



FCC RF Test Report

APPLICANT : ASUSTeK COMPUTER INC.
EQUIPMENT : ASUS Phone
BRAND NAME : ASUS
MODEL NAME : ASUS_Z00VD
MARKETING NAME : ZC500TG
FCC ID : MSQZ00VD
STANDARD : FCC 47 CFR Part 2, 22(H), 24(E)
CLASSIFICATION : PCS Licensed Transmitter Held to Ear (PCE)

The product was received on Apr. 13, 2015 and testing was completed on May 26, 2015. We, SPORTON INTERNATIONAL (KUNSHAN) 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 (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL (KUNSHAN) INC.

No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG541309	Rev. 01	Initial issue of report	Sep. 08, 2015

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	-
	§24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts	PASS	-
3.4	§2.1049	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 10.55 dB at 11280.000 MHz
3.8	§2.1055 §22.355	Frequency Stability for Temperature & Voltage	< 2.5 ppm for Part 22 Within Authorized Band	PASS	-
	§2.1055 §24.235				



1 General Description

1.1 Applicant

ASUSTeK COMPUTER INC.

4F, No.150, Li-Te Rd., Peitou, Taipei 112, Taiwan

1.2 Manufacturer

Dongguan Xinheng Electronic and Technology Co.,Ltd

A-1 DISTRICT, 4/F, NO.9 INDUSTRIAL NORTHERN ROAD DONGGUAN SONGSHAN LAKE
NATIONAL HIGH-TECH INDUSTRIAL DEVELOPMENT ZONE DONGGUAN, GUANGDONG, CHINA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	ASUS Phone
Brand Name	ASUS
Model Name	ASUS_Z00VD
Marketing Name	ZC500TG
FCC ID	MSQZ00VD
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/HSPA+(Downlink Only)/ WLAN 2.4GHz 802.11b/g/n HT20/HT40/ Bluetooth v3.0 + EDR/Bluetooth v4.0 LE
HW Version	AW806_MB_PCB_V2.0
SW Version	AW806_ZC500TG_20150407
EUT Stage	Identical Prototype

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	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 : 32.69 dBm GSM1900 : 30.11 dBm WCDMA Band V : 23.35 dBm WCDMA Band II : 23.32 dBm
Antenna Type	PIFA Antenna
Type of Modulation	GSM: GMSK GPRS: GMSK EDGE: GMSK / 8PSK WCDMA: QPSK (Uplink) HSDPA: QPSK (Uplink) HSUPA: QPSK (Uplink) HSPA+: 16QAM (Downlink Only)

1.5 Component List

Component	Sample 1	Sample 2
Memory	hynix H9TQ17ABJTM C URKUM 516A	hynix H9TQ64ABJTM C URKUM 514A
PCB	Evertex AW806_MB_PCB_V2.0	Evertex AW806_MB_PCB_V2.0
Front_camera	QUNHUI GV5770-00025	QUNHUI GV5770-00025
Back_camera	GUANGZHEN LA R140530R1448XAN	GUANGZHEN LA R140530R1448XAN
Motor	HONGZHIFA B1027-26-1	HONGZHIFA HZF1027A-P02L10-1
Speaker	HAOSHEN KFSC1115G3.5-08-0.7W-D	HAOSHEN XHS151118SW43P38-02
CTP	TOPTOUCH GT915L 1503-B26A 14BC0600 E5S263xxxx	TOPTOUCH GT915L 1503-B26A 14BC0600 E5S263xxxx
LCD	TXD TD-TNHD5031-3	TXD TXDT500SYPA-AW806

Component	Sample 3	Sample 4
Memory	hynix H9TQ17ABJPMC URKUM 516A	hynix H9TQ64ABJPMC URKUM 514A
PCB	wuzhu AW806_MB_PCB_V2.0	wuzhu AW806_MB_PCB_V2.0
Front_camera	HUAQUAN O6P2-QL1700HQ	HUAQUAN Q6P2-QL1700HQ
Back_camera	QIUTAI F4H5CAE-S	QIUTAI F4H5CAE-S
Motor	LEHUI B1027-26-1	LEHUI HZF1027A-P02L10-1
Speaker	XICHUN KFSC1115G3.5-08-0.7W-D	XICHUN XHS151118SW43P38-02
CTP	MUTTO FT5346DQQ ERH392E	MUTTO FT5346DQQ ERH392E
LCD	TCL TD-TNHD5031-3	TCL TXDT500SYPA-AW806

1.6 Modification of EUT

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

1.7 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	GSM850 GSM	GMSK	0.5791	0.0514 ppm	240KGXW
Part 22	GSM850 EDGE class 8	8PSK	0.2364	0.0550 ppm	246KG7W
Part 22	WCDMA Band V RMC 12.2Kbps	QPSK	0.0532	0.0622 ppm	4M16F9W
Part 24	GSM1900 GSM	GMSK	0.6125	0.0239 ppm	240KGXW
Part 24	GSM1900 EDGE class 8	8PSK	0.2577	0.0154 ppm	244KG7W
Part 24	WCDMA Band II RMC 12.2Kbps	QPSK	0.1765	0.0266 ppm	4M18F9W

1.8 Testing Location

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.		
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958		
Test Site No.	Sporton Site No.		FCC Registration No.
	TH01-KS	03CH02-KS	418269

1.9 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 v02r02

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.

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 v02r02 with maximum output power.

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

Radiated emissions were investigated as following frequency range:

1. 30 MHz to 10th harmonic for GSM850 and WCDMA Band V.
2. 30 MHz to 10th harmonic for GSM1900 and WCDMA Band II.

All modes and data rates and positions were investigated.

Test modes are chosen to be reported as the worst case configuration below:

Test Modes		
Band	Radiated TCs	Conducted TCs
GSM 850	■ GSM Link	■ GSM Link
	■ EDGE class 8 Link	■ EDGE class 8 Link
GSM 1900	■ GSM Link	■ GSM Link
	■ EDGE class 8 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:**

For SIM1 Card:

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	31.59	32.67	32.69	29.99	30.08	30.11
GPRS class 8	31.58	32.66	32.68	29.98	30.06	30.10
GPRS class 10	30.68	31.75	31.81	29.15	29.24	29.31
GPRS class 11	28.78	29.86	29.88	27.28	27.42	27.52
GPRS class 12	27.52	28.65	28.66	26.04	26.24	26.30
EGPRS class 8	28.09	28.12	28.33	26.92	26.73	26.54
EGPRS class 10	27.00	27.06	27.28	25.91	25.64	25.48
EGPRS class 11	24.77	24.81	25.02	23.67	23.41	23.18
EGPRS class 12	23.44	23.58	23.71	22.25	22.18	21.81

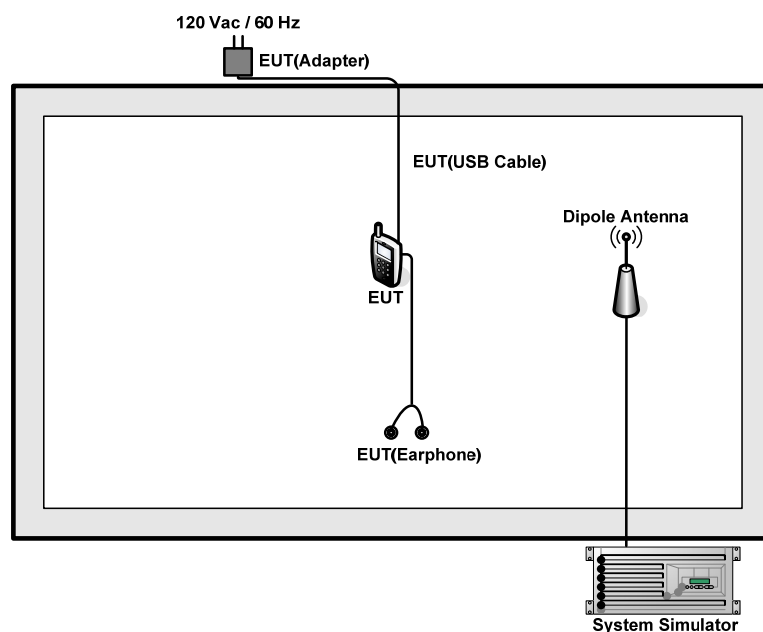
Conducted Power (*Unit: dBm)						
Band	WCDMA Band V			WCDMA Band II		
Channel	4132	4182	4233	9262	9400	9538
Frequency	826.4	836.4	846.6	1852.4	1880.0	1907.6
AMR 12.2K	23.24	23.32	23.34	22.93	23.11	23.30
RMC 12.2K	23.25	23.33	23.35	22.94	23.12	23.32
HSDPA Subtest-1	22.27	22.40	22.41	21.95	22.21	22.36
HSDPA Subtest-2	22.26	22.36	22.37	21.95	22.17	22.39
HSDPA Subtest-3	21.85	21.91	21.92	21.47	21.69	21.94
HSDPA Subtest-4	21.84	21.90	21.91	21.44	21.67	21.92
HSUPA Subtest-1	20.30	20.38	20.39	20.01	20.24	20.47
HSUPA Subtest-2	20.41	20.48	20.49	20.16	20.31	20.50
HSUPA Subtest-3	21.27	21.30	21.31	20.94	21.13	21.35
HSUPA Subtest-4	19.92	19.98	19.99	19.55	19.76	20.00
HSUPA Subtest-5	21.25	21.30	21.31	21.25	21.43	21.67

For SIM2 Card:

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	31.57	32.66	32.67	29.95	30.04	30.09
GPRS class 8	31.56	32.65	32.66	29.94	30.03	30.08
GPRS class 10	30.63	31.70	31.78	29.12	29.22	29.25
GPRS class 11	28.75	29.85	29.86	27.26	27.41	27.47
GPRS class 12	27.50	28.61	28.62	26.01	26.23	26.25
EGPRS class 8	28.05	28.09	28.31	26.89	26.71	26.51
EGPRS class 10	26.98	27.04	27.24	25.90	25.61	25.45
EGPRS class 11	24.73	24.78	24.99	23.65	23.39	23.17
EGPRS class 12	23.39	23.53	23.66	22.20	22.14	21.78

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 12.2K	23.16	23.24	23.31	22.87	23.05	23.28
RMC 12.2K	23.18	23.30	23.32	22.88	23.10	23.30
HSDPA Subtest-1	22.24	22.36	22.32	21.93	22.17	22.28
HSDPA Subtest-2	22.23	22.31	22.22	21.93	22.13	22.25
HSDPA Subtest-3	21.78	21.88	21.88	21.43	21.67	21.92
HSDPA Subtest-4	21.77	21.87	21.86	21.38	21.65	21.88
HSUPA Subtest-1	20.28	20.34	20.36	19.99	20.22	20.45
HSUPA Subtest-2	20.36	20.47	20.45	20.12	20.31	20.48
HSUPA Subtest-3	21.24	21.24	21.28	20.94	21.07	21.33
HSUPA Subtest-4	19.88	19.93	19.96	19.53	19.74	19.92
HSUPA Subtest-5	21.18	21.24	21.26	21.21	21.37	21.65

2.2 Connection Diagram of Test System



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	GW INSTRON	GPS-3030D	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 5.5 dB and a 10dB attenuator.

Example :

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 5.5 + 10 = 15.5 \text{ (dB)}\end{aligned}$$

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.

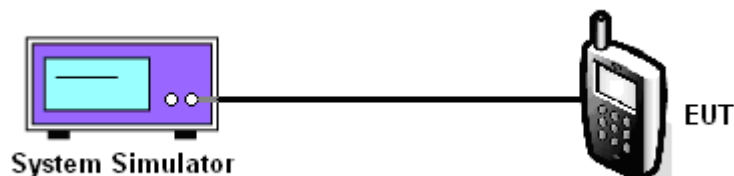
3.1.2 Measuring Instruments

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									
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)	31.59	32.67	32.69	28.09	28.12	28.33	23.25	23.33	23.35

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)	29.99	30.08	30.11	26.92	26.73	26.54	22.94	23.12	23.32

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.

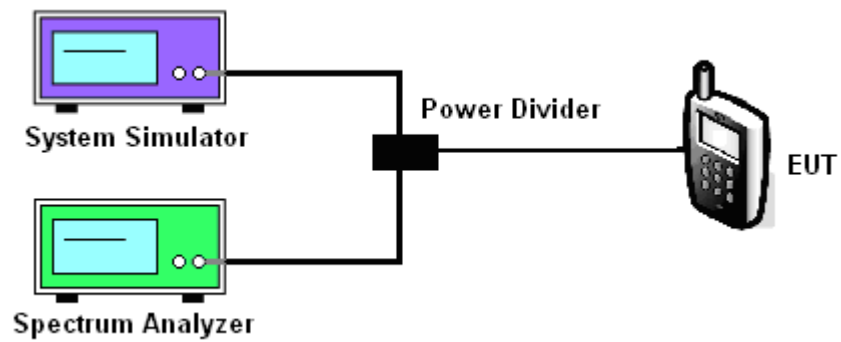
3.2.2 Measuring Instruments

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 v02r02 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

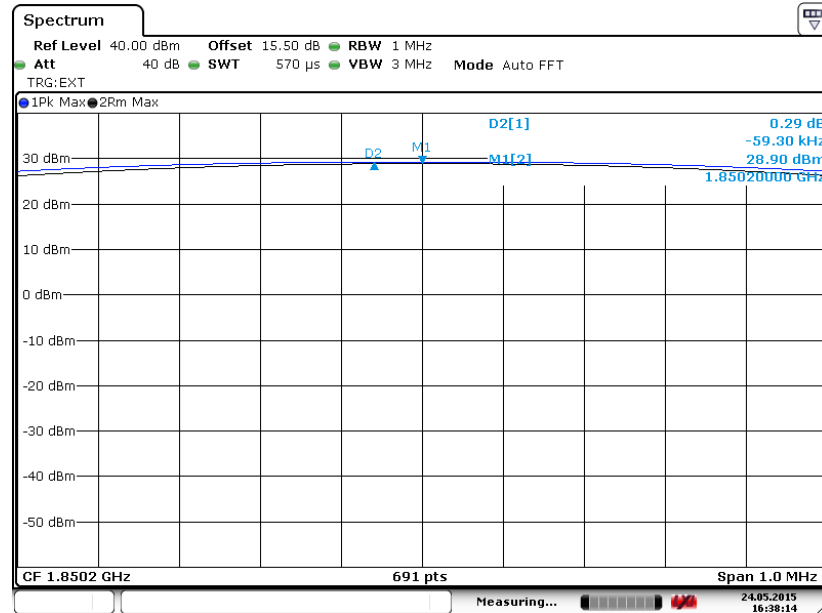
PCS Band									
Modes	GSM1900 (GSM)			GSM1900 (EDGE class 8)			WCDMA Band II (RMC 12.2Kbps)		
Channel	512 (Low)	661 (Mid)	810 (High)	512 (Low)	661 (Mid)	810 (High)	9262 (Low)	9400 (Mid)	9538 (High)
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8	1852.4	1880	1907.6
Peak-to-Average Ratio (dB)	0.29	0.29	0.29	3.00	2.98	2.97	3.08	3.24	3.12



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

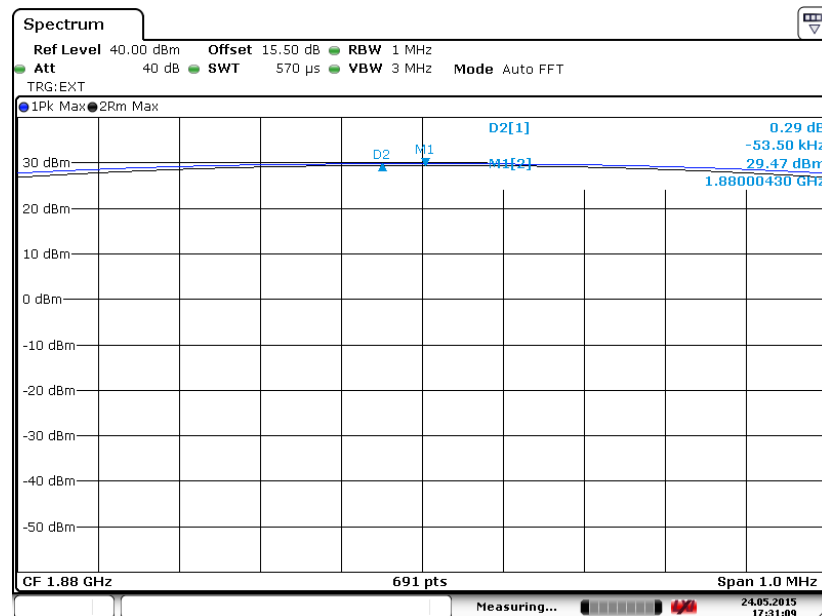
Band :	GSM 1900	Test Mode :	GSM Link (GMSK)
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Peak-to-Average Ratio on Channel 512 (1850.2 MHz)



Date: 24 MAY 2015 16:38:15

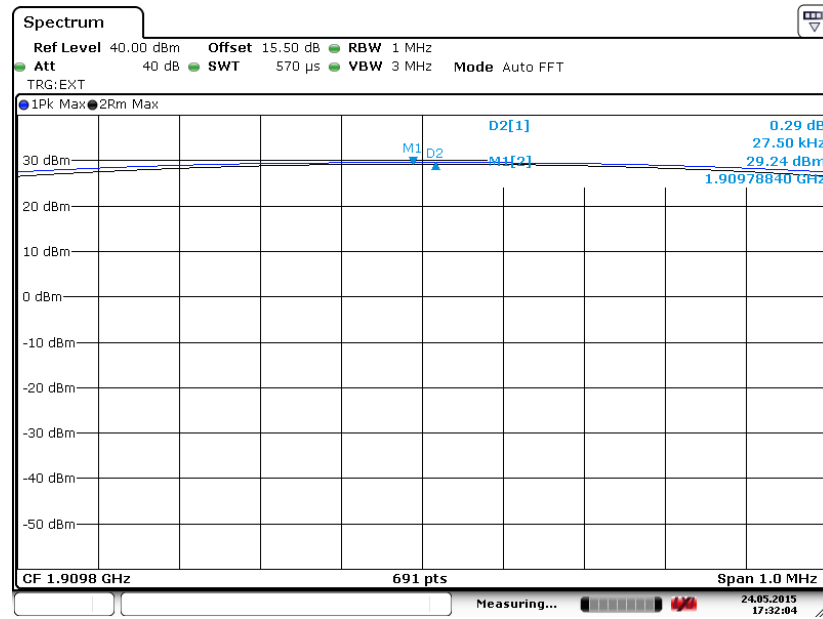
Peak-to-Average Ratio on Channel 661 (1880.0 MHz)



Date: 24 MAY 2015 17:31:10



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

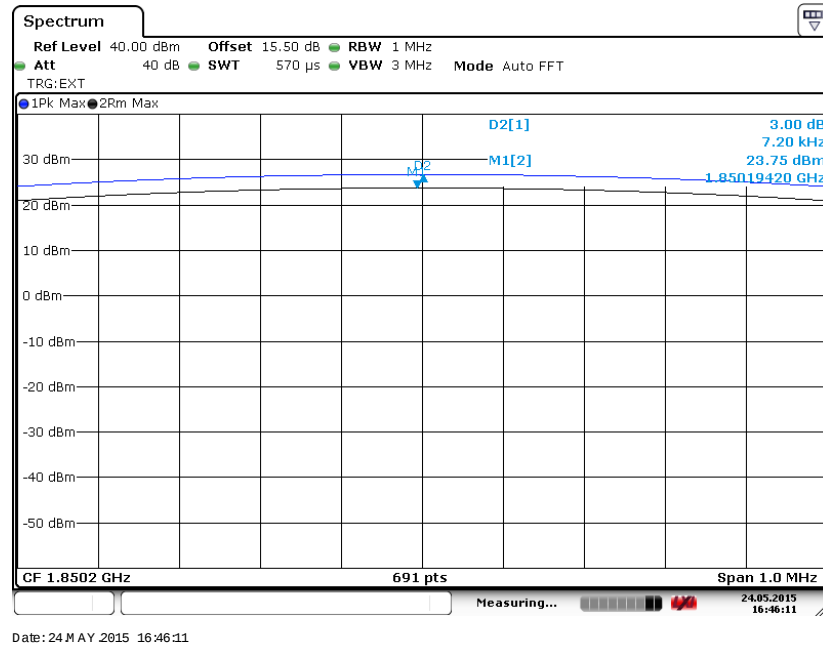


Date: 24 MAY 2015 17:32:04

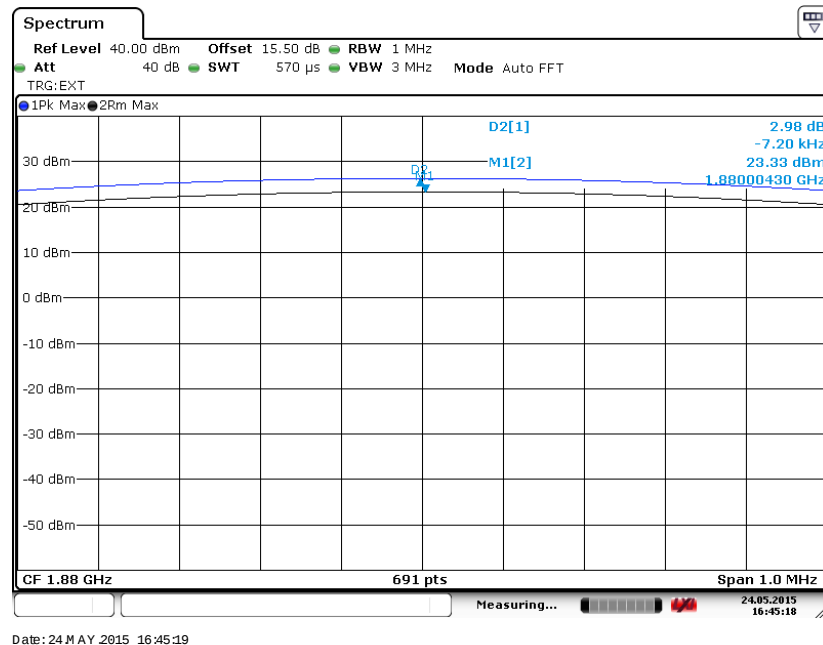


Band :	GSM 1900	Test Mode :	EDGE class 8 Link (8PSK)
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Peak-to-Average Ratio on Channel 512 (1850.2 MHz)

