

TEST REPORT

REPORT NUMBER: I14X50091-FCC-RF

ON

Type of Equipment: Wireless Modules
Type of Designation: EM7305
Manufacturer: Sierra Wireless Inc.

ACCORDING TO

**FCC CFR Part 2, FREQUENCY ALLOCATIONS AND RADIO
TREATY MATTERS; GENERAL RULES AND REGULATIONS;
e-CFR, Oct 1, 2012**

PART 22, PUBLIC MOBILE SERVICES ,Oct 1, 2012

**PART 24, PERSONAL COMMUNICATIONS SERVICES ,Oct 1,
2012**

China Telecommunication Technology Labs.

Month date, year

JAN, 17, 2014

Signature



He Guili
Director

FCC ID: N7NEM7305

Report Date: 2014-01-17

Test Firm Name: China Telecommunication Technology Labs

Registration Number: 840587

Statement

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported tests were carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Parts 2, 22, 24. The sample tested was found to comply with the requirements defined in the applied rules.

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1 General Information

1.1 Notes

All reported tests were carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Parts 2, 22, 24.

The test results of this test report relate exclusively to the item(s) tested as specified in section 2.

The following deviation from, additions to, or exclusions from the test specifications have been made. See Annex C.

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1.2 Testers

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Position: Engineer
Department: Department of EMC test
Date: 2014-01-17
Signature:

李国庆

Editor of this test report:

Name: Li Guoqing
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Date: 2014-01-17
Signature:

李国庆

Technical responsibility for area of testing:

Name: Zou Dongyi
Position: Manager
Department: Department of EMC test
Date: 2014-01-17
Signature:

邹东屹

1.3 Testing Laboratory information

1.3.1 Location

Name: China Telecommunication Technology Labs.
Address: No. 11, Yue Tan Nan Jie, Xi Cheng District
BEIJING
P. R. CHINA, 100083
Tel: +86 10 68094053
Fax: +86 10 68011404
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1.3.2 Details of accreditation status

Accredited by: China National Accreditation Service for Conformity
Assessment (CNAS)
Registration number: CNAS Registration No. CNAS L0570
Standard: ISO/IEC 17025:2005

1.3.3 Test location, where different from section 1.3.1

Name: -----
Street: -----
City: -----
Country: -----
Telephone: -----
Fax: -----
Postcode: -----

1.4 Details of applicant or manufacturer

1.4.1 Applicant

Name: Sierra Wireless Inc.
Address: 13811, Wireless Way, Richmond, British Columbia
Country: Canada
Telephone: --
Fax: --
Contact: --
Telephone: --
Email: --

1.4.2 Manufacturer (if different from applicant in section 1.4.1)

Name: --
Address: --
City: --
Country: --

1.4.3 Manufactory (if different from applicant in section 1.4.1)

Name: --
Address: --
City: --
Country: --

2 Test Item

2.1 General Information

Manufacturer: Sierra Wireless Inc.
 Name: Wireless Modules
 Model Number: EM7305
 Serial Number: --
 Production Status: Product
 Receipt date of test item: 2014-01-15

2.2 Outline of EUT

The EUT EM7305 is a model supporting EDGE/GPRS/GSM 850/900/1800/1900 bands, UMTS/HSPA+ FDDI/II/V/VIII bands, LTE 1/3/7/8/20 bands.

2.3 Modifications Incorporated in EUT

The EUT has not been modified from what is described by the brand name and unique type identification stated above.

2.4 Equipment Configuration

Equipment configuration list:

Item	Generic Description	Manufacturer	Type	Serial No.	Remarks
A	Wireless modules	Sierra Wireless Inc.	EM7305	--	None

2.5 Other Information

--

3 Summary of Test Results

A brief summary of the tests carried out is shown as following.

GSM/GPRS/EGPRS mode:		
Specification Clause	Name of Test	Result
2.1051, 24.238, 2.1053,22.917	Radiated Spurious Emission	Pass
2.1049,22.917(b), 24.238(b)	Occupied Bandwidth	*Note 1
2.1055,22.355, 24.235	Frequency Stability over Temperature Variation	Pass
2.1055,22.355, 24.235	Frequency Stability over Voltage Variation	Pass
2.1046,22.913(a), 24.232(c)	Conducted RF Power Output	Pass
2.1051,22.917, 24.238	Conducted spurious emissions	Pass
2.1051,24.238, 2.1053, 22.917	Band Edge	Pass
Note 1: No applicable performance criteria.		

WCDMA/HSDPA mode:		
Specification Clause	Name of Test	Result
2.1051, 24.238, 2.1053,22.917	Radiated Spurious Emission	Pass
2.1049,22.917(b), 24.238(b)	Occupied Bandwidth	*Note 2
2.1055,22.355, 24.235	Frequency Stability over Temperature Variation	Pass
2.1055,22.355, 24.235	Frequency Stability over Voltage Variation	Pass
2.1046,22.913(a), 24.232(c)	Conducted RF Power Output	Pass
2.1051,22.917, 24.238	Conducted spurious emissions	Pass
2.1051,24.238, 2.1053, 22.917	Band Edge	Pass
Note 2: No applicable performance criteria.		

Test equipment Used:						
Asset Number	Description	Manufacturer	Model Number	Serial Number	Cal Due	State
7805	EMI Test Receiver	R/S	ESIB26	100211	2014-03-03	Normal
7330	Ultra Broadband Antenna	R/S	VULB 9160	vulb9160-3252	2014-11-24	Normal
7330	Double-Ridged Horn Antenna	R/S	HF906	100038	2016-01-14	Normal
713	Fully-Anechoic Chamber	ETS	11.8m×6.5m×6.3m	--	2014-11-16	Normal
7330-2	Radio Communications Analyzer	Anritsu	MT8820B	6200772659	2014-01-27	Normal
7330-2	Radio Communications Analyzer	Anritsu	MT8820c	6201026477	2014-08-04	Normal
7330	Signal Generator	R/S	SMY02	100024	2014-10-12	Normal

4 Test Results

4.1 Radiated Spurious Emission

Specifications:	2.1051, 22.917, 2.1053, 22.917
Date of Tests	2014-01-15~2014-01-17
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	TX on, channel 190 and 661 for GSM/GPRS/EGPRS mode, channel 4175, and 9400 for WCDMA/HSUPA/HSDPA mode.
Test Results:	Pass

Limit Level Construction:

Part 22:

According to Part 22.917(a), i.e., Out of band emissions, 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, so the limit level is:

$$P(\text{dBm}) - (43 + 10 \log(P)) \text{ dB} = -13\text{dBm}$$

Part 24:

According to Part 24.238 (a), i.e., Out of band emissions, 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, so the limit level is:

$$P(\text{dBm}) - (43 + 10 \log(P)) \text{ dB} = -13\text{dBm}$$

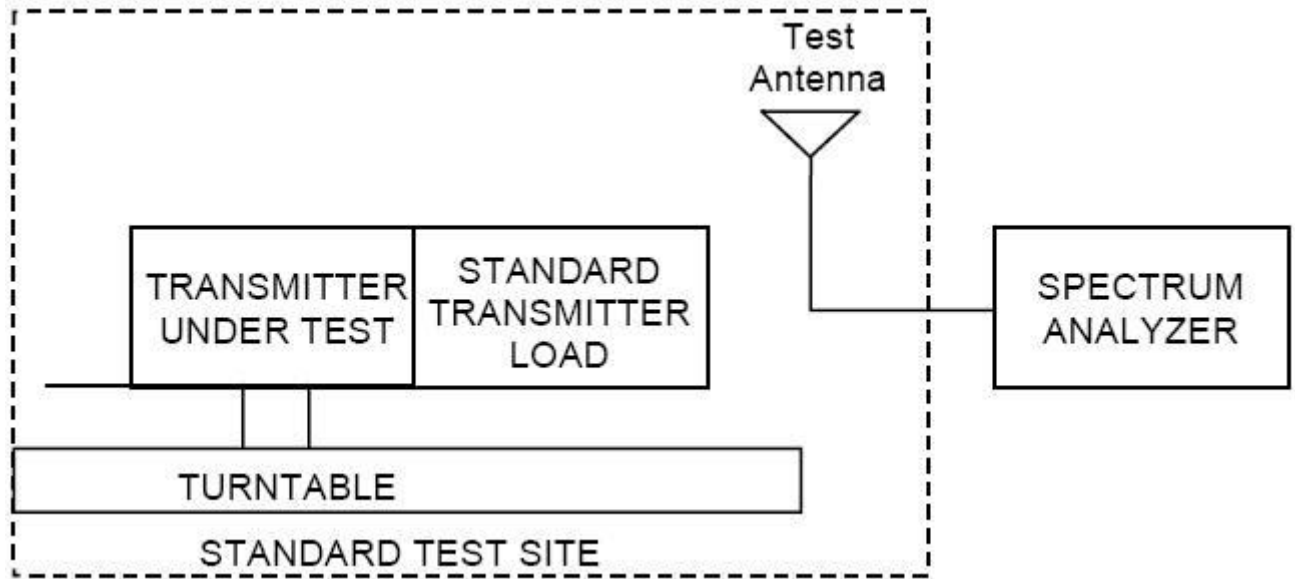
Test Setup:

The EUT was placed in an anechoic chamber. The Wireless Communications Test Set was used to set the TX channel and power level and modulate the TX signal with different bit patterns.

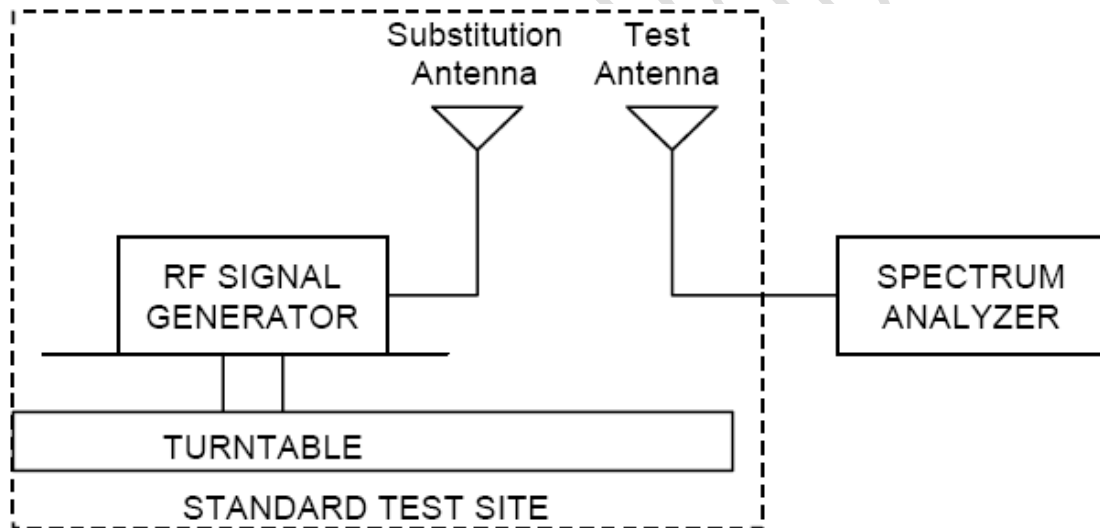
Test Method:

The measurement method is substitution method accordance with section 2.2.12 of ANSI/TIA-603-C: *Land Mobile FM or PM Communications Equipment Measurement and Performance Standards*.

(a) Connect the equipment as illustrated and measure the spurious emissions as the method as above.



(b) Reconnect the equipment as illustrated.



(c) Remove the transmitter and replace it with a substitution antenna. The center of the substitution antenna should be approximately at the same location as the center of the transmitter.

(d) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized, and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.

(e) Repeat step d) with both antennas vertically polarized for each spurious frequency.

(f) Calculate power in dBm into a reference ideal half-wave dipole antenna by

reducing the readings obtained in steps d) and e) by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula:

$$P_d(\text{dBm}) = P_g(\text{dBm}) - \text{cable loss (dB)} + \text{antenna gain (dB)}$$

where:

P_d is the dipole equivalent power and

P_g is the generator output power into the substitution antenna.

CITL Test Report

Test Data (GSM channel 190)

Frequency [GHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
1673.2	-59.9	7.2	8.6	-58.5	V
2509.8	-56.8	9.1	10	-55.9	V
3346.4	-60.5	11	9.9	-61.6	V
4183	-53.4	12.6	9.8	-56.2	V
5019.6	-57.6	14.2	10	-61.8	V
5856.2	-57.7	15.9	11.2	-62.4	V
1673.2	-60.5	7.2	8.6	-59.1	H
2509.8	-56	9.1	10	-55.1	H
3346.4	-59.5	11	9.9	-60.6	H
4183	-51.4	12.6	9.8	-54.2	H
5019.6	-61.1	14.2	10	-65.3	H
5856.2	-59.2	15.9	11.2	-63.9	H

Test Data (GSM channel 661)

Frequency [GHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
3760	-59.4	13.6	9.8	-63.2	V
5640	-50.6	15.1	10.9	-54.8	V
7520	-55.2	18.8	11.4	-62.6	V
9400	-48.5	22.9	12	-59.4	V
11280	-46.3	28.4	13.4	-61.3	V
13160	-39.3	36.7	13.4	-62.6	V
3760	-57	13.6	9.8	-60.8	H
5640	-55.6	15.1	10.9	-59.8	H
7520	-55.4	18.8	11.4	-62.8	H
9400	-49.4	22.9	12	-60.3	H
11280	-45.7	28.4	13.4	-60.7	H
13160	-39.0	36.7	13.4	-62.3	H

Test Data (GPRS channel 190)

Frequency [GHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
1673.2	-61.9	7.2	8.6	-60.5	V
2509.8	-62.6	9.1	10	-61.7	V
3346.4	-59.9	11	9.9	-61.0	V
4183	-54.5	12.6	9.8	-57.3	V
5019.6	-56.1	14.2	10	-60.3	V
5856.2	-58.5	15.9	11.2	-63.2	V
1673.2	-61.1	7.2	8.6	-59.7	H
2509.8	-60.9	9.1	10	-60.0	H
3346.4	-62.8	11	9.9	-63.9	H
4183	-54.8	12.6	9.8	-57.6	H
5019.6	-58.5	14.2	10	-62.7	H
5856.2	-57.3	15.9	11.2	-62.0	H

Test Data (GPRS channel 661)

Frequency [GHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
3760	-57.1	13.6	9.8	-60.9	V
5640	-53.7	15.1	10.9	-57.9	V
7520	-52.8	18.8	11.4	-60.2	V
9400	-48.7	22.9	12	-59.6	V
11280	-45.2	28.4	13.4	-60.2	V
13160	-39.6	36.7	13.4	-62.9	V
3760	-56.4	13.6	9.8	-60.2	H
5640	-58.6	15.1	10.9	-62.8	H
7520	-50.9	18.8	11.4	-58.3	H
9400	-48.3	22.9	12	-59.2	H
11280	-46.5	28.4	13.4	-61.5	H
13160	-39.9	36.7	13.4	-63.2	H

Test Data (EGPRS channel 190)

Frequency [GHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
1673.2	-62.9	7.2	8.6	-61.5	V
2509.8	-57.9	9.1	10	-57.0	V
3346.4	-60.3	11	9.9	-61.4	V
4183	-56	12.6	9.8	-58.8	V
5019.6	-56.4	14.2	10	-60.6	V
5856.2	-54.9	15.9	11.2	-59.6	V
1673.2	-61.7	7.2	8.6	-60.3	H
2509.8	-57.4	9.1	10	-56.5	H
3346.4	-59.4	11	9.9	-60.5	H
4183	-54.4	12.6	9.8	-57.2	H
5019.6	-56	14.2	10	-60.2	H
5856.2	-54.9	15.9	11.2	-59.6	H

Test Data (EGPRS channel 661)

Frequency [GHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
3760	-55.6	13.6	9.8	-59.4	V
5640	-51.8	15.1	10.9	-56.0	V
7520	-54.2	18.8	11.4	-61.6	V
9400	-47.5	22.9	12	-58.4	V
11280	-46	28.4	13.4	-61.0	V
13160	-39.2	36.7	13.4	-62.5	V
3760	-55.6	13.6	9.8	-59.4	H
5640	-51.9	15.1	10.9	-56.1	H
7520	-52.1	18.8	11.4	-59.5	H
9400	-49	22.9	12	-59.9	H
11280	-45.2	28.4	13.4	-60.2	H
13160	-38.6	36.7	13.4	-61.9	H

Test Data (WCDMA channel 4175)

Frequency [GHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
1670	-58.9	7.2	8.6	-57.5	V
2505	-59.8	9.1	10	-58.9	V
3340	-59.5	11	9.9	-60.6	V
4175	-53.4	12.6	9.8	-56.2	V
5010	-57.6	14.2	10	-61.8	V
5845	-57.7	15.9	11.2	-62.4	V
1670	-58.8	7.2	8.6	-57.4	H
2505	-58	9.1	10	-57.1	H
3340	-59.5	11	9.9	-60.6	H
4175	-54.4	12.6	9.8	-57.2	H
5010	-61.1	14.2	10	-65.3	H
5845	-59.2	15.9	11.2	-63.9	H

Test Data (WCDMA channel 9400)

Frequency [GHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
3760	-52.4	13.6	9.8	-56.2	V
5640	-54.6	15.1	10.9	-58.8	V
7520	-55.2	18.8	11.4	-62.6	V
9400	-48.5	22.9	12	-59.4	V
11280	-46.3	28.4	13.4	-61.3	V
13160	-39.3	36.7	13.4	-62.6	V
3760	-54.7	13.6	9.8	-58.5	H
5640	-53.6	15.1	10.9	-57.8	H
7520	-55.4	18.8	11.4	-62.8	H
9400	-49.4	22.9	12	-60.3	H
11280	-45.7	28.4	13.4	-60.7	H
13160	-39	36.7	13.4	-62.3	H

Test Data (HSDPA channel 4175)

Frequency [GHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
1670	-60.9	7.2	8.6	-59.5	V
2505	-61.6	9.1	10	-60.7	V
3340	-59.9	11	9.9	-61.0	V
4175	-54.5	12.6	9.8	-57.3	V
5010	-56.1	14.2	10	-60.3	V
5845	-58.5	15.9	11.2	-63.2	V
1670	-62.1	7.2	8.6	-60.7	H
2505	-60.9	9.1	10	-60.0	H
3340	-62.8	11	9.9	-63.9	H
4175	-54.8	12.6	9.8	-57.6	H
5010	-58.5	14.2	10	-62.7	H
5845	-57.3	15.9	11.2	-62.0	H

Test Data (HSDPA channel 9400)

Frequency [GHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
3760	-49.1	13.6	9.8	-52.9	V
5640	-41.7	15.1	10.9	-45.9	V
7520	-52.8	18.8	11.4	-60.2	V
9400	-48.7	22.9	12	-59.6	V
11280	-45.2	28.4	13.4	-60.2	V
13160	-39.6	36.7	13.4	-62.9	V
3760	-46.2	13.6	9.8	-50.0	H
5640	-48.6	15.1	10.9	-52.8	H
7520	-40.9	18.8	11.4	-48.3	H
9400	-48.3	22.9	12	-59.2	H
11280	-46.5	28.4	13.4	-61.5	H
13160	-39.9	36.7	13.4	-63.2	H

Test Data (HSUPA channel 4175)

Frequency [GHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
1670	-60.6	7.2	8.6	-59.2	V
2505	-56.9	9.1	10	-56.0	V
3340	-60.3	11	9.9	-61.4	V
4175	-56	12.6	9.8	-58.8	V
5010	-56.4	14.2	10	-60.6	V
5845	-54.9	15.9	11.2	-59.6	V
1670	-59.5	7.2	8.6	-58.1	H
2505	-56.4	9.1	10	-55.5	H
3340	-59.4	11	9.9	-60.5	H
4175	-54.4	12.6	9.8	-57.2	H
5010	-56	14.2	10	-60.2	H
5845	-54.9	15.9	11.2	-59.6	H

Test Data (HSUPA channel 9400)

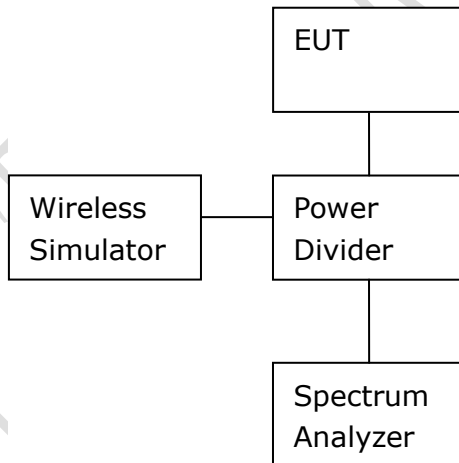
Frequency [GHz]	Generator output power(P_g) [dBm]	Cable loss [dB]	Antenna Gain [dB]	Spurious Emission Power (P_d) [dBm]	Antenna Polarization [H/V]
3760	-44.6	13.6	9.8	-48.4	V
5640	-39.8	15.1	10.9	-44.0	V
7520	-54.2	18.8	11.4	-61.6	V
9400	-47.5	22.9	12	-58.4	V
11280	-46	28.4	13.4	-61.0	V
13160	-39.2	36.7	13.4	-62.5	V
3760	-45.6	13.6	9.8	-49.4	H
5640	-38.9	15.1	10.9	-43.1	H
7520	-50.1	18.8	11.4	-57.5	H
9400	-49	22.9	12	-59.9	H
11280	-45.2	28.4	13.4	-60.2	H
13160	-38.6	36.7	13.4	-61.9	H

4.2 Occupied bandwidth

Specifications:	2.1049,22.917(b),24.238(b)
Date of Test	2014-01-17
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	TX on, channel 190 and 661 for GSM/GPRS/EGPRS mode, channel 4175, and 9400 for WCDMA/HSUPA/HSDPA mode.
Test Results:	--

Test Setup

During the test, the EUT was controlled via the Wireless Communications Test Set to ensure max power transmission and proper modulation and measured by spectrum analyzer.



Test Method

The 99% occupied bandwidth was calculated from the spectrum analyzer. Markers in the spectrum analyzer were then placed between the calculated frequencies to show the calculated 99% power band.

