



NVLAP LAB CODE 200707-0



FCC PART 22 H/24 E

MEASUREMENT AND TEST REPORT

For

Shenzhen CASTEL Wireless Telecommunications Co., Ltd.

5/F, Building, Software Park, No.2 GaoxinC. 3rd Road, Hi-Tech. Industrial Park,
Nanshan, Shenzhen, Guangdong, China

FCC ID: XDV618

Report Type: Original Report	Product Type: Mobile Positioning Information Platform
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Report Number: <u>RSZ09050403</u>	
Report Date: <u>2009-09-29</u>	
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* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "*" (Rev.2)

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The ShenZhen CASTEL Wireless Telecommunications Co., Ltd.'s product, model number: TCU-618 (FCC ID: XDV618) or the "EUT" as referred to in this report is a *MOBILE POSITIONING INFORMATION PLATFORM*, which measures approximately: 11.5 cm L x 6.6 cm W x 3.4 cm H, rated input voltage: DC 12V battery.(declared to be tested by manufacturer)

Frequency Range:

Cellular Band: 824-849 MHz (TX), 869-894 MHz (RX)

PCS Band: 1850-1910 MHz (TX), 1930-1990 MHz (RX)

Modulation Mode: GMSK

Transmitter Output Power:

Cellular Band: 33±2 dBm

PCS Band: 30±2 dBm

*Note: The series products, model MPIP-618A/MPIP-618B/MPIP-618C/MPIP-618D/MPIP-618T/MPIP-618W/TCU-618, we select TCU-618 to test, and all of the models are electrically identical, only their model names have differences, which were explained in the attached Declaration Letter.

* All measurement and test data in this report was gathered from production sample serial number: 0905003 (Assigned by BACL). The EUT was received on 2009-05-04.

EUT Photo



Please see additional photos in Exhibit B&C

Objective

This type approval report is prepared on behalf of *ShenZhen CASTEL Wireless Telecommunications Co., Ltd.* in accordance with Part 2, Subpart J, Part 22 Subpart H, and Part 24 Subpart E of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules for output power, modulation characteristic, occupied bandwidth, and spurious emission at antenna terminal, spurious radiated emission, frequency stability, band edge and radiated margin.

Related Submittal(s)/Grant(s)

No related submittal(s).

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

Part 22 Subpart H - Public Mobile Services
Part 24 Subpart E - Personal Communication Services

Applicable Standards: TIA/EIA 603-C, ANSI C63.4-2003.

All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratories Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp.(Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 21, 2007. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



NVLAP LAB CODE 200707-0

The current scope of accreditations can be found at <http://ts.nist.gov/Standards/scopes/2007070.htm>

SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing according to TIA/EIA-603-C.

The final qualification test was performed with the EUT operating at normal mode.

Equipment Modifications

No modifications were made to the EUT.

Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
DELL	Motherboard	OWC297	CN-OWC297-70821-566-02BR	DoC
DELL	Power	NPS-250KB D	CN-0H2678-17972-56E8NBM	DoC
Seagate	Hard Disk	ST340014A	5JXK3NAD	DoC
DELL	3.5' Floppy	N/A	CN-0N8893-69802-54Q-02OZ	DoC
Lite-ON	CD-Rom	LTN-489S	N/A	DoC
Intel	CPU	Celeron D-2533	N/A	N/A
ProMOS	Memory	V826632K24SATG-C0	0525-K1933700	N/A
Intel	Ethernet	PRO 10/100 VE	N/A	DoC

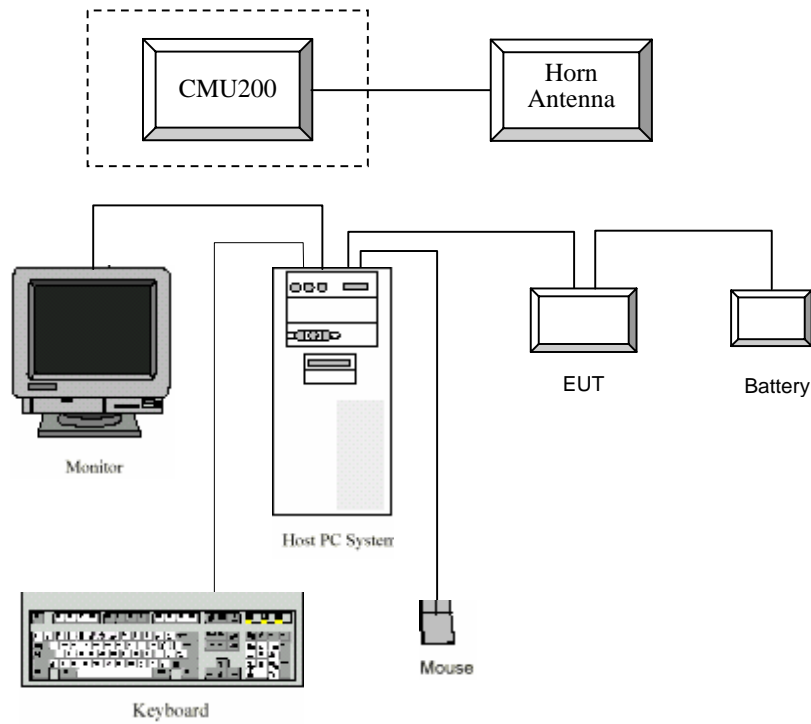
Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
DELL	PC	DELL 170L	CN-0TC670-70821-560-F4WQ	DoC
DELL	LCD Monitor	1505FP	Y4287-7168-574-GBSH	DoC
DELL	Mouse 1#	MOC5UO	G1B0096D	DoC
DELL	Keyboard 1#	L100	CNORH656658907BL04TY	DoC

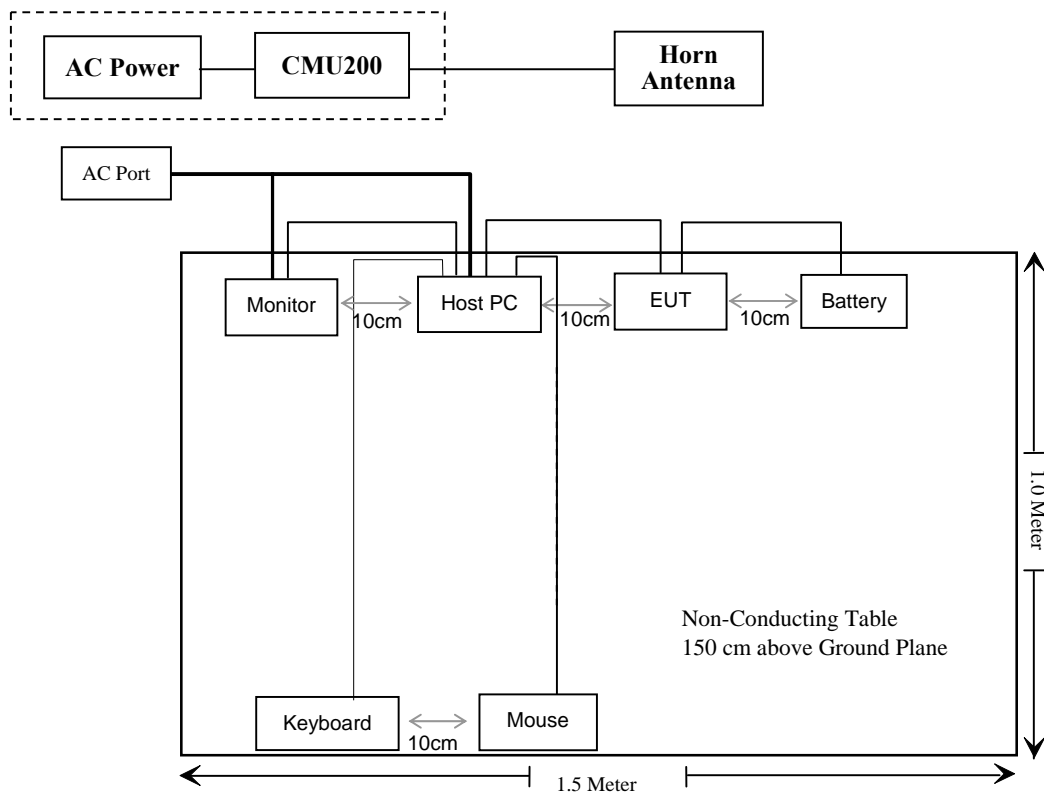
External I/O Cable

Cable Description	Length (m)	From/Port	To
Shielded Detachable K/B Cable	1.5	K/B Port	K/B
Shielded Detachable Mouse Cable	1.5	Mouse Port	Mouse
Shielded Detachable VGA Cable	1.5	VGA Port	Monitor
Shielded Detachable Power Cable	1.5	EUT	Battery

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307, §2.1091	Maximum Permissible Exposure(MPE)	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

FCC §1.1307 & §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Standard Applicable

According to subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm²)	Averaging Time (minutes)
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

f = frequency in MHz

* = Plane-wave equivalent power density

Test Data

Predication of MPE limit at a given distance.

$$S = PG/4\pi R^2$$

Where:

S = power density (in appropriate units, e.g. mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally *numeric* gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

For Cellular Band:

Maximum peak output power at antenna input terminal (dBm): 32.07

Maximum peak output power at antenna input terminal (mW): 1610.6

Prediction distance (cm): 20

Prediction frequency (MHz): 836.6

Antenna Gain, typical (dBi): 2.0

Maximum Antenna Gain (numeric): 1.58

Power density at predication frequency and distance (mW/cm²): 0.507

MPE limit for uncontrolled exposure at predication frequency (mW/cm²): 0.558

For PCS Band:

Maximum peak output power at antenna input terminal (dBm):	<u>30.23</u>
Maximum peak output power at antenna input terminal (mW):	<u>1054.4</u>
Prediction distance (cm):	<u>20</u>
Prediction frequency (MHz):	<u>1880</u>
Antenna Gain, typical (dBi):	<u>2.0</u>
Maximum Antenna Gain (numeric):	<u>1.58</u>
Power density at predication frequency and distance (mW/cm ²):	<u>0.33</u>
MPE limit for uncontrolled exposure at predication frequency (mW/cm ²):	<u>1.0</u>

Conclusion

The predicted power density level at 20 cm is 0.507 mw/cm² for cellular band and 0.33 mw/cm² for PCS band, both of them are below the limit of general population, the device is operated at least 20 cm away from user's body, and the RF exposure information has been addressed on the user manual.

FCC §2.1047 - MODULATION CHARACTERISTIC

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

FCC § 2.1046, § 22.913 (a) & § 24.232 (c) - RF OUTPUT POWER

Applicable Standard

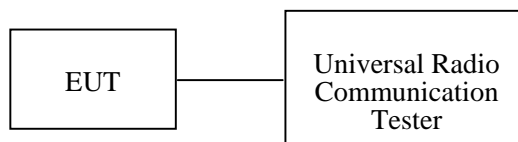
According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

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.

