



Inter**Lab**[®]

Final Report on

WHBB005BS (Basestation) FCC ID: BCE-WHN005BS
IC: 2386C-WHB005BS

and

WHBB005HS (Headset) FCC ID: BCE-WHN005HS
IC: 2386C-WHB005HS

Report Reference: MDE_GNNET_1310_FCCa
According to:
FCC 47 CFR Ch.1 Part 15 Subpart B

Date: November 28, 2013

Test Laboratory:

7Layers AG
Borsigstr. 11
40880 Ratingen
Germany



Note:

The following test results relate only to the devices specified in this document. This report shall not be reproduced in parts without the written approval of the test laboratory.

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Chairman of the Supervisory Board:
Ralf Mertens
Vorstand • Board:
Dr. H.-J. Meckelburg

Registergericht • registered in:
Düsseldorf, HRB 44096
USt-IdNr • VAT No.:
DE 203159652
TAX No. 147/5869/0385

1 Administrative Data

1.1 Project Data

Project Responsible: Patrick Lomax
Date Of Test Report: 2013/11/28
Date of first test: 2013/11/21
Date of last test: 2013/11/27

1.2 Applicant Data

Company Name: GN Netcom A/S
Street: Lautrupbjerg 7
City: DK-2750 Ballerup
Country: Denmark
Contact Person: Mr. Tom Ringtved
Phone: +45 45 75 91 86
E-Mail: tringtved@gn.com

1.3 Test Laboratory Data

The following list shows all places and laboratories involved for test result generation:

7 layers DE

Company Name : 7 layers AG
Street : Borsigstrasse 11
City : 40880 Ratingen
Country : Germany
Contact Person : Mr. Michael Albert
Phone : +49 2102 749 201
Fax : +49 2102 749 444
E Mail : michael.albert@7Layers.de

Laboratory Details

<i>Lab ID</i>	<i>Identification</i>	<i>Responsible</i>	<i>Accreditation Info</i>
Lab 1	Conducted Emissions	Mr. Robert Machulec Mr. Andreas Petz	DAkKS-Registration no. D-PL-12140-01-01
Lab 2	Radiated Emissions	Mr. Robert Machulec Mr. Andreas Petz	DAkKS-Registration no. D-PL-12140-01-01

1.4 Signature of the Testing Responsible



Patrick Lomax
responsible for tests performed in: Lab 1, Lab 2

1.5 Signature of the Accreditation Responsible



Accreditation scope responsible person
responsible for Lab 1, Lab 2

2 Test Object Data

2.1 General OUT Description

The following section lists all OUTs (Object's Under Test) involved during testing.

OUT: WHBB005BS

Product Category: Mobile Phone Accessory
Manufacturer:
Company Name: Please see applicant data
Contact Person: -

Parameter List:

<i>Parameter name</i>	<i>Value</i>
AC Power Supply	120 (V)
Antenna Gain	1.5
highest channel (BT)	2480 (MHz)
lowest channel (BT)	2402 (MHz)
mid channel (BT)	2441 (MHz)

OUT: WHBB005HS

Product Category: Mobile Phone Accessory
Manufacturer:
Company Name: Please see applicant data
Contact Person: -

Parameter List:

<i>Parameter name</i>	<i>Value</i>
AC Power Supply	120 (V)
Antenna Gain	1.5
highest channel (BT)	2480 (MHz)
lowest channel (BT)	2402 (MHz)
mid channel (BT)	2441 (MHz)

Ancillary Equipment: Power Adapter SIL SSA-5W-09 EU 075065F

Parameter List:

<i>Parameter name</i>	<i>Value</i>
AC Power Supply	120 (V)



2.2 Detailed Description of OUT Samples

Sample : A01

<i>OUT Identifier</i>	WHBB005BS		
<i>Sample Description</i>	Basestation USB Variant		
<i>Serial No.</i>	240414		
<i>HW Status</i>	28-03793		
<i>SW Status</i>	1.1.7		
<i>Low Voltage</i>	3.2 V	<i>Low Temp.</i>	-10 °C
<i>High Voltage</i>	4.2 V	<i>High Temp.</i>	60 °C
<i>Nominal Voltage</i>	3.7 V	<i>Normal Temp.</i>	25 °C

Sample : B01

<i>OUT Identifier</i>	WHBB005HS		
<i>Sample Description</i>	Headset Radiated		
<i>Serial No.</i>	00002991028		
<i>HW Status</i>	28-03764		
<i>SW Status</i>	1.1.7		
<i>Low Voltage</i>	3.2 V	<i>Low Temp.</i>	-10 °C
<i>High Voltage</i>	4.2 V	<i>High Temp.</i>	60 °C
<i>Nominal Voltage</i>	3.7 V	<i>Normal Temp.</i>	25 °C

Sample : G01

<i>OUT Identifier</i>	WHBB005BS		
<i>Sample Description</i>	Basestation Radiated -4 wire		
<i>Serial No.</i>	240419		
<i>HW Status</i>	28-03792		
<i>SW Status</i>	1.1.7		
<i>Low Voltage</i>	3.2 V	<i>Low Temp.</i>	-10 °C
<i>High Voltage</i>	4.2 V	<i>High Temp.</i>	60 °C
<i>Nominal Voltage</i>	3.7 V	<i>Normal Temp.</i>	25 °C

Sample : H01

<i>OUT Identifier</i>	WHBB005HS		
<i>Sample Description</i>	Headset Radaited		
<i>Serial No.</i>	00002991072		
<i>HW Status</i>	28-03764		
<i>SW Status</i>	1.1.7		
<i>Low Voltage</i>	3.2 V	<i>Low Temp.</i>	-10 °C
<i>High Voltage</i>	4.2 V	<i>High Temp.</i>	60 °C
<i>Nominal Voltage</i>	3.7 V	<i>Normal Temp.</i>	25 °C



Reference: MDE_GNNET_1310_FCCa
According to:
FCC 47 CFR Ch.1 Part 15 Subpart B

Sample : AC01

OUT Identifier
Sample Description
Serial No.

Power Adapter SIL SSA-5W-09 EU 075065F
ACDC adapter
AC01

Sample : AC02

OUT Identifier
Sample Description
Serial No.

