TESTING LABORATORY
CERTIFICATE#4323.01

FCC PART 27

FCC PART 22H, PART 24E

MEASUREMENT AND TEST REPORT

For

Waylens Inc.

2711 Centerville Road - Suite 400, Wilmington, Delaware, United States 19808

FCC ID: 2AKAF-TW02C2

Report Type:	**Product Type:**
Original Report	Secure360 4G

Test Engineer:	Alisa Gao
Report Number:	RSHA180709001-00D
Report Date:	2018-07-27
Reviewed By:	Oscar Ye RF Leader
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road,Kunshan,Jiangsu province,China Tel: +86-0512-86175000 Fax: +86-0512-88934268 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant:	Waylens Inc.
Tested Model:	TW02
Product Type:	Secure360 4G
Dimension:	60 mm (L) * 60 mm (W) * 50 mm (H)
Power Supply:	DC 12V

**All measurement and test data in this report was gathered from production sample serial number: 20180709001. (Assigned by the BACL. The EUT supplied by the applicant was received on 2018-07-09)*

Objective

This type approval report is prepared on behalf of Waylens Inc. in accordance with Part 2, Part 22-Subpart H and 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 15.247 DSS, Part 15.247 DTS and Part 15.249 DXX submissions with FCC ID: 2AKAF-TW02C2.

Test Methodology

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

Part 22 Subpart H - Public Mobile Services
Part 24 Subpart E - Personal Communication Services
Part 27 – Miscellaneous wireless communications services

Applicable Standards: TIA/EIA 603-D.

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

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19dB
RF conducted test with spectrum		0.9dB
RF Output Power with Power meter		0.5dB
Radiated emission	30MHz~1GHz	5.91dB
	1GHz~6GHz	4.68dB
	6GHz~18GHz	4.92dB
	18GHz~40GHz	5.21dB
Occupied Bandwidth		0.5kHz
Temperature		1.0℃
Humidity		6%

Test Facility

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

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

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.

Channel List

Mode		Channel		Frequency (MHz)
WCDMA Band II		Low	9262	1852.4
		Middle	9400	1880.0
		High	9538	1907.6
WCDMA Band V		Low	4132	826.4
		Middle	4183	836.6
		High	4233	846.6
LTE Band 2	1.4M	Low	18607	1850.7
		Middle	18900	1880.0
		High	19193	1909.3
	3M	Low	18615	1851.5
		Middle	18900	1880.0
		High	19185	1908.5
	5M	Low	18625	1852.5
		Middle	18900	1880.0
		High	19175	1907.5
	10M	Low	18650	1855.0
		Middle	18900	1880.0
		High	19150	1905.0
	15M	Low	18675	1857.5
		Middle	18900	1880.0
		High	19125	1902.5
	20M	Low	18700	1860.0
		Middle	18900	1880.0
		High	19100	1900.0

Mode		Channel		Frequency (MHz)
LTE Band 4	1.4M	Low	19957	1710.7
		Middle	20175	1732.5
		High	20393	1754.3
	3M	Low	19965	1711.5
		Middle	20175	1732.5
		High	20385	1753.5
	5M	Low	19975	1712.5
		Middle	20175	1732.5
		High	20375	1752.5
	10M	Low	20000	1715.0
		Middle	20175	1732.5
		High	20350	1750.0
	15M	Low	20025	1717.5
		Middle	20175	1732.5
		High	20325	1747.5
	20M	Low	20050	1720.0
		Middle	20175	1732.5
		High	20300	1745.0
LTE Band 5	1.4M	Low	20407	824.7
		Middle	20525	836.5
		High	20643	848.3
	3M	Low	20415	825.5
		Middle	20525	836.5
		High	20635	847.5
	5M	Low	20425	826.5
		Middle	20525	836.5
		High	20625	846.5
	10M	Low	20450	829.0
		Middle	20525	836.5
		High	20600	844.0
LTE Band 12	1.4M	Low	23017	699.7
		Middle	23095	707.5
		High	23173	715.3
	3M	Low	23025	700.5
		Middle	23095	707.5
		High	23165	714.5
	5M	Low	23035	701.5
		Middle	23095	707.5
		High	23155	713.5
	10M	Low	23060	704.0
		Middle	23095	707.5
		High	23130	711.0

Mode		Channel		Frequency (MHz)
LTE Band 17	5M	Low	23755	706.5
		Middle	23790	710.0
		High	23825	713.5
	10M	Low	23780	709.0
		Middle	23790	710.0
		High	23800	711.0

Equipment Modifications

No modifications were made to the EUT.

Support Equipment List and Details

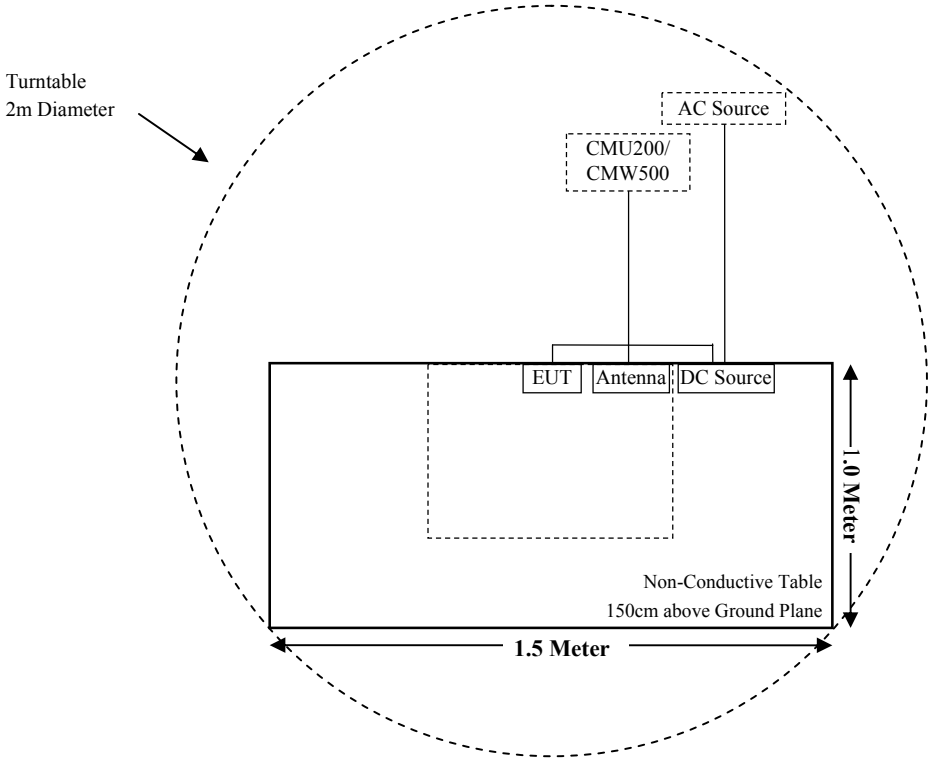
Manufacturer	Description	Model	Serial Number
BEST	DC Power Supply	PS-1502D+	/
Waylens Inc.	Antenna	/	/
Rohde & Schwarz	UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	110605
R & S	Wideband Radio Communication Tester	CMW500	104478

External I/O Cable

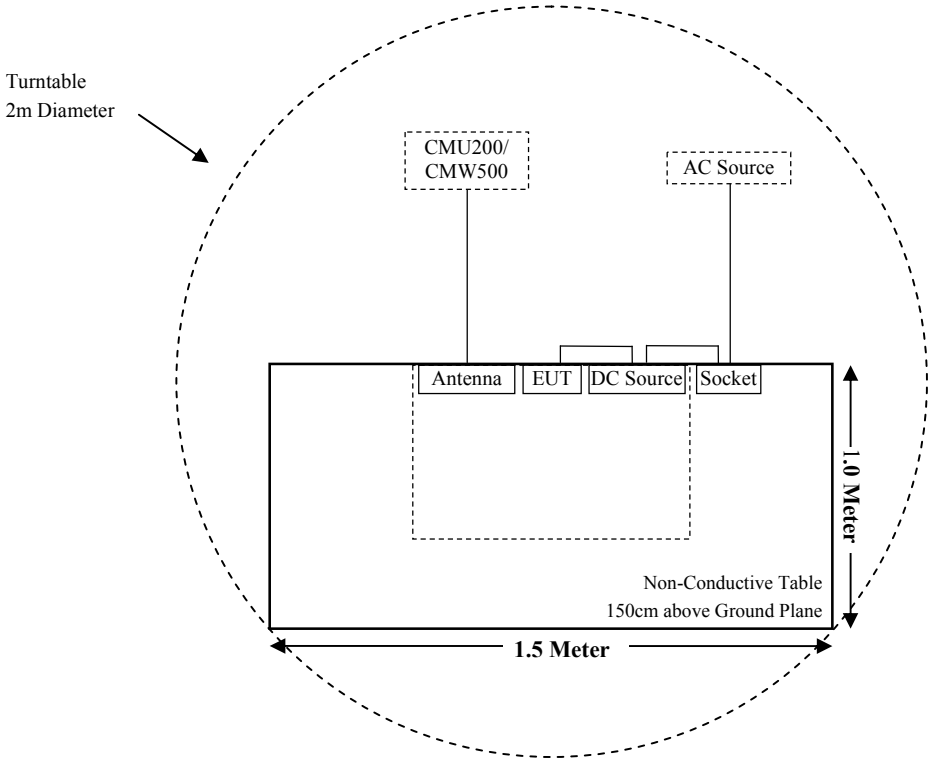
Cable Description	Length (m)	From Port	To
DC Cable	1.0	EUT	DC Source

Block Diagram of Test Setup

For Radiated Emissions(Below 1GHz)



For Radiated Emissions(Above 1GHz):