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:

TIA 603-C section 2.2.17

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Horn Antenna	DRH-118	A052604	2009-09-25	2010-09-25
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2009-08-28	2010-08-27
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2009-03-11	2010-03-11
HP	Preamplifier	8449B	3008A00277	2009-09-12	2010-09-11
HP	Signal Generator	HP8657A	2849U00982	2008-10-16	2009-10-15
HP	Amplifier	HP8447D	2944A09795	2009-08-02	2010-08-02
HP	Synthesized Sweeper	8341B	2624A00116	2008-11-07	2009-11-06
COM POWER	Dipole Antenna	AD-100	041000	2009-09-25	2010-09-25
A.H. System	Horn Antenna	SAS-200/571	135	2009-05-17	2010-05-17
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2009-05-09	2010-05-09

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data**Environmental Conditions**

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

The testing was performed by Kvass Yang on 2009-09-28

Conducted Power**Cellular Band (Part 22H)**

Mode	Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)
GSM	Channel 128	824.2	31.36	38.45
	Channel 190	836.6	31.44	38.45
	Channel 251	848.8	31.50	38.45
GRPS	Channel 128	824.2	32.07	38.45
	Channel 190	836.6	32.02	38.45
	Channel 251	848.8	31.80	38.45

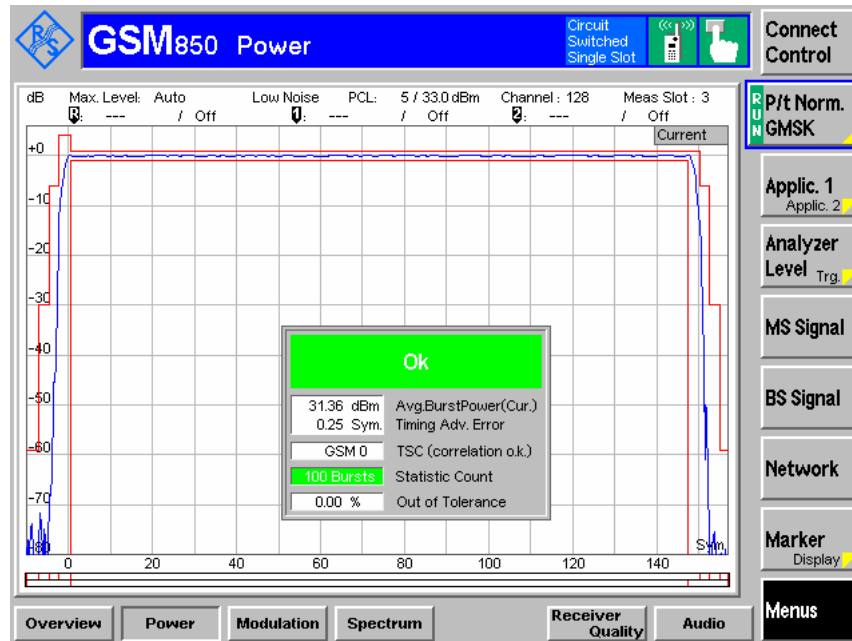
PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)
GSM	Channel 512	1850.2	30.23	33
	Channel 661	1880.0	30.18	33
	Channel 810	1909.8	29.60	33
GRPS	Channel 512	1850.2	28.27	33
	Channel 661	1880.0	28.83	33
	Channel 810	1909.8	28.16	33

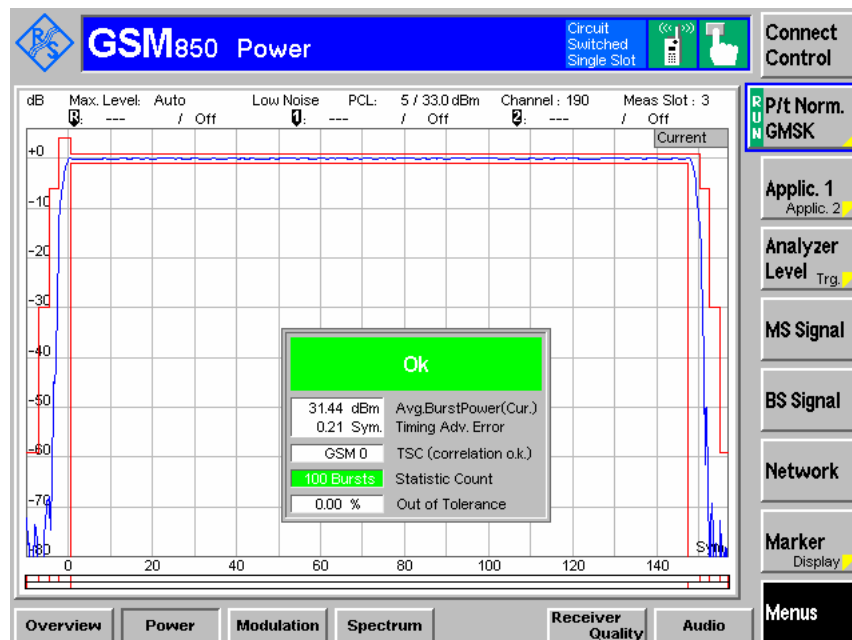
Please refer to the following plots.

Cellular Band (Part 22H)

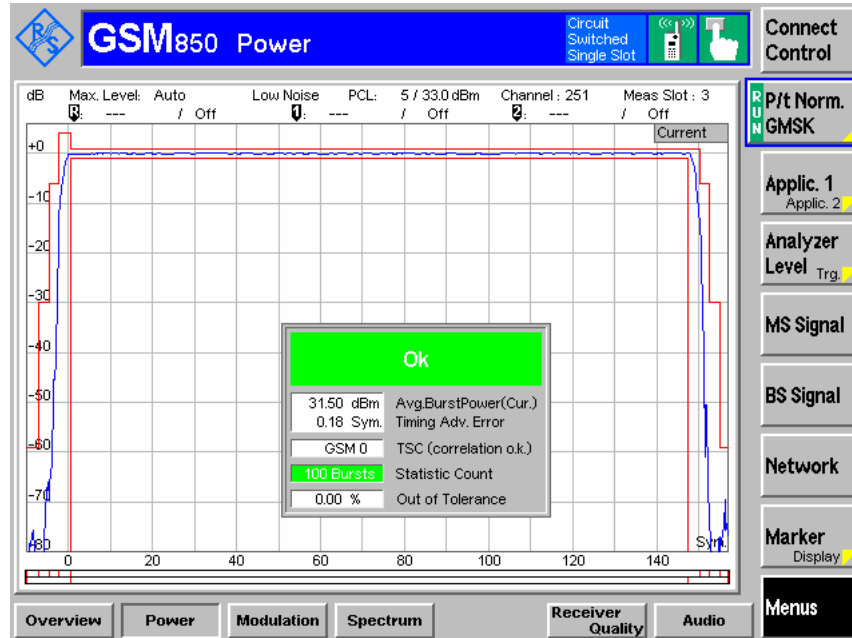
Low Channel (GSM)



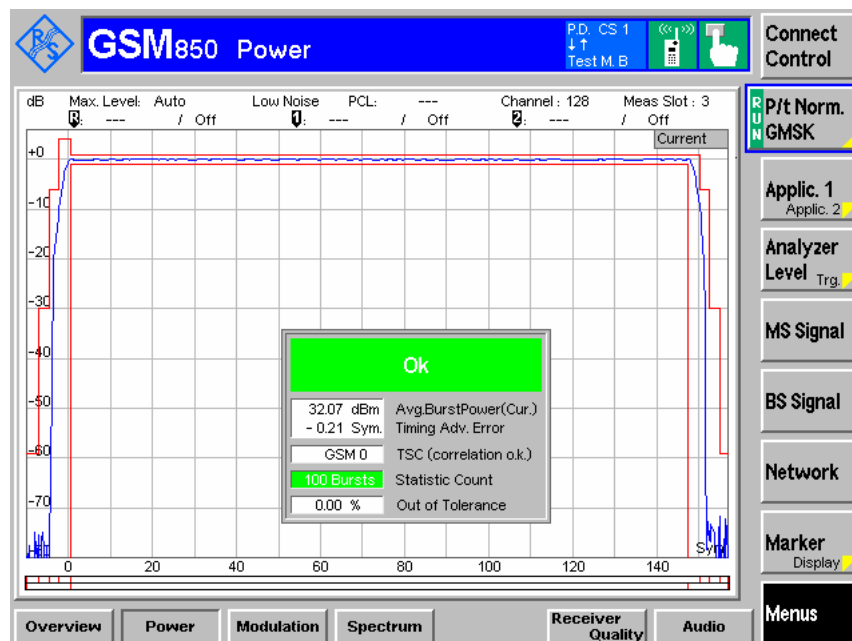
Middle Channel (GSM)



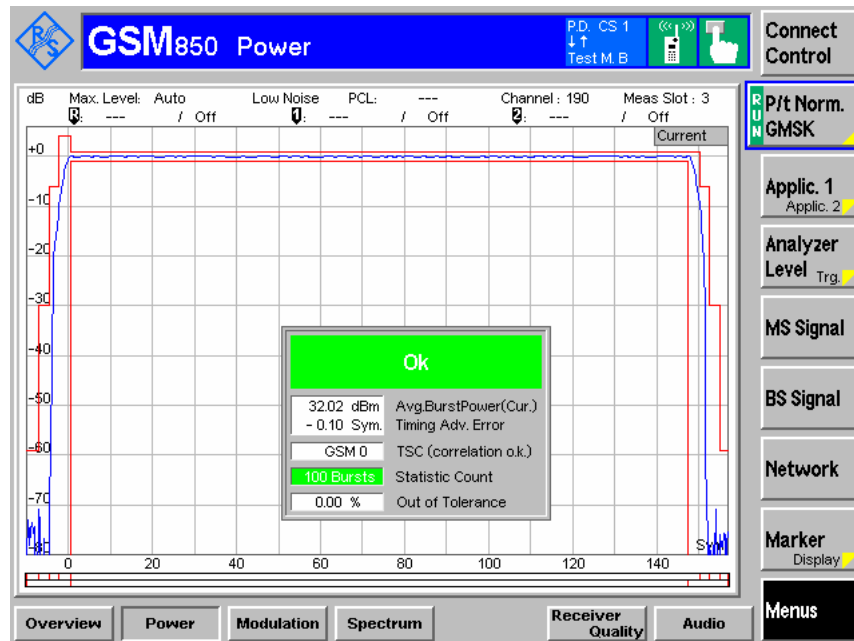
High Channel (GSM)



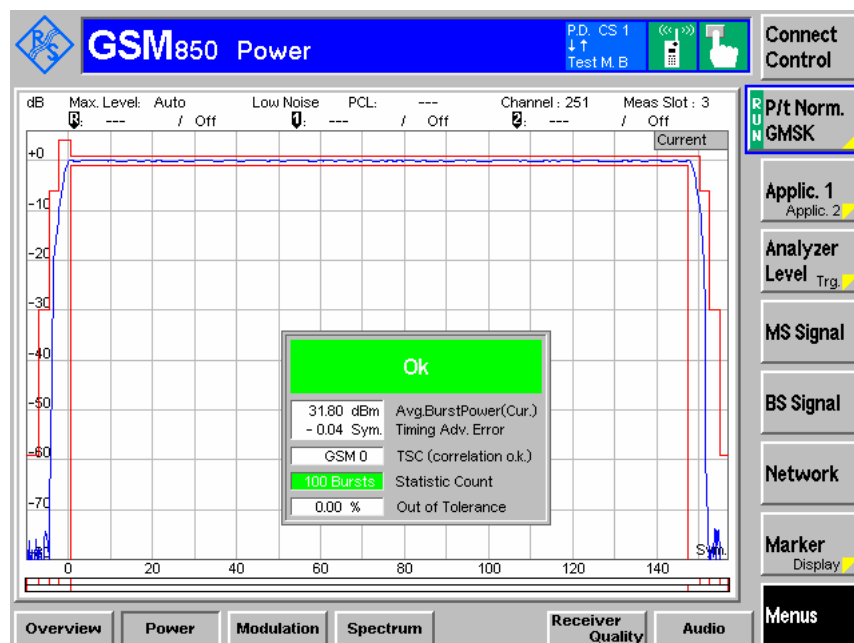
Low Channel (GPRS)



Middle Channel (GPRS)

