Full

TEST REPORT

No. I16D00097-RFA

For

Client : Haier Telecom (Qingdao)Co.,Ltd

Production : GSM/WCDMA/LTE handset

Model Name : L30

FCC ID: SG7201605L30

Hardware Version: V1.01

Software Version: L30-H02-S021-Tigo

Issued date: 2016-06-15

Test Laboratory:

ECIT Shanghai, East China Institute of Telecommunications

Add: 7-8F, G Area, No.668, Beijing East Road, Huangpu District, Shanghai, P. R. China

Tel: (+86)-021-63843300, E-Mail: welcome@ecit.org.cn

Revision Version

Report Number	Revision	Date	Memo
I16D00097-RFA	00	2016-06-15	Initial creation of test report

CONTENTS

1. Test Laboratory

1.1. Testing Location

Company Name:	ECIT Shanghai, East China Institute of Telecommunications
Address:	7-8F, G Area, No. 668, Beijing East Road, Huangpu District, Shanghai, P. R. China
Postal Code:	200001
Telephone:	(+86)-021-63843300
Fax:	(+86)-021-63843301
FCC Registration NO.:	489729

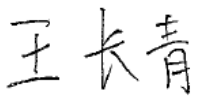
1.2. Testing Environment

Normal Temperature:	15-35℃
Extreme Temperature:	-10/+55℃
Relative Humidity:	30-60%

1.3. Project data

Project Leader:	Xu Yuting
Testing Start Date:	2016-05-28
Testing End Date:	2016-06-14

1.4. Signature



Wang Changqing
(Prepared this test report)

Liu Jianquan
(Reviewed this test report)

Zheng Zhongbin
Director of the laboratory
(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	Haier Telecom (Qingdao)Co.,Ltd
Address:	No1,Haier Road,Hi-tech Zone,Qingdao, China
Telephone:	0532-88937273
Postcode:	266101

2.2. Manufacturer Information

Company Name:	Haier Telecom (Qingdao)Co.,Ltd
Address:	No1,Haier Road,Hi-tech Zone,Qingdao, China
Telephone:	0532-88937273
Postcode:	266101

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

EUT Description	GSM/WCDMA/LTE handset	
Model name	L30	
FCC ID	SG7201605L30	
Frequency	GSM850/900/1800/1900； WCDMA BandII and V	
Extreme Temperature	-10/+55℃	
Nominal Voltage	3.8V	
Extreme High Voltage	4.35V	
Extreme Low Voltage	3.6V	
Multi slot class	GPRS: 10; EDGE:12;	
Power class	GSM850 :4;	PCS1900:1.
	4	1

Note: Photographs of EUT are shown in ANNEX A of this test report.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
N01	861864030000217	V1.01	L30-H02-S021-Tigo	2016-05-27

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE used during the test

AE ID*	Description	SN
AE1	RF cable	---
AE2	Dummy Battery	---

*AE ID: is used to identify the test sample in the lab internally.

3.4. Statements

The product name L30, supporting GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/HSPA+/LTE/WLAN/BT/BLE, manufactured by Haier Telecom (Qingdao)Co.,Ltd is a new product for testing.

ECIT has verified that the compliance of the tested device specified in section 5 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 5 of this test report.

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 24	PERSONAL COMMUNICATIONS SERVICES	2014
FCC Part 22	PUBLIC MOBILE SERVICES	2014
ANSI-TIA-603-D	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2010
ANSI C63.4	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2014

5. SUMMARY OF TEST RESULTS

Item	Test items	FCC rules	result
1	Output Power	2.1046/22.913(a)/24.232(c)	Pass
2	Peak-to-Average Ratio	24.232(d)	Pass
3	99%Occupied Bandwidth	2.1049(h)(i)/ 22.917(b)	Pass
4	-26dB Emission Bandwidth	22.917(b)/§24.238(b)	Pass
5	Band Edge at antenna terminals	22.917(a)/24.238(a)	Pass
6	Frequency stability	2.1055/24.235	Pass
7	Conducted Spurious mission	2.1053/22.917(a)/24.238(a)	Pass
8	Emission Limit	2.1051/22.917/24.238/22.913/24.232	Pass

6. Test Equipments Utilized

Climate chamber

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Cal.interval
1	Climate chamber	SH-641	92012011	ESPEC	2016-01-07	1

Radiated emission test system

The test equipments and ancillaries used are as follows.

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Date	Cal.interval
1	Universal Radio Communicati	CMU200	123126	R&S	2016-05-12	1
2	Test Receiver	ESU40	100307	R&S	2016-05-12	1
3	Trilog Antenna	VULB9163	VULB9163-515	Schwarzbeck	2014-11-05	3
4	Double Ridged Guide Antenna	ETS-3117	00135885	ETS	2014-05-06	3
5	2-Line V-Network	ENV216	101380	R&S	2016-05-12	1

Conducted test system

No.	Name	Type	SN	Manufacture	Cal. Due Date	Cal.interval
1	Spectrum Analyzer	FSQ26	101096	R&S	2016-05-12	1
2	Universal Radio Communication Tester	CMU200	123102	R&S	2016-05-12	1
3	DC Power Supply	ZUP60-14	LOC-220Z006 -0007	TDL-Lambda	2016-05-12	1
4	Weinschel power spliter	1870A	10264	Weinschel	2016-07-05	1

7. Test Environment

Shielding Room1 (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

Control room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. =30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber1 (6.8 meters×3.08 meters×3.53 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80MHz to 3000 MHz

Fully-anechoic chamber2 (Tapered Section: 8.75 meters×3.66 meters×3.66 meters, Rectangular Section: 7.32 meters×3.97 meters×3.66 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 30MHz to 40000MHz

ANNEX A. MEASUREMENT RESULTS

ANNEX A.1. OUTPUT POWER

A.1.1. Summary

During the process of testing, the EUT was controlled Rhode & Schwarz Digital Radio. Communication tester (CMU-200) to ensure max power transmission and proper modulation. This result contains peak output power and EIRP measurements for the EUT. In all cases, output power is within the specified limits.

A.1.2. Conducted

A.1.2.1. Method of Measurements

Method of measurements please refer to KDB971168 D01 v02r02 clause 5.
The EUT was set up for the max output power with pseudo random data modulation.
The power was measured with Rhode & Schwarz Spectrum Analyzer FSQ(peak).
These measurements were done at 3 frequencies, 1850.2 MHz, 1880.0MHz and 1909.8MHz for PCS1900 band; 824.2MHz, 836.6MHz and 848.8MHz for GSM850 band. (bottom, middle and top of operational frequency range).
These measurements were done at 3 frequencies, 1852.4 MHz, 1880.0MHz and 1907.6MHz for WCDMA Band II; 826.4MHz, 836.6MHz and 846.6MHz for WCDMA Band V. (bottom, middle and top of operational frequency range).

A.1.2.2 Test procedures:

1. The transmitter output port was connected to base station.
2. Set the EUT at maximum power through base station.
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.

A.1.2.3 GSM Limit:

GSM850	Power control level	Nominal Peak output power (dBm)
GSM	5	33
GPRS	3	33
EDGE	6	27

GSM1900	Power control level	Nominal Peak output power (dBm)

GSM	0	30
GPRS	3	30
EDGE	5	26

A.1.2.4 WCDMA Limit:

22.913(a) Mobile stations are limited to 7watts.

24.232(c) Mobile and portable stations are limited to 2 watts.

A.1.2.5 Test Procedure:

The transmitter output power was connected to calibrated attenuator, the other end of which was connected to signal analyzer. Transmitter output power was read off the power in dBm. The power outputs at the transmitter antenna port was determined by adding the value of attenuator to the signal analyzer reading.

A.1.2.6 GSM Test Condition:

RBW	VBW	Sweep time	Span
1MHz	1MHz	300ms	10MHz

A.1.2.7 WCDMA Test Condition:

RBW	VBW	Sweep time	Span
10MHz	10MHz	800ms	50MHz

A.1.2.8 Measurement results:

GSM 850 (GMSK)	
Channel/fc(MHz)	Peak power (dBm)
Mid 189/836.4	31.99
Low 128/824.2	31.99
High 251/848.8	31.93
GPRS 850 (GMSK 1 Slot)	
Channel/fc(MHz)	Peak power (dBm)
Mid 189/836.4	32.00
Low 128/824.2	32.00
High 251/848.8	31.92

EDGE 850 (8PSK 1 Slot)	
Channel/fc(MHz)	Peak power (dBm)
Mid 189/836.4	26.23
Low 128/824.2	26.34
High 251/848.8	26.32

GSM 1900(GMSK)	
Channel/fc(MHz)	Peak power (dBm)
Mid 661/1880	28.08
Low 512/1850.2	28.13
High 810/1909.8	27.83
GPRS 1900 (GMSK 1 Slot)	
Channel/fc(MHz)	Peak power (dBm)
Mid 661/1880	28.09
Low 512/1850.2	28.09
High 810/1909.8	27.82
EDGE 1900 (8PSK 1 Slot)	
Channel/fc(MHz)	Peak power (dBm)
Mid 661/1880	24.52
Low 512/1850.2	24.20
High 810/1909.8	24.16

WCDMA II	
Channel/fc(MHz)	Peak power (dBm)
Mid 9400 /1880	25.40
Low 9262/1852.4	25.17
High 9538/1907.6	25.12

WCDMA BAND V	
Channel/fc(MHz)	Peak power (dBm)
Mid 4183/836.6	26.98
Low 4132/826.4	26.74
High 4233/846.6	26.46

Conclusion: PASS

ANNEX A.2. Peak-to-Average Power Ratio

Method of test measurements please refer to KDB971168 D01 v02r02 clause 5.7.

A.2.1 PAPR Limit

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

A.2.2 Test procedures

1. The EUT was connected to the spectrum analyzer and system simulator via a power divider.
2. For GSM1900/WCDMA Band II:
   1) Select the spectrum analyzer CCDF function.
   2) Set RBW≥signal's occupied bandwidth.
   3) Set the number of counts to a value that stabilizes the measured CCDF cure;
   4) Sweep time ≥ 1s.
3. Record the maximum PAPR level associated with a probability of 0.1%.

