FCC TEST REPORT

FCC 47 CFR Part 22H
Industry Canada RSS-132, Issue 2
Cellular Telephones Operating in the Bands 824-849MHz and 869-894MHz
FCC 47 CFR Part 24E
Industry Canada RSS-133, Issue 5
2GHz Personal Communication Services

Report Reference No. ..... :	G0M-1508-4987-TFC224GS-V01
Testing Laboratory ..... :	Eurofins Product Service GmbH
Address ..... :	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation ..... :	A2LA Accredited Testing Laboratory, Certificate No.: 1983.01 FCC Filed Test Laboratory, Reg.-No.: 96970 IC OATS Filing assigned code: 3470A
Applicant's name ..... :	TomTom Telematics B.V.
Address ..... :	De Ruijterkade 154 1011 AC Amsterdam NETHERLANDS
Test specification:	
Standard..... :	47 CFR Part 22H, 47 CFR Part 24E RSS-132, Issue 3 : 2013-01, RSS-133, Issue 6 : 2013-01 SRSP-503 Issue 7 : 2008-09, SRSP-510 Issue 5 : 2009-02 RSS-Gen, Issue 4, 2014-11, ANSI/TIA-603-C-2004 KDB 971168
Equipment under test (EUT):	
Product description	Telematic Device with GPRS+WCDMA/BT/GPS
Model No.	L0530
Additional Model(s)	None
Brand Name(s)	LINK 530
Hardware version	drs_2_6b_pcb24/2015
Firmware / Software version	11_55_4640
	FCC-ID: 2AGPAL0530 IC: 20911-L0530
Test result	**Passed**

Possible test case verdicts:

- neither assessed nor tested ..... : N/N
- required by standard but not appl. to test object ..... : N/A
- required by standard but not tested ..... : N/T
- not required by standard for the test object ..... : N/R
- test object does meet the requirement ..... : P (Pass)
- test object does not meet the requirement ..... : F (Fail)

Testing:

Test Lab Temperature ..... :	20 – 23 °C	
Test Lab Humidity ..... :	32 – 38 %	
Date of receipt of test item ..... :	2015-11-23	
Date (s) of performance of tests ..... :	2015-12-01 - 2015-12-08	
Compiled by ..... :	Burkhard Pudell	
Tested by (+ signature) ..... : (Responsible for Test)	Burkhard Pudell	B. Pudell
Approved by (+ signature) ..... : (Head of Lab)	Christian Weber	C. Weber
Date of issue ..... :	2016-01-11	
Total number of pages ..... :	40	

General remarks:

The test results presented in this report relate only to the object tested.
The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

Additional comments:

Test case selection is based on full modular approval of licensed transmitter module used by the EUT. The EUT uses a GSM/GPRS module with full modular approval according to FCC and IC rules. For details about the radio module see EUT description in section 1.

Version History

Version	Issue Date	Remarks	Revised by
01	2016-01-11	Initial Release	

Eurofins Product Service GmbH
Storkower Str. 38c, D-15526 Reichenwalde, Germany

REPORT INDEX

1 EQUIPMENT (TEST ITEM) DESCRIPTION 5

1.1 Photos – Equipment External 7
1.2 Photos – Equipment internal 10
1.3 Photos – Test setup 11
1.4 Supporting Equipment Used During Testing 12
1.5 Test Modes 13
1.6 Test Equipment Used During Testing 15
1.7 Sample emission level calculation 16

2 RESULT SUMMARY 17

3 TEST CONDITIONS AND RESULTS 18

3.1 Test Conditions and Results – Occupied Bandwidth 18
3.2 Test Conditions and Results – Effective radiated power / Equivalent isotropic radiated power 32
3.3 Test Conditions and Results – Transmitter radiated emissions 35
3.4 Test Conditions and Results – Receiver radiated emissions 39

1 Equipment (Test item) Description

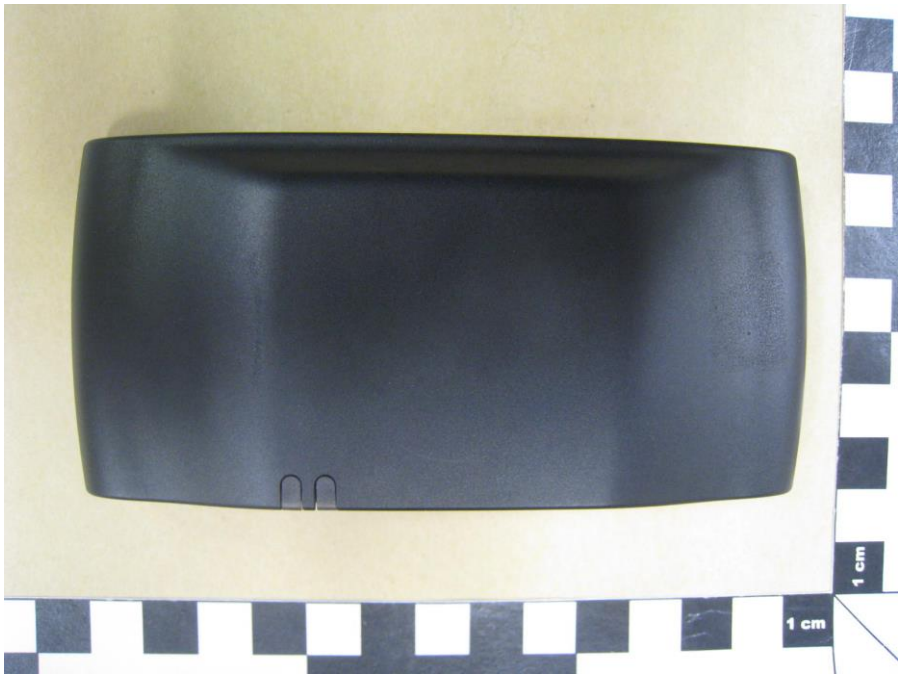
Description	Telematic Device with GPRS+WCDMA/BT/GPS		
Model	L0530		
Additional Model(s)	None		
Brand Name(s)	LINK 530		
Serial number	None		
Hardware version	drs_2_6b_pcb24/2015		
Software / Firmware version	11_55_4640		
FCC-ID	2AGPAL0530		
IC	20911-L0530		
Equipment type	End product		
Equipment classification	Mobile Device (Human Body distance > 20 cm)		
Radio type	Transceiver		
Radio technology	GSM850 / GSM1900 / W-CDMA FDDII / W-CDMA FDDV		
Operating frequency range	GSM850 : TX = 824 - 849 MHz, RX = 869 - 894 MHz GSM1900 : TX = 1850 - 1910 MHz, RX = 1930 - 1990 MHz FDDV : TX = 824 - 849MHz, RX = 869 - 894MHz FDDII : TX = 1850 - 1910MHz, RX = 1930 - 1990MHz		
Assigned frequency band	Cell. Service Block A & B : 824 - 849 MHz & 869 - 894 MHz Broadband PCS : 1850 - 1910 MHz & 1930 - 1990 MHz		
Main test frequencies GSM850	F_{LOW}	CH : 128 UL: 824.2 MHz	CH : 128 DL: 869.2 MHz
	F_{MID}	CH : 188 UL: 836.2 MHz	CH : 188 DL: 881.2 MHz
	F_{HIGH}	CH : 251 UL: 848.8 MHz	CH : 251 DL: 893.8 MHz
Main test frequencies GSM1900	F_{LOW}	CH : 512 UL: 1850.2 MHz	CH : 512 DL: 1930.2 MHz
	F_{MID}	CH : 661 UL: 1880.0 MHz	CH : 661 DL: 1960.0 MHz
	F_{HIGH}	CH : 810 UL: 1909.8 MHz	CH : 810 DL: 1989.8 MHz
Main test frequencies FDDV	F_{LOW}	CH : 4132 UL: 826.4MHz	CH : 4357 DL: 871.4MHz
	F_{MID}	CH : 4182 UL: 836.4MHz	CH : 4407DL: 881.4MHz
	F_{HIGH}	CH : 4233 UL: 846.6MHz	CH : 4458DL: 891.6MHz
Main test frequencies FDDII	F_{LOW}	CH : 9262UL: 1852.4MHz	CH : 9662DL: 1932.4MHz
	F_{MID}	CH : 9400 UL: 1880.0MHz	CH : 9663DL: 1960.0MHz
	F_{HIGH}	CH : 9538 UL: 1907.6MHz	CH : 9938DL: 1987.6MHz
Supported transmission modes	GSM, GPRS, UMTS, HSDPA, HSUPA		
Modulations	GSM, GPRS: GMSK W-CDMA : QPSK		
Multislot class	12		
Number of antennas	1		

Radio module	Type	Wireless Module 3G
	Model	EHS6
	Manufacturer	Cinterion
	HW Version	B2 (rev.3)
	SW Version	Rev. 02.000 SVN08
	FCC-ID	QIPEHS6
	IC	7830A-EHS6
Antenna 1	Type	integrated
	Model	A10315
	Manufacturer	Antenova
	Gain	2 – 3.7 dBi
Antenna 2	Type	external dedicated
	Model	562
	Manufacturer	2J
	Gain	2.2dBi (manufacturer declaration)
Manufacturer	Quanta Computer Inc. No.211, Wen Hwa 2nd Road., Kuei Shan Hsiang 33377 Tao Yuan Shien Taiwan (ROC)	
Power supply	V_{NOM}	12 or 24 VDC (Car Battery only)
	V_{MIN}	N/A
	V_{MIN}	N/A
AC/DC-Adaptor	Model	N/A
	Vendor	N/A
	Input	N/A
	Output	N/A