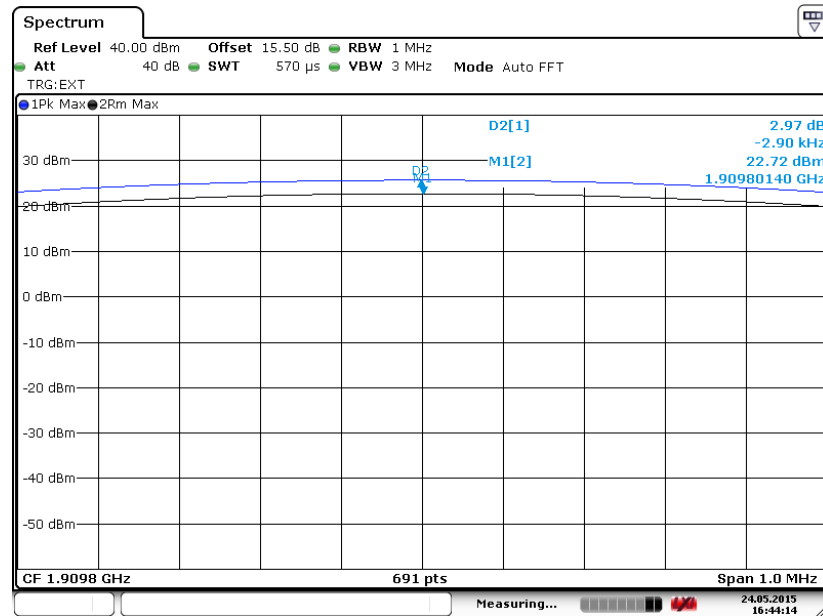


Peak-to-Average Ratio on Channel 661 (1880.0 MHz)



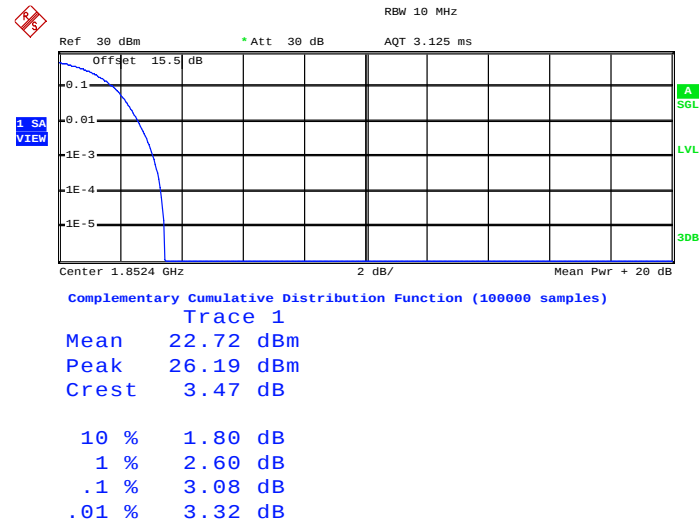


Peak-to-Average Ratio on Channel 810 (1909.8 MHz)

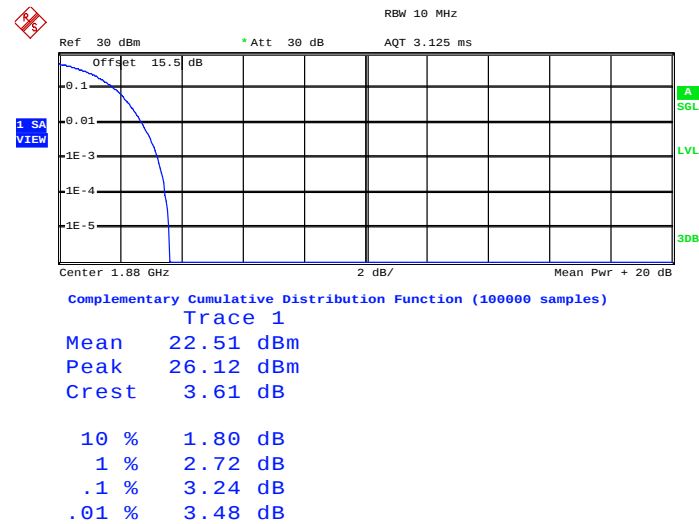


Date: 24 MAY 2015 16:44:15

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)


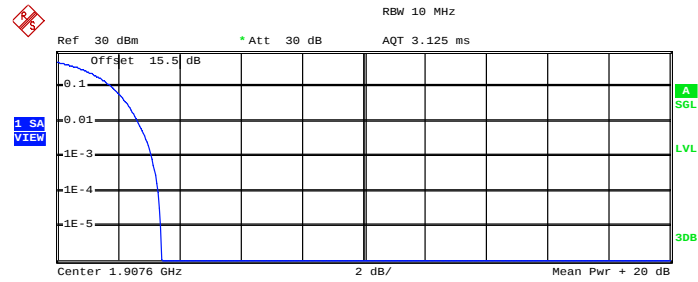
Date: 25.MAY.2015 01:38:54

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


Date: 25.MAY.2015 01:40:57



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



Complementary Cumulative Distribution Function (100000 samples)

Trace 1
Mean 22.64 dBm
Peak 26.05 dBm
Crest 3.41 dB

10 %	1.80 dB
1 %	2.64 dB
.1 %	3.12 dB
.01 %	3.32 dB

Date: 25.MAY.2015 01:43:21

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 v02r02. 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

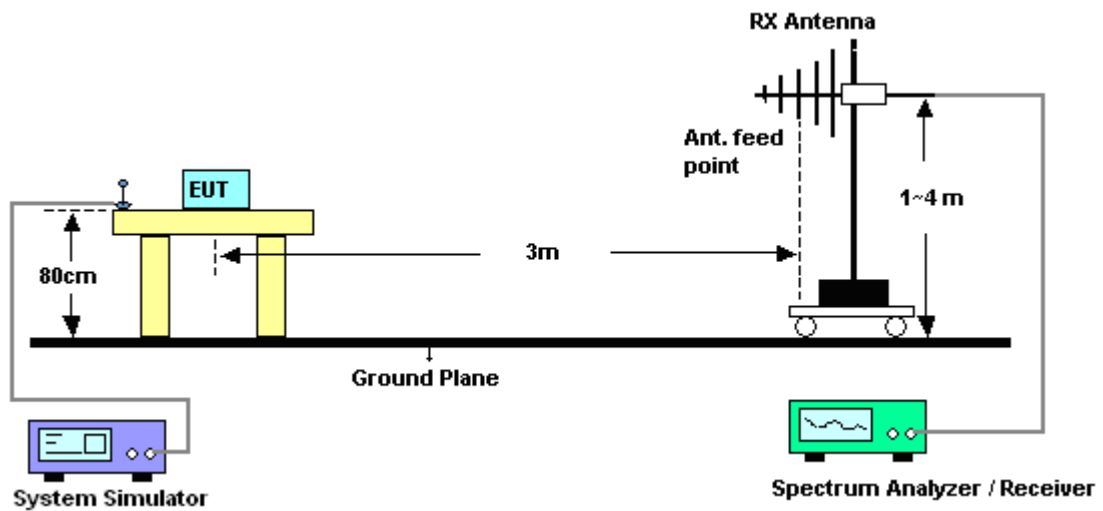
The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 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 the 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, $EIRP = LVL + \text{Correction factor}$ and $ERP = EIRP - 2.15$. Take the record of the output power at substitution antenna.

	GSM/GPRS/EDGE	WCDMA/HSPA
SPAN	500kHz	10MHz
RBW	10kHz	100kHz
VBW	30kHz	300kHz
Detector	RMS	RMS
Trace	Average	Average
Average Type	Power	Power
Sweep Count	100	100

3.3.4 Test Setup



3.3.5 Test Result of ERP

GSM850 (GSM) Radiated Power ERP					
Channel	Frequency (MHz)	Horizontal		Vertical	
		ERP(dBm)	ERP(W)	ERP(dBm)	ERP(W)
Lowest	824.20	26.43	0.4397	12.96	0.0198
Middle	836.40	27.63	0.5791	14.74	0.0298
Highest	848.80	27.18	0.5224	14.89	0.0308
Limit	ERP < 7W	Result		PASS	

GSM850 (EDGE class 8) Radiated Power ERP					
Channel	Frequency (MHz)	Horizontal		Vertical	
		ERP(dBm)	ERP(W)	ERP(dBm)	ERP(W)
Lowest	824.20	22.30	0.1697	8.85	0.0077
Middle	836.40	23.29	0.2134	10.46	0.0111
Highest	848.80	23.74	0.2364	11.39	0.0138
Limit	ERP < 7W	Result		PASS	

WCDMA Band V (RMC 12.2Kbps) Radiated Power ERP					
Channel	Frequency (MHz)	Horizontal		Vertical	
		ERP(dBm)	ERP(W)	ERP(dBm)	ERP(W)
Lowest	826.40	17.26	0.0532	3.97	0.0025
Middle	836.40	16.84	0.0483	4.22	0.0026
Highest	846.60	16.83	0.0482	4.61	0.0029
Limit	ERP < 7W	Result		PASS	

3.3.6 Test Result of EIRP

GSM1900 (GSM) Radiated Power EIRP					
Channel	Frequency (MHz)	Horizontal		Vertical	
		ERP(dBm)	ERP(W)	ERP(dBm)	ERP(W)
Lowest	1850.20	27.27	0.5338	27.49	0.5608
Middle	1880.00	27.27	0.5336	27.72	0.5910
Highest	1909.80	27.19	0.5235	27.87	0.6125
Limit	EIRP < 2W	Result		PASS	

GSM1900 (EDGE class 8) Radiated Power EIRP					
Channel	Frequency (MHz)	Horizontal		Vertical	
		ERP(dBm)	ERP(W)	ERP(dBm)	ERP(W)
Lowest	1850.20	23.57	0.2278	23.78	0.2388
Middle	1880.00	23.38	0.2179	23.86	0.2432
Highest	1909.80	23.45	0.2213	24.11	0.2577
Limit	EIRP < 2W	Result		PASS	

WCDMA Band II (RMC 12.2Kbps) Radiated Power EIRP					
Channel	Frequency (MHz)	Horizontal		Vertical	
		ERP(dBm)	ERP(W)	ERP(dBm)	ERP(W)
Lowest	1852.40	21.39	0.1378	21.73	0.1490
Middle	1880.00	22.00	0.1586	22.47	0.1765
Highest	1907.60	21.29	0.1344	21.81	0.1516
Limit	EIRP < 2W	Result		PASS	

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.

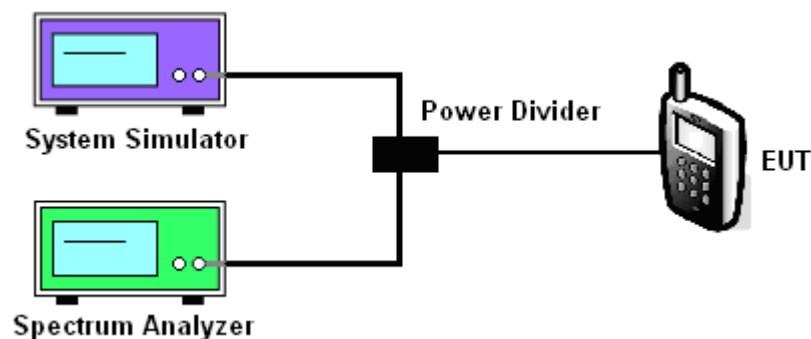
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 4.2.
2. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
3. 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.
4. The 99% occupied bandwidth were measured, set RBW= 1% of span, VBW= 3*RBW, sample detector, trace maximum hold.
5. 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)	238.00	236.00	240.00	244.00	246.00	244.00
26dB BW (kHz)	308.00	308.00	310.00	298.00	302.00	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)	238.00	236.00	240.00	244.00	244.00	244.00
26dB BW (kHz)	306.00	314.00	312.00	310.00	308.00	308.00

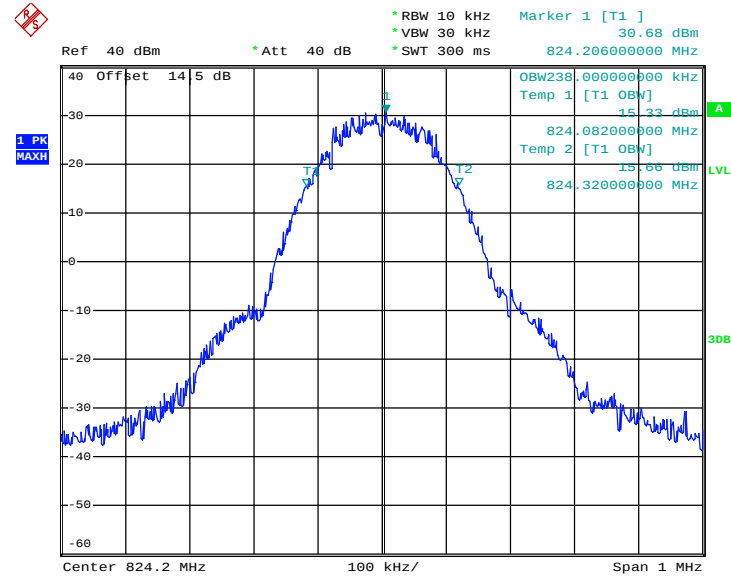
Cellular Band			
Modes	WCDMA Band V (RMC 12.2Kbps)		
Channel	4132 (Low)	4182 (Mid)	4233 (High)
Frequency (MHz)	826.4	836.4	846.6
99% OBW (MHz)	4.14	4.14	4.16
26dB BW (MHz)	4.68	4.68	4.68

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)	4.16	4.14	4.18
26dB BW (MHz)	4.70	4.70	4.70

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

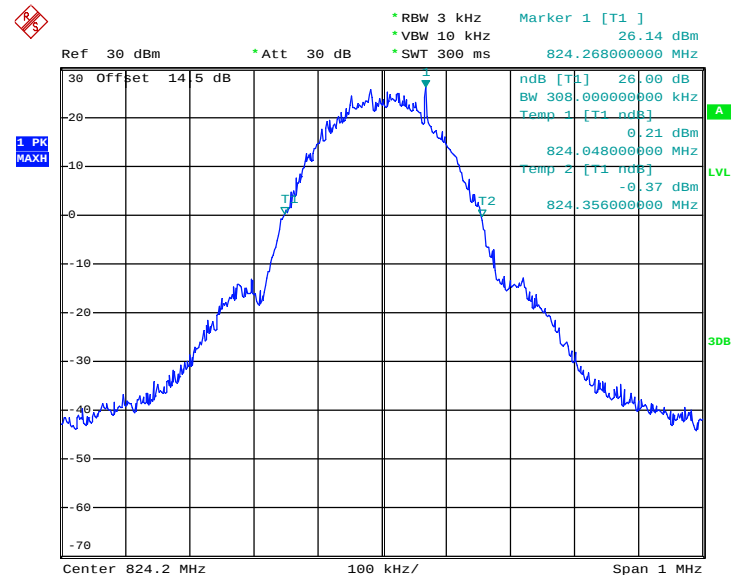
Band :	GSM 850	Test Mode :	GSM Link (GMSK)
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99% Occupied Bandwidth Plot on Channel 128 (824.2 MHz)



Date: 24.MAY.2015 21:41:34

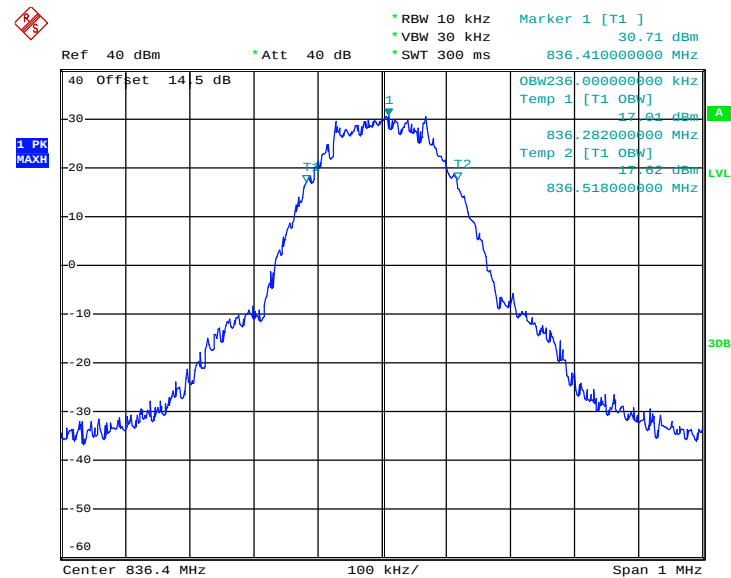
26dB Bandwidth Plot on Channel 128 (824.2 MHz)



Date: 24.MAY.2015 21:30:39

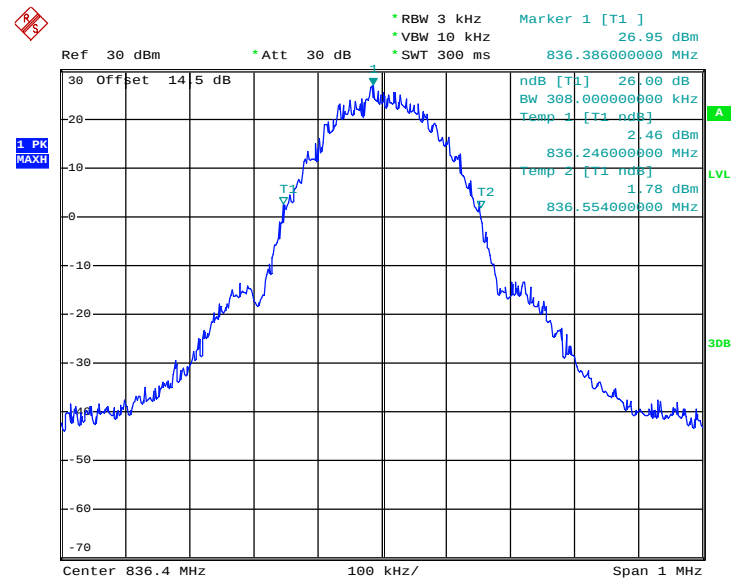


99% Occupied Bandwidth Plot on Channel 189 (836.4 MHz)



