequency is varied. The FM deviation is measured and recorded at several frequencies in order to determine the frequency response.

Audio [kHz]	Dev. [kHz]	Audio [kHz]	Dev. [kHz]	Audio [kHz]	Dev. [kHz]	Audio [kHz]	Dev. [kHz]
0.1	*5.3*	*0.9*	*4.6*	*4.0*	*4.3*	*8.0*	*0.1*
0.2	*4.7*	*1.0*	*4.6*	*4.5*	*4.2*	*9.0*	*0.1*
0.3	*4.7*	*1.2*	*4.6*	*5.0*	*4.2*	-	-
0.4	*4.7*	*1.5*	*4.5*	*5.5*	*4.1*	-	-
0.5	*4.7*	*2.0*	*4.4*	*6.0*	*0.5*	-	-
0.6	*4.7*	*2.5*	*4.4*	*6.5*	*0.1*	-	-
0.7	*4.7*	*3.0*	*4.3*	*7.0*	*0.1*	-	-
0.8	*4.6*	*3.5*	*4.3*	*7.5*	*0.1*	-	-

Limit [kHz]	Remarks:	Pass Yes	Pass No
±*75*	- - -	☒	☐

Modulation limiting of audio input:

An audio signal at different frequencies is adjusted for a 100 % rated FM deviation (= 16 mV rms). While maintaining the same frequency, the audio level is varied. The FM deviation s measured and recorded at different audio levels in order to determine the modulation limiting.

Audio signal level [mV rms]	FM Deviation [kHz]			
	200 Hz	1000 Hz	3500 Hz	8000 Hz
4	*1.4*	*1.5*	*1.4*	*0.1*
5	*1.8*	*1.9*	*1.8*	*0.1*
10	*3.4*	*3.7*	*3.5*	*0.1*
20	*4.7*	*4.6*	*4.3*	*0.1*
50	*4.8*	*4.8*	*4.4*	*0.1*
100	*5.0*	*4.8*	*4.6*	*0.1*

Limit [kHz]	Remarks:	Pass Yes	Pass No
±*75*	- - -	☒	☐

Date of test: *April 27, 2009*
Operator: *Erich Staub*

6.4 Occupied bandwidth

Standard: United States: 47 CFR "Code of Federal Regulations" – Telecommunication
☒ FCC Part 2, Subpart J: Certification: §2.1049
☒ FCC Part 95, Subpart E: Technical regulations: §95.635(c)(1)

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

Test precision: ± 1.5 dB

Test requirements: Emissions for transmitters operating on standard band channels (25 kHz) shall be attenuated below the unmodulated carrier in accordance with the following:

- Emissions 12.5 kHz to 22.5 kHz away from the channel centre frequency: at least 30 dB
- Emissions more than 22.5 kHz away from the channel centre frequency: at least 43 + 10 log (carrier power in watts) dB

Test method: The audio signal input was set to 16 mV rms (= FM deviation max). For different input frequencies the fundamental frequency was plotted.

Test set-up:

Remarks: *For frequencies over 22.5 kHz off the centre frequency and power levels below 50 mW, the formula given above produces values below 30 dB. Therefore, 30 dB is applied for all frequencies over 12.5 kHz off the centre frequency.*

Test equipment:

Spectrum analyser	☐ 88-14	☐ 90-26	☐ 94-24	☒ 02-06	☐ 03-45	☐ 03-57
RF communication test set	☒ HP8920B (Phonak)					
Oscilloscope numérique	☐ 90-14 ☐ 05-22	☐ 93-85 ☐ 05-28	☐ 93-86	☐ 01-20	☐ 04-06	☐ 04-50
Signal generator	☒ 07-25 (UPL)					
Power supply	☒ 04-31					
Power divider	☒ 6 dB					

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

Measurement Type :	Power Interference
Port :	Temporary antenna connector
Clamp position :	

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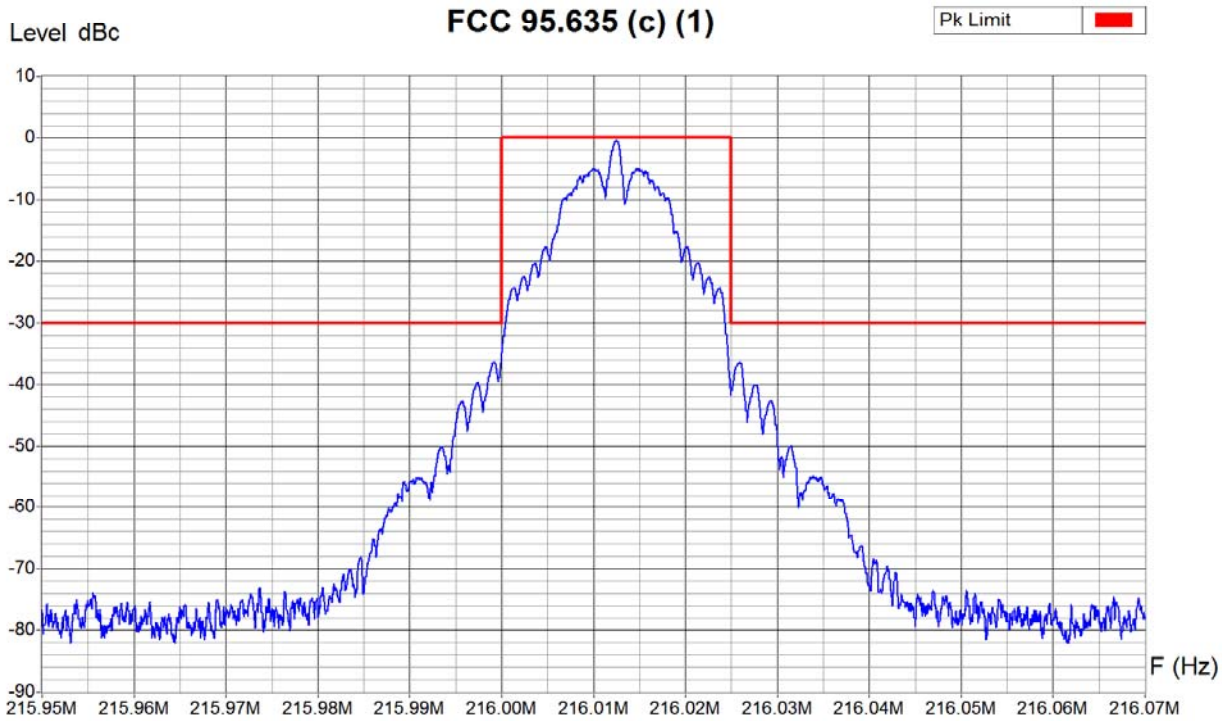
Equipment Under Test :	SmartLink+
Set-Up :	
Operating Conditions :	Tx = 216.0125 MHz; Audio level on channels in parallel = 16mV rms
Remarks :	Audio frequency sweep 1kHz - 8kHz; Spacing = log; nb points = 100;



Zone	215.95 MHz -
Video Bandwidth	1 KHz
Resol Bandwidth	1 KHz

Operator: E. Staub
Date/Time: 27.04.2009 10:21
Filename:
20098690_FCC95_FCC95_BW_000.png/.txt

6.5 Field strength of spurious radiation

6.5.1 Spurious emissions (radiated – 30 MHz to 1000 MHz)

Standard: United States: 47 CFR "Code of Federal Regulations" – Telecommunication
☒ FCC Part 2, Subpart J: Certification: §2.1053
☒ FCC Part 2: §2.1047 (Frequency range: up to tenth harmonic or 40 GHz)
☒ FCC Part 95, Subpart E: Technical regulations: §95.635(c)(1)

Distance: ☐ 30 m ☐ 10 m ☒ 3 m ☐ .....

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

Position of EUT: *1.5 m, antenna stretched vertically* (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 antenna is moved from 1 to 4 m in height. 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.

Test set-up:

Remarks: *Except the carrier frequencies, the emissions are < –30 dBc.*

Test equipment:

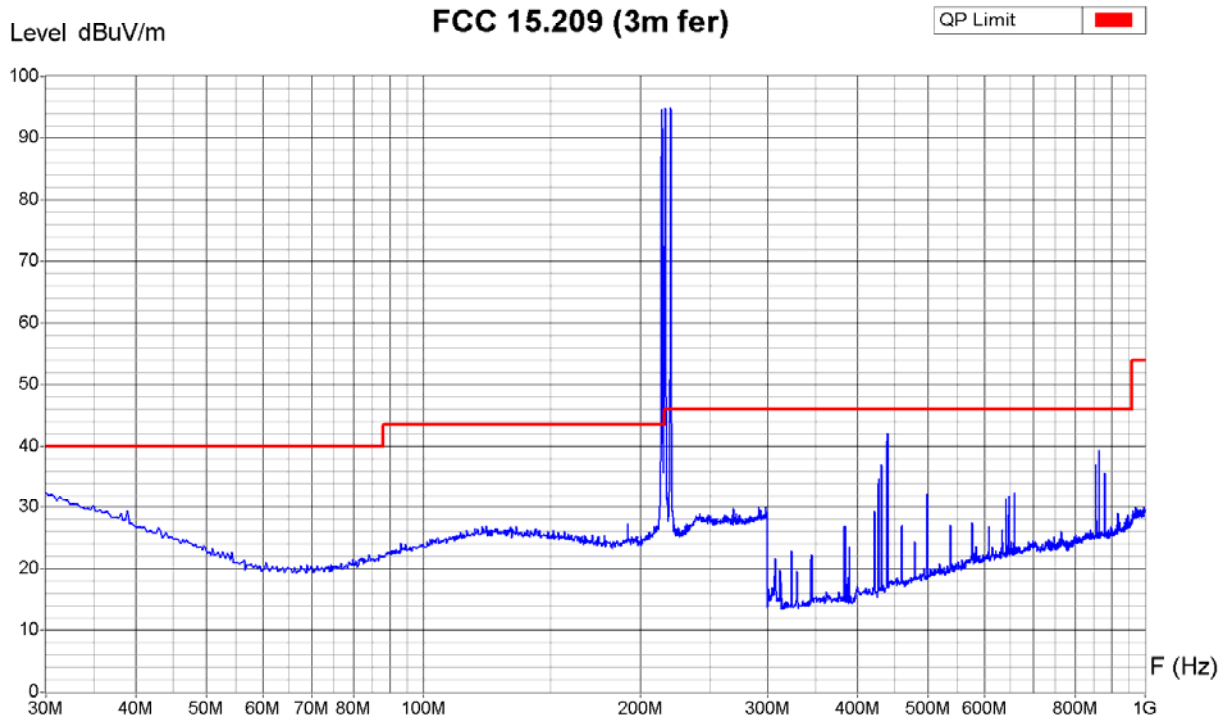
Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☒ 03-45	☐ 05-39	☐ 07-53
Receiver	☐ 85-04	☐ 90-43	☐ 94-35	☐ 04-29		
Preamplifier	☐ 90-01	☐ 95-86	☐ 05-56	☒ 05-59	☐ 05-62	☐ 05-87
Antenna (bilog)	☒ 94-03	☐ 05-38	☐			
Cables	☐ 06-00	☒ 06-01	☐			

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

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

montena
montena emc sa

Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, charger
Operating Conditions :	f = 214 MHz, 216.0125 MHz and 219.975 MHz; modulated
Remarks :	With phonak high-pass filter for f > 300 MHz



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

E. Staub
14.04.09 14:07
20098690_FCC95_er
Tx_003h.png/.txt

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

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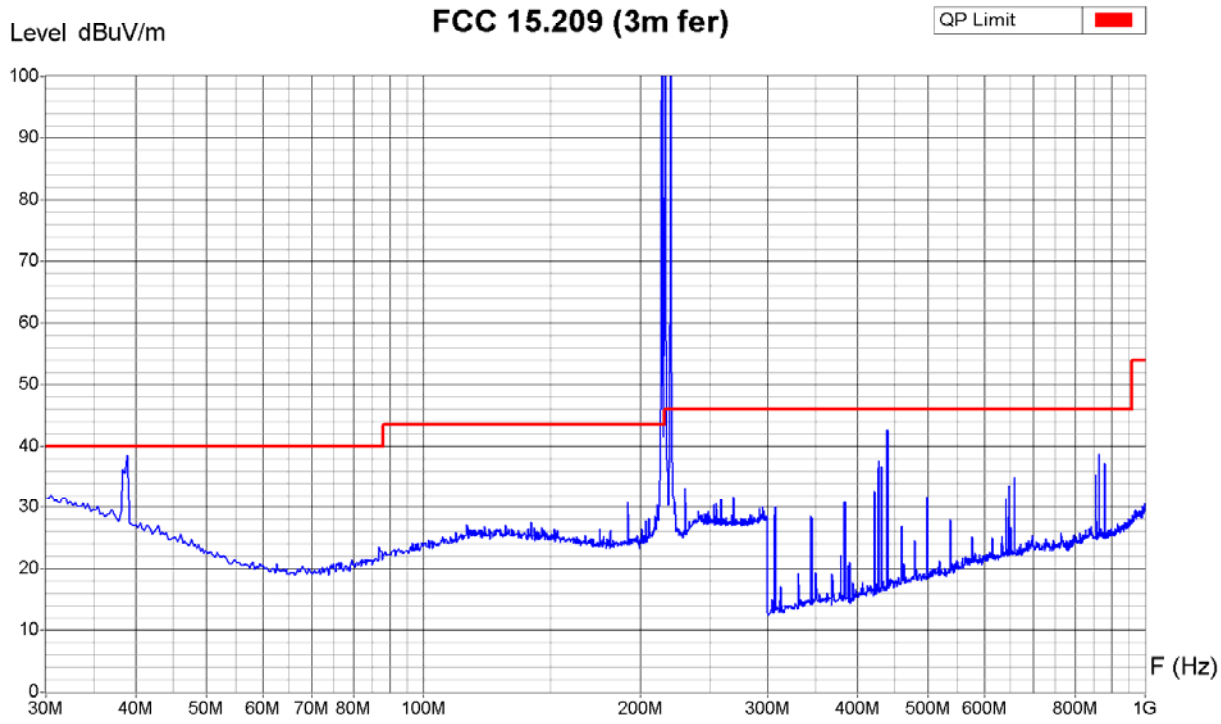
montena emc sa

Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, charger
Operating Conditions :	f = 214 MHz, 216.0125 MHz and 219.975 MHz; modulated
Remarks :	With phonak high-pass filter for f > 300 MHz



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

E. Staub
14.04.09 14:32
20098690_FCC95_er
Tx_003v.png/.txt

6.5.2 Spurious emissions (radiated – 1 GHz to 2.6 GHz)

Standard: United States: 47 CFR "Code of Federal Regulations" – Telecommunication
☒ FCC Part 2, Subpart J: Certification: §2.1053
☒ FCC Part 2: §2.1047 (Frequency range: up to tenth harmonic or 40 GHz)
☒ FCC Part 95, Subpart E: Technical regulations: §95.635(c)(1)

Distance: ☐ 30 m ☐ 10 m ☐ 3 m ☒ 1 m

Test site: ☒ anechoic chamber (foam) ☐ shielded room
☐ anechoic chamber (ferrites) ☐ .....

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

Meas. uncertainty: ± 4.7 dB

Test method: 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.

Test set-up:

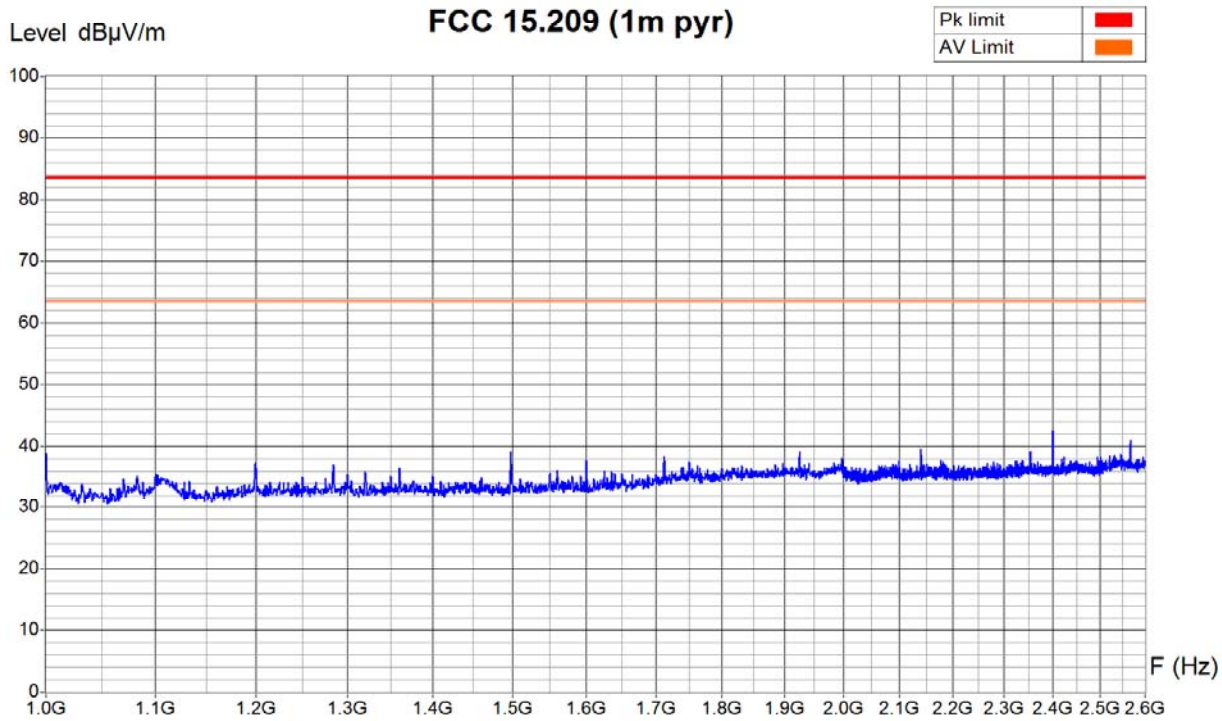
Test equipment:

Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Preamplifier	☐ 92-39	☐ 95-86	☐ 97-08	☐ 05-56	☒ 05-87	
Antenna (horn)	☒ 90-24	☐ 98-10	☐ 98-12	☐ 07-31	☐	
Cables	☒ Succoflex 1m (67688/4) + 0.5m (7833/4)					