Power Adapter SIL SSA-5W-09 EU 075065F
ACDC Adapter
AC01



2.3 OUT Features

Features for OUT: WHBB005BS

<i>Designation</i>	<i>Description</i>	<i>Allowed Values</i>	<i>Supported Value(s)</i>
Features for scope: FCC_v2			
AC	The OUT is powered by or connected to AC Mains		
BT	EUT supports Bluetooth data rate of 1 Mbps with GFSK modulation in the band 2400 MHz - 2483.5 MHz		
EDR2	EUT supports Bluetooth using data rate of 2 Mbps with PI/4 DQPSK modulation in the band 2400 MHz - 2483.5 MHz		
EDR3	EUT supports Bluetooth using data rate of 3 Mbps with 8DPSK modulation in the band 2400 MHz - 2483.5 MHz		
Iant	Integral Antenna: permanent fixed antenna, which may be built-in, designed as an indispensable part of the equipment		
TantC	temporary antenna connector, which may be only built-in for testing, designed as an example part of the equipment		

Features for OUT: WHBB005HS

<i>Designation</i>	<i>Description</i>	<i>Allowed Values</i>	<i>Supported Value(s)</i>
Features for scope: FCC_v2			
AC	The OUT is powered by or connected to AC Mains		
BT	EUT supports Bluetooth data rate of 1 Mbps with GFSK modulation in the band 2400 MHz - 2483.5 MHz		
EDR2	EUT supports Bluetooth using data rate of 2 Mbps with PI/4 DQPSK modulation in the band 2400 MHz - 2483.5 MHz		
EDR3	EUT supports Bluetooth using data rate of 3 Mbps with 8DPSK modulation in the band 2400 MHz - 2483.5 MHz		
Iant	Integral Antenna: permanent fixed antenna, which may be built-in, designed as an indispensable part of the equipment		
TantC	temporary antenna connector, which may be only built-in for testing, designed as an example part of the equipment		

2.4 Auxiliary Equipment

<i>AE No.</i>	<i>Type Designation</i>	<i>Serial No.</i>	<i>HW Status</i>	<i>SW Status</i>	<i>Description</i>
AE 02	0335C2065	A30638114250			Laptop Power supply
AE 05	Cherry RS 6000 USB ON	G 0000273 2P28			USB Keyboard
AE 03	Dell 1908FPc	Q40G19N-700-6C XY	120v/60Hz		Computer monitor
AE 01	Fujitsu AMILO Pro V3205	YK2H014267	120v/60Hz AC	Windows 7 Pro.	Laptop computer
AE 04	Logitech Model: M-BB48	LZC90505478			Computer Mouse

2.5 Operating Mode(s)

<i>Ref. -No.</i>	<i>Description</i>
01	Sample G01 Basestation is connected to computer with music playing over USB cable which charging circuit is activated and charging headset H01. Basestation A01 is connected to telephone and one additional headset and transmitting on at 2441 MHz.
02	Basestation G01 is transmitting in hopping mode and charging headset B01.
03	Data traffic over USB cable from laptop computer. Charging headset
04	Data traffic over USB, basestation transmitting on channel 2441 MHz and charging headset.

2.6 Setups used for Testing

For each setup a relation is given to determine if and which samples and auxiliary equipment is used. The left side list all OUT samples and the right side lists all auxiliary equipment for the given setup.

<i>Setup No.</i>	<i>List of OUT samples</i>		<i>List of auxiliary equipment</i>	
	<i>Sample No.</i>	<i>Sample Description</i>	<i>AE No.</i>	<i>AE Description</i>
S_PC1 (Radiated 15b Computer setup)				
	<i>Sample:</i> AC01	ACDC adapter	AE 02	Laptop Power supply
	<i>Sample:</i> AC02	ACDC Adapter	AE 05	USB Keyboard
	<i>Sample:</i> A01	Basestation USB Variant	AE 03	Computer monitor
	<i>Sample:</i> B01	Headset Radiated	AE 01	Laptop computer
	<i>Sample:</i> G01	Basestation Radiated -4 wire	AE 04	Computer Mouse
	<i>Sample:</i> H01	Headset Radaited		
S_PC2 (Computer setup for basestation A01)				
	<i>Sample:</i> AC01	ACDC adapter	AE 02	Laptop Power supply
	<i>Sample:</i> A01	Basestation USB Variant	AE 05	USB Keyboard
	<i>Sample:</i> B01	Headset Radiated	AE 03	Computer monitor
			AE 01	Laptop computer
			AE 04	Computer Mouse
S02_G01 (Basestation + Headset)				
	<i>Sample:</i> AC01	ACDC adapter		
	<i>Sample:</i> B01	Headset Radiated		
	<i>Sample:</i> G01	Basestation Radiated -4 wire		



3 Results

3.1 General

Documentation of tested devices:

Available at the test laboratory.

Interpretation of the test results:

The results of the inspection are described on the following pages, where 'Conformity' or 'Passed' means that the certification criteria were verified and that the tested device is conform to the applied standard.

In cases where 'Declaration' is printed, the required documents are available in the manufacturers product documentation.

In cases where 'not applicable' is printed, the test case requirements are not relevant to the specific equipment implementation.

Note:

1. All tests are performed under environmental conditions within the requirements of the specifications. Environmental conditions are available at the test facility.

3.2 List of the Applicable Body

(Body for Scope: FCC_v2)

<i>Designation</i>	<i>Description</i>
FCC47CFRChIPART15bRADIO FREQUENCY DEVICES	Part 15, Subpart B - Unintentional Radiators

3.3 List of Test Specification

<i>Test Specification:</i>	FCC part 2 and 15
<i>Version</i>	10-1-12 Edition
<i>Title:</i>	PART 2 - GENERAL RULES AND REGULATIONS PART 15 - RADIO FREQUENCY DEVICES



3.4 Summary

<i>Test Case Identifier / Name Test (condition)</i>	<i>Result</i>	<i>Date of Test</i>	<i>Lab Ref.</i>	<i>Setup</i>
15b.1 Conducted Emissions (AC Power Line) §15.107				
15b.1; Mode = generating a high power consumption	Passed	2013/11/27	Lab 1	S_PC2
operating mode: 04	Passed	2013/11/27	Lab 1	S_PC2
operating mode: 03	Passed	2013/11/21	Lab 1	S02_G01
operating mode: 02				
15b.2 Spurious Radiated Emissions §15.109				
15b.2; Mode = generating a high power consumption	Passed	2013/11/25	Lab 2	S_PC1
operating mode: 01				



3.5 Detailed Results

3.5.1 15b.1 Conducted Emissions (AC Power Line) §15.107

Test1: 15b.1; Mode = generating a high power consumption

<i>Result:</i>	Passed
<i>Setup No.:</i>	S02_G01
<i>Date of Test:</i>	2013/11/21 16:03
<i>Body:</i>	FCC47CFRCHIPART15bRADIO FREQUENCY DEVICES
<i>Test Specification:</i>	FCC part 2 and 15

