FCC RF Test Report

APPLICANT	:	Bullitt Group
EQUIPMENT	:	Smart Phone
BRAND NAME	:	CAT
MODEL NAME	:	B15
FCC ID	:	ZL5B15AWS
STANDARD	:	FCC 47 CFR Part 2, 22(H), 24(E)
CLASSIFICATION	:	PCS Licensed Transmitter Held to Ear (PCE)

The product was received on Dec. 26, 2012 and completely tested on Jun. 14, 2013. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI / TIA / EIA-603-C-2004 and shown 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 INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

Testing Laboratory 1190

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG2D2653-01A	Rev. 01	Initial issue of report	Jul. 18, 2013
FG2D2653-01A	Rev. 02	Update report for revising standard from KDB 971168 D01 Power Meas. License Digital Systems v02 to v02r01 and Product Equality Declaration.	Jul. 19, 2013

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	§2.1046	RSS-132 (5.4) RSS-133 (6.4)	Conducted Output Power	N/A	PASS	-
3.2	§24.232(d)	RSS-132 (5.4) RSS-133(6.4)	Peak-to-Average Ratio	< 13 dB	PASS	-
3.3	§22.913(a)(2)	RSS-132(5.4) SRSP-503(5.1.3)	Effective Radiated Power	< 7 Watts	PASS	-
3.3	§24.232(c)	RSS-133 (6.4) SRSP-510(5.1.2)	Equivalent Isotropic Radiated Power	< 2 Watts	PASS	-
3.4	§2.1049 §22.917(a) §24.238(a)	RSS-GEN(4.6.1) RSS-133(2.3)	Occupied Bandwidth	N/A	PASS	-
3.5	§2.1051 §22.917(a) §24.238(a)	RSS-132 (5.5) RSS-133 (6.5)	Band Edge Measurement	< $43+10\log_{10}$(P[Watts])	PASS	-
3.6	§2.1051 §22.917(a) §24.238(a)	RSS-132 (5.5) RSS-133 (6.5)	Conducted Spurious Emission	< $43+10\log_{10}$(P[Watts])	PASS	-
3.7	§2.1053 §22.917(a) §24.238(a)	RSS-132 (5.5) RSS-133 (6.5)	Field Strength of Spurious Radiation	< $43+10\log_{10}$(P[Watts])	PASS	Under limit 16.02 dB at 1669.000 MHz
3.8	§2.1055 §22.355 §24.235	RSS-132(5.3) RSS-133(6.3)	Frequency Stability for Temperature & Voltage	< 2.5 ppm	PASS	-

Remark: FCC ID ZL5B15AWS WWAN RF circuit design is the same as FCC ID ZL5B15 granted on 2013/02/19, except the differences referring to the Product Equality Declaration in Appendix C. Based on the similarity between two FCC IDs, the Conducted and Radiation test data of FCC ID ZL5B15 granted on 2013/02/19 is referred in this report to show the compliance of the FCC ID ZL5B15AWS, and revising the Peak-to-Average Ratio data under new measurement method.

1 General Description

1.1 Applicant

Bullitt Group

No. 4, The Aquarium, King Street, Reading, RG1 2AN United Kingdom

1.2 Manufacturer

Compal Communications (Nanjing) Co., Ltd.

No. 68-2, Suyuan Road, Nanjing Export, Processing Zone(South Area), P.R. China

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	Smart Phone
Brand Name	CAT
Model Name	B15
FCC ID	ZL5B15AWS
EUT supports Radios application	GSM/EGPRS/WCDMA/HSDPA WLAN 11bgn / Bluetooth 2.1/3.0
EUT Stage	Production Unit

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 of Equipment Under Test

Product Specification subjective to this standard	
Tx Frequency	GSM850: 824.2 MHz ~ 848.8 MHz 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	GSM850: 869.2 MHz ~ 893.8 MHz 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	GSM850 : 33.29 dBm GSM1900 : 30.49 dBm WCDMA Band V : 24.29 dBm WCDMA Band II : 23.42 dBm
Antenna Type	PIFA Antenna
Type of Modulation	GSM: GMSK GPRS: GMSK EDGE: GMSK / 8PSK WCDMA: QPSK (Uplink) HSDPA: QPSK (Uplink)

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 (%, Hz, ppm)	Emission Designator
Part 22	GSM850 GSM	GMSK	1.0375	0.02 ppm	250KGXW
Part 22	GSM850 EDGE class 8	8PSK	0.2213	0.02 ppm	244KG7W
Part 22	WCDMA Band V RMC 12.2kbps	QPSK	0.1271	0.01 ppm	4M20F9W
Part 24	GSM1900 GSM	GMSK	0.9661	0.02 ppm	250KGXW
Part 24	GSM1900 EDGE class 8	8PSK	0.2884	0.02 ppm	250KG7W
Part 24	WCDMA Band II RMC 12.2kbps	QPSK	0.1656	0.01 ppm	4M20F9W

1.7 Testing Site

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978		
Test Site No.	Sporton Site No.		FCC/IC Registration No.
	TH02-HY	03CH05-HY	722060/4086B-1

1.8 Applied 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

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Frequency range investigated for radiated emission is as follows:

1. 30 MHz to 9000 MHz for GSM850 and WCDMA Band V.
2. 30 MHz to 19000 MHz for GSM1900 and WCDMA Band II.

Test Modes		
Band	**Radiated TCs**	**Conducted TCs**
GSM 850	■ GSM Link ■ EDGE class 8 Link	■ GSM Link ■ EDGE class 8 Link
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

Note:

1. The maximum power levels are GSM mode for GMSK link, EDGE multi-slot class 8 mode for 8PSK link, RMC 12.2kbps mode for WCDMA band V, and RMC 12.2kbps mode for WCDMA band II, only these modes were used for all tests.

2. Because there are individual antennas for each WWAN, WLAN, and Bluetooth, the co-location test modes are not required.

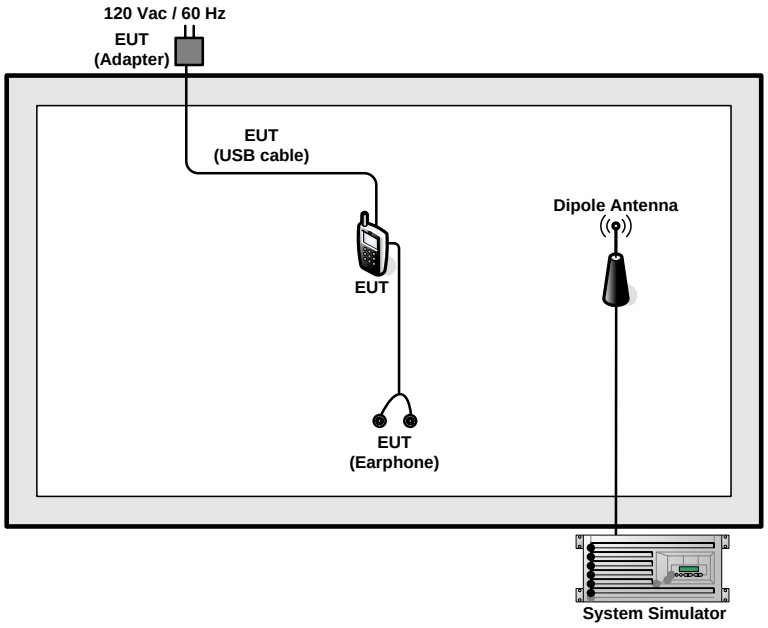
3. All the tests were performed with Earphone 1, USB Cable, Adapter, and Battery.

The conducted power tables are as follows:

Conducted Power (*Unit: dBm)						
Band	**GSM850**			**GSM1900**		
Channel	**128**	**189**	**251**	**512**	**661**	**810**
Frequency	**824.2**	**836.4**	**848.8**	**1850.2**	**1880.0**	**1909.8**
GSM	33.28	**33.29**	33.26	30.45	**30.49**	30.47
GPRS class 8	33.25	33.26	33.22	30.35	30.46	30.43
GPRS class 10	29.24	29.28	29.21	26.56	26.71	26.63
GPRS class 12	26.88	26.93	26.86	24.17	24.33	24.24
EGPRS class 8	26.04	**26.24**	25.82	25.21	**25.38**	25.31
EGPRS class 10	22.34	22.54	22.13	21.83	21.97	21.88
EGPRS class 12	19.64	19.84	19.49	19.12	19.18	19.13

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**
RMC 12.2k	23.93	24.14	**24.29**	**23.42**	23.12	23.07
HSDPA Subtest-1	23.99	24.13	24.28	23.39	23.18	23.14
HSDPA Subtest-2	22.97	23.13	23.28	22.39	22.13	22.10
HSDPA Subtest-3	22.49	22.66	22.82	21.92	21.69	21.64
HSDPA Subtest-4	22.48	22.66	22.81	21.89	21.65	21.60

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

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

2.4 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 EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

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

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Example :

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

= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 Conducted Output Power Measurement

3.1.1 Description of the Conducted Output Power Measurement

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

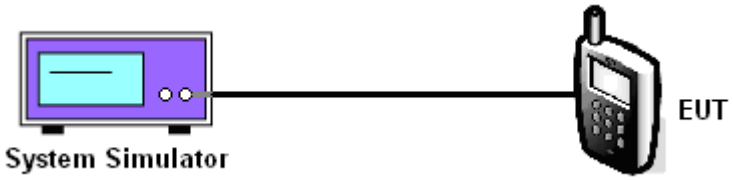
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The transmitter output port was connected to base station.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set EUT at maximum power through base station.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. 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									
Modes	GSM850 (GSM)			GSM850 (EDGE class 8)			WCDMA Band V (RMC 12.2kbps)		
Channel	128 (Low)	189 (Mid)	251 (High)	128 (Low)	189 (Mid)	251 (High)	4132 (Low)	4182 (Mid)	4233 (High)
Frequency (MHz)	824.2	836.4	848.8	824.2	836.4	848.8	826.4	836.4	846.6
Conducted Power (dBm)	33.28	33.29	33.26	26.04	26.24	25.82	23.93	24.14	24.29
Conducted Power (Watts)	2.13	2.13	2.12	0.40	0.42	0.38	0.25	0.26	0.27

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)	30.45	30.49	30.47	25.21	25.38	25.31	23.42	23.12	23.07
Conducted Power (Watts)	1.11	1.12	1.11	0.33	0.35	0.34	0.22	0.21	0.20

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.

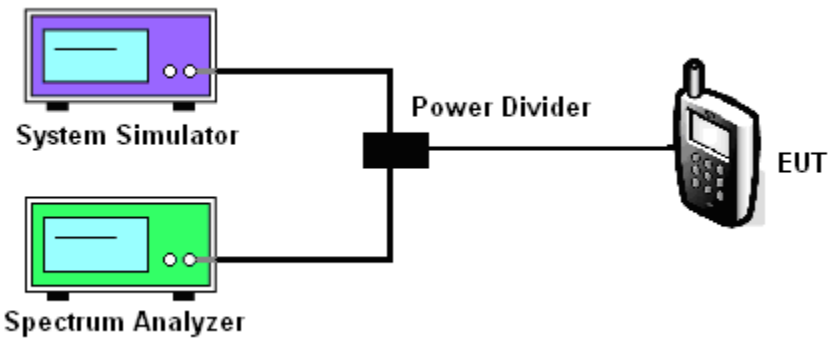
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and System Simulator via power divider.
2. For GSM/EGPRS operating modes:
   a. Set EUT in maximum power output.
   b. Set the RBW = 1MHz, VBW = 3MHz, Peak detector in spectrum analyzer for first trace.
   c. Set the RBW = 1MHz, VBW = 3MHz, RMS detector in 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 synchronized with the spectrum analyzer.
3. For UMTS operating modes:
   a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
   b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
4. Record the deviation as Peak to Average Ratio.

3.2.4 Test Setup



3.2.5 Test Result of Peak-to-Average Ratio

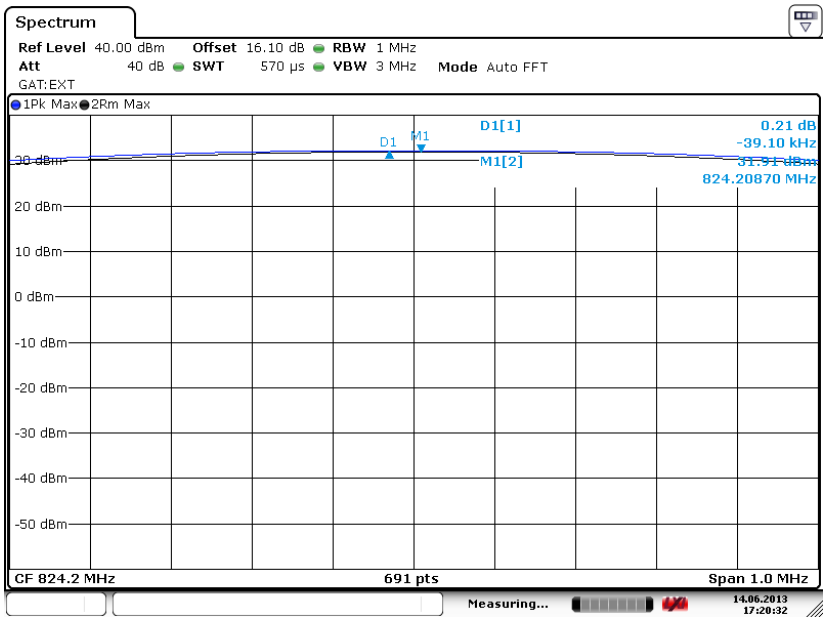
Cellular Band									
Modes	GSM850 (GSM)			GSM850 (EDGE class 8)			WCDMA Band V (RMC 12.2kbps)		
Channel	128 (Low)	189 (Mid)	251 (High)	128 (Low)	189 (Mid)	251 (High)	4132 (Low)	4182 (Mid)	4233 (High)
Frequency (MHz)	824.2	836.4	848.8	824.2	836.4	848.8	826.4	836.4	846.6
Peak-to-Average Ratio (dB)	0.21	0.20	0.20	2.87	2.80	2.93	3.24	3.08	3.48

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)	0.20	0.23	0.20	2.77	2.47	2.68	3.44	2.80	2.64

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

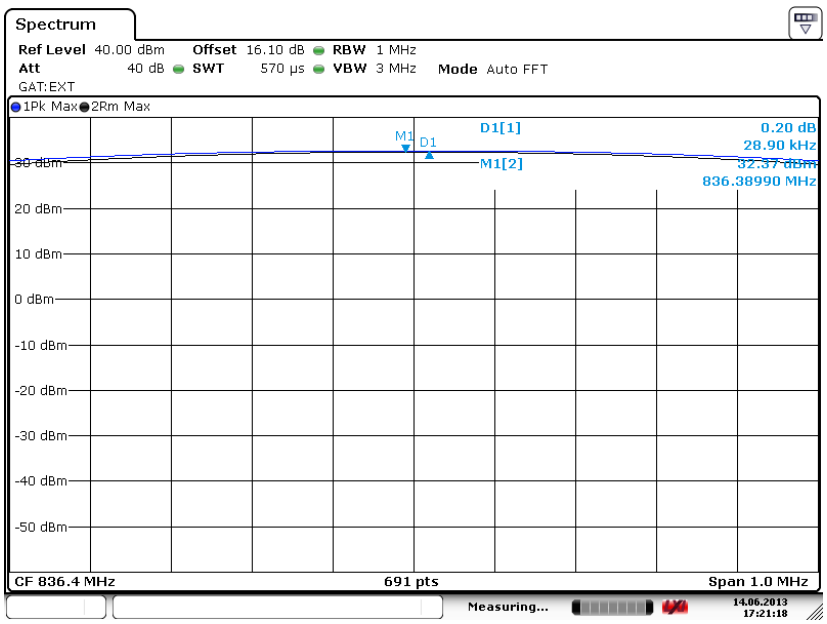
Band :	GSM 850	Test Mode :	GSM Link (GMSK)

Peak-to-Average Ratio on Channel 128 (824.2 MHz)



Date: 14.JUN.2013 17:20:32

Peak-to-Average Ratio on Channel 189 (836.4 MHz)



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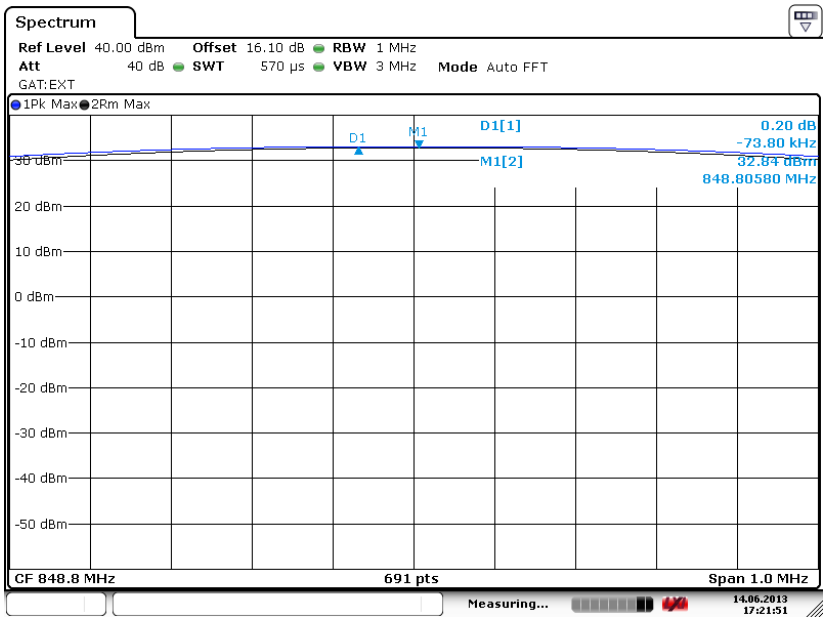
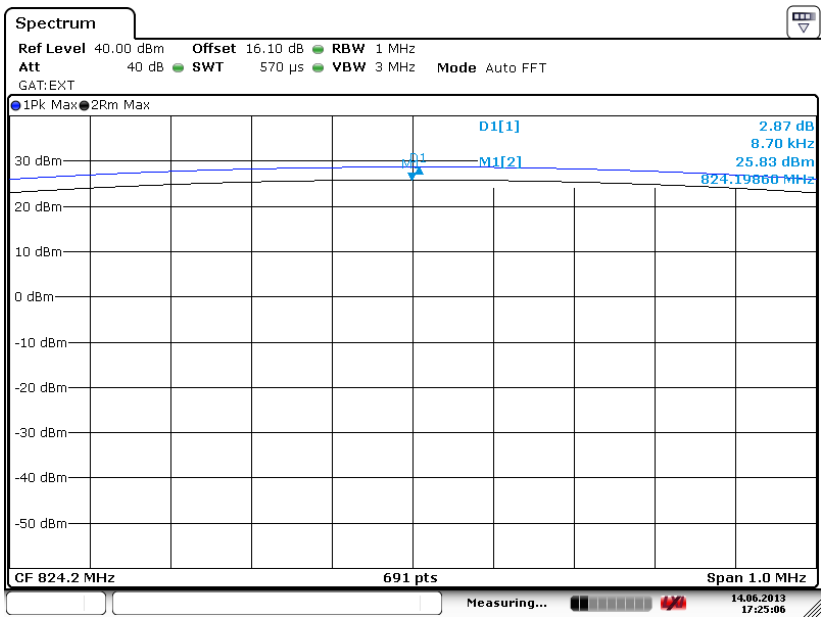
Peak-to-Average Ratio on Channel 251 (848.8 MHz)



Date: 14.JUN.2013 17:21:51

Band :	GSM 850	Test Mode :	EDGE class 8 Link (8PSK)

Peak-to-Average Ratio on Channel 128 (824.2 MHz)



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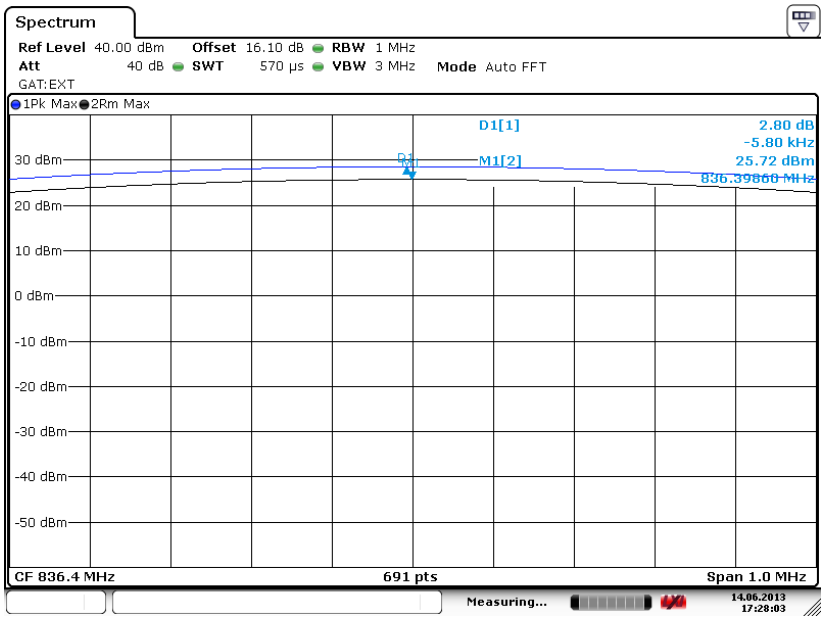
Peak-to-Average Ratio on Channel 189 (836.4 MHz)



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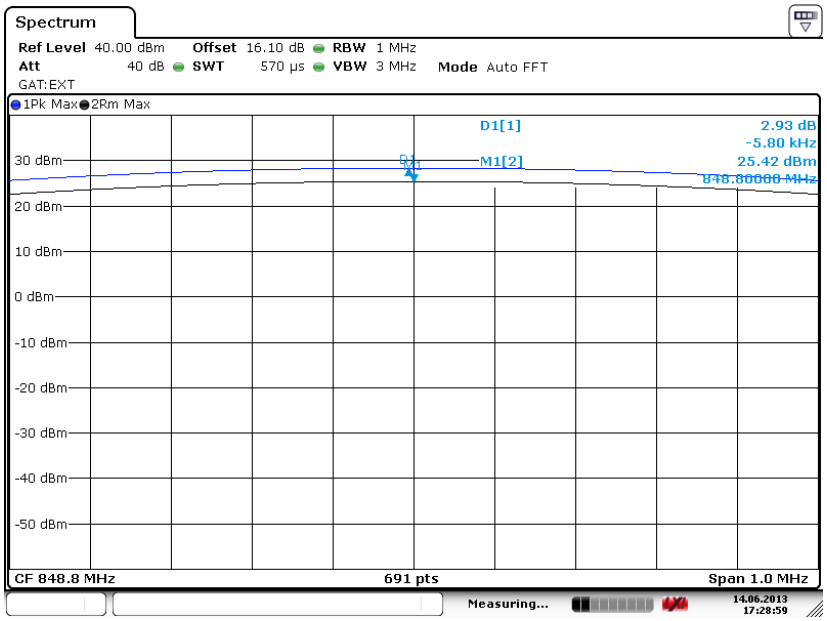
Peak-to-Average Ratio on Channel 251 (848.8 MHz)



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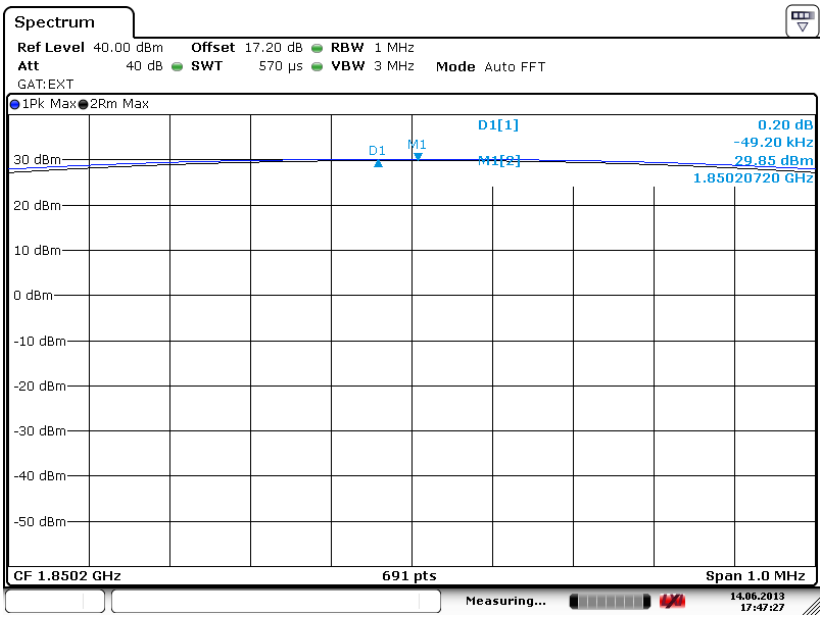
Band :	GSM 1900	Test Mode :	GSM Link

Peak-to-Average Ratio on Channel 512 (1850.2 MHz)



