

FCC PART 22H, PART 24E  
MEASUREMENT AND TEST REPORT

For

**i.safe MOBILE GmbH**

i\_PARK TAUBERFRANKEN 14 97922 Lauda-Koenigshofen, Germany

**FCC ID: 2AACZ-INNOVATION2X**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Mobile phone
<b>Test Engineer:</b> Dean Liu	
<b>Report Number:</b> RDG140805004-00C	
<b>Report Date:</b> 2014-11-17	
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FINAL

## GENERAL INFORMATION

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### Product Description for Equipment under Test (EUT)

The *i.safe MOBILE GmbH*'s product, model number: *INNOVATION2.0 (FCC ID: 2AACZ-INNOVATION2X)* (or the "EUT") in this report was a *Mobile phone*, which was measured approximately: 12.3 cm (L) x 7.0 cm (W) x 3.0 cm (H), rated input voltage: DC3.7 V rechargeable Li-ion or DC5V charging from adapter.

Adapter information: RugGear  
Model: ICP12-050-2000B  
Input: 100-240V~50/60Hz, 0.3A  
Output: DC5.0V, 2000mA

*\* All measurement and test data in this report was gathered from production sample serial number: 1020.1201.0540 (Assigned by applicant). The EUT was received on 2014-08-08.*

### Objective

This report is prepared on behalf of *i.safe MOBILE GmbH* in accordance with Part 2-Subpart J, Part 22-Subpart H, and Part 24-Subpart E of the Federal Communications Commission's rules.

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

### Related Submittal(s)/Grant(s)

FCC Part 15B JBP submissions with FCC ID: 2AACZ-INNOVATION2X.  
FCC Part15C DSS submissions with FCC ID: 2AACZ-INNOVATION2X.  
FCC Part15C DTS submissions with FCC ID: 2AACZ-INNOVATION2X.

### 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-D-2010, ANSI C63.4-2003.

All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratories Corp.(Dongguan).

**Test Facility**

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communications 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 February 02, 2012. 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.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

## SYSTEM TEST CONFIGURATION

### Justification

The EUT was configured for testing according to TIA/EIA-603-D-2010.

The test items were performed with the EUT operating at testing mode.

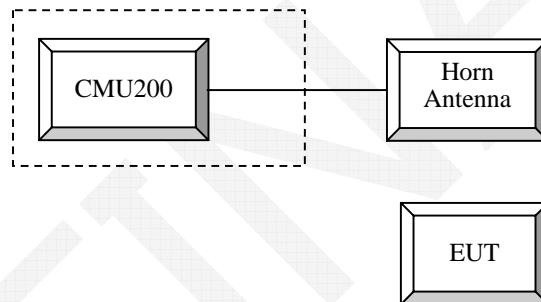
### Equipment Modifications

No modification was made to the EUT.

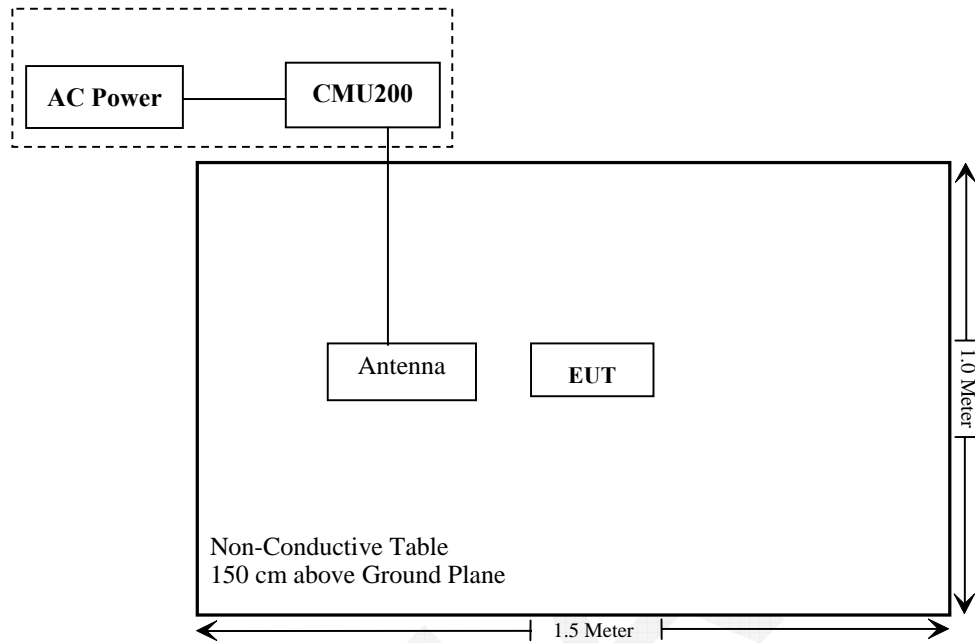
### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
R & S	Universal Radio Communication Tester	CMU200	109038

### Configuration of Test Setup



## Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

FCC Rules	Description of Test	Result
§1.1310, §2.1093	RF Exposure	Compliance
§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



## **FCC §1.1310 & §2.1093- RF EXPOSURE**

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### **Applicable Standard**

FCC§1.1310 and §2.1093.

### **Test Result**

Compliant, please refer to the SAR report: RDG140805004-20.

FINAL

## **FCC §2.1047 - MODULATION CHARACTERISTIC**

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

FINAL

**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), 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..

**Test Procedure****GSM**

Function: Menu select > GSM Mobile Station > GSM 850/1900  
Press Connection control to choose the different menus  
Press RESET > choose all the reset all settings  
Connection Press Signal Off to turn off the signal and change settings  
Network Support > GSM + only  
MS Signal  
    > 33 dBm for GSM 850  
    > 30 dBm for GSM 1900  
BS Signal Enter the same channel number for TCH channel (test channel) and BCCH channel  
Frequency Offset > + 0 Hz  
Mode > BCCH and TCH  
BCCH Level > -85 dBm (May need to adjust if link is not stable)  
BCCH Channel > choose desire test channel [Enter the same channel number for TCH channel (test channel) and BCCH channel]  
Channel Type > Off  
P0 > 4 dB  
TCH > choose desired test channel  
Hopping > Off  
AF/RF Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input  
Connection Press Signal on to turn on the signal and change settings

**GPRS**

Function: Menu select > GSM Mobile Station > GSM 850/1900  
Press Connection control to choose the different menus  
Press RESET > choose all the reset all settings  
Connection Press Signal Off to turn off the signal and change settings  
Network Support > GSM + GPRS or GSM + EGSM  
Main Service > Packet Data  
Service selection > Test Mode A – Auto Slot Config. off  
MS Signal Press Slot Config Bottom on the right twice to select and change the number of time slots and power setting  
    > Slot configuration > Uplink/Gamma  
    > 33 dBm for GPRS 850  
    > 30 dBm for GPRS 1900  
BS Signal Enter the same channel number for TCH channel (test channel) and BCCH channel  
Frequency Offset > + 0 Hz  
Mode > BCCH and TCH  
BCCH Level > -85 dBm (May need to adjust if link is not stable)  
BCCH Channel > choose desire test channel [Enter the same channel number for TCH channel (test channel) and BCCH channel]

Channel Type > Off  
 P0 > 4 dB  
 Slot Config > Unchanged (if already set under MS signal)  
 TCH > choose desired test channel  
 Hopping > Off  
 Main Timeslot > 3  
 Network Coding Scheme > CS4 (GPRS)  
 Bit Stream > 2E9-1 PSR Bit Stream  
 AF/RF Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input  
 Connection Press Signal on to turn on the signal and change settings

*Radiated method:*

ANSI/TIA 603-D section 2.2.17

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2014-05-09	2015-05-09
Sunol Sciences	Antenna	JB3	A060611-3	2014-07-28	2017-07-27
HP	Amplifier	8447E	2434A02181	2014-09-01	2015-09-01
R&S	Spectrum Analyzer	FSEM	DE31388	2014-05-09	2015-05-09
ETS LINDGREN	Horn Antenna	3115	000 527 35	2012-09-06	2015-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2014-02-19	2015-02-19
Giga	Signal Generator	1026	320408	2014-05-09	2015-05-09
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
TDK RF	Horn Antenna	HRN-0118	130 084	2012-09-06	2015-09-06

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

### Test Data

#### Environmental Conditions

Temperature:	28.4 °C
Relative Humidity:	57%
ATM Pressure:	100.5 kPa

*The testing was performed by Dean Liu on 2014-08-21*

**Conducted Power:****Cellular Band (Part 22H) & PCS Band (Part 24E)**

Band	Channel No.	Peak Output Power (dBm)								
		GSM	GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot	EDGE 1 TX Slot	EDGE 2 TX Slot	EDGE 3 TX Slot	EDGE 4 TX Slot
Cellular	128	31.52	31.50	30.56	28.87	28.09	25.32	23.97	21.80	20.64
	190	31.37	31.37	30.42	28.69	27.89	25.19	23.86	21.57	20.29
	251	31.24	31.23	30.31	28.55	27.78	25.03	23.68	21.55	20.25
PCS	512	28.40	28.42	27.37	25.58	24.90	24.83	23.36	21.22	19.94
	661	28.43	28.44	27.40	25.58	24.86	24.47	22.75	21.00	19.57
	810	28.32	28.34	27.31	25.53	24.82	23.94	22.28	20.27	19.03

**WCDMA Band II**

Mode	3GPP Sub Test	Average Output Power (dBm)					
		Low Channel (Ave. Power)	Low Channel (PAR)	Middle Channel (Ave. Power)	Middle Channel (PAR)	High Channel (Ave. Power)	High Channel (PAR)
Rel 99	1	21.19	3.19	21.06	3.10	20.84	2.02
HSDPA	1	21.03	3.16	21.04	3.24	20.52	2.08
	2	21.10	3.15	20.65	3.26	20.58	2.14
	3	21.09	3.21	20.87	3.17	20.47	3.01
	4	21.04	3.15	20.96	3.18	20.43	2.85
HSUPA	1	21.11	3.21	21.01	3.26	20.44	2.67
	2	21.12	3.08	20.93	3.16	20.31	2.06
	3	21.06	3.09	20.84	3.13	20.32	2.15
	4	21.07	3.14	20.58	3.23	20.42	2.10
	5	20.96	3.16	20.76	3.17	20.34	2.04

