TECHNICAL REPORT

卓時檢測 TIMEWAY TESTING LABORATORY

TESTING CNAS L2292

ISO/IEC17025Accredited Lab.

Report No: FCC 0901082
File reference No: 2009-02-06

Applicant: KINDWIN OPTO ELECTRONIC (SHENZHEN) CO., LTD

Product: WMC

Model No: WMC

Trademark: KTL

Test Standards: FCC Part 2 Subpart J & Part 22 Subpart H & Part 24 Subpart E

Test result: It is herewith confirmed and found to comply with the requirements set up by ANSI C63.4& FCC Part 2 Subpart J & Part 22 Subpart H & Part 24 Subpart E regulations for the evaluation of electromagnetic compatibility

Approved By

Jack Chung

Jack Chung
Manager

Dated: February 06, 2009

Results appearing herein relate only to the sample tested
The technical reports is issued errors and omissions exempt and is subject to withdrawal at

SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO LTD

5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian District, Shenzhen,CHINA.

Tel (755) 83448688 Fax (755) 83442996

Special Statement:

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

CNAS-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of testing Laboratories.

FCC-Registration No.: 899988

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.:899988.

IC- Registration No.: IC5205A-01

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration No.: IC 5205A-01.

Test Report Conclusion

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1.0 **General Details**

1.1 Test Lab Details

Name : SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO LTD

Address: 5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian District, Shenzhen,CHINA.

Telephone: (755) 83448688

Fax: (755) 83442996

Site on File with the Federal Communications Commission – United Sates

Registration Number: 899988

For 3m & 10 m OATS

Site Listed with Industry Canada of Ottawa, Canada

Registration Number: IC: 5205A-01

For 3m & 10 m OATS

1.2 Applicant Details

Applicant: KINDWIN OPTO ELECTRONIC (SHENZHEN) CO., LTD

Address: B Building, Fuxin Road, Xinnan Xinwu, Pinghu Town, Longgang, Shenzhen, China

Telephone: 00086-755-84675019

Fax: 00086-755-84674076

1.3 Description of EUT

Product:	WMC
Manufacturer:	KINDWIN OPTO ELECTRONIC (SHENZHEN) CO., LTD
Brand Name:	KTL
Model Number:	WMC
Additional Model Name	N/A
Emission Designator:	252KGXW
	250KGXW
Power Supply	12V
Type of Modulation	GMS/GPRS
Frequency range	824.2-848.8MHz 1850.2-1909.8MHz
Antenna type	the antenna gain is 1.0 dBi

1.4 Submitted Sample: 2 Sample

1.5 Test Duration

2009-01-15 to 2009-01-23

1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB

Radiated Emissions Uncertainty =4.7dB

1.7 Test Engineer

The sample tested by

Print Name: Terry Tang

2.0	Test Equipments				
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	2008-12-06	2009-12-05
Absorbing Clamp	ROHDE&SCHWARZ	MDS-21	100126	2008-12-06	2009-12-05
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100294	2008-12-06	2009-12-05
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100253	2008-12-06	2009-12-05
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	2008-12-06	2009-12-05
ESDV Test Receiver	ROHDE&SCHWARZ	ESDV	100008	2008-04-26	2009-04-25
4-WIRE ISN	ROHDE&SCHWARZ	ENY 41	830663/044	2009-02-17	2010-02-16
GG ENY22 Double 2-Wire ISN	ROHDE&SCHWARZ	ENY22	83066/016	2009-02-17	2010-02-16
Impuls-Begrenzer	ROHDE&SCHWARZ	ESH3-Z2	100281	2009-02-17	2010-02-16
System Controller	CT	SC100	-	2009-02-17	2010-02-16
Printer	EPSON	PHOTO EX3	CFNH234850	2009-02-17	2010-02-16
FM-AM Signal Generator	JUNGJIN	SG-150M	389911177	2009-02-17	2010-02-16
Color TV Pattern Generator	PHILIPS	PM5418	LO621747	2009-02-17	2010-02-16
Computer	IBM	8434	1S8434KCE99BLX LO*	-	-
Oscillator	KENWOOD	AG-203D	3070002	2009-02-17	2010-02-16
Power meter	Anritsu	ML2487A	6K00003613	2009-02-17	2010-02-16
Power sensor	Anritsu	MA2491A	32263	2009-02-17	2010-02-16

Spectrum Analyzer	HAMEG	HM5012	-	2008-04-26	2009-04-25
Power Supply	LW	APS1502	-	-	-
5K VA AC Power Source	California Instruments	5001iX	56060	2009-02-17	2010-02-16
CDN	EM TEST	CDN M2/M3	-	2009-02-17	2010-02-16
Attenuation	EM TEST	ATT6/75	-	2009-02-17	2010-02-16
Resistance	EM TEST	R100	-	2009-02-17	2010-02-16
Electromagnetic Injection Clamp	LITTHI	EM101	35708	2009-02-17	2010-02-16
Signal Generator	ROHDE&SCHWARZ	SMT03	100029	2009-02-17	2010-02-16
Power Amplifier	AR	150W1000	300999	2009-02-17	2010-02-16
Field probe	Holaday	HI-6005	105152	2009-02-17	2010-02-16
Bilog Antenna	Chase	CBL6111C	2576	2009-02-17	2010-02-16
ESPI Test Receiver	ROHDE&SCHWARZ	ESI26	838786/013	2009-02-17	2010-02-16
3m OATS	--	--	N/A	2009-02-17	2010-02-16
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170265	2009-02-17	2010-02-16
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-631	2008-04-26	2009-04-25
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	1100.0008.02	2008-12-03	2009-12-03

3.0 Technical Details

3.1 Summary of test results

FCC RULE	DESCRIPTION OF TEST	Result
§1.1037, §2.1091	RF Exposure	Compliant
§2.1046; § 22.913 (a) § 24.232 (c)	RF Output Power	Compliant
§ 2.1047	Modulation Characteristics	N/A
§ 2.1049 § 22.905 § 22.917 § 24.238	99% & -26 dB Occupied Bandwidth	Compliant
§ 2.1051, § 22.917 (a) § 24.238 (a)	Spurious Emissions at Antenna Terminal	Compliant
§ 2.1053 § 22.917 (a) § 24.238 (a)	Field Strength of Spurious Radiation	Compliant
§ 22.917 (a) § 24.238 (a)	Out of band emission, Band Edge	Compliant
§ 2.1055 § 22.355 § 24.235	Frequency stability vs. temperature Frequency stability vs. voltage	Compliant

3.2 Test Standards

FCC Part 2 Subpart J & Part 22 Subpart H & Part 24 Subpart E

4.0 EUT Modification

No modification by Shenzhen Timeway Technology Consulting Co.,Ltd

5.0 RF EXPOSURE

5.1 Applicable Standards:

§1.1310 and §2.1093

According to 1.1307(b)(1), systems operating under the provisions of this section shall be operated in Manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to 1.1310 and 2.1091 RF exposure is calculated . Limits for Maximum Pemissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(B) Limits for General Population/Uncontrolled Exposure				
0.3 - 1.34	614	1.63	*(100)	30
1.34 - 30	824/f	2.19/f	*($180/f^2$)	30
30 - 300	27.5	0.073	0.2	30
300 - 1500	--.	--.	f/1500	30
1500 - 100,000	--	--	1.0	30

5.2 Test Data:

S=PG/4∏R2

Where: S= Power density

P= Power input to antenna

G=Power gain of the antenna in the direction of interest relative to an isotropic radiator

R=Distance to the center of raidation of the antenna

Maximum peak output power at antenna input terminal : 32.42 (dBm) =**1.745(W)**

Prediction distance 20 (cm)

Prediction frequency :850 (MHz)

Antenna Gain: 1.0 dBi

Power density at predication frequency at 20cm :0.437(mW/cm2)

MPE Limit for uncontrolled exposure at prediction frequency : 850/1500=**0.567(mW/cm2)**

6.0 MODULATION CHARACTERISTIC

6.1 Applicable Standards:

According to FCC § 2.1047(d), Part 22H & 24E there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

7.0 RF OUTPUT POWER

7.1 Applicable Standards

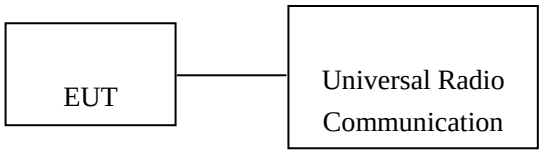
According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §24.232 (C), in no case may the peak output power of a base station transmitter exceed 2 watt EIRP.

7.2 Test Procedure

Conducted method:

The RF output of the transmitter was connected to the wireless test set and the spectrum analyzer through sufficient attenuation.



Radiated method:

Please refer to TIA 603-C section 2.2.17

7.3 Test Data:

Environmental conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

Conducted Power

Cellular Band Part 22H

GSM

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)
Low	824.2	32.42	38.45
Middle	836.6	32.12	38.45
High	848.8	31.96	38.45

GPRS

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)
Low	824.2	32.38	38.45
Middle	836.6	32.10	38.45
High	848.8	31.98	38.45

PCS Band Part 24E

GSM

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)
Low	1850.2	29.01	33
Middle	1880.0	29.42	33
High	1909.8	29.03	33

GPRS

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)
Low	1850.2	29.02	33
Middle	1880.0	29.38	33
High	1909.8	28.98	33

Radiated Power (ERP and EIRP)

Cellular Band Part 22H

GSM:

Indicated		Table Angle Degree	Test Antenna		Substituted			Antenna Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	FCC Part 22H Limit (dBm)
Frequency (MHz)	Receiver Reading (dBμV)		Height (m)	Polar (H/V)	Frequency (MHz)	Level (dBm)	Polar (H/V)				
Frequency in Low Channel											
824.2	115.03	120	1.0	H	824.2	25.75	H	0	0.9	24.85	38.45
824.2	117.50	80	1.5	V	824.2	28.46	V	0	0.9	27.56	38.45
Frequency in Middle Channel											
836.6	117.36	120	125	H	836.6	28.39	H	0	0.9	27.49	38.45
836.6	117.56	88	155	V	836.6	28.64	V	0	0.9	27.74	38.45
Frequency in High Channel											
848.8	117.71	120	1.0	H	848.8	28.81	H	0	0.9	27.91	38.45
848.8	117.74	82	1.54	V	848.8	28.99	V	0	0.9	28.09	38.45

GPRS:

Indicated		Table Angle Degree	Test Antenna		Substituted			Antenna Gain Correction (dBi)	Cable Loss (dB)	Absolute Level (dBm)	FCC Part 22H Limit (dBm)
Frequency (MHz)	Receiver Reading (dBμV)		Height (m)	Polar (H/V)	Frequency (MHz)	Level (dBm)	Polar (H/V)				
Frequency in Low Channel											
824.2	115.14	120	1.0	H	824.2	25.86	H	0	0.90	24.96	38.45
824.2	117.48	80	1.5	V	824.2	28.44	V	0	0.90	27.54	38.45
Frequency in Middle Channel											
836.6	117.41	120	125	H	836.6	28.44	H	0	0.9	27.54	38.45
836.6	117.53	88	155	V	836.6	28.61	V	0	0.9	27.71	38.45
Frequency in High Channel											
848.8	117.56	120	1.0	H	848.8	28.66	H	0	0.9	27.76	38.45
848.8	117.69	82	1.54	V	848.8	28.94	V	0	0.9	28.04	38.45

GSM:

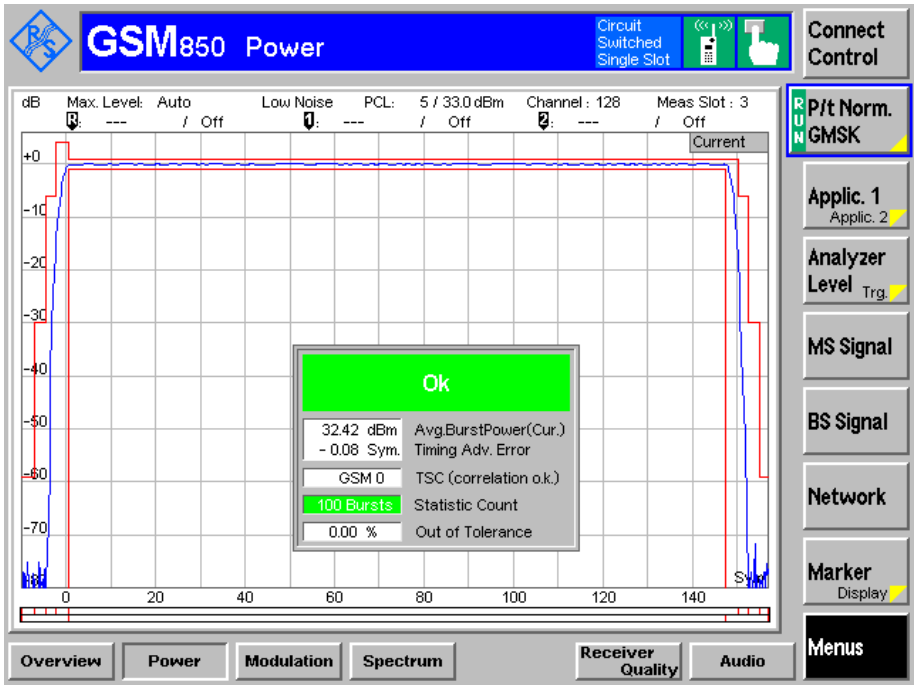
Indicated		Table Angle Degree	Test Antenna		Substituted			Antenna Gain Correction (dBi)	Cable Loss (dB)	Absolute Level	FCC Part 22H
Frequency (MHz)	Receiver Reading (dBμV)		Height (m)	Polar (H/V)	Frequency (MHz)	Level (dBm)	Polar (H/V)			(dBm)	Limit (dBm)
Frequency in Low Channel											
1850.2	118.63	240	1.8	H	1850.2	17.45	H	6.2	1.02	22.63	33
1850.2	124.45	80	1.0	V	1850.2	24.61	V	6.2	1.02	29.79	33
Frequency in Middle Channel											
1880	119.0/	230	1.85	H	1880	17.78	H	6.2	1.03	22.95	33
1880	125.38	82	1.0	V	1880	24.38	V	6.2	1.03	29.55	33
Frequency in High Channel											
1909.8	119.40	240	1.9	H	1909.8	19.66	H	6.2	1.03	24.83	33
1909.8	124.79	82	1.04	V	1909.8	24.59	V	6.2	1.03	29.76	33

GPRS:

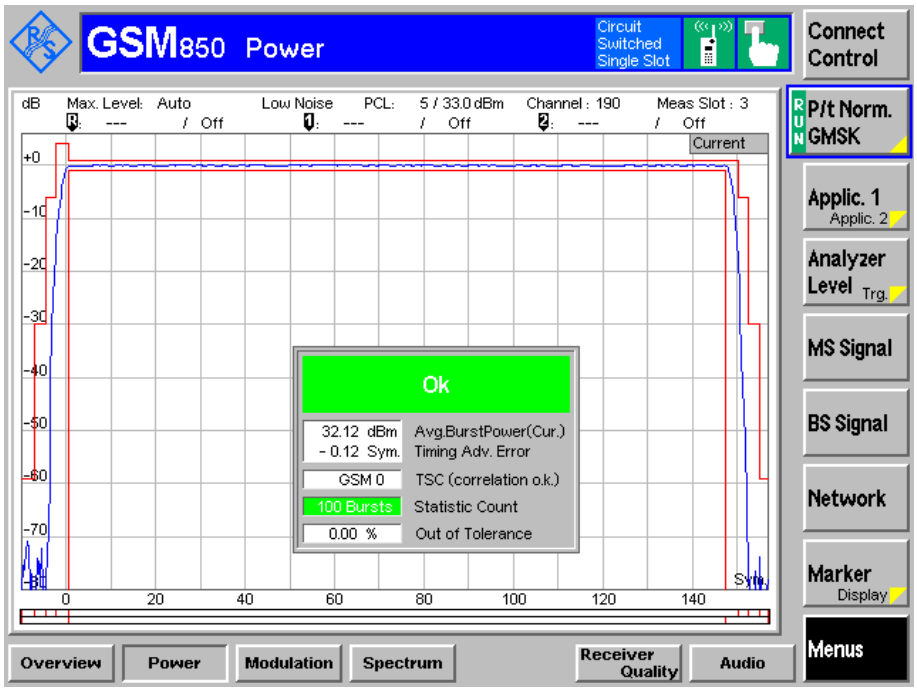
Indicated		Table Angle Degree	Test Antenna		Substituted			Antenna Gain Correction (dBi)	Cable Loss (dB)	Absolute Level	FCC Part 22H
Frequency (MHz)	Receiver Reading (dBμV)		Height (m)	Polar (H/V)	Frequency (MHz)	Level (dBm)	Polar (H/V)			(dBm)	Limit (dBm)
Frequency in Low Channel											
1850.2	117.90	240	1.8	H	1850.2	16.72	H	6.2	1.02	21.90	33
1850.2	122.96	80	1.0	V	1850.2	23.12	V	6.2	1.02	28.30	33
Frequency in Middle Channel											
1880	120.09	230	1.85	H	1880	18.87	H	6.2	1.03	24.04	33
1880	122.60	82	1.0	V	1880	21.6	V	6.2	1.03	26.77	33
Frequency in High Channel											
1909.8	116.89	240	1.9	H	1909.8	17.15	H	6.2	1.03	22.32	33
1909.8	122.37	82	1.04	V	1909.8	22.17	V	6.2	1.03	27.34	33

