

FCC PART 27  
FCC PART 22H, PART 24E  
MEASUREMENT AND TEST REPORT

For

**Jiangsu SEUIC Technology Co.,Ltd**

No23, Wenzhu Road, Yuhuatai District Nanjing, Jiangsu, China

**FCC ID: 2AC68-CRUISE1**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Portable Data Collection Terminal
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<b>Report Number:</b> RKS160913001-00K	
<b>Report Date:</b> 2016-12-02 Jesse Huang	
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**Note:** This test report is prepared for the customer shown above and for the equipment 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

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

Manufacturer	Jiangsu SEUIC Technology Co.,Ltd.
Model	CRUISE 1
Series Model	CRUISE 1-HC
Product	Portable Data Collection Terminal
Dimension	152mm(H)×75.9mm(W)×12.8mm(T)
Power input	DC 3.8V From rechargeable battery or DC 5V Adapter

*Adapter 1 Information:**Model: SW-3530**INPUT: 100-240V~50/60Hz 0.7A**OUTPUT: 5V, 2.5A**Adapter 2 Information:**Model: FJ-SW1260502000UB**INPUT: 100-240V~50/60Hz 0.4A Max**OUTPUT: 5V, 2000mA*

*Note: \* The difference between tested model and series model was explained in the declaration letter.*

*\*All measurement and test data in this report was gathered from production sample serial number: 20160909001 (Assigned by BACL, Kunshan). The EUT was received on 2016-09-09.*

### Objective

This type approval report is prepared on behalf of Jiangsu SEUIC Technology Co.,Ltd in accordance with Part 2, Part 22-Subpart H, Part 24-Subpart E and Part 27 of the Federal Communication Commission's rules.

The objective is to determine the compliance of 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)

FCC Part 15B JBP, Part 15.247 DSS & DTS, Part 15.225 DXX and Part 15.407 NII submissions with FCC ID: 2AC68-CRUISE1.

### 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

Part 27 – Miscellaneous wireless communications services

Applicable Standards: TIA/EIA 603-D.

All radiated and conducted emissions measurements were 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
RF conducted test with spectrum		$\pm 0.9\text{dB}$
RF Output Power with Power meter		$\pm 0.5\text{dB}$
Radiated emission	30MHz~1GHz	$\pm 5.91\text{dB}$
	Above 1GHz	$\pm 4.92\text{dB}$
Occupied Bandwidth		$\pm 0.5\text{kHz}$
CMU200		$\pm 0.5\text{dB}$
CMW500		$\pm 0.5\text{dB}$
Temperature		$\pm 1.0^{\circ}\text{C}$
Humidity		$\pm 6\%$

**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 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.

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.

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

### Equipment Modifications

No modifications were made to the EUT.

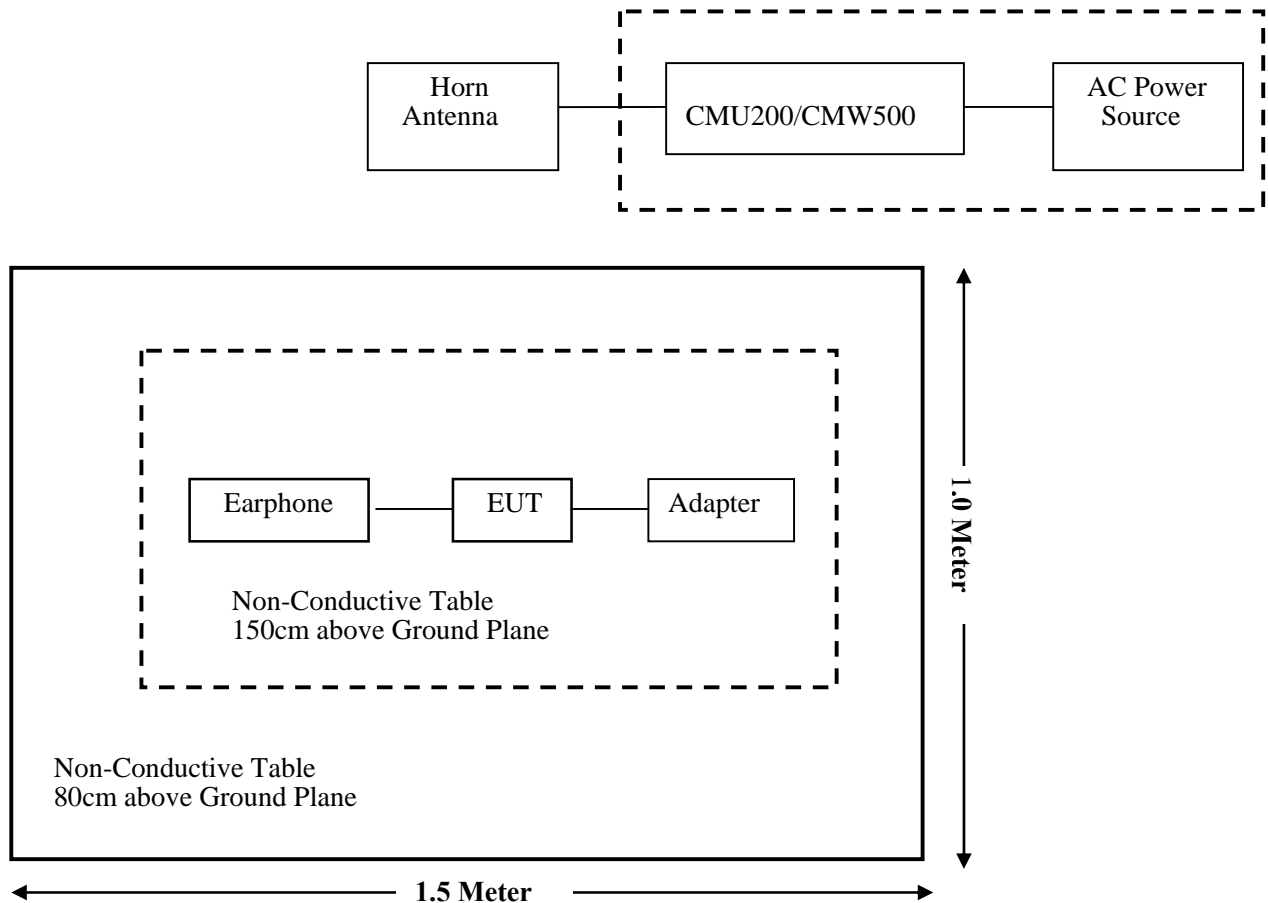
### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Hisense	Earphone	N/A	N/A

### External Cable List and Details

Cable Description	Length (m)	From Port	To
USB Cable	0.8m	EUT	Adapter

### Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

FCC Rules	Description of Test	Result
§1.1307(b) & §2.1093	RF Exposure Information	Compliance*
§2.1046; § 22.913 (a); § 24.232 (c); §27.50 (d) (h)	RF Output Power	Compliance
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.905; § 22.917; § 24.238; §27.53	Occupied Bandwidth	Compliance
§ 2.1051; § 22.917 (a); § 24.238 (a); §27.53 (h)(m)	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053; § 22.917 (a); § 24.238 (a); §27.53 (h)(m)	Spurious Radiated Emissions	Compliance
§ 22.917 (a); § 24.238 (a); §27.53 (h)(m)	Band Edge	Compliance
§ 2.1055; § 22.355; § 24.235; §27.54;	Frequency stability	Compliance

Compliance\*: Please refer to SAR report released by BACL, report number: RKS160905050-20.



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## **FCC §1.1307(b) & §2.1093 - RF EXPOSURE INFORMATION**

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### **Applicable Standard**

FCC§1.1307, §2.1093.

### **Test Result**

Compliance, please refer to the SAR report: RKS160905050-20.

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

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According to FCC § 2.1047(d) , Part 22H & 24E, Part 27 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

**§2.1046; § 22.913 (a);§ 24.232 (c); §27.50 (d) - RF OUTPUT POWER****Applicable Standards**

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

According to FCC §2.1046 and §24.232 (c), 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..

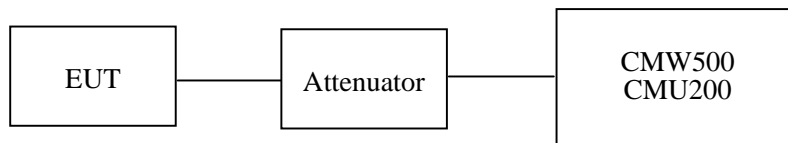
According to §27.50(d), the maximum EIRP must not exceed 1Watts (30dBm) for 1710-1755MHz. The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

According to §27.50, the maximum EIRP must not exceed 3Watts (34.77dBm) for 699-716MHz.

**Test Procedure**

*Conducted method:*

The RF output of the transmitter was connected to the CMW500/CMU200 through sufficient attenuation.



**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2015-11-12	2016-11-11
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	110605	2015-11-25	2016-11-25
Rohde & Schwarz	Wideband Radio Communication tester	CMW500	1201.002K50-116218-UY	2016-10-08	2017-10-07
Rohde & Schwarz	Spectrum Analyzer	FSIQ26	100048	2015-11-12	2016-11-11
SEUIC	RF Cable	N/A	N/A	2016-10-02	2017-10-01
Sonoma Instrument	Amplifier	330	171377	2016-09-16	2017-09-16
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2015-11-12	2016-11-11
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
ETS	Horn Antenna	3115	6229	2016-01-11	2019-01-10
ETS	Horn Antenna	3115	9311-4159	2016-01-11	2019-01-10
Mini	Pre-amplifier	ZVA-183-S+	857001418	2016-09-16	2017-09-16
HP	Signal Generator	E4421B	3426A01336	2015-11-04	2016-11-03
R&S	Auto test Software	EMC32	V 09.10.0	-	-

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

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

<b>Temperature:</b>	23 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	101.0kPa

*The testing was performed by Chris Wang on 2016-10-12.*

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

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	128	824.2	32.25	38.45
	190	836.6	32.36	38.45
	251	848.8	32.39	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	32.41	28.62	26.98	25.06	38.45
	190	836.6	32.52	28.64	26.91	24.86	38.45
	251	848.8	32.50	28.83	26.67	25.15	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	128	824.2	26.31	25.60	23.09	21.49	38.45
	190	836.6	26.26	25.58	23.07	21.42	38.45
	251	848.8	26.28	25.66	22.98	21.37	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		21.76	21.97	21.97
		Rel 6 HSDPA	1	21.67	21.89	21.89
			2	21.73	21.88	21.83
			3	21.70	21.92	21.73
			4	21.72	21.85	21.64
		Rel 6 HSUPA	1	21.69	21.78	21.57
			2	21.73	21.80	21.49
			3	21.69	21.72	21.41
			4	21.68	21.81	21.33
			5	21.70	21.73	21.28
		HSPA+	1	21.78	21.78	21.19

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
CDMA 850MHz	Normal	RMC12.2k		27.52	27.37	26.77
		1xEV-DO	1	27.82	27.71	26.90
			2	26.53	26.23	26.43

**PCS Band (Part 24E)**

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	512	1850.2	29.50	33
	661	1880.0	29.20	33
	810	1909.8	29.00	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	29.44	27.34	26.02	24.56	33
	661	1880.0	29.17	27.13	25.74	24.37	33
	810	1909.8	28.97	26.63	25.35	23.98	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	512	1850.2	25.74	25.42	22.63	20.25	33
	661	1880.0	25.46	25.17	22.30	19.91	33
	810	1909.8	24.98	24.70	21.81	19.48	33

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band II)	Normal	Rel 99	1	21.99	21.83	22.20
		Rel 6 HSDPA	1	21.90	21.73	22.15
			2	21.90	21.80	22.07
			3	21.84	21.75	21.98
			4	21.81	21.77	21.89
		Rel 6 HSUPA	1	21.90	21.81	21.82
			2	21.83	21.85	21.77
			3	21.82	21.80	21.70
			4	21.80	21.83	21.63
			5	21.84	21.93	21.53
		HSPA+	1	21.86	21.98	21.43

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

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	2.23	13
	Middle	2.31	13
	High	2.59	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	2.44	13
	Middle	2.41	13
	High	2.46	13

Mode	Channel	PAR (dB)	Limit (dB)
WCDMA (BPSK)	Low	3.14	13
	Middle	3.19	13
	High	3.13	13
HSDPA (16QAM)	Low	2.83	13
	Middle	2.76	13
	High	2.53	13
HSUPA (BPSK)	Low	2.72	13
	Middle	2.79	13
	High	2.69	13
HSPA+ (16QAM)	Low	2.57	13
	Middle	2.44	13
	High	2.34	13



**PCS Band**

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	2.21	13
	Middle	2.30	13
	High	2.19	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	2.33	13
	Middle	2.51	13
	High	2.42	13

Mode	Channel	PAR (dB)	Limit (dB)
WCDMA (BPSK)	Low	2.68	13
	Middle	2.71	13
	High	2.72	13
HSDPA (16QAM)	Low	2.59	13
	Middle	2.37	13
	High	2.44	13
HSUPA (BPSK)	Low	2.42	13
	Middle	2.29	13
	High	2.56	13
HSPA+ (16QAM)	Low	2.34	13
	Middle	2.20	13
	High	2.08	13

**Radiated Power****GSM 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)			
Cellular Band (Part 22H), Middle Channel										
836.6	97.98	134	1.4	H	29.9	0.3	4.86	31.46	38.45	3.99
836.6	93.68	336	1.6	V	26.6	0.3	4.86	26.16	38.45	7.29
PCS Band (Part 24E), Middle Channel										
1880.00	93.53	16	1.8	H	22.4	1.40	6.72	27.72	33.00	5.28
1880.00	87.03	332	1.3	V	15.9	1.40	6.72	21.26	33.00	11.74

**EDGE 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)			
Cellular Band (Part 22H), Middle Channel										
836.6	93.01	57	1.4	H	21.93	0.3	4.86	26.49	38.45	11.96
836.6	89.78	245	1.5	V	17.7	0.3	4.86	22.26	38.45	16.19
PCS Band (Part 24E), Middle Channel										
1880.0	90.43	228	2.2	H	19.3	1.4	6.72	24.62	33	8.38
1880.0	87.89	134	1.6	V	16.8	1.4	6.72	22.12	33	10.88

**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)			
WCDMA Band V (Part 22H), Middle Channel										
836.6	86.35	253	1.3	H	15.27	0.3	4.86	19.83	38.45	18.62
836.6	85.08	23	1.7	V	13.00	0.3	4.86	17.56	38.45	20.89
WCDMA Band II (Part 24E), Middle Channel										
1880.0	85.38	10	1.5	H	14.25	1.4	6.72	19.57	33	13.43
1880.0	82.26	170	1.7	V	11.17	1.4	6.72	16.49	33	16.51

**CDMA 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)			
CDMA BC0 (Part 22H), Middle Channel										
836.52	85.06	7	1.3	H	15.08	1.4	4.86	18.54	33	14.46
836.52	82.99	343	1.8	V	12.01	1.4	4.86	15.47	33	17.53

**Note:**

All above data were tested with no amplifier.

Absolute Level = SG Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

**LTE Band 7****Maximum Output Power**

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)	Limit (dBm)
5M	QPSK	1#0	22.45	22.54	22.47	33.00
		1#12	22.51	22.51	22.32	
		1#24	22.35	22.53	22.48	
		12#0	22.13	22.26	22.21	
		12#6	22.16	22.03	22.01	
		12#11	22.08	22.12	22.23	
		25#0	21.52	21.62	21.49	
	16-QAM	1#0	21.50	21.50	21.25	
		1#12	21.48	21.48	21.19	
		1#24	21.54	21.49	21.37	
		12#0	21.24	21.28	20.96	
		12#6	21.12	21.20	20.96	
		12#11	21.15	21.20	21.07	
		25#0	20.73	20.67	20.64	
10M	QPSK	1#0	22.51	22.62	22.52	33.00
		1#24	22.31	22.54	22.61	
		1#49	22.51	22.52	22.36	
		25#0	22.13	22.23	22.20	
		25#12	22.18	22.34	22.22	
		25#24	22.22	22.23	22.34	
		50#0	21.48	21.68	21.58	
	16-QAM	1#0	21.52	21.28	21.28	
		1#24	21.50	21.31	21.32	
		1#49	21.47	21.22	21.44	
		25#0	21.39	21.09	21.05	
		25#12	21.25	21.05	20.87	
		25#24	21.17	21.19	21.14	
		50#0	20.68	20.42	20.46	

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)	Limit (dBm)
15M	QPSK	1#0	22.45	22.47	22.48	33.00
		1#37	22.39	22.52	22.32	
		1#74	22.40	22.37	22.50	
		36#0	22.17	22.12	21.94	
		36#17	22.02	22.10	21.85	
		36#35	22.19	22.13	21.99	
		75#0	21.45	21.66	21.63	
	16-QAM	1#0	21.28	21.55	21.42	
		1#37	21.50	21.48	21.30	
		1#74	21.41	21.48	21.38	
		36#0	21.03	21.26	21.02	
		36#17	21.02	21.20	21.04	
		36#35	20.85	21.19	20.86	
		75#0	20.43	20.26	20.40	
20M	QPSK	1#0	22.36	22.44	22.36	33.00
		1#49	22.36	22.42	22.37	
		1#99	22.47	22.35	22.53	
		50#0	22.10	22.06	22.31	
		50#24	21.95	22.17	22.22	
		50#49	22.07	22.21	22.25	
		100#0	21.74	21.78	21.37	
	16-QAM	1#0	21.36	21.33	21.58	
		1#49	21.49	21.31	21.53	
		1#99	21.40	21.33	21.51	
		50#0	20.95	21.03	21.26	
		50#24	21.09	20.98	21.13	
		50#49	21.06	21.05	21.06	
		100#0	20.55	20.42	20.43	

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

Test Modulation		Test Bandwidth	Low Channel (dB)	Middle Channel (dB)	High Channel (dB)	Limit(dB)
QPSK	1 RB	20M	4.32	4.32	4.32	13.00
	100 RB		6.24	6.28	6.36	13.00
16-QAM	1 RB	20M	5.12	5.12	5.08	13.00
	100 RB		7.08	7.08	7.04	13.00

**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)			
QPSK 5M BW Middle Channel 2535.000 MHZ								
2535.000	H	78.64	7.4	13.1	2.5	18.0	33.00	15.0
2535.000	V	81.28	11.5	13.1	2.5	22.1	33.00	10.9
16-QAM 5M BW Middle Channel 2535.000 MHZ								
2535.000	H	77.18	6	13.1	2.5	16.6	33.00	16.4
2535.000	V	80.22	10.5	13.1	2.5	21.1	33.00	11.9
QPSK 10M BW Middle Channel 2535.000 MHZ								
2535.000	H	77.69	6.5	13.1	2.5	17.1	33.00	15.9
2535.000	V	80.63	10.9	13.1	2.5	21.5	33.00	11.5
16-QAM 10M BW Middle Channel 2535.000 MHZ								
2535.000	H	76.29	5.1	13.1	2.5	15.7	33.00	17.3
2535.000	V	79.87	10.1	13.1	2.5	20.7	33.00	12.3
QPSK 15M BW Middle Channel 2535.000 MHZ								
2535.000	H	76.84	5.6	13.1	2.5	16.2	33.00	16.8
2535.000	V	79.12	9.4	13.1	2.5	20.0	33.00	13.0
16-QAM 15M BW Middle Channel 2535.000MHZ								
2535.000	H	75.38	4.2	13.1	2.5	14.8	33.00	18.2
2535.000	V	78.14	8.4	13.1	2.5	19.0	33.00	14.0
QPSK 20M BW Middle Channel 2535.000 MHZ								
2535.000	H	75.91	4.7	13.1	2.5	15.3	33.00	17.7
2535.000	V	78.78	9	13.1	2.5	19.6	33.00	13.4
16-QAM 20M BW Middle Channel 2535.000 MHZ								
2535.000	H	74.51	3.3	13.1	2.5	13.9	33.00	19.1
2535.000	V	77.64	7.9	13.1	2.5	18.5	33.00	14.5

**Note:**

All above data were tested with no amplifier

Absolute Level = SG Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

**LTE Band 41:****Maximum Output Power**

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5M	QPSK	1#0	22.76	22.53	22.61
		1#12	22.66	22.55	22.62
		1#24	22.70	22.43	22.53
		12#0	22.49	22.05	22.33
		12#6	22.54	22.15	22.30
		12#11	22.34	22.21	22.17
		25#0	21.71	21.95	21.25
	16-QAM	1#0	22.07	21.98	21.85
		1#12	21.98	21.91	21.78
		1#24	21.90	22.03	21.87
		12#0	21.55	21.63	21.51
		12#6	21.47	21.61	21.57
		12#11	21.74	21.96	21.66
		25#0	20.86	21.05	20.97
10M	QPSK	1#0	22.77	22.44	22.54
		1#24	22.83	22.48	22.50
		1#49	22.78	22.43	22.58
		25#0	22.42	22.45	22.28
		25#12	22.30	22.42	22.28
		25#24	22.33	22.61	22.33
		50#0	22.13	22.01	21.90
	16-QAM	1#0	22.10	22.25	21.94
		1#24	22.10	22.10	21.81
		1#49	22.17	22.28	21.82
		25#0	21.66	21.77	21.38
		25#12	21.50	21.80	21.30
		25#24	21.51	21.83	21.28
		50#0	20.95	21.15	21.01

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15M	QPSK	1#0	22.80	22.49	22.78
		1#37	22.83	22.52	22.82
		1#74	22.79	22.45	22.79
		36#0	22.39	22.36	22.46
		36#17	22.36	22.33	22.44
		36#35	22.37	22.37	22.41
		75#0	21.79	21.69	21.69
	16-QAM	1#0	22.03	22.14	21.75
		1#37	21.96	22.22	21.61
		1#74	22.12	22.25	21.71
		36#0	21.61	21.81	21.37
		36#17	21.72	21.90	21.47
		36#35	21.65	21.74	21.32
		75#0	21.03	21.00	20.99
20M	QPSK	1#0	22.79	22.54	22.61
		1#49	22.76	22.52	22.79
		1#99	22.70	22.50	22.73
		50#0	22.43	22.34	22.27
		50#24	22.45	22.35	22.05
		50#49	22.34	22.31	22.22
		100#0	21.65	21.71	21.51
	16-QAM	1#0	22.21	22.33	21.83
		1#49	22.32	22.26	21.91
		1#99	22.09	22.37	21.81
		50#0	21.82	22.03	21.50
		50#24	21.68	21.94	21.58
		50#49	21.66	21.84	21.53
		100#0	20.96	21.12	20.86



**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)			
QPSK 5M BW Middle Channel 2605.000 MHZ								
2605.000	H	74.33	3.6	13.2	2.5	14.3	33.00	18.7
2605.000	V	80.08	11.2	13.2	2.5	21.9	33.00	11.1
16-QAM 5M BW Middle Channel 2605.000 MHZ								
2605.000	H	73.85	3.1	13.2	2.5	13.8	33.00	19.2
2605.000	V	79.54	10.7	13.2	2.5	21.4	33.00	11.6
QPSK 10M BW Middle Channel 2605.000 MHZ								
2605.000	H	73.18	2.5	13.2	2.5	13.2	33.00	19.8
2605.000	V	79.06	10.2	13.2	2.5	20.9	33.00	12.1
16-QAM 10M BW Middle Channel 2605.000 MHZ								
2605.000	H	72.59	1.9	13.2	2.5	12.6	33.00	20.4
2605.000	V	78.16	9.3	13.2	2.5	20.0	33.00	13.0
QPSK 15M BW Middle Channel 2605.000 MHZ								
2605.000	H	72.28	1.6	13.2	2.5	12.3	33.00	20.7
2605.000	V	78.34	9.5	13.2	2.5	20.2	33.00	12.8
16-QAM 15M BW Middle Channel 2605.000 MHZ								
2605.000	H	71.62	0.9	13.2	2.5	11.6	33.00	21.4
2605.000	V	77.84	9	13.2	2.5	19.7	33.00	13.3
QPSK 20M BW Middle Channel 2605.000 MHZ								
2605.000	H	71.06	0.3	13.2	2.5	11.0	33.00	22.0
2605.000	V	77.96	9.1	13.2	2.5	19.8	33.00	13.2
16-QAM 20M BW Middle Channel 2605.000 MHZ								
2605.000	H	70.98	0.3	13.2	2.5	11.0	33.00	22.0
2605.000	V	76.34	7.5	13.2	2.5	18.2	33.00	14.8

**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 & §27.53 - OCCUPIED BANDWIDTH

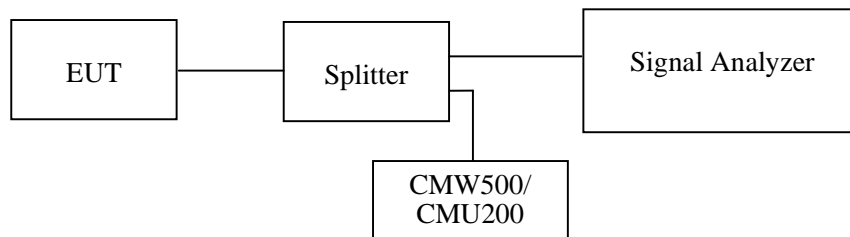
### Applicable Standards

FCC 47 §2.1049, §22.917, §22.905, §24.238 and §27.53.