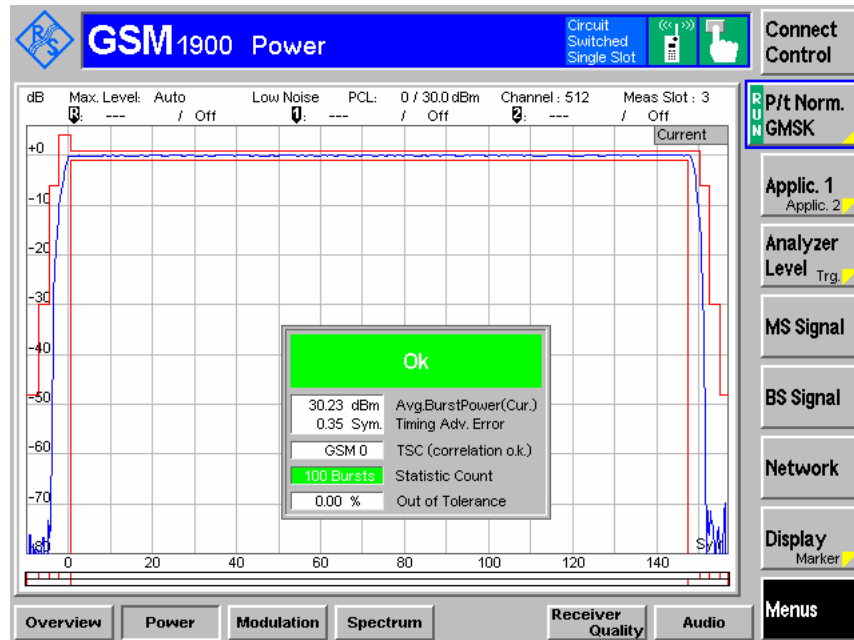


High Channel (GPRS)

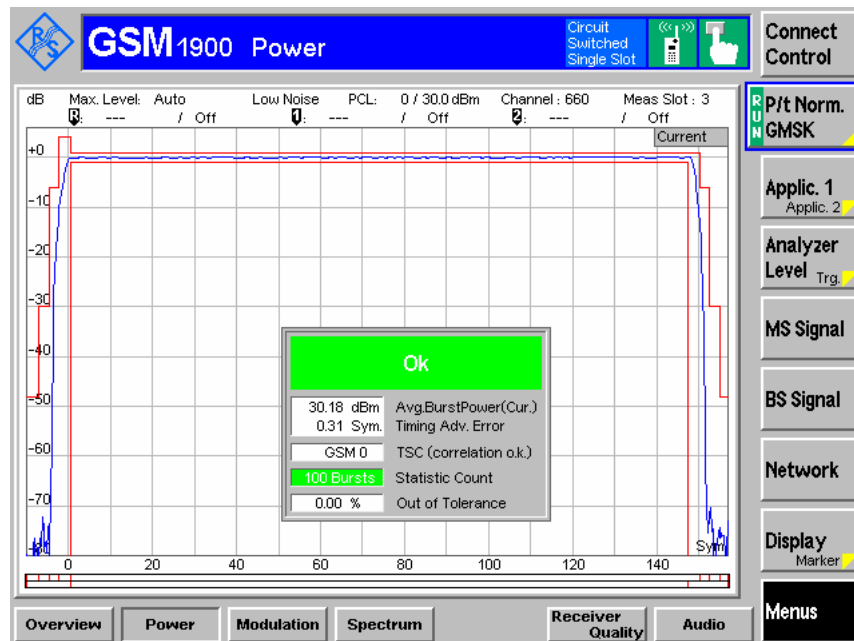


PCS Band (Part 24E)

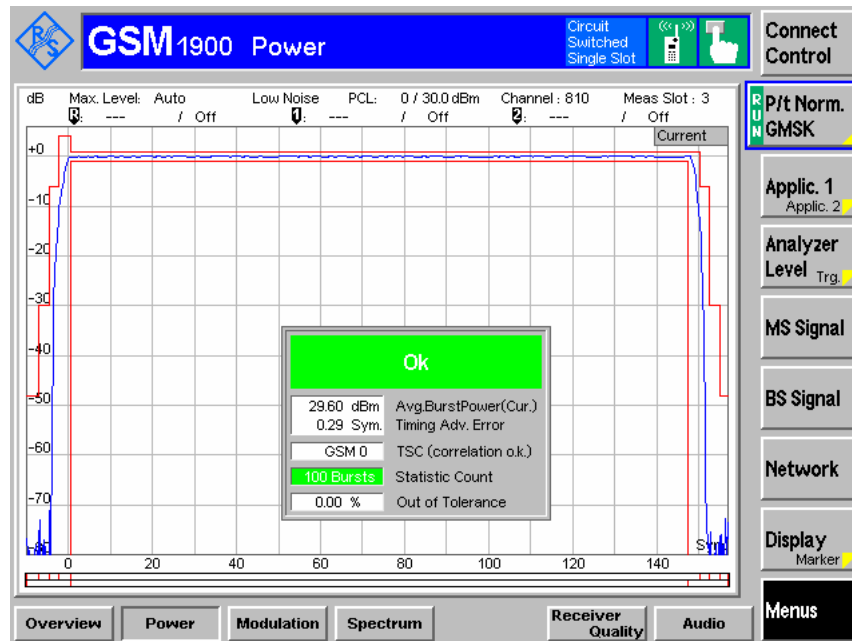
Low Channel (GSM)



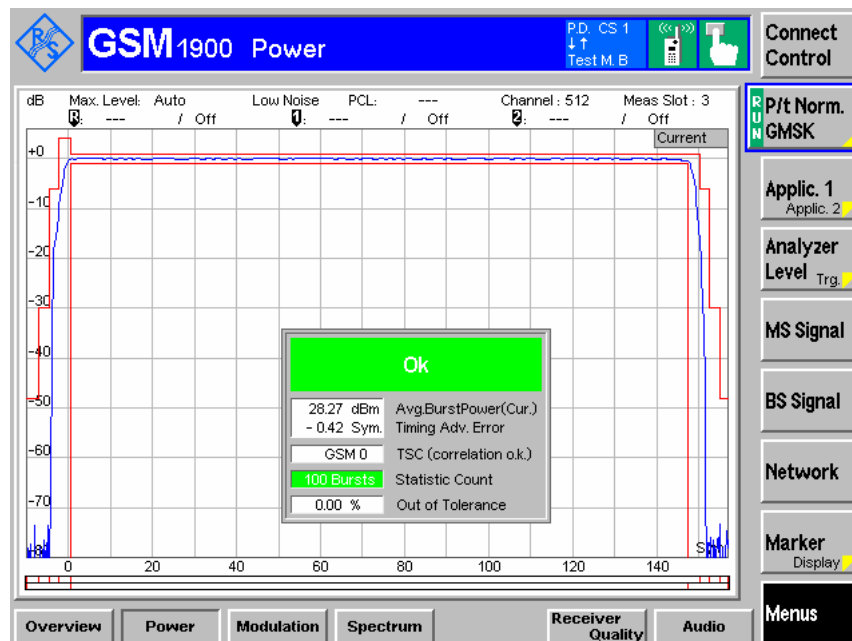
Middle Channel (GSM)



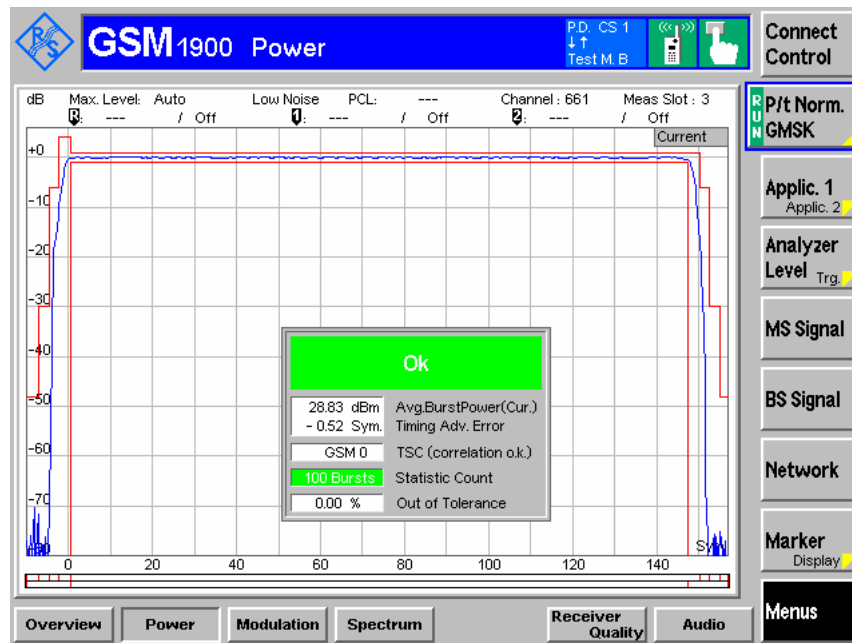
High Channel (GSM)



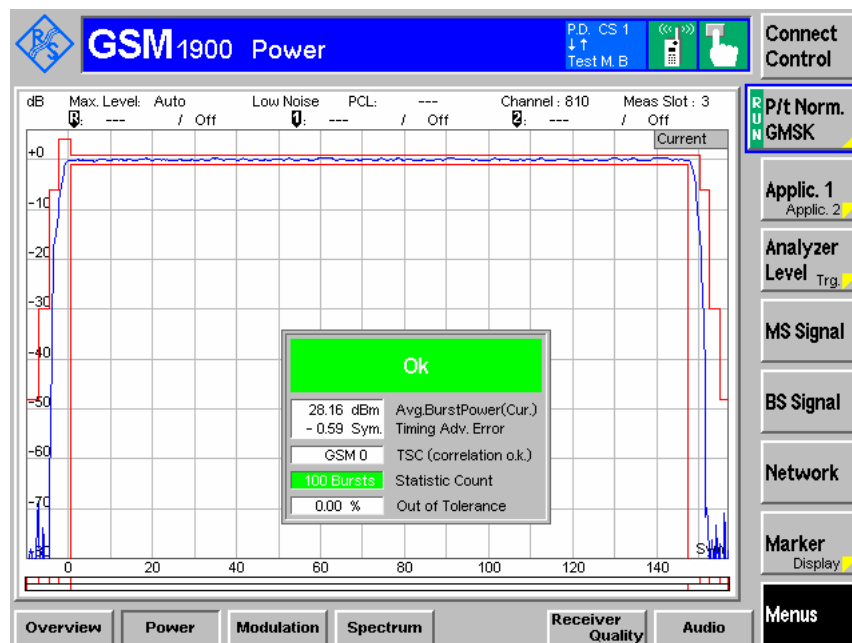
Low Channel (GPRS)



Middle Channel (GPRS)



High Channel (GPRS)



Radiated Power (ERP and EIRP)**Cellular Band (Part 22H)**

GSM:

Indicated		Azimuth (degree)	Test Antenna		Substituted					FCC Part 22H	
Freq. (MHz)	S.A. Amp. (dBuV)		Height (m)	Polarity (H/V)	Freq. (MHz)	Level (dBm)	Ant. Gain Cord. (dB)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency in Low Channel											
824.2	97.16	34	1.7	H	824.2	26.32	0	0.9	25.42	38.45	13.03
824.2	102.97	279	1.7	V	824.2	29.86	0	0.9	28.96	38.45	9.49
Frequency in Middle Channel											
836.6	99.60	168	2.0	H	836.6	27.81	0	0.9	26.91	38.45	11.54
836.6	103.18	260	1.6	V	836.6	29.87	0	0.9	28.97	38.45	9.48
Frequency in High Channel											
848.8	97.60	32	1.0	H	848.8	26.44	0	0.9	25.54	38.45	12.91
848.8	102.95	95	2.0	V	848.8	29.70	0	0.9	28.80	38.45	9.65

GPRS:

Indicated		Azimuth (degree)	Test Antenna		Substituted					FCC Part 22H	
Freq. (MHz)	S.A. Amp. (dBuV)		Height (m)	Polarity (H/V)	Freq. (MHz)	Level (dBm)	Ant. Gain Cord. (dB)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency in Low Channel											
824.2	97.26	34	1.7	H	824.2	26.42	0	0.9	25.52	38.45	12.93
824.2	103.07	279	1.7	V	824.2	29.96	0	0.9	29.06	38.45	9.39
Frequency in Middle Channel											
836.6	99.80	168	2.0	H	836.6	27.01	0	0.9	26.11	38.45	12.34
836.6	103.38	260	1.6	V	836.6	30.07	0	0.9	29.17	38.45	9.28
Frequency in High Channel											
848.8	97.90	32	1.0	H	848.8	26.74	0	0.9	25.84	38.45	12.61
848.8	103.25	95	2.0	V	848.8	30.00	0	0.9	29.10	38.45	9.35

