



FCC RF Test Report

APPLICANT : Samsung Electronics Co., Ltd.
EQUIPMENT : Mobile phone
BRAND NAME : SAMSUNG
MODEL NAME : SM-G5109
FCC ID : A3LSMG5109
STANDARD : FCC 47 CFR Part 2, 22(H), 24(E)
CLASSIFICATION : PCS Licensed Transmitter Held to Ear (PCE)

The product was received on Sep. 19, 2014 and testing was completed on Oct. 24, 2014. We, SPORTON INTERNATIONAL (SHENZHEN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA / EIA-603-C-2004 and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (SHENZHEN) INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL (SHENZHEN) INC.

No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C.



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG491901A	Rev. 01	Initial issue of report	Oct. 24, 2014

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	§2.1046	Conducted Output Power	N/A	PASS	-
3.2	§24.232(d)	Peak-to-Average Ratio	<13 dB	PASS	-
3.3	§22.913(a)(2)	Effective Radiated Power	< 7 Watts	PASS	-
3.3	§24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts	PASS	-
3.4	§2.1049 §22.917(b) §24.238(b)	Occupied Bandwidth	N/A	PASS	-
3.5	§2.1051 §22.917(a) §24.238(a)	Band Edge Measurement	$< 43 + 10\log_{10}(P[\text{Watts}])$	PASS	-
3.6	§2.1051 §22.917(a) §24.238(a)	Conducted Spurious Emission	$< 43 + 10\log_{10}(P[\text{Watts}])$	PASS	-
3.7	§2.1053 §22.917(a) §24.238(a)	Field Strength of Spurious Radiation	$< 43 + 10\log_{10}(P[\text{Watts}])$	PASS	Under limit 32.98 dB at 2479.200 MHz
3.8	§2.1055 §22.355 §24.235	Frequency Stability for Temperature & Voltage	< 2.5 ppm	PASS	-



1 General Description

1.1 Applicant

Samsung Electronics Co., Ltd.

A3 Building, No.185 Kexue Avenue, Science City, Guang Zhou, PRC

1.2 Manufacturer

Samsung Electronics Co., Ltd.

416 Maetan-3dong, Yeongtong-gu, Suwon-City, Gyeonggi-do, 443-742 KOREA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile phone
Brand Name	SAMSUNG
Model Name	SM-G5109
FCC ID	A3LSMG5109
GSM Operating Band(s)	GSM900/1800/1900MHz
GPRS/EGPRS Multislot Class	GPRS Class 10, EGPRS Class 10
WCDMA Operating Band(s)	FDD Band I / II / V
LTE Operating Band(s)	FDD Band 1/3 TDD Band 41
Wi-Fi Specification	2.4GHz 802.11b/g/n HT20
Bluetooth Version	Bluetooth v3.0 + EDR/Bluetooth v4.0 LE
HW Version	G5109.01
SW Version	G5109KEU0ANI1
EUT Stage	Pre-Production

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification subjective to this standard

Product Specification subjective to this standard	
Tx Frequency	GSM1900: 1850.2 MHz ~ 1909.8MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz
Rx Frequency	GSM1900: 1930.2 MHz ~ 1989.8 MHz WCDMA Band V: 871.4 MHz ~ 891.6 MHz WCDMA Band II: 1932.4 MHz ~ 1987.6 MHz
Maximum Output Power to Antenna	GSM1900 : 28.77 dBm WCDMA Band V : 22.36 dBm WCDMA Band II : 22.09 dBm
Antenna Type	LDS Antenna
Type of Modulation	GSM: GMSK GPRS: GMSK EDGE: GMSK / 8PSK WCDMA : QPSK (Uplink) HSDPA/DC-HSDPA : QPSK (Uplink) HSUPA : QPSK (Uplink) HSPA+ : 16QAM (Downlink Only) DC-HSDPA : 64QAM

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator

FCC Rule	System	Type of Modulation	Maximum ERP/EIRP (W)	Frequency Tolerance (ppm)	Emission Designator
Part 22	WCDMA Band V RMC 12.2Kbps	QPSK	0.0619	0.0060 ppm	4M15F9W
Part 24	GSM1900 GSM	GMSK	1.1066	0.0085 ppm	250KGXW
Part 24	GSM1900 EDGE class 8	8PSK	0.5483	0.0138 ppm	247KG7W
Part 24	WCDMA Band II RMC 12.2Kbps	QPSK	0.2523	0.0016 ppm	4M17F9W

1.7 Testing Location

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.		
Test Site Location	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P.R.C. TEL: +86-755-3320-2398		
Test Site No.	Sporton Site No.		FCC Registration No.
	TH01-SZ	03CH01-SZ	831040

1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC 47 CFR Part 2, 22(H), 24(E)
- ANSI / TIA / EIA-603-C-2004
- FCC KDB 971168 D01 Power Meas. License Digital Systems v02r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

2.1 Test Mode

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r01 with maximum output power.

Radiated measurements were performed with rotating EUT in different three orthogonal test planes with accessories and standalone to find the maximum emission.

Radiated emissions were investigated as following frequency range:

1. 30 MHz to 9000 MHz for WCDMA Band V
2. 30 MHz to 19000 MHz for GSM1900 and WCDMA Band II.

GSM 1900	■ GSM Link ■ EDGE class 8 Link	■ GSM Link ■ EDGE class 8 Link
WCDMA Band V	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link
WCDMA Band II	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link

Conducted Power Measurement Results:

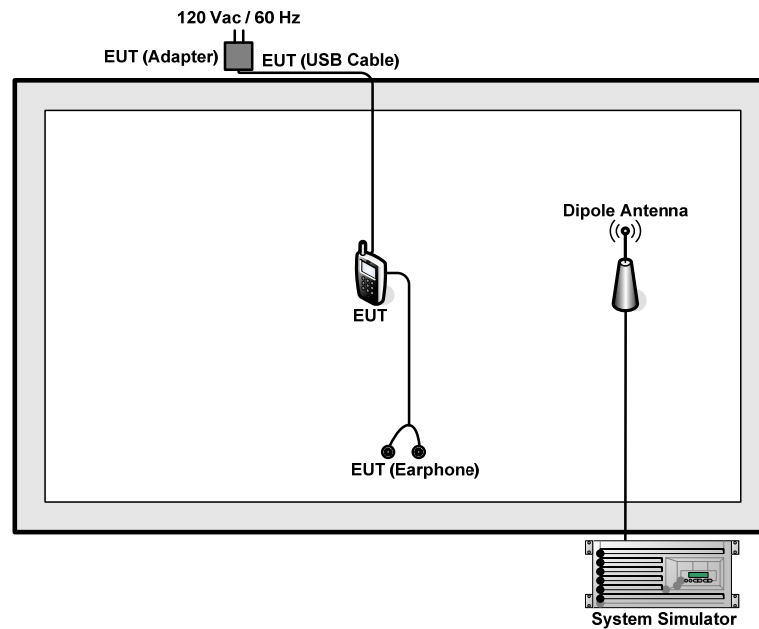
Conducted Power (*Unit: dBm)			
Band	GSM1900		
Channel	512	661	810
Frequency	1850.2	1880.0	1909.8
GSM	28.77	28.66	28.69
GPRS class 8	28.74	28.65	28.68
GPRS class 10	27.00	26.90	26.95
EGPRS class 8	25.52	25.42	25.51
EGPRS class 10	24.58	24.41	24.56

Conducted Power (*Unit: dBm)						
Band	WCDMA Band V			WCDMA Band II		
Channel	4132	4182	4233	9262	9400	9538
Frequency	826.4	836.4	846.6	1852.4	1880.0	1907.6
AMR 12.2Kbps	22.09	22.21	22.35	21.72	22.08	21.65
RMC 12.2Kbps	22.10	22.23	22.36	21.73	22.09	21.67
HSDPA Subtest-1	21.60	21.64	21.82	21.11	21.41	20.97
HSDPA Subtest-2	21.59	21.63	21.82	21.26	21.53	21.05
HSDPA Subtest-3	21.09	21.14	21.31	20.69	21.01	20.55
HSDPA Subtest-4	21.11	21.14	21.31	20.64	21.02	20.54
DC-HSDPA Subtest-1	21.60	21.63	21.72	21.55	21.86	21.52
DC-HSDPA Subtest-2	21.58	21.51	21.63	21.47	21.85	21.49
DC-HSDPA Subtest-3	21.13	21.18	21.23	21.12	21.27	21.04
DC-HSDPA Subtest-4	21.14	21.17	21.23	21.16	21.29	21.01
HSUPA Subtest-1	21.63	21.56	21.41	21.37	21.49	21.63
HSUPA Subtest-2	20.55	20.26	20.71	20.16	20.39	20.10
HSUPA Subtest-3	20.34	20.38	20.48	20.11	20.41	20.07
HSUPA Subtest-4	20.57	20.97	20.77	20.10	20.55	20.21
HSUPA Subtest-5	21.70	21.70	21.80	21.10	21.57	21.00

Remark: The power variation is within measurement uncertainty after verified different SIM card. The power level shown in this report is the worst power level.

2.2 Connection Diagram of Test System

<22H/24E Tx Mode>





2.3 Support Unit used in test configuration

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	TOPWORD	3303DR	N/A	N/A	Unshielded, 1.8 m

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between RF conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level will be exactly the RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

The following shows an offset computation example with RF cable loss 8 dB and a 10dB attenuator.

Example :

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

$$= 8 + 10 = 18 \text{ (dB)}$$

3 Test Result

3.1 Conducted Output Power Measurement

3.1.1 Description of the Conducted Output Power Measurement

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.

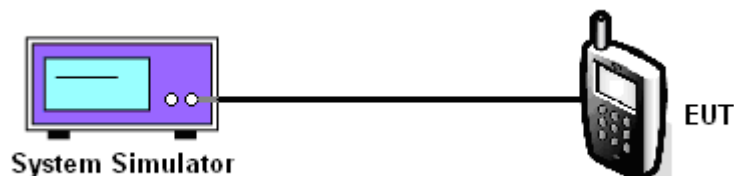
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

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

3.1.4 Test Setup



3.1.5 Test Result of Conducted Output Power

Cellular Band			
Test Mode	WCDMA Band V (RMC 12.2Kbps)		
Channel	4132 (Low)	4182 (Mid)	4233 (High)
Frequency (MHz)	826.4	836.4	846.6
Conducted Power (dBm)	22.10	22.23	22.36
Conducted Power (Watts)	0.16	0.17	0.17

PCS Band									
Modes	GSM1900 (GSM)			GSM1900 (EDGE class 8)			WCDMA Band II (RMC 12.2Kbps)		
Channel	512 (Low)	661 (Mid)	810 (High)	512 (Low)	661 (Mid)	810 (High)	9262 (Low)	9400 (Mid)	9538 (High)
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8	1852.4	1880	1907.6
Conducted Power (dBm)	28.77	28.66	28.69	25.52	25.42	25.51	21.73	22.09	21.67
Conducted Power (Watts)	0.75	0.73	0.74	0.36	0.35	0.36	0.15	0.16	0.15

Note: maximum burst average power for GSM, and maximum average power for WCDMA

3.2 Peak-to-Average Ratio

3.2.1 Description of the PAR Measurement

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

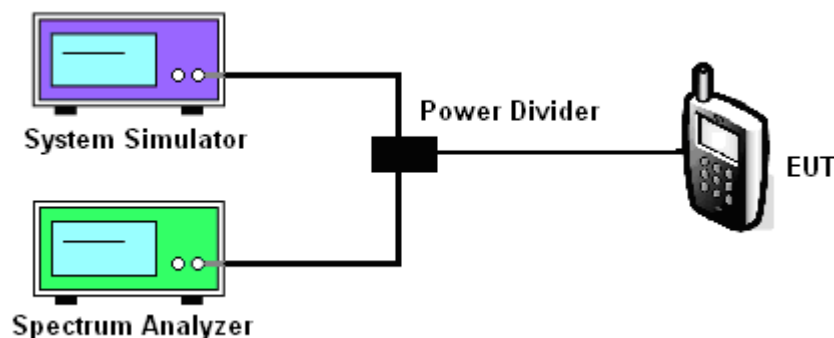
3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.2.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r01 Section 5.7.1.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. For GSM/EGPRS operating modes:
 - a. Set EUT in maximum power output.
 - b. Set the RBW = 1MHz, VBW = 3MHz, Peak detector on spectrum analyzer for first trace.
 - c. Set the RBW = 1MHz, VBW = 3MHz, RMS detector on spectrum analyzer for second trace.
 - d. The wanted burst signal is triggered by spectrum analyzer, and measured respectively the peak level and Mean level without burst-off time, after system simulator has synchronized with the spectrum analyzer.
4. For UMTS operating modes:
 - a. Set the CCDF (Complementary Cumulative Distribution Function) option on the spectrum analyzer.
 - b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
5. Record the deviation as Peak to Average Ratio.

3.2.4 Test Setup



**3.2.5 Test Result of Peak-to-Average Ratio**

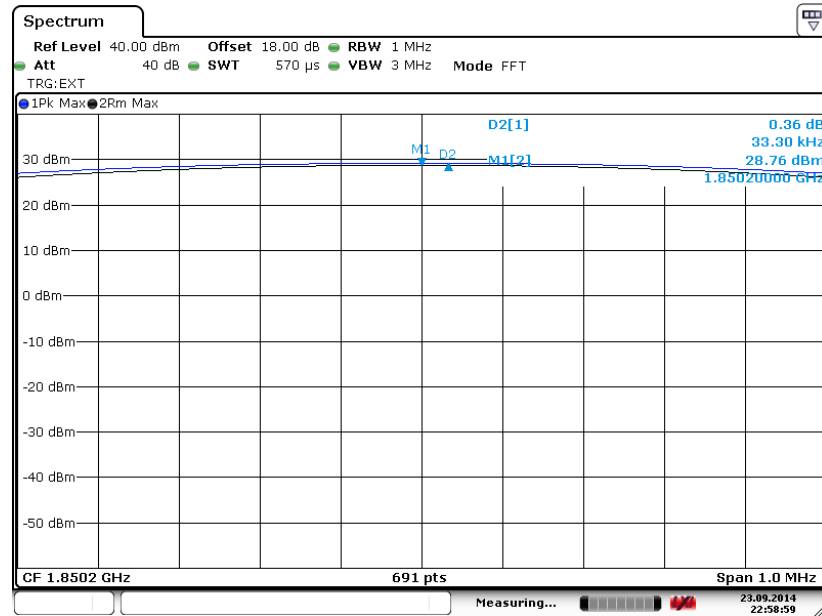
PCS Band									
Modes	GSM1900 (GSM)			GSM1900 (EDGE class 8)			WCDMA Band II (RMC 12.2Kbps)		
Channel	512 (Low)	661 (Mid)	810 (High)	512 (Low)	661 (Mid)	810 (High)	9262 (Low)	9400 (Mid)	9538 (High)
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8	1852.4	1880	1907.6
Peak-to-Average Ratio (dB)	0.36	0.37	0.34	2.69	2.71	2.56	2.81	2.87	2.64



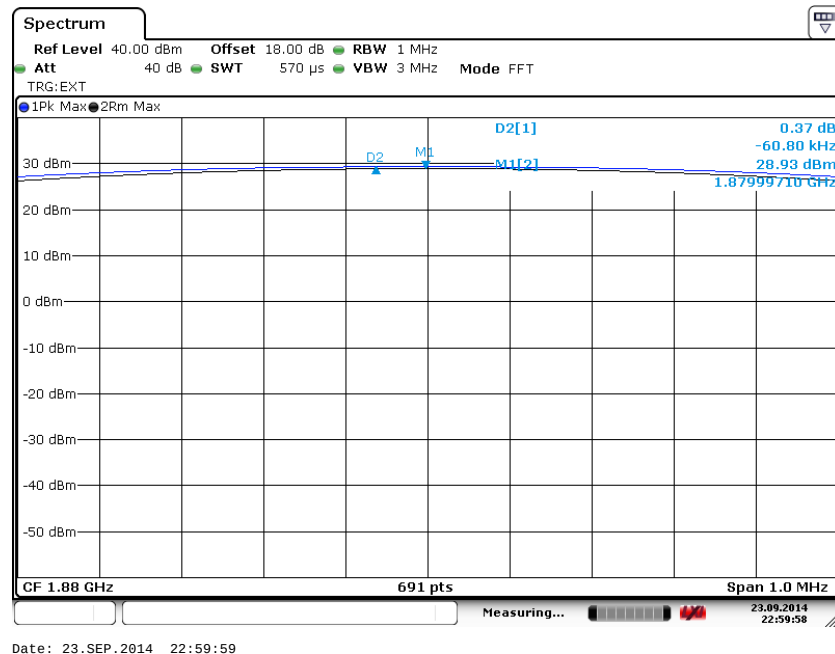
3.2.6 Test Result (Plots) of Peak-to-Average Ratio

Band :	GSM 1900	Test Mode :	GSM Link (GMSK)
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Peak-to-Average Ratio on Channel 512 (1850.2 MHz)

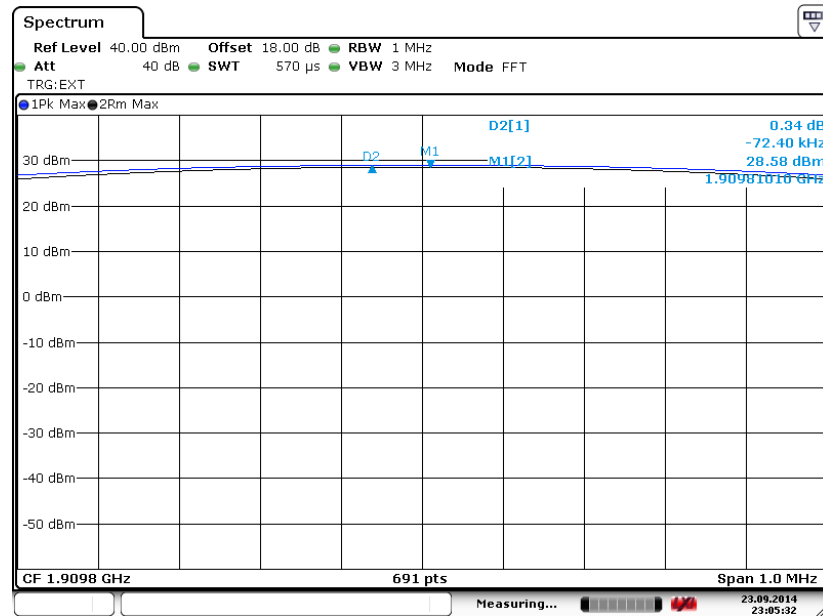


Peak-to-Average Ratio on Channel 661 (1880.0 MHz)





Peak-to-Average Ratio on Channel 810 (1909.8 MHz)

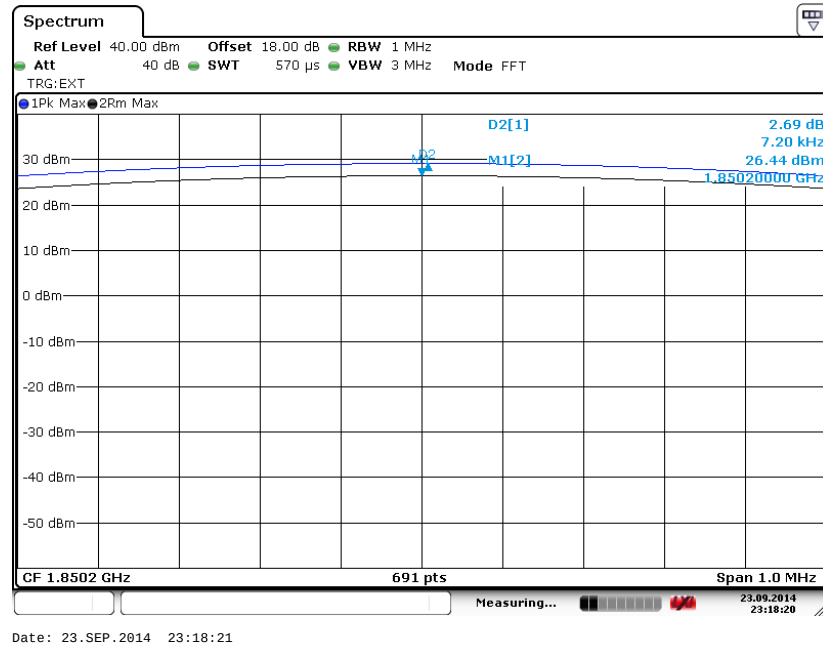


Date: 23.SEP.2014 23:05:32

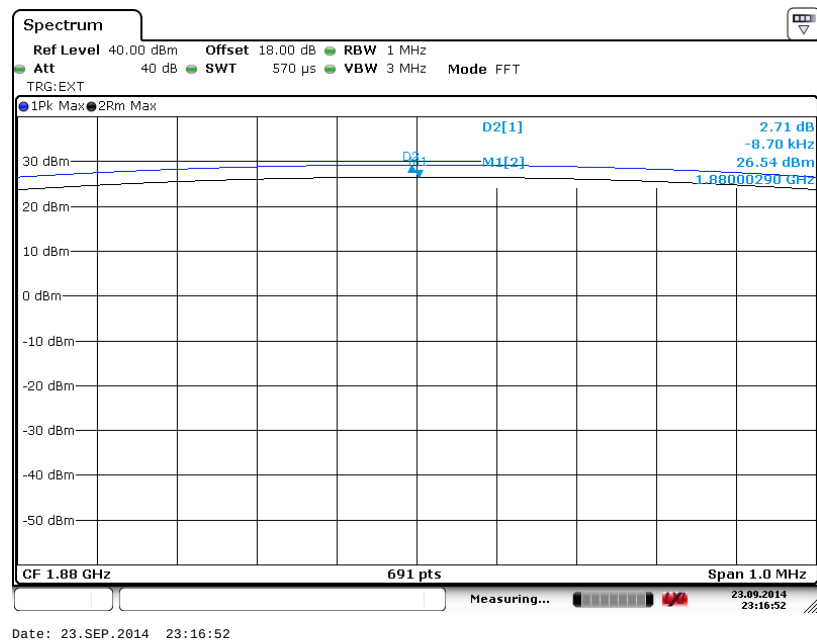


Band :	GSM 1900	Test Mode :	EDGE class 8 Link (8PSK)
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Peak-to-Average Ratio on Channel 512 (1850.2 MHz)

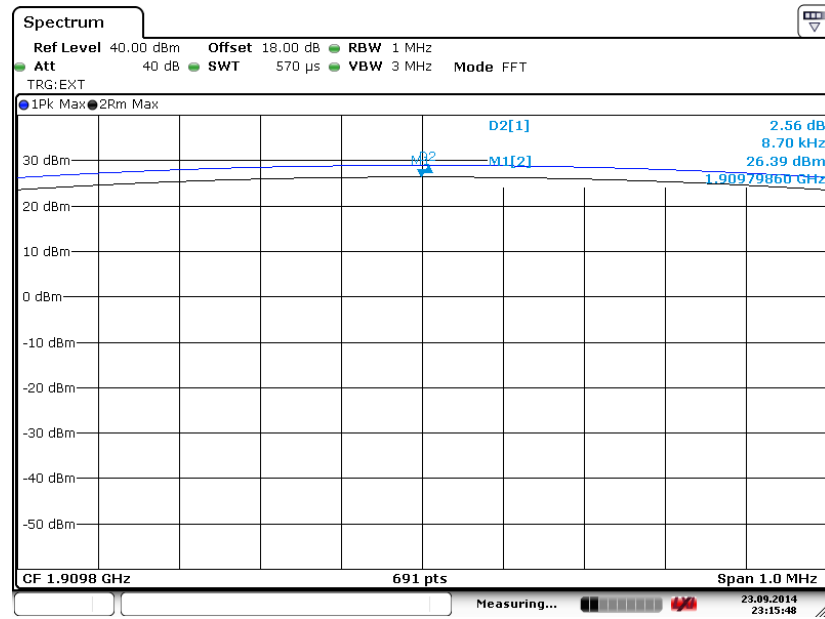


Peak-to-Average Ratio on Channel 661 (1880.0 MHz)





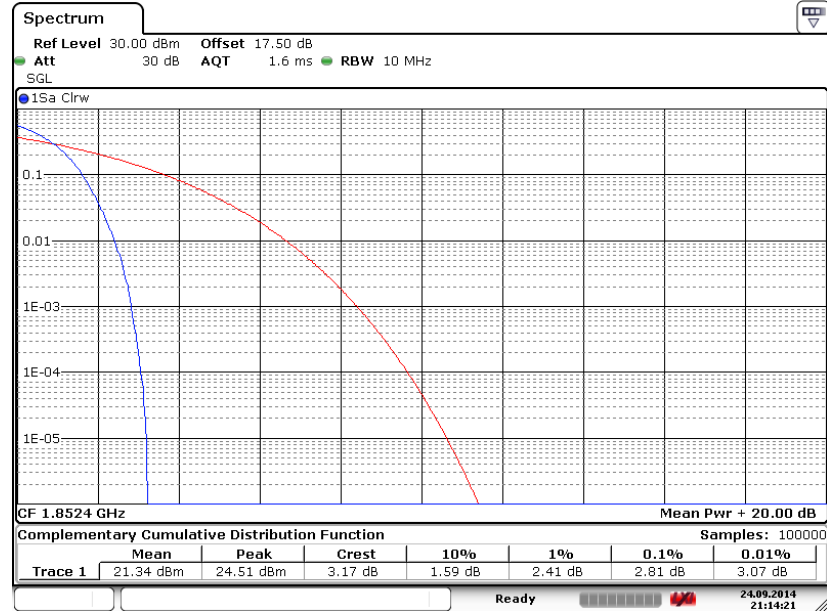
Peak-to-Average Ratio on Channel 810 (1909.8 MHz)



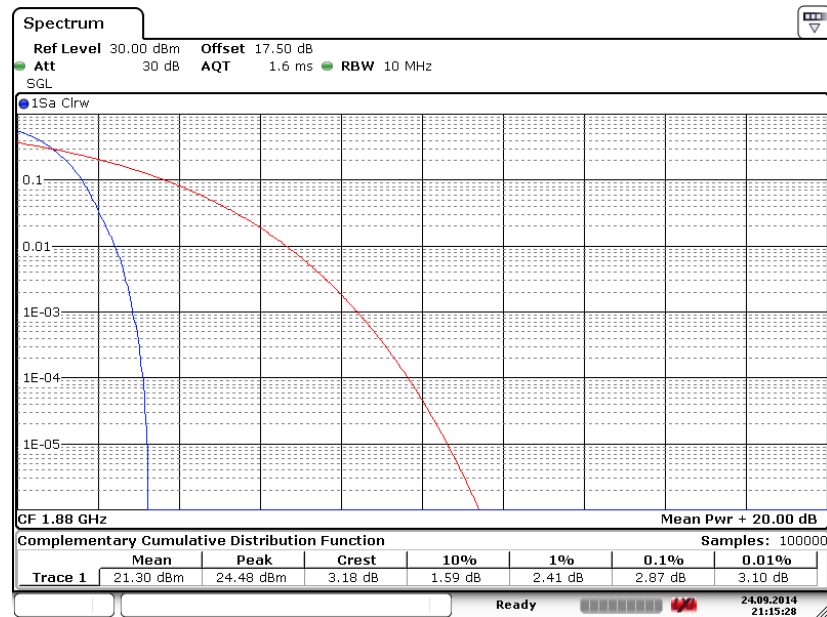
Date: 23.SEP.2014 23:15:48



Band :	WCDMA Band II	Test Mode :	RMC 12.2Kbps Link (QPSK)
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Peak-to-Average Ratio on Channel 9262 (1852.4 MHz)

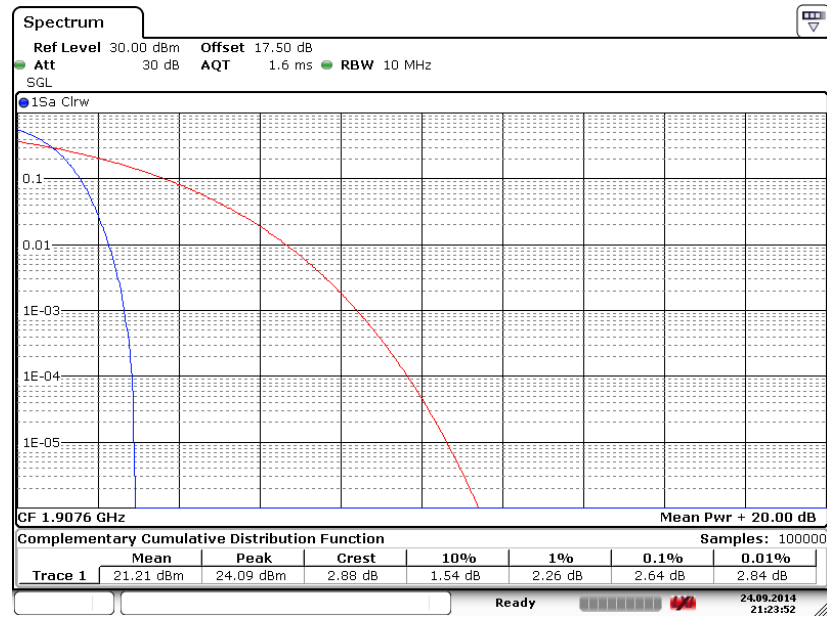
Date: 24.SEP.2014 21:14:21

Peak-to-Average Ratio on Channel 9400 (1880.0 MHz)

Date: 24.SEP.2014 21:15:28



Peak-to-Average Ratio on Channel 9538 (1907.6 MHz)



Date: 24.SEP.2014 21:23:52

3.3 Effective Radiated Power and Effective Isotropic Radiated Power Measurement

3.3.1 Description of the ERP/EIRP Measurement

The substitution method, in ANSI / TIA / EIA-603-C-2004, was used for ERP/EIRP measurement, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r01. The ERP of mobile transmitters must not exceed 7 Watts and the EIRP of mobile transmitters are limited to 2 Watts.