Note: peak-to-average ratio (PAR) &lt;13 dB

## ERP &amp; EIRP

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
GSM 850								
824.200	H	90.31	15.3	0.0	1.0	14.3	38.45	24.2
824.200	V	103.42	31.5	0.0	1.0	30.5	38.45	8.0
836.600	H	90.15	15.2	0.0	1.0	14.2	38.45	24.3
836.600	V	104.02	32.2	0.0	1.0	31.2	38.45	7.3
848.800	H	91.06	16.2	0.0	1.0	15.2	38.45	23.3
848.800	V	104.28	32.6	0.0	1.0	31.6	38.45	6.9
PCS 1900								
1850.200	H	90.15	18.3	11.4	1.4	28.3	33.0	4.7
1850.200	V	87.42	15.5	11.4	1.4	25.5	33.0	7.5
1880.000	H	90.06	18.5	11.7	1.4	28.8	33.0	4.2
1880.000	V	87.46	16.0	11.7	1.4	26.3	33.0	6.7
1909.800	H	89.56	18.2	11.8	1.4	28.6	33.0	4.4
1909.800	V	87.37	16.3	11.8	1.4	26.7	33.0	6.3
EGPRS 850								
824.200	H	89.31	14.3	0.0	1.0	13.3	38.45	25.2
824.200	V	97.87	25.9	0.0	1.0	24.9	38.45	13.6
836.600	H	88.96	14.0	0.0	1.0	13.0	38.45	25.5
836.600	V	97.91	26.1	0.0	1.0	25.1	38.45	13.4
848.800	H	88.03	13.2	0.0	1.0	12.2	38.45	26.3
848.800	V	97.67	26.0	0.0	1.0	25.0	38.45	13.5
EGPRS 1900								
1850.200	H	85.78	13.9	11.4	1.4	23.9	33.0	9.1
1850.200	V	82.06	10.1	11.4	1.4	20.1	33.0	12.9
1880.000	H	84.79	13.2	11.7	1.4	23.5	33.0	9.5
1880.000	V	81.36	9.9	11.7	1.4	20.2	33.0	12.8
1909.800	H	84.71	13.4	11.8	1.4	23.8	33.0	9.2
1909.800	V	80.96	9.9	11.8	1.4	20.3	33.0	12.7
WCDMA Band II								
1852.400	H	82.31	10.5	11.5	1.4	20.6	33.0	12.4
1852.400	V	79.52	7.6	11.5	1.4	17.7	33.0	15.3
1880.000	H	82.05	10.5	11.7	1.4	20.8	33.0	12.2
1880.000	V	78.61	7.2	11.7	1.4	17.5	33.0	15.5
1907.600	H	81.49	10.1	11.8	1.4	20.5	33.0	12.5
1907.600	V	78.44	7.4	11.8	1.4	17.8	33.0	15.2

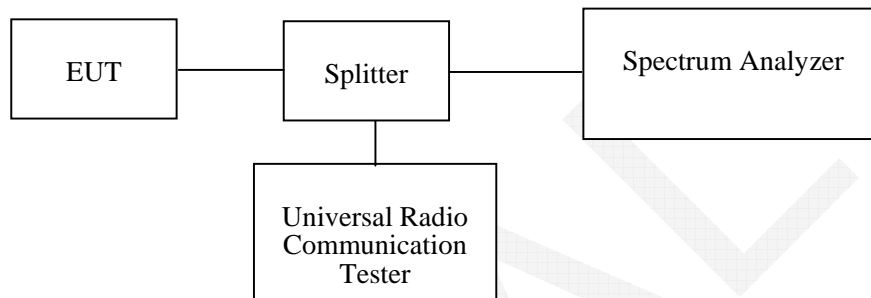
**FCC §2.1049, §22.917, §22.905 & §24.238 - OCCUPIED BANDWIDTH****Applicable Standard**

FCC §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 26 dB & 99% bandwidth was recorded.

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

**Test Data****Environmental Conditions**

Temperature:	29.1 °C
Relative Humidity:	62 %
ATM Pressure:	101 kPa

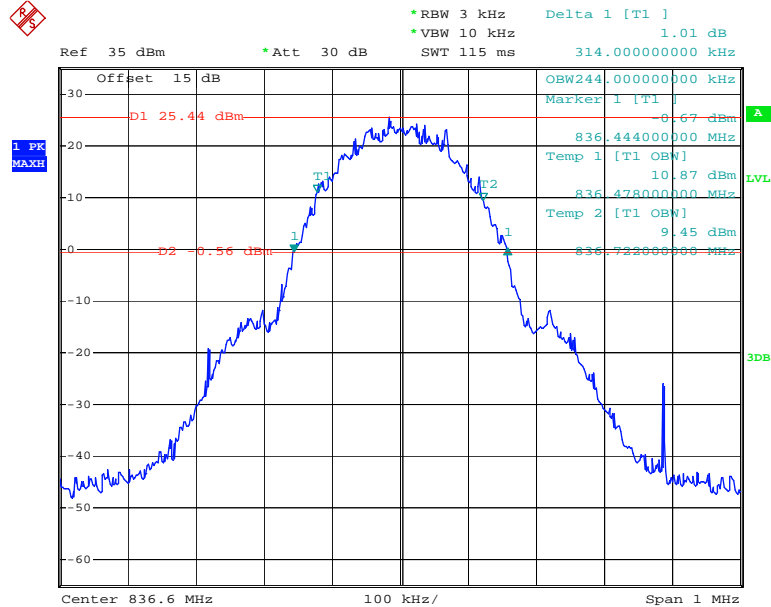
*The testing was performed by Dean Liu on 2014-09-13.*

Band	Channel No.	Mode	99% Occupied Bandwidth (kHz)	26 dB Occupied Bandwidth (kHz)
Cellular	190	GSM	244	314
		EGPRS	246	314
PCS	661	GSM	244	316
		EGPRS	246	316
WCDMA Band II	9400	Rel 99	4180	4700
	9400	HSDPA	4180	4740
	9400	HSUPA	4180	4740



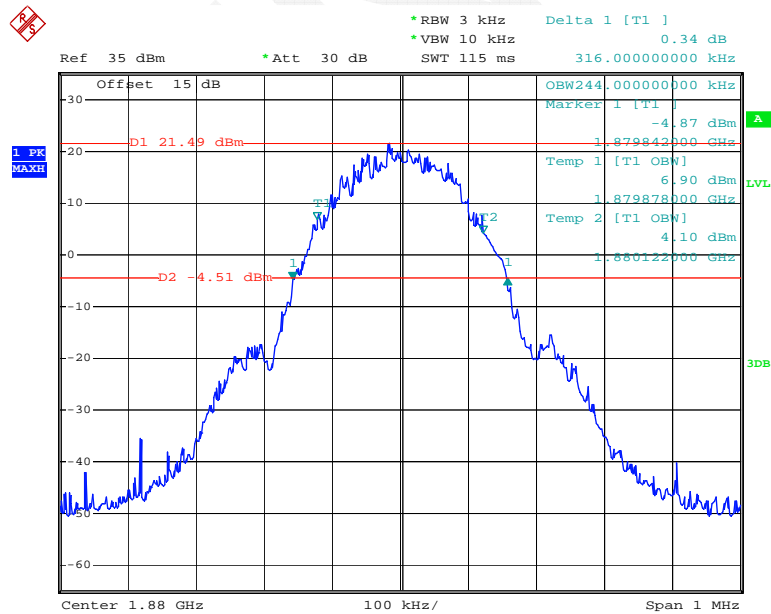
Please refer to the following plots.

### GMSK Cellular Band



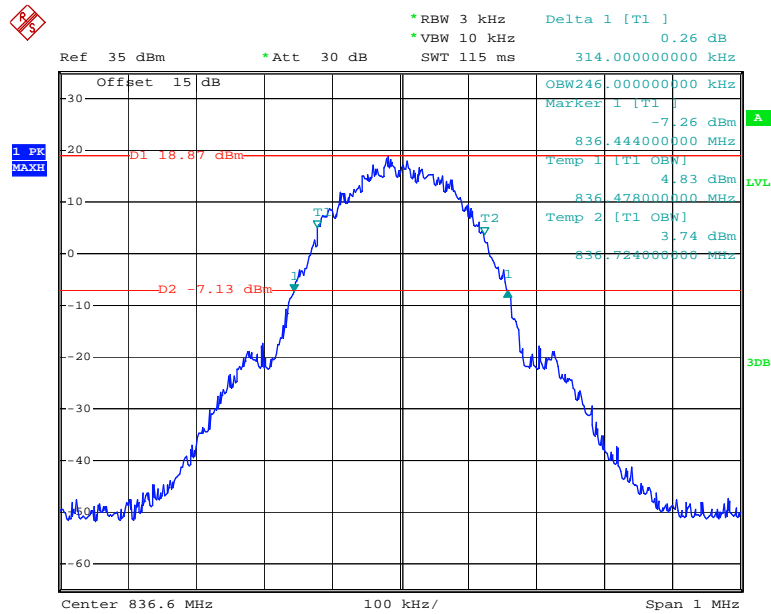
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### GMSK PCS Band



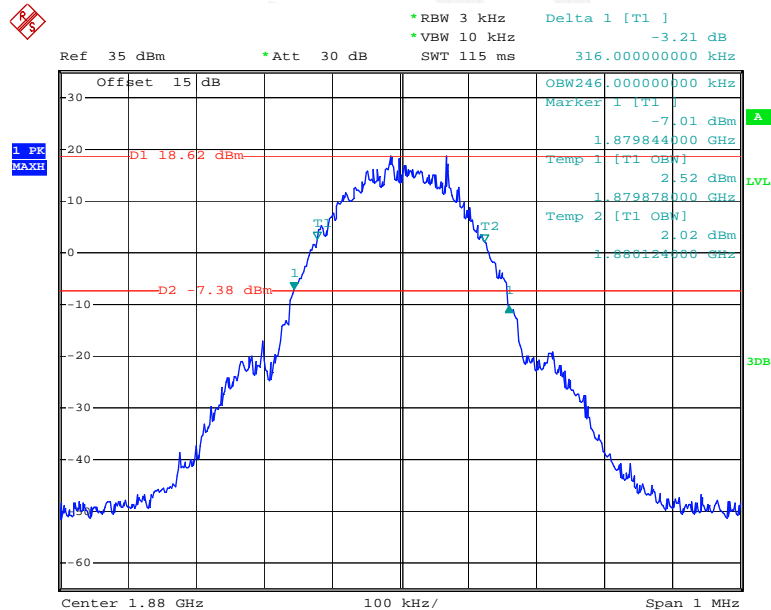
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## 8PSK Cellular Band



