



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

For

**Amgoo Telecom Co., Ltd.**

3/F, Block R2-A (North), Gaoxin S.Ave.4th, Hi-Tech Industrial Park, Nanshan District, Shenzhen, China

**FCC ID: UOSAM509**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Smartphone
<b>Report Number:</b> RSZ170804002-00D	
<b>Report Date:</b> 2017-09-04	
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## GENERAL INFORMATION

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

The *Amgoo Telecom Co., Ltd.*'s product, model number: *AM509 (FCC ID: UOSAM509)* or the "EUT" in this report was a *Smartphone*, which was measured approximately: 145.6 mm (L) × 73.2 mm (W) × 10.2 mm (H), rated with input voltage: DC 3.8 V battery or DC 5V from adapter.

Adapter Information:

Model: CH5

Input: AC 100-240V, 50/60Hz, 0.2A

Output: DC 5V, 1000 mA

*\*All measurement and test data in this report was gathered from production sample serial number: 1701849 (Assigned by applicant). The EUT supplied by the applicant was received on 2017-08-04.*

### Objective

This type approval report is prepared on behalf of *Amgoo Telecom 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 submissions with FCC ID: UOSAM509.

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

**Measurement Uncertainty**

Parameter	uncertainty
Occupied Channel Bandwidth	$\pm 5\%$
RF output power, conducted	$\pm 1.5\text{dB}$
Unwanted Emission, conducted	$\pm 1.5\text{dB}$
All emissions, radiated	$\pm 4.88\text{dB}$
Temperature	$\pm 1^\circ\text{C}$
Supply voltages	$\pm 0.4\%$

**Test Facility**

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

Bay Area Compliance Laboratories Corp. (Shenzhen) has been accredited to ISO/IEC 17025 by CNAS(Lab code: L2408). And accredited to ISO/IEC 17025 by NVLAP(Lab code: 200707-0), the FCC Designation No. CN5001 under the KDB 974614 D01.

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

Bay Area Compliance Laboratories Corp. (Shenzhen) was registered with ISED Canada under ISED Canada Registration Number 3062B.

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.

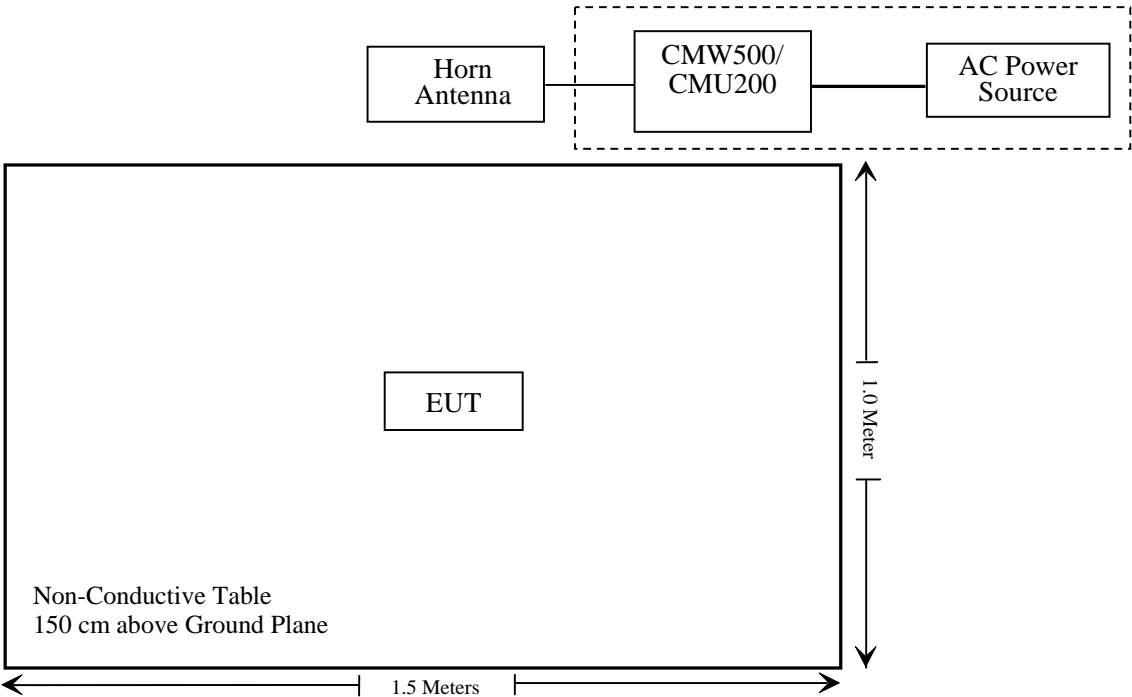
Equipment Modifications

No modifications were made to the EUT.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-146520-wh
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891

Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

FCC Rules	Description of Test	Result
§1.1307 (b)(1), §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: RSZ170804002-20.

**TEST EQUIPMENT LIST**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
<b>Radiated Emission Test</b>					
Sunol Sciences	Horn Antenna	DRH-118	A052604	2014-12-29	2017-12-28
Rohde & Schwarz	Signal Generator	FSIQ26	8386001028	2017-04-24	2018-04-24
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2014-12-17	2017-12-16
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2017-02-14	2018-02-14
HP	Amplifier	HP8447E	1937A01046	2017-05-21	2017-11-19
Anritsu	Signal Generator	68369B	004114	2016-12-05	2017-12-05
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2016-12-07	2017-12-07
COM POWER	Dipole Antenna	AD-100	041000	NCR	NCR
A.H. System	Horn Antenna	SAS-200/571	135	2015-08-18	2018-08-17
R & S	Wideband Radio Communication Tester	CMW500	146520	2017-02-14	2018-02-14
Ducommun technologies	RF Cable	UFA210A-1-4724-30050U	MFR64369 223410-001	2017-05-21	2017-11-19
Ducommun technologies	RF Cable	104PEA	218124002	2017-05-21	2017-11-19
Ducommun technologies	RF Cable	RG-214	1	2017-05-21	2017-11-19
Ducommun technologies	RF Cable	RG-214	2	2017-05-22	2017-11-22
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-04	2014-12-29	2017-12-28
Ducommun technologies	Horn Antenna	ARH-4223-02	1007726-03	2014-12-29	2017-12-28
Ducommun technologies	Pre-amplifier	ALN-22093530-01	991373-01	2017-08-03	2018-08-03

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
<b>RF Conducted Test</b>					
Rohde & Schwarz	Signal Analyzer	FSIQ26	837405/023	2017-04-24	2018-04-24
ESPEC	Temperature & Humidity Chamber	EL-10KA	09107726	2016-11-22	2017-11-22
Long Wei	DC Power Supply	TPR-6420D	398363	NCR	NCR
Aglient	ESG Vector Signal Generator	E4438C	MY42080875	2017-05-09	2018-05-09
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-146520-wh	2017-04-24	2018-04-24
Rohde & Schwarz	Wideband Radio Communication Tester	CMU200	106891	2016-10-18	2017-10-18
Ducommun technologies	RF Cable	RG-214	3	2017-05-22	2017-11-22
WEINSCHTEL	3dB Attenuator	N/A	N/A	2017-05-23	2017-11-22
WEINSCHTEL	6 dB Attenuator	50-6	R4376	2017-05-23	2017-11-22
N/A	Power Splitter	N/A	N/A	2017-05-21	2018-05-21

**\* Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) 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(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: RSZ170804002-20.

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## **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) (h) - 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.

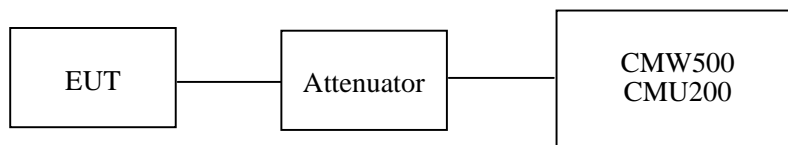
According to §27.50(d), the maximum EIRP must not exceed 1Watts (30dBm) for 1710-1755MHz.

According to §27.50(h), the maximum EIRP must not exceed 2Watts (33dBm) for 2500-2570MHz.

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

**Test Procedure***Conducted method:*

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

*Radiated method:*

TIA603-D section 2.2.17

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

<b>Temperature:</b>	26 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	101.0 kPa

The testing was performed by Xiangguang Kong from 2017-07-25 to 2017-08-30.

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

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	128	824.2	33.05	38.45
	190	836.6	33.03	38.45
	251	848.8	32.95	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	33.10	32.19	30.18	28.97	38.45
	190	836.6	33.06	32.17	30.16	28.89	38.45
	251	848.8	32.98	32.03	30.03	28.82	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	128	824.2	27.73	26.47	24.19	22.65	38.45
	190	836.6	27.69	26.41	24.03	22.60	38.45
	251	848.8	27.43	26.17	23.71	22.34	38.45

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band V)	Normal	RMC		22.18	22.24	22.13
		HSDPA	1	21.57	21.70	21.52
			2	21.81	21.80	21.69
			3	21.59	21.61	21.60
			4	21.77	21.79	21.68
		HSUPA	1	21.63	21.66	21.54
			2	21.73	21.87	21.67
			3	21.64	21.70	21.52
			4	21.77	21.85	21.75
			5	21.73	21.84	21.72

**PCS Band (Part 24E)**

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	512	1850.2	28.55	33
	661	1880.0	28.21	33
	810	1909.8	28.15	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	27.67	26.76	24.85	23.75	33
	661	1880.0	27.29	26.46	24.51	23.44	33
	810	1909.8	27.24	26.37	24.46	23.42	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	512	1850.2	24.02	23.08	21.16	19.91	33
	661	1880.0	24.10	23.14	21.26	20.14	33
	810	1909.8	24.29	23.37	21.55	20.47	33

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band I I)	Normal	RMC		22.48	22.46	22.43
		HSDPA	1	21.92	21.85	21.83
			2	22.11	22.02	21.97
			3	21.93	21.87	21.83
			4	22.02	22.07	22.02
		HSUPA	1	21.92	21.90	21.83
			2	22.10	22.07	22.00
			3	21.87	21.89	21.84
			4	22.07	22.03	22.05
			5	22.09	22.03	22.03

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

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	0.36	13
	Middle	0.31	13
	High	0.33	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	0.34	13
	Middle	0.38	13
	High	0.32	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.15	13
	Middle	3.32	13
	High	3.28	13
HSDPA (16QAM)	Low	3.36	13
	Middle	3.31	13
	High	4.63	13
HSUPA (BPSK)	Low	3.84	13
	Middle	3.45	13
	High	4.96	13

**PCS Band**

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	0.36	13
	Middle	0.33	13
	High	0.37	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	0.34	13
	Middle	0.32	13
	High	0.39	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.22	13
	Middle	3.43	13
	High	3.52	13
HSDPA (16QAM)	Low	4.78	13
	Middle	4.13	13
	High	4.46	13
HSUPA (BPSK)	Low	3.34	13
	Middle	3.52	13
	High	4.86	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)	Level (dBm)	Cable loss (dB)	Antenna Gain (dB)			
ERP, Cellular Band (Part 22H), Middle Channel										
836.60	89.56	121	2.0	H	21.6	0.67	0	20.93	38.45	17.52
836.60	99.35	186	1.8	V	31.4	0.67	0	30.73	38.45	7.72
EIRP, PCS Band (Part 24E), Middle Channel										
1880.00	92.03	81	2.3	H	22.0	1.30	8.50	29.20	33	3.80
1880.00	91.26	197	1.7	V	21.0	1.30	8.50	28.20	33	4.80

**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)	Level (dBm)	Cable loss (dB)	Antenna Gain (dB)			
ERP, Cellular Band (Part 22H), Middle Channel										
836.60	84.56	267	1.3	H	16.6	0.67	0	15.93	38.45	22.52
836.60	93.85	326	2.3	V	25.9	0.67	0	25.23	38.45	13.22
EIRP, PCS Band (Part 24E), Middle Channel										
1880.00	86.59	81	2.3	H	16.6	1.30	8.50	23.80	33	9.2
1880.00	84.32	197	1.7	V	14.3	1.30	8.50	21.50	33	11.5

**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)	Level (dBm)	Cable loss (dB)	Antenna Gain (dB)			
ERP, WCDMA Band V (Part 22H), Middle Channel										
836.50	82.87	323	2.4	H	14.9	0.67	0	14.23	38.45	24.22
836.50	91.03	327	2.5	V	23.0	0.67	0	22.33	38.45	16.12
EIRP, WCDMA Band II (Part 24E), Middle Channel										
1880.00	84.06	306	2.5	H	14.0	1.30	8.50	21.20	33	11.8
1880.00	81.54	13	2.1	V	11.3	1.30	8.50	18.50	33	14.5

**Note:**

All above data were tested with no amplifier.

Absolute Level = Substituted Level - Cable loss + Antenna Gain

Margin = Limit - Absolute Level



**LTE Band 4:****Maximum Output Power**

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	21.68	21.37	21.86
		RB Size=1, RB Offset=2	22.03	22.24	21.93
		RB Size=1, RB Offset=5	21.87	21.95	21.84
		RB Size=3, RB Offset=0	22.24	22.56	22.01
		RB Size=3, RB Offset=1	22.14	22.24	22.11
		RB Size=3, RB Offset=2	22.13	22.24	22.01
		RB Size=6, RB Offset=0	21.55	21.25	21.96
	16QAM	RB Size=1, RB Offset=0	22.69	22.36	22.98
		RB Size=1, RB Offset=2	22.97	22.41	22.98
		RB Size=1, RB Offset=5	22.61	22.14	22.88
		RB Size=3, RB Offset=0	22.69	22.68	23.12
		RB Size=3, RB Offset=1	22.60	22.49	23.03
		RB Size=3, RB Offset=2	22.77	22.54	23.01
		RB Size=6, RB Offset=0	20.55	20.21	20.85
3.0	QPSK	RB Size=1, RB Offset=0	22.63	22.33	22.86
		RB Size=1, RB Offset=7	22.81	22.44	22.87
		RB Size=1, RB Offset=14	22.77	22.18	22.79
		RB Size=8, RB Offset=0	21.76	21.69	21.98
		RB Size=8, RB Offset=4	21.74	21.07	21.77
		RB Size=8, RB Offset=7	21.88	21.26	21.61
		RB Size=15, RB Offset=0	21.59	21.34	21.88
	16QAM	RB Size=1, RB Offset=0	21.70	21.84	21.87
		RB Size=1, RB Offset=7	21.65	22.05	21.90
		RB Size=1, RB Offset=14	21.59	21.84	21.74
		RB Size=8, RB Offset=0	20.56	20.92	20.89
		RB Size=8, RB Offset=4	20.44	20.84	20.77
		RB Size=8, RB Offset=7	20.51	20.62	20.75
		RB Size=15, RB Offset=0	20.57	20.44	20.91

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	22.70	22.41	22.86
		RB Size=1, RB Offset=12	22.80	22.48	22.77
		RB Size=1, RB Offset=24	22.53	22.23	22.55
		RB Size=12, RB Offset=0	21.85	21.38	22.00
		RB Size=12, RB Offset=6	21.53	21.36	21.77
		RB Size=12, RB Offset=11	21.78	21.68	21.56
		RB Size=25, RB Offset=0	21.56	21.35	21.82
	16QAM	RB Size=1, RB Offset=0	21.90	21.45	21.66
		RB Size=1, RB Offset=12	21.87	21.34	21.53
		RB Size=1, RB Offset=24	21.89	21.19	21.40
		RB Size=12, RB Offset=0	20.97	20.55	20.78
		RB Size=12, RB Offset=6	20.92	20.45	20.59
		RB Size=12, RB Offset=11	20.84	20.37	20.61
		RB Size=25, RB Offset=0	20.60	20.40	20.87
10.0	QPSK	RB Size=1, RB Offset=0	22.63	22.41	22.85
		RB Size=1, RB Offset=24	22.63	22.59	22.82
		RB Size=1, RB Offset=49	22.30	22.39	22.65
		RB Size=25, RB Offset=0	21.55	21.42	21.71
		RB Size=25, RB Offset=12	21.78	21.57	21.80
		RB Size=25, RB Offset=24	21.56	21.52	21.64
		RB Size=50, RB Offset=0	21.63	21.36	21.75
	16QAM	RB Size=1, RB Offset=0	21.66	21.89	21.65
		RB Size=1, RB Offset=24	21.58	21.95	21.68
		RB Size=1, RB Offset=49	21.38	21.88	21.81
		RB Size=25, RB Offset=0	20.64	20.87	20.82
		RB Size=25, RB Offset=12	20.46	20.93	20.68
		RB Size=25, RB Offset=24	20.70	20.97	20.48
		RB Size=50, RB Offset=0	20.65	20.41	20.74

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15.0	QPSK	RB Size=1, RB Offset=0	22.75	22.55	22.54
		RB Size=1, RB Offset=37	22.93	22.68	22.51
		RB Size=1, RB Offset=74	22.88	22.51	22.29
		RB Size=36, RB Offset=0	21.87	21.57	21.82
		RB Size=36, RB Offset=18	21.69	21.67	21.45
		RB Size=36, RB Offset=37	21.68	21.30	21.70
		RB Size=75, RB Offset=0	21.68	21.48	21.81
	16QAM	RB Size=1, RB Offset=0	21.80	21.86	22.01
		RB Size=1, RB Offset=37	21.76	21.95	22.19
		RB Size=1, RB Offset=74	21.51	21.74	21.97
		RB Size=36, RB Offset=0	20.58	20.84	20.79
		RB Size=36, RB Offset=18	20.86	20.69	20.88
		RB Size=36, RB Offset=37	20.71	20.86	20.94
		RB Size=75, RB Offset=0	20.71	20.45	20.76
20.0	QPSK	RB Size=1, RB Offset=0	22.54	22.54	23.04
		RB Size=1, RB Offset=49	22.53	22.64	22.89
		RB Size=1, RB Offset=99	22.67	22.45	22.87
		RB Size=50, RB Offset=0	21.47	21.40	21.86
		RB Size=50, RB Offset=24	21.64	21.63	21.74
		RB Size=50, RB Offset=49	21.90	21.71	21.87
		RB Size=100, RB Offset=0	21.56	21.43	21.60
	16QAM	RB Size=1, RB Offset=0	21.75	21.70	21.94
		RB Size=1, RB Offset=49	21.79	21.57	22.05
		RB Size=1, RB Offset=99	21.67	21.41	21.92
		RB Size=50, RB Offset=0	20.80	20.78	20.90
		RB Size=50, RB Offset=24	20.59	20.64	20.73
		RB Size=50, RB Offset=49	20.63	20.70	20.84
		RB Size=100, RB Offset=0	20.60	20.46	20.61

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

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
16QAM (1RB Size)	5.46	13	Pass
16QAM (100%RB Size)	7.39	13	Pass

**QPSK:**

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
1732.50	88.36	316	1.3	H	15.2	1.30	9.10	23.00	30
1732.50	87.03	45	2.1	V	14.5	1.30	9.10	22.30	30
3 MHz Bandwidth									
1732.50	88.03	275	2.1	H	14.9	1.30	9.10	22.70	30
1732.50	87.42	189	2.4	V	14.9	1.30	9.10	22.70	30
5 MHz Bandwidth									
1732.50	87.60	308	2.5	H	14.4	1.30	9.10	22.20	30
1732.50	87.87	24	1.3	V	15.3	1.30	9.10	23.10	30
10 MHz Bandwidth									
1732.50	88.57	341	1.2	H	15.4	1.30	9.10	23.20	30
1732.50	87.33	15	1.3	V	14.8	1.30	9.10	22.60	30
15 MHz Bandwidth									
1732.50	88.31	120	2.1	H	15.1	1.30	9.10	22.90	30
1732.50	87.32	85	1.7	V	14.8	1.30	9.10	22.60	30
20 MHz Bandwidth									
1732.50	88.44	85	1.2	H	15.3	1.30	9.10	23.10	30
1732.50	87.30	157	1.6	V	14.7	1.30	9.10	22.50	30

**16QAM:**

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
1732.50	87.49	287	2.4	H	14.3	1.30	9.10	22.10	30
1732.50	85.95	288	2.0	V	13.4	1.30	9.10	21.20	30
3 MHz Bandwidth									
1732.50	88.01	22	1.4	H	14.8	1.30	9.10	22.60	30
1732.50	87.18	348	2.1	V	14.6	1.30	9.10	22.40	30
5 MHz Bandwidth									
1732.50	87.37	206	1.1	H	14.2	1.30	9.10	22.00	30
1732.50	86.62	61	1.5	V	14.1	1.30	9.10	21.90	30
10 MHz Bandwidth									
1732.50	87.43	181	1.7	H	14.3	1.30	9.10	22.10	30
1732.50	86.74	167	1.9	V	14.2	1.30	9.10	22.00	30
15 MHz Bandwidth									
1732.50	87.83	65	2.1	H	14.7	1.30	9.10	22.50	30
1732.50	86.30	147	1.3	V	13.7	1.30	9.10	21.50	30
20 MHz Bandwidth									
1732.50	88.10	338	1.9	H	14.9	1.30	9.10	22.70	30
1732.50	86.85	301	1.1	V	14.3	1.30	9.10	22.10	30

**LTE Band 5:****Maximum Output Power**

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	22.03	22.23	21.96
		RB Size=1, RB Offset=2	22.12	22.01	21.82
		RB Size=1, RB Offset=5	21.72	22.21	21.95
		RB Size=3, RB Offset=0	22.03	22.41	22.13
		RB Size=3, RB Offset=1	22.00	22.09	22.04
		RB Size=3, RB Offset=2	21.99	21.95	21.84
		RB Size=6, RB Offset=0	21.02	21.22	20.94
	16QAM	RB Size=1, RB Offset=0	21.13	21.25	20.95
		RB Size=1, RB Offset=2	20.99	21.09	20.74
		RB Size=1, RB Offset=5	21.18	21.41	20.88
		RB Size=3, RB Offset=0	21.06	21.14	20.90
		RB Size=3, RB Offset=1	21.23	21.35	20.78
		RB Size=3, RB Offset=2	21.14	21.19	21.11
		RB Size=6, RB Offset=0	20.03	20.22	19.98
3.0	QPSK	RB Size=1, RB Offset=0	22.33	22.25	22.04
		RB Size=1, RB Offset=7	22.22	22.11	22.10
		RB Size=1, RB Offset=14	22.04	22.47	21.96
		RB Size=8, RB Offset=0	21.37	21.21	21.16
		RB Size=8, RB Offset=4	21.29	21.21	20.97
		RB Size=8, RB Offset=7	21.05	21.47	21.36
		RB Size=15, RB Offset=0	21.04	21.27	21.00
	16QAM	RB Size=1, RB Offset=0	21.08	21.26	21.46
		RB Size=1, RB Offset=7	21.07	21.12	21.43
		RB Size=1, RB Offset=14	21.20	21.14	21.63
		RB Size=8, RB Offset=0	20.04	20.57	20.68
		RB Size=8, RB Offset=4	20.04	20.12	20.53
		RB Size=8, RB Offset=7	20.00	20.45	20.38
		RB Size=15, RB Offset=0	20.02	20.39	20.11

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	22.13	22.31	22.16
		RB Size=1, RB Offset=12	22.13	22.38	22.31
		RB Size=1, RB Offset=24	22.21	22.35	21.99
		RB Size=12, RB Offset=0	21.45	21.58	21.17
		RB Size=12, RB Offset=6	21.19	21.15	21.40
		RB Size=12, RB Offset=11	21.25	21.24	20.99
		RB Size=25, RB Offset=0	21.04	21.34	21.01
	16QAM	RB Size=1, RB Offset=0	21.21	21.30	21.15
		RB Size=1, RB Offset=12	21.07	21.29	21.17
		RB Size=1, RB Offset=24	21.14	21.18	21.34
		RB Size=12, RB Offset=0	20.17	20.18	19.94
		RB Size=12, RB Offset=6	20.18	20.32	20.17
		RB Size=12, RB Offset=11	20.04	20.42	20.25
		RB Size=25, RB Offset=0	20.05	20.42	20.08
10.0	QPSK	RB Size=1, RB Offset=0	22.08	22.32	22.12
		RB Size=1, RB Offset=24	22.05	22.46	22.20
		RB Size=1, RB Offset=49	22.11	22.13	21.86
		RB Size=25, RB Offset=0	21.07	21.31	20.94
		RB Size=25, RB Offset=12	21.04	21.44	21.12
		RB Size=25, RB Offset=24	21.31	21.52	21.27
		RB Size=50, RB Offset=0	21.32	21.31	21.18
	16QAM	RB Size=1, RB Offset=0	21.04	21.71	21.43
		RB Size=1, RB Offset=24	21.01	21.93	21.22
		RB Size=1, RB Offset=49	20.91	21.74	21.28
		RB Size=25, RB Offset=0	20.08	20.90	20.71
		RB Size=25, RB Offset=12	20.09	20.84	20.65
		RB Size=25, RB Offset=24	20.07	20.34	20.51
		RB Size=50, RB Offset=0	20.15	20.32	20.21

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

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
16QAM (1RB Size)	5.87	13	Pass
16QAM (100%RB Size)	6.48	13	Pass

**QPSK:**

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
836.50	81.17	37	1.2	H	13.2	0.67	0	12.53	38.45
836.50	89.98	156	1.2	V	22.0	0.67	0	21.33	38.45
3 MHz Bandwidth									
836.50	81.25	0	1.5	H	13.3	0.67	0	12.63	38.45
836.50	89.14	313	1.8	V	21.1	0.67	0	20.43	38.45
5 MHz Bandwidth									
836.50	81.21	47	1.4	H	13.2	0.67	0	12.53	38.45
836.50	90.14	12	1.1	V	22.1	0.67	0	21.43	38.45
10 MHz Bandwidth									
836.50	82.01	170	1.3	H	14.0	0.67	0	13.33	38.45
836.50	89.1	26	2.1	V	21.1	0.67	0	20.43	38.45



**16QAM:**

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
836.50	81.52	90	1.2	H	13.5	0.67	0	12.83	38.45
836.50	89.74	115	1.9	V	21.7	0.67	0	21.03	38.45
3 MHz Bandwidth									
836.50	81.5	227	1.1	H	13.5	0.67	0	12.83	38.45
836.50	89.78	90	2.2	V	21.8	0.67	0	21.13	38.45
5 MHz Bandwidth									
836.50	82.13	300	2.1	H	14.1	0.67	0	13.43	38.45
836.50	90.3	82	1.5	V	22.3	0.67	0	21.63	38.45
10 MHz Bandwidth									
836.50	82.2	230	2.0	H	14.2	0.67	0	13.53	38.45
836.50	90.33	291	1.3	V	22.3	0.67	0	21.63	38.45

**LTE Band 7**

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5	QPSK	RB Size=1, RB Offset=0	22.42	22.02	22.37
		RB Size=1, RB Offset=12	22.58	21.89	22.38
		RB Size=1, RB Offset=24	22.41	21.76	22.46
		RB Size=12, RB Offset=0	21.18	21.16	21.52
		RB Size=12, RB Offset=6	21.53	21.05	21.50
		RB Size=12, RB Offset=11	21.45	21.09	21.38
		RB Size=25, RB Offset=0	21.23	21.06	21.34
	16QAM	RB Size=1, RB Offset=0	21.34	20.94	21.60
		RB Size=1, RB Offset=12	21.24	20.94	21.70
		RB Size=1, RB Offset=24	21.16	20.87	21.87
		RB Size=12, RB Offset=0	20.51	19.96	20.64
		RB Size=12, RB Offset=6	20.10	20.08	20.64
		RB Size=12, RB Offset=11	20.34	20.04	20.70
		RB Size=25, RB Offset=0	20.22	20.06	20.35
10	QPSK	RB Size=1, RB Offset=0	22.34	22.13	22.35
		RB Size=1, RB Offset=24	22.08	22.00	22.46
		RB Size=1, RB Offset=49	22.10	22.14	22.34
		RB Size=25, RB Offset=0	21.16	21.43	21.22
		RB Size=25, RB Offset=12	21.23	20.95	21.51
		RB Size=25, RB Offset=24	21.47	21.17	21.42
		RB Size=50, RB Offset=0	21.19	20.98	21.27
	16QAM	RB Size=1, RB Offset=0	21.39	21.09	21.68
		RB Size=1, RB Offset=24	21.50	21.02	21.74
		RB Size=1, RB Offset=49	21.45	21.15	21.83
		RB Size=25, RB Offset=0	20.42	20.00	20.68
		RB Size=25, RB Offset=12	20.42	20.10	20.71
		RB Size=25, RB Offset=24	20.34	19.92	20.93
		RB Size=50, RB Offset=0	20.25	20.32	20.40

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15	QPSK	RB Size=1, RB Offset=0	22.61	22.07	22.28
		RB Size=1, RB Offset=37	22.52	22.20	22.09
		RB Size=1, RB Offset=74	21.51	21.06	21.22
		RB Size=36, RB Offset=0	21.45	21.05	21.32
		RB Size=36, RB Offset=18	21.66	21.16	21.34
		RB Size=36, RB Offset=37	21.37	21.16	21.42
		RB Size=75, RB Offset=0	21.42	21.59	21.35
	16QAM	RB Size=1, RB Offset=0	21.45	21.57	21.40
		RB Size=1, RB Offset=37	21.50	21.68	21.22
		RB Size=1, RB Offset=74	20.52	20.62	20.29
		RB Size=36, RB Offset=0	20.54	20.61	20.26
		RB Size=36, RB Offset=18	20.42	20.76	20.63
		RB Size=36, RB Offset=37	20.36	20.13	20.39
		RB Size=75, RB Offset=0	22.61	22.07	22.28
20	QPSK	RB Size=1, RB Offset=0	22.16	22.13	22.60
		RB Size=1, RB Offset=49	22.23	22.01	22.44
		RB Size=1, RB Offset=99	22.22	22.15	22.52
		RB Size=50, RB Offset=0	21.17	21.19	21.55
		RB Size=50, RB Offset=24	21.21	21.07	21.42
		RB Size=50, RB Offset=49	21.36	21.07	21.84
		RB Size=100, RB Offset=0	21.22	21.06	21.27
	16QAM	RB Size=1, RB Offset=0	21.28	21.57	21.72
		RB Size=1, RB Offset=49	21.37	21.69	21.54
		RB Size=1, RB Offset=99	21.38	21.54	21.54
		RB Size=50, RB Offset=0	20.58	20.55	21.08
		RB Size=50, RB Offset=24	20.02	20.58	20.53
		RB Size=50, RB Offset=49	20.01	20.63	20.36
		RB Size=100, RB Offset=0	20.07	20.11	20.24

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

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
16QAM (1RB Size)	5.92	13	Pass
16QAM (100%RB Size)	7.31	13	Pass

**EIRP:****QPSK:**

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
5 MHz Bandwidth									
2535.00	84.27	98	1.2	H	14.8	2.60	9.30	21.50	33
2535.00	77.37	163	2.2	V	8.5	2.60	9.30	15.20	33
10 MHz Bandwidth									
2535.00	83.94	208	2.0	H	14.5	2.60	9.30	21.20	33
2535.00	77.54	134	1.8	V	8.7	2.60	9.30	15.40	33
15 MHz Bandwidth									
2535.00	84.54	16	2.5	H	15.1	2.60	9.30	21.80	33
2535.00	77.61	237	2.2	V	8.7	2.60	9.30	15.40	33
20 MHz Bandwidth									
2535.00	84.68	268	1.3	H	15.2	2.60	9.30	21.90	33
2535.00	77.41	59	2.2	V	8.5	2.60	9.30	15.20	33

**16QAM:**

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
5 MHz Bandwidth									
2535.00	84.50	101	1.8	H	15.0	2.60	9.30	21.70	33
2535.00	77.21	300	1.8	V	8.3	2.60	9.30	15.00	33
10 MHz Bandwidth									
2535.00	84.61	278	2.3	H	15.1	2.60	9.30	21.80	33
2535.00	76.84	307	1.6	V	8.0	2.60	9.30	14.70	33
15 MHz Bandwidth									
2535.00	83.97	289	2.0	H	14.5	2.60	9.30	21.20	33
2535.00	76.75	5	1.9	V	7.9	2.60	9.30	14.60	33
20 MHz Bandwidth									
2535.00	84.21	289	1.0	H	14.7	2.60	9.30	21.40	33
2535.00	77.19	93	1.7	V	8.3	2.60	9.30	15.00	33

**Note:**

All above data were tested with no amplifier

Absolute Level = Substituted Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

## FCC §2.1049, §22.917, §22.905 & §24.238 & §27.53 - OCCUPIED BANDWIDTH

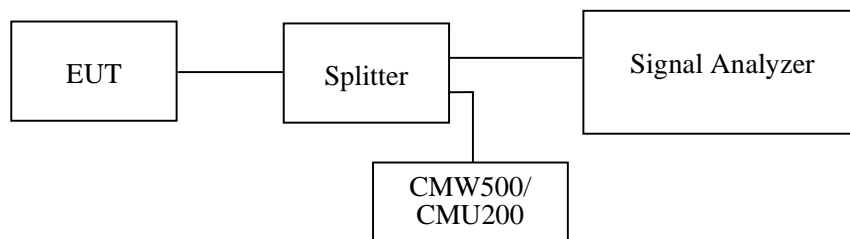
### Applicable Standards

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 1% to 5% of the anticipated emission bandwidth and the 26 dB & 99% bandwidth was recorded.



### Test Data

#### Environmental Conditions

Temperature:	25 °C
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Xiangguang Kong from 2017-08-21 to 2017-09-04.

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	248.4	312.5
EGPRS(8PSK)	836.6	251.6	317.3

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	836.6	4.21	4.90
HSUPA (BPSK)	836.6	4.21	4.87
HSDPA (16QAM)	836.6	4.23	4.92

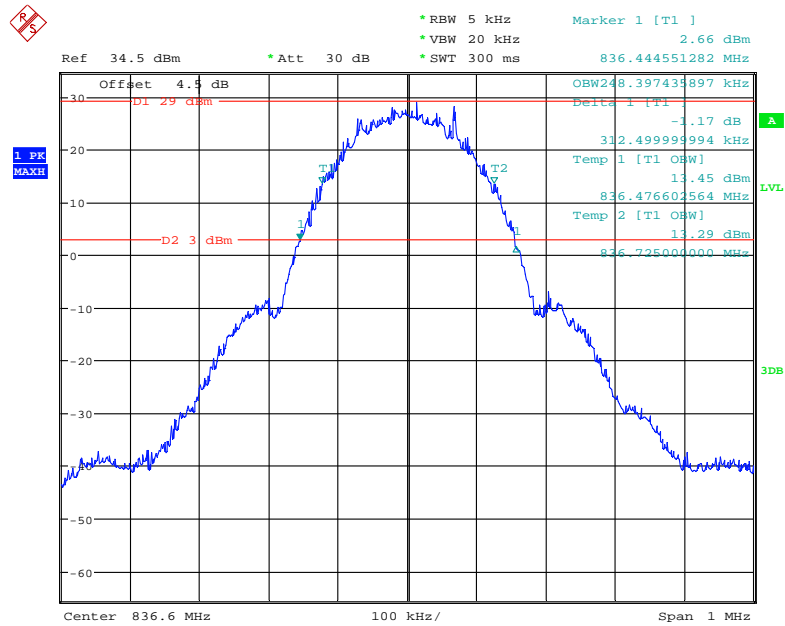
**PCS Band (Part 24E)**

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	1880.0	245.2	314.1
EGPRS(8PSK)	1880.0	259.6	330.1

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1880.0	4.20	4.87
HSUPA (BPSK)	1880.0	4.21	4.87
HSDPA (16QAM)	1880.0	4.21	4.87

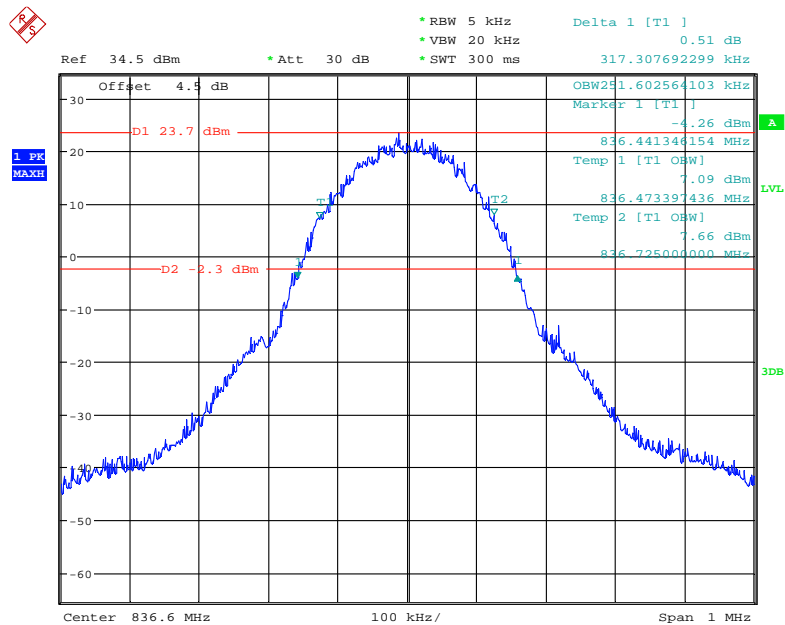
## Cellular Band (Part 22H)

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



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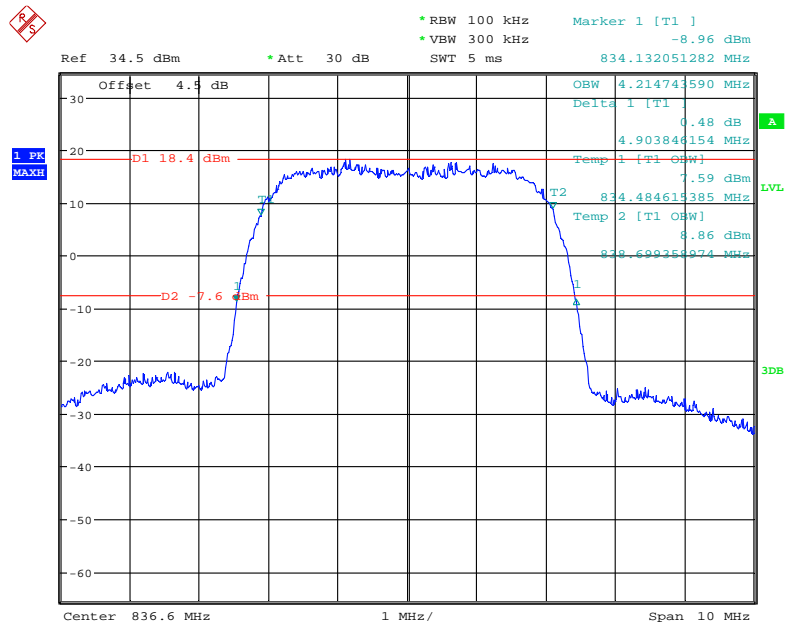
## 26 dB Emissions &amp; 99% Occupied Bandwidth for EDGE Mode



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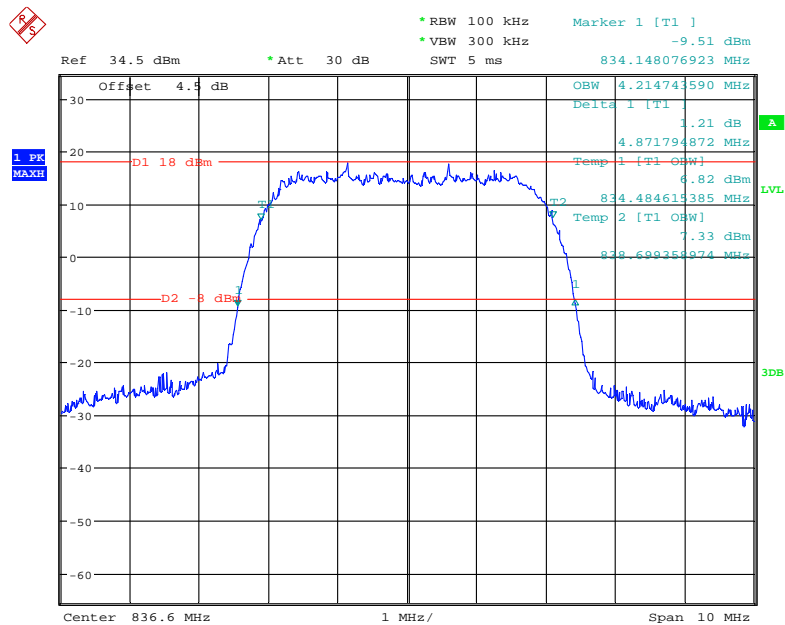


## 26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode



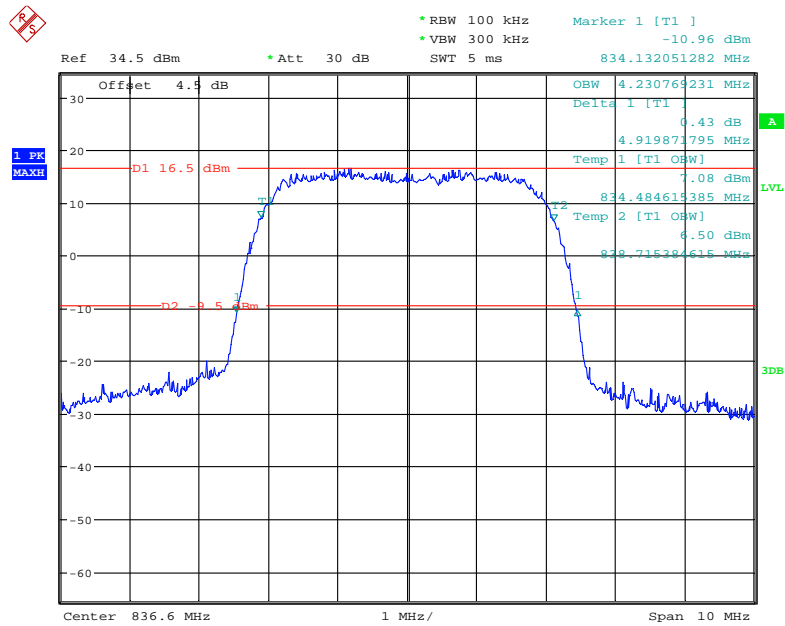
Date: 21.AUG.2017 22:59:00

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



Date: 21.AUG.2017 22:57:46

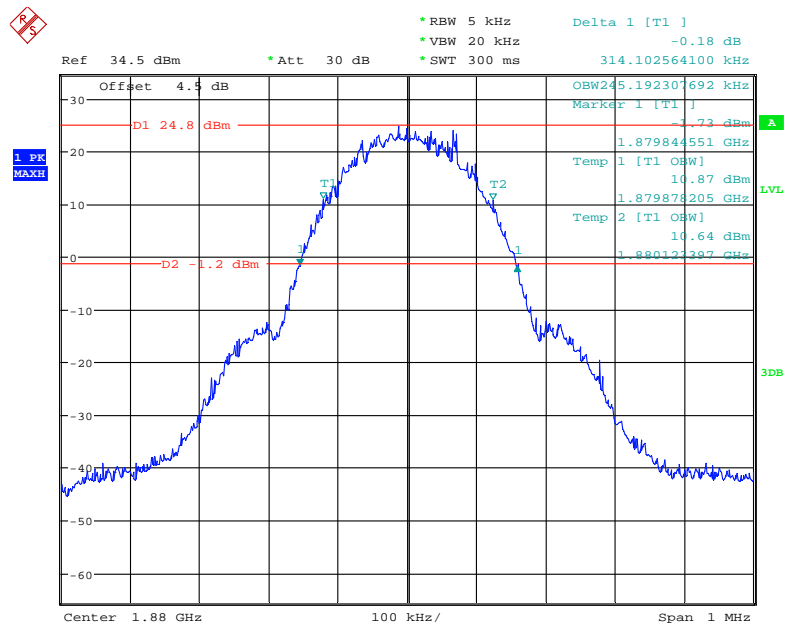
## 26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode



Date: 21.AUG.2017 22:56:06

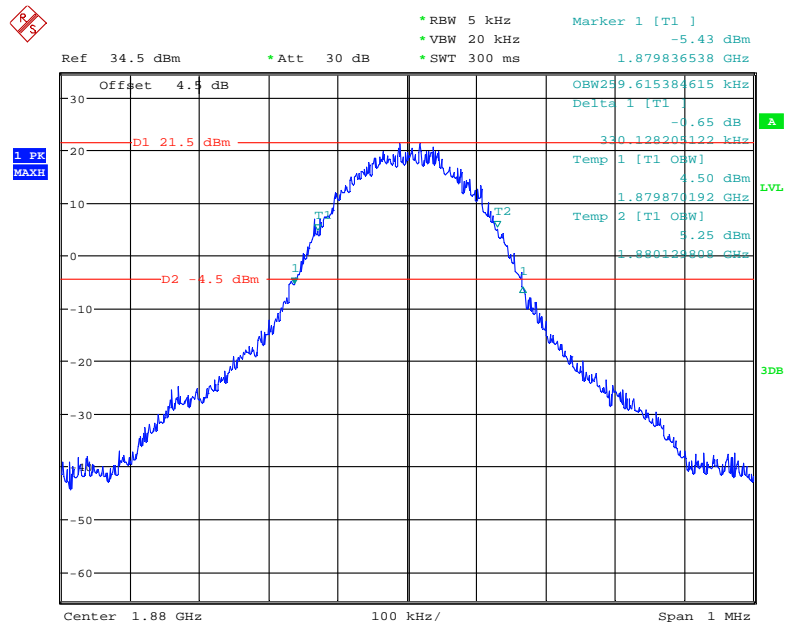
## PCS Band (Part 24E)

