

EMI MEASUREMENT AND TEST REPORT

For

DAHL SWEDEN MOBILE TECHNOLOGY AB

Rasundavagen 166, 1tr. 169 36 SOLNA/ SWEDEN

FCC ID:R44INTOUCH

January 11, 2013

This Report Concerns: Original Report	Equipment Type: DAHL InTouch I GSM and WCDMA Dual sim-card Smart phone
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Test Engineer of performing the tests:	Hans Hu <i>Hans Hu</i>
Report No.:	BST12104072YER-3
Receive EUT Date/Test Date:	December 02, 2012/ December 02, 2012- January 11, 2013
Reviewed By:	Mike Moo <i>Mike Moo</i>
Prepared By:	 Shenzhen BST Technology Co.,Ltd. 3F, Weames Technology Building, No. 10 Kefa Road, Science Park, Nanshan District, Shenzhen, Guangdong, China Tel: 0755-26747751-3 Fax: 0755-26747751-3 ext.826

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1. GENERAL INFORMATION

1.1. Report information

1.1.1. This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that BST approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that BST in any way guarantees the later performance of the product/equipment.

1.1.2. The sample/s mentioned in this report is/are supplied by Applicant, BST therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture or any information supplied.

Additional copies of the report are available to the Applicant at an additional fee. No third part can obtain a copy of this report through DAHL SWEDEN MOBILE TECHNOLOGY AB, unless the applicant has authorized DAHL SWEDEN MOBILE TECHNOLOGY AB in writing to do so.

Test Facility -

The test site used to collect the radiated data is located on the address of
Global United Technology Service Co., Ltd
(FCC Registered Test Site Number: 600491) on
2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District,
Shenzhen, China 518102

The Test Site is constructed and calibrated to meet the FCC requirements.

1.2. Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power, conducted	$\pm 0.16\text{dB}$
3	Spurious emissions, conducted	$\pm 0.21\text{dB}$
4	All emissions, radiated (<1G)	$\pm 4.68\text{dB}$
5	All emissions, radiated (>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2\%$

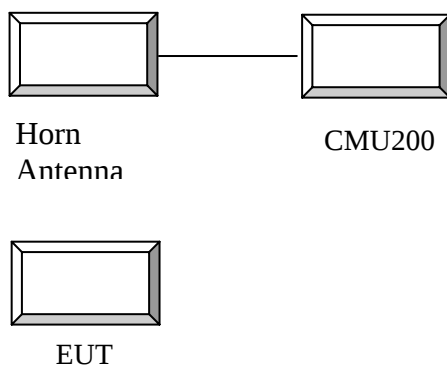
2. PRODUCT DESCRIPTION

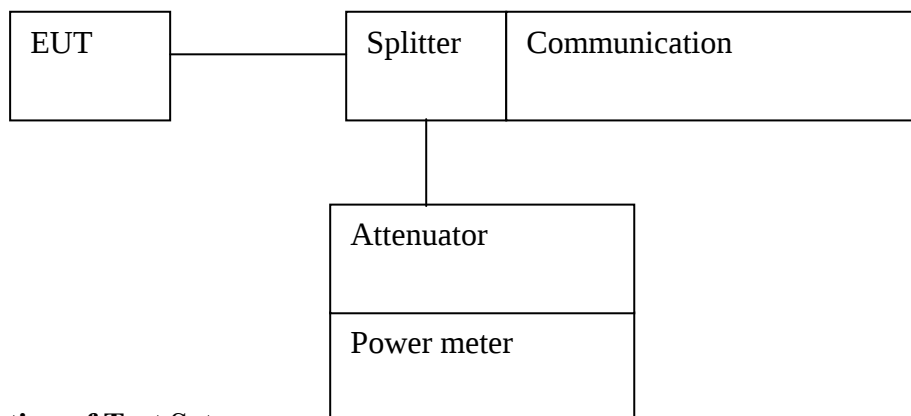
2.1. EUT Description

Description	: DAHL InTouch I GSM and WCDMA Dual sim-card Smart phone
Applicant	: DAHL SWEDEN MOBILE TECHNOLOGY AB Rasundavagen 166, 1tr. 169 36 SOLNA/ SWEDEN
Model Number	: InTouch I
Trade Name	: Dahl
Modulation	GMSK(GSM/GPRS) QPSK (WCDMA)
Frequency Bands	: GSM 850: 824- 849MHz PCS 1900: 1850-1910MHz UMTS BAND V: 824-849MHz
Antenna gain	: 0dBi for GSM850 and UMTS BAND V 0dBi for PCS1900
Antenna Type	: PIFA
Power Supply	DC 3.7V Battery or DC 5V (Powered by 120V/60 Hz Adapter)
Battery information	: DC 3.4-4.2V
Hardware version	: 4.0.4
Software version	: InTouch I_V0.7
Adapter	Brand Name:DAHL M/N:KYT0500100BU Input: 100-240Vac, 50/60Hz, Max 0.2A Output: 5Vdc, 1A

2.2. Block Diagram of EUT Configuration

Radiated output power



Conducted output power**2.3. Configuration of Test Setup**

EUT Orthogonal Axis:

X - denotes Laid on Table; Y - denotes Vertical Stand; Z - denotes Side Stand

2.4. Test Conditions

Temperature: 23~25℃

Relative Humidity: 55~63 %

3. TEST RESULTS SUMMARY**FCC PART 22H & FCC PART 24E**

FCC Rules	Description of Test	Result
§1.1307, §2.1093	RF Exposure (SAR)	Compliance (Please refer to SAR report)
§2.1046; § 22.913 (a); § 24.232 (c)	RF Output Power	Compliance
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.905 § 22.917; § 24.238	Occupied Bandwidth	Compliance
§ 2.1051, § 22.917 (a); § 24.238 (a)	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053 § 22.917 (a); § 24.238 (a)	Field Strength of Spurious Radiation	Compliance
§ 22.917 (a); § 24.238 (a)	Out of band emission, Band Edge	Compliance
§ 2.1055 § 22.355; § 24.235	Frequency stability vs. temperature Frequency stability vs. voltage	Compliance

Note: WCDMA EMI testing was done in SIM 1 and SIM 1 Only Support WCDMA,

GSM EMI testing was done in SIM 2 and SIM 2 Only Support GSM

Modifications

No modification was made.

4. TEST EQUIPMENT USED

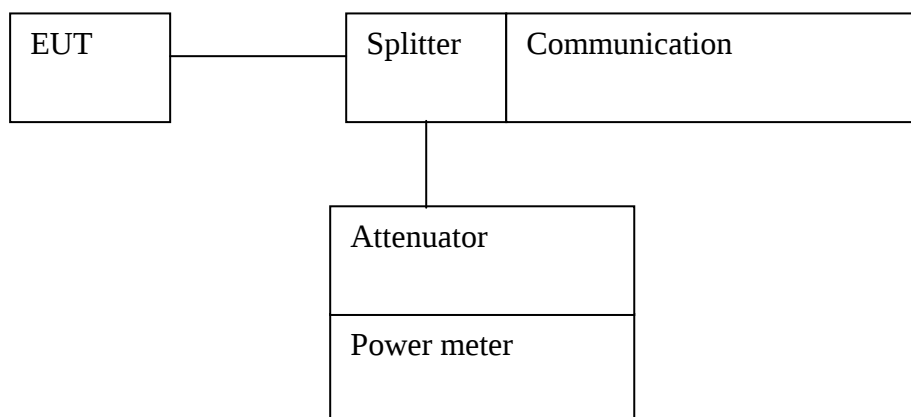
EQUIPMENT/FACILITIES	MANUFACTURER	MODEL	SERIAL NO.	DATE OF CAL.	CAL. INTERVAL
3m Semi-Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	Mar. 30 2012	1 Year
Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Jul. 04 2012	1 Year
BiConiLog Antenna	Schwarzbeck Mess-Elektronik	VULB9163	GTS214	Feb. 25 2012	1 Year
Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRO NIK	9120D-829	GTS208	June 30 2012	1 Year
Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 30 2012	1 Year
EMI Test Software	AUDIX	E3	N/A	N/A	N/A
Cable	Resenberger	N/A	NO.1	Apr. 6, 2012	1 Year
Cable	SCHWARZBECK	N/A	NO.2	Apr. 6, 2012	1 Year
Cable	SCHWARZBECK	N/A	NO.3	Apr. 6, 2012	1 Year
Amplifier(100kHz-3G Hz)	HP	8347A	GTS204	Jul. 04 2012	1 Year
Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jul. 04 2012	1 Year
Amplifier (18-26GHz)	R&S	AFS33-18002 650-30-8P-44	GTS218	June 30 2012	1 Year
Band filter	Amindeon	82346	GTS219	Mar. 31 2012	1 Year
Active Loop Antenna	Beijing Daze	ZN30900A	GTS215	Mar. 31 2012	1 Year
Power Meter	R&S	NRVS	GTS216	Apr. 6, 2012	1 Year
Power Sensor	R&S	NRV-Z33	GTS220	Apr. 6, 2012	1 Year
Shielding Room	ZhongYu Electron	7.0(L)x3.0(W)x3.0(H)	GTS264	Sep. 08 2012	1 Year
Universal radio communication tester	R&S	CMU200	GTS235	May 11 2012	1 Year
Signal Generator	R&S	SML03	GTS236	May 11 2012	1 Year
Temp. Humidity/Barometer	Oregon Scientific	BA-888	GTS248	May 11 2012	1 Year
D.C. Power Supply	Instek	PS-3030	GTS232	N/A	N/A
Splitter	Agilent	11636B	GTS237	May 11 2012	1 Year
EMI Test Receiver	R&S	ESCS30	GTS223	Jul. 04 2012	1 Year
10dB Pulse Limiter	R&S	N/A	GTS224	Jul. 04 2012	1 Year
Coaxial Switch	ANRITSU CORP	MP59B	GTS225	Jul. 04 2012	1 Year
LISN	Schwarzbeck Mess-Elektronik	NSLK 8127	GTS226	Jul. 04 2012	1 Year
Coaxial Cable	SCHWARZBECK	N/A	NO.4	Apr. 6, 2012	1 Year
EMI Test Software	AUDIX	E3	N/A	N/A	N/A
Spectrum analyzer	agilent	E4440A	GTS251	N/A	N/A

5. OUTPUT POWER

5.1. Conducted Output Power

5.1.1.MEASUREMENT METHOD

The EUT was setup for the max output power with pseudo random data modulation. The EUT was directly connected to the power meter. The measurements were performed on all modes(GPRS850, GPRS1900, HSDPA band V) at 3 typical channels(the Top Channel, the Middle Channel and the Bottom Channel) for each band.



Power Limits

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), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

5.1.2.MEASUREMENT RESULT**GSM /GPRS:**

Band	Channel No.	Test Result PK Power(dBm)				
		GSM	GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot
Cellular	128	33.11	33.11	31.62	30.08	28.42
	190	33.18	33.17	31.68	30.15	28.49
	251	33.20	33.20	31.75	30.18	28.52
PCS	512	29.87	29.87	28.26	26.75	25.25
	661	30.28	30.26	28.55	27.07	25.58
	810	30.38	30.38	28.60	27.13	25.72

WCDMA BAND V:

Mode	3GPP Sub test	Low CH Peak Power (dBm)	Mid CH Peak Power (dBm)	High CH Peak Power (dBm)
Rel 99	1	22.68	22.93	22.57
Rel 5 HSDPA	1	22.34	22.64	22.23
	2	22.25	22.45	21.96
	3	22.02	22.22	21.54
	4	21.55	21.99	21.34
Rel 6 HSUPA	1	22.03	21.98	21.86
	2	20.46	20.23	20.65
	3	21.02	21.04	20.87
	4	20.74	20.55	20.81
	5	22.01	21.62	21.73

