InterLab®

Final Report on

GSM/GPRS Module BGS8
FCC ID: QIPBGS8
IC: 7830A-BGS8

Report Reference:	MDE_GEMALTO_1404_FCCa_Rev04 According to: FCC Part 22, Subpart H and FCC Part 24, Subpart E
Date:	December 02, 2014

Test Laboratory:
7Layers AG
Borsigstr. 11
40880 Ratingen
Germany

DAkkS
Deutsche
Akkreditierungsstelle
D-PL-12140-01-01

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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1 Administrative Data

1.1 Project Data

Project Responsible:	Adyl Mssalak
Date Of Test Report:	2014/11/26
Date of first test:	2014/08/26
Date of last test:	2014/10/10

1.2 Applicant Data

Company Name:	Gemalto M2M GmbH
Street:	Siemensdamm 50
City:	13629 Berlin
Country:	Germany
Contact Person:	Mr. Axel Heike
Department:	Approval Dep.
Phone:	+49 30 31102 8146
Mobile:	+49 172 840 8795
E-Mail:	Axel.Heike@gemalto.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.com

Laboratory Details

Lab ID	*Identification*	*Responsible*	*Accreditation Info*
Lab 1	Radiated Emissions	Mr. Marco Kullik Mr. Robert Machulec	DAkkS-Registration no. D-PL-12140-01-01
Lab 2	Radio Lab	Mr. Dobrin Dobrinov Mr. Daniel Gall	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

M. Mullik [M. Mullik]

7 layers AG, Borsigstr. 11
40880 Ratingen, Germany
Phone +49 (0)2102 749 0

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: BGS8

Type / Model / Family:	GSM/GPRS Module BGS8 HW: b1 Rev.3 SW: 03.100 (SVN 04)
Product Category:	Module
Manufacturer:	
Company Name:	see applicant data
Contact Person:	.

Parameter List:

Parameter name	*Value*
Parameter for Scope FCC_v2:	
AC Power Supply	120 V / 60 Hz
Antenna gain 1900 band	0,65 (dBi)
Antenna gain 850 band	1.15 (dBi)
DC Power Supply	4.5 (V)
FCC ID	QIPBGS8
highest channel	251 (848.8MHz) for GSM850, 810 (1909.8MHz) for GSM1900
lowest channel	128 (824.2MHz) for GSM850, 512 (1850.2MHz) for GSM1900 (MHz)
mid channel	190 (836.6MHz) for GSM850, 661 (1880.0MHz) for GSM1900

2.2 Detailed Description of OUT Samples

Sample : af01

OUT Identifier	BGS8		
Sample Description	#07 FCC Conducted1		
Serial No.	004401081184802		
HW Status	b1 Rev.3		
SW Status	03.000		
Low Voltage	3.3 V	*Low Temp.*	-10 °C
High Voltage	4.5 V	*High Temp.*	+55 °C
Nominal Voltage	4.5 V	*Normal Temp.*	+20 °C

Parameter List:

Parameter Description	*Value*
Parameter for Scope FCC_v2	
IMEI	004401081184802

Sample : ag01

OUT Identifier	BGS8		
Sample Description	#08 Radiated1		
Serial No.	004401081183358		
HW Status	b1 Rev.3		
SW Status	03.000		
Low Voltage	3.5 V	*Low Temp.*	-10 °C
High Voltage	4.5 V	*High Temp.*	+55 °C
Nominal Voltage	4.5 V	*Normal Temp.*	+20 °C

Parameter List:

Parameter Description	*Value*
Parameter for Scope FCC_v2	
IMEI	004401081183358

Sample : ak01

OUT Identifier	BGS8		
Sample Description	#11 FCC Conducted3		
Serial No.	004401081184232		
HW Status	b1 Rev.3		
SW Status	03.000		
Low Voltage	3.5 V	*Low Temp.*	-10 °C
High Voltage	4.5 V	*High Temp.*	+55 °C
Nominal Voltage	4.5 V	*Normal Temp.*	+20 °C

Parameter List:

Parameter Description	*Value*
Parameter for Scope FCC_v2	
IMEI	004401081184232

2.3 OUT Features

Features for OUT: BGS8

Designation	*Description*	*Allowed Values*	*Supported Value(s)*
Features for scope: FCC_v2			
AC	The OUT is powered by or connected to AC Mains		
DC	The OUT is powered by or connected to DC		
Eant	removable antenna supplied and type tested with the radio equipment, designed as an indispensable part of the equipment		
GSM850	EUT supports GSM850 band 824MHz - 849MHz		
PantC	permanent fixed antenna connector, which may be built-in, designed as an indispensable part of the equipment		
PCS1900	EUT supports PCS1900 band 1850MHz - 1910MHz		

2.4 Auxiliary Equipment

AE No.	*Type Designation*	*Serial No.*	*HW Status*	*SW Status*	*Description*
AE 03					Flex cable (80-pin connection)
AE 04					Shielded housing
AE 10	0335C2065	A30638114250			AC Adaptor
AE 06	AA.162	162CT12440189			GPS/Glonass IP67 Active antenna
AE 02	AH6 - DSB75 ADAPTOR -1				Adapter Board
AE 09	AMILO Pro V3205	YK2H014267			Laptop
AE 01	DSB75	W30880-Q9812-X-2	DSB75_Rev2.0_010		Evaluation board
AE 08	Flatron L1740BQ	509WANF1W607			TFT Monitor
AE 11	M-BB48	LZC90505478			Computer mouse
AE 05	MiniMag set				GSM antenna
AE 07	PS-2403D				AC/DC external power supply
AE 12	RS 6000	G 0000273 2P28			Keyboard

2.5 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.

Setup No.	*List of OUT samples*		*List of auxiliary equipment*	
	Sample No.	*Sample Description*	*AE No.*	*AE Description*
S_AF01				
	Sample: af01	#07 FCC Conducted1	AE 03	Flex cable (80-pin connection)
			AE 04	Shielded housing
			AE 02	Adapter Board
			AE 01	Evaluation board
S_AK02				
	Sample: ak01	#11 FCC Conducted3	AE 03	Flex cable (80-pin connection)
			AE 04	Shielded housing
			AE 02	Adapter Board
			AE 01	Evaluation board
S01_AG01				
	Sample: ag01	#08 Radiated1	AE 03	Flex cable (80-pin connection)
			AE 04	Shielded housing
			AE 10	AC Adaptor
			AE 06	GPS/Glonass IP67 Active antenna
			AE 02	Adapter Board
			AE 09	Laptop
			AE 01	Evaluation board
			AE 08	TFT Monitor
			AE 11	Computer mouse
			AE 05	GSM antenna
			AE 07	AC/DC external power supply
			AE 12	Keyboard

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. This report contains the abbreviated information content pertaining to services rendered. Supporting documentation not included herein is maintained and available at the laboratory. 2. All tests are performed under environmental conditions within the requirements of the specifications. Environmental conditions are available at the laboratory.

3.2 List of the Applicable Body

(Bodies for Scope: FCC_v2)

Designation	*Description*
FCC47CFRChIPART22PUBLIC MOBILE SERVICES	Part 22, Subpart H - Cellular Radiotelephone Service
FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES	Part 24, Subpart E - Broadband PCS

3.3 List of Test Specification

Test Specification:	**FCC part 2 and 22**
Version	10-1-13 Edition
Title:	PART 2 - GENERAL RULES AND REGULATIONS PART 22 - PUBLIC MOBILE SERVICES
Test Specification:	**FCC part 2 and 24**
Version	10-1-13 Edition
Title:	PART 2 - GENERAL RULES AND REGULATIONS PART 24 - PERSONAL COMMUNICATIONS SERVICES

3.4 Summary

Test Case Identifier / Name *Test (condition)*	*Result*	*Date of Test*	*Lab Ref.*	*Setup*
Test Specification: FCC part 2 and 22				
22.1 RF Power Output §2.1046, §22.913				
22.1; Frequency Band = 850, Mode = GSM, Channel = 128, Frequency = 824.2MHz, Method = conducted	Passed	2014/10/10	Lab 2	S_AK02
22.1; Frequency Band = 850, Mode = GSM, Channel = 190, Frequency = 836.6MHz, Method = conducted	Passed	2014/10/10	Lab 2	S_AK02
22.1; Frequency Band = 850, Mode = GSM, Channel = 251, Frequency = 848.8MHz, Method = conducted	Passed	2014/10/10	Lab 2	S_AK02
22.2 Frequency stability §2.1055				
22.2; Frequency Band = 850, Mode = GSM, Channel = 190, Frequency = 836.6MHz	Passed	2014/08/28	Lab 2	S_AF01
22.3 Spurious emissions at antenna terminals §2.1051, §22.917				
22.3; Frequency Band = 850, Mode = GSM, Channel = 128, Frequency = 824.2MHz,	Passed	2014/08/26	Lab 2	S_AF01
22.3; Frequency Band = 850, Mode = GSM, Channel = 190, Frequency = 836.6MHz	Passed	2014/08/26	Lab 2	S_AF01
22.3; Frequency Band = 850, Mode = GSM, Channel = 251, Frequency = 848.8MHz	Passed	2014/08/26	Lab 2	S_AF01
22.4 Field strength of spurious radiation §2.1053, §22.917				
22.4; Frequency Band = 850, Mode = GSM, Channel = 128, Frequency = 824.2MHz	Passed	2014/10/01	Lab 1	S01_AG01
22.4; Frequency Band = 850, Mode = GSM, Channel = 190, Frequency = 836.6MHz	Passed	2014/09/19	Lab 1	S01_AG01
22.4; Frequency Band = 850, Mode = GSM, Channel = 251, Frequency = 848.8MHz	Passed	2014/10/01	Lab 1	S01_AG01
22.5 Emission and Occupied Bandwidth §2.1049, §22.917				
22.5; Frequency Band = 850, Mode = GSM, Channel = 128, Frequency = 824.2MHz	Passed	2014/08/26	Lab 2	S_AF01
22.5; Frequency Band = 850, Mode = GSM, Channel = 190, Frequency = 836.6MHz	Passed	2014/08/26	Lab 2	S_AF01
22.5; Frequency Band = 850, Mode = GSM, Channel = 251, Frequency = 848.8MHz	Passed	2014/08/26	Lab 2	S_AF01
22.6 Band edge compliance §2.1053, §22.917				
22.6; Frequency Band = 850, Mode = GSM, Channel = 128, Frequency = 824.2MHz	Passed	2014/08/26	Lab 2	S_AF01
22.6; Frequency Band = 850, Mode = GSM, Channel = 251, Frequency = 848.8MHz	Passed	2014/08/26	Lab 2	S_AF01
Test Specification: FCC part 2 and 24				
24.1 RF Power Output §2.1046, §24.232				
24.1; Frequency Band = 1900, Mode = GSM, Channel = 512, Frequency = 1850.2MHz, Method = conducted	Passed	2014/10/10	Lab 2	S_AK02
24.1; Frequency Band = 1900, Mode = GSM, Channel = 661, Frequency = 1880.0MHz, Method = conducted	Passed	2014/10/10	Lab 2	S_AK02
24.1; Frequency Band = 1900, Mode = GSM, Channel = 810, Frequency = 1909.8MHz, Method = conducted	Passed	2014/10/10	Lab 2	S_AK02
24.2 Frequency stability §2.1055, §24.235				
24.2; Frequency Band = 1900, Mode = GSM, Channel = 661, Frequency = 1880.0MHz	Passed	2014/08/28	Lab 2	S_AF01

Test Case Identifier / Name *Test (condition)*	*Result*	*Date of Test*	*Lab Ref.*	*Setup*
24.3 Spurious emissions at antenna terminals §2.1051, §24.238				
24.3; Frequency Band = 1900, Mode = GSM, Channel = 512, Frequency = 1850.2MHz	Passed	2014/08/26	Lab 2	S_AF01
24.3; Frequency Band = 1900, Mode = GSM, Channel = 661, Frequency = 1880.0MHz	Passed	2014/08/26	Lab 2	S_AF01
24.3; Frequency Band = 1900, Mode = GSM, Channel = 810, Frequency = 1909.8MHz	Passed	2014/08/26	Lab 2	S_AF01
24.4 Field strength of spurious radiation §2.1053, §24.238				
24.4; Frequency Band = 1900, Mode = GSM, Channel = 512, Frequency = 1850.2MHz	Passed	2014/10/01	Lab 1	S01_AG01
24.4; Frequency Band = 1900, Mode = GSM, Channel = 661, Frequency = 1880.0MHz	Passed	2014/09/20	Lab 1	S01_AG01
24.4; Frequency Band = 1900, Mode = GSM, Channel = 810, Frequency = 1909.8MHz	Passed	2014/10/02	Lab 1	S01_AG01
24.5 Emission and Occupied Bandwidth §2.1049, §24.238				
24.5; Frequency Band = 1900, Mode = GSM, Channel = 512, Frequency = 1850.2MHz	Passed	2014/08/26	Lab 2	S_AF01
24.5; Frequency Band = 1900, Mode = GSM, Channel = 661, Frequency = 1880.0MHz	Passed	2014/08/26	Lab 2	S_AF01
24.5; Frequency Band = 1900, Mode = GSM, Channel = 810, Frequency = 1909.8MHz	Passed	2014/08/26	Lab 2	S_AF01
24.6 Band edge compliance §2.1053, §24.238				
24.6; Frequency Band = 1900, Mode = GSM, Channel = 512, Frequency = 1850.2MHz	Passed	2014/08/26	Lab 2	S_AF01
24.6; Frequency Band = 1900, Mode = GSM, Channel = 810, Frequency = 1909.8MHz	Passed	2014/08/26	Lab 2	S_AF01

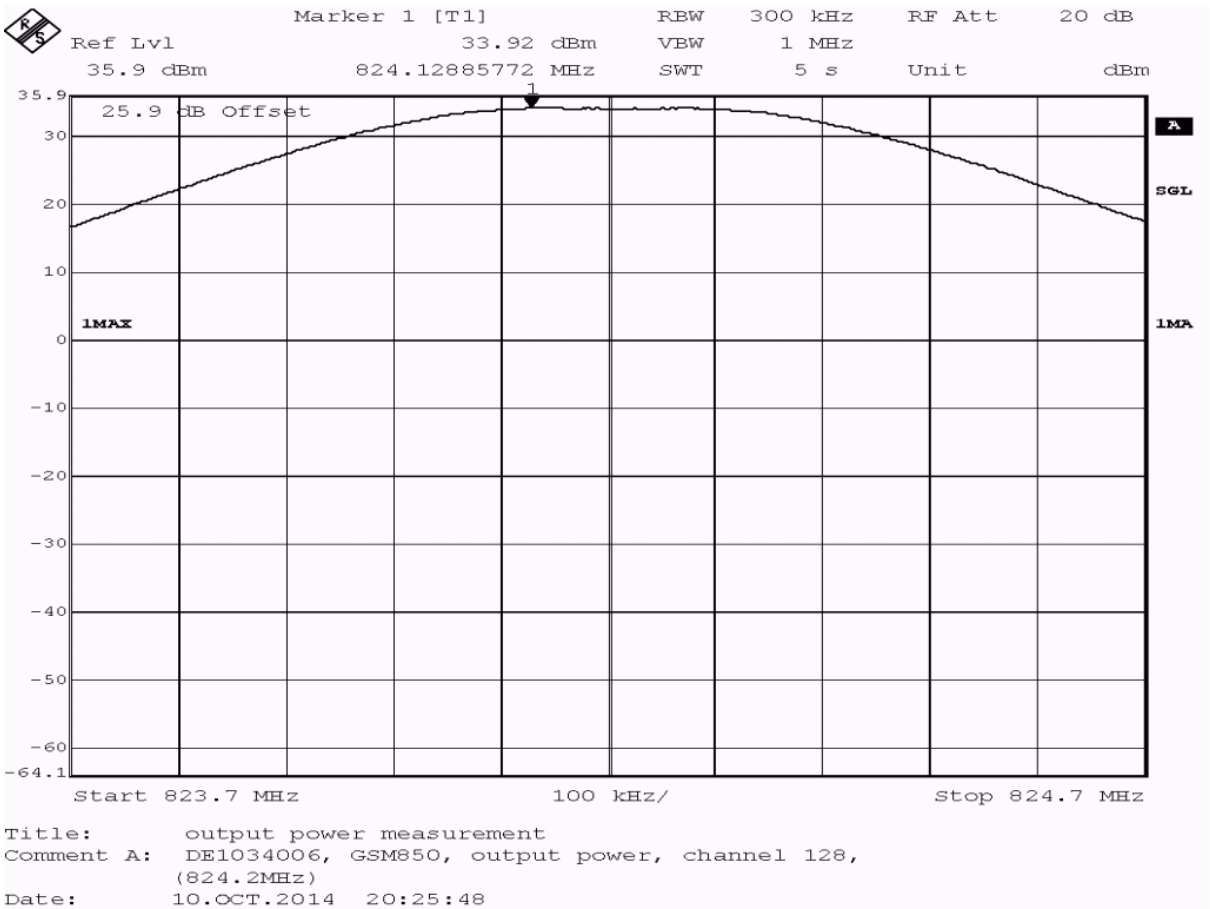
3.5 Detailed Results

3.5.1 22.1 RF Power Output §2.1046, §22.913

Test: 22.1; Frequency Band = 850, Mode = GSM, Channel = 128, Frequency = 824.2MHz, Method = conducted

Result:	Passed
Setup No.:	S_AK02
Date of Test:	2014/10/10 20:07
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:



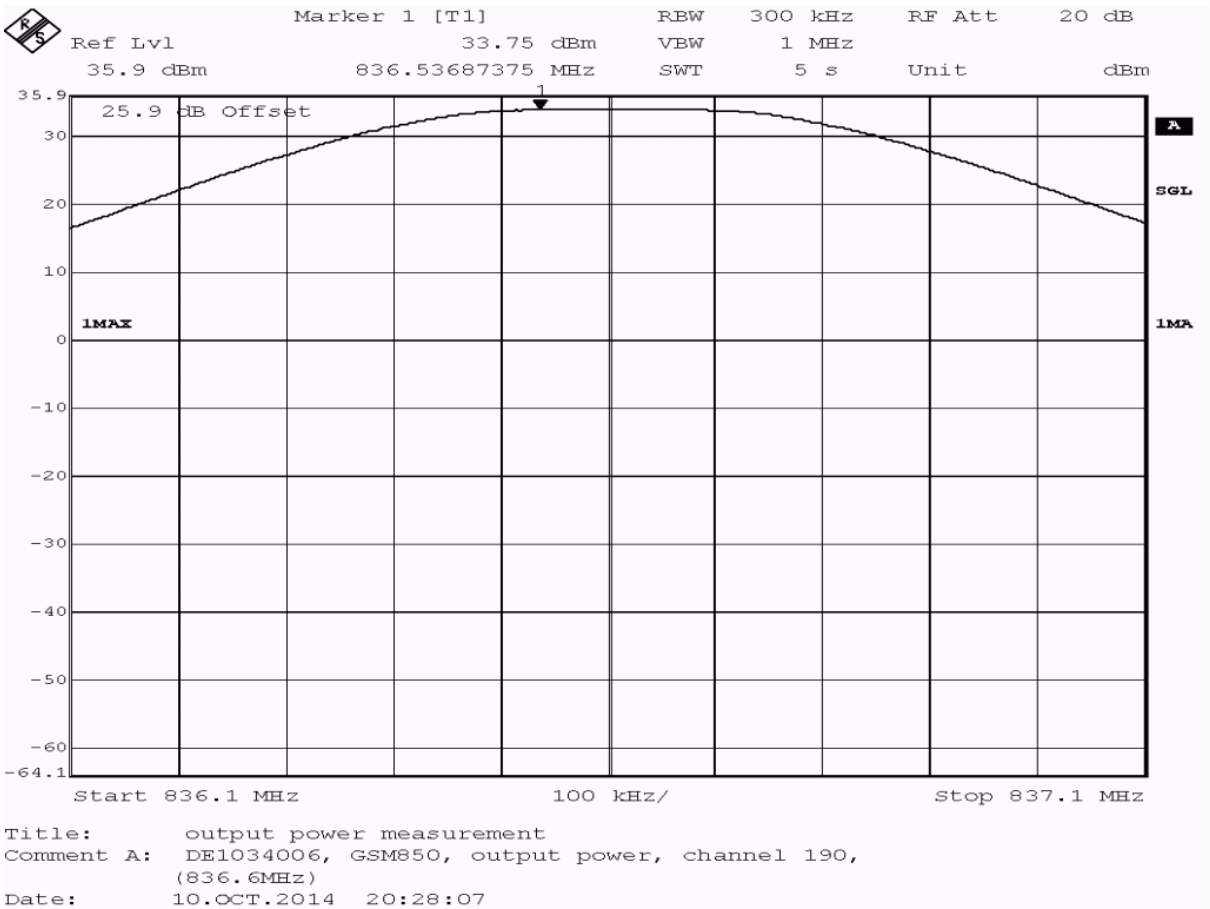
detector	trace	resolution bandwidth /kHz	conducted peak value /dBm	verdict
peak	maxhold	300	33.92	passed
average	maxhold	300	33.49	passed
rms	maxhold	300	33.49	passed

no external antenna gain is specified, the verdict is valid
for external antenna gains equal or less than
6.67 dBi

Test: 22.1; Frequency Band = 850, Mode = GSM, Channel = 190, Frequency = 836.6MHz, Method = conducted

Result:	Passed
Setup No.:	S_AK02
Date of Test:	2014/10/10 20:09
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:



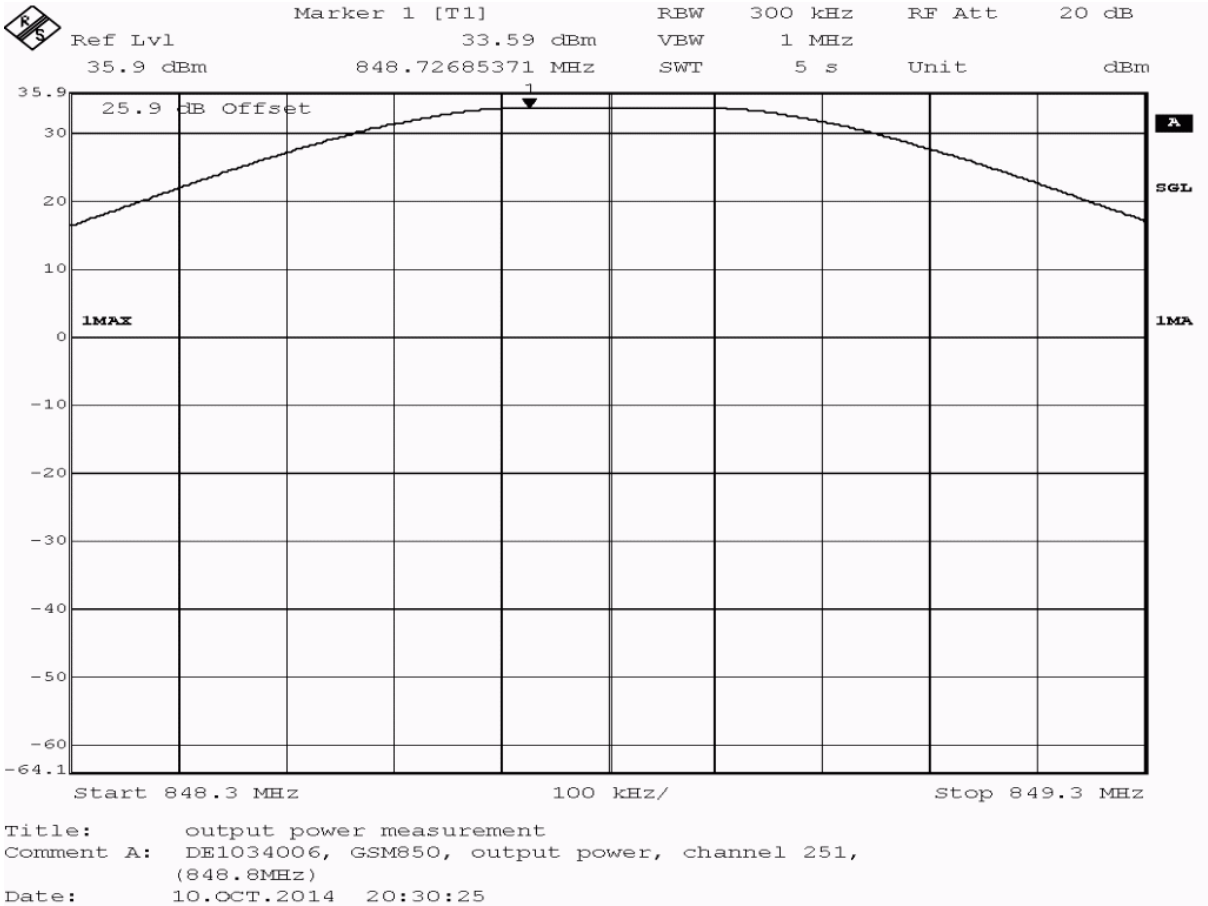
detector	trace	resolution bandwidth /kHz	conducted peak value /dBm	verdict
peak	maxhold	300	33.75	passed
average	maxhold	300	33.32	passed
rms	maxhold	300	33.34	passed

no external antenna gain is specified, the verdict is valid for external antenna gains equal or less than 6.84 dBi

