FCC RF Test Report

APPLICANT	:	Doro AB
EQUIPMENT	:	GSM/WCDMA/LTE Mobile Telephone
BRAND NAME	:	doro
MODEL NAME	:	DSB-0010
FCC ID	:	WS5DSB0010
STANDARD	:	FCC 47 CFR Part 2, 22(H), 24(E)
CLASSIFICATION	:	PCS Licensed Transmitter Held to Ear (PCE)

The product testing was completed on Jul. 19, 2016. 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-D-2010 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

Testing Laboratory 2627

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
FG570906-04A	Rev. 01	Initial issue of report	Aug. 05, 2016

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[Watts])	PASS	-
3.6	§2.1051 §22.917(a) §24.238(a)	Conducted Spurious Emission	< $43+10\log_{10}$(P[Watts])	PASS	-
3.7	§2.1053 §22.917(a) §24.238(a)	Field Strength of Spurious Radiation	< $43+10\log_{10}$(P[Watts])	PASS	Under limit 32.01 dB at 2512.000 MHz
3.8	§2.1055 §22.355	Frequency Stability for Temperature & Voltage	< 2.5 ppm	PASS	-
	§2.1055 §24.235		Within Authorized Band		

1. General Description

1.1 Applicant

Doro AB
Magistratsvägen 10 SE-226 43 Lund Sweden

1.2 Manufacturer

BYD PRECISION MFR CO., LTD
No.3001, Baohe Road, Baolong Industrial, Longgang, Shenzhen, 518116, P.R.China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	GSM/WCDMA/LTE Mobile Telephone
Brand Name	doro
Model Name	DSB-0010
FCC ID	WS5DSB0010
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/ HSPA+(16QAM is not supported)/DC-HSDPA/LTE/ WLAN 2.4GHz 802.11b/g/n HT20/ Bluetooth v3.0 + EDR/Bluetooth v4.1 LE
IMEI Code	Conducted: 351512080000861 Radiation: 351512080000630 ERP/EIRP: 351512080000671
HW Version	DIVA-V2.1
SW Version	DSB0010_EU_RET_02.16.00_USER _160705
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 : 33.15 dBm GSM1900 : 30.32 dBm WCDMA Band V : 22.58 dBm WCDMA Band II : 23.10 dBm
Antenna Type	PIFA Antenna
Type of Modulation	GSM: GMSK GPRS: GMSK EDGE: GMSK / 8PSK WCDMA: QPSK (Uplink) HSDPA/DC-HSDPA: QPSK (Uplink) HSUPA: QPSK (Uplink) HSPA+: 16QAM (16QAM is not supported) DC-HSDPA : 64QAM

1.5 Modification of EUT

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

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

FCC Rule	System	Type of Modulation	Maximum ERP/EIRP (W)	Frequency Tolerance (ppm)	Emission Designator
Part 22	GSM850 GSM	GMSK	0.6637	0.0466	244KGXW
Part 22	GSM850 EDGE class 8	8PSK	0.1641	0.0466	248KG7W
Part 22	WCDMA Band V RMC 12.2Kbps	QPSK	0.0619	0.0466	4M16F9W
Part 24	GSM1900 GSM	GMSK	1.4125	0.0234	246KGXW
Part 24	GSM1900 EDGE class 8	8PSK	0.5188	0.0218	246KG7W
Part 24	WCDMA Band II RMC 12.2Kbps	QPSK	0.2535	0.0223	4M16F9W

1.7 Testing Location

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

Note: The test site complies with ANSI C63.4 2014 requirement.

1.8 Applicable Standards

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

- FCC 47 CFR Part 2, 22(H), 24(E)
- ANSI / TIA / EIA-603-D-2010
- 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. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2. Test Configuration of Equipment Under Test

2.1 Test Mode

Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas. License Digital Systems 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 from 30 MHz to 10th harmonic.

All modes and data rates and positions were investigated.

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

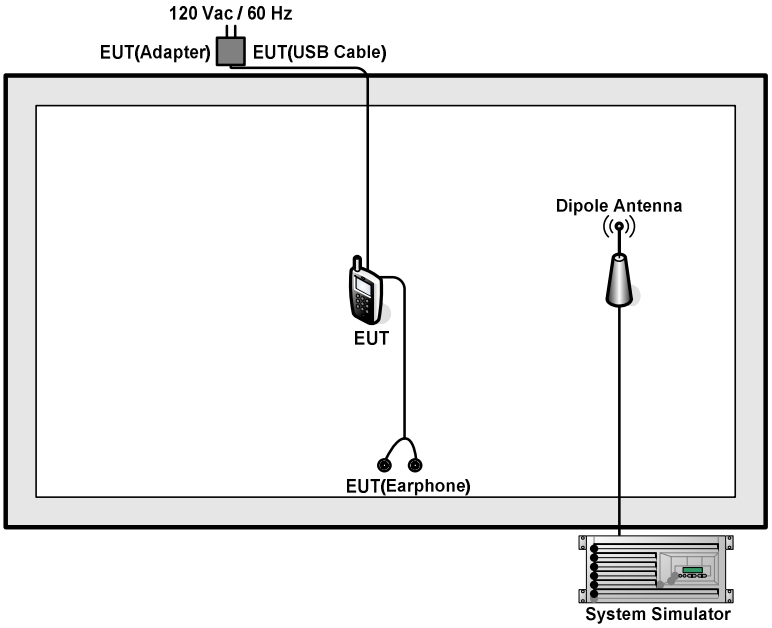
Test Modes		
Band	**Radiated TCs**	**Conducted TCs**
GSM 850	■ GSM Link ■ EDGE class 8 Link	■ GSM Link ■ EDGE class 8 Link
GSM 1900	■ GSM Link ■ EDGE class 8 Link	■ GSM Link ■ EDGE class 8 Link
WCDMA Band V	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link
WCDMA Band II	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link

Conducted Power Measurement Results:

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	33.07	33.15	32.84	30.32	30.30	30.26
GPRS class 8	33.05	33.13	32.82	30.24	30.28	30.24
GPRS class 10	29.98	29.84	29.87	27.45	27.66	27.63
GPRS class 11	28.41	28.52	28.45	25.49	25.47	25.78
EGPRS class 8	26.93	26.94	26.91	25.96	25.90	26.16
EGPRS class 10	24.55	24.56	24.49	23.30	23.31	23.52
EGPRS class 11	22.69	22.75	22.57	21.45	21.49	21.70
EGPRS class 12	21.80	21.85	21.74	20.62	20.59	20.76

Conducted Power (*Unit: dBm)						
Band	WCDMA Band V			WCDMA Band II		
Channel	4132	4182	4233	9262	9400	9538
Frequency	826.4	836.4	846.6	1852.4	1880.0	1907.6
AMR 12.2Kbps	22.56	22.50	22.44	23.07	22.92	23.03
RMC 12.2Kbps	22.58	22.52	22.46	23.10	22.93	23.05
HSDPA Subtest-1	22.01	22.01	22.05	21.56	21.57	21.48
HSDPA Subtest-2	22.00	21.97	22.04	21.57	21.51	21.59
HSDPA Subtest-3	21.56	21.47	21.51	20.06	21.06	21.03
HSDPA Subtest-4	21.55	21.49	21.48	21.01	21.03	21.00
DC-HSDPA Subtest-1	21.96	22.00	22.03	21.57	21.56	21.49
DC-HSDPA Subtest-2	21.98	21.99	22.04	21.55	21.52	21.51
DC-HSDPA Subtest-3	21.53	21.45	21.53	21.05	21.08	21.02
DC-HSDPA Subtest-4	21.51	21.51	21.51	21.00	21.05	21.03
HSUPA Subtest-1	21.08	21.15	20.58	20.39	20.48	20.51
HSUPA Subtest-2	20.70	20.41	20.85	20.37	20.25	20.34
HSUPA Subtest-3	20.88	20.21	20.43	20.55	20.51	20.49
HSUPA Subtest-4	20.84	21.35	20.89	20.99	20.65	20.59
HSUPA Subtest-5	21.89	21.97	21.95	20.86	21.75	21.89

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 INSTEK	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 5.2 dB and a 10dB attenuator.

Example :

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

= 5.2 + 10 = 15.2 (dB)

3. Test Result

3.1 Conducted Output Power Measurement

3.1.1 Description of the Conducted Output Power Measurement

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

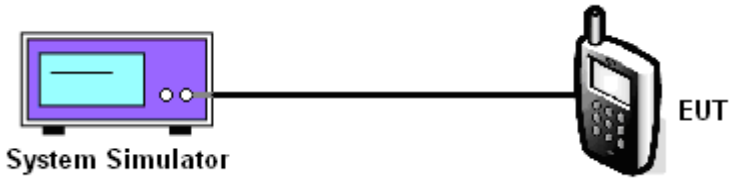
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

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

3.1.4 Test Setup



3.1.5 Test Result of Conducted Output Power

Cellular Band									
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)	33.07	33.15	32.84	26.93	26.94	26.91	22.58	22.52	22.46

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)	30.32	30.30	30.26	25.96	25.90	26.16	23.10	22.93	23.05

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.

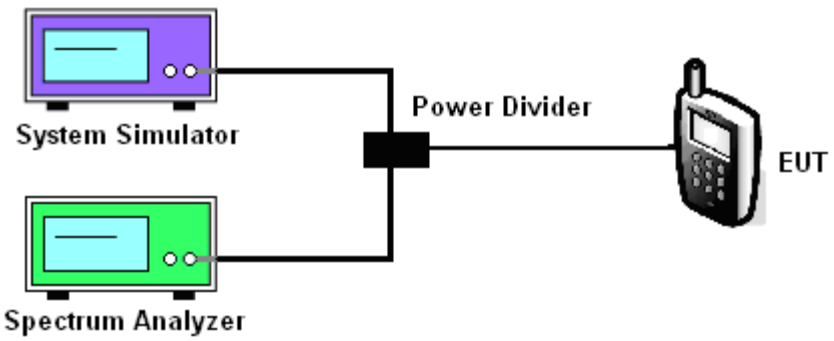
3.2.2 Measuring Instruments

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



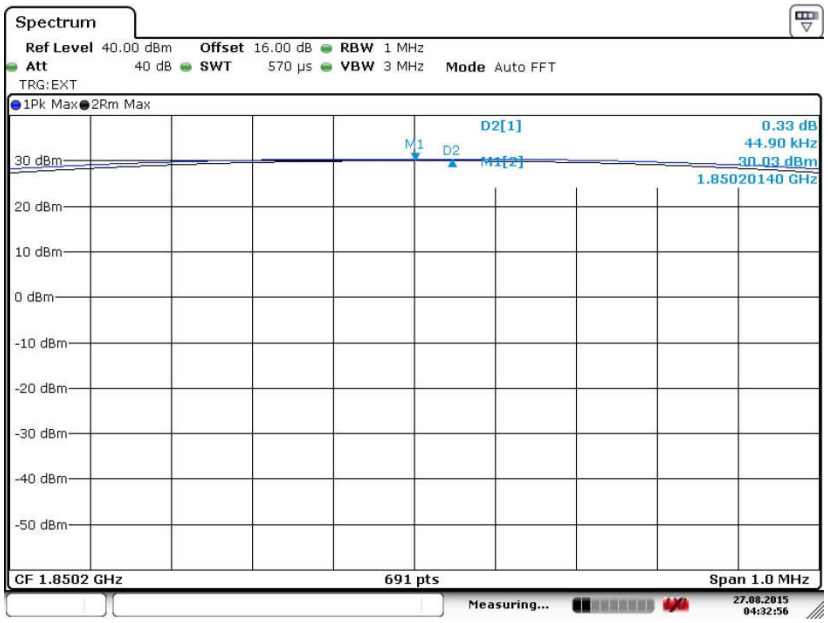
3.2.5 Test Result of Peak-to-Average Ratio

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)	0.33	0.34	0.31	2.73	2.97	2.95	2.88	2.72	2.40

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

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

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



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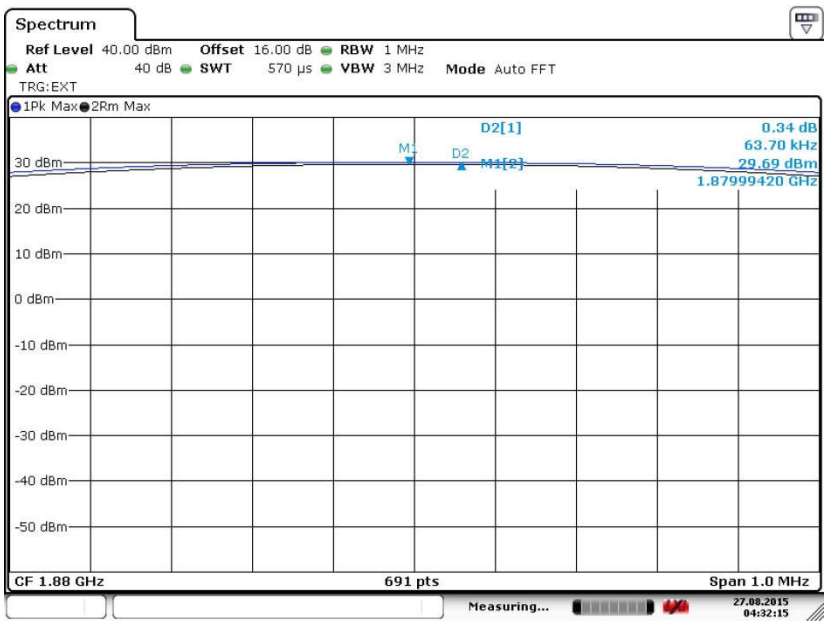
Peak-to-Average Ratio on Channel 661 (1880.0 MHz)



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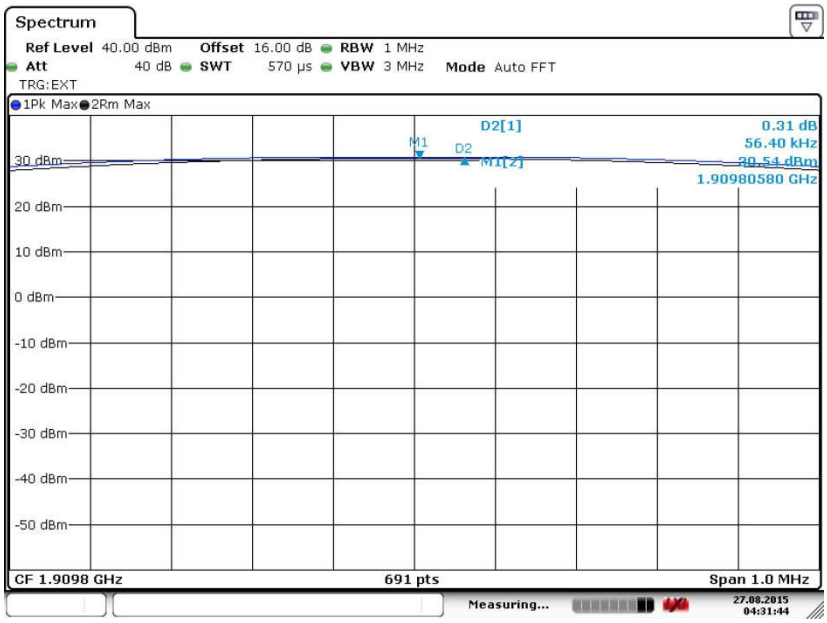
Peak-to-Average Ratio on Channel 810 (1909.8 MHz)



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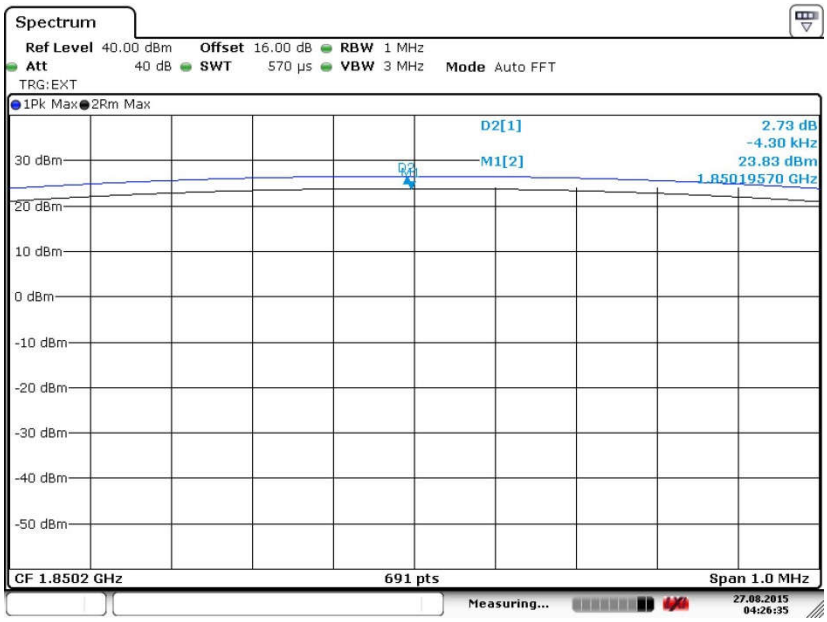
Band :	GSM 1900	Test Mode :	EDGE class 8 Link (8PSK)