Date: 24.MAY.2015 21:41:03

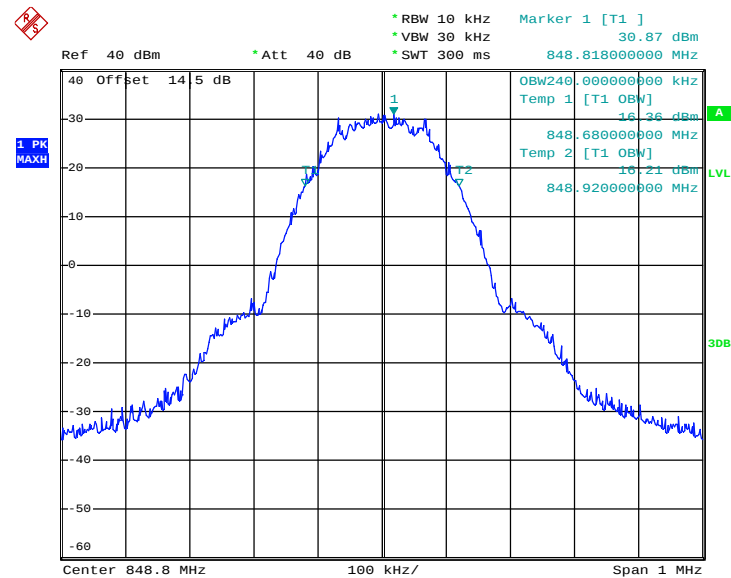
26dB Bandwidth Plot on Channel 189 (836.4 MHz)



Date: 24.MAY.2015 21:32:03

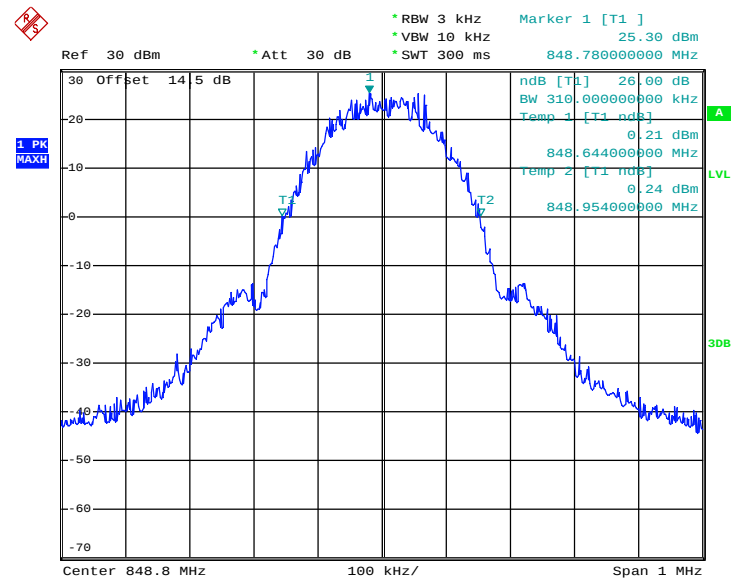


99% Occupied Bandwidth Plot on Channel 251 (848.8 MHz)



Date: 24.MAY.2015 21:39:38

26dB Bandwidth Plot on Channel 251 (848.8 MHz)

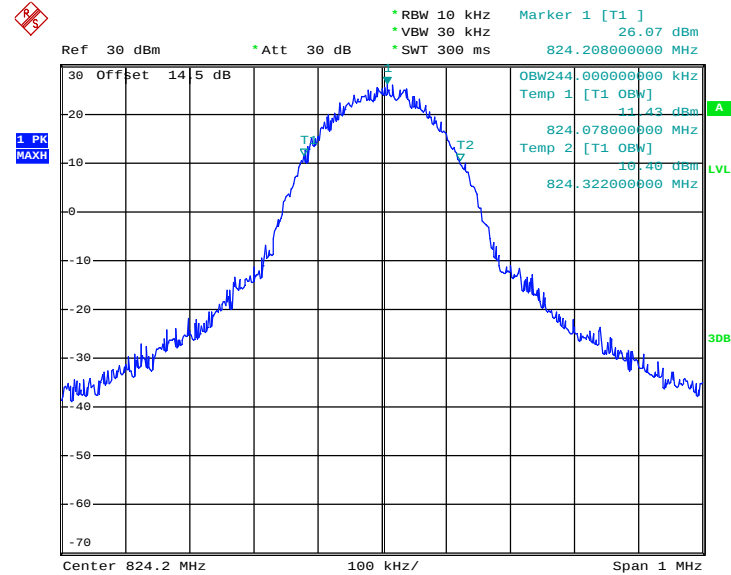


Date: 24.MAY.2015 21:32:38



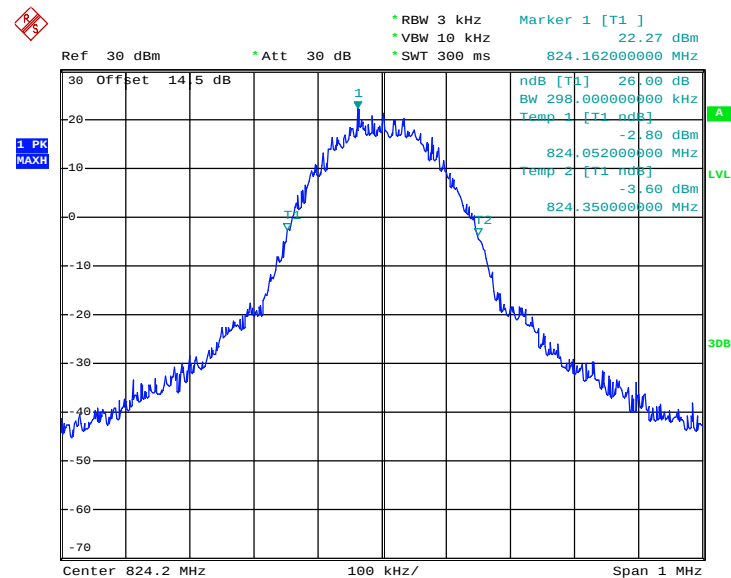
Band :	GSM 850	Test Mode :	EDGE class 8 Link (8PSK)
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99% Occupied Bandwidth Plot on Channel 128 (824.2 MHz)



Date: 24.MAY.2015 22:53:31

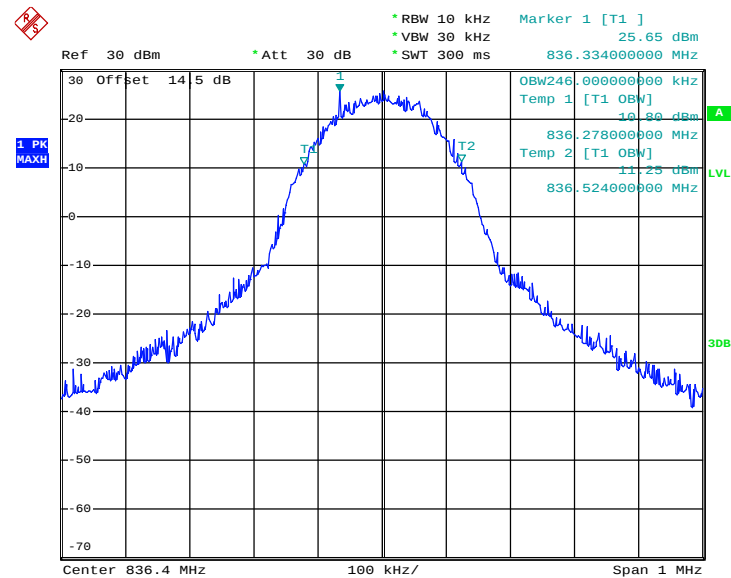
26dB Bandwidth Plot on Channel 128 (824.2 MHz)



Date: 24.MAY.2015 22:40:22

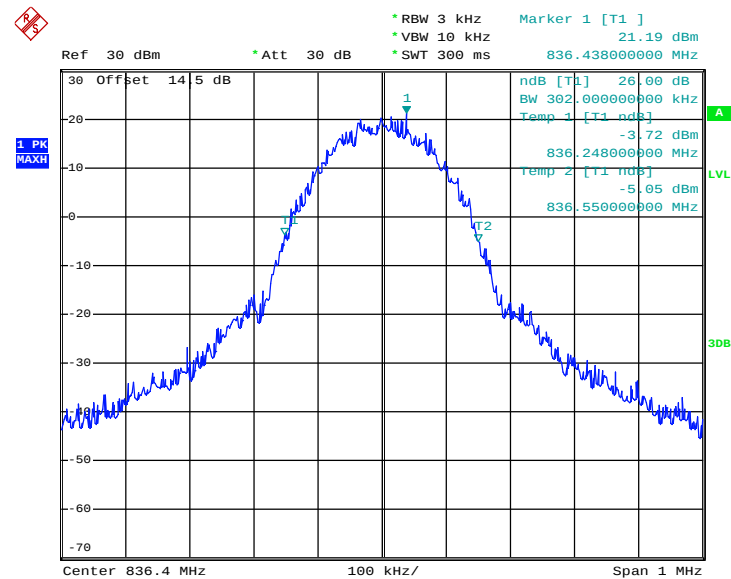


99% Occupied Bandwidth Plot on Channel 189 (836.4 MHz)



Date: 24.MAY.2015 22:51:43

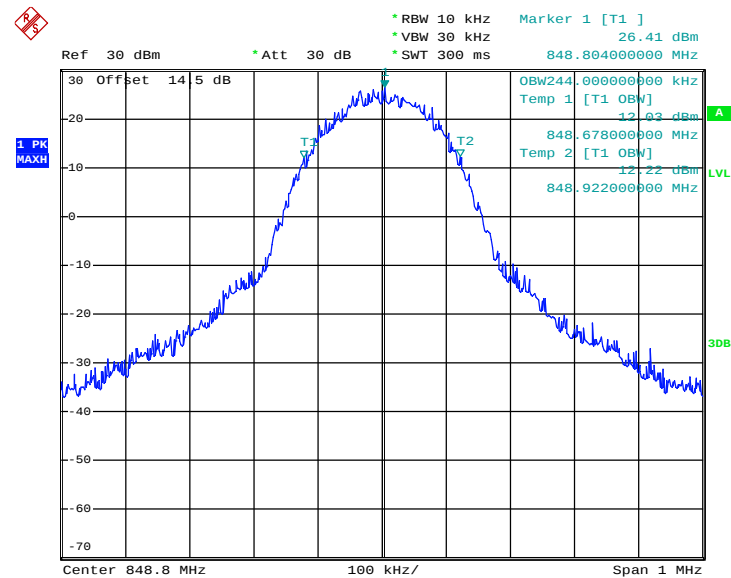
26dB Bandwidth Plot on Channel 189 (836.4 MHz)



Date: 24.MAY.2015 22:41:27

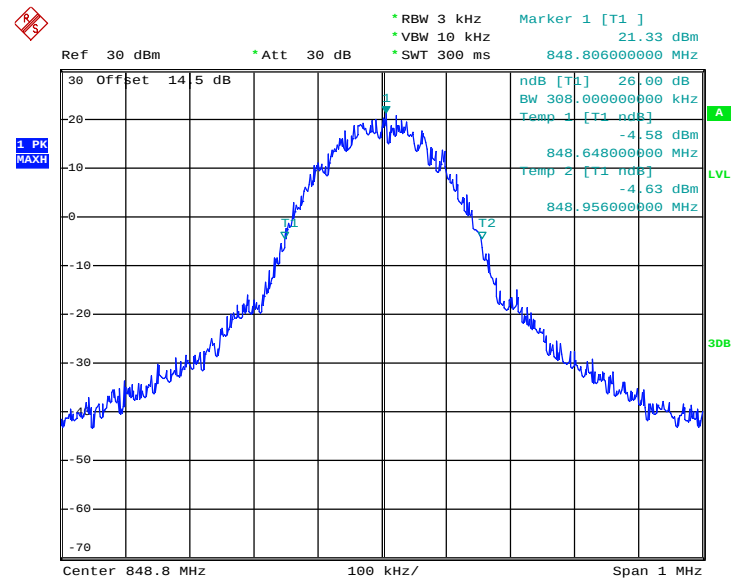


99% Occupied Bandwidth Plot on Channel 251 (848.8 MHz)



Date: 24.MAY.2015 22:47:43

26dB Bandwidth Plot on Channel 251 (848.8 MHz)

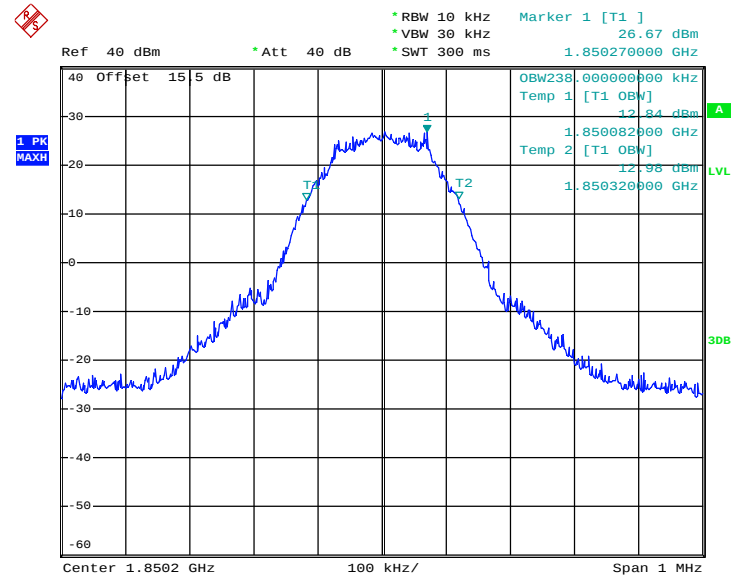


Date: 24.MAY.2015 22:43:09



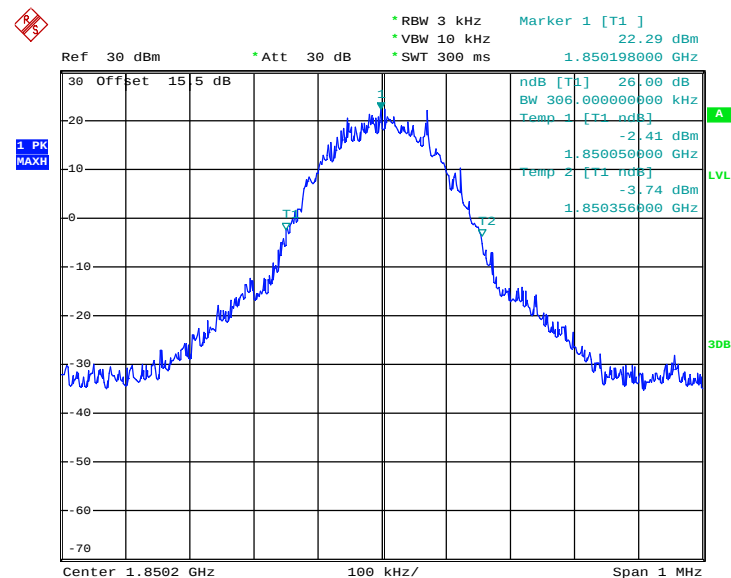
Band :	GSM 1900	Test Mode :	GSM Link (GMSK)
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99% Occupied Bandwidth Plot on Channel 512 (1850.2 MHz)



Date: 25.MAY.2015 03:17:19

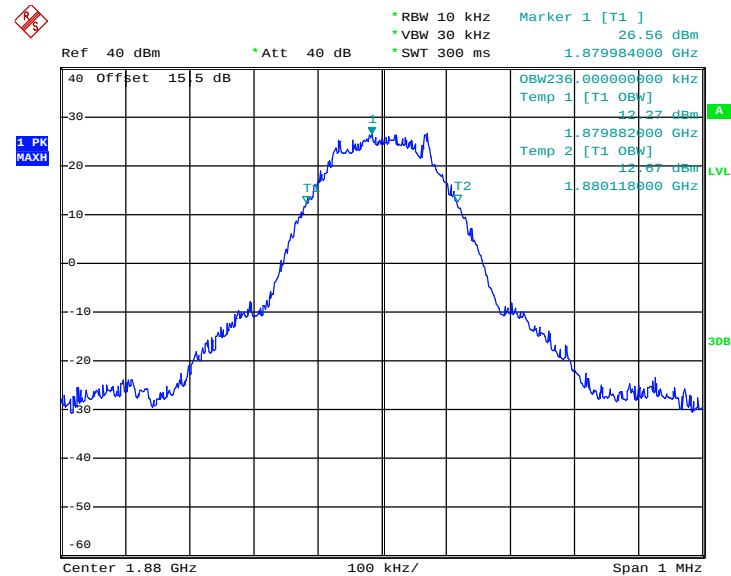
26dB Bandwidth Plot on Channel 512 (1850.2 MHz)



Date: 25.MAY.2015 03:07:47

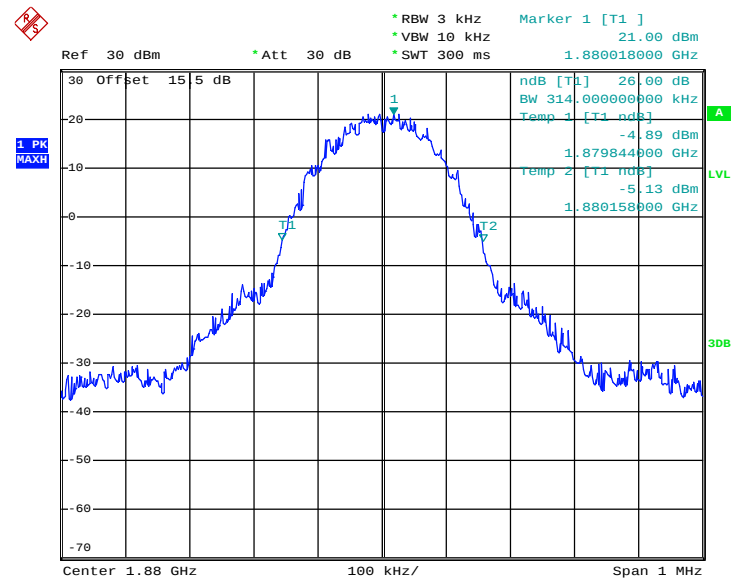


99% Occupied Bandwidth Plot on Channel 661 (1880.0 MHz)



Date: 25.MAY.2015 03:16:08

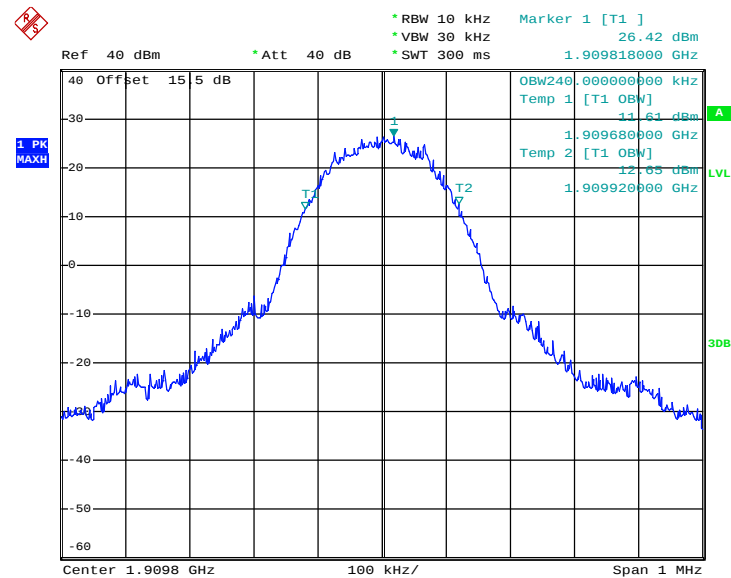
26dB Bandwidth Plot on Channel 661 (1880.0 MHz)



Date: 25.MAY.2015 03:09:00

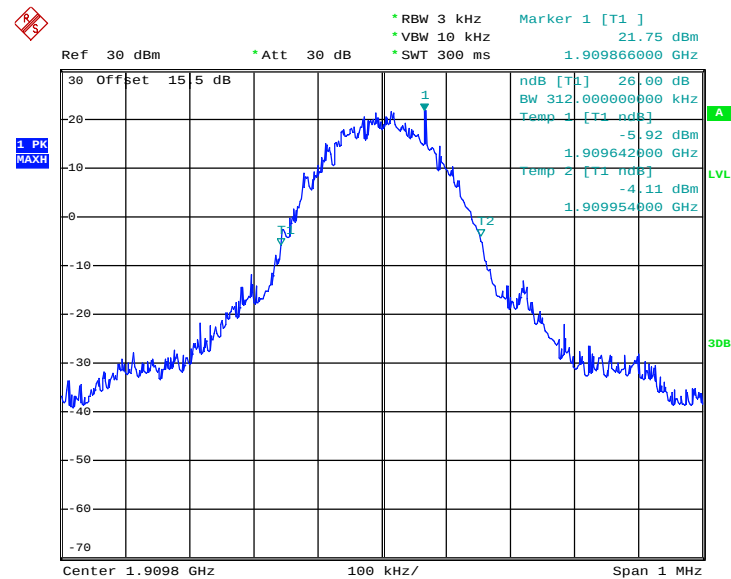


99% Occupied Bandwidth Plot on Channel 810 (1909.8 MHz)