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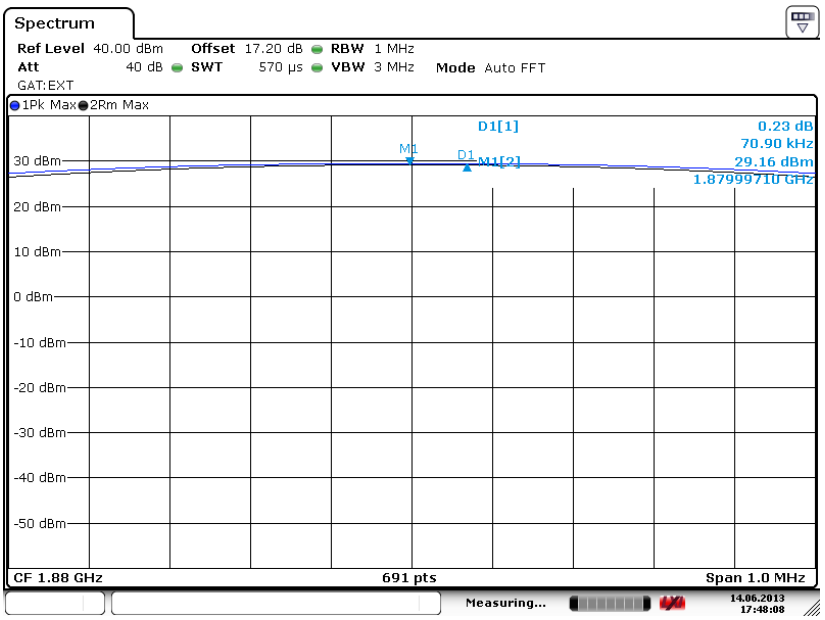
Peak-to-Average Ratio on Channel 661 (1880.0 MHz)



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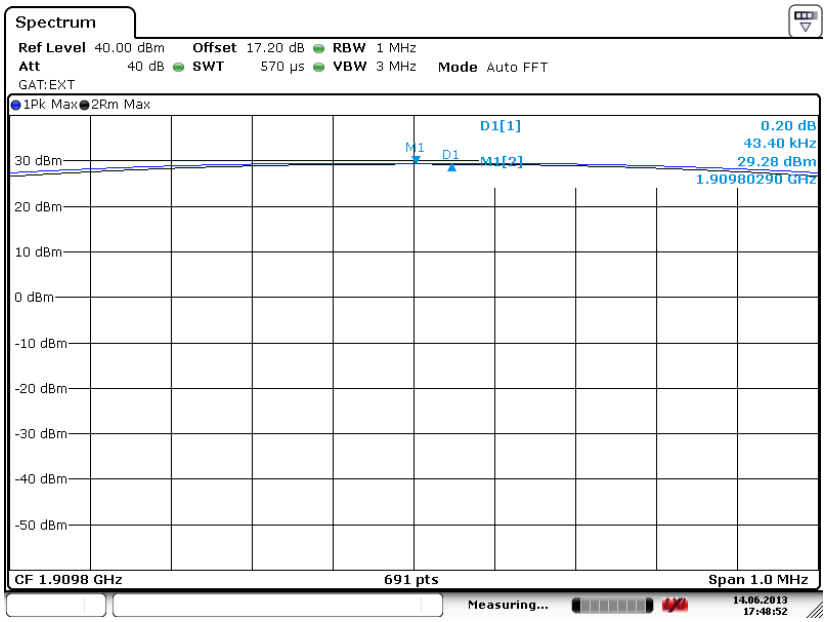
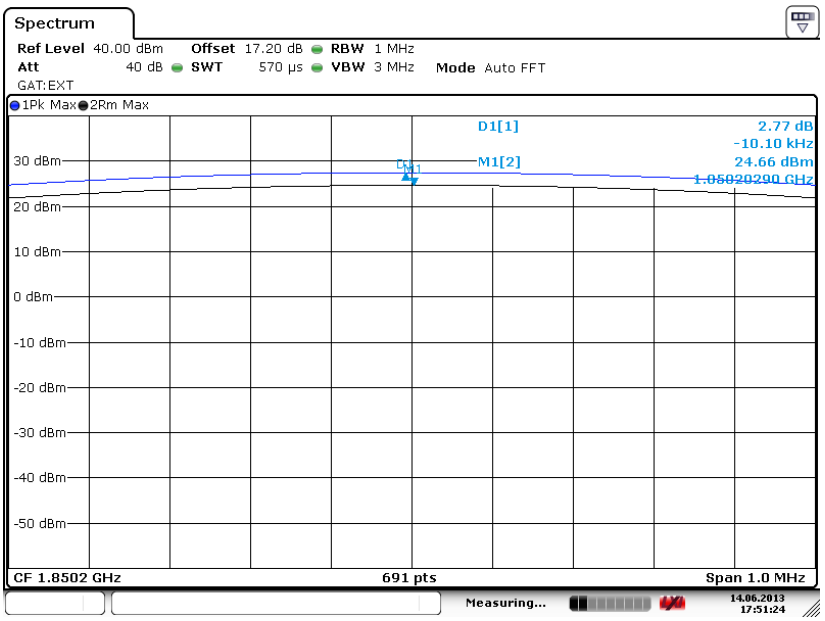
Peak-to-Average Ratio on Channel 810 (1909.8 MHz)



Date: 14.JUN.2013 17:48:52

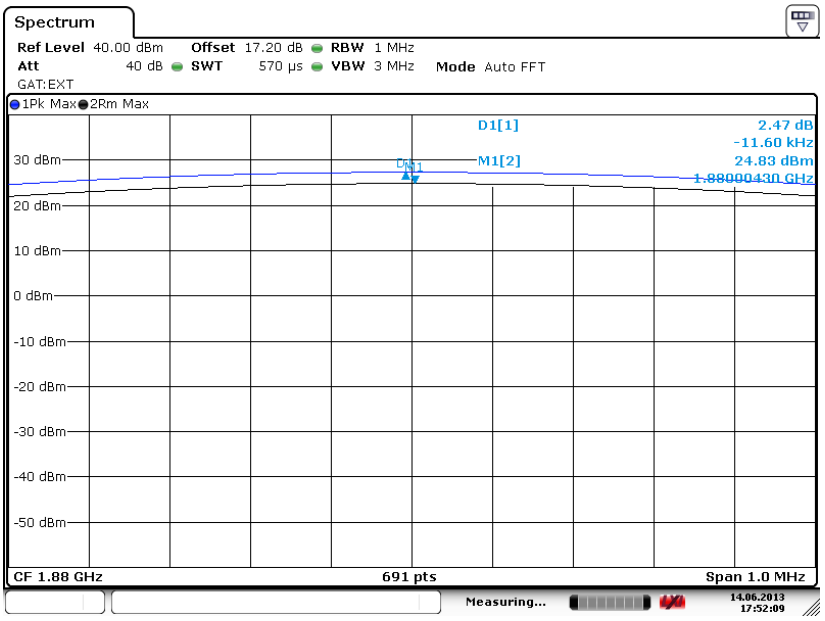
Band :	GSM 1900	Test Mode :	EDGE class 8 Link (8PSK)

Peak-to-Average Ratio on Channel 512 (1850.2 MHz)



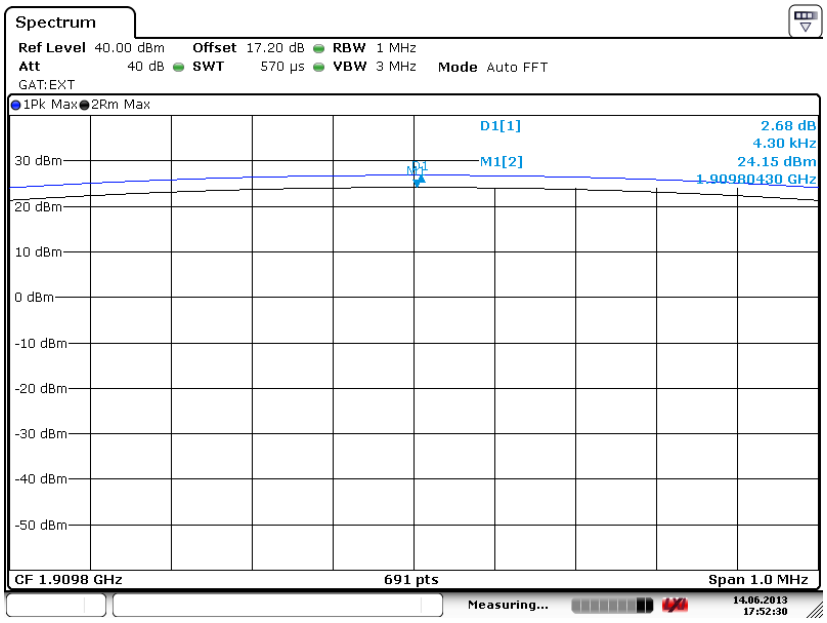
Date: 14.JUN.2013 17:51:25

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



Date: 14.JUN.2013 17:52:10

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



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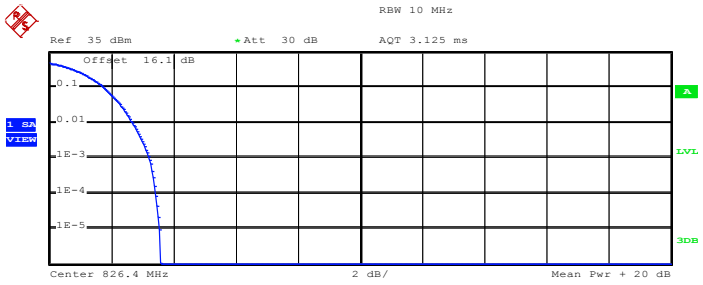
Band :	WCDMA Band V	Test Mode :	RMC 12.2kbps Link (QPSK)

Peak-to-Average Ratio on Channel 4132 (826.4 MHz)

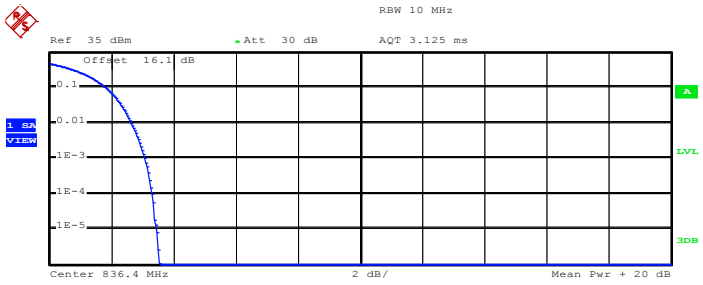


Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	19.88 dBm
Peak	23.47 dBm
Crest	3.59 dB
10 %	1.76 dB
1 %	2.68 dB
.1 %	3.24 dB
.01 %	3.44 dB

Date: 10.JAN.2013 09:29:34

Peak-to-Average Ratio on Channel 4182 (836.4 MHz)

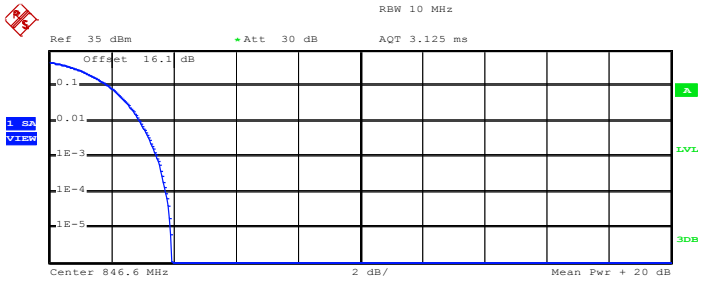


Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	20.50 dBm
Peak	24.04 dBm
Crest	3.53 dB
10 %	1.84 dB
1 %	2.64 dB
.1 %	3.08 dB
.01 %	3.32 dB

Date: 10.JAN.2013 09:30:01

Peak-to-Average Ratio on Channel 4233 (846.6 MHz)



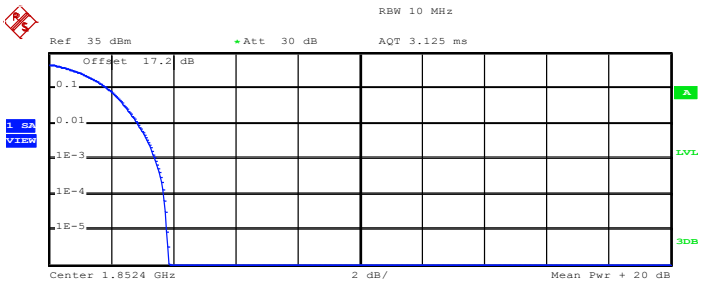
Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	20.71 dBm
Peak	24.67 dBm
Crest	3.96 dB
10 %	1.92 dB
1 %	2.92 dB
.1 %	3.48 dB
.01 %	3.76 dB

Date: 10.JAN.2013 09:30:19

Band :	WCDMA Band II	Test Mode :	RMC 12.2kbps Link

Peak-to-Average Ratio on Channel 9262 (1852.4 MHz)

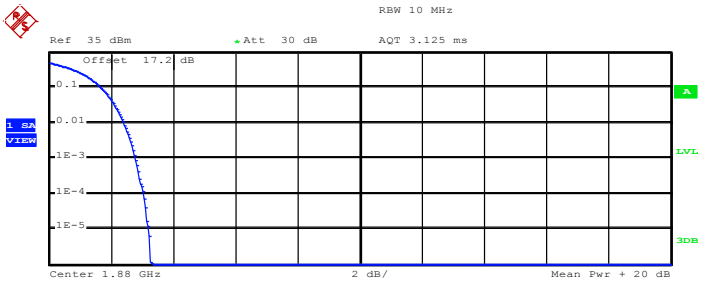


Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	19.75 dBm
Peak	23.61 dBm
Crest	3.86 dB
10 %	1.92 dB
1 %	2.88 dB
.1 %	3.44 dB
.01 %	3.72 dB

Date: 10.JAN.2013 09:20:27

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

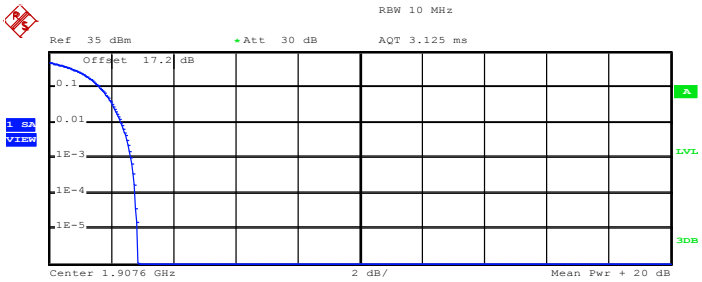


Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	20.26 dBm
Peak	23.54 dBm
Crest	3.28 dB
10 %	1.68 dB
1 %	2.40 dB
.1 %	2.80 dB
.01 %	3.04 dB

Date: 10.JAN.2013 09:20:44

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



Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	19.97 dBm
Peak	22.84 dBm
Crest	2.86 dB
10 %	1.64 dB
1 %	2.32 dB
.1 %	2.64 dB
.01 %	2.80 dB

Date: 10.JAN.2013 09:21:05

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.

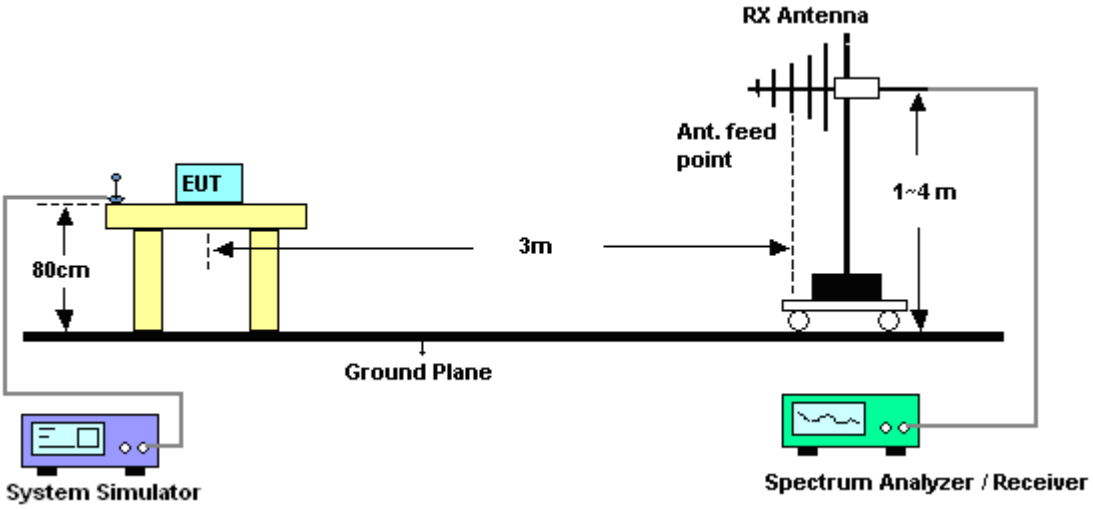
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

1. The EUT was placed on an non-conductive rotating platform with 0.8 meter height 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 RBW= 1MHz, VBW= 3MHz for GSM, RBW= 100 kHz, VBW= 300 kHz, used channel power option with bandwidth=5MHz for WCDMA, and RMS detector settings per section 4.0 of KDB 971168 D01.
2. During the measurement, the EUT was enforced in maximum power and linked with a base station. The highest 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.
3. 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 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 + Correction factor and ERP = EIRP – 2.15 .

3.3.4 Test Setup



3.3.5 Test Result of ERP

GSM850 (GSM) Radiated Power ERP				
Horizontal Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (W)**
824.2	0.87	30.99	29.71	0.9354
836.4	0.90	30.89	29.64	0.9204
848.8	1.09	31.22	30.16	1.0375
Vertical Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (W)**
824.2	-7.30	34.67	25.22	0.3327
836.4	-6.94	34.88	25.79	0.3793
848.8	-6.46	34.74	26.13	0.4102

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

GSM850 (EDGE class 8) Radiated Power ERP				
Horizontal Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (W)**
824.2	-6.09	30.99	22.75	0.1884
836.4	-5.88	30.89	22.86	0.1932
848.8	-5.62	31.22	23.45	0.2213
Vertical Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (W)**
824.2	-14.16	34.67	18.36	0.0685
836.4	-13.66	34.88	19.07	0.0807
848.8	-13.02	34.74	19.57	0.0906

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

WCDMA Band V (RMC 12.2kbps) Radiated Power ERP				
Horizontal Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (W)**
826.40	-8.52	30.74	20.07	0.1016
836.40	-8.61	30.89	20.13	0.1030
846.60	-8.10	31.29	21.04	0.1271
Vertical Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**ERP (dBm)**	**ERP (W)**
826.40	-16.44	34.94	16.35	0.0432
836.40	-16.23	34.88	16.50	0.0447
846.60	-15.57	34.67	16.95	0.0495

* 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	-12.17	40.70	28.53	0.7129
1880.0	-12.06	41.91	29.85	0.9661
1909.8	-12.35	41.73	29.38	0.8670
Vertical Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (W)**
1850.2	-20.09	42.78	22.69	0.1858
1880.0	-20.65	43.75	23.10	0.2042
1909.8	-21.03	43.06	22.03	0.1596

* 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	-17.04	40.70	23.66	0.2323
1880.0	-17.31	41.91	24.60	0.2884
1909.8	-18.00	41.73	23.73	0.2360
Vertical Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (W)**
1850.2	-25.43	42.78	17.35	0.0543
1880.0	-26.23	43.75	17.52	0.0565
1909.8	-27.03	43.06	16.03	0.0401

* 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	-18.21	40.40	22.19	0.1656
1880.00	-19.91	41.91	22.00	0.1585
1907.60	-20.39	41.59	21.20	0.1318
Vertical Polarization				
Frequency (MHz)	**LVL (dBm)**	**Correction Factor (dB)**	**EIRP (dBm)**	**EIRP (W)**
1852.40	-26.87	42.69	15.82	0.0382
1880.00	-28.10	43.75	15.65	0.0367
1907.60	-27.80	43.02	15.22	0.0333

* 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.

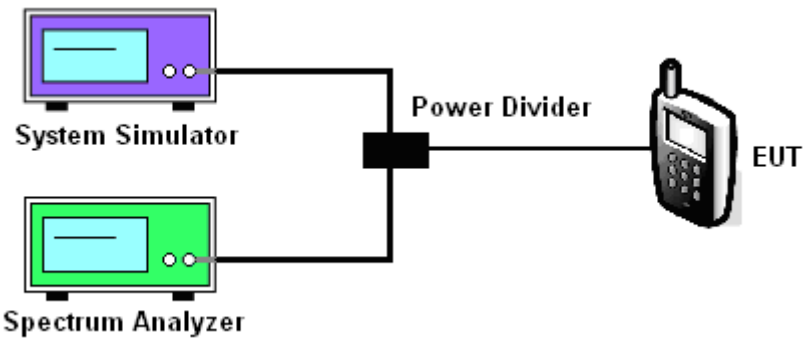
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The 99% occupied bandwidth were measured, set RBW= 1% of span, VBW= 3*RBW, sample detector, trace maximum hold.
4. 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

Cellular Band						
Modes	**GSM850 (GSM)**			**GSM850 (EDGE class 8)**		
Channel	**128 (Low)**	**189 (Mid)**	**251 (High)**	**128 (Low)**	**189 (Mid)**	**251 (High)**
Frequency (MHz)	**824.2**	**836.4**	**848.8**	**824.2**	**836.4**	**848.8**
99% OBW (kHz)	250.00	246.00	244.00	244.00	242.00	242.00
26dB BW (kHz)	312.00	318.00	318.00	312.00	310.00	308.00

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)	250.00	246.00	248.00	248.00	244.00	250.00
26dB BW (kHz)	316.00	318.00	312.00	312.00	308.00	316.00

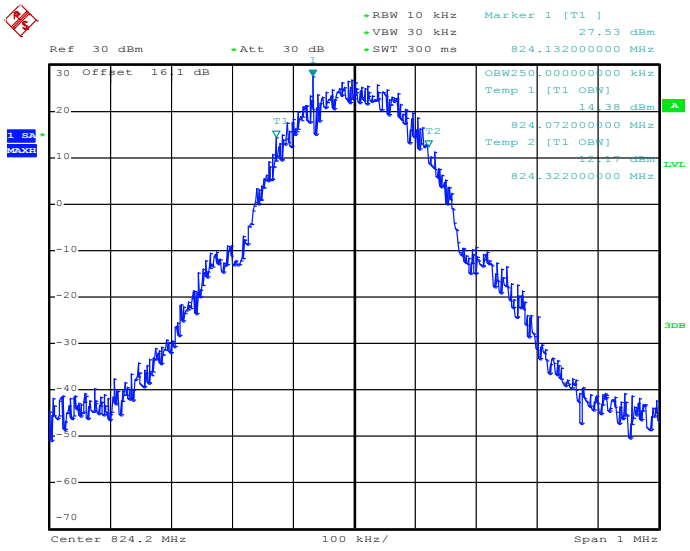
Cellular Band			
Modes	**WCDMA Band V (RMC 12.2kbps)**		
Channel	**4132 (Low)**	**4182 (Mid)**	**4233 (High)**
Frequency (MHz)	**826.4**	**836.4**	**846.6**
99% OBW (MHz)	4.18	4.20	4.16
26dB BW (MHz)	4.66	4.68	4.70

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)	4.20	4.16	4.20
26dB BW (MHz)	4.68	4.68	4.70

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

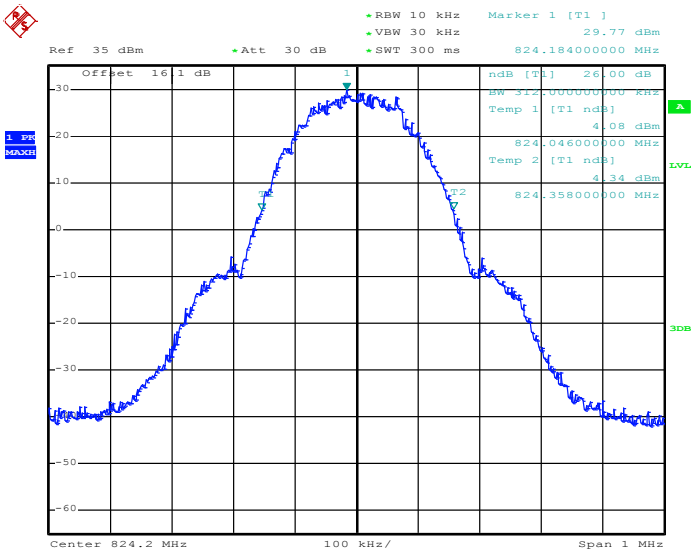
Band :	GSM 850	Test Mode :	GSM Link (GMSK)

99% Occupied Bandwidth Plot on Channel 128 (824.2 MHz)



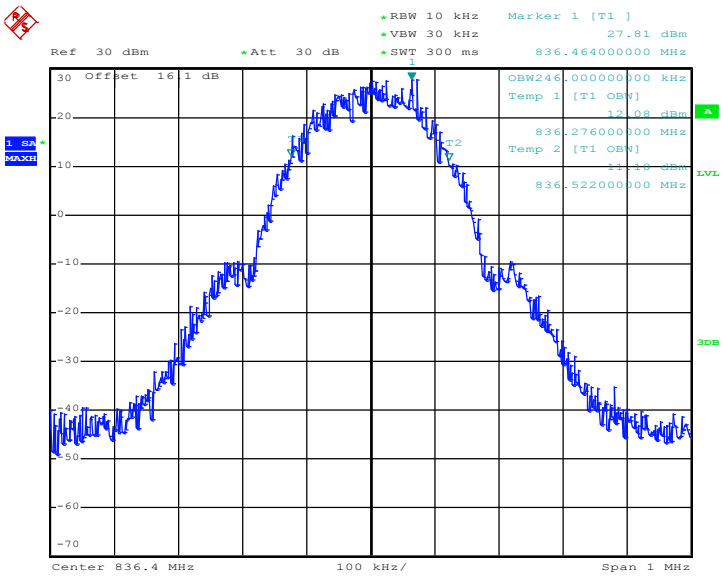
Date: 10.JAN.2013 05:04:53

26dB Bandwidth Plot on Channel 128 (824.2 MHz)