A.2.3 Test results:

GSM850			
Modes	GSM850		
Channel	512	661	810
Frequency (MHz)	824.2	836.4	848.8
PAPR(dB)	10.61	10.29	10.45
GPRS850			
Modes	GPRS850		
Channel	512	661	810
Frequency (MHz)	824.2	836.4	848.8

PAPR(dB)	10.64	10.74	10.61
EDGE850			
Modes	EDGE850		
Channel	512	661	810
Frequency (MHz)	824.2	836.4	848.8
PAPR(dB)	10.64	10.42	10.64

GSM1900			
Modes	GSM1900		
Channel	512	661	810
Frequency (MHz)	1850.2	1880	1909.8
PAPR(dB)	8.59	10.90	7.85
GPRS1900			
Modes	GPRS1900		
Channel	512	661	810
Frequency (MHz)	1850.2	1880	1909.8
PAPR(dB)	10.10	10.83	10.80
EDGE1900			
Modes	EDGE1900		
Channel	512	661	810
Frequency (MHz)	1850.2	1880	1909.8
PAPR(dB)	8.40	8.43	8.40

WCDMA Band II			
Modes	GSM1900		
Channel	9262	9400	9538
Frequency (MHz)	1852.4	1880	1907.6

PAPR(dB)	2.95	3.01	2.95

WCDMA Band V			
Modes	GSM1900		
Channel	4132	4183	4233
Frequency (MHz)	826.4	836.4	846.6
PAPR(dB)	8.43	8.46	8.40

Conclusion: PASS

ANNEX A.3. Occupied Bandwidth

Method of test please refer to KDB971168 D01 v02r02 clause 4.0.

A.3.1. Occupied Bandwidth

Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of GSM850, PCS1900, WCDMA BANDII and WCDMA BANDV.

A.3.2 Test Procedure:

1. The EUT output RF connector was connected with a short cable to the signal analyzer.
2. RBW was set to about 1% of emission BW, VBW >= 3 times RBW,.
3. 99% bandwidth were measured, the occupied bandwidth is delta frequency between the two points where the display line intersects the signal trace.

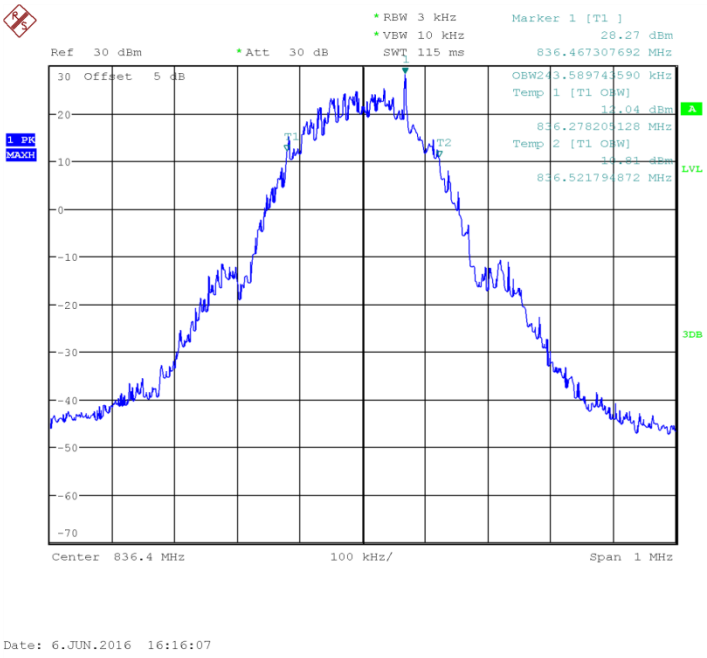
A.3.3 Test result:

GSM850		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(KHz)
Mid 189	836.4	241.987
Low 128	824.2	243.590
High 251	848.8	246.795
GPRS850		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(KHz)

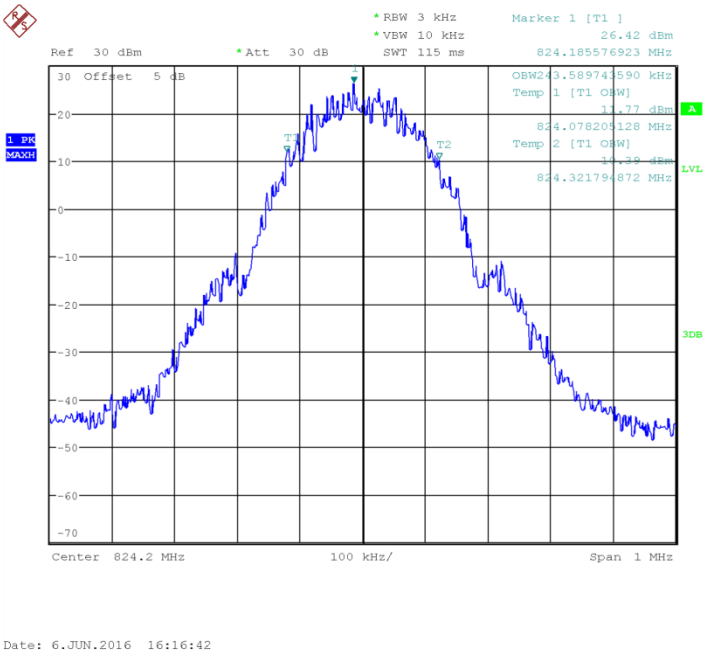
Mid 189	836.4	241.987
Low 128	824.2	243.590
High 251	848.8	248.397
EDGE850		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(KHz)
Mid 189	836.4	245.192
Low 128	824.2	245.192
High 251	848.8	241.987

Conclusion: PASS

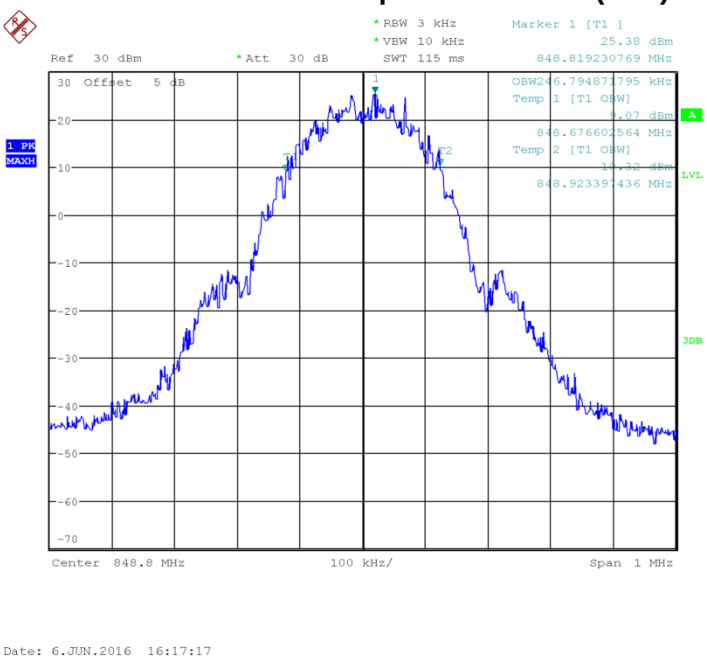
GSM 850



Channel 189-Occupied Bandwidth (99%)

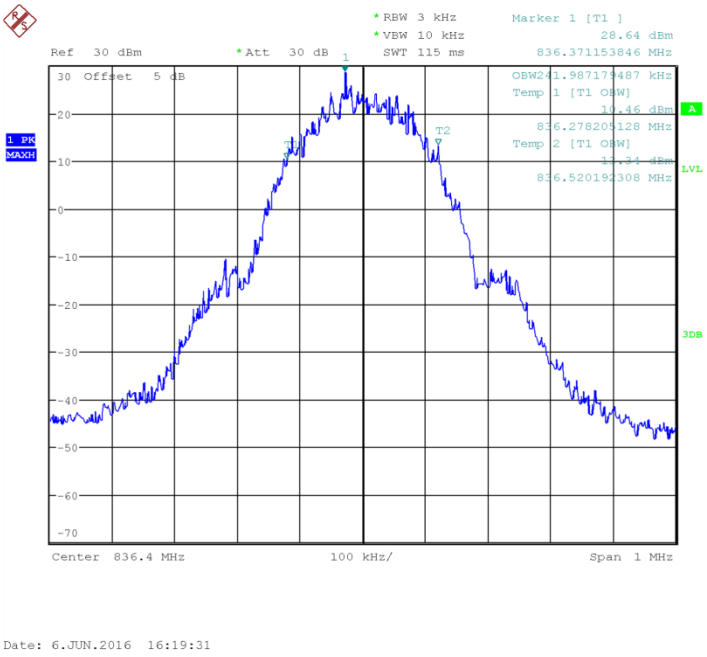


Channel 128-Occupied Bandwidth (99%)

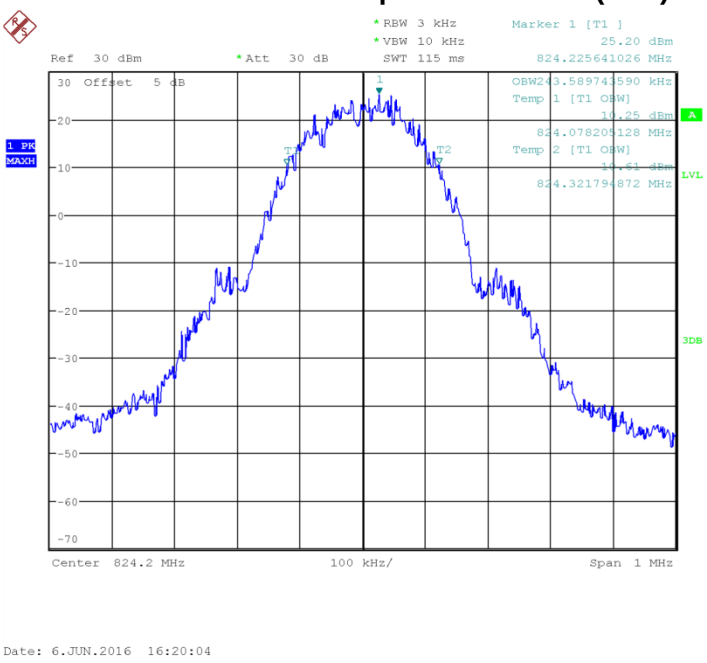


Channel 251-Occupied Bandwidth (99%)

GPRS 850



Channel 189-Occupied Bandwidth (99%)