Test: 22.1; Frequency Band = 850, Mode = GSM, Channel = 251, Frequency = 848.8MHz, Method = conducted

Result:	Passed
Setup No.:	S_AK02
Date of Test:	2014/10/10 20:11
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:



detector	trace	resolution bandwidth /kHz	conducted peak value /dBm	verdict
peak	maxhold	300	33.59	passed
average	maxhold	300	33.22	passed
rms	maxhold	300	33.23	passed

no external antenna gain is specified, the verdict is valid
for external antenna gains equal or less than
7.00 dBi

3.5.2 22.2 Frequency stability §2.1055

Test: 22.2; Frequency Band = 850, Mode = GSM, Channel = 190, Frequency = 836.6MHz

Result:	Passed
Setup No.:	S_AF01
Date of Test:	2014/08/28 0:00
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	2095.5	-12	-19	passed
-30	5			-5	-20	passed
-30	10			-9	-20	passed
-20	0	normal	2095.5	-5	-13	passed
-20	5			-7	-19	passed
-20	10			-10	-26	passed
-10	0	normal	2095.5	-12	-28	passed
-10	5			-7	-20	passed
-10	10			-10	-23	passed
0	0	normal	2095.5	-14	-28	passed
0	5			-10	-14	passed
0	10			-9	-27	passed
10	0	normal	2095.5	-13	-22	passed
10	5			-8	-14	passed
10	10			-11	-21	passed
20	0	low	2095.5	-13	-26	passed
20	5			-7	-13	passed
20	10			-4	-18	passed
20	0	normal = high [1)]	2095.5	-18	-31	passed
20	5			-6	-10	passed
20	10			-9	-16	passed
20	0	high	2095.5	-16	-27	passed
20	5			-7	-24	passed
20	10			-13	-23	passed
30	0	normal	2095.5	-16	-27	passed
30	5			-6	-19	passed
30	10			-14	-28	passed
40	0	normal	2095.5	-18	-29	passed
40	5			-8	-14	passed
40	10			-7	-15	passed
50	0	normal	2095.5	-19	-29	passed
50	5			-10	-15	passed
50	10			-14	-23	passed

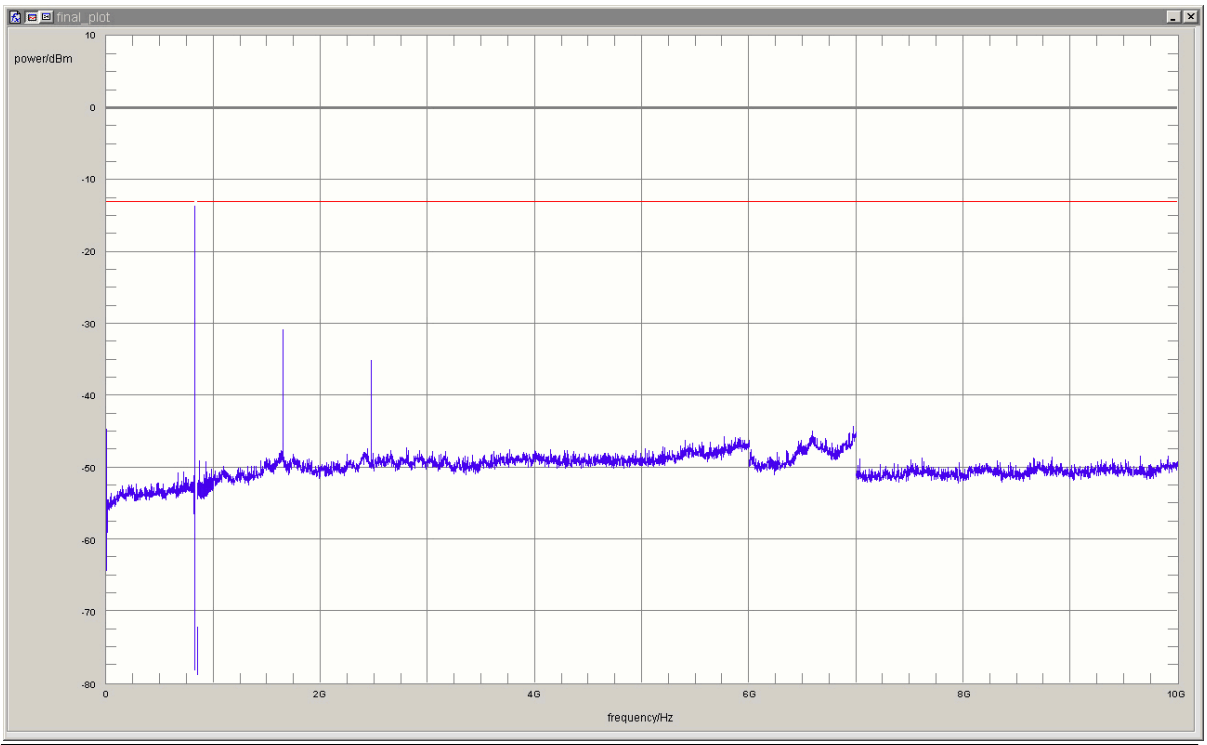
1) The manufacturer declared that normal voltage is equivalent with high voltage.
2) The call is established at high voltage and the voltage is then reduced to the battery operating end.

3.5.3 22.3 Spurious emissions at antenna terminals §2.1051, §22.917

Test: 22.3; Frequency Band = 850, Mode = GSM, Channel = 128, Frequency = 824.2MHz,

Result:	Passed
Setup No.:	S_AF01
Date of Test:	2014/08/26 11:10
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:



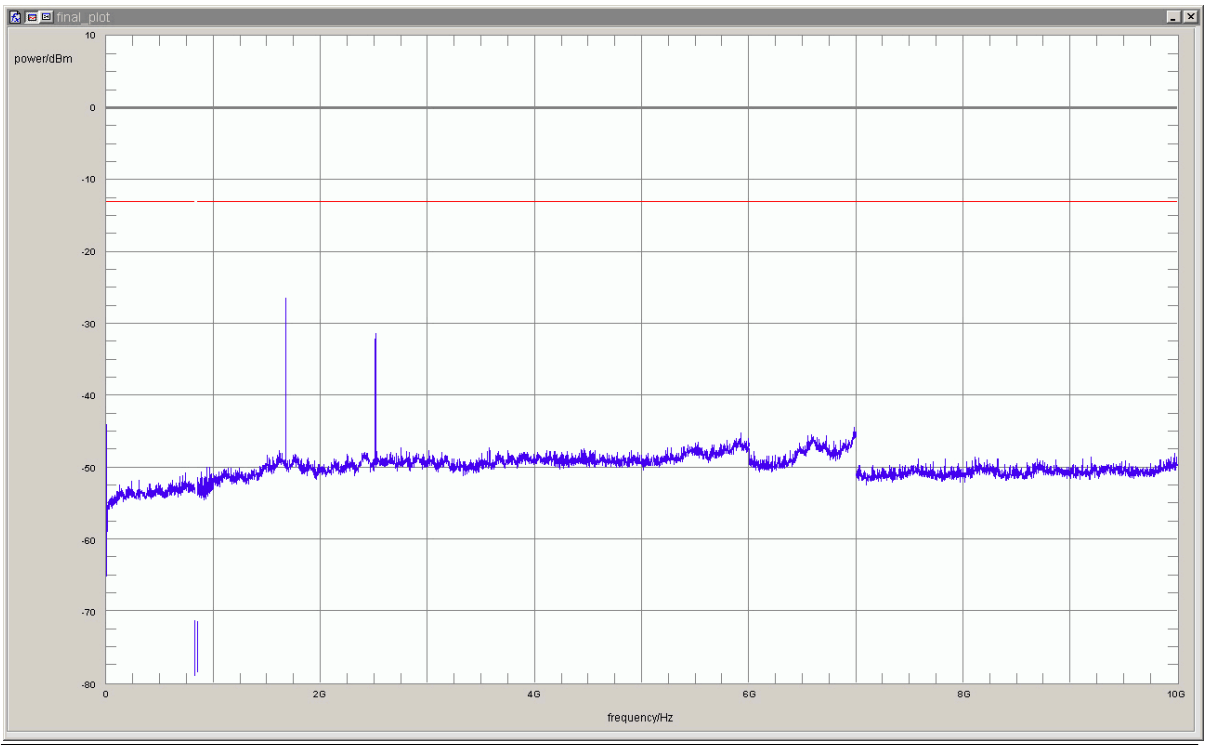
detector	trace	resolution bandwidth /kHz	frequency /MHz	peak value /dBm	margin to limit /dB	limit /dBm	verdict
peak	maxhold	3	823.9098	-32.5	19.5	-13.0	passed
peak	maxhold	3	823.9259	-29.5	16.5	-13.0	passed
peak	maxhold	3	823.9319	-31.4	18.4	-13.0	passed
peak	maxhold	3	823.9359	-23.0	10.0	-13.0	passed
peak	maxhold	3	823.9399	-21.6	8.6	-13.0	passed
peak	maxhold	3	823.9619	-17.5	4.5	-13.0	passed
peak	maxhold	3	823.9760	-16.7	3.7	-13.0	passed
peak	maxhold	3	823.9980	-13.6	0.6	-13.0	passed
peak	maxhold	100	1649.30	-30.9	17.9	-13.0	passed

no further values have been found with a margin of less than 20 dB

Test: 22.3; Frequency Band = 850, Mode = GSM, Channel = 190, Frequency = 836.6MHz

Result:	Passed
Setup No.:	S_AF01
Date of Test:	2014/08/26 10:58
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:



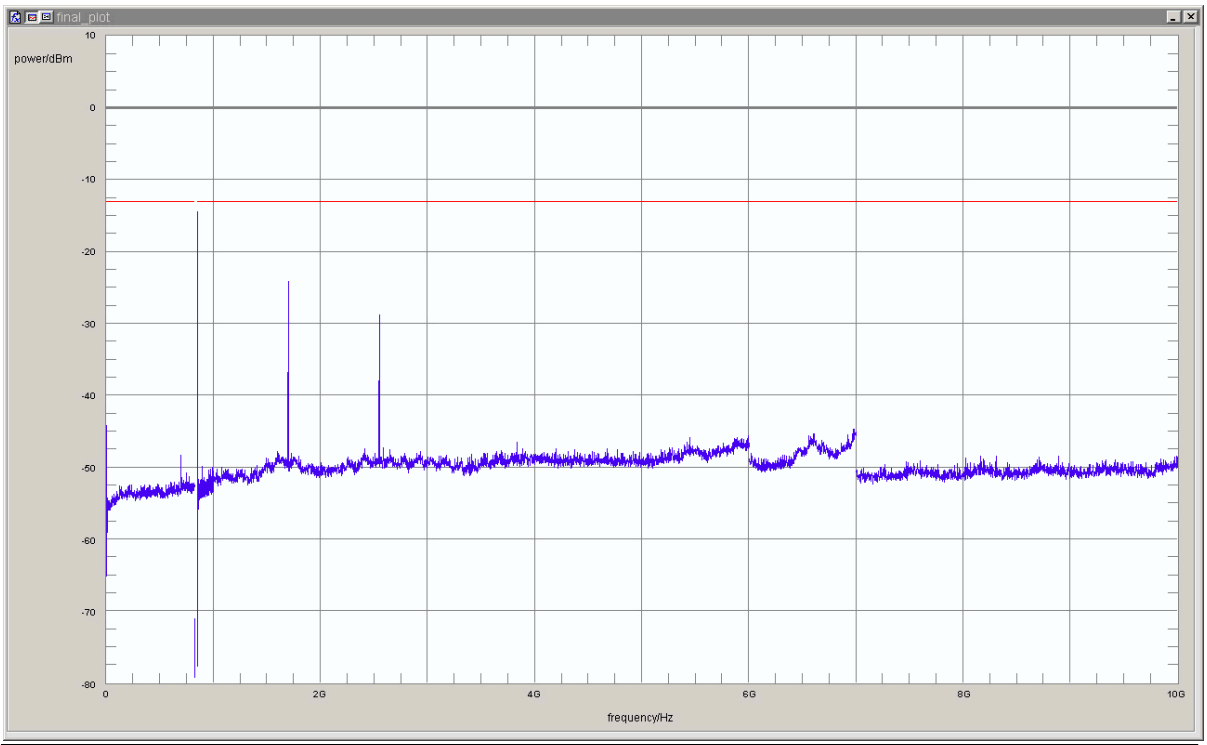
detector	trace	resolution bandwidth /kHz	frequency /MHz	peak value /dBm	margin to limit /dB	limit /dBm	verdict
peak	maxhold	100	1673.35	-26.4	13.4	-13.0	passed
peak	maxhold	100	2511.02	-31.4	18.4	-13.0	passed

no further values have been found with a margin of less than 20 dB

Test: 22.3; Frequency Band = 850, Mode = GSM, Channel = 251, Frequency = 848.8MHz

Result:	Passed
Setup No.:	S_AF01
Date of Test:	2014/08/26 11:25
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:



detector	trace	resolution bandwidth /kHz	frequency /MHz	peak value /dBm	margin to limit /dB	limit /dBm	verdict
peak	maxhold	3	849.0000	-14.6	1.6	-13.0	passed
peak	maxhold	3	849.0060	-18.3	5.3	-13.0	passed
peak	maxhold	3	849.0200	-14.4	1.4	-13.0	passed
peak	maxhold	3	849.0421	-19.7	6.7	-13.0	passed
peak	maxhold	3	849.0601	-23.2	10.2	-13.0	passed
peak	maxhold	3	849.0741	-24.1	11.1	-13.0	passed
peak	maxhold	3	849.0882	-29.9	16.9	-13.0	passed
peak	maxhold	3	849.0962	-30.4	17.4	-13.0	passed
peak	maxhold	100	1697.39	-24.1	11.1	-13.0	passed
peak	maxhold	100	2547.09	-28.7	15.7	-13.0	passed

no further values have been found with a margin of less than 20 dB

3.5.4 22.4 Field strength of spurious radiation §2.1053, §22.917

Test: 22.4; Frequency Band = 850, Mode = GSM, Channel = 128, Frequency = 824.2MHz

Result: Passed

Setup No.: S01_AG01

Date of Test: 2014/10/01 21:55

Body: FCC47CFRChIPART22PUBLIC MOBILE SERVICES

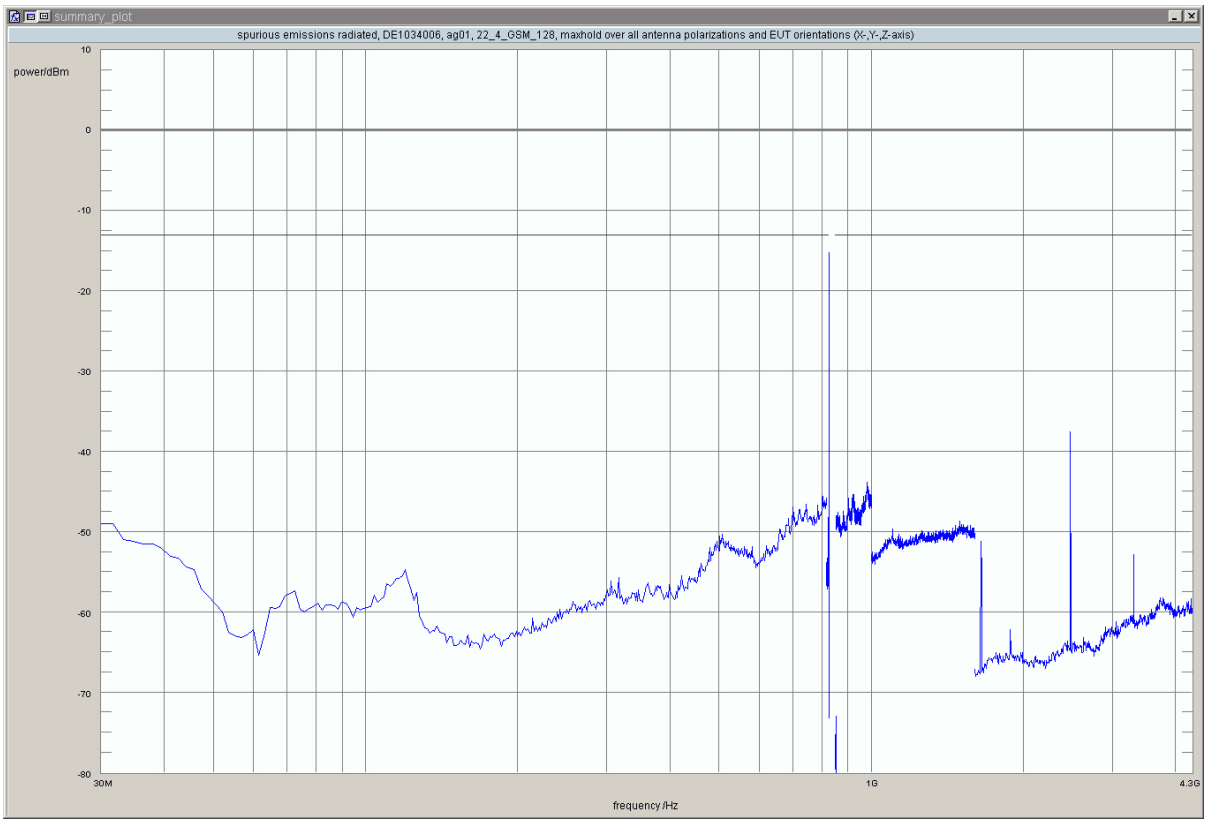
Test Specification: FCC part 2 and 22

Detailed Results:

detector	trace	resolution bandwidth /kHz	frequency /MHz	peak value /dBm	limit /dBm	margin to limit /dB	azimuth /°	antenna polarization	EUT orientation	verdict
peak	maxhold	3	823.9218	-29.14	-13.00	16.14	90.0	horizontal	vertical	passed
peak	maxhold	3	823.9359	-27.36	-13.00	14.36	-180.0	vertical	horizontal	passed
peak	maxhold	3	823.9419	-26.75	-13.00	13.75	90.0	horizontal	vertical	passed
peak	maxhold	3	823.9499	-26.55	-13.00	13.55	-180.0	vertical	horizontal	passed
peak	maxhold	3	823.9659	-19.97	-13.00	6.97	90.0	horizontal	vertical	passed
peak	maxhold	3	823.9719	-21.81	-13.00	8.81	-180.0	vertical	horizontal	passed
peak	maxhold	3	823.9820	-15.22	-13.00	2.22	90.0	horizontal	vertical	passed
peak	maxhold	3	823.9960	-24.92	-13.00	11.92	-90.0	horizontal	vertical	passed
peak	maxhold	3	824.0000	-19.51	-13.00	6.51	90.0	horizontal	vertical	passed

no further values have been found with a margin of less than 20 dB

tested up to the 5th harmonic

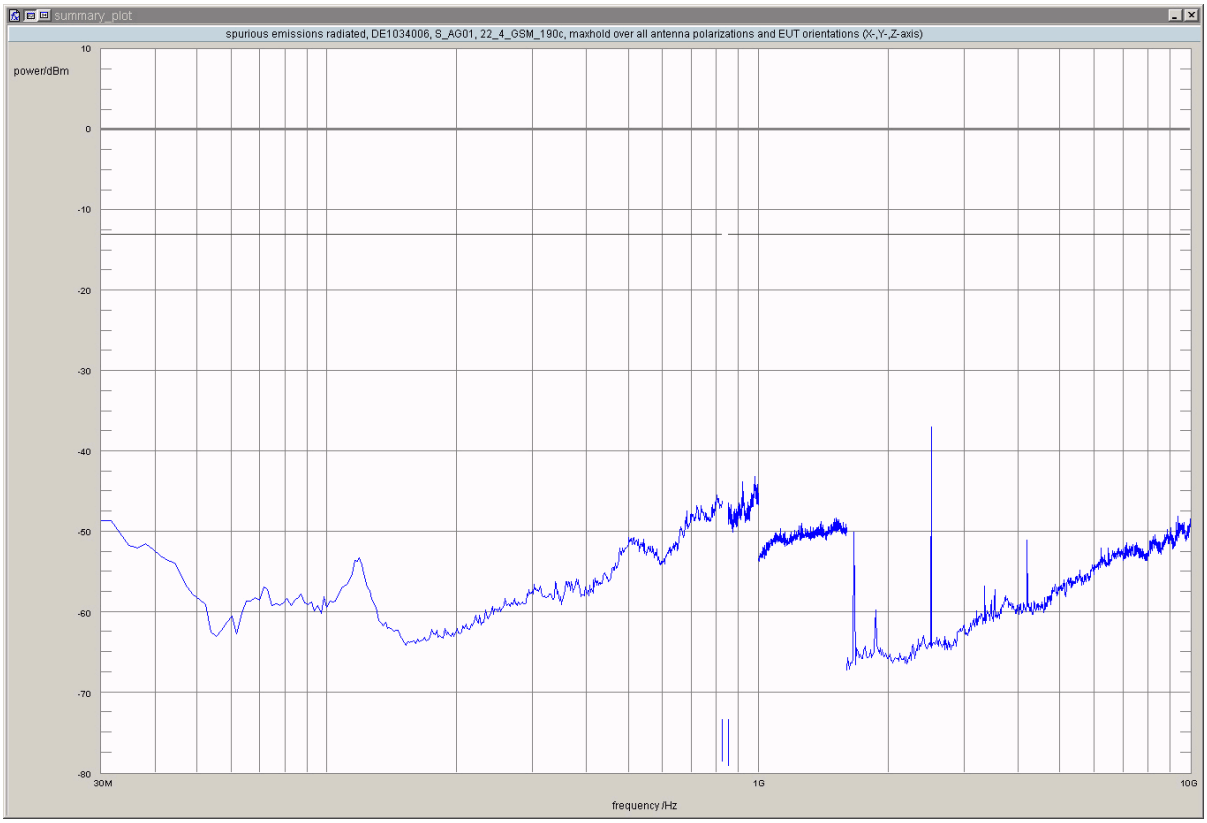


tested up to the 5th harmonic

Test: 22.4; Frequency Band = 850, Mode = GSM, Channel = 190, Frequency = 836.6MHz