1.1 Photos – Equipment External

EUT FRONT

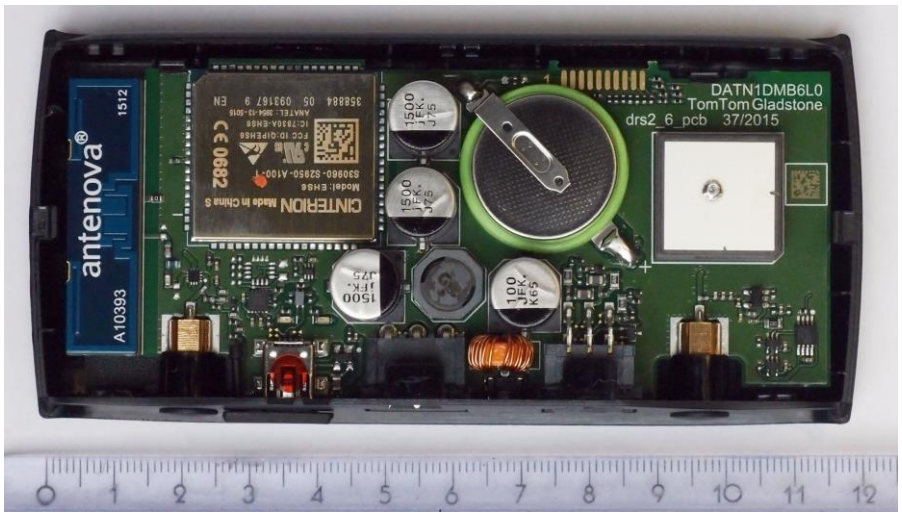
EUT BACK

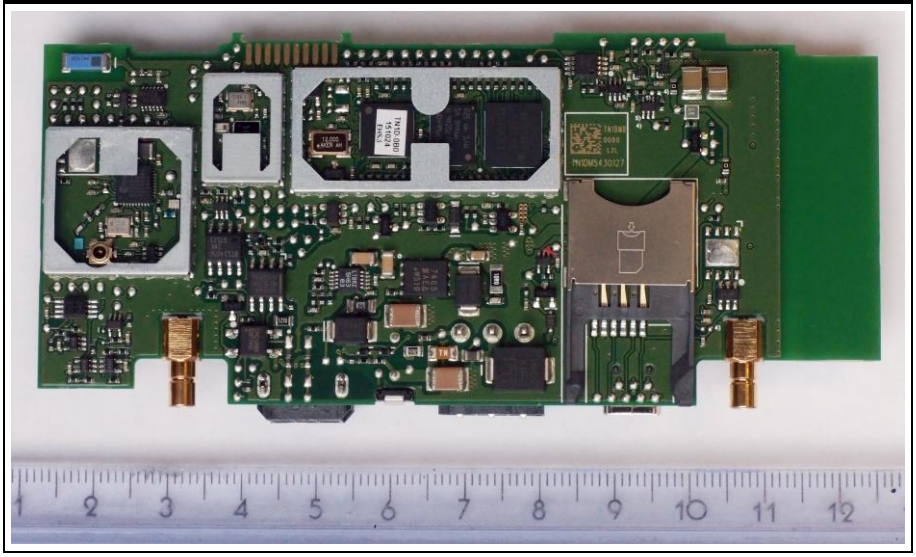
EUT TOP


ANTENNA GSM -UMTS

POWER CABLE

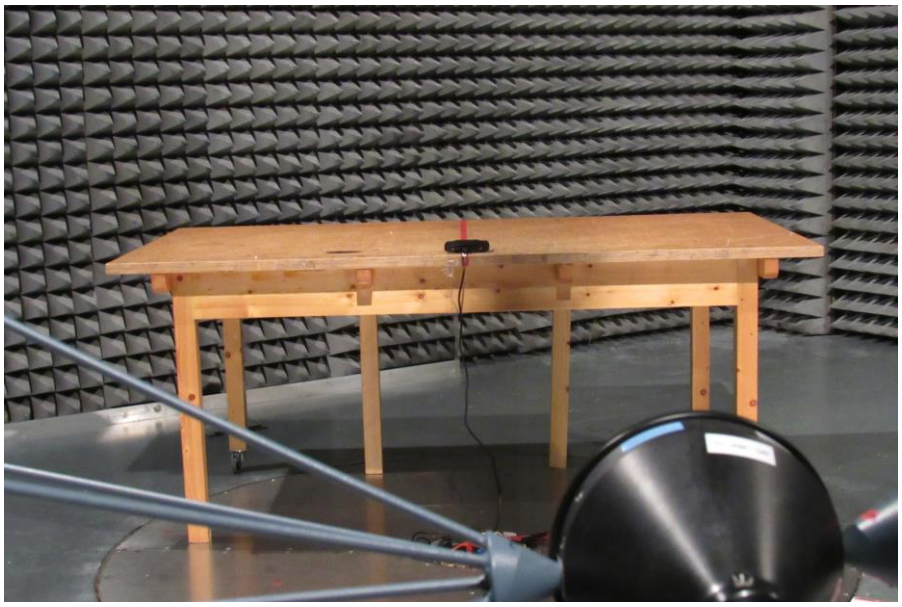
1.2 Photos – Equipment internal

EUT PCB FRONT


EUT PCB BACK


1.3 Photos – Test setup

GSM ANTTENNA EXTERN VERTICAL

GSM ANTTENNA INTERN


1.4 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments
SIM	Network	R&S	CMU200	GSM-Tester
SIM	Network	R&S	CMW500	W-CDMA-Tester

***Note:** Use the following abbreviations:

AE : Auxiliary/Associated Equipment, or

SIM : Simulator (Not Subjected to Test)

CABL : Connecting cables

1.5 Test Modes

Mode #	Description	
GSM850-Ext	General conditions:	EUT powered by power supply. External GSM and GPS antenna connected. Active data call to communication tester.
	Radio conditions:	Mode = transmit Connection = Packet switched Modulation = GMSK Slot configuration = 1 up / 1 down Power level = Maximum (Gamma3)
GSM850-Int	General conditions:	EUT powered by power supply. Internal GSM and GPS antenna connected. Active data call to communication tester.
	Radio conditions:	Mode = transmit Connection = Packet switched Modulation = GMSK Slot configuration = 1 up / 1 down Power level = Maximum (Gamma3)
GSM1900-Ext	General conditions:	EUT powered by power supply. External GSM and GPS antenna connected. Active data call to communication tester.
	Radio conditions:	Mode = transmit Connection = Packet switched Modulation = GMSK Slot configuration = 1 up / 1 down Power level = Maximum (Gamma3)
GSM1900-Int	General conditions:	EUT powered by power supply. Internal GSM and GPS antenna connected. Active data call to communication tester.
	Radio conditions:	Mode = transmit Connection = Packet switched Modulation = GMSK Slot configuration = 1 up / 1 down Power level = Maximum (Gamma3)
UMTS FDD V-Ext	General conditions:	EUT powered by battery. External GSM and GPS antenna connected. Active call to communication tester.
	Radio conditions:	Mode = transmit Connection = Circuit & Packet switched Modulation = QPSK Configuration = HSUPA / HSDPA Power level = Maximum

UMTS FDD V-Int	General conditions:	EUT powered by battery. Internal GSM and GPS antenna connected. Active call to communication tester.
	Radio conditions:	Mode = transmit Connection = Circuit & Packet switched Modulation = QPSK Configuration = HSUPA / HSDPA Power level = Maximum
UMTS FDD II-Ext	General conditions:	EUT powered by battery. External GSM and GPS antenna connected. Active call to communication tester.
	Radio conditions:	Mode = transmit Connection = Circuit & Packet switched Modulation = QPSK Configuration = HSUPA / HSDPA Power level = Maximum
UMTS FDD II-Int	General conditions:	EUT powered by battery. Internal GSM and GPS antenna connected. Active call to communication tester.
	Radio conditions:	Mode = transmit Connection = Circuit & Packet switched Modulation = QPSK Configuration = HSUPA / HSDPA Power level = Maximum
Receive-Ext	General conditions:	EUT powered by battery. External GSM and GPS antenna connected. Active call to communication tester.
	Radio conditions:	Mode = standalone receive
Receive-Int	General conditions:	EUT powered by battery. Internal GSM and GPS antenna connected. Active call to communication tester.
	Radio conditions:	Mode = standalone receive

1.6 Test Equipment Used During Testing

Measurement Software			
Description	Manufacturer	Name	Version
EMC Test Software	Dare Instruments	Radimation	2014.1.5

Occupied Bandwidth					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2015-02	2016-02

Radiated power					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Fully-anechoic chamber	Frankonia	AC 3	EF00199	--	--
Spectrum Analyzer	R&S	FSIQ 26	EF00242	2015-04	2016-04
LPD Antenna	R&S	HL 223	EF00202	2014-02	2016-02
LPD Antenna	R&S	HL 025	EF00014	2014-01	2016-01

Radiated spurious emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Semi-anechoic chamber	Frankonia	AC 1	EF00062	--	--
Spectrum Analyzer	R&S	FSEK 30	EF00168	2015-01	2016-01
Biconical Antenna	R&S	HK 116	EF00012	2013-02	2016-02
LPD Antenna	R&S	HL 223	EF00212	2013-02	2016-02
LPD Antenna	R&S	HL 025	EF00327	2015-10	2018-10

1.7 Sample emission level calculation

The following is a description of terms and a sample calculation, as appears in the radiated emissions data table. The numbers used in the calculation are for example only. There is no direct correlation to the specific data taken for the product described in this document:

Reading:

This is the reading obtained on the spectrum analyzer in dBµV. Any external preamplifiers used are taken into account through internal analyzer settings.

A.F.:

This is the antenna factor for the receiving antenna. It is a conversion factor, which converts electric fields strengths to voltages, which can be measured directly on the spectrum analyzer. It is treated as a loss in dB. Cable losses have been included with the A.F. to simplify the calculations. The antenna factor is used in calculations as follows:

Reading on Analyzer (dBµV) + A.F. (dB) = Net field strength (dBµV/m)

Net:

This is the net field strength measurement (as shown above).

Limit:

This is the FCC Class B radiated emission limit (in units of dBµV/m). The FCC limits are given in units of µV/m. The following formula is used to convert the units of µV/m to dBµV/m:

Limit (dBµV/m) = 20*log (µV/m)

Margin:

This is the margin of compliance below the FCC limit. The units are given in dB. A negative margin indicates the emission was below the limit. A positive margin indicates that the emission exceeds the limit.