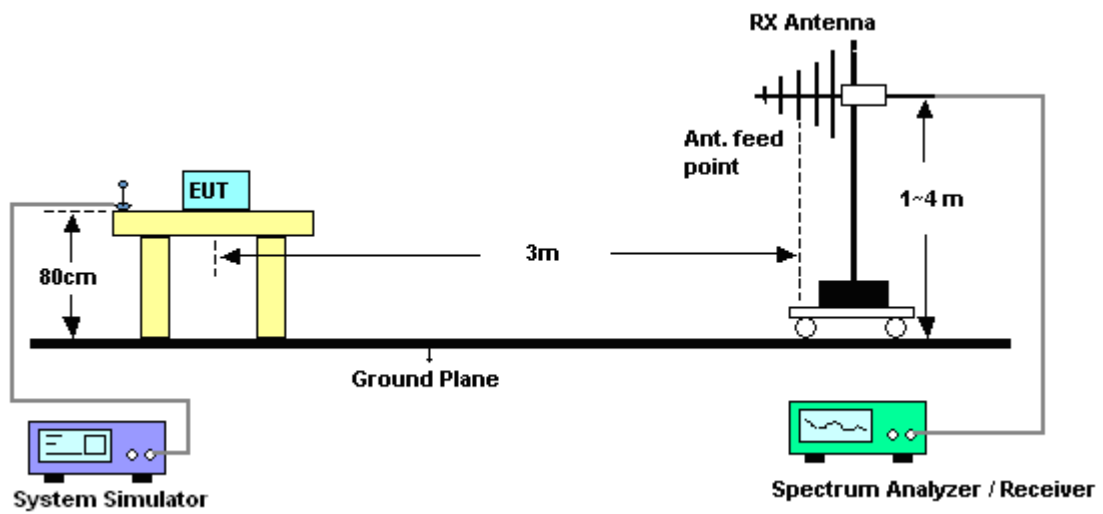
3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r01 Section 5.2.1. (for CDMA/WCDMA), Section 5.2.2.2 (for GSM/GPRS/EDGE) and ANSI / TIA-603-C-2004 Section 2.2.17.
2. The EUT was placed on a non-conductive rotating platform 0.8 meters high in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with RMS detector per section 5. of KDB 971168 D01.
3. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power. The maximum emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
4. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-C. The EUT was replaced by dipole antenna (substitution antenna) at the same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading. Then the EUT's EIRP was calculated with the correction factor, $EIRP = LVL + \text{Correction factor}$ and $ERP = EIRP - 2.15$.

3.3.4 Test Setup



3.3.5 Test Result of ERP

WCDMA Band V (RMC 12.2Kbps) Radiated Power ERP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
826.40	-10.92	30.3	17.23	0.0528
836.40	-11.26	31.09	17.68	0.0586
846.60	-11.60	31.67	17.92	0.0619
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	ERP (dBm)	ERP (W)
826.40	-16.25	35.69	17.29	0.0536
836.40	-16.60	36.01	17.26	0.0532
846.60	-15.85	35.36	17.36	0.0545

* ERP = LVL (dBm) + Correction Factor (dB) – 2.15

3.3.6 Test Result of EIRP

GSM1900 (GSM) Radiated Power EIRP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1850.2	-15.58	46.02	30.44	1.1066
1880.0	-14.63	44.73	30.10	1.0233
1909.8	-15.46	45.20	29.74	0.9419
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1850.2	-19.86	45.58	25.72	0.3733
1880.0	-19.78	45.75	25.97	0.3954
1909.8	-21.21	47.21	26.00	0.3981

* EIRP = LVL (dBm) + Correction Factor (dB)

GSM1900 (EDGE class 8) Radiated Power EIRP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1850.2	-18.91	46.02	27.11	0.5140
1880.0	-17.34	44.73	27.39	0.5483
1909.8	-18.28	45.20	26.92	0.4920
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1850.2	-24.04	45.58	21.54	0.1426
1880.0	-24.73	45.75	21.02	0.1265
1909.8	-25.37	47.21	21.84	0.1528

* EIRP = LVL (dBm) + Correction Factor (dB)



WCDMA Band II (RMC 12.2Kbps) Radiated Power EIRP				
Horizontal Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1852.40	-21.69	45.71	24.02	0.2523
1880.00	-21.70	44.73	23.03	0.2009
1907.60	-22.08	45.34	23.26	0.2118
Vertical Polarization				
Frequency (MHz)	LVL (dBm)	Correction Factor (dB)	EIRP (dBm)	EIRP (W)
1852.40	-27.69	45.35	17.66	0.0583
1880.00	-26.78	45.75	18.97	0.0789
1907.60	-28.61	47.51	18.90	0.0776

* EIRP = LVL (dBm) + Correction Factor (dB)

3.4 99% Occupied Bandwidth and 26dB Bandwidth Measurement

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

The 99% occupied bandwidth 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 width of the signal between two points, located at the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

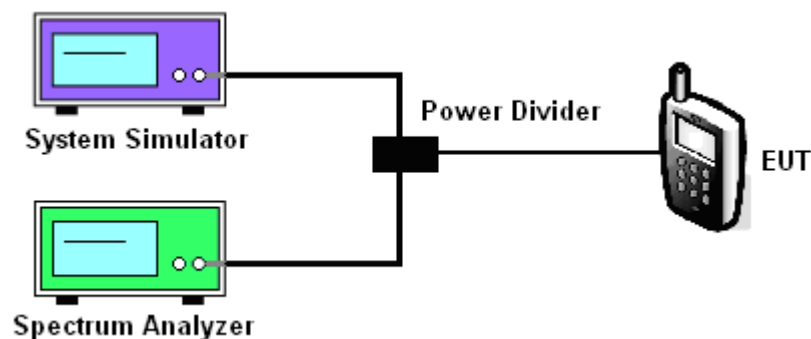
3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.4.3 Test Procedures

5. The testing follows FCC KDB 971168 v02r01 Section 4.2.
6. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
7. 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.
8. The 99% occupied bandwidth were measured, set RBW= 1% of span, VBW= 3*RBW, sample detector, trace maximum hold.
9. The 26dB bandwidth were measured, set RBW= 1% of EBW, VBW= 3*RBW, peak detector, trace maximum hold.

3.4.4 Test Setup



3.4.5 Test Result of Occupied Bandwidth and 26dB Bandwidth

PCS Band						
Modes	GSM1900 (GSM)			GSM1900 (EDGE class 8)		
Channel	512 (Low)	661 (Mid)	810 (High)	512 (Low)	661 (Mid)	810 (High)
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8
99% OBW (kHz)	247.47	250.36	246.02	246.02	247.47	246.02
26dB BW (kHz)	311.10	309.70	312.60	308.20	309.70	305.40

Cellular Band			
Modes	WCDMA Band V (RMC 12.2Kbps)		
Channel	4132 (Low)	4182 (Mid)	4233 (High)
Frequency (MHz)	826.4	836.4	846.6
99% OBW (MHz)	4.15	4.15	4.15
26dB BW (MHz)	4.66	4.66	4.66

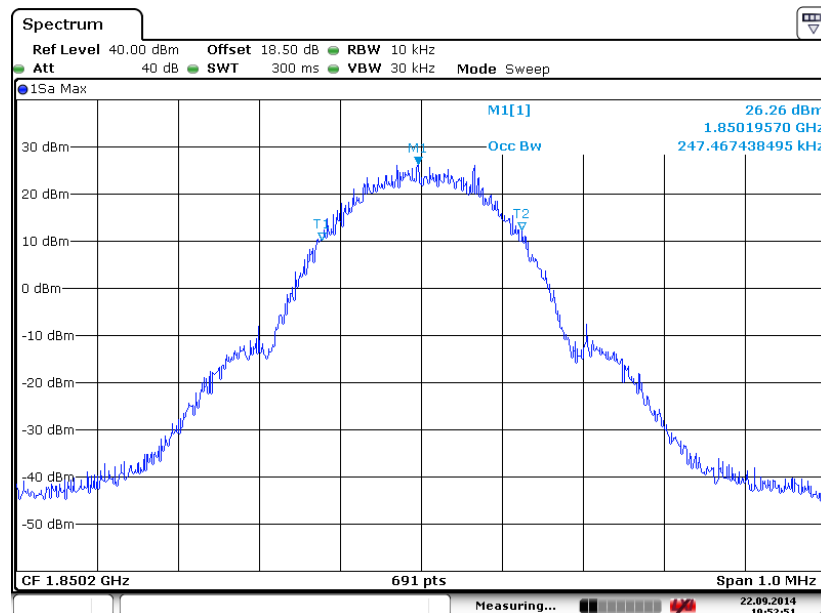
PCS Band			
Modes	WCDMA Band II (RMC 12.2Kbps)		
Channel	9262 (Low)	9400 (Mid)	9538 (High)
Frequency (MHz)	1852.4	1880	1907.6
99% OBW (MHz)	4.15	4.17	4.15
26dB BW (MHz)	4.69	4.66	4.69



3.4.6 Test Result (Plots) of Occupied Bandwidth and 26dB Bandwidth

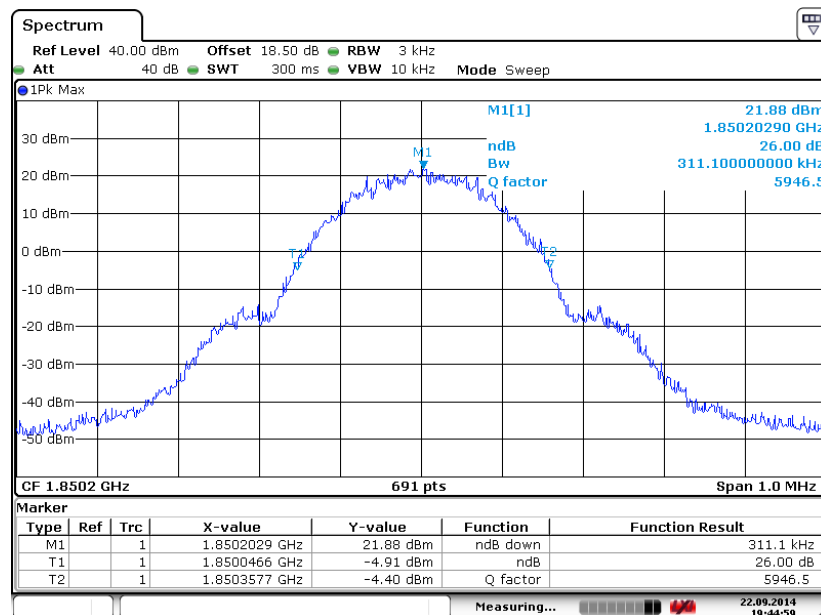
Band :	GSM 1900	Test Mode :	GSM Link (GMSK)
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99% Occupied Bandwidth Plot on Channel 512 (1850.2 MHz)



Date: 22.SEP.2014 19:52:51

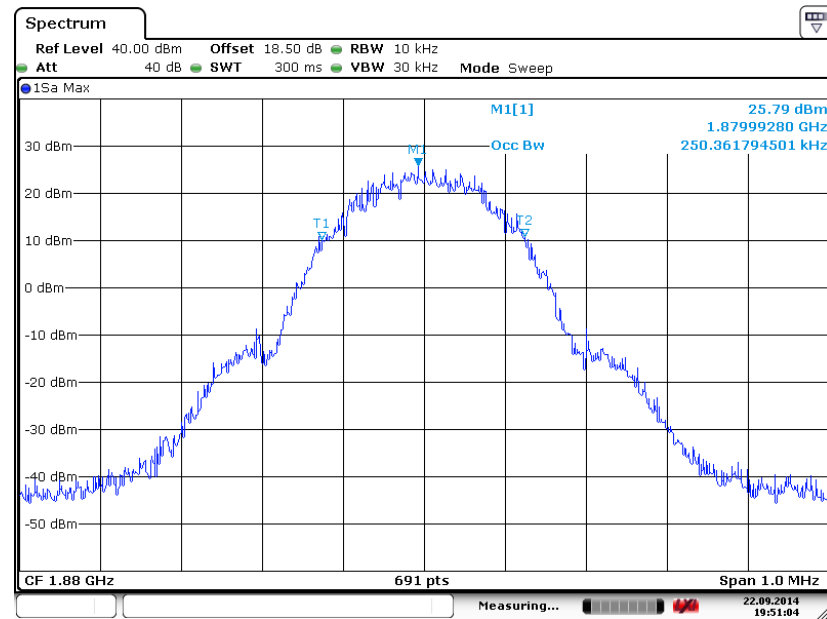
26dB Bandwidth Plot on Channel 512 (1850.2 MHz)



Date: 22.SEP.2014 19:44:59

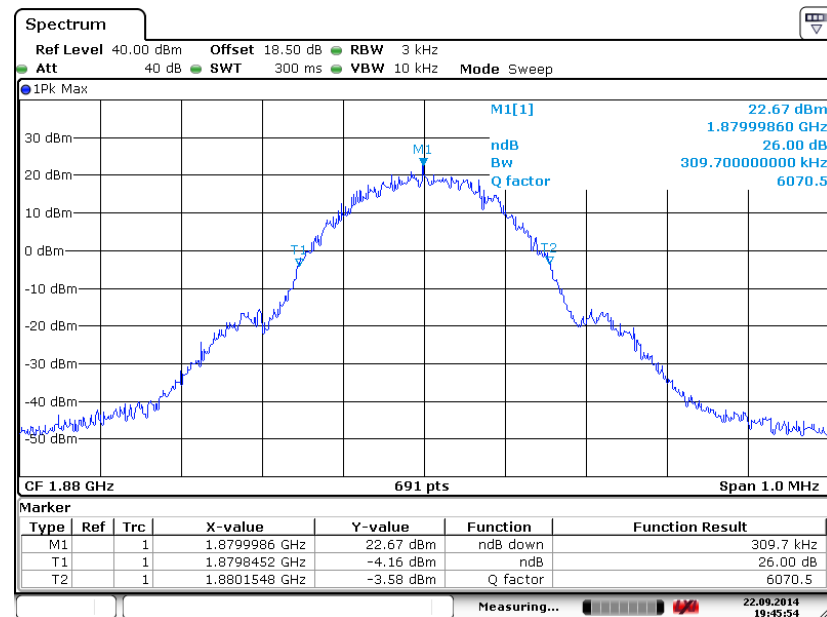


99% Occupied Bandwidth Plot on Channel 661 (1880.0 MHz)



Date: 22.SEP.2014 19:51:04

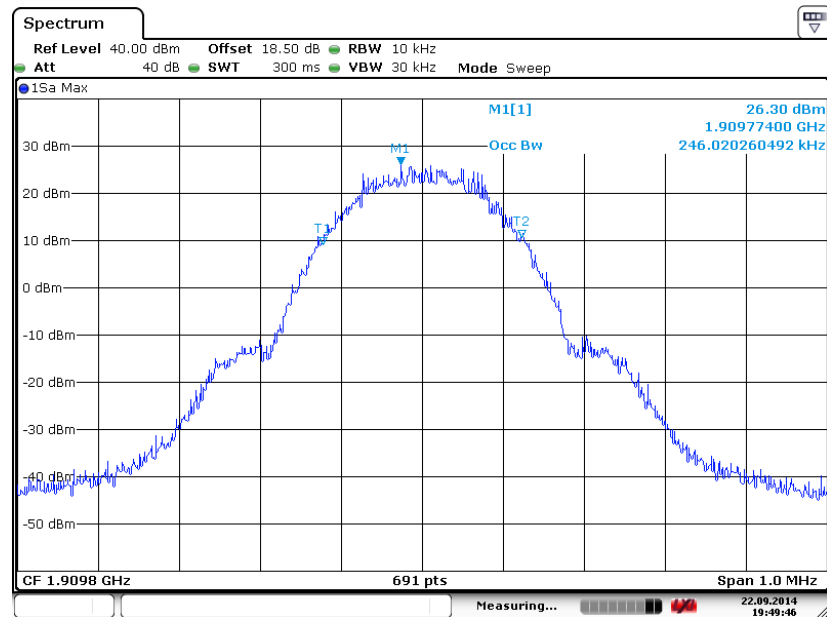
26dB Bandwidth Plot on Channel 661 (1880.0 MHz)



Date: 22.SEP.2014 19:45:54

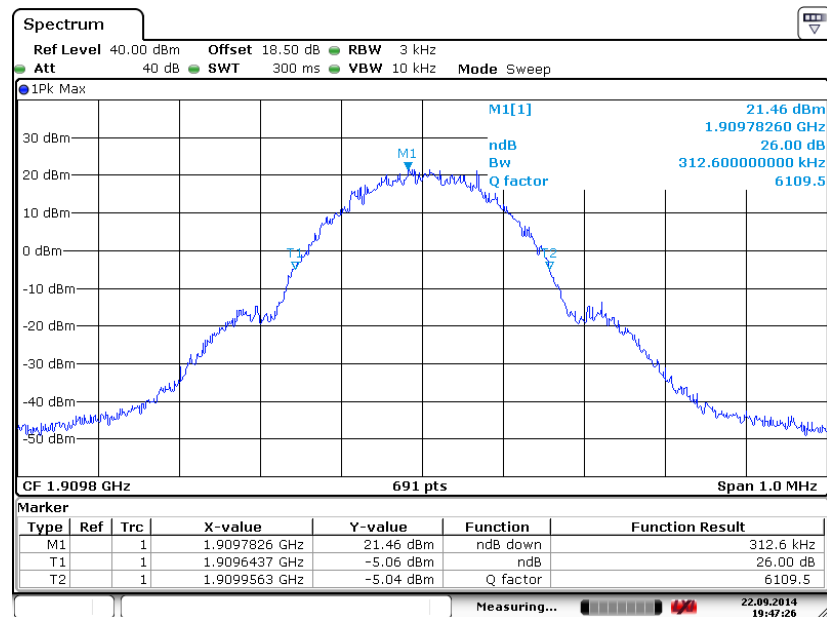


99% Occupied Bandwidth Plot on Channel 810 (1909.8 MHz)



Date: 22.SEP.2014 19:49:46

26dB Bandwidth Plot on Channel 810 (1909.8 MHz)

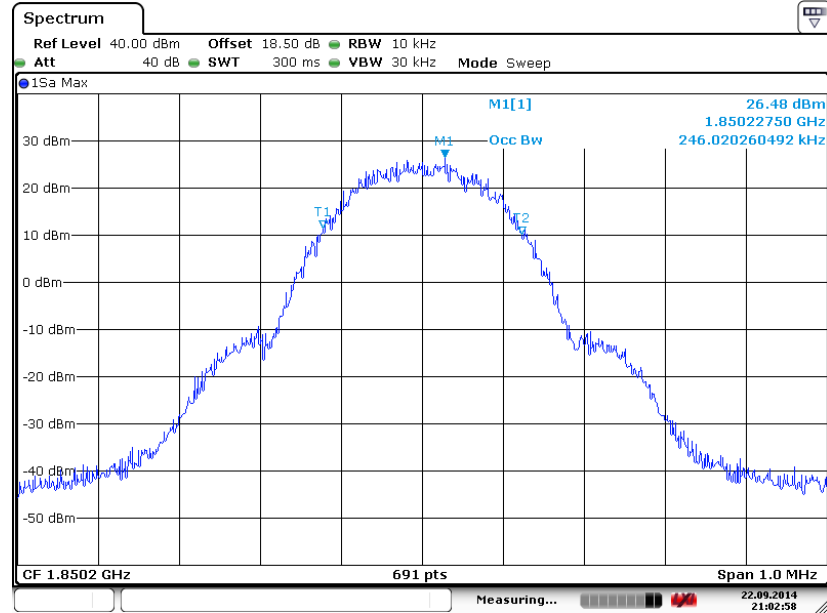


Date: 22.SEP.2014 19:47:26



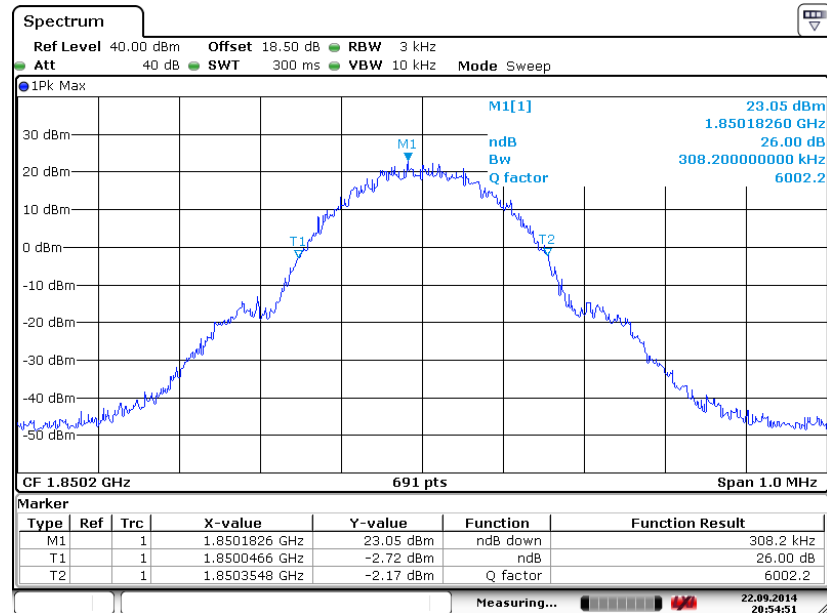
Band :	GSM 1900	Test Mode :	EDGE class 8 Link (8PSK)
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99% Occupied Bandwidth Plot on Channel 512 (1850.2 MHz)



Date: 22.SEP.2014 21:02:58

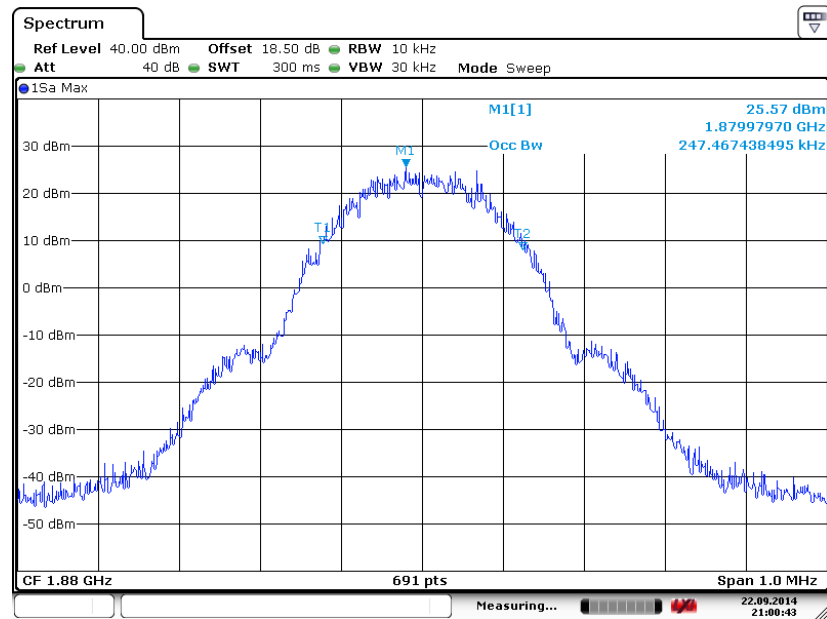
26dB Bandwidth Plot on Channel 512 (1850.2 MHz)



Date: 22.SEP.2014 20:54:51

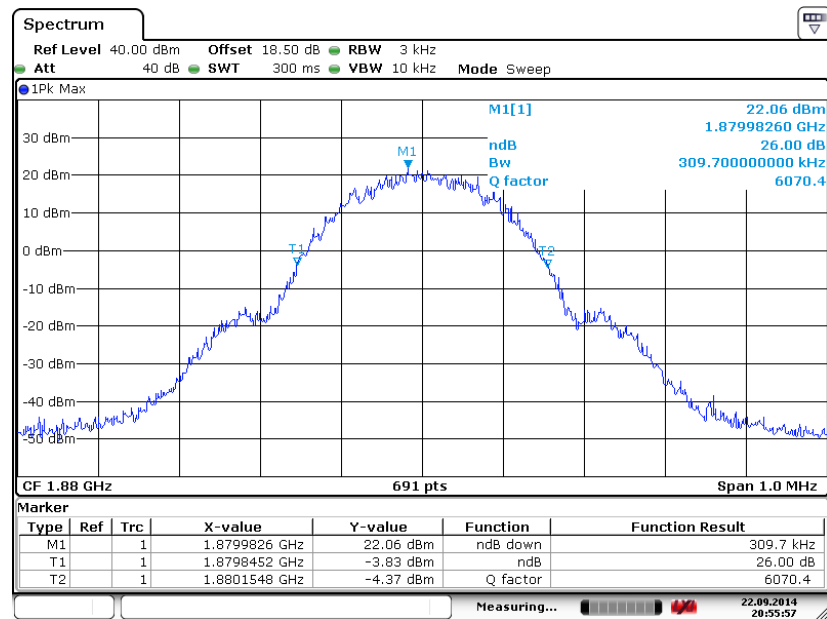


99% Occupied Bandwidth Plot on Channel 661 (1880.0 MHz)