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 & §2.1091	MAXIMUM PERMISSIBLE EXPOSURE (MPE)	Compliant
§2.1046; § 22.913 (a);§ 24.232 (c); § 27.50 (c)(d)	RF Output Power	Compliant
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.905; § 22.917; § 24.238	Occupied Bandwidth	Compliant
§ 2.1051; § 22.917 (a); § 24.238 (a); §27.53	Spurious Emissions at Antenna Terminal	Compliant
§ 2.1053; § 22.917 (a); § 24.238 (a); §27.53 (h) (m)	Spurious Radiated Emissions	Compliant
§ 22.917 (a); § 24.238 (a); §27.53 (h) (m)	Band Edge	Compliant
§ 2.1055; § 22.355; § 24.235; §27.54	Frequency stability	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test（Chamber 1#）					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2017-11-12	2018-11-11
HP	Signal Generator	HP 8341B	2624A00116	2017-08-29	2018-08-28
Sunol Sciences	Broadband Antenna	JB3	A090413-1	2016-12-26	2019-12-25
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2016-01-09	2019-01-08
Sonoma Instrunent	Pre-amplifier	310N	171205	2017-08-15	2018-08-14
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-6	006	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-8	008	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2017-08-15	2018-08-14
Rohde & Schwarz	UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	110605	2017-11-12	2018-11-11
R & S	Wideband Radio Communication Tester	CMW500	104478	2017-07-22	2018-07-21
BEST	DC Power Supply	PS-1502D+	/	2017-10-10	2018-10-09
Radiated Emission Test（Chamber 2#）					
HP	Signal Generator	HP 8341B	2624A00116	2017-08-29	2018-08-28
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2017-08-27	2018-08-26
ETS-LINDGREN	Horn Antenna	3115	9311-4159	2016-01-11	2019-01-10
ETS-LINDGREN	Horn Antenna	3115	6229	2016-01-11	2019-01-10
ETS-LINDGREN	Horn Antenna	3116	00084159	2016-10-18	2019-10-17
ETS-LINDGREN	Horn Antenna	3116	2516	2016-12-12	2019-12-12
Mini-Circuits	Amplifier	ZVA-183W-S+	220701818	2018-05-20	2019-05-19
EM Electronics Corporation	Amplifier	EM18G40G	060726	2018-03-22	2019-03-21
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-6	006	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-11	011	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-12	012	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-13	013	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-16	016	2017-08-15	2018-08-14
Rohde & Schwarz	UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	110605	2017-11-12	2018-11-11
R & S	Wideband Radio Communication Tester	CMW500	104478	2017-07-22	2018-07-21
BEST	DC Power Supply	PS-1502D+	/	2017-10-10	2018-10-09

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	Signal Analyzer	FSIQ26	836131/009	2017-09-21	2018-09-20
Narda	Attenuator/6dB	10690812-2	26850-6	2018-01-10	2019-01-09
Rohde & Schwarz	UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	110605	2017-11-12	2018-11-11
R & S	Wideband Radio Communication Tester	CMW500	104478	2017-07-22	2018-07-21
Mini-Ciruits	Power splitter	ZFRSC-14-S+	SF019411452	2017-11-10	2018-11-09
BACL	Temperature & Humidity Chamber	BTH-150	30023	2017-10-10	2018-10-09
EAST	Regulated DC Power Supply	MCH-303D-II	14070562	2017-10-10	2018-10-09
Waylens Inc.	RF Cable	/	/	Each Time	/

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

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

Applicable Standard

According to subpart §2.1091 and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:
Predication of MPE limit at a given distance
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Calculated Data:

Mode	Frequency Range (MHz)	Antenna Gain		Tune-up Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)	MPE ratio
		(dBi)	(numeric)	(dBm)	(mW)				
802.11b	2412-2462	1.50	1.41	15.50	35.48	20	0.0100	1.0000	0.0100
802.11g		1.50	1.41	18.50	70.79	20	0.0199	1.0000	**0.0199**
802.11n-HT20		1.50	1.41	18.50	70.79	20	0.0199	1.0000	0.0199
802.11n-HT40	2422-2452	1.50	1.41	17.50	56.23	20	0.0158	1.0000	0.0158
BLE	2402-2480	1.50	1.41	-2.00	0.63	20	0.0002	1.0000	0.0002
BT 3.0	2402-2480	1.50	1.41	0.00	1.00	20	0.0003	1.0000	**0.0003**
WCDMA Band V	826.4-846.6	1.00	1.26	24.00	251.19	20	0.0630	0.5509	**0.1144**
WCDMA Band II	1852.4-1907.6	1.50	1.41	24.00	251.19	20	0.0705	1.0000	0.0705
FDD Band 2	1850.7-1909.3	1.50	1.41	23.00	199.53	20	0.0560	1.0000	0.0560
FDD Band 4	1710.7-1754.3	1.40	1.38	23.00	199.53	20	0.0548	1.0000	0.0548
FDD Band 5	824.7-848.3	1.00	1.26	23.00	199.53	20	0.0500	0.5498	0.0909
FDD Band 12	699.7-715.3	0.80	1.20	23.00	199.53	20	0.0476	0.4665	**0.1020**
FDD Band 17	706.5-713.5	0.80	1.20	23.00	199.53	20	0.0476	0.4710	0.1011

Note:
1. The tune-up conducted power was declared by the manufacturer.
2. Wi-Fi, BT and WCDMA/LTE can transmit simultaneously, and the worst condition is 802.11g of Wi-Fi, BT3.0 & WDCMA Band V as below:

$$\sum_i \frac{S_i}{S_{Limit,i}} = 0.0199/1.0+0.0003/1.0+0.0630/0.5509=0.0199+0.0003+0.1144= 0.1346 < \mathbf{1.0}$$

Result: The device meet FCC MPE at 20 cm distance.

FCC §2.1047 - MODULATION CHARACTERISTIC

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.

FCC §2.1046; § 22.913 (a); § 24.232 (c); §27.50 (c) (d) - RF OUTPUT POWER

Applicable Standards

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts (38.45dBm).

According to FCC §2.1046 and §24.232 (c), mobile and portable stations are limited to 2 watts (33dBm) 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.

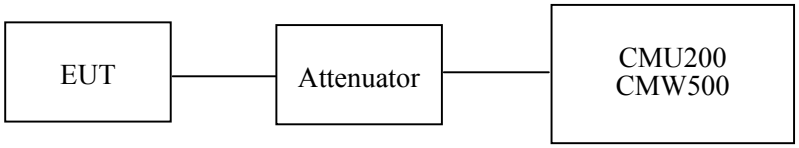
According to §27.50(c), the maximum EIRP must not exceed 3Watts (34.77dBm) for 699-716MHz.

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 CMU200 through sufficient attenuation.



Radiated Output Power:

The measurements procedures specified in ANSI/TIA-603-D were applied.

a) Connect the equipment as illustrated. Mount the equipment with the manufacturer specified antenna in a vertical orientation on a manufacturer specified mounting surface located on a non-conducting rotating platform of a RF anechoic chamber (preferred) or a standard radiation site.

b) Key the transmitter, then rotate the EUT 360o azimuthally and record spectrum analyzer power level (LVL) measurements at angular increments that are sufficiently small to permit resolution of all peaks. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading at each angular increment. (Note: several batteries may be needed to offset the effect of battery voltage droop, which should not exceed 5% of the manufactured specified battery voltage during transmission).

c) Replace the transmitter under test with a vertically polarized half-wave dipole (or an antenna whose gain is known relative to an ideal half-wave dipole). The center of the antenna should be at the same location as the center of the antenna under test.

d) Connect the antenna to a signal generator with a known output power and record the path loss (in dB) as LOSS. If a standard radiation test site is used,raise and lower the test antenna to obtain a maximum reading. LOSS = Generator Output Power (dBm) – Analyzer reading (dBm)

e) Determine the effective radiated output power at each angular position from the readings in steps b) and d) using the following equation:
ERP (dBm) = LVL (dBm) + LOSS (dB)

f) The maximum ERP is the maximum value determined in the preceding step.
(Note: Effective Isotropic Radiated Power (EIRP) can be computed using the following:
EIRP (dBm) = ERP (dBm) + 2.15 (dB)

Test Data

Environmental Conditions

Temperature:	23.2℃
Relative Humidity:	51 %
ATM Pressure:	101.3kPa

The testing was performed by Alisa Gao on 2018-07-14.

Conducted Power:

WCDMA Band V

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band V)	Normal	Rel 99	1	23.61	23.87	23.53
		HSDPA	1	23.56	23.75	23.46
			2	23.31	23.55	23.17
			3	23.09	23.23	22.93
			4	22.76	22.91	22.63
		HSUPA	1	23.45	23.53	23.34
			2	23.14	23.24	23.03
			3	22.82	22.93	22.78
			4	22.57	22.72	22.58
			5	22.26	22.43	22.26

WCDMA Band II

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band II)	Normal	Rel 99	1	23.59	23.68	23.80
		HSDPA	1	23.68	23.59	23.73
			2	23.36	23.32	23.50
			3	23.11	23.08	23.22
			4	22.89	22.84	23.02
		HSUPA	1	23.52	23.50	23.61
			2	23.21	23.26	23.37
			3	22.91	22.94	23.08
			4	22.59	22.70	22.83
			5	22.29	22.39	22.59

Maximum Output Power:

LTE Band 2

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4M	QPSK	1#0	22.54	22.79	22.62
		1#3	22.28	22.51	22.37
		1#5	22.04	22.23	22.11
		3#0	21.80	21.94	21.87
		3#1	21.55	21.77	21.59
		3#3	21.33	21.51	21.33
		6#0	21.18	21.33	21.17
	16-QAM	1#0	22.36	22.68	22.45
		1#3	22.14	22.39	22.27
		1#5	21.90	22.11	21.97
		3#0	21.69	21.92	21.79
		3#1	21.47	21.67	21.61
		3#3	21.21	21.50	21.36
		6#0	21.05	21.31	21.15
3M	QPSK	1#0	22.74	22.80	22.87
		1#7	22.57	22.52	22.61
		1#14	22.34	22.34	22.44
		8#0	22.15	22.06	22.26
		8#4	21.96	21.88	22.00
		8#7	21.80	21.62	21.80
		15#0	21.64	21.41	21.55
	16-QAM	1#0	22.46	22.78	22.39
		1#7	22.18	22.49	22.12
		1#14	21.92	22.27	21.96
		8#0	21.74	21.98	21.79
		8#4	21.57	21.72	21.61
		8#7	21.30	21.46	21.43
		15#0	21.13	21.23	21.23

