



FCC RF TEST REPORT

Report No.:	R201811001
Model No.:	JA32
Grant No.:	JOY
FCC ID:	JOYJA32
Date of Receipt:	Oct 10,2018
Date of Test:	Oct 10,2018~ Nov 19,2018
Date of Issue:	Nov 26,2018
Test Result:	PASS
Applicant:	KYOCERA CORPORATION
Manufacturer:	KYOCERA CORPORATION
Factory:	KYOCERA CORPORATION
Product Name	SMART PHONE
Trade Mark	KYOCERA
Address:	Yokohama Office 2-1-1 Kagahara,Tsuzuki-ku Yokohama-shi,Kanagawa,Japan
Issued By:	BYD Precise Manufacture Co., Ltd.
Lab Location:	No. 3001, Baohe Road, Baolong Longgang, Shenzhen, 518116, People's Republic of China

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1 REPORT ISSUED HISTORY

Version	Description	Issued Data
Rev. 01	Original issue	Nov 26,2018



2 CERTIFICATION

PRODUCT:	Smart Phone
MODEL:	JA32
BRAND:	KYOCERA
APPLICANT:	KYOCERA
TEST SAMPLE:	ENGINEERING SAMPLE
SN.:	JA32125479850089K0036/ JA32125479850089K0021
HW Version:	JA32
SW Version:	Sdm660_64-userdebug 9
TESTED:	Oct 10,2018~ Nov 19,2018
STANDARDS:	FCC 47 CFR Part2,22(H),24(E),27(L)

The above equipment has been tested by **BYD Precise Manufacture Co., Ltd.**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

PREPARED BY : 鲁芬, 薛怡 , **DATE:** 2018-11-26
(Fen Lu , Yi Xue / Engineer)

TECHNICAL ACCEPTANCE : 冯卓辉 , **DATE:** 2018-11-26
Responsible for EMS (Zhaohui Feng / Manager)

APPROVED BY : 颜杰 , **DATE:** 2018-11-26
(Jie Yan / Director)



3 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

SN.	FCC RULE	Description	RESULT	REMARK
JA32125479850089K0036	§2.1046	Conducted Output Power	Pass	Reporting Only
	§24.232(d)	peak-to-average ratio	Pass	<13dB
	§2.1049 §22.917 (b) §24.238(b) §27.53(g)	Bandwidth	Pass	Reporting Only
	§2.1051 §22.917(a) §24.238(a) §27.53(h)	Band Edges	Pass	<43+10log10(P[Watts])
	§2.1051 §22.917(a) §24.238(a) §27.53(h)	Spurious Emission	Pass	<43+10log10(P[Watts])
	§2.1055 §22.355 §24.235 §27.54	Frequency Stability	Pass	<2.5ppm for Part22 Within Authorized Band
	§Part22.913(a)(2) §Part24.232(c) §Part27.50(d)(4)	ERP/EIRP	Pass	Band5:ERP<7W Band2:EIRP<2W Band4:EIRP<1W
JA32125479850089K0021	§2.1053 §22.917(a) §24.238(a) §27.53(h)	Field Strength of Spurious Radiation	Pass	<43+10log10(P[Watts])



3.1 Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5%
RF output power, Conducted	±0.59dB
Bandwidth, conducted	±1.78kHz
Unwanted Emissions, conducted	±0.9dB
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±0.4%

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.0dB
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Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.8dB
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4 GENERAL INFORMATION

4.1 Test Equipments List

Description & Manufacturer	MODEL NO.	SERIAL NO.	Next Calibration date
WIDEBAND RADIO COMMUNICATION TESTER ROHDE & SCHWARZ	CMW500	148277	2019/10/16
SIGNAL ANALYZER ROHDE & SCHWARZ	FSQ26	200393	2019/4/9
CMU200 ROHDE & SCHWARZ	CMU200	117747	2018/5/30
Temperature Chamber WEISS	Temperature Chamber	'58226087670060	2019/3/5
DC Power Supply Agilent	E3632A	MY40029031	2019/3/5
RF cable	Huber Suhner SUCOFLEX 104PE	-	-
PC	-	30008979	-
Power Divider	-	C279810-01	-
Universal radio communication tester	CMU 200	100677	2019.4.9
Antenna	ETS 3142C	79888	2019.1.29
Antenna	ETS 3117	57412	2019.1.25
EMI test receiver	ESU	100041	2019.4.9
EMC32 software	R&S	-	-
ETS 3M Semi-Anechoic Chamber	9.47m*6.59m*5.91m	A88030002609000010071	2019.1.22

NOTE: Calibration cycle 12 months.



4.2 Description of Test Modes

Test items	function type	Channel
Conducted Output Power	GSM850/PCS1900(GMSK+8PSK)+WCDMA BAND5(RMC 12.2kbps)	L/M/H
peak-to-average ratio		L/M/H
Bandwidth		L/M/H
Band Edges		L/H
Spurious Emission		L/M/H
Frequency Stability		M
Effective Radiated Power and Effective Isotropic Radiated Power		L/M/H
Filed Strength of Spurious Radiation	GSM 850 TX mode /PCS 1900 TX mode/ WCDMA Band5 TX mode	M

4.3 Test Environment and List of Software and Accessory

Test Items	Software	Accessory	Environment
Conducted Output Power	-	USB Cable、Fake battery、 Power Divider	Temp.:25°C±3
			Humi:30%~60%
			Volt.:3.8V
peak-to-average ratio	-	USB Cable、Fake battery、 Power Divider	Temp.:25°C±3
			Humi:30%~60%
			Volt.:3.8V
Bandwidth	-	USB Cable、Fake battery、 Power Divider	Temp.:25°C±3
			Humi:30%~60%
			Volt.:3.8V
Band Edges	-	USB Cable、Fake battery、 Power Divider	Temp.:25°C±3
			Humi:30%~60%



			Volt.:3.8V
Spurious Emission	-	USB Cable、Fake battery、Power Divider	Temp.:25°C±3
			Humi:30%~60%
			Volt.:3.8V
Frequency Stability	-	USB Cable、Fake battery、Power Divider	Temp.: -20°C~60°C
			Humi:30%~60%
			Volt.:3.8、3.42、4.18V
Effective Radiated Power and Effective Isotropic Radiated Power	-	USB Cable、Fake battery、Power Divider	Temp.:25°C±3
			Humi:30%~60%
			Volt.:3.8V
Filed Strength of Spurious Radiation	EMC32	Charger: AC-10UC(NOKIA) Headset: HSEJ03JY(Mi)	Temp.:25°C±3
			Humi:30%~60%
			Volt.:3.8V

4.4 Testing Location

Test Site	BYD Precise Manufacture Co., Ltd.
Test Site Location	No. 3001, Baohe Road, Baolong Longgang, Shenzhen, 518116, People' s Republic of China
Post Code	518116
Telephone	+86-755 8489 8888 55501
Fax	+86-755 8964 3771



4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **A2LA (Certificate No. 4886.01)**

BYD Precise Manufacture Co., Ltd., Baolong Shenzhen Laboratory is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 4886.01.

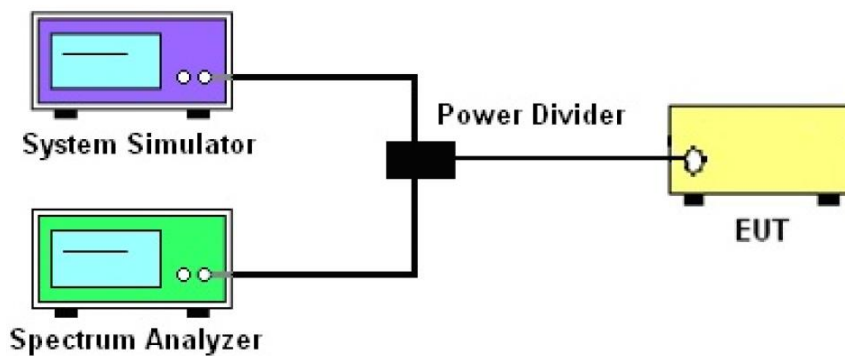
- **FCC –Designation Number: CN1232**

BYD Precise Manufacture Co., Ltd., Baolong Shenzhen Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1232.

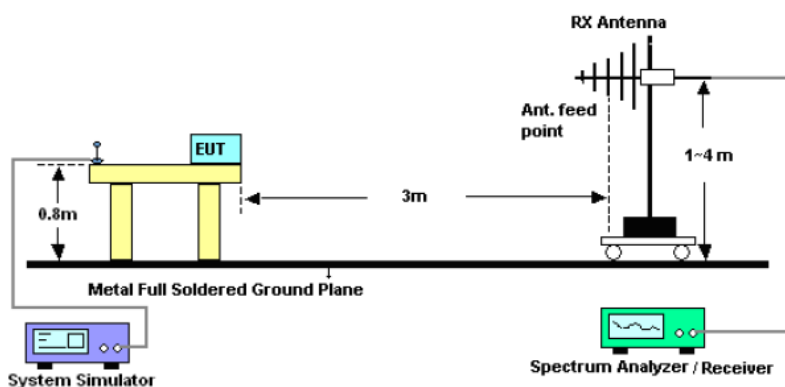
4.6 Configuration of System Under Test

Conducted:

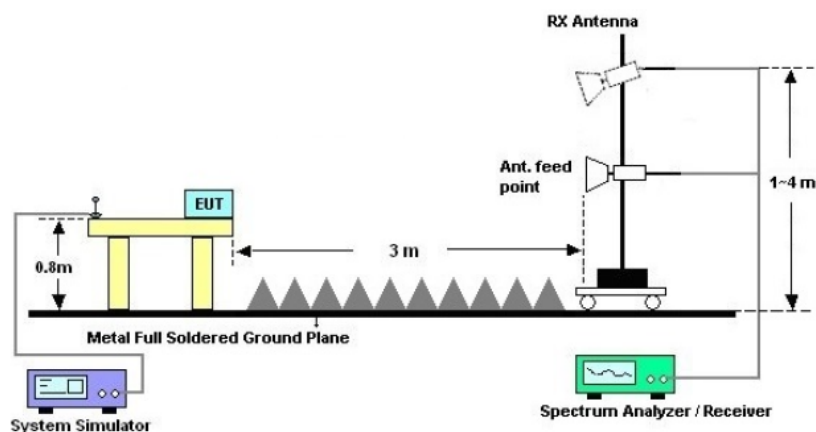


Radiated:

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz





4.7 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC 47 CFR Part2, 22(H), 24(E), 27(L)

ANSI/TIA/EIA-603-D-2010

FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02

All test items have been performed and recorded as per the above standards.



5 TEST TYPES AND RESULTS

5.1 Conducted Output Power (Reporting Only)

5.1.1 Description of the Conducted Output Power

A system simulator was used to establish communication with the EUT. Its parameters were set to enforce EUT transmitting at the maximum power. The measured power in the radio frequency on the transmitter output terminals shall be reported

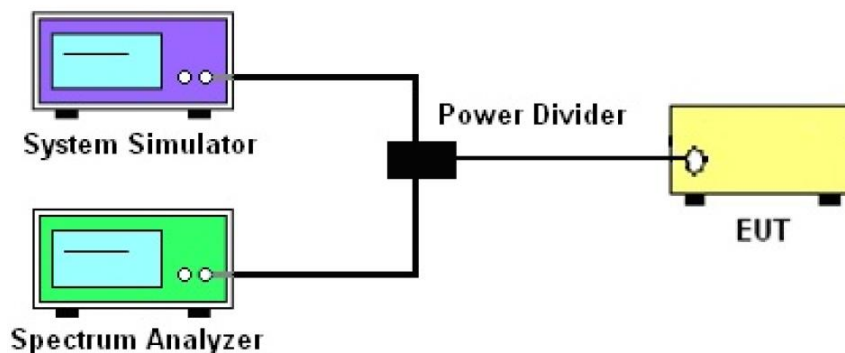
5.1.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

5.1.3 Test Procedure

- The transmitter output port was connected to the system simulator.
- Set EUT at maximum power through system simulator.
- Select lowest, middle, and highest channels for each band and different modulation.
- Measure the maximum burst average power for GSM and maximum average power for other modulation signal.

5.1.4 Test Setup



5.1.5 Test Results

Modes	GSM850			Modes	PCS1900		
Channel	128	190	251	Channel	512	661	810
Frequency(MHz)	824.2	836.6	848.8	Frequency(MHz)	1850.2	1880	1909.8
Conducted Power (dBm)	32.83	32.54	32.36	Conducted Power(dBm)	27.97	28.72	29.35
Modes	WCDMA BAND5						
Channel	4132	4182	4233				
Frequency(MHz)	826.4	836.4	846.6				
Conducted Power(dBm)	22.66	22.89	22.70				



Modes	GPRS 850			Modes	GPRS 1900		
Channel	128	190	251	Channel	512	661	810
Frequency(MHz)	824.2	836.6	848.8	Frequency(MHz)	1850.2	1880	1909.8
Conducted Power(dBm)	33.04	32.75	32.59	Conducted Power(dBm)	28.42	29.05	29.54

Modes	EGPRS 850			Modes	EGPRS 1900		
Channel	128	190	251	Channel	512	661	810
Frequency(MHz)	824.2	836.6	848.8	Frequency(MHz)	1850.2	1880	1909.8
Conducted Power(dBm)	26.68	26.66	26.81	Conducted Power(dBm)	24.55	24.83	25.54



5.2 Peak-To-Average Ratio

5.2.1 Description

The peak-to-average ratio (PAR) of the transmission may not exceed 13dB.

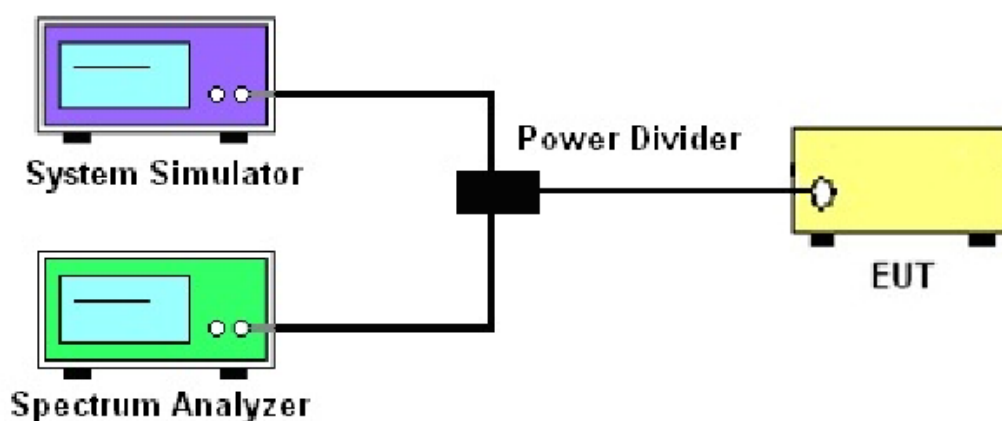
5.2.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

5.2.3 Test Procedure

- The EUT was connected to the spectrum analyzer and system simulator via a power divider.
- Set EUT in maximum power output.
- For GSM, Set spectrum analyzer: RBW=1MHz, VBW=3MHz, Peak detector on spectrum analyzer for first trace, RMS detector on spectrum analyzer for second trace. Record the deviation as Peak to Average Ratio.
- For WCDMA, Set the CCDF (Complementary Cumulative Distribution Function) option of the spectrum analyzer. Record the maximum PAPR level associated with a probability of 0.1%.

5.2.4 Test Setup



5.2.5 Test Result

Modes	GSM850	PCS1900
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Channel	128	190	251	512	661	810
Frequency (MHz)	824.2	836.6	848.8	1850.2	1880	1909.8
Peak-to-Average Ratio(dB)	0.05	0.05	0.05	0.03	0.05	0.06
Result (<13dB)	Pass	Pass	Pass	Pass	Pass	Pass
Modes	WCDMA BAND5					
Channel	4132	4182	4233			
Frequency (MHz)	826.4	836.4	846.6			
Peak-to-Average Ratio(dB)	3.04	3.01	2.85			
Result (<13dB)	Pass	Pass	Pass			

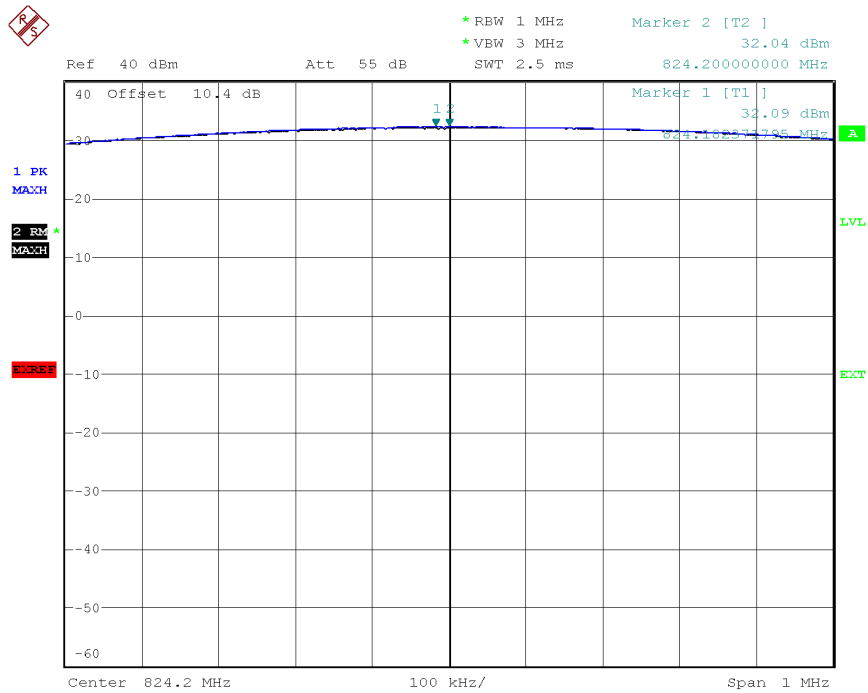
Modes	GPRS850			GPRS1900		
Channel	128	190	251	512	661	810
Frequency (MHz)	824.2	836.6	848.8	1850.2	1880	1909.8
Peak-to-Average Ratio(dB)	0.05	0.03	0.06	0.05	0.06	0.06
Result (<13dB)	Pass	Pass	Pass	Pass	Pass	Pass

Modes	EGPRS850			EGPRS1900		
Channel	128	190	251	512	661	810
Frequency (MHz)	824.2	836.6	848.8	1850.2	1880	1909.8
Peak-to-Average Ratio(dB)	0.02	0.07	0.09	0.09	0.08	0.06
Result (<13dB)	Pass	Pass	Pass	Pass	Pass	Pass



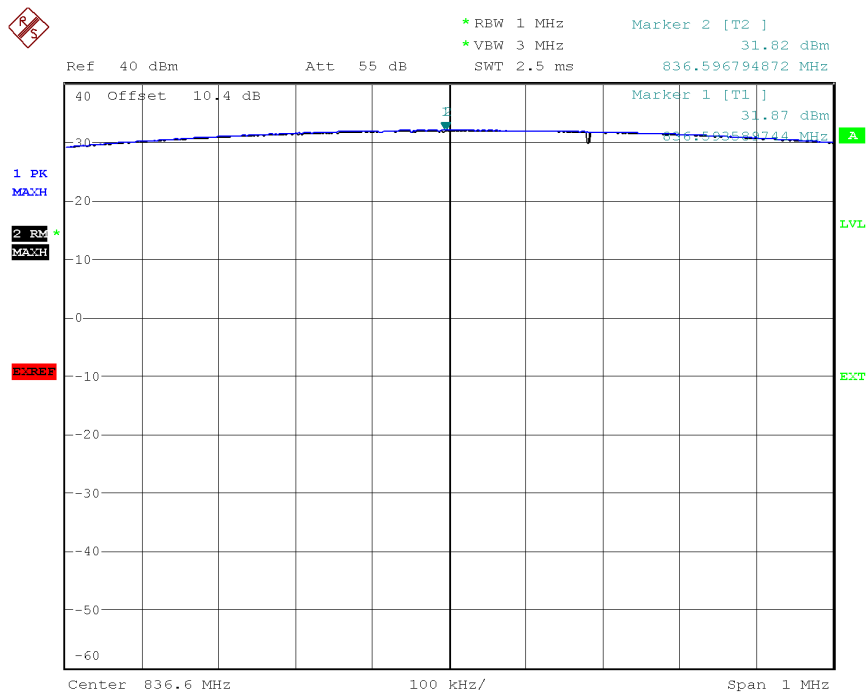
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Date: 16.OCT.2018 12:19:15

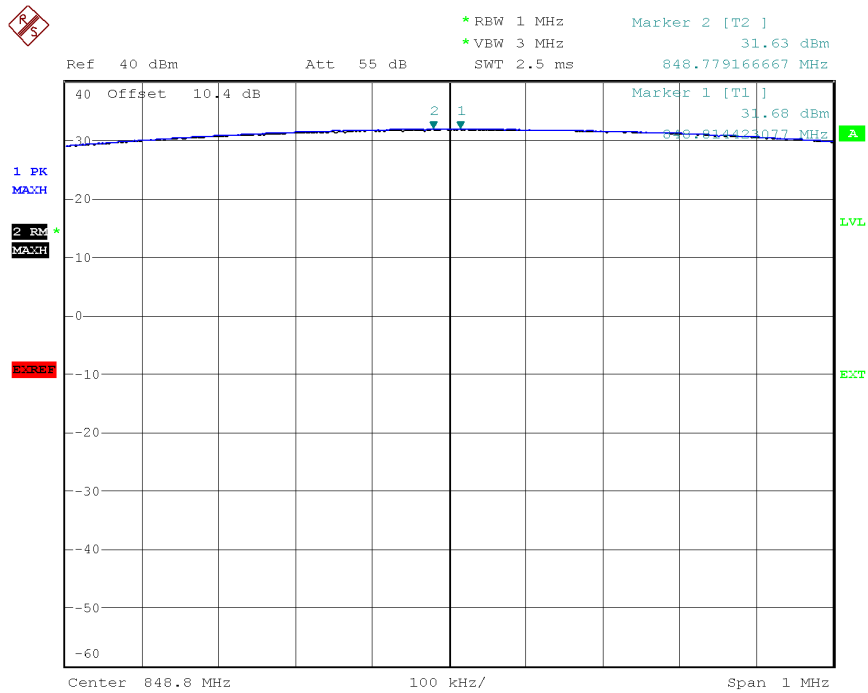
GSM850 Low Channel1



Date: 16.OCT.2018 12:17:56



GSM850 Mid Channel



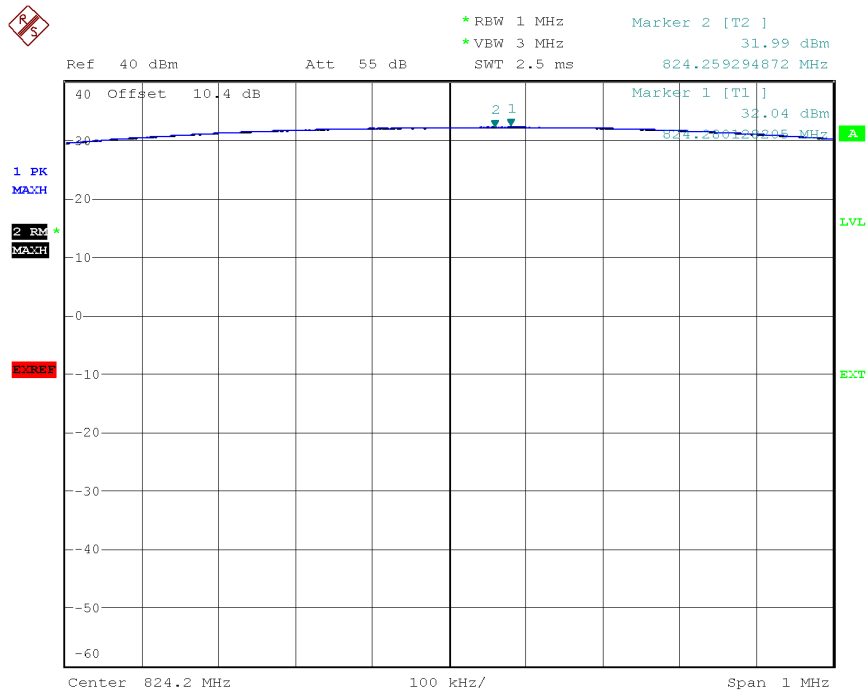
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GSM850 High Channel



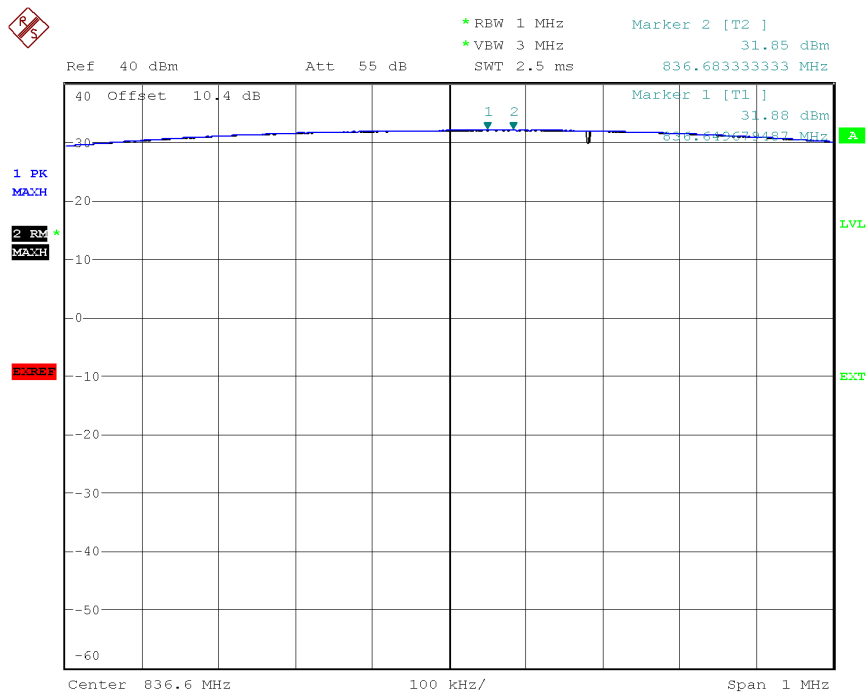
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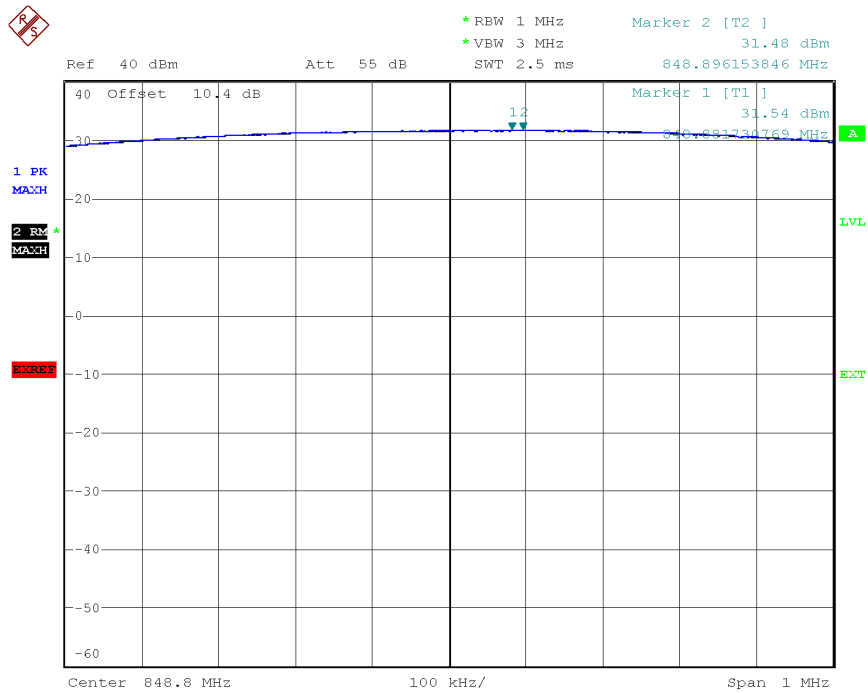
GPRS850 Low Channel



Date: 18.OCT.2018 11:28:39



GPRS850 Mid Channel



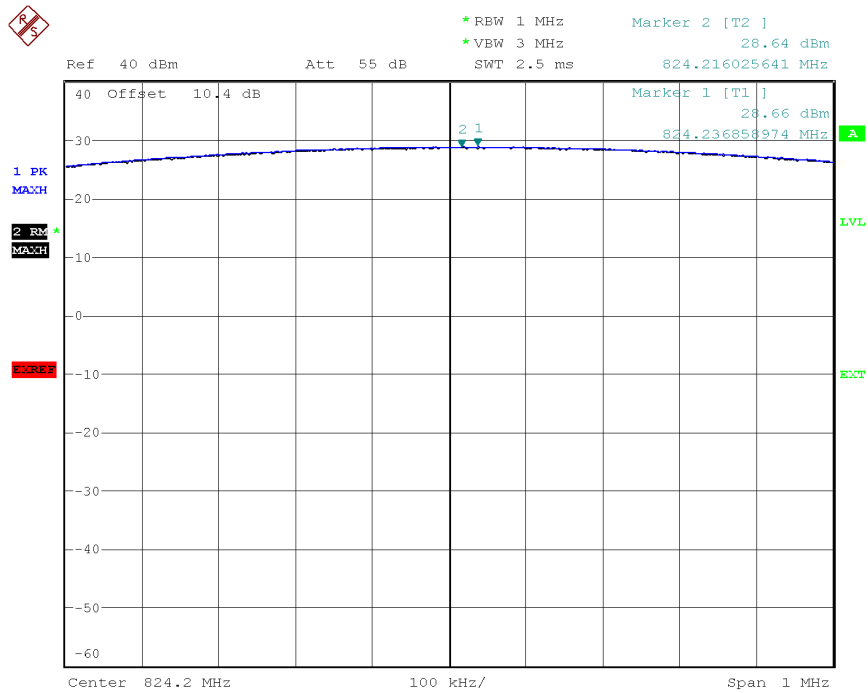
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GPRS850 High Channel



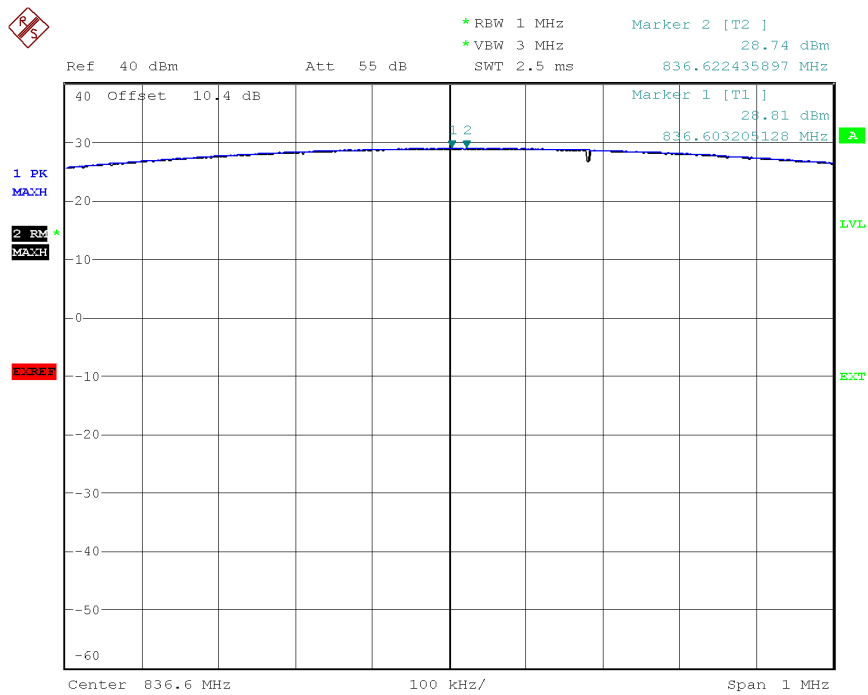
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FCC RF TEST REPORT