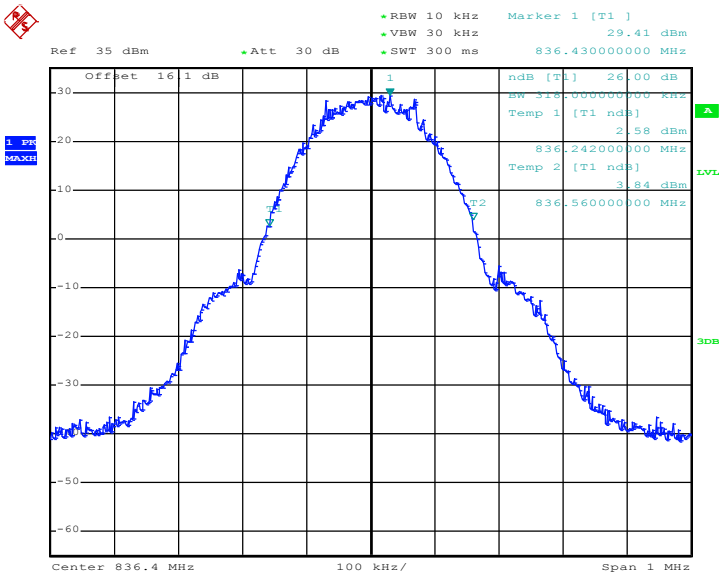
Date: 10.JAN.2013 05:13:10

99% Occupied Bandwidth Plot on Channel 189 (836.4 MHz)



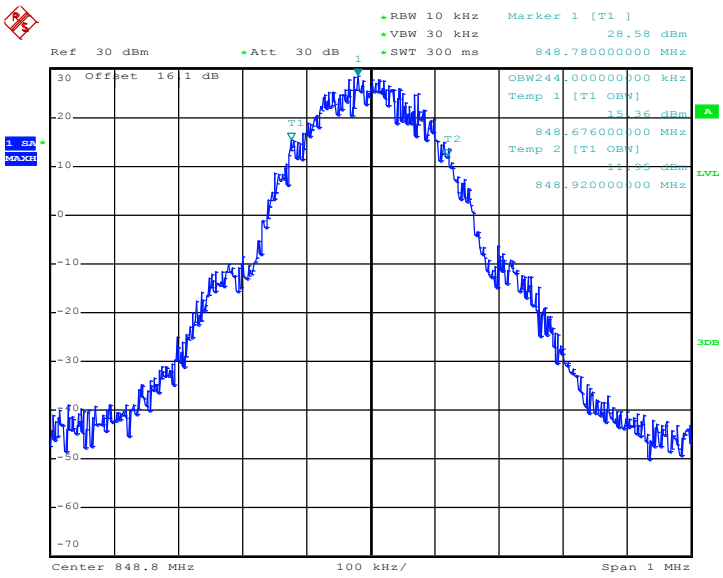
Date: 10.JAN.2013 05:05:19

26dB Bandwidth Plot on Channel 189 (836.4 MHz)



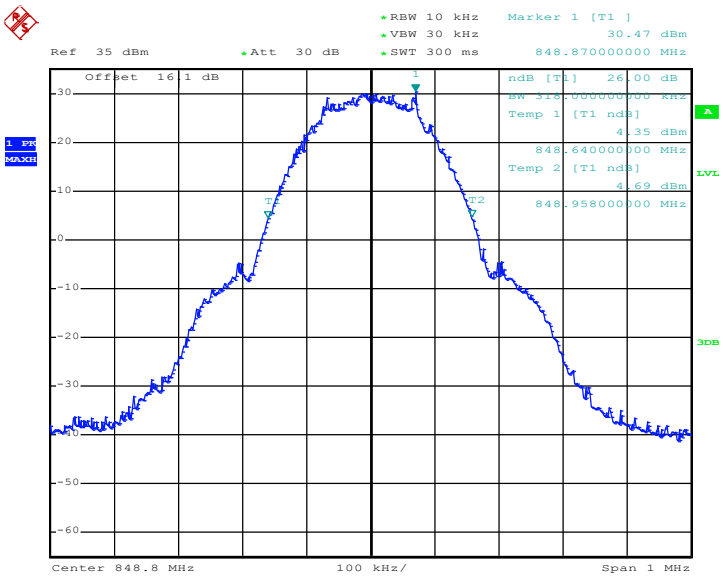
Date: 10.JAN.2013 05:12:23

99% Occupied Bandwidth Plot on Channel 251 (848.8 MHz)



Date: 10.JAN.2013 05:05:45

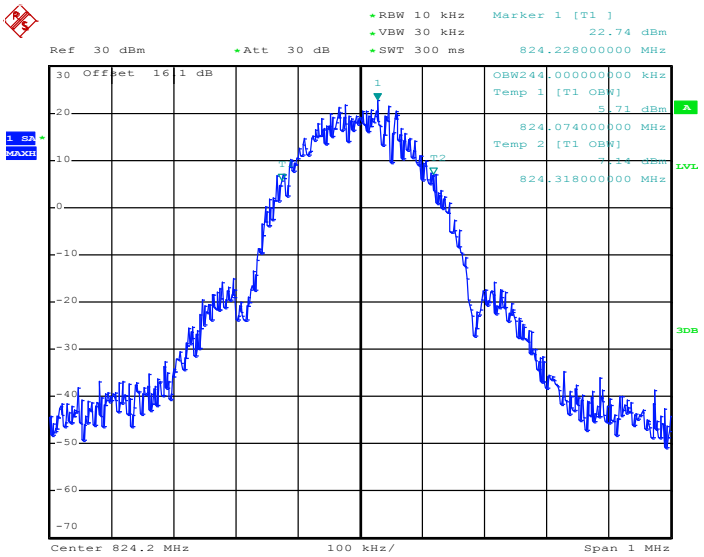
26dB Bandwidth Plot on Channel 251 (848.8 MHz)



Date: 10.JAN.2013 05:11:30

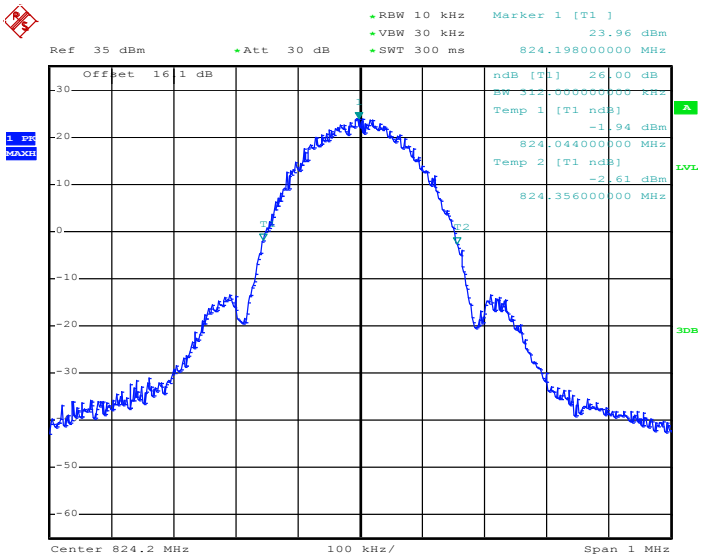
Band :	GSM 850	Test Mode :	EDGE class 8 Link (8PSK)

99% Occupied Bandwidth Plot on Channel 128 (824.2 MHz)



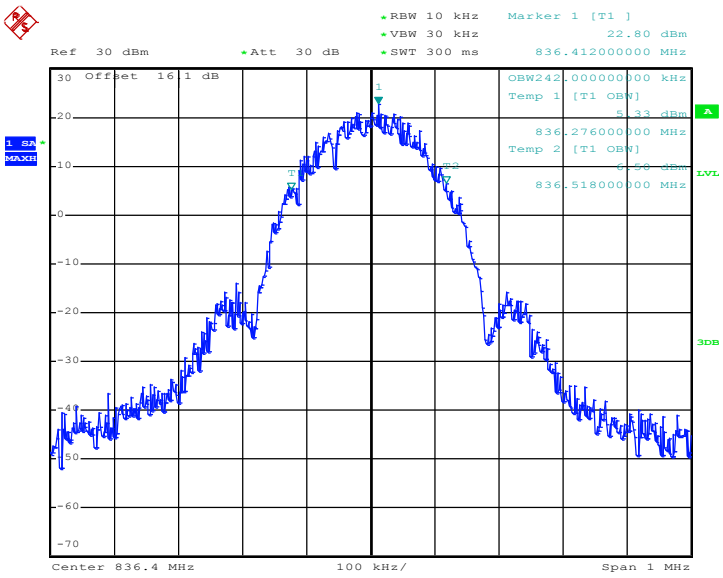
Date: 10.JAN.2013 05:51:30

26dB Bandwidth Plot on Channel 128 (824.2 MHz)



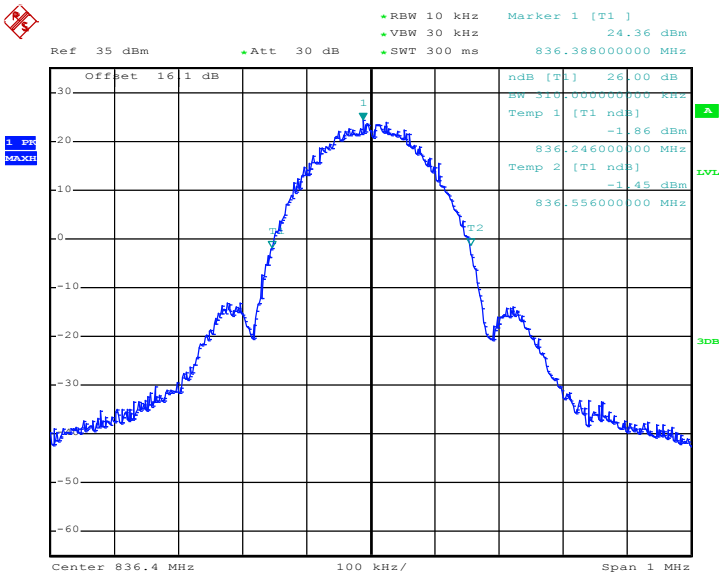
Date: 10.JAN.2013 05:24:13

99% Occupied Bandwidth Plot on Channel 189 (836.4 MHz)



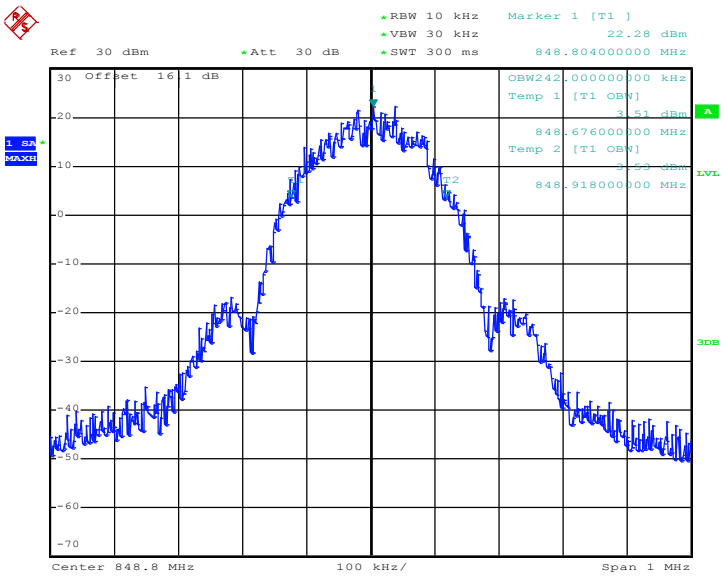
Date: 10.JAN.2013 05:51:56

26dB Bandwidth Plot on Channel 189 (836.4 MHz)



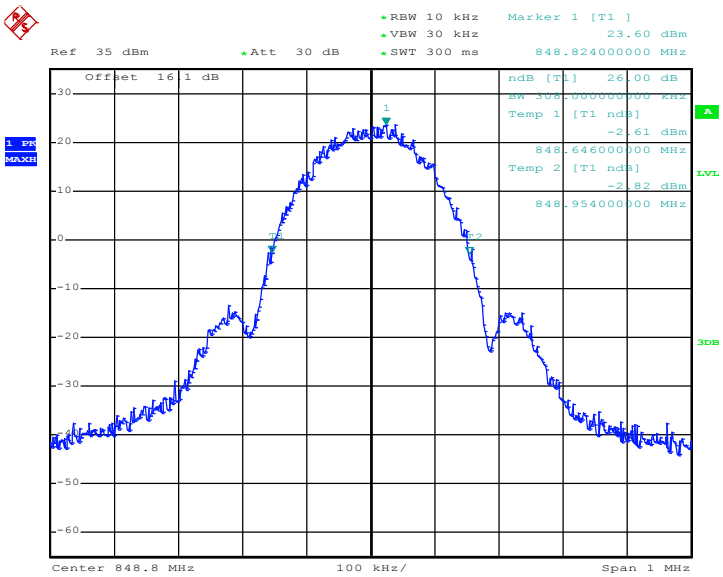
Date: 10.JAN.2013 05:23:24

99% Occupied Bandwidth Plot on Channel 251 (848.8 MHz)



Date: 10.JAN.2013 05:52:21

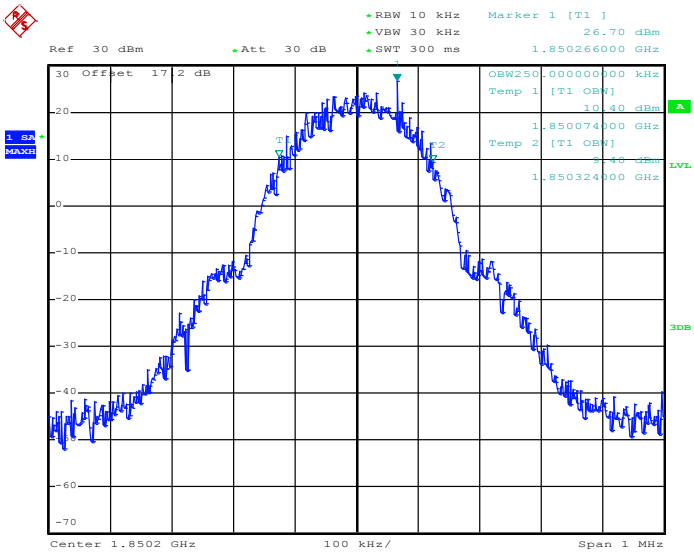
26dB Bandwidth Plot on Channel 251 (848.8 MHz)



Date: 10.JAN.2013 05:25:00

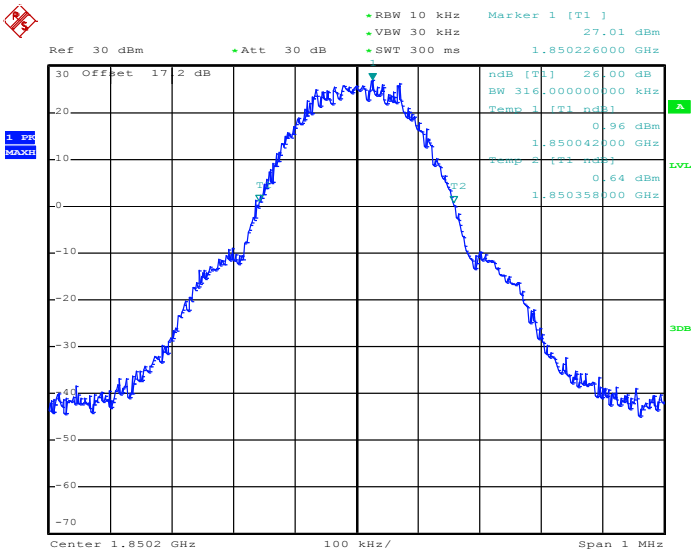
Band :	GSM 1900	Test Mode :	GSM Link (GMSK)

99% Occupied Bandwidth Plot on Channel 512 (1850.2 MHz)



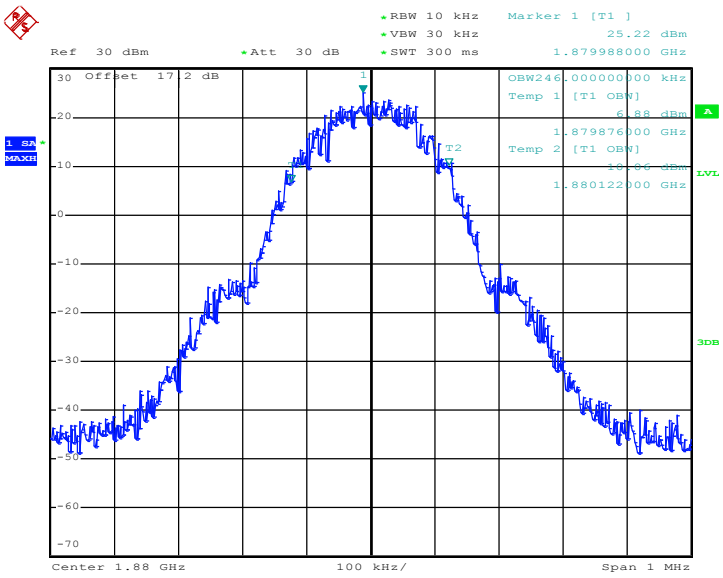
Date: 10.JAN.2013 06:55:10

26dB Bandwidth Plot on Channel 512 (1850.2 MHz)



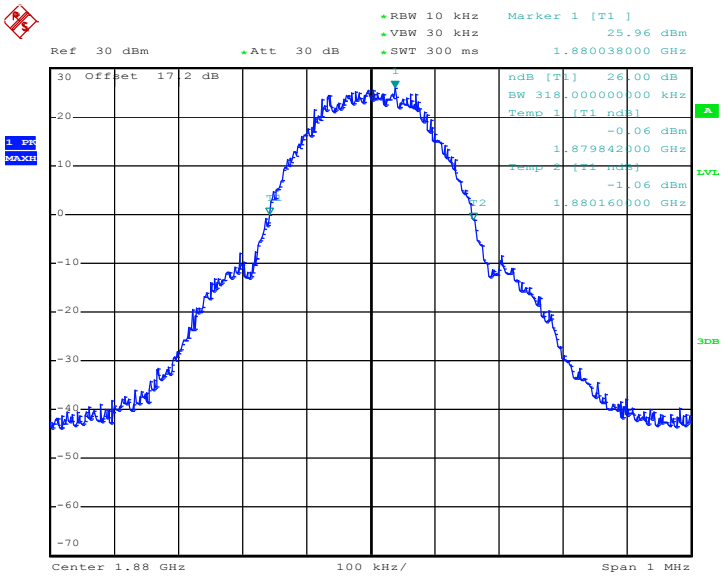
Date: 10.JAN.2013 08:13:31

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



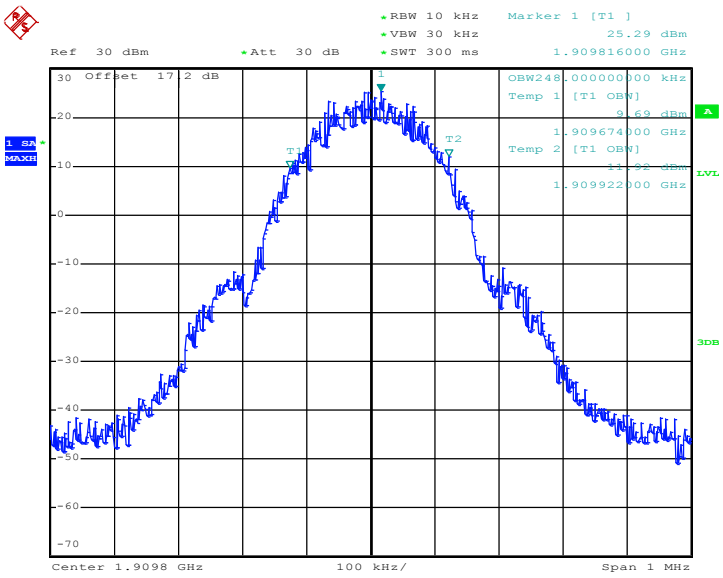
Date: 10.JAN.2013 06:55:36

26dB Bandwidth Plot on Channel 661 (1880.0 MHz)



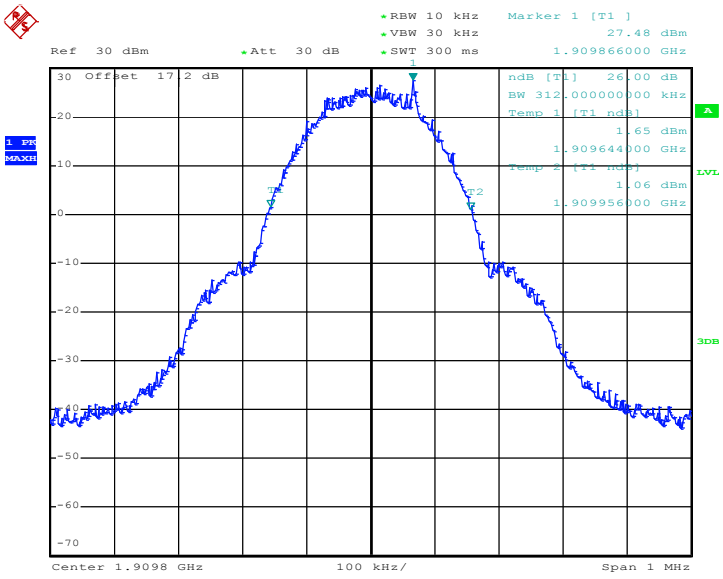
Date: 10.JAN.2013 08:13:02

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



Date: 10.JAN.2013 06:56:02

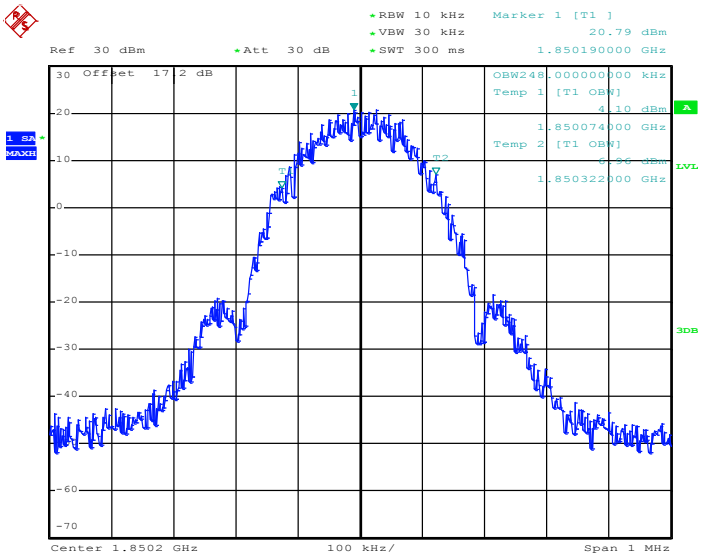
26dB Bandwidth Plot on Channel 810 (1909.8 MHz)



Date: 10.JAN.2013 08:12:42

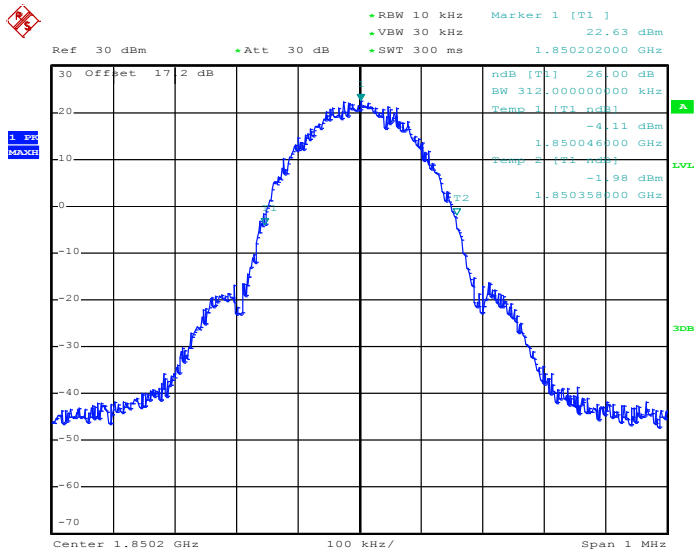
Band :	GSM 1900	Test Mode :	EDGE class 8 Link (8PSK)

99% Occupied Bandwidth Plot on Channel 512 (1850.2 MHz)



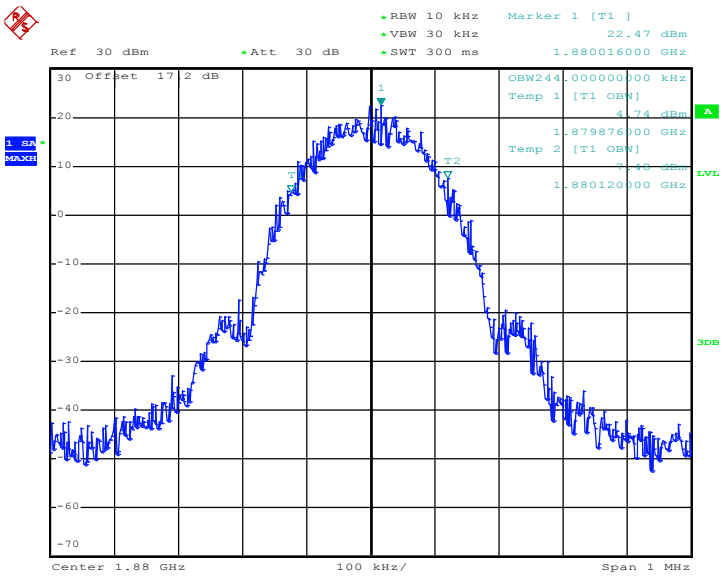
Date: 10.JAN.2013 08:46:02

26dB Bandwidth Plot on Channel 512 (1850.2 MHz)



