TEST REPORT
No.: 6-0147-12-19-6c

According to:
FCC Regulations
Part 15.107, Part 15.109, Part 15.209

IC-Regulations
RSS-Gen, Issue 3

for

Cinterion Wireless Modules GmbH

Wireless Module EHS6

FCC-ID: QIPEHS6
IC-ID: 7830A-EHS6

Laboratory Accreditation and Listings			
DAkkS Deutsche Akkreditierungsstelle D-PL-12047-01-01	Reg. No.: 736496 MRA US-EU 0003	Industry Canada Reg. No.: 3462D-1 Reg. No.: 3462D-2 Reg. No.: 3462D-3	Voluntary Controls for Electromagnetic Emissions Reg. No.: R-2665, R-2666 C-2914, T-1967, G-301
Wi Fi ALLIANCE AUTHORIZED RF LABORATORY	CTIA Authorized Test Lab LAB CODE 20011130-00		
accredited according to DIN EN ISO/IEC 17025			

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The listed attachments are an integral part of this report.

1. Summary of test results

The test results apply exclusively to the test samples as presented in this Report. The CETECOM GmbH does not assume responsibility for any conclusions and generalizations taken in conjunction with other specimens or samples of the type of the item presented to tests.

The Equipment Under Test (in this report, hereinafter referred as EUT) supports radiofrequency technologies. This test report shows results for GSM and (E)GPRS technologies only when EUT is performing in RX conditions. Other implemented wireless technologies were not considered within this test report.

Following tests have been performed to show compliance with applicable FCC Part 15 of the FCC CFR 47 Rules, Edition October 2012 (e-CFR 47 FCC Rules) and Canada RSS-Gen Issue 3 standards.

1.1. TEST OVERVIEW ACCORDING FCC PART 15B/C AND CANADIAN RSS- OR ICES STANDARDS

No. of Diagram group	Test Cases	Port	References, Standarts & Limits			EUT set-up	EUT op-mode	Result
			FCC	IC	Limits			
1	AC Power Lines Conducted emissions 0,15 – 30 MHz	AC Power lines	§15.107	--	☐ Class A ☒ Class B	2	7+8+9 +10	passed
			§15.207		§15.207		1+4+5 +6	
			--	RSS-Gen., Issue 3	Chapter 7.2.4 Table 4		1+4+5 +6+7+ 8+9+10	
2	Radiated emissions 9 kHz - 30 MHz)	Cabinet + Inter-connecting cables	§15.209	RSS-Gen., Issue 3 Table 6	2400/F(kHz) µV/m 24000/F(kHz) µV/m 30 µV/m	1	2+6	passed
3	Radiated emissions 30 MHz-1 GHz	Cabinet + Inter-connecting cables	§15.109	--	☐ Class A ☒ Class B	1	7+8+9 +10	.passed
			--	RSS-Gen., Issue 3	Chapter 6.1 Table 2			
4	Radiated emissions above 1 GHz	Cabinet + Inter-connecting cables	§15.109	--	☐ Class A ☒ Class B	1	7+8+9 +10	.passed
			--	RSS-Gen., Issue 3	Chapter 6.1			

Remark:

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Responsible for test section

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Dipl.-Ing. C. Lorenz
Responsible for test report

2. Administrative Data

2.1. Identification of the testing laboratory

Company name:	CETECOM GmbH
Address:	Im Teelbruch 116 45219 Essen - Kettwig Germany
Responsible for testing laboratory:	Dipl.-Ing. Niels Jeß
Deputy:	Dipl.-Ing. Rachid Acharkaoui

2.2. Test location

2.2.1. Test laboratory "CTC"

Company name:	see chapter 2.1. Identification of the testing laboratory

2.3. Organizational items

Order No.:	E60041719
Responsible for test report and project leader:	Dipl.-Ing. C. Lorenz
Receipt of EUT:	2012-10-29
Date(s) of test:	2012-10-30 to 2013-04-10
Date of report:	2013-05-06
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Version of template: 12.11 Lorenz	

2.4. Applicant's details

Applicant's name:	Cinterion Wireless Modules GmbH
Address:	St.-Martin-Str. 60 81541 München Germany
Contact person:	Mr. Stefan Ludwig

2.5. Manufacturer's details

Manufacturer's name:	please see Applicant's details
Address:	please see Applicant's details

3. Equipment under test (EUT)

3.1. EUT: Type, S/N etc. and short descriptions used in this test report

Short description*)	EUT	Type	S/N serial number	HW hardware status	SW software status
EUT A	Wireless Module	EHS6	004401080840396	B2 (rev.2)	Rev 01.001

*) EUT short description is used to simplify the identification of the EUT in this test report.

3.2. Auxiliary Equipment (AE): Type, S/N etc. and short descriptions

AE short description *)	Auxiliary Equipment	Type	S/N serial number	HW hardware status	SW software status
AE 1	SMARTEQ MiniMag. mount antenna	2.6m RG174, SMA-m 0dBd, 824-960 / 1710-2170MHz	59801B	1140.26 SMA	-
AE 2	RS232 cable	2 m	-	-	-
AE 3	DSB75-Adapter	DSB75	-	AH6-DSB75-1	-
AE 4	Handset Votronic	Telephone receiver with RJ11 connector	4017953211311	HH-SI-30.3/V3.0/0	-
AE 5	USB cable	1m	-	-	-
AE 6	Notebook	DELL D610 D	CTC-PC3	-	Windows XP + Terminal Programm

*) AE short description is used to simplify the identification of the auxiliary equipment in this test report.

3.3. EUT set-ups

EUT set-up no.*)	Combination of EUT and AE	Remarks
Set. 1	EUT A + AE1 + AE2 + AE3 + AE4 + AE5 + AE6	Radiated tests performed: AT commands set the device into operating mode conditions with help of AE6 AE6 is not connected to the EUT during tests
Set. 2	EUT B + AE2 + AE3 + AE5 + AE6	Conducted tests performed: AT commands set the device into operating mode conditions with help of AE6.

*) EUT set-up no. is used to simplify the identification of the EUT set-up in this test report.

3.4. EUT TX operating modes

EUT operating mode no.*)	Description of operating modes	Additional information
op. 1	GSM 850-Voice Traffic channels = 128/192/251	A communication link is established between the mobile station and the test simulator. The transmitter is operated at its maximum rated output power: 33 dBm (power class 4; power control level 5). The input signal to the receiver is modulated with normal test modulation. The wanted RF input signal level to the receiver of the mobile station is set to a level to provide a stable communication link.
op. 2	GPRS 850 Data Traffic channels = 128/192/251	A communication link is established between the mobile station and the test simulator. The transmitter is operated at its maximum rated output power: 33 dBm (power class 4; power control level 5). USF_Duty CYCLE set to 100%, coding scheme CS-1 for GMSK modulation, slot 3 active, uplink gamma: 3 (33 dBm). The input signal to the receiver is modulated with normal test modulation. The wanted RF input signal level to the receiver of the mobile station is set to a level to provide a stable communication link.
op. 3	GSM1900-Voice Traffic channels = 512/661/810	A communication link is established between the mobile station and the test simulator. The transmitter is operated at its maximum rated output power: 30 dBm (power class 1; power control level 0). The input signal to the receiver is modulated with normal test modulation. The wanted RF input signal level to the receiver of the mobile station is set to a level to provide a stable communication link
op. 4	GPRS 1900 Data Traffic channels = 512/661/810	A communication link is established between the mobile station and the test simulator. The transmitter is operated at its maximum rated output power: 30 dBm (power class 1; power control level 0). USF_Duty CYCLE set to 100%, coding scheme CS-1 for GMSK modulation, slot 3 active, uplink gamma: 3 (30 dBm). The input signal to the receiver is modulated with normal test modulation. The wanted RF input signal level to the receiver of the mobile station is set to a level to provide a stable communication link
op. 5	FDD-Band 5 12.2 kbps RMC	A communication link is established between the mobile station (UE) and the test simulator. The transmitter is operated on its maximum rated output power class: 21 dBm or 24dBm nominal. The input signal to the receiver is modulated with normal test modulation. The wanted RF input signal level to the receiver of the mobile station is set to a level to provide a stable communication link according Table E5.1/Table E5.1A as described in 3GPP TS34.121, Annex E.
op. 6	FDD-Band 2 12.2 kbps RMC	A communication link is established between the mobile station (UE) and the test simulator. The transmitter is operated on its maximum rated output power class: 21 dBm or 24dBm nominal. The input signal to the receiver is modulated with normal test modulation. The wanted RF input signal level to the receiver of the mobile station is set to a level to provide a stable communication link according Table E5.1/Table E5.1A as described in 3GPP TS34.121, Annex E.

*) EUT operating mode no. is used to simplify the test report.

3.5. EUT RX operating modes

EUT operating mode no.*)	Description of operating modes	Additional information
op. 7	GSM 850 Idle mode BCCH 50	The mobile station is synchronized to the Broadcast Control Channel (BCCH) and listening to the Common Control Channel (CCCH). Periodic location update is disabled.
op. 8	GSM 1900 Idle mode BCCH 651	The mobile station is synchronized to the Broadcast Control Channel (BCCH) and listening to the Common Control Channel (CCCH).
op. 9	Synchronized FDD Band 2 Registered/RX-Mode	The mobile station is synchronized to the Node B station. The Node B downlink physical channels settings according Table E.5.1/E.5.1A in 3GPP TS34.121.
op. 10	Synchronized FDD Band 5 Registered/RX-Mode	

*) EUT operating mode no. is used to simplify the test report.

3.6. Additional declaration and description of EUT

(Applicant's declaration, ☐ = not selected, ☒ = selected)

EUT A/ AE 3	☐ table-top ☐ floor-standing ☐ wall-mounted ☒ not defined	typical use ☒ portable use ☒ fixed use ☐ vehicular use	typical operating cycle of EUT. ☒ < 0,5 sec. ☐ :
Place of use	☒ Residential, commercial and light industry ☐ Industrial environment ☐ vehicular use		
Highest frequency generated or used in the device or on which the device operates or tunes	☐ below 1.705 MHz -> up to 30 MHz ☐ 1.705 MHz – 108 MHz -> up to 1 GHz ☐ 108 MHz -500 MHz -> up to 2 GHz ☐ 500MHz 1000 MHz -> up to 5 GHz ☒ Above 1000 MHz -> 5th harmonic or 40 GHz		
Power line: ☐ AC ☐ L1, ☐ L2, ☐ L3, ☐ N ☒ DC ☒ 9 to 12V for AE 3 ☒	EUT-grounding: ☒ none ☐ with power supply ☐ additional:	(in case of deviation during tests the single details are described on chapter 4)	

Other Ports (description of interconnecting cables)	Connector	possible total cable length	shielding	connected during test
RS232 Port	--	☒ < 3m ☐> 3m ☐ : other	☒ screened ☐ unscreened	☒ yes ☐ no
USB Port	--	☒ < 3m ☐> 3m ☐ : other	☒ screened ☐ unscreened	☒ yes ☐ no
RJ11 handset line	--	☒ < 3m ☐> 3m ☐ : other	☒ screened ☐ unscreened	☒ yes ☐ no
RF-antenna port	--	☒ < 3m ☐> 3m ☐ : other	☒ screened ☐ unscreened	☐ yes ☒ no
Does EUT contain devices susceptible to magnetic fields, e.g. Hall elements, electrodynamics microphones, etc.?				☐ yes ☒ no
Is mounting position / usual operating position defined?				☐ yes ☒ no

3.7. Configuration of cables used for testing

Cable number	Item	Type	S/N serial number	HW hardware status	Cable length
Cable 1	RS232 Port	--	--	--	2.5 m
Cable 2	USB Port	--	--	--	1 m
Cable 3	RJ11 handset line	--	--	--	1.5 m
Cable 4	RF-antenna port	--	--	--	1.5 m

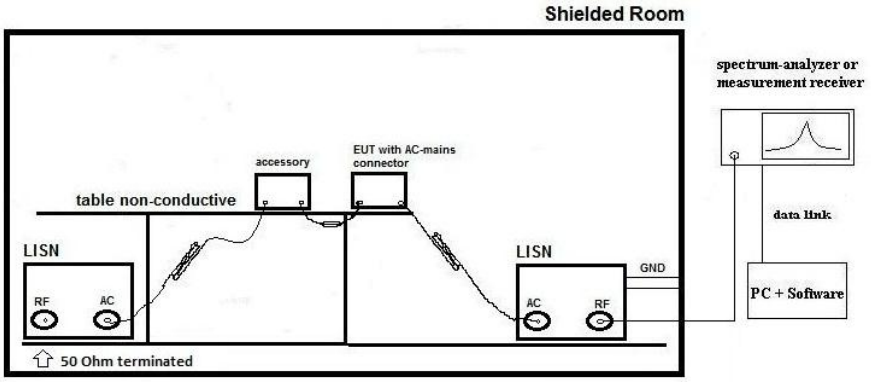
4. Description of test system set-up's

4.1. Test system set-up for AC power-line conducted emission measurements

Specification: ANSI C63.4-2009 chapter 7, ANSI C63.10-2009 chapter 6.2

General Description: The radio frequency voltage conducted back into the AC power line in the frequency range 150 kHz to 30 MHz has to be investigated. Compliance should be tested by measuring the radio frequency voltage between each power line and ground at the power terminals in the stated frequency range.
A 50 Ohm / 50 µH line impedance stabilization network (LISN) is used coupling the interface to the measurement equipment. The EUT power input leads are connected through the LISN to the AC-power source. The LISN enclosure is electrically connected to the ground plane. The measuring instrument is connected to the coaxial output of the LISN.
Tabletop devices were set-up on a 80 cm height above reference ground plane, floor standing equipment 10 cm raised above ground plane. Measurements have been performed on each phase line and neutral line of the devices AC-power lines. The EUT was power supplied with 110 V/60 Hz. The EUT was tested in the defined operating mode and installed (connected) to accessory equipment according the general description of use given by the applicant.

Schematic:



Only schematic view, we refer to figure 6, 7 and 8 of ANSI C63.4-2009 for more details.

Testing method: **Exploratory, preliminary measurements** as a first step, determines the worst-case phase line (neutral or phase) as well as the most critical operating mode of the equipment. A complete frequency-sweep with PK-Detector is performed on each current-carrying conductor.

Final testing for power phases and critical frequencies (Margin to AV- or QP limit lower than 3 dB) as a second step includes measurements with receivers detector set to Quasi-Peak and Average.

Formula:

$V_C = V_R + C_L$ (1)
$M = L_T - V_C$ (2)

V_C = measured Voltage –corrected value
V_R = Receiver reading
C_L = Cable loss
M = Margin
L_T = Limit

Values are in dB, positive margin means value is below limit.

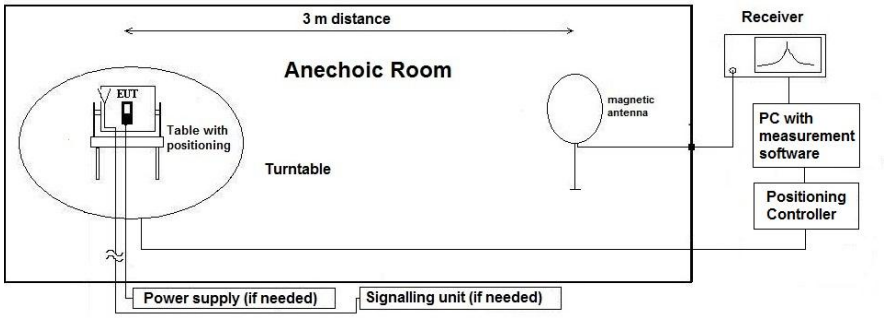
4.2. Test system set-up for radiated magnetic field measurements below 30 MHz

Specification: ANSI C63.4-2009 chapter 8.2.1, ANSI C63.10-2009 chapter 6.4

General Description: Evaluating the radiated field emissions are done first by an exploratory emission measurement and a final measurement for most critical frequencies determined.

The loop antenna was placed at 1 m height above ground plane and 3 m measurement distance from set-up for investigations. Because of reduced measurement distance, correction data were applied, as stated in chapter "General Limit - Radiated field strength emissions below 30 MHz". The tests are performed in the semi anechoic room recognized by the regulatory commission.

Schematic:



Testing method:

Exploratory, preliminary measurement
The EUT and it's associated accessories are placed on a non-conductive position manipulator (tipping device) of 0.8 m height which is placed on the turntable. By rotating the turntable (step 90°, range 0°to 360°) and the EUT itself either on 3-orthogonal axis (portable equipment) or 2-orthogonal axis (defined operational position of EUT), the emission spectrum was recorded. The loop antenna was moved at least to 2-perpendicular axes (antenna vector in direction of EUT and parallel to EUT) in order to maximize the emissions. The results are documented in a diagram. Critical frequencies (low margin to limit) are saved within a data reduction table for further investigations. If various operating modes are supported, further investigations are made to find the worst-case. Also the interconnection cables and equipment position were varied in order to maximize the emissions.

Final measurement on critical frequencies
Based on the exploratory measurements, the most critical frequencies are re-measured by maintaining the EUT's worst-case operation mode, cable position, etc.

First a frequency zoom around the critical frequency is done to locate the frequency more precisely. After this step, for all identified critical frequencies, the maximum peak was determined.

Following parameters were varied: the turntable angle continuously in the range 0 to 360 degree, the EUT itself either over 3-orthogonal axis (not defined usage position) or 2-orthogonal axis (defined usage position).

On the determined worst-case position, a final measurement with necessary bandwidth and detector according standard has been carried out.

Formula:

$E_C = E_R + AF + C_L + D_F - G_A$

$M = L_T - E_C$

AF =Antenna factor
C_L = Cable loss
D_F= Distance correction factor
E_C = Electrical field – corrected value
E_R = Receiver reading
G_A= Gain of pre-amplifier (if used)
L_T = Limit
M = Margin

All units are dB-units, positive margin means value is below limit.

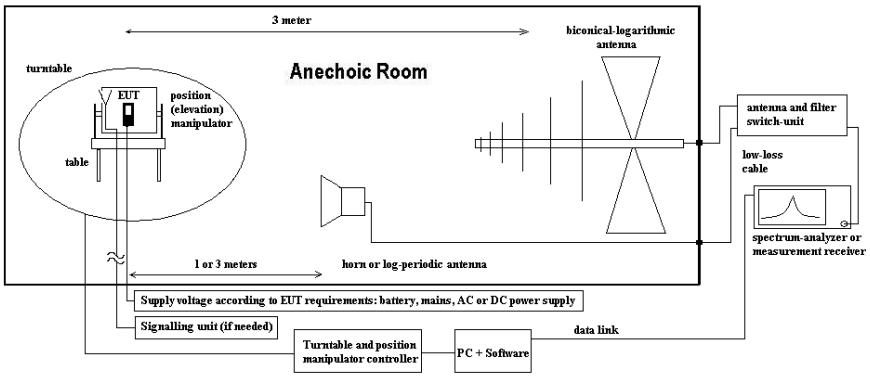
Distance correction: Reference for applied correction (extrapolating) factors:
IEEC Transaction EMC, Vol. 47, No. 3 , Aug. 2005, Journal Paper
"*Extrapolating Near-field emissions of low frequency loop transmitters".*

4.3. Test system set-up for radiated electric field measurement 30 MHz to 1 GHz

Specification: ANSI C63.4-2009 chapter 8, ANSI C63.10-2009 chapter 6.5

General Description: Evaluating the field emissions have to be done first by an exploratory emissions measurement and a final measurement for most critical frequencies. The tests are performed in a NSA-compliant semi anechoic room (SAR) recognized by the regulatory commissions.

Schematic:



Testing method:

Exploratory, preliminary measurements
The EUT and it's associated accessories are placed on a non-conductive position manipulator (tipping device) of 0.8 m height which is placed on the turntable. By rotating the turntable (range 0° to 360°, step 90°) and the EUT itself either on 3-orthogonal axis (portable equipment) or 2-orthogonal axis (defined operational position of EUT) the emission spectrum and it's characteristics was recorded with an EMI-receiver, broadband antenna and software.

Measurement antenna: horizontal and vertical, heights: 1,0 m and 1,82 m. The results are documented in a diagram. Critical frequencies (low margin to limit) are saved within a table for further investigations. If various operating modes are supported, further investigations are made to find the worst-case of them. Also the interconnection cables and equipment position were varied in order to maximize the emissions.

Final measurement on critical frequencies
Based on the exploratory measurements, the most critical frequencies are re-measured by maintaining the EUT's worst-case operation mode, cable position, etc.

First a frequency zoom around the critical frequency is done to locate the frequency more precisely. After this step, for all identified critical frequencies, the maximum peak was determined.

Following parameters were varied: the turntable angle continuously in the range 0 to 360 degree, the EUT itself either over 3-orthogonal axis (not defined usage position) or 2-orthogonal axis (defined usage position). The measurement antenna height between 1 m and 4 m.

On the determined worst-case position, a final measurement with necessary bandwidth and detector according standard has been carried out.

Formula:

$E_C = E_R + AF + C_L + D_F - G_A$ (1)

$M = L_T - E_C$ (2)

AF = Antenna factor
C_L = Cable loss
D_F = Distance correction factor (if used)
E_C = Electrical field – corrected value
E_R = Receiver reading
G_A = Gain of pre-amplifier (if used)
L_T = Limit
M = Margin

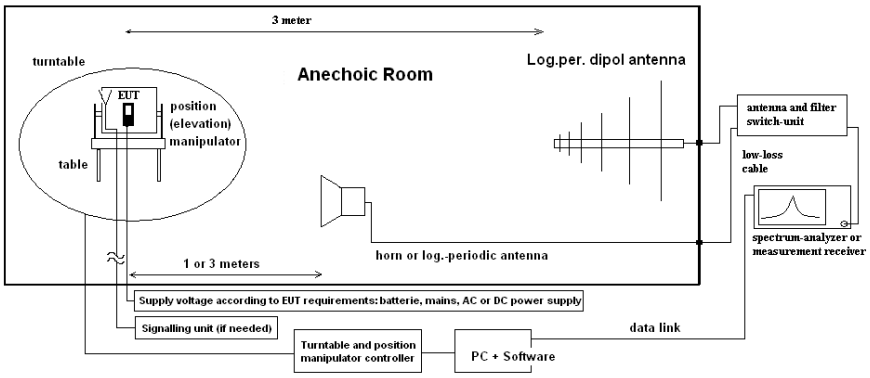
All units are dB-units, positive margin means value is below limit.

4.4. Test system set-up for radiated electric field measurement above 1 GHz

Specification: ANSI C63.4-2009 chapter 8, ANSI C63.10-2009 chapter 6.6

General Description: Evaluating the field emissions have to be done first by an exploratory emissions measurement and a final measurement for most critical frequencies. The tests are performed in a CISPR 16-4 compliant fully anechoic room (FAR) recognized by the regulatory commissions. The measurement distance was set to 3 meter for frequencies up to 18 GHz and 1 meter above 18 GHz. Logarithmic periodic antenna is used for frequency range 1 GHz to 18 GHz, above 18 GHz a horn antenna is used. The antennas are set to fixed antenna height of 1.55 m and the EUT aligned within 3 dB cone of radiation pattern.

Schematic:



Testing method:

Exploratory, preliminary measurements
The EUT and it's associated accessories are placed on a non-conductive position manipulator (tipping device) of 1.55 m height which is placed on the turntable. By rotating the turntable (range 0° to 360°, step 45°) and the EUT itself either on 3-orthogonal axis (portable equipment) or 2-orthogonal axis (defined operational position of EUT) the emission spectrum and it's characteristics was recorded with an EMI-receiver, broadband antenna and software.
The measurements are performed in horizontal and vertical polarization of the measurement antennas. The results are documented in a diagram. Critical frequencies (low margin to limit) are saved within a table for further investigations. If various operating modes are supported, further investigations are made to find the worst-case of them. Also the interconnection cables and equipment position were varied in order to maximize the emissions.

Final measurement on critical frequencies
Based on the exploratory measurements, the most critical frequencies are re-measured by maintaining the EUT's worst-case operation mode, cable position, etc.

First a frequency zoom around the critical frequency is done to locate the frequency more precisely. After this step, for all identified critical frequencies, the maximum peak was determined.

Following parameters were varied: the turntable angle continuously in the range 0 to 360 degree, the EUT itself either over 3-orthogonal axis (not defined usage position) or 2-orthogonal axis (defined usage position). The measurement antenna height is fixed to 1.55 m.

On the determined worst-case position, a final measurement with necessary bandwidth and detector according standard has been carried out.

Formula:

$E_C = E_R + AF + C_L + D_F - G_A$ (1)

$M = L_T - E_C$ (2)

E_C = Electrical field – corrected value
E_R = Receiver reading
M = Margin
L_T = Limit
AF = Antenna factor
C_L = Cable loss
D_F = Distance correction factor (if used)
G_A = Gain of pre-amplifier (if used)

All units are dB-units, positive margin means value is below limit.

