



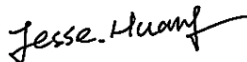
FCC PART 22H, PART 24E  
TEST REPORT

For

**VIRTUAL TRUNK PTE LTD**

12 Kallang Avenue Aperia #04-30 Singapore

**FCC ID: 2AKDAVT12W**

<b>Report Type:</b> Original Report	<b>Product Type:</b> IP WALKIE TALKIE
<b>Report Number:</b> RSH161104050-00B	
<b>Report Date:</b> 2016-12-19	
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**Note:** This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

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## GENERAL INFORMATION

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

The *VIRTUAL TRUNK PTE LTD*'s product, model number: *VT12W (FCC ID: 2AKDAVT12W)* in this report is an *IP WALKIE TALKIE*, which was measured approximately: 61 mm (L) × 38 mm (W) × 132 mm (H), rated with input voltage: DC 3.7 V battery or DC 5.0V from adapter.

#### Adapter information

Model: K2001U-1004UL

Input: AC100-240V~50/60Hz 0.35A Max

Output: DC5V-2000mA

*\* All measurement and test data in this report was gathered from production sample serial number: 1604050 (Assigned by BACL, Kunshan). The EUT supplied by the applicant was received on 2016-11-04.*

### Objective

This test report is prepared on behalf of *VIRTUAL TRUNK PTE 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 the compliance of the EUT with FCC rules for output power, modulation characteristic, occupied bandwidth, and spurious emission at antenna terminal, spurious radiated emission, frequency stability and band edge.

### 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-Subpart 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, ANSI C63.4-2014.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

### Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		±3.26 dB
RF conducted test with spectrum		±0.9dB
RF Output Power with Power meter		±0.5dB
Radiated emission	30MHz~1GHz	±5.91dB
	Above 1G	±4.92dB
Occupied Bandwidth		±0.5kHz
Temperature		±1.0°C
Humidity		±6%

### Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China

Test site at Bay Area Compliance Laboratories Corp. (Kunshan) 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 06, 2014. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 815570. 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

### Description of Test Configuration

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

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

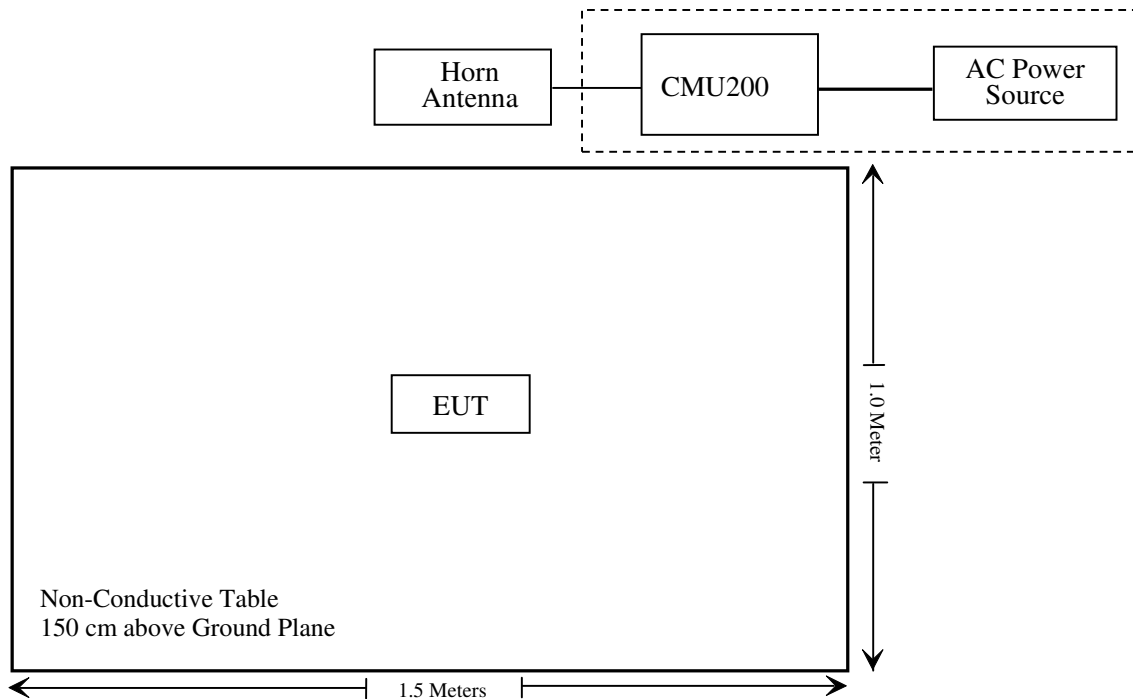
### Equipment Modifications

No modification was made to the EUT.

### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	110605

### Block Diagram of Test Setup



## **SUMMARY OF TEST RESULTS**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Result</b>
§1.1307, §2.1093	RF Exposure (SAR)	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

Note: \* Please refer to SAR report released by BACL, report number: RKS161220001-20.

**TEST EQUIPMENT LIST**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
<b>Radiated Emission Test</b>					
Sonoma Instrument	Amplifier	330	171377	2015-12-12	2016-12-12
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2016-11-25	2017-11-25
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2016-01-09	2019-01-08
Sunol Sciences	Broadband Antenna	JB3	A090314-1	2016-01-09	2019-01-08
Narda	Pre-amplifier	AFS42-00101800	2001270	2016-09-08	2017-09-08
EMCO	Horn Antenna	3116	9510-2384	2015-11-07	2018-11-06
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2016-11-25	2017-11-25
ETS	Horn Antenna	3115	6229	2016-01-11	2017-01-10
ETS	Horn Antenna	3115	9311-4159	2016-01-11	2017-01-10
R&S	Auto test Software	EMC32	V 09.10.0	NCR	NCR
haojintech	Coaxial Cable	Cable-1	001	2016-09-08	2017-09-07
haojintech	Coaxial Cable	Cable-2	002	2016-09-08	2017-09-07
haojintech	Coaxial Cable	Cable-3	003	2016-09-08	2017-09-07
MICRO-COAX	Coaxial Cable	Cable-4	004	2016-11-18	2017-11-17
MICRO-COAX	Coaxial Cable	Cable-5	005	2016-11-18	2017-11-17
HP	Signal Generator	E4421B	US38440505	2016-11-25	2017-11-25
<b>RF Conducted test</b>					
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-12-15
WEINSCHL	3dB Attenuator	5326	N/A	2016-06-18	2017-06-18
Rohde & Schwarz	Signal Analyzer	FSIQ26	836131/009	2016-09-21	2017-09-21
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	110605	2016-11-25	2017-11-25
HONOVA	Power Splitter	ZFRSC-14-S+	019411452	2016-06-12	2017-06-12
WEINSCHL	10dB Attenuator	5328	N/A	2016-06-18	2017-06-18

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

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## **FCC §1.1307 & §2.1093 - RF EXPOSURE**

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### **Applicable Standard**

FCC§1.1310 and §2.1093.

### **Test Result**

Compliance, please refer to the SAR report: RKS161220001-20.

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## **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.

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

**Applicable Standard**

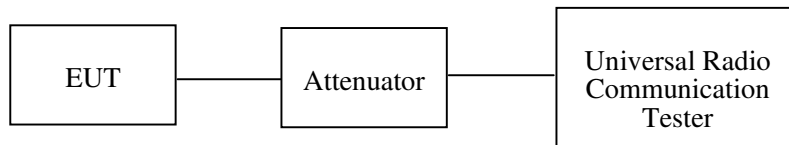
According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

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**

*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-D section 2.2.17

**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	24 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Echo Wu on 2016-12-12.*

**Conducted Power**

**Cellular Band (Part 22H)**

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	33.01	32.13	30.33	29.56	38.45
	190	836.6	32.67	31.72	29.91	29.10	38.45
	251	848.8	33.00	32.17	30.35	29.56	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	128	824.2	26.95	25.68	23.51	22.24	38.45
	190	836.6	26.78	25.52	23.37	21.79	38.45
	251	848.8	26.53	25.23	23.18	21.46	38.45

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band V)	Normal	RMC12.2k		21.54	21.92	21.77
		HSDPA	1	20.49	20.82	20.49
			2	20.68	20.92	20.68
			3	20.47	20.74	20.47
			4	20.67	20.9	20.67
		HSUPA	1	20.47	20.73	20.47
			2	20.59	20.93	20.59
			3	20.43	20.76	20.43
			4	20.62	20.89	20.62
			5	20.47	20.75	20.47

**PCS Band (Part 24E)**

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	29.46	28.65	26.68	25.61	33
	661	1880.0	29.33	28.54	26.57	25.52	33
	810	1909.8	29.29	28.47	26.53	25.51	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	512	1850.2	24.26	23.08	20.83	19.38	33
	661	1880.0	24.26	23.07	20.72	19.29	33
	810	1909.8	23.90	22.62	20.46	18.67	33

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band II)	Normal	RMC12.2k		21.57	21.41	21.19
		HSDPA	1	20.78	21.00	20.83
			2	21.01	21.11	21.01
			3	20.80	20.98	20.78
			4	21.00	21.18	20.93
		HSUPA	1	20.81	21.01	20.84
			2	20.96	21.11	21.01
			3	20.84	21.03	20.82
			4	20.97	21.10	20.99
			5	20.99	21.10	20.96

**Peak-to-average ratio (PAR)**

**Cellular Band**

Mode	Channel	PAR (dB)	Limit (dB)
GPRS	Low	0.18	13
	Middle	0.14	13
	High	0.15	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	0.34	13
	Middle	0.28	13
	High	0.35	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.46	13
	Middle	3.36	13
	High	3.75	13
HSDPA (16QAM)	Low	3.64	13
	Middle	3.52	13
	High	3.68	13
HSUPA (BPSK)	Low	3.74	13
	Middle	3.56	13
	High	3.68	13

**PCS Band**

<b>Mode</b>	<b>Channel</b>	<b>PAR (dB)</b>	<b>Limit (dB)</b>
GPRS	Low	0.22	13
	Middle	0.23	13
	High	0.25	13

<b>Mode</b>	<b>Channel</b>	<b>PAR (dB)</b>	<b>Limit (dB)</b>
EGPRS	Low	0.27	13
	Middle	0.29	13
	High	0.33	13

<b>Mode</b>	<b>Channel</b>	<b>PAR (dB)</b>	<b>Limit (dB)</b>
RMC (BPSK)	Low	3.15	13
	Middle	3.46	13
	High	3.25	13
HSDPA (16QAM)	Low	3.27	13
	Middle	3.25	13
	High	3.27	13
HSUPA (BPSK)	Low	3.21	13
	Middle	3.17	13
	High	3.35	13

**Radiated Power**

**ERP & EIRP**

**GPRS Mode:**

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	S.G. Level (dBm)	Cable loss (dB)	Antenna Gain (dB)			
ERP for Cellular Band (Part 22H), Middle channel										
836.6	98.17	10	1.6	H	27.1	0.46	4.75	31.39	38.45	7.06
836.6	92.68	159	2.1	V	21.7	0.46	4.75	25.99	38.45	12.46
EIRP for PCS Band (Part 24E), Middle channel										
1880.00	77.84	98	1.6	H	17.0	0.31	10.4	27.09	33	5.91
1880.00	73.97	151	2.3	V	9.7	0.31	10.4	19.79	33	13.21

**EGPRS Mode:**

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	S.G. Level (dBm)	Cable loss (dB)	Antenna Gain (dB)			
ERP for Cellular Band (Part 22H), Middle channel										
836.6	92.14	10	1.6	H	21.1	0.46	4.75	25.39	38.45	13.06
836.6	82.06	159	2.1	V	11.0	0.46	4.75	15.29	38.45	23.16
EIRP for PCS Band (Part 24E), Middle channel										
1880.00	73.84	98	1.6	H	13.0	0.31	10.4	23.09	33	9.91
1880.00	68.97	151	2.3	V	4.7	0.31	10.4	14.79	33	18.21

**WCDMA Mode:**

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	S.G. Level (dBm)	Cable loss (dB)	Antenna Gain (dB)			
ERP for WCDMA Band V (Part 22H), Middle Channel										
836.6	87.17	243	1.8	H	16.1	0.46	4.75	20.39	38.45	18.06
836.6	83.43	214	1.6	V	12.4	0.46	4.75	16.69	38.45	21.76
EIRP for WCDMA Band II (Part 24E), Middle Channel										
1880.00	71.94	33	1.0	H	11.1	0.31	10.4	21.19	33	11.81
1880.00	68.77	212	1.4	V	4.5	0.31	10.4	14.59	33	18.41

**Note:**

All above data were tested with no amplifier.