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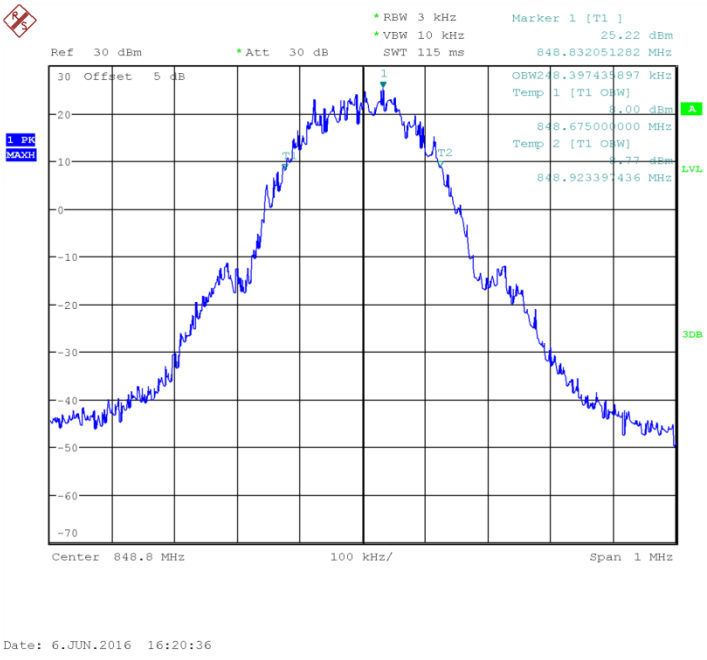
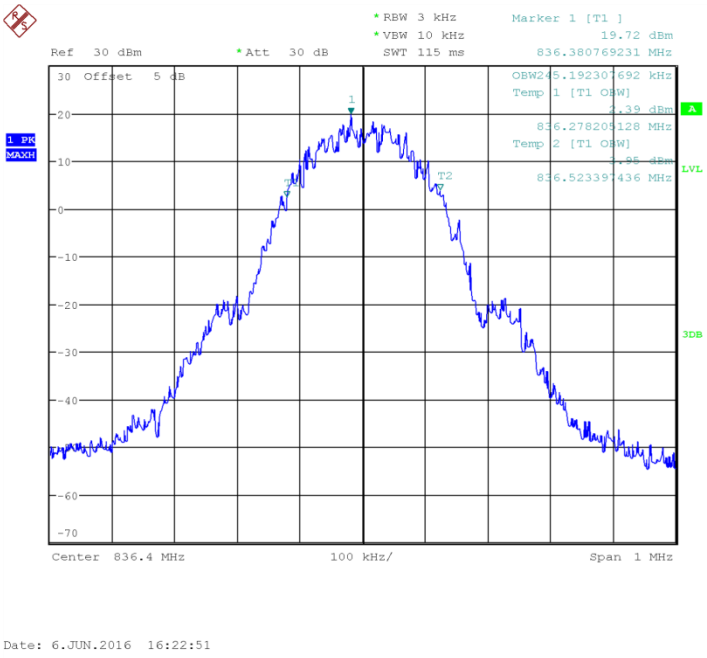
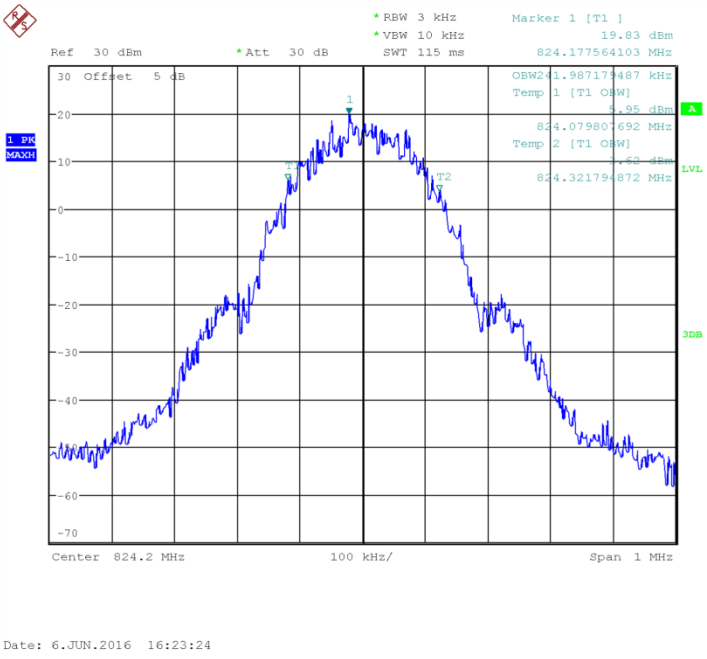


Channel 251-Occupied Bandwidth (99%)

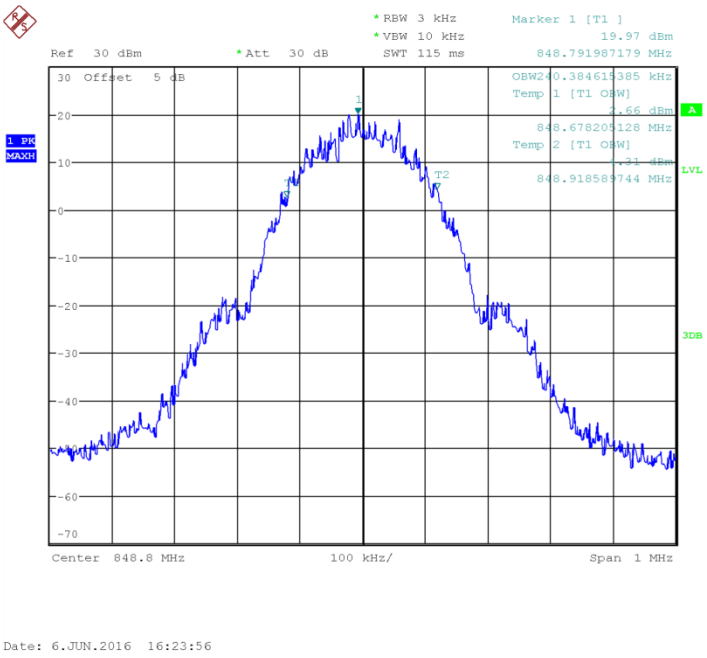
EDGE 850



Channel 189-Occupied Bandwidth (99%)



Channel 128-Occupied Bandwidth (99%)

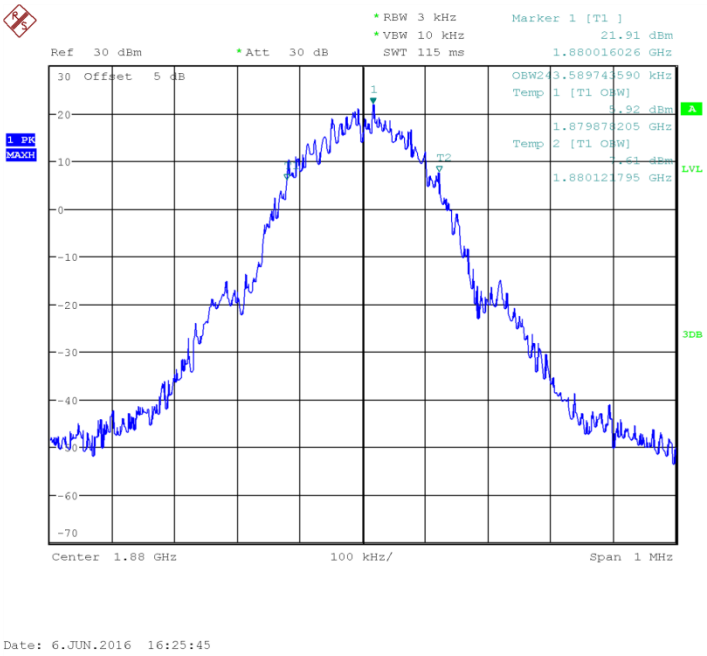


Channel 251-Occupied Bandwidth (99%)

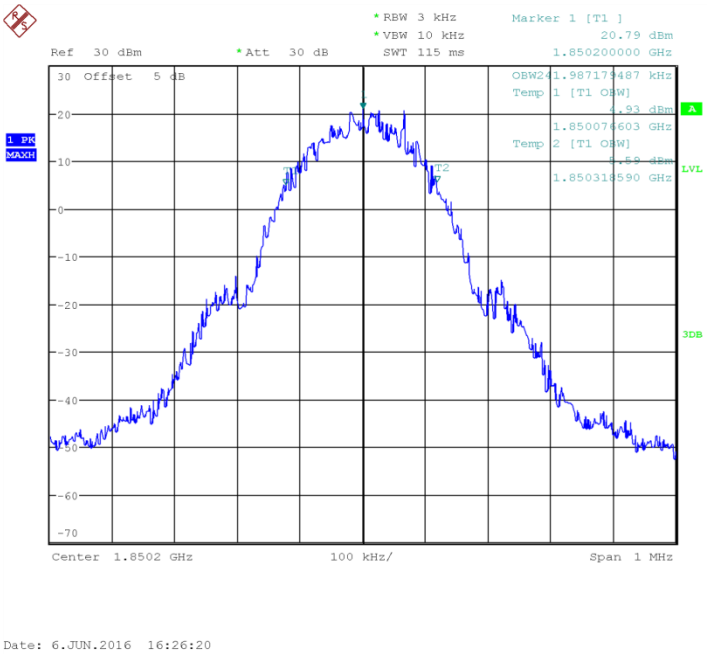
GSM 1900		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(KHz)
Mid 661	1880	243.590
Low 512	1850.2	241.987
High 810	1909.8	208.333
GPRS1900		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(KHz)
Mid 661	1880	241.987
Low 512	1850.2	168.269
High 810	1909.8	211.538
EDGE1900		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(KHz)
Mid 661	1880	238.782
Low 512	1850.2	246.795
High 810	1909.8	246.795