### 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 (Cellular /PCS) & 100 kHz (WCDMA) 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	Signal Analyzer	FSIQ26	100048	2015-11-12	2016-11-11
Rohde & Schwarz	Signal Analyzer	FSV40	101116	2016-07-04	2017-07-03
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	110605	2015-11-25	2016-11-25
R&S	Wideband Radio Communication tester	CMW500	1201.002K50-116218-UY	2016-10-08	2017-10-07
Haojintech	Coaxial Cable	SR	SS11800	2016-09-08	2017-09-08
Dressler	attenuator	ATT 6/75	510020010004	/	/

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

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

<b>Temperature:</b>	23 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	101.0kPa

The testing was performed by Chris Wang on 2016-09-19 to 2016-10-20.

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)
GSM(GMSK)	836.6	244.49	314.63
EGPRS(8PSK)	836.6	242.48	304.61

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
WCDMA (BPSK)	836.6	4.17	4.69

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
CDMA850 (1xEV-DO)	836.52	1.20	1.44

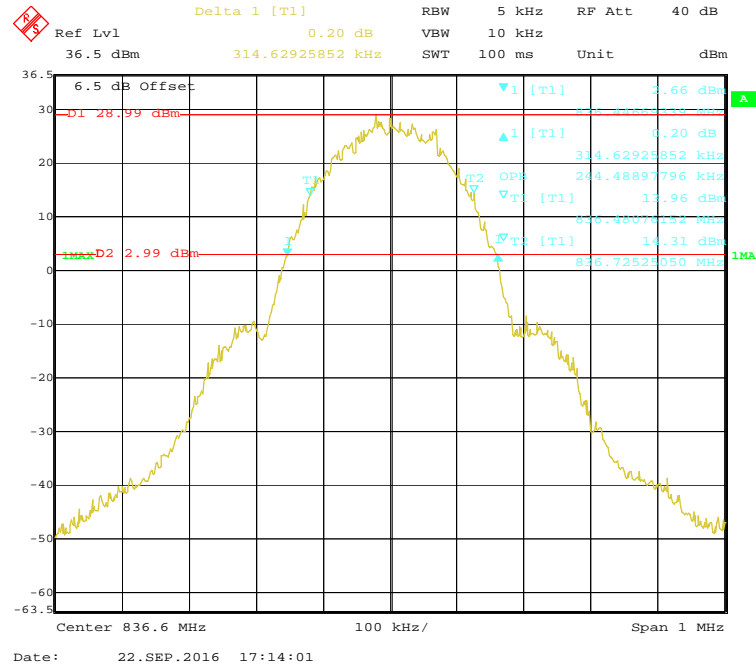
**PCS Band (Part 24E)**

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	1880.0	242.48	322.65
EGPRS(8PSK)	1880.0	248.50	308.62

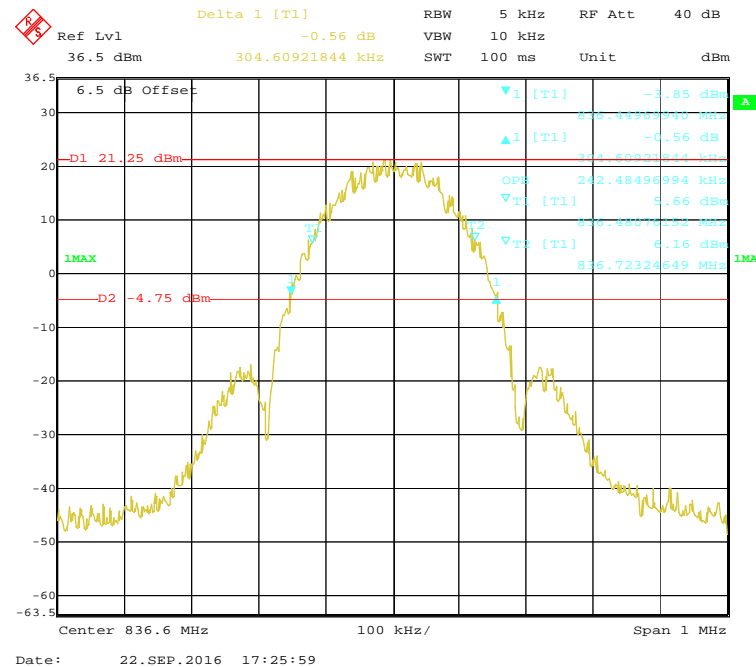
Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
WCDMA (BPSK)	1880.0	4.17	4.69

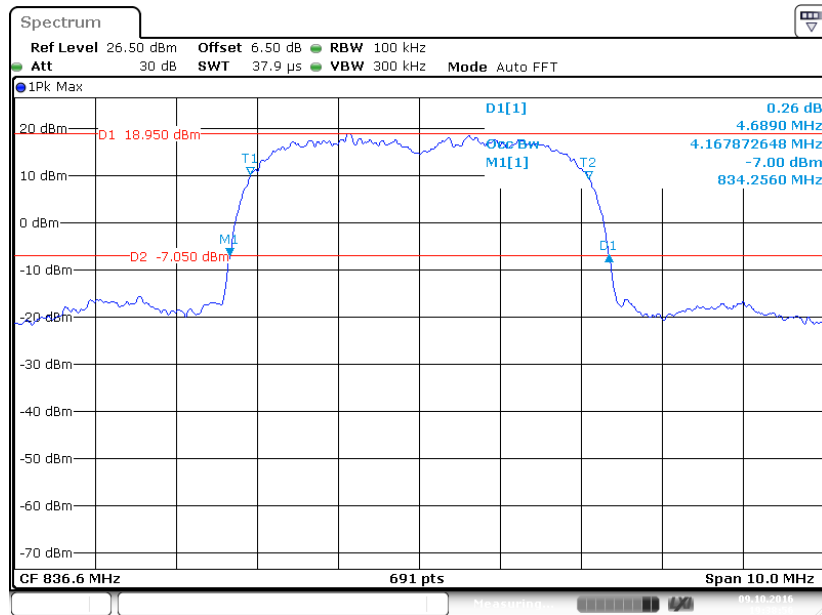
## Cellular Band (Part 22H)

## 99% Occupied &amp; 26 dB Emissions Bandwidth for GSM (GMSK) Mode

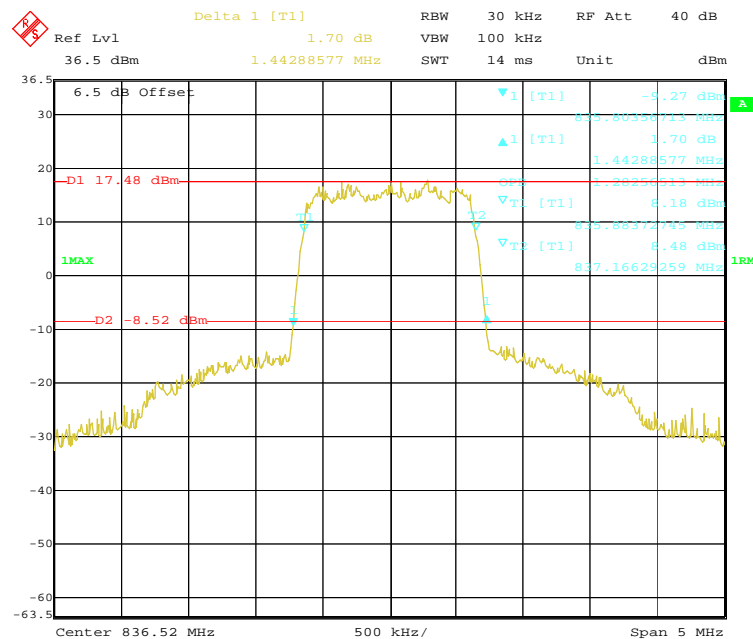


## 99% Occupied &amp; 26 dB Emissions Bandwidth for EDGE Mode



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

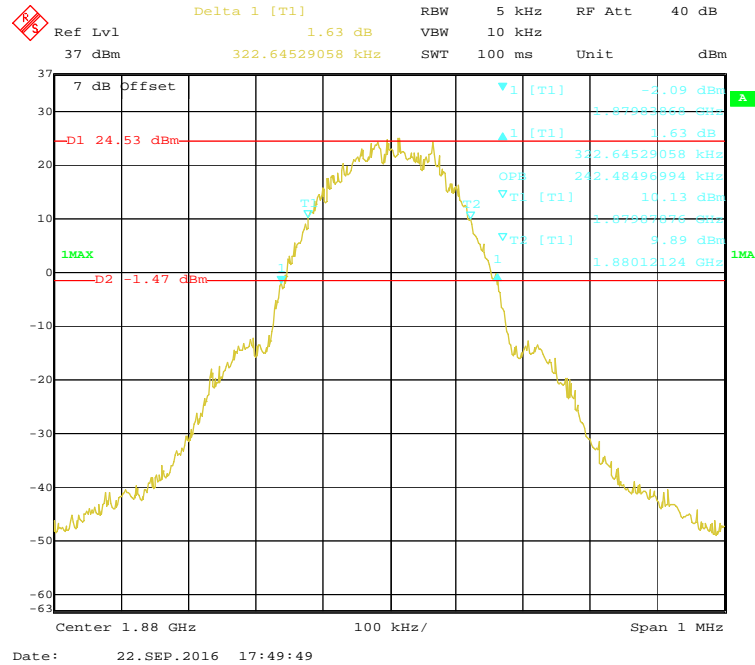
Date: 9.OCT.2016 19:38:57

**99% Occupied & 26 dB Emissions Bandwidth for CDMA850 (1xEV-DO) Mode**

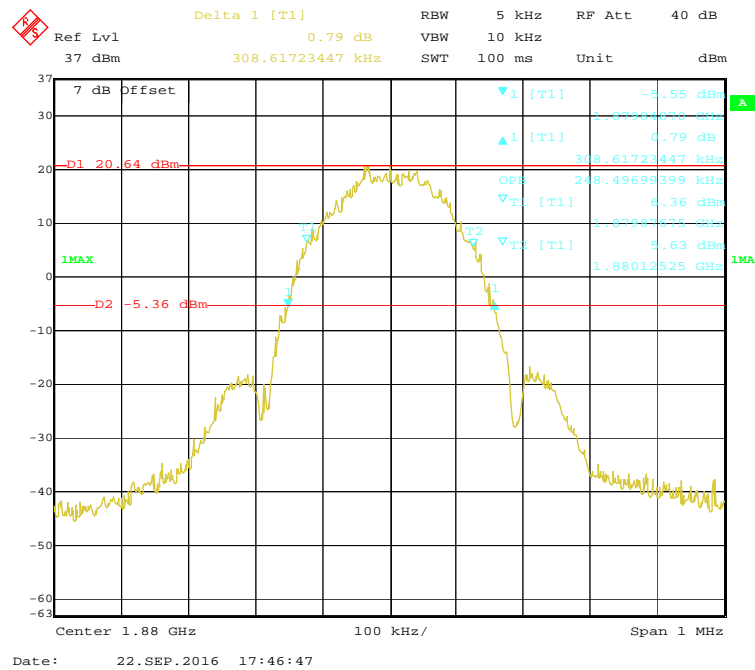
Date: 20.OCT.2016 15:24:59

# PCS Band (Part 24E)

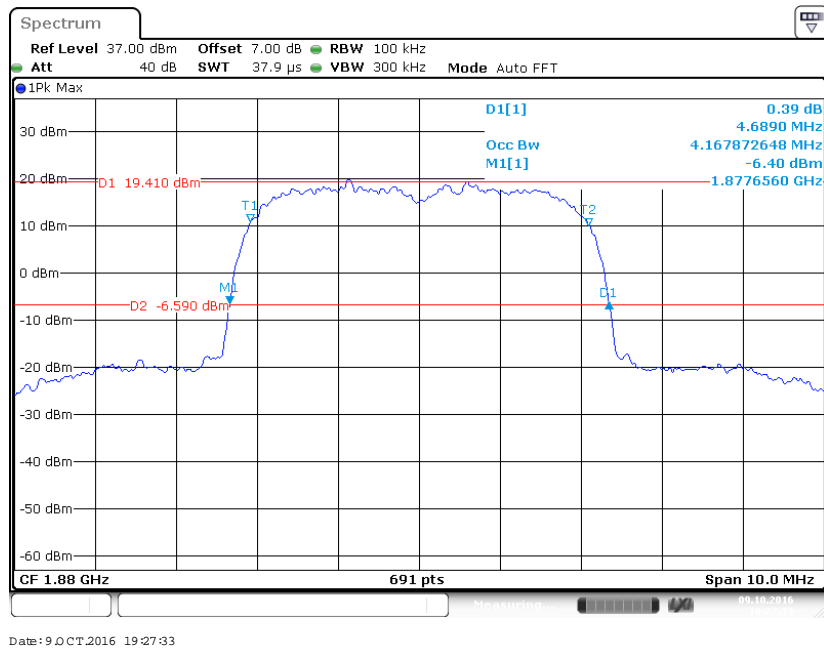
## 99% Occupied & 26 dB Emissions Bandwidth for GSM (GMSK) Mode



### 99% Occupied & 26 dB Emissions Bandwidth for EGPRS Mode

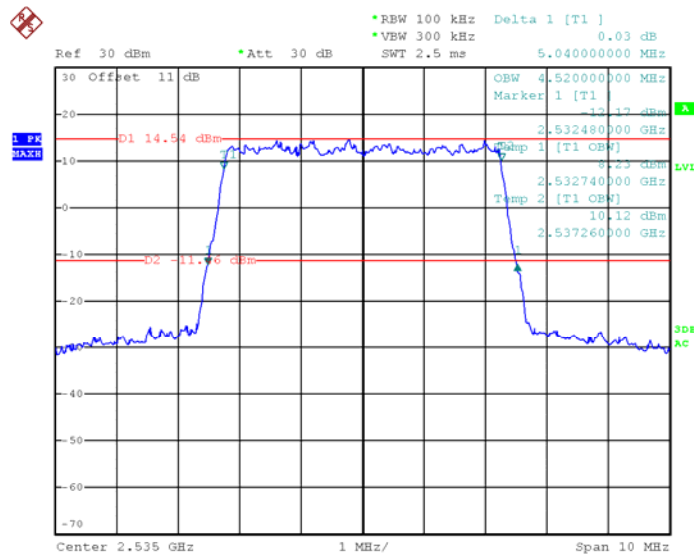


### 99% Occupied & 26 dB Emissions Bandwidth for WCDMA (BPSK) Mode



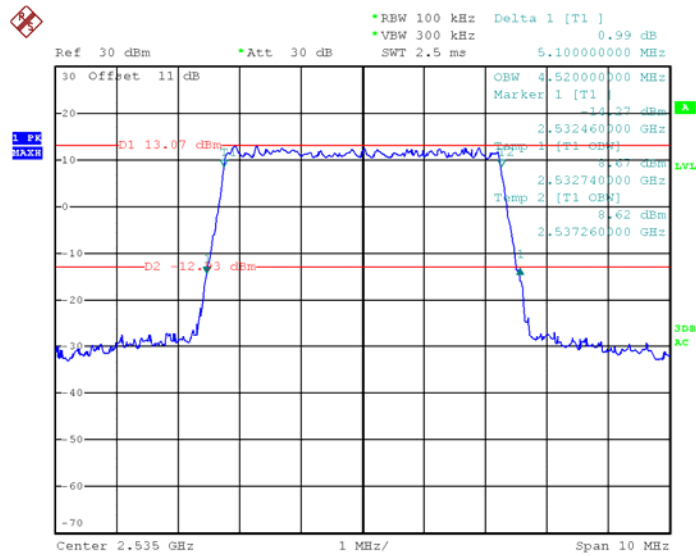
**LTE Band 7:**

Test Modulation	Test Bandwidth	Test Channel	99% Occupied Bandwidth	26 dB Bandwidth
			MHz	MHz
QPSK	5M	Middle	4.520	5.040
	10M		9.160	10.360
	15M		13.560	15.120
	20M		18.640	21.280
16-QAM	5M	Middle	4.520	5.100
	10M		9.120	10.320
	15M		13.500	15.000
	20M		18.560	21.280

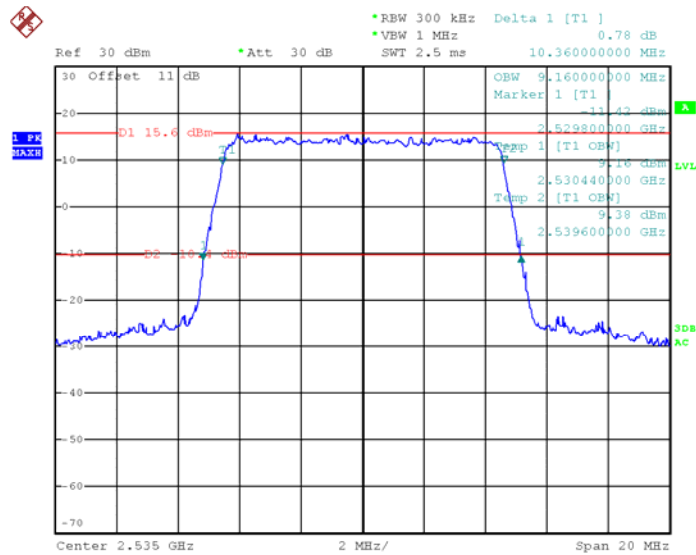
**QPSK (5.0 MHz) - 99% Occupied & 26 dB Bandwidth, Middle channel**