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5M	QPSK	1#0	22.75	22.81	22.67
		1#12	22.53	22.52	22.46
		1#24	22.35	22.23	22.24
		12#0	22.06	22.01	21.95
		12#6	21.80	21.85	21.72
		12#11	21.51	21.67	21.53
		25#0	21.33	21.47	21.26
	16-QAM	1#0	22.69	22.59	22.46
		1#12	22.44	22.43	22.30
		1#24	22.20	22.18	22.04
		12#0	22.02	22.02	21.80
		12#6	21.84	21.77	21.59
		12#11	21.63	21.59	21.42
		25#0	21.41	21.41	21.14
10M	QPSK	1#0	22.72	22.88	22.72
		1#24	22.43	22.65	22.44
		1#49	22.23	22.47	22.17
		25#0	22.04	22.24	21.99
		25#12	21.86	22.06	21.77
		25#24	21.64	21.82	21.59
		50#0	21.46	21.67	21.32
	16-QAM	1#0	22.68	22.62	22.56
		1#24	22.40	22.46	22.30
		1#49	22.14	22.29	22.10
		25#0	21.89	22.02	21.94
		25#12	21.59	21.72	21.74
		25#24	21.44	21.55	21.55
		50#0	21.19	21.36	21.34

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15M	QPSK	1#0	22.71	22.72	22.65
		1#37	22.42	22.44	22.41
		1#74	22.13	22.27	22.14
		36#0	21.87	21.97	21.85
		36#17	21.64	21.81	21.56
		36#35	21.44	21.65	21.39
		75#0	21.25	21.36	21.15
	16-QAM	1#0	22.68	22.73	22.58
		1#37	22.48	22.56	22.28
		1#74	22.25	22.33	22.08
		36#0	22.04	22.06	21.92
		36#17	21.77	21.89	21.74
		36#35	21.54	21.67	21.46
		75#0	21.39	21.45	21.30
20M	QPSK	1#0	22.57	22.71	22.6
		1#49	22.34	22.44	22.35
		1#99	22.14	22.19	22.08
		50#0	21.86	21.92	21.80
		50#24	21.67	21.76	21.53
		50#49	21.38	21.59	21.36
		100#0	21.16	21.31	21.07
	16-QAM	1#0	22.69	22.33	22.85
		1#49	22.53	22.14	22.64
		1#99	22.29	21.92	22.34
		50#0	22.07	21.69	22.15
		50#24	21.79	21.41	21.89
		50#49	21.60	21.19	21.65
		100#0	21.33	21.03	21.37

LTE Band 4

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4M	QPSK	1#0	22.33	22.40	22.55
		1#3	22.05	22.24	22.27
		1#5	21.84	22.04	22.06
		3#0	21.59	21.78	21.87
		3#1	21.31	21.57	21.71
		3#3	21.16	21.31	21.55
		6#0	20.94	21.01	21.40
	16-QAM	1#0	22.32	22.28	22.17
		1#3	22.05	22.09	21.99
		1#5	21.77	21.93	21.79
		3#0	21.62	21.78	21.60
		3#1	21.33	21.48	21.42
		3#3	21.17	21.31	21.22
		6#0	21.01	21.13	21.06
3M	QPSK	1#0	22.50	22.73	22.64
		1#7	22.28	22.51	22.41
		1#14	22.10	22.27	22.14
		8#0	21.87	22.06	21.96
		8#4	21.69	21.86	21.74
		8#7	21.51	21.58	21.53
		15#0	21.32	21.33	21.31
	16-QAM	1#0	22.26	22.39	22.15
		1#7	22.04	22.11	21.91
		1#14	21.81	21.94	21.74
		8#0	21.53	21.75	21.54
		8#4	21.33	21.55	21.34
		8#7	21.19	21.29	21.18
		15#0	21.03	21.11	21.01

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5M	QPSK	1#0	22.56	22.50	22.40
		1#12	22.39	22.31	22.21
		1#24	22.16	22.02	22.00
		12#0	21.99	21.72	21.83
		12#6	21.69	21.47	21.62
		12#11	21.48	21.24	21.42
		25#0	21.20	21.00	21.23
	16-QAM	1#0	22.47	22.63	22.31
		1#12	22.18	22.41	22.14
		1#24	22.03	22.13	21.85
		12#0	21.83	21.98	21.70
		12#6	21.65	21.81	21.43
		12#11	21.37	21.56	21.22
		25#0	21.18	21.35	21.06
10M	QPSK	1#0	22.66	22.73	22.66
		1#24	22.42	22.54	22.42
		1#49	22.25	22.31	22.16
		25#0	22.05	22.10	21.88
		25#12	21.88	21.91	21.72
		25#24	21.68	21.70	21.56
		50#0	21.43	21.46	21.37
	16-QAM	1#0	22.35	22.53	22.32
		1#24	22.20	22.34	22.11
		1#49	21.97	22.14	21.86
		25#0	21.67	21.93	21.59
		25#12	21.42	21.64	21.34
		25#24	21.22	21.38	21.11
		50#0	21.06	21.21	21.02

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15M	QPSK	1#0	22.48	22.7	22.48
		1#37	22.27	22.42	22.32
		1#74	22.03	22.14	22.14
		36#0	21.85	21.89	21.85
		36#17	21.56	21.64	21.70
		36#35	21.31	21.37	21.44
		75#0	21.06	21.07	21.22
	16-QAM	1#0	22.39	22.37	22.29
		1#37	22.19	22.18	22.13
		1#74	22.00	21.89	21.87
		36#0	21.73	21.67	21.68
		36#17	21.55	21.42	21.47
		36#35	21.36	21.13	21.20
		75#0	21.15	21.02	21.05
20M	QPSK	1#0	22.56	22.36	22.56
		1#49	22.41	22.07	22.39
		1#99	22.24	21.91	22.19
		50#0	22.05	21.67	22.03
		50#24	21.78	21.39	21.82
		50#49	21.59	21.11	21.58
		100#0	21.41	21.01	21.30
	16-QAM	1#0	22.36	22.14	22.51
		1#49	22.11	21.96	22.29
		1#99	21.92	21.72	22.05
		50#0	21.74	21.54	21.89
		50#24	21.55	21.35	21.61
		50#49	21.38	21.18	21.38
		100#0	21.09	21.04	21.21

LTE Band 5

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4M	QPSK	1#0	22.43	22.53	22.69
		1#3	22.28	22.29	22.39
		1#5	21.94	22.03	22.18
		3#0	21.78	21.83	21.93
		3#1	21.45	21.59	21.71
		3#3	21.28	21.31	21.55
		6#0	21.03	21.07	21.33
	16-QAM	1#0	22.16	22.59	22.44
		1#3	21.95	22.43	22.20
		1#5	21.79	22.21	21.98
		3#0	21.56	21.93	21.77
		3#1	21.32	21.69	21.61
		3#3	21.11	21.41	21.35
		6#0	21.02	21.18	21.12
3M	QPSK	1#0	22.41	22.36	22.32
		1#7	22.15	22.20	22.12
		1#14	21.95	21.92	21.86
		8#0	21.67	21.77	21.68
		8#4	21.45	21.55	21.46
		8#7	21.24	21.37	21.29
		15#0	20.98	21.16	21.10
	16-QAM	1#0	22.54	22.41	22.32
		1#7	22.33	22.14	22.11
		1#14	22.15	21.89	21.91
		8#0	21.90	21.66	21.62
		8#4	21.71	21.40	21.36
		8#7	21.44	21.15	21.13
		15#0	21.20	21.03	21.01

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5M	QPSK	1#0	22.38	22.53	22.51
		1#12	22.10	22.33	22.34
		1#24	21.92	22.04	22.16
		12#0	21.65	21.83	21.95
		12#6	21.45	21.62	21.71
		12#11	21.16	21.45	21.56
		25#0	21.01	21.19	21.37
	16-QAM	1#0	22.54	22.21	22.70
		1#12	22.36	21.98	22.44
		1#24	22.20	21.74	22.28
		12#0	21.99	21.56	22.01
		12#6	21.75	21.37	21.82
		12#11	21.54	21.24	21.54
		25#0	21.26	21.04	21.37
10M	QPSK	1#0	22.45	22.53	22.46
		1#24	22.23	22.29	22.31
		1#49	22.01	22.11	22.03
		25#0	21.78	21.89	21.82
		25#12	21.53	21.71	21.55
		25#24	21.37	21.48	21.26
		50#0	21.08	21.23	20.96
	16-QAM	1#0	22.50	22.26	22.64
		1#24	22.22	21.99	22.46
		1#49	22.03	21.72	22.21
		25#0	21.74	21.47	21.96
		25#12	21.53	21.28	21.75
		25#24	21.28	21.12	21.55
		50#0	21.04	20.01	21.29

LTE Band 12

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4M	QPSK	1#0	22.33	22.53	22.33
		1#3	22.18	22.24	22.07
		1#5	21.95	22.05	21.83
		3#0	21.70	21.78	21.61
		3#1	21.53	21.50	21.37
		3#3	21.27	21.24	21.11
		6#0	21.08	21.05	21.02
	16-QAM	1#0	22.36	22.49	22.58
		1#3	22.10	22.28	22.29
		1#5	21.82	22.09	22.05
		3#0	21.66	21.91	21.80
		3#1	21.49	21.64	21.52
		3#3	21.26	21.38	21.29
		6#0	21.10	21.15	21.05
3M	QPSK	1#0	22.41	22.36	22.32
		1#7	22.14	22.20	22.11
		1#14	21.86	22.01	21.90
		8#0	21.62	21.75	21.61
		8#4	21.47	21.53	21.35
		8#7	21.31	21.23	21.20
		15#0	21.09	21.02	21.01
	16-QAM	1#0	22.51	22.45	22.18
		1#7	22.21	22.27	22.02
		1#14	22.03	22.12	21.83
		8#0	21.84	21.93	21.67
		8#4	21.62	21.74	21.49
		8#7	21.44	21.52	21.34
		15#0	21.26	21.33	21.08