Date: 22.SEP.2014 21:00:43

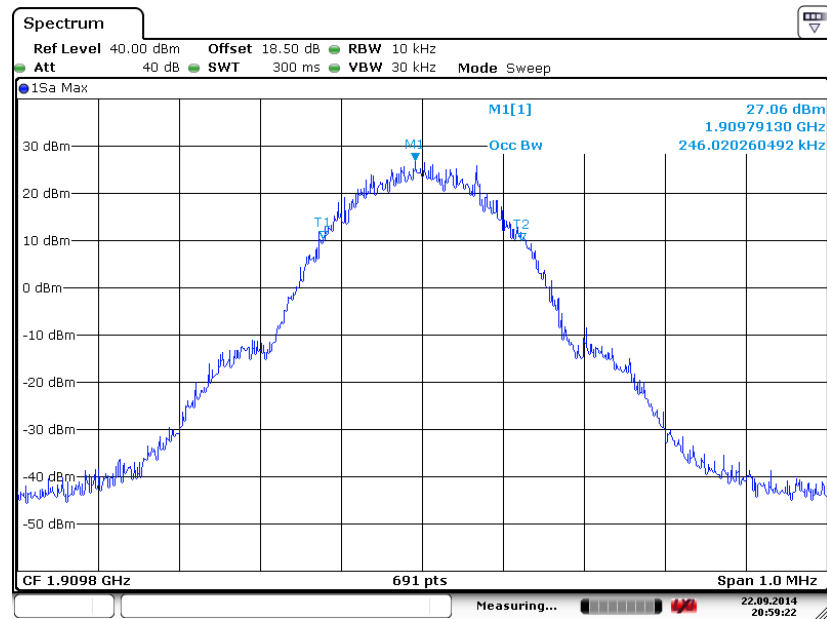
26dB Bandwidth Plot on Channel 661 (1880.0 MHz)



Date: 22.SEP.2014 20:55:57

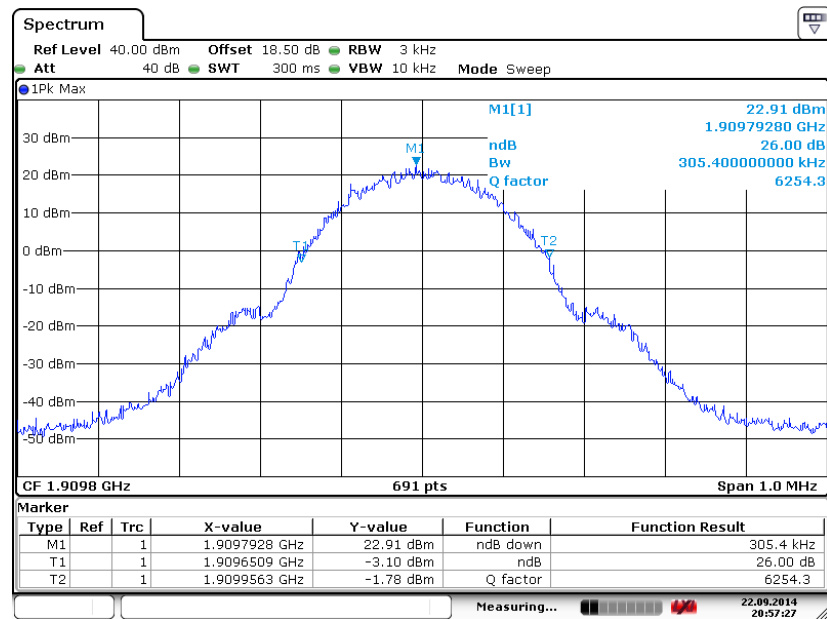


99% Occupied Bandwidth Plot on Channel 810 (1909.8 MHz)



Date: 22.SEP.2014 20:59:21

26dB Bandwidth Plot on Channel 810 (1909.8 MHz)

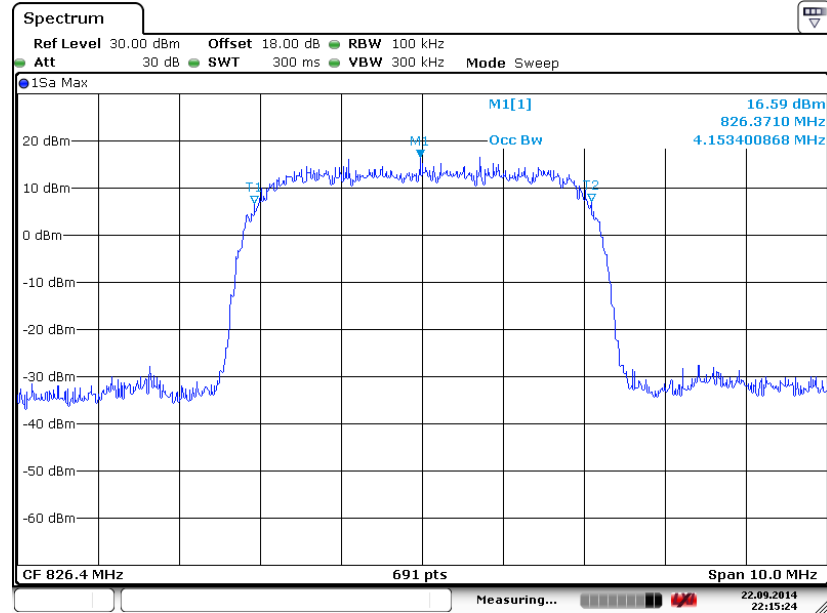


Date: 22.SEP.2014 20:57:27



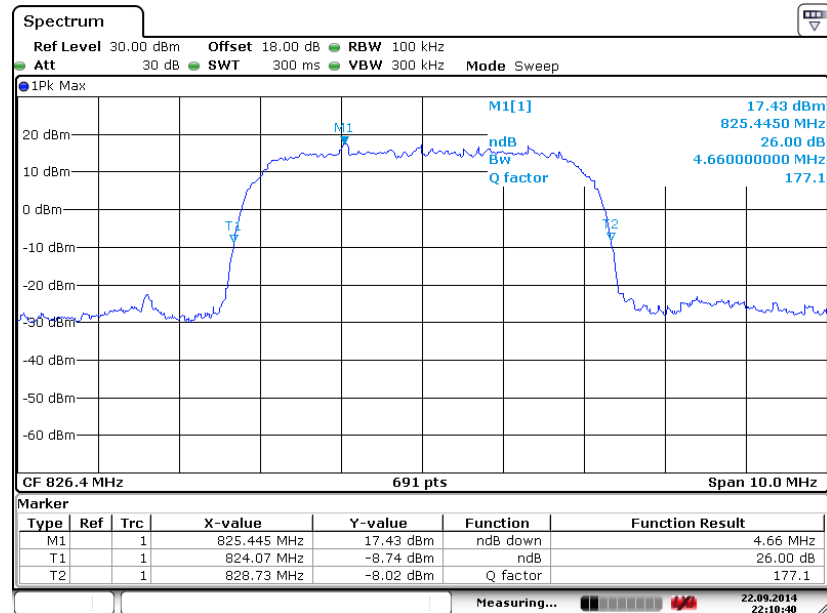
Band :	WCDMA Band V	Test Mode :	RMC 12.2Kbps Link (QPSK)
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99% Occupied Bandwidth Plot on Channel 4132 (826.4 MHz)



Date: 22.SEP.2014 22:15:24

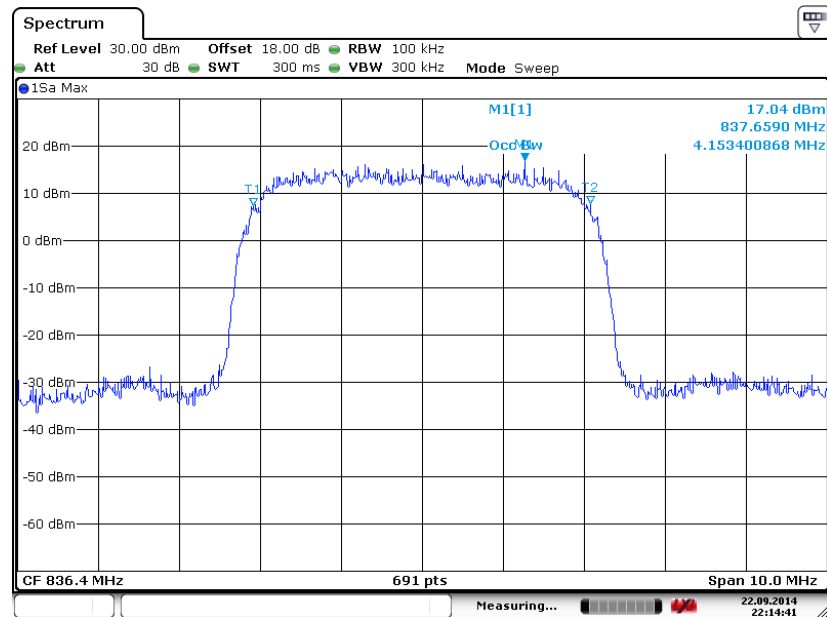
26dB Bandwidth Plot on Channel 4132 (826.4 MHz)



Date: 22.SEP.2014 22:10:40

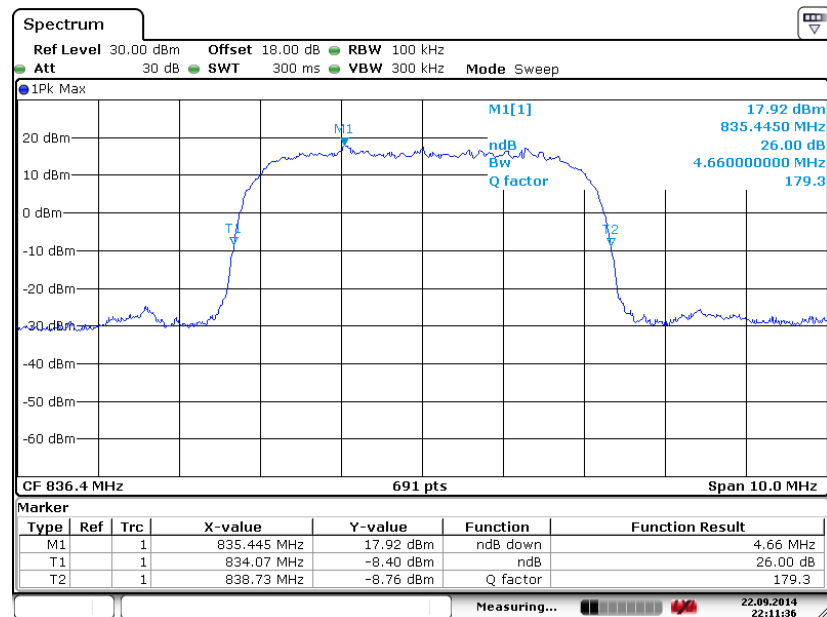


99% Occupied Bandwidth Plot on Channel 4182 (836.4 MHz)



Date: 22.SEP.2014 22:14:41

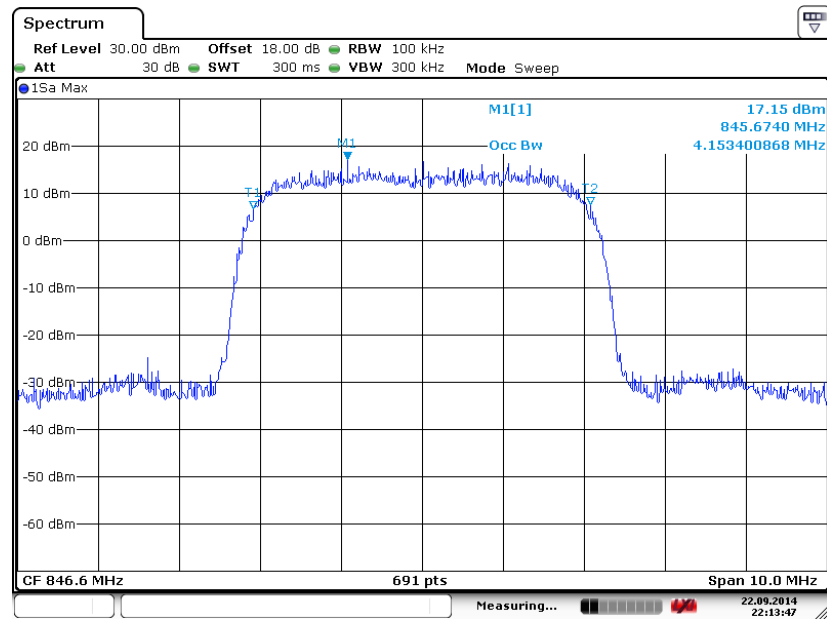
26dB Bandwidth Plot on Channel 4182 (836.4 MHz)



Date: 22.SEP.2014 22:11:36

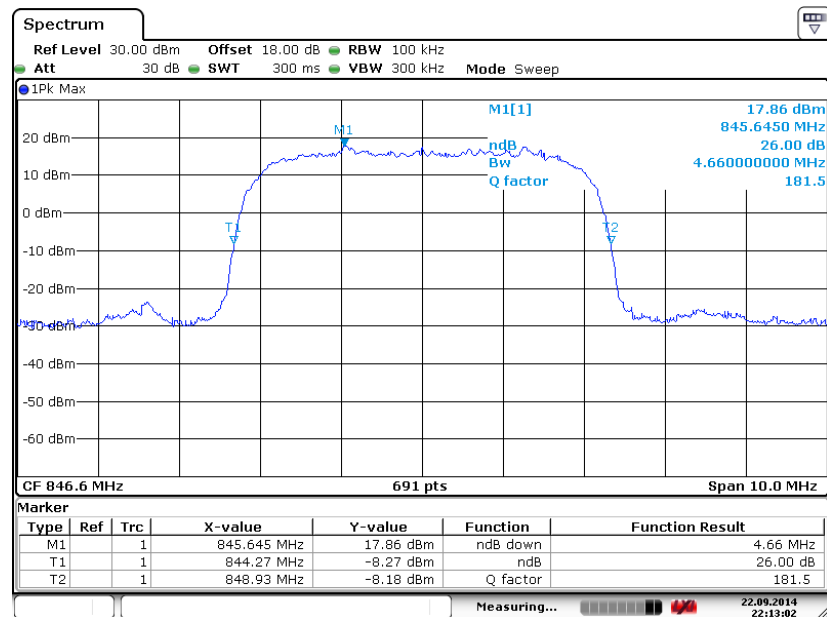


99% Occupied Bandwidth Plot on Channel 4233 (846.6 MHz)



Date: 22.SEP.2014 22:13:48

26dB Bandwidth Plot on Channel 4233 (846.6 MHz)

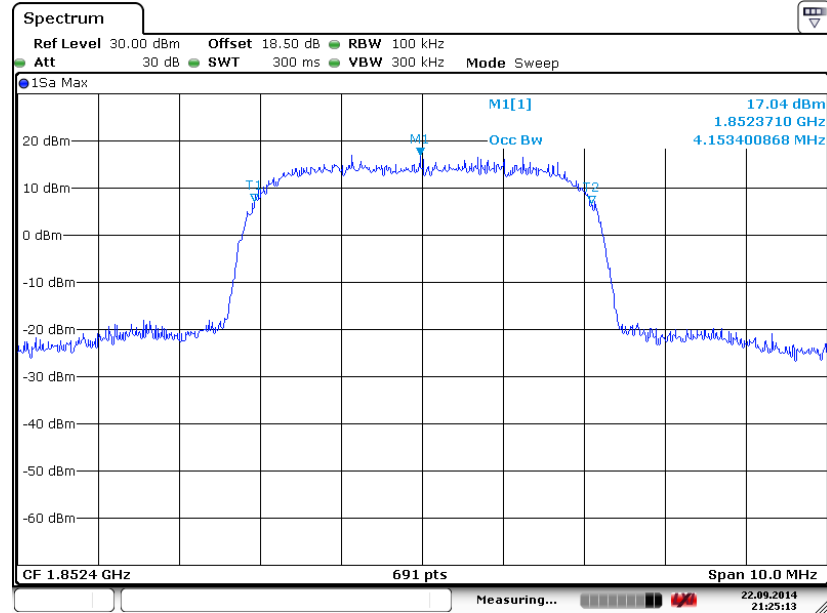


Date: 22.SEP.2014 22:13:02



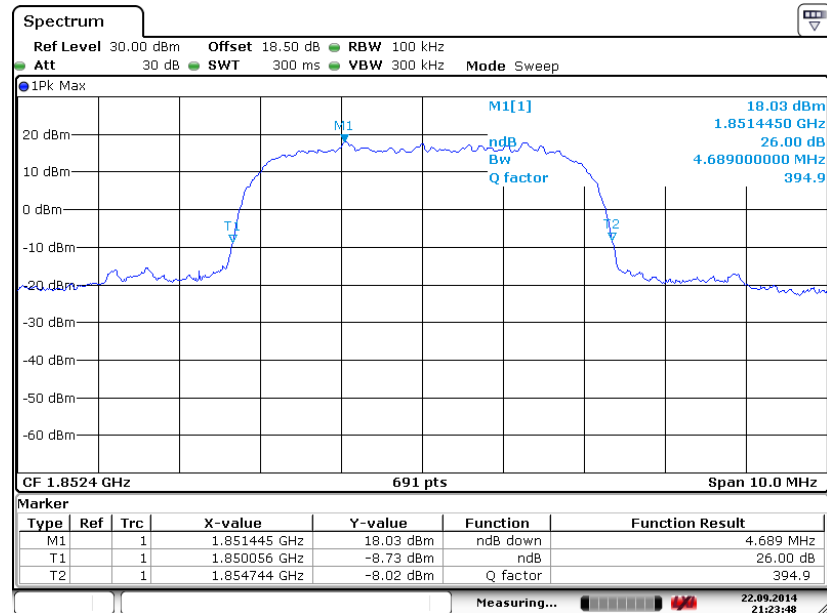
Band :	WCDMA Band II	Test Mode :	RMC 12.2Kbps Link (QPSK)
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99% Occupied Bandwidth Plot on Channel 9262 (1852.4 MHz)



Date: 22.SEP.2014 21:25:13

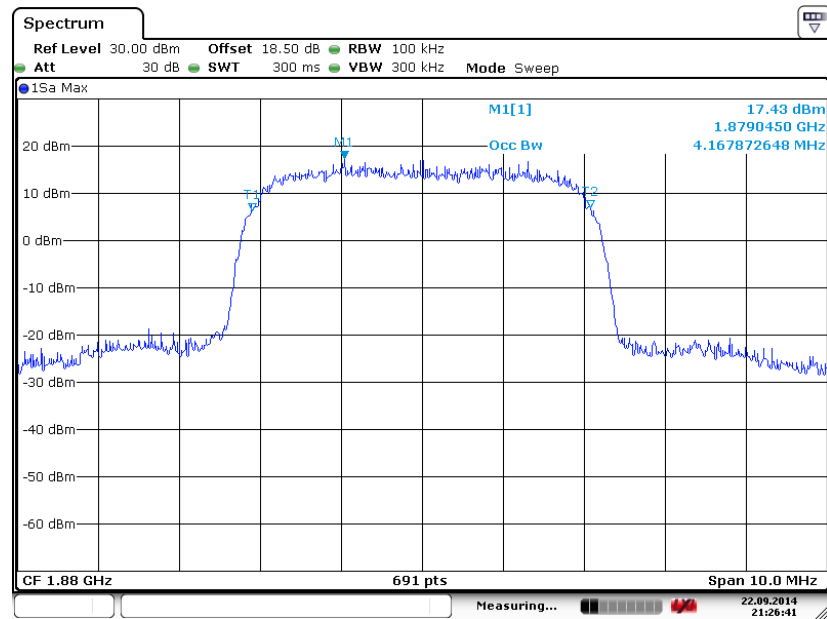
26dB Bandwidth Plot on Channel 9262 (1852.4 MHz)



Date: 22.SEP.2014 21:23:48

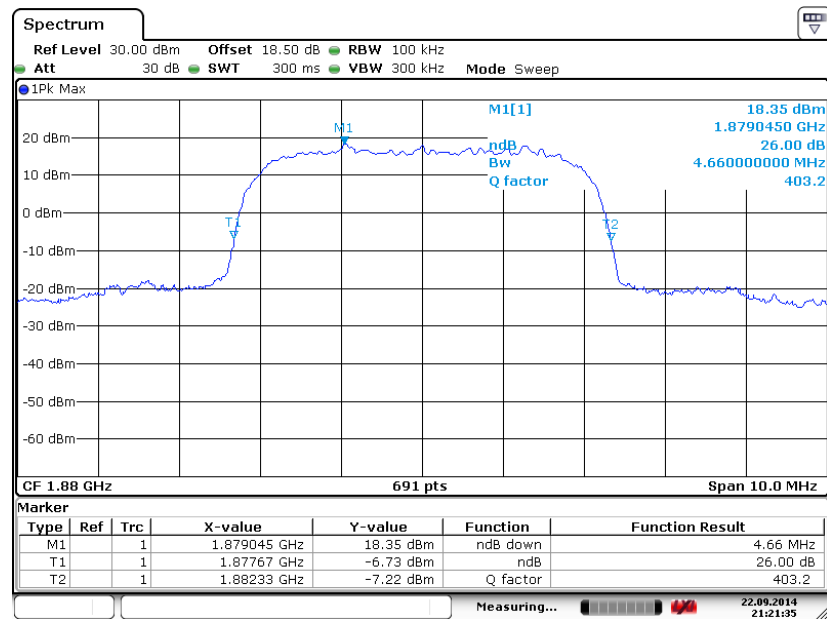


99% Occupied Bandwidth Plot on Channel 9400 (1880.0 MHz)



Date: 22.SEP.2014 21:26:41

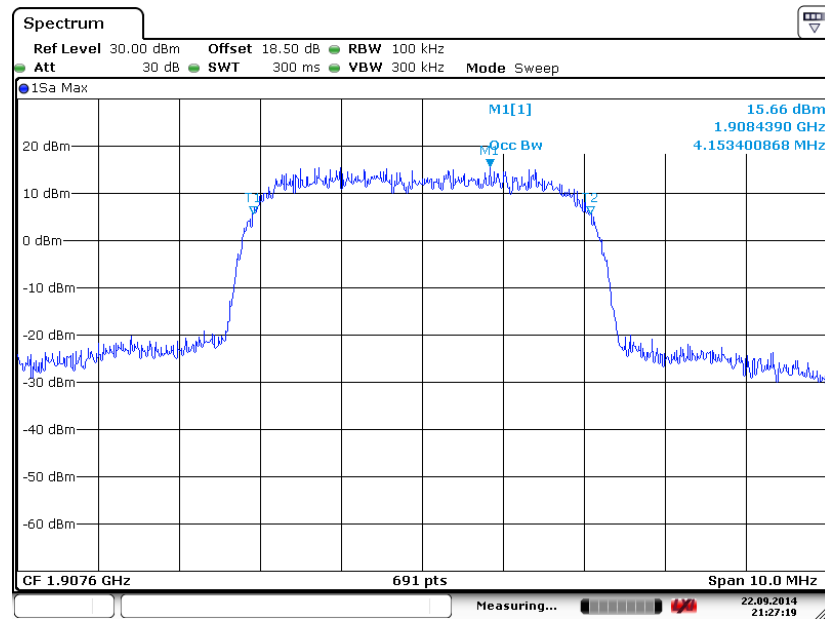
26dB Bandwidth Plot on Channel 9400 (1880.0 MHz)



Date: 22.SEP.2014 21:21:35

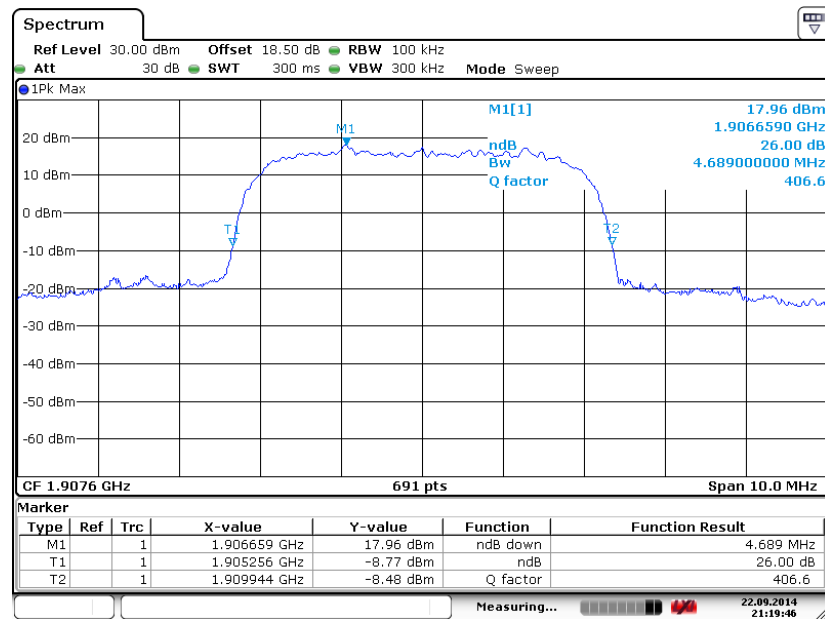


99% Occupied Bandwidth Plot on Channel 9538 (1907.6 MHz)



Date: 22.SEP.2014 21:27:19

26dB Bandwidth Plot on Channel 9538 (1907.6 MHz)



Date: 22.SEP.2014 21:19:46

3.5 Band Edge Measurement

3.5.1 Description of 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.

3.5.2 Measuring Instruments

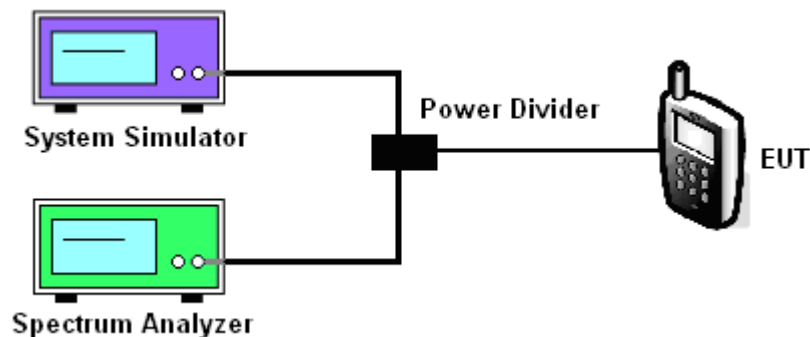
The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r01 Section 6.0.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The band edges of low and high channels for the highest RF powers were measured.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$

3.5.4 Test Setup

<Conducted Band Edge >

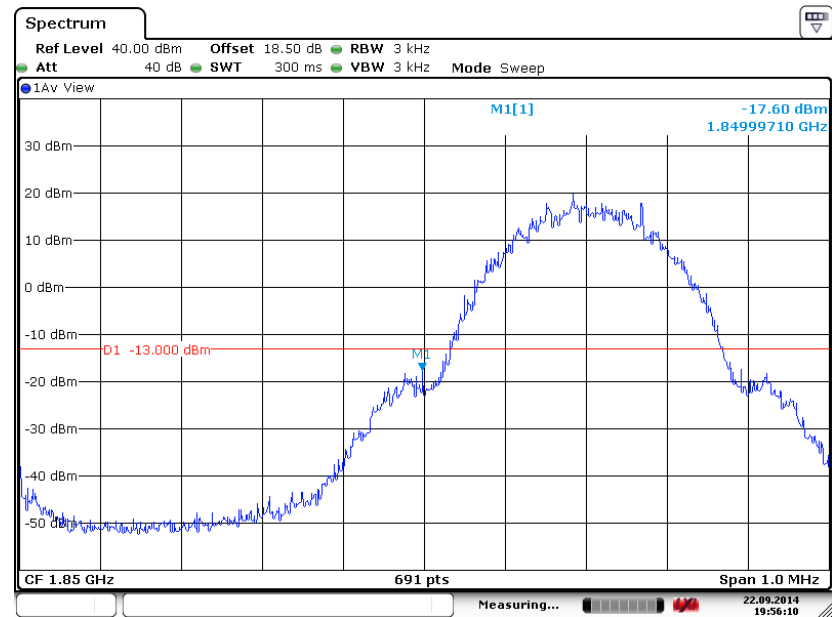




3.5.5 Test Result (Plots) of Conducted Band Edge

Band :	GSM1900	Test Mode :	GSM (GMSK)	Link
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Lower Band Edge Plot on Channel 512 (1850.2 MHz)