Date: 19.SEP.2016 21:58:14

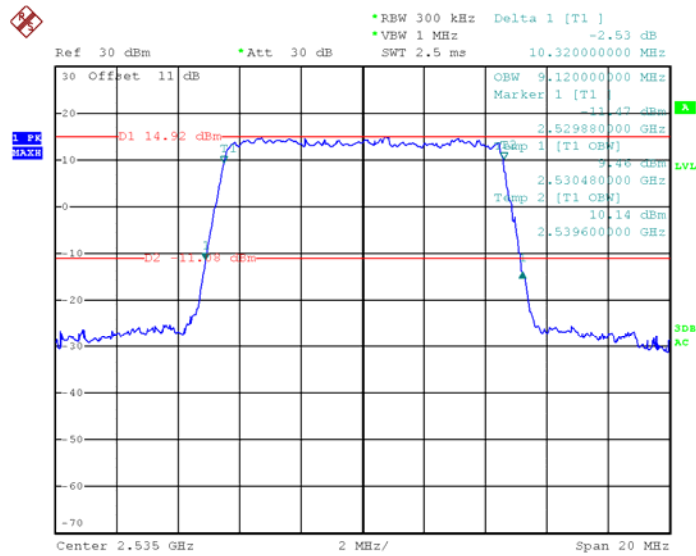


**16-QAM (5.0 MHz) - 99% Occupied & 26 dB Bandwidth, Middle channel**

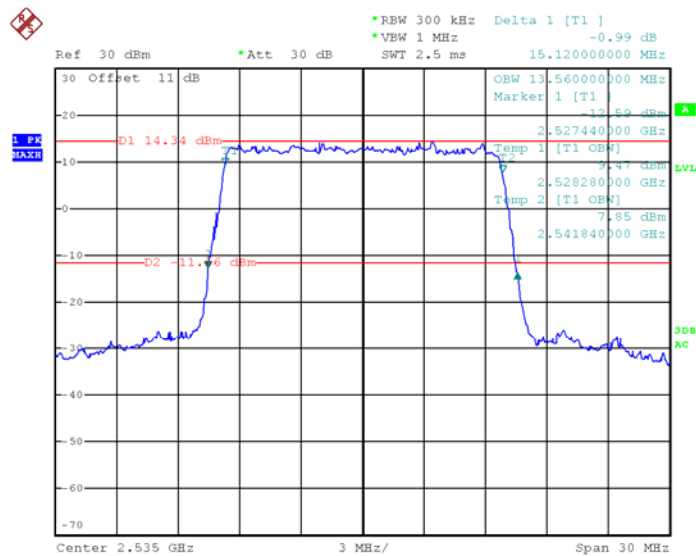
Date: 19.SEP.2016 21:59:15

**QPSK (10.0 MHz) - 99% Occupied & 26 dB Bandwidth, Middle channel**

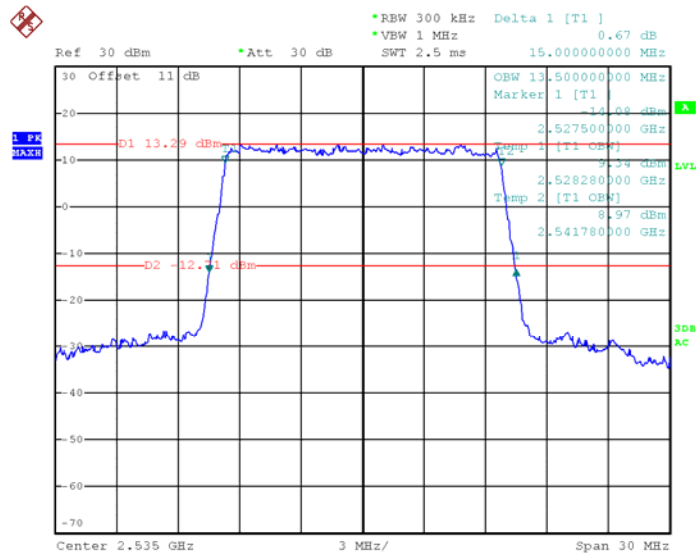
Date: 19.SEP.2016 21:52:45

**16-QAM (10.0MHz) - 99% Occupied & 26 dB Bandwidth, Middle channel**

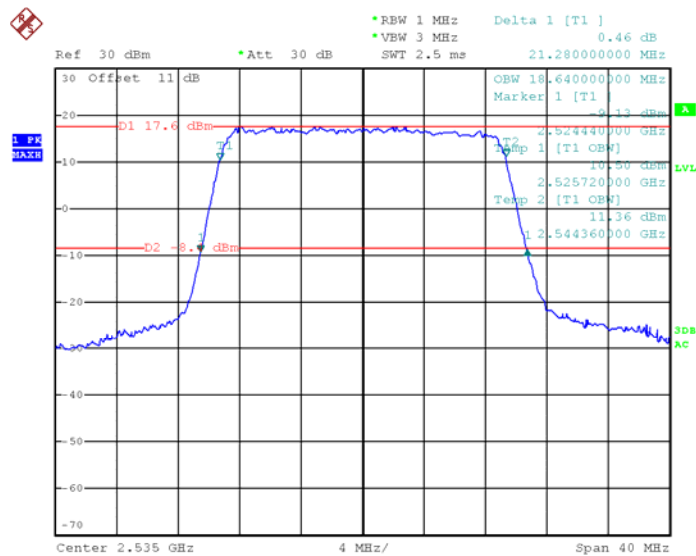
Date: 19.SEP.2016 21:54:05

**QPSK (15.0 MHz) - 99% Occupied & 26 dB Bandwidth, Middle channel**

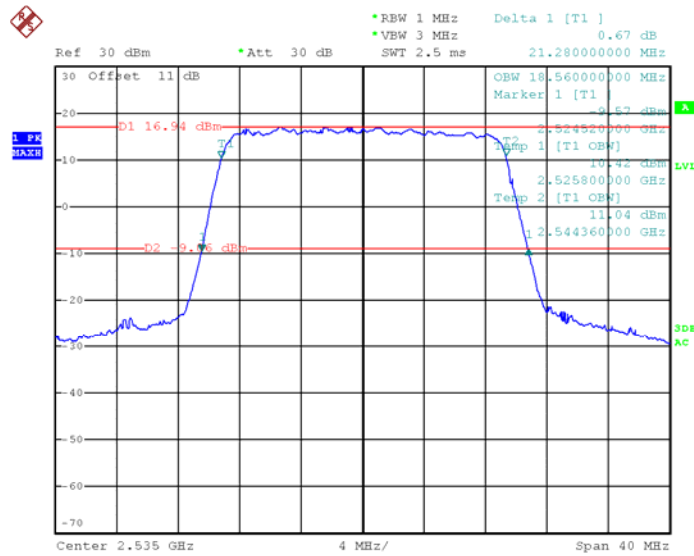
Date: 19.SEP.2016 21:49:50

**16-QAM (15.0 MHz) - 99% Occupied & 26 dB Bandwidth, Middle channel**

Date: 19.SEP.2016 21:50:46

**QPSK (20.0 MHz) - 99% Occupied & 26 dB Bandwidth, Middle channel**

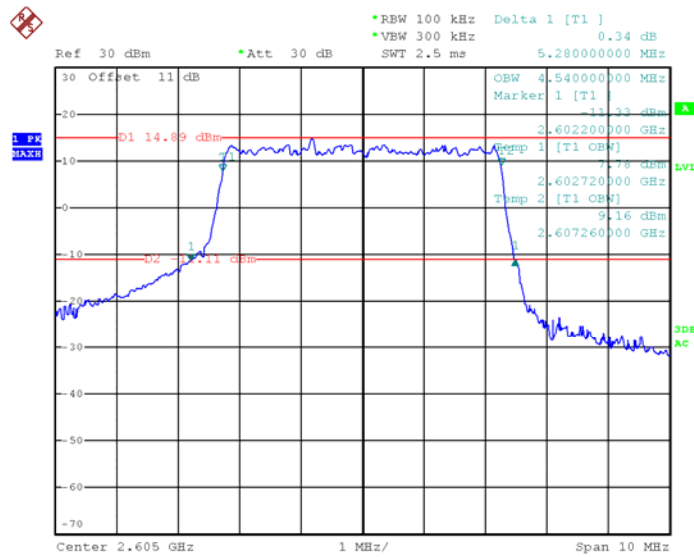
Date: 19.SEP.2016 21:56:50

**16-QAM (20.0 MHz) - 99% Occupied & 26 dB Bandwidth, Middle channel**

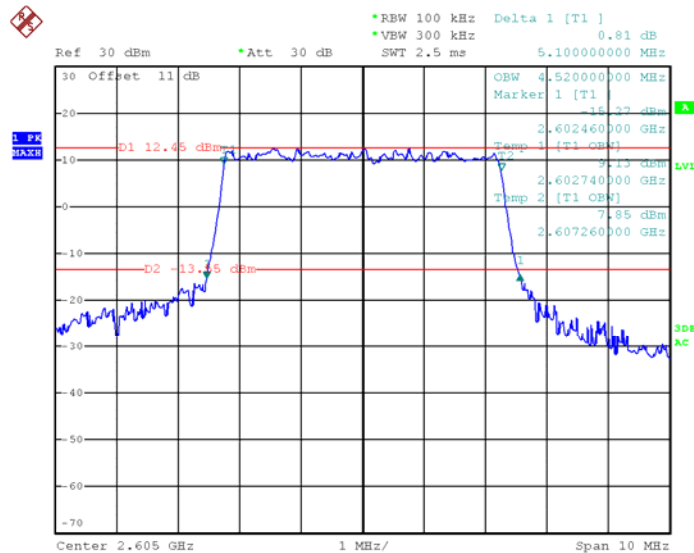
Date: 19.SEP.2016 21:55:56

**LTE Band 41:**

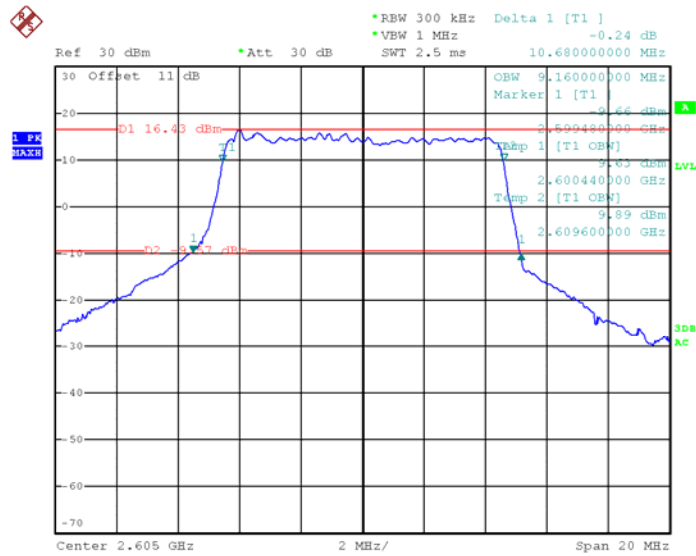
Test Modulation	Test Bandwidth	Test Channel	99% Occupied Bandwidth	26 dB Bandwidth
			MHz	MHz
QPSK	5M	Middle	4.540	5.280
	10M		9.160	10.680
	15M		13.620	16.260
	20M		18.000	19.840
16-QAM	5M	Middle	4.520	5.100
	10M		9.160	10.320
	15M		13.560	16.200
	20M		17.920	20.160

**QPSK (5.0 MHz) - 99% Occupied & 26 dB Bandwidth, Middle channel**

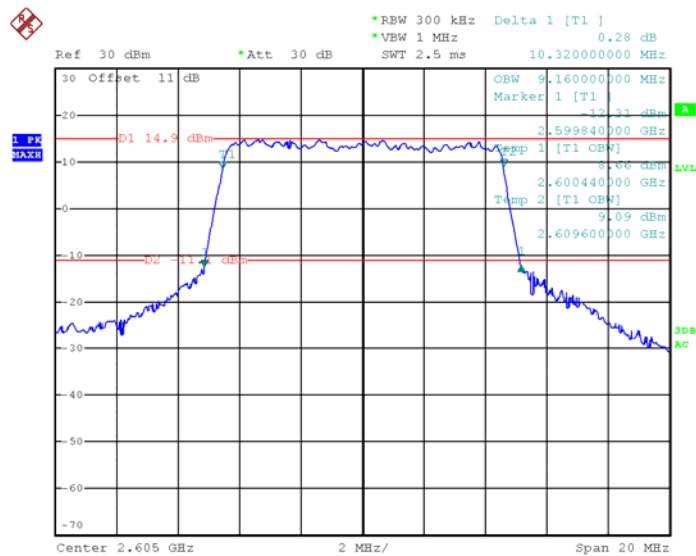
Date: 19.SEP.2016 23:10:14

**16-QAM (5.0 MHz) - 99% Occupied & 26 dB Bandwidth, Middle channel**

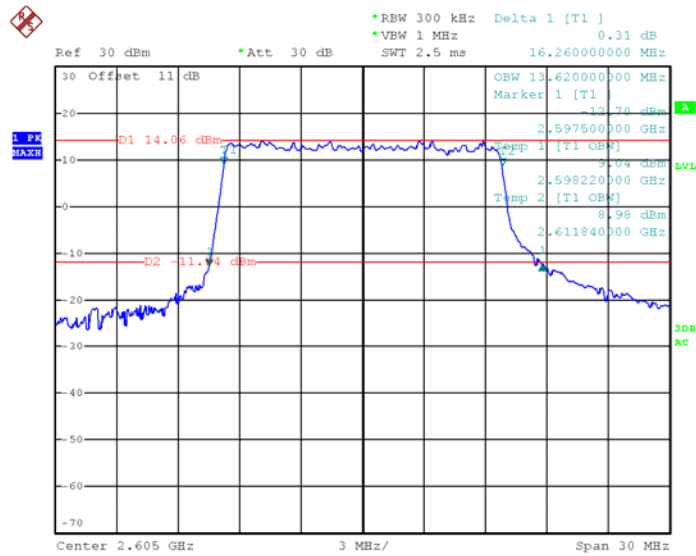
Date: 19.SEP.2016 23:11:41

**QPSK (10.0MHz) - 99% Occupied & 26 dB Bandwidth, Middle channel**

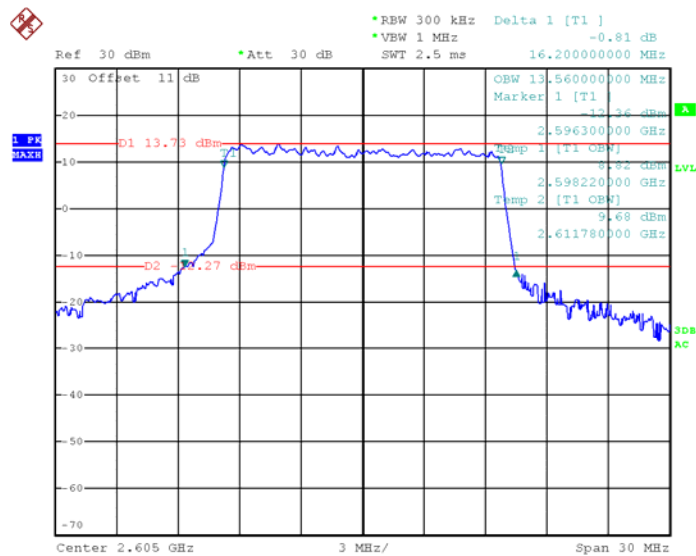
Date: 19.SEP.2016 23:17:30

**16-QAM (10.0 MHz) - 99% Occupied & 26 dB Bandwidth, Middle channel**

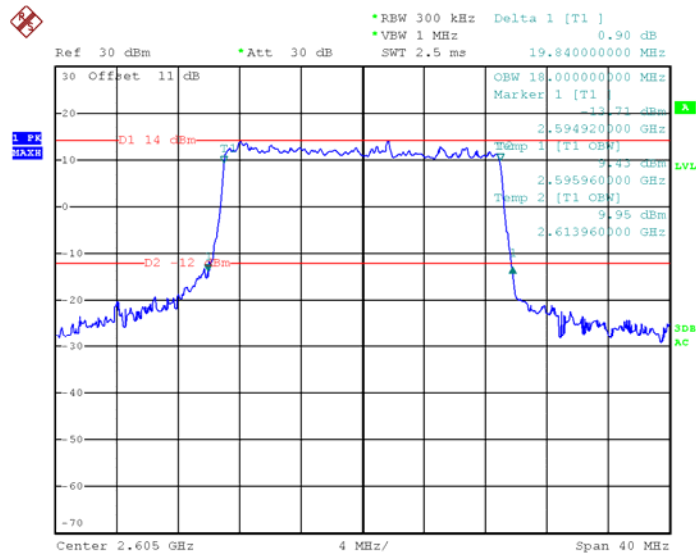
Date: 19.SEP.2016 23:20:01

**QPSK (15.0 MHz) - 99% Occupied & 26 dB Bandwidth, Middle channel**

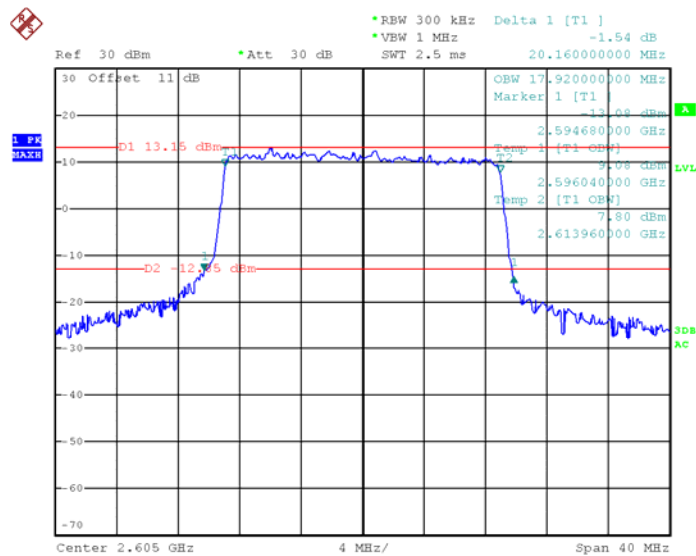
Date: 19.SEP.2016 23:23:40

**16-QAM (15.0 MHz) - 99% Occupied & 26 dB Bandwidth, Middle channel**

Date: 19.SEP.2016 23:26:56

**QPSK (20.0 MHz) - 99% Occupied & 26 dB Bandwidth, Middle channel**

Date: 19.SEP.2016 23:30:13

**16-QAM (20.0MHz) - 99% Occupied & 26 dB Bandwidth, Middle channel**

Date: 19.SEP.2016 23:32:32



## § 2.1051; § 22.917 (a);§ 24.238 (a); §27.53 (h)(m) SPURIOUS EMISSIONS AT ANTENNA TERMINALS

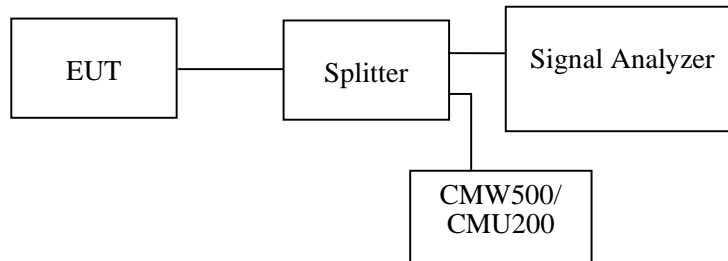
### Applicable Standards

FCC §2.1051, §22.917(a) and §24.238(a) and §27.53(h)(m).

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde &Schwarz	Signal Analyzer	FSIQ26	100048	2015-11-12	2016-11-11
Rohde & Schwarz	Signal Analyzer	FSV40	101116	2016-07-04	2017-07-03
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	110605	2015-11-25	2016-11-25
R&S	Wideband Radio Communication tester	CMW500	1201.002K50-116218-UY	2016-10-08	2017-10-07
Haojintech	Coaxial Cable	SR	SS11800	2016-09-08	2017-09-08
Dressler	attenuator	ATT 6/75	510020010004	/	/

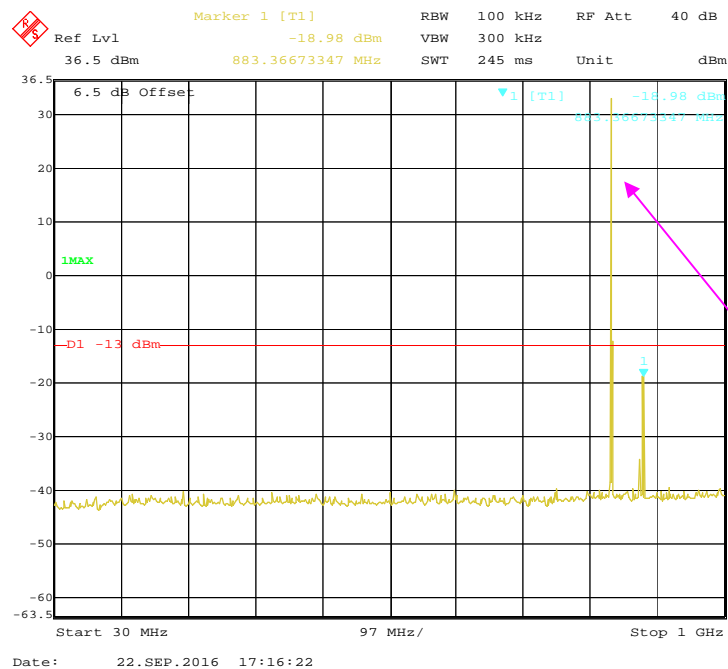
\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

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

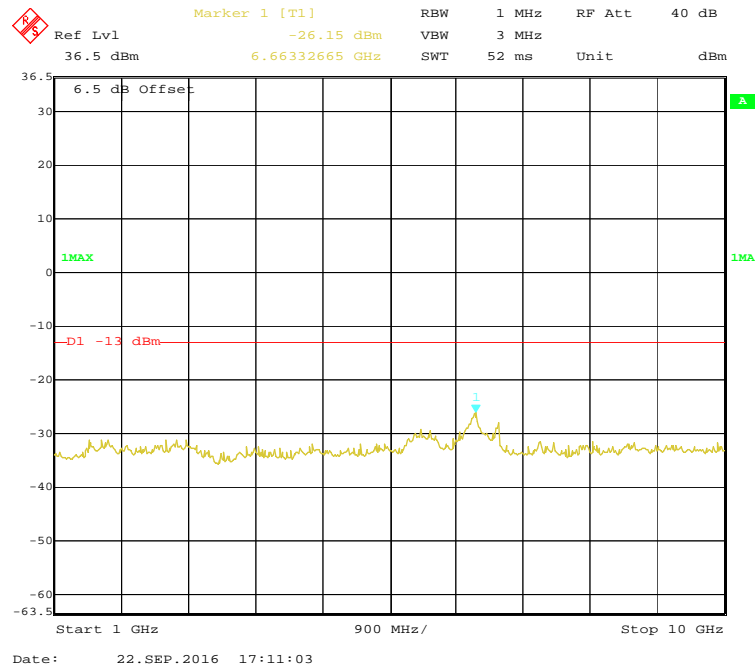
Temperature:	23 °C
Relative Humidity:	50 %
ATM Pressure:	101.0kPa

The testing was performed by Chris Wang on 2016-09-19 to 2016-10-20.

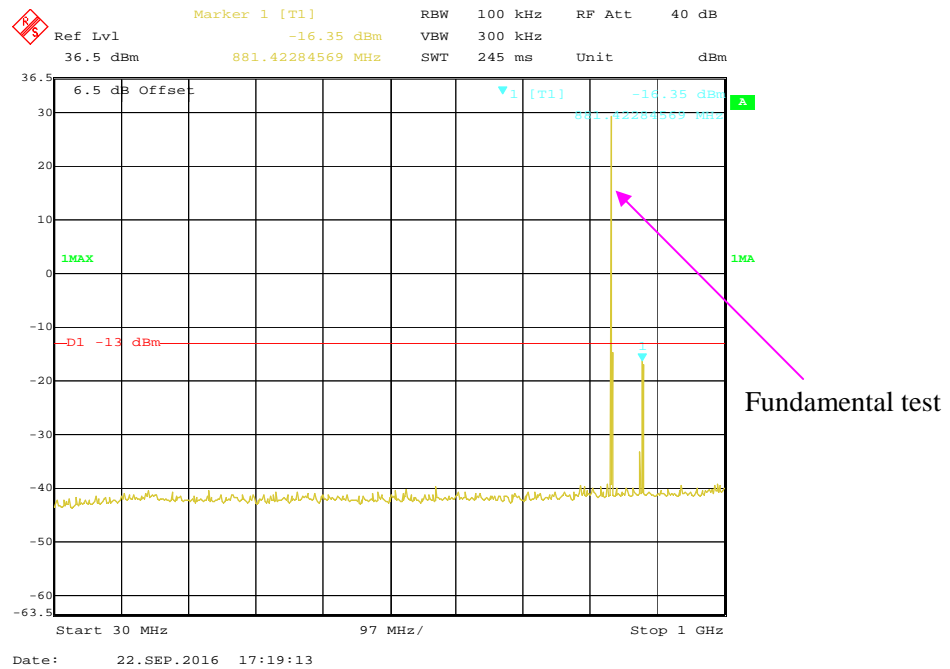
Please refer to the following plots.

