

Recognized by the
Federal Communications Commission
Anechoic chamber registration no.: 90462 (FCC)
Anechoic chamber registration no.: IC 3463A-1
TCB ID: DE 0001



Accredited by the
German Accreditation Council
DAR-Registration Number
DAT-P-176/94-D1



Accredited Bluetooth® Test Facility (BQTF)

Test report no. : 5-5766-04-03/07
Applicant : Oticon S/A
Type : VIGO PRO RITE Power
Test Standard : FCC Part 15.209, 15.223
RSS-210 Issue 7
FCC ID : U28FURPT01
Certification No. IC : 1350B-FURPT01

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ANNEX 1: TECHNICAL PRODUCT DESCRIPTION

1. Administrative data

1.1. Administrative data of the test facility

1.1.1 Identification of the testing laboratory

Company name:	Cetecom ICT Services GmbH
Address:	Untertürkheimerstr. 6-10 D-66117 Saarbruecken Germany
Laboratory accreditation:	DAR-Registration No. DAT-P-176/94-D1 Bluetooth Qualification Test Facility (BQTF)
Responsible for testing laboratory:	Harro Ames Phone: +49 681 598 0 Fax: +49 681 598 9075 email: info@ict.cetecom.de



Responsible for testing
(Stefan Bös)

1.1.2 Organizational items

Reference No.:	5-5766-04-03/07
Order No.:	
Receipt of EUT:	2008-02-15
Date(s) of test:	2008-02-15
Date of report:	2008-03-10
Number of report pages:	25
Number of diagram pages (annex):	
Version of template:	1.8



Responsible for laboratory
(Harro Ames)

Note:

The test results of this test report relate exclusively to the item tested as specified in this report. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.

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During the test no hardware and software changes are allowed to be performed at the EUT.

1.1.3 Applicant's details

Applicant's name:	Oticon A/S
Address:	Kongebakken 9 2765 Smørum Denmark
Contact person:	Mrs. Kristine Klitgaard Pedersen Phone: +45 3913 8583 Fax: +45 3927 7900 email: kkp@oticon.dk

1.2 Administrative data of manufacturer / member

Manufacturer's name:	same as applicant
Address:	

1.3 Description of the Equipment under test (EUT)

1.3.1 EUT: Type, S/N etc.

Type of equipment	:	Hearing aid
Model name	:	VIGO PRO RITE Power
Manufacturer	:	Oticon A/S
Address	:	Kongebakken 9
City	:	2765 Smørum
Country	:	Denmark
Tested to Radio Standards Specification(RSS) No.	:	210 Issue 7
Open Area Test Site Industry Canada Number	:	IC 3463A-1
Frequency Range (or fixed frequency)	:	3.84 MHz TX/RX
R F: Power in Watts	:	<0.000001
Field Strength (at what distance)	:	7.9 μ V/m (17.9 dB μ V/m) @ 10m
Occupied Bandwidth (99% BW)	:	367.2 kHz (-20 dBc)
Type of Modulation	:	A1D (inductive loop)
Antenna Information	:	Integrated Coil antenna
Emission Designator	:	A1D
Transmitter Spurious (worst case)	:	143 μ V/m in 3m (noise floor)
IC no.	:	1350B-FURPT01
FCC ID	:	U28FURBT01

ATTESTATION:

DECLARATION OF COMPLIANCE: I declare that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned Industry Canada standard(s); and that the equipment identified in this application has been subjected to all the applicable test conditions specified in the Industry Canada standards and all of the requirements of the standard have been met.

Laboratory Manager :

2008-03-10

Stefan Bös

Date

Name

Signature



1.4 Test Setup

Hardware : PCB rev. 04
Software : 2.0.2

1.5 Test Specifications

FCC:	CFR Part 15.209, 15.223
IC:	RSS 210, Issue 7

2 Statement of Compliance

No deviations from the technical specification(s) were ascertained in the course of the tests performed.

