TEST REPORT

No. 2014RFA0031

For

Client : Fibocom Wireless Inc.

Production : WCDMA/GSM(GPRS) Dual-band wireless module

Model Name : H350,H350R

FCC ID: ZMOH35F

Hardware Version: V1.0.2

Software Version: H350_V3H.00.03

Issued date: 2014-04-04

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of ECIT Shanghai.

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
2014RFA0031	00	2014-04-04	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:	Gong Yujuan
Testing Start Date:	2014-03-24
Testing End Date:	2014-04-02

1.4. Signature

Wang Daming
(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:	Fibocom Wireless Inc.
Address:	5/F, Block A, Shekou Technology Building II, 1057 Nanhai Blvd, Nanshan, Shenzhen, China
Country:	China
Telephone:	075526733555
Postal Code:	518067
Contact	Wang Xuejuan

2.2. Manufacturer Information

Company Name:	Fibocom Wireless Inc.
Address:	5/F, Block A, Shekou Technology Building II, 1057 Nanhai Blvd, Nanshan, Shenzhen, China
Country:	China
Telephone:	075526733555
Postal Code:	518067
Contact	Wang Xuejuan

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

3.1. About EUT

EUT Description	WCDMA/GSM(GPRS) Dual-band wireless module
Model name	H350,H350R
FCC ID	ZMOH35F
Frequency	GSM 850/1900； WCDMA Band II and V
Extreme Temperature	-10/+55℃
Nominal Voltage	3.8V
Extreme High Voltage	4.5V
Extreme Low Voltage	3.3V

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
N04	NA	V1.0.2	H350_V3H.00.03	2014-03-25

*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 H350 H350R, supporting GSM/GPRS/EGPRS/WCDMA/HSDPA/HSUPA, manufactured by Fibocom Wireless Inc. 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-C	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2004
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	2009
KDB Publication 971168 D01	Measurement Guidance for Certification of Licensed Digital Transmitters	v02r01

5. SUMMARY OF TEST RESULTS

Item	Test items	FCC rules	result
1	Output Power	22.913(a)/24.232(c)	Pass
2	Emission Limit	2.1051/22.917/24.238	Pass
3	Conducted Emission	15.107/15.207	Pass
4	99%Occupied Bandwidth	2.1049(h)(i)	Pass
5	-26dB Emission Bandwidth	22.917(b)/§24.238(b)	Pass
6	Band Edge at antenna terminals	22.917(b)/24.238(b)	Pass
7	Frequency stability	2.1055/24.235	Pass
8	Conducted Spurious mission	2.1057/22.917/24.238	Pass

6. Test Equipments Utilized

Climate chamber

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date
1	Climate chamber	SH-641	92012011	ESPEC	2014-08-30

Radiated emission test system

The test equipments and ancillaries used are as follows.

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date
1	Universal Radio Communication Tester	CMU200	123102	R&S	2014-08-30
2	Test Receiver	ESCI	101235	R&S	2014-08-30
3	Test Receiver	ESU40	100307	R&S	2014-10-29
4	Trilog Antenna	VULB9163	19-162515	Schwarzbeck	2014-11-11
5	Double Ridged Guide Antenna	ETS-3117	135885	ETS	2014-04-28
6	2-Line V-Network	ENV216	101380	R&S	2014-10-30
7	Single Phase Harmonic & Flicker	DPA500N	V1126109988	EM Test	2014-10-28

8	Multifunction AC/DC Power Source	Netwave7	V1126109989	EM Test	2014-10-28
9	Ultra Compact Simulator	UCS 500N7	V1126109983	EM Test	2014-07-22
10	Motorized Variac	MV 2616	V1126109987	EM Test	2014-07-22
11	Telecom Surge Module	TSurge7	V0902104582	EM Test	2014-07-22
12	Audio Analyzer	UPV	101950	R&S	2014-08-30
13	Power Meter	NRP2	101804	R&S	2014-08-30
14	Signal Generator	SMB 100A	105563	R&S	2014-08-30
15	ESD Test Simulator	Dito	V1126109982	EM Test	2014-10-31
16	Active Loop antenna	FMZB 1519	1519-020	SCHWARZBECK	2014-10-31
17	Horn antenna(18.0-26.5GHz)	3160_09	00086671	ETS-LINDGREN	2014/06/14

Conducted test system

No.	Name	Type	SN	Manufacture	Cal. Due Date
1	Spectrum Analyzer	FSQ26	101096	R&S	2014-08-30
2	Universal Radio Communication Tester	CMU200	123102	R&S	2014-08-30
3	DC Power Supply	ZUP60-14	LOC-220Z006-0007	TDL-Lambda	2014-08-30
4	Weinschel power spliter	1870A	10264	Weinschel	2014-08-30

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 (§22.913(a)/§24.232(c))

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, outputpower is within the specified limits.

A.1.2. Conducted

A.1.2.1. Method of Measurements

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; 824.4MHz, 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).

Limit:

GSM850	Power step	Nominal Peak outpu power (dBm)
GSM	5	33
GPRS	3	33
EDGE	6	27

GSM1900	Power step	Nominal Peak outpu power (dBm)
GSM	0	30
GPRS	3	30
EDGE	5	26

WCDMA Limit:

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

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

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.

GSM Test Condition:

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

WCDMA Test Condition:

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

Measurement results:

GSM 850 (GMSK)		
Channel/fc(MHz)	Peak power (dBm)	AV power (dBm)
Mid 189/836.4	32.79	32.63
Low 128/824.2	32.80	32.66
High 251/848.8	32.70	32.54
GPRS 850 (GMSK 1 Slot)		
Channel/fc(MHz)	Peak power (dBm)	AV power (dBm)
Mid 189/836.4	32.68	32.53
Low 128/824.2	32.63	32.48
High 251/848.8	32.58	32.44
EDGE 850 (GMSK 1 Slot)		
Channel/fc(MHz)	Peak power (dBm)	AV power (dBm)
Mid 189/836.4	27.57	27.42
Low 128/824.2	27.19	27.04
High 251/848.8	27.44	27.29

GSM 1900(GMSK)		
Channel/fc(MHz)	Peak power (dBm)	AV power (dBm)
Mid 661/1880	29.43	29.30
Low 512/1850.2	29.54	29.39
High 810/1909.8	28.82	28.69
GPRS 1900 (GMSK 1 Slot)		
Channel/fc(MHz)	Peak power (dBm)	AV power (dBm)
Mid 661/1880	29.41	29.27
Low 512/1850.2	29.53	29.39
High 810/1909.8	28.80	28.67
EDGE 1900 (8PSK 1 Slot)		
Channel/fc(MHz)	Peak power (dBm)	AV power (dBm)
Mid 661/1880	25.82	25.69
Low 512/1850.2	25.66	25.55
High 810/1909.8	25.22	25.08

WCDMA II		
Channel/fc(MHz)	Peak power (dBm)	AV power (dBm)
Mid 9400 /1880	24.38	21.50
Low 9262/1852.4	24.46	21.52
High 9538/1907.6	24.16	21.23
HSPA+ BAND II		
Channel/fc(MHz)	Peak power (dBm)	AV power (dBm)
Mid 9400 /1880	23.82	21.28
Low 9262/1852.4	23.62	21.12
High 9538/1907.6	23.76	21.03

WCDMA BAND V		
Channel/fc(MHz)	Peak power (dBm)	AV power (dBm)
Mid 4183/836.6	25.31	22.61
Low 4132/826.4	25.46	22.81
High 4233/846.6	25.56	22.91
HSPA+ BAND V		
Channel/fc(MHz)	Peak power (dBm)	AV power (dBm)
Mid 4183/836.6	24.18	22.01
Low 4132/826.4	24.67	22.11
High 4233/846.6	24.63	22.23

Conclusion: PASS

ANNEX A.2. 99%Occupied Bandwidth (§2.1049(h)(i))

A.2.1. Occupied Bandwidth Results

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.

Test Procedure:

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

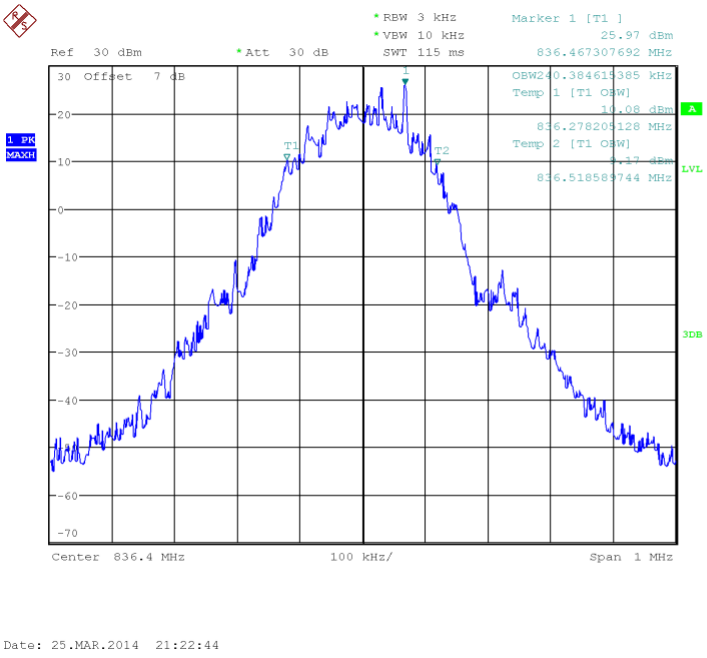
Test result:

GSM850		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(KHz)
Mid 189	836.4	240.385
Low 128	824.2	240.385
High 251	848.8	238.782
GPRS850		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(KHz)
Mid 189	836.4	246.795

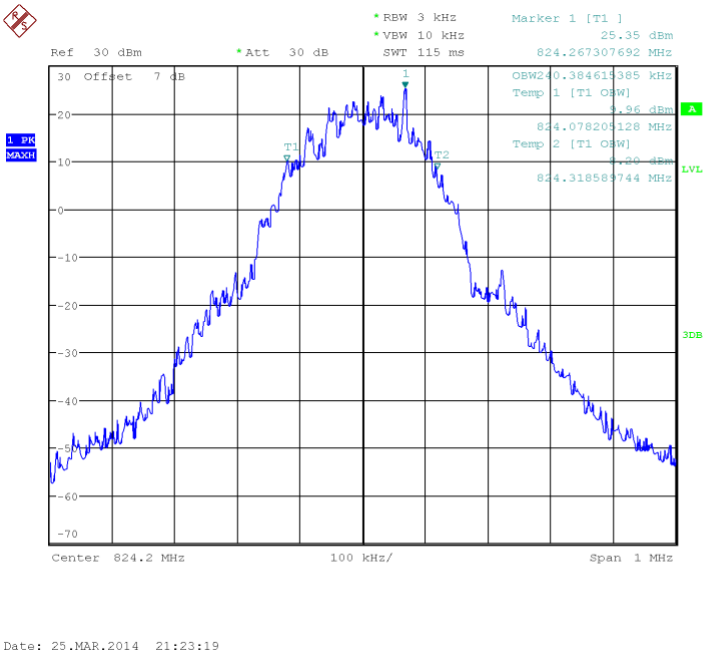
Low 128	824.2	243.590
High 251	848.8	243.590
EDGE850		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(KHz)
Mid 189	836.4	241.987
Low 128	824.2	245.192
High 251	848.8	243.590

Conclusion: PASS

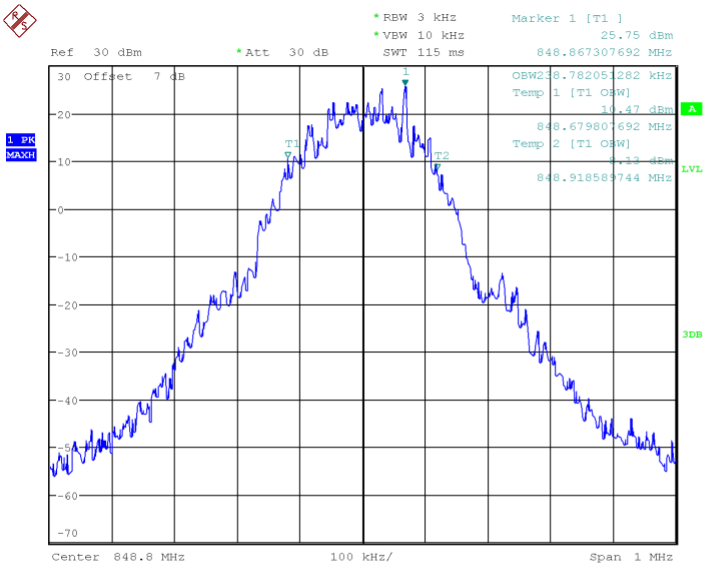
GSM 850



Channel 189-Occupied Bandwidth (99%)



Channel 128-Occupied Bandwidth (99%)



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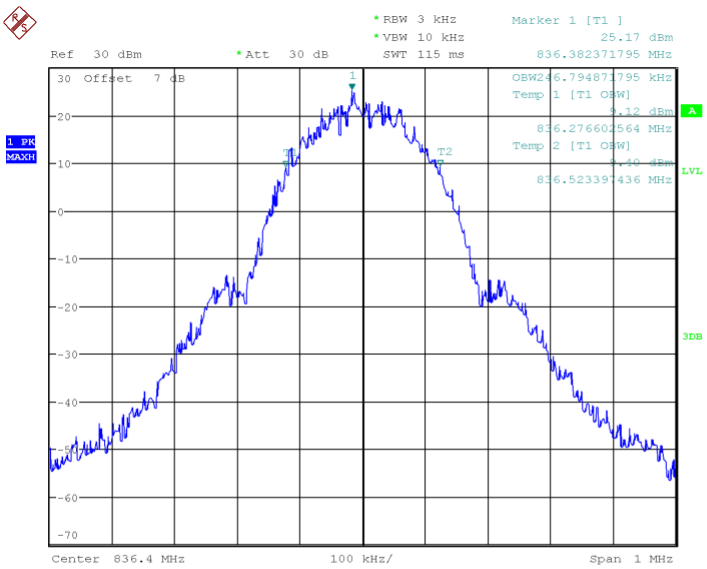
Channel 251-Occupied Bandwidth (99%)

GPRS 850



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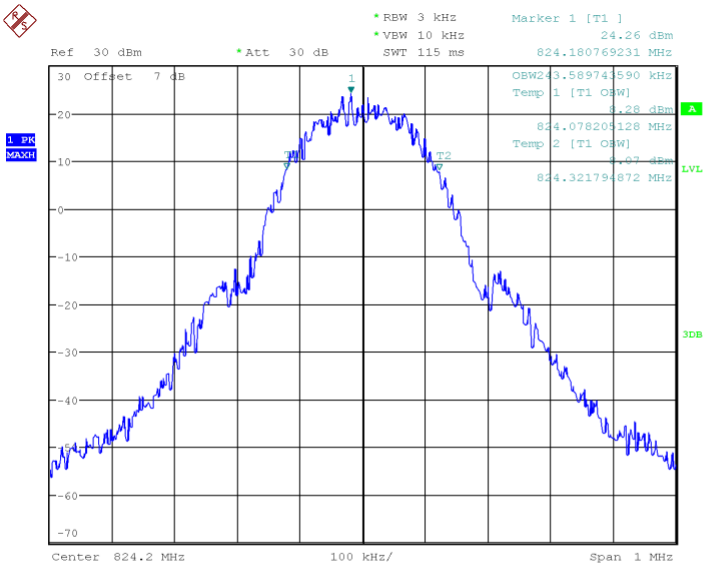
Channel 189-Occupied Bandwidth (99%)



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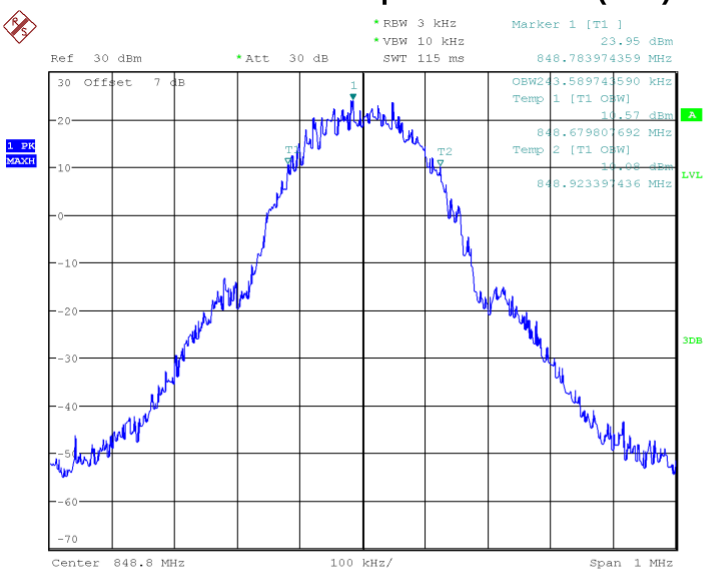
Channel 128-Occupied Bandwidth (99%)



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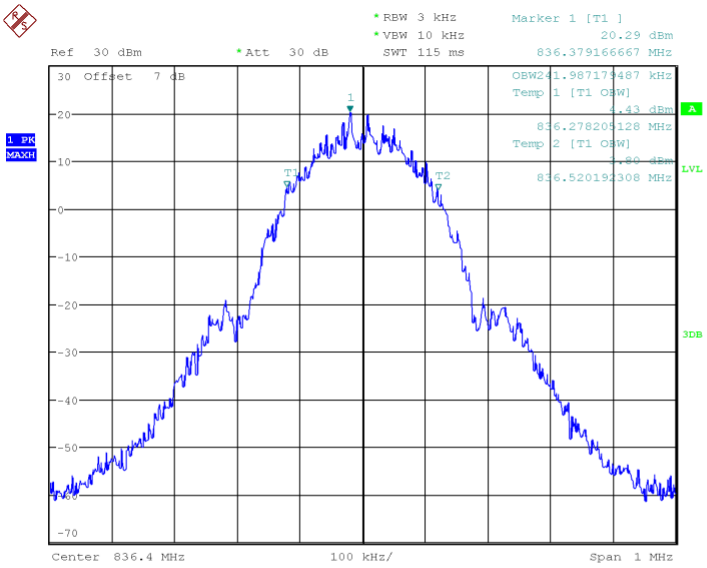
Channel 251-Occupied Bandwidth (99%)

EDGE 850



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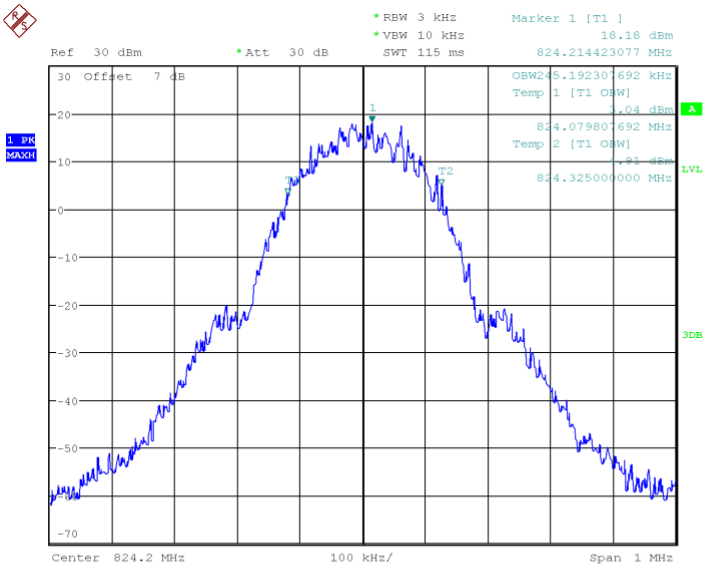
Channel 189-Occupied Bandwidth (99%)



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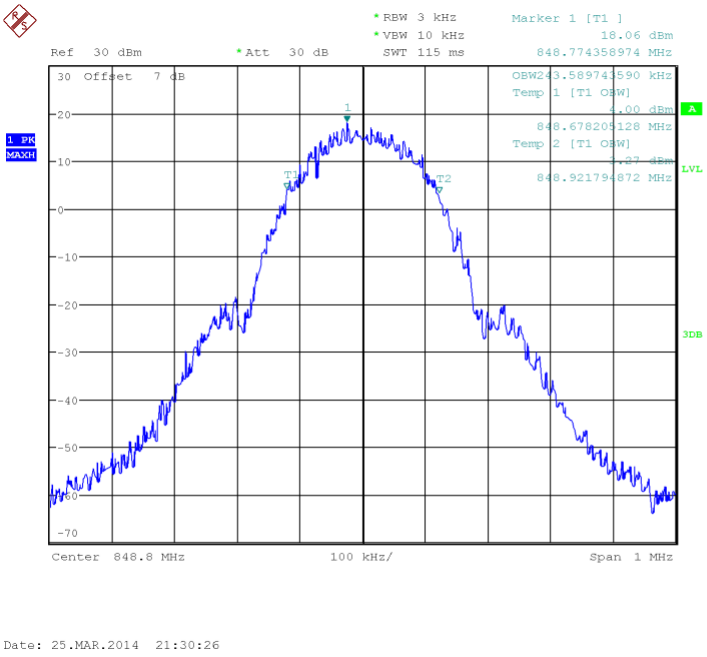
Channel 128-Occupied Bandwidth (99%)

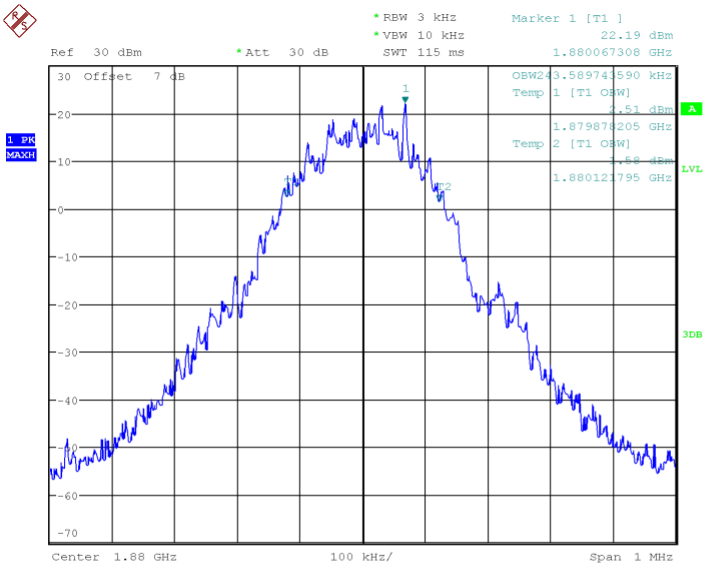


Channel 251-Occupied Bandwidth (99%)