Note:

None

Test Data:

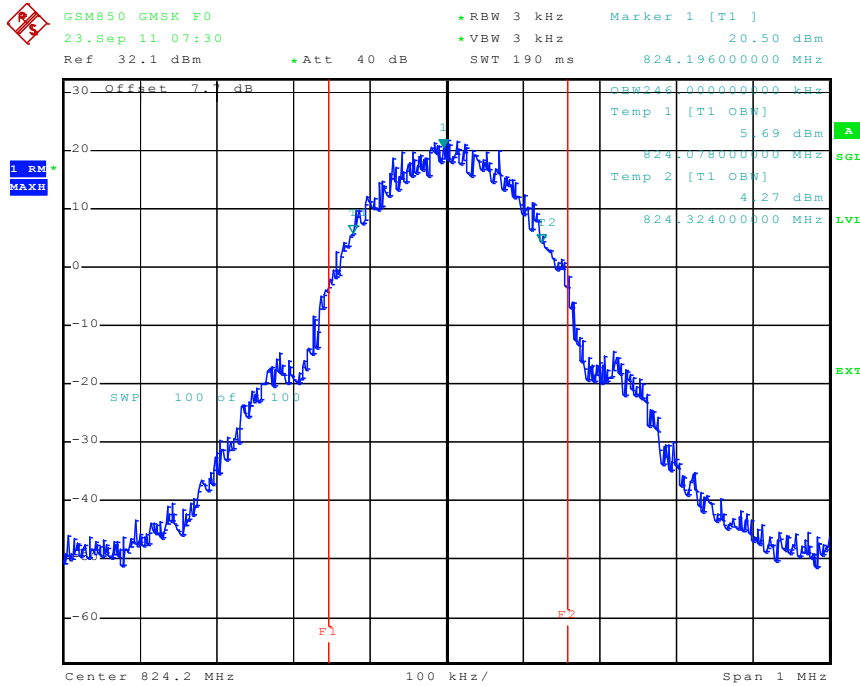
GSM/GPRS/EDGE mode

	EUT channel no.	99% occupied bandwidth [kHz]
GMSK	128 (824.2MHz)	246.30
	189 (836.4MHz)	249.65
	251 (848.8MHz)	245.20
	512 (1850.2MHz)	247.59
	661 (1880 MHz)	244.41
	810 (1909.8 MHz)	244.65
8PSK	128 (824.2MHz)	234.20
	189 (836.4MHz)	240.10
	251 (848.8MHz)	245.54
	512 (1850.2MHz)	244.57
	661 (1880 MHz)	239.97
	810 (1909.8 MHz)	240.91

FCC Parts 2, 22, 24
Equipment:EM7305

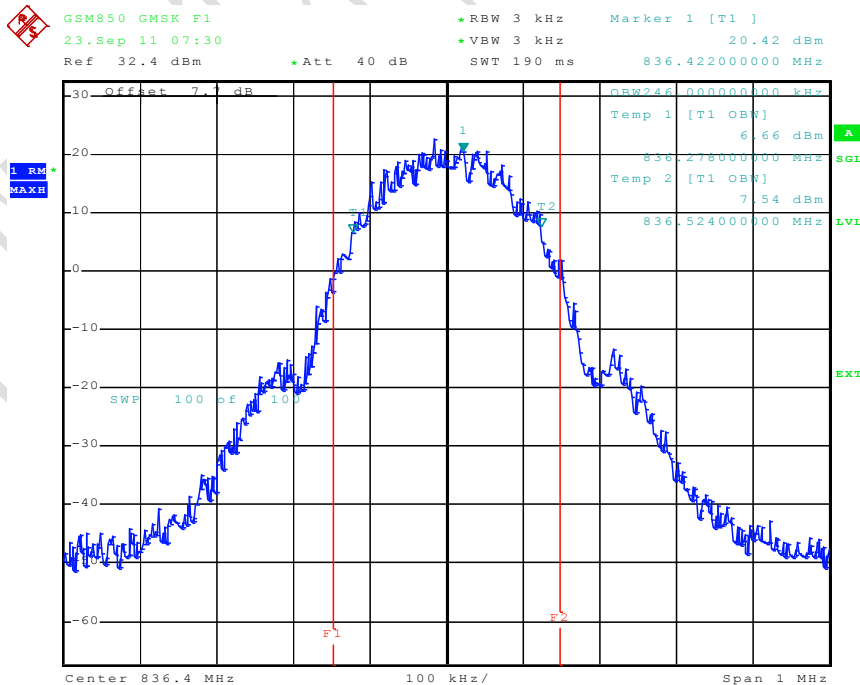
REPORT NO.: I14X50091-FCC-RF

Graphical results for GSM/GPRS/EDGE mode:



Date: 23.SEP.2011 07:30:01

GMSK Channel 128

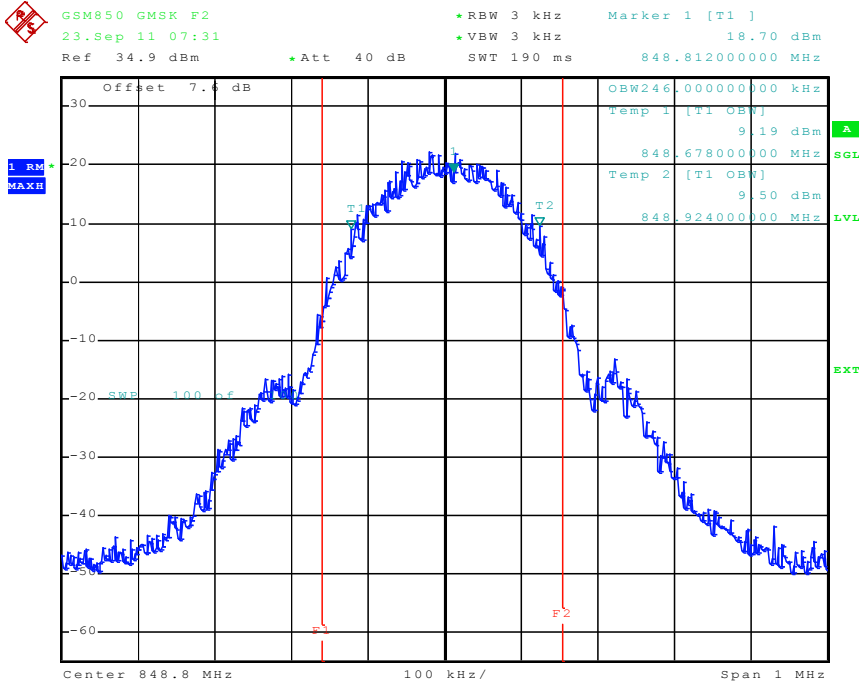


Date: 23.SEP.2011 07:30:59

GMSK Channel 189

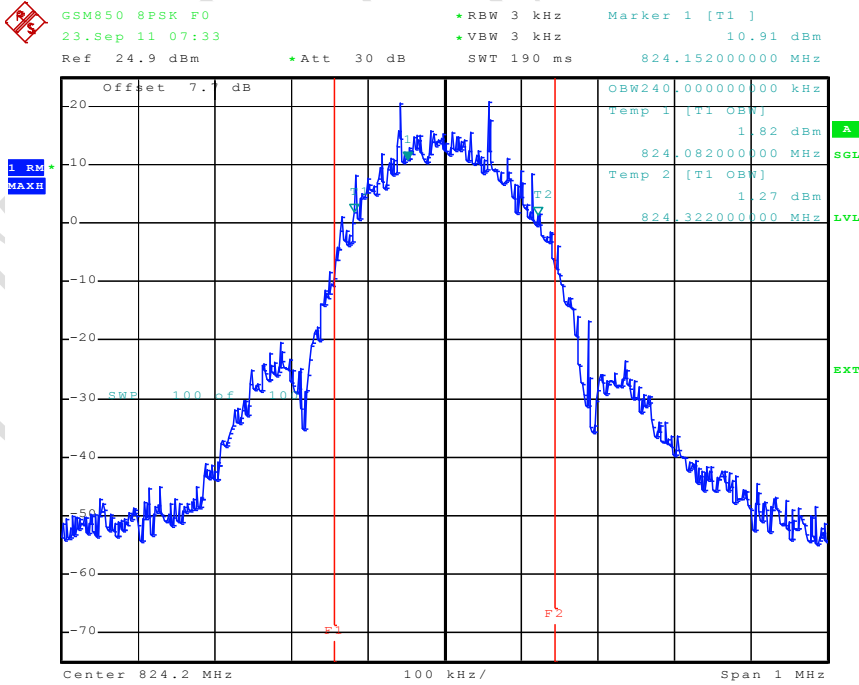
FCC Parts 2, 22, 24
Equipment:EM7305

REPORT NO.: I14X50091-FCC-RF



Date: 23.SEP.2011 07:32:00

GMSK Channel 251

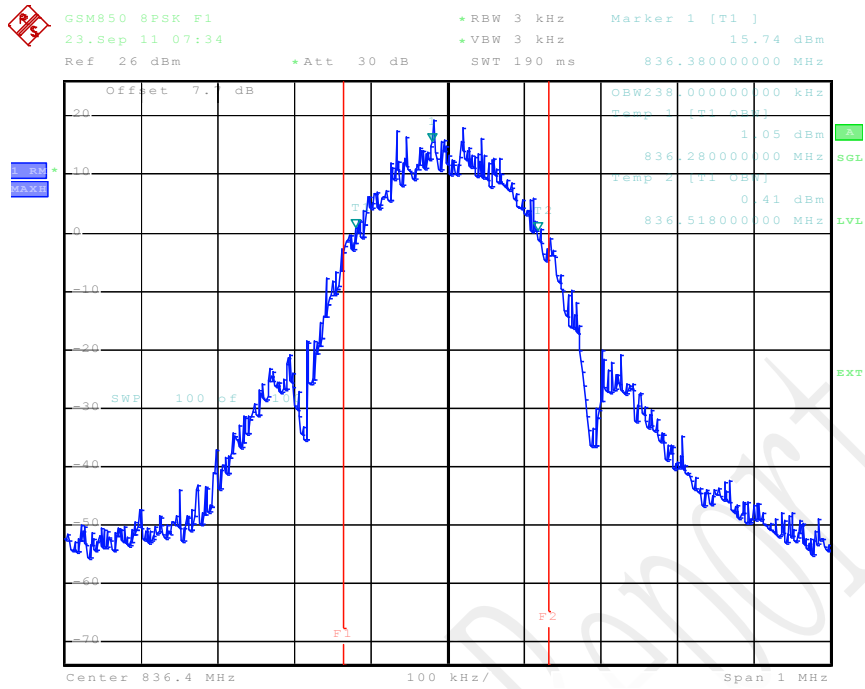


Date: 23.SEP.2011 07:33:40

8PSK Channel 128

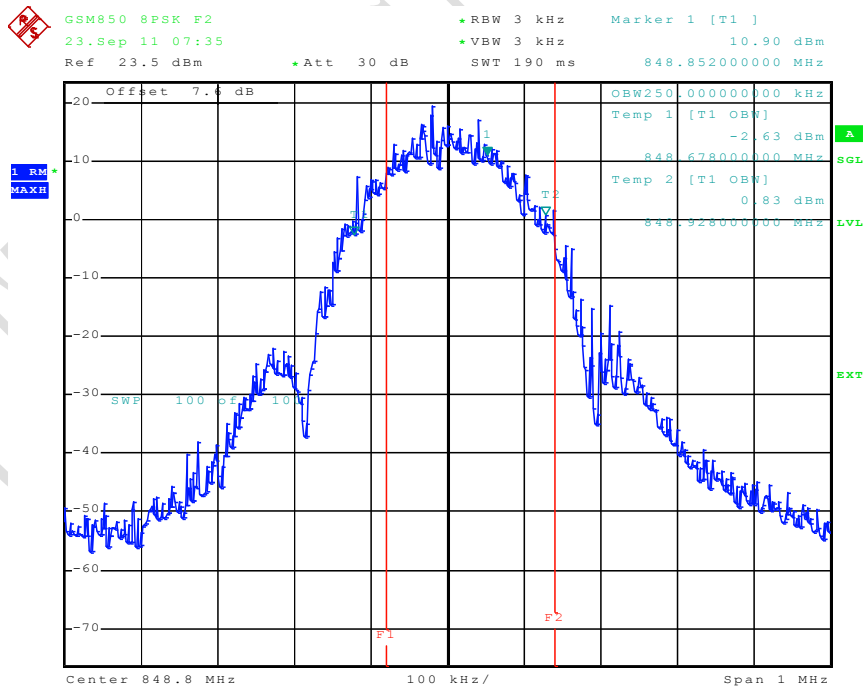
FCC Parts 2, 22, 24
Equipment:EM7305

REPORT NO.: I14X50091-FCC-RF



Date: 23.SEP.2011 07:34:37

8PSK Channel 189

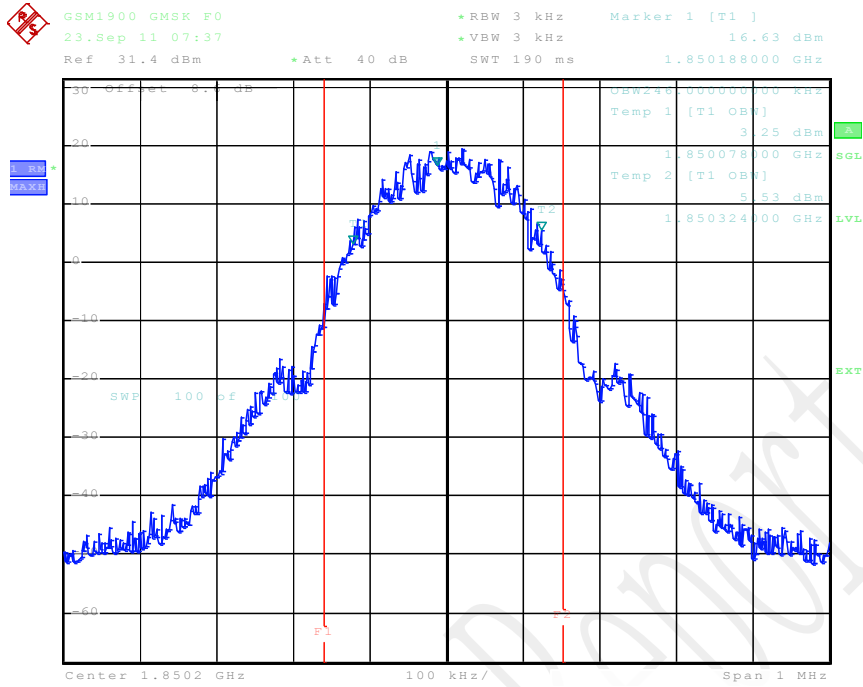


Date: 23.SEP.2011 07:35:37

8PSK Channel 251

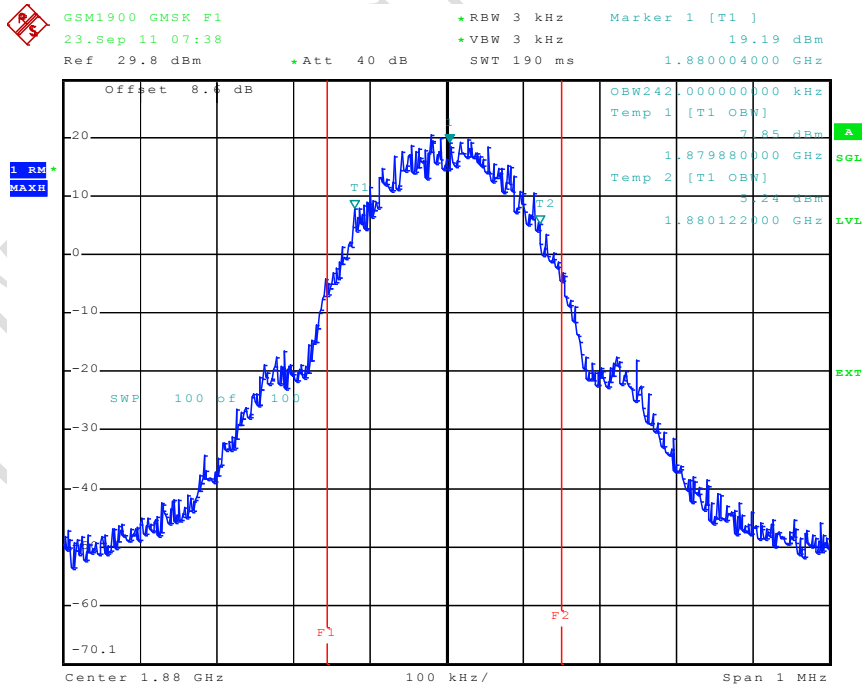
FCC Parts 2, 22, 24
Equipment:EM7305

REPORT NO.: I14X50091-FCC-RF



Date: 23.SEP.2011 07:37:25

GMSK Channel 512

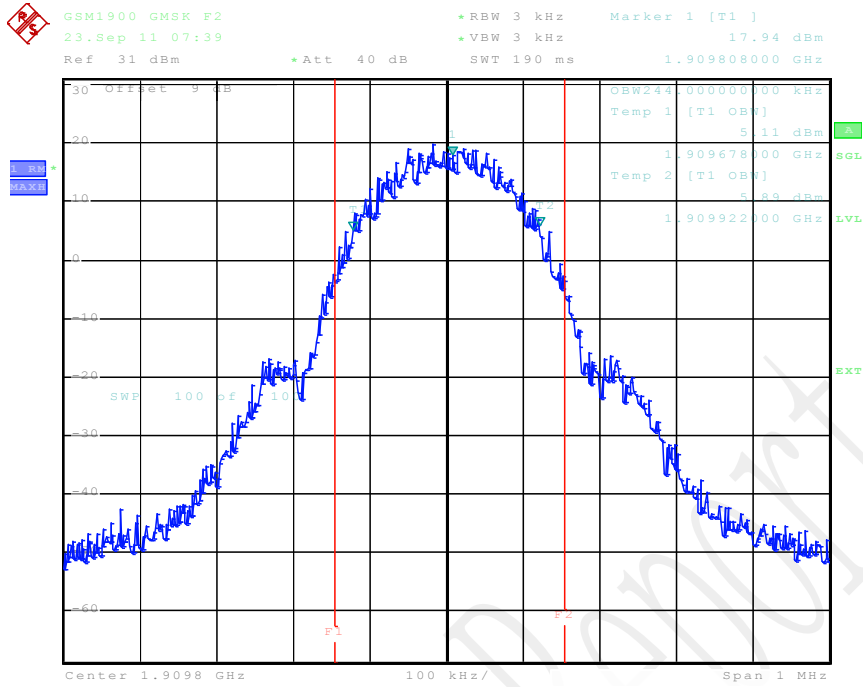


Date: 23.SEP.2011 07:38:21

GMSK Channel 661

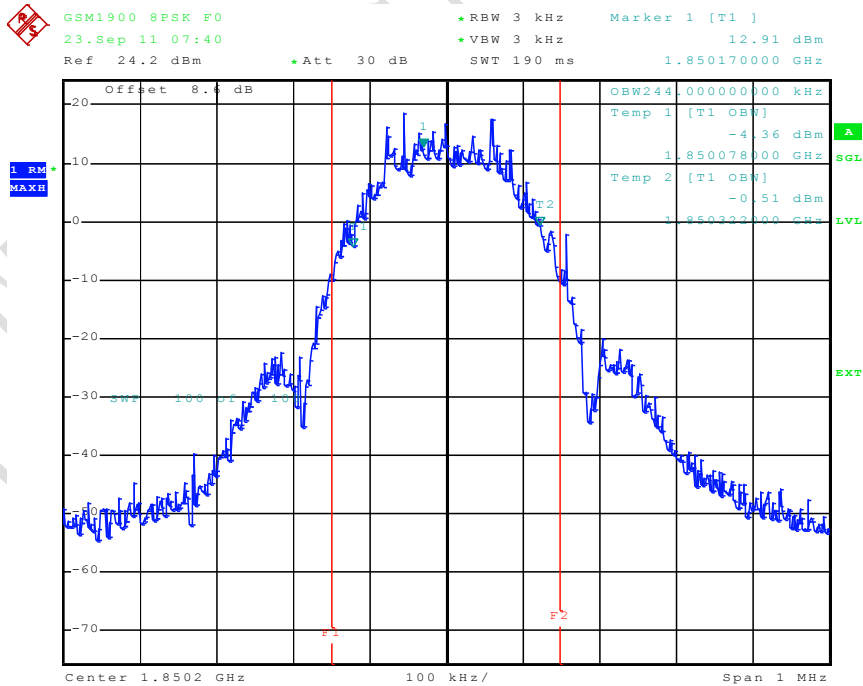
FCC Parts 2, 22, 24
Equipment:EM7305

REPORT NO.: I14X50091-FCC-RF



Date: 23.SEP.2011 07:39:19

GMSK Channel 810

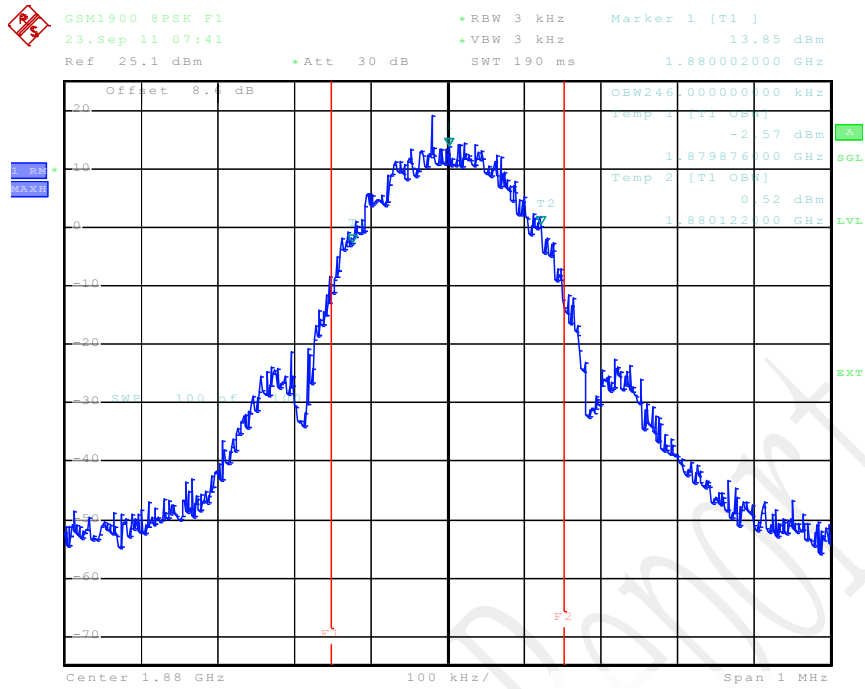


Date: 23.SEP.2011 07:40:59

8PSK Channel 512

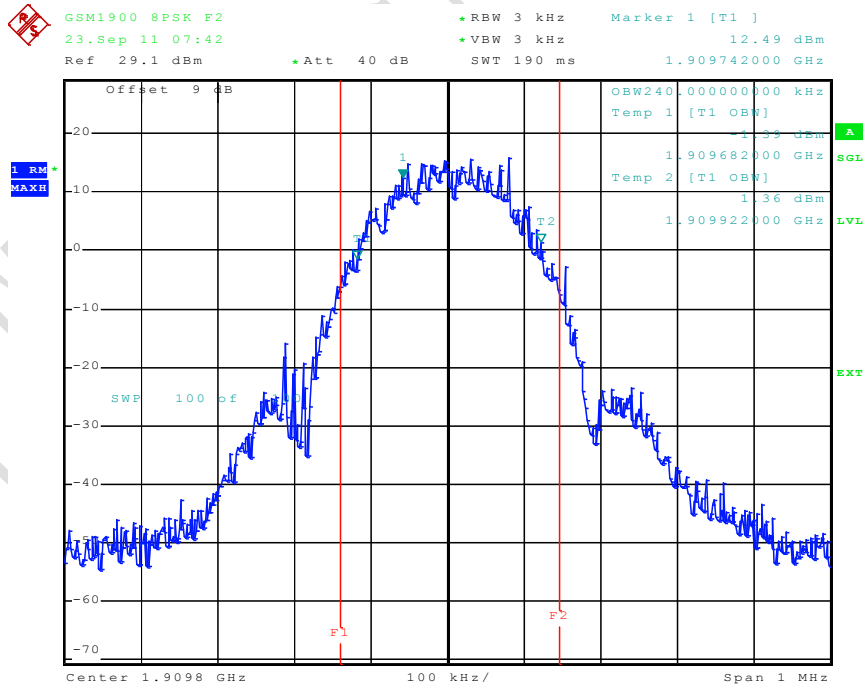
FCC Parts 2, 22, 24
Equipment:EM7305

REPORT NO.: I14X50091-FCC-RF



Date: 23.SEP.2011 07:41:55

8PSK Channel 661



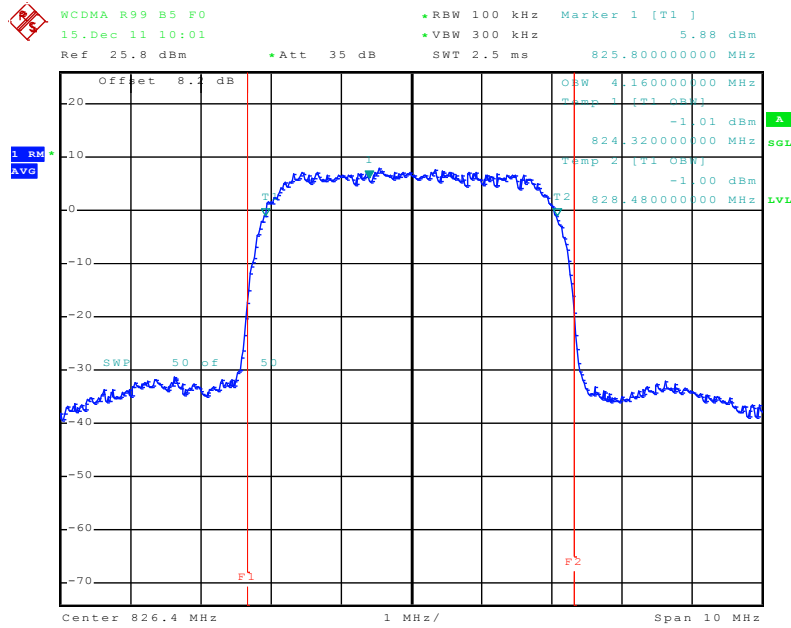
Date: 23.SEP.2011 07:42:53

8PSK Channel 810

WCDMA/HSDPA/HSUPA mode

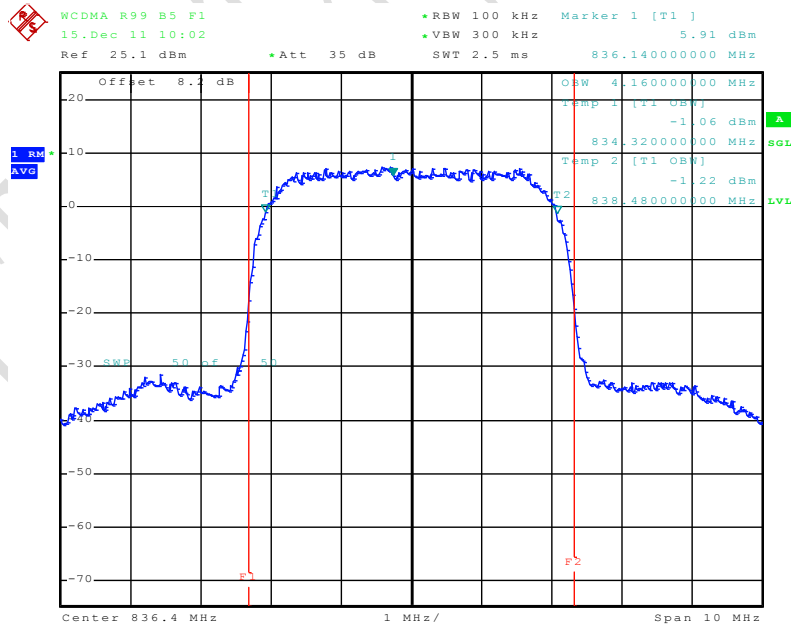
	EUT channel no.	99% occupied bandwidth [kHz]
Rel99	4132 (826.4MHz)	4.1622
	4182 (836.4MHz)	4.1633
	4233 (846.6MHz)	4.1662
	9262 (1852.4MHz)	4.1658
	9400 (1880 MHz)	4.1668
	9538 (1907.5 MHz)	4.1709
HSUPA Rel6	4132 (826.4MHz)	4.1625
	4182 (836.4MHz)	4.1525
	4233 (846.6MHz)	4.1524
	9262 (1852.4MHz)	4.1781
	9400 (1880 MHz)	4.1708
	9538 (1907.5 MHz)	4.1751

Graphical results for WCDMA/HSDPA/HSUPA mode:



Date: 15.DEC.2011 10:01:42

Rel99 Channel 4132

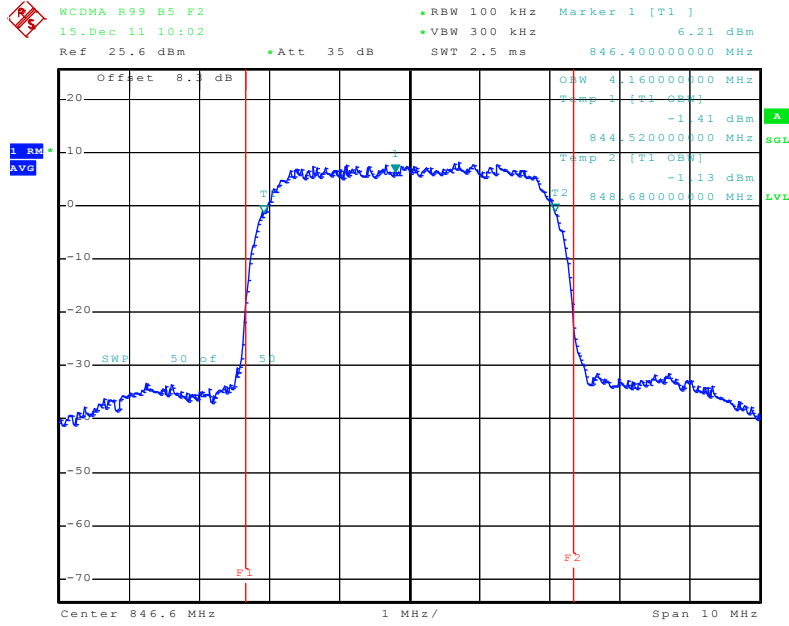


Date: 15.DEC.2011 10:02:00

Rel99 Channel 4182

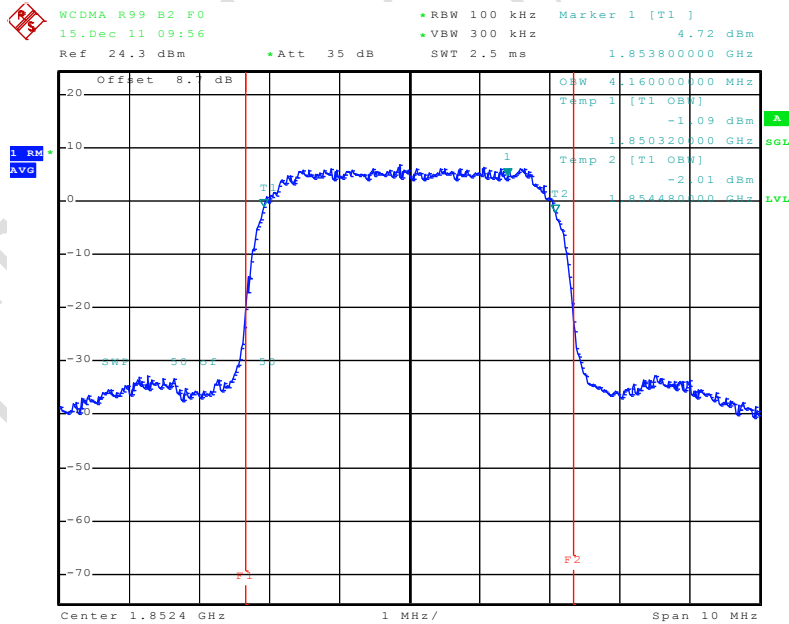
FCC Parts 2, 22, 24
Equipment:EM7305

REPORT NO.: I14X50091-FCC-RF



Date: 15.DEC.2011 10:02:18

Rel99 Channel 4233

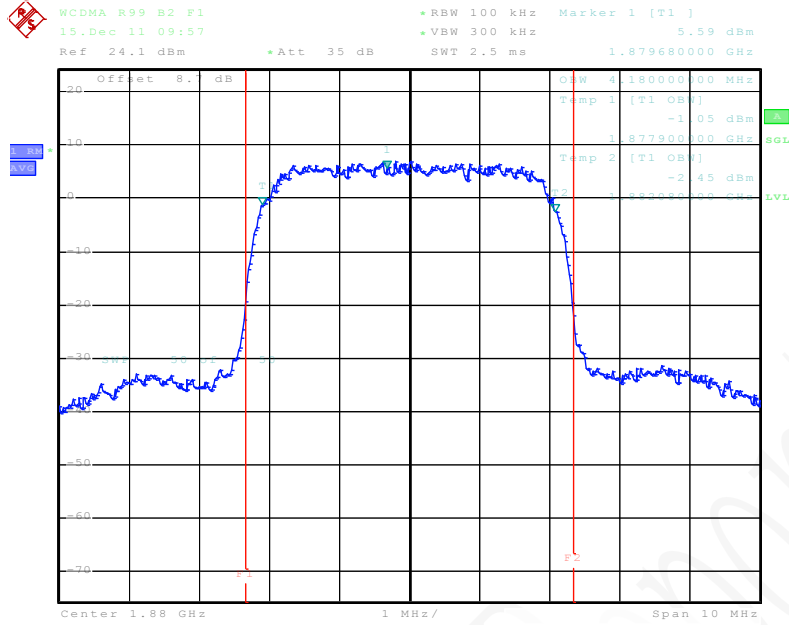


Date: 15.DEC.2011 09:56:48

Rel99 Channel 9262

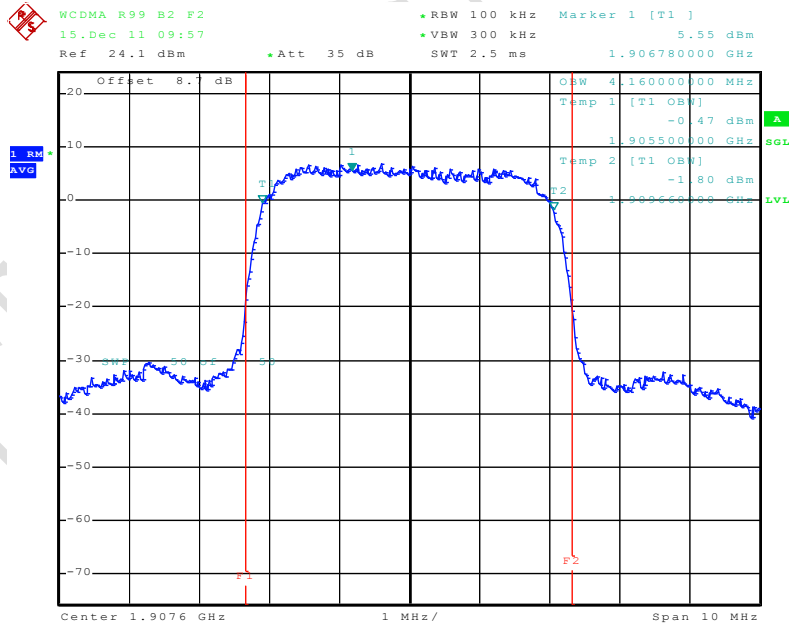
FCC Parts 2, 22, 24
Equipment:EM7305

REPORT NO.: I14X50091-FCC-RF



Date: 15.DEC.2011 09:57:06

Rel99 Channel 9400

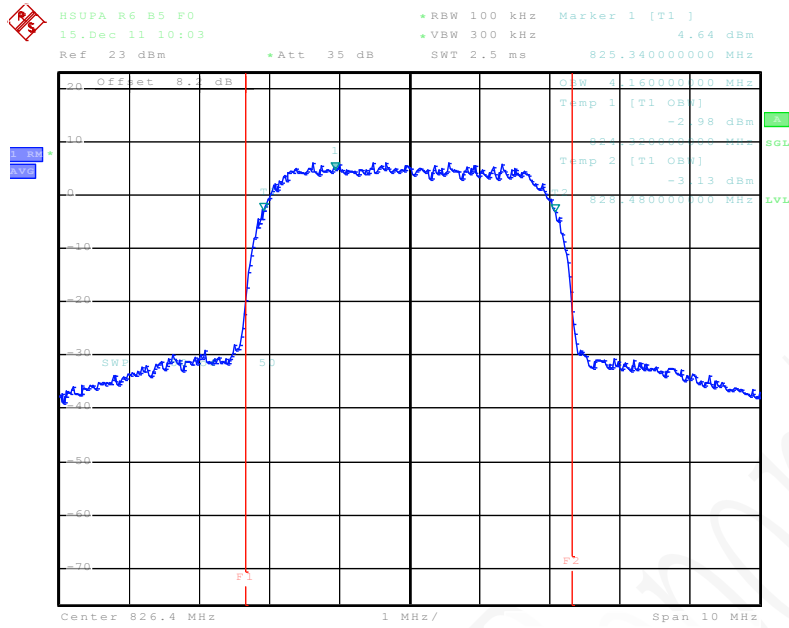


Date: 15.DEC.2011 09:57:25

Rel99 Channel 9538

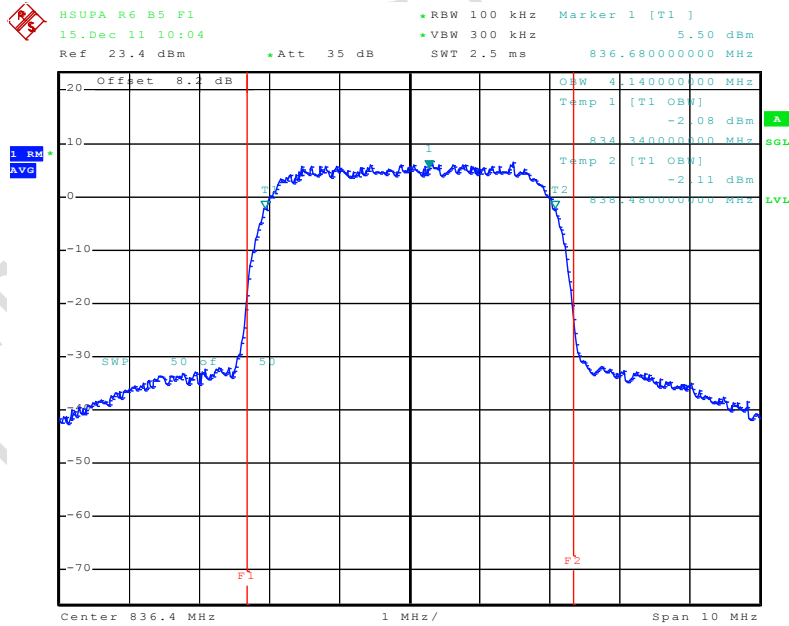
FCC Parts 2, 22, 24
Equipment:EM7305

REPORT NO.: I14X50091-FCC-RF



Date: 15.DEC.2011 10:03:57

HSUPA Rel6 Channel 4132

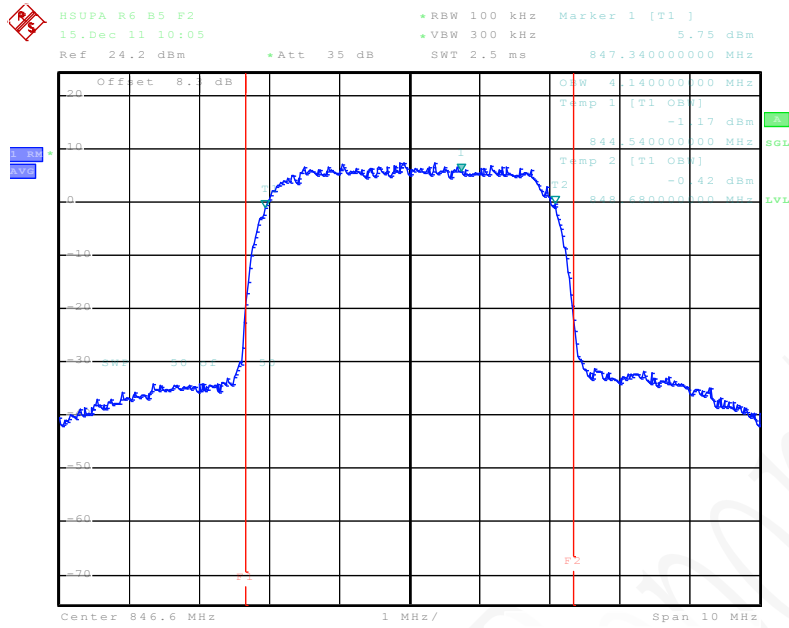


Date: 15.DEC.2011 10:04:46

HSUPA Rel6 Channel 4182

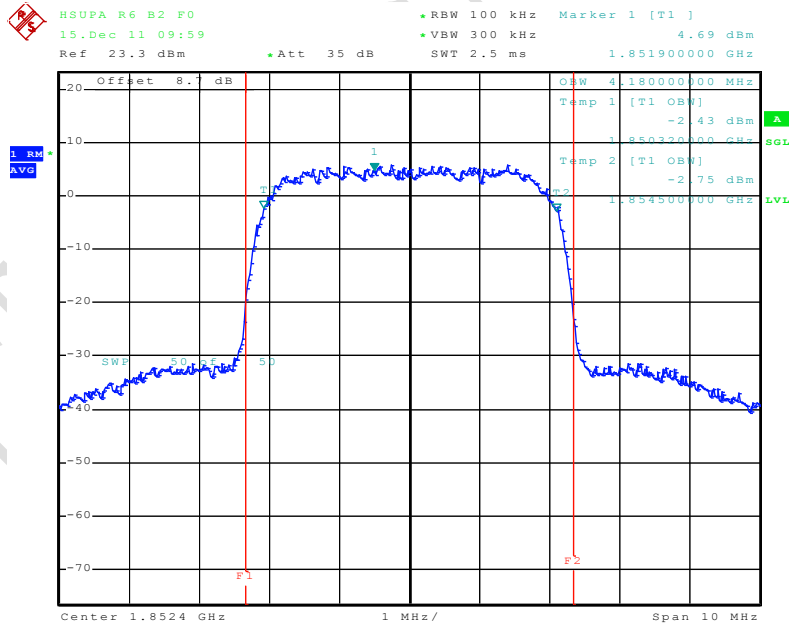
FCC Parts 2, 22, 24
Equipment:EM7305

REPORT NO.: I14X50091-FCC-RF



Date: 15.DEC.2011 10:05:36

HSUPA Rel6 Channel 4233

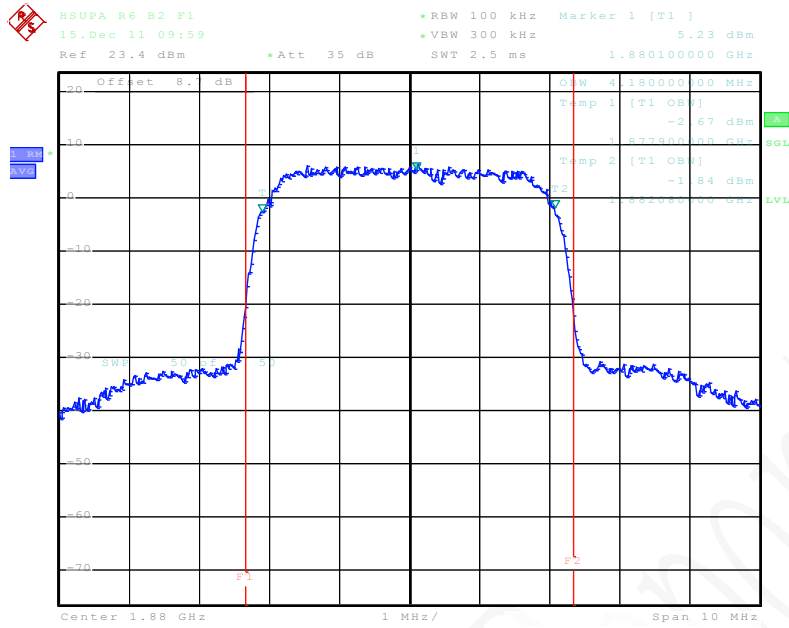


Date: 15.DEC.2011 09:59:05

HSUPA Rel6 Channel 9262

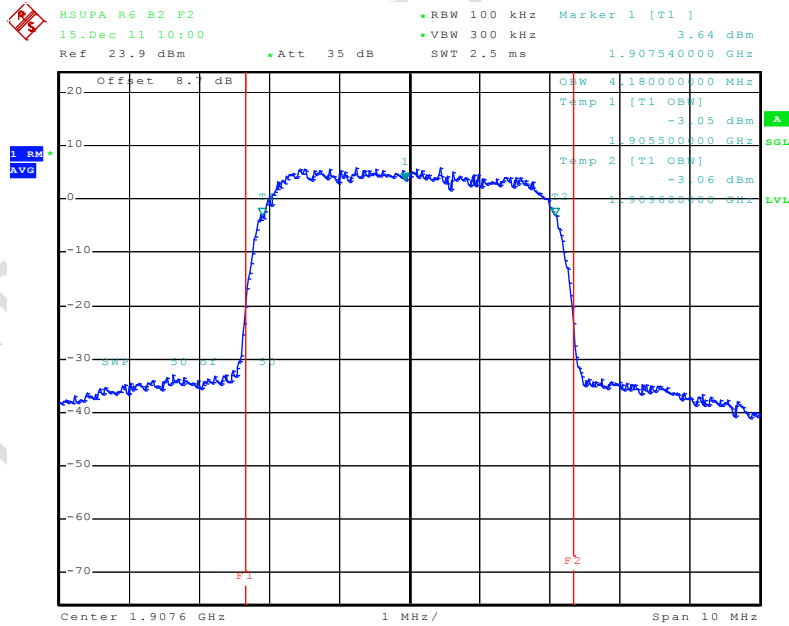
FCC Parts 2, 22, 24
Equipment:EM7305

REPORT NO.: I14X50091-FCC-RF



Date: 15.DEC.2011 09:59:53

HSUPA Rel6 Channel 9400



Date: 15.DEC.2011 10:00:42

HSUPA Rel6 Channel 9538

4.3 Frequency Stability over Temperature Variation

Specifications:	2.1055,22.355,24.235
Date of Test	2014-01-15~2014-01-17
Test conditions:	Ambient Temperature:-30°C-50°C Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	TX on, channel 190 and 661 for GSM/GPRS/EGPRS mode, channel 4175, and 9400 for WCDMA/HSUPA/HSDPA mode.
Test Results:	Pass

Limit	
Frequency deviation [ppm]	±2.5

Test Setup

The EUT was placed in a temperature chamber, demonstrated as figure T. The Wireless Telecommunications Test Set was used to set the Tx channel and power level, modulate the TX signal with different bit patterns and measure the frequency of Tx.