Plots of Conducted Output Power for Cellular Band (GSM):

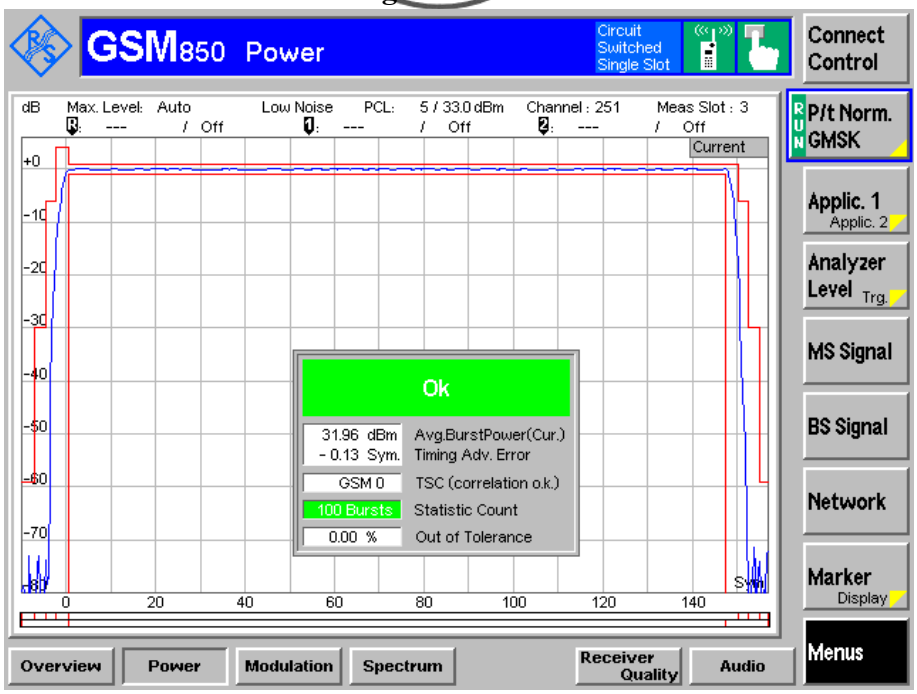
Low Channel



Middle Channel

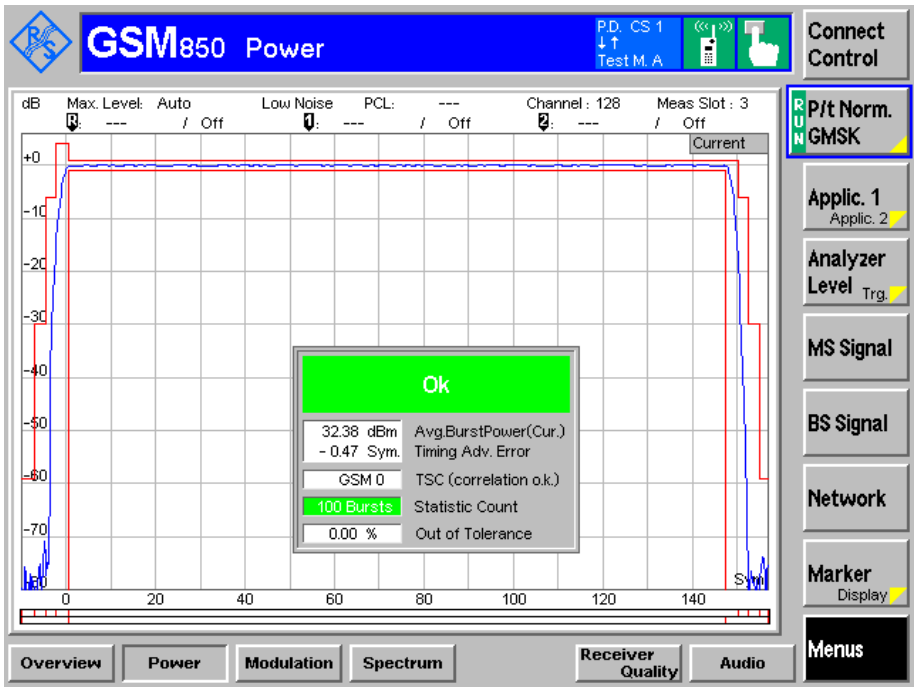


High Channel

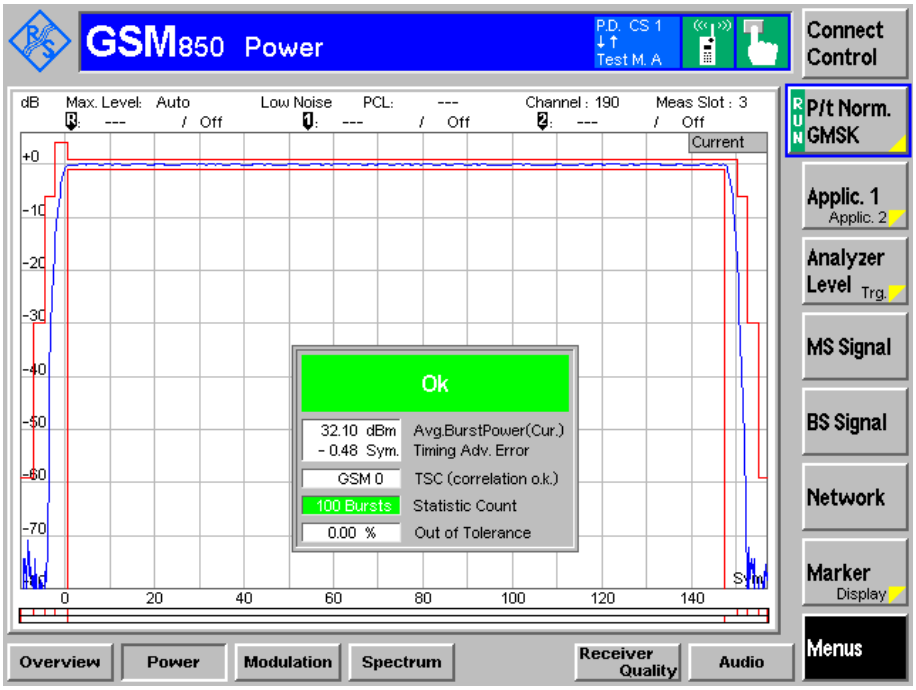


Plots of Conducted Output Power for Cellular Band (GPRS):

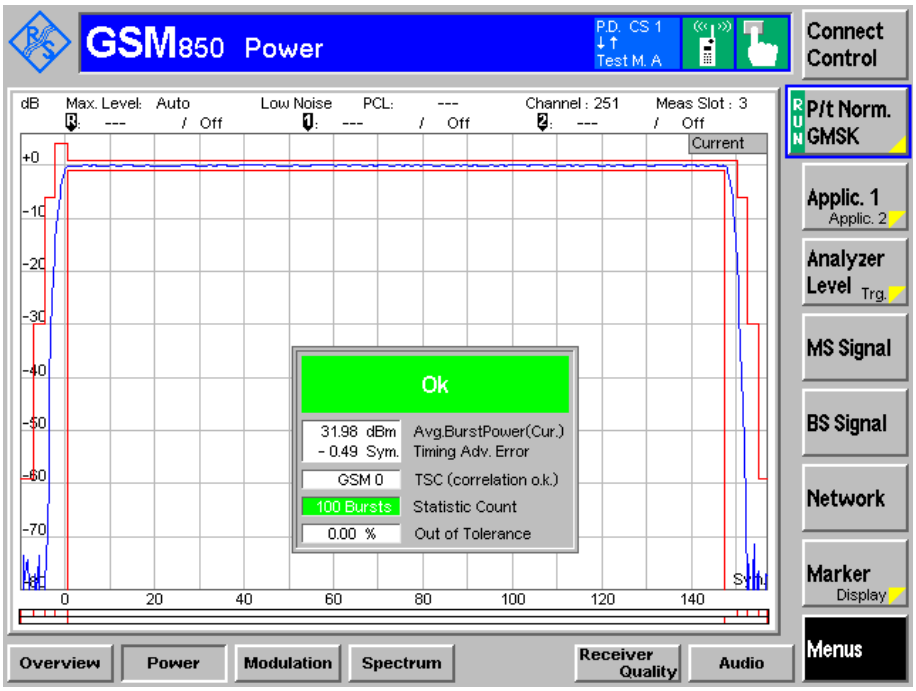
Low Channel



Middle channel

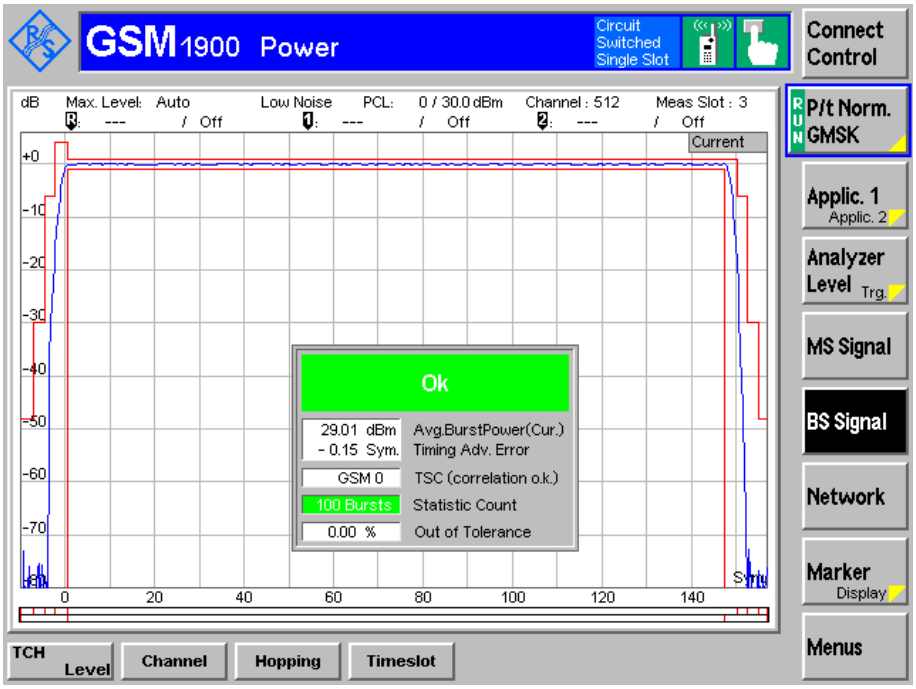


High channel

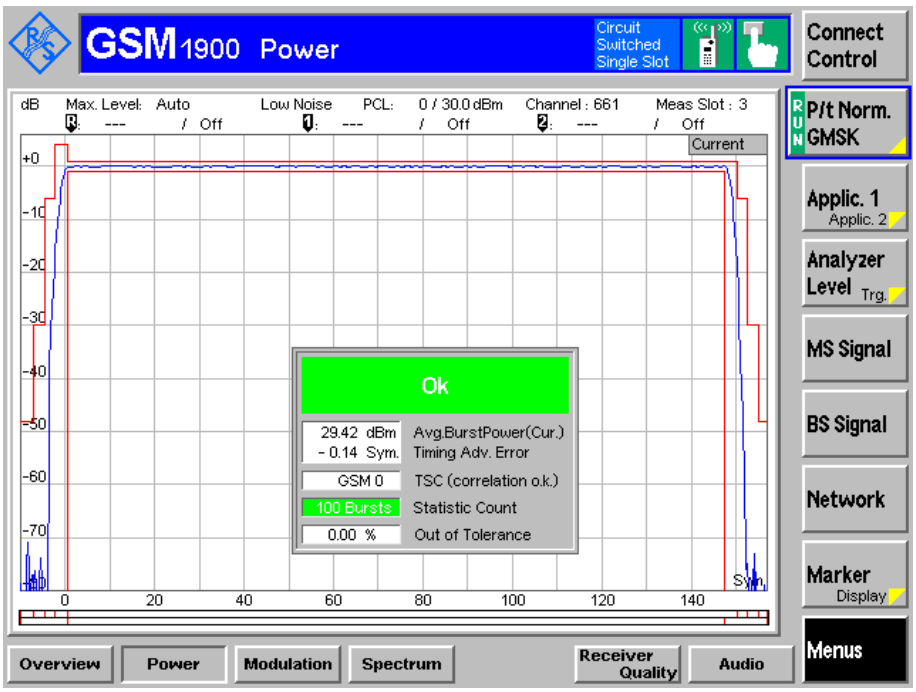


Plots of Conducted Output Power for PCS Band (GSM):