2.1 Summary of Measurement Results

2.1.1 CFR 47 Part 15 Radio frequency devices

Section in this Report	Test Name / Section FCC Part 15	Test Name / Section RSS 210 Issue 7	applicable	Verdict
4.1	§ 15.35 (c) Timing of the transmitter (Duty cycle correction factor)		YES	pass
4.2	§ 15.209 (a) / § 15.223 FIELDSTRENGTH OF FUNDAMENTAL incl. OCCUPIED BANDWIDTH (6dB/20dB)	2.6	YES	pass
4.3	§ 15.209 (a) FIELDSTRENGTH OF HARMONICS and SPURIOUS	2.6	YES	pass
4.4	§ 15.109 Receiver spurious emissions (radiated)	2.6	YES	pass
4.5	§ 15.107 / 15.207 Conducted Limits		NO	

3 Measurements and results

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 20 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber.

The receiving antennas conform with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2003 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test set-ups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received.

The wanted and unwanted emissions are received by spectrum analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.4-2003 clause 4.2.

Antennas conform with ANSI C63.2-1996 item 15.

9 kHz – 150 kHz: Quasi Peak measurement, 200 Hz Bandwidth, magnetic shielded loop antenna

150 kHz - 30 MHz: Quasi Peak measurement, 9kHz Bandwidth, passive loop antenna.

30 MHz - 200 MHz: Quasi Peak measurement, 120KHz Bandwidth, biconical antenna

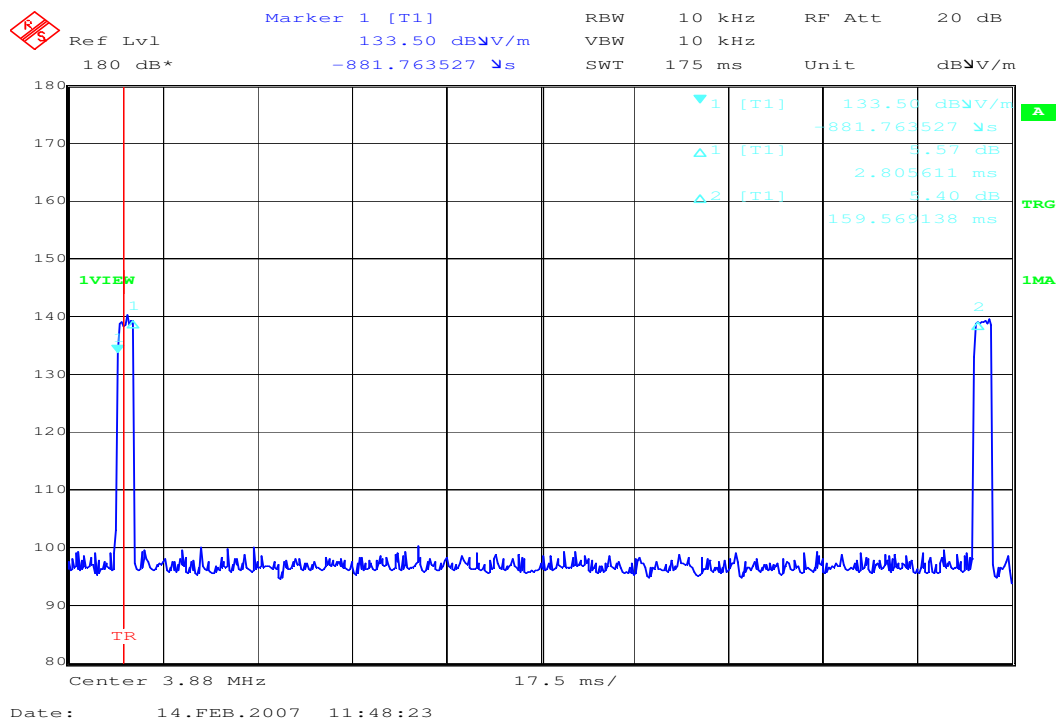
200MHz - 1GHz: Quasi Peak measurement, 120KHz Bandwidth, log periodic antenna

>1GHz: Average, RBW 1MHz, VBW 10 Hz, wave guide horn

All measurement settings are according to FCC 15.209 and 15.207

4 FCC Part 15 Subpart C

4.1 Timing of the transmitter



Reference

FCC:	CFR Part SUBCLAUSE § 15.35 (c)
IC:	