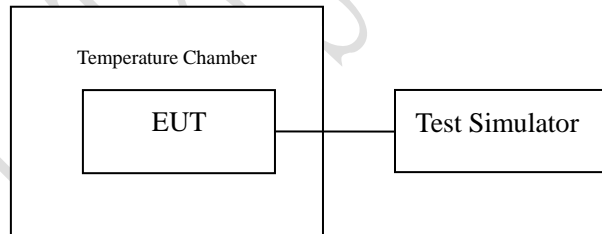


Figure T: setup for measurement of frequency stability over temperature variation

Test Method

1. The EUT was turned off and placed in the temperature chamber.
2. The temperature of the chamber was set to -30°C and allowed to stabilize.
3. The EUT temperature was allowed to stabilize for 45 minutes.
4. The EUT was turned on and set to transmit with Wireless Telecommunications Test Set.
5. The maximum transmit frequency deviation during one minute period was measured by Wireless Communications Test Set.
6. The steps 3-5 were repeated for -30°C, -20°C, -10°C, 0°C, 10°C, 20°C, 30°C, 40°C and 50°C.

Test data:

GSM/GPRS/EDGE 850 band mode

	Temperature[°C]	Offset[Hz]	Offset[ppm]	Remarks
GMSK	-30	-22.5	-0.0269	Pass
	-20	-15.3	-0.0182	Pass
	-10	15.0	-0.0180	Pass
	0	2.6	0.0031	Pass
	10	4.2	0.0050	Pass
	20	7.2	0.0086	Pass
	30	8.8	0.0106	Pass
	40	-17.8	-0.0213	Pass
	50	-22.9	-0.0274	Pass
8PSK	-30	-25.0	-0.00300	Pass
	-20	20.9	0.0250	Pass
	-10	0.0	0.0000	Pass
	0	-5.7	-0.0069	Pass
	10	1.5	0.0018	Pass
	20	33.1	0.0396	Pass
	30	-11.6	-0.0139	Pass
	40	2.8	0.0034	Pass
	50	3.4	0.0041	Pass

GSM/GPRS/EDGE 1900 band mode

	Temperature[°C]	Offset[Hz]	Offset[ppm]	Remarks
GMSK	-30	-50.8	-0.0270	Pass
	-20	29.8	0.0158	Pass
	-10	-31.4	-0.0167	Pass
	0	-31.2	-0.0166	Pass
	10	-11.6	-0.0062	Pass
	20	-3.9	-0.0021	Pass
	30	36.5	0.0194	Pass
	40	0.3	0.0002	Pass
	50	37.6	0.0200	Pass
8PSK	-30	-2.0	-0.001	Pass
	-20	3.3	0.002	Pass
	-10	12.5	0.007	Pass
	0	-15.9	-0.008	Pass
	10	-21.4	-0.011	Pass
	20	-18.9	-0.010	Pass
	30	-47.2	-0.025	Pass
	40	-8.2	-0.004	Pass
	50	54.8	0.029	Pass

WCDMA/HSDPA/HSUPA FDD 850MHz band mode:

Temperature[°C]	Offset[Hz]	Offset[ppm]	Remarks
-30	-19.8	-0.0237	Pass
-20	7.9	0.0095	Pass
-10	3.7	0.0044	Pass
0	40.0	0.0479	Pass
10	-16.1	-0.0192	Pass
20	36.8	0.0441	Pass
30	3.8	0.0045	Pass
40	-28.0	-0.0334	Pass
50	-19.6	-0.0234	Pass

WCDMA/HSDPA/HSUPA FDD 1900MHz band mode:

Temperature[°C]	Offset[Hz]	Offset[ppm]	Remarks
-30	15.2	0.0182	Pass
-20	3.9	0.0046	Pass
-10	-28.8	-0.0344	Pass
0	-1.9	-0.0023	Pass
10	15.8	0.0189	Pass
20	-1.6	-0.0019	Pass
30	-26.8	-0.0321	Pass
40	-5.5	-0.0066	Pass
50	-33.4	-0.0399	Pass

4.4 Frequency Stability over Voltage Variation

Specifications:	2.1055,22.355,24.235
Date of Test	2014-01-15~2014-01-17
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	TX on, channel 190 and 661 for GSM/GPRS/EGPRS mode, channel 4175, and 9400 for WCDMA/HSUPA/HSDPA mode.
Test Results:	Pass

Limit	
Frequency deviation [ppm]	±2.5

Test Setup

The EUT was placed in a shielding chamber and powered by an adjustable power supply, demonstrated as figure V. A Wireless Telecommunications Test Set was used to set the TX channel and power level, modulate the TX signal with different bit patterns and measure the frequency of TX.

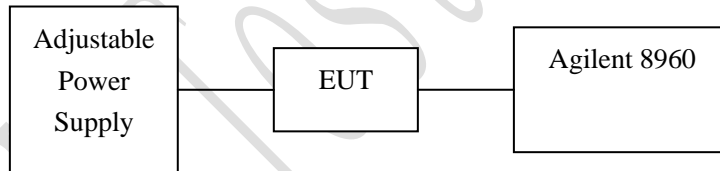


Figure V: test setup for measurement of frequency stability over voltage variation

Test Method

The EUT was powered by the adjustable power supply. The frequency stability is measured by the Wireless Telecommunications Test Set.

Test data:

GSM/GPRS/EDGE 850 band GMSK mode

Voltage (V)	Offset[Hz]	Offset[ppm]	Remarks
4.5	-22.5	-0.0269	Pass
5.0	-21.5	-0.0257	Pass
5.5	-20.5	-0.0245	Pass

GSM/GPRS/EDGE 850 band 8PSK mode

Voltage (V)	Offset[Hz]	Offset[ppm]	Remarks
4.5	9.5	0.0113	Pass
5.0	-8.2	-0.0098	Pass
5.5	-17.6	-0.0210	Pass

GSM/GPRS/EDGE 1900 band GMSK mode

Voltage (V)	Offset[Hz]	Offset[ppm]	Remarks
4.5	-1.1	-0.0006	Pass
5.0	15.4	0.0082	Pass
5.5	-83.4	-0.0444	Pass

GSM/GPRS/EDGE 1900 band 8PSK mode

Voltage (V)	Offset[Hz]	Offset[ppm]	Remarks
4.5	16.1	0.009	Pass
5.0	8.8	0.005	Pass
5.5	-36.9	-0.020	Pass

WCDMA FDD V band mode:

Voltage (V)	Offset[Hz]	Offset[ppm]	Remarks
4.5	-20.3	-0.0243	Pass
5.0	-18.2	-0.0218	Pass
5.5	-29.8	-0.0357	Pass

WCDMA FDD II band mode:

Voltage (V)	Offset[Hz]	Offset[ppm]	Remarks
4.5	23.1	0.0277	Pass
5.0	-13.0	-0.0155	Pass
5.5	-15.2	-0.0181	Pass

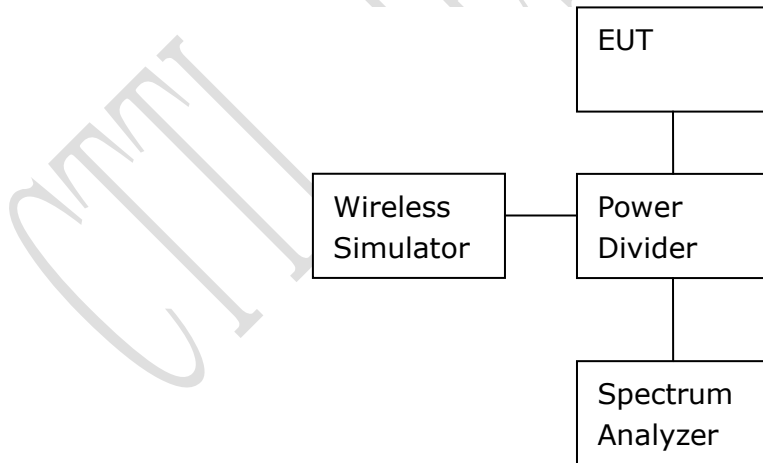
4.5 Conducted RF Power Output

Specifications:	2.1046,22.913(a),24.232(c)
Date of Tests	2014-01-15~2014-01-17
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	TX on, channel 190 and 661 for GSM/GPRS/EGPRS mode, channel 4175, and 9400 for WCDMA/HSUPA/HSDPA mode.
Test Results:	Pass

Limit Level Construction: ERP: According to Part 22.913(a) and 24.232(c), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.	
Limits for ERP	
Frequency range	Limit Level (ERP)
TX channel	7W or 38.5dBm

Test Setup:

During the test, the EUT was controlled via the Wireless Communications Test Set to ensure max power transmission and proper modulation and measured by spectrum analyzer.



Test Method

- 1) The EUT was coupled to the spectrum analyzer and the base station simulator through a power divider. The lost of the cables the test system is calibrated to correct the readings.
- 2) The spectrum analyzer was set to Maxpeak Detector function and Maximum hold mode.

3) The resolution bandwidth of the spectrum analyzer was comparable to the emission bandwidth.

Note:

None

Test Results:

GSM 850 band GMSK mode

Channel No.	Maximum output power [dBm]	
	1TS	2TS
128 (824.2MHz)	32.72	32.28
190 (836.6MHz)	32.76	32.52
251 (848.8MHz)	32.75	31.85

GSM 1900 band GMSK mode

Channel No.	Maximum output power [dBm]	
	1TS	2TS
512 (1850.2MHz)	29.64	29.79
661 (1880.0MHz)	29.88	29.80
810 (1909.8MHz)	29.94	29.89

GSM 850 band 8PSK mode

Channel No.	Maximum output power [dBm]	
	1TS	2TS
128 (824.2MHz)	29.48	29.44
190 (836.6MHz)	29.53	29.36
251 (848.8MHz)	29.34	29.24

GSM 1900 band 8PSK mode

Channel No.	Maximum output power [dBm]	
	1TS	2TS
512 (1850.2MHz)	29.13	29.09
661 (1880.0MHz)	29.15	29.07
810 (1909.8MHz)	28.96	28.92

WCDMA V band mode

		Maximum output power [dBm]		
mode	3GPP Subtest	4132	4182	4233
Rel99	1	22.96	22.99	23.02
Rel6 HSDPA	1	22.73	22.47	22.41
	2	22.77	22.56	22.51
	3	22.35	22.06	22.03
	4	22.33	22.10	22.06
Rel6 HSUPA	1	22.38	22.45	22.13
	2	20.95	20.86	20.79
	3	21.81	21.78	21.81
	4	21.80	21.71	21.79
	5	22.44	22.45	22.32

WCDMA II band mode

		Maximum output power [dBm]		
mode	3GPP Subtest	9262	9400	9538
Rel99	1	22.56	22.38	22.34
Rel6 HSDPA	1	21.46	21.77	21.71
	2	21.47	21.87	21.80
	3	21.00	21.37	21.36
	4	21.08	21.38	21.27
Rel6 HSUPA	1	22.03	22.13	21.61
	2	20.73	20.56	20.61
	3	20.94	20.90	20.85
	4	20.62	20.59	20.63
	5	21.75	21.94	22.18

4.6 Conducted Spurious Emission

Specifications:	2.1051,22.917,24.238
Date of Tests	2012-12-06
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	TX on, channel 190 and 661 for GSM/GPRS/EGPRS mode, channel 4175, and 9400 for WCDMA/HSUPA/HSDPA mode.
Test Results:	Pass

Limit Level Construction:

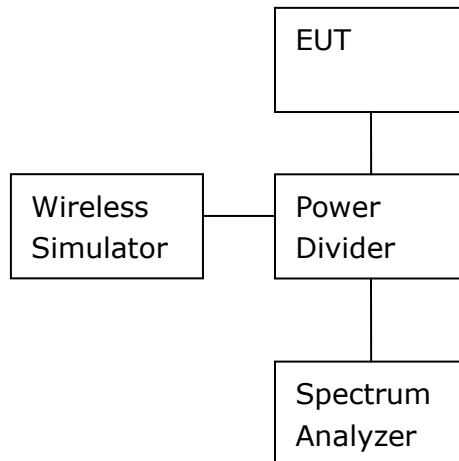
According to Part 24.238 (a), i.e., Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB, so the limit level is:
 $P(\text{dBm}) - (43 + 10 \log(P)) \text{ dB} = -13\text{dBm}$

Limits for Radiated spurious emissions(UE)

Frequency range	Limit Level /Resolution Bandwidth
30 MHz to 20000 MHz	-13dBm/1MHz

Test Setup:

During the test, the EUT was controlled via the Wireless Communications Test Set to ensure max power transmission and proper modulation and measured by spectrum analyzer.



Test Method

The measurement was performed accordance with section 2.2.13 of ANSI/TIA-603-B-2002: *Land Mobile FM or PM Communications Equipment Measurement and Performance Standards*.

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency.

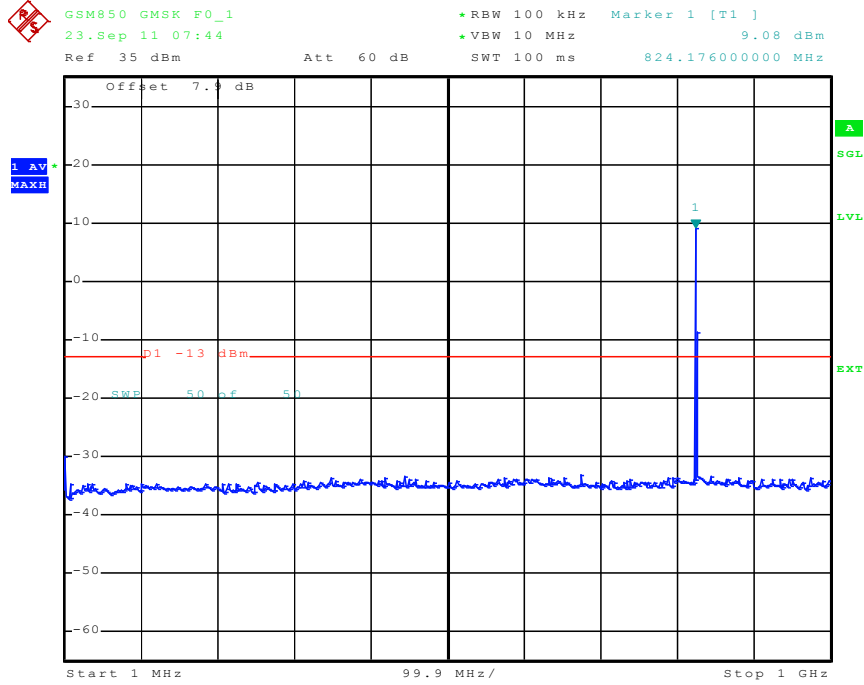
Note:

None

CITL Test Report

Graphical results :

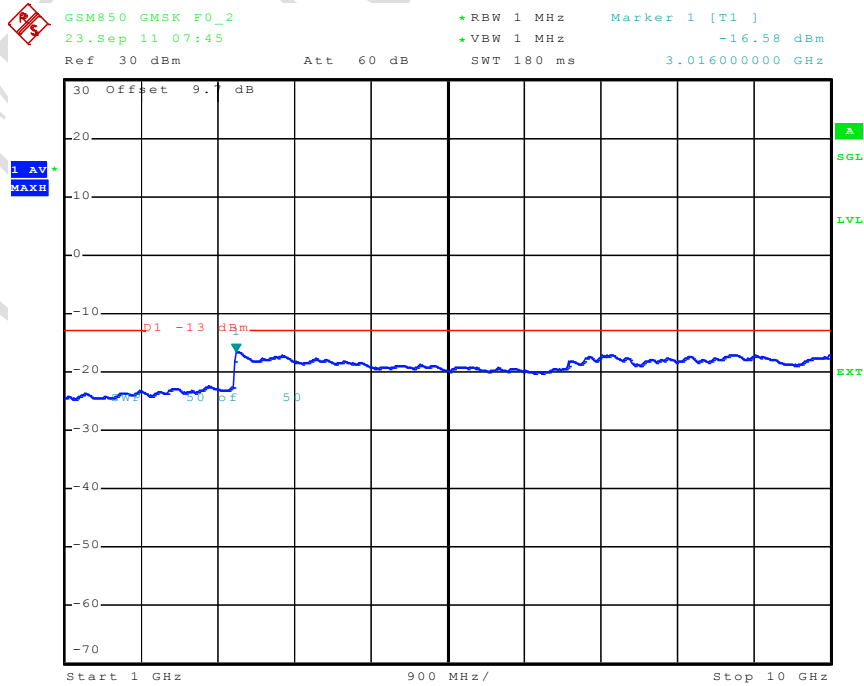
GMSK, Low channel, 824.200 MHz, 2 Hz to 1 GHz



Date: 23.SEP.2011 07:44:49

Note: The strong emission shown in each case is the carrier signal.

GMSK, Low channel, 824.200 MHz, 1 GHz to 20 GHz

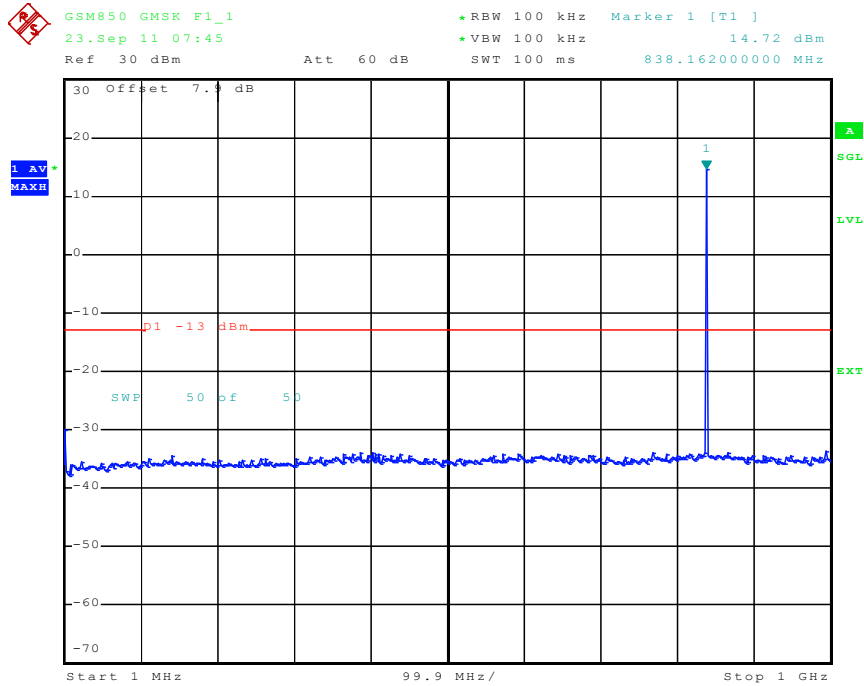


Date: 23.SEP.2011 07:45:14

FCC Parts 2, 22, 24
Equipment:EM7305

REPORT NO.: I14X50091-FCC-RF

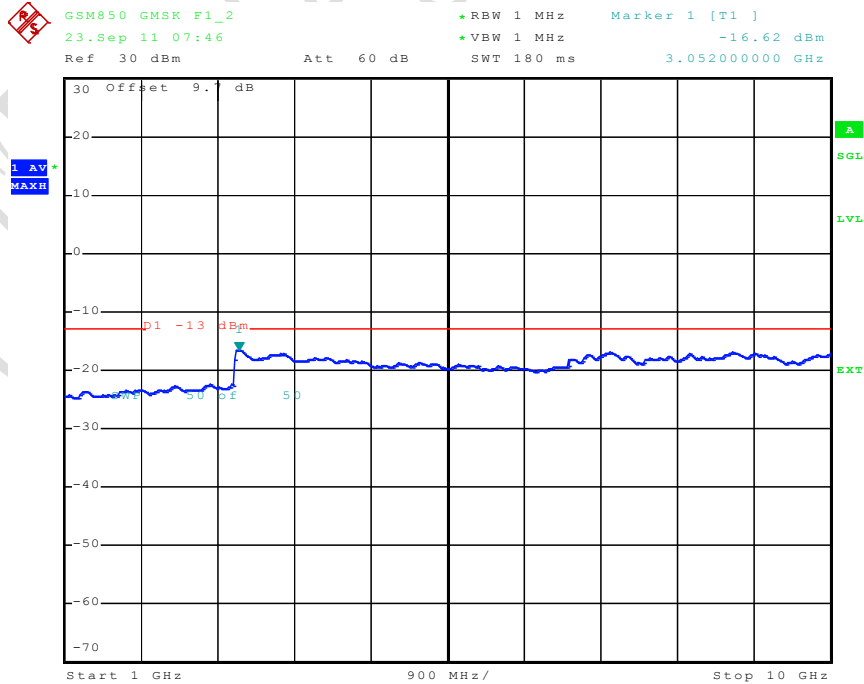
GMSK, Mid Channel, 836.6 MHz, 2 Hz to 1 GHz



Date: 23.SEP.2011 07:45:48

Note: The strong emission shown in each case is the carrier signal.