GSM 1900		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(KHz)
Mid 661	1880	243.590
Low 512	1850.2	245.192
High 810	1909.8	245.192
GPRS1900		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(KHz)
Mid 661	1880	245.192
Low 512	1850.2	241.987
High 810	1909.8	246.495
EDGE1900		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(KHz)
Mid 661	1880	245.192
Low 512	1850.2	245.192
High 810	1909.8	243.590

Conclusion: PASS

GSM 1900



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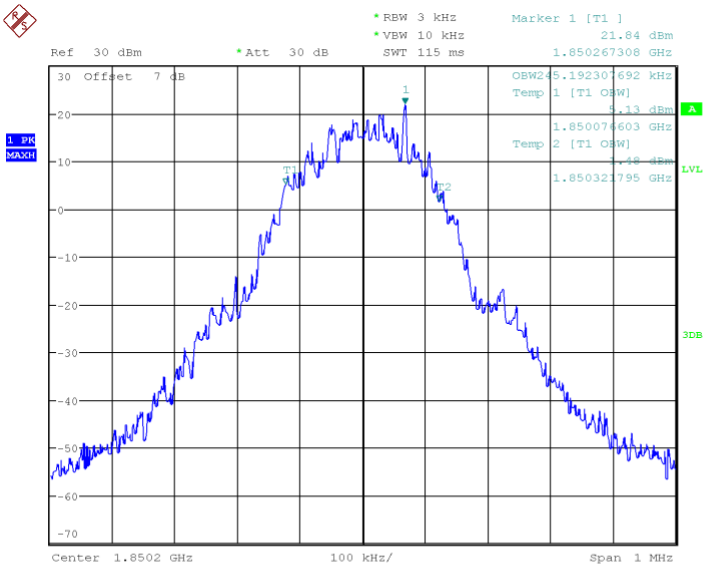
Channel 661-Occupied Bandwidth



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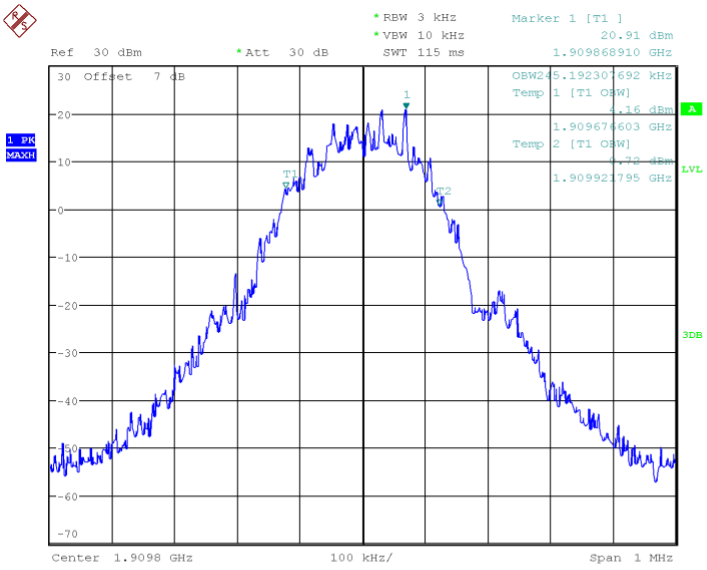
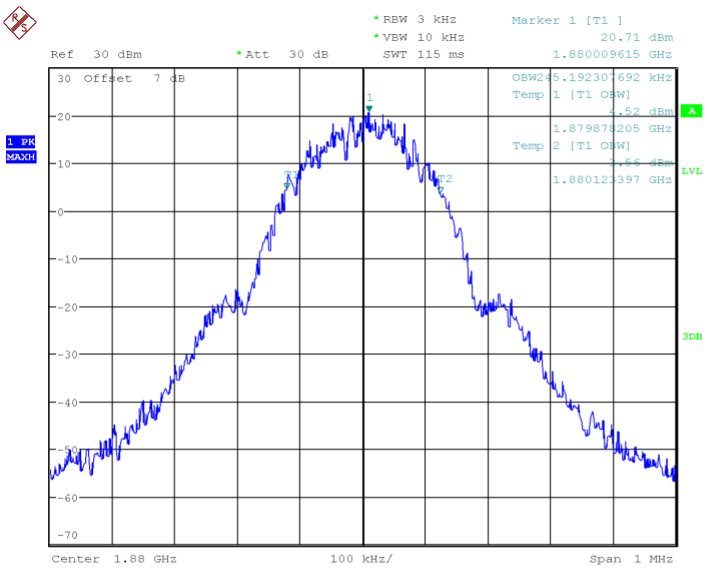
Channel512-Occupied Bandwidth

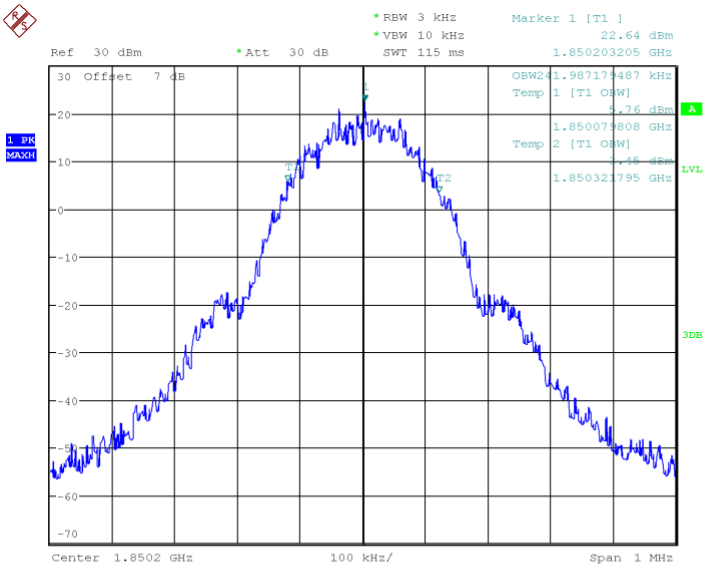


Channel 810-Occupied Bandwidth

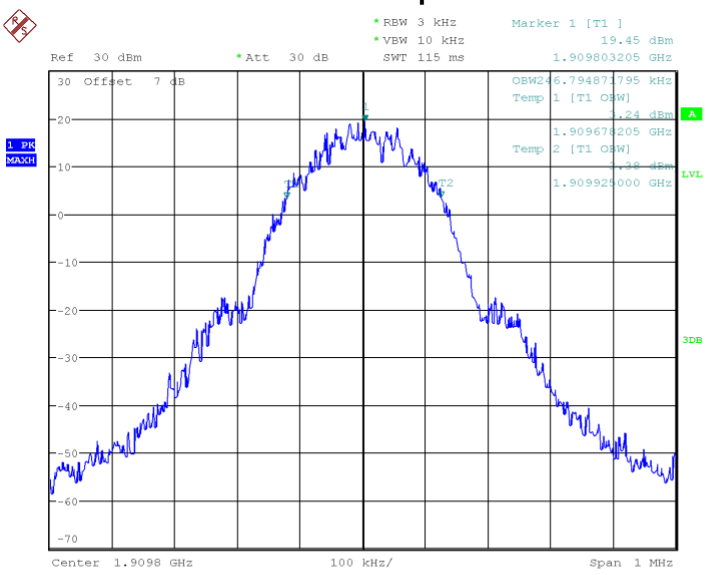
GPRS 1900



Channel 661-Occupied Bandwidth

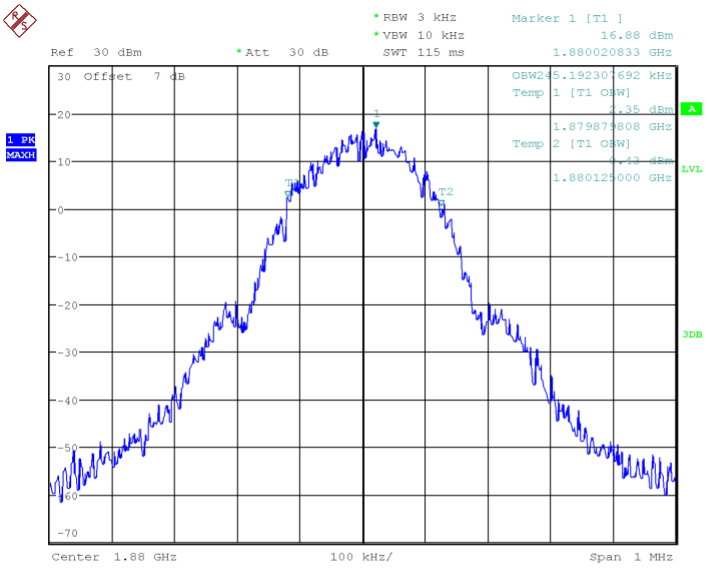


Channel512-Occupied Bandwidth



Channel 810-Occupied Bandwidth

EDGE 1900



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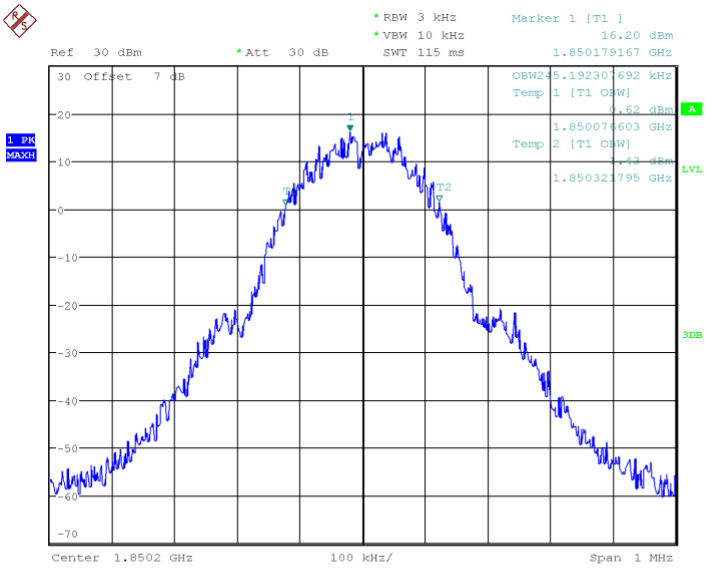
Channel 661-Occupied Bandwidth



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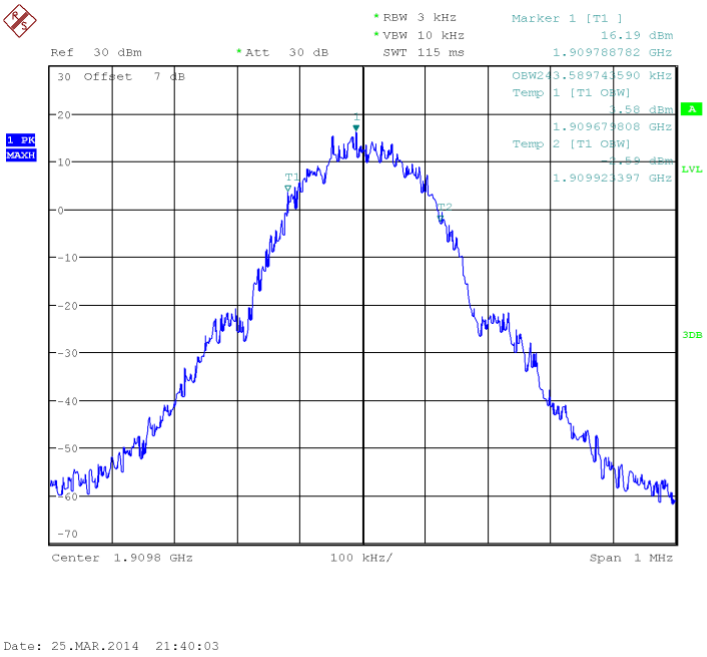
Channel512-Occupied Bandwidth

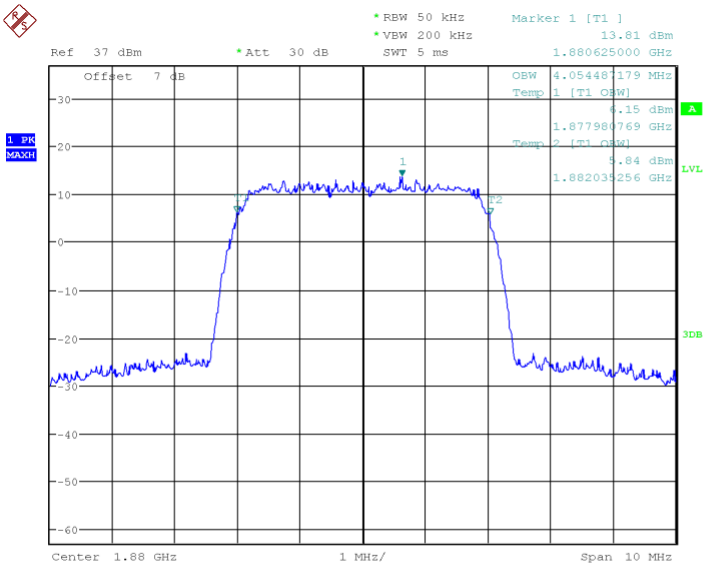


Channel 810-Occupied Bandwidth

WCDMA BAND II		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(MHz)
Mid 9400	1880	4.05
Low 9262	1852.4	4.05
High 9538	1907.6	4.07
WCDMA BAND V		
Test channel	Frequency (MHz)	99% Occupied Bandwidth(MHz)
Mid 4183	836.6	4.08
Low 4132	826.4	4.07
High 4233	846.6	4.07

Conclusion: PASS

WCDMA BAND II



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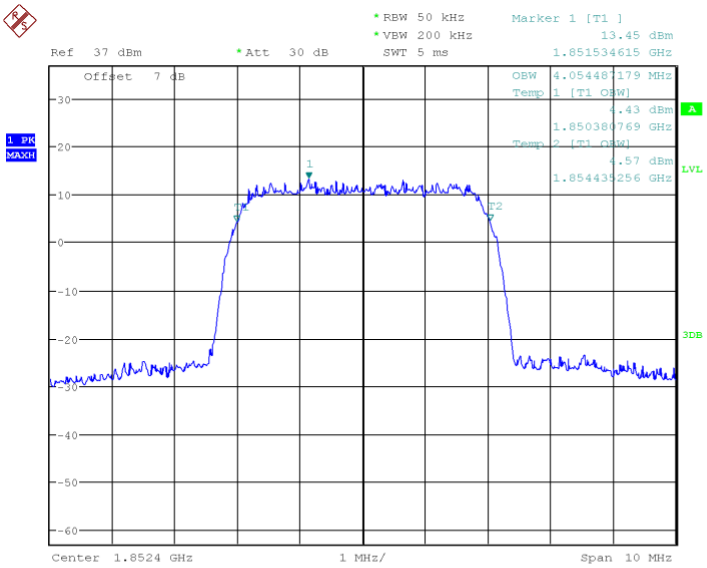

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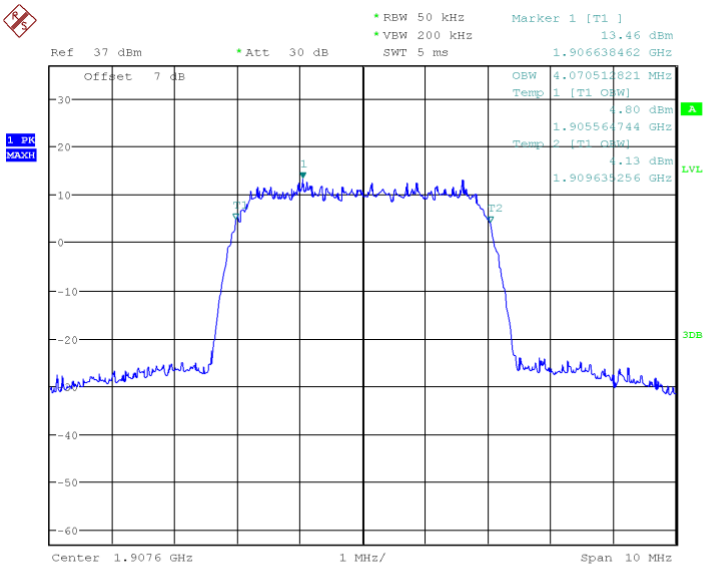
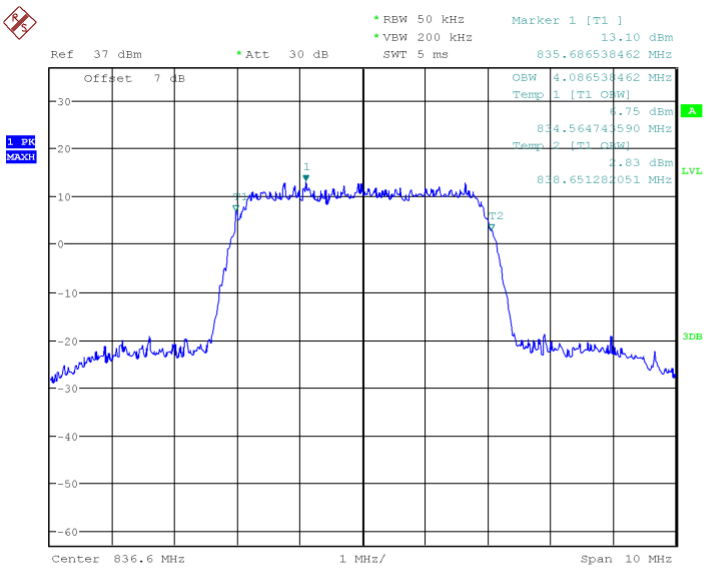
Channel9262-Occupied Bandwidth

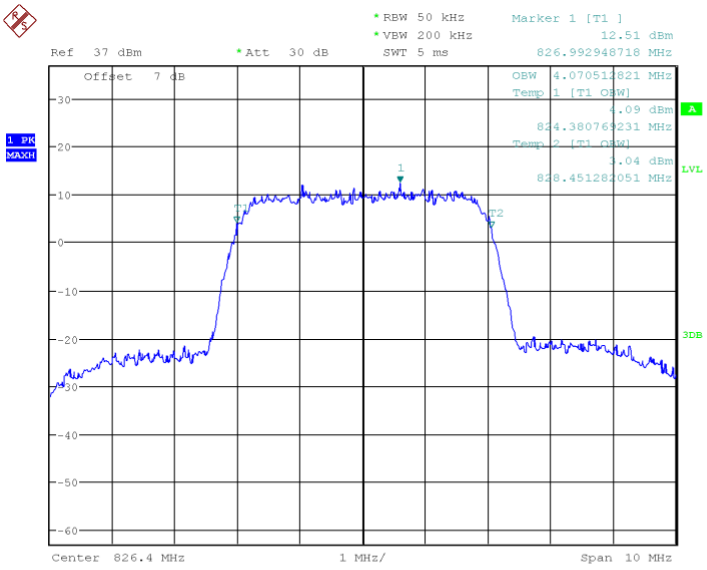


Channel 9538-Occupied Bandwidth

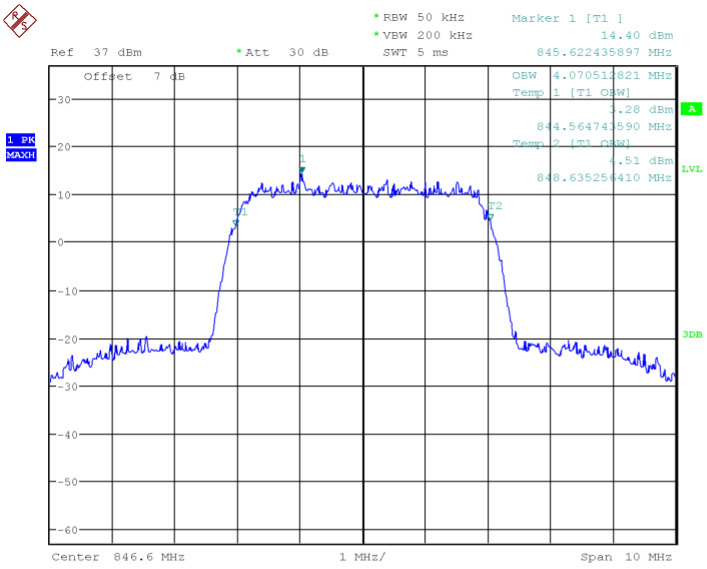
WCDMA BAND V



Channel 4183-Occupied Bandwidth



Channel4132-Occupied Bandwidth



Channel 4233-Occupied Bandwidth

ANNEX A.3. -26dB Emission Bandwidth(§22.917(b)/§24.238(b))

A.3.1. -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.

Test Procedure:

The table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

Measurement methods:

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

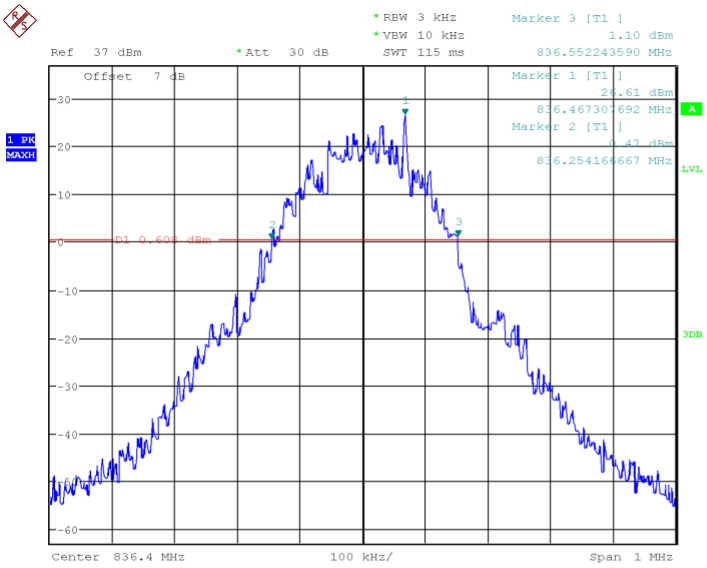
For WCDMA: signal analyzer setting as: RBW=50KHZ;VBW=20KHZ;Span=10MHz.