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



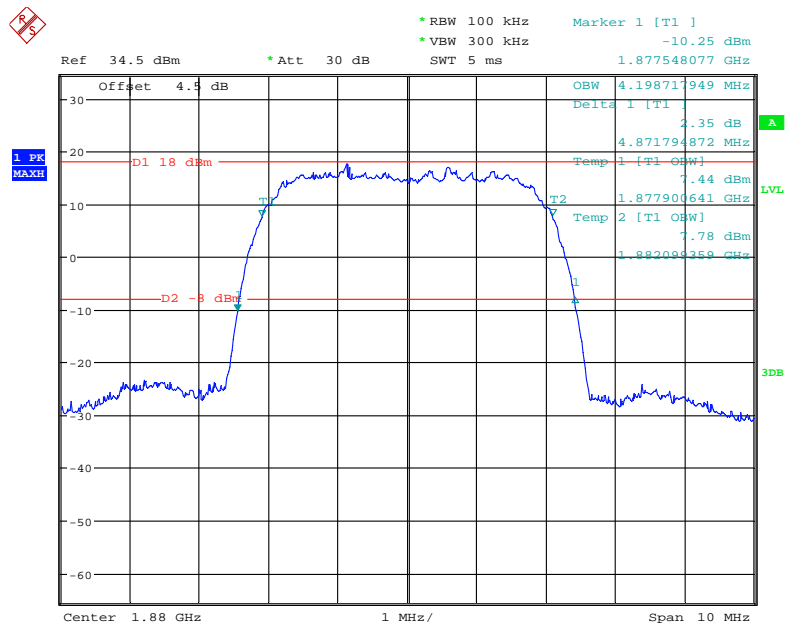
Date: 21.AUG.2017 22:20:25

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



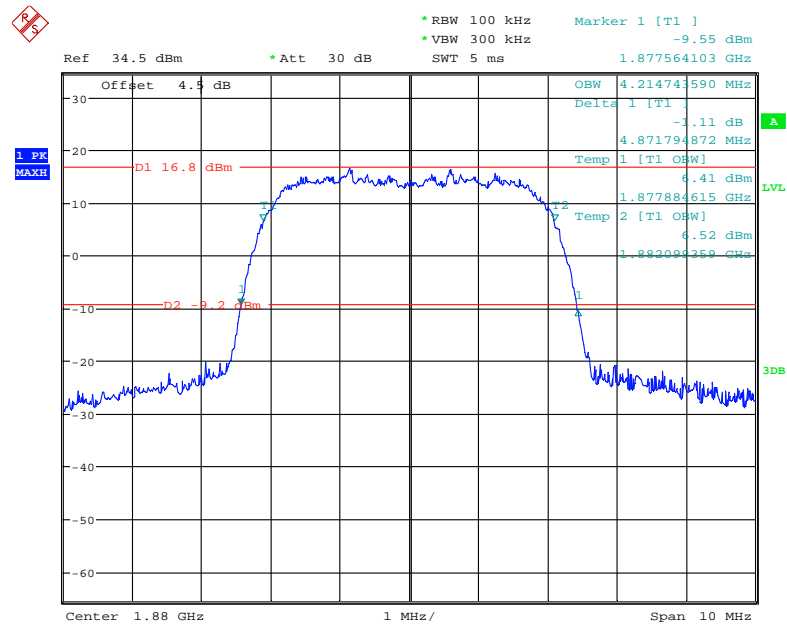
Date: 21.AUG.2017 22:27:05

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



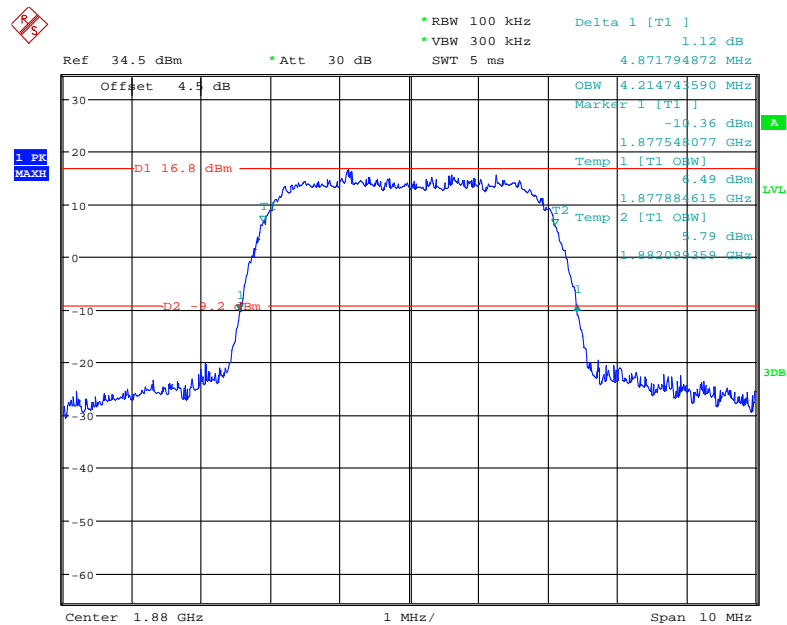
Date: 21.AUG.2017 22:52:14

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



Date: 21.AUG.2017 22:53:13

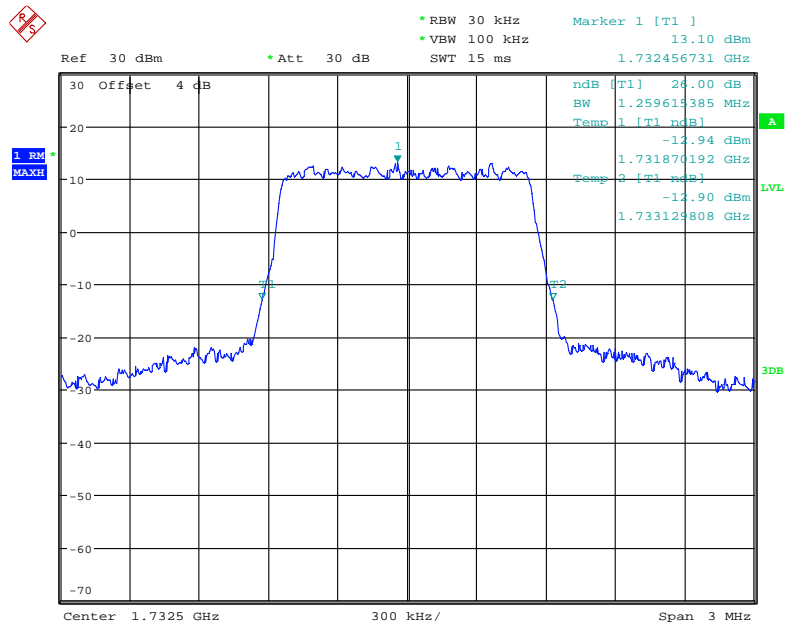
## 26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode



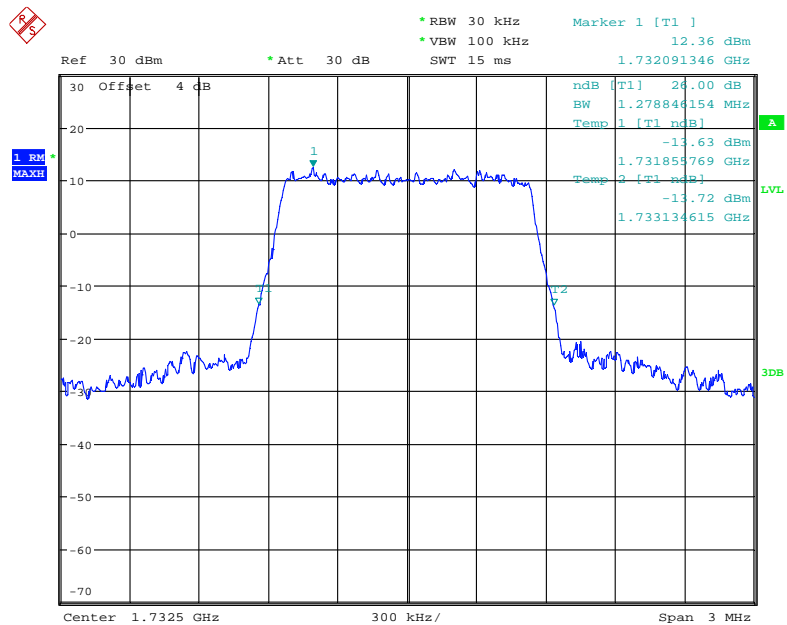
Date: 21.AUG.2017 22:54:03

**LTE Band 4: (Middle Channel)**

<b>Bandwidth (MHz)</b>	<b>Modulation</b>	<b>99% Occupied Bandwidth (MHz)</b>	<b>26 dB Emission Bandwidth (MHz)</b>
1.4	QPSK	1.101	1.260
	16QAM	1.106	1.279
3.0	QPSK	2.692	2.894
	16QAM	2.692	2.904
5.0	QPSK	4.551	5.048
	16QAM	4.519	5.016
10.0	QPSK	8.974	9.647
	16QAM	8.974	9.615
15.0	QPSK	13.510	14.712
	16QAM	13.462	14.567
20.0	QPSK	17.949	19.103
	16QAM	17.949	19.167

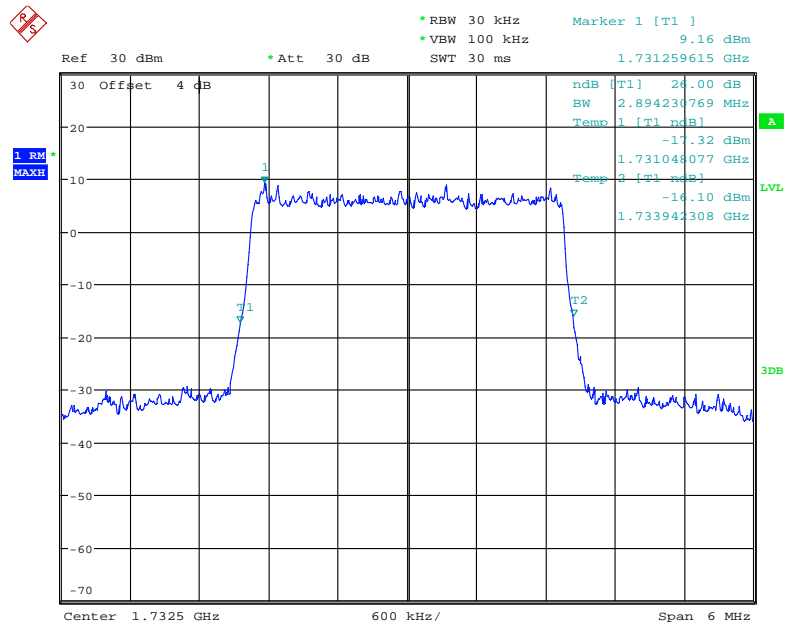
**QPSK (1.4 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel**

Date: 28.AUG.2017 22:31:53

**16-QAM (1.4 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel**

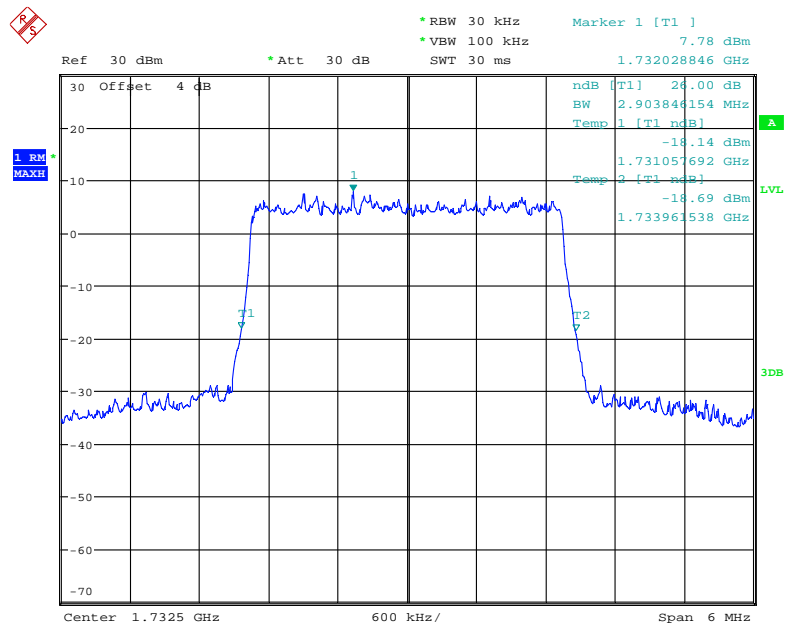
Date: 28.AUG.2017 22:30:59

### QPSK (3.0 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel



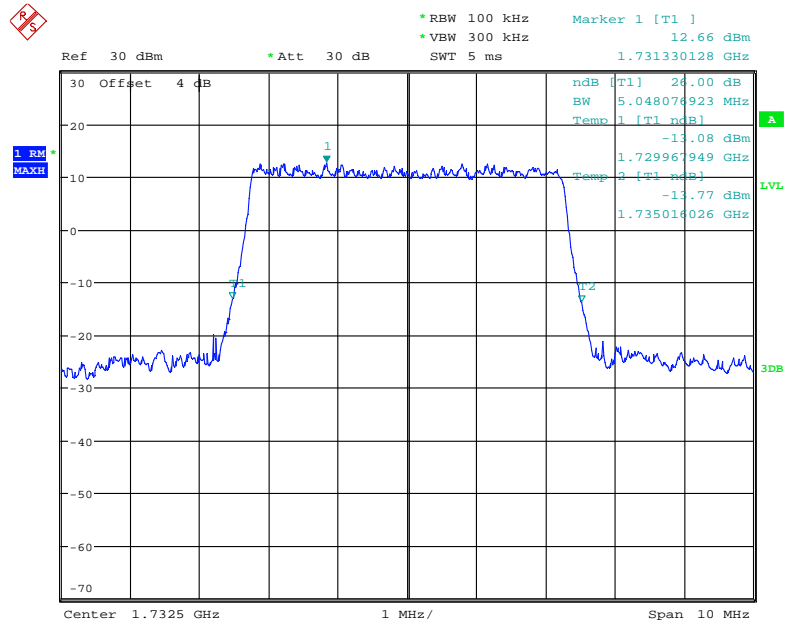
Date: 28.AUG.2017 22:32:56

### 16-QAM (3.0 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel



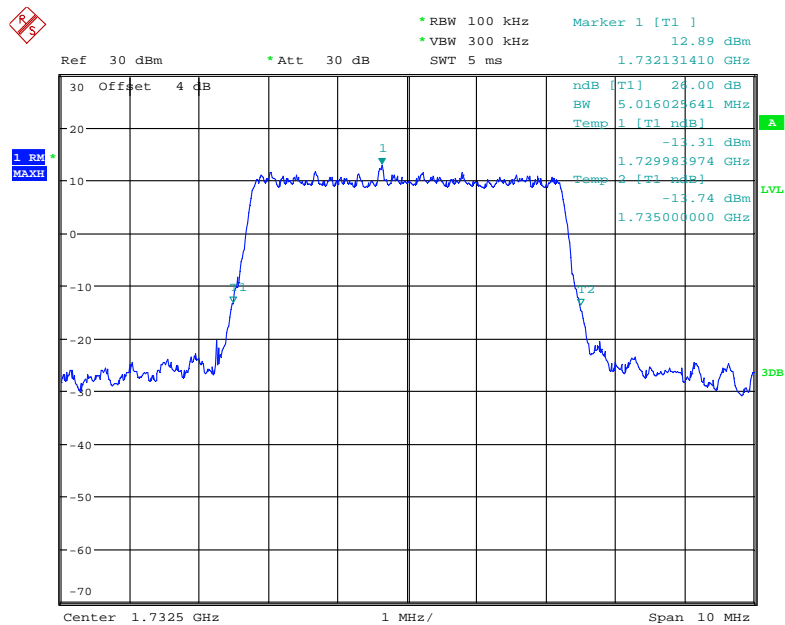
Date: 28.AUG.2017 22:33:33

### QPSK (5.0 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel



Date: 28.AUG.2017 22:44:22

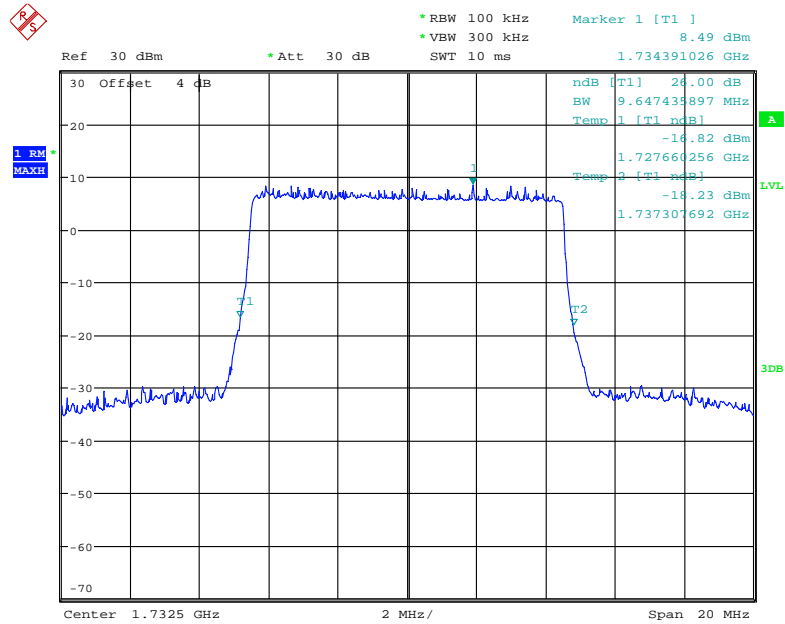
### 16-QAM (5.0 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel



Date: 28.AUG.2017 22:40:05

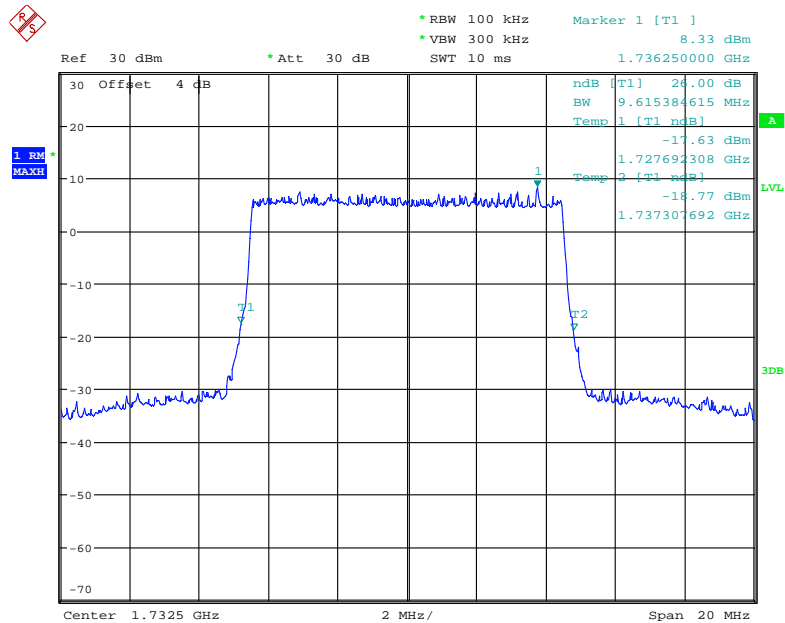


### QPSK (10.0 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel

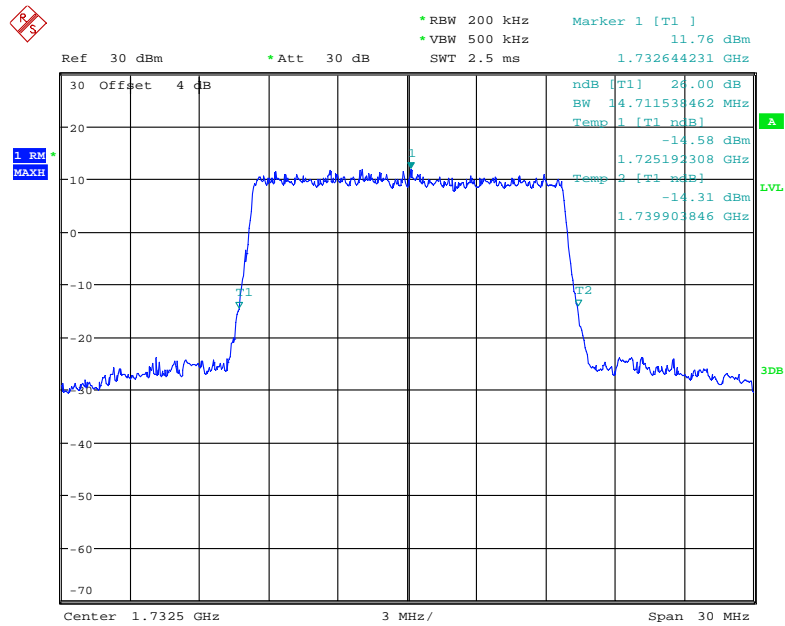


Date: 28.AUG.2017 22:45:44

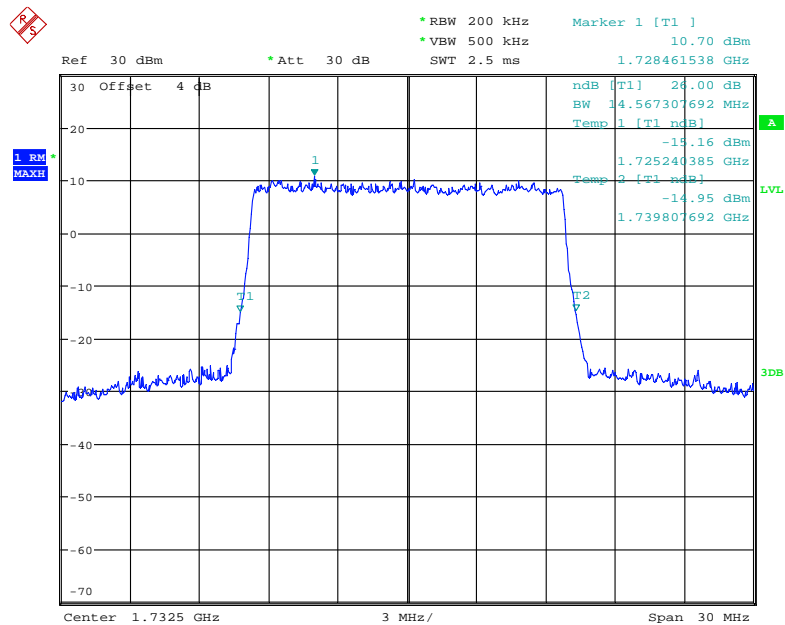
### 16-QAM (10.0 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel



Date: 28.AUG.2017 22:51:52

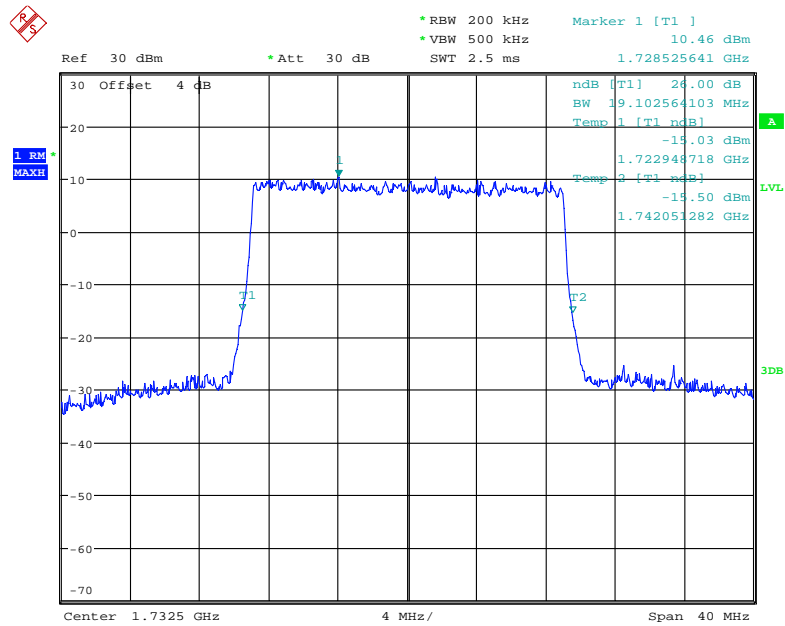
**QPSK (15.0 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel**

Date: 28.AUG.2017 23:03:49

**16-QAM (15.0 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel**

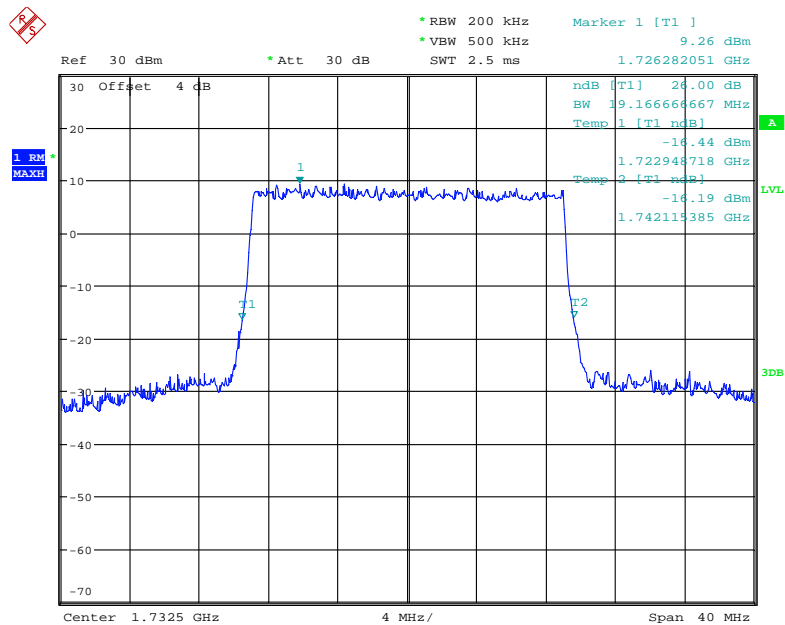
Date: 28.AUG.2017 22:59:46

### QPSK (20.0 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel



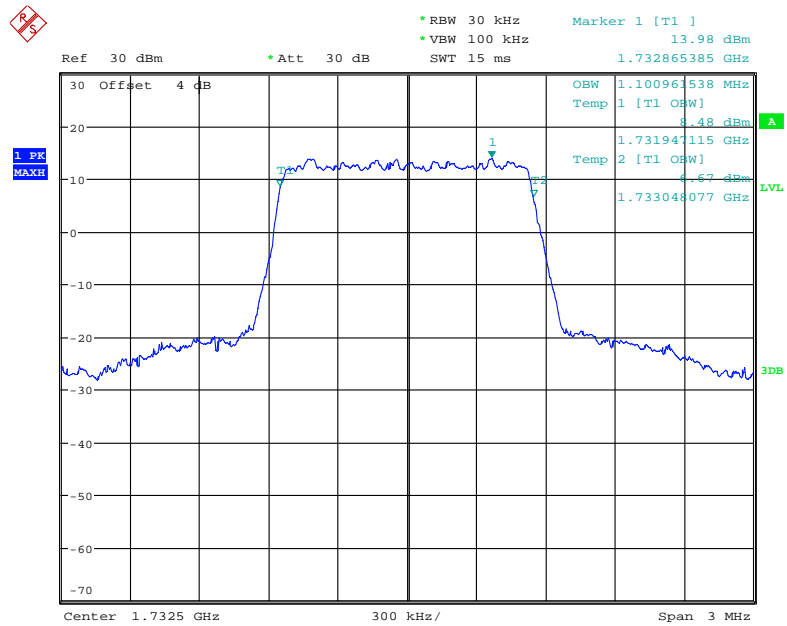
Date: 28.AUG.2017 23:09:41

### 16-QAM (20.0 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel



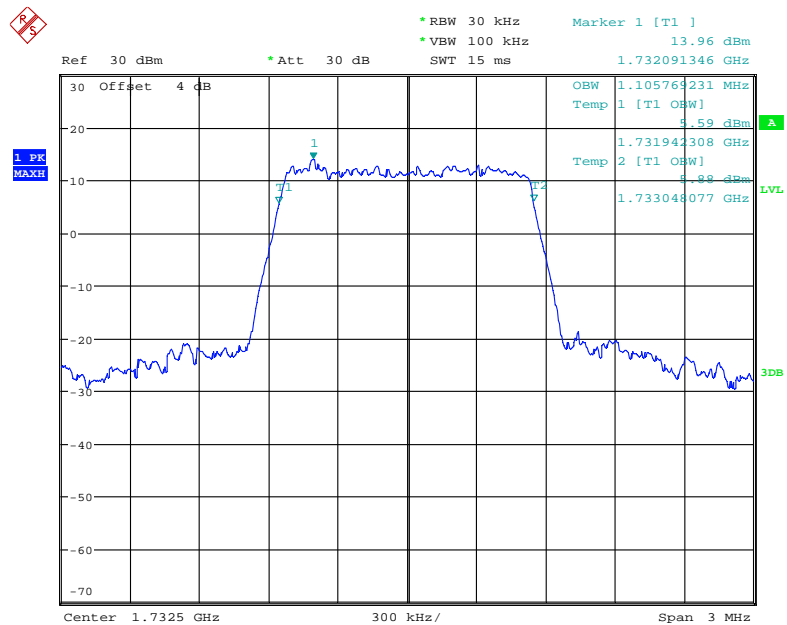
Date: 28.AUG.2017 23:14:36

### QPSK (1.4 MHz) - 99% Occupied Bandwidth, Middle channel



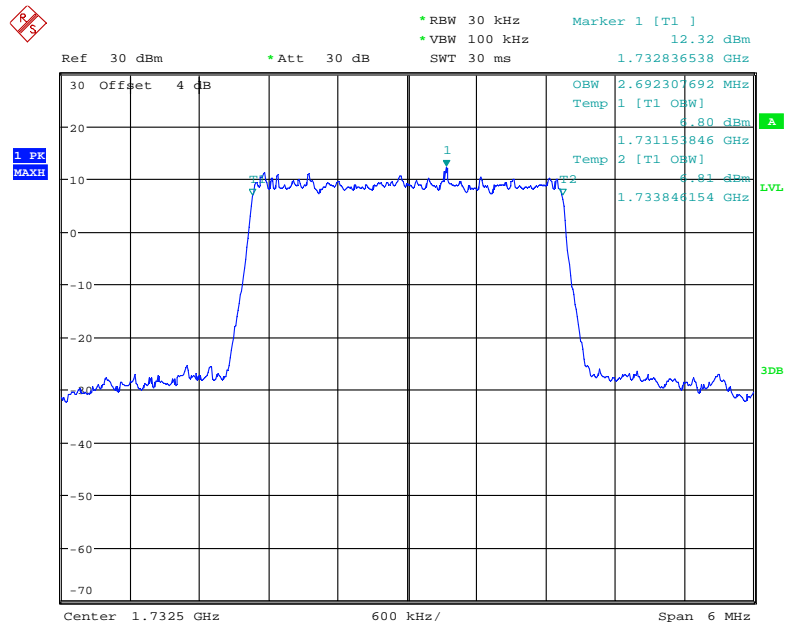
Date: 28.AUG.2017 22:28:02

### 16-QAM (1.4 MHz) - 99% Occupied Bandwidth, Middle channel



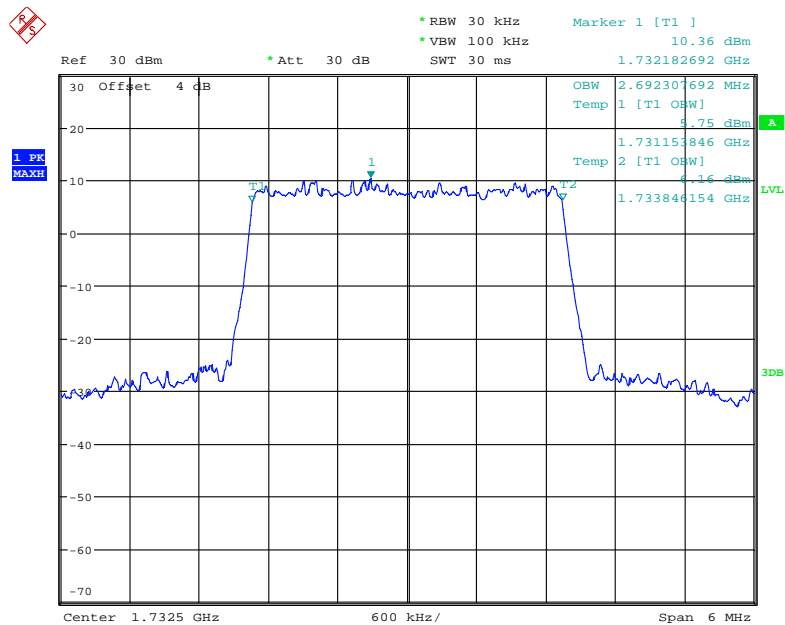
Date: 28.AUG.2017 22:29:33

### QPSK (3.0 MHz) - 99% Occupied Bandwidth, Middle channel



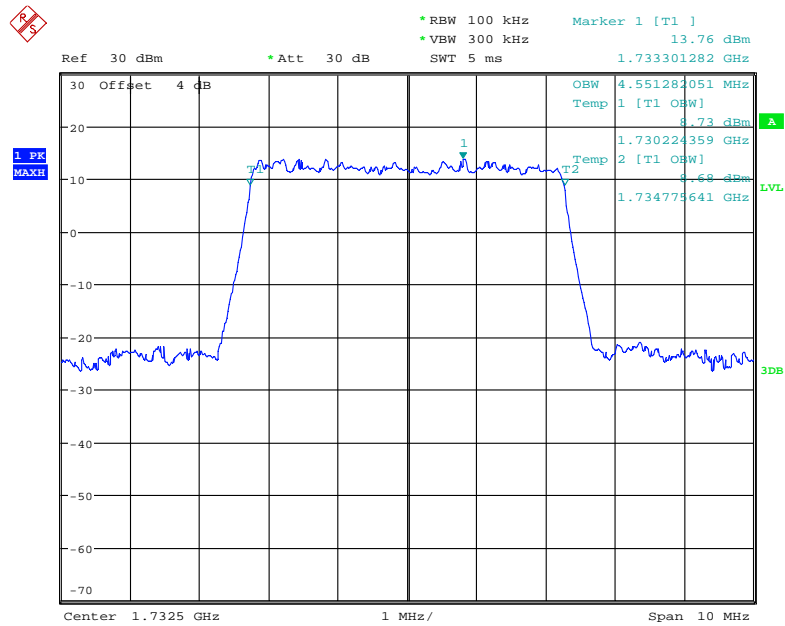
Date: 28.AUG.2017 22:35:31

### 16-QAM (3.0 MHz) - 99% Occupied Bandwidth, Middle channel



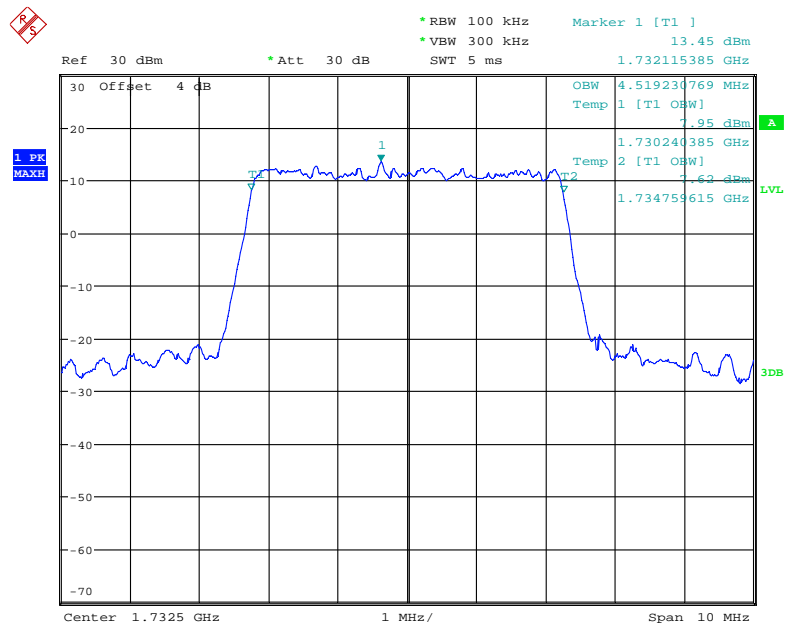
Date: 28.AUG.2017 22:34:46

### QPSK (5.0 MHz) - 99% Occupied Bandwidth, Middle channel



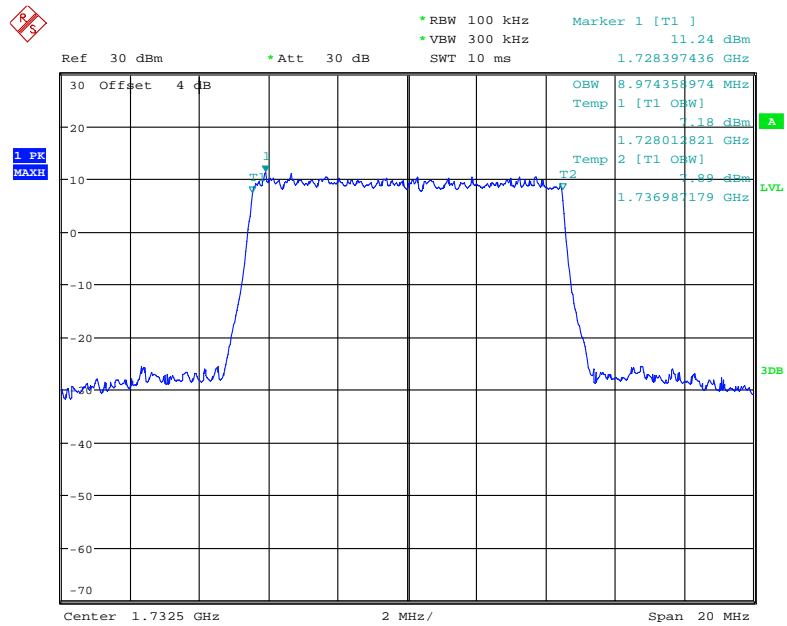
Date: 28.AUG.2017 22:36:33

### 16-QAM (5.0 MHz) - 99% Occupied Bandwidth, Middle channel



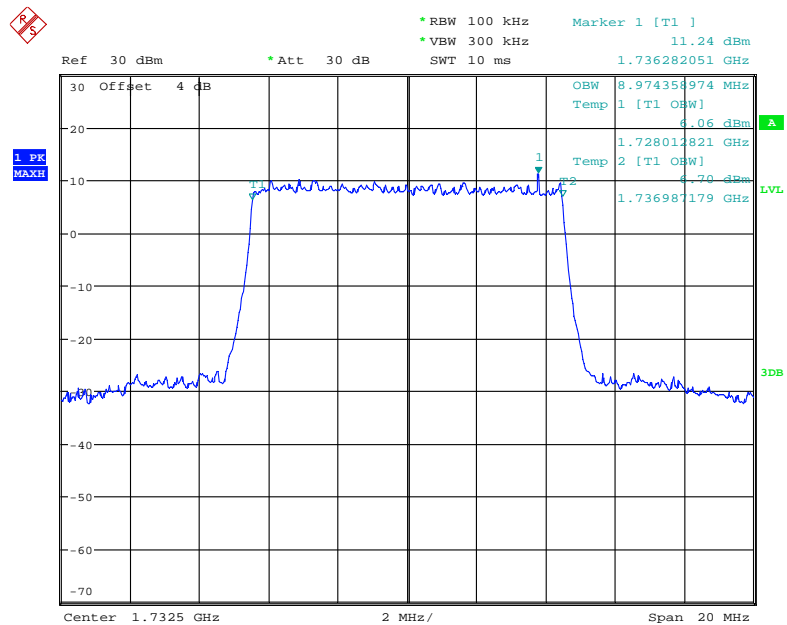
Date: 28.AUG.2017 22:37:59

### QPSK (10.0 MHz) - 99% Occupied Bandwidth, Middle channel



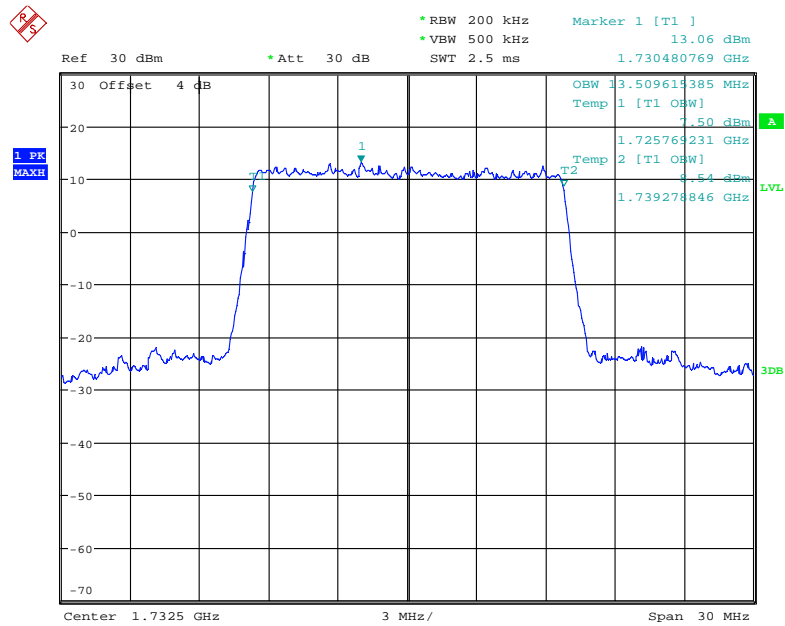
Date: 28.AUG.2017 22:53:50

### 16-QAM (10.0 MHz) - 99% Occupied Bandwidth, Middle channel



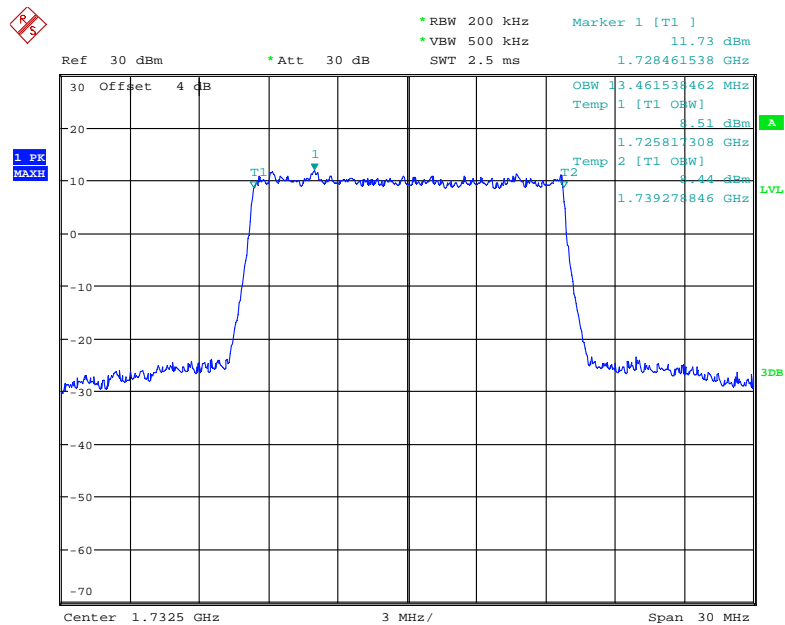
Date: 28.AUG.2017 22:52:52

### QPSK (15.0 MHz) - 99% Occupied Bandwidth, Middle channel



Date: 28.AUG.2017 22:56:20

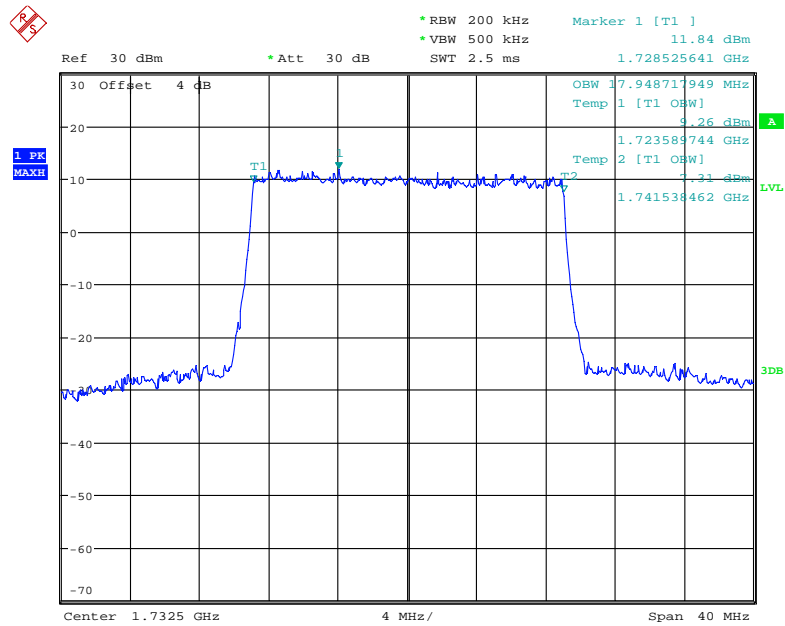
### 16-QAM (15.0 MHz) - 99% Occupied Bandwidth, Middle channel



Date: 28.AUG.2017 22:57:19

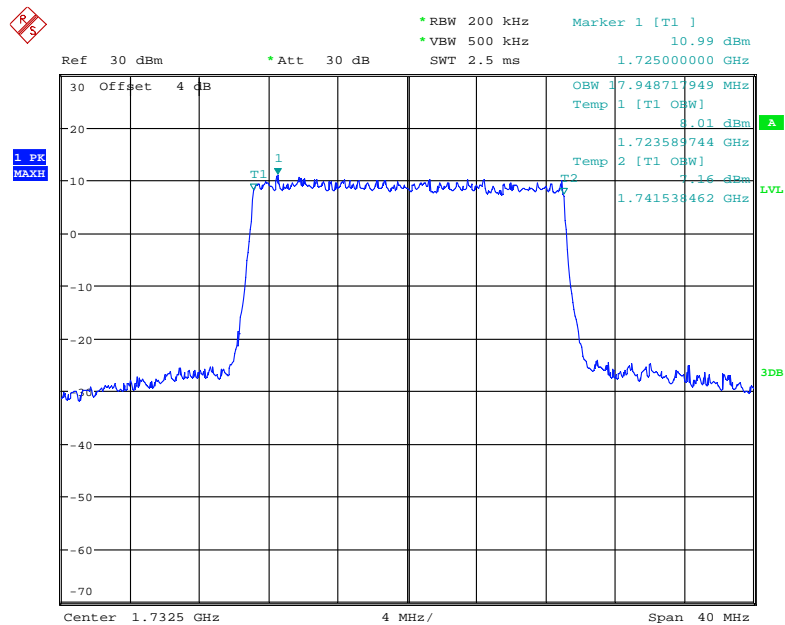


### QPSK (20.0 MHz) - 99% Occupied Bandwidth, Middle channel



Date: 28.AUG.2017 23:17:58

### 16-QAM (20.0 MHz) - 99% Occupied Bandwidth, Middle channel

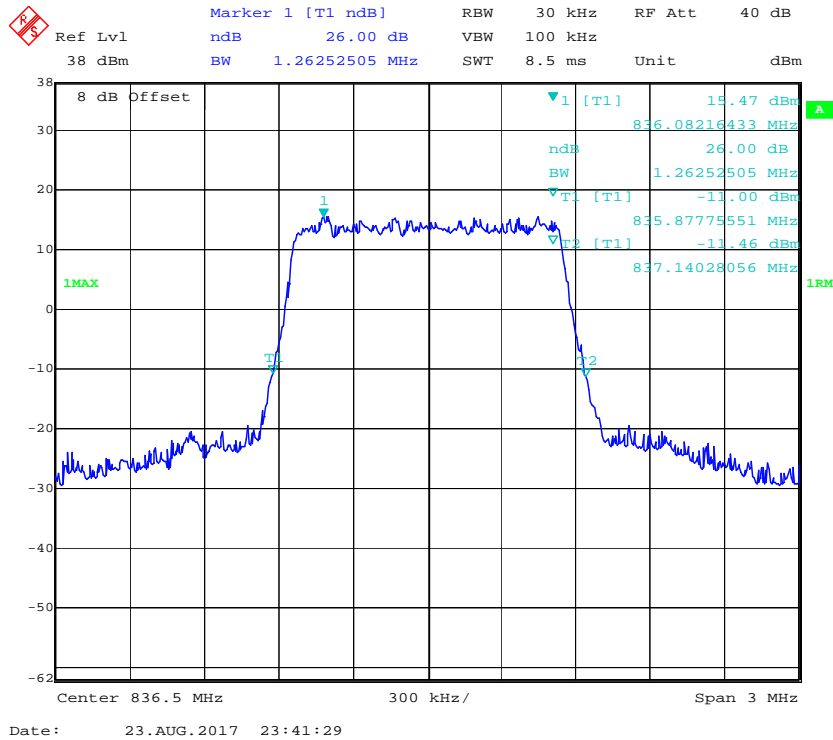


Date: 28.AUG.2017 23:15:56

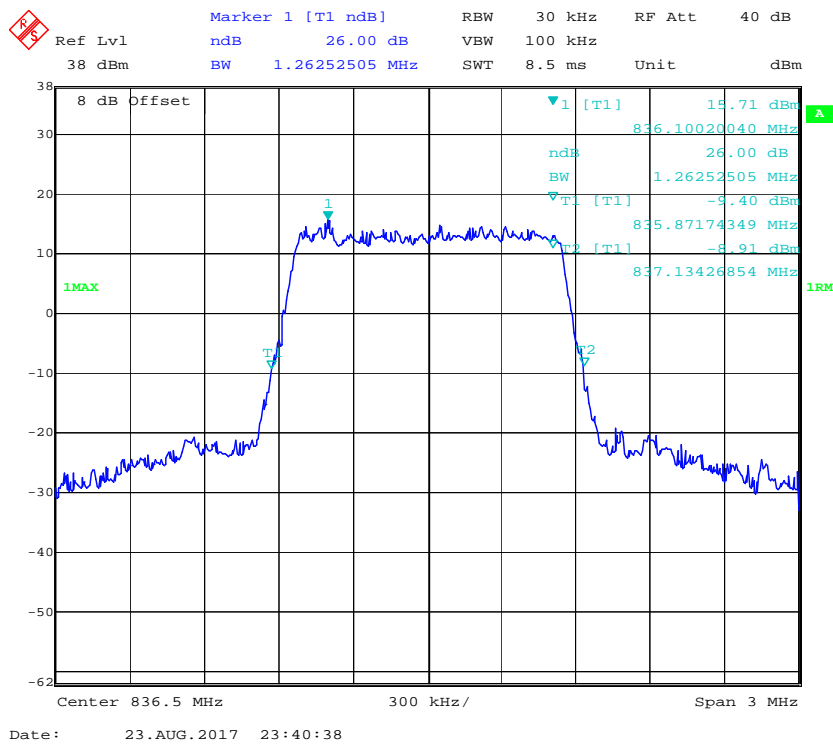
**LTE Band 5: (Middle Channel)**

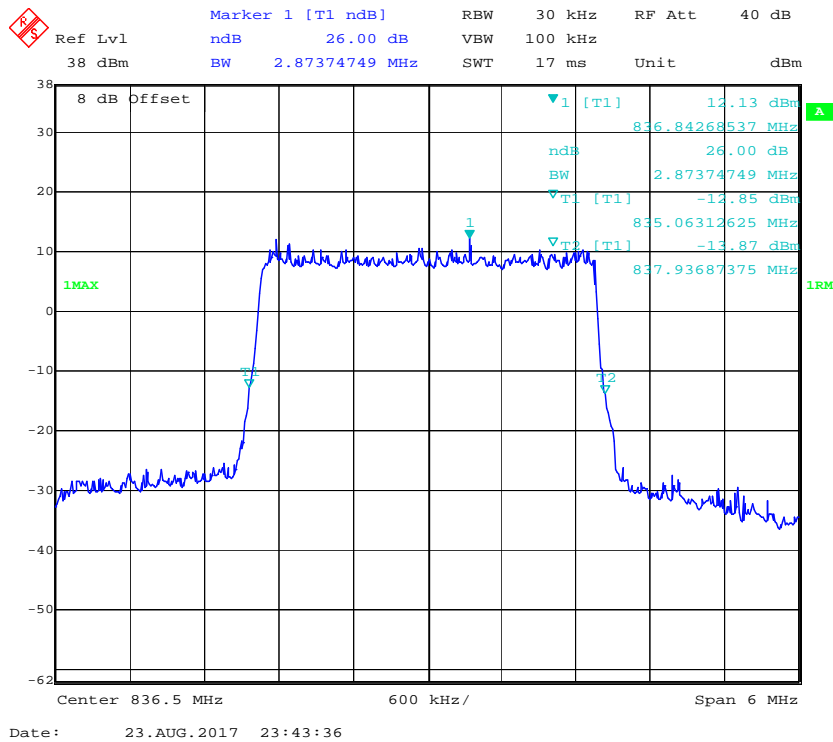
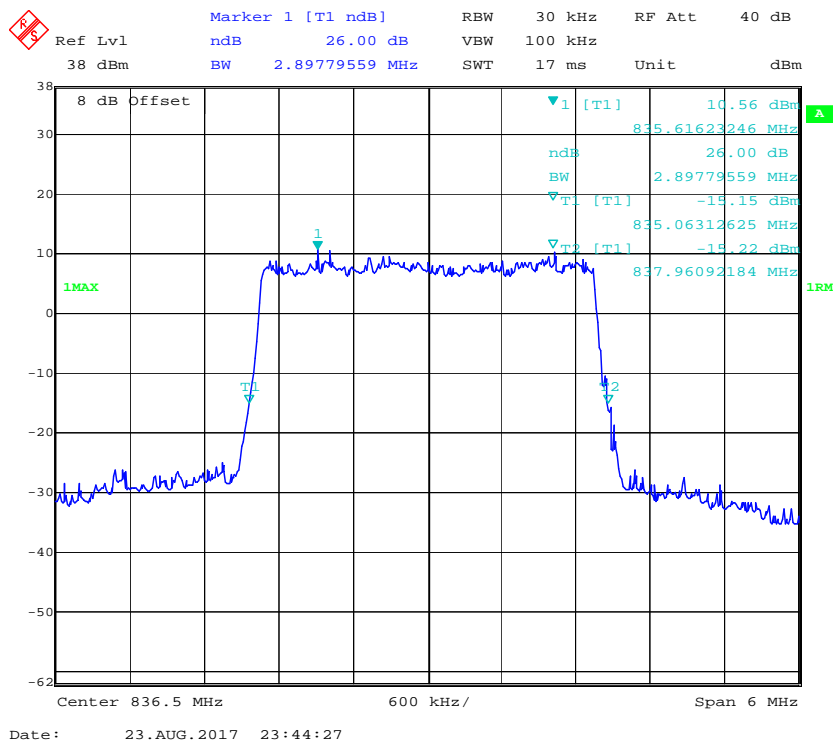
<b>Bandwidth (MHz)</b>	<b>Modulation</b>	<b>99% Occupied Bandwidth (MHz)</b>	<b>26 dB Emission Bandwidth (MHz)</b>
1.4	QPSK	1.100	1.263
	16QAM	1.106	1.263
3.0	QPSK	2.705	2.874
	16QAM	2.693	2.898
5.0	QPSK	4.549	5.030
	16QAM	4.529	5.030
10.0	QPSK	9.018	9.699
	16QAM	8.978	9.659