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5M	QPSK	1#0	22.38	22.53	22.50
		1#12	22.14	22.30	22.32
		1#24	21.88	22.06	22.11
		12#0	21.67	21.84	21.83
		12#6	21.48	21.56	21.54
		12#11	21.28	21.34	21.31
		25#0	21.01	21.19	21.06
	16-QAM	1#0	22.54	22.31	22.36
		1#12	22.26	22.15	22.11
		1#24	22.01	21.99	21.91
		12#0	21.75	21.70	21.63
		12#6	21.52	21.51	21.46
		12#11	21.35	21.32	21.29
		25#0	21.17	21.02	21.07
10M	QPSK	1#0	22.45	22.53	22.46
		1#24	22.24	22.38	22.28
		1#49	21.96	22.11	22.11
		25#0	21.76	21.90	21.83
		25#12	21.53	21.61	21.58
		25#24	21.31	21.36	21.32
		50#0	21.12	21.12	21.14
	16-QAM	1#0	22.50	22.41	22.34
		1#24	22.22	22.21	22.16
		1#49	22.00	21.96	21.95
		25#0	21.76	21.75	21.73
		25#12	21.52	21.53	21.53
		25#24	21.34	21.37	21.30
		50#0	21.19	21.09	21.10

LTE Band 17

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5M	QPSK	1#0	22.84	22.48	22.75
		1#12	22.58	22.23	22.53
		1#24	22.38	22.03	22.37
		12#0	22.14	21.75	22.16
		12#6	21.91	21.53	21.92
		12#11	21.62	21.34	21.72
		25#0	21.37	21.10	21.49
	16-QAM	1#0	22.67	22.55	22.61
		1#12	22.50	22.28	22.41
		1#24	22.27	22.02	22.22
		12#0	22.05	21.79	21.99
		12#6	21.86	21.50	21.79
		12#11	21.65	21.24	21.62
		25#0	21.43	21.09	21.34
10M	QPSK	1#0	22.82	22.65	22.53
		1#24	22.54	22.44	22.37
		1#49	22.37	22.21	22.08
		25#0	22.13	22.04	21.78
		25#12	21.83	21.80	21.53
		25#24	21.68	21.54	21.34
		50#0	21.43	21.36	21.09
	16-QAM	1#0	22.46	22.59	22.38
		1#24	22.20	22.30	22.22
		1#49	21.95	22.07	22.04
		25#0	21.72	21.77	21.88
		25#12	21.44	21.54	21.64
		25#24	21.26	21.27	21.42
		50#0	21.01	21.12	21.16

Peak-to-average ratio (PAR):

WCDMA Band II

Mode	Channel	PAR (dB)	Limit (dB)
WCDMA (Rel99)	Low	2.86	≤ 13
	Middle	2.75	≤ 13
	High	2.73	≤ 13
WCDMA (HSDPA)	Low	2.45	≤ 13
	Middle	2.42	≤ 13
	High	2.21	≤ 13
WCDMA (HSUPA)	Low	2.56	≤ 13
	Middle	2.48	≤ 13
	High	2.42	≤ 13

LTE Band 2

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.72	≤ 13	Pass
QPSK (100%RB Size)	6.68	≤ 13	Pass
16QAM (1RB Size)	4.48	≤ 13	Pass
16QAM (100%RB Size)	5.94	≤ 13	Pass

LTE Band 4

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.79	≤ 13	Pass
QPSK (100%RB Size)	5.92	≤ 13	Pass
16QAM (1RB Size)	4.89	≤ 13	Pass
16QAM (100%RB Size)	5.63	≤ 13	Pass

LTE Band 12

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	3.98	≤ 13	Pass
QPSK (100%RB Size)	5.55	≤ 13	Pass
16QAM (1RB Size)	4.01	≤ 13	Pass
16QAM (100%RB Size)	5.65	≤ 13	Pass

LTE Band 17

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.45	≤ 13	Pass
QPSK (100%RB Size)	5.05	≤ 13	Pass
16QAM (1RB Size)	4.42	≤ 13	Pass
16QAM (100%RB Size)	5.29	≤ 13	Pass

Radiated Power:

WCDMA Mode

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
WCDMA Band V, Middle Channel(ERP)										
836.60	83.97	301	176	H	20.28	0.63	-1.14	18.51	38.45	19.94
836.60	88.44	59	238	V	21.29	0.63	-1.14	19.52	38.45	18.93
WCDMA Band II, Middle Channel(EIRP)										
1880.00	72.87	258	249	H	9.19	0.85	8.81	17.15	33	15.85
1880.00	75.58	135	200	V	11.47	0.85	8.81	19.43	33	13.57

EIRP:

LTE Band 2

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)			
QPSK, 1.4M BW, Middle Channel								
1880.00	H	73.01	11.60	0.85	8.81	19.56	33	13.44
1880.00	V	75.66	13.82	0.85	8.81	21.78	33	11.22
16-QAM, 1.4M BW, Middle Channel								
1880.00	H	72.93	11.52	0.85	8.81	19.48	33	13.52
1880.00	V	75.20	13.36	0.85	8.81	21.32	33	11.68
QPSK, 3M BW, Middle Channel								
1880.00	H	72.22	10.81	0.85	8.81	18.77	33	14.23
1880.00	V	75.02	13.18	0.85	8.81	21.14	33	11.86
16-QAM, 3M BW, Middle Channel								
1880.00	H	71.94	10.53	0.85	8.81	18.49	33	14.51
1880.00	V	75.00	13.16	0.85	8.81	21.12	33	11.88
QPSK, 5M BW, Middle Channel								
1880.00	H	70.39	8.98	0.85	8.81	16.94	33	16.06
1880.00	V	74.56	12.72	0.85	8.81	20.68	33	12.32
16-QAM, 5M BW, Middle Channel								
1880.00	H	70.20	8.79	0.85	8.81	16.75	33	16.25
1880.00	V	74.44	12.60	0.85	8.81	20.56	33	12.44
QPSK, 10M BW, Middle Channel								
1880.00	H	69.06	7.65	0.85	8.81	15.61	33	17.39
1880.00	V	74.37	12.53	0.85	8.81	20.49	33	12.51
16-QAM, 10M BW, Middle Channel								
1880.00	H	69.17	7.76	0.85	8.81	15.72	33	17.28
1880.00	V	74.46	12.62	0.85	8.81	20.58	33	12.42
QPSK, 15M BW, Middle Channel								
1880.00	H	68.98	7.57	0.85	8.81	15.53	33	17.47
1880.00	V	73.34	11.50	0.85	8.81	19.46	33	13.54
16-QAM, 15M BW, Middle Channel								
1880.00	H	69.13	7.72	0.85	8.81	15.68	33	17.32
1880.00	V	73.60	11.76	0.85	8.81	19.72	33	13.28
QPSK, 20M BW, Middle Channel								
1880.00	H	67.92	6.51	0.85	8.81	14.47	33	18.53
1880.00	V	72.52	10.68	0.85	8.81	18.64	33	14.36
16-QAM, 20M BW, Middle Channel								
1880.00	H	67.84	6.43	0.85	8.81	14.39	33	18.61
1880.00	V	72.60	10.76	0.85	8.81	18.72	33	14.28

LTE Band 4

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)			
QPSK, 1.4M BW, Middle Channel								
1732.50	H	74.96	12.65	0.84	8.57	20.38	30	9.62
1732.50	V	77.00	14.22	0.84	8.57	21.95	30	8.05
16-QAM, 1.4M BW, Middle Channel								
1732.50	H	74.86	12.55	0.84	8.57	20.28	30	9.72
1732.50	V	76.22	13.44	0.84	8.57	21.17	30	8.83
QPSK, 3M BW, Middle Channel								
1732.50	H	74.74	12.43	0.84	8.57	20.16	30	9.84
1732.50	V	75.78	13.00	0.84	8.57	20.73	30	9.27
16-QAM, 3M BW, Middle Channel								
1732.50	H	74.45	12.14	0.84	8.57	19.87	30	10.13
1732.50	V	75.09	12.31	0.84	8.57	20.04	30	9.96
QPSK, 5M BW, Middle Channel								
1732.50	H	74.04	11.73	0.84	8.57	19.46	30	10.54
1732.50	V	74.82	12.04	0.84	8.57	19.77	30	10.23
16-QAM, 5M BW, Middle Channel								
1732.50	H	73.61	11.30	0.84	8.57	19.03	30	10.97
1732.50	V	75.49	12.71	0.84	8.57	20.44	30	9.56
QPSK, 10M BW, Middle Channel								
1732.50	H	73.43	11.12	0.84	8.57	18.85	30	11.15
1732.50	V	74.97	12.19	0.84	8.57	19.92	30	10.08
16-QAM, 10M BW, Middle Channel								
1732.50	H	73.31	11.00	0.84	8.57	18.73	30	11.27
1732.50	V	74.81	12.03	0.84	8.57	19.76	30	10.24
QPSK, 15M BW, Middle Channel								
1732.50	H	73.23	10.92	0.84	8.57	18.65	30	11.35
1732.50	V	74.59	11.81	0.84	8.57	19.54	30	10.46
16-QAM, 15M BW, Middle Channel								
1732.50	H	73.45	11.14	0.84	8.57	18.87	30	11.13
1732.50	V	74.66	11.88	0.84	8.57	19.61	30	10.39
QPSK, 20M BW, Middle Channel								
1732.50	H	72.88	10.57	0.84	8.57	18.30	30	11.70
1732.50	V	73.79	11.01	0.84	8.57	18.74	30	11.26
16-QAM, 20M BW, Middle Channel								
1732.50	H	72.60	10.29	0.84	8.57	18.02	30	11.98
1732.50	V	73.43	10.65	0.84	8.57	18.38	30	11.62

LTE Band 5

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd)			
QPSK, 1.4M BW, Middle Channel								
836.50	H	83.92	20.23	0.63	-1.14	18.46	38.45	19.99
836.50	V	90.45	23.29	0.63	-1.14	21.52	38.45	16.93
16-QAM, 1.4M BW, Middle Channel								
836.50	H	83.83	20.14	0.63	-1.14	18.37	38.45	20.08
836.50	V	90.41	23.25	0.63	-1.14	21.48	38.45	16.97
QPSK, 3M BW, Middle Channel								
836.50	H	83.15	19.46	0.63	-1.14	17.69	38.45	20.76
836.50	V	89.90	22.74	0.63	-1.14	20.97	38.45	17.48
16-QAM, 3M BW, Middle Channel								
836.50	H	82.87	19.18	0.63	-1.14	17.41	38.45	21.04
836.50	V	89.76	22.60	0.63	-1.14	20.83	38.45	17.62
QPSK, 5M BW, Middle Channel								
836.50	H	82.70	19.01	0.63	-1.14	17.24	38.45	21.21
836.50	V	89.37	22.21	0.63	-1.14	20.44	38.45	18.01
16-QAM, 5M BW, Middle Channel								
836.50	H	82.01	18.32	0.63	-1.14	16.55	38.45	21.90
836.50	V	88.14	20.98	0.63	-1.14	19.21	38.45	19.24
QPSK, 10M BW, Middle Channel								
836.50	H	81.89	18.20	0.63	-1.14	16.43	38.45	22.02
836.50	V	88.11	20.95	0.63	-1.14	19.18	38.45	19.27
16-QAM, 10M BW, Middle Channel								
836.50	H	81.74	18.05	0.63	-1.14	16.28	38.45	22.17
836.50	V	87.99	20.83	0.63	-1.14	19.06	38.45	19.39