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



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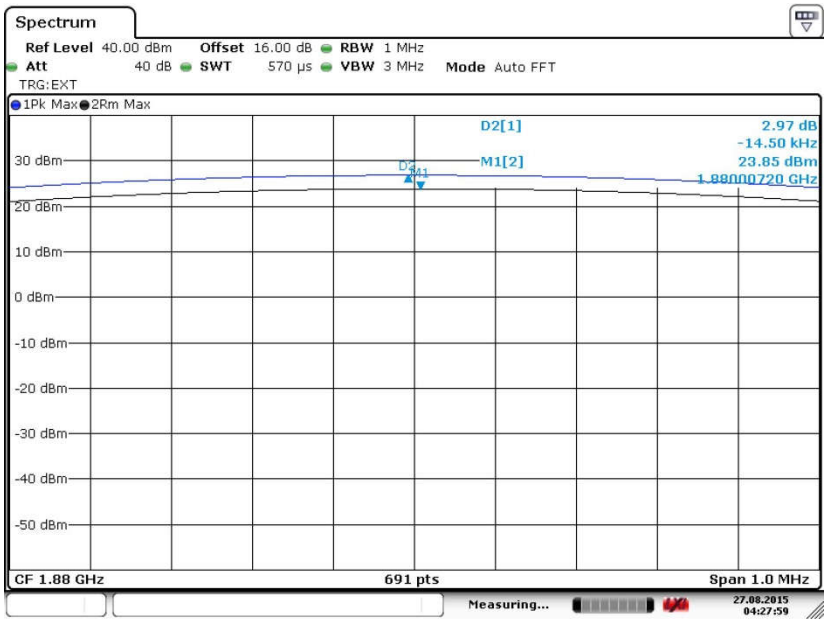
Peak-to-Average Ratio on Channel 661 (1880.0 MHz)



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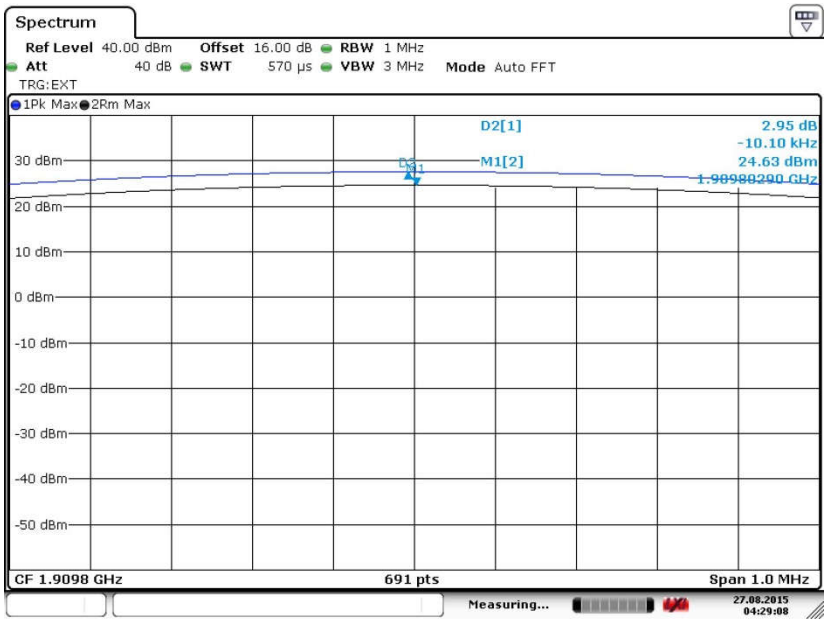
Peak-to-Average Ratio on Channel 810 (1909.8 MHz)



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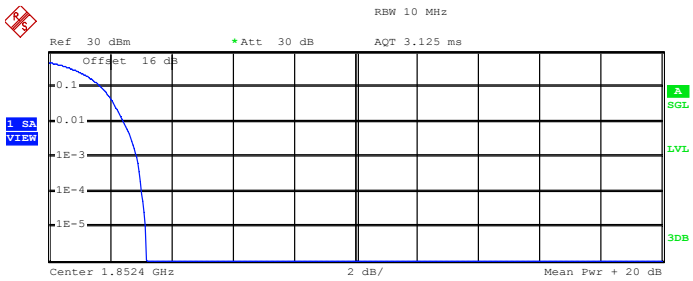
Band :	WCDMA Band II	Test Mode :	RMC 12.2Kbps Link (QPSK)

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



Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	22.45 dBm
Peak	25.62 dBm
Crest	3.18 dB
10 %	1.72 dB
1 %	2.44 dB
.1 %	2.88 dB
.01 %	3.04 dB

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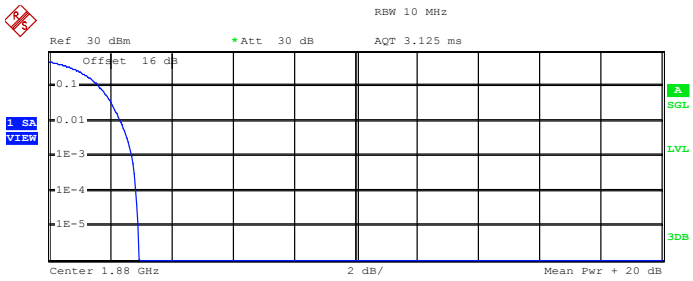
Peak-to-Average Ratio on Channel 9400 (1880.0 MHz)



Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	22.46 dBm
Peak	25.41 dBm
Crest	2.96 dB
10 %	1.64 dB
1 %	2.36 dB
.1 %	2.72 dB
.01 %	2.84 dB

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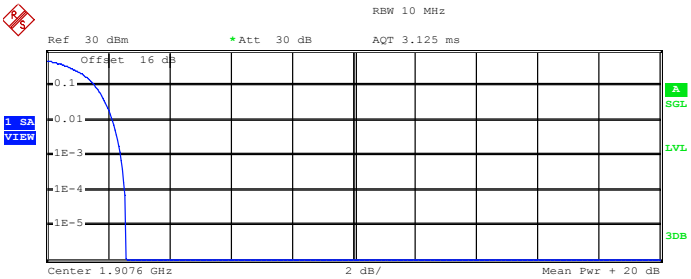
Peak-to-Average Ratio on Channel 9538 (1907.6 MHz)



Complementary Cumulative Distribution Function (100000 samples)

	Trace 1
Mean	23.18 dBm
Peak	25.77 dBm
Crest	2.59 dB
10 %	1.56 dB
1 %	2.16 dB
.1 %	2.40 dB
.01 %	2.56 dB

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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-D-2010, 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-D-2010 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-D. 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 + 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 Result of ERP

GSM850 (GSM) Radiated Power ERP					
Channel	Frequency (MHz)	Horizontal		Vertical	
		ERP(dBm)	ERP(W)	ERP(dBm)	ERP(W)
Lowest	824.20	26.36	0.4325	16.93	0.0493
Middle	836.40	27.39	0.5483	17.88	0.0614
Highest	848.80	28.22	0.6637	18.47	0.0703
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	20.89	0.1227	11.22	0.0132
Middle	836.40	21.54	0.1426	11.90	0.0155
Highest	848.80	22.15	0.1641	12.37	0.0173
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	15.94	0.0393	6.52	0.0045
Middle	836.40	16.95	0.0495	7.55	0.0057
Highest	846.60	17.92	0.0619	8.39	0.0069
Limit	ERP < 7W	Result		PASS	

3.3.5 Test Result of EIRP

GSM1900 (GSM) Radiated Power EIRP					
Channel	Frequency (MHz)	Horizontal		Vertical	
		EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	1850.20	30.12	1.0280	30.78	1.1967
Middle	1880.00	30.38	1.0914	30.86	1.2190
Highest	1909.80	30.94	1.2417	31.50	1.4125
Limit	EIRP < 2W	Result		PASS	

GSM1900 (EDGE class 8) Radiated Power EIRP					
Channel	Frequency (MHz)	Horizontal		Vertical	
		EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	1850.20	25.86	0.3855	26.78	0.4764
Middle	1880.00	26.25	0.4217	26.43	0.4395
Highest	1909.80	26.48	0.4446	27.15	0.5188
Limit	EIRP < 2W	Result		PASS	

WCDMA Band II (RMC 12.2Kbps) Radiated Power EIRP					
Channel	Frequency (MHz)	Horizontal		Vertical	
		EIRP(dBm)	EIRP(W)	EIRP(dBm)	EIRP(W)
Lowest	1852.40	22.78	0.1897	23.44	0.2208
Middle	1880.00	23.23	0.2104	23.66	0.2323
Highest	1907.60	23.53	0.2254	24.04	0.2535
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.

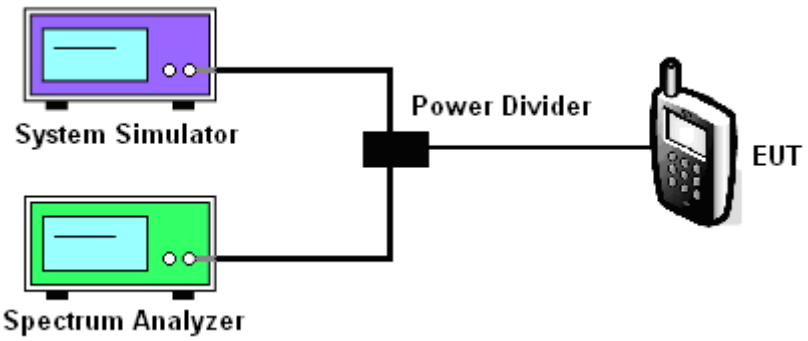
3.4.2 Measuring Instruments

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, peak 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 99% 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)	244.00	244.00	244.00	248.00	244.00	244.00
26dB BW (kHz)	314.00	318.00	318.00	310.00	302.00	306.00

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)	246.00	246.00	244.00	244.00	244.00	246.00
26dB BW (kHz)	312.00	318.00	314.00	316.00	312.00	306.00

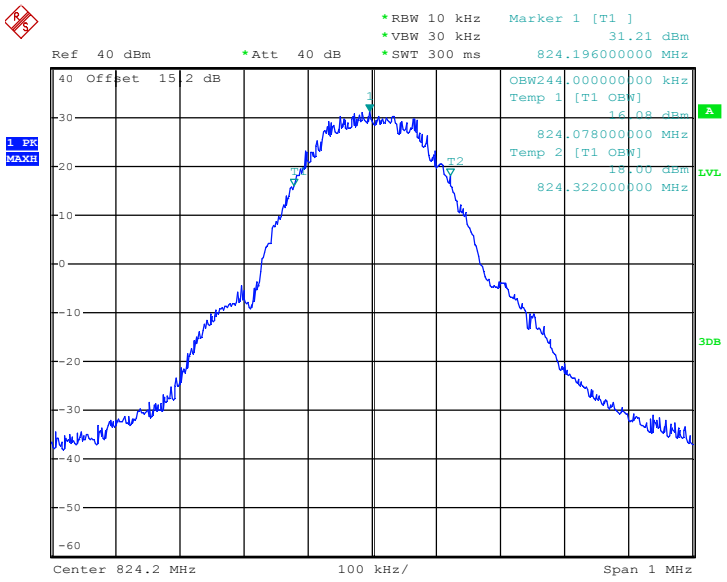
Cellular Band			
Modes	WCDMA Band V (RMC 12.2Kbps)		
Channel	4132 (Low)	4182 (Mid)	4233 (High)
Frequency (MHz)	826.4	836.4	846.6
99% OBW (MHz)	4.16	4.14	4.14
26dB BW (MHz)	4.74	4.76	4.74

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	4.16	4.16
26dB BW (MHz)	4.76	4.76	4.80

3.4.6 Test Result (Plots) of 99% Occupied Bandwidth and 26dB Bandwidth

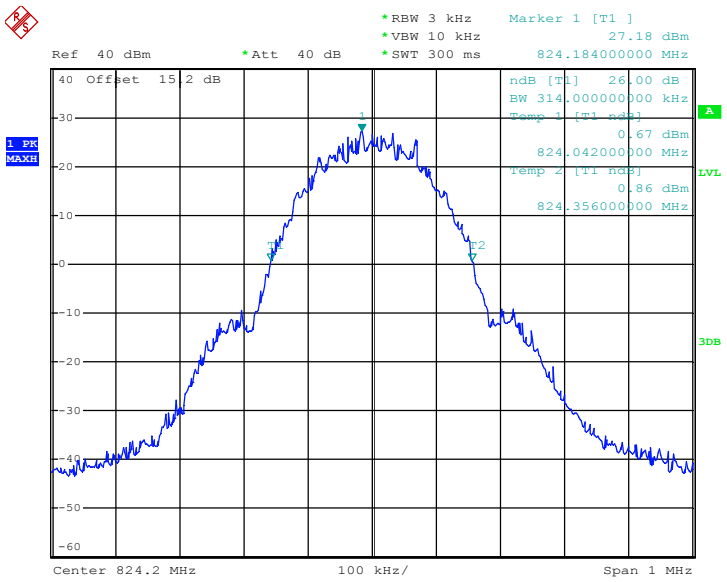
Band :	GSM 850	Test Mode :	GSM Link (GMSK)

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



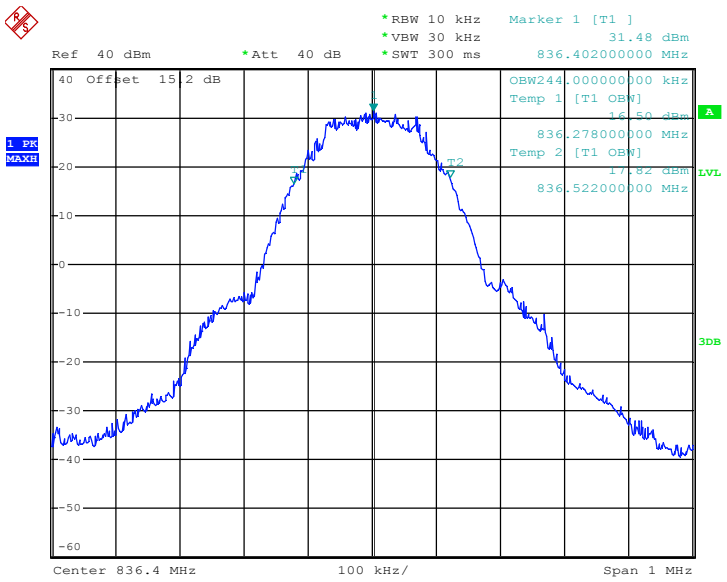
Date: 27.AUG.2015 01:21:09

26dB Bandwidth Plot on Channel 128 (824.2 MHz)



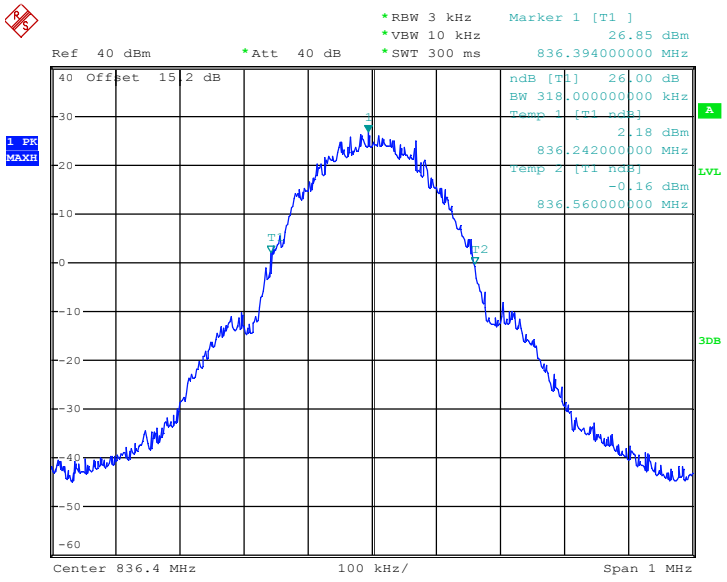
Date: 27.AUG.2015 01:11:10

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



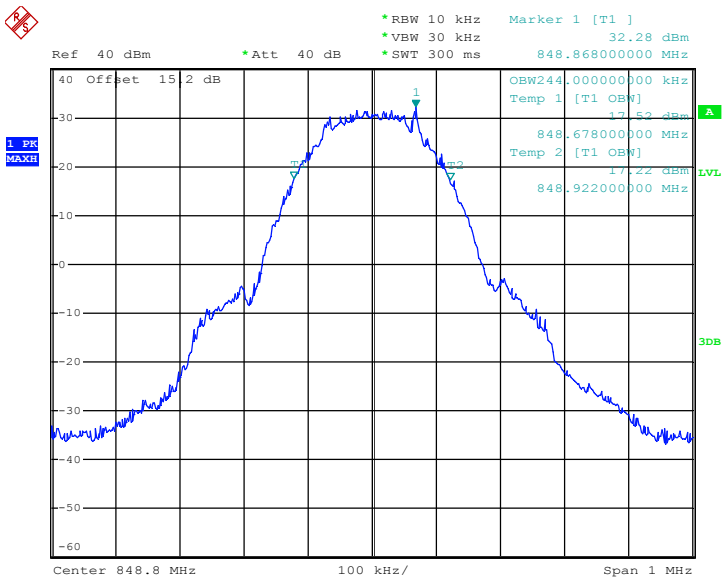
Date: 27.AUG.2015 01:20:19

26dB Bandwidth Plot on Channel 189 (836.4 MHz)