Example only:

Reading	+	AF	=	Net Reading	:	Net reading - FCC limit = Margin
21.5 dBµV	+	26 dB	=	47.5 dBµV/m	:	47.5 dBµV/m - 57.0 dBµV/m = -9.5 dB

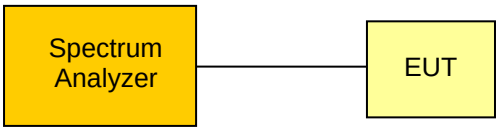
2 Result Summary

FCC 47 CFR Part 22H, 24E, IC RSS-132, 133				
Product Specific Standard Section	**Requirement – Test**	**Reference Method**	**Result**	**Remarks**
RSS-Gen 6.6	Occupied Bandwidth	RSS-Gen 6.6 KDB 971168		Informational only
FCC § 24.235 FCC § 22.355 IC RSS-132 § 4.3 IC RSS-133 § 6.3	Frequency stability	FCC § 24.235 FCC § 22.355 IC RSS-132 § 4.3 IC RSS-133 § 6.3 KDB 971168	N/R	Conducted results of licensed radio unaffected. See module radio report.
FCC § 22.913(a)	Effective radiated power	ANSI/TIA-603-C KDB 971168	PASS	
FCC § 24.232(c) IC RSS-132 § 4.4 IC RSS-133 § 6.4	Equivalent isotropic radiated power	ANSI/TIA-603-C KDB 971168	PASS	
FCC § 24.232(d) IC RSS-133 § 6.4	Peak to average ratio	FCC § 24.232(d) IC RSS-133 § 6.4 KDB 971168	N/R	Conducted results of licensed radio unaffected. See module radio report
FCC § 22.917(b) FCC § 24.238(b) IC RSS-132 § 4.5 IC RSS-133 § 6.5	Band-edge compliance	FCC § 22.917(b) FCC § 24.238(b) IC RSS-132 § 4.5 IC RSS-133 § 6.5 KDB 971168	N/R	Conducted results of licensed radio unaffected. See module radio report
FCC § 22.917(a) FCC § 24.238(a) IC RSS-132 § 4.5 IC RSS-133 § 6.5	Conducted out-of-band emissions	FCC § 22.917(a) FCC § 24.238(a) IC RSS-132 § 4.5 IC RSS-133 § 6.5 KDB 971168	N/R	Conducted results of licensed radio unaffected. See module radio report
FCC § 22.917(a) FCC § 24.238(a) IC RSS-132 § 4.5 IC RSS-133 § 6.5	Radiated out-of-band emissions	ANSI/TIA-603-C KDB 971168	PASS	
IC RSS-132 § 4.6 IC RSS-133 § 6.6 IC RSS-Gen 7.1	Receiver radiated spurious emissions	IC RSS-132 § 4.6 IC RSS-133 § 6.6 IC RSS-Gen 7.1 KDB 971168	PASS	Conducted results of licensed radio unaffected. See module radio report
Remarks:				

3 Test Conditions and Results

3.1 Test Conditions and Results – Occupied Bandwidth

Occupied Bandwidth acc. to IC RSS-Gen	
Test according to measurement reference	Reference Method
	RSS-Gen 6.6
Test frequency range	Tested frequencies
	F_{LOW} / F_{MID} / F_{HIGH}
Limits	
None (Informational only)	
Test setup	



Test procedure

1. EUT set to test mode (Communication tester is used if needed)
2. Span set to at least twice the emission spectrum
3. Resolution bandwidth set to 1 % of span
4. Occupied Bandwidth (99 %) measurement with spectrum analyzer built in measurement function

Test results – GSM850

Channel	Frequency [MHz]	Mode	Occupied Bandwidth [kHz]
F_{LOW}	824.2	GSM850	250.5
F_{MID}	836.2	GSM850	250.5
F_{HIGH}	848.8	GSM850	250.5

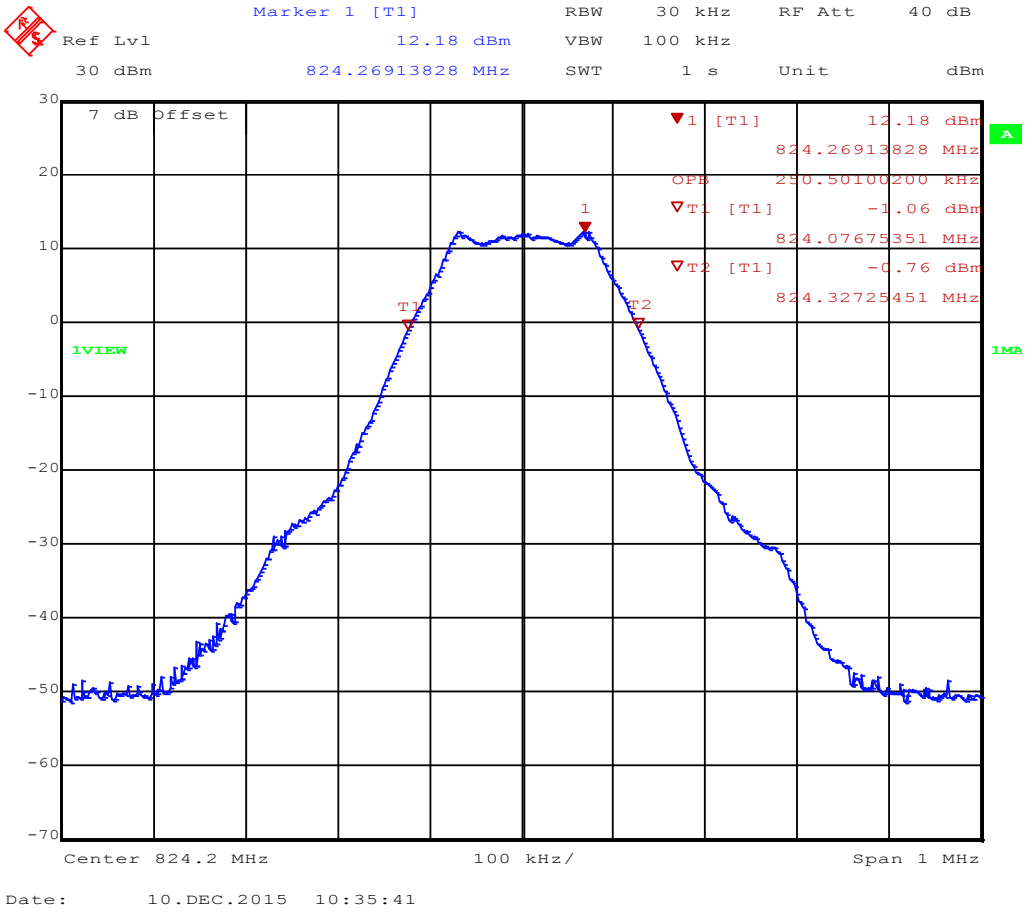
Test results – GSM1900			
Channel	Frequency [MHz]	Mode	Occupied Bandwidth [kHz]
F_{LOW}	1850.2	GSM1900	250.5
F_{MID}	1880	GSM1900	250.5
F_{HIGH}	1909.8	GSM1900	250.5
Test results – UMTS FDDV			
Channel	Frequency [MHz]	Mode	Occupied Bandwidth [kHz]
F_{LOW}	862.6	UMTS FDDV	4.068
F_{MID}	835.0	UMTS FDDV	4.068
F_{HIGH}	846.4	UMTS FDDV	4.068
Test results – UMTS FDDII			
Channel	Frequency [MHz]	Mode	Occupied Bandwidth [kHz]
F_{LOW}	1852.6	UMTS FDDII	4.068
F_{MID}	1880.0	UMTS FDDII	4.068
F_{HIGH}	1907.4	UMTS FDDII	4.068
Comments:			

Occupied Bandwidth – GSM850 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1508-4987

Applicant:	TomTom Telematics B.V.
EUT Name:	Telematic Device with GPRS+WCDMA/BT/GPS
Model:	L0530
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	GPRS 850 / CH: 128 / Gamma:3 (33 dBm) / Main Slot 2
Test Date:	2015-12-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 250.5 kHz

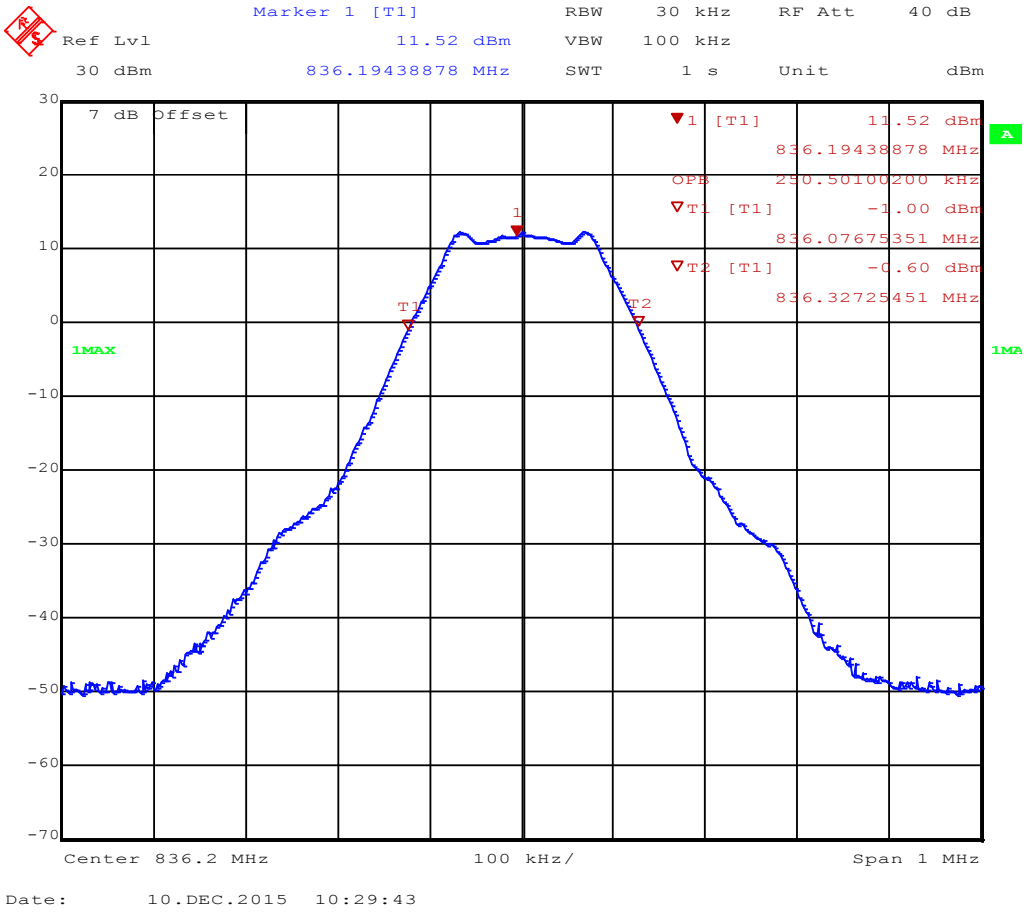


Occupied Bandwidth – GSM850 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1508-4987

Applicant:	TomTom Telematics B.V.
EUT Name:	Telematic Device with GPRS+WCDMA/BT/GPS
Model:	L0530
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	GPRS 850 / CH: 188 / Gamma:3 (33 dBm) / Main Slot 2
Test Date:	2015-12-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 250.5 kHz