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

Measurement Type :	Radiated Field
Polarisation :	Horizontal
Table Angle :	0 - 360°
Antenna Height :	1.5m
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, USB
Operating Conditions :	f = 214.0MHz; modulated
Remarks :	

montena
montena emc sa

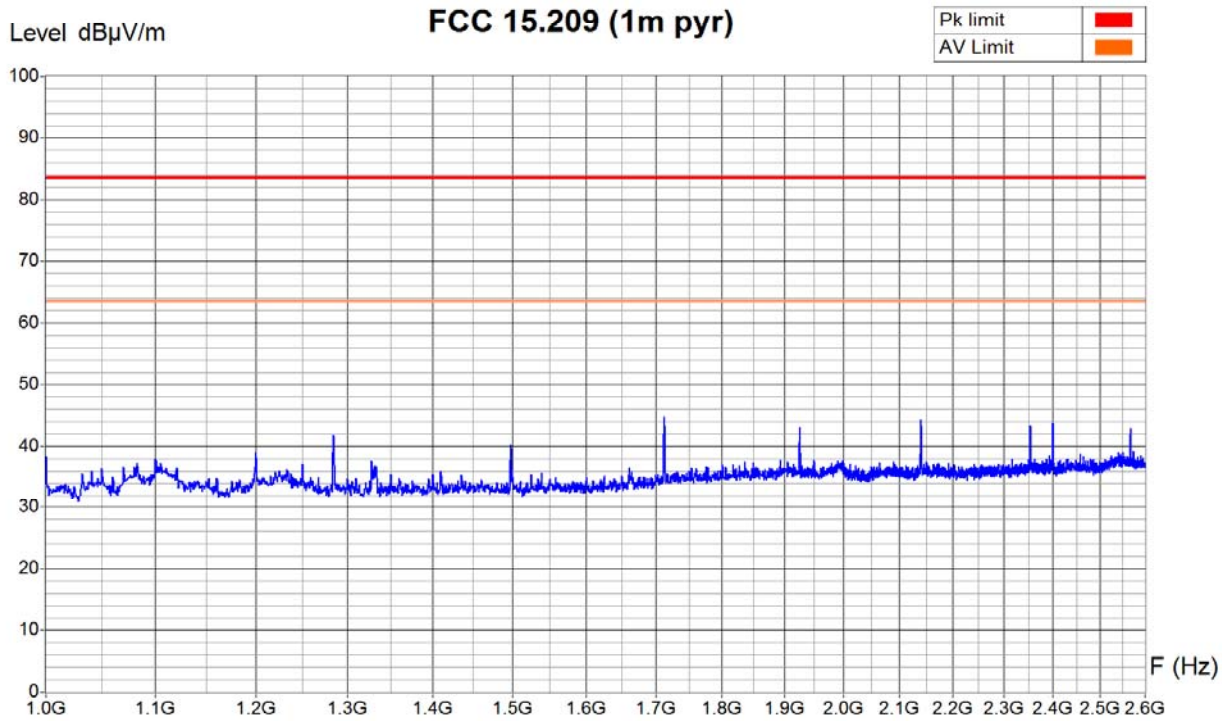


Zone	1 GHz - 2 GHz	2 GHz - 2.60 GHz
Video Bandwidth	1 MHz	1 MHz
Resol Bandwidth	1 MHz	1 MHz

Operator: E. Staub
Date/Time: 31.03.2009 13:18
Filename:
20098690_FCC95_er
Tx_000h.png/.txt

Measurement Type :	Radiated Field
Polarisation :	Vertical
Table Angle :	0 - 360°
Antenna Height :	1.5m
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, USB
Operating Conditions :	f = 214.0MHz; modulated
Remarks :	

montena
montena emc sa

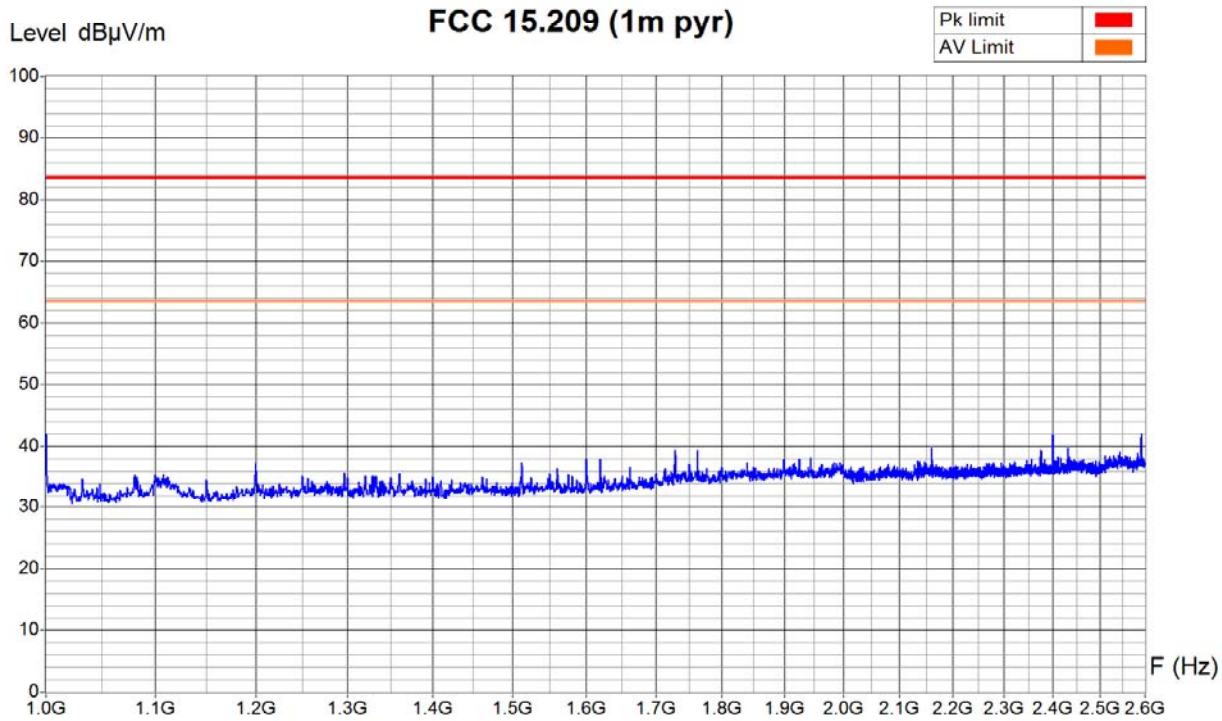


Zone	1 GHz - 2 GHz	2 GHz - 2.60 GHz
Video Bandwidth	1 MHz	1 MHz
Resol Bandwidth	1 MHz	1 MHz

Operator: E. Staub
Date/Time: 31.03.2009 13:13
Filename:
20098690_FCC95_er
Tx_000v.png/.txt

Measurement Type :	Radiated Field
Polarisation :	Horizontal
Table Angle :	0 - 360°
Antenna Height :	1.5m
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, USB
Operating Conditions :	f = 216.0125MHz; modulated
Remarks :	

montena
montena emc sa

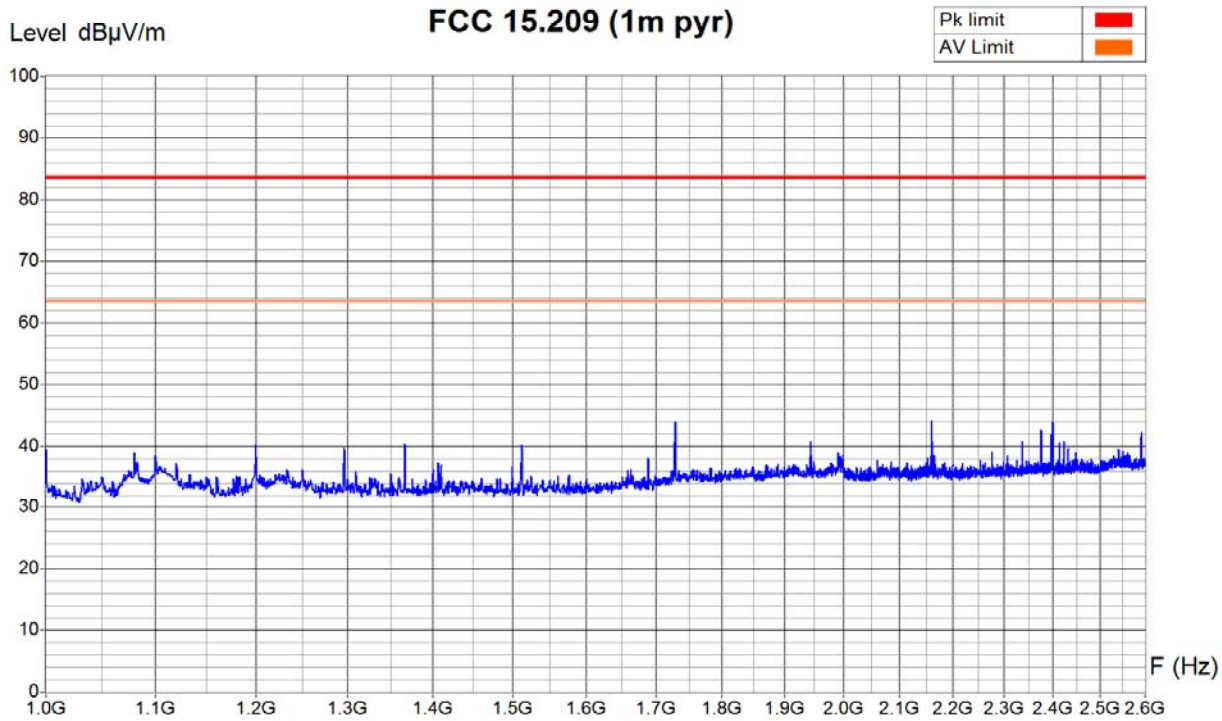


Zone	1 GHz - 2 GHz	2 GHz - 2.60 GHz
Video Bandwidth	1 MHz	1 MHz
Resol Bandwidth	1 MHz	1 MHz

Operator: E. Staub
Date/Time: 31.03.2009 13:36
Filename:
20098690_FCC95_er
Tx_001h.png/.txt

Measurement Type :	Radiated Field
Polarisation :	Vertical
Table Angle :	0 - 360°
Antenna Height :	1.5m
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, USB
Operating Conditions :	f = 216.0125MHz; modulated
Remarks :	

montena
montena emc sa

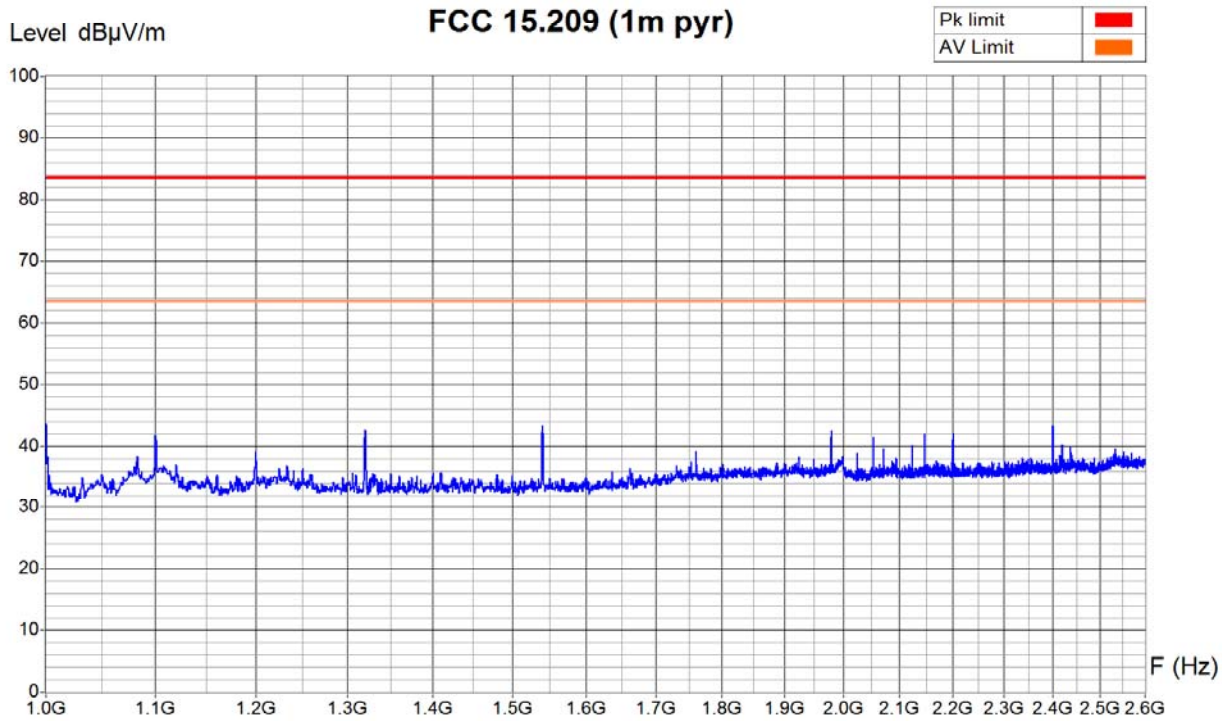


Zone	1 GHz - 2 GHz	2 GHz - 2.60 GHz
Video Bandwidth	1 MHz	1 MHz
Resol Bandwidth	1 MHz	1 MHz

Operator: E. Staub
Date/Time: 31.03.2009 13:39
Filename:
20098690_FCC95_er
Tx_001v.png/.txt

Measurement Type :	Radiated Field
Polarisation :	Horizontal
Table Angle :	0 - 360°
Antenna Height :	1.5m
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, USB
Operating Conditions :	f = 219.975MHz; modulated
Remarks :	

montena
montena emc sa

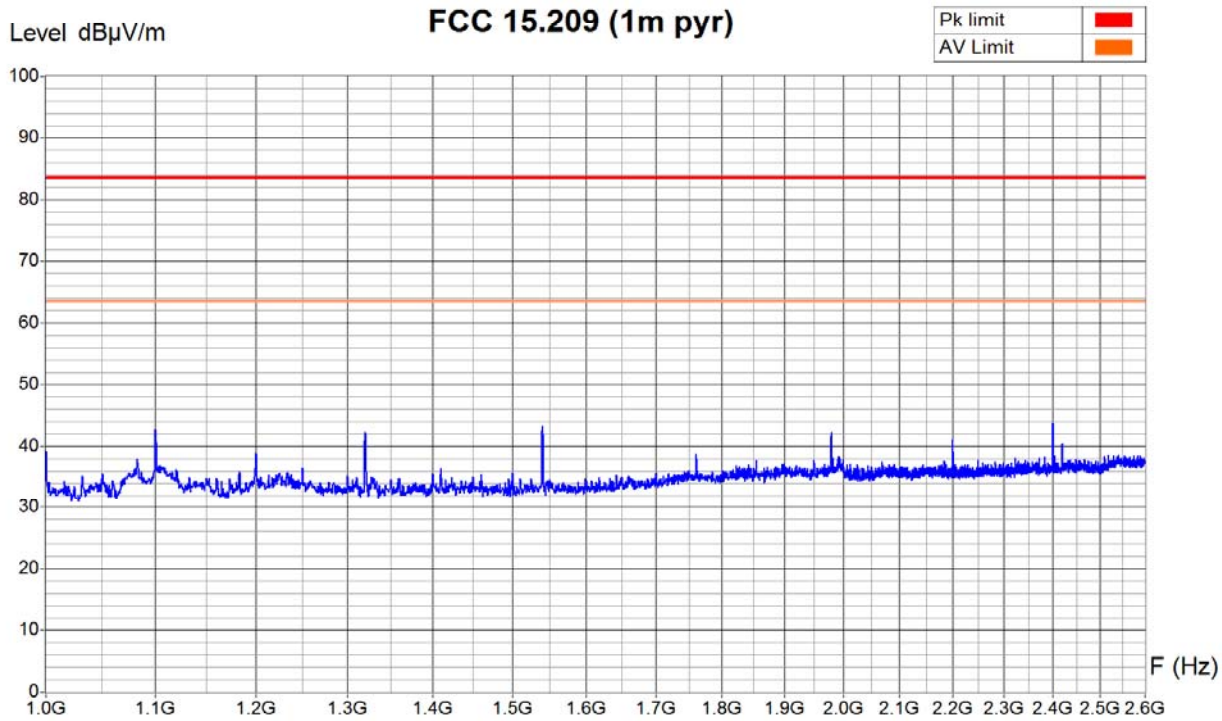


Zone	1 GHz - 2 GHz	2 GHz - 2.60 GHz
Video Bandwidth	1 MHz	1 MHz
Resol Bandwidth	1 MHz	1 MHz

Operator: E. Staub
Date/Time: 31.03.2009 13:47
Filename:
20098690_FCC95_er
Tx_002h.png/.txt

Measurement Type :	Radiated Field
Polarisation :	Vertical
Table Angle :	0 - 360°
Antenna Height :	1.5m
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, USB
Operating Conditions :	f = 219.975MHz; modulated
Remarks :	

montena
montena emc sa



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

Operator: E. Staub
Date/Time: 31.03.2009 13:43
Filename:
20098690_FCC95_er
Tx_002v.png/.txt

6.6 Frequency and power level stability

Standard: United States: 47 CFR "Code of Federal Regulations" – Telecommunication
☒ FCC Part 2, Subpart J: Certification: §2.1055
☒ FCC Part 95, Subpart E: Technical regulations: §95.629(d)(2)
☒ FCC Part 95, Subpart E: Technical regulations: §95.639(e)
Limit for LPRS = 100 mW = 20 dBm

Test site:

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

Test method: Measurement of the frequency and the power level at the antenna connector or at the test fixture.

Test set-up:

Remarks:	- - -

Test equipment:

Spectrum analyser	☐ 88-14	☐ 94-24	☒ 02-06	☐ 03-45	☐ 05-39	☐ 07-53
Multimeter	☐ 89-07	☒ 90-15	☐ 92-25	☐ 94-51	☐ 02-03	☐ 03-22
	☐ 04-47	☐ 04-104	☐ 04-105	☐		
Temperature chamber	☒ 06-66					
Temperature probe	☒ 91-11	☐ 03-05	☐ 05-34			
Attenuator	☒ 05-81					
Variable transformer	☐ 75-04	☐ ……				
Power supply	☐ 99-04	☒ 04-31				
Cables	☒ RG 223 2m					

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

Results of the test

Client: *Phonak Communications SA*

Apparatus: *SmartLink+*

Operating mode: *Normal operation without audio input signal*

Cables connected to the EUT:
- *DC supply*
- *Temporary antenna cable*

Remarks:
- *Measured on temporary antenna connector*
- *RBW = VBW = 3kHz; Span = 100 kHz; ST = 80 ms; RefLev = 10 dBm; Detector = Peak; Trace mode = Peak hold; Nb points = 8001*
- *Temperature chamber switched off during measurement to avoid acoustic coupling to microphones*

Variation of the temperature (measured at nominal supply voltage)

Requirement:
∆f < 50 ppm and P < 100 mW (20 dBm) with temperature varied from –30° to + 50° in steps of 10 degrees.