Date: 18.OCT.2018 15:51:56

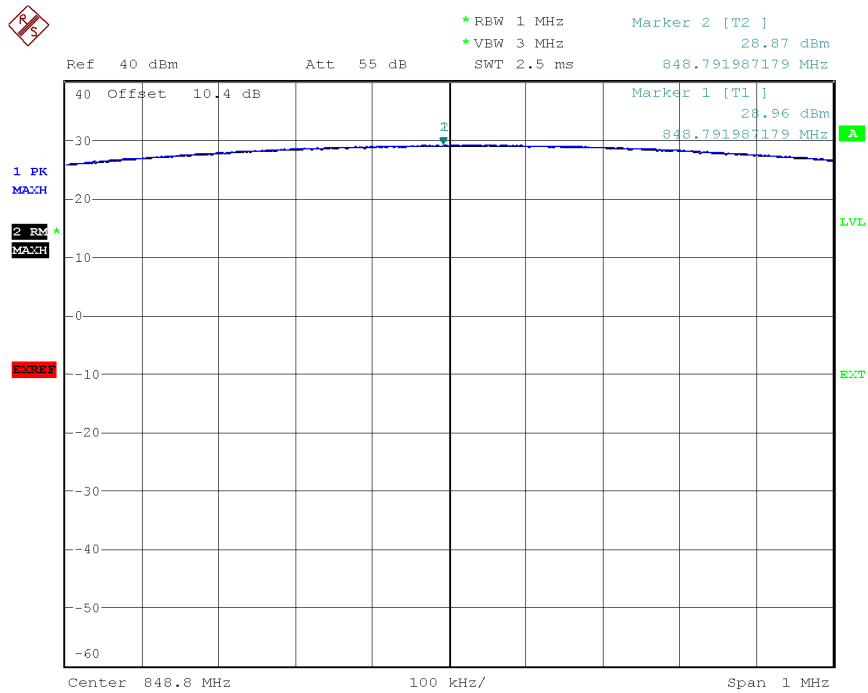
EGPRS850 Low Channel



Date: 18.OCT.2018 15:50:50



EGPRS850 Mid Channel



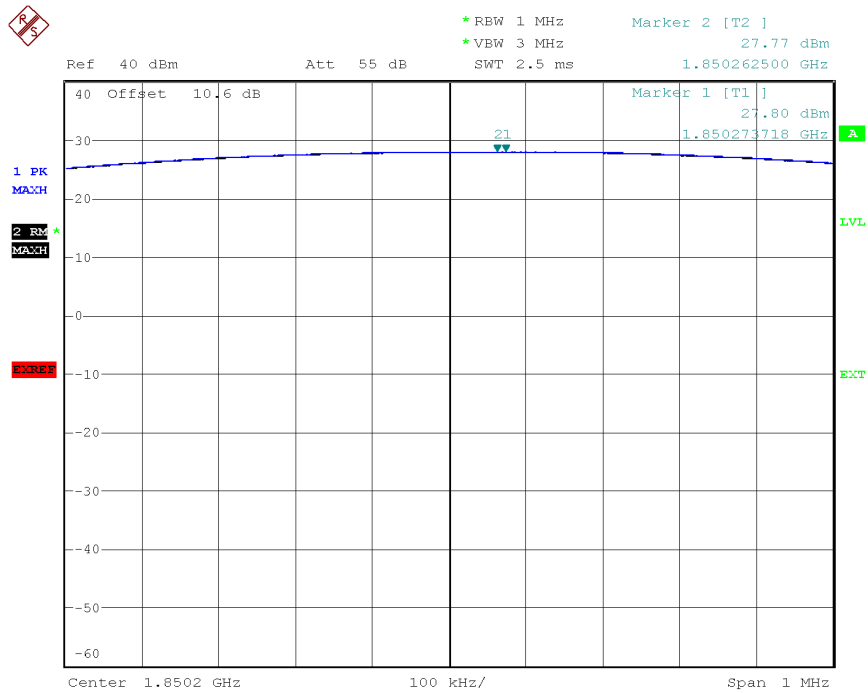
Date: 18.OCT.2018 15:48:32

EGPRS850 High Channel



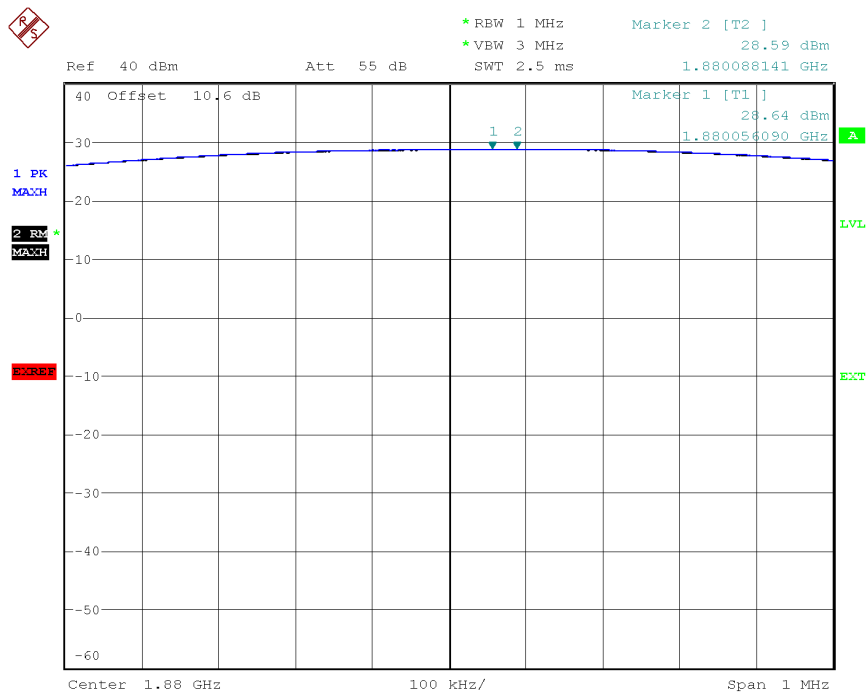
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FCC RF TEST REPORT



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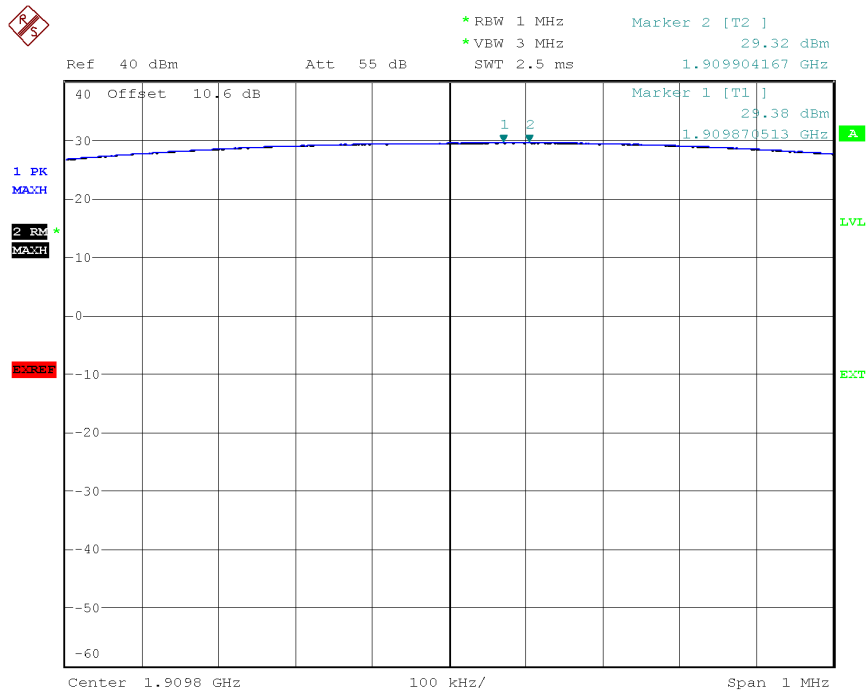
PCS1900 Low Channel



Date: 16.OCT.2018 12:02:15



PCS1900 Mid Channel



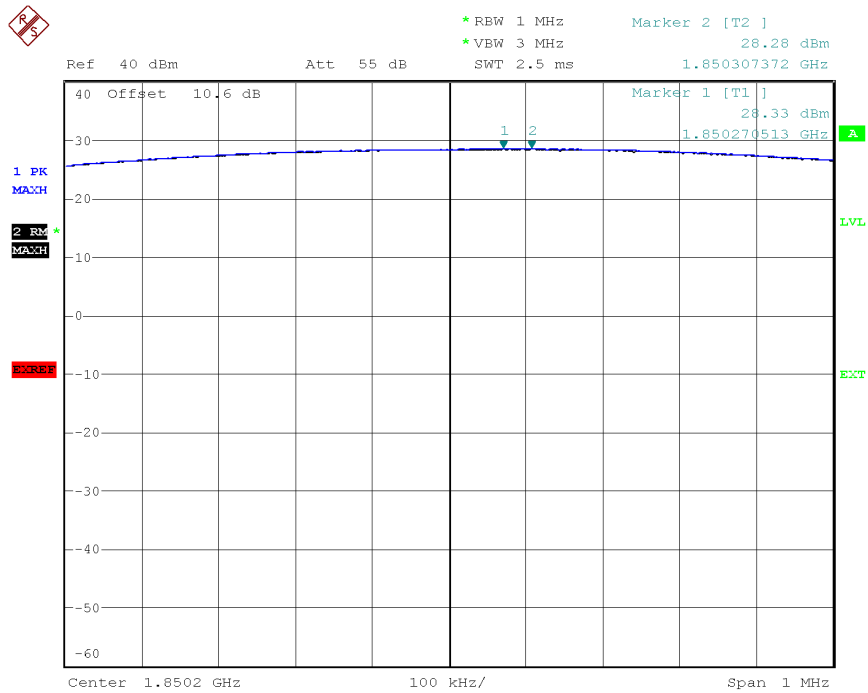
Date: 16.OCT.2018 12:04:19

PCS1900 High Channel



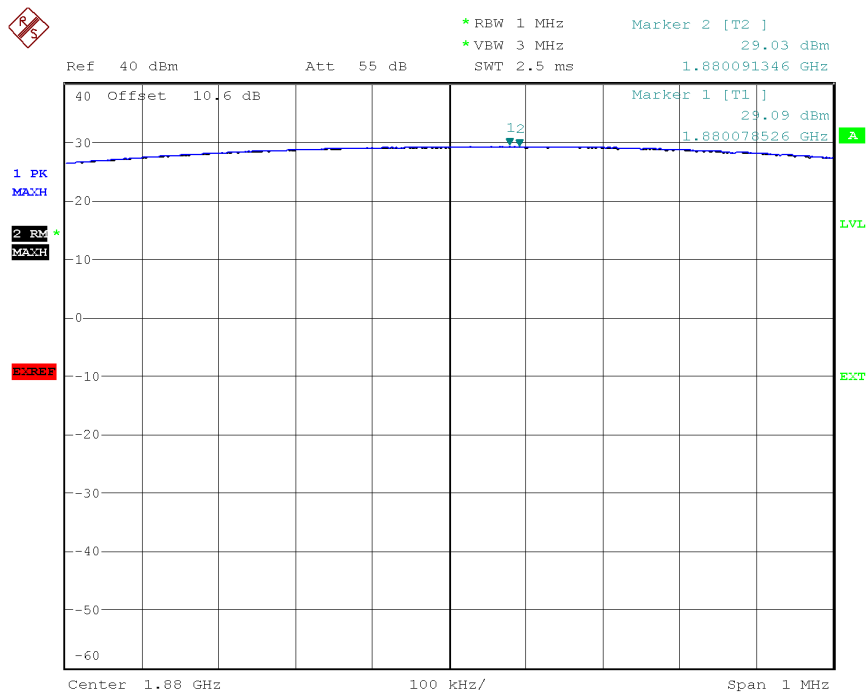
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Date: 18.OCT.2018 12:18:06

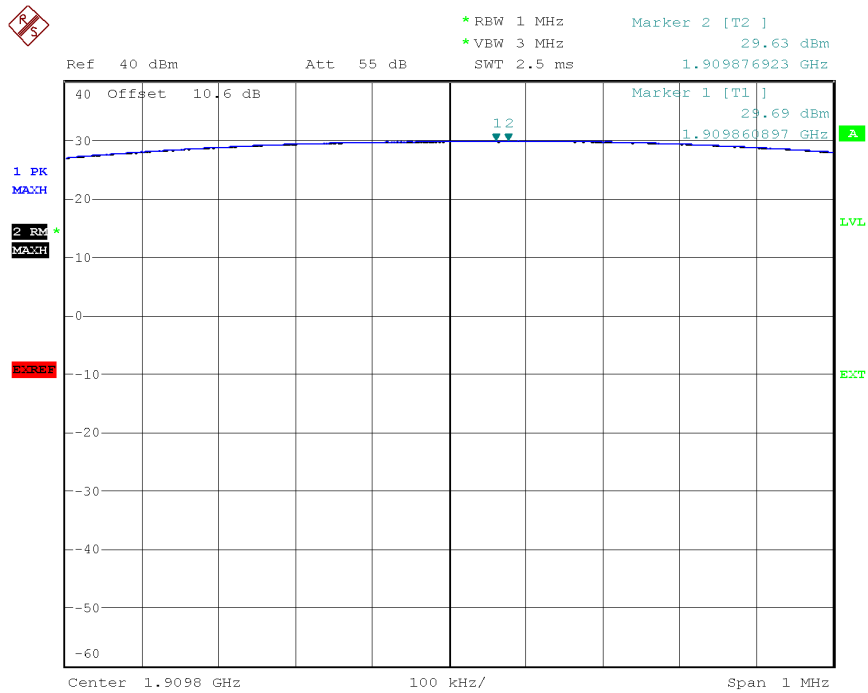
GPRS1900 Low Channel1



Date: 18.OCT.2018 12:17:11



GPRS1900 Mid Channel



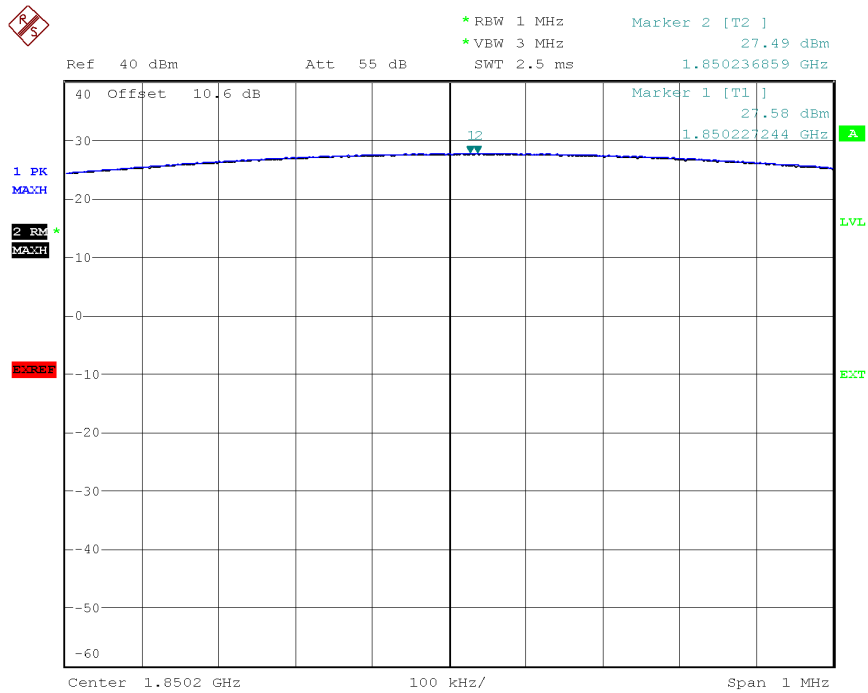
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GPRS1900 High Channel



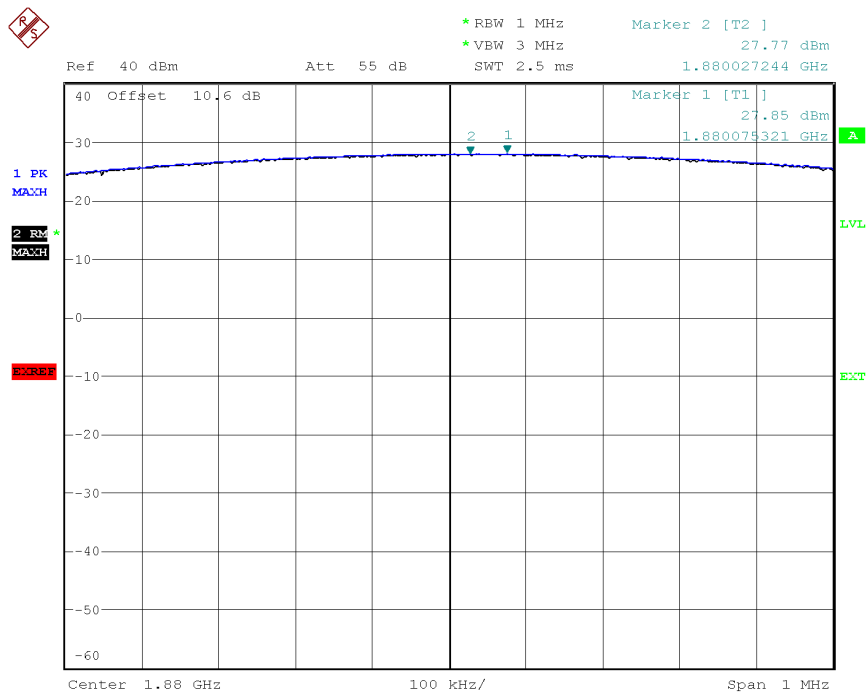
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Date: 18.OCT.2018 16:24:54

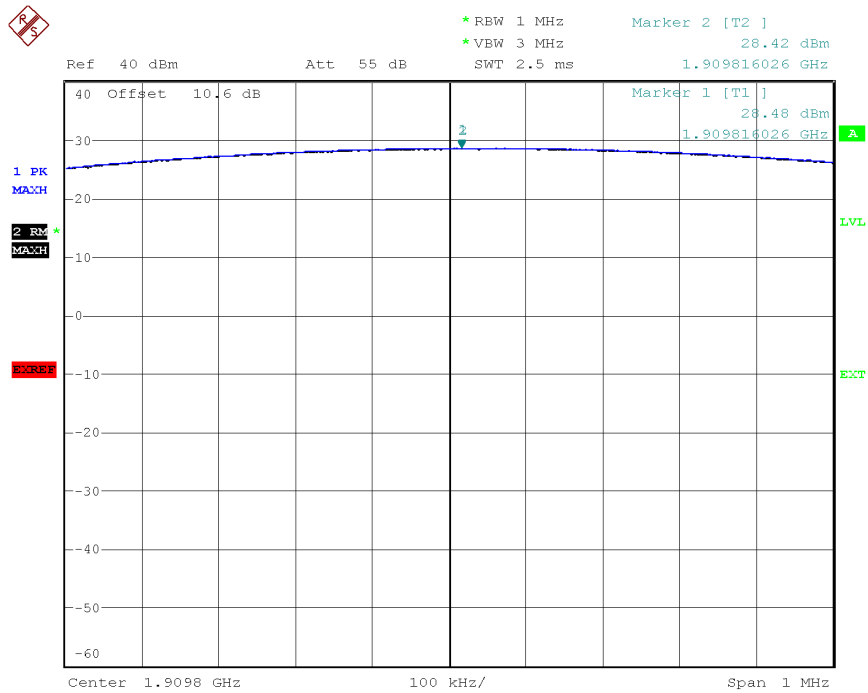
EGPRS1900 Low Channel



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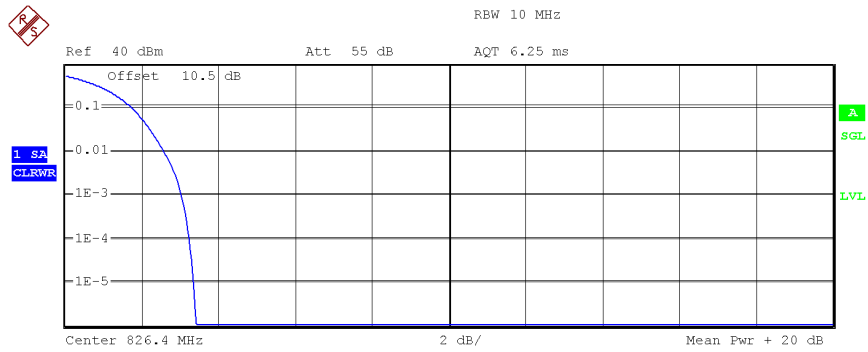


EGPRS1900 Mid Channel



Date: 18.OCT.2018 16:27:06

EGPRS1900 High Channel



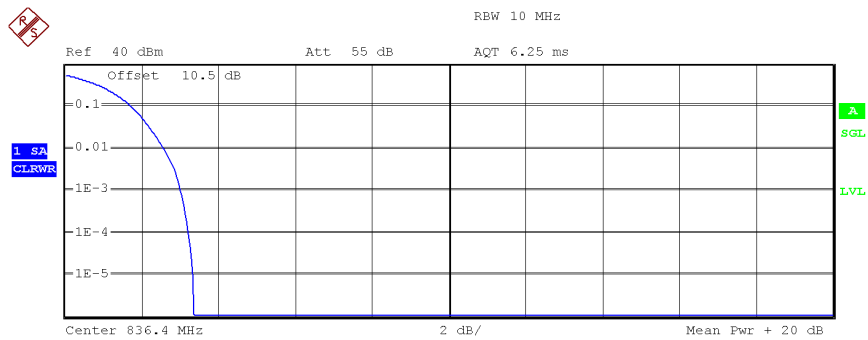
SECRET Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz EXT

Trace 1
Mean 21.59 dBm
Peak 25.00 dBm
Crest 3.41 dB

10 % 1.73 dB
1 % 2.56 dB
.1 % 3.04 dB
.01 % 3.24 dB

Date: 15.OCT.2018 17:01:49

WCDMA BAND5 Low Channel1



SECRET Complementary Cumulative Distribution Function
NOF samples: 100000, Usable BW: 11.2MHz EXT

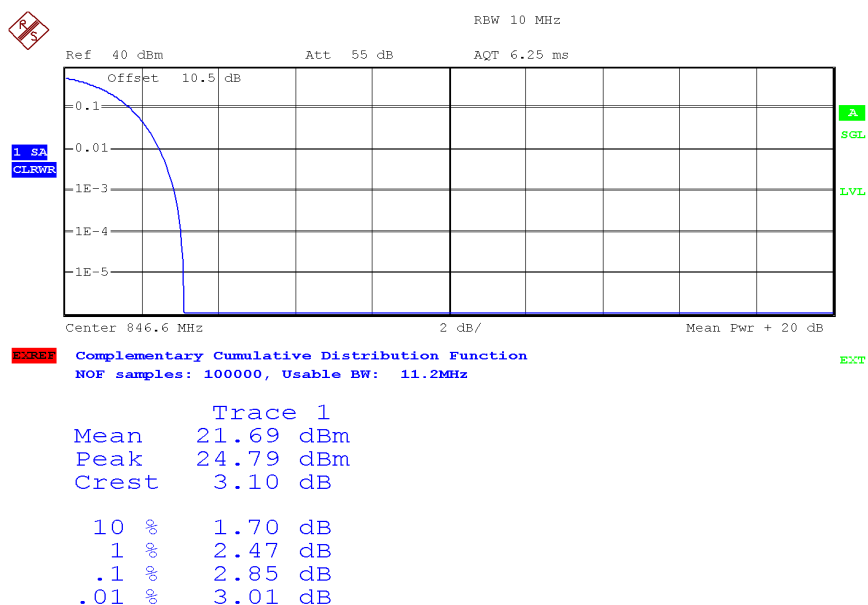
Trace 1
Mean 21.79 dBm
Peak 25.14 dBm
Crest 3.35 dB

10 % 1.70 dB
1 % 2.56 dB
.1 % 3.01 dB
.01 % 3.21 dB

Date: 15.OCT.2018 17:03:34



WCDMA BAND5 Mid Channel



Date: 15.OCT.2018 17:05:04

WCDMA BAND5 High Channel

5.3 99% & 26dB Occupied Bandwidth (Reporting Only)

5.3.1 Description of 99% Occupied Bandwidth and 26 dB Bandwidth Measurement

The 99% occupied band width is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

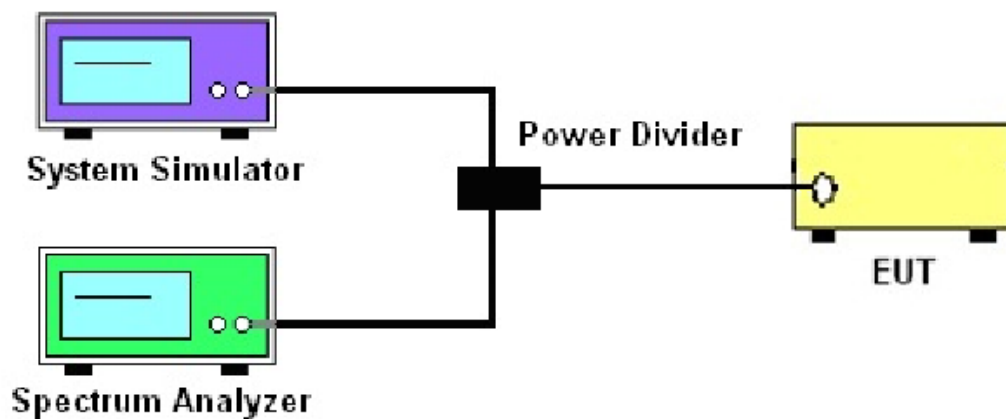
5.3.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

5.3.3 Test Procedure

- a. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
- b. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
- c. The 99% occupied bandwidth were measured, set RBW=1~5% of the anticipated OBW, VBW $\geq$ 3*RBW, peak detector, trace maximum hold.
- d. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace. (this is the reference value)
- e. Use the 99% power bandwidth function of the spectrum analyzer and report the measured bandwidth.
- f. Use the N dB Down function of the spectrum analyzer and report the measured bandwidth.

5.3.4 Test Setup



**5.3.5 Test Result**

Modes	GSM850			PCS1900		
Channel	128	190	251	512	661	810
Frequency(MHz)	824.2	836.6	848.8	1850.2	1880	1909.8
26dB OBW(kHz)	314.10	312.50	310.90	312.5	314.10	314.10
99% OBW(kHz)	245.19	246.79	245.19	241.99	241.99	241.99
Modes	WCDMA BAND5					
Channel	4132	4182	4233			
Frequency(MHz)	826.4	836.4	846.6			
26dB OBW(kHz)	4.73	4.70	4.73			
99% OBW(kHz)	4.15	4.13	4.13			

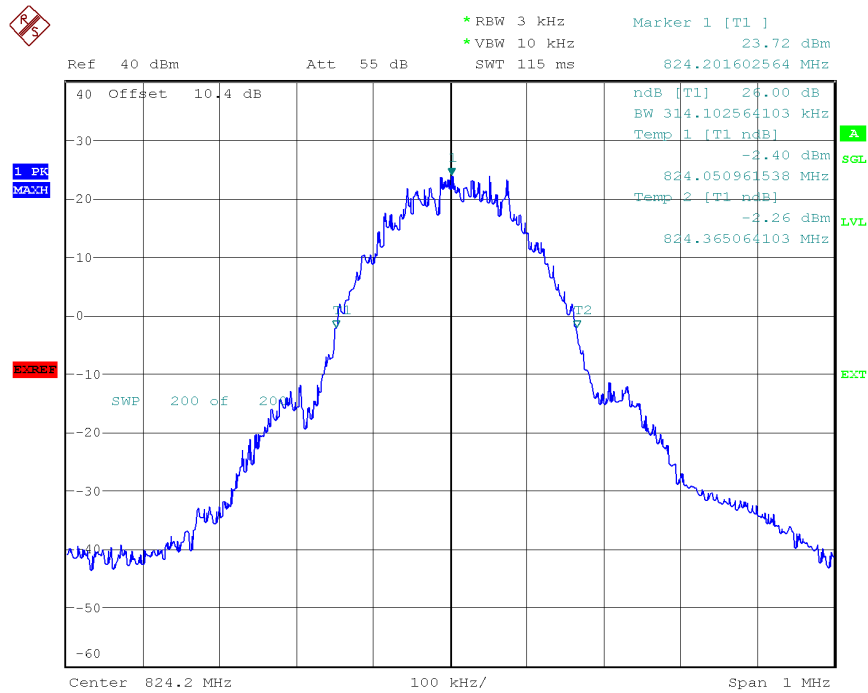
Modes	GPRS850			GPRS1900		
Channel	128	190	251	512	661	810
Frequency(MHz)	824.2	836.6	848.8	1850.2	1880	1909.8
26dB OBW(kHz)	310.90	312.50	310.90	315.71	310.90	312.50
99% OBW(kHz)	248.40	246.79	243.59	248.40	245.19	243.59

Modes	EGPRS850			EGPRS1900		
Channel	128	190	251	512	661	810
Frequency(MHz)	824.2	836.6	848.8	1850.2	1880	1909.8
26dB OBW(kHz)	310.90	309.29	307.69	302.88	302.88	299.68
99% OBW(kHz)	246.79	245.19	248.40	246.79	253.21	250.00



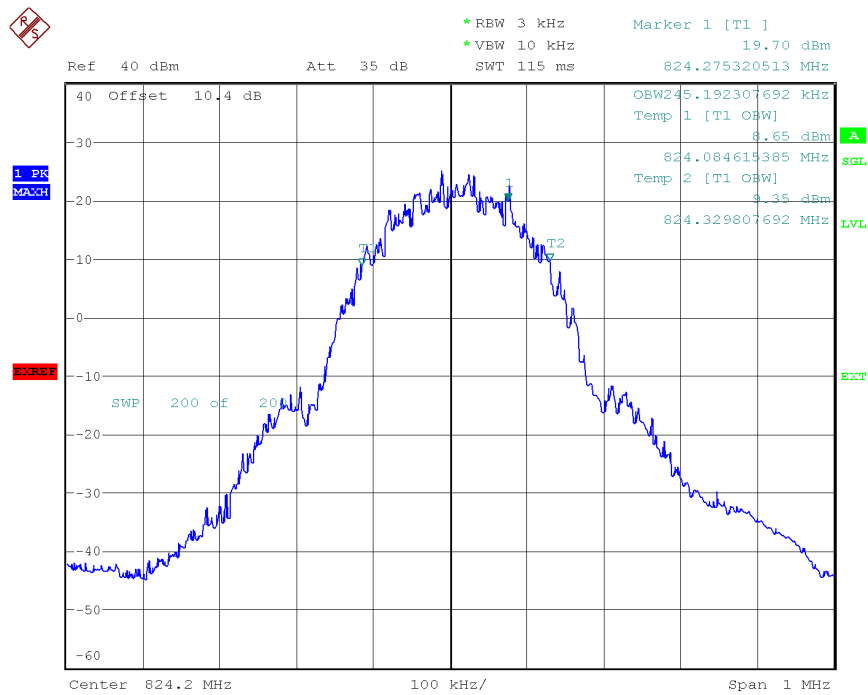
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FCC RF TEST REPORT