**Cellular Band (Part 22H)****30 MHz – 1 GHz (GSM Mode)**

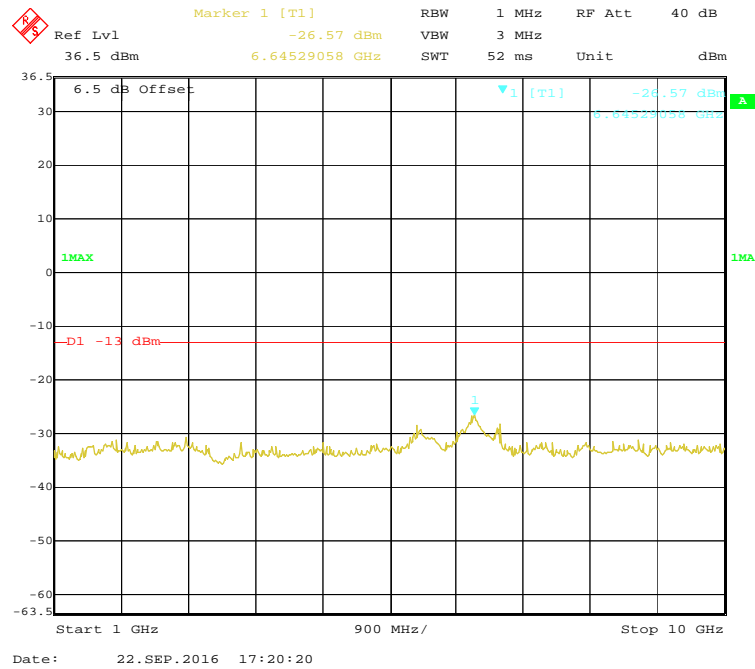
### 1 GHz – 10 GHz (GSM Mode)



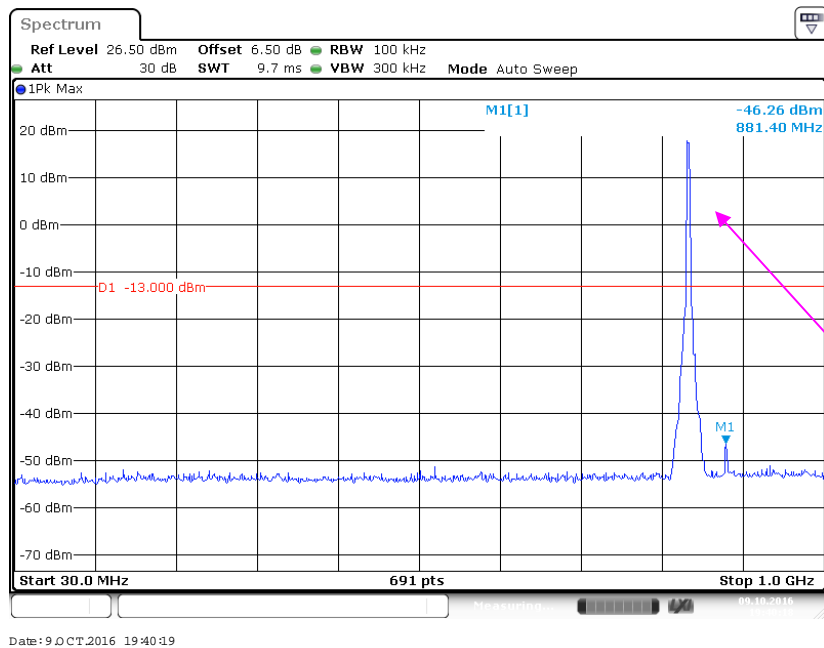
### 30 MHz – 1 GHz (EGPRS Mode)



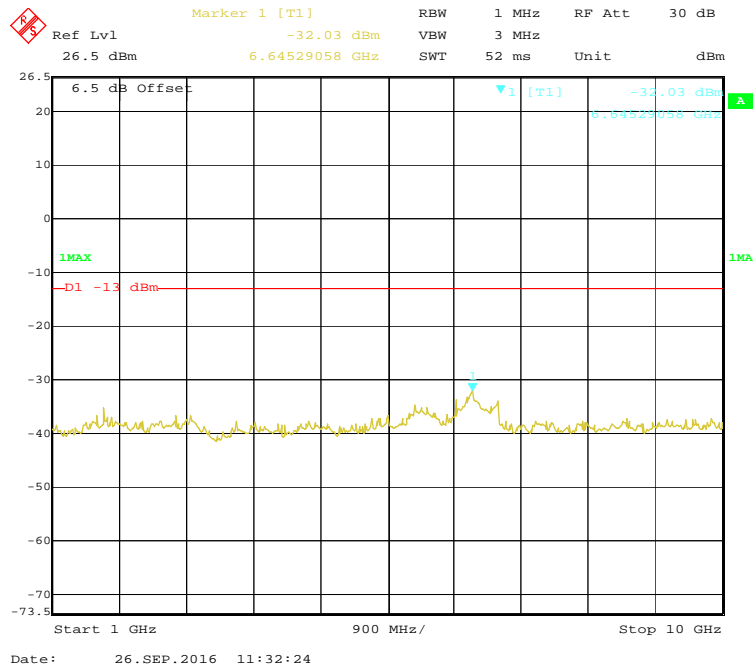
### 1 GHz – 10 GHz (EGPRS Mode)



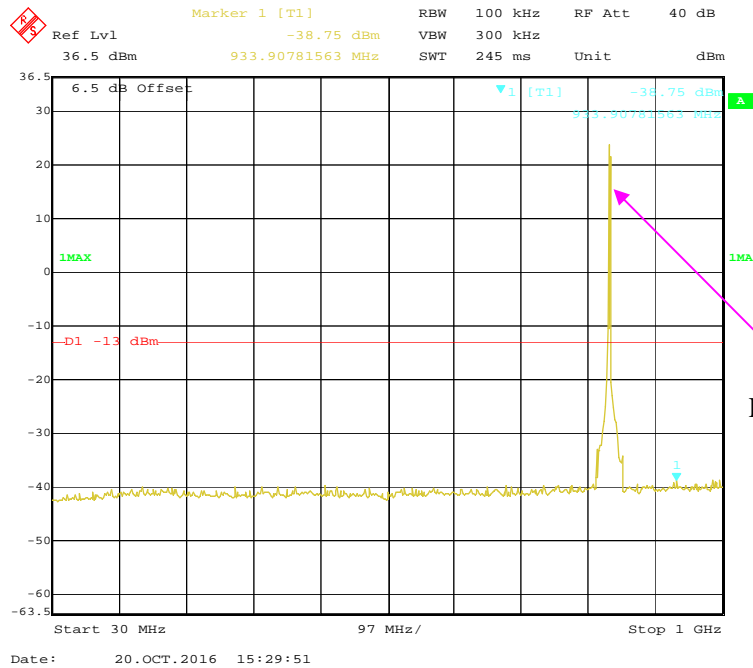
### 30 MHz – 1GHz(WCDMA Mode)



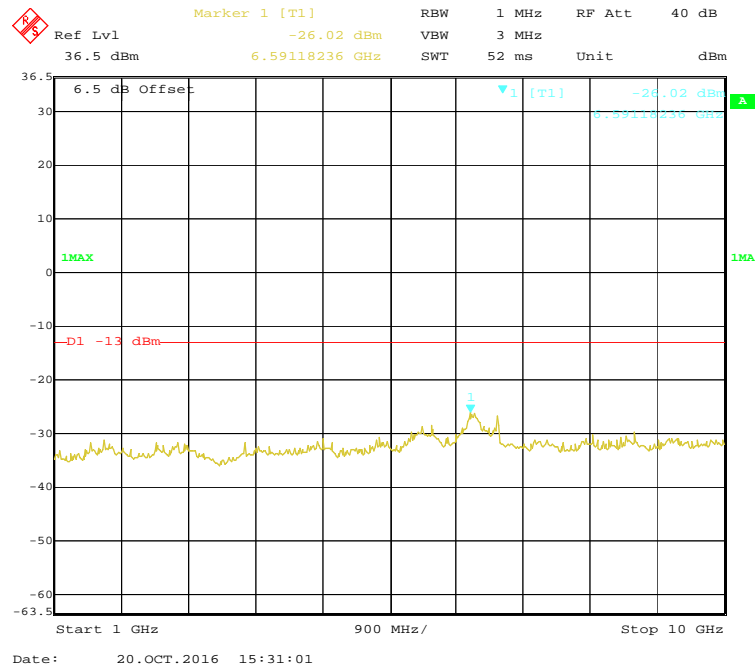
### 1 GHz – 10 GHz (WCDMA Mode)



### 30 MHz – 1 GHz (CDMA850 1xEV-DO Mode)

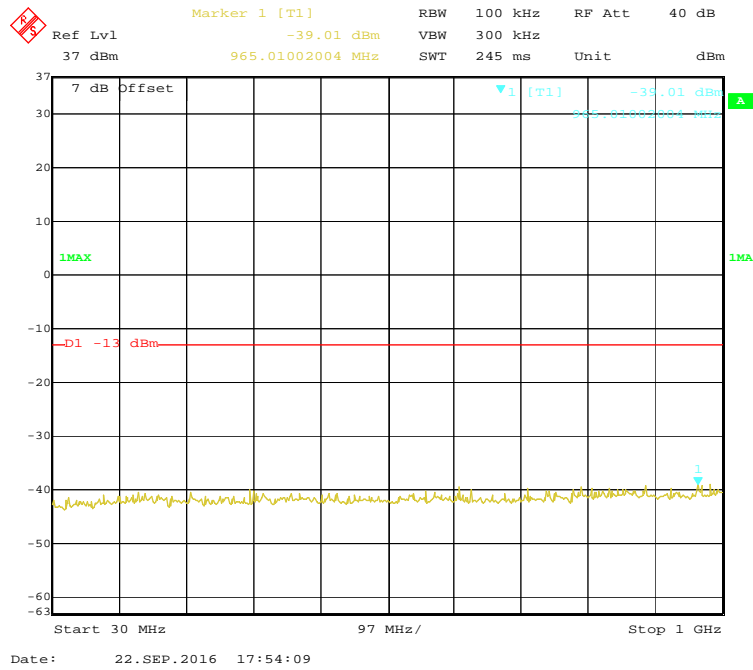


# 1 GHz – 10 GHz (CDMA850 1xEV-DO Mode)

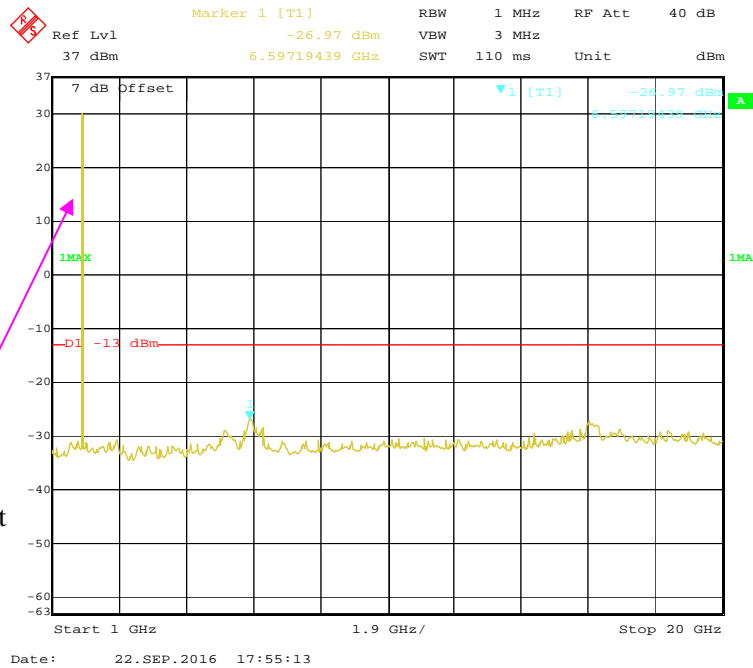


PCS Band (Part 24E)

30 MHz – 1 GHz (GSM Mode)

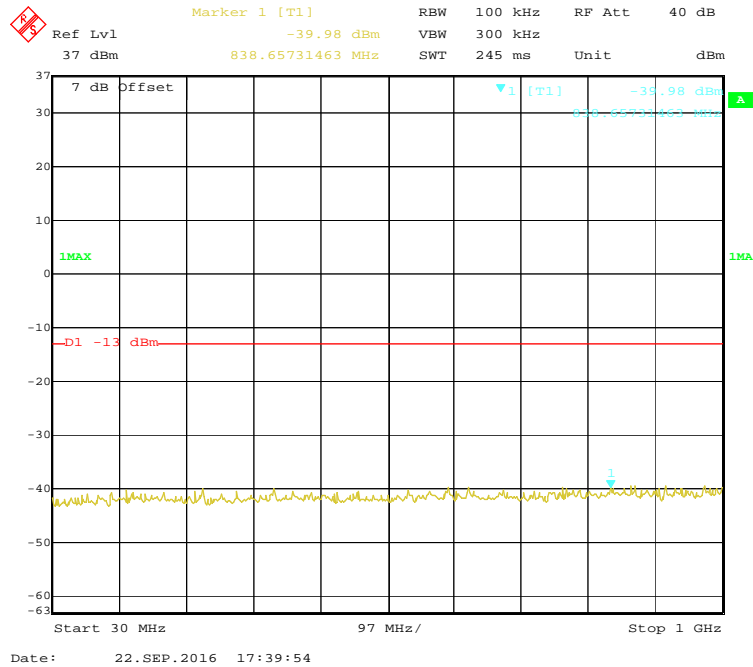


### 1 GHz – 20 GHz (GSM Mode)



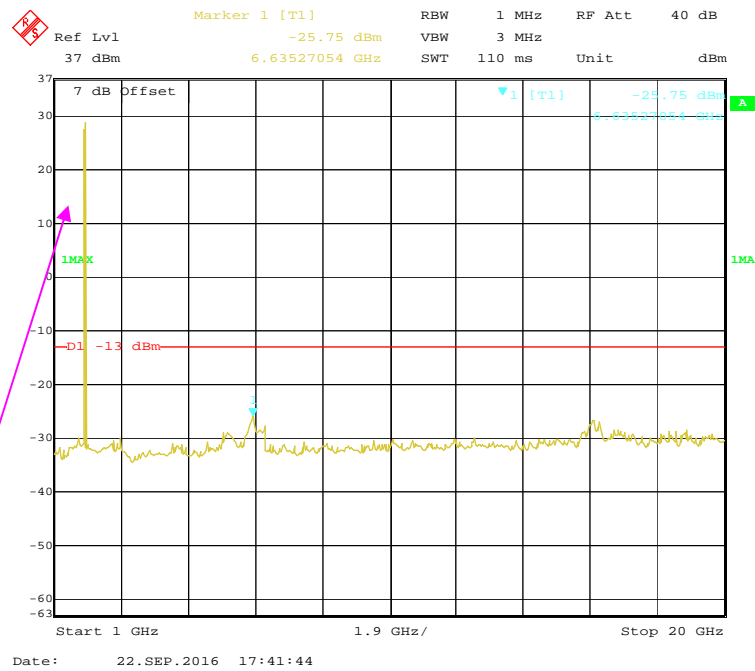
Fundamental test

### 30 MHz – 1 GHz (EGPRS Mode)



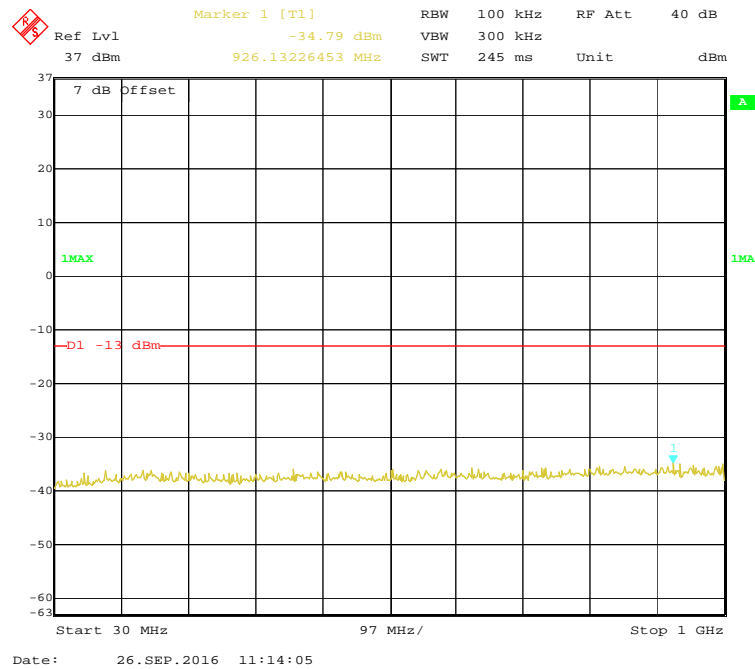


### 1 GHz – 20 GHz (EGPRS Mode)



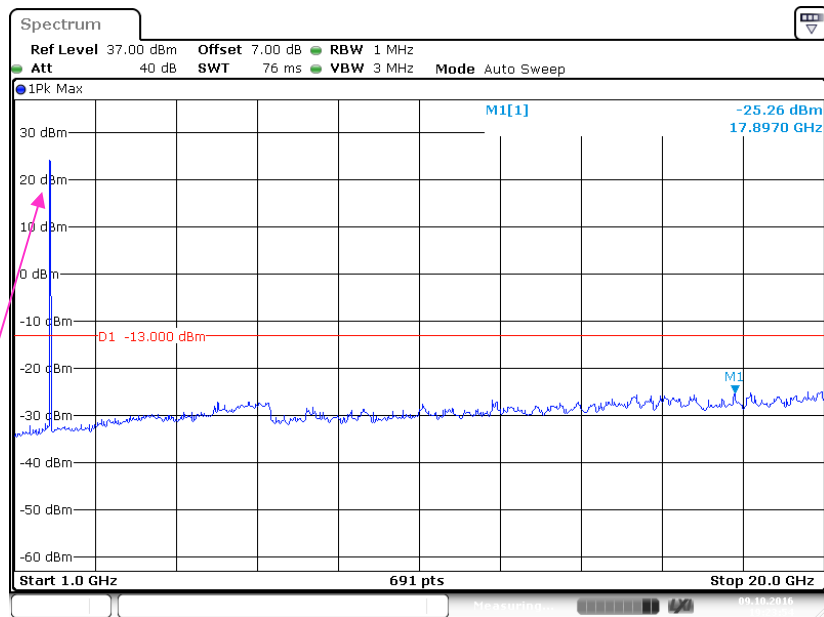
Fundamental test

### 30 MHz – 1 GHz (WCDMA Mode)



# 1 GHz – 20 GHz (WCDMA Mode)

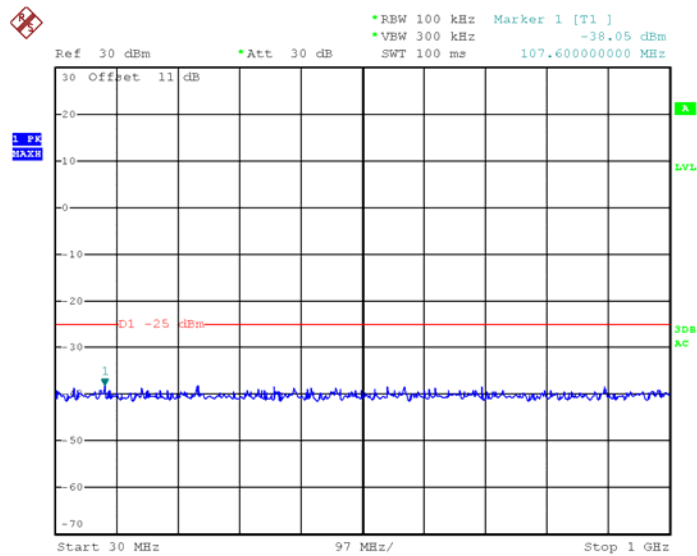
Fundamental test



Date: 9 OCT. 2016 19:23:54

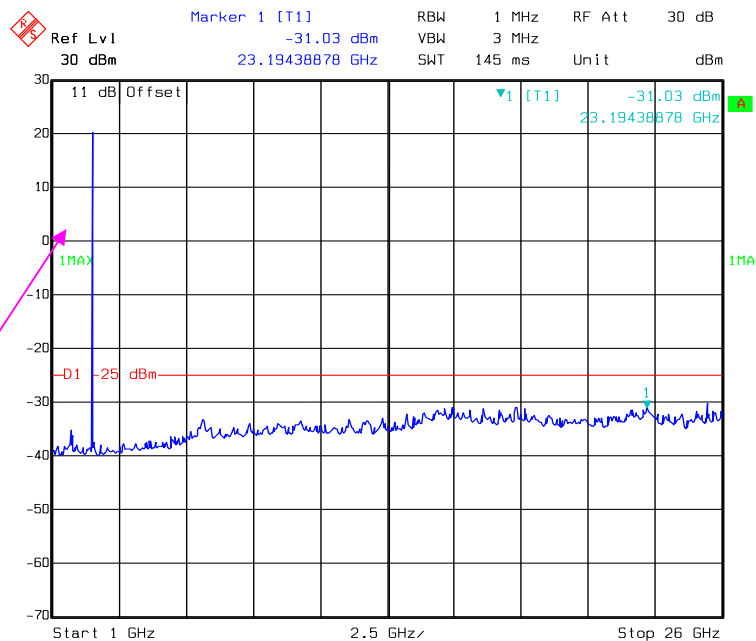
**LTE Band 7:**

**30 MHz - 1 GHz (5.0 MHz, Middle Channel)**



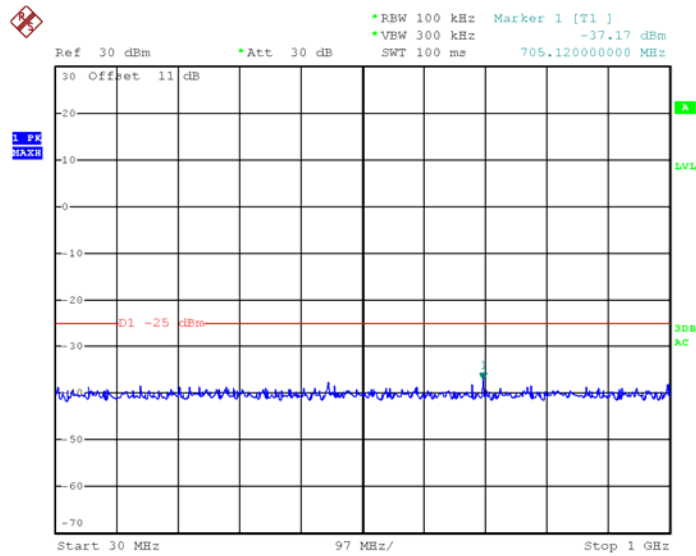
Date: 19.SEP.2016 22:22:47

**1 GHz – 26 GHz (5.0 MHz, Middle Channel)**

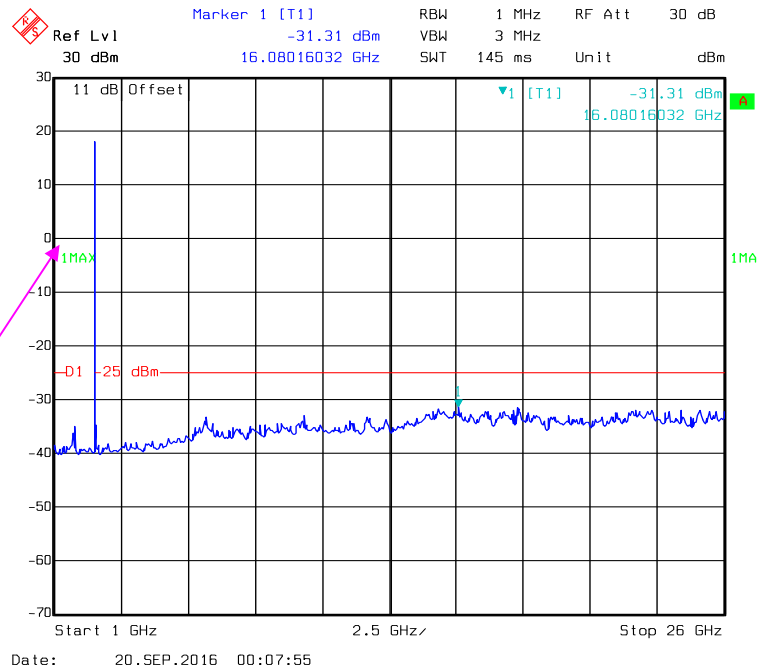


Fundamental test

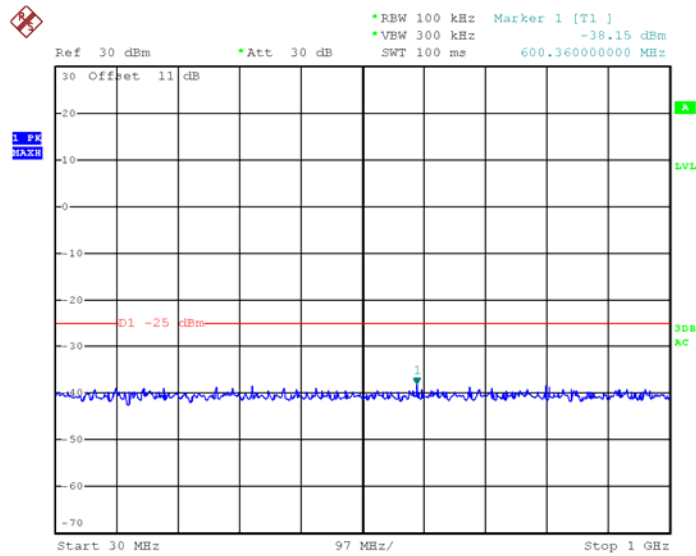
Date: 20.SEP.2016 00:07:28

**30 MHz - 1 GHz (10.0 MHz, Middle Channel)**

Date: 19.SEP.2016 22:25:17

**1 GHz – 26 GHz (10.0 MHz, Middle Channel)**

### 30 MHz - 1 GHz (15.0 MHz, Middle Channel)



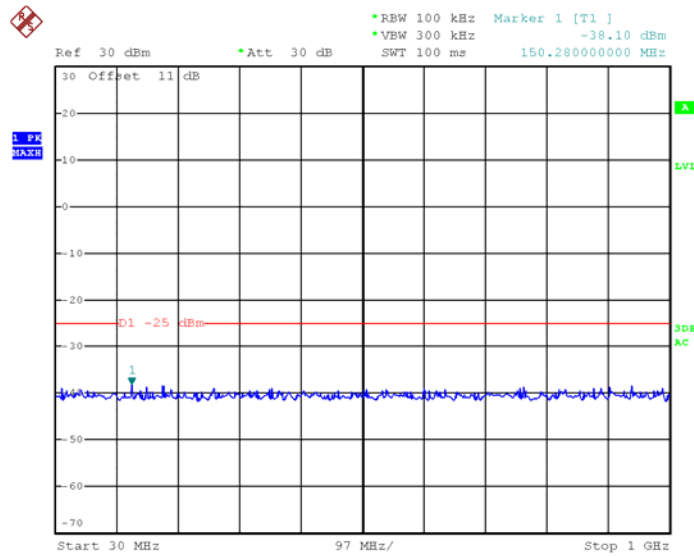
Date: 19.SEP.2016 22:28:29

### 1 GHz – 26 GHz (15.0MHz, Middle Channel)



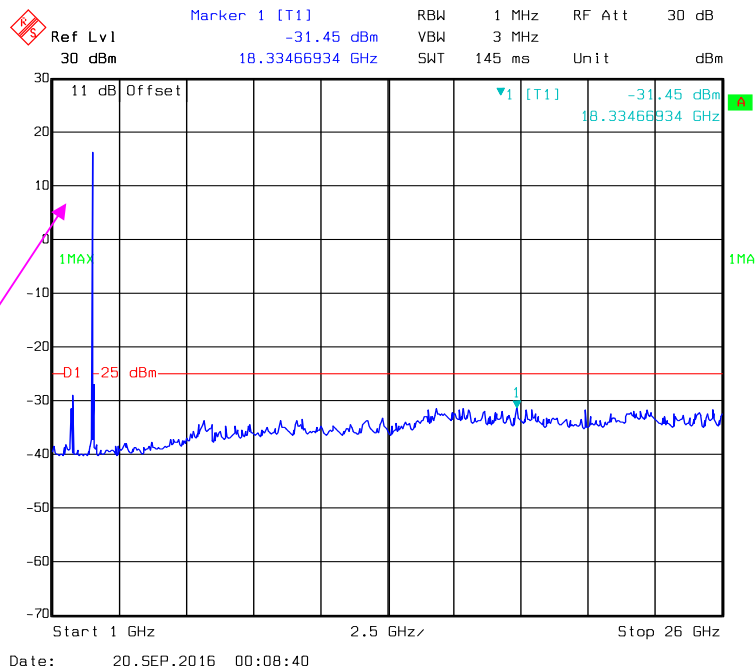
Fundamental test

### 30 MHz - 1 GHz (20.0 MHz, Middle Channel)



Date: 19.SEP.2016 22:32:43

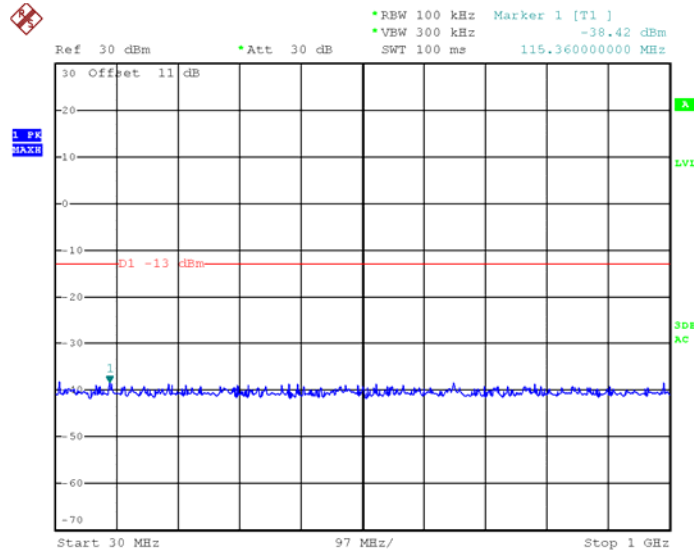
### 1 GHz – 26 GHz (20.0 MHz, Middle Channel)