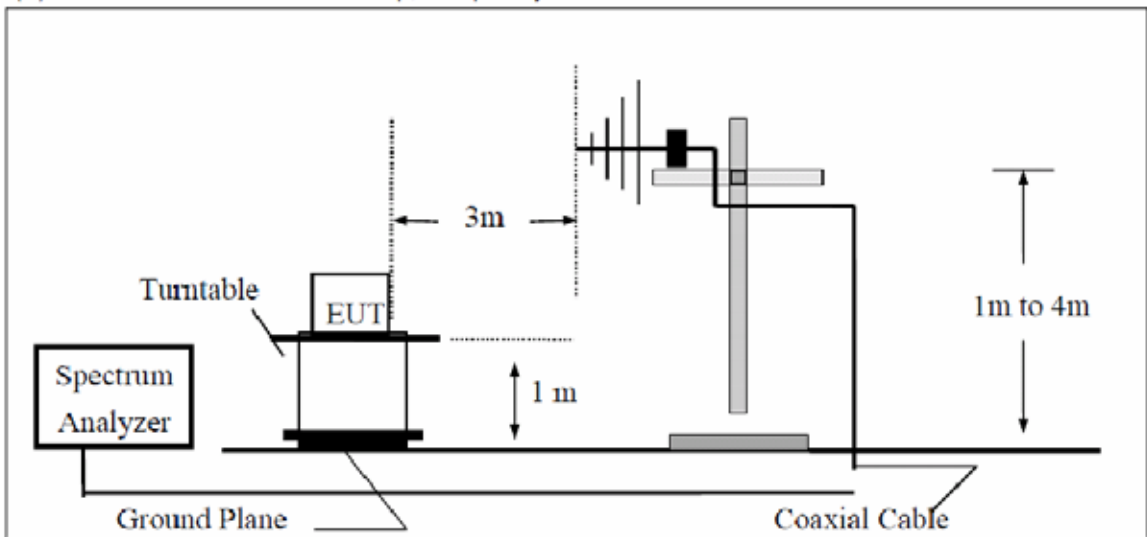
5.2. Radiated Output Power

5.2.1.MEASUREMENT METHOD

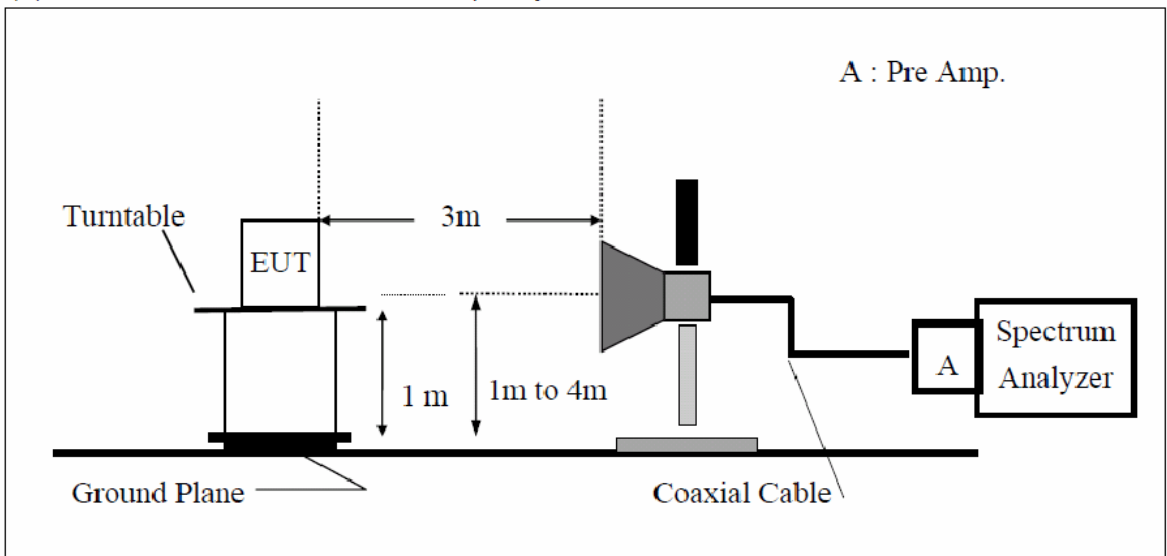
ANSI/TIA 603-D section 2.2.17

Test SET-UP (Block Diagram of Configuration)

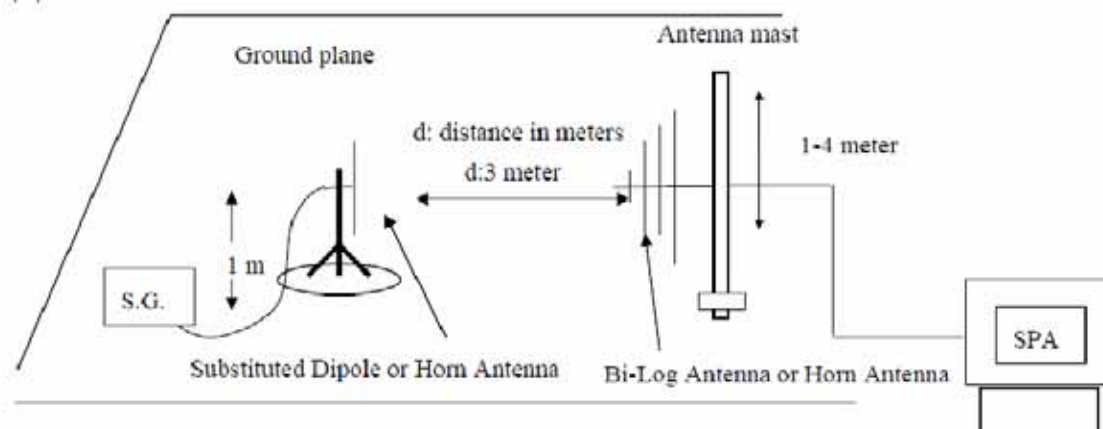
(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-Up Frequency Over 1 GHz



(C) Substituted Method Test Set-UP



Measurement Procedure

The EUT was placed on a non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.

During the measurement, the EUT was in communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4 m to 1 m. The reading was recorded and the field strength (E in dBuV/m) was calculated.

ERP in frequency band 824.2 – 848.80.8 MHz were measured using a substitution method. The EUT was replaced by a dipole antenna connected, the S.G. output was recorded and ERP was calculated as follows:

EIRP in frequency band 1850.2 – 1909.8 MHz were measured using a substitution method. The EUT was replaced by a horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows:

$$\text{ERP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBd)} - \text{Cable Loss (dB)}$$

$$\text{EIRP} = \text{S.G. output (dBm)} + \text{Antenna Gain (dBi)} - \text{Cable Loss (dB)}$$

5.2.2. PROVISIONS APPLICABLE

This is the test for the maximum radiated power from the EUT. Rule Part 24.232(b) 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 of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage." Rule Part 22.913(a) specifies "Maximum ERP. The effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts."

Mode	Nominal Peak Power
GSM 850	≤ 38.45 dBm (7W)
PCS 1900	≤ 33 dBm (2W)
UMTS BANDV	≤ 38.45 dBm (7W)

5.2.3.Measurement Result

ERP & EIRP

ERP for Cellular Band (Part 22H)

Frequency	Polar	S.A. Reading	S.G. Level	Antenn a Gain	Cable Loss	Absolut e Level	Limit
	H/V	dB μ V	dBm	dBd	dB	dBm	dBm
824.2	H	88.77	30.27	0.0	3.3	26.97	38.4
	V	104.43	35.85	0.0	3.3	32.55	38.4
836.6	H	88.36	30.24	0.0	3.3	26.94	38.4
	V	103.76	35.83	0.0	3.3	32.53	38.4
848.4	H	89.13	30.29	0.0	3.3	26.99	38.4
	V	102.53	35.87	0.0	3.3	32.57	38.4

EIRP for PCS Band (Part 24E)

Frequency	Polar	S.A. Reading	S.G. Level	Antenn a Gain	Cable Loss	Absolut e Level	Limit
	H/V	dB μ V	dBm	dB i	dB	dBm	dBm
1850.2	H	89.42	17.95	8.0	0.9	25.05	33.0
	V	93.61	21.03	8.0	0.9	28.13	33.0
1880.0	H	89.42	17.99	8.0	0.9	25.09	33.0
	V	94.14	21.41	8.0	0.9	28.51	33.0
1909.8	H	90.06	17.64	8.4	0.9	25.14	33.0
	V	93.92	20.73	8.4	0.9	28.23	33.0

ERP for WCDMA Band (Part 22H)

Frequency	Polar	S.A. Reading	S.G. Level	Antenn a Gain	Cable Loss	Absolut e Level	Limit
	H/V	dB μ V	dBm	dBd	dB	dBm	dBm
826.4	H	77.34	20.4	0.0	3.3	17.1	38.4
	V	86.76	25.55	0.0	3.3	22.25	38.4
836.6	H	77.16	20.73	0.0	3.3	17.43	38.4
	V	86.99	25.57	0.0	3.3	22.27	38.4
846.6	H	76.47	20.37	0.0	3.3	17.07	38.4
	V	86.19	25.43	0.0	3.3	22.13	38.4

NOTE: in the part, result the worst case GSM for Cellular and PCS, and Rel 99 for WCDMA band V.

6. SPURIOUS EMISSION

6.1. CONDUCTED SPURIOUS EMISSION

6.1.1.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 9 GHz.

2. Determine EUT transmit frequencies: the following typical channels were chosen to conducted emissions testing.

Typical Channels for testing of GSM850 band	
Channel	Frequency (MHz)
128	824.2
190	836.6
251	848.8

Typical Channels for testing of PCS1900 band	
Channel	Frequency (MHz)
512	1850.2
661	1880.0
810	1909.8

Typical Channels for testing of UMTS band V	
Channel	Frequency (MHz)
4132	826.4
4175	835.0
4233	826.6

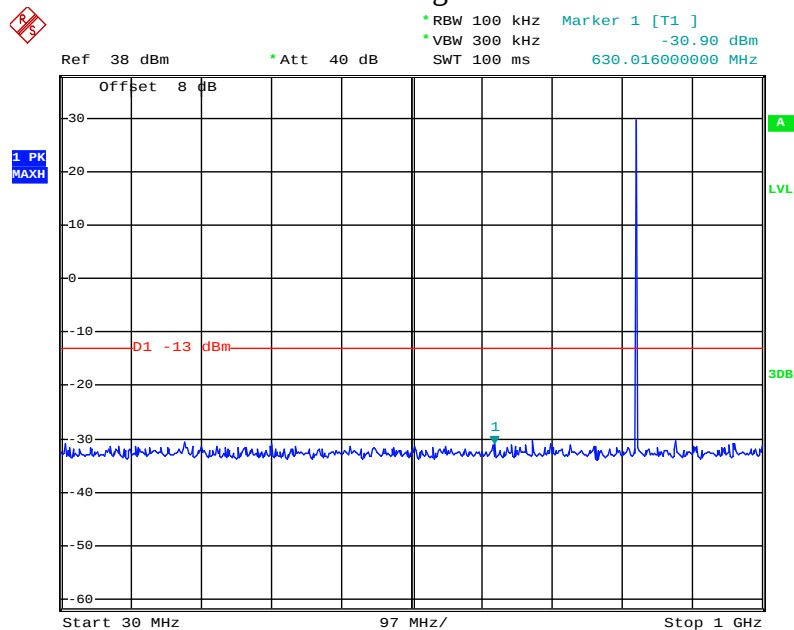
Note: 1. Below 30MHZ no Spurious found and The GSM modes is the worst condition.

2. As no emission found in standby or receive mode, no recording in this report.

6.1.2.Measurement Result

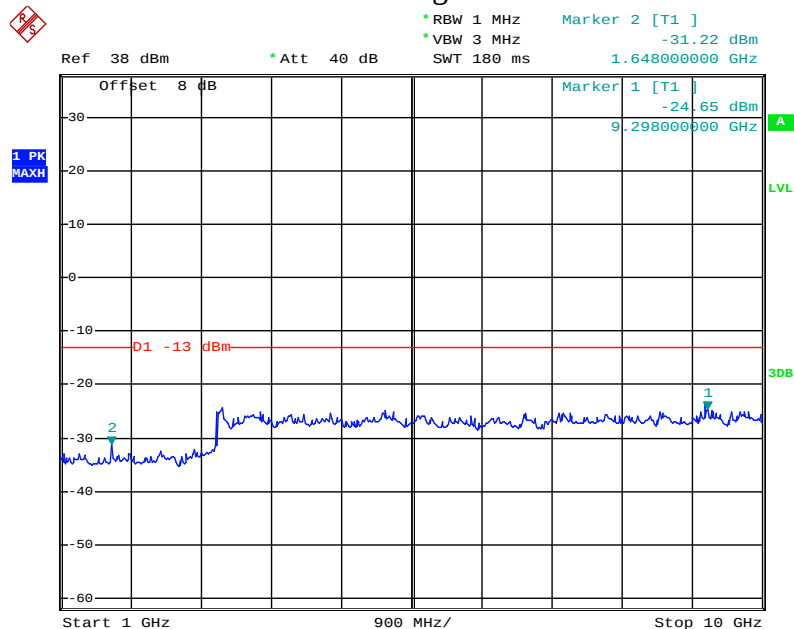
GSM 850 BAND

Conducted Emission Transmitting Mode CH 128 30MHz-1GHz



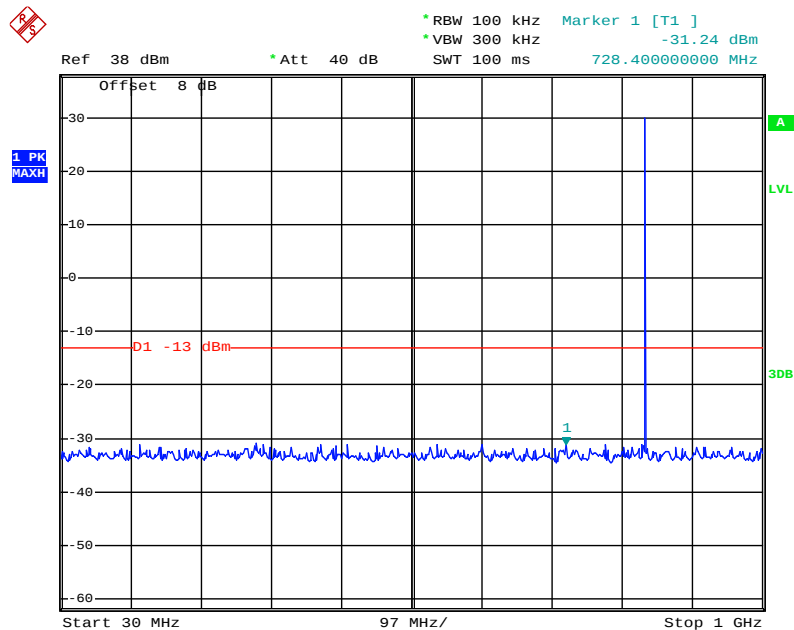
Date: 7.DEC.2012 11:27:10

Conducted Emission Transmitting Mode CH 128 1GHz -10GHz



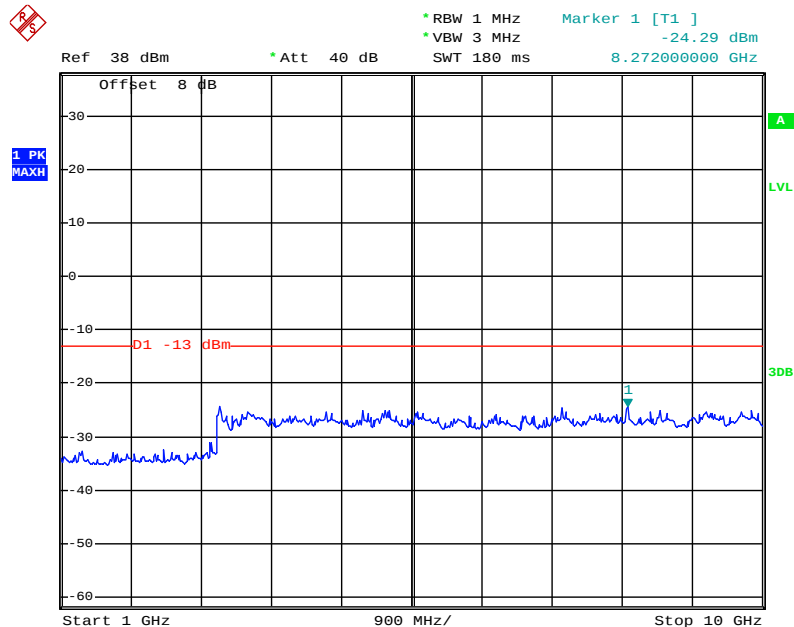
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Conducted Emission Transmitting Mode CH 190 30MHz-1GHz