Date: 16.OCT.2018 12:24:51

GSM850 Low Channel 26dB BW



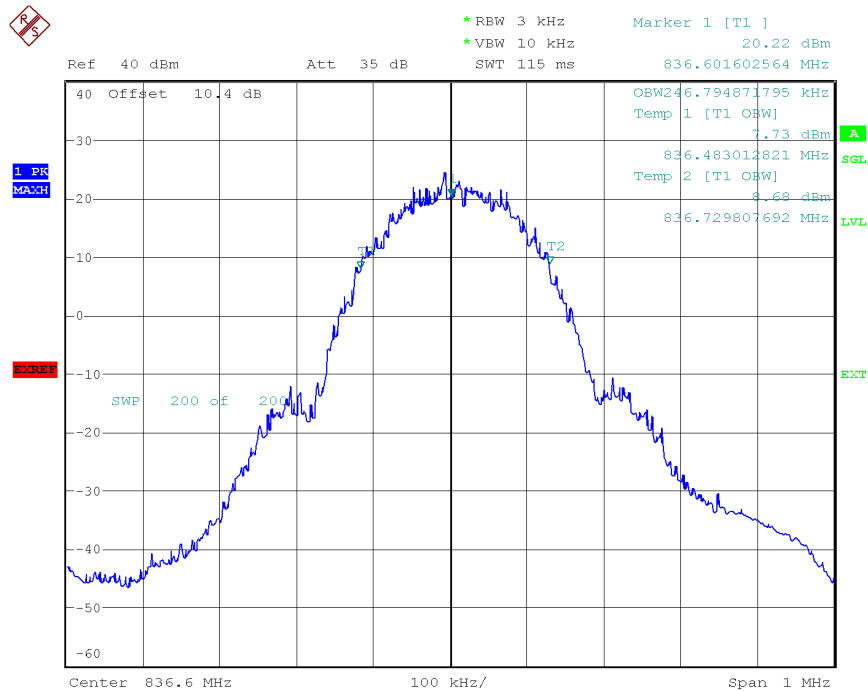
Date: 16.OCT.2018 12:33:33





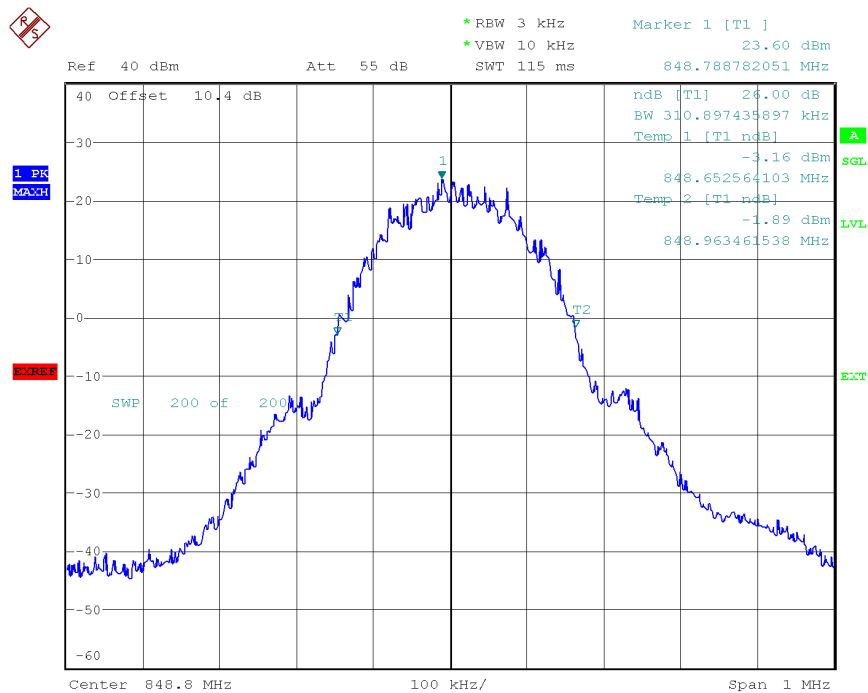
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FCC RF TEST REPORT



Date: 16.OCT.2018 12:35:09

GSM850 Mid Channel 99% OBW



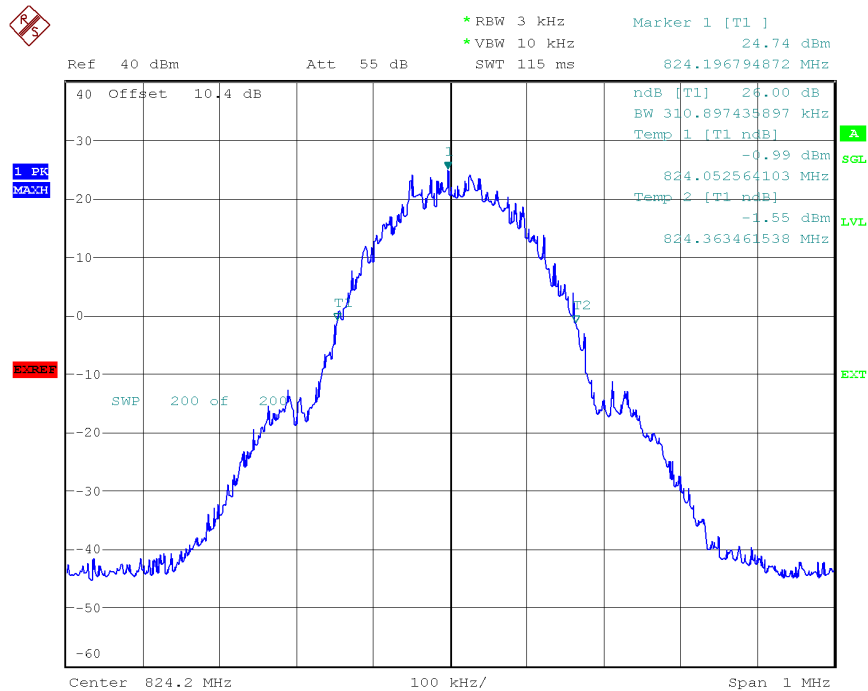
Date: 16.OCT.2018 12:36:19





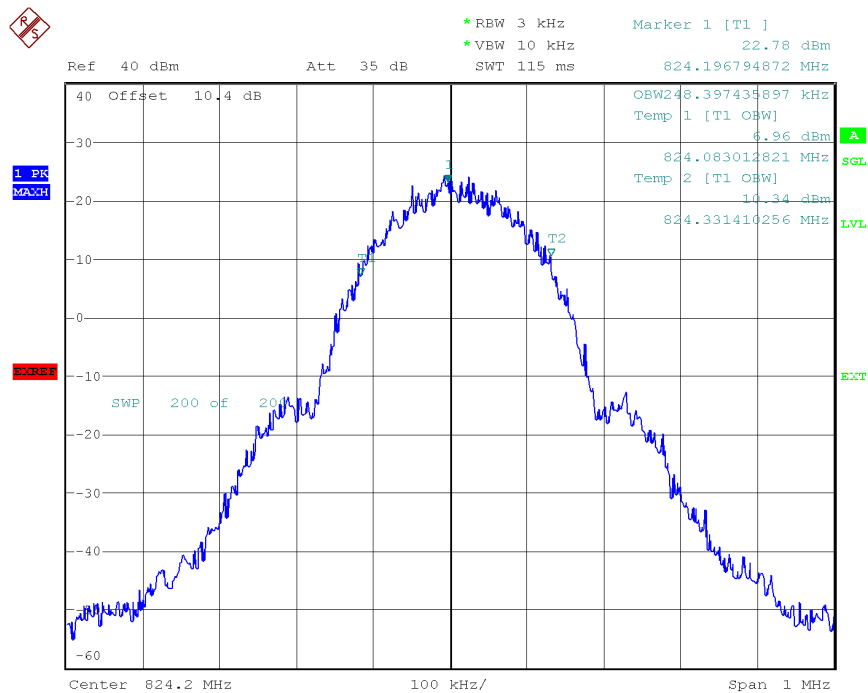
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FCC RF TEST REPORT



Date: 18.OCT.2018 11:40:38

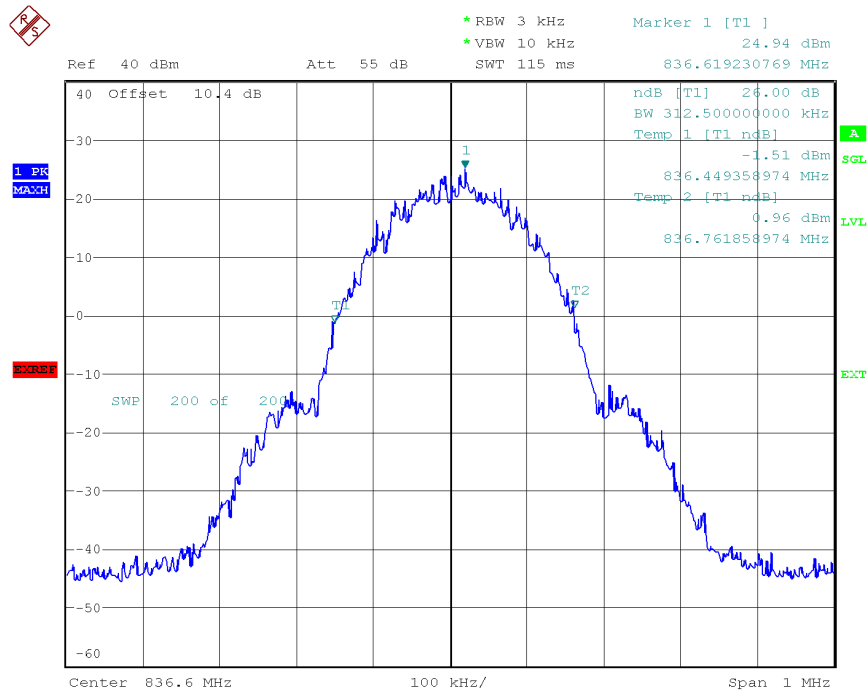
GPRS850 Low Channel 26dB BW



Date: 18.OCT.2018 11:41:33



GPRS850 Low Channel 99% OBW



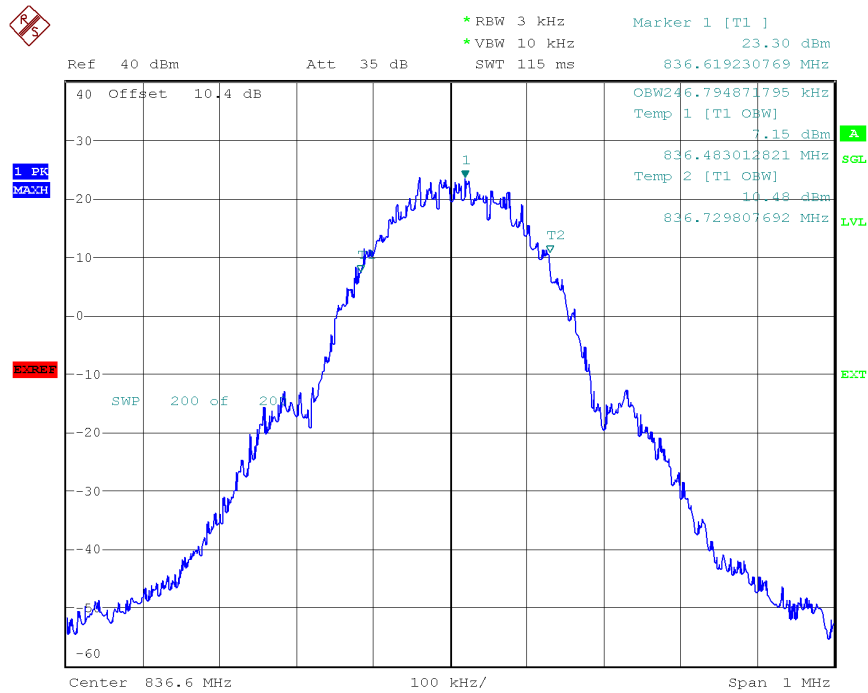
Date: 18.OCT.2018 11:38:01

GPRS850 Mid Channel 26dB BW



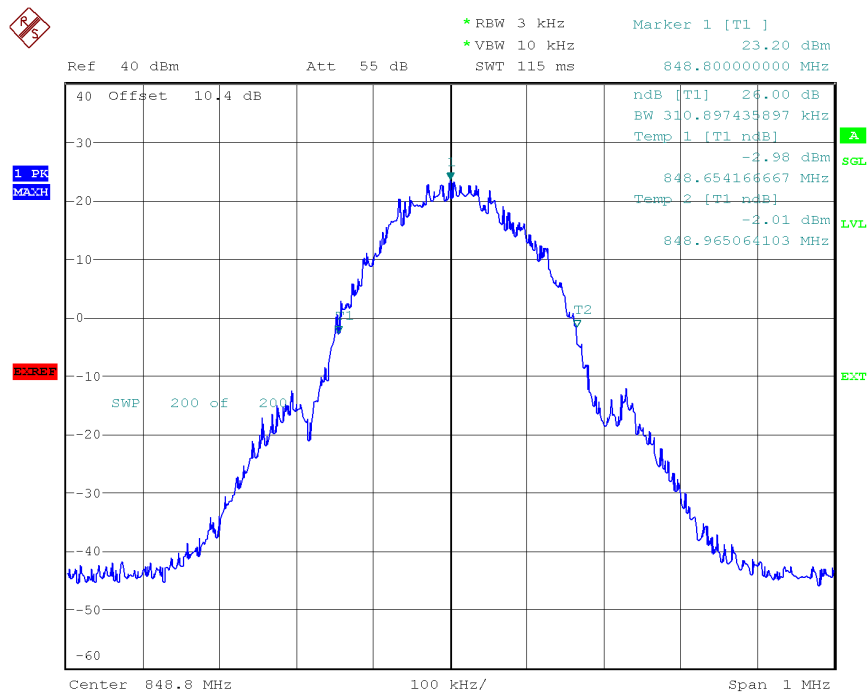
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FCC RF TEST REPORT



Date: 18.OCT.2018 11:39:14

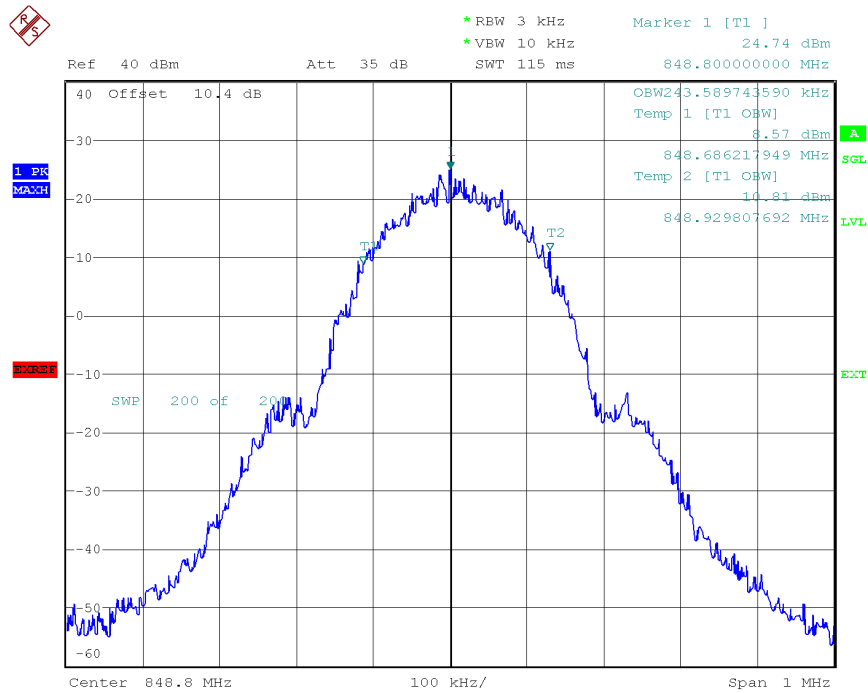
GPRS850 Mid Channel 99% OBW



Date: 18.OCT.2018 11:35:33



GPRS850 High Channel 26dB BW



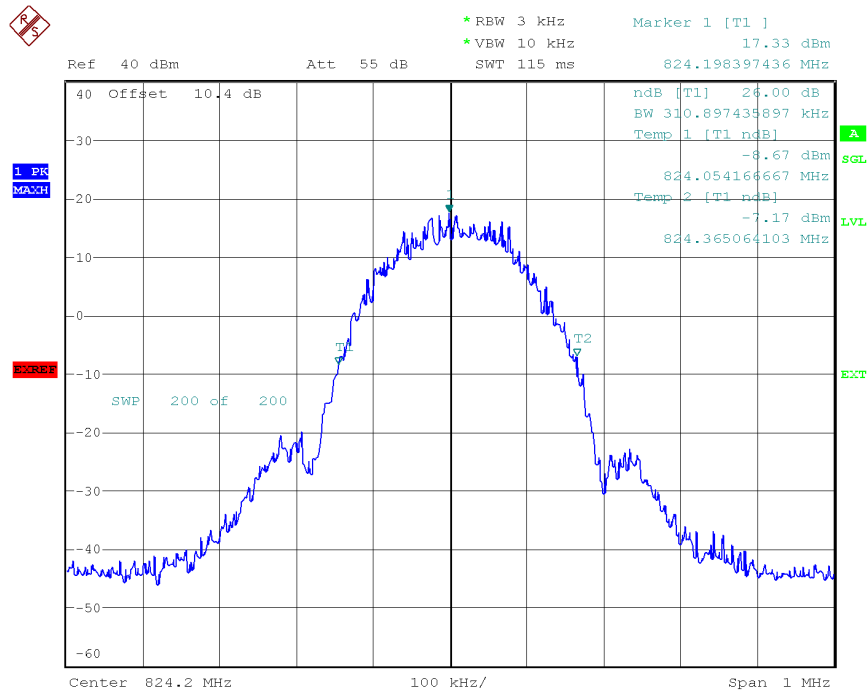
Date: 18.OCT.2018 11:36:35

GPRS850 High Channel 99% OBW



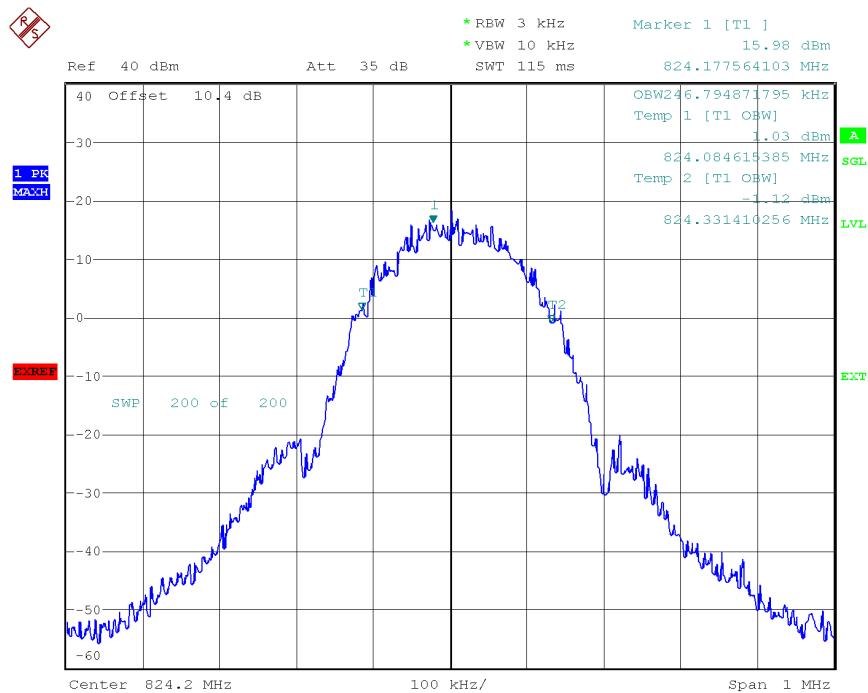
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FCC RF TEST REPORT



Date: 18.OCT.2018 15:55:37

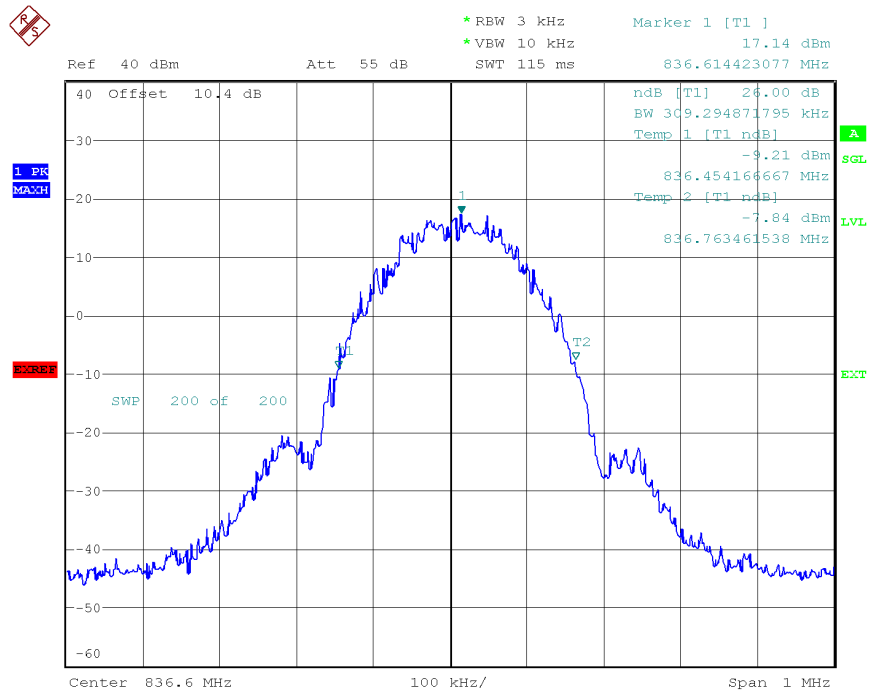
EGPRS850 Low Channel 26dB BW



Date: 18.OCT.2018 15:57:05



EGPRS850 Low Channel 99% OBW



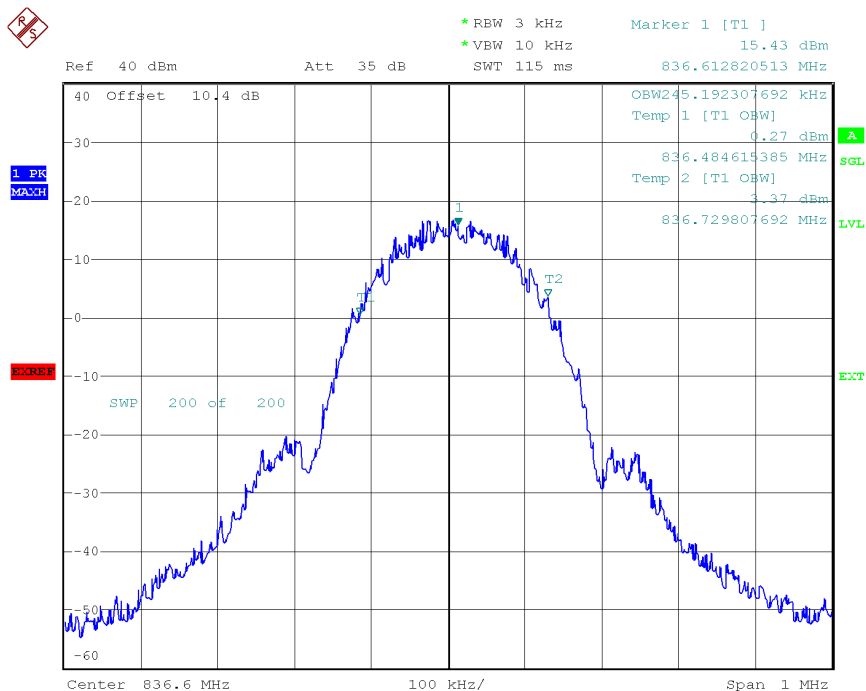
Date: 18.OCT.2018 15:58:14

EGPRS850 Mid Channel 26dB BW



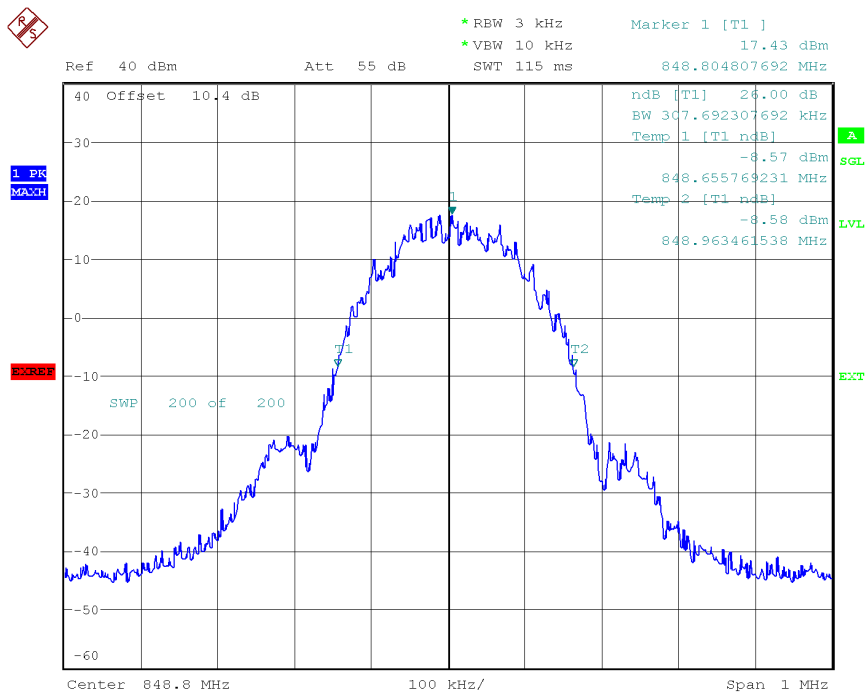
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FCC RF TEST REPORT



Date: 18.OCT.2018 15:59:18

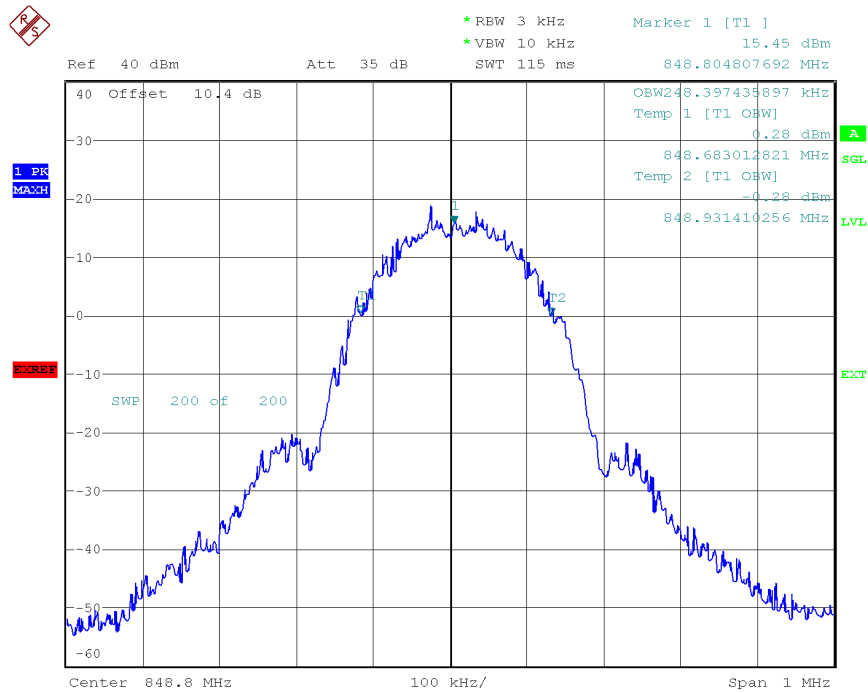
EGPRS850 Mid Channel 99% OBW



Date: 18.OCT.2018 16:02:14



EGPRS850 High Channel 26dB BW



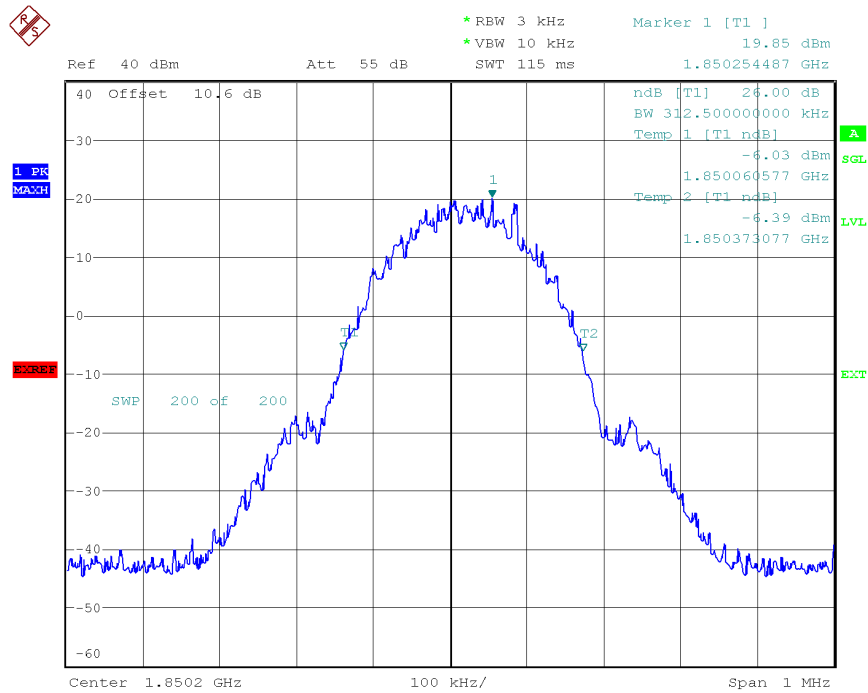
Date: 18.OCT.2018 16:03:09

EGPRS850 High Channel 99% OBW



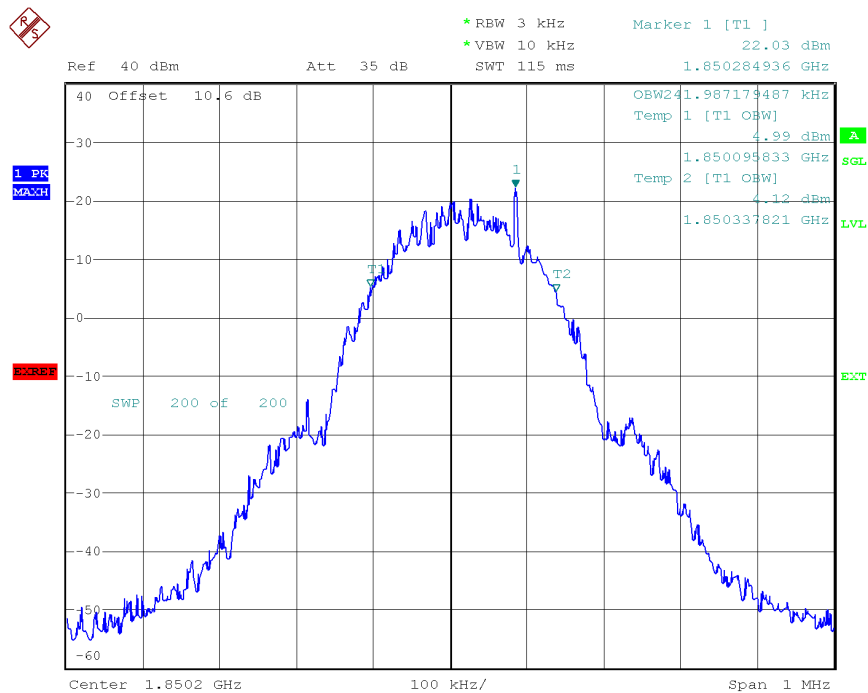
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FCC RF TEST REPORT