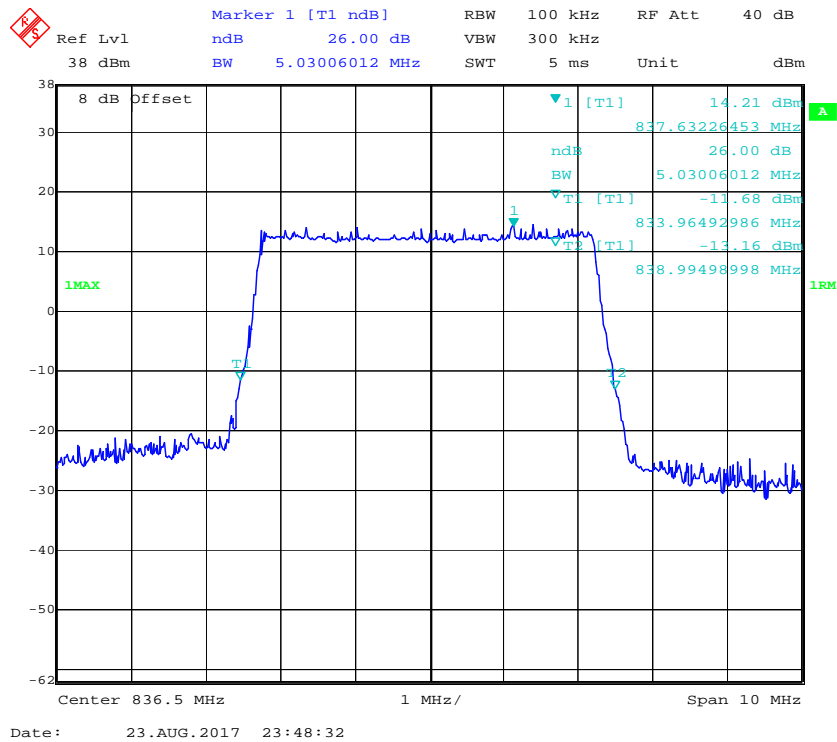
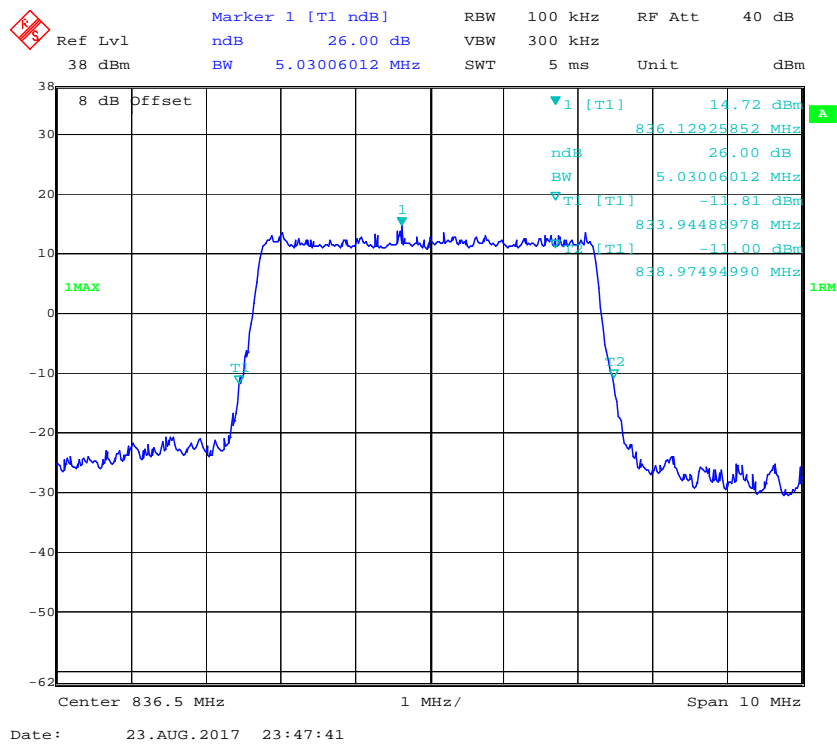
### QPSK (1.4 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel



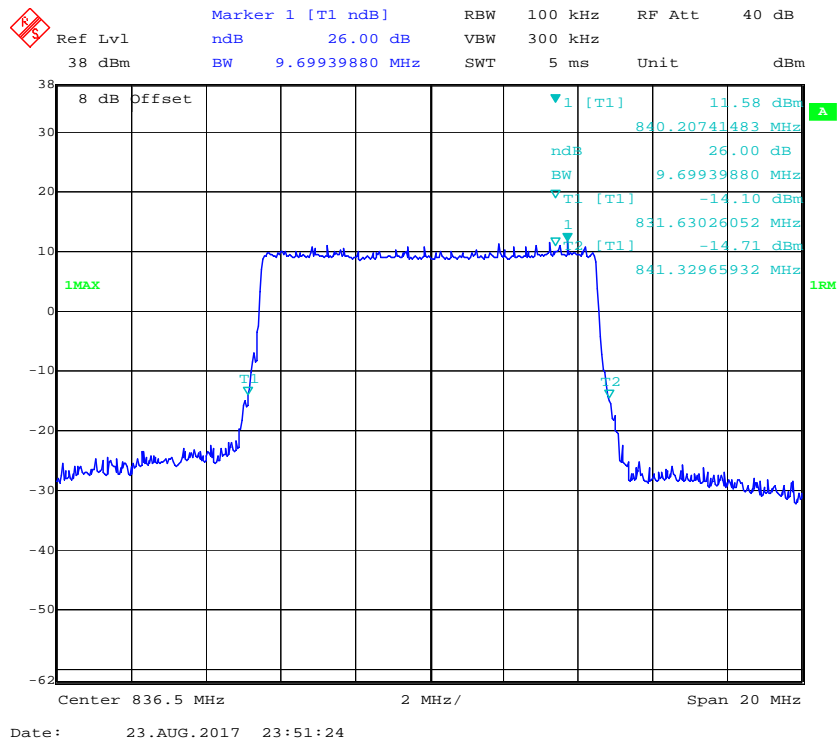
### 16-QAM (1.4 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel



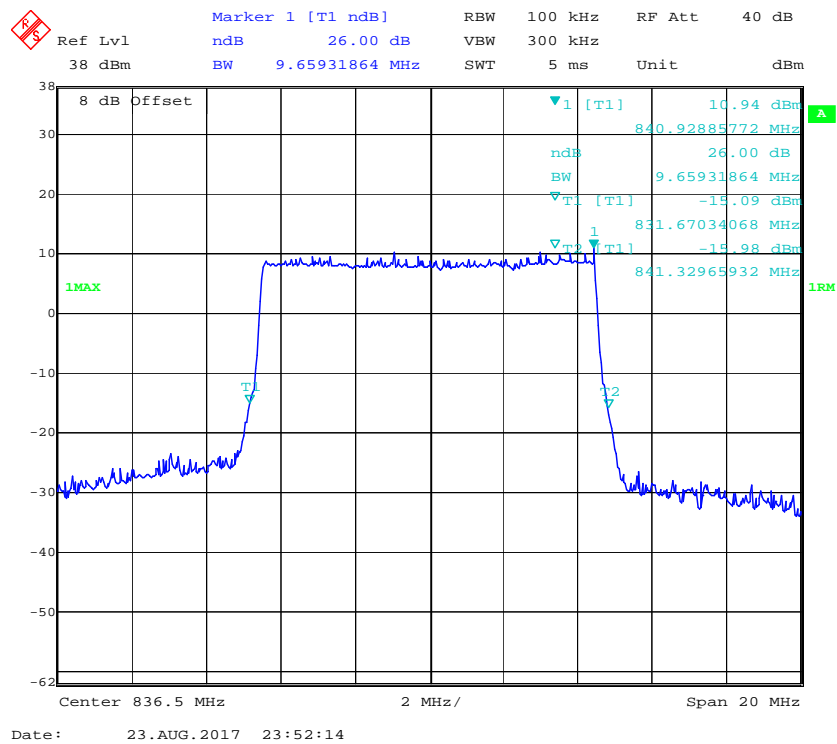
**QPSK (3.0 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel****16-QAM (3.0 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel**

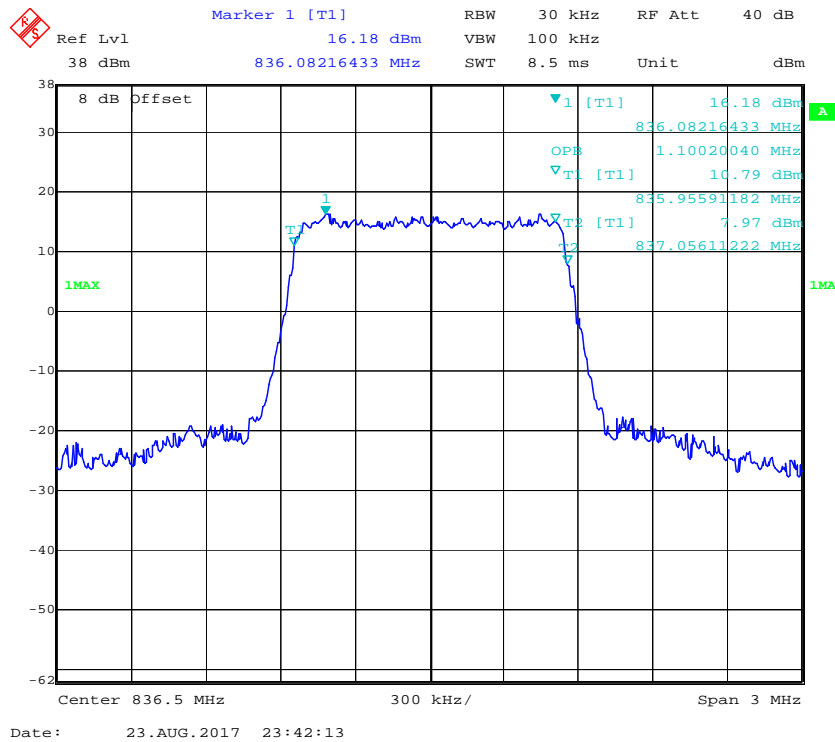
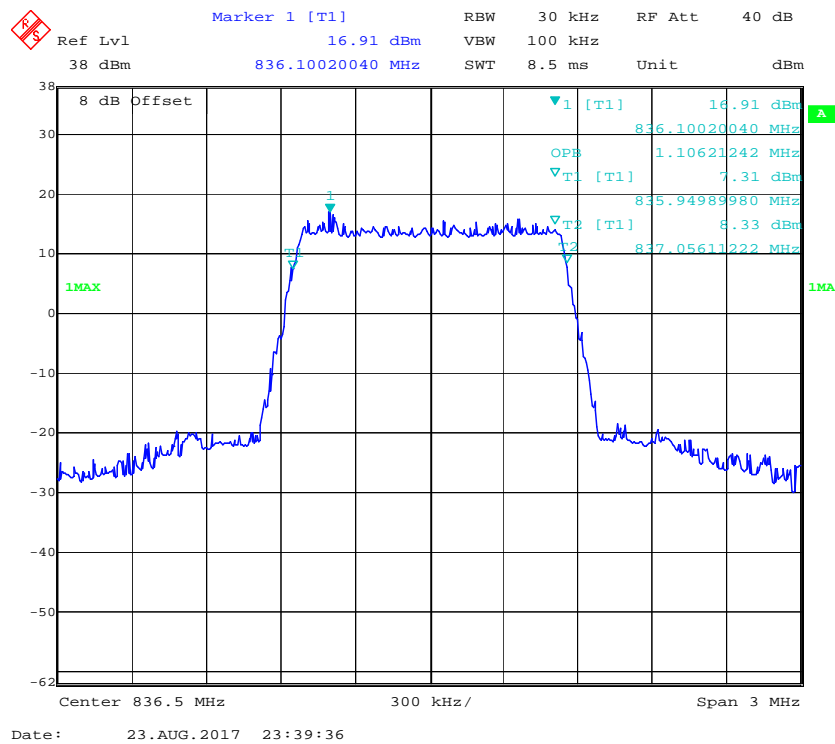
**QPSK (5.0 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel****16-QAM (5.0 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel**

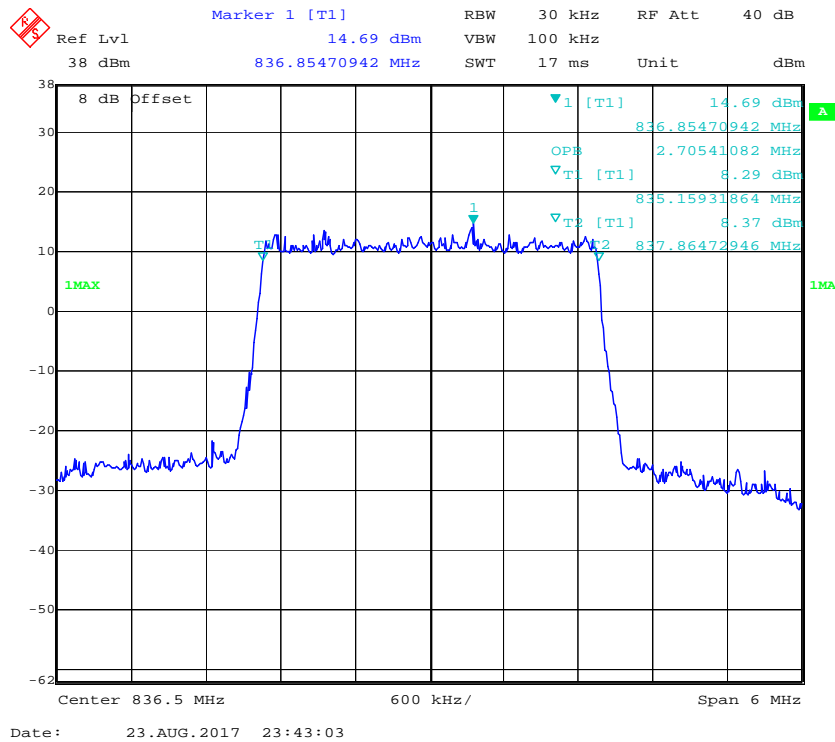
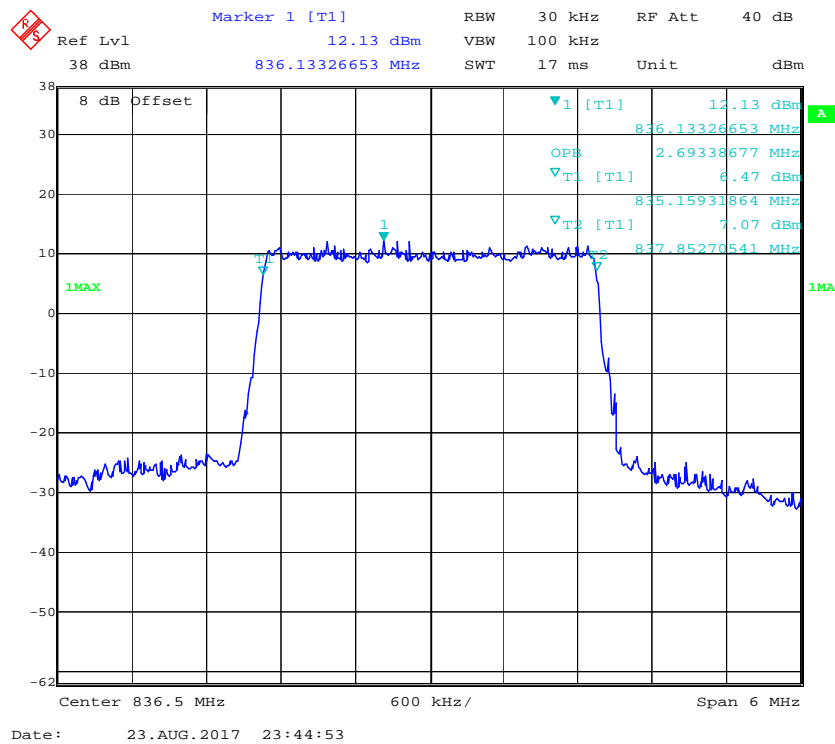
### QPSK (10.0 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel



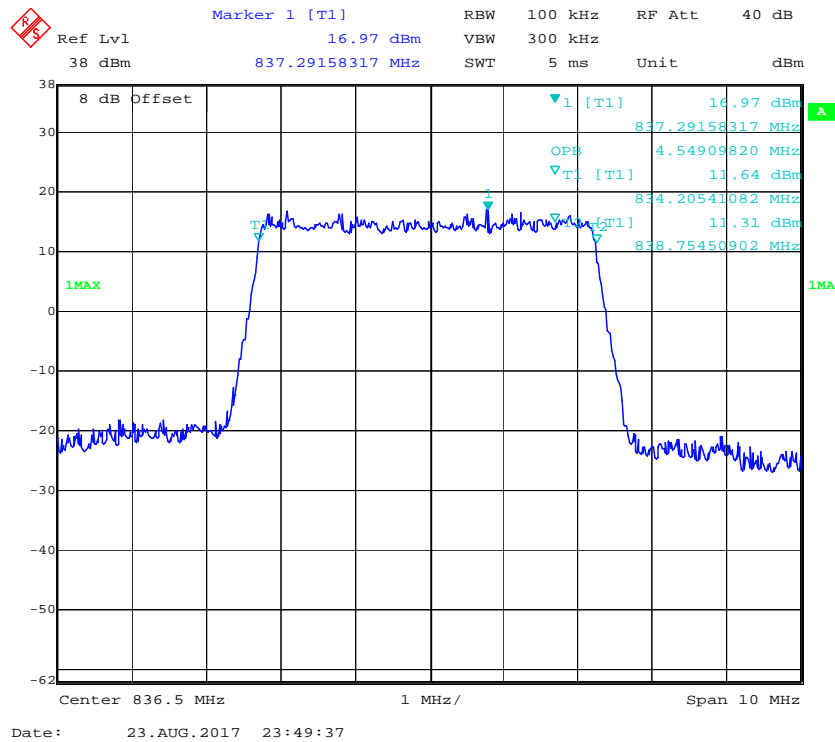
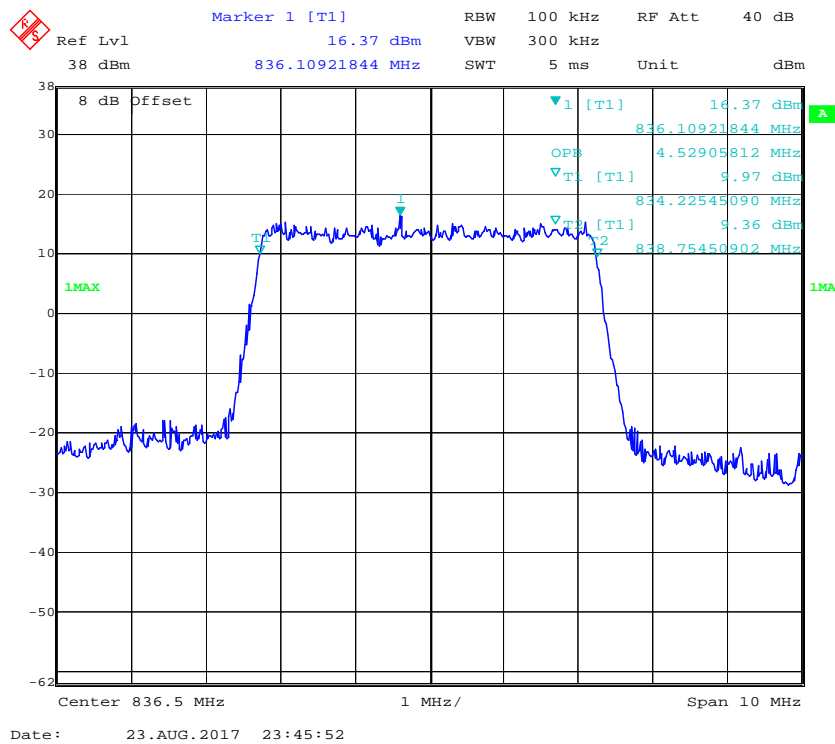
### 16-QAM (10.0 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel

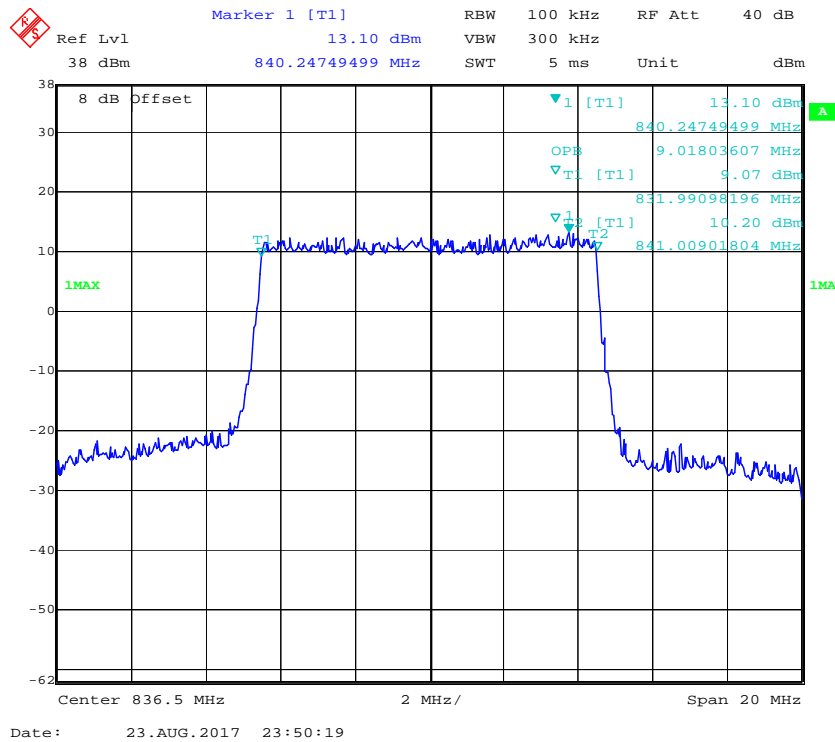
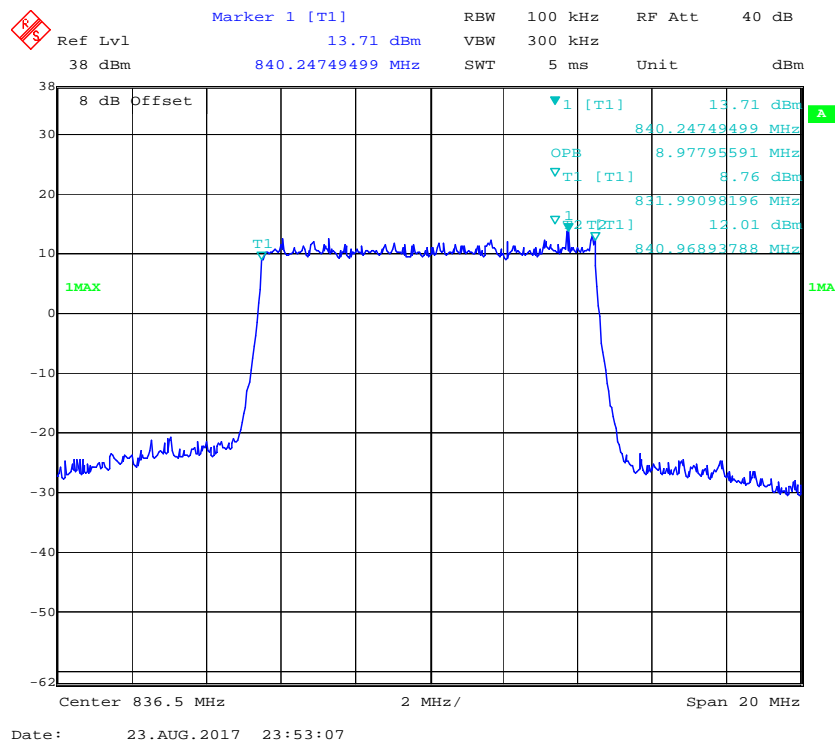


**QPSK (1.4 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (1.4 MHz) - 99% Occupied Bandwidth, Middle channel**

**QPSK (3.0 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (3.0 MHz) - 99% Occupied Bandwidth, Middle channel**

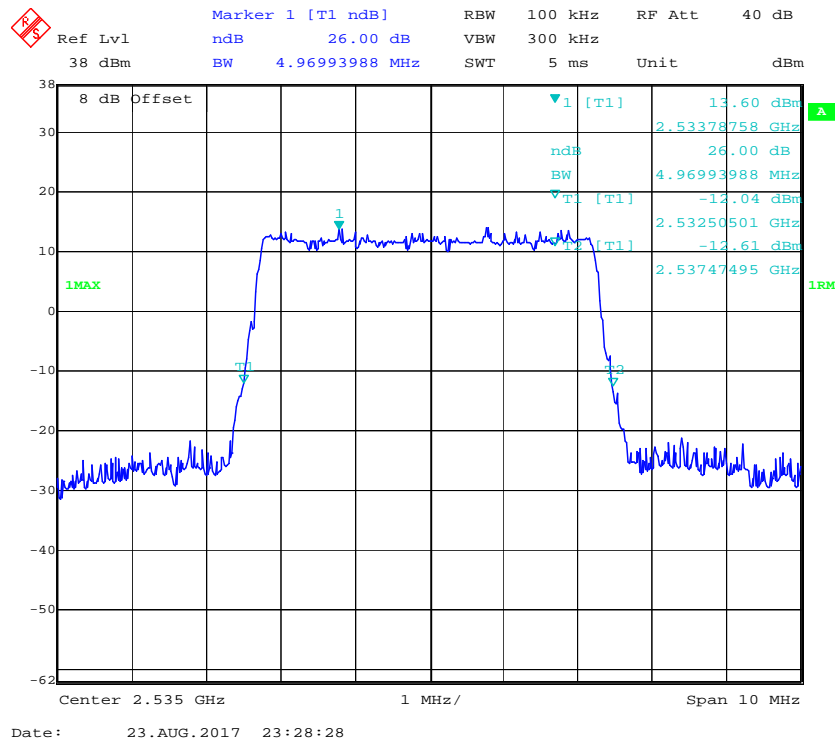
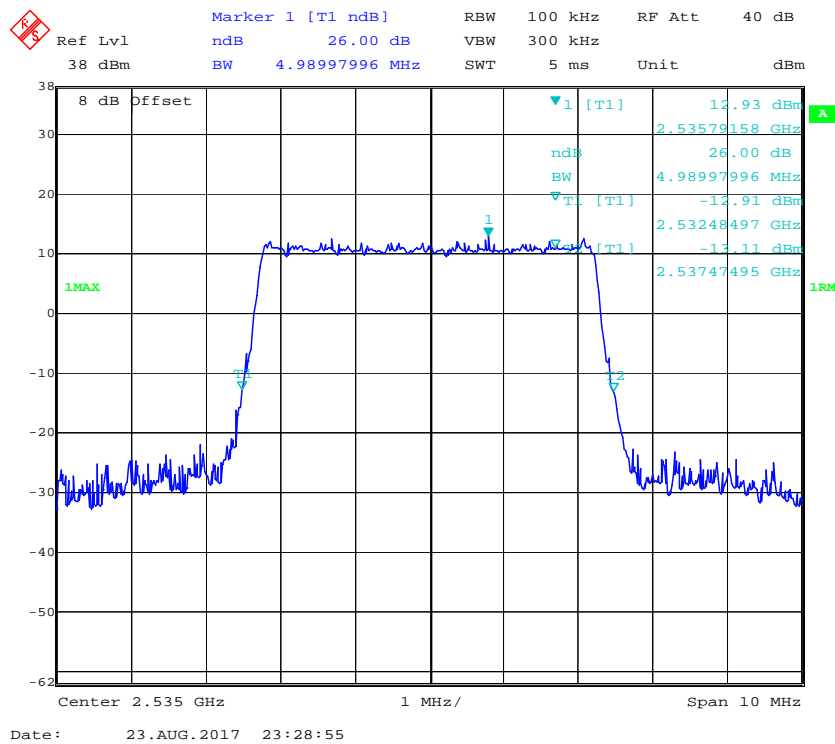


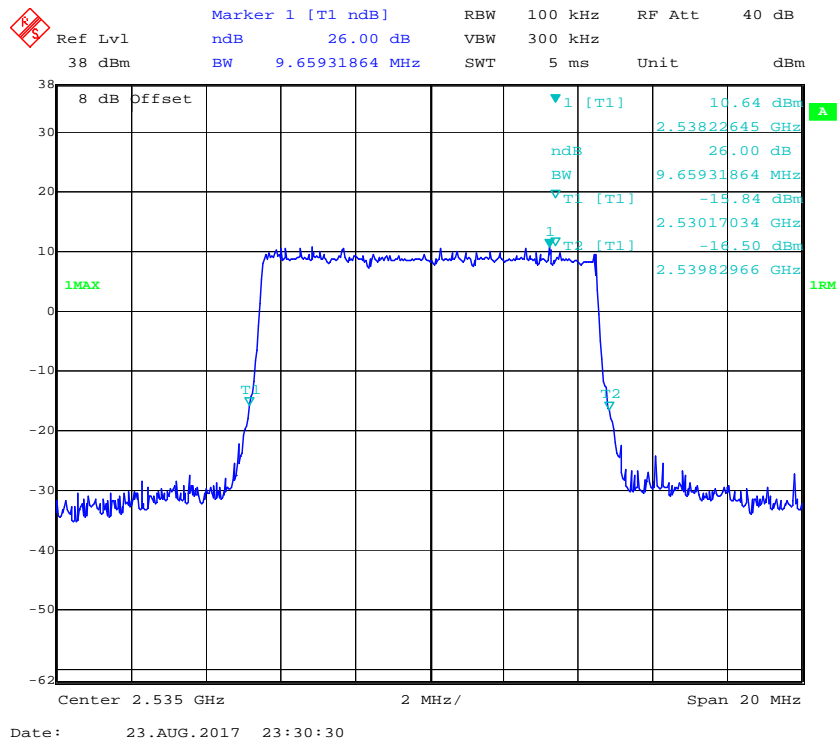
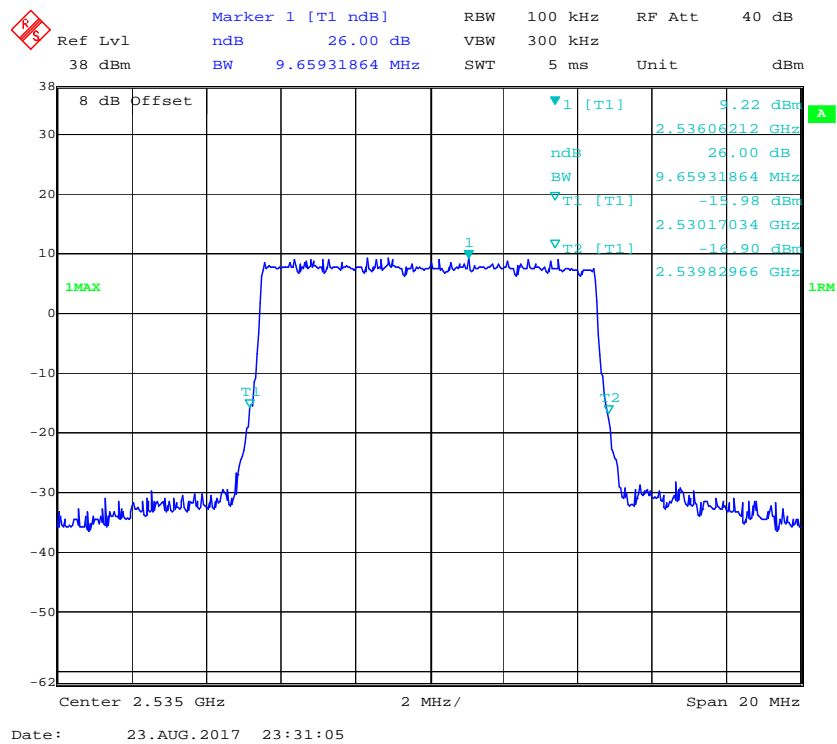
**QPSK (5.0 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (5.0 MHz) -99% Occupied Bandwidth, Middle channel**

**QPSK (10.0 MHz) -99% Occupied Bandwidth, Middle channel****16-QAM (10.0 MHz) - 99% Occupied Bandwidth, Middle channel**

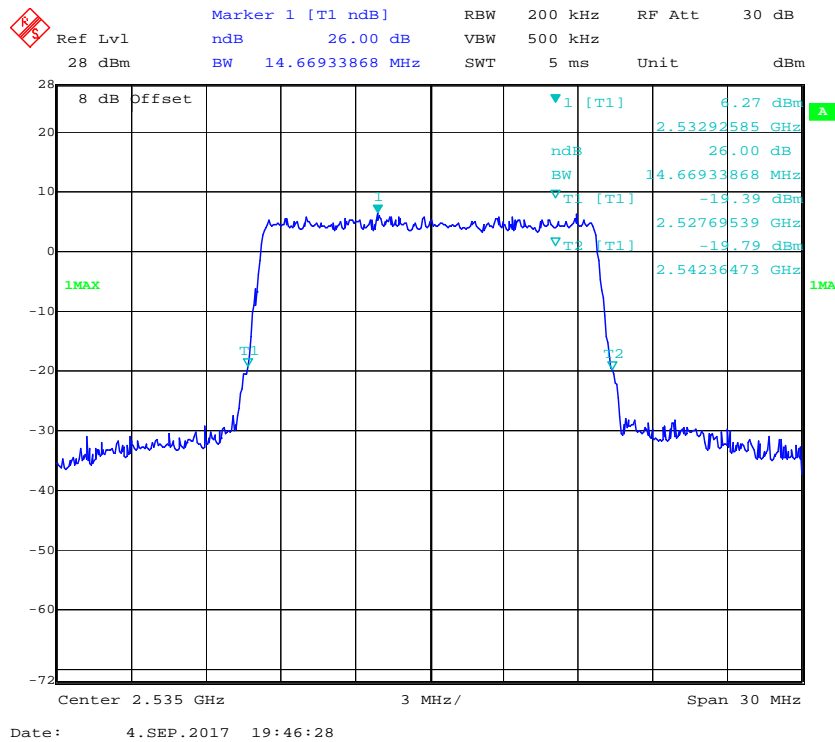
**LTE Band 7: (Middle Channel)**

<b>Bandwidth (MHz)</b>	<b>Modulation</b>	<b>99% Occupied Bandwidth (MHz)</b>	<b>26 dB Emission Bandwidth (MHz)</b>
5	QPSK	4.569	4.970
	16QAM	4.529	4.990
10	QPSK	8.938	9.659
	16QAM	8.938	9.659
15	QPSK	13.527	14.669
	16QAM	13.407	14.669
20	QPSK	17.876	19.158
	16QAM	17.956	19.399

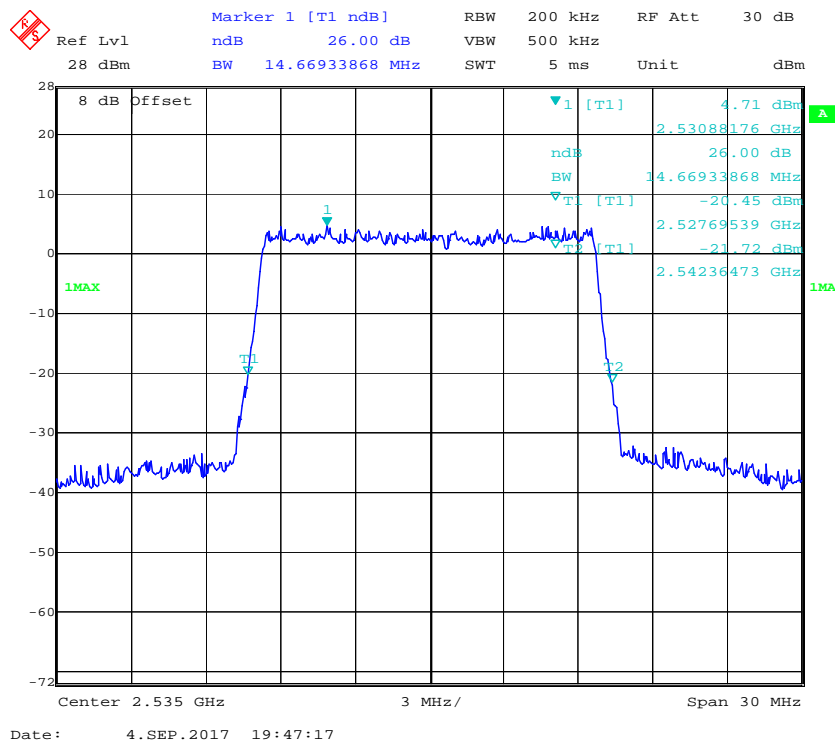
**QPSK (5 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel****16-QAM (5 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel**

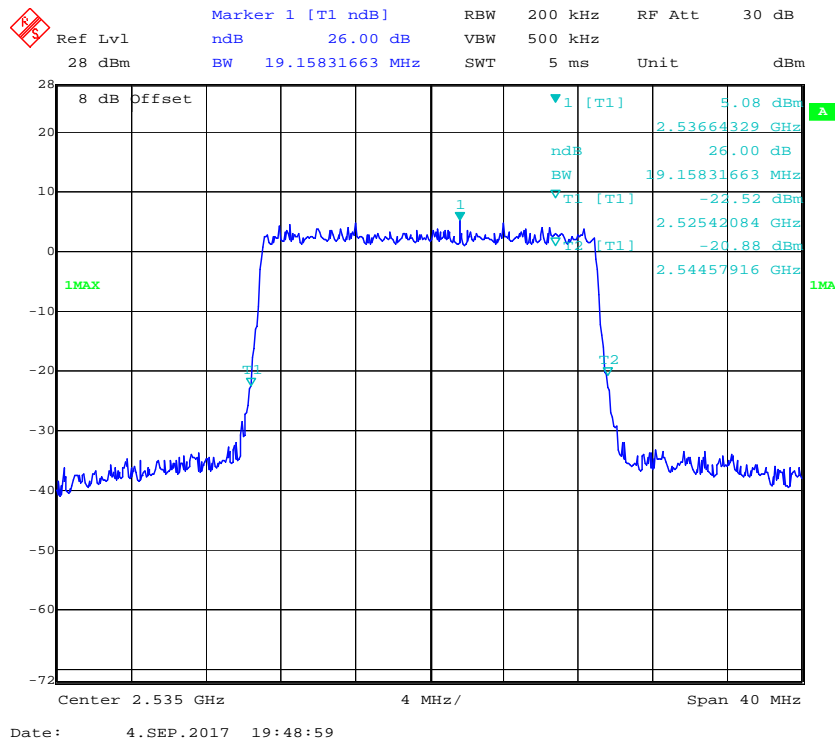
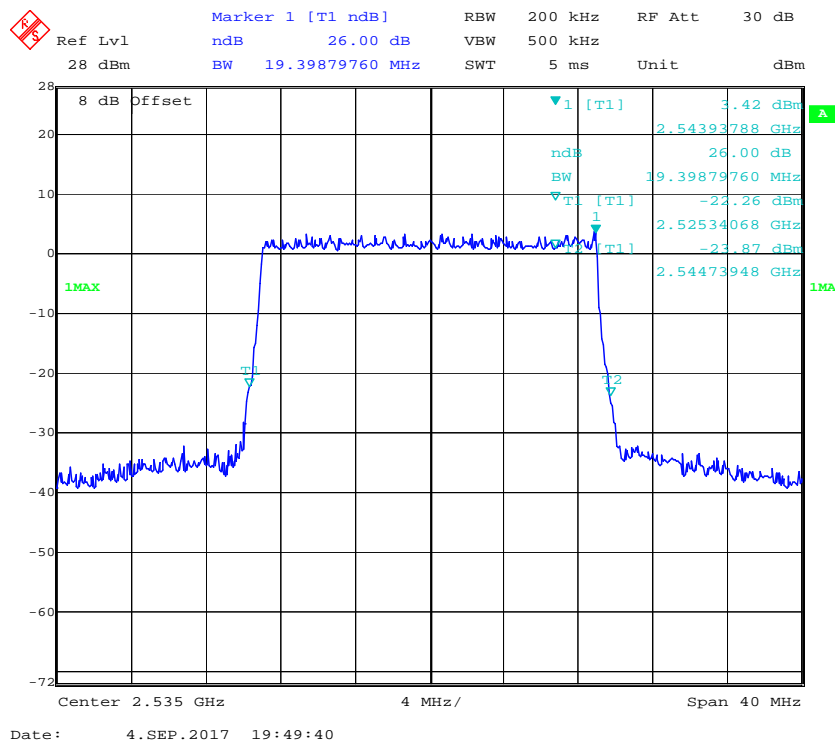
**QPSK (10 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel****16-QAM (10MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel**

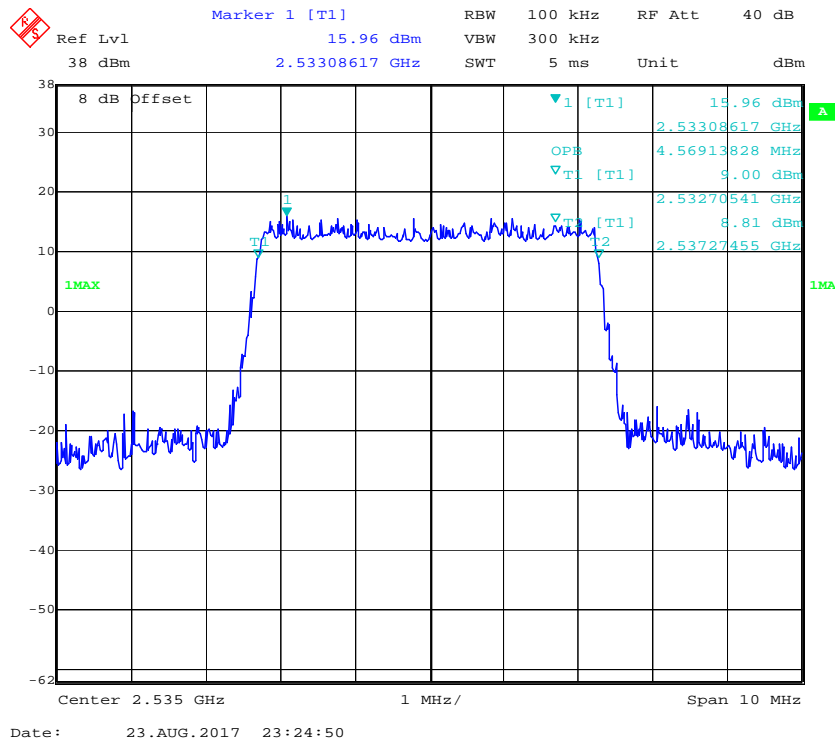
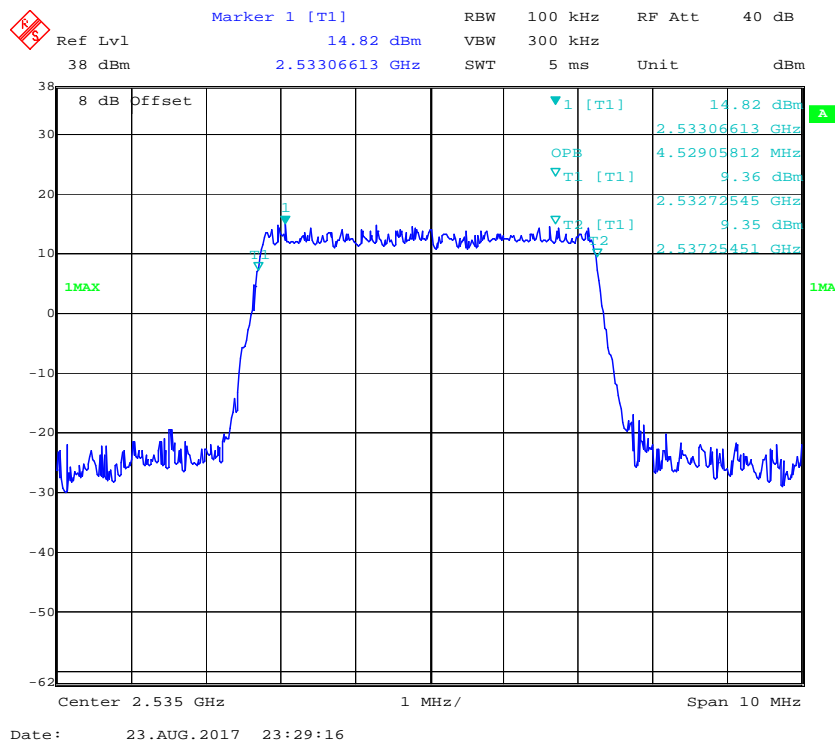
### QPSK (15 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel



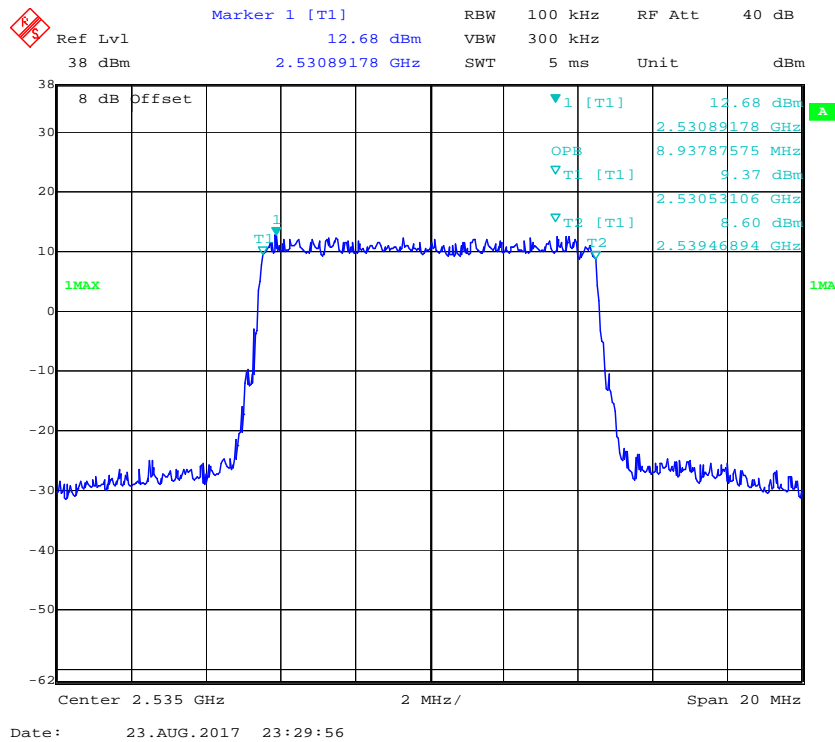
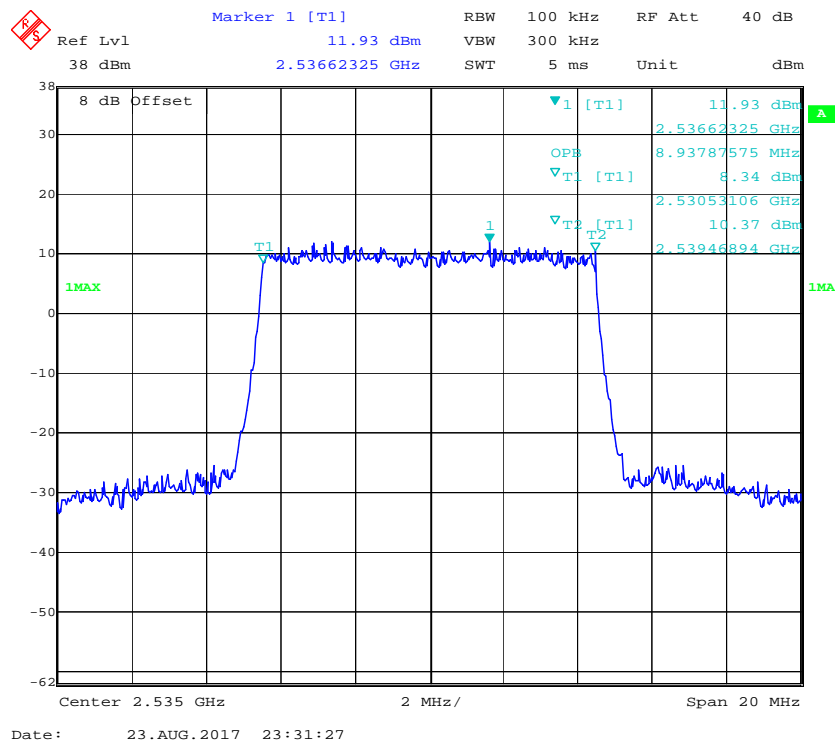
### 16-QAM (15 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel

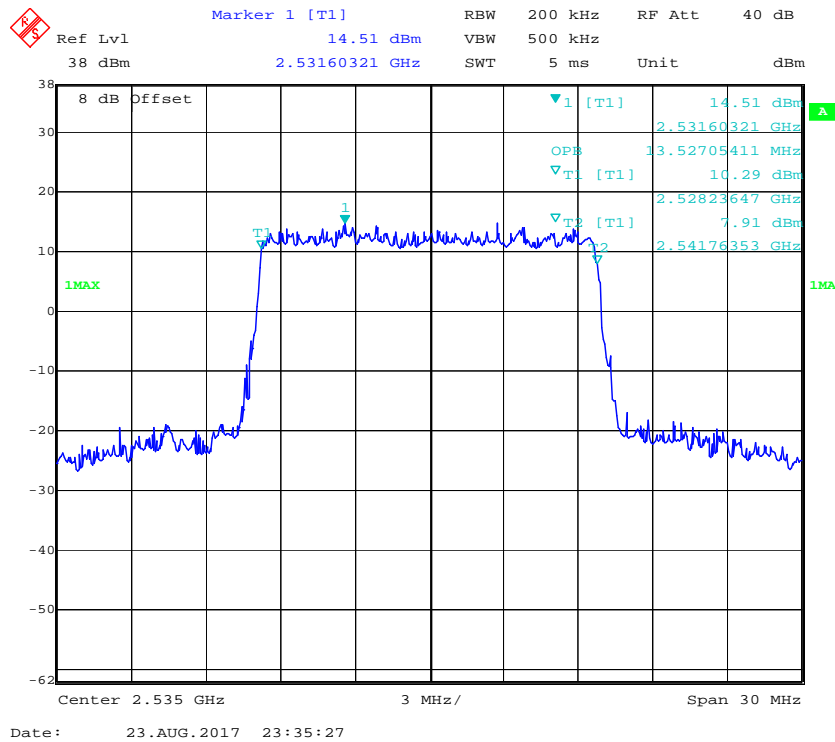
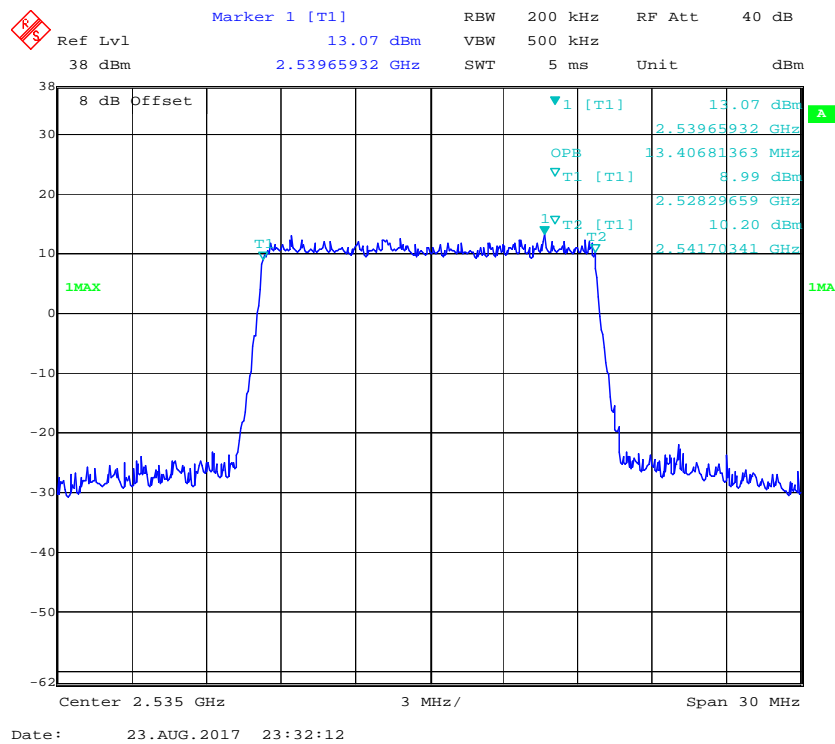


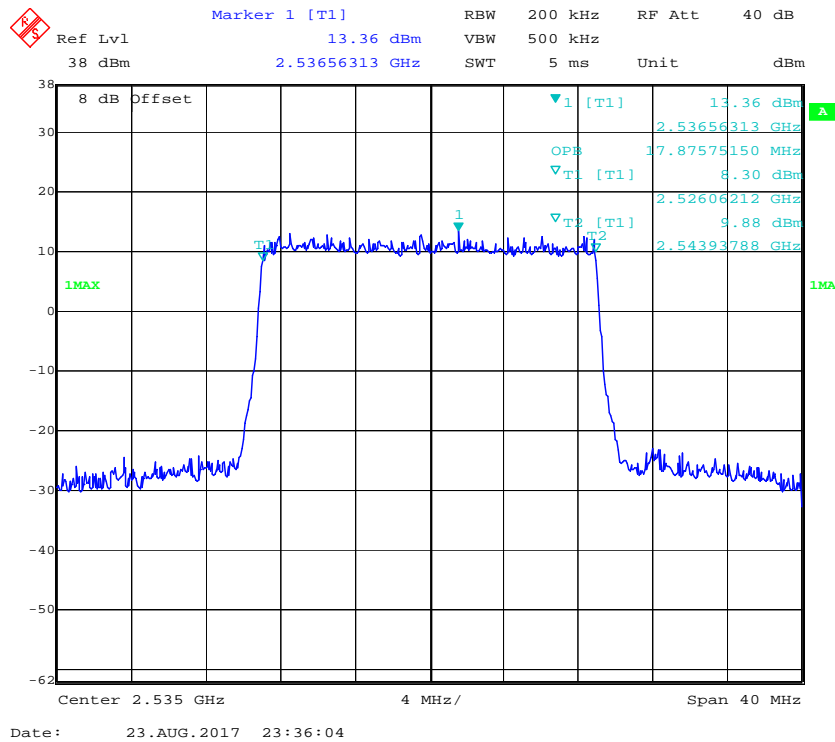
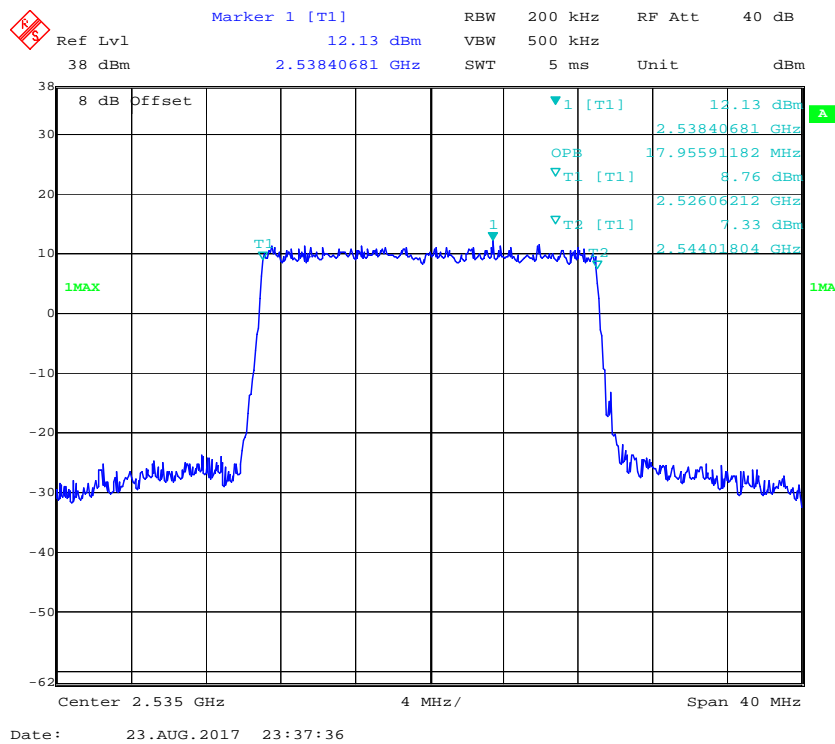
**QPSK (20 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel****16-QAM (20 MHz) - 26 dB Emissions Occupied Bandwidth, Middle channel**

**QPSK (5 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (5 MHz) - 99% Occupied Bandwidth, Middle channel**



**QPSK (10 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (10MHz) - 99% Occupied Bandwidth, Middle channel**

**QPSK (15 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (15 MHz) - 99% Occupied Bandwidth, Middle channel**

**QPSK (20 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (20 MHz) - 99% Occupied Bandwidth, Middle channel**

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

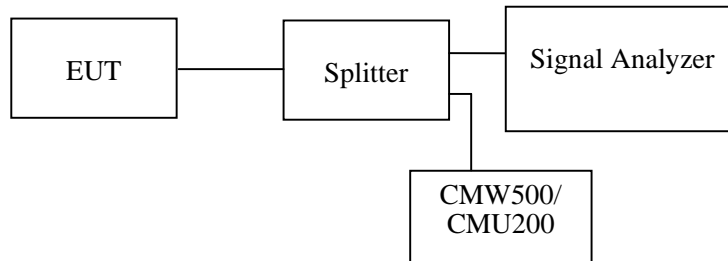
### Applicable Standards

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 100kHz for below 1GHz and 1MHz for above 1GHz. Sufficient scans were taken to show any out of band emissions up to 10<sup>th</sup> harmonic.



### Test Data

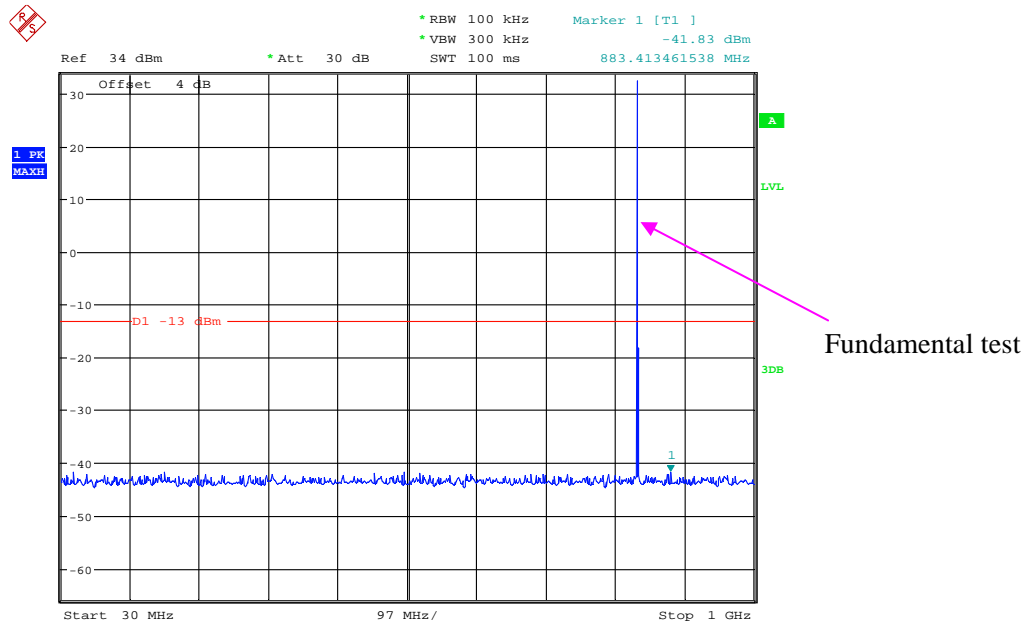
#### Environmental Conditions

Temperature:	24~25 °C
Relative Humidity:	53~57 %
ATM Pressure:	100.9~101.0 kPa

The testing was performed by Xiangguang Kong from 2017-09-01 to 2017-09-04.

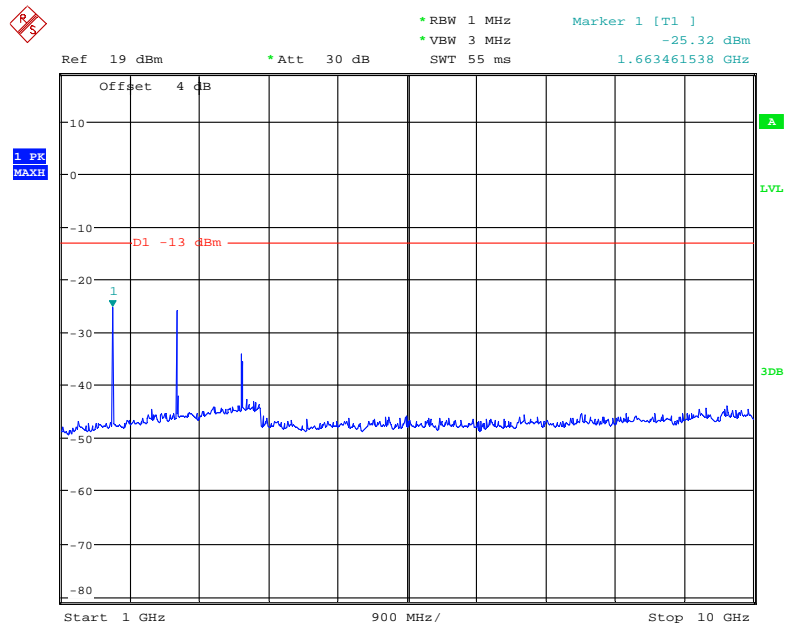
Cellular Band (Part 22H)

30 MHz – 1 GHz (GSM Mode)



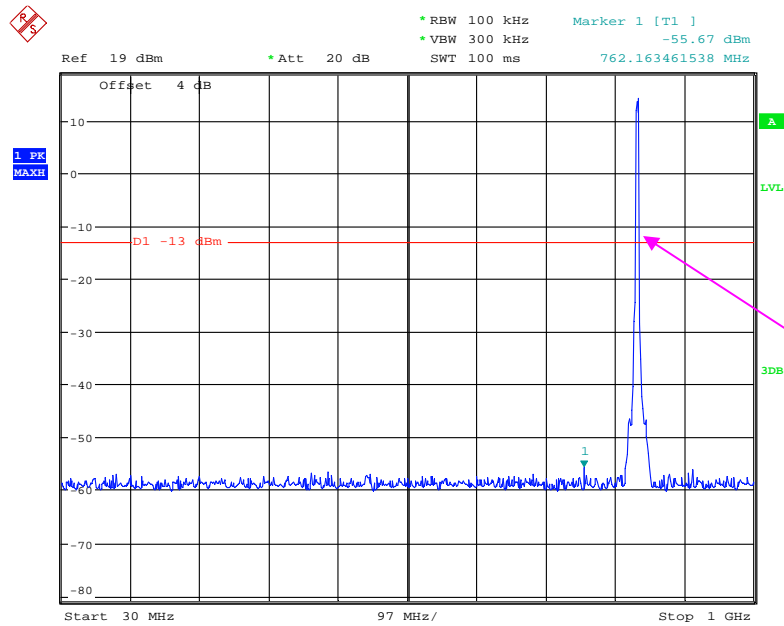
Date: 1.SEP.2017 23:43:28

1 GHz – 10 GHz (GSM Mode)



Date: 1.SEP.2017 23:47:06

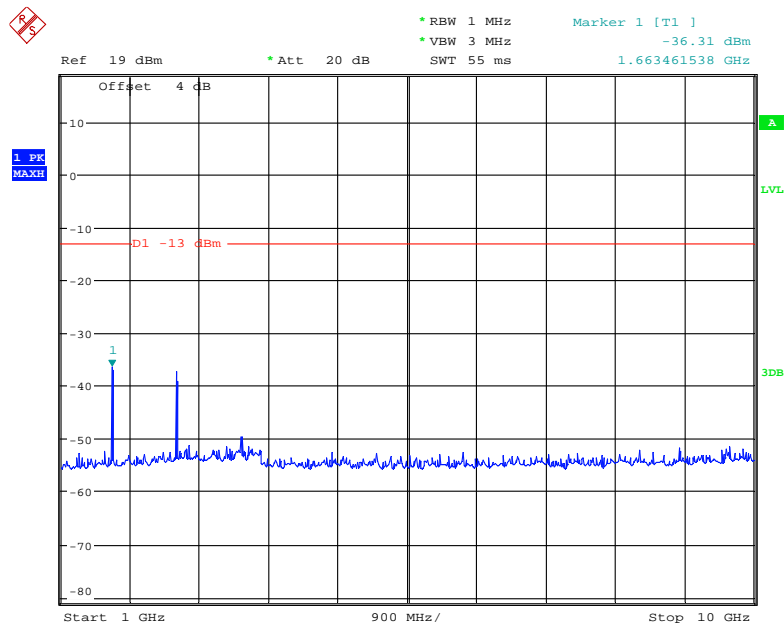
### 30 MHz – 1 GHz (WCDMA Mode)



Fundamental test

Date: 2.SEP.2017 00:04:15

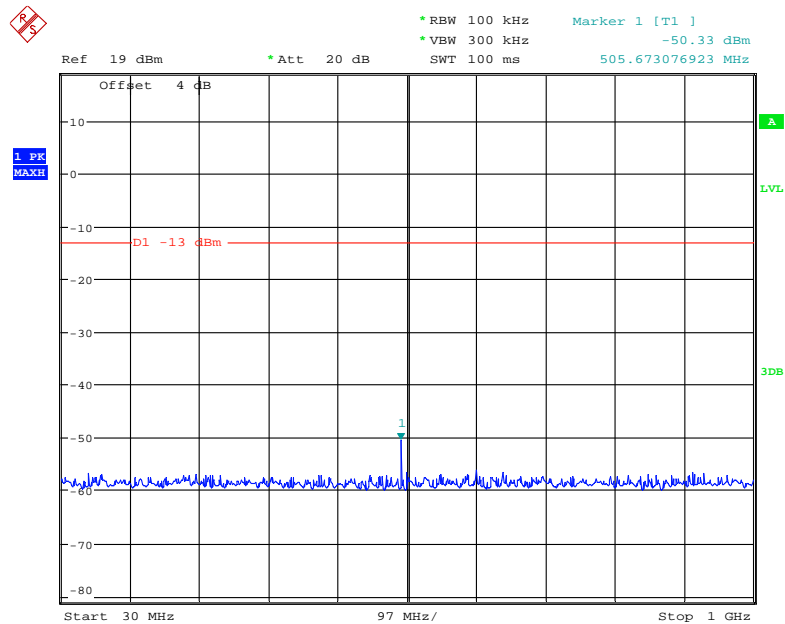
### 1 GHz – 10 GHz (WCDMA Mode)



Date: 2.SEP.2017 00:04:42

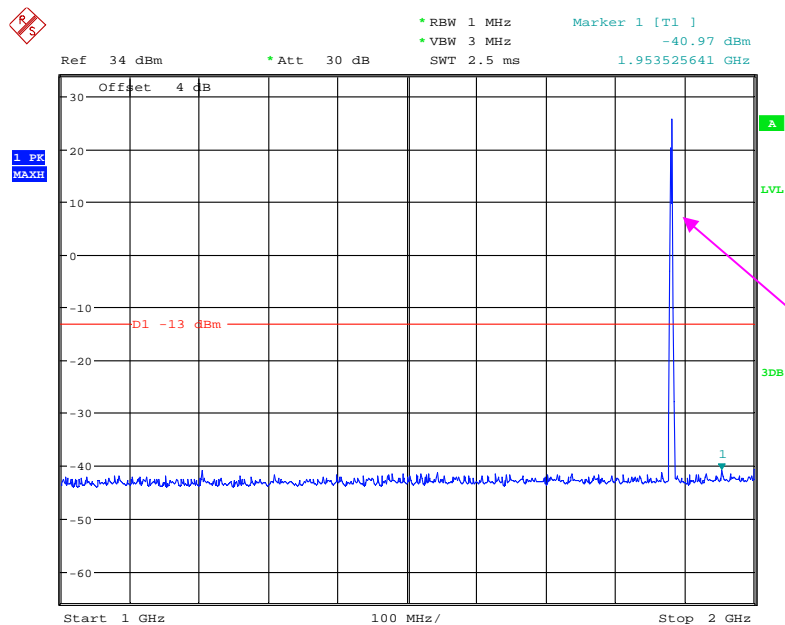
## PCS Band (Part 24E)

## 30 MHz – 1 GHz (GSM Mode)



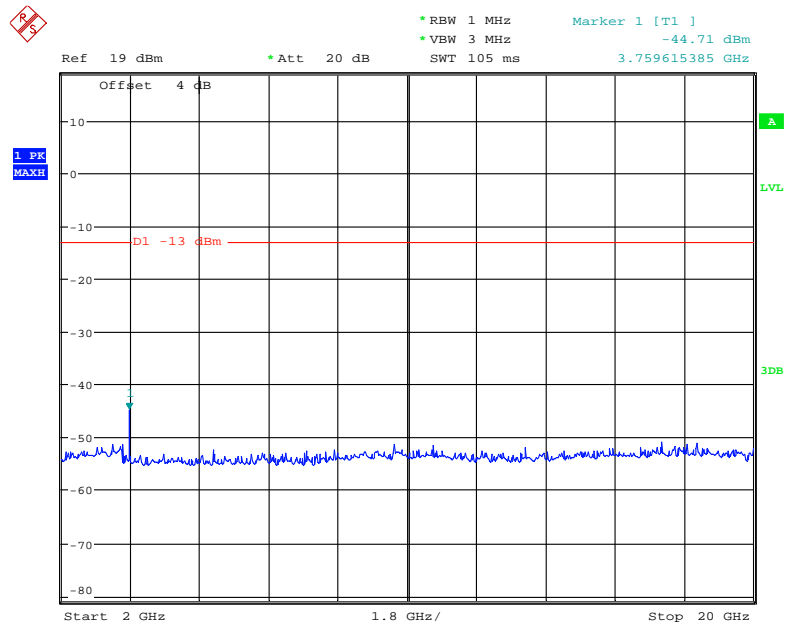
Date: 1.SEP.2017 23:51:35

## 1 GHz – 2 GHz (GSM Mode)

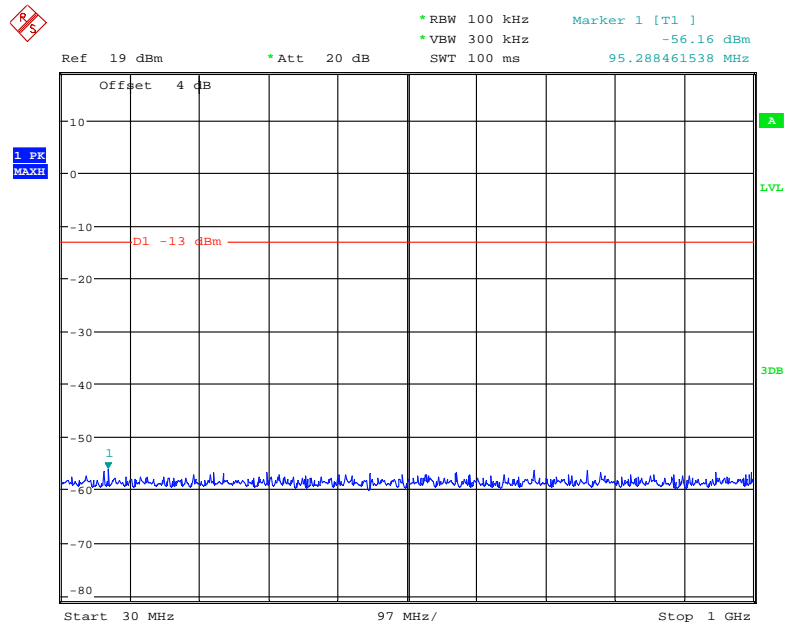


Fundamental test

Date: 1.SEP.2017 23:48:43

**2 GHz – 20 GHz (GSM Mode)**

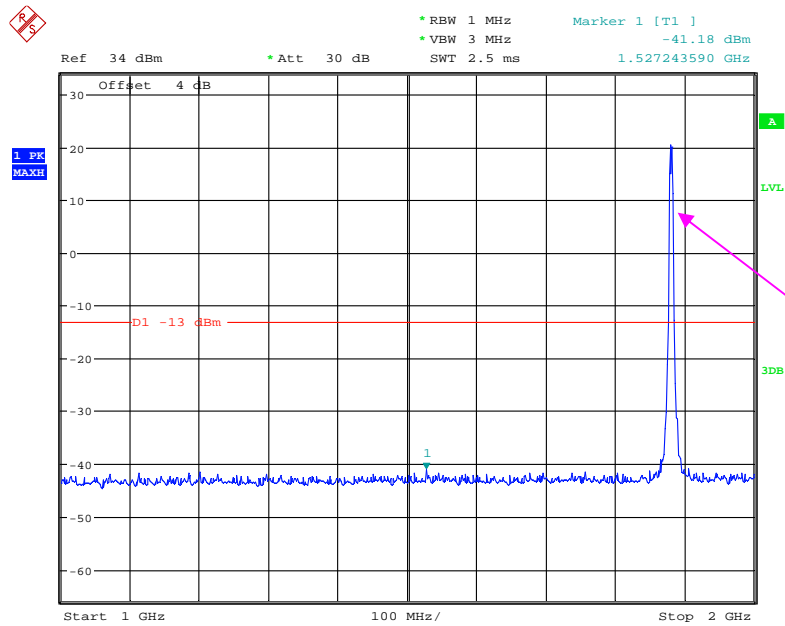
Date: 1.SEP.2017 23:50:13

**30 MHz – 1 GHz (WCDMA Mode)**

Date: 2.SEP.2017 00:03:24



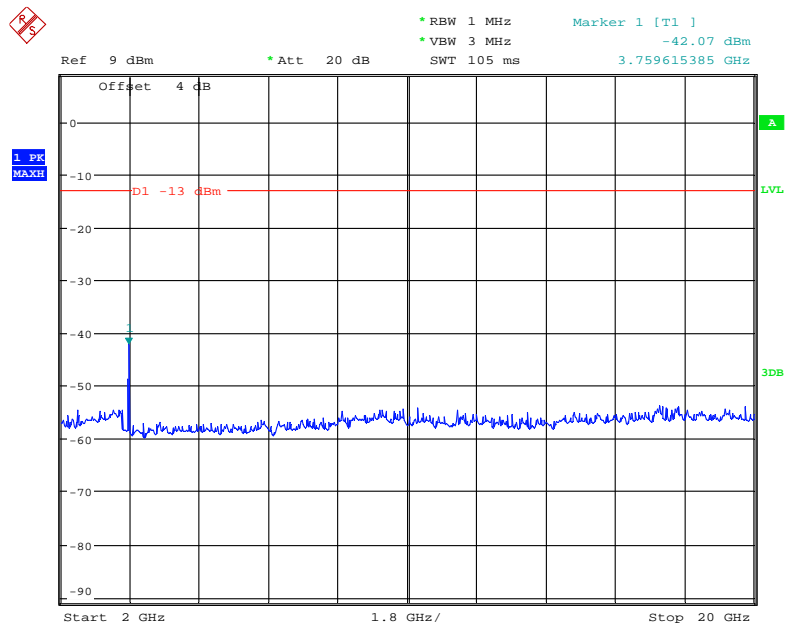
### 1 GHz – 2 GHz (WCDMA Mode)



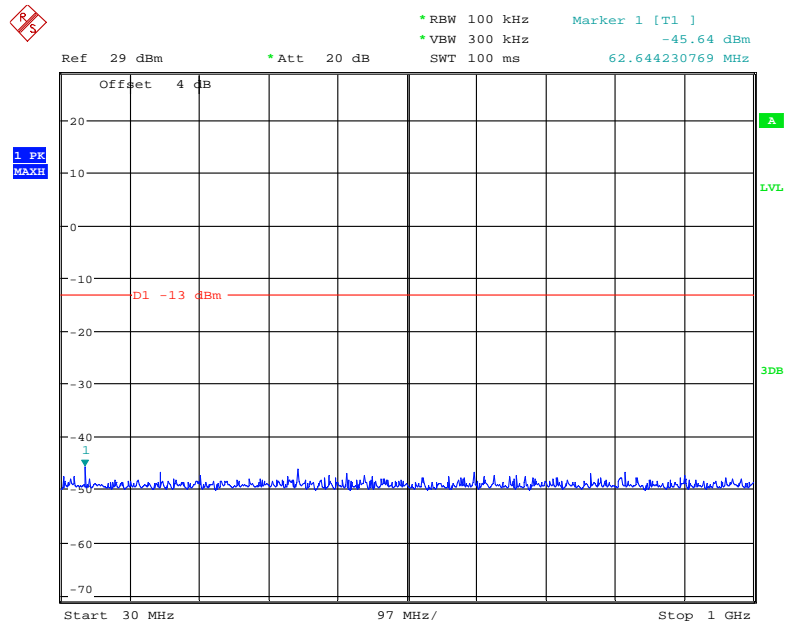
Fundamental test

Date: 2.SEP.2017 00:05:31

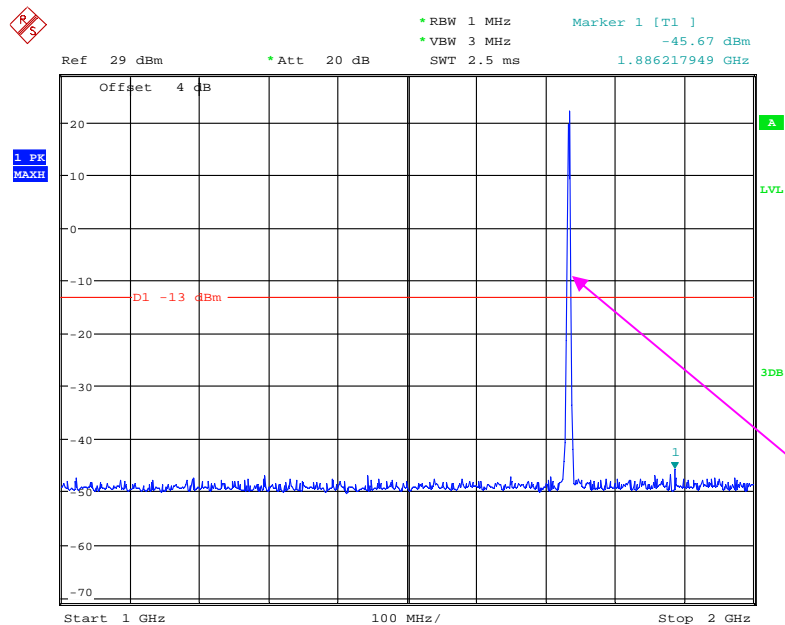
### 2 GHz – 20 GHz (WCDMA Mode)



Date: 2.SEP.2017 00:06:10

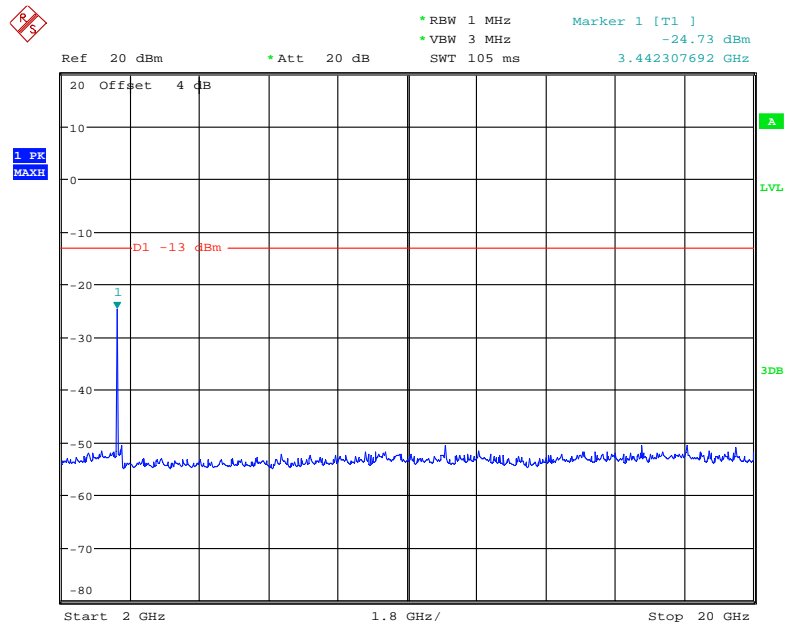
**LTE Band 4: LTE****30 MHz - 1 GHz (1.4 MHz, Middle Channel)**