Date: 25.MAY.2015 03:12:06

26dB Bandwidth Plot on Channel 810 (1909.8 MHz)

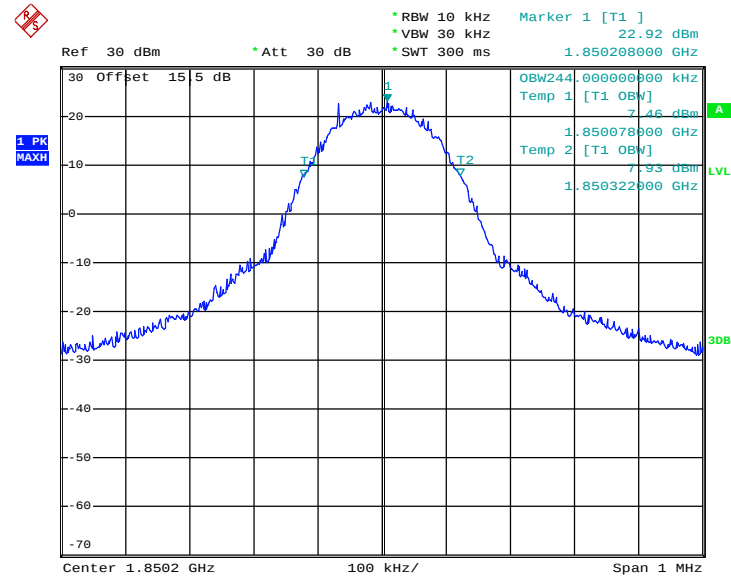


Date: 25.MAY.2015 03:09:55



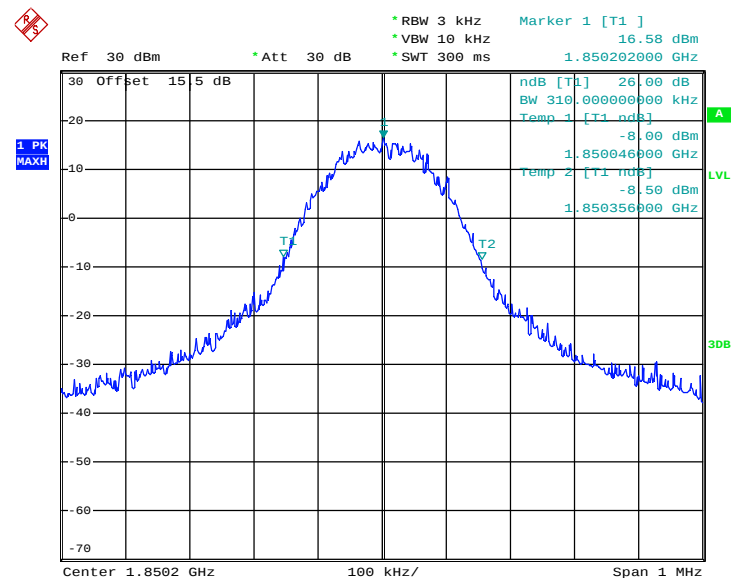
Band :	GSM 1900	Test Mode :	EDGE class 8 Link (8PSK)
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99% Occupied Bandwidth Plot on Channel 512 (1850.2 MHz)



Date: 25.MAY.2015 04:03:25

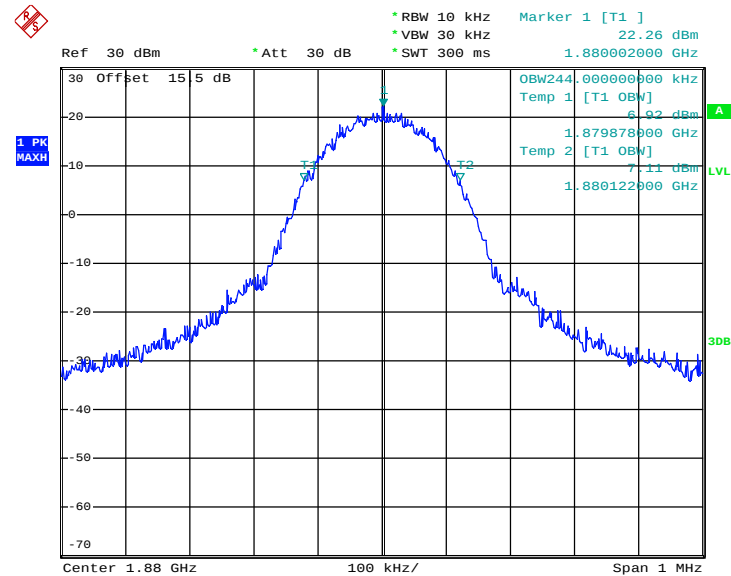
26dB Bandwidth Plot on Channel 512 (1850.2 MHz)



Date: 25.MAY.2015 03:50:20

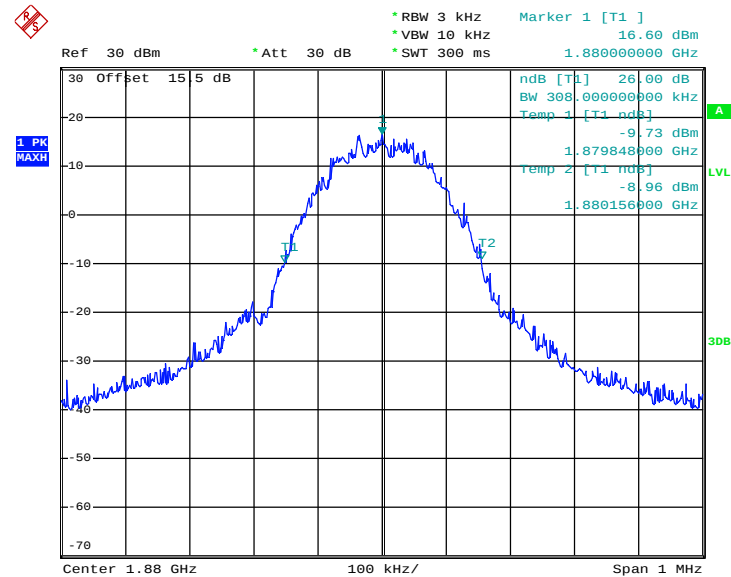


99% Occupied Bandwidth Plot on Channel 661 (1880.0 MHz)



Date: 25.MAY.2015 03:57:56

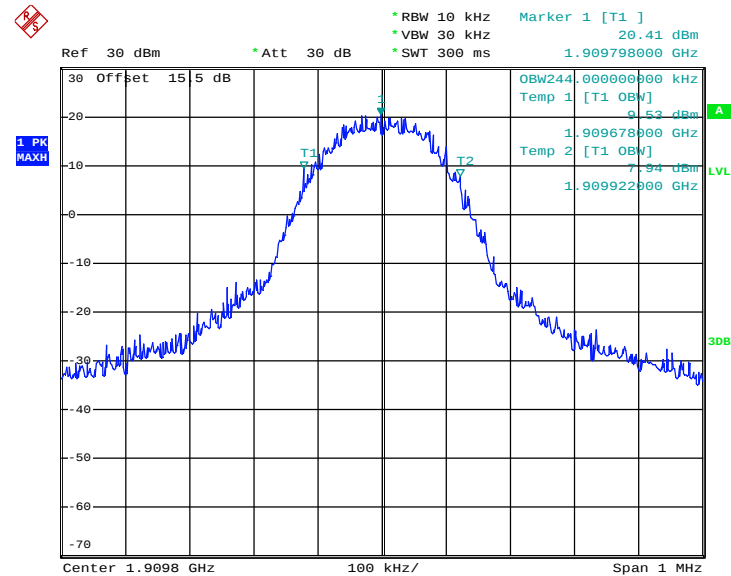
26dB Bandwidth Plot on Channel 661 (1880.0 MHz)



Date: 25.MAY.2015 03:51:17

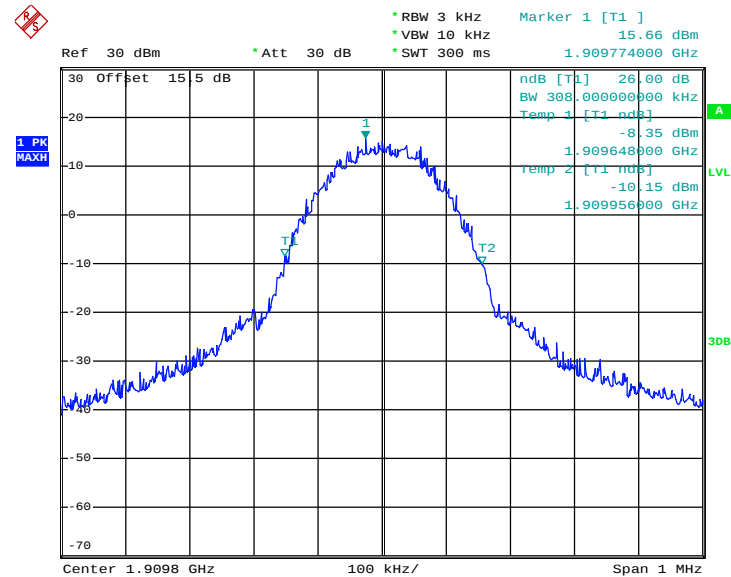


99% Occupied Bandwidth Plot on Channel 810 (1909.8 MHz)



Date: 25.MAY.2015 03:56:47

26dB Bandwidth Plot on Channel 810 (1909.8 MHz)

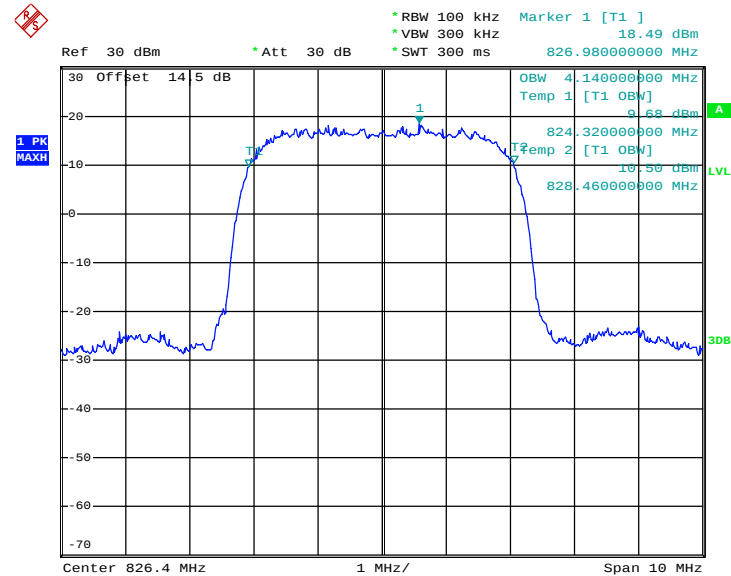


Date: 25.MAY.2015 03:52:26



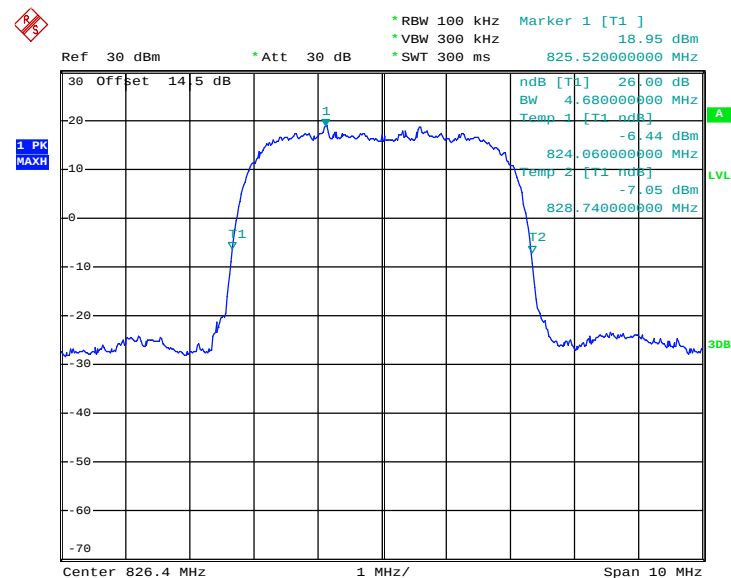
Band :	WCDMA Band V	Test Mode :	RMC 12.2Kbps Link (QPSK)
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99% Occupied Bandwidth Plot on Channel 4132 (826.4 MHz)



Date: 24.MAY.2015 23:30:46

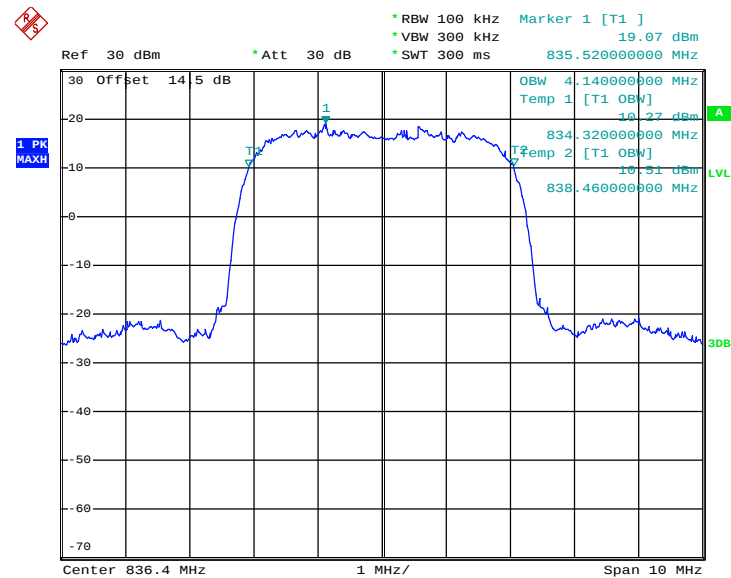
26dB Bandwidth Plot on Channel 4132 (826.4 MHz)



Date: 24.MAY.2015 23:25:37

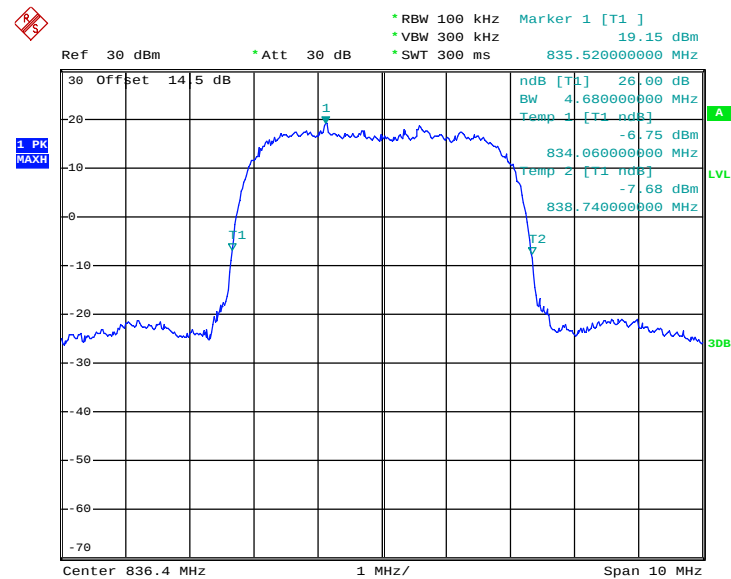


99% Occupied Bandwidth Plot on Channel 4182 (836.4 MHz)



Date: 24.MAY.2015 23:30:15

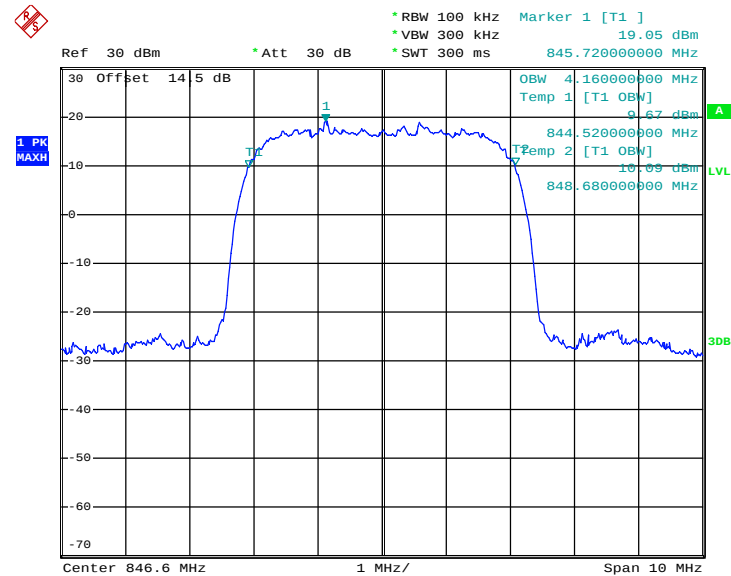
26dB Bandwidth Plot on Channel 4182 (836.4 MHz)



Date: 24.MAY.2015 23:26:10

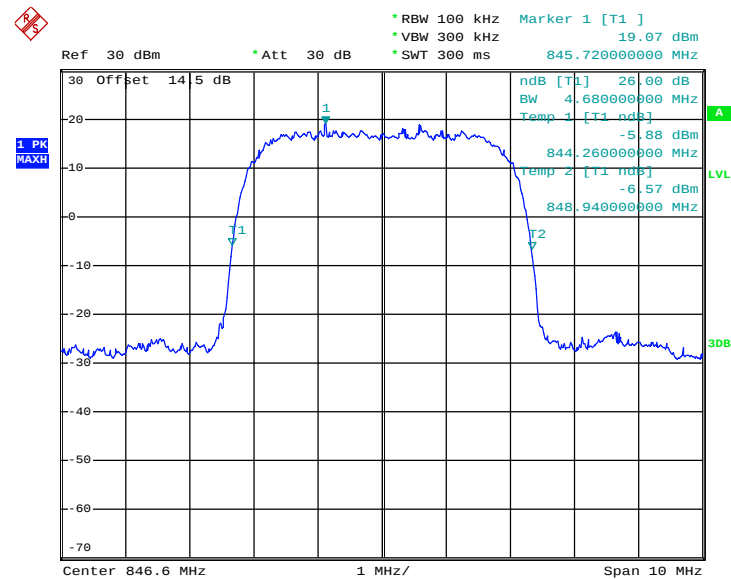


99% Occupied Bandwidth Plot on Channel 4233 (846.6 MHz)



Date: 24.MAY.2015 23:28:11

26dB Bandwidth Plot on Channel 4233 (846.6 MHz)

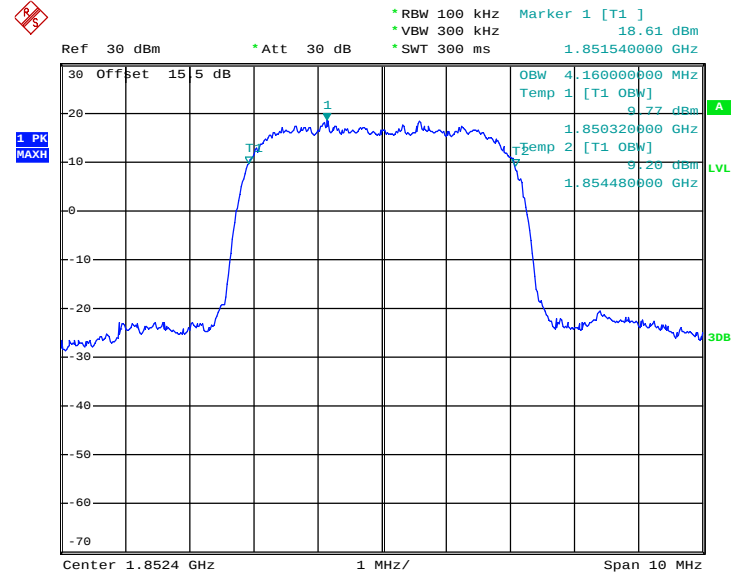


Date: 24.MAY.2015 23:26:41



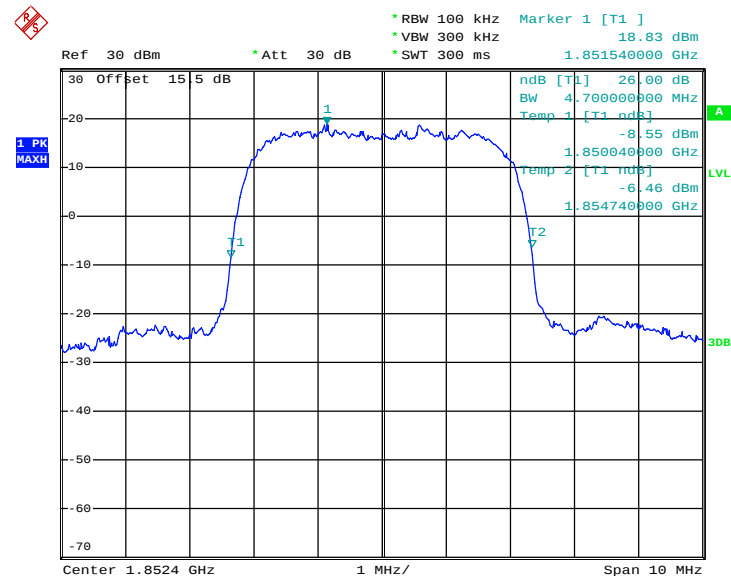
Band :	WCDMA Band II	Test Mode :	RMC 12.2Kbps Link (QPSK)
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99% Occupied Bandwidth Plot on Channel 9262 (1852.4 MHz)