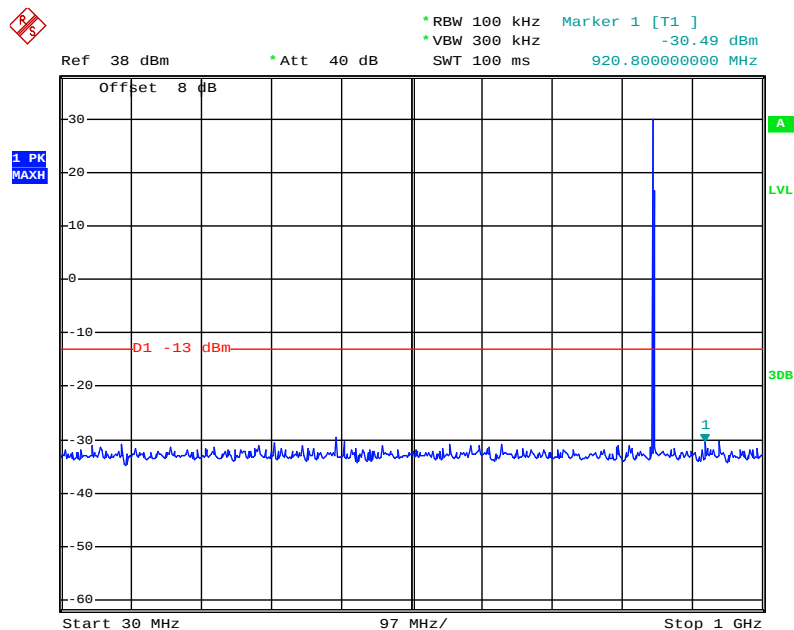
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Conducted Emission Transmitting Mode CH 190 1GHz -10GHz



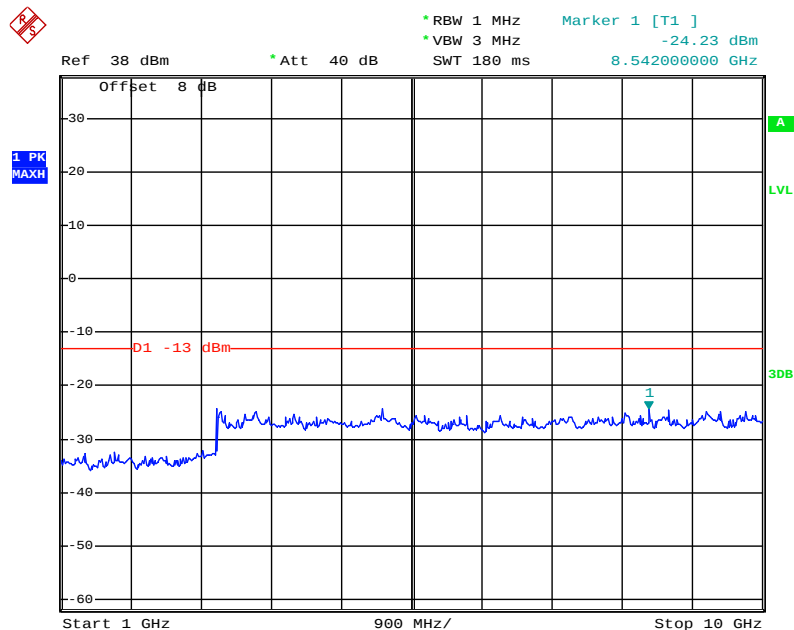
Date: 7.DEC.2012 11:27:57

Conducted Emission Transmitting Mode CH 251 30MHz-1GHz



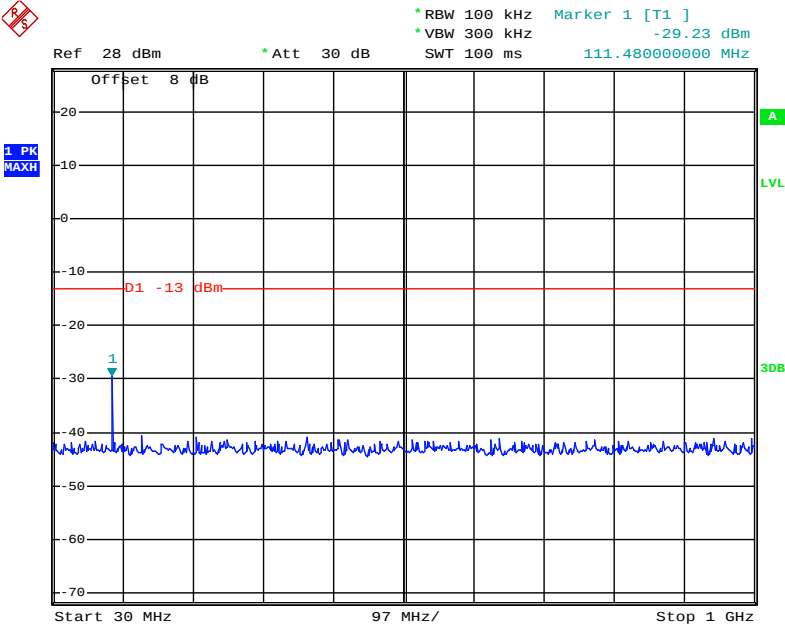
Date: 7.DEC.2012 11:32:00

Conducted Emission Transmitting Mode CH 251 1GHz -10GHz



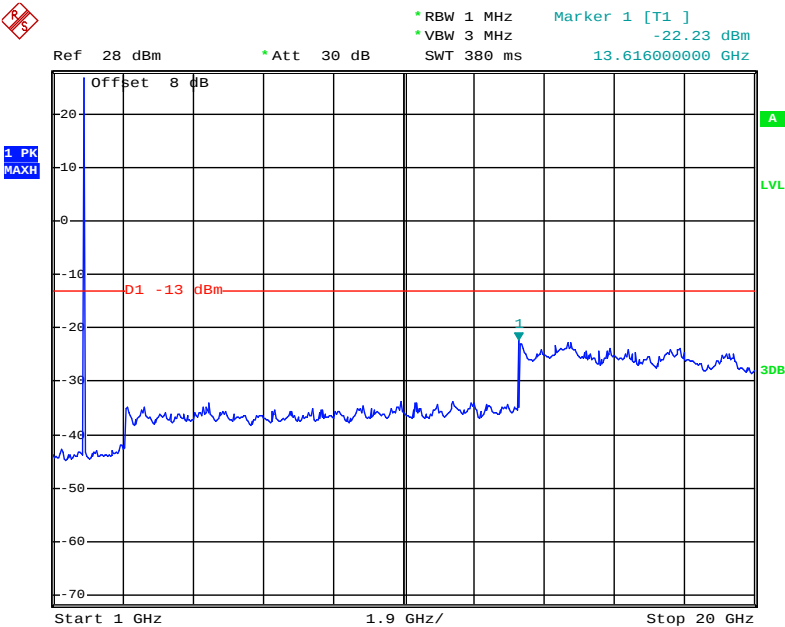
Date: 7.DEC.2012 11:32:25

PCS 1900 BAND
Conducted Emission Transmitting Mode CH 512 30MHz-1GHz



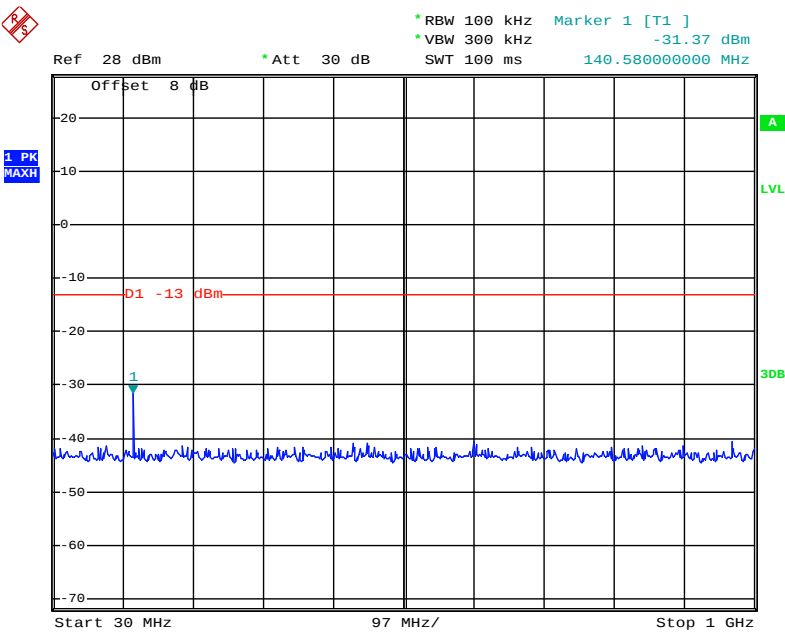
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Conducted Emission Transmitting Mode CH 251 1GHz -20GHz



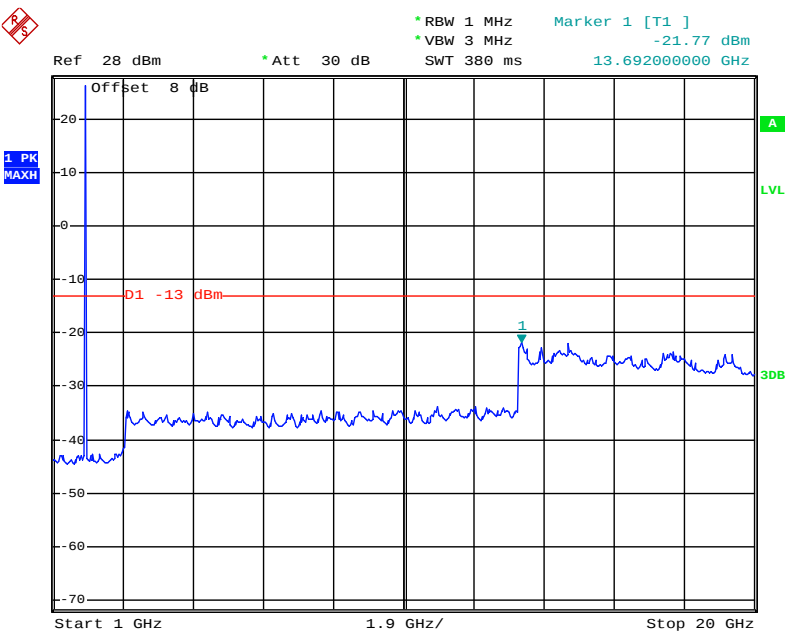
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Conducted Emission Transmitting Mode CH 661 30MHz-1GHz



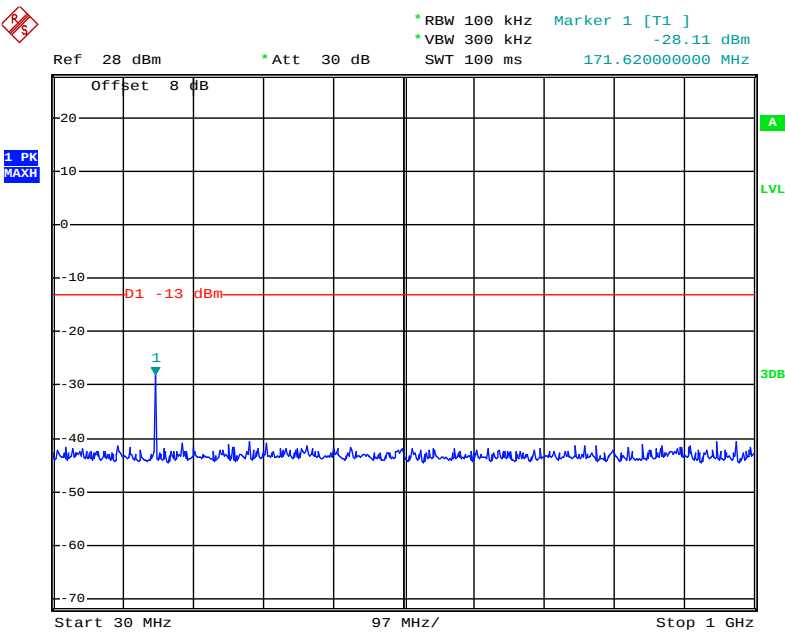
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Conducted Emission Transmitting Mode CH 661 1GHz -20GHz