Test results:

GSM850		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(KHz)
Mid 189	836.4	298.077
Low 128	824.2	309.295
High 251	848.8	298.077
GPRS850		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(KHz)
Mid 189	836.4	320.513
Low 128	824.2	306.090
High 251	848.8	315.705
EDGE850		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(KHz)
Mid 189	836.4	310.897
Low 128	824.2	318.910
High 251	848.8	317.308

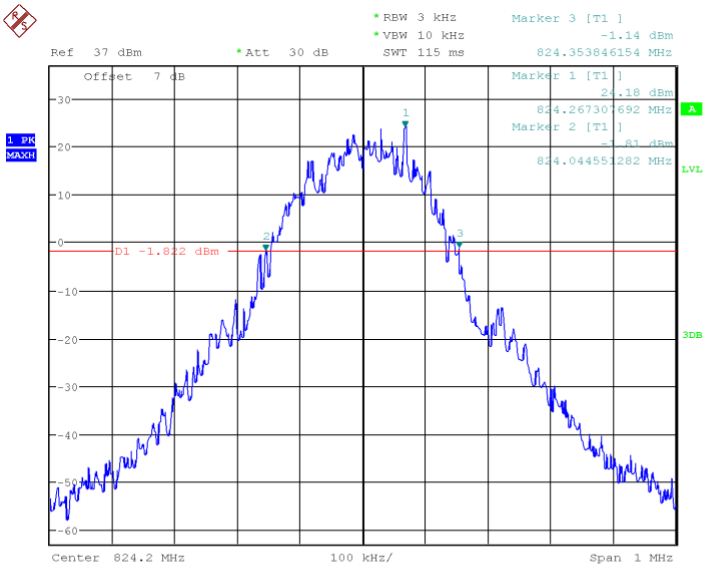
Conclusion: PASS

GSM 850



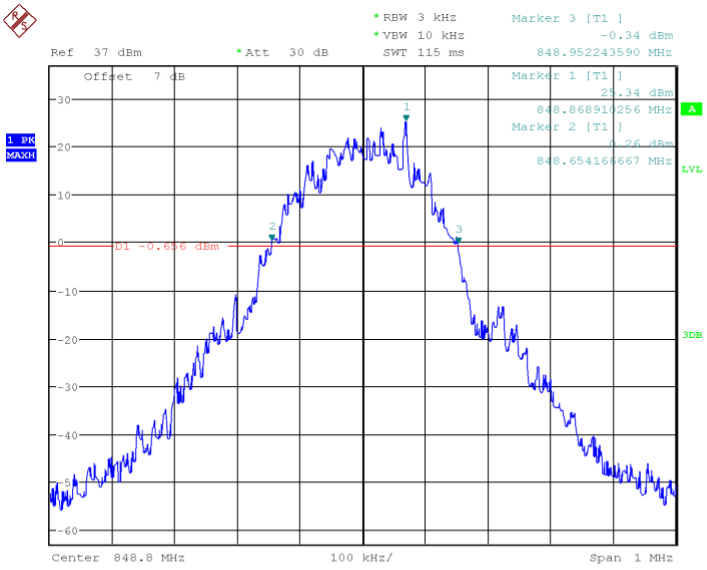
Date: 25.MAR.2014 21:44:25

Channel 189-Emission Bandwidth (-26dBc BW)



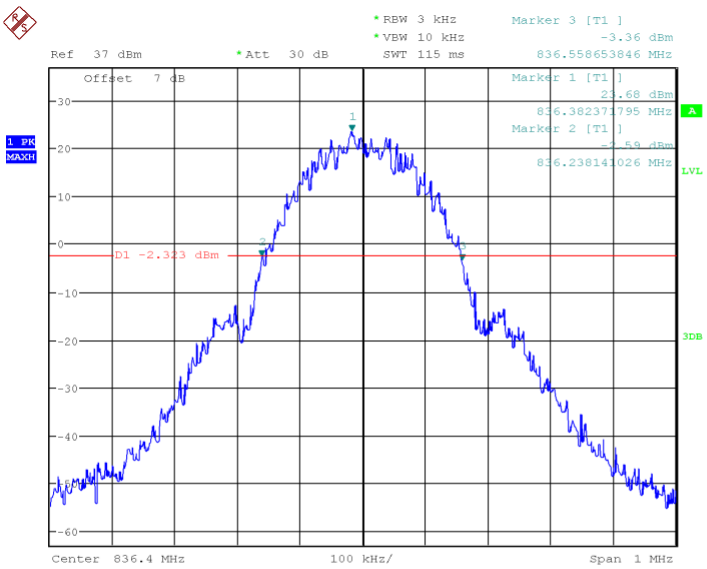
Date: 25.MAR.2014 21:44:50

Channel 128- Emission Bandwidth (-26dBc BW)

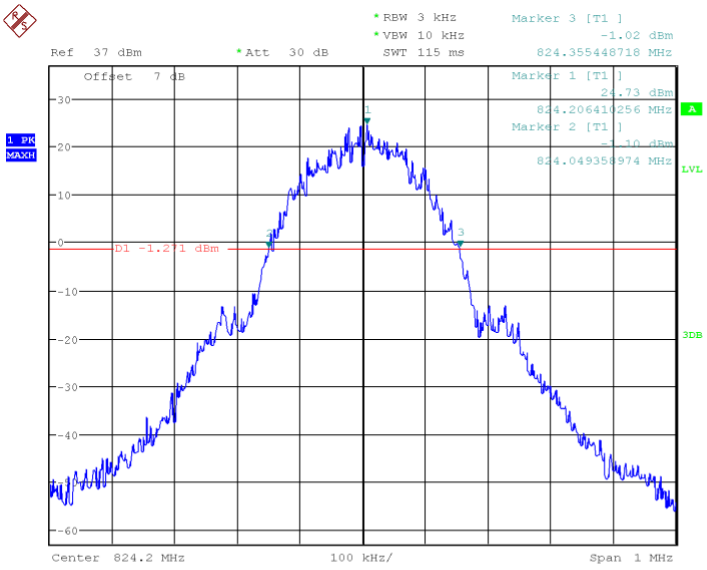


Channel 251- Emission Bandwidth (-26dBc BW)

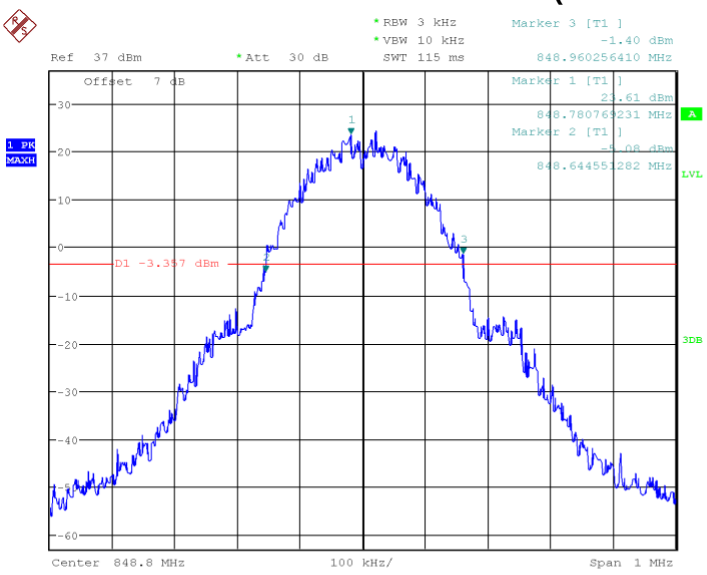
GPRS 850



Channel 189- Emission Bandwidth (-26dBc BW)

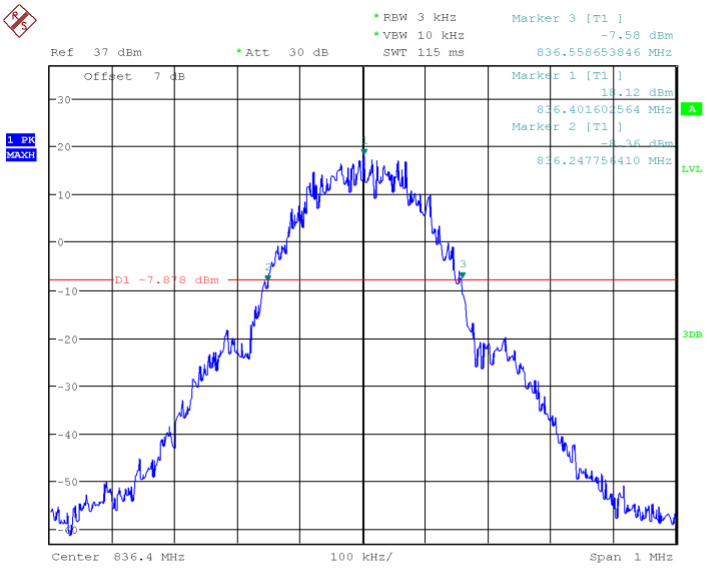


Channel 128- Emission Bandwidth (-26dBc BW)



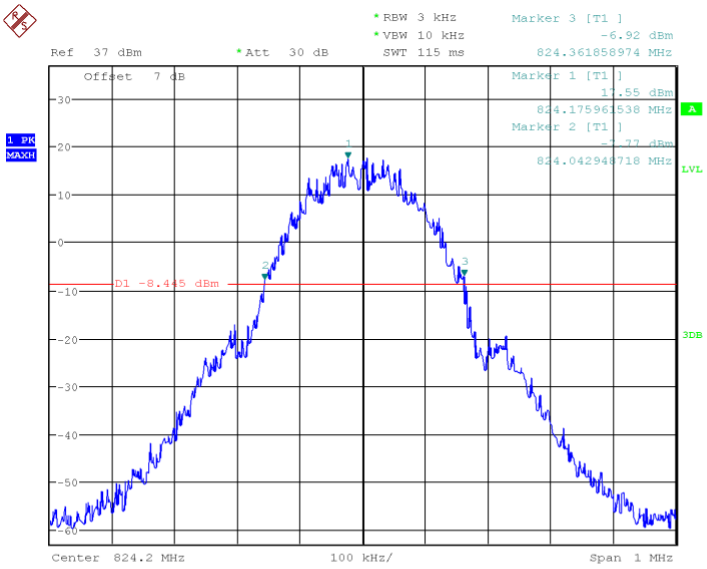
Channel 251- Emission Bandwidth (-26dBc BW)

EDGE 850



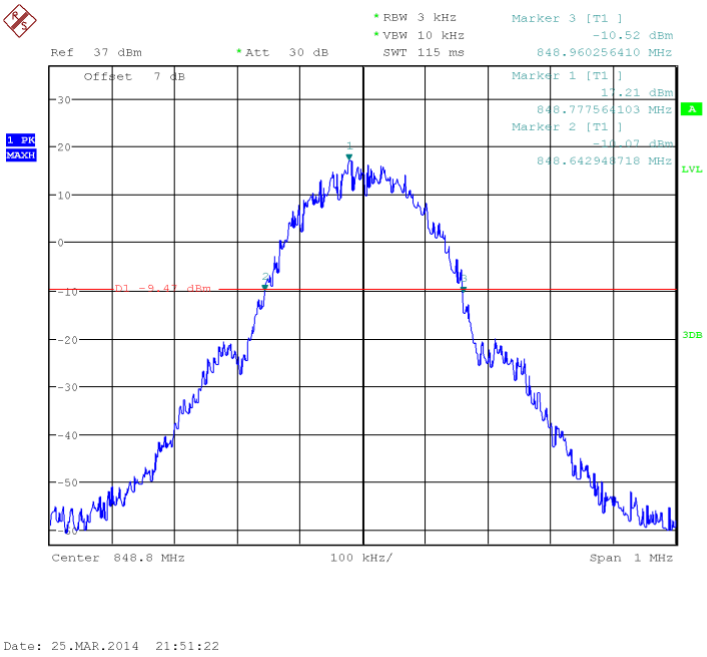
Date: 25.MAR.2014 21:50:35

Channel 189- Emission Bandwidth (-26dBc BW)



Date: 25.MAR.2014 21:50:59

Channel 128- Emission Bandwidth (-26dBc BW)

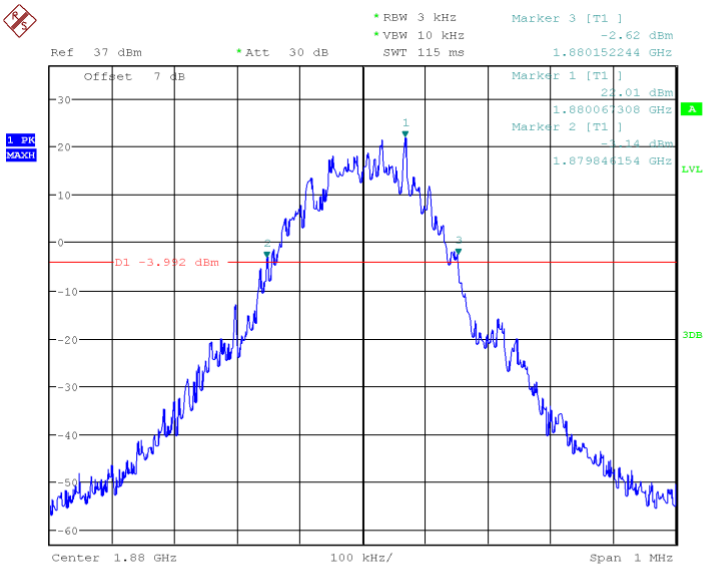


Channel 251- Emission Bandwidth (-26dBc BW)

GSM 1900		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(KHz)
Mid 661	1880	306.090
Low 512	1850.2	301.282
High 810	1909.8	301.282
GPRS1900		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(KHz)
Mid 661	1880	310.897
Low 512	1850.2	314.103
High 810	1909.8	307.692
EDGE1900		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(KHz)
Mid 661	1880	317.308
Low 512	1850.2	312.500
High 810	1909.8	309.295

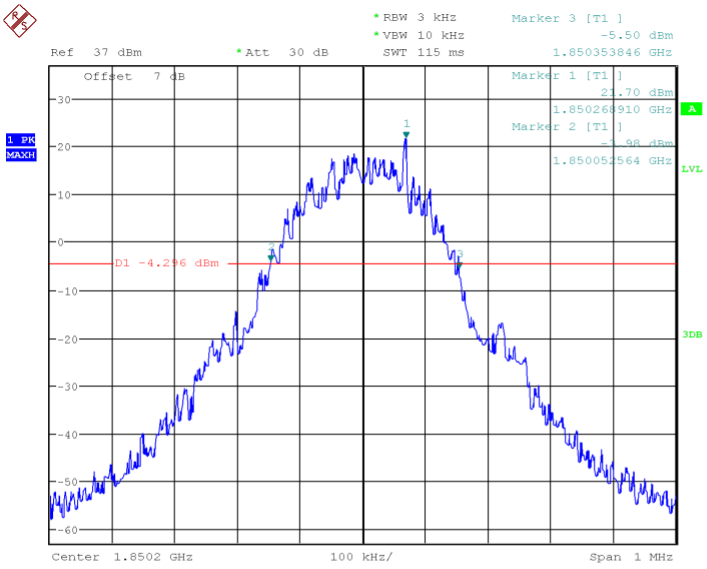
Conclusion: PASS

GSM 1900



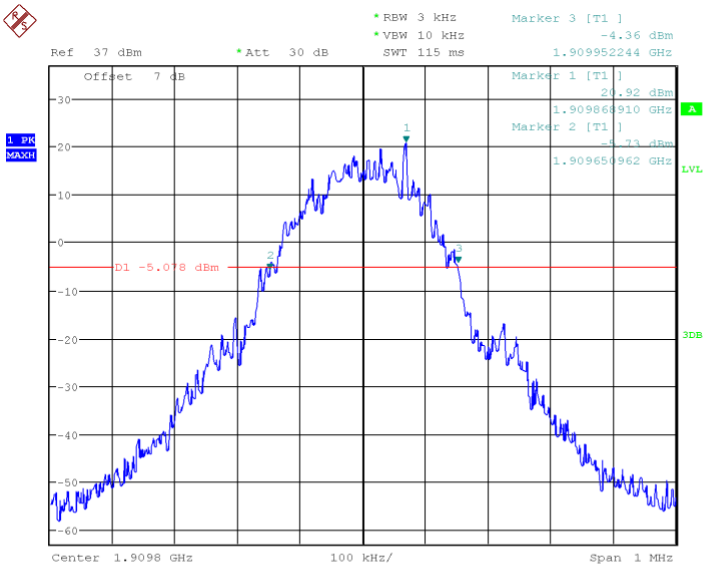
Date: 26.MAR.2014 15:07:06

Channel 661- Emission Bandwidth (-26dBc BW)



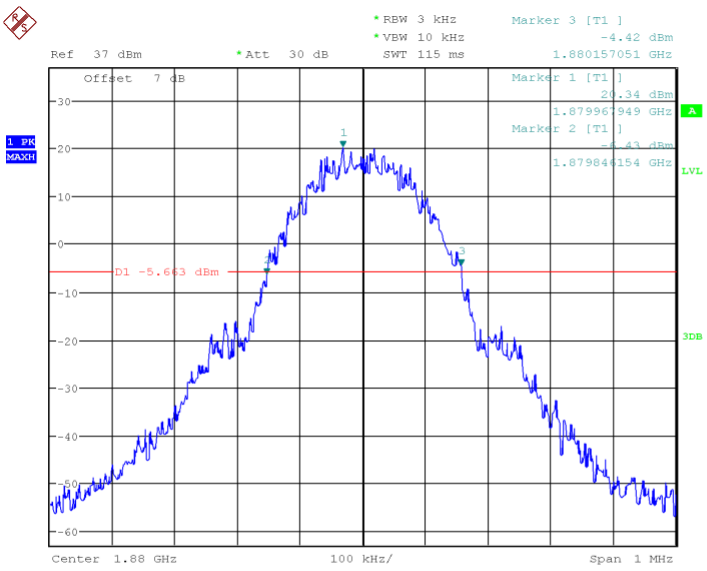
Date: 26.MAR.2014 15:07:31

Channel512- Emission Bandwidth (-26dBc BW)

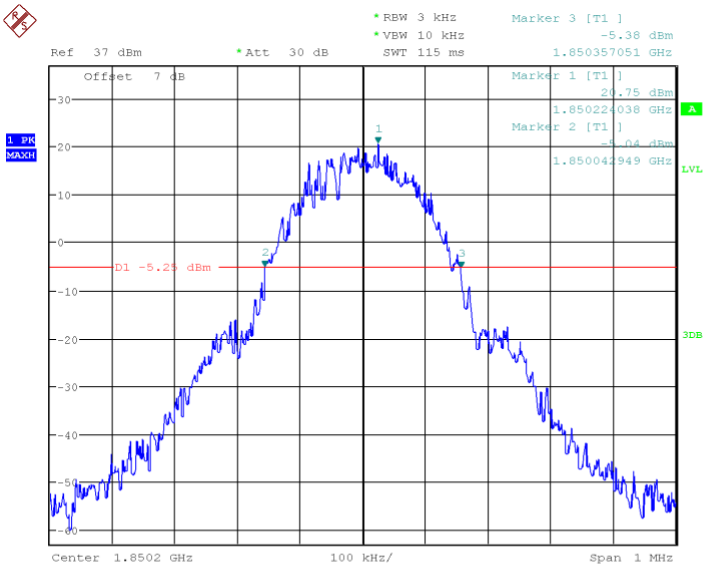


Channel 810- Emission Bandwidth (-26dBc BW)

GPRS 1900

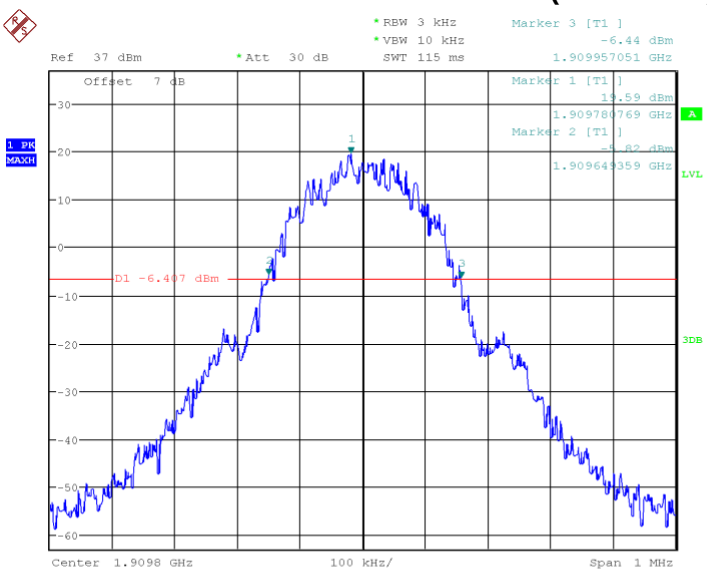


Channel 661- Emission Bandwidth (-26dBc BW)