5. Measurements

5.1. General Limit - Conducted emissions on AC-Power lines

5.1.1. Test location and equipment

test location	☒ CETECOM Essen (Chapter 2.2.1)		☐ Please see Chapter 2.2.2		☐ Please see Chapter 2.2.3	
test site	☐ 333 EMI field	☒ 348 EMI cond.				
receiver	☐ 001 ESS	☒ 377 ESCS 30	☐ 489 ESU 40	☐ 620 ESU 26		
LISN	☒ 005 ESH2-Z5	☐ 007 ESH3-Z6	☐ 300 ESH3-Z5 & 50Ω used for AE		☒ no LISN for AE	
signalling	☒ 392 MT8820A	☐ 436 CMU	☐ 547 CMU	☐ 594 CMW		
line voltage	☐ 230 V 50 Hz via public mains		☒ 060 120 V 60 Hz via PAS 5000			

5.1.2. Requirements

FCC		Part 15, Subpart B, §15.207	
IC		RSS-Gen., § 7.2.4	
ANSI		C63.4-2009 / C63.10-2009	
Limit	Frequency [MHz]	QUASI-Peak [dBµV]	AVERAGE [dBµV]
	0.15 – 0.5	66 to 56*	56 to 46*
	0.5 – 5	56	46
	5 – 30	60	50
Remark: * decreases with the logarithm of the frequency			

5.1.3. Test condition and test set-up

link to test system (if used):	☒ air link	☐ cable connection	☐
EUT-grounding	☒ none	☐ with power supply	☐ additional connection
Equipment set up	☒ table top (40 cm distance to reference ground plane (wall)		☐ floor standing EUT stands isolated on reference ground plane (floor)
Climatic conditions	Temperature: (22±3°C)		Rel. humidity: (40±20)%
EMI-Receiver or Analyzer settings – Scan data	☐ 9 – 150 kHz, RBW = 200 Hz, Step = 61 Hz ☒ 150 kHz – 30 MHz RBW = 9 kHz, Step = 4 kHz ☐ other:		
EMI-Receiver or Analyzer settings – Scan-Mode Pre-measurement Final measurement	6 dB EMI-Receiver Mode Peak detector, Repetitive-Scan, max-hold, sweep-time 50 µs per frequency point Average & Quasi-peak detector at critical frequencies		
General measurement procedures	Please see chapter "Test system set-up for AC power line conducted emissions measurements"		

5.1.4. Measurement results according §15.207

The results are presented below in summary form only. For more information please see the diagrams

EUT set-up no.:			set-up 1		
Diagram No.	EUT operating mode no. or commend	Used Detector	Power line	Additional (scan-) information or remarks	Result
1.1_TX_ Ch192	EUT operating mode 1	☒ Peak (pre-scan) ☒ CAV (final) ☐ QP (final)	L1/ N	--	passed
1.3_TX_ Ch661	EUT operating mode 4	☒ Peak (pre-scan) ☒ CAV (final) ☐ QP (final)	L1/ N	--	passed
1.5_TX_ Ch9400	EUT operating mode 6	☒ Peak (pre-scan) ☒ CAV (final) ☐ QP (final)	L1/ N	--	passed
1.7_TX_ Ch4183	EUT operating mode 5	☒ Peak (pre-scan) ☒ CAV (final) ☐ QP (final)	L1/ N	--	passed

5.1.5. Measurement results according §15.107, class B

The results are presented below in summary form only. For more information please see the diagrams

EUT set-up no.:			set-up 1		
Diagram No.	EUT operating mode no. or commend	Used Detector	Power line	Additional (scan-) information or remarks	Result
1.2_RX_ Ch192	EUT operating mode 7	☒ Peak (pre-scan) ☒ CAV (final) ☐ QP (final)	L1/ N	--	passed
1.4_RX_ Ch661	EUT operating mode 8	☒ Peak (pre-scan) ☒ CAV (final) ☐ QP (final)	L1/ N	--	passed
1.6_RX_ Ch9400	EUT operating mode 9	☒ Peak (pre-scan) ☒ CAV (final) ☐ QP (final)	L1/ N	--	passed
1.8_RX_ Ch4183	EUT operating mode 10	☒ Peak (pre-scan) ☒ CAV (final) ☐ QP (final)	L1/ N	--	passed

5.2. General Limit - Radiated field strength emissions below 30 MHz

5.2.1. Test location and equipment

test location	☒ CETECOM Essen (Chapter. 2.2.1)		☐ Please see Chapter. 2.2.2		☐ Please see Chapter. 2.2.3	
test site	☒ 441 EMI SAR	☐ 487 SAR NSA	☐ 347 Radio.lab.		☐	☐
receiver	☐ 377 ESCS30	☒ 001 ESS	☐	☐	☐	☐
spectr. analys.	☐ 584 FSU	☐ 120 FSEM	☐ 264 FSEK	☐	☐	☐
antenna	☐ 574 BTA-L	☐ 133 EMCO3115	☐ 302 BBHA9170	☐ 289 CBL 6141	☒ 030 HFH-Z2	☐ 477 GPS
signaling	☐ 392 MT8820A	☐ 436 CMU	☐ 547 CMU	☐ 594 CMW		
otherwise	☐ 400 FTC40x15E	☐ 401 FTC40x15E	☐ 110 USB LWL	☐ 482 Filter Matrix	☐ 378 RadiSense	
DC power	☐ 456 EA 3013A	☐ 457 EA 3013A	☐ 459 EA 2032-50	☐ 268 EA- 3050	☐ 494 AG6632A	☐ 498 NGPE 40
line voltage	☐ 230 V 50 Hz via public mains		☒ 060 120 V 60 Hz via PAS 5000			

5.2.2. Requirements

FCC	Part 15, Subpart C, §15.205 & §15.209			
IC	RSS-Gen., Issue 3			
ANSI	C63.10-2009			
Frequency [MHz]	Field strength limit [µV/m]	[dBµV/m]	Distance [m]	Remarks
0.009 – 0.490	2400/f (kHz)	67.6 – 20Log(f) (kHz)	300	Correction factor used due to measurement distance of 3 m
0.490 – 1.705	24000/f (kHz)	87.6 – 20Log(f) (kHz)	30	Correction factor used due to measurement distance of 3 m
1.705 – 30	30	29.5	30	Correction factor used due to measurement distance of 3 m

5.2.3. Test condition and test set-up

link to test system (if used):		☐ air link	☐ cable connection	☐ none
EUT-grounding		☐ none	☐ with power supply	☐ additional connection
Equipment set up		☒ table top		☐ floor standing
Climatic conditions		Temperature: (22±3°C)		Rel. humidity: (40±20)%
EMI-Receiver or Analyzer Settings	Scan data	☒ 9 – 150 kHz RBW/VBW = 200 Hz Scan step = 80 Hz ☒ 150 kHz – 30 MHz RBW/VBW = 9 kHz Scan step = 4 kHz ☐ other:		
	Scan-Mode Detector Mode: Sweep-Time	☒ 6 dB EMI-Receiver Mode ☐ 3dB Spectrum analyser Mode Peak (pre-measurement) and Quasi-PK/Average (final if applicable) Repetitive-Scan, max-hold Coupled – calibrated display if continuous signal otherwise adapted to EUT's individual transmission duty-cycle		
General measurement procedures		Please see chapter "Test system set-up radiated magnetic field measurements below 30 MHz"		

5.2.4. Measurement Results

The results are presented below in summary form only. For more information please see the diagrams.

Due to uncritical measurements (only noise floor) measurements have been performed only in GPRS850 and FDD RMC99 operational mode.

Table of measurement results:

Diagram No.	Carrier Channel Range	Carrier Channel No.	Frequency range	Set-up no.	OP-mode no.	Remark	Used detector PK	Used detector AV	Used detector QP	Result
2.01	Low	128	9 kHz-30 MHz	1	2	GPRS 850 Mode	☒	☐	☐	passed
2.04	Low	9262	9 kHz-30 MHz		6	FDD Band 2 mode	☒	☐	☐	passed
2.02	Middle	192	9 kHz-30 MHz		2	GPRS 850 Mode	☒	☐	☐	passed
2.05	Middle	9400	9 kHz-30 MHz		6	FDD Band 2 mode	☒	☐	☐	passed
2.03	High	251	9 kHz-30 MHz		2	GPRS 850 Mode	☒	☐	☐	passed
2.06	High	9538	9 kHz-30 MHz		6	FDD Band 2 mode	☒	☐	☐	passed

5.2.5. Correction factors due to reduced meas. distance (f< 30 MHz)

The used correction factors when the measurement distance is reduced, are taken from IEEC Transaction EMC, Vol 47, No.3, Aug. 2005, Journal Paper *"EXTRAPOLATING NEAR-FIELD EMISSIONS OF LOW-FREQUENCY LOOP TRANSMITTERS"*.

Used Transducer factors (f < 30 MHz)					
1	2	3	4	5	6
					=2+3+4+5
Frequency	Antenna factor	Corection factor		Cable loss	Transducer factor
		300m to 3m	30m to 3m		
kHz	dB µV/m	dB	dB	dB	dB µV/m
9,0	20,0	-116,7		0,0	-96,7
10,6	20,0	-116,7		0,0	-96,7
12,6	20,0	-116,7		0,0	-96,7
14,8	20,0	-116,7		0,0	-96,7
17,5	20,0	-116,6		0,0	-96,6
20,7	20,0	-116,6		0,0	-96,6
24,4	20,0	-116,6		0,0	-96,6
28,9	20,0	-116,6		0,0	-96,6
34,1	20,0	-116,5		0,0	-96,5
40,3	20,0	-116,4		0,0	-96,4
47,6	20,0	-116,3		0,0	-96,3
56,2	20,0	-116,2		0,0	-96,2
66,4	20,0	-116,0		0,0	-96,0
78,4	20,0	-115,8		0,0	-95,8
92,7	20,0	-115,4		0,0	-95,4
109,4	20,0	-115,0		0,0	-95,0
129,3	20,0	-114,5		0,0	-94,5
152,7	20,0	-113,9		0,0	-93,9
180,4	20,0	-113,1		0,0	-93,1
213,1	20,0	-112,2		0,0	-92,2
251,7	20,0	-111,3		0,0	-91,3
297,3	20,0	-108,3		0,0	-88,3
351,2	20,0	-105,2		0,0	-85,2
414,8	20,0	-102,1		0,0	-82,1
490,0	20,0	-99,1		0,0	-79,1
490,0	20,0		-56,4	0,1	-36,3
582,0	20,0		-56,2	0,1	-36,1
690,0	20,0		-56,0	0,2	-35,8
820,0	20,0		-55,7	0,2	-35,5
973,0	20,0		-55,4	0,2	-35,2
1.155,0	20,0		-54,9	0,3	-34,6
1.371,0	20,0		-54,4	0,3	-34,1
1.627,0	20,0		-53,7	0,3	-33,4
1.931,0	20,0		-52,9	0,4	-32,5
2.292,0	20,0		-52,0	0,4	-31,6
2.721,0	20,0		-49,8	0,5	-29,3
3.230,0	20,0		-46,6	0,5	-26,1
3.834,0	20,0		-43,3	0,6	-22,7
4.551,0	20,0		-40,1	0,6	-19,5
5.402,0	20,0		-36,8	0,7	-16,1
6.412,0	20,0		-33,5	0,7	-12,8
7.612,0	20,0		-30,3	0,8	-9,5
9.035,0	20,0		-27,0	0,8	-6,2
10.725,0	20,0		-23,9	0,9	-3,0
12.730,0	20,0		-21,2	0,9	-0,3
15.111,0	20,0		-19,3	1,0	1,7
17.937,0	20,0		-18,4	1,0	2,6
21.292,0	20,0		-18,2	1,1	2,9
25.274,0	20,0		-18,3	1,1	2,8
30.000,0	20,0		-18,4	1,2	2,8

5.3. General Limit - Radiated field strength emissions, 30 MHz - 1 GHz

5.3.1. Test location and equipment

test location	☒ CETECOM Essen (Chapter. 2.2.1)		☐ Please see Chapter. 2.2.2		☐ Please see Chapter. 2.2.3	
test site	☒ 441 EMI SAR	☒ 487 SAR NSA				
receiver	☐ 377 ESCS30	☒ 001 ESS	☐ 489 ESU 40	☐ 620 ESU 26		
spectr. analys.	☐ 584 FSU	☐ 120 FSEM	☐ 264 FSEK			
antenna	☒ 574 BTA-L	☐ 133 EMCO3115	☐ 302 BBHA9170	☐ 289 CBL 6141	☐ 030 HFH-Z2	☐ 477 GPS
signaling	☐ 392 MT8820A	☐ 436 CMU	☐ 547 CMU	☐ 594 CMW		
otherwise	☐ 400 FTC40x15E	☐ 401 FTC40x15E	☐ 110 USB LWL	☒ 482 Filter Matrix		
DC power	☐ 456 EA 3013A	☐ 457 EA 3013A	☐ 459 EA 2032-50	☐ 268 EA- 3050	☐ 494 AG6632A	☐ 498 NGPE
line voltage	☐ 230 V 50 Hz via public mains		☒ 060 120 V 60 Hz via PAS 5000			

5.3.2. Requirements/Limits

FCC		☒ Part 15 Subpart B, §15.109, class B ☐ Part 15 Subpart C, §15.209 @ frequencies defined in §15.205	
IC		RSS-Gen., Issue 3	
ANSI		☒ C63.4-2009 ☐ C63.10-2009	
Limit	Frequency [MHz]	Radiated emissions limits, 3 meters	
		QUASI Peak [µV/m]	QUASI-Peak [dBµV/m]
	30 - 88	100	40.0
	88 - 216	150	43.5
	216 - 960	200	46.0
	above 960	500	49.0

5.3.3. Test condition and measurement test set-up

link to test system (if used):		☒ air link	☐ cable connection	☐ none
EUT-grounding		☒ none	☐ with power supply	☐ additional connection
Equipment set up		☒ table top 0.8m height		☐ floor standing
Climatic conditions		Temperature: (22±3°C)		Rel. humidity: (40±20)%
EMI-Receiver (Analyzer) Settings	Scan frequency range:	☒ 30 – 1000 MHz ☐ other:		
	Scan-Mode	☒ 6 dB EMI-Receiver Mode ☐ 3 dB spectrum analyser mode		
	Detector	Peak / Quasi-peak		
	RBW/VBW	100 kHz/300 kHz		
	Mode:	Repetitive-Scan, max-hold		
	Scan step	80 kHz		
	Sweep-Time	Coupled – calibrated display if continuous tx-signal otherwise adapted to EUT's individual duty-cycle		
General measurement procedures		Please see chapter "Test system set-up for electric field measurement in the range 30 MHz to 1 GHz"		

5.3.4. MEASUREMENT RESULTS

The results are presented below in summary form only. For more information please see diagrams.

Table of measurement results:

Dia-gram no.	Carrier Channel Range	Carrier Channel No.	Frequency range	Set-up no.	OP-mode no.	Remark	Used detector PK	Used detector AV	Used detector QP	Result
3.01_	Middle	4185	30 to 1000 MHz	1	10	FDD Band 5	☒	☐	☒	passed
3.02_	Middle	9400			9	FDD Band 5	☒	☐	☒	passed
3.03_	Middle	192			7	GSM 850 band	☒	☐	☒	passed
3.04a_ 3.04b_	Middle	661			8	GSM1900 Band	☒	☐	☒	passed

Remark:

5.4. General Limit - Radiated emissions, above 1 GHz

5.4.1. Test location and equipment FAR

test site	☐441 EMI SAR	☐348 EMI cond.	☒443 EMI FAR	☐347 Radio.lab.	☐337 OATS	☐
spectr. analys.	☐584 FSU	☐120 FSEM	☐264 FSEK	☒489 ESU 40	☐	☐
antenna meas	☐574 BTA-L	☐289 CBL 6141	☒608 HL 562	☒549 HL025	☐302 BBHA9170	☐477 GPS
antenna meas	☐123 HUF-Z2	☐132 HUF-Z3	☐030 HFH-Z2	☐	☐	☐
antenna subst	☐071 HUF-Z2	☐020 EMCO3115	☐063 LP 3146	☐303 BBHA9170	☐	☐
multimeter	☐341 Fluke 112	☐	☐	☐	☐	☐
signaling	☐392 MT8820A	☐436 CMU	☐547 CMU	☐594 CMW		
DCpower	☐086 LNG50-10	☐087 EA3013	☐354 NGPE 40	☐349 car battery	☐350 Car battery	☐
line voltage	☐ 230 V 50 Hz via public mains		☒060 120 V 60 Hz via PAS 5000			

5.4.2. Requirements/Limits

FCC	☒ Part 15 Subpart B, §15.109 class B ☐ Part 15 subpart C, §15.209 @ frequencies defined in §15.205			
IC	RSS-Gen., Issue 3			
ANSI	☒ C63.4-2009 ☐ C63.10-2009			
Frequency [MHz]	Limits, 3 meters			
	AV [µV/m]	AV [dBµV/m]	Peak [µV/m]	Peak [dBµV/m]
above 1 GHz	500	54.0	5000	74.0

5.4.3. Test condition and measurement test set-up

link to test system (if used):		☒ air link	☐ cable connection	
EUT-grounding		☒ none	☐ with power supply	☐ additional connection
Equipment set up		☒ table top 1.5m height		☐ floor standing
Climatic conditions		Temperature: (22±3°C)		Rel. humidity: (40±20)%
Spectrum-Analyzer settings	Scan frequency range:	☐ 1 – 18 GHz ☐ 18 – 25 GHz ☐ 18 – 40 GHz ☒ other: 1 – 10GHz		
	Scan-Mode	☒ 6 dB EMI-Receiver Mode ☐ 3 dB Spectrum analyser Mode		
	Detector	Peak and Average		
	RBW/VBW	1 MHz / 3 MHz		
	Mode:	Repetitive-Scan, max-hold		
	Scan step	400 kHz		
	Sweep-Time	Coupled – calibrated display if CW signal otherwise adapted to EUT's individual duty-cycle		
General measurement procedures		Please see chapter "Test system set-up for radiated electric field measurements above 1 GHz"		

5.4.4. Measurement Results

The results are presented below in summary form only. For more information please see diagrams.

Dia-gram no.	Carrier Channel Range	Carrier Channel No.	Frequency range	Set-up no.	OP-mode no.	Remark	Used detector PK	Used detector AV	Used detector QP	Result
4.01_	Middle	192	1 to 5 GHz	1	7	GSM850 mode	☒	☒	☐	passed
4.02_	Middle	661	1 to 10 GHz		8	GSM1900 mode	☒	☒	☐	passed
4.03_	Middle	4183	1 to 5 GHz		10	FDD Band 5 mode	☒	☒	☐	passed
4.04_	Middle	9400	1 to 10 GHz		9	FDD Band 2 mode	☒	☒	☐	passed

5.5. Measurement uncertainties

The reported uncertainties are calculated based on the standard uncertainty multiplied with the appropriate coverage factor **k**, such that a confidence level of approximately 95% is achieved.
For uncertainty determination, each component used in the concrete measurement set-up was taken in account and it's contribution to the overall uncertainty according it's statistical distribution calculated.

Following table shows expectable uncertainties for each measurement type performed.

RF-Measurement	Frequency range	Calculated uncertainty based on a confidence level of 95%	Remarks:
Power Output conducted	9 kHz .. 20 GHz	1.0 dB	--
Power Output radiated	30 MHz .. 4 GHz	3.17 dB	Substitution method
Conducted emissions on antenna ports	9 kHz .. 20 GHz	1.0 dB	--
Radiated emissions enclosure	150 kHz .. 30 MHz	5.0 dB	Magnetic field
	30 MHz .. 1 GHz	4.2 dB	E-Field
	1 GHz .. 20 GHz	3.17 dB	Substitution method
Occupied bandwidth	9 kHz .. 4 GHz	0.1272 ppm (Delta Marker)	Frequency error
		1.0 dB	Power
Emission bandwidth	9 kHz .. 4 GHz	0.1272 ppm (Delta Marker)	Frequency error
		1.0 dB	Power
Frequency stability	9 kHz .. 20 GHz	0.0636 ppm	--
Conducted emissions on AC-mains port (U_{CISPR})	9 kHz .. 150 kHz	4.0 dB	--
	150 kHz .. 30 MHz	3.6 dB	

Table: measurement uncertainties, valid for conducted/radiated measurements

6. Abbreviations used in this report

The abbreviations	
ANSI	American National Standards Institute
AV , AVG, CAV	Average detector
EIRP	Equivalent isotropically radiated power, determined within a separate measurement
EGPRS	Enhanced General Packet Radio Service
EUT	Equipment Under Test
FCC	Federal Communications Commission, USA
IC	Industry Canada
n.a.	not applicable
Op-Mode	Operating mode of the equipment
PK	Peak
RBW	resolution bandwidth
RF	Radio frequency
RSS	Radio Standards Specification, Dokuments from Industry Canada
Rx	Receiver
TCH	Traffic channel
Tx	Transmitter
QP	Quasi peak detector
VBW	Video bandwidth
ERP	Effective radiated power

7. Accreditation details of CETECOM's laboratories and test sites

Ref.-No.	Accreditation Certificate	Valid for laboratory area or test site	Accreditation Body
-	D-PL-12047-01-01	All laboratories and test sites of CETECOM GmbH, Essen	DAkkS, Deutsche Akkreditierungsstelle GmbH
337 487 558 348 348	736496	Radiated Measurements 30 MHz to 1 GHz, 3 m / 10 m (OATS) Radiated Measurements 30 MHz to 1 GHz, 3 m (SAR) Radiated Measurements above 1 GHz, 3 m (FAR) Mains Ports Conducted Interference Measurements Telecommunication Ports Conducted Interference Measurem.	FCC, Federal Communications Commission Laboratory Division, USA (MRA US-EU 0003)
337 487 550 558	3462D-1 3462D-2 3462D-2 3462D-3	Radiated Measurements 30 MHz to 1 GHz, 3 m / 10 m (OATS) Radiated Measurements 30 MHz to 1 GHz, 3 m (SAR) Radiated Measurements 1 GHz to 6 GHz, 3 m (SAR) Radiated Measurements above 1 GHz, 3 m (FAR)	IC, Industry Canada Certification and Engineering Bureau
337 487 550 348 348	R-2665 R-2666 G-301 C-2914 T-1967	Radiated Measurements 30 MHz to 1 GHz, 3 m / 10 m (OATS) Radiated Measurements 30 MHz to 1 GHz, 3 m (SAR) Radiated Measurements 1 GHz to 6 GHz, 3 m (SAR) Mains Ports Conducted Interference Measurements Telecommunication Ports Conducted Interference Measurem.	VCCI, Voluntary Control Council for Interference by Information Technology Equipment, Japan
OATS = Open Area Test Site, SAR = Semi Anechoic Room, FAR = Fully Anechoic Room			

8. Instruments and Ancillary

8.1. Used equipment "CTC"

The "Ref.-No" in the left column of the following tables allows the clear identification of the laboratory equipment.