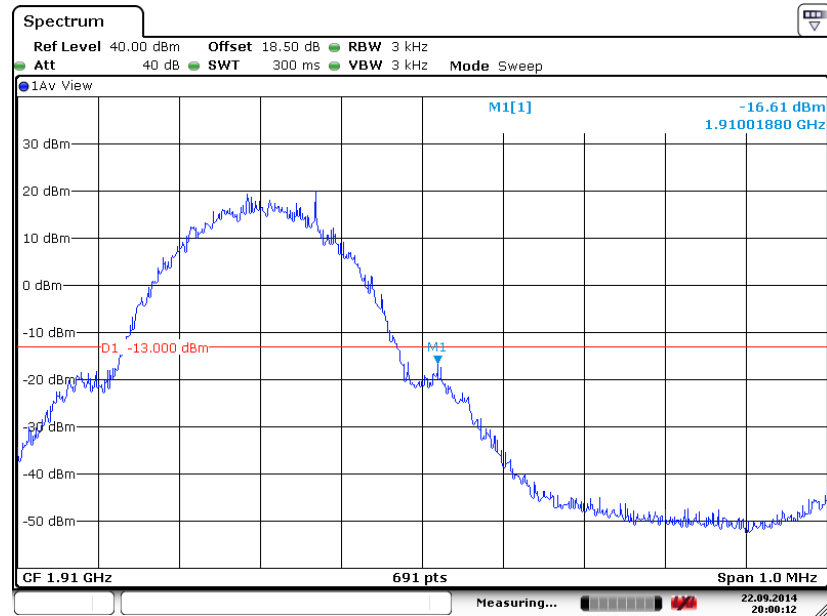


Date: 22.SEP.2014 19:56:10



Band :	GSM1900	Test Mode :	GSM (GMSK)	Link
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Higher Band Edge Plot on Channel 810 (1909.8 MHz)

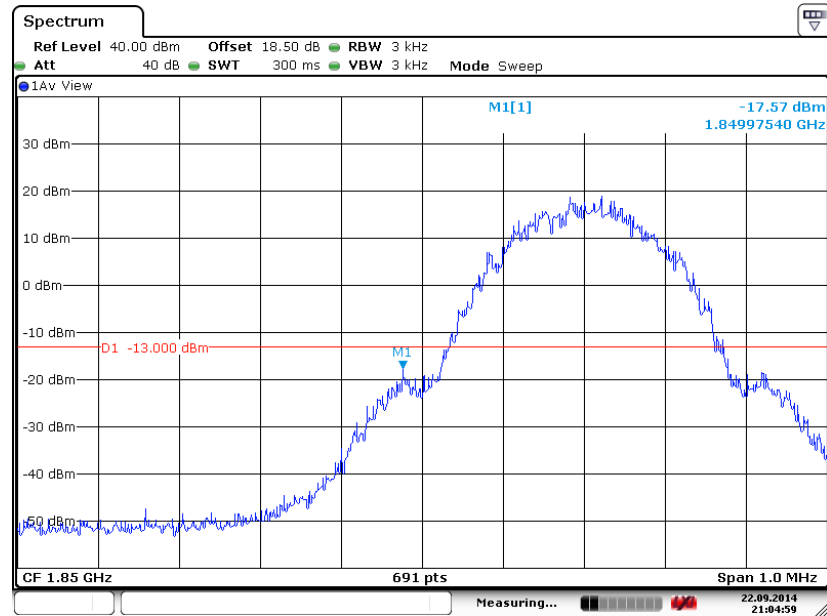


Date: 22.SEP.2014 20:00:12



Band :	GSM1900	Test Mode :	EDGE class 8 Link (8PSK)
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Lower Band Edge Plot on Channel 512 (1850.2 MHz)

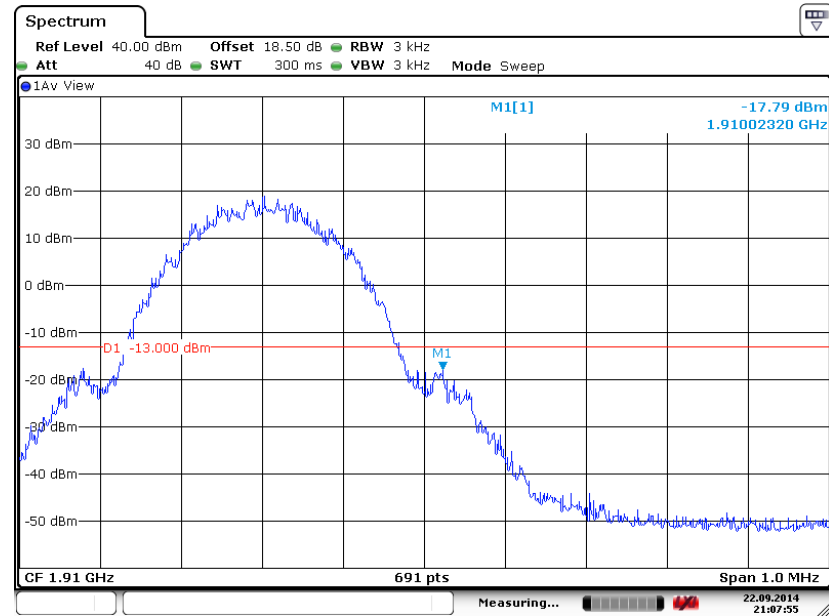


Date: 22.SEP.2014 21:04:58



Band :	GSM1900	Test Mode :	EDGE class 8 Link (8PSK)
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Higher Band Edge Plot on Channel 810 (1909.8 MHz)

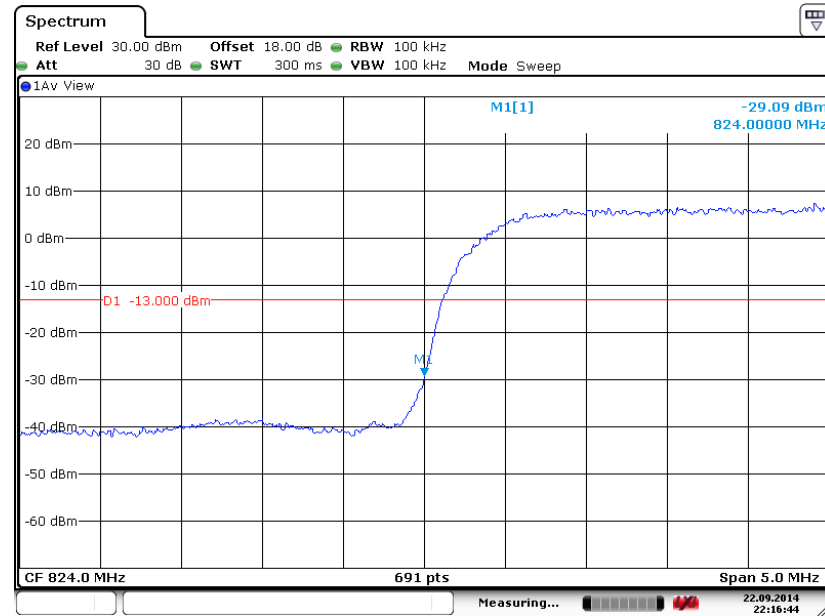


Date: 22.SEP.2014 21:07:55



Band :	WCDMA Band V	Test Mode :	RMC 12.2Kbps Link (QPSK)
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Lower Band Edge Plot on Channel 4132 (826.4 MHz)

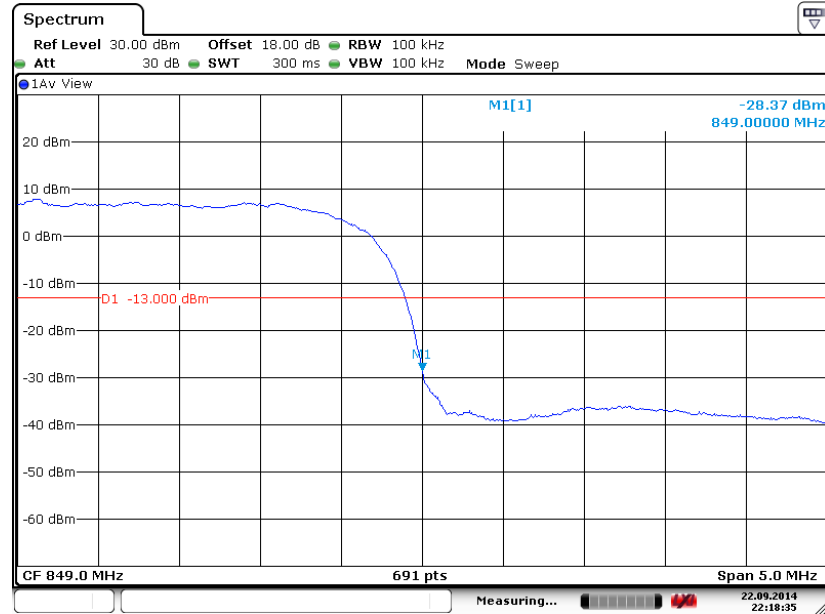


Date: 22.SEP.2014 22:16:44



Band :	WCDMA Band V	Test Mode :	RMC 12.2Kbps Link (QPSK)
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Higher Band Edge Plot on Channel 4233 (846.6 MHz)

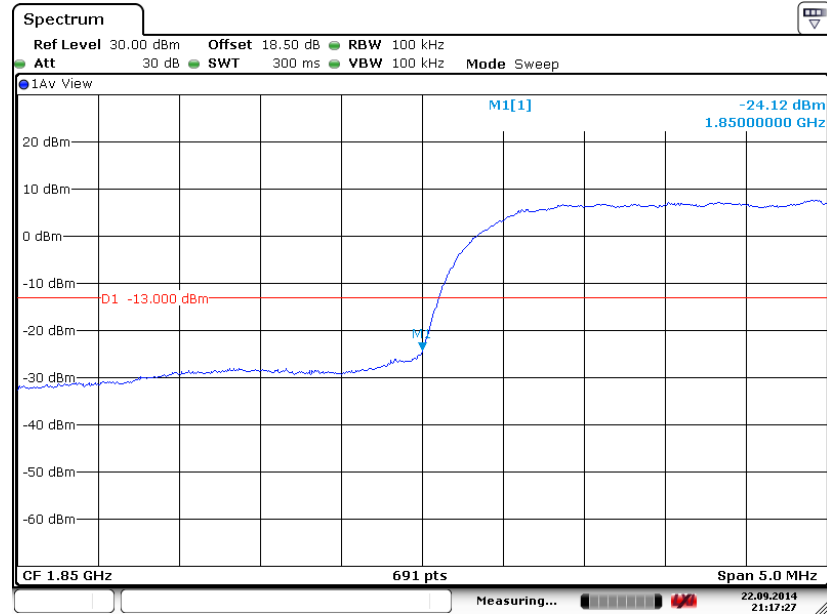


Date: 22.SEP.2014 22:18:35



Band :	WCDMA Band II	Test Mode :	RMC 12.2Kbps Link (QPSK)
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Lower Band Edge Plot on Channel 9262 (1852.4 MHz)

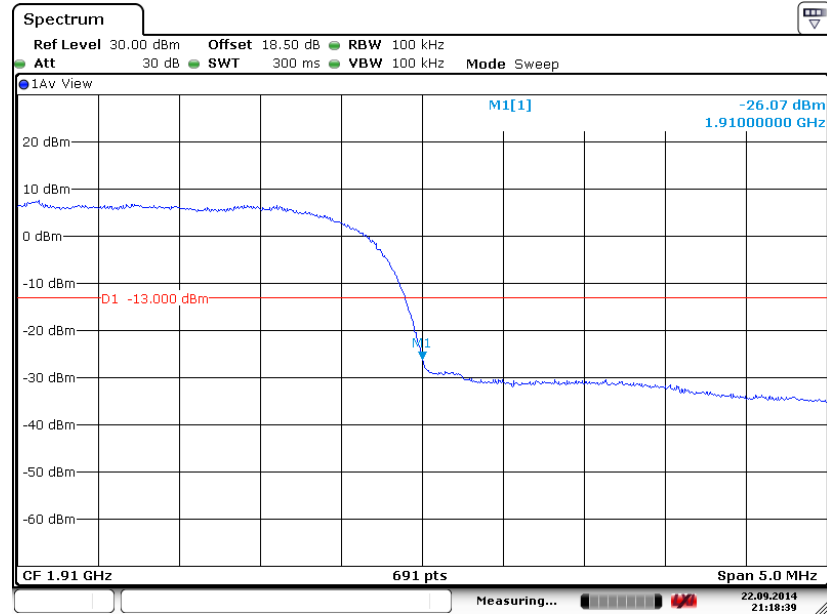


Date: 22.SEP.2014 21:17:27



Band :	WCDMA Band II	Test Mode :	RMC 12.2Kbps Link (QPSK)
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Higher Band Edge Plot on Channel 9538 (1907.6 MHz)



Date: 22.SEP.2014 21:18:38

3.6 Conducted Spurious Emission Measurement

3.6.1 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.

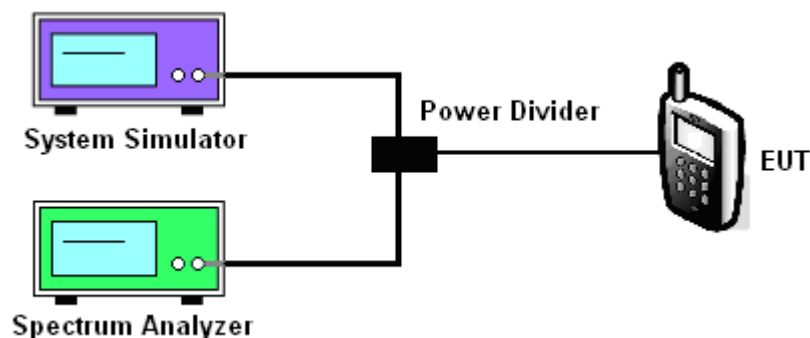
3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r01 Section 6.0.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by an RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$

3.6.4 Test Setup

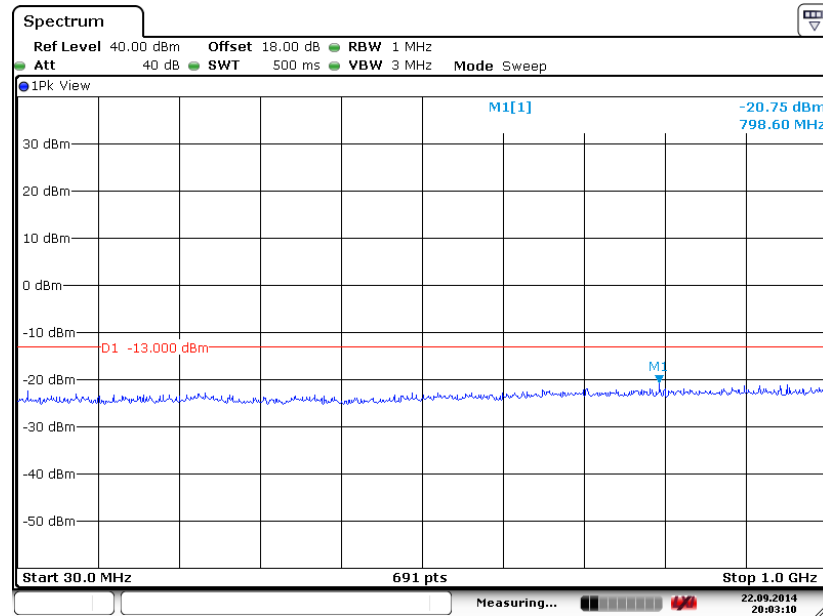




3.6.5 Test Result (Plots) of Conducted Spurious Emission

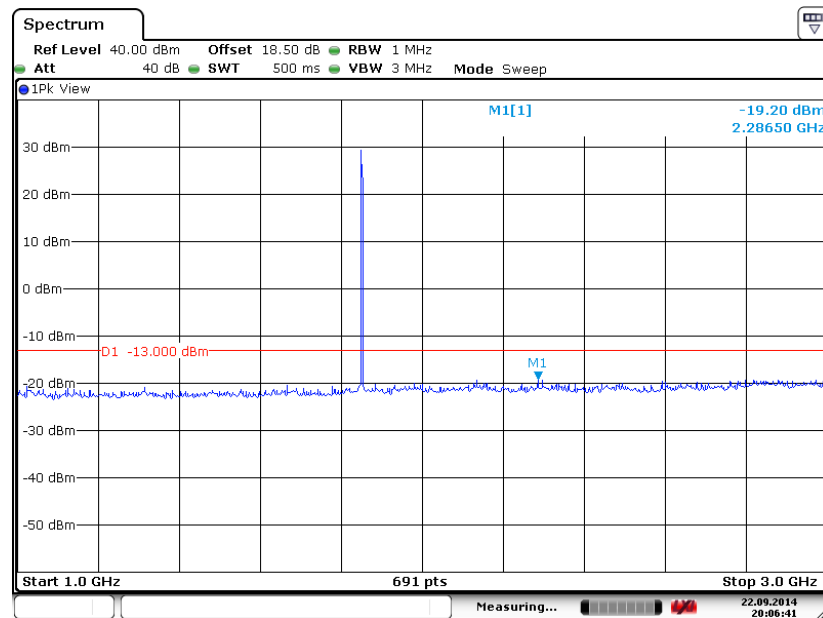
Band :	GSM1900	Channel :	CH512
Test Mode :	GSM Link (GMSK)	Frequency :	1850.2 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 22.SEP.2014 20:03:10

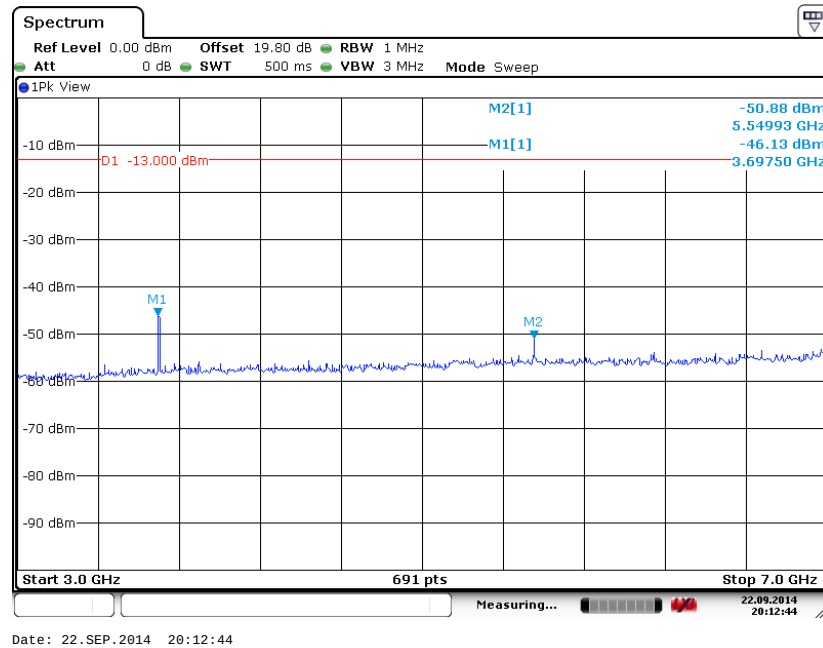
Conducted Spurious Emission Plot between 1GHz ~ 3GHz



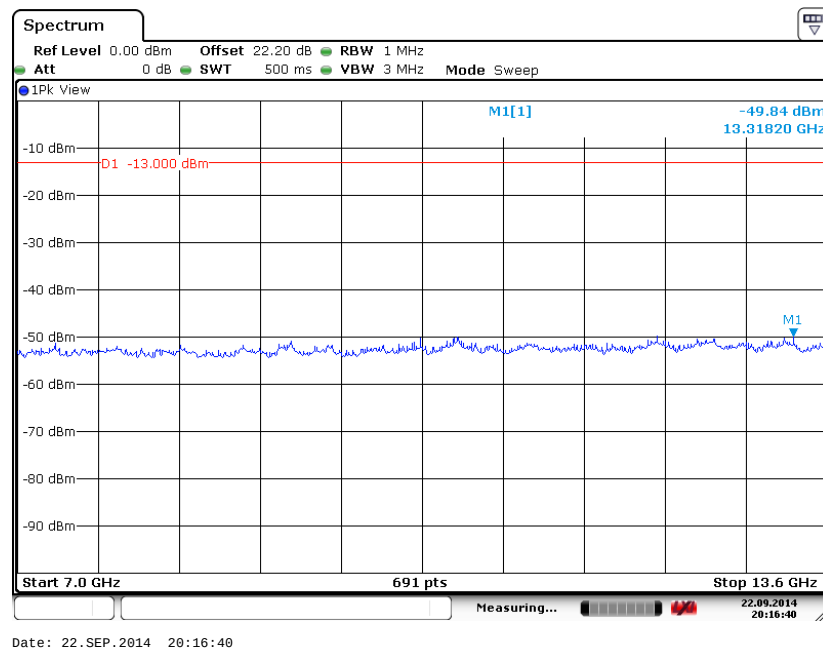
Date: 22.SEP.2014 20:06:41



Conducted Spurious Emission Plot between 3GHz ~ 7GHz

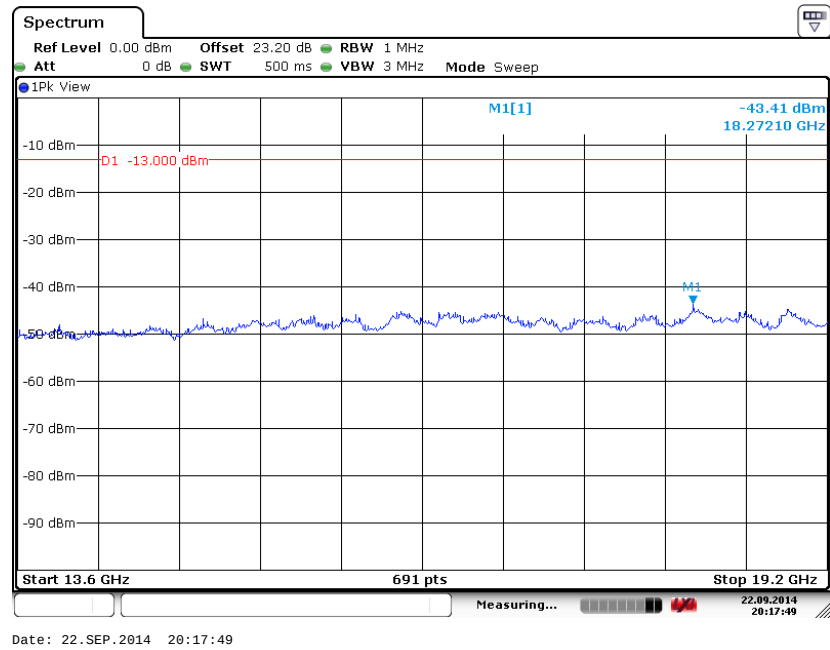


Conducted Spurious Emission Plot between 7GHz ~ 13.6GHz



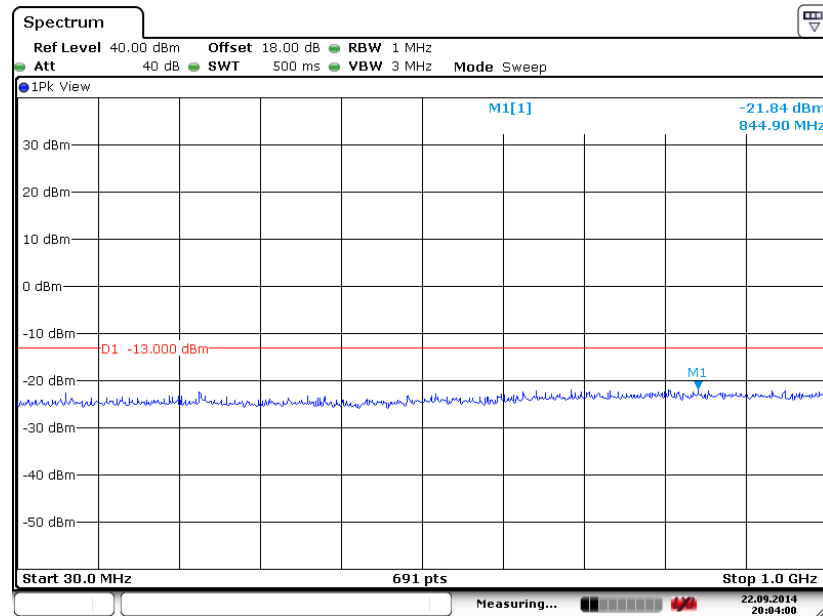


Conducted Spurious Emission Plot between 13.6GHz ~ 19.2GHz

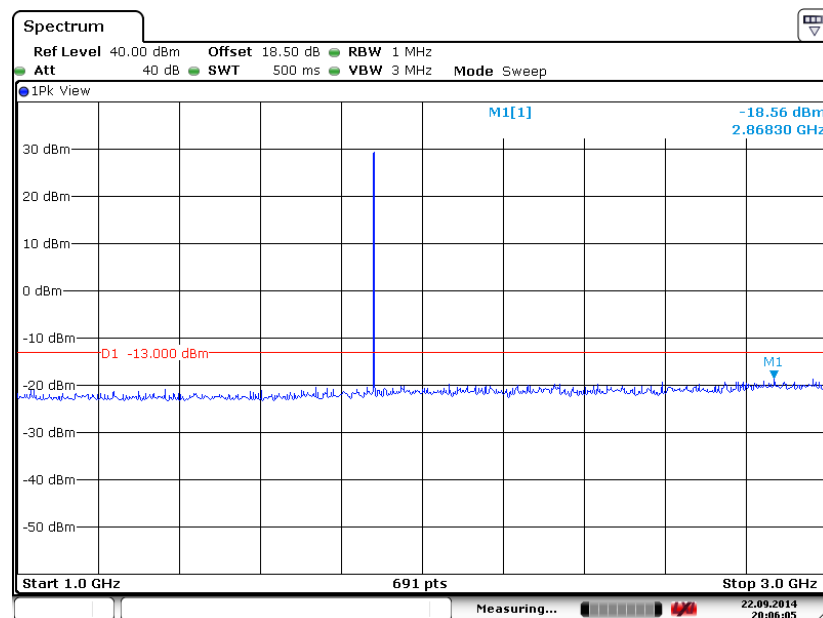




Band :	GSM1900	Channel :	CH661
Test Mode :	GSM Link (GMSK)	Frequency :	1880.0 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz

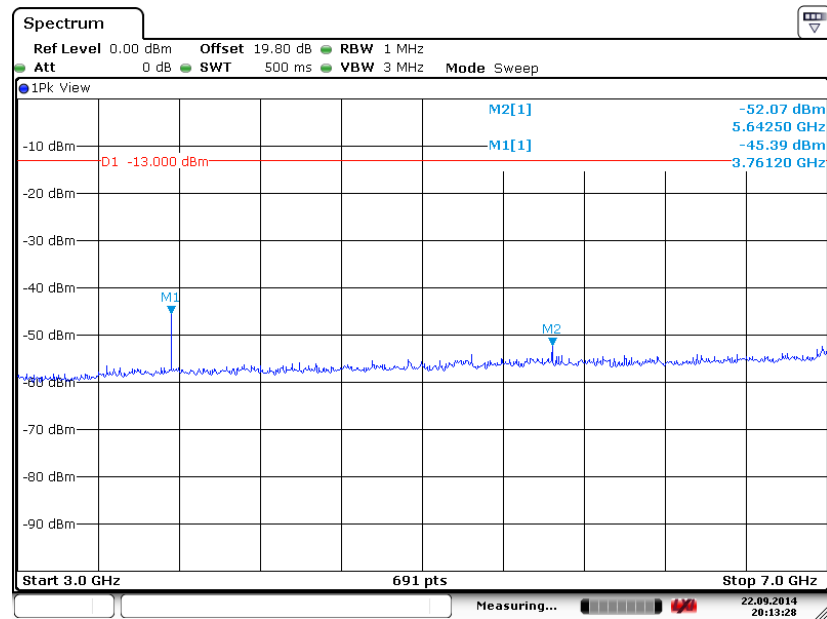
Date: 22.SEP.2014 20:04:00

Conducted Spurious Emission Plot between 1GHz ~ 3GHz

Date: 22.SEP.2014 20:06:05

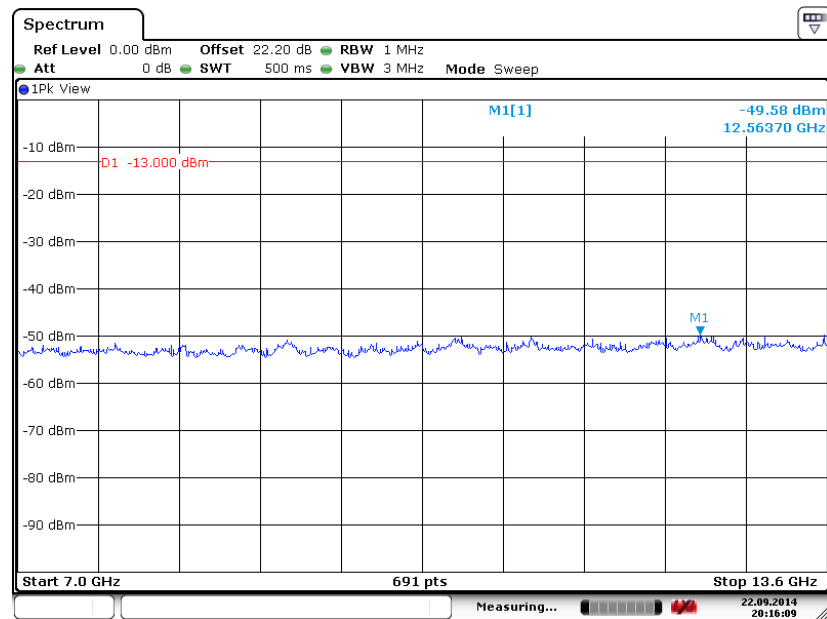


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 22.SEP.2014 20:13:28

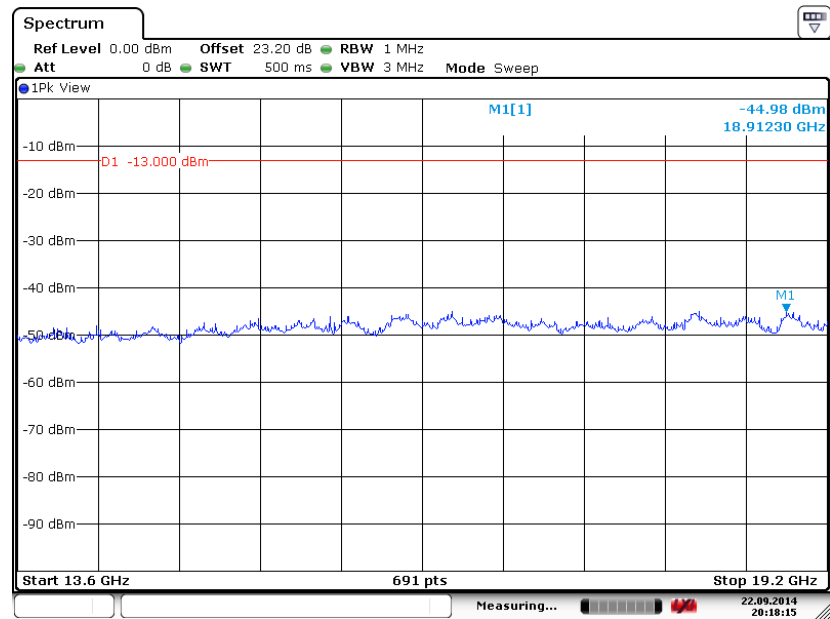
Conducted Spurious Emission Plot between 7GHz ~ 13.6GHz



Date: 22.SEP.2014 20:16:09



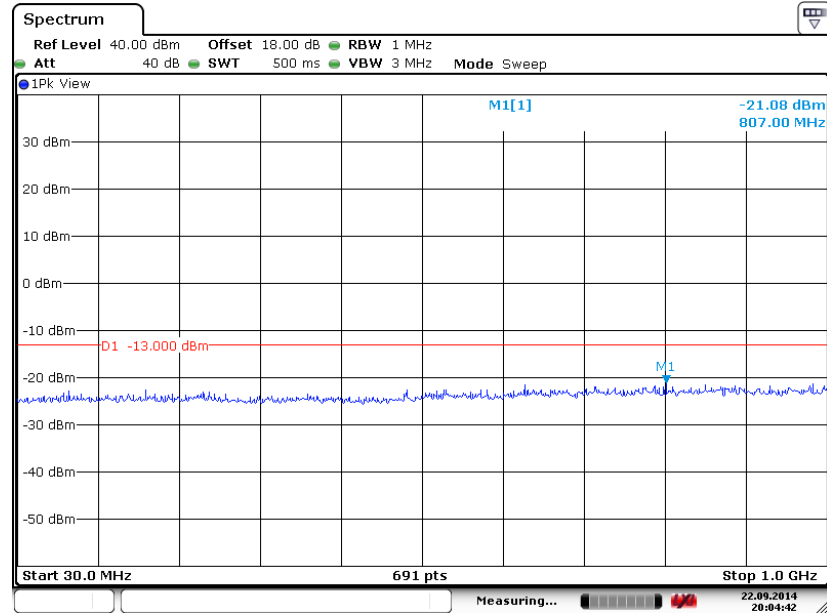
Conducted Spurious Emission Plot between 13.6GHz ~ 19.2GHz



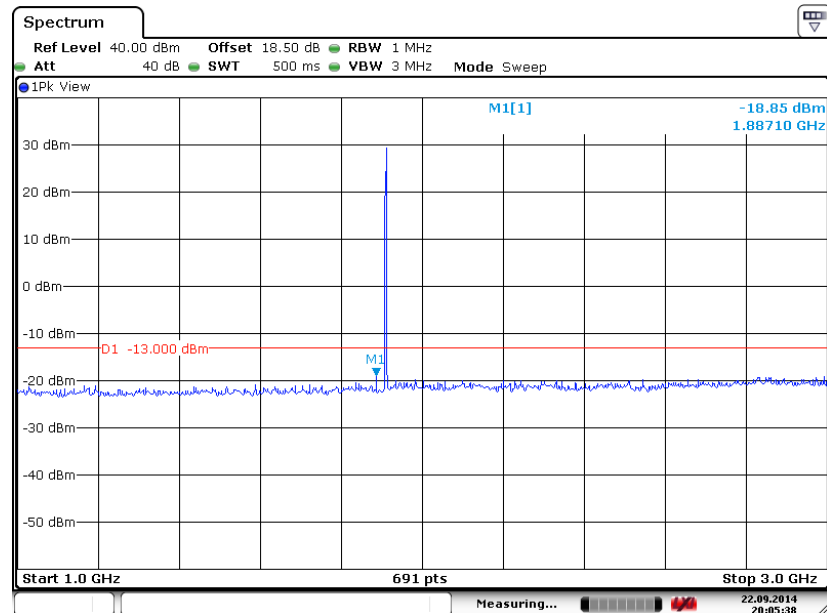
Date: 22.SEP.2014 20:18:14



Band :	GSM1900	Channel :	CH810
Test Mode :	GSM Link (GMSK)	Frequency :	1909.8 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz

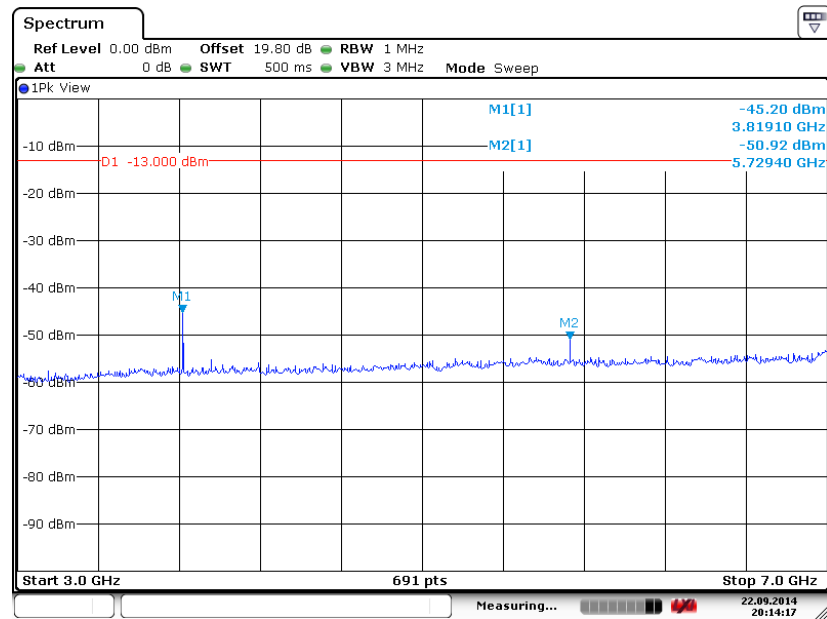
Date: 22.SEP.2014 20:04:42

Conducted Spurious Emission Plot between 1GHz ~ 3GHz

Date: 22.SEP.2014 20:05:37

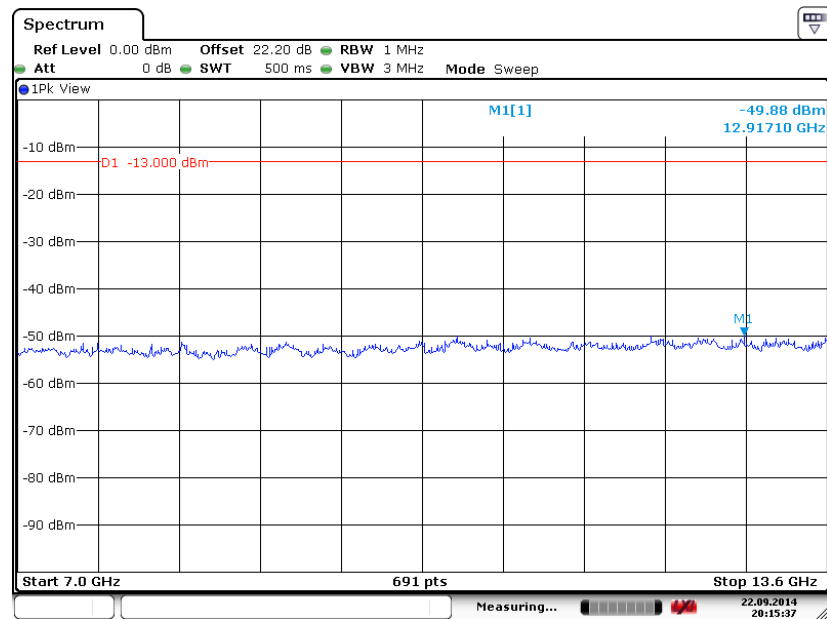


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 22.SEP.2014 20:14:17

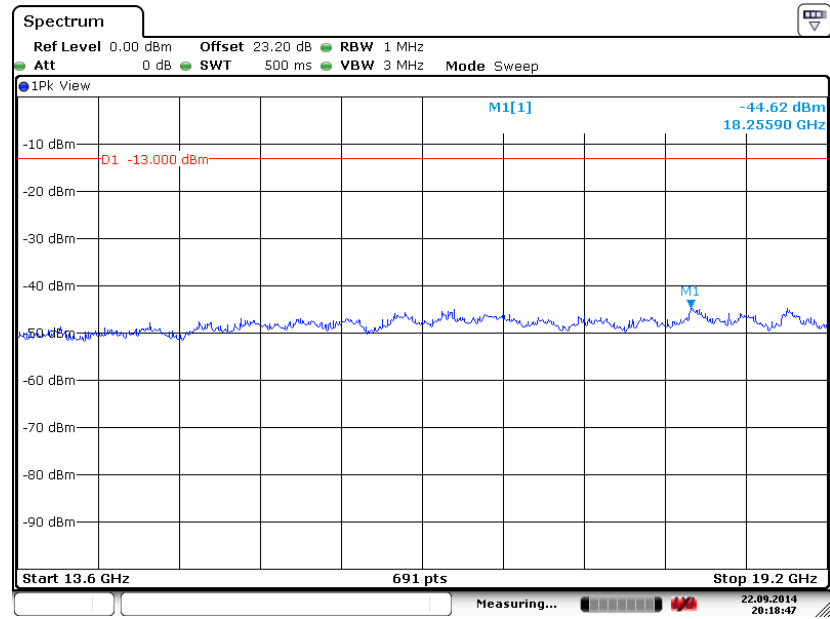
Conducted Spurious Emission Plot between 7GHz ~ 13.6GHz



Date: 22.SEP.2014 20:15:37



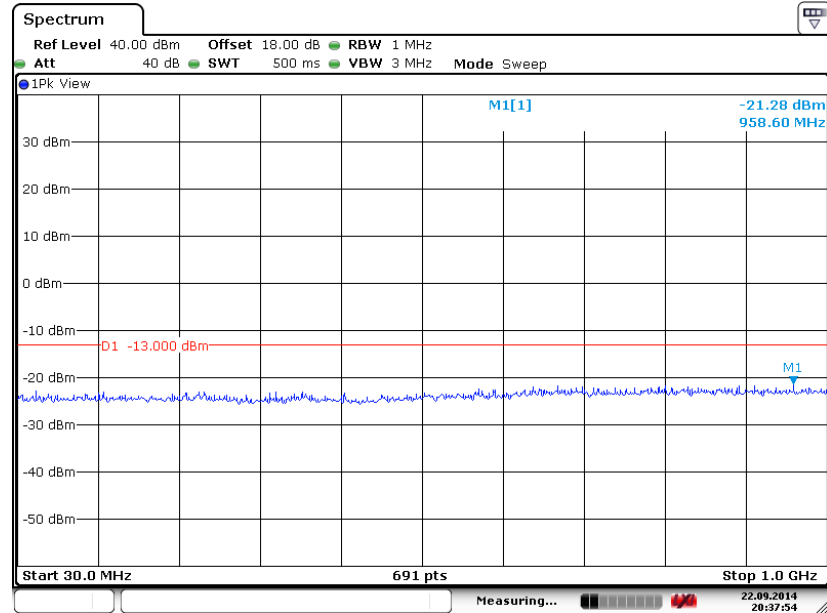
Conducted Spurious Emission Plot between 13.6GHz ~ 19.2GHz



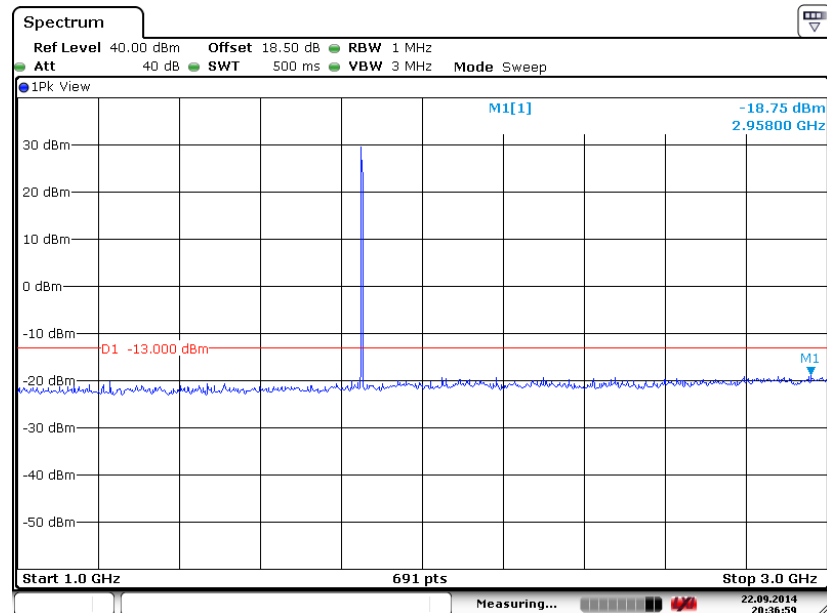
Date: 22.SEP.2014 20:18:47



Band :	GSM1900	Channel :	CH512
Test Mode :	EDGE class 8 Link (8PSK)	Frequency :	1850.2 MHz

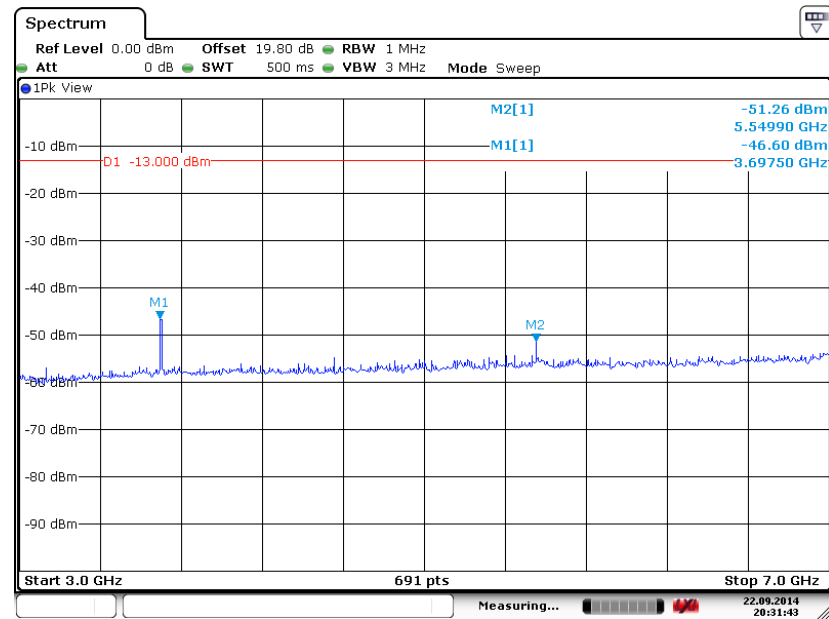
Conducted Spurious Emission Plot between 30MHz ~ 1GHz

Date: 22.SEP.2014 20:37:54

Conducted Spurious Emission Plot between 1GHz ~ 3GHz

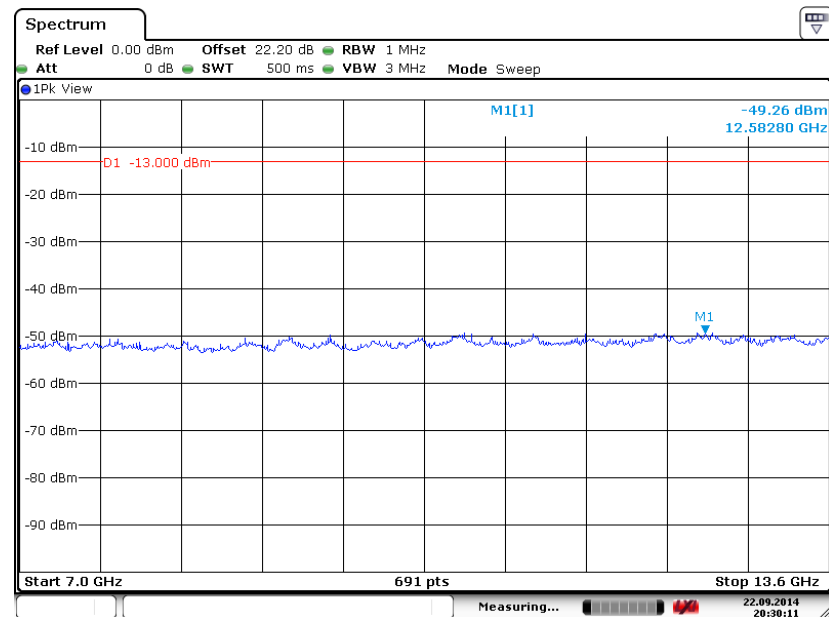
Date: 22.SEP.2014 20:36:59

Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 22.SEP.2014 20:31:43

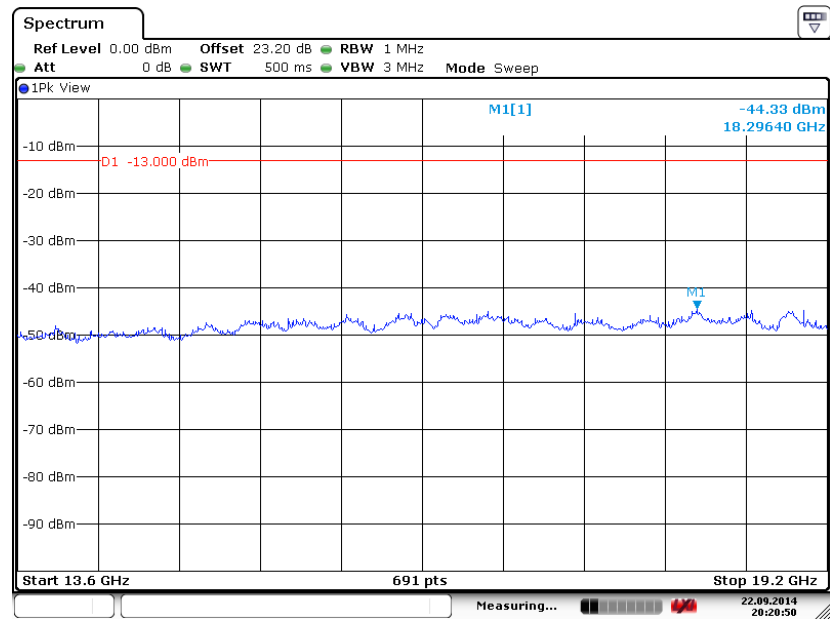
Conducted Spurious Emission Plot between 7GHz ~ 13.6GHz



Date: 22.SEP.2014 20:30:11



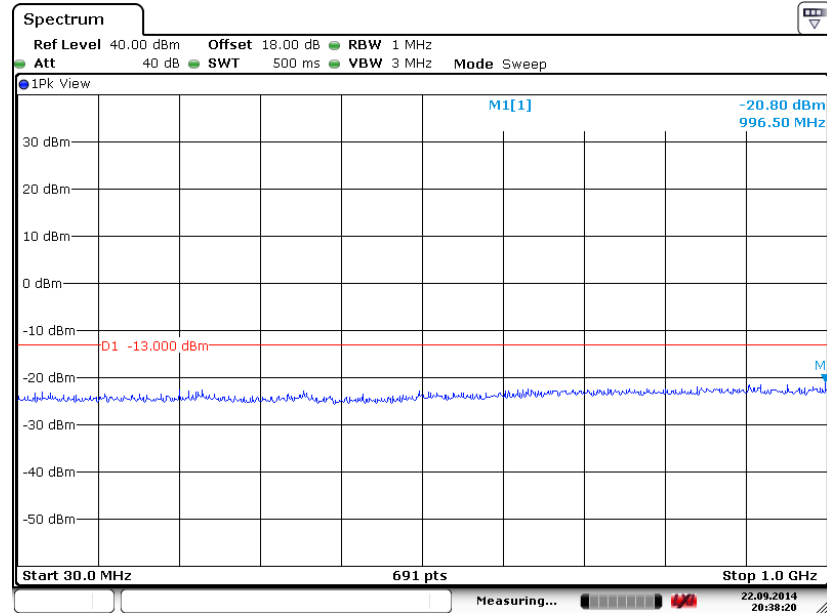
Conducted Spurious Emission Plot between 13.6GHz ~ 19.2GHz



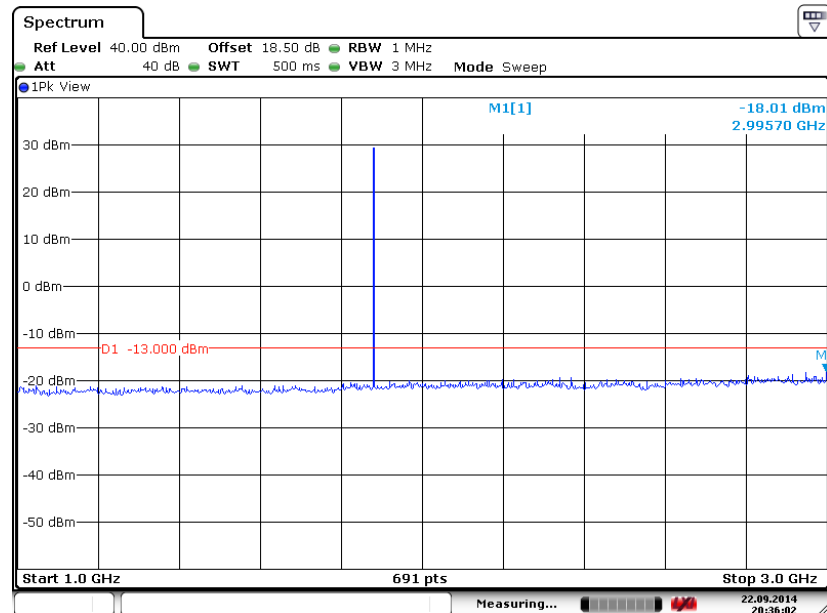
Date: 22.SEP.2014 20:20:50



Band :	GSM1900	Channel :	CH661
Test Mode :	EDGE class 8 Link (8PSK)	Frequency :	1880.0 MHz

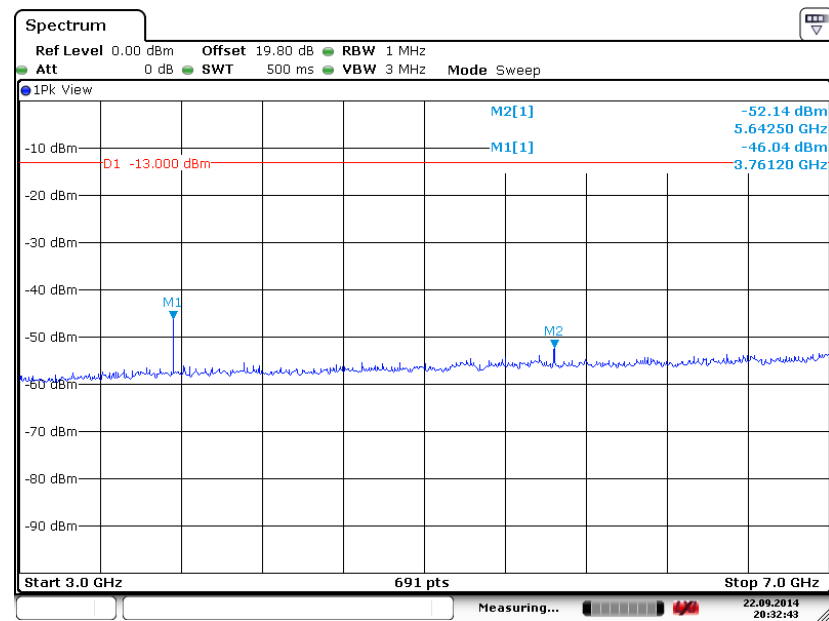
Conducted Spurious Emission Plot between 30MHz ~ 1GHz