PCS Band (Part 24E)

GSM:

Indicated		Azimuth (degree)	Test Antenna		Substituted					FCC Part 24E	
Freq. (MHz)	S.A. Amp. (dBuV)		Height (m)	Polarity (H/V)	Freq. (MHz)	Level (dBm)	Ant. Gain Cord. (dB)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency in Low Channel											
1850.2	85.7	177	1.8	H	1850.2	18.66	6.2	1.02	23.84	33	9.16
1850.2	90.9	85	1.2	V	1850.2	23.51	6.2	1.02	28.69	33	4.31
Frequency in Middle Channel											
1880	85.61	186	1.5	H	1880	18.64	6.2	1.03	23.81	33	9.19
1880	91.18	261	1.3	V	1880	22.72	6.2	1.03	27.89	33	5.11
Frequency in High Channel											
1909.8	83.28	254	1.6	H	1909.8	16.84	6.2	1.03	22.01	33	10.99
1909.8	90.65	152	1.7	V	1909.8	22.61	6.2	1.03	27.78	33	5.22

GPRS:

Indicated		Azimuth (degree)	Test Antenna		Substituted					FCC Part 24E	
Freq. (MHz)	S.A. Amp. (dBuV)		Height (m)	Polarity (H/V)	Freq. (MHz)	Level (dBm)	Ant. Gain Cord. (dB)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
Frequency in Low Channel											
1850.2	85.90	177	1.8	H	1850.2	18.86	6.2	1.02	24.04	33	8.96
1850.2	91.10	85	1.2	V	1850.2	23.71	6.2	1.02	28.89	33	4.11
Frequency in Middle Channel											
1880	85.91	186	1.5	H	1880	18.94	6.2	1.03	24.11	33	8.89
1880	91.48	261	1.3	V	1880	23.02	6.2	1.03	28.19	33	4.81
Frequency in High Channel											
1909.8	83.68	254	1.6	H	1909.8	17.24	6.2	1.03	22.41	33	10.59
1909.8	91.05	152	1.7	V	1909.8	23.01	6.2	1.03	28.18	33	4.82

FCC §2.1049, §22.917, §22.905 & §24.238 - OCCUPIED BANDWIDTH

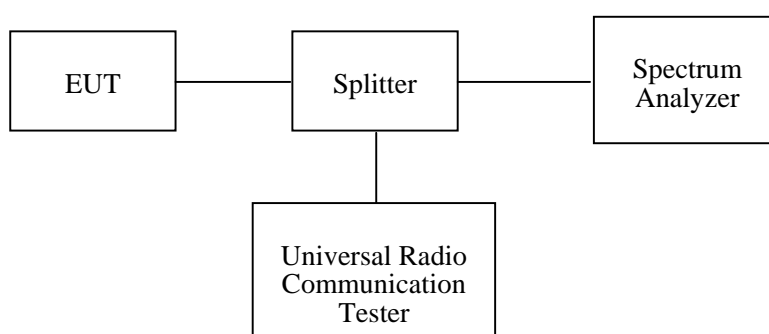
Applicable Standards

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

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.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2008-11-07	2009-11-06
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2009-05-09	2010-05-09

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data

Environmental Conditions

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

The testing was performed by Kvass Yang on 2009-09-25 to 2009-09-28.

GSM:

Cellular Band (Part 22H)

Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	26 dB Bandwidth (kHz)
190	836.6	246	330

PCS Band (Part 24E)

Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	26 dB Bandwidth (kHz)
661	1880.0	244	328

GPRS:

Cellular Band (Part 22H)

Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	26 dB Bandwidth (kHz)
190	836.6	244	330

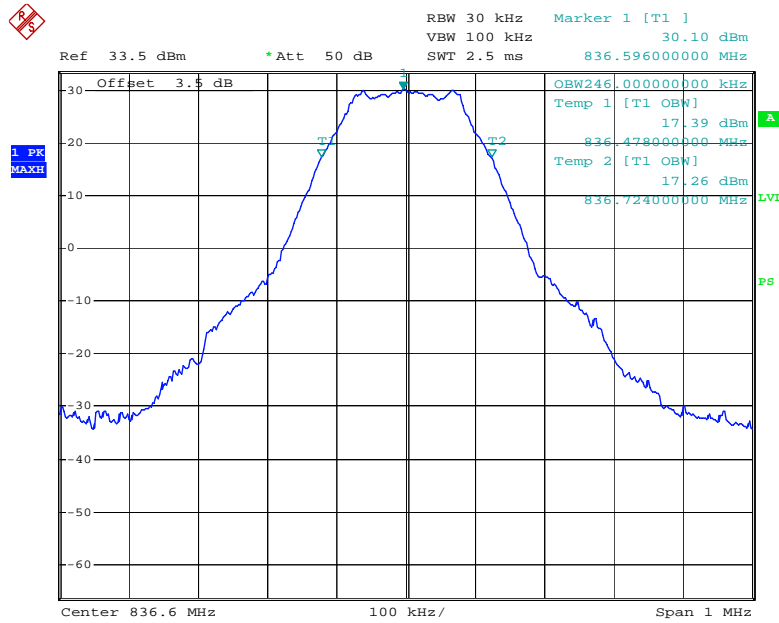
PCS Band (Part 24E)

Channel	Frequency (MHz)	99% Emission Bandwidth (kHz)	26 dB Bandwidth (kHz)
661	1880.0	246	328

Please refer to the following plots.

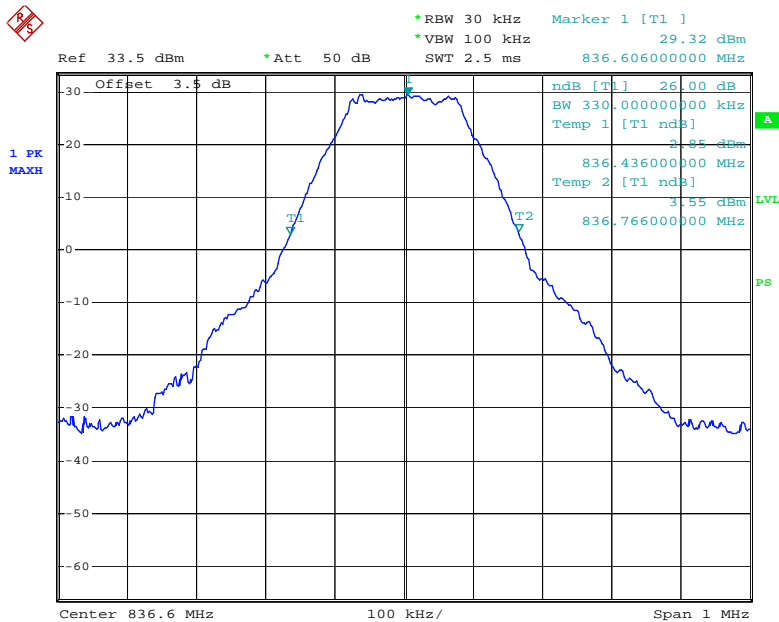
Cellular Band (Part 22H)

99% Emission Bandwidth (GSM)



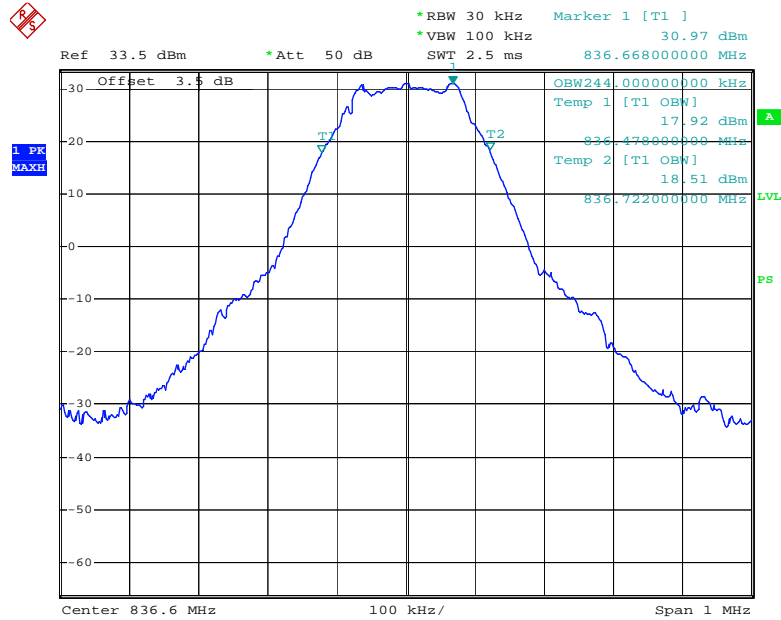
Date: 25.SEP.2009 02:17:17

26 dB Bandwidth (GSM)



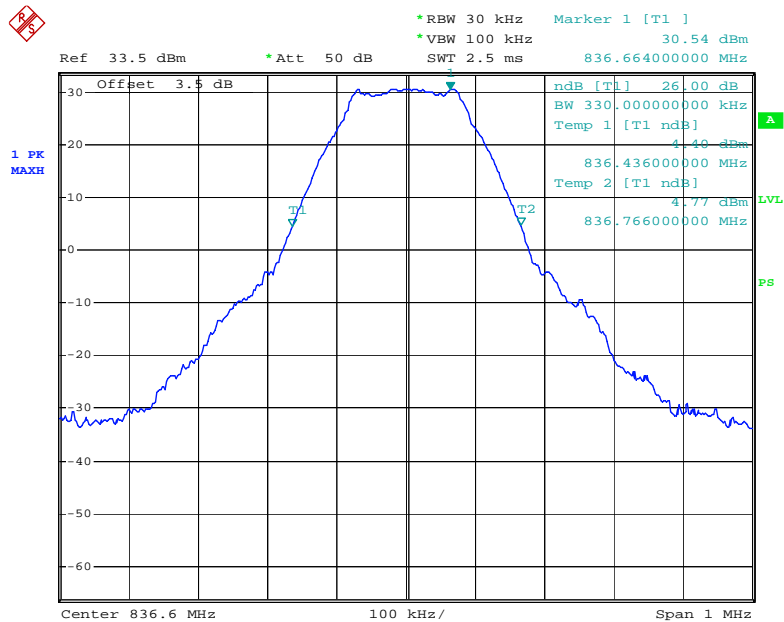
Date: 28.SEP.2009 07:33:29

99% Emission Bandwidth (GPRS)



Date: 26.SEP.2009 02:15:21

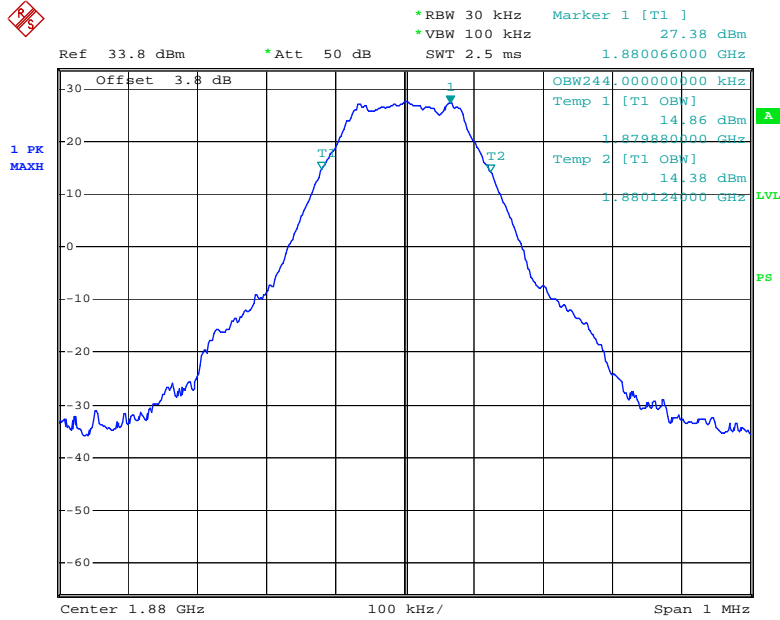
26 dB Bandwidth (GPRS)