Date: 25.MAY.2015 01:28:39

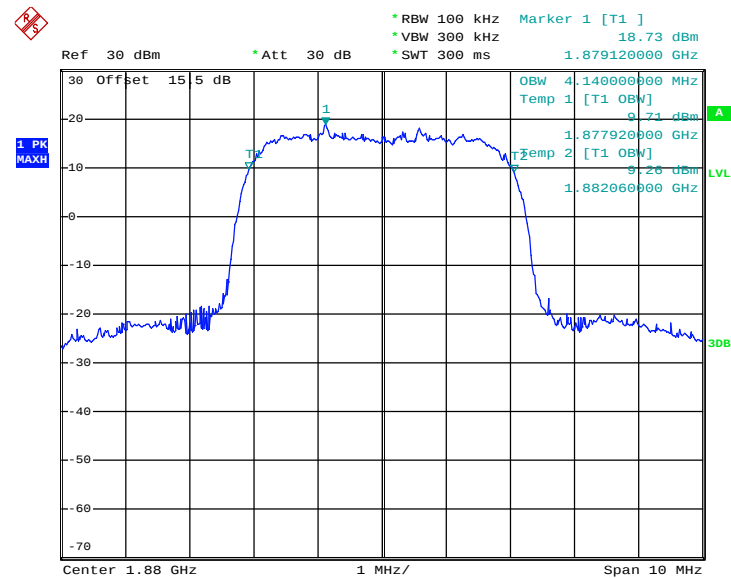
26dB Bandwidth Plot on Channel 9262 (1852.4 MHz)



Date: 25.MAY.2015 01:23:27

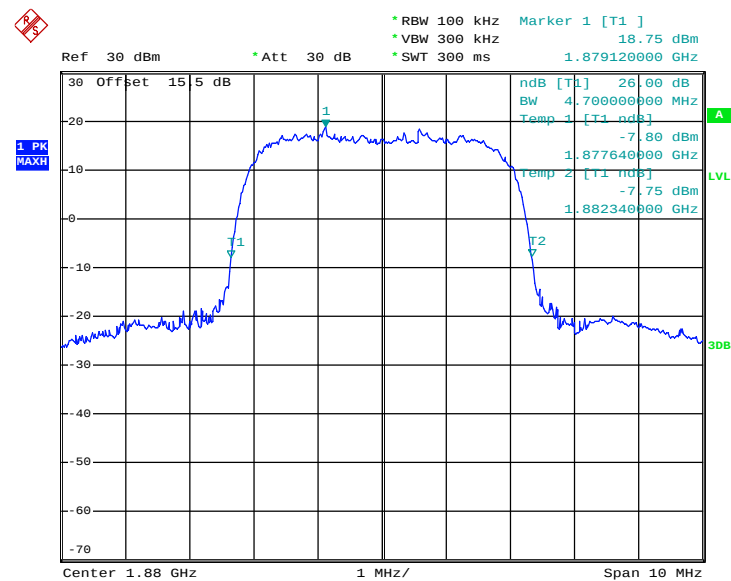


99% Occupied Bandwidth Plot on Channel 9400 (1880.0 MHz)



Date: 25.MAY.2015 01:27:56

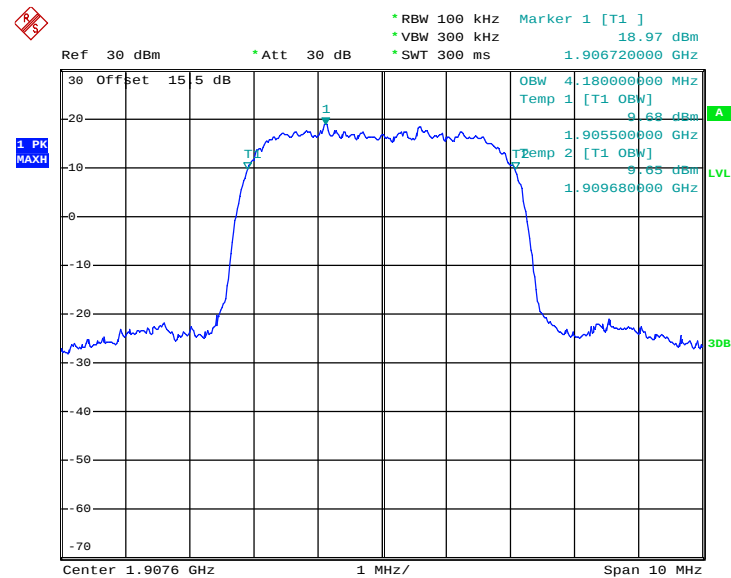
26dB Bandwidth Plot on Channel 9400 (1880.0 MHz)



Date: 25.MAY.2015 01:24:02

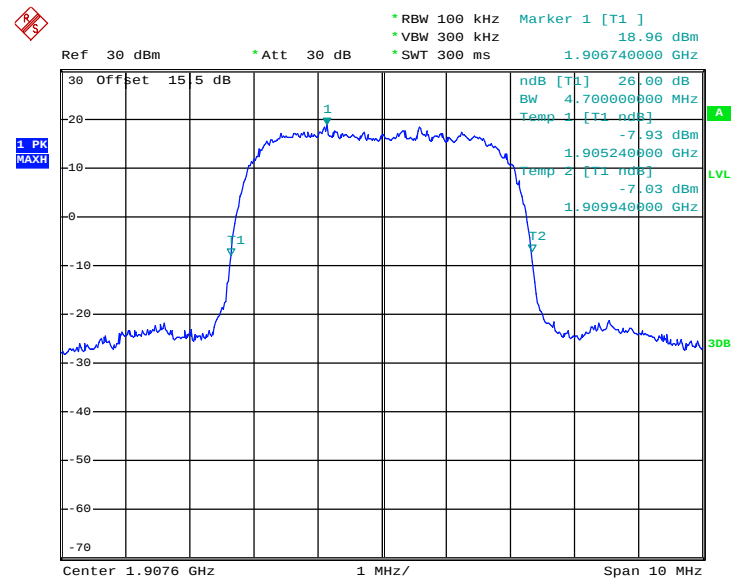


99% Occupied Bandwidth Plot on Channel 9538 (1907.6 MHz)



Date: 25.MAY.2015 01:25:32

26dB Bandwidth Plot on Channel 9538 (1907.6 MHz)



Date: 25.MAY.2015 01:24:40

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

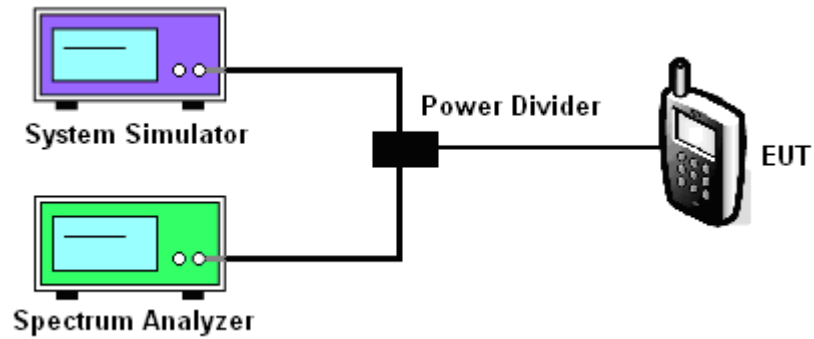
The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 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 >

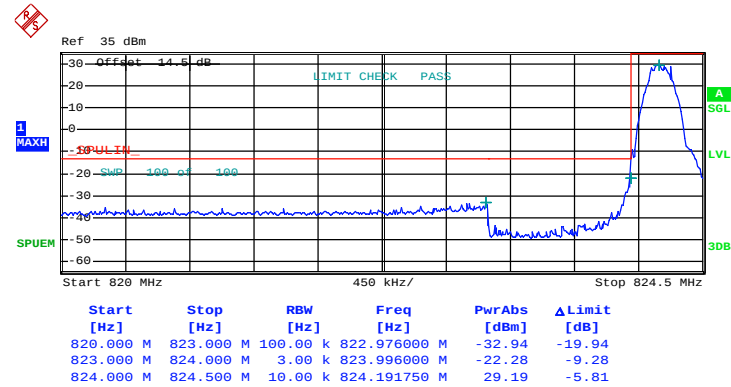




3.5.5 Test Result (Plots) of Conducted Band Edge

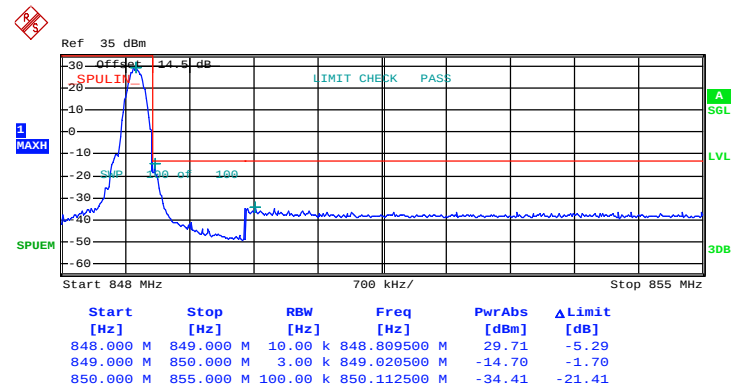
Band :	GSM850	Test Mode :	GSM Link (GMSK)
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Lower Band Edge Plot on Channel 128 (824.2 MHz)



Date: 24.MAY.2015 21:48:52

Higher Band Edge Plot on Channel 251 (848.8 MHz)

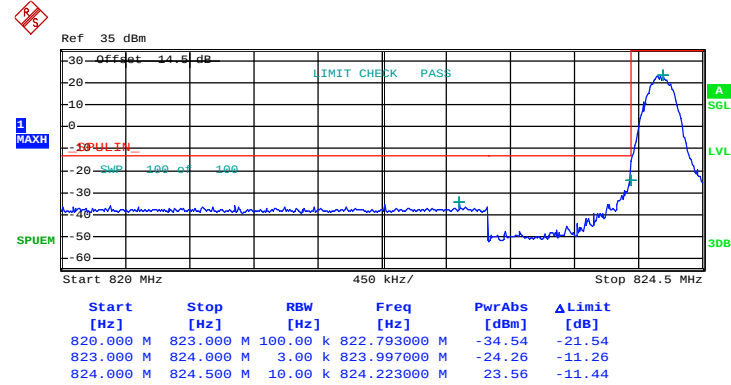


Date: 24.MAY.2015 21:53:54



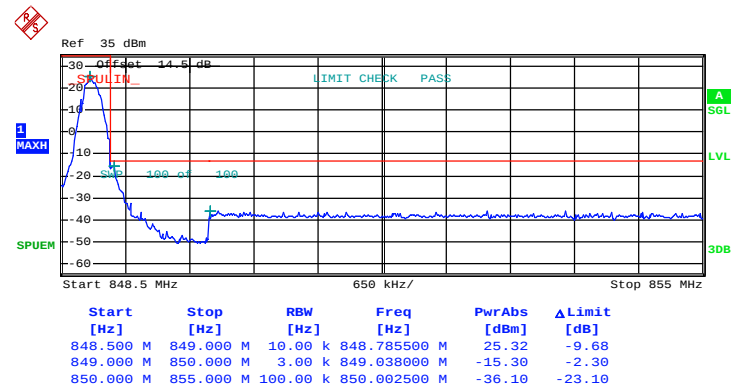
Band :	GSM850	Test Mode :	EDGE class 8 Link (8PSK)
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Lower Band Edge Plot on Channel 128 (824.2 MHz)



Date: 25.MAY.2015 23:35:21

Higher Band Edge Plot on Channel 251 (848.8 MHz)

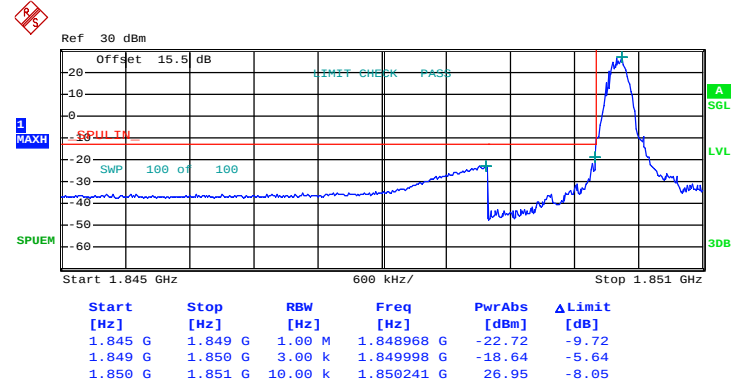


Date: 25.MAY.2015 23:37:41



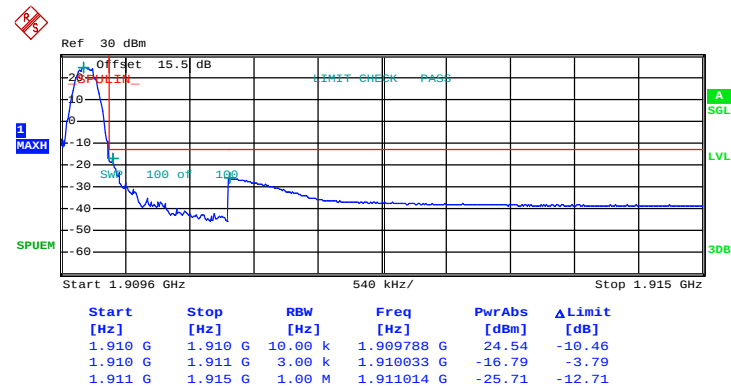
Band :	GSM1900	Test Mode :	GSM Link (GMSK)
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Lower Band Edge Plot on Channel 512 (1850.2 MHz)



Date: 25.MAY.2015 03:06:02

Higher Band Edge Plot on Channel 810 (1909.8 MHz)

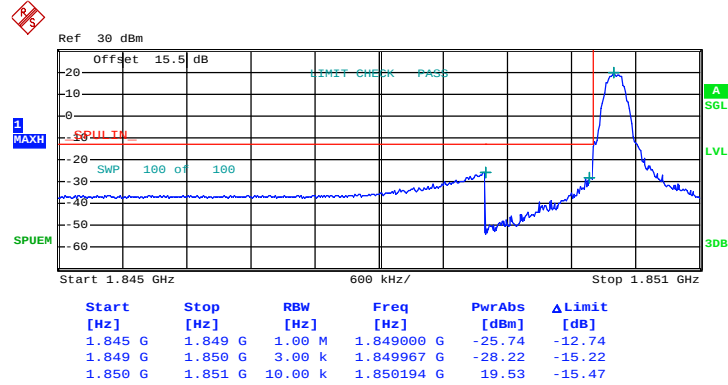


Date: 25.MAY.2015 03:01:39



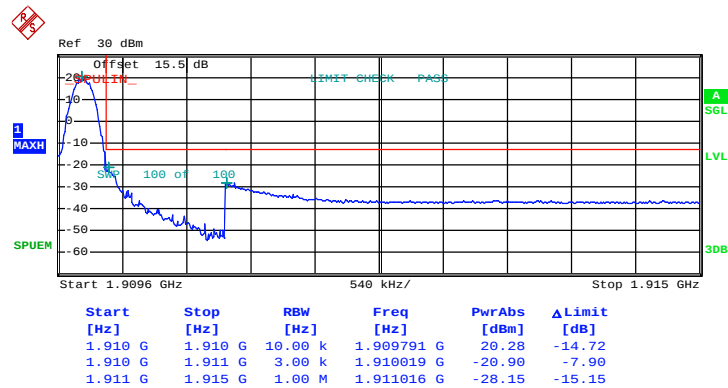
Band :	GSM1900	Test Mode :	EDGE class 8 Link (8PSK)
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Lower Band Edge Plot on Channel 512 (1850.2 MHz)



Date: 25.MAY.2015 03:45:24

Higher Band Edge Plot on Channel 810 (1909.8 MHz)

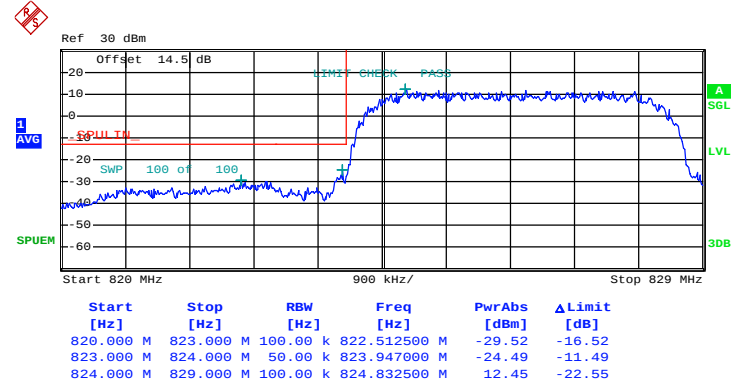


Date: 25.MAY.2015 03:47:08



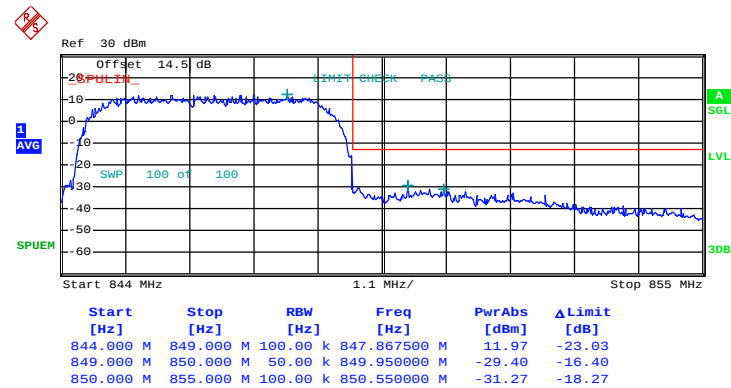
Band :	WCDMA Band V	Test Mode :	RMC 12.2Kbps Link (QPSK)
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Lower Band Edge Plot on Channel 4132 (826.4 MHz)



Date: 24.MAY.2015 23:22:01

Higher Band Edge Plot on Channel 4233 (846.6 MHz)

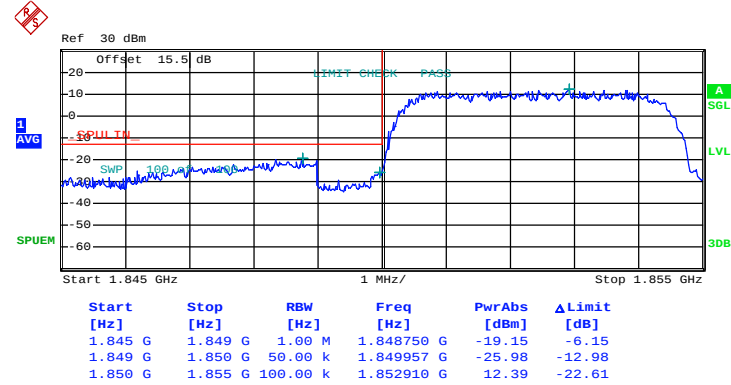


Date: 24.MAY.2015 23:23:50



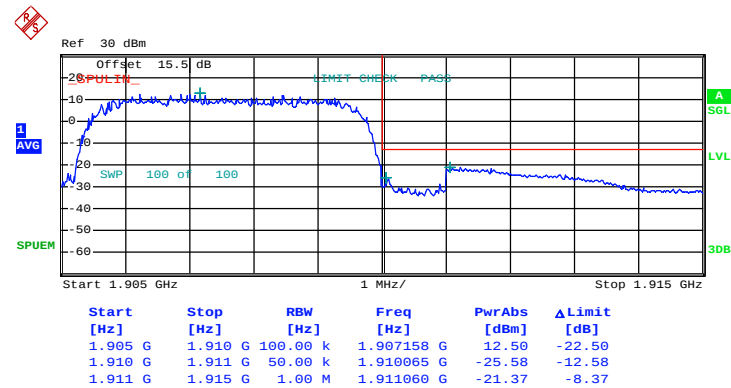
Band :	WCDMA Band II	Test Mode :	RMC 12.2Kbps Link (QPSK)
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Lower Band Edge Plot on Channel 9262 (1852.4 MHz)



Date: 25.MAY.2015 01:34:27

Higher Band Edge Plot on Channel 9538 (1907.6 MHz)



Date: 25.MAY.2015 01:36:56

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.