LTE Band 12

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd)			
QPSK, 1.4M BW, Middle Channel								
707.50	H	90.50	21.17	0.63	-1.14	19.40	34.77	15.37
707.50	V	91.40	23.46	0.63	-1.14	21.69	34.77	13.08
16-QAM, 1.4M BW, Middle Channel								
707.50	H	90.42	21.09	0.63	-1.14	19.32	34.77	15.45
707.50	V	91.19	23.25	0.63	-1.14	21.48	34.77	13.29
QPSK, 3M BW, Middle Channel								
707.50	H	90.14	20.81	0.63	-1.14	19.04	34.77	15.73
707.50	V	90.66	22.72	0.63	-1.14	20.95	34.77	13.82
16-QAM, 3M BW, Middle Channel								
707.50	H	89.97	20.64	0.63	-1.14	18.87	34.77	15.90
707.50	V	90.54	22.60	0.63	-1.14	20.83	34.77	13.94
QPSK, 5M BW, Middle Channel								
707.50	H	90.20	20.87	0.62	-1.71	18.54	34.77	16.23
707.50	V	90.60	22.66	0.62	-1.71	20.33	34.77	14.44
16-QAM, 5M BW, Middle Channel								
707.50	H	90.31	20.98	0.62	-1.71	18.65	34.77	16.12
707.50	V	90.73	22.79	0.62	-1.71	20.46	34.77	14.31
QPSK, 10M BW, Middle Channel								
707.50	H	90.18	20.85	0.62	-1.71	18.52	34.77	16.25
707.50	V	90.61	22.67	0.62	-1.71	20.34	34.77	14.43
16-QAM, 10M BW, Middle Channel								
707.50	H	89.93	20.60	0.62	-1.71	18.27	34.77	16.50
707.50	V	90.45	22.51	0.62	-1.71	20.18	34.77	14.59

LTE Band 17

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd)			
QPSK, 5M BW, Middle Channel								
710.00	H	91.76	22.38	0.62	-1.70	20.06	34.77	14.71
710.00	V	91.57	23.75	0.62	-1.70	21.43	34.77	13.34
16-QAM, 5M BW, Middle Channel								
710.00	H	91.47	22.09	0.62	-1.70	19.77	34.77	15.00
710.00	V	91.59	23.77	0.62	-1.70	21.45	34.77	13.32
QPSK, 10M BW, Middle Channel								
710.00	H	91.00	21.62	0.62	-1.70	19.30	34.77	15.47
710.00	V	91.38	23.56	0.62	-1.70	21.24	34.77	13.53
16-QAM, 10M BW, Middle Channel								
710.00	H	90.68	21.30	0.62	-1.70	18.98	34.77	15.79
710.00	V	90.86	23.04	0.62	-1.70	20.72	34.77	14.05

Note:
All above data were tested without amplifier.
Absolute Level (dBm) = Submitted Level (dBm) - Cable loss (dB) + Antenna Gain (dBd/dBi)
Margin (dB) = Limit (dBm) - Absolute Level (dBm)

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

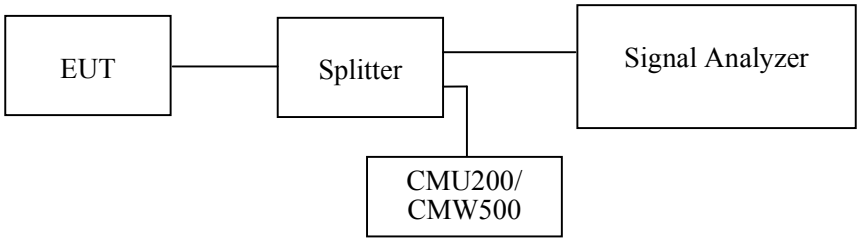
Applicable Standards

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

Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 5 kHz (Cellular /PCS) & 100 kHz (WCDMA), and the 26 dB & 99% bandwidth was recorded.



Test Data

Environmental Conditions

Temperature:	23.2℃
Relative Humidity:	51 %
ATM Pressure:	101.3kPa

The testing was performed by Alisa Gao from 2018-07-12 to 2018-07-16.

EUT operation mode: Transmitting

Test Result: Compliance.

WCDMA Band V

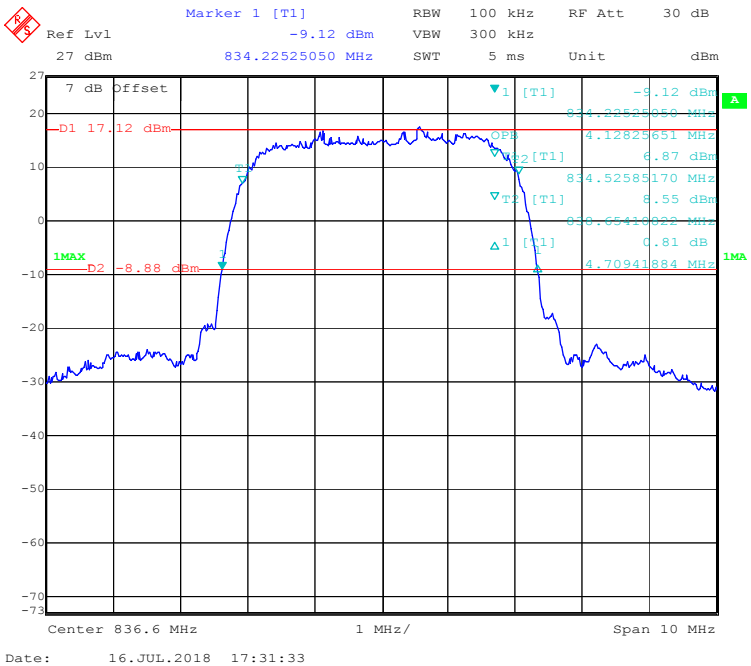
Mode	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
WCDMA (Rel 99)	836.6	4.709	4.128
WCDMA (HSDPA)	836.6	4.729	4.128
WCDMA (HSUPA)	836.6	4.709	4.128

WCDMA Band II

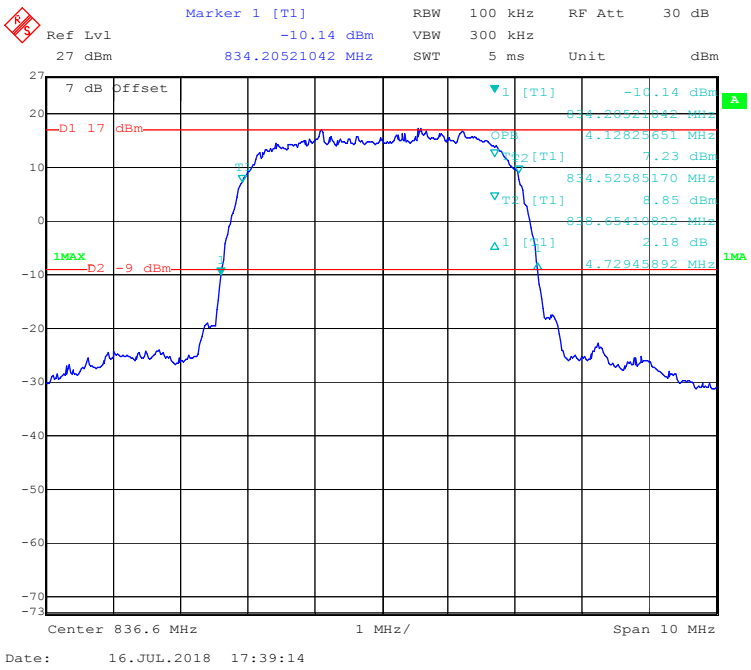
Mode	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
WCDMA (Rel 99)	1880.0	4.729	4.148
WCDMA (HSDPA)	1880.0	4.729	4.148
WCDMA (HSUPA)	1880.0	4.709	4.148

WCDMA Band V

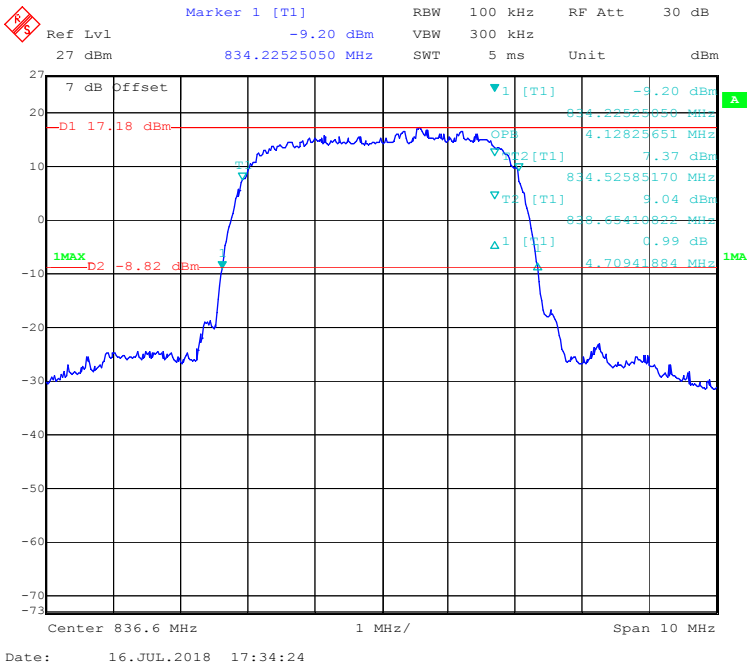
99% Occupied & 26 dB Emissions Bandwidth for WCDMA (Rel 99) Mode