Fundamental test

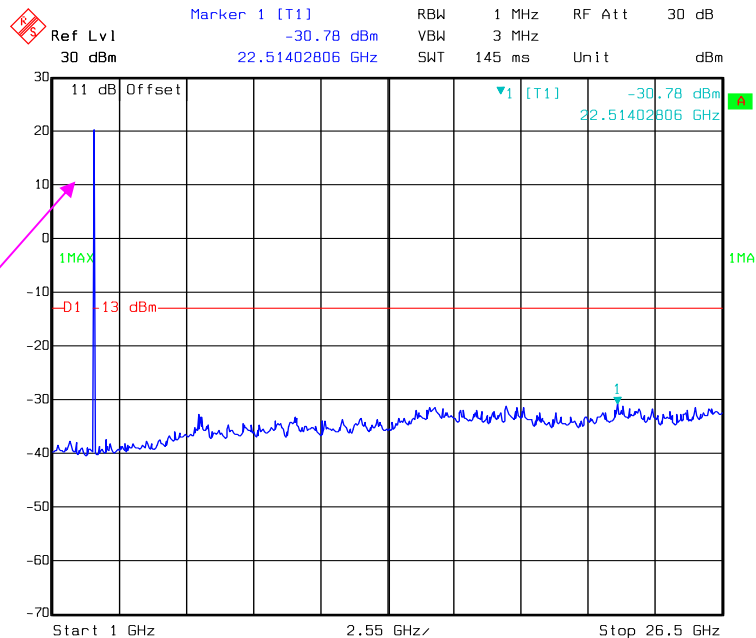
**LTE Band 41:**

**30 MHz - 1 GHz (5.0 MHz, Middle Channel)**



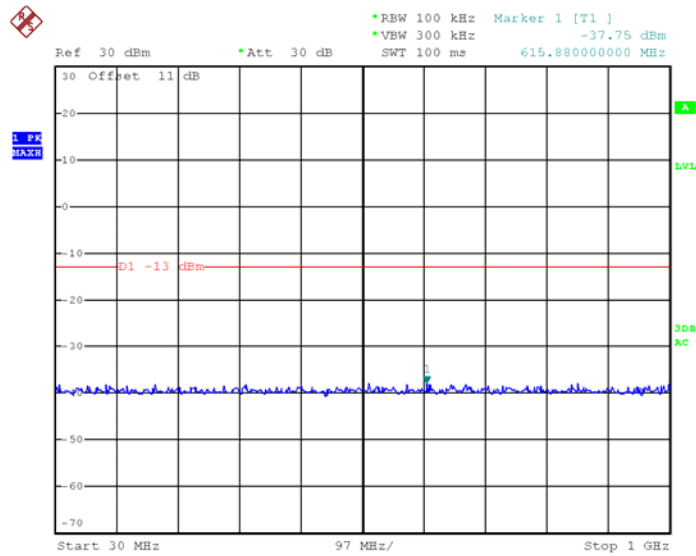
Date: 19.SEP.2016 23:33:12

**1 GHz – 26.5 GHz (5.0 MHz, Middle Channel)**



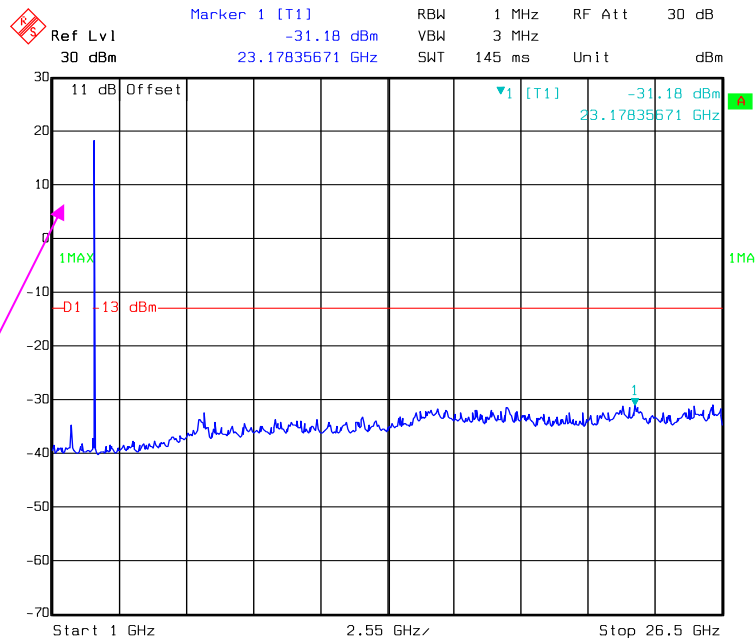
Date: 19.SEP.2016 23:59:07

### 30 MHz - 1 GHz (10.0 MHz, Middle Channel)



Date: 19.SEP.2016 23:36:13

### 1 GHz – 26.5 GHz (10.0 MHz, Middle Channel)

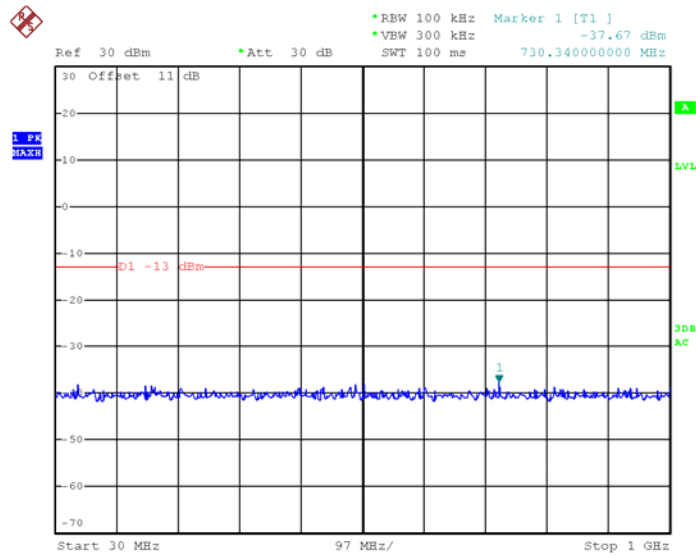


Fundamental test

Date: 19.SEP.2016 23:58:36

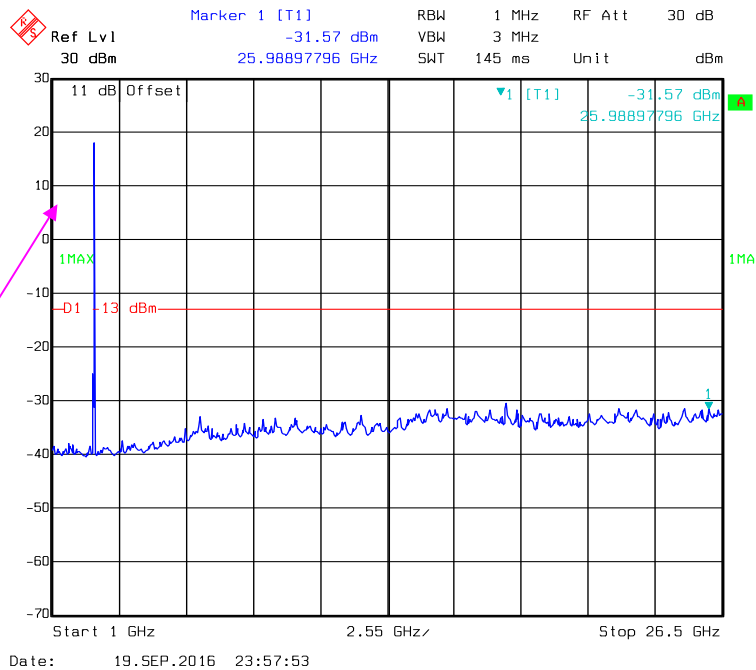


### 30 MHz - 1 GHz (15.0 MHz, Middle Channel)

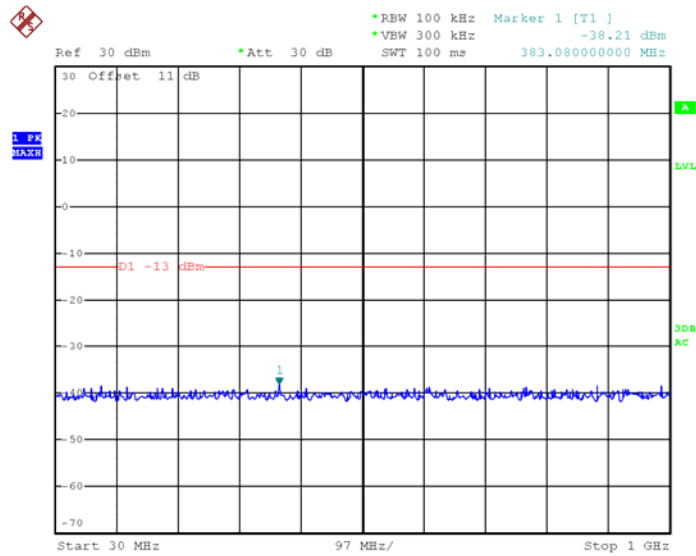


Date: 19.SEP.2016 23:39:34

### 1 GHz – 26.5 GHz (15.0 MHz, Middle Channel)

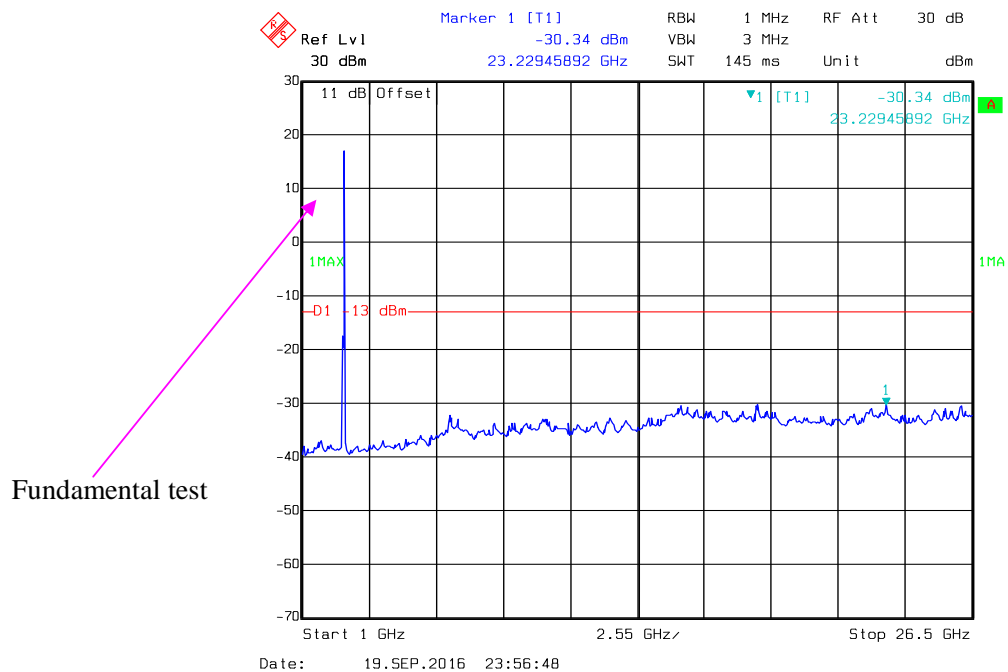


### 30 MHz - 1 GHz (20.0 MHz, Middle Channel)



Date: 19.SEP.2016 23:41:56

### 1 GHz -26.5 GHz (20.0 MHz, Middle Channel)



**FCC § 2.1053; § 22.917 (a); § 24.238 (a); § 27.53 (h)(m)**  
**SPURIOUS RADIATED EMISSIONS****Applicable Standards**

FCC § 2.1053, § 22.917(a) and § 24.238(a) and § 27.53(h)(m)

22.917 (a) Out of band emissions. The power of any emission 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.

24.238 (a) Out of band emissions. The power of any emission 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.

27.53 (h)(m), For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log(P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log(P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log(P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log(P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log(P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

**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 =  $10 \lg(\text{TX pwr in Watts}/0.001)$  – 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
Sonoma Instrument	Amplifier	330	171377	2016-09-16	2017-09-16
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2015-11-12	2016-11-11
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2016-01-09	2019-01-08
Sunol Sciences	Broadband Antenna	JB3	A040914-1	2016-01-09	2019-01-08
ETS-LINDGREN	Horn Antenna	3115	6229	2016-01-11	2019-01-10
ETS-LINDGREN	Horn Antenna	3115	9311-4159	2016-01-11	2019-01-10
ETS-LINDGREN	Horn Antenna	3116	00084159	2015-10-18	2018-10-18
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2015-11-12	2016-11-11
Narda	Pre-amplifier	AFS42-00101800	2001270	2016-09-08	2017-09-08
R&S	Auto test Software	EMC32	V 09.10.0	/	/
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	110605	2015-11-25	2016-11-25
R&S	Wideband Radio Communication tester	CMW500	1201.002K50-116218-UY	2016-10-08	2017-10-07
HP	Signal Generator	8341B	DE23437	2016-8-29	2017-8-29
Haojintech	Coaxial Cable	HMR400UF	NN11600	2016-09-08	2017-09-08
Haojintech	Coaxial Cable	SR	SS11800	2016-09-08	2017-09-08

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

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

<b>Temperature:</b>	23 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	101.0kPa

*The testing was performed by Chris Wang on 2016-10-26.*

*Test mode: Transmitting*

Test mode: Transmitting (Pre-scan with Low, Middle, High channel, and the worse case data 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)			
GSM Mode, Middle channel										
475.25	34.23	131	1.7	H	-66.73	0.47	4.05	-63.15	-13	50.15
475.25	31.62	46	1.6	V	-69.34	0.47	4.05	-65.76	-13	52.76
1673.20	38.35	310	1.5	H	-62.18	1.6	6.9	-56.88	-13	43.88
1673.20	38.24	154	1.6	V	-62.29	1.6	6.9	-56.99	-13	43.99
2509.80	39.65	343	1.8	H	-62.48	1.7	8.6	-55.58	-13	42.58
2509.80	39.84	205	2.0	V	-62.29	1.7	8.6	-55.39	-13	42.39
WCDMA Mode, Middle channel										
475.25	37.13	146	1.8	H	-63.83	0.47	4.05	-60.25	-13	47.25
475.25	35.72	309	2.0	V	-65.24	0.47	4.05	-61.66	-13	48.66
1673.20	37.25	284	1.5	H	-63.28	1.6	6.9	-57.98	-13	44.98
1673.20	37.24	105	1.7	V	-63.29	1.6	6.9	-57.99	-13	44.99
2509.80	43.84	279	1.8	H	-58.29	1.7	8.6	-51.39	-13	38.39
2509.80	43.74	101	2.1	V	-58.39	1.7	8.6	-51.49	-13	38.49
CDMA Mode, Middle channel										
475.25	37.12	79	1.6	H	-63.84	0.47	4.05	-60.26	-13	47.26
475.25	35.73	77	2.0	V	-65.23	0.47	4.05	-61.65	-13	48.65
1673.04	37.25	181	1.9	H	-63.28	1.6	6.9	-57.98	-13	44.98
1673.04	37.33	357	1.6	V	-63.20	1.6	6.9	-57.90	-13	44.90
2509.56	43.85	94	1.5	H	-58.28	1.7	8.6	-51.38	-13	38.38
2509.56	43.75	193	1.6	V	-58.38	1.7	8.6	-51.48	-13	38.48

**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)			
GSM Mode, Middle channel										
475.25	36.62	62	1.4	H	-64.34	0.47	4.05	-60.76	-13	47.76
475.25	33.43	177	1.5	V	-67.53	0.47	4.05	-63.95	-13	50.95
3760.00	47.44	212	1.9	H	-55.79	1.90	9.90	-47.79	-13	34.79
3760.00	50.34	77	2.0	V	-52.89	1.90	9.90	-44.89	-13	31.89
5640.00	49.34	194	1.7	H	-54.09	2.10	10.30	-45.89	-13	32.89
5640.00	48.14	204	1.5	V	-55.29	2.10	10.30	-47.09	-13	34.09
WCDMA Mode, Middle channel										
475.25	36.72	320	1.5	H	-64.24	0.47	4.05	-60.66	-13	47.66
475.25	34.43	42	1.9	V	-66.53	0.47	4.05	-62.95	-13	49.95
3760.00	47.84	345	1.8	H	-55.39	1.90	9.90	-47.39	-13	34.39
3760.00	47.75	153	2.1	V	-55.48	1.90	9.90	-47.48	-13	34.48
5640.00	60.34	126	1.6	H	-43.09	2.10	10.30	-34.89	-13	21.89
5640.00	61.44	265	2.1	V	-41.99	2.10	10.30	-33.79	-13	20.79

Test mode: Transmitting (Pre-scan with all the bandwidth, and worse case as below)

### LTE Band 7:

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)			
QPSK Middle Channel 2535.000 MHZ								
5070.000	H	37.18	-54.1	13.9	2.4	-42.6	-25.0	17.6
5070.000	V	40.86	-51.3	13.9	2.4	-39.8	-25.0	14.8
7605.000	H	36.48	-51	13.2	3.1	-40.9	-25.0	15.9
7605.000	V	39.83	-47.7	13.2	3.1	-37.6	-25.0	12.6
261.800	H	37.69	-70.3	0.0	0.5	-70.8	-25.0	45.8
301.300	V	36.80	-68	0.0	0.5	-68.5	-25.0	43.5
16-QAM Middle Channel 2535.000 MHZ								
5070.000	H	36.62	-54.7	13.9	2.4	-43.2	-25.0	18.2
5070.000	V	39.71	-52.4	13.9	2.4	-40.9	-25.0	15.9
7605.000	H	35.92	-51.6	13.2	3.1	-41.5	-25.0	16.5
7605.000	V	38.49	-49	13.2	3.1	-38.9	-25.0	13.9
261.800	H	37.84	-70.2	0.0	0.5	-70.7	-25.0	45.7
301.300	V	36.47	-68.3	0.0	0.5	-68.8	-25.0	43.8

### LTE Band 41

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)			
QPSK Middle Channel 2605.000 MHZ								
5210.000	H	42.19	-48.9	14.0	2.3	-37.2	-13.0	24.2
5210.000	V	45.76	-46.8	14.0	2.3	-35.1	-13.0	22.1
7815.000	H	41.68	-45.5	13.3	3.6	-35.8	-13.0	22.8
7815.000	V	43.49	-44.1	13.3	3.6	-34.4	-13.0	21.4
271.900	H	37.03	-70.8	0.0	0.5	-71.3	-13.0	58.3
312.500	V	36.27	-67.2	0.0	0.5	-67.7	-13.0	54.7
16-QAM Middle Channel 2605.000 MHZ								
5210.000	H	41.87	-49.2	14.0	2.3	-37.5	-13.0	24.5
5210.000	V	44.64	-47.9	14.0	2.3	-36.2	-13.0	23.2
7815.000	H	40.68	-46.5	13.3	3.6	-36.8	-13.0	23.8
7815.000	V	42.79	-44.8	13.3	3.6	-35.1	-13.0	22.1
271.900	H	37.45	-70.4	0.0	0.5	-70.9	-13.0	57.9
312.500	V	36.61	-66.8	0.0	0.5	-67.3	-13.0	54.3

**FCC § 22.917 (a);§ 24.238 (a); §27.53 (h)(m) - 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.

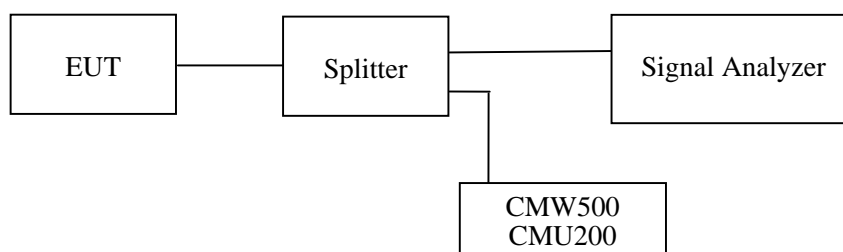
According to FCC §27.53 (h)(m), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log(P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log(P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log(P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log(P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log(P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

**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
Rohde &Schwarz	Signal Analyzer	FSIQ26	100048	2015-11-12	2016-11-11
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	110605	2015-11-25	2016-11-25
Rohde & Schwarz	SIGNAL ANALYZER	FSV40	101116	2016-07-04	2017-07-03
R&S	Wideband Radio Communication tester	CMW500	1201.002K50-116218-UY	2016-10-08	2017-10-07
Haojintech	Coaxial Cable	SR	SS11800	2016-09-08	2017-09-08
Dressler	attenuator	ATT 6/75	510020010004	/	/