Date: 26.MAR.2014 15:09:58

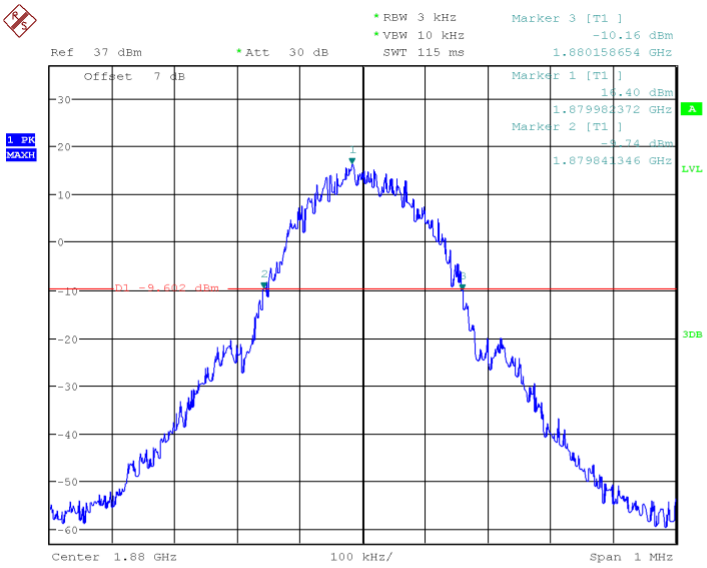
Channel512- Emission Bandwidth (-26dBc BW)



Date: 26.MAR.2014 15:10:21

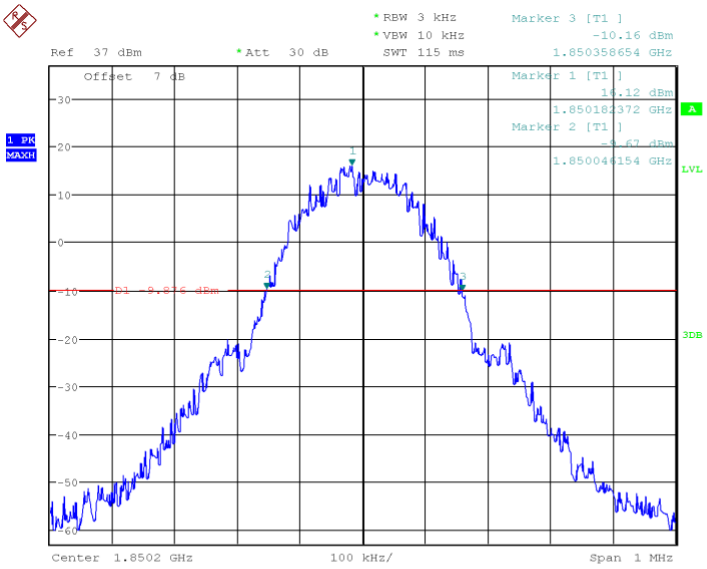
Channel 810- Emission Bandwidth (-26dBc BW)

EDGE 1900



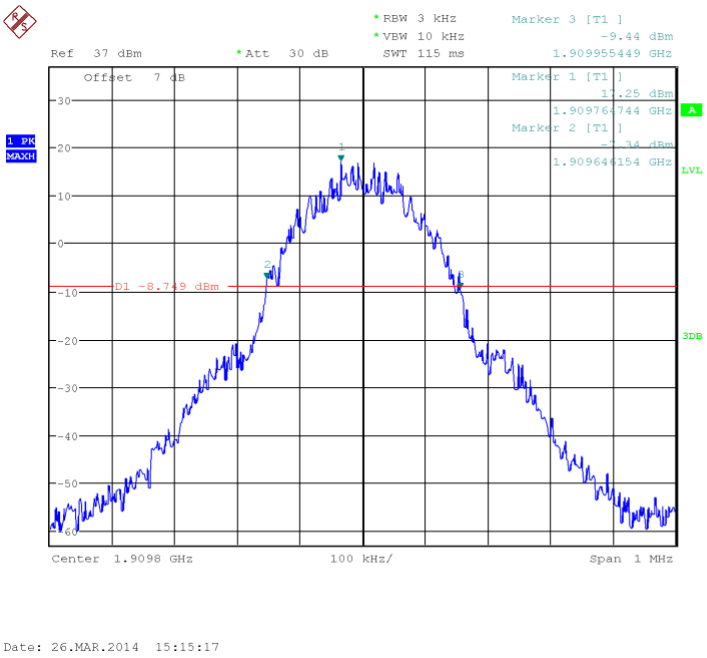
Date: 26.MAR.2014 15:14:32

Channel 661- Emission Bandwidth (-26dBc BW)



Date: 26.MAR.2014 15:14:54

Channel512- Emission Bandwidth (-26dBc BW)

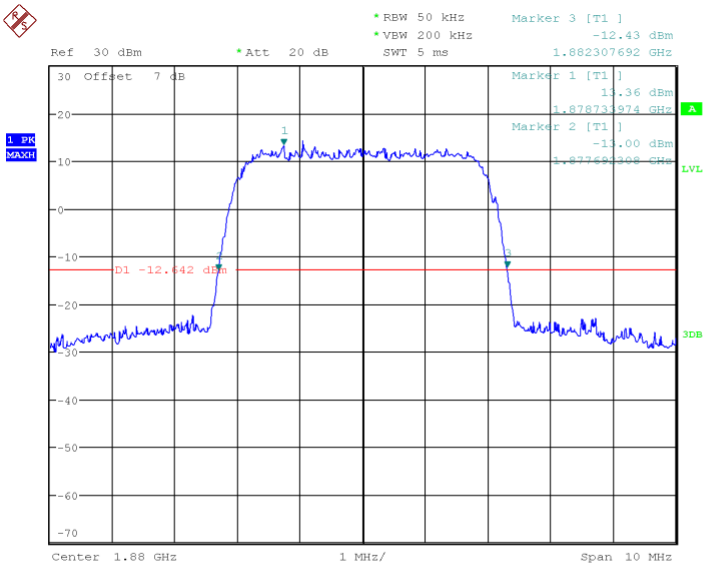


Channel 810- Emission Bandwidth (-26dBc BW)

WCDMA BAND II		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(MHz)
Mid 9400	1880	4.6
Low 9262	1852.4	4.6
High 9538	1907.6	4.6
WCDMA BAND V		
Test channel	Frequency (MHz)	–26dBc Emission Bandwidth(MHz)
Mid 4183	836.6	4.6
Low 4132	826.4	4.6
High 4233	846.6	4.6

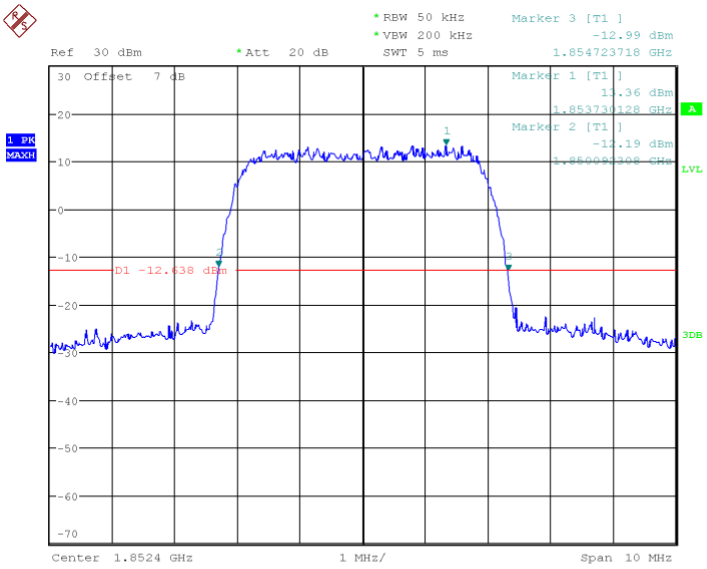
Conclusion: PASS

WCDMA BAND II



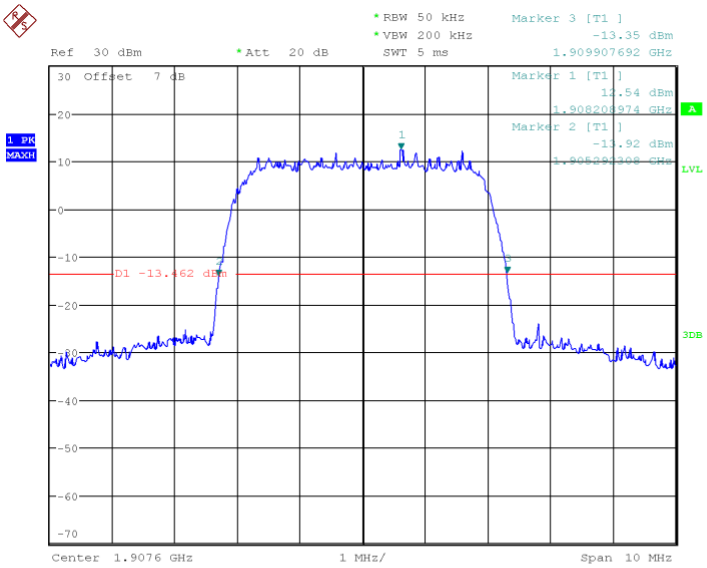
Date: 26.MAR.2014 17:14:29

Channel 9400- Emission Bandwidth (-26dBc BW)



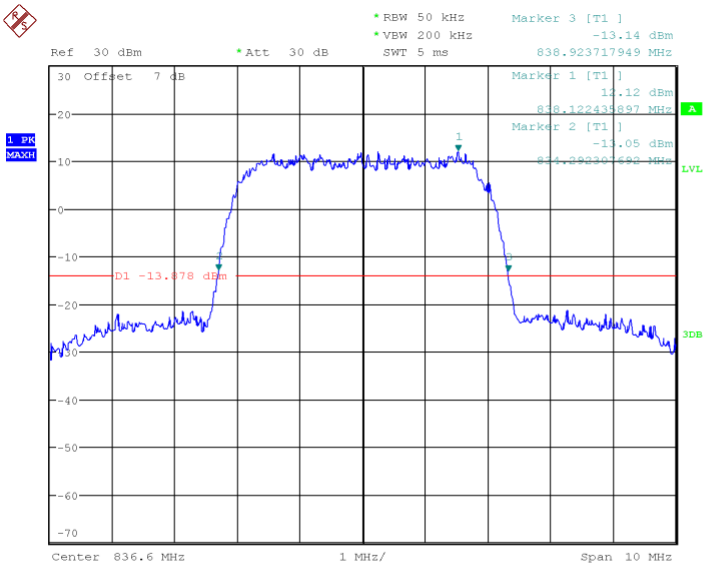
Date: 26.MAR.2014 17:14:53

Channel9262- Emission Bandwidth (-26dBc BW)

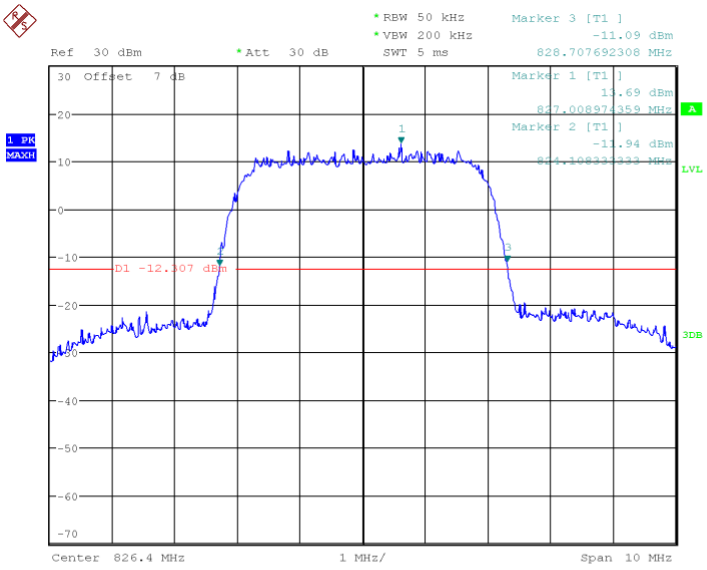


Channel 9538- Emission Bandwidth (-26dBc BW)

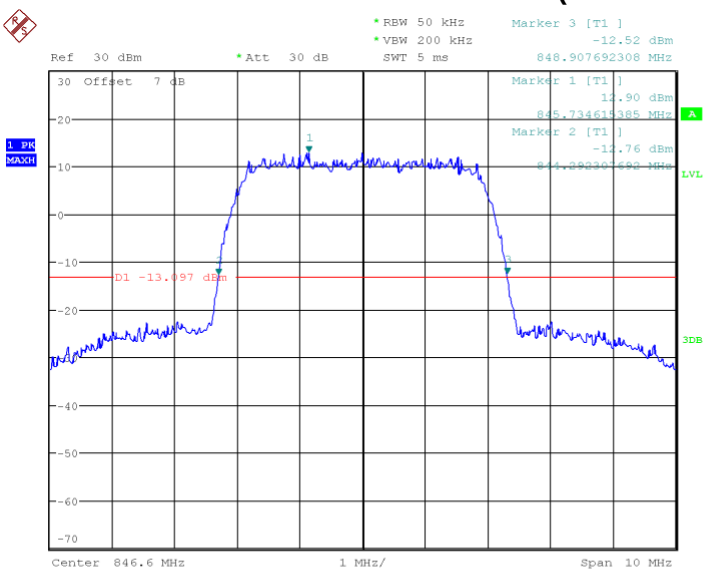
WCDMA BAND V



Channel 4183- Emission Bandwidth (-26dBc BW)



Channel4132- Emission Bandwidth (-26dBc BW)



Channel 4233- Emission Bandwidth (-26dBc BW)

ANNEX A.4. Band Edge at antenna terminals(§22.917(b)/§24.238(b))

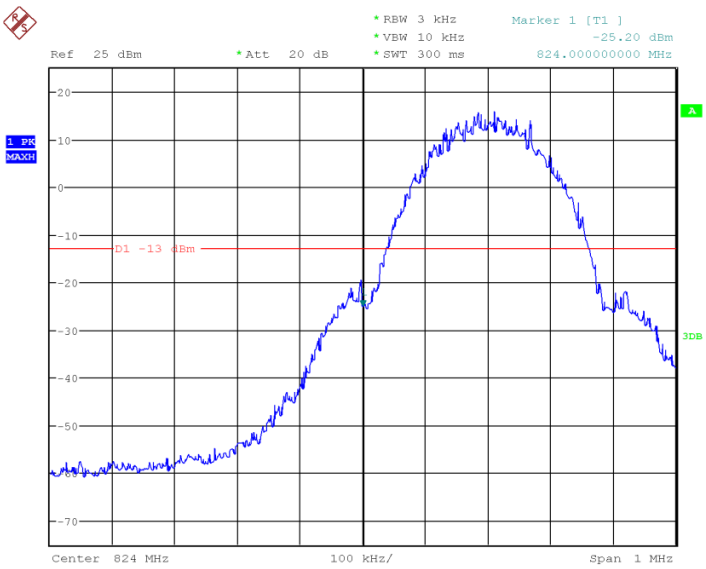
Limit:

The magnitude of each spurious and harmonic emission that can be detected when the equipment is operated under the conditions specification in the instruction manual and/or alignment procedure, shall not be less than 43+10log (Mean power in watts) dBc below the mean power output outside a license's frequency block(-13dBm).

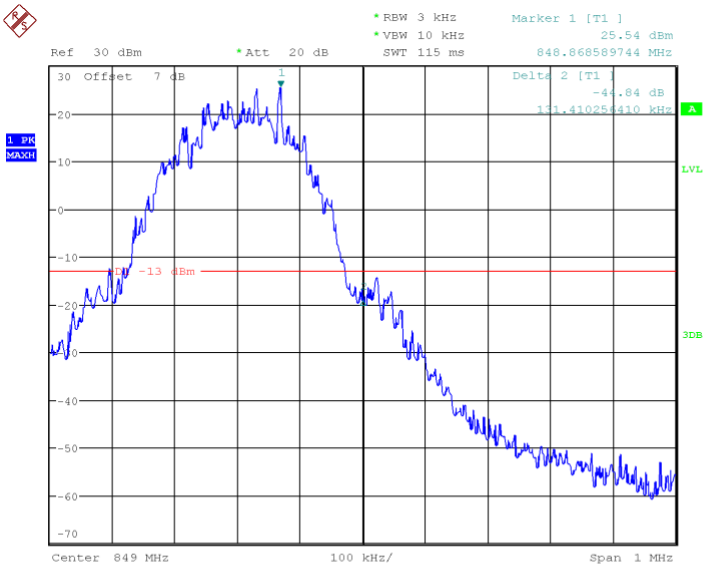
Test procedure:

The RF output of the transceiver was connected to a signal analyzer through appropriate attenuation. In the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emissionbandwidth of the fundamental emission of the transmitter may be employed.