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

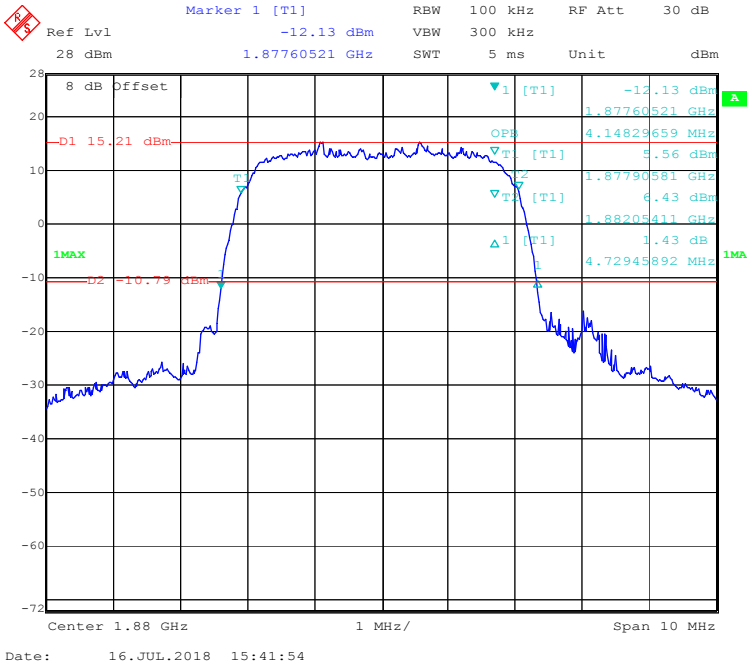


99% Occupied & 26 dB Emissions Bandwidth for WCDMA (HSUPA) Mode

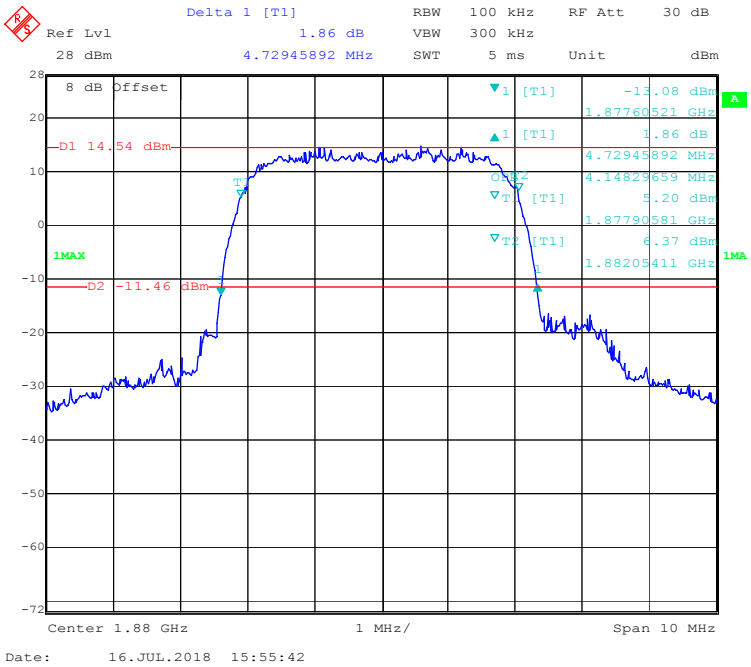


WCDMA Band II

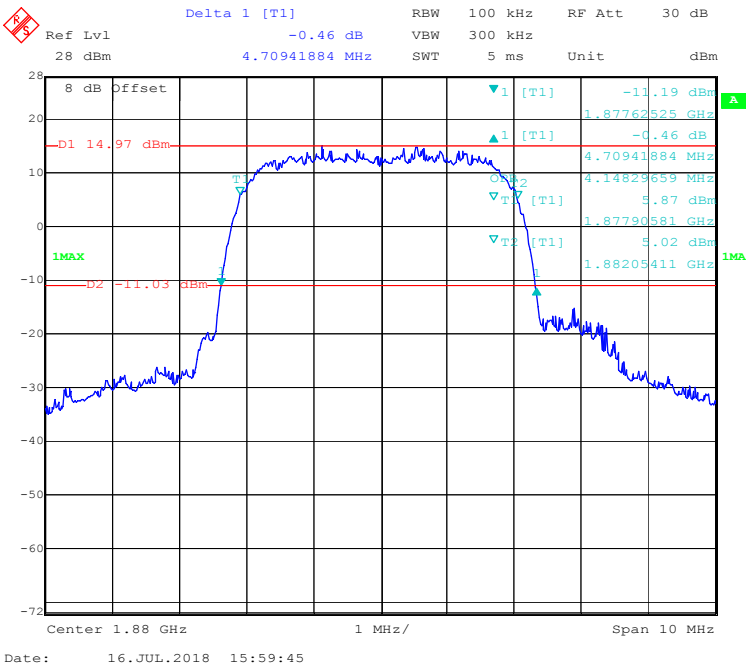
99% Occupied & 26 dB Emissions Bandwidth for WCDMA (Rel 99) Mode



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



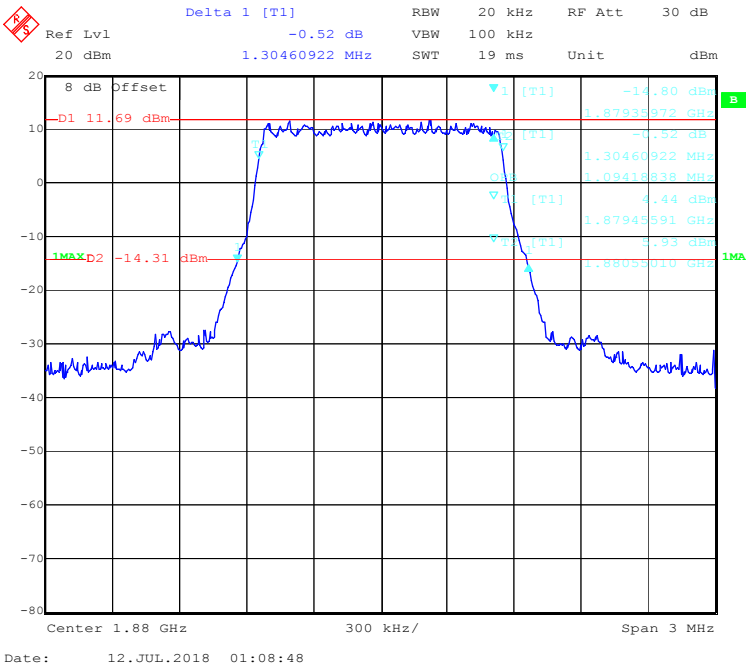
99% Occupied & 26 dB Emissions Bandwidth for WCDMA (HSUPA) Mode



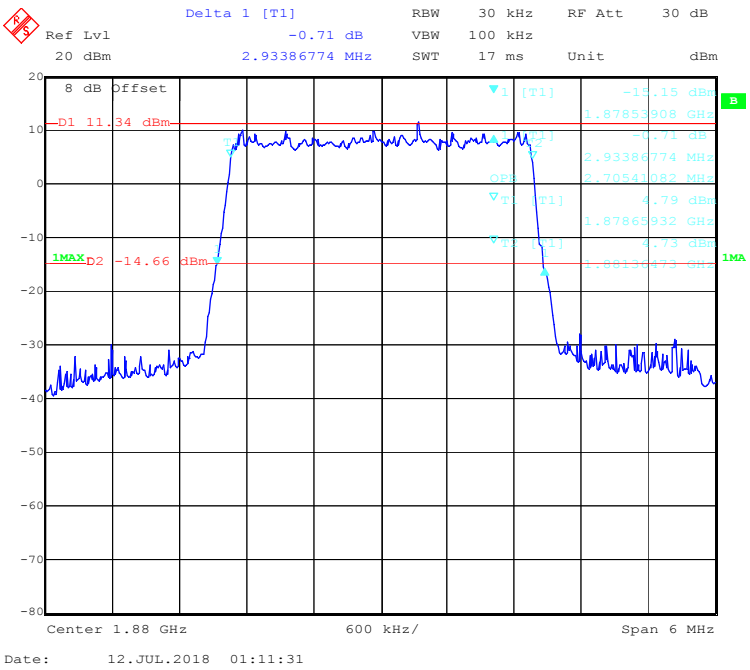
LTE Band 2:

Test Modulation	Test Bandwidth	Test Channel	26 dB Bandwidth	99% Occupied Bandwidth
			MHz	MHz
QPSK	1.4M	Middle	1.305	1.094
	3M		2.934	2.705
	5M		4.910	4.489
	10M		9.739	8.978
	15M		14.489	13.467
	20M		18.998	17.956
16-QAM	1.4M	Middle	1.287	1.094
	3M		2.943	2.705
	5M		4.890	4.489
	10M		9.739	8.978
	15M		14.609	13.467
	20M		19.238	17.956

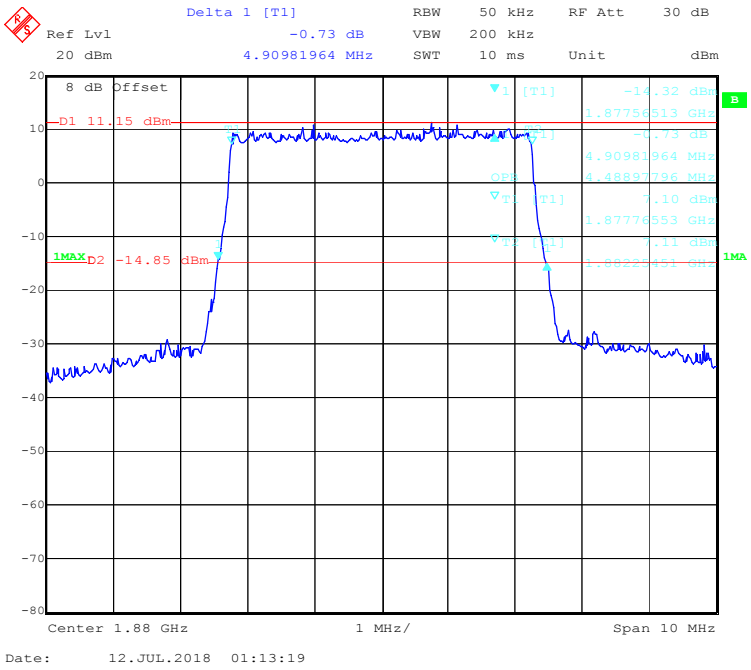
QPSK (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