Absolute Level = SG Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

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

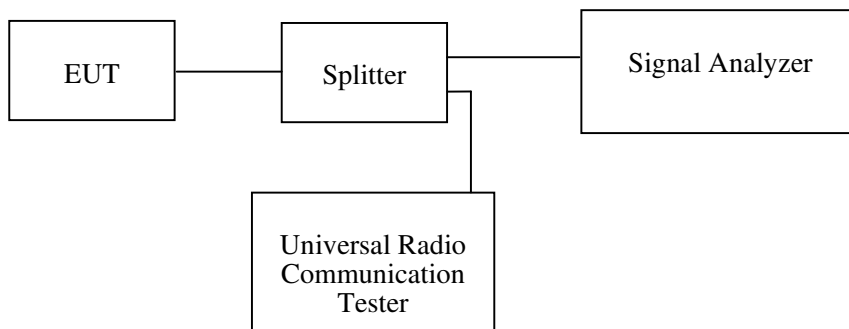
**Applicable Standard**

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 resolution bandwidth of the spectrum analyzer was set at 5 kHz (GPRS) and the 26 dB & 99% bandwidth was recorded.



**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	24~25 °C
<b>Relative Humidity:</b>	50~52 %
<b>ATM Pressure:</b>	100.5~101.0 kPa

*The testing was performed by Echo Wu from 2016-12-04 to 2016-12-05.*

*EUT Operation Mode: Transmitting*

*Test Result: Compliance. Please refer to the following tables and plots.*

### Cellular Band (Part 22H)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GPRS(GMSK)	836.6	246.5	320.6
EDGE(8PSK)	836.6	244.5	308.6

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC(BPSK)	836.6	4.148	4.709
HSUPA (BPSK)	836.6	4.168	4.729
HSDPA (16QAM)	836.6	4.148	4.709

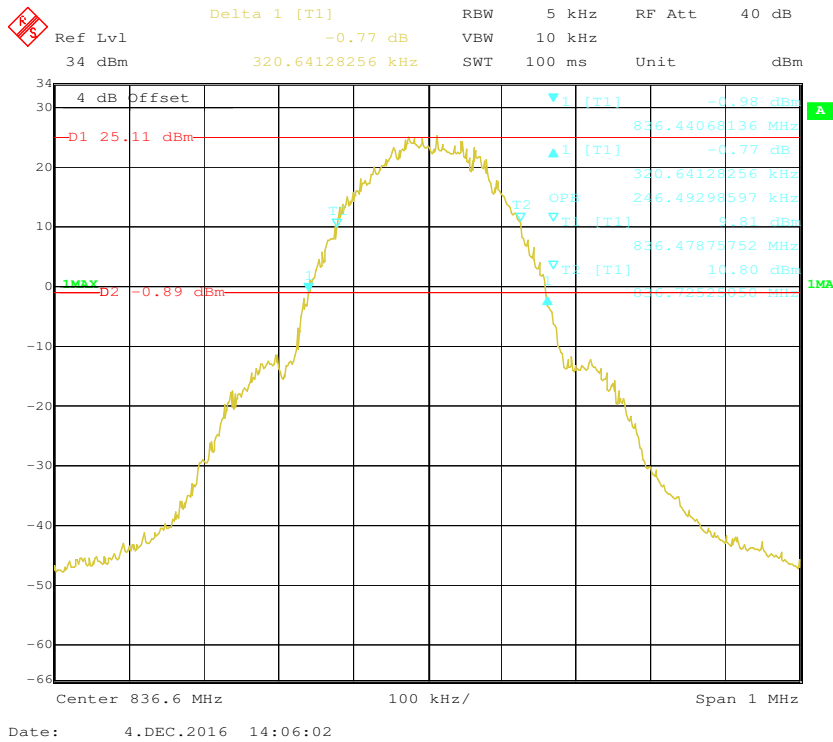
### PCS Band (Part 24E)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GPRS(GMSK)	1880.0	244.5	320.6
EDGE(8PSK)	1880.0	242.5	320.6

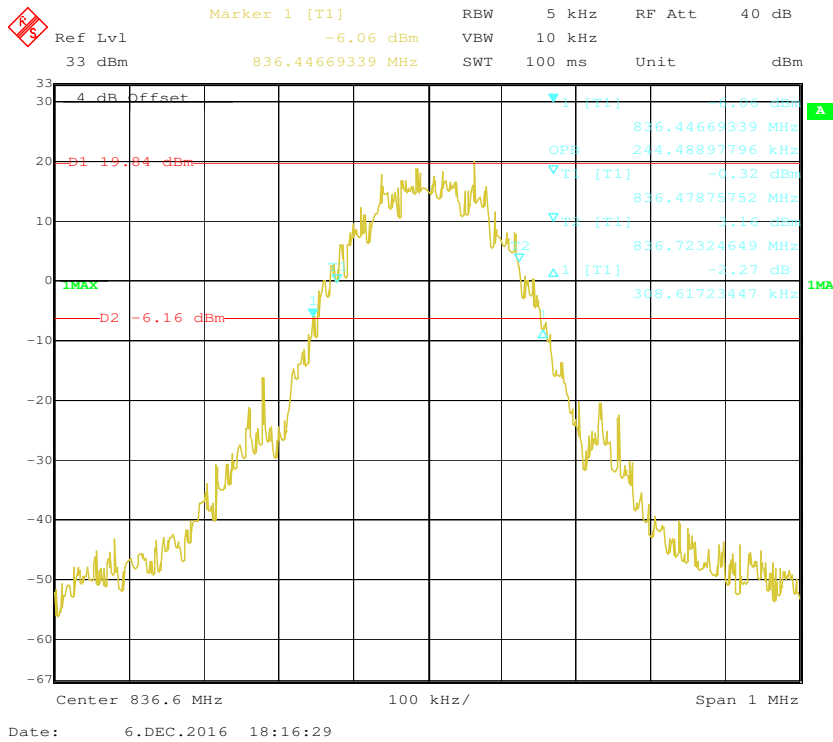
Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC(BPSK)	1880.0	4.168	4.709
HSUPA (BPSK)	1880.0	4.168	4.689
HSDPA (16QAM)	1880.0	4.168	4.709

**Cellular Band (Part 22H)**

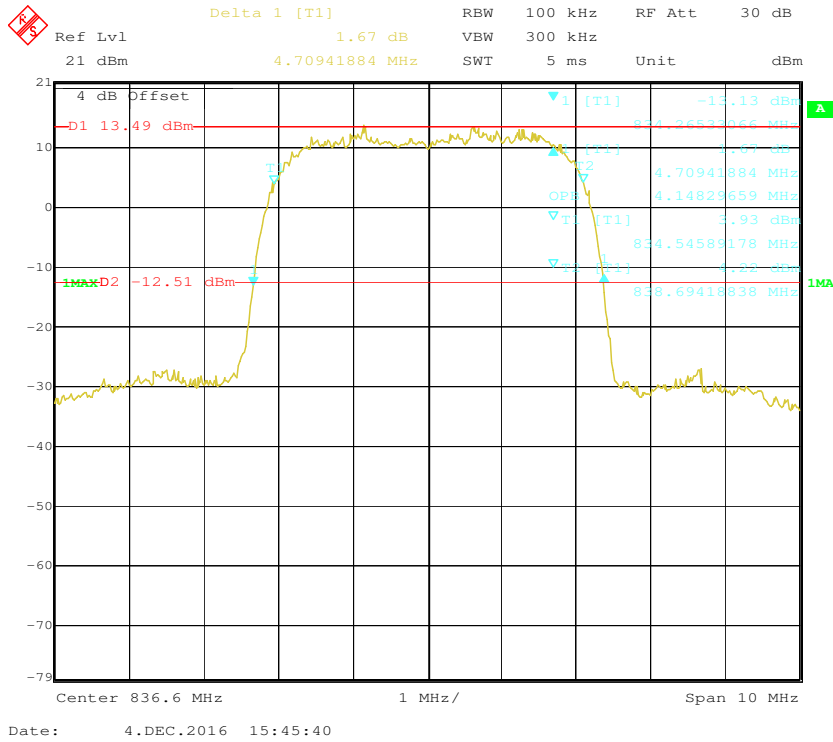
**99% Occupied & 26 dB Emissions Bandwidth for GPRS (GMSK) Mode**



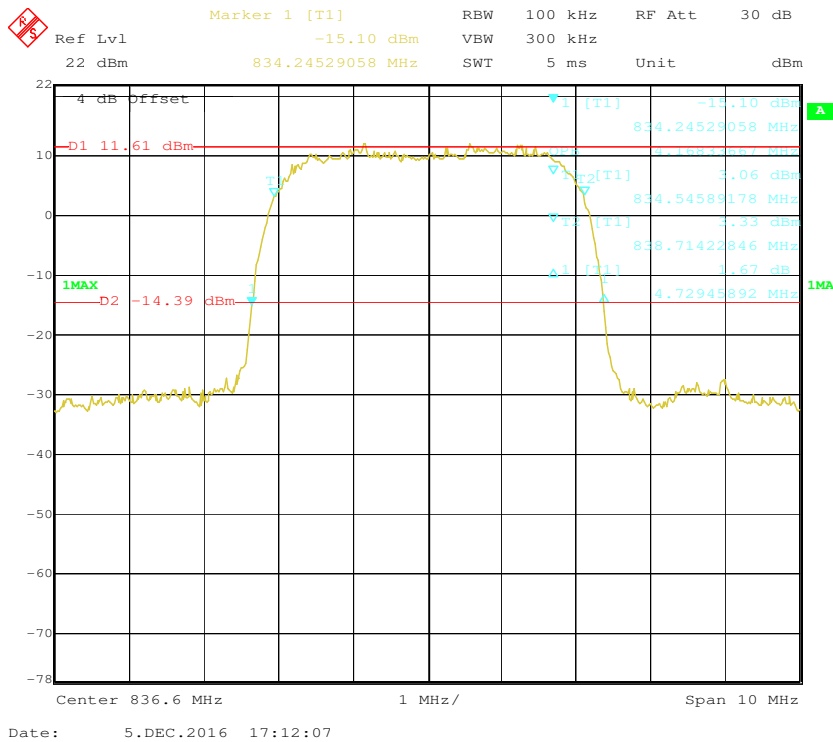
**99% Occupied & 26 dB Emissions Bandwidth for EDGE (8PSK) Mode**



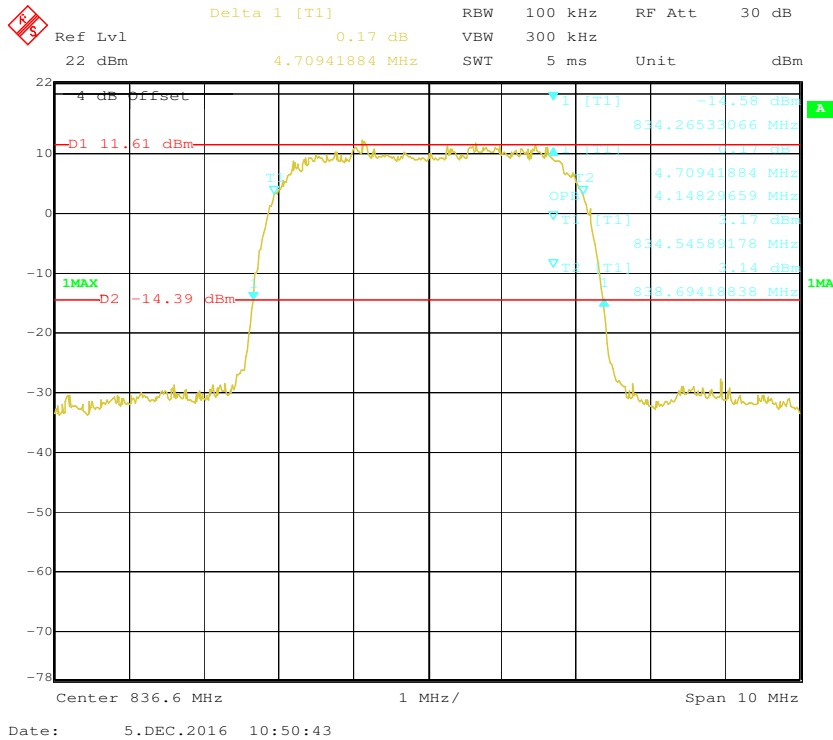
**99% Occupied & 26 dB Emissions Bandwidth for WCDMA (BPSK) Mode**