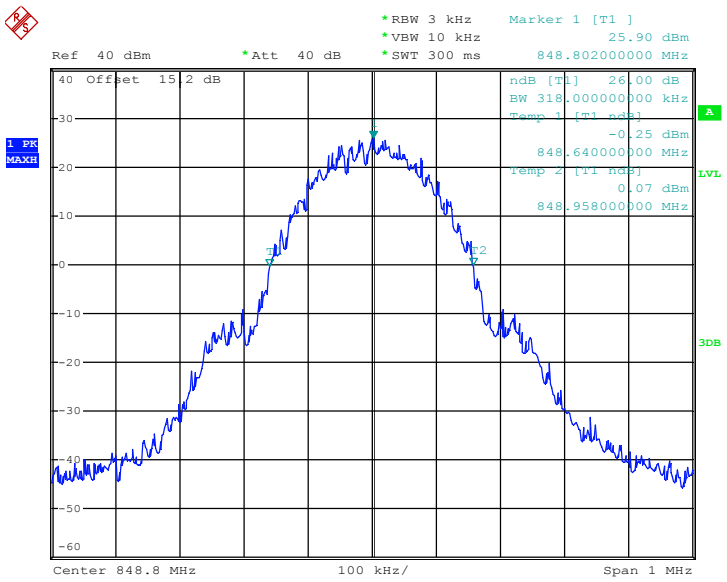
Date: 27.AUG.2015 01:12:12

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



Date: 27.AUG.2015 01:16:14

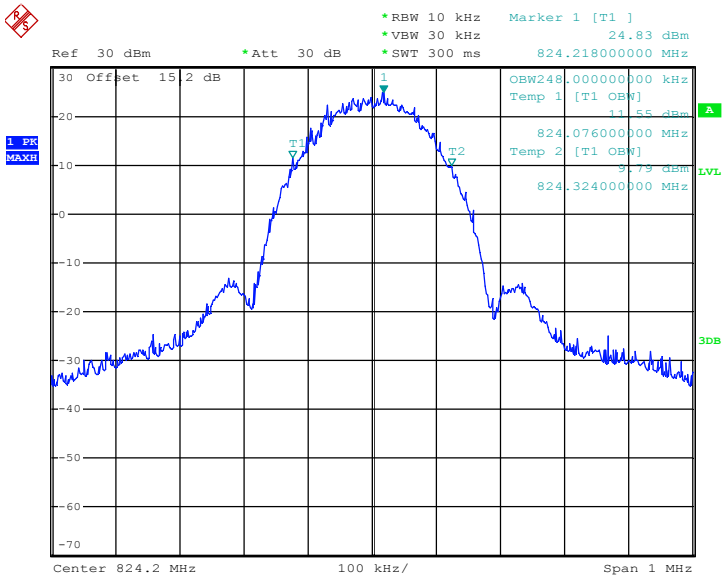
26dB Bandwidth Plot on Channel 251 (848.8 MHz)



Date: 27.AUG.2015 01:12:50

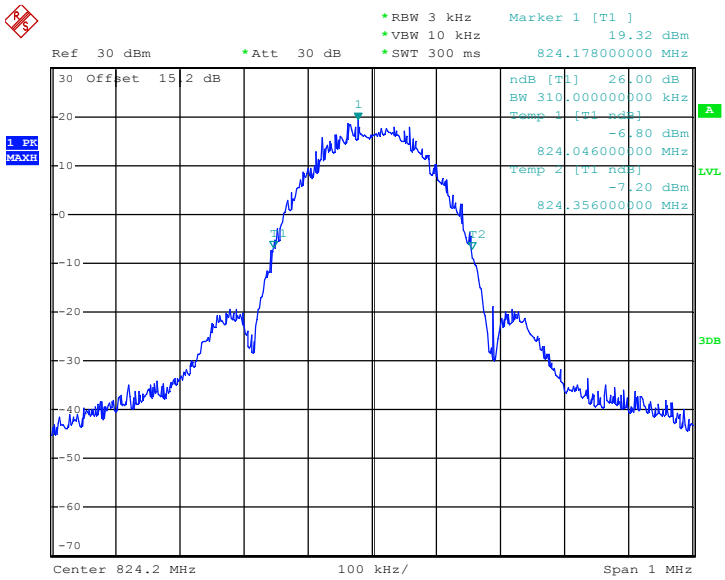
Band :	GSM 850	Test Mode :	EDGE class 8 Link (8PSK)

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



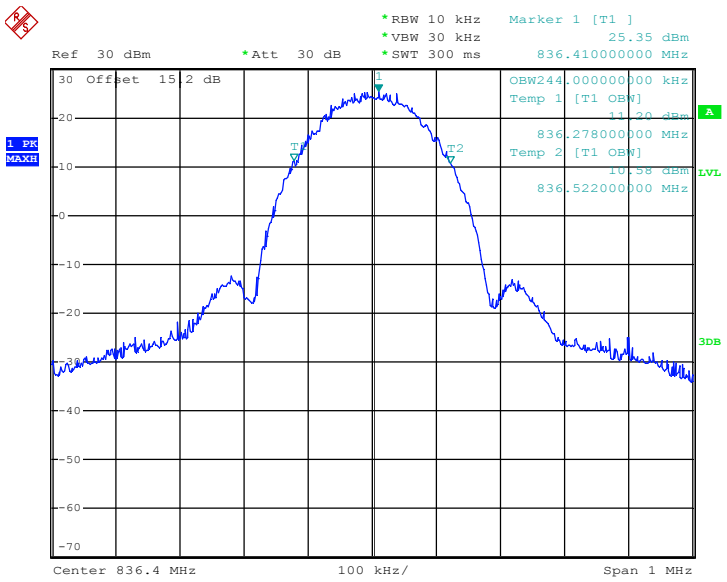
Date: 27.AUG.2015 02:00:25

26dB Bandwidth Plot on Channel 128 (824.2 MHz)



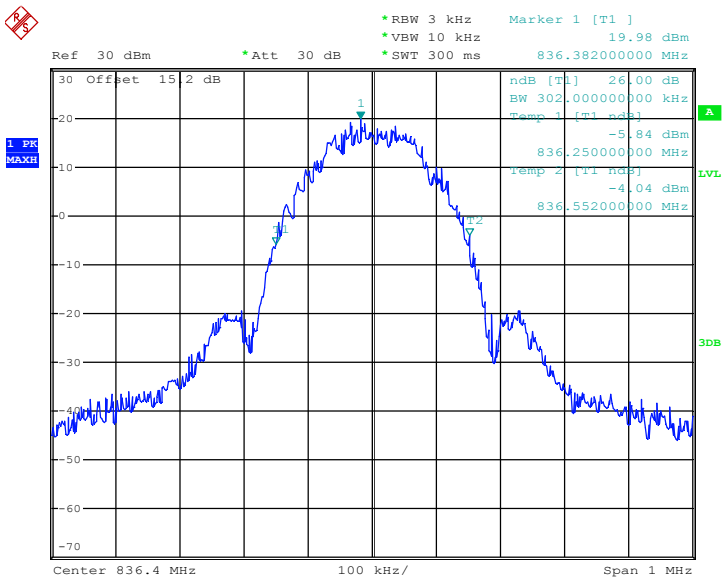
Date: 27.AUG.2015 01:45:42

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



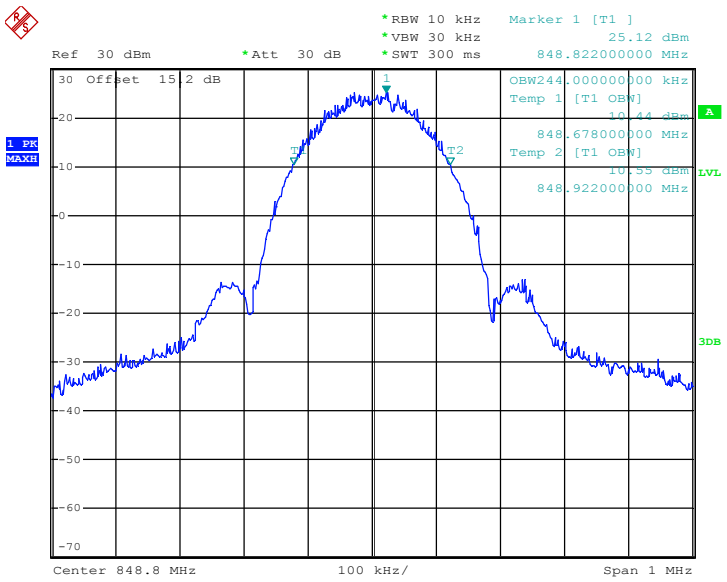
Date: 27.AUG.2015 01:59:09

26dB Bandwidth Plot on Channel 189 (836.4 MHz)



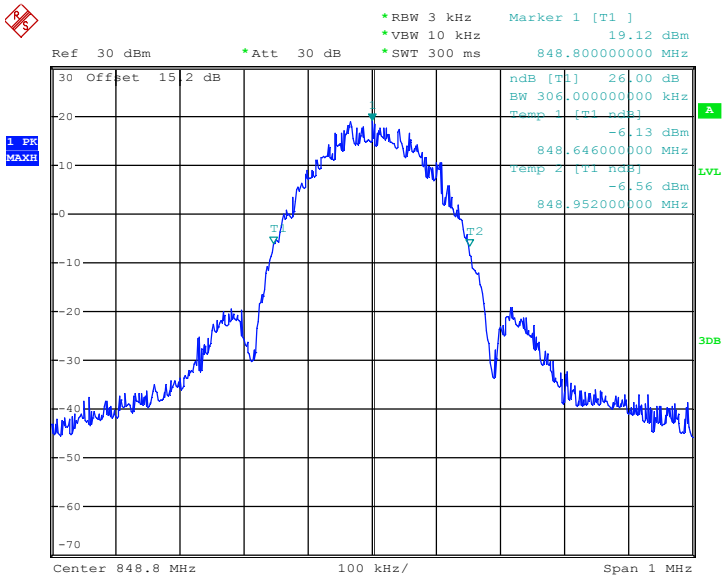
Date: 27.AUG.2015 01:46:48

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



Date: 27.AUG.2015 01:49:08

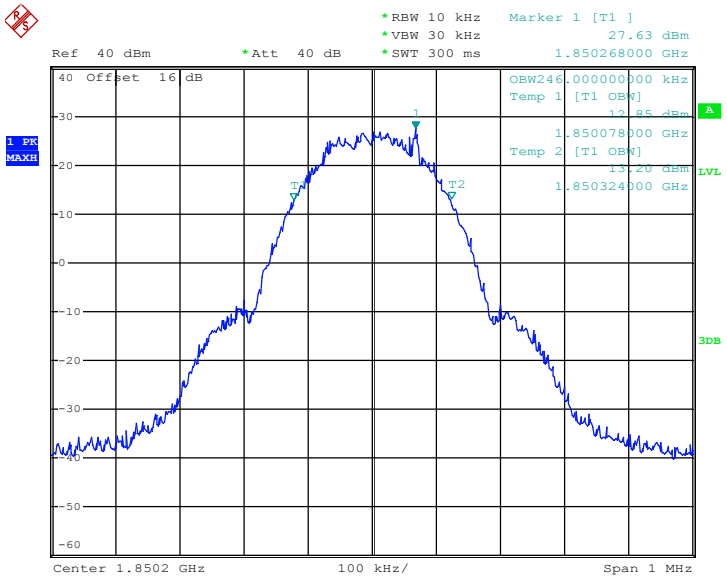
26dB Bandwidth Plot on Channel 251 (848.8 MHz)



Date: 27.AUG.2015 01:47:29

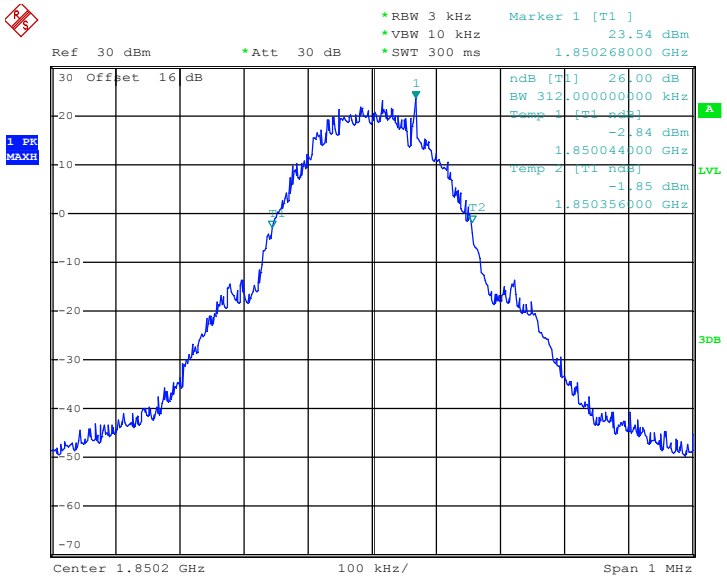
Band :	GSM 1900	Test Mode :	GSM Link (GMSK)

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



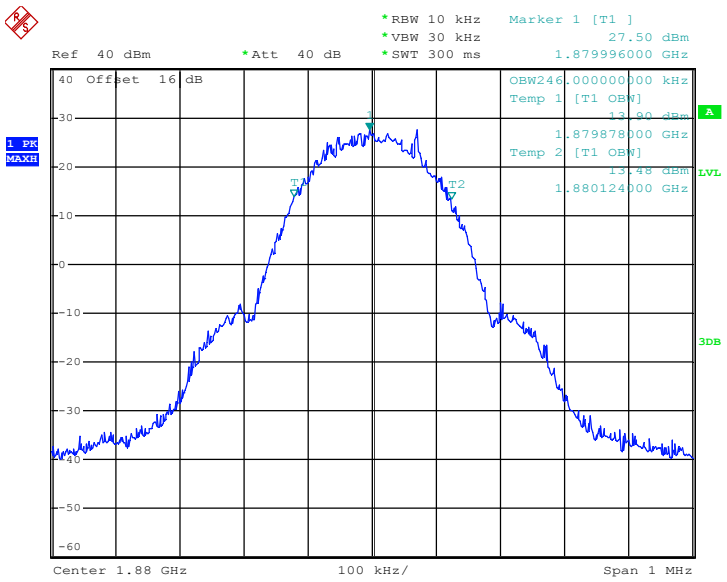
Date: 27.AUG.2015 03:20:09

26dB Bandwidth Plot on Channel 512 (1850.2 MHz)



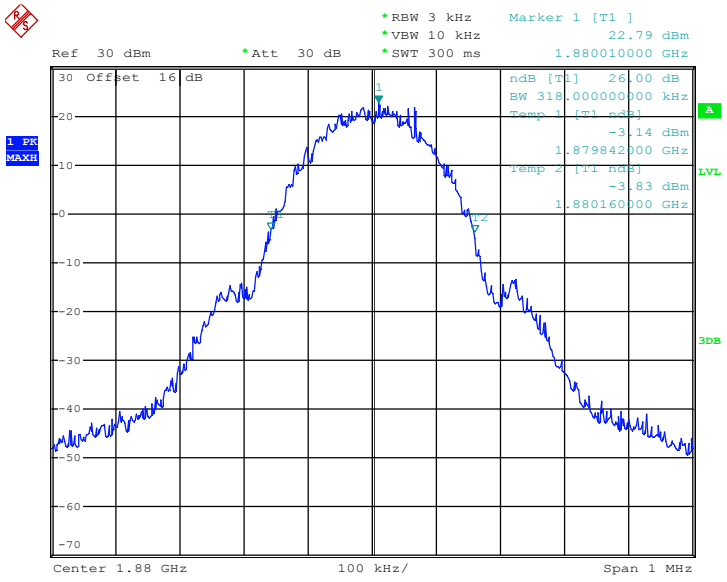
Date: 27.AUG.2015 03:05:24

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



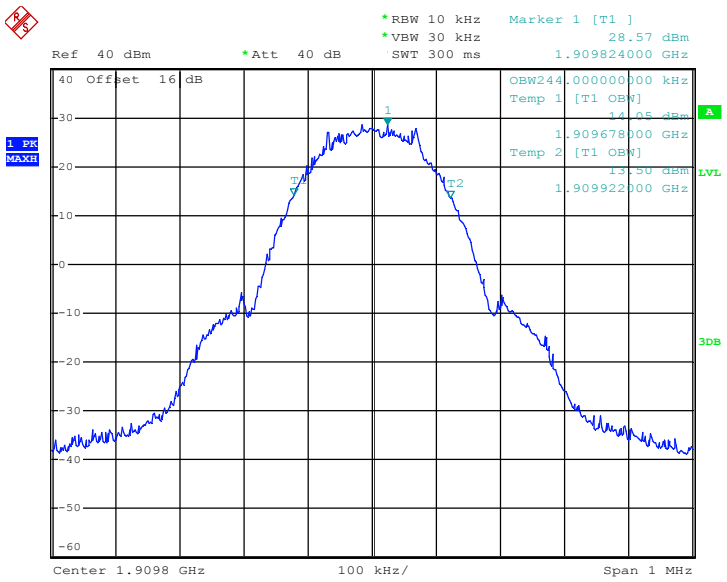
Date: 27.AUG.2015 03:16:54

26dB Bandwidth Plot on Channel 661 (1880.0 MHz)



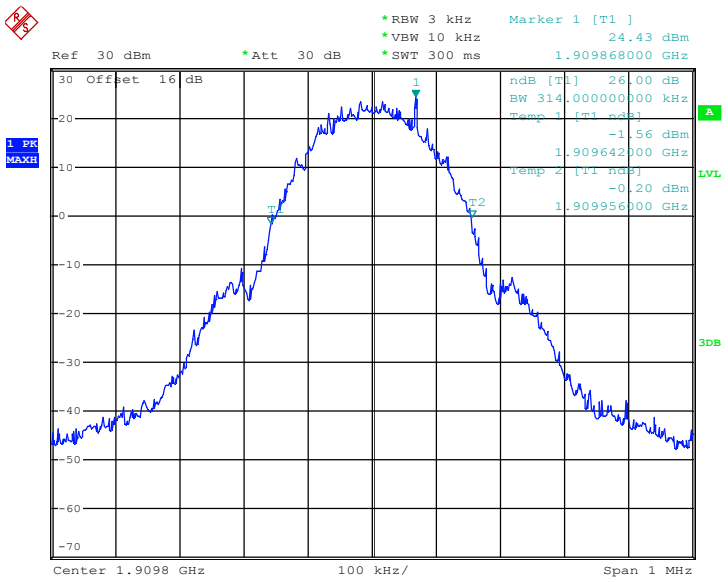
Date: 27.AUG.2015 03:06:38

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



Date: 27.AUG.2015 03:15:12

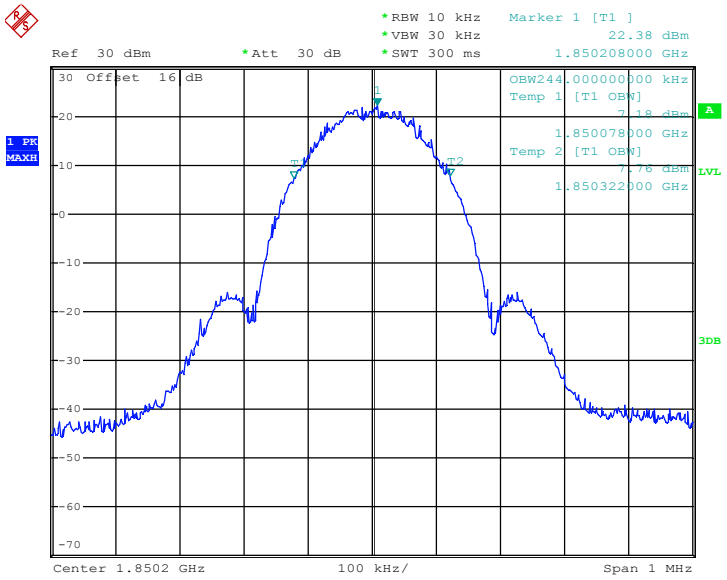
26dB Bandwidth Plot on Channel 810 (1909.8 MHz)