Date: 28.SEP.2009 07:34:40

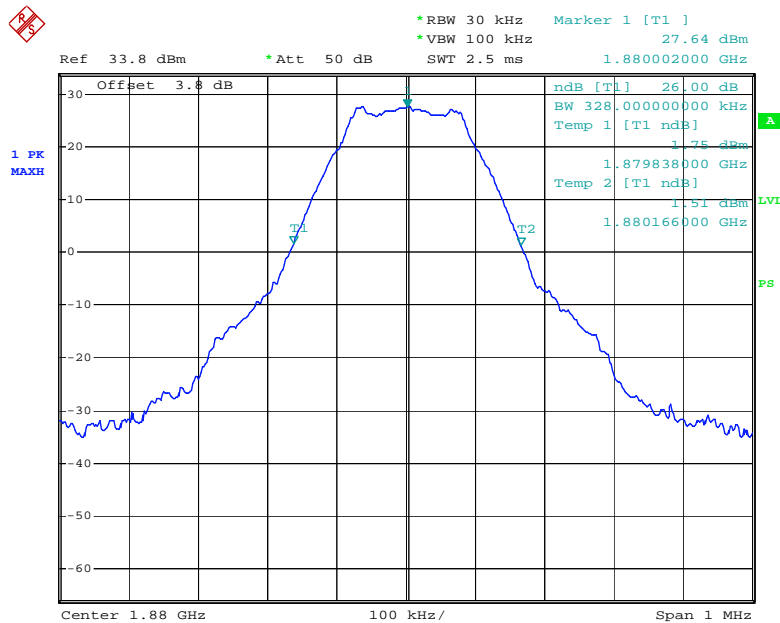
PCS Band (Part 24E)

99% Emission Bandwidth (GSM)



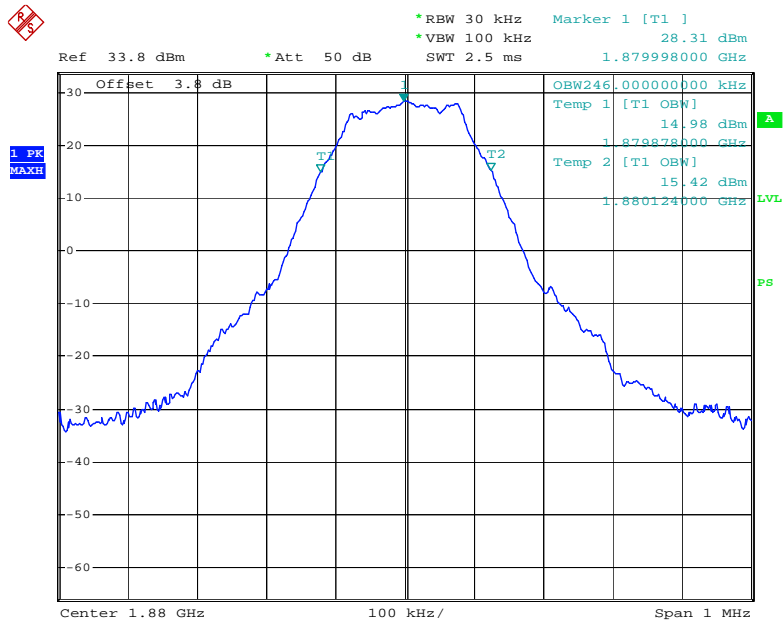
Date: 28.SEP.2009 07:39:42

26 dB Bandwidth (GSM)



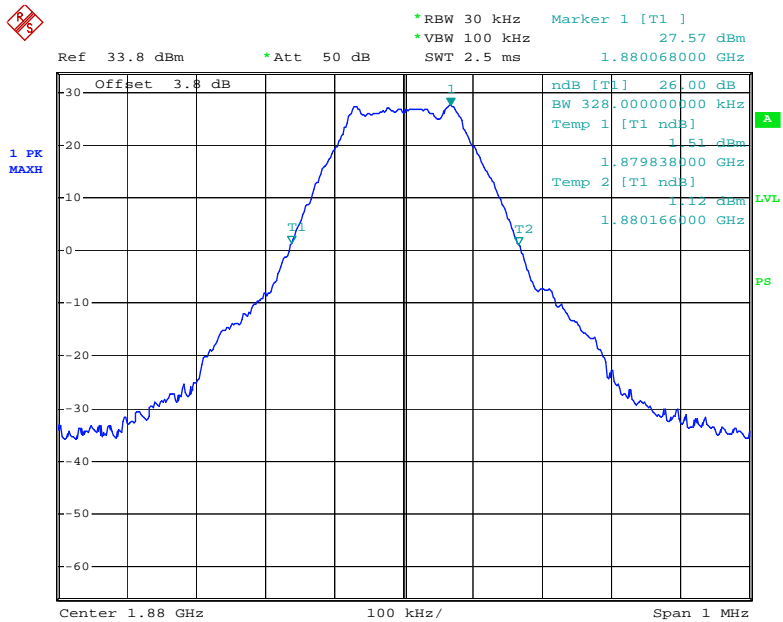
Date: 28.SEP.2009 07:37:31

99% Emission Bandwidth (GPRS)



Date: 26.SEP.2009 01:35:07

26 dB Bandwidth (GPRS)



Date: 28.SEP.2009 07:39:10

FCC §2.1051, §22.917(a) & §24.238(a) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

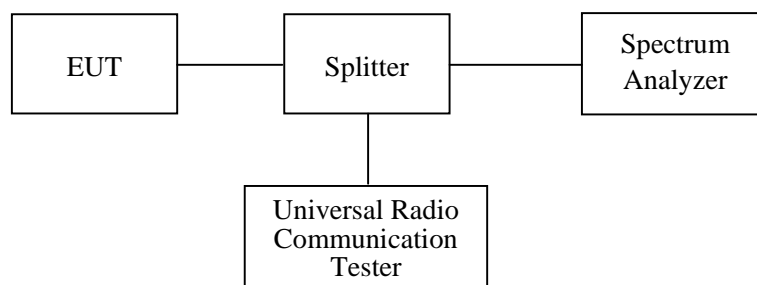
Applicable Standards

CFR 47 §2.1051, §22.917(a) and §24.238(a).

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

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 10th harmonic.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2009-08-28	2010-08-27
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2009-05-09	2010-05-09
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2008-11-07	2009-10-16

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data

Environmental Conditions

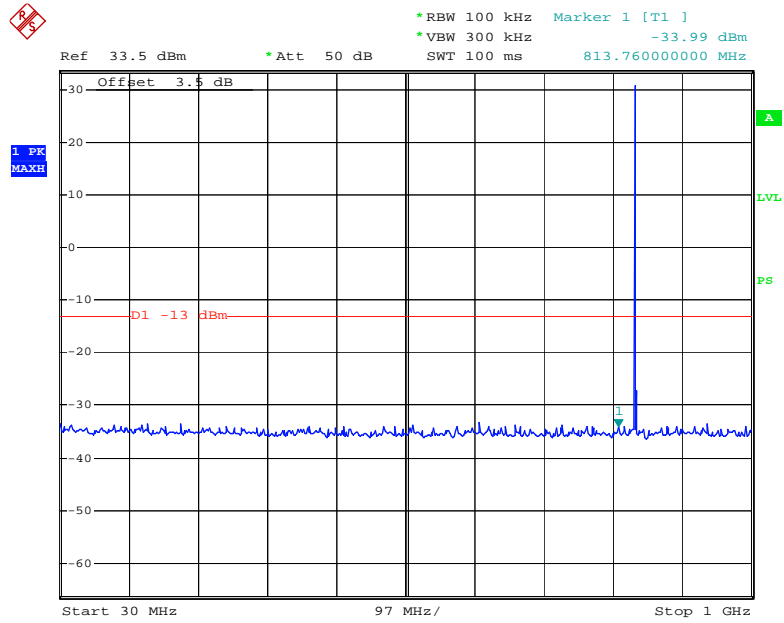
Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Kvass Yang on 2009-09-25 to 2009-09-28.

Please refer to the following plots.

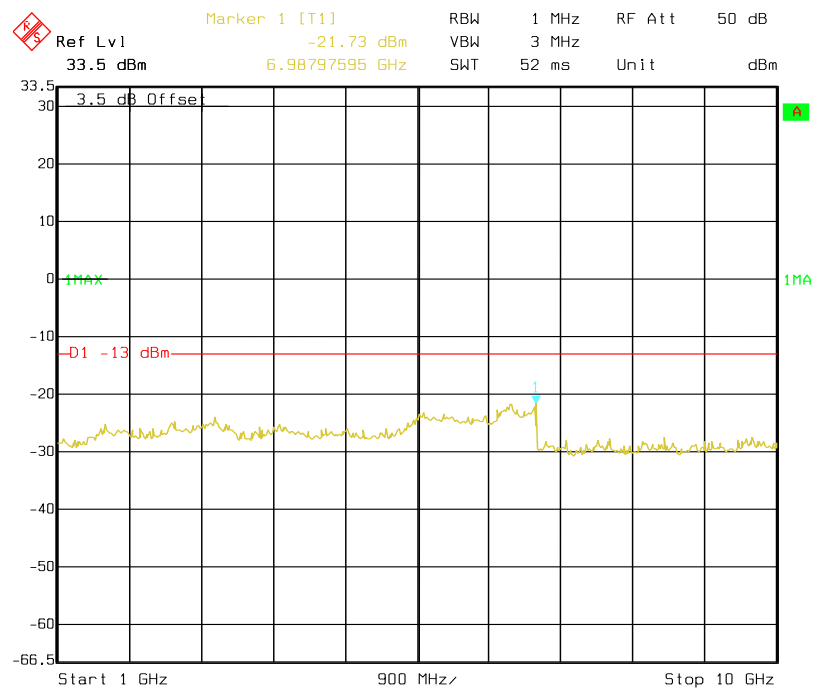
Cellular Band (Part 22H)

30 – 1000 MHz - Middle Channel (GSM)



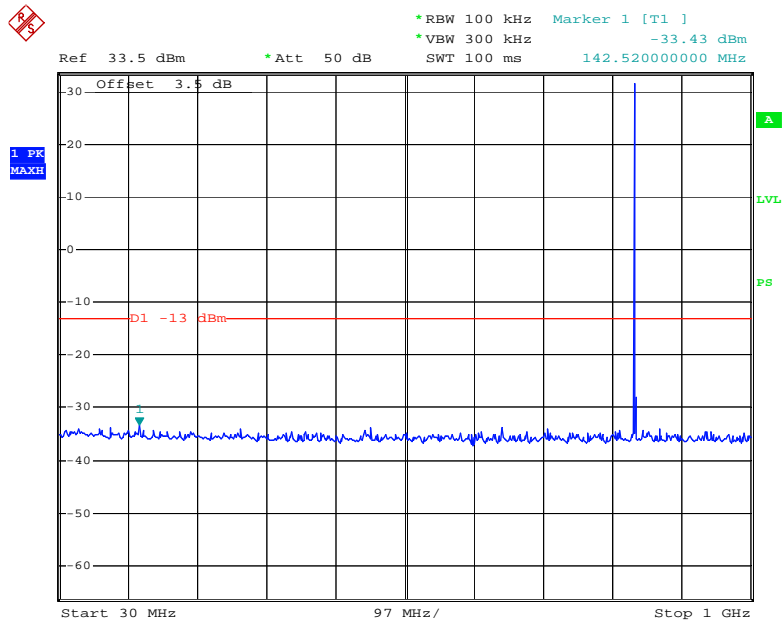
Date: 25.SEP.2009 02:48:37

1 – 10 GHz - Middle Channel (GSM)