GSM 850

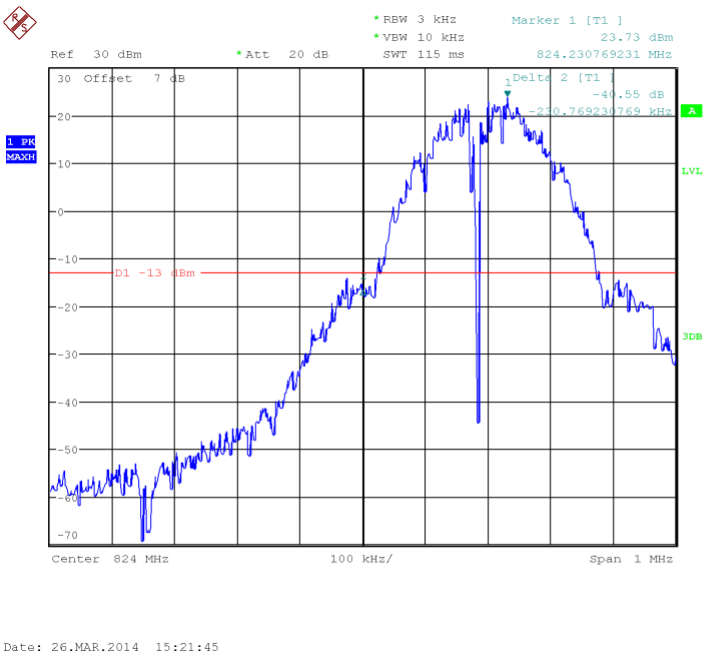


Channel 128- LOW BAND EDGE BLOCK

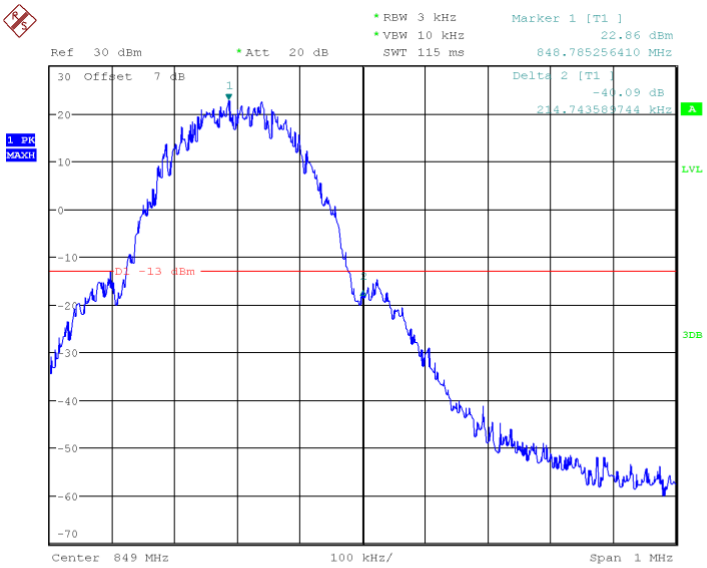


Channel 251- HIGH BAND EDGE BLOCK

GPRS 850



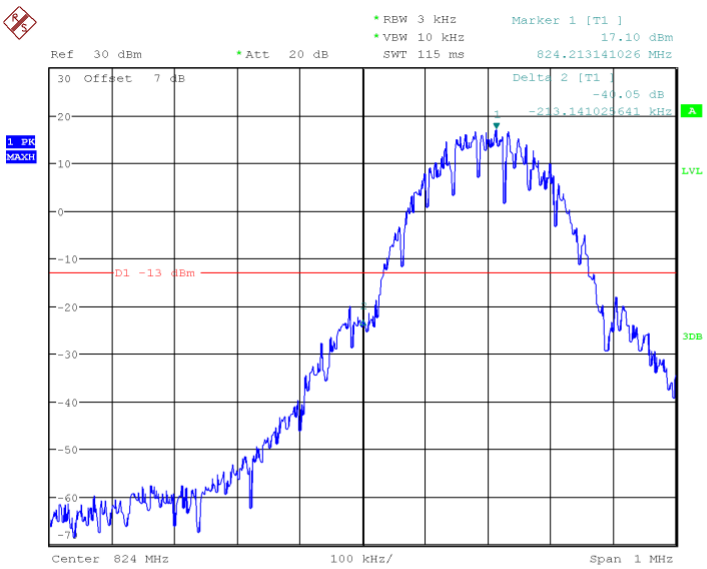
Channel 128- LOW BAND EDGE BLOCK



Date: 26.MAR.2014 15:22:11

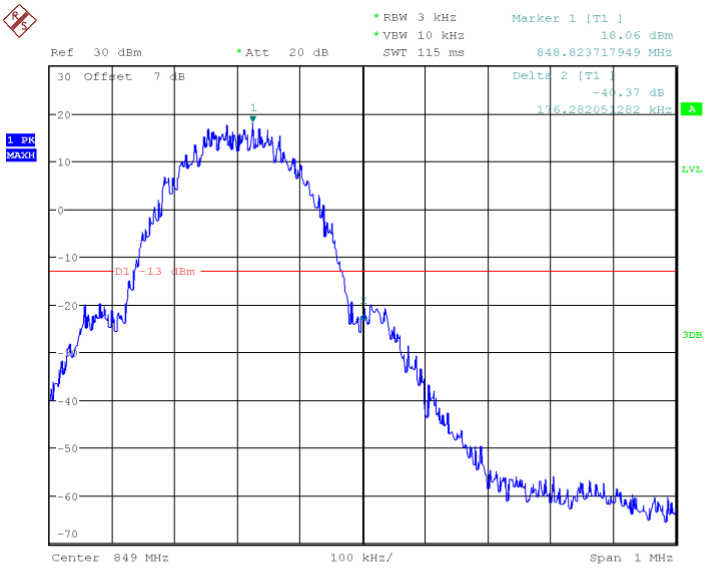
Channel 251- HIGH BAND EDGE BLOCK

EDGE 850



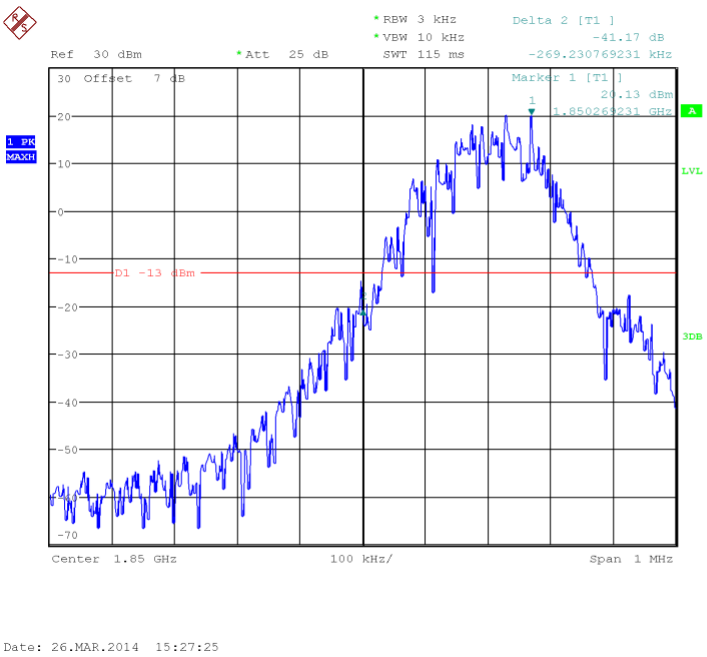
Date: 26.MAR.2014 15:25:22

Channel 128- LOW BAND EDGE BLOCK

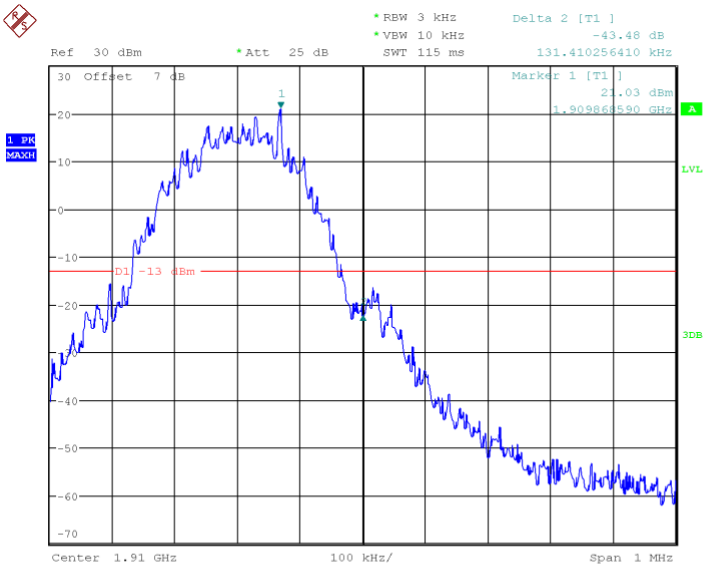


Channel 251- HIGH BAND EDGE BLOCK

GSM 1900

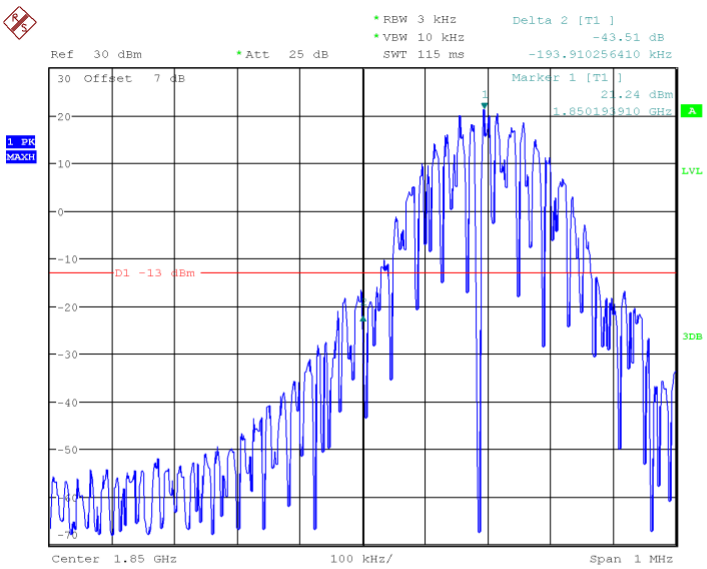


Channel 512- LOW BAND EDGE BLOCK

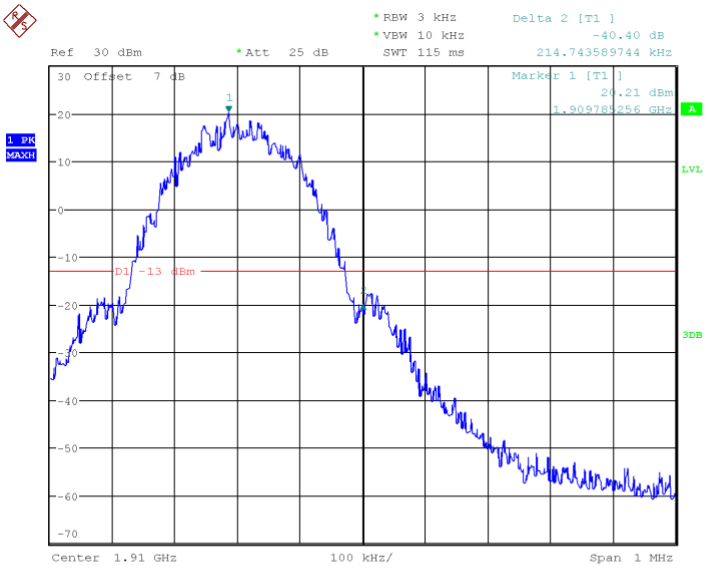


Channel 810- HIGH BAND EDGE BLOCK

GPRS 1900

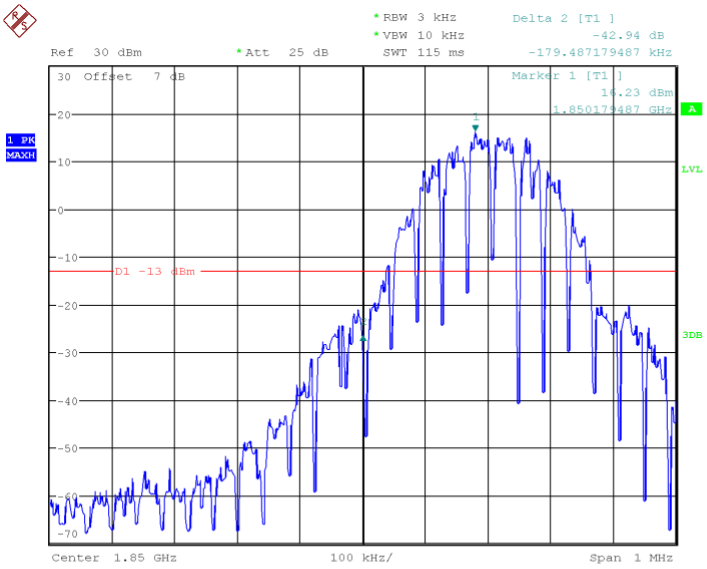


Channel 512- LOW BAND EDGE BLOCK

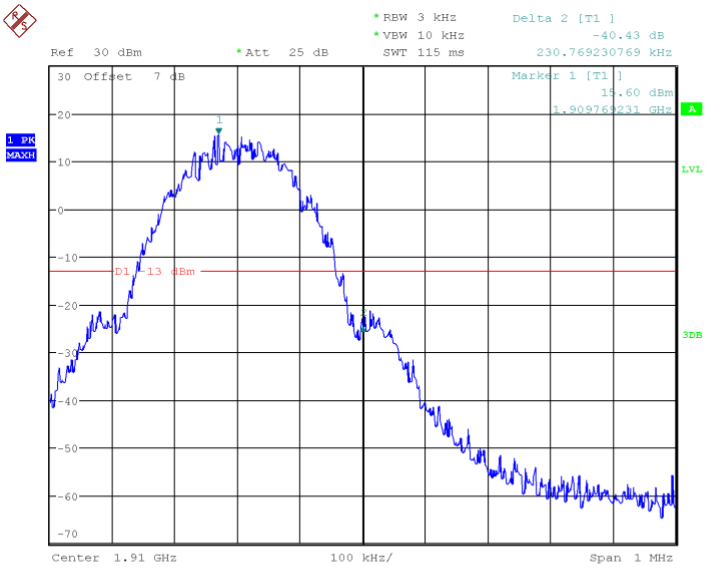


Channel 810- HIGH BAND EDGE BLOCK

EDGE 1900

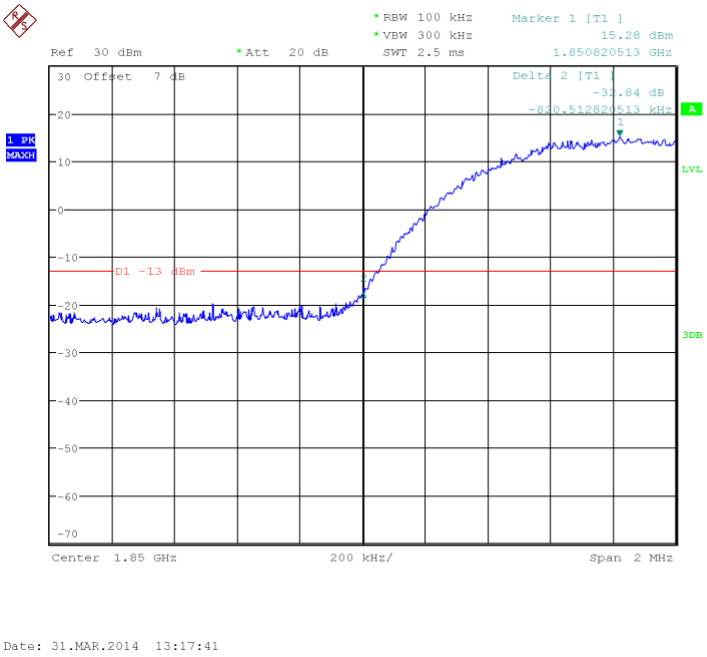


Channel 512- LOW BAND EDGE BLOCK

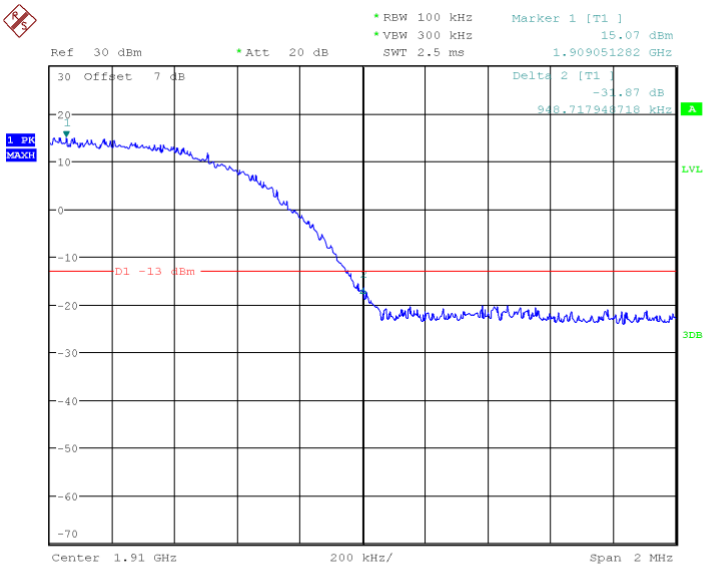


Channel 810- HIGH BAND EDGE BLOCK

WCDMA BAND II

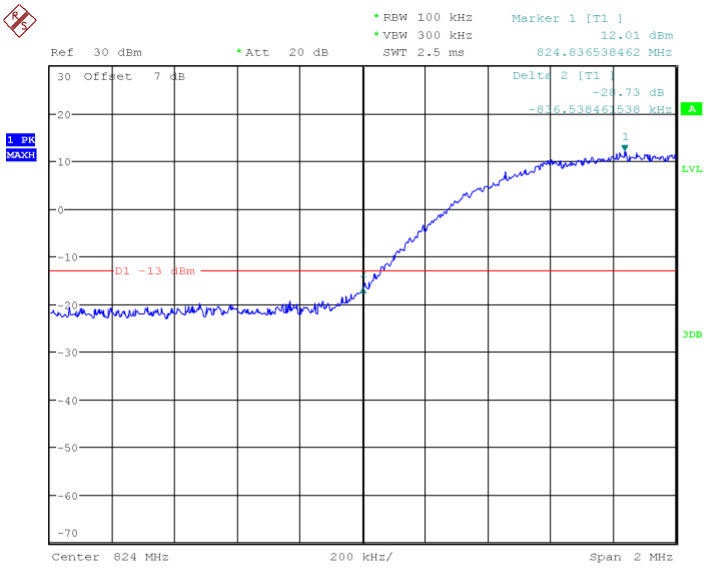


Channel 9262- LOW BAND EDGE BLOCK

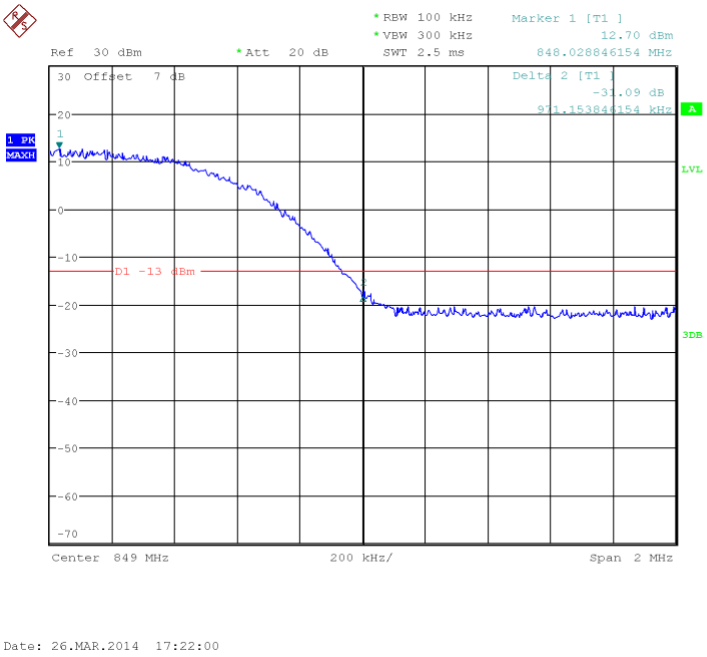


Channel 9538- HIGH BAND EDGE BLOCK

WCDMA BAND V



Channel4132- LOW BAND EDGE BLOCK



Channel 4233- HIGH BAND EDGE BLOCK

Conclusion: PASS

ANNEX A.5. FREQUENCY STABILITY (§2.1055/§24.235)

A.5.1.Method of Measurement

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of R&S CMU200 DIGITAL RADIO COMMUNICATION TESTER.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30℃.
3. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on mid channel of GSM850, PCS1900, WCDMA BANDII and WCDMA BANDV, measure the carrier frequency. Thesemeasurements should be made within 2 minutes of Powering up the EUT, to preventsignificant self-warming.
4. Repeat the above measurements at 10℃ increments from -30℃ to +50℃. Allow at least 1 1/2 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50℃.
7. With the EUT, powered via nominal voltage, connected to the CMU200 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 C increments from +50℃ to -30℃. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5℃ during the measurement procedure.

A.5.2. Measurement Limit

A.5.2.1. For Hand carried battery powered equipment

According to the JTC standard the GSM frequency stability of the carrier shall be accurate to within 0.1ppm of the received frequency from the base station. And the WCDMA is 2.5ppm. This accuracy is sufficient to meet Sec.24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that thefundamental emission stays within the authorized frequency block. As this transceiver isconsidered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requiresthat the lower voltage for frequency stability testing be specified by the manufacturer. Thistransceiver is specified to operate with an input voltage of between 3.2VDC and 3.6VDC, with anominal voltage of 3.3VDC. Operation above or below these voltage limits is prohibited bytransceiver software in order to prevent improper operation as well as to protect components fromoverstress. These voltages represent a tolerance of -10 % and +12.5 %. For the purposes ofmeasuring frequency stability these voltage limits are to be used.

A.5.2.2. For equipment powered by primary supply voltage

According to the JTC standard the GSM frequency stability of the carrier shall be accurate to within 0.1ppm of the received frequency from the base station. And the WCDMA is 2.5ppm. This accuracy is sufficient to meet Sec.24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that thefundamental emission stays within the authorized frequency block. For this EUT section2.1055(d)(1) applies. This requires varying primary supply voltage from 85 to 115 percent of thenominal value for other than hand carried battery equipment.

GSM850Mid Channel/fc(MHz) 189/836.4

Frequency Error VS Temperature

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.8	-30	-19	2091
3.8	-20	-18	2091
3.8	-10	-9	2091
3.8	0	-10	2091
3.8	10	-12	2091
3.8	20	-11	2091
3.8	30	-13	2091
3.8	40	-12	2091
3.8	50	-17	2091

Frequency Error VS Voltage

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.3	25	-10	2091
3.8	25	-15	2091
4.5	25	-19	2091

PCS1900 Mid Channel/fc(MHz) 661/1880

Frequency Error VS Temperature

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.8	-30	23	4700
3.8	-20	-25	4700
3.8	-10	22	4700
3.8	0	23	4700
3.8	10	26	4700
3.8	20	-28	4700
3.8	30	27	4700
3.8	40	28	4700
3.8	50	25	4700

Frequency Error VS Voltage

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.3	25	23	4700
3.8	25	29	4700
4.5	25	26	4700

WCDMA BAND II Mid Channel/fc(MHz) 9400 /1880

Frequency Error VS Temperature

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.8	-30	28	4700
3.8	-20	31	4700
3.8	-10	30	4700
3.8	0	26	4700
3.8	10	33	4700
3.8	20	34	4700
3.8	30	40	4700
3.8	40	27	4700
3.8	50	-32	4700

Frequency Error VS Voltage

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.3	25	29	4700
3.8	25	33	4700
4.5	25	37	4700

WCDMA BAND V Mid Channel/fc(MHz) 4183/836.6

Frequency Error VS Temperature

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.8	-30	17	2091
3.8	-20	17	2091
3.8	-10	18	2091
3.8	0	19	2091
3.8	10	18	2091
3.8	20	14	2091
3.8	30	16	2091
3.8	40	18	2091
3.8	50	19	2091

Frequency Error VS Voltage

Power Supply (VDc)	Environment Temperature(℃)	Frequency error(Hz)	Limit (Hz)
3.3	25	12	2091
3.8	25	15	2091
4.5	25	14	2091

Conclusion: PASS

ANNEX A.6. CONDUCTED SPURIOUS EMISSION

A.6.1. GSM Measurement Method

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the equipment of PCS1900 band, this equates to a frequency range of 30 MHz to 19.1 GHz, data taken from 30 MHz to 20 GHz. For GSM850, data taken from 30 MHz to 10 GHz.
2. The sweep time is set automatically by instrument itself. That should be the optimal sweep time for the span and the RBW. If the sweep time is too short, that is sweep is too fast, the sweep result is not accurate; If the sweep time is too long, that is sweep is too low, some frequency components may be lost. The instrument will give a optimal sweep time according the selected span and RBW.
3. The procedure to get the conducted spurious emission is as follows:
The trace mode is set to MaxHold to get the highest signal at each frequency;
Wait 25 seconds;Get the result.
4. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

GSM 850 Transmitter

Channel	Frequency(MHz)
128	824.2
190	836.6
251	848.8

PCS1900 Transmitter

Channel	Frequency(MHz)
512	1850.2
661	1880.0
810	1909.8

A.6.1.1. Measurement Limit

Part 24.238 and Part 22.917 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

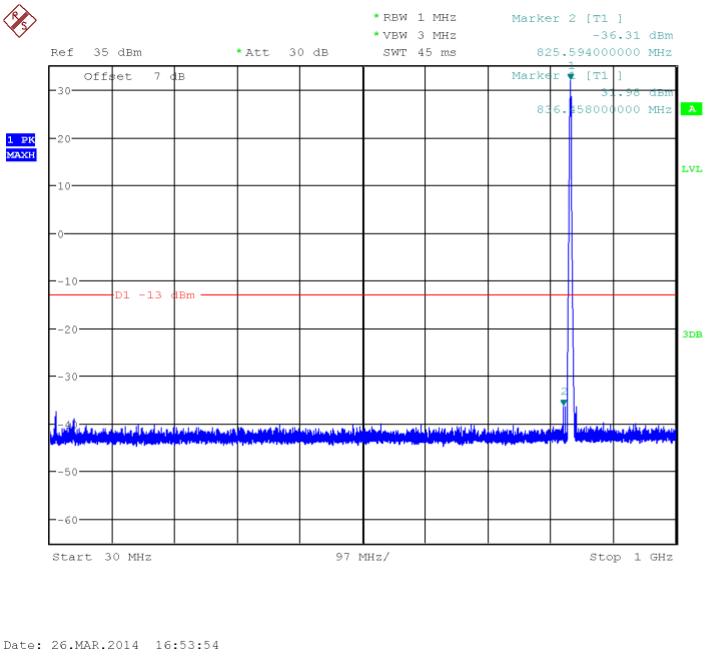
The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

A6.1.2. Measurement result

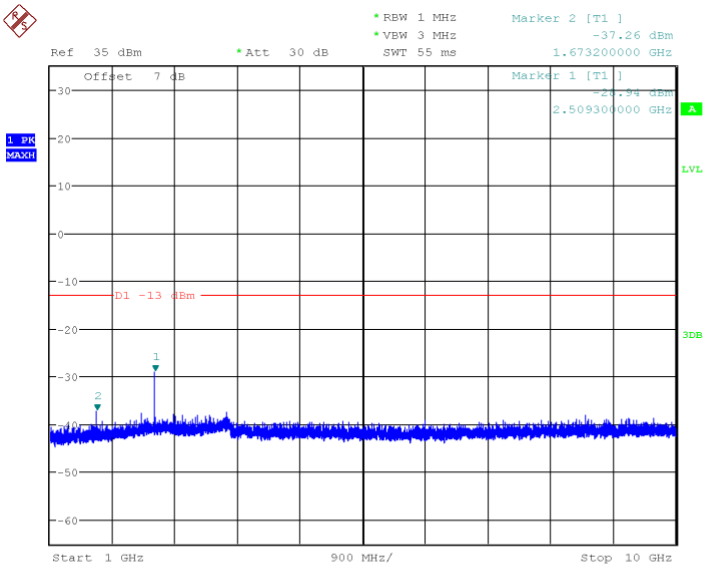
Spurious emission limit -13dBm.