Date: 27.AUG.2015 03:08:20

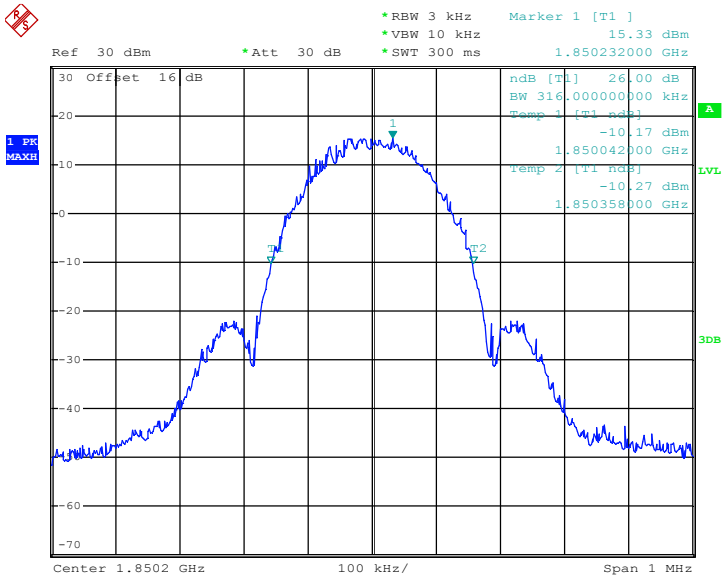
Band :	GSM 1900	Test Mode :	EDGE class 8 Link (8PSK)

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



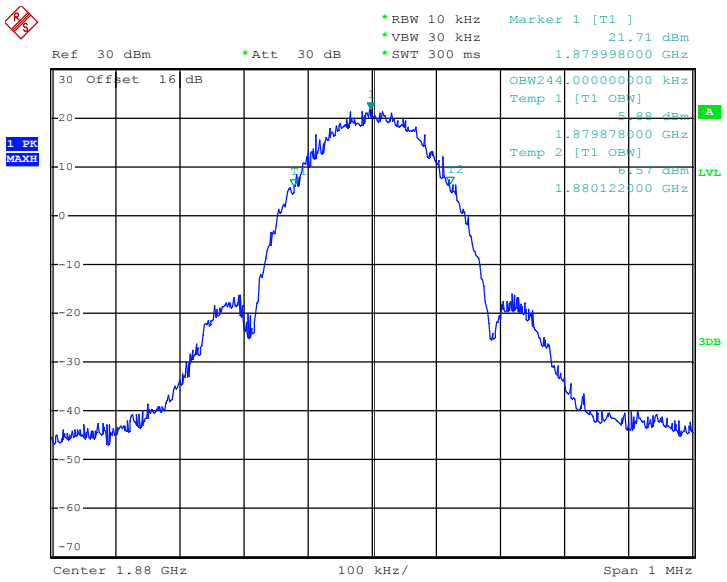
Date: 27.AUG.2015 03:54:46

26dB Bandwidth Plot on Channel 512 (1850.2 MHz)



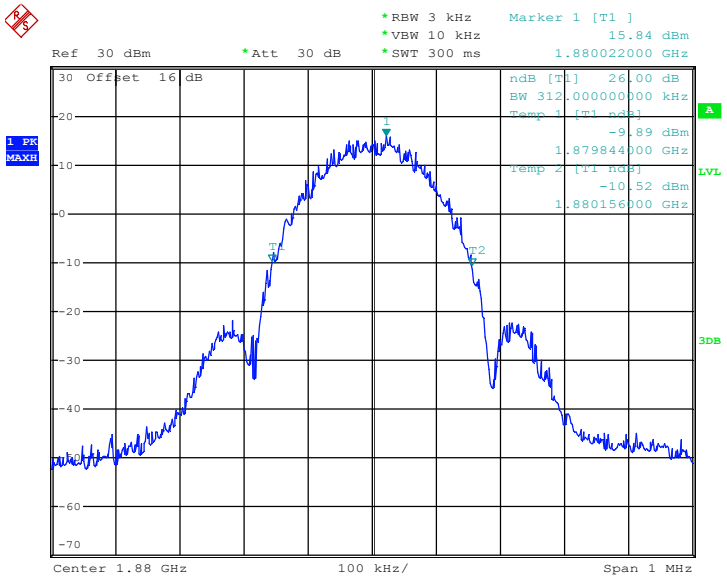
Date: 27.AUG.2015 03:41:29

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



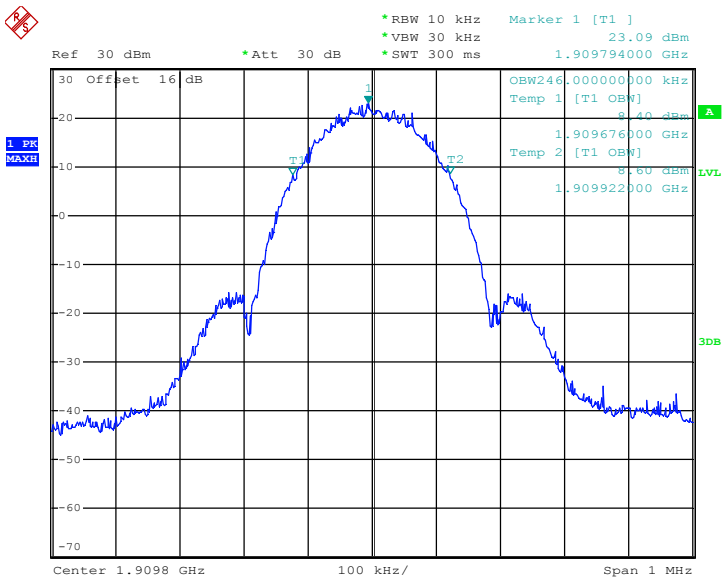
Date: 27.AUG.2015 03:52:33

26dB Bandwidth Plot on Channel 661 (1880.0 MHz)



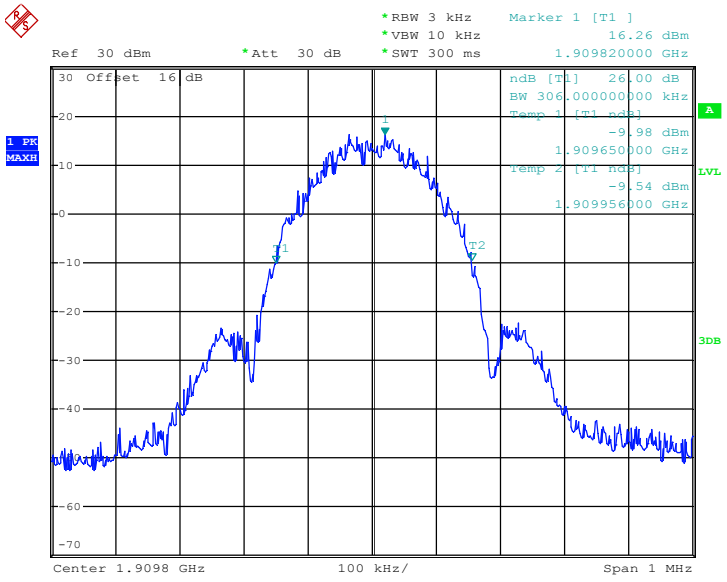
Date: 27.AUG.2015 03:42:20

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



Date: 27.AUG.2015 03:47:25

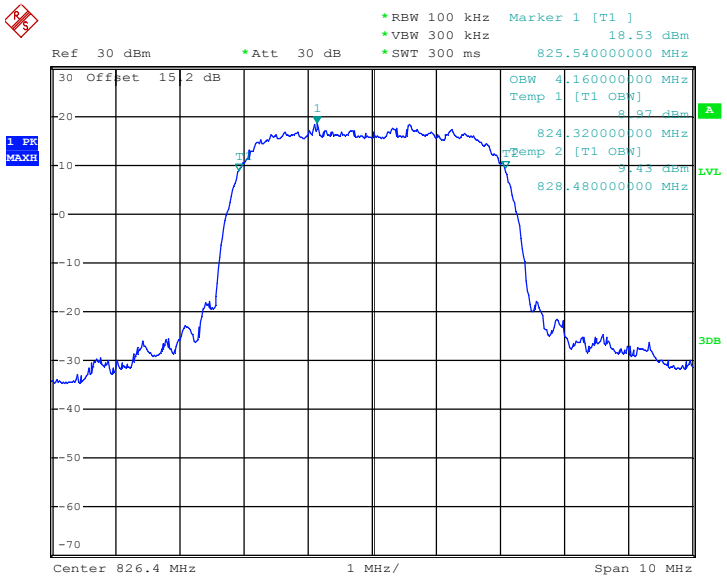
26dB Bandwidth Plot on Channel 810 (1909.8 MHz)



Date: 27.AUG.2015 03:43:07

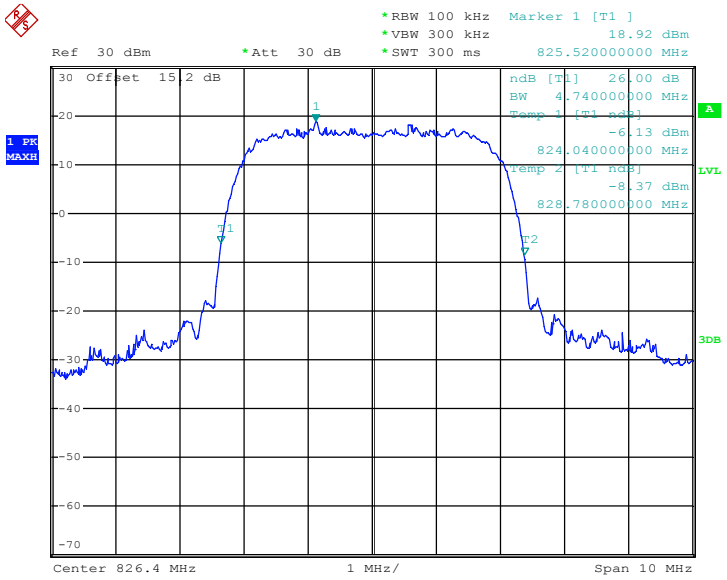
Band :	WCDMA Band V	Test Mode :	RMC 12.2Kbps Link (QPSK)

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



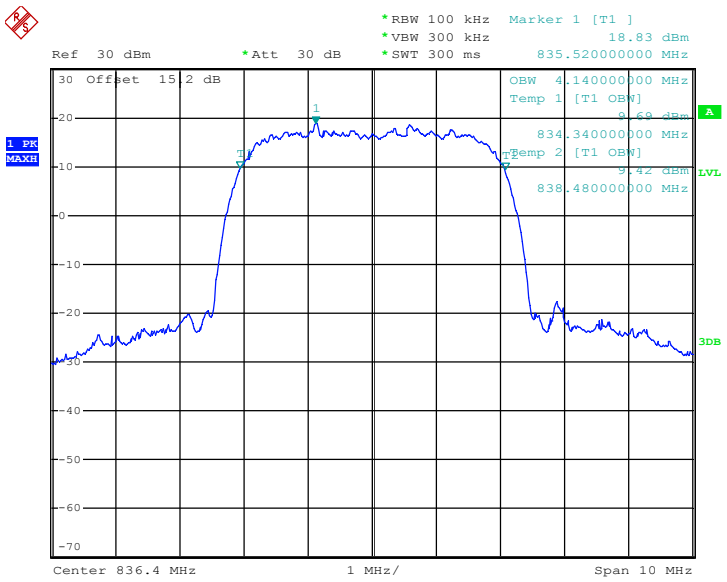
Date: 27.AUG.2015 02:11:55

26dB Bandwidth Plot on Channel 4132 (826.4 MHz)



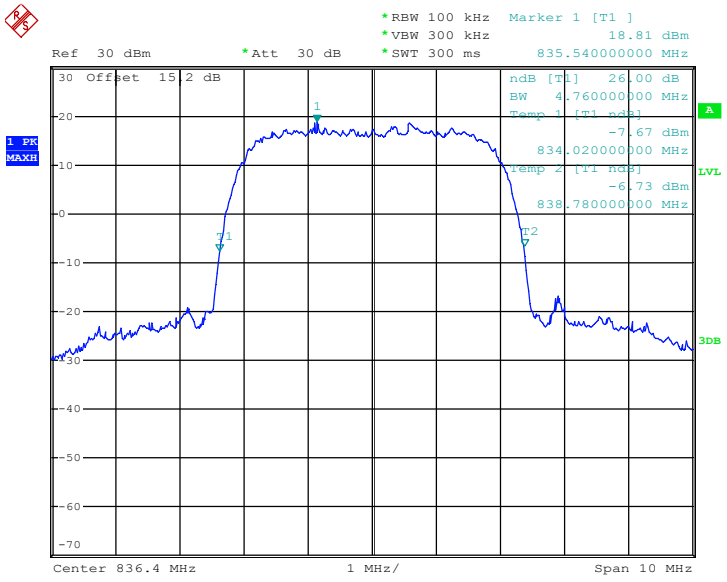
Date: 27.AUG.2015 02:16:57

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



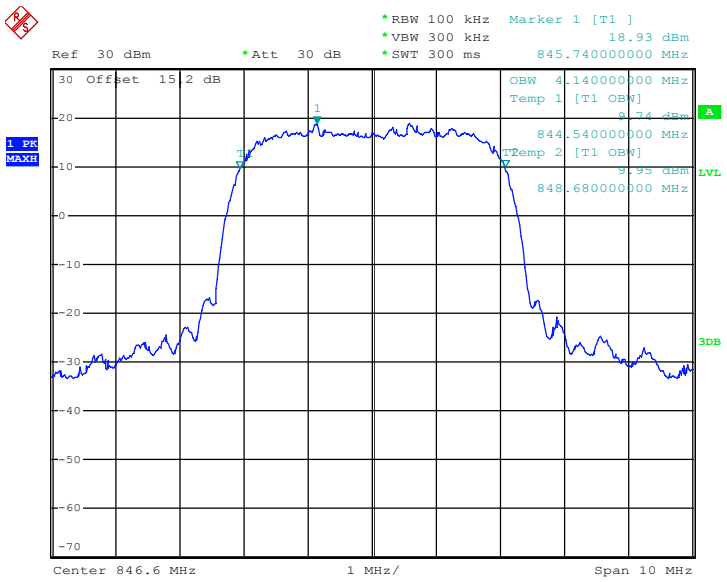
Date: 27.AUG.2015 02:12:56

26dB Bandwidth Plot on Channel 4182 (836.4 MHz)



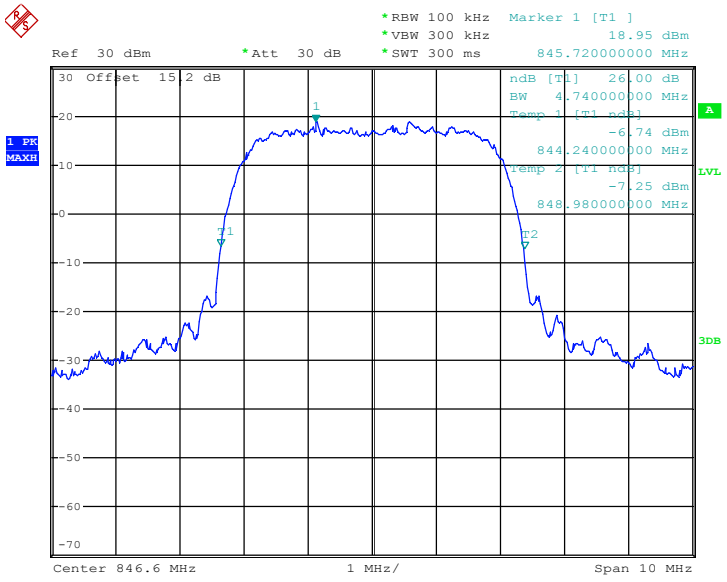
Date: 27.AUG.2015 02:16:13

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



Date: 27.AUG.2015 02:15:03

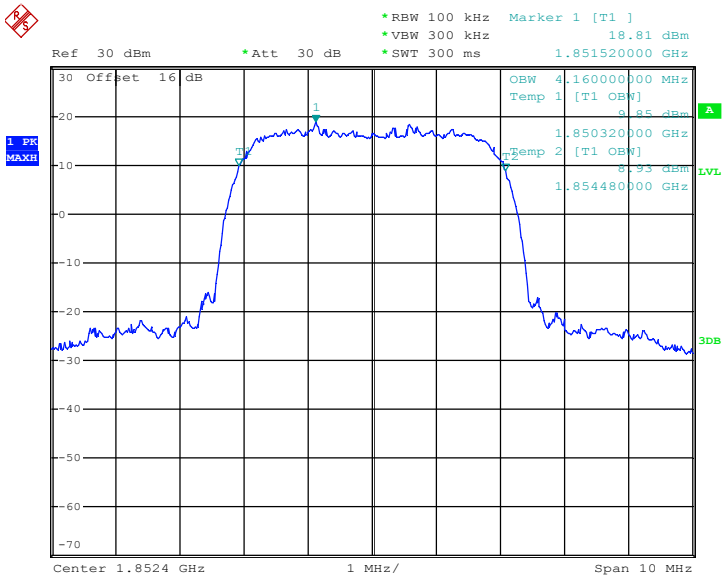
26dB Bandwidth Plot on Channel 4233 (846.6 MHz)