8.1.1. Test software and firmware of equipment

Ref.-No.	Equipment	Type	Serial-No.	Version of Firmware or Software during the test
001	EMI Test Receiver	ESS	825132/017	Firm.= 1.21 , OTP=2.0, GRA=2.0
012	Signal Generator (EMS-cond.)	SMY 01	839069/027	Firm.= V 2.02
013	Power Meter (EMS cond.)	NRVD	839111/003	Firm.= V 1.51
017	Digital Radiocommunication Tester	CMD 60 M	844365/014	Firmware = V 3.52 .22.01.99, DECT = D2.87 13.01.99
053	Audio Analyzer	UPA3	860612/022	Firm. V 4.3
119	RT Harmonics Analyzer dig. Flickermeter	B10	G60547	Firm.= V 3.1DHG
140	Signal Generator	SMHU	831314/006	Firm.= 3.21
261	Thermal Power Sensor	NRV-Z55	825083/0008	EPROM-Datum 02.12.04, SE EE 1 B
262	Power Meter	NRV-S	825770/0010	Firm.= 2.6
263	Signal Generator	SMP 04	826190/0007	Firm.=3.21
264	Spectrum Analyzer	FSEK 30	826939/005	Bios=2.1, Analyzer= 3.20
295	Racal Digital Radio Test Set	6103	1572	UNIT Firmware= 4.04, SW-Main=4.04, SW-BBP=1.04, SW-DSP=1.02, Hardboot=1.02, Softboot=2.02
298	Univ. Radio Communication Tester	CMU 200	832221/091	R&S Test Firmware =3.53 /3.54 (current Testsoftw. f. all band used
323	Digital Radiocommunication Tester	CMD 55	825878/0034	Firm.= 3.52 .22.01.99
331	Climatic Test Chamber -40/+80 Grad	HC 4055	43146	TSI 1.53
335	CTC-EMS-Conducted	System EMS Conducted	-	EMC 32 V 8.52
340	Digital Radiocommunication Tester	CMD 55	849709/037	Firm.= 3.52 .22.01.99
355	Power Meter	URV 5	891310/027	Firm.= 1.31
365	10V Insertion Unit 50 Ohm	URV5-Z2	100880	Eprom Data = 31.03.08
366	Ultra Compact Simulator	UCS 500 M4	V0531100594	Firm. UCS 500=001925/3.06a02, rc=ISMIEC 4.10
371	Bluetooth Tester	CBT32	100153	CBT V5,30+ SW-Option K55, K57
377	EMI Test Receiver	ESCS 30	100160	Firm.= 2.30, OTP= 02.01, GRA= 02.36
378	Broadband RF Field Monitor	RadiSense III	03D00013SNO-08	Firm.= V.03D13
383	Signal Generator	SME 03	842 828 /034	Firm.= 4.61
389	Digital Multimeter	Keithley 2000	0583926	Firm. = A13 (Mainboard) A02 (Display)
392	Radio Communication Tester	MT8820A	6K00000788	Firm.= 4.50 #005, IPL=4.01#001,OS=4.02#001, GSM=4.41#013, W-CDMA= 4.54#004, scenario= 4.52#002
436	Univ. Radio Communication Tester	CMU 200	103083	R&S Test Firmware Base=5.14, Mess-Software= GSM:5.14 WCDMA:5.14 (current Testsoftw. F. all band
441	CTC-SAR-EMI Cable Loss	System EMI field (SAR)	-	EMC 32 Version 8.52
442	CTC-SAR-EMS	System EMS field (SAR)	-	EMC 32 Version 8.40
443	CTC-FAR-EMI-RSE	System CTC-FAR-EMI-RSE	-	Spuri 7.2.5 or EMC 32 Ver. 8.53
444	CTC-FAR-EMS field	System-EMS-Field (FAR)	-	EMC 32 Version 8.40
460	Univ. Radio Communication Tester	CMU 200	108901	R&S Test Firmware Base=5.14, GSM=5.14 WCDMA=5.14 (current Testsoftw.,f. all band to be used,
489	EMI Test Receiver	ESU40	1000-30	Firmware=4.43 SP3, Bios=V5.1-16-3, Spec. =01.00
491	ESD Simulator dito	ESD dito	dito307022	V 2.30
524	Voltage Drop Simulator	VDS 200	0196-16	Software Nr: 000037 Version V4.20a01
526	Burst Generator	EFT 200 A	0496-06	Software Nr. 000034 Version V2.32
527	Micro Pulse Generator	MPG 200 B	0496-05	Software-Nr. 000030 Version V2.43
528	Load Dump Simulator	LD 200B	0496-06	Software-Nr. 000031 Version V2.35a01
546	Univ. Radio Communication Tester	CMU 200	106436	R&S Test Firmware Base=5.14, GSM=5.14 WCDMA=5.14 (current Testsoftw.,f. all band to be used
547	Univ. Radio Communication Tester	CMU 200	835390/014	R&S Test Firmware Base=V5.1403 (current Testsoftw., f. all band used, GSM = 5.14 WCDMA: = 5.14
584	Spectrum Analyzer	FSU 8	100248	2.82_SP3
594	Wideband Radio Communication Tester	CMW500	101757	Firmware Base=2.0.20.9, LTE=2.0.20.8. CDMA= 2.0.10
597	Univ. Radio Communication Tester	CMU 200	100347	R&S Test Firmware Base=5.01, GSM=5.02 WCDMA= not installed, Mainboard= µP1=V.850
598	Spectrum Analyzer	FSEM 30 (Reserve)	831259/013	Firmware Bios 3.40 , Analyzer 3.40 Sp 2
620	EMI Test Receiver	ESU 26	100362	4.43_SP3
642	Wideband Radio Communication Tester	CMW 500	126089	Setup V03.26, Test programm component V02.12.01

8.1.2. Single instruments and test systems

Ref.-No.	Equipment	Type	Serial-No.	Manufacturer	Interval of calibration	Remark	Cal due
001	EMI Test Receiver	ESS	825132/017	Rohde & Schwarz	12 M	-	31.03.2014
005	AC - LISN (50 Ohm/50µH, test site 1)	ESH2-Z5	861741/005	Rohde & Schwarz	24/12 M	-	31.03.2014
007	Single-Line V-Network (50 Ohm/5µH)	ESH3-Z6	892563/002	Rohde & Schwarz	24/12 M	-	31.03.2014
009	Power Meter (EMS-radiated)	NRV	863056/017	Rohde & Schwarz	24 M	-	31.03.2015
016	Line Impedance Simulating Network	Op. 24-D	B6366	Spitzenberger+Spies	36 M	-	31.03.2016
020	Horn Antenna 18 GHz (Subst 1)	3115	9107-3699	EMCO	36/12 M	-	31.03.2013
021	Loop Antenna (H-Field)	6502	9206-2770	EMCO	36 M	-	31.03.2015
030	Loop Antenna (H-field)	HFH-Z2	879604/026	Rohde & Schwarz	36 M	-	31.03.2015
033	RF-current probe (100kHz-30MHz)	ESH2-Z1	879581/18	Rohde & Schwarz	24 M	-	31.03.2015
057	relay-switch-unit (EMS system)	RSU	494440/002	Rohde & Schwarz	pre-m	1a	
060	power amplifier (DC-2kHz)	PAS 5000	B6363	Spitzenberger+Spies	-	3	
066	notch filter (WCDMA; FDD1)	WRCT 1900/2200-5/40-10EEK	5	Wainwright GmbH	12 M	1g	30.06.2013
086	DC - power supply, 0 -10 A	LNG 50-10	-	Heinzinger Electronic	pre-m	2	
087	DC - power supply, 0 -5 A	EA-3013 S	-	Elektro Automatik	pre-m	2	
090	Helmholtz coil: 2x10 coils in series	-	-	RWTÜV	-	4	
091	USB-LWL-Converter	OLS-1	007/2006	Ing. Büro Scheiba	-	4	
099	passive voltage probe	ESH2-Z3	299.7810.52	Rohde & Schwarz	36 M	-	31.03.2015
100	passive voltage probe	Probe TK 9416	without	Schwarzbeck	36 M	-	31.03.2015
110	USB-LWL-Converter	OLS-1	-	Ing. Büro Scheiba	-	4	
119	RT Harmonics Analyzer dig. Flickermeter	B10	G60547	BOCONSULT	36 M	-	31.03.2016
134	horn antenna 18 GHz (Subst 2)	3115	9005-3414	EMCO	12 M	-	31.03.2014
136	adjustable dipole antenna (Dipole 1)	3121C-DB4	9105-0697	EMCO	36 M	-	31.03.2015
140	Signal Generator	SMHU	831314/006	Rohde & Schwarz	24 M	-	31.03.2014
248	attenuator	SMA 6dB 2W	-	Radiall	pre-m	2	
249	attenuator	SMA 10dB 10W	-	Radiall	pre-m	2	
252	attenuator	N 6dB 12W	-	Radiall	pre-m	2	
256	attenuator	SMA 3dB 2W	-	Radiall	pre-m	2	
257	hybrid	4031C	04491	Narda	pre-m	2	
260	hybrid coupler	4032C	11342	Narda	pre-m	2	
261	Thermal Power Sensor	NRV-Z55	825083/0008	Rohde & Schwarz	24 M	-	31.03.2014
262	Power Meter	NRV-S	825770/0010	Rohde & Schwarz	24 M	-	31.03.2014
263	Signal Generator	SMP 04	826190/0007	Rohde & Schwarz	36 M	-	31.03.2016
264	Spectrum Analyzer	FSEK 30	826939/005	Rohde & Schwarz	12 M	-	31.03.2014
265	peak power sensor	NRV-Z33, Model 04	840414/009	Rohde & Schwarz	24 M	-	31.03.2014
266	peak power sensor	NRV-Z31, Model 04	843383/016	Rohde & Schwarz	24 M	-	31.03.2014
267	notch filter GSM 850	WRCA 800/960-6EEK	9	Wainwright GmbH	pre-m	2	
270	termination	1418 N	BB6935	Weinschel	pre-m	2	
271	termination	1418 N	BE6384	Weinschel	pre-m	2	
272	attenuator (20 dB) 50 W	Model 47	BF6239	Weinschel	pre-m	2	
273	attenuator (10 dB) 100 W	Model 48	BF9229	Weinschel	pre-m	2	
274	attenuator (10 dB) 50 W	Model 47 (10 dB) 50 W	BG0321	Weinschel	pre-m	2	
275	DC-Block	Model 7003 (N)	C5129	Weinschel	pre-m	2	
276	DC-Block	Model 7006 (SMA)	C7061	Weinschel	pre-m	2	
279	power divider	1515 (SMA)	LH855	Weinschel	pre-m	2	
287	pre-amplifier 25MHz - 4GHz	AMF-2D-100M4G-35-10P	379418	Miteq	12 M	1c	30.06.2013
291	high pass filter GSM 850/900	WHJ 2200-4EE	14	Wainwright GmbH	12 M	1c	30.06.2013
298	Univ. Radio Communication Tester	CMU 200	832221/091	Rohde & Schwarz	pre-m	3	
300	AC LISN (50 Ohm/50µH, 1-phase)	ESH3-Z5	892 239/020	Rohde & Schwarz	24/12 M	-	31.03.2014
301	attenuator (20 dB) 50W, 18GHz	47-20-33	AW0272	Lucas Weinschel	pre-m	2	
302	horn antenna 40 GHz (Meas 1)	BBHA9170	155	Schwarzbeck	36 M	-	31.03.2014
303	horn antenna 40 GHz (Subst 1)	BBHA9170	156	Schwarzbeck	36 M	-	31.03.2014
331	Climatic Test Chamber -40/+80 Grad	HC 4055	43146	Heraeus Vötsch	24 M	-	30.11.2014
341	Digital Multimeter	Fluke 112	81650455	Fluke	24 M	-	31.03.2014
342	Digital Multimeter	Voltcraft M-4660A	IB 255466	Voltcraft	24 M	-	31.03.2015
347	laboratory site	radio lab.	-	-	-	5	
348	laboratory site	EMI conducted	-	-	-	5	
354	DC - Power Supply 40A	NGPE 40/40	448	Rohde & Schwarz	pre-m	2	
355	Power Meter	URV 5	891310/027	Rohde & Schwarz	24 M	-	31.03.2014
356	power sensor	NRV-Z1	882322/014	Rohde & Schwarz	24 M	-	31.03.2015
357	power sensor	NRV-Z1	861761/002	Rohde & Schwarz	24 M	-	31.03.2015
371	Bluetooth Tester	CBT32	100153	R&S	24 M	-	31.03.2014
373	Single-Line V-Network (50 Ohm/5µH)	ESH3-Z6	100535	Rohde & Schwarz	24/12 M	-	31.03.2014
376	Horn Antenna 6 GHz	BBHA9120 E	BBHA 9120 E 179	Schwarzbeck	12 M	-	31.03.2014
377	EMI Test Receiver	ESCS 30	100160	Rohde & Schwarz	12 M	-	31.03.2014
389	Digital Multimeter	Keithley 2000	0583926	Keithley	24 M	-	31.03.2015
392	Radio Communication Tester	MT8820A	6K00000788	Anritsu	12 M	-	31.03.2014
431	Model 7405	Near-Field Probe Set	9305-2457	EMCO	-	4	
436	Univ. Radio Communication Tester	CMU 200	103083	Rohde & Schwarz	12 M	-	31.03.2014
441	CTC-SAR-EMI Cable Loss	System EMI field (SAR) Cable	-	CETECOM	12 M	5	31.10.2013

Ref.-No.	Equipment	Type	Serial-No.	Manufacturer	Interval of calibration	Remark	Cal due
443	CTC-FAR-EMI-RSE	System CTC-FAR-EMI-RSE	-	ETS-Lindgren / CETECOM	12 M	5	30.06.2013
448	notch filter WCDMA_FDD II	WRCT 1850.0/2170.0-5/40-	5	Wainwright Instruments GmbH	12 M	1c	30.06.2013
449	notch filter WCDMA FDD V	WRCT 824.0/894.0-5/40-8SSK	1	Wainwright	12 M	1c	30.06.2013
454	Oscilloscope	HM 205-3	9210 P 29661	Hameg	-	4	
456	DC-Power supply 0-5 A	EA 3013 S	207810	Elektro Automatik	pre-m	2	
459	DC -Power supply 0-5 A , 0-32 V	EA-PS 2032-50	910722	Elektro Automatik	pre-m	2	
460	Univ. Radio Communication Tester	CMU 200	108901	Rohde & Schwarz	12 M	-	31.03.2014
463	Universal source	HP3245A	2831A03472	Agilent	-	4	
466	Digital Multimeter	Fluke 112	89210157	Fluke USA	24 M	-	31.03.2014
467	Digital Multimeter	Fluke 112	89680306	Fluke USA	24 M	-	31.03.2014
468	Digital Multimeter	Fluke 112	90090455	Fluke USA	24 M	-	31.03.2014
477	ReRadiating GPS-System	AS-47	-	Automotive Cons. Fink	-	3	
480	power meter (Fula)	NRVS	838392/031	Rohde & Schwarz	24 M	-	31.03.2015
482	filter matrix	Filter matrix SAR 1	-	CETECOM (Brl)	-	1d	
484	pre-amplifier 2,5 - 18 GHz	AMF-5D-02501800-25-10P	1244554	Miteq	12 M	-	30.06.2013
487	System CTC NSA-Verification SAR-EMI	System EMI field (SAR) NSA	-	ETS Lindgren / CETECOM	24 M	-	30.09.2013
489	EMI Test Receiver	ESU40	1000-30	Rohde & Schwarz	12 M	-	31.03.2014
502	band reject filter	WRCG 1709/1786-1699/1796-	SN 9	Wainwright	pre-m	2	
503	band reject filter	WRCG 824/849-814/859-	SN 5	Wainwright	pre-m	2	
512	notch filter GSM 850	WRCA 800/960-02/40-6EEK	SN 24	Wainwrght	12 M	1c	30.06.2013
517	relais switch matrix	HF Relais Box Keithley	SE 04	Keithley	pre-m	2	
523	Digital Multimeter	L4411A	MY46000154	Agilent	24 M	-	31.03.2015
529	6 dB Broadband resistive power divider	Model 1515	LH 855	Weinschel	pre-m	2	
530	10 dB Broadband resistive power divider	R 416110000	LOT 9828	-	pre-m	2	
546	Univ. Radio Communication Tester	CMU 200	106436	R&S	12 M	-	31.03.2014
547	Univ. Radio Communication Tester	CMU 200	835390/014	Rohde & Schwarz	12 M	-	31.03.2014
548	Digital-Barometer	GBP 2300	without	Greisinger GmbH	36 M	-	30.06.2015
549	Log.Per-Antenna	HL025	1000060	Rohde & Schwarz	36/12 M	-	31.03.2015
552	high pass filter 2,8-18GHz	WHKX 2.8/18G-10SS	4	Wainwright	12 M	1c	30.06.2013
558	System CTC FAR S-VSWR	System CTC FAR S-VSWR	-	CTC	24 M	-	31.07.2013
574	Biconilog Hybrid Antenna	BTA-L	980026L	Frankonia	36/12 M	-	31.03.2016
584	Spectrum Analyzer	FSU 8	100248	Rohde & Schwarz	24 M	-	31.03.2014
594	Wideband Radio Communication Tester	CMW500	101757	Rohde & Schwarz	24 M	-	31.03.2014
597	Univ. Radio Communication Tester	CMU 200	100347	Rohde & Schwarz	12 M	-	31.03.2014
598	Spectrum Analyzer	FSEM 30 (Reserve)	831259/013	Rohde & Schwarz	24 M	-	13.01.2015
600	power meter	NRVD (Reserve)	834501/018	Rohde & Schwarz	24 M	-	31.03.2015
601	medium-sensitivity diode sensor	NRV-Z5 (Reserve)	8435323/003	Rohde & Schwarz	24 M	-	31.03.2015
602	peak power sensor	NRV-Z32 (Reserve)	835080	Rohde & Schwarz	24 M	-	31.03.2015
608	UltraLog-Antenna	HL 562	830547/009	Rohde & Schwarz	36/12 M	-	31.03.2014
611	DC power supply	E3632A	KR 75305854	Agilent	pre-m	2	
612	DC power supply	E3632A	MY 40001321	Agilent	pre-m	2	
613	Attenuator	R416120000 20dB 10W	Lot. 9828	Radiall	pre-m	2	
616	Digitalmultimeter	Fluke 177	88900339	Fluke	24 M	-	31.03.2014
617	Power Splitter/Combiner	ZFSC-2-2-S+	S F987001108	Mini Circuits	-	2	
618	Power Splitter/Combiner	50PD-634	600994	JFW Industries USA	-	2	
619	Power Splitter/Combiner	50PD-634	600995	JFW Industries, USA	-	3	
620	EMI Test Receiver	ESU 26	100362	Rohde-Schwarz	12 M	-	01.03.2014
621	Step Attenuator 0-139 dB	RSP	100017	Rohde & Schwarz	pre-m	2	
625	Generic Test Load USB	Generic Test Load USB	-	CETECOM	-	2	
627	data logger	OPUS 1	201.0999.9302.6.4.1.43	G. Lufft GmbH	24 M	-	30.05.2014
634	Spectrum Analyzer	FSM (HF-Unit)	826188/010	Rohde & Schwarz	pre-m	2	
636	Thermal Imaging camera	Ti32	Ti32-12060213	Fluke Corporation	24 M	-	31.07.2014
637	High Speed HDMI with Ethernet 1m	HDMI cable with Ethernet 1m	-	KogiLink	-	2	
638	HDMI Kabel with Ethernet 1,5 m flach	HDMI cable with Ethernet	-	Reichelt	-	2	
640	HDMI cable 2m rund	HDMI cable 2m rund	-	Reichelt	-	2	
641	HDMI cable with Ethernet	Certified HDMI cable with	-	PureLink	-	2	
642	Wideband Radio Communication Tester	CMW 500	126089	Rohde&Schwarz	24 M	-	31.03.2014
644	Amplifierer	ZX60-2534M+	SN865701299	Mini-Circuits	-	-	
670	Univ. Radio Communication Tester	CMU 200	106833	Rohde & Schwarz	12 M	-	31.03.2014

8.1.3. Legend

Note / remarks		Calibrated during system calibration:
	1a	System CTC-SAR-EMS (Ref.-No. 442)
	1b	System-CTC-EMS-Conducted (Ref.-No. 335)
	1c	System CTC-FAR-EMI-RSE (Ref.-No . 443)
	1d	System CTC-SAR-EMI (Ref.-No . 441)
	1e	System CTC-OATS (EMI radiated) (Ref.-No. 337)
	1 f	System CTC-CTIA-OTA (Ref.-No . 420)
	1 g	System CTC-FAR-EMS (Ref.-No . 444)
	2	Calibration or equipment check immediately before measurement
	3	Regulatory maintained equipment for functional check or support purpose
	4	Ancillary equipment without calibration e.g. mechanical equipment or monitoring equipment
	5	Test System

Interval of calibration	12 M	12 month
	24 M	24 month
	36 M	36 month
	24/12 M	Calibration every 24 months, between this every 12 months internal validation
	36/12 M	Calibration every 36 months, between this every 12 months internal validation
	Pre-m	Check before starting the measurement
	-	Without calibration

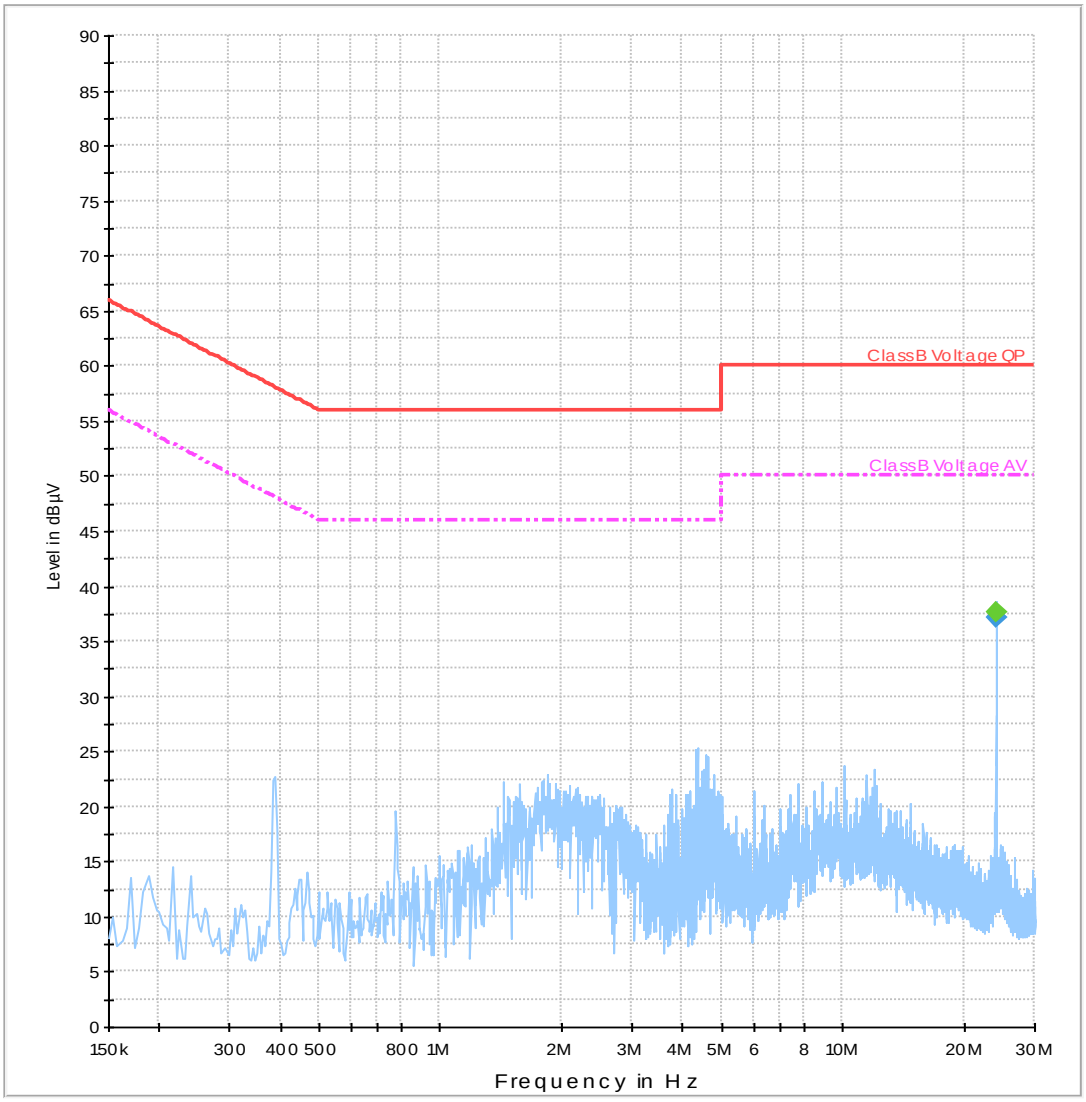
8.2. Measurement diagrams of emission test

8.2.1. Diagrams of conducted emissions on AC-Power lines (Diagram group 01)

Diagram No. 1.1_TX_Ch192

	Date: 08.11.2012
Test Description:	Conducted Voltage Measurement Class B
Testspezification:	FCC 15.107, FCC 15.207
Technical Data:	Please see next page for detailed information
Diagram:	Shows the peak values as a sum of measured ports (N+L1) in maxhold mode
Operator name:	OOu
Report.- Nr.	6-0147-12-19
EUT:	ESH6
Manufacturer:	Cinterion
Operating mode:	GSM 850 TX
Measured on line:	Mains AC L1 and N
Power during test:	110 V AC 60 Hz

01b_FCC_107_207_Class B_Voltage_PK_QPAV_N_L1



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
23.999063	37.2	1000.0	9.000	GN	N	0.3	22.8	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
23.999063	37.6	1000.0	9.000	GN	N	0.3	12.4	50.0

Technical Data of Measurements with R&S EMC32 V8.52.0

EMI Auto Test Template: 01b_FCC_107_207_Class B_Voltage_PK_QPAV_N_L1

Hardware Setup: ESH2-Z5
Measurement Type: 4 Line LISN
Frequency Range: 150 kHz - 30 MHz
Graphics Level Range: 0 dBµV - 90 dBµV

Preview Measurements:
Scan Test Template: 02_Class B pre_PK_fast

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	61.035 Hz	PK+	200 Hz	0,00005 s	0 dB
150 kHz - 30 MHz	3.906 kHz	PK+	9 kHz	0,00005 s	0 dB

Receiver: [ESCS 30]

Data Reduction:
Limit Line #1: Class B Voltage QP
Limit Line #2: Class B Voltage AV
Peak Search: 6 dB , Maximum Results: 10
Subrange Maxima: 25 Subranges , Maxima per Subrange: 1
Acceptance Offset: -13 dB
Maximum Number of Results: 30
After Data Reduction: Interactive data reduction

Frequency Zoom:
Zoom Scan Template: 08_Class B maxZoom_PK100mS

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	5 kHz	PK+	200 Hz	0,1 s	0 dB
150 kHz - 30 MHz	5 kHz	PK+	9 kHz	0,1 s	0 dB

Receiver: [ESCS 30]

Final Measurements:
Template for Single Meas.: 07a_FCC Class B fin AV QP 1sek

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
150 kHz - 30 MHz	4.5 kHz	QPK; CAV	9 kHz	1 s	0 dB

Receiver: [ESCS 30]

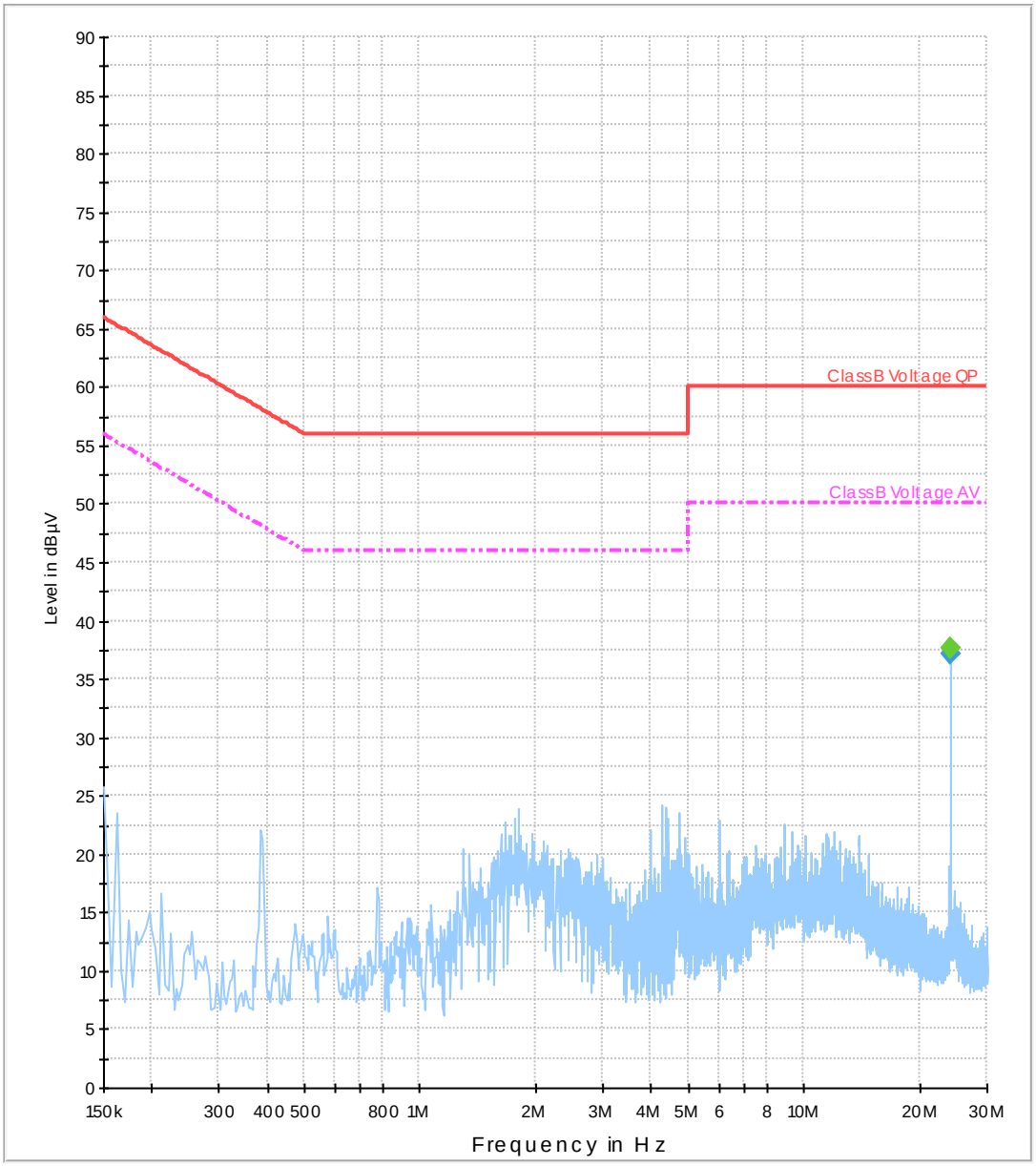
Report Settings:
Report Template: Ctc_Standard_class_B_FCC
Create Electronic Report: RTF PDF
Document Name: EMI Report