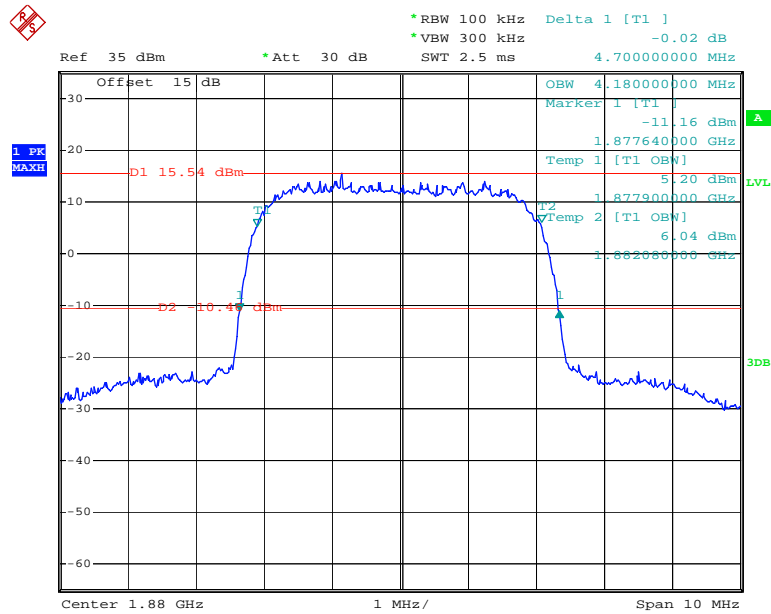
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## 8PSK PCS Band



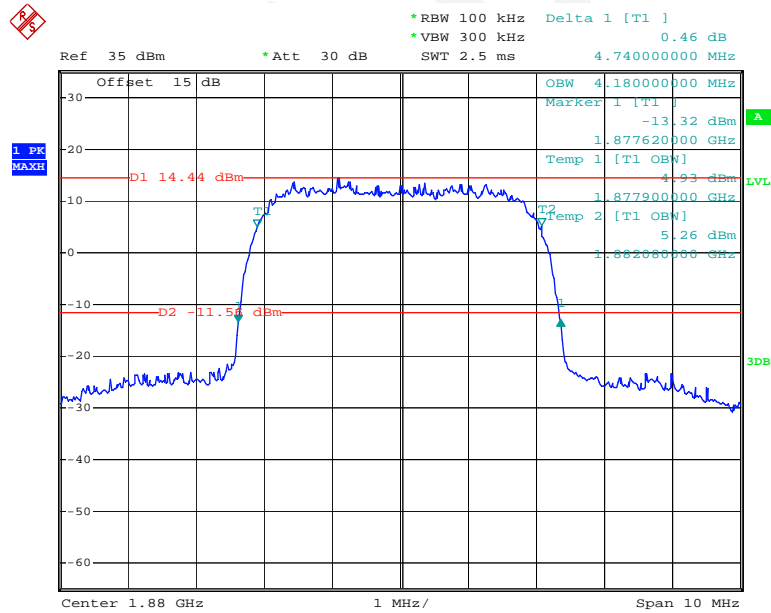
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## WCDMA Band II



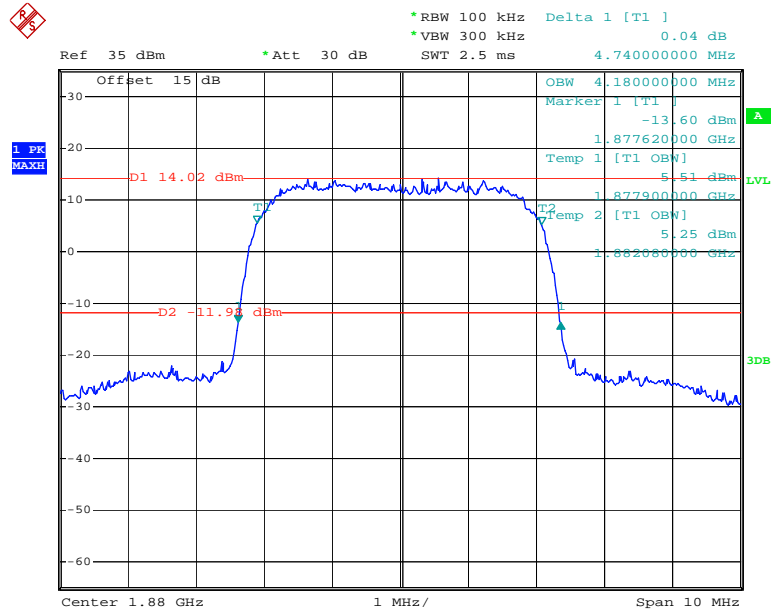
Date: 13.SEP.2014 12:45:27

## HSDPA Band II



Date: 13.SEP.2014 12:48:46

# HSUPA Band II



Date: 13.SEP.2014 12:54:32

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

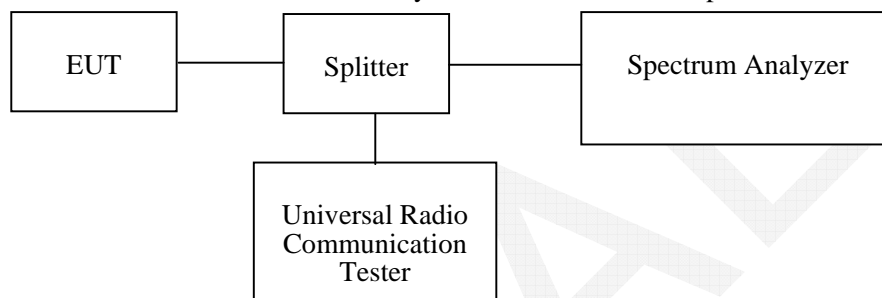
### Applicable Standard

FCC §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. Sufficient scans were taken to show any out of band emissions up to 10<sup>th</sup> harmonic.



### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

### Test Data

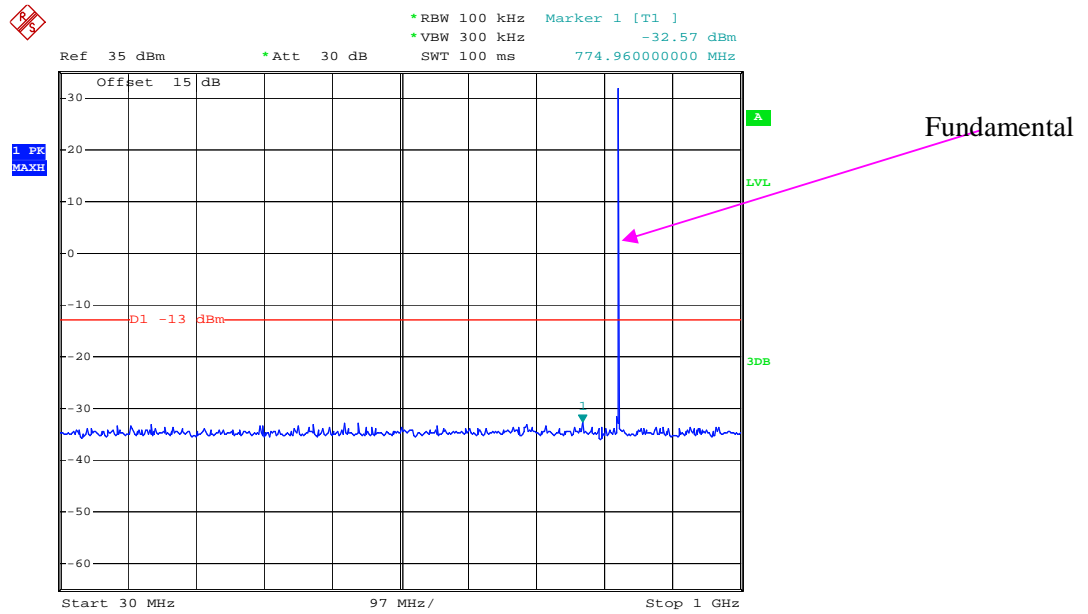
#### Environmental Conditions

Temperature:	29.1 °C
Relative Humidity:	62 %
ATM Pressure:	101 kPa

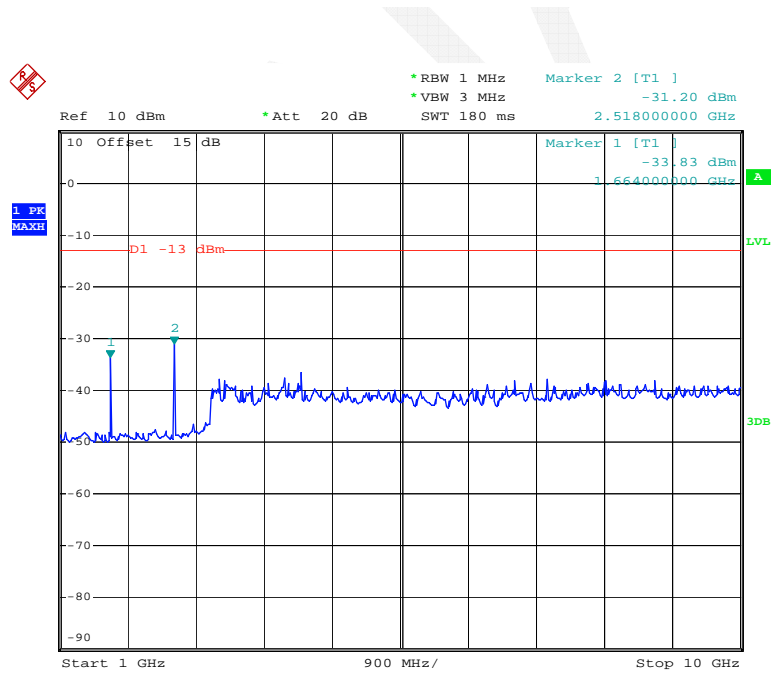
*The testing was performed by Dean Liu on 2014-09-13*

Please refer to the following plots.