Reference value:

Temp [°C]	Frequency [MHz]	Error [ppm]	Limit [ppm]	P [dBm]	P ERP [dbm]	Limit [dBm]	Remarks
23.8	*216.012500*	*- - -*	*- - -*	*6.62*	*7.74*	*20*	*See §6.2*

Temp [°C]	Frequency [MHz]	Error [ppm]	Limit [ppm]	P [dBm]	P ERP [dbm]	Limit [dBm]	Remarks	Pass Yes	Pass No
-30	*216.012637*	*-0.6*	*50*	*5.41*	*6.52*	*20*	*- - -*	☒	☐
-20	*216.012337*	*0.8*	*50*	*5.60*	*6.72*	*20*	*- - -*	☒	☐
-10	*216.012412*	*0.4*	*50*	*5.93*	*7.05*	*20*	*- - -*	☒	☐
0	*216.012500*	*0.0*	*50*	*6.23*	*7.35*	*20*	*- - -*	☒	☐
10	*216.012475*	*0.1*	*50*	*6.35*	*7.47*	*20*	*- - -*	☒	☐
30	*216.012475*	*0.1*	*50*	*6.61*	*7.73*	*20*	*- - -*	☒	☐
40	*216.012525*	*-0.1*	*50*	*6.64*	*7.76*	*20*	*- - -*	☒	☐
50	*216.012412*	*0.4*	*50*	*6.72*	*7.83*	*20*	*- - -*	☒	☐

Variation of the supply voltage (measured at ambient temperature)

Requirement:
∆f < 50 ppm and P < 100 mW (20 dBm) with supply voltage varied from 85% to 115%

Reference value:

Volt [%]	Volt [V]	Frequency [MHz]	Error [ppm]	Limit [ppm]	P [dBm]	P ERP [dbm]	Limit [dBm]	Remarks
100	*3.7*	*216.012500*	*- - -*	*- - -*	*6.63*	*7.74*	*20*	*See §6.2*

Volt [%]	Volt [V]	Frequency [MHz]	Error [ppm]	Limit [ppm]	P [dBm]	P ERP [dbm]	Limit [dBm]	Remarks	Pass Yes	Pass No
85	*3.145*	*216.012462*	*0.2*	*50*	*6.62*	*7.73*	*20*	*- - -*	☒	☐
115	*4.255*	*216.012487*	*0.1*	*50*	*6.60*	*7.71*	*20*	*- - -*	☒	☐

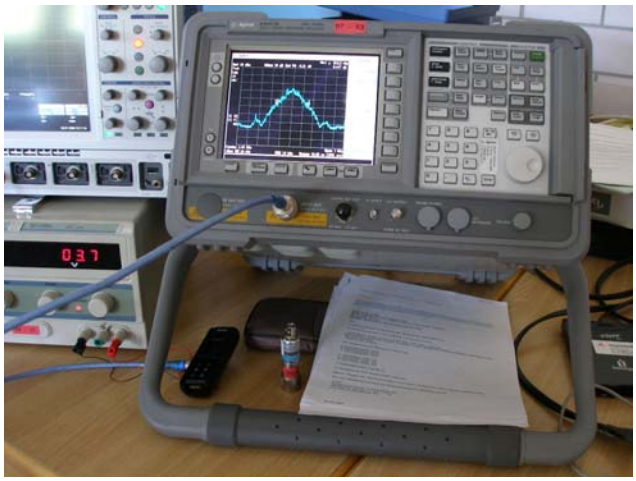
Date of test: *April 24, 2009*
Operator: *Erich Staub*

7. 47 CFR 15.247

7.1 Channel 20dB-bandwidth

Introduction:	Channel-bandwidth measured at -20 dBc.	
Test site:	☐ anechoic chamber (foam)	☐ open test site
	☐ anechoic chamber (ferrites)	☒ laboratory
Meas. uncertainty:	9kHz – 3GHz:	± 1 dB
	3GHz – 6.7GHz:	± 2.1 dB
	6.7GHz – 13.2GHz:	± 2.6 dB
	13.2GHz – 19GHz:	± 2.8 dB
	19GHz – 26.5GHz:	± 3 dB
Method:	Measurement of the conducted power on the antenna connector or a test fixture.	
Limit:	- - -	

Test set-up:



Remarks:	- - -

Test equipment:

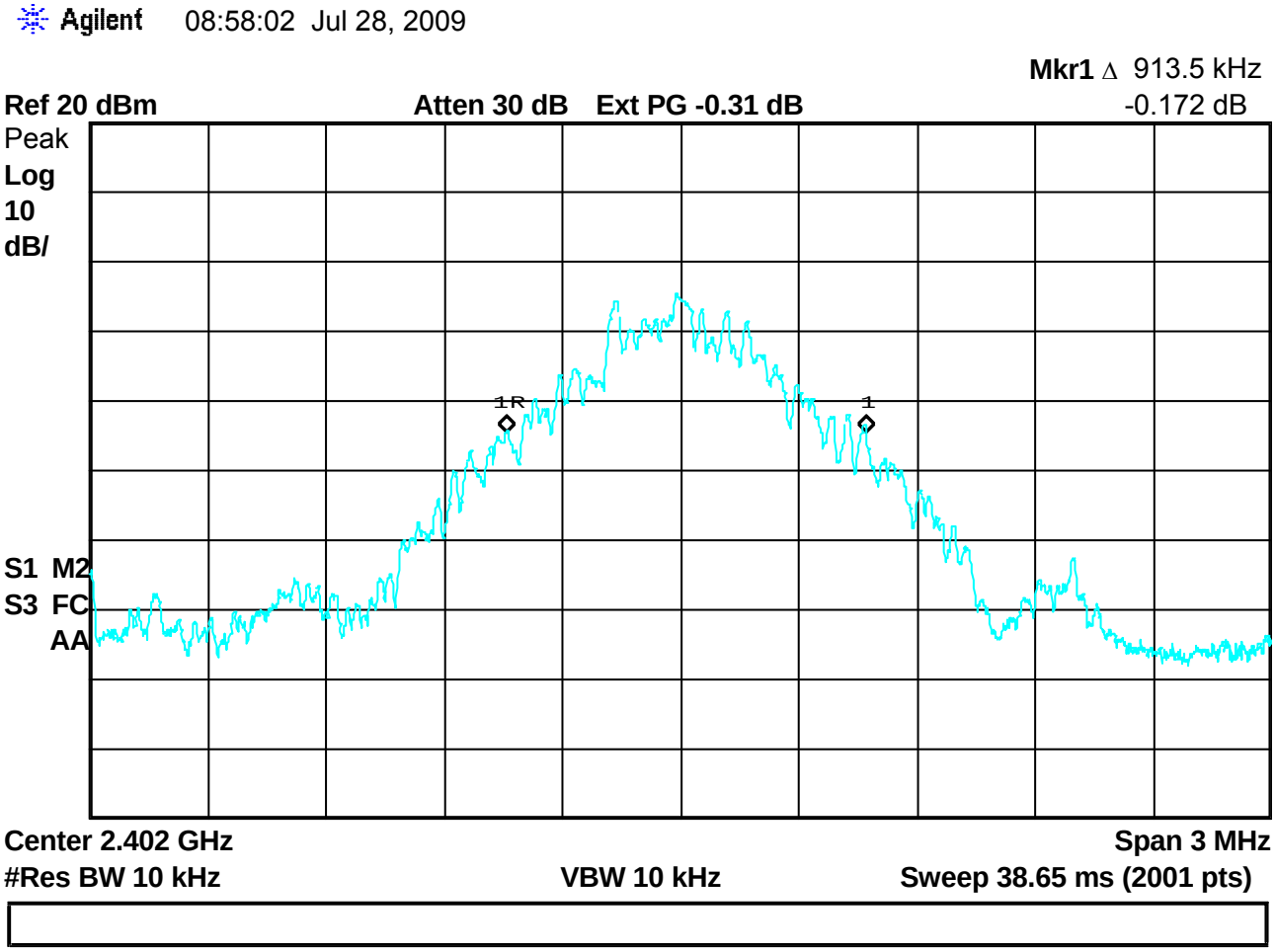
Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Cables	☒ Succoflex 1m (8407/4)					
Power supply	☒ 04-31					

Results of the test

Client:	*Phonak Communications SA*
Apparatus:	*SmartLink+*
Operating mode:	• *Single frequency* • *Modulated*
Cables connected to the EUT:	• *DC supply* • *Temporary antenna cable*
Remarks:	• *Measured on temporary antenna connector*

frequency [GHz]	20 dB bandwidth [kHz]	Remarks
2.402000	*913.5*	*- - -*
2.441000	*913.5*	*- - -*
2.480000	*916.5*	*- - -*

Example of measurement at 2.402 GHz

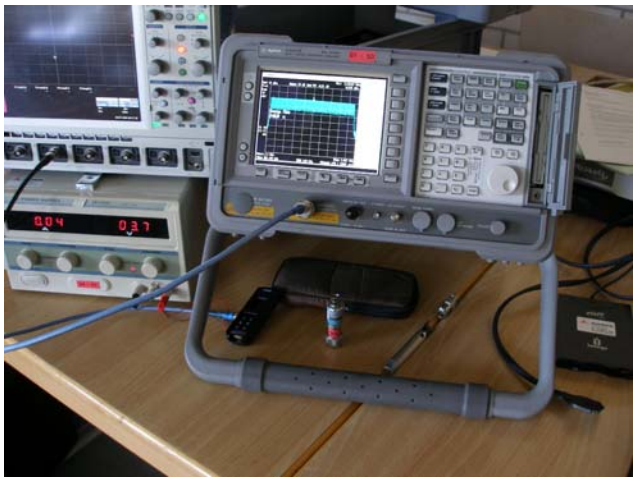


Date of test: *July 28, 2009*
Operator: *Erich Staub*

7.2 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	

Test set-up:



Remarks:	- - -

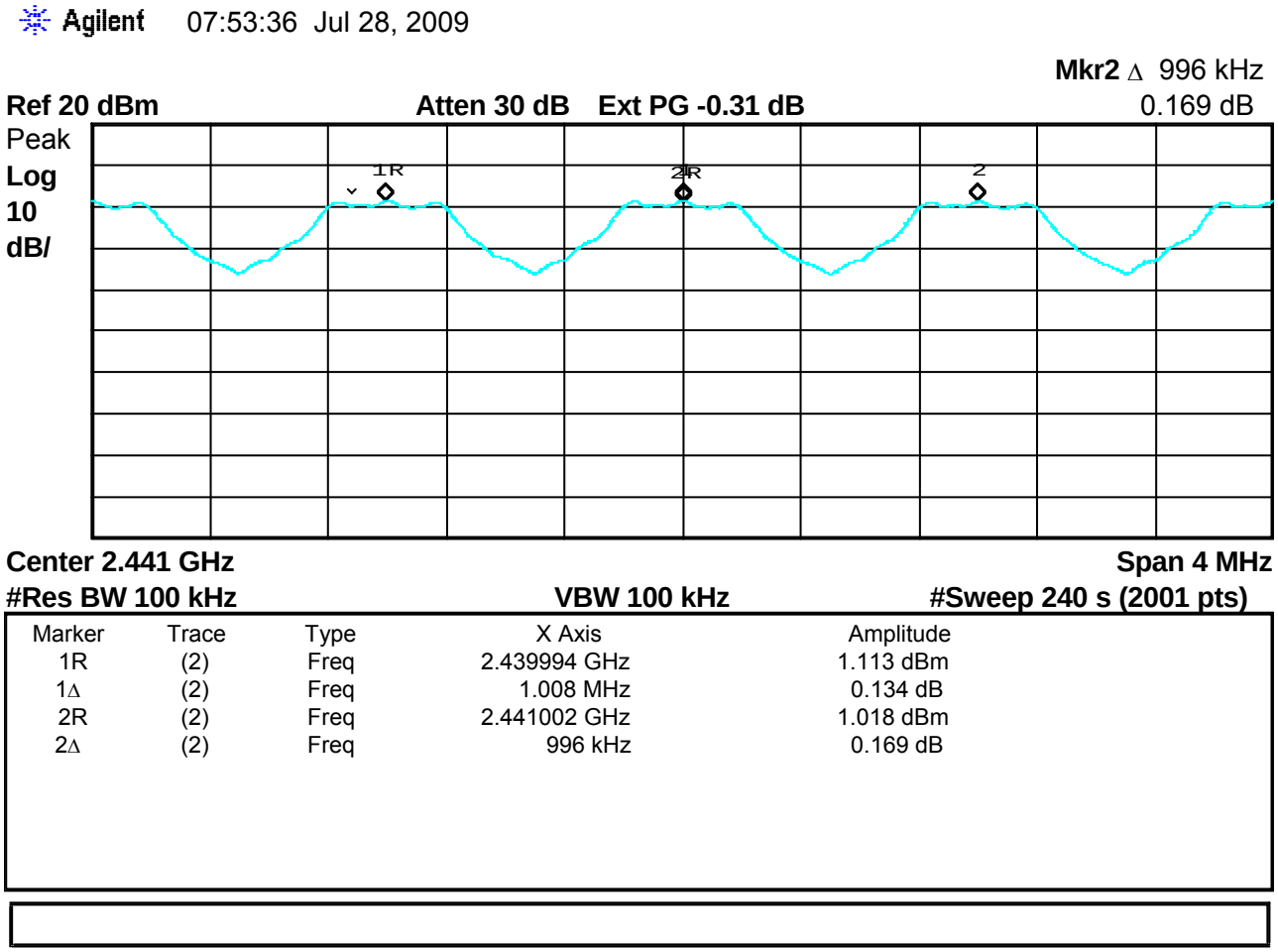
Test equipment:

Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Cables	☒ Succoflex 1m (8407/4)					
Power supply	☒ 04-31					

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

Results of the test

Client:	*Phonak Communications SA*
Apparatus:	*SmartLink+*
Operating mode:	• *Continuously hopping*
Cables connected to the EUT:	• *DC supply* • *Temporary antenna cable*
Remarks:	• *Measured on temporary antenna connector*



Marker	Trace	Type	X Axis	Amplitude
1R	(2)	Freq	2.439994 GHz	1.113 dBm
1Δ	(2)	Freq	1.008 MHz	0.134 dB
2R	(2)	Freq	2.441002 GHz	1.018 dBm
2Δ	(2)	Freq	996 kHz	0.169 dB

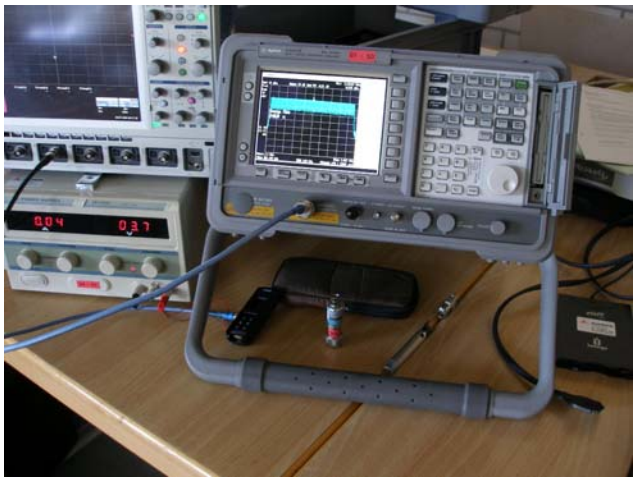
Carrier frequency separation = 1 MHz

Date of test: *July 28 2009*
Operator: *Erich Staub*

7.3 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:	- - -

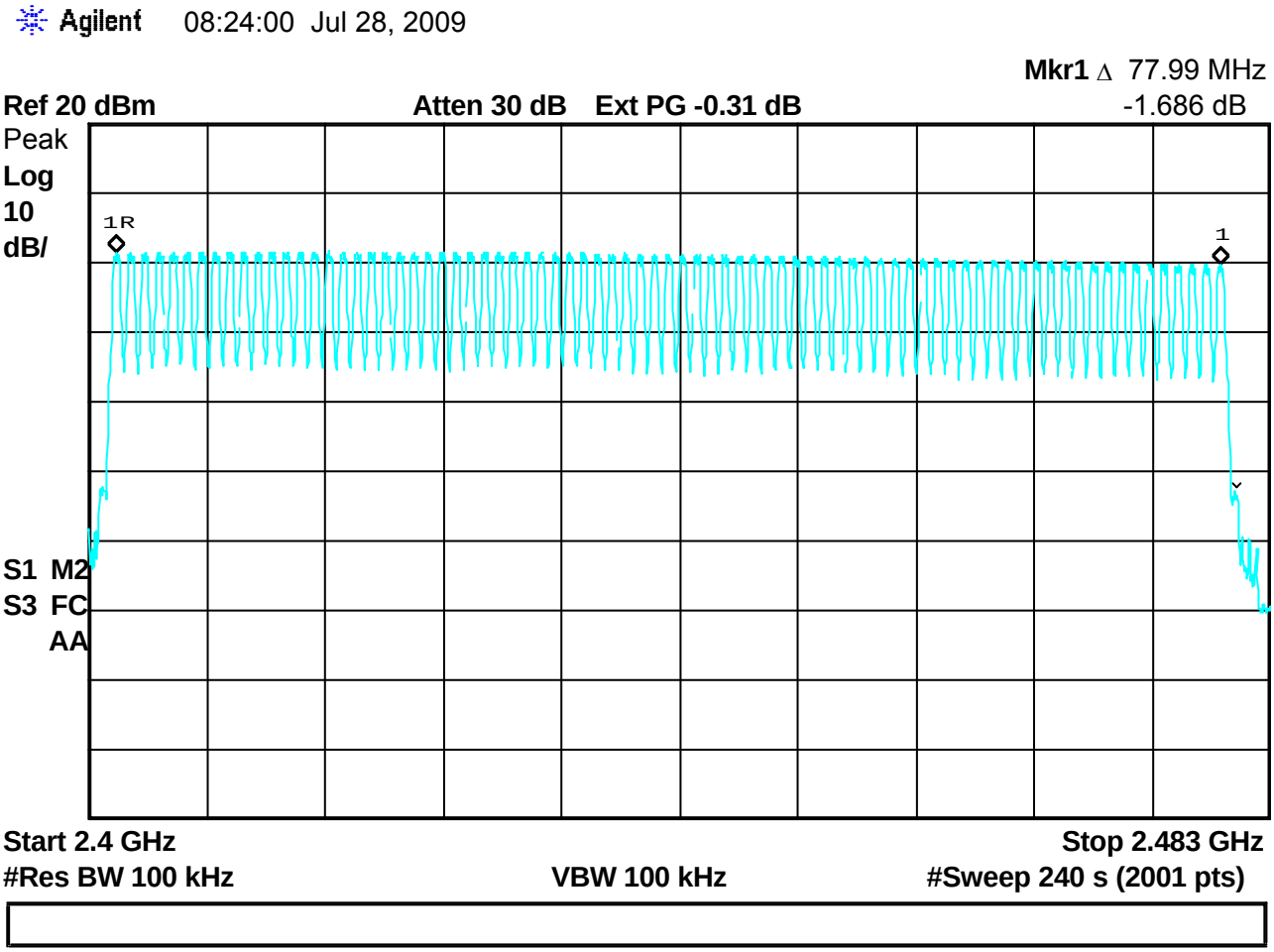
Test equipment:

Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Cables	☒ Succoflex 1m (8407/4)					
Power supply	☒ 04-31					

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

Results of the test

Client:	*Phonak Communications SA*
Apparatus:	*SmartLink+*
Operating mode:	• *Continuously hopping*
Cables connected to the EUT:	• *DC supply* • *Temporary antenna cable*
Remarks:	• *Measured on temporary antenna connector*



Number of hopping channels = 79

Date of test: *July 28, 2009*
Operator: *Erich Staub*

7.4 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: According to the bluetooth core specification V 3.0, all bluetooth devices comply to the following:

Within a 31.6 second period (= number of hopping channels * 0.4 s = 79 * 0.4 s) in data mode, the dwell time of 0.4 s is independent from the packet type (packet length).