**99% Occupied & 26 dB Emissions Bandwidth for HSUPA (BPSK) Mode**

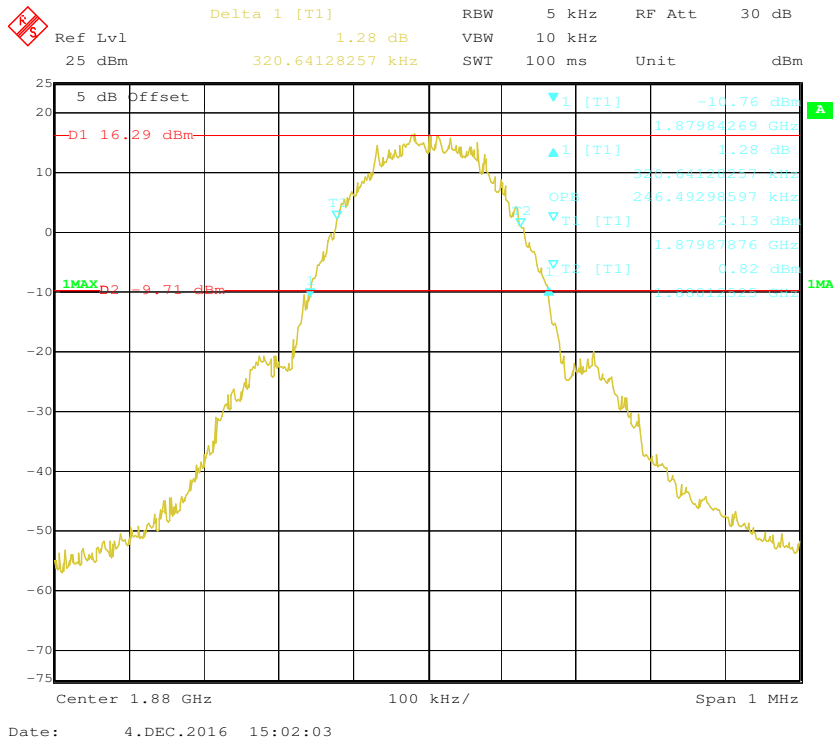


**99% Occupied & 26 dB Emissions Bandwidth for HSDPA (16QAM) Mode**

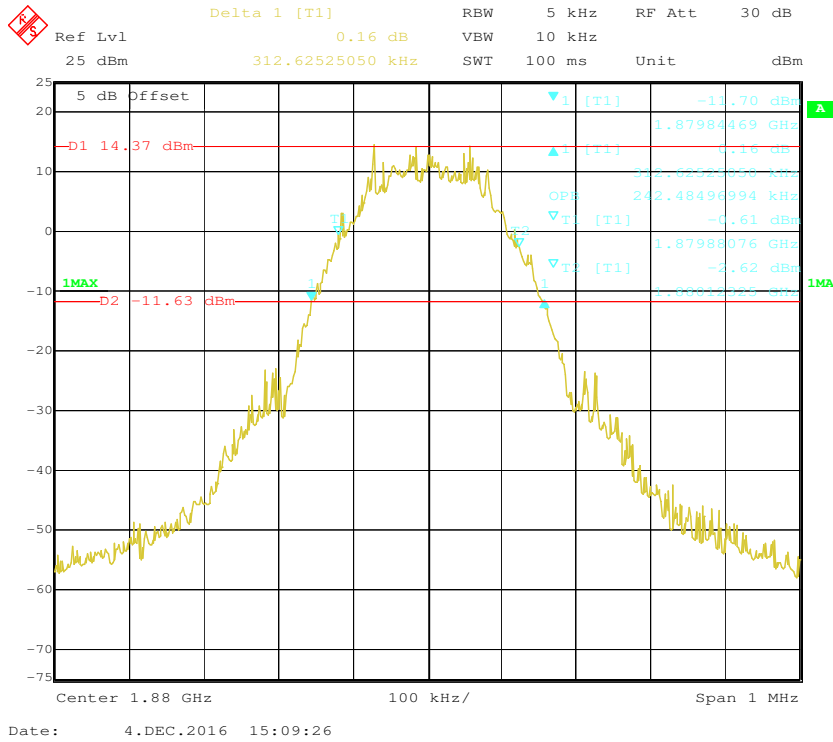


**PCS Band (Part 24E)**

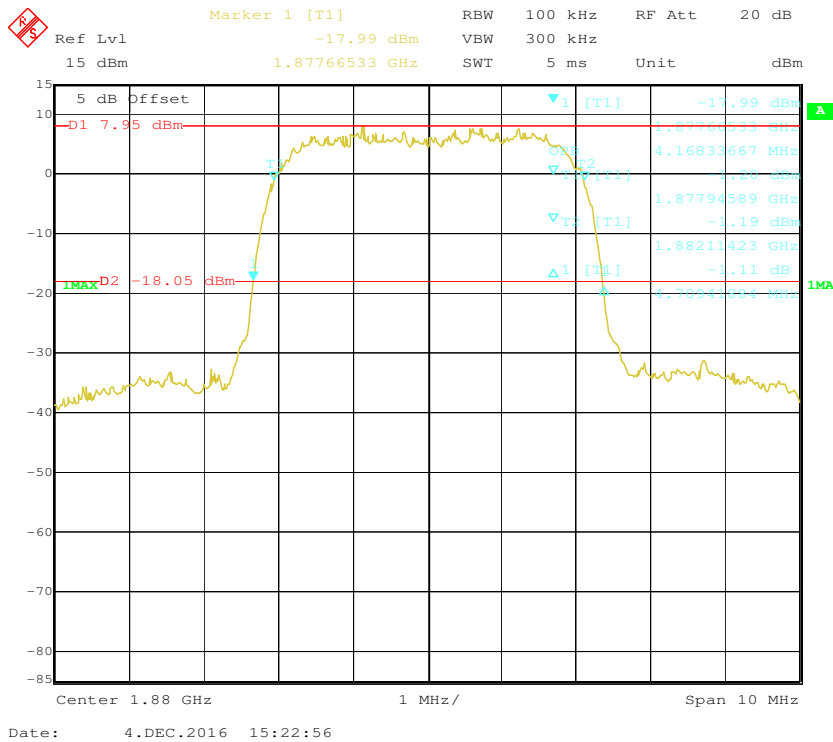
**99% Occupied & 26 dB Emissions Bandwidth for GPRS (GMSK) Mode**



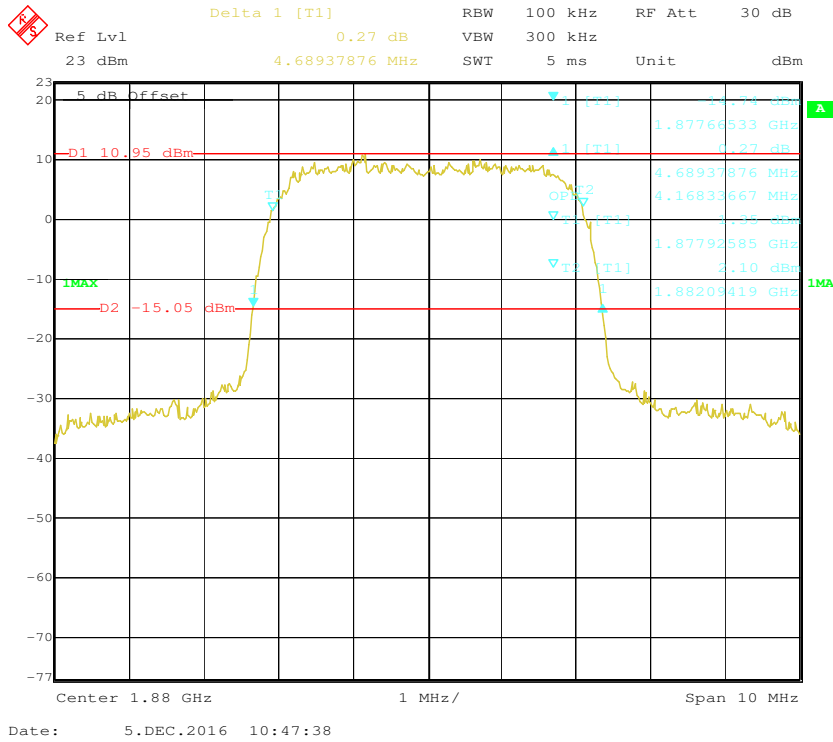
**99% Occupied & 26 dB Emissions Bandwidth for EDGE (8PSK) Mode**



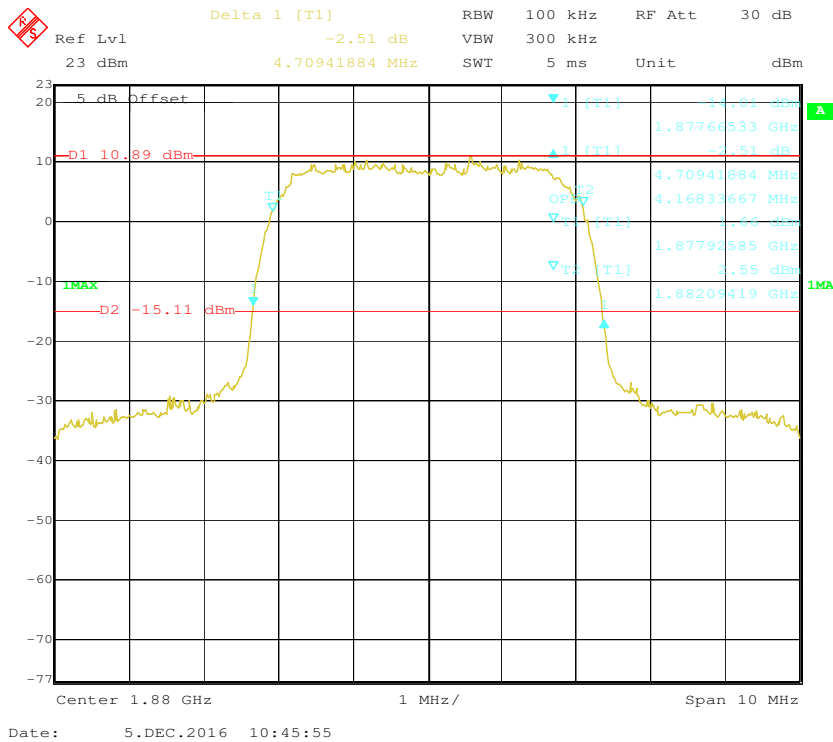
**99% Occupied & 26 dB Emissions Bandwidth for WCDMA (BPSK) Mode**



**99% Occupied & 26 dB Emissions Bandwidth for HSUPA (BPSK) Mode**



**99% Occupied & 26 dB Emissions Bandwidth for HSDPA (16QAM) Mode**



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

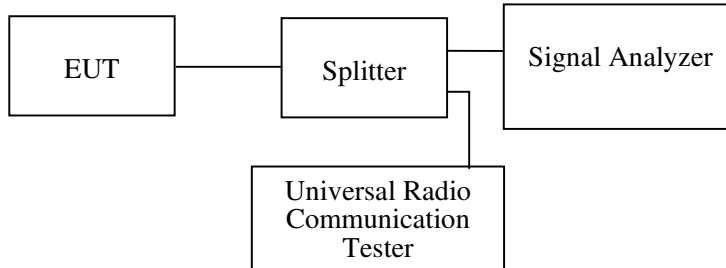
**Applicable Standard**

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. The resolution bandwidth of the spectrum analyzer was set at 1MHz. Sufficient scans were taken to show any out of band emissions up to 10<sup>th</sup> harmonic.