Date: 22.SEP.2014 20:38:20

Conducted Spurious Emission Plot between 1GHz ~ 3GHz

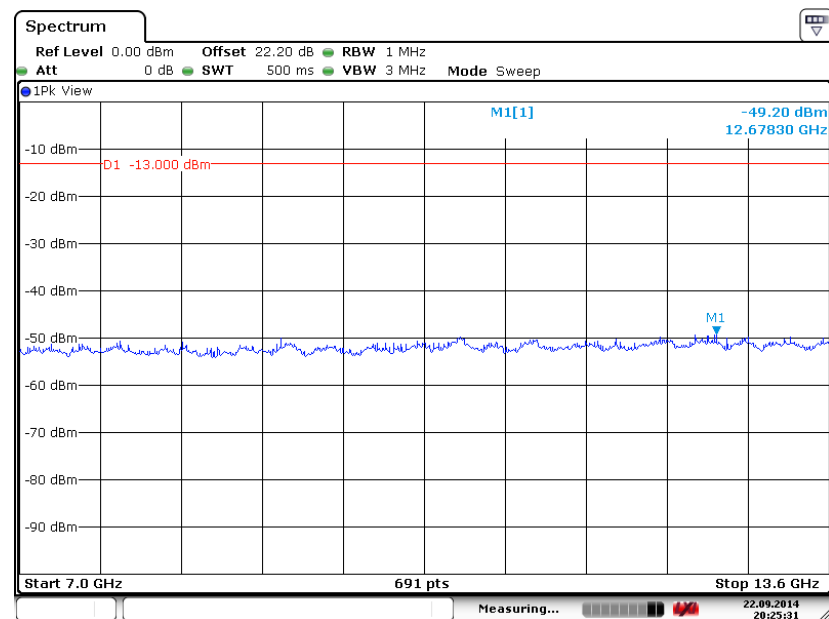
Date: 22.SEP.2014 20:36:02

Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 22.SEP.2014 20:32:42

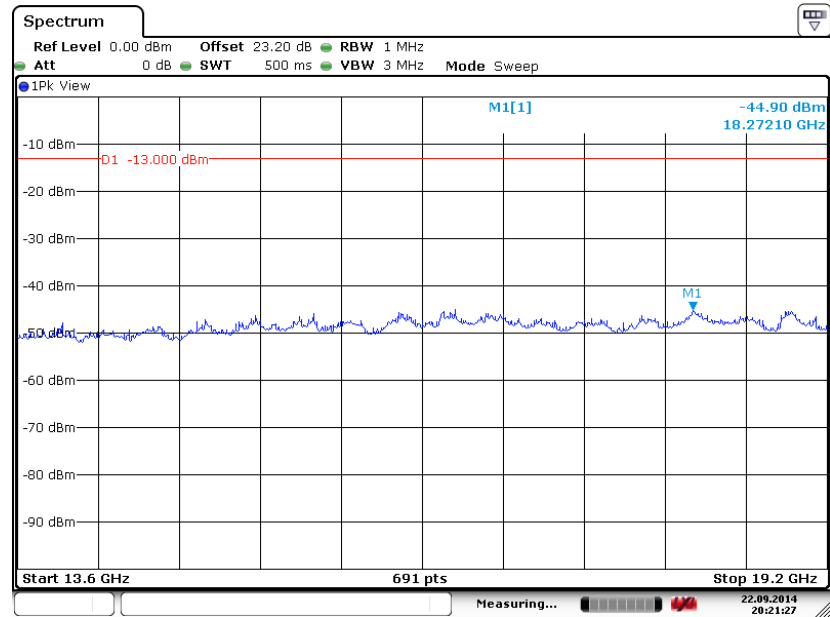
Conducted Spurious Emission Plot between 7GHz ~ 13.6GHz



Date: 22.SEP.2014 20:25:31



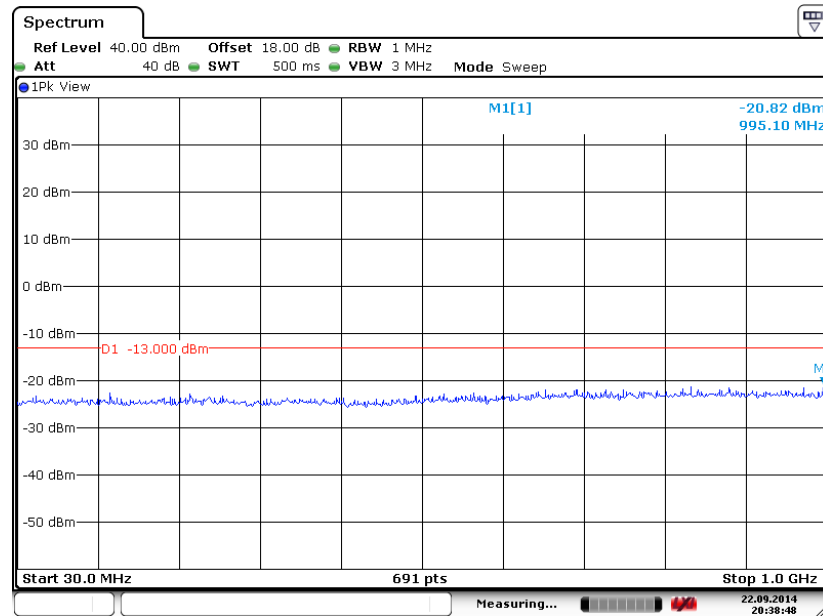
Conducted Spurious Emission Plot between 13.6GHz ~ 19.2GHz



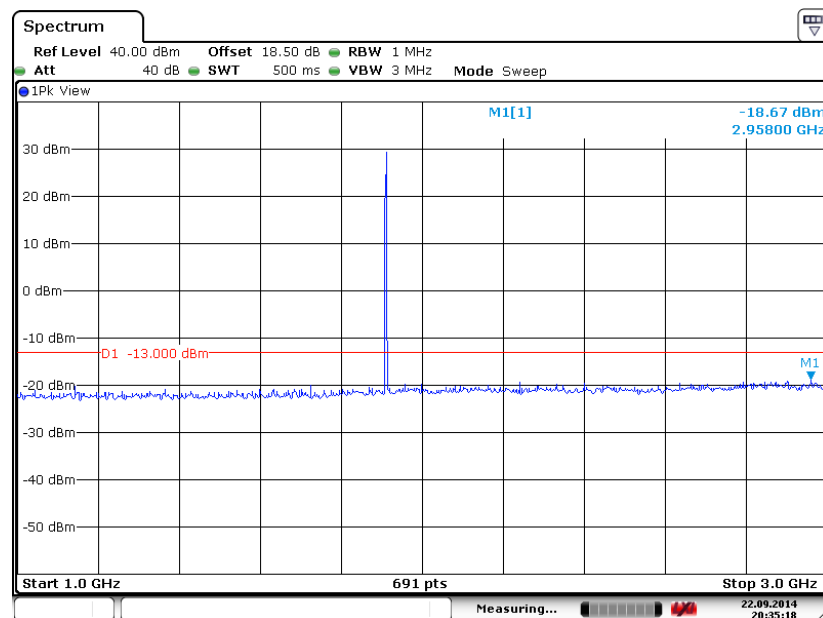
Date: 22.SEP.2014 20:21:26



Band :	GSM1900	Channel :	CH810
Test Mode :	EDGE class 8 Link (8PSK)	Frequency :	1909.8 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz

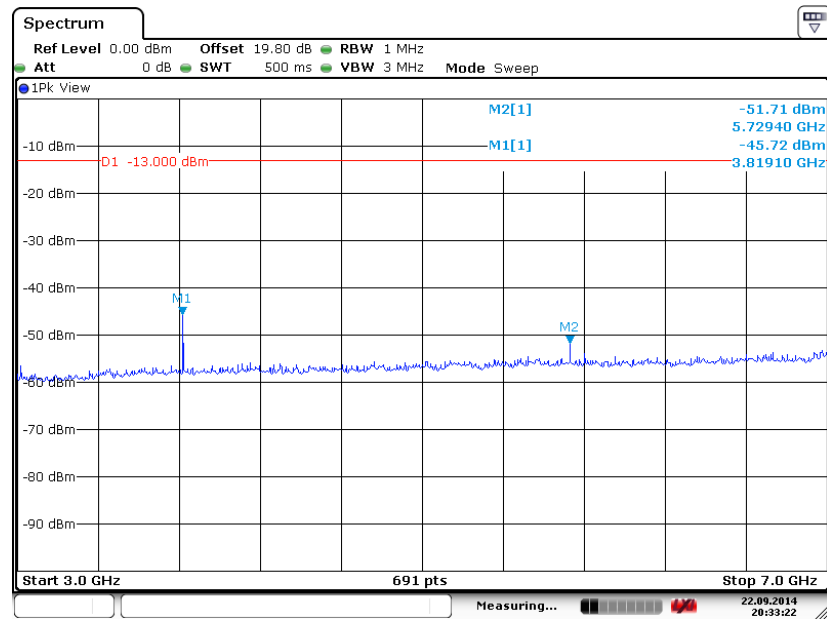
Date: 22.SEP.2014 20:38:48

Conducted Spurious Emission Plot between 1GHz ~ 3GHz

Date: 22.SEP.2014 20:35:18

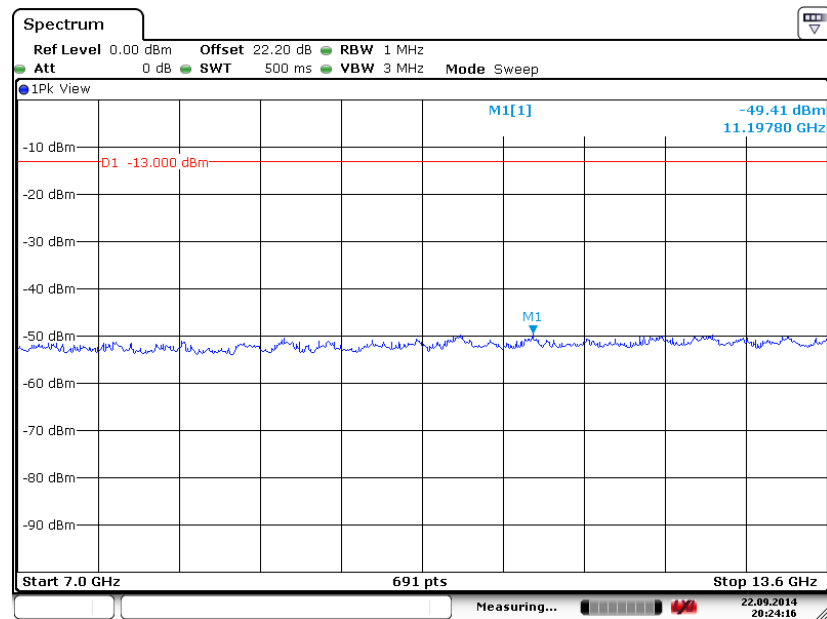


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 22.SEP.2014 20:33:22

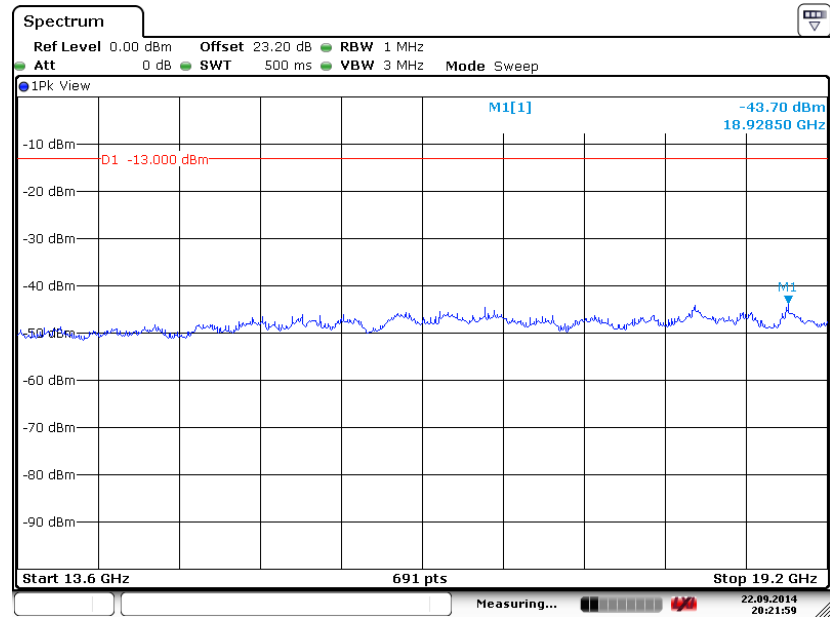
Conducted Spurious Emission Plot between 7GHz ~ 13.6GHz



Date: 22.SEP.2014 20:24:16



Conducted Spurious Emission Plot between 13.6GHz ~ 19.2GHz

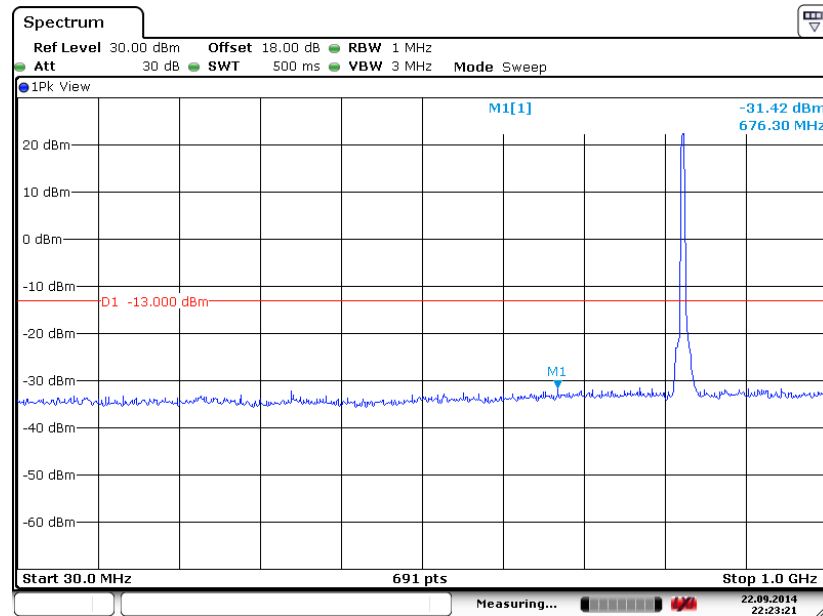


Date: 22.SEP.2014 20:21:58



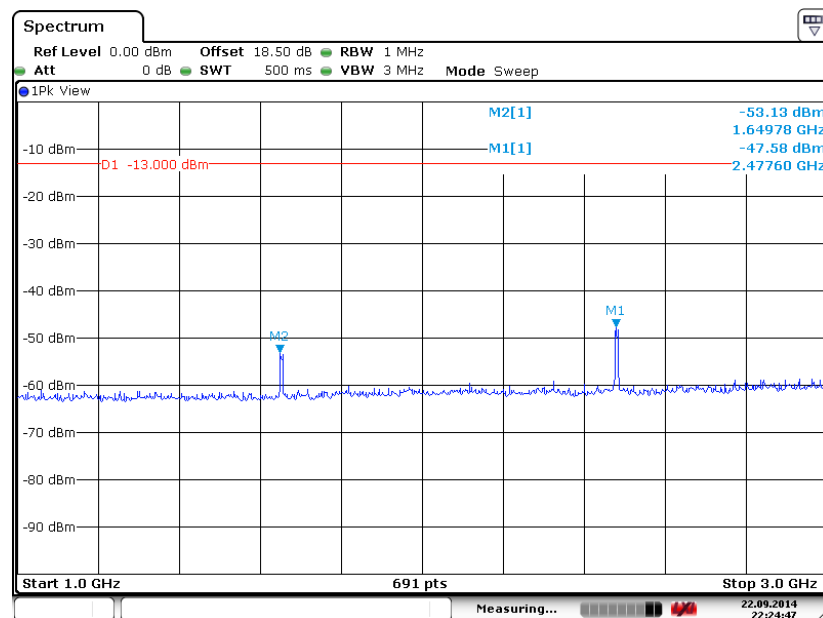
Band :	WCDMA Band V	Channel :	CH4132
Test Mode :	RMC 12.2Kbps Link (QPSK)	Frequency :	826.4 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 22.SEP.2014 22:23:21

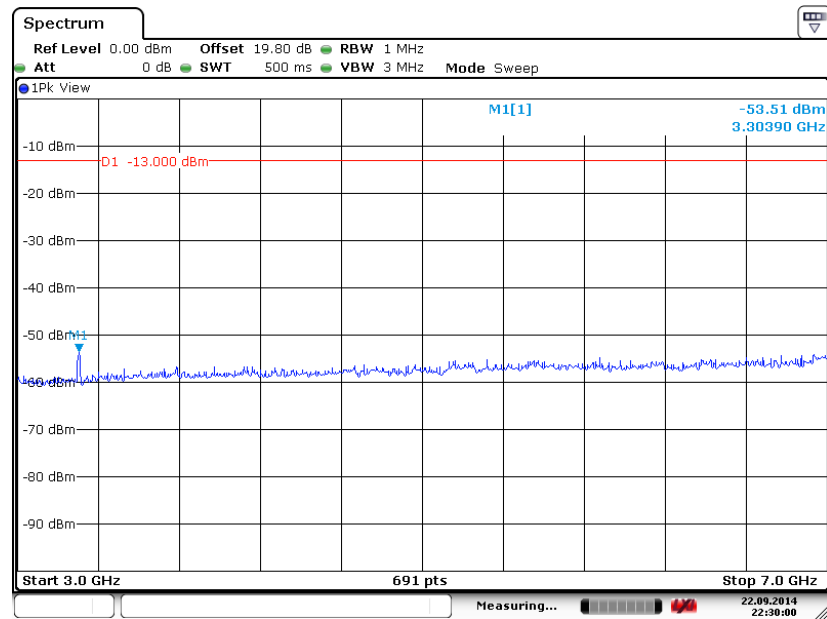
Conducted Spurious Emission Plot between 1GHz ~ 3GHz



Date: 22.SEP.2014 22:24:47

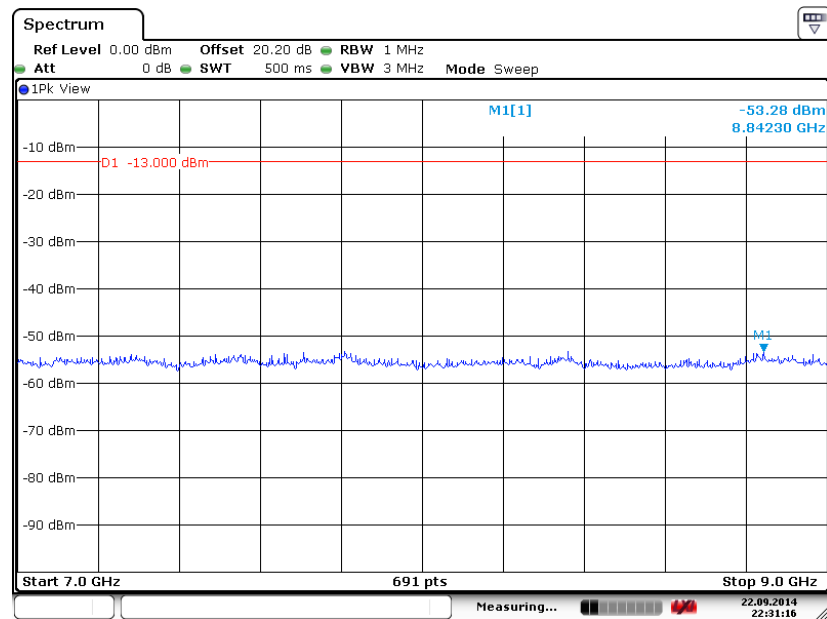


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 22.SEP.2014 22:30:00

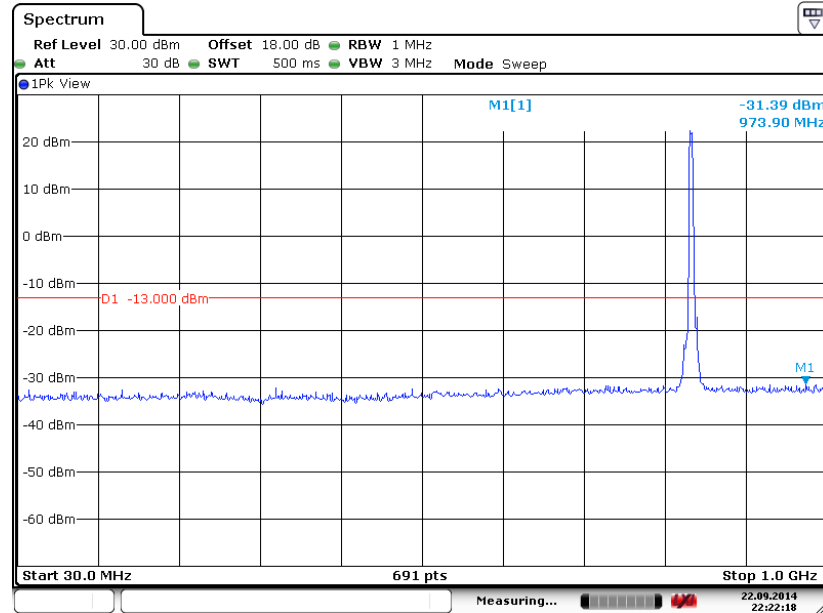
Conducted Spurious Emission Plot between 7GHz ~ 9GHz



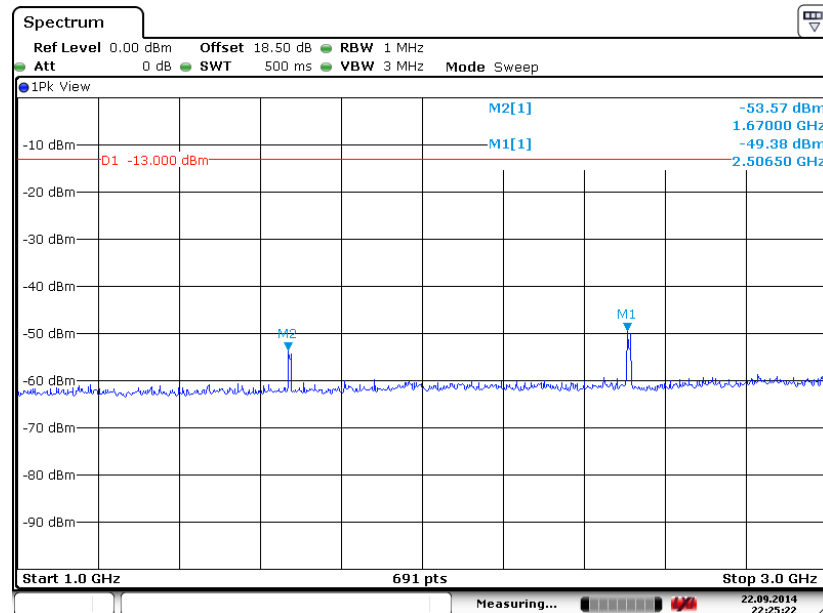
Date: 22.SEP.2014 22:31:16



Band :	WCDMA Band V	Channel :	CH4182
Test Mode :	RMC 12.2Kbps Link (QPSK)	Frequency :	836.4 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz

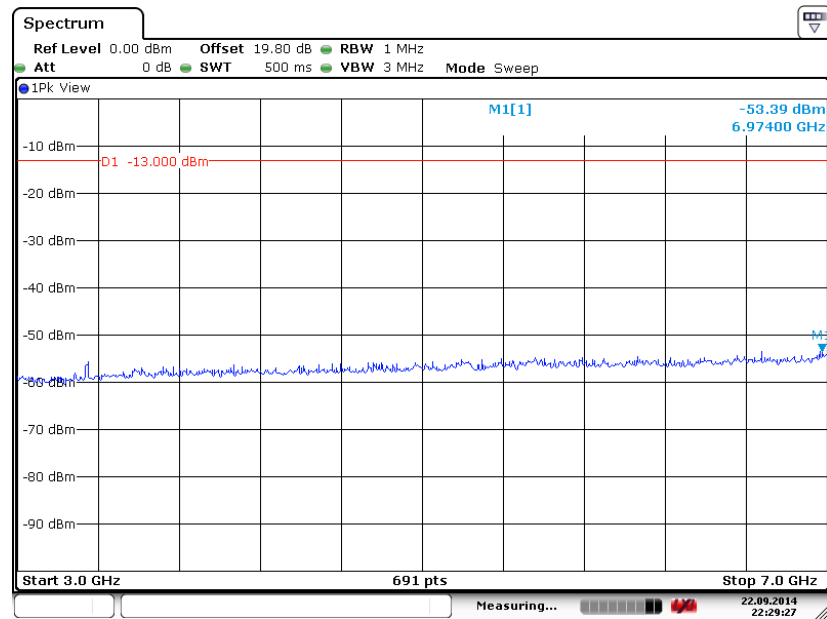
Date: 22.SEP.2014 22:22:18

Conducted Spurious Emission Plot between 1GHz ~ 3GHz

Date: 22.SEP.2014 22:25:22

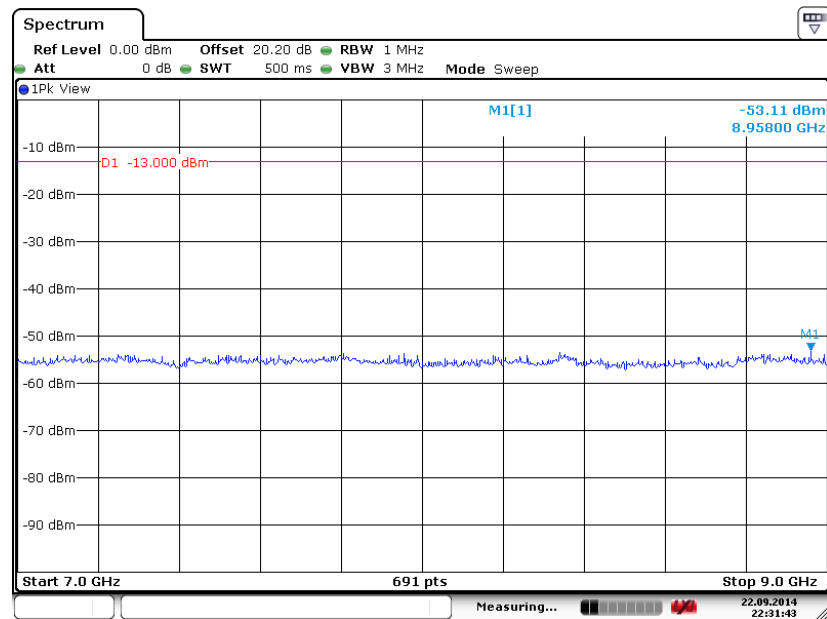


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 22.SEP.2014 22:29:27

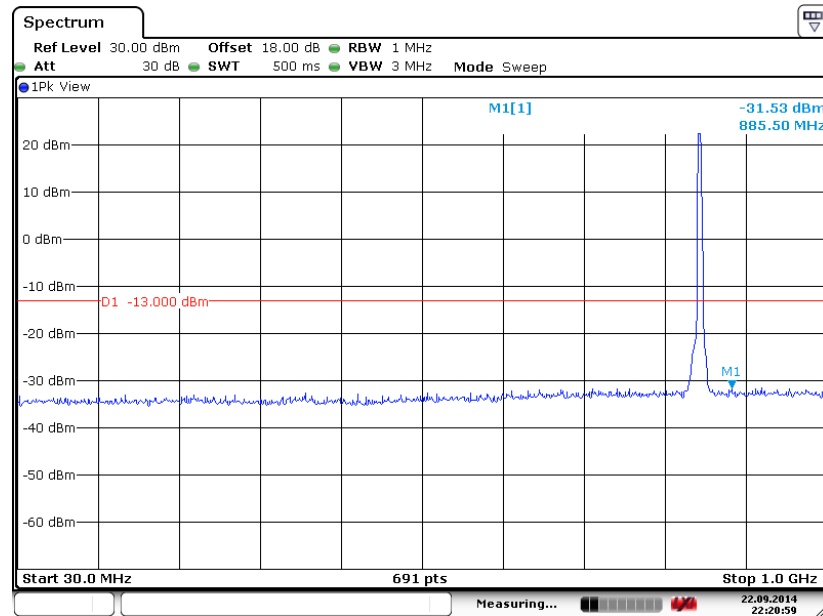
Conducted Spurious Emission Plot between 7GHz ~ 9GHz