The calculation for a 31.6 second period is as follows:

Dwell time = time slot length * hop rate / number of hopping channels *31.6 s

Example for a DH1 packet (with a maximum length of one time slot)

Dwell time = 625 µs * 1600 1/s / 79 * 31.6 s = 0.4s (in a 31.6 s period)

For multi-slot packet the hopping is reduced according to the length of the packet.
Example for a DH5 packet (with a maximum length of five time slots)

Dwell time = 5 * 625 µs * 1600 * 1/5 *1/s / 79 * 31.6 s = 0.4 s (in a 31.6 s period)

Bluetooth devices comply with the FCC dwell time requirement in the data mode by definition.

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

7.5 Maximum output power (conducted)

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

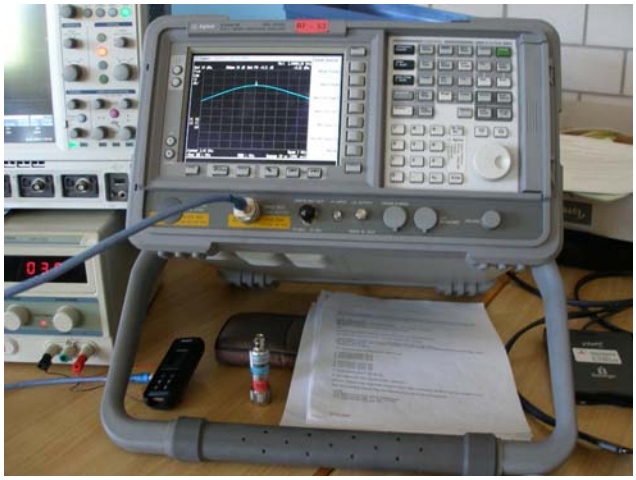
Meas. uncertainty:

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 1 Watt (= 30 dBm).

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	☒ 04-31					

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

Results of the test

Client: *Phonak Communications SA*

Apparatus: *SmartLink+*

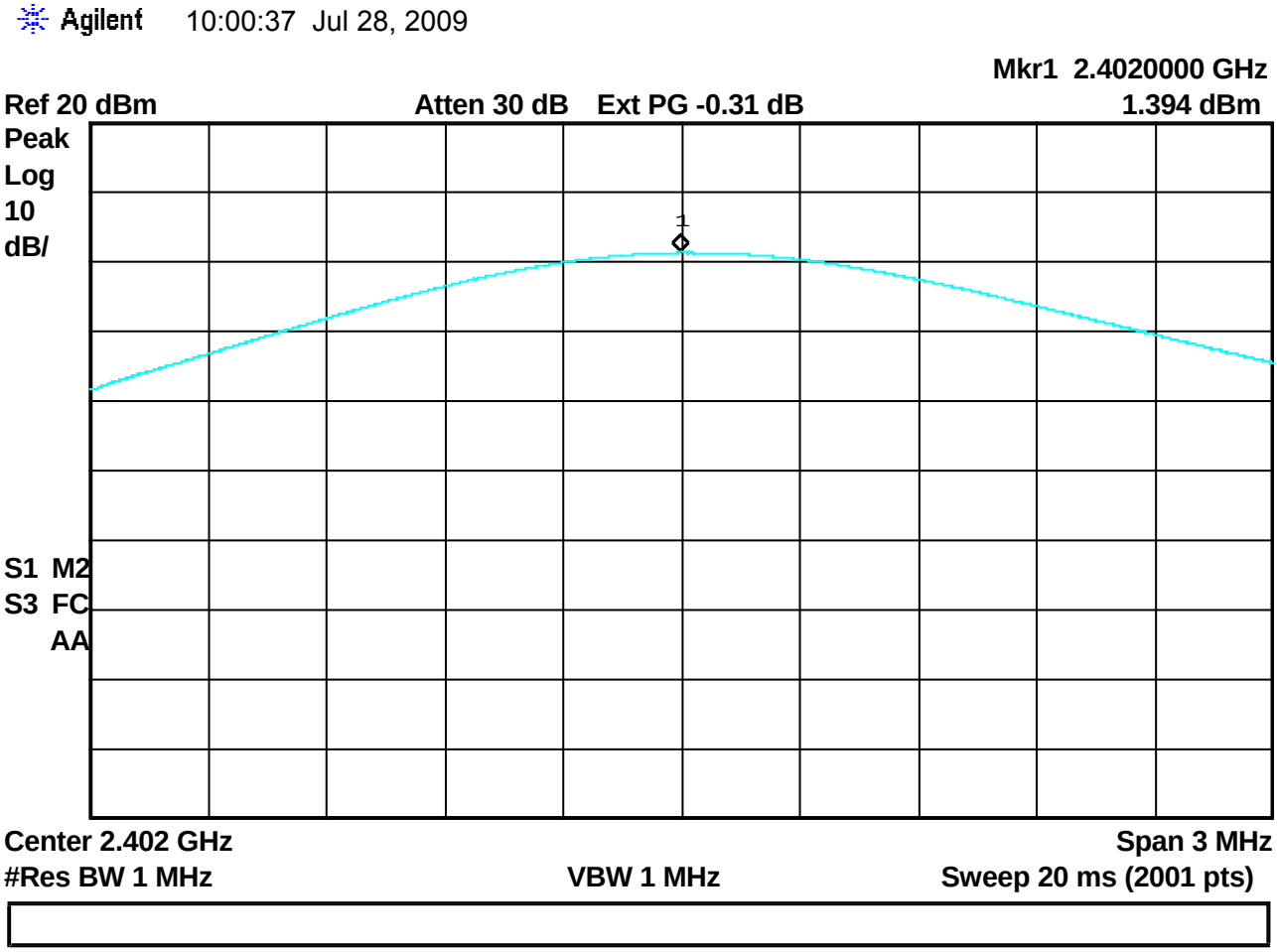
Operating mode:
- *Single frequency*
- *Unmodulated*

Cables connected to the EUT:
- *DC supply*
- *Temporary antenna cable*

Remarks:
- *Measured on temporary antenna connector*

f normal [GHz]	Temp [°C]	U [V]	P [dBm]	Limit [dBm]	Remarks	Pass Yes	Pass No
2.402	*23.6*	*3.7*	*1.39*	*30*	- - -	☒	☐
2.441	*23.6*	*3.7*	*1.17*	*30*	- - -	☒	☐
2.480	*23.6*	*3.7*	*-0.29*	*30*	- - -	☒	☐

Example of measurement at 2.402 GHz



Date of test: *July 28, 2009*
Operator: *Erich Staub*

7.6 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:	*1.5 m* (height of the equipment under test above floor)
Meas. uncertainty:	± 1.34 dB (f < 300 MHz) / ± 1.61 dB (f > 300 MHz)
Test method:	The electromagnetic disturbance radiated by the equipment is measured using a spectrum analyser and a wide band antenna. The ERP / EIRP values are determined replacing the EUT by a substitution antenna (dipole or other). The limits on the plots represent the equivalent field levels for the required power limits.
Limit:	Maximum 1 Watt (= 30 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	☐ .....
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 1m (67688/4)					

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

Results of the test

Client: *Phonak Communications SA*

Apparatus: *SmartLink+*

Operating mode:
- *Unmodulated*
- *Continuous emission*

Cables connected to the EUT: - - -

Remarks:
- *Centre of Tx antenna at 1.5m*
- *RBW = VBW = 1MHz; Det = Peak*

	Measurement with EUT		Power at substitution ant.		Meas. with subst. ant.	Parameters of substitution ant.		Result			Remarks
f [GHz]	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	*-36.1*	*0.0*	*0*	*0*	*-29.12*	*2.15*	*0*	*31.27*	*-4.87*	*325.84 uW*	*Vertical*
2.402	*-37.2*	*0.0*	*0*	*0*	*-28.4*	*2.15*	*0*	*30.55*	*-6.61*	*218.27 uW*	*Horizontal*
2.441	*-33.6*	*0.0*	*0*	*0*	*-29.12*	*2.15*	*0*	*31.27*	*-2.33*	*584.79 uW*	*Vertical*
2.441	*-35.9*	*0.0*	*0*	*0*	*-28.4*	*2.15*	*0*	*30.55*	*-5.32*	*293.76 uW*	*Horizontal*
2.480	*-34.0*	*0.0*	*0*	*0*	*-29.12*	*2.15*	*0*	*31.27*	*-2.76*	*529.66 uW*	*Vertical*
2.480	*-36.8*	*0.0*	*0*	*0*	*-28.4*	*2.15*	*0*	*30.55*	*-6.28*	*235.50 uW*	*Horizontal*

Date of test: *April 1, 2009*
Operator: *Erich Staub*

7.7 Antenna gain

Introduction: Determination of the antenna gain.

Method: The antenna gain is the difference of the radiated power EIRP of §7.6 and the conducted power of §7.5.

frequency [GHz]	Conducted power [dBm]	Radiated power EIRP [dBm]	Antenna gain [dBi]	Remarks
2.402000	*1.39*	*-4.87*	*-6.26*	*- - -*
2.442000	*1.17*	*-2.33*	*-3.50*	*- - -*
2.481000	*-0.29*	*-2.76*	*-2.47*	*- - -*

7.8 Power spectral density (conducted)

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

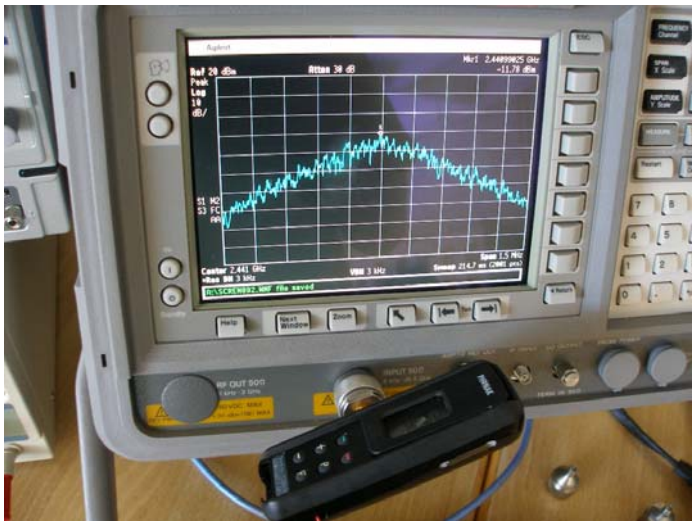
Meas. uncertainty:

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: - - -

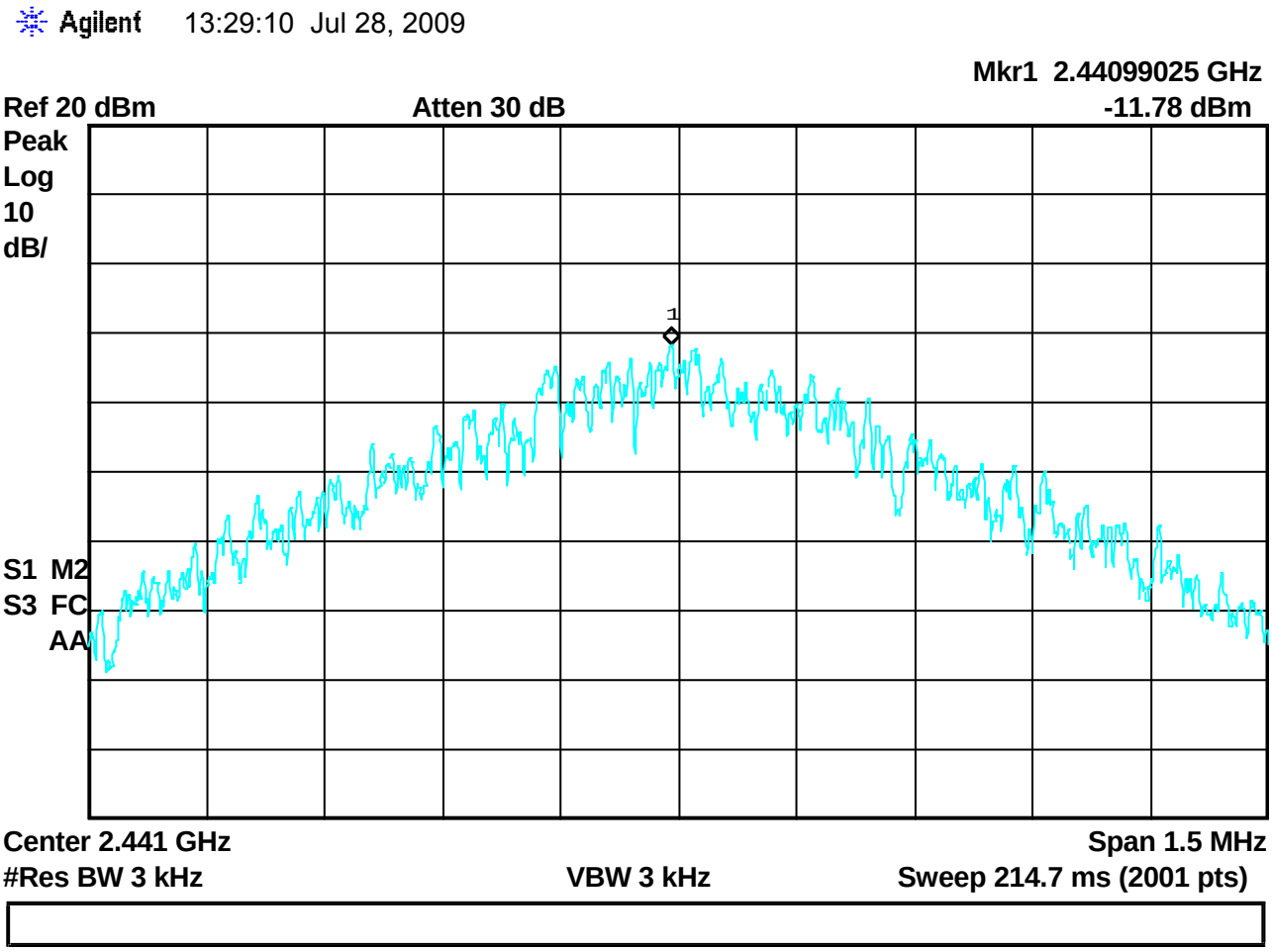
Test equipment:

Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Cables	☐ Succoflex 1m (8407/4)					
Power supply	☒ 04-31					

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

Results of the test

Client:	*Phonak Communications SA*
Apparatus:	*SmartLink+*
Operating mode:	• *Single frequency* • *Modulated*
Cables connected to the EUT:	• *DC supply* • *Temporary antenna cable*
Remarks:	• *Measured on temporary antenna connector*



Power spectral density = -11.78 dBm / 3 kHz

Date of test: *July 28, 2009*
Operator: *Erich Staub*

7.9 Band-edge emission (conducted)

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

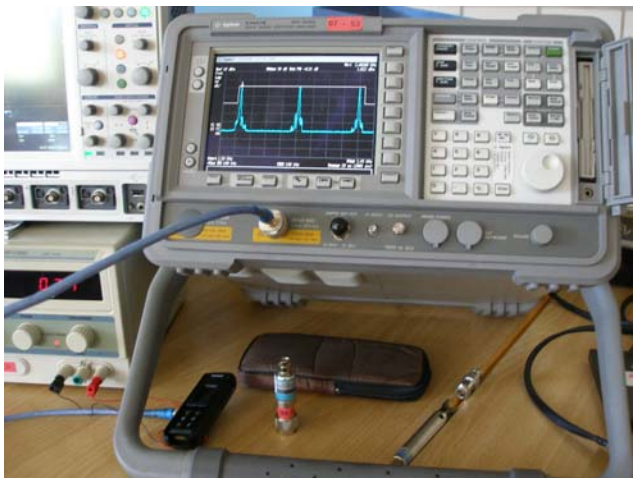
Meas. uncertainty:

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: - - -

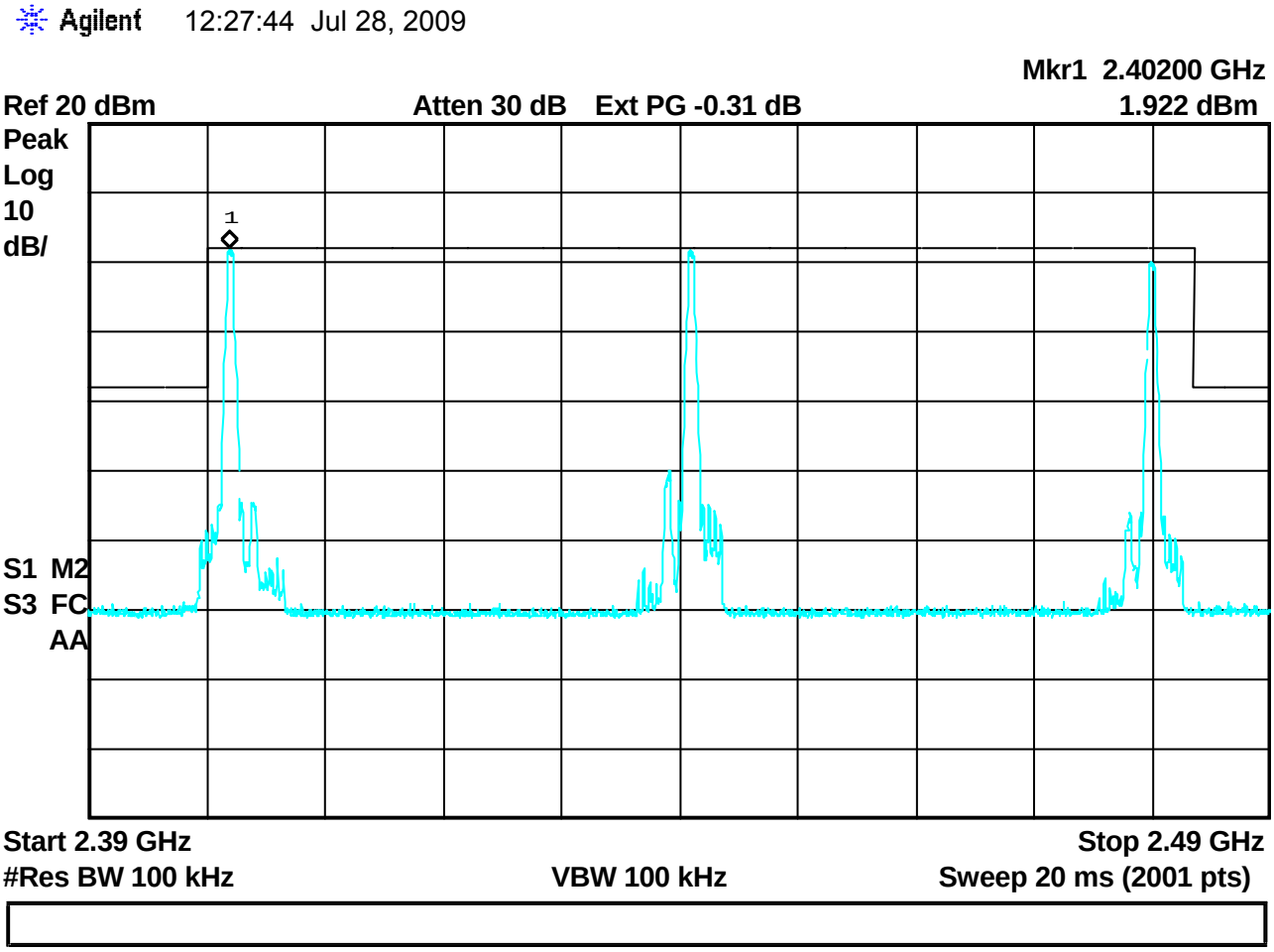
Test equipment:

Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Cables	☒ Succoflex 1m (8407/4)					
Power supply	☒ 04-31					

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

Results of the test

Client:	*Phonak Communications SA*
Apparatus:	*SmartLink+*
Operating mode:	• *Single frequency* • *Modulated*
Cables connected to the EUT:	• *DC supply* • *Temporary antenna cable*
Remarks:	• *Measured on temporary antenna connector*



Date of test: *July 28, 2009*
Operator: *Erich Staub*

7.10 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:	*1.5 m* (height above floor of equipment under test)			
Measuring method:	The carrier radiated by the equipment is measured using a spectrum analyser and a wide band antenna. The antenna is placed at the same height as the EUT successively with horizontal and vertical polarisations. The turning table is operated through 360° during the measurements. The recordings are carried out taking into account the maximum value of all the disturbances appearing while the apparatus is under test. The peak values are recorded continuously on the graph. The values exceeding a limit are remeasured manually using a receiver.			
Limit:	In any 100 kHz bandwidth outside the frequency band, the radio frequency power shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power			

Test set-up:

Remarks: *Limit values expressed in dBµV/m and transformed to a measuring distance of 1 m (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);

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

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 1m (67688/4)					

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

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

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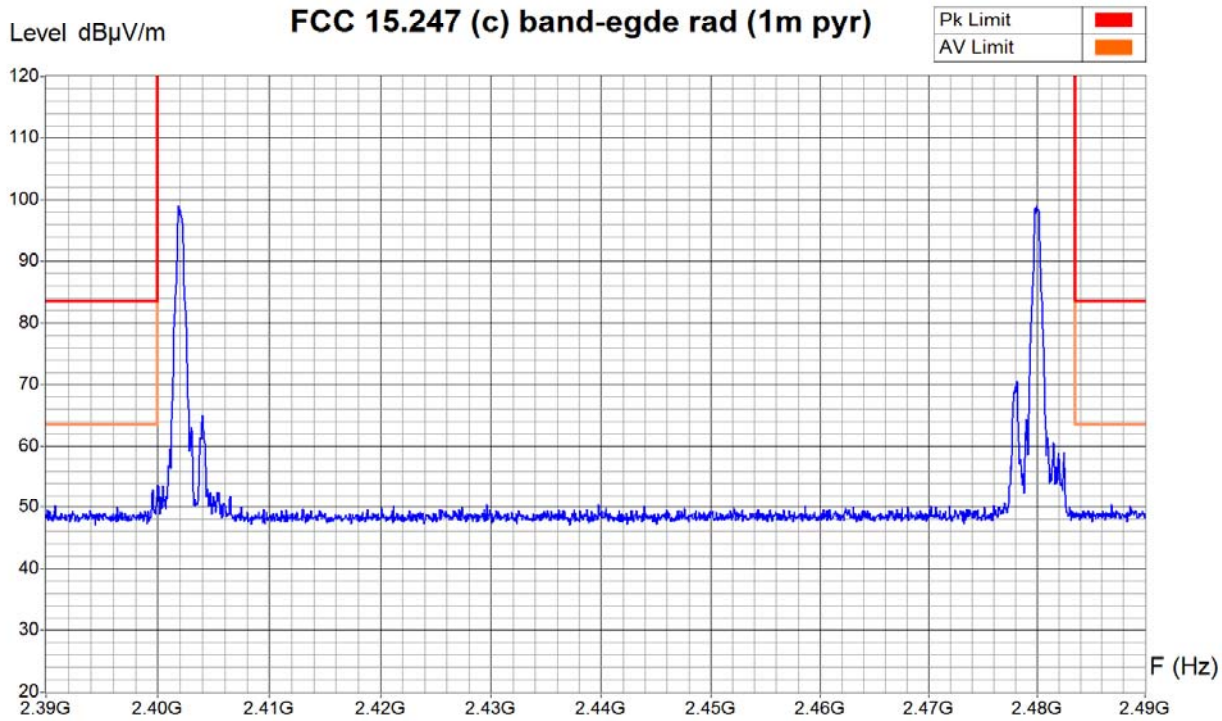
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, charger
Operating Conditions :	f = 2402 MHz and 2480 MHz (single frequencies); modulated
Remarks :	



Zone	2.39 GHz - 2.49
Video Bandwidth	100 KHz
Resol Bandwidth	100 KHz

Operator: E. Staub
Date/Time: 02.04.2009 13:27
Filename:
20098690_FCC15-249_er
Tx_000h.png/.txt

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

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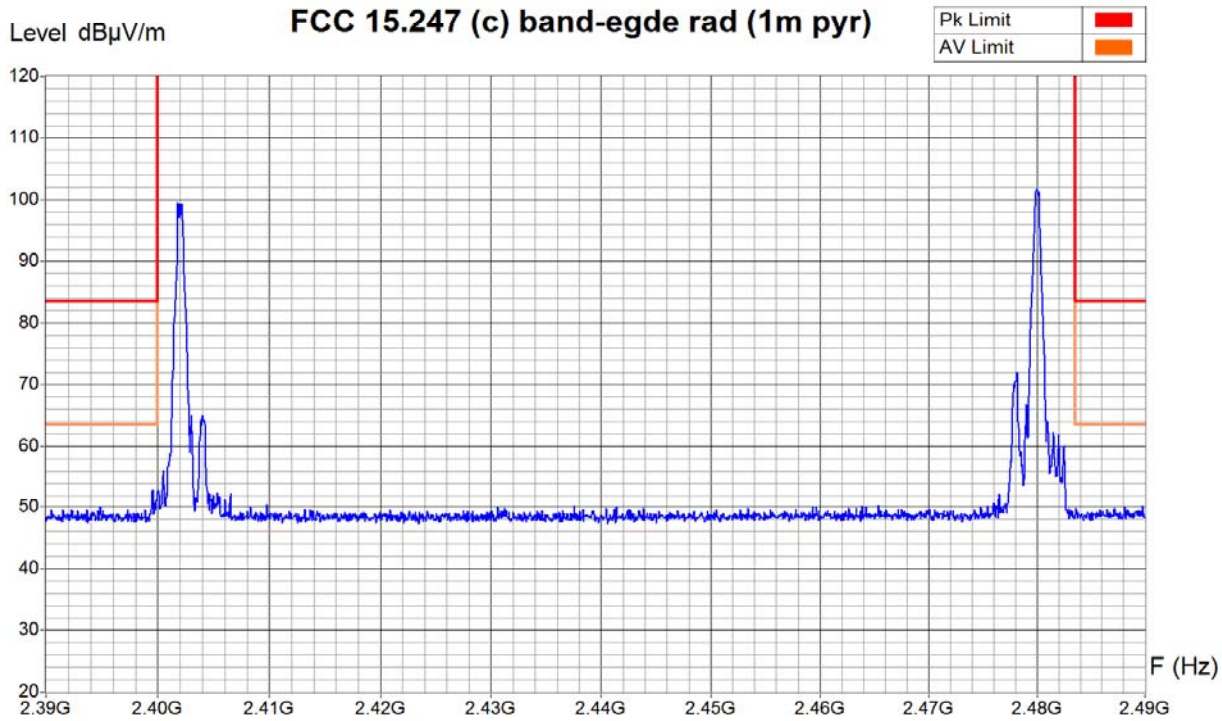
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, charger
Operating Conditions :	f = 2402 MHz and 2480 MHz (single frequencies); modulated
Remarks :	



Zone	2.39 GHz - 2.49
Video Bandwidth	100 KHz
Resol Bandwidth	100 KHz

Operator: E. Staub
Date/Time: 02.04.2009 13:35
Filename:
20098690_FCC15-249_er
Tx_000v.png/.txt

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

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

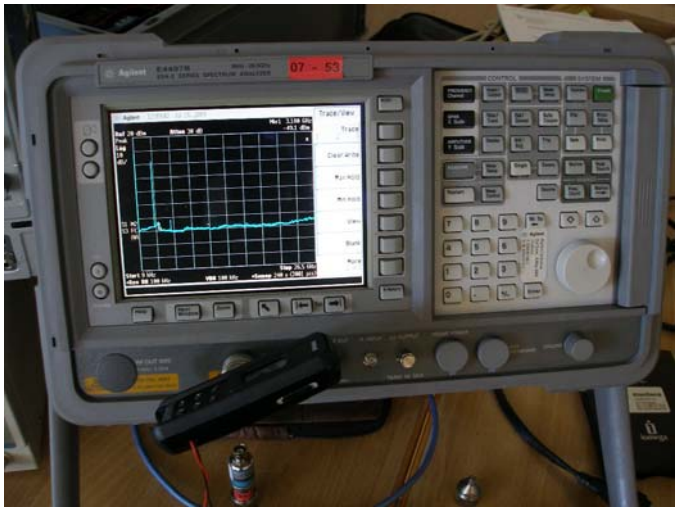
Meas. uncertainty:

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:

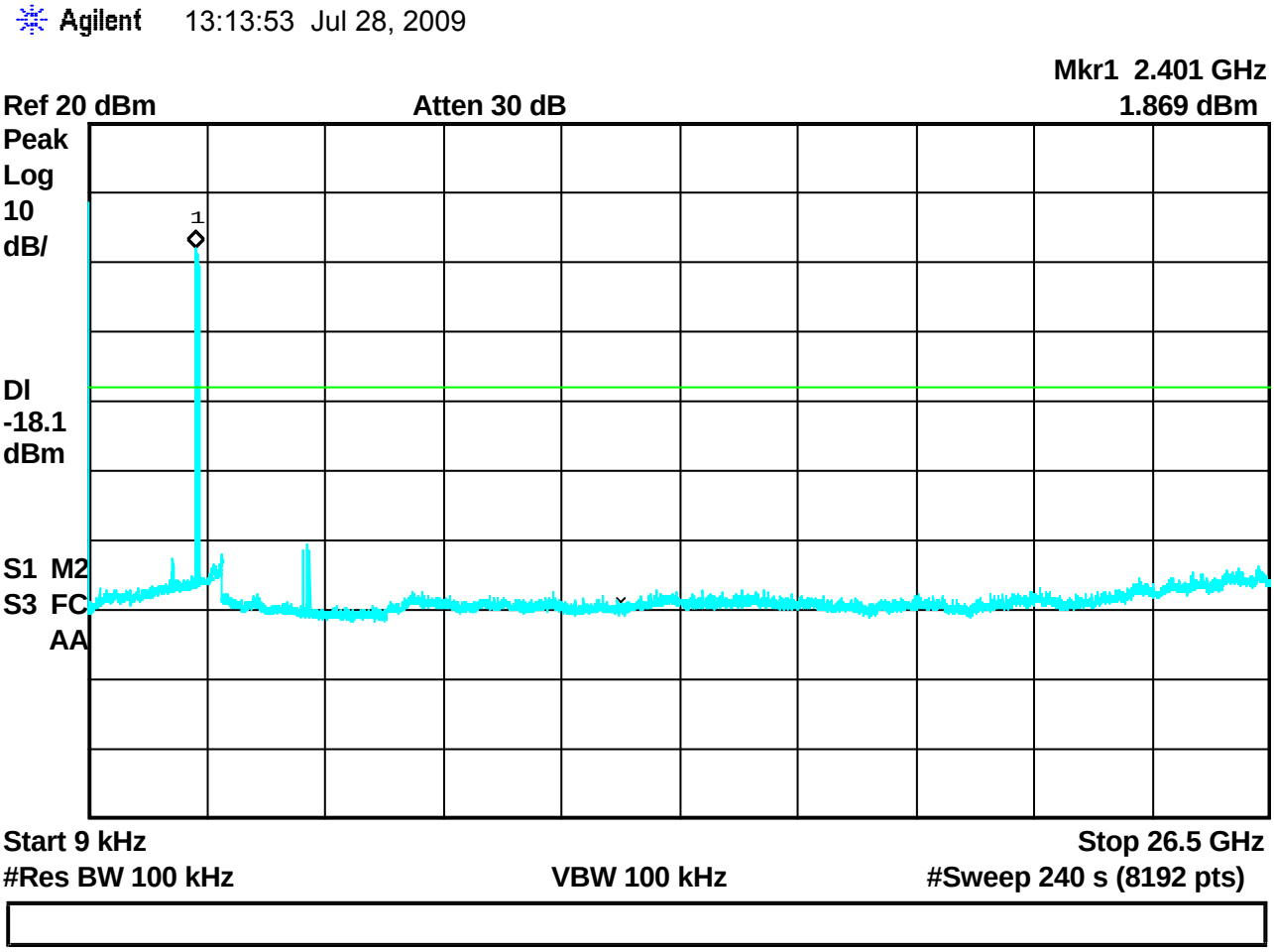
Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Cables	☐ Succoflex 1m (8407/4)					
Power supply	☒ 04-31					

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

Results of the test

Client:	*Phonak Communications SA*
Apparatus:	*SmartLink+*
Operating mode:	• *Single frequency (2.402 GHz, 2.441 GHz, 2.48 GHz)* • *Modulated*
Cables connected to the EUT:	• *DC supply* • *Temporary antenna cable*
Remarks:	• *Measured on temporary antenna connector*

Measurement of all three single frequencies on the following plot



Date of test: *July 28, 2009*
Operator: *Erich Staub*

7.12 Spurious emission - radiated

7.12.1 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: *1.5 m* (height of the equipment under test above floor)

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

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

Test set-up:

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

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

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	☐ 06-00	☒ 06-01	☐			

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

Measurement Type :	Radiated Field
Polarisation :	Horizontal
Table Angle :	0 - 360°
Antenna Height :	1 - 4m
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, charger
Operating Conditions :	f = 2402 MHz and 2480 MHz; modulated
Remarks :	

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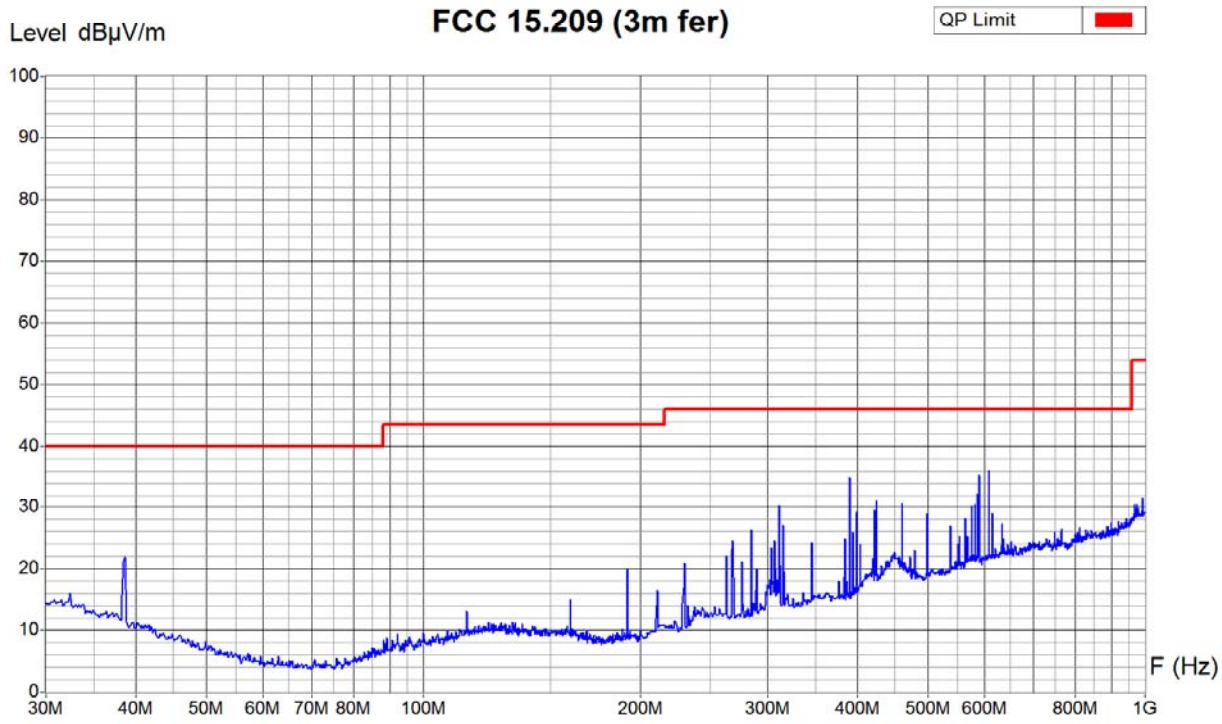

Zone	30 MHz - 199 MHz	199 MHz - 1 GHz
Video Bandwidth	100 KHz	100 KHz
Resol Bandwidth	100 KHz	100 KHz

Operator: E. Staub
Date/Time: 09.04.09 10:45
Filename:
20098690_FCC15-209_er
Tx_007h.png/.txt

Measurement Type :	Radiated Field
Polarisation :	Vertical
Table Angle :	0 - 360°
Antenna Height :	1 - 4m
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, charger
Operating Conditions :	f = 2402 MHz and 2480 MHz; modulated
Remarks :	