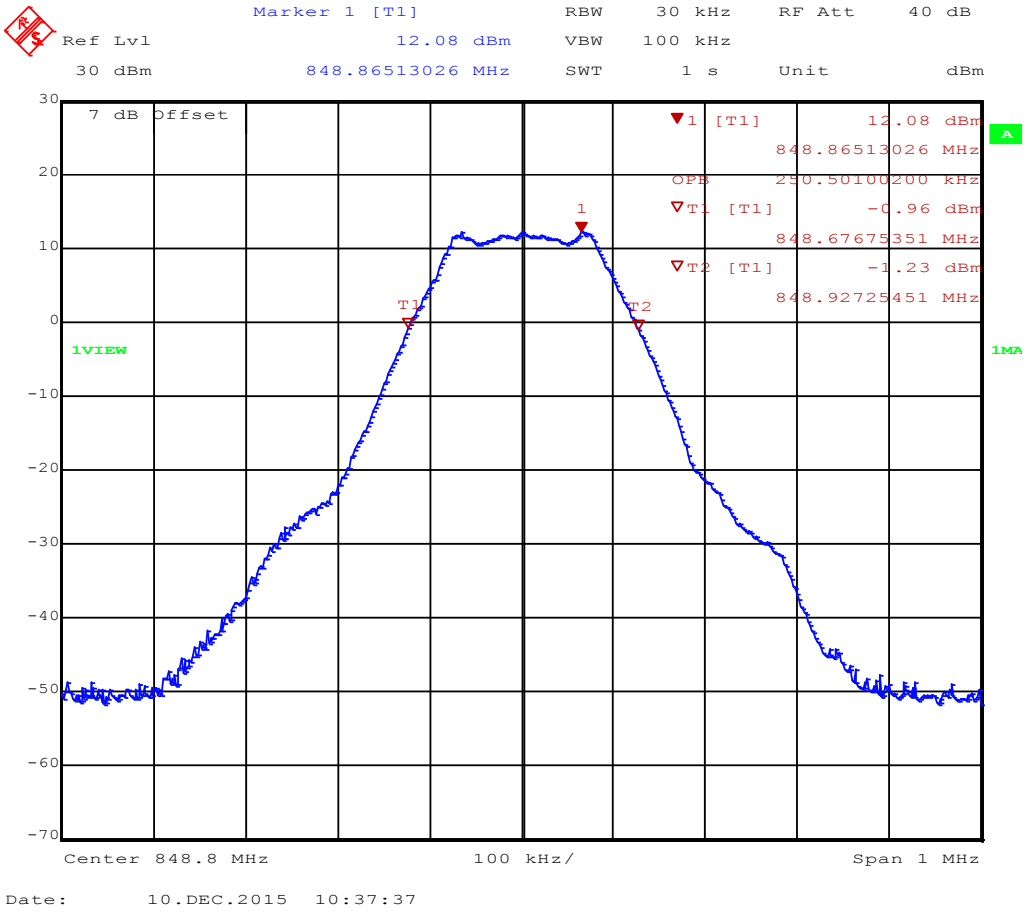


Occupied Bandwidth – GSM850 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1508-4987

Applicant:	TomTom Telematics B.V.
EUT Name:	Telematic Device with GPRS+WCDMA/BT/GPS
Model:	L0530
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	GPRS 850 / CH: 251 / Gamma:3 (33 dBm) / Main Slot 2
Test Date:	2015-12-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 250.5 kHz

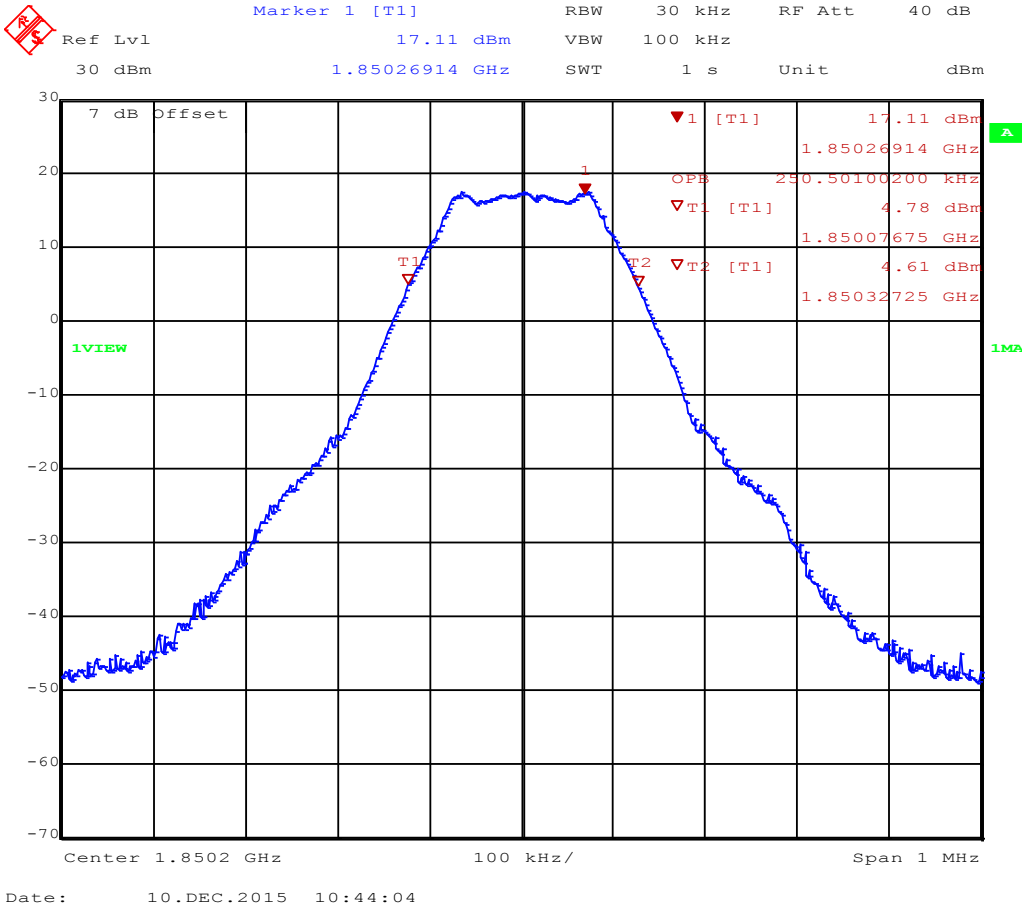


Occupied Bandwidth – GPRS900 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1508-4987

Applicant:	TomTom Telematics B.V.
EUT Name:	Telematic Device with GPRS+WCDMA/BT/GPS
Model:	L0530
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	GPRS 1900 / CH: 512 / Gamma:3 (30 dBm) / Main Slot 2
Test Date:	2015-12-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 250.5 kHz

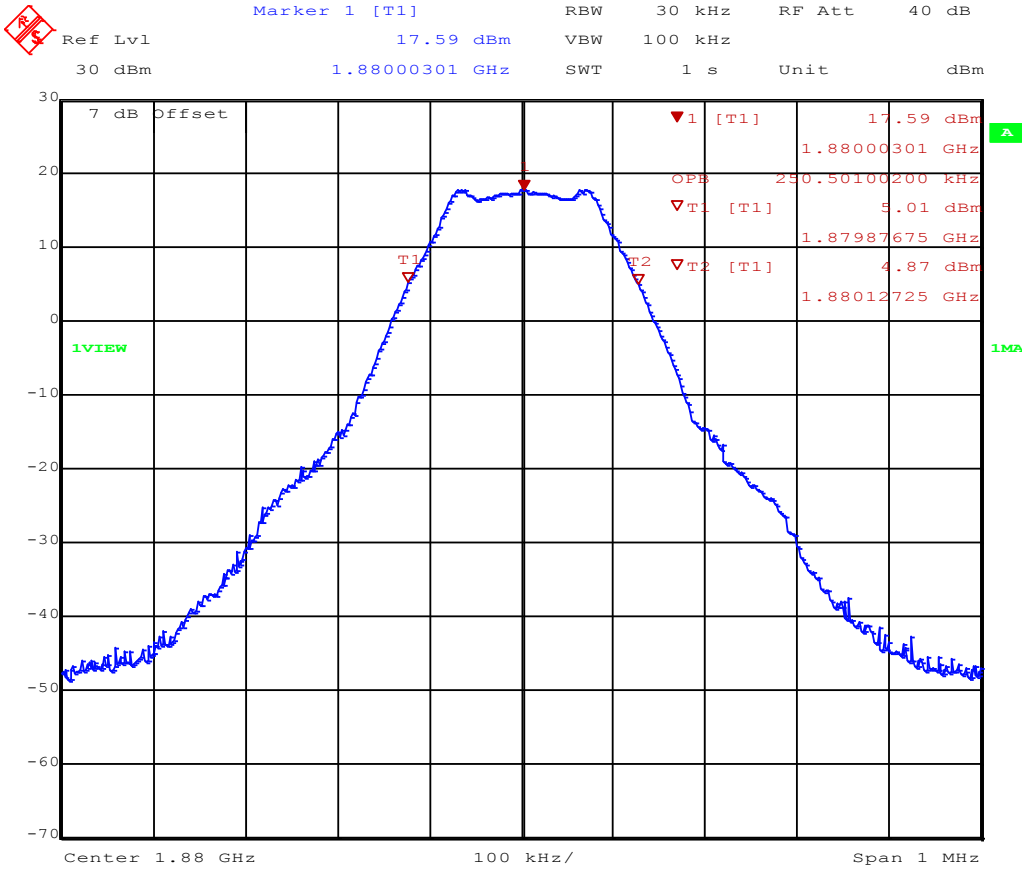


Occupied Bandwidth – GSM1900 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1508-4987

Applicant:	TomTom Telematics B.V.
EUT Name:	Telematic Device with GPRS+WCDMA/BT/GPS
Model:	L0530
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	GPRS 1900 / CH: 661 / Gamma:3 (30 dBm) / Main Slot 2
Test Date:	2015-12-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 250.5 kHz