4.2 Field strength of the fundamental


§ 15.209 (a) / 15.223

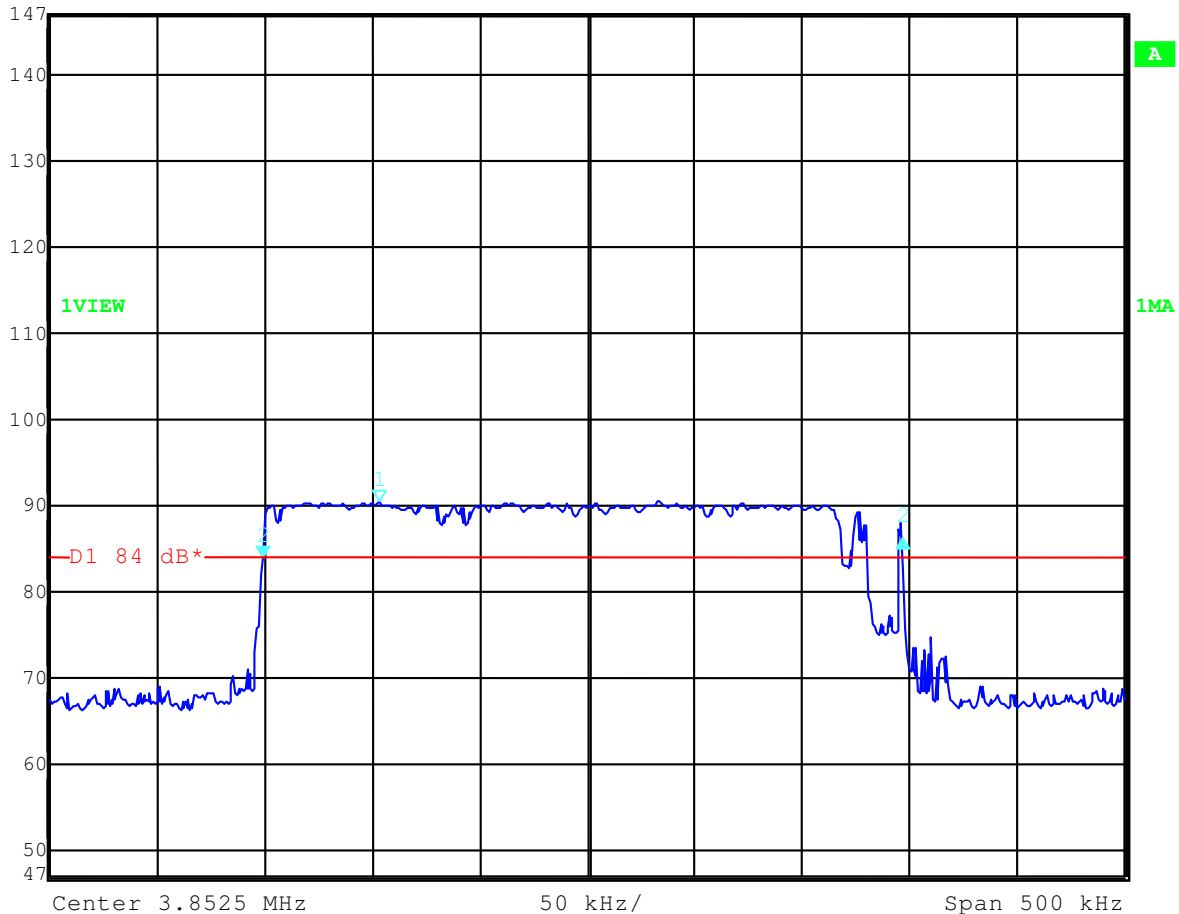
Reference

FCC:	CFR Part SUBCLAUSE § 15.209 (a) / § 15.223
IC:	RSS 210, Issue 7, 2.6

	Occupied Bandwidth (kHz)
6 dB	346.2
20 dB	367.2


Plot 1: 6 dB-Bandwidth

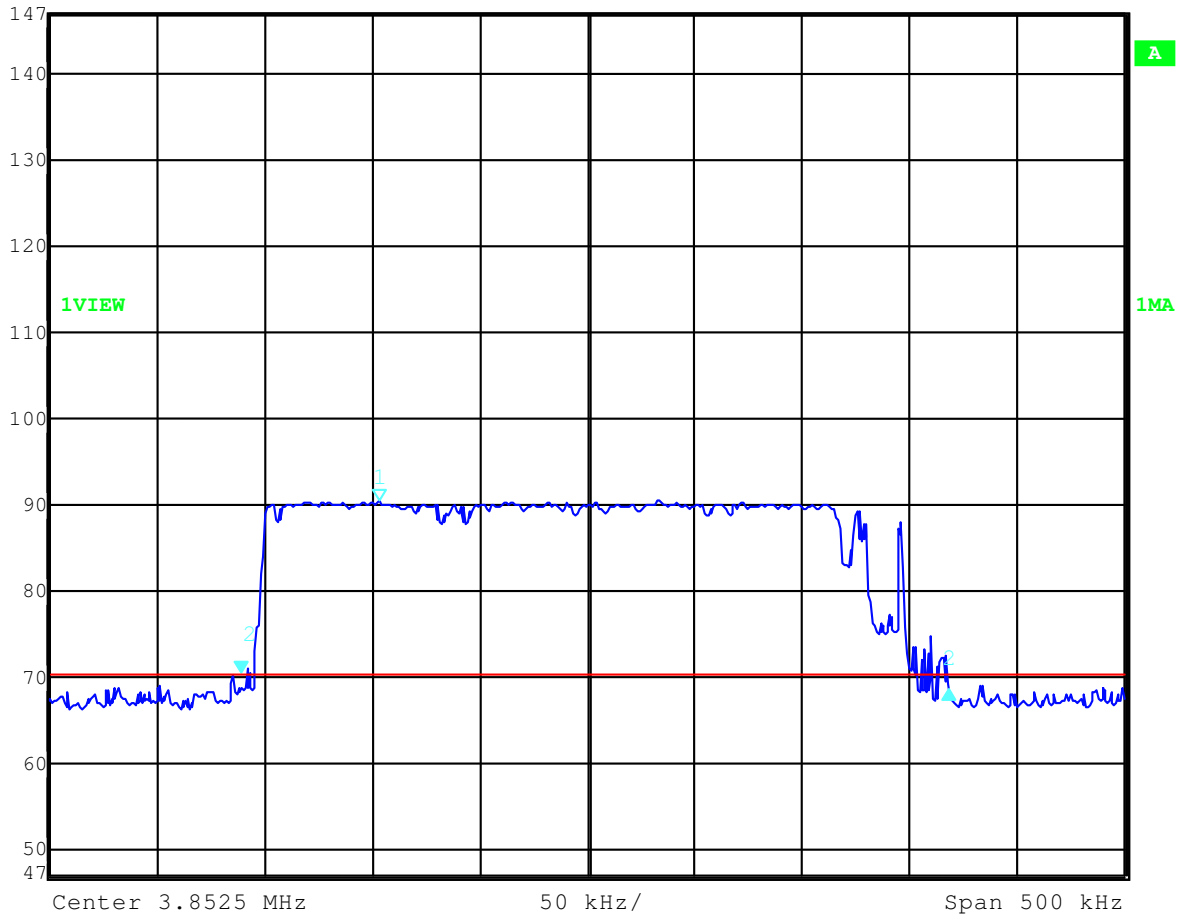

Delta 2 [T1]
RBW 1 kHz
RF Att 0 dB
Ref Lvl 147 dB*
2.29 dB
VBW 1 kHz
346.1903808 kHz
SWT 250 ms
Unit dBµV/m



Date: 18.FEB.2008 13:34:40

Plot 2: 20 dB-Bandwidth

	Delta 2 [T1]	REW	1 kHz	RF Att	0 dB
	Ref Lvl	2.29 dB	VBW	1 kHz	
	147 dB*	367.1903808 kHz	SWT	250 ms	Unit



Date: 18.FEB.2008 13:34:40

Maximum output power (peak) - (radiated)

Power measured

TEST CONDITIONS		MAXIMUM POWER ($\mu\text{V/m}$)		
Frequency		3.84 MHz		
Distance		0.3 m	10 m	30m
T_{nom} +21 °C	V_{nom} 1.3V DC	7.852 $\mu\text{V/m}$ 77.9 dB $\mu\text{V/m}$	7.9 $\mu\text{V/m}$ 17.9 dB $\mu\text{V/m}$	0.79 $\mu\text{V/m}$ -2.1 dB $\mu\text{V/m}$
Maximum deviation from output power under extreme test conditions (dBc)		1.0		
Measurement uncertainty		$\pm 3\text{dB}$		