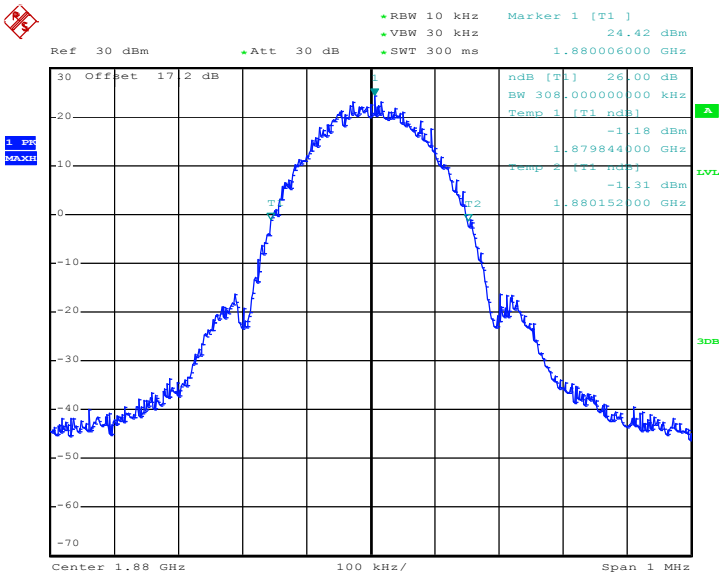
Date: 10.JAN.2013 08:35:58

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



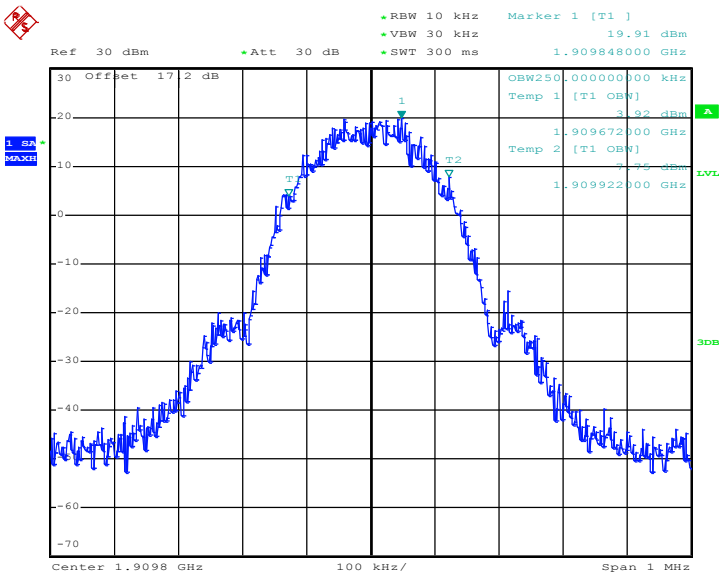
Date: 10.JAN.2013 08:46:28

26dB Bandwidth Plot on Channel 661 (1880.0 MHz)



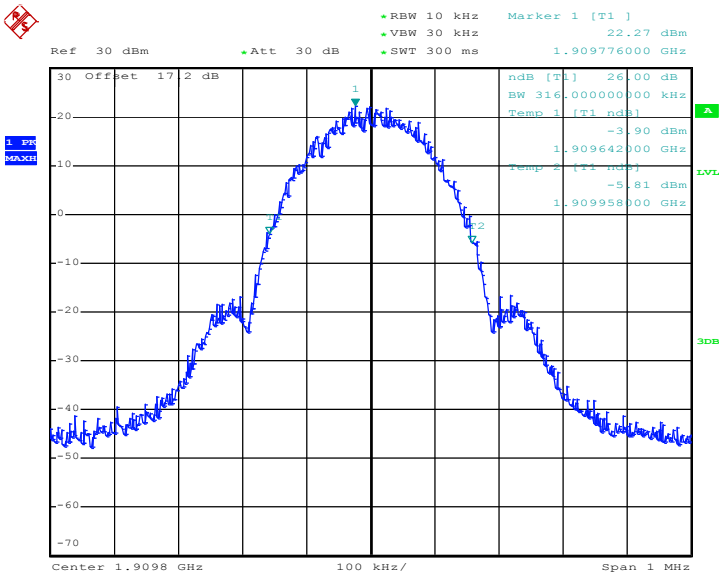
Date: 10.JAN.2013 08:35:34

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



Date: 10.JAN.2013 08:46:53

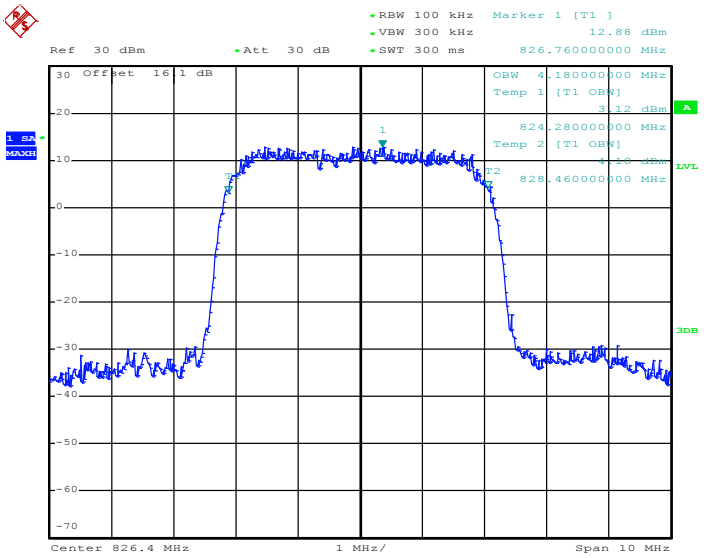
26dB Bandwidth Plot on Channel 810 (1909.8 MHz)



Date: 10.JAN.2013 08:36:17

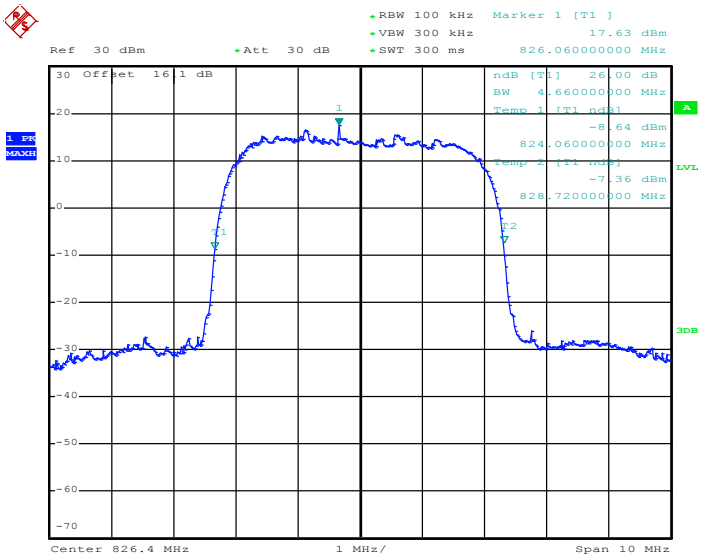
Band :	WCDMA Band V	Test Mode :	RMC 12.2kbps Link (QPSK)

99% Occupied Bandwidth Plot on Channel 4132 (826.4 MHz)



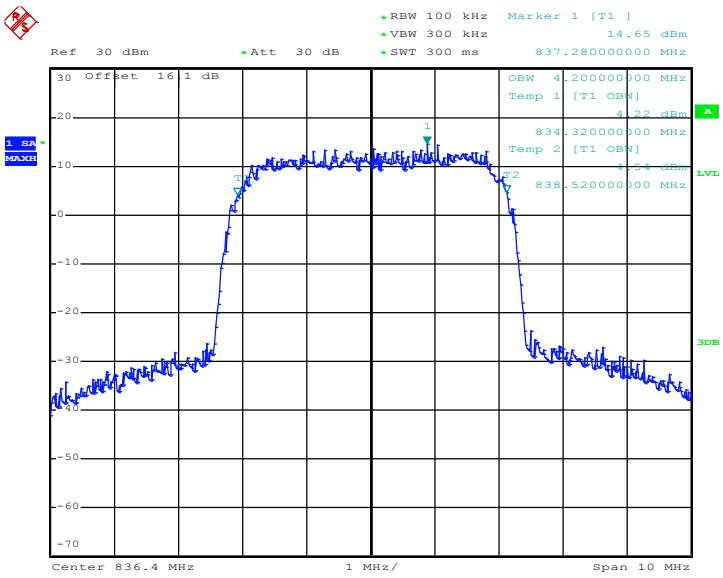
Date: 10.JAN.2013 09:36:06

26dB Bandwidth Plot on Channel 4132 (826.4 MHz)



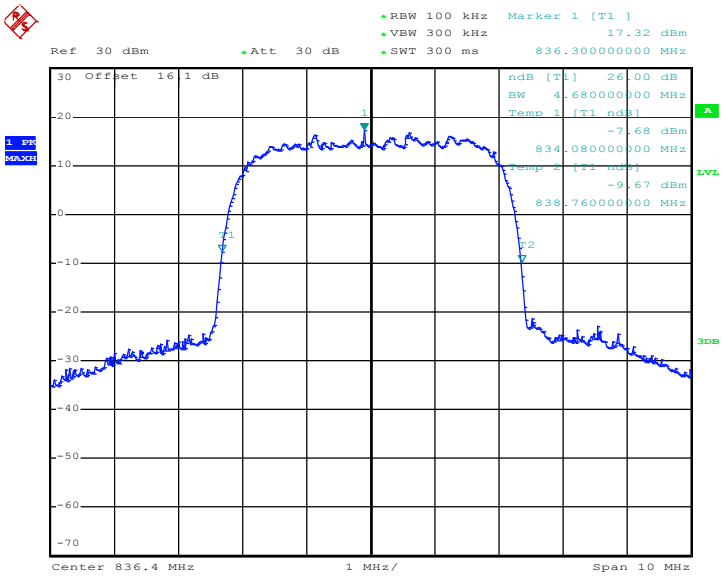
Date: 10.JAN.2013 09:34:48

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



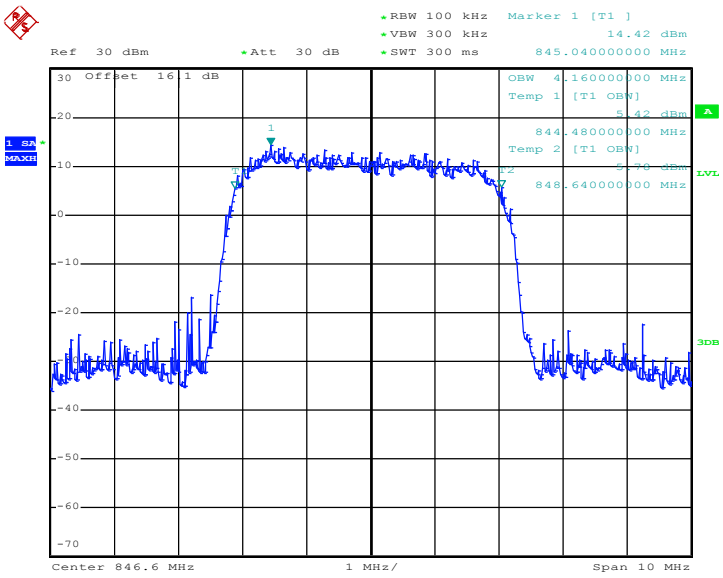
Date: 10.JAN.2013 09:36:32

26dB Bandwidth Plot on Channel 4182 (836.4 MHz)



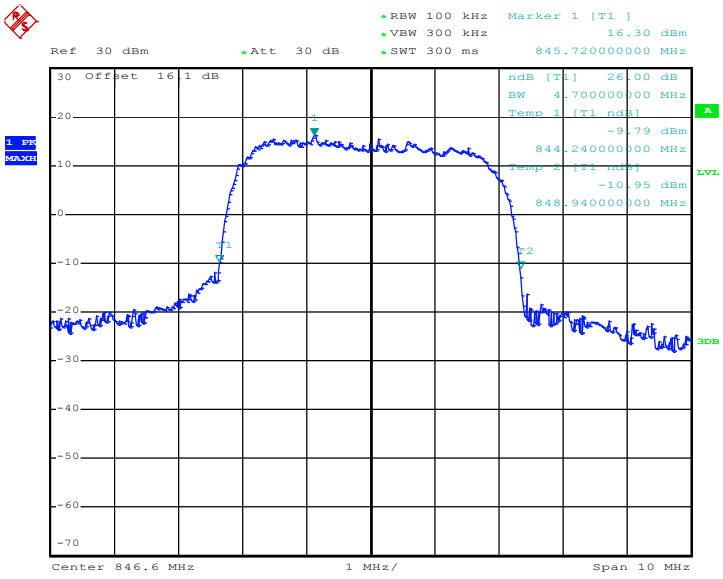
Date: 10.JAN.2013 09:35:14

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



Date: 10.JAN.2013 09:36:58

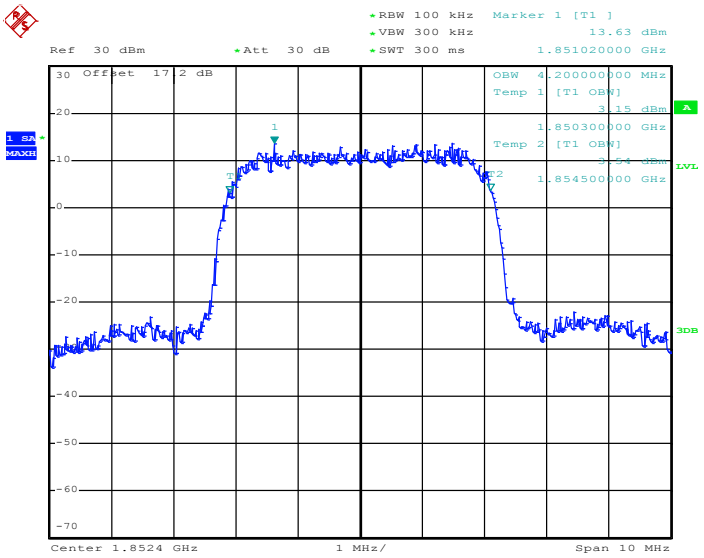
26dB Bandwidth Plot on Channel 4233 (846.6 MHz)



Date: 10.JAN.2013 09:35:40

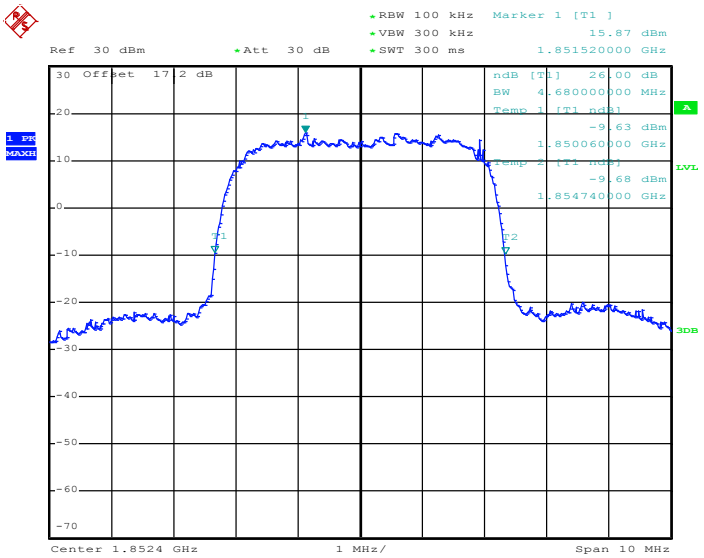
Band :	WCDMA Band II	Test Mode :	RMC 12.2kbps Link (QPSK)

99% Occupied Bandwidth Plot on Channel 9262 (1852.4 MHz)



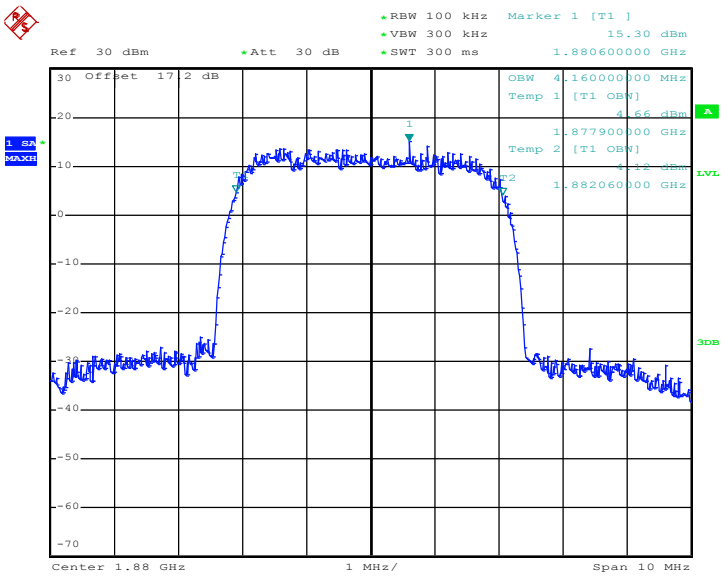
Date: 10.JAN.2013 09:25:00

26dB Bandwidth Plot on Channel 9262 (1852.4 MHz)



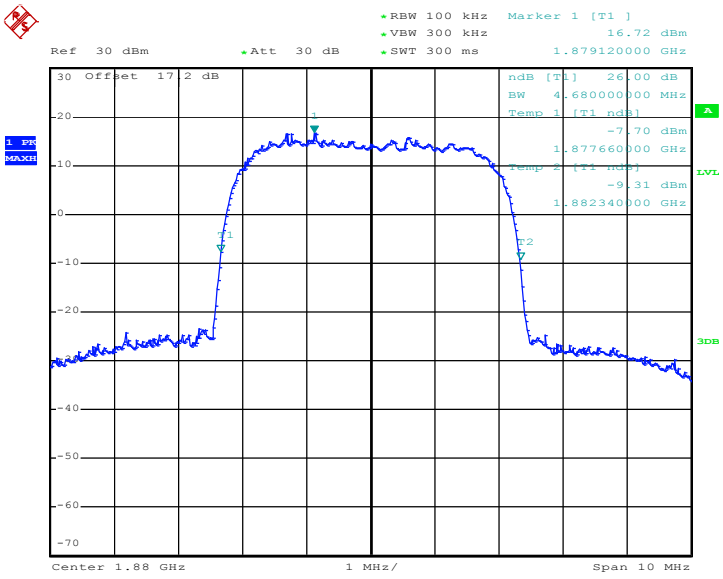
Date: 10.JAN.2013 09:23:41

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



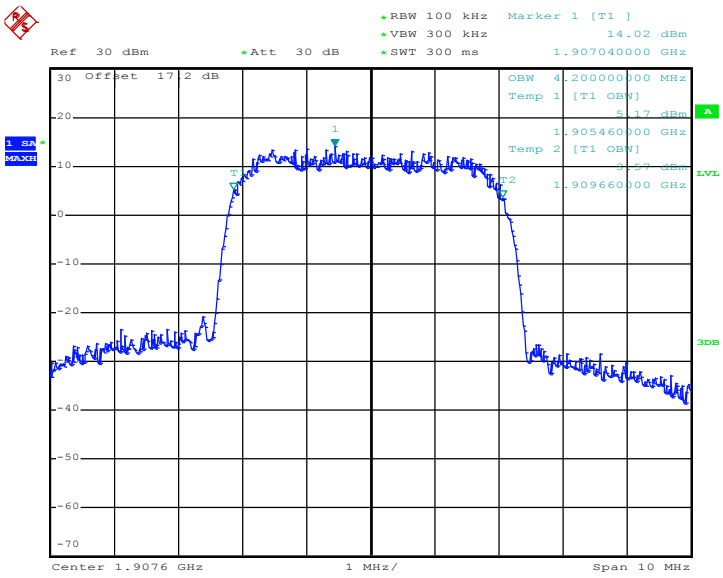
Date: 10.JAN.2013 09:25:26

26dB Bandwidth Plot on Channel 9400 (1880.0 MHz)



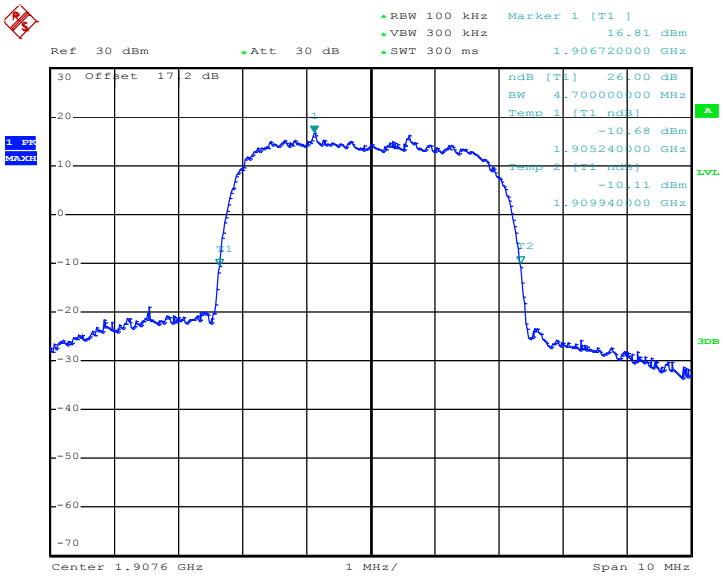
Date: 10.JAN.2013 09:24:08

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



Date: 10.JAN.2013 09:25:52

26dB Bandwidth Plot on Channel 9538 (1907.6 MHz)



Date: 10.JAN.2013 09:24:34

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

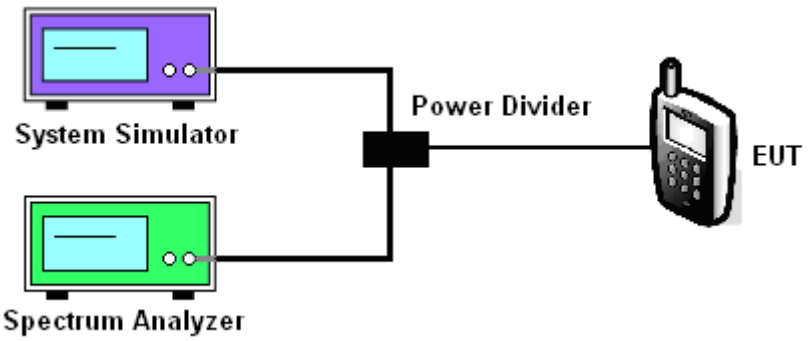
See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The band edges of low and high channels for the highest RF powers were measured. Setting RBW as roughly BW/100.
4. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
5. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)
   = P(W) - [43 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
   = -13dBm.