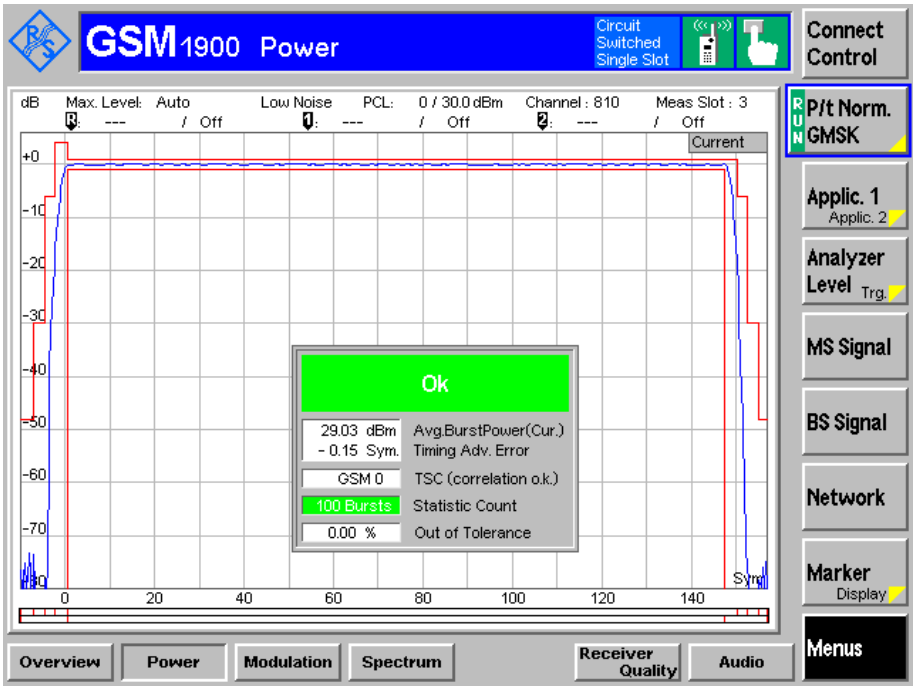
Low Channel



Middle Channel

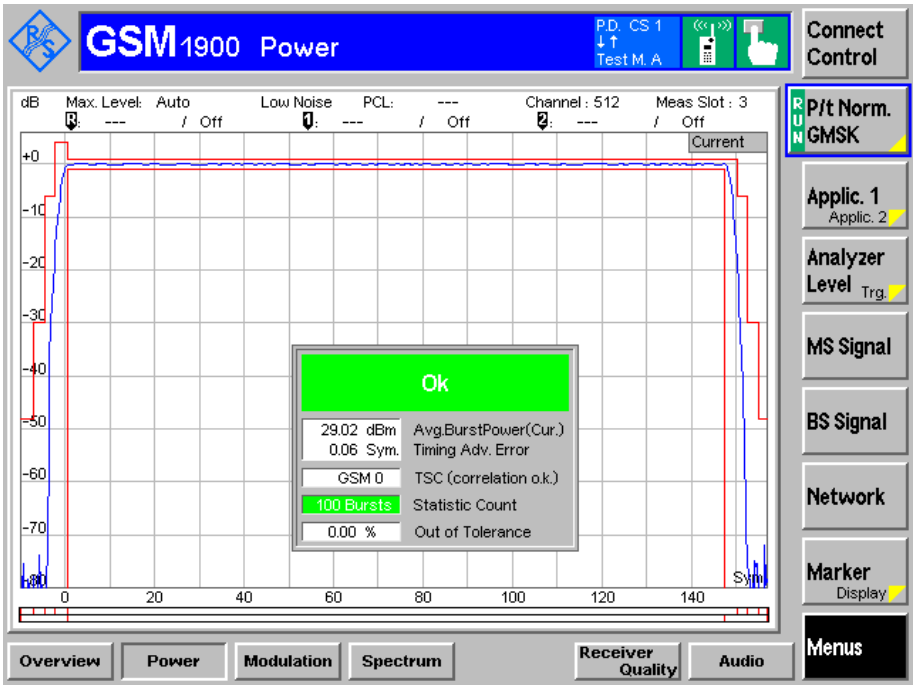


High channel

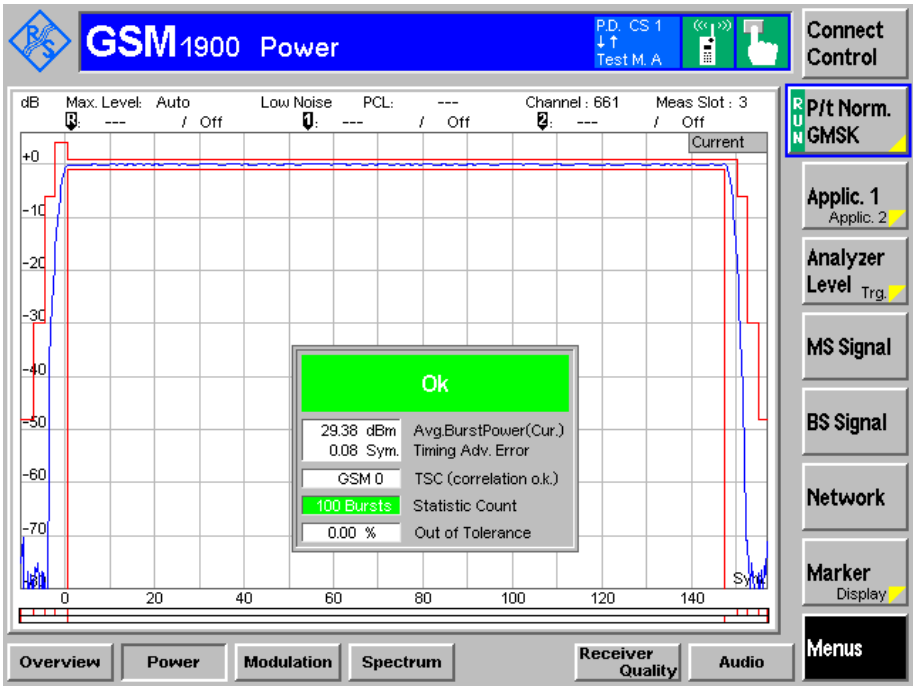


Plots of Conducted Output Power for PCS Band (GPRS):

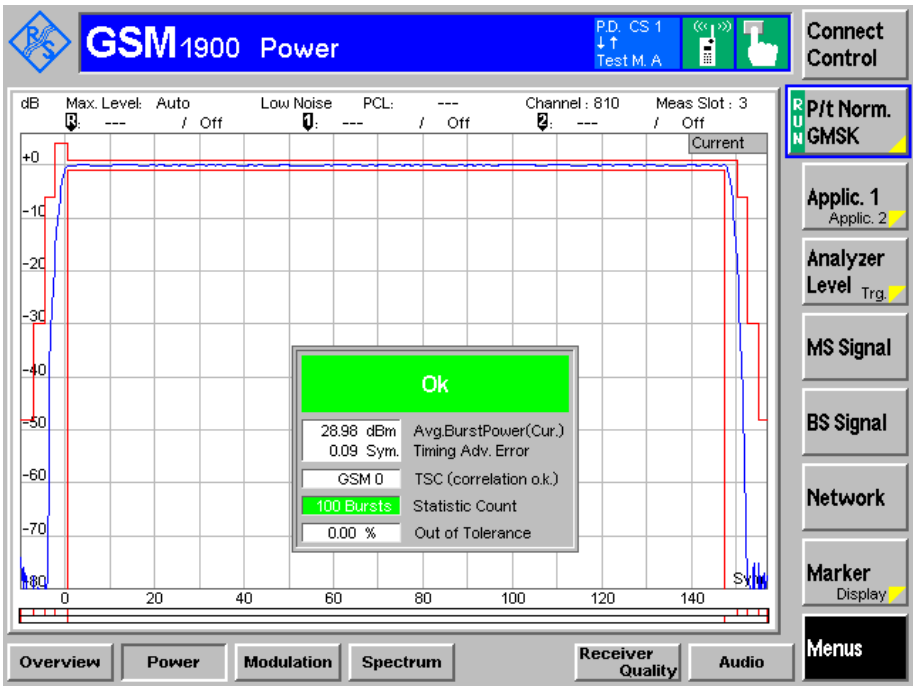
Low Channel



Middle channel



High channel



8.0 Occupied Bandwidth

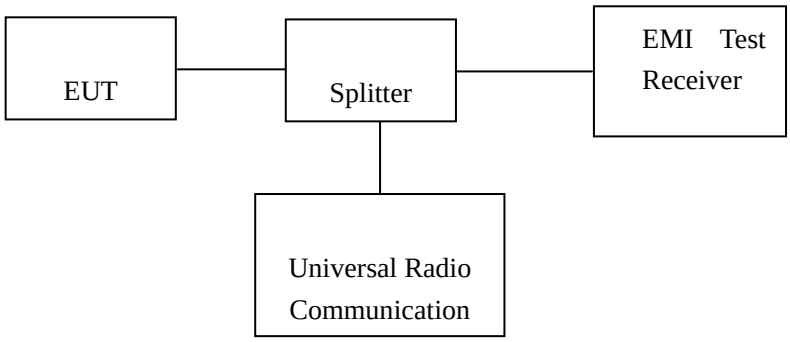
8.1 Applicable Standards:

CFR 47 §2.1049, §22.917, §22.905 and §24.238.

8.2 Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 30 kHz (Cellular /PCS) and the 26 dB & 99% bandwidth was recorded.



8.3 Test Data:

Environmental conditions:

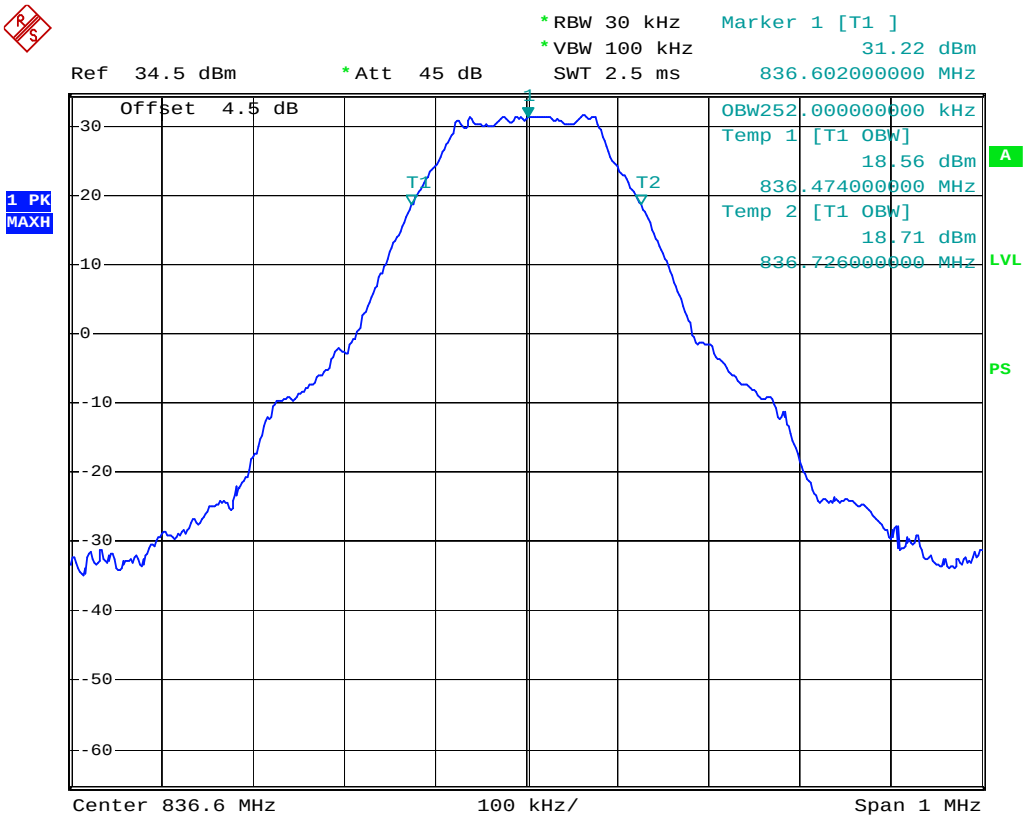
Temperature:	25 ° C
Relative Humidity:	56%
ATM Pressure:	100.0kPa

For GSM 850

Channel	Channel frequency (MHz)	99% Power Bandwidth (kHz)	26 dB Bandwidth (kHz)
Channel 190	836.6	252.0	336.0

Please refer to the following plots.

99% Power Bandwidth



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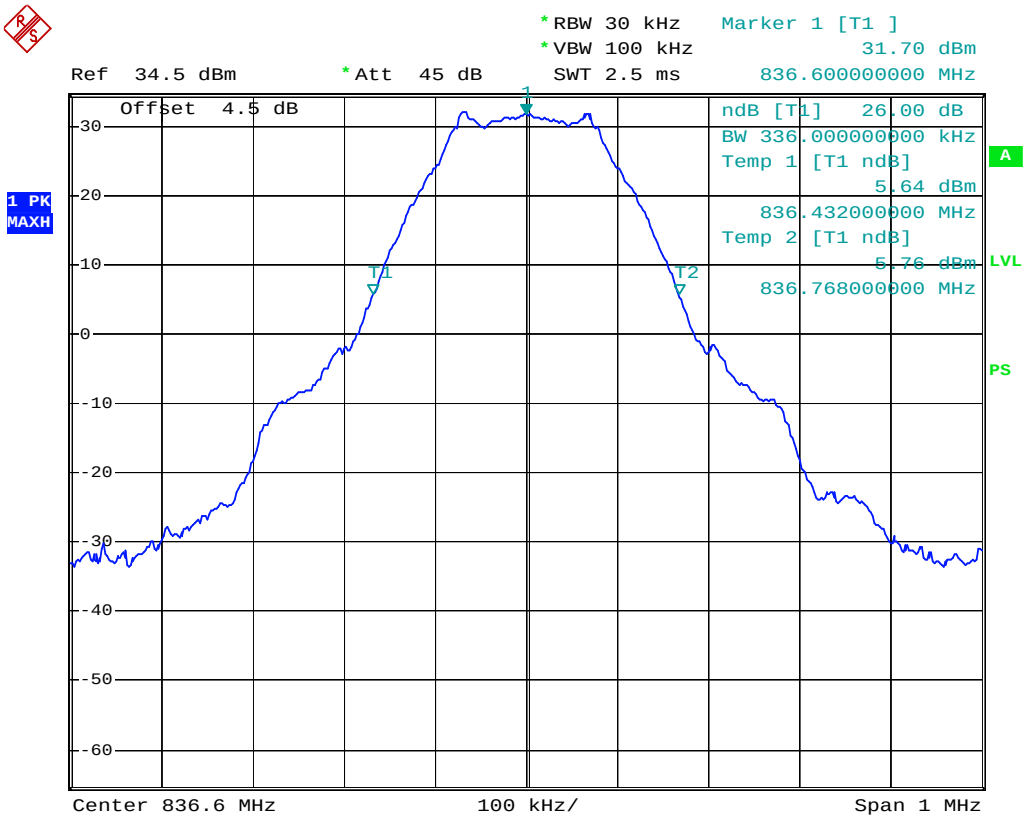
26 dB bandwidth



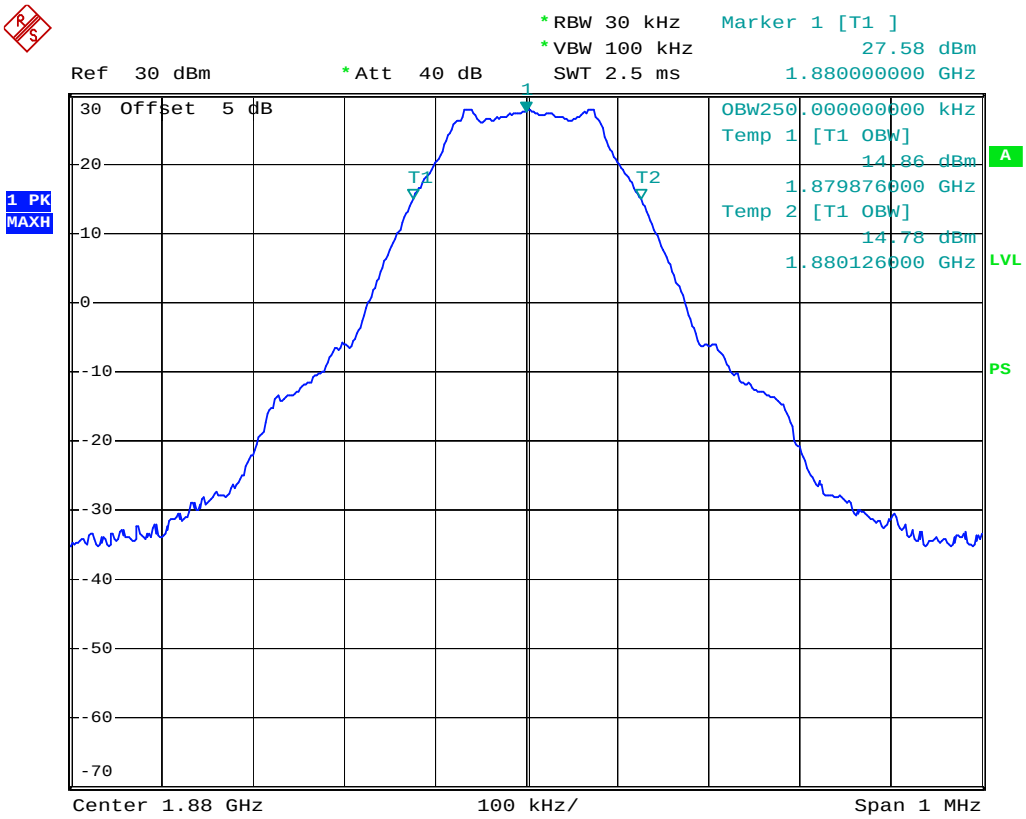
Date: 5.JAN.2009 13:40:40

For PCS1900

Channel	Channel frequency (MHz)	99% Power Bandwidth (kHz)	26 dB Bandwidth (kHz)
Channel 661	1880.0	250.0	334.0