Date: 16.OCT.2018 14:36:07

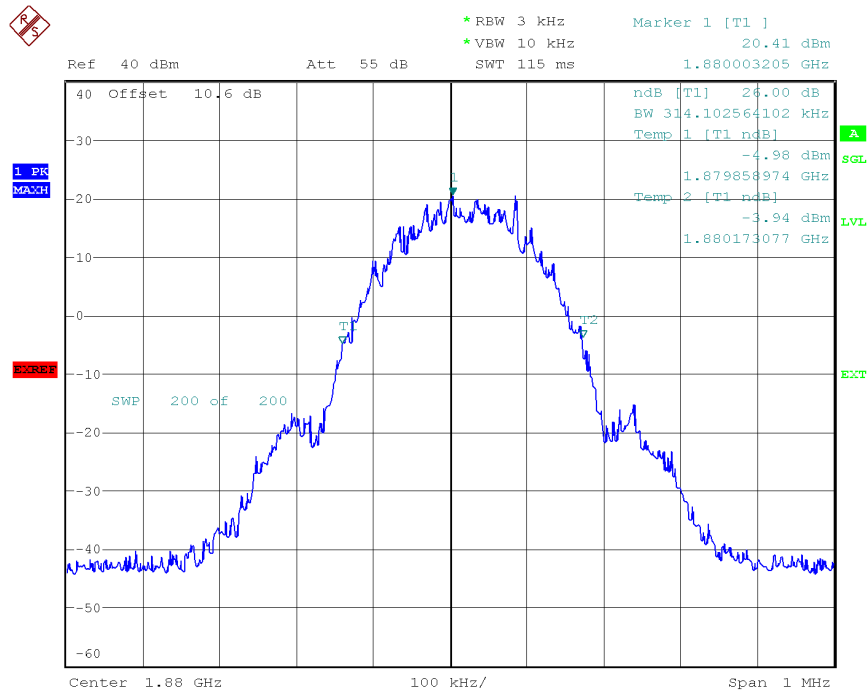
PCS1900 Low Channel 26dB BW



Date: 16.OCT.2018 14:38:20



PCS1900 Low Channel 99% OBW



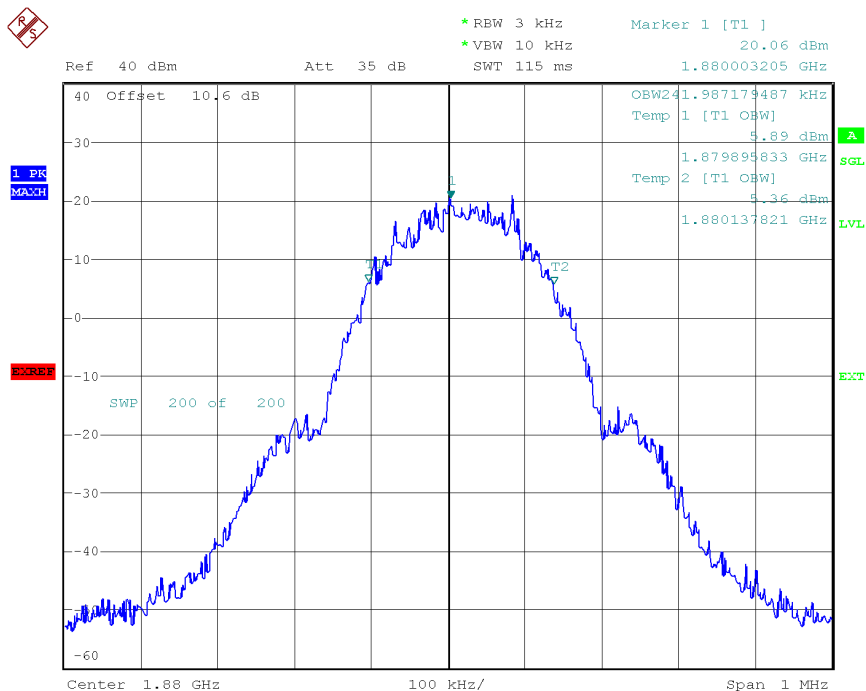
Date: 16.OCT.2018 14:46:26

PCS1900 Mid Channel 26dB BW



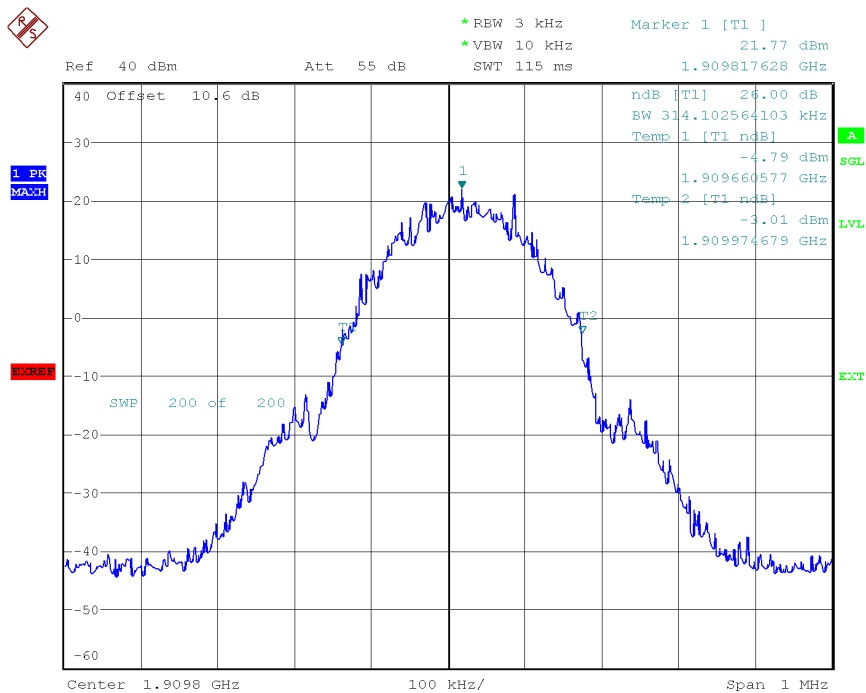
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FCC RF TEST REPORT



Date: 16.OCT.2018 14:47:18

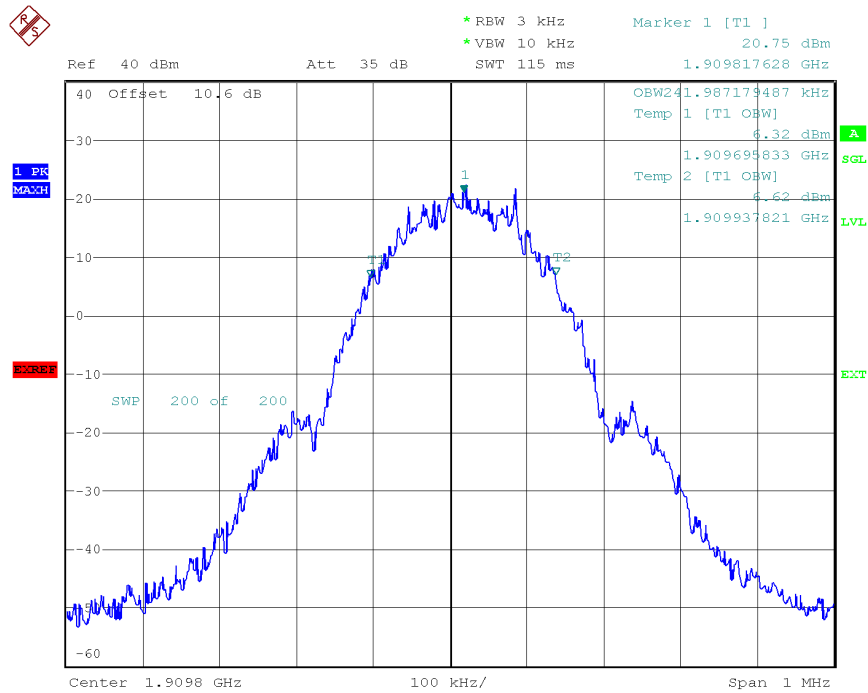
PCS1900 Mid Channel 99% OBW



Date: 16.OCT.2018 14:48:52



PCS1900 High Channel 26dB BW



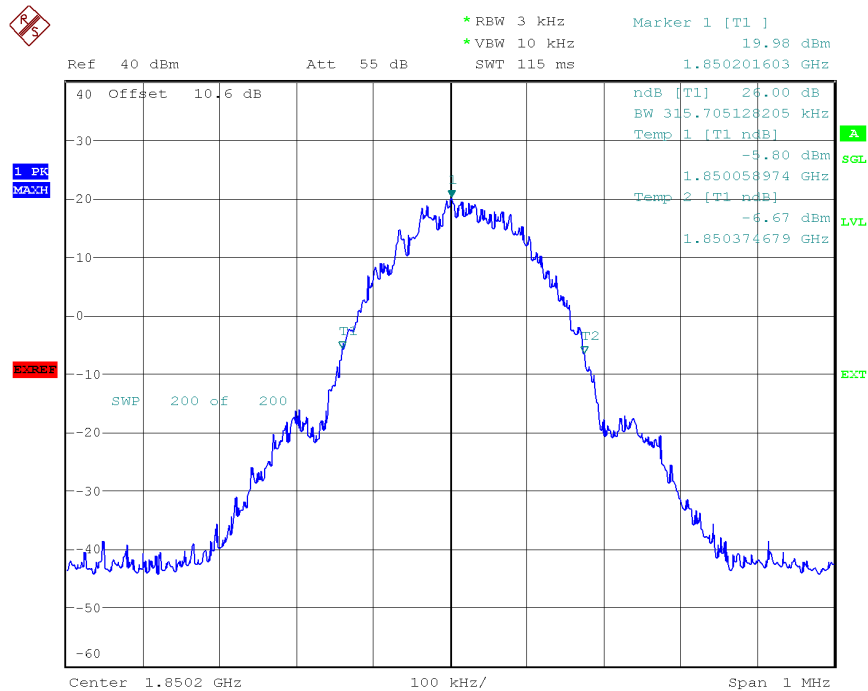
Date: 16.OCT.2018 14:51:44

PCS1900 High Channel 99% OBW



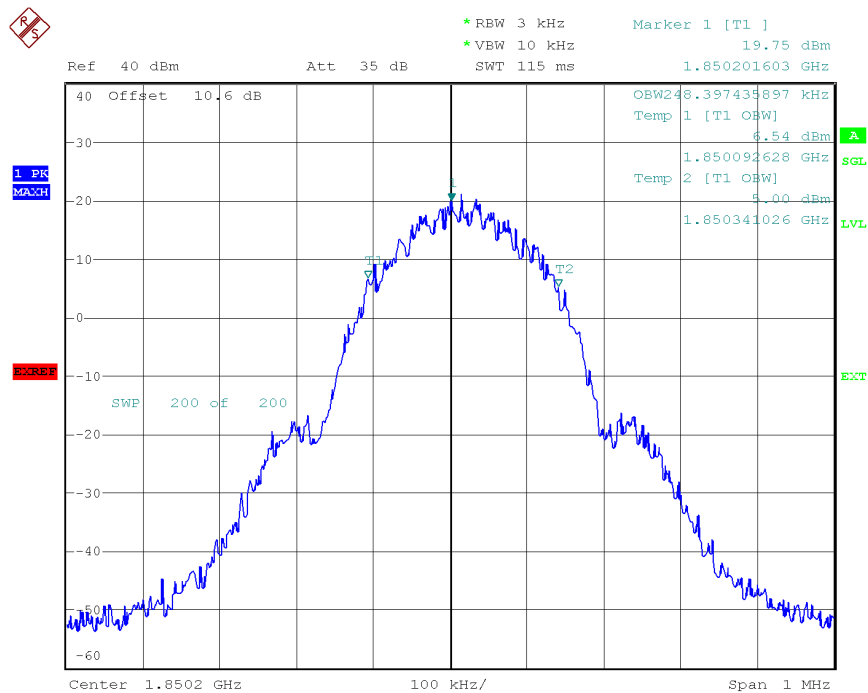
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FCC RF TEST REPORT



Date: 18.OCT.2018 12:20:20

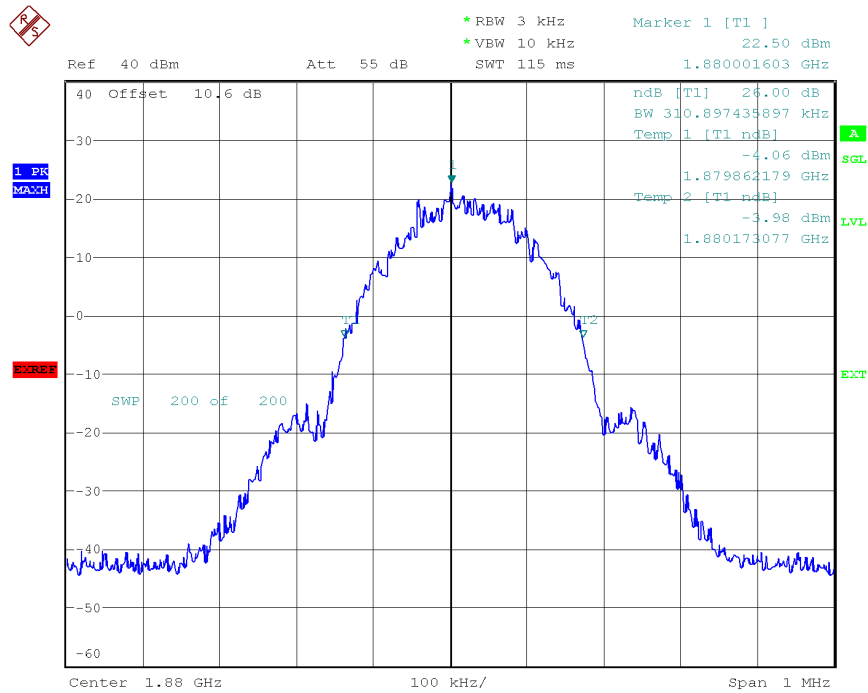
GPRS1900 Low Channel 26dB BW



Date: 18.OCT.2018 12:21:12



GPRS1900 Low Channel 99% OBW



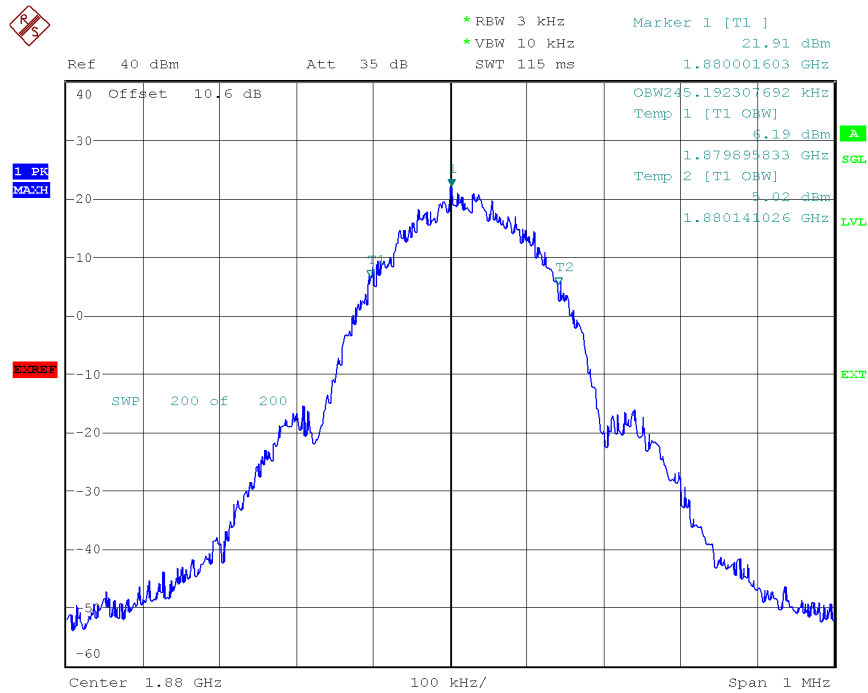
Date: 18.OCT.2018 12:22:19

GPRS1900 Mid Channel 26dB BW



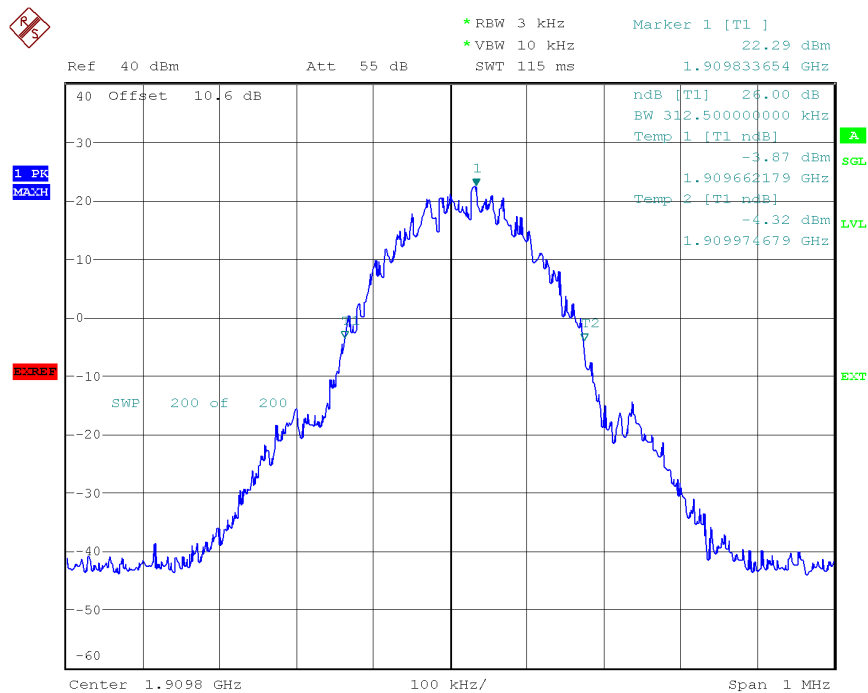
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FCC RF TEST REPORT



Date: 18.OCT.2018 12:23:18

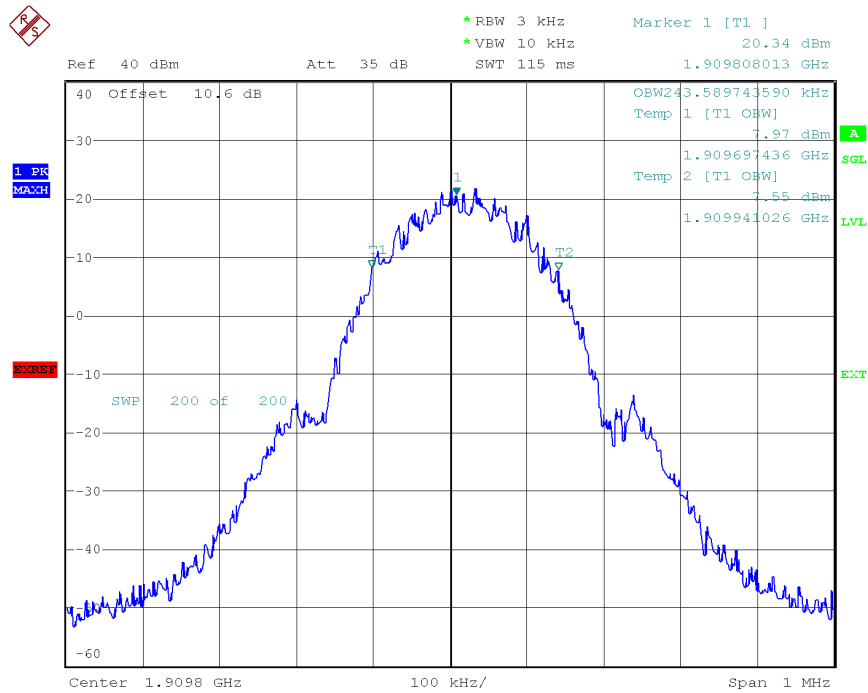
GPRS1900 Mid Channel 99% OBW



Date: 18.OCT.2018 12:31:09



GPRS1900 High Channel 26dB BW



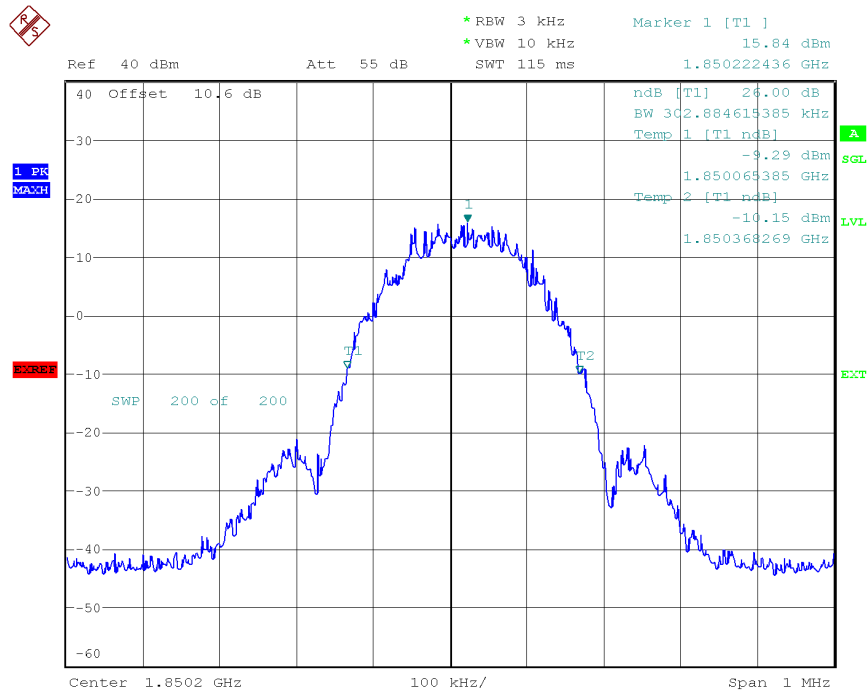
Date: 18.OCT.2018 12:29:46

GPRS1900 High Channel 99% OBW



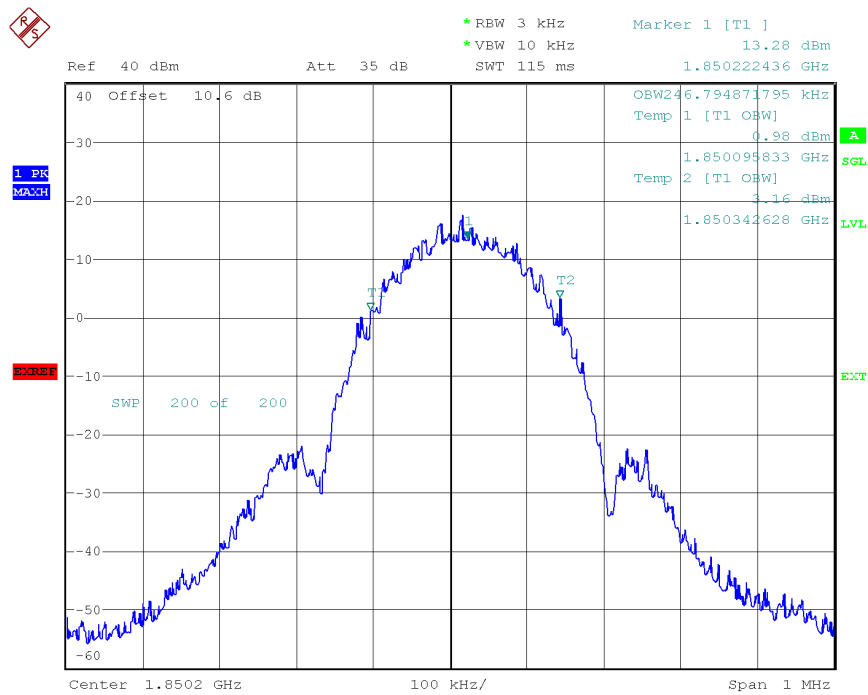
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FCC RF TEST REPORT



Date: 18.OCT.2018 16:36:58

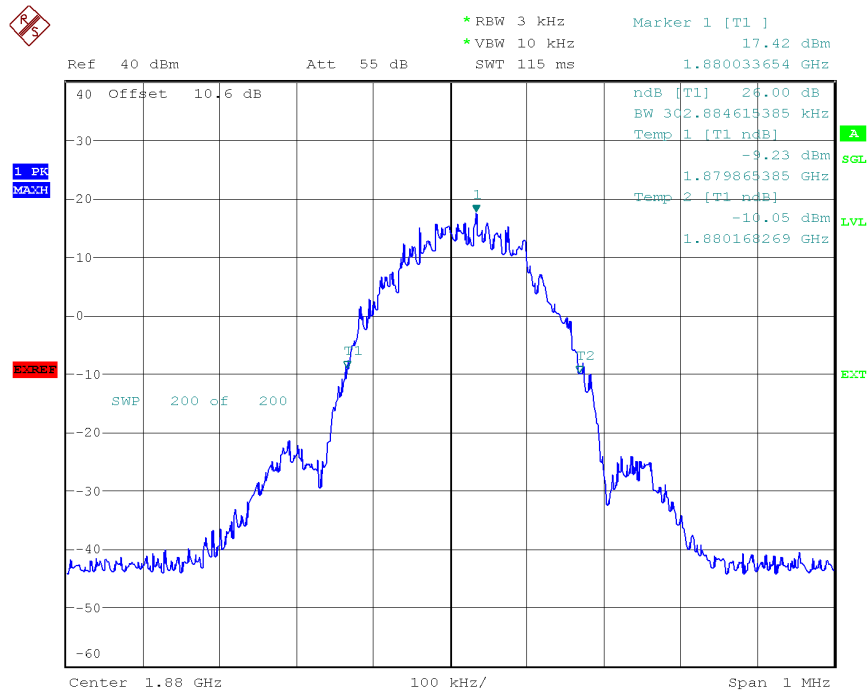
EGPRS1900 Low Channel 26dB BW



Date: 18.OCT.2018 16:39:04



EGPRS1900 Low Channel 99% OBW



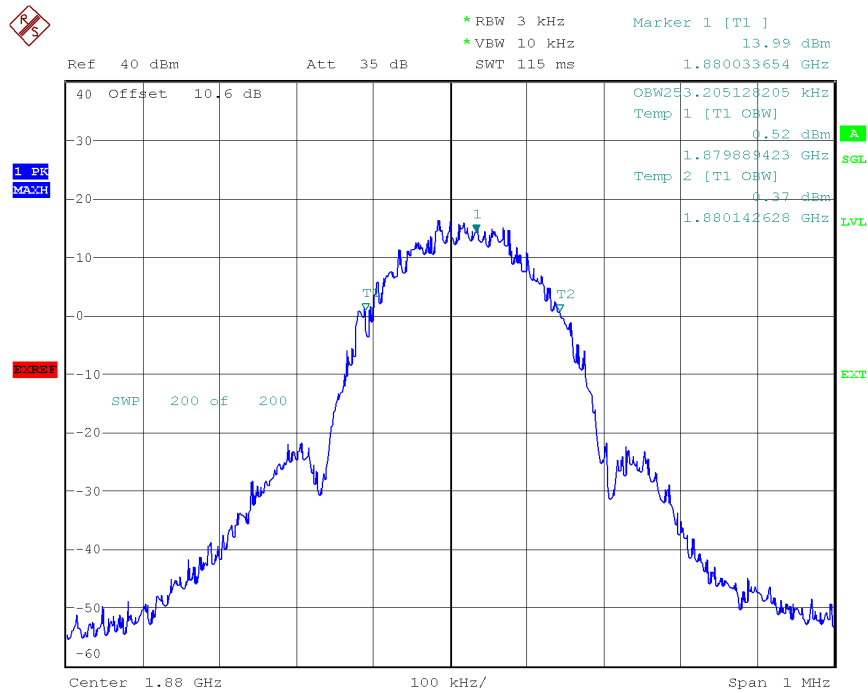
Date: 18.OCT.2018 16:34:57

EGPRS1900 Mid Channel 26dB BW



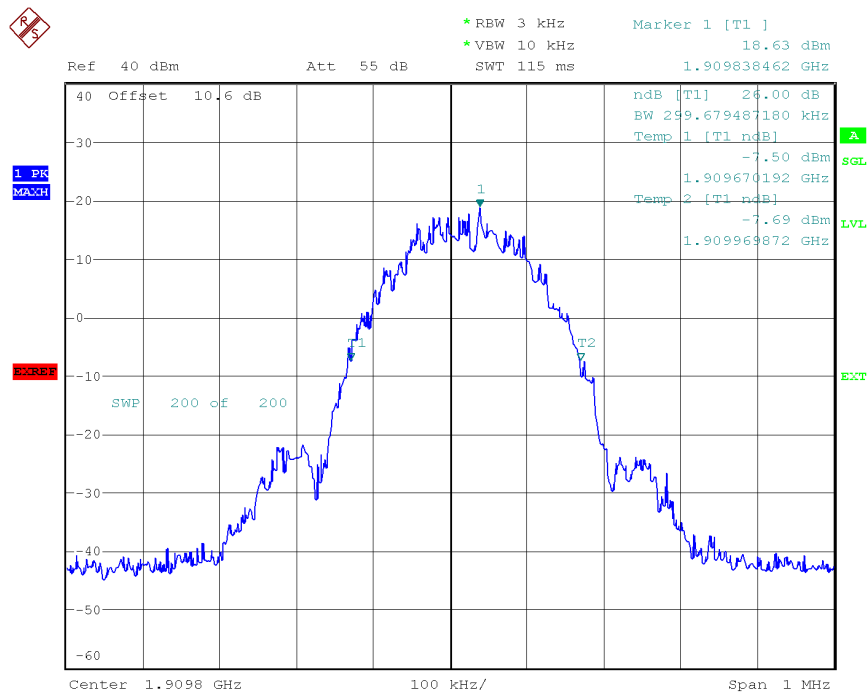
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FCC RF TEST REPORT