Date: 27.AUG.2015 02:15:32

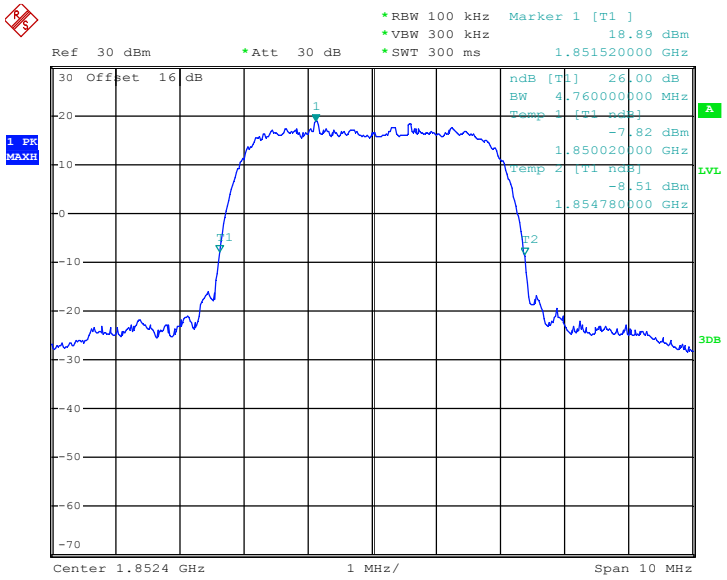
Band :	WCDMA Band II	Test Mode :	RMC 12.2Kbps Link (QPSK)

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



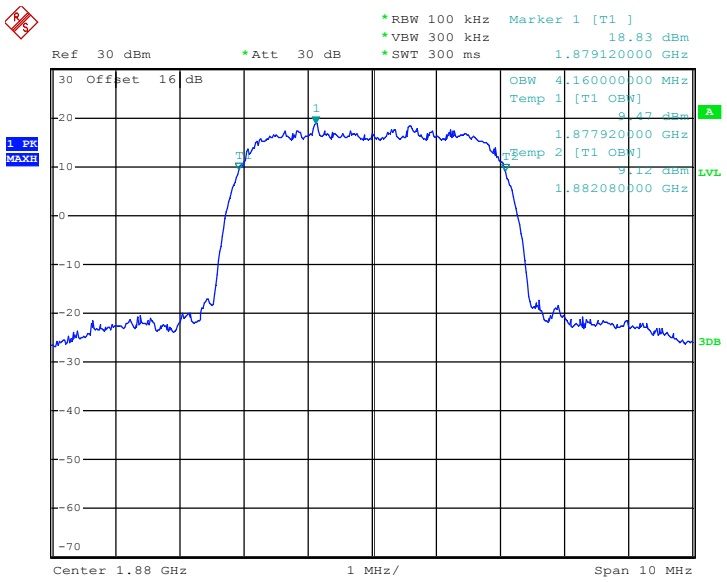
Date: 27.AUG.2015 02:54:03

26dB Bandwidth Plot on Channel 9262 (1852.4 MHz)



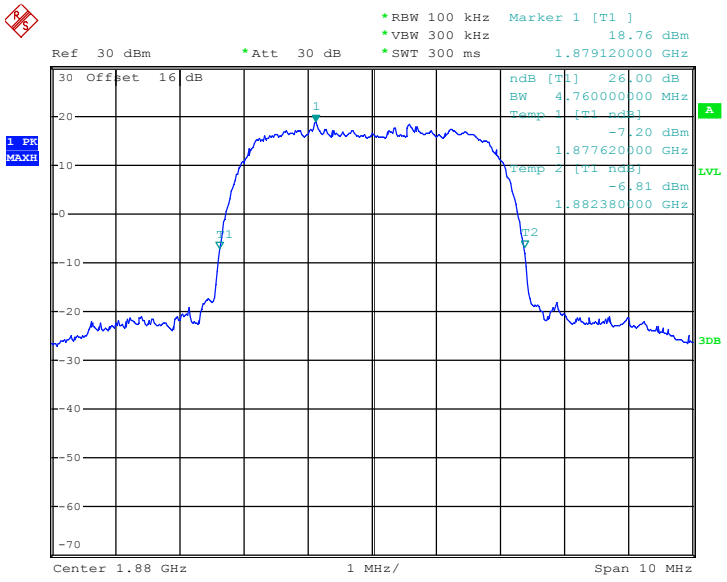
Date: 27.AUG.2015 02:53:30

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



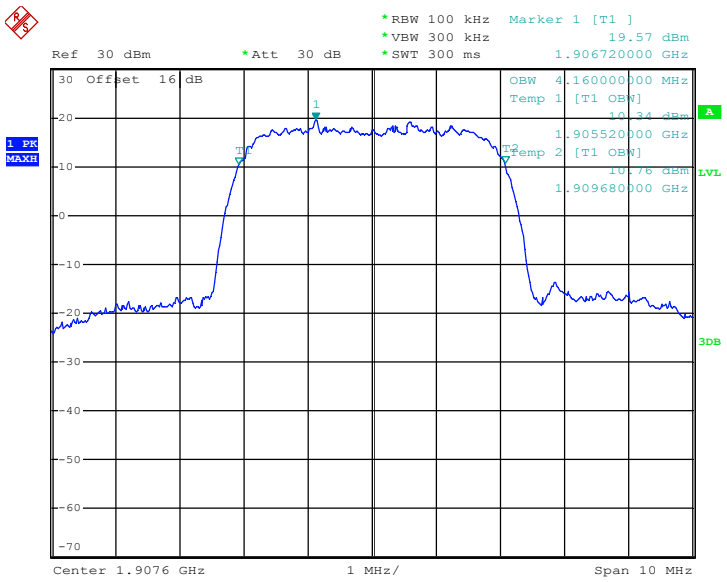
Date: 27.AUG.2015 02:56:03

26dB Bandwidth Plot on Channel 9400 (1880.0 MHz)



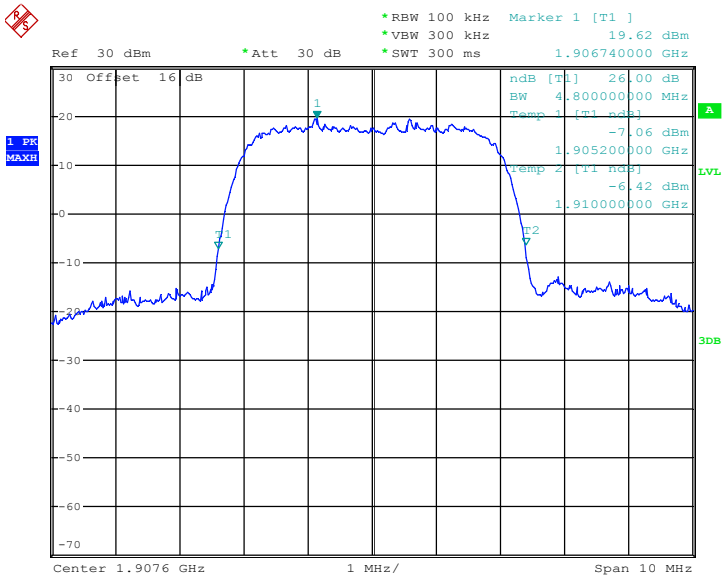
Date: 27.AUG.2015 02:52:54

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



Date: 27.AUG.2015 02:56:47

26dB Bandwidth Plot on Channel 9538 (1907.6 MHz)



Date: 27.AUG.2015 02:52:22

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

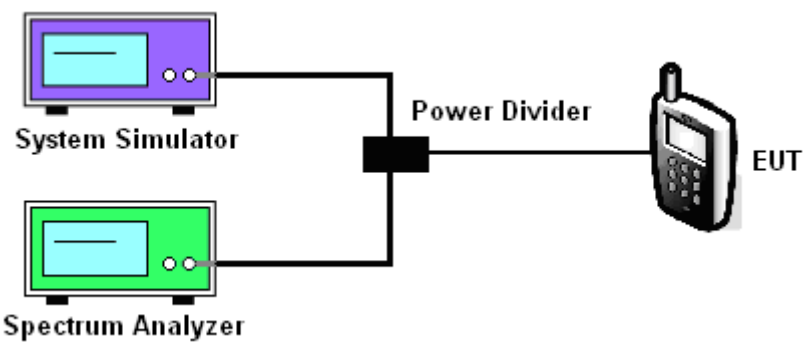
The measuring equipment is listed in the section 4 of this test report.

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 + 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

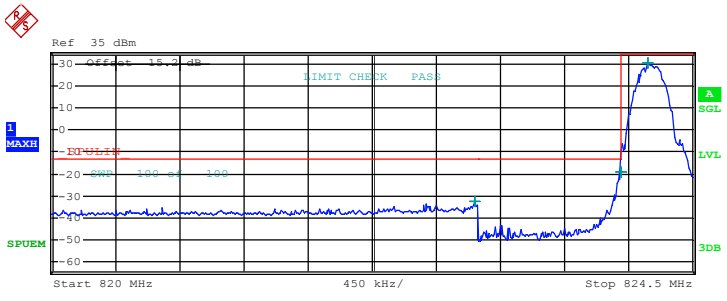
<Conducted Band Edge >



3.5.5 Test Result (Plots) of Conducted Band Edge

Band :	GSM850	Test Mode :	GSM Link (GMSK)

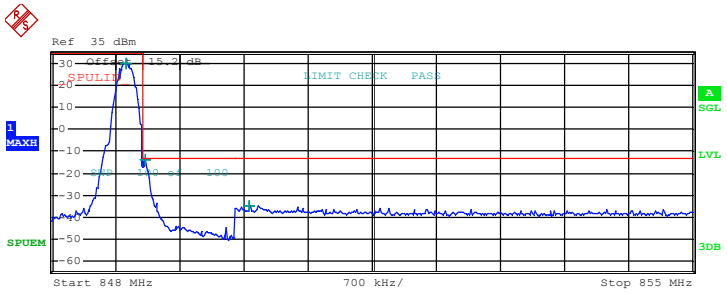
Lower Band Edge Plot on Channel 128 (824.2 MHz)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
820.000 M	823.000 M	100.00 k	822.965500 M	-32.65	-19.65
823.000 M	824.000 M	3.00 k	823.995000 M	-19.04	-6.04
824.000 M	824.500 M	10.00 k	824.188750 M	30.33	-4.67

Date: 27.AUG.2015 01:29:58

Higher Band Edge Plot on Channel 251 (848.8 MHz)

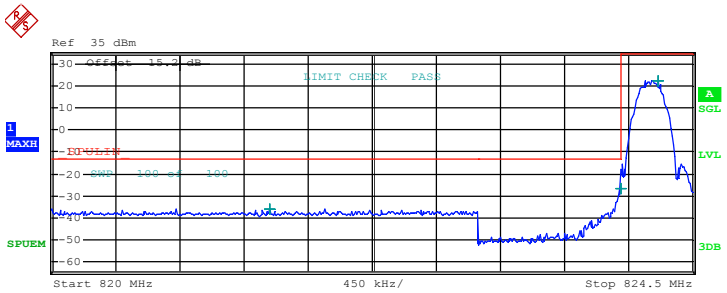


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
848.000 M	849.000 M	10.00 k	848.813000 M	30.21	-4.79
849.000 M	850.000 M	3.00 k	849.023500 M	-13.62	-0.62
850.000 M	855.000 M	100.00 k	850.162500 M	-34.67	-21.67

Date: 27.AUG.2015 01:34:56

Band :	GSM850	Test Mode :	EDGE class 8 Link (8PSK)

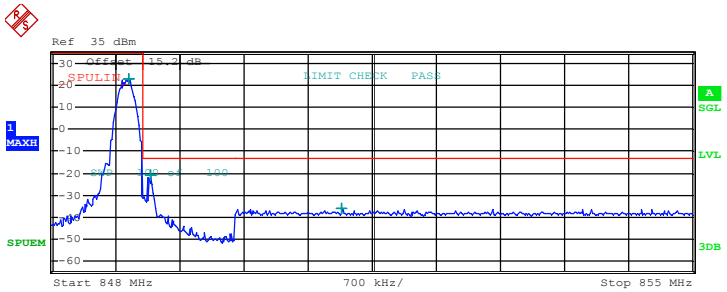
Lower Band Edge Plot on Channel 128 (824.2 MHz)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
820.000 M	823.000 M	100.00 k	821.533000 M	-36.11	-23.11
823.000 M	824.000 M	3.00 k	823.997500 M	-26.89	-13.89
824.000 M	824.500 M	10.00 k	824.253250 M	22.70	-12.30

Date: 27.AUG.2015 01:43:45

Higher Band Edge Plot on Channel 251 (848.8 MHz)

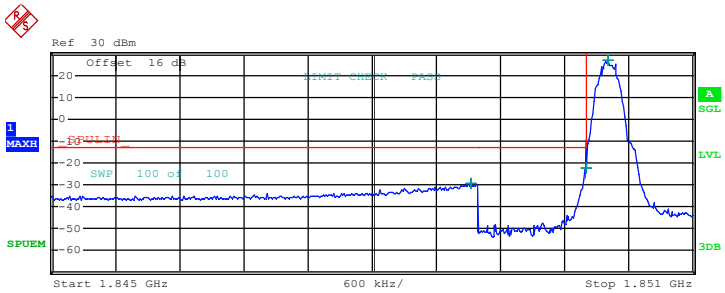


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
848.000 M	849.000 M	10.00 k	848.838000 M	22.99	-12.01
849.000 M	850.000 M	3.00 k	849.077500 M	-20.85	-7.85
850.000 M	855.000 M	100.00 k	851.170000 M	-36.30	-23.30

Date: 27.AUG.2015 01:41:35

Band :	GSM1900	Test Mode :	GSM Link (GMSK)

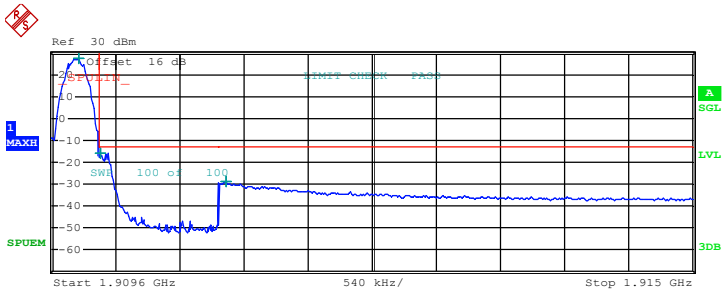
Lower Band Edge Plot on Channel 512 (1850.2 MHz)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
1.845 G	1.849 G	1.00 M	1.848918 G	-29.40	-16.40
1.849 G	1.850 G	3.00 k	1.849999 G	-22.39	-9.39
1.850 G	1.851 G	10.00 k	1.850212 G	26.75	-8.25

Date: 27.AUG.2015 03:28:32

Higher Band Edge Plot on Channel 810 (1909.8 MHz)

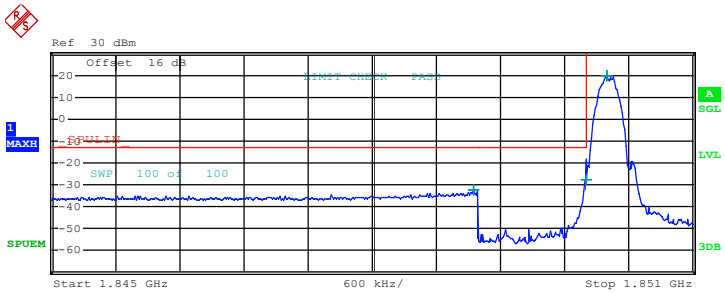


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
1.910 G	1.910 G	10.00 k	1.909824 G	27.41	-7.59
1.910 G	1.911 G	3.00 k	1.910008 G	-15.77	-2.77
1.911 G	1.915 G	1.00 M	1.911068 G	-29.05	-16.05

Date: 27.AUG.2015 03:30:37

Band :	GSM1900	Test Mode :	EDGE class 8 Link (8PSK)

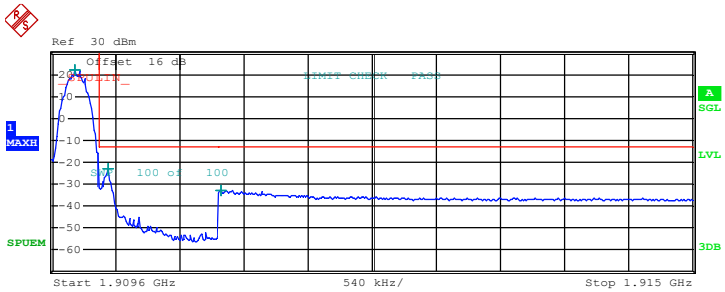
Lower Band Edge Plot on Channel 512 (1850.2 MHz)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
1.845 G	1.849 G	1.00 M	1.848948 G	-32.45	-19.45
1.849 G	1.850 G	3.00 k	1.850000 G	-27.77	-14.77
1.850 G	1.851 G	10.00 k	1.850199 G	19.95	-15.05

Date: 27.AUG.2015 03:38:17

Higher Band Edge Plot on Channel 810 (1909.8 MHz)