GMSK, Mid Channel, 836.6 MHz, 1 GHz to 20 GHz

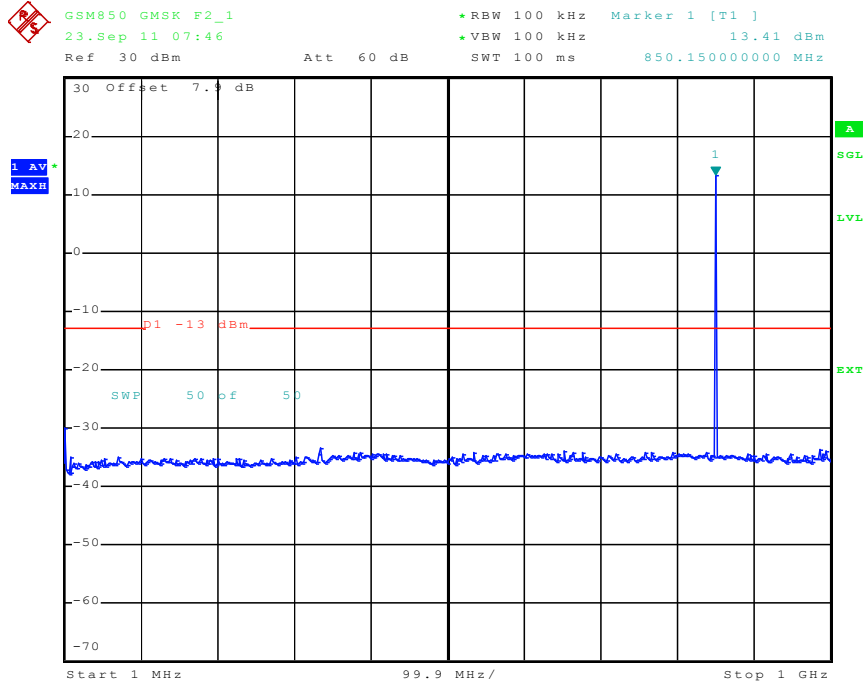


Date: 23.SEP.2011 07:46:14

FCC Parts 2, 22, 24
Equipment:EM7305

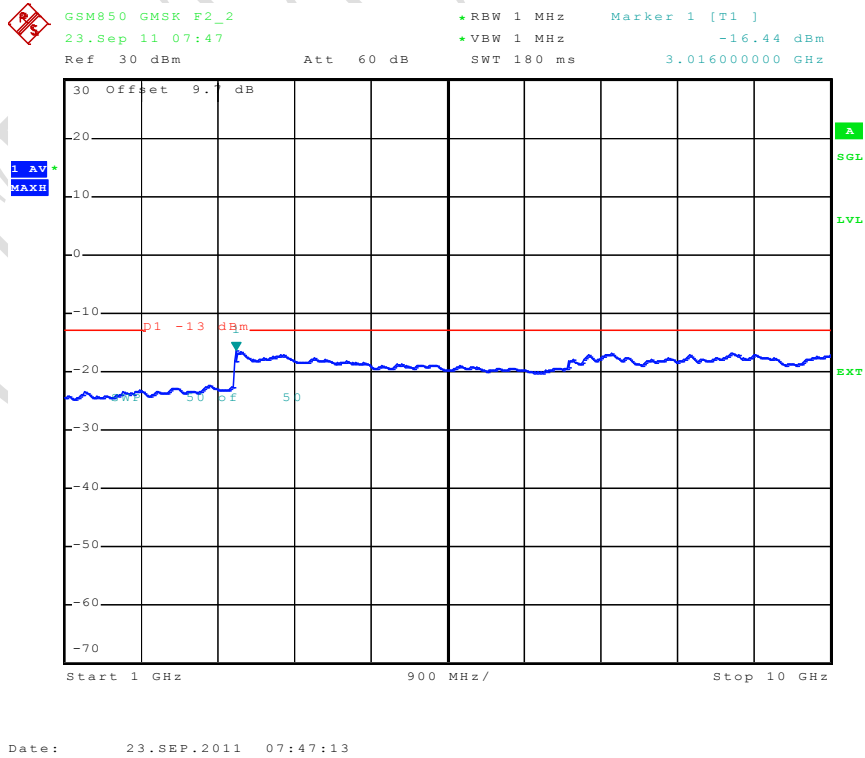
REPORT NO.: I14X50091-FCC-RF

GMSK, High Channel, 848.8 MHz, 2 Hz to 1 GHz



Note: The strong emission shown in each case is the carrier signal.

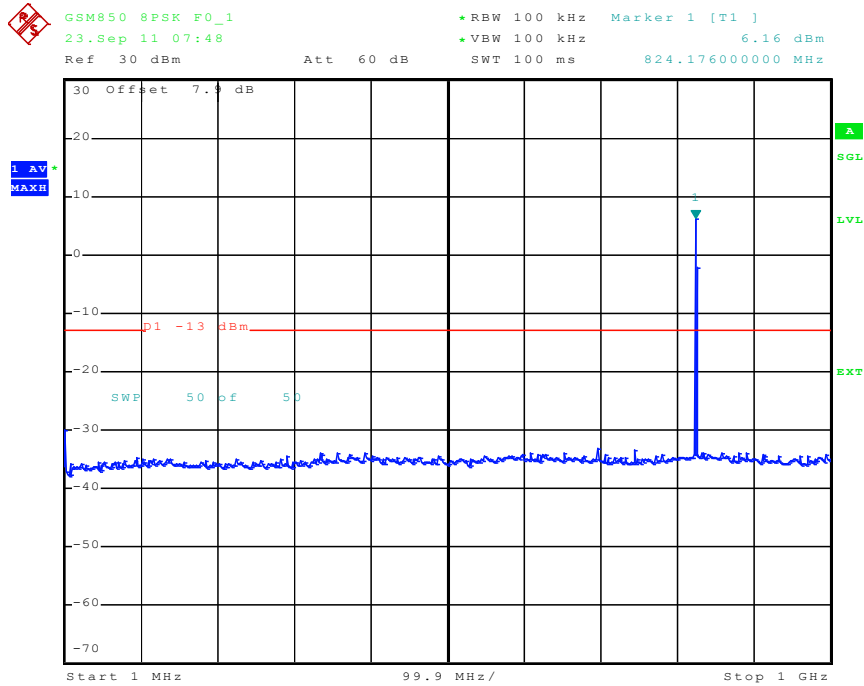
GMSK, High Channel, 848.8 MHz, 1 GHz to 20 GHz



FCC Parts 2, 22, 24
Equipment:EM7305

REPORT NO.: I14X50091-FCC-RF

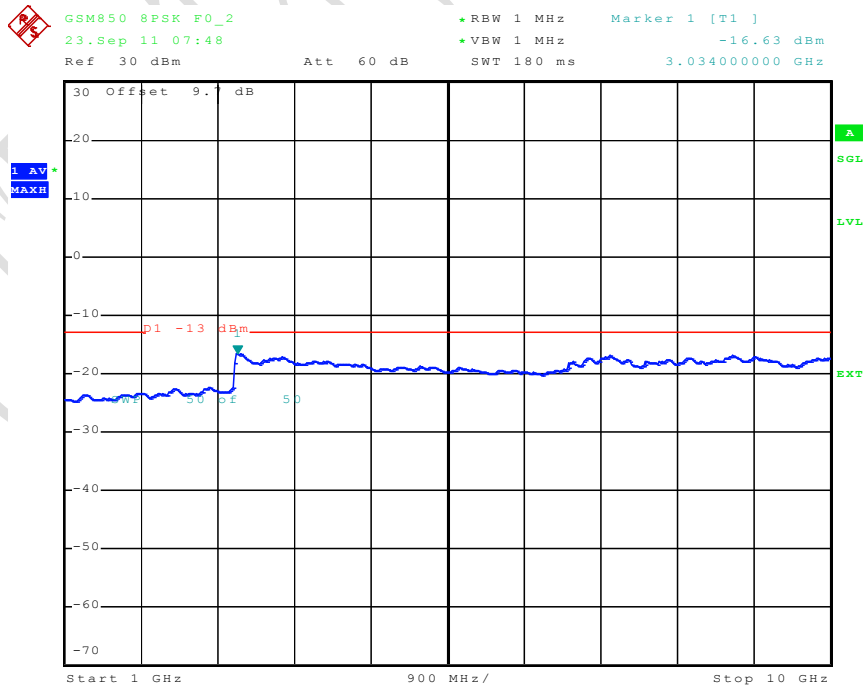
8PSK, Low channel, 824.200 MHz, 2 Hz to 1 GHz



Date: 23.SEP.2011 07:48:33

Note: The strong emission shown in each case is the carrier signal.

8PSK, Low channel, 824.200 MHz, 1 GHz to 20 GHz

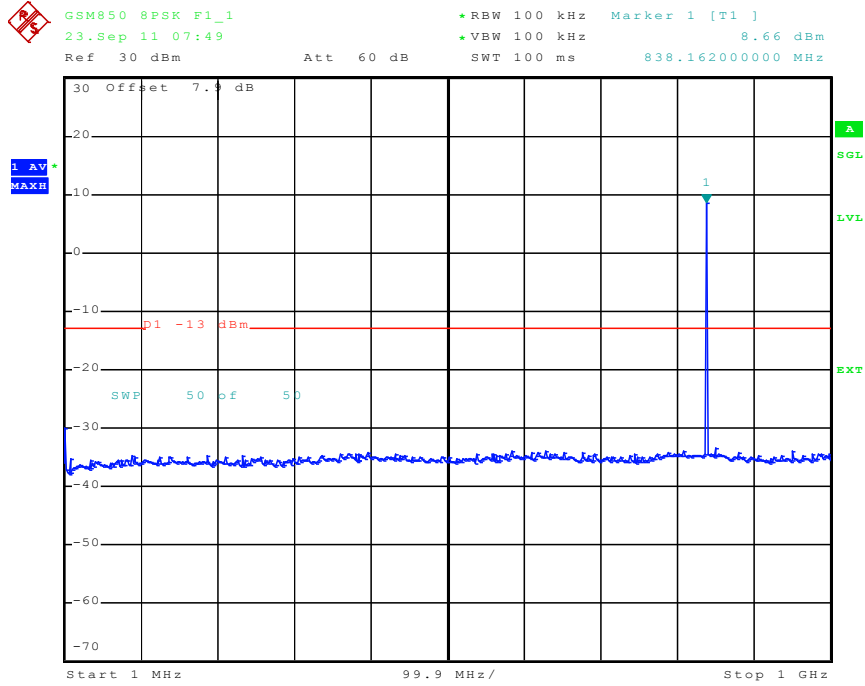


Date: 23.SEP.2011 07:48:58

FCC Parts 2, 22, 24
Equipment:EM7305

REPORT NO.: I14X50091-FCC-RF

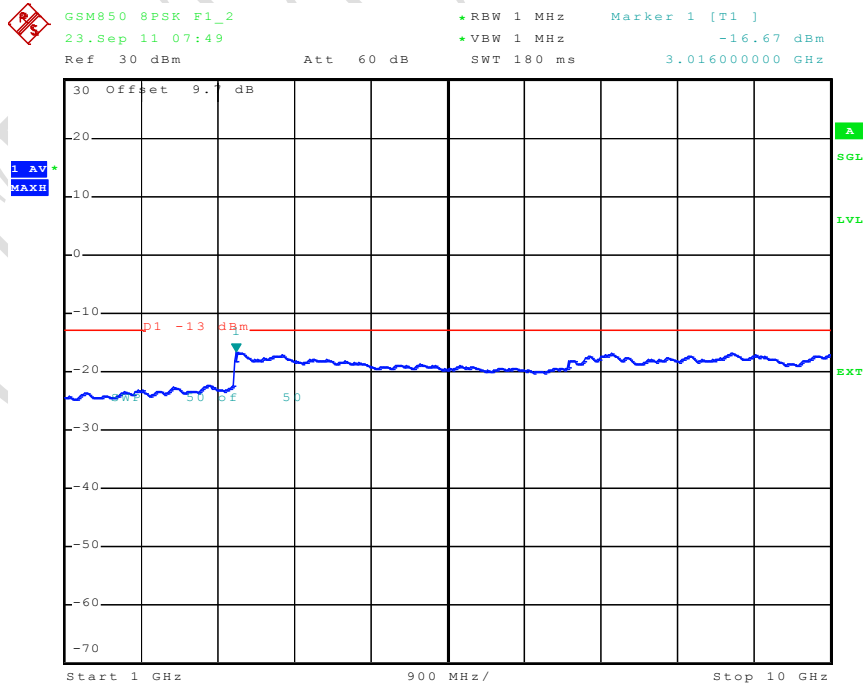
8PSK, Mid Channel, 836.6 MHz, 2 Hz to 1 GHz



Date: 23.SEP.2011 07:49:33

Note: The strong emission shown in each case is the carrier signal.

8PSK, Mid Channel, 836.6 MHz, 1 GHz to 20 GHz

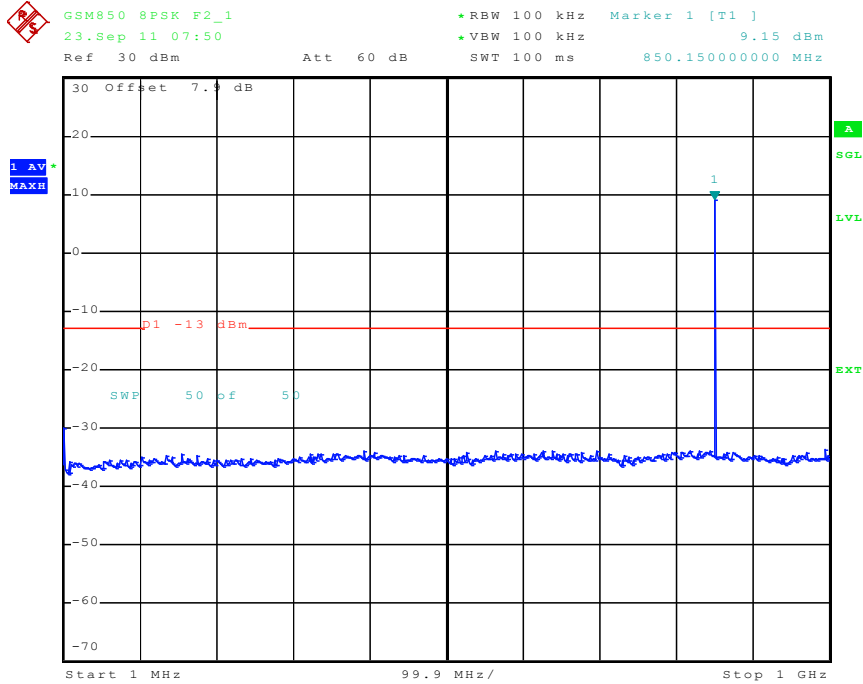


Date: 23.SEP.2011 07:49:57

FCC Parts 2, 22, 24
Equipment:EM7305

REPORT NO.: I14X50091-FCC-RF

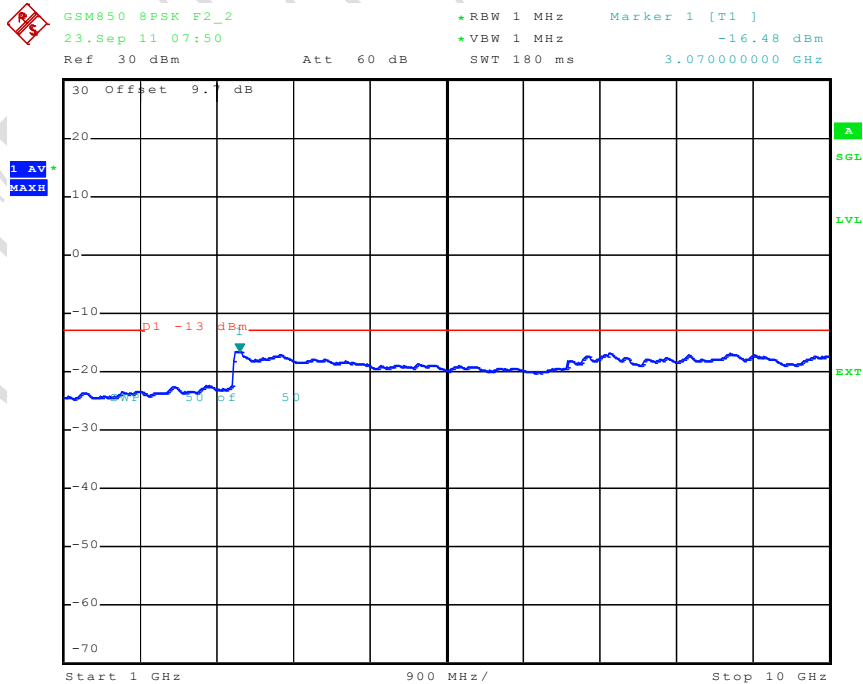
8PSK, High Channel, 848.8 MHz, 2 Hz to 1 GHz



Date: 23.SEP.2011 07:50:32

Note: The strong emission shown in each case is the carrier signal.

8PSK, High Channel, 848.8 MHz, 1 GHz to 20 GHz

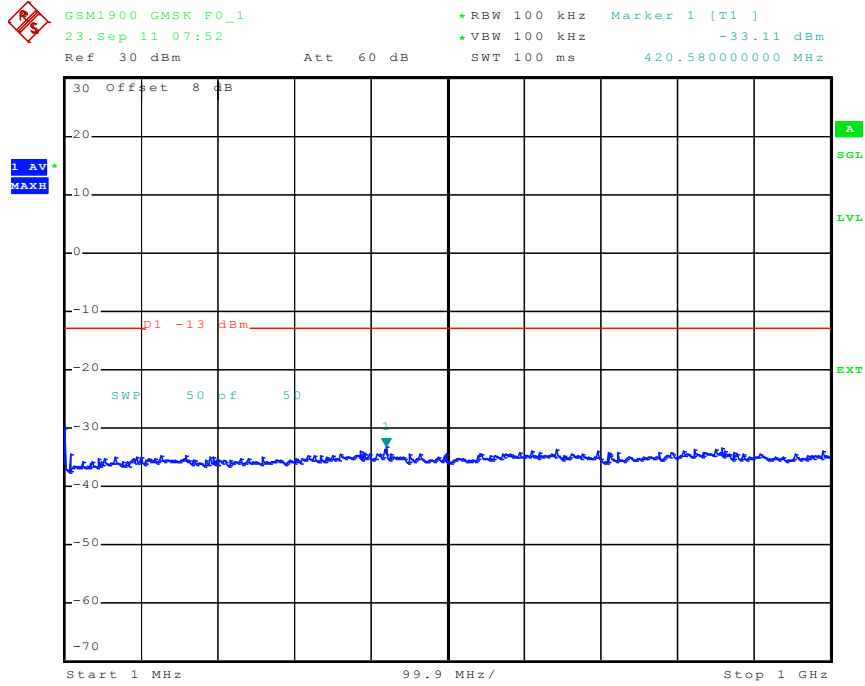


Date: 23.SEP.2011 07:50:57

FCC Parts 2, 22, 24
Equipment:EM7305

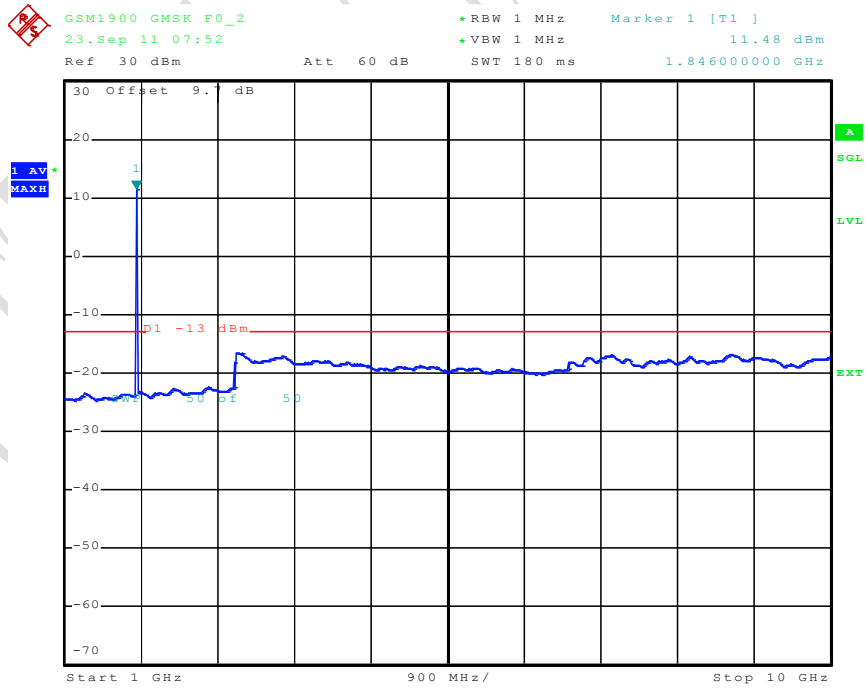
REPORT NO.: I14X50091-FCC-RF

GMSK, Low channel, 1850.2 MHz, 2 Hz to 1 GHz



Date: 23.SEP.2011 07:52:26

GMSK, Low channel, 1850.2 MHz, 1 GHz to 20 GHz



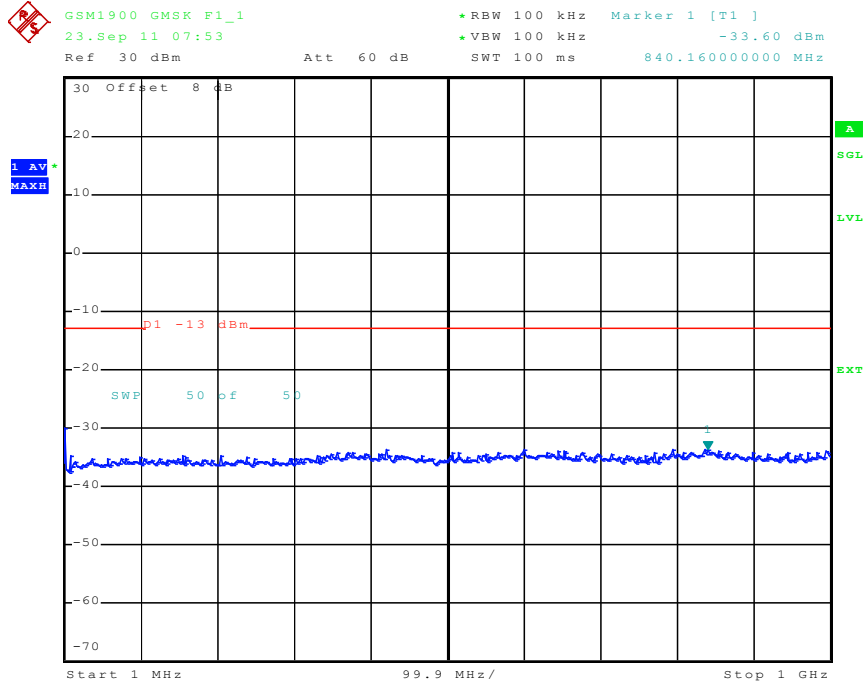
Date: 23.SEP.2011 07:52:51

Note: The strong emission shown is the carrier signal.