Date: 24.AUG.2017 23:34:52

**1 GHz - 2 GHz (1.4 MHz, Middle Channel)**

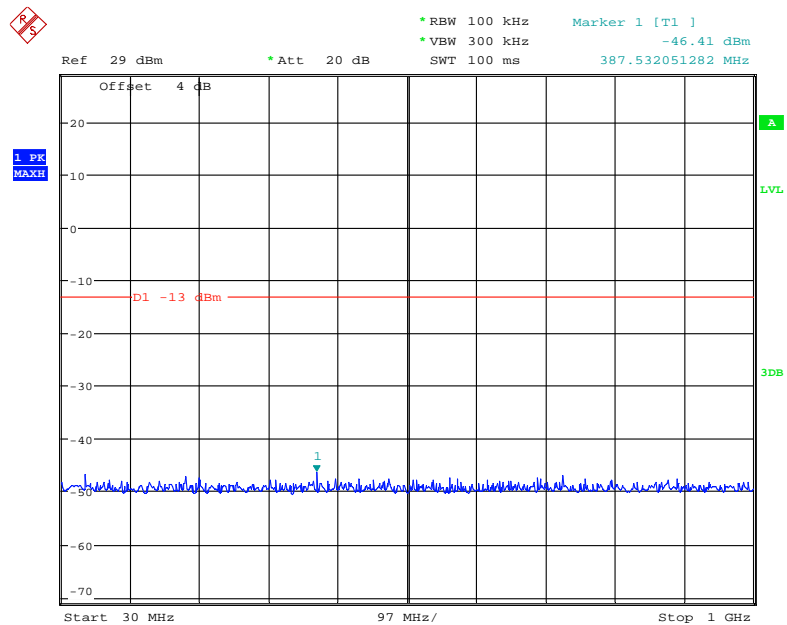
Date: 24.AUG.2017 23:39:54

### 2 GHz – 20 GHz (1.4 MHz, Middle Channel)



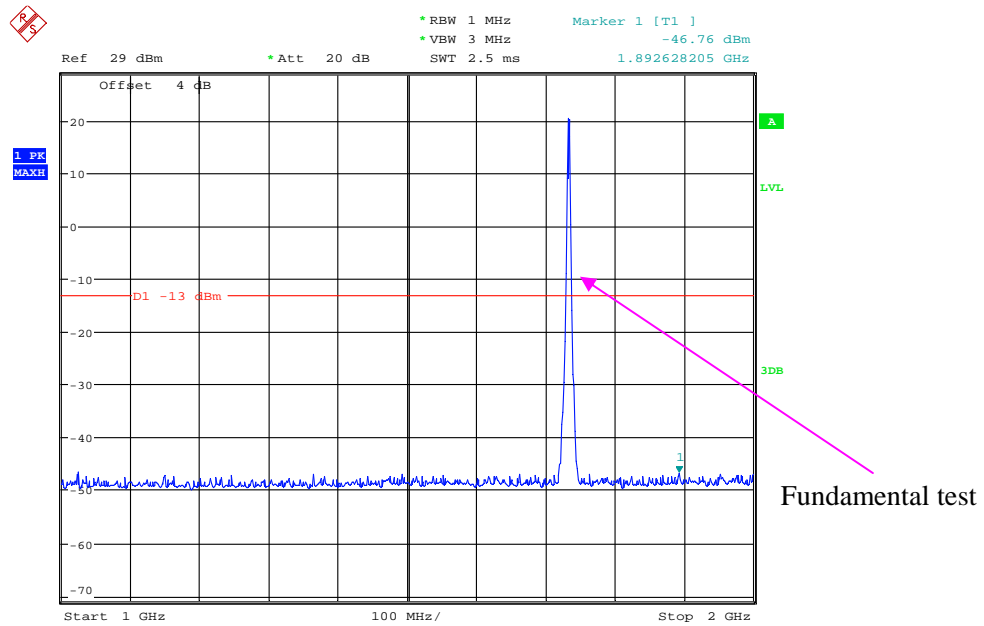
Date: 24.AUG.2017 23:42:32

### 30 MHz - 1 GHz (3.0 MHz, Middle Channel)



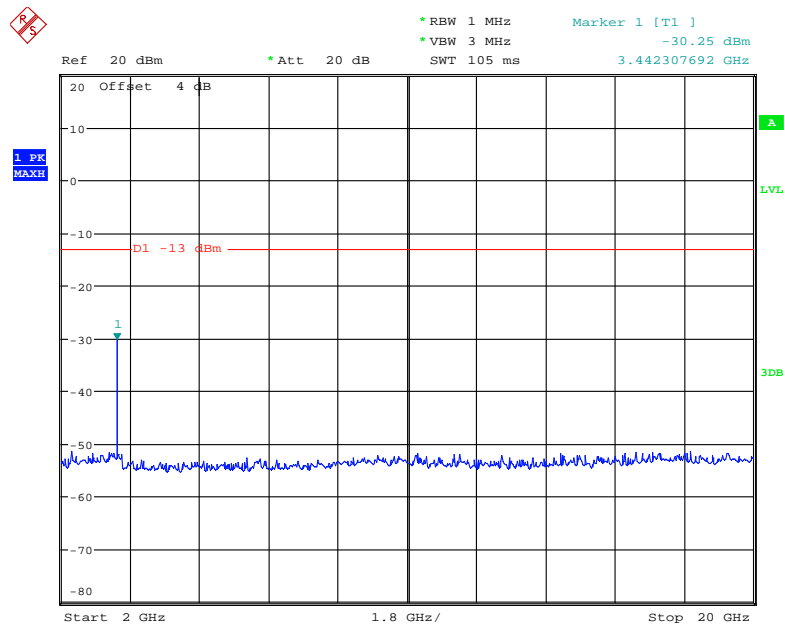
Date: 24.AUG.2017 23:35:32

### 1 GHz – 2 GHz (3.0 MHz, Middle Channel)



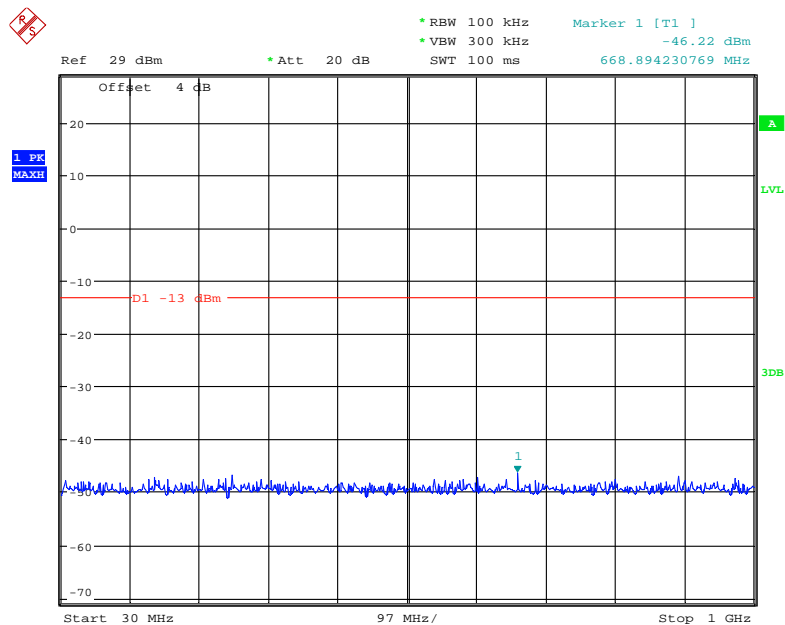
Date: 24.AUG.2017 23:39:36

### 2 GHz – 20 GHz (3.0 MHz, Middle Channel)



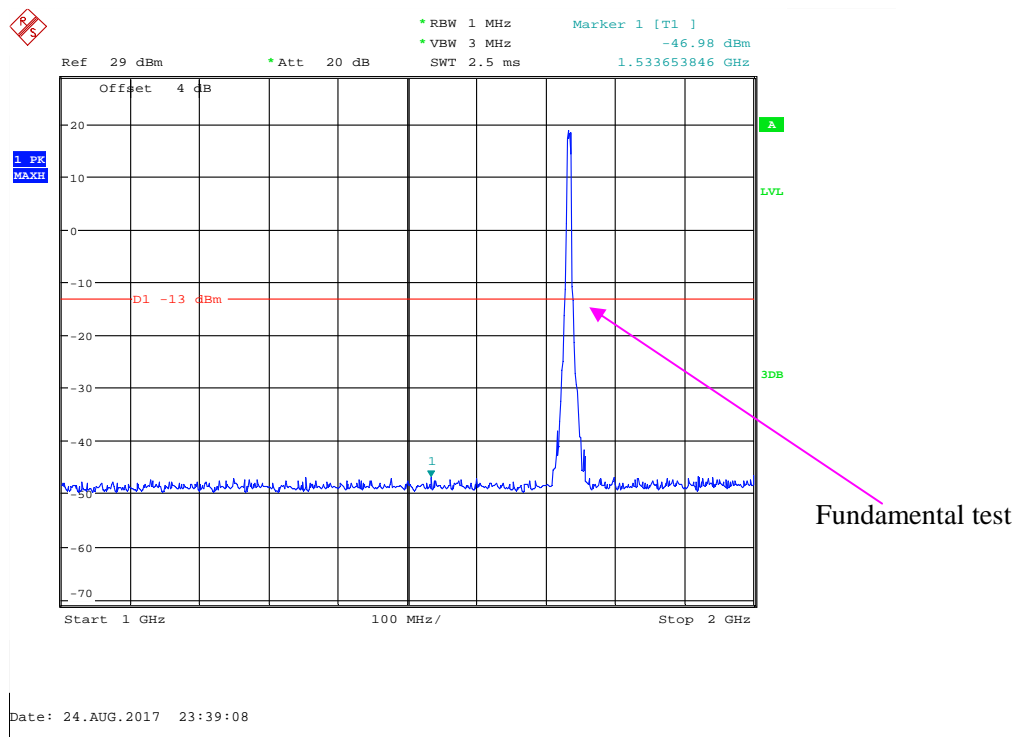
Date: 24.AUG.2017 23:42:11

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



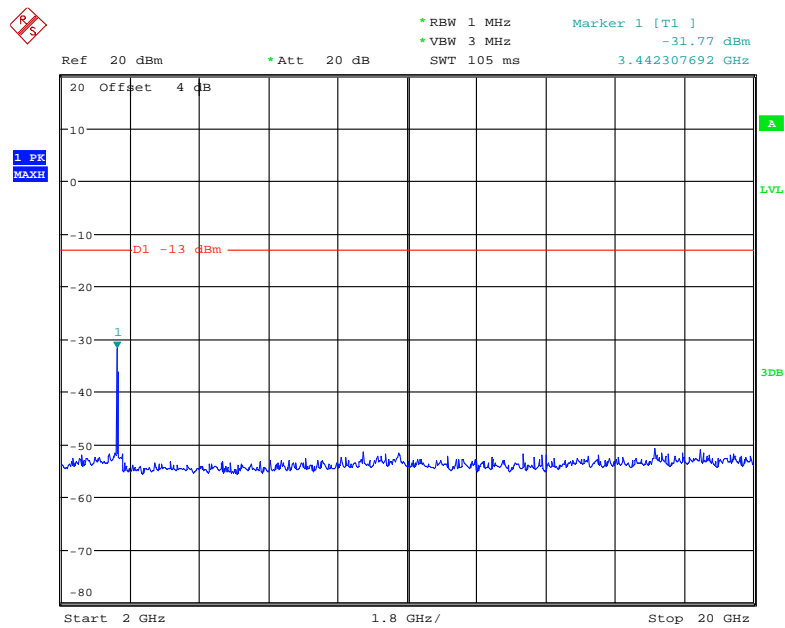
Date: 24.AUG.2017 23:36:07

### 1 GHz - 2 GHz (5.0 MHz, Middle Channel)



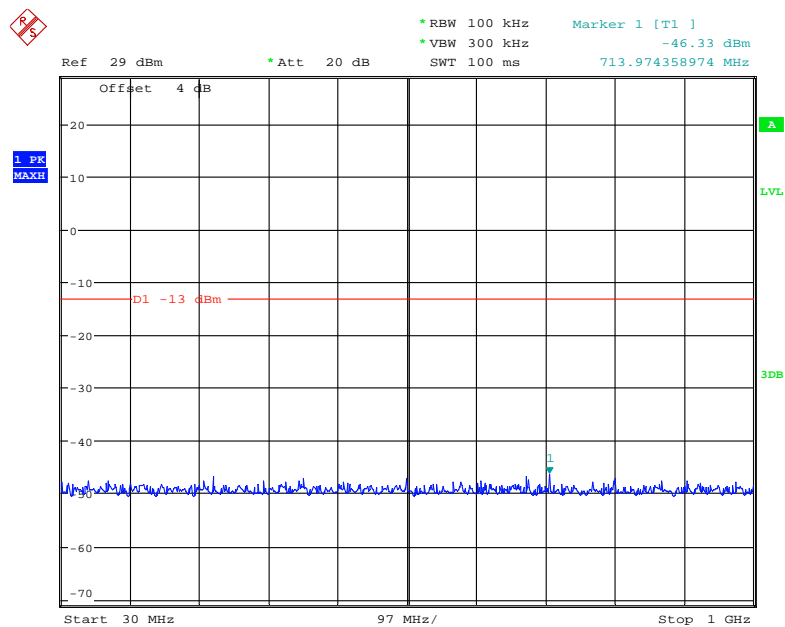
Date: 24.AUG.2017 23:39:08

**2 GHz – 20 GHz (5.0 MHz, Middle Channel)**



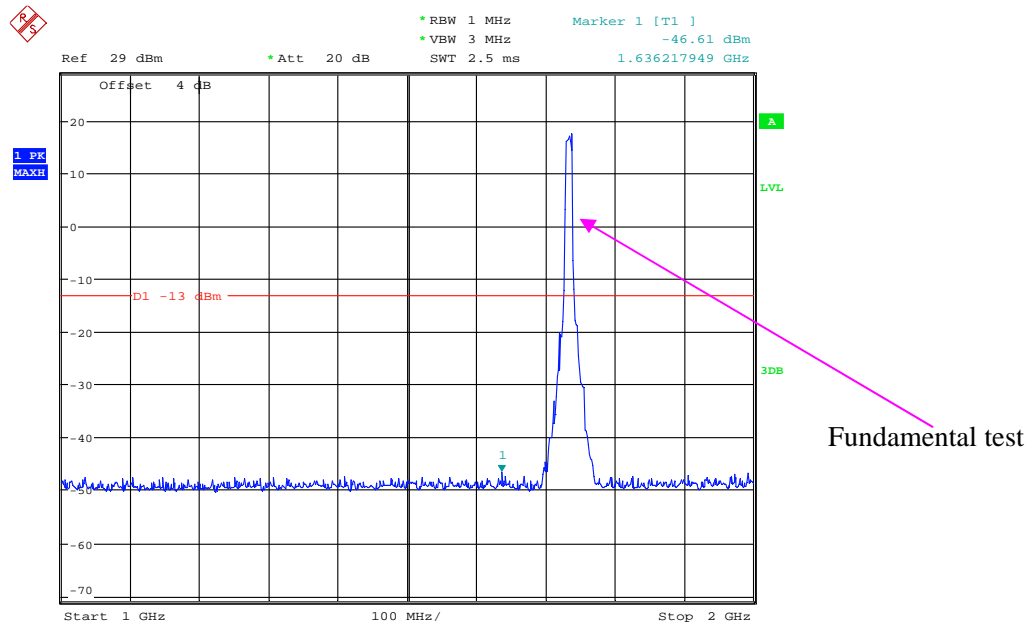
Date: 24.AUG.2017 23:41:52

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



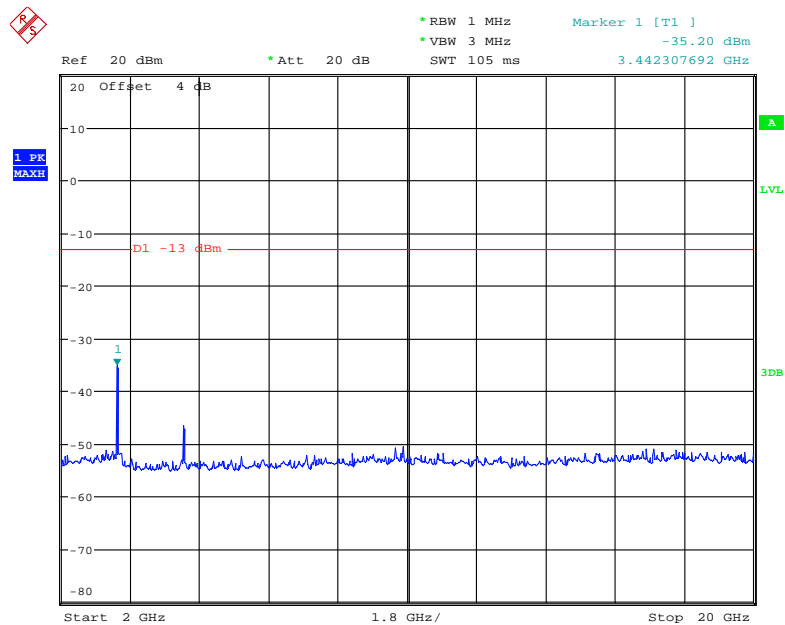
Date: 24.AUG.2017 23:36:23

### 1 GHz – 2 GHz (10.0 MHz, Middle Channel)



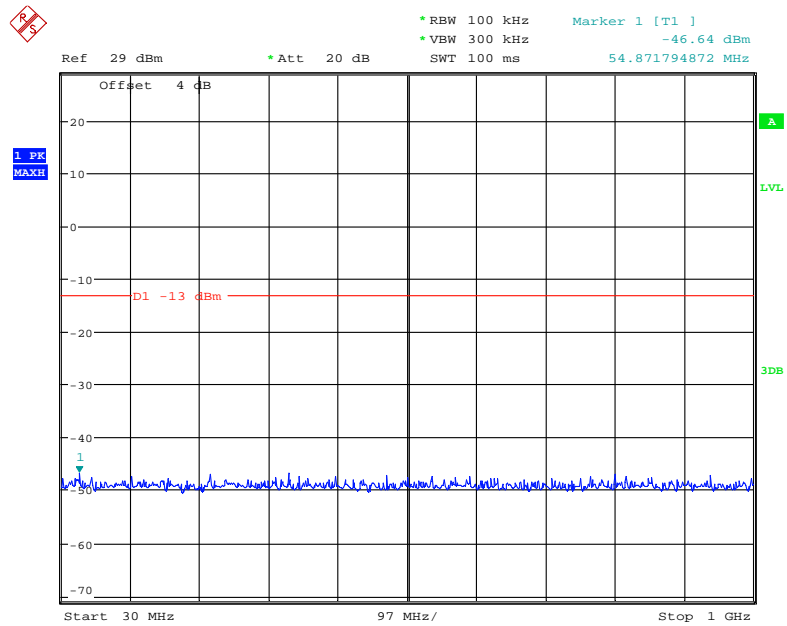
Date: 24.AUG.2017 23:38:42

### 2 GHz – 20 GHz (10.0 MHz, Middle Channel)



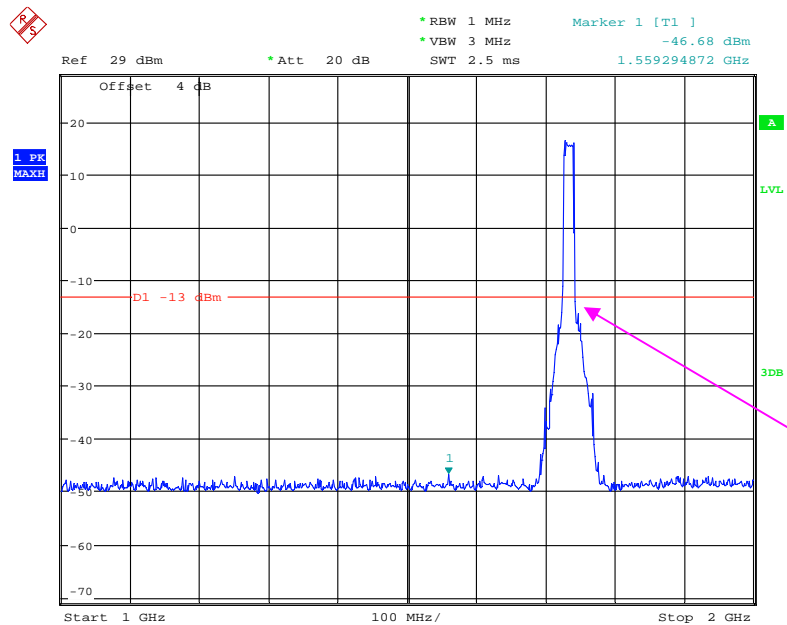
Date: 24.AUG.2017 23:41:36

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



Date: 24.AUG.2017 23:36:48

### 1 GHz - 2 GHz (15.0 MHz, Middle Channel)

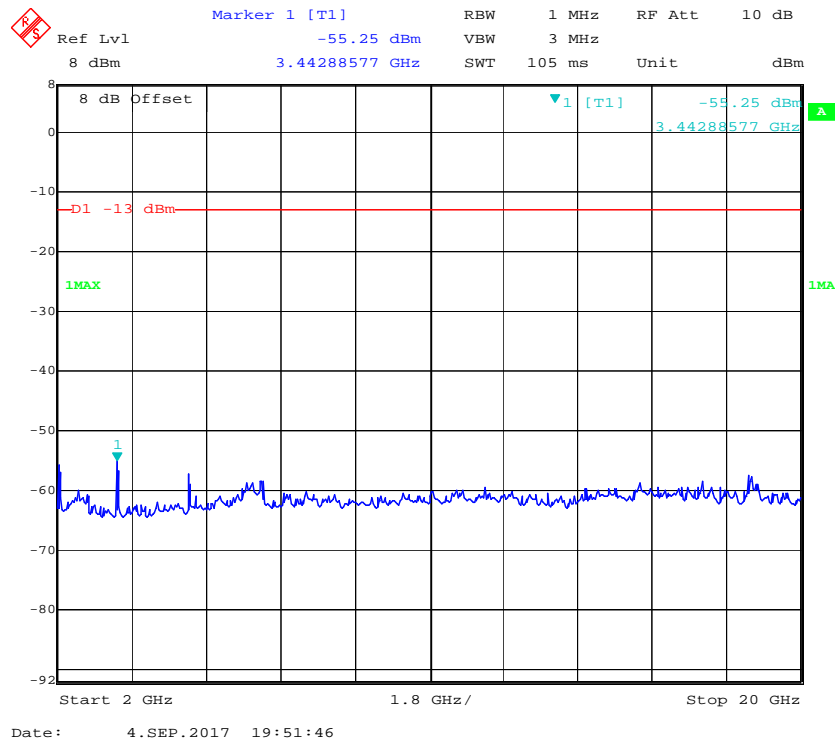


Fundamental test

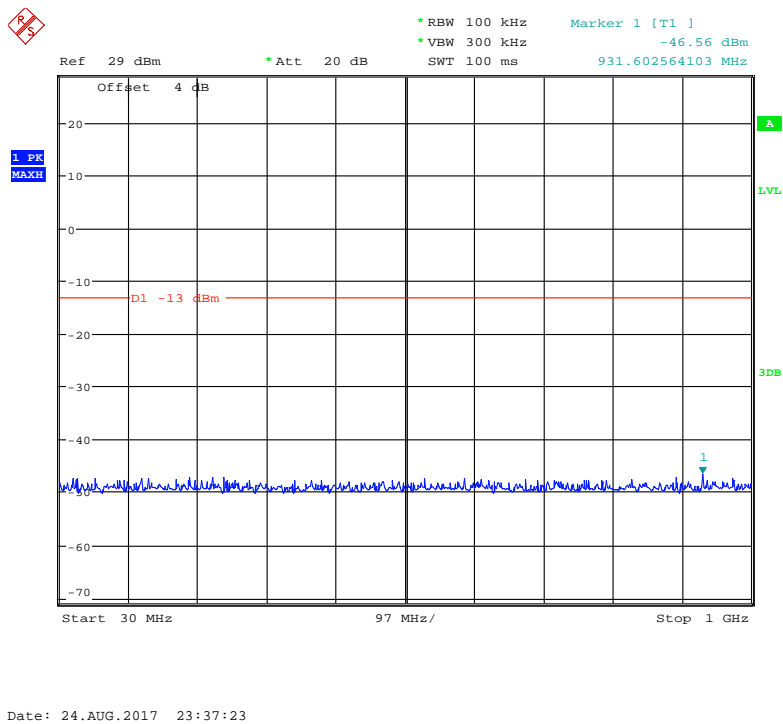
Date: 24.AUG.2017 23:38:23



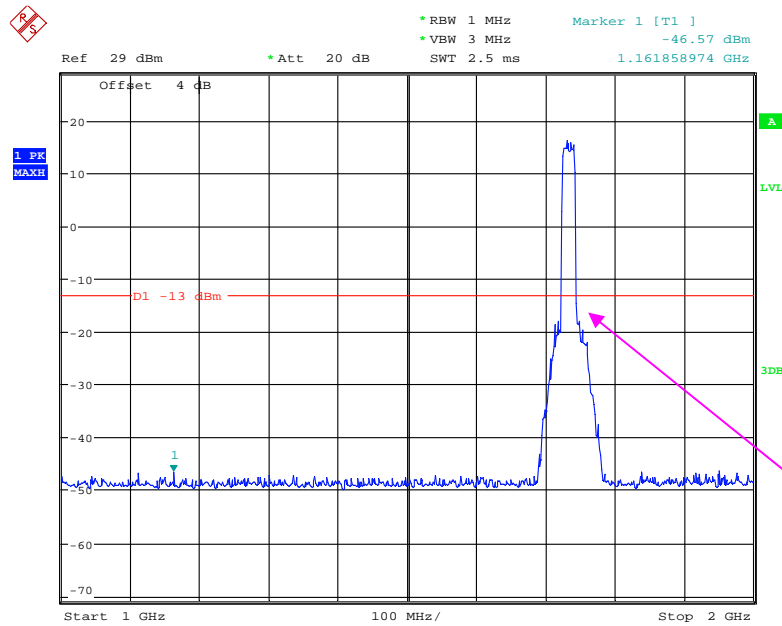
### 2 GHz – 20 GHz (15.0 MHz, Middle Channel)



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



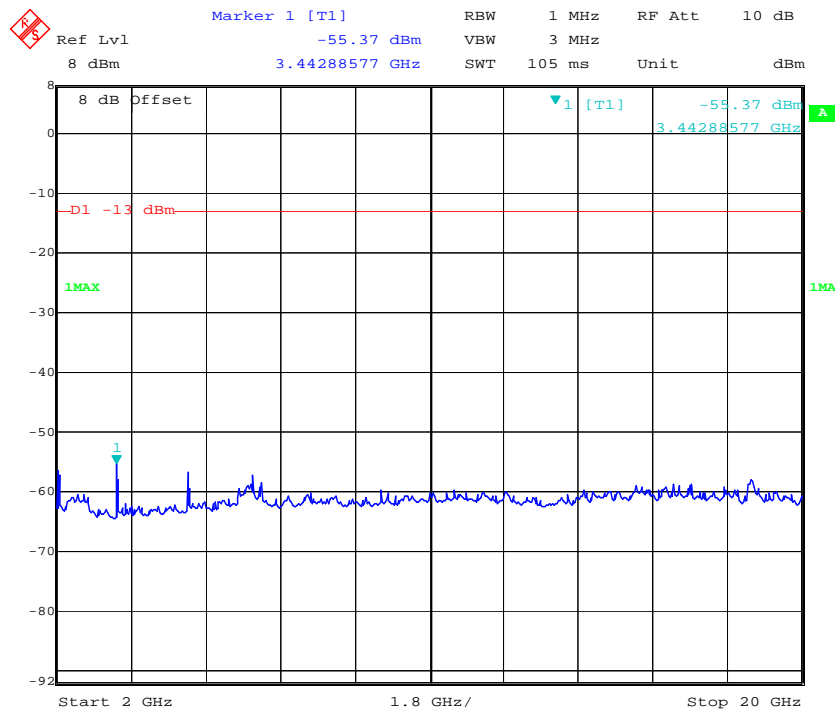
### 1 GHz – 2 GHz (20.0 MHz, Middle Channel)



Fundamental test

Date: 24.AUG.2017 23:37:58

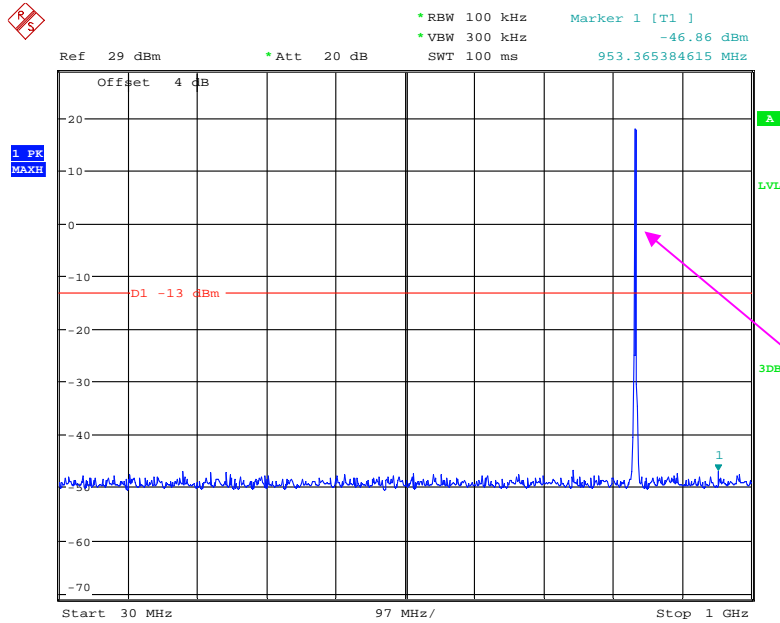
### 2 GHz – 20 GHz (20.0 MHz, Middle Channel)



Date: 4.SEP.2017 19:51:08

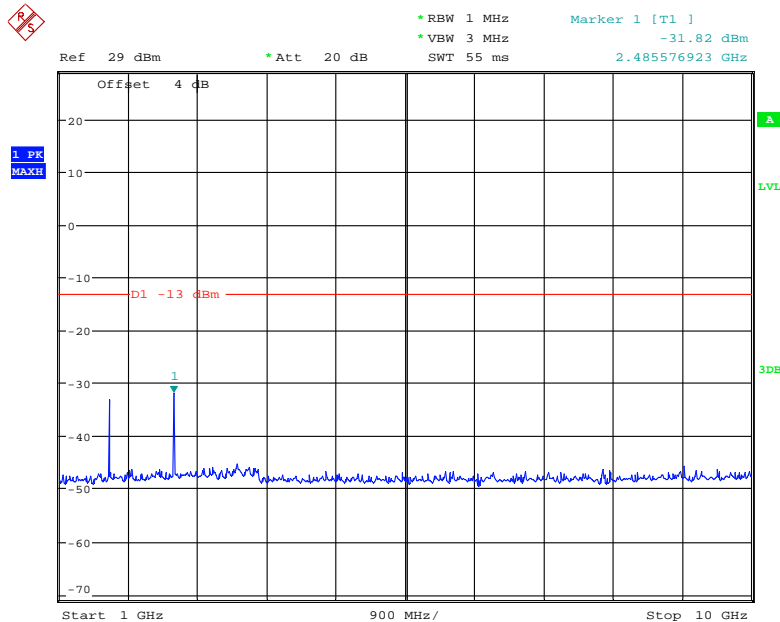
**LTE Band 5:**

**30 MHz - 1 GHz (1.4 MHz, Middle Channel)**



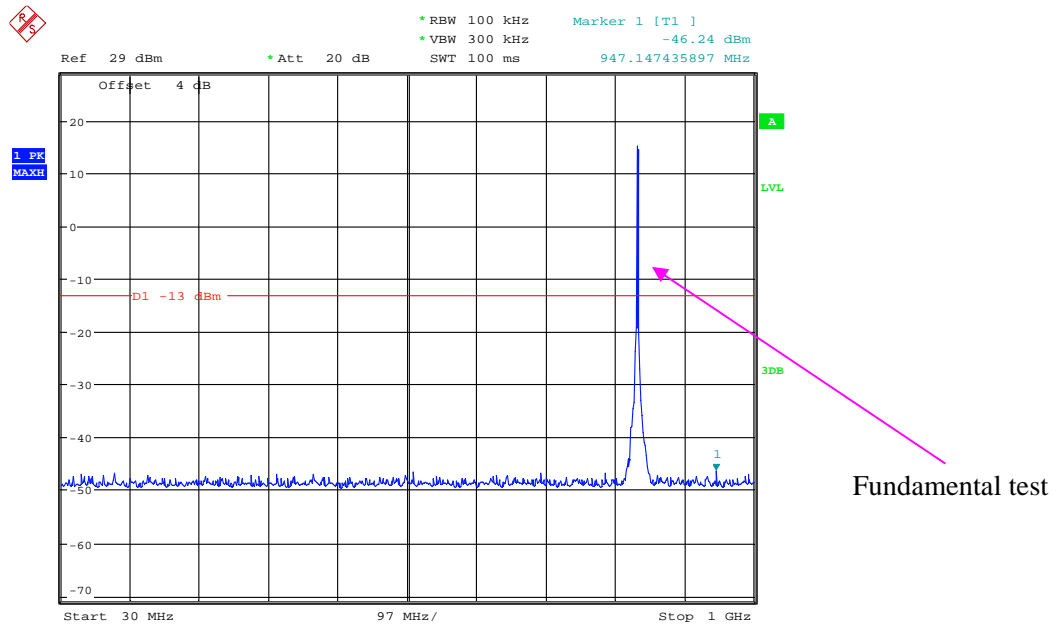
Date: 24.AUG.2017 23:34:12

**1 GHz - 10 GHz (1.4 MHz, Middle Channel)**



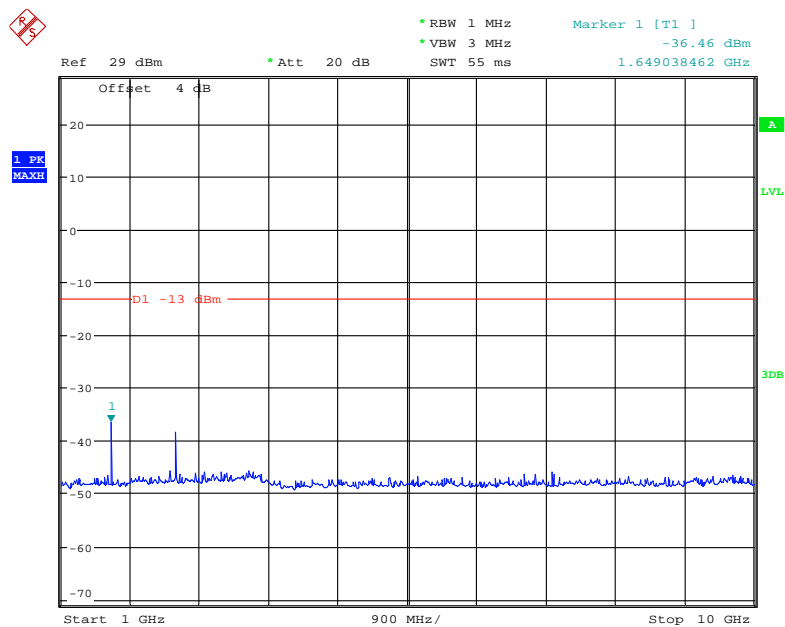
Date: 24.AUG.2017 23:27:44

### 30 MHz - 1 GHz (3.0 MHz, Middle Channel)



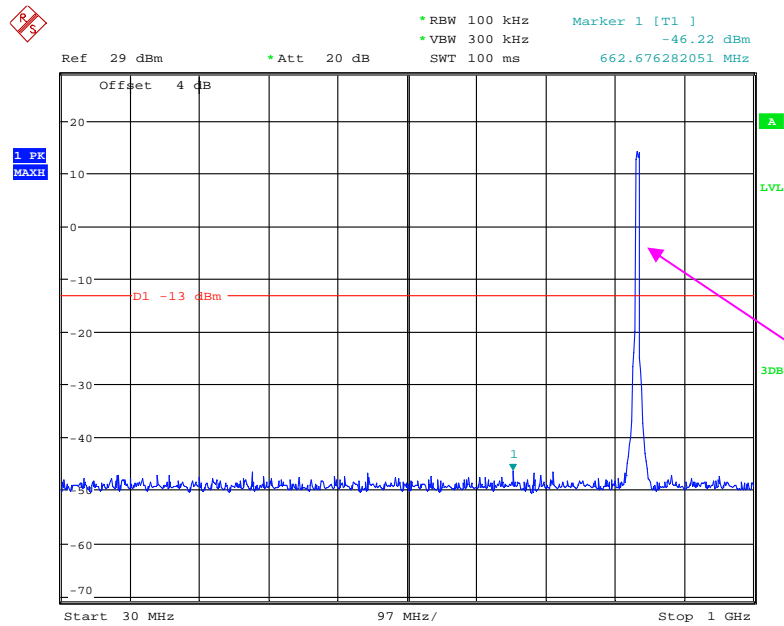
Date: 24.AUG.2017 23:33:44

### 1 GHz – 10 GHz (3.0 MHz, Middle Channel)



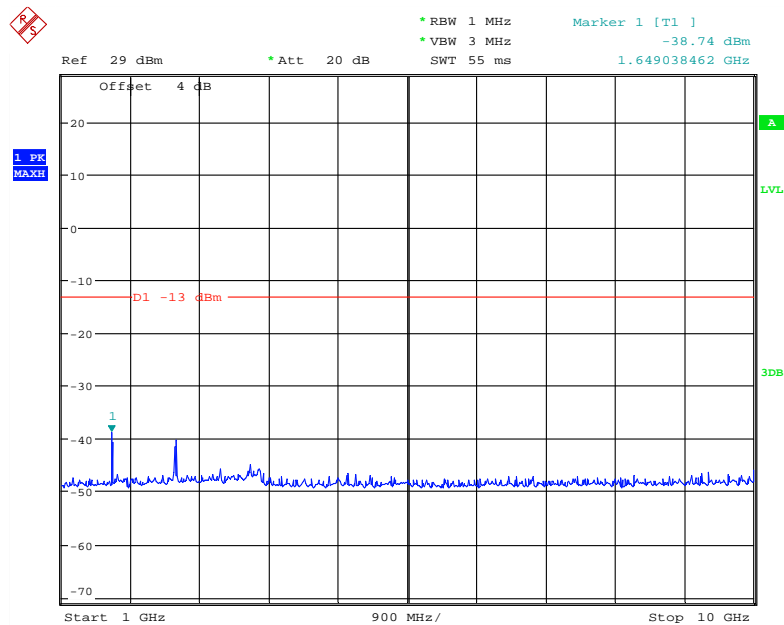
Date: 24.AUG.2017 23:28:12

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



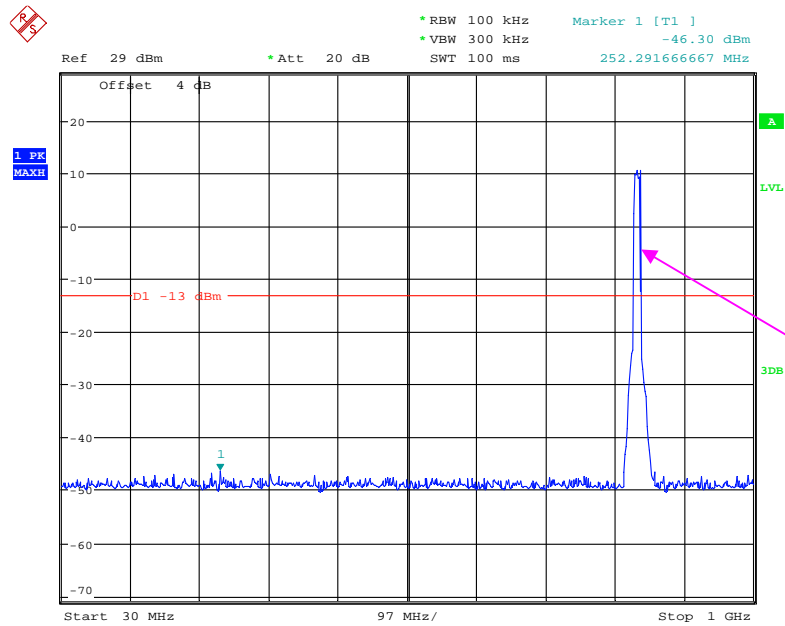
Date: 24.AUG.2017 23:33:03

### 1 GHz – 10 GHz (5.0 MHz, Middle Channel)



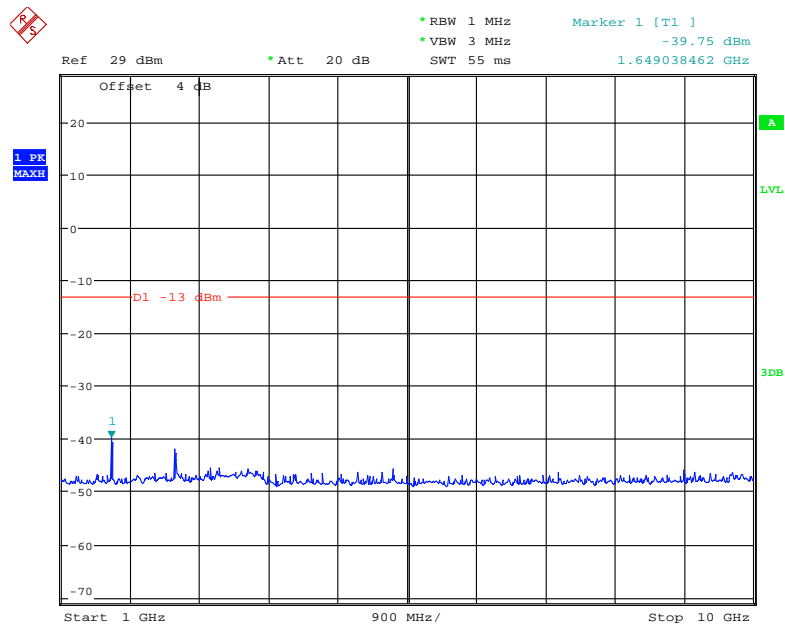
Date: 24.AUG.2017 23:28:28

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



Date: 24.AUG.2017 23:31:41

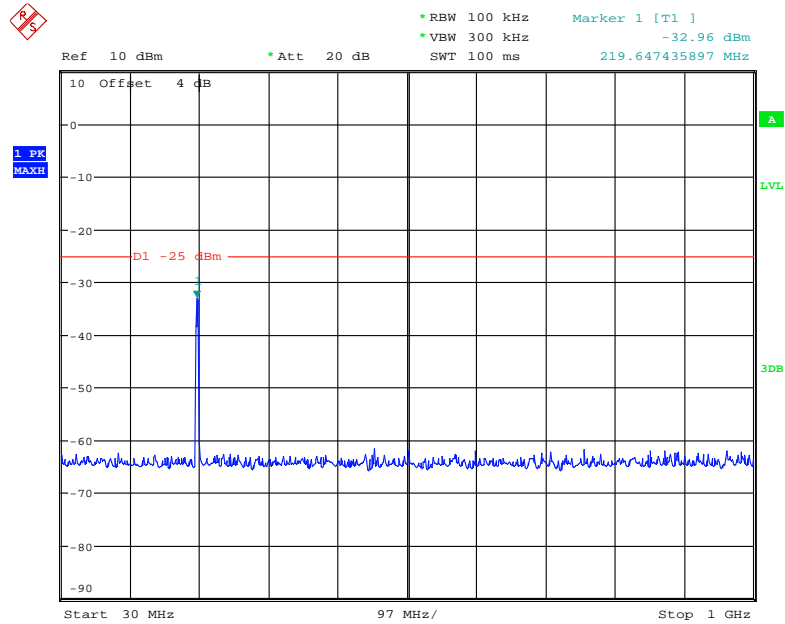
### 1 GHz - 10 GHz (10.0 MHz, Middle Channel)



Date: 24.AUG.2017 23:28:49

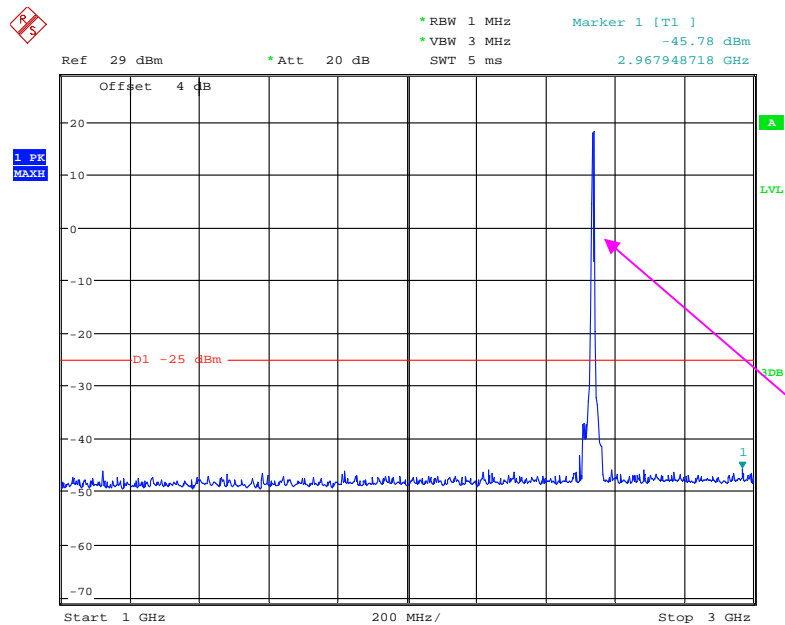
**LTE Band 7:**

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



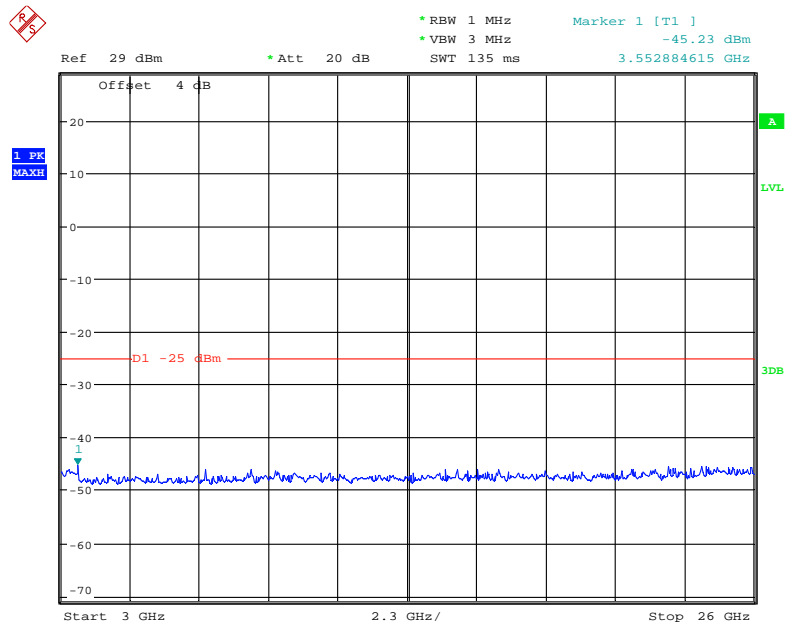
Date: 24.AUG.2017 23:19:48

**1 GHz – 3.0 GHz (5.0 MHz, Middle Channel)**



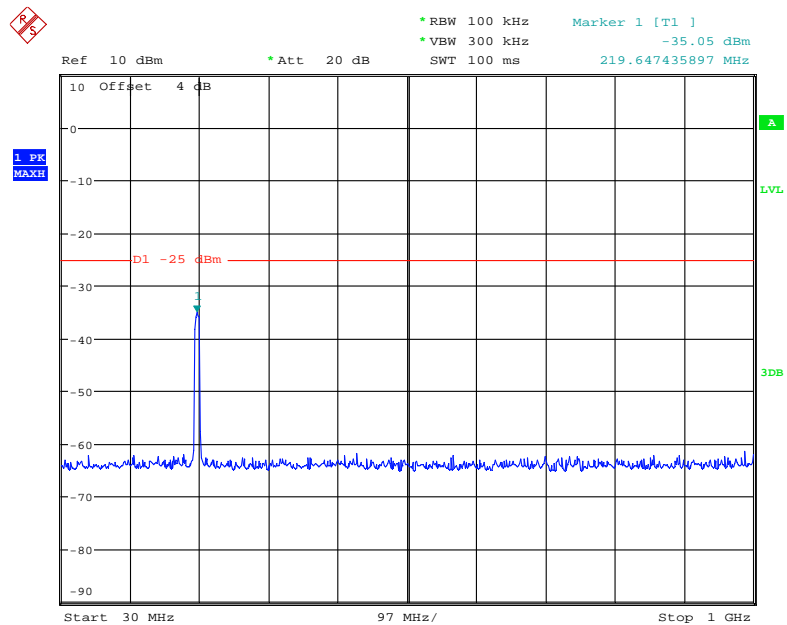
Date: 24.AUG.2017 23:24:05

### 3.0 GHz – 26 GHz (5.0 MHz, Middle Channel)



Date: 24.AUG.2017 23:26:26

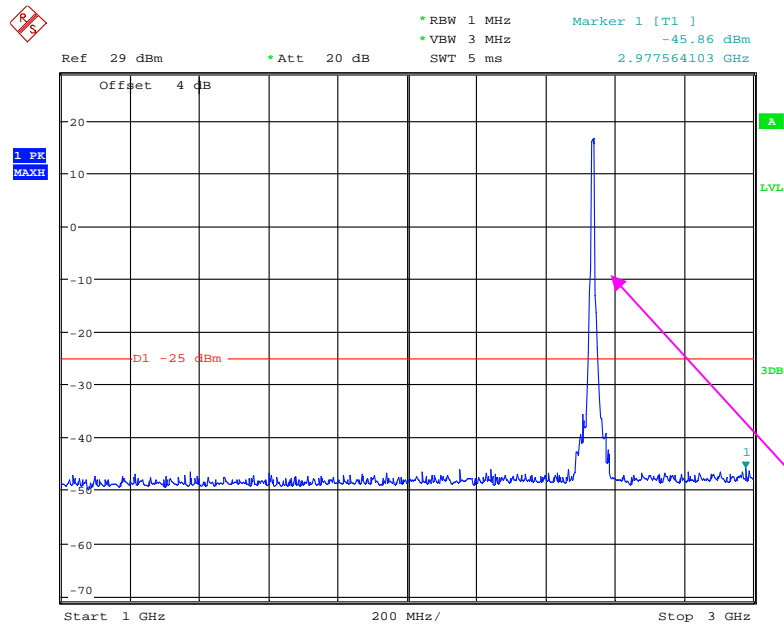
### 30 MHz – 1.0 GHz (10.0 MHz, Middle Channel)



Date: 24.AUG.2017 23:30:52

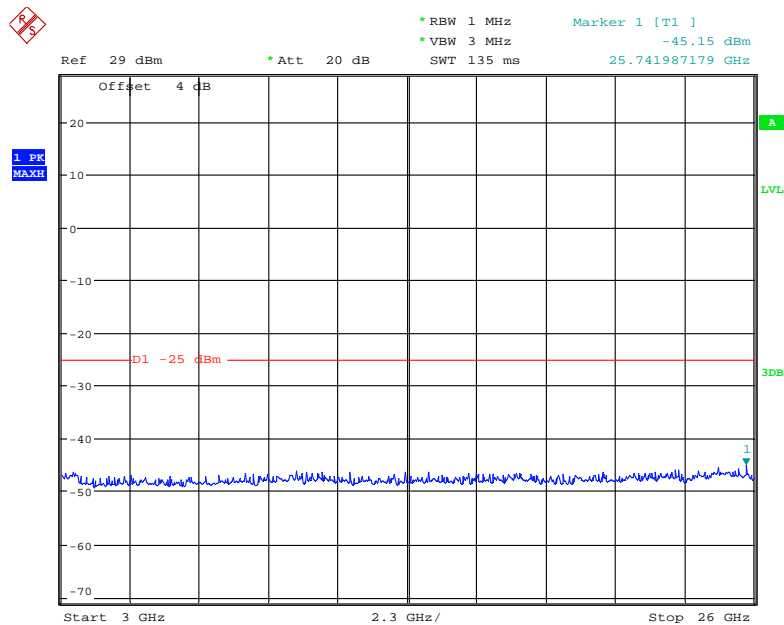


### 1 GHz – 3 GHz (10.0 MHz, Middle Channel)



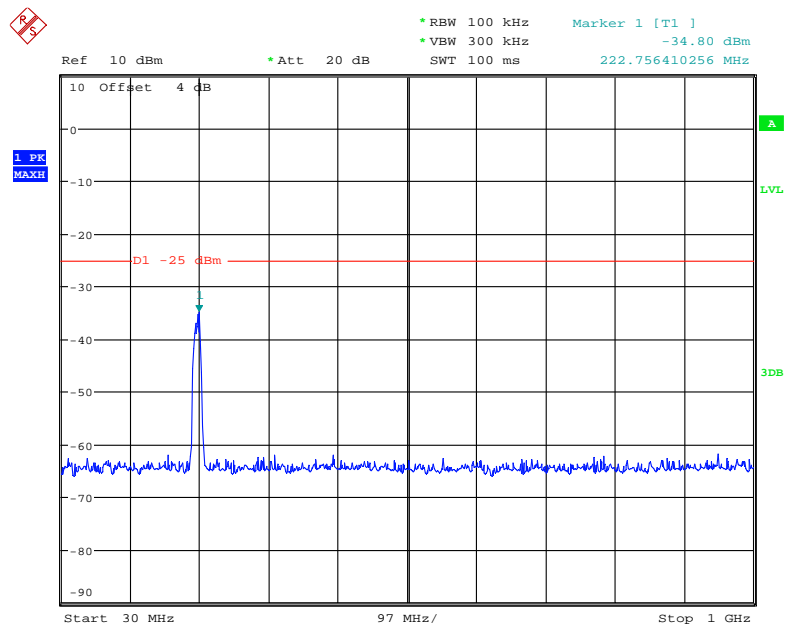
Date: 24.AUG.2017 23:23:42

### 3 GHz – 26 GHz (10.0 MHz, Middle Channel)



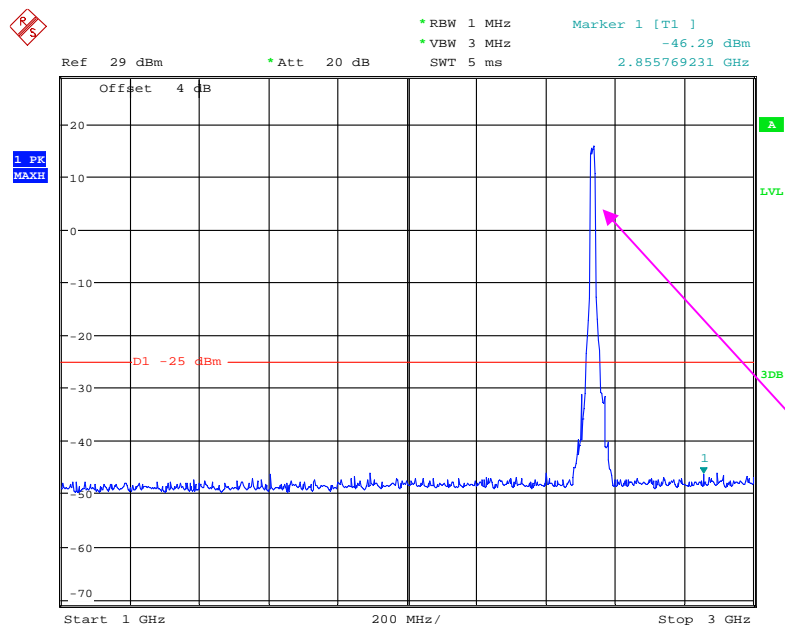
Date: 24.AUG.2017 23:26:04

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



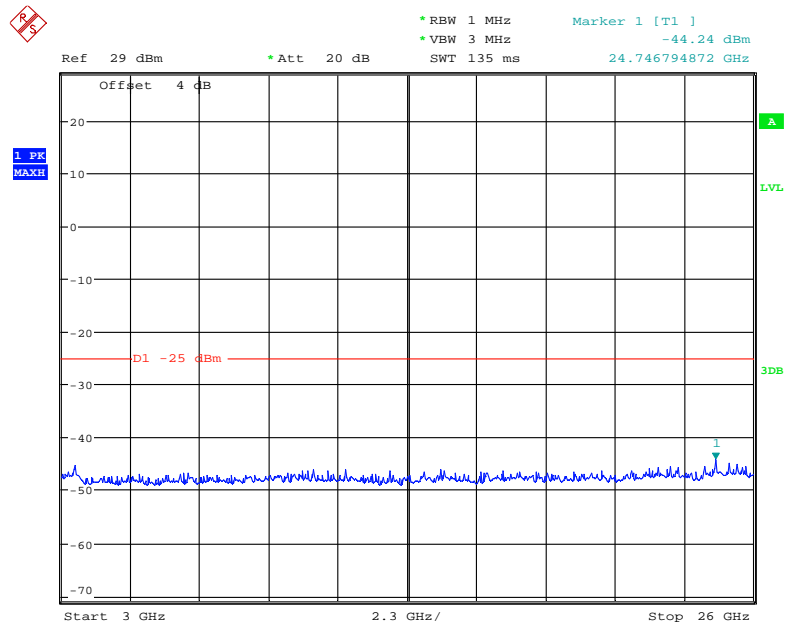
Date: 24.AUG.2017 23:19:15

### 1 GHz – 3 GHz (15.0 MHz, Middle Channel)



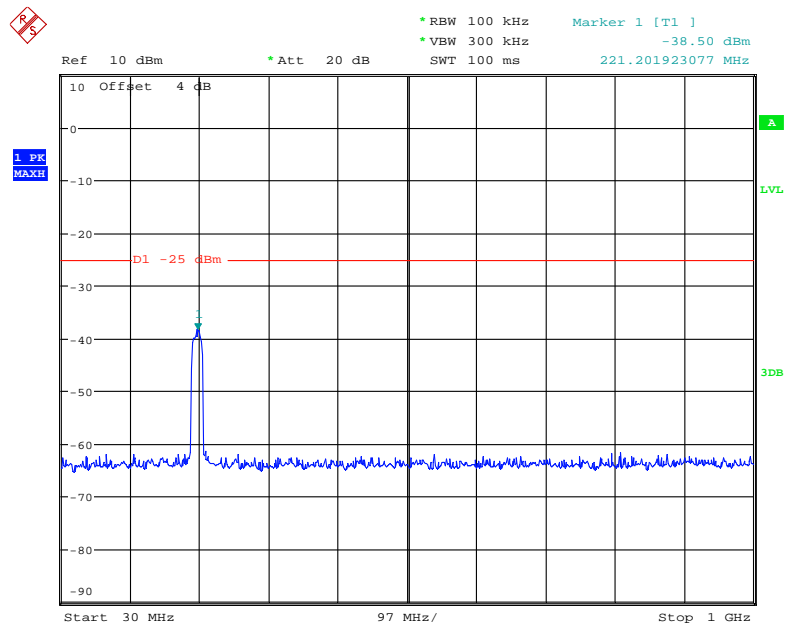
Date: 24.AUG.2017 23:23:22

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



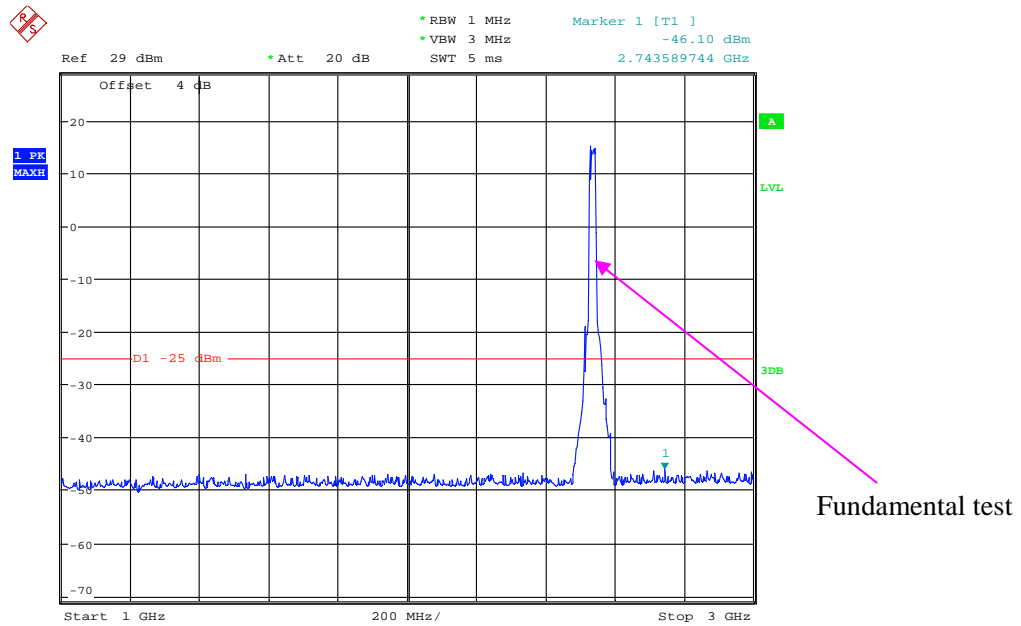
Date: 24.AUG.2017 23:25:48

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



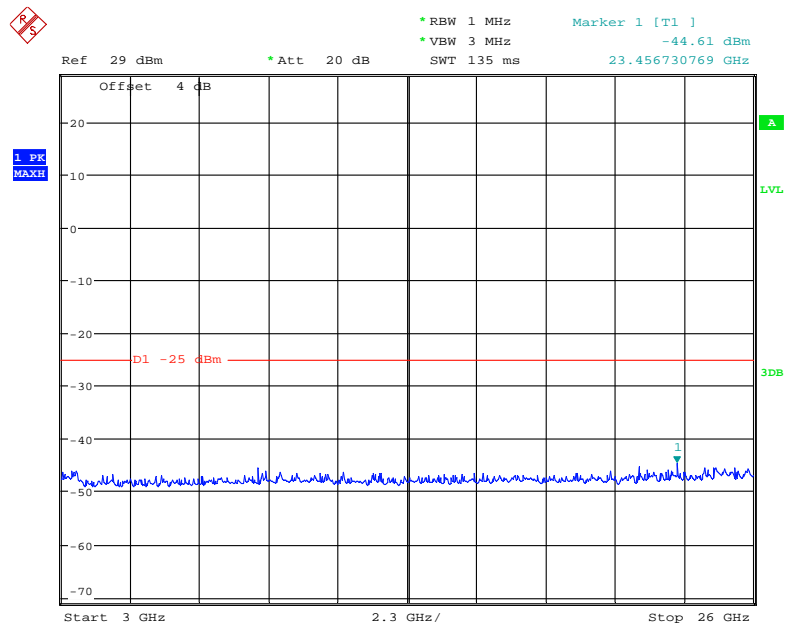
Date: 24.AUG.2017 23:18:26

### 1 GHz – 3 GHz (20.0 MHz, Middle Channel)



Date: 24.AUG.2017 23:23:05

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



Date: 24.AUG.2017 23:25:15

## 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)

### 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 =  $43 + 10 \lg_{10} (\text{power out in Watts})$  or,

Spurious attenuation limit in dB =  $55 + 10 \lg_{10} (\text{power out in Watts})$

### Test Data

#### Environmental Conditions

Temperature:	26 °C
Relative Humidity:	56 %
ATM Pressure:	101.0 kPa

The testing was performed by Xiangguang Kong on 2017-08-19.