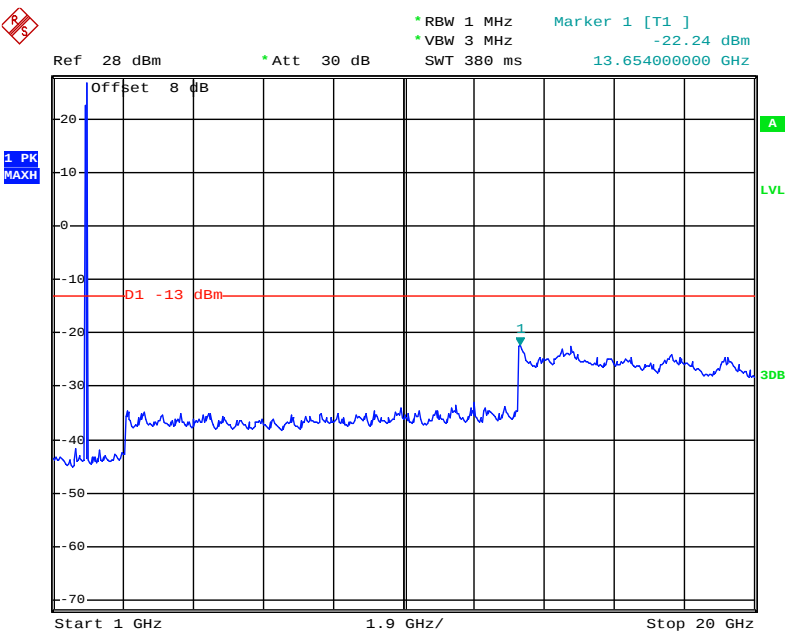
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Conducted Emission Transmitting Mode CH 810 30MHz-1GHz



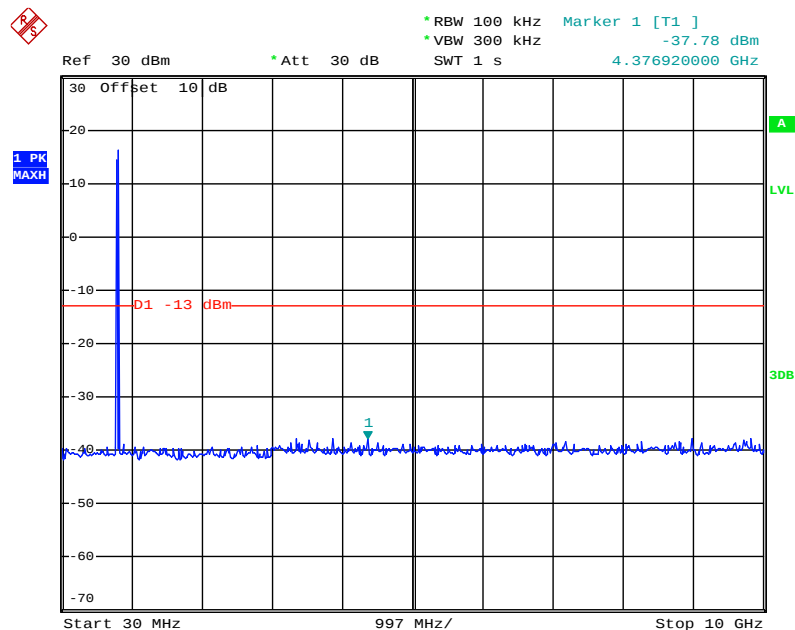
Date: 7.DEC.2012 11:38:47

Conducted Emission Transmitting Mode CH 810 1GHz -20GHz



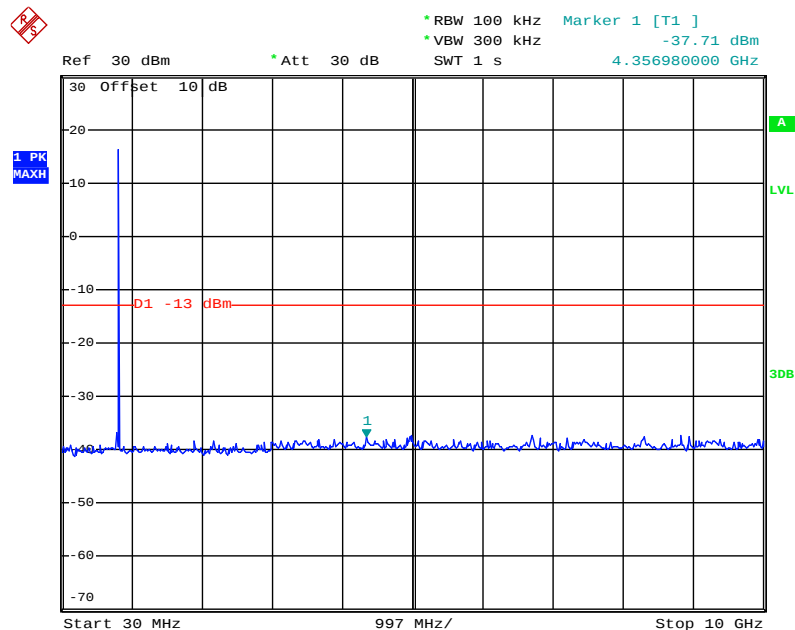
Date: 7.DEC.2012 11:38:32

UMTS BAND V Conducted Emission Transmitting Mode CH 4132 30MHz-10GHz



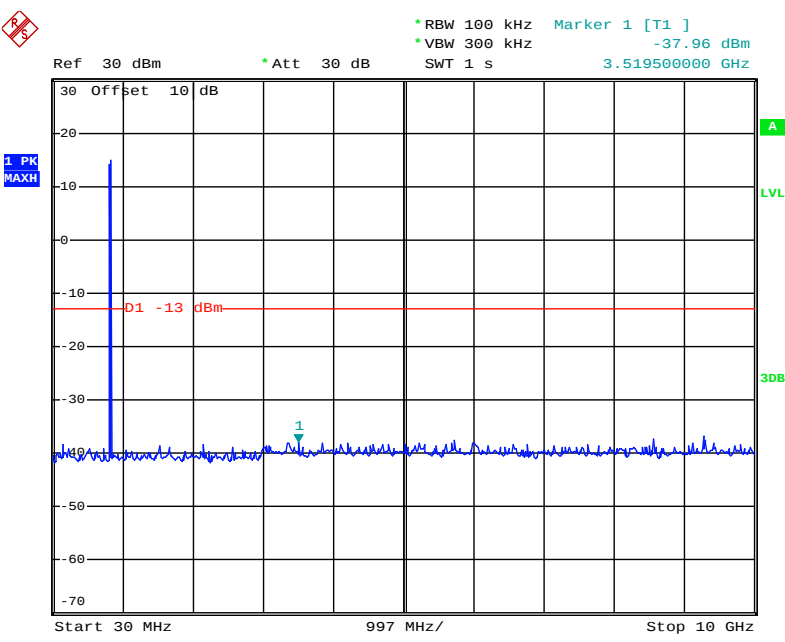
Date: 10.JAN.2013 10:11:46

Conducted Emission Transmitting Mode CH 4175 30MHz-10GHz



Date: 10.JAN.2013 10:12:39

Conducted Emission Transmitting Mode CH 4233 30MHz-10GHz



Date: 10.JAN.2013 10:13:07

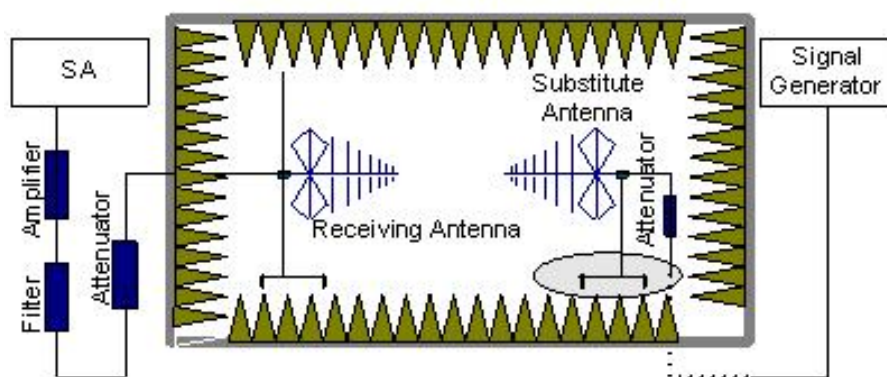
6.2. Radiated Spurious Emission

6.2.1. Measurement Method

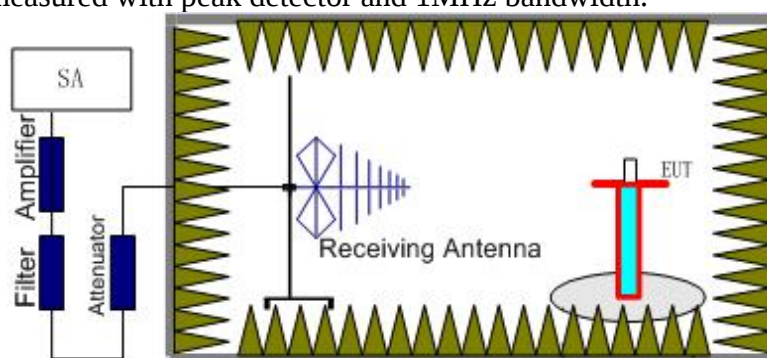
The measurements procedures specified in TIA-603C-2004 were used for testing. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment. The resolution bandwidth is set 1MHz as outlined in Part 24.238. The measurements were performed on all modes(GPRS850, GPRS1900, HSDPA band V) at 3 typical channels(the Top Channel, the Middle Channel and the Bottom Channel) for each band.

The procedure of radiated spurious emissions is as follows:

a) Pre-calibration With pre-calibration method, the Radiated Spurious Emissions(RSE) is calculated as, $RSE = Rx(dBuV) + CL(dB) + SA(dB) + Gain(dBi) - 107(dBuV \text{ to } dBm)$ The SA is calibrated using following setup.



b) EUT was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the test item for emission measurements. The height of receiving antenna is 0.8m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the test item and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector and 1MHz bandwidth.



Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the PCS 1900 band (1850.2 MHz, 1880 MHz and 1909.8 MHz), GSM850 band (824.2MHz, 836.6MHz, 848.8MHz), UMTS band V(826.4MHz, 835.0MHz, 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 any band into any of the other blocks.

The substitution method is used. Substitution values at each frequency are measured before and saved to the test software. A "reference path loss" is established and the ARpl is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss and the air loss. The measurement results are obtained as described below: $\text{Power} = \text{PMea} + \text{ARpl}$

6.2.2.Provisions Applicable

(a) On any frequency outside a licensee's frequency block (e.g. A, D, B, etc.) within the USPCS spectrum, the power of any emission shall be attenuated below the transmitter power (P, in Watts) by 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.

Note: only result the worst condition of each test mode:

6.3. MEASUREMENT RESULT

GSM 850:

Low Channel					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	PMea(dBm)	Limit(dBm)	Polarity
1648.4	-46.28	3.69	-42.59	-13.00	Horizontal
2472.6	-43.25	2.92	-40.33	-13.00	Horizontal
1648.4	-46.38	3.69	-42.69	-13.00	Vertical
2472.6	-43.67	2.92	-40.75	-13.00	Vertical
Middle Channel					
1673.2	-43.21	3.69	-39.52	-13.00	Horizontal
2509.8	-40.07	2.92	-37.15	-13.00	Horizontal
1673.2	-43.25	3.69	-39.56	-13.00	Vertical
2509.8	-40.53	2.92	-37.61	-13.00	Vertical
High Channel					
1697.6	-42.93	3.69	-39.24	-13.00	Horizontal
2546.4	-40.12	2.92	-37.2	-13.00	Horizontal
1697.6	-42.48	3.69	-38.79	-13.00	Vertical
2546.4	-40.57	2.92	-37.65	-13.00	Vertical

TEST RESULT:PASS

PCS 1900:

Low Channel					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	PMea(dBm)	Limit(dBm)	Polarity
3700.4	-48.75	2.58	-46.17	-13.00	Horizontal
5550.6	-44.36	1.93	-42.43	-13.00	Horizontal
3700.4	-47.98	2.58	-45.4	-13.00	Vertical
5550.6	-43.98	1.93	-42.05	-13.00	Vertical
Middle Channel					
3760.0	-46.53	2.58	-43.95	-13.00	Horizontal
5640.0	-42.37	1.93	-40.44	-13.00	Horizontal
3760.0	-46.09	2.58	-43.51	-13.00	Vertical
5640.0	-42.48	1.93	-40.55	-13.00	Vertical
High Channel					
3819.6	-44.88	2.58	-42.3	-13.00	Horizontal
5729.4	-39.87	1.93	-37.94	-13.00	Horizontal
3819.6	-44.20	2.58	-41.62	-13.00	Vertical
5729.4	-39.62	1.93	-37.69	-13.00	Vertical

TEST RESULT:PASS

UMTS band V:

Low Channel					
Frequency(MHz)	Power(dBm)	ARpl (dBm)	PMea(dBm)	Limit(dBm)	Polarity
1652.8	-48.63	3.60	-45.03	-13.00	Horizontal
2479.2	-45.70	2.84	-42.86	-13.00	Horizontal
1652.8	-47.66	3.60	-44.06	-13.00	Vertical
2479.2	-44.71	2.84	-41.87	-13.00	Vertical
Middle Channel					
1673.2	-46.29	3.60	-42.69	-13.00	Horizontal
2509.8	-42.93	2.84	-40.09	-13.00	Horizontal
1673.2	-46.37	3.60	-42.77	-13.00	Vertical
2509.8	-42.74	2.84	-39.90	-13.00	Vertical
High Channel					
1693.2	-43.72	3.60	-40.12	-13.00	Horizontal
2539.8	-39.90	2.84	-37.06	-13.00	Horizontal
1693.2	-43.86	3.60	-40.26	-13.00	Vertical
2539.8	-39.61	2.84	-36.77	-13.00	Vertical

TEST RESULT:PASS

Note: Below 30MHZ no Spurious found .
in the part result the worst case GSM for Cellular ,PCS, and Rel 99 for WCDMA band V.