Note: peak above the limit line is the carrier frequency.

A6.1.2.1. GSM850

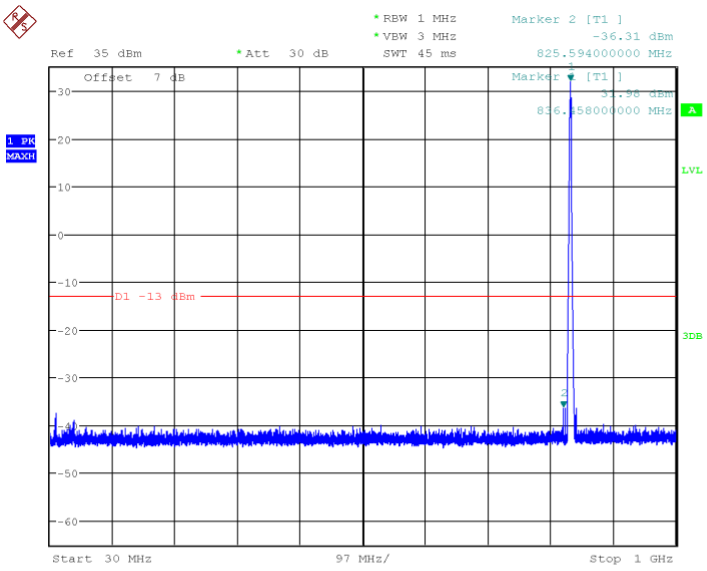


Channel 128: 30MHz~1GHz



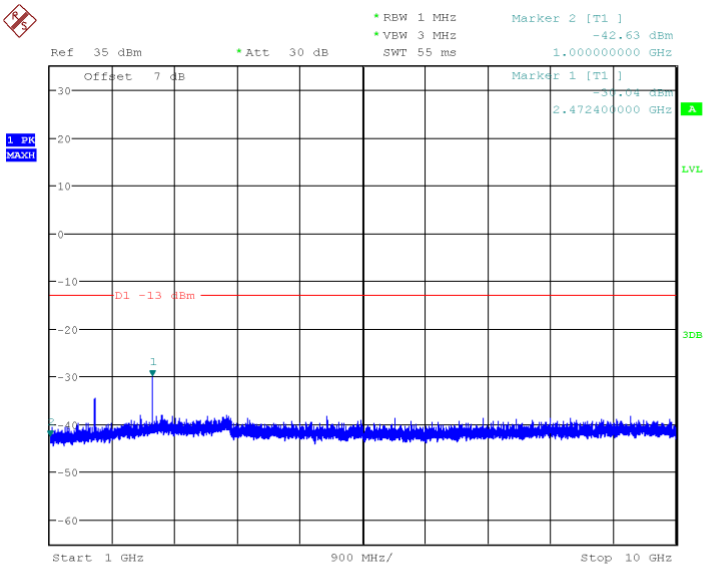
Date: 26.MAR.2014 15:34:48

Channel 128: 1GHz~10GHz

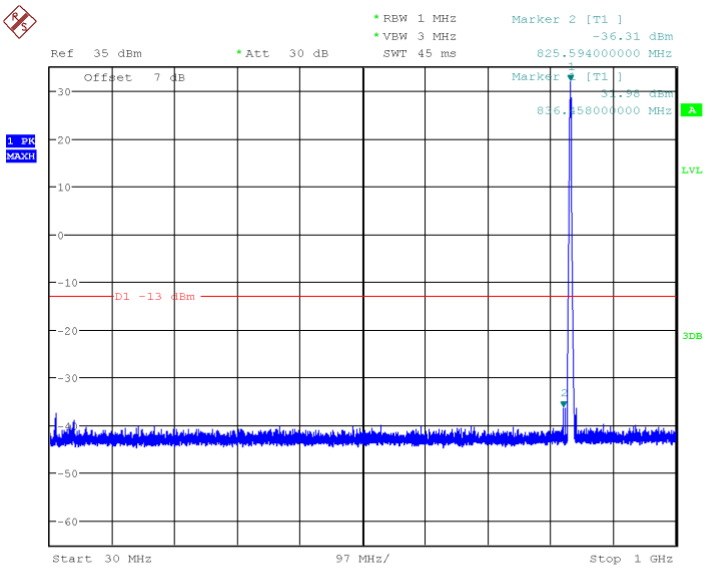


Date: 26.MAR.2014 16:53:54

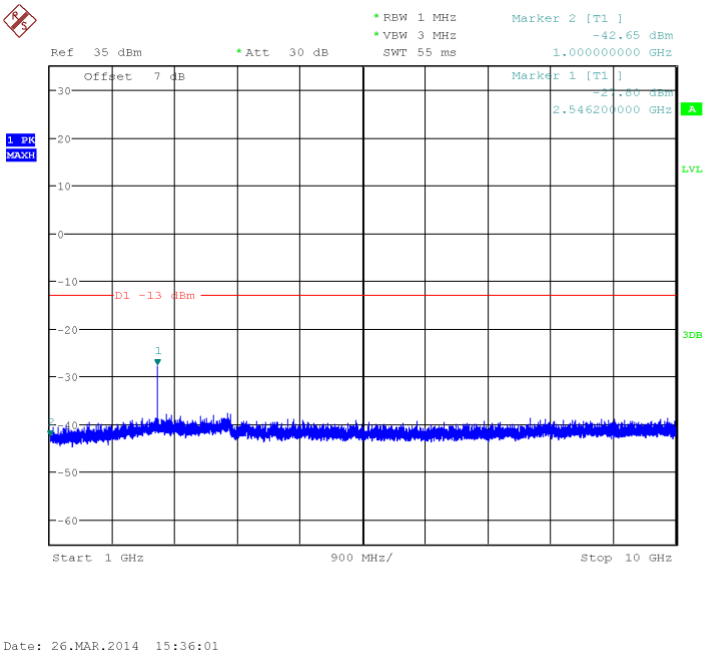
Channel 190: 30MHz~1GHz



Channel 190: 1GHz~10GHz

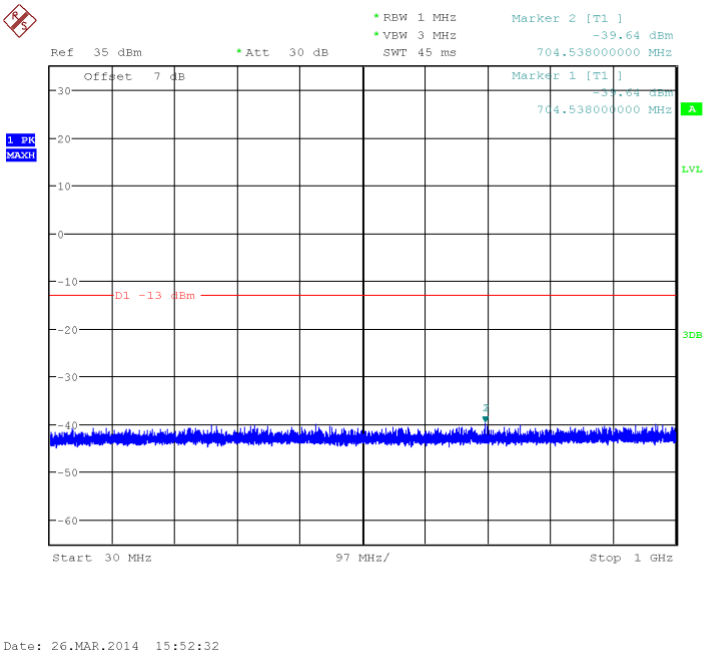


Channel 251: 30MHz~1GHz

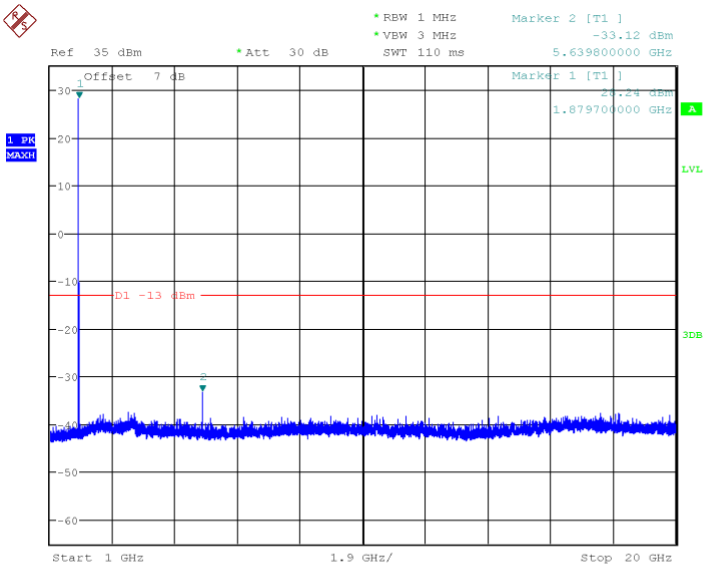


Channel 251: 1GHz~10GHz

A6.1.2.2. GSM1900

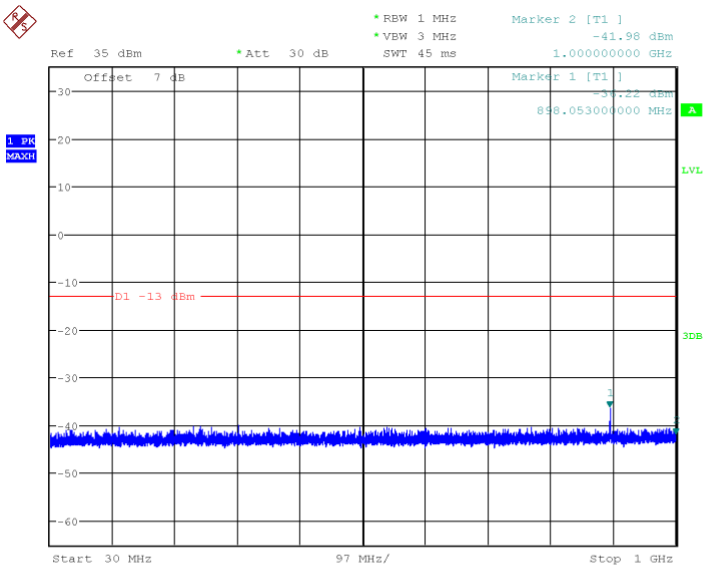


Channel 512: 30MHz~1GHz



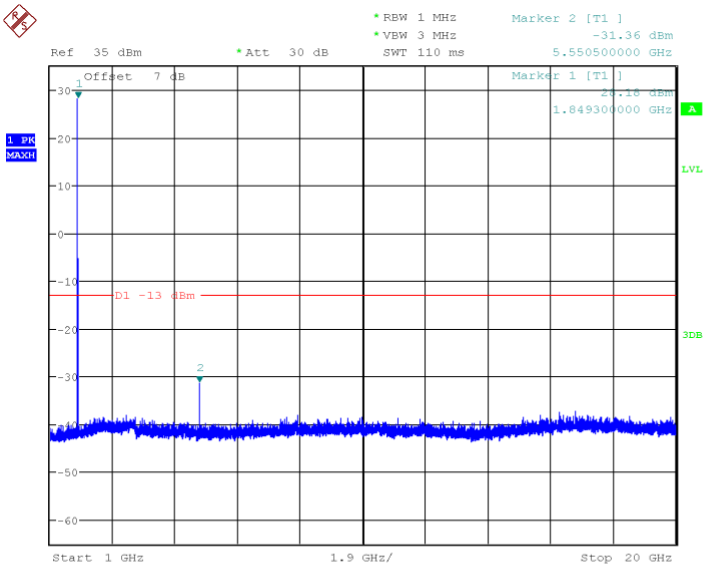
Date: 26.MAR.2014 16:42:14

Channel 512: 1GHz~20GHz



Date: 26.MAR.2014 15:53:08

Channel 661: 30MHz~1GHz



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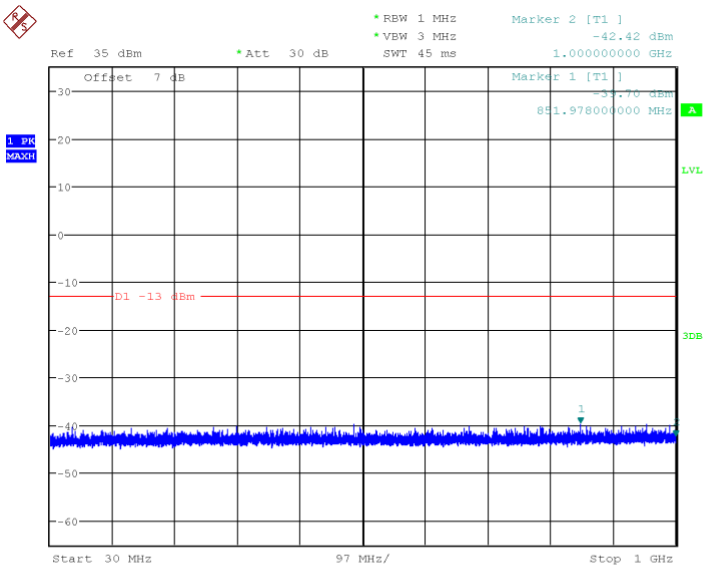
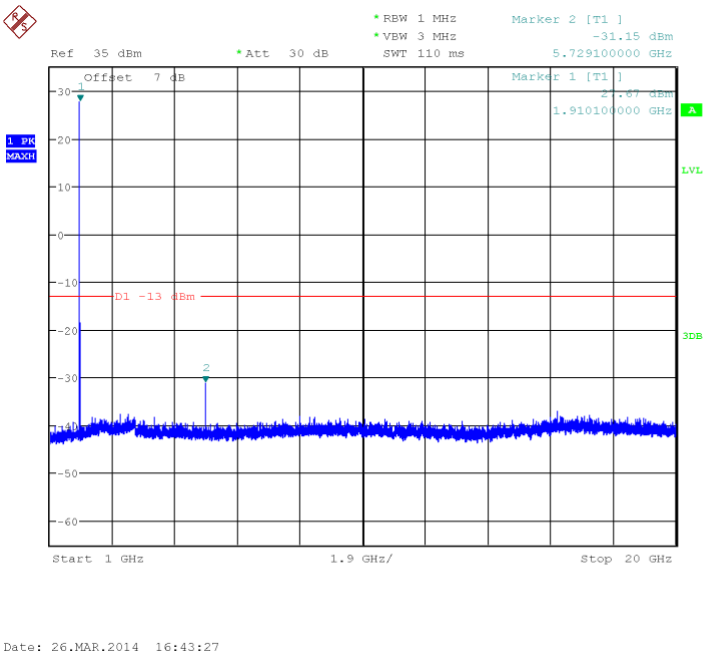
Channel 661: 1GHz~20GHz



Date: 26.MAR.2014 15:53:45

Channel 810: 30MHz~1GHz



Channel 810: 1GHz~20GHz

Conclusion: PASS

A6.2. WCDMA Measurement Method

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. Determine frequency range for measurements: From CFR 2.1057 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the equipment of WCDMA Band II, this equates to a frequency range of 30 MHz to 19.1 GHz, data taken from 30 MHz to 20 GHz. For WCDMA Band V, data taken from 30 MHz to 10GHz.
2. The sweep time is set automatically by instrument itself. That should be the optimal sweep time for the span and the RBW. If the sweep time is too short, that is sweep is too fast, the sweep result is not accurate; If the sweep time is too long, that is sweep is too low, some frequency components may be lost. The instrument will give a optimal sweep time according the selected span and RBW.
3. The procedure to get the conducted spurious emission is as follows:

The trace mode is set to MaxHold to get the highest signal at each frequency;

Wait 25 seconds;

Get the result.

4. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

WCDMA Band IITransmitter

Channel	Frequency (MHz)
9262	1852.40
9400	1880.00
9538	1907.60

WCDMA Band V Transmitter

Channel	Frequency (MHz)
4132	826.40
4183	836.60
4233	846.60

A 6.2.1. Measurement Limit

Part 24.238 and Part 22.917 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried

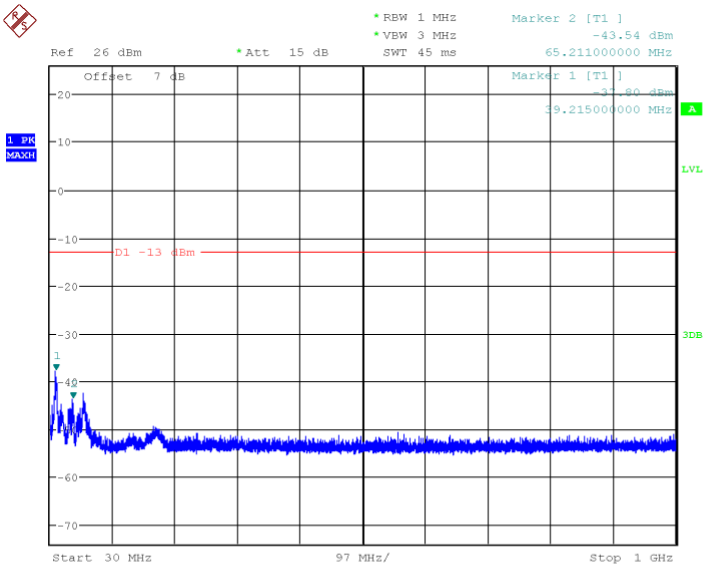
out.

A 6.2.2. Measurement result

Spurious emission limit -13dBm.

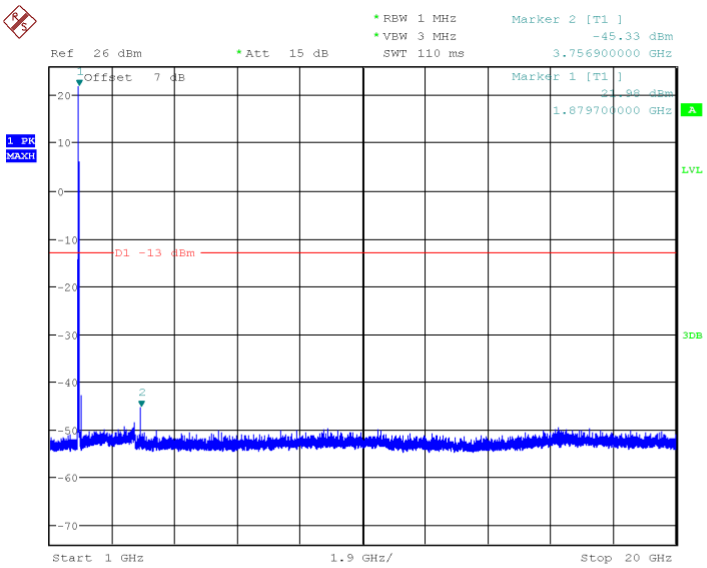
Note: peak above the limit line is the carrier frequency.