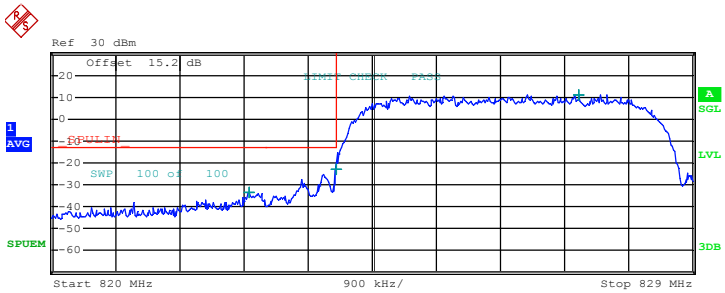


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
1.910 G	1.910 G	10.00 k	1.909798 G	21.91	-13.09
1.910 G	1.911 G	3.00 k	1.910071 G	-22.91	-9.91
1.911 G	1.915 G	1.00 M	1.911024 G	-32.79	-19.79

Date: 27.AUG.2015 03:35:47

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

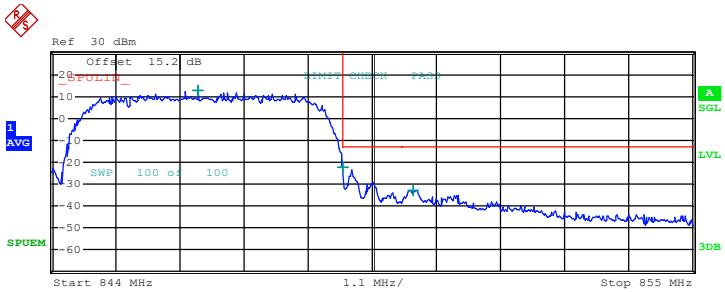
Lower Band Edge Plot on Channel 4132 (826.4 MHz)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
820.000 M	823.000 M	100.00 k	822.775000 M	-33.28	-20.28
823.000 M	824.000 M	50.00 k	823.999500 M	-23.21	-10.21
824.000 M	829.000 M	100.00 k	827.397500 M	10.99	-24.01

Date: 27.AUG.2015 02:24:54

Higher Band Edge Plot on Channel 4233 (846.6 MHz)

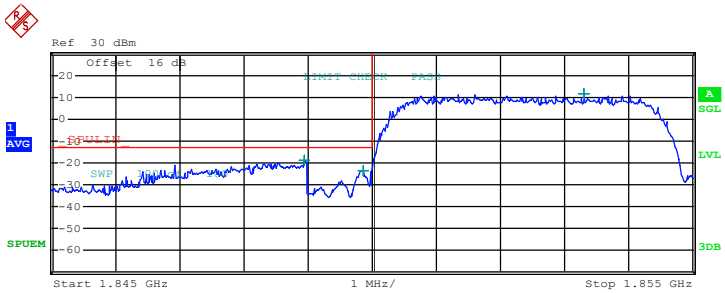


Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
844.000 M	849.000 M	100.00 k	846.510000 M	12.53	-22.47
849.000 M	850.000 M	50.00 k	849.001000 M	-22.37	-9.37
850.000 M	855.000 M	100.00 k	850.207500 M	-32.61	-19.61

Date: 27.AUG.2015 02:26:55

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

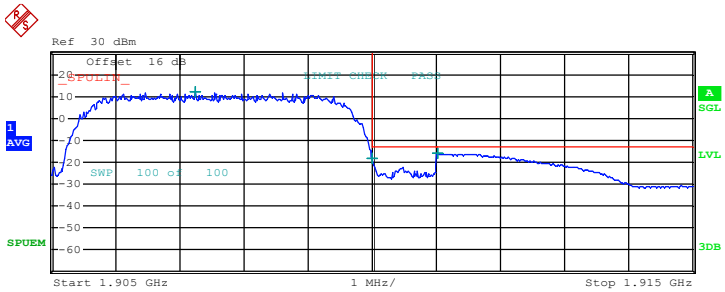
Lower Band Edge Plot on Channel 9262 (1852.4 MHz)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
1.845 G	1.849 G	1.00 M	1.848946 G	-18.93	-5.93
1.849 G	1.850 G	50.00 k	1.849864 G	-23.27	-10.27
1.850 G	1.855 G	100.00 k	1.853308 G	11.44	-23.56

Date: 27.AUG.2015 02:32:31

Higher Band Edge Plot on Channel 9538 (1907.6 MHz)



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	ΔLimit [dB]
1.905 G	1.910 G	100.00 k	1.907230 G	11.91	-23.09
1.910 G	1.911 G	50.00 k	1.910006 G	-18.11	-5.11
1.911 G	1.915 G	1.00 M	1.911018 G	-16.20	-3.20

Date: 27.AUG.2015 02:35:58

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.

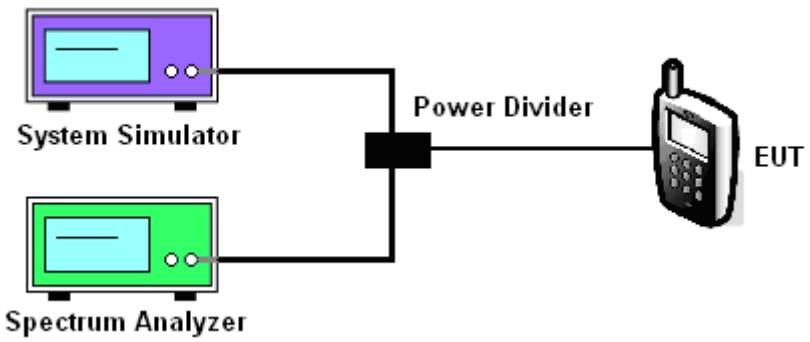
3.6.2 Measuring Instruments

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 + 10log(P) dB below the transmitter power P(Watts)
   = P(W) - [43 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
   = -13dBm.

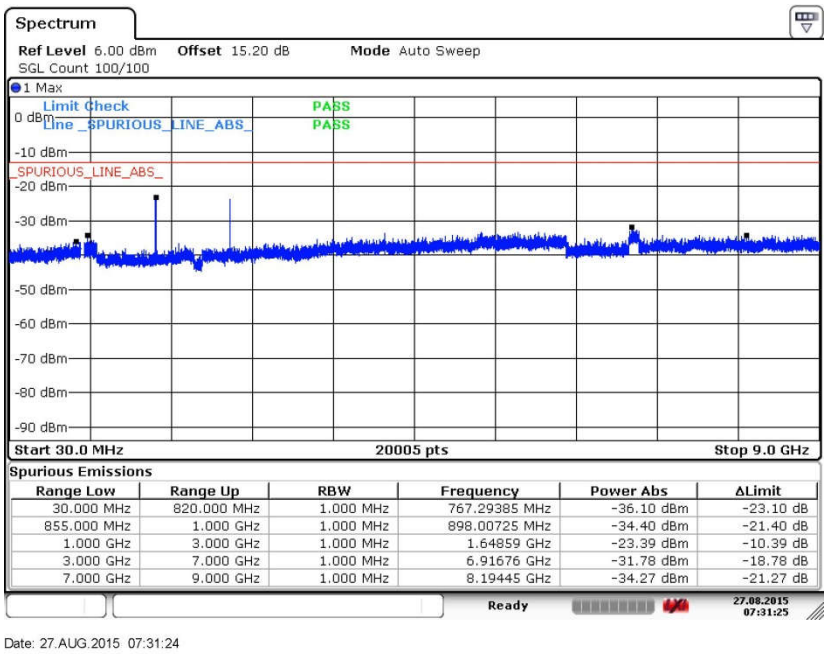
3.6.4 Test Setup



3.6.5 Test Result (Plots) of Conducted Spurious Emission

Band :	GSM850	Channel :	CH128
Test Mode :	GSM Link (GMSK)	Frequency :	824.2 MHz

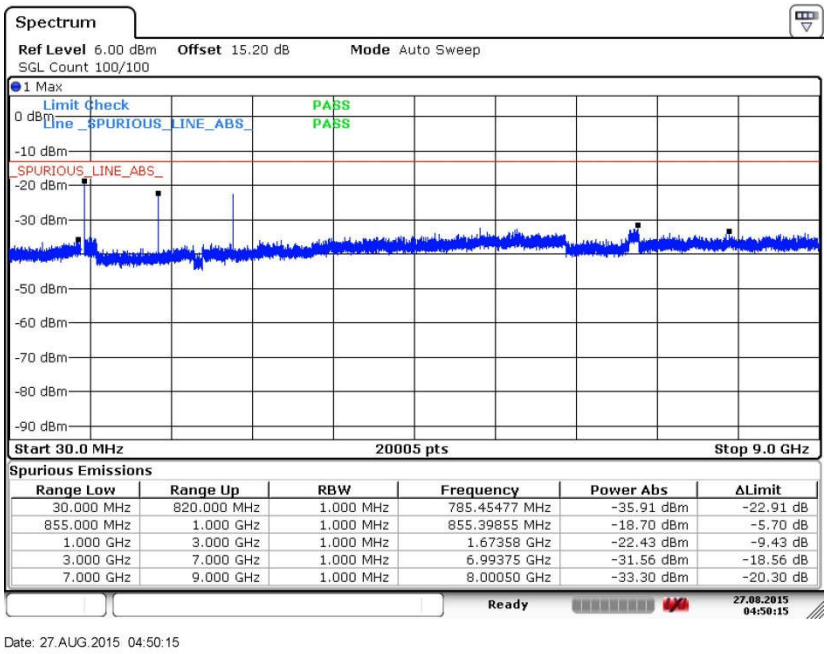
Conducted Spurious Emission Plot between 30MHz ~ 9GHz



Date: 27.AUG.2015 07:31:24

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

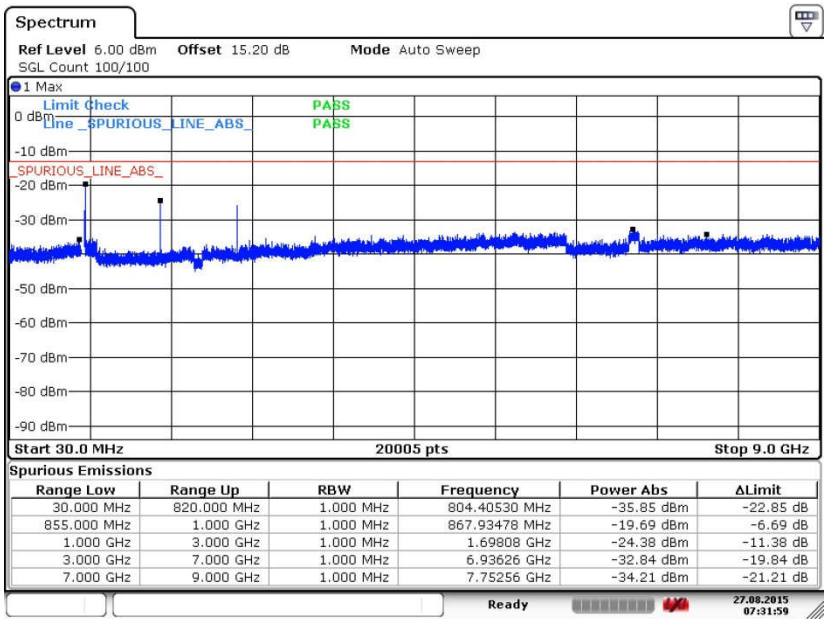
Conducted Spurious Emission Plot between 30MHz ~ 9GHz



Date: 27.AUG.2015 04:50:15

Band :	GSM850	Channel :	CH 251
Test Mode :	GSM Link (GMSK)	Frequency :	848.8 MHz

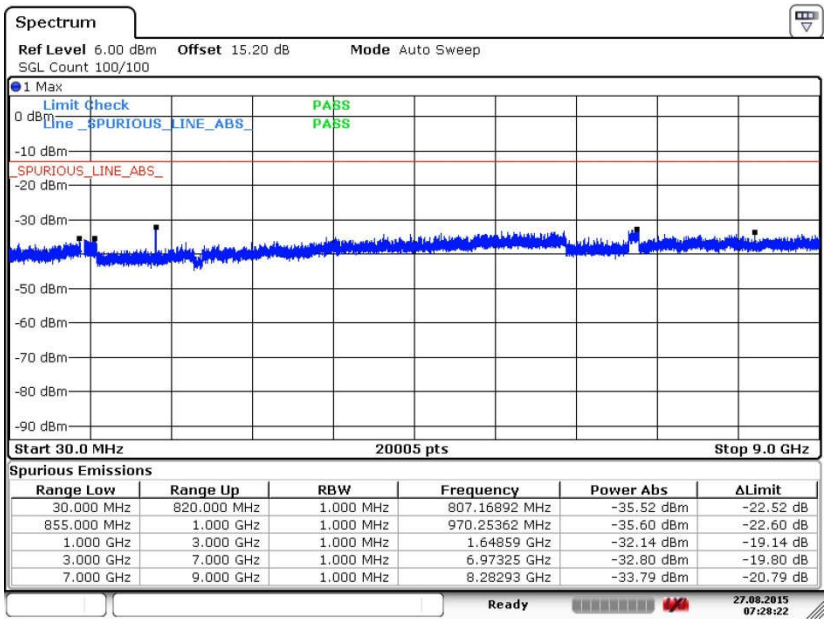
Conducted Spurious Emission Plot between 30MHz ~ 9GHz



Date: 27.AUG.2015 07:31:59

Band :	GSM850	Channel :	CH128
Test Mode :	EDGE class 8 Link (8PSK)	Frequency :	824.2 MHz

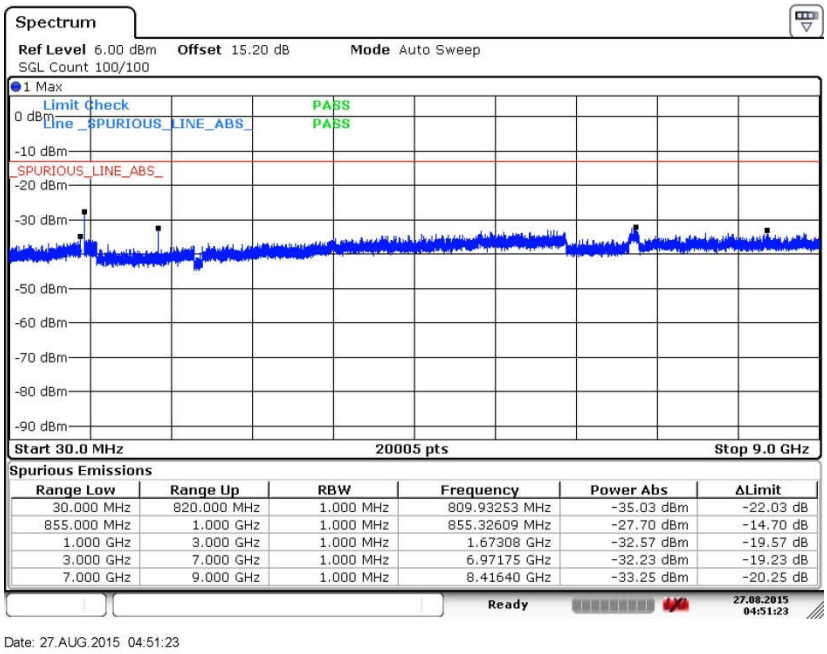
Conducted Spurious Emission Plot between 30MHz ~ 9GHz



Date: 27.AUG.2015 07:28:23

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

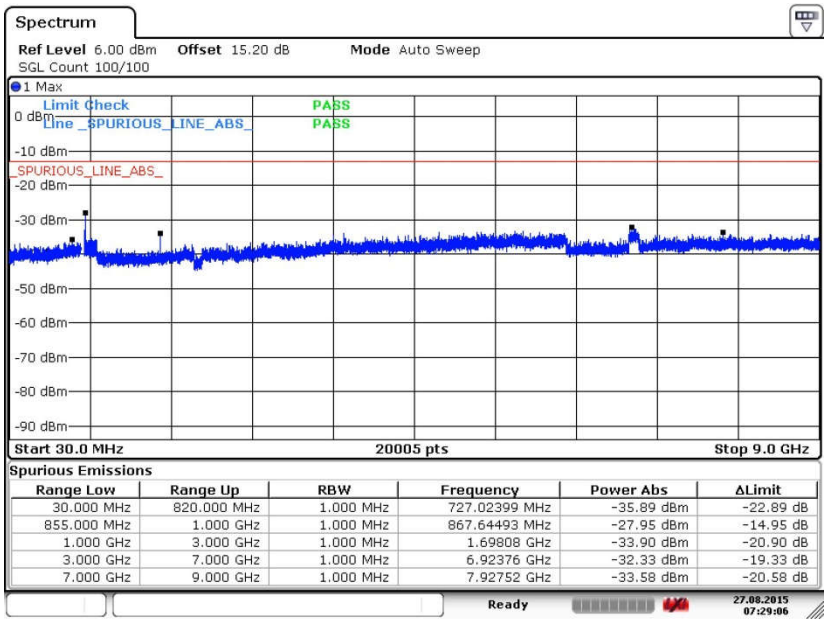
Conducted Spurious Emission Plot between 30MHz ~ 9GHz



Date: 27.AUG.2015 04:51:23

Band :	GSM850	Channel :	CH251
Test Mode :	EDGE class 8 Link (8PSK)	Frequency :	848.8 MHz

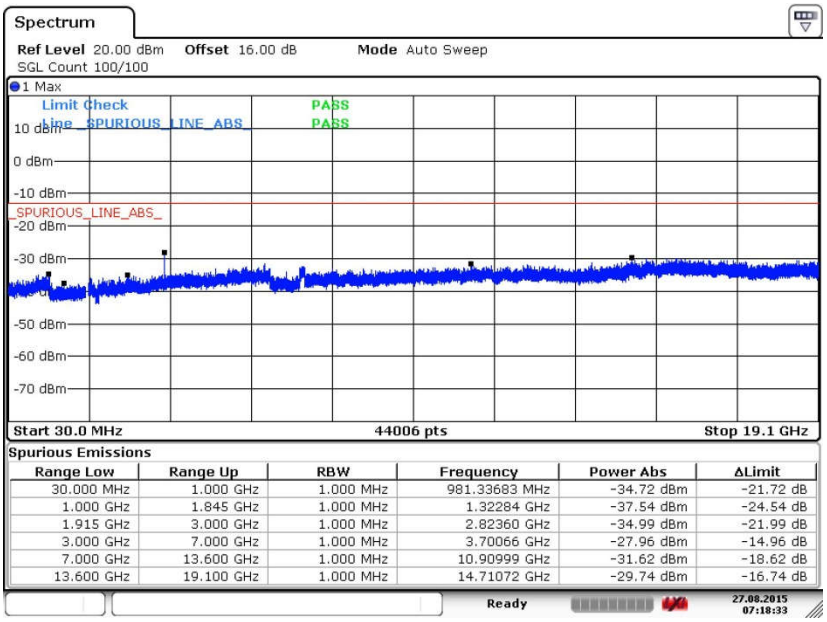
Conducted Spurious Emission Plot between 30MHz ~ 9GHz