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)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
GSM 850 Mode										
327.19	33.21	295	1.3	H	-63.8	0.38	0	-64.18	-13	51.18
327.19	33.42	355	1.4	V	-63.6	0.38	0	-63.98	-13	50.98
1673.20	54.66	151	2.2	H	-52.4	1.30	9.10	-44.60	-13	31.60
1673.20	51.67	20	1.2	V	-54.8	1.30	9.10	-47.00	-13	34.00
2509.80	60.45	250	1.5	H	-43.1	2.60	9.30	-36.40	-13	23.40
2509.80	59.64	253	1.6	V	-43.3	2.60	9.30	-36.60	-13	23.60
3346.40	50.77	321	1.0	H	-49.6	1.50	9.60	-41.50	-13	28.50
3346.40	50.12	23	1.4	V	-50.3	1.50	9.60	-42.20	-13	29.20
WCDMA 850 Mode										
327.19	33.03	218	1.7	H	-64.0	0.38	0	-64.38	-13	51.38
327.19	32.72	312	1.4	V	-64.3	0.38	0	-64.68	-13	51.68
1673.20	50.75	351	1.3	H	-56.3	1.30	9.10	-48.50	-13	35.50
1673.20	47.11	30	1.7	V	-59.4	1.30	9.10	-51.60	-13	38.60
2509.80	59.48	117	2.4	H	-44.0	2.60	9.30	-37.30	-13	24.30
2509.80	55.86	158	2.2	V	-47.1	2.60	9.30	-40.40	-13	27.40
3346.40	47.75	18	1.6	H	-52.6	1.50	9.60	-44.50	-13	31.50
3346.40	49.31	147	1.8	V	-51.1	1.50	9.60	-43.00	-13	30.00

**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)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
GSM 1900 Mode										
327.19	33.53	288	1.3	H	-63.5	0.38	0	-63.88	-13	50.88
327.19	33.85	14	2.3	V	-63.1	0.38	0	-63.48	-13	50.48
3760.00	48.25	352	1.3	H	-53.0	1.50	9.70	-44.80	-13	31.80
3760.00	46.36	112	2.0	V	-54.4	1.50	9.70	-46.20	-13	33.20
WCDMA 1900 Mode										
327.19	33.34	340	2.4	H	-63.7	0.38	0	-64.08	-13	51.08
327.19	32.71	93	1.7	V	-64.3	0.38	0	-64.68	-13	51.68
3760.00	45.98	181	1.3	H	-55.2	1.50	9.70	-47.00	-13	34.00
3760.00	45.35	85	1.3	V	-55.4	1.50	9.70	-47.20	-13	34.20

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

Frequency	Receiver	Turntable	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
(MHz)	Reading (dBμV)	Angle Degree	Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
<b>Band 4</b>										
<b>Test frequency range:30 MHz ~ 18 GHz</b>										
327.19	32.56	213	1.7	H	-64.4	0.38	0	-64.78	-13	51.78
327.19	33.27	329	2.3	V	-63.7	0.38	0	-64.08	-13	51.08
3465.00	48.46	304	1.7	H	-51.9	1.50	9.70	-43.70	-13	30.70
3465.00	45.94	86	1.6	V	-55.2	1.50	9.70	-47.00	-13	34.00
5197.50	50.97	90	1.3	H	-47.7	1.60	11.20	-38.10	-13	25.10
5197.50	48.84	318	1.5	V	-49.3	1.60	11.20	-39.70	-13	26.70
<b>Band 5</b>										
<b>Test frequency range:30 MHz ~ 10 GHz</b>										
327.19	32.85	261	1.1	H	-64.1	0.38	0	-64.48	-13	51.48
327.19	32.72	98	1.9	V	-64.3	0.38	0	-64.68	-13	51.68
1673.00	48.9	124	1.0	H	-58.2	1.30	9.10	-50.40	-13	37.40
1673.00	47.16	300	1.7	V	-59.3	1.30	9.10	-51.50	-13	38.50
2509.50	43.96	80	2.2	H	-59.6	2.60	9.30	-52.90	-13	39.90
2509.50	45.85	66	2.3	V	-57.1	2.60	9.30	-50.40	-13	37.40
3346.00	45.01	187	1.1	H	-55.3	1.50	9.60	-47.20	-13	34.20
3346.00	46.12	163	1.6	V	-54.3	1.50	9.60	-46.20	-13	33.20
<b>Band 7</b>										
<b>Test frequency range: 30 MHz ~ 26 GHz</b>										
327.19	32.09	251	2.0	H	-64.9	0.38	0	-65.28	-25	40.28
327.19	32.51	304	1.9	V	-64.5	0.38	0	-64.88	-25	39.88
5070.00	48.45	125	2.4	H	-49.4	1.60	11.20	-39.80	-25	14.80
5070.00	46.86	2	2.3	V	-51.0	1.60	11.20	-41.40	-25	16.40

**Note:**

1) Absolute Level = Substituted Level - Cable loss + Antenna Gain

2) Margin = Limit- Absolute Level



## 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.

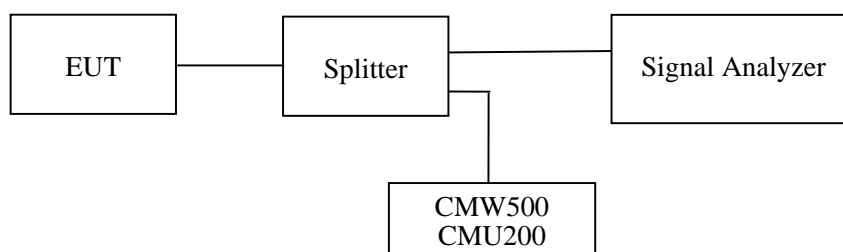
According to FCC § 27.53 (h)(m), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

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 Data

#### Environmental Conditions

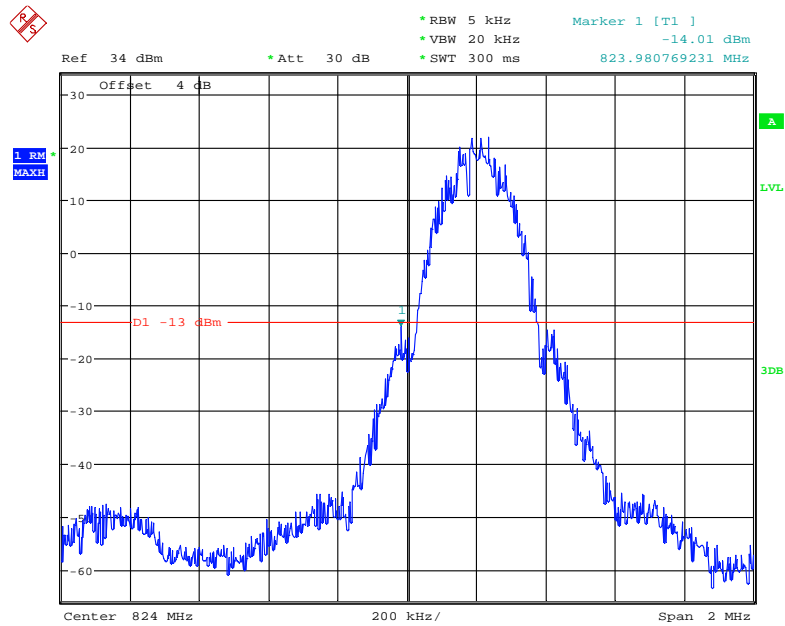
Temperature:	24~25 °C
Relative Humidity:	50~58 %
ATM Pressure:	100.9~101.0 kPa

The testing was performed by Xiangguang Kong from 2017-08-21 to 2017-09-04.

EUT operation mode: Transmitting

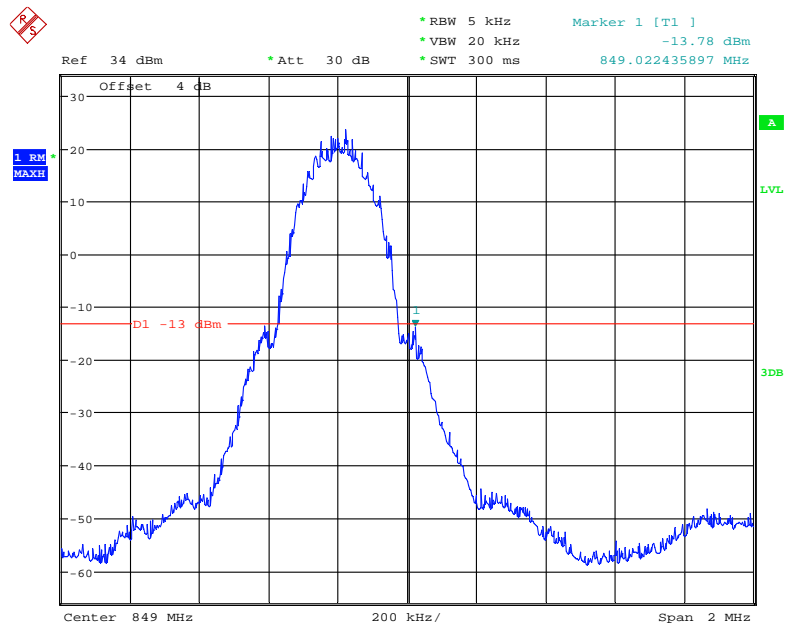
Test Result: Compliance. Please refer to the following plots.

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



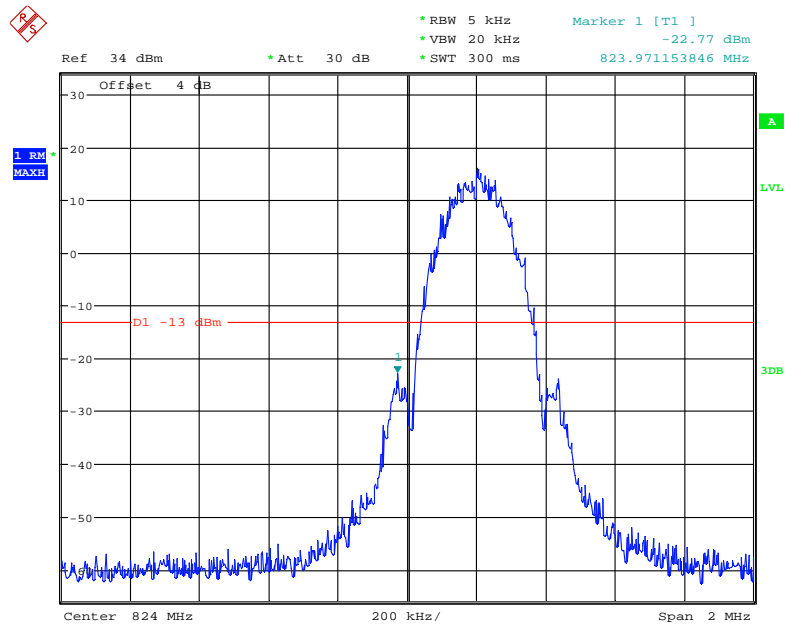
Date: 1.SEP.2017 23:40:00

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



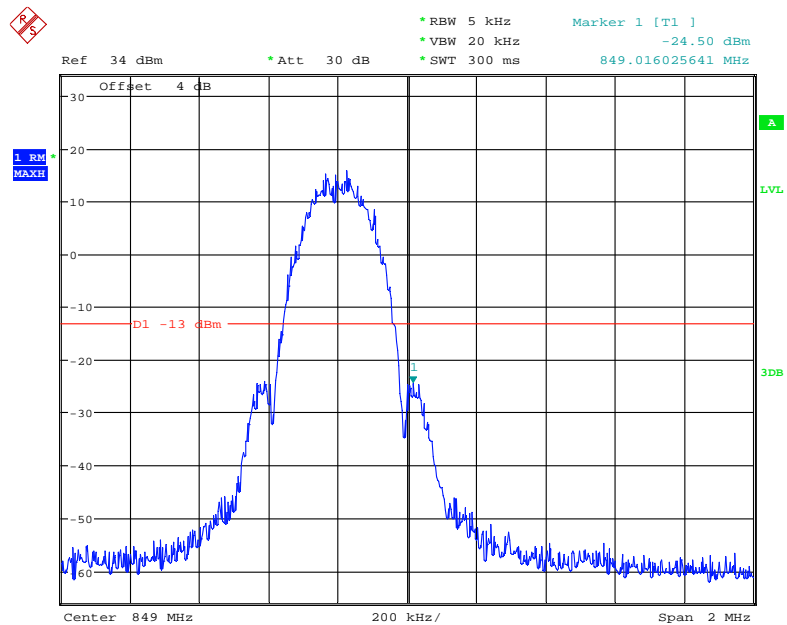
Date: 1.SEP.2017 23:39:14

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



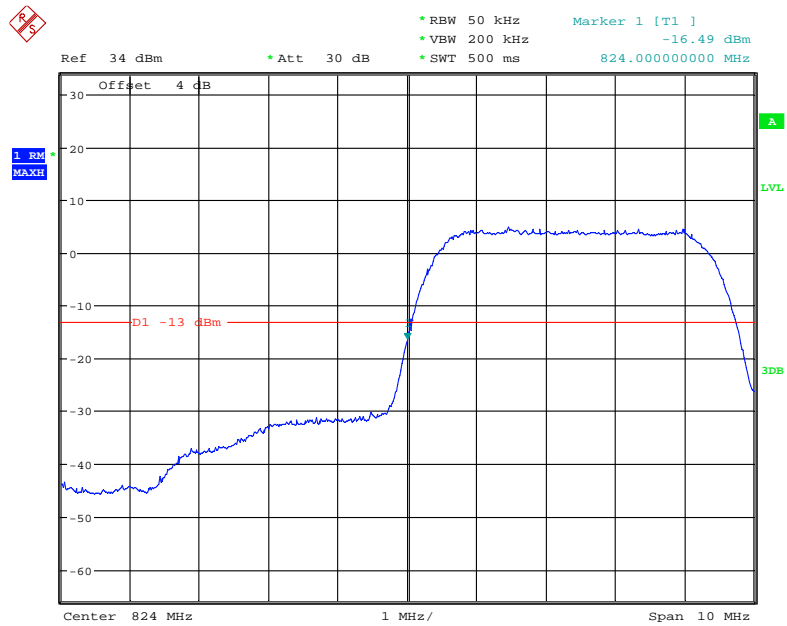
Date: 1.SEP.2017 23:25:10

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



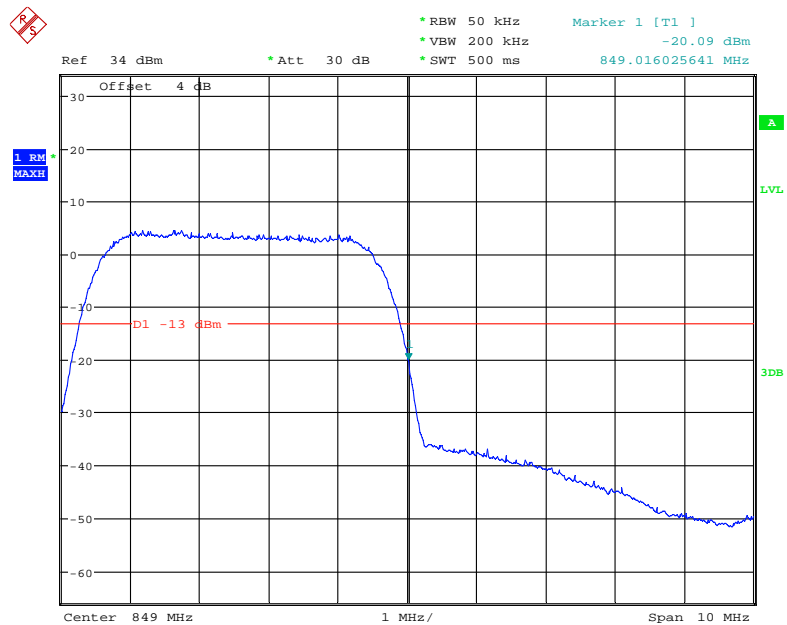
Date: 1.SEP.2017 23:25:56

### Cellular Band, Left Band Edge for RMC (BPSK) Mode



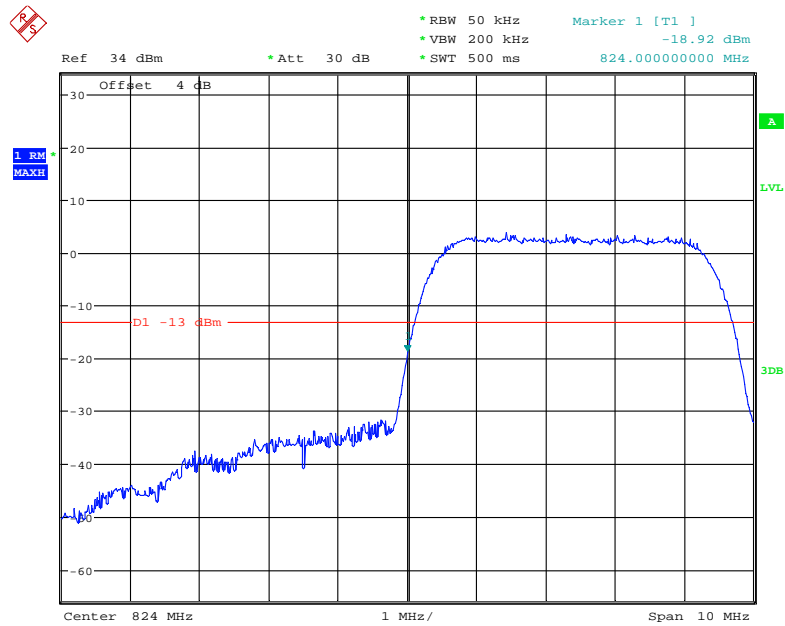
Date: 2.SEP.2017 00:16:24

### Cellular Band, Right Band Edge for RMC (BPSK) Mode



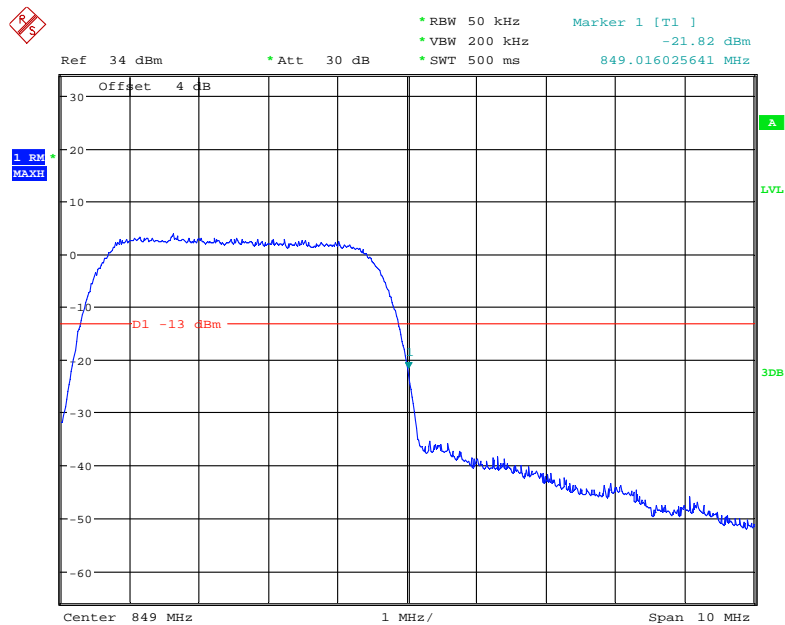
Date: 2.SEP.2017 00:16:50

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



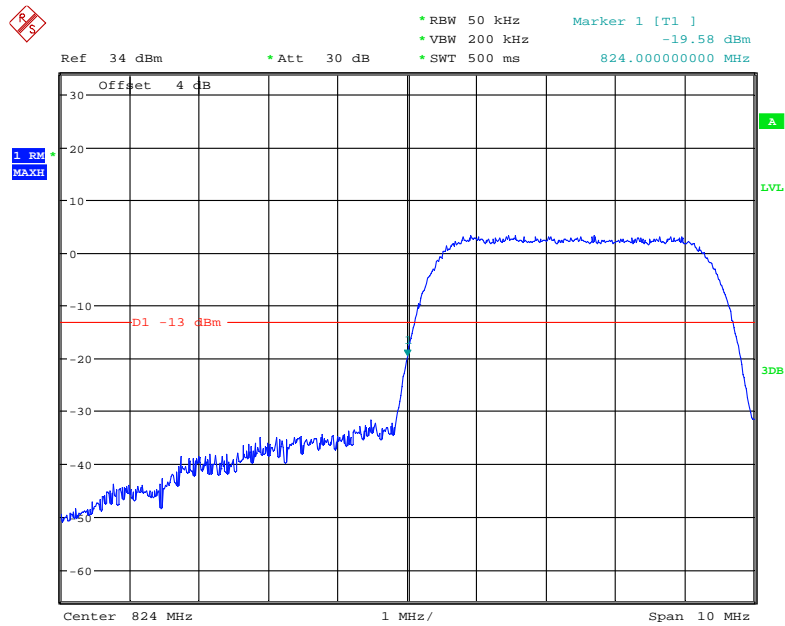
Date: 2.SEP.2017 00:17:41

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



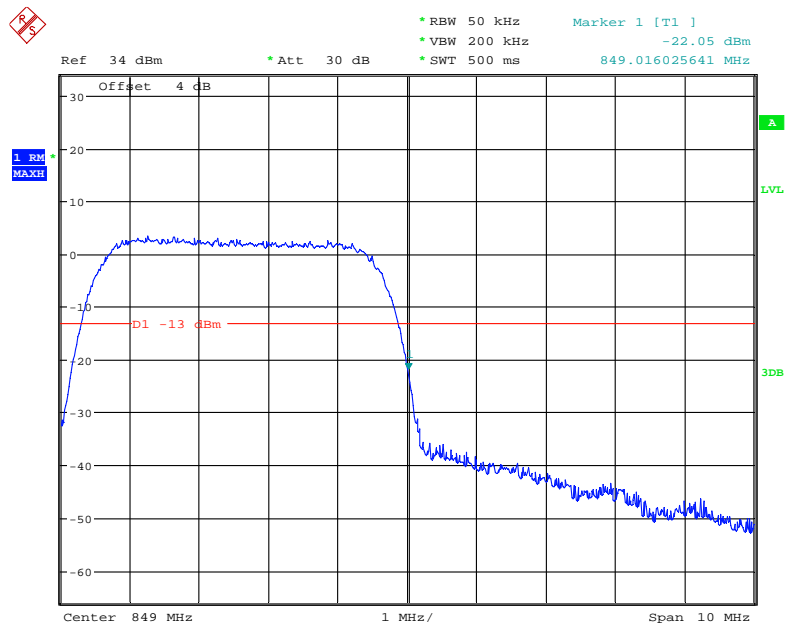
Date: 2.SEP.2017 00:17:16

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



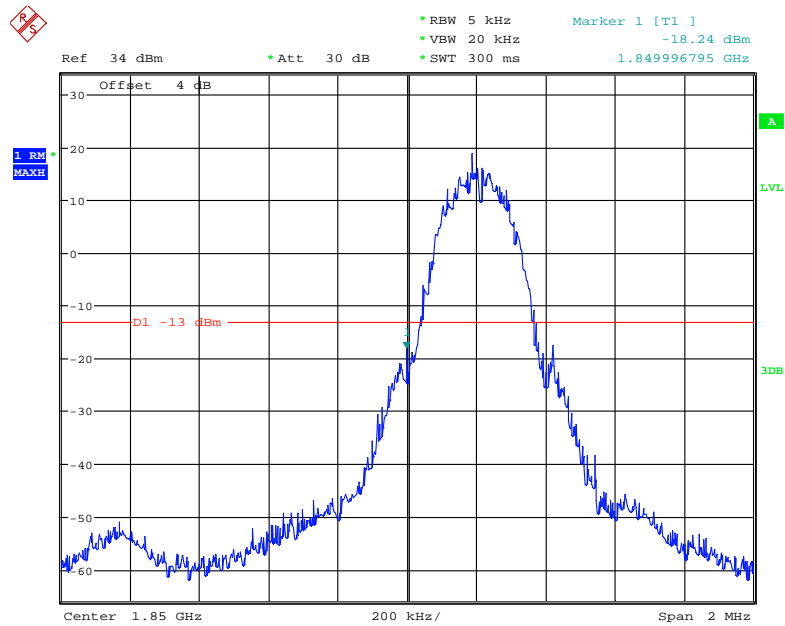
Date: 2.SEP.2017 00:18:09

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



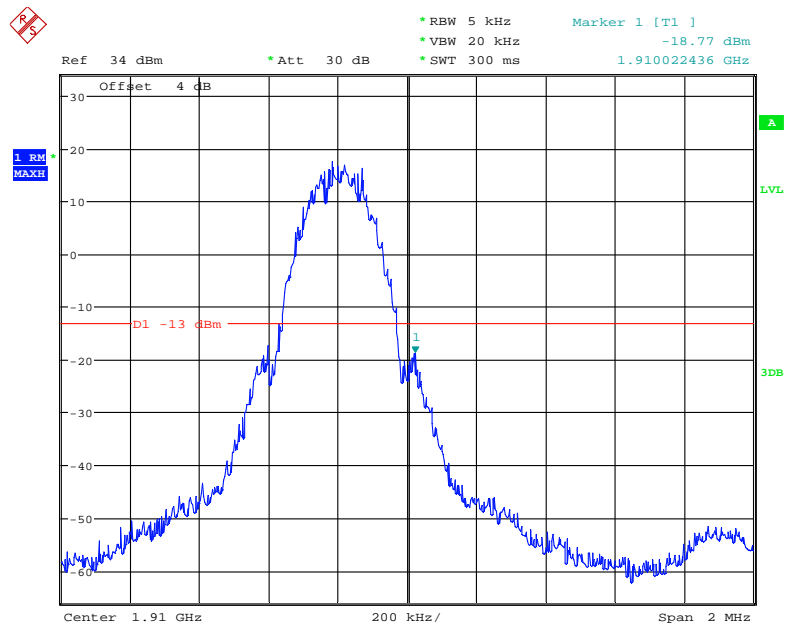
Date: 2.SEP.2017 00:18:31

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



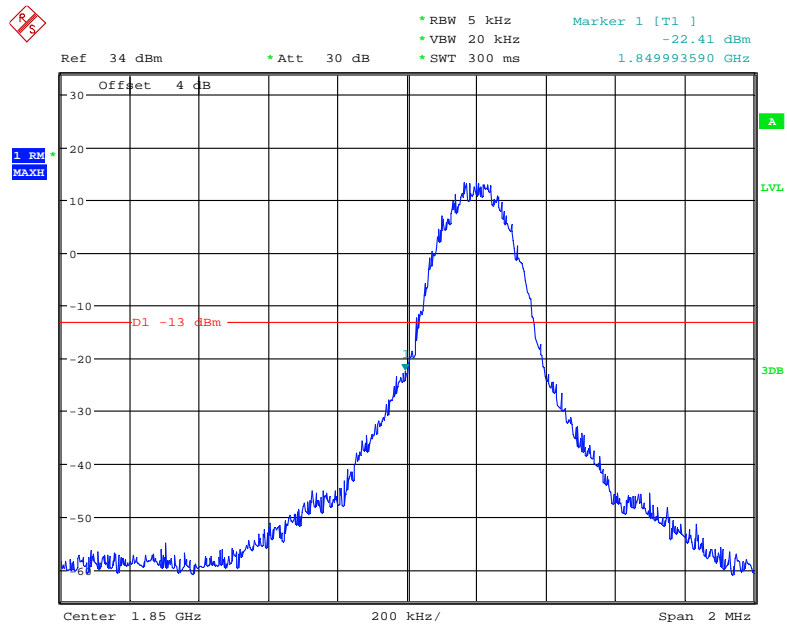
Date: 1.SEP.2017 23:17:12

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



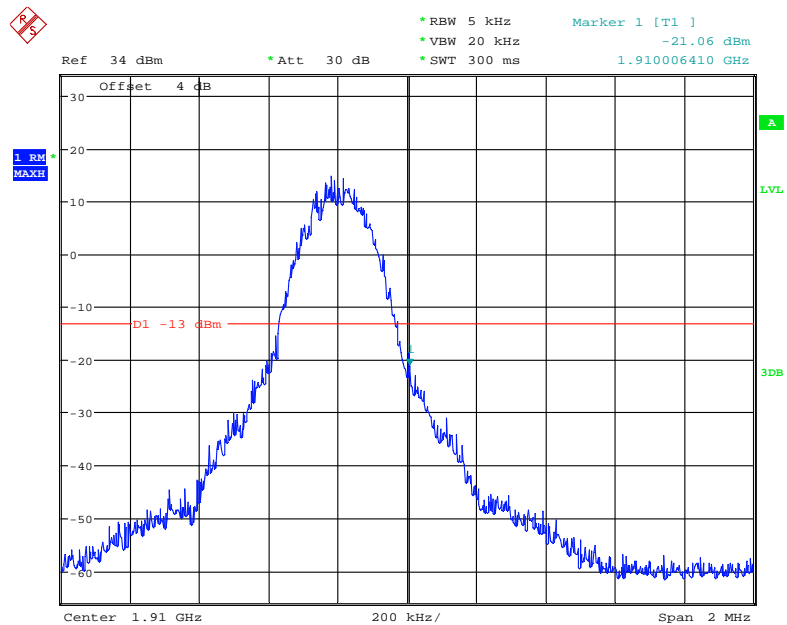
Date: 1.SEP.2017 23:16:51

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



Date: 1.SEP.2017 23:22:04

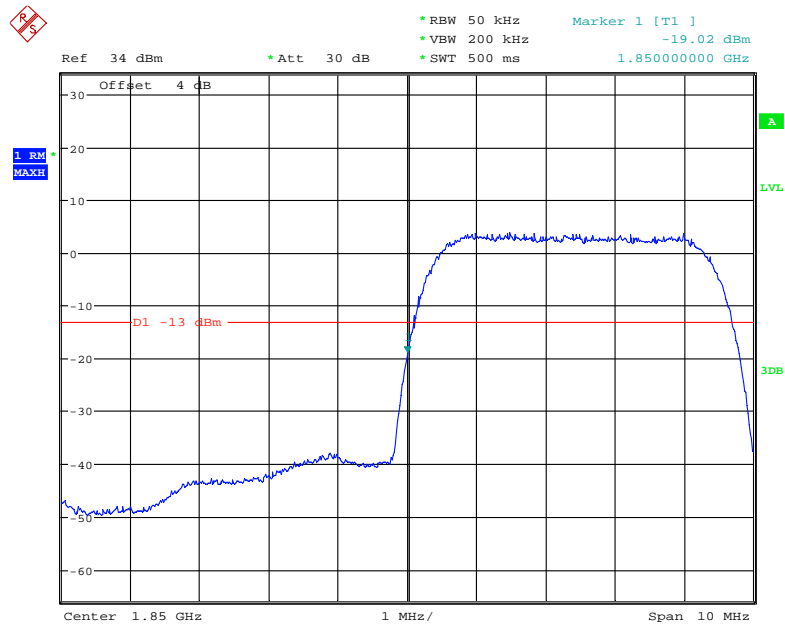
### PCS Band, Right Band Edge for EGPRS Mode



Date: 1.SEP.2017 23:22:43

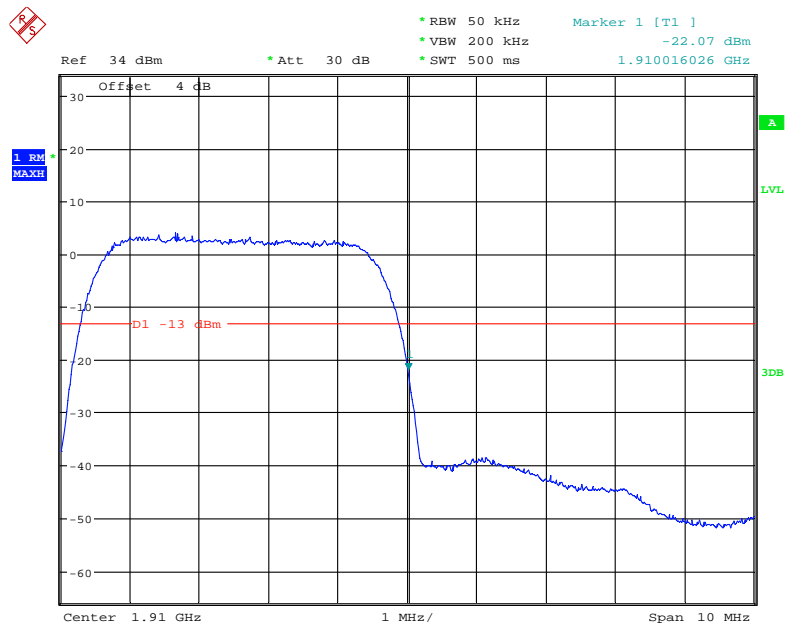


### PCS Band, Left Band Edge for RMC (BPSK) Mode



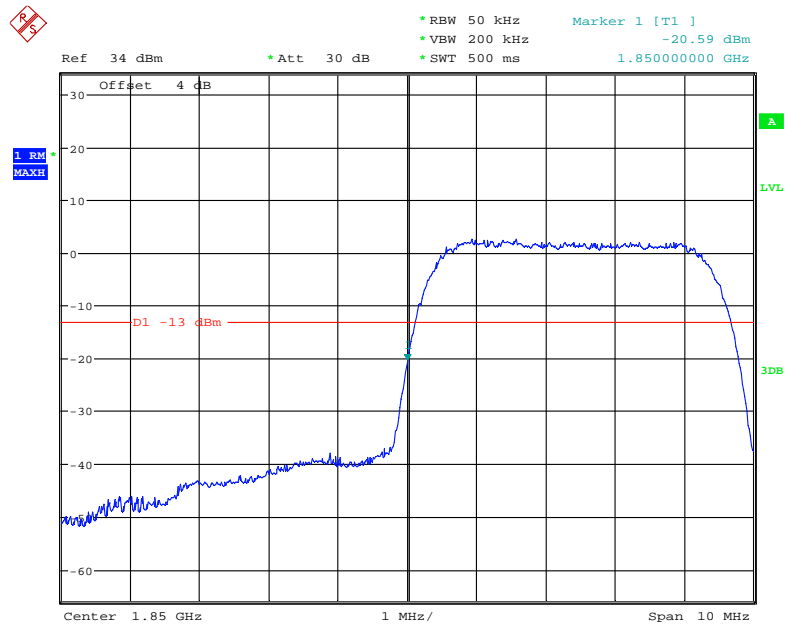
Date: 2.SEP.2017 00:19:15

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



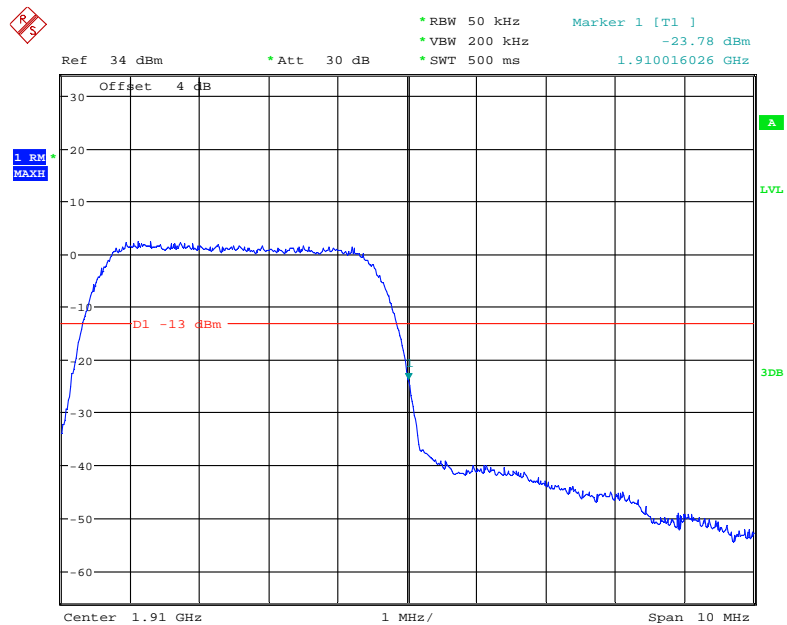
Date: 2.SEP.2017 00:19:47

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



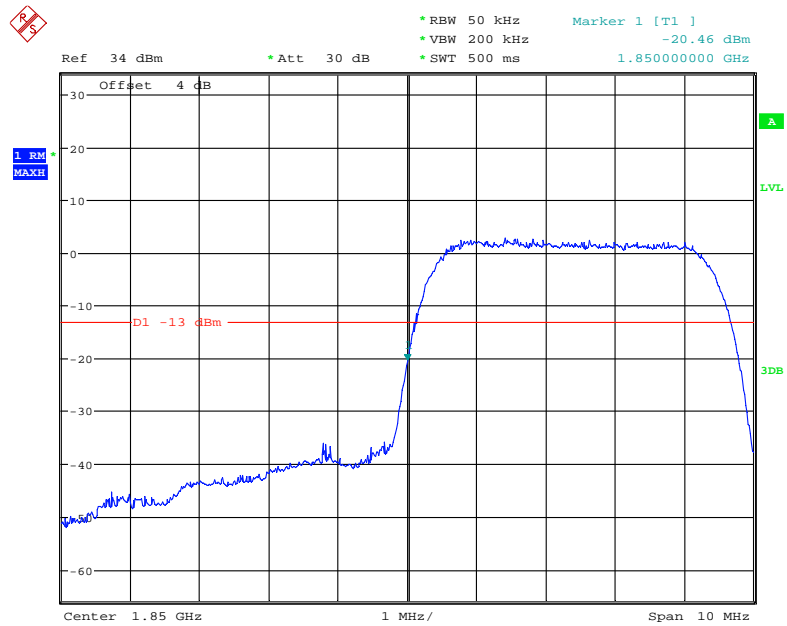
Date: 2.SEP.2017 00:21:26

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



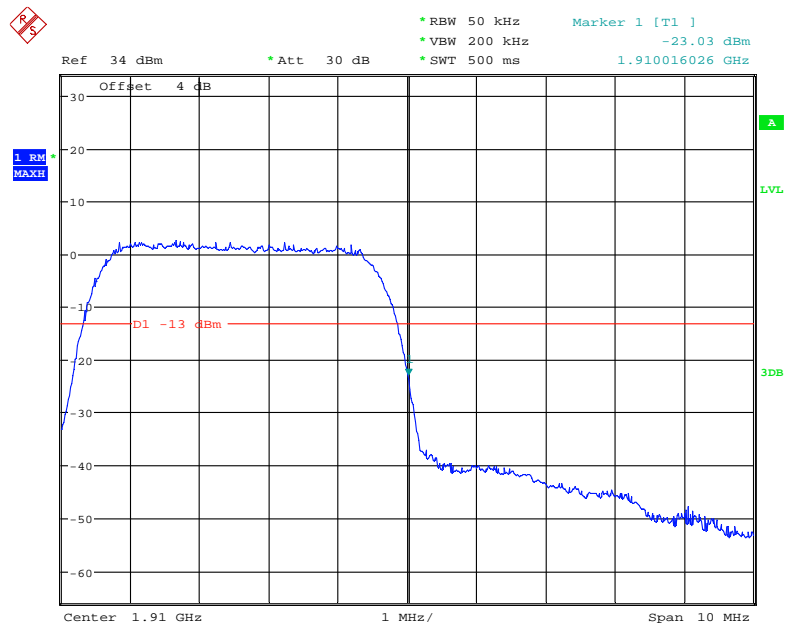
Date: 2.SEP.2017 00:21:44

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

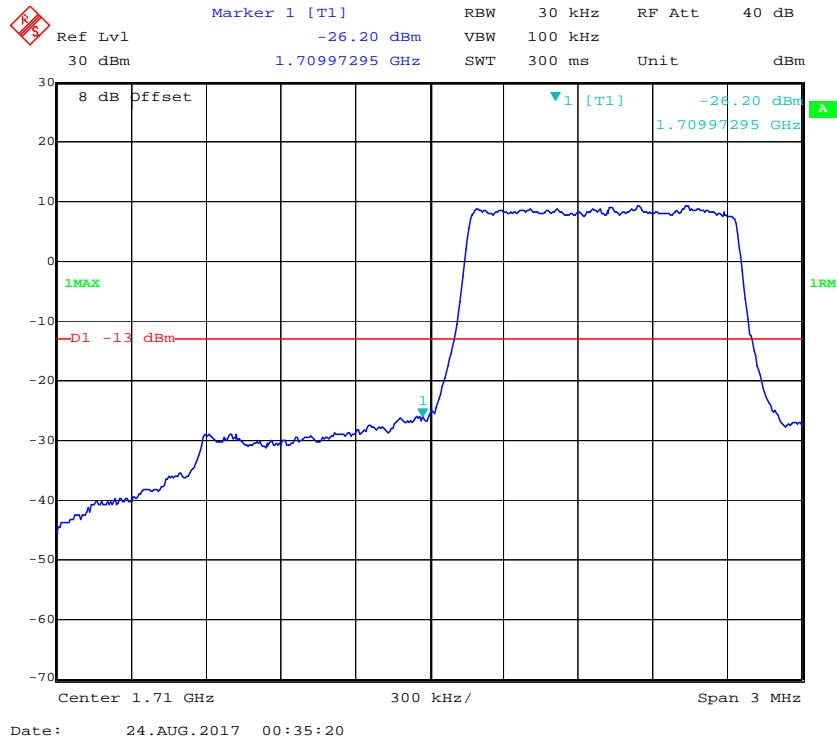
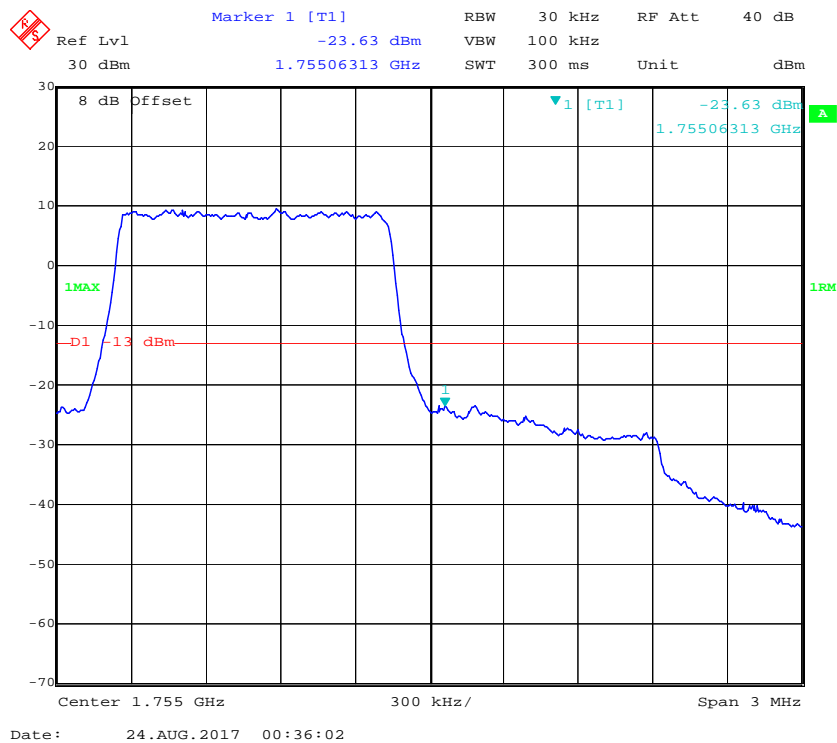


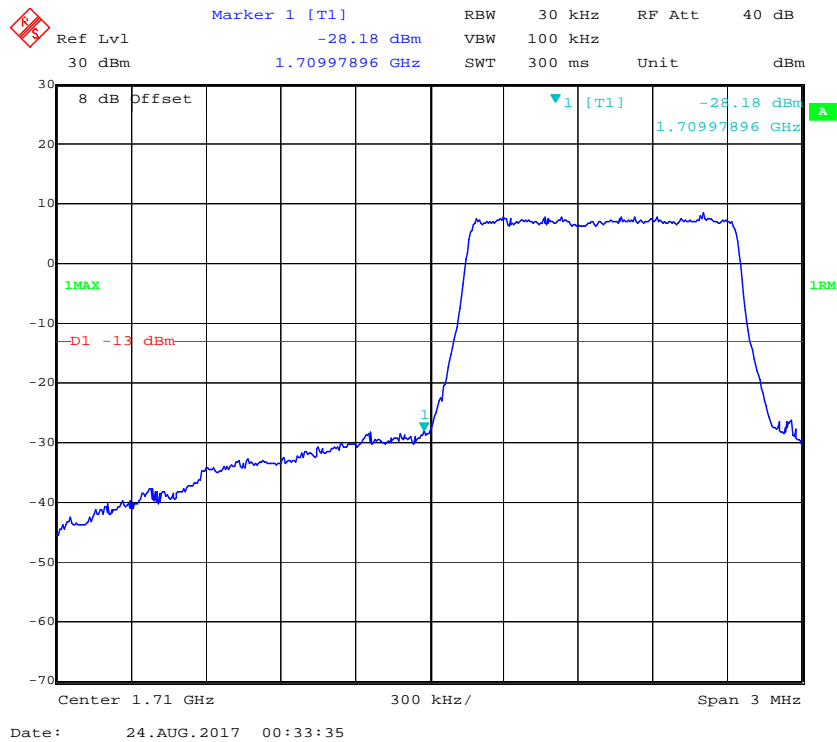
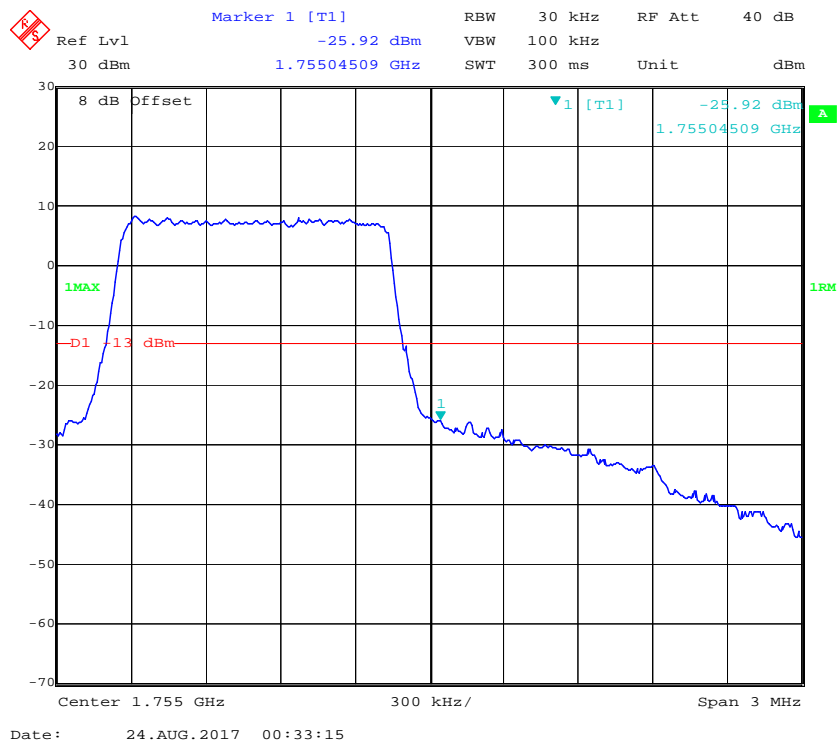
Date: 2.SEP.2017 00:21:00