Conclusion: PASS

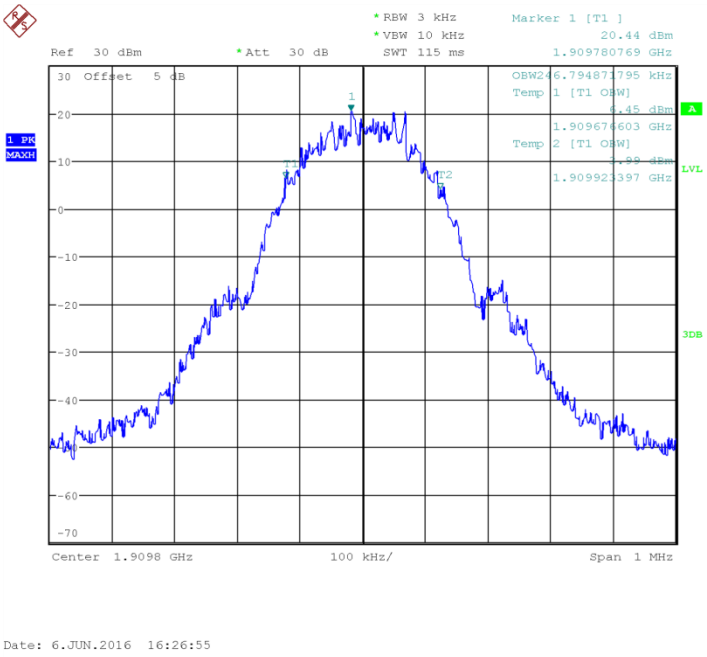
GSM 1900



Channel 661-Occupied Bandwidth

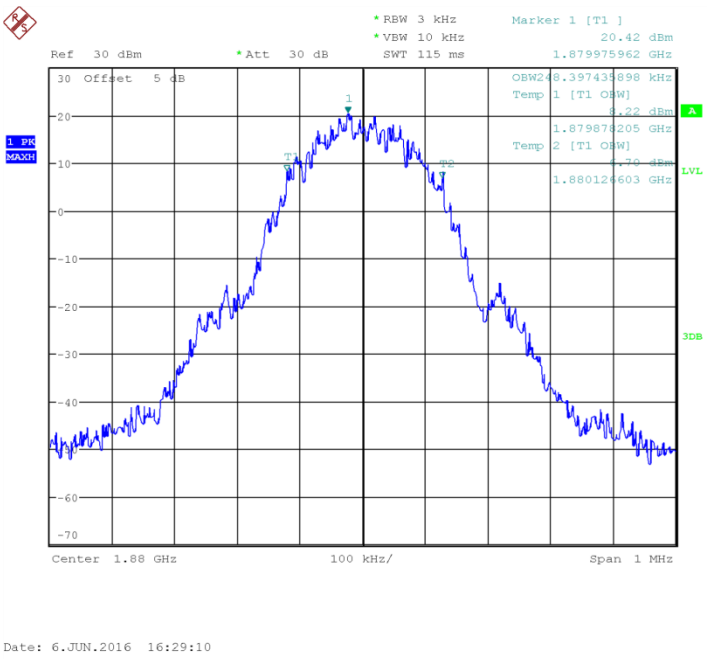


Channel512-Occupied Bandwidth

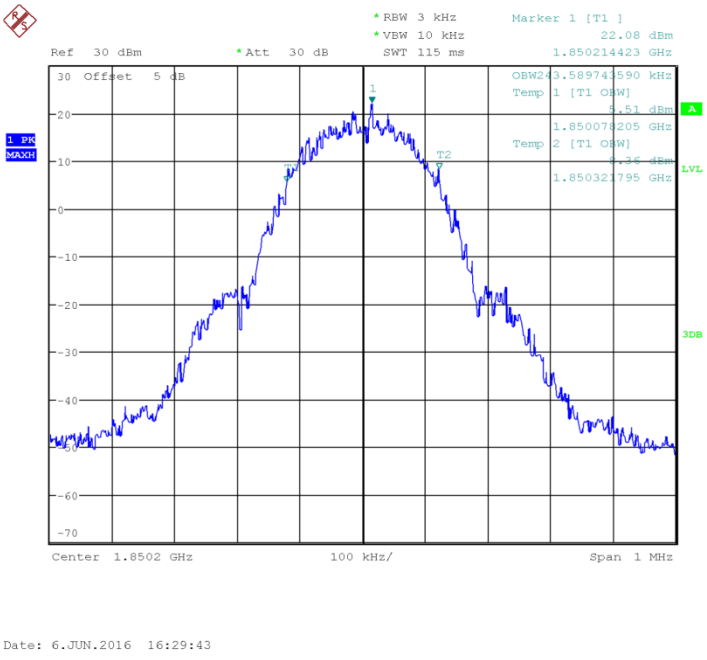


Channel 810-Occupied Bandwidth

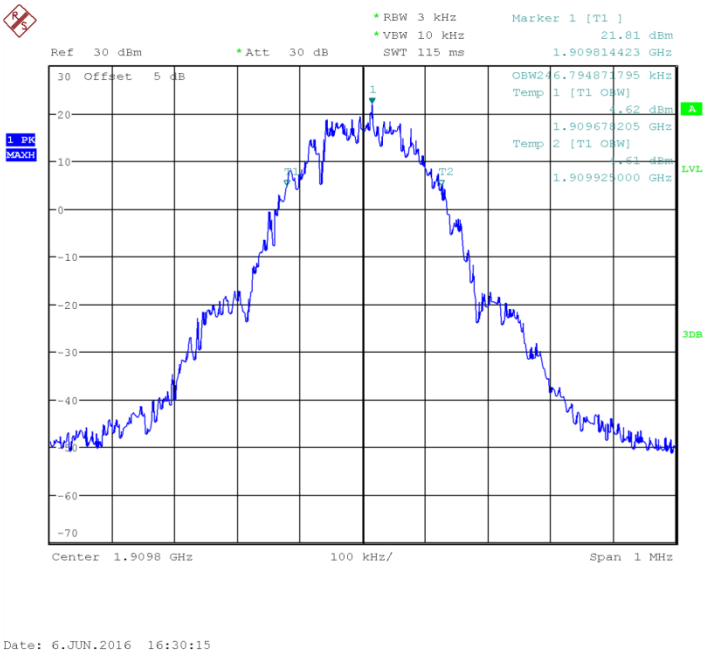
GPRS 1900



Channel 661-Occupied Bandwidth

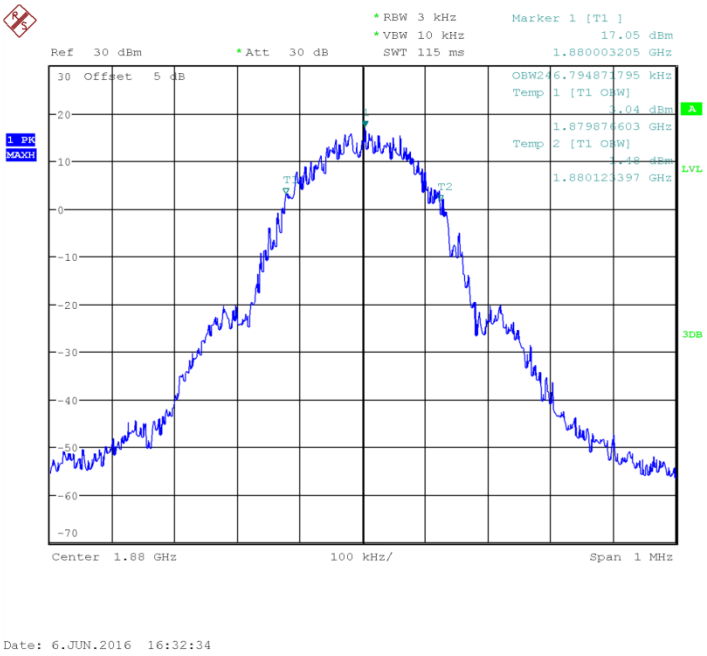


Channel512-Occupied Bandwidth

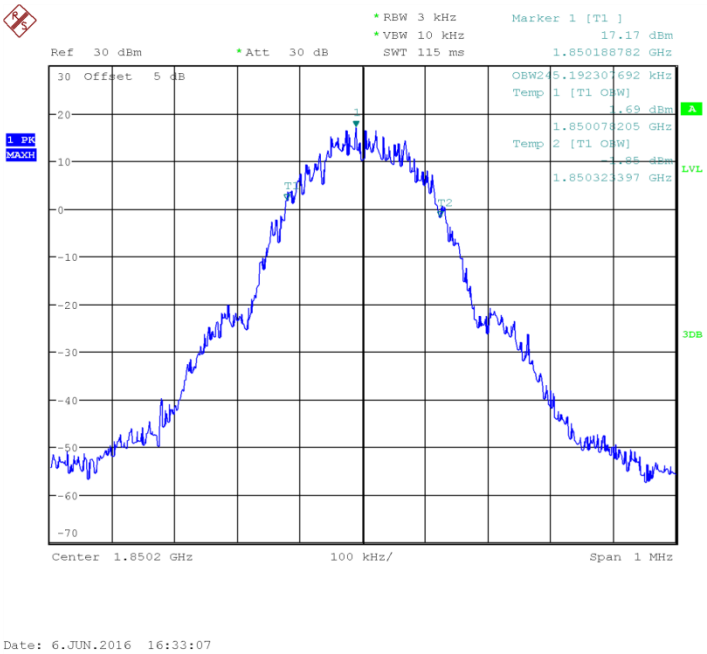


Channel 810-Occupied Bandwidth

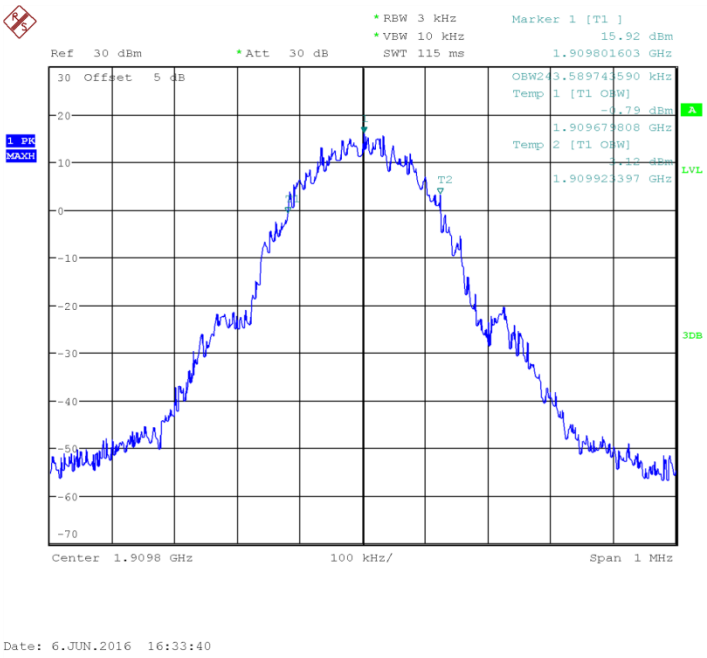
EDGE 1900



Channel 661-Occupied Bandwidth



Channel512-Occupied Bandwidth

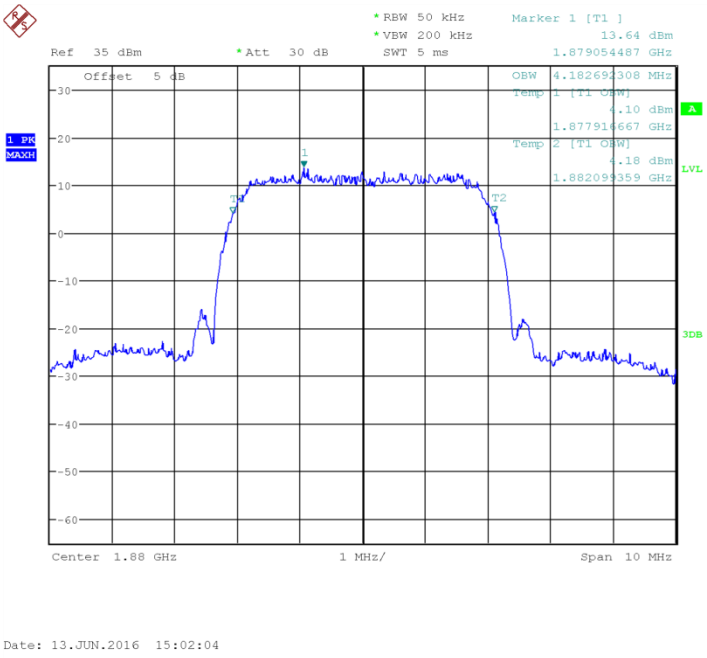


Channel 810-Occupied Bandwidth

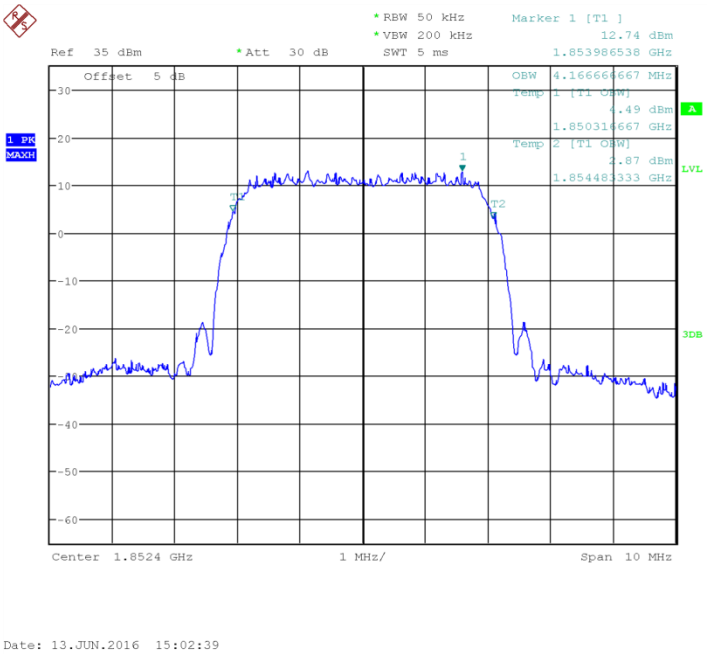
WCDMA BAND II		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(MHz)
Mid 9400	1880	4.18
Low 9262	1852.4	4.17
High 9538	1907.6	4.17
WCDMA BAND V		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(MHz)
Mid 4183	836.6	4.17
Low 4132	826.4	4.15
High 4233	846.6	4.15

Conclusion: PASS

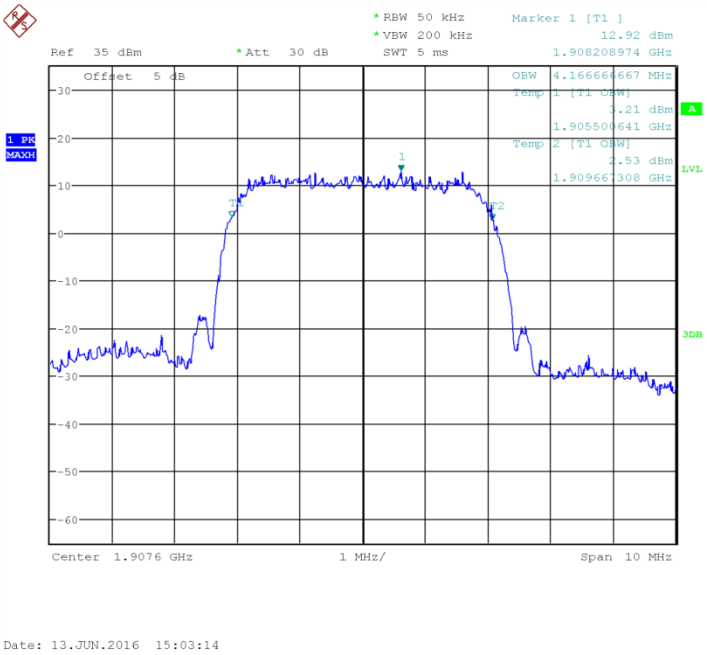
WCDMA BAND II



Channel 9400-Occupied Bandwidth