**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	24 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	101.0 kPa

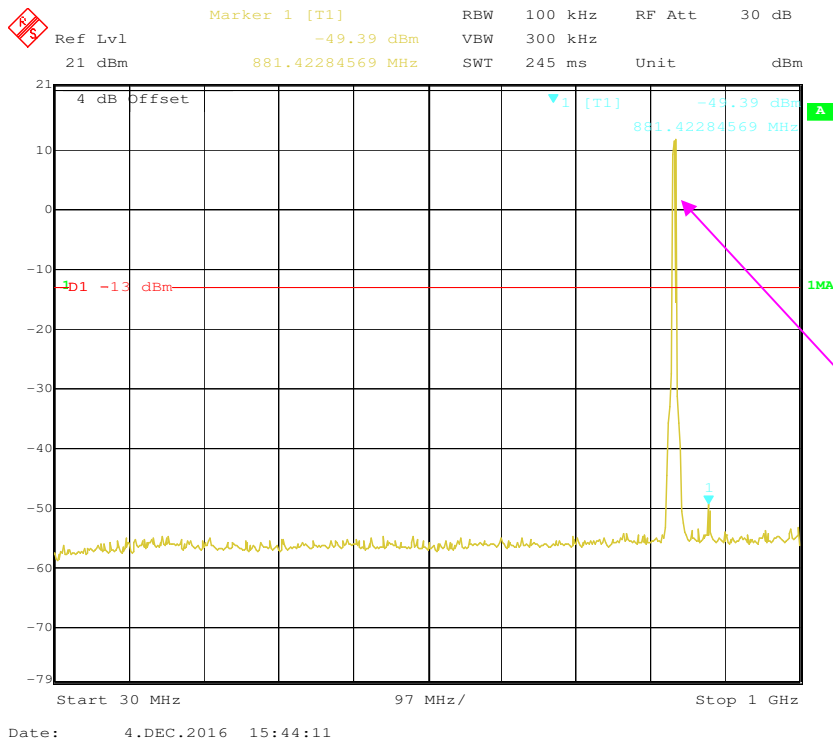
*The testing was performed by Echo Wu on 2016-12-04.*

*Test result: Compliance, please refer to the following plots.*

*EUT Operation Mode: Transmitting*

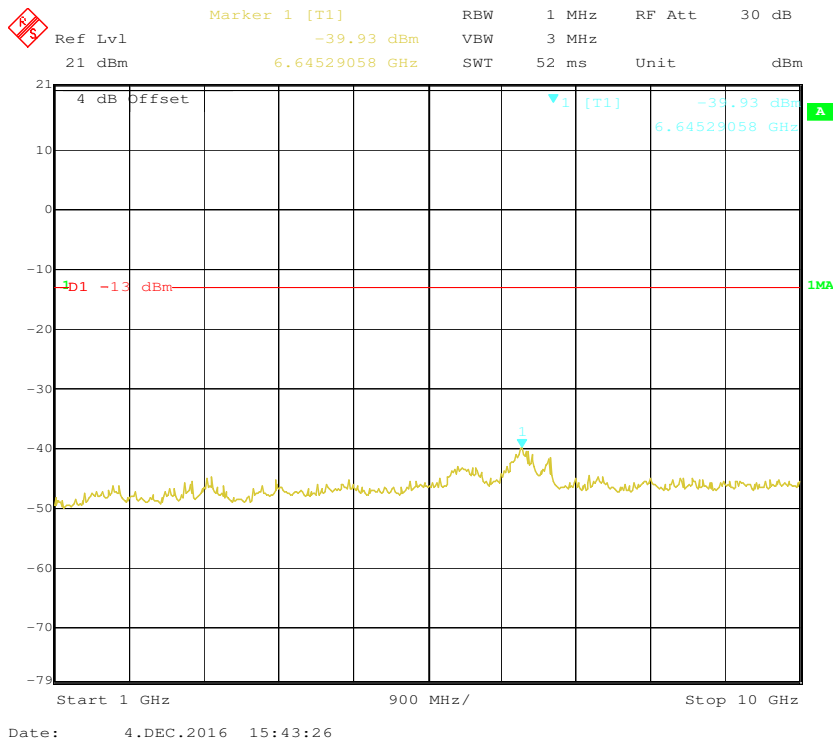


### 30 MHz – 1 GHz (WCDMA Mode)



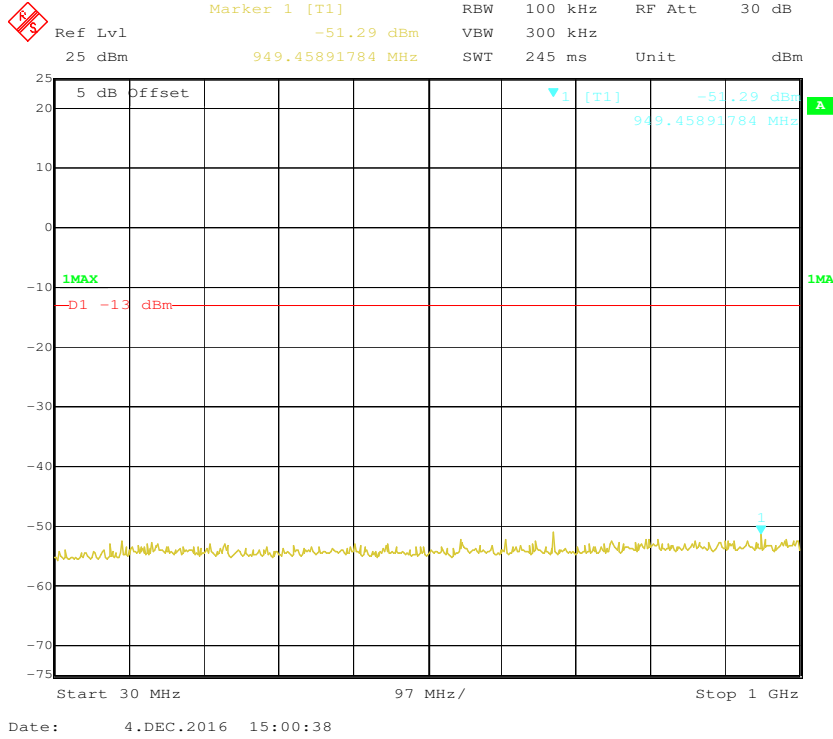
Fundamental test

### 1 GHz – 10 GHz (WCDMA Mode)



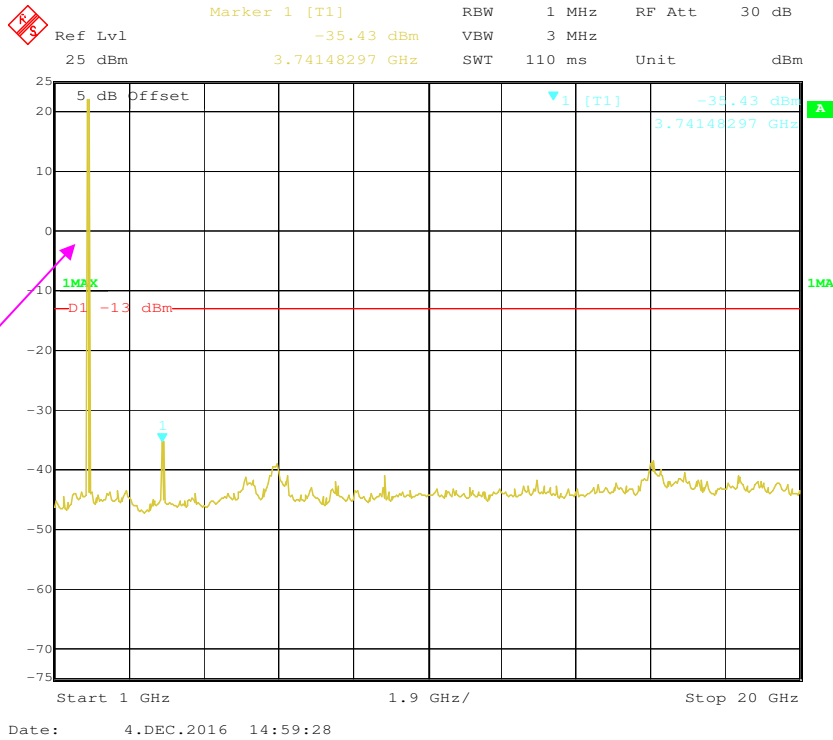
PCS Band (Part 24E)

30 MHz – 1 GHz

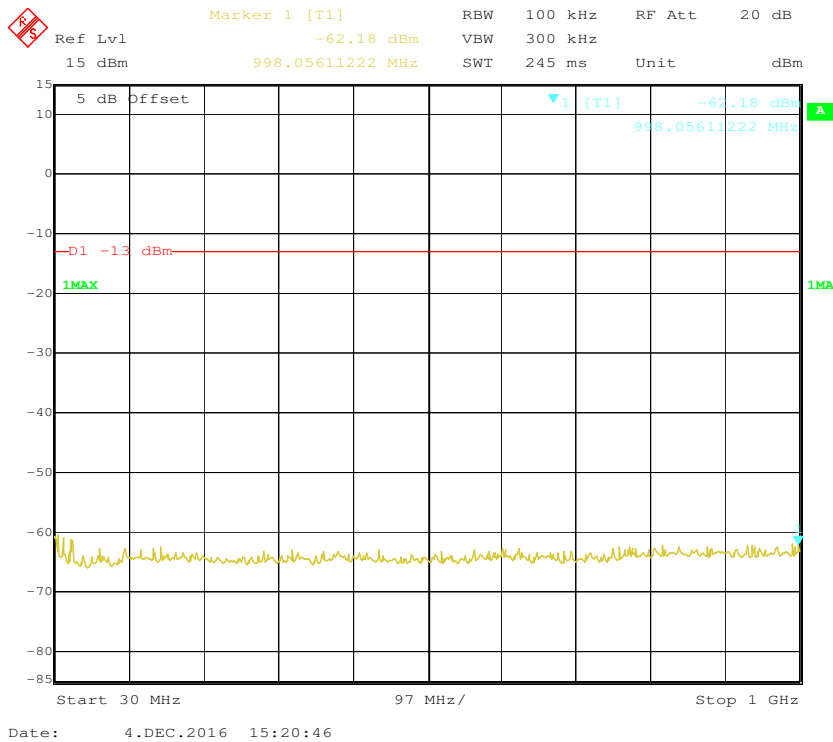


1 GHz – 20 GHz

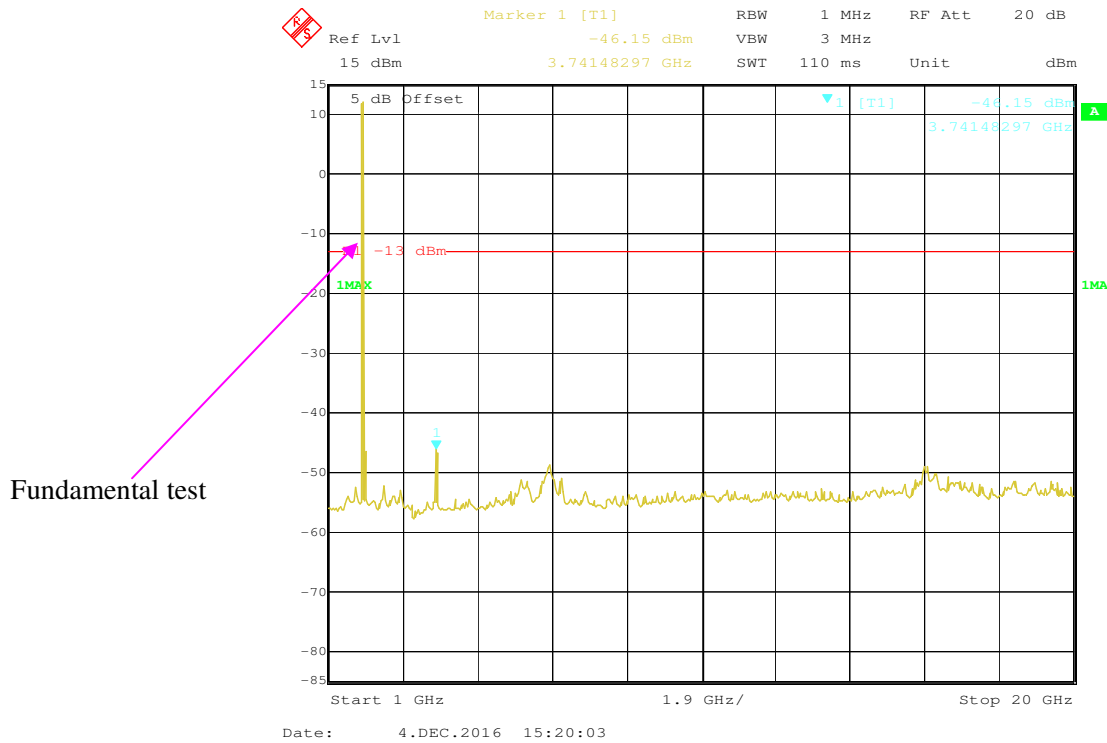
Fundamental test



**30 MHz – 1 GHz (WCDMA Mode)**



**1 GHz – 2 GHz (WCDMA Mode)**



## **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 receiving antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