### GMSK, GSM850\_Low Channel

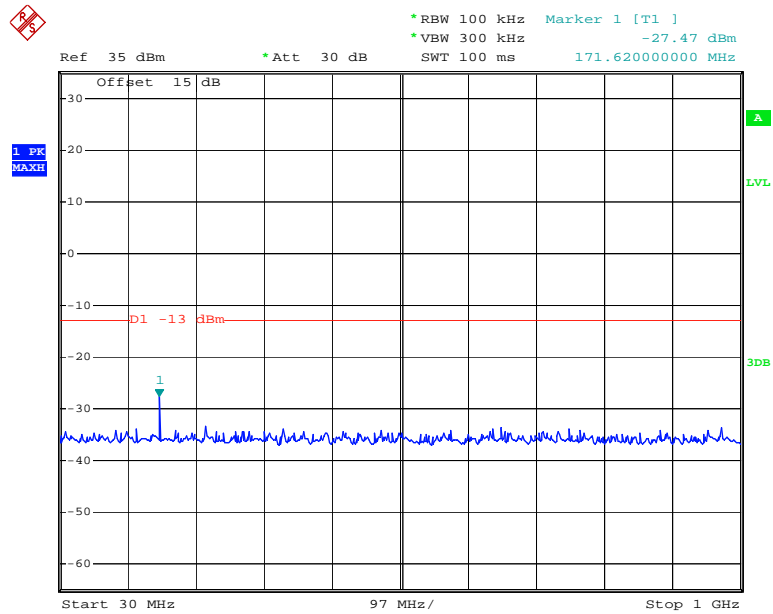


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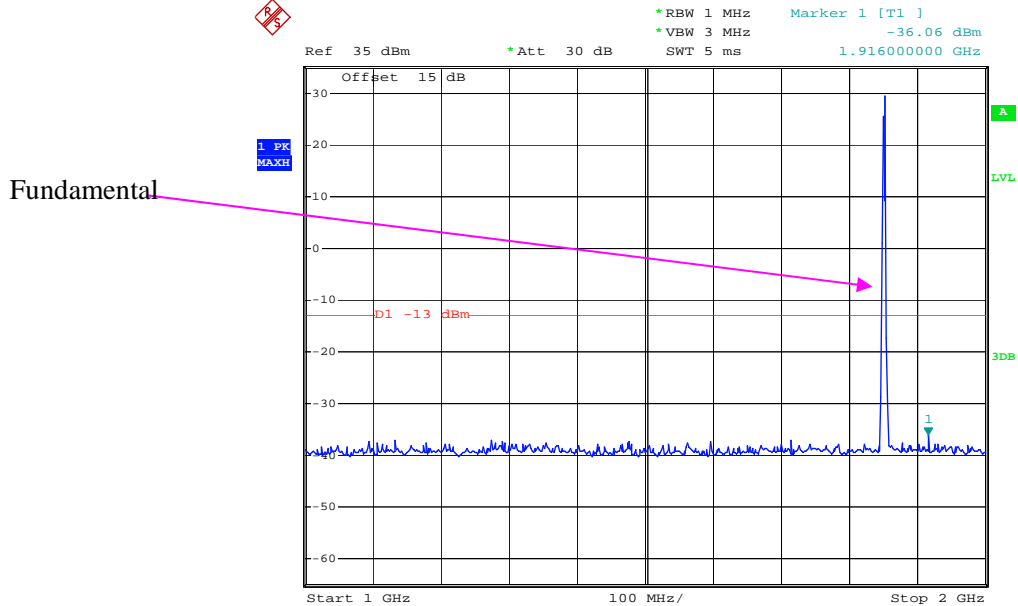


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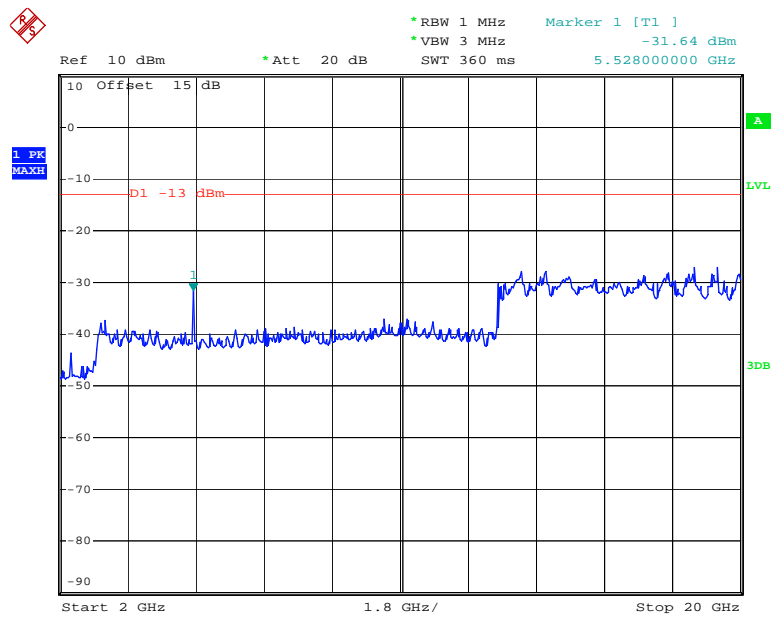
### GMSK, PCS 1900\_Middle Channel



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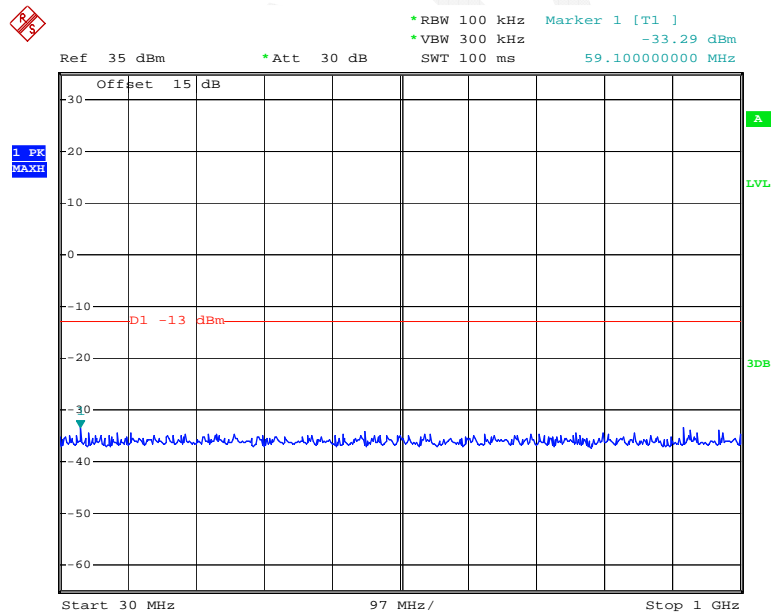


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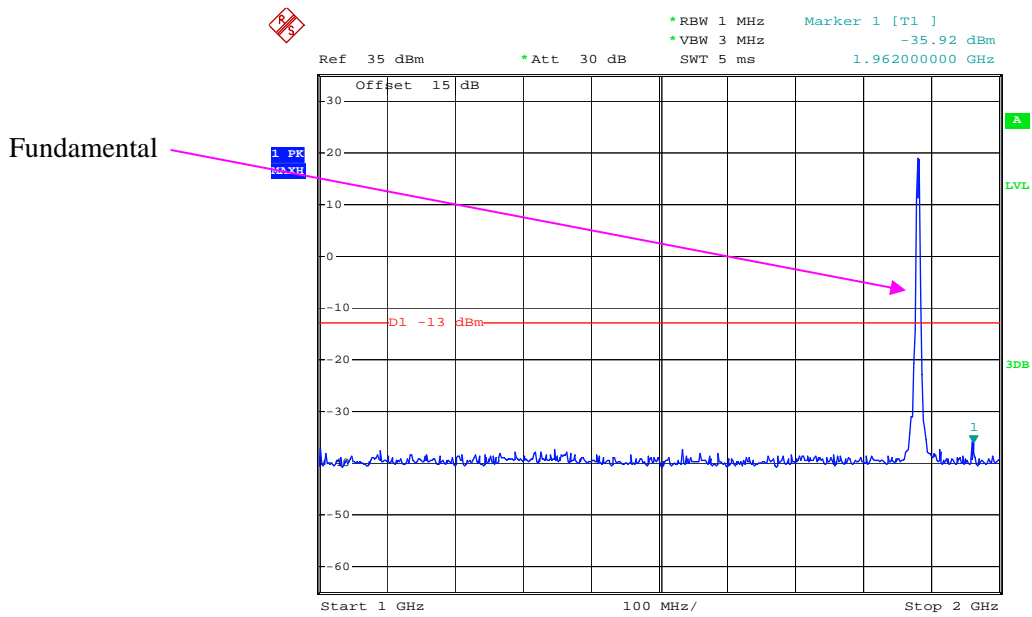
Date: 13.SEP.2014 11:43:27