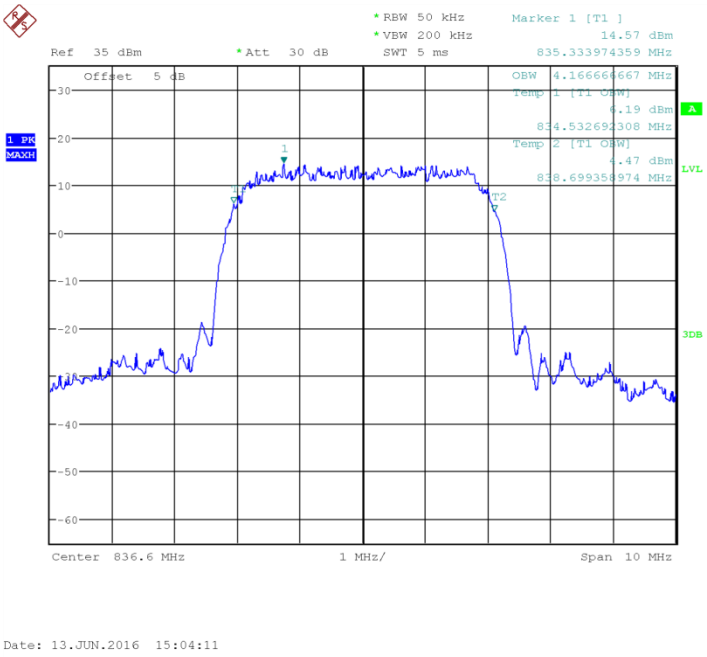


Channel9262-Occupied Bandwidth

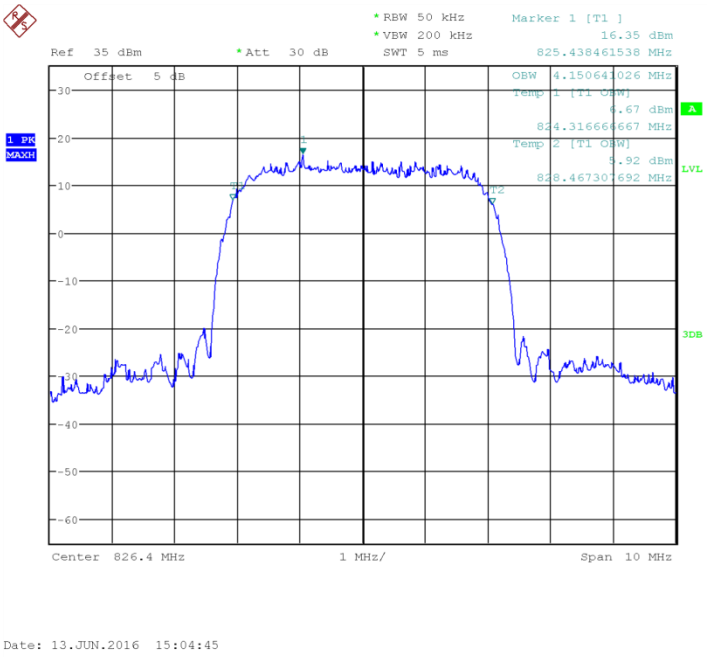


Channel 9538-Occupied Bandwidth

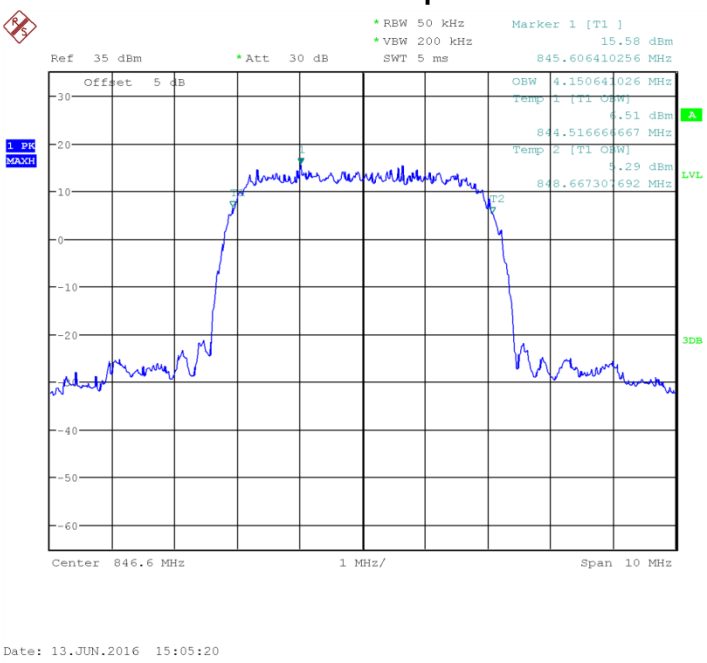
WCDMA BAND V



Channel 4183-Occupied Bandwidth



Channel4132-Occupied Bandwidth



Channel 4233-Occupied Bandwidth

ANNEX A.4. -26dB Emission Bandwidth

Method of test please refer to KDB971168 D01 v02r02 clause 4.0.

A.4.1. -26dB Emission Bandwidth

Similar to conducted emissions; occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of GSM850, PCS1900, WCDMA BANDII and WCDMA BANDV.

A.4.2 Test Procedure:

1. The EUT output RF connector was connected with a short cable to the signal analyzer.
2. RBW was set to about 1% of emission BW, VBW >= 3 times RBW,.
3. 26dB bandwidth were measured, the occupied bandwidth is delta frequency between the two points where the display line intersects the signal trace.

A.4.3 Measurement methods:

For GSM: signal analyzer setting as: RBW=3KHz;VBW=10KHz;Span=1MHz.
For WCDMA: signal analyzer setting as: RBW=50KHZ;VBW=20KHZ;Span=10MHz.