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

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

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

Spurious attenuation limit in dB = 43 + 10 Log<sub>10</sub> (power out in Watts)

### **Test Data**

#### **Environmental Conditions**

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Layne Li on 2016-12-01.*

*EUT Operation Mode: Transmitting*

Pre-scan with Low, Middle and High channel, the worst case as below:

**30 MHz ~ 10 GHz:**

**Cellular Band (Part 22H)**

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
<b>GPRS Mode</b>										
236.57	31.85	321	1.5	H	-65.1	0.28	3.75	-61.63	-13	48.63
236.57	30.30	57	2.3	V	-66.7	0.28	3.75	-63.23	-13	50.23
1673.20	42.13	97	1.8	H	-61.8	0.30	9.40	-52.70	-13	39.70
1673.20	42.82	209	1.1	V	-62.6	0.30	9.40	-53.50	-13	40.50
<b>WCDMA Mode</b>										
236.57	31.63	360	2.0	H	-65.4	0.28	3.75	-61.93	-13	48.93
236.57	30.00	250	2.2	V	-67.0	0.28	3.75	-63.53	-13	50.53
1673.20	53.33	292	1.1	H	-50.6	0.30	9.40	-41.50	-13	28.50
1673.20	49.82	221	1.9	V	-55.6	0.30	9.40	-46.50	-13	33.50

**30 MHz ~ 20 GHz:**

**PCS Band (Part 24E)**

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
<b>GPRS Mode</b>										
836.57	31.13	72	1.2	H	-65.9	0.28	3.75	-62.43	-13	49.43
836.57	30.34	8	2.3	V	-66.7	0.28	3.75	-63.23	-13	50.23
3760.00	44.43	110	1.5	H	-49.3	2.42	12.60	-39.12	-13	26.12
3760.00	47.13	287	1.5	V	-45.6	2.42	12.60	-35.42	-13	22.42
<b>WCDMA Mode</b>										
836.57	31.80	88	2.4	H	-65.2	0.28	3.75	-61.73	-13	48.73
836.57	31.97	258	1.2	V	-65.0	0.28	3.75	-61.53	-13	48.53
3760.00	47.33	184	1.4	H	-46.4	2.42	12.60	-36.22	-13	23.22
3760.00	51.03	64	1.5	V	-41.7	2.42	12.60	-31.52	-13	18.52

**Note:**

- 1) Absolute Level = SG Level - Cable loss + Antenna Gain
- 2) Margin = Limit- Absolute Level

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

**Applicable Standard**

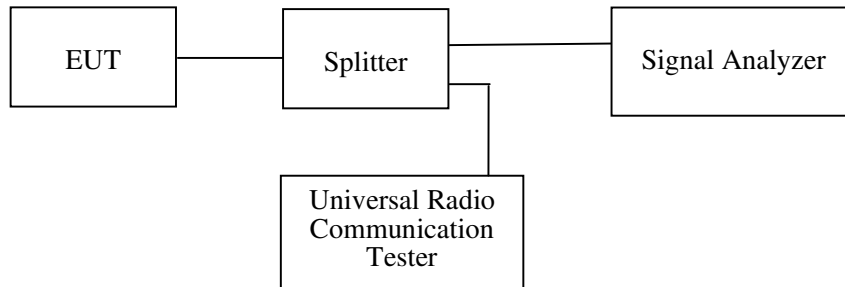
According to § 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

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 Data**

**Environmental Conditions**

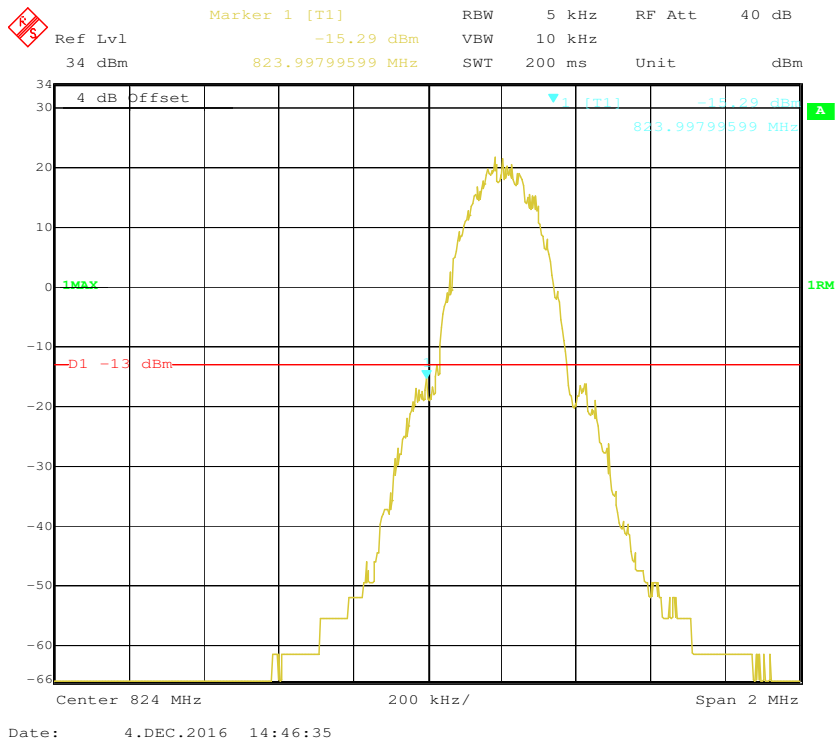
<b>Temperature:</b>	22~24°C
<b>Relative Humidity:</b>	45~50 %
<b>ATM Pressure:</b>	100.0~101.0 kPa

*The testing was performed by Echo Wu from 2016-12-04 to 2016-12-13.*

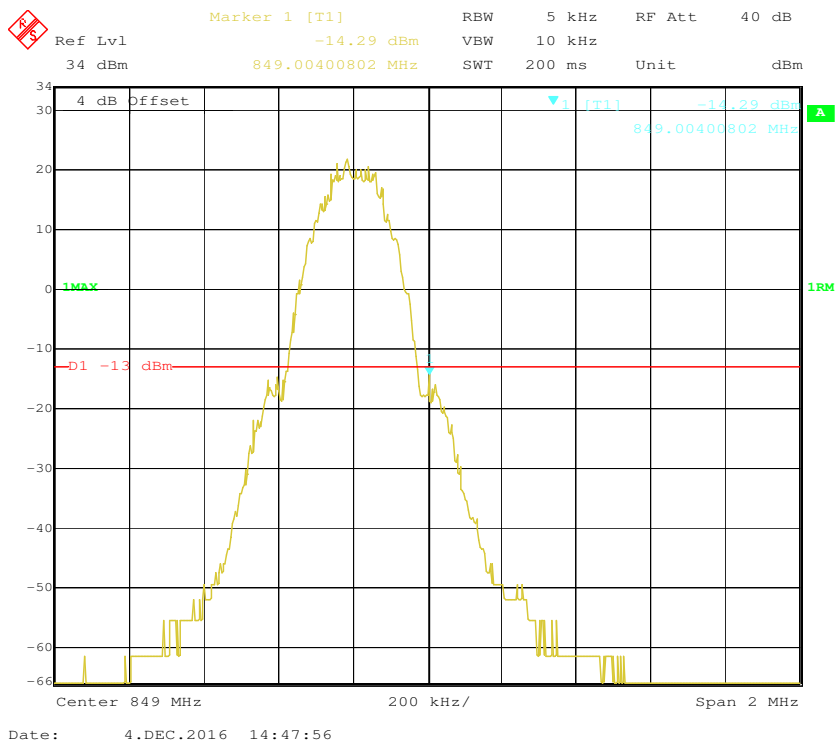
*EUT Operation Mode: Transmitting*

*Test Result: Compliance. Please refer to the following plots.*

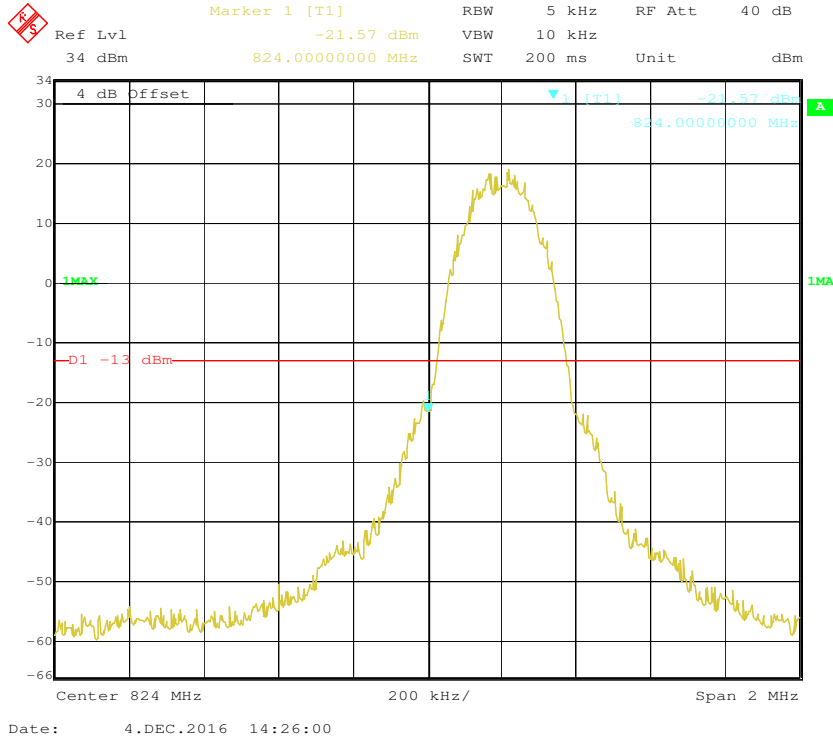
**Cellular Band, Left Band Edge for GPRS (GMSK) Mode**



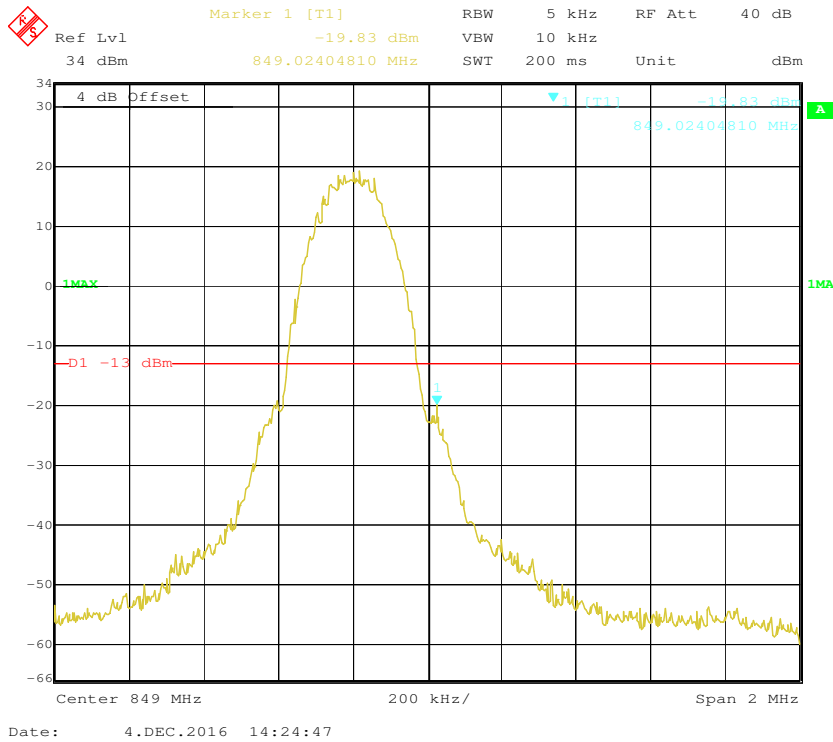
**Cellular Band, Right Band Edge for GPRS (GMSK) Mode**