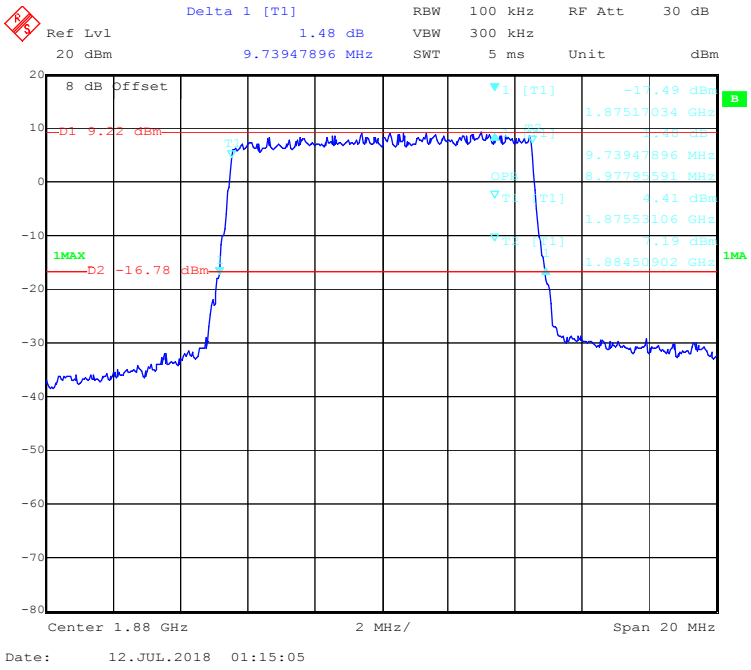
QPSK (3.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



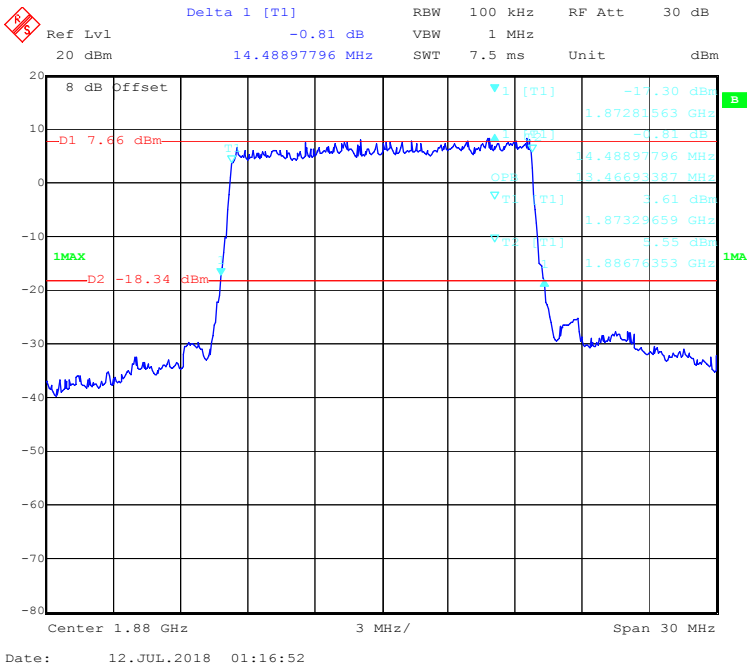
QPSK (5.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



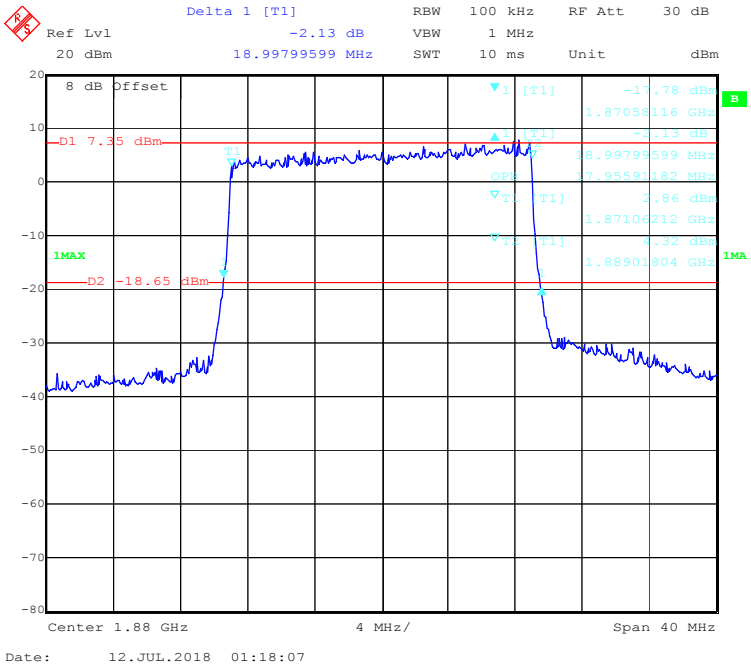
QPSK (10.0MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



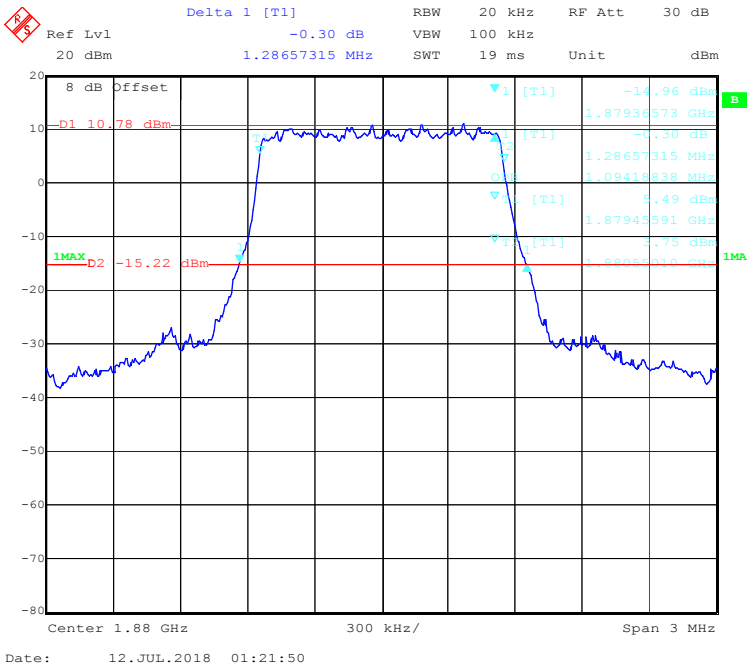
QPSK (15.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



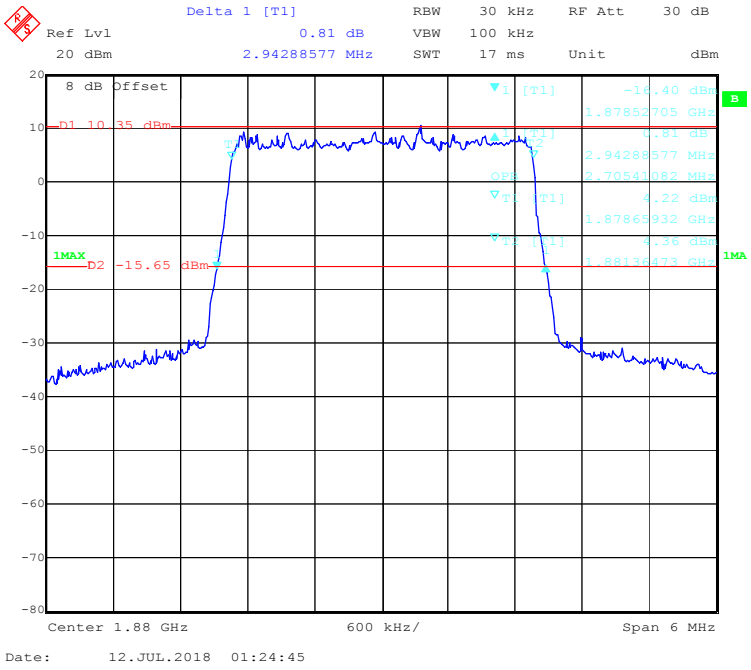
QPSK (20.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



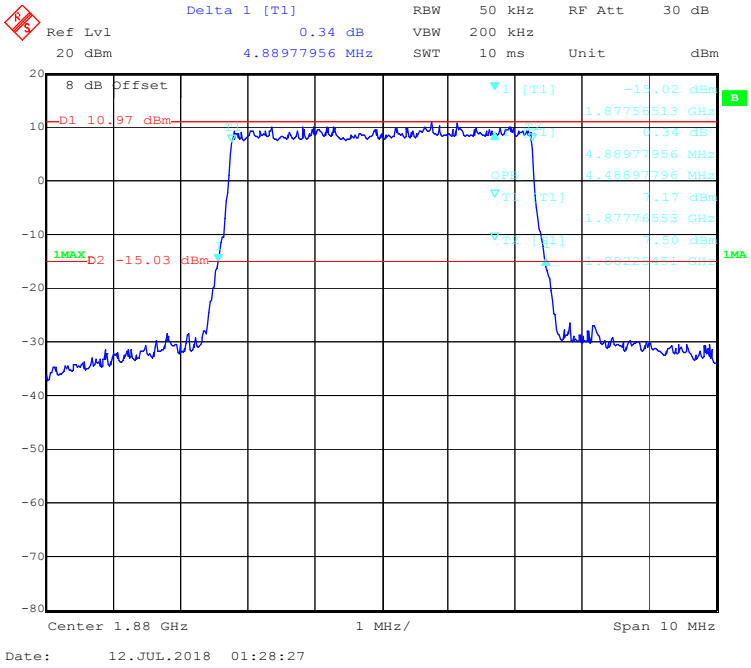
16-QAM (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