Result:	Passed
Setup No.:	S01_AG01
Date of Test:	2014/09/19 23:01
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:



detector	trace	resolution bandwidth /kHz	frequency /MHz	peak value /dBm	limit /dBm	margin to limit /dB	azimuth /°	antenna polarization	EUT orientation	verdict
peak	maxhold	1000	2509.0	-36.96	-13.00	23.96	0.0	vertical	horizontal	passed

no further values have been found with a margin of less than 20 dB

Test: 22.4; Frequency Band = 850, Mode = GSM, Channel = 251, Frequency = 848.8MHz

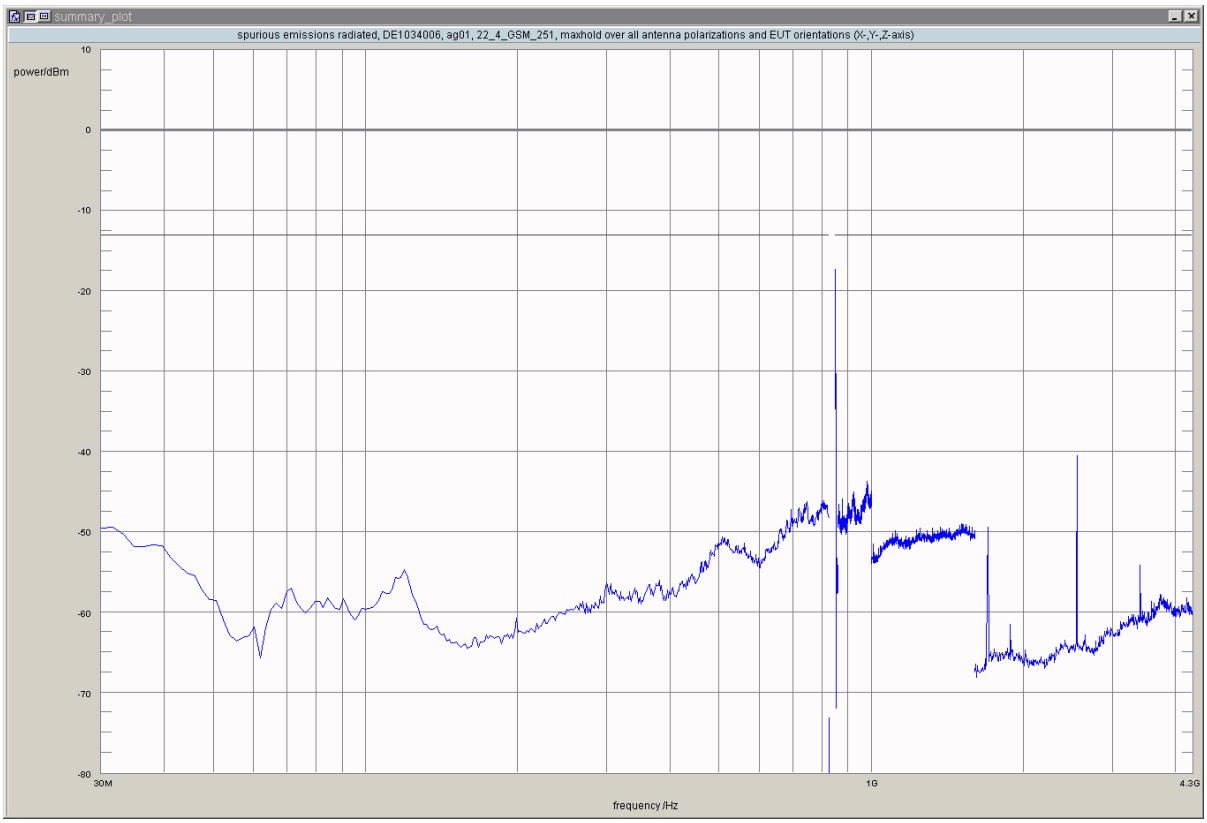
Result:	Passed
Setup No.:	S01_AG01
Date of Test:	2014/10/01 21:57
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:

detector	trace	resolution bandwidth /kHz	frequency /MHz	peak value /dBm	limit /dBm	margin to limit /dB	azimuth /°	antenna polarization	EUT orientation	verdict
peak	maxhold	3	849.0000	-18.54	-13.00	5.54	0.0	vertical	horizontal	passed
peak	maxhold	3	849.0160	-17.30	-13.00	4.30	90.0	horizontal	vertical	passed
peak	maxhold	3	849.0261	-21.55	-13.00	8.55	0.0	vertical	horizontal	passed
peak	maxhold	3	849.0341	-25.40	-13.00	12.40	-90.0	horizontal	vertical	passed
peak	maxhold	3	849.0421	-18.92	-13.00	5.92	90.0	horizontal	vertical	passed
peak	maxhold	3	849.0501	-25.68	-13.00	12.68	0.0	vertical	horizontal	passed
peak	maxhold	3	849.0541	-32.61	-13.00	19.61	0.0	vertical	vertical	passed
peak	maxhold	3	849.0621	-27.97	-13.00	14.97	90.0	horizontal	vertical	passed
peak	maxhold	3	849.0762	-30.27	-13.00	17.27	90.0	horizontal	vertical	passed
peak	maxhold	3	849.0842	-31.45	-13.00	18.45	90.0	horizontal	vertical	passed
peak	maxhold	3	849.0962	-32.83	-13.00	19.83	90.0	horizontal	vertical	passed

no further values have been found with a margin of less than 20 dB

tested up to the 5th harmonic



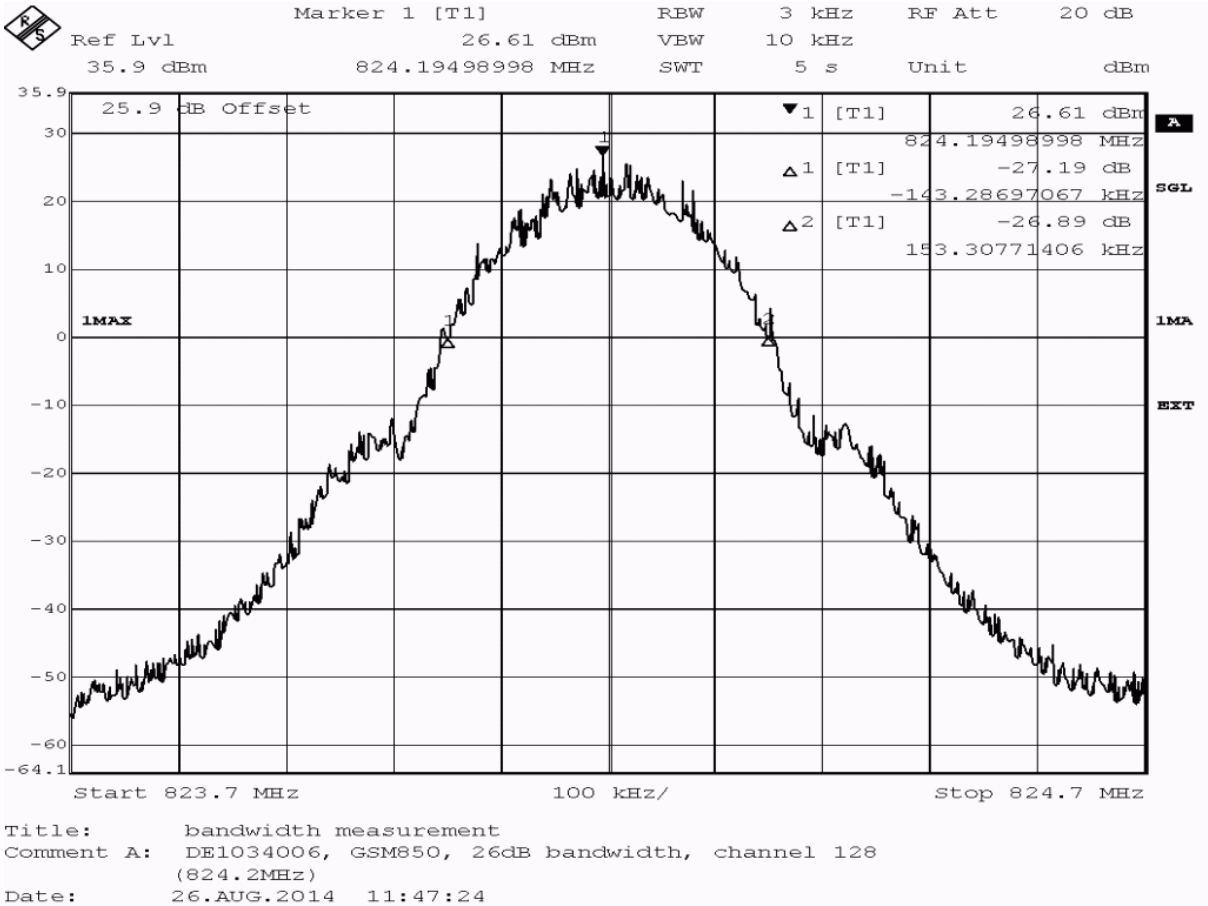
tested up to the 5th harmonic

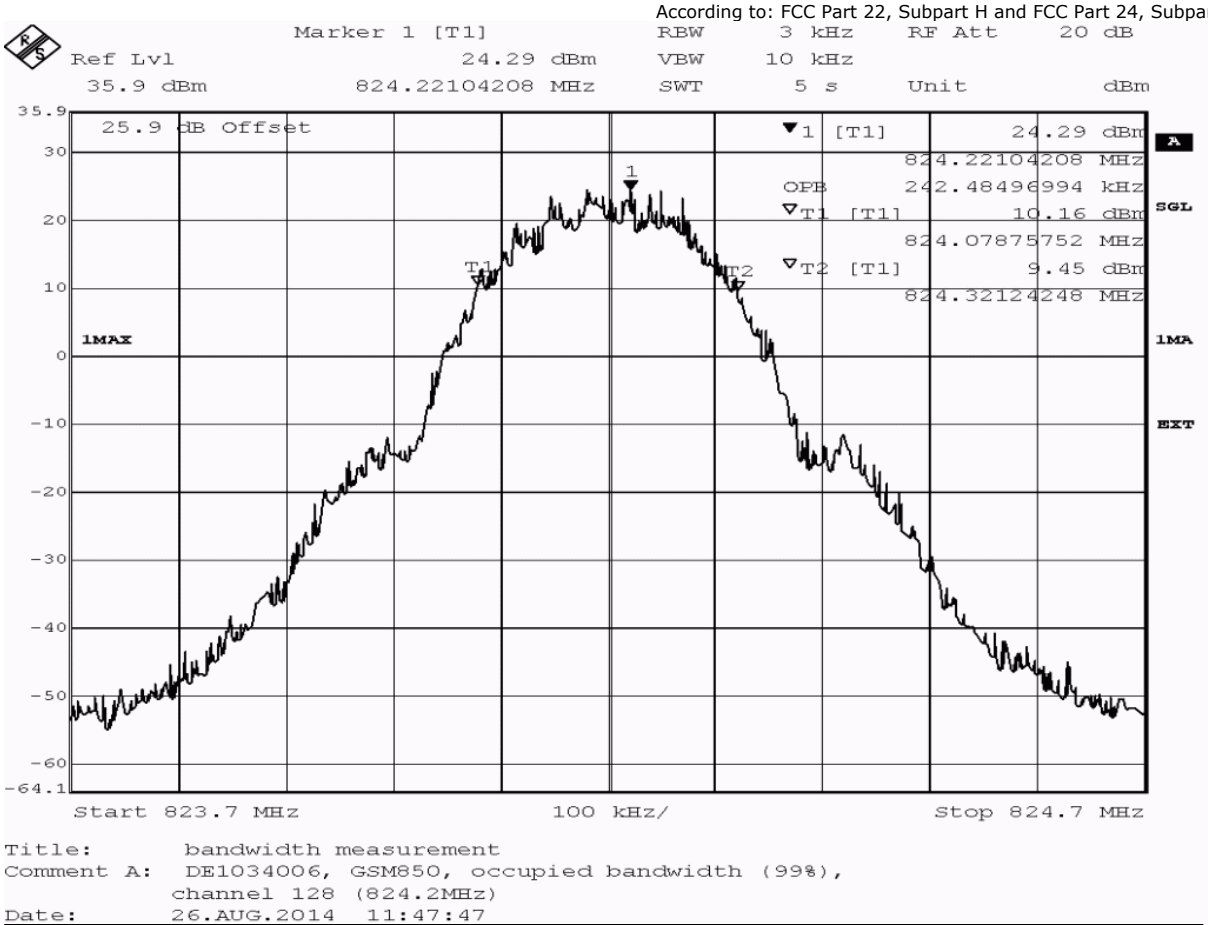
3.5.5 22.5 Emission and Occupied Bandwidth §2.1049, §22.917

Test: 22.5; Frequency Band = 850, Mode = GSM, Channel = 128, Frequency = 824.2MHz

Result:	Passed
Setup No.:	S_AF01
Date of Test:	2014/08/26 11:28
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:



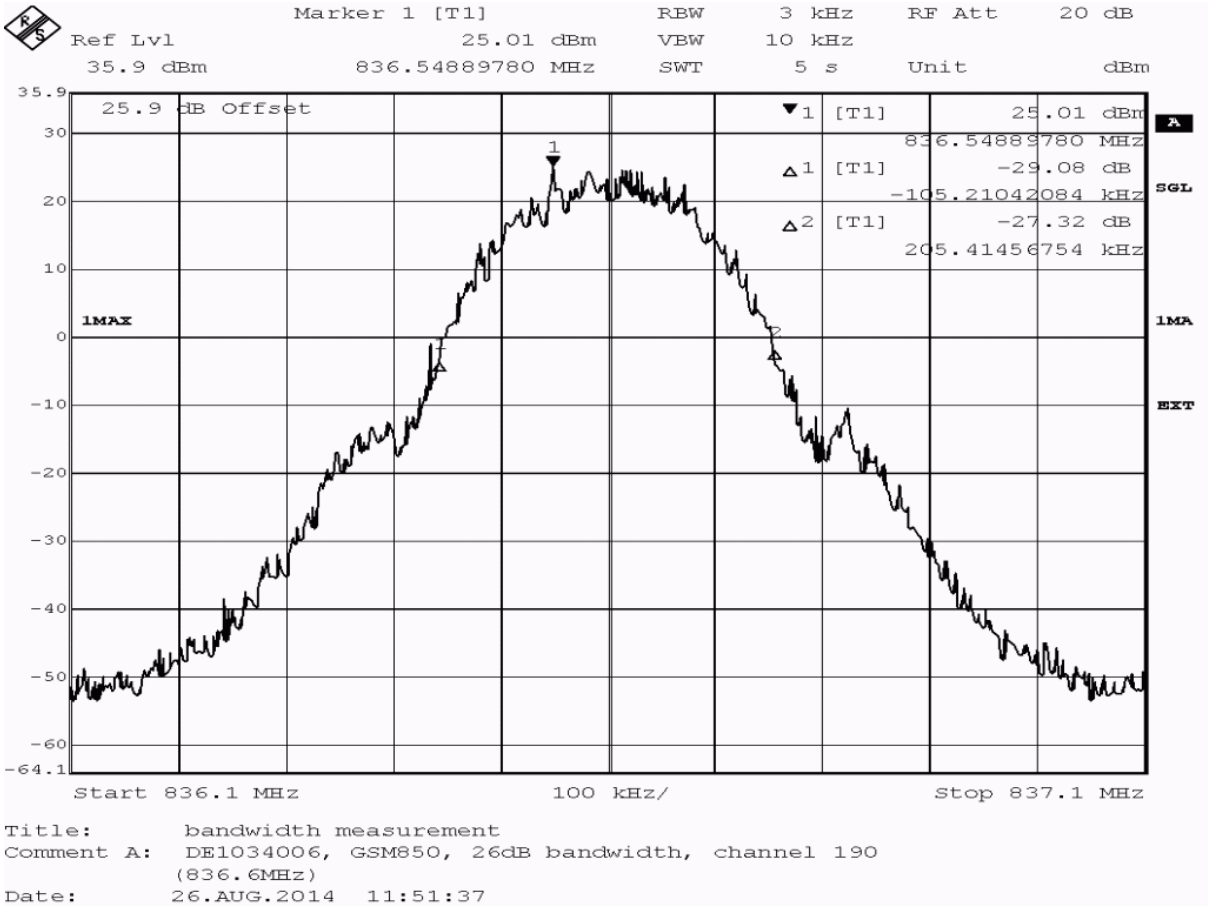


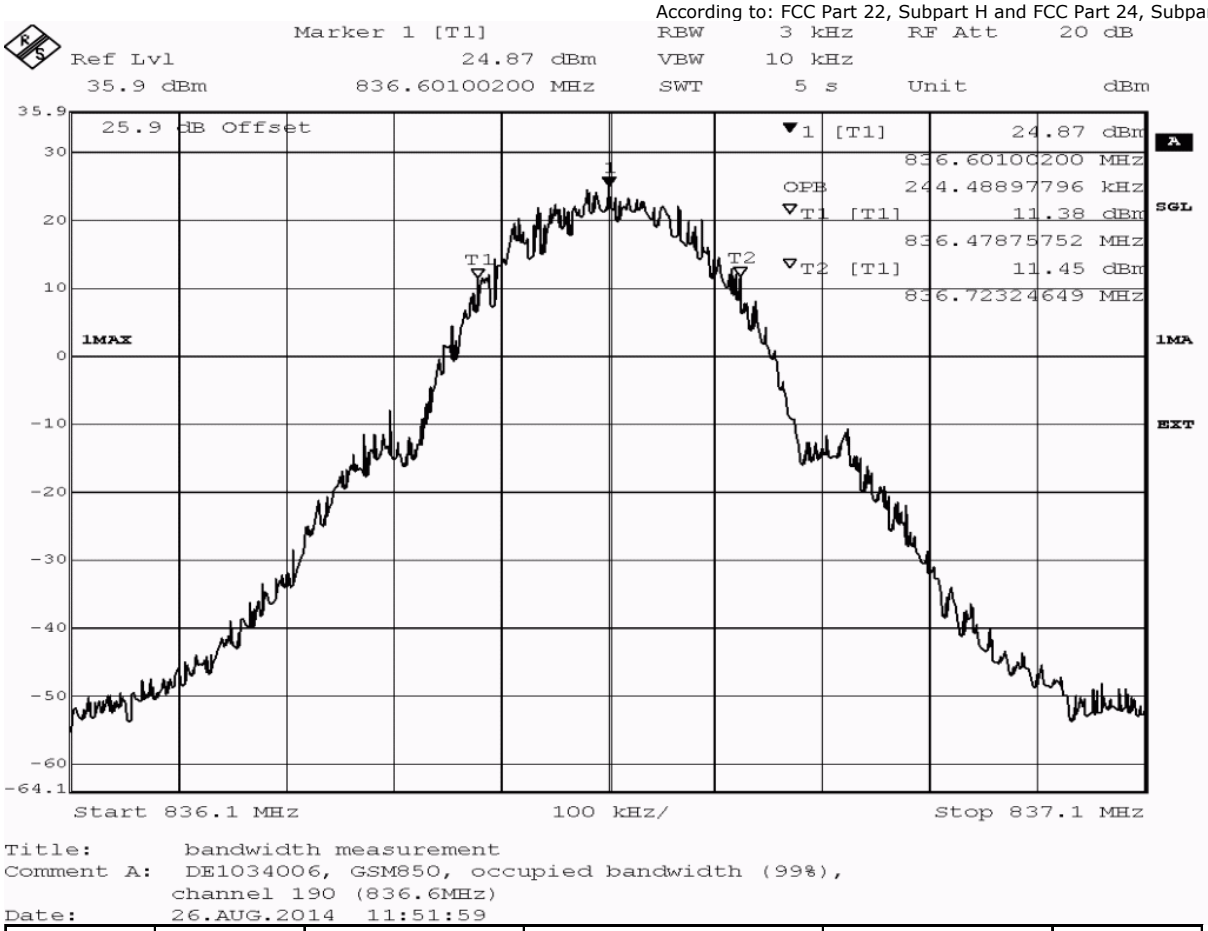
detector	trace	resolution bandwidth /kHz	type of measurement	measured value /kHz	verdict
peak	maxhold	3	-26dB bandwidth	296.6	passed
peak	maxhold	3	99% bandwidth	242.5	passed

Test: 22.5; Frequency Band = 850, Mode = GSM, Channel = 190, Frequency = 836.6MHz

Result:	Passed
Setup No.:	S_AF01
Date of Test:	2014/08/26 11:32
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:



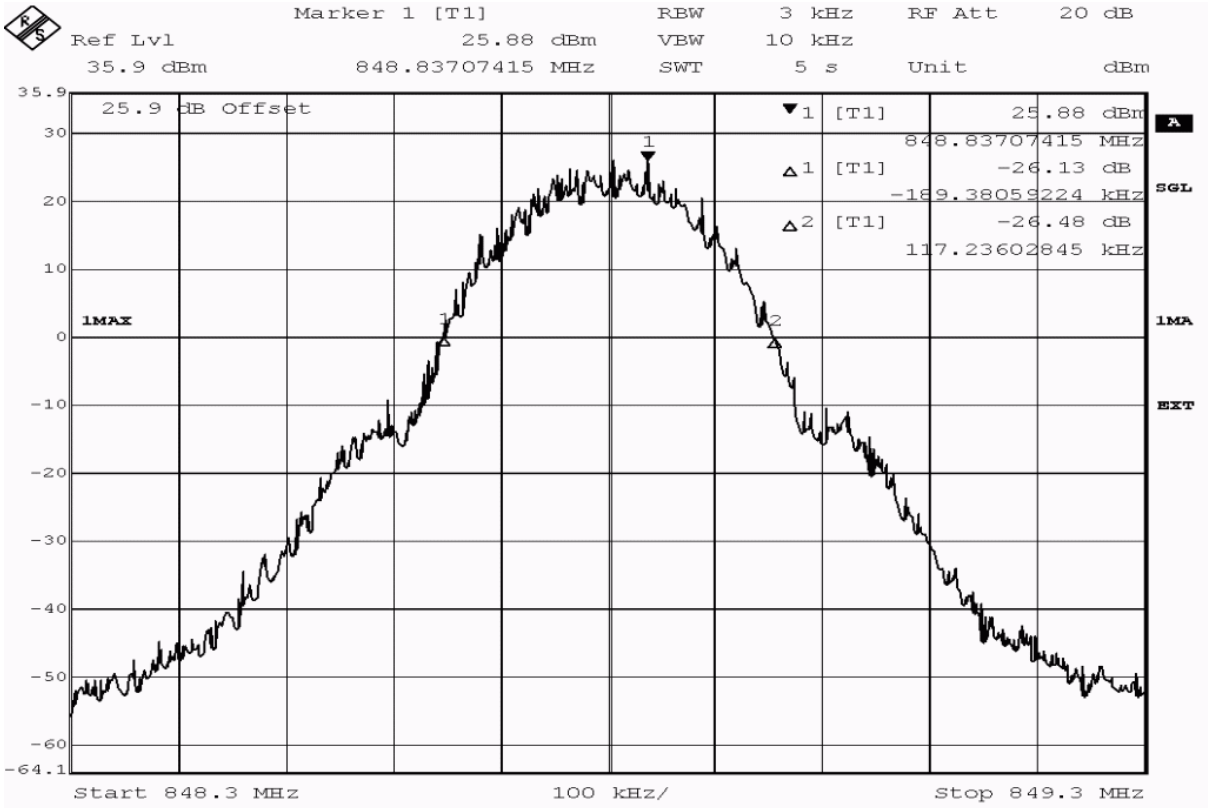


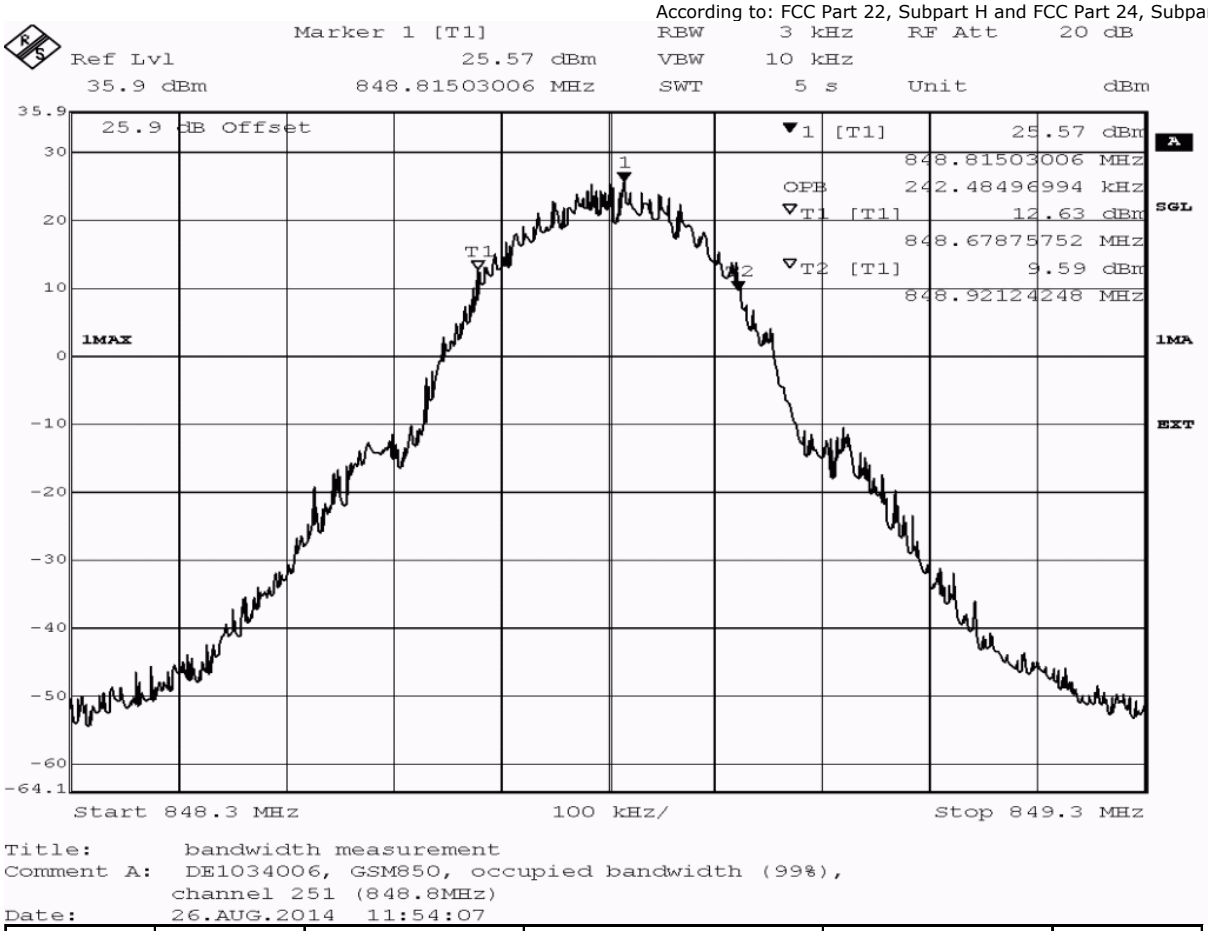
detector	trace	resolution bandwidth /kHz	type of measurement	measured value /kHz	verdict
peak	maxhold	3	-26dB bandwidth	310.6	passed
peak	maxhold	3	99% bandwidth	244.5	passed

Test: 22.5; Frequency Band = 850, Mode = GSM, Channel = 251, Frequency = 848.8MHz

Result:	Passed
Setup No.:	S_AF01
Date of Test:	2014/08/26 11:34
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:





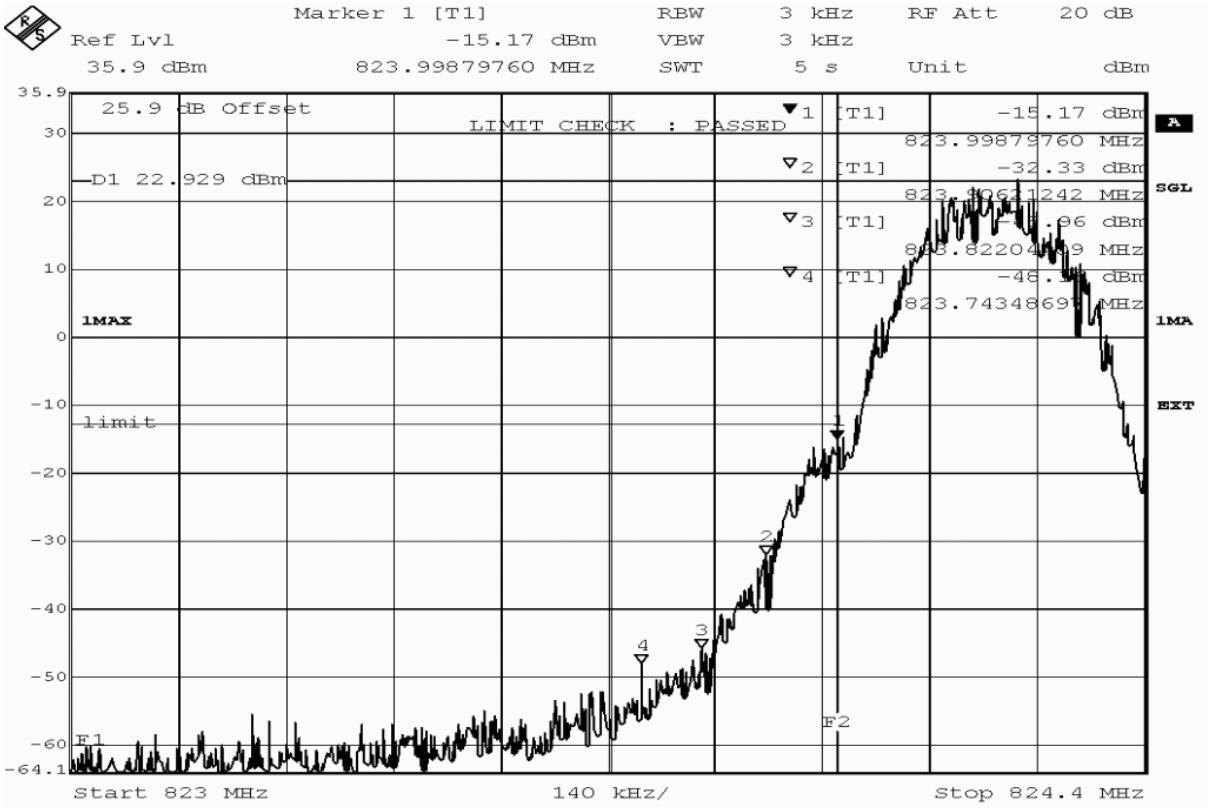
detector	trace	resolution bandwidth /kHz	type of measurement	measured value /kHz	verdict
peak	maxhold	3	-26dB bandwidth	306.6	passed
peak	maxhold	3	99% bandwidth	242.5	passed

3.5.6 22.6 Band edge compliance §2.1053, §22.917

Test: 22.6; Frequency Band = 850, Mode = GSM, Channel = 128, Frequency = 824.2MHz

Result:	Passed
Setup No.:	S_AF01
Date of Test:	2014/08/26 11:36
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:



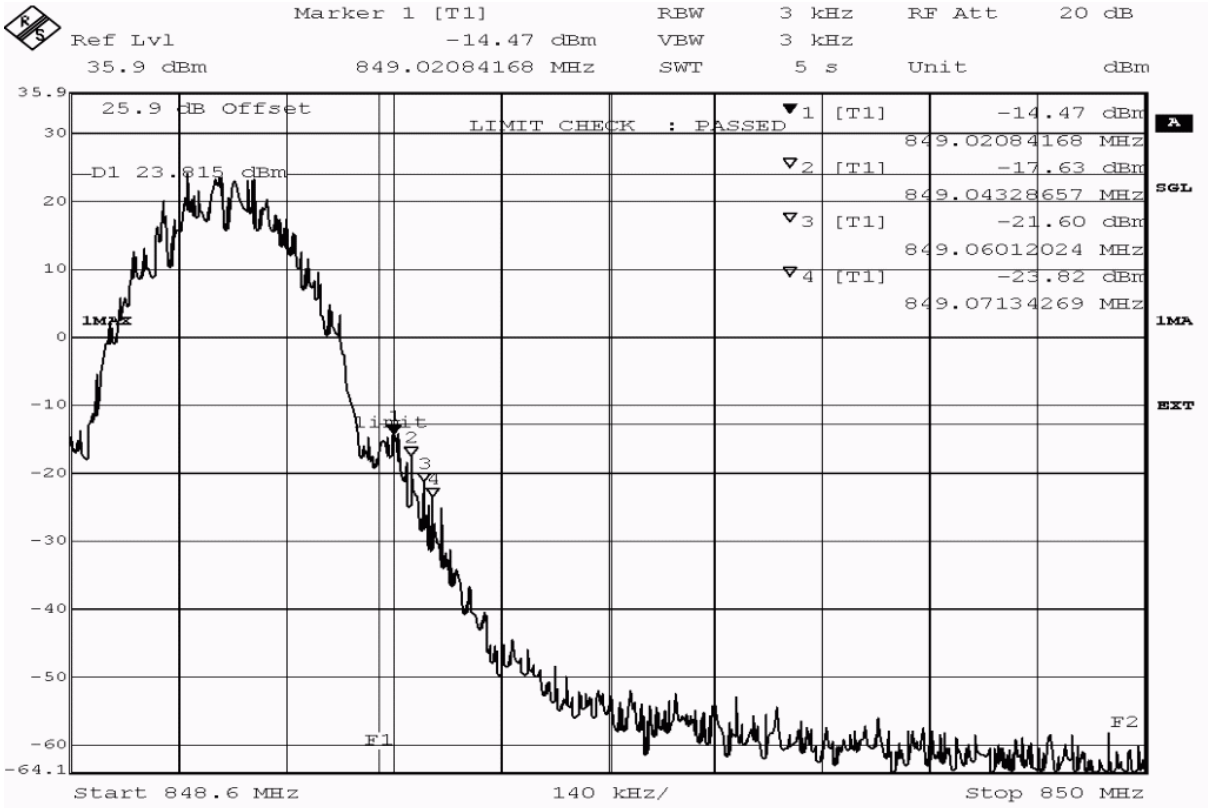
detector	trace	resolution bandwidth /kHz	frequency /MHz	peak value /dBm	margin to limit /dB	limit /dBm	verdict
peak	maxhold	3	823.906	-32.33	19.33	-13	passed
peak	maxhold	3	823.999	-15.17	2.17	-13	passed
average	maxhold	3	823.999	-34.56	21.56	-13	passed
rms	maxhold	3	823.982	-26.60	13.60	-13	passed

no further values have been found by test instrument with a margin of less than 20 dB

Test: 22.6; Frequency Band = 850, Mode = GSM, Channel = 251, Frequency = 848.8MHz

Result:	Passed
Setup No.:	S_AF01
Date of Test:	2014/08/26 11:39
Body:	FCC47CFRChIPART22PUBLIC MOBILE SERVICES
Test Specification:	FCC part 2 and 22

Detailed Results:



detector	trace	resolution bandwidth /kHz	frequency /MHz	peak value /dBm	margin to limit /dB	limit /dBm	verdict
peak	maxhold	3	849.021	-14.47	1.47	-13	passed
peak	maxhold	3	849.043	-17.63	4.63	-13	passed
peak	maxhold	3	849.060	-21.60	8.60	-13	passed
peak	maxhold	3	849.071	-23.82	10.82	-13	passed
average	maxhold	3	849.004	-32.82	19.82	-13	passed
average	maxhold	3	849.015	-32.06	19.06	-13	passed
rms	maxhold	3	849.004	-24.86	11.86	-13	passed
rms	maxhold	3	849.024	-24.10	11.10	-13	passed

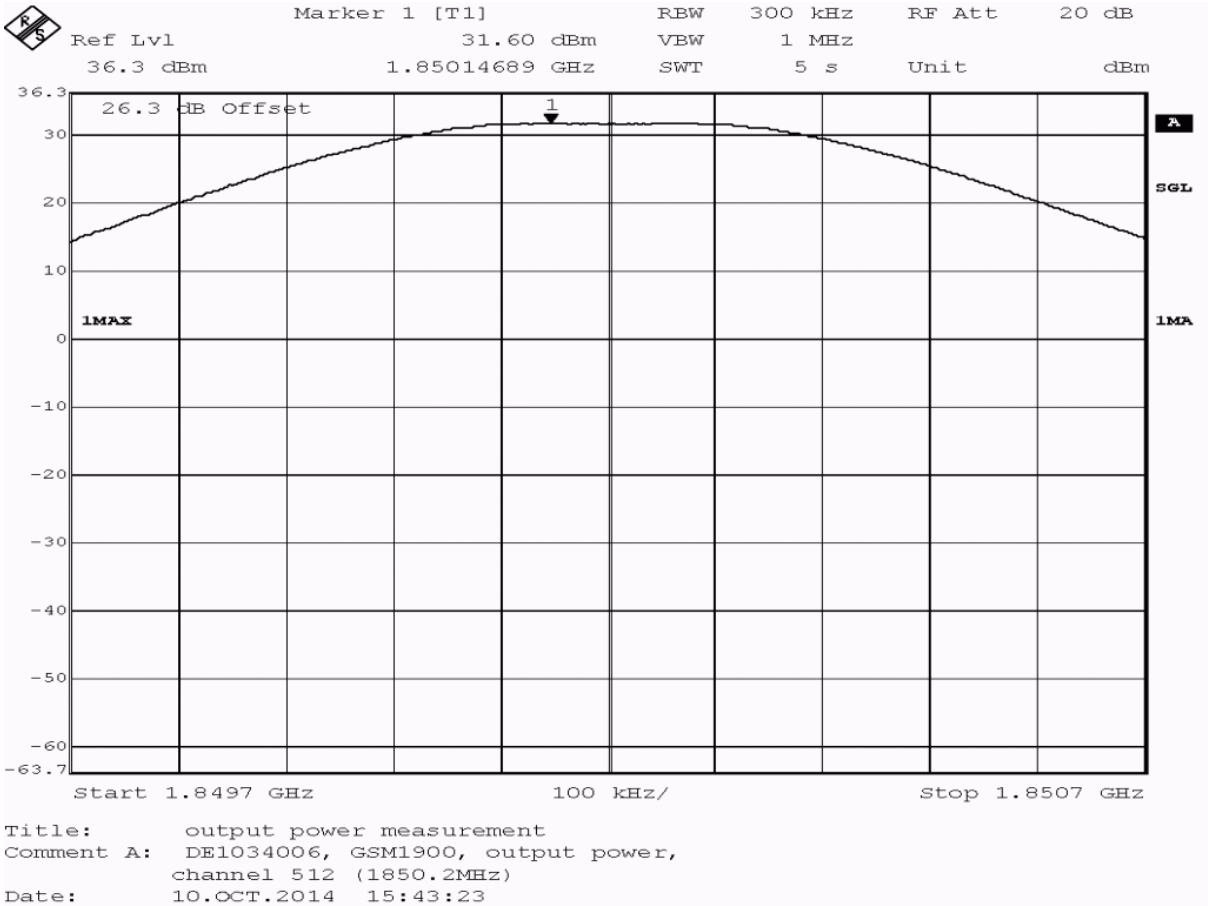
no further values have been found by test instrument with a margin of less than 20 dB

3.5.7 24.1 RF Power Output §2.1046, §24.232

Test: 24.1; Frequency Band = 1900, Mode = GSM, Channel = 512, Frequency = 1850.2MHz, Method = conducted

Result:	Passed
Setup No.:	S_AK02
Date of Test:	2014/10/10 15:24
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:



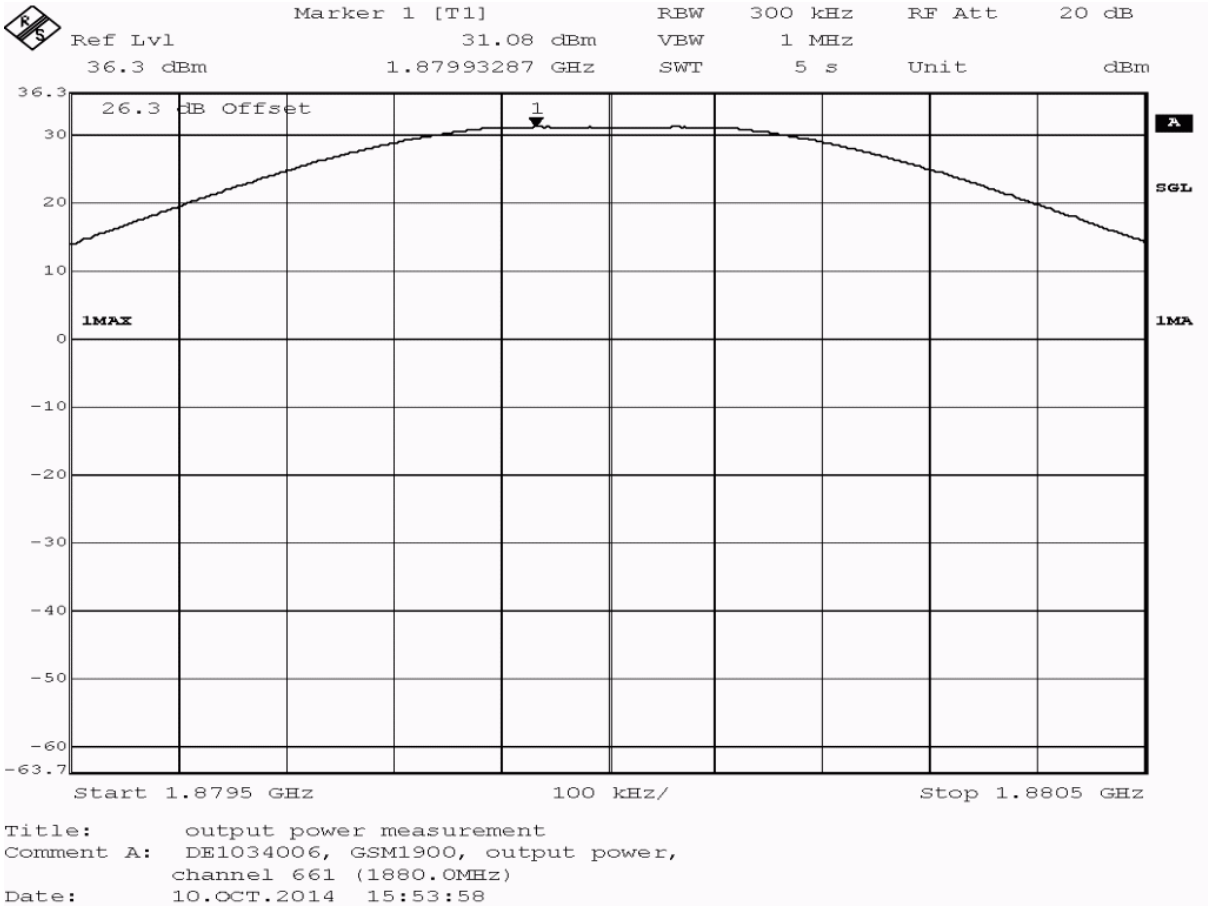
detector	trace	resolution bandwidth /kHz	conducted peak value /dBm	verdict
peak	maxhold	300	31.60	passed
average	maxhold	300	31.17	passed
rms	maxhold	300	31.18	passed

no external antenna gain is specified, the verdict is valid for external antenna gains equal or less than 1.4 dBi

Test: 24.1; Frequency Band = 1900, Mode = GSM, Channel = 661, Frequency = 1880.0MHz, Method = conducted

Result:	Passed
Setup No.:	S_AK02
Date of Test:	2014/10/10 15:35
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:



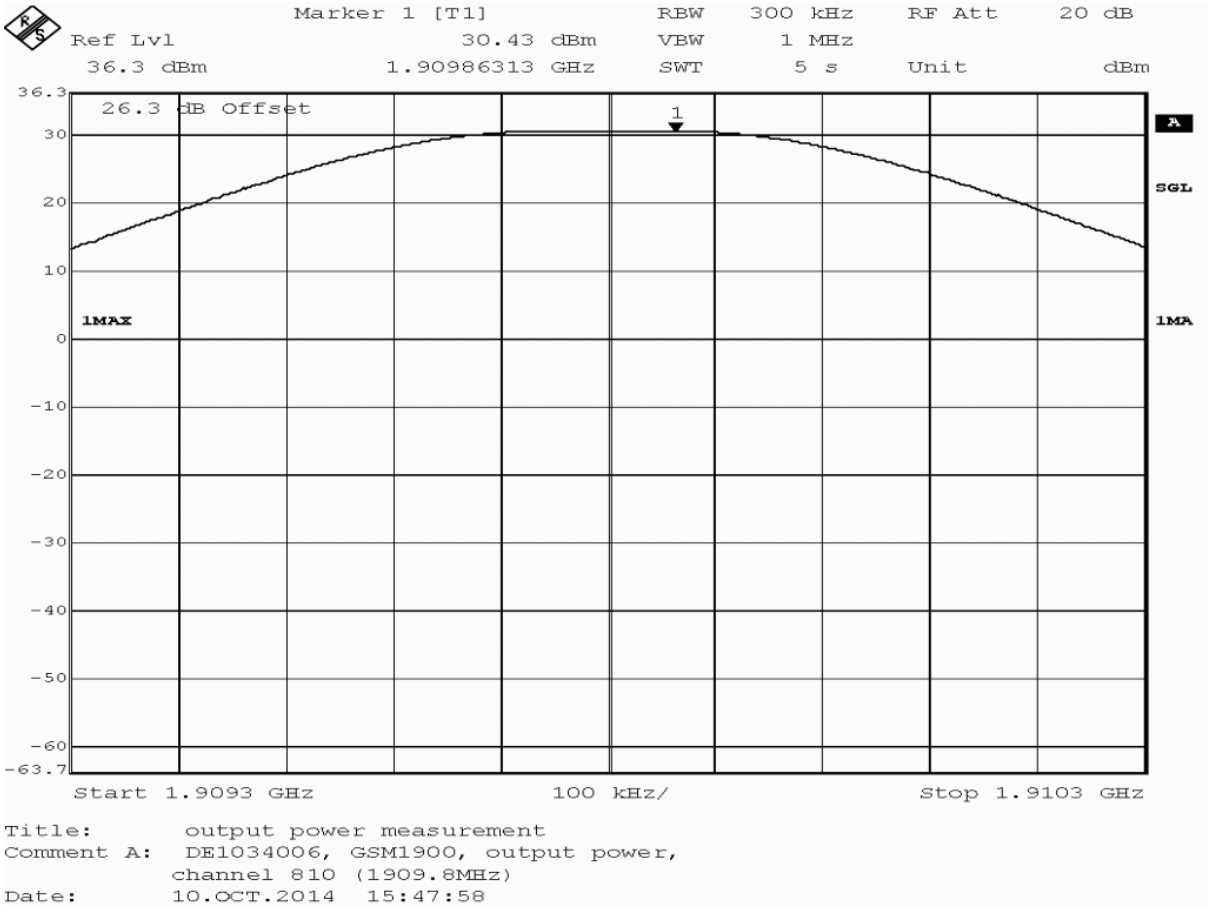
detector	trace	resolution bandwidth /kHz	conducted peak value /dBm	verdict
peak	maxhold	300	31.08	passed
average	maxhold	300	30.68	passed
rms	maxhold	300	30.71	passed

no external antenna gain is specified, the verdict is valid for external antenna gains equal or less than 1.92 dBi