Date: 18.OCT.2018 16:35:52

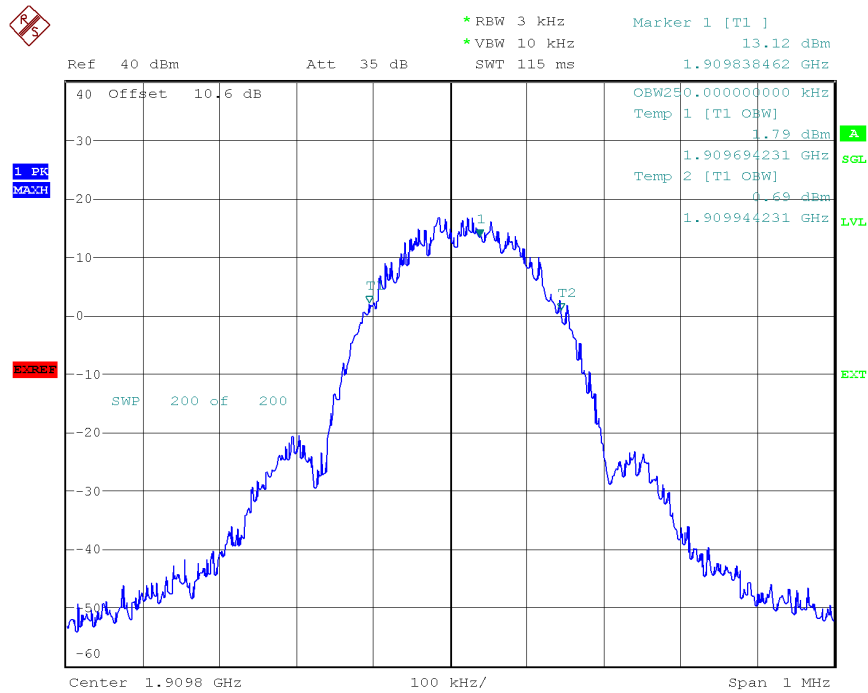
EGPRS1900 Mid Channel 99% OBW



Date: 18.OCT.2018 16:32:28

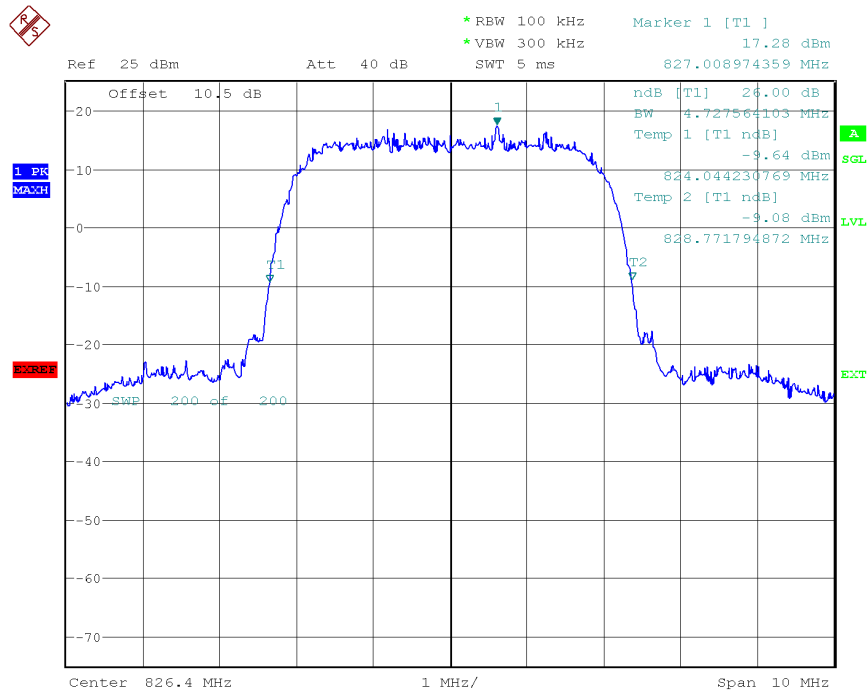


EGPRS1900 High Channel 26dB BW



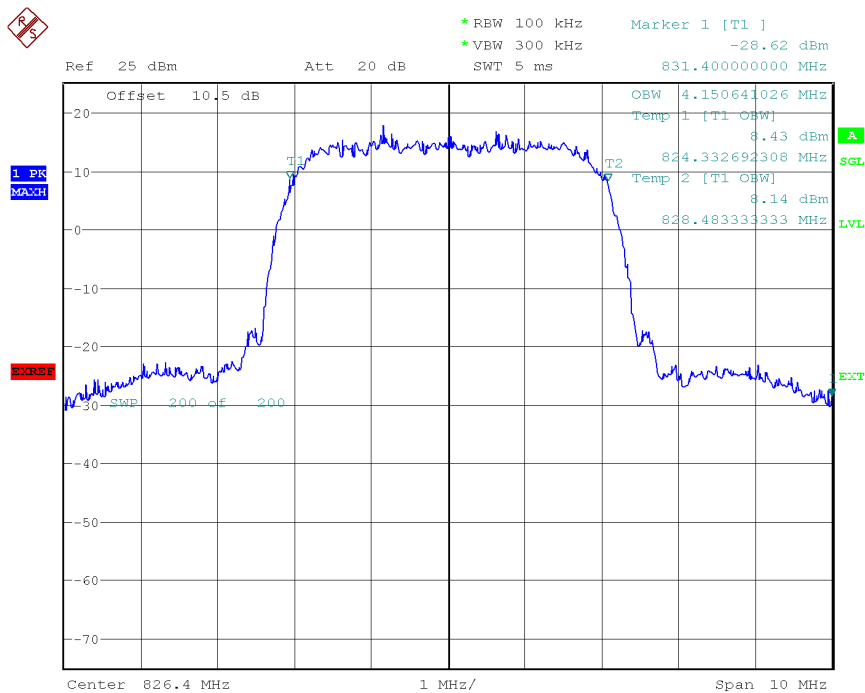
Date: 18.OCT.2018 16:33:18

EGPRS1900 High Channel 99% OBW



Date: 15.OCT.2018 17:15:23

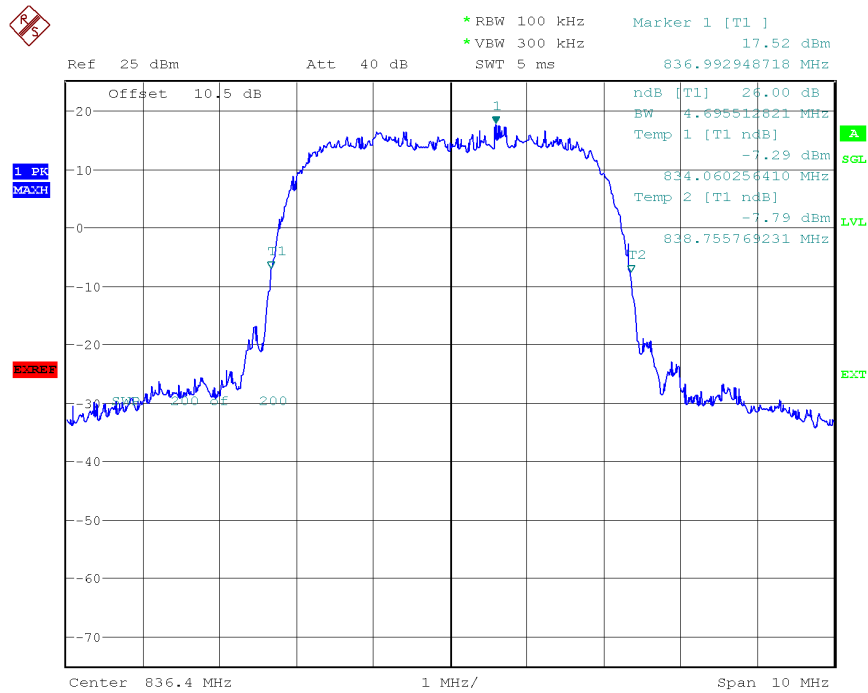
WCDMA BAND5 Low Channel 26dB BW



Date: 15.OCT.2018 17:21:24



WCDMA BAND5 Low Channel 99% OBW



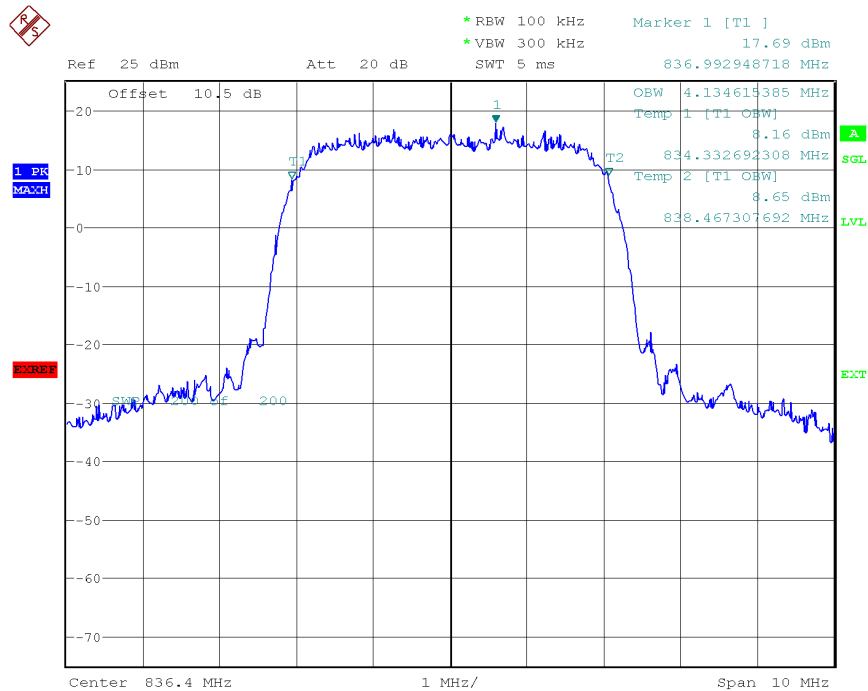
Date: 15.OCT.2018 17:22:38

WCDMA BAND5 Mid Channel 26dB BW



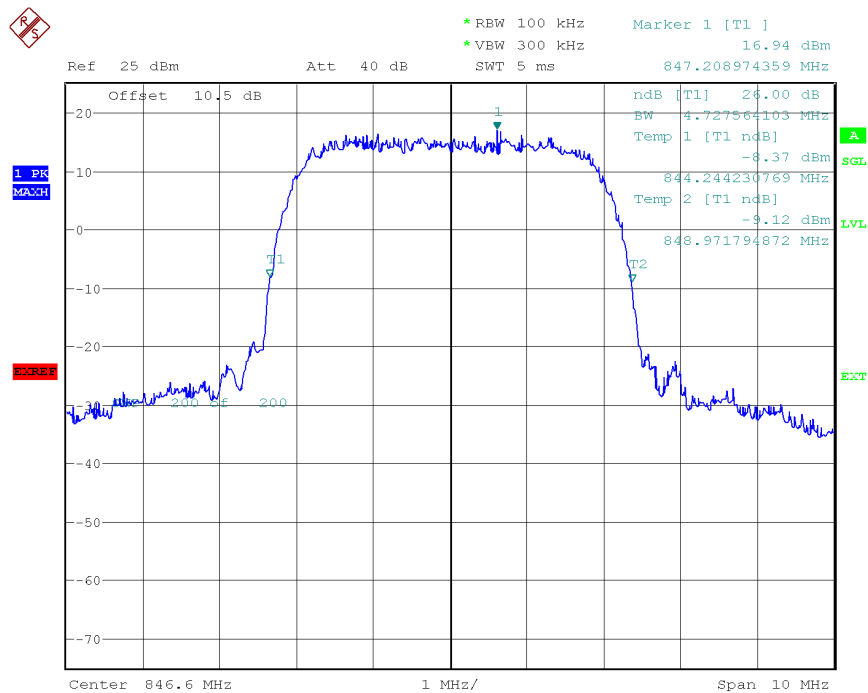
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FCC RF TEST REPORT



Date: 15.OCT.2018 17:23:18

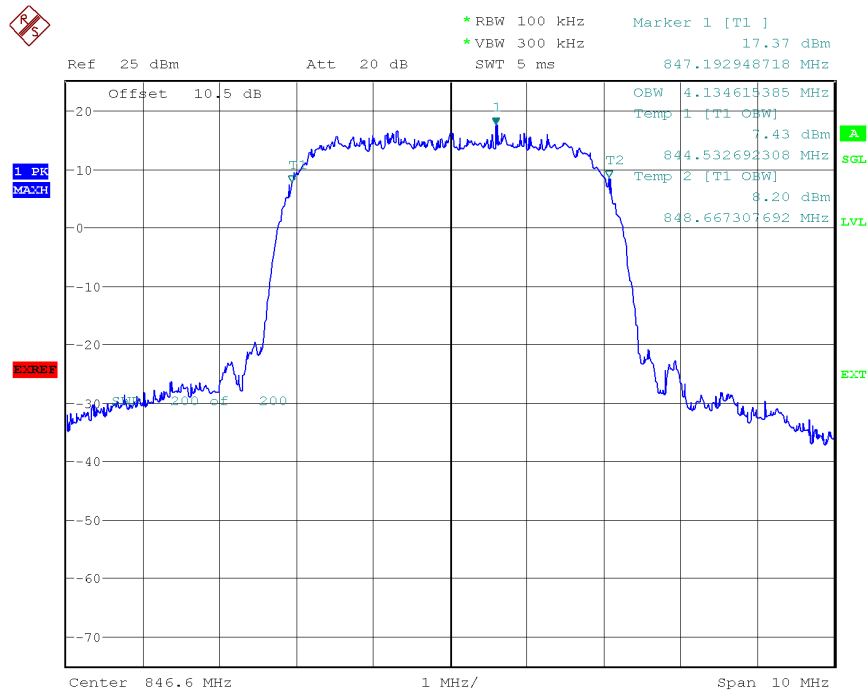
WCDMA BAND5 Mid Channel 99% OBW



Date: 15.OCT.2018 17:19:17



WCDMA BAND5 High Channel 26dB BW



Date: 15.OCT.2018 17:18:34

WCDMA BAND5 High Channel 99% OBW

5.4 Conducted Band Edge

5.4.1 Description of Conducted Band Edge Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $43 + 10\log(P)$ dB.

5.4.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

5.4.3 Test Procedure

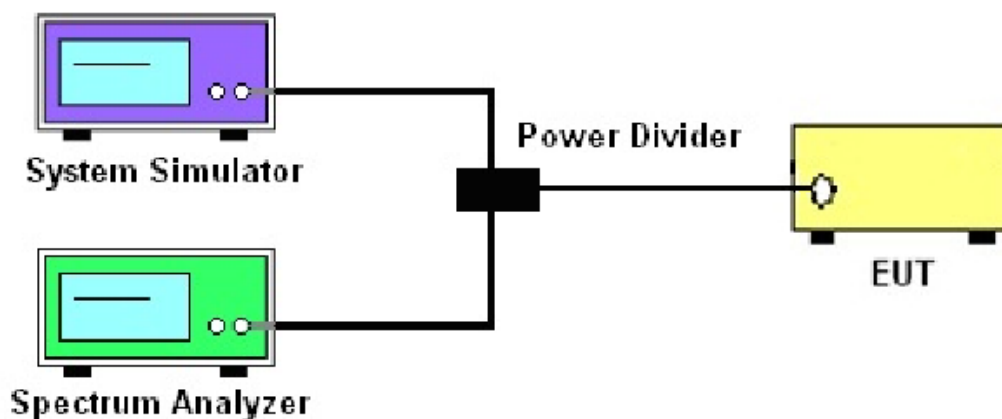
- The EUT was connected to the spectrum analyzer and system simulator via a power divider.
- The RF output of the EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- The band edges of low and high channels for the highest RF powers were measured.
- The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
- The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P (Watts).

$$= P(W) - [43 + 10\log(P)](dB)$$

$$= [30 + 10\log(P)](dBm) - [43 + 10\log(P)](dB)$$

$$= -13dBm.$$

5.4.4 Test Setup



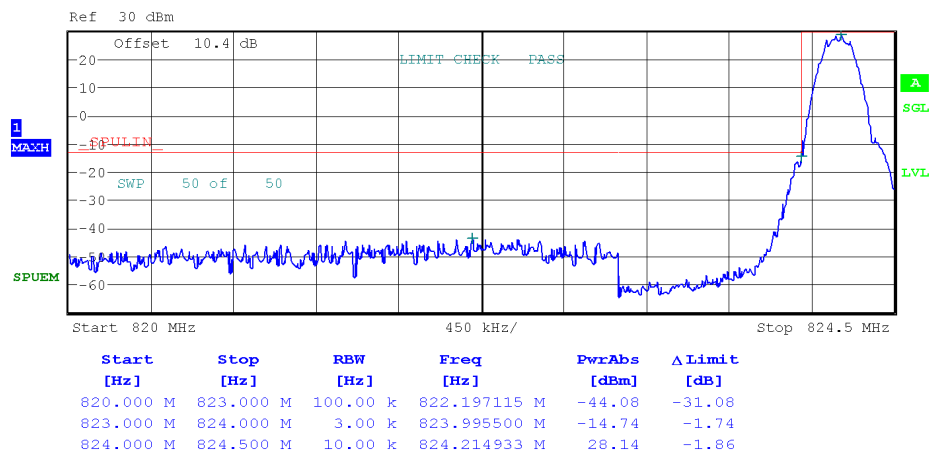


5.4.5 Test Result

Modes	GSM850		PCS1900		WCDMA BAND5	
Channel	128	251	512	810	4132	4233
Bandedge(<-13dBm)	Pass	Pass	Pass	Pass	Pass	Pass

Modes	GPRS850		GPRS1900	
Channel	128	251	512	810
Bandedge(<-13dBm)	Pass	Pass	Pass	Pass

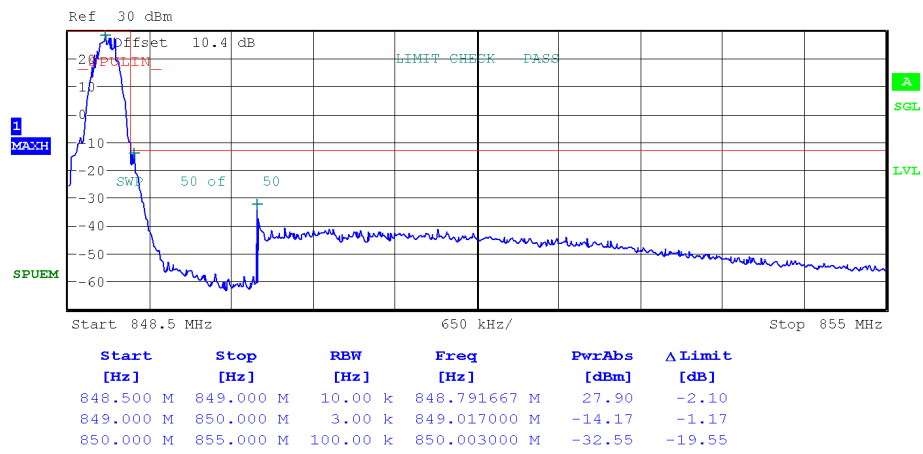
Modes	EGPRS850		EGPRS1900	
Channel	128	251	512	810
Bandedge(<-13dBm)	Pass	Pass	Pass	Pass



BAND

Date: 28.NOV.2018 04:48:20

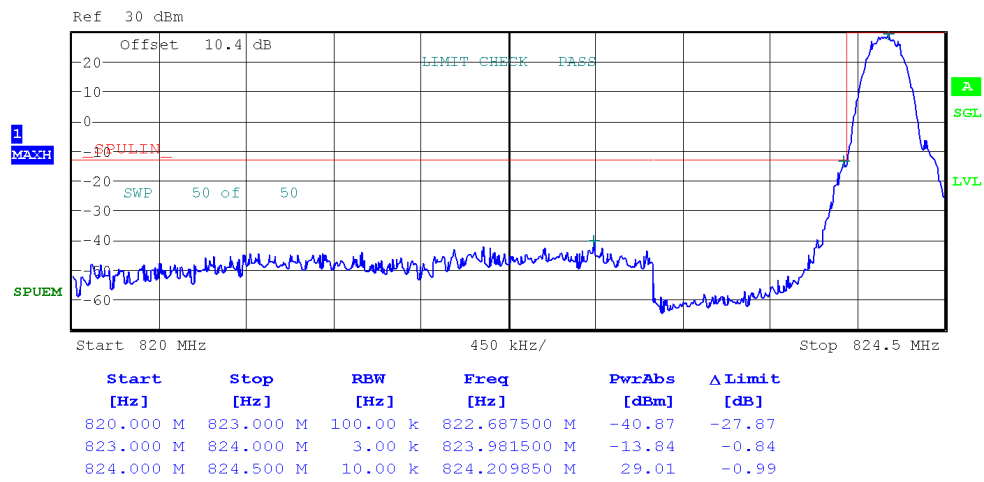
GSM850 Low Channel



BAND

Date: 28.NOV.2018 04:44:25

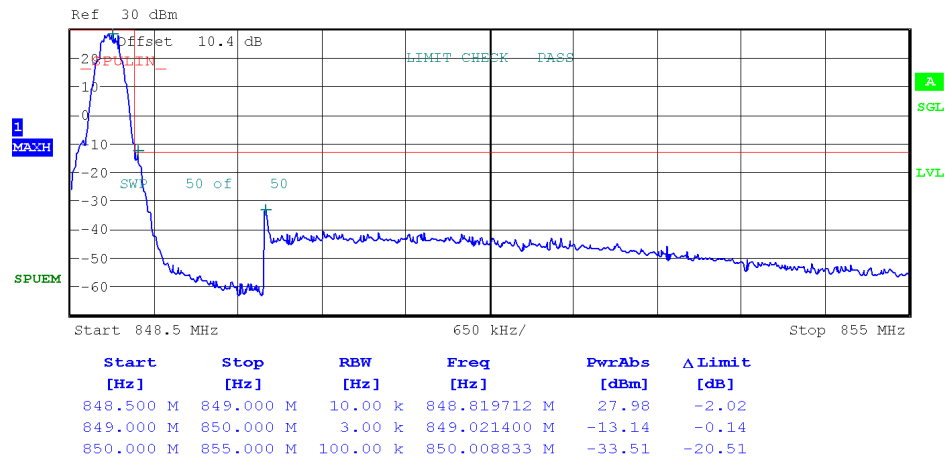
GSM850 High Channel



BAND

Date: 28.NOV.2018 07:41:20

GPRS850 Low Channel1



BAND

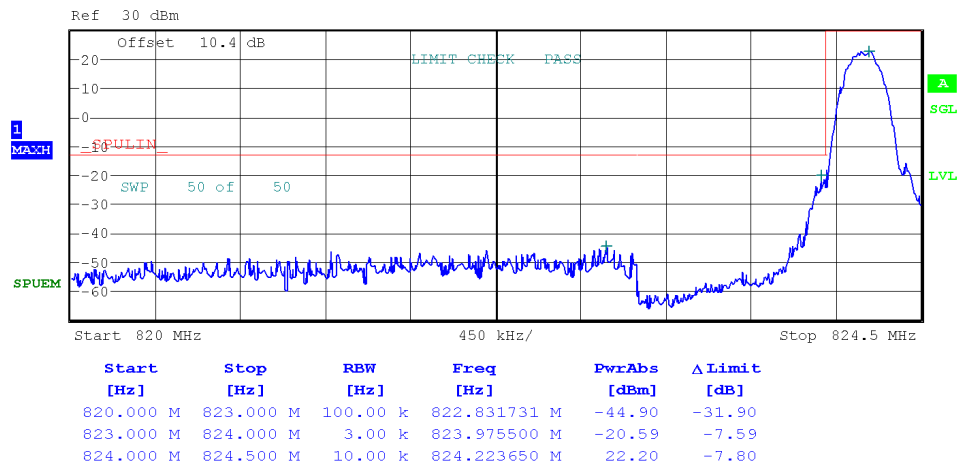
Date: 28.NOV.2018 07:38:54

GPRS850 High Channel



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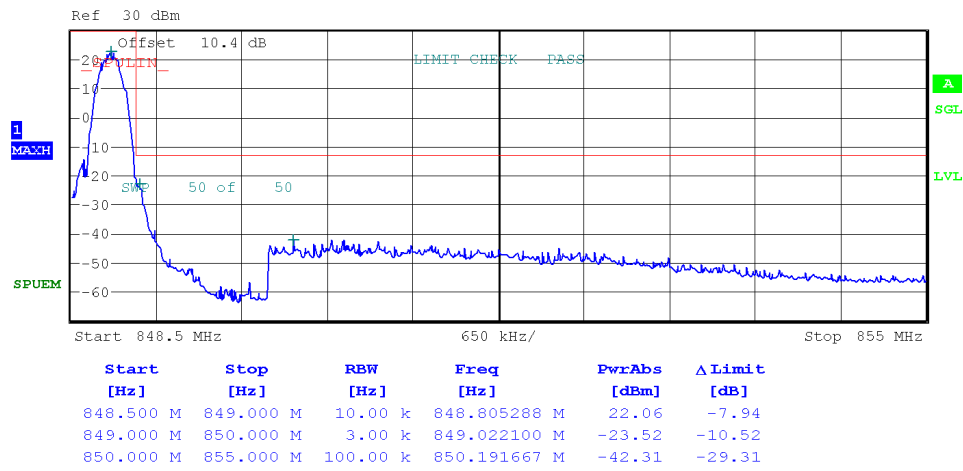
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BAND

Date: 28.NOV.2018 07:29:50

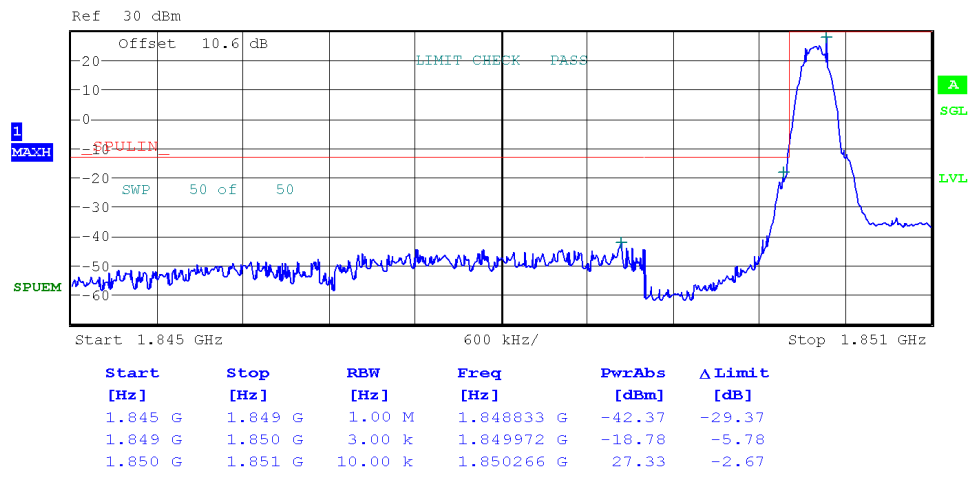
EGPRS850 Low Channel



BAND

Date: 28.NOV.2018 07:32:32

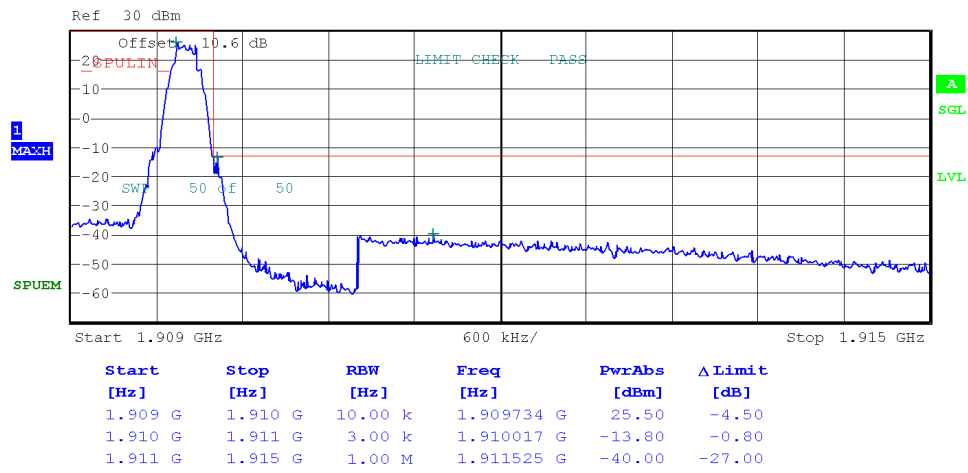
EGPRS850 High Channel



BAND

Date: 28.NOV.2018 08:01:23

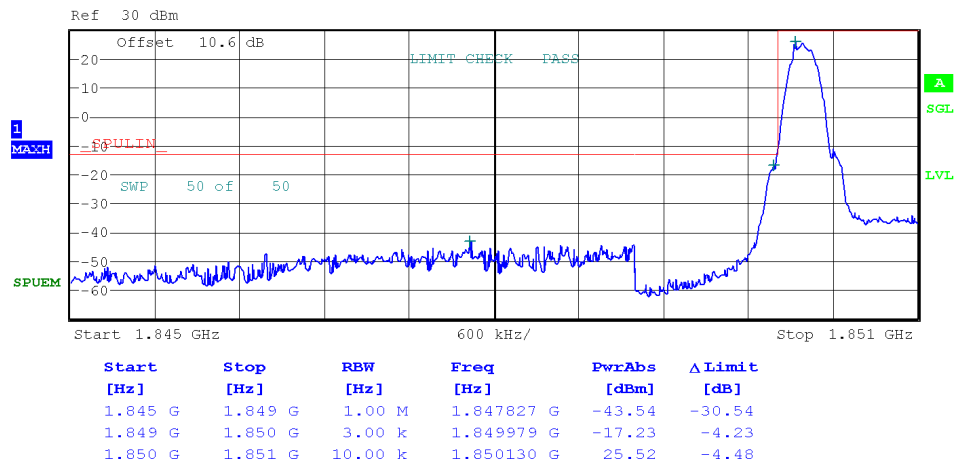
PCS1900 Low Channel



BAND

Date: 28.NOV.2018 08:06:15

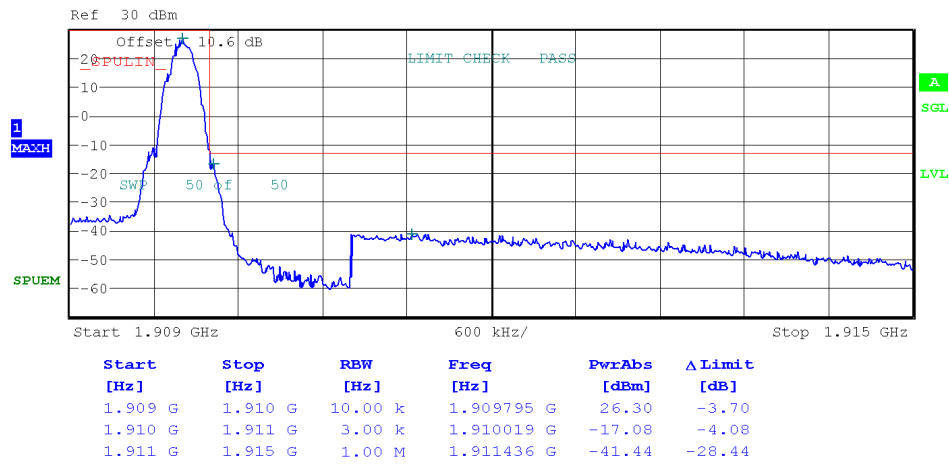
PCS1900 High Channel



BAND

Date: 28.NOV.2018 08:10:54

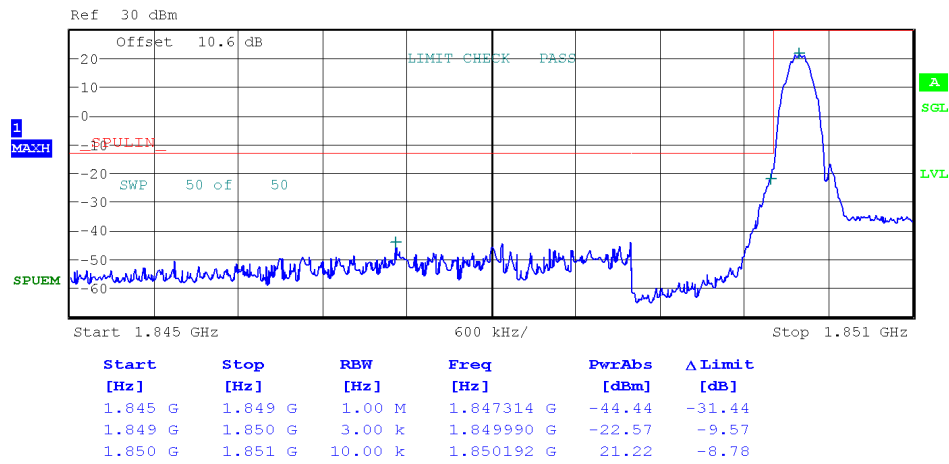
GPRS1900 Low Channel



BAND

Date: 28.NOV.2018 08:08:25

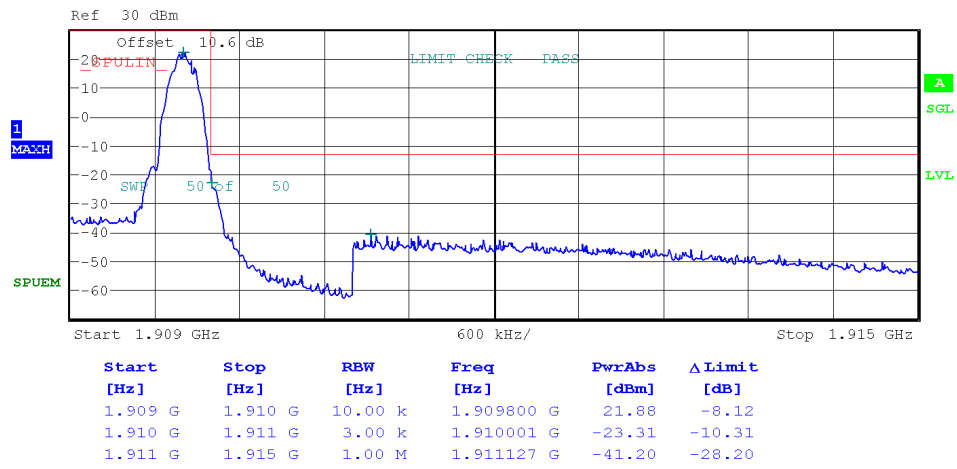
GPRS1900 High Channel



BAND

Date: 28.NOV.2018 08:18:20

EGPRS1900 Low Channel1



BAND

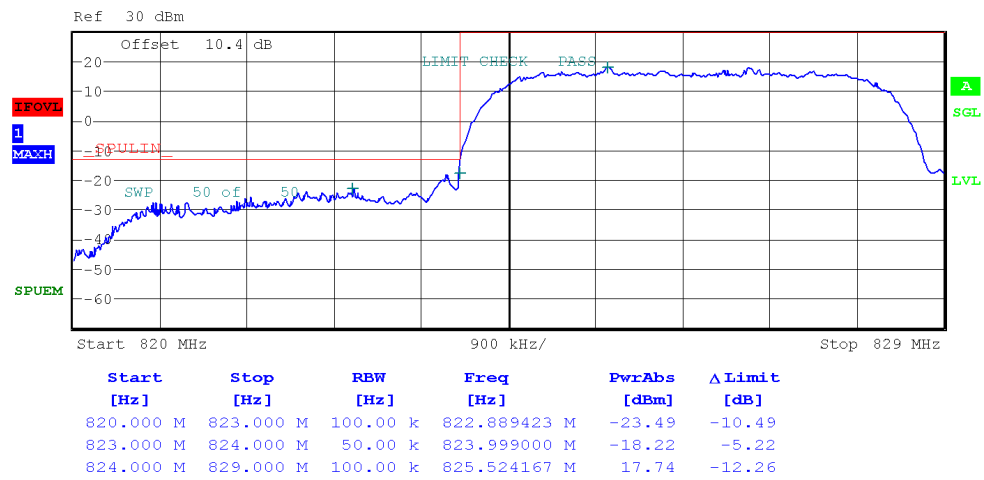
Date: 28.NOV.2018 08:21:40

EGPRS1900 High Channel



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FCC RF TEST REPORT



BAND

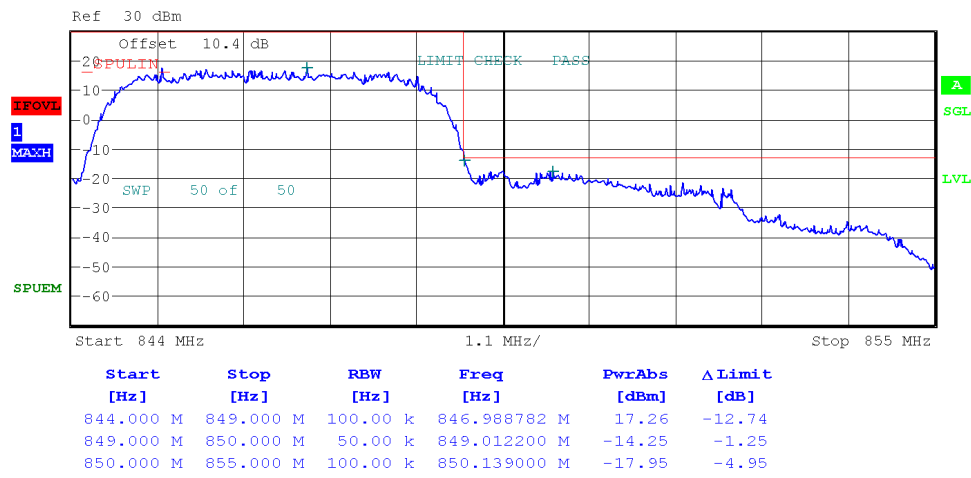
Date: 28.NOV.2018 08:38:59

WCDMA BAND5 Low Channel



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FCC RF TEST REPORT



BAND

Date: 28.NOV.2018 09:04:17

WCDMA BAND5 High Channel



5.5 Conducted Spurious Emissions

5.5.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least $43+10\log(P)$ dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10th harmonic.