7. MAINS CONDUCTED EMISSION

7.1. MEASUREMENT METHOD

The measurement procedure specified in ANSI C63.4-2003 was used for testing. Conducted Emission was measured with travel charger.

7.2. PROVISIONS APPLICABLE

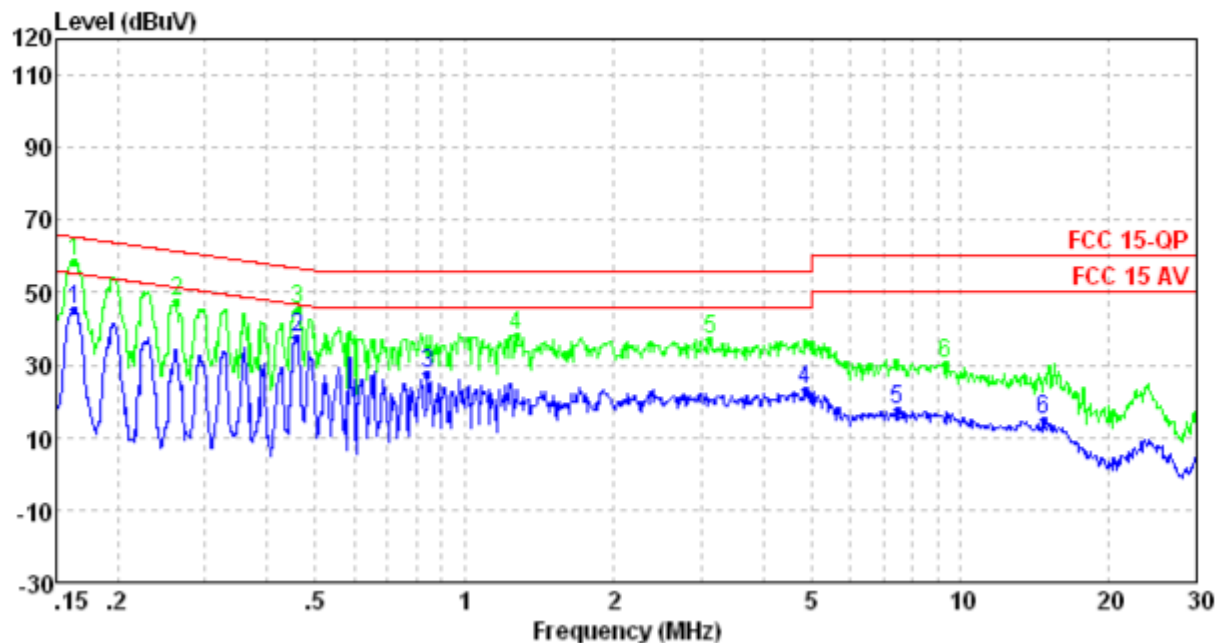
Frequency of Emission (MHz)	Conducted Limit(dBuV)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56 *	56 to 46 *
0.5 – 5	56	46
5 – 30	60	50
*Decreases with the logarithm of the frequency.		
*The lower limit shall apply at the transition frequency.		

7.3. MEASUREMENT RESULT

Pass.

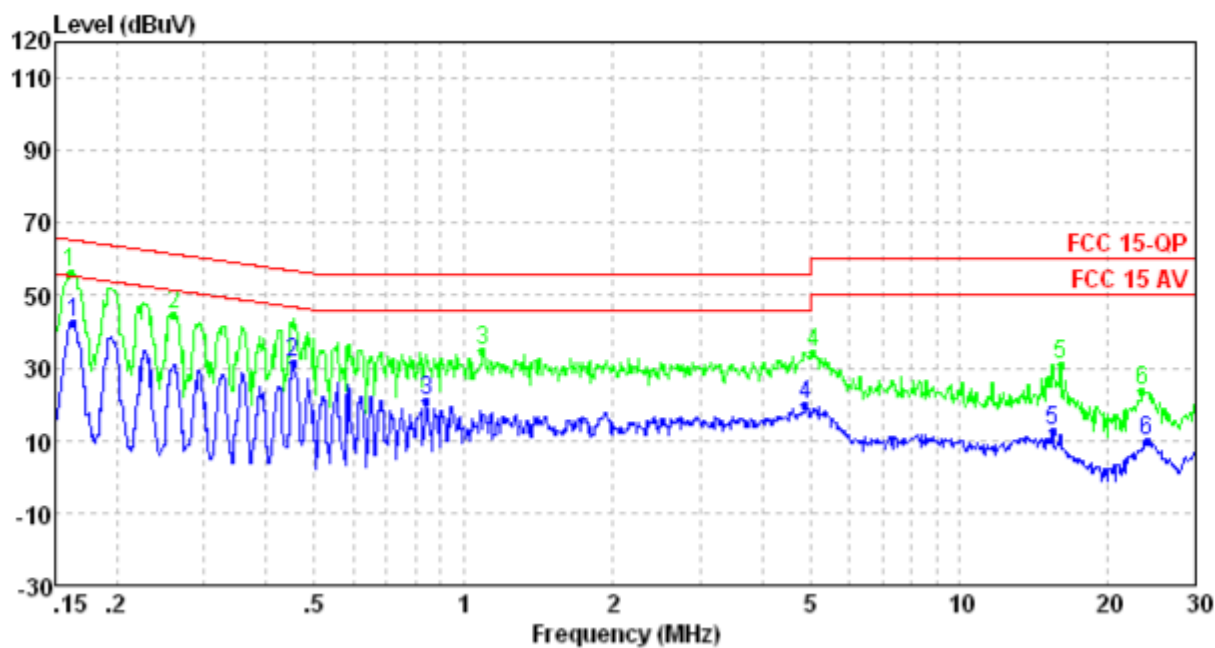
Note: The GSM850(1 UP Slot) mode is the worst condition and the test result as following

L line



Frequency (MHz)	Corrected Result (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK /QP/Ave.)
0.16	58.46	0.16	65.30	-6.84	QP
0.26	47.34	0.13	61.34	-14.00	QP
0.46	45.41	0.11	56.67	-11.26	QP
1.28	38.10	0.15	56.00	-17.90	QP
3.12	37.13	0.20	56.00	-18.87	QP
9.35	30.46	0.31	60.00	-29.54	QP
0.16	45.30	0.16	55.30	-10.00	AV
0.46	37.76	0.13	46.71	-8.95	AV
0.84	27.33	0.11	46.00	-18.67	AV
4.87	22.98	0.15	46.00	-23.02	AV
7.49	17.75	0.20	50.00	-32.25	AV
14.75	14.67	0.31	50.00	-35.33	AV

N line



Frequency (MHz)	Corrected Result (dBμV)	Correction Factor (dB)	Limit (dBμV)	Margin (dB)	Detector (PK /QP/Ave.)
0.16	56.28	0.16	65.38	-9.10	QP
0.26	44.73	0.13	61.42	-16.69	QP
1.09	34.54	0.11	56.00	-21.46	QP
5.08	34.07	0.15	60.00	-25.93	QP
16.05	31.03	0.20	60.00	-28.97	QP
23.39	23.47	0.31	60.00	-36.53	QP
0.16	42.38	0.16	55.30	-12.92	AV
0.45	31.23	0.13	46.80	-15.57	AV
0.84	20.99	0.11	46.00	-25.01	AV
4.90	19.95	0.15	46.00	-26.05	AV
15.47	12.40	0.20	50.00	-37.60	AV
23.89	10.07	0.31	50.00	-39.93	AV

8. FREQUENCY STABILITY

8.1. Applicable Standard

FCC § 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

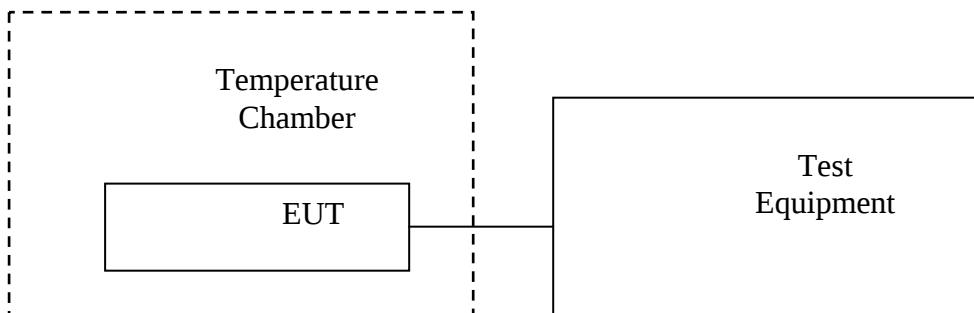
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

8.2. 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.



8.3. Measurement Result

Cellular Band (Part 22H)

Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.7	14.6	0.017	2.5
-20	3.7	15.6	0.019	2.5
-10	3.7	11.6	0.014	2.5
0	3.7	20.6	0.025	2.5
10	3.7	16.6	0.020	2.5
20	3.7	2.6	0.003	2.5
30	3.7	18.6	0.022	2.5
40	3.7	16.6	0.020	2.5
55	3.7	13.6	0.016	2.5
25	V _{end point} = 3.4	27.6	0.033	2.5
25	V _{end point} = 4.2	20.6	0.025	2.5

PCS Band (Part 24E)

Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	3.7	19.6	0.010	Pass
-20	3.7	12.6	0.007	Pass
-10	3.7	18.6	0.010	Pass
0	3.7	13.6	0.007	Pass
10	3.7	15.6	0.008	Pass
20	3.7	8.6	0.005	Pass
30	3.7	20.6	0.011	Pass
40	3.7	11.6	0.006	Pass
55	3.7	25.6	0.014	Pass
25	V _{end point} = 3.4	18.6	0.010	Pass
25	V _{end point} = 4.2	20.6	0.011	Pass

WCDMA BandV(Part 22H)

Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.7	22.7	0.027	2.5
-20	3.7	14.7	0.018	2.5
-10	3.7	13.7	0.016	2.5
0	3.7	16.7	0.020	2.5
10	3.7	9.7	0.012	2.5
20	3.7	1.7	0.002	2.5
30	3.7	17.7	0.021	2.5
40	3.7	23.7	0.028	2.5
55	3.7	19.7	0.024	2.5
25	V _{end point} = 3.4	17.7	0.021	2.5
25	V _{end point} = 4.2	16.7	0.020	2.5

9. OCCUPIED BANDWIDTH

9.1. MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

9.2. PROVISIONS APPLICABLE

The occupied bandwidth (99%) shall not exceed 300 KHz.