Test: 24.1; Frequency Band = 1900, Mode = GSM, Channel = 810, Frequency = 1909.8MHz, Method = conducted

Result:	Passed
Setup No.:	S_AK02
Date of Test:	2014/10/10 15:29
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:



detector	trace	resolution bandwidth /kHz	conducted peak value /dBm	verdict
peak	maxhold	300	30.43	passed
average	maxhold	300	30.01	passed
rms	maxhold	300	30.02	passed

no external antenna gain is specified, the verdict is valid
for external antenna gains equal or less than
2.57 dBi

3.5.8 24.2 Frequency stability §2.1055, §24.235

Test: 24.2; Frequency Band = 1900, Mode = GSM, Channel = 661, Frequency = 1880.0MHz

Result:	Passed
Setup No.:	S_AF01
Date of Test:	2014/08/28 0:00
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:

Temp. °C	Duration min	Voltage	Limit Hz	Freq. error Average (Hz)	Freq. error Max. (Hz)	Verdict
-30	0	normal	4700	76	146	passed
-30	5			-7	-30	passed
-30	10			-10	-32	passed
-20	0	normal	4700	38	69	passed
-20	5			-12	-27	passed
-20	10			-5	-12	passed
-10	0	normal	4700	5	19	passed
-10	5			1	10	passed
-10	10			-11	-40	passed
0	0	normal	4700	-35	-69	passed
0	5			2	-34	passed
0	10			-9	-18	passed
10	0	normal	4700	-44	-93	passed
10	5			-2	29	passed
10	10			-6	-30	passed
20	0	low	4700	-56	-84	passed
20	5			-6	-26	passed
20	10			-2	-12	passed
20	0	normal = high [1)]	4700	-3	27	passed
20	5			8	-40	passed
20	10			-16	-35	passed
20	0	high	4700	-72	-125	passed
20	5			-8	-22	passed
20	10			-2	31	passed
30	0	normal	4700	1	-136	passed
30	5			-20	-30	passed
30	10			-10	-18	passed
40	0	normal	4700	-37	-98	passed
40	5			-7	-35	passed
40	10			-7	-28	passed
50	0	normal	4700	-40	-105	passed
50	5			-9	-29	passed
50	10			-11	-33	passed

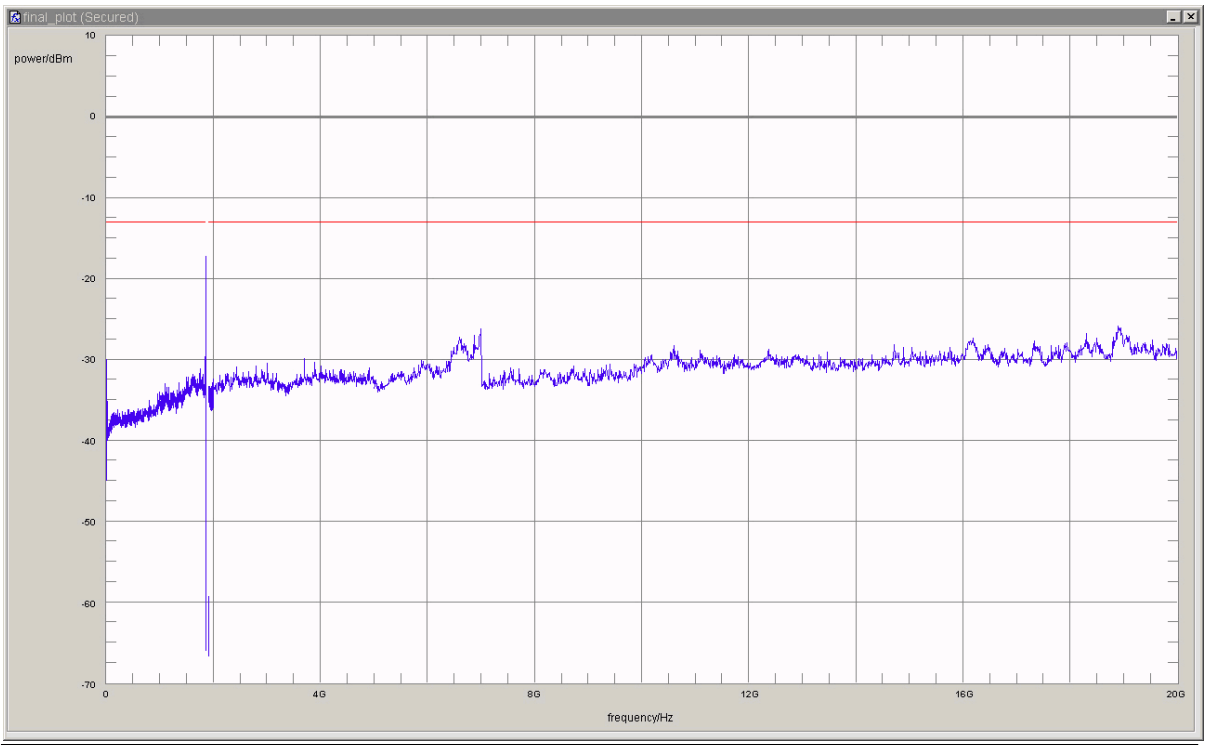
1) The manufacturer declared that normal voltage is equivalent with high voltage.
2) The call is established at high voltage and the voltage is then reduced to the battery operating end.

3.5.9 24.3 Spurious emissions at antenna terminals §2.1051, §24.238

Test: 24.3; Frequency Band = 1900, Mode = GSM, Channel = 512, Frequency = 1850.2MHz

Result:	Passed
Setup No.:	S_AF01
Date of Test:	2014/08/26 12:16
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:



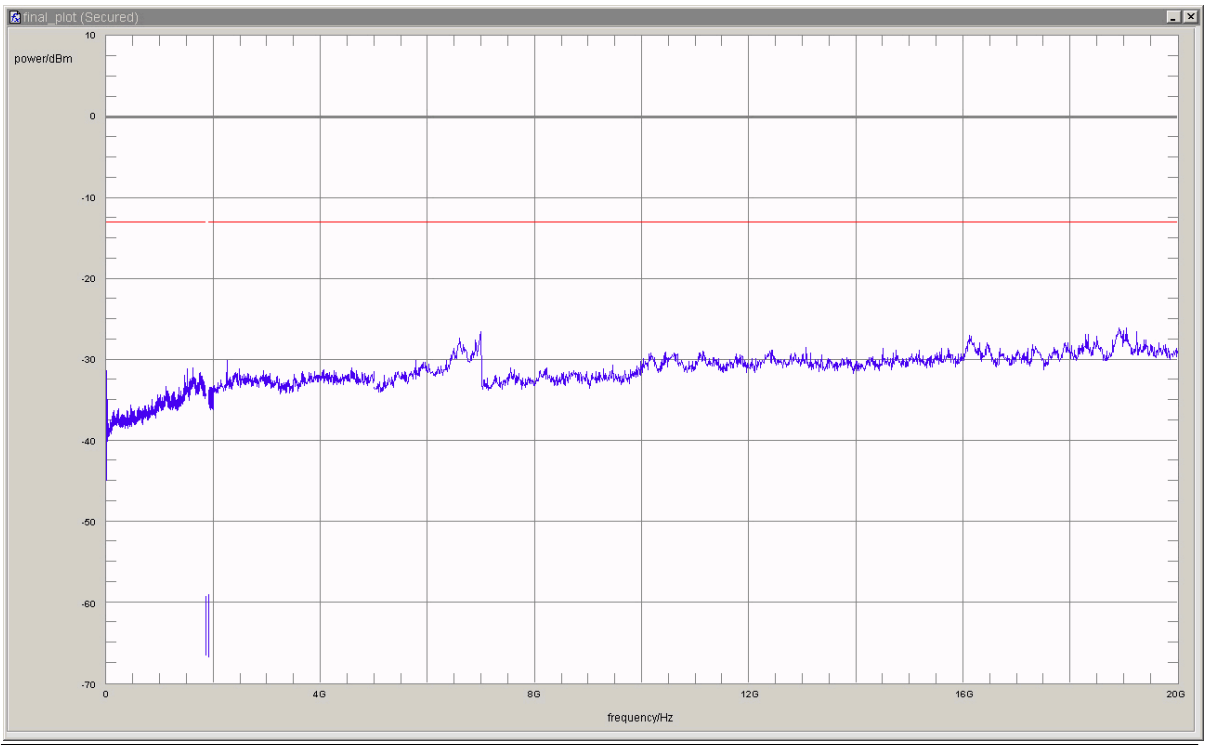
detector	trace	resolution bandwidth /kHz	frequency /MHz	peak value /dBm	margin to limit /dB	limit /dBm	verdict
peak	maxhold	1	0.0095	-31.9	18.9	-13.0	passed
peak	maxhold	1	0.0103	-30.0	17.0	-13.0	passed
peak	maxhold	1	0.0108	-32.4	19.4	-13.0	passed
peak	maxhold	1000	1750.8	-31.1	18.1	-13.0	passed
peak	maxhold	100	1848.53	-29.4	16.4	-13.0	passed
peak	maxhold	3	1849.9098	-32.7	19.7	-13.0	passed
peak	maxhold	3	1849.9238	-28.2	15.2	-13.0	passed
peak	maxhold	3	1849.9800	-17.3	4.3	-13.0	passed
peak	maxhold	3	1849.9940	-18.6	5.6	-13.0	passed
peak	maxhold	1000	1992.5	-32.4	19.4	-13.0	passed
peak	maxhold	1000	3695.4	-29.9	16.9	-13.0	passed
peak	maxhold	1000	6994.0	-26.2	13.2	-13.0	passed
peak	maxhold	1000	14709.4	-28.2	15.2	-13.0	passed
peak	maxhold	1000	18897.8	-25.9	12.9	-13.0	passed

no further values have been found with a margin of less than 20 dB

Test: 24.3; Frequency Band = 1900, Mode = GSM, Channel = 661, Frequency = 1880.0MHz

Result:	Passed
Setup No.:	S_AF01
Date of Test:	2014/08/26 12:12
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:



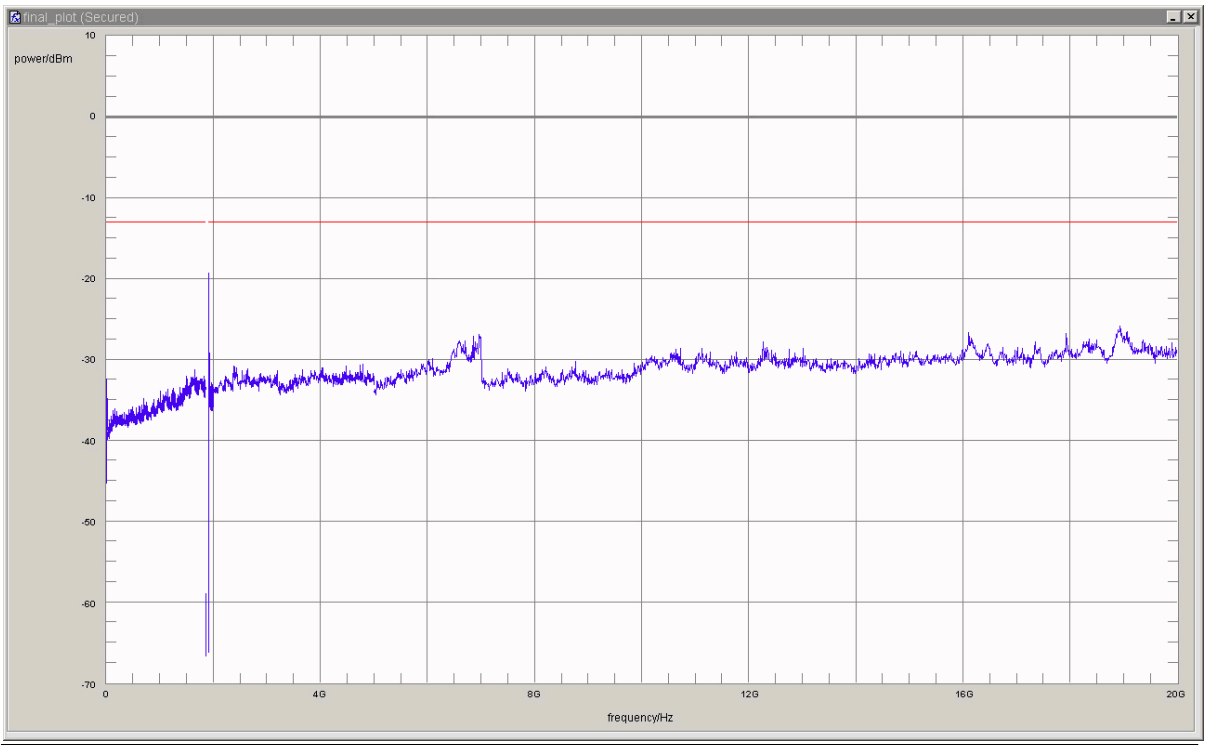
detector	trace	resolution bandwidth /kHz	frequency /MHz	peak value /dBm	margin to limit /dB	limit /dBm	verdict
peak	maxhold	1	0.0097	-31.4	18.4	-13.0	passed
peak	maxhold	1	0.0100	-32.1	19.1	-13.0	passed
peak	maxhold	1000	1617.6	-31.0	18.0	-13.0	passed
peak	maxhold	1000	2246.5	-30.1	17.1	-13.0	passed
peak	maxhold	1000	6994.0	-26.6	13.6	-13.0	passed
peak	maxhold	1000	13066.1	-28.5	15.5	-13.0	passed
peak	maxhold	1000	18907.8	-26.1	13.1	-13.0	passed

no further values have been found with a margin of less than 20 dB

Test: 24.3; Frequency Band = 1900, Mode = GSM, Channel = 810, Frequency = 1909.8MHz

Result:	Passed
Setup No.:	S_AF01
Date of Test:	2014/08/26 12:05
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:



detector	trace	resolution bandwidth /kHz	frequency /MHz	peak value /dBm	margin to limit /dB	limit /dBm	verdict
peak	maxhold	1	0.0103	-32.7	19.7	-13.0	passed
peak	maxhold	1	0.0110	-32.4	19.4	-13.0	passed
peak	maxhold	1	0.0120	-32.7	19.7	-13.0	passed
peak	maxhold	1	0.0158	-32.5	19.5	-13.0	passed
peak	maxhold	1000	1646.5	-31.3	18.3	-13.0	passed
peak	maxhold	3	1910.0000	-21.0	8.0	-13.0	passed
peak	maxhold	3	1910.0200	-19.3	6.3	-13.0	passed
peak	maxhold	3	1910.0541	-26.1	13.1	-13.0	passed
peak	maxhold	3	1910.0661	-26.0	13.0	-13.0	passed
peak	maxhold	3	1910.0882	-32.1	19.1	-13.0	passed
peak	maxhold	100	1918.74	-29.2	16.2	-13.0	passed
peak	maxhold	1000	1954.8	-32.9	19.9	-13.0	passed
peak	maxhold	1000	4783.6	-30.6	17.6	-13.0	passed
peak	maxhold	1000	6963.9	-26.9	13.9	-13.0	passed
peak	maxhold	1000	12264.5	-27.8	14.8	-13.0	passed
peak	maxhold	1000	18927.9	-25.9	12.9	-13.0	passed

no further values have been found with a margin of less than 20 dB

3.5.10 24.4 Field strength of spurious radiation §2.1053, §24.238

Test: 24.4; Frequency Band = 1900, Mode = GSM, Channel = 512, Frequency = 1850.2MHz

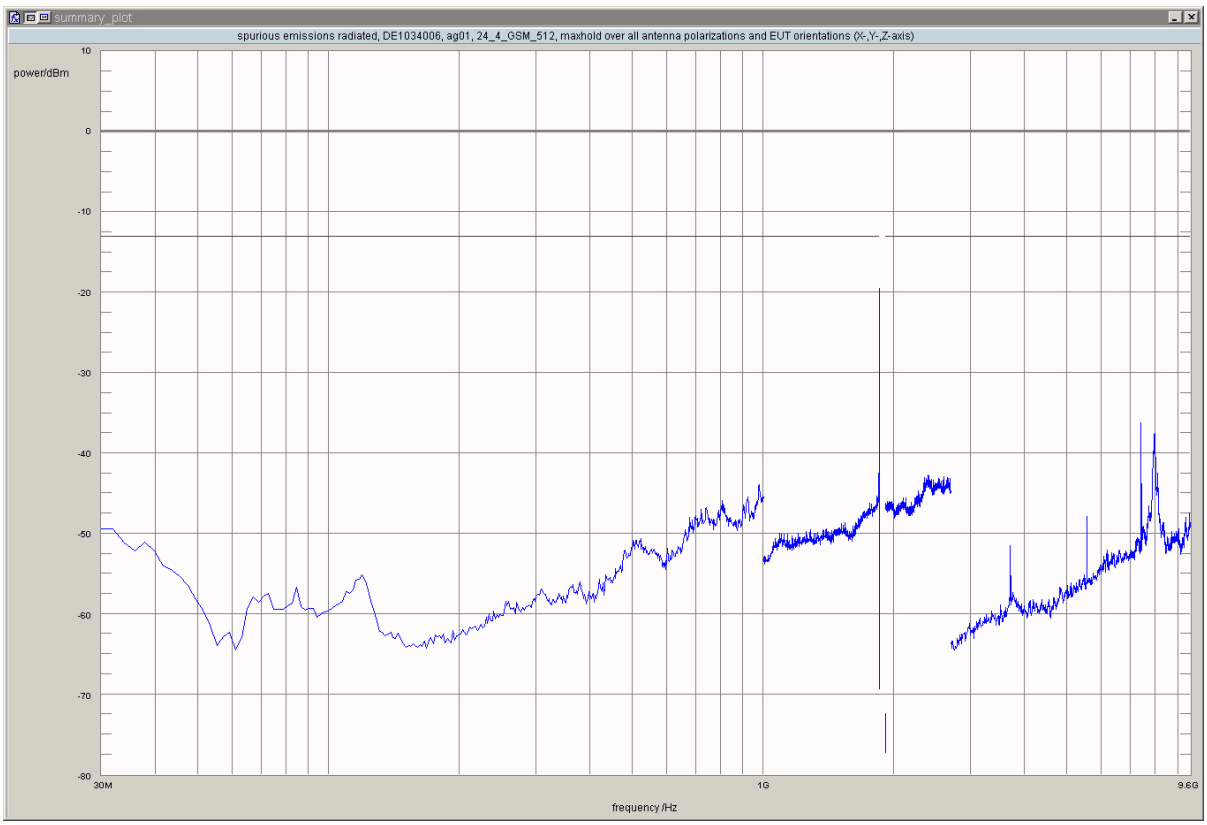
Result:	Passed
Setup No.:	S01_AG01
Date of Test:	2014/10/01 23:58
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:

detector	trace	resolution bandwidth /kHz	frequency /MHz	peak value /dBm	limit /dBm	margin to limit /dB	azimuth /°	antenna polarization	EUT orientation	verdict
peak	maxhold	3	1849.9299	-30.53	-13.00	17.53	135.0	horizontal	vertical	passed
peak	maxhold	3	1849.9359	-30.47	-13.00	17.47	-120.0	vertical	horizontal	passed
peak	maxhold	3	1849.9439	-26.82	-13.00	13.82	135.0	horizontal	vertical	passed
peak	maxhold	3	1849.9539	-32.84	-13.00	19.84	90.0	vertical	vertical	passed
peak	maxhold	3	1849.9739	-22.89	-13.00	9.89	135.0	horizontal	vertical	passed
peak	maxhold	3	1849.9820	-21.78	-13.00	8.78	-60.0	vertical	horizontal	passed
peak	maxhold	3	1849.9980	-19.51	-13.00	6.51	0.0	horizontal	vertical	passed

no further values have been found with a margin of less than 20 dB

tested up to the 5th harmonic

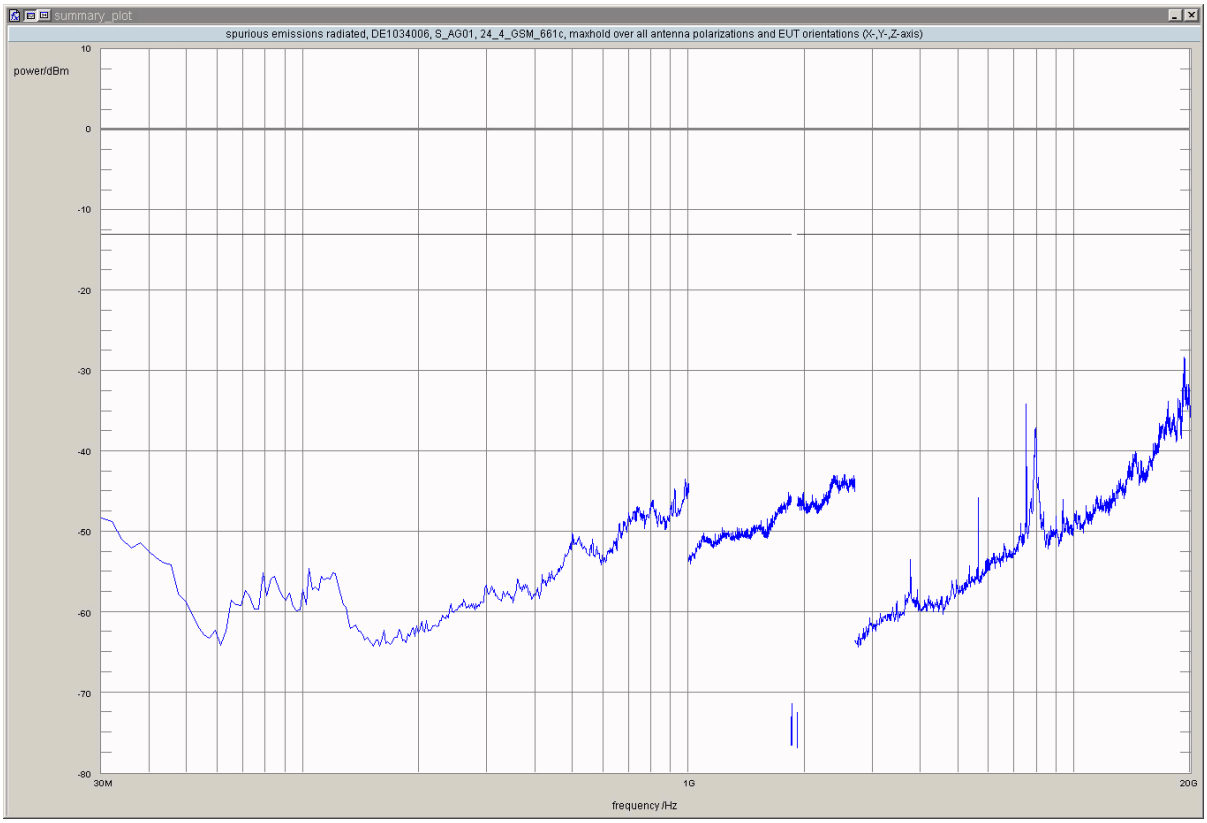


tested up to the 5th harmonic

Test: 24.4; Frequency Band = 1900, Mode = GSM, Channel = 661, Frequency = 1880.0MHz