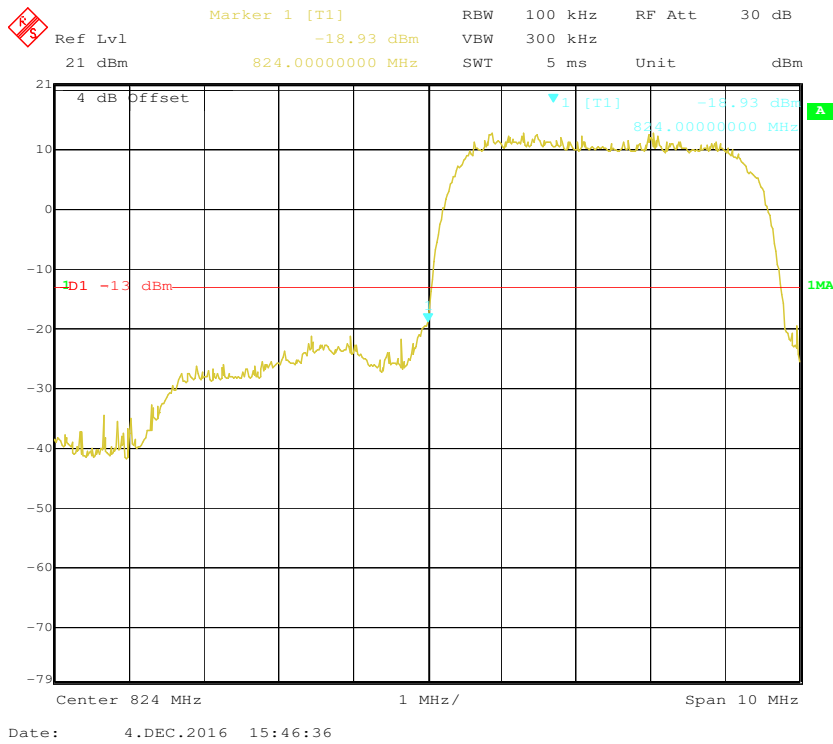
### Cellular Band, Left Band Edge for EDGE (8PSK) Mode



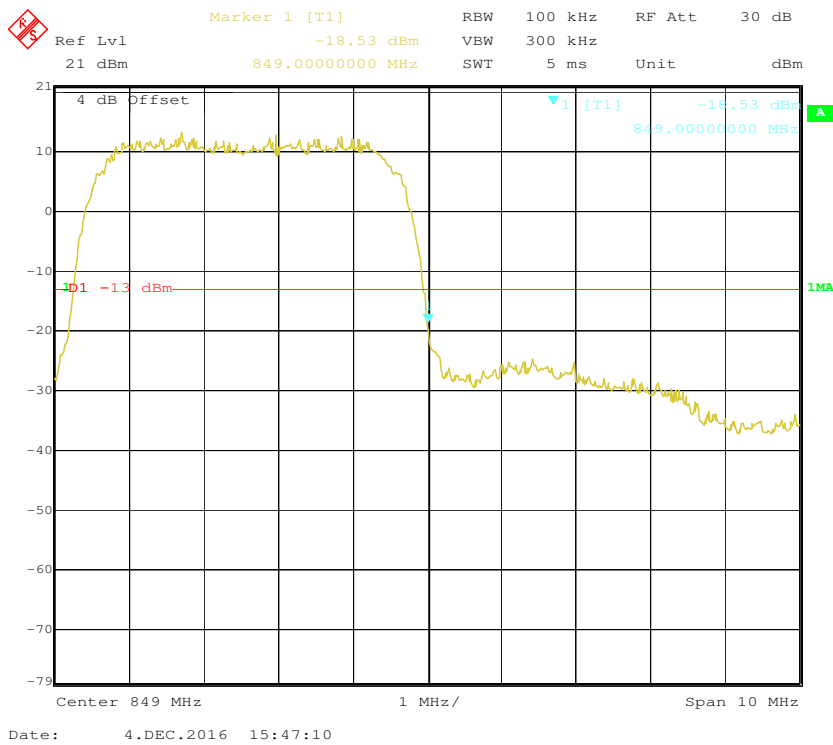
### Cellular Band, Right Band Edge for EDGE (8PSK) Mode



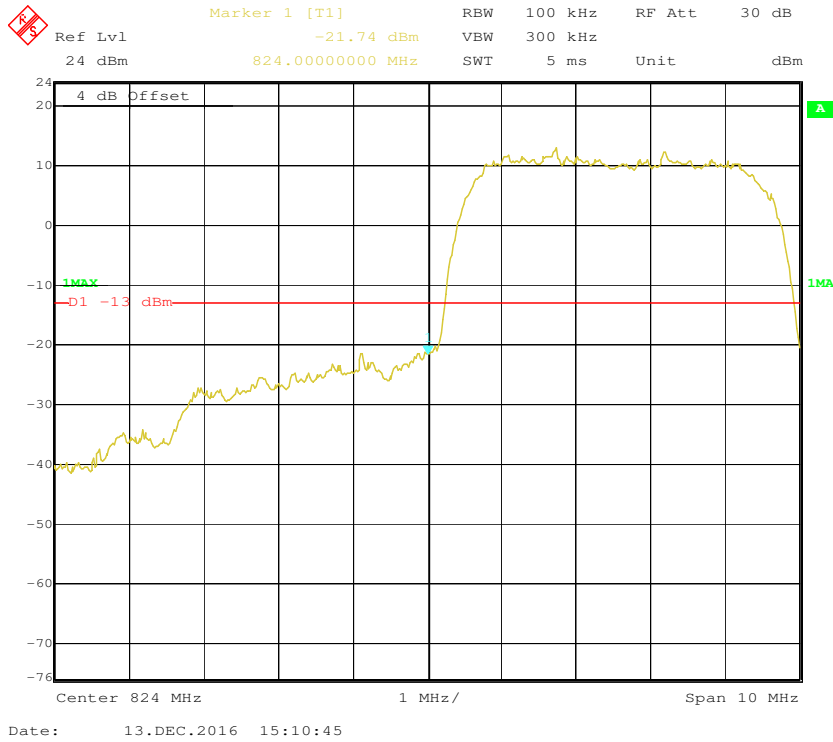
**Cellular Band, Left Band Edge for WCDMA (BPSK) Mode**



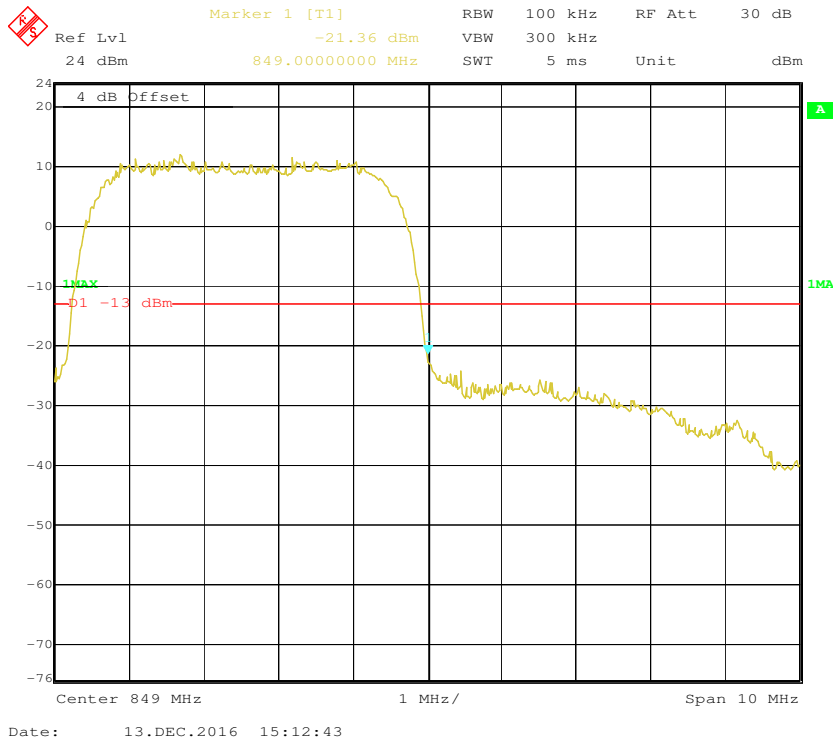
**Cellular Band, Right Band Edge for WCDMA (BPSK) Mode**



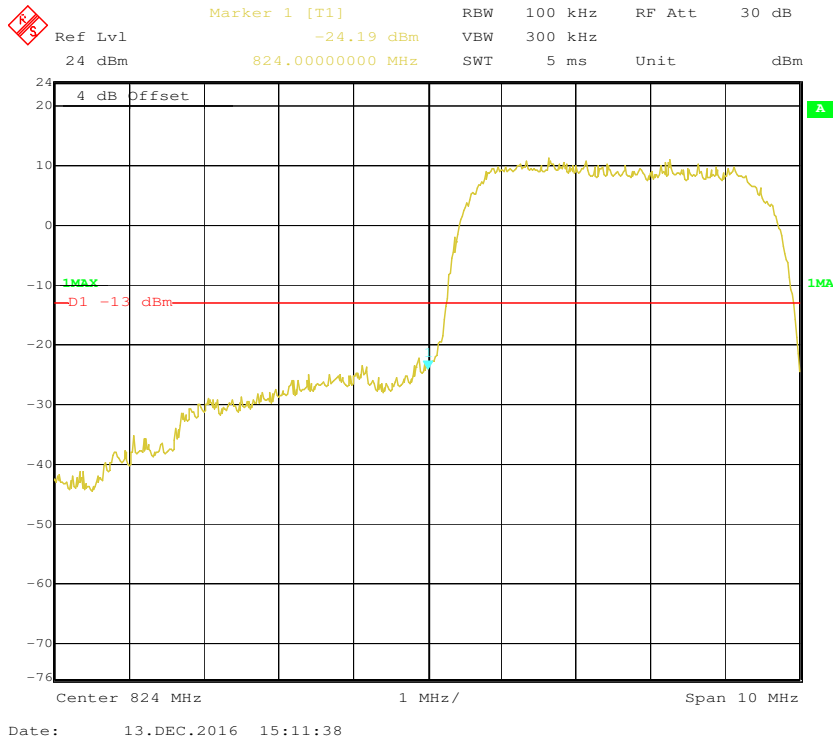
### Cellular Band, Left Band Edge for HSDPA (16QAM) Mode



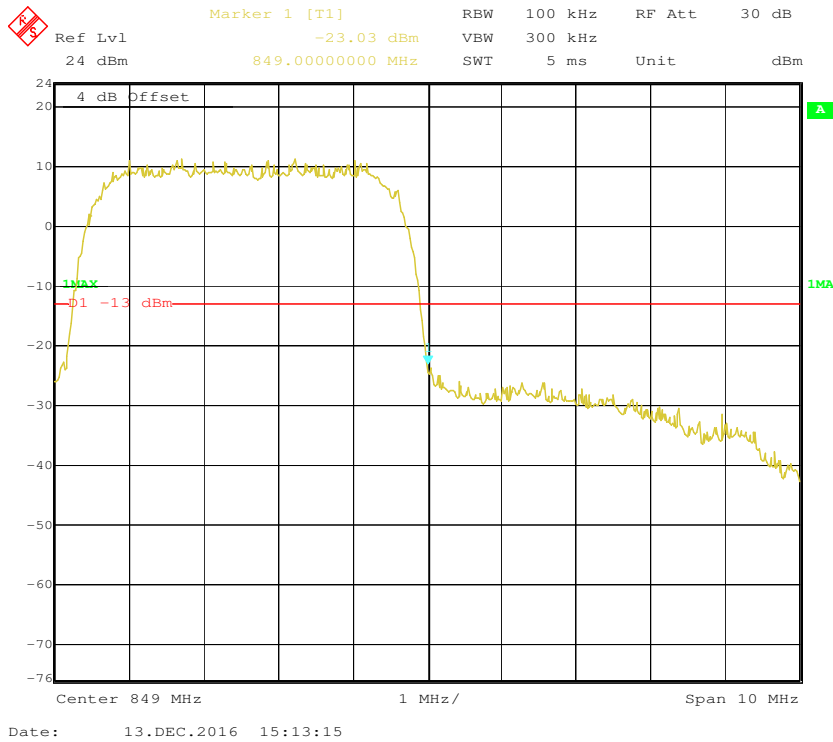
### Cellular Band, Right Band Edge for HSDPA (16QAM) Mode