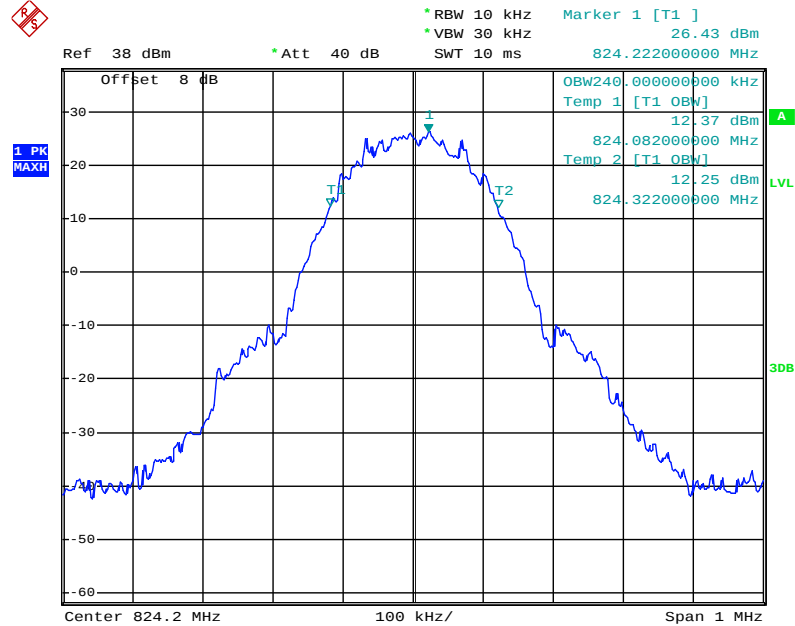
9.3. MEASUREMENT RESULT

Occupied Bandwidth (99%) for GSM850 band		
Mode	Frequency(MHz)	Occupied Bandwidth (99%)(kHz)
Low Channel	824.2	240.00
Middle Channel	836.6	244.00
High Channel	848.8	246.00

Occupied Bandwidth (99%) for PCS1900 band		
Mode	Frequency(MHz)	Occupied Bandwidth (99%)(kHz)
Low Channel	1850.2	246.00
Middle Channel	1880.0	244.00
High Channel	1909.8	252.00

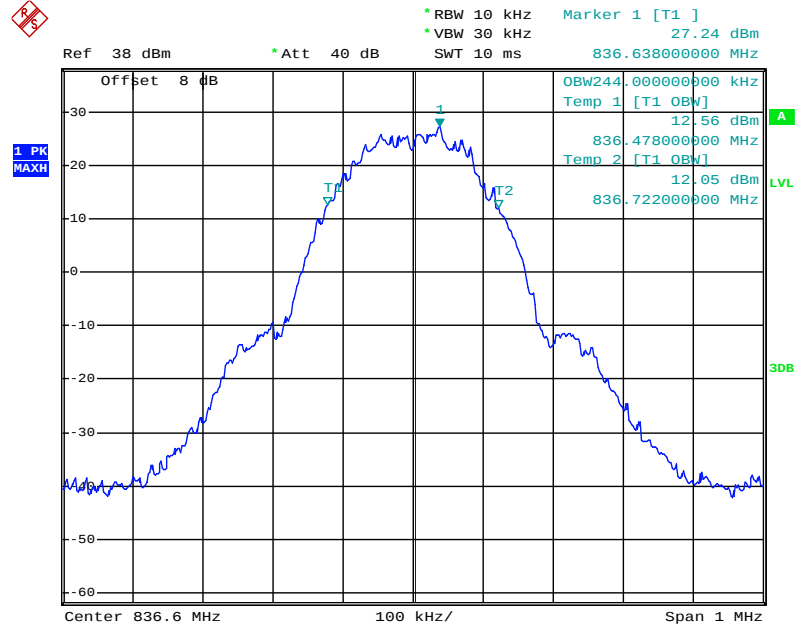
Occupied Bandwidth (99%) for UMTS band V		
Mode	Frequency(MHz)	Occupied Bandwidth (99%)(MHz)
Low Channel	826.4	4.18
Middle Channel	836.6	4.18
High Channel	846.6	4.18

GSM850 band Low Channel



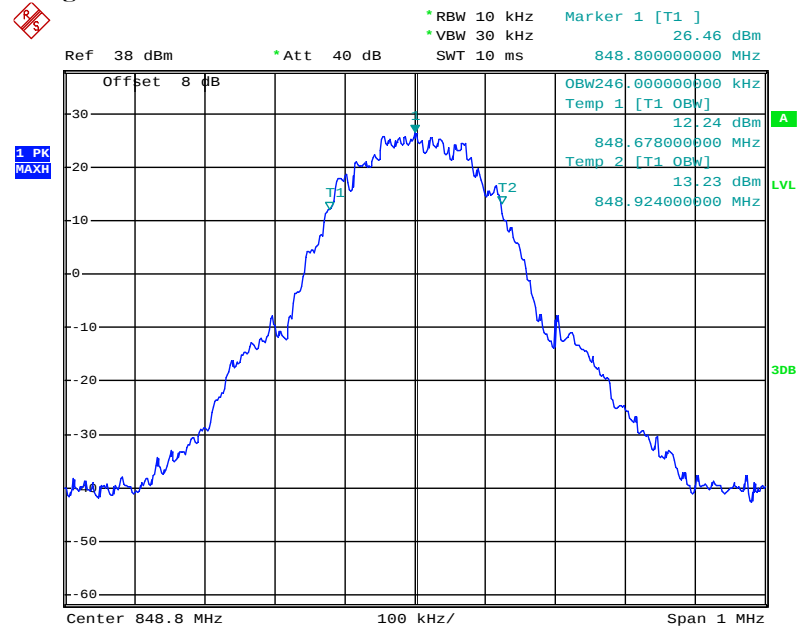
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GSM850 band Middle Channel



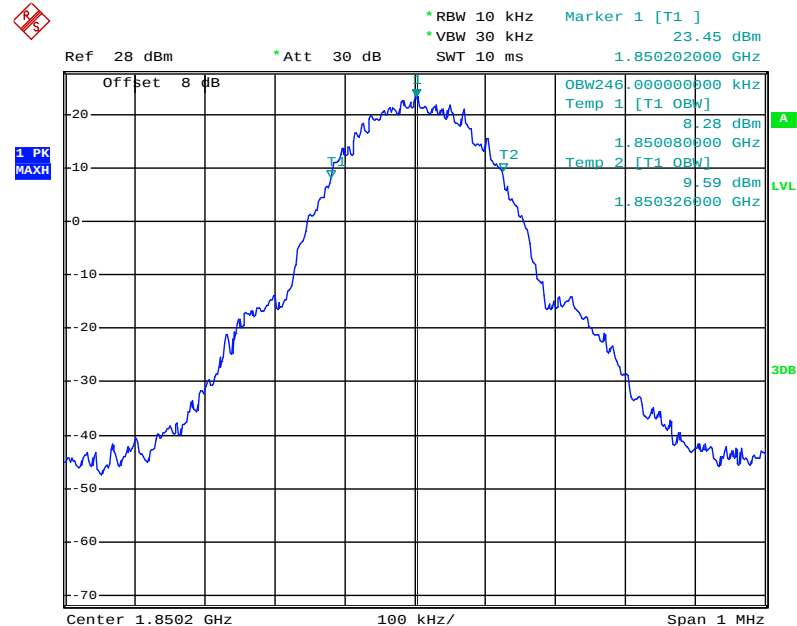
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GSM850 band High Channel



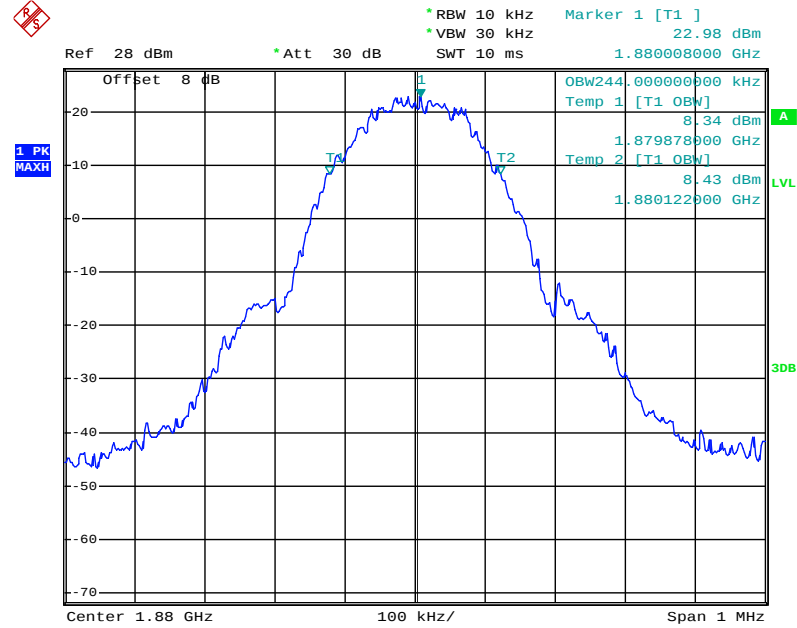
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PCS1900 band Low Channel



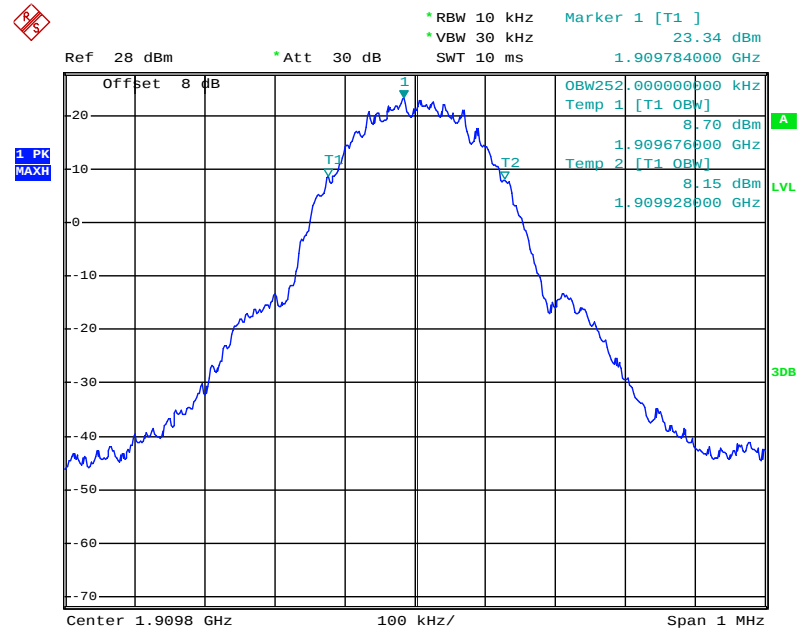
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PCS1900 band Middle Channel



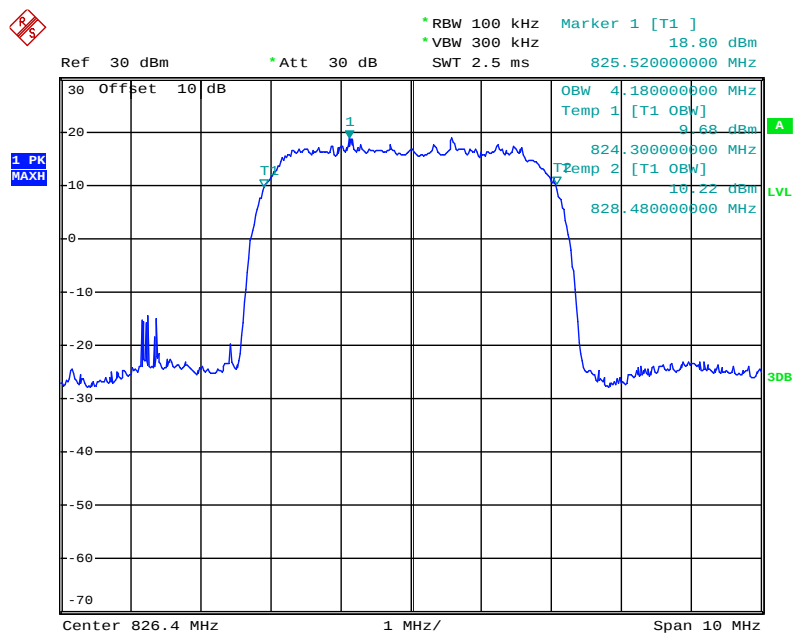
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PCS1900 band High Channel



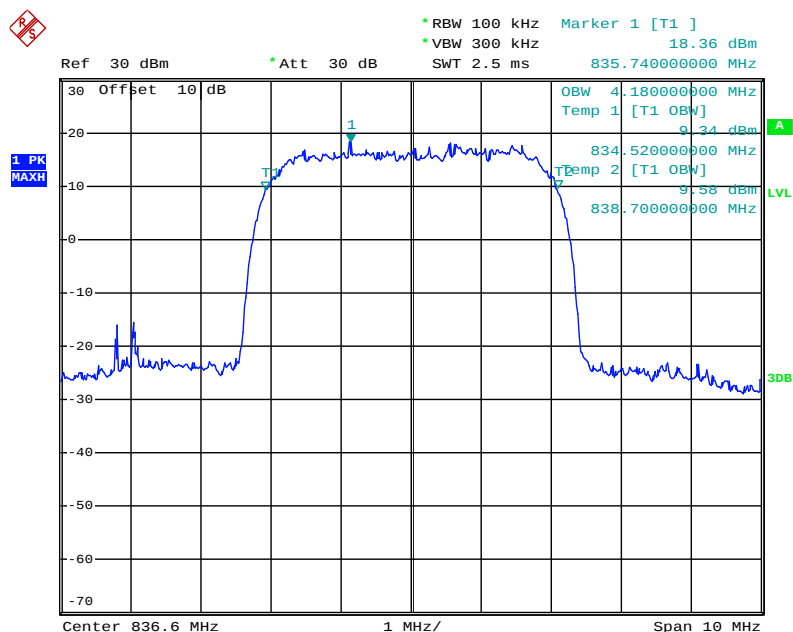
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UMTS band V Low Channel