3.5.4 Test Setup

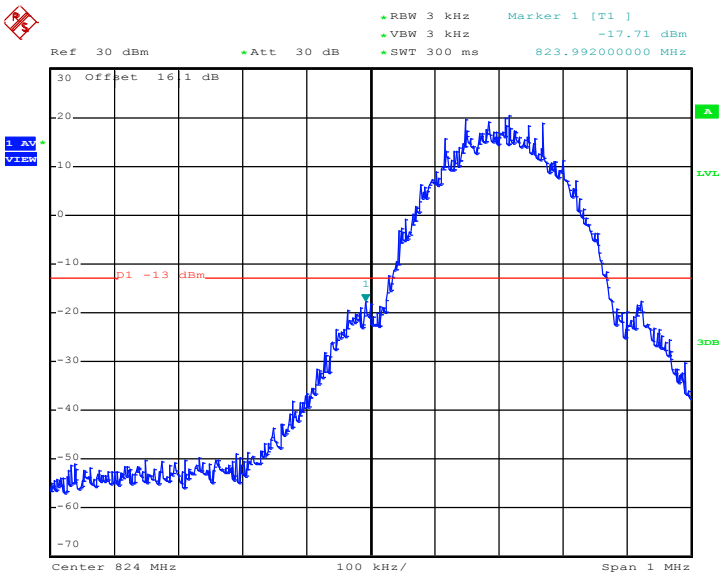
<Conducted Band Edge >



3.5.5 Test Result (Plots) of Conducted Band Edge

Band :	GSM850	Test Mode :	GSM Link (GMSK)
Correction Factor :	0.25dB	Maximum 26dB Bandwidth :	0.318MHz
Band Edge :	-17.46dBm	Measurement Value :	-17.71dBm

Lower Band Edge Plot on Channel 128 (824.2 MHz)



Date: 10.JAN.2013 05:06:12

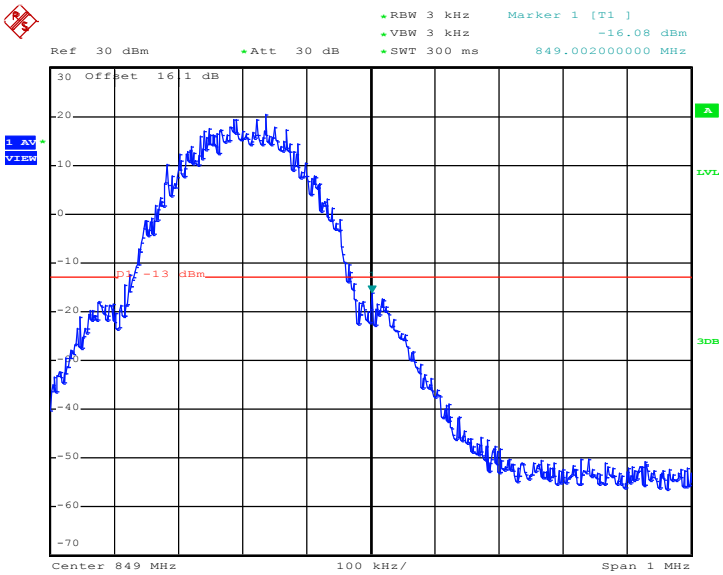
1. Correction Factor(dB)= 10log(1% Emission BW/RBW)

2. Band Edge= Measurement Value + Correction Factor(dB)

For example, -17.71dBm + 0.25dB = -17.46dBm

Band :	GSM850	Test Mode :	GSM Link (GMSK)
Correction Factor :	0.25dB	Maximum 26dB Bandwidth :	0.318MHz
Band Edge :	-15.83dBm	Measurement Value :	-16.08dBm

Higher Band Edge Plot on Channel 251 (848.8 MHz)



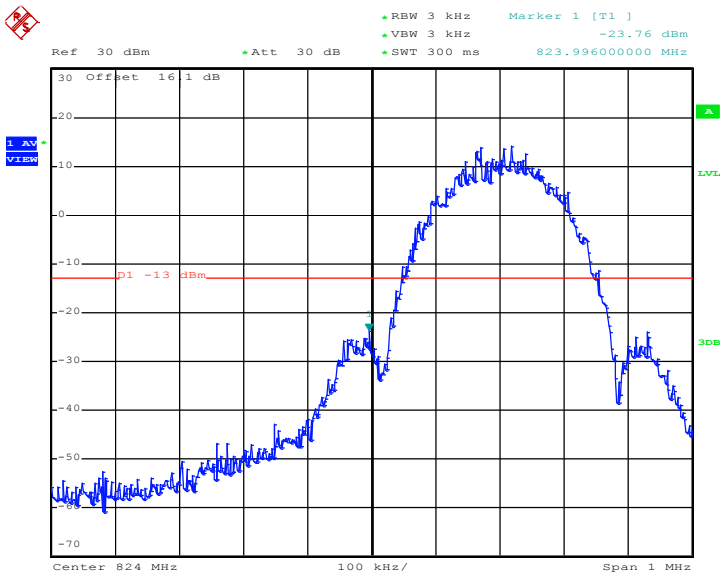
Date: 10.JAN.2013 05:06:38

1. Correction Factor(dB)= 10log(1% Emission BW/RBW)

2. Band Edge= Measurement Value + Correction Factor(dB)

Band :	GSM850	Test Mode :	EDGE class 8 Link (8PSK)
Correction Factor :	0.17dB	Maximum 26dB Bandwidth :	0.312MHz
Band Edge :	-23.59dBm	Measurement Value :	-23.76dBm

Lower Band Edge Plot on Channel 128 (824.2 MHz)



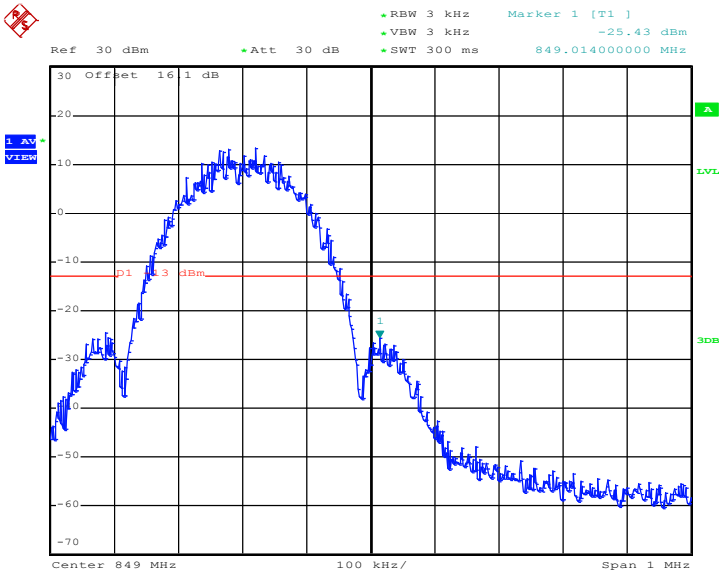
Date: 10.JAN.2013 05:52:48

1. Correction Factor(dB)= 10log(1% Emission BW/RBW)

2. Band Edge= Measurement Value + Correction Factor(dB)

Band :	GSM850	Test Mode :	EDGE class 8 Link (8PSK)
Correction Factor :	0.17dB	Maximum 26dB Bandwidth :	0.312MHz
Band Edge :	-25.26dBm	Measurement Value :	-25.43dBm

Higher Band Edge Plot on Channel 251 (848.8 MHz)



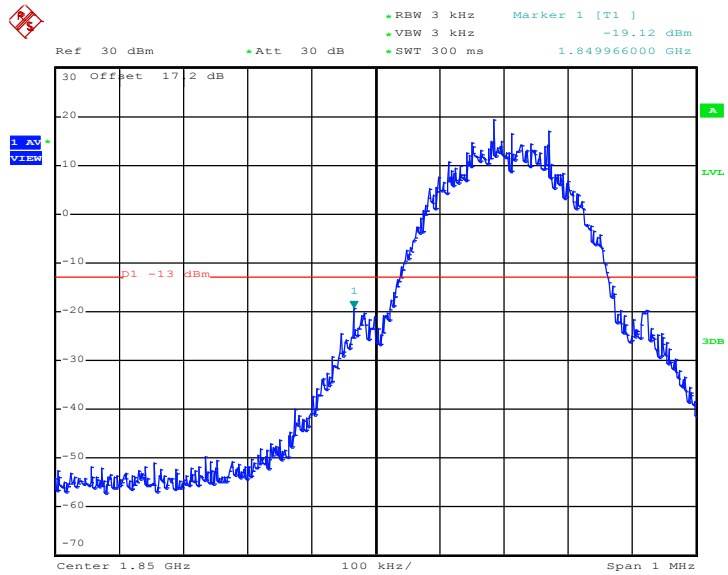
Date: 10.JAN.2013 05:53:14

1. Correction Factor(dB)= 10log(1% Emission BW/RBW)

2. Band Edge= Measurement Value + Correction Factor(dB)

Band :	GSM1900	Test Mode :	GSM Link (GMSK)
Correction Factor :	0.25dB	Maximum 26dB Bandwidth :	0.318MHz
Band Edge :	-18.87dBm	Measurement Value :	-19.12dBm

Lower Band Edge Plot on Channel 512 (1850.2 MHz)



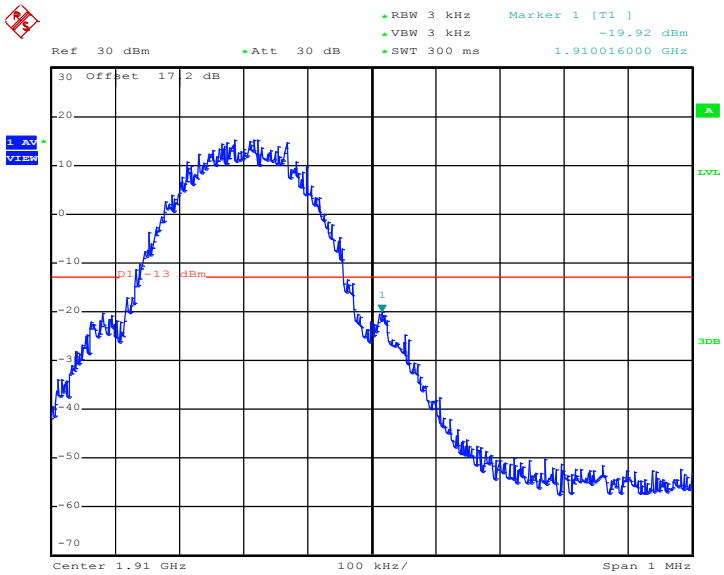
Date: 10.JAN.2013 06:59:40

1. Correction Factor(dB)= 10log(1% Emission BW/RBW)

2. Band Edge= Measurement Value + Correction Factor(dB)

Band :	GSM1900	Test Mode :	GSM Link (GMSK)
Correction Factor :	0.25dB	Maximum 26dB Bandwidth :	0.318MHz
Band Edge :	-19.67dBm	Measurement Value :	-19.92dBm

Higher Band Edge Plot on Channel 810 (1909.8 MHz)



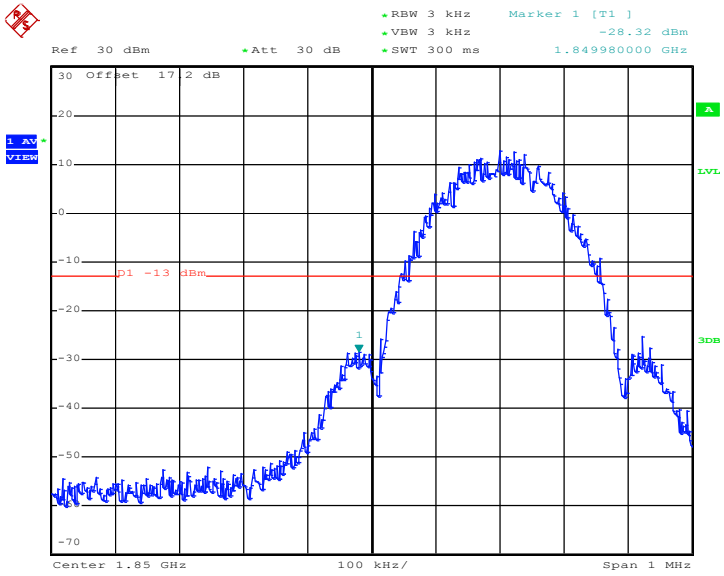
Date: 10.JAN.2013 07:00:06

1. Correction Factor(dB)= 10log(1% Emission BW/RBW)

2. Band Edge= Measurement Value + Correction Factor(dB)

Band :	GSM1900	Test Mode :	EDGE class 8 Link (8PSK)
Correction Factor :	0.23dB	Maximum 26dB Bandwidth :	0.316MHz
Band Edge :	-28.09dBm	Measurement Value :	-28.32dBm

Lower Band Edge Plot on Channel 512 (1850.2 MHz)



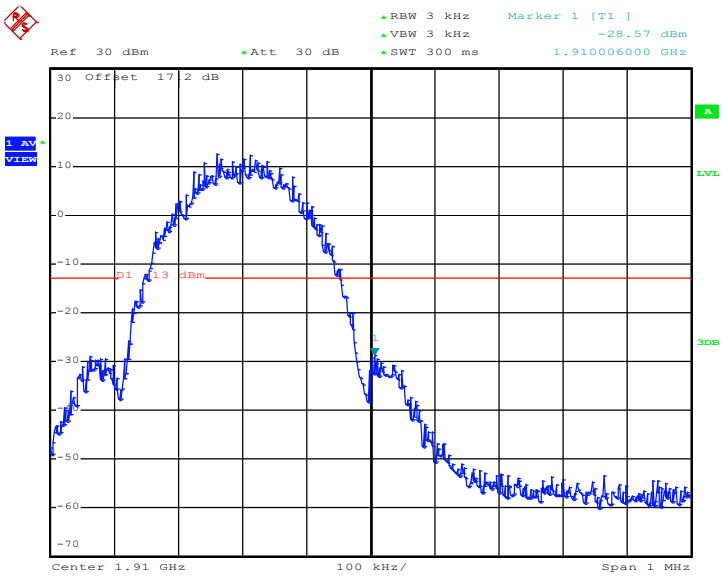
Date: 10.JAN.2013 08:50:41

1. Correction Factor(dB)= 10log(1% Emission BW/RBW)

2. Band Edge= Measurement Value + Correction Factor(dB)

Band :	GSM1900	Test Mode :	EDGE class 8 Link (8PSK)
Correction Factor :	0.23dB	Maximum 26dB Bandwidth :	0.316MHz
Band Edge :	-28.34dBm	Measurement Value :	-28.57dBm

Higher Band Edge Plot on Channel 810 (1909.8 MHz)

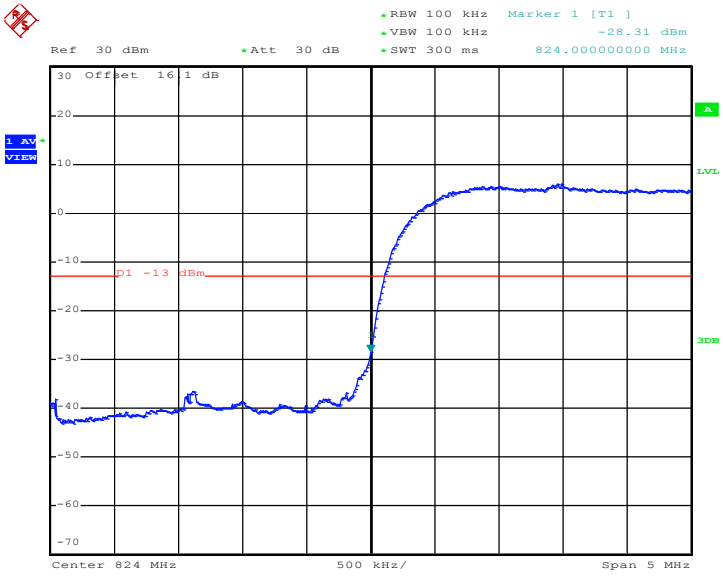


1. Correction Factor(dB)= 10log(1% Emission BW/RBW)

2. Band Edge= Measurement Value + Correction Factor(dB)

Band :	WCDMA Band V	Test Mode :	RMC 12.2kbps Link (QPSK)
Correction Factor :	-3.28dB	Maximum 26dB Bandwidth :	4.700MHz
Band Edge :	-31.59dBm	Measurement Value :	-28.31dBm

Lower Band Edge Plot on Channel 4132 (826.4 MHz)



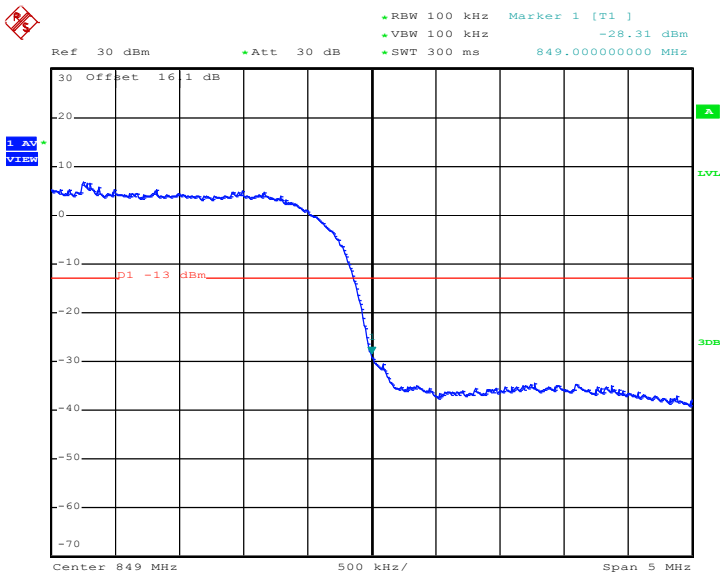
Date: 10.JAN.2013 09:37:25

1. Correction Factor(dB)= 10log(1% Emission BW/RBW)

2. Band Edge= Measurement Value + Correction Factor(dB)

Band :	WCDMA Band V	Test Mode :	RMC 12.2kbps Link (QPSK)
Correction Factor :	-3.28dB	Maximum 26dB Bandwidth :	4.700MHz
Band Edge :	-31.59dBm	Measurement Value :	-28.31dBm

Higher Band Edge Plot on Channel 4233 (846.6 MHz)

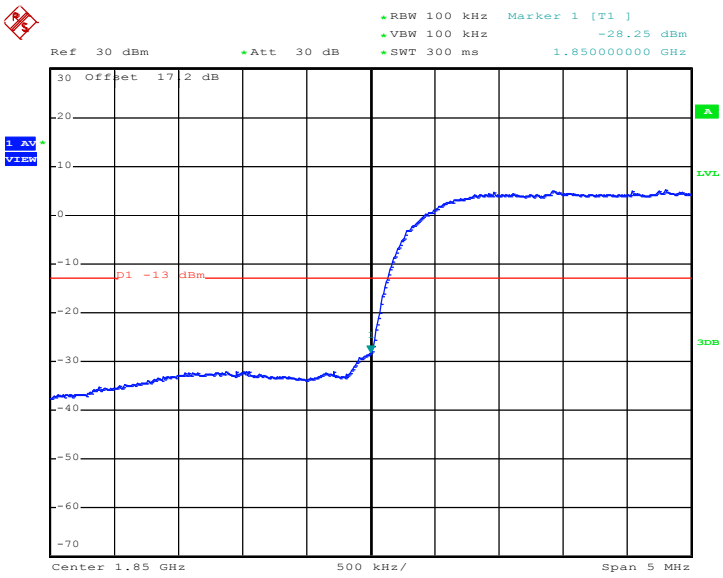


1. Correction Factor(dB)= 10log(1% Emission BW/RBW)

2. Band Edge= Measurement Value + Correction Factor(dB)

Band :	WCDMA Band II	Test Mode :	RMC 12.2kbps Link (QPSK)
Correction Factor :	-3.28dB	Maximum 26dB Bandwidth :	4.700MHz
Band Edge :	-31.53dBm	Measurement Value :	-28.25dBm

Lower Band Edge Plot on Channel 9262 (1852.4 MHz)

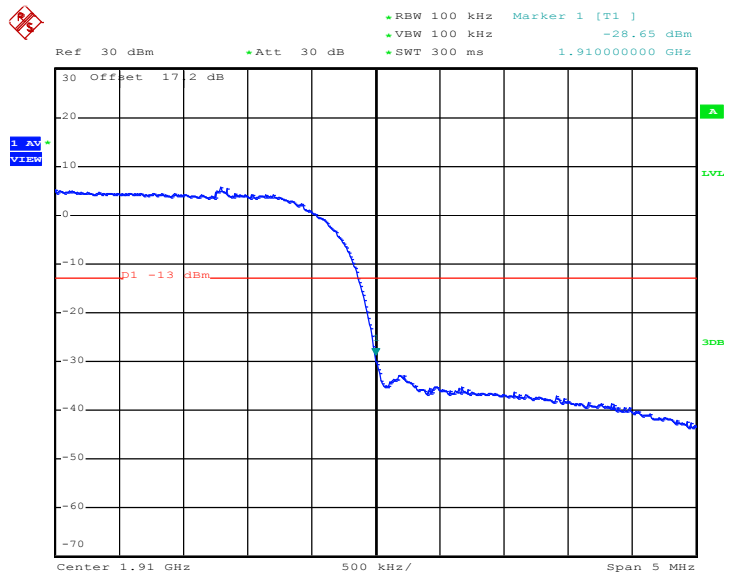


1. Correction Factor(dB)= 10log(1% Emission BW/RBW)

2. Band Edge= Measurement Value + Correction Factor(dB)

Band :	WCDMA Band II	Test Mode :	RMC 12.2kbps Link (QPSK)
Correction Factor :	-3.28dB	Maximum 26dB Bandwidth :	4.700MHz
Band Edge :	-31.93dBm	Measurement Value :	-28.65dBm

Higher Band Edge Plot on Channel 9538 (1907.6 MHz)



Date: 10.JAN.2013 09:26:46

1. Correction Factor(dB)= 10log(1% Emission BW/RBW)

2. Band Edge= Measurement Value + Correction Factor(dB)

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.

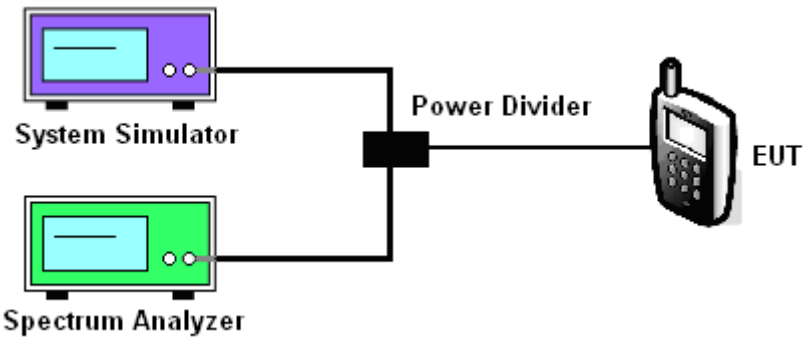
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

1. The EUT was connected to spectrum analyzer and base station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.
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 + 10log(P) dB below the transmitter power P(Watts)
   = P(W) - [43 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
   = -13dBm.

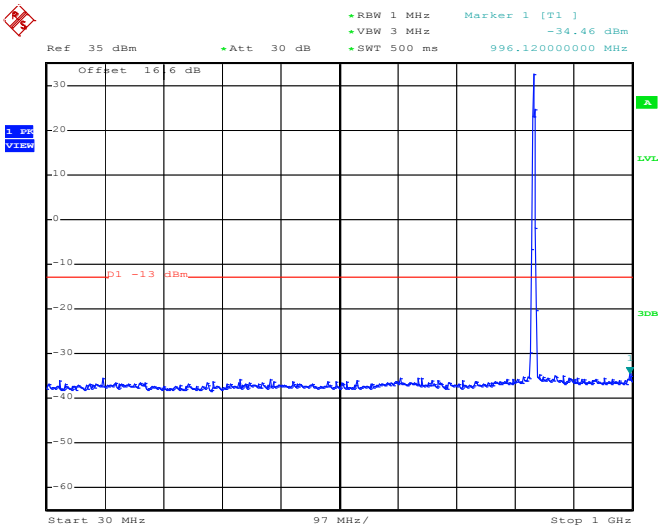
3.6.4 Test Setup



3.6.5 Test Result (Plots) of Conducted Spurious Emission

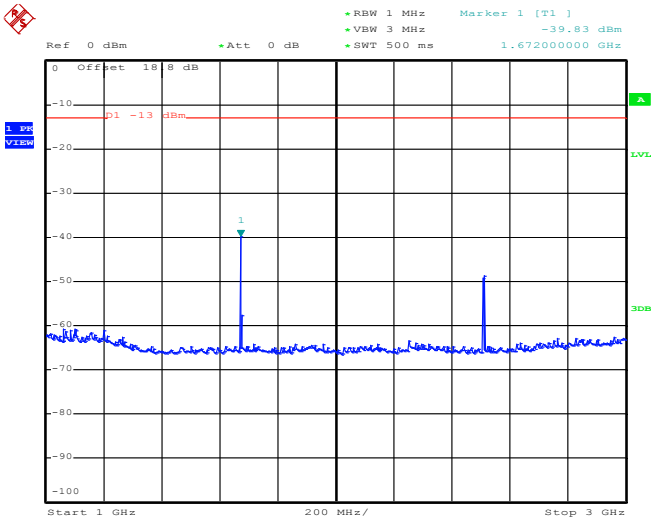
Band :	GSM850	Channel :	CH189
Test Mode :	GSM Link (GMSK)	Frequency :	836.4 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



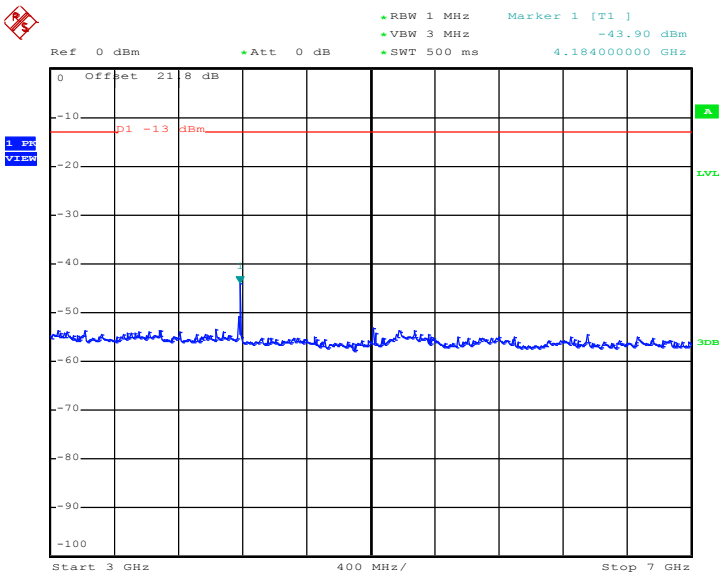
Date: 10.JAN.2013 04:49:25

Conducted Spurious Emission Plot between 1GHz ~ 3GHz



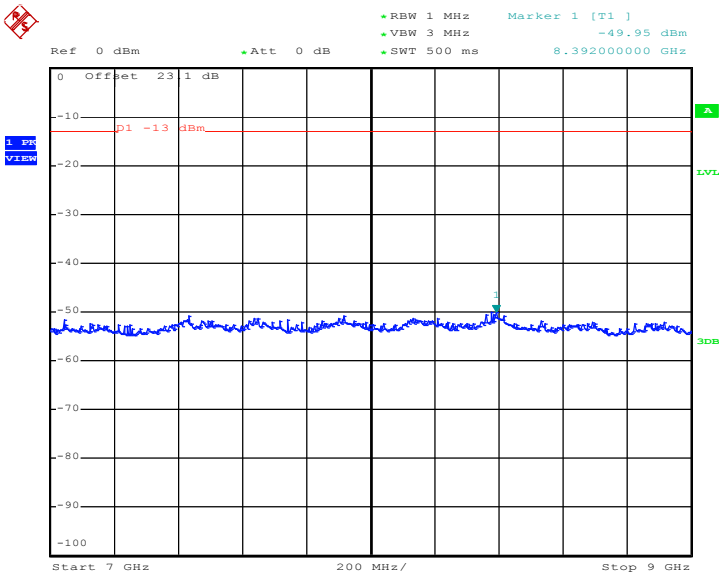
Date: 10.JAN.2013 04:49:43

Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 10.JAN.2013 04:49:55

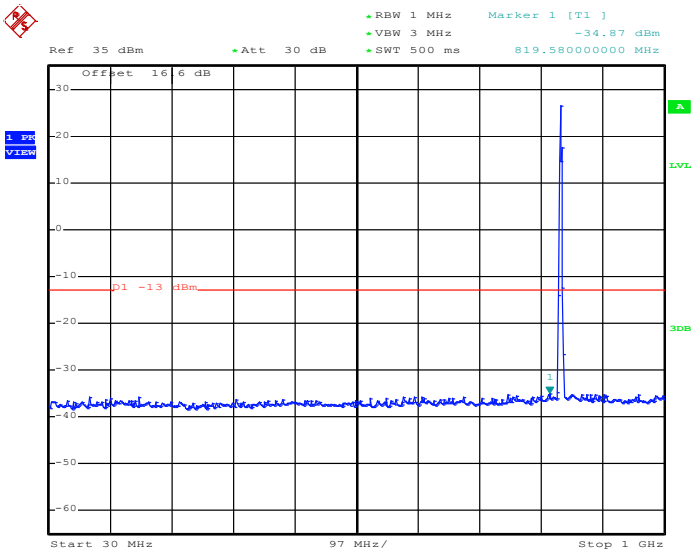
Conducted Spurious Emission Plot between 7GHz ~ 9GHz