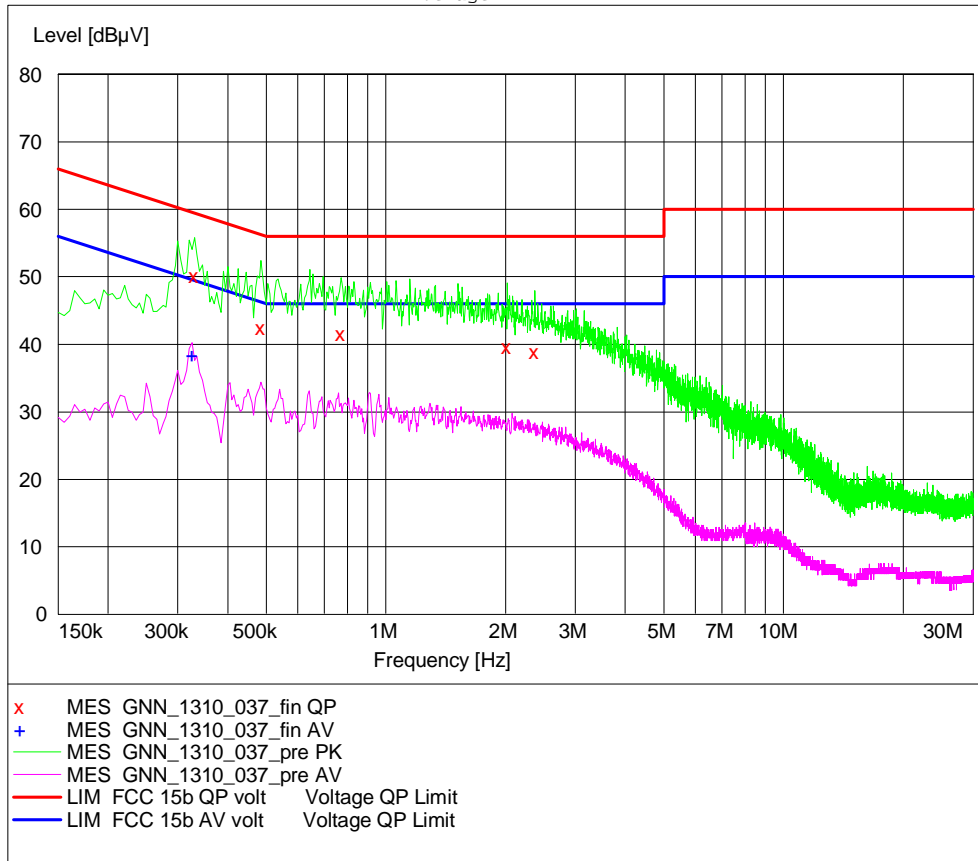
Detailed Results:

AC MAINS CONDUCTED

EUT: CJ260g01
 Manufacturer: GNNET
 Operating Condition: Tx on, hopping
 Test Site: 7 layers Ratingen
 Operator: Moh
 Test Specification: ANSI C63.4; FCC 15.107 / 15.207
 Comment:
 Start of Test: 21.11.2013 / 23:51:14

SCAN TABLE: "FCC Voltage"

Short Description:	FCC Voltage	Meas. Time	IF Bandw.	Transducer
Start Stop Step	Detector			
Frequency Frequency Width	MaxPeak	20.0 ms	9 kHz	ESH3-Z5
150.0 kHz 30.0 MHz 5.0 kHz	Average			



MEASUREMENT RESULT: "GNN_1310_037_fin QP"

21.11.2013 23:59

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBµV	dB	dBµV	dB		
0.330000	50.10	10.1	60	9.4	L1	FLO
0.485000	42.50	10.1	56	13.8	N	FLO
0.777000	41.60	10.1	56	14.4	N	GND
2.020000	39.60	10.2	56	16.4	L1	FLO
2.370000	38.80	10.2	56	17.2	L1	FLO

MEASUREMENT RESULT: "GNN_1310_037_fin AV"

21.11.2013 23:59

Frequency	Level	Transd	Limit	Margin	Line	PE
MHz	dBµV	dB	dBµV	dB		
0.325000	38.40	10.1	50	11.2	N	GND



Reference: MDE_GNNET_1310_FCCa
According to:
FCC 47 CFR Ch.1 Part 15 Subpart B

Test1: 15b.1; Mode = generating a high power consumption

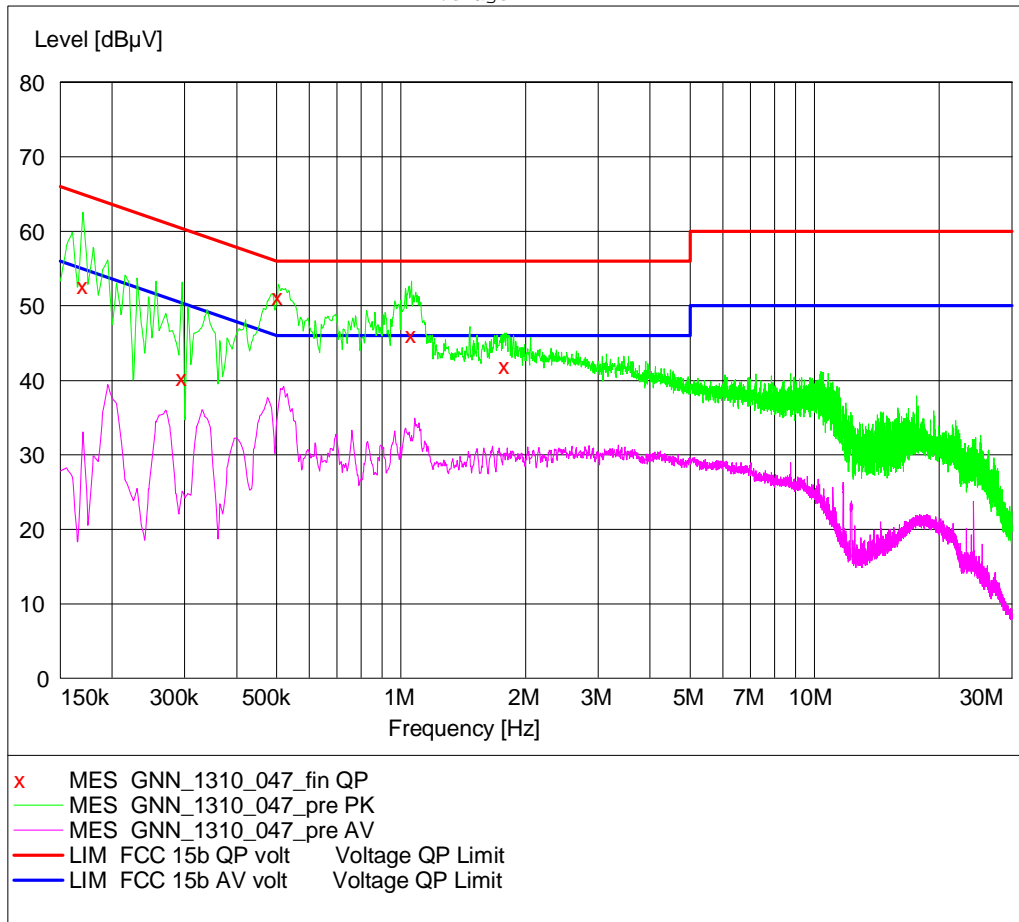
Result: Passed
Setup No.: S_PC2
Date of Test: 2013/11/27 9:04
Body: FCC47CFRCHIPART15bRADIO FREQUENCY DEVICES
Test Specification: FCC part 2 and 15