Result:	Passed
Setup No.:	S01_AG01
Date of Test:	2014/09/20 0:48
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:



detector	trace	resolution bandwidth /kHz	frequency /MHz	peak value /dBm	limit /dBm	margin to limit /dB	azimuth /°	antenna polarization	EUT orientation	verdict
peak	maxhold	1000	19228.5	-28.33	-13.00	15.33	135.0	vertical	vertical	passed
peak	maxhold	1000	19312.6	-28.95	-13.00	15.95	120.0	vertical	horizontal	passed
peak	maxhold	1000	19326.7	-28.46	-13.00	15.46	-135.0	vertical	vertical	passed

no further values have been found with a margin of less than 20 dB

Test: 24.4; Frequency Band = 1900, Mode = GSM, Channel = 810, Frequency = 1909.8MHz

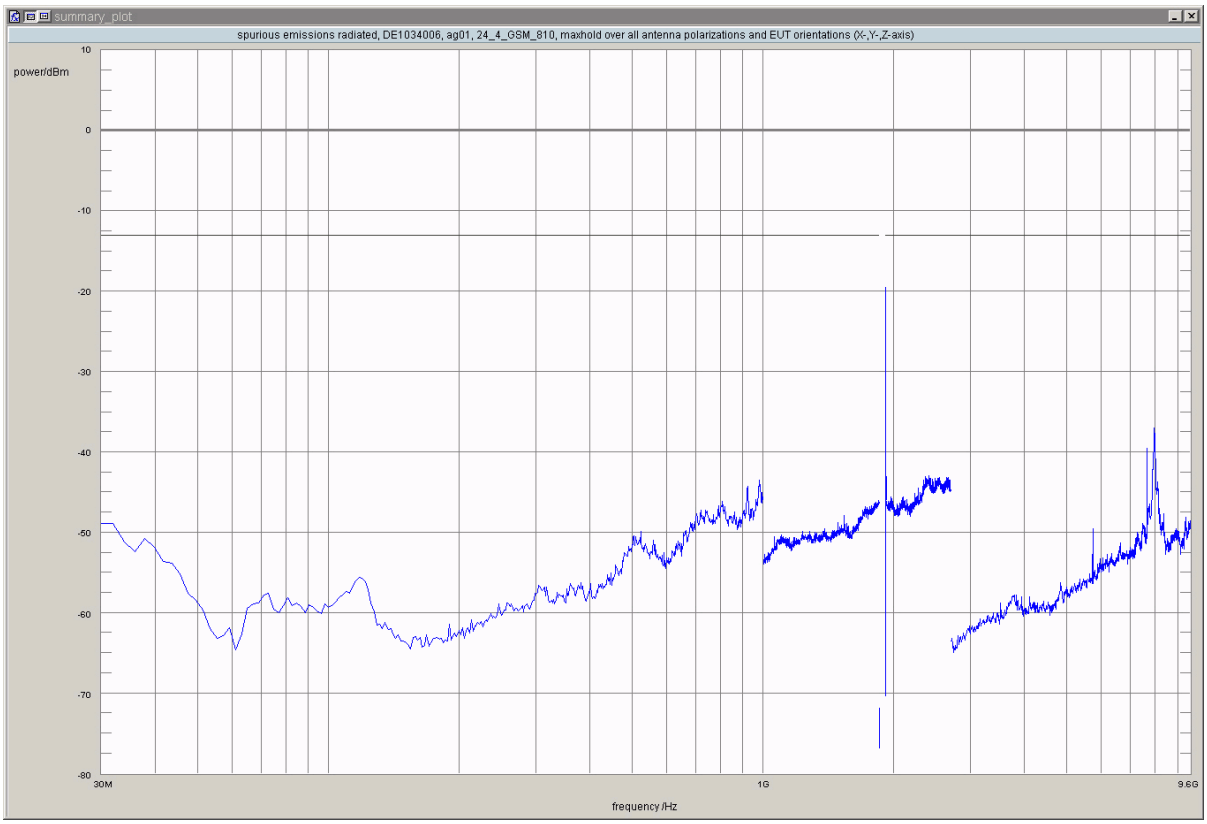
Result:	Passed
Setup No.:	S01_AG01
Date of Test:	2014/10/02 0:01
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:

detector	trace	resolution bandwidth /kHz	frequency /MHz	peak value /dBm	limit /dBm	margin to limit /dB	azimuth /°	antenna polarization	EUT orientation	verdict
peak	maxhold	3	1910.0200	-19.53	-13.00	6.53	135.0	horizontal	vertical	passed
peak	maxhold	3	1910.0301	-24.68	-13.00	11.68	135.0	horizontal	vertical	passed
peak	maxhold	3	1910.0441	-25.34	-13.00	12.34	-180.0	vertical	horizontal	passed
peak	maxhold	3	1910.0481	-26.32	-13.00	13.32	-180.0	horizontal	vertical	passed
peak	maxhold	3	1910.0601	-29.72	-13.00	16.72	-120.0	vertical	horizontal	passed
peak	maxhold	3	1910.0701	-29.96	-13.00	16.96	135.0	horizontal	vertical	passed
peak	maxhold	3	1910.0802	-32.07	-13.00	19.07	-120.0	vertical	horizontal	passed

no further values have been found with a margin of less than 20 dB

tested up to the 5th harmonic



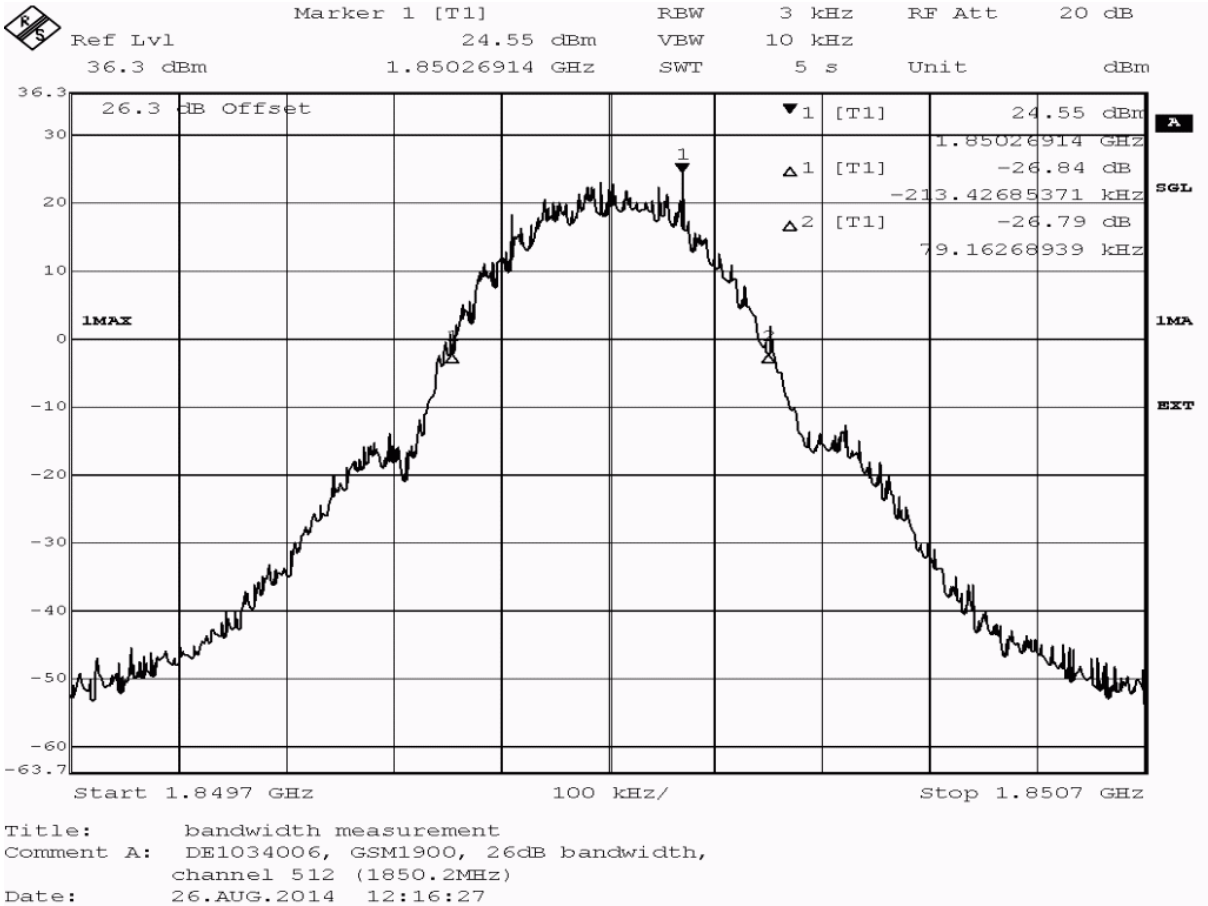
tested up to the 5th harmonic

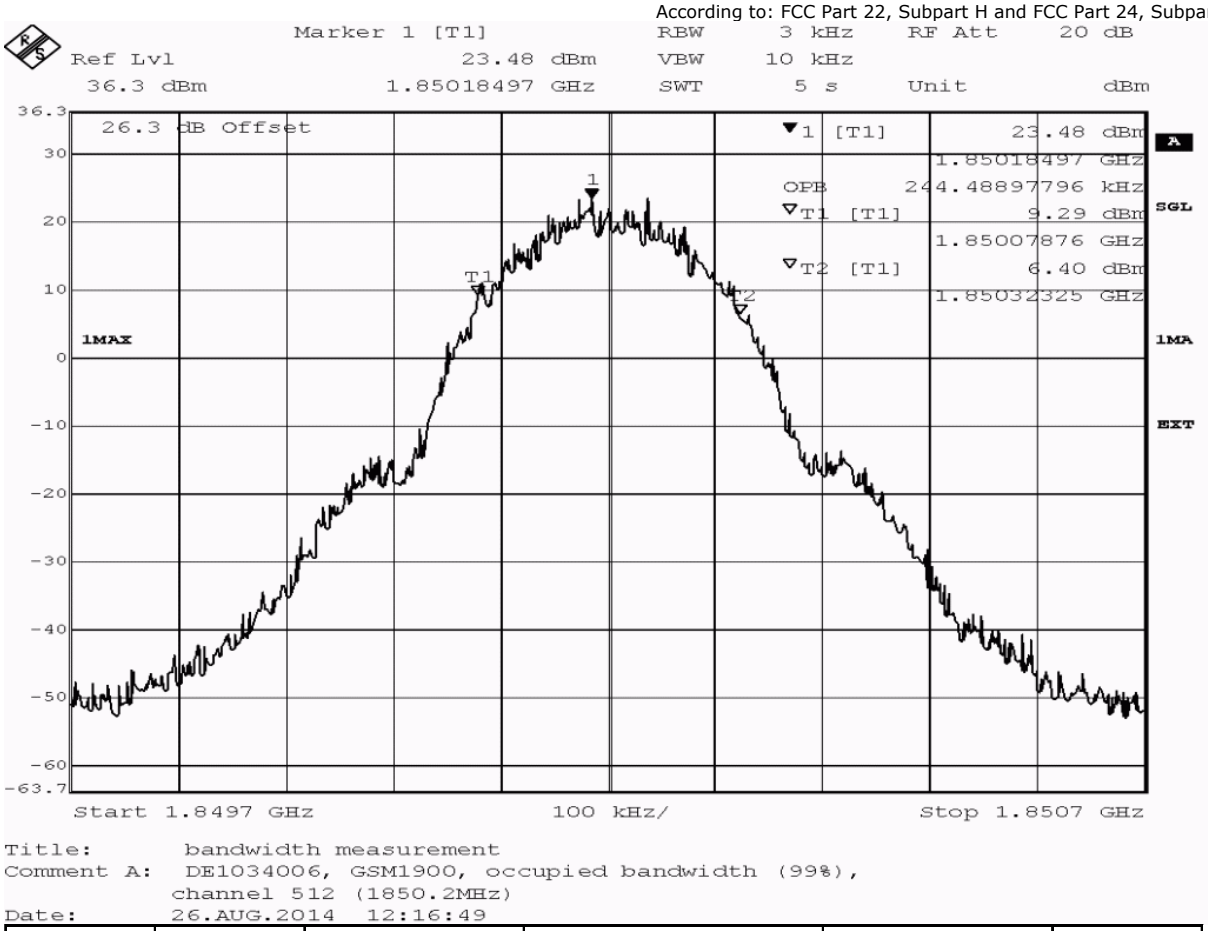
3.5.11 24.5 Emission and Occupied Bandwidth §2.1049, §24.238

Test: 24.5; Frequency Band = 1900, Mode = GSM, Channel = 512, Frequency = 1850.2MHz

Result:	Passed
Setup No.:	S_AF01
Date of Test:	2014/08/26 11:57
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:



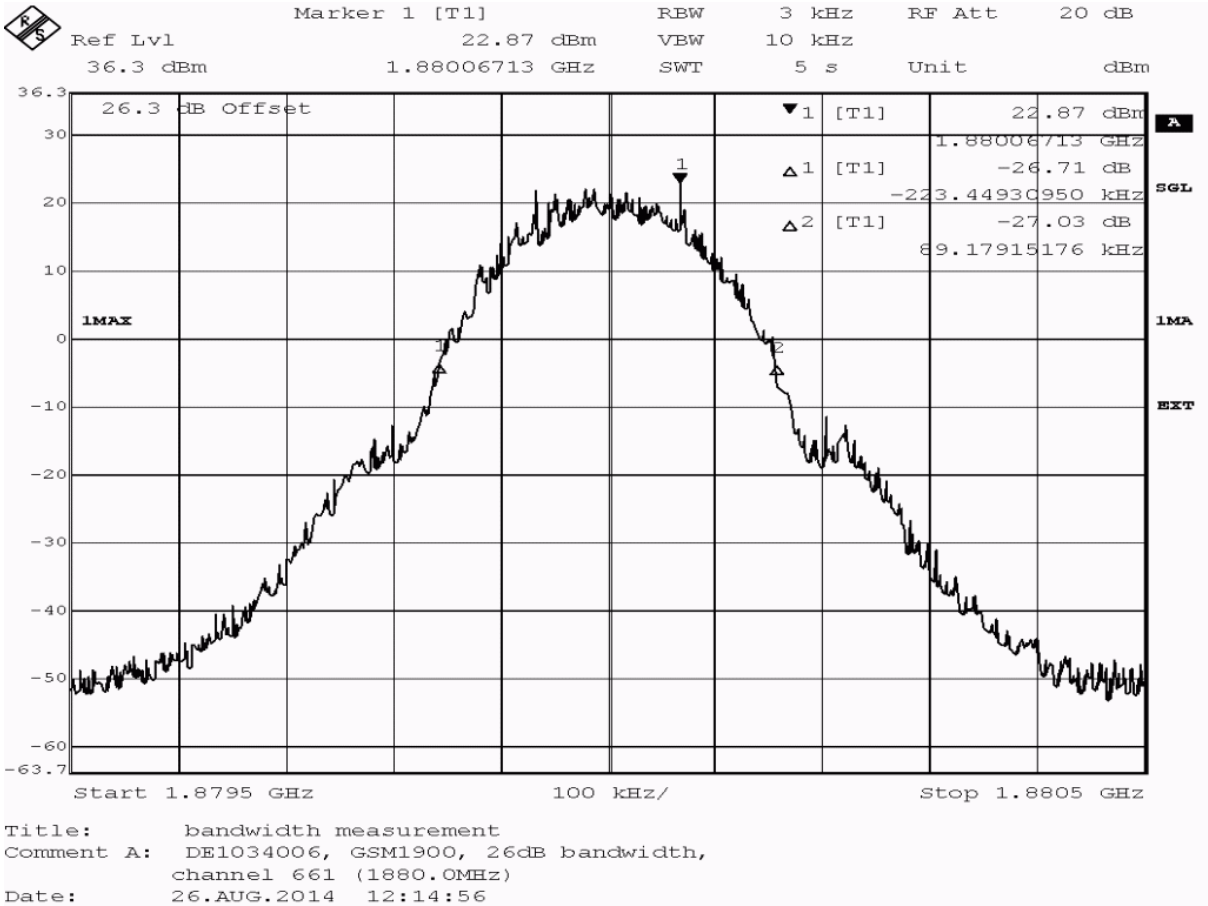


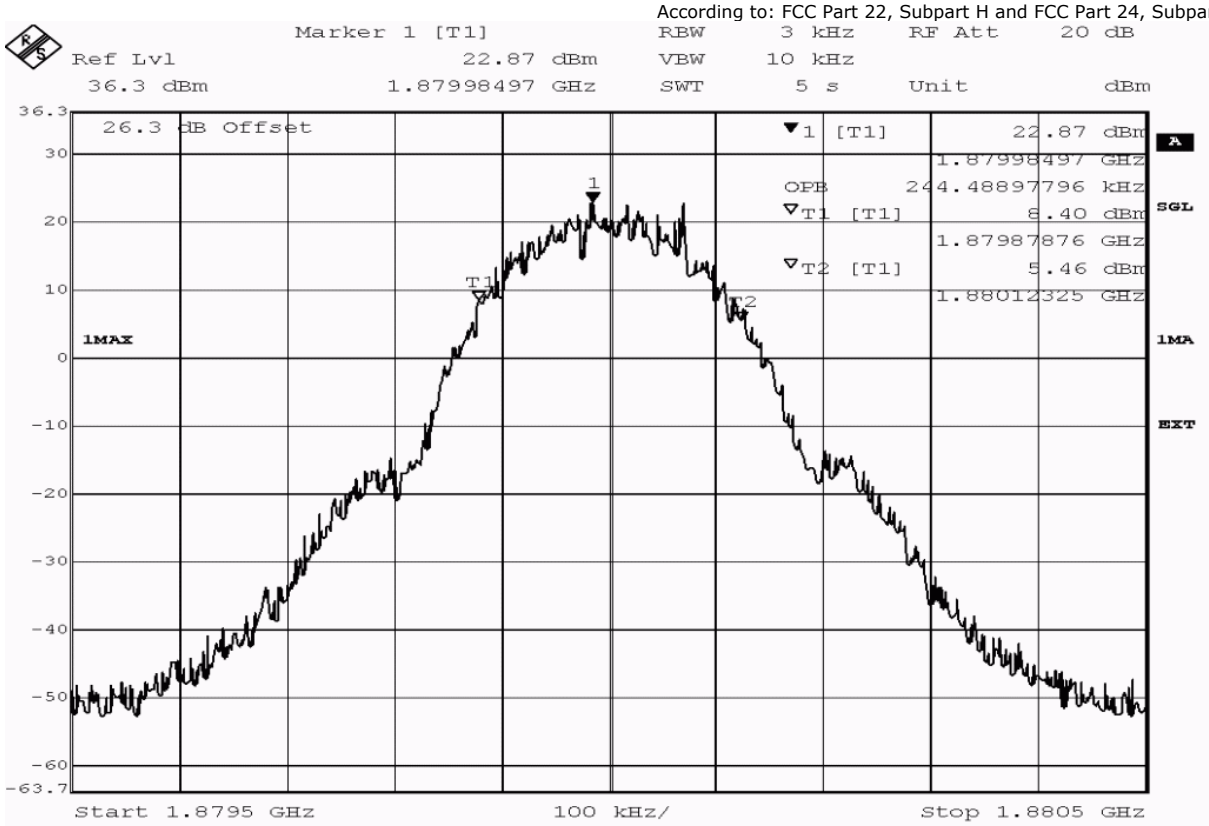
detector	trace	resolution bandwidth /kHz	type of measurement	measured value /kHz	verdict
peak	maxhold	3	-26dB bandwidth	292.6	passed
peak	maxhold	3	99% bandwidth	244.5	passed

Test: 24.5; Frequency Band = 1900, Mode = GSM, Channel = 661, Frequency = 1880.0MHz

Result:	Passed
Setup No.:	S_AF01
Date of Test:	2014/08/26 11:55
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:



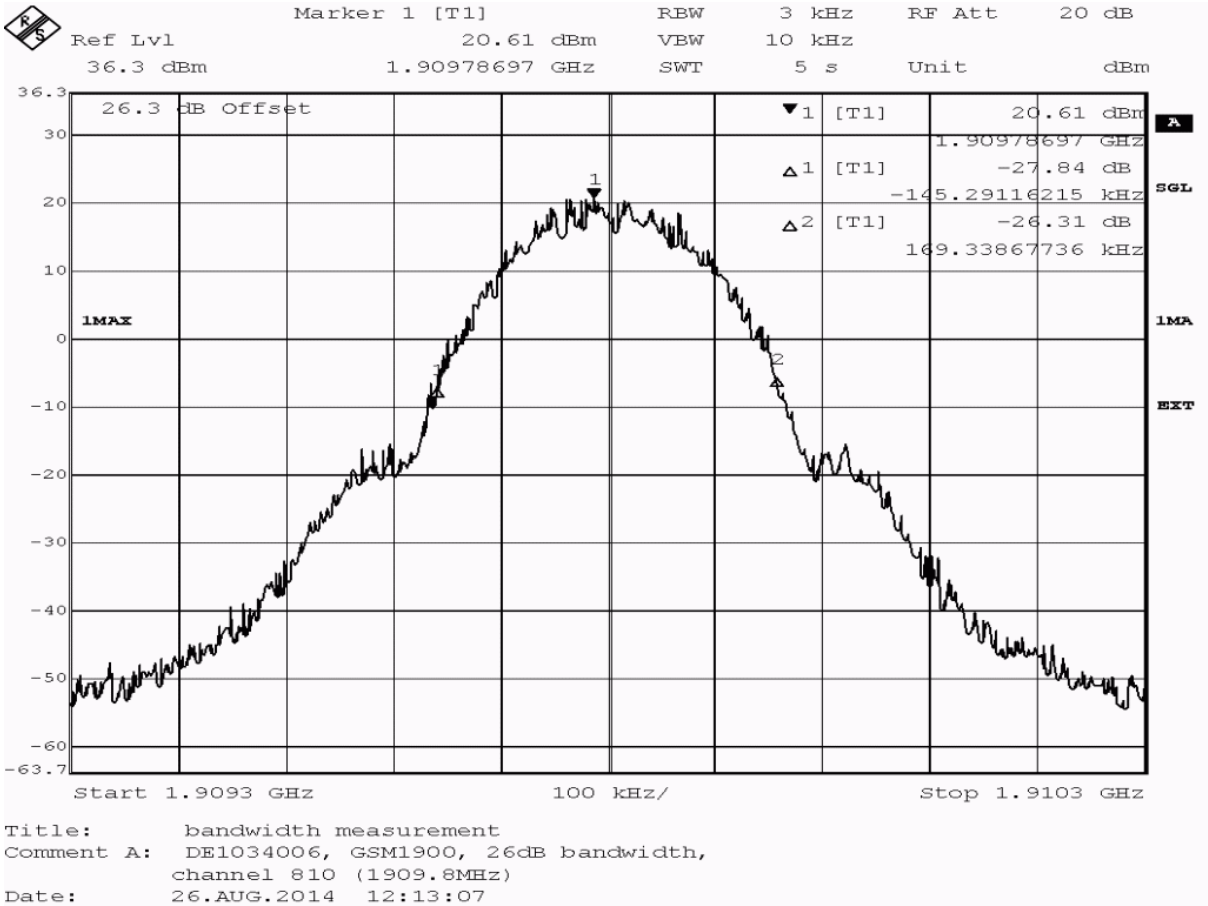


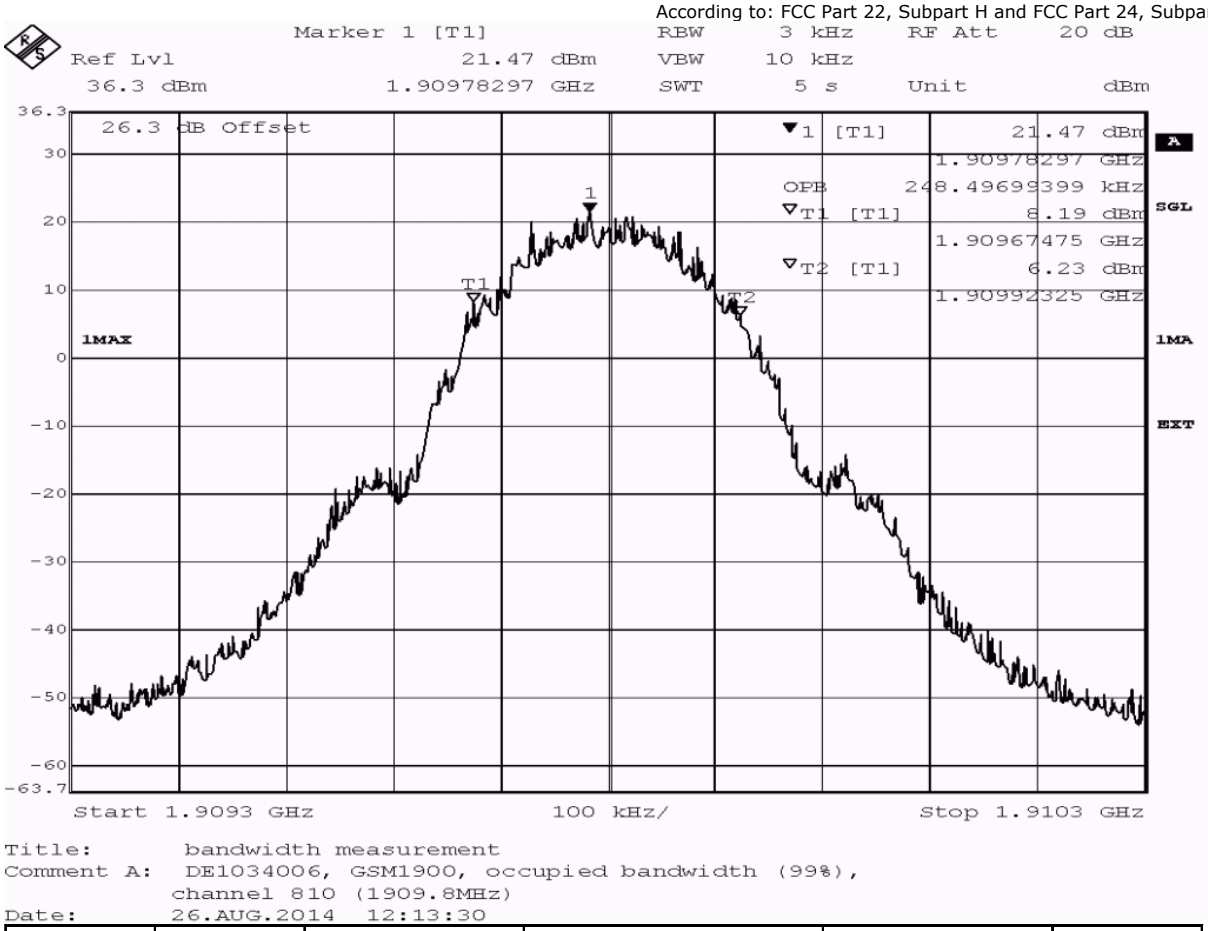
detector	trace	resolution bandwidth /kHz	type of measurement	measured value /kHz	verdict
peak	maxhold	3	-26dB bandwidth	312.6	passed
peak	maxhold	3	99% bandwidth	244.5	passed

Test: 24.5; Frequency Band = 1900, Mode = GSM, Channel = 810, Frequency = 1909.8MHz

Result:	Passed
Setup No.:	S_AF01
Date of Test:	2014/08/26 11:53
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:





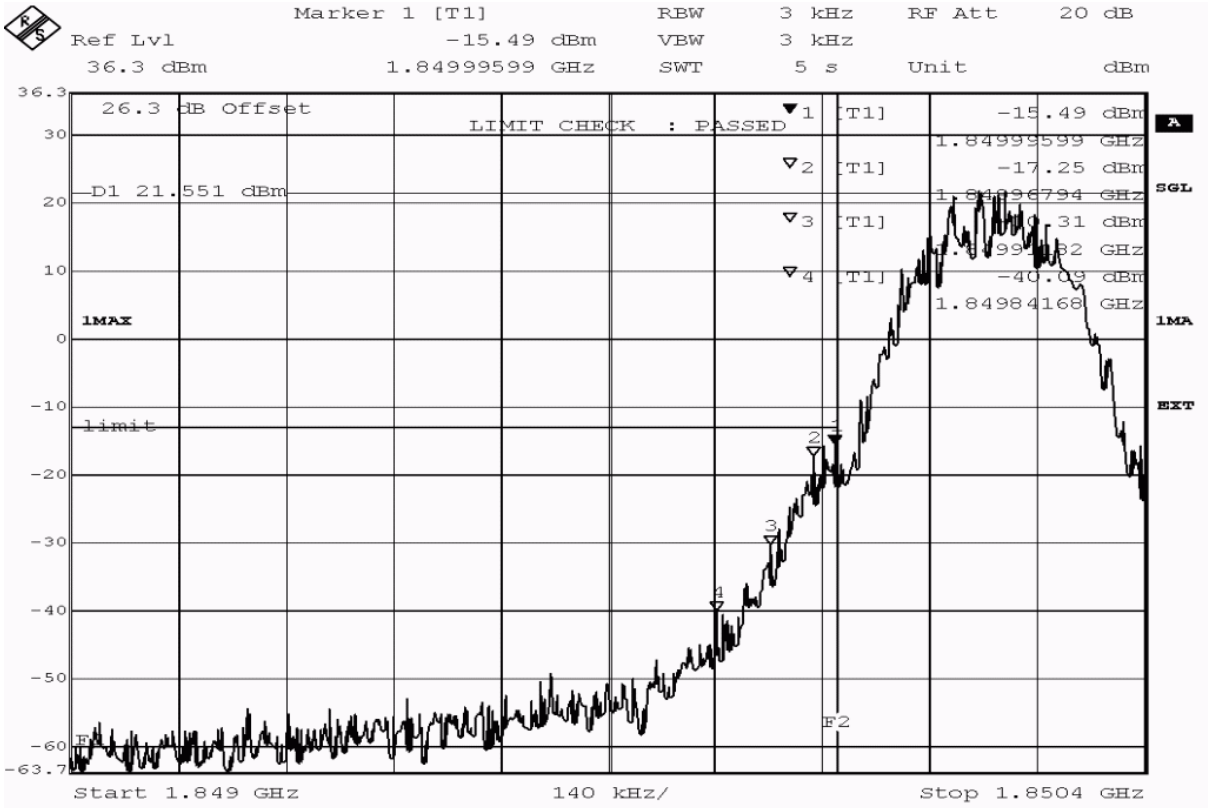
detector	trace	resolution bandwidth /kHz	type of measurement	measured value /kHz	verdict
peak	maxhold	3	-26dB bandwidth	314.6	passed
peak	maxhold	3	99% bandwidth	248.5	passed

3.5.12 24.6 Band edge compliance §2.1053, §24.238

Test: 24.6; Frequency Band = 1900, Mode = GSM, Channel = 512, Frequency = 1850.2MHz

Result:	Passed
Setup No.:	S_AF01
Date of Test:	2014/08/26 11:58
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:



Title: band edge compliance measurement
Comment A: DE1034006, GSM1900, band edge compliance, channel 512 (1850.2MHz)
Date: 26.AUG.2014 12:17:30

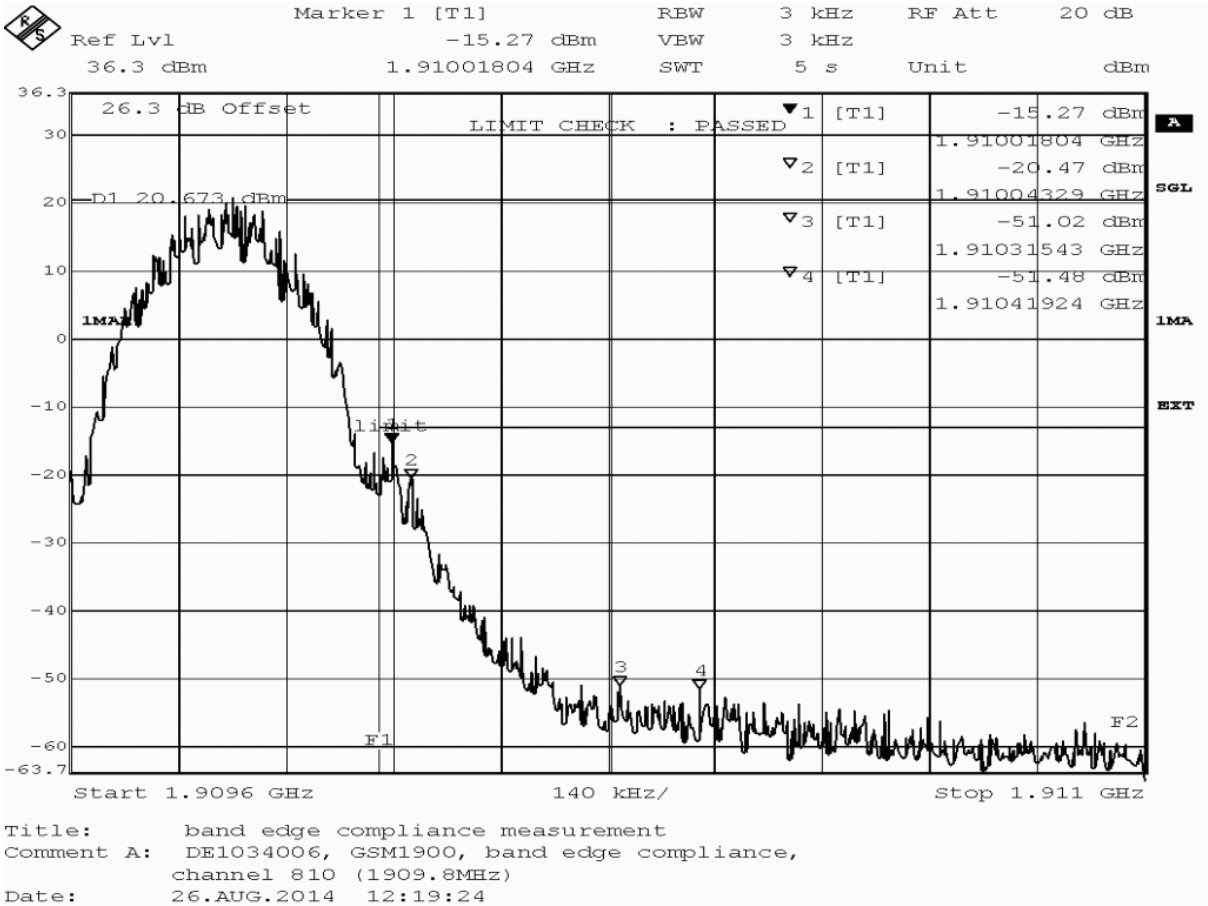
detector	trace	resolution bandwidth /kHz	frequency /MHz	peak value /dBm	margin to limit /dB	limit /dBm	verdict
peak	maxhold	3	1849.912	-30.31	17.31	-13	passed
peak	maxhold	3	1849.968	-17.25	4.25	-13	passed
peak	maxhold	3	1849.996	-15.49	2.49	-13	passed
average	maxhold	3	1849.990	-36.34	23.34	-13	passed
rms	maxhold	3	1849.996	-27.67	14.67	-13	passed

no further values have been found by test instrument with a margin of less than 20 dB

Test: 24.6; Frequency Band = 1900, Mode = GSM, Channel = 810, Frequency = 1909.8MHz

Result:	Passed
Setup No.:	S_AF01
Date of Test:	2014/08/26 12:00
Body:	FCC47CFRChIPART24PERSONAL COMMUNICATIONS SERVICES
Test Specification:	FCC part 2 and 24

Detailed Results:



detector	trace	resolution bandwidth /kHz	frequency /MHz	peak value /dBm	margin to limit /dB	limit /dBm	verdict
peak	maxhold	3	1910.018	-15.27	2.27	-13	passed
peak	maxhold	3	1910.043	-20.47	7.47	-13	passed
average	maxhold	3	1910.018	-35.74	22.74	-13	passed
rms	maxhold	3	1910.021	-28.14	15.14	-13	passed

no further values have been found by test instrument with a margin of less than 20 dB

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 1**
Manufacturer:	Frankonia
Description:	Anechoic Chamber for radiated testing
Type:	10.58x6.38x6.00 m³

Calibration Details	*Last Execution*	*Next Exec.*
NSA (FCC)	2014/01/09	2017/01/09

Single Devices for Anechoic Chamber

Single Device Name	*Type*	*Serial Number*	*Manufacturer*
Air compressor	none	-	Atlas Copco
Anechoic Chamber	10.58 x 6.38 x 6.00 m³	none	Frankonia

Calibration Details	*Last Execution*	*Next Exec.*
FCC listing 96716 3m Part15/18	2014/01/09	2017/01/08

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 Radiated emissions

Lab ID:	**Lab 1**
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	
Biconical dipole	VUBA 9117	9117-108	Schwarzbeck	
	Calibration Details		*Last Execution*	*Next Exec.*
	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	
Double-ridged horn	HF 906	357357/001	Rohde & Schwarz GmbH & Co. KG	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard Calibration		2012/05/18	2015/05/17
Double-ridged horn	HF 906	357357/002	Rohde & Schwarz GmbH & Co. KG	
	Calibration Details		*Last Execution*	*Next Exec.*
	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	
	Calibration Details		*Last Execution*	*Next Exec.*
	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	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard calibration		2011/10/27	2014/10/26
Pyramidal Horn Antenna 26,5 GHz	3160-09	00083069	EMCO Elektronik GmbH	

Single Devices for Auxiliary Equipment for Radiated emissions (continued)

Single Device Name	*Type*	*Serial Number*	*Manufacturer*
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 1, Lab 2**
Manufacturer:	see single devices
Description:	Single Devices for various Test Equipment
Type:	various
Serial Number:	none

Single Devices for Auxiliary Test Equipment

Single Device Name	*Type*	*Serial Number*	*Manufacturer*	
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.	
	Calibration Details		*Last Execution*	*Next Exec.*
	Customized calibration		2013/12/04	2015/12/03
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	
Signal Analyzer	FSV30	103005	Rohde & Schwarz GmbH & Co. KG	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard		2014/02/10	2016/02/09
Spectrum Analyser	FSP3	836722/011	Rohde & Schwarz GmbH & Co. KG	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard		2012/06/13	2015/06/12
Spectrum Analyser	FSU26	200418	Rohde & Schwarz GmbH & Co.KG	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard calibration		2014/07/29	2015/07/28
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	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard calibration		2011/11/24	2014/11/23
CMW500	CMW500	107500	Rohde & Schwarz GmbH & Co.KG	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard calibration		2014/01/27	2016/01/26
Digital Radio Communication Tester	CMD 55	831050/020	Rohde & Schwarz GmbH & Co. KG	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard calibration		2011/11/28	2014/11/27
Universal Radio Communication Tester	CMU 200	102366	Rohde & Schwarz GmbH & Co. KG	
	HW/SW Status		*Date of Start*	*Date of End*
	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	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard calibration		2011/12/07	2014/12/06
	HW/SW Status		*Date of Start*	*Date of End*
	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**
Description:	Equipment for emission measurements
Serial Number:	see single devices

Single Devices for Emission measurement devices

Single Device Name	*Type*	*Serial Number*	*Manufacturer*	
Personal Computer	Dell	30304832059	Dell	
Power Meter	NRVD	828110/016	Rohde & Schwarz GmbH & Co.KG	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard calibration		2014/05/13	2015/05/12
Sensor Head A	NRV-Z1	827753/005	Rohde & Schwarz GmbH & Co.KG	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard calibration		2014/05/13	2015/05/12
Signal Generator	SMR 20	846834/008	Rohde & Schwarz GmbH & Co. KG	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard Calibration		2014/06/24	2017/06/23
Spectrum Analyzer	ESIB 26	830482/004	Rohde & Schwarz GmbH & Co. KG	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard Calibration		2014/01/07	2016/01/31
	HW/SW Status		*Date of Start*	*Date of End*
	Firmware-Update 4.34.4 from 3.45 during calibration		2009/12/03	

Test Equipment Radio Lab Test Equipment

Lab ID: **Lab 2**
Description: Radio Lab Test Equipment

Single Devices for Radio Lab Test Equipment

Single Device Name	*Type*	*Serial Number*	*Manufacturer*	
Broadband Power Divider SMA	WA1515	A856	Weinschel Associates	
Coax Attenuator 10dB SMA 2W	4T-10	F9401	Weinschel Associates	
Coax Attenuator 10dB SMA 2W	56-10	W3702	Weinschel Associates	
Coax Attenuator 10dB SMA 2W	56-10	W3711	Weinschel Associates	
Coax Cable Huber&Suhner	Sucotest 2,0m		Huber&Suhner	
Coax Cable Rosenberger Micro Coax FA210A0010003030 SMA/SMA 1,0m	FA210A0010003030	54491-2	Rosenberger Micro-Coax	
Power Meter	NRVD	828110/016	Rohde & Schwarz GmbH & Co.KG	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard calibration		2014/05/13	2015/05/12
RF Step Attenuator RSP	RSP	833695/001	Rohde & Schwarz GmbH & Co.KG	
Rubidium Frequency Standard	Datum, Model: MFS	5489/001	Datum-Beverly	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard calibration		2014/07/03	2015/07/02
Sensor Head A	NRV-Z1	827753/005	Rohde & Schwarz GmbH & Co.KG	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard calibration		2014/05/13	2015/05/12
Signal Generator SME	SME03	827460/016	Rohde & Schwarz GmbH & Co.KG	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard calibration		2011/11/25	2014/11/24
Signal Generator SMP	SMP02	836402/008	Rohde & Schwarz GmbH & Co. KG	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard calibration		2013/05/06	2016/05/05
Spectrum Analyser	FSIQ26	840061/005	Rohde & Schwarz GmbH & Co. KG	
	Calibration Details		*Last Execution*	*Next Exec.*
	Standard Calibration		2013/02/12	2015/02/11

Test Equipment T/A Logger 13

Lab ID:	**Lab 1, Lab 2**
Description:	Lufft Opus10 TPR
Type:	Opus10 TPR
Serial Number:	13936

Single Devices for T/A Logger 13

Single Device Name	*Type*	*Serial Number*	*Manufacturer*	
ThermoAirpressure Datalogger 13 (Environ)	Opus10 TPR (8253.00)	13936	Lufft Mess- und Regeltechnik GmbH	
	Calibration Details		*Last Execution*	*Next Exec.*
	Customized calibration		2013/02/07	2015/02/06

Test Equipment T/H Logger 03

Lab ID:	**Lab 2**
Description:	Lufft Opus10
Serial Number:	7482

Single Devices for T/H Logger 03

Single Device Name	*Type*	*Serial Number*	*Manufacturer*	
ThermoHygro Datalogger 03 (Environ)	Opus10 THI (8152.00)	7482	Lufft Mess- und Regeltechnik GmbH	
	Calibration Details		*Last Execution*	*Next Exec.*
	Customized calibration		2013/02/07	2015/02/06

Test Equipment T/H Logger 12

Lab ID:	**Lab 1**
Description:	Lufft Opus10
Serial Number:	12482

Single Devices for T/H Logger 12

Single Device Name	*Type*	*Serial Number*	*Manufacturer*	
ThermoHygro Datalogger 12 (Environ)	Opus10 THI (8152.00)	12482	Lufft Mess- und Regeltechnik GmbH	
	Calibration Details		*Last Execution*	*Next Exec.*
	Customized calibration		2013/01/07	2015/01/06

Test Equipment Temperature Chamber 05

Lab ID:	**Lab 2**
Manufacturer:	see single devices
Description:	Temperature Chamber VT4002
Type:	Vötsch
Serial Number:	see single devices

Single Devices for Temperature Chamber 05

Single Device Name	*Type*	*Serial Number*	*Manufacturer*	
Temperature Chamber Vötsch 05	VT 4002	58566080550010	Vötsch	
	Calibration Details		*Last Execution*	*Next Exec.*
	Customized calibration		2014/03/11	2016/03/10

5 Annex

5.1 Additional Information for Report

Summary of Test Results

The EUT complied with all performed tests as listed in the summary section of this report.

Technical Report Summary

Type of Authorization :

Certification for a GSM/WCDMA/CDMA2000 cellular radiotelephone device

Applicable FCC Rules

Prepared in accordance with the requirements of FCC Rules and Regulations as listed in 47 CFR Ch.1 Parts 0 to 69. The following subparts are applicable to the results in this test report.

Part 2, Subpart J - Equipment Authorization Procedures, Certification

§ 2.1046 Measurement required: RF power output
§ 2.1049 Measurement required: Occupied bandwidth
§ 2.1051 Measurement required: Spurious emissions at antenna terminals
§ 2.1053 Measurement required: Field strength of spurious radiation
§ 2.1055 Measurement required: Frequency stability
§ 2.1057 Frequency spectrum to be investigated

Part 22, Subpart C – Operational and Technical Requirements

§ 22.355 Frequency tolerance

Part 22, Subpart H – Cellular Radiotelephone Service

§ 22.913 Effective radiated power limits
§ 22.917 Emission limitations for cellular equipment

additional documents

ANSI TIA-603-C-2004

Description of Methods of Measurements

RF Power Output

Standard FCC Part 22, Subpart H

The test was performed according to: FCC §2.1046

Test Description (conducted measurement procedure)

1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.
3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.
Important Settings:
- Channel (Frequency): please refer to the detailed results
4) The transmitted power of the EUT was recorded by using a spectrum analyser.

Test Description (radiated measurement procedure)

1) The EUT was placed inside an anechoic chamber. Refer to chapter "Setup Drawings". The EUT was coupled to a Digital Communication Tester which was located outside the chamber via a small signalling antenna.
2) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.
Important Settings:
- Output Power: Maximum
- Channel: please refer to the detailed results
3) A substitution procedure is used so that the readings from the spectrum analyser are corrected and represent directly the equivalent radiated power (related to a lamda/2 dipole).
4) The output power was measured in both vertical and horizontal antenna polarisation during the call is established on the lowest channel, mid channel and on the highest channel. To find the worst case power all orientations (X, Y, Z) of the EUT have been measured.
5) The test procedure according to TIA-603-C-2004 has been considered.