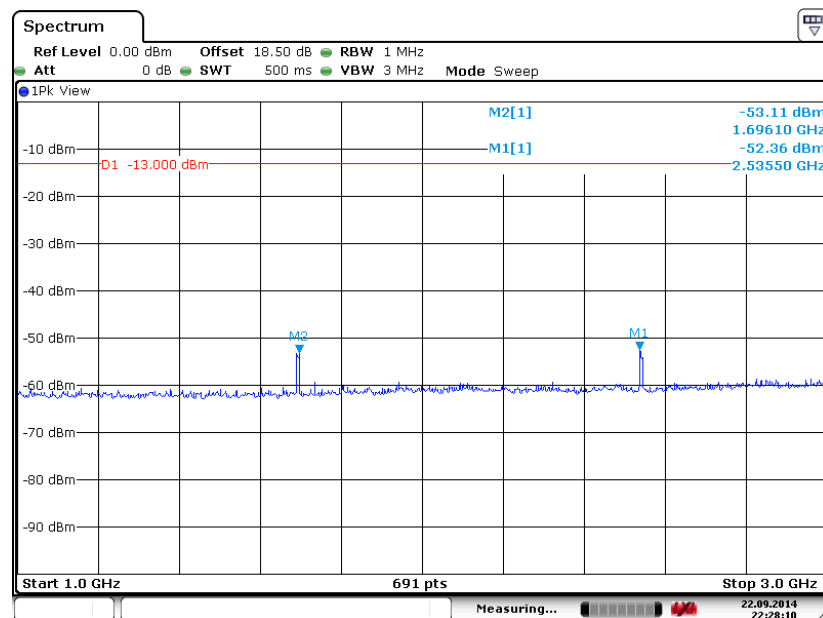
Date: 22.SEP.2014 22:31:44



Band :	WCDMA Band V	Channel :	CH4233
Test Mode :	RMC 12.2Kbps Link (QPSK)	Frequency :	846.6 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz

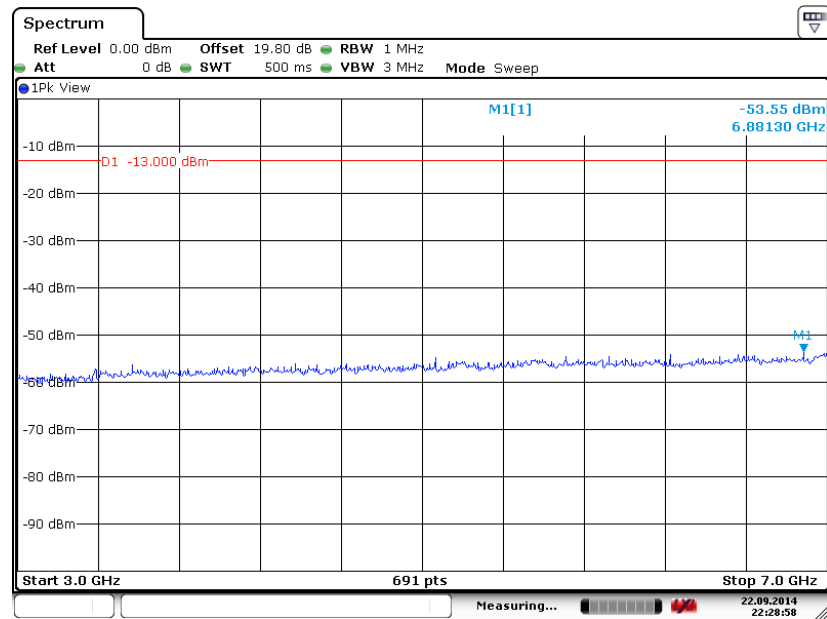
Date: 22.SEP.2014 22:20:59

Conducted Spurious Emission Plot between 1GHz ~ 3GHz

Date: 22.SEP.2014 22:28:10

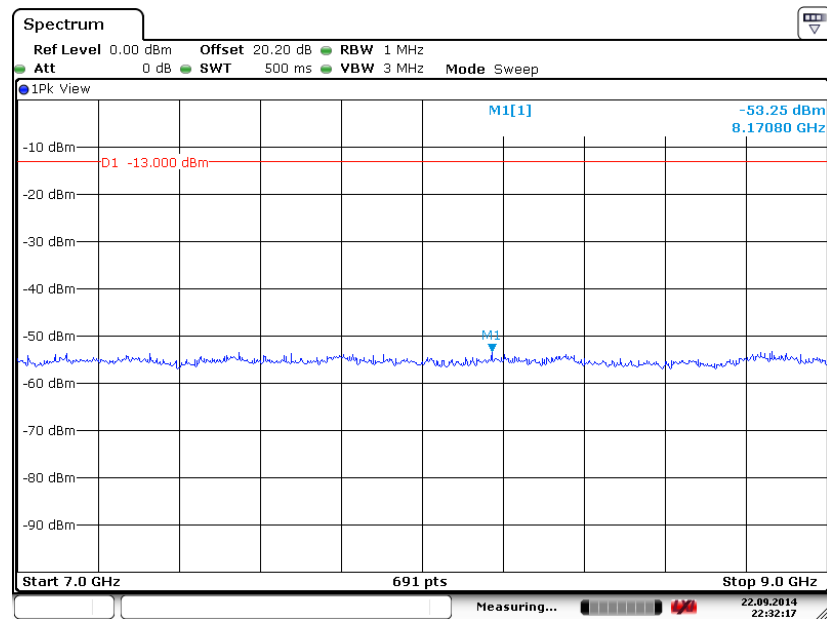


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 22.SEP.2014 22:28:58

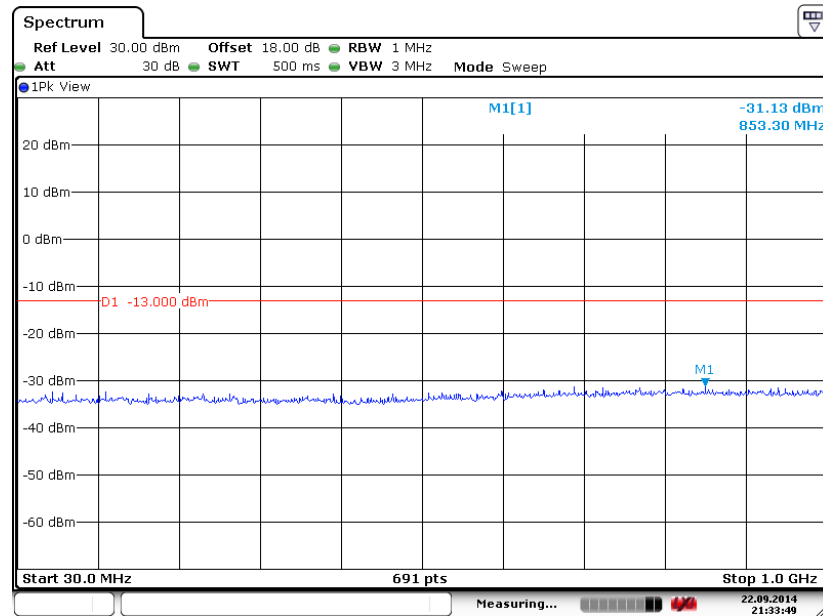
Conducted Spurious Emission Plot between 7GHz ~ 9GHz



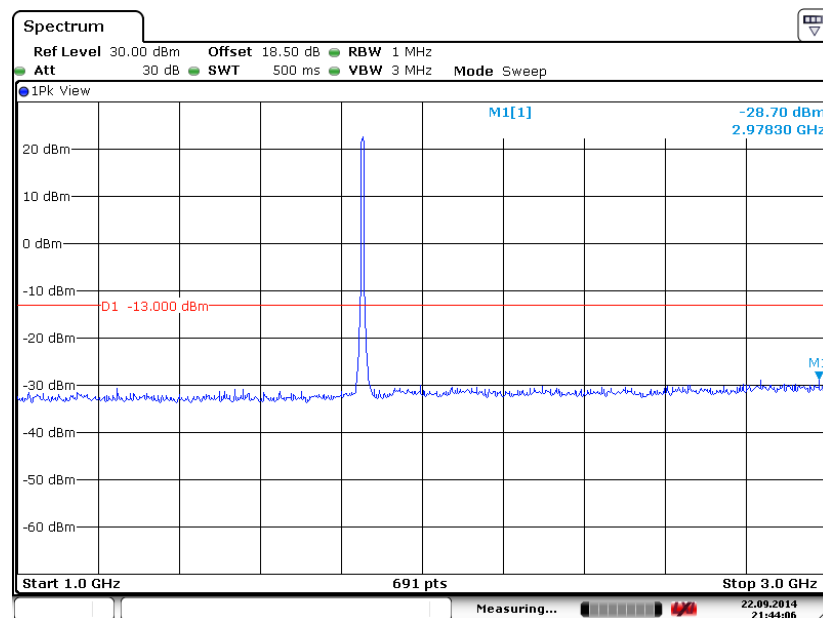
Date: 22.SEP.2014 22:32:18



Band :	WCDMA Band II	Channel :	CH9262
Test Mode :	RMC 12.2Kbps Link (QPSK)	Frequency :	1852.4 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz

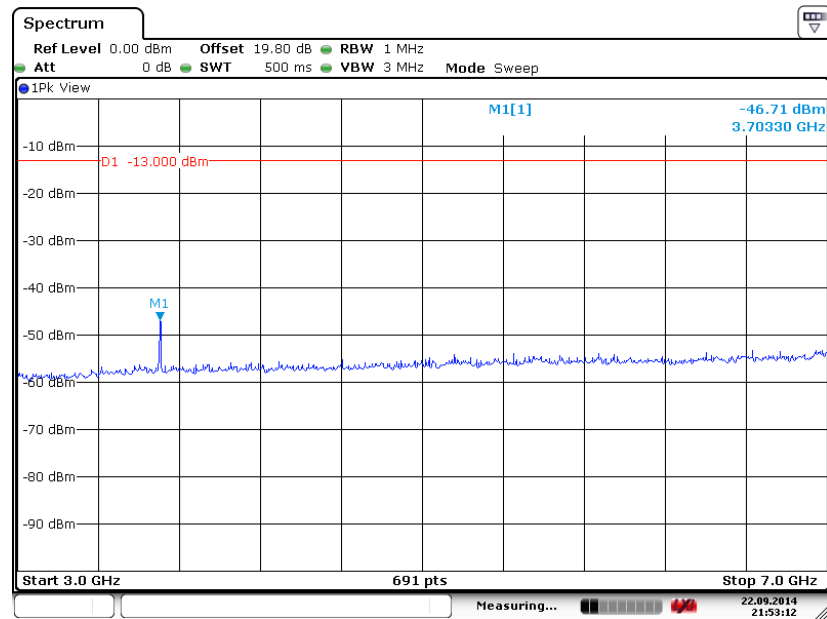
Date: 22.SEP.2014 21:33:49

Conducted Spurious Emission Plot between 1GHz ~ 3GHz

Date: 22.SEP.2014 21:44:06

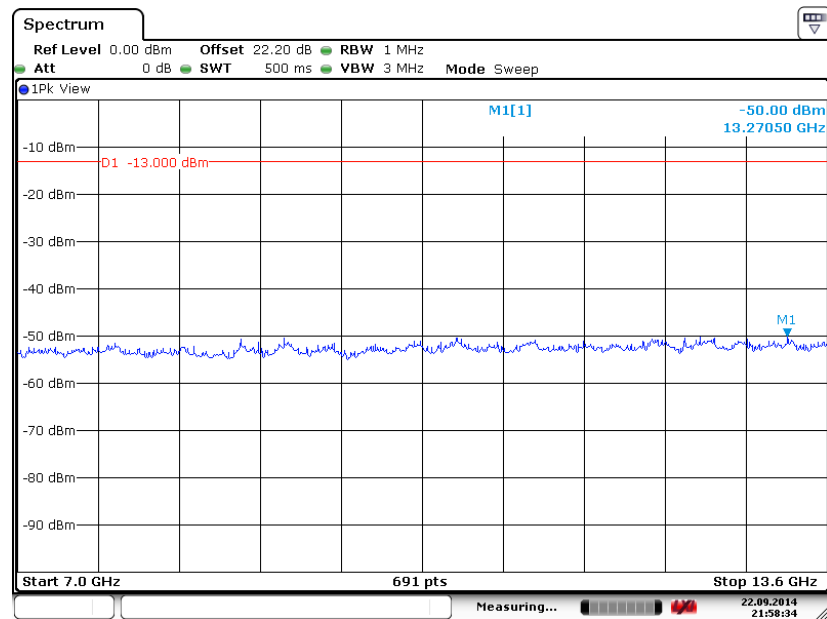


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 22.SEP.2014 21:53:12

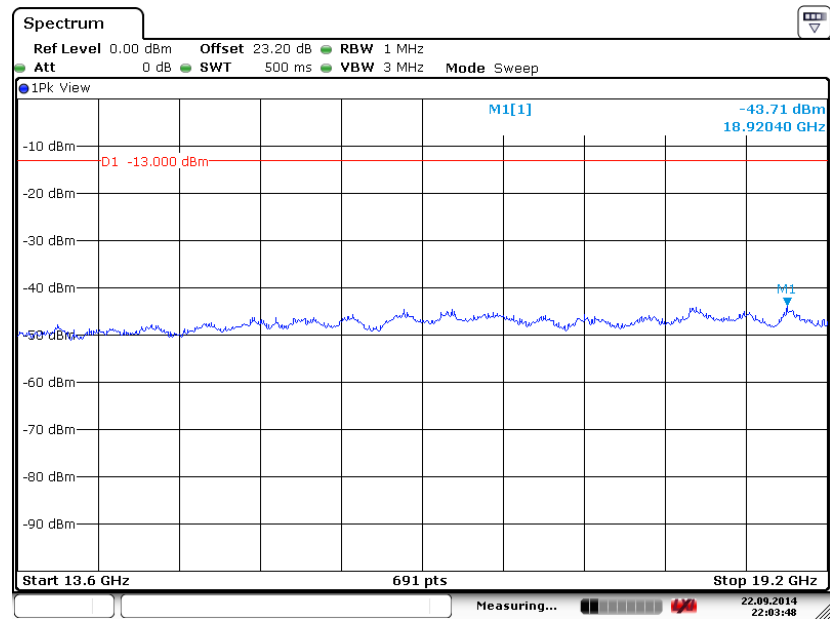
Conducted Spurious Emission Plot between 7GHz ~ 13.6GHz



Date: 22.SEP.2014 21:58:34



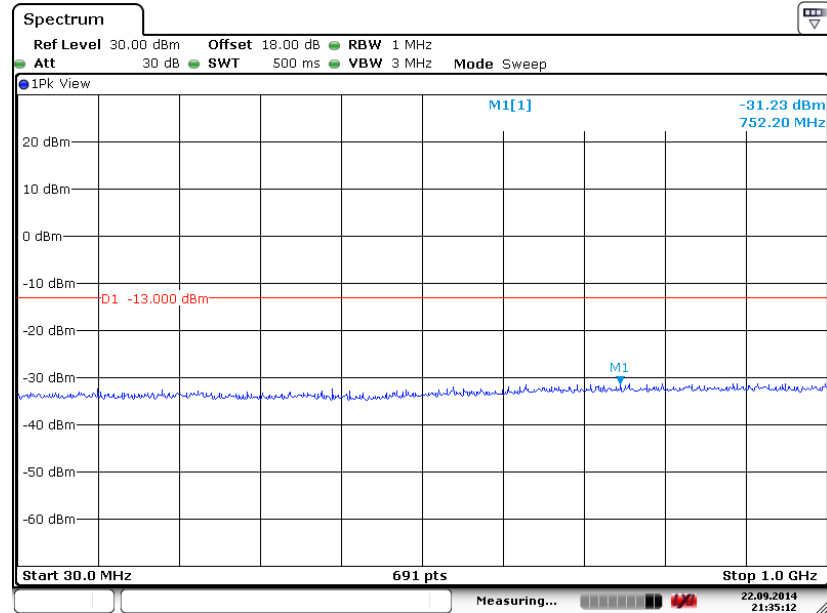
Conducted Spurious Emission Plot between 13.6GHz ~ 19.2GHz



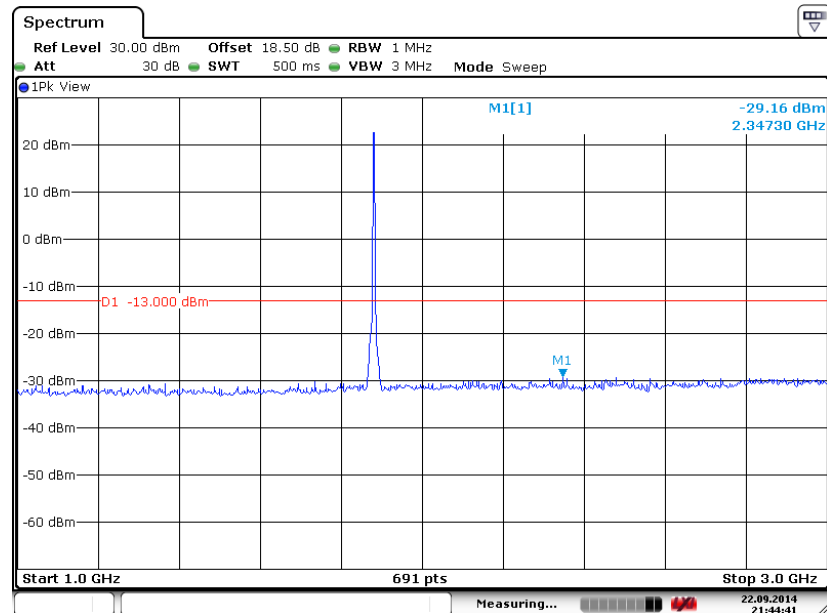
Date: 22.SEP.2014 22:03:48



Band :	WCDMA Band II	Channel :	CH9400
Test Mode :	RMC 12.2Kbps Link (QPSK)	Frequency :	1880.0 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz

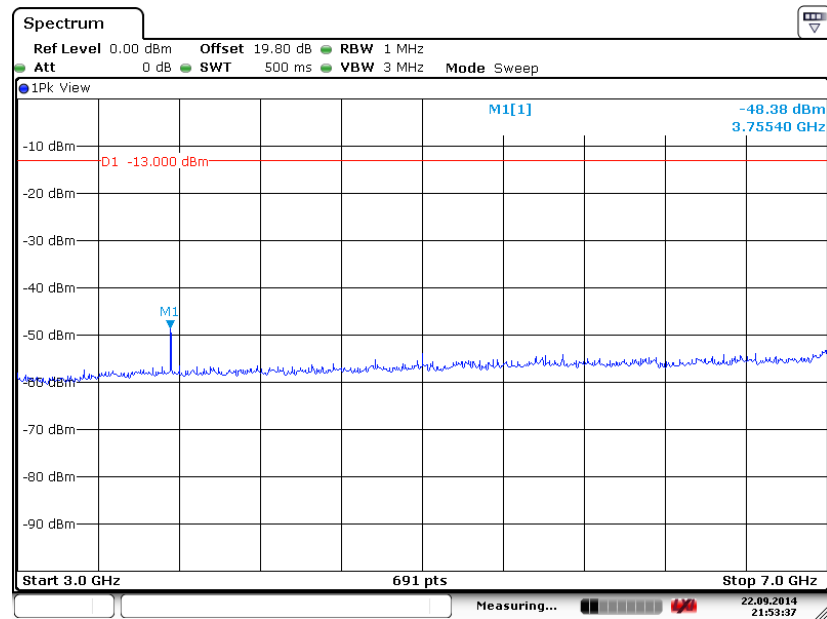
Date: 22.SEP.2014 21:35:12

Conducted Spurious Emission Plot between 1GHz ~ 3GHz

Date: 22.SEP.2014 21:44:41

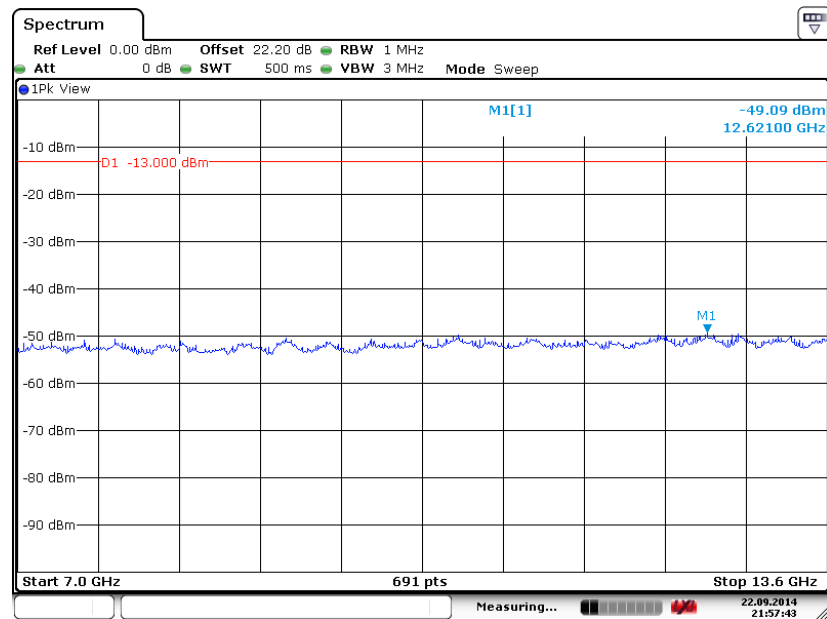


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 22.SEP.2014 21:53:37

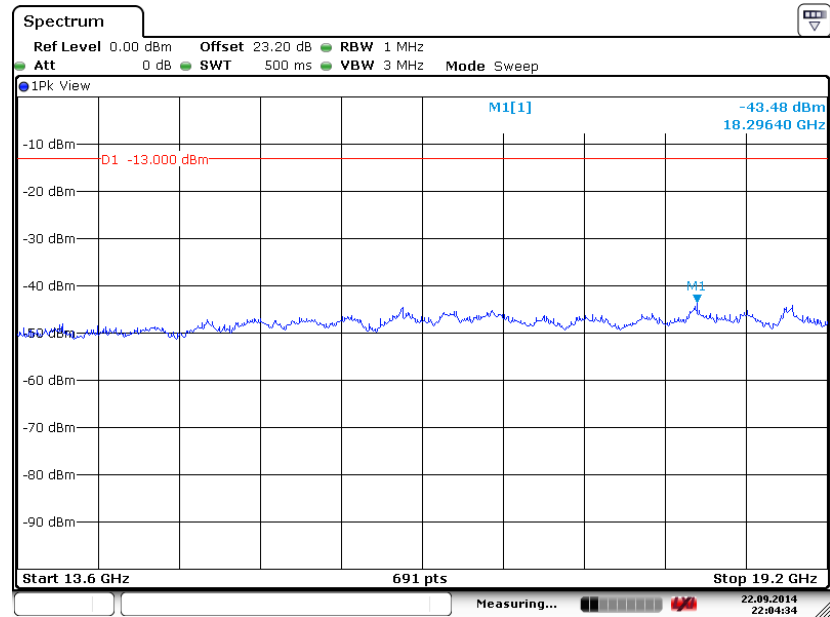
Conducted Spurious Emission Plot between 7GHz ~ 13.6GHz



Date: 22.SEP.2014 21:57:43

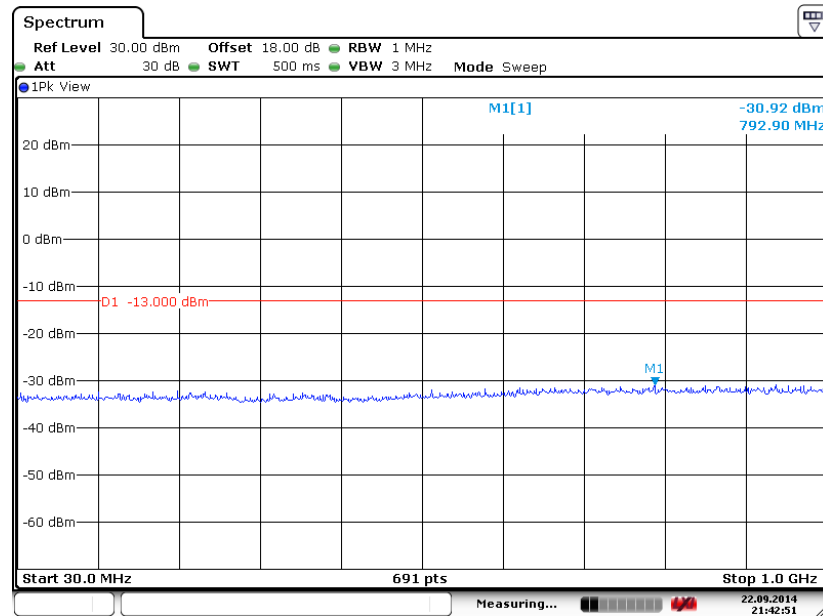


Conducted Spurious Emission Plot between 13.6GHz ~ 19.2GHz

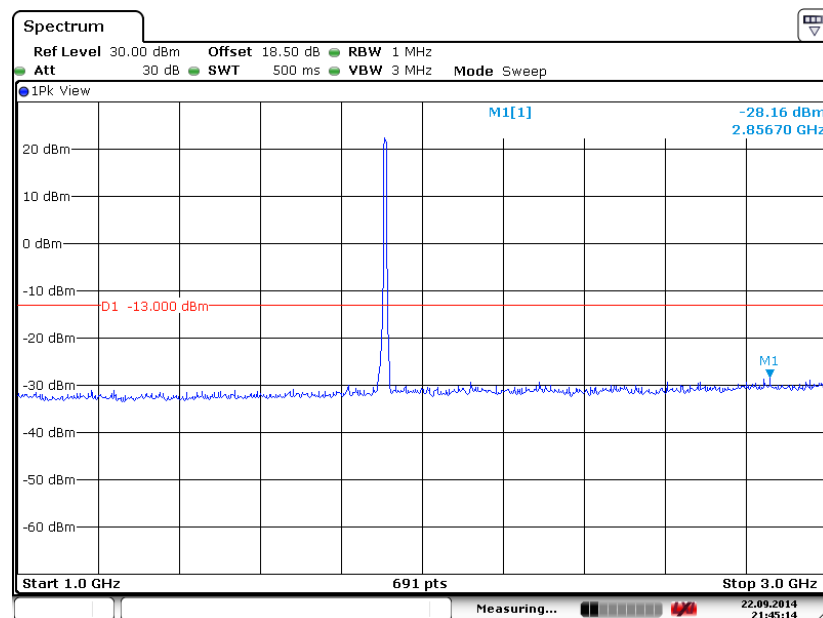




Band :	WCDMA Band II	Channel :	CH9538
Test Mode :	RMC 12.2Kbps Link (QPSK)	Frequency :	1907.6 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz

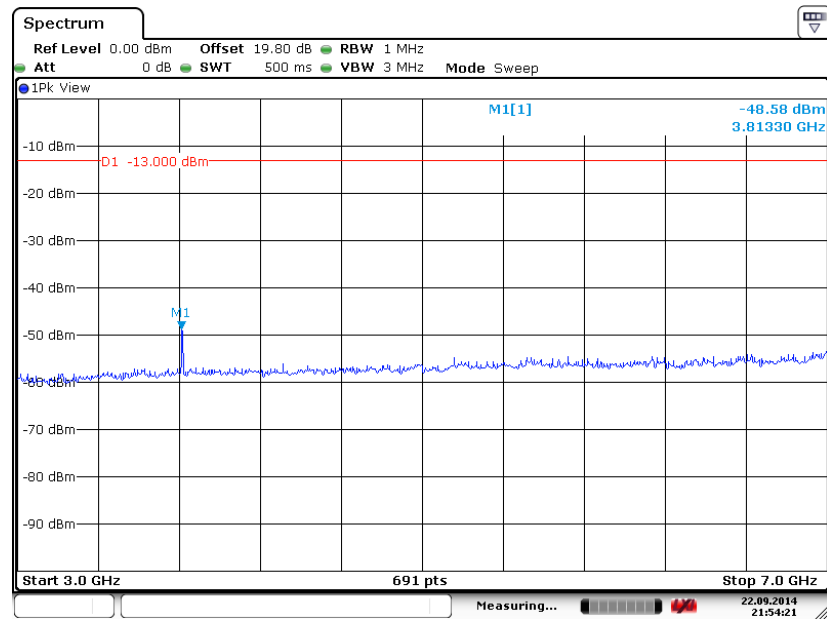
Date: 22.SEP.2014 21:42:51

Conducted Spurious Emission Plot between 1GHz ~ 3GHz

Date: 22.SEP.2014 21:45:14

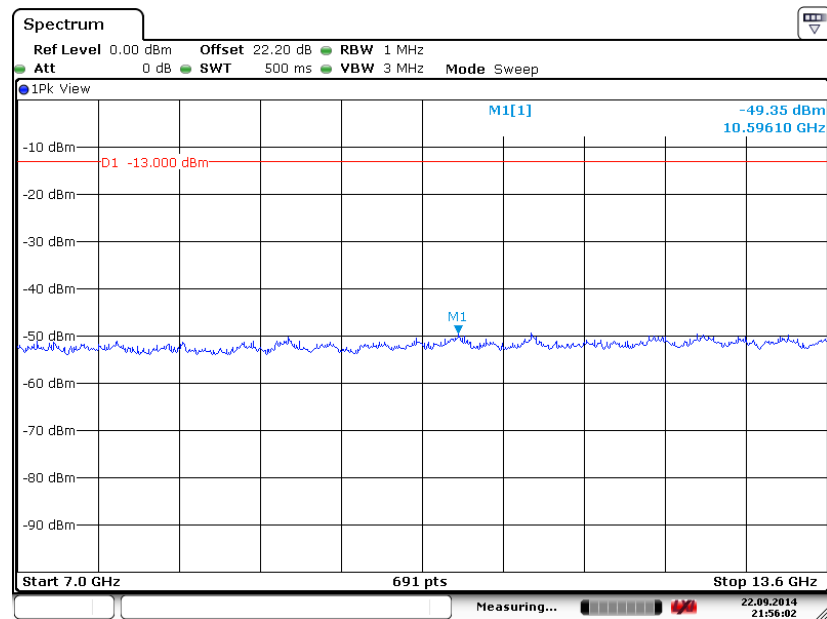


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 22.SEP.2014 21:54:21

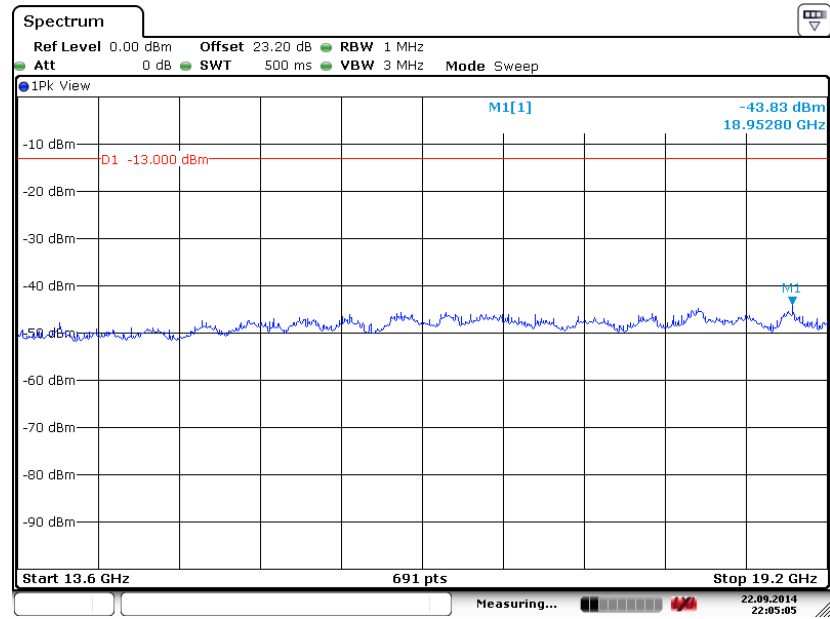
Conducted Spurious Emission Plot between 7GHz ~ 13.6GHz



Date: 22.SEP.2014 21:56:02



Conducted Spurious Emission Plot between 13.6GHz ~ 19.2GHz



3.7 Field Strength of Spurious Radiation Measurement

3.7.1 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.