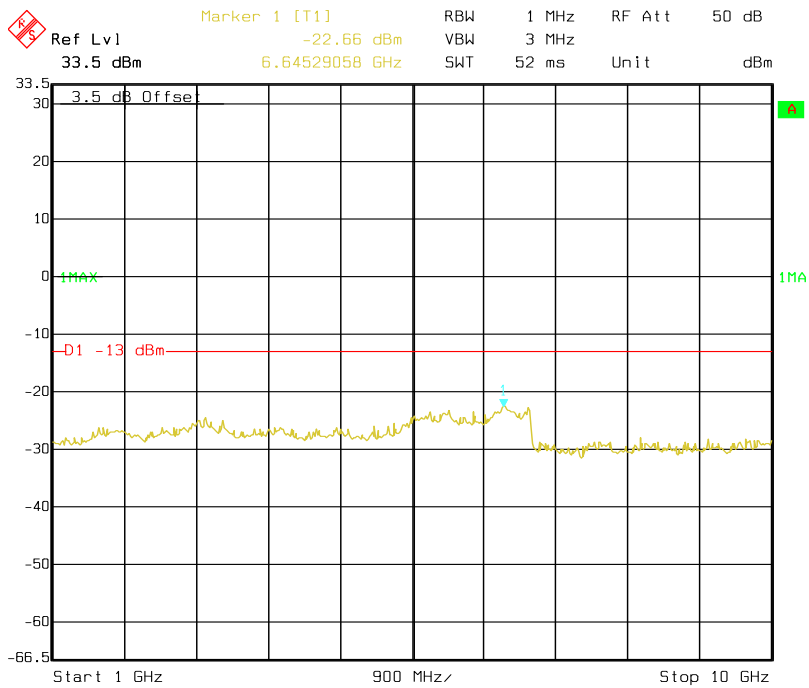
Date: 25.SEP.2009 07:03:03

30 – 1000 MHz - Middle Channel (GPRS)



Date: 26.SEP.2009 02:07:50

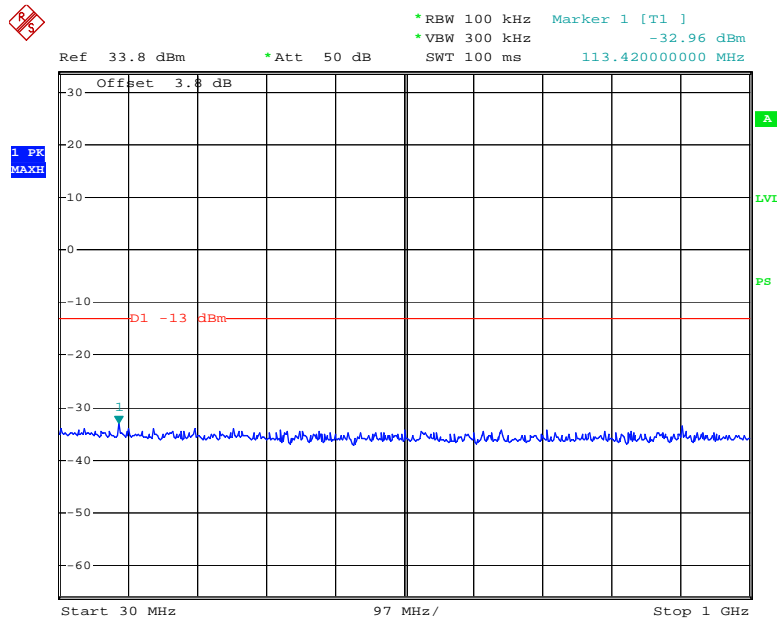
1 – 10 GHz - Middle Channel (GPRS)



Date: 26.SEP.2009 02:04:46

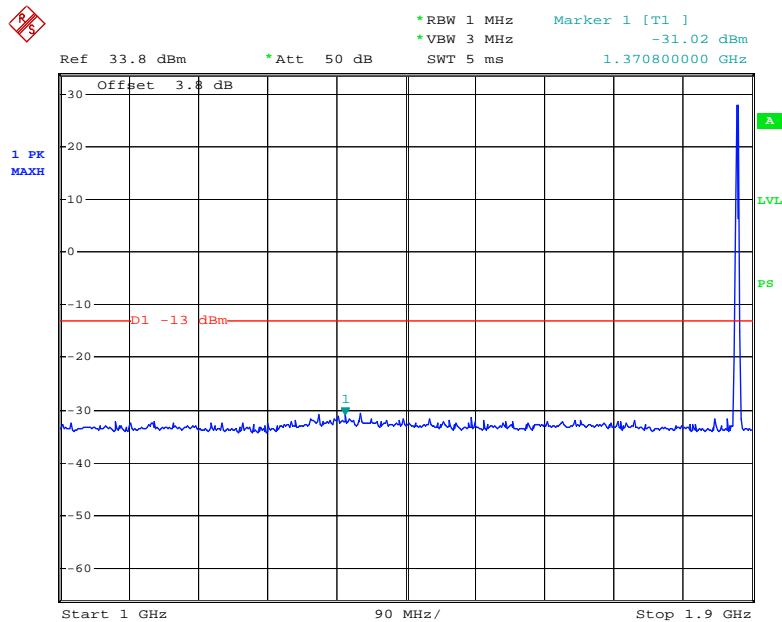
PCS Band (Part24E)

30 – 1000 MHz - Middle Channel (GSM)



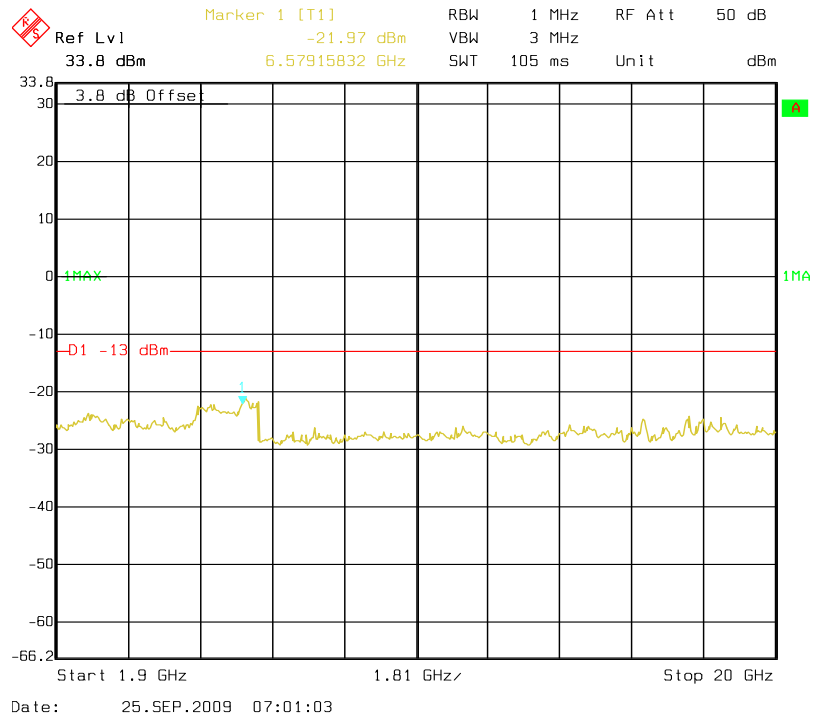
Date: 25.SEP.2009 02:51:57

1 – 1.9 GHz - Middle Channel (GSM)

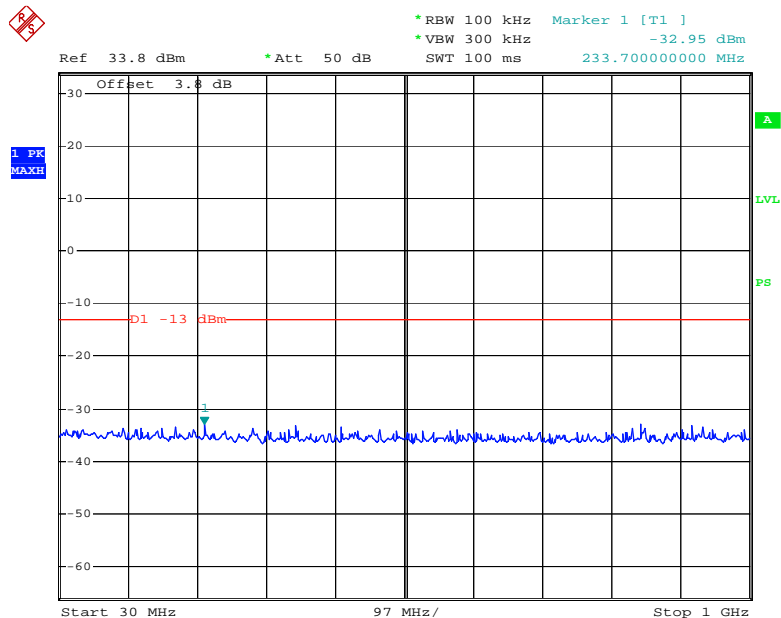


Date: 28.SEP.2009 07:41:13

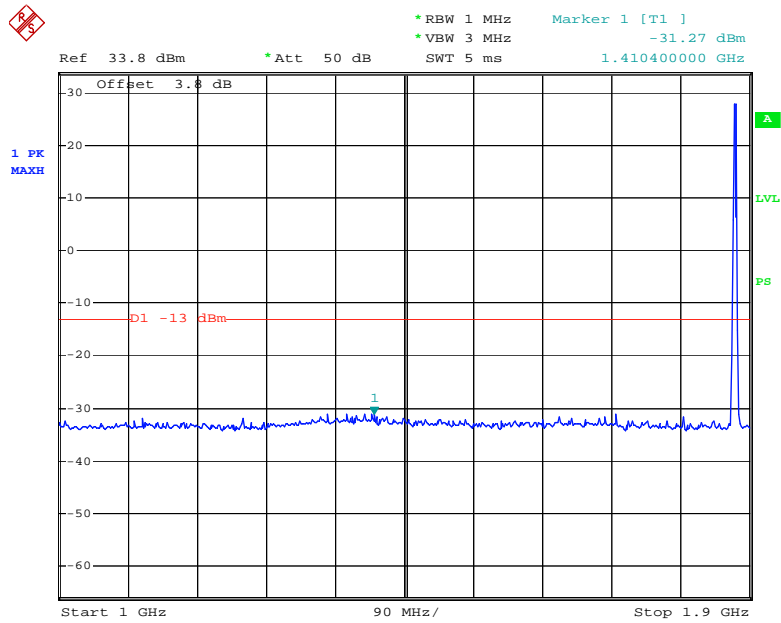
1.9 – 20 GHz - Middle Channel (GSM)



30 – 1000 MHz - Middle Channel (GPRS)

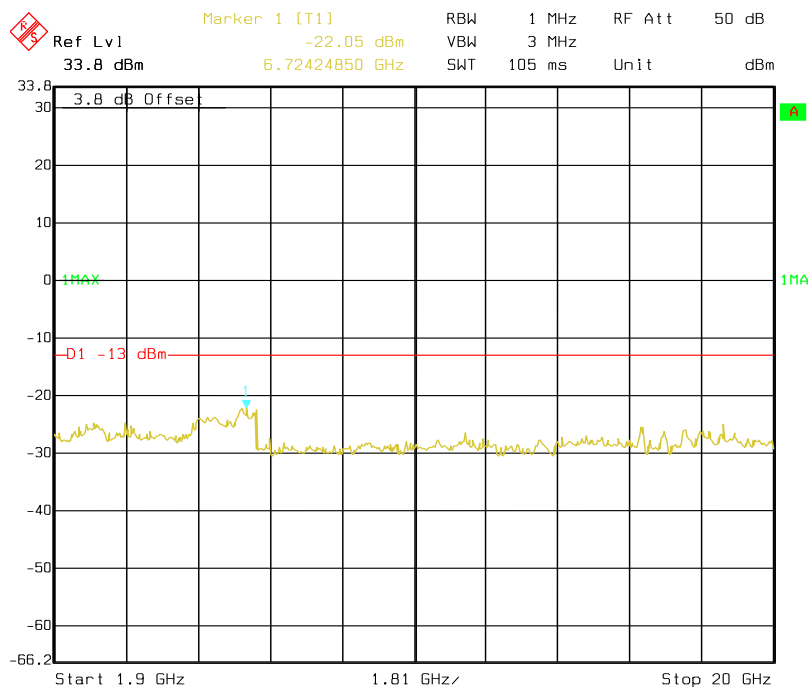


1 – 1.9 GHz - Middle Channel (GPRS)



Date: 28.SEP.2009 07:40:39

1.9 – 20 GHz - Middle Channel (GPRS)



Date: 26.SEP.2009 01:53:00

FCC §2.1053, §22.917 & §24.238 - SPURIOUS RADIATED EMISSIONS

Applicable Standards

CFR 47 § 2.1053, §22.917 and § 24.238.