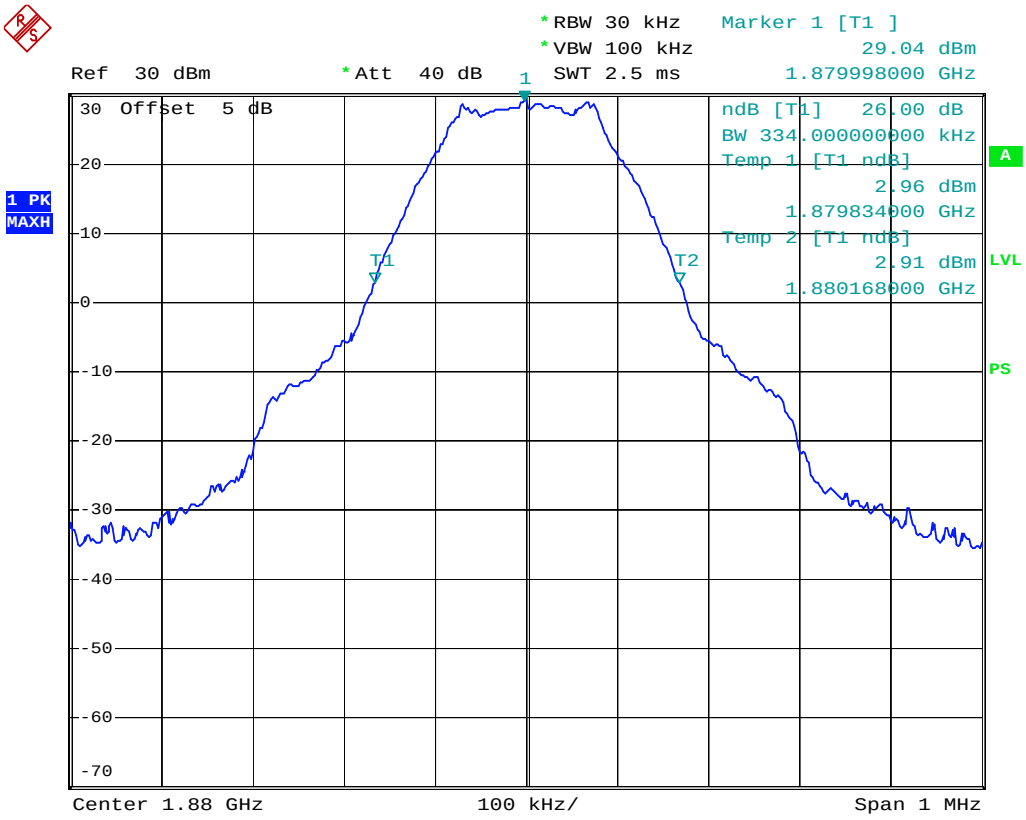
Please refer to the following plots.

99% Power Bandwidth



Date: 5.JAN.2009 13:35:50

26 dB Bandwidth



Date: 5.JAN.2009 13:34:06

9.0 SPURIOUS EMISSIONS AT ANTENNA TERMINALS

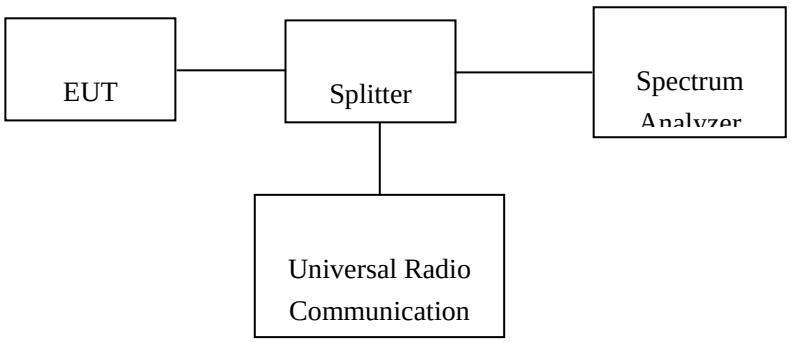
9.1 Applicable Standards

CFR 47 §2.1051, §22.917(a) and §4.238(a).

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

9.2 Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10^{th} harmonic.



9.3 Test Data:

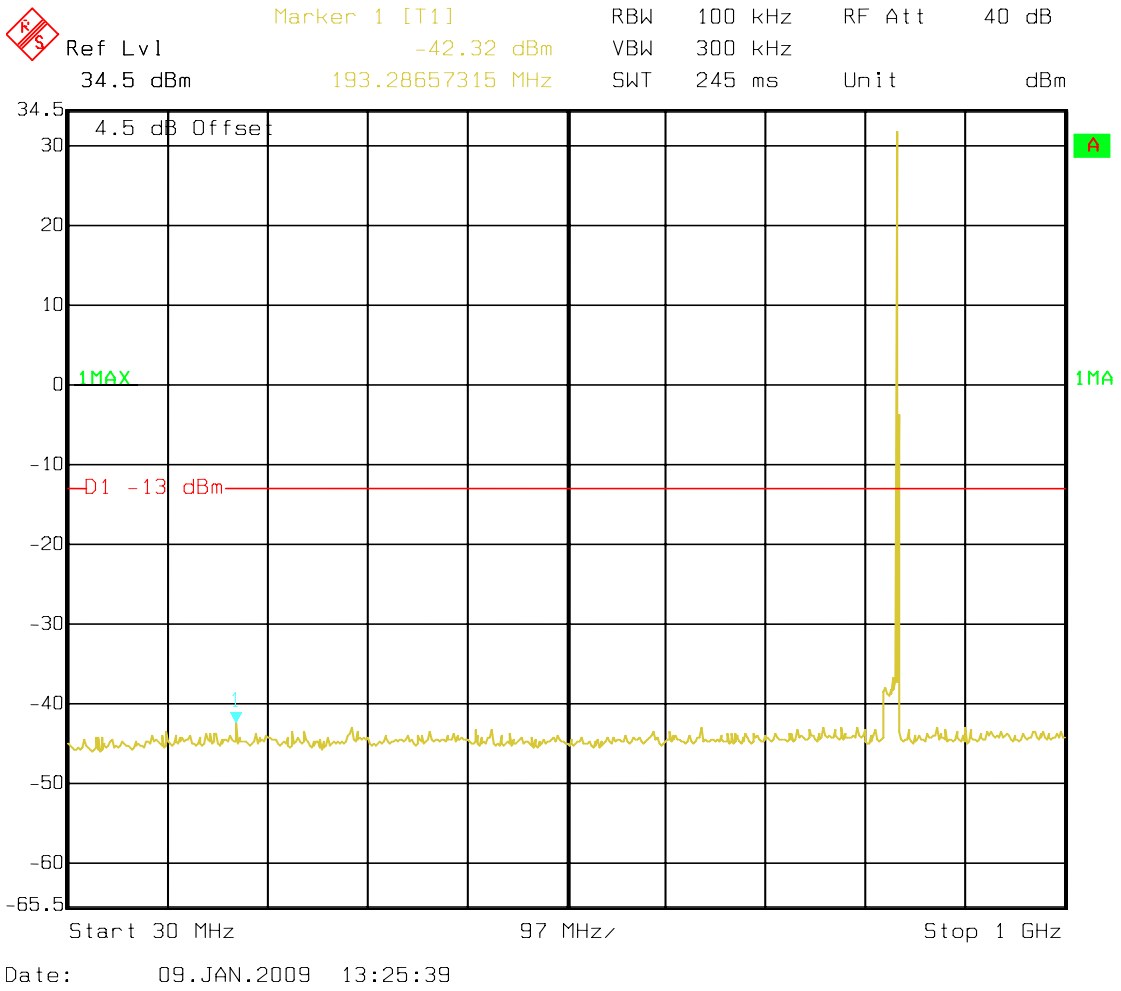
Environmental conditions:

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

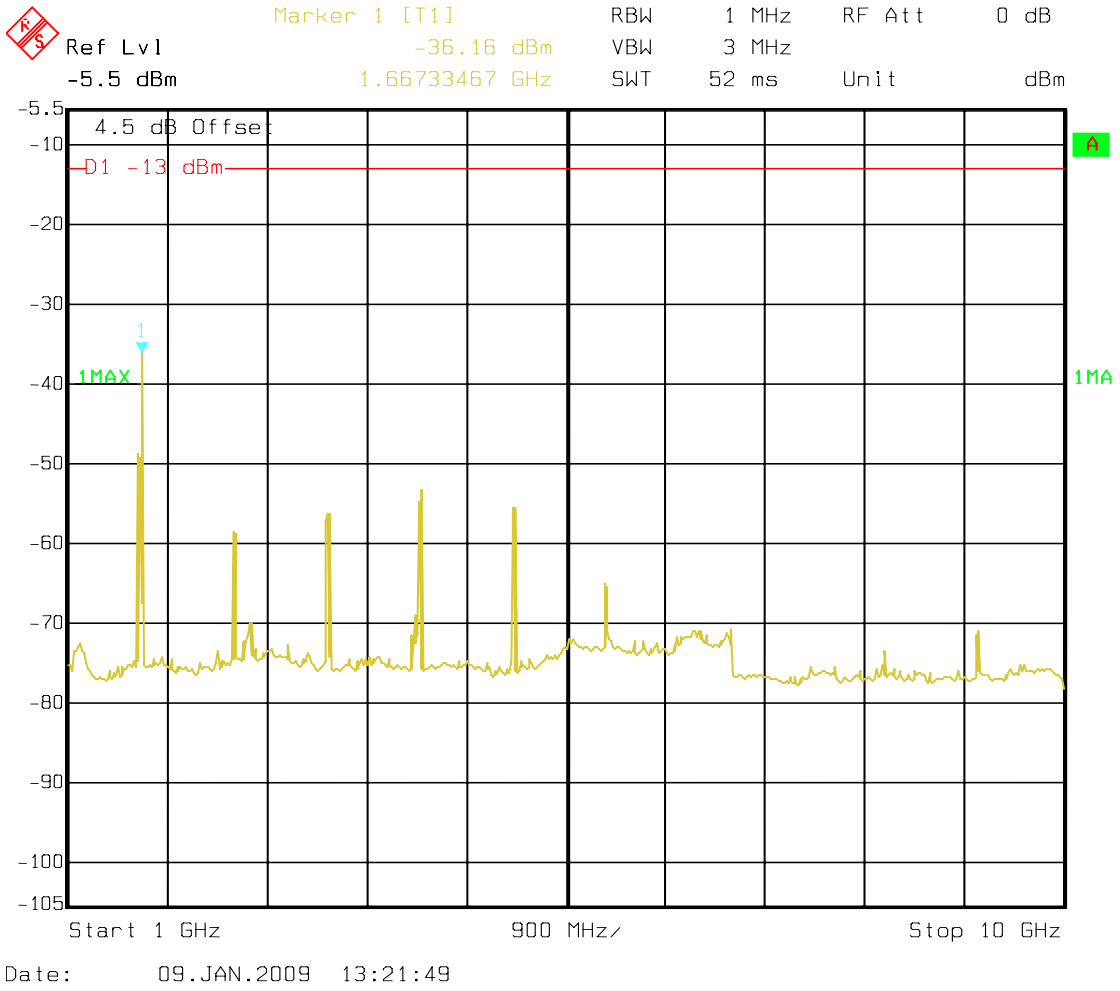
Please refer to the hereinafter plots.