Actions:
Test stop
Notify: "End of Test"

Diagram No. 1.2_RX_ch192

	Date: 08.11.2012
Test Description:	Conducted Voltage Measurement Class B
Testspezification:	FCC 15.107, FCC 15.207
Technical Data:	Please see next page for detailed information
Diagram:	Shows the peak values as a sum of measured ports (N+L1) in maxhold mode
Operator name:	OOu
Report.- Nr.	6-0147-12-19
EUT:	ESH6
Manufacturer:	Cinterion
Operating mode:	GSM 850 RX
Measured on line:	Mains AC L1 and N
Power during test:	110 V AC 60 Hz

01b_FCC_107_207_Class B_Voltage_PK_QPAV_N_L1



Date: 08.11.2012

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
23.999063	37.2	1000.0	9.000	GN	N	0.3	22.8	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
23.999063	37.6	1000.0	9.000	GN	N	0.3	12.4	50.0

Technical Data of Measurements with R&S EMC32 V8.52.0

EMI Auto Test Template: 01b_FCC_107_207_Class B_Voltage_PK_QPAV_N_L1

Hardware Setup: ESH2-Z5
Measurement Type: 4 Line LISN
Frequency Range: 150 kHz - 30 MHz
Graphics Level Range: 0 dBµV - 90 dBµV

Preview Measurements:
Scan Test Template: 02_Class B pre_PK_fast

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	61.035 Hz	PK+	200 Hz	0,00005 s	0 dB
150 kHz - 30 MHz	3.906 kHz	PK+	9 kHz	0,00005 s	0 dB

Receiver: [ESCS 30]

Data Reduction:
Limit Line #1: Class B Voltage QP
Limit Line #2: Class B Voltage AV
Peak Search: 6 dB , Maximum Results: 10
Subrange Maxima: 25 Subranges , Maxima per Subrange: 1
Acceptance Offset: -13 dB
Maximum Number of Results: 30
After Data Reduction: Interactive data reduction

Frequency Zoom:
Zoom Scan Template: 08_Class B maxZoom_PK100mS

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	5 kHz	PK+	200 Hz	0,1 s	0 dB
150 kHz - 30 MHz	5 kHz	PK+	9 kHz	0,1 s	0 dB

Receiver: [ESCS 30]

Final Measurements:
Template for Single Meas.: 07a_FCC Class B fin AV QP 1sek

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
150 kHz - 30 MHz	4.5 kHz	QPK; CAV	9 kHz	1 s	0 dB

Receiver: [ESCS 30]

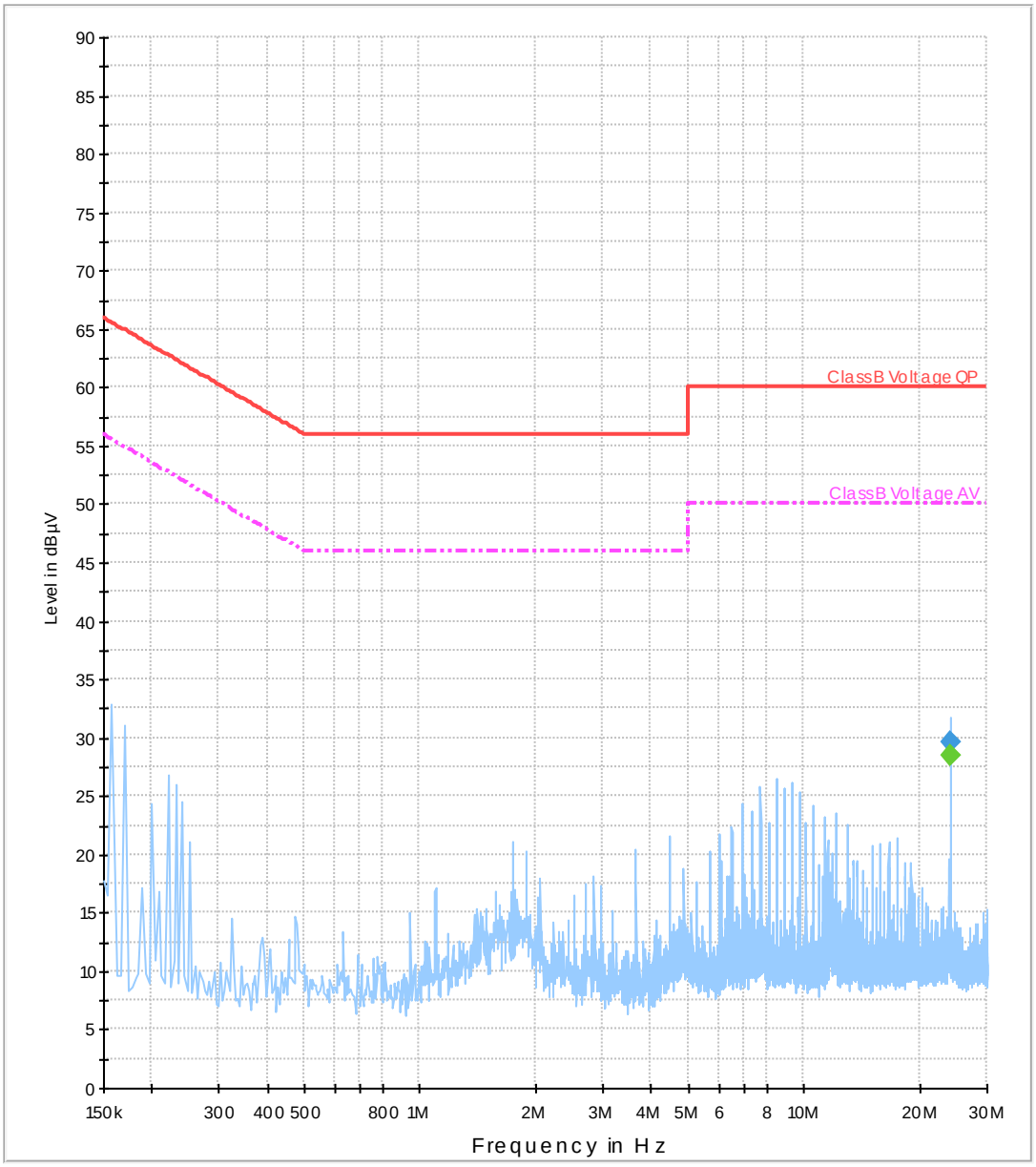
Report Settings:
Report Template: Ctc_Standard_class_B_FCC
Create Electronic Report: RTF PDF
Document Name: EMI Report

Actions:
Test stop
Notify: "End of Test"

Diagram No. 1.3_TX_Ch661

	Date: 08.11.2012
Test Description:	Conducted Voltage Measurement Class B
Testspezification:	FCC 15.107, FCC 15.207
Technical Data:	Please see next page for detailed information
Diagram:	Shows the peak values as a sum of measured ports (N+L1) in maxhold mode
Operator name:	OOu
Report.- Nr.	6-0147-12-19
EUT:	ESH6
Manufacturer:	Cinterion
Operating mode:	PCS1900 TX
Measured on line:	Mains AC L1 and N
Power during test:	110 V AC 60 Hz

01b_FCC_107_207_Class B_Voltage_PK_QPAV_N_L1



Date: 08.11.2012

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
23.999063	29.6	1000.0	9.000	GN	N	0.3	30.4	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
23.999063	28.4	1000.0	9.000	GN	N	0.3	21.6	50.0

Technical Data of Measurements with R&S EMC32 V8.52.0

EMI Auto Test Template: 01b_FCC_107_207_Class B_Voltage_PK_QPAV_N_L1

Hardware Setup: ESH2-Z5
Measurement Type: 4 Line LISN
Frequency Range: 150 kHz - 30 MHz
Graphics Level Range: 0 dBµV - 90 dBµV

Preview Measurements:
Scan Test Template: 02_Class B pre_PK_fast

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	61.035 Hz	PK+	200 Hz	0,00005 s	0 dB
150 kHz - 30 MHz	3.906 kHz	PK+	9 kHz	0,00005 s	0 dB

Receiver: [ESCS 30]

Data Reduction:
Limit Line #1: Class B Voltage QP
Limit Line #2: Class B Voltage AV
Peak Search: 6 dB , Maximum Results: 10
Subrange Maxima: 25 Subranges , Maxima per Subrange: 1
Acceptance Offset: -13 dB
Maximum Number of Results: 30
After Data Reduction: Interactive data reduction

Frequency Zoom:
Zoom Scan Template: 08_Class B maxZoom_PK100mS

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	5 kHz	PK+	200 Hz	0,1 s	0 dB
150 kHz - 30 MHz	5 kHz	PK+	9 kHz	0,1 s	0 dB

Receiver: [ESCS 30]

Final Measurements:
Template for Single Meas.: 07a_FCC Class B fin AV QP 1sek

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
150 kHz - 30 MHz	4.5 kHz	QPK; CAV	9 kHz	1 s	0 dB

Receiver: [ESCS 30]

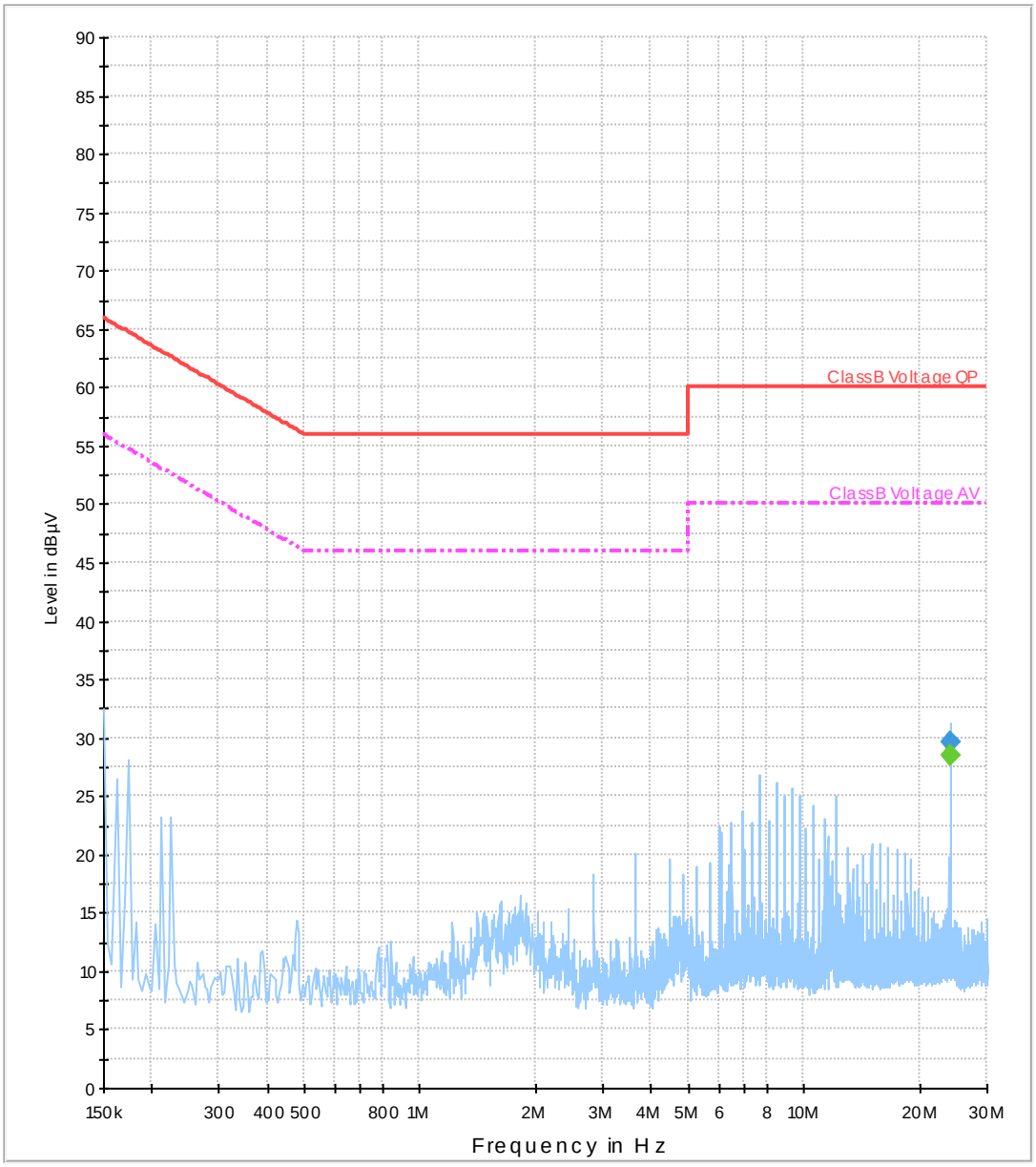
Report Settings:
Report Template: Ctc_Standard_class_B_FCC
Create Electronic Report: RTF PDF
Document Name: EMI Report

Actions:
Test stop
Notify: "End of Test"

Diagram No. 1.4_RX_ch661

	Date: 08.11.2012
Test Description:	Conducted Voltage Measurement Class B
Testspezification:	FCC 15.107, FCC 15.207
Technical Data:	Please see next page for detailed information
Diagram:	Shows the peak values as a sum of measured ports (N+L1) in maxhold mode
Operator name:	OOu
Report.- Nr.	6-0147-12-19
EUT:	ESH6
Manufacturer:	Cinterion
Operating mode:	PCS1900 RX
Measured on line:	Mains AC L1 and N
Power during test:	110 V AC 60 Hz

01b_FCC_107_207_Class B_Voltage_PK_QPAV_N_L1



Date: 08.11.2012

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
23.999063	29.6	1000.0	9.000	GN	N	0.3	30.4	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
23.999063	28.4	1000.0	9.000	GN	N	0.3	21.6	50.0

Technical Data of Measurements with R&S EMC32 V8.52.0

EMI Auto Test Template: 01b_FCC_107_207_Class B_Voltage_PK_QPAV_N_L1

Hardware Setup: ESH2-Z5
Measurement Type: 4 Line LISN
Frequency Range: 150 kHz - 30 MHz
Graphics Level Range: 0 dBµV - 90 dBµV

Preview Measurements:
Scan Test Template: 02_Class B pre_PK_fast

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	61.035 Hz	PK+	200 Hz	0,00005 s	0 dB
150 kHz - 30 MHz	3.906 kHz	PK+	9 kHz	0,00005 s	0 dB

Receiver: [ESCS 30]

Data Reduction:
Limit Line #1: Class B Voltage QP
Limit Line #2: Class B Voltage AV
Peak Search: 6 dB , Maximum Results: 10
Subrange Maxima: 25 Subranges , Maxima per Subrange: 1
Acceptance Offset: -13 dB
Maximum Number of Results: 30
After Data Reduction: Interactive data reduction

Frequency Zoom:
Zoom Scan Template: 08_Class B maxZoom_PK100mS

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	5 kHz	PK+	200 Hz	0,1 s	0 dB
150 kHz - 30 MHz	5 kHz	PK+	9 kHz	0,1 s	0 dB

Receiver: [ESCS 30]

Final Measurements:
Template for Single Meas.: 07a_FCC Class B fin AV QP 1sek

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
150 kHz - 30 MHz	4.5 kHz	QPK; CAV	9 kHz	1 s	0 dB

Receiver: [ESCS 30]

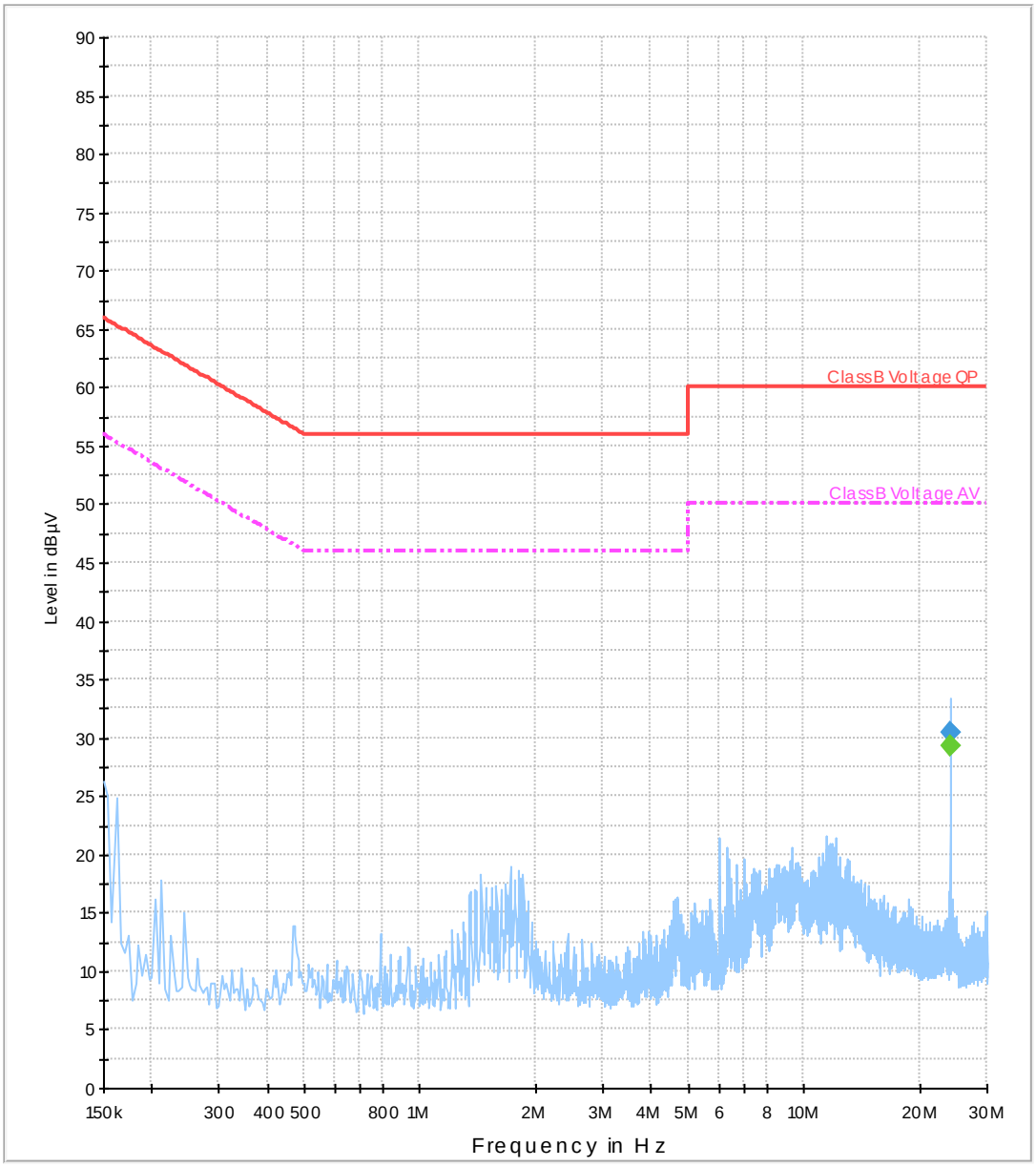
Report Settings:
Report Template: Ctc_Standard_class_B_FCC
Create Electronic Report: RTF PDF
Document Name: EMI Report

Actions:
Test stop
Notify: "End of Test"

Diagram No. 1.5_TX_Ch9400

	Date: 08.11.2012
Test Description:	Conducted Voltage Measurement Class B
Testspezification:	FCC 15.107, FCC 15.207
Technical Data:	Please see next page for detailed information
Diagram:	Shows the peak values as a sum of measured ports (N+L1) in maxhold mode
Operator name:	OOu
Report.- Nr.	6-0147-12-19
EUT:	ESH6
Manufacturer:	Cinterion
Operating mode:	FDDII TX
Measured on line:	Mains AC L1 and N
Power during test:	110 V AC 60 Hz

01b_FCC_107_207_Class B_Voltage_PK_QPAV_N_L1



Date: 08.11.2012

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
23.999063	30.5	1000.0	9.000	GN	N	0.3	29.5	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
23.999063	29.3	1000.0	9.000	GN	N	0.3	20.7	50.0

Technical Data of Measurements with R&S EMC32 V8.52.0

EMI Auto Test Template: 01b_FCC_107_207_Class B_Voltage_PK_QPAV_N_L1

Hardware Setup: ESH2-Z5
Measurement Type: 4 Line LISN
Frequency Range: 150 kHz - 30 MHz
Graphics Level Range: 0 dBµV - 90 dBµV

Preview Measurements:
Scan Test Template: 02_Class B pre_PK_fast

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	61.035 Hz	PK+	200 Hz	0,00005 s	0 dB
150 kHz - 30 MHz	3.906 kHz	PK+	9 kHz	0,00005 s	0 dB

Receiver: [ESCS 30]

Data Reduction:
Limit Line #1: Class B Voltage QP
Limit Line #2: Class B Voltage AV
Peak Search: 6 dB , Maximum Results: 10
Subrange Maxima: 25 Subranges , Maxima per Subrange: 1
Acceptance Offset: -13 dB
Maximum Number of Results: 30
After Data Reduction: Interactive data reduction

Frequency Zoom:
Zoom Scan Template: 08_Class B maxZoom_PK100mS

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	5 kHz	PK+	200 Hz	0,1 s	0 dB
150 kHz - 30 MHz	5 kHz	PK+	9 kHz	0,1 s	0 dB

Receiver: [ESCS 30]

Final Measurements:
Template for Single Meas.: 07a_FCC Class B fin AV QP 1sek

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
150 kHz - 30 MHz	4.5 kHz	QPK; CAV	9 kHz	1 s	0 dB

Receiver: [ESCS 30]

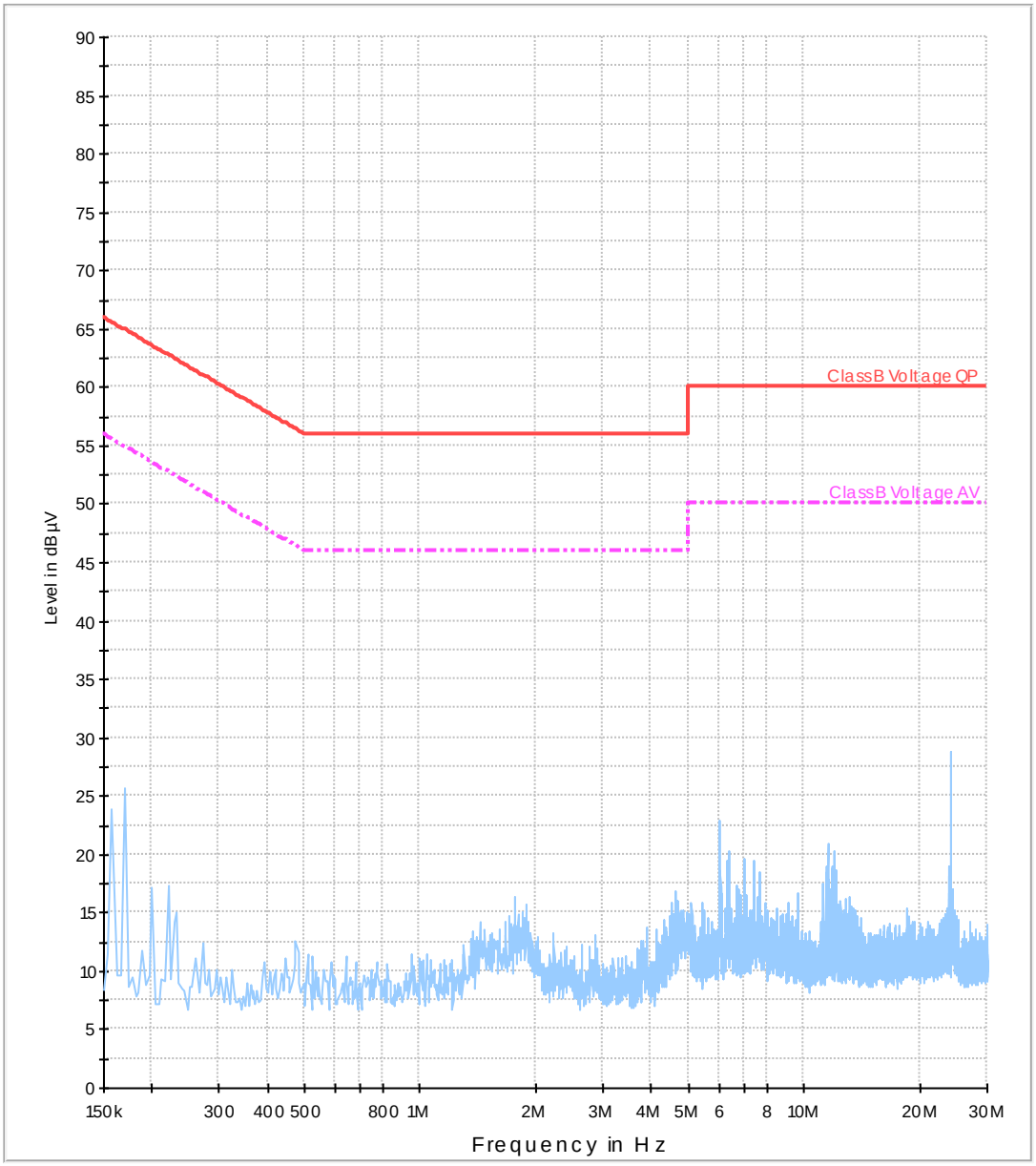
Report Settings:
Report Template: Ctc_Standard_class_B_FCC
Create Electronic Report: RTF PDF
Document Name: EMI Report