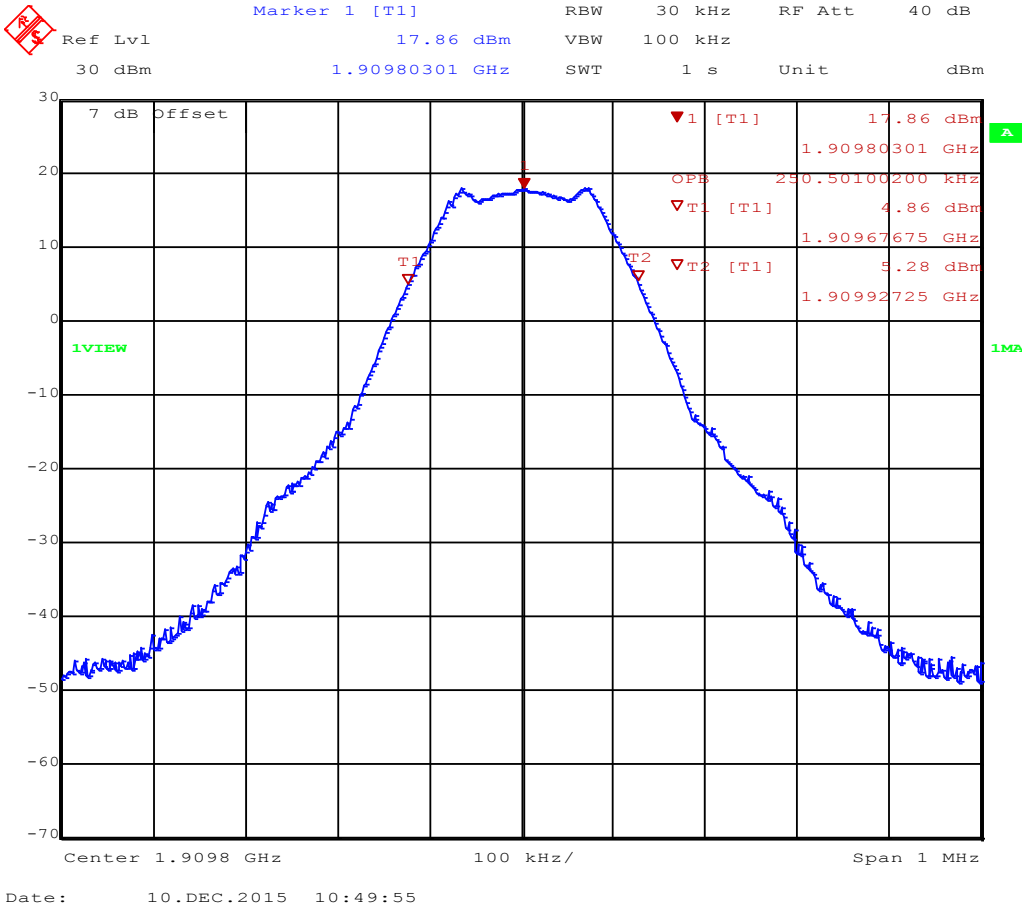
Date: 10.DEC.2015 10:46:20

Occupied Bandwidth – GSM1900 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1508-4987

Applicant:	TomTom Telematics B.V.
EUT Name:	Telematic Device with GPRS+WCDMA/BT/GPS
Model:	L0530
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	GPRS 1900 / CH: 810 / Gamma:3 (30 dBm) / Main Slot 2
Test Date:	2015-12-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 250.5 kHz

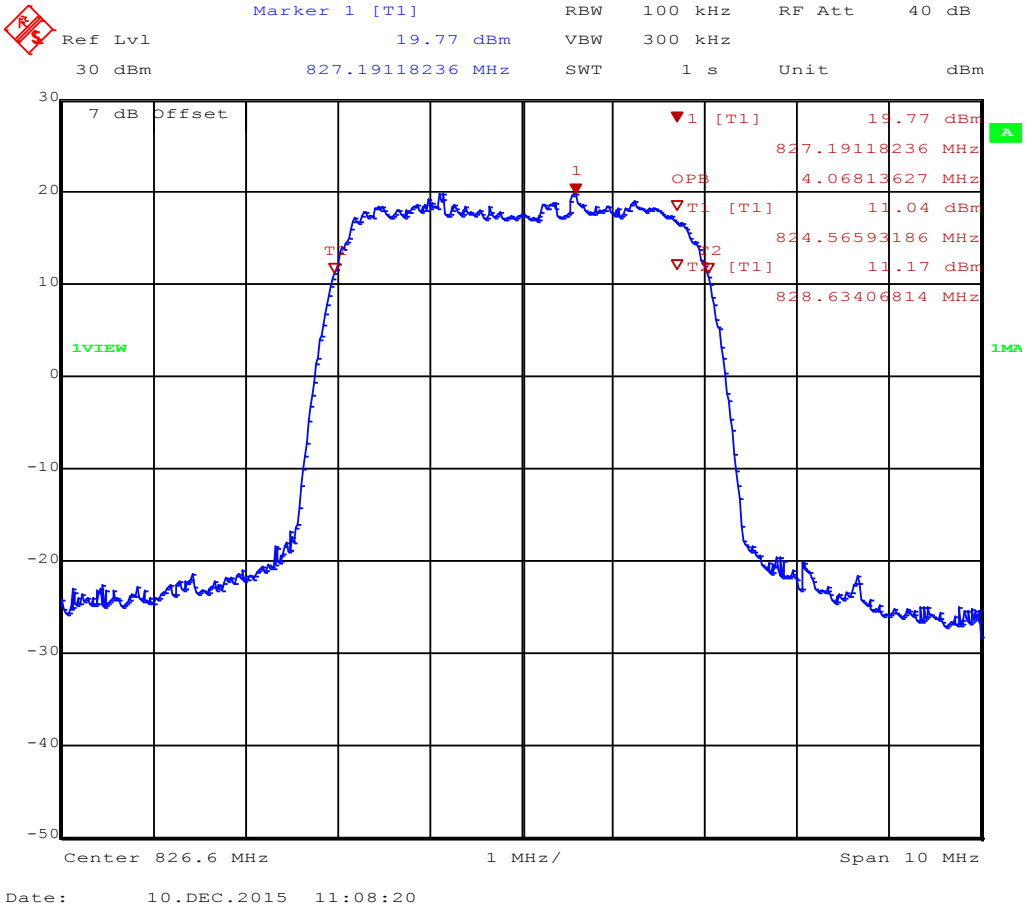


Occupied Bandwidth – FDD V F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1508-4987

Applicant:	TomTom Telematics B.V.
EUT Name:	Telematic Device with GPRS+WCDMA/BT/GPS
Model:	L0530
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	UMTS FDD V / CH: 4133 / HSUPA-HSDPA
Test Date:	2015-12-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.068 MHz

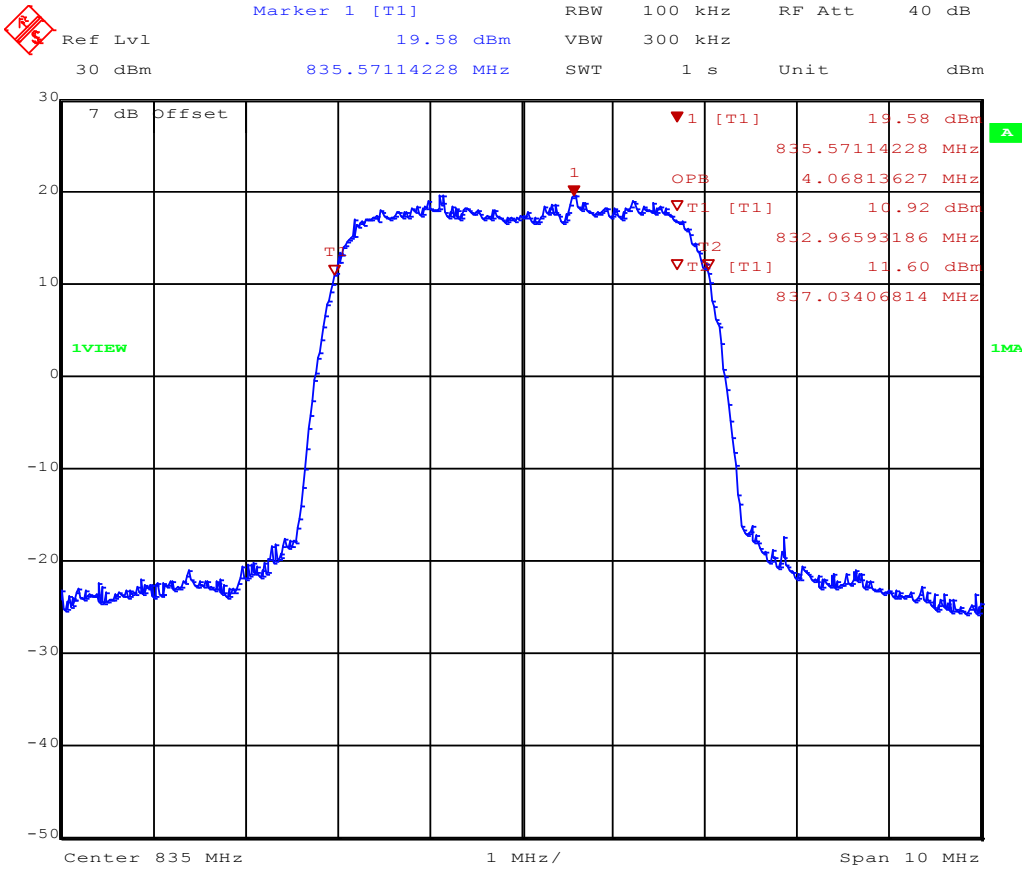


Occupied Bandwidth – FDD V F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1508-4987

Applicant:	TomTom Telematics B.V.
EUT Name:	Telematic Device with GPRS+WCDMA/BT/GPS
Model:	L0530
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	UMTS FDD V / CH: 4175 / HSUPA-HSDPA
Test Date:	2015-12-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.068 MHz

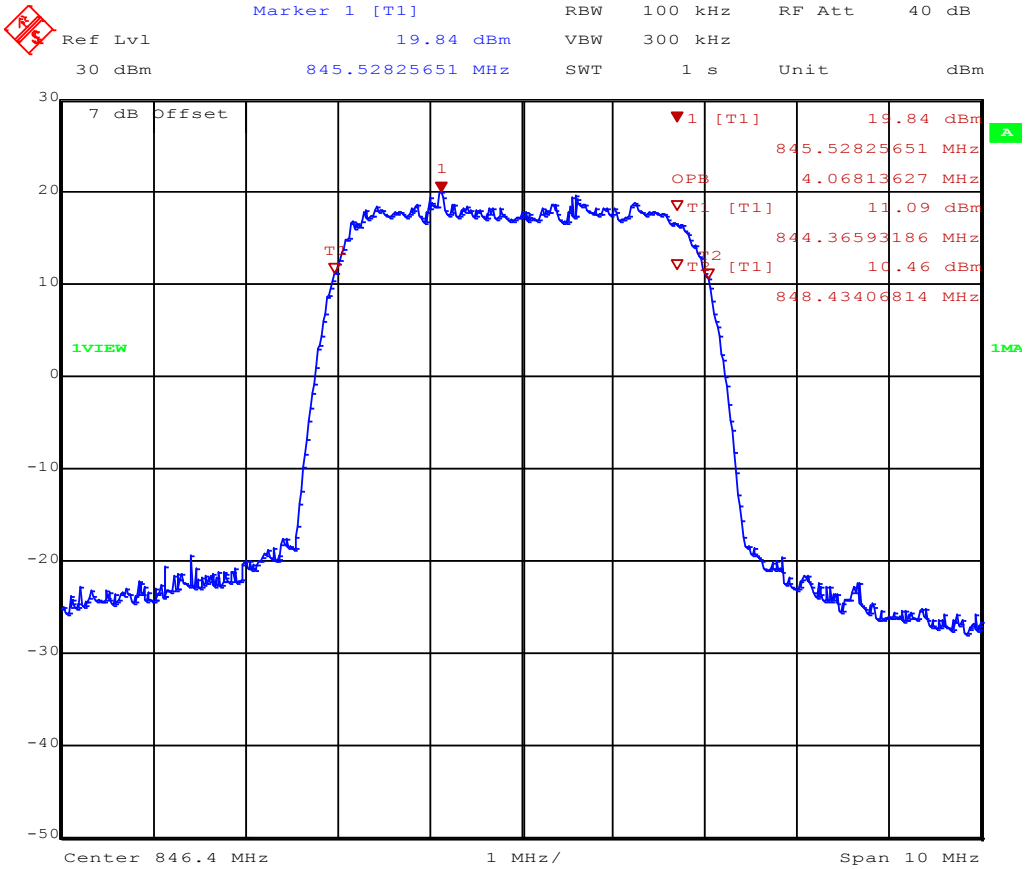


Occupied Bandwidth – FDD V F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1508-4987