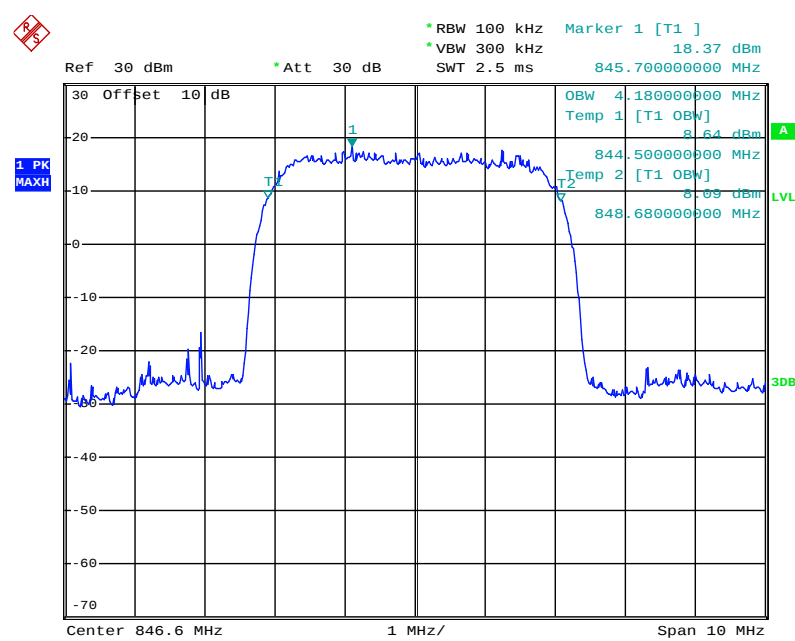
Date: 10.JAN.2013 10:06:37

UMTS band V Middle Channel



Date: 10.JAN.2013 10:08:59

UMTS band V High Channel



Date: 10.JAN.2013 10:10:20

10. EMISSION BANDWIDTH

10.1.MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

10.2.PROVISIONS APPLICABLE

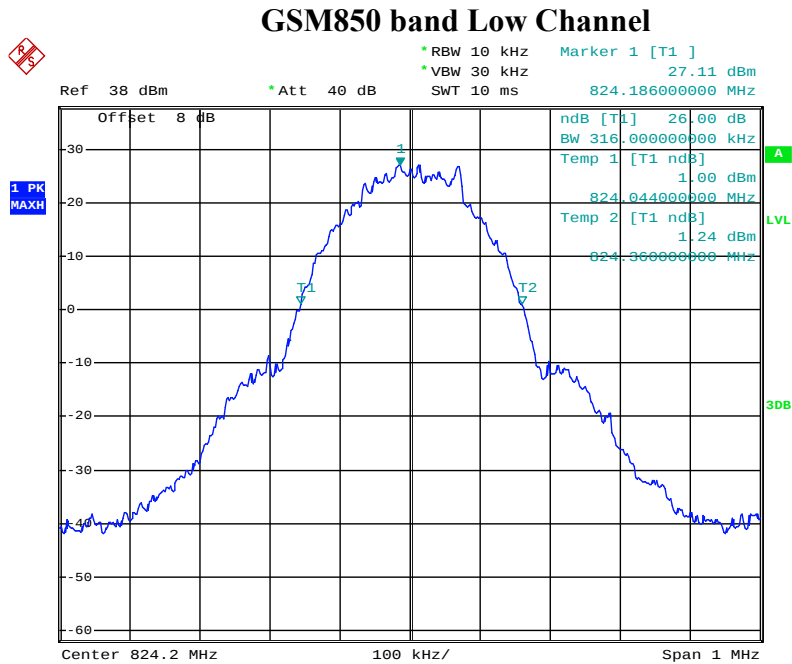
The emission bandwidth is defined as two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26dB below the transmitter power

10.3.MEASUREMENT RESULT

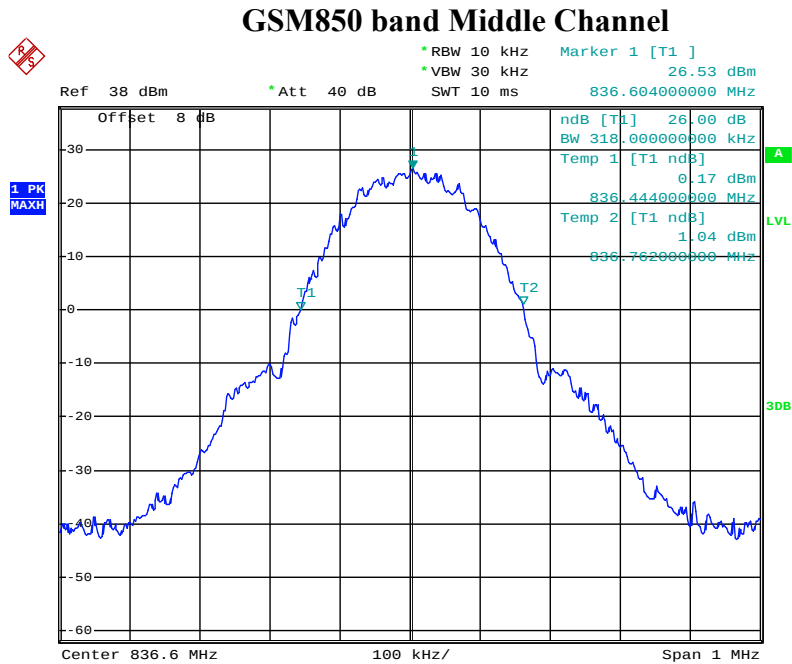
Emission Bandwidth (-26dBc) for GSM850 band		
Mode	Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)
Low Channel	824.2	316.00
Middle Channel	836.6	318.00
High Channel	848.8	316.00

Emission Bandwidth (-26dBc) for PCS1900 band		
Mode	Frequency(MHz)	Emission Bandwidth (-26dBc)(kHz)
Low Channel	1850.2	310.00
Middle Channel	1880.0	320.00
High Channel	1909.8	316.00

Emission Bandwidth (-26dBc) for UMTS band V		
Mode	Frequency(MHz)	Emission Bandwidth (-26dBc)(MHz)
Low Channel	826.4	4.68
Middle Channel	836.6	4.70
High Channel	846.6	4.68

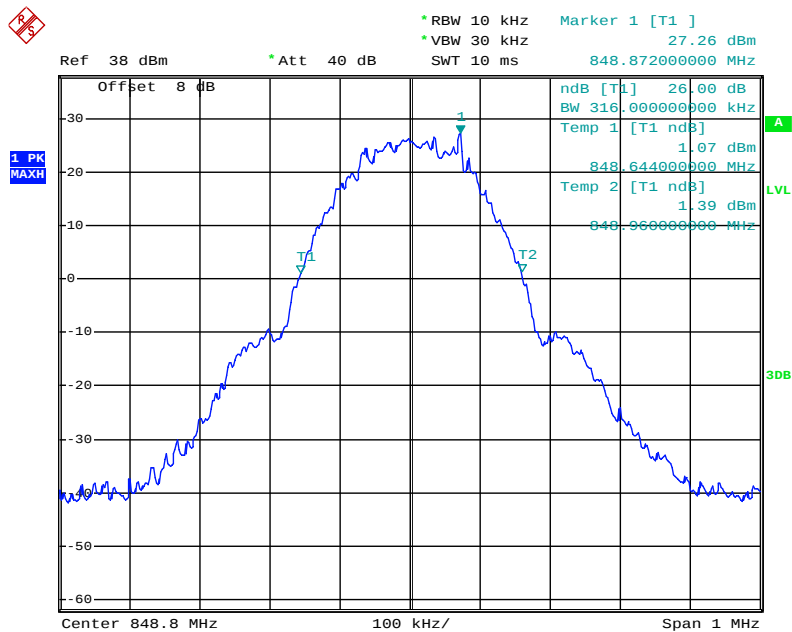


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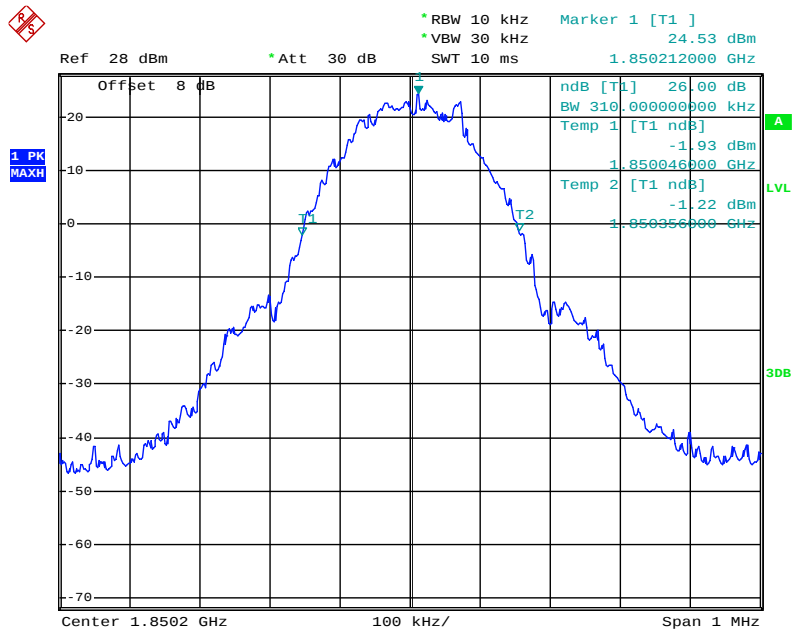
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GSM850 band High Channel



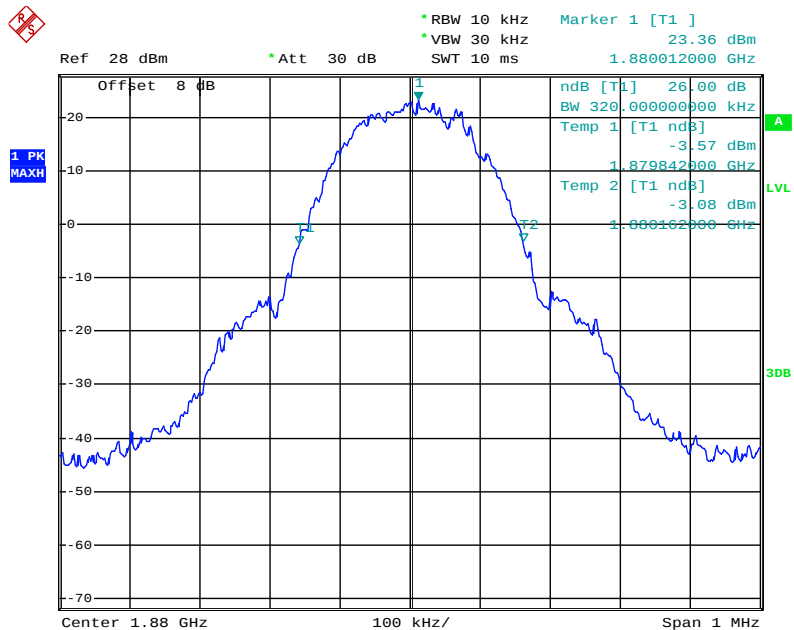
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PCS1900 band Low Channel



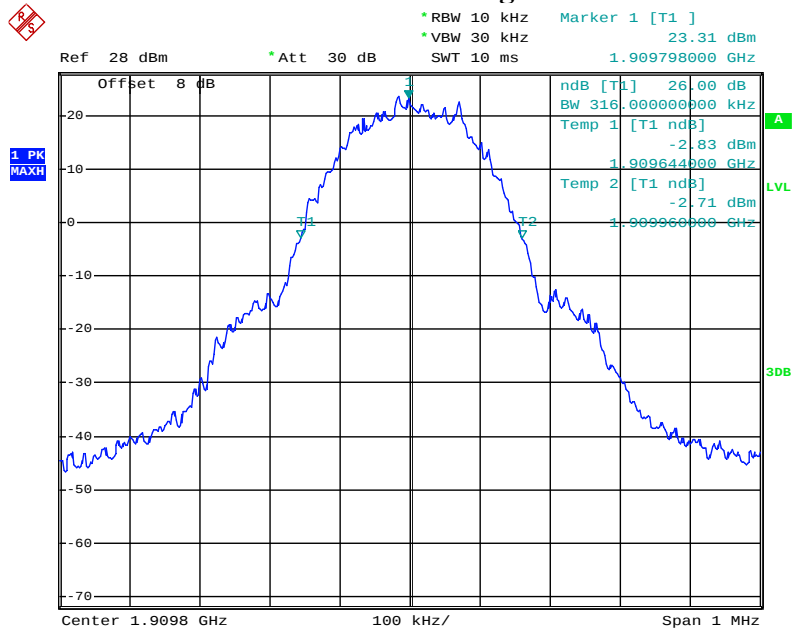
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PCS1900 band Middle Channel