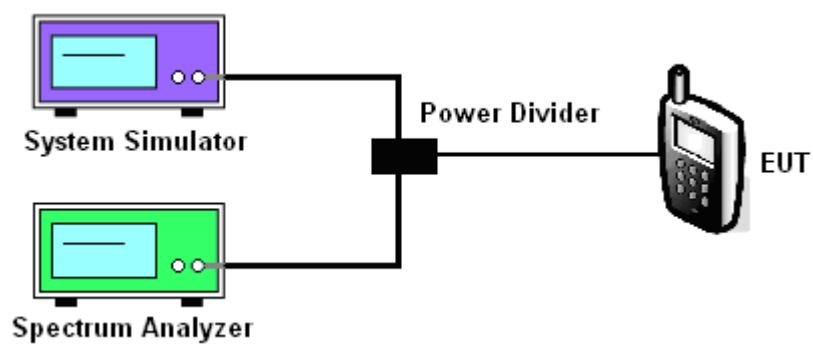
3.6.2 Measuring Instruments

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 v02r02 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)
 $= P(W) - [43 + 10\log(P)]$ (dB)
 $= [30 + 10\log(P)]$ (dBm) - $[43 + 10\log(P)]$ (dB)
 $= -13\text{dBm}$.

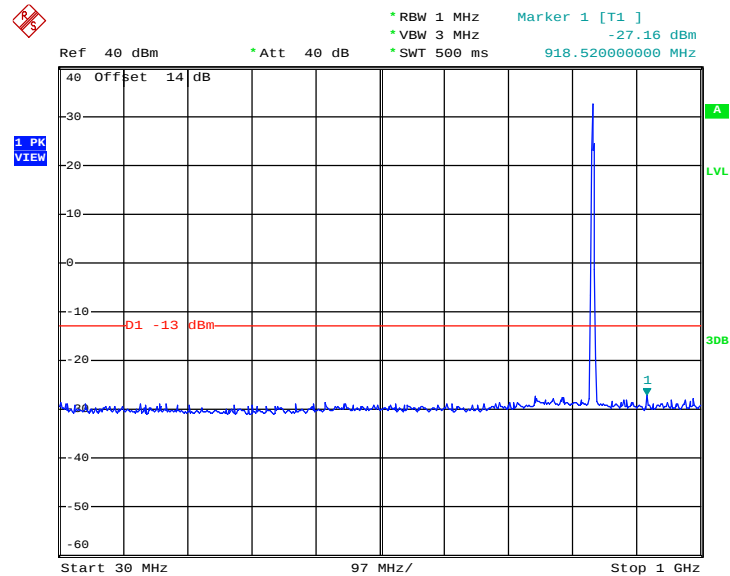
3.6.4 Test Setup



3.6.5 Test Result (Plots) of Conducted Spurious Emission

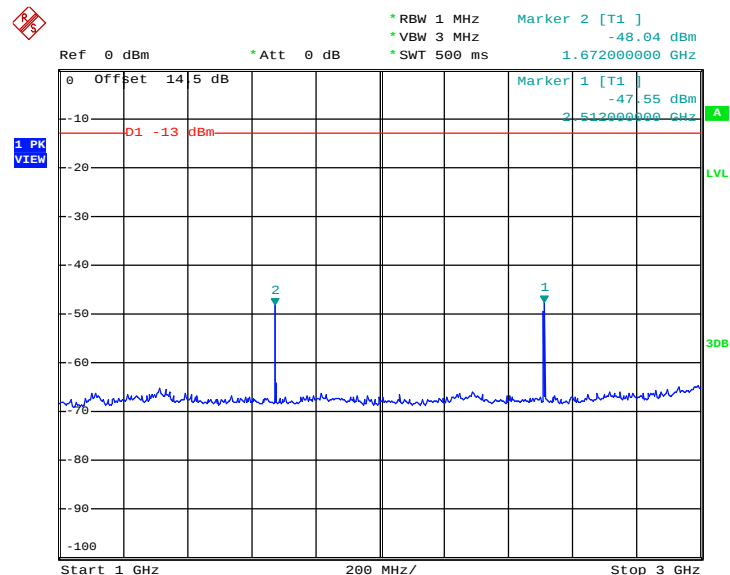
Band :	GSM850	Channel :	CH189
Test Mode :	GSM Link (GMSK)	Frequency :	836.4 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 24.MAY.2015 22:01:28

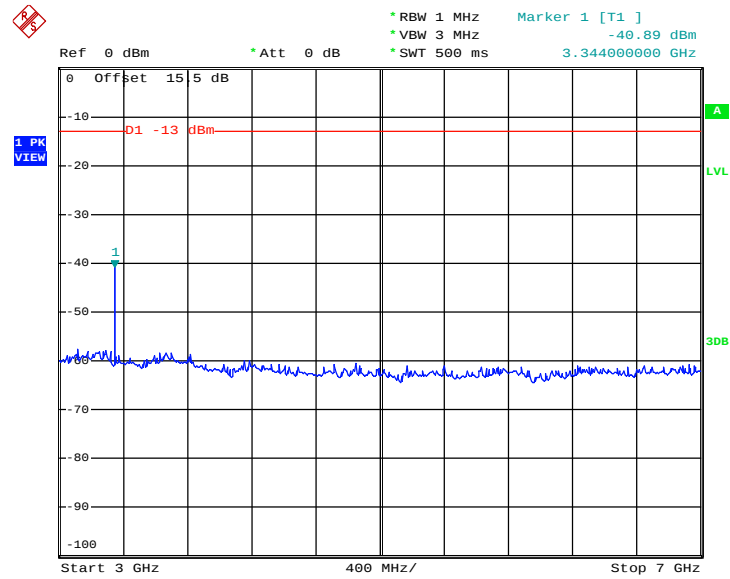
Conducted Spurious Emission Plot between 1GHz ~ 3GHz



Date: 24.MAY.2015 22:06:16

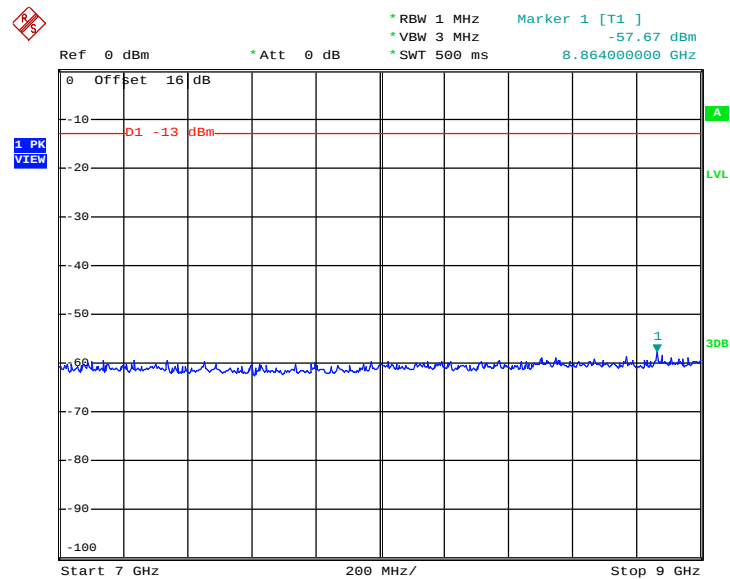


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 24.MAY.2015 22:16:28

Conducted Spurious Emission Plot between 7GHz ~ 9GHz

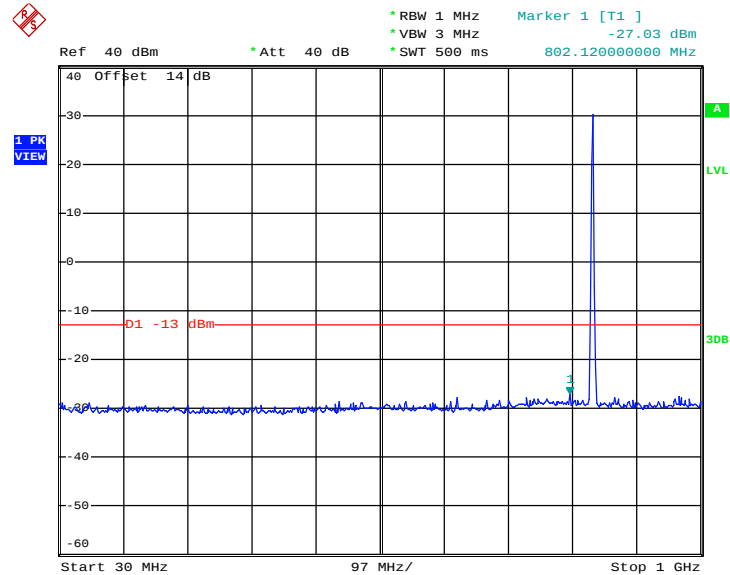


Date: 24.MAY.2015 22:09:58



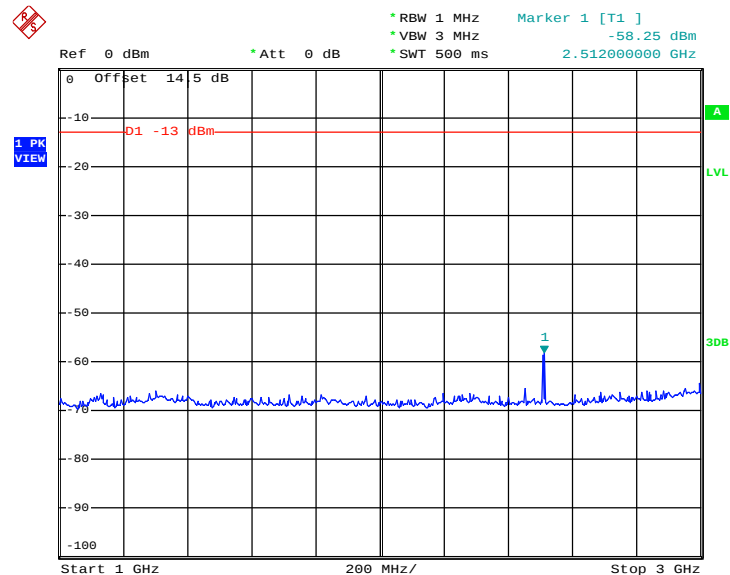
Band :	GSM850	Channel :	CH189
Test Mode :	EDGE class 8 Link (8PSK)	Frequency :	836.4 MHz

Conducted Spurious Emission Plot between 30MHz ~ 1GHz



Date: 24.MAY.2015 22:35:18

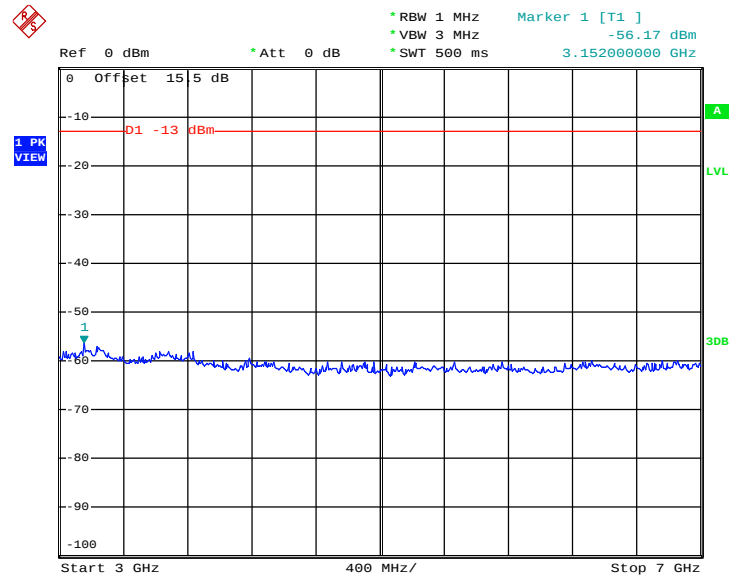
Conducted Spurious Emission Plot between 1GHz ~ 3GHz



Date: 24.MAY.2015 22:31:04

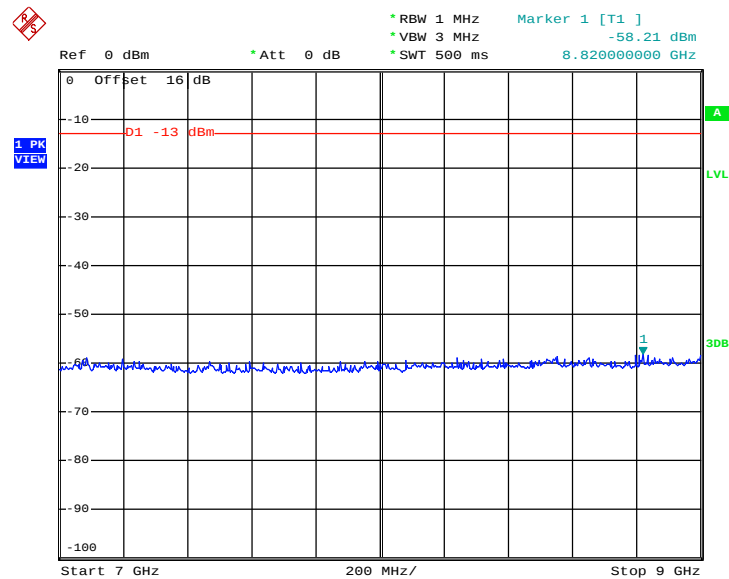


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



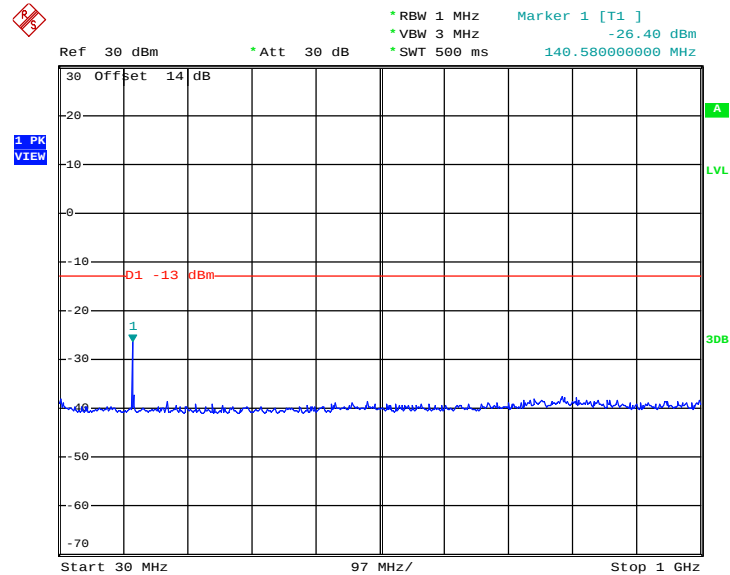
Date: 24.MAY.2015 22:29:47

Conducted Spurious Emission Plot between 7GHz ~ 9GHz

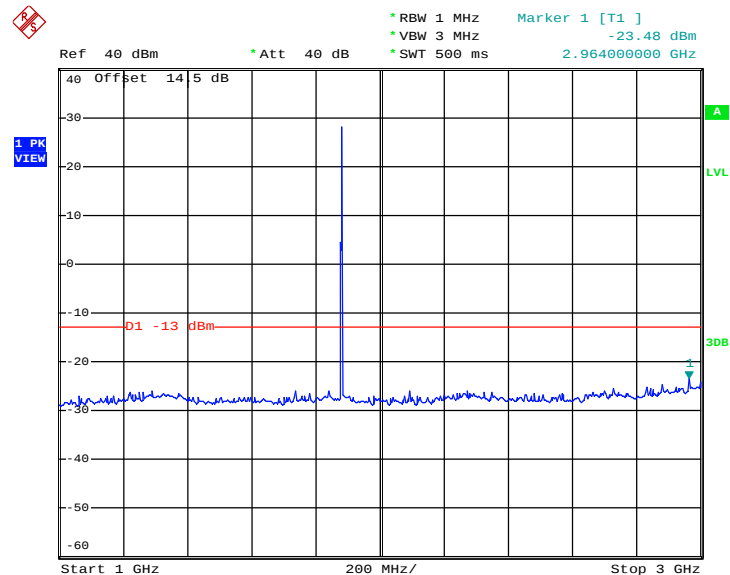


Date: 24.MAY.2015 22:31:53

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

Conducted Spurious Emission Plot between 30MHz ~ 1GHz


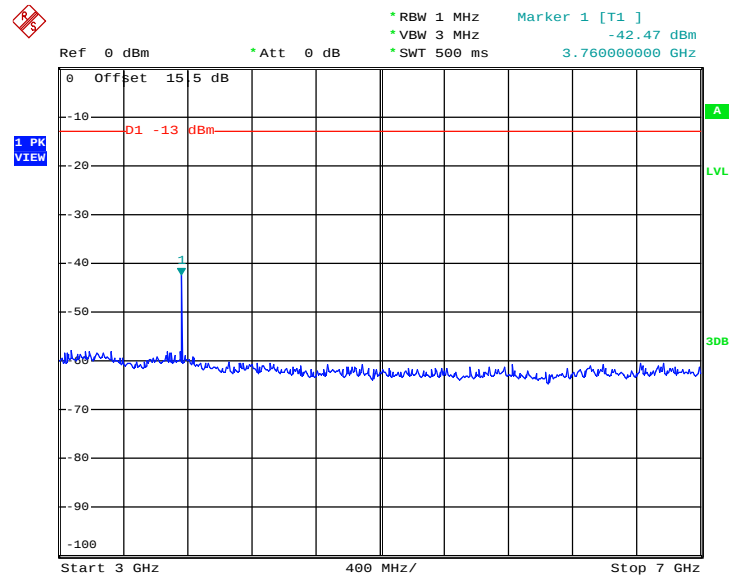
Date: 25.MAY.2015 03:26:36

Conducted Spurious Emission Plot between 1GHz ~ 3GHz


Date: 25.MAY.2015 03:28:07

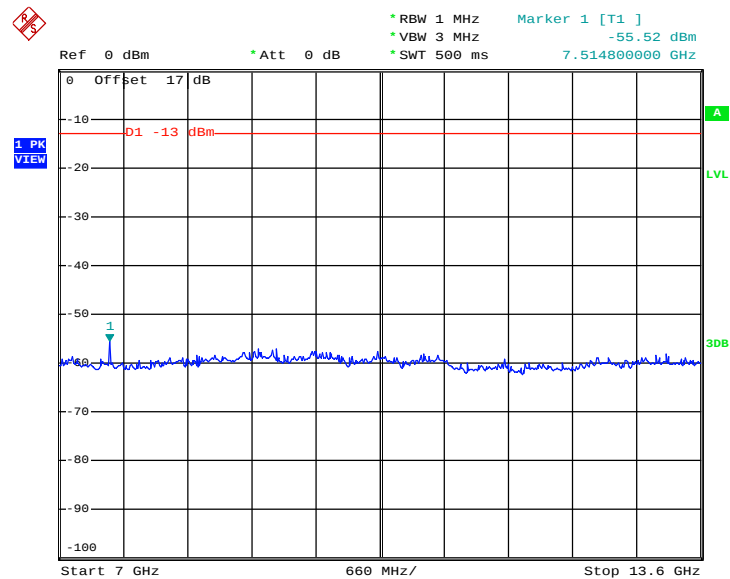


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 25.MAY.2015 03:29:56

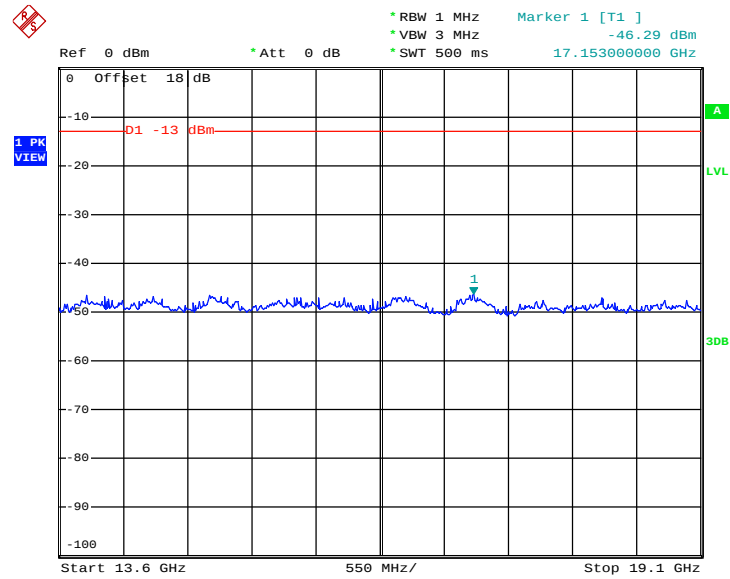
Conducted Spurious Emission Plot between 7GHz ~ 13.6GHz