RBW/VBW : 200 Hz up to 150 kHz, 9 kHz up to 30 MHz, 120 kHz up to 1 GHz

Measurement distance 0.3 m, recalculated to 10m and 30m with -40 dB/decade (15.31 (f)(2))

This measurement was done in 3 planes, the plot shows the worst case case

Limits

SUBCLAUSE § 15.209 (a)

Fundamental Frequency (MHz)	Field strength of Fundamental ($\mu\text{V/m}$)	Measurement Distance (meters)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30.0 – 88.0	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

Limits

SUBCLAUSE § 15.223

Fundamental Frequency (MHz)	Field strength of Fundamental ($\mu\text{V/m}$)	Measurement Distance (meters)
1.705 – 10.0	[15 $\mu\text{V/m}$] or [6dB-BW(kHz)/F(MHz)] whichever is higher (here 15.9 $\mu\text{V/m}$)	30

4.3 Field strength of the harmonics and the spurious

§ 15.209 (a) / 15.223

Reference

FCC:	CFR Part SUBCLAUSE § 15.209 (a) / § 15.223
IC:	RSS 210, Issue 7, 2.6

EMISSION LIMITATIONS					
f (MHz)		amplitude of emission (dBµV/m) Average/QP	limit max. allowed emission power at 30m	actual attenuation below frequency of operation (dB)	results
No spurious found					
Measurement uncertainty			± 3dB		

RBW/VBW : 200 Hz up to 150 kHz, 9 kHz up to 30 MHz, 120 kHz up to 1 GHz

Limits

SUBCLAUSE § 15.209 (a)

Fundamental Frequency (MHz)	Field strength of Fundamental (µV/m)	Measurement Distance (meters)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30.0 – 88.0	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

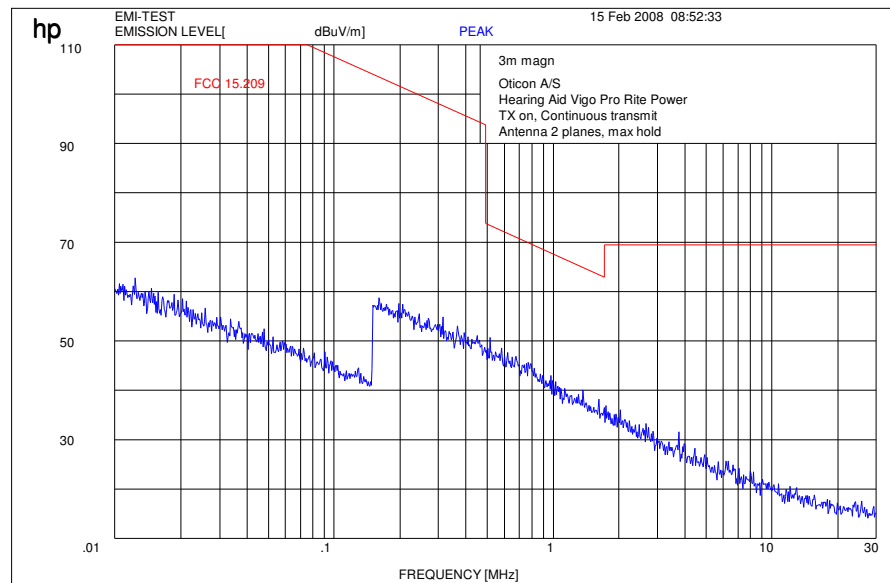
Limits

SUBCLAUSE § 15.223

Fundamental Frequency (MHz)	Field strength of Fundamental (µV/m)	Measurement Distance (meters)
1.705 – 10.0	[15] or [6dB-BW(kHz)/F(MHz)] whichever is higher	30

4.4 Plots of measurements

Plot 1: *Part 15.209 Magnetics TX*



Performed in a fully anechoic chamber at 3m to get an overview about radiated emissions. This values may have some errors because of the small distance between measuring antenna and sample. Therefore we remeasured all found peaks at 10m. (see page 10)