Test Requirements / Limits

§2.1046 Measurements Required: RF Power Output
(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in § 2.1033(c)(8). The electrical characteristics of the output terminals when this test is made shall be stated.
§22.913 Effective radiated power limits
(a)(2) Maximum ERP. … The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

Emission and Occupied Bandwidth

Standard FCC Part 22, Subpart H

The test was performed according to: FCC §2.1049

Test Description

1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.
3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.
Important Settings:
- Output Power: Maximum
- Channel: please refer to the detailed results
4) Important Analyser Settings:
- Resolution Bandwidth: >1% of the manufacturer’s stated occupied bandwidth
5) The maximum spectral level of the modulated signal was recorded as the reference.
6) The emission bandwidth is measured as follows:
the two furthest frequencies above and below the frequency of the maximum reference level where the spectrum is –26 dB down have to be found.
7) The occupied bandwidth (99% Bandwidth) is measured as follows:
the occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5 percent of the total mean power.

Test Requirements / Limits

§ 2.1049 Measurements required: Occupied bandwidth

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions (as applicable):

(h) Transmitters employing digital modulation techniques - when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at the discretion of the user.

Spurious emissions at antenna terminals

Standard FCC Part 22, Subpart H

The test was performed according to FCC §2.1051

Test Description

1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.
3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.
Important Settings:
- Output Power: Maximum
- Channel: please refer to the detailed results
4) Important Analyser Settings
- [Resolution Bandwidth]:
a) [>=1% of wanted signal bandwidth] in the Span of 1 MHz directly below and above the PCS-Band,
b) otherwise [100 kHz] (or [1 MHz] for accelerated sweep times)
c) [reduced resolution bandwidth] in case the curve of the analyser IF-Filter or the wanted EUT signal leads to an exceeding of the limit, in this case a correction factor was used
- Sweep Time: depending on the transmitting signal, the span and the resolution bandwidth
5) The spurious emissions peaks were measured in the frequency range from 9 kHz to 10 GHz (up to the 10th harmonic) during the call was established

Test Requirements / Limits

§ 2.1051 Spurious emissions at antenna terminals

The radio frequency voltage or power generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in Sec. 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

§ 2.1057 Frequency spectrum to be investigated.

(a) In all of the measurements set forth in Secs. 2.1051 and 2.1053, the spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown below:
(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
(b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those frequencies removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages should also be checked.
(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution bandwidth of 1 MHz.

§ 22.917 Emission limitations for cellular equipment

(a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
Remark of the test laboratory: This is calculated to be -13 dBm.
(b) Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.
(c) Licensees in this service may establish an alternative out of band emission limit to be used at specified band edge(s) in specified geographical areas [...].
(d) If any emission from a transmitter operating in this service results in interference to users of another radio service, the FCC may require a greater attenuation of that emission than specified in this section.

For reporting only spurious emission levels reaching to the 20dB margin to limit were noted.

Field strength of spurious radiation

Standard FCC Part 22, Subpart H

The test was performed according to: FCC §2.1053

Test Description

1) The EUT was placed inside an anechoic chamber. Refer to chapter "Setup Drawings". The EUT was coupled to a Digital Communication Tester which was located outside the chamber via a small signalling antenna.
2) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.
Important Settings:
- Output Power: Maximum
- Channel: please refer to the detailed results
3) A pre-calibration procedure is used so that the readings from the spectrum analyser are corrected and represent directly the equivalent radiated power (related to a lamda/2 dipole).
4) All spurious radiation measurements were made with spectrum analyser and the appropriate calibrated antennas for the frequency range of 30 MHz to 10 GHz (up to the 10th harmonic of the transmit frequency). The frequency range from 9 kHz to 30 MHz has been examined during the conducted spurious emission measurements.
5) Important Analyser Settings
- [Resolution Bandwidth / Video Bandwidth]:
a) [3 kHz / 10 kHz] in the Span of 1 MHz directly below and above the Band,
b) [10 kHz / 30 kHz] in case the curve of the analyser IF-Filter leads to an exceeding of the limit, in this case a worst case correction factor of 20 dB (1 MHz -> 10 kHz) was used
c) [1 MHz / 3 MHz] otherwise
- Sweep Time: depending on the transmitting signal, the span and the resolution bandwidth
6) The spurious emissions peaks were measured in both vertical and horizontal antenna polarization during the call is established on the lowest channel, mid channel and on the highest channel. To find the worst case peaks all orientations (X, Y, Z) of the EUT have been measured.

Test Requirements / Limits

§ 2.1053 Measurements required: Field strength of spurious radiation.

Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of Sec. 2.1049, as appropriate. For

equipment operating on frequencies below 890 MHz, an open field test is normally required, with the measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from halfwave dipole antennas.
(b) The measurements specified in paragraph (a) of this section shall be made for the following equipment:
(2) All equipment operating on frequencies higher than 25 MHz.

§ 2.1057 Frequency spectrum to be investigated.

(a) In all of the measurements set forth in Secs. 2.1051 and 2.1053, the spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown below:
(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
(b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those frequencies removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages should also be checked.
(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.
(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution bandwidth of 1 MHz.

§ 22.917 Emission limitations for cellular equipment

(a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
This is calculated to be -13 dBm (effective radiated power) which corresponds to 84.6 dBµV/m (field strength) in a distance of 3 m.

(b) Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.
(c) Licensees in this service may establish an alternative out of band emission limit to be used at specified band edge(s) in specified geographical areas [...].
(d) If any emission from a transmitter operating in this service results in interference to users of another radio service, the FCC may require a greater attenuation of that emission than specified in this section.

For reporting only spurious emission levels reaching to the 20dB margin to limit were noted.

Frequency stability

Standard FCC Part 22, Subpart H

The test was performed according to FCC §2.1055

Test Description

1) The EUT was placed inside a temperature chamber.
2) The EUT was coupled to a Digital Communication Tester. Refer to chapter "Setup Drawings".
3) The climatic chamber was cycled down/up to a certain temperature, starting with the EUT minimum temperature.
4) After the temperature was stabilized the EUT was switched on and a call was established on a Traffic Channel between the EUT and the Digital Communication Tester.
Important Settings:
- Output Power: Maximum

- Mid Channel
5) The frequency error of the EUT was recorded by using an internal measurement function of the Digital Communication Tester immediately after the call was established, five minutes after the call was established and ten minutes after the call was established.
6) This measurement procedure was performed for temperature variation from –30°C to +50°C in increments of 10°C, if not otherwise stated in the detailed results.
When the EUT did not operate at certain temperature levels, these measurements were left out.

Test Requirements / Limits

§2.1055 Measurements required: Frequency stability

(a) The frequency stability shall be measured with variation of ambient temperature as follows:
(1) From -30° to +50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.
(b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10° centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. The short term transient effects on the frequency of the transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring at each ambient temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency determining and stabilizing circuitry need be subjected to the temperature variation test.
(d) The frequency stability shall be measured with variation of primary supply voltage as follows:
(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.
(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.
(3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

§22.355 Frequency tolerance

…the carrier frequency of each transmitter in the Public Mobile Service must be maintained within the tolerances given in table C-1 of this section.

Table C-1.- Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency range (MHz)	Base, fixed (ppm)	Mobile up to 3 watts (ppm)	Mobile above 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929	5.0	n/a	n/a
929 to 960	1.5	n/a	n/a
2110 to 2220	10.0	n/a	n/a

For the mid channel (836.6 MHz) the frequency tolerance is 2.5 ppm (2091.5 Hz).

Band edge compliance

Standard FCC Part 22, Subpart H

The test was performed according to: FCC §22.913

Test Description

1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.
3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.
Important Settings:

- Output Power: Maximum
- Channel: please refer to the detailed results

4) Important Analyser Settings:

- Resolution Bandwidth = Video Bandwidth: >1% of the manufacturer’s stated occupied bandwidth

Test Requirements / Limits

§ 22.917 Emission limitations for cellular equipment

Refer to chapter "Field strength of spurious radiation".

Summary of Test Results

The EUT complied with all performed tests as listed in the summary section of this report.

Technical Report Summary

Type of Authorization :

Certification for a GSM/WCDMA/CDMA2000 cellular radiotelephone device

Applicable FCC Rules

Prepared in accordance with the requirements of FCC Rules and Regulations as listed in
47 CFR Ch.1 Parts 0 to 69. The following subparts
are applicable to the results in this test report.

Part 2, Subpart J - Equipment Authorization Procedures, Certification

§ 2.1046 Measurement required: RF power output
§ 2.1049 Measurement required: Occupied bandwidth
§ 2.1051 Measurement required: Spurious emissions at antenna terminals
§ 2.1053 Measurement required: Field strength of spurious radiation
§ 2.1055 Measurement required: Frequency stability
§ 2.1057 Frequency spectrum to be investigated

Part 24, Subpart E - Broadband PCS

§ 24.232 Power and antenna height limits
§ 24.235 Frequency stability
§ 24.236 Field strength limits
§ 24.238 Emission limitations for Broadband PCS equipment

additional documents

ANSI TIA-603-C-2004

Description of Methods of Measurements

RF Power Output

Standard: FCC Part 24, Subpart E

The test was performed according to: FCC §2.1046

Test Description (conducted measurement procedure)

1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.
3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.
Important Settings:
- Channel (Frequency): please refer to the detailed results
4) The transmitted power of the EUT was recorded by using a spectrum analyser.

Test Description (radiated measurement procedure)

1) The EUT was placed inside an anechoic chamber. Refer to chapter "Setup Drawings". The EUT was coupled to a Digital Communication Tester which was located outside the chamber via a small signalling antenna.
2) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.
Important Settings:
- Output Power: Maximum
- Channel: please refer to the detailed results
3) A substitution procedure is used so that the readings from the spectrum analyser are corrected and represent directly the equivalent radiated power (related to a lamda/2 dipole).
4) The output power was measured in both vertical and horizontal antenna polarisation during the call is established on the lowest channel, mid channel and on the highest channel. To find the worst case power all orientations (X, Y, Z) of the EUT have been measured.
5) The test procedure according to TIA-603-C-2004 has been considered.

Test Requirements / Limits

§2.1046 Measurements Required: RF Power Output
(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in § 2.1033(c)(8). The electrical characteristics of the output terminals when this test is made shall be stated.
§24.232 Power and antenna height limits
(c) Mobile/portable stations are limited to 2 watts EIRP peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.
(e) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.

Emission and Occupied Bandwidth

Standard: FCC Part 24, Subpart E

The test was performed according to: FCC §2.1049

Test Description

1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.
3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.
Important Settings:
- Output Power: Maximum
- Channel: please refer to the detailed results
4) Important Analyser Settings:
- Resolution Bandwidth: >1% of the manufacturer’s stated occupied bandwidth
5) The maximum spectral level of the modulated signal was recorded as the reference.
6) The emission bandwidth is measured as follows:
the two furthest frequencies above and below the frequency of the maximum reference level where the spectrum is –26 dB down have to be found.
7) The occupied bandwidth (99% Bandwidth) is measured as follows:

the occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5 percent of the total mean power.

Test Requirements / Limits

§ 2.1049 Measurements required: Occupied bandwidth

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions (as applicable):

(h) Transmitters employing digital modulation techniques - when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at the discretion of the user.

Spurious emissions at antenna terminals

Standard: FCC Part 24, Subpart E

The test was performed according to FCC §2.1051

Test Description

1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.
3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.
Important Settings:
- Output Power: Maximum
- Channel: please refer to the detailed results
4) Important Analyser Settings
- [Resolution Bandwidth]:
a) [>=1% of wanted signal bandwidth] in the Span of 1 MHz directly below and above the Band,
b) otherwise [1 MHz]
c) [reduced resolution bandwidth] in case the curve of the analyser IF-Filter or the wanted EUT signal leads to an exceeding of the limit, in this case a correction factor was used
- Sweep Time: depending on the transmitting signal, the span and the resolution bandwidth
5) The spurious emissions peaks were measured in the frequency range from 9 kHz to 20 GHz (up to the 10th harmonic) during the call was established

Test Requirements / Limits

§ 2.1051 Spurious emissions at antenna terminals

The radio frequency voltage or power generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in Sec. 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

§ 2.1057 Frequency spectrum to be investigated.

(a) In all of the measurements set forth in Secs. 2.1051 and 2.1053, the spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown below:
(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
(b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those frequencies removed from the carrier by multiples of the oscillator frequency. Radiation at the

frequencies of multiplier stages should also be checked.
(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.
(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution bandwidth of 1 MHz.

§ 24.238 Emission limitations for Broadband PCS equipment

(a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
Remark of the test laboratory: This is calculated to be -13 dBm.
(b) Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.
(c) Licensees in this service may establish an alternative out of band emission limit to be used at specified band edge(s) in specified geographical areas [...].
(d) If any emission from a transmitter operating in this service results in interference to users of another radio service, the FCC may require a greater attenuation of that emission than specified in this section.

For reporting only spurious emission levels reaching to the 20dB margin to limit were noted.

Field strength of spurious radiation

Standard: FCC Part 24, Subpart E

The test was performed according to: FCC §2.1053

Test Description

1) The EUT was placed inside an anechoic chamber. Refer to chapter "Setup Drawings". The EUT was coupled to a Digital Communication Tester which was located outside the chamber via a small signalling antenna.
2) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.
Important Settings:
- Output Power: Maximum
- Channel: please refer to the detailed results
3) A pre-calibration procedure is used so that the readings from the spectrum analyser are corrected and represent directly the equivalent radiated power (related to a lamda/2 dipole).
4) All spurious radiation measurements were made with spectrum analyser and the appropriate calibrated antennas for the frequency range of 30 MHz to 20 GHz (up to the 10th harmonic of the transmit frequency). The frequency range from 9 kHz to 30 MHz has been examined during the conducted spurious emission measurements.
5) Important Analyser Settings
- [Resolution Bandwidth / Video Bandwidth]:
a) [3 kHz / 10 kHz] in the Span of 1 MHz directly below and above the Band,
b) [10 kHz / 30 kHz] in case the curve of the analyser IF-Filter leads to an exceeding of the limit, in this case a worst case correction factor of 20 dB (1 MHz -> 10 kHz) was used
c) [1 MHz / 3 MHz] otherwise
- Sweep Time: depending on the transmitting signal, the span and the resolution bandwidth
6) The spurious emissions peaks were measured in both vertical and horizontal antenna polarisation during the call is established on the lowest channel, mid channel and on the highest channel. To find the worst case peaks all orientations (X, Y, Z) of the EUT have been measured.

Test Requirements / Limits

§ 2.1053 Measurements required: Field strength of spurious radiation.

Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and

operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of Sec. 2.1049, as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required, with the measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from halfwave dipole antennas.
(b) The measurements specified in paragraph (a) of this section shall be made for the following equipment:
(2) All equipment operating on frequencies higher than 25 MHz.

§ 2.1057 Frequency spectrum to be investigated.

(a) In all of the measurements set forth in Secs. 2.1051 and 2.1053, the spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown below:
(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
(b) Particular attention should be paid to harmonics and subharmonics of the carrier frequency as well as to those frequencies removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages should also be checked.
(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.
(d) Unless otherwise specified, measurements above 40 GHz shall be performed using a minimum resolution bandwidth of 1 MHz.

§ 24.238 Emission limitations for Broadband PCS equipment

(a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
This is calculated to be -13 dBm (effective radiated power) which corresponds to 84.6 dBµV/m (field strength) in a distance of 3 m.

(b) Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.
(c) Licensees in this service may establish an alternative out of band emission limit to be used at specified band edge(s) in specified geographical areas [...].
(d) If any emission from a transmitter operating in this service results in interference to users of another radio service, the FCC may require a greater attenuation of that emission than specified in this section.

For reporting only spurious emission levels reaching to the 20dB margin to limit were noted.

Frequency stability

Standard: FCC Part 24, Subpart E

The test was performed according to FCC §2.1055

Test Description

1) The EUT was placed inside a temperature chamber.
2) The EUT was coupled to a Digital Communication Tester. Refer to chapter "Setup Drawings".
3) The climatic chamber was cycled down/up to a certain temperature, starting with the EUT minimum temperature.
4) After the temperature was stabilized the EUT was switched on and a call was established on a Traffic

Channel between the EUT and the Digital Communication Tester.
Important Settings:
- Output Power: Maximum
- Mid Channel
5) The frequency error of the EUT was recorded by using an internal measurement function of the Digital Communication Tester immediately after the call was established, five minutes after the call was established and ten minutes after the call was established.
6) This measurement procedure was performed for temperature variation from –30°C to +50°C in increments of 10°C, if not otherwise stated in the detailed results.
When the EUT did not operate at certain temperature levels, these measurements were left out.

Test Requirements / Limits

§2.1055 Measurements required: Frequency stability

(a) The frequency stability shall be measured with variation of ambient temperature as follows:
(1) From -30° to +50° centigrade for all equipment except that specified in paragraphs
(a) (2) and (3) of this section.
(b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10° centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. The short term transient effects on the frequency of the transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring at each ambient temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency determining and stabilizing circuitry need be subjected to the temperature variation test.
(d) The frequency stability shall be measured with variation of primary supply voltage as follows:
(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.
(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.
(3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

§24.235 Frequency stability

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

7Layers interpretation of limit:

To ensure that the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block following limit was used:

+/- 2.5 ppm = 4700 Hz for a frequency of 1880.0 MHz

in accordance with FCC Part 22, Subpart H, §22.355, table C-1: Frequency tolerance for the carrier frequency of mobile transmitters in the Public Mobile Service in the frequency range 821 to 896 MHz.

Band edge compliance

Standard: FCC Part 24, Subpart E

The test was performed according to: FCC §24.238

Test Description

1) The EUT was coupled to a Spectrum Analyser and a Digital Communication Tester through a Power Divider. Refer to chapter "Setup Drawings".
2) The total insertion losses for signal path 1 and signal path 2 were measured. The values were used to correct the readings from the Spectrum Analyser and the Digital Communication Tester.
3) A call was established on a Traffic Channel between the EUT and the Digital Communication Tester.

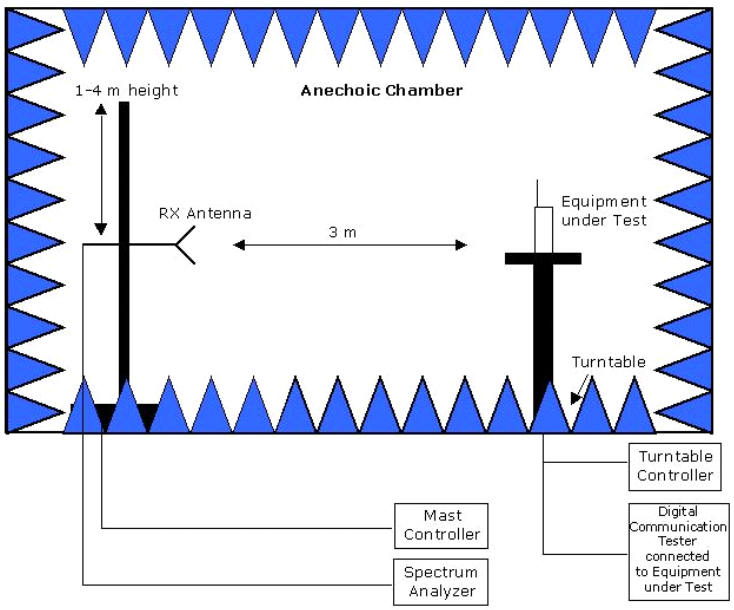
Important Settings:
- Output Power: Maximum
- Channel: please refer to the detailed results
4) Important Analyser Settings:
- Resolution Bandwidth = Video Bandwidth: >1% of the manufacturer's stated occupied bandwidth

Test Requirements / Limits

§ 24.238 Effective radiated power limits

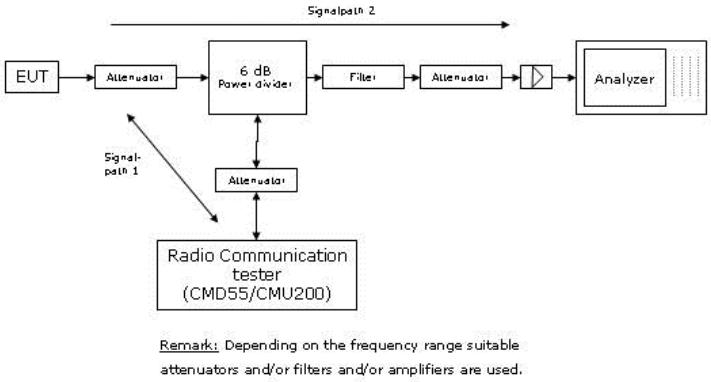
Refer to chapter "Field strength of spurious radiation".

Setup Drawings

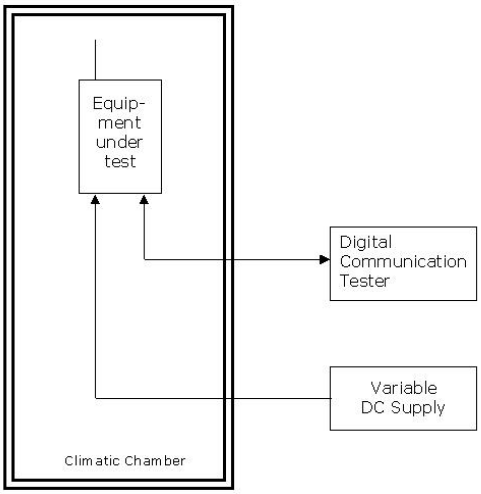


Remark: Depending on the frequency range suitable antenna types, attenuators or preamplifiers are used.

Principle set-up for radiated measurements



Principle set-up for conducted measurements under nominal conditions



Principle set-up for tests under extreme test conditions

Correlation of measurement requirements for Cellular Equipment from FCC and IC

Test name – FCC	FCC reference CFR47				Test name – IC	IC reference			
	Part 2	Part 22	Part 24	Part 27		RSS-Gen	RSS-132 SRSP-503	RSS-133 SRSP-510	RSS-139 SRSP-513
					Issue:	4, 2014	3, 2013	6, 2013	2, 2009
RF power output	§ 2.1046	§ 22.913	§ 24.232	§ 27.50	Transmitter output power	6.12	5.4	6.4	6.4
Frequency stability	§ 2.1055	§ 22.355	§ 24.235	§ 27.54	Frequency stability	6.11	5.3	6.3	6.3
Spurious emissions at antenna terminals	§ 2.1051	§ 22.917	§ 24.238	§ 27.53	Transmitter unwanted emissions conducted	6.13	5.5	6.5	6.5
–	–	–	–	–	Receiver unwanted emissions conducted	5/7 *), 7.1.3	5.6	6.6	6.6
Field strength of spurious radiation	§ 2.1053	§ 22.917	§ 24.238	§ 27.53	Transmitter unwanted emissions radiated	6.13	5.5	6.5	6.5
–	–	–	–	–	Receiver unwanted emissions radiated	5/7 *), 7.1.2	5.6	6.6	6.6
Emission and Occupied Bandwidth	§ 2.1049	–	–	–	Emission and Occupied Bandwidth	6.6	5.5	2.3; 6.5	2.3; 6.5
Band edge compliance	§ 2.1053	§ 22.917	§ 24.238	§ 27.53	Band edge compliance	6.13	5.5	6.5	6.5

*) Receivers are exempted from certification besides if operating in stand-alone mode in the frequency range 30–960 MHz or if these are scanner receivers.

Report version control			
Version	Release date	Changes	Version validity
01	02.10.2014	Inital version	not valid
02	20.10.2014	RF Power Output measured using S_AK01 Setup	not valid
03	22.10.2014	HW version update	not valid
04	28.10.2014	Updated correclaton table FCC/IC	valid

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