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 Log₁₀ (power out in Watts)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Horn Antenna	DRH-118	A052604	2009-09-25	2010-09-25
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2009-03-11	2010-03-11
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2009-08-28	2010-08-27
HP	Preamplifier	8449B	3008A00277	2009-09-12	2010-09-11
HP	Signal Generator	HP8657A	2849U00982	2008-10-16	2009-10-15
HP	Amplifier	HP8447D	2944A09795	2009-08-02	2010-08-02
HP	Synthesized Sweeper	8341B	2624A00116	2008-11-07	2009-11-06
COM POWER	Dipole Antenna	AD-100	041000	2009-09-25	2010-09-25
A.H. System	Horn Antenna	SAS-200/571	135	2009-05-17	2010-05-17
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2009-05-09	2010-05-09

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data**Environmental Conditions**

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

The testing was performed by Kvass Yang on 2009-09-28.

Test mode: Transmitting

Below 1 GHz:**Cellular Band (Part 22H)**

Indicated		Table Angle Degree	Test Antenna		Substituted				Absolute Level (dBm)	FCC Limit (dBm)	Margin (dB)
Freq. (MHz)	S.A. Amp. (dBμV)		Height (m)	Polar (H/V)	Freq. (MHz)	Level (dBm)	Ant. Gain (dBi)	Cable Loss (dB)			
Middle Channel											
545.32	47.75	130	1.8	H	545.32	-53.23	0	0.68	-53.91	-13	40.91
765.34	46.49	175	1.9	H	765.34	-53.98	0	0.76	-54.74	-13	41.74
543.21	45.70	135	1.5	V	543.21	-54.12	0	0.68	-54.80	-13	41.80
764.26	44.32	225	1.4	V	764.26	-55.41	0	0.76	-56.17	-13	43.17

PCS Band (Part 24E)

Indicated		Table Angle Degree	Test Antenna		Substituted				Absolute Level (dBm)	FCC Limit (dBm)	Margin (dB)
Freq. (MHz)	S.A. Amp. (dBμV)		Height (m)	Polar (H/V)	Freq. (MHz)	Level (dBm)	Ant. Gain (dBi)	Cable Loss (dB)			
Middle Channel											
763.40	47.35	102	1.3	V	763.40	-51.23	0	0.76	-51.99	-13	38.99
705.52	45.14	0	1.2	V	705.52	-53.67	0	0.70	-54.37	-13	41.37
765.32	43.10	77	1.6	H	765.32	-55.47	0	0.76	-56.23	-13	43.23
709.25	42.32	158	1.8	H	709.25	-56.78	0	0.70	-57.48	-13	44.48

Above 1 GHz:**Cellular Band (Part 22H)**

Indicated		Table Angle Degree	Test Antenna		Substituted				Absolute Level (dBm)	FCC Limit (dBm)	Margin (dB)
Freq. (MHz)	S.A. Amp. (dBμV)		Height (m)	Polar (H/V)	Freq. (MHz)	Level (dBm)	Ant. Gain (dBi)	Cable Loss (dB)			
Middle Channel											
2509.8	56.43	0	1.2	V	2509.8	-43.21	7.3	1.19	-37.10	-13	24.10
2509.8	53.36	325	1.26	H	2509.8	-45.98	7.3	1.19	-39.87	-13	26.87
3346.6	52.45	232	1.0	V	3346.6	-52.78	6.7	1.38	-47.46	-13	34.46
1673.2	51.75	157	1.50	H	1673.2	-53.32	6.2	0.94	-48.06	-13	35.06
3346.6	50.78	147	1.5	H	3346.6	-54.46	6.7	1.38	-49.14	-13	36.14
1673.2	51.10	325	1.82	V	1673.2	-54.65	6.2	0.94	-49.39	-13	36.39

PCS Band (Part 24E)

Indicated		Table Angle Degree	Test Antenna		Substituted				Absolute Level (dBm)	FCC Limit (dBm)	Margin (dB)
Freq. (MHz)	S.A. Amp. (dBμV)		Height (m)	Polar (H/V)	Freq. (MHz)	Level (dBm)	Ant. Gain (dBi)	Cable Loss (dB)			
Middle Channel											
3760	65.76	290	2.0	V	3760	-38.48	6.9	1.47	-33.05	-13	20.05
3760	65.05	360	2.0	H	3760	-39.05	6.9	1.47	-33.62	-13	20.62
5640	59.31	210	1.6	V	5640	-44.57	8.3	1.76	-38.03	-13	25.03
5640	54.91	261	2.0	H	5640	-47.32	8.3	1.76	-40.78	-13	27.78
7520	49.09	154	1.6	V	7520	-51.61	7.6	2.09	-46.10	-13	33.10
7520	48.05	164	2.0	H	7520	-52.04	7.6	2.09	-46.53	-13	33.53

FCC §22.917(a) & §24.238(a) - BAND EDGES

Applicable Standards

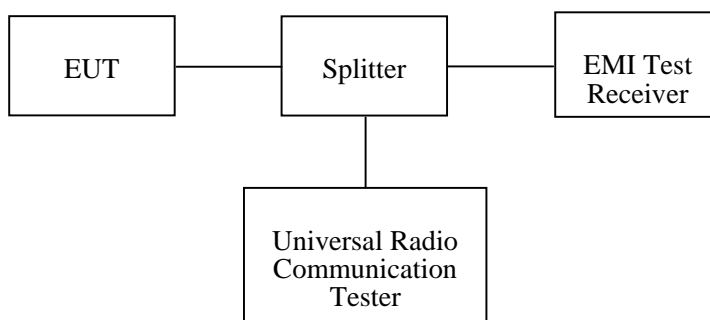
According to § 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

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.

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 3 kHz.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2008-11-07	2009-11-06
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2009-05-09	2010-05-09

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data

Environmental Conditions

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

The testing was performed by Kvass Yang on 2009-09-25 to 2009-09-26.

Please refer to the following tables and plots.

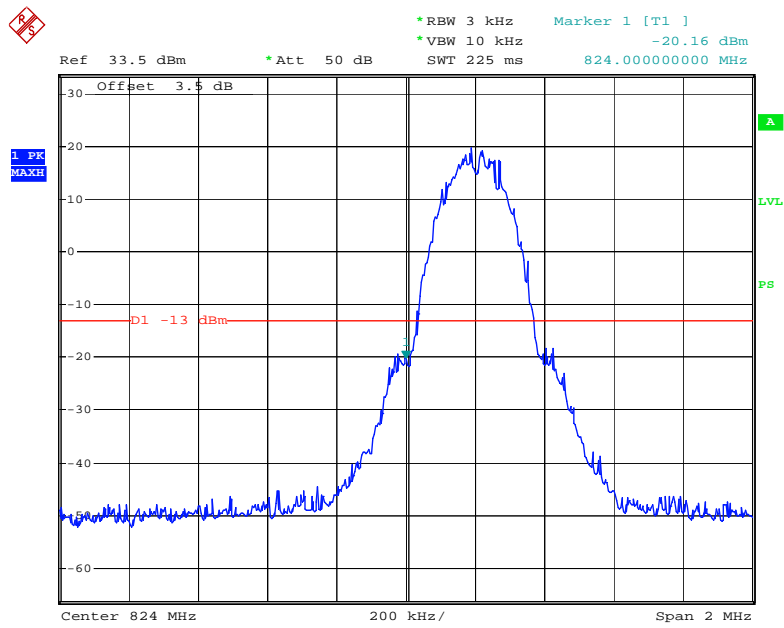
Cellular Band (Part 22H)

Mode	Frequency (MHz)	Emission (dBm)	Limit (dBm)
GSM	824	-20.16	-13
	849	-20.71	-13
GPRS	824	-15.17	-13
	849	-17.63	-13

PCS Band (Part 24E)

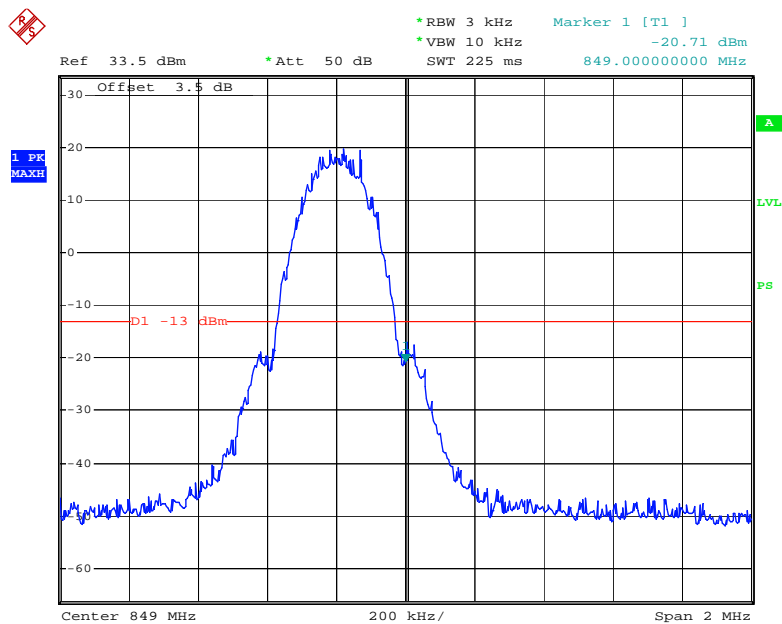
Mode	Frequency (MHz)	Emission (dBm)	Limit (dBm)
GSM	1850	-16.30	-13
	1910	-16.78	-13
GPRS	1850	-20.05	-13
	1910	-20.13	-13

Cellular Band, Left Channel (GSM)



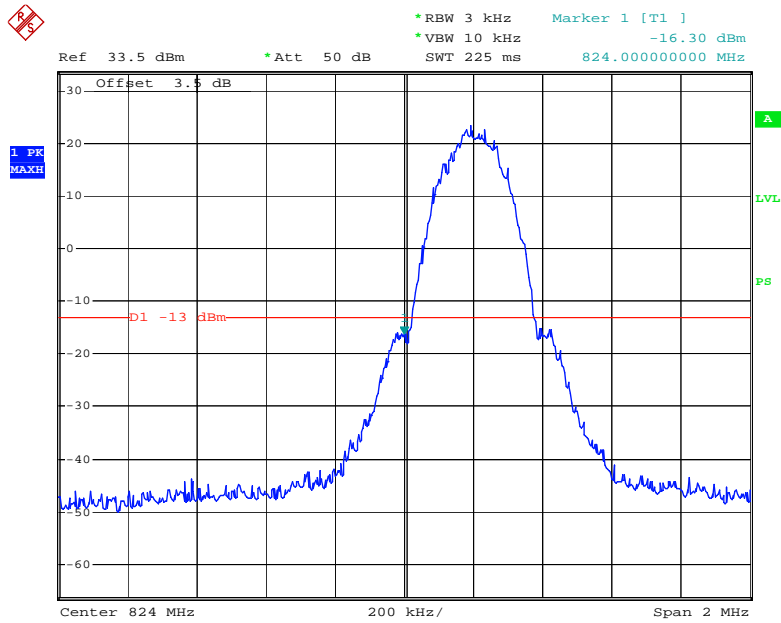
Date: 25.SEP.2009 02:42:52

Cellular Band, Right Channel (GSM)