(to convert the measuring distance from 10m to 30m and 30 to 300m a correction factor from 40 dB/decade was used. Here we use 40 dB to recalculate from 3m to 30m)

Measurement distance 3 m

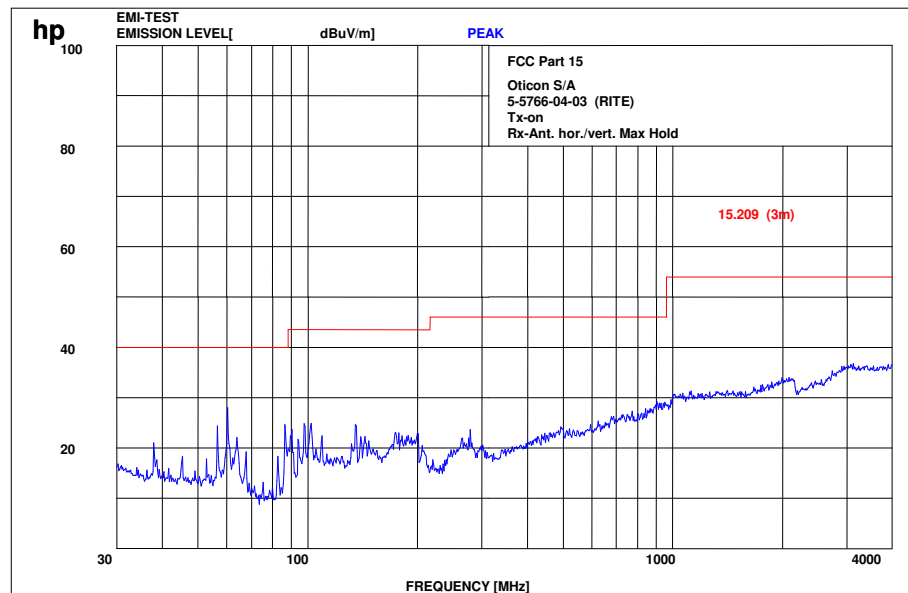
This measurement was done in 3 planes, the plot shows the worst case ase

Limits

SUBCLAUSE § 15.209

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Measurement distance (m)
0.0009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