A 6.2.2.1. WCDMA Band II



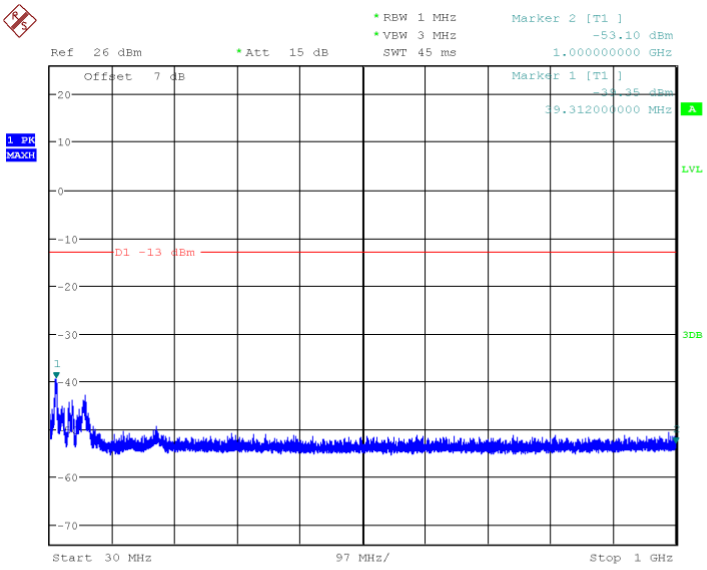
Date: 31.MAR.2014 13:20:49

Channel 9262: 30MHz~1GHz



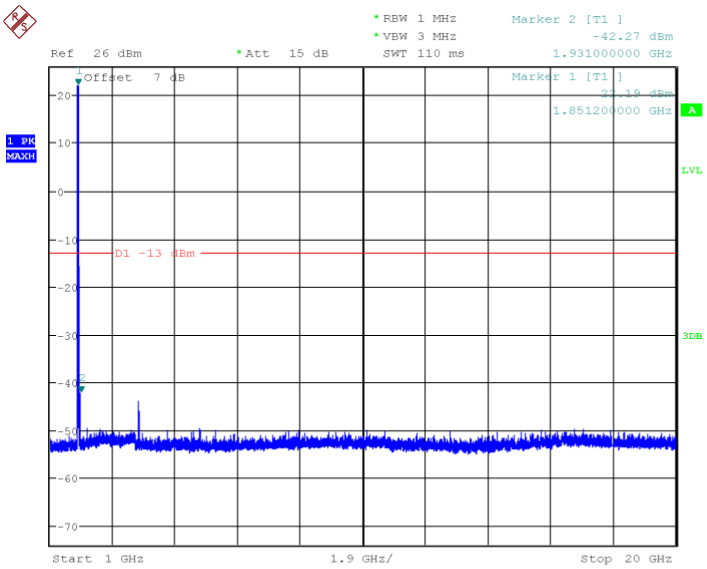
Date: 31.MAR.2014 13:32:01

Channel 9262: 1GHz~20GHz



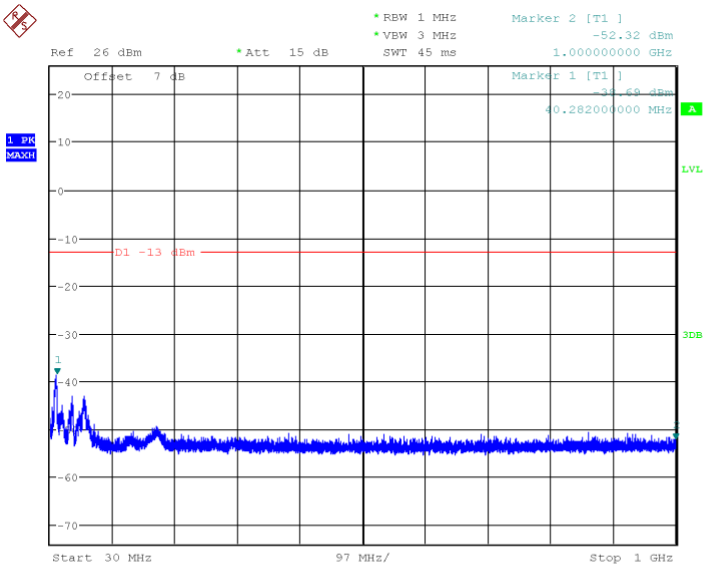
Date: 31.MAR.2014 13:21:25

Channel 9400: 30MHz~1GHz



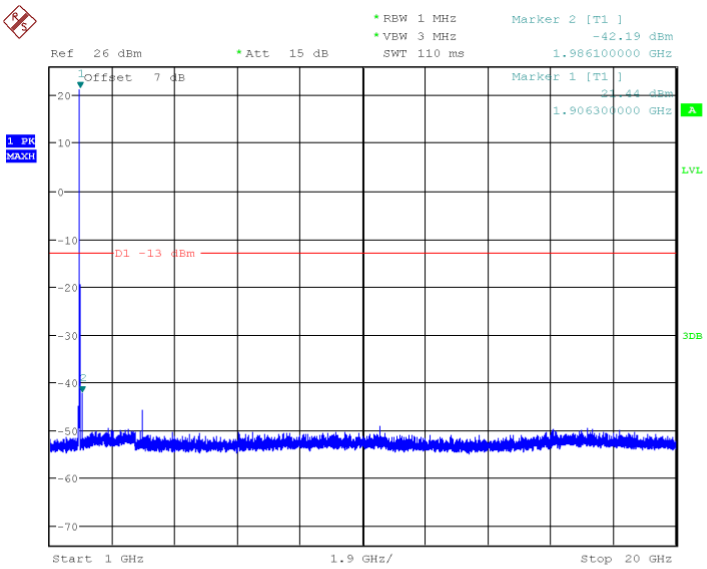
Date: 31.MAR.2014 13:32:38

Channel 9400: 1GHz~20GHz



Date: 31.MAR.2014 13:22:02

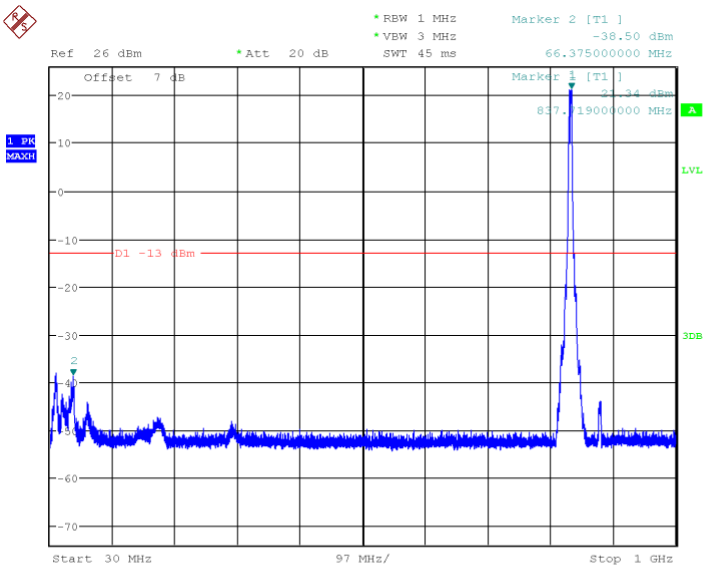
Channel 9538: 30MHz~1GHz



Date: 31.MAR.2014 13:33:14

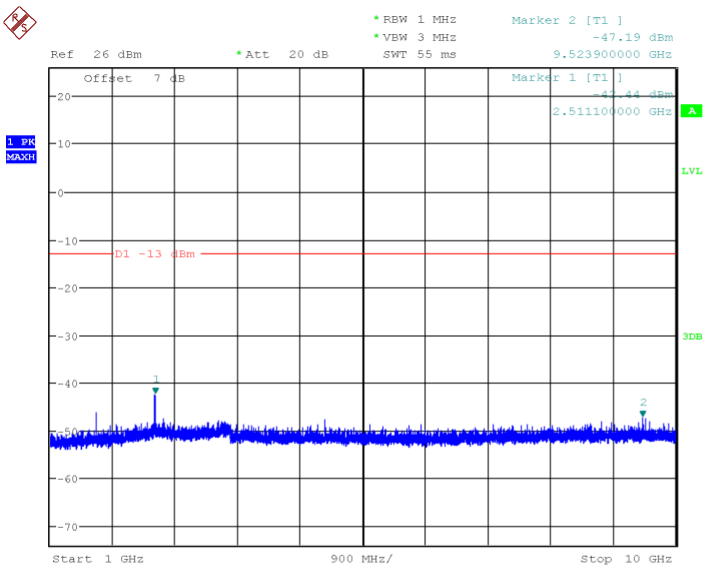
Channel 9538: 1GHz~20GHz

A 6.2.2.2. WCDMA Band V



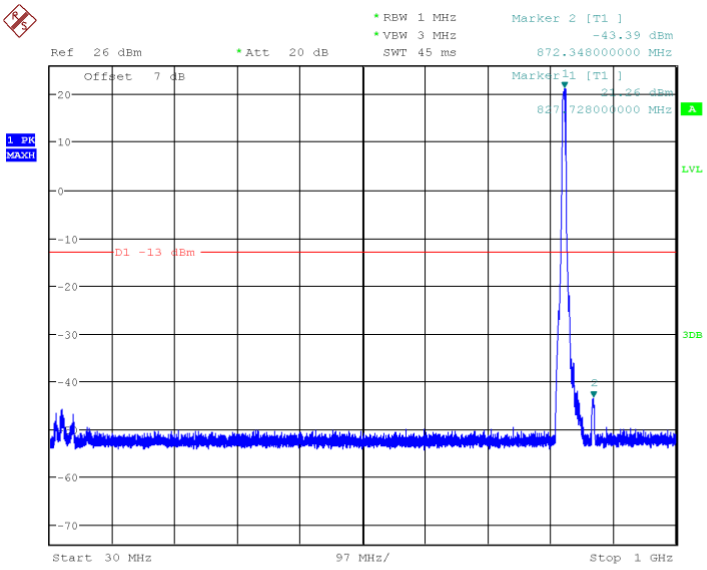
Date: 26.MAR.2014 17:26:30

Channel 4132: 30MHz~1GHz



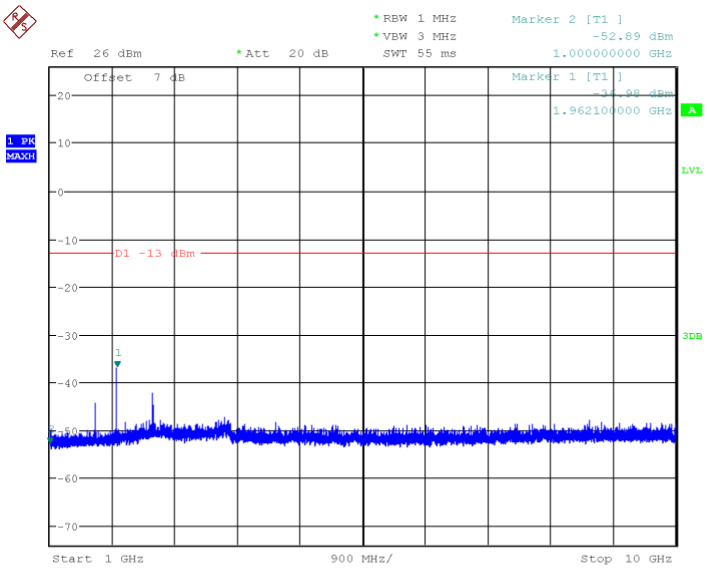
Date: 26.MAR.2014 17:40:39

Channel 4132: 1GHz~10GHz



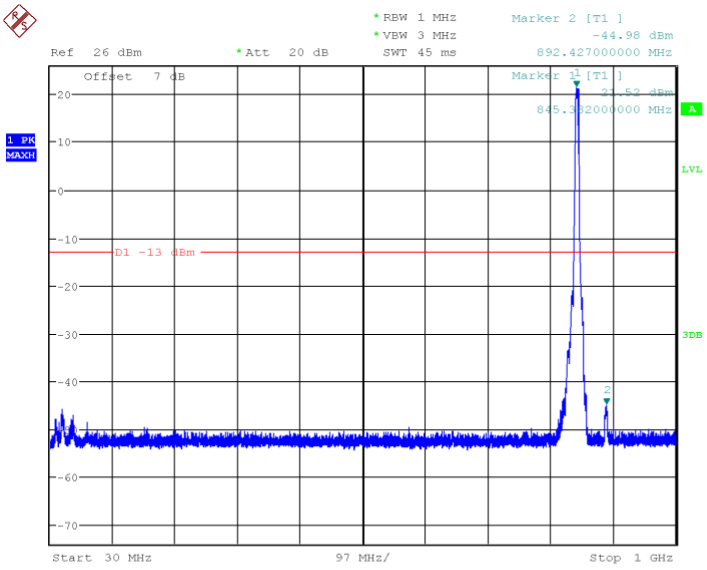
Date: 26.MAR.2014 17:27:06

Channel 4183: 30MHz~1GHz



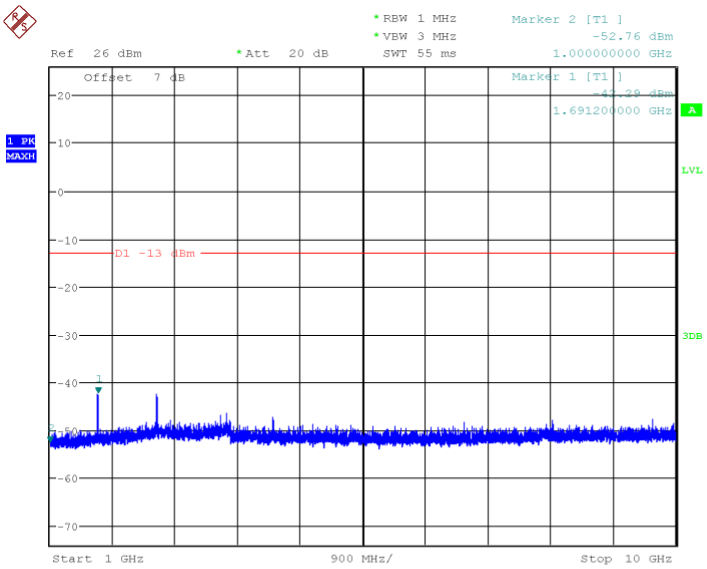
Date: 26.MAR.2014 17:41:15

Channel 4183: 1GHz~10GHz



Date: 26.MAR.2014 17:27:43

Channel 4233: 30MHz~1GHz



Date: 26.MAR.2014 17:41:52

Channel 4233: 1GHz~10GHz

Conclusion: PASS

ANNEX A.7. RADIATED

A.7.1. ERP

A.7.1.1. GSM ERP

A.7.1.1.1. Description

This is the test for the maximum radiated power from the EUT.

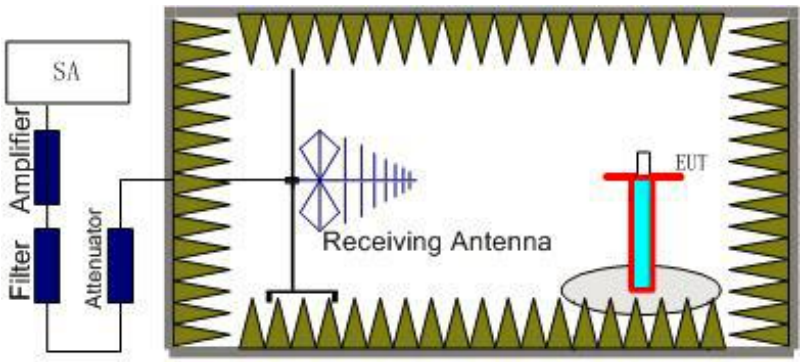
Rule Part 24.232(c) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power"and 24.232(c) specifies that "Peak transmit power must be measured over any interval ofcontinuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."Rule Part 22.913(a) specifies ” The ERP of mobile transmitters and auxiliary test transmitters must

not exceed 7 Watts.”

A.7.1.1.2. Method of Measurement

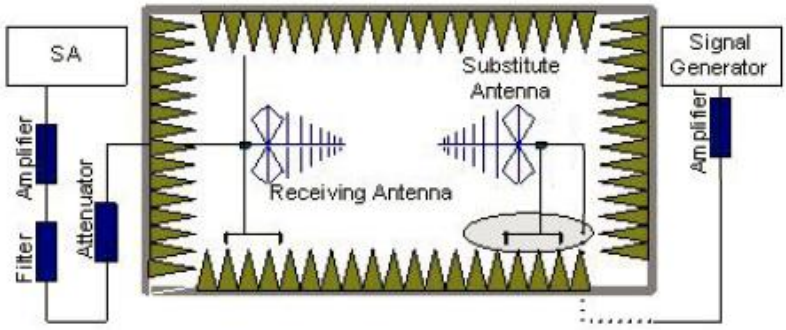
The measurements procedures in TIA-603C-2004 are used.

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from thereceive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUTfor emission measurements. The height of receiving antenna is 1.5m. The test setup refers tofigure below. Detected emissions were maximized at each frequency by rotating the EUTthrough 360° and adjusting the receiving antenna polarization. The radiated emissionmeasurements of all transmit frequencies in three channels (High, Middle, Low) weremeasured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level duringthe test. And the maximum value of the receiver should be recorded as (Pr).

3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at thereference point of the chamber. An RF Signal source for the frequency band of interest isconnected to the substitution antenna with a cable that has been constructed to not interferewith

the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of thesubstitution antenna, and adjust the level of the signal generator output until the value of thereceiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. Thetest should be performed by rotating the test item and adjusting the receiving antennapolarization.

4. A amplifier should be connected to the Signal Source output port. And the cable should beconnect between the Amplifier and the Substitution Antenna.

The cable loss (P_{cl}) ,the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should berecorded after test.

The measurement results are obtained as described below:

Power(EIRP)=PMea+ PAg - Pcl + Ga

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15dBi) and known input power.

6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.

GSM 850-ERP 22.913(a)

Limits

	Power Step	Burst Peak ERP (dBm)
GSM	5	≤38.45dBm (7W)
GPRS	3	≤38.45dBm (7W)
EDGE	6	≤38.45dBm (7W)

Measurement result

GSM(GMSK)

Frequency (MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_aAntenna Gain (dBd)	PeakERP (dBm)	Polarization
824.2	-38.86	3.05	69.40	3.11	30.60	V
836.6	-38.37	3.05	69.40	3.11	31.09	H
848.8	-37.66	3.05	69.40	3.11	31.8	H

GPRS(GMSK)

Frequency (MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_aAntenna Gain(dBd)	PeakERP(dBm)	Polarization
824.2	-39.23	3.05	69.40	3.11	30.23	H
836.6	-38.91	3.05	69.40	3.11	30.55	H
848.8	-38.23	3.05	69.40	3.11	31.23	H

EDGE(8PSK)

Frequency (MHz)	P_{Mea}(dBm)	P_{Cl}(dB)	P_{Ag}(dB)	G_aAntenna Gain(dBd)	PeakERP(dBm)	Polarization
824.2	-44.23	3.05	69.40	3.11	25.23	H
836.6	-44.19	3.05	69.40	3.11	25.27	H
848.8	-44.31	3.05	69.40	3.11	25.15	H

Frequency**:** 824.2MHz

Peak ERP(dBm)= P_{Mea}(-38.86.dBm) - P_{Cl}(3.05dB) +P_{Ag}(69.4dB) +G_a (3.11dBd)

= 30.60dBm

ANALYZER SETTINGS: RBW = VBW = 3MHz

PCS 1900-EIRP 24.232(c)

Limits

	Power Step	**Burst Peak ERP (dBm)**
GSM	0	≤33dBm (2W)
EDGE	5	≤33dBm (2W)
GPRS	3	≤33dBm (2W)

Measurement result

GSM(GMSK)

Frequency (MHz)	P_{Mea}(dBm)	P_{Cl}(dB)	P_{Ag}(dB)	G_aAntenna Gain(dBi)	PeakEIRP(dBm)	Polarization
1850.2	-41.53	3.54	69.40	2.9	27.23	H
1880.0	-41.20	3.54	69.40	2.9	27.56	H
1909.8	-41.04	3.54	69.40	2.9	27.72	H

GPRS(GMSK)

Frequency (MHz)	P_{Mea}(dBm)	P_{Cl}(dB)	P_{Ag}(dB)	G_aAntenna Gain(dBi)	PeakEIRP(dBm)	Polarization
1850.2	-41.69	3.54	69.40	2.9	27.07	H
1880.0	-41.63	3.54	69.40	2.9	27.13	H
1909.8	-41.10	3.54	69.40	2.9	27.66	H

EDGE(8PSK)

Frequency (MHz)	P_{Mea}(dBm)	P_{Cl}(dB)	P_{Ag}(dB)	G_aAntenna Gain(dBi)	PeakEIRP(dBm)	Polarization

1850.2	-45.12	3.54	69.40	2.9	23.64	H
1880.0	-45.18	3.54	69.40	2.9	23.58	H
1909.8	-45.66	3.54	69.40	2.9	23.10	H

Frequency**:** 1850.2MHz

Peak EIRP(dBm)= P_{Mea}(-41.53dBm) - P_{cl}(3.54dB) + P_{Ag}(69.4dB) + G_a (2.9dBi)=27.23dBm

ANALYZER SETTINGS: RBW = VBW = 3MHz

A.7.1.2. WCDMA ERP

A.7.1.2.1. Description

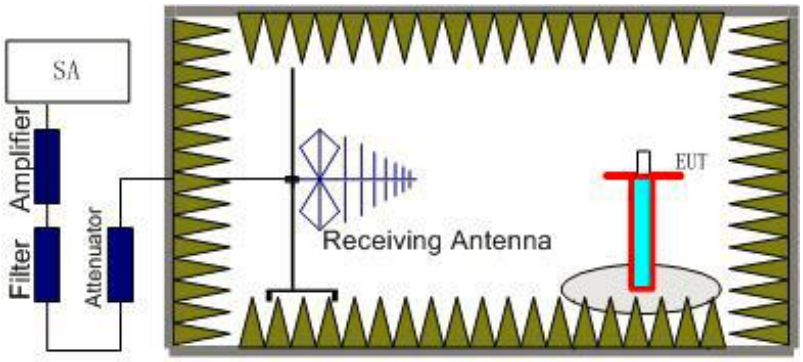
This is the test for the maximum radiated power from the EUT.

Rule Part 24.232(c) specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power"and 24.232(c) specifies that "Peak transmit power must be measured over any interval ofcontinuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."Rule Part 22.913(a) specifies ” The ERP of mobile transmitters and auxiliary test transmitters mustnot exceed 7 Watts.”

A.7.1.2.2. Method of Measurement

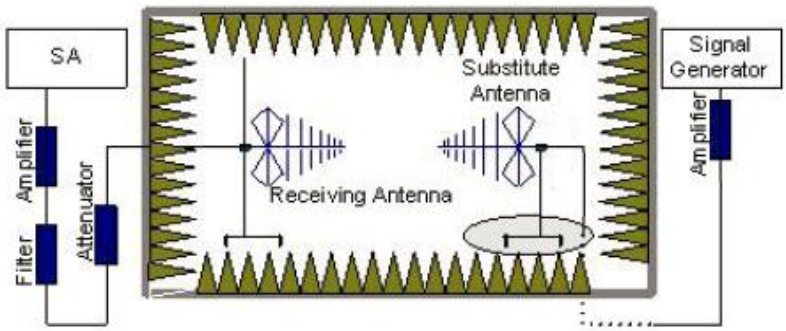
The measurements procedures in TIA-603C-2004 are used.

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from thereceive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUTfor emission measurements. The height of receiving antenna is 1.5m. The test setup refers tofigure below. Detected emissions were maximized at each frequency by rotating the EUTthrough 360° and adjusting the receiving antenna polarization. The radiated emissionmeasurements of all transmit frequencies in three channels (High, Middle, Low) weremeasured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).

3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna.

The cable loss (P_{cl}) ,the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.

The measurement results are obtained as described below:

Power(EIRP)=P_{Mea}+ P_{Ag}+ P_{cl}+ G_a

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.

6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.

WCDMA Band II-EIRP

Limit

	Burst Peak EIRP (dBm)
WCDMA Band II	≤33dBm (2W)

Measurement result

Frequency (MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_aAntenna Gain(dBi)	PeakEIRP(dBm)	Polarization
1852.4	-49.23	3.54	69.40	2.9	19.53	V
1880.0	-49.42	3.54	69.40	2.9	19.34	H
1907.6	-49.49	3.54	69.40	2.9	19.27	H

Frequency**:** 1852.40MHz

Peak EIRP(dBm)= P_{Mea}(-49.23dBm)- P_{cl}(3.54dB)+ P_{Ag}(69.4dB)+G_a (2.9dBi) =19.53dBm

ANALYZER SETTINGS: RBW = VBW = 5MHz

WCDMA Band V-ERP

Limits

	Burst Peak EIRP (dBm)
WCDMA Band V	≤38.45dBm (7W)

Measurement result

Frequency (MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_aAntenna Gain(dBd)	PeakERP(dBm)	Polarization
826.4	-48.63	3.05	69.4	2.9	20.13	H
836.6	-48.55	3.05	69.4	2.9	20.21	H
846.6	-48.58	3.05	69.4	2.9	20.18	H

Frequency**:** 846.60 MHz

Peak ERP(dBm)= P_{Mea}(-48.63dBm)- P_{cl}(3.05dB)+ P_{Ag}(69.4dB)+G_a (2.9dBi)=20.13dBm

ANALYZER SETTINGS: RBW = VBW = 5MHz

Note: the EUT was displayed in several different direction, the worst cases were shown.