For GSM 850

30MHz-1000MHz - Middle Channel

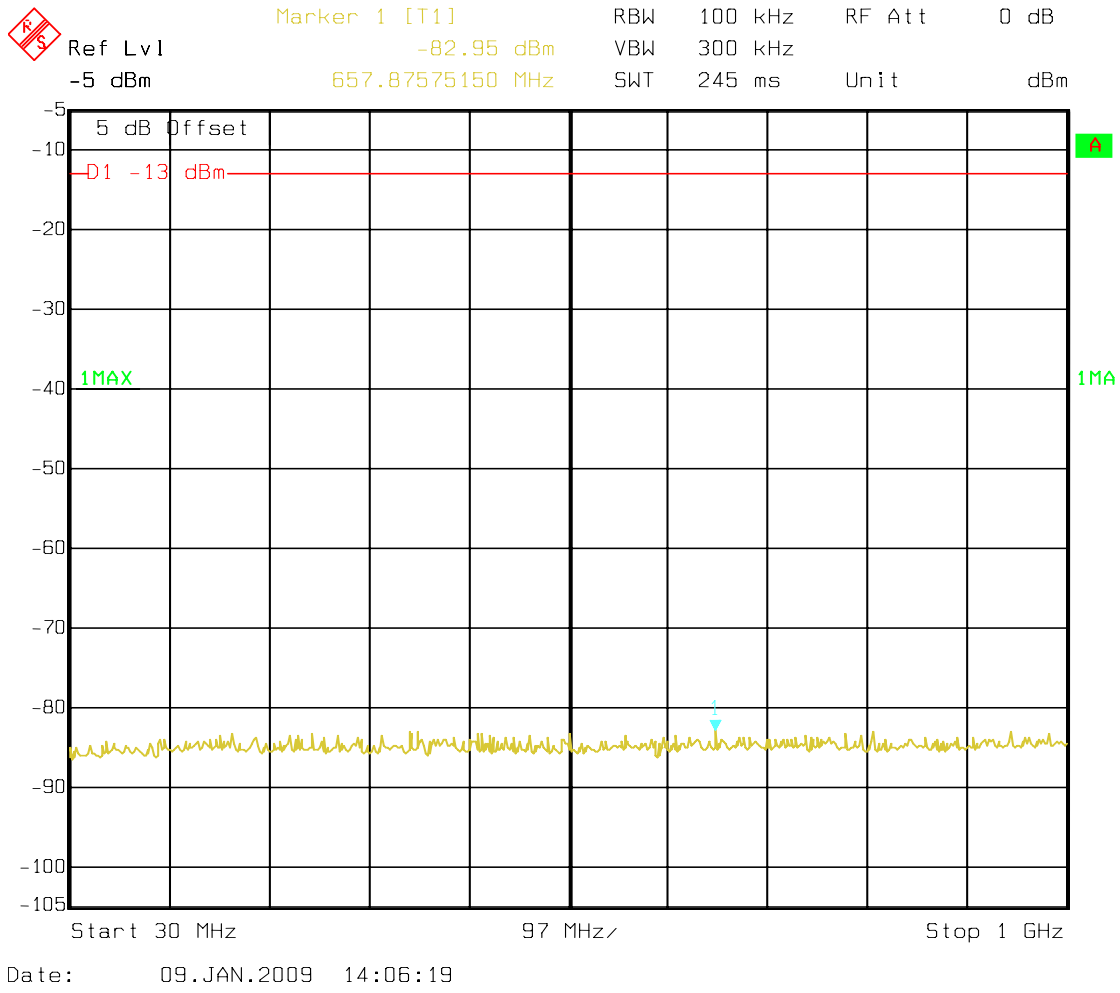


1GHz-10GHz - Middle Channel

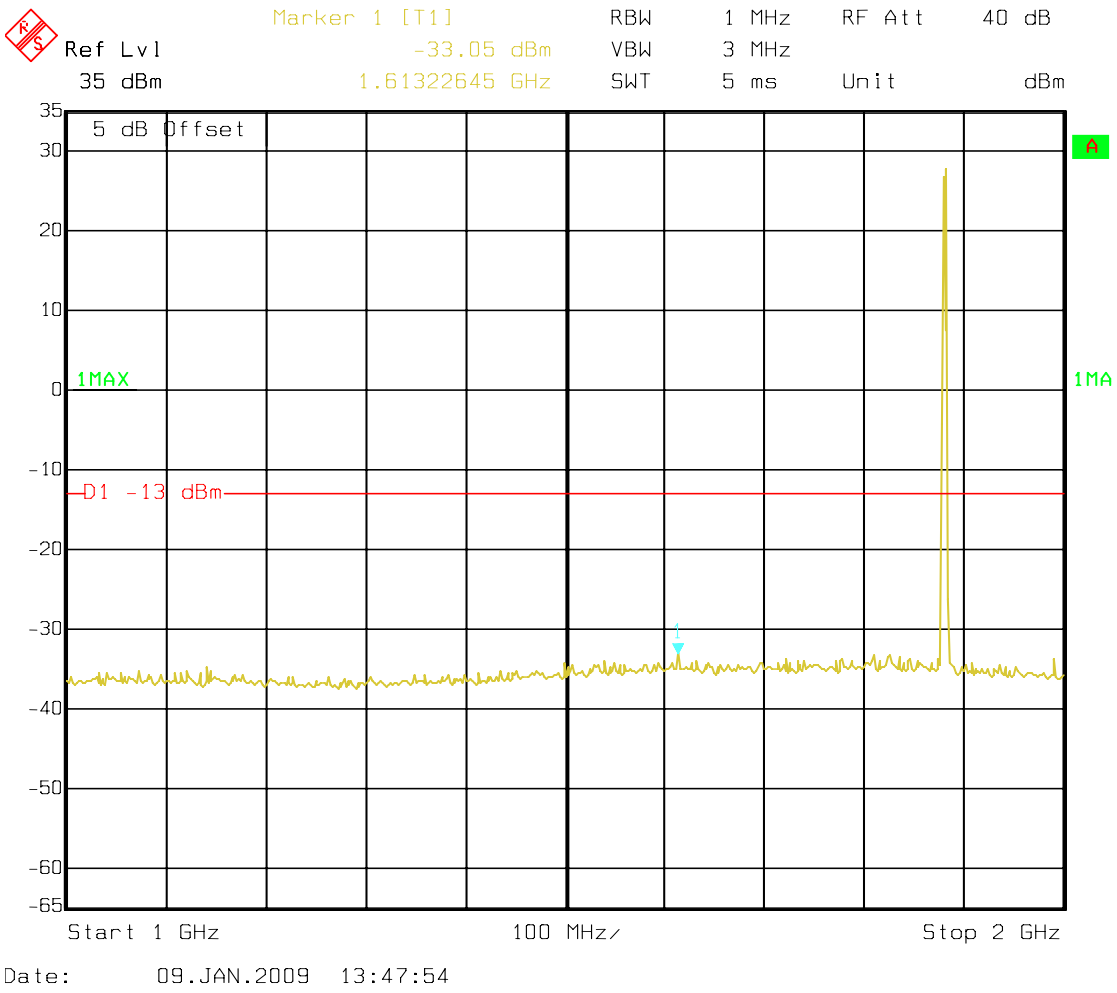


For PCS 1900

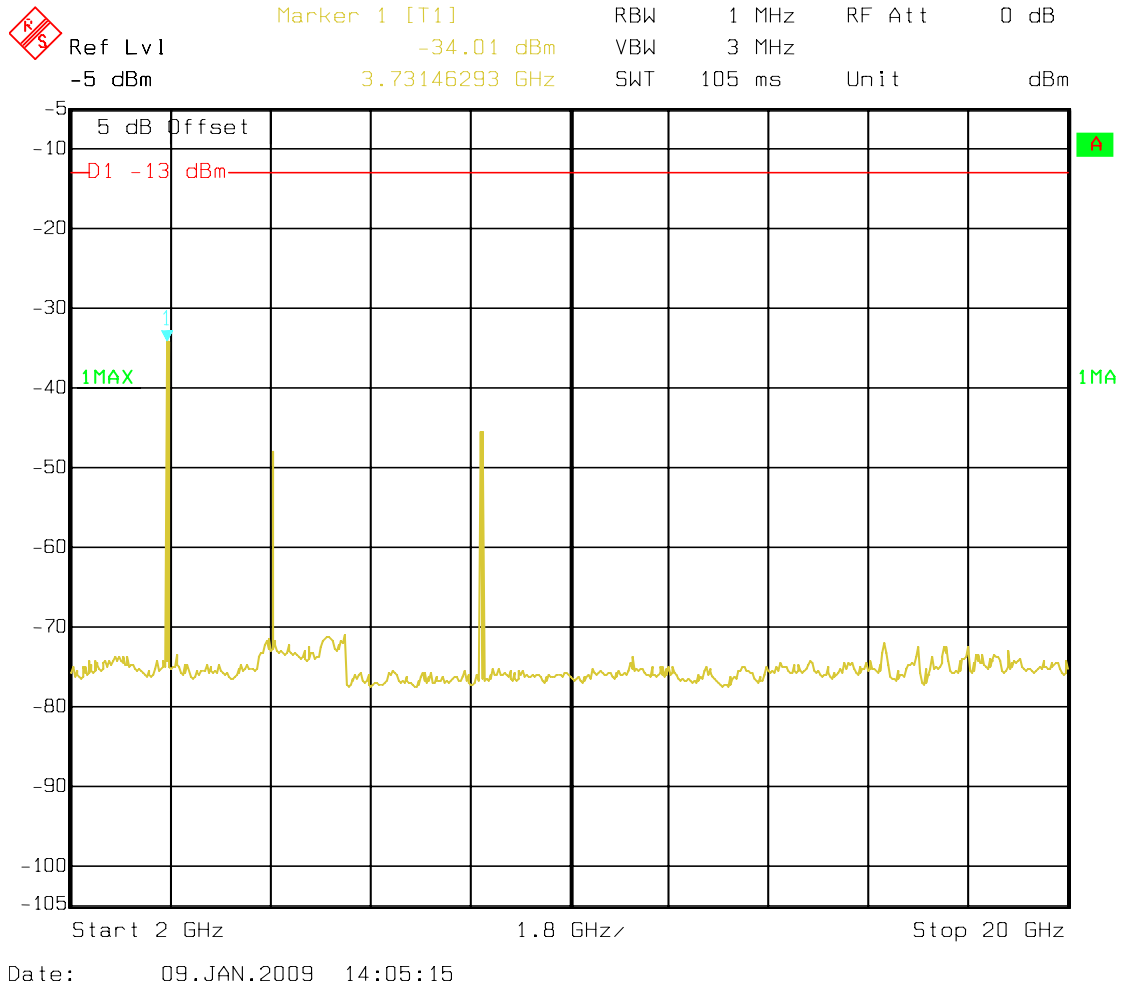
30MHz-1000MHz - Middle Channel



1GHz-2GHz - Middle Channel

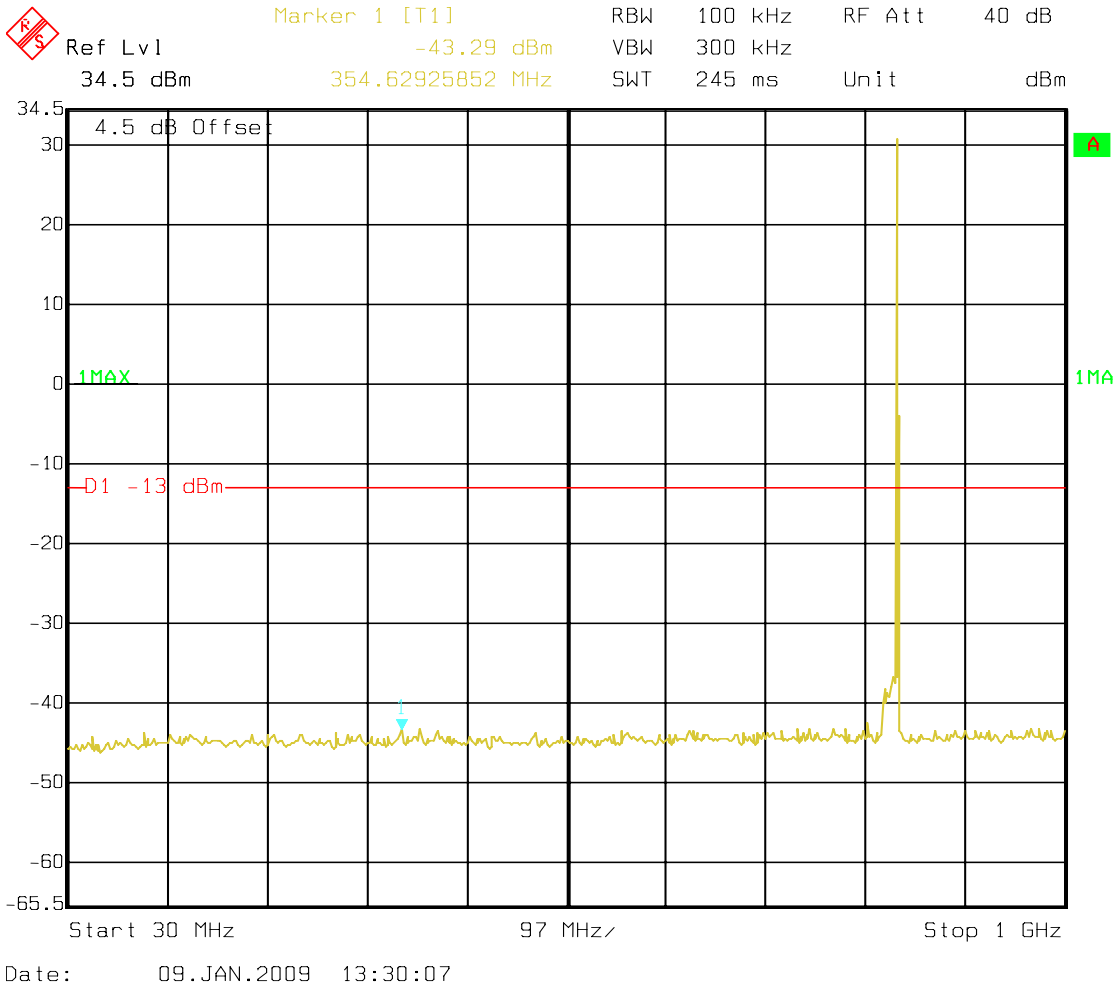


2GHz-20GHz - Middle Channel

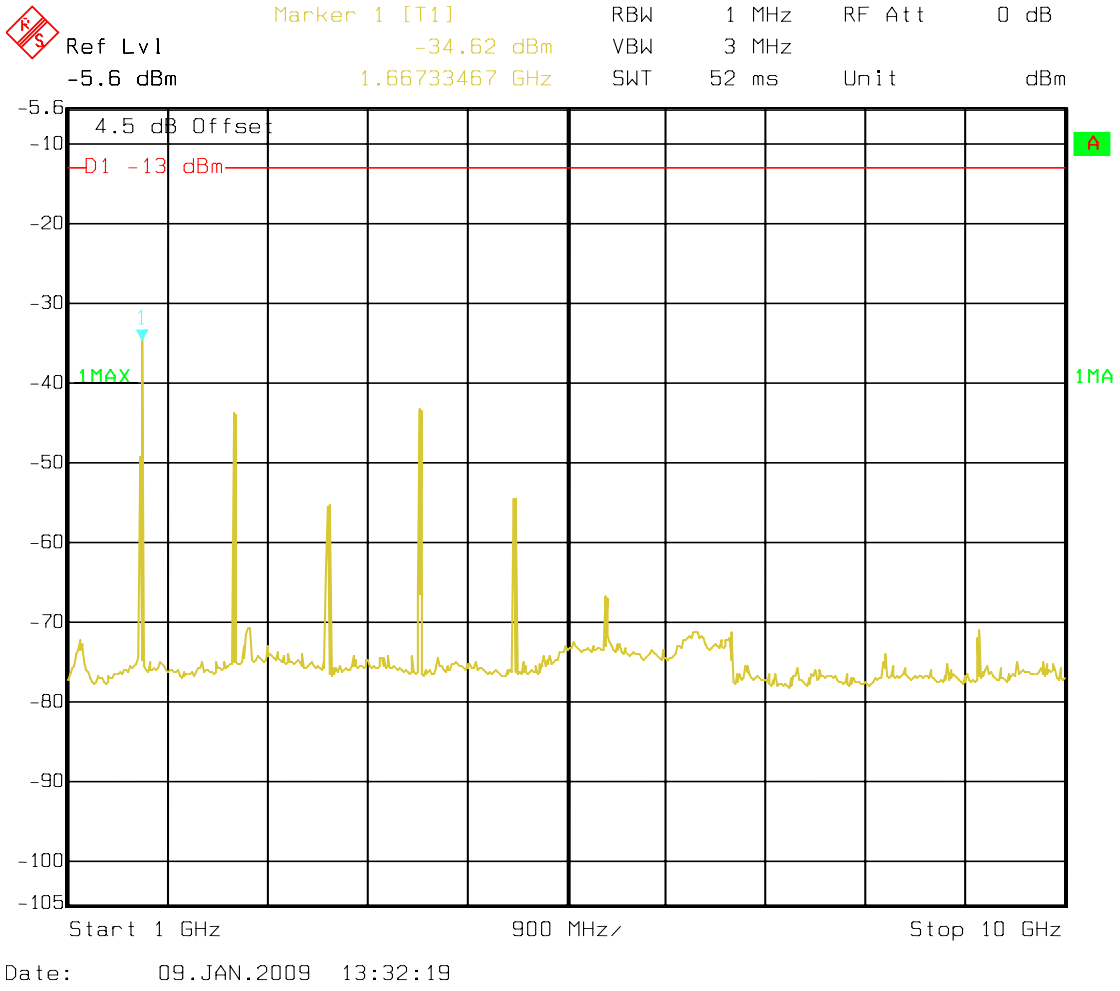


For GPRS (850 MHz)