Date: 27.AUG.2015 07:29:06

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

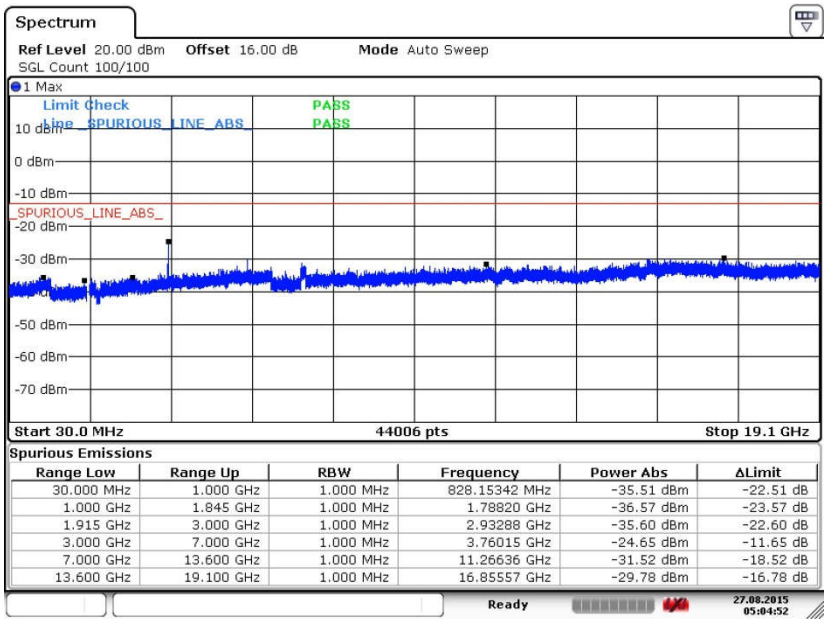
Conducted Spurious Emission Plot between 30MHz ~ 19.1GHz



Date: 27.AUG.2015 07:18:32

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

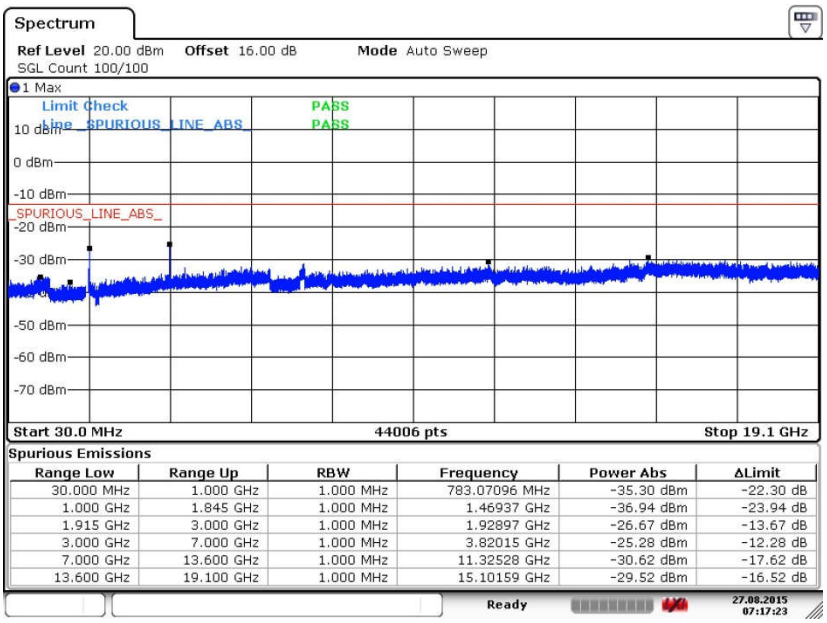
Conducted Spurious Emission Plot between 30MHz ~ 19.1GHz



Date: 27.AUG.2015 05:04:52

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

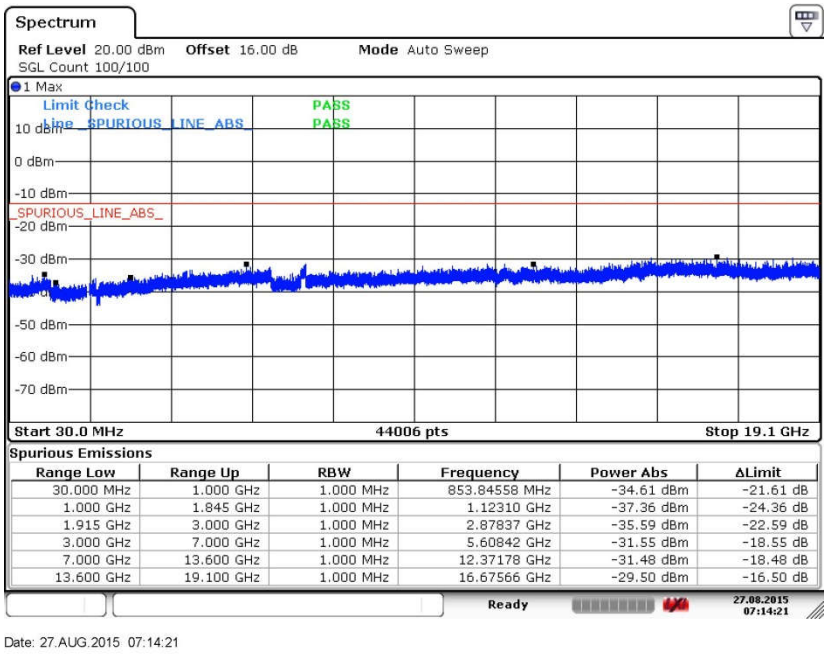
Conducted Spurious Emission Plot between 30MHz ~ 19.1GHz



Date: 27.AUG.2015 07:17:23

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

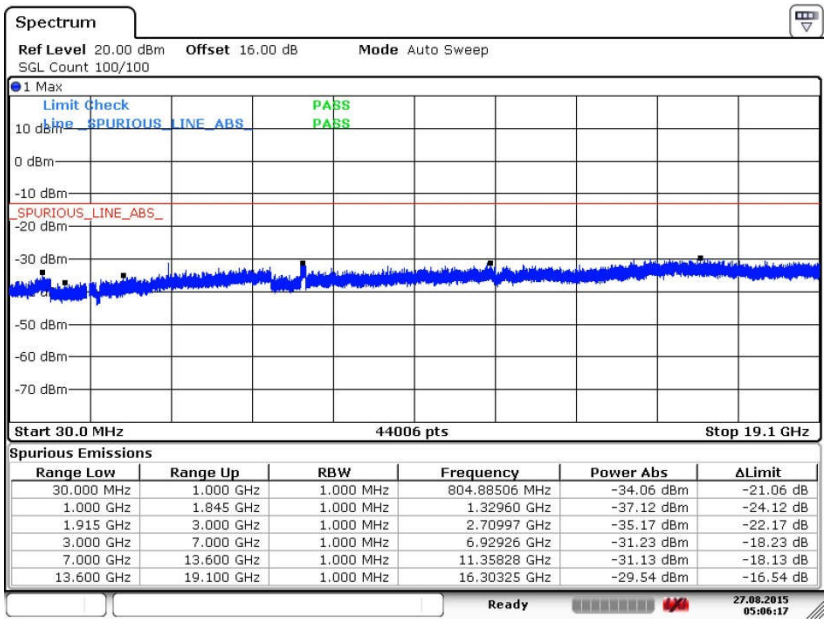
Conducted Spurious Emission Plot between 30MHz ~ 19.1GHz



Date: 27.AUG.2015 07:14:21

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

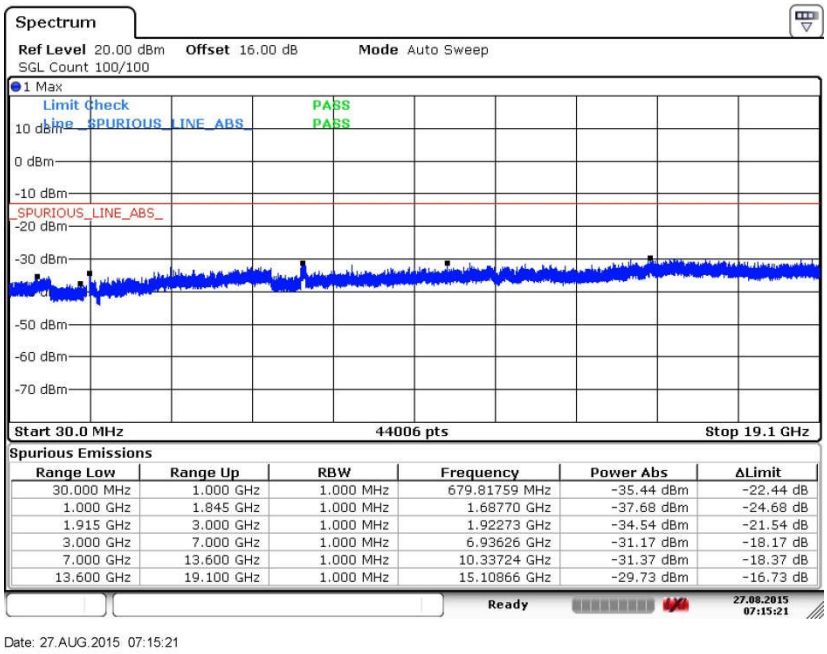
Conducted Spurious Emission Plot between 30MHz ~ 19.1GHz



Date: 27.AUG.2015 05:06:17

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

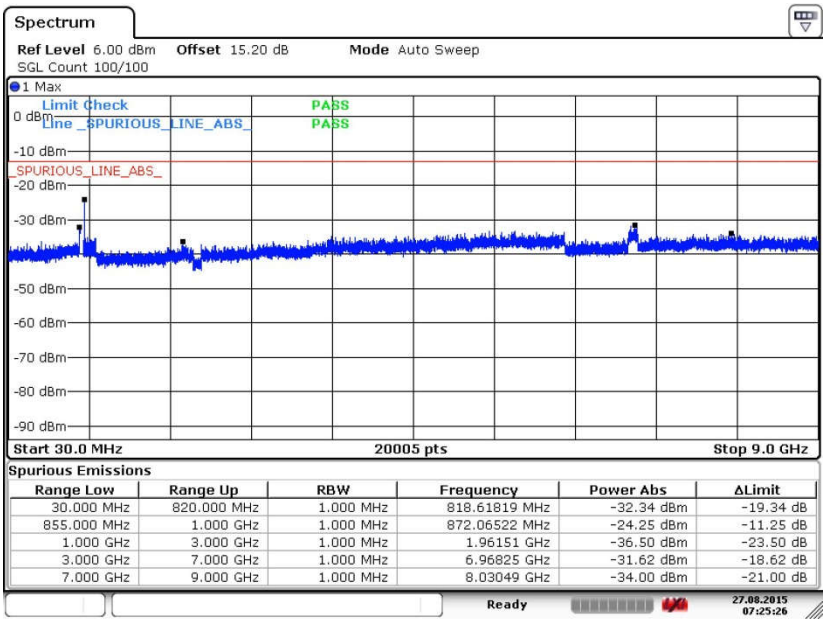
Conducted Spurious Emission Plot between 30MHz ~ 19.1GHz



Date: 27.AUG.2015 07:15:21

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

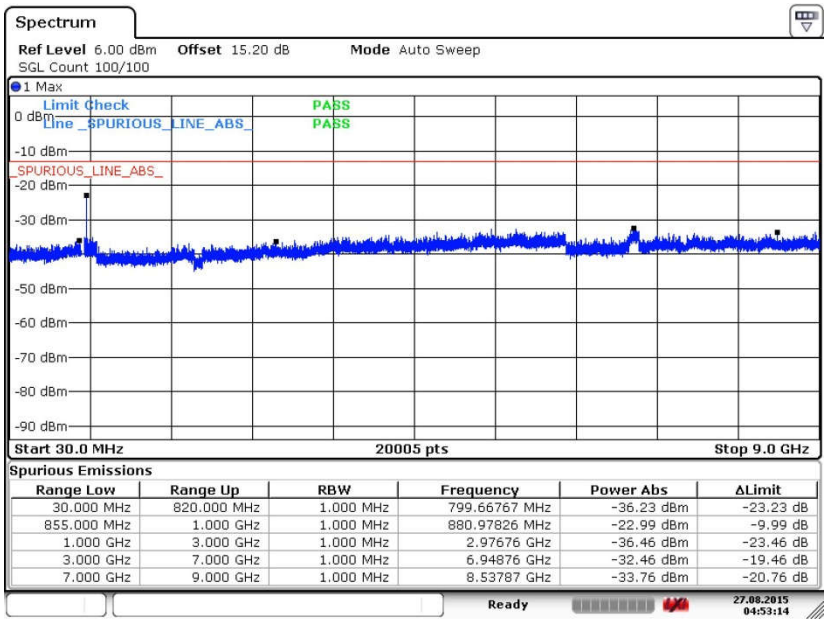
Conducted Spurious Emission Plot between 30MHz ~ 9GHz



Date: 27.AUG.2015 07:25:25

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

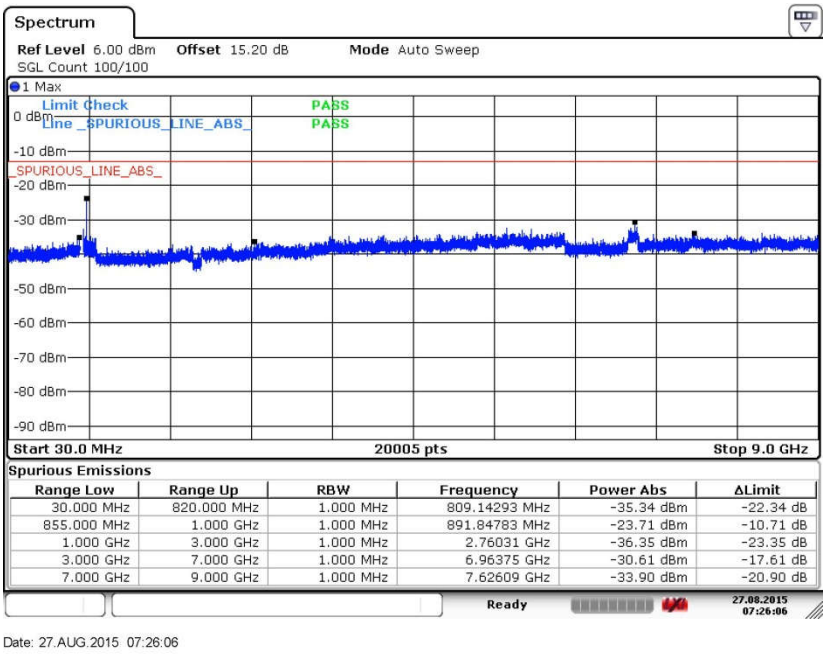
Conducted Spurious Emission Plot between 30MHz ~ 9GHz



Date: 27.AUG.2015 04:53:14

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

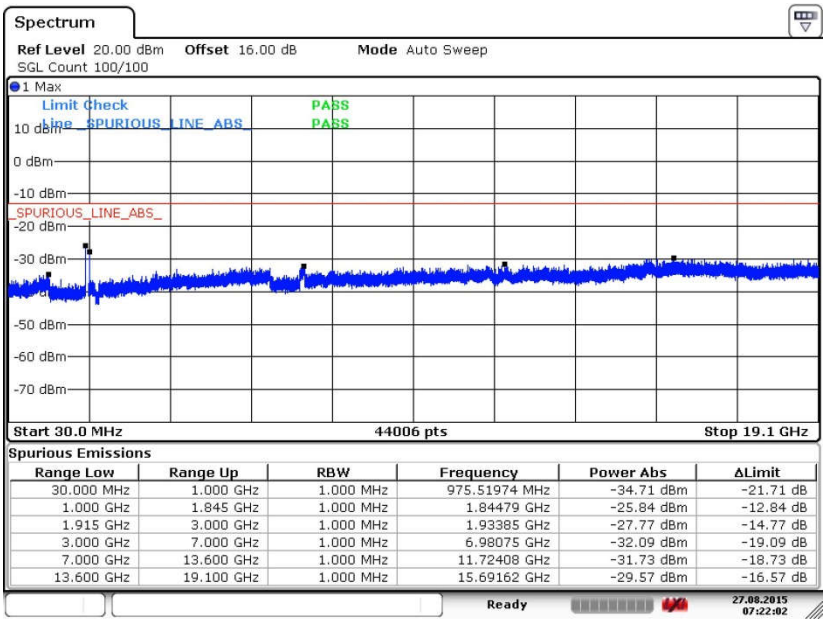
Conducted Spurious Emission Plot between 30MHz ~ 9GHz