Date: 10.JAN.2013 04:50:07

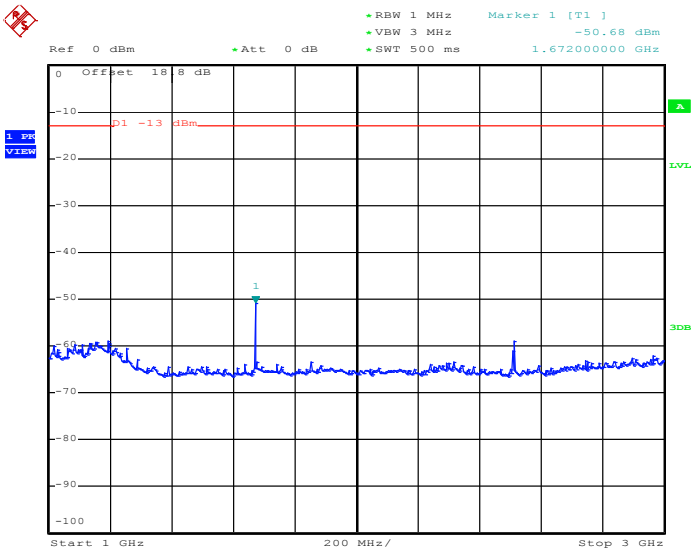
Band :	GSM850	Channel :	CH189
Test Mode :	EDGE class 8 Link (8PSK)	Frequency :	836.4 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



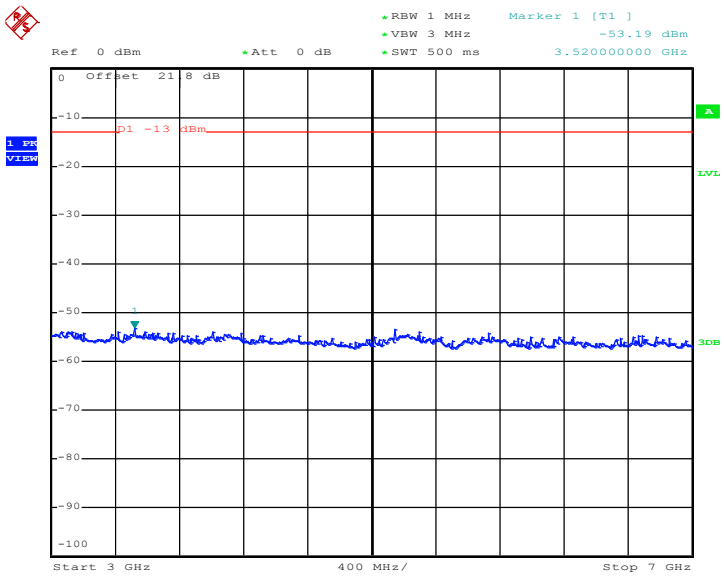
Date: 10.JAN.2013 05:45:51

Conducted Spurious Emission Plot between 1GHz ~ 3GHz



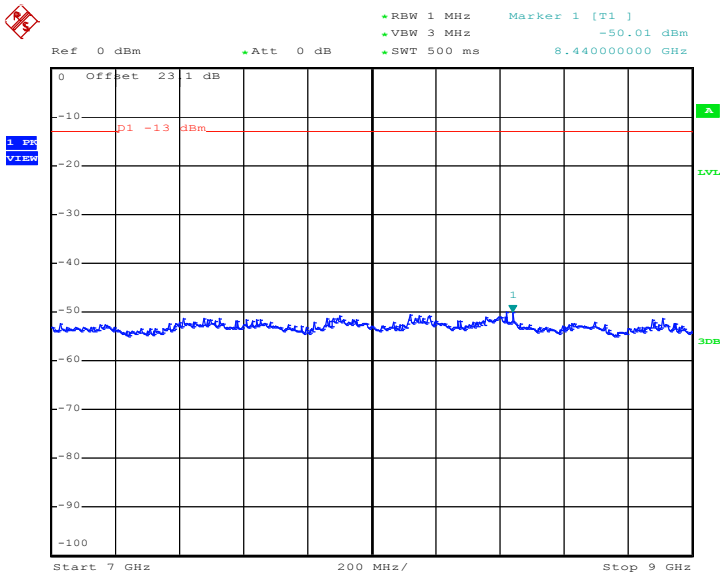
Date: 10.JAN.2013 05:46:09

Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 10.JAN.2013 05:46:21

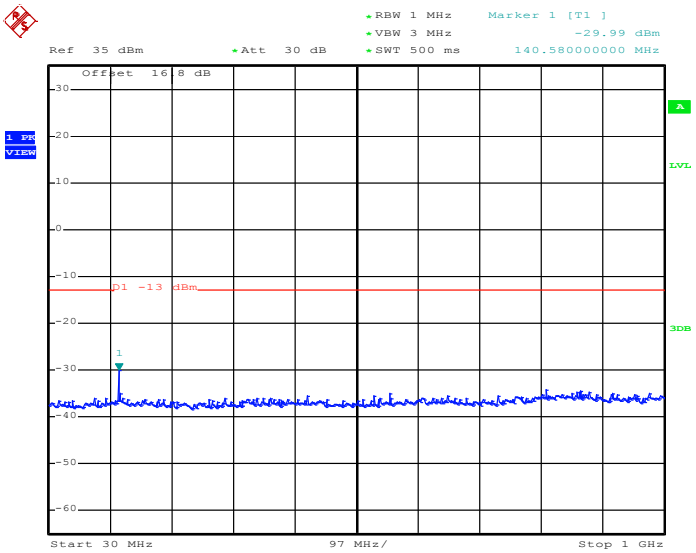
Conducted Spurious Emission Plot between 7GHz ~ 9GHz



Date: 10.JAN.2013 05:46:33

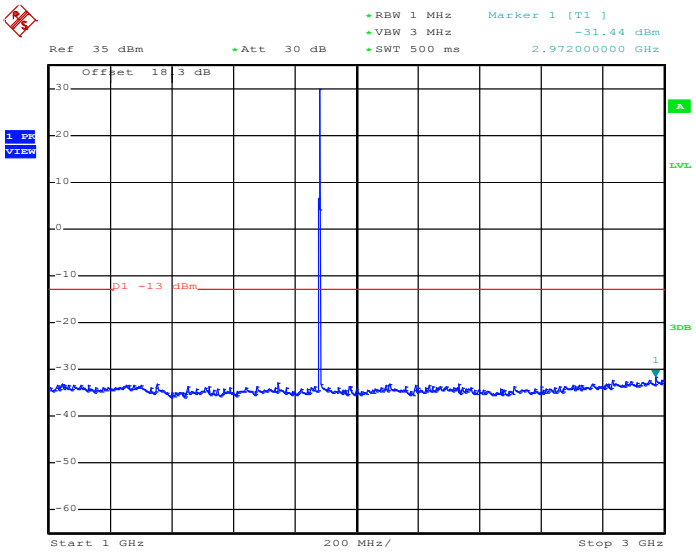
Band :	GSM1900	Channel :	CH661
Test Mode :	GSM Link (GMSK)	Frequency :	1880.0 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



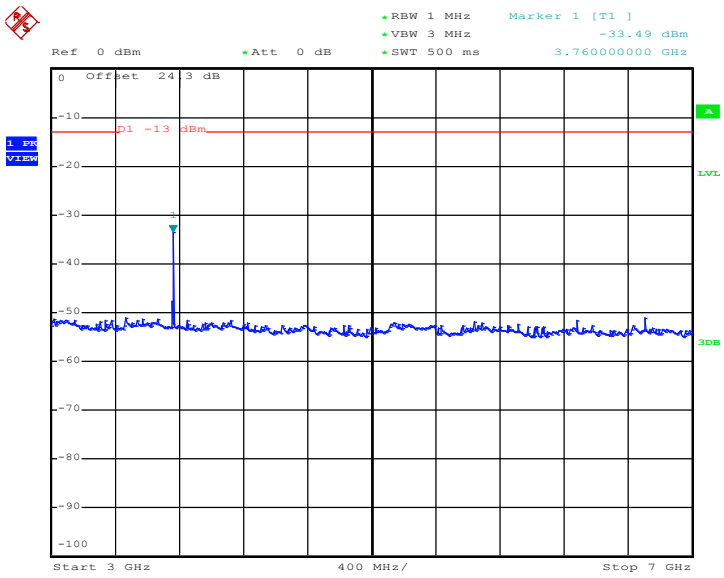
Date: 10.JAN.2013 06:47:27

Conducted Spurious Emission Plot between 1GHz ~ 3GHz



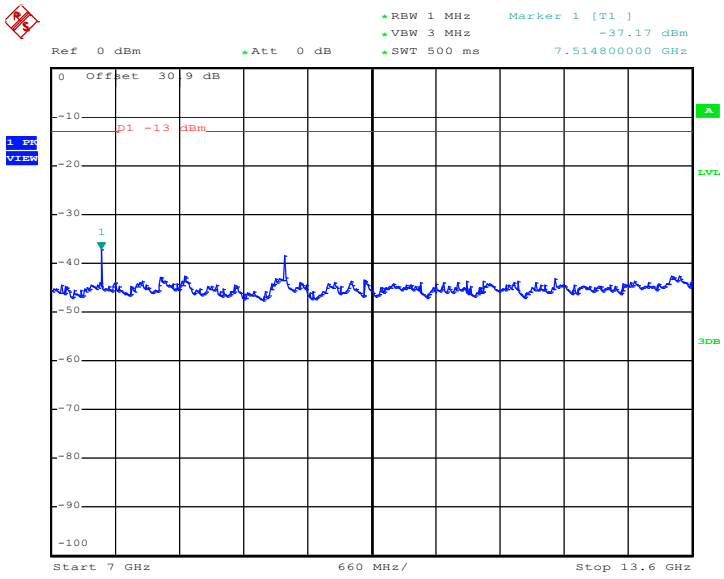
Date: 10.JAN.2013 06:47:40

Conducted Spurious Emission Plot between 3GHz ~ 7GHz



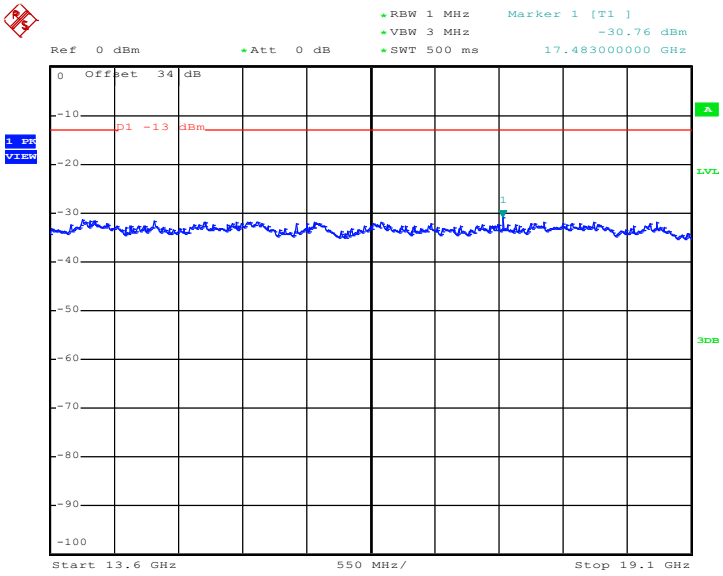
Date: 10.JAN.2013 06:47:57

Conducted Emission Plot between 7GHz ~ 13.6GHz



Date: 10.JAN.2013 06:48:09

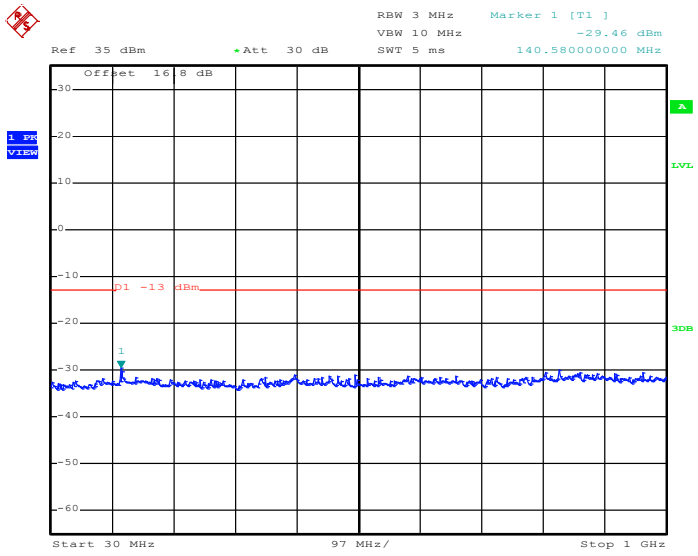
Conducted Spurious Emission Plot between 13.6GHz ~ 19.1GHz



Date: 10.JAN.2013 06:48:21

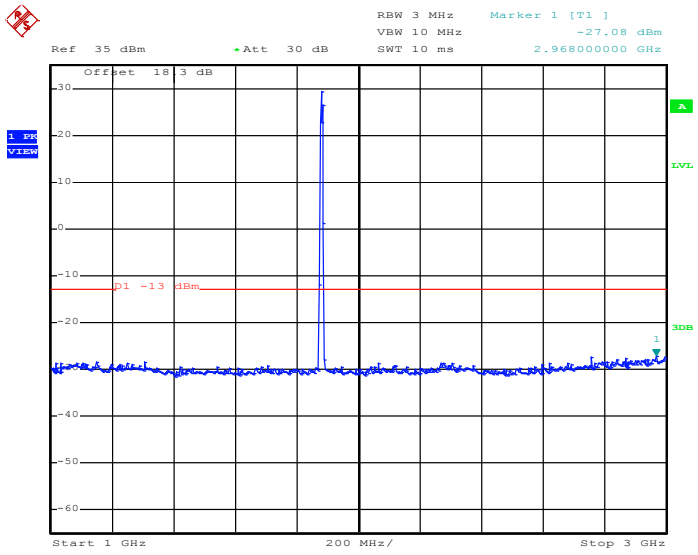
Band :	GSM1900	Channel :	CH661
Test Mode :	EDGE class 8 Link (8PSK)	Frequency :	1880.0 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



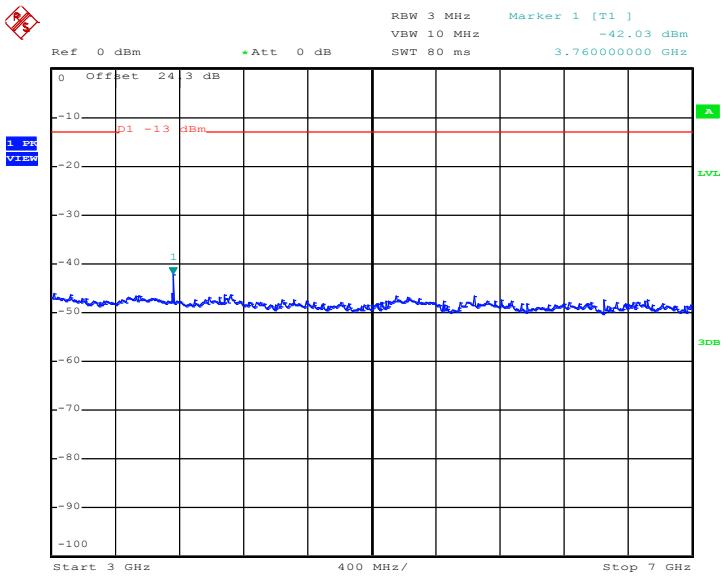
Date: 10.JAN.2013 08:43:38

Conducted Spurious Emission Plot between 1GHz ~ 3GHz



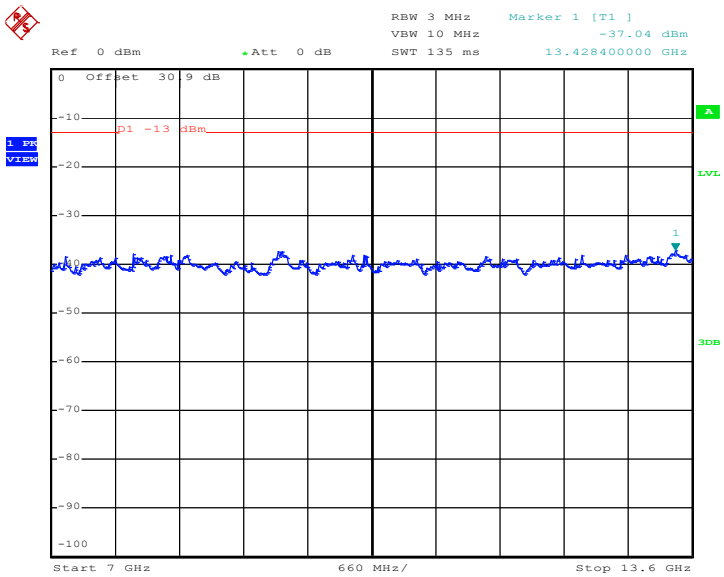
Date: 10.JAN.2013 08:43:50

Conducted Spurious Emission Plot between 3GHz ~ 7GHz



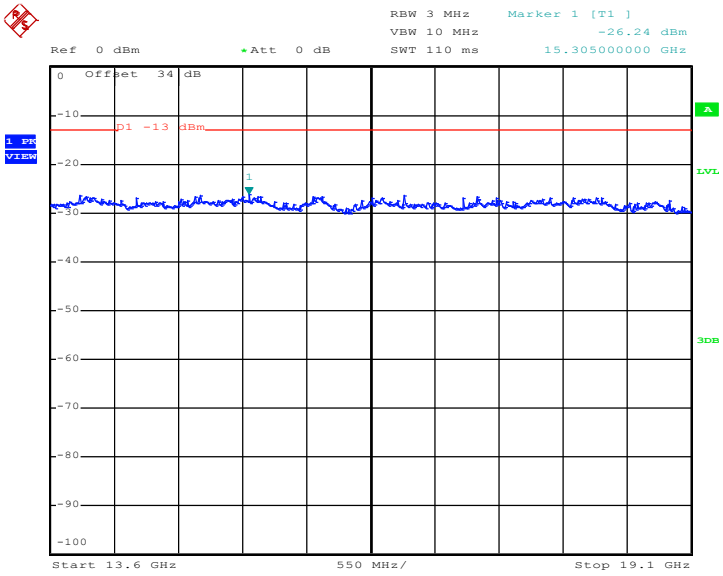
Date: 10.JAN.2013 08:44:05

Conducted Spurious Emission Plot between 7GHz ~ 13.6GHz



Date: 10.JAN.2013 08:44:18

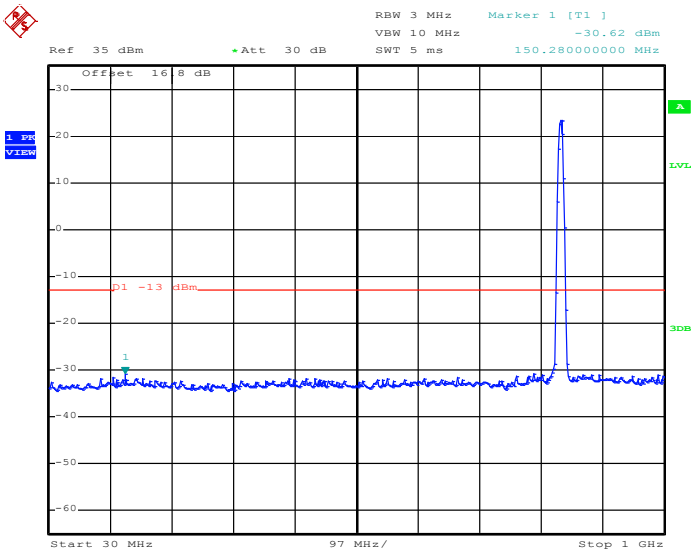
Conducted Spurious Emission Plot between 13.6GHz ~ 19.1GHz



Date: 10.JAN.2013 08:44:30

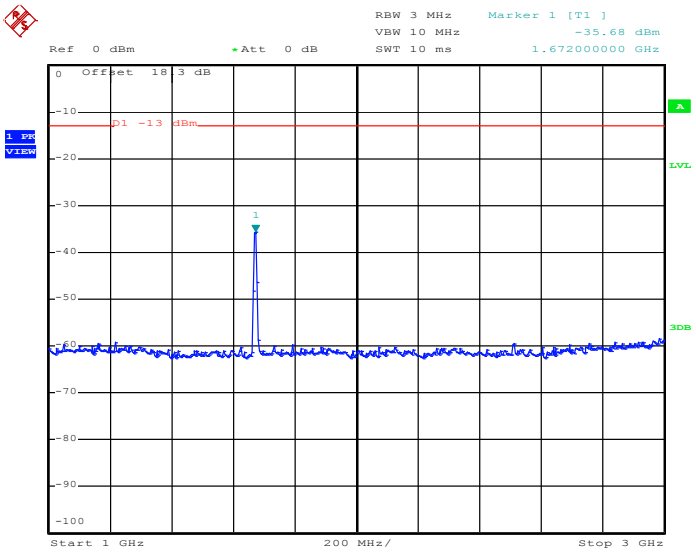
Band :	WCDMA Band V	Channel :	CH4182
Test Mode :	RMC 12.2kbps Link (QPSK)	Frequency :	836.4 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



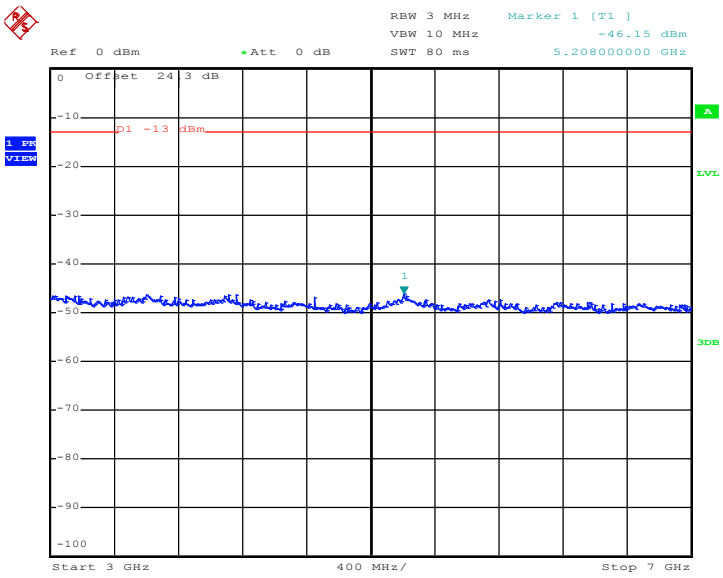
Date: 10.JAN.2013 09:33:22

Conducted Spurious Emission Plot between 1GHz ~ 3GHz



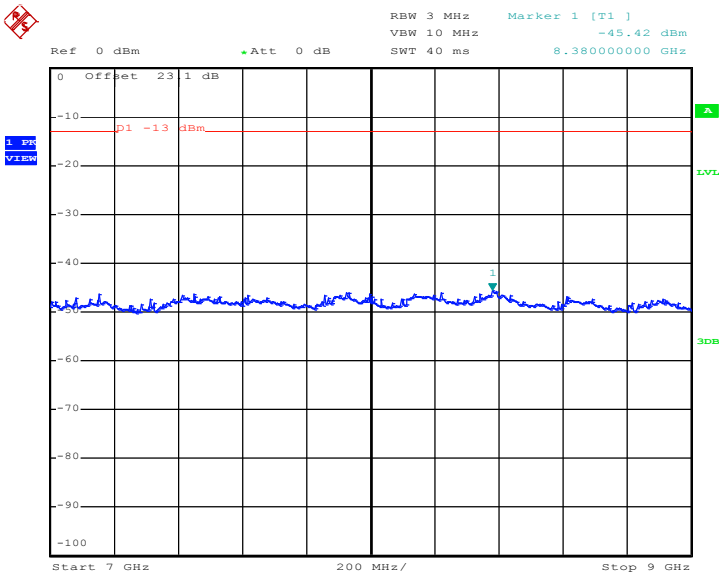
Date: 10.JAN.2013 09:33:39

Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 10.JAN.2013 09:33:52

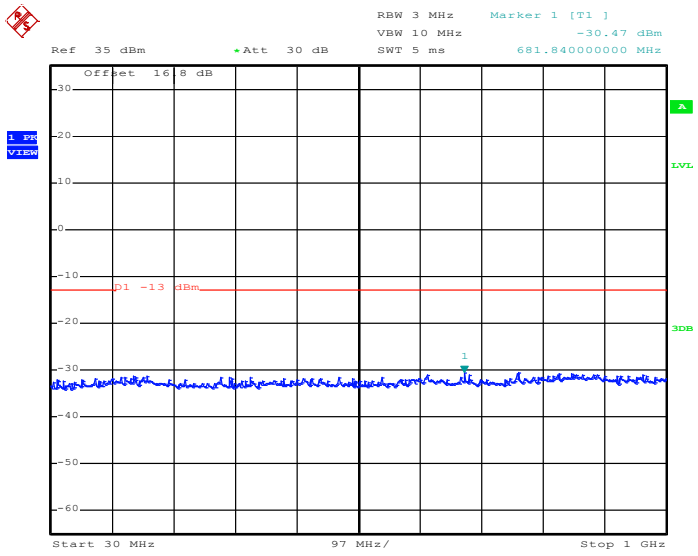
Conducted Spurious Emission Plot between 7GHz ~ 9GHz