Actions:
Test stop
Notify: "End of Test"

Diagram No. 1.6_RX_ch9400

	Date: 08.11.2012
Test Description:	Conducted Voltage Measurement Class B
Testspezification:	FCC 15.107, FCC 15.207
Technical Data:	Please see next page for detailed information
Diagram:	Shows the peak values as a sum of measured ports (N+L1) in maxhold mode
Operator name:	OOu
Report.- Nr.	6-0147-12-19
EUT:	ESH6
Manufacturer:	Cinterion
Operating mode:	FDDII RX
Measured on line:	Mains AC L1 and N
Power during test:	110 V AC 60 Hz

01b_FCC_107_207_Class B_Voltage_PK_QPAV_N_L1



Date: 08.11.2012

Technical Data of Measurements with R&S EMC32 V8.52.0

EMI Auto Test Template: 01b_FCC_107_207_Class B_Voltage_PK_QPAV_N_L1

Hardware Setup: ESH2-Z5
Measurement Type: 4 Line LISN
Frequency Range: 150 kHz - 30 MHz
Graphics Level Range: 0 dBµV - 90 dBµV

Preview Measurements:
Scan Test Template: 02_Class B pre_PK_fast

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	61.035 Hz	PK+	200 Hz	0,00005 s	0 dB
150 kHz - 30 MHz	3.906 kHz	PK+	9 kHz	0,00005 s	0 dB

Receiver: [ESCS 30]

Data Reduction:
Limit Line #1: Class B Voltage QP
Limit Line #2: Class B Voltage AV
Peak Search: 6 dB , Maximum Results: 10
Subrange Maxima: 25 Subranges , Maxima per Subrange: 1
Acceptance Offset: -13 dB
Maximum Number of Results: 30
After Data Reduction: Interactive data reduction

Frequency Zoom:
Zoom Scan Template: 08_Class B maxZoom_PK100mS

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	5 kHz	PK+	200 Hz	0,1 s	0 dB
150 kHz - 30 MHz	5 kHz	PK+	9 kHz	0,1 s	0 dB

Receiver: [ESCS 30]

Final Measurements:
Template for Single Meas.: 07a_FCC Class B fin AV QP 1sek

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
150 kHz - 30 MHz	4.5 kHz	QPK; CAV	9 kHz	1 s	0 dB

Receiver: [ESCS 30]

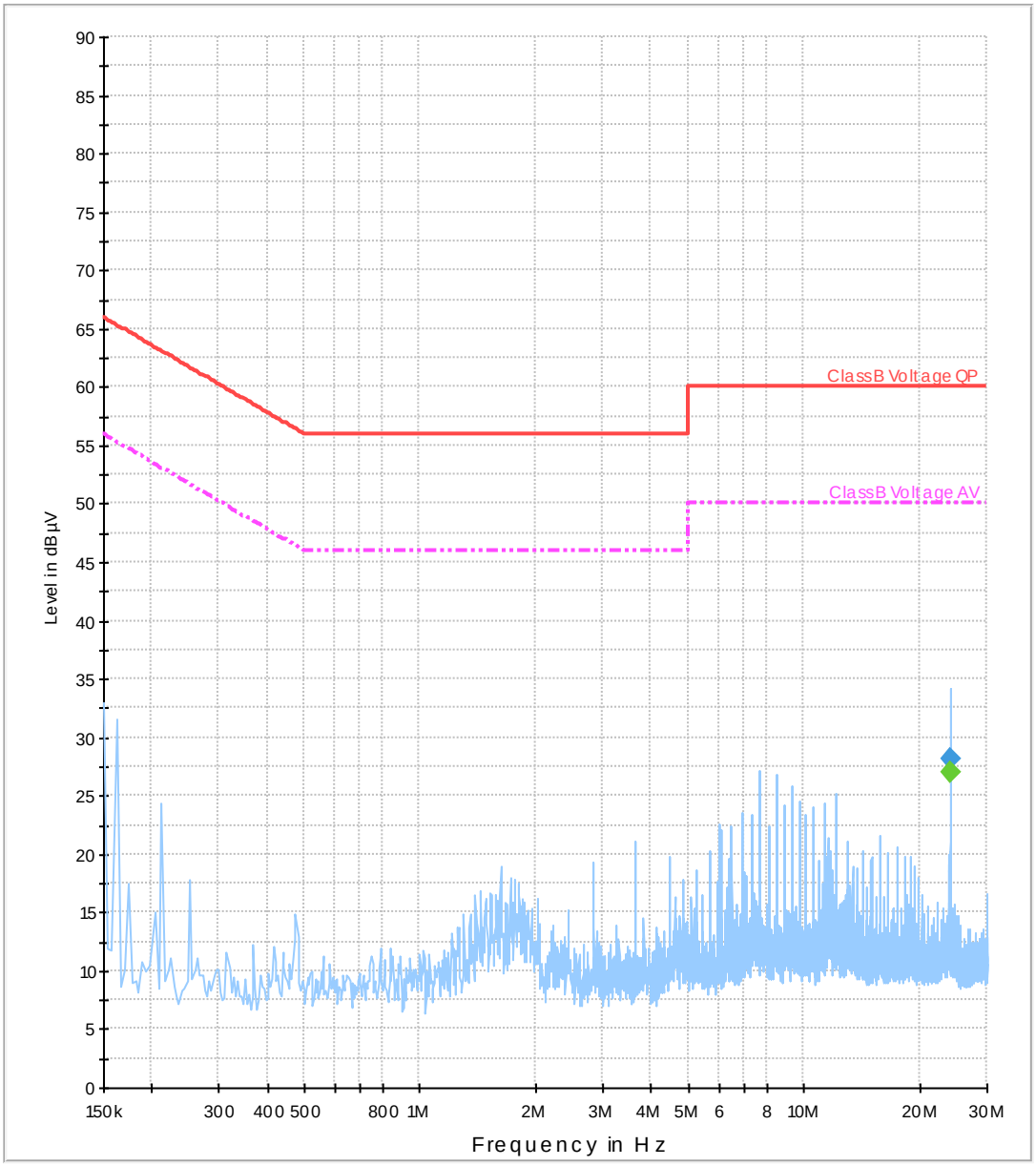
Report Settings:
Report Template: Ctc_Standard_class_B_FCC
Create Electronic Report: RTF PDF
Document Name: EMI Report

Actions:
Test stop
Notify: "End of Test"

Diagram No. 1.7_TX_Ch4183

	Date: 08.11.2012
Test Description:	Conducted Voltage Measurement Class B
Testspezification:	FCC 15.107, FCC 15.207
Technical Data:	Please see next page for detailed information
Diagram:	Shows the peak values as a sum of measured ports (N+L1) in maxhold mode
Operator name:	OOu
Report.- Nr.	6-0147-12-19
EUT:	ESH6
Manufacturer:	Cinterion
Operating mode:	FDDV TX
Measured on line:	Mains AC L1 and N
Power during test:	110 V AC 60 Hz

01b_FCC_107_207_Class B_Voltage_PK_QPAV_N_L1



Date: 08.11.2012

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
23.999063	28.2	1000.0	9.000	GN	L1	0.3	31.8	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
23.999063	27.0	1000.0	9.000	GN	L1	0.3	23.0	50.0

Technical Data of Measurements with R&S EMC32 V8.52.0

EMI Auto Test Template: 01b_FCC_107_207_Class B_Voltage_PK_QPAV_N_L1

Hardware Setup: ESH2-Z5
Measurement Type: 4 Line LISN
Frequency Range: 150 kHz - 30 MHz
Graphics Level Range: 0 dBµV - 90 dBµV

Preview Measurements:
Scan Test Template: 02_Class B pre_PK_fast

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	61.035 Hz	PK+	200 Hz	0,00005 s	0 dB
150 kHz - 30 MHz	3.906 kHz	PK+	9 kHz	0,00005 s	0 dB

Receiver: [ESCS 30]

Data Reduction:
Limit Line #1: Class B Voltage QP
Limit Line #2: Class B Voltage AV
Peak Search: 6 dB , Maximum Results: 10
Subrange Maxima: 25 Subranges , Maxima per Subrange: 1
Acceptance Offset: -13 dB
Maximum Number of Results: 30
After Data Reduction: Interactive data reduction

Frequency Zoom:
Zoom Scan Template: 08_Class B maxZoom_PK100mS

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	5 kHz	PK+	200 Hz	0,1 s	0 dB
150 kHz - 30 MHz	5 kHz	PK+	9 kHz	0,1 s	0 dB

Receiver: [ESCS 30]

Final Measurements:
Template for Single Meas.: 07a_FCC Class B fin AV QP 1sek

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
150 kHz - 30 MHz	4.5 kHz	QPK; CAV	9 kHz	1 s	0 dB

Receiver: [ESCS 30]

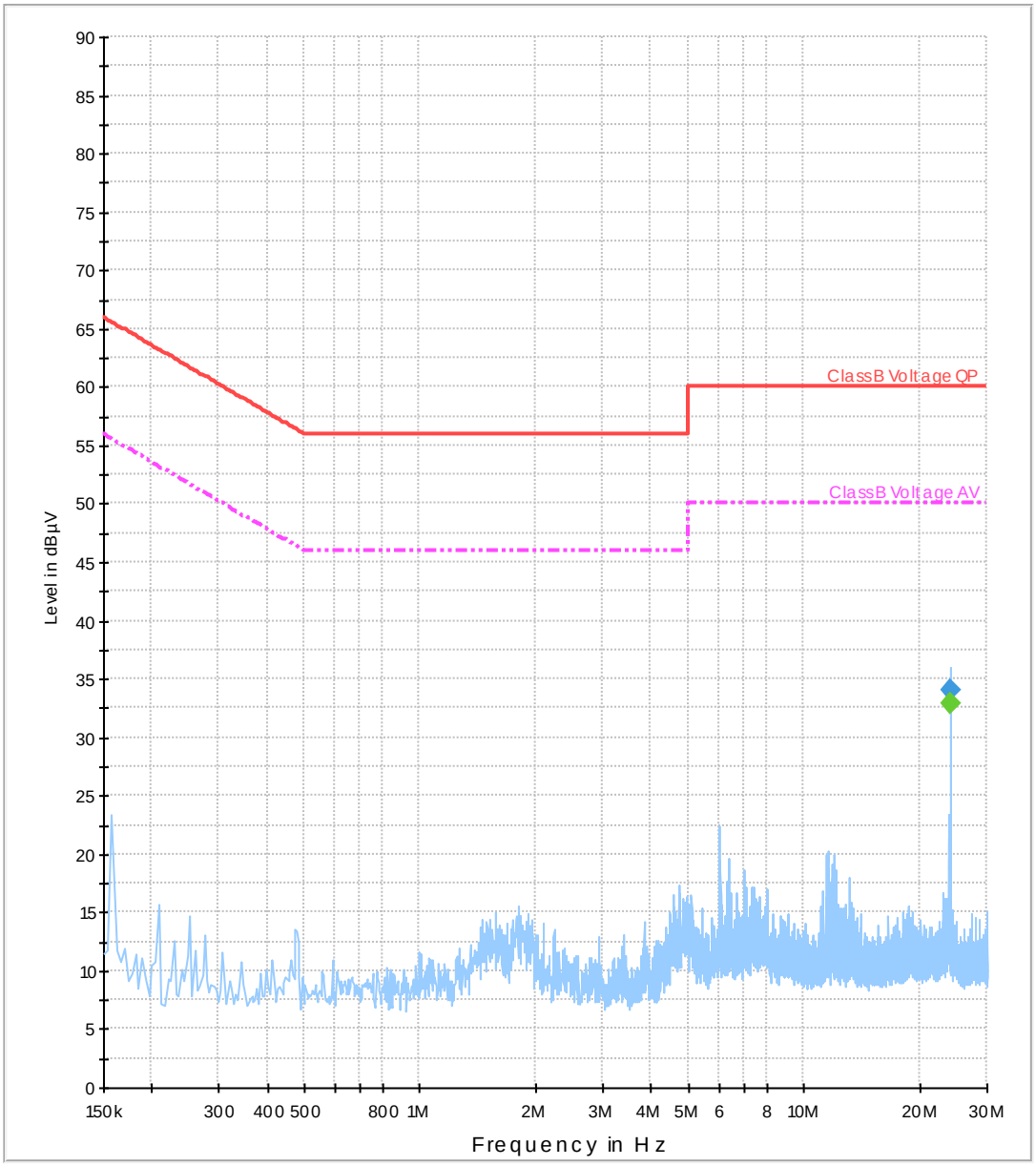
Report Settings:
Report Template: Ctc_Standard_class_B_FCC
Create Electronic Report: RTF PDF
Document Name: EMI Report

Actions:
Test stop
Notify: "End of Test"

Diagram No. 1.8_RX_ch4183

	Date: 08.11.2012
Test Description:	Conducted Voltage Measurement Class B
Testspezification:	FCC 15.107, FCC 15.207
Technical Data:	Please see next page for detailed information
Diagram:	Shows the peak values as a sum of measured ports (N+L1) in maxhold mode
Operator name:	OOu
Report.- Nr.	6-0147-12-19
EUT:	ESH6
Manufacturer:	Cinterion
Operating mode:	FDDV RX
Measured on line:	Mains AC L1 and N
Power during test:	110 V AC 60 Hz

01b_FCC_107_207_Class B_Voltage_PK_QPAV_N_L1



Date: 08.11.2012

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
23.999063	34.0	1000.0	9.000	GN	N	0.3	26.0	60.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
23.999063	32.9	1000.0	9.000	GN	N	0.3	17.1	50.0

Technical Data of Measurements with R&S EMC32 V8.52.0

EMI Auto Test Template: 01b_FCC_107_207_Class B_Voltage_PK_QPAV_N_L1

Hardware Setup: ESH2-Z5
Measurement Type: 4 Line LISN
Frequency Range: 150 kHz - 30 MHz
Graphics Level Range: 0 dBµV - 90 dBµV

Preview Measurements:
Scan Test Template: 02_Class B pre_PK_fast

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	61.035 Hz	PK+	200 Hz	0,00005 s	0 dB
150 kHz - 30 MHz	3.906 kHz	PK+	9 kHz	0,00005 s	0 dB

Receiver: [ESCS 30]

Data Reduction:
Limit Line #1: Class B Voltage QP
Limit Line #2: Class B Voltage AV
Peak Search: 6 dB , Maximum Results: 10
Subrange Maxima: 25 Subranges , Maxima per Subrange: 1
Acceptance Offset: -13 dB
Maximum Number of Results: 30
After Data Reduction: Interactive data reduction

Frequency Zoom:
Zoom Scan Template: 08_Class B maxZoom_PK100mS

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	5 kHz	PK+	200 Hz	0,1 s	0 dB
150 kHz - 30 MHz	5 kHz	PK+	9 kHz	0,1 s	0 dB

Receiver: [ESCS 30]

Final Measurements:
Template for Single Meas.: 07a_FCC Class B fin AV QP 1sek

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
150 kHz - 30 MHz	4.5 kHz	QPK; CAV	9 kHz	1 s	0 dB

Receiver: [ESCS 30]

Report Settings:
Report Template: Ctc_Standard_class_B_FCC
Create Electronic Report: RTF PDF
Document Name: EMI Report

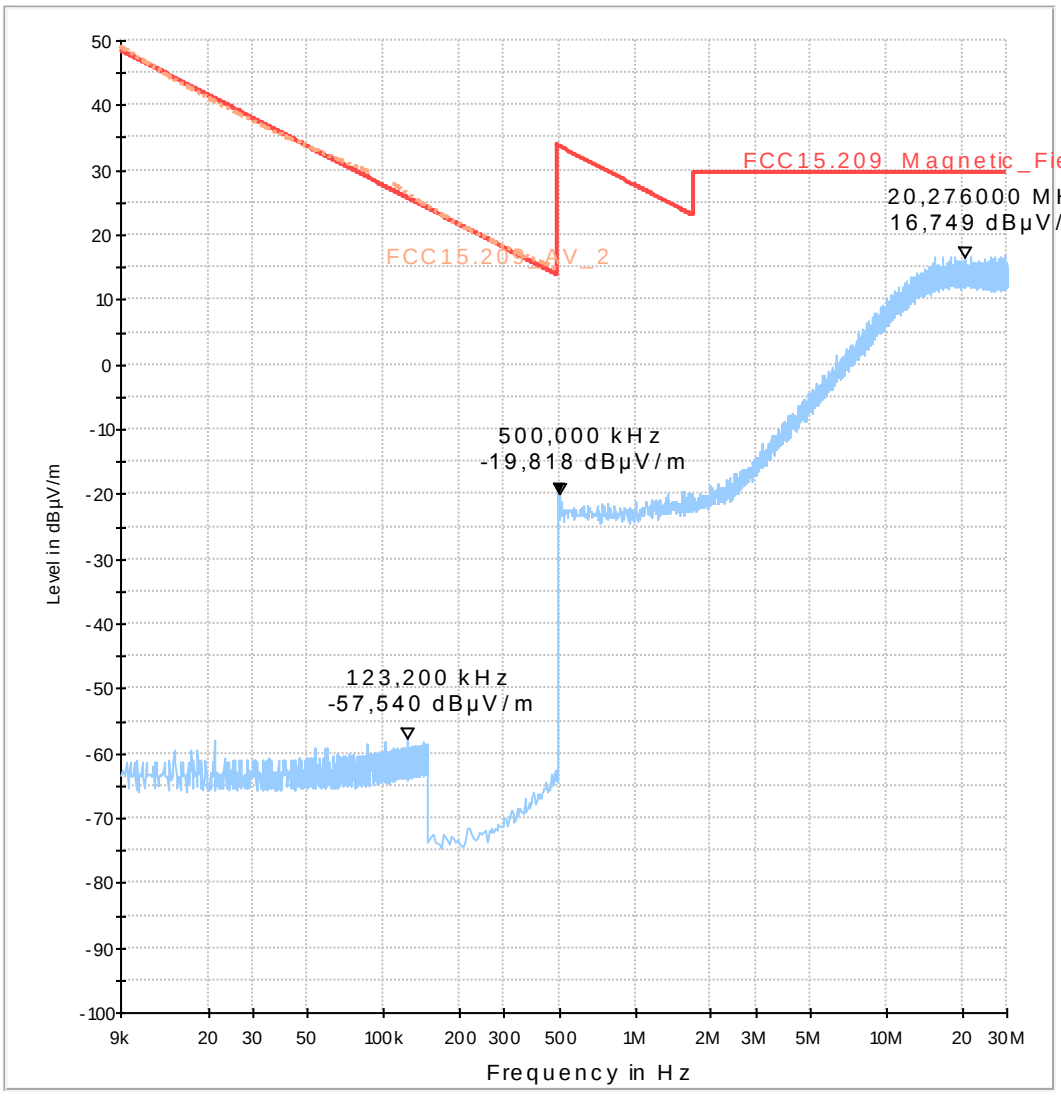
Actions:
Test stop
Notify: "End of Test"

8.3. Radiated Magnetic Field Strength measurements (f<30MHz)

Diagram No. 2.01_RSE_MG_Ch128_GPRS

	Date: 06.11.2012
Test description:	Magnetic Field strength Measurement related to 30/300 m distance
Test site and distance:	Semi Anechoic Room (SAR) with 3 m measurement distance
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 3
Operator:	Lor
EUT:	ESH6+DSB75+Handset Votronic + Antenna External
Manufacturer	Cinterion GmbH
Operating conditions:	GPRS850 Band
Power during tests:	12V DC
Comment 1:	Channel low=128
Comment 2:	RS232 + USB cable attached

FCC15.209_magn hor+vert



EMI Auto Test Template: FCC15.209_magn hor+vert

Hardware Setup: HW25_FCC15109_ESCS_MgFeld_ohne_SAR_MATRIX
Measurement Type: Open-Area-Test-Site
Frequency Range: 9 kHz - 30 MHz
Graphics Level Range: -100 dBµV/m - 50 dBµV/m

Preview Measurements:
Antenna height: 1000 - 1000 cm , Step Size = 0 cm , Positioning Speed = 1
Polarization: H + V
Turntable position: 35 - 305 deg , Step Size = 90 deg , Positioning Speed = 8
Scan Test Template: 01_FCC_MG_FELD_PK_FAST_H&V_EUT

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0,01 s	0 dB
150 kHz - 500 kHz	4 kHz	PK+	10 kHz	0,01 s	0 dB
500 kHz - 30 MHz	4 kHz	PK+	10 kHz	0,01 s	0 dB

Receiver: [ESS]

Data Reduction:
Limit Line #1: FCC15.209_Magnetic_Field
Limit Line #2: FCC15.209_AV_2
Peak Search: 20 dB , Maximum Results: 10
Subrange Maxima: 10 Subranges , Maxima per Subrange: 1
Acceptance Offset: -10 dB
Maximum Number of Results: 10
After Data Reduction: Interactive data reduction

Adjustment:
Antenna height: Adjustment with full Range , Measuring Speed = 1
Turntable position: Adjustment with full Range , Measuring Speed = 3
Template for Single Meas.: 01_FCC_MG_FELD_PK_FAST_H&V_EUT

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0,01 s	0 dB
150 kHz - 500 kHz	4 kHz	PK+	10 kHz	0,01 s	0 dB
500 kHz - 30 MHz	4 kHz	PK+	10 kHz	0,01 s	0 dB

Receiver: [ESS]

Final Measurements:
Template for Single Meas.: 02_FCC_MG_FELD_QP_final_H&V_EUT

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	QPK	200 Hz	1 s	0 dB
150 kHz - 30 MHz	5 kHz	QPK	10 kHz	1 s	0 dB

Receiver: [ESS]

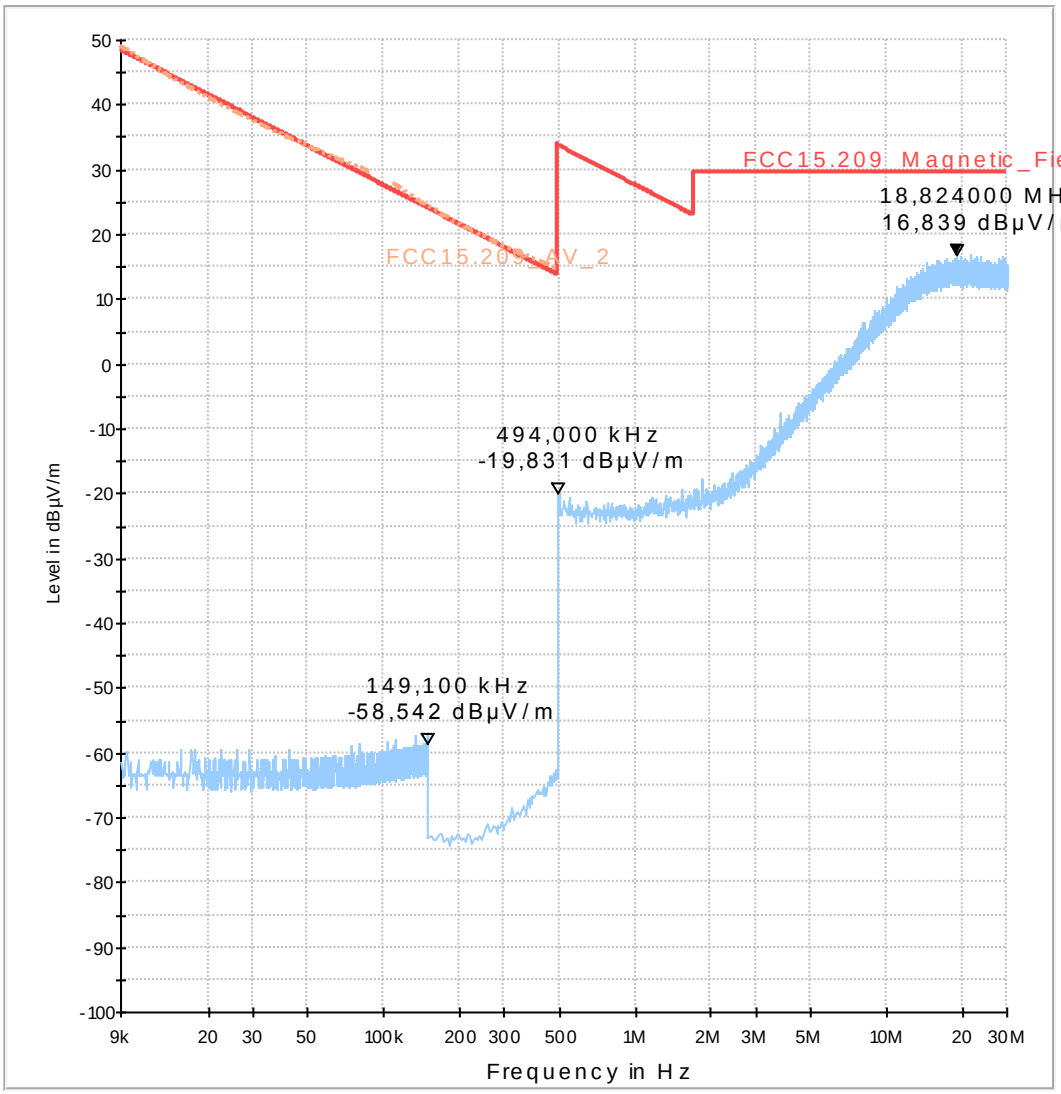
Report Settings:
Report Template: FCC15_209_magn_vert_hor
Create Electronic Report: RTF PDF
Document Name: EMI Report