Detailed Results:

AC MAINS CONDUCTED

EUT: (CJ260a01 + b01)
 Manufacturer: GNNET
 Operating Condition: USB traffic
 Test Site: 7 layers Ratingen
 Operator: Doe
 Test Specification: ANSI C63.4; FCC 15.107 / 15.207
 Comment:
 Start of Test: 27.11.2013 / 23:16:19
SCAN TABLE: "FCC Voltage"

Short Description:	FCC Voltage					
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency	Frequency	Width				
150.0 kHz	30.0 MHz	5.0 kHz	MaxPeak Average	20.0 ms	9 kHz	ESH3-Z5



MEASUREMENT RESULT: "GNN_1310_047_fin QP"

27.11.2013 23:17

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.170000	52.70	10.1	65	12.2	L1	FLO
0.295000	40.30	10.1	60	20.1	L1	FLO
0.505000	51.20	10.1	56	4.8	N	FLO
1.060000	46.10	10.1	56	9.9	N	GND
1.780000	42.00	10.1	56	14.0	L1	FLO



Reference: MDE_GNNET_1310_FCCa
According to:
FCC 47 CFR Ch.1 Part 15 Subpart B

Test1: 15b.1; Mode = generating a high power consumption

Result: Passed
Setup No.: S_PC2
Date of Test: 2013/11/27 9:09
Body: FCC47CFRCHIPART15bRADIO FREQUENCY DEVICES
Test Specification: FCC part 2 and 15

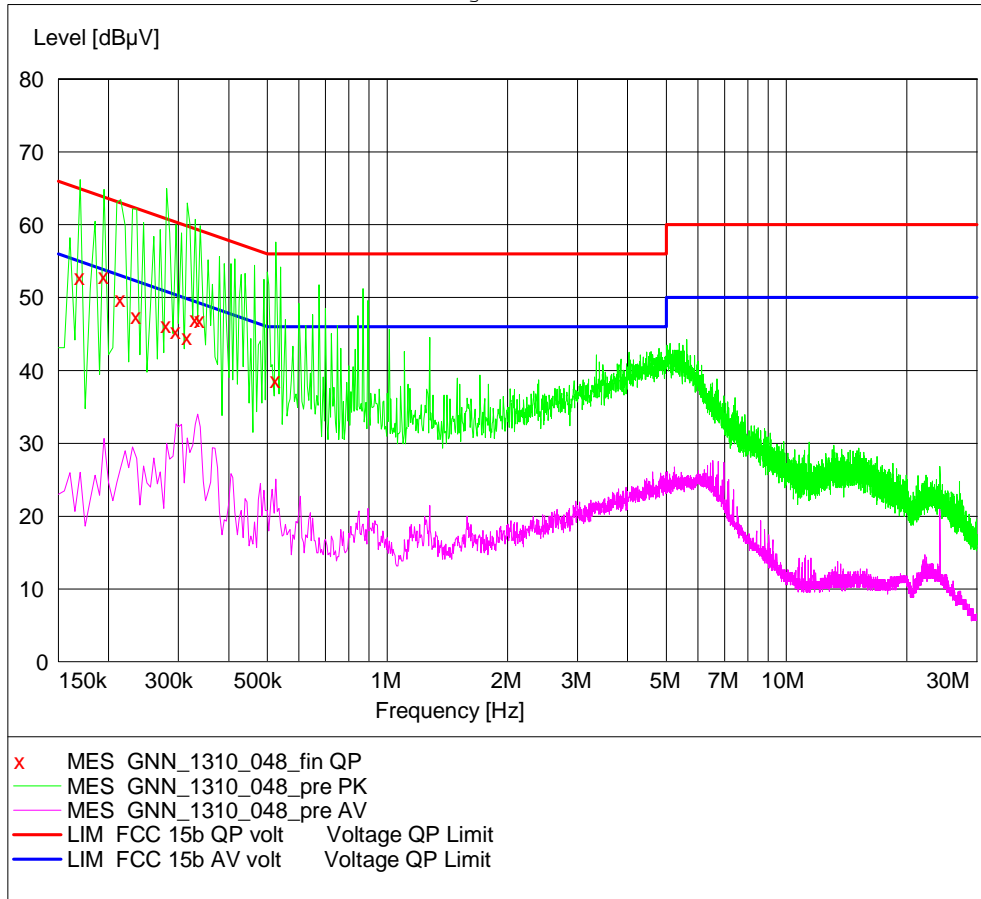
Detailed Results:

AC MAINS CONDUCTED

EUT: (CJ260a01 + b01)
 Manufacturer: GNNET
 Operating Condition: BT TX on 2441 MHz
 Test Site: 7 layers Ratingen
 Operator: Doe
 Test Specification: ANSI C63.4; FCC 15.107 / 15.207
 Comment:
 Start of Test: 27.11.2013 / 22:53:42

SCAN TABLE: "FCC Voltage"

Short Description:	FCC Voltage	Meas. Time	IF Bandw.	Transducer
Start Stop Step	Detector			
Frequency Frequency Width	MaxPeak	20.0 ms	9 kHz	ESH3-Z5
150.0 kHz 30.0 MHz 5.0 kHz	Average			



MEASUREMENT RESULT: "GNN_1310_048_fin QP"

27.11.2013 22:59

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.170000	52.80	10.1	65	12.2	L1	GND
0.195000	52.90	10.1	64	10.9	N	GND
0.215000	49.80	10.1	63	13.2	L1	GND
0.235000	47.50	10.1	62	14.8	L1	GND
0.280000	46.20	10.1	61	14.6	L1	GND
0.295000	45.40	10.1	60	15.0	L1	GND
0.315000	44.60	10.1	60	15.2	L1	GND
0.330000	47.00	10.1	60	12.5	L1	GND
0.340000	46.90	10.1	59	12.3	L1	GND
0.525000	38.70	10.1	56	17.3	L1	GND