Date: 10.JAN.2013 09:34:04

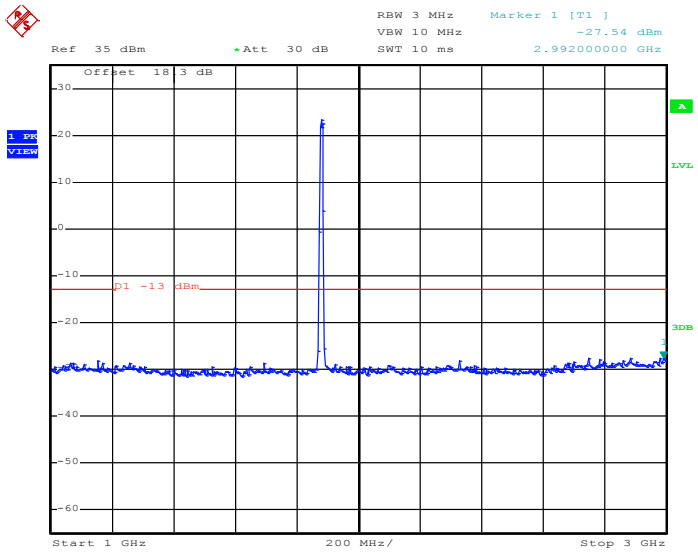
Band :	WCDMA Band II	Channel :	CH9400
Test Mode :	RMC 12.2kbps Link (QPSK)	Frequency :	1880.0 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



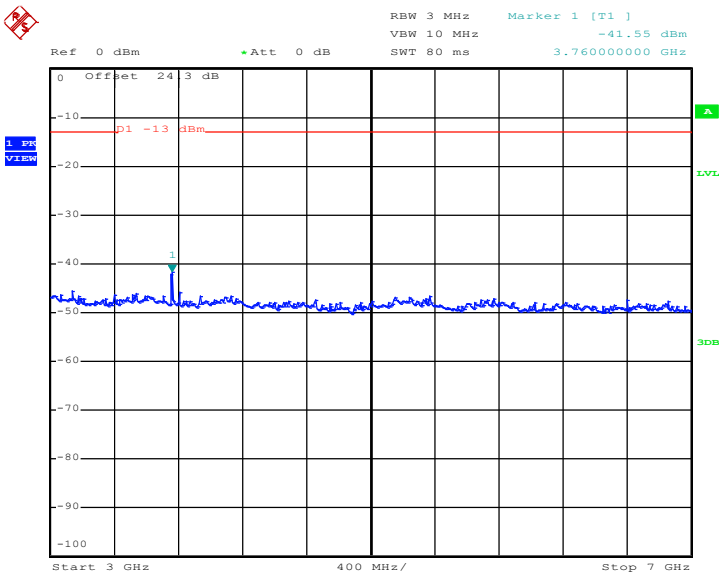
Date: 10.JAN.2013 09:22:02

Conducted Spurious Emission Plot between 1GHz ~ 3GHz



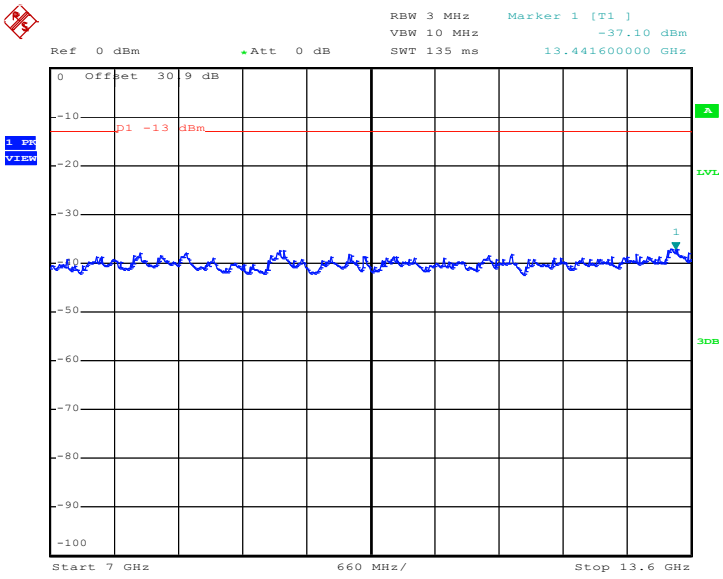
Date: 10.JAN.2013 09:22:15

Conducted Spurious Emission Plot between 3GHz ~ 7GHz



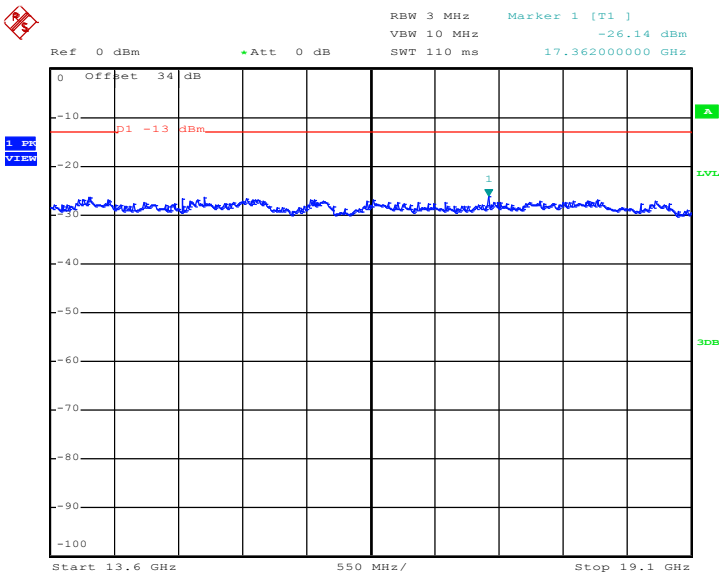
Date: 10.JAN.2013 09:22:32

Conducted Spurious Emission Plot between 7GHz ~ 13.6GHz



Date: 10.JAN.2013 09:22:44

Conducted Spurious Emission Plot between 13.6GHz ~ 19.1GHz



Date: 10.JAN.2013 09:22:57

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

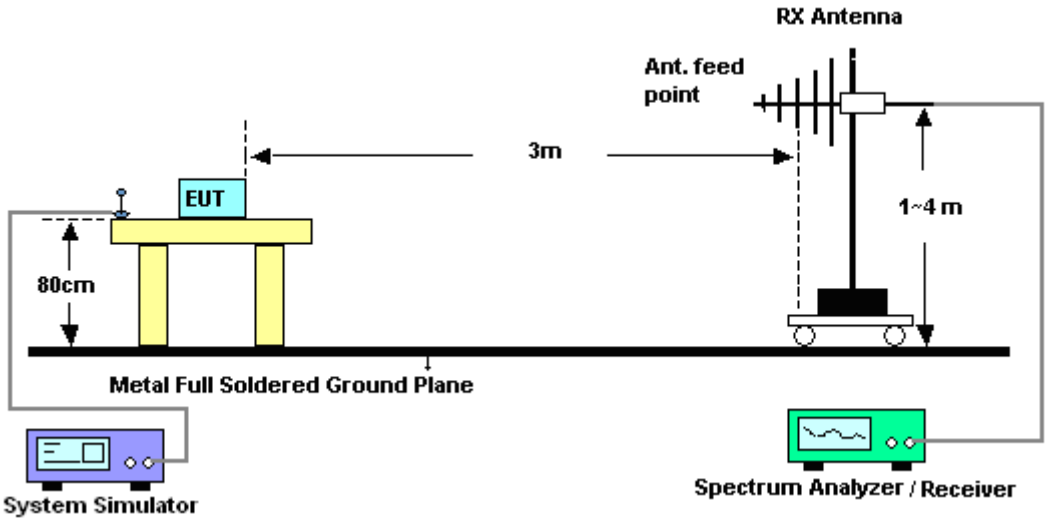
See list of measuring instruments of this test report.

3.7.3 Test Procedures

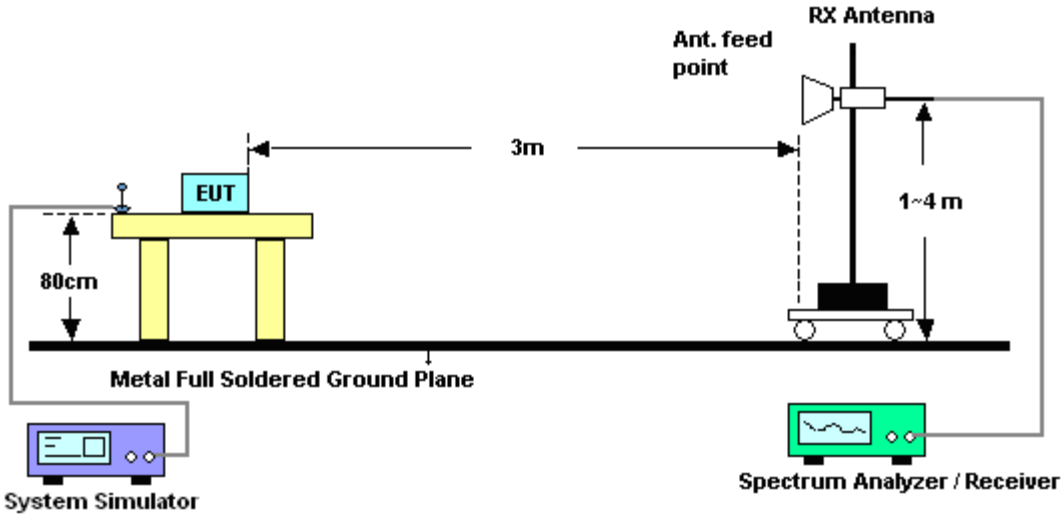
1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
11. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)
    = P(W) - [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.
12. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
13. ERP (dBm) = EIRP - 2.15

3.7.4 Test Setup

For radiated emissions from 30MHz to 1GHz

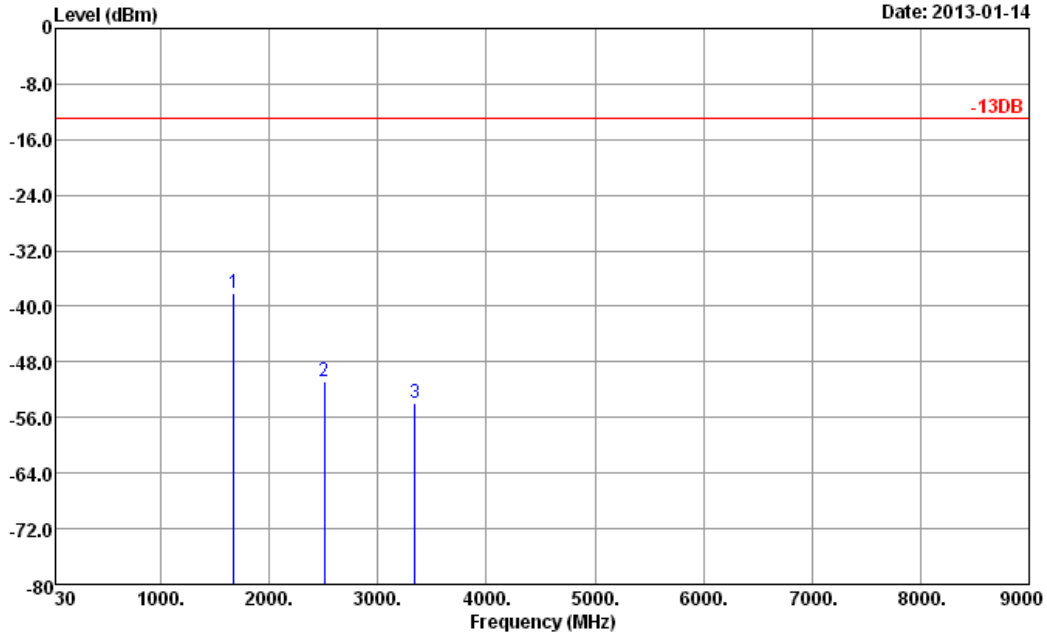


For radiated emissions above 1GHz



3.7.5 Test Result of Field Strength of Spurious Radiated

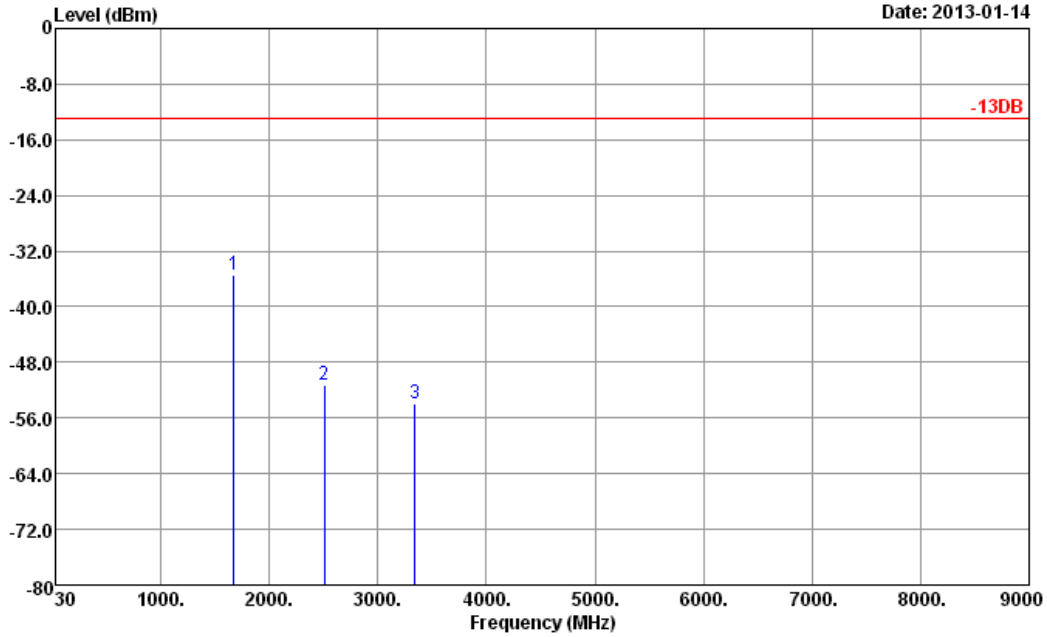
Band :	GSM850	**Temperature :**	20~22°C
Test Mode :	GSM Link (GMSK)	**Relative Humidity :**	40~42%
Test Engineer :	David Ke	**Polarization :**	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH05-HY
Condition : -13DB HF EIRP 101221 HORIZONTAL

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1672	-38.11	-13	-25.11	-44.04	-39.87	1.35	5.25	H	Pass
2509	-50.81	-13	-37.81	-60.05	-53.19	1.58	6.11	H	Pass
3345.6	-53.86	-13	-40.86	-65.39	-57.71	1.94	7.94	H	Pass

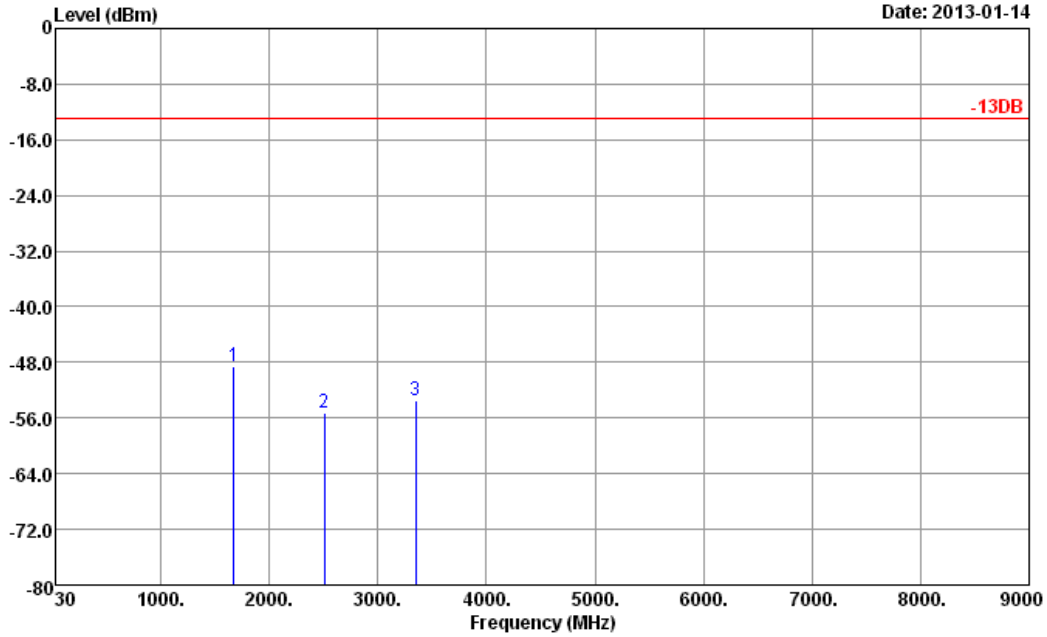
Band :	GSM850	Temperature :	20~22°C
Test Mode :	GSM Link (GMSK)	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH05-HY
Condition : -13DB HF_EIRP_101221 VERTICAL

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1672	-35.46	-13	-22.46	-41.5	-37.22	1.35	5.25	V	Pass
2509	-51.20	-13	-38.20	-60.52	-53.58	1.58	6.11	V	Pass
3345.6	-53.84	-13	-40.84	-65.34	-57.69	1.94	7.94	V	Pass

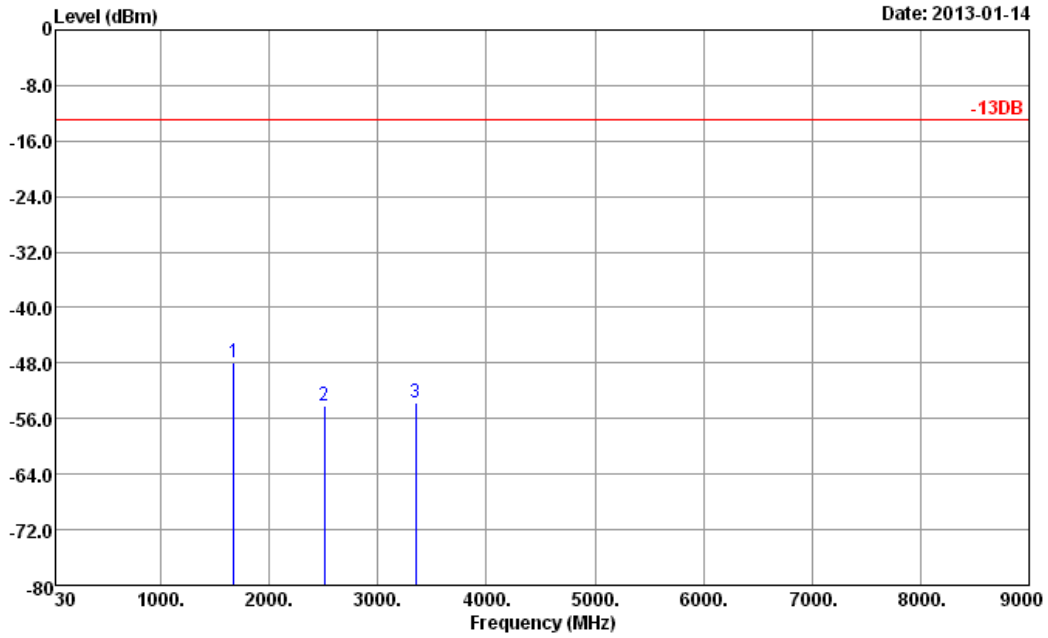
Band :	GSM850	Temperature :	20~22°C
Test Mode :	EDGE class 8 Link (8PSK)	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH05-HY
Condition : -13DB HF_EIRP_101221 HORIZONTAL

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1672	-48.54	-13	-35.54	-54.59	-50.3	1.35	5.25	H	Pass
2509	-55.16	-13	-42.16	-64.43	-57.54	1.58	6.11	H	Pass
3346	-53.44	-13	-40.44	-64.97	-57.29	1.94	7.94	H	Pass

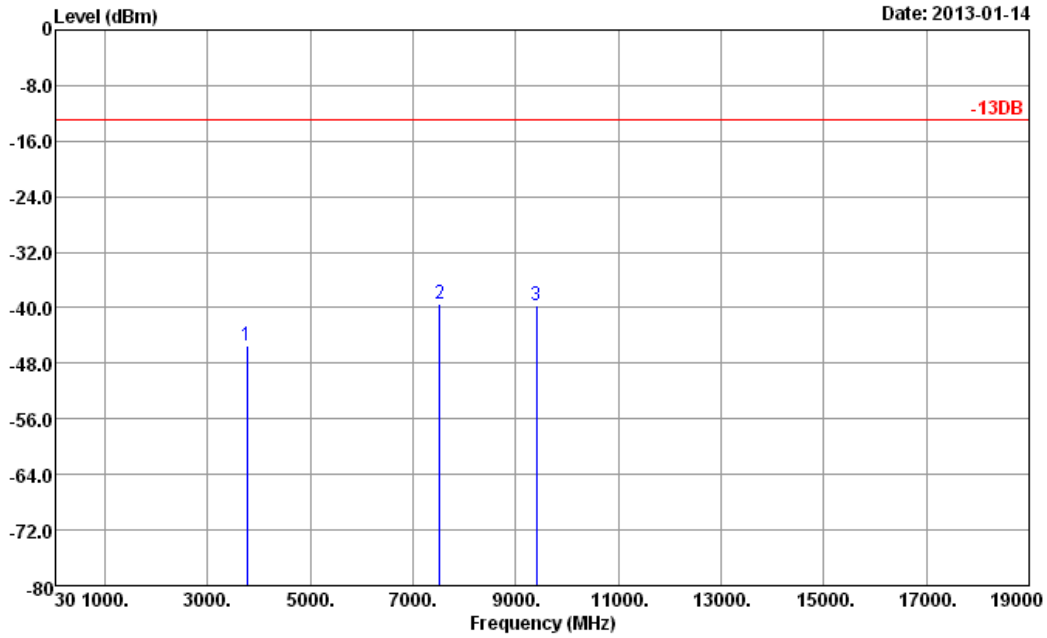
Band :	GSM850	Temperature :	20~22°C
Test Mode :	EDGE class 8 Link (8PSK)	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH05-HY
Condition : -13DB HF_EIRP_101221 VERTICAL

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1672	-47.81	-13	-34.81	-53.83	-49.57	1.35	5.25	V	Pass
2509	-54.08	-13	-41.08	-63.33	-56.46	1.58	6.11	V	Pass
3346	-53.78	-13	-40.78	-65.3	-57.63	1.94	7.94	V	Pass

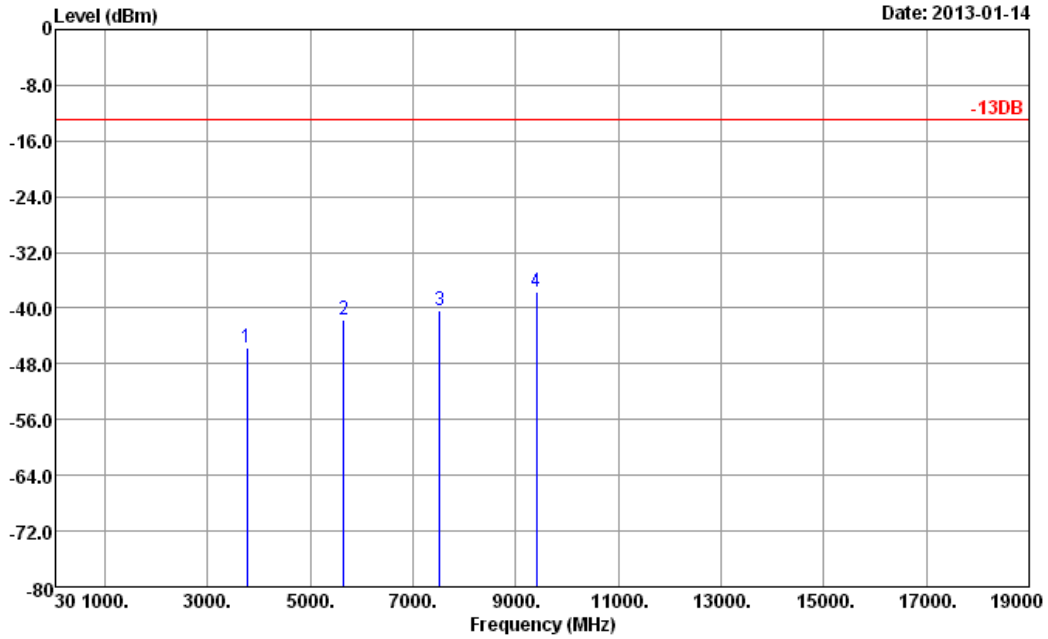
Band :	GSM1900	Temperature :	20~22°C
Test Mode :	GSM Link (GMSK)	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH05-HY
Condition : -13DB HF_EIRP_101221 HORIZONTAL