Actions:
Preview Measurements: Before
Notify: "Achtung: es gibt Frequenzbereich mit AVERAGE detector als Ergebniss..."
Data Reduction: Before
Notify: Sound (WAV file) 'tada.wav'
Frequency Zoom 1: Before
Notify: "EUT funktioniert noch ?"
Final Measurements: After
Notify: Sound (WAV file) 'tada.wav'

Diagram No. 2.02_RSE_MG_Ch192_GPRS

	Date: 06.11.2012
Test description:	Magnetic Field strength Measurement related to 30/300 m distance
Test site and distance:	Semi Anechoic Room (SAR) with 3 m measurement distance
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 3
Operator:	Lor
EUT:	ESH6+DSB75+Handset Votronic + Antenna External
Manufacturer	Cinterion GmbH
Operating conditions:	GPRS850 Band
Power during tests:	12V DC
Comment 1:	Channel middle=192
Comment 2:	RS232 + USB cable attached

FCC15.209_magn hor+vert



EMI Auto Test Template: FCC15.209_magn hor+vert

Hardware Setup: HW25_FCC15109_ESCS_MgFeld_ohne_SAR_MATRIX
Measurement Type: Open-Area-Test-Site
Frequency Range: 9 kHz - 30 MHz
Graphics Level Range: -100 dBµV/m - 50 dBµV/m

Preview Measurements:
Antenna height: 1000 - 1000 cm , Step Size = 0 cm , Positioning Speed = 1
Polarization: H + V
Turntable position: 35 - 305 deg , Step Size = 90 deg , Positioning Speed = 8
Scan Test Template: 01_FCC_MG_FELD_PK_FAST_H&V_EUT

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0,01 s	0 dB
150 kHz - 500 kHz	4 kHz	PK+	10 kHz	0,01 s	0 dB
500 kHz - 30 MHz	4 kHz	PK+	10 kHz	0,01 s	0 dB

Receiver: [ESS]

Data Reduction:
Limit Line #1: FCC15.209_Magnetic_Field
Limit Line #2: FCC15.209_AV_2
Peak Search: 20 dB , Maximum Results: 10
Subrange Maxima: 10 Subranges , Maxima per Subrange: 1
Acceptance Offset: -10 dB
Maximum Number of Results: 10
After Data Reduction: Interactive data reduction

Adjustment:
Antenna height: Adjustment with full Range , Measuring Speed = 1
Turntable position: Adjustment with full Range , Measuring Speed = 3
Template for Single Meas.: 01_FCC_MG_FELD_PK_FAST_H&V_EUT

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0,01 s	0 dB
150 kHz - 500 kHz	4 kHz	PK+	10 kHz	0,01 s	0 dB
500 kHz - 30 MHz	4 kHz	PK+	10 kHz	0,01 s	0 dB

Receiver: [ESS]

Final Measurements:
Template for Single Meas.: 02_FCC_MG_FELD_QP_final_H&V_EUT

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	QPK	200 Hz	1 s	0 dB
150 kHz - 30 MHz	5 kHz	QPK	10 kHz	1 s	0 dB

Receiver: [ESS]

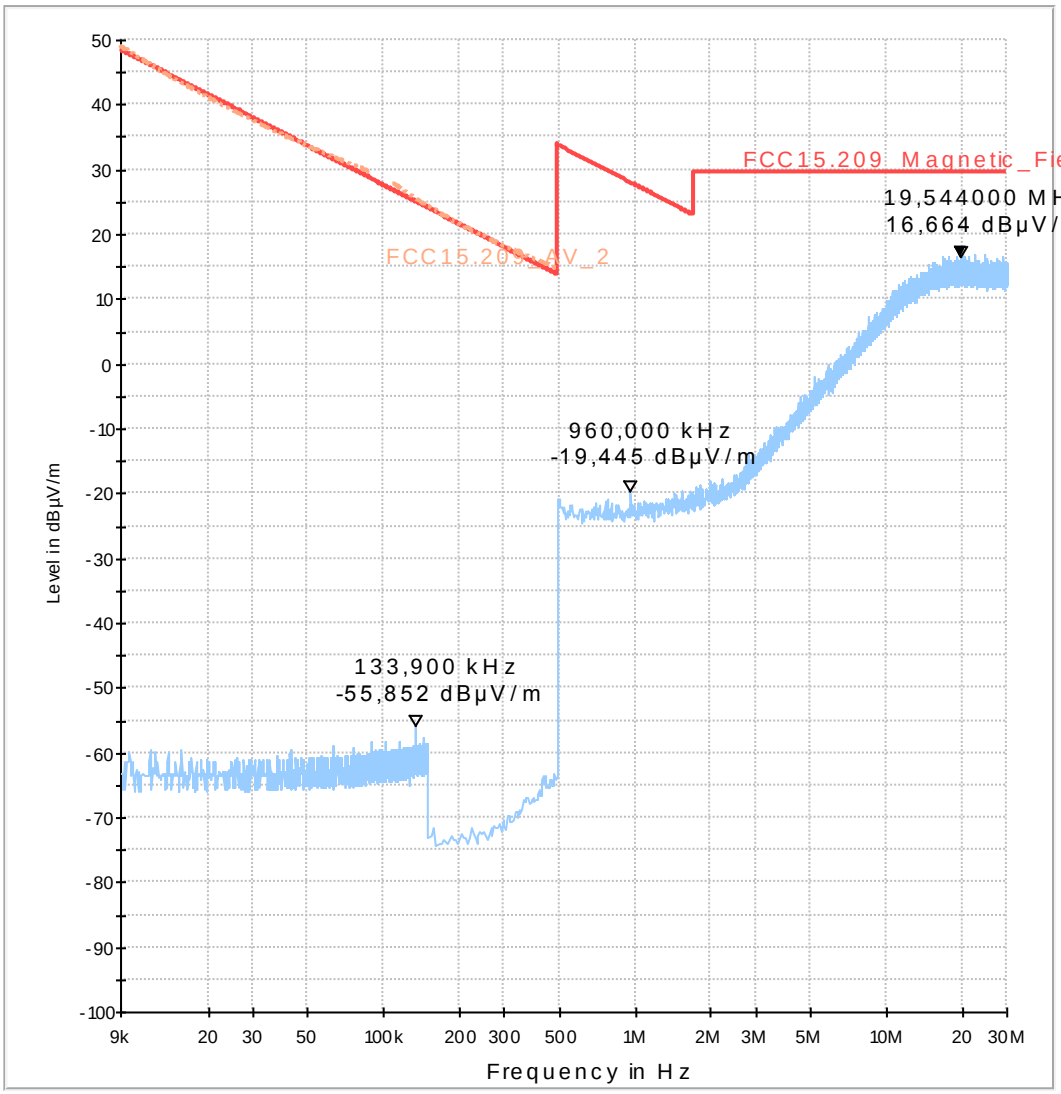
Report Settings:
Report Template: FCC15_209_magn_vert_hor
Create Electronic Report: RTF PDF
Document Name: EMI Report

Actions:
Preview Measurements: Before
Notify: "Achtung: es gibt Frequenzbereich mit AVERAGE detector als Ergebniss..."
Data Reduction: Before
Notify: Sound (WAV file) 'tada.wav'
Frequency Zoom 1: Before
Notify: "EUT funktioniert noch ?"
Final Measurements: After
Notify: Sound (WAV file) 'tada.wav'

Diagram No. 2.03_RSE_MG_Ch251_GPRS

	Date: 06.11.2012
Test description:	Magnetic Field strength Measurement related to 30/300 m distance
Test site and distance:	Semi Anechoic Room (SAR) with 3 m measurement distance
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 3
Operator:	Lor
EUT:	ESH6+DSB75+Handset Votronic + Antenna External
Manufacturer	Cinterion GmbH
Operating conditions:	GPRS850 Band
Power during tests:	12V DC, 110V/60Hz, full loaded batteries
Comment 1:	Channel high=251
Comment 2:	RS232 + USB cable attached

FCC15.209_magn hor+vert



EMI Auto Test Template: FCC15.209_magn hor+vert

Hardware Setup: HW25_FCC15109_ESCS_MgFeld_ohne_SAR_MATRIX
Measurement Type: Open-Area-Test-Site
Frequency Range: 9 kHz - 30 MHz
Graphics Level Range: -100 dBµV/m - 50 dBµV/m

Preview Measurements:
Antenna height: 1000 - 1000 cm , Step Size = 0 cm , Positioning Speed = 1
Polarization: H + V
Turntable position: 35 - 305 deg , Step Size = 90 deg , Positioning Speed = 8
Scan Test Template: 01_FCC_MG_FELD_PK_FAST_H&V_EUT

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0,01 s	0 dB
150 kHz - 500 kHz	4 kHz	PK+	10 kHz	0,01 s	0 dB
500 kHz - 30 MHz	4 kHz	PK+	10 kHz	0,01 s	0 dB

Receiver: [ESS]

Data Reduction:
Limit Line #1: FCC15.209_Magnetic_Field
Limit Line #2: FCC15.209_AV_2
Peak Search: 20 dB , Maximum Results: 10
Subrange Maxima: 10 Subranges , Maxima per Subrange: 1
Acceptance Offset: -10 dB
Maximum Number of Results: 10
After Data Reduction: Interactive data reduction

Adjustment:
Antenna height: Adjustment with full Range , Measuring Speed = 1
Turntable position: Adjustment with full Range , Measuring Speed = 3
Template for Single Meas.: 01_FCC_MG_FELD_PK_FAST_H&V_EUT

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0,01 s	0 dB
150 kHz - 500 kHz	4 kHz	PK+	10 kHz	0,01 s	0 dB
500 kHz - 30 MHz	4 kHz	PK+	10 kHz	0,01 s	0 dB

Receiver: [ESS]

Final Measurements:
Template for Single Meas.: 02_FCC_MG_FELD_QP_final_H&V_EUT

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	QPK	200 Hz	1 s	0 dB
150 kHz - 30 MHz	5 kHz	QPK	10 kHz	1 s	0 dB

Receiver: [ESS]

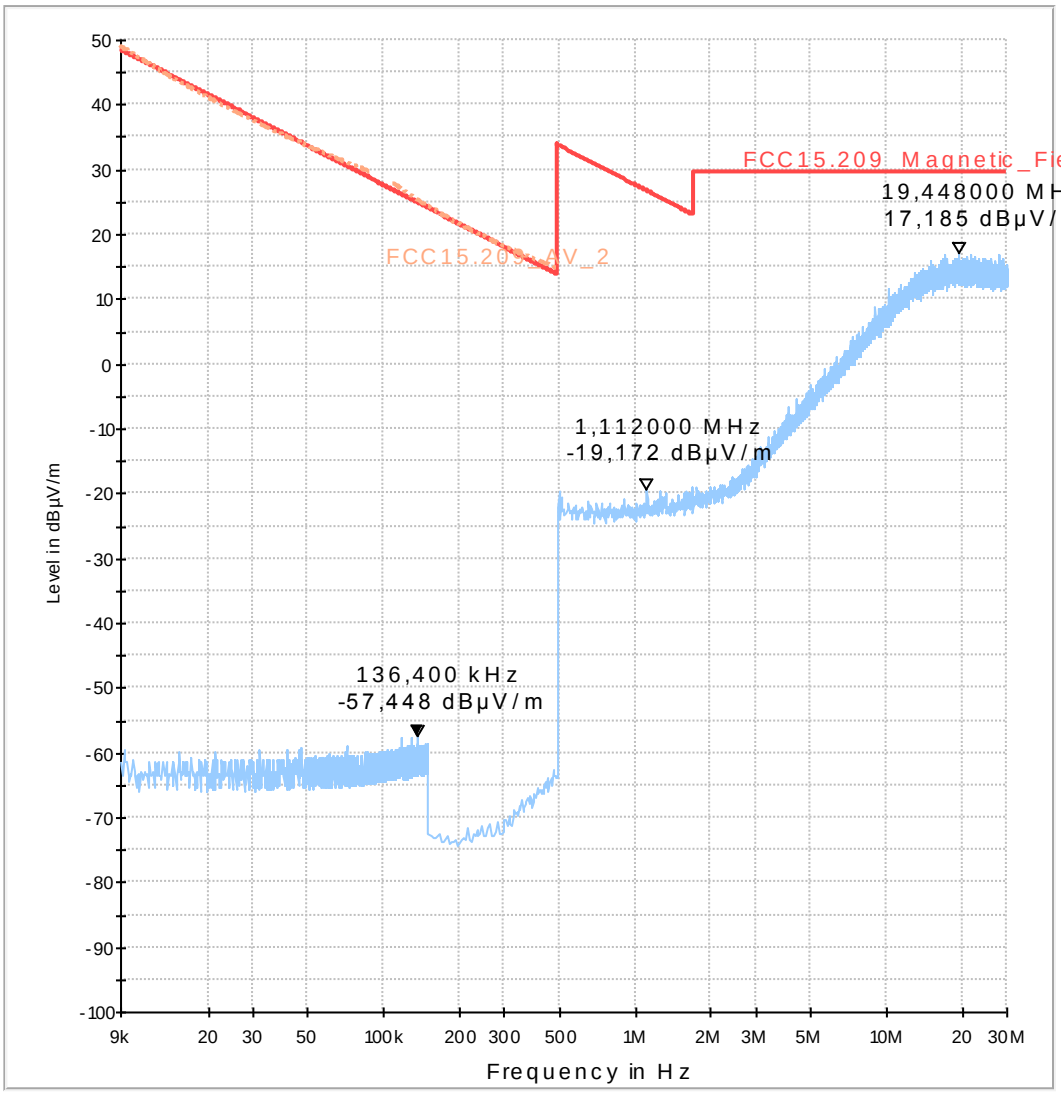
Report Settings:
Report Template: FCC15_209_magn_vert_hor
Create Electronic Report: RTF PDF
Document Name: EMI Report

Actions:
Preview Measurements: Before
Notify: "Achtung: es gibt Frequenzbereich mit AVERAGE detector als Ergebniss..."
Data Reduction: Before
Notify: Sound (WAV file) 'tada.wav'
Frequency Zoom 1: Before
Notify: "EUT funktioniert noch ?"
Final Measurements: After
Notify: Sound (WAV file) 'tada.wav'

Diagram No. 2.04_RSE_MG_Ch9262_Voice

	Date: 06.11.2012
Test description:	Magnetic Field strength Measurement related to 30/300 m distance
Test site and distance:	Semi Anechoic Room (SAR) with 3 m measurement distance
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 3
Operator:	Lor
EUT:	ESH6+DSB75+Handset Votronic + Antenna External
Manufacturer	Cinterion
Operating conditions:	FDD Band 2 - RMC99
Power during tests:	12V DC
Comment 1:	Channel low=9262
Comment 2:	RS232 + USB cable attached

FCC15.209_magn hor+vert



EMI Auto Test Template: FCC15.209_magn hor+vert

Hardware Setup: HW25_FCC15109_ESCS_MgFeld_ohne_SAR_MATRIX
Measurement Type: Open-Area-Test-Site
Frequency Range: 9 kHz - 30 MHz
Graphics Level Range: -100 dBµV/m - 50 dBµV/m

Preview Measurements:
Antenna height: 1000 - 1000 cm , Step Size = 0 cm , Positioning Speed = 1
Polarization: H + V
Turntable position: 35 - 305 deg , Step Size = 90 deg , Positioning Speed = 8
Scan Test Template: 01_FCC_MG_FELD_PK_FAST_H&V_EUT

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0,01 s	0 dB
150 kHz - 500 kHz	4 kHz	PK+	10 kHz	0,01 s	0 dB
500 kHz - 30 MHz	4 kHz	PK+	10 kHz	0,01 s	0 dB

Receiver: [ESS]

Data Reduction:
Limit Line #1: FCC15.209_Magnetic_Field
Limit Line #2: FCC15.209_AV_2
Peak Search: 20 dB , Maximum Results: 10
Subrange Maxima: 10 Subranges , Maxima per Subrange: 1
Acceptance Offset: -10 dB
Maximum Number of Results: 10
After Data Reduction: Interactive data reduction

Adjustment:
Antenna height: Adjustment with full Range , Measuring Speed = 1
Turntable position: Adjustment with full Range , Measuring Speed = 3
Template for Single Meas.: 01_FCC_MG_FELD_PK_FAST_H&V_EUT

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0,01 s	0 dB
150 kHz - 500 kHz	4 kHz	PK+	10 kHz	0,01 s	0 dB
500 kHz - 30 MHz	4 kHz	PK+	10 kHz	0,01 s	0 dB

Receiver: [ESS]

Final Measurements:
Template for Single Meas.: 02_FCC_MG_FELD_QP_final_H&V_EUT

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	QPK	200 Hz	1 s	0 dB
150 kHz - 30 MHz	5 kHz	QPK	10 kHz	1 s	0 dB

Receiver: [ESS]

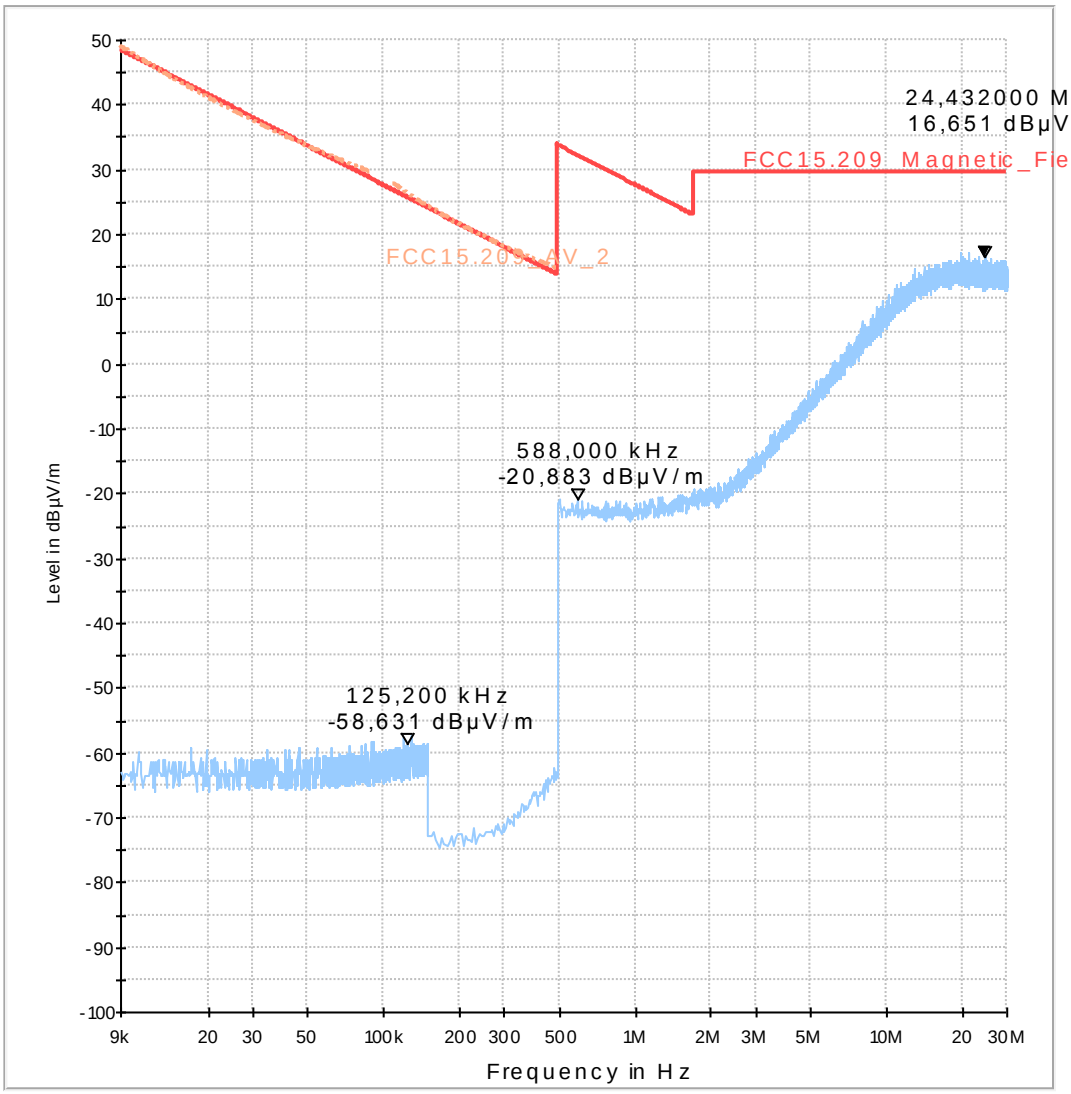
Report Settings:
Report Template: FCC15_209_magn_vert_hor
Create Electronic Report: RTF PDF
Document Name: EMI Report

Actions:
Preview Measurements: Before
Notify: "Achtung: es gibt Frequenzbereich mit AVERAGE detector als Ergebniss..."
Data Reduction: Before
Notify: Sound (WAV file) 'tada.wav'
Frequency Zoom 1: Before
Notify: "EUT funktioniert noch ?"
Final Measurements: After
Notify: Sound (WAV file) 'tada.wav'

Diagram No. 2.05_RSE_MG_Ch9400_Voice

	Date: 06.11.2012
Test description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test site and distance:	Semi Anechoic Room (SAR) with 3 m measurement distance
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 3
Operator:	Lor
EUT:	ESH6+DSB75+Handset Votronic + Antenna External
Manufacturer	Cinterion
Operating conditions:	FDD Band 2 - RMC99
Power during tests:	12V DC
Comment 1:	Channel middle=9400
Comment 2:	RS232 + USB cable attached

FCC15.209_magn hor+vert



EMI Auto Test Template: FCC15.209_magn hor+vert

Hardware Setup: HW25_FCC15109_ESCS_MgFeld_ohne_SAR_MATRIX
Measurement Type: Open-Area-Test-Site
Frequency Range: 9 kHz - 30 MHz
Graphics Level Range: -100 dBµV/m - 50 dBµV/m

Preview Measurements:
Antenna height: 1000 - 1000 cm , Step Size = 0 cm , Positioning Speed = 1
Polarization: H + V
Turntable position: 35 - 305 deg , Step Size = 90 deg , Positioning Speed = 8
Scan Test Template: 01_FCC_MG_FELD_PK_FAST_H&V_EUT

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0,01 s	0 dB
150 kHz - 500 kHz	4 kHz	PK+	10 kHz	0,01 s	0 dB
500 kHz - 30 MHz	4 kHz	PK+	10 kHz	0,01 s	0 dB

Receiver: [ESS]

Data Reduction:
Limit Line #1: FCC15.209_Magnetic_Field
Limit Line #2: FCC15.209_AV_2
Peak Search: 20 dB , Maximum Results: 10
Subrange Maxima: 10 Subranges , Maxima per Subrange: 1
Acceptance Offset: -10 dB
Maximum Number of Results: 10
After Data Reduction: Interactive data reduction

Adjustment:
Antenna height: Adjustment with full Range , Measuring Speed = 1
Turntable position: Adjustment with full Range , Measuring Speed = 3
Template for Single Meas.: 01_FCC_MG_FELD_PK_FAST_H&V_EUT

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0,01 s	0 dB
150 kHz - 500 kHz	4 kHz	PK+	10 kHz	0,01 s	0 dB
500 kHz - 30 MHz	4 kHz	PK+	10 kHz	0,01 s	0 dB

Receiver: [ESS]

Final Measurements:
Template for Single Meas.: 02_FCC_MG_FELD_QP_final_H&V_EUT

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	QPK	200 Hz	1 s	0 dB
150 kHz - 30 MHz	5 kHz	QPK	10 kHz	1 s	0 dB

Receiver: [ESS]