5.5.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

5.5.3 Test Procedure

- a. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
- b. The RF output of the EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
- c. The middle channel for the highest RF power within the transmitting frequency was measured.
- d. The conducted spurious emission for the whole frequency range was taken.
- e. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
- f. The limit line is derived from $43+10\log(P)$ dB below the transmitter power P (Watts).

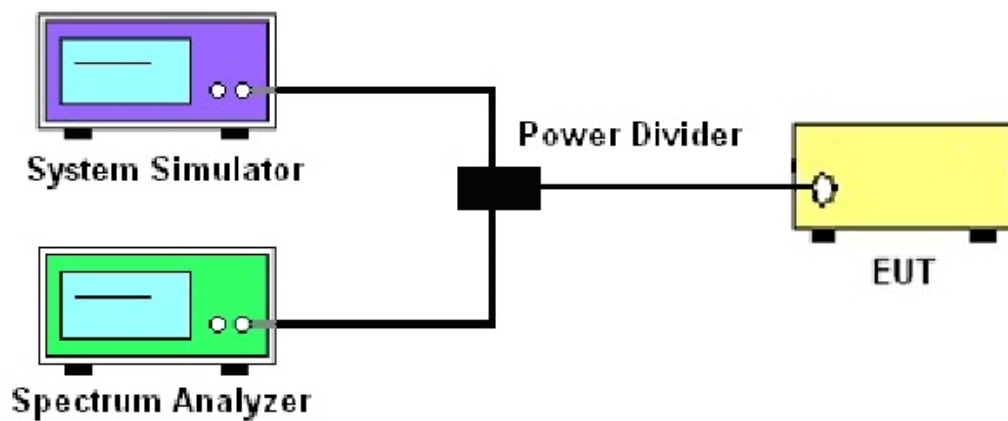
$$= P(W) - [43 + 10\log(P)](dB)$$

$$= [30 + 10\log(P)](dBm) - [43 + 10\log(P)](dB)$$

$$= -13dBm.$$



5.5.4 Test Setup



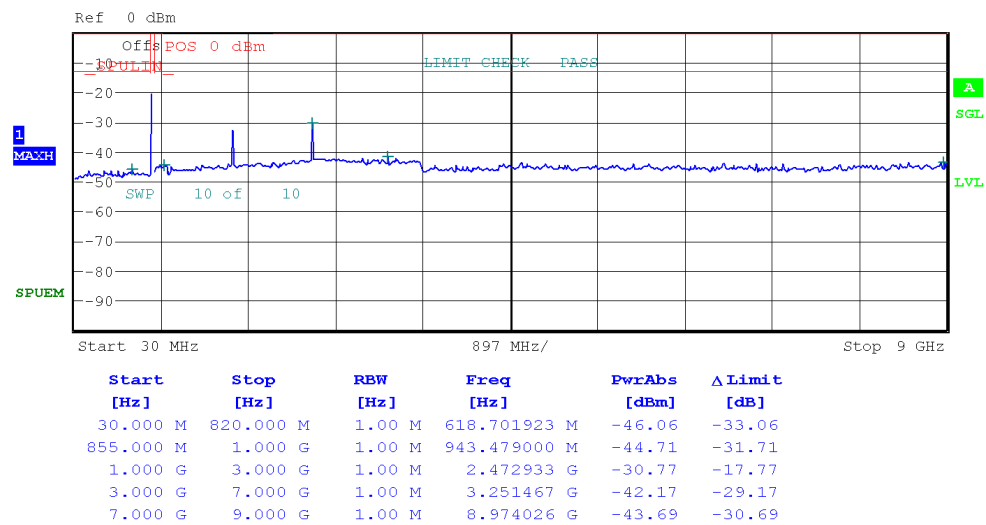
5.5.5 Test Result

Modes	GSM850			PCS1900		
Channel	128	190	251	512	661	810
Conducted Spurious emissions(<-13dBm)	Pass	Pass	Pass	Pass	Pass	Pass
Modes	WCDMA BAND5					
Channel	4132	4182	4233			
Conducted Spurious emissions(<-13dBm)	Pass	Pass	Pass			

Modes	GPRS850			GPRS1900		
Channel	128	190	251	512	661	810
Conducted Spurious emissions(<-13dBm)	Pass	Pass	Pass	Pass	Pass	Pass



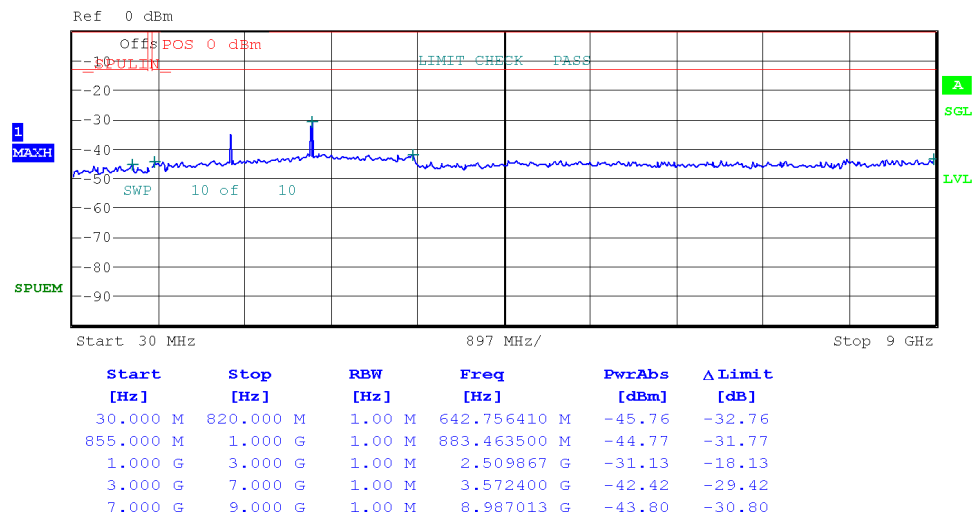
Modes	EGPRS850			EGPRS1900		
Channel	128	190	251	512	661	810
Conducted Spurious emissions(<-13dBm)	Pass	Pass	Pass	Pass	Pass	Pass



BAND

Date: 28.NOV.2018 10:00:44

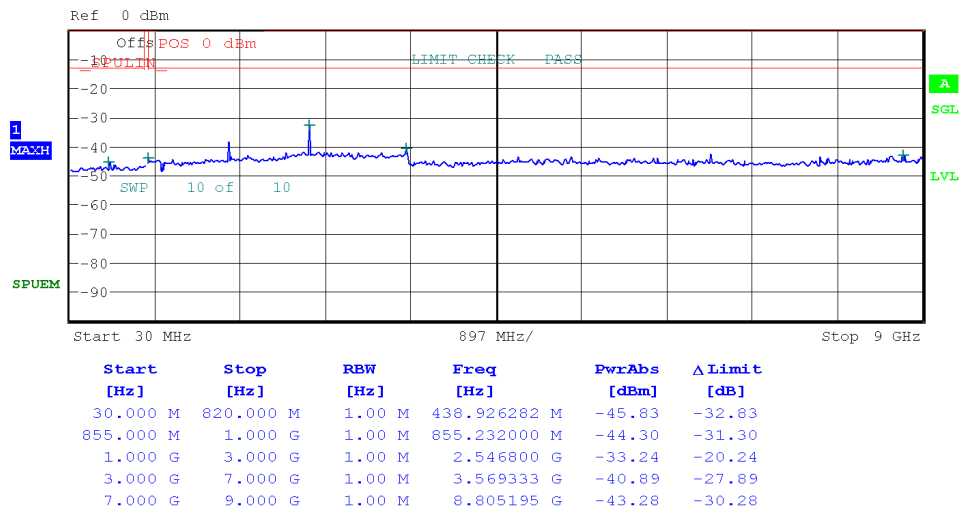
GSM850 Low Channel



BAND

Date: 28.NOV.2018 09:59:27

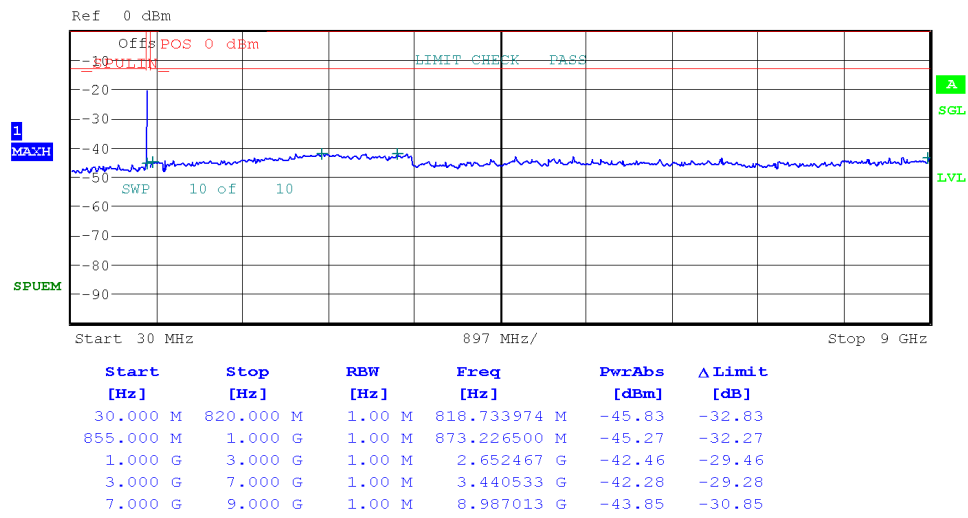
GSM850 Mid Channel



BAND

Date: 28.NOV.2018 09:55:02

GSM850 High Channel



BAND

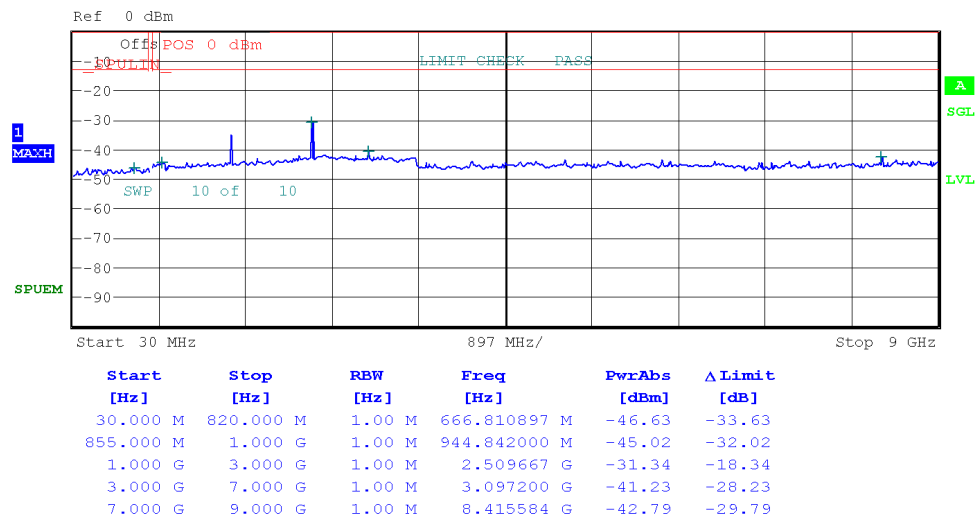
Date: 28.NOV.2018 10:01:47

GPRS850 Low Channel



Build Your Dreams!

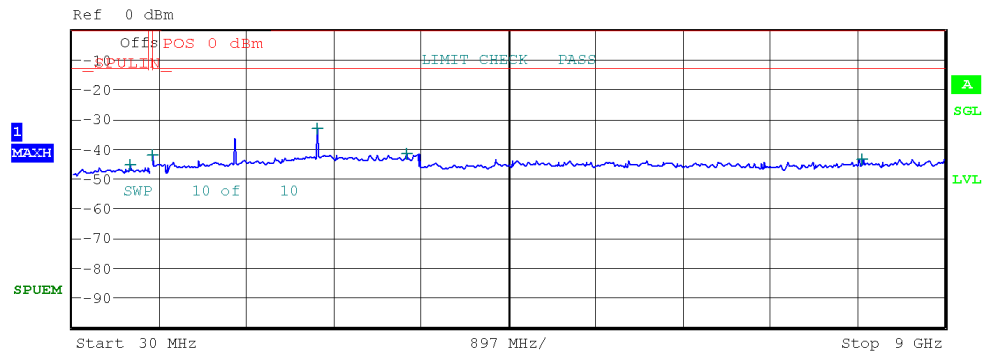
FCC RF TEST REPORT



BAND

Date: 28.NOV.2018 10:02:27

GPRS850 Mid Channel

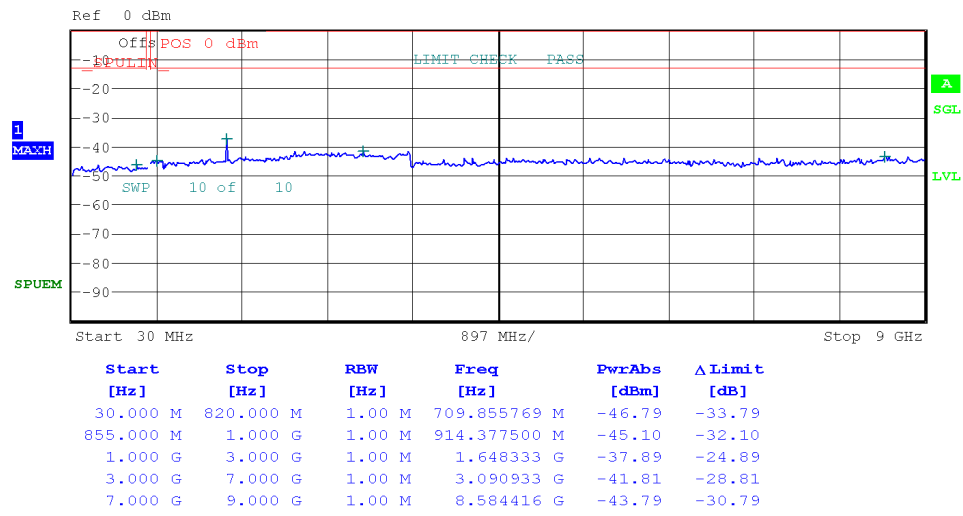


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
30.000 M	820.000 M	1.00 M	618.701923 M	-45.96	-32.96
855.000 M	1.000 G	1.00 M	855.029000 M	-42.47	-29.47
1.000 G	3.000 G	1.00 M	2.546533 G	-33.74	-20.74
3.000 G	7.000 G	1.00 M	3.462800 G	-42.23	-29.23
7.000 G	9.000 G	1.00 M	8.155844 G	-43.82	-30.82

BAND

Date: 28.NOV.2018 10:03:05

GPRS850 High Channel



BAND

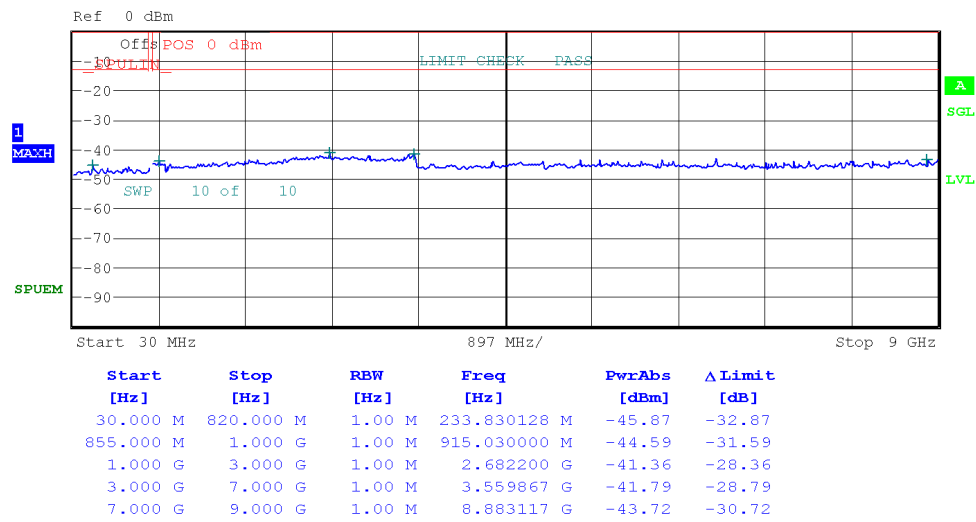
Date: 28.NOV.2018 10:06:35

EGPRS850 Low Channel



Build Your Dreams!

FCC RF TEST REPORT



BAND

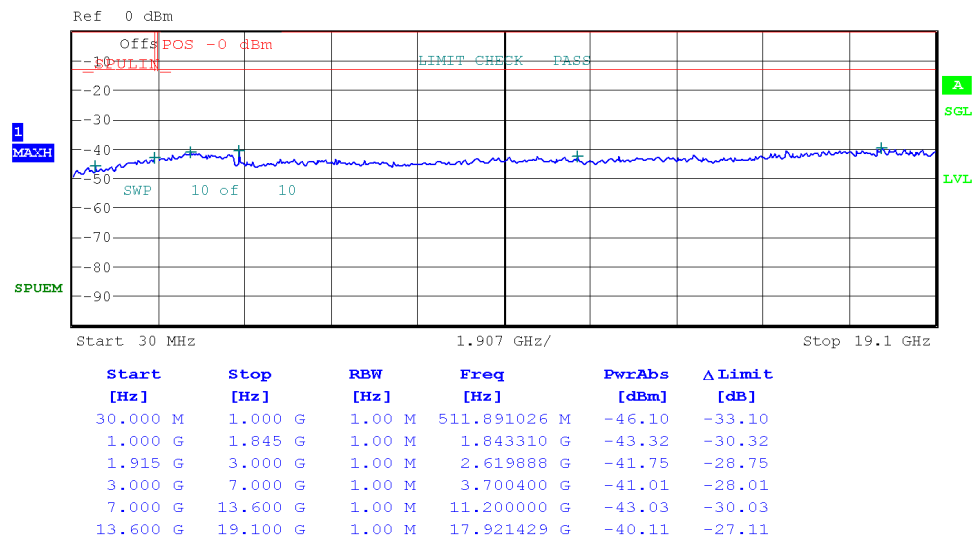
Date: 28.NOV.2018 10:05:18

EGPRS850 High Channel



Build Your Dreams!

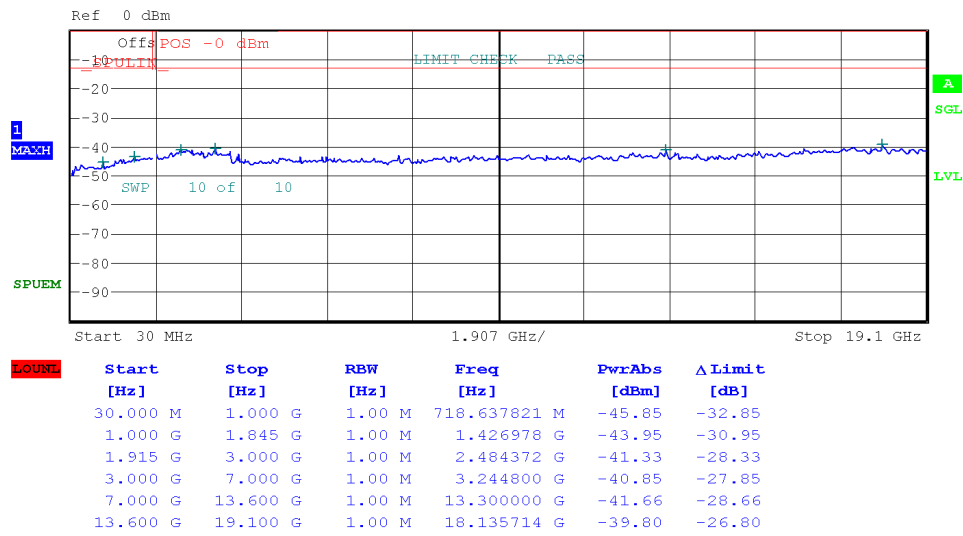
FCC RF TEST REPORT



BAND

Date: 28.NOV.2018 09:41:58

PCS1900 Low Channel



BAND

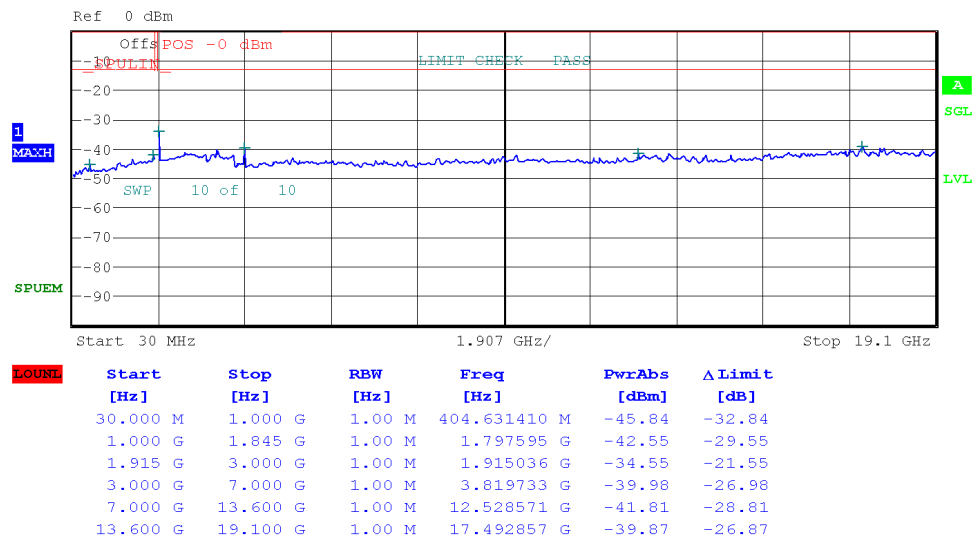
Date: 28.NOV.2018 09:35:58

PCS1900 Mid Channel



Build Your Dreams!

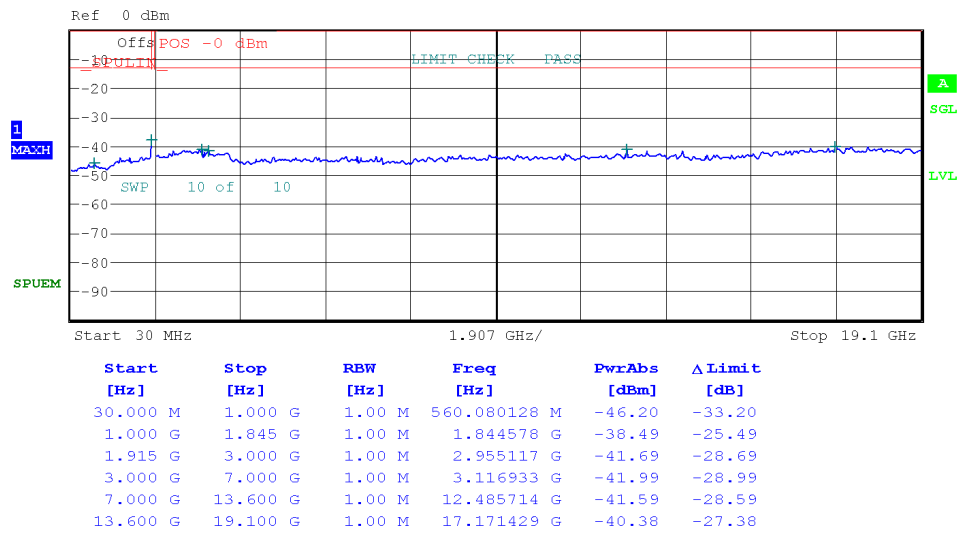
FCC RF TEST REPORT



BAND

Date: 28.NOV.2018 09:34:48

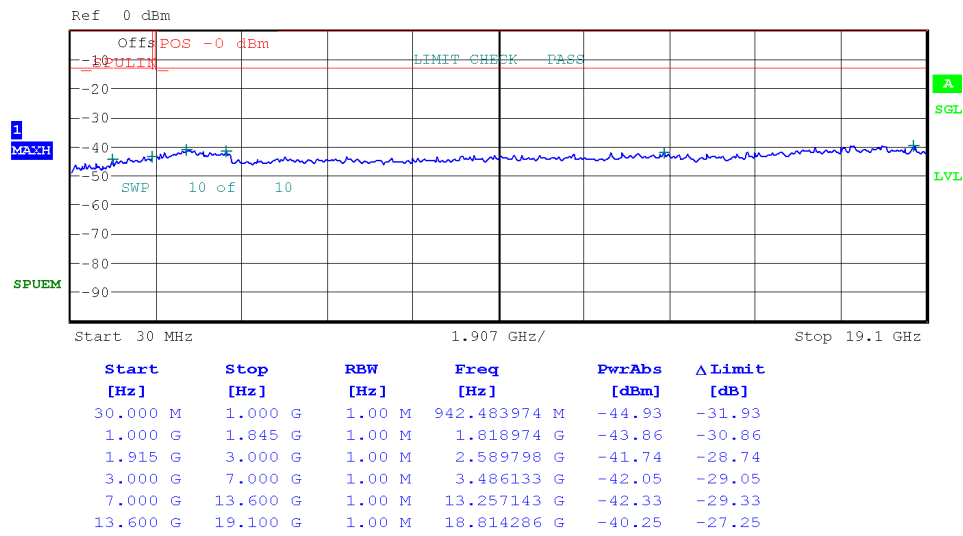
PCS1900 High Channel



BAND

Date: 28.NOV.2018 09:48:21

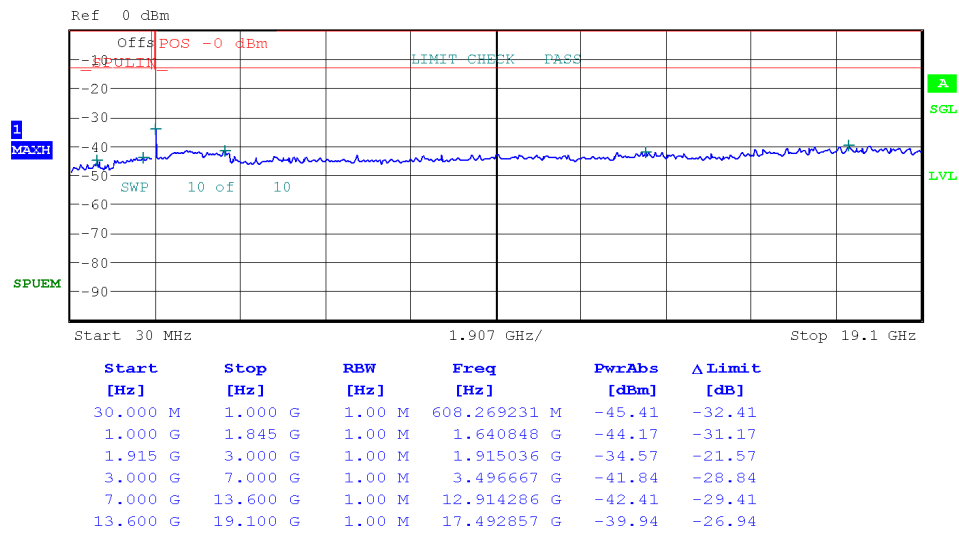
GPRS1900 Low Channel



BAND

Date: 28.NOV.2018 09:49:09

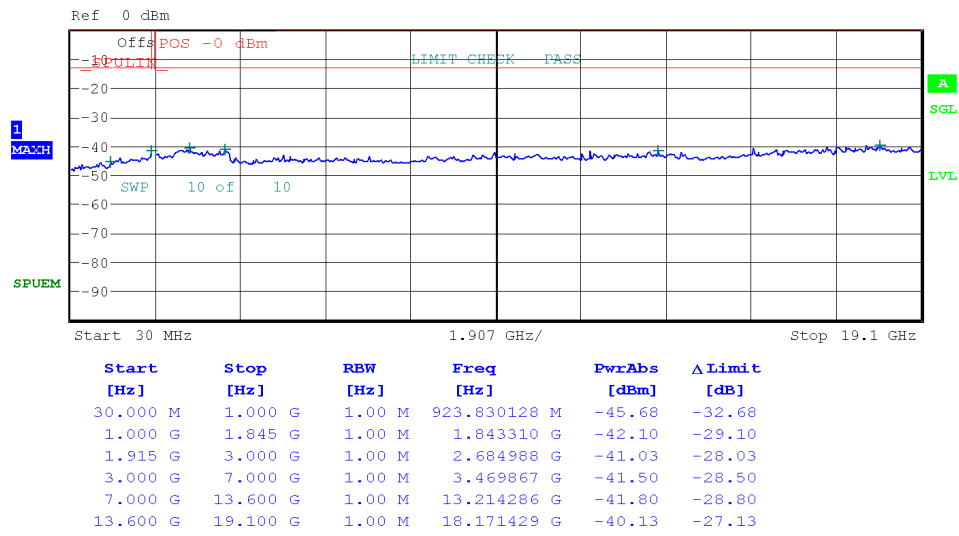
GPRS1900 Mid Channel



BAND

Date: 28.NOV.2018 09:50:00

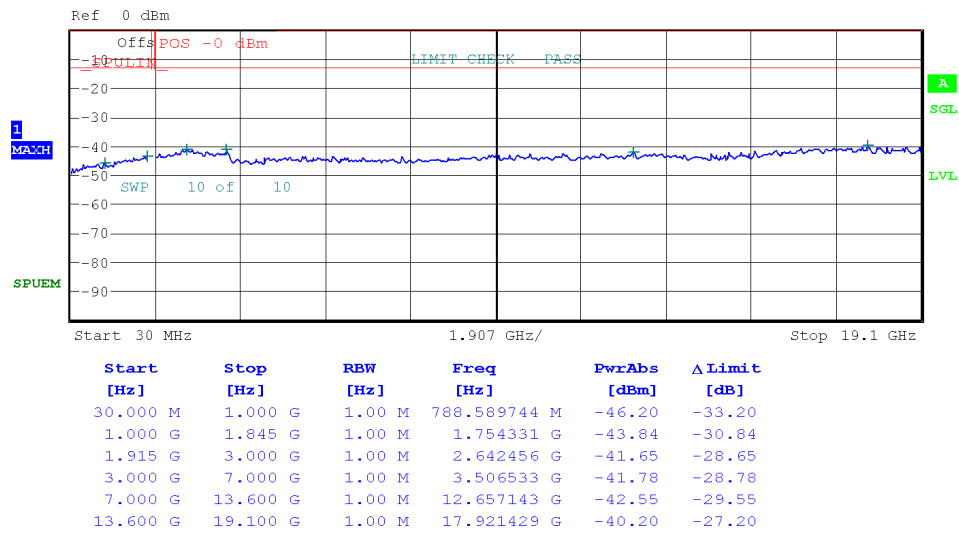
GPRS1900 High Channel



BAND

Date: 28.NOV.2018 09:44:12

EGPRS1900 Low Channel



BAND

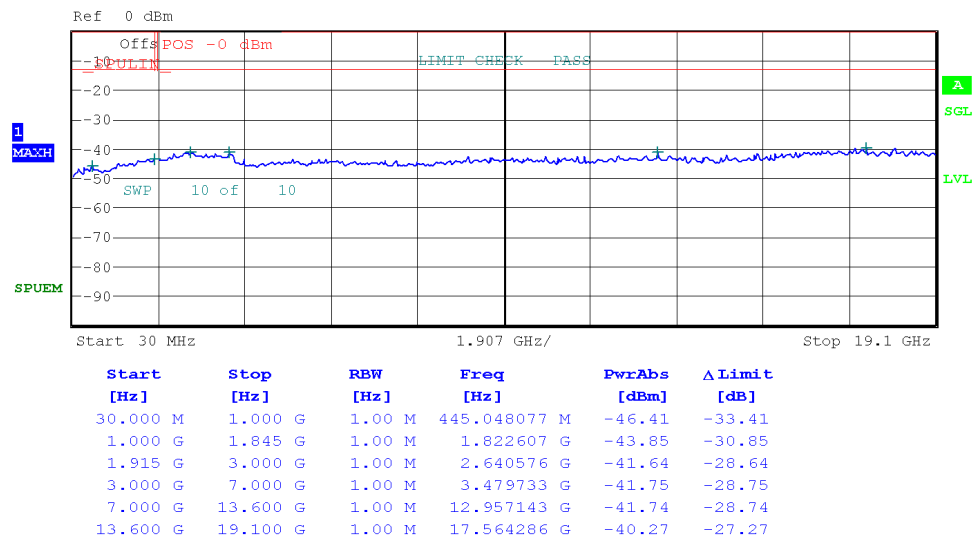
Date: 28.NOV.2018 09:45:03

EGPRS1900 Mid Channel



Build Your Dreams!