Applicant:	TomTom Telematics B.V.
EUT Name:	Telematic Device with GPRS+WCDMA/BT/GPS
Model:	L0530
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	UMTS FDD V / CH: 4232 / HSUPA-HSDPA
Test Date:	2015-12-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.068 MHz

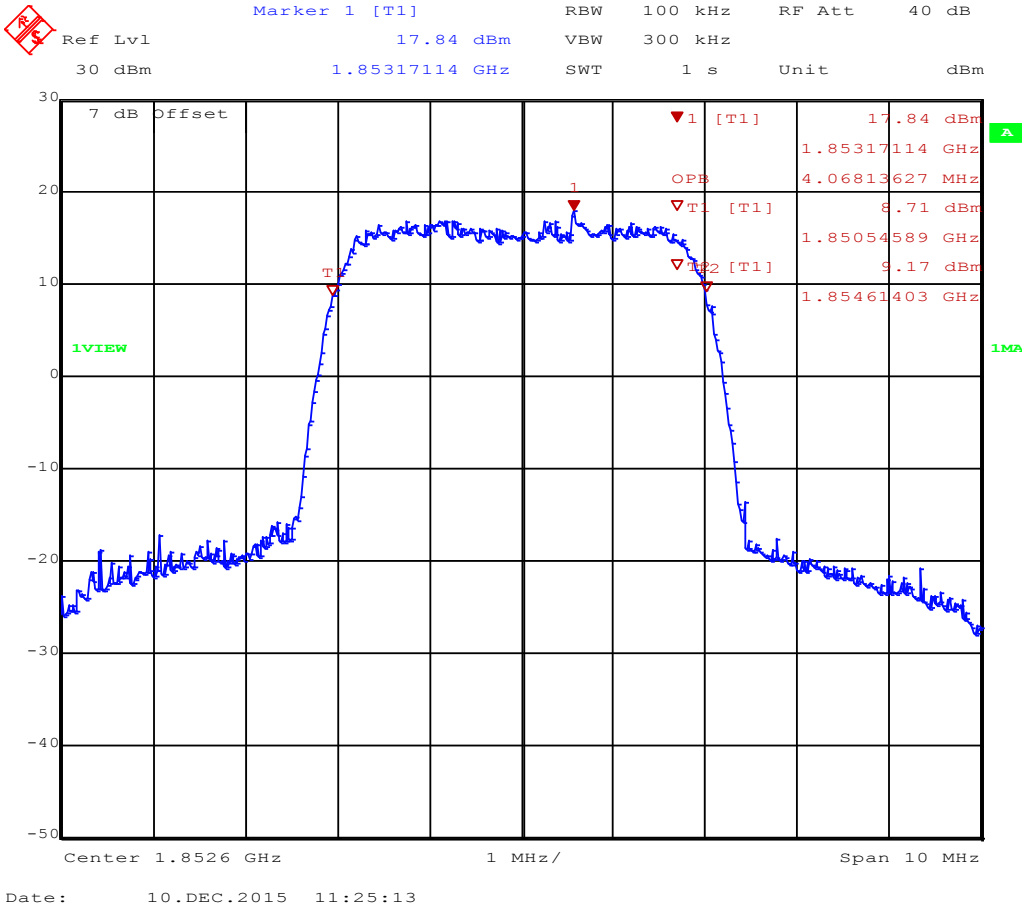


Occupied Bandwidth – FDD II F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1508-4987

Applicant:	TomTom Telematics B.V.
EUT Name:	Telematic Device with GPRS+WCDMA/BT/GPS
Model:	L0530
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	UMTS FDD II / CH: 9263 / HSUPA-HSDPA
Test Date:	2015-12-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.068 MHz

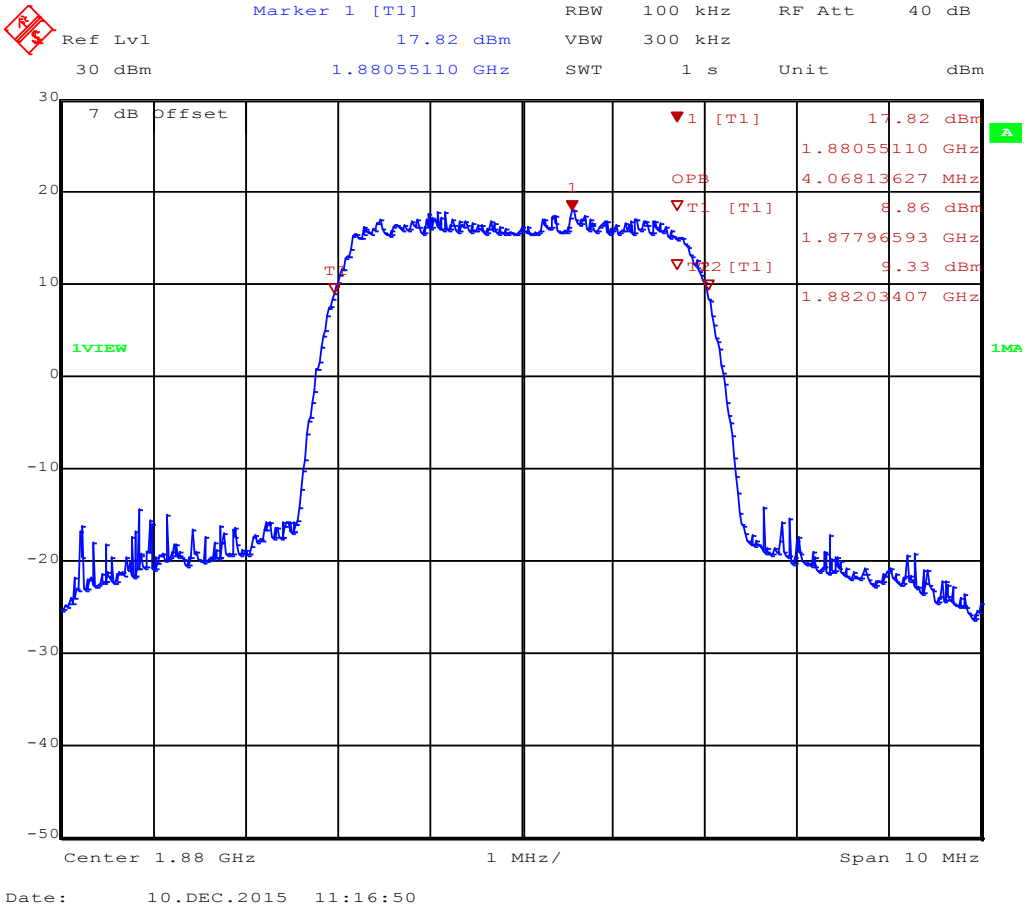


Occupied Bandwidth – FDD II F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1508-4987

Applicant:	TomTom Telematics B.V.
EUT Name:	Telematic Device with GPRS+WCDMA/BT/GPS
Model:	L0530
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	UMTS FDD II / CH: 9400 / HSUPA-HSDPA
Test Date:	2015-12-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.068 MHz

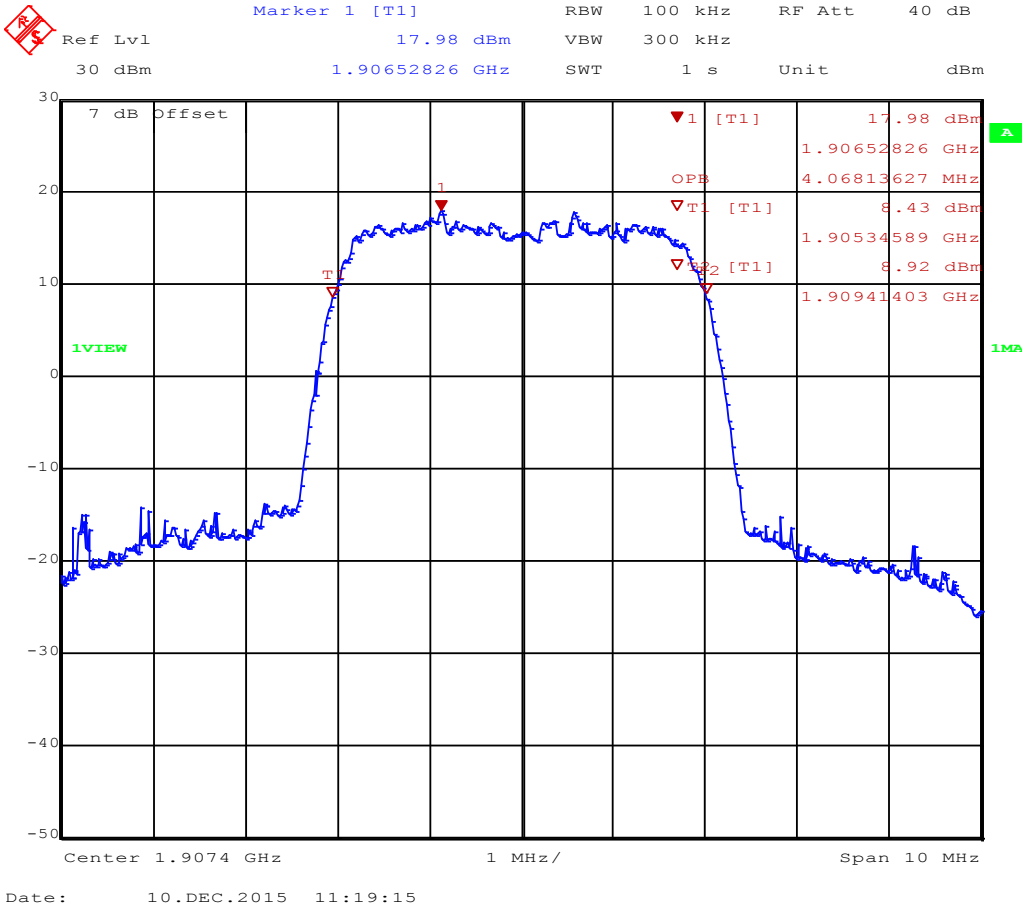


Occupied Bandwidth – FDD II F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1508-4987