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

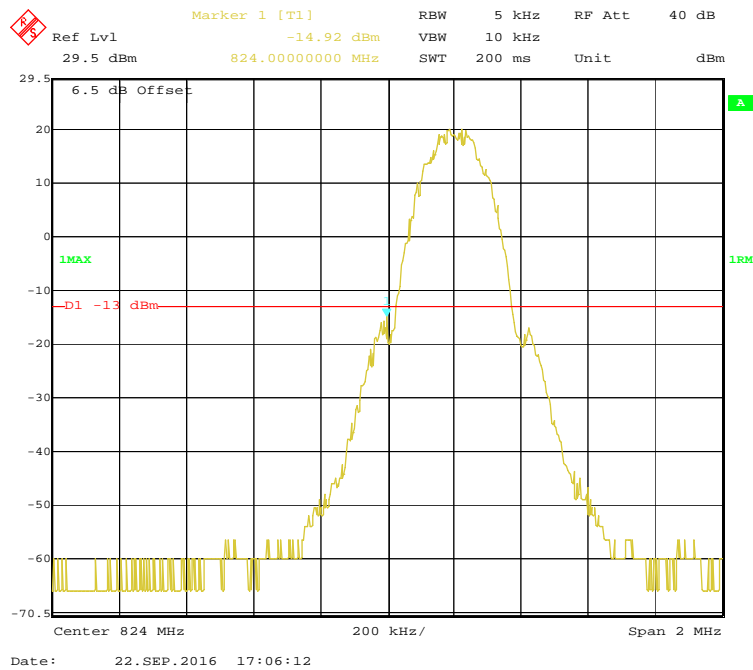
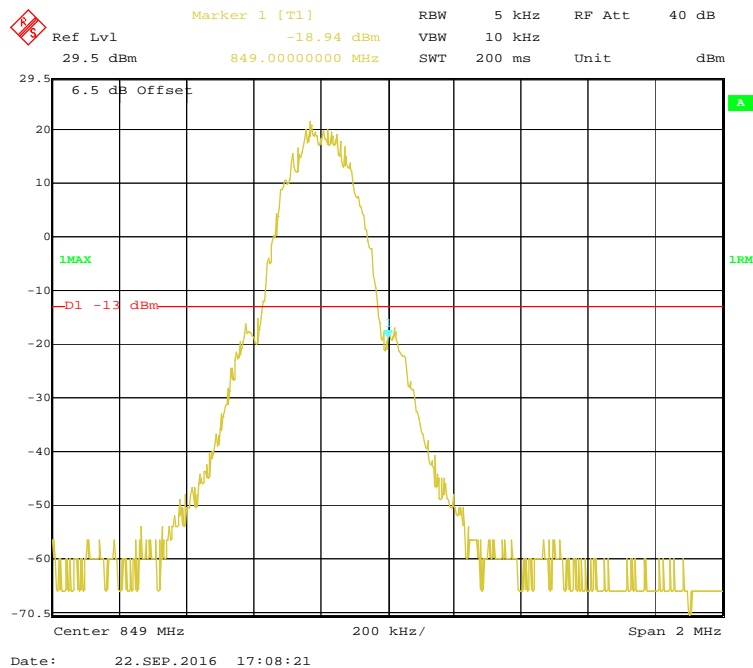
**Test Data****Environmental Conditions**

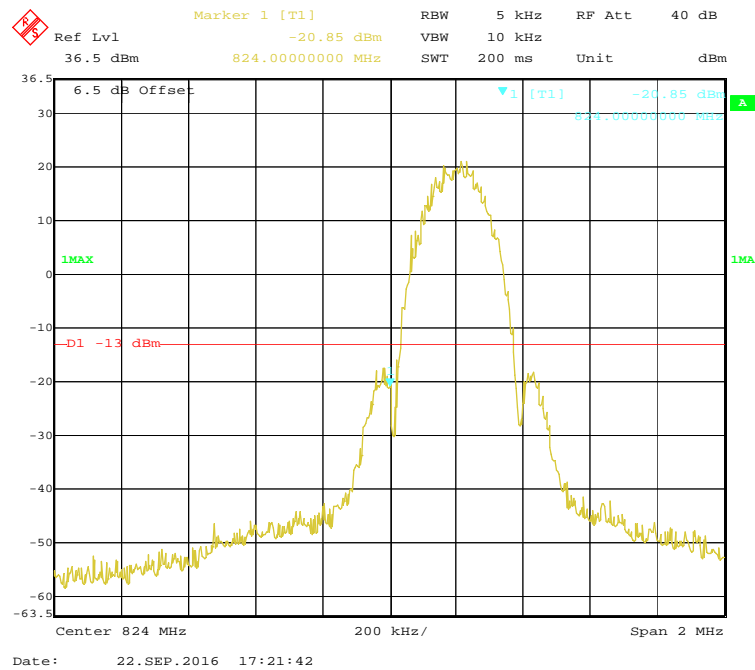
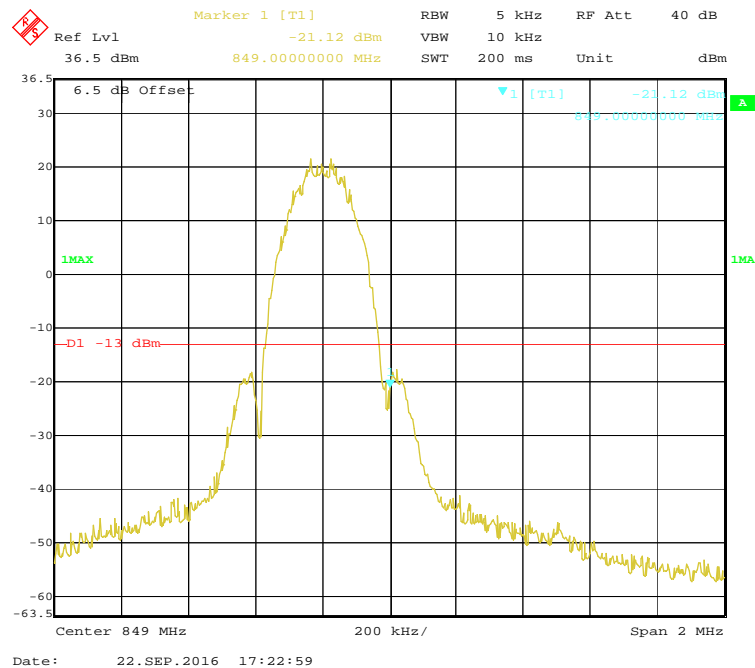
<b>Temperature:</b>	23 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	101.0kPa

*The testing was performed by Chris Wang on 2016-09-19 to 2016-10-20.*

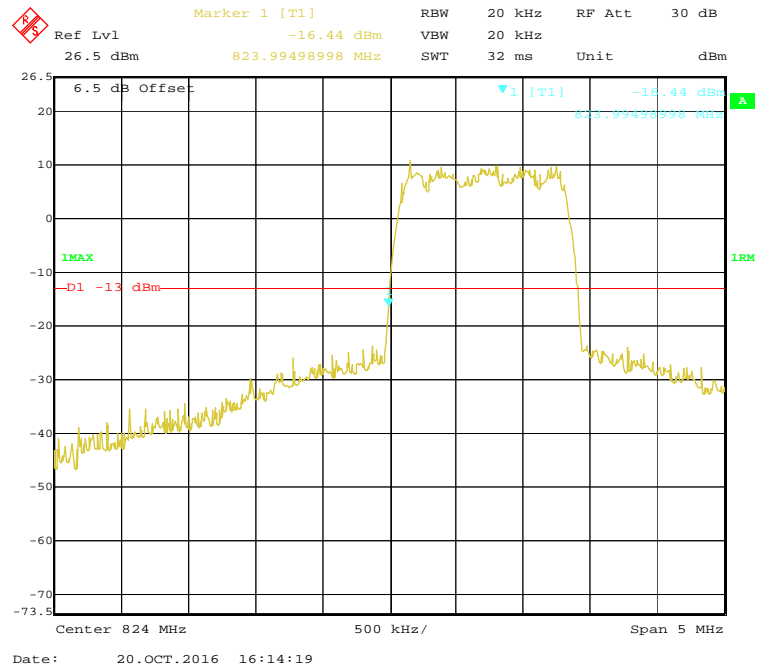
*EUT operation mode: Transmitting*

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

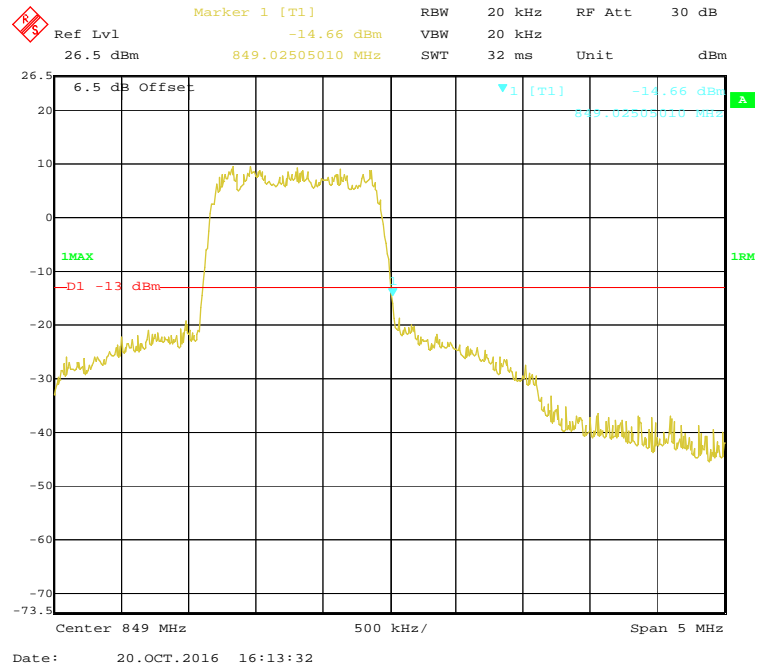
**Cellular Band, Left Band Edge for GSM (GMSK) Mode****Cellular Band, Right Band Edge for GSM (GMSK) Mode**

**Cellular Band, Left Band Edge for EGPRS Mode****Cellular Band, Right Band Edge for EGPRS Mode**

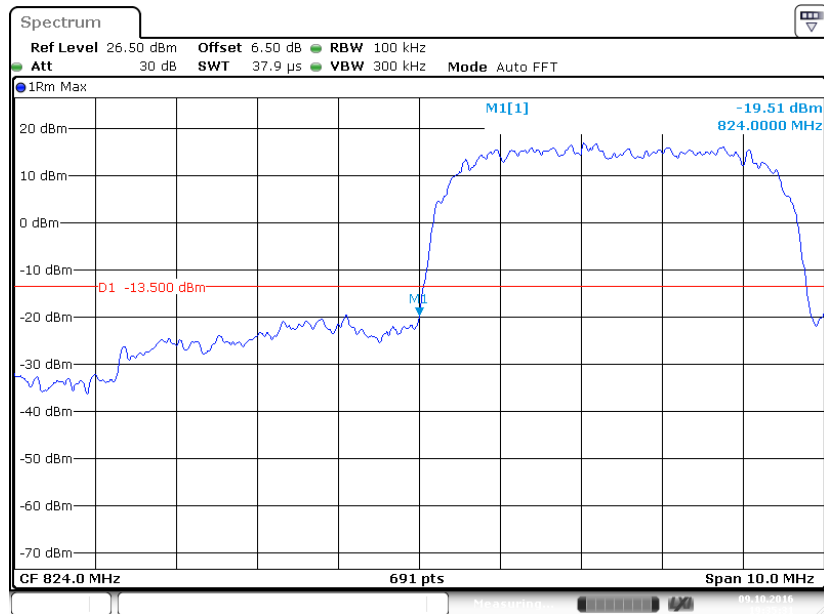
### Cellular Band, Left Band Edge for CDMA Mode



### Cellular Band, Right Band Edge for CDMA Mode



### Cellular Band, Left Band Edge for WCDMA Mode



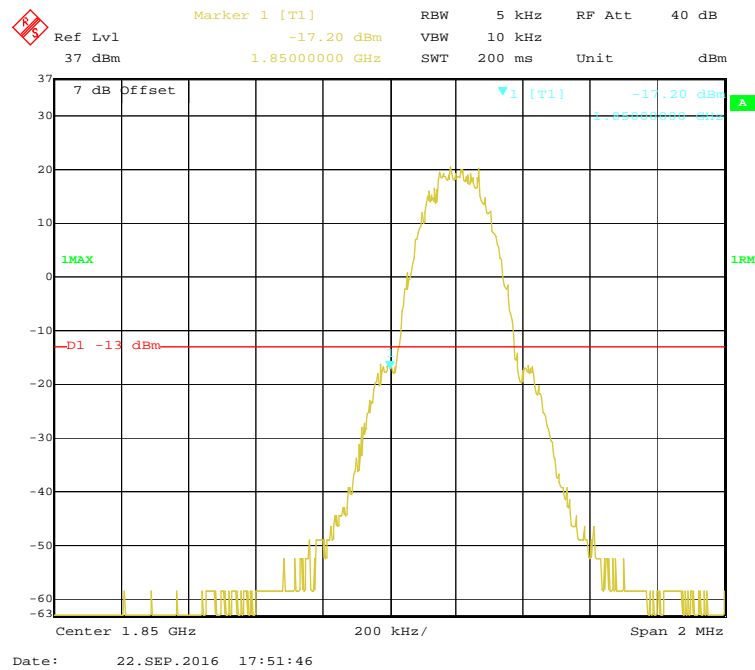
Date: 9 OCT 2016 19:35:32

### Cellular Band, Right Band Edge for WCDMA Mode

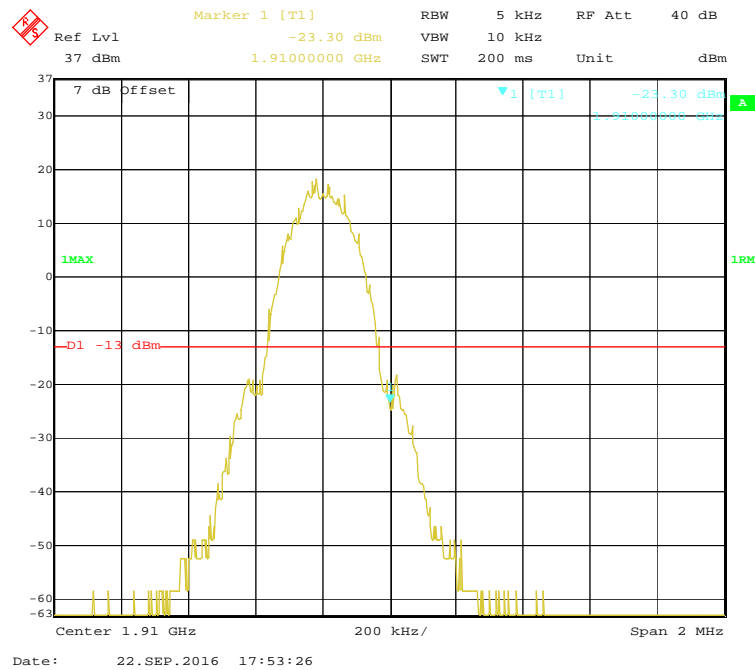


Date: 9 OCT 2016 19:36:37

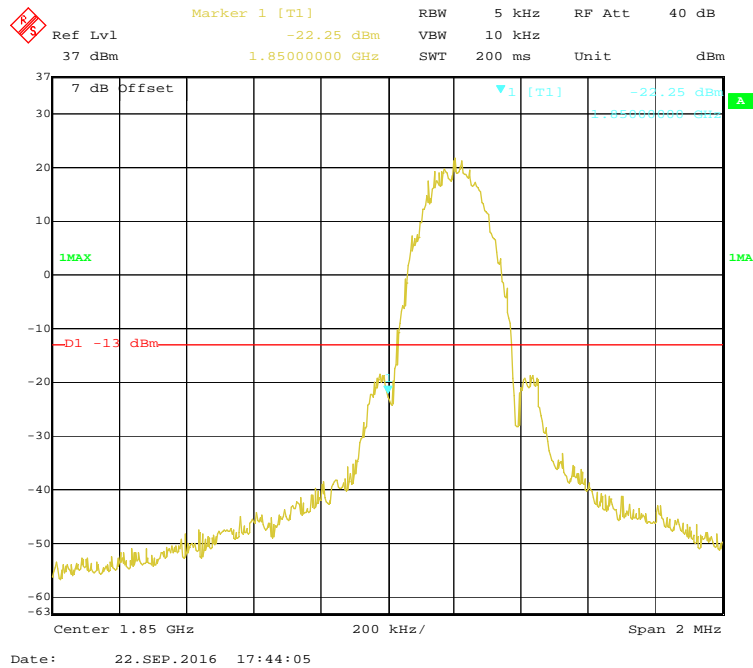
### PCS Band, Left Band Edge for GSM (GMSK) Mode



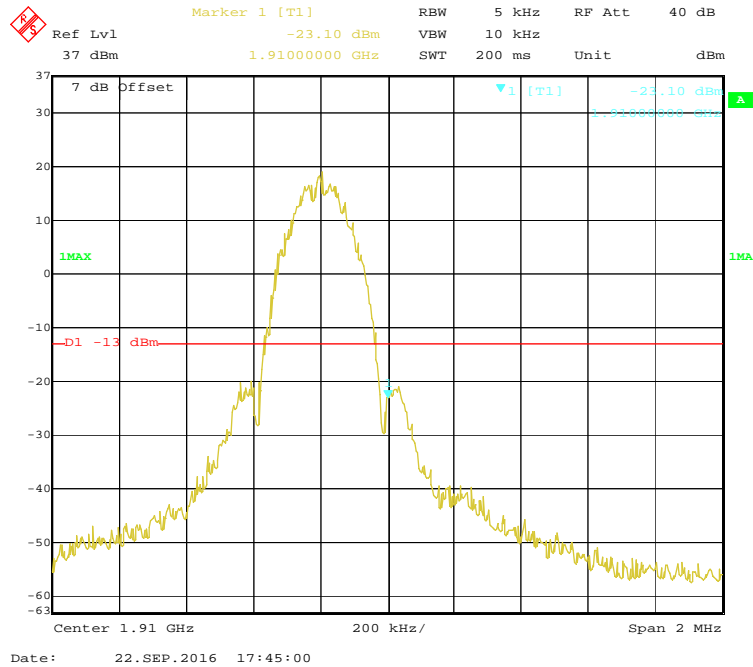
### PCS Band, Right Band Edge for GSM (GMSK) Mode



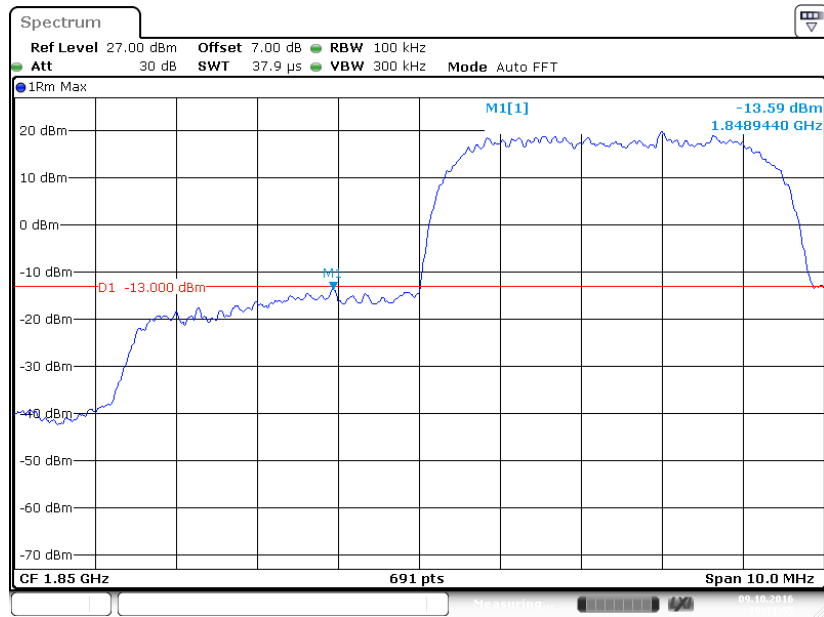
### PCS Band, Left Band Edge for EGPRS Mode



### PCS Band, Right Band Edge for EGPRS Mode



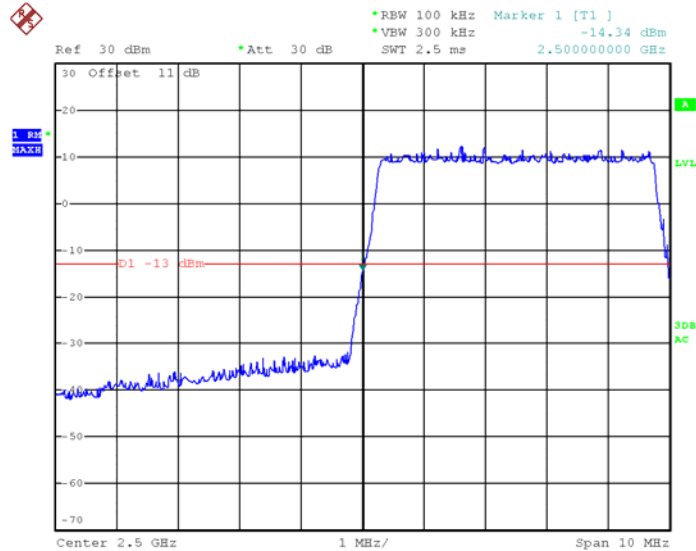
### PCS Band, Left Band Edge for WCDMA Mode



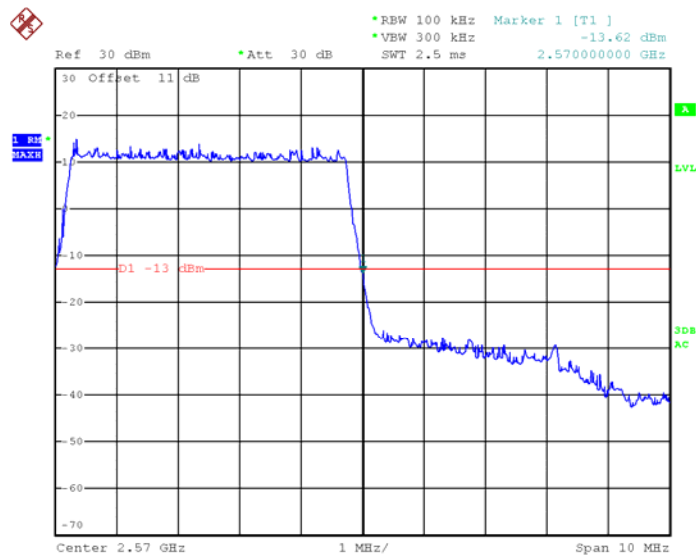
### PCS Band, Right Band Edge for WCDMA Mode





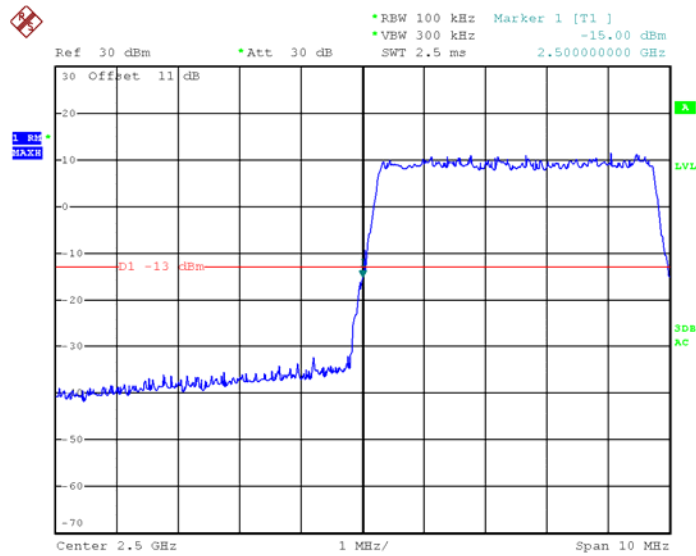
**LTE Band 7:****QPSK (5.0 MHz, FULL RB) - Left Band Edge**