Reference: MDE_GNNET_1310_FCCa
According to:
FCC 47 CFR Ch.1 Part 15 Subpart B

3.5.2 15b.2 Spurious Radiated Emissions §15.109

Test: 15b.2; Mode = generating a high power consumption

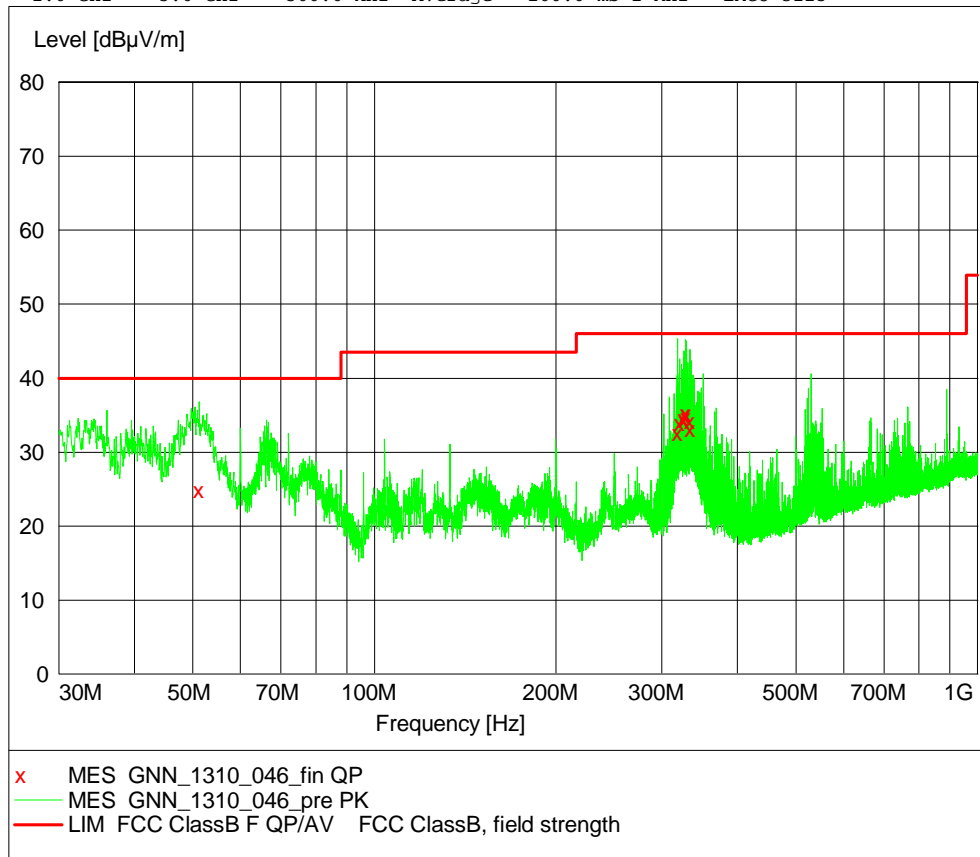
<i>Result:</i>	Passed
<i>Setup No.:</i>	S_PC1
<i>Date of Test:</i>	2013/11/25 8:46
<i>Body:</i>	FCC47CFRCHIPART15bRADIO FREQUENCY DEVICES
<i>Test Specification:</i>	FCC part 2 and 15

Detailed Results:

EMI RADIATED TEST

EUT: (CJ260 a01/b01/c01/g01)
 Manufacturer: GNNET
 Operating Condition: Computer peripheral setup and music from laptop
 Test Site: 7 layers, Ratingen
 Operator: ASO
 Test Specification: FCC15B class B
 Comment: powered by 120 V /60 Hz
 Start of Test: 22.11.2013 / 17:25:10
SCAN TABLE: "FCC ClassB Field max"

Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1000.0 MHz	60.0 kHz	MaxPeak	100.0 ms	120 kHz	CBL 6112
Average						
2.0 GHz	5.0 GHz	500.0 kHz	Average	100.0 ms	1 MHz	EMCO 3115



MEASUREMENT RESULT: "GNN_1310_046_fin QP"

22.11.2013 18:27

Frequency MHz	Level dBµV/m	Transd dB	Limit dBµV/m	Margin dB	Height cm	Azimuth deg	Polarisation
51.240000	24.90	7.9	40.0	15.1	100.0	202.00	VERTICAL
318.180000	32.60	14.4	46.0	13.4	112.0	0.00	HORIZONTAL
320.640000	33.90	14.4	46.0	12.1	125.0	0.00	HORIZONTAL
325.560000	34.60	14.5	46.0	11.4	105.0	358.00	HORIZONTAL
326.520000	34.30	14.5	46.0	11.7	143.0	0.00	HORIZONTAL
328.020000	35.30	14.6	46.0	10.7	124.0	0.00	HORIZONTAL
328.860000	34.70	14.6	46.0	11.3	125.0	359.00	HORIZONTAL
329.520000	35.10	14.6	46.0	10.9	100.0	0.00	HORIZONTAL
333.780000	34.10	14.7	46.0	11.9	110.0	0.00	HORIZONTAL
334.440000	33.10	14.7	46.0	12.9	120.0	4.00	HORIZONTAL

4 Test Equipment Details

4.1 List of Used Test Equipment

The calibration, hardware and software states are shown for the testing period.

Test Equipment Anechoic Chamber

Lab ID:	Lab 2		
Manufacturer:	Frankonia		
Description:	Anechoic Chamber for radiated testing		
Type:	10.58x6.38x6.00 m ³		
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	NSA (FCC, IC)		2011/01/10 2014/01/10

Single Devices for Anechoic Chamber

<i>Single Device Name</i>	<i>Type</i>	<i>Serial Number</i>	<i>Manufacturer</i>
Air compressor	none	-	Atlas Copco
Anechoic Chamber	10.58 x 6.38 x 6.00 m ³	none	Frankonia
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	FCC listing 96716 3m Part15/18		2011/01/11 2014/01/10
	IC listing 3699A-1 3m		2011/02/07 2014/02/06
Controller Maturo	MCU	961208	Maturo GmbH
EMC camera	CE-CAM/1	-	CE-SYS
EMC camera Nr.2	CCD-400E	0005033	Mitsubishi
Filter ISDN	B84312-C110-E1		Siemens&Matsushita
Filter Universal 1A	BB4312-C30-H3	-	Siemens&Matsushita

Test Equipment Auxiliary Equipment for Conducted emissions

Lab ID:	Lab 1
Manufacturer:	Rohde & Schwarz GmbH & Co.KG
Description:	EMI Conducted Auxiliary Equipment

Single Devices for Auxiliary Equipment for Conducted emissions

<i>Single Device Name</i>	<i>Type</i>	<i>Serial Number</i>	<i>Manufacturer</i>
Cable "LISN to ESI"	RG214	W18.03+W48.03	Huber&Suhner
Coupling-Decoupling-Network	CDN ENY41	100002	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Standard Calibration		2013/03/01 2015/02/28
One-Line V-Network	ESH 3-Z6	100489	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Standard calibration		2011/02/08 2014/02/07
Two-Line V-Network	ESH 3-Z5	828304/029	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Standart Calibration		2013/03/01 2015/02/28
Two-Line V-Network	ESH 3-Z5	829996/002	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Standard Calibration		2013/03/01 2015/02/28

Test Equipment Auxiliary Equipment for Radiated emissions

Lab ID: Lab 2
Description: Equipment for emission measurements
Serial Number: see single devices