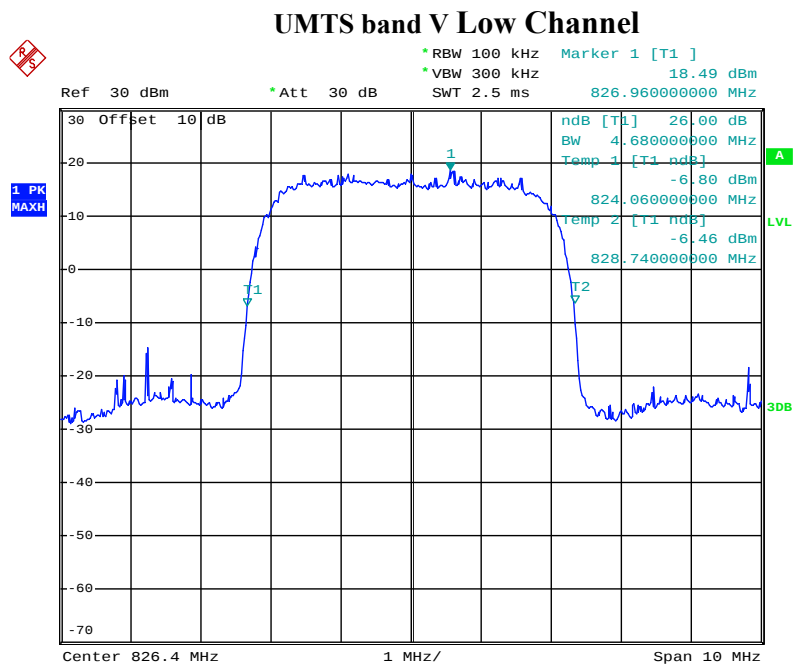


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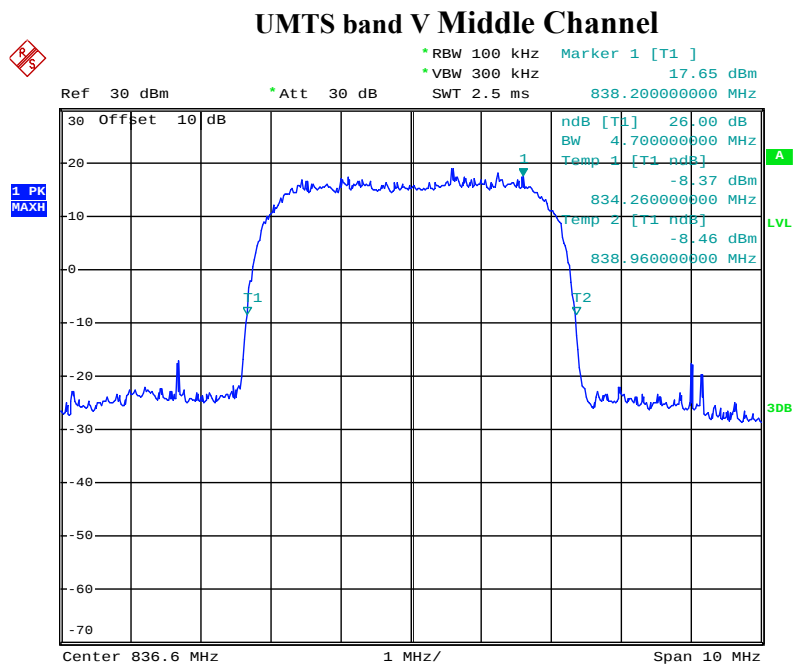
PCS1900 band High Channel



Date: 7.DEC.2012 11:40:30

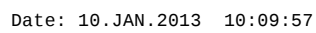


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11. BAND EDGE

11.1.MEASUREMENT METHOD

The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

11.2.PROVISIONS APPLICABLE

as Specified in FCC rules of 22.917(b) and 24.238(b)

11.3.MEASUREMENT RESULT

Cellular Band (Part 22H)

Channel	Emission (dBm)	Limit (dBm)
128(824.2MHz)	-13.64	-13
251(848.8MHz)	-13.73	-13

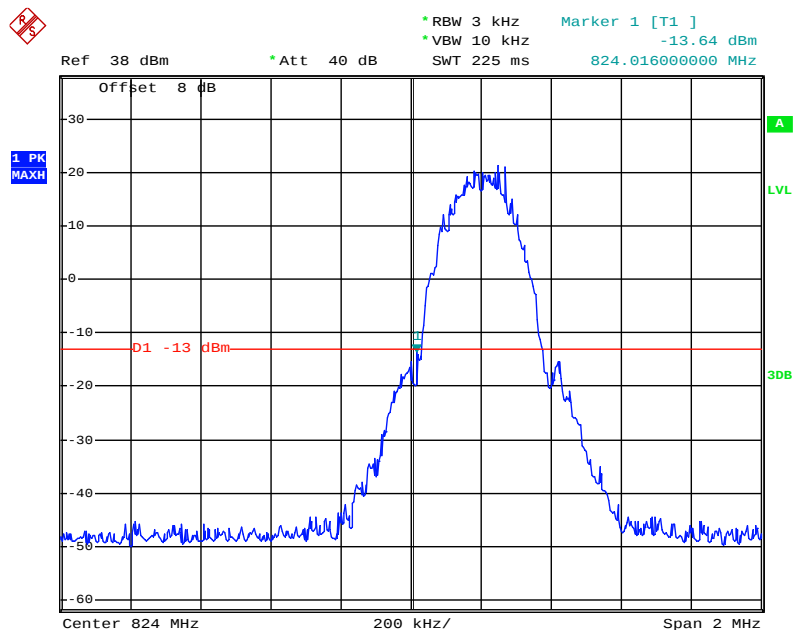
PCS Band (Part 24E)

Channel	Emission (dBm)	Limit (dBm)
512(1850.2MHz)	-17.47	-13
810(1909.8MHz)	-18.34	-13

WCDMA Band V (Part 22H)

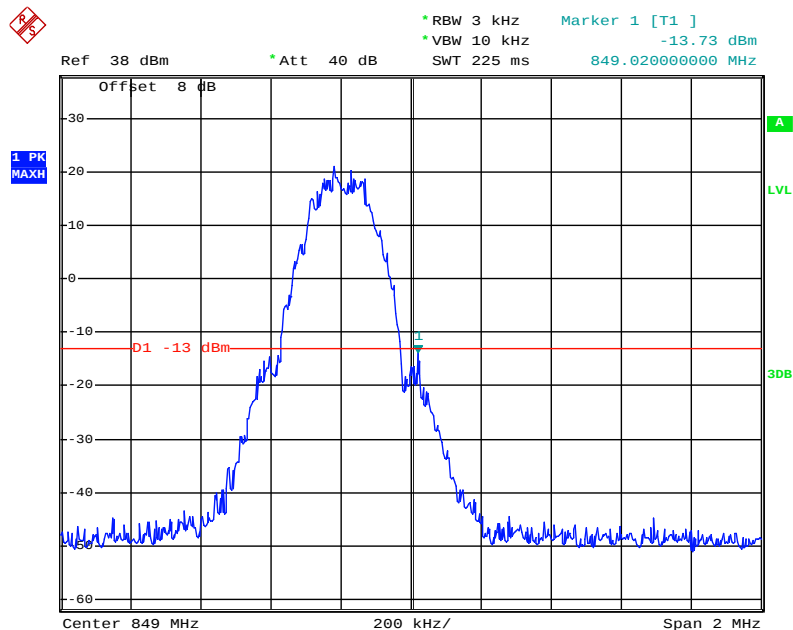
Channel	Emission (dBm)	Limit (dBm)
4132(826.4MHz)	-16.89	-13
4233(846.6MHz)	-17.45	-13

Low Band Edge GSM 850



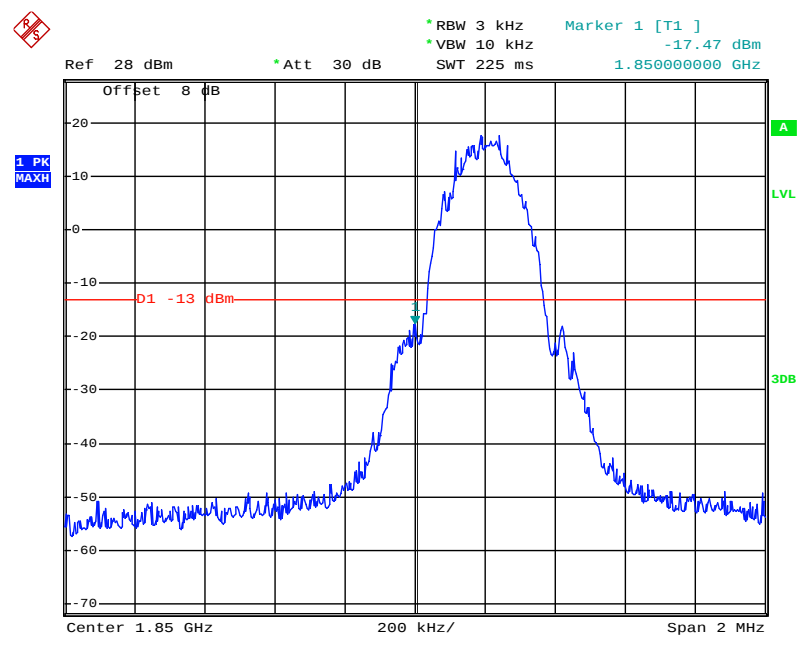
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High Band Edge GSM 850



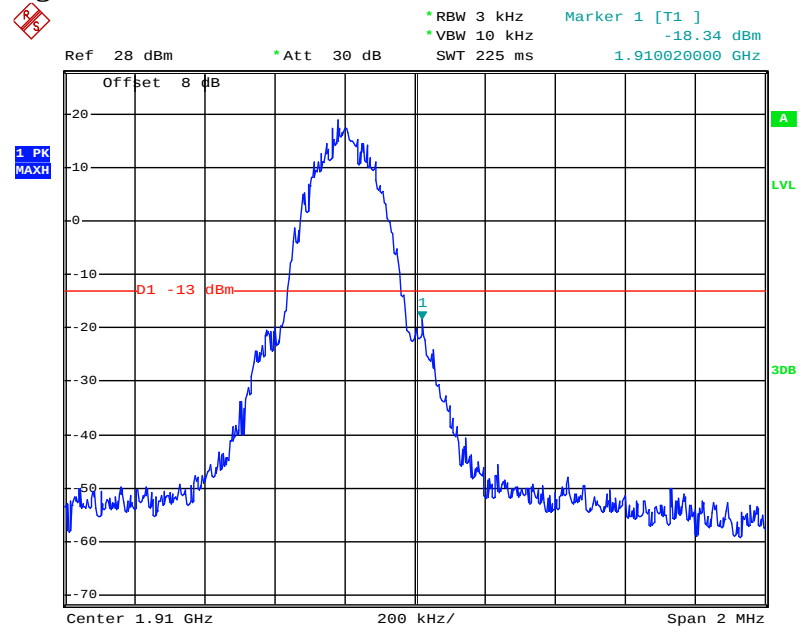
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Low Band Edge PCS 1900



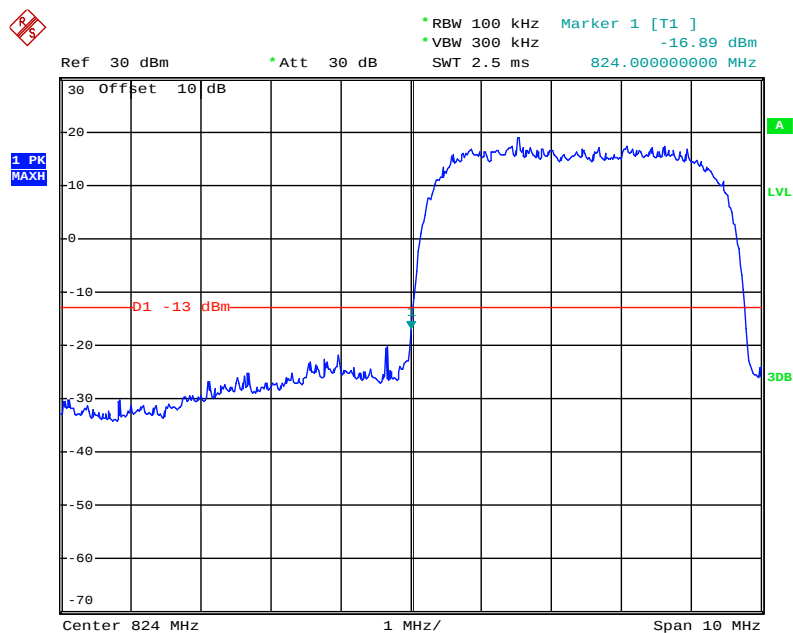
Date: 7.DEC.2012 11:34:35

High Band Edge PCS 1900



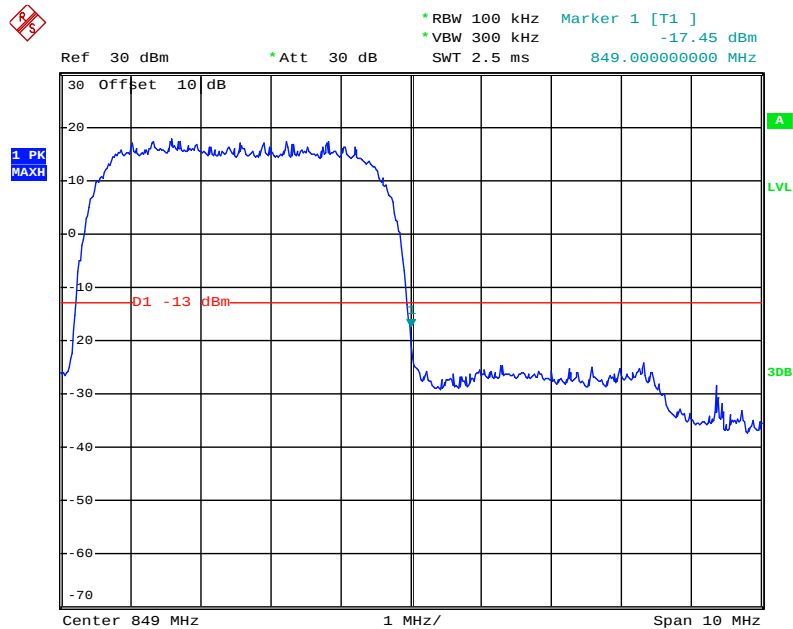
Date: 7.DEC.2012 11:39:27

Low Band Edge UMTS V



Date: 10.JAN.2013 10:11:13

High Band Edge UMTS V



Date: 10.JAN.2013 10:10:42