30MHz-1000MHz - Middle Channel

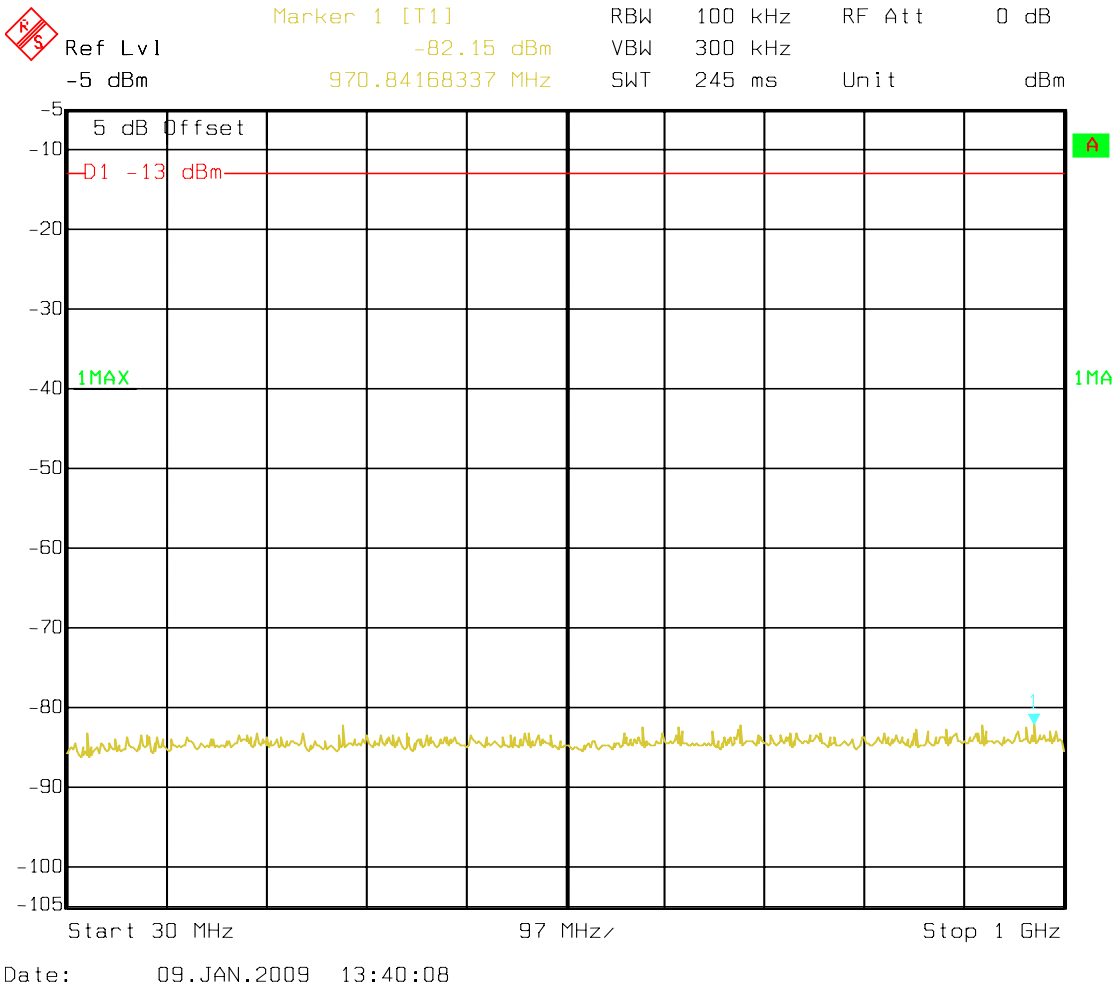


1GHz-10GHz - Middle Channel

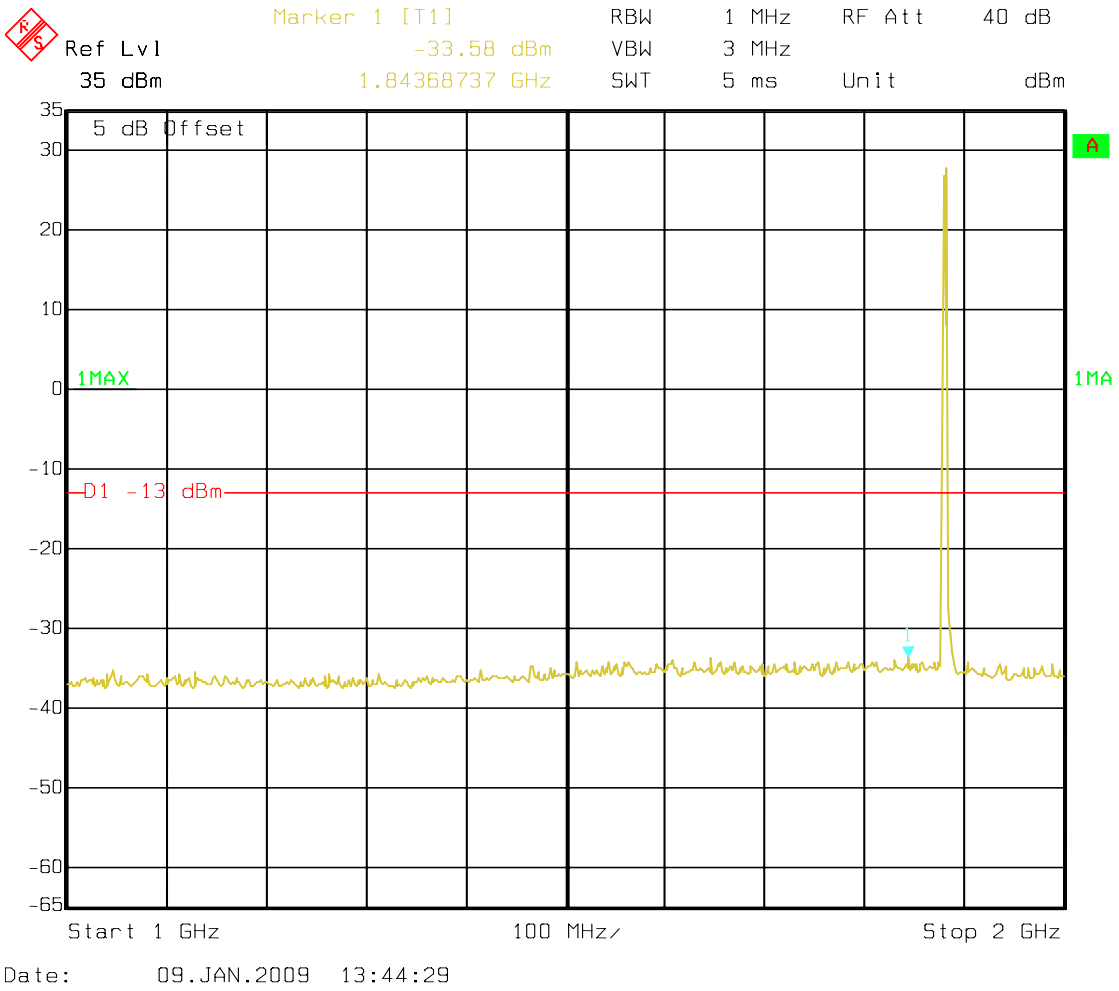


For GPRS (1900 MHz)

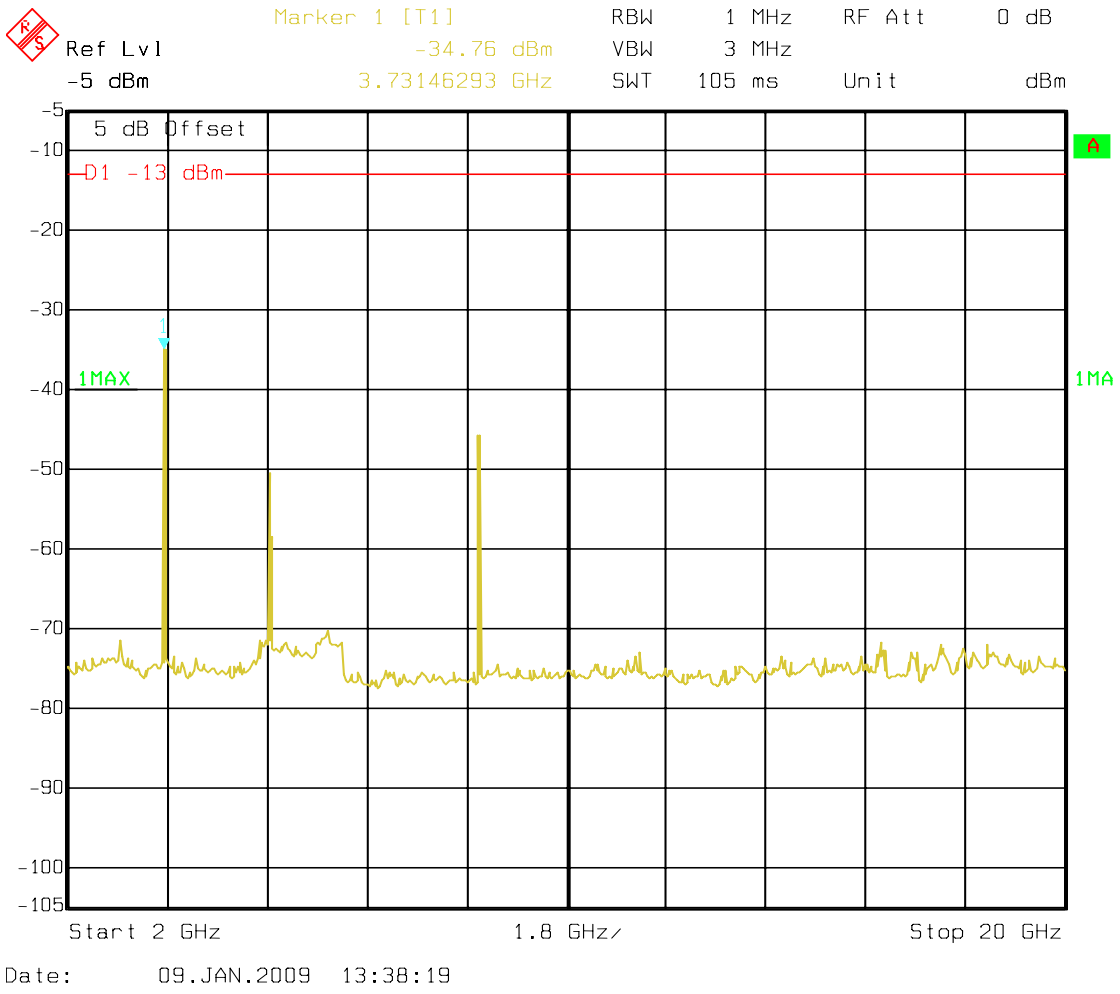
30MHz-1000MHz - Middle Channel



1GHz-2GHz - Middle Channel



2GHz-20GHz - Middle Channel



10.0 SPURIOUS RADIATED EMISSIONS

10.1 Applicable Standards:

CFR 47 § 2.1053, 22.917 and § 24.238.

10.2 Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = 10 lg (TXpwr in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log_{10} (power out in Watts)

10.3 Test Data:

Environmental conditions:

Temperature:	25 ° C
Relative Humidity:	56%
ATM Pressure:	100.0kPa

For GSM 850 Band: Below 1GHz:

Indicated		Table	Test Antenna		Substituted		Antenna	Cable	Absolute	Limit	Margin
Frequency (MHz)	Reading (dBμV)	Angle Degree	Height Meter	Polar H/V	Frequency (MHz)	Level (dBm)	Gain (dBi)	Loss (dB)	Level (dBm)	(dBm)	(dB)
Middle Channel											
782.89	37.53	242	1.2	V	782.89	-61.3	0	0.88	-62.18	-13	49.18
757.41	38.12	70	1.5	V	757.41	-62.1	0	0.86	-62.96	-13	49.96
80.40	25.07	150	1.5	H	80.40	-67.3	0	0.45	-67.75	-13	54.75
158.93	21.58	210	1.0	H	158.93	-73.6	0	0.48	-74.08	-13	61.08

For PCS 1900 Band: Below 1GHz

Indicated		Table	Test Antenna		Substituted		Antenna	Cable	Absolute	Limit	Margin
Frequency (MHz)	Reading (dBμV)	Angle Degree	Height Meter	Polar H/V	Frequency (MHz)	Level (dBm)	Gain (dBi)	Loss (dB)	Level (dBm)	(dBm)	(dB)
Middle Channel											
900.15	42.38	137.0	1.2	V	900.15	-53.7	0	0.76	-54.46	-13	41.46
760.70	37.15	199.0	1.3	V	760.70	-58.4	0	0.86	-59.26	-13	46.26
952.09	32.99	130	1.5	H	952.09	-59.8	0	0.86	-60.66	-13	47.66
900.15	35.81	240	1.2	H	900.15	-60.3	0	0.76	-61.06	-13	48.06

For GSM 850 Band: above 1GHz:

Indicated		Table	Test Antenna		Substituted		Antenna	Cable	Absolute	Limit	Margin
Frequency (MHz)	Reading (dBμV)	Angle Degree	Height Meter	Polar H/V	Frequency (MHz)	Level (dBm)	Gain (dBi)	Loss (dB)	Level (dBm)	(dBm)	(dB)
Middle Channel											
2509.8	63.66	210	1.8	H	2509.8	-38.58	7.3	1.19	-32.47	-13	19.47
1673.2	59.98	220	1	V	1673.2	-40.27	6.2	0.94	-35.01	-13	22.01
2509.8	59.82	130	1.5	V	2509.8	-42.00	7.3	1.19	-35.89	-13	22.89
1673.2	56.42	100	1.9	H	1673.2	-43.73	6.2	0.94	-38.47	-13	25.47
1937.9	50.03	180	1.6	V	1937.9	-44.8	6.1	1.04	-39.74	-13	26.74
3346.6	44.53	150	1.4	V	3346.6	-59.11	6.7	1.38	-53.79	-13	40.79
3346.6	44.12	130	1.6	H	3346.6	-59.75	6.7	1.38	-54.43	-13	41.43

For PCS 1900 Band: above 1GHz

Indicated		Table	Test Antenna		Substituted		Antenna	Cable	Absolute	Limit	Margin
Frequency (MHz)	Reading (dBμV)	Angle Degree	Height Meter	Polar H/V	Frequency (MHz)	Level (dBm)	Gain (dBi)	Loss (dB)	Level (dBm)	(dBm)	(dB)
Middle Channel											
3760	52.81	200	1.6	V	3760	-50.71	6.9	1.47	-45.28	-13	32.28
3760	51.94	190	1.9	H	3760	-51.44	6.9	1.47	-46.01	-13	33.01
7520	43.98	110	1.5	V	7520	-56.06	7.6	2.09	-50.55	-13	37.55
5640	44.59	80	1.5	V	5640	-57.43	8.3	1.76	-50.89	-13	37.89
7520	43.46	180	1.5	H	7520	-56.52	7.6	2.09	-51.01	-13	38.01
5640	43.83	170	1.6	H	5640	-58.39	8.3	1.76	-51.85	-13	38.85

11.0 BAND EDGES

11.1 Applicable Standards:

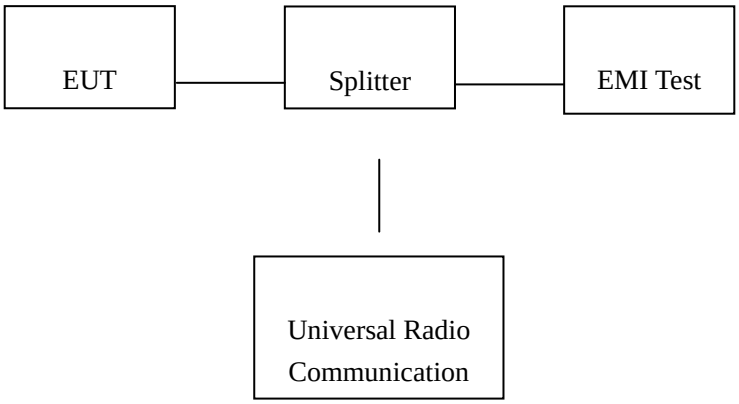
According to § 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to §24.238(a), the power of any emissions 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.

11.2 Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency, RBW set to 10 kHz.



11.3 Test Data

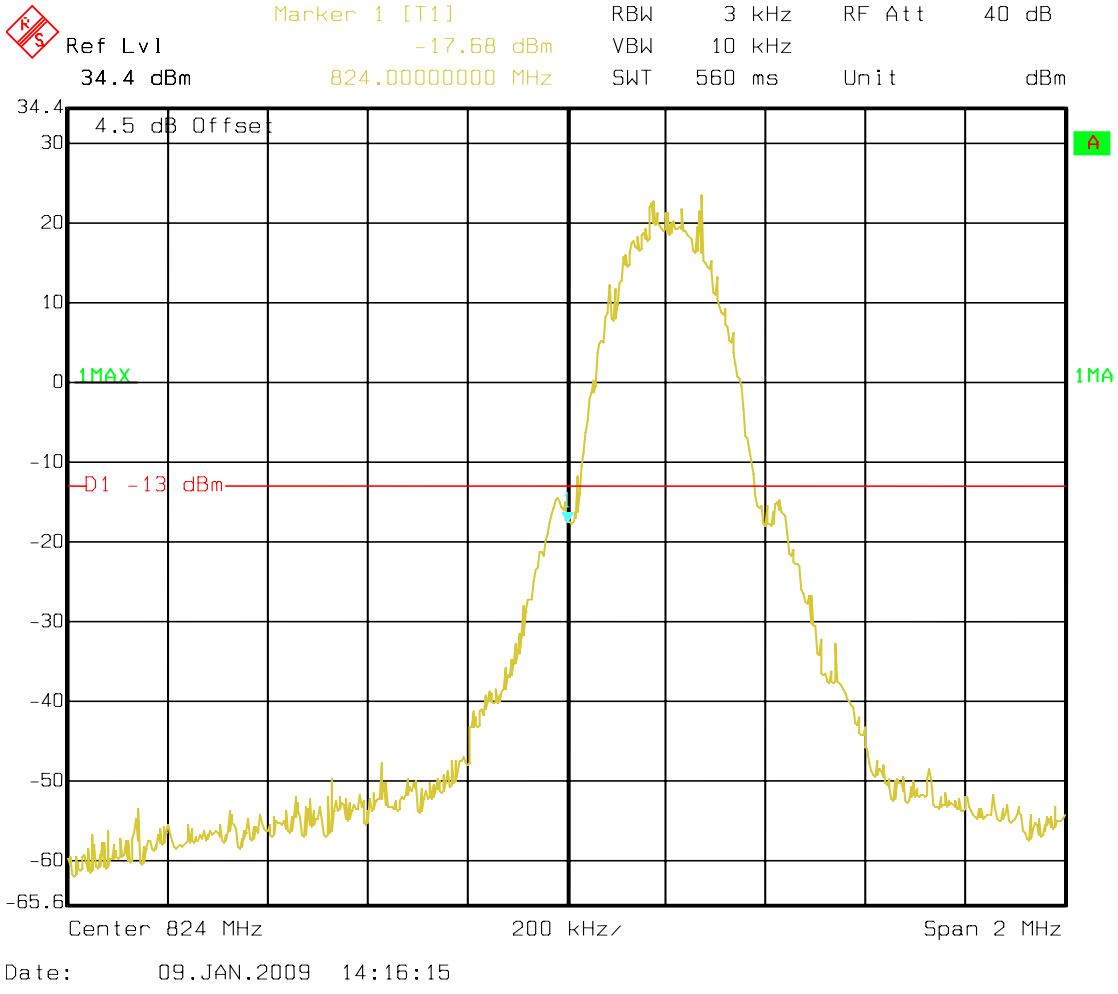
Environmental conditions:

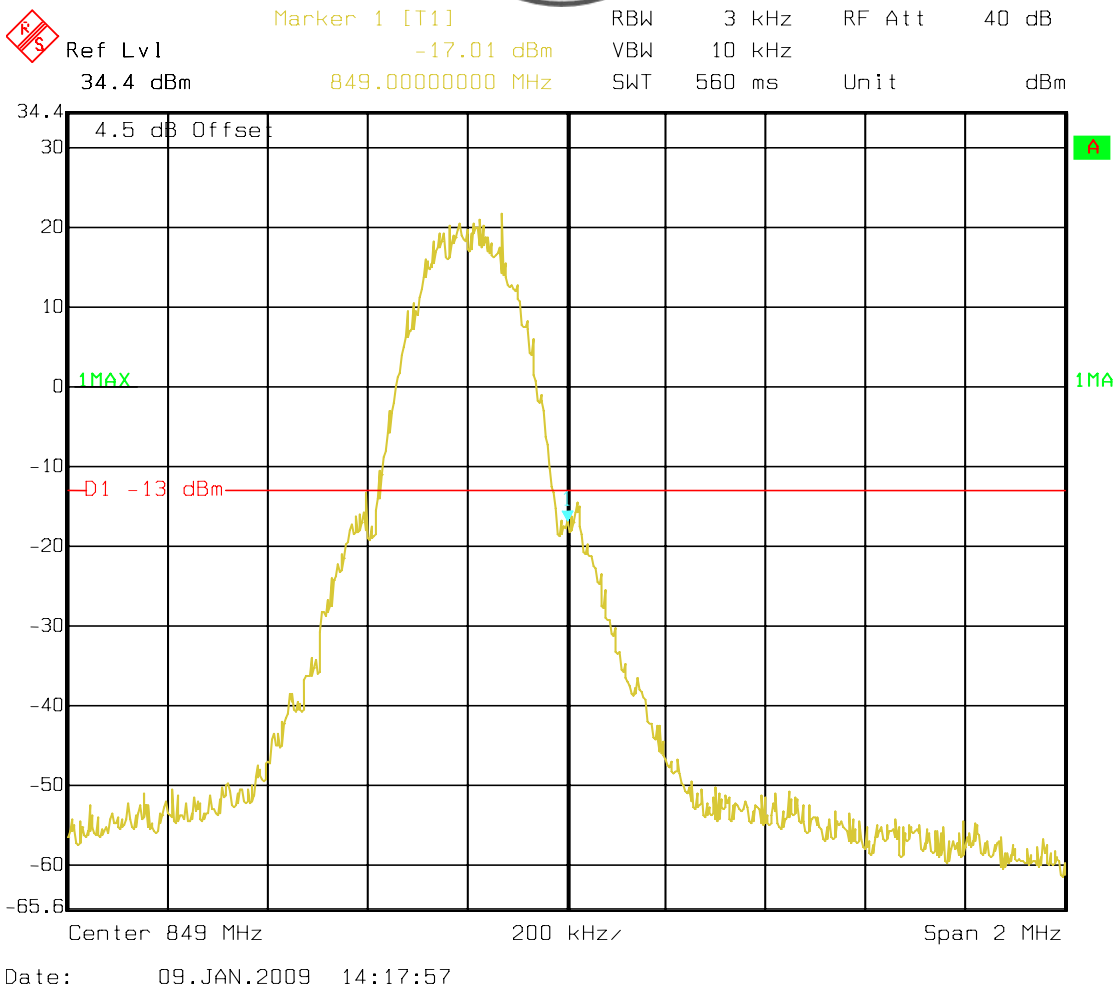
Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

Please refer to the following tables and plots.

For GSM 850

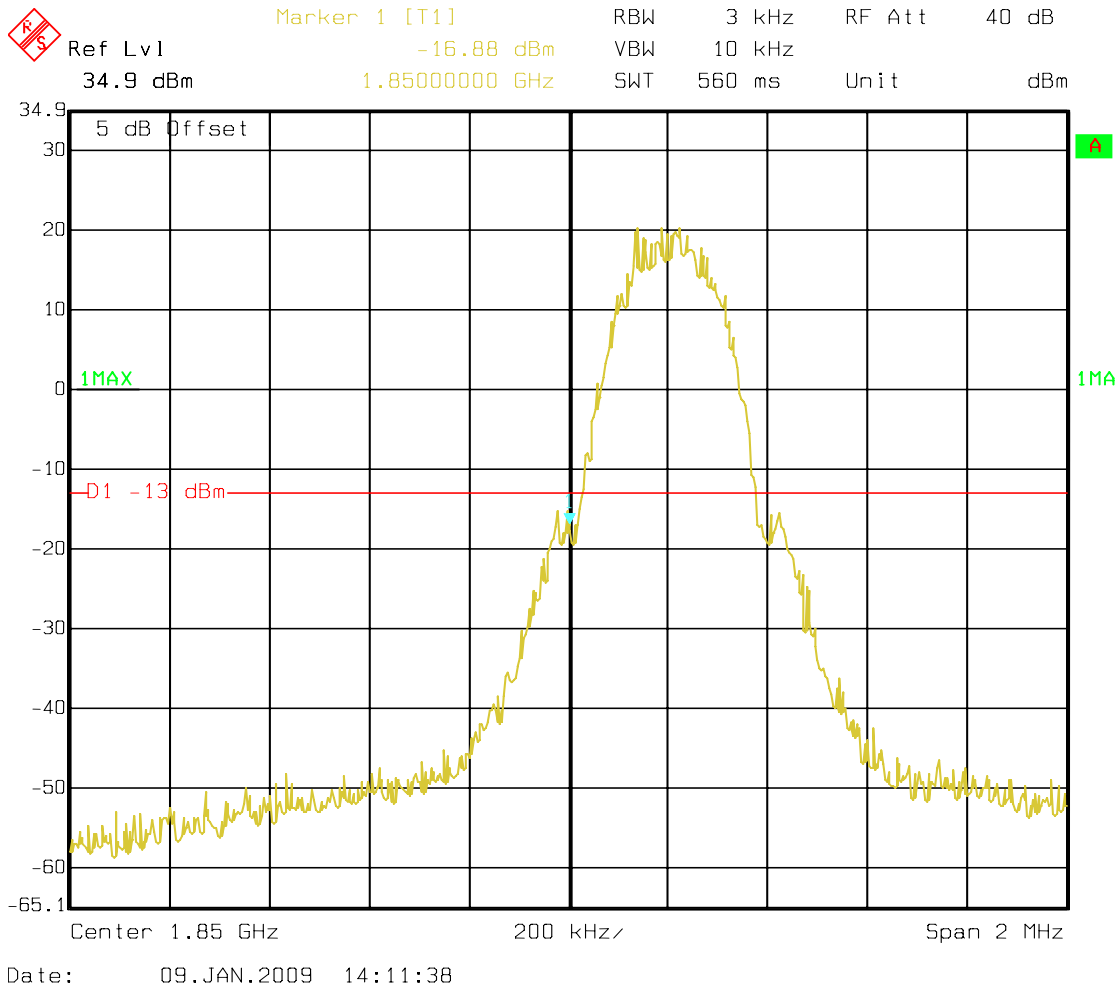
Frequency (MHz)	Emission (dBm)	Limit (dBm)
824	-17.68	-13
849	-17.01	-13

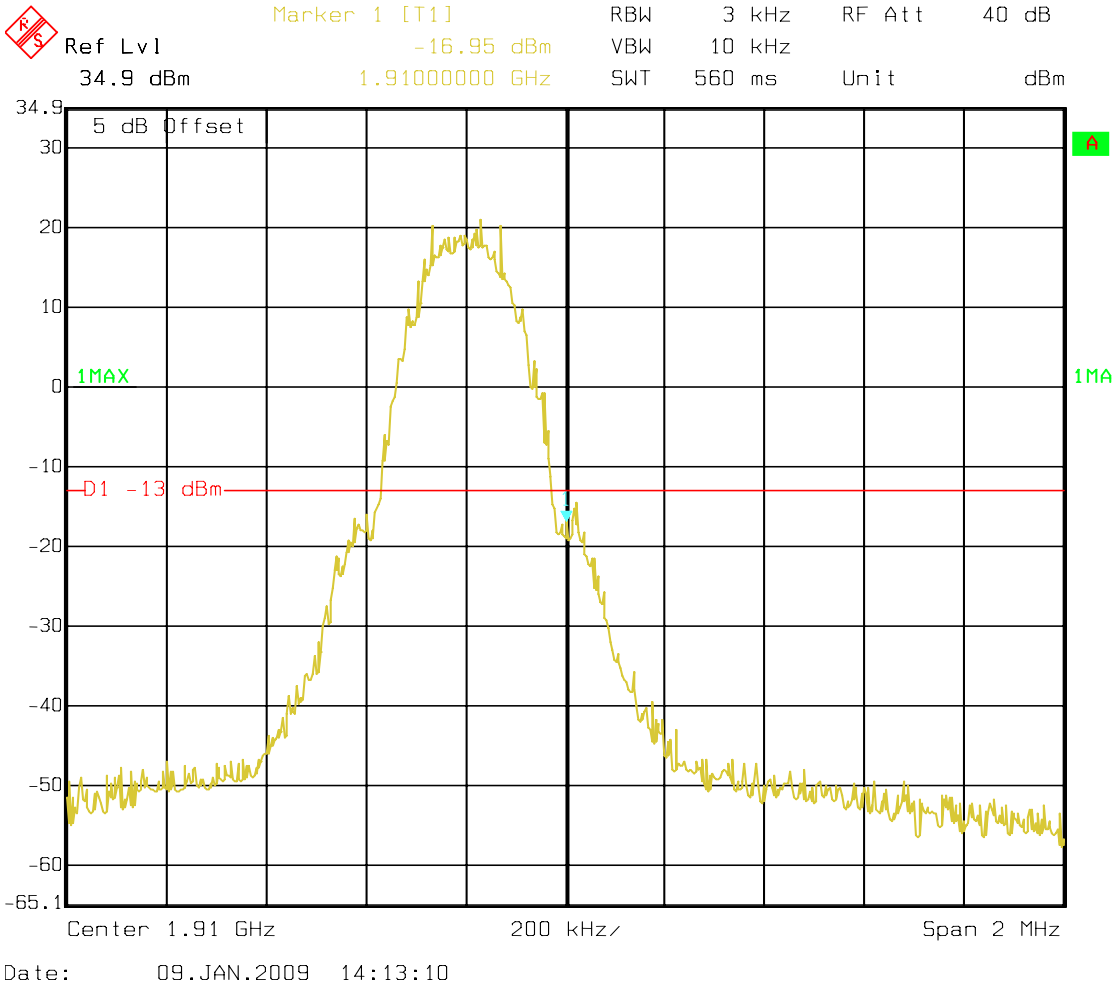




For PCS1900

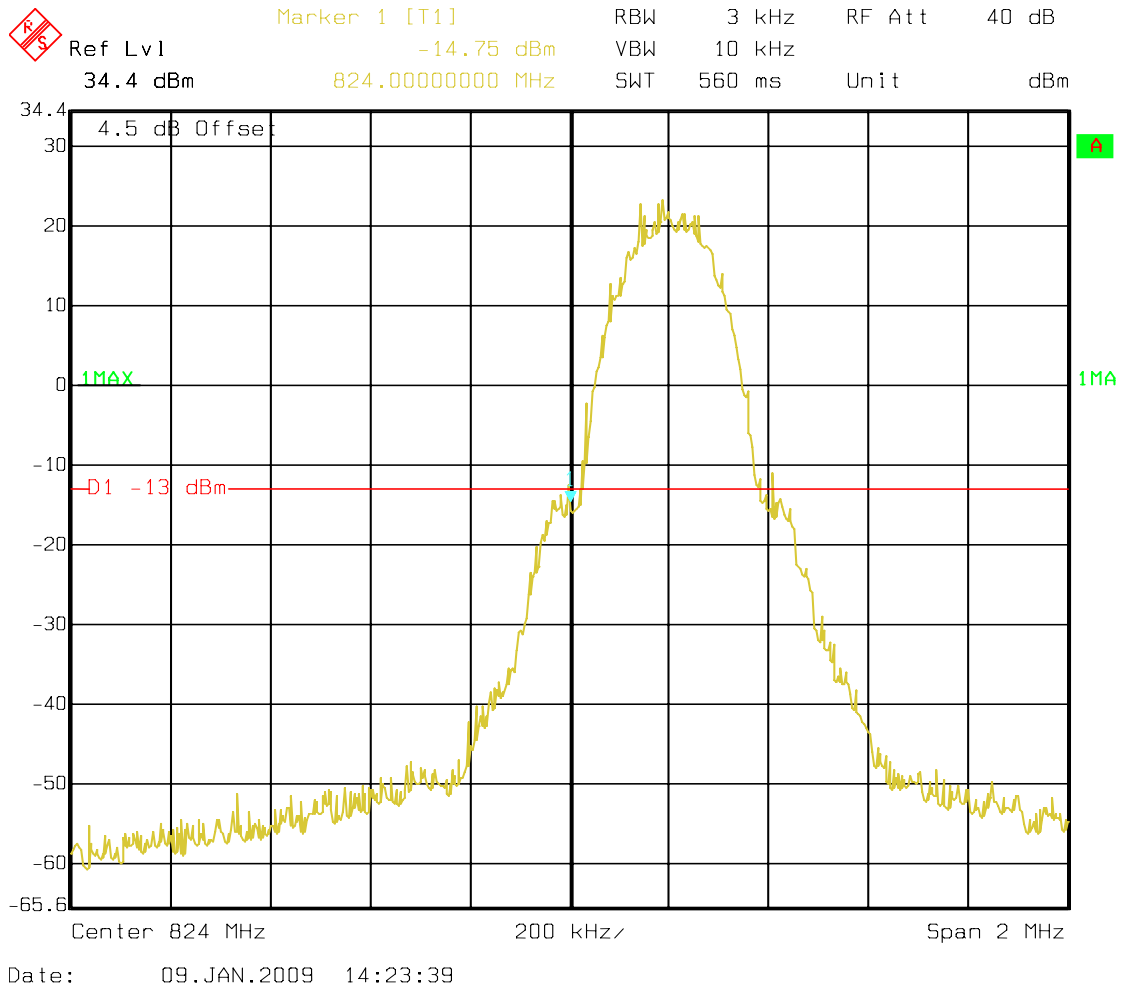
Frequency (MHz)	Emission (dBm)	Limit (dBm)
1850	-16.88	-13
1910	-16.95	-13