### WCDMA Band II\_Low Channel

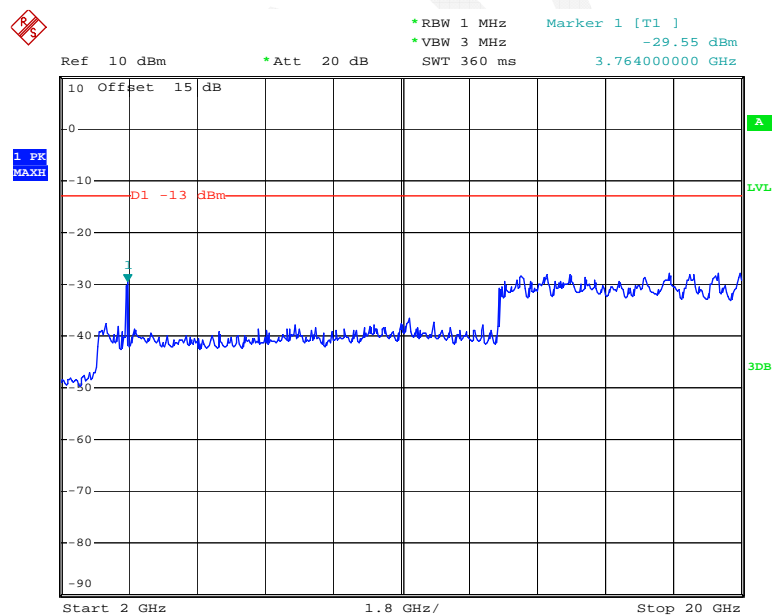


Date: 13.SEP.2014 12:55:39



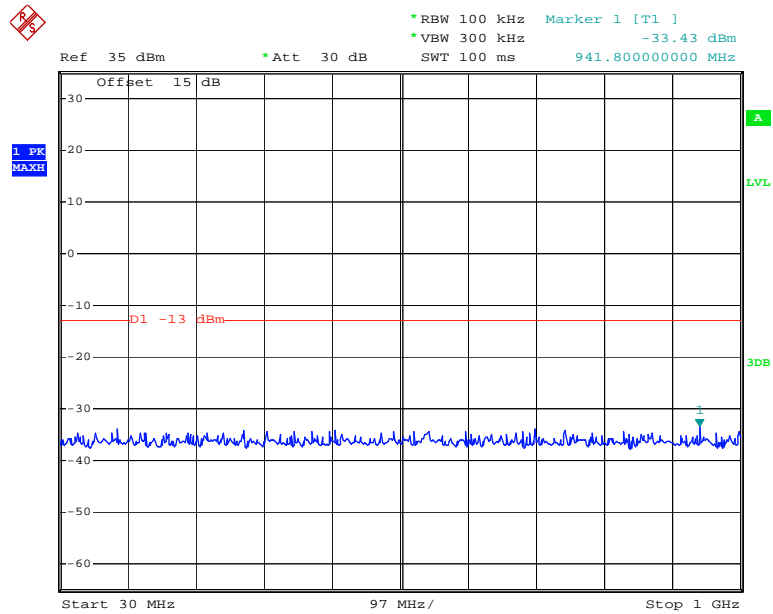


Date: 13.SEP.2014 12:57:32

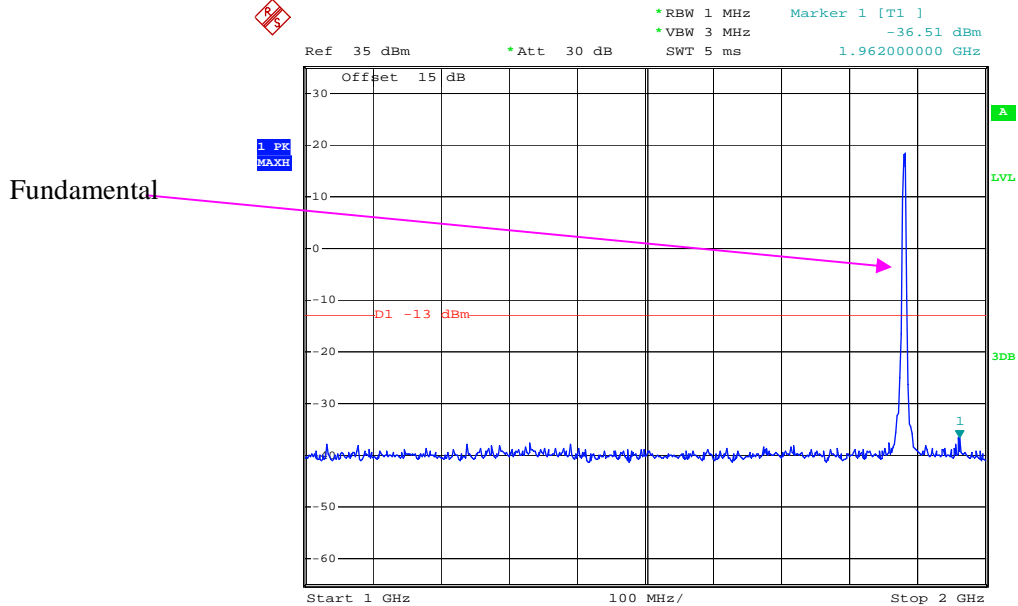


Date: 13.SEP.2014 12:59:07

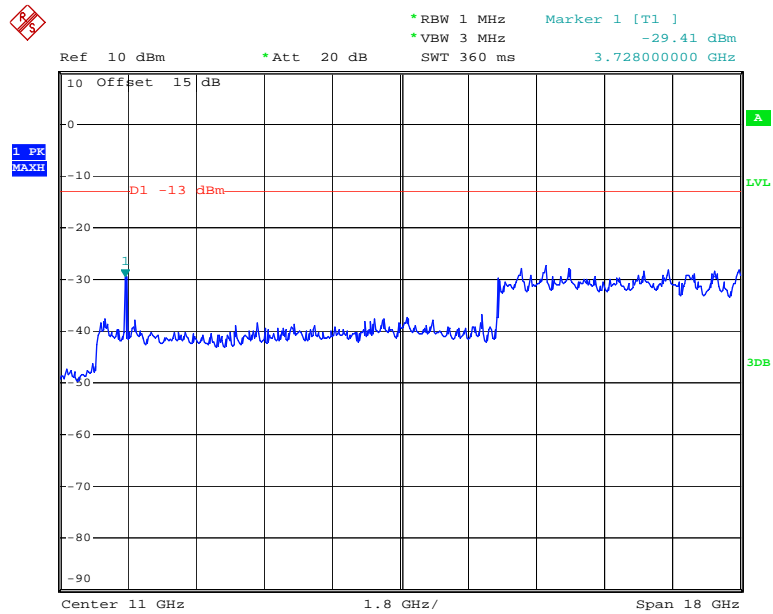
### Band II HSDPA\_Low Channel



Date: 13.SEP.2014 13:21:52

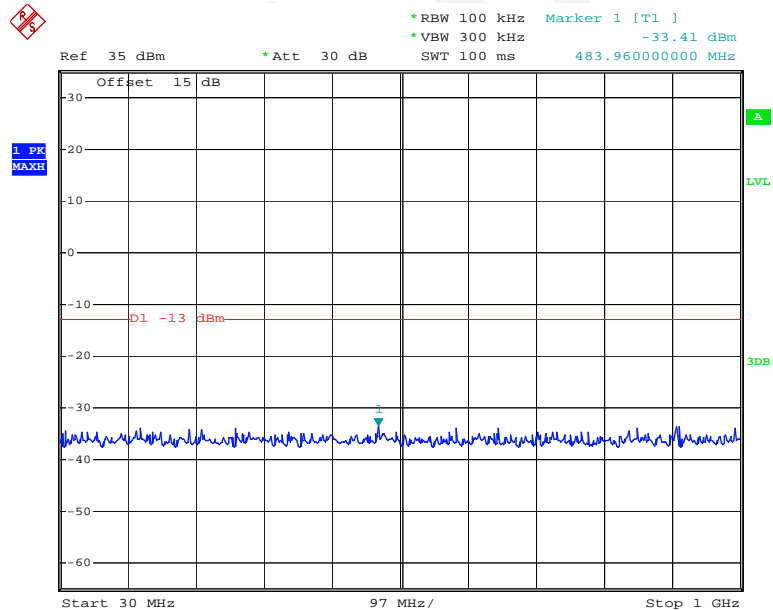


Date: 13.SEP.2014 13:21:11

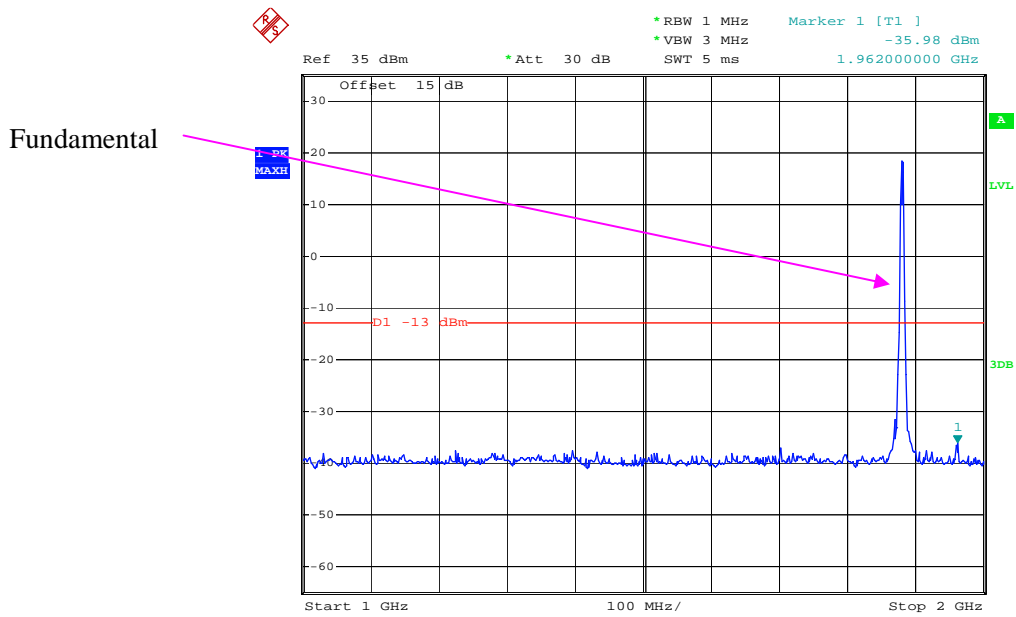


Date: 13.SEP.2014 13:22:09

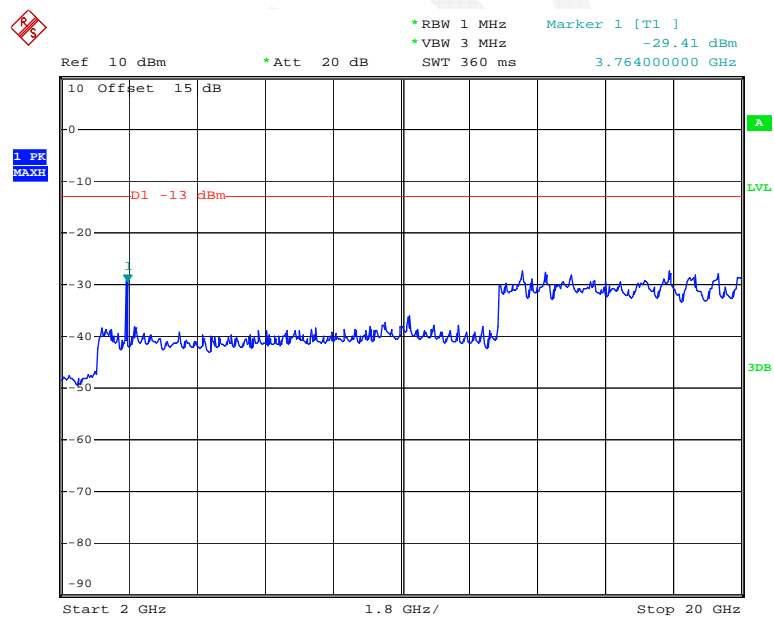
### Band II HSUPA\_Low Channel



Date: 13.SEP.2014 13:26:38



Date: 13.SEP.2014 13:27:05



Date: 13.SEP.2014 13:29:11

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

### Applicable Standard

FCC § 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 =  $10 \lg(\text{TXpwr in Watts}/0.001)$  – the absolute level

Spurious attenuation limit in dB =  $43 + 10 \log_{10}(\text{power out in Watts})$

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2014-05-09	2015-05-09
Sunol Sciences	Antenna	JB3	A060611-3	2014-07-28	2017-07-27
HP	Amplifier	8447E	2434A02181	2014-09-01	2015-09-01
R&S	Spectrum Analyzer	FSEM	DE31388	2014-05-09	2015-05-09
ETS LINDGREN	Horn Antenna	3115	000 527 35	2012-09-06	2015-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2014-02-19	2015-02-19
Giga	Signal Generator	1026	320408	2014-05-09	2015-05-09
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
TDK RF	Horn Antenna	HRN-0118	130 084	2012-09-06	2015-09-06

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

**Test Data****Environmental Conditions**

<b>Temperature:</b>	26.3 °C
<b>Relative Humidity:</b>	52 %
<b>ATM Pressure:</b>	100.1 kPa