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3760	-45.41	-13	-32.41	-58.96	-52.12	2.00	8.71	H	Pass
7520	-39.48	-13	-26.48	-61.41	-49.02	2.68	12.22	H	Pass
9400	-39.67	-13	-26.67	-63.65	-50.18	2.87	13.38	H	Pass

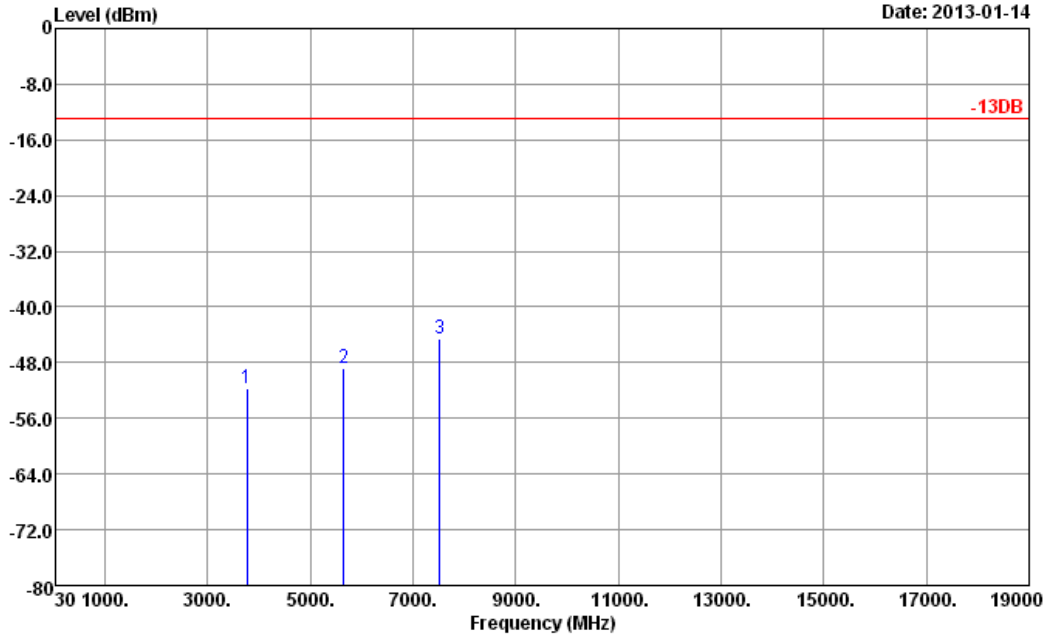
Band :	GSM1900	Temperature :	20~22°C
Test Mode :	GSM Link (GMSK)	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH05-HY
Condition : -13DB HF_EIRP_101221 VERTICAL

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3760	-45.76	-13	-32.76	-59.23	-52.47	2.00	8.71	V	Pass
5640	-41.71	-13	-28.71	-60.57	-50.35	2.13	10.77	V	Pass
7520	-40.43	-13	-27.43	-62.33	-49.97	2.68	12.22	V	Pass
9400	-37.71	-13	-24.71	-61.69	-48.22	2.87	13.38	V	Pass

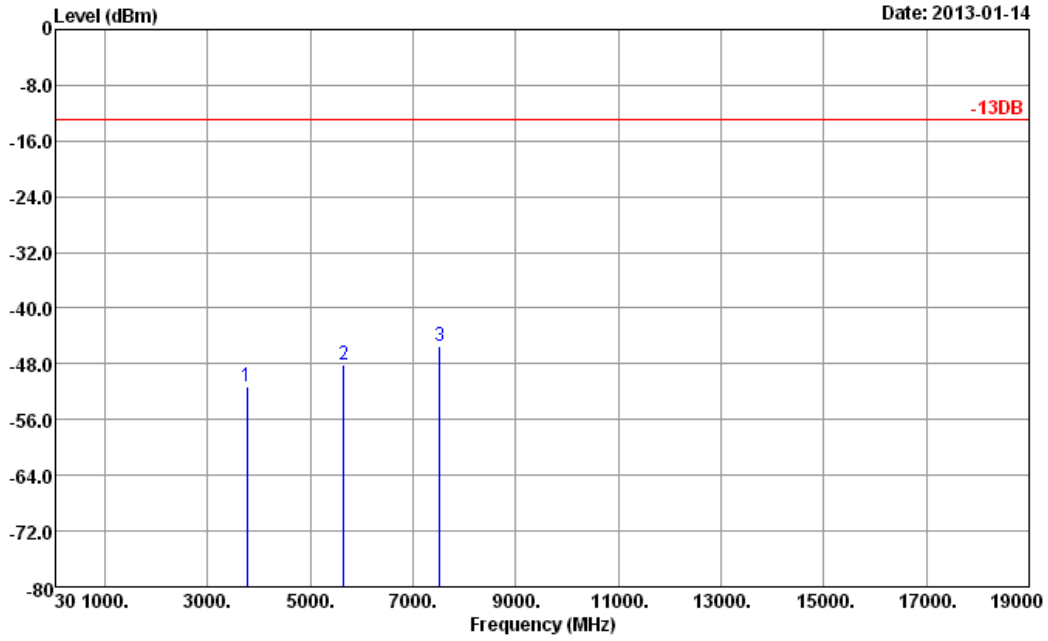
Band :	GSM1900	Temperature :	20~22°C
Test Mode :	EDGE class 8 Link (8PSK)	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH05-HY
Condition : -13DB HF_EIRP_101221 HORIZONTAL

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3760	-51.65	-13	-38.65	-65.15	-58.36	2.00	8.71	H	Pass
5640	-47.87	-13	-34.87	-66.79	-56.51	2.13	10.77	H	Pass
7520	-44.64	-13	-31.64	-66.67	-54.18	2.68	12.22	H	Pass

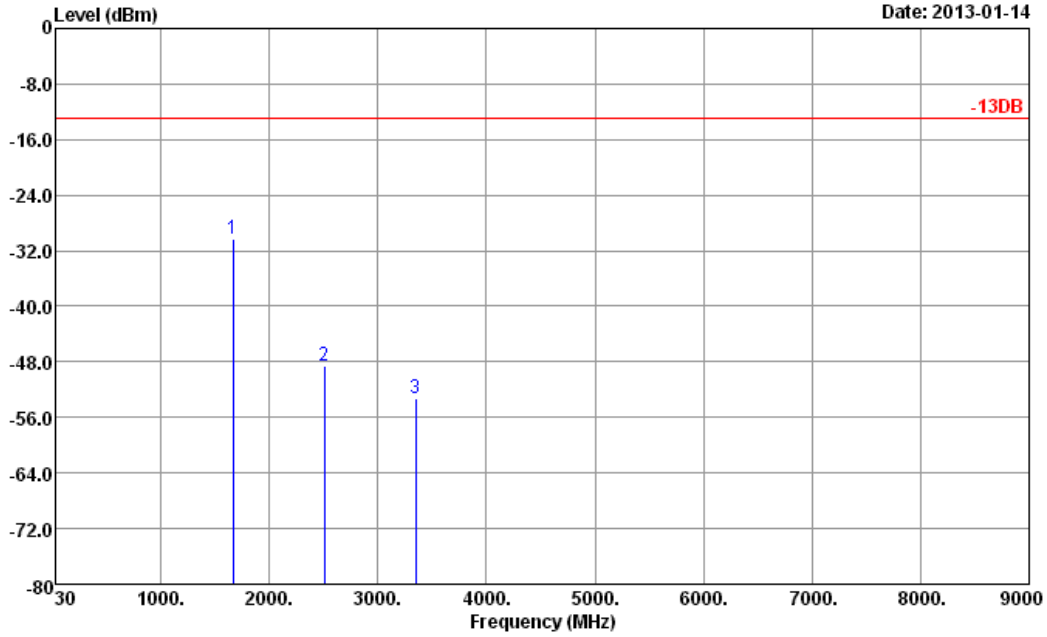
Band :	GSM1900	Temperature :	20~22°C
Test Mode :	EDGE class 8 Link (8PSK)	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH05-HY
Condition : -13DB HF_EIRP_101221 VERTICAL

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3760	-51.31	-13	-38.31	-64.73	-58.02	2.00	8.71	V	Pass
5640	-48.06	-13	-35.06	-66.9	-56.7	2.13	10.77	V	Pass
7520	-45.50	-13	-32.50	-67.43	-55.04	2.68	12.22	V	Pass

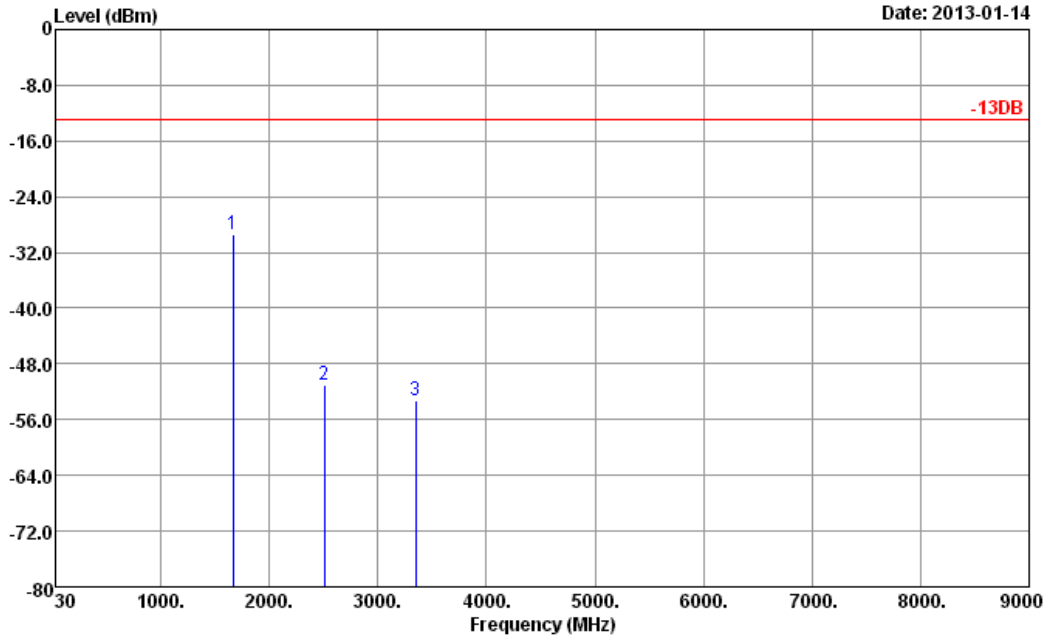
Band :	WCDMA Band V	Temperature :	20~22°C
Test Mode :	RMC 12.2kbps Link (QPSK)	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH05-HY
Condition : -13DB HF_EIRP_101221 HORIZONTAL

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1669	-30.24	-13	-17.24	-36.09	-32	1.35	5.25	H	Pass
2509	-48.50	-13	-35.50	-57.79	-50.88	1.58	6.11	H	Pass
3346	-53.36	-13	-40.36	-64.89	-57.21	1.94	7.94	H	Pass

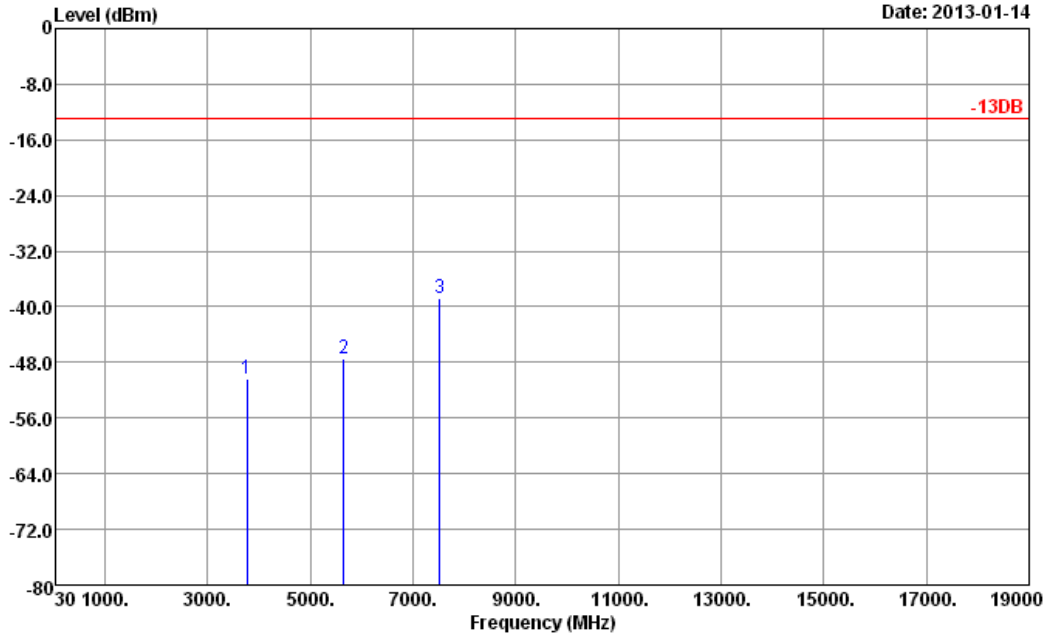
Band :	WCDMA Band V	Temperature :	20~22°C
Test Mode :	RMC 12.2kbps Link (QPSK)	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH05-HY
Condition : -13DB HF_EIRP_101221 VERTICAL

Frequency (MHz)	ERP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
1669	-29.37	-13	-16.37	-35.28	-31.13	1.35	5.25	V	Pass
2509	-51.03	-13	-38.03	-60.3	-53.41	1.58	6.11	V	Pass
3346	-53.26	-13	-40.26	-64.84	-57.11	1.94	7.94	V	Pass

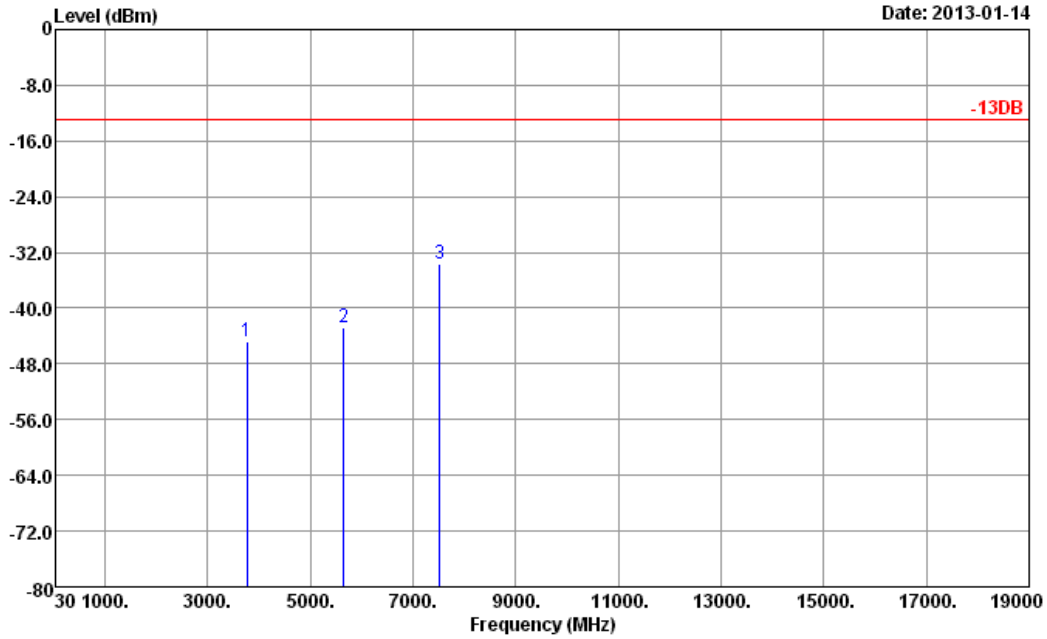
Band :	WCDMA Band II	Temperature :	20~22°C
Test Mode :	RMC 12.2kbps Link (QPSK)	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH05-HY
Condition : -13DB HF_EIRP_101221 HORIZONTAL

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3760	-50.40	-13	-37.40	-63.84	-57.11	2.00	8.71	H	Pass
5640	-47.49	-13	-34.49	-66.38	-56.13	2.13	10.77	H	Pass
7520	-38.71	-13	-25.71	-60.67	-48.25	2.68	12.22	H	Pass

Band :	WCDMA Band II	Temperature :	20~22°C
Test Mode :	RMC 12.2kbps Link (QPSK)	Relative Humidity :	40~42%
Test Engineer :	David Ke	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		



Site : 03CH05-HY
Condition : -13DB HF_EIRP_101221 VERTICAL

Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	SPA Reading (dBm)	S.G. Power (dBm)	TX Cable loss (dB)	TX Antenna Gain (dBi)	Polarization (H/V)	Result
3760	-44.76	-13	-31.76	-58.21	-51.47	2.00	8.71	V	Pass
5644	-42.68	-13	-29.68	-61.6	-51.32	2.13	10.77	V	Pass
7520	-33.67	-13	-20.67	-55.65	-43.21	2.68	12.22	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 ±0.00025% (±2.5ppm) of the center frequency.

3.8.2 Measuring Instruments

See list of measuring instruments of this test report.

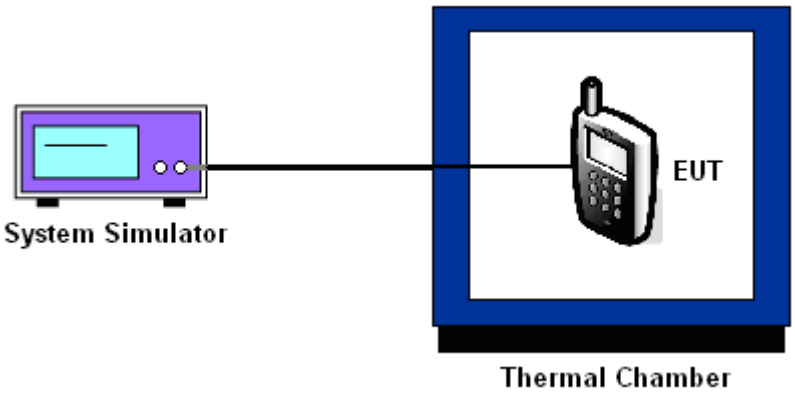
3.8.3 Test Procedures for Temperature Variation

1. The EUT was set up in the thermal chamber and connected with the base station.
2. 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.
3. With power OFF, the temperature was raised in 10°C step 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.
4. If the EUT cannot be turned on at -30°C, the testing lowest temperature will be raised in 10°C step until the EUT can be turned on.

3.8.4 Test Procedures for Voltage Variation

1. The EUT was placed in a temperature chamber at 25±5° C and connected with the base station.
2. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
3. 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 850	Channel :	189
Limit (ppm) :	2.5	Frequency :	836.4 MHz

Temperature (°C)	GSM		EDGE class 8		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	15	0.02	13	0.02	PASS
-20	18	0.02	10	0.01	
-10	21	0.02	15	0.02	
0	13	0.02	16	0.02	
10	14	0.02	14	0.02	
20	15	0.02	18	0.02	
30	12	0.01	10	0.01	
40	15	0.02	19	0.02	
50	16	0.02	20	0.02	

Band :	GSM 1900	Channel :	661
Limit (ppm) :	2.5	Frequency :	1880.0 MHz

Temperature (°C)	GSM		EDGE class 8		Result
	Freq. Dev. (Hz)	Deviation (ppm)	Freq. Dev. (Hz)	Deviation (ppm)	
-30	35	0.02	23	0.01	PASS
-20	31	0.02	20	0.01	
-10	40	0.02	37	0.02	
0	36	0.02	36	0.02	
10	32	0.02	28	0.01	
20	31	0.02	30	0.02	
30	35	0.02	29	0.02	
40	39	0.02	40	0.02	
50	47	0.02	46	0.02	

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)	
-30	8	0.01	PASS
-20	10	0.01	
-10	6	0.01	
0	7	0.01	
10	5	0.01	
20	6	0.01	
30	4	0.00	
40	5	0.01	
50	3	0.00	

Band :	WCDMA Band II	Channel :	9400
Limit (ppm) :	2.5	Frequency :	1880.0 MHz

Temperature (°C)	RMC 12.2kbps		Result
	Freq. Dev. (Hz)	Deviation (ppm)	
-30	13	0.01	PASS
-20	10	0.01	
-10	12	0.01	
0	10	0.01	
10	14	0.01	
20	11	0.01	
30	13	0.01	
40	10	0.01	
50	14	0.01	

3.8.7 Test Result of Voltage Variation

Band & Channel	Mode	Voltage (Volt)	Freq. Dev. (Hz)	Deviation (ppm)	Limit (ppm)	Result
GSM 850 CH189	GSM	3.7	16	0.02	2.5	PASS
		BEP	11	0.01		
		4.2	20	0.02		
	EDGE class 8	3.7	16	0.02		
		BEP	13	0.02		
		4.2	21	0.02		
GSM 1900 CH661	GSM	3.7	35	0.02		
		BEP	31	0.02		
		4.2	42	0.02		
	EDGE class 8	3.7	35	0.02		
		BEP	30	0.02		
		4.2	46	0.02		
WCDMA Band V CH4182	RMC 12.2kbps	3.7	8	0.01		
		BEP	9	0.01		
		4.2	5	0.01		
WCDMA Band II CH9400	RMC 12.2kbps	3.7	10	0.01		
		BEP	13	0.01		
		4.2	15	0.01		

Note:

1. Normal Voltage = 3.7V.
2. Battery End Point (BEP) = 3.6 V.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
System Simulator	R&S	CMU200	117995	N/A	Jul. 30, 2012	Jan. 10, 2013 ~ Jun. 14, 2013	Jul. 29, 2013	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP40	100057	9kHz~40GHz	Oct. 29, 2012	Jan. 10, 2013 ~ Jun. 14, 2013	Oct. 28, 2013	Conducted (TH02-HY)
Thermal Chamber	Ten Billion	TTH-D3SP	TBN-930701	N/A	Jul. 23, 2012	Jan. 10, 2013 ~ Jun. 14, 2013	Jul. 22, 2013	Conducted (TH02-HY)
Spectrum Analyzer	R&S	ESU26	100390	20Hz~26.5GHz	Dec. 14, 2012	Jan. 12, 2013 ~ Jan. 17, 2013	Dec. 13, 2013	Radiation (03CH05-HY)
Bilog Antenna	Schaffner	CBL6111C	2725	30MHz~2GHz	Oct. 06, 2012	Jan. 12, 2013 ~ Jan. 17, 2013	Oct. 05, 2013	Radiation (03CH05-HY)
Turn Table	HD	Deis HD 2000	420/611	0 ~ 360 degree	N/A	Jan. 12, 2013 ~ Jan. 17, 2013	N/A	Radiation (03CH05-HY)
Antenna Mast	HD	MA 240	240/666	1 m ~ 4 m	N/A	Jan. 12, 2013 ~ Jan. 17, 2013	N/A	Radiation (03CH05-HY)
Horn Antenna	ESCO	3117	66584	1GHz~18GHz	Aug. 10, 2012	Jan. 12, 2013 ~ Jan. 17, 2013	Aug. 09, 2013	Radiation (03CH05-HY)
Pre Amplifier	Agilent	8449B	3008A02665	1GHz~26.5GHz	Aug. 28, 2012	Jan. 12, 2013 ~ Jan. 17, 2013	Aug. 27, 2013	Radiation (03CH05-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz ~ 40GHz	Sep. 28, 2012	Jan. 12, 2013 ~ Jan. 17, 2013	Sep. 27, 2013	Radiation (03CH05-HY)
Pre Amplifier	COM-POWER	PA-103	161075	10-1000MHz.32dB.GAIN	Feb. 27, 2012	Jan. 12, 2013 ~ Jan. 17, 2013	Feb. 26, 2013	Radiation (03CH05-HY)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.54**

Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.72**

Appendix A. Photographs of EUT

Please refer to Sporton report number EP2D2653-01 as below.

Appendix C. Product Equality Declaration

Bullitt Group

No. 4, The Aquarium, King Street, Reading RG1 2AN, United Kingdom
Tel: +44 (0) 7818 413 871 ; Fax: +44 (0) 7818 413 871

Federal Communications Commission
Authorization and Evaluation Division
1435 Oakland Mills Road
Columbia, MD 21046

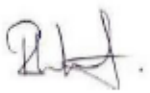
To whom it may concern:

The differences between devices FCC ID: ZL5B15 and FCC ID: ZL5B15AWS are outlined as below.

- Antenna design is the same.
- PCB: DDR1 change to DDR2 memory (Layout modification)
- PCB: Add HAC inductor at receiver for HAC t-coil (Layout modification, A case modification)
- PCB: Add WCDMA Band 4 hardware.
- PCB: Introduce some 2nd source passive components
- Assembly: LCM module change new driver IC (FPC layout modification), module outline is the same as FCC ID ZL5B15.
  (SW change new LCM driver and HW add one GPIO for auto configuration new/old LCM.)
- Add 2nd source earphone

Based on the similarity between two FCC IDs, we hereby request permission to use Part 15C/22H/24E test data of FCC ID: ZL5B15 granted on 2013/02/19, verifying the worst cases found in ZL5B15 on ZL5B15AWS, to show the compliance of FCC ID ZL5B15AWS regarding Part 15C/22H/24E requirements. As for Part 27, the RF and SAR assessment will be fully tested in accordance with Part 27 and SAR requirements.

Sincerely,



Richard Wharton
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