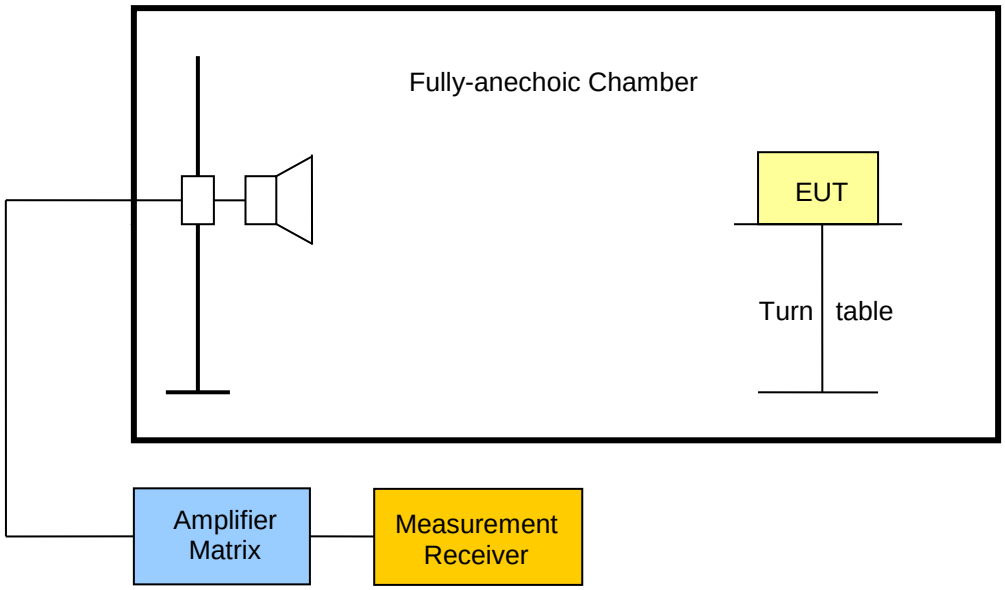
Applicant:	TomTom Telematics B.V.
EUT Name:	Telematic Device with GPRS+WCDMA/BT/GPS
Model:	L0530
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	UMTS FDD II / CH: 9537 / HSUPA-HSDPA
Test Date:	2015-12-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.068 MHz



3.2 Test Conditions and Results – Effective radiated power / Equivalent isotropic radiated power

Radiated power acc. to FCC 22H / FCC 24E / IC RSS-132 / IC RSS-133		Verdict: PASS
EUT requirement rule parts and clause	Reference	
	FCC § 22.913(a) / FCC § 24.232(c) IC RSS-132 § 4.4 /IC RSS-133 § 6.4	
Test according to measurement reference	Reference Method	
	FCC § 22.913(a) / FCC § 24.232(c) / ANSI/TIA-603-C IC RSS-132 § 4.4 /IC RSS-133 § 6.4	
Test frequency range	Tested frequencies	
	F_{LOW} / F_{MID} / F_{HIGH}	
Limits		
Frequency range	Equipment type	Power limit
824-849 MHz	Mobile transmitter	FCC : 7 Watts (38.45 dBm) e.r.p. IC : 11.5 Watts (40.6 dBm) e.i.r.p.
1850-1910 MHz	Mobile transmitter	FCC : 2 Watts (33 dBm) e.i.r.p. IC : 2 Watts (33 dBm) e.i.r.p.

Test setup



Test procedure

1. EUT set to test mode
2. The radiated power is measured with a measurement antenna in vertical polarization
3. To obtain maximum level the EUT is rotated
4. The EUT is replaced with a half-wave dipole and the power to the dipole is adjusted to obtain same radiated power measurement value

Test results – GSM850 E.R.P. Antenna integrated							
Channel	Frequency [MHz]	Mode	Pol.	Power [dBm e.r.p]	Limit [dBm e.r.p]	Margin [dB]	Result
F_{LOW}	824.2	GSM850	hor	31.6	38.45	-6.85	PASS
F_{MID}	836.2	GSM850	hor	31.4	38.45	-7.05	PASS
F_{HIGH}	848.8	GSM850	hor	30.8	38.45	-7.65	PASS
Test results – GSM850 E.R.P. Antenna external							
Channel	Frequency [MHz]	Mode	Pol.	Power [dBm e.i.r.p]	Limit [dBm e.i.r.p]	Margin [dB]	Result
FLOW	824.2	GSM850	ver	27.0	38.45	-11.45	PASS
FMID	836.2	GSM850	ver	28.9	38.45	-9.55	PASS
FHIGH	848.8	GSM850	ver	28.7	38.45	-9.75	PASS
Test results – GSM1900 E.I.R.P. Antenna integrated							
Channel	Frequency [MHz]	Mode	Pol.	Power [dBm e.i.r.p]	Limit [dBm e.i.r.p]	Margin [dB]	Result
F_{LOW}	1850.2	GSM1900	hor	29.5	33	-3.5	PASS
F_{MID}	1880	GSM1900	hor	29.4	33	-3.6	PASS
F_{HIGH}	1909.8	GSM1900	hor	29.5	33	-3.5	PASS
Test results – GSM1900 E.I.R.P. Antenna external							
Channel	Frequency [MHz]	Mode	Pol.	Power [dBm e.i.r.p]	Limit [dBm e.i.r.p]	Margin [dB]	Result
F_{LOW}	1850.2	GSM1900	ver	21.8	33	-11.2	PASS
F_{MID}	1880	GSM1900	ver	22.4	33	-10.6	PASS
F_{HIGH}	1909.8	GSM1900	hor	23.8	33	-9.2	PASS
Test results – UMTS FDDV E.R.P. Antenna integrated							
Channel	Frequency [MHz]	Mode	Pol.	Power [dBm e.i.r.p]	Limit [dBm e.i.r.p]	Margin [dB]	Result
F_{LOW}	826.6	UMTS FDDV	hor	24.5	38.45	-13.95	PASS
F_{MID}	835.0	UMTS FDDV	hor	25.5	38.45	-12.95	PASS
F_{HIGH}	846.4	UMTS FDDV	hor	24.9	38.45	-13.55	PASS
Test results – UMTS FDDV E.R.P. Antenna external							
Channel	Frequency [MHz]	Mode	Pol.	Power [dBm e.i.r.p]	Limit [dBm e.i.r.p]	Margin [dB]	Result
F_{LOW}	826.6	UMTS FDDV	ver	19.5	38.45	-18.95	PASS
F_{MID}	835.0	UMTS FDDV	ver	21.3	38.45	-17.15	PASS
F_{HIGH}	846.4	UMTS FDDV	ver	22.8	38.45	-15.65	PASS

Test results – UMTS FDDII E.I.R.P. Antenna integrated							
Channel	Frequency [MHz]	Mode	Pol.	Power [dBm e.i.r.p]	Limit [dBm e.i.r.p]	Margin [dB]	Result
F_{LOW}	1852.6	UMTS FDDII	hor	25.3	33	-7.7	PASS
F_{MID}	1880.0	UMTS FDDII	hor	22.5	33	-9.5	PASS
F_{HIGH}	1907.4	UMTS FDDII	hor	25.6	33	-7.4	PASS
Test results – UMTS FDDII E.I.R.P. Antenna external							
Channel	Frequency [MHz]	Mode	Pol.	Power [dBm e.i.r.p]	Limit [dBm e.i.r.p]	Margin [dB]	Result
F_{LOW}	1852.6	UMTS FDDII	ver	17.7	33	-15.3	PASS
F_{MID}	1880.0	UMTS FDDII	ver	18.3	33	-14.7	PASS
F_{HIGH}	1907.4	UMTS FDDII	ver	19.6	33	-13.4	PASS
Comments:							

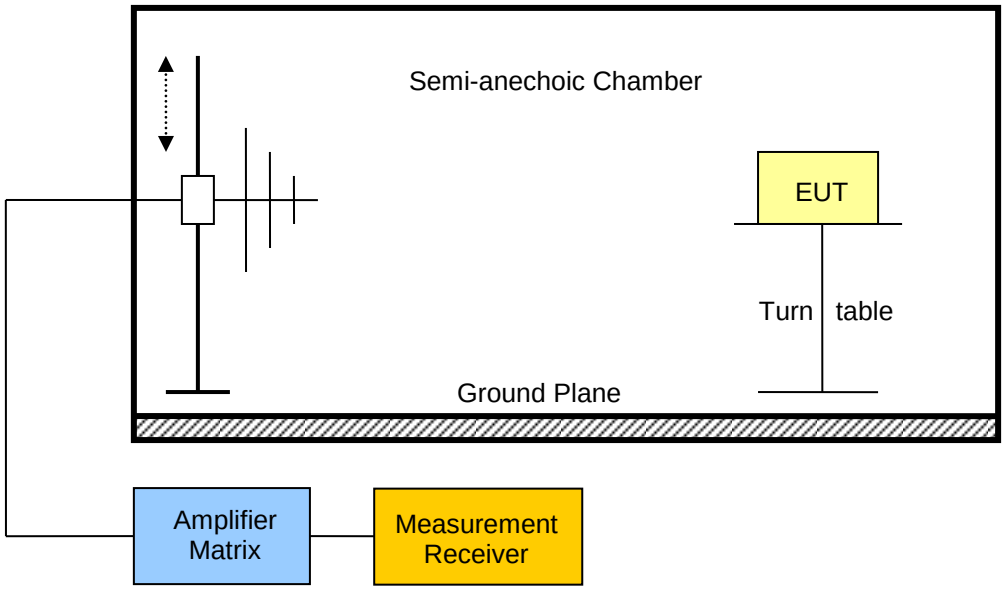
3.3 Test Conditions and Results – Transmitter radiated emissions