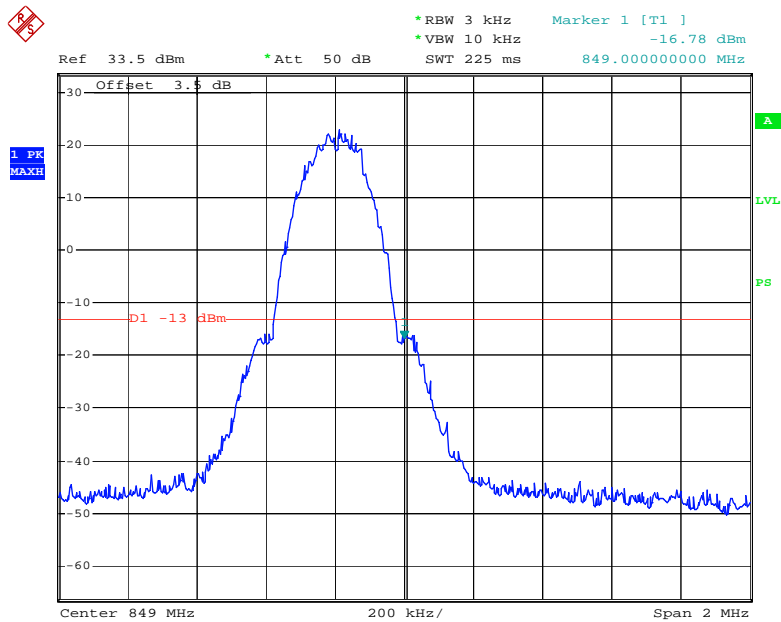
Date: 25.SEP.2009 02:41:55

Cellular Band, Left Channel (GPRS)



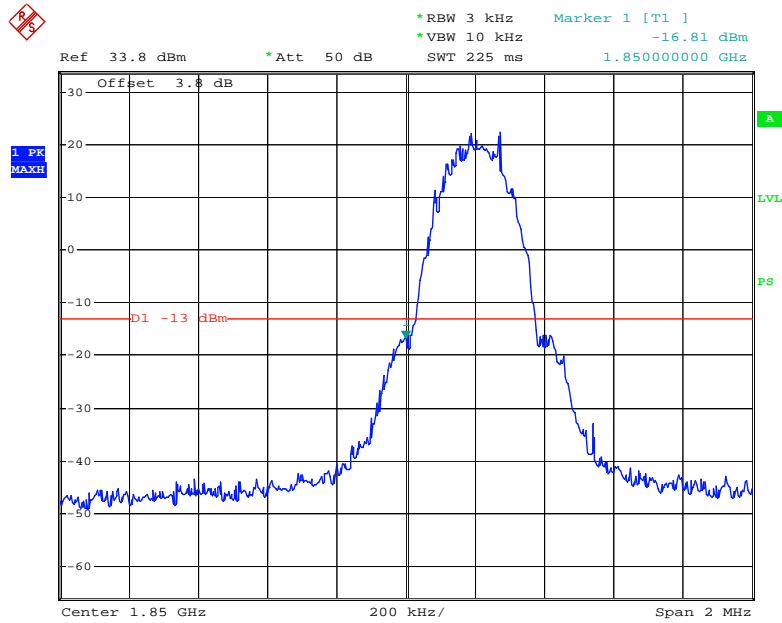
Date: 29.SEP.2009 07:26:06

Cellular Band, Right Channel (GPRS)



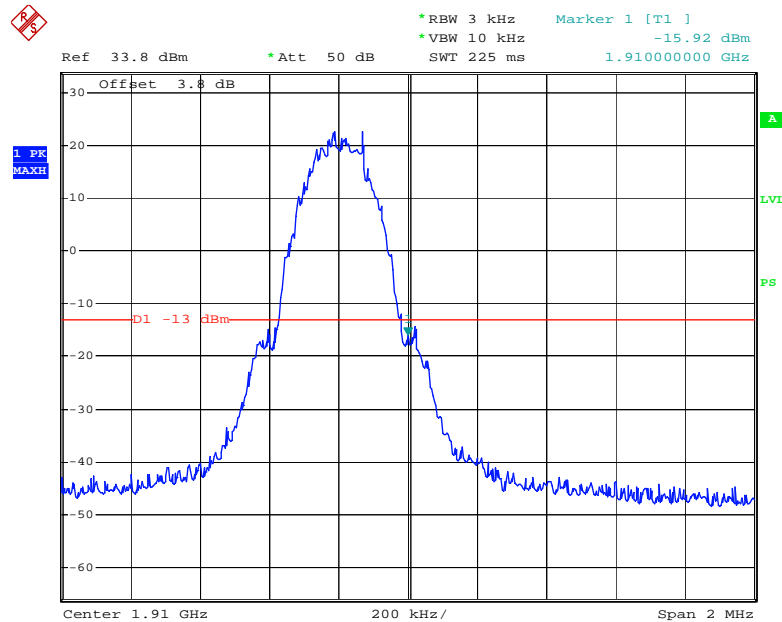
Date: 29.SEP.2009 07:41:24

PCS Band, Left Channel (GSM)



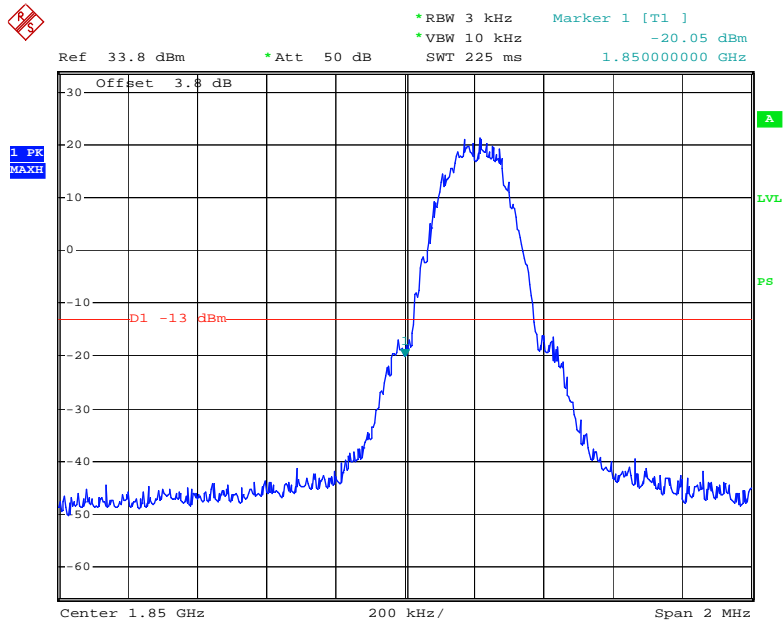
Date: 25.SEP.2009 02:37:13

PCS Band, Right Channel (GSM)



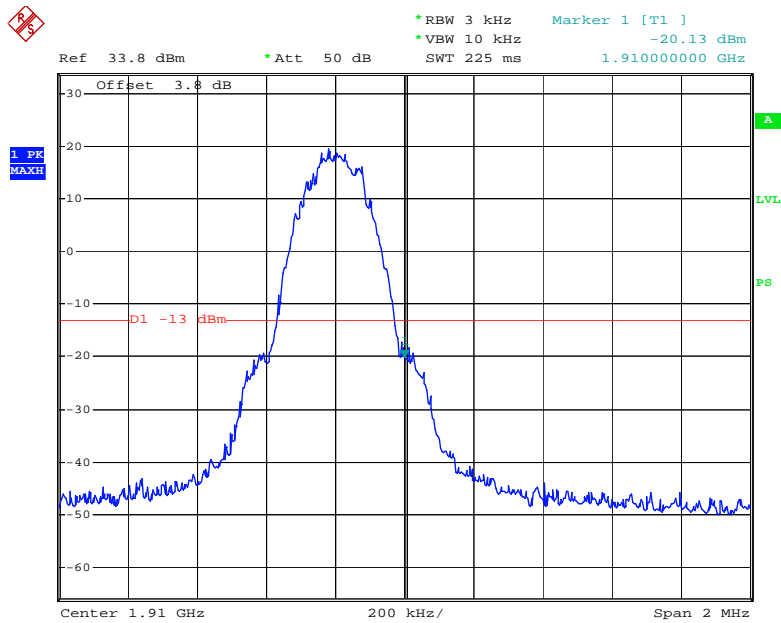
Date: 25.SEP.2009 02:34:34

PCS Band, Left Channel (GPRS)



Date: 26.SEP.2009 01:41:20

PCS Band, Right Channel (GPRS)



Date: 26.SEP.2009 01:39:43

FCC §2.1055, §22.355 & §24.235 - FREQUENCY STABILITY

Applicable Standard

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

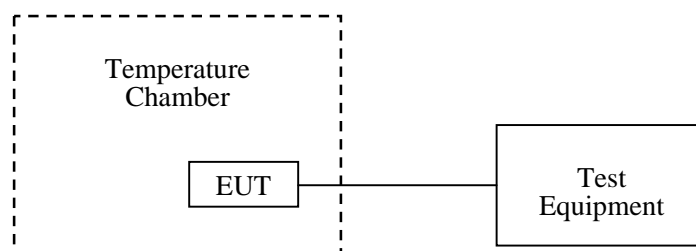
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
WUHUAN	Temperature & Humidity Chamber	HTP205	20021115	2009-05-09	2010-05-09
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	109038	2009-05-09	2010-05-09

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Data

Environmental Conditions

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

The testing was performed by Kvass Yang on 2009-09-27.

Cellular Band (Part 22H):

Middle Channel, fo = 836.6 MHz				
Temperature (°C)	Power Supplied (Vdc)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-20	12.0	-19	-0.0128	2.5
	10.2	-15	-0.0117	2.5
-10	12.0	-16	-0.0128	2.5
	10.2	-13	-0.0138	2.5
0	12.0	-12	-0.0101	2.5
	10.2	-18	-0.0128	2.5
10	12.0	-13	-0.0085	2.5
	10.2	-12	-0.0096	2.5
20	12.0	-9	-0.0154	2.5
	10.2	-15	-0.0133	2.5
30	12.0	-8	-0.0122	2.5
	10.2	-12	-0.0122	2.5
40	12.0	-11	-0.0170	2.5
	10.2	-15	-0.0138	2.5
55	12.0	-13	-0.0128	2.5
	10.2	-9	-0.0117	2.5

PCS Band (Part 24E):

Middle Channel, fo = 1880 MHz				
Temperature (°C)	Power Supplied (Vdc)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-20	12.0	-46	-0.0550	2.5
	10.2	-47	-0.0562	2.5
-10	12.0	-49	-0.0586	2.5
	10.2	-46	-0.0550	2.5
0	12.0	-49	-0.0586	2.5
	10.2	-45	-0.0538	2.5
10	12.0	-41	-0.0490	2.5
	10.2	-46	-0.0550	2.5
20	12.0	-47	-0.0562	2.5
	10.2	-41	-0.0490	2.5
30	12.0	-46	-0.0550	2.5
	10.2	-45	-0.0538	2.5
40	12.0	-46	-0.0550	2.5
	10.2	-49	-0.0586	2.5
55	12.0	-43	-0.0514	2.5
	10.2	-45	-0.0538	2.5

DECLARATION LETTER



Company Address: 5/F, Building, Software Park, No.2 GaoxinC. 3rd Road, Hi-Tech, Industrial Park,
Nanshan, shenzhen
Tel: (0755) 86185127
Fax:(0755) 86169366

Product Similarity Declaration

To Whom It May Concern,

We, ShenZhen CASTEL Wireless Telecommunications Co., Ltd., hereby declare that our Mobile positioning information platform, Model Number: MPIP-618A/ MPIP-618B/ MPIP-618C/MPIP-618D/MPIP-618T/MPIP-618W/ TCU-618 are electrically identical with the Model Number: TCU-618 that was certified by BAEL. MPIP-618A/ MPIP-618B/ MPIP-618C/MPIP-618D/MPIP-618T/MPIP-618W/ TCU-618 are named differently due to marketing purposes.

Please contact me if you have any question.

Signature: *Ling Li*

Print Name: Ling Li

Title: Standardization Engineer

Date:2009-9-25

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