Date: 19.SEP.2016 22:02:32

**QPSK (5.0 MHz, FULL RB) - Right Band Edge**

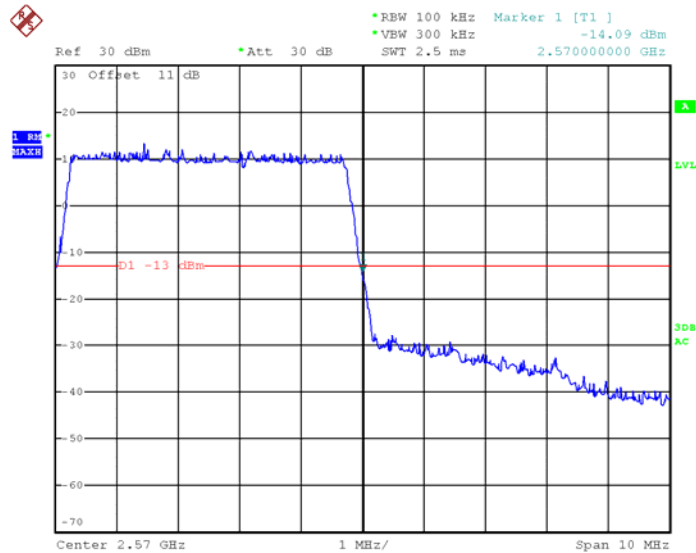
Date: 19.SEP.2016 22:05:40

### 16-QAM (5.0 MHz, FULL RB) - Left Band Edge



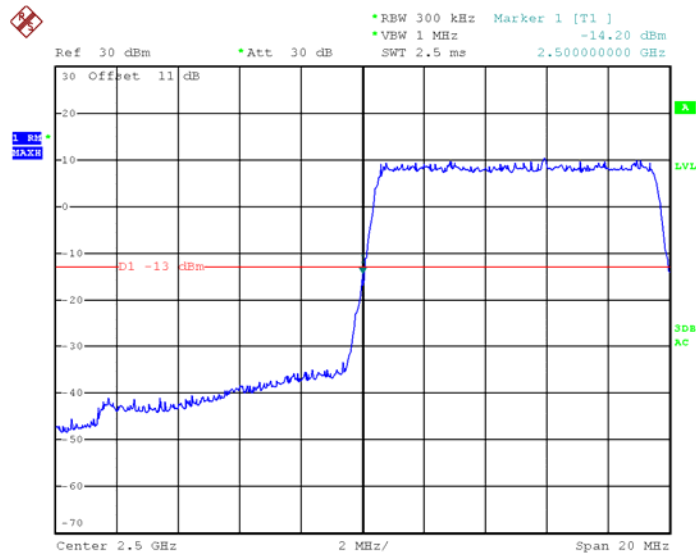
Date: 19.SEP.2016 22:01:58

### 16-QAM (5.0 MHz, FULL RB) - Right Band Edge



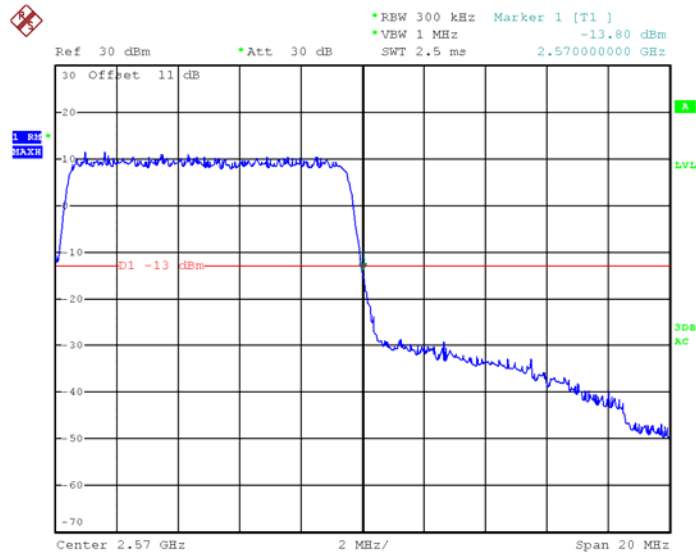
Date: 19.SEP.2016 22:06:52

### QPSK (10.0 MHz, FULL RB) - Left Band Edge



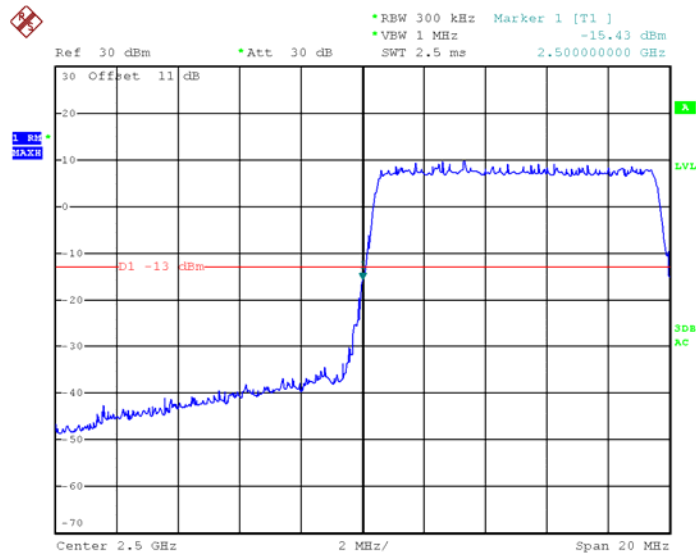
Date: 19.SEP.2016 22:10:13

### QPSK (10.0 MHz, FULL RB) - Right Band Edge



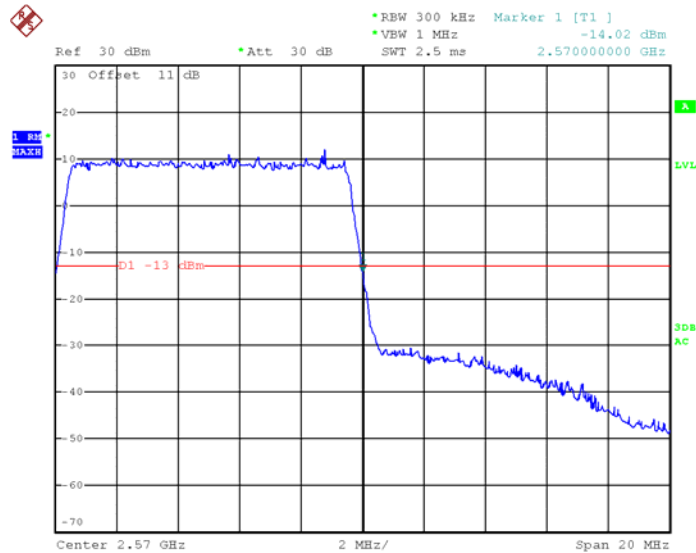
Date: 19.SEP.2016 22:09:22

### 16-QAM (10.0 MHz, FULL RB) - Left Band Edge



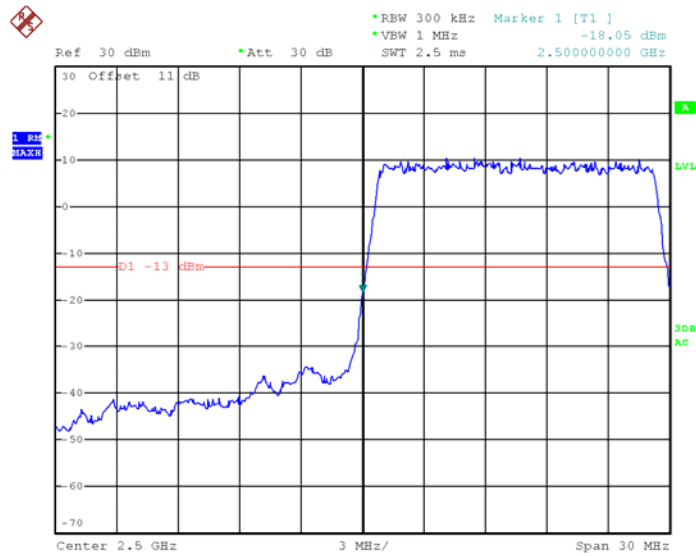
Date: 19.SEP.2016 22:10:41

### 16-QAM (10.0 MHz, FULL RB) - Right Band Edge



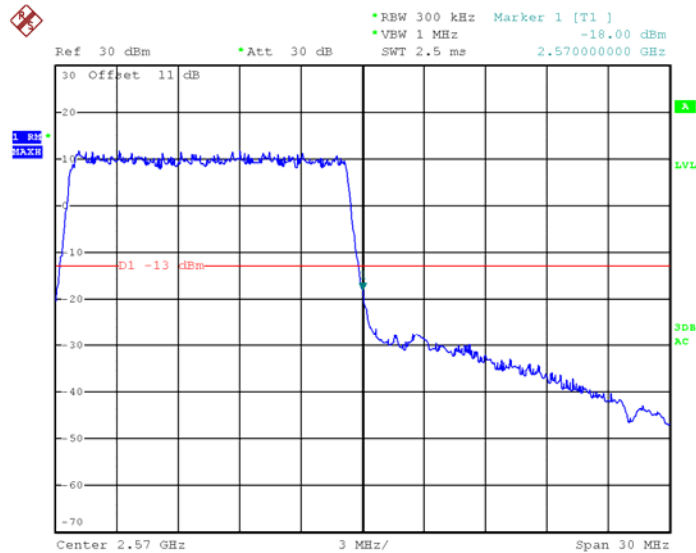
Date: 19.SEP.2016 22:08:52

### QPSK (15.0 MHz, FULL RB) - Left Band Edge

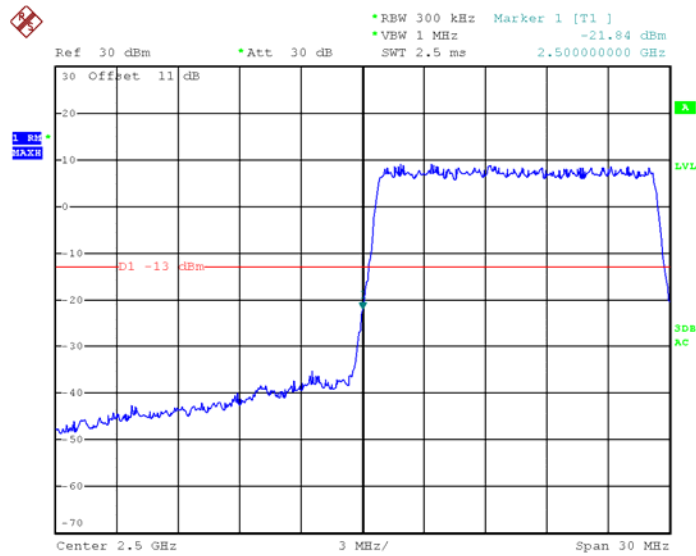


Date: 19.SEP.2016 22:13:36

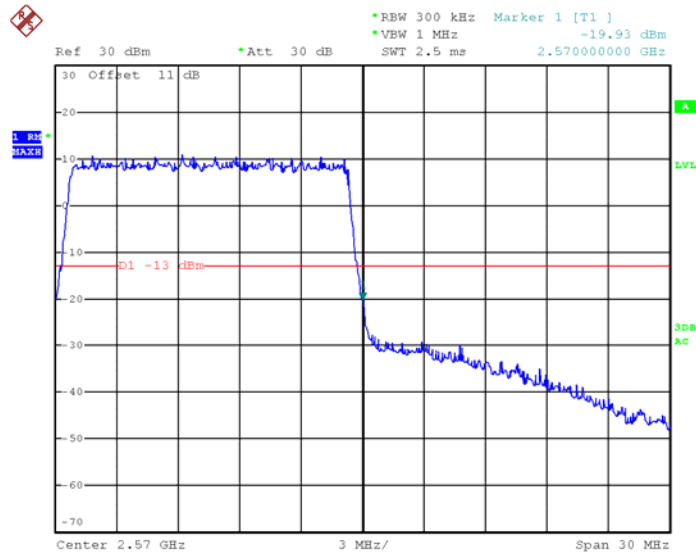
### QPSK (15.0 MHz, FULL RB) - Right Band Edge



Date: 19.SEP.2016 22:14:37

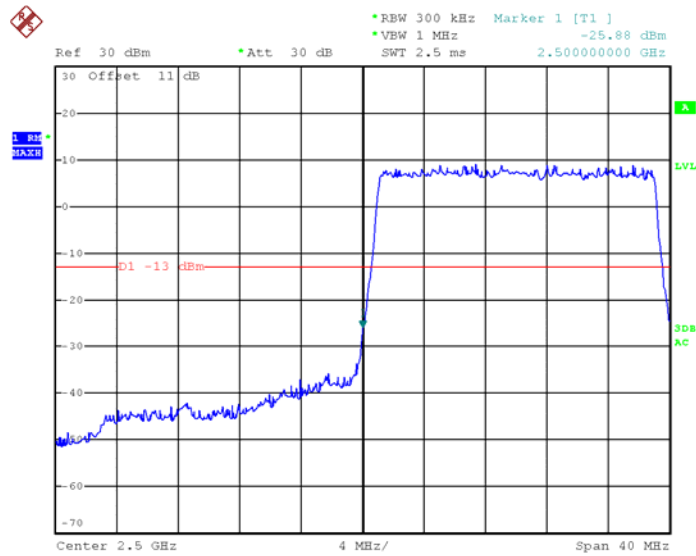
**16-QAM (15.0 MHz, FULL RB) - Left Band Edge**