FCC Parts 2, 22, 24
Equipment:EM7305

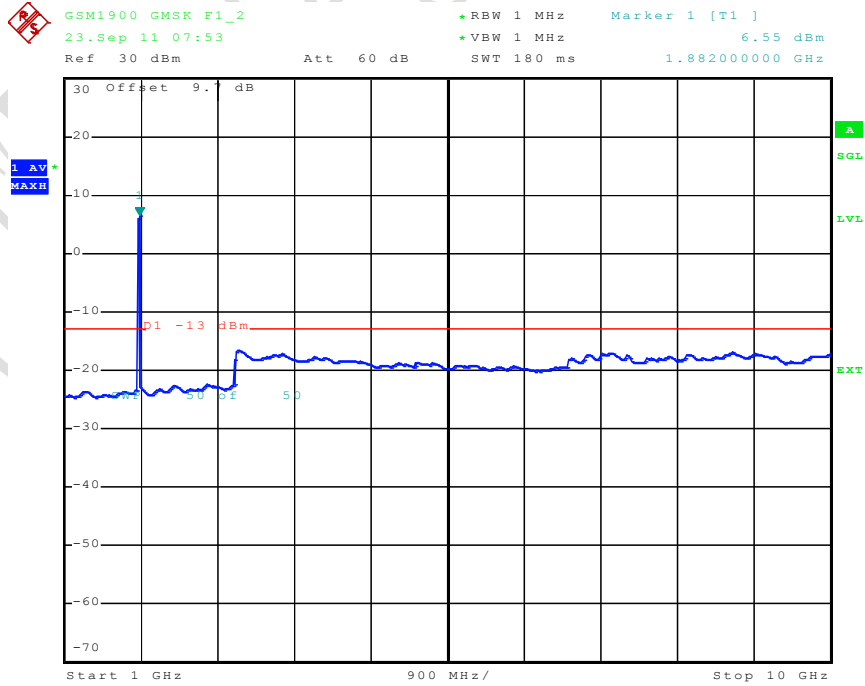
REPORT NO.: I14X50091-FCC-RF

GMSK, Middle channel, 1880.0 MHz, 2 Hz to 1 GHz



Date: 23.SEP.2011 07:53:26

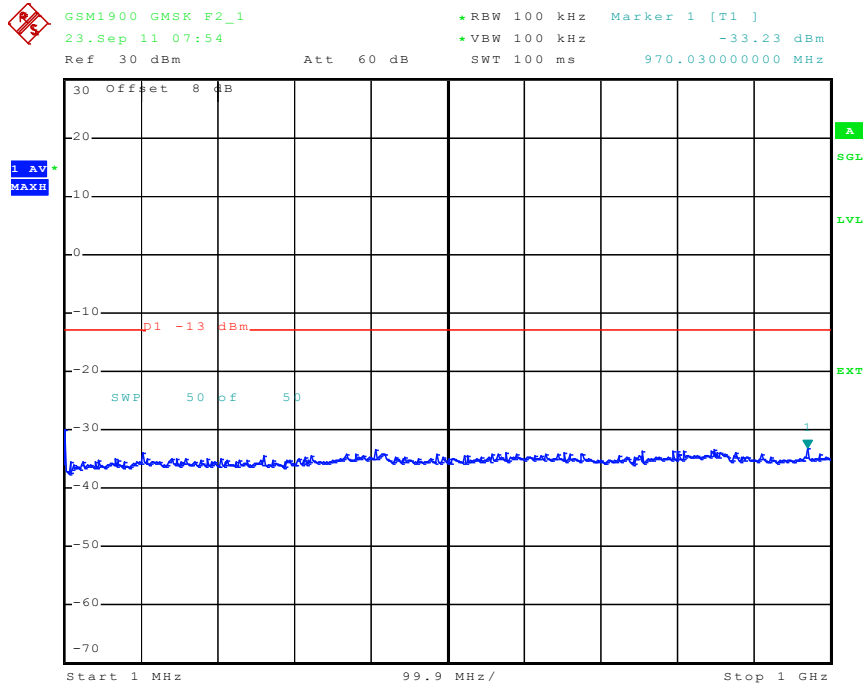
GMSK, Middle channel, 1880.0 MHz, 1 GHz to 20 GHz



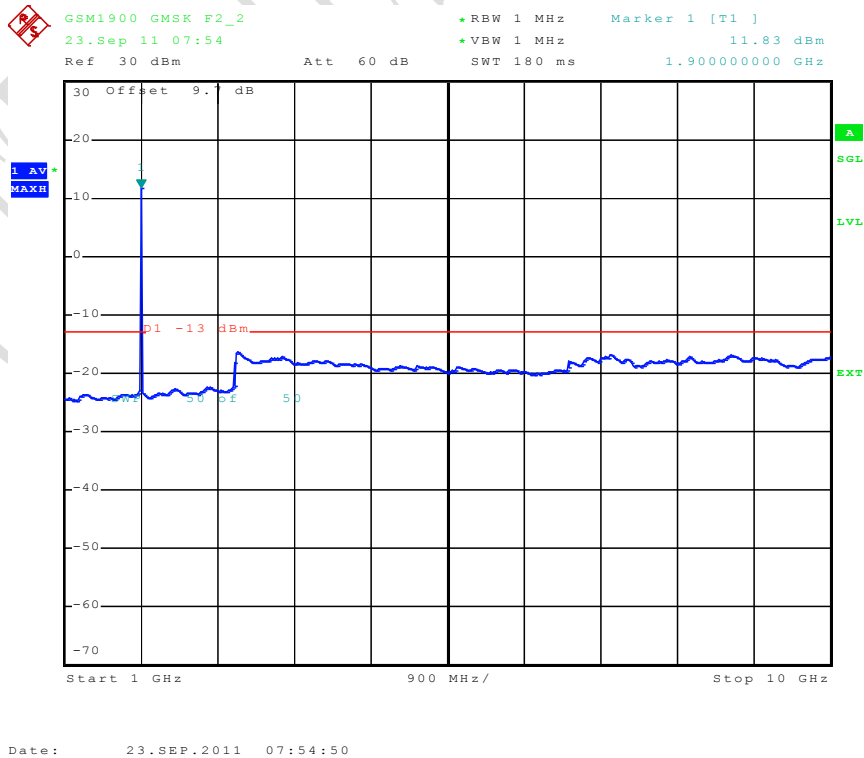
Date: 23.SEP.2011 07:53:51

Note: The strong emission shown is the carrier signal.

GMSK, High channel, 1909.8 MHz, 2 Hz to 1 GHz

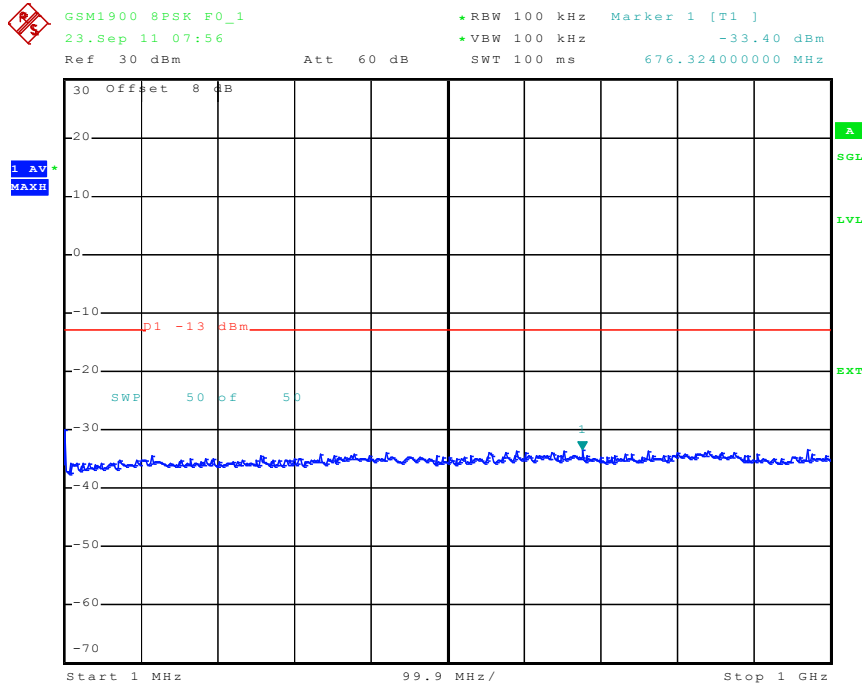


GMSK, High channel, 1909.8 MHz, 1 GHz to 20 GHz



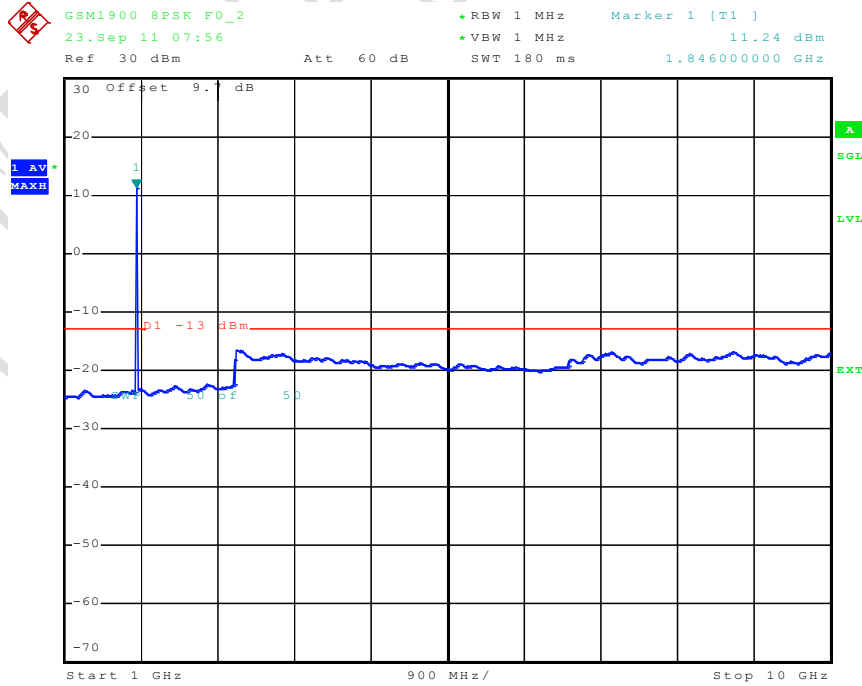
Note: The strong emission shown is the carrier signal.

8PSK, Low channel, 1850.2 MHz, 2 Hz to 1 GHz



Date: 23.SEP.2011 07:56:09

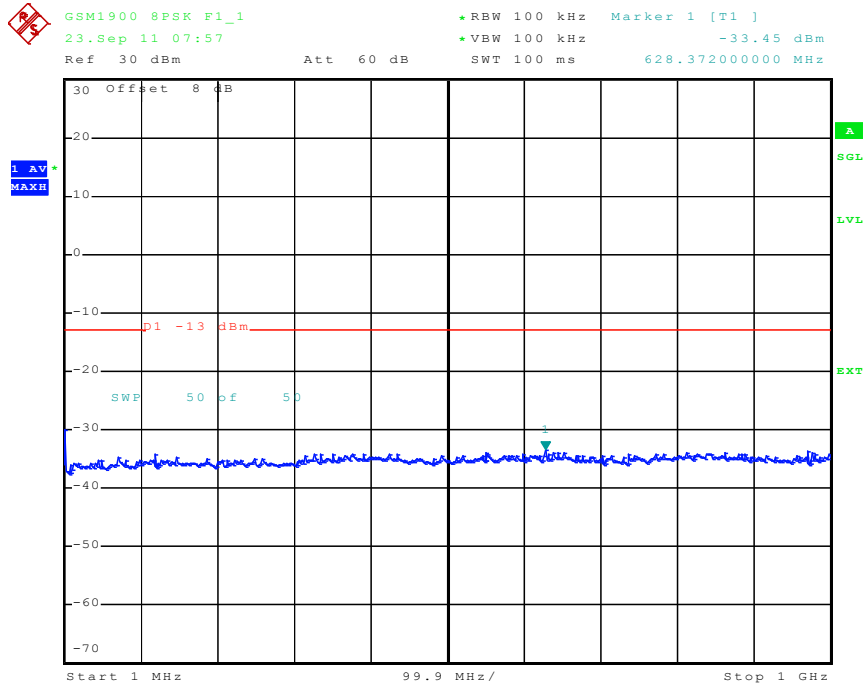
8PSK, Low channel, 1850.2 MHz, 1 GHz to 20 GHz



Date: 23.SEP.2011 07:56:34

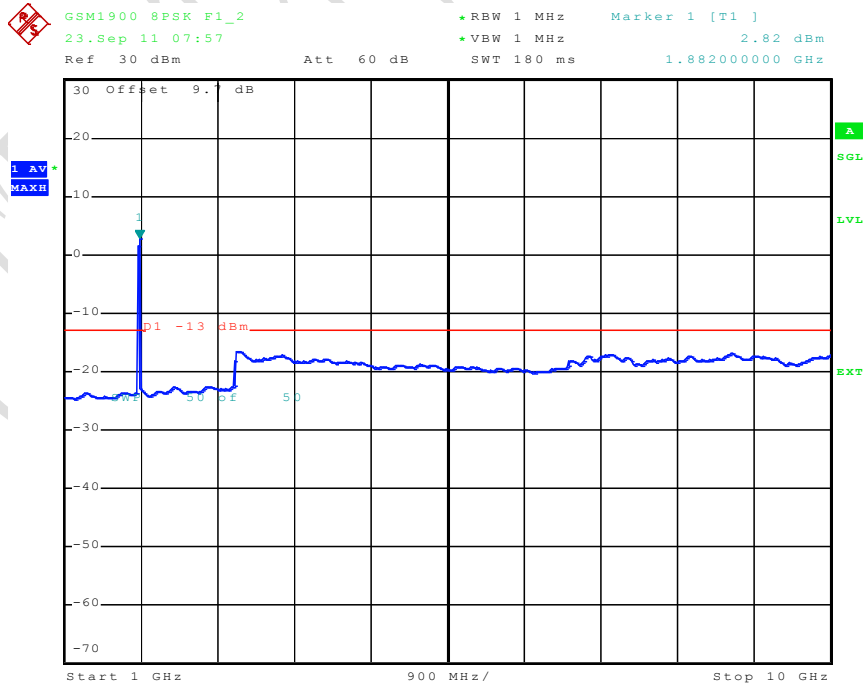
Note: The strong emission shown is the carrier signal.

8PSK, Middle channel, 1880.0 MHz, 2 Hz to 1 GHz



Date: 23.SEP.2011 07:57:08

8PSK, Middle channel, 1880.0 MHz, 2 Hz to 20 GHz



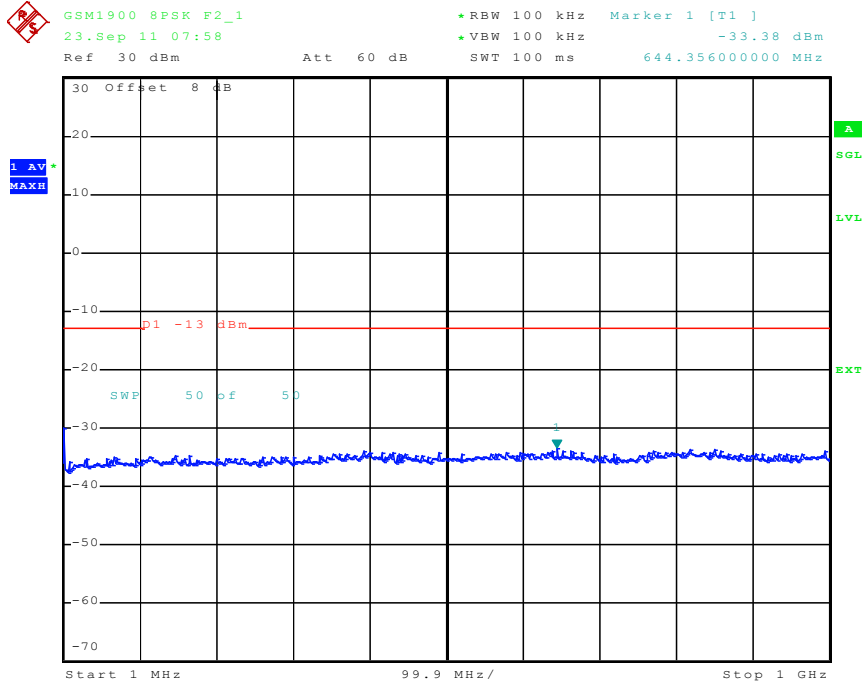
Date: 23.SEP.2011 07:57:34

Note: The strong emission shown is the carrier signal.

FCC Parts 2, 22, 24
Equipment:EM7305

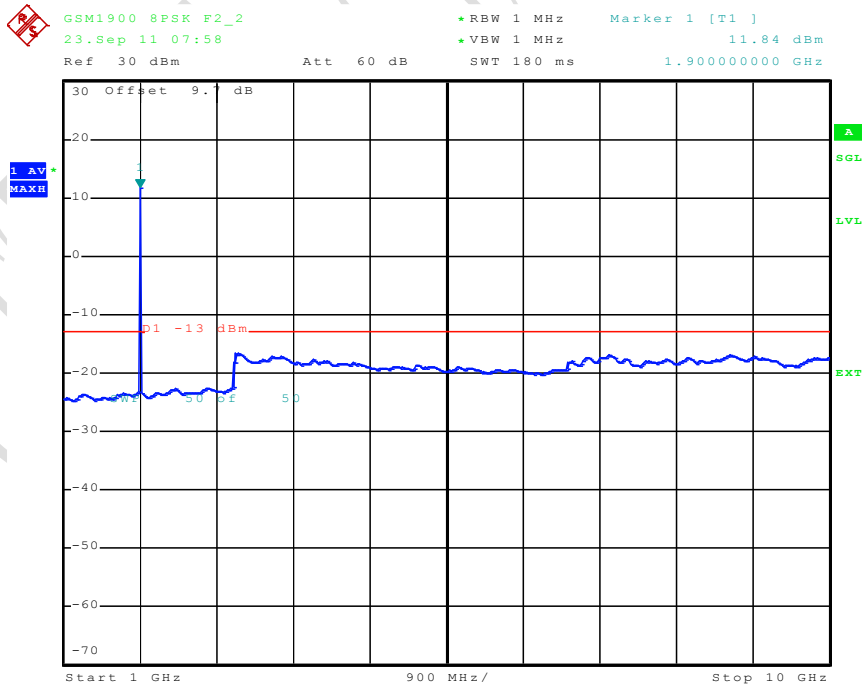
REPORT NO.: I14X50091-FCC-RF

8PSK, High channel, 1909.8 MHz, 2 Hz to 1 GHz



Date: 23.SEP.2011 07:58:08

8PSK, High channel, 1909.8 MHz, 2 Hz to 20 GHz



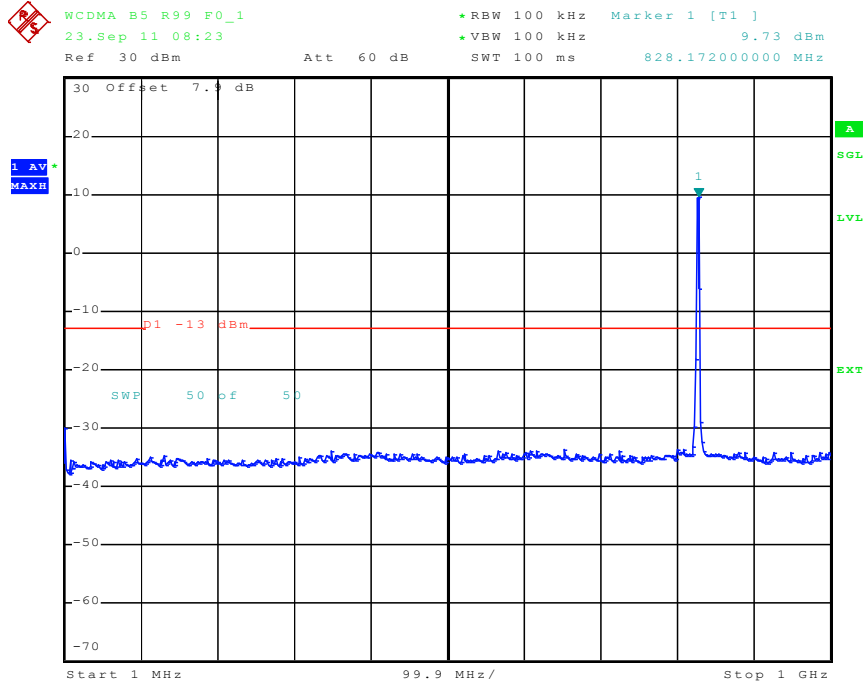
Date: 23.SEP.2011 07:58:33

Note: The strong emission shown is the carrier signal

FCC Parts 2, 22, 24
Equipment:EM7305

REPORT NO.: I14X50091-FCC-RF

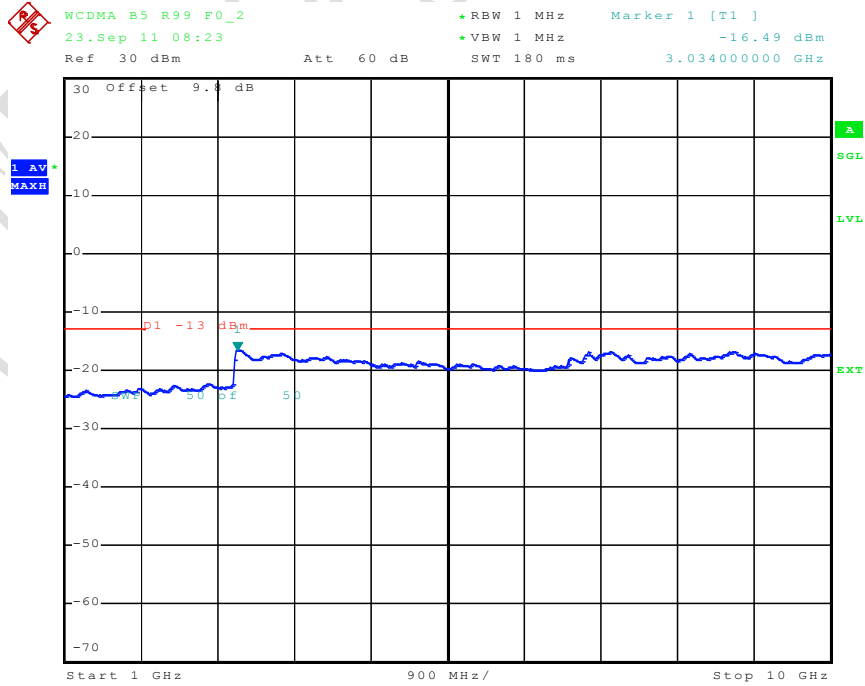
WCDMA, Low channel, 826.4 MHz, 1 MHz to 1 GHz



Date: 23.SEP.2011 08:23:18

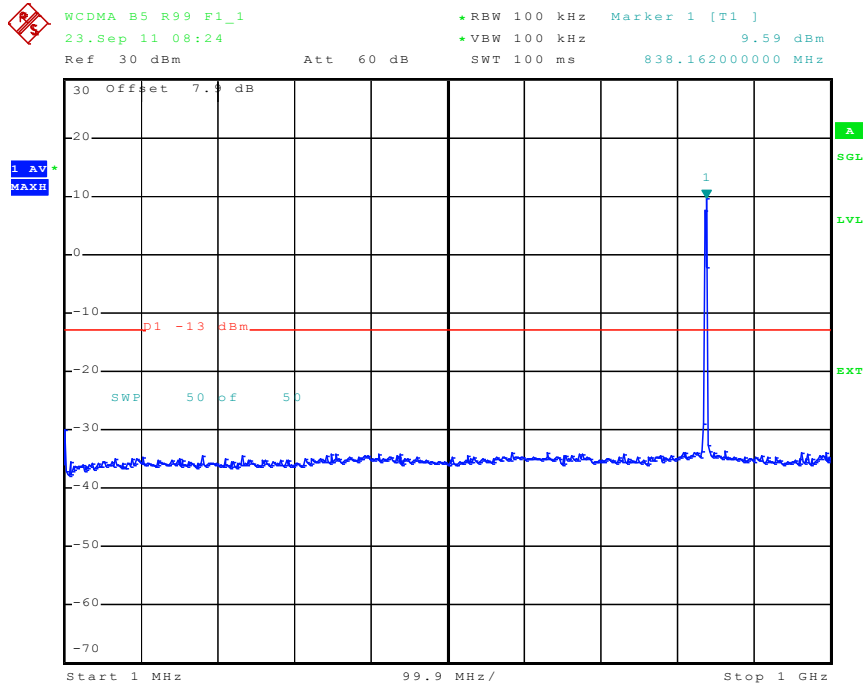
Note: The strong emission shown in each case is the carrier signal.