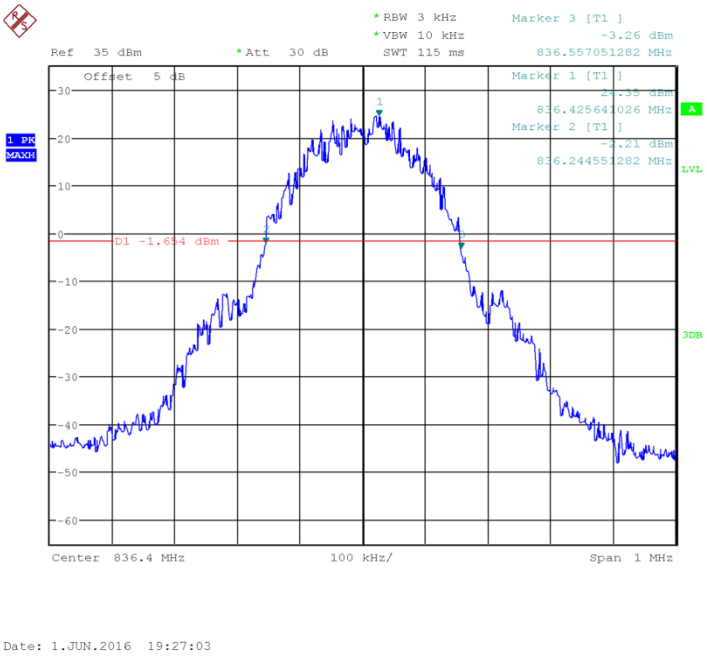
A.4.4 Test results:

GSM850		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(KHz)
Mid 189	836.4	312.500
Low 128	824.2	314.103
High 251	848.8	309.295
GPRS850		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(KHz)
Mid 189	836.4	306.090
Low 128	824.2	309.295
High 251	848.8	314.103
EDGE850		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(KHz)
Mid 189	836.4	315.705

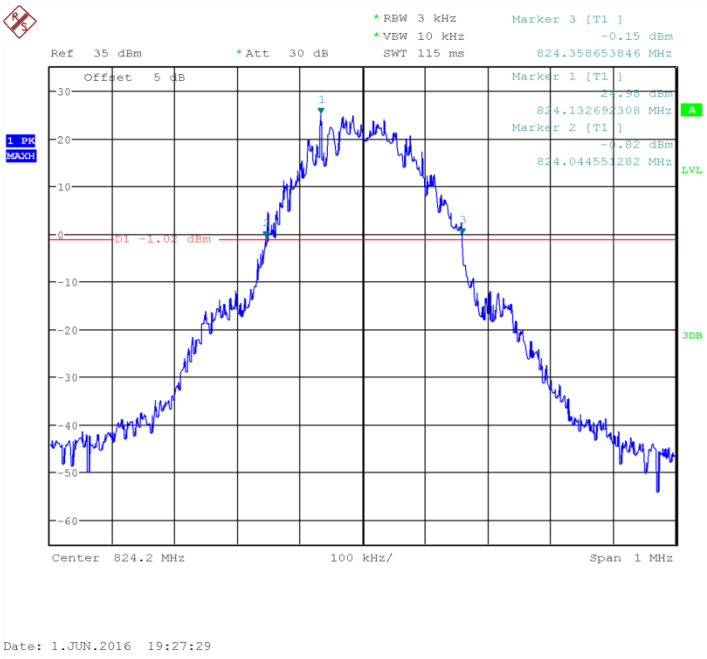
Low 128	824.2	307.692
High 251	848.8	314.103

Conclusion: PASS

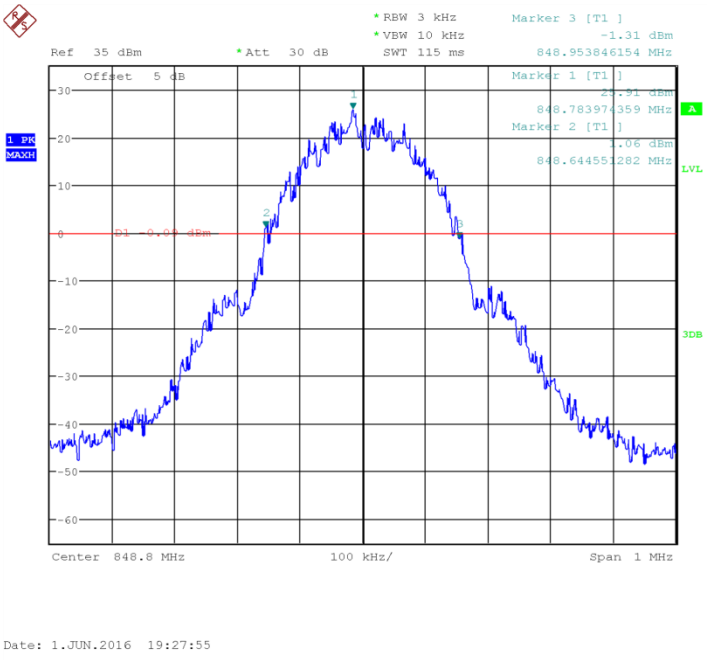
GSM 850



Channel 189-Emission Bandwidth (-26dBc BW)

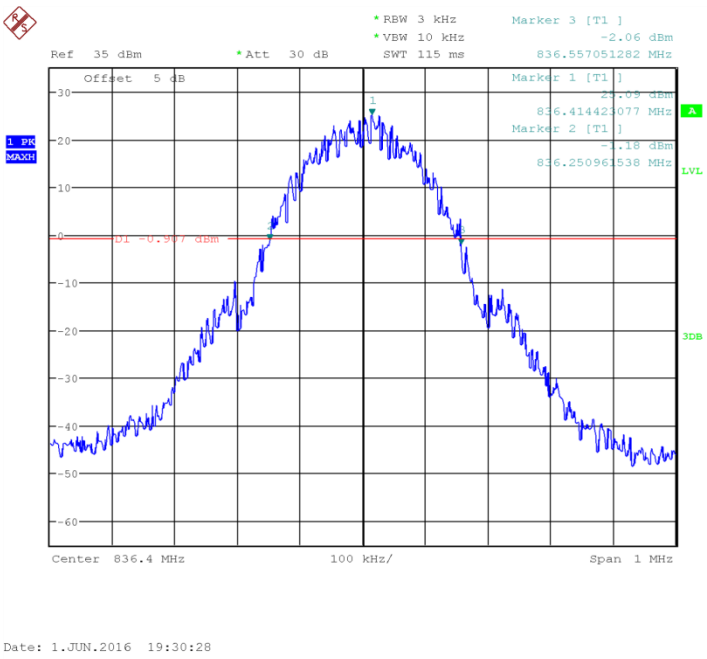


Channel 128- Emission Bandwidth (-26dBc BW)

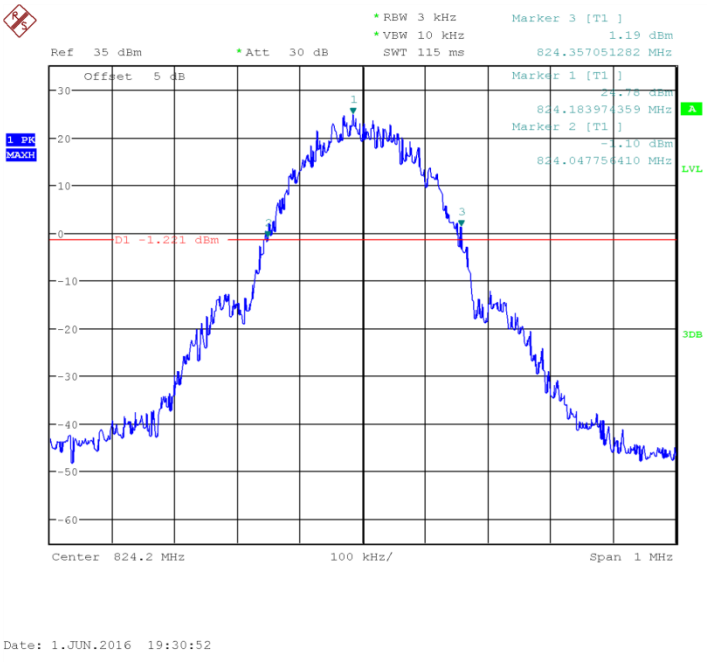


Channel 251- Emission Bandwidth (-26dBc BW)

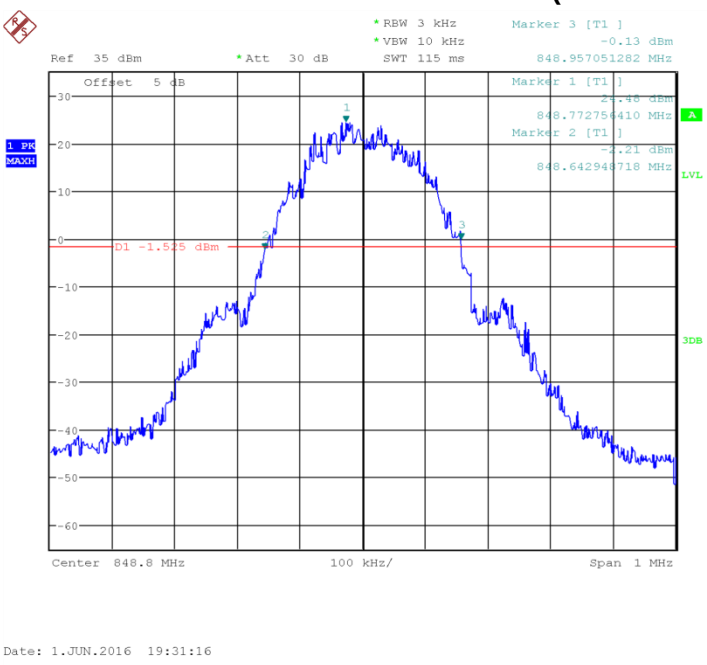
GPRS 850



Channel 189- Emission Bandwidth (-26dBc BW)

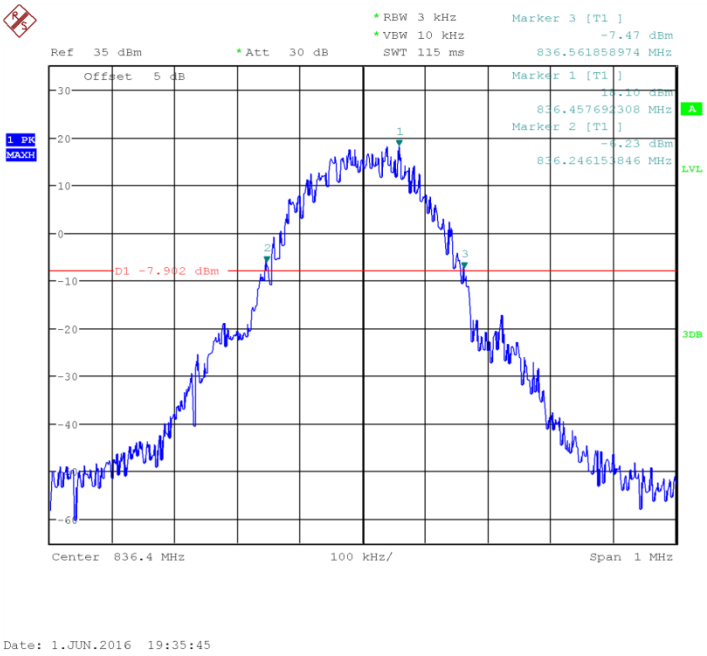


Channel 128- Emission Bandwidth (-26dBc BW)