Single Devices for Auxiliary Equipment for Radiated emissions

Single Device Name	Type	Serial Number	Manufacturer
Antenna mast	AM 4.0	AM4.0/180/11920 513	Maturo GmbH
Biconical Broadband Antenna	SBA 9119	9119-005	Schwarzbeck
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Standard Calibration		2009/06/04 2014/06/03
Biconical dipole	VUBA 9117	9117-108	Schwarzbeck
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Standard Calibration		2012/01/18 2015/01/17
Broadband Amplifier 18MHz-26GHz	JS4-18002600-32-5P	849785	Miteq
Broadband Amplifier 1GHz-4GHz	AFS4-01000400-1Q-10P-4	-	Miteq
Broadband Amplifier 30MHz-18GHz	JS4-00101800-35-5P	896037	Miteq
Cable "ESI to EMI Antenna"	EcoFlex10	W18.01- 2+W38.01-2	Kabel Kusch
Cable "ESI to Horn Antenna"	UFB311A+UFB293C	W18.02- 2+W38.02-2	Rosenberger Micro-Coax
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Path Calibration		2013/05/22 2013/11/23
Double-ridged horn	HF 906	357357/001	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Standard Calibration		2012/05/18 2015/05/17
Double-ridged horn	HF 906	357357/002	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Standard Calibration		2012/06/26 2015/06/25
High Pass Filter	4HC1600/12750-1.5-KK	9942011	Trilithic
High Pass Filter	5HC2700/12750-1.5-KK	9942012	Trilithic
High Pass Filter	5HC3500/12750-1.2-KK	200035008	Trilithic
High Pass Filter	WHKX 7.0/18G-8SS	09	Wainwright
Horn Antenna Schwarzbeck 15-26 GHz BBHA 9170	BBHA 9170		
Log.-per. Antenna	HL 562 Ultralog	100609	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution Next Exec.</i>
	Standard Calibration		2012/12/18 2015/12/17
Log.-per. Antenna	HL 562 Ultralog	830547/003	Rohde & Schwarz GmbH & Co. KG
Loop Antenna	HFH2-Z2	829324/006	Rohde & Schwarz GmbH & Co. KG

Single Devices for Auxiliary Equipment for Radiated emissions (continued)

<i>Single Device Name</i>	<i>Type</i>	<i>Serial Number</i>	<i>Manufacturer</i>	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Standard calibration		2011/10/27	2014/10/26
Pyramidal Horn Antenna 26,5 GHz	3160-09	00083069	EMCO Elektronik GmbH	
Pyramidal Horn Antenna 40 GHz	3160-10	00086675	EMCO Elektronik GmbH	
Tilt device Maturo (Rohacell)	Antrieb TD1.5-10kg	TD1.5-10kg/024/3790709	Maturo GmbH	

Test Equipment Auxiliary Test Equipment

Lab ID:	Lab 2
Manufacturer:	see single devices
Description:	Single Devices for various Test Equipment
Type:	various
Serial Number:	none

Single Devices for Auxiliary Test Equipment

<i>Single Device Name</i>	<i>Type</i>	<i>Serial Number</i>	<i>Manufacturer</i>	
Broadband Power Divider N (Aux)	1506A / 93459	LM390	Weinschel Associates	
Broadband Power Divider SMA	WA1515	A855	Weinschel Associates	
Digital Multimeter 03 (Multimeter)	Fluke 177	86670383	Fluke Europe B.V.	
Fibre optic link Satellite (Aux)	FO RS232 Link	181-018	Pontis	
Fibre optic link Transceiver (Aux)	FO RS232 Link	182-018	Pontis	
Isolating Transformer	LTS 604	1888	Thalheimer Transformatorenwerke GmbH	
Notch Filter Ultra Stable (Aux)	WRCA800/960-6EEK	24	Wainwright	
Spectrum Analyser	FSP3	836722/011	Rohde & Schwarz GmbH & Co. KG	
	<i>Calibration Details</i>		<i>Last Execution</i>	<i>Next Exec.</i>
	Standard		2012/06/13	2015/06/12
Vector Signal Generator	SMIQ 03B	832492/061	Rohde & Schwarz GmbH & Co.KG	

Test Equipment Digital Signalling Devices

Lab ID: Lab 1, Lab 2
Description: Signalling equipment for various wireless technologies.

Single Devices for Digital Signalling Devices

Single Device Name	Type	Serial Number	Manufacturer
Bluetooth Signalling Unit CBT	CBT	100589	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Standard calibration		2011/11/24 2014/11/23
CMW500	CMW500	107500	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Initial factory calibration		2012/01/26 2014/01/25
Digital Radio Communication Tester	CMD 55	831050/020	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Standard calibration		2011/11/28 2014/11/27
Universal Radio Communication Tester	CMU 200	102366	Rohde & Schwarz GmbH & Co. KG
	<i>HW/SW Status</i>		<i>Date of Start</i> <i>Date of End</i>
	Hardware: B11, B21V14, B21-2, B41, B52V14, B52-2, B53-2, B56V14, B68 3v04, PCMCIA, U65V04 Software: K21 4v21, K22 4v21, K23 4v21, K24 4v21, K42 4v21, K43 4v21, K53 4v21, K56 4v22, K57 4v22, K58 4v22, K59 4v22, K61 4v22, K62 4v22, K63 4v22, K64 4v22, K65 4v22, K66 4v22, K67 4v22, K68 4v22, K69 4v22 Firmware: µP1 8v50 02.05.06 ---		2007/07/16
Universal Radio Communication Tester	CMU 200	837983/052	Rohde & Schwarz GmbH & Co. KG
	<i>Calibration Details</i>		<i>Last Execution</i> <i>Next Exec.</i>
	Standard calibration		2011/12/07 2014/12/06
	<i>HW/SW Status</i>		<i>Date of Start</i> <i>Date of End</i>
	HW options: B11, B21V14, B21-2, B41, B52V14, B52-2, B53-2, B54V14, B56V14, B68 3v04, B95, PCMCIA, U65V02 SW options: K21 4v11, K22 4v11, K23 4v11, K24 4v11, K27 4v10, K28 4v10, K42 4v11, K43 4v11, K53 4v10, K65 4v10, K66 4v10, K68 4v10, Firmware: µP1 8v40 01.12.05 ---		2007/01/02
	SW: K62, K69		2008/11/03
Vector Signal Generator	SMU200A	100912	Rohde & Schwarz GmbH & Co. KG



Test Equipment Emission measurement devices

Lab ID: Lab 1, Lab 2
Description: Equipment for emission measurements
Serial Number: see single devices