WCDMA, Low channel, 826.4 MHz, 1 GHz to 20 GHz



Date: 23.SEP.2011 08:23:43

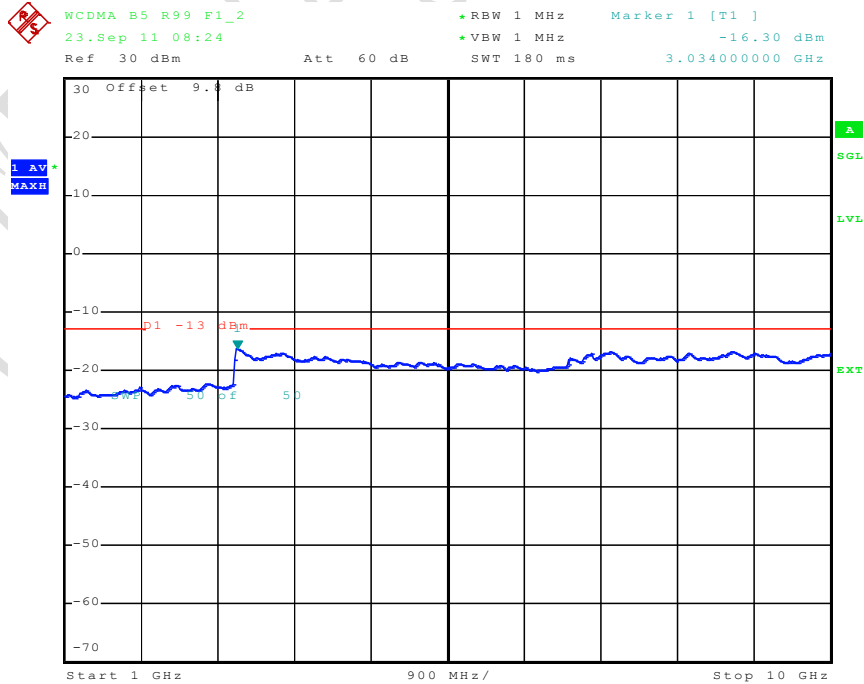
WCDMA, Middle channel, 836.4 MHz, 2 Hz to 1 GHz



Date: 23.SEP.2011 08:24:20

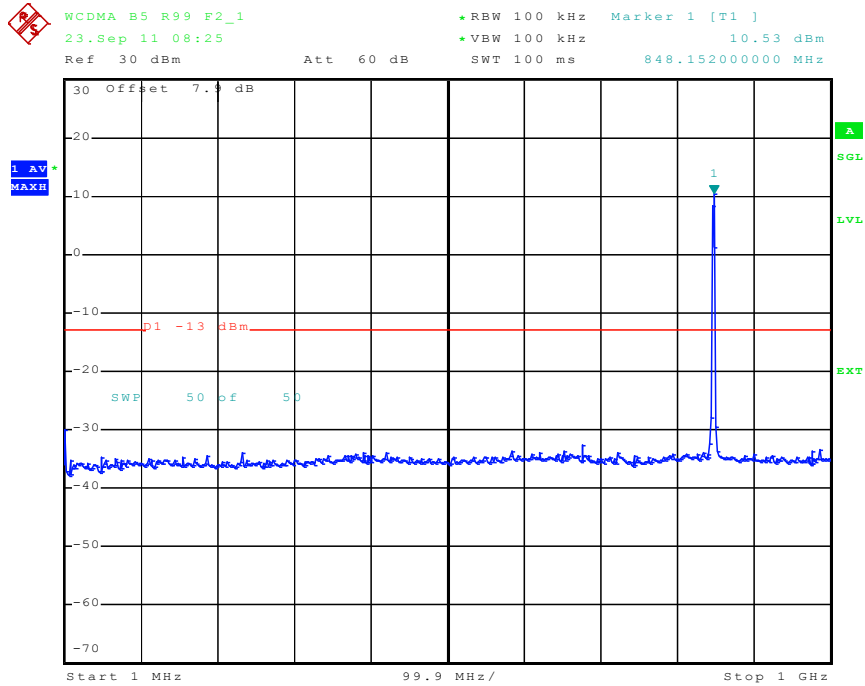
Note: The strong emission shown in each case is the carrier signal.

WCDMA, Middle channel, 836.4 MHz, 1 GHz to 20 GHz



Date: 23.SEP.2011 08:24:45

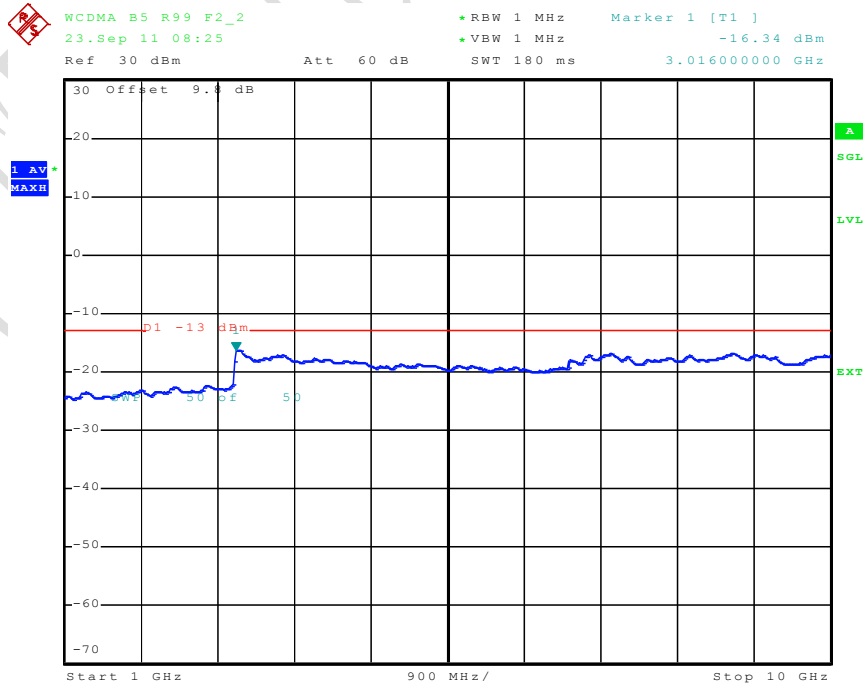
WCDMA, High Channel, 846.6 MHz, 2 Hz to 1 GHz



Date: 23.SEP.2011 08:25:23

Note: The strong emission shown in each case is the carrier signal.

WCDMA, High Channel, 846.6 MHz, 1 GHz to 20 GHz

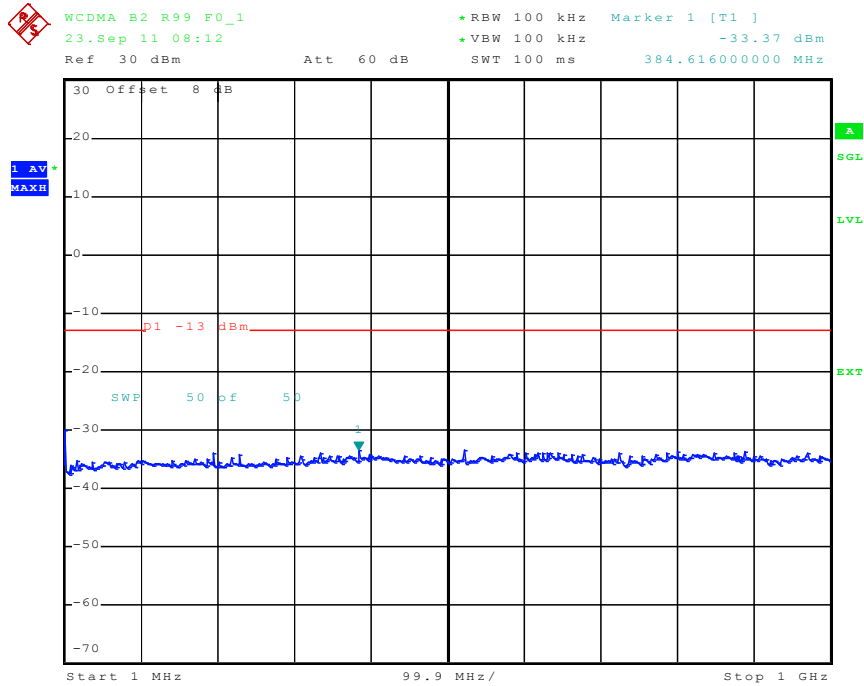


Date: 23.SEP.2011 08:25:48

FCC Parts 2, 22, 24
Equipment:EM7305

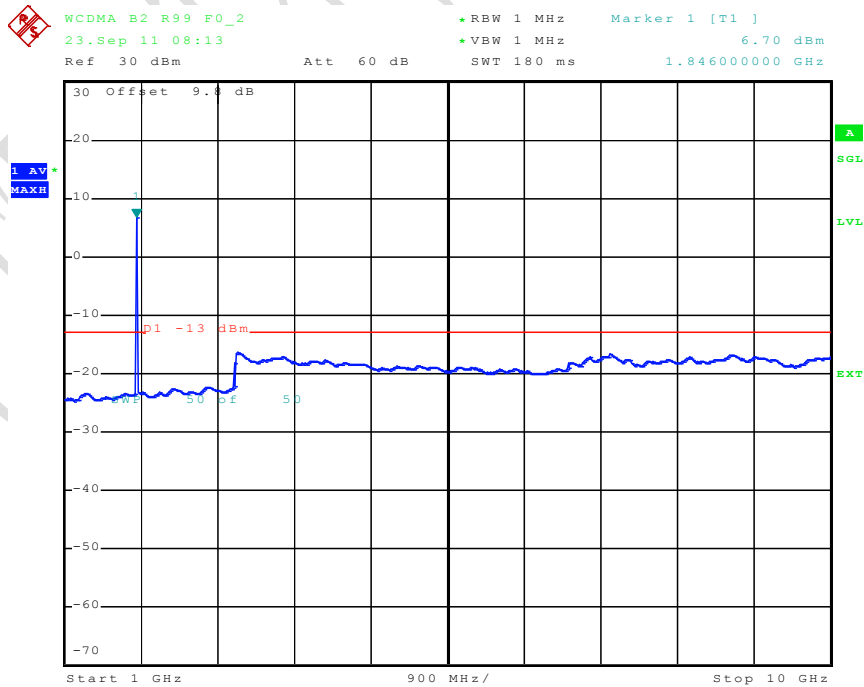
REPORT NO.: I14X50091-FCC-RF

WCDMA, Low channel, 1852.4 MHz, 2 Hz to 1 GHz



Date: 23.SEP.2011 08:12:54

WCDMA, Low channel, 1852.4 MHz, 1 GHz to 20 GHz



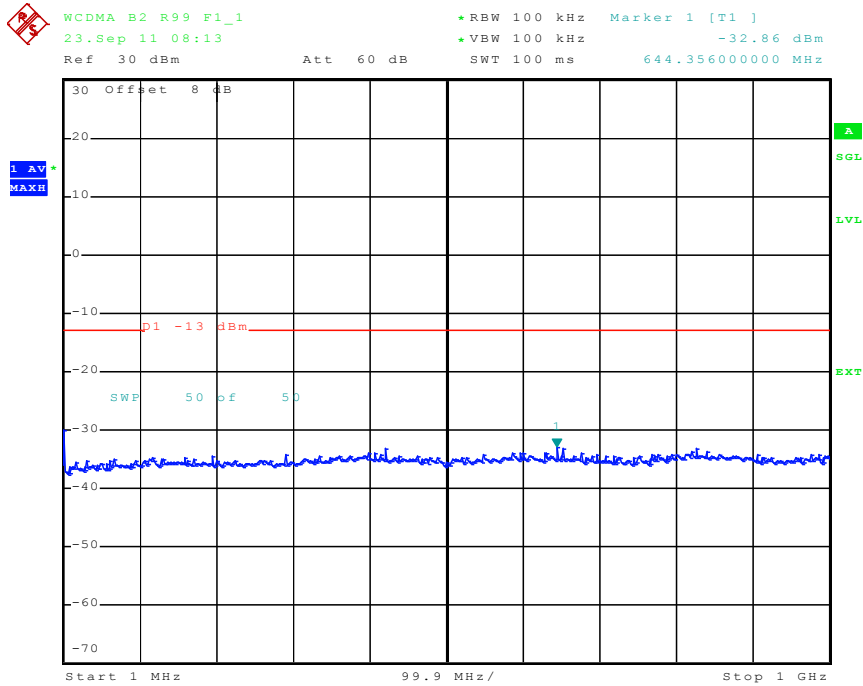
Date: 23.SEP.2011 08:13:19

Note: The strong emission shown is the carrier signal.

FCC Parts 2, 22, 24
Equipment:EM7305

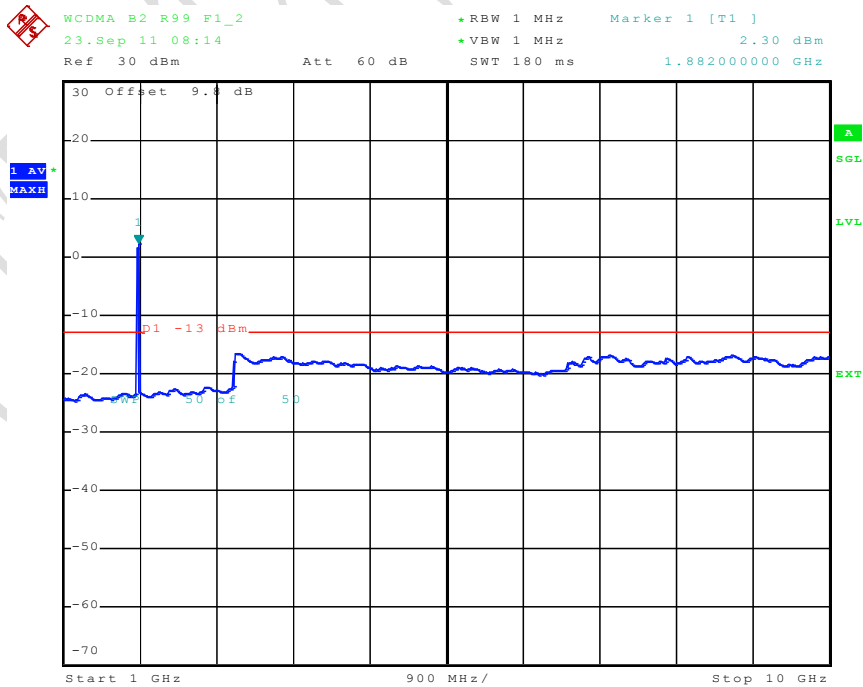
REPORT NO.: I14X50091-FCC-RF

WCDMA, Middle channel, 1880 MHz, 2 Hz to 1 GHz



Date: 23.SEP.2011 08:13:57

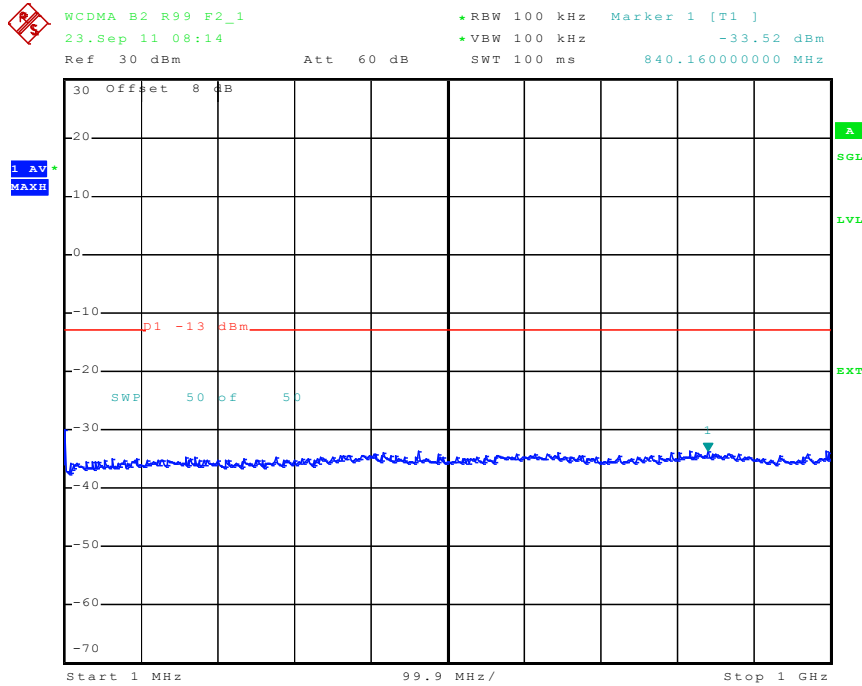
WCDMA, Middle channel, 1880 MHz, 1 GHz to 20 GHz



Date: 23.SEP.2011 08:14:22

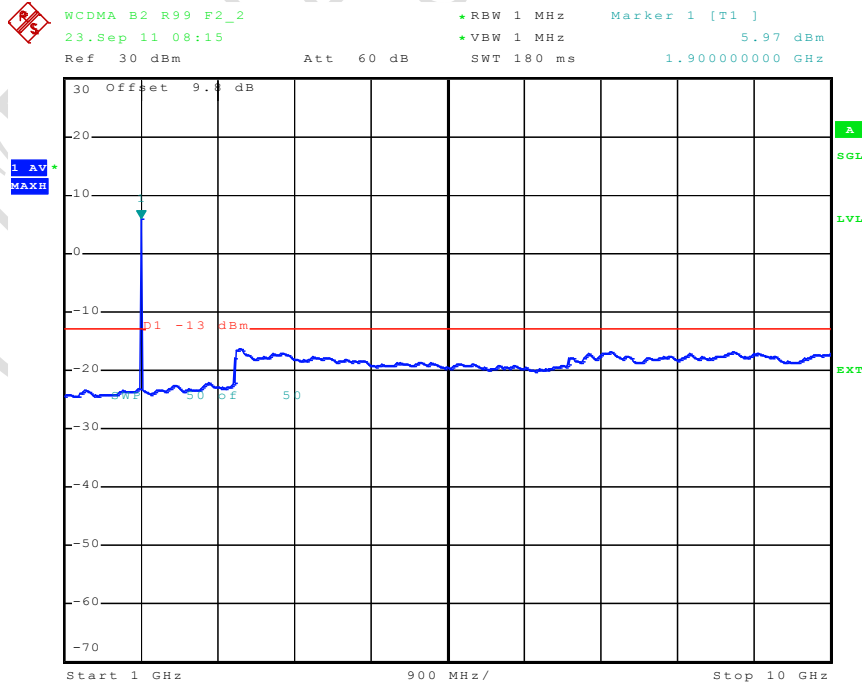
Note: The strong emission shown is the carrier signal.

WCDMA, High channel, 1907.6 MHz, 2 Hz to 1 GHz



Date: 23.SEP.2011 08:14:59

WCDMA, High channel, 1907.6 MHz, 1 GHz to 20 GHz



Date: 23.SEP.2011 08:15:24

Note: The strong emission shown is the carrier signal.

4.7 Band Edge

Specifications:	2.1051, 24.238, 2.1053, 22.917
Date of Tests	2013-01-17
Test conditions:	Ambient Temperature:15°C-35°C Relative Humidity:30%-60% Air pressure: 86-106kPa
Operation Mode	TX on, channel 190 and 661 for GSM/GPRS/EGPRS mode,channel 4175 and 9400 for WCDMA/HSUPA/HSDPA mode.
Test Results:	Pass

Limit Level Construction:

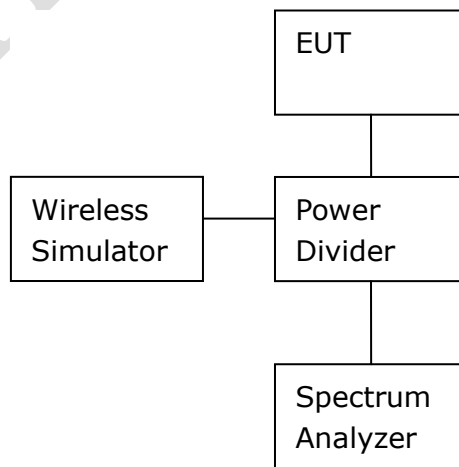
According to Part 24.238 (a), i.e., Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB, so the limit level is:
 $P(\text{dBm}) - (43 + 10 \log(P)) \text{ dB} = -13\text{dBm}$

Limits for Radiated spurious emissions

Frequency range	Limit Level
Band edge	-13dBm

Test Setup:

During the test, the EUT was controlled via the Wireless Communications Test Set to ensure max power transmission and proper modulation and measured by spectrum analyzer.



Test Method

- 1) The EUT was coupled to the EMI test receiver analyzer mode and the base station simulator through a power divider. The lost of the cables the test system is calibrated to correct the readings.
- 2) The spectrum analyzer was set to Maxpeak Detector function and Maximum hold mode.
- 3) The resolution bandwidth of the spectrum analyzer was a little greater than 1% of the 26dB emission bandwidth.