Date: 25.MAY.2015 03:31:27

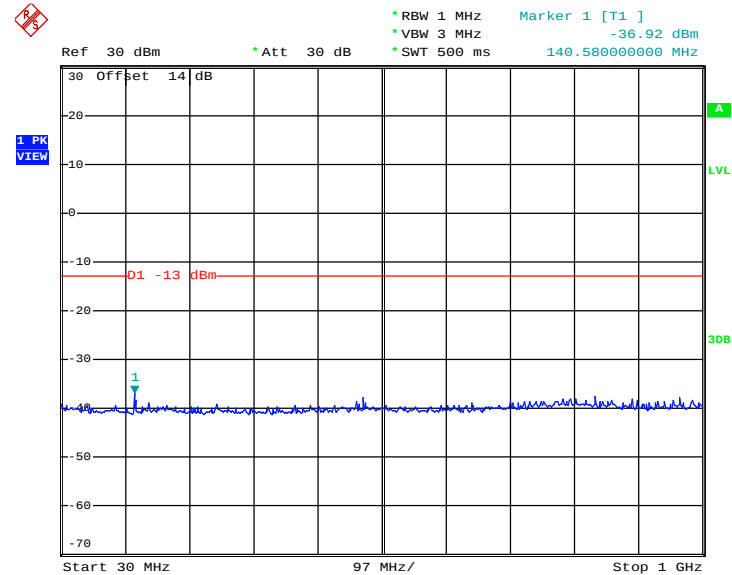


Conducted Spurious Emission Plot between 13.6GHz ~ 19.1GHz

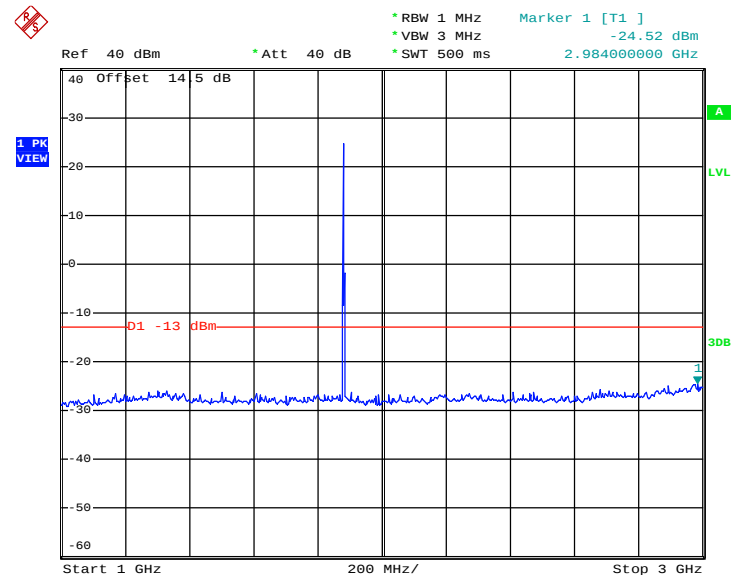


Date: 25.MAY.2015 03:32:29

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

Conducted Spurious Emission Plot between 30MHz ~ 1GHz


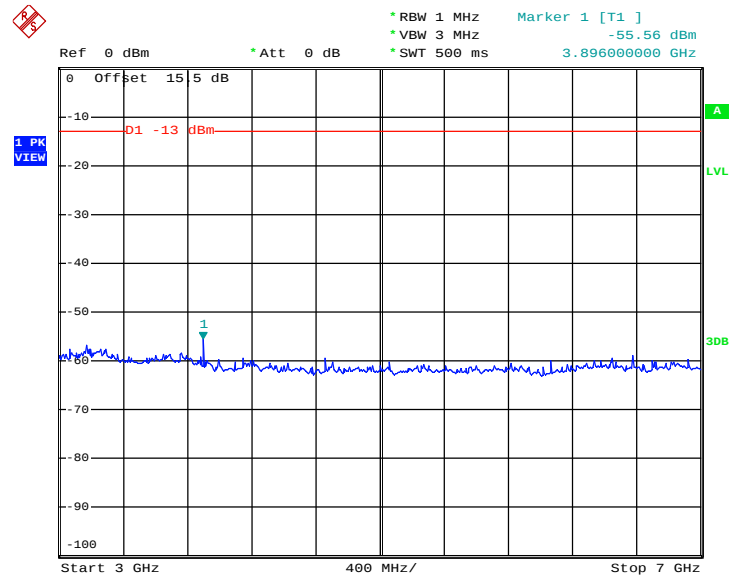
Date: 25.MAY.2015 03:39:15

Conducted Spurious Emission Plot between 1GHz ~ 3GHz


Date: 25.MAY.2015 03:41:07

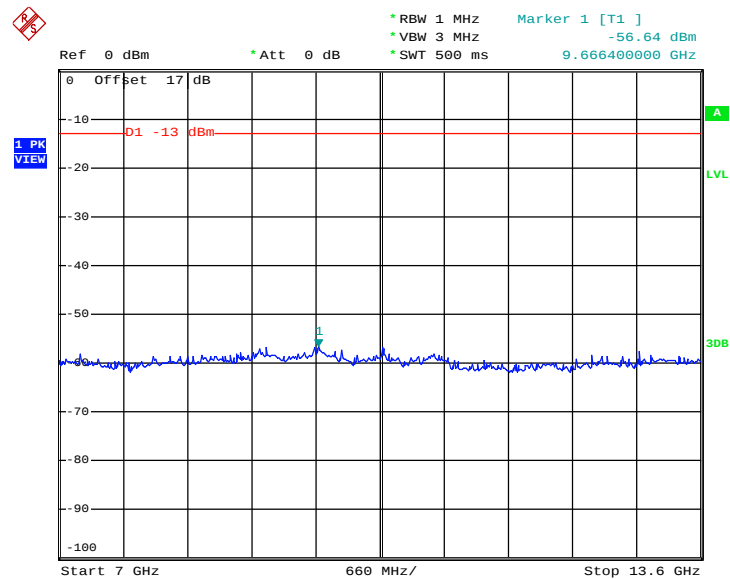


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 25.MAY.2015 03:41:48

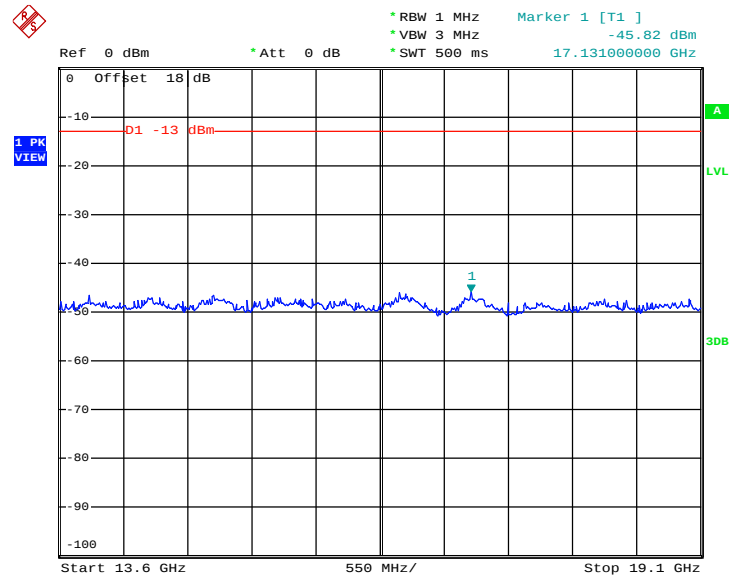
Conducted Spurious Emission Plot between 7GHz ~ 13.6GHz



Date: 25.MAY.2015 03:42:36

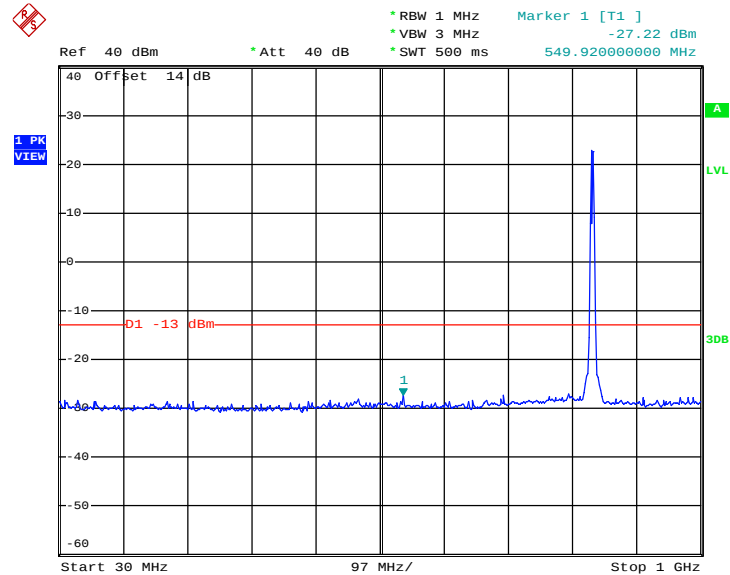


Conducted Spurious Emission Plot between 13.6GHz ~ 19.1GHz

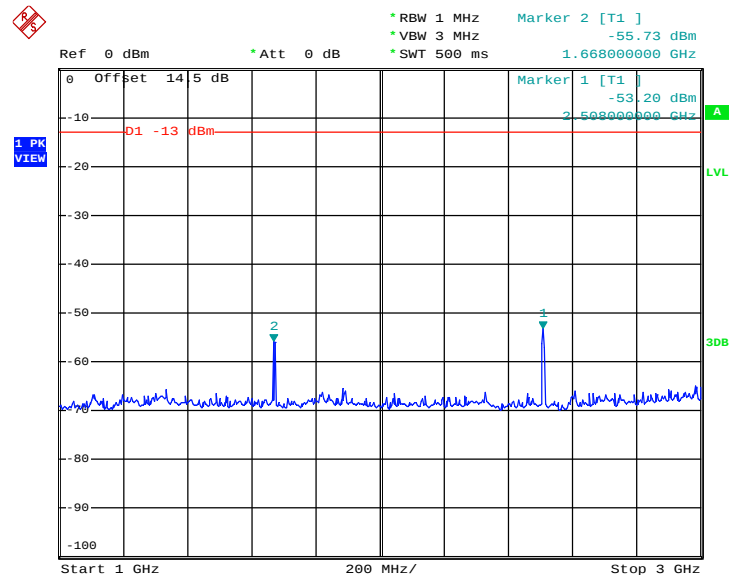


Date: 25.MAY.2015 03:38:17

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

Conducted Spurious Emission Plot between 30MHz ~ 1GHz


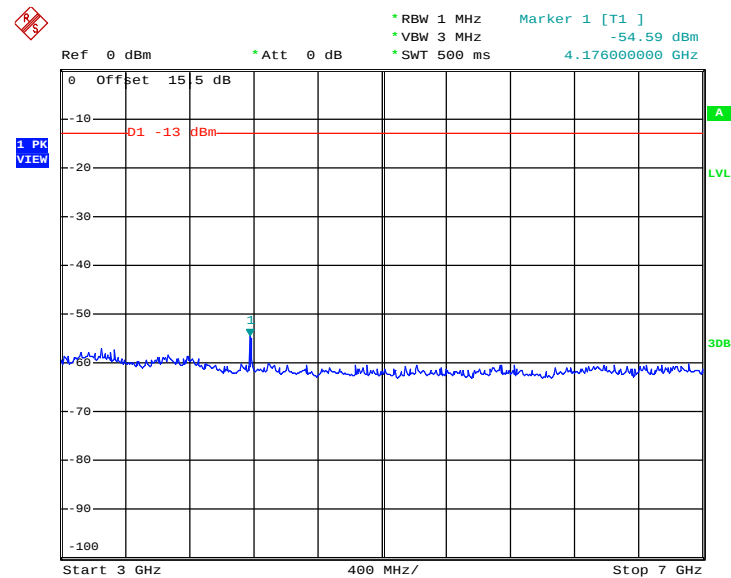
Date: 25.MAY.2015 01:04:15

Conducted Spurious Emission Plot between 1GHz ~ 3GHz


Date: 25.MAY.2015 22:29:22

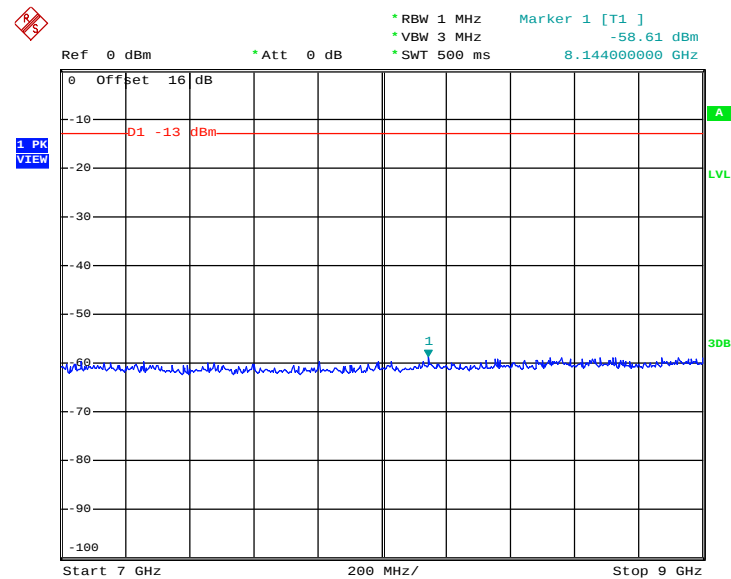


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 25.MAY.2015 01:07:26

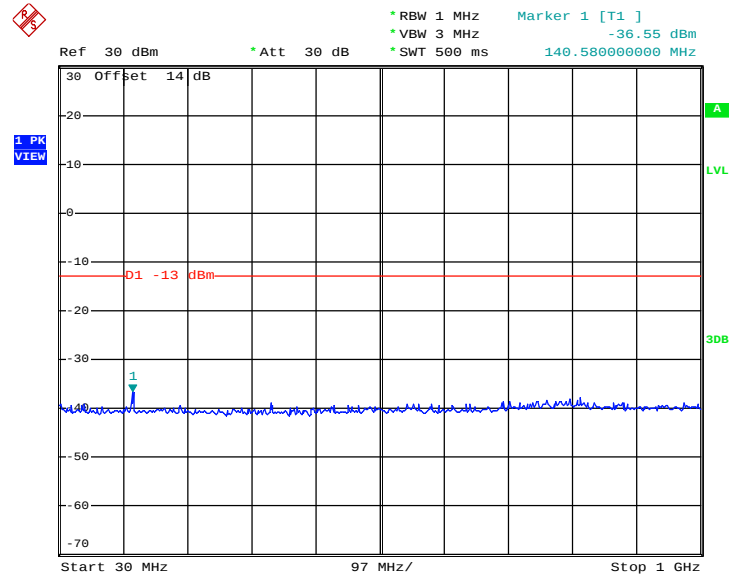
Conducted Spurious Emission Plot between 7GHz ~ 9GHz



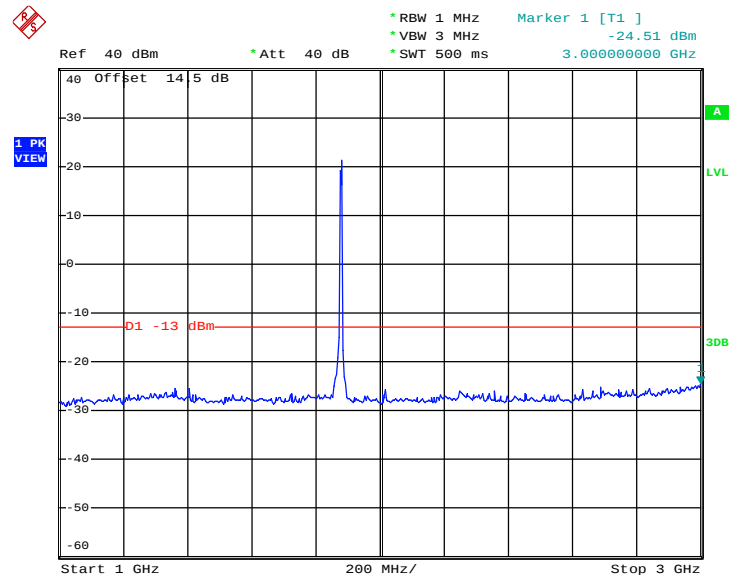
Date: 25.MAY.2015 01:08:10



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

Conducted Spurious Emission Plot between 30MHz ~ 1GHz

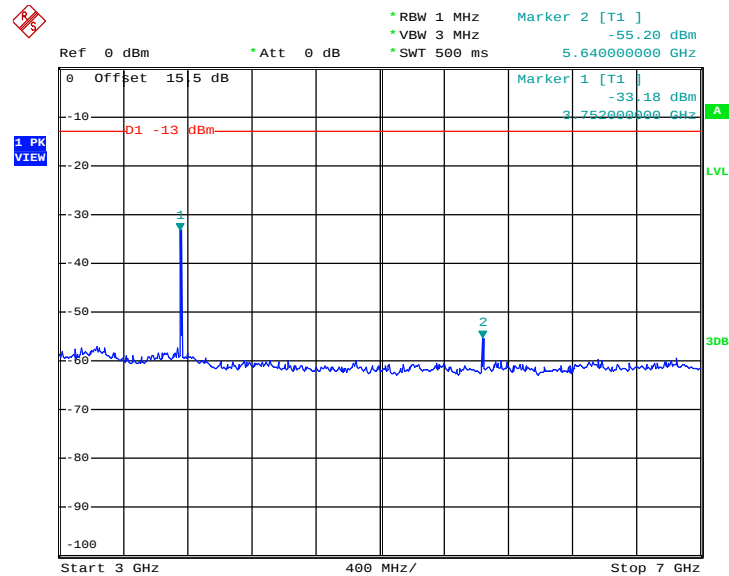
Date: 25.MAY.2015 01:15:31

Conducted Spurious Emission Plot between 1GHz ~ 3GHz

Date: 25.MAY.2015 01:17:05

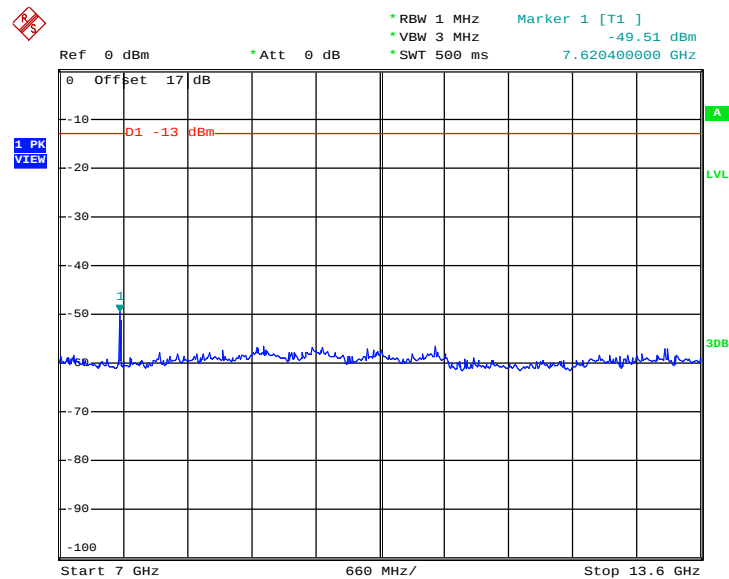


Conducted Spurious Emission Plot between 3GHz ~ 7GHz



Date: 25.MAY.2015 01:18:40

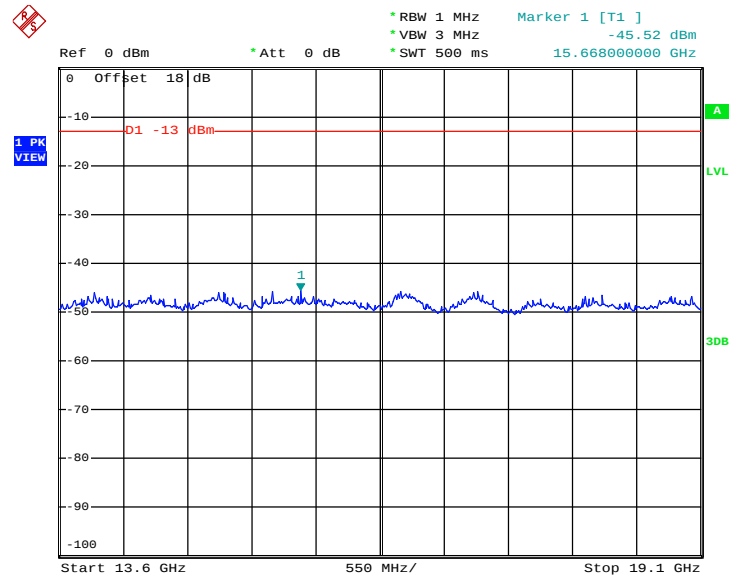
Conducted Spurious Emission Plot between 7GHz ~ 13.6GHz