Plot 2: **TX (30 MHz to 4 GHz)**



RBW/VBW : 200 Hz up to 150 kHz, 9 kHz up to 30 MHz

Measurement distance 3 m

This measurement was done in 2 planes, the plot shows the worst case case

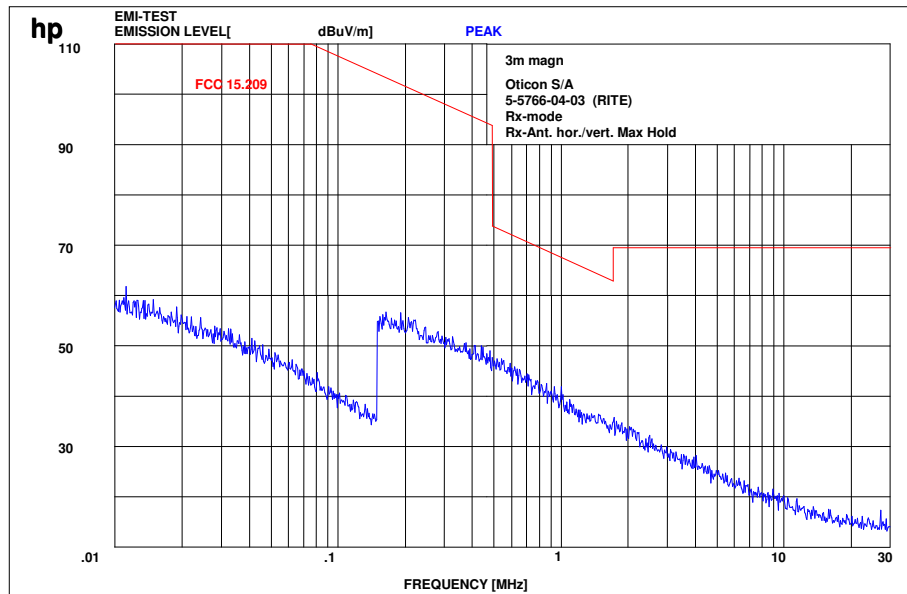
Limits

SUBCLAUSE § 15.209

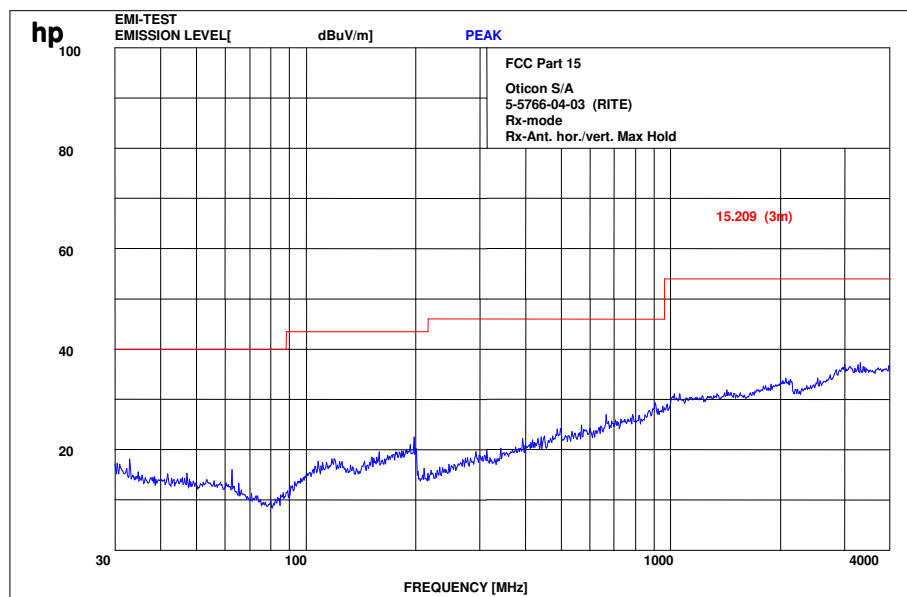
Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Measurement distance (m)
0.0009 – 0.490	$2400/F(\text{kHz})$	300
0.490 – 1.705	$24000/F(\text{kHz})$	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

4.5 Receiver spurious emission (radiated)

Plot 1:



Plot 2:



Reference

FCC:	CFR Part SUBCLAUSE § 15.109
IC:	RSS 210, Issue 7, Section 2.6

SPURIOUS EMISSIONS LEVEL ($\mu\text{V/m}$)								
3.85 MHz								
F [MHz]	Detector	Level [$\mu\text{V/m}$]	F [MHz]	Detector	Level [$\mu\text{V/m}$]	F [MHz]	Detector	Level [$\mu\text{V/m}$]
No critical peaks found								
Measurement uncertainty			± 3 dB					

$f < 1$ GHz : RBW/VBW: 100 kHz

$f \geq 1$ GHz : RBW/VBW: 1 MHz

Limits

SUBCLAUSE § 15.109

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Measurement distance (m)
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

4.6 Conducted Limits

Not applicable

Limits: § 15.107 / 15.207

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15 – 0.5	66 to 56 *	56 to 46 *
0.5 – 5	56	46
5 - 30	60	50