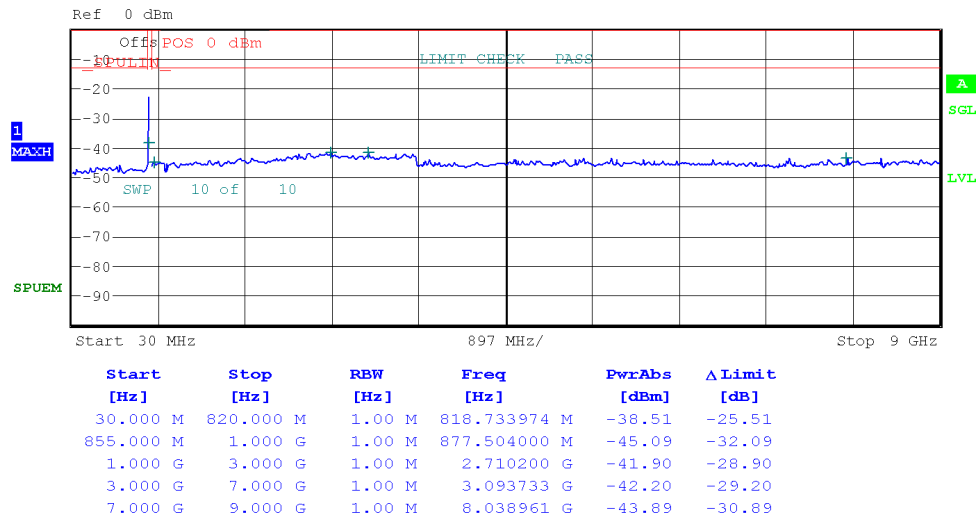
FCC RF TEST REPORT



BAND

Date: 28.NOV.2018 09:45:54

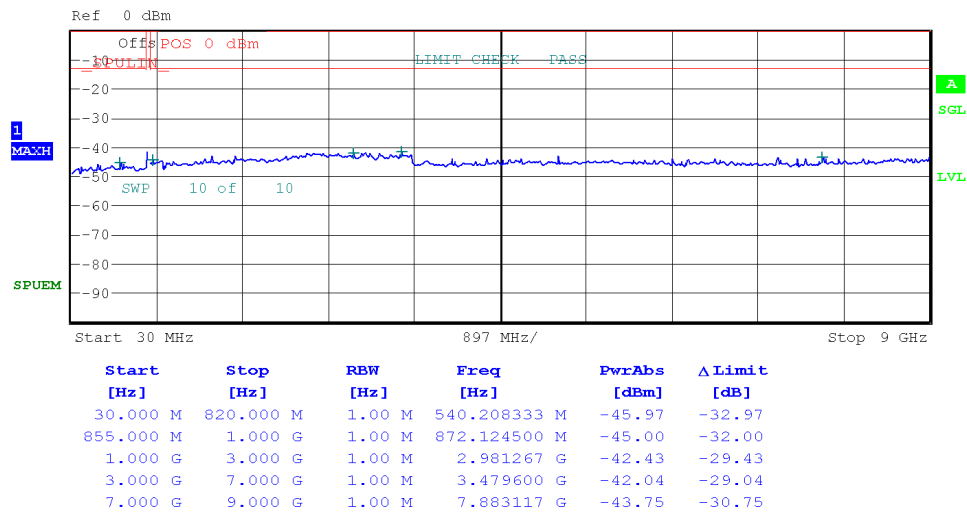
EGPRS1900 High Channel



BAND

Date: 28.NOV.2018 10:12:35

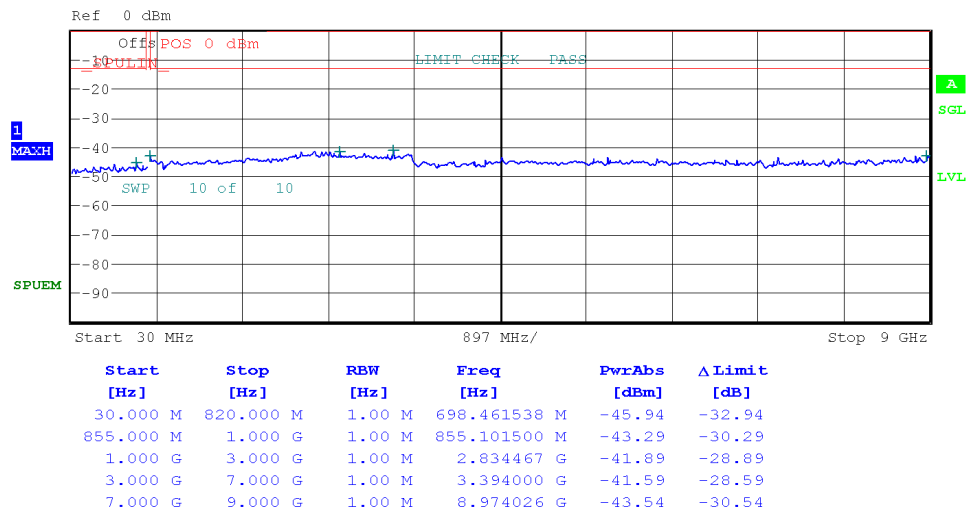
WCDMA BAND5 Low Channel



BAND

Date: 28.NOV.2018 10:13:25

WCDMA BAND5 Mid Channel



BAND

Date: 28.NOV.2018 10:14:08

WCDMA BAND5 High Channel



5.6 Frequency Stability

5.6.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency.

5.6.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

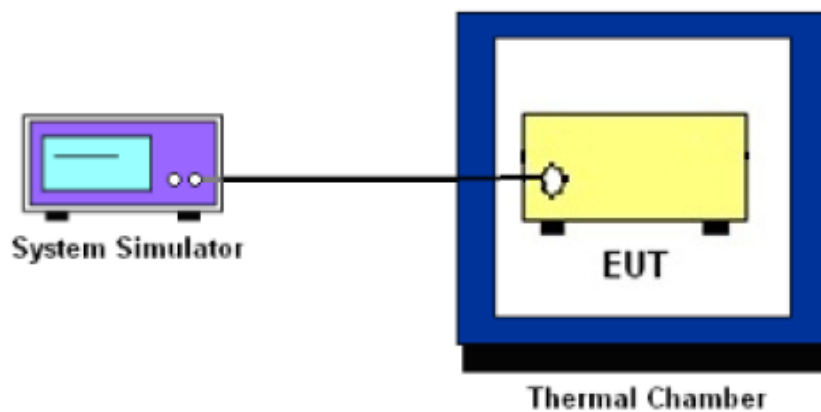
5.6.3 Test Procedure for Temperature Variation

- a. The EUT was set up in the thermal chamber and connected with the system simulator.
- b. With power OFF, the temperature was decreased to -20°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
- c. With power OFF, the temperature was raised in 10°C steps up to 60°C . The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

5.6.4 Test Procedure for Voltage Variation

- a. The EUT was placed in a temperature chamber at $25\pm 5^{\circ}\text{C}$ and connected with the system simulator.
- b. The power supply voltage to the EUT was varied from 3.42V to 4.18V measured at the input to the EUT.
- c. The variation in frequency was measured for the worst case.

5.6.5 Test Setup



5.6.6 Test Result

Test Result of Temperature Variation

Band:	GSM850		Channel:	190
Limit(ppm)	2.5		Frequency:	836.6MHZ
Temperature (°C)	GSM Deviation (ppm)	GPRS Deviation (ppm)	EGPRS Deviation (ppm)	Result
-20	+0.02	+0.03	+0.03	PASS
-10	+0.02	+0.03	+0.03	
0	+0.02	+0.03	+0.03	
10	+0.02	+0.03	+0.03	
20(Ref.)	+0.02	+0.03	+0.03	
30	+0.02	+0.03	+0.03	
40	+0.02	+0.02	+0.04	
50	+0.02	+0.03	+0.03	
60	+0.02	+0.03	+0.03	



Band:	PCS1900		Channel:	661
Limit(ppm)	2.5		Frequency:	1880.0MHZ
Temperature (°C)	GSM Deviation (ppm)	GPRS Deviation (ppm)	EGPRS Deviation (ppm)	Result
-20	+0.01	+0.01	+0.01	PASS
-10	+0.01	+0.01	+0.02	
0	+0.01	+0.01	+0.01	
10	+0.01	+0.01	+0.01	
20(Ref.)	+0.01	+0.01	+0.01	
30	+0.02	+0.02	+0.01	
40	+0.00	+0.01	+0.01	
50	+0.01	+0.01	+0.02	
60	+0.01	+0.01	+0.01	

Band:	WCDMA BAND5	Channel:	4182
Limit(ppm)	2.5	Frequency:	836.4MHZ
Temperature(°C)	Deviation(ppm)		Result
-20	-0.0006		Pass
-10	-0.0013		Pass
0	-0.0007		Pass
10	-0.0015		Pass
20(Ref.)	-0.0004		Pass



30	-0.0003	Pass
40	-0.0005	Pass
50	-0.0002	Pass
60	-0.0002	Pass

Test Result of Voltage Variation

Band Channel	Mode	Voltage	Deviation(ppm)	Limit(ppm)	Result
GSM 850 CH190	GSM	LV	+0.02	2.5	Pass
		NV	+0.03	2.5	Pass
		HV	+0.02	2.5	Pass
	GPRS	LV	+0.02	2.5	Pass
		NV	+0.03	2.5	Pass
		HV	+0.02	2.5	Pass
	EGPRS	LV	+0.02	2.5	Pass
		NV	+0.03	2.5	Pass
		HV	+0.03	2.5	Pass
PCS 1900 CH661	GSM	LV	+0.01	2.5	Pass
		NV	+0.01	2.5	Pass
		HV	+0.01	2.5	Pass
	GPRS	LV	+0.01	2.5	Pass
		NV	+0.01	2.5	Pass
		HV	+0.01	2.5	Pass
	EGPRS	LV	+0.01	2.5	Pass
		NV	+0.01	2.5	Pass



		HV	+0.01	2.5	Pass
WCDMA BAND5 CH4182	RMC	LV	-0.0012	2.5	Pass
	12.2Kbps	NV	-0.0009	2.5	Pass
		HV	-0.0009	2.5	Pass



5.7 Effective radiated power and effective isotropic radiated power measurement

5.7.1 Description of the ERP/EIRP Measurement

The ERP of mobile transmitters must not exceed 7 Watts (Cellular Band) and the EIRP of mobile transmitters are limited to 2 Watts (PCS Band) and 1 Watts (AWS Band).

5.7.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

5.7.3 Test Procedure

Effective Isotropic Radiated Power (EIRP) was calculated with the correction factor,
 $EIRP = \text{Conducted Output Power} + \text{Substitution antenna gain}$. $ERP = EIRP - 2.15$.

5.7.4 Test Result

Modes	GSM850			Modes	PCS1900		
Channel	128	190	251	Channel	512	661	810
Frequency(MHz)	824.2	836.6	848.8	Frequency(MHz)	1850.2	1880	1909.8
Antenna Gain(dBi)	0.12	0.2	0.05	Antenna Gain(dBi)	0.2	0.35	0.7
ERP	30.8	30.59	30.26	EIRP	28.17	29.05	30.05
Limit	≤ 7W(38.45dBm)			Limit	≤ 2W(33dBm)		
Result	PASS			Result	PASS		
Modes	WCDMA BAND5						
Channel	4132	4182	4233				
Frequency(MHz)	826.4	836.4	846.6				
Antenna Gain(dBi)	0.12	0.2	0.05				
ERP	20.63	20.94	20.6				
Limit	≤ 7W(38.45dBm)						
Result	PASS						



Modes	GPRS 850			Modes	GPRS 1900		
Channel	128	190	251	Channel	512	661	810
Frequency(MHz)	824.2	836.6	848.8	Frequency(MHz)	1850.2	1880	1909.8
Antenna Gain(dBi)	0.12	0.2	0.05	Antenna Gain(dBi)	0.2	0.35	0.7
ERP	31.01	30.08	30.49	EIRP	28.62	29.4	30.24
Limit	$\leq 7W(38.45dBm)$			Limit	$\leq 2W(33dBm)$		
Result	PASS			Result	PASS		

Modes	EGPRS 850			Modes	EGPRS 1900		
Channel	128	190	251	Channel	512	661	810
Frequency(MHz)	824.2	836.6	848.8	Frequency(MHz)	1850.2	1880	1909.8
Antenna Gain(dBi)	0.12	0.2	0.05	Antenna Gain(dBi)	0.2	0.35	0.7
ERP	24.65	24.71	24.71	EIRP	24.75	25.18	26.24
Limit	$\leq 7W(38.45dBm)$			Limit	$\leq 2W(33dBm)$		
Result	PASS			Result	PASS		



5.8 Filed Strength of Spurious Radiation

5.8.1 Description of Field Strength of Spurious Radiated Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

5.8.2 Test Instruments

The measuring equipment is listed in the section 4.1 of this test report.

5.8.3 Test Procedures

- a. The EUT was placed on a rotatable wooden table 0.8 meters above the ground.
- b. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest spurious emission.
- d. The height of the receiving antenna is varied between one meter and four meters to search for the maximum spurious emission for both horizontal and vertical polarizations.
- e. Make the measurement with the spectrum analyzer RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.
- f. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
- g. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
- h. Taking the record of output power at antenna port.
- i. Repeat step 7 to step 8 for another polarization.
- j. $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
- k. $ERP \text{ (dBm)} = EIRP - 2.15$
- l. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)

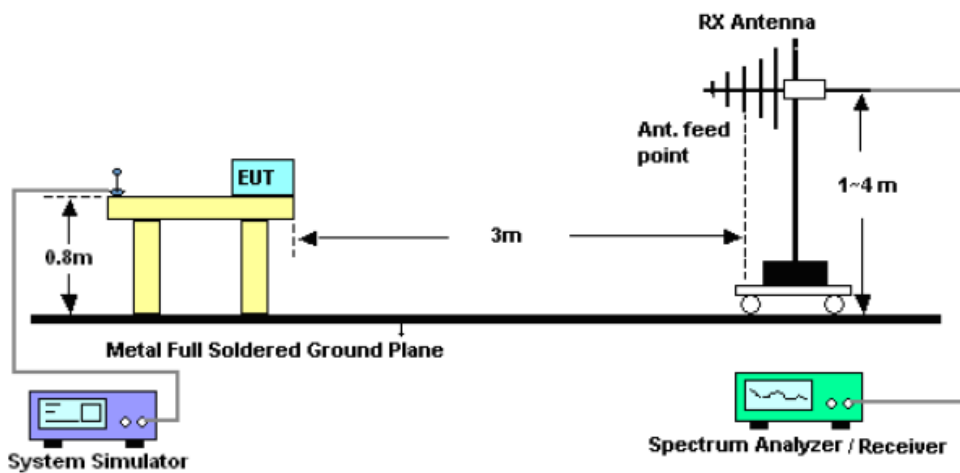
$$=P(W) - [43 + 10\log(P)](\text{dB})$$

$$=[30 + 10\log(P)](\text{dBm}) - [43 + 10\log(P)](\text{dB})$$

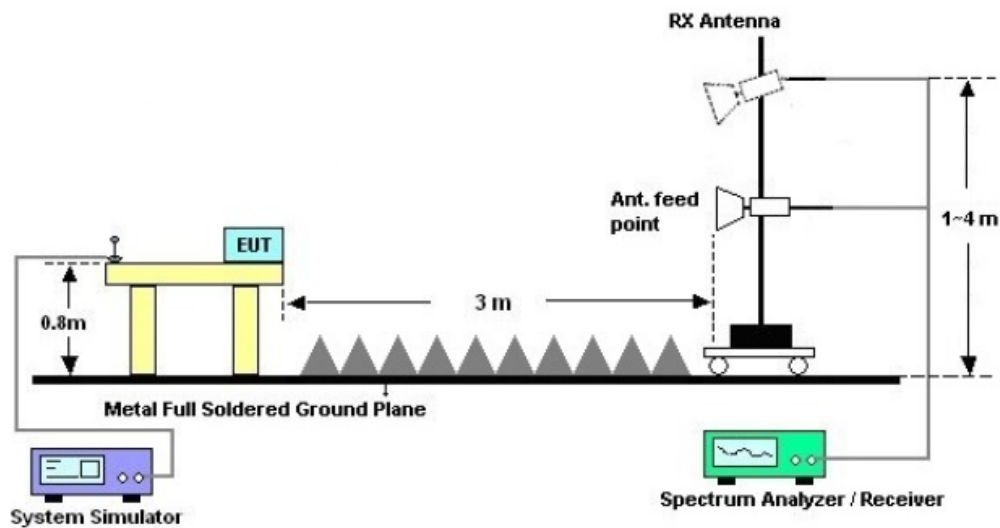
$$=-13\text{dBm}.$$

5.8.4 Test Setup

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



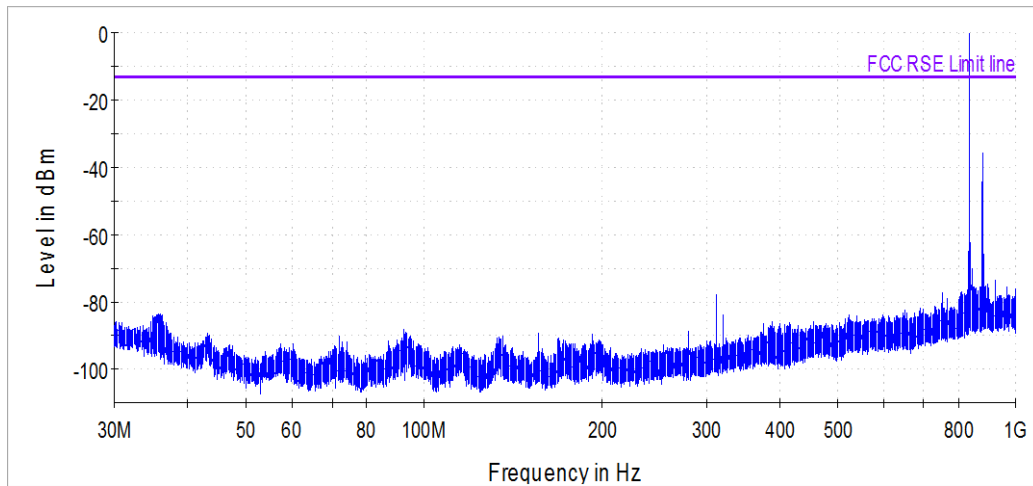


5.8.5 Test Result

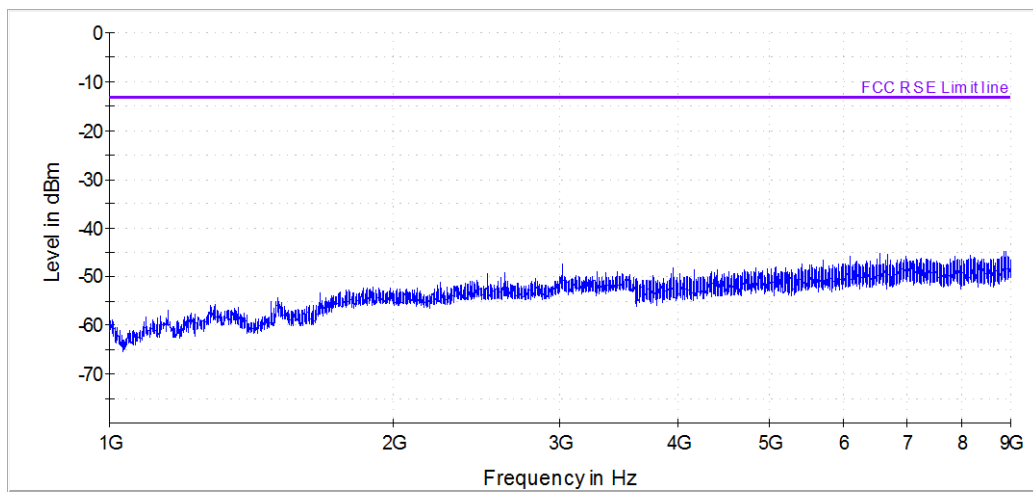
GSM 850 TX

Position 1

(30MHz~1GHz)

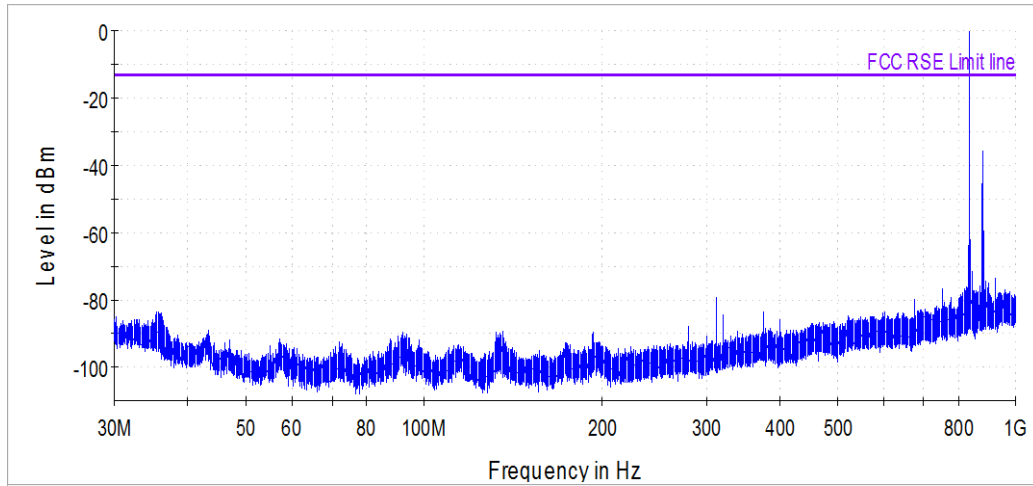


(1GHz~9GHz)

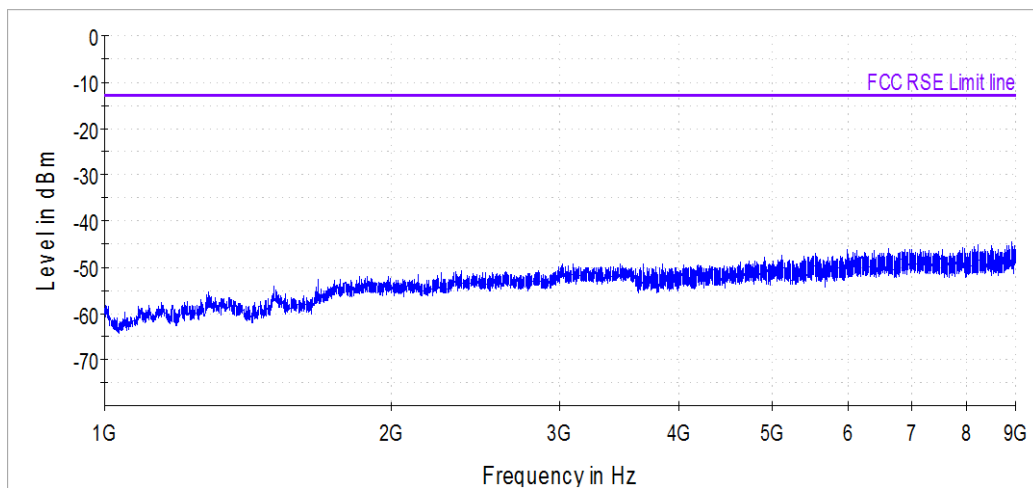




Positon 2
(30MHz~1GHz)

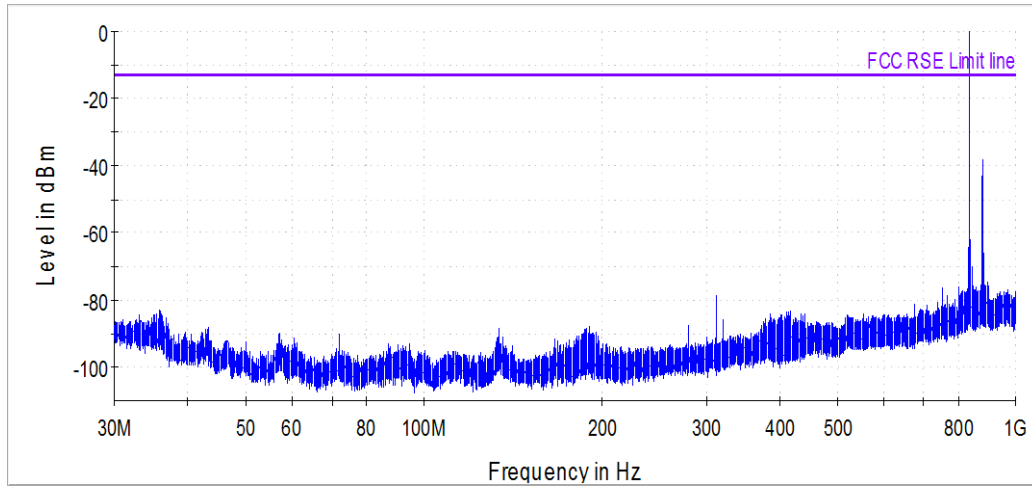


(1GHz~9GHz)

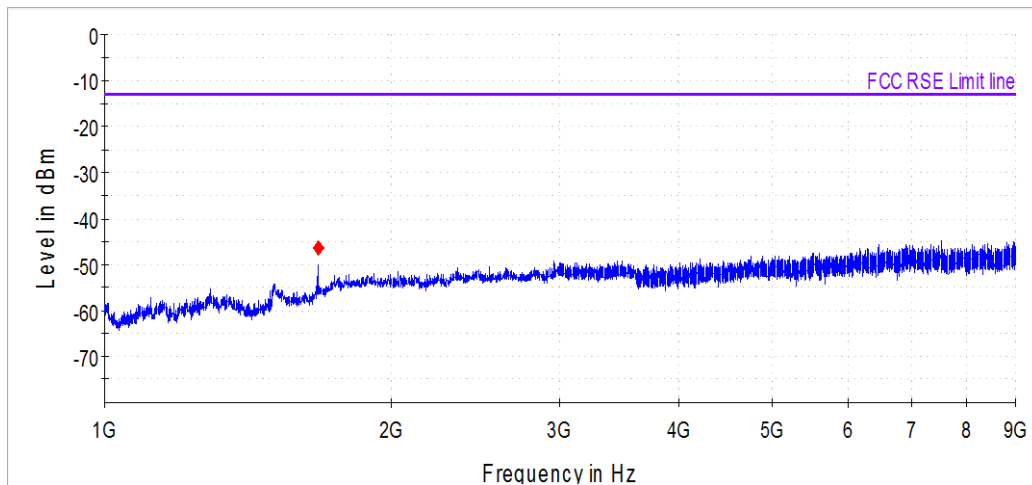




Position 3
(30MHz~1GHz)



(1GHz~9GHz)