Date: 27.AUG.2015 07:26:06

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

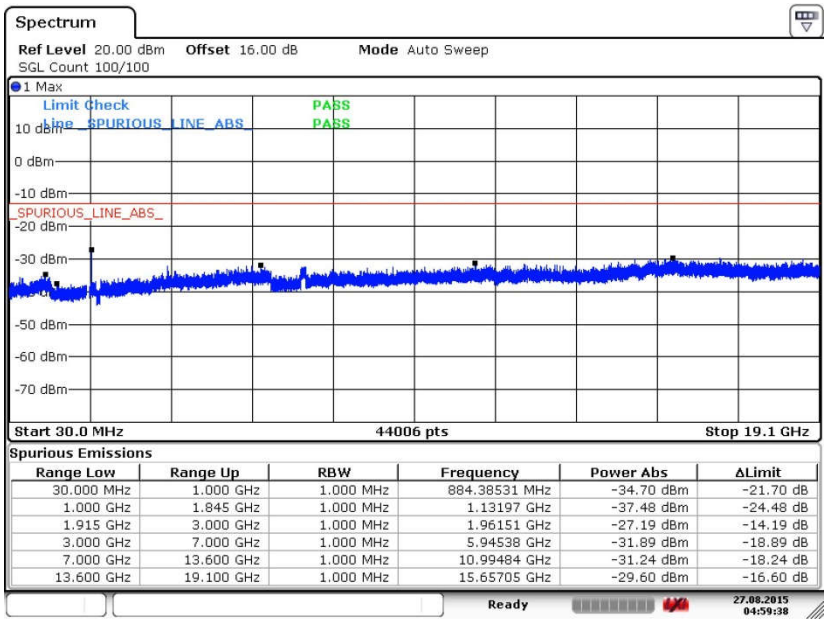
Conducted Spurious Emission Plot between 30MHz ~ 19.1GHz



Date: 27.AUG.2015 07:22:01

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

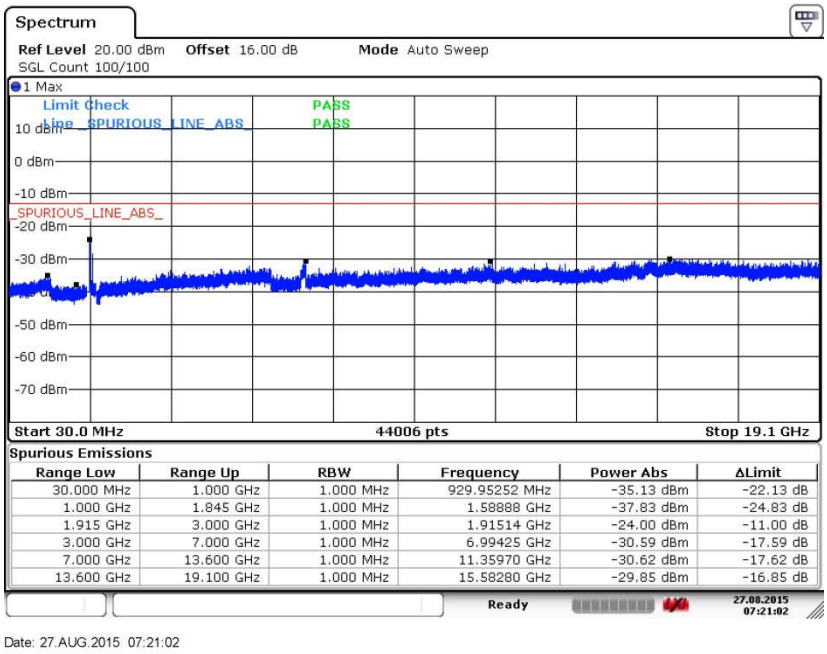
Conducted Spurious Emission Plot between 30MHz ~ 19.1GHz



Date: 27.AUG.2015 04:59:38

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

Conducted Spurious Emission Plot between 30MHz ~ 19.1GHz



Date: 27.AUG.2015 07:21:02

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-D-2010 Section 2.2.12.
2. The EUT was placed on a rotatable wooden table 0.8 meters for frequency below 1GHz and 1.5 meter for frequency above 1GHz 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 (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
12. ERP (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 + 10log(P) dB below the transmitter power P(Watts)

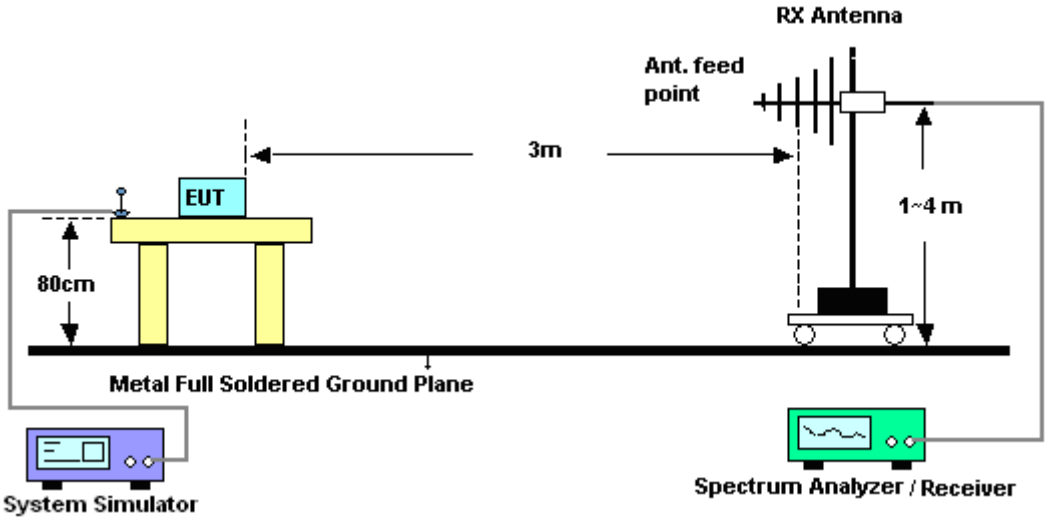
    = P(W) - [43 + 10log(P)] (dB)

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

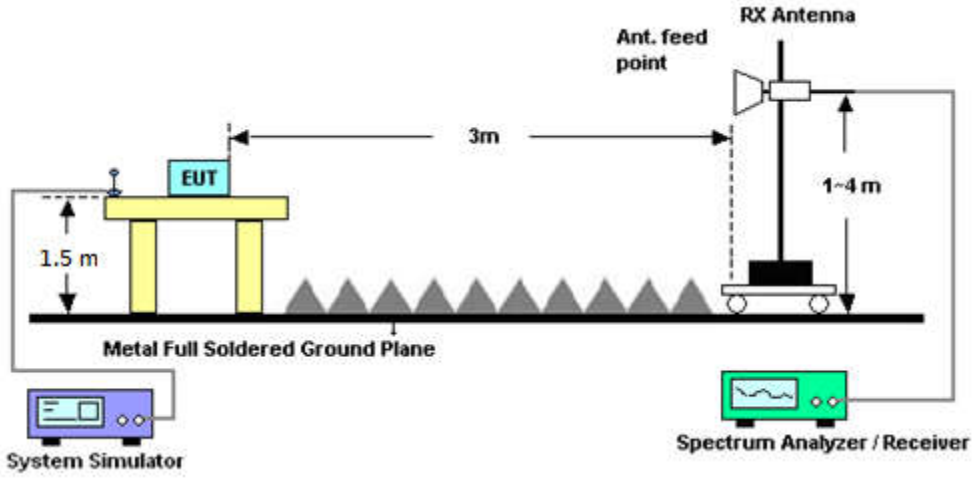
    = -13dBm.

3.7.4 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 :	21~22°C
Test Mode :	GSM Link (GMSK)	Relative Humidity :	41~42%
Test Engineer :	Carl Ni	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

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	-55.14	-13	-42.14	-54.27	-56.96	1.23	5.20	H	Pass
2512	-45.01	-13	-32.01	-56.39	-47.24	1.52	5.90	H	Pass
3345	-59.33	-13	-46.33	-66.89	-62.11	1.77	6.70	H	Pass

Band :	GSM850	Temperature :	21~22°C
Test Mode :	GSM Link (GMSK)	Relative Humidity :	41~42%
Test Engineer :	Carl Ni	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

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	-60.95	-13	-47.95	-58.90	-62.77	1.23	5.20	V	Pass
2509	-51.95	-13	-38.95	-63.38	-54.18	1.52	5.90	V	Pass
3345	-55.60	-13	-42.60	-66.70	-58.38	1.77	6.70	V	Pass

Band :	GSM850	Temperature :	21~22°C
Test Mode :	EDGE class 8 Link (8PSK)	Relative Humidity :	41~42%
Test Engineer :	Carl Ni	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

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	-61.21	-13	-48.21	-59.41	-63.03	1.23	5.20	H	Pass
2509	-58.42	-13	-45.42	-63.27	-60.65	1.52	5.90	H	Pass
3345	-59.72	-13	-46.72	-67.28	-62.50	1.77	6.70	H	Pass

Band :	GSM850	Temperature :	21~22°C
Test Mode :	EDGE class 8 Link (8PSK)	Relative Humidity :	41~42%
Test Engineer :	Carl Ni	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

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	-61.67	-13	-48.67	-59.62	-63.49	1.23	5.20	V	Pass
2509	-53.09	-13	-40.09	-64.35	-55.32	1.52	5.90	V	Pass
3344	-55.50	-13	-42.50	-66.60	-58.28	1.77	6.70	V	Pass

Band :	GSM1900	Temperature :	21~22°C
Test Mode :	GSM Link (GMSK)	Relative Humidity :	41~42%
Test Engineer :	Carl Ni	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

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
3762	-57.08	-13	-44.08	-66.09	-61.94	1.931	6.80	H	Pass
5640	-54.54	-13	-41.54	-62.46	-61.84	2.398	9.70	H	Pass
7520	-54.18	-13	-41.18	-64.55	-63.23	2.76	11.81	H	Pass

Band :	GSM1900	Temperature :	21~22°C
Test Mode :	GSM Link (GMSK)	Relative Humidity :	41~42%
Test Engineer :	Carl Ni	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

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
3762	-56.46	-13	-43.46	-65.77	-61.33	1.931	6.80	V	Pass
5640	-53.44	-13	-40.44	-61.39	-60.74	2.398	9.70	V	Pass
7520	-51.67	-13	-38.67	-64.16	-60.72	2.76	11.81	V	Pass

Band :	GSM1900	Temperature :	21~22°C
Test Mode :	EDGE class 8 Link (8PSK)	Relative Humidity :	41~42%
Test Engineer :	Carl Ni	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

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
3762	-56.61	-13	-43.61	-65.62	-61.47	1.931	6.80	H	Pass
5640	-55.37	-13	-42.37	-63.29	-62.67	2.398	9.70	H	Pass
7520	-53.64	-13	-40.64	-64.01	-62.69	2.76	11.81	H	Pass

Band :	GSM1900	Temperature :	21~22°C
Test Mode :	EDGE class 8 Link (8PSK)	Relative Humidity :	41~42%
Test Engineer :	Carl Ni	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

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
3762	-56.51	-13	-43.51	-65.82	-61.38	1.931	6.80	V	Pass
5640	-55.26	-13	-42.26	-63.21	-62.56	2.398	9.70	V	Pass
7520	-51.61	-13	-38.61	-64.1	-60.66	2.76	11.81	V	Pass

Band :	WCDMA Band V	Temperature :	21~22°C
Test Mode :	RMC 12.2Kbps Link (QPSK)	Relative Humidity :	41~42%
Test Engineer :	Carl Ni	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

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	-59.71	-13	-46.71	-57.91	-61.53	1.23	5.20	H	Pass
2509	-59.39	-13	-46.39	-64.24	-61.62	1.52	5.90	H	Pass
3344	-59.54	-13	-46.54	-67.10	-62.32	1.77	6.70	H	Pass

Band :	WCDMA Band V	Temperature :	21~22°C
Test Mode :	RMC 12.2Kbps Link (QPSK)	Relative Humidity :	41~42%
Test Engineer :	Carl Ni	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

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	-61.45	-13	-48.45	-59.40	-63.27	1.23	5.20	V	Pass
2509	-54.61	-13	-41.61	-64.72	-56.84	1.52	5.90	V	Pass
3345	-55.01	-13	-42.01	-66.11	-57.79	1.77	6.70	V	Pass

Band :	WCDMA Band II	Temperature :	21~22°C
Test Mode :	RMC 12.2Kbps Link (QPSK)	Relative Humidity :	41~42%
Test Engineer :	Carl Ni	Polarization :	Horizontal
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

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
3762	-55.92	-13	-42.92	-64.93	-60.78	1.931	6.80	H	Pass
5640	-55.65	-13	-42.65	-63.57	-62.95	2.398	9.70	H	Pass
7520	-53.93	-13	-40.93	-64.30	-62.98	2.76	11.81	H	Pass

Band :	WCDMA Band II	Temperature :	21~22°C
Test Mode :	RMC 12.2Kbps Link (QPSK)	Relative Humidity :	41~42%
Test Engineer :	Carl Ni	Polarization :	Vertical
Remark :	Spurious emissions within 30-1000MHz were found more than 20dB below limit line.		

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
3762	-56.53	-13	-43.53	-65.84	-61.40	1.931	6.80	V	Pass
5640	-55.17	-13	-42.17	-63.12	-62.47	2.398	9.70	V	Pass
7520	-51.85	-13	-38.85	-64.34	-60.90	2.76	11.81	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

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

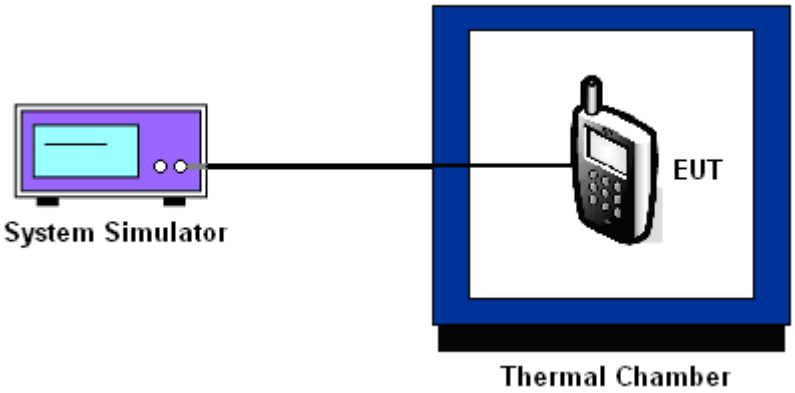
3.8.3 Test Procedures for Temperature Variation

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±5° 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	0.0155	0.0155	PASS
40	0.0096	0.0371	
30	0.0466	0.0120	
20(Ref.)	0.0000	0.0000	
10	0.0454	0.0466	
0	0.0012	0.0418	
-10	0.0442	0.0024	
-20	0.0036	0.0036	
-30	0.0347	0.0430	

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	0.0053	0.0064	PASS
40	0.0032	0.0218	
30	0.0234	0.0197	
20(Ref.)	0.0000	0.0000	
10	0.0207	0.0186	
0	0.0043	0.0005	
-10	0.0202	0.0207	
-20	0.0021	0.0011	
-30	0.0218	0.0176	

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	0.0108	PASS
40	0.0442	
30	0.0072	
20(Ref.)	0.0000	
10	0.0466	
0	0.0024	
-10	0.0395	
-20	0.0430	
-30	0.0060	

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	0.0021	
30	0.0223	
20(Ref.)	0.0000	
10	0.0197	
0	0.0011	
-10	0.0021	
-20	0.0186	
-30	0.0181	

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	4.2	0.0024	2.5	PASS
		3.8	0.0048		
		BEP	0.0371		
	EDGE class 8	4.2	0.0012		
		3.8	0.0407		
		BEP	0.0072		
GSM 1900 CH661	GSM	4.2	0.0016	(Note 3.)	
		3.8	0.0027		
		BEP	0.0160		
	EDGE class 8	4.2	0.0027		
		3.8	0.0181		
		BEP	0.0053		
WCDMA Band V CH4182	RMC 12.2Kbps	4.2	0.0012	2.5	
		3.8	0.0418		
		BEP	0.0084		
WCDMA Band II CH9400	RMC 12.2Kbps	4.2	0.0005	(Note 3.)	
		3.8	0.0191		
		BEP	0.0037		

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	Aug. 27,2015~ Sep. 09,2015	Oct. 27, 2015	Conducted (TH01-KS)
Spectrum Analyzer	R&S	FSV30	100845	9kHz~30GHz	Oct. 28, 2014	Aug. 27,2015~ Sep. 09,2015	Oct. 27, 2015	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Oct. 25, 2014	Aug. 27,2015~ Sep. 09,2015	Oct. 24, 2015	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Sep. 10, 2015	Jul. 19, 2016	Sep. 09, 2016	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY5515020	10Hz~44GHz; Max 30dB	Apr. 22, 2016	Jul. 19, 2016	Apr. 21, 2017	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6112D	37879	30MHz~2GHz	Sep. 12, 2015	Jul. 19, 2016	Sep. 11, 2016	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 07, 2015	Jul. 19, 2016	Nov. 06, 2016	Radiation (03CH02-KS)
SHF-EHF Horn	com-power	AH-840	101070	18GHz~40GHz	Oct. 10, 2015	Jul. 19, 2016	Oct. 09, 2016	Radiation (03CH02-KS)
Amplifier	com-power	PA-103A	161069	1kHz~1000MHz / 32 dB	Apr. 22, 2016	Jul. 19, 2016	Apr. 21, 2017	Radiation (03CH02-KS)
High Gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	1865802	1GHz~18GHz	Jan. 20, 2016	Jul. 19, 2016	Jan. 19, 2017	Radiation (03CH02-KS)
Amplifier	Agilent	8449B	3008A02384	1~26.5GHz Gain 30dB	Oct. 24, 2015	Jul. 19, 2016	Oct. 23, 2016	Radiation (03CH02-KS)
Amplifier	MITEQ	TTA1840-35-HG	1887435	18GHz~40GHz	Jan. 20, 2016	Jul. 19, 2016	Jan. 19, 2017	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	6160100024 73	N/A	NCR	Jul. 19, 2016	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Jul. 19, 2016	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Jul. 19, 2016	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 = 2Uc(y))	**5.1dB**

Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.5dB**

Uncertainty of Radiated Emission Measurement (18GHz ~ 40GHz)

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

Appendix B. Photographs of EUT

Please refer to Sporton report number EP570906-04 which is issued separately.