Date: 19.SEP.2016 22:12:45

**16-QAM (15.0 MHz, FULL RB) - Right Band Edge**

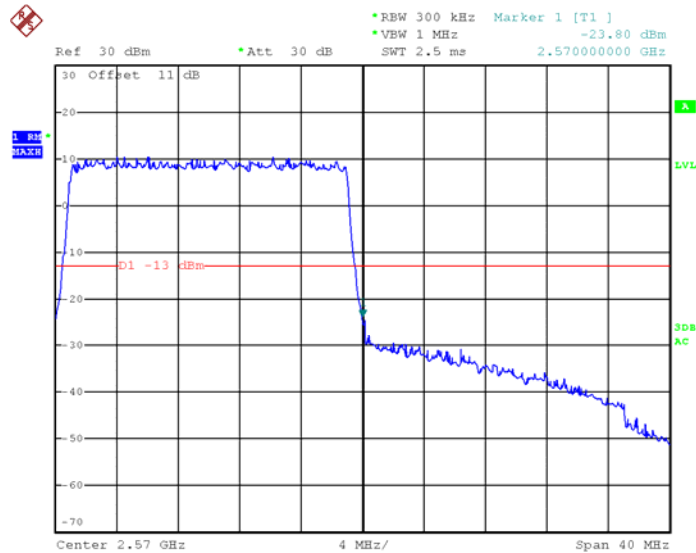
Date: 19.SEP.2016 22:14:58

### QPSK (20.0MHz, FULL RB) - Left Band Edge



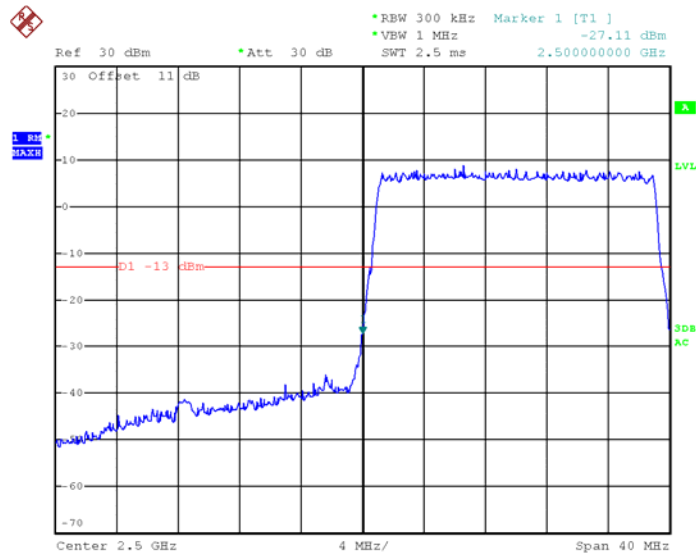
Date: 19.SEP.2016 22:20:59

### QPSK (20.0MHz, FULL RB) - Right Band Edge



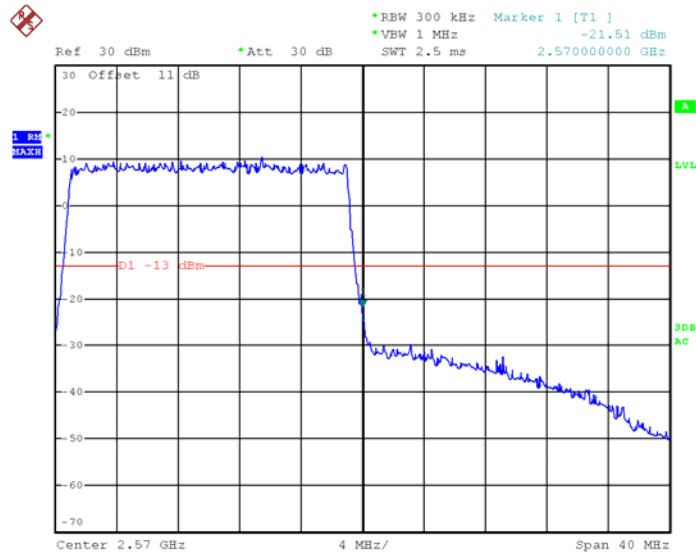
Date: 19.SEP.2016 22:16:04

### 16-QAM (20.0 MHz, FULL RB) - Left Band Edge



Date: 19.SEP.2016 22:21:47

### 16-QAM (20.0 MHz, FULL RB) - Right Band Edge

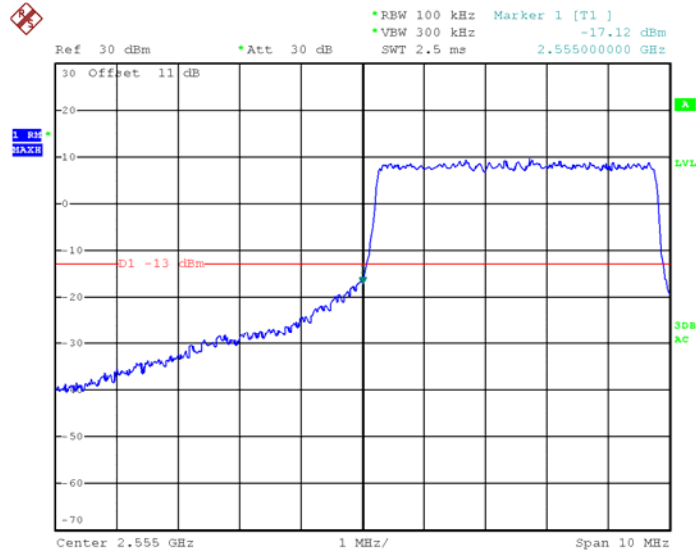


Date: 19.SEP.2016 22:17:11



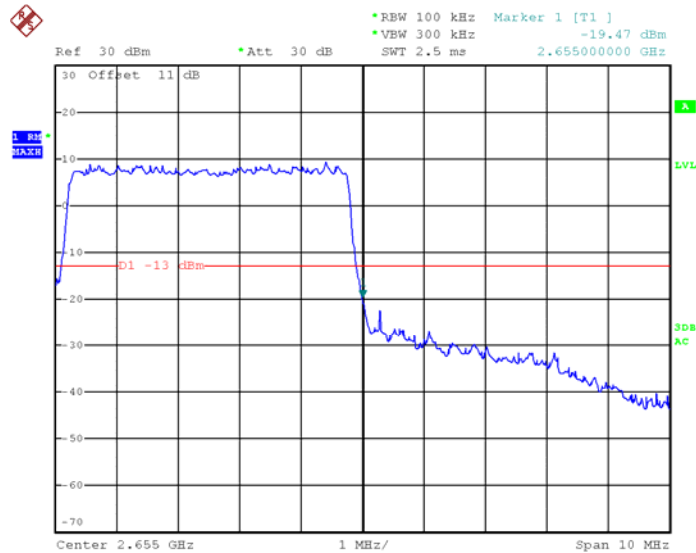
**LTE Band 41:**

**QPSK (5.0 MHz, FULL RB) - Left Band Edge**



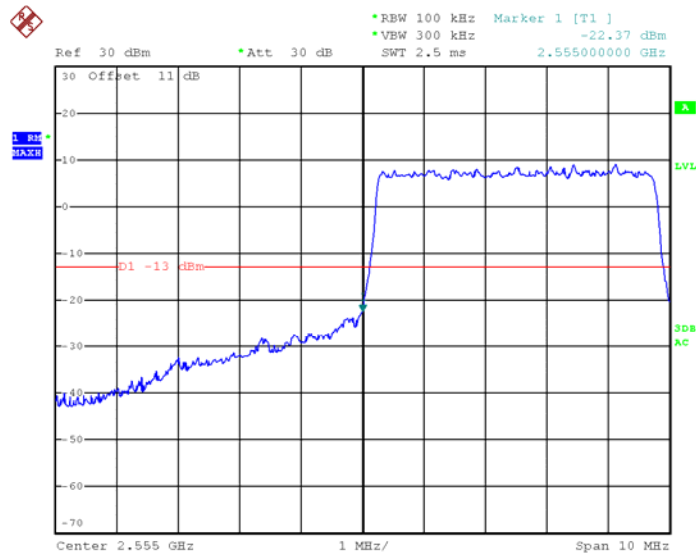
Date: 20.SEP.2016 00:02:49

**QPSK (5.0 MHz, FULL RB) - Right Band Edge**



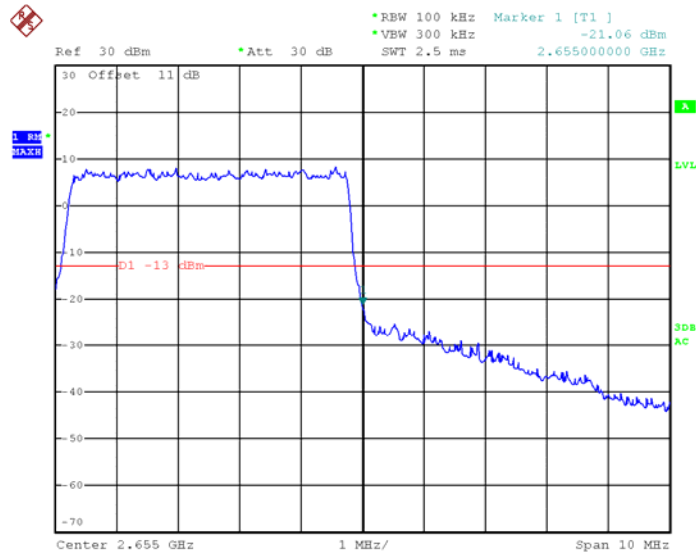
Date: 20.SEP.2016 00:07:47

### 16-QAM (5.0 MHz, FULL RB) - Left Band Edge



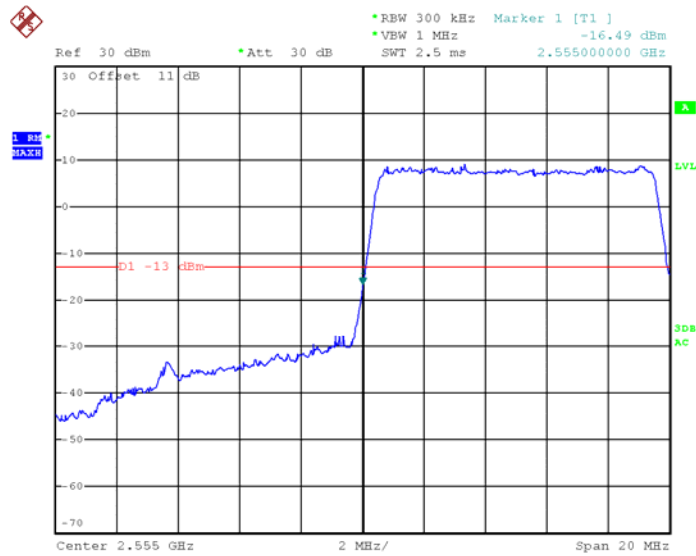
Date: 20.SEP.2016 00:05:30

### 16-QAM (5.0 MHz, FULL RB) - Right Band Edge



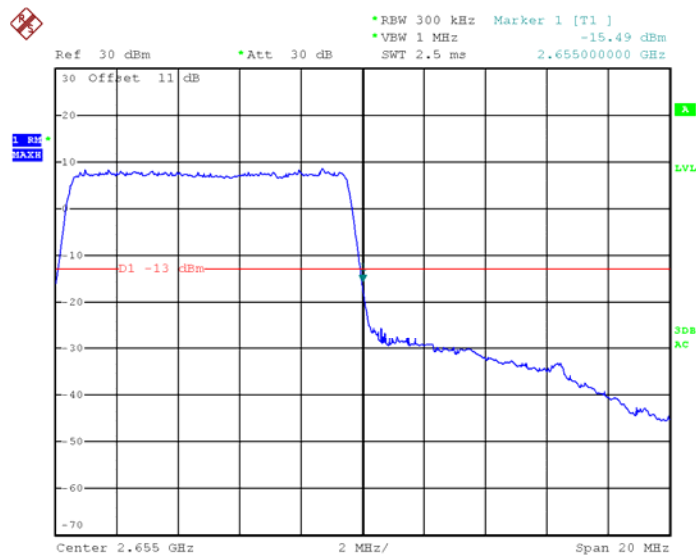
Date: 20.SEP.2016 00:06:34

### QPSK (10.0 MHz, FULL RB) - Left Band Edge



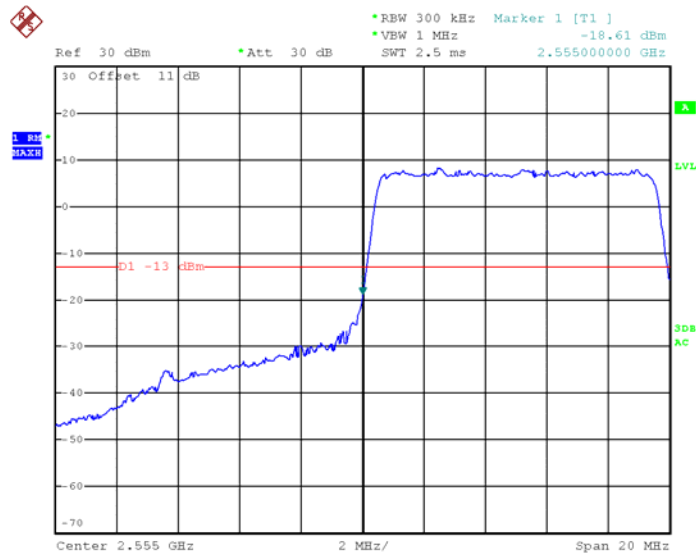
Date: 20.SEP.2016 00:11:30

### QPSK (10.0 MHz, FULL RB) - Right Band Edge



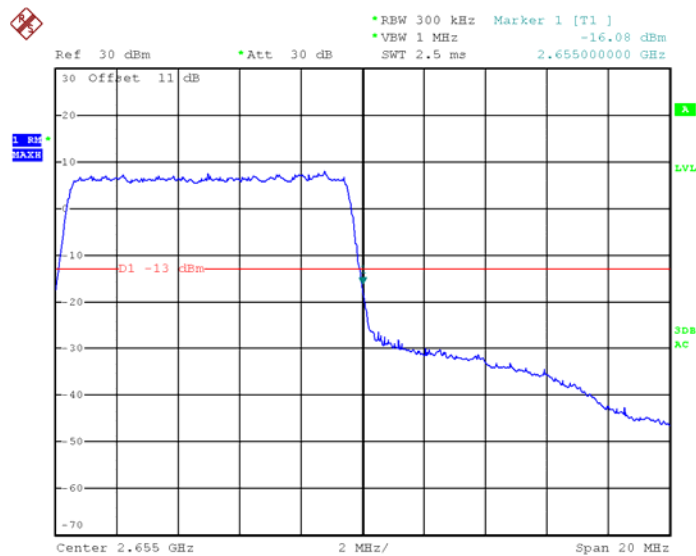
Date: 20.SEP.2016 00:09:45

### 16-QAM (10.0 MHz, FULL RB) - Left Band Edge



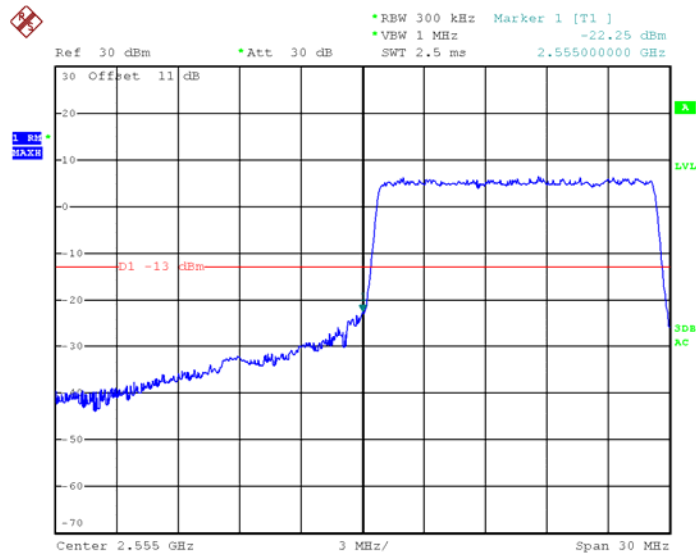
Date: 20.SEP.2016 00:12:01

### 16-QAM (10.0 MHz, FULL RB) - Right Band Edge



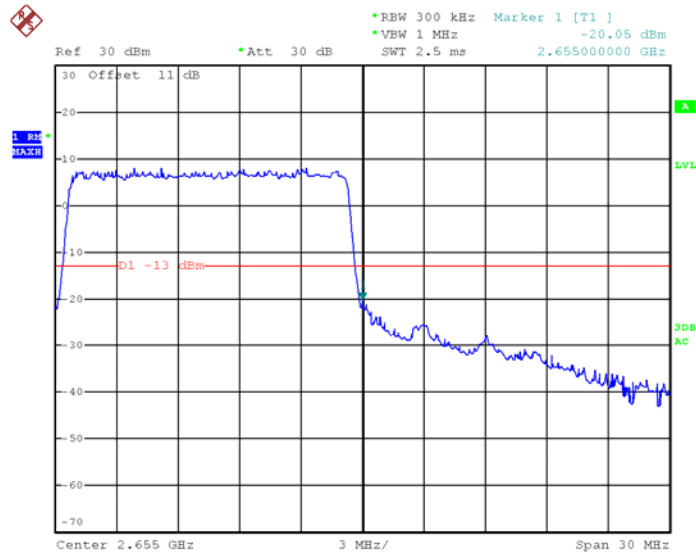
Date: 20.SEP.2016 00:09:13

### QPSK (15.0 MHz, FULL RB) - Left Band Edge



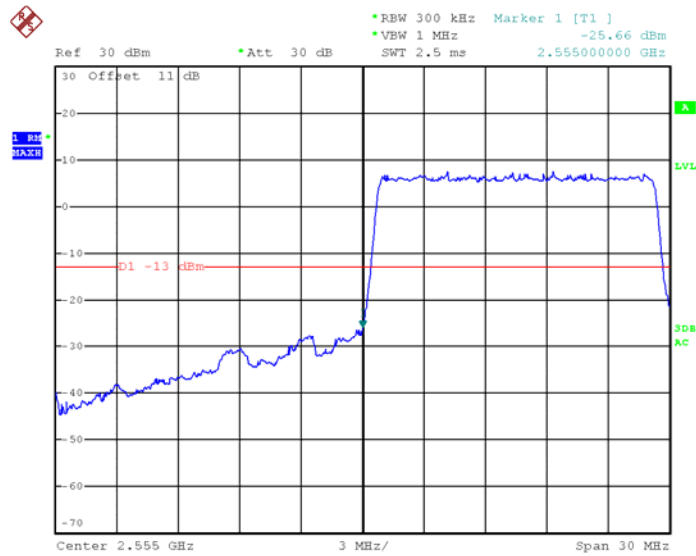
Date: 20.SEP.2016 00:13:49

### QPSK (15.0 MHz, FULL RB) - Right Band Edge



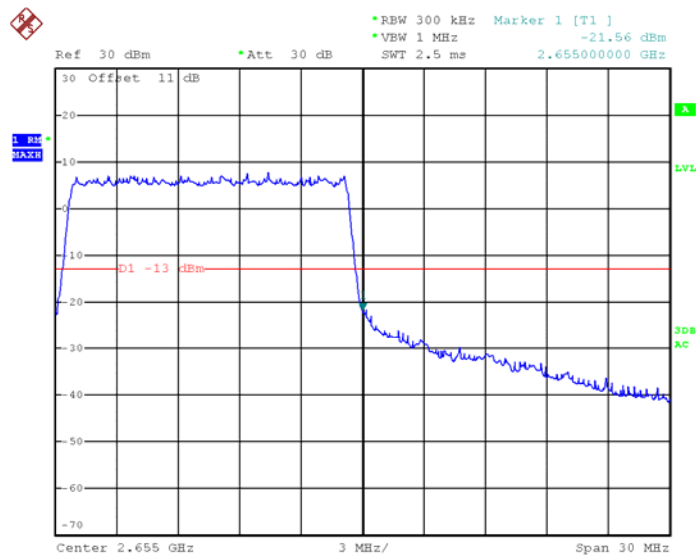
Date: 20.SEP.2016 00:19:20

### 16-QAM (15.0 MHz, FULL RB) - Left Band Edge



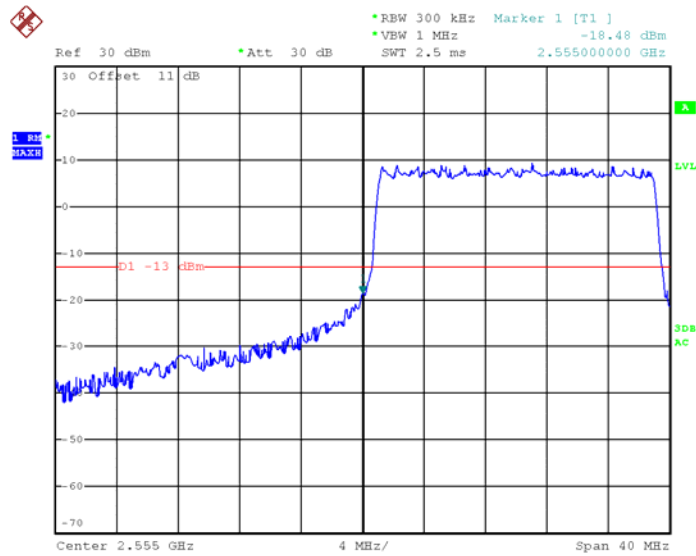
Date: 20.SEP.2016 00:15:00

### 16-QAM (15.0 MHz, FULL RB) - Right Band Edge



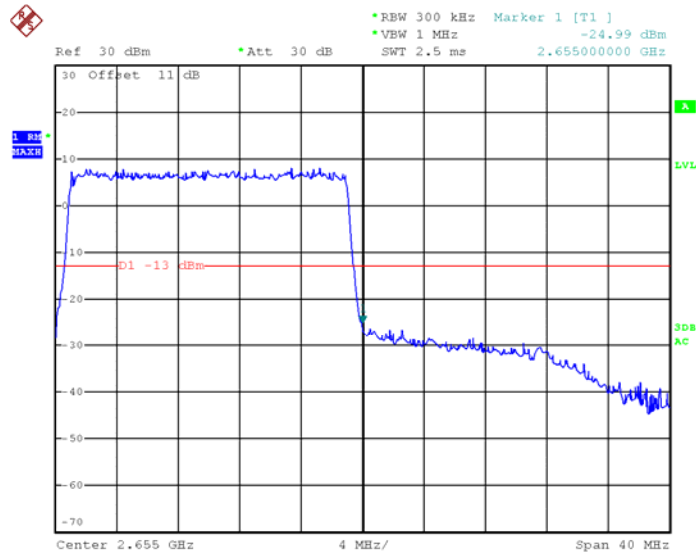
Date: 20.SEP.2016 00:18:02

### QPSK (20.0MHz, FULL RB) - Left Band Edge



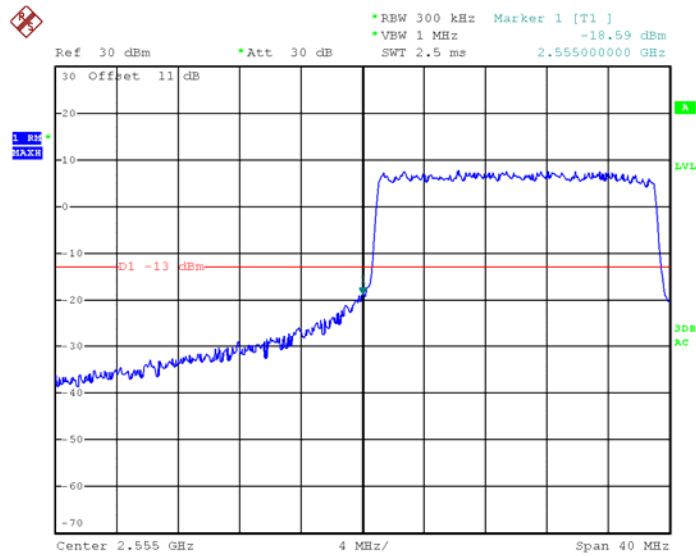
Date: 20.SEP.2016 00:24:58

### QPSK (20.0MHz, FULL RB) - Right Band Edge



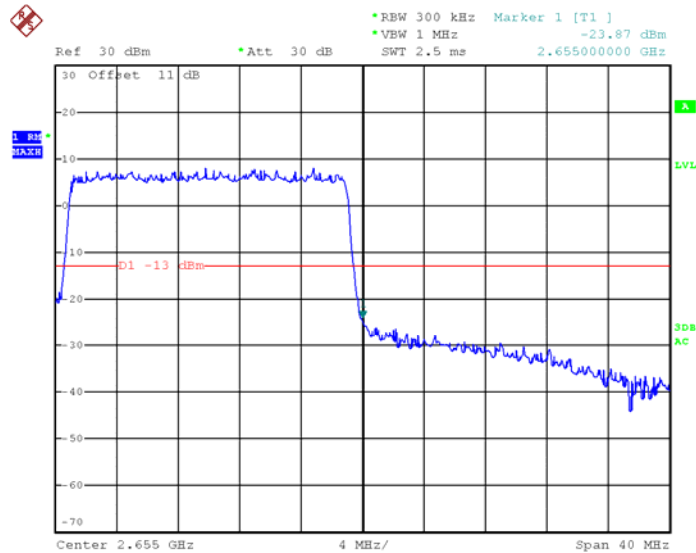
Date: 20.SEP.2016 00:22:53

### 16-QAM (20.0 MHz, FULL RB) - Left Band Edge



Date: 20.SEP.2016 00:27:02

### 16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 20.SEP.2016 00:22:22



## **FCC § 2.1055; § 22.355;§ 24.235; §27.54; - FREQUENCY STABILITY**

### **Applicable Standards**

FCC § 2.1055, §22.355, §24.235 and & §27.54.

According to FCC §2.1055, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

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**

<b>Frequency Range (MHz)</b>	<b>Base, fixed (ppm)</b>	<b>Mobile &gt; 3 watts (ppm)</b>	<b>Mobile ≤ 3 watts (ppm)</b>
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

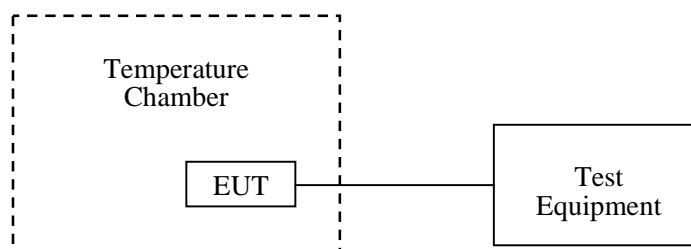
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

### **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 Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde &Schwarz	Signal Analyzer	FSIQ26	100048	2015-11-12	2016-11-11
Rohde & Schwarz	Signal Analyzer	FSV40	101116	2016-07-04	2017-07-03
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	110605	2015-11-25	2016-11-25
R&S	Wideband Radio Communication tester	CMW500	1201.002K50-116218-UY	2016-10-08	2017-10-07
Haojintech	Coaxial Cable	SR	SS11800	2016-09-08	2017-09-08
Dressler	attenuator	ATT 6/75	510020010004	/	/

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

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

<b>Temperature:</b>	23 °C
<b>Relative Humidity:</b>	50 %
<b>ATM Pressure:</b>	101.0kPa

*The testing was performed by Chris Wang on 2016-09-23.*

*EUT operation mode: Transmitting*

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

**Cellular Band (Part 22H)****GSM 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	3.8	7	0.00837	2.5
-20		1	0.00120	2.5
-10		6	0.00717	2.5
0		3	0.00359	2.5
10		5	0.00598	2.5
20		-4	-0.00478	2.5
30		-1	-0.00120	2.5
40		2	0.00239	2.5
50		3	0.00359	2.5
25	V min.= 3.6	5	0.00598	2.5
25	V max.= 4.2	6	0.00717	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	3.8	17	0.02032	2.5
-20		14	0.01673	2.5
-10		12	0.01434	2.5
0		10	0.01195	2.5
10		13	0.01554	2.5
20		15	0.01793	2.5
30		12	0.01434	2.5
40		10	0.01195	2.5
50		13	0.01554	2.5
25	V min.= 3.6	14	0.01673	2.5
25	V max.= 4.2	16	0.01913	2.5

**WCDMA Mode**

Middle Channel, fo =836.6 MHz				
Temperature (°C)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	-3	-0.00359	2.5
-20		-2	-0.00239	2.5
-10		-7	-0.00837	2.5
0		-2	-0.00239	2.5
10		-5	-0.00598	2.5
20		-5	-0.00598	2.5
30		-1	-0.00120	2.5
40		-2	-0.00239	2.5
50		-3	-0.00359	2.5
25	V min.= 3.6	-7	-0.00837	2.5
25	V max.= 4.2	-5	-0.00598	2.5

**CDMA Mode**

Middle Channel, fo =836.52 MHz				
Temperature (°C)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	-1	-0.00120	2.5
-20		1	0.00120	2.5
-10		-4	-0.00478	2.5
0		-2	-0.00239	2.5
10		-4	-0.00478	2.5
20		-3	-0.00359	2.5
30		1	0.00120	2.5
40		-2	-0.00239	2.5
50		-3	-0.00359	2.5
25	V min.= 3.6	-4	-0.00478	2.5
25	V max.= 4.2	-6	-0.00717	2.5

**PCS Band (Part 24E)****GSM Mode**

Middle Channel, $f_o = 1880.0$ MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	-4	-0.00213	pass
-20		-5	-0.00266	pass
-10		-12	-0.00638	pass
0		-2	-0.00106	pass
10		1	0.00053	pass
20		-3	-0.00160	pass
30		2	0.00106	pass
40		-3	-0.00160	pass
50		-14	-0.00745	pass
25	V min.= 3.6	-7	-0.00372	pass
25	V max.= 4.2	-12	-0.00638	pass

**EDGE Mode**

Middle Channel, $f_o = 1880.0$ MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	-4	-0.00213	pass
-20		-5	-0.00266	pass
-10		-12	-0.00638	pass
0		-2	-0.00106	pass
10		-3	-0.00160	pass
20		2	0.00106	pass
30		-3	-0.00160	pass
40		14	0.00745	pass
50		5	0.00266	pass
25	V min.= 3.6	7	0.00372	pass
25	V max.= 4.2	9	0.00479	pass

**WCDMA Mode**

Middle Channel, $f_o = 1880.0$ MHz				
Temperature (°C)	Power Supplied (VDC)	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	-7	-0.00372	pass
-20		-3	-0.00160	pass
-10		-2	-0.00106	pass
0		-14	-0.00745	pass
10		-11	-0.00585	pass
20		-1	-0.00053	pass
30		-2	-0.00106	pass
40		-7	-0.00372	pass
50		-5	-0.00266	pass
25	V min.= 3.6	-6	-0.00319	pass
25	V max.= 4.2	-9	-0.00479	pass

**Band 7:**

10.0 MHz Middle Channel, $f_0$ =2535.0 MHz (QPSK)				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	-5.20	-0.0021	pass
-20		-5.25	-0.0021	pass
-10		-5.17	-0.0020	pass
0		-5.32	-0.0021	pass
10		-5.28	-0.0021	pass
20		-5.35	-0.0021	pass
30		-5.43	-0.0021	pass
40		-5.10	-0.0020	pass
50		-5.36	-0.0021	pass
25	V min.= 3.6	-5.19	-0.0020	pass
25	V max.= 4.2	-5.46	-0.0022	pass

10.0 MHz Middle Channel, $f_0$ =2535.0 MHz (16QAM)				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	-6.18	-0.0024	0.0001
-20		-6.23	-0.0025	0.0002
-10		-6.27	-0.0025	0.0001
0		-6.01	-0.0024	0.0001
10		-6.25	-0.0025	0.0001
20		-6.33	-0.0025	0.0001
30		-6.21	-0.0024	0.0001
40		-6.18	-0.0024	0.0001
50		-6.15	-0.0024	0.0001
25	V min.= 3.6	-6.28	-0.0025	0.0001
25	V max.= 4.2	-6.06	-0.0024	0.0001

**Band 41:**

10.0 MHz Middle Channel, $f_0=2605.0\text{MHz}$ (QPSK)				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	-4.69	-0.0018	pass
-20		-4.28	-0.0016	pass
-10		-4.60	-0.0018	pass
0		-4.67	-0.0018	pass
10		-4.70	-0.0018	pass
20		-4.79	-0.0018	pass
30		-4.64	-0.0018	pass
40		-4.57	-0.0018	pass
50		-4.49	-0.0017	pass
25	V min.= 3.6	-4.55	-0.0017	pass
25	V max.= 4.2	-4.58	-0.0018	pass

10.0 MHz Middle Channel, $f_0=2605.0\text{ MHz}$ (16QAM)				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	-4.39	-0.0017	0.0001
-20		-4.15	-0.0016	0.0002
-10		-4.03	-0.0015	0.0001
0		-4.27	-0.0016	0.0001
10		-4.02	-0.0015	0.0001
20		-4.13	-0.0016	0.0001
30		-4.19	-0.0016	0.0001
40		-4.26	-0.0016	0.0001
50		-4.20	-0.0016	0.0001
25	V min.= 3.6	-4.00	-0.0015	0.0001
25	V max.= 4.2	-4.33	-0.0017	0.0001

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