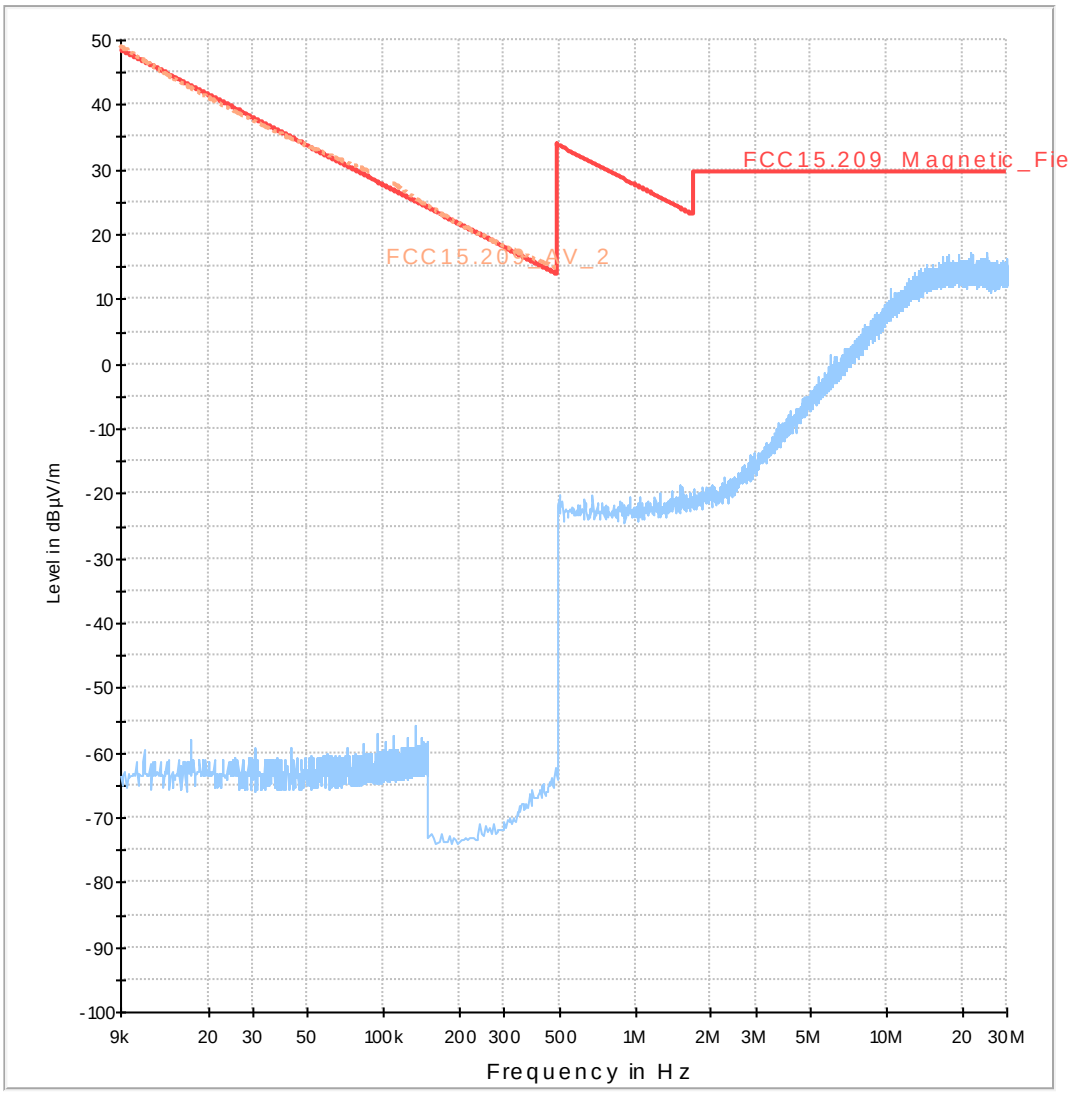
Report Settings:
Report Template: FCC15_209_magn_vert_hor
Create Electronic Report: RTF PDF
Document Name: EMI Report

Actions:
Preview Measurements: Before
Notify: "Achtung: es gibt Frequenzbereich mit AVERAGE detector als Ergebniss..."
Data Reduction: Before
Notify: Sound (WAV file) 'tada.wav'
Frequency Zoom 1: Before
Notify: "EUT funktioniert noch ?"
Final Measurements: After
Notify: Sound (WAV file) 'tada.wav'

Diagram No. 2.06_RSE_MG_Ch9538_Voice

	Date: 06.11.2012
Test description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test site and distance:	Semi Anechoic Room (SAR) with 3 m measurement distance
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used filter:	bypass
Test specification:	FCC 15.205 § 15.209; RSS-Gen: Issue 3
Operator:	Lor
EUT:	ESH6+DSB75+Handset Votronic + Antenna External
Manufacturer	Cinterion
Operating conditions:	FDD Band 2 - RMC99
Power during tests:	12V DC
Comment 1:	Channel high=9538
Comment 2:	RS232 + USB cable attached

FCC15.209_magn hor+vert



EMI Auto Test Template: FCC15.209_magn hor+vert

Hardware Setup: HW25_FCC15109_ESCS_MgFeld_ohne_SAR_MATRIX
Measurement Type: Open-Area-Test-Site
Frequency Range: 9 kHz - 30 MHz
Graphics Level Range: -100 dBµV/m - 50 dBµV/m

Preview Measurements:
Antenna height: 1000 - 1000 cm , Step Size = 0 cm , Positioning Speed = 1
Polarization: H + V
Turntable position: 35 - 305 deg , Step Size = 90 deg , Positioning Speed = 8
Scan Test Template: 01_FCC_MG_FELD_PK_FAST_H&V_EUT

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0,01 s	0 dB
150 kHz - 500 kHz	4 kHz	PK+	10 kHz	0,01 s	0 dB
500 kHz - 30 MHz	4 kHz	PK+	10 kHz	0,01 s	0 dB

Receiver: [ESS]

Data Reduction:
Limit Line #1: FCC15.209_Magnetic_Field
Limit Line #2: FCC15.209_AV_2
Peak Search: 20 dB , Maximum Results: 10
Subrange Maxima: 10 Subranges , Maxima per Subrange: 1
Acceptance Offset: -10 dB
Maximum Number of Results: 10
After Data Reduction: Interactive data reduction

Adjustment:
Antenna height: Adjustment with full Range , Measuring Speed = 1
Turntable position: Adjustment with full Range , Measuring Speed = 3
Template for Single Meas.: 01_FCC_MG_FELD_PK_FAST_H&V_EUT

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	PK+	200 Hz	0,01 s	0 dB
150 kHz - 500 kHz	4 kHz	PK+	10 kHz	0,01 s	0 dB
500 kHz - 30 MHz	4 kHz	PK+	10 kHz	0,01 s	0 dB

Receiver: [ESS]

Final Measurements:
Template for Single Meas.: 02_FCC_MG_FELD_QP_final_H&V_EUT

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	100 Hz	QPK	200 Hz	1 s	0 dB
150 kHz - 30 MHz	5 kHz	QPK	10 kHz	1 s	0 dB

Receiver: [ESS]

Report Settings:
Report Template: FCC15_209_magn_vert_hor
Create Electronic Report: RTF PDF
Document Name: EMI Report

Actions:
Preview Measurements: Before
Notify: "Achtung: es gibt Frequenzbereich mit AVERAGE detector als Ergebniss..."
Data Reduction: Before
Notify: Sound (WAV file) 'tada.wav'
Frequency Zoom 1: Before
Notify: "EUT funktioniert noch ?"
Final Measurements: After
Notify: Sound (WAV file) 'tada.wav'

8.4. Diagrams of radiated field strength emissions, 30 MHz - 1 GHz (Diagram group 03)

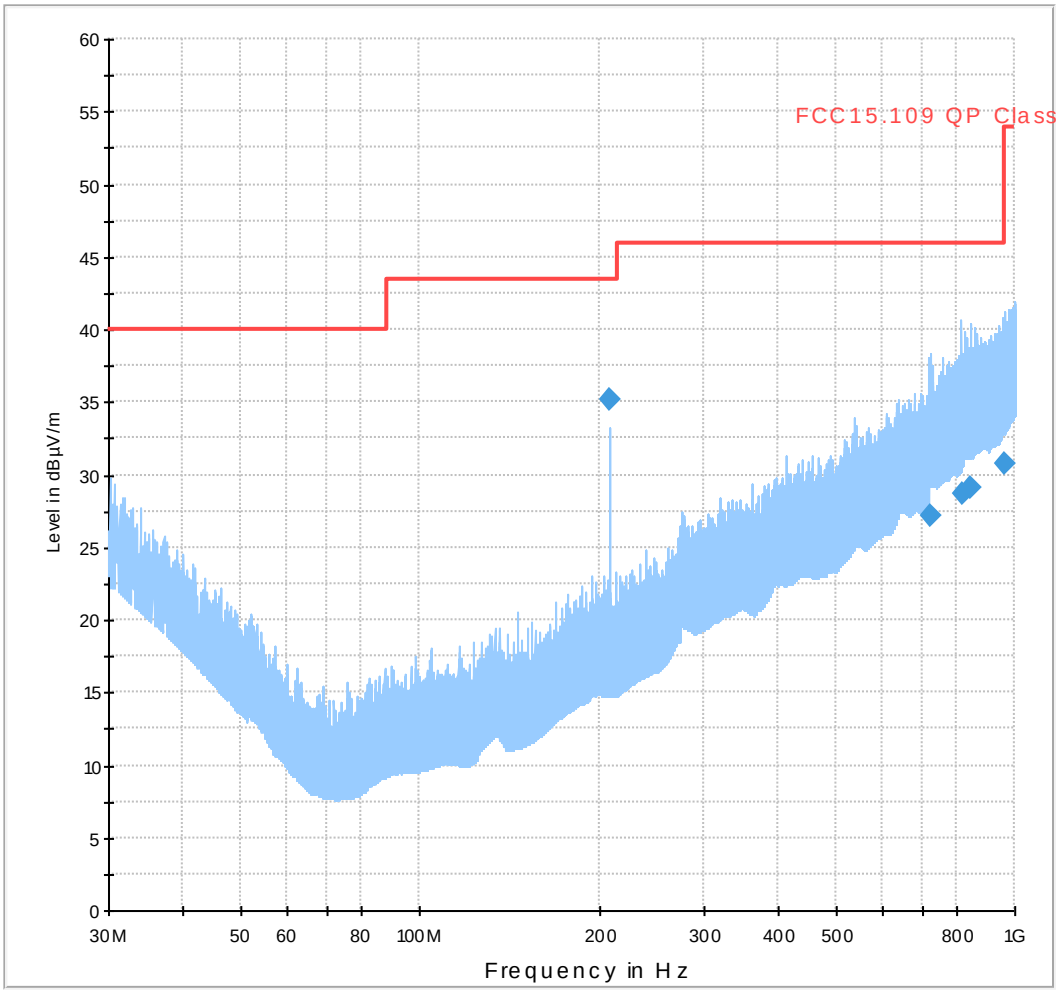
Diagram No. 3.01_RSE_RX_Ch4185

	08.11.2012
Test description:	Electric Field Strength Measurement
Test site and distance:	Semi Anechoic Room (SAR) - 3 m measurement distance
Distance correction:	not used
Used filter:	not used
Technical Data:	please see page 2 for detailed data of measurement setup
Test specification.:	FCC 15.109 Class B; RSS-Gen., Issue 3
Operator:	Lor
Operating conditions:	RX Mode - FDD Band 5
Power during tests:	12V DC
Comment 1:	--

EUT Information

EUT Name:	ESH6 + DSB75+ Handset Votronic + External Antenna + Cable RS232/USB
Manufacturer:	Cinterion
IMEI:	Sample RAD
HW:	--
Add. Info:	--

FCC15.109_hor+vert



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
207.990000	35.2	1000.0	120.000	162.0	H	41.0	11.7	8.3	43.5
724.380000	27.1	1000.0	120.000	237.0	V	341.0	24.0	18.9	46.0
814.660000	28.7	1000.0	120.000	280.0	V	249.0	25.2	17.3	46.0
839.910000	29.1	1000.0	120.000	293.0	V	276.0	25.3	16.9	46.0
960.870000	30.7	1000.0	120.000	259.0	V	30.0	27.0	23.3	54.0

EMI Auto Test Template: FCC15.109_hor+vert

Hardware Setup: HW11_FCC_ESCS30_TP1200
Measurement Type: Open-Area-Test-Site
Frequency Range: 30 MHz - 1 GHz
Graphics Level Range: 0 dBµV/m - 60 dBµV/m

Preview Measurements:
- Antenna height: 100 - 182 cm , Step Size = 82 cm , Positioning Speed = 8
- Polarization: H + V
- Turntable position: 0 - 270 deg , Step Size = 90 deg , Positioning Speed = 8
- Scan Test Template: EMI Scan 01_fast_FCC 15_209 B

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 1 GHz	40 kHz	PK+	120 kHz	0,00005 s	0 dB

Receiver: [ESS]

Data Reduction:
- Limit Line #1: FCC15.109 QP Class B
- Peak Search: 6 dB , Maximum Results: 10
- Subrange Maxima: 25 Subranges , Maxima per Subrange: 1
- Acceptance Offset: -6 dB
- Maximum Number of Results: 10
- After Data Reduction: Interactive data reduction

Frequency Zoom:
- Zoom Scan Template: EMI Scan 02_20ms_zoom_FCC 15_209 B

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 1 GHz	10 kHz	PK+	120 kHz	0,02 s	0 dB

Receiver: [ESS]

Adjustment:
- Antenna height: Adjustment with full Range , Measuring Speed = 8
- Turntable position: Adjustment with full Range , Measuring Speed = 4
- Template for Single Meas.: EMI Scan 02_20ms_FCC 15_209 B

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 1 GHz	100 kHz	PK+	120 kHz	0,02 s	0 dB

Receiver: [ESS]

Final Measurements:
- Template for Single Meas.: EMI Scan 03_1s_FCC 15_209 B

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 1 GHz	100 kHz	QPK	120 kHz	1 s	0 dB

Receiver: [ESS]

Report Settings:
- Report Template: FCC15_209_vert_hor
- Create Electronic Report: RTF PDF
- Document Name: EMI Report

Actions:
- Data Reduction: Before
  - Notify: Sound (WAV file) 'tada.wav'
- Final Measurements: After
  - Notify: Sound (WAV file) 'tada.wav'

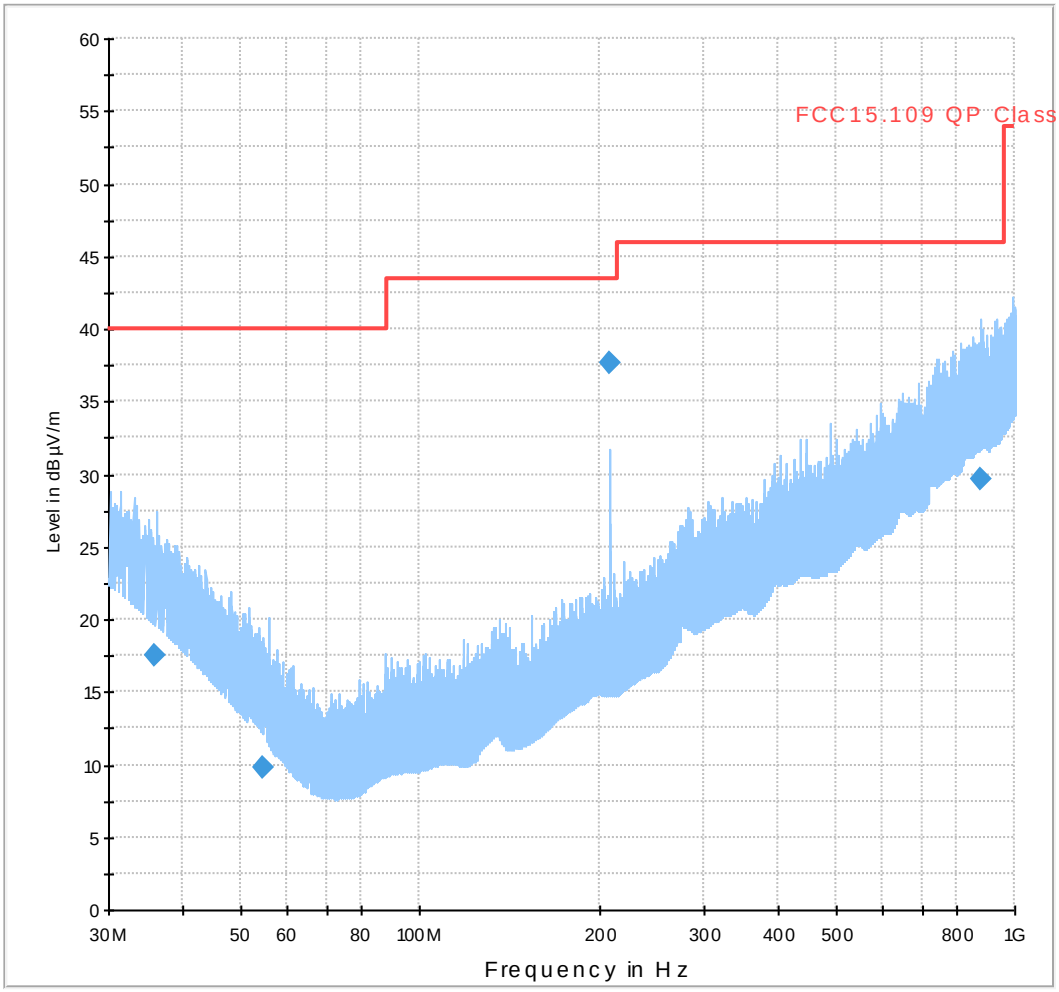
Diagram No. 3.02_RSE_RX_Ch9400

	08.11.2012
Test description:	Electric Field Strength Measurement
Test site and distance:	Semi Anechoic Room (SAR) - 3 m measurement distance
Distance correction:	not used
Used filter:	not used
Technical Data:	please see page 2 for detailed data of measurement setup
Test specification.:	FCC 15.109 Class B; RSS-Gen., Issue 3
Operator:	Lor
Operating conditions:	RX Mode - FDD Band 2
Power during tests:	12V DC
Comment 1:	--

EUT Information

EUT Name:	ESH6 + DSB75+ Handset Votronic + External Antenna + Cable RS232/USB
Manufacturer:	Cinterion
IMEI:	Sample RAD
HW:	--
Add. Info:	--

FCC15.109_hor+vert



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
35.880000	17.5	1000.0	120.000	293.0	H	40.0	19.2	22.5	40.0
54.540000	9.8	1000.0	120.000	175.0	H	56.0	11.2	30.2	40.0
208.000000	37.6	1000.0	120.000	149.0	H	201.0	11.7	5.9	43.5
874.380000	29.6	1000.0	120.000	151.0	H	0.0	26.1	16.4	46.0

EMI Auto Test Template: FCC15.109_hor+vert

Hardware Setup: HW11_FCC_ESCS30_TP1200
Measurement Type: Open-Area-Test-Site
Frequency Range: 30 MHz - 1 GHz
Graphics Level Range: 0 dBµV/m - 60 dBµV/m

Preview Measurements:
- Antenna height: 100 - 182 cm , Step Size = 82 cm , Positioning Speed = 8
- Polarization: H + V
- Turntable position: 0 - 270 deg , Step Size = 90 deg , Positioning Speed = 8
- Scan Test Template: EMI Scan 01_fast_FCC 15_209 B

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 1 GHz	40 kHz	PK+	120 kHz	0,00005 s	0 dB

Receiver: [ESS]

Data Reduction:
- Limit Line #1: FCC15.109 QP Class B
- Peak Search: 6 dB , Maximum Results: 10
- Subrange Maxima: 25 Subranges , Maxima per Subrange: 1
- Acceptance Offset: -6 dB
- Maximum Number of Results: 10
- After Data Reduction: Interactive data reduction

Frequency Zoom:
- Zoom Scan Template: EMI Scan 02_20ms_zoom_FCC 15_209 B

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 1 GHz	10 kHz	PK+	120 kHz	0,02 s	0 dB

Receiver: [ESS]

Adjustment:
- Antenna height: Adjustment with full Range , Measuring Speed = 8
- Turntable position: Adjustment with full Range , Measuring Speed = 4
- Template for Single Meas.: EMI Scan 02_20ms_FCC 15_209 B

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 1 GHz	100 kHz	PK+	120 kHz	0,02 s	0 dB

Receiver: [ESS]

Final Measurements:
- Template for Single Meas.: EMI Scan 03_1s_FCC 15_209 B

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 1 GHz	100 kHz	QPK	120 kHz	1 s	0 dB

Receiver: [ESS]

Report Settings:
- Report Template: FCC15_209_vert_hor
- Create Electronic Report: RTF PDF
- Document Name: EMI Report

Actions:
- Data Reduction: Before
  - Notify: Sound (WAV file) 'tada.wav'
- Final Measurements: After
  - Notify: Sound (WAV file) 'tada.wav'

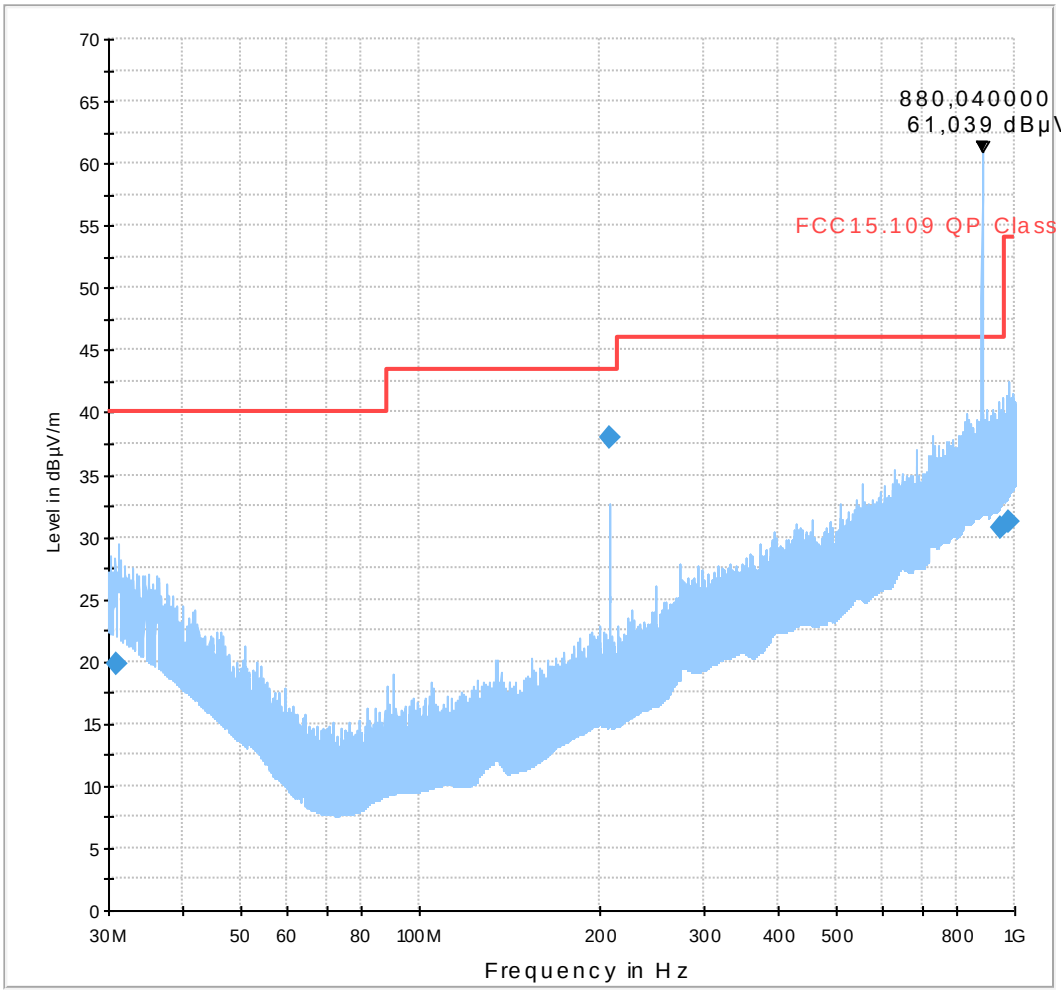
Diagram No. 3.03_RSE_RX_Ch192

	08.11.2012
Test description:	Electric Field Strength Measurement
Test site and distance:	Semi Anechoic Room (SAR) - 3 m measurement distance
Distance correction:	not used
Used filter:	not used
Technical Data:	please see page 2 for detailed data of measurement setup
Test specification.:	FCC 15.109 Class B; RSS-Gen., Issue 3
Operator:	Lor
Operating conditions:	RX Mode - GSM850
Power during tests:	12V DC
Comment 1:	--

EUT Information

EUT Name:	ESH6 + DSB75+ Handset Votronic + External Antenna + Cable RS232/USB
Manufacturer:	Cinterion
IMEI:	Sample RAD
HW:	--
Add. Info:	--

FCC15.109_hor+vert



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
30.890000	19.7	1000.0	120.000	246.0	H	41.0	21.5	20.3	40.0
208.000000	38.0	1000.0	120.000	168.0	H	206.0	11.7	5.5	43.5
950.640000	30.7	1000.0	120.000	222.0	H	0.0	27.0	15.3	46.0
974.940000	31.2	1000.0	120.000	368.0	H	0.0	27.3	22.8	54.0

EMI Auto Test Template: FCC15.109_hor+vert

Hardware Setup: HW11_FCC_ESCS30_TP1200
Measurement Type: Open-Area-Test-Site
Frequency Range: 30 MHz - 1 GHz
Graphics Level Range: 0 dBµV/m - 60 dBµV/m

Preview Measurements:
- Antenna height: 100 - 182 cm , Step Size = 82 cm , Positioning Speed = 8
- Polarization: H + V
- Turntable position: 0 - 270 deg , Step Size = 90 deg , Positioning Speed = 8
- Scan Test Template: EMI Scan 01_fast_FCC 15_209 B

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 1 GHz	40 kHz	PK+	120 kHz	0,00005 s	0 dB

Receiver: [ESS]

Data Reduction:
- Limit Line #1: FCC15.109 QP Class B
- Peak Search: 6 dB , Maximum Results: 10
- Subrange Maxima: 25 Subranges , Maxima per Subrange: 1
- Acceptance Offset: -6 dB
- Maximum Number of Results: 10
- After Data Reduction: Interactive data reduction

Frequency Zoom:
- Zoom Scan Template: EMI Scan 02_20ms_zoom_FCC 15_209 B

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 1 GHz	10 kHz	PK+	120 kHz	0,02 s	0 dB

Receiver: [ESS]

Adjustment:
- Antenna height: Adjustment with full Range , Measuring Speed = 8
- Turntable position: Adjustment with full Range , Measuring Speed = 4
- Template for Single Meas.: EMI Scan 02_20ms_FCC 15_209 B

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 1 GHz	100 kHz	PK+	120 kHz	0,02 s	0 dB