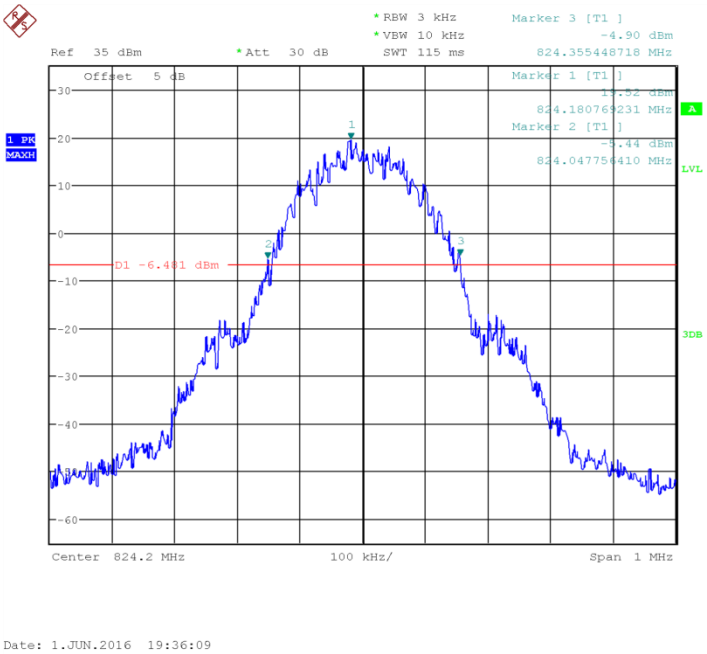


Channel 251- Emission Bandwidth (-26dBc BW)

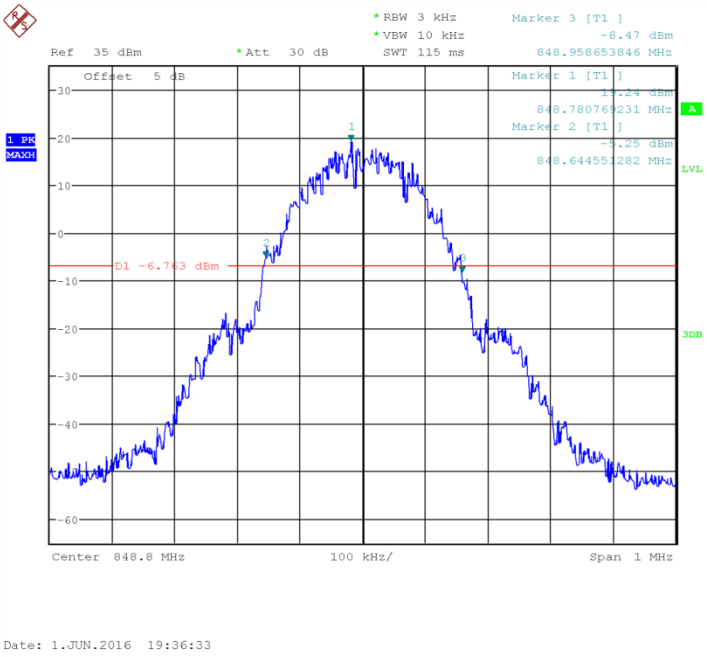
EDGE 850



Channel 189- Emission Bandwidth (-26dBc BW)



Channel 128- Emission Bandwidth (-26dBc BW)

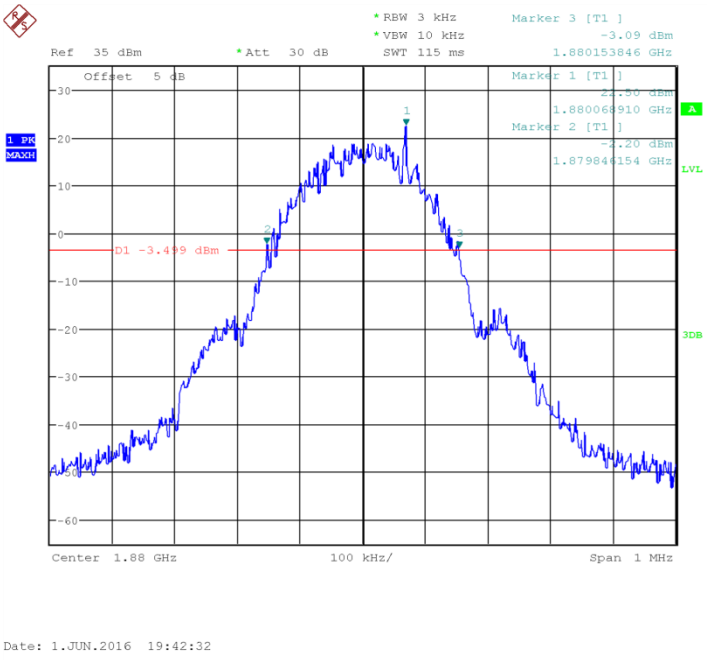


Channel 251- Emission Bandwidth (-26dBc BW)

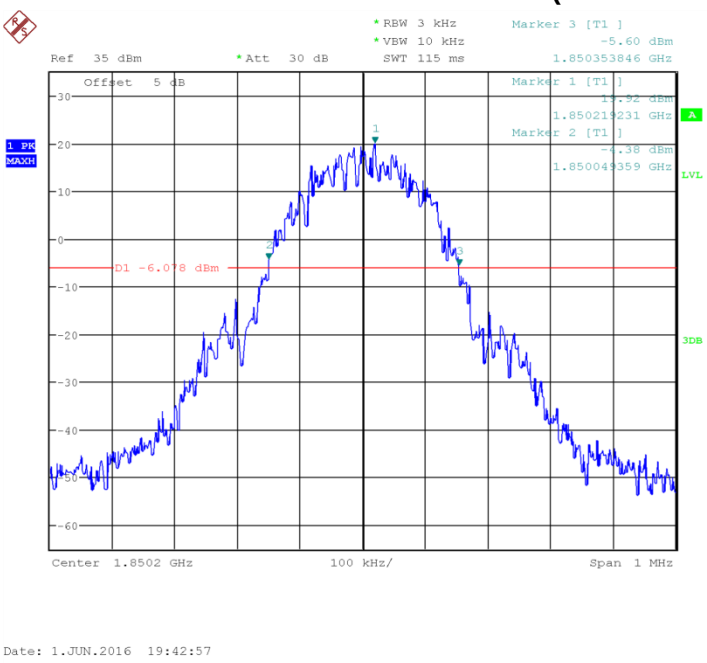
GSM 1900		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(KHz)
Mid 661	1880	307.692
Low 512	1850.2	304.487
High 810	1909.8	301.282
GPRS1900		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(KHz)
Mid 661	1880	318.910
Low 512	1850.2	307.692
High 810	1909.8	318.910
EDGE1900		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(KHz)
Mid 661	1880	315.705
Low 512	1850.2	317.308
High 810	1909.8	317.308

Conclusion: PASS

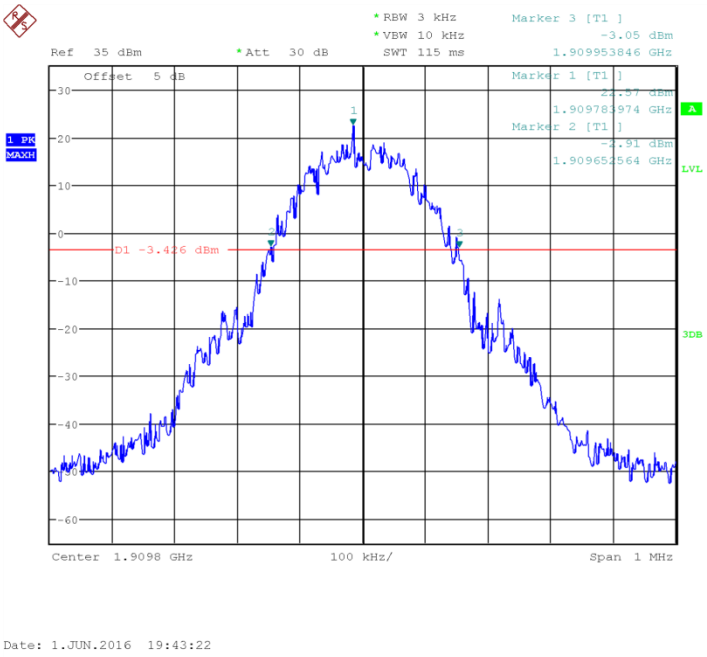
GSM 1900



Channel 661- Emission Bandwidth (-26dBc BW)

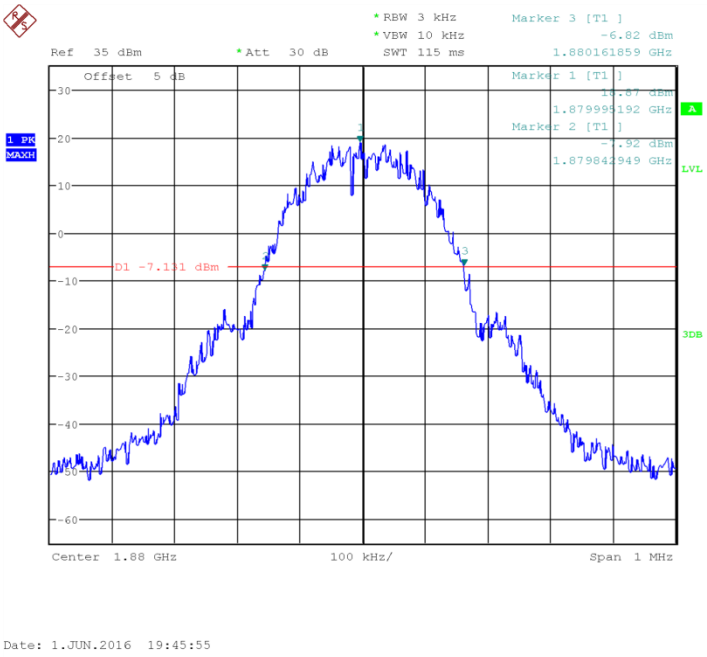


Channel512- Emission Bandwidth (-26dBc BW)

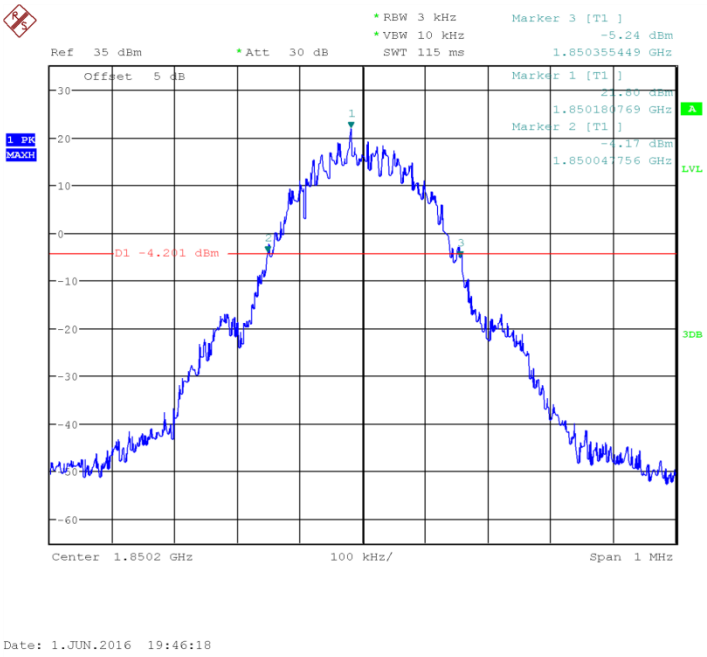


Channel 810- Emission Bandwidth (-26dBc BW)