The testing was performed by Dean Liu on 2014-09-13

EUT Operation Mode: Transmitting

**Cellular Band**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
Frequency:824.200 MHz								
1648.400	H	64.10	-37	10.5	1.5	-28.0	-13.0	15.0
1648.400	V	72.36	-29.2	10.5	1.5	-20.2	-13.0	7.2
2472.600	H	58.31	-39.7	12.9	2.6	-29.4	-13.0	16.4
2472.600	V	62.01	-34.7	12.9	2.6	-24.4	-13.0	11.4
799.240	H	40.12	-51.7	0.0	0.9	-52.6	-13.0	39.6
799.240	V	34.25	-55.1	0.0	0.9	-56.0	-13.0	43.0
Frequency:836.600 MHz								
1673.200	H	64.52	-36.6	10.6	1.5	-27.5	-13.0	14.5
1673.200	V	72.44	-28.9	10.6	1.5	-19.8	-13.0	6.8
2509.800	H	60.32	-37.7	13.1	2.8	-27.4	-13.0	14.4
2509.800	V	63.04	-34.1	13.1	2.8	-23.8	-13.0	10.8
799.340	H	40.10	-51.7	0.0	0.9	-52.6	-13.0	39.6
799.340	V	35.41	-53.9	0.0	0.9	-54.8	-13.0	41.8
Frequency:848.800 MHz								
1697.600	H	65.24	-35.8	10.8	1.5	-26.5	-13.0	13.5
1697.600	V	72.42	-28.8	10.8	1.5	-19.5	-13.0	6.5
2546.400	H	62.74	-33.8	13.1	2.8	-23.5	-13.0	10.5
2546.400	V	65.67	-31.4	13.1	2.8	-21.1	-13.0	8.1
799.960	H	39.65	-52.2	0.0	0.9	-53.1	-13.0	40.1
799.960	V	34.45	-54.9	0.0	0.9	-55.8	-13.0	42.8

**PCS Band**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
Frequency:1850.200 MHz								
3700.400	H	56.68	-38.1	14.0	2.5	-26.6	-13.0	13.6
3700.400	V	58.03	-36.3	14.0	2.5	-24.8	-13.0	11.8
799.240	H	38.45	-53.4	0.0	0.9	-54.3	-13.0	41.3
799.240	V	32.89	-56.4	0.0	0.9	-57.3	-13.0	44.3
Frequency:1880.000 MHz								
3760.000	H	55.17	-39.1	13.8	2.9	-28.2	-13.0	15.2
3760.000	V	57.36	-35.7	13.8	2.9	-24.8	-13.0	11.8
799.340	H	38.75	-53.1	0.0	0.9	-54.0	-13.0	41.0
799.340	V	33.20	-56.1	0.0	0.9	-57.0	-13.0	44.0
Frequency:1909.800 MHz								
3819.600	H	54.18	-39.6	13.6	3.3	-29.3	-13.0	16.3
3819.600	V	57.59	-34.6	13.6	3.3	-24.3	-13.0	11.3
799.960	H	38.81	-53	0.0	0.9	-53.9	-13.0	40.9
799.960	V	33.15	-56.2	0.0	0.9	-57.1	-13.0	44.1

## WCDMA Band II

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
Frequency:1852.400 MHz								
3704.800	H	41.26	-53.4	13.9	2.5	-42.0	-13.0	29.0
3704.800	V	41.97	-52.3	13.9	2.5	-40.9	-13.0	27.9
799.240	H	38.31	-53.5	0.0	0.9	-54.4	-13.0	41.4
799.240	V	32.28	-57.1	0.0	0.9	-58.0	-13.0	45.0
Frequency:1880.000 MHz								
3760.000	H	40.90	-53.4	13.8	2.9	-42.5	-13.0	29.5
3760.000	V	41.55	-51.5	13.8	2.9	-40.6	-13.0	27.6
799.340	H	38.39	-53.4	0.0	0.9	-54.3	-13.0	41.3
799.340	V	32.78	-56.6	0.0	0.9	-57.5	-13.0	44.5
Frequency:1907.600 MHz								
3815.200	H	40.19	-53.7	13.6	3.3	-43.4	-13.0	30.4
3815.200	V	41.09	-51.1	13.6	3.3	-40.8	-13.0	27.8
799.960	H	38.16	-53.7	0.0	0.9	-54.6	-13.0	41.6
799.960	V	32.28	-57.1	0.0	0.9	-58.0	-13.0	45.0

## Note:

- 1) The unit of Antenna Gain is dBd for frequency below 1GHz, and the unit of Antenna Gain is dBi for frequency above 1GHz.
- 2) Absolute Level = SG Level - Cable loss + Antenna Gain
- 3) Margin = Limit-Absolute Level



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

### Applicable Standard

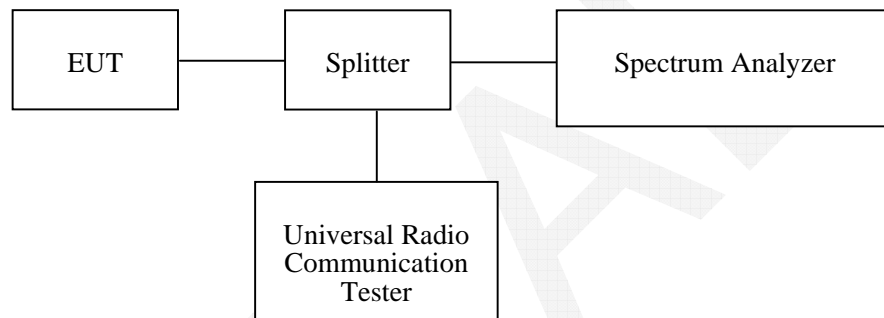
According to § 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

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.



### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to National Primary Standards and International System of Units (SI).

### Test Data

#### Environmental Conditions

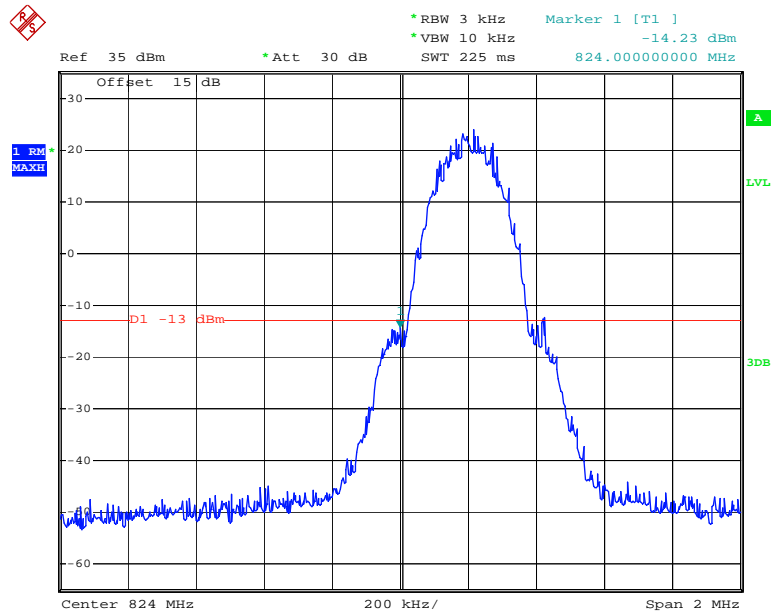
Temperature:	29.1 °C
Relative Humidity:	62 %
ATM Pressure:	101 kPa

*The testing was performed by Dean Liu on 2014-09-13*

Please refer to the following tables and plots.

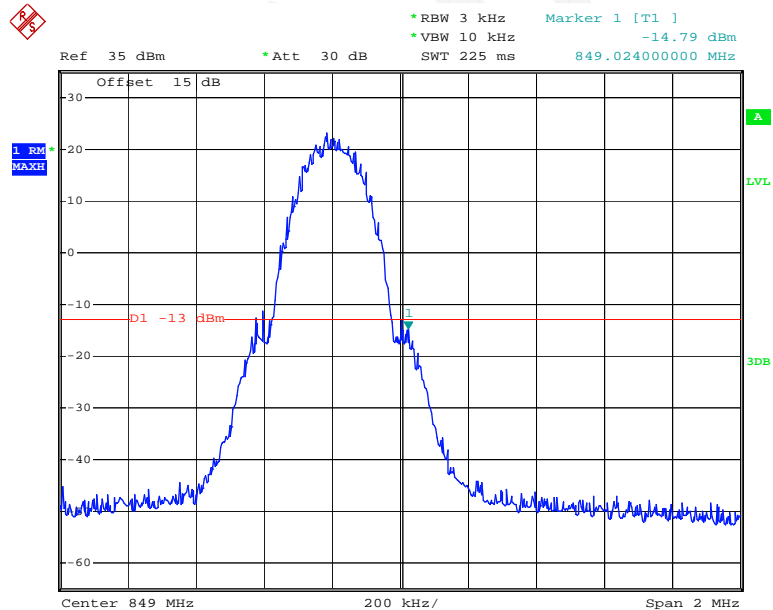
Band	Mode	Band Edge	Reading	Limit
			dBm	dBm
Cellular	GSM	Left	-14.23	-13
		Right	-14.79	-13
	EGPRS	Left	-21.96	-13
		Right	-20.72	-13
PCS	GSM	Left	-13.98	-13
		Right	-15.73	-13
	EGPRS	Left	-18.55	-13
		Right	-20.80	-13
WCDMA Band II	Rel 99	Left	-17.26	-13
		Right	-13.30	-13
	HSDPA	Left	-17.85	-13
		Right	-13.19	-13
	HSUPA	Left	-17.65	-13
		Right	-13.48	-13