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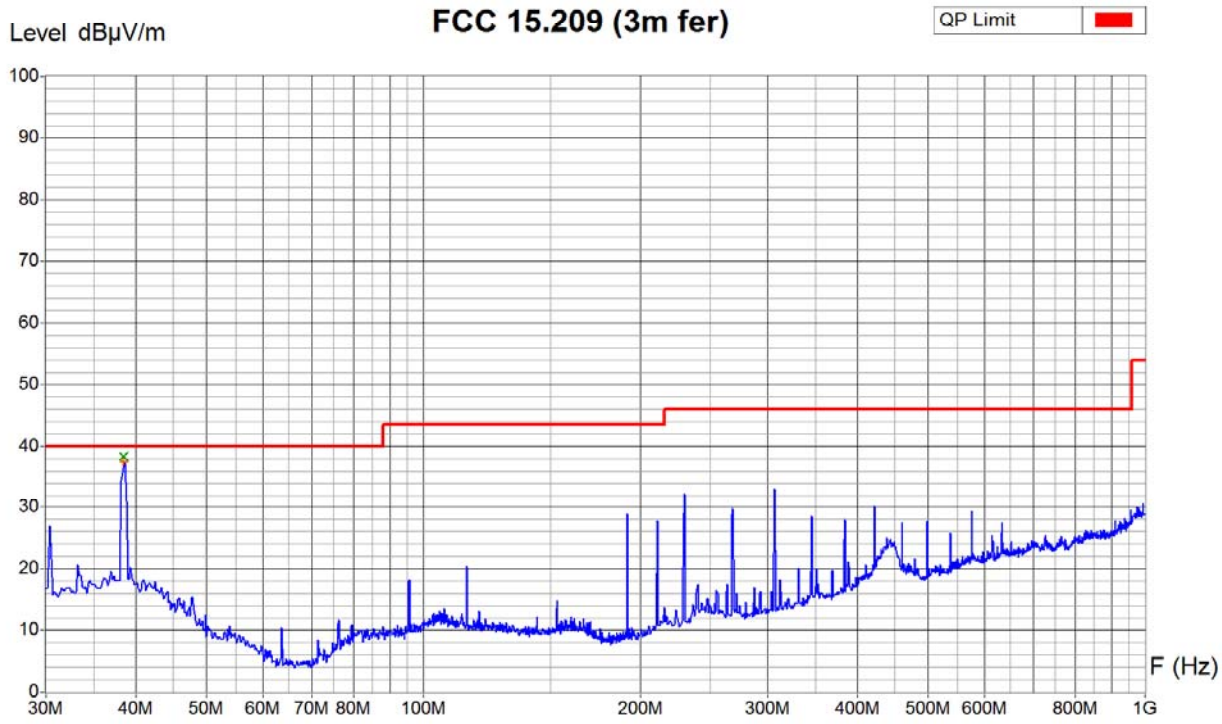

Zone	30 MHz - 199 MHz	199 MHz - 1 GHz
Video Bandwidth	100 KHz	100 KHz
Resol Bandwidth	100 KHz	100 KHz

Receiver Measures

Frequency	Peak	QuasiPeak (x)	Average (+)	QP Margin
38.40 MHz	39.3 dBµV/m	38.4 dBµV/m	37.5 dBµV/m	1.6 dB

Operator: E. Staub
Date/Time: 09.04.09 09:46
Filename:
20098690_FCC15-209_er
Tx_007v.png/.txt

7.12.2 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: *1.5 m* (height of the equipment under test above floor)

Meas. uncertainty: ± 4.7 dB

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

Test set-up:

Remarks: *Limit values expressed in dBµV/m and transformed to a measuring distance of 1 m (factor used = 20 dB/decade) if necessary*
e.g.: for f = 1 GHz the limit is 500 µV/m at 3 m;

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

Test equipment:

Spectrum analyser	☐ 88-14	☐ 94-24	☐ 02-06	☐ 03-45	☐ 05-39	☒ 07-53
Preamplifier	☒ 05-56	☒ 05-87	☐			
Antenna (horn)	☒ 90-24	☐ 07-31	☐			
Cables	☒ Succoflex 1m (67688/4) + 0.5m (7833/4)					

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

Measurement Type :	Radiated Field
Polarisation :	Horizontal
Table Angle :	0 - 360°
Antenna Height :	1.5m
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, charger
Operating Conditions :	f = 2402MHz; modulated
Remarks :	

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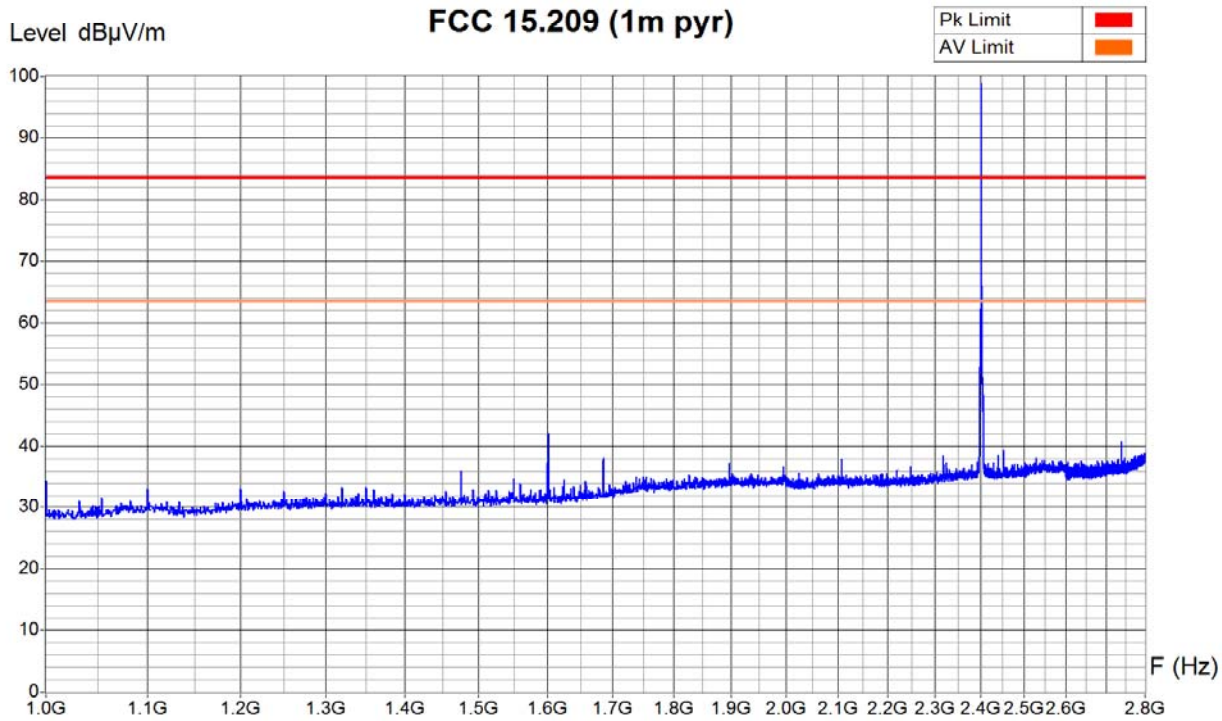

Zone	1 GHz - 2 GHz	2 GHz - 2.60 GHz	2.60 GHz - 2.80
Video Bandwidth	100 KHz	100 KHz	100 KHz
Resol Bandwidth	100 KHz	100 KHz	100 KHz

Operator: E. Staub
Date/Time: 01.04.2009 11:50
Filename:
20098690_FCC15-209_er
Tx_000h.png/.txt

Measurement Type :	Radiated Field
Polarisation :	Vertical
Table Angle :	0 - 360°
Antenna Height :	1.5m
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, charger
Operating Conditions :	f = 2402MHz; modulated
Remarks :	

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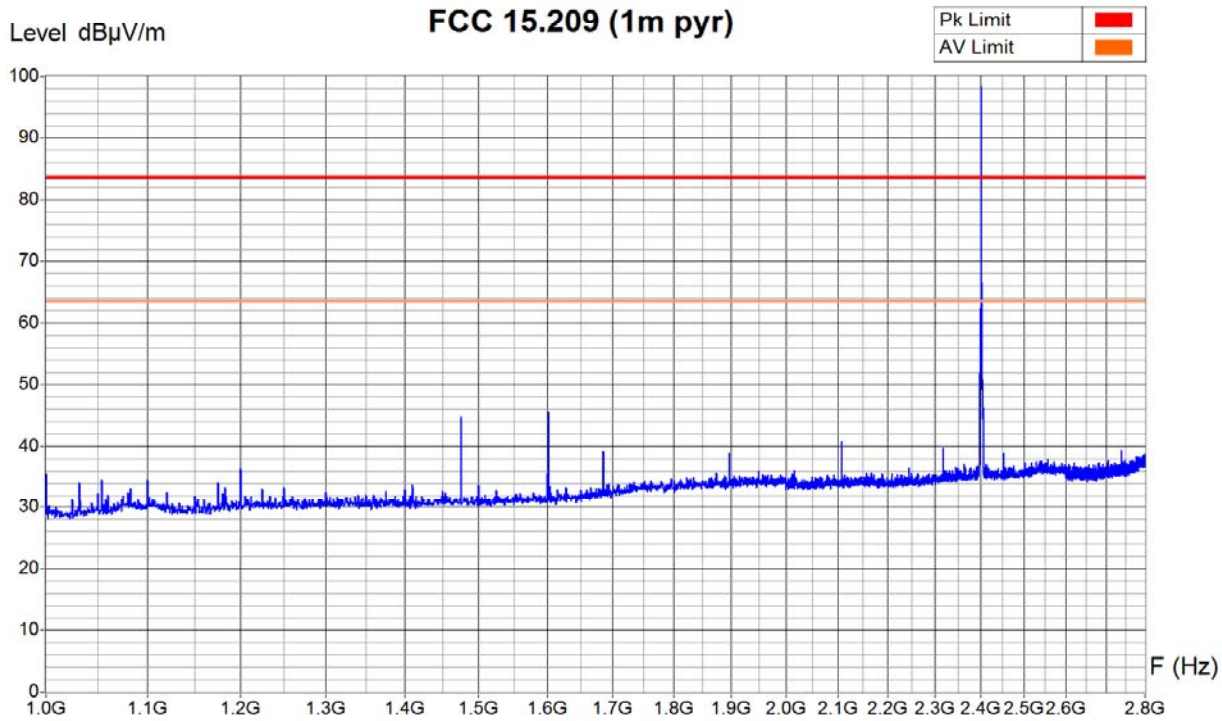
montena emc sa



Zone	1 GHz - 2 GHz	2 GHz - 2.60 GHz	2.60 GHz - 2.80
Video Bandwidth	100 KHz	100 KHz	100 KHz
Resol Bandwidth	100 KHz	100 KHz	100 KHz

Operator: E. Staub
Date/Time: 01.04.2009 11:56
Filename:
20098690_FCC15-209_er
Tx_000v.png/.txt

Measurement Type :	Radiated Field
Polarisation :	Horizontal
Table Angle :	0 - 360°
Antenna Height :	1.5m
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, charger
Operating Conditions :	f = 2480MHz; modulated
Remarks :	

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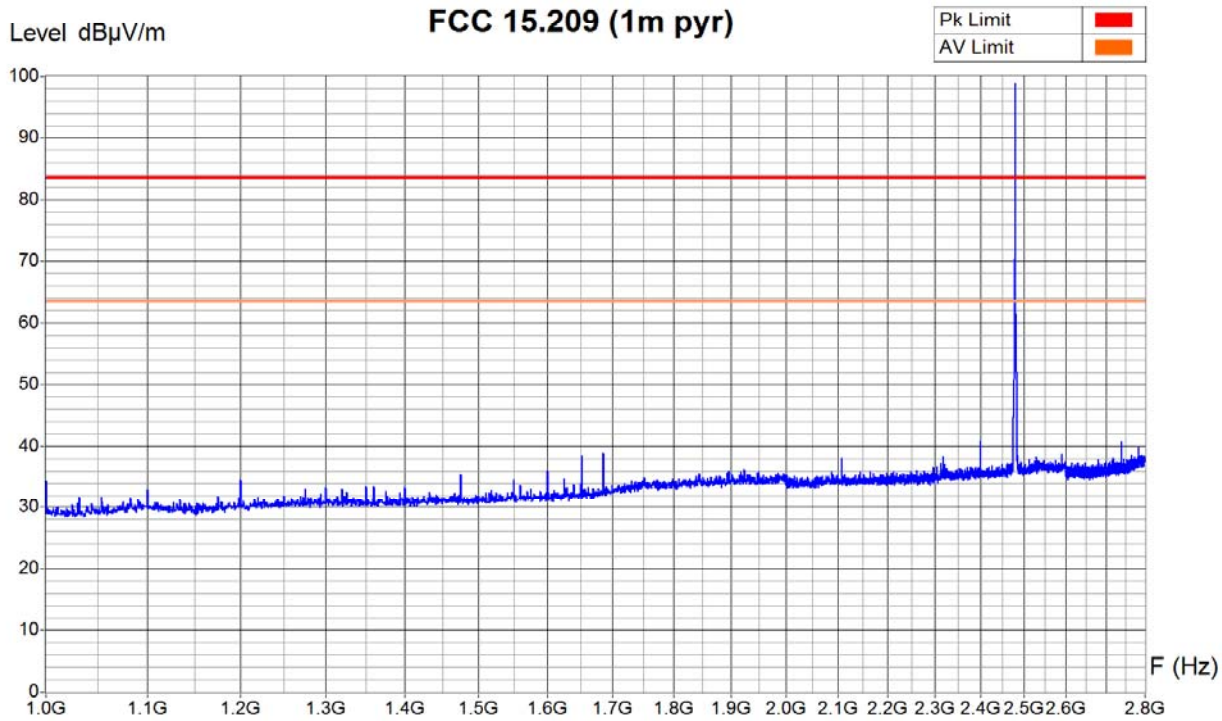

Zone	1 GHz - 2 GHz	2 GHz - 2.60 GHz	2.60 GHz - 2.80
Video Bandwidth	100 KHz	100 KHz	100 KHz
Resol Bandwidth	100 KHz	100 KHz	100 KHz

Operator: E. Staub
Date/Time: 01.04.2009 13:36
Filename:
20098690_FCC15-209_er
Tx_001h.png/.txt

Measurement Type :	Radiated Field
Polarisation :	Vertical
Table Angle :	0 - 360°
Antenna Height :	1.5m
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, charger
Operating Conditions :	f = 2480MHz; modulated
Remarks :	

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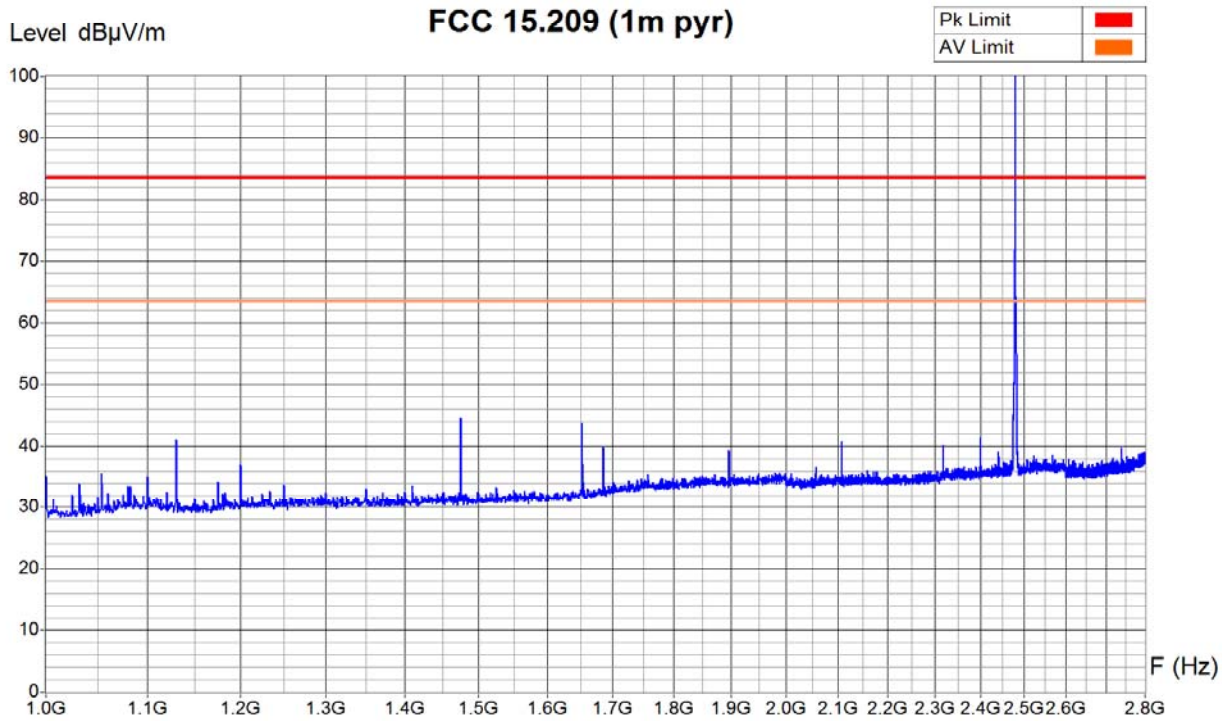
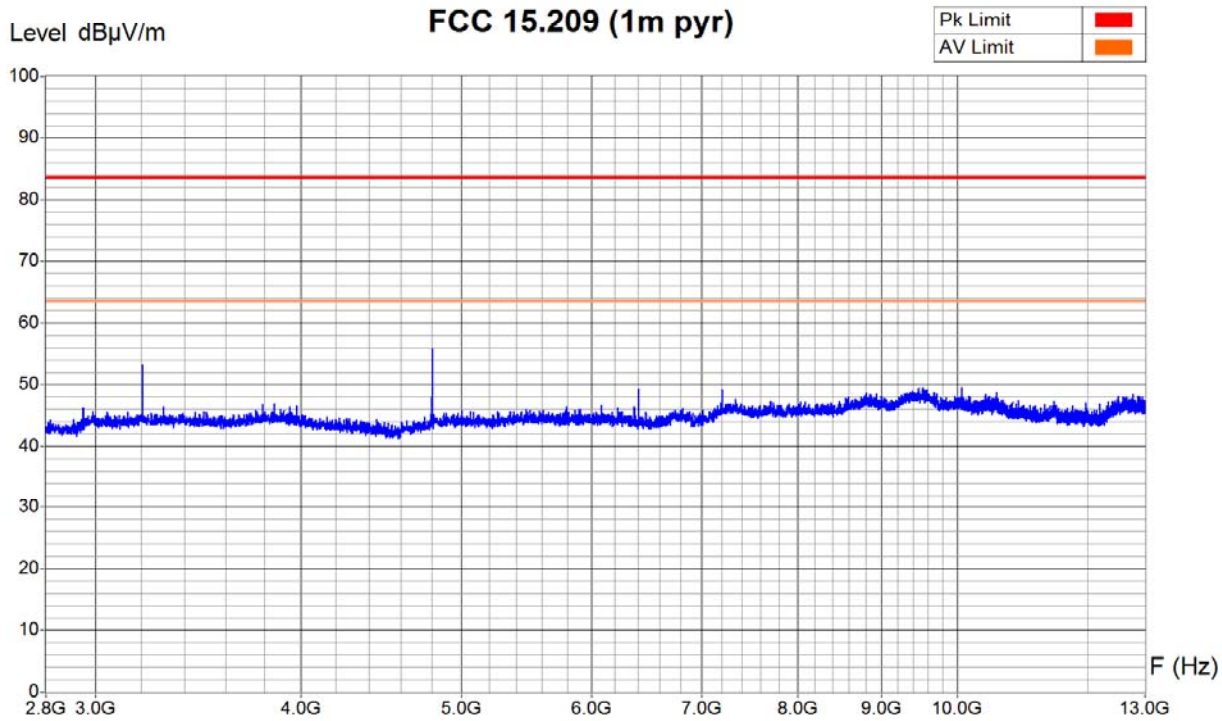


Zone	1 GHz - 2 GHz	2 GHz - 2.60 GHz	2.60 GHz - 2.80
Video Bandwidth	100 KHz	100 KHz	100 KHz
Resol Bandwidth	100 KHz	100 KHz	100 KHz