A.7.2 EMISSION LIMIT (§2.1051/§22.917§24.238)

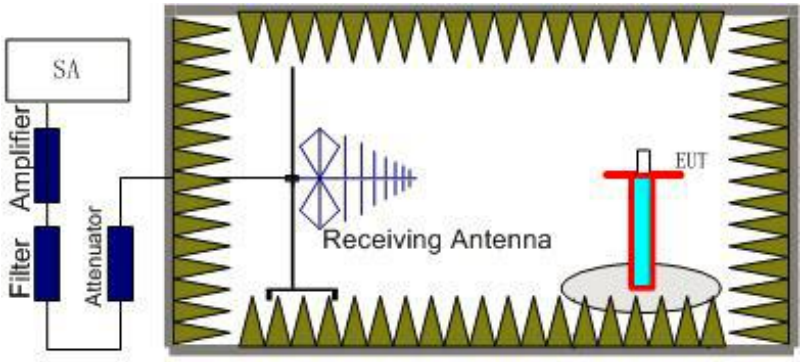
A.7.2.1 GSM Measurement Method

The measurement procedures in TIA-603C-2004 are used.

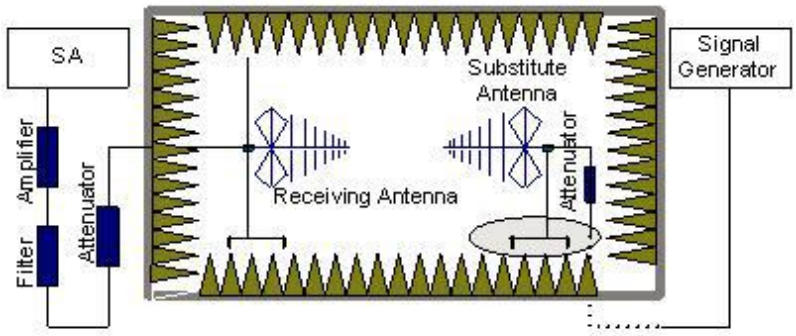
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generatedwithin the equipment, which is the transmitted carrier that can be as high as 1910 MHz. Theresolution bandwidth is set as outlined in Part 24.238 and Part 22.917. The spectrum is scannedwith the mobile station transmitting at carrier frequencies that pertain to low, mid and highchannels of PCS1900 and GSM850.

The procedure of radiated spurious emissions is as follows:

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from thereceive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUTfor emission measurements. The height of receiving antenna is 1.5m. The test setup refers tofigure below. Detected emissions were maximized at each frequency by rotating the EUTthrough 360° and adjusting the receiving antenna polarization. The radiated emissionmeasurements of all non-harmonic and harmonics of the transmit frequency through the 10^{th}harmonic were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
4. The Path loss (P_{pl}) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain (G_a) should be recorded after test.
A amplifier should be connected in for the test.
The Path loss (P_{pl}) is the summation of the cable loss and the gain of the amplifier.
The measurement results are obtained as described below:
Power(EIRP)=P_{Mea}+ P_{pl}+ G_a
5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi

A.7.2.1.1. Measurement Limit

Part 24.238 and Part 22.917 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
The specification that emissions shall be attenuated below the transmitter power (P) by at least 43

+ 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

A.7.2.1.2. Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the PCS1900 band (1850.2 MHz, 1880 MHz and 1909.8 MHz) and GSM850 band (824.2MHz, 836.6MHz, 848.8MHz) . It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the PCS1900 ,GSM850 into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

A.7.2.1.3. Measurement Results

Table:

Frequency	Channel	Frequency Range	Result
GSM850	Low	30MHz~10GHz	P
	Middle	30MHz~10GHz	P
	High	30MHz~10GHz	P
GSM1900	Low	30MHz~20GHz	P
	Middle	30MHz~20GHz	P
	High	30MHz~20GHz	P

GSM Mode Channel 128

Final result:

Frequency (MHz)	PMea (dBm)	Pcl(dB)	Antenna Gain(dBd)	Peak EIRP (dBm)	Limit （dBm）	Polarization
1954.8	-27.63	3.07	3.4	-27.3	-13	V
2614.8	-35.13	3.57	3.7	-35	-13	H
3394.8	-37.54	4.26	7.4	-34.4	-13	V

Note:

GSM850, CH128

Power(ERP)=Pmea- Pcl + Ga=-27.63-3.07+3.4=-27.3dbm

This method Applicable to the following table.

GSM Mode Channel 190

Final result:

Frequency (MHz)	PMea (dBm)	Pcl(dB)	Antenna Gain(dBd)	Peak EIRP (dBm)	Limit （dBm）	Polarization
2955	-47.44	4.26	7.7	-44	-13	V
3345.6	-51.77	4.43	9	-47.2	-13	V
4183.8	-53.87	5.83	12.3	-47.4	-13	H

GSM Mode Channel 251

Final result:

Frequency (MHz)	PMea (dBm)	Pcl(dB)	Antenna Gain(dBd)	Peak EIRP (dBm)	Limit （dBm）	Polarization
3395.4	-35.66	4.24	4.9	-35	-13	V
4595.4	-37.7	4.4	7.7	-34.4	-13	H
5092.8	-47.57	4.83	9	-43.4	-13	V

Note:

GSM850, CH128

Power(ERP)=Pmea- Pcl + Ga=-43.03-3.07+3.4=-42.7dbm

This method Applicable to the following table.

GSM Mode Channel 512

Final result:

Frequency (MHz)	PMea (dBm)	Pcl（dB）	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit （dBm）	Polarization
3699.6	-46.08	4.42	6.2	-44.3	-13	H
3393.6	-52.26	5.24	9.5	-48	-13	V
3771	-51.07	6.13	10.6	-46.6	-13	V
3857.4	-51.53	6.97	11.5	-47	-13	H

GSM Mode Channel 661

Final result:

Frequency (MHz)	P_{Mea} (dBm)	Pcl（dB）	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit （dBm）	Polarization

3759	-46.38	4.42	6.2	-44.6	-13	V
3394.8	-51.86	5.24	9.5	-47.6	-13	H
5640.6	-55.27	6.13	10.6	-50.8	-13	H
7519.2	-52.78	7.82	12.7	-47.9	-13	V
10629.6	-52.12	8.68	13.9	-46.9	-13	V

GSM Mode Channel 810

Final result:

Frequency (MHz)	P_{Mea} (dBm)	Pcl（dB）	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit （dBm）	Polarization
3819	-42.68	4.42	6.2	-40.9	-13	V
3394.8	-51.06	5.24	8.7	-47.6	-13	H
3681.6	-54.77	6.13	10.6	-50.3	-13	V
5730	-54.13	6.97	11.5	-49.6	-13	H
10621.2	-50.48	7.82	12.7	-45.6	-13	V

Conclusion: PASS

Note: the EUT was displayed in several different direction, the worst cases were shown.

A.7.2.2. WCDMA Measurement Method

The measurements procedures in TIA-603C-2004 are used.

The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment. The resolution bandwidth is set as outlined in Part 24.238 and Part 24.917.

The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of WCDMA Band II and WCDMA Band V.

The procedure of radiated spurious emissions is the same like GSM.

A.7.2.2.1. Measurement Limit

Part 24.238 and Part 22.917 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

A.7.2.2.2. Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier

frequencies of the WCDMA Band II (1852.4 MHz, 1880.0MHz and 1907.6MHz) and WCDMA Band
V (826.4MHz, 836.6MHz and 846.6MHz) . It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the WCDMA Band II and WCDMA Band V into any of the other blocks. The
equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

A.7.2.2.3. Measurement Results Table

Frequency	Channel	Frequency Range	Result
WCDMA Band V	Low	30MHz~10GHz	P
	Middle	30MHz~10GHz	P
	High	30MHz~10GHz	P
WCDMA Band II	Low	30MHz~20GHz	P
	Middle	30MHz~20GHz	P
	High	30MHz~20GHz	P

WCDMA BAND II Mode Channel 9262

Final result:

Frequency (MHz)	P_{Mea} (dBm)	Pcl（dB）	Antenna Gain(dBd)	Peak EIRP (dBm)	Limit （dBm）	Polarization
3490.8	-64.88	4.42	6.2	-63.1	-13	V
3706.4	-60.16	5.24	9.5	-55.9	-13	V
3864.8	-67.77	6.13	10.6	-63.3	-13	H
5986.4	-68.93	6.97	11.5	-64.4	-13	V

WCDMA BAND II Mode Channel 9400

Final result:

Frequency (MHz)	P_{Mea} (dBm)	Pcl（dB）	Antenna Gain(dBd)	Peak EIRP (dBm)	Limit （dBm）	Polarization
3758	-55.98	4.42	6.2	-54.2	-13	V
3920	-67.26	5.24	9.5	-63	-13	H

4584	-68.67	6.13	10.6	-64.2	-13	V
5430	-70.33	6.97	11.5	-65.8	-13	V

WCDMA BAND II Mode Channel 9538

Final result:

Frequency (MHz)	P_{Mea} (dBm)	Pcl（dB）	Antenna Gain(dBd)	Peak EIRP (dBm)	Limit （dBm）	Polarization
3340.4	-67.98	4.42	6.2	-66.2	-13	V
3813.2	-57.56	5.24	9.5	-53.3	-13	V
3975.2	-66.87	6.13	10.6	-62.4	-13	H

WCDMA BAND V Mode Channel 4132

Final result:

Frequency (MHz)	P_{Mea} (dBm)	Pcl（dB）	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit （dBm）	Polarization
1746	-61.45	3.05	3.4	-61.8	-13	V
1938.8	-60.77	3.57	3.7	-60.9	-13	V

WCDMA BAND V Mode Channel 4183

Final result:

Frequency (MHz)	P_{Mea} (dBm)	Pcl（dB）	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit （dBm）	Polarization
1328.8	-63.92	3.82	4.7	-64.8	-13	V
1746	-61.5	4	4.9	-62.4	-13	V
1966	-57.9	4.6	7.3	-60.6	-13	V
2603.6	-51.1	5.1	8.7	-54.7	-13	V

WCDMA BAND V Mode Channel 4233

Final result:

Frequency (MHz)	P_{Mea} (dBm)	Pcl（dB）	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit （dBm）	Polarization

1746	-62.65	3.05	3.4	-62.3	-13	V
2514.8	-55.53	3.57	3.7	-55.4	-13	V

Conclusion: PASS

Note:

1.The EUT was displayed in several different direction, the worst cases were shown.

2.For radiated emission test we were used a foldable antenna which was the worst one that was selected from some samples.

ANNEX A.8. CONDUCTED EMISSION (§15.107§15.207)

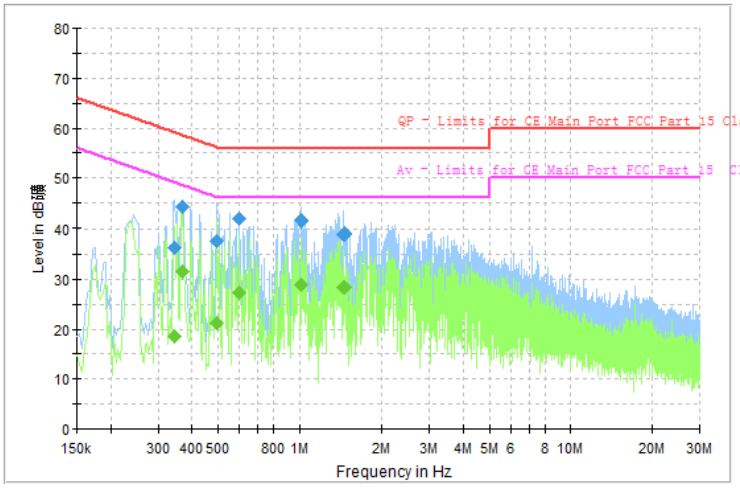
The measurement procedure in ANSI C63.4-1003 is used. Conducted Emission is measured with travel charger.

A.8.1. Limit

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with logarithm of the frequency		

A.8.2. Measurement result

GSM850:



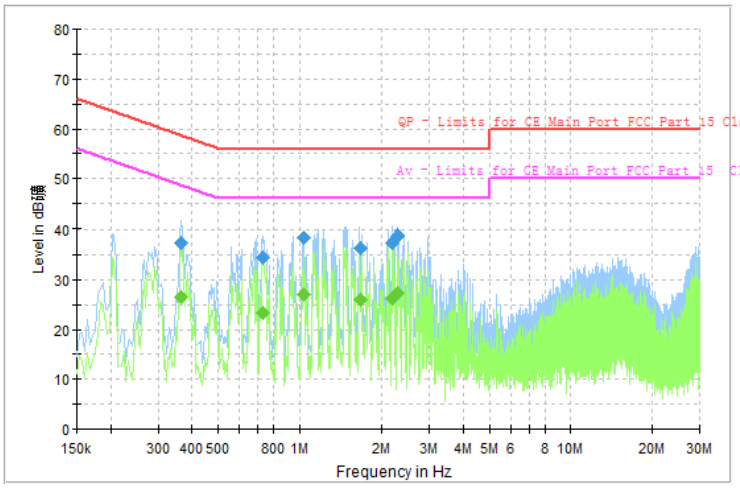
Final Result1

Frequency(MHz)	QuasiPeak (dBuV)	Meas. Time(ms)	Bandwidth(kHz)	Filter	Line	Corr.(dB)	Margin(dB)	Limit(dBuV)
0.344025	36.3	5000.0	9.000	On	N	12.6	22.8	59.1
0.370144	44.3	5000.0	9.000	On	L1	12.6	14.2	58.5
0.497006	37.7	5000.0	9.000	On	N	12.6	18.3	56.0
0.597750	41.8	5000.0	9.000	On	L1	12.6	14.2	56.0
1.015650	41.6	5000.0	9.000	On	L1	12.6	14.4	56.0
1.452206	38.8	5000.0	9.000	On	L1	12.6	17.2	56.0

Final Result2

Frequency(MHz)	Average (dBuV)	Meas. Time(ms)	Bandwidth(kHz)	Filter	Line	Corr.(dB)	Margin(dB)	Limit(dBuV)
0.344025	18.6	5000.0	9.000	On	N	12.6	30.5	49.1
0.370144	31.6	5000.0	9.000	On	L1	12.6	16.9	48.5
0.497006	21.3	5000.0	9.000	On	N	12.6	24.8	46.0
0.597750	27.3	5000.0	9.000	On	L1	12.6	18.7	46.0
1.015650	28.9	5000.0	9.000	On	L1	12.6	17.1	46.0
1.452206	28.3	5000.0	9.000	On	L1	12.6	17.7	46.0

PCS1900



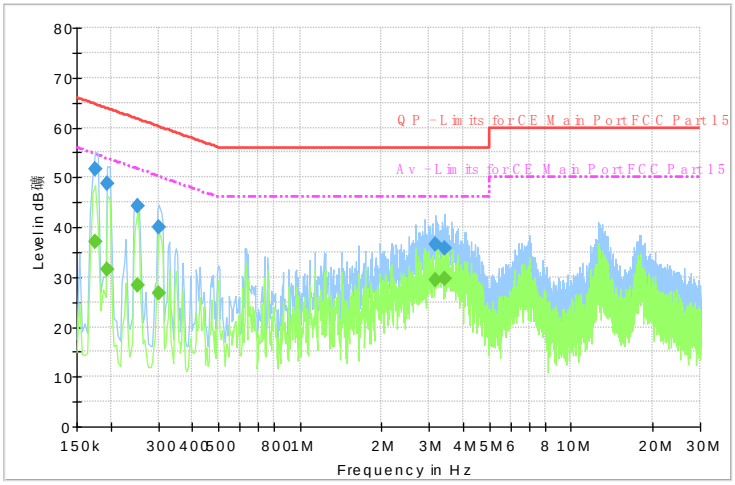
Final Result1

Frequency(MHz)	QuasiPeak (dBuV)	Meas. Time(ms)	Bandwidth(kHz)	Filter	Line	Corr.(dB)	Margin(dB)	Limit(dBuV)
0.202238	50.4	3000.0	9.000	On	L1	10.0	13.1	63.5
0.213431	41.5	3000.0	9.000	On	N	9.9	21.6	63.1
3.243206	33.4	3000.0	9.000	On	L1	9.8	22.6	56.0
3.709612	38.9	3000.0	9.000	On	L1	9.8	17.1	56.0
3.911100	42.5	3000.0	9.000	On	L1	9.8	13.5	56.0
4.108856	37.7	3000.0	9.000	On	L1	9.8	18.3	56.0

Final Result2

Frequency(MHz)	Average (dBuV)	Meas. Time(ms)	Bandwidth(kHz)	Filter	Line	Corr.(dB)	Margin(dB)	Limit(dBuV)
0.202238	40.0	3000.0	9.000	On	L1	10.0	13.5	53.5
0.213431	10.7	3000.0	9.000	On	N	9.9	42.4	53.1
3.243206	21.0	3000.0	9.000	On	L1	9.8	25.0	46.0
3.709612	28.1	3000.0	9.000	On	L1	9.8	17.9	46.0
3.911100	32.8	3000.0	9.000	On	L1	9.8	13.2	46.0
4.108856	27.7	3000.0	9.000	On	L1	9.8	18.3	46.0

WCDMA Band II



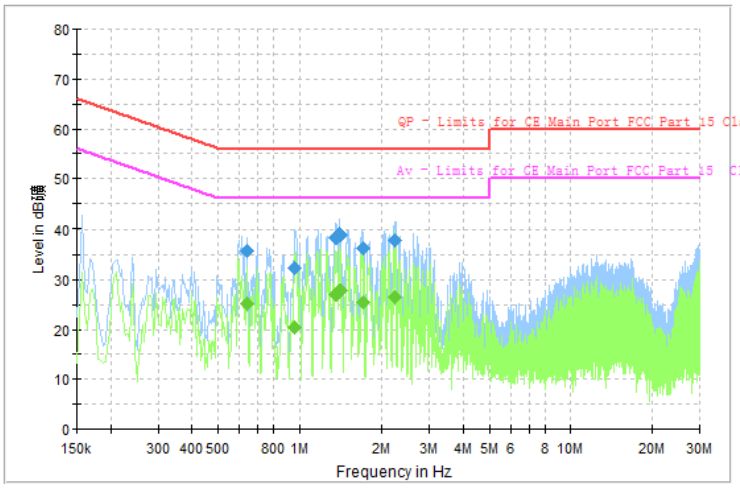
Final Result1

Frequency(MHz)	QuasiPeak (dBuV)	Meas. Time(ms)	Bandwidth(kHz)	Filter	Line	Corr.(dB)	Margin(dB)	Limit(dBuV)
0.153731	47.1	3000.0	9.000	On	N	10.0	21.7	56.0
0.202238	50.2	3000.0	9.000	On	N	9.9	17.0	56.0
0.254475	37.6	3000.0	9.000	On	L1	10.0	20.2	56.0
3.653644	37.4	3000.0	9.000	On	L1	9.8	19.2	56.0
3.851400	32.8	3000.0	9.000	On	L1	9.8	17.5	56.0
4.981969	28.1	3000.0	9.000	On	N	9.8	19.1	56.0

Final Result2

Frequency(MHz)	Average (dBuV)	Meas. Time(ms)	Bandwidth(kHz)	Filter	Line	Corr.(dB)	Margin(dB)	Limit(dBuV)
0.153731	15.6	3000.0	9.000	On	N	10.0	40.2	55.8
0.202238	38.6	3000.0	9.000	On	N	9.9	14.9	53.5
0.254475	9.4	3000.0	9.000	On	L1	10.0	42.2	51.6
3.653644	27.6	3000.0	9.000	On	L1	9.8	18.4	46.0
3.851400	20.9	3000.0	9.000	On	L1	9.8	25.1	46.0
4.981969	17.1	3000.0	9.000	On	N	9.8	28.9	46.0

WCDMA Band V



Final Result1

Frequency(MHz)	QuasiPeak (dBuV)	Meas. Time(ms)	Bandwidth(kHz)	Filter	Line	Corr.(dB)	Margin(dB)	Limit(dBuV)
0.151194	45.8	3000.0	9.000	On	L1	10.2	19.6	65.4
0.181044	43.5	3000.0	9.000	On	N	10.0	20.5	64.0
3.198431	42.2	3000.0	9.000	On	L1	9.8	13.8	56.0
3.392456	39.0	3000.0	9.000	On	L1	9.8	17.0	56.0
4.624512	33.8	3000.0	9.000	On	N	9.8	22.2	56.0
4.826000	39.5	3000.0	9.000	On	N	9.8	16.5	56.0

Final Result2

Frequency(MHz)	Average (dBuV)	Meas. Time(ms)	Bandwidth(kHz)	Filter	Line	Corr.(dB)	Margin(dB)	Limit(dBuV)
0.151194	14.3	3000.0	9.000	On	L1	10.2	41.1	55.4
0.181044	20.8	3000.0	9.000	On	N	10.0	33.2	54.0
3.198431	37.1	3000.0	9.000	On	L1	9.8	8.9	46.0
3.392456	28.4	3000.0	9.000	On	L1	9.8	17.6	46.0
4.624512	23.1	3000.0	9.000	On	N	9.8	22.9	46.0
4.826000	29.8	3000.0	9.000	On	N	9.8	16.2	46.0

Conclusion: PASS

ANNEX B. Deviations from Prescribed Test Methods

No deviation from Prescribed Test Methods.

************End The Report************