Single Devices for Emission measurement devices

<i>Single Device Name</i>	<i>Type</i>	<i>Serial Number</i>	<i>Manufacturer</i>
Personal Computer	Dell	30304832059	Dell
Power Meter	NRVD	828110/016	Rohde & Schwarz GmbH & Co.KG
<i>Calibration Details</i>			<i>Last Execution</i> <i>Next Exec.</i>
	Standard calibration		2013/05/03 2014/05/02
Sensor Head A	NRV-Z1	827753/005	Rohde & Schwarz GmbH & Co.KG
<i>Calibration Details</i>			<i>Last Execution</i> <i>Next Exec.</i>
	Standard calibration		2013/04/30 2014/04/29
Signal Generator	SMR 20	846834/008	Rohde & Schwarz GmbH & Co. KG
<i>Calibration Details</i>			<i>Last Execution</i> <i>Next Exec.</i>
	standard calibration		2011/05/12 2014/05/11
Spectrum Analyzer	ESIB 26	830482/004	Rohde & Schwarz GmbH & Co. KG
<i>Calibration Details</i>			<i>Last Execution</i> <i>Next Exec.</i>
	Standard Calibration		2011/12/05 2013/12/04
<i>HW/SW Status</i>			<i>Date of Start</i> <i>Date of End</i>
	Firmware-Update 4.34.4 from 3.45 during calibration		2009/12/03

Test Equipment Shielded Room 02

Lab ID: Lab 1
Manufacturer: Frankonia
Description: Shielded Room for conducted testing
Type: 12 qm
Serial Number: none



Reference: MDE_GNNET_1310_FCCa
According to:
FCC 47 CFR Ch.1 Part 15 Subpart B

5 Annex

5.1 Additional Information for Report

Test Description

Conducted emissions (AC power line)

Standard FCC Part 15 Subpart B

The test was performed according to: ANSI C 63.4, 2009

Test Description

The test set-up was made in accordance to the general provisions of ANSI C 63.4-2009. The Equipment Under Test (EUT) was setup in a shielded room to perform the conducted emissions measurements in a typical installation configuration. The EUT was powered from 50μH || 50 Ohm Line Impedance Stabilization Network (LISN) which meets the requirements of ANSI C63.4-2009, Annex B, in the frequency range of the measurements. The LISN's unused connections were terminated with 50 Ohm loads.

The measurement procedure consists of two steps. It is implemented into the EMI test software ES-K1 from R&S.

Step 1: Preliminary scan

Intention of this step is, to determine the conducted EMI-profile of the EUT.

EMI receiver settings:

- Detector: Peak - Maxhold
- Frequency range: 150 kHz – 30 MHz
- Frequency steps: 5 kHz
- IF-Bandwidth: 9 kHz
- Measuring time / Frequency step: 20 ms
- Measurement on phase + neutral lines of the power cords

On basis of this preliminary scan the highest amplitudes and the corresponding frequencies relative to the limit are identified. Emissions above the limit and emissions which are in the 10 dB range below the limit are considered.

Step 2: Final measurement

Intention of this step is, to determine the highest emissions with the settings defined in the test specification for the frequencies identified in step 1.

EMI receiver settings:

- Detector: Quasi-Peak
- IF - Bandwidth: 9 kHz
- Measuring time: 1 s / frequency

At each frequency determined in step 1, four measurements are performed in the following combinations:

- 1) Neutral lead - reference ground (PE grounded)
- 2) Phase lead - reference ground (PE grounded)
- 3) Neutral lead - reference ground (PE floating)
- 4) Phase lead - reference ground (PE floating)

The highest value is reported.

Test Requirements / Limits

If not stated within the measurement plot and/or test result, class B limits are applied.

FCC Part 15, Subpart B, §15.107, Class B Limit

Frequency Range (MHz)	QP Limit (dBμV)	AV Limit (dBμV)
0.15 – 0.5	66 to 56	56 to 46
0.5 – 5	56	46
5 – 30	60	50

FCC Part 15, Subpart B, §15.107, Class A Limit

Frequency Range (MHz)	QP Limit (dBµV)	AV Limit (dBµV)
0.15 - 0.5	79	66
0.5 - 30	73	60

Used conversion factor: Limit (dBµV) = 20 log (Limit (µV)/1µV).

NOTES:

A missing result table in the corresponding test report section means, that no final measurement was performed because no relevant frequencies (peaks) were found in the preliminary scan.
The chosen operating mode is selected as representative mode to generate "worst-case" conditions, i.e. high power consumption.

Spurious radiated emissions

Standard FCC Part 15, Subpart B

The test was performed according to: ANSI C 63.4, 2009

Test Description

Measurement below 1 GHz:

The test set-up was made in accordance to the general provisions of ANSI C 63.4-2009.

The Equipment Under Test (EUT) was set up on a non-conductive table 1.0 x 2.0 m in the semi-anechoic chamber. The influence of the EUT support table that is used between 30–1000 MHz was evaluated.

The test was performed at the distance of 3 m between the EUT and the receiving antenna. The measurement procedure is implemented into the EMI test software ES-K1 from R&S. The radiated emissions measurements were made in a typical installation configuration. Exploratory tests are performed at 3 orthogonal axes to determine the worst-case orientation of a body-worn or handheld EUT. The final test on all kind of EUTs is performed at 2 axes. A pre-check is also performed while the EUT is powered from both AC and DC (battery) power in order to find the worst-case operating condition.

Step 1: Preliminary scan (test to identify the highest amplitudes relative to the limit)

Intention of this step is, to determine the radiated EMI-profile of the EUT.

Settings for step 1:

- Detector: Peak-Maxhold
- Frequency range: 30 – 1000 MHz
- Frequency steps: 60 kHz
- IF-Bandwidth: 120 kHz
- Measuring time / Frequency step: 100 µs
- Turntable angle range: –180° to +180°
- Turntable step size: 90°
- Height variation range: 1 – 3 m
- Height variation step size: 2 m
- Polarisation: Horizontal + Vertical

On basis of this preliminary scan the highest amplitudes and the corresponding frequencies relative to the limit are identified. Emissions above the limit and emissions which are in the 10 dB range below the limit are considered.

Step 2:

A further measurement will be performed on the frequencies determined in step 1. Intention of this step is, to find out the approximate turntable angle and antenna height for each frequency.

Settings for step 2:

- Detector: Peak – Maxhold
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 100 ms
- Turntable angle range: –180° to +180°

- Turntable step size: 45°
- Height variation range: 1 – 4 m
- Height variation step size: 0.5 m
- Polarisation: horizontal + vertical

After this step the EMI test system has determined the following values for each frequency (of step 1):

- Frequency
- Azimuth value (of turntable)
- Antenna height

The last two values have now the following accuracy:

- Azimuth value (of turntable): 45°
- Antenna height: 0.5 m

Step 3: final measurement

In this step the accuracy of the turntable azimuth and antenna height will be improved. This is necessary to find out the maximum value of every frequency.

For each frequency, which was determined the turntable azimuth and antenna height will be adjusted. The turntable azimuth will be slowly varied by +/- 22.5° around this value. During this action the value of emission is continuously measured. The turntable azimuth at the highest emission will be recorded and adjusted. In this position the antenna height is also slowly varied by +/- 25 cm around the antenna height determined. During this action the value of emission is also continuously measured. The antenna height of the highest emission will also be recorded and adjusted.