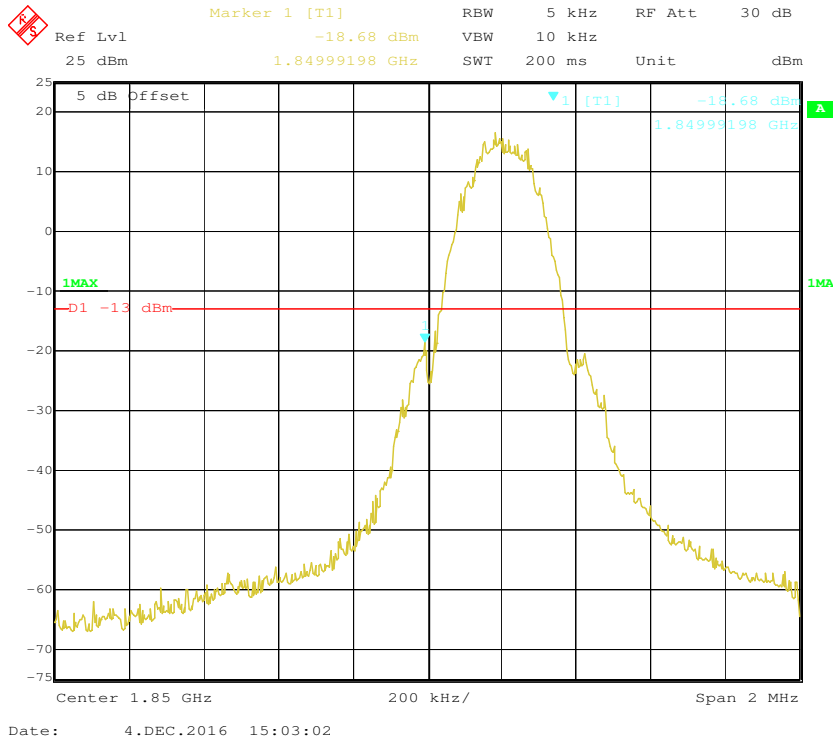
**Cellular Band, Left Band Edge for HSUPA (BPSK) Mode**



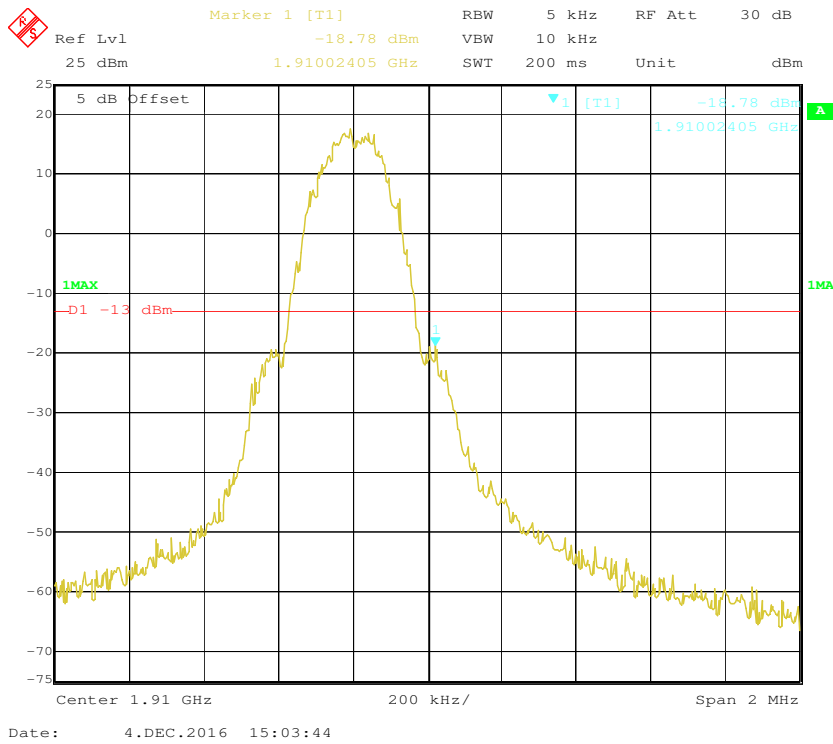
**Cellular Band, Right Band Edge for HSUPA (BPSK) Mode**



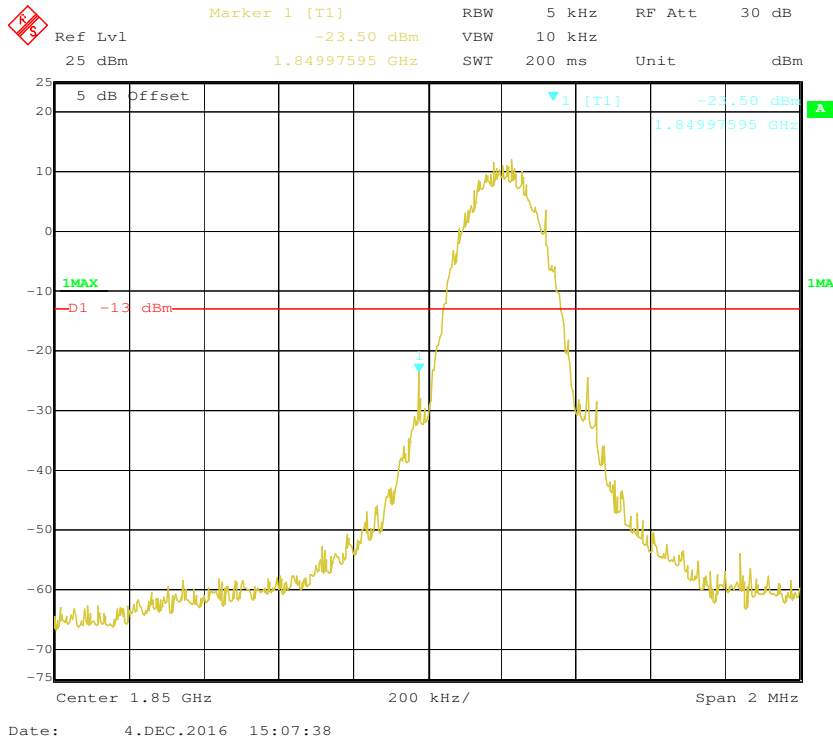
**PCS Band, Left Band Edge for GPRS (GMSK) Mode**



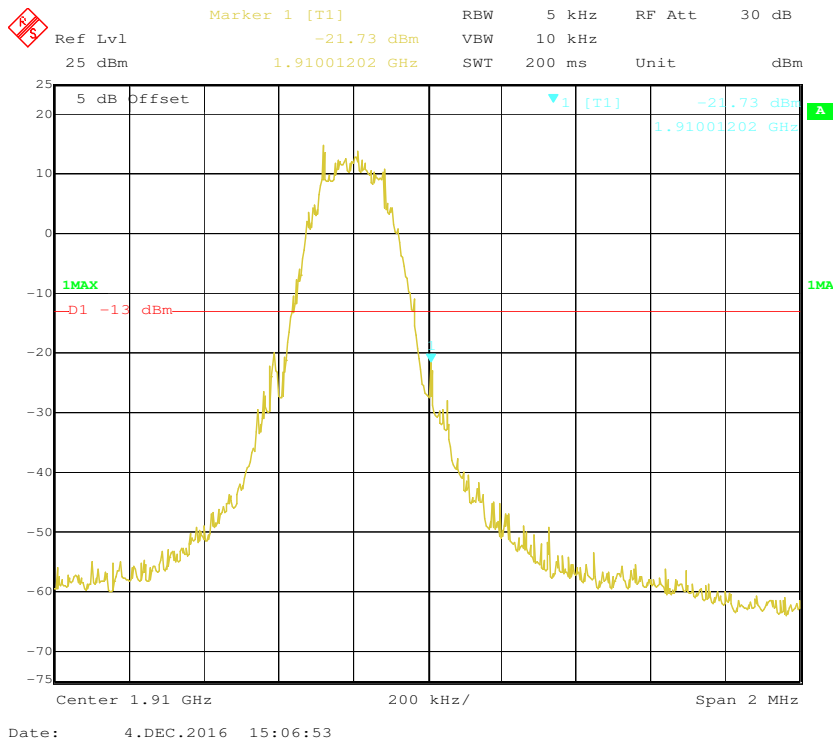
**PCS Band, Right Band Edge for GPRS (GMSK) Mode**



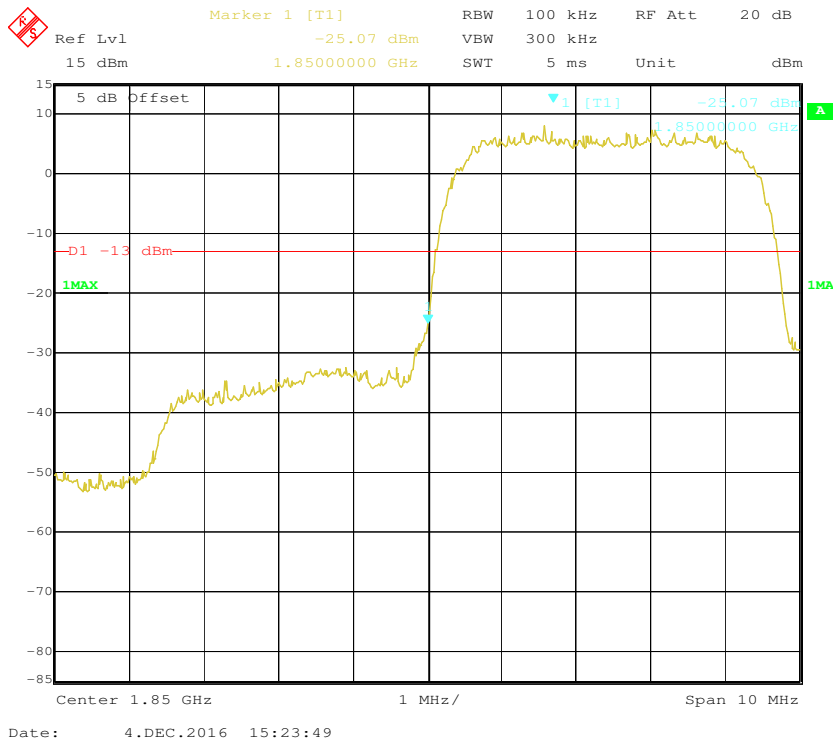
**PCS Band, Left Band Edge for EDGE (8PSK) Mode**



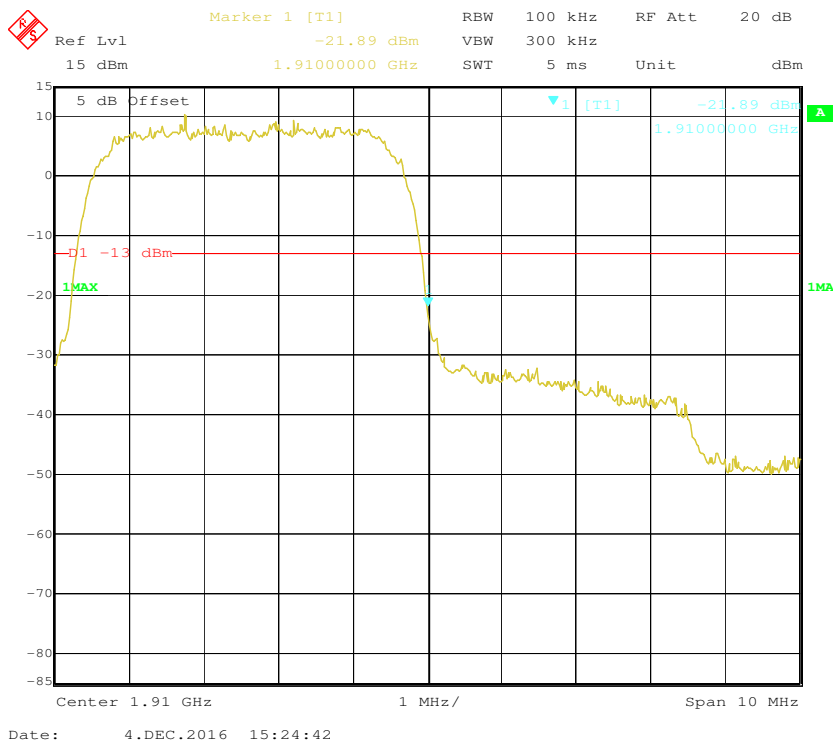
**PCS Band, Right Band Edge for EDGE (8PSK) Mode**