Transmitter radiated power acc. to FCC 22H / FCC 24E / IC RSS-132 / IC RSS-133	**Verdict: PASS**
Test according referenced standards	Reference Method
	FCC § 22.917(a) / FCC § 24.238(a) IC RSS-132 § 4.5 / IC RSS-133 § 6.5
Test according to measurement reference	Reference Method
	ANSI/TIA-603-C
Test frequency range	Tested frequencies
	30 MHz – 10th Harmonic

Limits

Frequency range	Limit
824-849 MHz	Attenuation below transmitter power ≥ 43 + 10 · $\log_{10}$(P) [dB] = -13 dBm
1850-1910 MHz	Attenuation below transmitter power ≥ 43 + 10 · $\log_{10}$(P) [dB] = -13 dBm

Test setup



Test procedure

1. EUT set to test mode
2. Maximum emission level is measured by rotating the EUT and adjusting the antenna height for vertical polarization
3. The EUT is replaced by a substitution antenna and generator
4. The power level is set to obtain the same power reading
5. Measurement is repeated for horizontal polarization

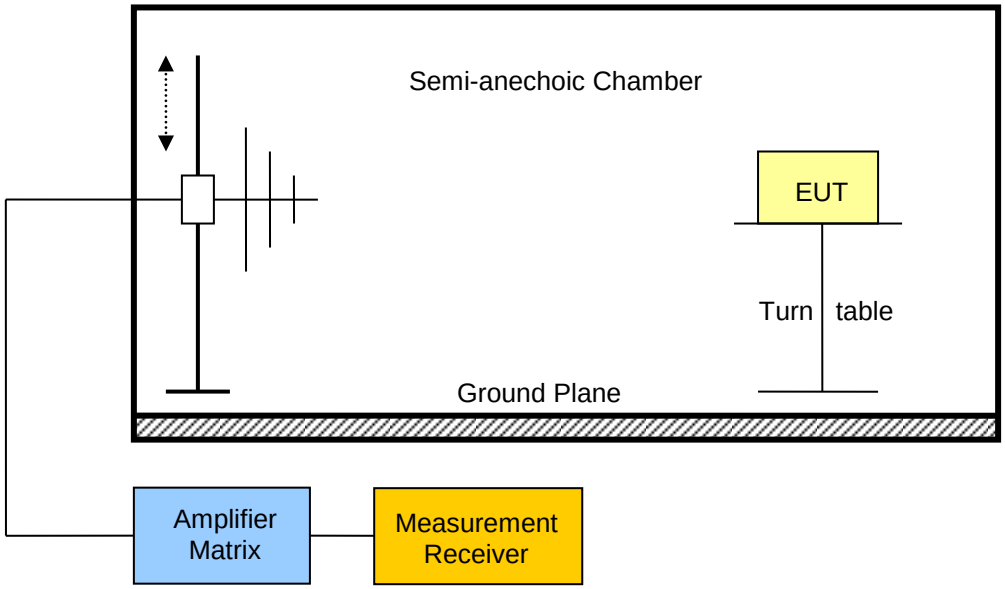
Test results – GPRS850 Antenna external							
Channel	Frequency [MHz]	Mode	Emission [MHz]	Level [dbm]	Pol.	Limit [dBm]	Margin [dB]
128	824.2	GPRS850	823.996	-16.2	ver	-13.0	-3.2
128	824.2	GPRS850	823.998	-16.7	hor	-13.0	-3.7
251	848.8	GPRS850	849.002	-15.2	ver	-13.0	-2.2
251	848.8	GPRS850	849.002	-16.4	hor	-13.0	-3.4
Test results – GPRS850 Antenna integrated							
Channel	Frequency [MHz]	Mode	Emission [MHz]	Level [dbm]	Pol.	Limit [dBm]	Margin [dB]
128	824.2	GPRS850	823.980	-19.0	hor	-13.0	-6.0
188	836.2	GPRS850	1666	-28.7	hor	-13.0	-15.7
251	848.8	GPRS850	850.718	-19.8	hor	-13.0	-6.8
251	848.8	GPRS850	1696	-26.1	hor	-13.0	-13.1
Test results – GPRS 1900 Antenna external							
Channel	Frequency [MHz]	Mode	Emission [MHz]	Level [dbm]	Pol.	Limit [dBm]	Margin [dB]
512	1850.2	GPRS1900	1850	-29.9	ver	-13.0	-16.9
512	1850.2	GPRS1900	1850	-29.7	hor	-13.0	-16.3
810	1909,8	GPRS1900	1910	-26.3	ver	-13.0	-13.3
810	1909,8	GPRS1900	1910	-25.6	hor	-13.0	-12.6
Test results – GPRS 1900 Antenna integrated							
Channel	Frequency [MHz]	Mode	Emission [MHz]	Level [dbm]	Pol.	Limit [dBm]	Margin [dB]
512	1850.2	GPRS1900	1850	-30.3	ver	-13.0	-17.3
512	1850.2	GPRS1900	1850	-23.9	hor	-13.0	-10.9
810	1909,8	GPRS1900	1910	-26.9	ver	-13.0	-13.9
810	1909,8	GPRS1900	1910	-21.1	hor	-13.0	- 8.1
Comments:							

Test results – UMTS FDDV Antenna external							
Channel	Frequency [MHz]	Mode	Emission [MHz]	Level [dbm]	Pol.	Limit [dBm]	Margin [dB]
4133	826.6	HSPA	822.816	-29.3	ver	-13.0	-16.3
4133	826.6	HSPA	1648	-21.8	ver	-13.0	-8.8
4133	826.6	HSPA	1648	-23.8	hor	-13.0	-10.8
4133	826.6	HSPA	2476	-25.9	ver	-13.0	-12.9
4175	835.0	HSPA	1666	-23.8	ver	-13.0	-10.8
4175	835.0	HSPA	1666	-23.2	hor	-13.0	-10.2
4175	835.0	HSPA	2506	-26.8	ver	-13.0	-13.8
4232	846.4	HSPA	850.150	-28.1	ver	-13.0	-15.1
4232	846.4	HSPA	1690	-28.2	ver	-13.0	-15.2
4232	846.4	HSPA	1690	-26.5	hor	-13.0	-13.5
4232	846.4	HSPA	2535	-26.4	ver	-13.0	-13.4
4232	846.4	HSPA	2536	-27.6	hor	-13.0	-14.6
Test results – UMTS FDDV Antenna integrated							
Channel	Frequency [MHz]	Mode	Emission [MHz]	Level [dbm]	Pol.	Limit [dBm]	Margin [dB]
4133	826.6	HSPA	821.298	-26.5	hor	-13.0	-13.5
4133	826.6	HSPA	1648	-25.5	hor	-13.0	-12.5
4175	835.0	HSPA	1672	-25.1	hor	-13.0	-12.1
4232	846.4	HSPA	850.100	-23.6	hor	-13.0	-13.6
4232	846.4	HSPA	1690	-24.6	ver	-13.0	-11.6
4232	846.4	HSPA	1690	-23.2	hor	-13.0	-10.2
4232	846.4	HSPA	2542	-25.3	hor	-13.0	-12.3

Test results – UMTS FDDII Antenna external							
Channel	Frequency [MHz]	Mode	Emission [MHz]	Level [dbm]	Pol.	Limit [dBm]	Margin [dB]
9263	1852.6	HSPA	3704	-20.6	ver	-13.00	-7.6
9400	1880.0	HSPA	3760	-18.9	ver	-13.00	-5.9
9537	1907.4	HSPA	3816	-15.6	ver	-13.00	-2.6
Test results – UMTS FDDII Antenna integrated							
Channel	Frequency [MHz]	Mode	Emission [MHz]	Level [dbm]	Pol.	Limit [dBm]	Margin [dB]
9263	1852.6	HSPA	1844	-23.3	hor	-13.00	-10.3
9263	1852.6	HSPA	3703	-21.3	ver	-13.00	-8.3
9263	1852.6	HSPA	3704	-25.6	hor	-13.00	-12.6
9400	1880.0	HSPA	3756	-18.5	ver	-13.00	-05.5
9400	1880.0	HSPA	3756	-25.6	hor	-13.00	-12.6
9537	1907.4	HSPA	1915	-22.6	hor	-13.00	-9.6
9537	1907.4	HSPA	3816	-19.0	ver	-13.00	-6.0
Comments:							

3.4 Test Conditions and Results – Receiver radiated emissions

Receiver radiated emissions acc. to IC RSS-132 / RSS-133				Verdict: PASS
Test according referenced standards	Reference Method			
	IC RSS-132 5.6 / 133 6.6			
Test according to measurement reference	Reference Method			
	ANSI C63.4			
Test frequency range	Tested frequencies			
	30 MHz – 5th Harmonic			
EUT test mode	Receive			
Limits				
Frequency range [MHz]	Detector	Limit [µV/m]	Limit [dBµV/m]	Limit Distance [m]
30 – 88	Quasi-Peak	100	40	3
88 – 216	Quasi-Peak	150	43.5	3
216 – 960	Quasi-Peak	200	46	3
960 – 1000	Quasi-Peak	500	54	3
> 1000	Average	500	54	3
Test setup				



Test procedure
1. EUT set to receive mode (Communication tester is used if needed) 2. Span it set according to measurement range 3. Resolution bandwidth below 1GHz is set according to CISPR 16 with peak/quasi-peak detector and RBW of 1MHz with peak/average detector is used above 1GHz 4. Markers are set to peak emission levels

Test results

Channel	Frequency [MHz]	Emission [MHz]	Emission Level [dBµV/m]	Polarization	Det.	Limit [dBµV/m]	Margin [dB]
188	836.2	7824	51.35	ver	pk	53.98	-2.63
188	836.2	7848	51.43	ver	pk	53.98	-2.55
188	836.2	12710	47.56	ver	pk	53.98	-6.42
188	836.2	7568	51.83	ver	pk	53.98	-2.15
188	836.2	7784	51.25	ver	pk	53.98	-2.73
661	1880	7688	52.34	ver	pk	53.98	-1.64
4400	835.0	7824	51.35	ver	pk	53.98	-2.63
4400	835.0	7848	51.43	ver	pk	53.98	-2.55
4400	835.0	12710	47.56	ver	pk	53.98	-6.42
4400	835.0	7564	50.38	ver	pk	53.98	-3.60
4400	835.0	7780	51.95	ver	pk	53.98	-2.03
9800	1880	17196	49.57	ver	pk	53.98	-4.41
9800	1880	7680	51.51	ver	pk	53.98	-2.47
9800	1880	17095	49.40	ver	pk	53.98	-4.58

Comments:
* Physical distance between EUT and measurement antenna.
** Emission level corresponds to ambient noise floor