- Detector: Peak – Maxhold
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 100ms
- Turntable angle range: -22.5° to +22.5° around the determined value
- Height variation range: -0.25 m to +0.25 m around the determined value

Step 4: Final measurement (with QP detector)

With the settings determined in step 3, the final measurement will be performed:

EMI receiver settings for step 4:

- Detector: Quasi-Peak(< 1GHz)
- Measured frequencies: in step 3 determined frequencies
- IF – Bandwidth: 120 kHz
- Measuring time: 1 s

Measurement above 1 GHz:

The following modifications apply to the measurement procedure for the frequency range above 1 GHz: The measurement distance was reduced to 1 m. The results were extrapolated by the extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements, inverse-linear-distance-squared for the power density measurements). Due to the fact that in this frequency range a double ridged wave guided horn antenna (up to 18 GHz) and a horn antenna (18–25 GHz) are used, the steps 2-4 as described before, are omitted. Step 1 was performed at one height of the receiving antenna only.

Detector: Peak, Average (simultaneously)
 RBW = VBW = 1 MHz; above 7 GHz 100 kHz

Test Requirements / Limits

If not stated within the measurement plot and/or test result, class B limits are applied.

FCC Part 15, Subpart B, §15.109, Radiated Emission Limits
 Frequency Range (MHz): Class B Limit (dBµV/m)

Frequency Range (MHz)	Class B Limit (dBµV/m)
30 – 88	40.0
88 – 216	43.5
216 – 960	46.0
above 960	54.0

Frequency Range (MHz)	Class A Limit (dBµV/m) / @ 3m !
30 - 88	49.5
88 - 216	54.0
216 - 960	56.9
above 960	60.0

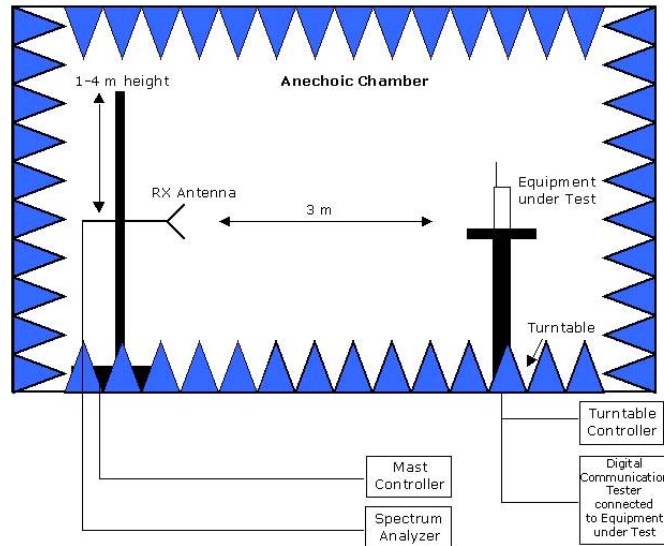
§15.35(b)

..., there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit....

Used conversion factor: $\text{Limit (dB}\mu\text{V/m)} = 20 \log (\text{Limit } (\mu\text{V/m})/1\mu\text{V/m})$

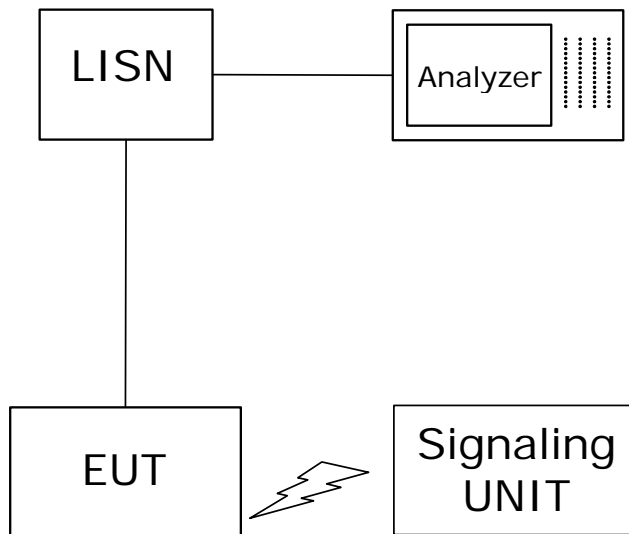
NOTE: A missing result table in the corresponding test report section means, that no final measurement was performed because no relevant frequencies (peaks) were found in the preliminary scan.

Setup Drawings



Remark: Depending on the frequency range suitable antenna types, attenuators or preamplifiers are used.

Setup in the Anechoic chamber. For measurements below 1 GHz the ground was replaced by a conducting ground plane.



Setup in the shielded room for conducted measurements at AC mains port

Correlation of measurement requirements from FCC and IC

Measurement	FCC reference	IC reference
Conducted Emissions (AC Power Line)	§15.107	ICES-001 or ICES-003 or RSS-Gen
Radiated Spurious Emissions	§15.109	ICES-001 or ICES-003 or RSS-Gen

Remarks:

1. FCC Part 15 subpart B, ICES 003 and CISPR 22 contain different definitions of Class A and Class B limits, i.e. which class is applicable to which kind of EUT. ICES 003 and CISPR 22 distinguish between the location where the EUT is intended to operate whilst FCC refers to the method of commercial distribution (distributive trades).
2. The correct assignment of the appropriate class to the concrete EUT is not scope of this test report!
3. A radio apparatus that is specifically subject to an Industry Canada Radio Standard Specification (RSS) and which contains an ITE is not subject to ICES-003 provided the ITE is used only to enable operation of the radio apparatus and the ITE does not control additional functions or capabilities.
4. ISM (Industrial, Scientific or Medical) radio frequency generators, though they may contain ITE, are excluded from the definition of ITE and are not subject to ICES-003. They are instead subject to the Interference-Causing Equipment Standard ICES-001, which specifically addresses ISM radio frequency generators.
5. The kind of EUT (ITE, ISM, Radio) determines which IC Standard is applicable.



6 Index

1	Administrative Data	2
1.1	Project Data	2
1.2	Applicant Data	2
1.3	Test Laboratory Data	2
1.4	Signature of the Testing Responsible	2
1.5	Signature of the Accreditation Responsible	3
2	Test Object Data	3
2.1	General OUT Description	3
2.2	Detailed Description of OUT Samples	4
2.3	OUT Features	6
2.4	Auxiliary Equipment	6
2.5	Operating Mode(s)	7
2.6	Setups used for Testing	7
3	Results	8
3.1	General	8
3.2	List of the Applicable Body	8
3.3	List of Test Specification	8
3.4	Summary	9
3.5	Detailed Results	10
3.5.1	15b.1 Conducted Emissions (AC Power Line) §15.107	10
3.5.2	15b.2 Spurious Radiated Emissions §15.109	16
4	Test Equipment Details	18
4.1	List of Used Test Equipment	18
5	Annex	23
5.1	Additional Information for Report	23
6	Index	30