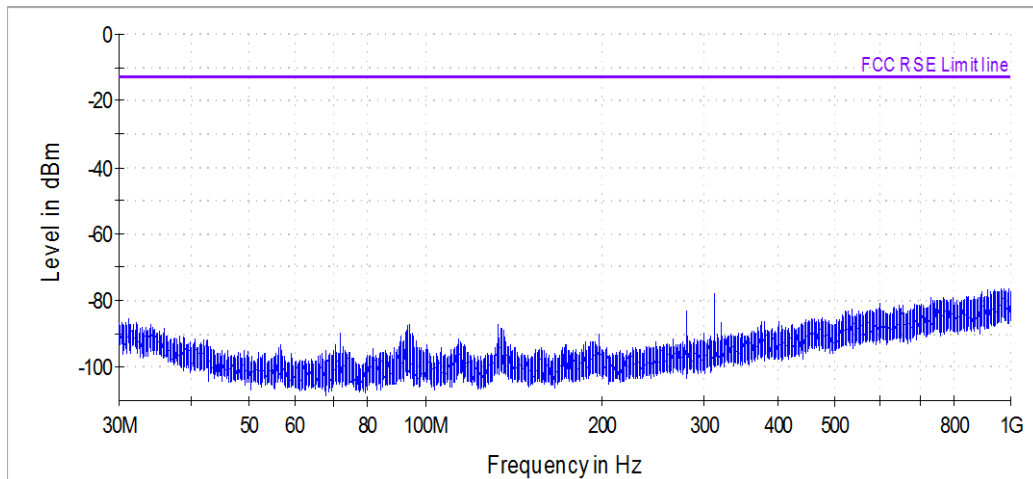


Frequency	MaxPeak	Limit	Margin	Read	SG	Cable loss	TX ant gain	Azimuth	Pol
MHz	dBm	dBm	dB	dBuV	dBm	dB	dB	deg	
1673.287500	-46.53	-13.00	33.53	49.27	-49.3	1.28	6.2	255.0	H

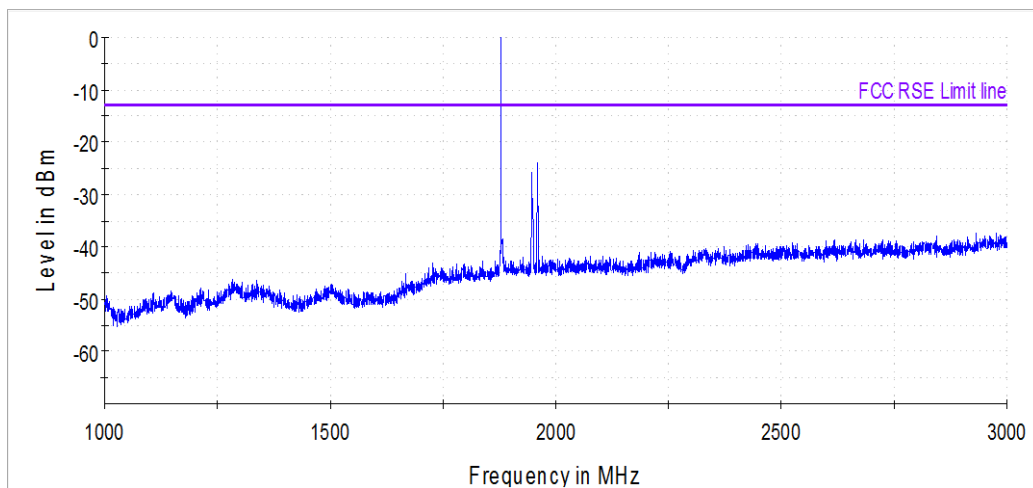
EIRP=SG Power - cable loss + Tx ant gain
ERP=EIRP-2.15



PCS 1900 TX
Position 1
(30MHz~1GHz)

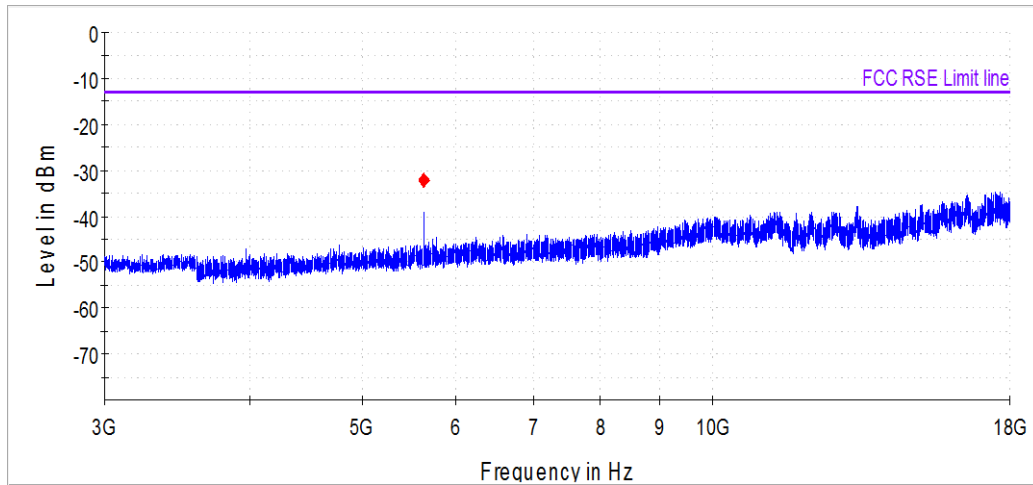


(1GHz~3GHz)





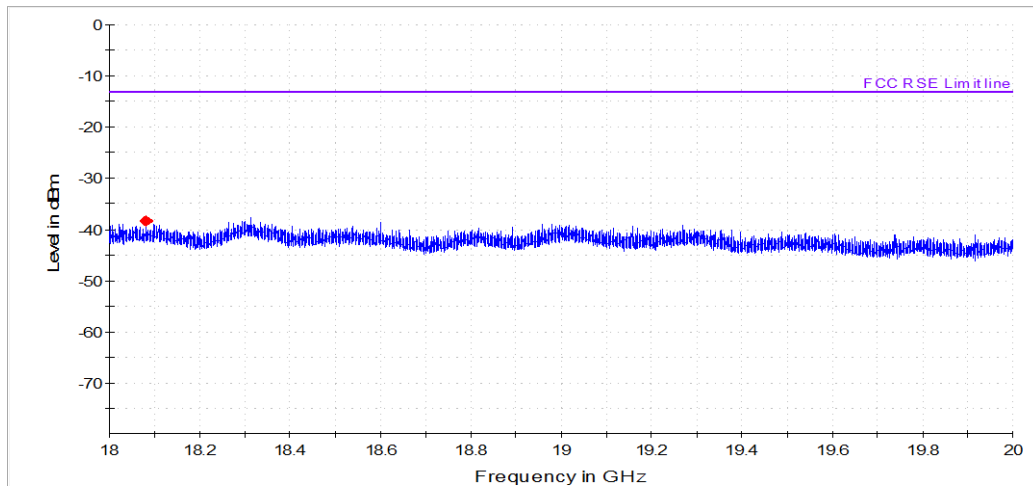
(3GHz~18GHz)



Fin PK

Frequency	MaxPeak	Limit	Margin	Read	SG	Cable loss	TX ant gain	Azimuth	Pol
MHz	dBm	dBm	dB	dBuV	dBm	dB	dB	deg	
5639.892000	-32.19	-13.00	19.19	53.61	-38.6	3.69	10.1	157.0	H

(18GHz~20GHz)



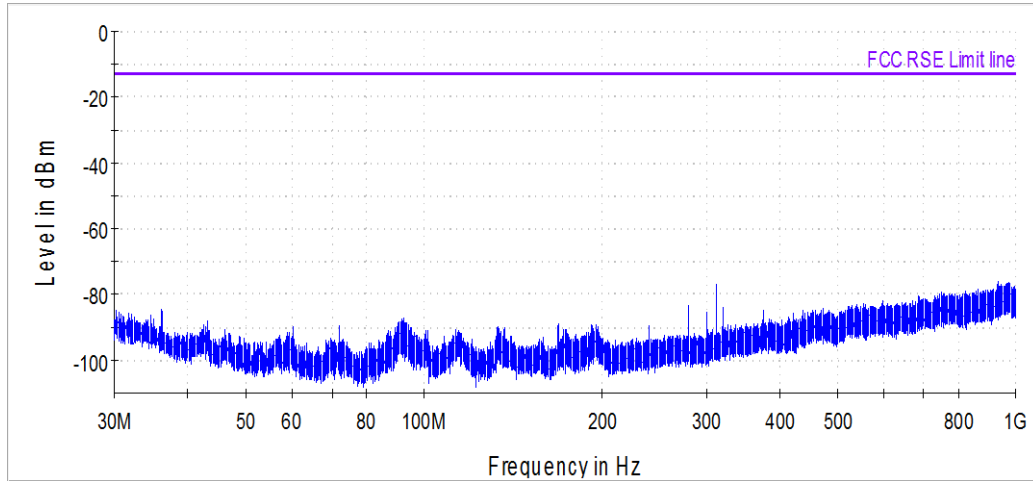
Fin PK

Frequency	MaxPeak	Limit	Margin	Read	SG	Cable loss	TX ant gain	Azimuth	Pol
MHz	dBm	dBm	dB	dBuV	dBm	dB	dB	deg	
18080.742167	-38.31	-13.00	25.31	40.29	-53.6	2.58	17.87	334.0	V

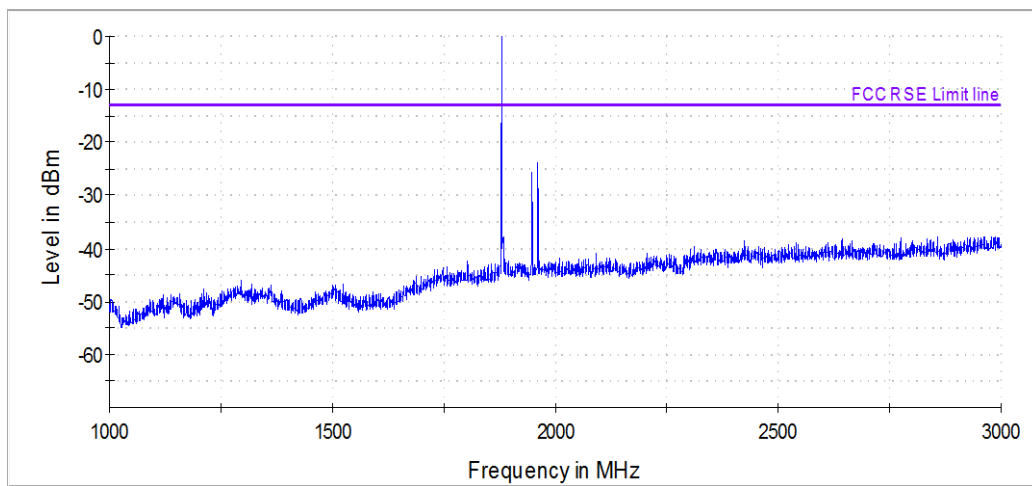
EIRP=SG Power - cable loss + Tx ant gain



Position 2
(30MHz~1GHz)

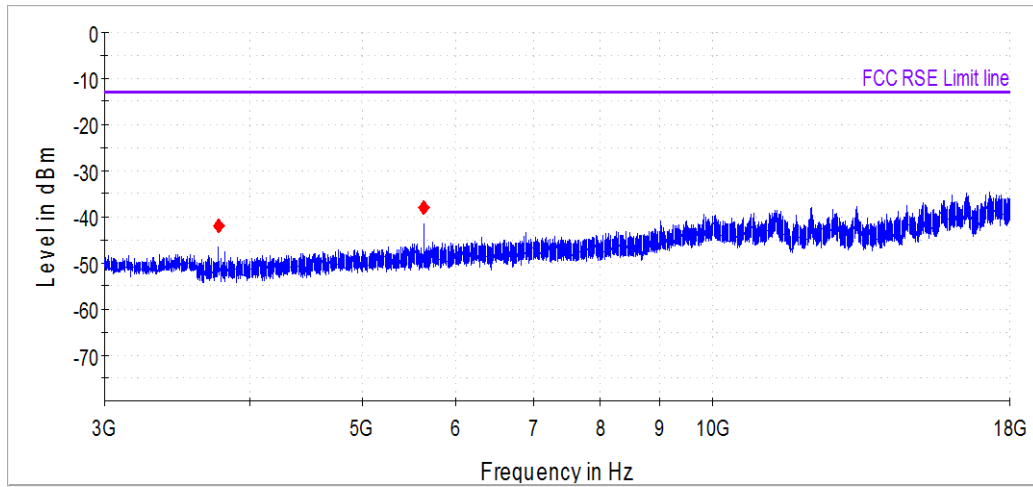


(1GHz~3GHz)





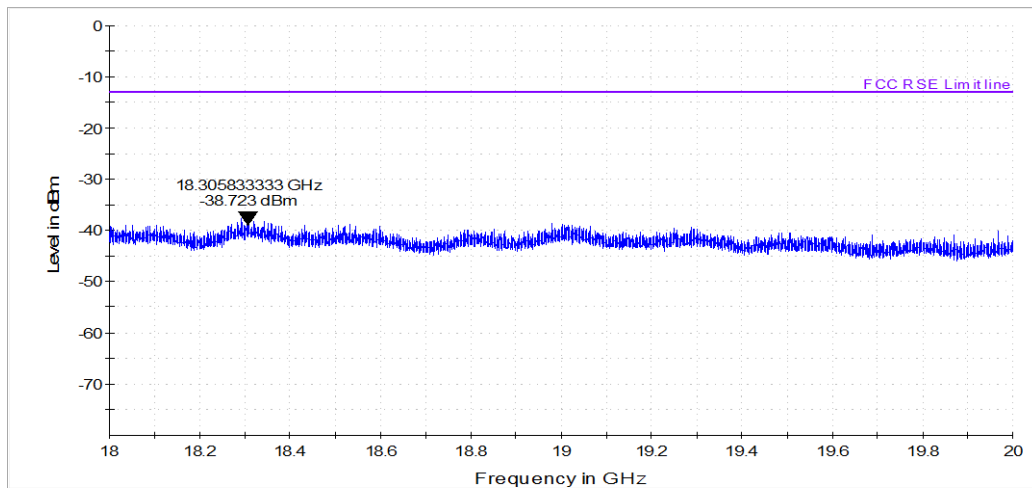
(3GHz~18GHz)



Fin PK

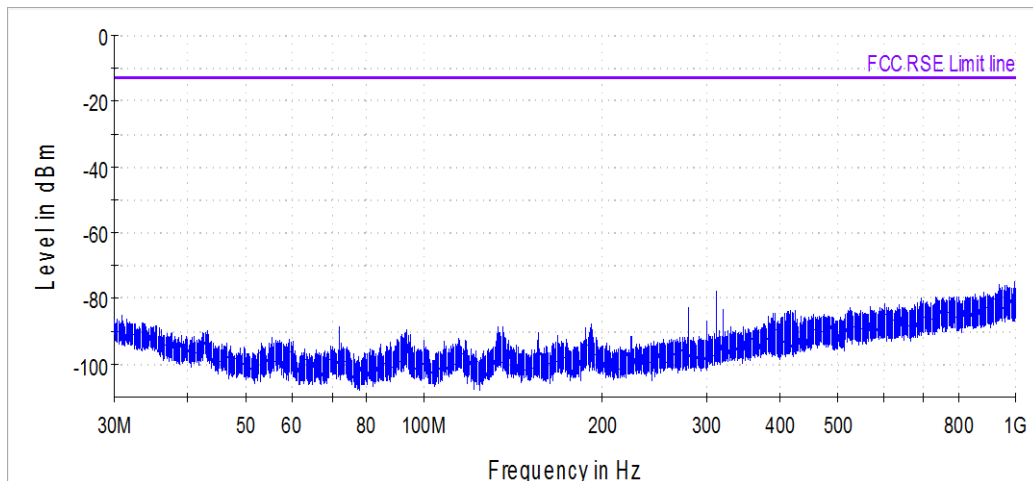
Frequency	MaxPeak	Limit	Margin	Read	SG	Cable loss	TX ant gain	Azimuth	Pol
MHz	dBm	dBm	dB	dBuV	dBm	dB	dB	deg	
3760.175667	-42.02	-13.00	29.02	47.83	-47.3	3.12	8.4	30.0	H
5639.938667	-38.11	-13.00	25.11	48.05	-44.5	3.71	10.1	248.0	V

EIRP=SG Power - cable loss + Tx ant gain

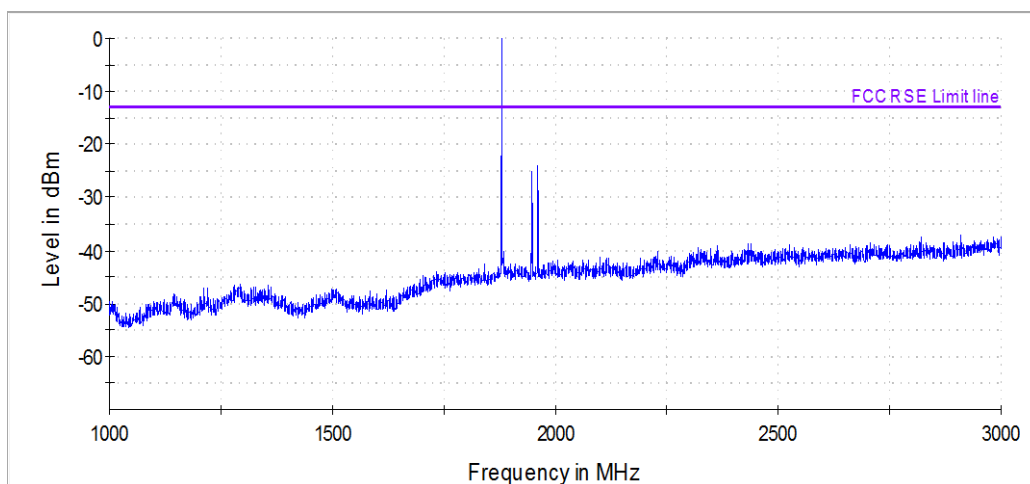




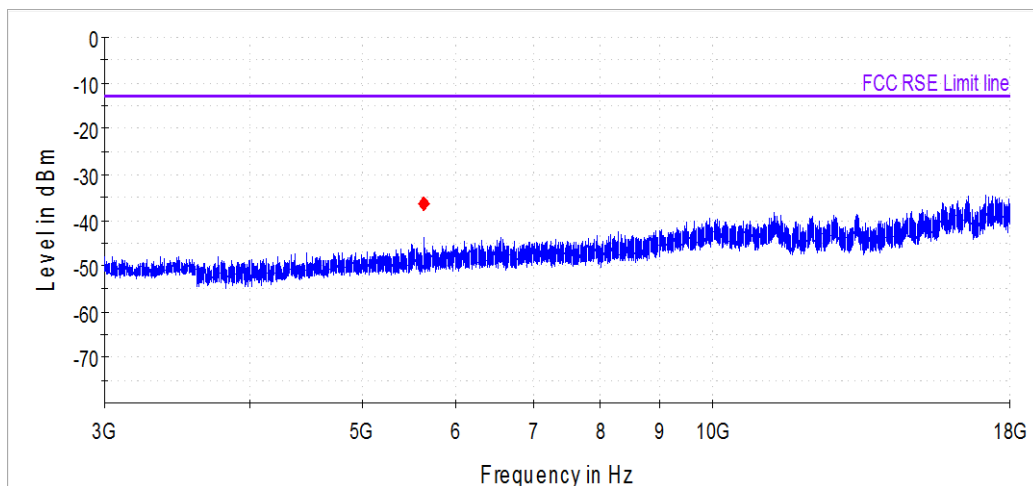
Position 3
(30MHz~1GHz)



(1GHz~3GHz)



(3GHz~18GHz)



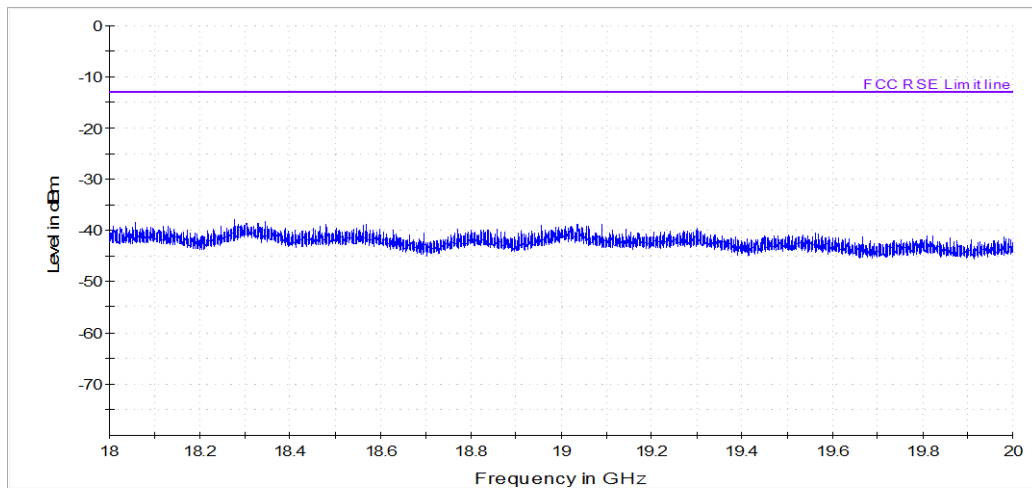


Fin PK

Frequency	MaxPeak	Limit	Margin	Read	SG	Cable loss	TX ant gain	Azimuth	Pol
MHz	dBm	dBm	dB	dBuV	dBm	dB	dBd	deg	
5639.895666	-36.43	-13.00	23.43	49.67	-42.8	3.73	10.1	310.0	V

EIRP=SG Power - cable loss + Tx ant gain

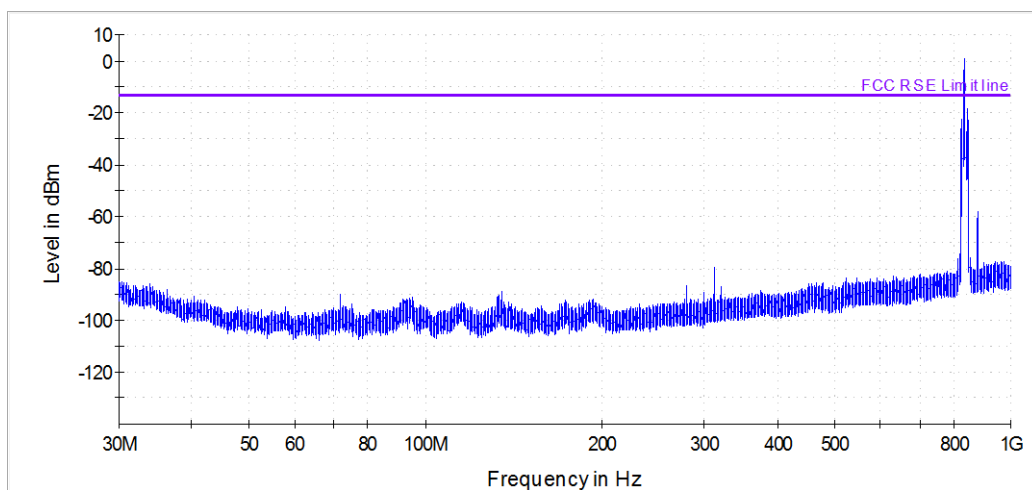
(18GHz~20GHz)



WCDMA Band5 TX

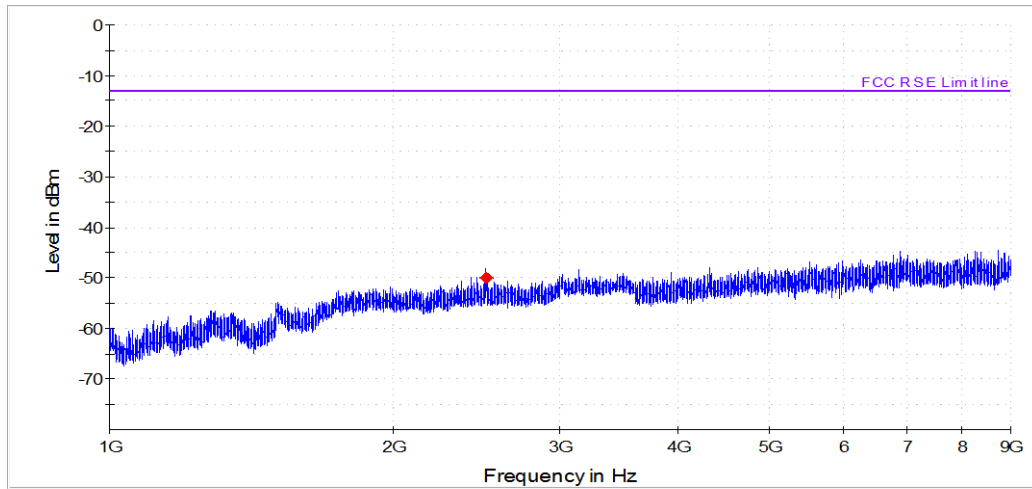
Position 1

(30MHz~1GHz)





(1GHz~9GHz)



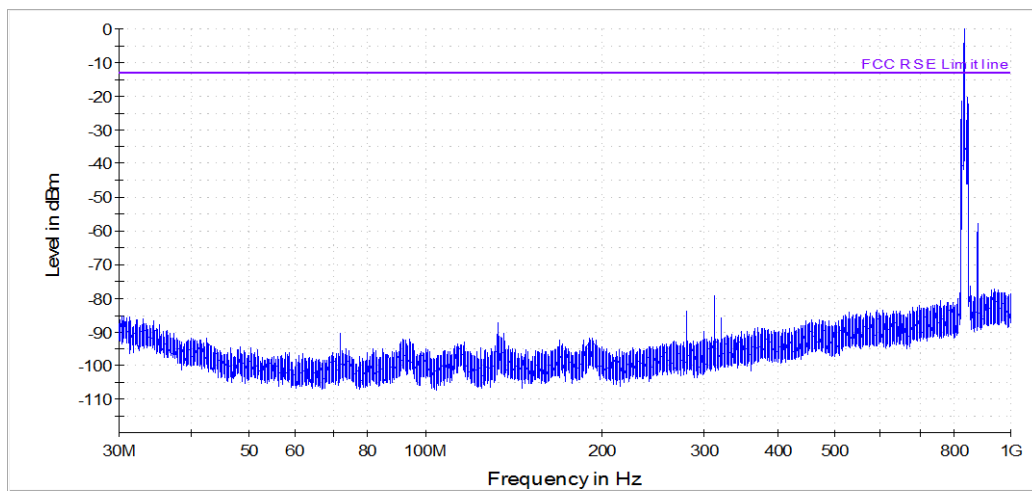
Frequency	MaxPeak	Limit	Margin	Read	SG	Cable loss	TX ant gain	Azimuth	Pol
MHz	dBm	dBm	dB	dBuV	dBm	dB	dB	deg	
2503.371600	-49.93	-13.00	36.93	42.23	-51.8	1.88	5.90	63.0	H

EIRP=SG Power - cable loss + Tx ant gain

ERP=EIRP-2.15

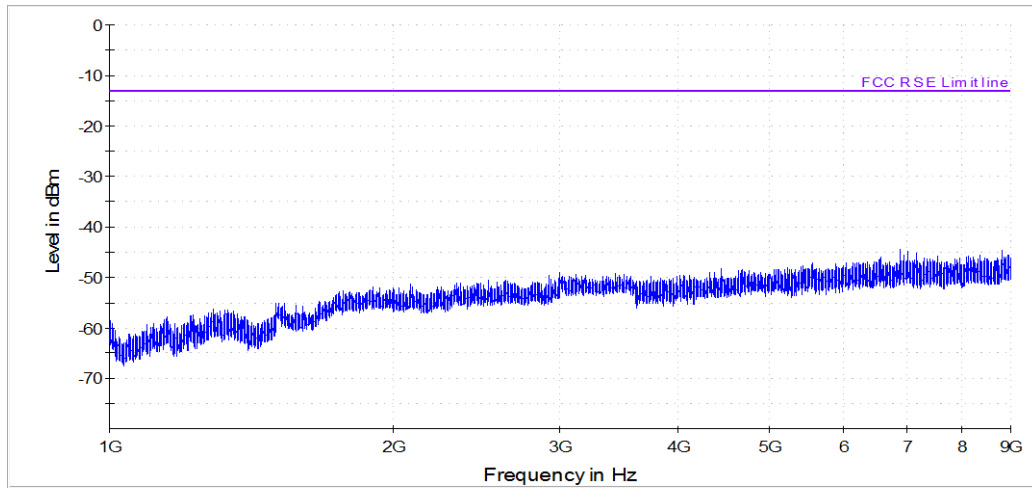
Position 2

(30MHz~1GHz)

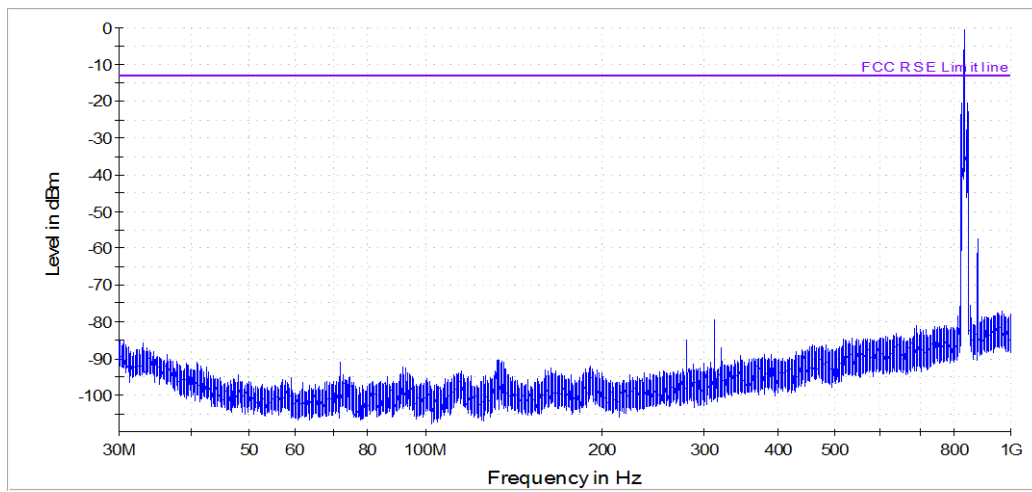




(1GHz~9GHz)

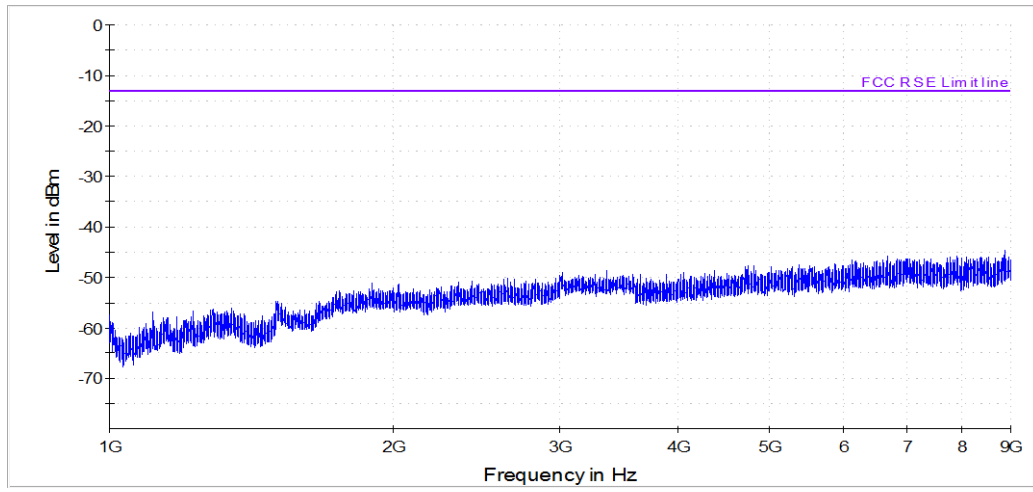


Position 3
(30MHz~1GHz)





(1GHz~9GHz)





Build Your Dreams!

FCC RF TEST REPORT

6 SAMPLE PICTURE

Reference attachment : Test Setup Photos_2



7 APPENDIX - INFORMATION ON THE TESTING LABORATORIES

We, BYD Precise Manufacture Co., Ltd., were founded in 2007 to provide our best service in RF, Radio consultation. Our laboratories are accredited by the following accreditation bodies according to ISO/IEC 17025 (2005) .

USA

A2LA

Certificate No.: 4886.01

Copies of accreditation certificates could be inquired from our office. If you have any comments, please feel free to contact us at the following:

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Tel: +86-755 8489 8888 55501

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