### GSM 850, Left Band Edge



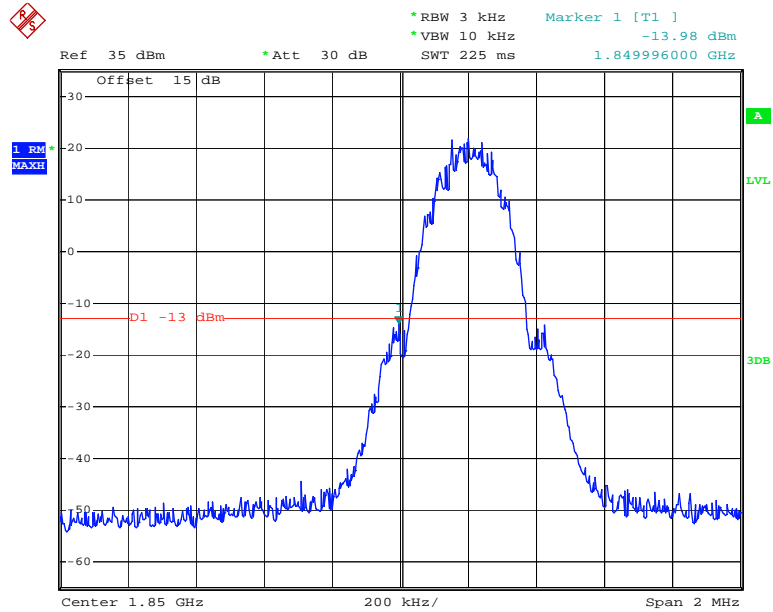
Date: 13.SEP.2014 10:39:09

### GSM 850, Right Band Edge



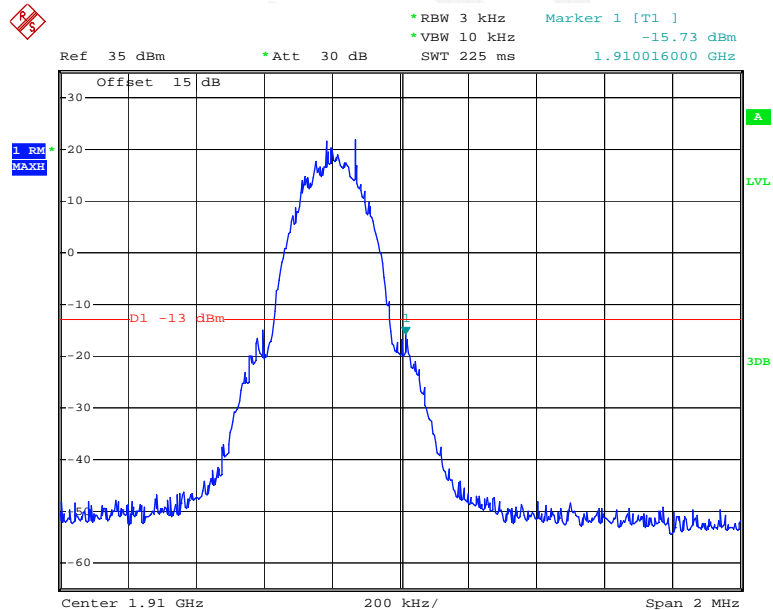
Date: 13.SEP.2014 10:53:56

### GSM 1900, Left Band Edge



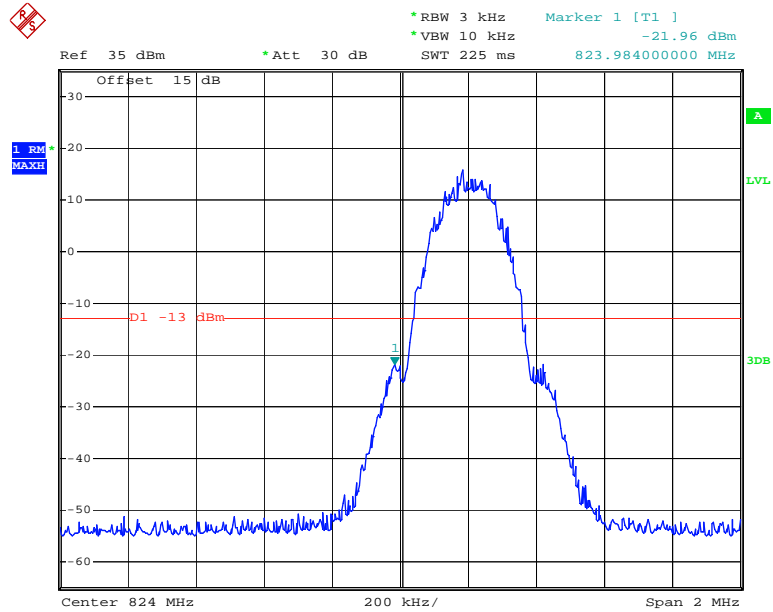
Date: 13.SEP.2014 11:18:22

### GSM 1900, Right Band Edge



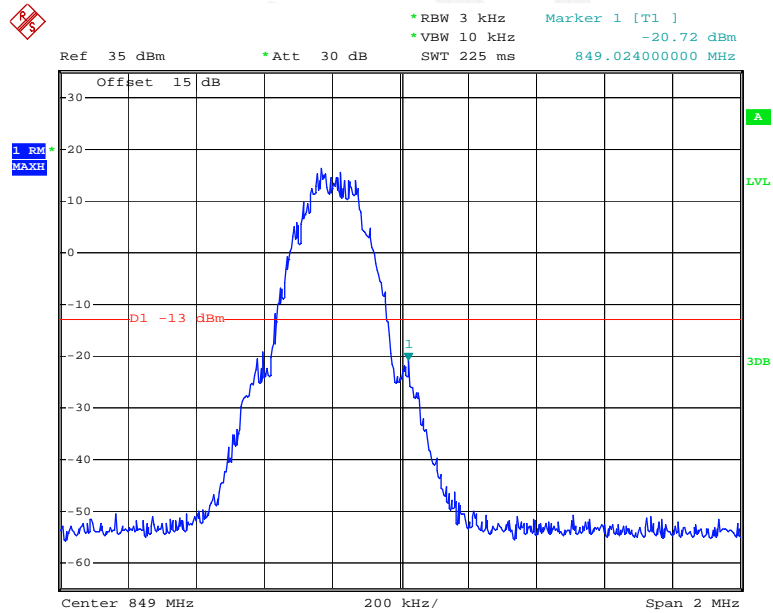
Date: 13.SEP.2014 11:21:02

### EGPRS 850, Left Band Edge



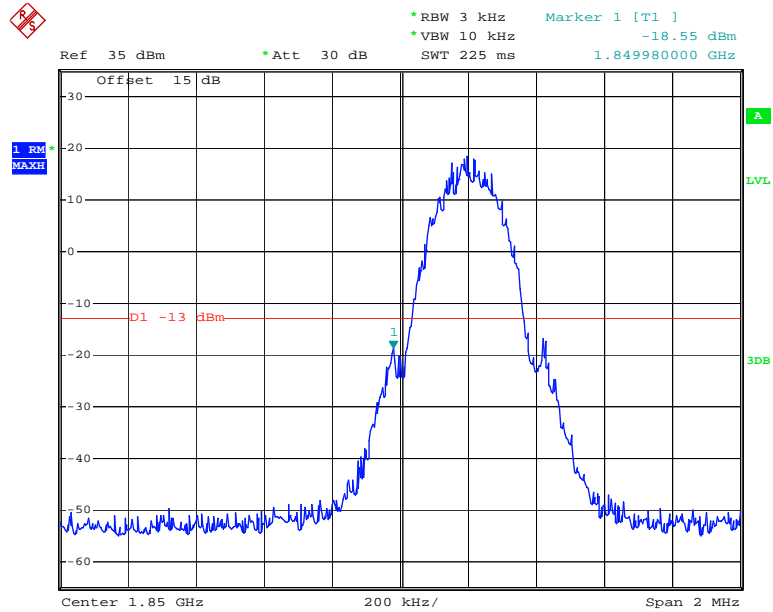
Date: 13.SEP.2014 12:06:56

### EGPRS 850, Right Band Edge



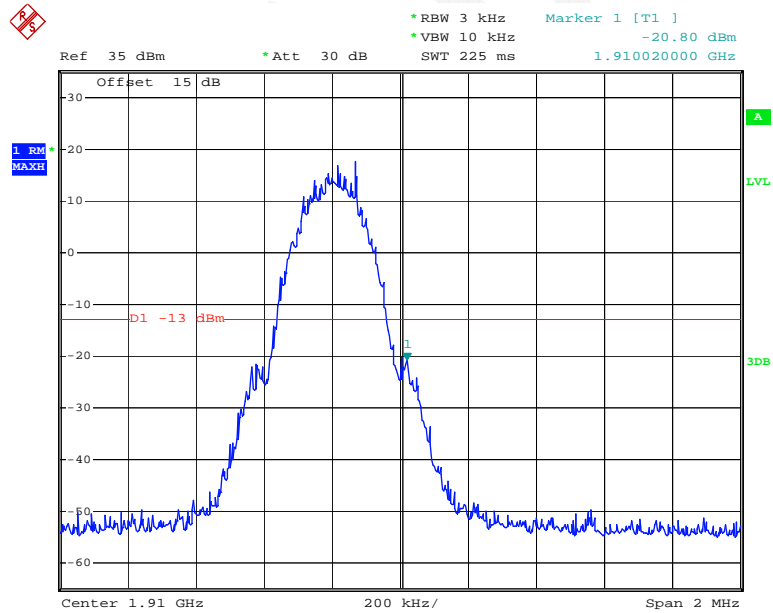
Date: 13.SEP.2014 12:05:33

### EGPRS 1900, Left Band Edge



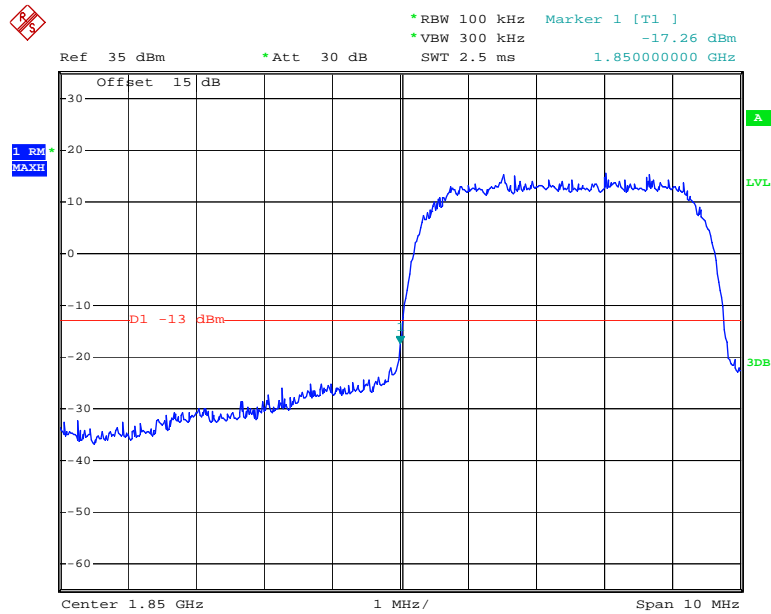
Date: 13.SEP.2014 11:56:09

### EGPRS 1900, Right Band Edge



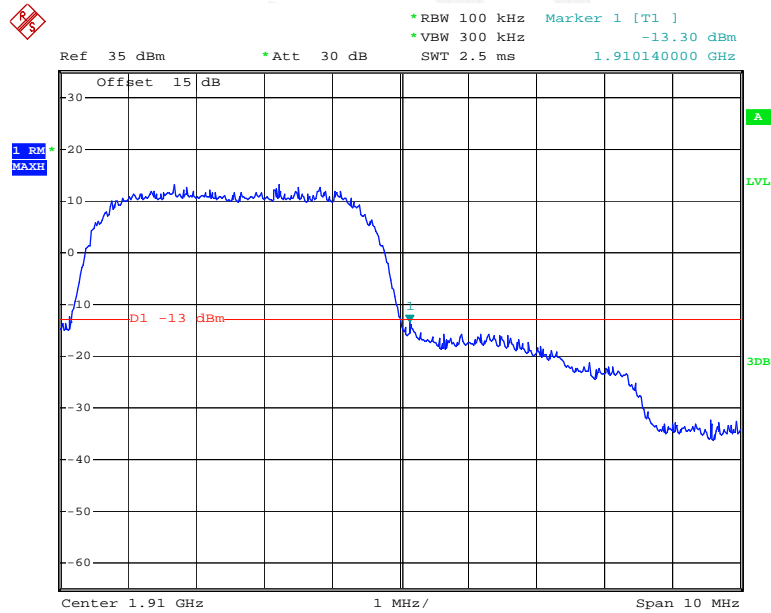
Date: 13.SEP.2014 11:55:13

### WCDMA Band II, Left Band Edge



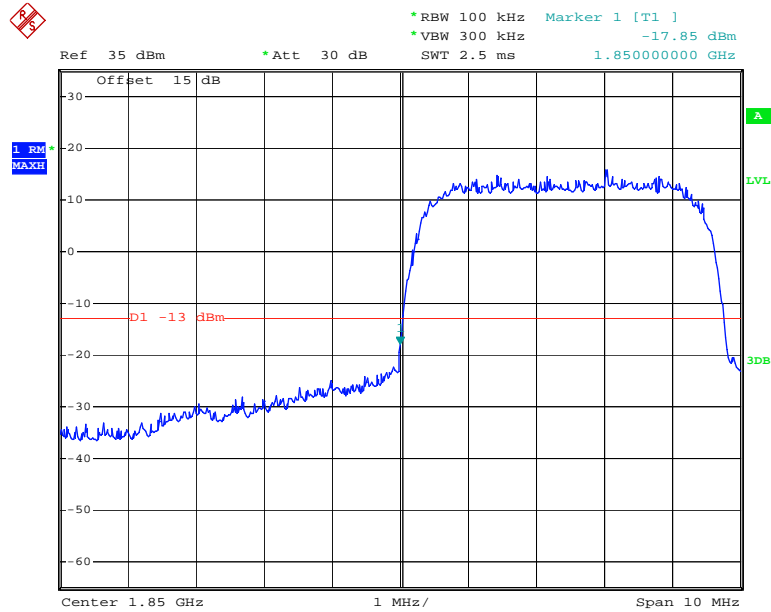
Date: 13.SEP.2014 13:16:43

### WCDMA Band II, Right Band Edge



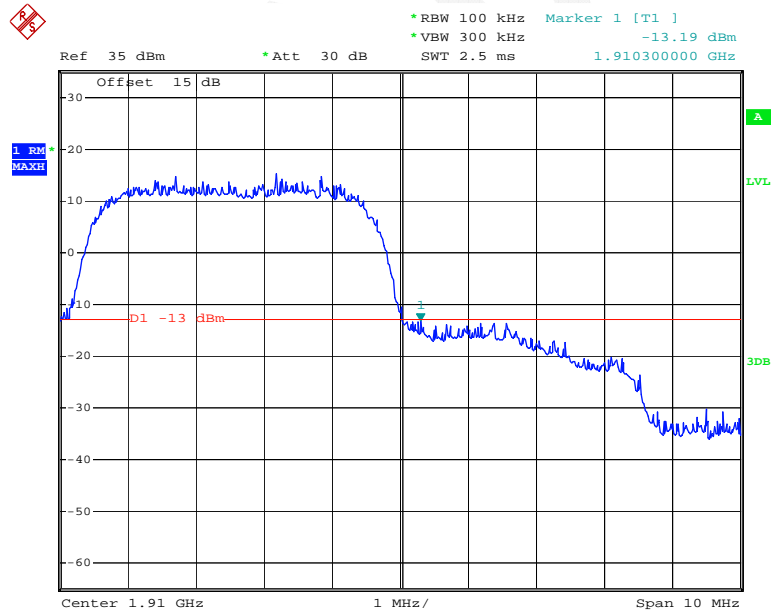
Date: 13.SEP.2014 12:47:33

### HSDPA Band II , Left Band Edge



Date: 13.SEP.2014 13:05:50

### HSDPA Band II, Right Band Edge



Date: 13.SEP.2014 12:49:06



Offset 15 dB

Ref 35 dBm \*Att 30 dB

\*RBW 100 kHz Marker 1 [T1 ]  
 \*VBW 300 kHz -17.65 dBm  
 SWT 2.5 ms 1.850000000 GHz

1 RM MAXH

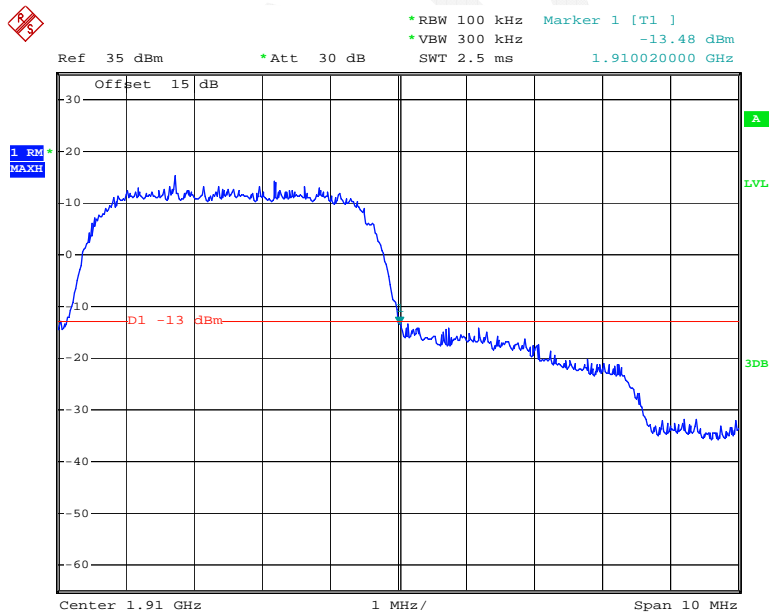
D1 -13 dBm

LVL

3dB

Center 1.85 GHz 1 MHz/ Span 10 MHz

### HSUPA Band II, Right Band Edge



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

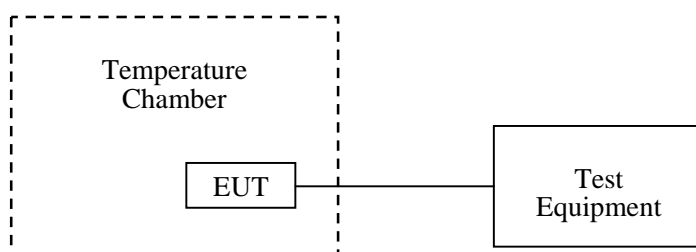
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

**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 from 85% 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
Dongzhixu	High Temperature Test Chamber	DP1000	201105083-3	2014-08-11	2015-08-11
R&S	Universal Radio Communication Tester	CMU200	109 038	2014-05-09	2015-05-09

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

**Test Data****Environmental Conditions**

Temperature:	29.1 °C
Relative Humidity:	62 %
ATM Pressure:	101 kPa

The testing was performed by Dean Liu on 2014-09-13

**Cellular Band (Part 22H)**

GMSK, Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V <sub>DC</sub>	Hz	ppm	ppm
-30	3.7	-17	-0.020	2.5
-20	3.7	-14	-0.017	2.5
-10	3.7	-20	-0.024	2.5