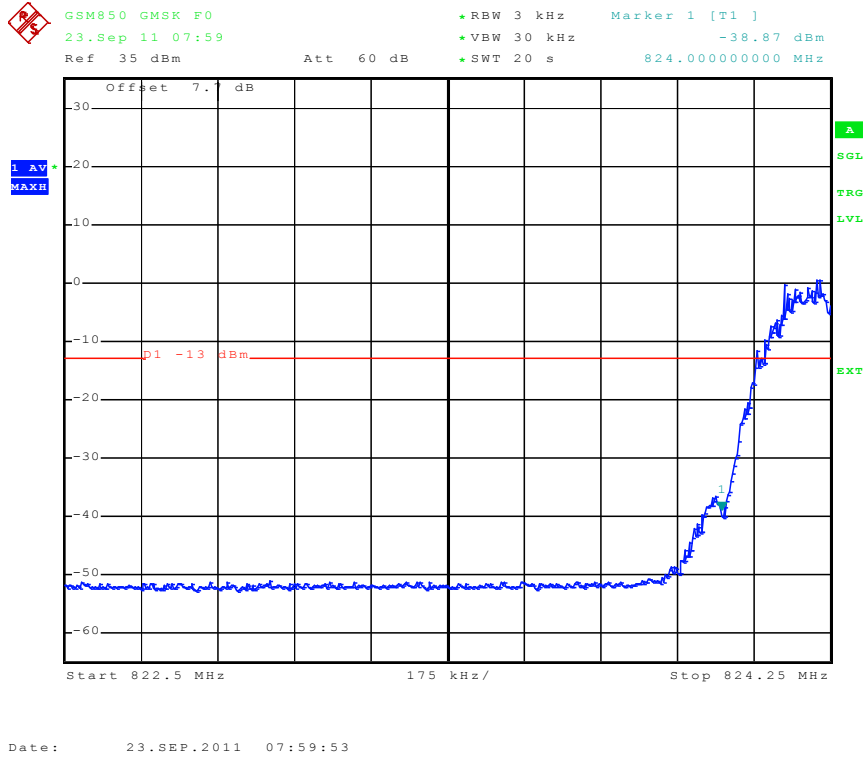
Note: --

CITL Test Report

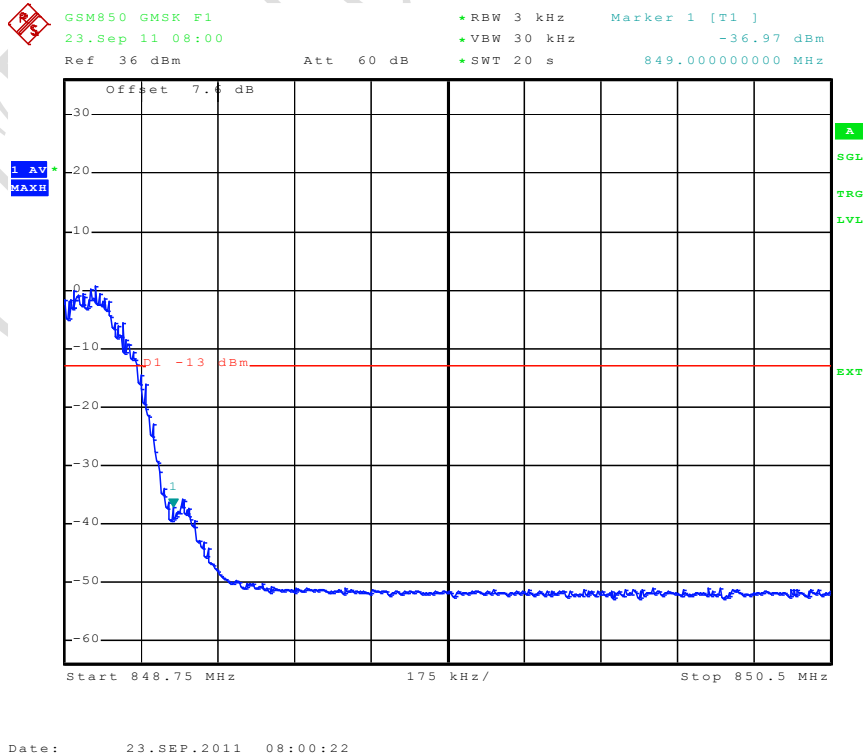
Test Results:

Graphical results :

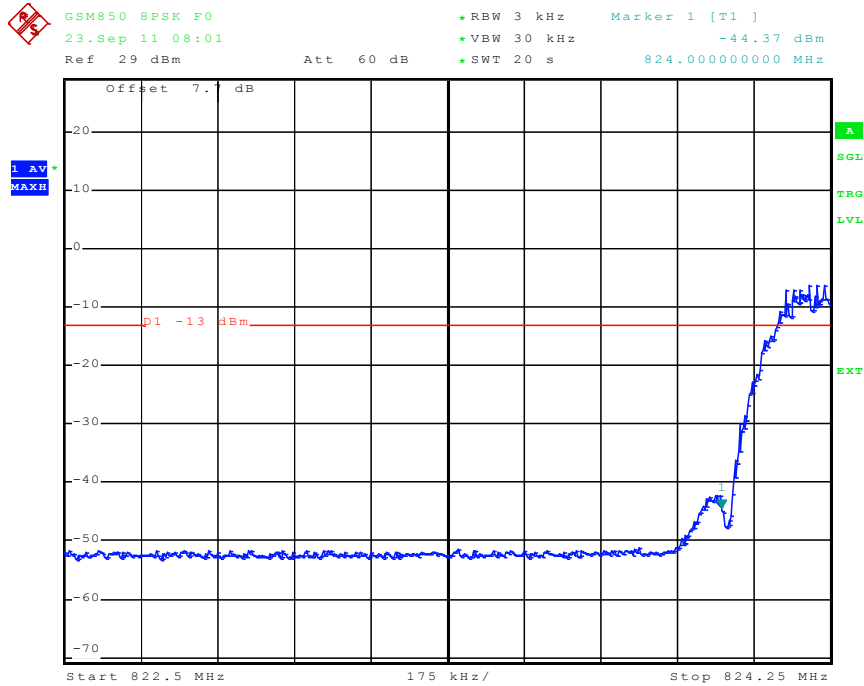
GSMK; Cellular low channel, below 824 MHz



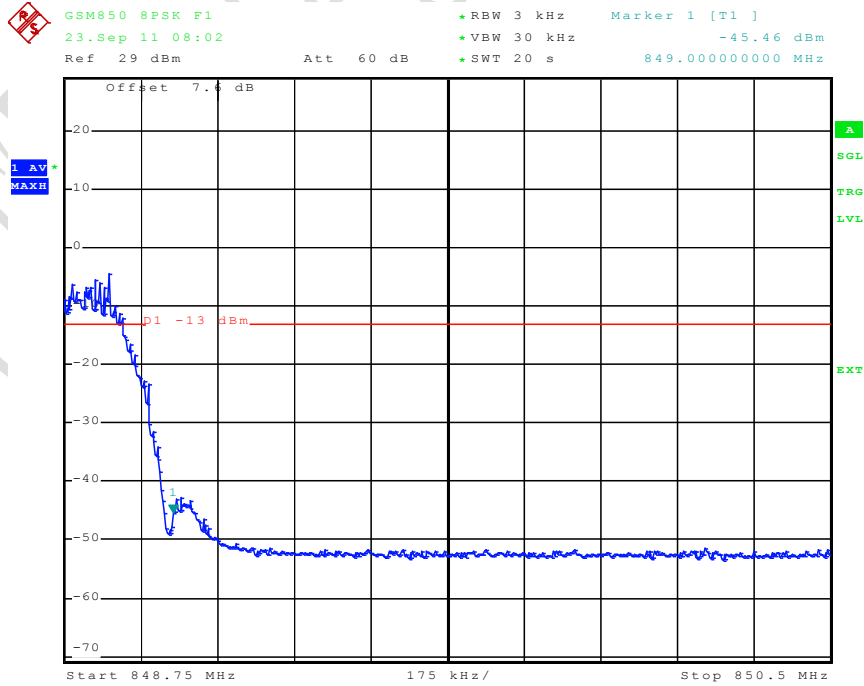
GSMK; Cellular high channel, above 849 MHz



8PSK; Cellular low channel, below 824 MHz



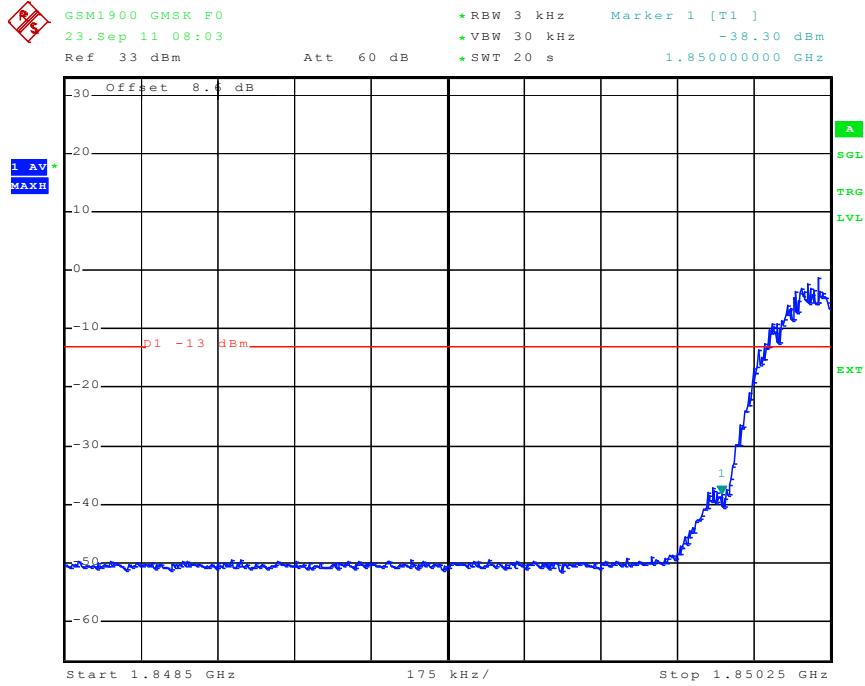
8PSK; Cellular high channel, above 849 MHz



FCC Parts 2, 22, 24
Equipment:EM7305

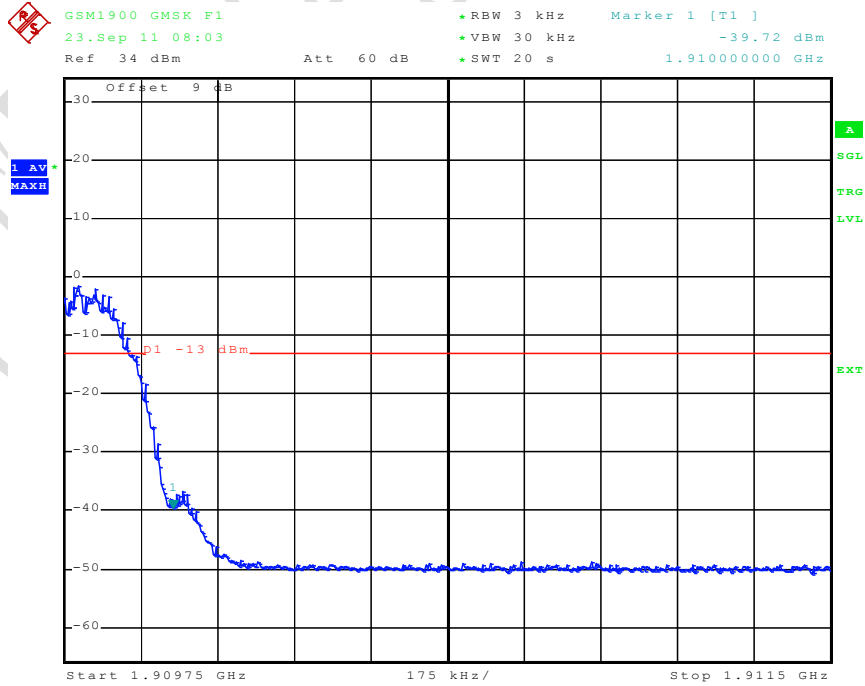
REPORT NO.: I14X50091-FCC-RF

GMSK; PCS low channel, below 1850 MHz



Date: 23.SEP.2011 08:03:26

GMSK; PCS high channel, above 1910 MHz

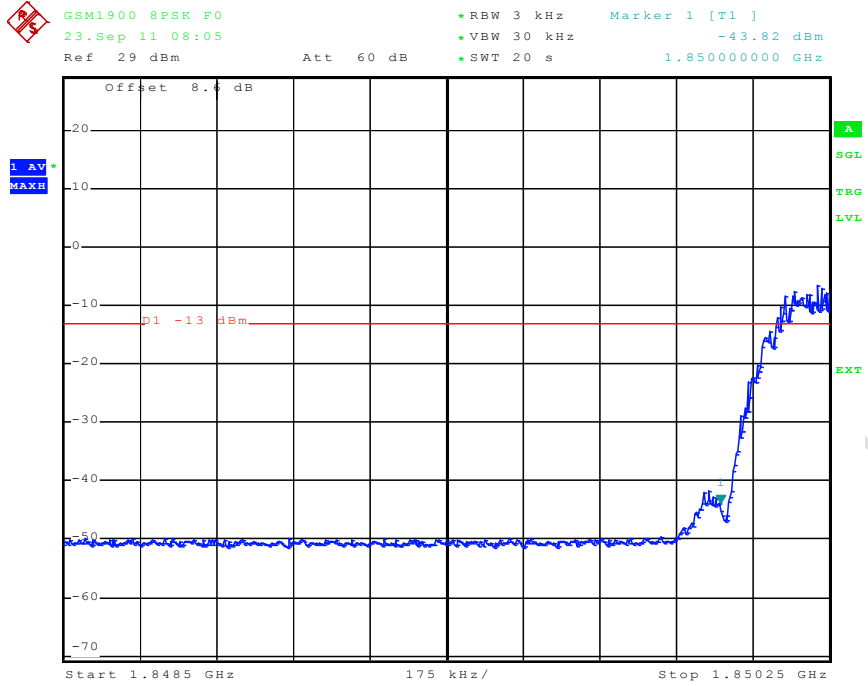


Date: 23.SEP.2011 08:03:55

FCC Parts 2, 22, 24
Equipment:EM7305

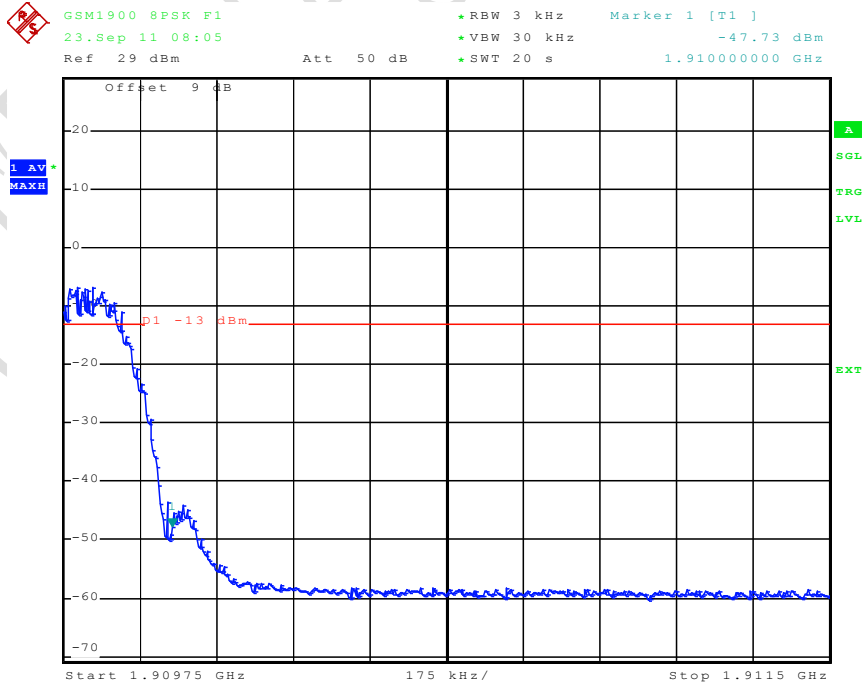
REPORT NO.: I14X50091-FCC-RF

8-PSK; PCS low channel, below 1850 MHz



Date: 23.SEP.2011 08:05:07

8PSK; PCS high channel, above 1910 MHz

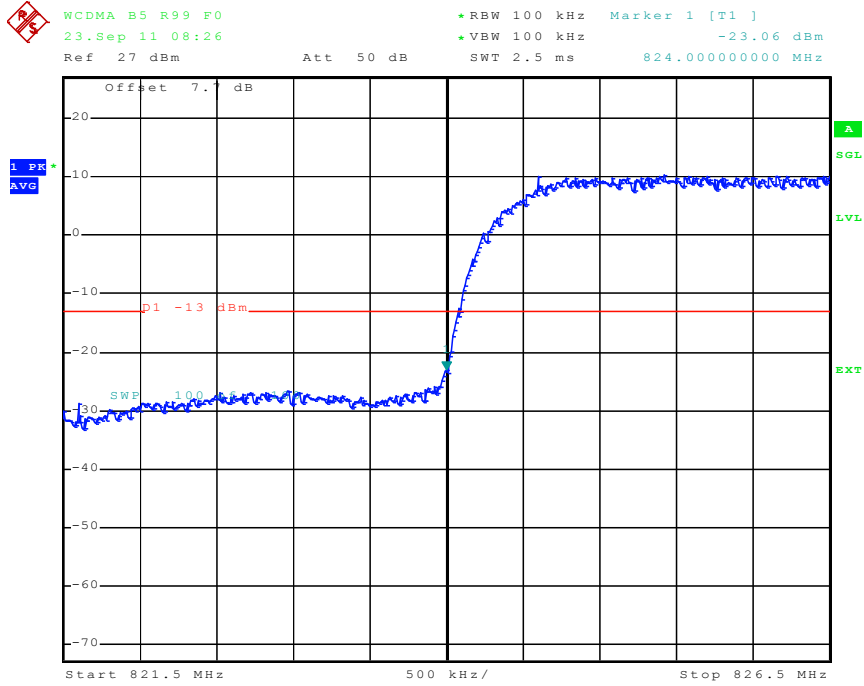


Date: 23.SEP.2011 08:05:35

FCC Parts 2, 22, 24
Equipment:EM7305

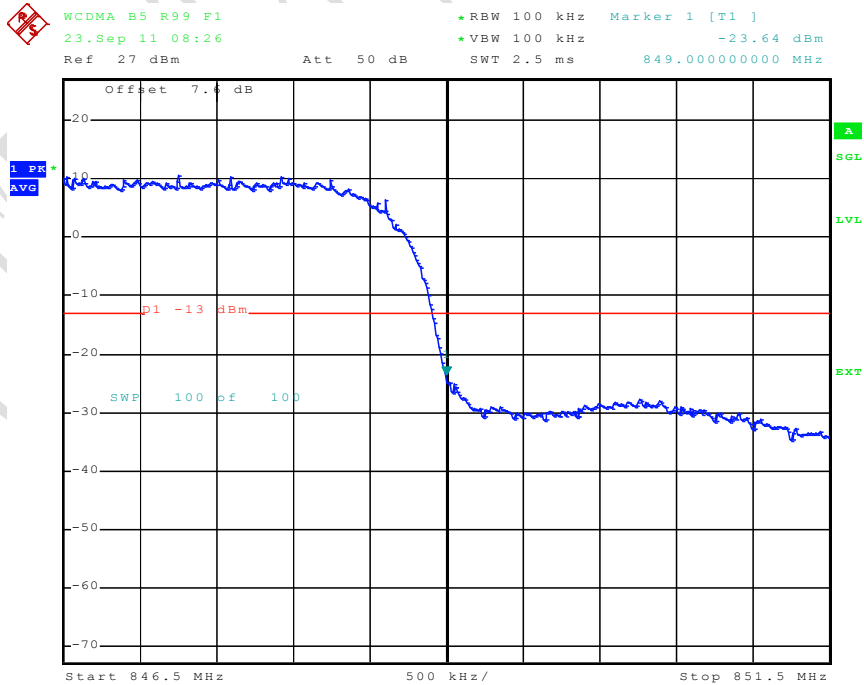
REPORT NO.: I14X50091-FCC-RF

WCDMA; Cellular low channel, below 824 MHz



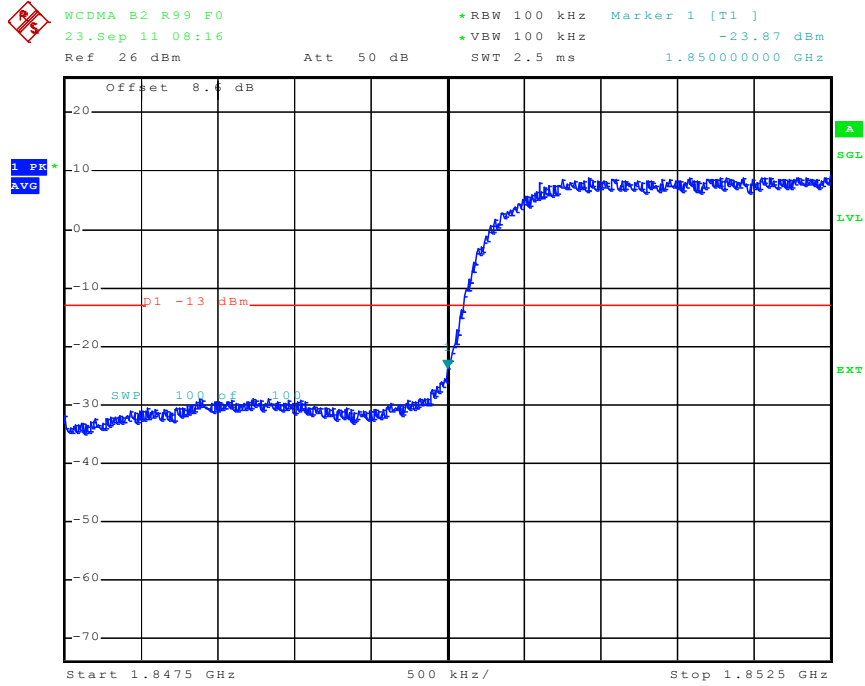
Date: 23.SEP.2011 08:26:42

WCDMA; Cellular high channel, above 849 MHz



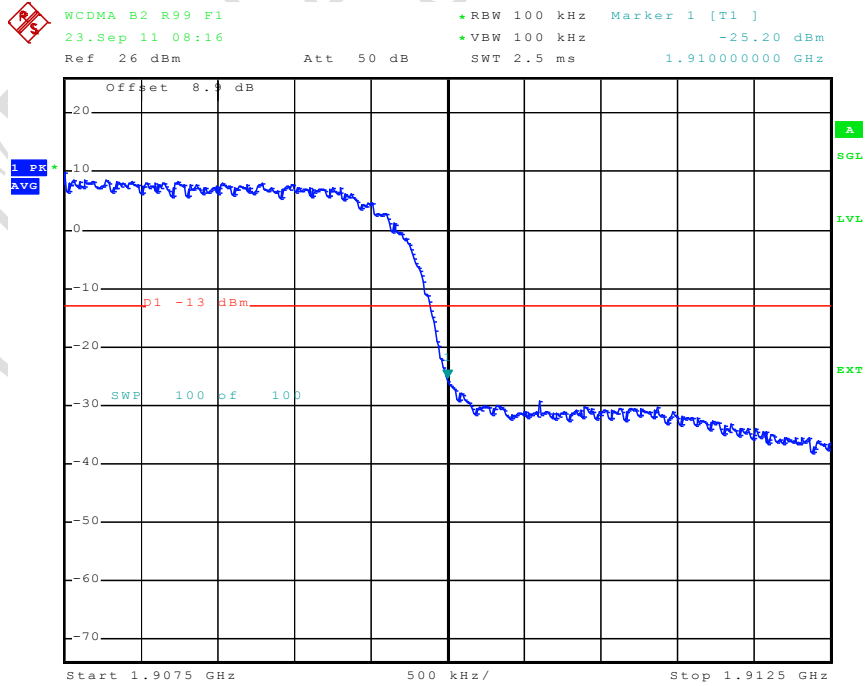
Date: 23.SEP.2011 08:26:55

WCDMA; PCS low channel, below 1850 MHz



Date: 23.SEP.2011 08:16:18

WCDMA; PCS high channel, above 1910 MHz



Date: 23.SEP.2011 08:16:31

Annex A External Photos

Refer to attachment *External photos*.

CITL Test Report

Annex B Internal Photos

Refer to attachment *Internal photos*.

CITL Test Report

ANNEX C Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

————— **The End of this Report** —————

CTTL Test Report