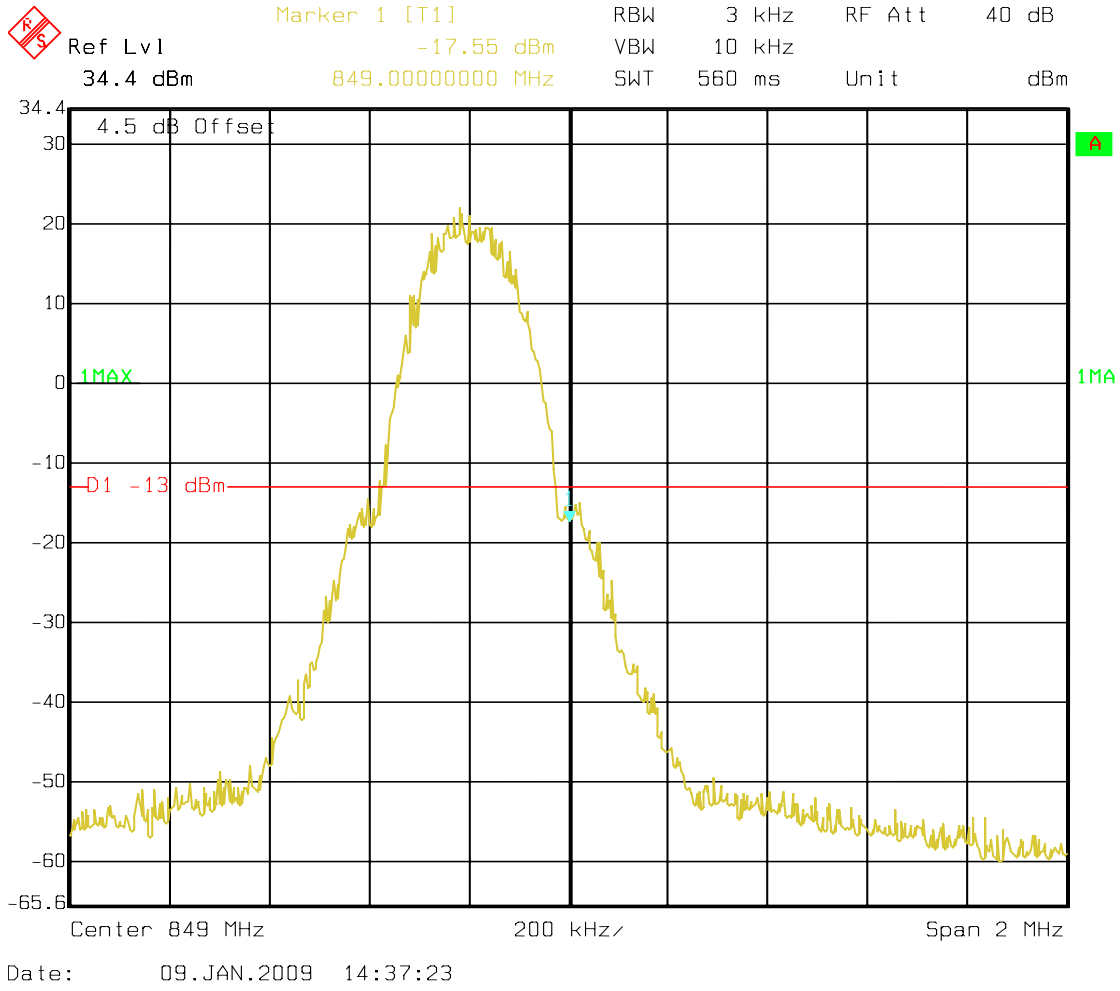




For GPRS (850 MHz)

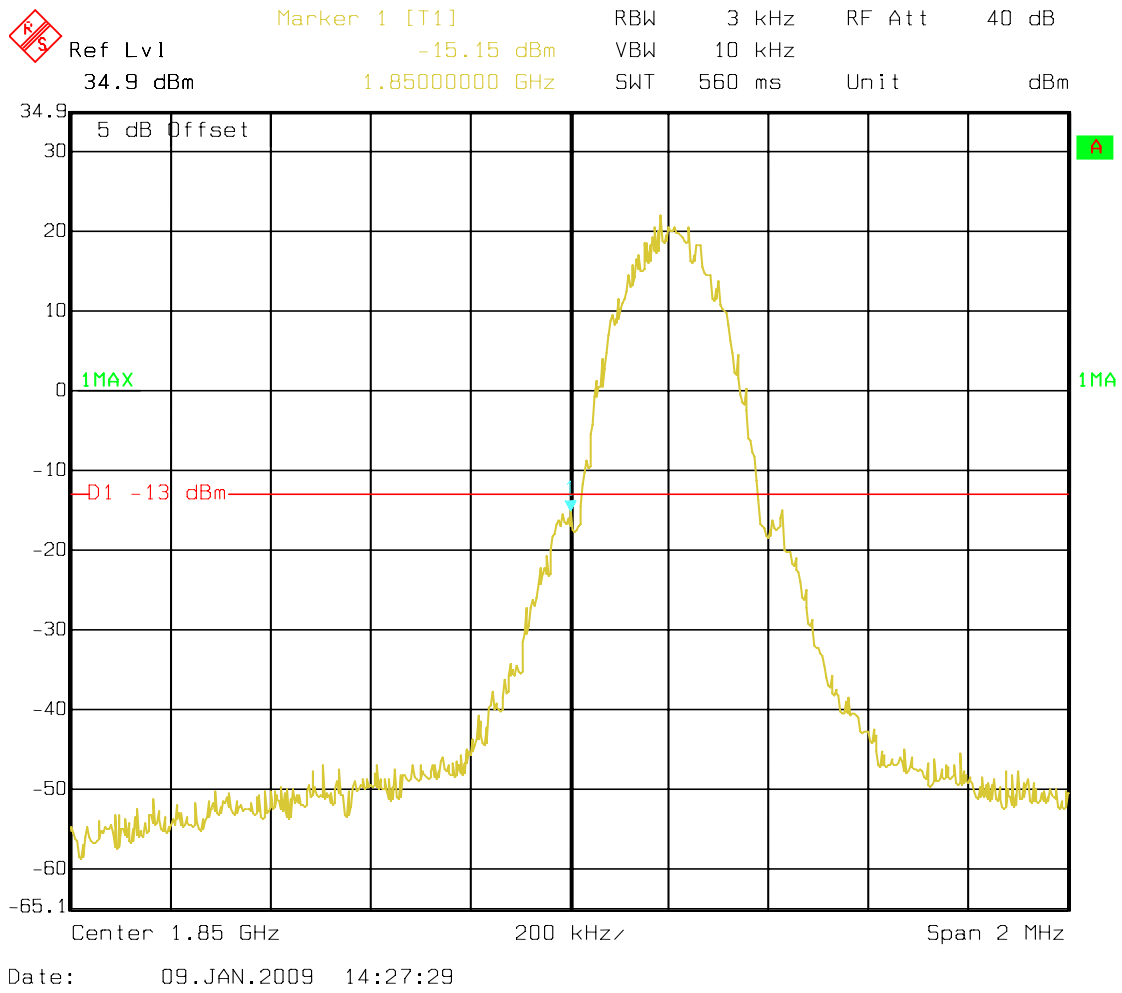
Frequency (MHz)	Emission (dBm)	Limit (dBm)
824	-14.75	-13
849	-17.55	-13

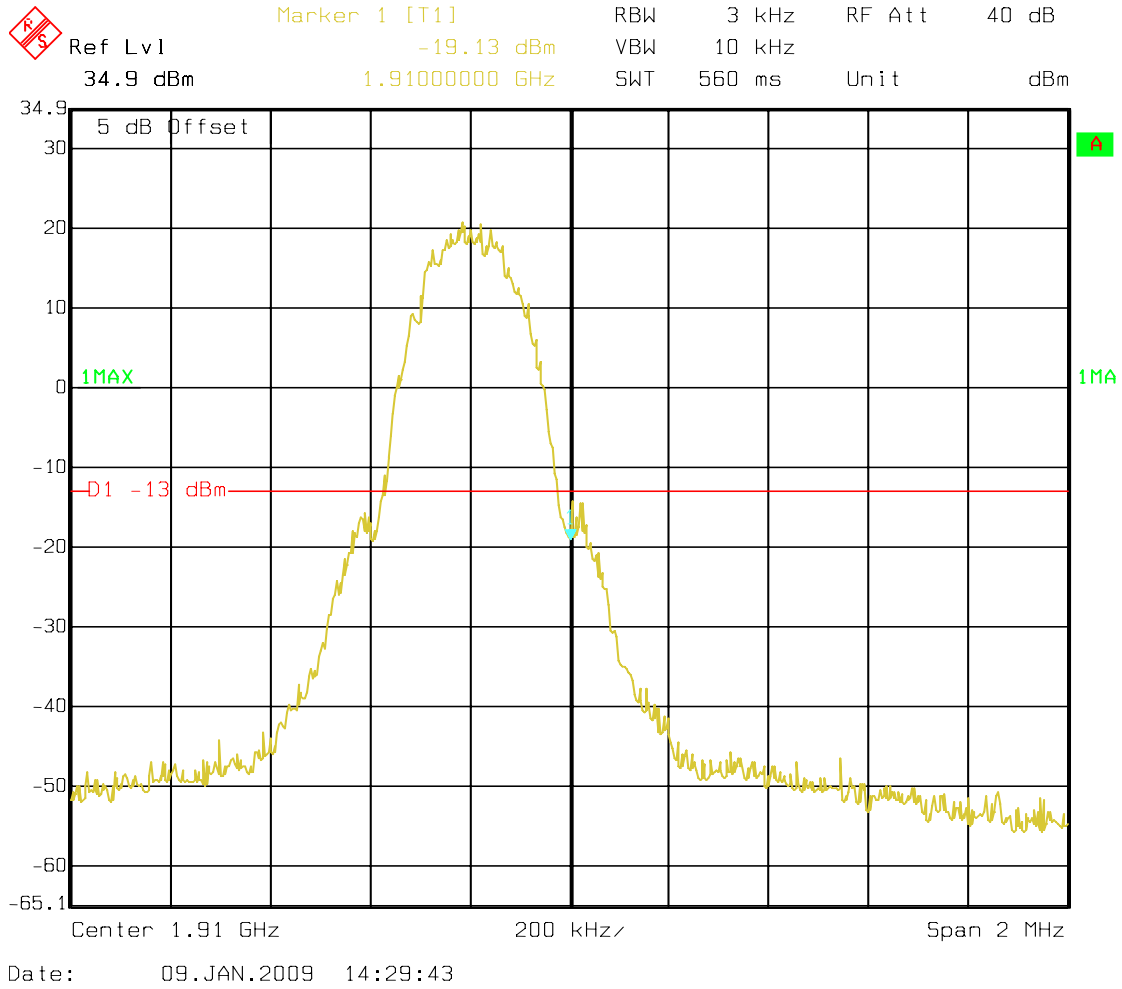




For GPRS (1900 MHz)

Frequency (MHz)	Emission (dBm)	Limit (dBm)
1850	-15.15	-13
1910	-19.13	-13





12.0 FREQUENCY STABILITY

12.1 Applicable Standards:

CFR47 § 2.1055 (a), § 2.1055 (d), §22.355, §24.235

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929.	5.0	N/A	N/A
929 to 960.	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

12.2 Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: An external variable DC power supply was connected to the battery terminals of the equipment under test. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the battery end point. The output frequency was recorded for each battery voltage.

12.3 Test Data

Environmental conditions:

Temperature:	25 ° C
Relative Humidity:	56%
ATM Pressure:	100.0kPa

Cellular Band:

Middle channel, fo =836.6MHz				
Temperature (℃)	**Power Supplied (V)**	**Frequency Error (Hz)**	**Error (ppm)**	**Limit (ppm)**
-30	10.2	-21	-0.0251	2.5
	12.0	-24	-0.0287	2.5
	13.8	-23	-0.0275	2.5
-20	10.2	-21	-0.0251	2.5
	12.0	-27	-0.0323	2.5
	13.8	-24	-0.0287	2.5
-10	10.2	-23	-0.0275	2.5
	12.0	-23	-0.0275	2.5
	13.8	-24	-0.0287	2.5
0	10.2	-23	-0.0275	2.5
	12.0	-23	-0.0275	2.5
	13.8	-24	-0.0287	2.5
10	10.2	-32	-0.0383	2.5
	12.0	-25	-0.0299	2.5
	13.8	-24	-0.0287	2.5
20	10.2	-28	-0.0335	2.5
	12.0	-37	-0.0442	2.5
	13.8	-25	-0.0299	2.5
30	10.2	-59	-0.0705	2.5
	12.0	-27	-0.0323	2.5
	13.8	-32	-0.0383	2.5
40	10.2	-70	-0.0837	2.5
	12.0	-41	-0.0490	2.5
	13.8	-32	-0.0383	2.5
50	10.2	-72	-0.0861	2.5
	12.0	-34	-0.0406	2.5
	13.8	-32	-0.0383	2.5

PCS Band:

Middle channel, fo =1880MHz				
Temperature (℃)	**Power Supplied (V)**	**Frequency Error (Hz)**	**Error (ppm)**	**Limit (ppm)**
-30	10.2	-17	-0.0090	2.5
	12.0	-15	-0.0080	2.5
	13.8	-14	-0.0074	2.5
-20	10.2	-16	-0.0085	2.5
	12.0	-15	-0.0080	2.5
	13.8	-16	-0.0085	2.5
-10	10.2	-18	-0.0096	2.5
	12.0	-8	-0.0043	2.5
	13.8	-16	-0.0085	2.5
0	10.2	-18	-0.0096	2.5
	12.0	-17	-0.0090	2.5
	13.8	-16	-0.0085	2.5
10	10.2	-14	-0.0074	2.5
	12.0	-15	-0.0080	2.5
	13.8	-16	-0.0085	2.5
20	10.2	-21	-0.0112	2.5
	12.0	-22	-0.0117	2.5
	13.8	-18	-0.0096	2.5
30	10.2	-26	-0.0138	2.5
	12.0	-24	-0.0128	2.5
	13.8	-18	-0.0096	2.5
40	10.2	-31	-0.0165	2.5
	12.0	-28	-0.0149	2.5
	13.8	-18	-0.0096	2.5
50	10.2	-28	-0.0149	2.5
	12.0	-29	-0.0154	2.5
	13.8	-18	-0.0096	2.5

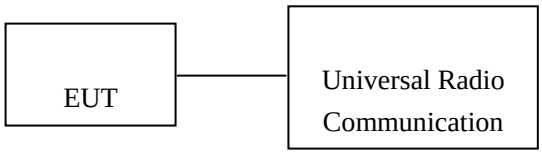
13.0 Peak-to Average Ratio

13.1 Applicable Standards:

According to CFR47 § 24.232 (d) ,the peak-to-average ratio(PAR) of transmission may not exceed 13 dB.

13.2 Test Procedure

The RF output of the transmitter was connected to the wireless test set and the spectrum analyzer through sufficient attenuation.



13.3 Test Data

Environmental conditions:

Temperature:	25 ° C
Relative Humidity:	56%
ATM Pressure:	100.0kPa

Note: The Formula of Peak-to-average ratio =20log(Peak value/average value)

Cellular Band Part 22H

GSM

Channel	Frequency (MHz)	Output Power Peak value (dBm)	Output Power Average value (dBm)	Peak-to-average ratio (dB)	Limit (dB)
Low	824.2	32.42	31.89	0.663	13
Middle	836.6	32.12	31.71	0.112	13
High	848.8	31.96	31.13	0.112	13

GPRS

Channel	Frequency (MHz)	Output Power Peak value (dBm)	Output Power Average value (dBm)	Peak-to-average ratio (dB)	Limit (dB)
Low	824.2	32.38	31.77	0.165	13
Middle	836.6	32.10	31.64	0.125	13
High	848.8	31.98	31.03	0.262	13

PCS Band Part 24E

GSM

Channel	Frequency (MHz)	Output Power Peak value (dBm)	Output Power Average value (dBm)	Peak-to-average ratio (dB)	Limit (dB)
Low	1850.2	29.01	28.35	0.209	13
Middle	1880.0	29.42	28.68	0.221	13
High	1909.8	29.03	28.44	0.178	13

GPRS

Channel	Frequency (MHz)	Output Power Peak value (dBm)	Output Power Average value (dBm)	Peak-to-average ratio (dB)	Limit (dB)
Low	1850.2	29.02	28.58	0.133	13
Middle	1880.0	29.38	28.85	0.158	13
High	1909.8	28.98	28.12	0.262	13

******END OF REPORT******