Operator: E. Staub
Date/Time: 01.04.2009 13:32
Filename:
20098690_FCC15-209_er
Tx_001v.png/.txt

Measurement Type :	Radiated Field
Polarisation :	Horizontal
Table Angle :	0 - 360°
Antenna Height :	1.5m
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, charger
Operating Conditions :	f = 2402MHz; modulated
Remarks :	

montena
montena emc sa



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	100 KHz	100 KHz	100 KHz	100 KHz	100 KHz
Resol Bandwidth	100 KHz	100 KHz	100 KHz	100 KHz	100 KHz

Operator: E. Staub
Date/Time: 01.04.2009 15:38
Filename:
20098690_FCC15-209_er
Tx_002h.png/.txt

Measurement Type :	Radiated Field
Polarisation :	Vertical
Table Angle :	0 - 360°
Antenna Height :	1.5m
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, charger
Operating Conditions :	f = 2402MHz; modulated
Remarks :	

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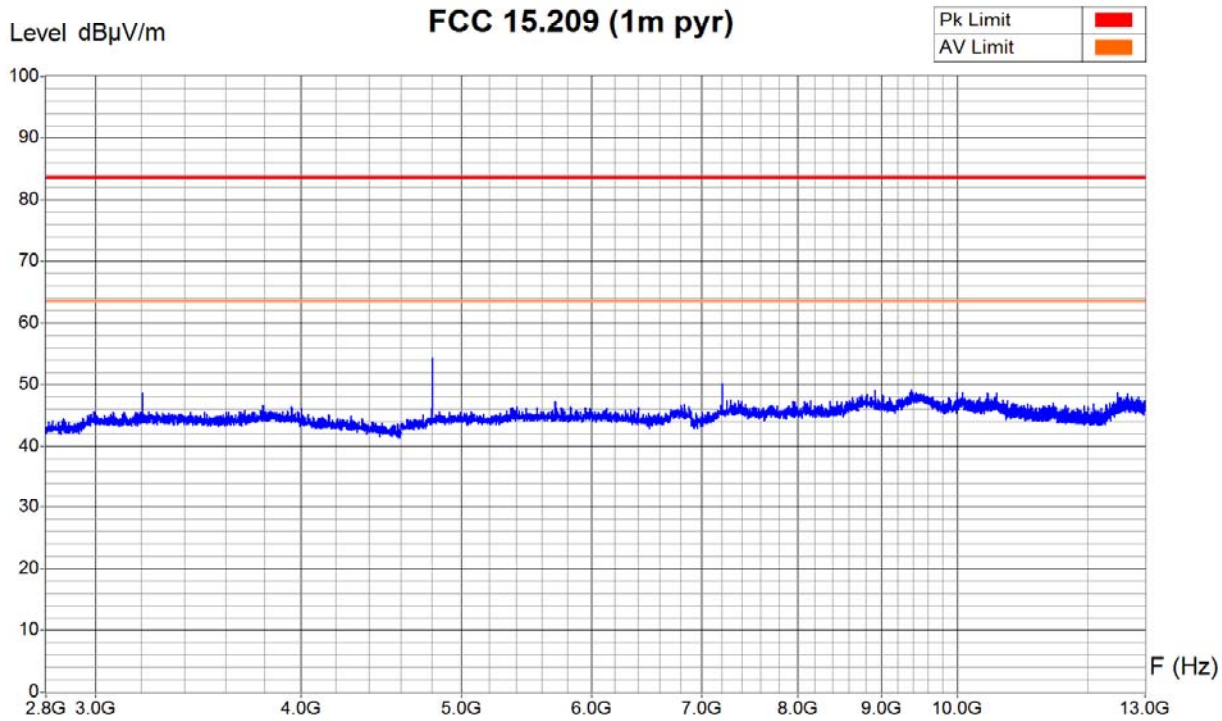

Zone	2.80 GHz - 4.60	4.60 GHz - 6.90	6.90 GHz - 10 GHz	10 GHz - 11.50 GHz	11.50 GHz - 13 GHz
Video Bandwidth	100 KHz	100 KHz	100 KHz	100 KHz	100 KHz
Resol Bandwidth	100 KHz	100 KHz	100 KHz	100 KHz	100 KHz

Operator: E. Staub
Date/Time: 01.04.2009 15:30
Filename:
20098690_FCC15-209_er
Tx_002v.png/.txt

Measurement Type :	Radiated Field
Polarisation :	Horizontal
Table Angle :	0 - 360°
Antenna Height :	1.5m
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, charger
Operating Conditions :	f = 2480 MHz; modulated
Remarks :	

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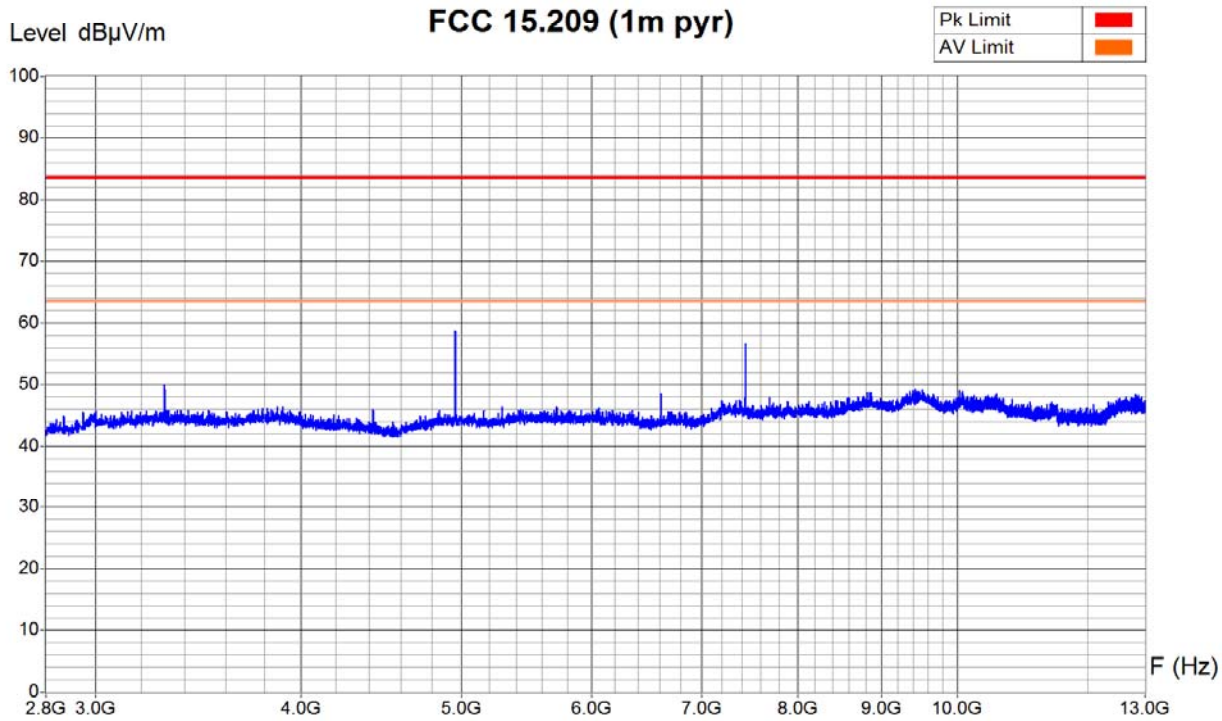
montena emc sa

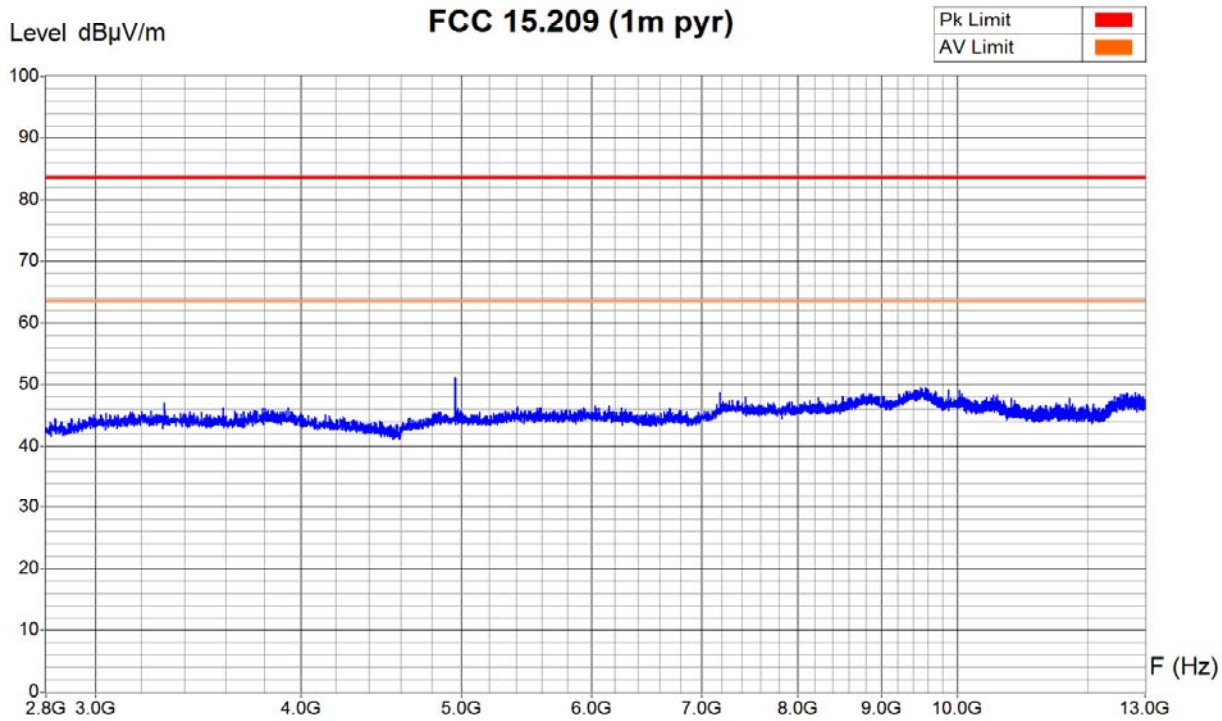


Zone	2.80 GHz - 4.60	4.60 GHz - 6.90	6.90 GHz - 10 GHz	10 GHz - 11.50 GHz	11.50 GHz - 13 GHz
Video Bandwidth	100 KHz	100 KHz	100 KHz	100 KHz	100 KHz
Resol Bandwidth	100 KHz	100 KHz	100 KHz	100 KHz	100 KHz

Operator: E. Staub
Date/Time: 01.04.2009 15:48
Filename:
20098690_FCC15-209_er
Tx_003h.png/.txt

Measurement Type :	Radiated Field
Polarisation :	Vertical
Table Angle :	0 - 360°
Antenna Height :	1.5m
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, charger
Operating Conditions :	f = 2480 MHz; modulated
Remarks :	

montena
montena emc sa



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	100 KHz	100 KHz	100 KHz	100 KHz	100 KHz
Resol Bandwidth	100 KHz	100 KHz	100 KHz	100 KHz	100 KHz

Operator: E. Staub
Date/Time: 01.04.2009 16:00
Filename:
20098690_FCC15-209_er
Tx_003v.png/.txt

Measurement Type :	Radiated Field
Polarisation :	Horizontal
Table Angle :	0 - 360°
Antenna Height :	1.5m
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, charger
Operating Conditions :	f = 2402 MHz; modulated
Remarks :	

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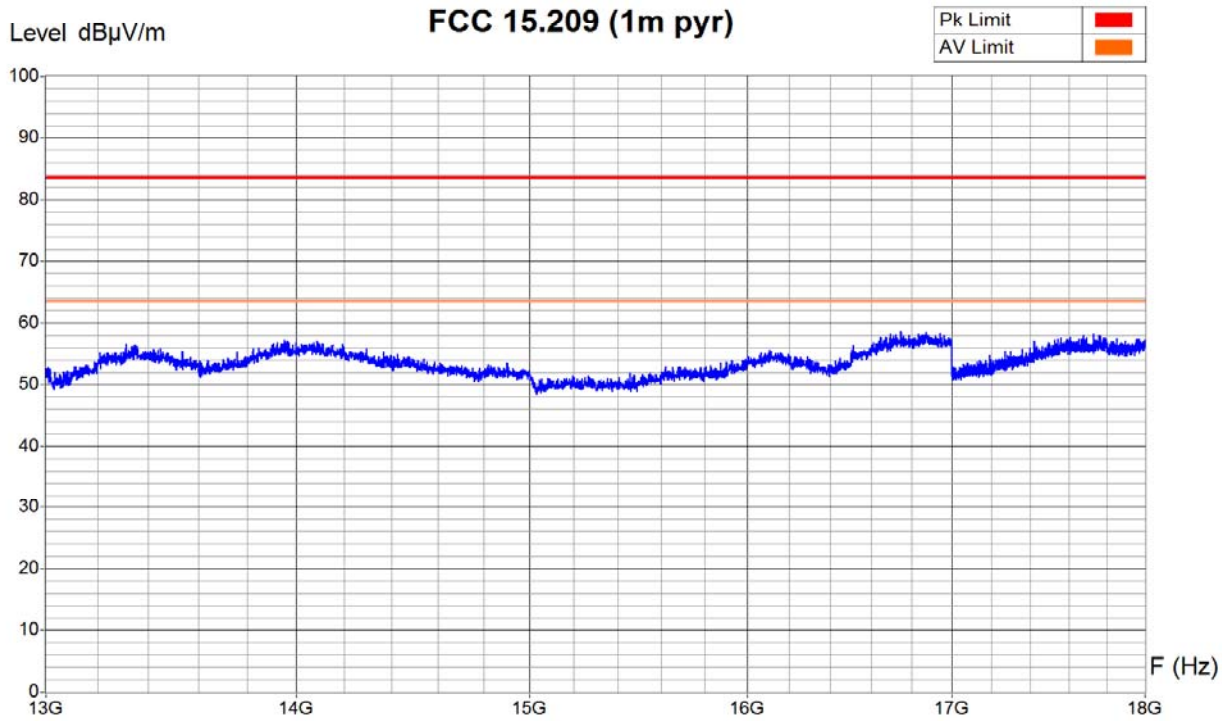
montena emc sa



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: E. Staub
Date/Time: 01.04.2009 17:52
Filename:
20098690_FCC15-209_er
Tx_004h.png/.txt

Measurement Type :	Radiated Field
Polarisation :	Vertical
Table Angle :	0 - 360°
Antenna Height :	1.5m
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, charger
Operating Conditions :	f = 2402 MHz; modulated
Remarks :	

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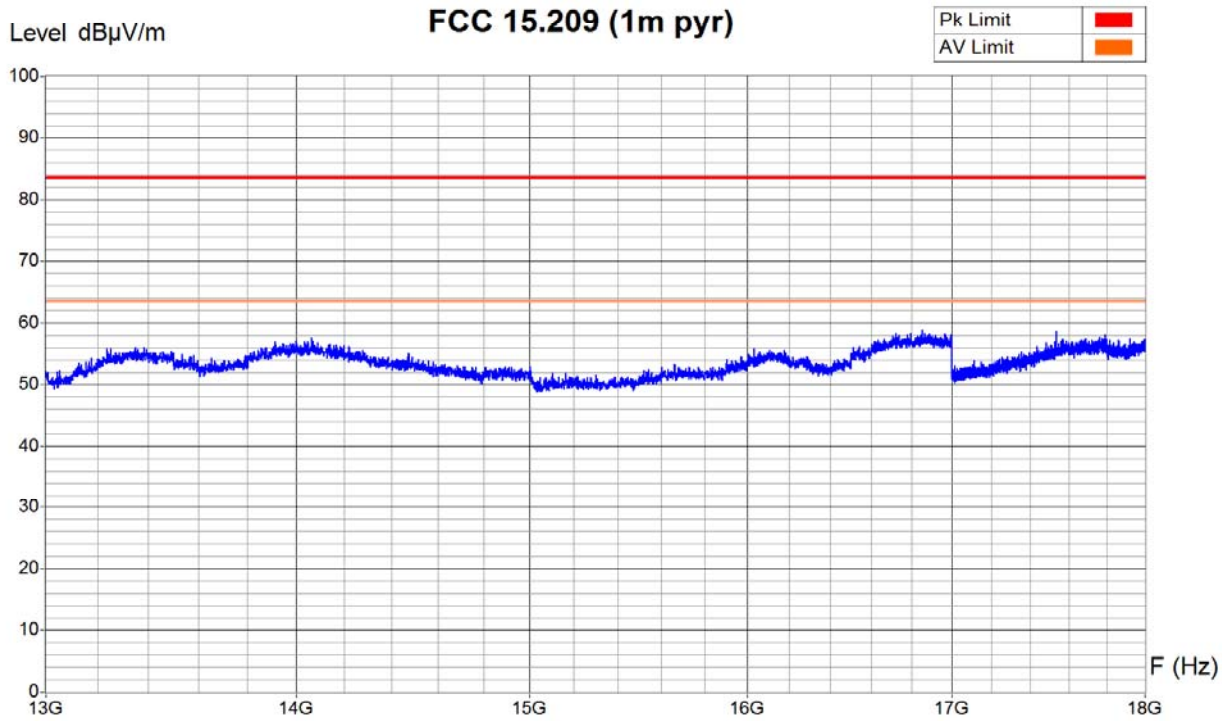
montena emc sa

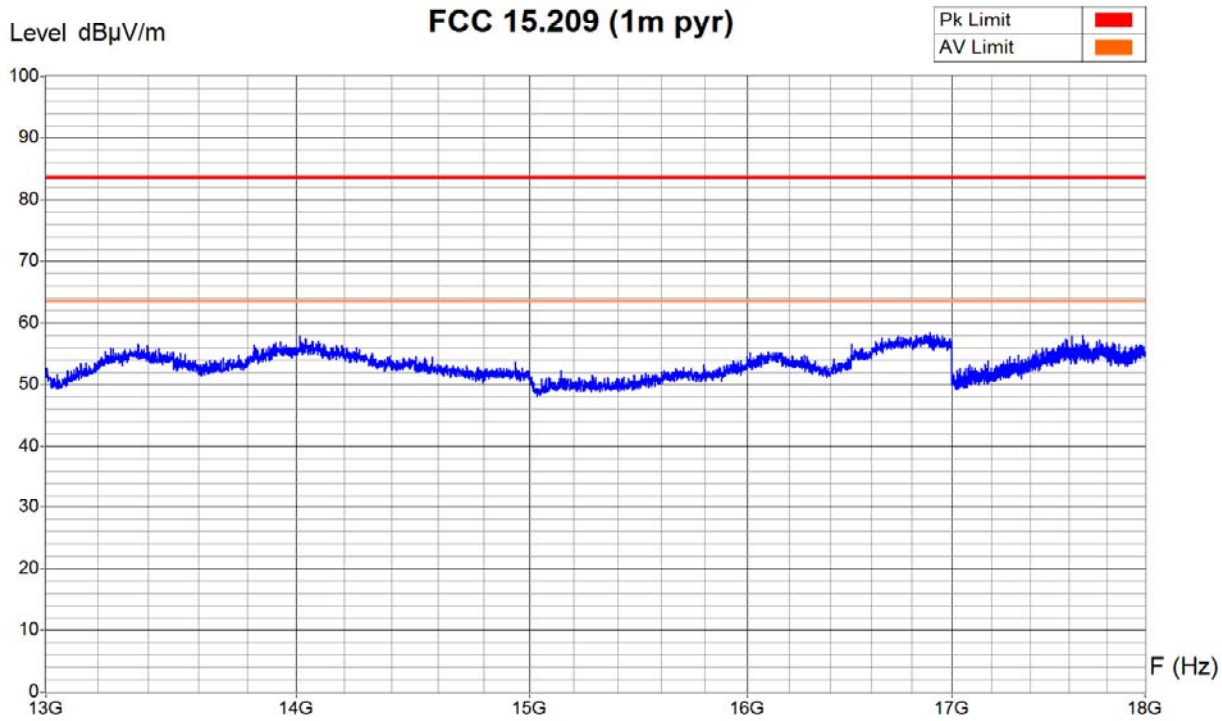


Zone	13 GHz - 15 GHz	15 GHz - 17 GHz	17 GHz - 18 GHz
Video Bandwidth	1 MHz	1 MHz	300 KHz
Resol Bandwidth	1 MHz	1 MHz	300 KHz