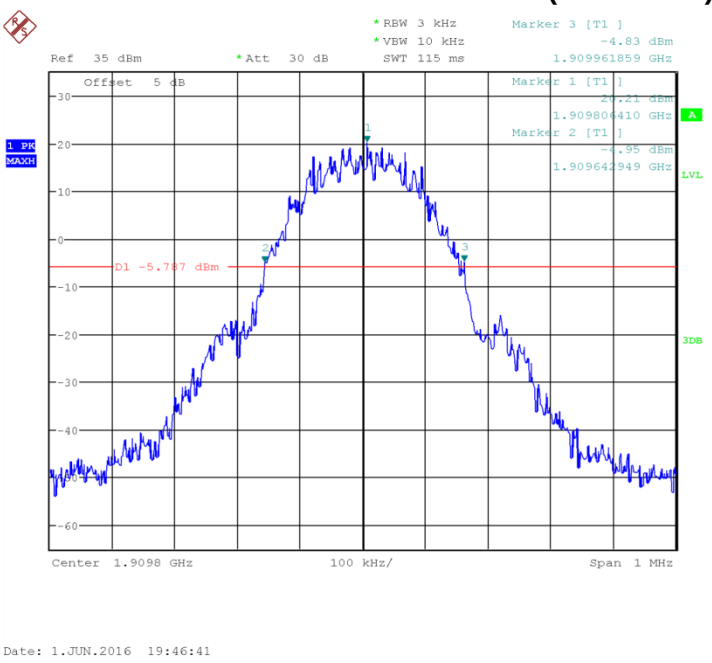
GPRS 1900



Channel 661- Emission Bandwidth (-26dBc BW)

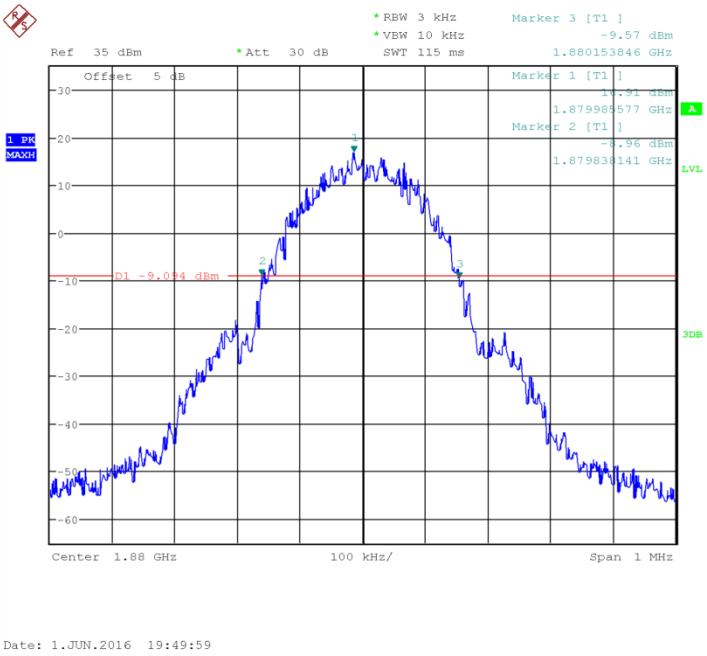


Channel512- Emission Bandwidth (-26dBc BW)

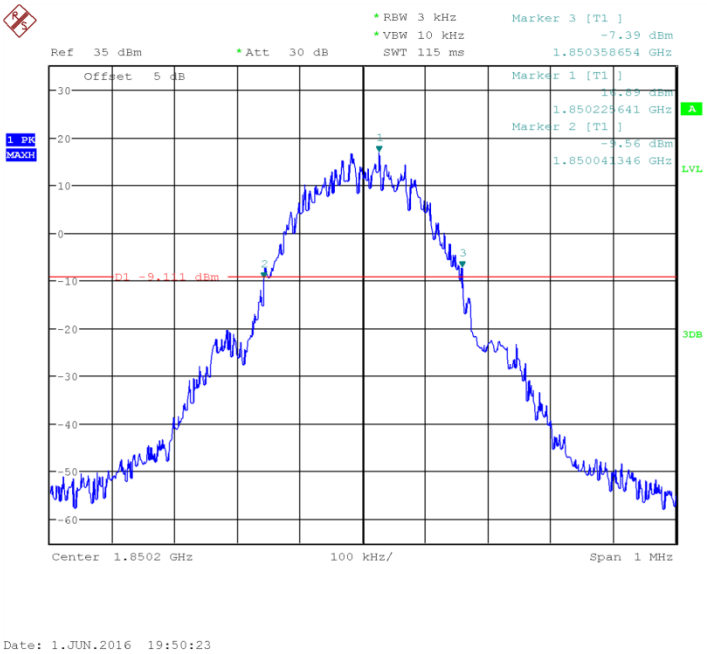


Channel 810- Emission Bandwidth (-26dBc BW)

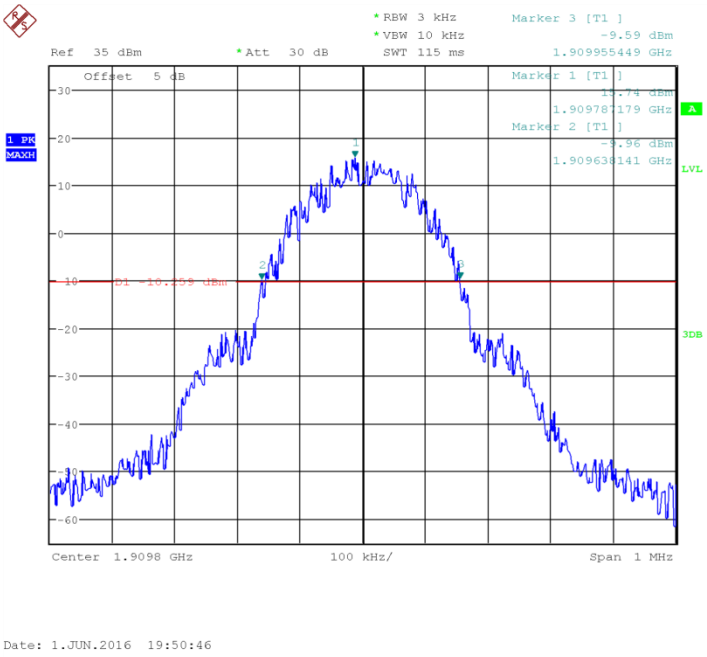
EDGE 1900



Channel 661- Emission Bandwidth (-26dBc BW)



Channel512- Emission Bandwidth (-26dBc BW)

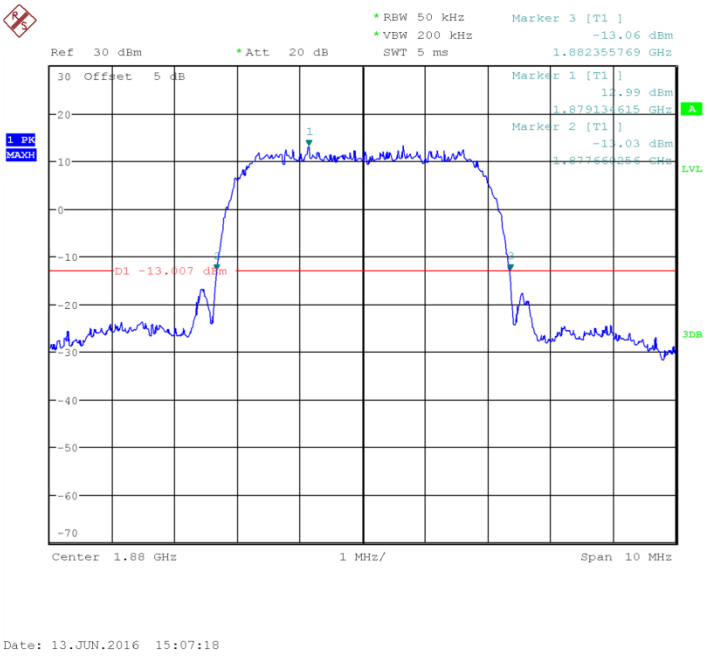


Channel 810- Emission Bandwidth (-26dBc BW)

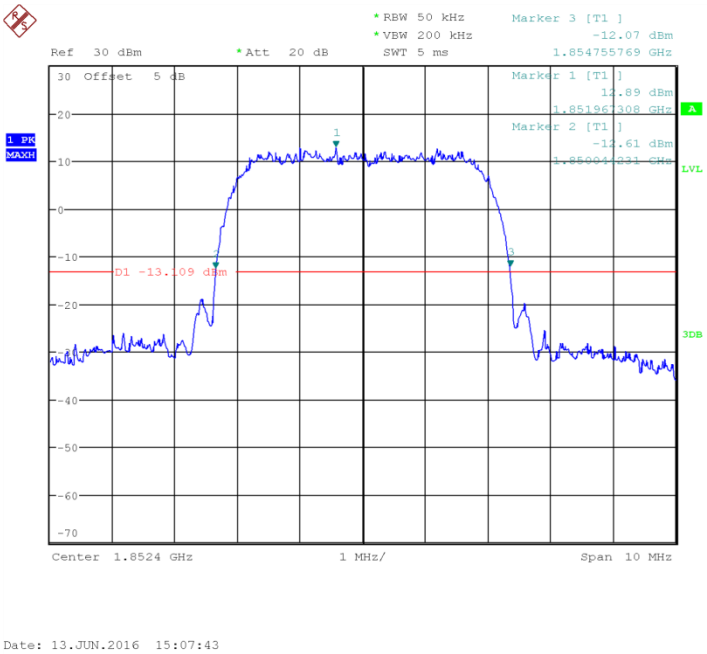
WCDMA BAND II		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(MHz)
Mid 9400	1880	4.7
Low 9262	1852.4	4.7
High 9538	1907.6	4.7
WCDMA BAND V		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(MHz)
Mid 4183	836.6	4.7
Low 4132	826.4	4.7
High 4233	846.6	4.7

Conclusion: PASS

WCDMA BAND II



Channel 9400- Emission Bandwidth (-26dBc BW)



Channel9262- Emission Bandwidth (-26dBc BW)