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

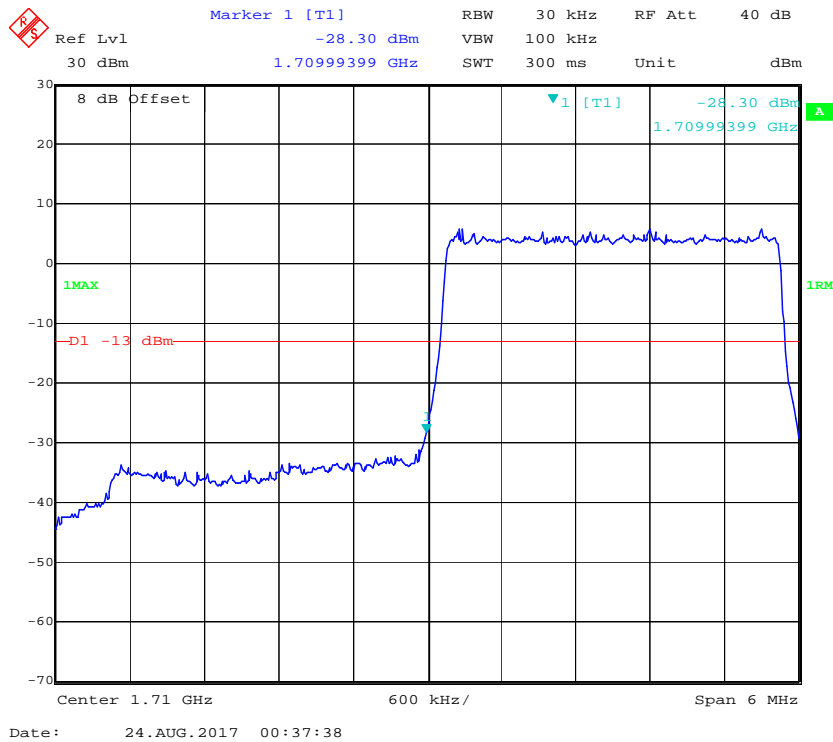


Date: 2.SEP.2017 00:20:34

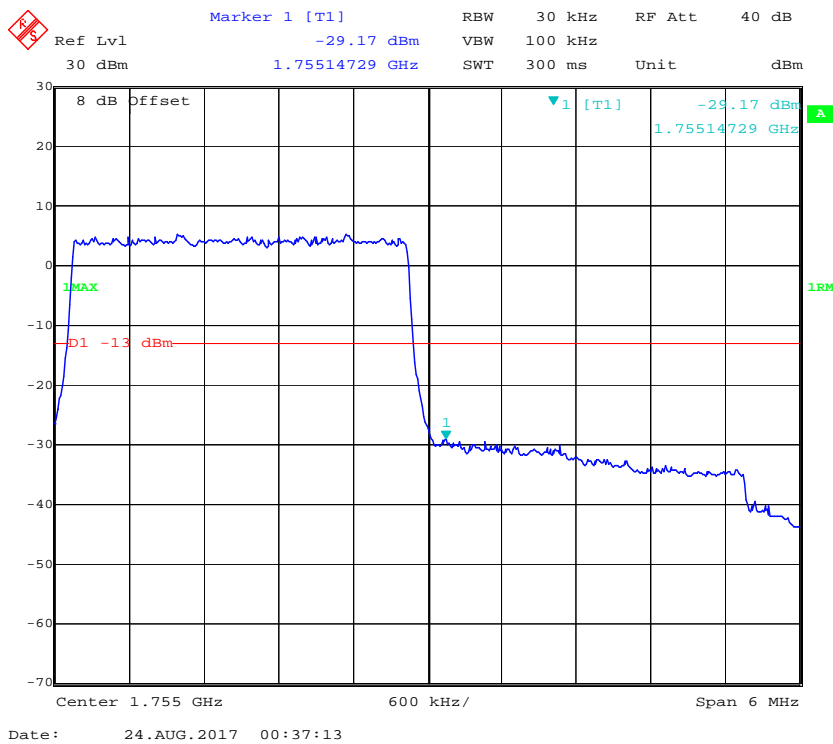
**Band 4:****QPSK (1.4 MHz, FULL RB) - Left Band Edge****QPSK (1.4 MHz, FULL RB) - Right Band Edge**

**16-QAM (1.4 MHz, FULL RB) - Left Band Edge****16-QAM (1.4 MHz, FULL RB) - Right Band Edge**

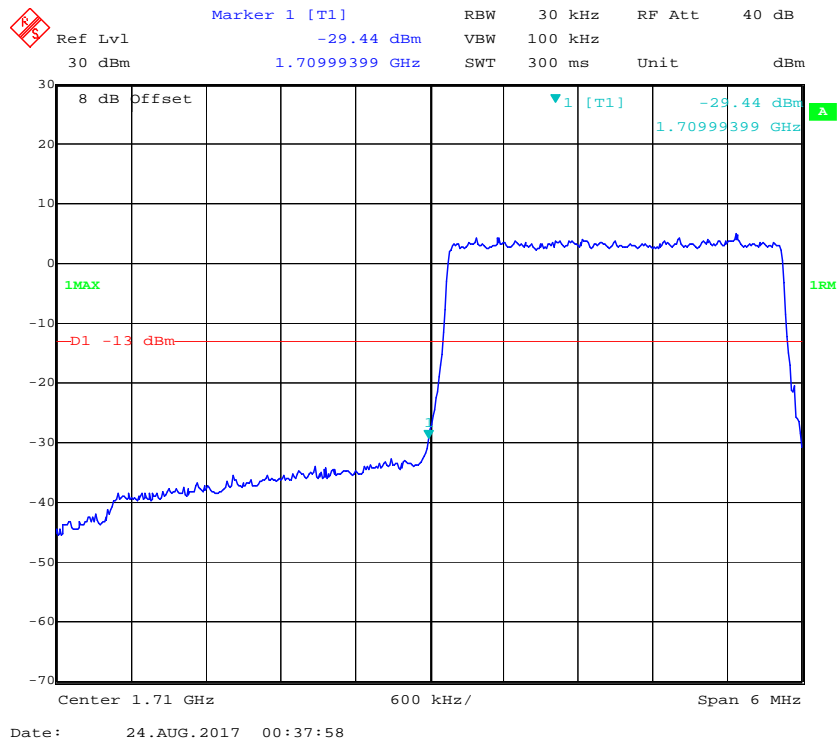
### QPSK (3.0 MHz, FULL RB) - Left Band Edge



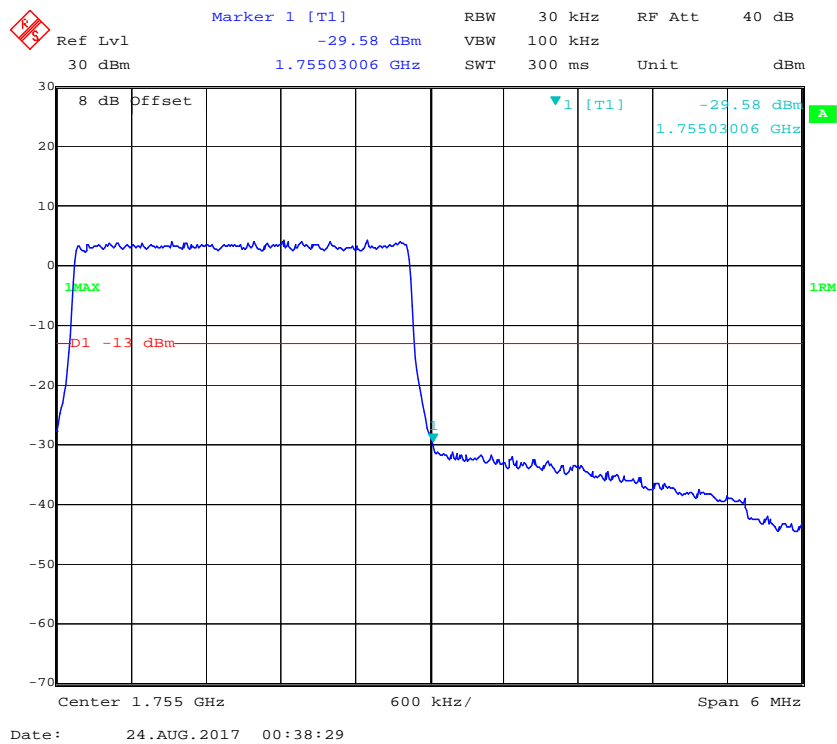
### QPSK (3.0 MHz, FULL RB) - Right Band Edge



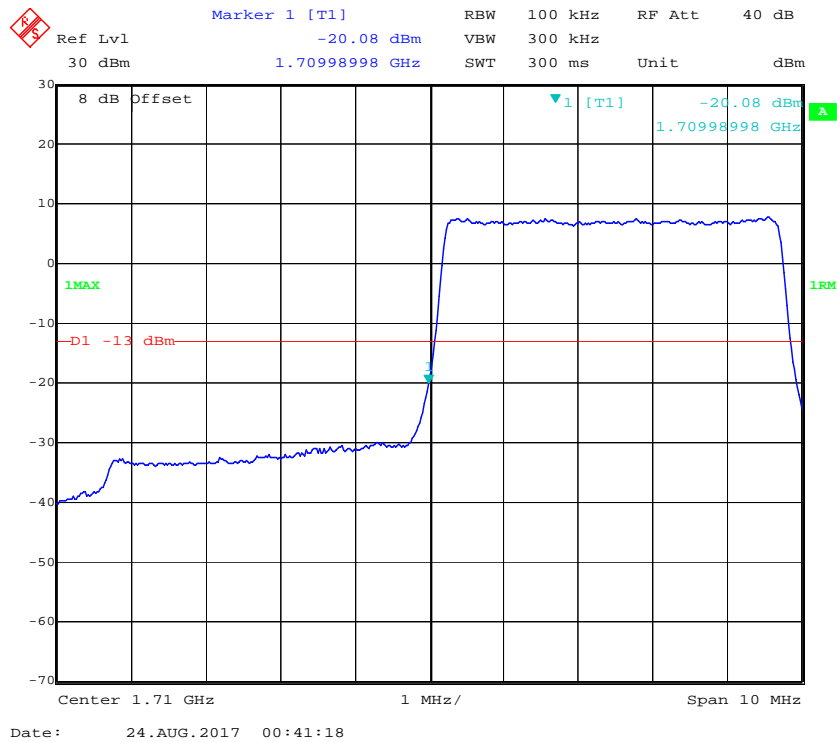
### 16-QAM (3.0 MHz, FULL RB) - Left Band Edge



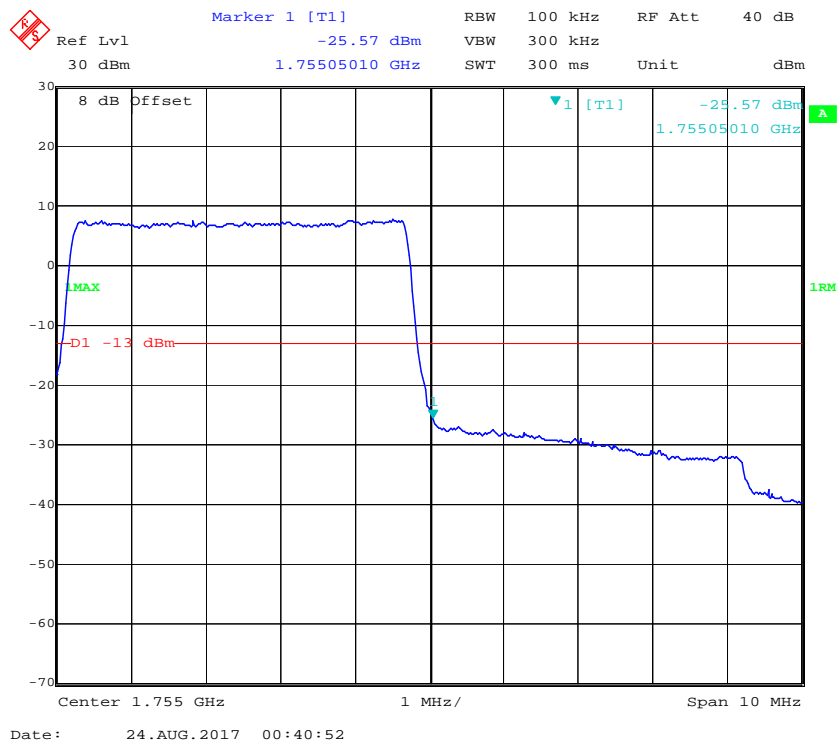
### 16-QAM (3.0 MHz, FULL RB) - Right Band Edge



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

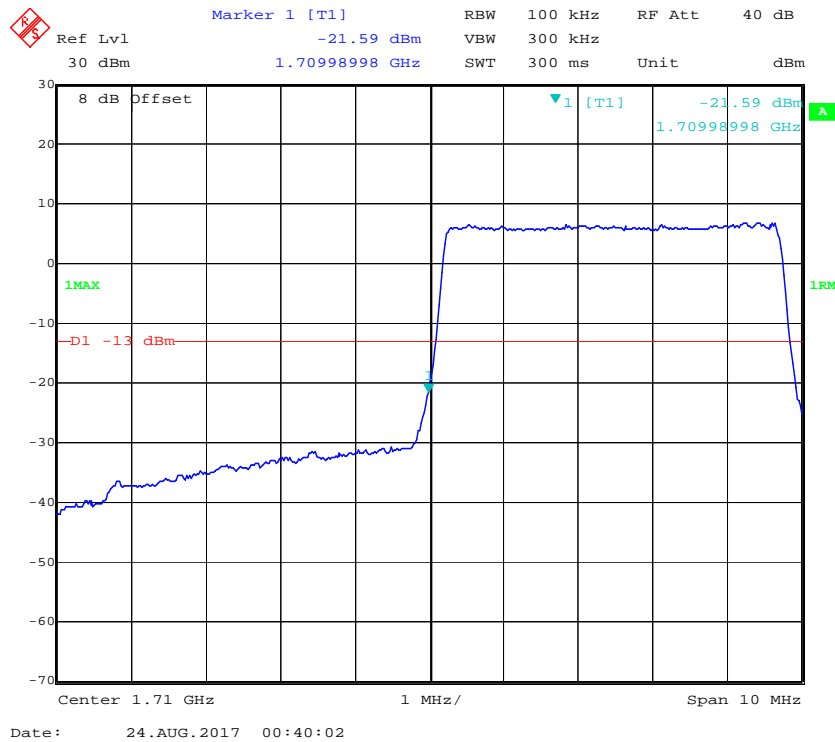


### QPSK (5.0 MHz, FULL RB) - Right Band Edge

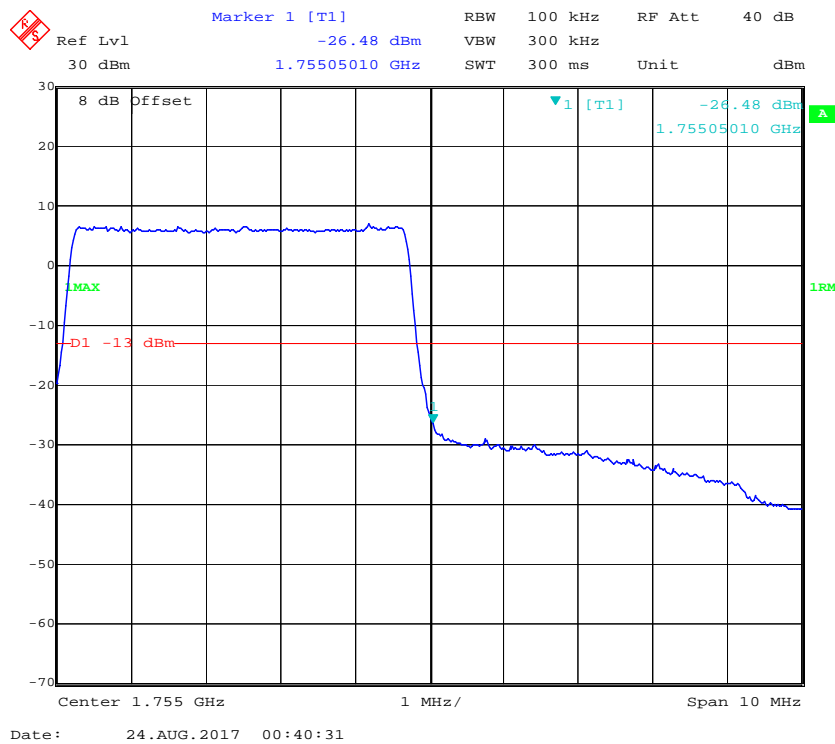




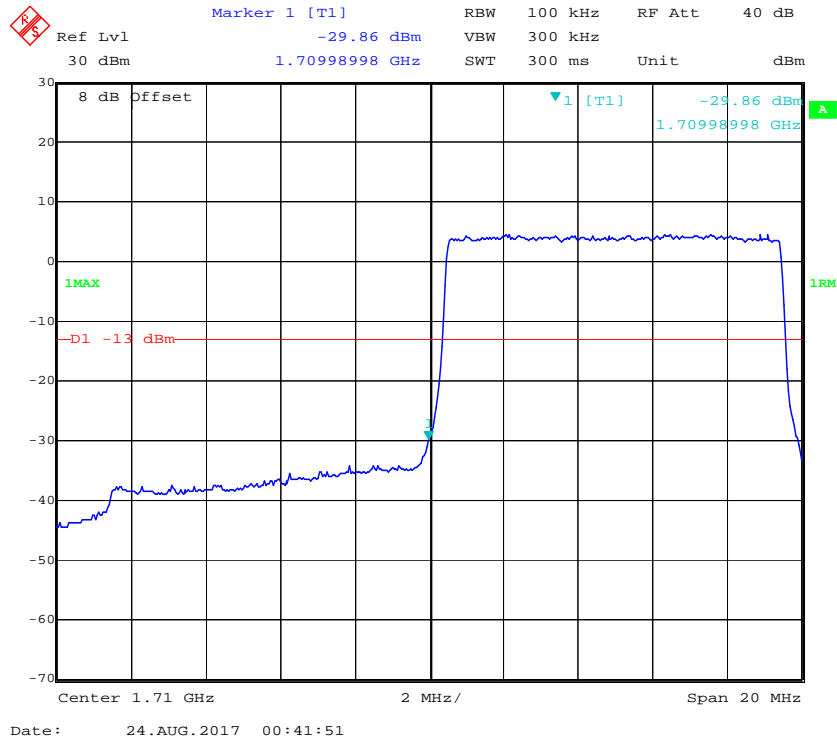
### 16-QAM (5.0 MHz, FULL RB) - Left Band Edge



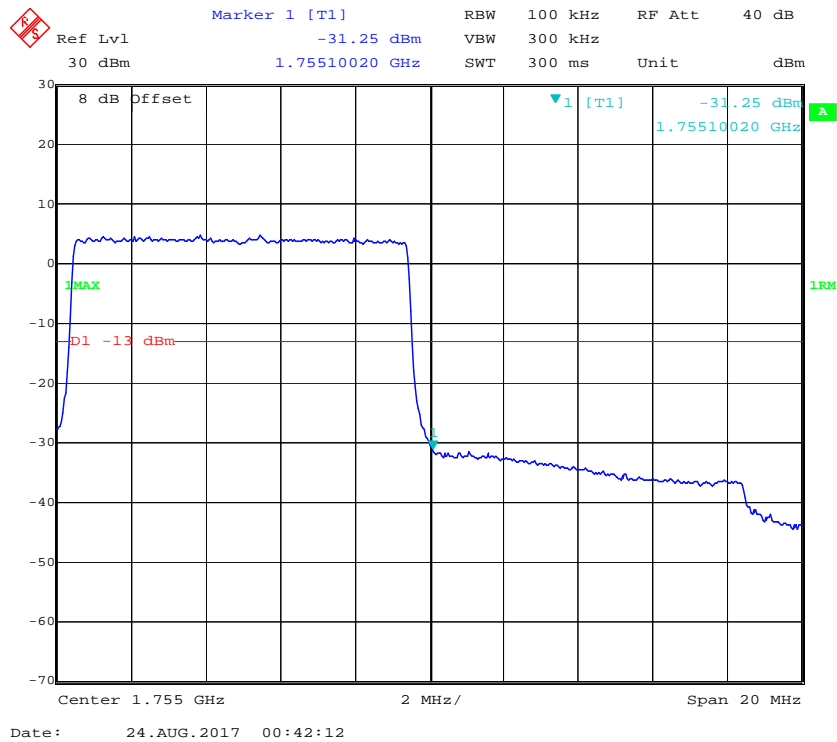
### 16-QAM (5.0 MHz, FULL RB) - Right Band Edge



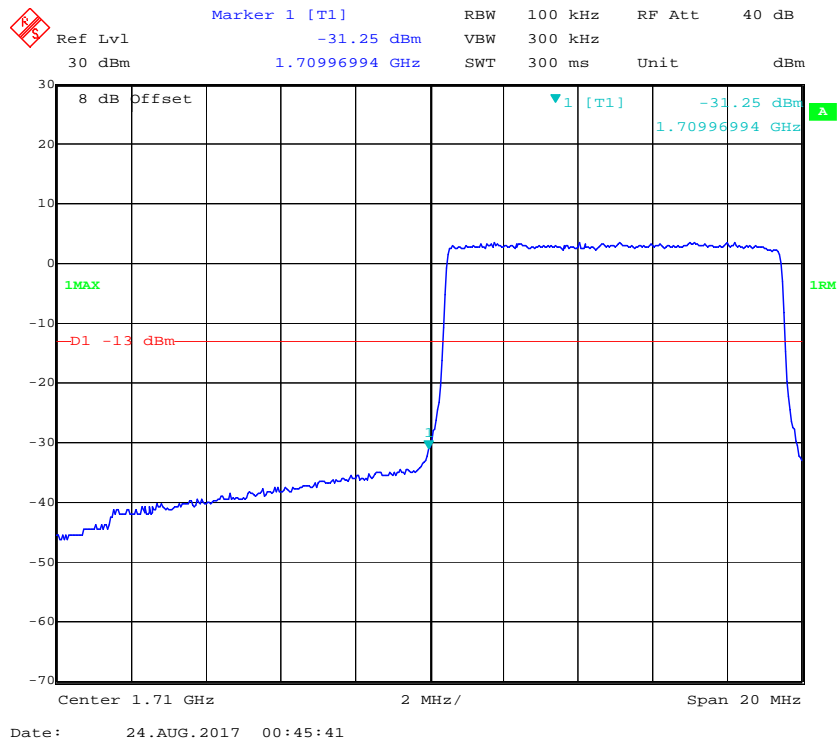
### QPSK (10.0 MHz, FULL RB) - Left Band Edge



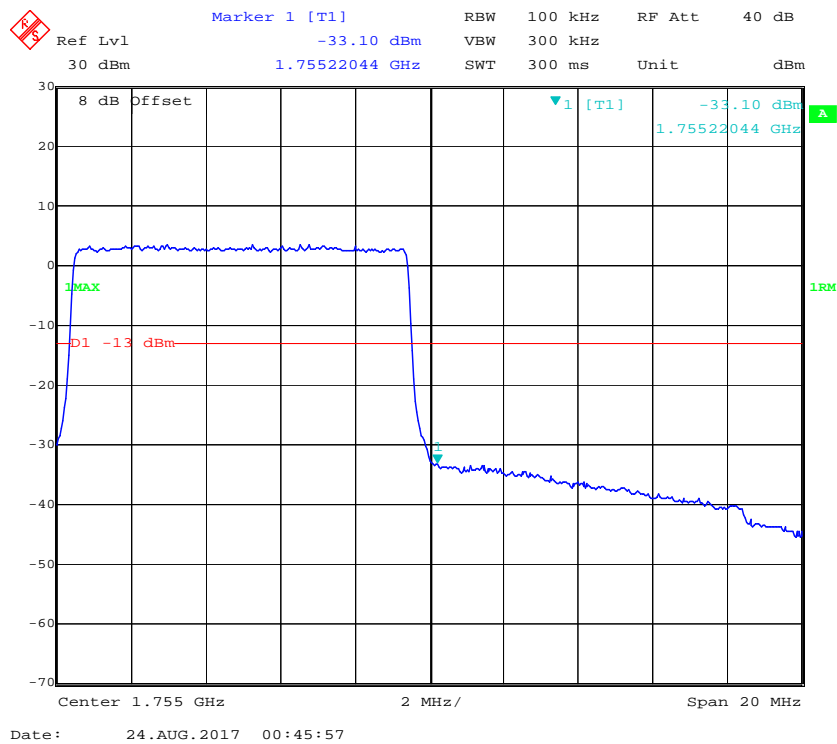
### QPSK (10.0 MHz, FULL RB) - Right Band Edge



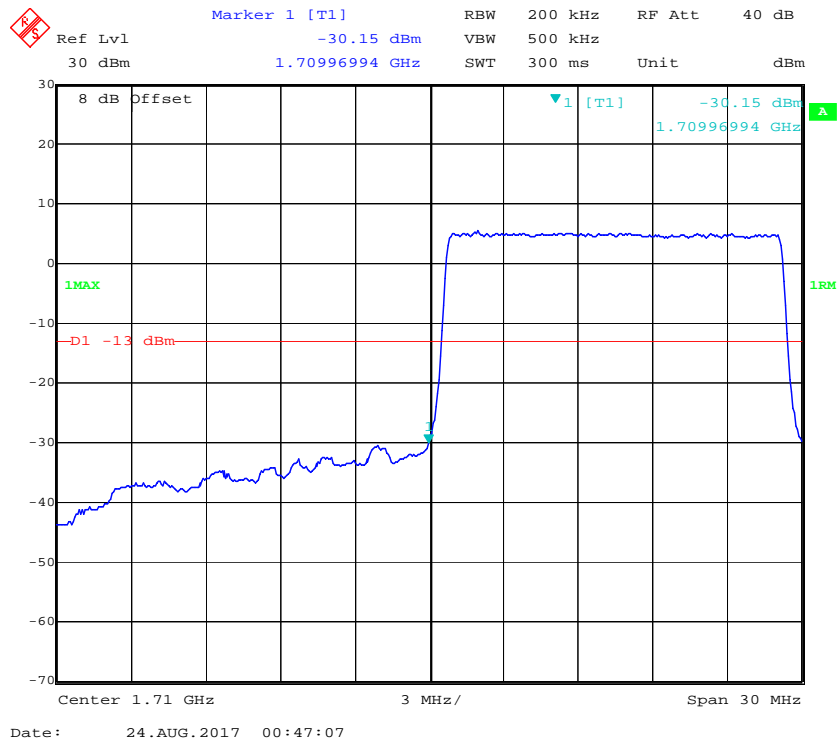
### 16-QAM (10.0 MHz, FULL RB) - Left Band Edge



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



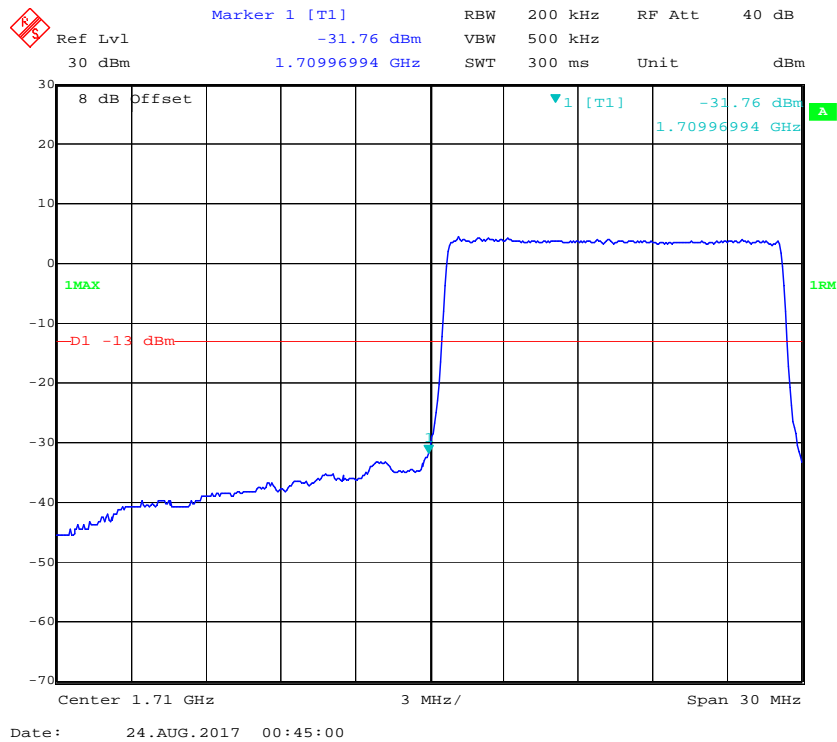
### QPSK (15.0 MHz, FULL RB) - Left Band Edge



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



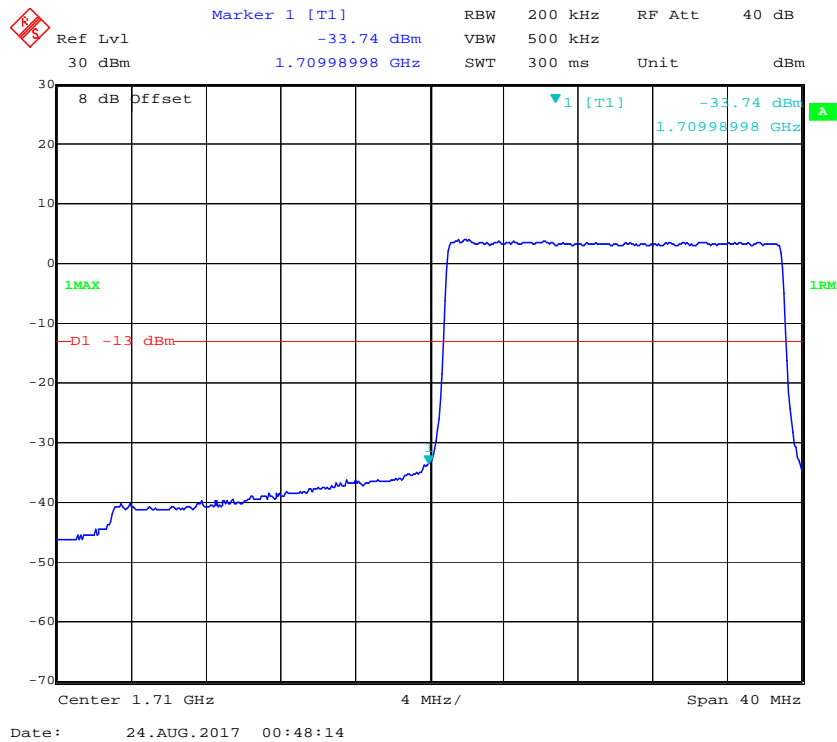
### 16-QAM (15.0 MHz, FULL RB) - Left Band Edge



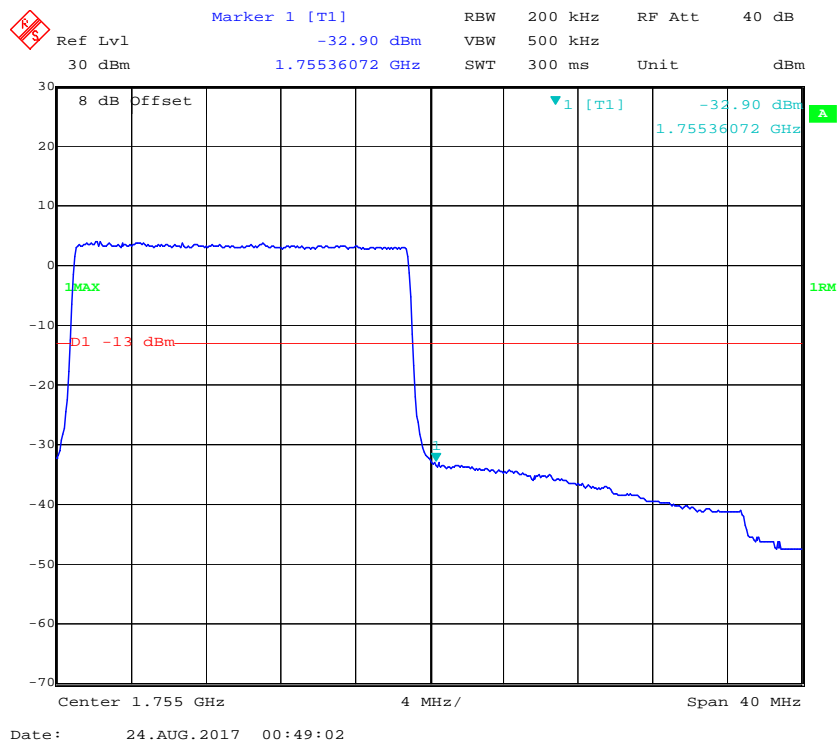
### 16-QAM (15.0 MHz, FULL RB) - Right Band Edge



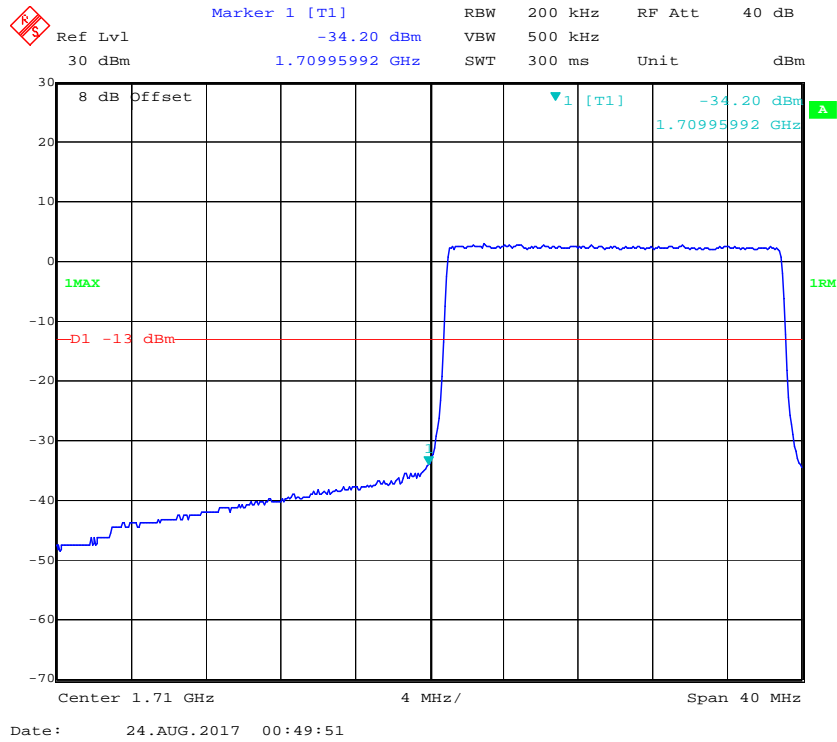
### QPSK (20.0 MHz, FULL RB) - Left Band Edge



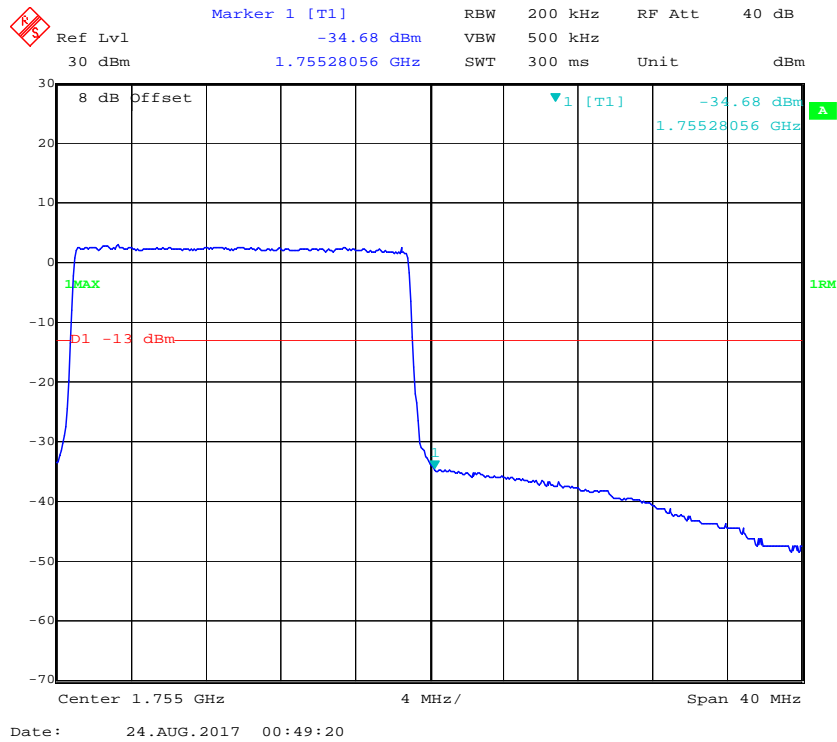
### QPSK (20.0 MHz, FULL RB) - Right Band Edge



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

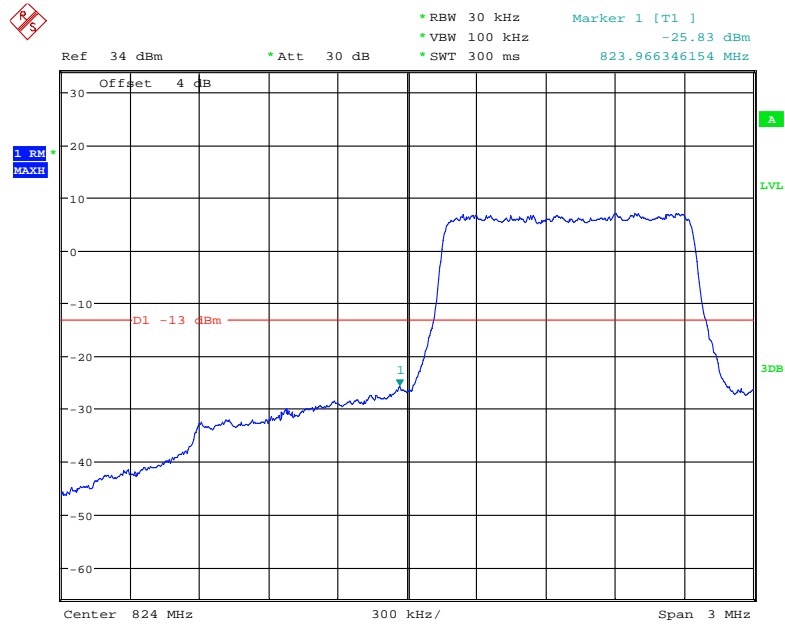


### 16-QAM (20.0 MHz, FULL RB) - Right Band Edge



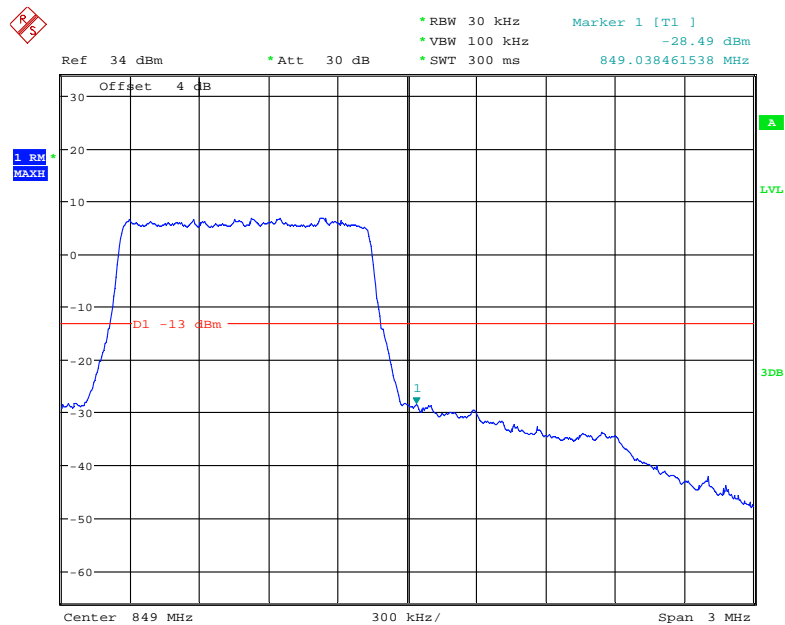
**Band 5:**

**QPSK (1.4 MHz, FULL RB) - Left Band Edge**



Date: 24.AUG.2017 22:14:24

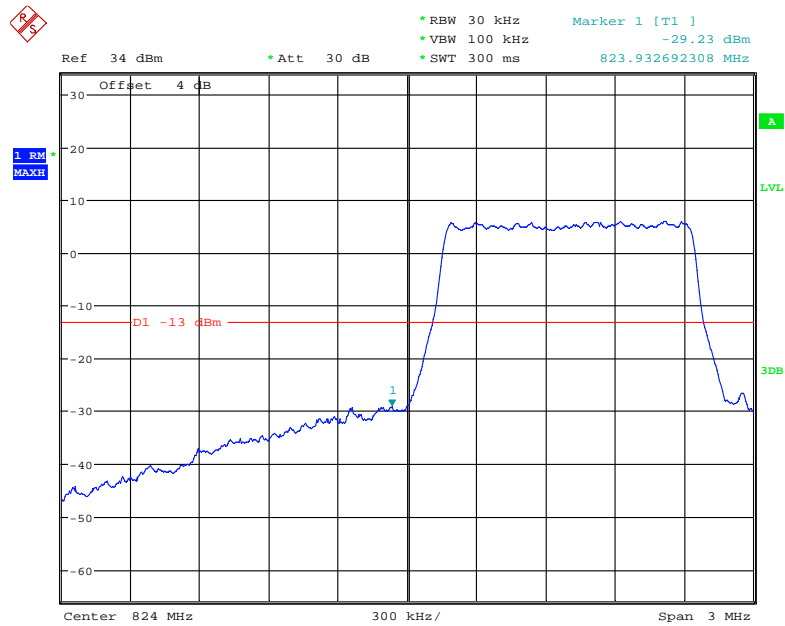
**QPSK (1.4 MHz, FULL RB) - Right Band Edge**