Receiver: [ESS]

Final Measurements:
- Template for Single Meas.: EMI Scan 03_1s_FCC 15_209 B

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 1 GHz	100 kHz	QPK	120 kHz	1 s	0 dB

Receiver: [ESS]

Report Settings:
- Report Template: FCC15_209_vert_hor
- Create Electronic Report: RTF PDF
- Document Name: EMI Report

Actions:
- Data Reduction: Before
  - Notify: Sound (WAV file) 'tada.wav'
- Final Measurements: After
  - Notify: Sound (WAV file) 'tada.wav'

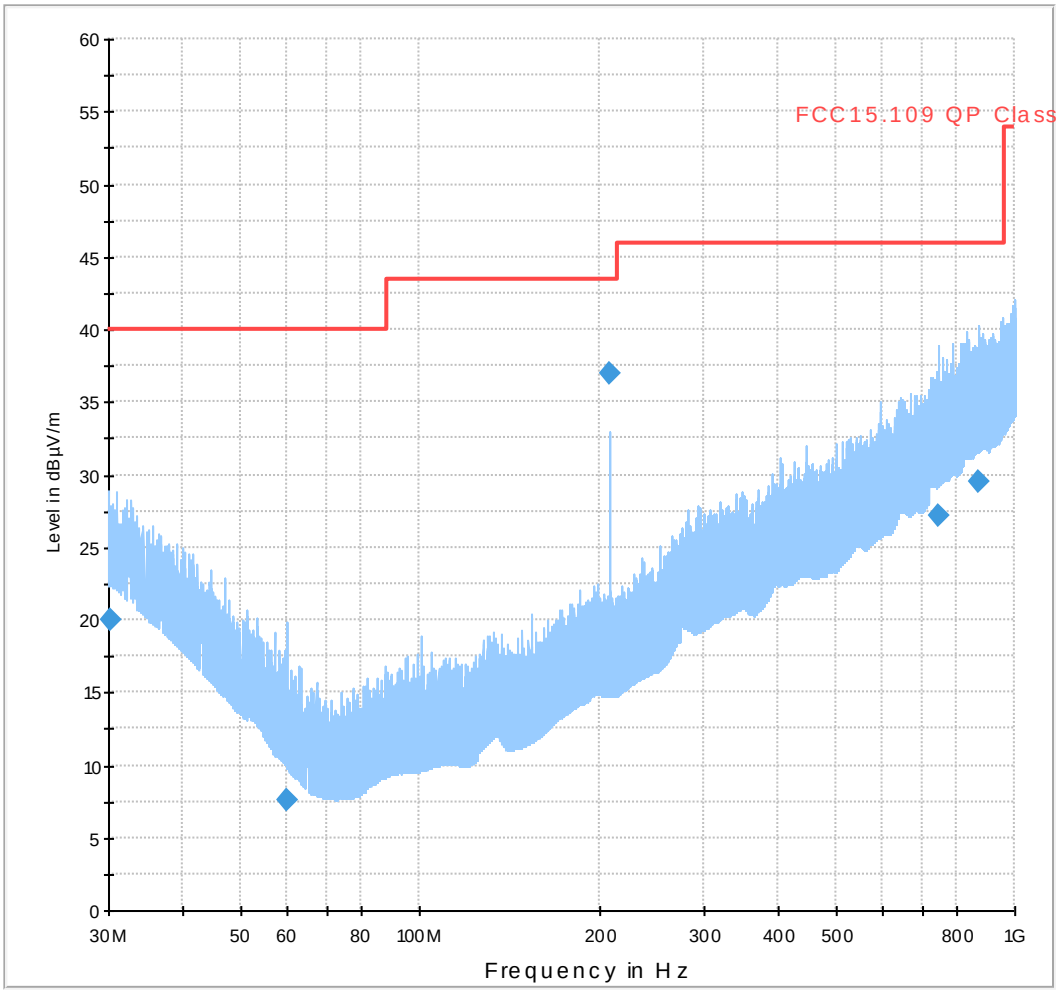
Diagram No. 3.04a_RSE_RX_Ch661

	08.11.2012
Test description:	Electric Field Strength Measurement
Test site and distance:	Semi Anechoic Room (SAR) - 3 m measurement distance
Distance correction:	not used
Used filter:	not used
Technical Data:	please see page 2 for detailed data of measurement setup
Test specification.:	FCC 15.109 Class B; RSS-Gen., Issue 3
Operator:	Lor
Operating conditions:	RX Mode - GSM1900
Power during tests:	12V DC
Comment 1:	EUT placed vertical

EUT Information

EUT Name:	ESH6 + DSB75+ Handset Votronic + External Antenna + Cable RS232/USB
Manufacturer:	Cinterion
IMEI:	Sample RAD
HW:	--
Add. Info:	--

FCC15.109_hor+vert



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
30.270000	20.0	1000.0	120.000	117.0	V	281.0	21.7	20.0	40.0
59.750000	7.6	1000.0	120.000	199.0	V	223.0	9.0	32.4	40.0
208.000000	37.0	1000.0	120.000	149.0	H	309.0	11.7	6.5	43.5
743.500000	27.1	1000.0	120.000	115.0	H	57.0	24.0	18.9	46.0
...	...	...	...	...	...	...	...	...	...

EMI Auto Test Template: FCC15.109_hor+vert

Hardware Setup: HW11_FCC_ESCS30_TP1200
Measurement Type: Open-Area-Test-Site
Frequency Range: 30 MHz - 1 GHz
Graphics Level Range: 0 dBµV/m - 60 dBµV/m

Preview Measurements:
- Antenna height: 100 - 182 cm , Step Size = 82 cm , Positioning Speed = 8
- Polarization: H + V
- Turntable position: 0 - 270 deg , Step Size = 90 deg , Positioning Speed = 8
- Scan Test Template: EMI Scan 01_fast_FCC 15_209 B

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 1 GHz	40 kHz	PK+	120 kHz	0,00005 s	0 dB

Receiver: [ESS]

Data Reduction:
- Limit Line #1: FCC15.109 QP Class B
- Peak Search: 6 dB , Maximum Results: 10
- Subrange Maxima: 25 Subranges , Maxima per Subrange: 1
- Acceptance Offset: -6 dB
- Maximum Number of Results: 10
- After Data Reduction: Interactive data reduction

Frequency Zoom:
- Zoom Scan Template: EMI Scan 02_20ms_zoom_FCC 15_209 B

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 1 GHz	10 kHz	PK+	120 kHz	0,02 s	0 dB

Receiver: [ESS]

Adjustment:
- Antenna height: Adjustment with full Range , Measuring Speed = 8
- Turntable position: Adjustment with full Range , Measuring Speed = 4
- Template for Single Meas.: EMI Scan 02_20ms_FCC 15_209 B

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 1 GHz	100 kHz	PK+	120 kHz	0,02 s	0 dB

Receiver: [ESS]

Final Measurements:
- Template for Single Meas.: EMI Scan 03_1s_FCC 15_209 B

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 1 GHz	100 kHz	QPK	120 kHz	1 s	0 dB

Receiver: [ESS]

Report Settings:
- Report Template: FCC15_209_vert_hor
- Create Electronic Report: RTF PDF
- Document Name: EMI Report

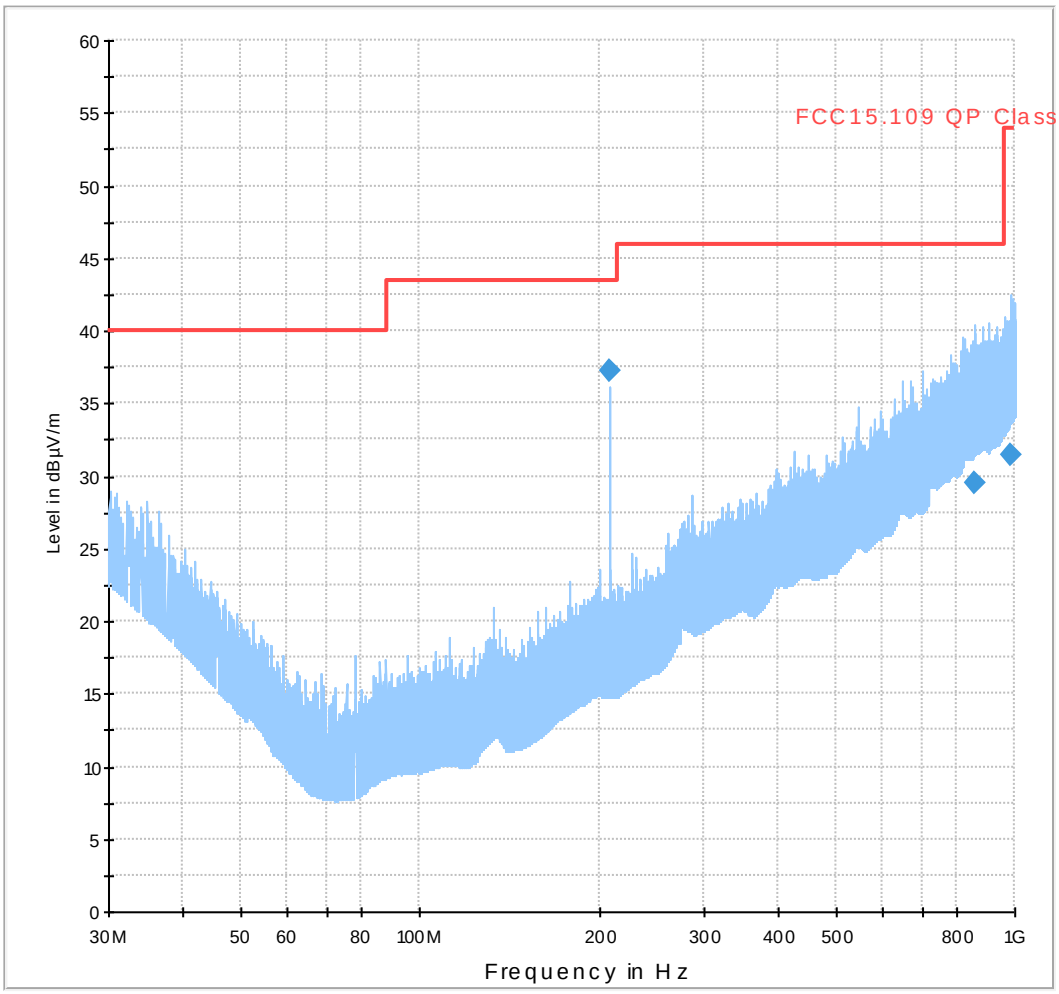
Actions:
- Data Reduction: Before
  - Notify: Sound (WAV file) 'tada.wav'
- Final Measurements: After
  - Notify: Sound (WAV file) 'tada.wav'

Diagram No. 3.04b_RSE_RX_Ch661

	08.11.2012
Test description:	Electric Field Strength Measurement
Test site and distance:	Semi Anechoic Room (SAR) - 3 m measurement distance
Distance correction:	not used
Used filter:	not used
Technical Data:	please see page 2 for detailed data of measurement setup
Test specification.:	FCC 15.109 Class B; RSS-Gen., Issue 3
Operator:	Lor
Operating conditions:	RX Mode - GSM1900
Power during tests:	12V DC
Comment 1:	EUT placed horizontal

EUT Information

EUT Name:	ESH6 + DSB75+ Handset Votronic + External Antenna + Cable RS232/USB
Manufacturer:	Cinterion
IMEI:	Sample RAD
HW:	--
Add. Info:	--



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
207.990000	37.3	1000.0	120.000	153.0	H	270.0	11.7	6.2	43.5
858.370000	29.5	1000.0	120.000	100.0	V	205.0	25.7	16.5	46.0
982.430000	31.5	1000.0	120.000	115.0	V	226.0	27.3	22.5	54.0

EMI Auto Test Template: FCC15.109_hor+vert

Hardware Setup: HW11_FCC_ESCS30_TP1200
Measurement Type: Open-Area-Test-Site
Frequency Range: 30 MHz - 1 GHz
Graphics Level Range: 0 dBµV/m - 60 dBµV/m

Preview Measurements:
- Antenna height: 100 - 182 cm , Step Size = 82 cm , Positioning Speed = 8
- Polarization: H + V
- Turntable position: 0 - 270 deg , Step Size = 90 deg , Positioning Speed = 8
- Scan Test Template: EMI Scan 01_fast_FCC 15_209 B

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 1 GHz	40 kHz	PK+	120 kHz	0,00005 s	0 dB

Receiver: [ESS]

Data Reduction:
- Limit Line #1: FCC15.109 QP Class B
- Peak Search: 6 dB , Maximum Results: 10
- Subrange Maxima: 25 Subranges , Maxima per Subrange: 1
- Acceptance Offset: -6 dB
- Maximum Number of Results: 10
- After Data Reduction: Interactive data reduction

Frequency Zoom:
- Zoom Scan Template: EMI Scan 02_20ms_zoom_FCC 15_209 B

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 1 GHz	10 kHz	PK+	120 kHz	0,02 s	0 dB

Receiver: [ESS]

Adjustment:
- Antenna height: Adjustment with full Range , Measuring Speed = 8
- Turntable position: Adjustment with full Range , Measuring Speed = 4
- Template for Single Meas.: EMI Scan 02_20ms_FCC 15_209 B

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 1 GHz	100 kHz	PK+	120 kHz	0,02 s	0 dB

Receiver: [ESS]

Final Measurements:
- Template for Single Meas.: EMI Scan 03_1s_FCC 15_209 B

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 1 GHz	100 kHz	QPK	120 kHz	1 s	0 dB

Receiver: [ESS]

Report Settings:
- Report Template: FCC15_209_vert_hor
- Create Electronic Report: RTF PDF
- Document Name: EMI Report

Actions:
- Data Reduction: Before
  - Notify: Sound (WAV file) 'tada.wav'
- Final Measurements: After
  - Notify: Sound (WAV file) 'tada.wav'

8.5. Diagrams of radiated emission above 1 GHz (Diagram group 04)

4.01_RSE_RX_Ch192

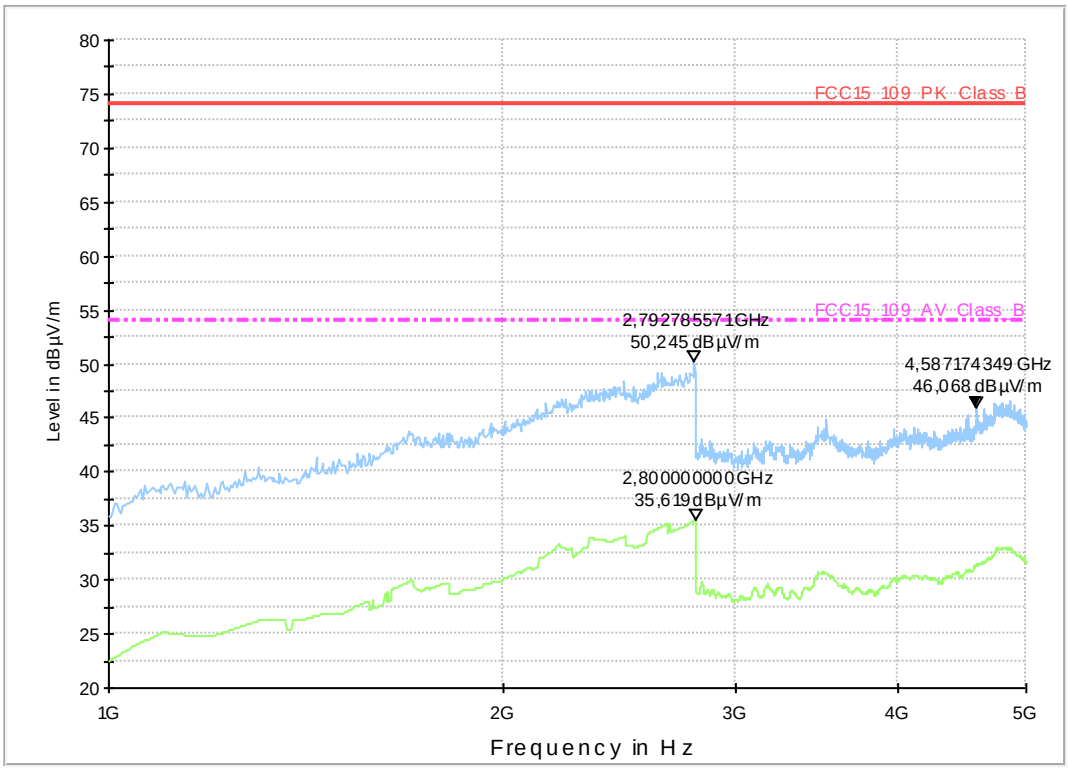
Common Information

Test Description:	Radiated Field Strength Emission
Test Site Location:	CETECOM GmbH Essen
Test Site:	Fully Anechoic Room (FAR)
Test Standard:	FCC Part 15.109
Operating Mode:	RX-GSM850 , Channel 192
Equipment Class:	Class B
Environmental Conditions:	Humidity: 19%rH; Temperature: 45°C
Operator:	YZH

EUT Information

Manufacturer:	Cinterion GmbH
Model:	Wireless Module
Type:	GSM/E-GPRS/W-CDMA
---	---
EUT:	EHS6
Serial number:	004401 08 084039 6
Hardware Rev.	B1.2/1
Software Rev.	rev 01.001
Connected Interfaces:	USB/RS-232/Audio
Power Supply:	9V DC to DSB75
Comments:	Accessories: DSB75-Adapter, Handset Votronic, Smarteq MiniMag mounbt antenna

030445_FCC_Part15.109_Unint_Rad_Class_B_1G-20G_FSEK



4.02_RSE_RX_Ch661

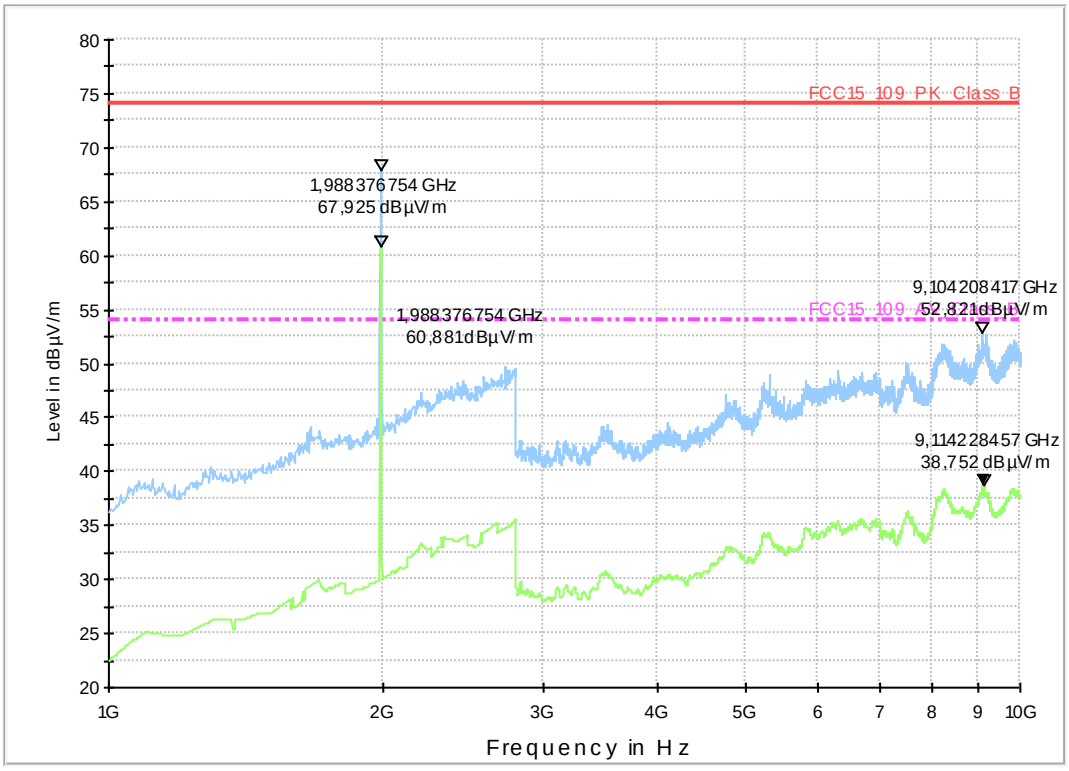
Common Information

Test Description:	Radiated Field Strength Emission
Test Site Location:	CETECOM GmbH Essen
Test Site:	Fully Anechoic Room (FAR)
Test Standard:	FCC Part 15.109
Operating Mode:	RX Mode 850, Ch 661
Equipment Class:	Class B
Environmental Conditions:	Humidity: 19%rH; Temperature: 45°C
Operator:	YZH

EUT Information

Manufacturer:	Cinterion GmbH
Model:	Wireless Module
Type:	GSM/E-GPRS/W-CDMA
---	---
EUT:	EHS6
Serial number:	004401 08 084039 6
Hardware Rev.	B1.2/1
Software Rev.	rev 01.001
Connected Interfaces:	USB/RS-232/Audio
Power Supply:	9V DC to DSB75
Comments:	Accessories: DSB75-Adapter, Handset Votronic, Smarteq MiniMag mount antenna

030445_FCC_Part15.109_Unint_Rad_Class_B_1G-20G_FSEK



4.03_RSE_RX_Ch4183

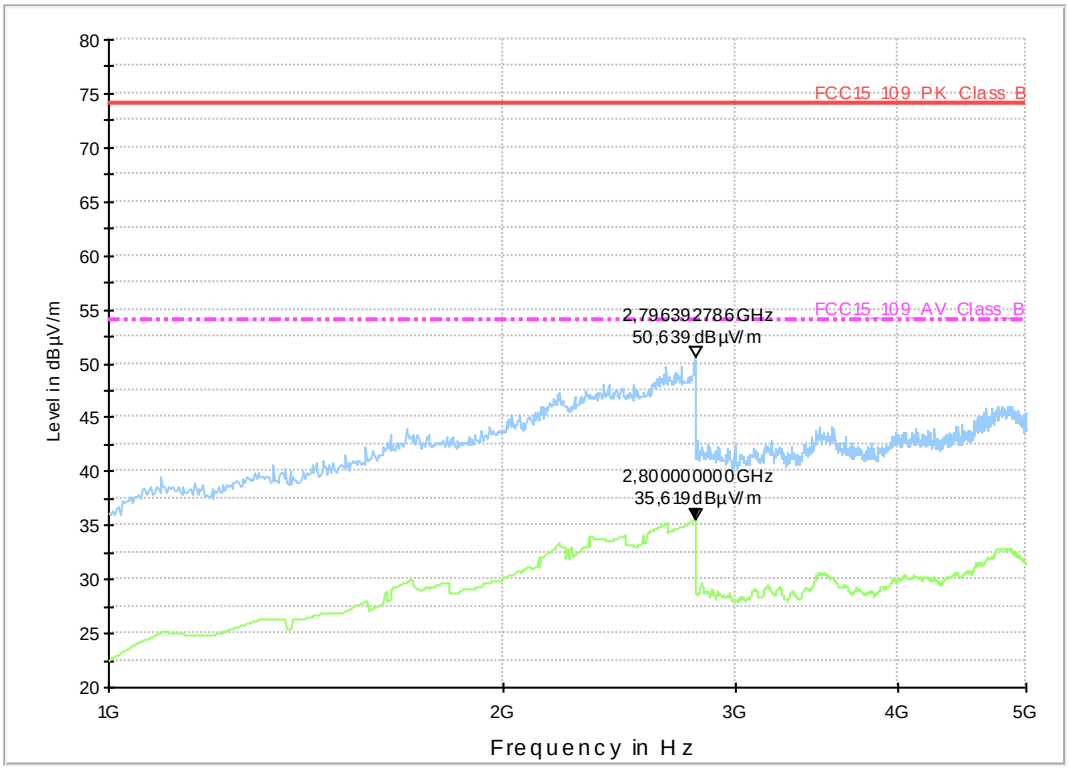
Common Information

Test Description:	Radiated Field Strength Emission
Test Site Location:	CETECOM GmbH Essen
Test Site:	Fully Anechoic Room (FAR)
Test Standard:	FCC Part 15.109
Operating Mode:	RX, ch 4183
Equipment Class:	Class B
Environmental Conditions:	Humidity: 19%rH; Temperature: 45°C
Operator:	YZH

EUT Information

Manufacturer:	Cinterion GmbH
Model:	Wireless Module
Type:	GSM/E-GPRS/W-CDMA
---	---
EUT:	EHS6
Serial number:	004401 08 084039 6
Hardware Rev.	B1.2/1
Software Rev.	rev 01.001
Connected Interfaces:	USB/RS-232/Audio
Power Supply:	9V DC to DSB75
Comments:	Accessories: DSB75-Adapter, Handset Votronic, Smarteq MiniMag mount antenna

030445_FCC_Part15.109_Unint_Rad_Class_B_1G-20G_FSEK



4.04_RSE_RX_Ch9400

Common Information

Test Description:	Radiated Field Strength Emission
Test Site Location:	CETECOM GmbH Essen
Test Site:	Fully Anechoic Room (FAR)
Test Standard:	FCC Part 15.109
Operating Mode:	RX, Ch 9400
Equipment Class:	Class B
Environmental Conditions:	Humidity: 19%rH; Temperature: 45°C
Operator:	YZH

EUT Information

Manufacturer:	Cinterion GmbH
Model:	Wireless Module
Type:	GSM/E-GPRS/W-CDMA
---	---
EUT:	EHS6
Serial number:	004401 08 084039 6
Hardware Rev.	B1.2/1
Software Rev.	rev 01.001
Connected Interfaces:	USB/RS-232/Audio
Power Supply:	9V DC to DSB75
Comments:	Accessories: DSB75-Adapter, Handset Votronic, Smarteq MiniMag mount antenna

030445_FCC_Part15.109_Unint_Rad_Class_B_1G-20G_FSEK