3.7.2 Measuring Instruments

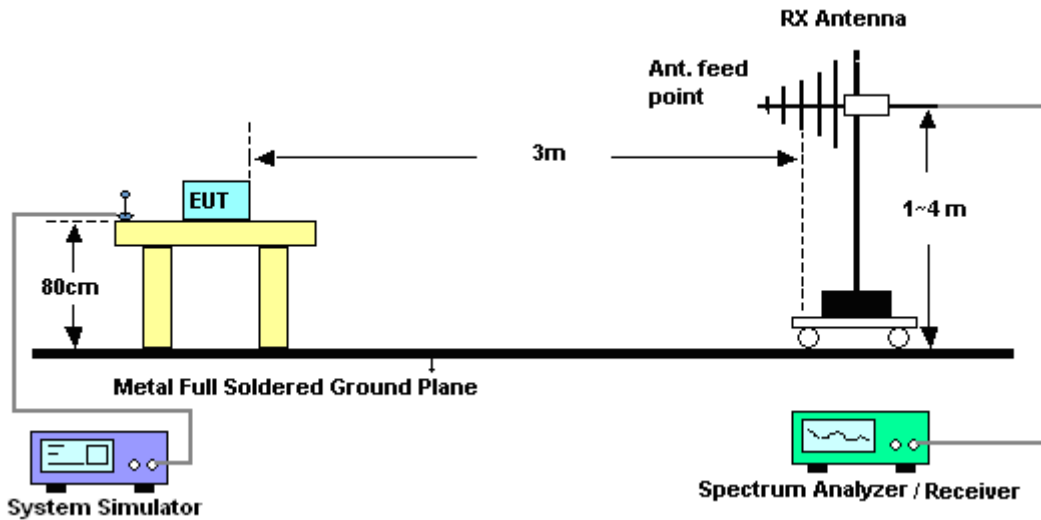
The measuring equipment is listed in the section 4 of this test report.

3.7.3 Test Procedures

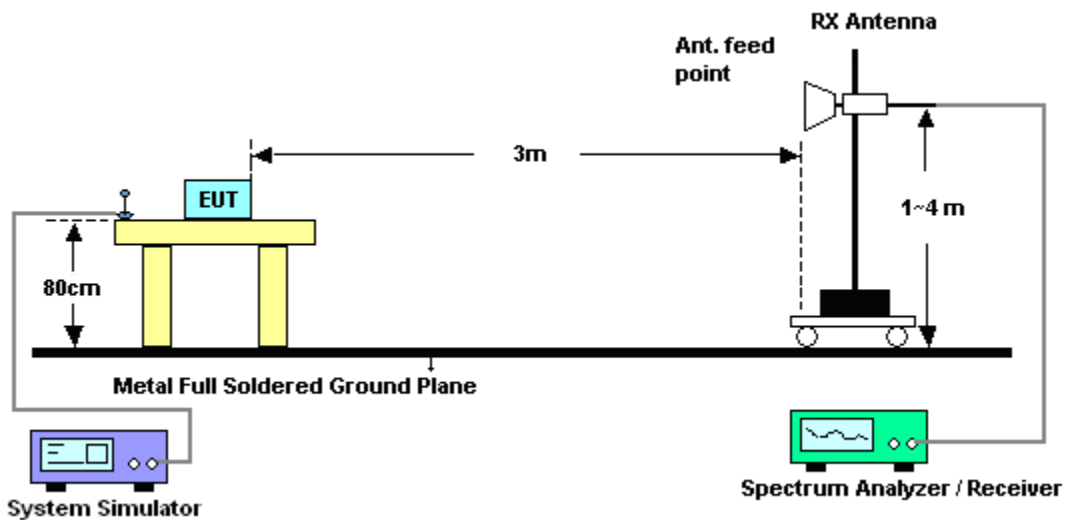
1. The testing follows FCC KDB 971168 v02r01 Section 5.8 and ANSI / TIA-603-C-2004 Section 2.2.12.
2. The EUT was placed on a rotatable wooden table 0.8 meters above the ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. 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.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
11. $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
12. $ERP \text{ (dBm)} = EIRP - 2.15$
13. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
14. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$

3.7.4 Test Setup

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.7.5 Test Result of Field Strength of Spurious Radiated

Band :	GSM1900 for CH512	Temperature :	23~25°C						
Test Mode :	GSM Link (GMSK)	Relative Humidity :	48~52%						
Test Engineer :	Tang Liang	Polarization :	Horizontal						
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit	Reading	Power	loss	Gain		
			(dB)	(dBm)	(dBm)	(dB)	(dBi)	(H/V)	
3700.4	-58.12	-13	-45.12	-69.67	-64.87	1.2	7.95	H	Pass
5550.6	-56.22	-13	-43.22	-73.61	-64.32	1.5	9.60	H	Pass
7400.8	-54.05	-13	-41.05	-75.63	-64.24	1.7	11.89	H	Pass

Band :	GSM1900 for CH512	Temperature :	23~25°C						
Test Mode :	GSM Link (GMSK)	Relative Humidity :	48~52%						
Test Engineer :	Tang Liang	Polarization :	Vertical						
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3700.4	-57.61	-13	-44.61	-72.04	-64.36	1.2	7.95	V	Pass
5550.6	-56.95	-13	-43.95	-73.43	-65.05	1.5	9.6	V	Pass
7400.8	-53.82	-13	-40.82	-75.71	-64.01	1.7	11.89	V	Pass



Band :	GSM1900 for CH661					Temperature :	23~25°C		
Test Mode :	GSM Link (GMSK)					Relative Humidity :	48~52%		
Test Engineer :	Tang Liang					Polarization :	Horizontal		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3760	-58.44	-13	-45.44	-70.59	-65.18	1.28	8.02	H	Pass
5640	-55.43	-13	-42.43	-73.42	-63.85	1.58	10.00	H	Pass
7520	-53.10	-13	-40.10	-75.04	-63.42	1.78	12.10	H	Pass

Band :	GSM1900 for CH661	Temperature :	23~25°C						
Test Mode :	GSM Link (GMSK)	Relative Humidity :	48~52%						
Test Engineer :	Tang Liang	Polarization :	Vertical						
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit	Reading	Power	loss	Gain		
			(dB)	(dBm)	(dBm)	(dB)	(dBi)	(H/V)	
3760	-58.06	-13	-45.06	-73.09	-64.80	1.28	8.02	V	Pass
5640	-56.13	-13	-43.13	-73.21	-64.55	1.58	10	V	Pass
7520	-53.06	-13	-40.06	-75.31	-63.38	1.78	12.1	V	Pass



Band :	GSM1900 for CH810					Temperature :	23~25°C		
Test Mode :	GSM Link (GMSK)					Relative Humidity :	48~52%		
Test Engineer :	Tang Liang					Polarization :	Horizontal		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit	Reading	Power	loss	Gain	(H/V)	
(dB)			(dB)	(dBm)	(dBm)	(dB)	(dBi)		
3819.6	-58.73	-13	-45.73	-70.30	-65.50	1.23	8.00	H	Pass
5729.4	-55.27	-13	-42.27	-73.07	-63.40	1.52	9.65	H	Pass
7639.2	-52.16	-13	-39.16	-74.40	-62.34	1.82	12.00	H	Pass

Band :	GSM1900 for CH810	Temperature :	23~25°C						
Test Mode :	GSM Link (GMSK)	Relative Humidity :	48~52%						
Test Engineer :	Tang Liang	Polarization :	Vertical						
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3819.6	-57.63	-13	-44.63	-72.08	-64.40	1.23	8	V	Pass
5729.4	-56.44	-13	-43.44	-73.33	-64.57	1.52	9.65	V	Pass
7639.2	-52.74	-13	-39.74	-75.29	-62.92	1.82	12	V	Pass



Band :	GSM1900 for CH512					Temperature :	23~25°C		
Test Mode :	EDGE class 8 Link (8PSK)					Relative Humidity :	48~52%		
Test Engineer :	Tang Liang					Polarization :	Horizontal		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3700.4	-62.02	-13	-49.02	-73.57	-68.77	1.2	7.95	H	Pass
5550.6	-56.72	-13	-43.72	-74.11	-64.82	1.5	9.60	H	Pass
7400.8	-53.91	-13	-40.91	-75.49	-64.10	1.7	11.89	H	Pass

Band :	GSM1900 for CH512	Temperature :	23~25°C						
Test Mode :	EDGE class 8 Link (8PSK)	Relative Humidity :	48~52%						
Test Engineer :	Tang Liang	Polarization :	Vertical						
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit	Reading	Power	loss	Gain		
			(dB)	(dBm)	(dBm)	(dB)	(dBi)	(H/V)	
3700.4	-58.87	-13	-45.87	-73.3	-65.62	1.2	7.95	V	Pass
5550.6	-57.41	-13	-44.41	-73.89	-65.51	1.5	9.6	V	Pass
7400.8	-53.83	-13	-40.83	-75.72	-64.02	1.7	11.89	V	Pass



Band :	GSM1900 for CH661					Temperature :	23~25°C		
Test Mode :	EDGE class 8 Link (8PSK)					Relative Humidity :	48~52%		
Test Engineer :	Tang Liang					Polarization :	Horizontal		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3760	-60.84	-13	-47.84	-72.99	-67.58	1.28	8.02	H	Pass
5640	-55.70	-13	-42.70	-73.69	-64.12	1.58	10.00	H	Pass
7520	-53.56	-13	-40.56	-75.50	-63.88	1.78	12.10	H	Pass

Band :	GSM1900 for CH661					Temperature :	23~25°C		
Test Mode :	EDGE class 8 Link (8PSK)					Relative Humidity :	48~52%		
Test Engineer :	Tang Liang					Polarization :	Vertical		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3760	-58.56	-13	-45.56	-73.59	-65.30	1.28	8.02	V	Pass
5640	-56.45	-13	-43.45	-73.53	-64.87	1.58	10	V	Pass
7520	-52.67	-13	-39.67	-74.92	-62.99	1.78	12.1	V	Pass



Band :	GSM1900 for CH810					Temperature :	23~25°C		
Test Mode :	EDGE class 8 Link (8PSK)					Relative Humidity :	48~52%		
Test Engineer :	Tang Liang					Polarization :	Horizontal		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3819.6	-62.04	-13	-49.04	-73.61	-68.81	1.23	8.00	H	Pass
5729.4	-55.97	-13	-42.97	-73.77	-64.10	1.52	9.65	H	Pass
7639.2	-52.63	-13	-39.63	-74.87	-62.81	1.82	12.00	H	Pass

Band :	GSM1900 for CH810					Temperature :	23~25°C		
Test Mode :	EDGE class 8 Link (8PSK)					Relative Humidity :	48~52%		
Test Engineer :	Tang Liang					Polarization :	Vertical		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3819.6	-58.88	-13	-45.88	-73.33	-65.65	1.23	8	V	Pass
5729.4	-56.77	-13	-43.77	-73.66	-64.90	1.52	9.65	V	Pass
7639.2	-53.33	-13	-40.33	-75.88	-63.51	1.82	12	V	Pass



Band :	WCDMA Band V for CH4132	Temperature :	23~25°C						
Test Mode :	RMC 12.2Kbps Link (QPSK)	Relative Humidity :	48~52%						
Test Engineer :	Tang Liang	Polarization :	Horizontal						
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1652.8	-50.93	-13	-37.93	-66.25	-53.92	0.81	5.95	H	Pass
2479.2	-45.98	-13	-32.98	-68.35	-48.43	1.2	5.80	H	Pass
3305.6	-57.57	-13	-44.57	-68.17	-61.87	1.25	7.70	H	Pass

Band :	WCDMA Band V for CH4132	Temperature :	23~25°C						
Test Mode :	RMC 12.2Kbps Link (QPSK)	Relative Humidity :	48~52%						
Test Engineer :	Tang Liang	Polarization :	Vertical						
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1652.8	-55.53	-13	-42.53	-66.96	-58.52	0.81	5.95	V	Pass
2479.2	-47.34	-13	-34.34	-67.65	-49.79	1.20	5.80	V	Pass
3305.6	-60.04	-13	-47.04	-71.87	-64.34	1.25	7.70	V	Pass



Band :	WCDMA Band V for CH4182	Temperature :	23~25°C						
Test Mode :	RMC 12.2Kbps Link (QPSK)	Relative Humidity :	48~52%						
Test Engineer :	Tang Liang	Polarization :	Horizontal						
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1672	-55.85	-13	-42.85	-68.77	-58.82	0.88	6.00	H	Pass
2510	-47.55	-13	-34.55	-69.87	-50.16	1.08	5.84	H	Pass
3346	-61.49	-13	-48.49	-72.09	-65.86	1.14	7.66	H	Pass

Band :	WCDMA Band V for CH4182	Temperature :	23~25°C						
Test Mode :	RMC 12.2Kbps Link (QPSK)	Relative Humidity :	48~52%						
Test Engineer :	Tang Liang	Polarization :	Vertical						
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1672	-57.74	-13	-44.74	-68.37	-60.71	0.88	6.00	V	Pass
2510	-50.89	-13	-37.89	-70.39	-53.50	1.08	5.84	V	Pass
3346	-60.30	-13	-47.30	-72.13	-64.67	1.14	7.66	V	Pass



Band :	WCDMA Band V for CH4233					Temperature :	23~25°C		
Test Mode :	RMC 12.2Kbps Link (QPSK)					Relative Humidity :	48~52%		
Test Engineer :	Tang Liang					Polarization :	Horizontal		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1693.2	-55.09	-13	-42.09	-68.63	-58.42	0.82	6.30	H	Pass
2539.8	-47.44	-13	-34.44	-69.81	-50.05	1.08	5.84	H	Pass
3386.4	-60.88	-13	-47.88	-71.77	-65.00	1.23	7.50	H	Pass

Band :	WCDMA Band V for CH4233					Temperature :	23~25°C		
Test Mode :	RMC 12.2Kbps Link (QPSK)					Relative Humidity :	48~52%		
Test Engineer :	Tang Liang					Polarization :	Vertical		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	ERP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
1693.2	-56.80	-13	-43.80	-68.05	-60.13	0.82	6.30	V	Pass
2539.8	-50.85	-13	-37.85	-70.37	-53.46	1.08	5.84	V	Pass
3386.4	-59.93	-13	-46.93	-72.05	-64.05	1.23	7.50	V	Pass



Band :	WCDMA Band II for CH9262					Temperature :	23~25°C		
Test Mode :	RMC 12.2Kbps Link (QPSK)					Relative Humidity :	48~52%		
Test Engineer :	Tang Liang					Polarization :	Horizontal		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3704.8	-61.17	-13	-48.17	-73.03	-68.02	1.35	8.20	H	Pass
5557.2	-53.74	-13	-40.74	-71.47	-62.35	1.65	10.26	H	Pass
7409.6	-53.32	-13	-40.32	-75.76	-63.66	1.82	12.16	H	Pass

Band :	WCDMA Band II for CH9262	Temperature :	23~25°C						
Test Mode :	RMC 12.2Kbps Link (QPSK)	Relative Humidity :	48~52%						
Test Engineer :	Tang Liang	Polarization :	Vertical						
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3704.8	-57.78	-13	-44.78	-72.52	-64.63	1.35	8.2	V	Pass
5557.2	-56.90	-13	-43.90	-73.72	-65.51	1.65	10.26	V	Pass
7409.6	-52.67	-13	-39.67	-75.42	-63.01	1.82	12.16	V	Pass



Band :	WCDMA Band II for CH9400					Temperature :	23~25°C		
Test Mode :	RMC 12.2Kbps Link (QPSK)					Relative Humidity :	48~52%		
Test Engineer :	Tang Liang					Polarization :	Horizontal		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3760	-60.39	-13	-47.39	-72.54	-67.13	1.28	8.02	H	Pass
5640	-54.78	-13	-41.78	-72.77	-63.20	1.58	10.00	H	Pass
7520	-53.60	-13	-40.60	-75.54	-63.92	1.78	12.10	H	Pass

Band :	WCDMA Band II for CH9400					Temperature :	23~25°C		
Test Mode :	RMC 12.2Kbps Link (QPSK)					Relative Humidity :	48~52%		
Test Engineer :	Tang Liang					Polarization :	Vertical		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3760	-57.63	-13	-44.63	-72.66	-64.37	1.28	8.02	V	Pass
5640	-55.41	-13	-42.41	-72.49	-63.83	1.58	10	V	Pass
7520	-52.90	-13	-39.90	-75.15	-63.22	1.78	12.1	V	Pass



Band :	WCDMA Band II for CH9538	Temperature :	23~25°C						
Test Mode :	RMC 12.2Kbps Link (QPSK)	Relative Humidity :	48~52%						
Test Engineer :	Tang Liang	Polarization :	Horizontal						
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over Limit	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	(dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3815.2	-60.48	-13	-47.48	-72.63	-67.22	1.28	8.02	H	Pass
5722.8	-52.09	-13	-39.09	-70.08	-60.51	1.58	10.00	H	Pass
7630.4	-53.43	-13	-40.43	-75.37	-63.75	1.78	12.10	H	Pass

Band :	WCDMA Band II for CH9538					Temperature :	23~25°C		
Test Mode :	RMC 12.2Kbps Link (QPSK)					Relative Humidity :	48~52%		
Test Engineer :	Tang Liang					Polarization :	Vertical		
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.								
Frequency	EIRP	Limit	Over	SPA	S.G.	TX Cable	TX Antenna	Polarization	Result
(MHz)	(dBm)	(dBm)	Limit (dB)	Reading (dBm)	Power (dBm)	loss (dB)	Gain (dBi)	(H/V)	
3815.2	-57.65	-13	-44.65	-72.68	-64.39	1.28	8.02	V	Pass
5722.8	-55.36	-13	-42.36	-72.44	-63.78	1.58	10	V	Pass
7630.4	-53.42	-13	-40.42	-75.67	-63.74	1.78	12.1	V	Pass

3.8 Frequency Stability Measurement

3.8.1 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.

3.8.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

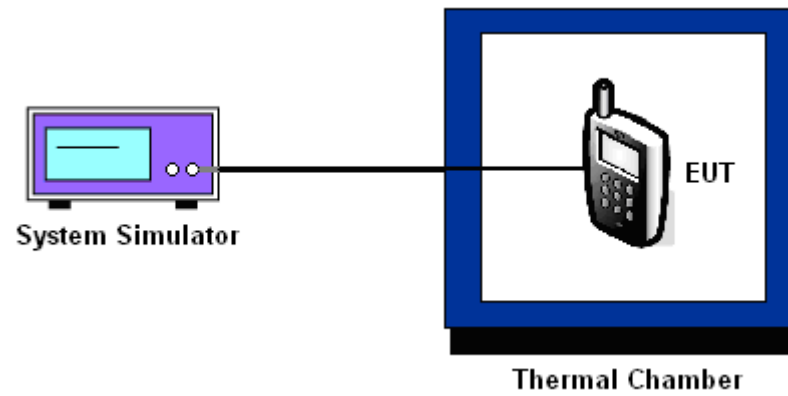
3.8.3 Test Procedures for Temperature Variation

1. The testing follows FCC KDB 971168 v02r01 Section 9.0.
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in 10°C steps up to 50°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.

3.8.4 Test Procedures for Voltage Variation

1. The testing follows FCC KDB 971168 v02r01 Section 9.0.
2. The EUT was placed in a temperature chamber at $25\pm 5^{\circ}\text{C}$ and connected with the system simulator.
3. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
4. The variation in frequency was measured for the worst case.

3.8.5 Test Setup



3.8.6 Test Result of Temperature Variation

Band :	GSM 1900	Channel :	661
Limit (ppm) :	within authorized band	Frequency :	1880.0 MHz

Temperature (°C)	GSM		EDGE class 8		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
50	-24	0.0027	-16	0.0021	PASS
40	-25	0.0032	-14	0.0032	
30	-22	0.0016	-18	0.0011	
20(Ref.)	-19	0.0000	-20	0.0000	
10	-15	0.0021	-19	0.0005	
0	-18	0.0005	-22	0.0011	
-10	-20	0.0005	-26	0.0032	
-20	-30	0.0059	-30	0.0053	
-30	-35	0.0085	-46	0.0138	

Note: The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.

Band :	WCDMA Band V	Channel :	4182
Limit (ppm) :	2.5	Frequency :	836.4 MHz

Temperature (°C)	RMC 12.2Kbps		Result
	Freq. Dev. (Hz)	Deviation (ppm)	
50	2	0.0012	PASS
40	2	0.0012	
30	2	0.0012	
20(Ref.)	3	0.0000	
10	2	0.0012	
0	-2	0.0060	
-10	2	0.0012	
-20	3	0.0000	
-30	-2	0.0060	

Band :	WCDMA Band II	Channel :	9400
Limit (ppm) :	within authorized band	Frequency :	1880.0 MHz

Temperature (°C)	RMC 12.2Kbps		Result
	Freq. Dev. (Hz)	Deviation (ppm)	
50	-10	0.0005	PASS
40	-11	0.0011	
30	-10	0.0005	
20(Ref.)	-9	0.0000	
10	-9	0.0000	
0	-10	0.0005	
-10	-8	0.0005	
-20	-8	0.0005	
-30	-8	0.0005	

Note: The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.

3.8.7 Test Result of Voltage Variation

Band & Channel	Mode	Voltage (Volt)	Freq. Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
GSM 1900 CH661	GSM	3.40	-20	0.0005	Note 2	PASS
		3.85	-19	0.0000		
		4.40	-28	0.0037		
	EDGE class 8	3.40	-17	0.0016		
		3.85	-20	0.0000		
		4.40	-28	0.0048		
WCDMA Band V CH4182	RMC 12.2Kbps	3.40	3	0.0000	2.5	
		3.85	3	0.0000		
		4.40	3	0.0012		
WCDMA Band II CH9400	RMC 12.2Kbps	3.40	-10	0.0005	Note 2	
		3.85	-10	0.0005		
		4.40	-10	0.0016		

Note:

1. Normal Voltage = 3.85V.
2. The frequency fundamental emissions stay within the authorized frequency block based on the frequency deviation measured is small.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	May. 08, 2014	Sep. 22, 2014~ Oct. 24, 2014	May. 07, 2015	Conducted (TH01-SZ)
Thermal Chamber	Hongzhangroup	LP-150U	HD20120425	-40℃~150℃	Feb. 21, 2014	Sep. 22, 2014~ Oct. 24, 2014	Feb. 20, 2015	Conducted (TH01-SZ)
ESCIO TEST Receiver	R&S	ESCI	100724	9kHz~3GHz	Feb. 21, 2014	Sep. 30, 2014	Feb. 20, 2015	Radiation (03CH01-SZ)
Spectrum Analyzer	Agilent Technologies	N9038A	MY52260185	20Hz~26.5GHz	May 26, 2014	Sep. 30, 2014	May 25, 2015	Radiation (03CH01-SZ)
Bilog Antenna	TESEQ	CBL 6112D	23188	30MHz~2GHz	Oct. 26, 2013	Sep. 30, 2014	Oct. 25, 2014	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS Lindgren	3117	00119436	1GHz~18GHz	Oct. 26, 2013	Sep. 30, 2014	Oct. 25, 2014	Radiation (03CH01-SZ)
Double Ridged Horn Antenna	COM-POWER	AH-840	101073	18GHz~40GHz	Jan. 27, 2014	Sep. 30, 2014	Jan. 26, 2015	Radiation (03CH01-SZ)
Amplifier	ADVANTEST	BB525C	E9007003	9kHz~3000MHz	Feb. 21, 2014	Sep. 30, 2014	Feb. 20, 2015	Radiation (03CH01-SZ)
Amplifier	Yiai	AV3860B	04030	2GHz~26.5GHz	May 08, 2014	Sep. 30, 2014	May 07, 2015	Radiation (03CH01-SZ)
AC Source(AVR)	Chroma	61601	61601000198 5	100Vac~250Vac	Mar. 25, 2014	Sep. 30, 2014	Mar. 24, 2015	Radiation (03CH01-SZ)
Turn Table	EM Electronics	EM 1000	N/A	0~360 degree	NCR	Sep. 30, 2014	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM Electronics	EM 1000	N/A	1 m~4 m	NCR	Sep. 30, 2014	NCR	Radiation (03CH01-SZ)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	3.9
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