* Decreases with the logarithm of the frequency

SRD Laboratory Room 002:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	System Controller PSM 12	R&S	835259/007	3000002681-00xx	n.a.		
2	Memory Extension PSM-K10	R&S	To 1	3000002681	n.a.		
3	Operating Software PSM-B2	R&S	To 1	3000002681	n.a.		
4	19" Monitor		22759020-ED	3000002681	n.a.		
5	Mouse		LZE 0095/6639	3000002681	n.a.		
6	Keyboard		G00013834L 461	3000002681	n.a.		
7	Spectrum Analyser FSIQ 26	R&S	835540/018	3000002681-0005	01.08.2006	24	01.08.2008
8	Tracking Generator FSIQ-B10	R&S	835107/015	3000002681	s.No.7		
10	RF-Generator SMIQ03 (B1 Signal)	R&S	835541/056	3000002681-0002	01.08.2006	36	01.08.2009
11	Modulation Coder SMIQ-B20	R&S	To 10	3000002681	s.No.10		
12	Data Generator SMIQ-B11	R&S	To 10	3000002681	s.No.10		
13	RF Rear Connection SMIQ-B19	R&S	To 10	3000002681	s.No.10		
14	Fast CPU SM-B50	R&S	To 10	3000002681	s.No.10		
15	FM Modulator SM-B5	R&S	835676/033	3000002681	s.No.10		
16	RF-Generator SMIQ03 (B2 Signal)	R&S	835541/055	3000002681-0001	01.08.2006	36	01.08.2009
17	Modulation Coder SMIQ-B20	R&S	To 16	3000002681	s.No.16		
18	Data Generator SMIQ-B11	R&S	To 16	3000002681	s.No.16		
19	RF Rear Connection SMIQ-B19	R&S	To 16	3000002681	s.No.16		
20	Fast CPU SM-B50	R&S	To 16	3000002681	s.No.16		
21	FM Modulator SM-B5	R&S	836061/022	3000002681	s.No.16		
22	RF-Generator SMP03 (B3 Signal)	R&S	835133/011	3000002681-0003	01.08.2006	36	01.08.2009
23	Attenuator SMP-B15	R&S	835136/014	3000002681	S.No.22		
24	RF Rear Connection SMP-B19	R&S	834745/007	3000002681	S.No.22		
25	Power Meter NRVD	R&S	835430/044	3000002681-0004	01.08.2006	24	01.08.2008
26	Power Sensor NRVD-Z1	R&S	833894/012	3000002681-0013	01.08.2006	24	01.08.2008
27	Power Sensor NRVD-Z1	R&S	833894/011	3000002681-0010	01.08.2006	24	01.08.2008
28	Rubidium Standard RUB	R&S		3000002681-0009	01.08.2006	24	01.08.2008
29	Switching and Signal Conditioning Unit SSCU	R&S	338864/003	3000002681-0006	01.08.2006	24	01.08.2008
30	Laser Printer HP Deskjet 2100	HP	N/A	3000002681-0011	n.a.		
31	19" Rack	R&S	11138363000 004	3000002681	n.a.		
32	RF-cable set	R&S	N/A	3000002681	n.a.		
33	IEEE-cables	R&S	N/A	3000002681	n.a.		
34	Sampling System FSIQ-B70	R&S	835355/009	3000002681	s.No.7		

35	RSP programmable attenuator	R&S	834500/010	3000002681-0007	01.08.2006	24	01.08.2008
36	Signalling Unit	R&S	838312/011	3000002681	n.a.		
37	NGPE programmable Power Supply for EUT	R&S	192.033.41	3000002681			
38	Climatic box VT 4002	Heraeus Vötsch	58566046820 010	300003019	11.05.2007	24	11.05.2009
39	Signaling Unit CMU200	R&S	832221/0055	300002862	12.01.2006	24	12.01.2008
40	Power Splitter 6005-3	Inmet Corp.	none	300002841	23.12.2006	24	23.12.2008
41	SMA Cables SPS-1151-985-SPS	Insulated Wire	different	different	n.a.		
42	CBT32 with EDR Signaling Unit	R&S					
43	Coupling unit	Narda	N/A	--	n.a.		
44	2xSwitch Matrix PSU	R&S	872584/021	300001329	n.a.		
45	RF-cable set	R&S	N/A	different	n.a.		
46	IEEE-cables	R&S	N/A	--	n.a.		

Anechoic chamber F:

No.	Instrument/Ancillary	Manufacturer	Type	Serial-No.	Internal identification
Radiated emission in chamber F					
F-1	Control Computer	F+W		FW0502032	300003303
F-2	Bilog antenna	Chase	CBL 6112A	2110	300000573
F-3a	Amplifier	Veritech Microwave Inc.	0518C-138	- / -	- / -
F-4b	Switch	HP	3488A	- / -	300000368
F-5	EMI Test receiver	R&S	ESCI	100083	300003312
F-6	Turntable Controller	EMCO	1061 3M	1218	300000661
F-7	Tower Controller	EMCO	1051 Controller	1262	300000625
F-8	Tower	EMCO	1051 Tower	1262	300000625
F-9	Ultra Notch-Filter Rejected band Ch. 62	WRCD		9	