0	3.7	-14	-0.017	2.5
10	3.7	-11	-0.013	2.5
20	3.7	-16	-0.019	2.5
30	3.7	-21	-0.025	2.5
40	3.7	-13	-0.016	2.5
50	3.7	-10	-0.012	2.5
25	3.5	-15	-0.018	2.5
25	4.2	-17	-0.020	2.5

8PSK, Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V <sub>DC</sub>	Hz	ppm	ppm
-30	3.7	-18	-0.022	2.5
-20	3.7	-16	-0.019	2.5
-10	3.7	-20	-0.024	2.5
0	3.7	-19	-0.023	2.5
10	3.7	-22	-0.026	2.5
20	3.7	-18	-0.022	2.5
30	3.7	-21	-0.025	2.5
40	3.7	-17	-0.020	2.5
50	3.7	-19	-0.023	2.5
25	3.5	-22	-0.026	2.5
25	4.2	-16	-0.019	2.5

**PCS Band (Part 24E)**

GMSK, Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V <sub>DC</sub>	Hz	ppm	
-30	3.7	-11	-0.006	Pass
-20	3.7	-16	-0.009	Pass
-10	3.7	-10	-0.005	Pass
0	3.7	-13	-0.007	Pass
10	3.7	-12	-0.006	Pass
20	3.7	-15	-0.008	Pass
30	3.7	-14	-0.007	Pass
40	3.7	-20	-0.011	Pass
50	3.7	-18	-0.010	Pass
25	3.5	-14	-0.007	Pass
25	4.2	-10	-0.005	Pass

8PSK, Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V <sub>DC</sub>	Hz	ppm	
-30	3.7	-17	-0.009	Pass
-20	3.7	-23	-0.012	Pass
-10	3.7	-21	-0.011	Pass
0	3.7	-18	-0.010	Pass
10	3.7	-22	-0.012	Pass
20	3.7	-21	-0.011	Pass
30	3.7	-25	-0.013	Pass
40	3.7	-19	-0.010	Pass
50	3.7	-22	-0.012	Pass
25	3.5	-21	-0.011	Pass
25	4.2	-18	-0.010	Pass

**WCDMA Band II**

Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V <sub>DC</sub>	Hz	ppm	
-30	3.7	11	0.006	Pass
-20	3.7	14	0.007	Pass
-10	3.7	16	0.009	Pass
0	3.7	12	0.006	Pass
10	3.7	14	0.007	Pass
20	3.7	11	0.006	Pass
30	3.7	12	0.006	Pass
40	3.7	12	0.006	Pass
50	3.7	14	0.007	Pass
25	3.5	10	0.005	Pass
25	4.2	16	0.009	Pass

**HSDPA Band II**

Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V <sub>DC</sub>	Hz	ppm	
-30	3.7	16	0.009	Pass
-20	3.7	19	0.010	Pass
-10	3.7	21	0.011	Pass
0	3.7	18	0.010	Pass
10	3.7	17	0.009	Pass
20	3.7	21	0.011	Pass
30	3.7	19	0.010	Pass
40	3.7	18	0.010	Pass
50	3.7	16	0.009	Pass
25	3.5	17	0.009	Pass
25	4.2	20	0.011	Pass

**HSUPA Band II**

Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V <sub>DC</sub>	Hz	ppm	
-30	3.7	22	0.012	Pass
-20	3.7	18	0.010	Pass
-10	3.7	20	0.011	Pass
0	3.7	24	0.013	Pass
10	3.7	21	0.011	Pass
20	3.7	23	0.012	Pass
30	3.7	22	0.012	Pass
40	3.7	19	0.010	Pass
50	3.7	24	0.013	Pass
25	3.5	21	0.011	Pass
25	4.2	23	0.012	Pass

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