Date: 24.AUG.2017 22:18:54

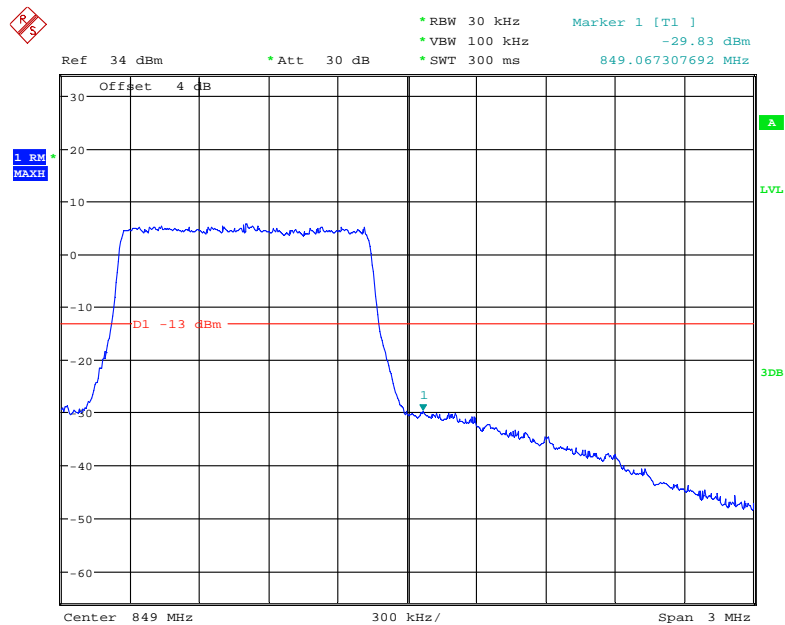


### 16-QAM (1.4 MHz, FULL RB) - Left Band Edge



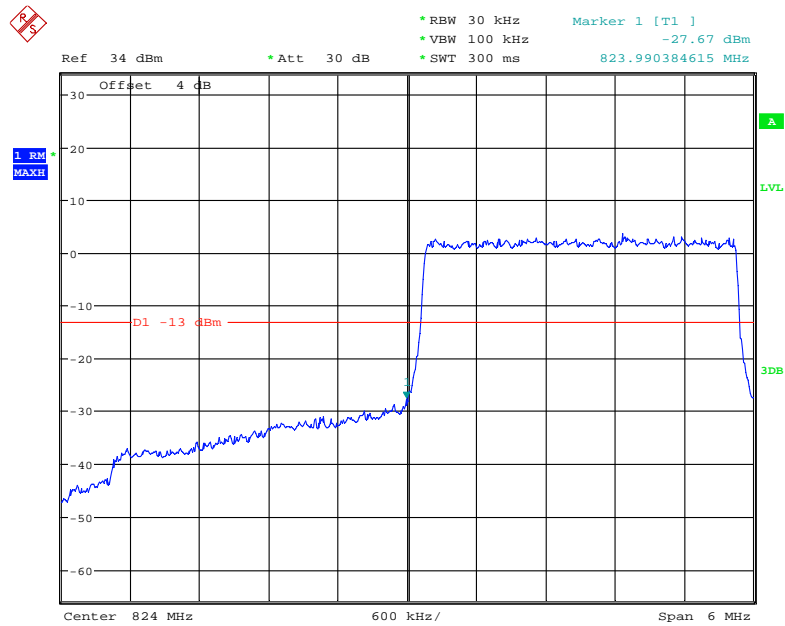
Date: 24.AUG.2017 22:17:23

### 16-QAM (1.4 MHz, FULL RB) - Right Band Edge



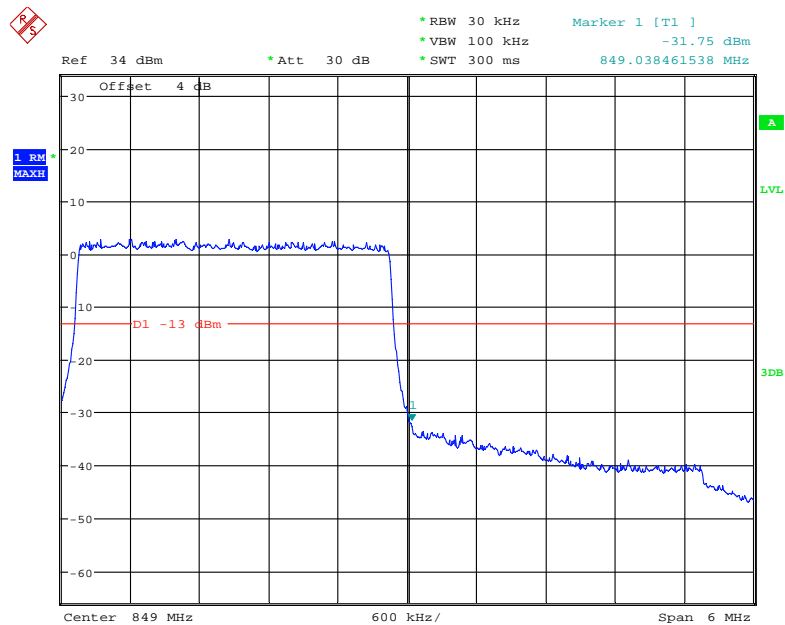
Date: 24.AUG.2017 22:17:57

### QPSK (3.0 MHz, FULL RB) - Left Band Edge



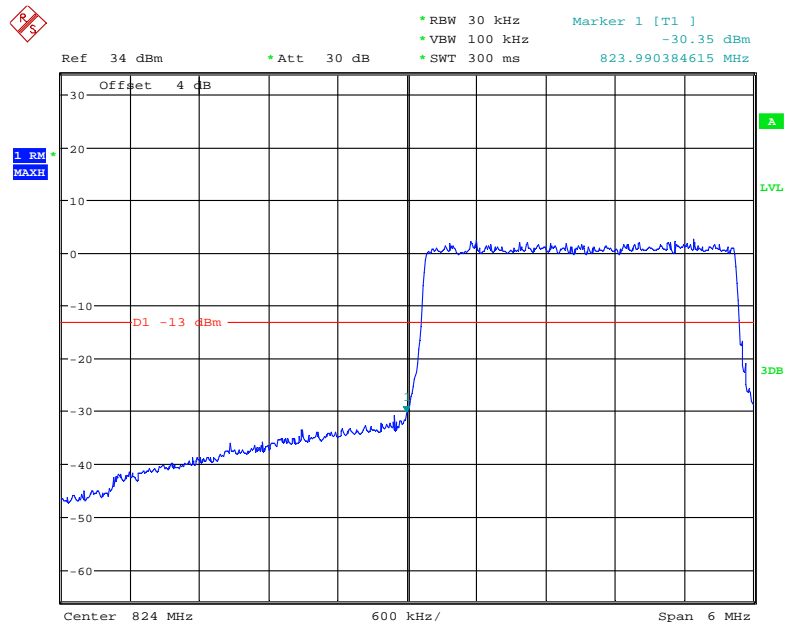
Date: 24.AUG.2017 22:20:30

### QPSK (3.0 MHz, FULL RB) - Right Band Edge



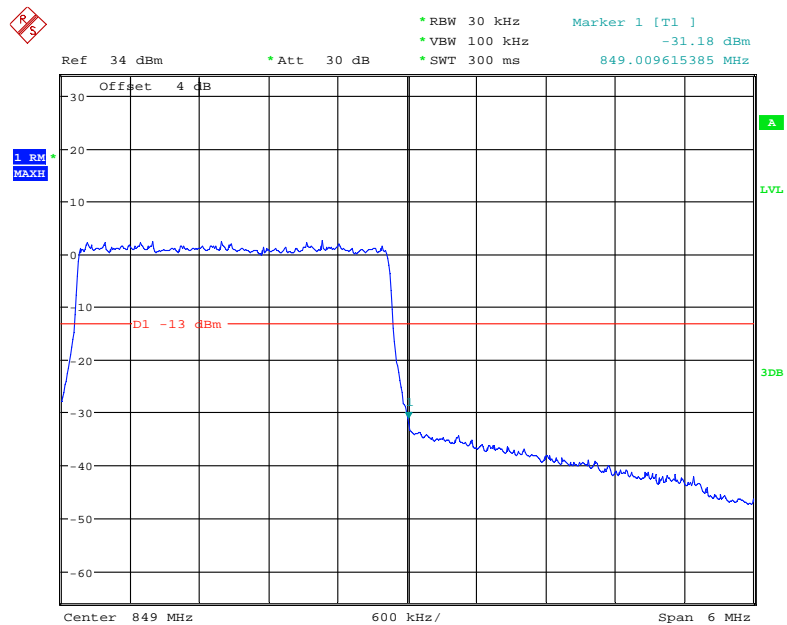
Date: 24.AUG.2017 22:21:00

### 16-QAM (3.0 MHz, FULL RB) - Left Band Edge



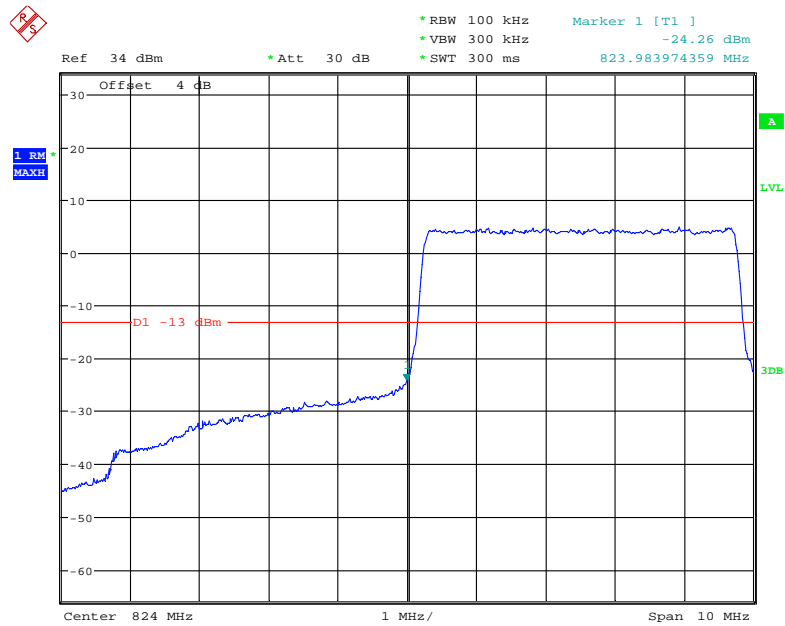
Date: 24.AUG.2017 22:24:11

### 16-QAM (3.0 MHz, FULL RB) - Right Band Edge



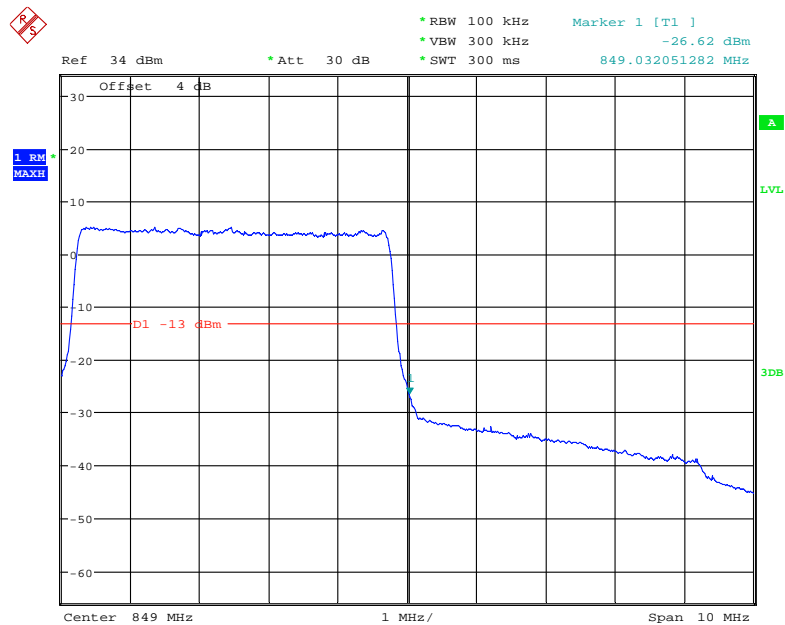
Date: 24.AUG.2017 22:23:20

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

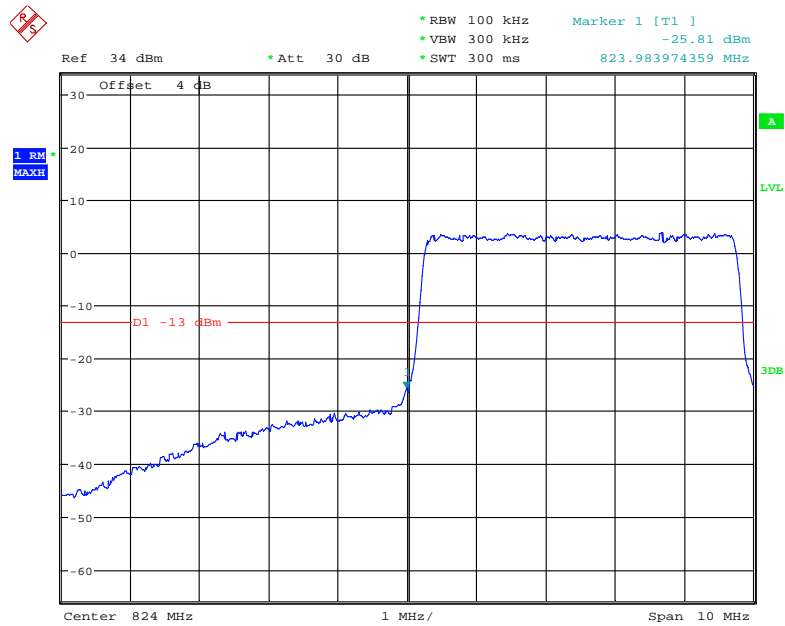


Date: 24.AUG.2017 22:25:00

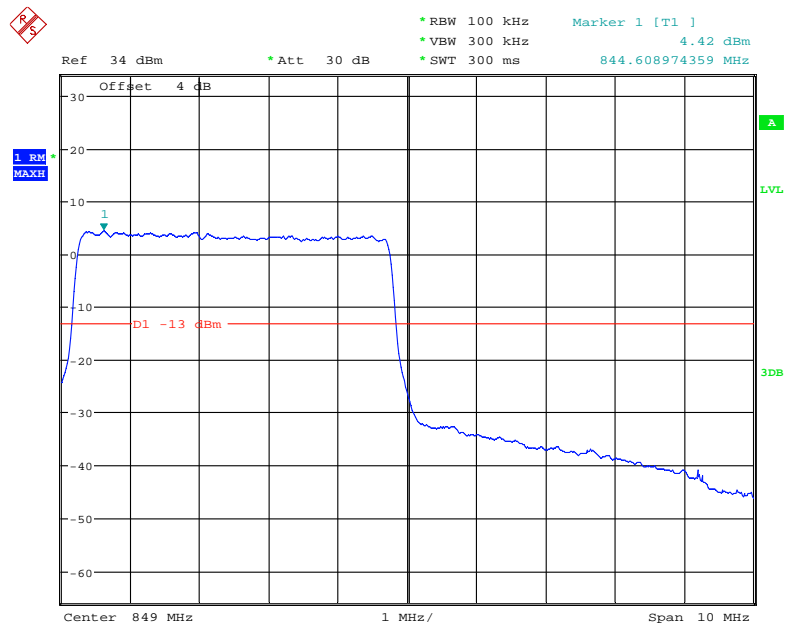
### QPSK (5.0 MHz, FULL RB) - Right Band Edge



Date: 24.AUG.2017 22:31:08

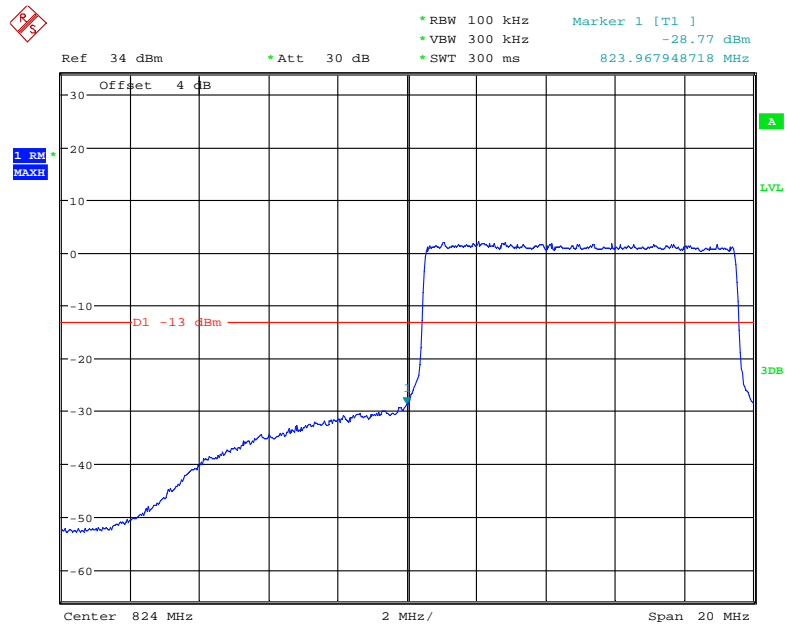
**16-QAM (5.0 MHz, FULL RB) - Left Band Edge**

Date: 24.AUG.2017 22:25:27

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

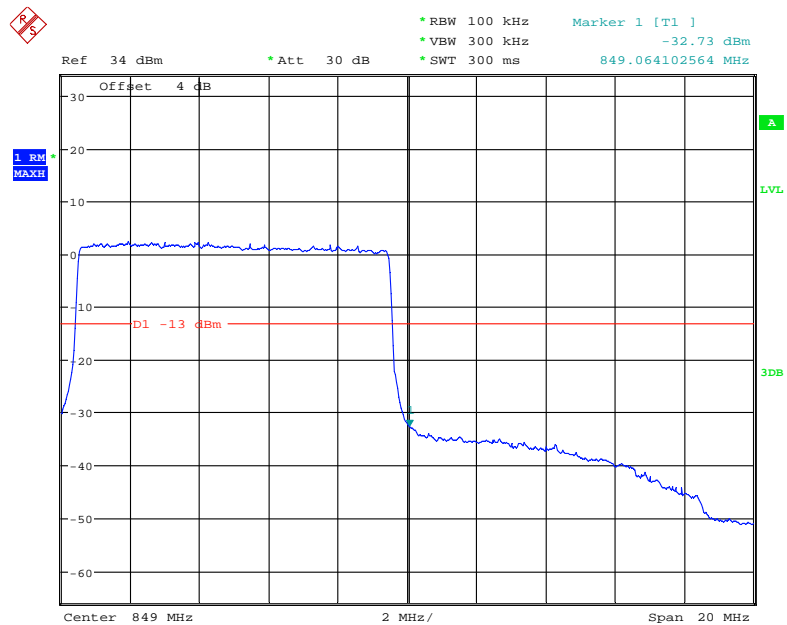
Date: 24.AUG.2017 22:30:31

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



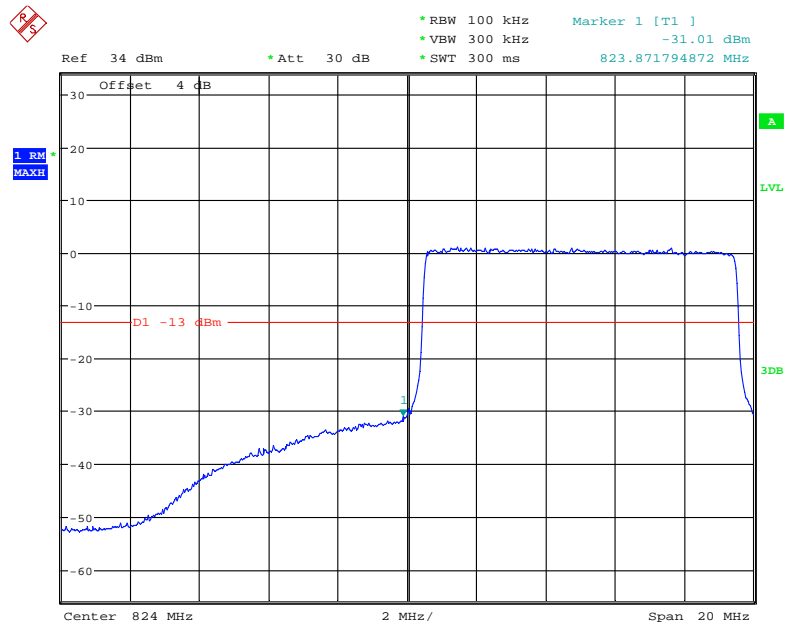
Date: 24.AUG.2017 22:34:48

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



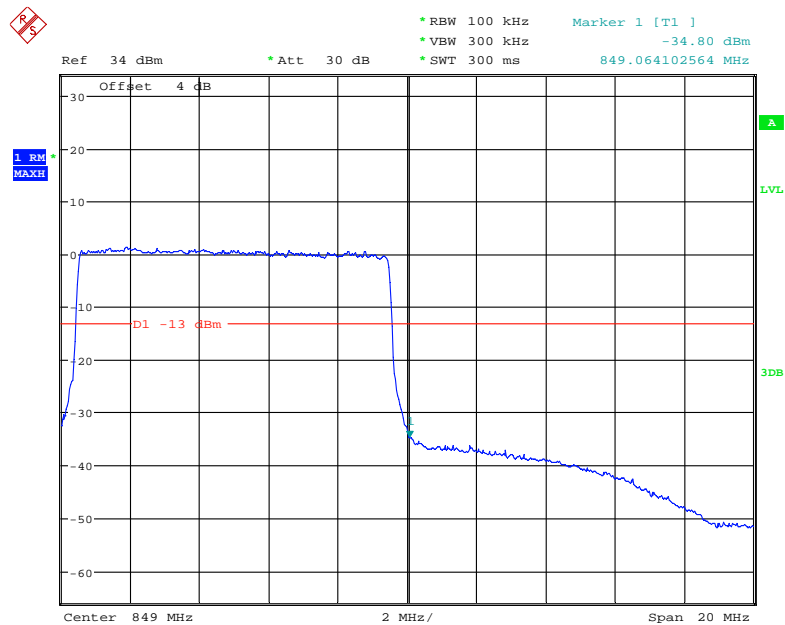
Date: 24.AUG.2017 22:33:24

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



Date: 24.AUG.2017 22:34:25

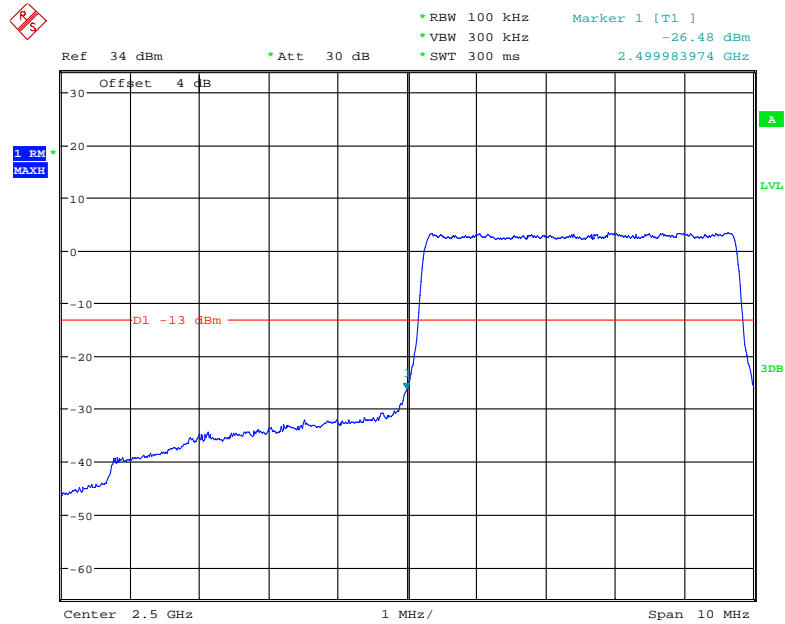
### 16-QAM (10.0 MHz, FULL RB) - Right Band Edge



Date: 24.AUG.2017 22:33:52

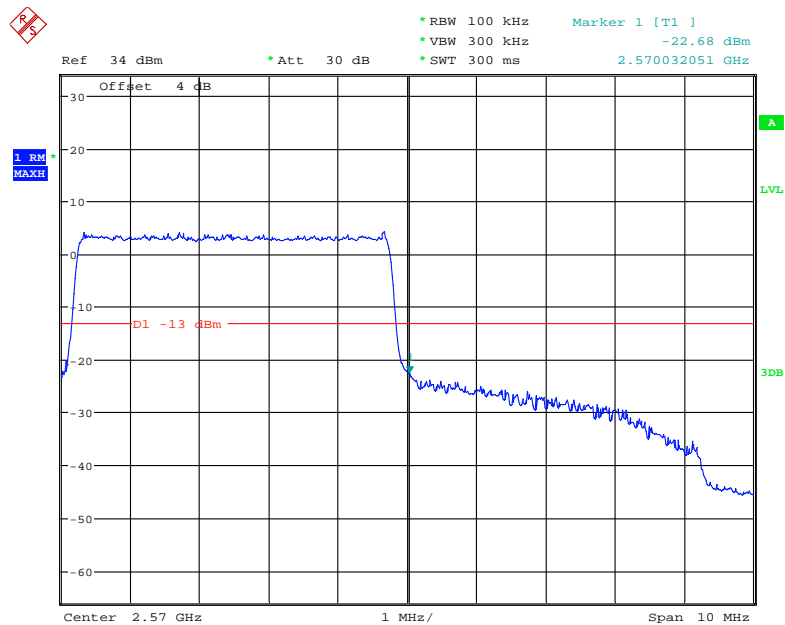
**Band 7:**

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



Date: 24.AUG.2017 22:54:07

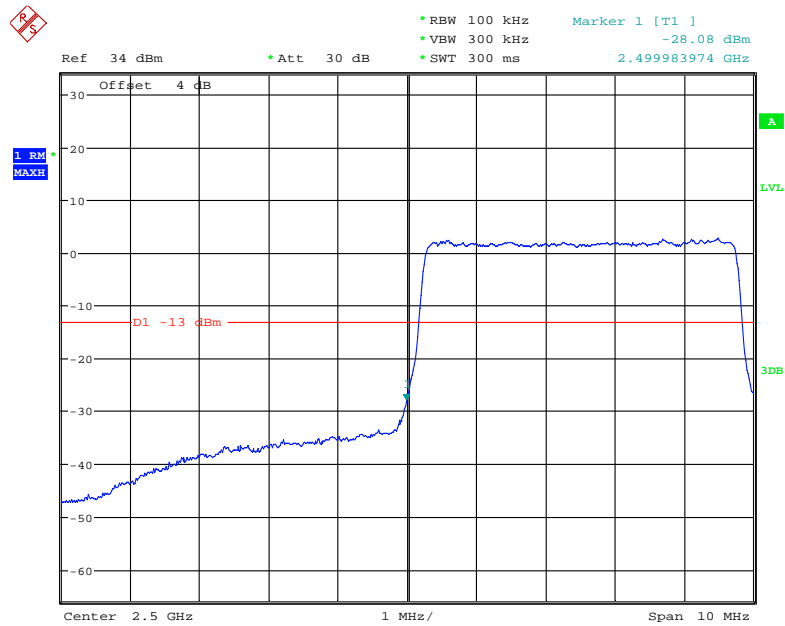
**QPSK (5.0 MHz, FULL RB) - Right Band Edge**



Date: 24.AUG.2017 22:57:54

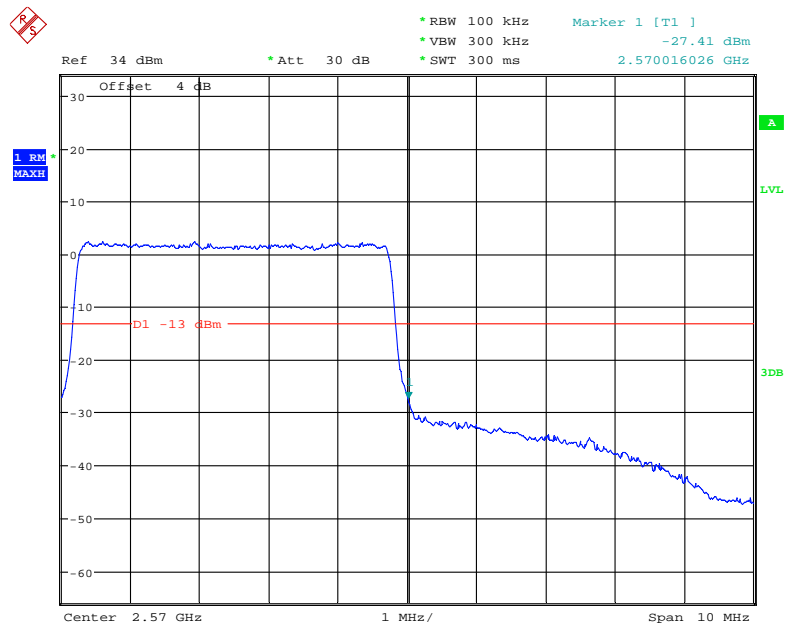


### 16-QAM (5.0 MHz, FULL RB) - Left Band Edge



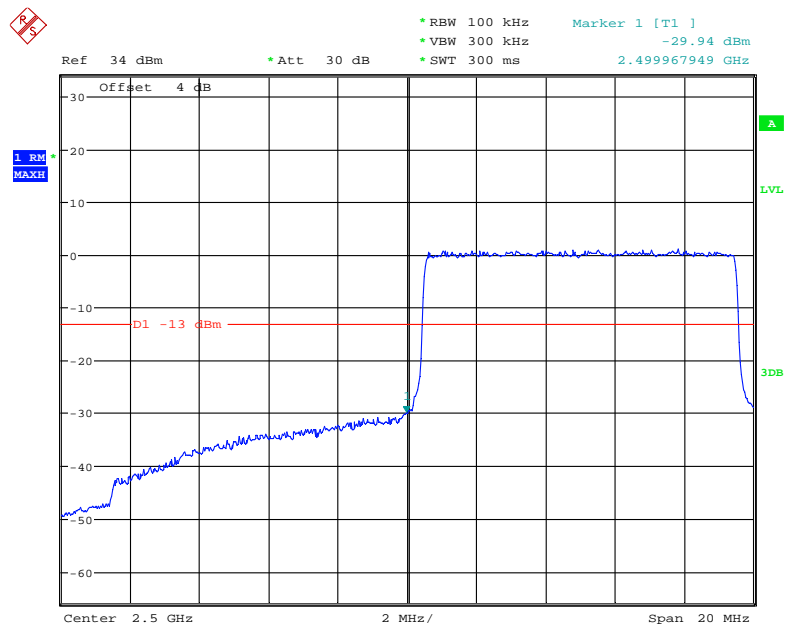
Date: 24.AUG.2017 22:54:53

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



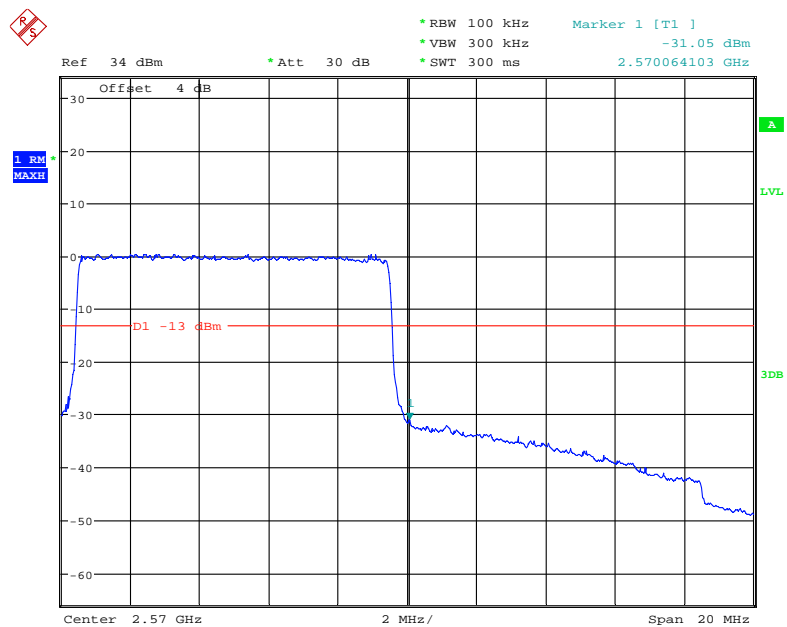
Date: 24.AUG.2017 22:55:47

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



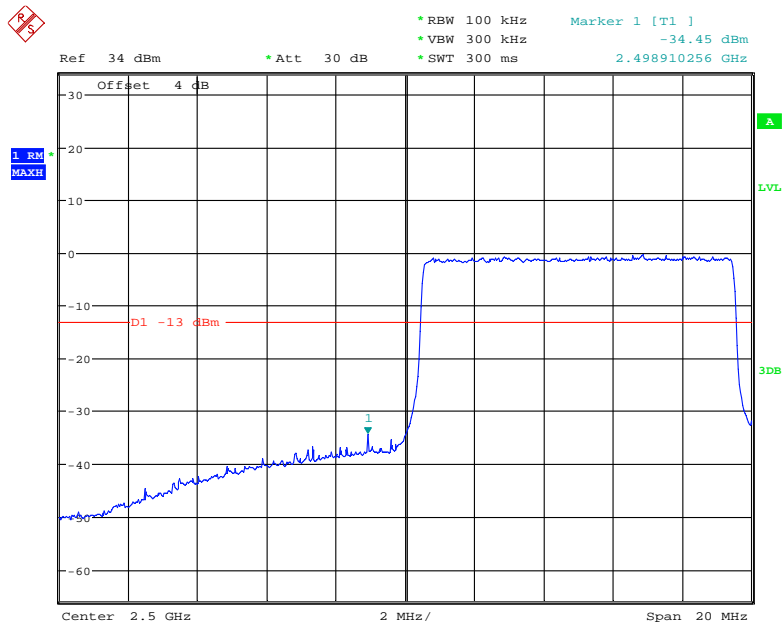
Date: 24.AUG.2017 23:00:17

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



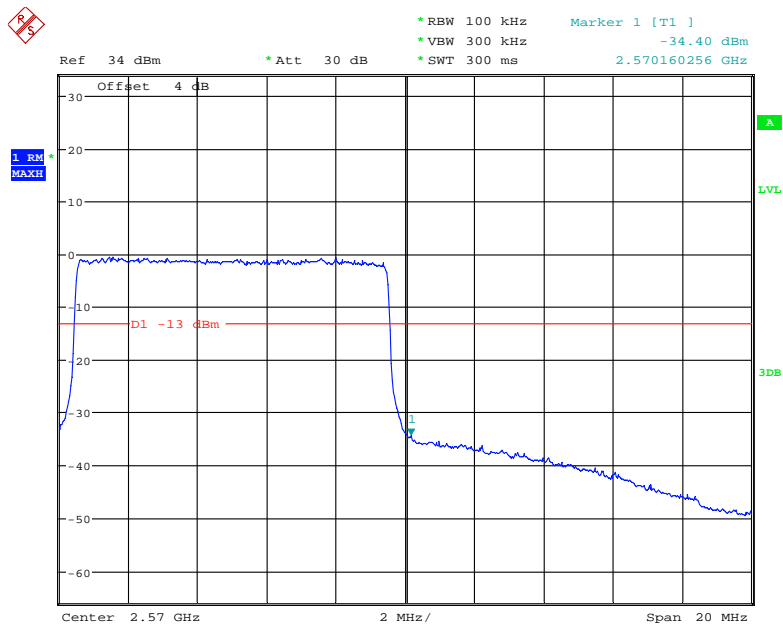
Date: 24.AUG.2017 22:58:42

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



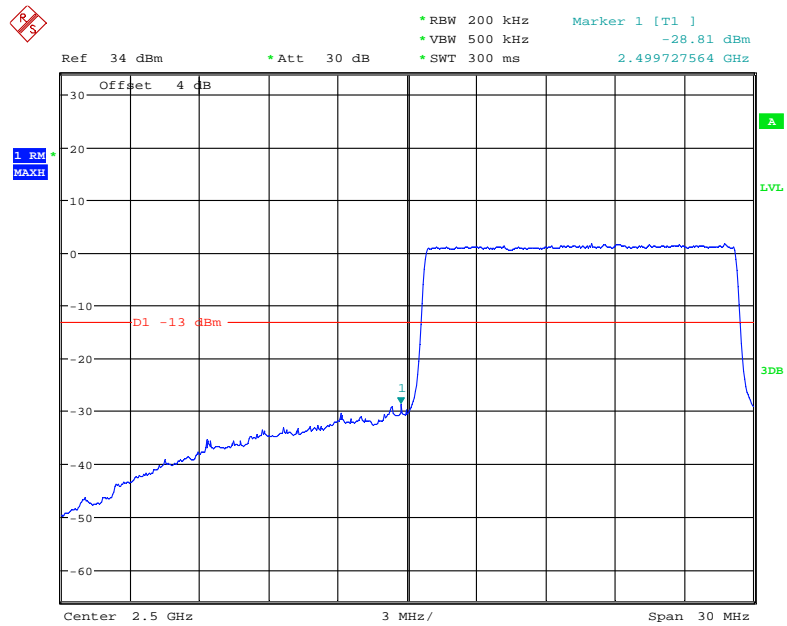
Date: 24.AUG.2017 22:59:44

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



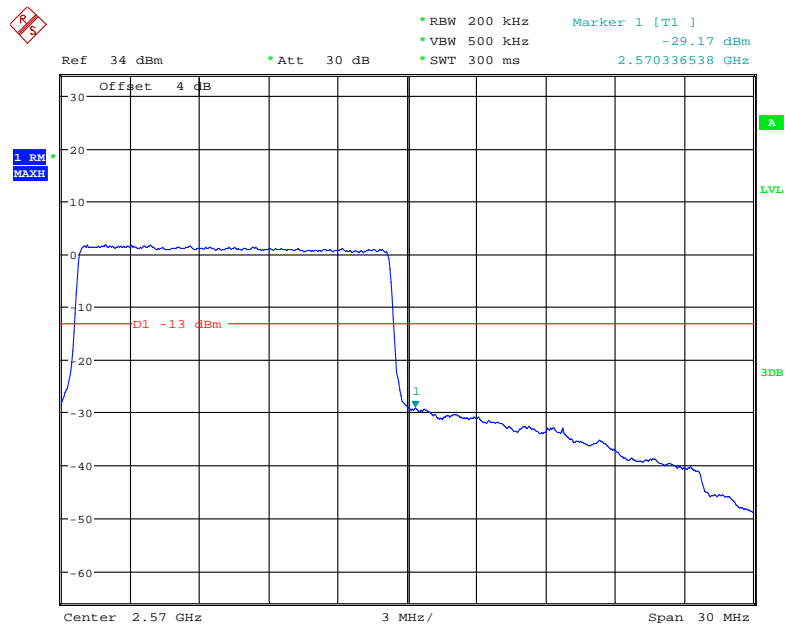
Date: 24.AUG.2017 22:59:07

### QPSK (15 MHz, FULL RB) - Left Band Edge



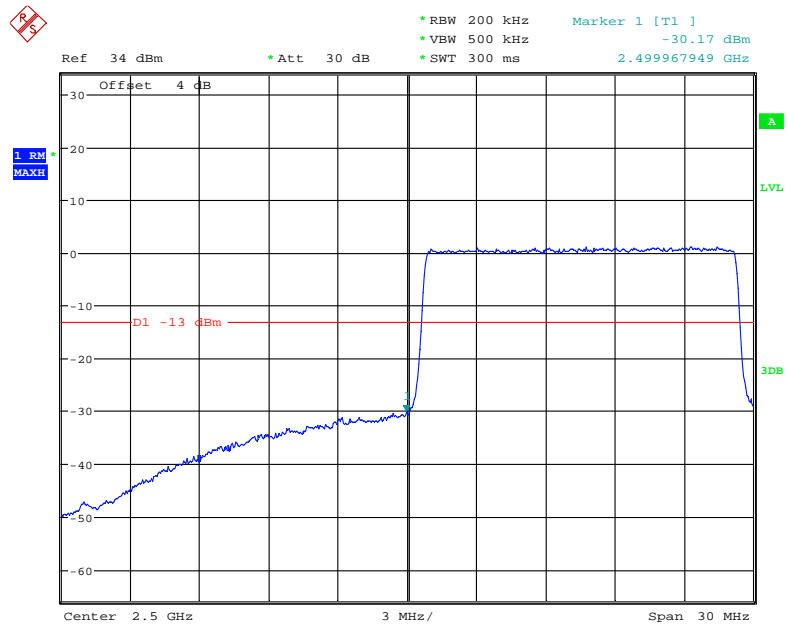
Date: 24.AUG.2017 23:01:34

### QPSK (15 MHz, FULL RB) - Right Band Edge



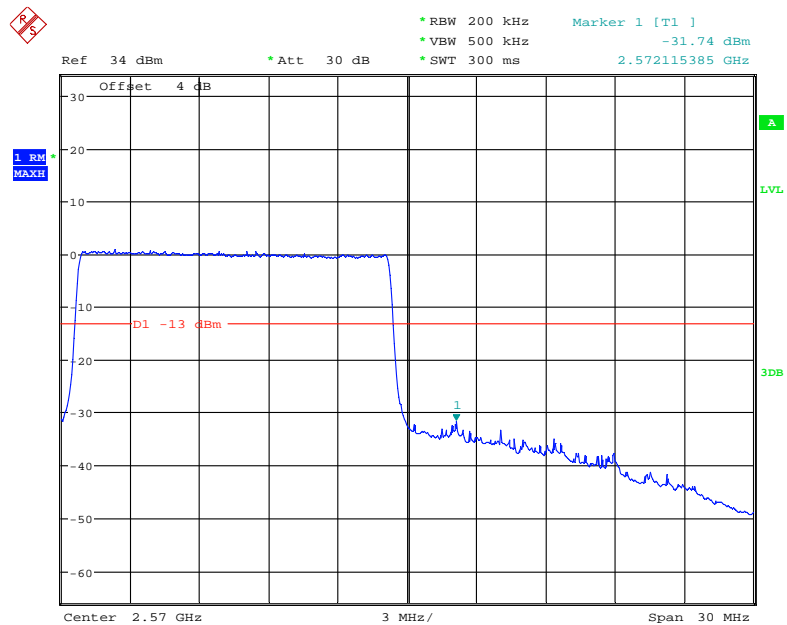
Date: 24.AUG.2017 23:03:33

### 16-QAM (15 MHz, FULL RB) - Left Band Edge



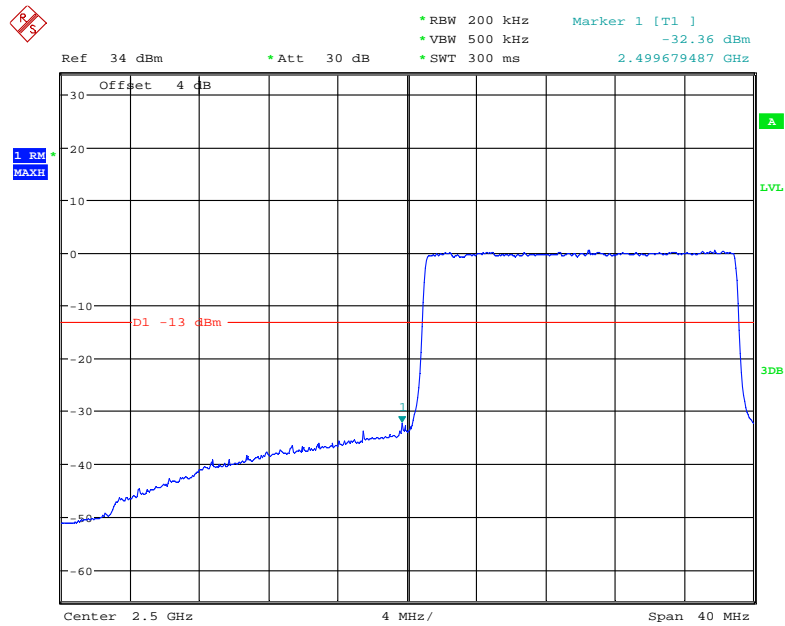
Date: 24.AUG.2017 23:02:19

### 16-QAM (15 MHz, FULL RB) - Right Band Edge



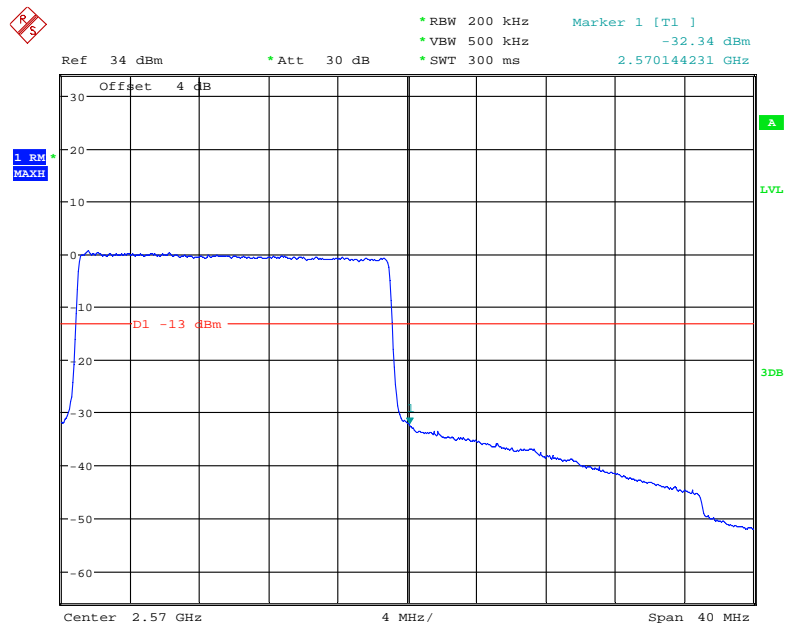
Date: 24.AUG.2017 23:03:02

### QPSK (20 MHz, FULL RB) - Left Band Edge



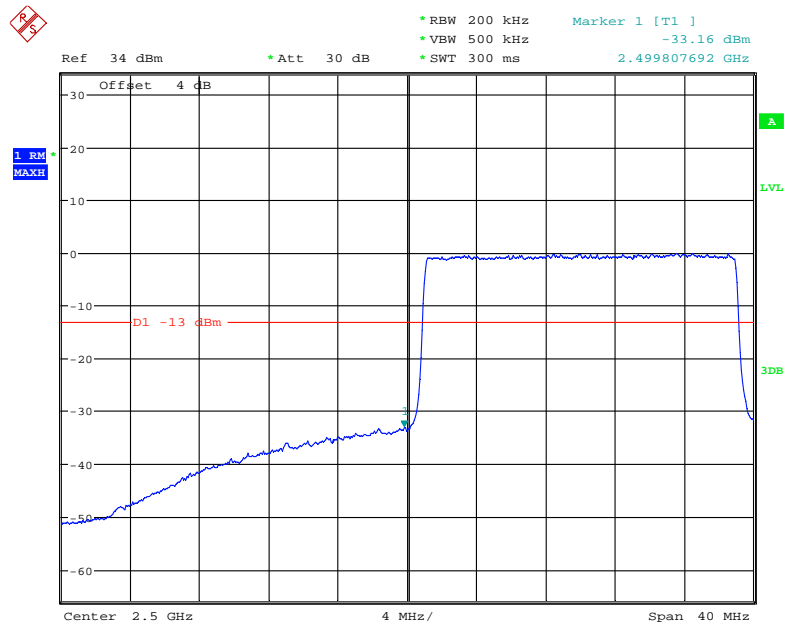
Date: 24.AUG.2017 23:10:07

### QPSK (20 MHz, FULL RB) - Right Band Edge



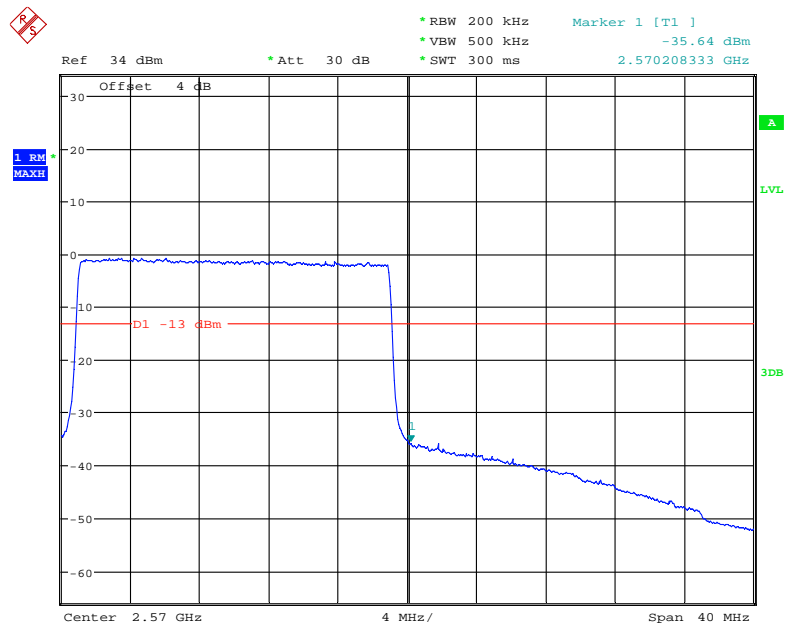
Date: 24.AUG.2017 23:04:20

### 16-QAM (20 MHz, FULL RB) - Left Band Edge



Date: 24.AUG.2017 23:06:23

### 16-QAM (20 MHz, FULL RB) - Right Band Edge



Date: 24.AUG.2017 23:04:53

**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**

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

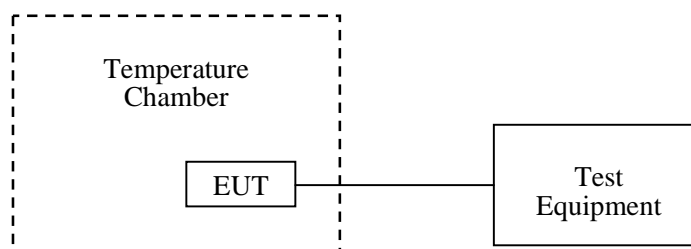
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

**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>	26 °C
<b>Relative Humidity:</b>	56 %
<b>ATM Pressure:</b>	101.0 kPa

The testing was performed by Xiangguang Kong on 2017-08-28.

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	6	0.007172	2.5
-20		4	0.004781	2.5
-10		-1	-0.001195	2.5
0		3	0.003586	2.5
10		1	0.001195	2.5
20		2	0.002391	2.5
30		0	0.000000	2.5
40		5	0.005977	2.5
50		8	0.009563	2.5
20	V min.= 3.6	4	0.004781	2.5
	V max.= 4.35	11	0.013148	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	2	0.002391	2.5
-20		1	0.001195	2.5
-10		-1	-0.001195	2.5
0		3	0.003586	2.5
10		0	0.000000	2.5
20		3	0.003586	2.5
30		2	0.002391	2.5
40		4	0.004781	2.5
50		8	0.009563	2.5
20	V min.= 3.6	7	0.008367	2.5
	V max.= 4.35	13	0.015539	2.5

**WCDMA 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	2	0.002391	2.5
-20		1	0.001195	2.5
-10		-2	-0.002391	2.5
0		1	0.001195	2.5
10		0	0.000000	2.5
20		2	0.002391	2.5
30		-1	-0.001195	2.5
40		3	0.003586	2.5
50		4	0.004781	2.5
25	V min.= 3.6	2	0.002391	2.5
25	V max.= 4.35	7	0.008367	2.5

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

Middle Channel, $f_0=1880.0$ MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	9	0.004787	pass
-20		6	0.003191	pass
-10		2	0.001064	pass
0		4	0.002128	pass
10		5	0.002660	pass
20		8	0.004255	pass
30		6	0.003191	pass
40		11	0.005851	pass
50		15	0.007979	pass
25	V min.= 3.6	12	0.006383	pass
25	V max.= 4.35	17	0.009043	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	3.8	-3	-0.001596	pass
-20		1	0.000532	pass
-10		-2	-0.001064	pass
0		0	0.000000	pass
10		-1	-0.000532	pass
20		1	0.000532	pass
30		-2	-0.001064	pass
40		-5	-0.002660	pass
50		-6	-0.003191	pass
25	V min.= 3.6	-4	-0.002128	pass
25	V max.= 4.35	-13	-0.006915	pass

**WCDMA Mode**

<b>Middle Channel, <math>f_0</math> =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	3.8	4	0.002128	pass
-20		1	0.000532	pass
-10		2	0.001064	pass
0		-1	-0.000532	pass
10		3	0.001596	pass
20		2	0.001064	pass
30		-2	-0.001064	pass
40		3	0.001596	pass
50		6	0.003191	pass
25	V min.= 3.6	5	0.002660	pass
25	V max.= 4.35	8	0.004255	pass

**QPSK:****LTE Band 4:**

20.0 MHz Middle Channel, $f_0 = 1732.5$ MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	3	0.00173	pass
-20		1	0.00058	pass
-10		-1	-0.00058	pass
0		2	0.00115	pass
10		-1	-0.00058	pass
20		2	0.00115	pass
30		0	0.00000	pass
40		3	0.00173	pass
50		8	0.00462	pass
20	V min.= 3.6	3	0.003586	pass
	V max.= 4.35	8	0.009563	pass

**LTE Band 5:**

10.0 MHz Middle Channel, $f_0 = 836.5$ MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	3	0.003586	pass
-20		2	0.002391	pass
-10		-1	-0.001195	pass
0		1	0.001195	pass
10		-2	-0.002391	pass
20		1	0.001195	pass
30		3	0.003586	pass
40		2	0.002391	pass
50		6	0.007172	pass
20	V min.= 3.6	3	0.003586	pass
	V max.= 4.35	8	0.009563	pass

**LTE Band 7:**

20.0 MHz Middle Channel, $f_0=2535$ MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	1	0.00039	pass
-20		-1	-0.00039	pass
-10		0	0.00000	pass
0		-2	-0.00079	pass
10		1	0.00039	pass
20		2	0.00079	pass
30		-1	-0.00039	pass
40		4	0.00158	pass
50		7	0.00276	pass
20	V min.= 3.6	5	0.00197	pass
	V max.= 4.35	13	0.00513	pass

**16-QAM:****LTE Band 4:**

20.0 MHz Middle Channel, $f_0=1732.5$ MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	5	0.00289	pass
-20		-2	-0.00115	pass
-10		3	0.00173	pass
0		0	0	pass
10		-3	-0.00173	pass
20		4	0.00231	pass
30		1	0.00058	pass
40		6	0.00346	pass
50		-2	-0.00115	pass
20	V min.= 3.6	1	0.00058	pass
	V max.= 4.35	3	0.00173	pass

**LTE Band 5:**

10.0 MHz Middle Channel, $f_o = 836.5$ MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	1	0.00120	pass
-20		-3	-0.00359	pass
-10		0	0	pass
0		4	0.00478	pass
10		2	0.00239	pass
20		-2	-0.00239	pass
30		0	0	pass
40		4	0.00478	pass
50		1	0.00120	pass
20	V min.= 3.6	-2	-0.00239	pass
	V max.= 4.35	2	0.00239	pass

**LTE Band 7:**

20.0 MHz Middle Channel, $f_o = 2535$ MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	3	0.00118	pass
-20		0	0	pass
-10		-4	-0.00158	pass
0		2	0.00079	pass
10		0	0	pass
20		5	0.00197	pass
30		-1	-0.00039	pass
40		3	0.00118	pass
50		0	0	pass
20	V min.= 3.6	-1	-0.00039	pass
	V max.= 4.35	4	0.00158	pass

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