Operator: E. Staub
Date/Time: 01.04.2009 17:46
Filename:
20098690_FCC15-209_er
Tx_004v.png/.txt

Measurement Type :	Radiated Field
Polarisation :	Horizontal
Table Angle :	0 - 360°
Antenna Height :	1.5m
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, charger
Operating Conditions :	f = 2480 MHz; modulated
Remarks :	

montena
montena emc sa

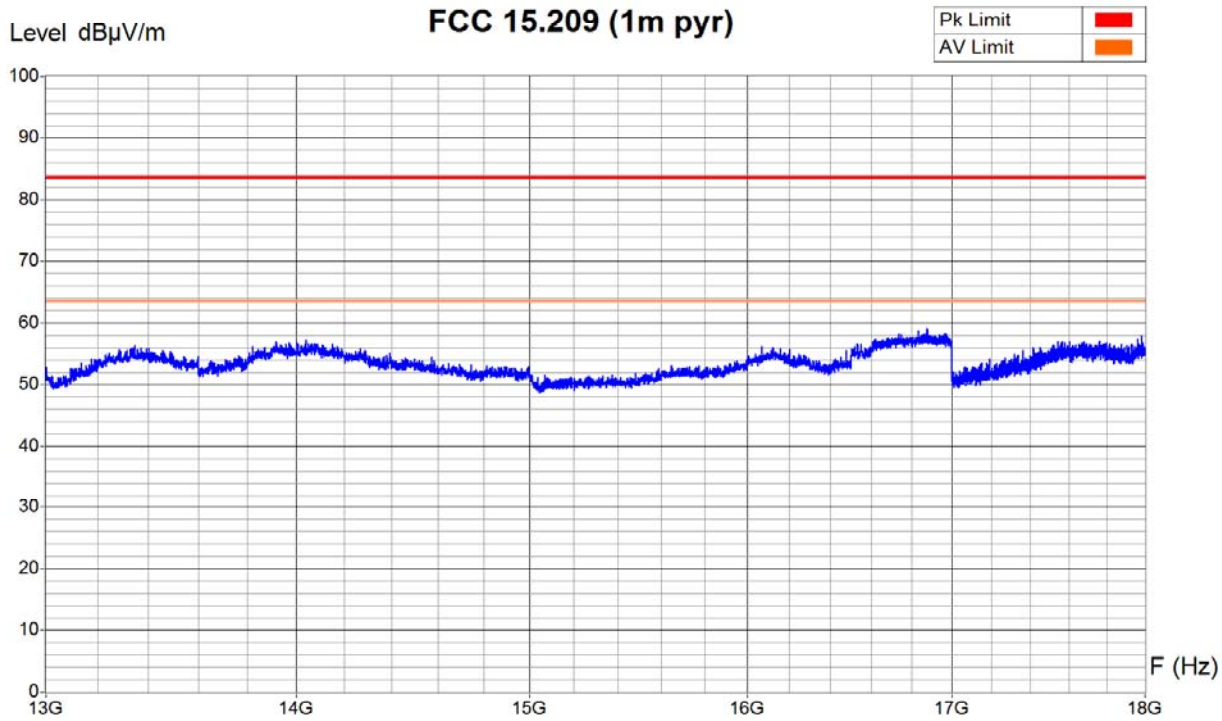


Zone	13 GHz - 15 GHz	15 GHz - 17 GHz	17 GHz - 18 GHz
Video Bandwidth	1 MHz	1 MHz	300 KHz
Resol Bandwidth	1 MHz	1 MHz	300 KHz

Operator: E. Staub
Date/Time: 01.04.2009 17:58
Filename:
20098690_FCC15-209_er
Tx_005h.png/.txt

Measurement Type :	Radiated Field
Polarisation :	Vertical
Table Angle :	0 - 360°
Antenna Height :	1.5m
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, charger
Operating Conditions :	f = 2480 MHz; modulated
Remarks :	

montena
montena emc sa



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: E. Staub
Date/Time: 01.04.2009 18:07
Filename:
20098690_FCC15-209_er
Tx_005v.png/.txt

7.12.3 Radiated emission - Electromagnetic field (radiated – 18 GHz to 26.5 GHz)

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

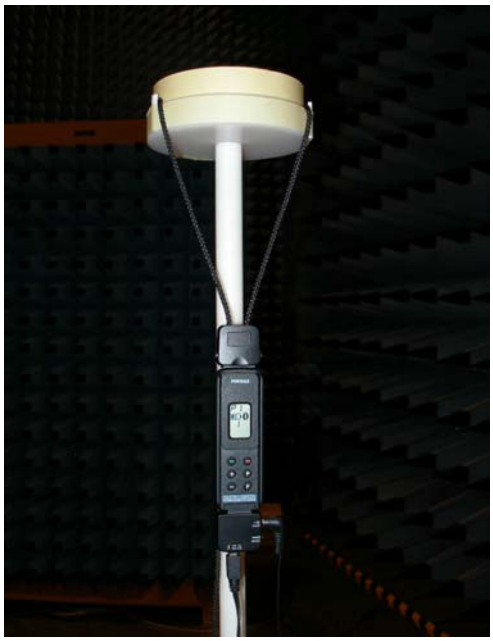
Distance: ☐ 30 m ☐ 10 m ☐ 3 m ☒ 1 m

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

Meas. uncertainty: ± 4.7 dB

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

Test set-up:



Remarks:

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

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

Test equipment:

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

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

Measurement Type :	Radiated Field
Polarisation :	Horizontal
Table Angle :	0 - 360°
Antenna Height :	1.5m
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, charger
Operating Conditions :	f = 2402 MHz and 2480 MHz; modulated
Remarks :	

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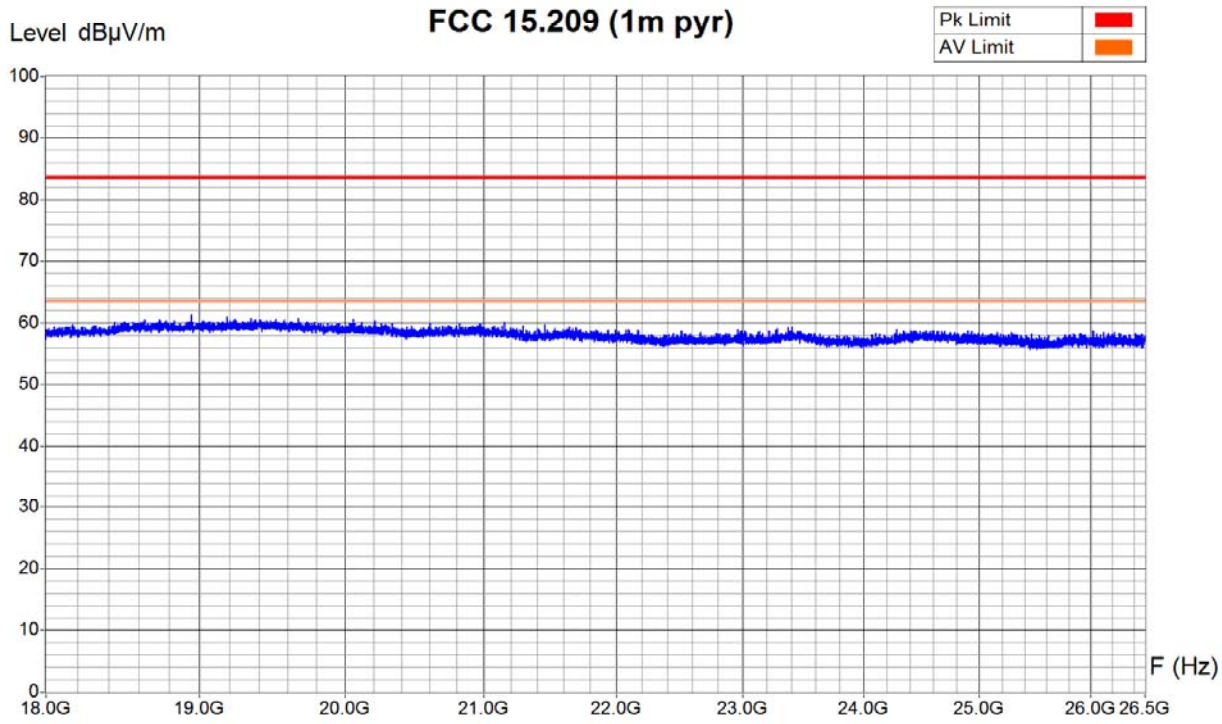
montena emc sa

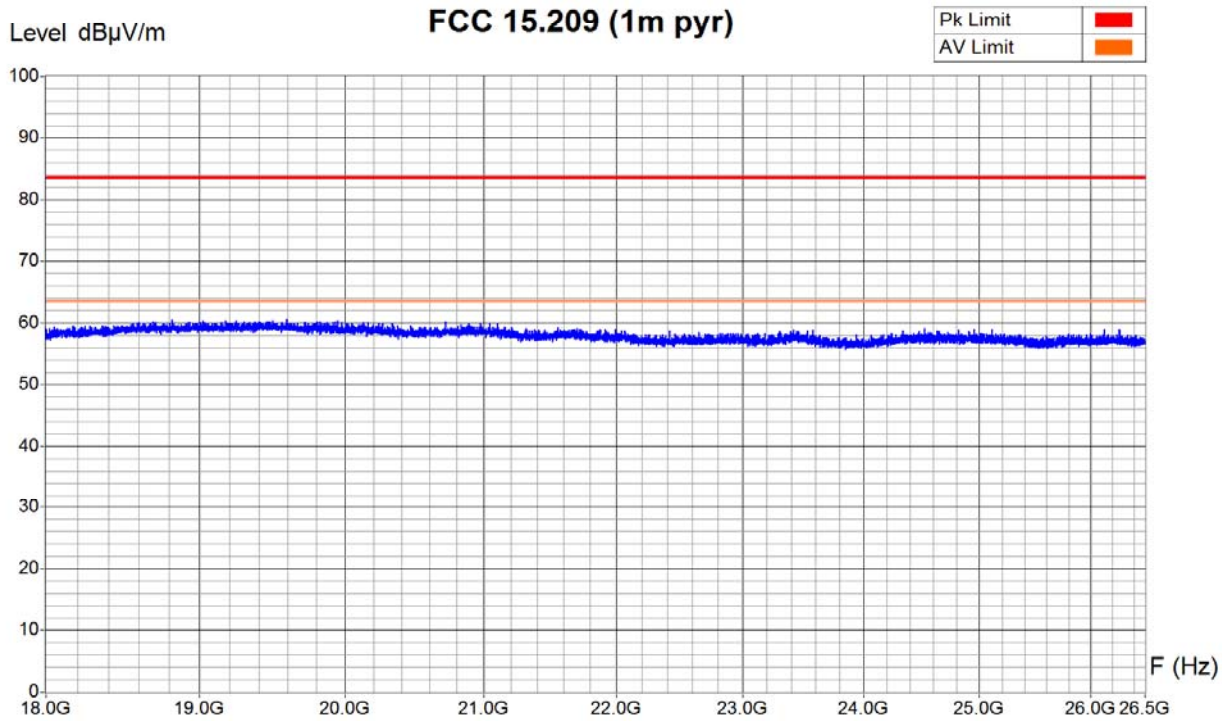


Zone	18 GHz - 19.70 GHz	19.70 GHz - 21.40	21.40 GHz - 23.10	23.10 GHz - 24.80	24.80 GHz - 26.50
Video Bandwidth	1 MHz	1 MHz	1 MHz	1 MHz	1 MHz
Resol Bandwidth	100 KHz	100 KHz	100 KHz	100 KHz	100 KHz

Operator: E. Staub
Date/Time: 02.04.2009 12:00
Filename:
20098690_FCC15-209_er
Tx_006h.png/.txt

Measurement Type :	Radiated Field
Polarisation :	Vertical
Table Angle :	0 - 360°
Antenna Height :	1.5m
Equipment Under Test :	SmartLink+
Set-Up :	cables: ext. audio, charger
Operating Conditions :	f = 2402 MHz and 2480 MHz; modulated
Remarks :	

montena
montena emc sa



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: E. Staub
Date/Time: 02.04.2009 11:37
Filename:
20098690_FCC15-209_er
Tx_006v.png/.txt

8. Prospectus of the product / Prospectus du produit / Produktprospekt

SmartLink+

Technical Data

SmartLink+ features

- Dynamic FM
- Multiple microphone settings
- Latest Bluetooth version for simple cellphone and MP3 use
- SoftLanding technology
- Audio input for wireless TV and audio enjoyment
- Fast-charging battery
- Hearing instrument remote control

SmartLink+ is the product for those who want nothing less than the very best: in meetings, when it is noisy, over distance, at home and at work, in the car and in the mall, on the cellphone face to face, even when watching TV or listening to music. In short: **SmartLink+ is the Rolls Royce of the hearing industry.**

Product description

A Selectable microphone settings
B High quality microphone array
C Advanced signal processing:
- Dynamic FM
- SoftLanding technology
- High resolution multi-channel noise cancellation

D Integrated invisible antenna
- for operating ranges less than 15 feet (5 meters)

E Interface for the lavalier cord with external antenna
- for operating ranges up to 50 feet (15 meters) indoors, and 170 feet (50 meters) outdoors

F Retention clip
G Easy to read LCD display
H Bluetooth control keys for cellphone use
I Keys for
- remote control of Phonak Hearing instruments
- frequency change and other features

Attachable interface with connections for:
M 3.5 mm socket for external audio sources (e.g. TV)
N mini USB socket for power supply and programming cable
O 2.5 mm socket external microphone (MM8 and iBoom)

Microphone settings

SuperZoom
Use SuperZoom for all situations featuring high noise levels, such as:
- Noisy restaurants and parties
- In the car or on the train
- Making Bluetooth phone calls
- When the transmitter is worn lavalier style (neck-hung) by your communication partner

Zoom
Use Zoom for all medium noise situations, such as:
- Face-to-face conversations
- Walking
- Meetings and conferences
- And many other everyday situations...

Omni
Use Omni in situations such as:
- Round-table discussions in quiet environments
- Playing cards with friends

PHONAK life is on

SmartLink+

General data

Type:	Dynamic FM transmitter
Dimensions:	L x W x H: 98 x 35 x 18mm (3.8 x 1.4 x 0.7 inches) (without interface and lavaliere cord)
Weight:	56 g
Operating temperature range:	-10°C to +60°C
Humidity:	20 ... 75%

HF characteristics

Frequency range:	169.4 – 176 MHz (Band HA) 214.0 – 220.0 MHz (Band NB)
Frequency switching:	Integrated digital frequency synthesizer, max. 40 programmable channels
Frequency stability:	Better than ±1 kHz
Modulation:	FM (narrow-band), maximum frequency deviation Δfdev< 6 kHz
Antennas:	- Built-in concealed antenna for short-range operation (up to 3 m/10feet) - Plug-in lavalier cord antenna for maximum operating range (up to 50 m/170feet)
Signal-to-noise ratio:	(microphone setting: Omni) > 45 dB at Δfdev < 4 kHz and fmod = 1 kHz

SmartLink+ combined with ML9i, ML10i, ML11i, ML12i, MLxi or any other Dynamic FM receiver from Phonak leads to a significantly higher signal to noise ratio.

Audio characteristics

Audio frequency range:	100-6000 Hz
Microphone sensitivity: (In Omni mode)	97 dB SPL at fmod = 1 kHz for Δfdev = 4.0 kHz (100% modulation) 70 dB SPL at fmod = 1 kHz for Δfdev = 3.0 kHz
Distortion: (In Omni mode)	THD < 0.2 % according to IEC 118-7 at 70 dB SPLwith fmod = 1 kHz for Δfdev = 3.0 kHz

Battery

Type:	Lithium Polymer 3.7 VDC
Dimensions:	Length: 36 mm Width: 26 mm Height: 6 mm
Capacity:	525 mAh
Operating time:	10 hours max.

Power supply

Type:	Dedicated SmartLink+ charger
Connector:	Mini USB
Secondary voltage:	5.0 VDC
Current:	500 mA
Important notice:	It is recommended to use only the original Phonak charging unit.
Fast-charge:	80% charged within an hour Fully charged in two hours
	The battery cannot be over-charged
	The adapter may become warm during charging.

Built in remote control for Phonak hearing instrument

Frequency:	40.96 kHz
Modulation:	CPFSK
Operating range:	< 50 cm

Bluetooth link

Profiles:	HSP	"Headset Profile"
	HFP	"Hands-free Profile"
	A2DP	"Advanced Audio Distribution Profile"
	AVRCP	"Audio/Video Remote Control Profile"
Core Version:	2.0/2.0+EDR	
Bluetooth Chip:	CSR BC5MM Flash BC57H687C	
Operating range:	5-8 meters (Mobile phone to SmartLink+)	

Standards

Radiocom:	EN 300.422-1,-2:2001 EN 300.330-1,-2:2006 EN 300.328:2006 CFR 47, part 95, part 15C
EMC:	EN 301.489-3, -9, 17:2002
Electric Safety:	EN 60950-1:2006

Dynamic FM System data

Adaptive FM Advantage (AFMA), Ambient noise level >= 73 dB SPL	
Dynamic FM advantage over the Hearing instrument:	25 dB
Dynamic FM advantage over a traditional FM system:	15 dB
Wireless sub-audio data-link:	Frequency range: Above the audio band
Operating range:	as FM operating range

Accessories and replacement parts

Interface
iBoom microphone
MM8 lapel microphone
miniUSB charger
miniUSB cable for re-programming
Audio cable 1m/3 feet
Audio cable 3m/10 feet
Scart adapter for audio cable
Cinch adapter for audio cable
Lavalier with built in Antenna
Home&travel case