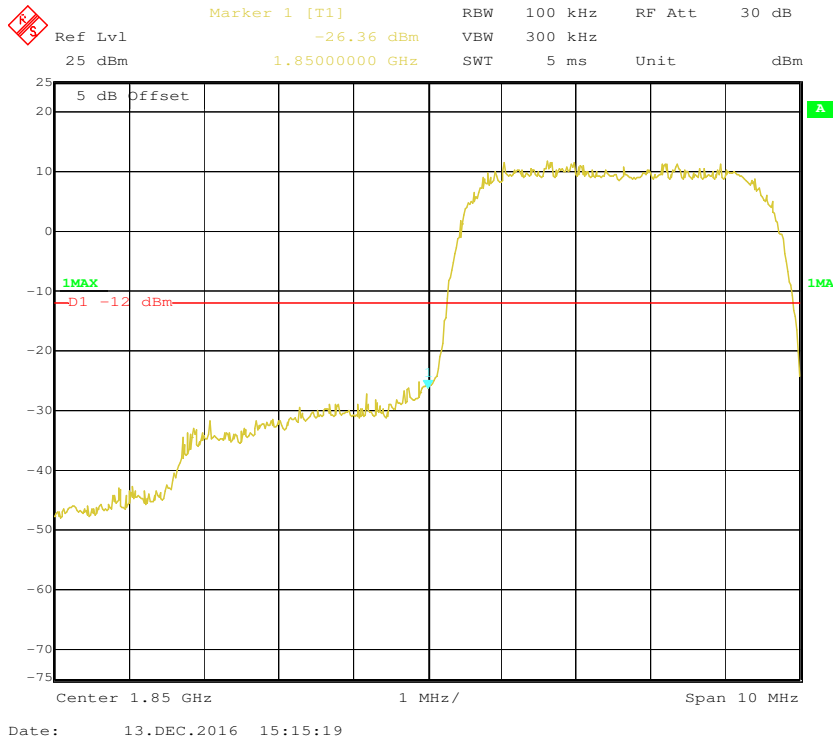
**PCS Band, Left Band Edge for WCDMA (BPSK) Mode**



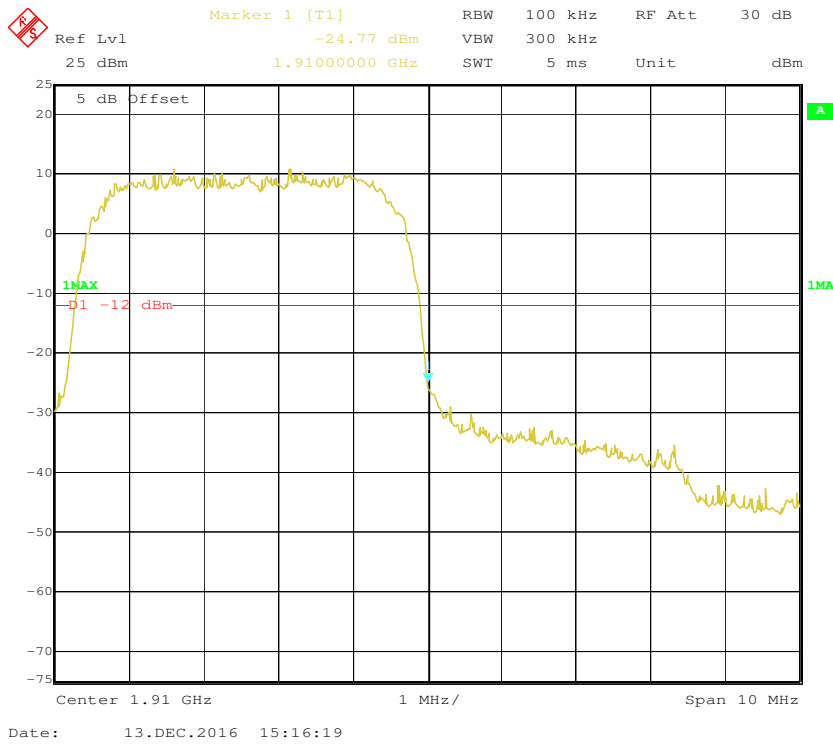
**PCS Band, Right Band Edge for WCDMA (BPSK) Mode**



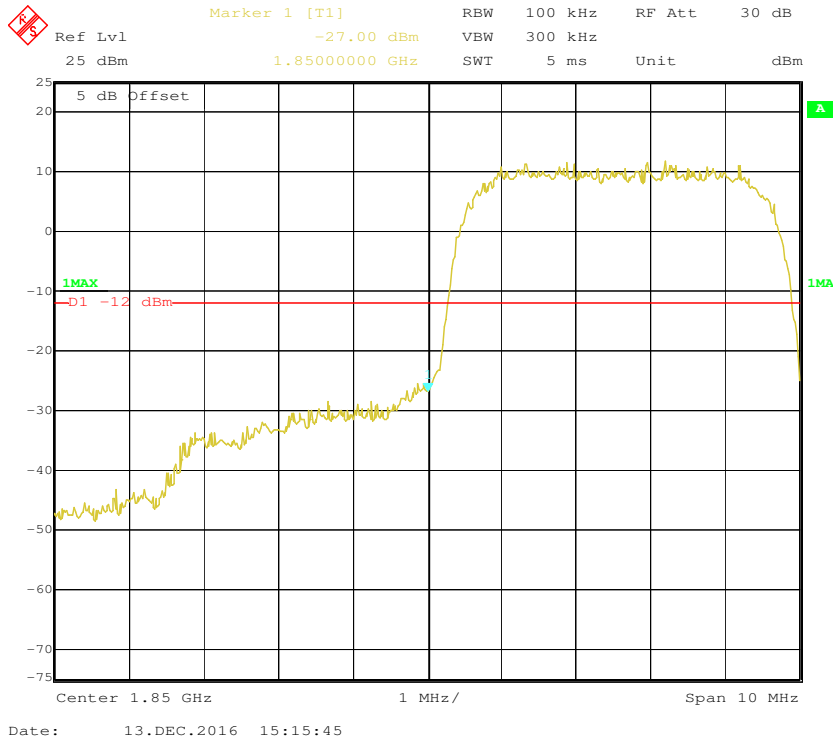
### PCS Band, Left Band Edge for HSDPA (16QAM) Mode



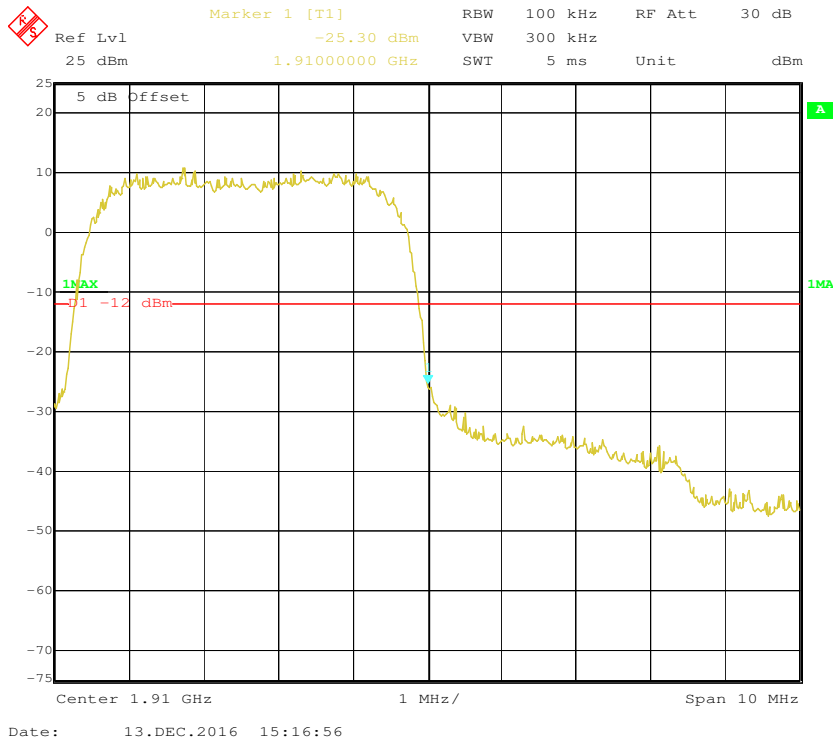
### PCS Band, Right Band Edge for HSDPA (16QAM) Mode



### PCS Band, Left Band Edge for HSUPA (BPSK) Mode



### PCS Band, Right Band Edge for HSUPA (BPSK) Mode



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

### Applicable Standard

FCC § 2.1055, §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

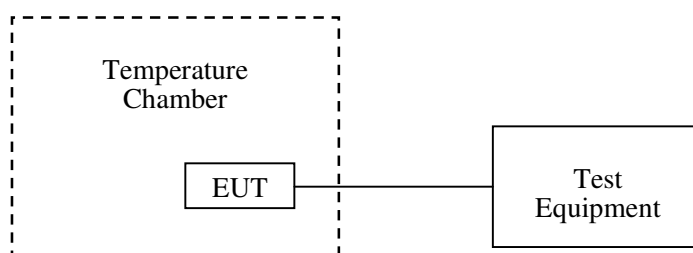
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

### 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: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	24 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Echo Wu on 2016-12-04.*

*EUT Operation Mode: Transmitting*

*Test Result: Compliance. Please refer to the following tables.*

**Cellular Band (Part 22H)**

**GPRS Mode**

Middle Channel, $f_0 = 836.6$ MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.7V	-1	-0.001195	2.5
-20		0	0.000000	2.5
-10		3	0.003586	2.5
0		1	0.001195	2.5
10		2	0.002391	2.5
20		5	0.005977	2.5
30		-2	-0.002391	2.5
40		3	0.003586	2.5
50		6	0.007172	2.5
25		3.5V	9	0.010758
25	4.2V	14	0.016734	2.5

**EDGE Mode**

Middle Channel, $f_0 = 836.6$ MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.7V	3	0.003586	2.5
-20		2	0.002391	2.5
-10		-2	-0.002391	2.5
0		1	0.001195	2.5
10		2	0.002391	2.5
20		3	0.003586	2.5
30		-1	-0.001195	2.5
40		4	0.004781	2.5
50		5	0.005977	2.5
25		3.5V	8	0.009563
25	4.2V	9	0.010758	2.5

**WCDMA Mode**

<b>Middle Channel, <math>f_0 = 836.6</math> MHz</b>				
<b>Temperature (°C)</b>	<b>Power Supplied (V<sub>DC</sub>)</b>	<b>Frequency Error (Hz)</b>	<b>Frequency Error (ppm)</b>	<b>Limit (ppm)</b>
-30	3.7V	1	0.001195	2.5
-20		-2	-0.002391	2.5
-10		0	0.000000	2.5
0		3	0.003586	2.5
10		2	0.002391	2.5
20		-1	-0.001195	2.5
30		1	0.001195	2.5
40		-2	-0.002391	2.5
50		3	0.003586	2.5
25		3.5V	7	0.008367
25	4.2V	11	0.013148	2.5

**PCS Band (Part 24E)**

**GPRS Mode**

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.7V	7	0.003723	pass
-20		4	0.002128	pass
-10		6	0.003191	pass
0		8	0.004255	pass
10		10	0.005319	pass
20		11	0.005851	pass
30		8	0.004255	pass
40		13	0.006915	pass
50		16	0.008511	pass
25	3.5V	9	0.004787	pass
25	4.2V	21	0.011170	pass

**EDGE Mode**

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.7V	7	0.003723	pass
-20		6	0.003191	pass
-10		4	0.002128	pass
0		9	0.004787	pass
10		12	0.006383	pass
20		10	0.005319	pass
30		6	0.003191	pass
40		11	0.005851	pass
50		5	0.002660	pass
25	3.5V	12	0.006383	pass
25	4.2V	18	0.009574	pass

**WCDMA Mode**

<b>Middle Channel, f<sub>0</sub> = 1880.0 MHz</b>				
<b>Temperature (°C)</b>	<b>Power Supplied (V<sub>DC</sub>)</b>	<b>Frequency Error (Hz)</b>	<b>Frequency Error (ppm)</b>	<b>Result</b>
-30	3.7V	16	0.008511	pass
-20		7	0.003723	pass
-10		3	0.001596	pass
0		-2	-0.001064	pass
10		-6	-0.003191	pass
20		5	0.002660	pass
30		0	0.000000	pass
40		9	0.004787	pass
50		-2	-0.001064	pass
25	3.5V	13	0.006915	pass
25	4.2V	22	0.011702	pass

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