Date: 25.MAY.2015 22:35:42



Conducted Spurious Emission Plot between 13.6GHz ~ 19.1GHz



Date: 25.MAY.2015 22:36:49

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

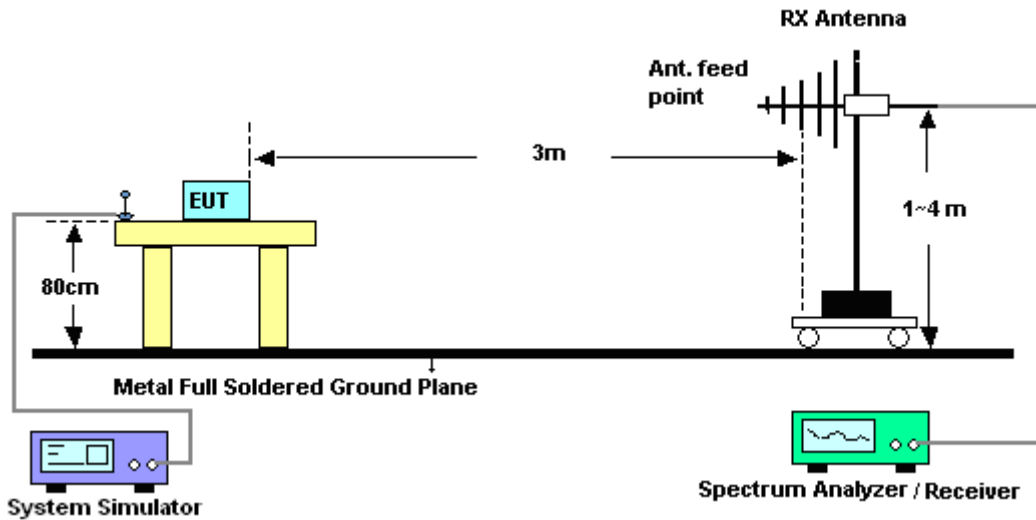
The measuring equipment is listed in the section 4 of this test report.

3.7.3 Test Procedures

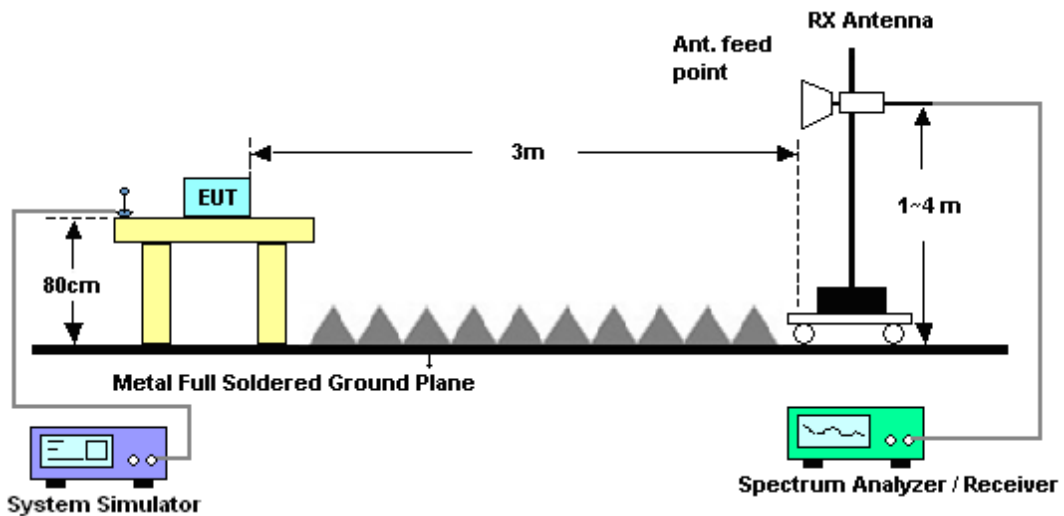
1. The testing follows FCC KDB 971168 v02r02 Section 5.8 and ANSI / TIA-603-C-2004 Section 2.2.12.
2. The EUT was placed on a rotatable wooden table 0.8 meters above the ground.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
4. The table was rotated 360 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 :	GSM850 for Sample 1					Temperature :	22~23℃		
Test Mode :	GSM Link (GMSK)					Relative Humidity :	42~43%		
Test Engineer :	Simon Lu					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)	
1674	-51.20	-13	-38.20	-53.67	-53.09	1.86	5.90	H	Pass
2510	-42.37	-13	-29.37	-55.09	-44.71	2.31	6.80	H	Pass
3346	-43.90	-13	-30.90	-58.67	-46.30	2.85	7.40	H	Pass
4182	-51.06	-13	-38.06	-62.47	-53.74	3.07	7.90	H	Pass
5018	-42.71	-13	-29.71	-56.06	-46.51	3.25	9.20	H	Pass
5854	-41.51	-13	-28.51	-54.97	-45.96	3.7	10.30	H	Pass

Band :	GSM850 for Sample 1					Temperature :	22~23℃		
Test Mode :	GSM Link (GMSK)					Relative Humidity :	42~43%		
Test Engineer :	Simon Lu					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	-49.45	-13	-36.45	-52.06	-51.34	1.86	5.90	V	Pass
2510	-50.45	-13	-37.45	-61.42	-52.79	2.31	6.80	V	Pass
3346	-41.79	-13	-28.79	-58.23	-44.19	2.85	7.40	V	Pass
4182	-42.94	-13	-29.94	-58.28	-45.62	3.07	7.90	V	Pass
5018	-41.18	-13	-28.18	-55.96	-44.98	3.25	9.20	V	Pass
5856	-48.13	-13	-35.13	-57.57	-52.58	3.70	10.30	V	Pass



Band :	GSM850 for Sample 1					Temperature :	22~23°C		
Test Mode :	EDGE class 8 Link (8PSK)					Relative Humidity :	42~43%		
Test Engineer :	Simon Lu					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	-50.81	-13	-37.81	-53.33	-52.70	1.86	5.90	H	Pass
2510	-48.00	-13	-35.00	-58.21	-50.34	2.31	6.80	H	Pass
3344	-52.74	-13	-39.74	-65.37	-55.14	2.85	7.40	H	Pass

Band :	GSM850 for Sample 1					Temperature :	22~23°C		
Test Mode :	EDGE class 8 Link (8PSK)					Relative Humidity :	42~43%		
Test Engineer :	Simon Lu					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)	
1674	-48.85	-13	-35.85	-51.67	-50.74	1.86	5.90	V	Pass
2510	-42.49	-13	-29.49	-56.36	-44.83	2.31	6.80	V	Pass
3344	-51.69	-13	-38.69	-65.67	-54.09	2.85	7.40	V	Pass



Band :	GSM1900 for Sample 1					Temperature :	22~23°C		
Test Mode :	GSM Link (GMSK)					Relative Humidity :	42~43%		
Test Engineer :	Simon Lu					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)	
3759	-51.32	-13	-38.32	-65.52	-55.92	3	7.60	H	Pass
5640	-49.60	-13	-36.60	-63.39	-55.86	3.84	10.10	H	Pass
7521	-38.93	-13	-25.93	-58.71	-46.43	4.43	11.93	H	Pass
9399	-42.49	-13	-29.49	-61.75	-50.15	4.92	12.58	H	Pass
11280	-27.31	-13	-14.31	-53.04	-33.76	5.95	12.40	H	Pass

Band :	GSM1900 for Sample 1					Temperature :	22~23℃		
Test Mode :	GSM Link (GMSK)					Relative Humidity :	42~43%		
Test Engineer :	Simon Lu					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)	
3759	-52.72	-13	-39.72	-65.21	-57.32	3	7.60	V	Pass
5640	-50.58	-13	-37.58	-62.99	-56.84	3.84	10.10	V	Pass
7521	-34.34	-13	-21.34	-54.27	-41.84	4.43	11.93	V	Pass
9399	-39.47	-13	-26.47	-60.28	-47.13	4.92	12.58	V	Pass
11280	-23.55	-13	-10.55	-50.44	-30.00	5.95	12.40	V	Pass



Band :	GSM1900 for Sample 1					Temperature :	22~23°C		
Test Mode :	EDGE class 8 Link (8PSK)					Relative Humidity :	42~43%		
Test Engineer :	Simon Lu					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)	
3759	-50.80	-13	-37.80	-65.00	-55.40	3	7.60	H	Pass
5640	-48.77	-13	-35.77	-62.56	-55.03	3.84	10.10	H	Pass
7521	-40.76	-13	-27.76	-60.54	-48.26	4.43	11.93	H	Pass

Band :	GSM1900 for Sample 1					Temperature :	22~23°C		
Test Mode :	EDGE class 8 Link (8PSK)					Relative Humidity :	42~43%		
Test Engineer :	Simon Lu					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)	
3759	-53.63	-13	-40.63	-66.12	-58.23	3	7.60	V	Pass
5640	-51.18	-13	-38.18	-63.59	-57.44	3.84	10.10	V	Pass
7524	-42.28	-13	-29.28	-60.07	-49.78	4.43	11.93	V	Pass



Band :	WCDMA Band V for Sample 1					Temperature :	22~23°C		
Test Mode :	RMC 12.2Kbps Link (QPSK)					Relative Humidity :	42~43%		
Test Engineer :	Simon Lu					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	-55.75	-13	-42.75	-57.93	-57.64	1.86	5.90	H	Pass
2509	-53.85	-13	-40.85	-62.88	-56.19	2.31	6.80	H	Pass
3344	-53.20	-13	-40.20	-65.83	-55.60	2.85	7.40	H	Pass

Band :	WCDMA Band V for Sample 1					Temperature :	22~23°C		
Test Mode :	RMC 12.2Kbps Link (QPSK)					Relative Humidity :	42~43%		
Test Engineer :	Simon Lu					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
			Limit	Reading	Power	loss	Gain		
(MHz)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	(dBi)	(H/V)	
1672	-59.74	-13	-46.74	-58.60	-61.63	1.86	5.90	V	Pass
2508	-53.40	-13	-40.40	-64.37	-55.74	2.31	6.80	V	Pass
3344	-50.63	-13	-37.63	-64.61	-53.03	2.85	7.40	V	Pass



Band :	WCDMA Band II for Sample 1	Temperature :	22~23°C						
Test Mode :	RMC 12.2Kbps Link (QPSK)	Relative Humidity :	42~43%						
Test Engineer :	Simon Lu	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)	
3759	-48.54	-13	-35.54	-62.74	-53.14	3	7.60	H	Pass
5640	-49.20	-13	-36.20	-62.99	-55.46	3.84	10.10	H	Pass
7521	-41.76	-13	-28.76	-61.54	-49.26	4.43	11.93	H	Pass

Band :	WCDMA Band II for Sample 1					Temperature :	22~23°C		
Test Mode :	RMC 12.2Kbps Link (QPSK)					Relative Humidity :	42~43%		
Test Engineer :	Simon Lu					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)	
3759	-51.30	-13	-38.30	-63.79	-55.90	3	7.60	V	Pass
5640	-51.99	-13	-38.99	-64.4	-58.25	3.84	10.10	V	Pass
7521	-43.40	-13	-30.40	-61.19	-50.90	4.43	11.93	V	Pass



Band :	GSM850 for Sample 2					Temperature :	22~23℃		
Test Mode :	GSM Link (GMSK)					Relative Humidity :	42~43%		
Test Engineer :	Simon Lu					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)	
1674	-39.75	-13	-26.75	-45.92	-41.64	1.86	5.90	H	Pass
2512	-40.65	-13	-27.65	-53.92	-42.99	2.31	6.80	H	Pass
3348	-49.55	-13	-36.55	-62.18	-51.95	2.85	7.40	H	Pass
4186	-51.02	-13	-38.02	-62.43	-53.70	3.07	7.90	H	Pass
5022	-44.46	-13	-31.46	-56.80	-48.26	3.25	9.20	H	Pass
5860	-47.42	-13	-34.42	-57.43	-51.87	3.7	10.30	H	Pass

Band :	GSM850 for Sample 2					Temperature :	22~23℃		
Test Mode :	GSM Link (GMSK)					Relative Humidity :	42~43%		
Test Engineer :	Simon Lu					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)	
1674	-36.90	-13	-23.90	-43.47	-38.79	1.86	5.90	V	Pass
2508	-52.34	-13	-39.34	-63.31	-54.68	2.31	6.80	V	Pass
3348	-48.03	-13	-35.03	-62.01	-50.43	2.85	7.40	V	Pass
4186	-46.41	-13	-33.41	-60.00	-49.09	3.07	7.90	V	Pass
5022	-47.75	-13	-34.75	-59.10	-51.55	3.25	9.20	V	Pass
5854	-51.84	-13	-38.84	-61.28	-56.29	3.70	10.30	V	Pass



Band :	GSM1900 for Sample 2					Temperature :	22~23℃		
Test Mode :	GSM Link (GMSK)					Relative Humidity :	42~43%		
Test Engineer :	Simon Lu					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)	
3759	-51.02	-13	-38.02	-65.22	-55.62	3	7.60	H	Pass
5640	-50.47	-13	-37.47	-64.26	-56.73	3.84	10.10	H	Pass
7521	-41.25	-13	-28.25	-61.03	-48.75	4.43	11.93	H	Pass
9399	-42.38	-13	-29.38	-61.64	-50.04	4.92	12.58	H	Pass
11280	-31.61	-13	-18.61	-55.67	-38.06	5.95	12.40	H	Pass

Band :	GSM1900 for Sample 2					Temperature :	22~23°C		
Test Mode :	GSM Link (GMSK)					Relative Humidity :	42~43%		
Test Engineer :	Simon Lu					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)	
3759	-53.18	-13	-40.18	-65.67	-57.78	3	7.60	V	Pass
5640	-51.95	-13	-38.95	-64.36	-58.21	3.84	10.10	V	Pass
7521	-40.00	-13	-27.00	-57.79	-47.50	4.43	11.93	V	Pass
9399	-39.46	-13	-26.46	-60.27	-47.12	4.92	12.58	V	Pass
11280	-25.58	-13	-12.58	-51.95	-32.03	5.95	12.40	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.

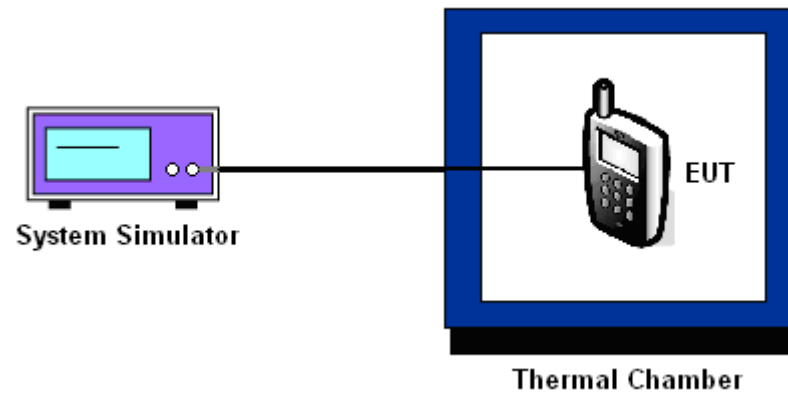
3.8.3 Test Procedures for Temperature Variation

1. The testing follows FCC KDB 971168 v02r02 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 v02r02 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 850	Channel :	189
Limit (ppm) :	2.5	Frequency :	836.4 MHz

Temperature (°C)	GSM	EDGE class 8	Result
	Deviation (ppm)	Deviation (ppm)	
50	0.0108	0.0108	PASS
40	0.0048	0.0550	
30	0.0514	0.0466	
20(Ref.)	0.0000	0.0000	
10	0.0442	0.0048	
0	0.0072	0.0430	
-10	0.0036	0.0478	
-20	0.0490	0.0084	
-30	0.0108	0.0096	

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

Temperature (°C)	GSM	EDGE class 8	Result
	Deviation (ppm)	Deviation (ppm)	
50	0.0239	0.0064	PASS
40	0.0043	0.0154	
30	0.0229	0.0128	
20(Ref.)	0.0000	0.0000	
10	0.0154	0.0005	
0	0.0021	0.0027	
-10	0.0144	0.0128	
-20	0.0176	0.0011	
-30	0.0149	0.0144	

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
	Deviation (ppm)	
50	0.0586	PASS
40	0.0538	
30	0.0502	
20(Ref.)	0.0000	
10	0.0454	
0	0.0096	
-10	0.0574	
-20	0.0120	
-30	0.0622	

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

Temperature (°C)	RMC 12.2Kbps	Result
	Deviation (ppm)	
50	0.0059	PASS
40	0.0011	
30	0.0170	
20(Ref.)	0.0000	
10	0.0223	
0	0.0011	
-10	0.0181	
-20	0.0144	
-30	0.0234	

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)	Deviation (ppm)	Limit (ppm)	Result
GSM 850 CH189	GSM	4.35	0.0155	2.5	PASS
		3.8	0.0430		
		BEP	0.0407		
	EDGE class 8	4.35	0.0060		
		3.8	0.0383		
		BEP	0.0167		
GSM 1900 CH661	GSM	4.35	0.0011	(Note 3.)	
		3.8	0.0165		
		BEP	0.0154		
	EDGE class 8	4.35	0.0011		
		3.8	0.0149		
		BEP	0.0005		
WCDMA Band V CH4182	RMC 12.2Kbps	4.35	0.0383	2.5	
		3.8	0.0060		
		BEP	0.0395		
WCDMA Band II CH9400	RMC 12.2Kbps	4.35	0.0027	(Note 3.)	
		3.8	0.0165		
		BEP	0.0266		

Note:

1. Normal Voltage = 3.8V.
2. Battery End Point (BEP) = 3.6 V.
3. 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	FSP40	100319	9kHz~40GHz	Oct. 28, 2014	May 24,2015~ May 25,2015	Oct. 27, 2015	Conducted (TH01-KS)
Spectrum Analyzer	R&S	FSV30	100845	9kHz~30GHz	Oct. 28, 2014	May 24,2015~ May 25,2015	Oct. 27, 2015	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Oct. 25, 2014	May 24,2015~ May 25,2015	Oct. 24, 2015	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Sep. 29, 2014	May 26, 2015	Sep. 28, 2015	Radiation (03CH02-KS)
Spectrum Analyzer	R&S	FSV40	101040	10kHz~40GHz;Max 30dBm	Sep. 25, 2014	May 26, 2015	Sep. 24, 2015	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6112D	37879	30MHz~2GHz	Sep. 13, 2014	May 26, 2015	Sep. 12, 2015	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 08, 2014	May 26, 2015	Nov. 07, 2015	Radiation (03CH02-KS)
Active Horn Antenna	com-power	AHA-118	701030	1GHz~18GHz	Nov. 08, 2014	May 26, 2015	Nov. 07, 2015	Radiation (03CH02-KS)
SHF-EHF Horn	com-power	AH-840	101070	18GHz~40GHz	Sep. 04, 2014	May 26, 2015	Sep. 03, 2015	Radiation (03CH02-KS)
Amplifier	com-power	PA-103A	161069	1kHz~1000MHz / 32 dB	May 04, 2015	May 26, 2015	May 03, 2016	Radiation (03CH02-KS)
Amplifier	Agilent	8449B	3008A02384	1GHz~26.5GHz Gain 30dB	Oct. 28, 2014	May 26, 2015	Oct. 27, 2015	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	61601000247 3	N/A	NCR	May 26, 2015	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	May 26, 2015	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	May 26, 2015	NCR	Radiation (03CH02-KS)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	5.1dB
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