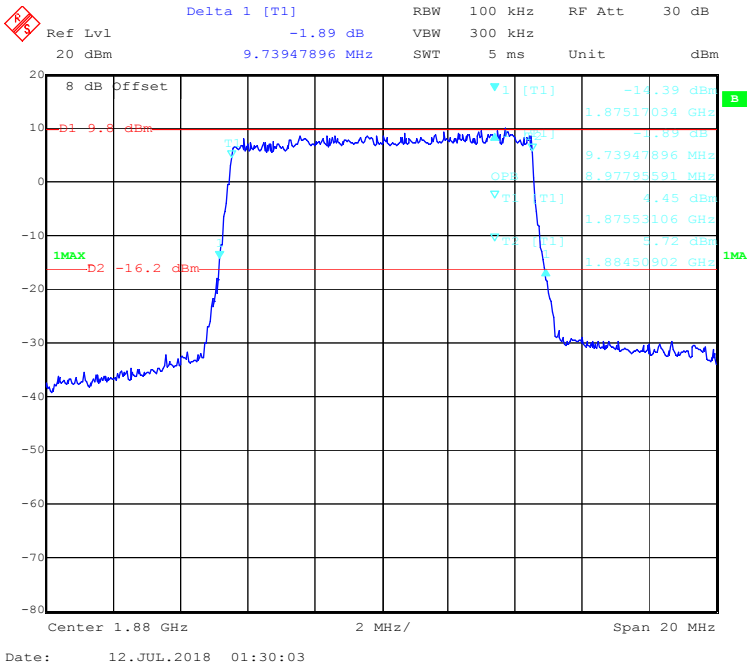
16-QAM (3.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



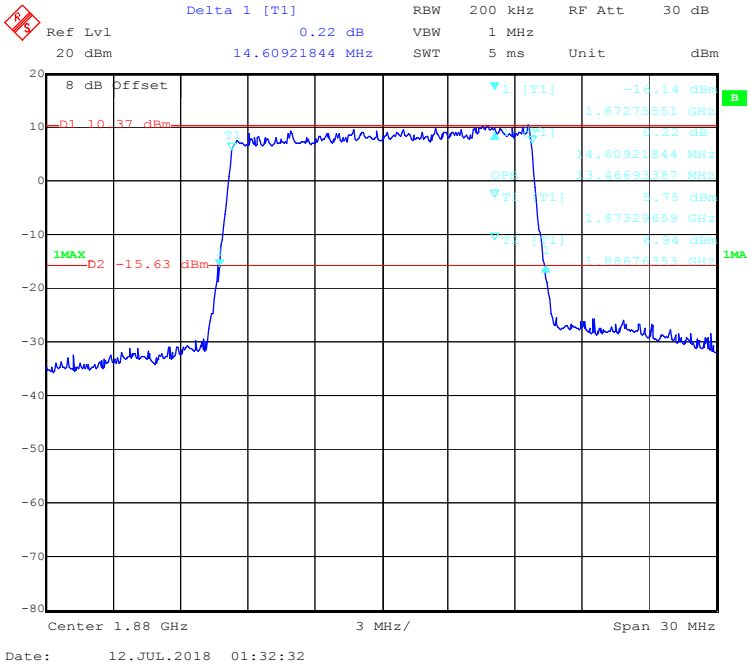
16-QAM (5.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



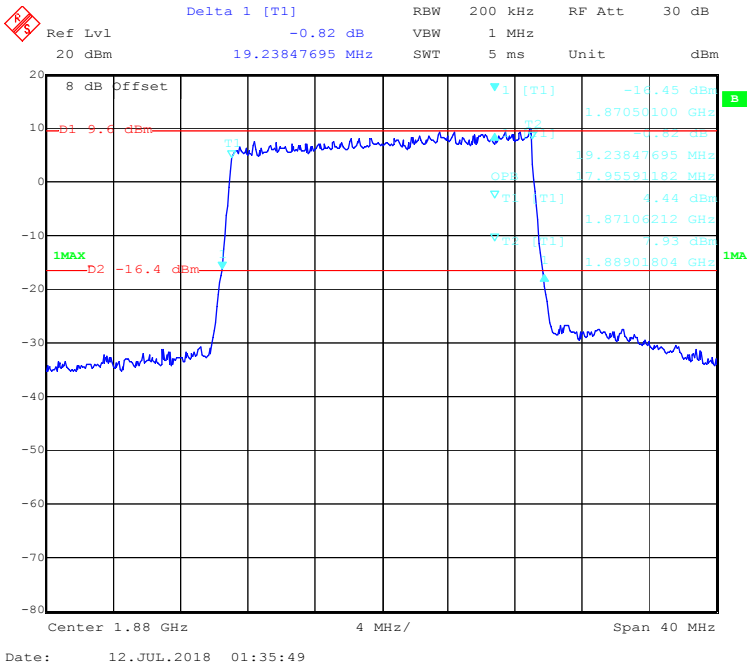
16-QAM (10.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



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



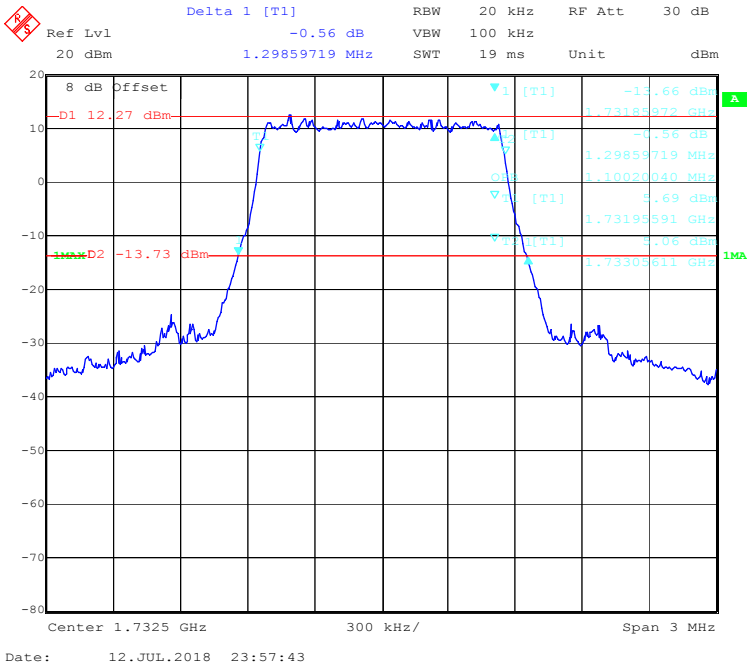
16-QAM (20.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



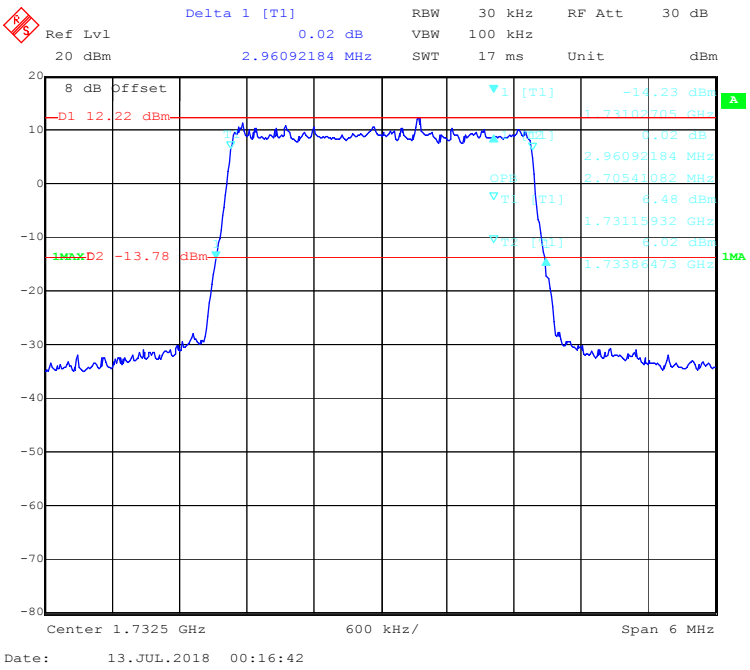
LTE Band 4:

Test Modulation	Test Bandwidth	Test Channel	26 dB Bandwidth	99% Occupied Bandwidth
			MHz	MHz
QPSK	1.4M	Middle	1.299	1.100
	3M		2.961	2.705
	5M		4.905	4.489
	10M		9.630	8.978
	15M		14.609	13.467
	20M		19.158	17.876
16-QAM	1.4M	Middle	1.281	1.094
	3M		2.946	2.705
	5M		4.910	4.489
	10M		9.830	8.978
	15M		14.729	13.467
	20M		19.158	17.876

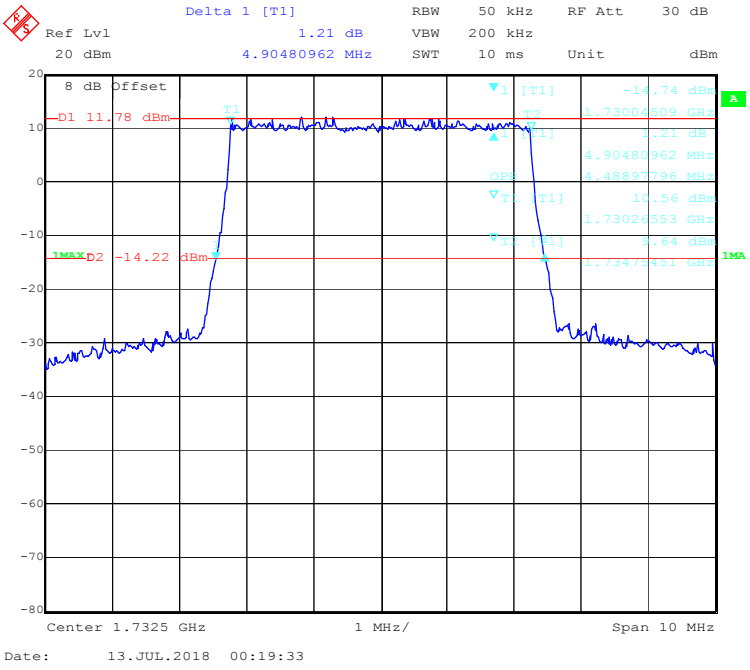
QPSK (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



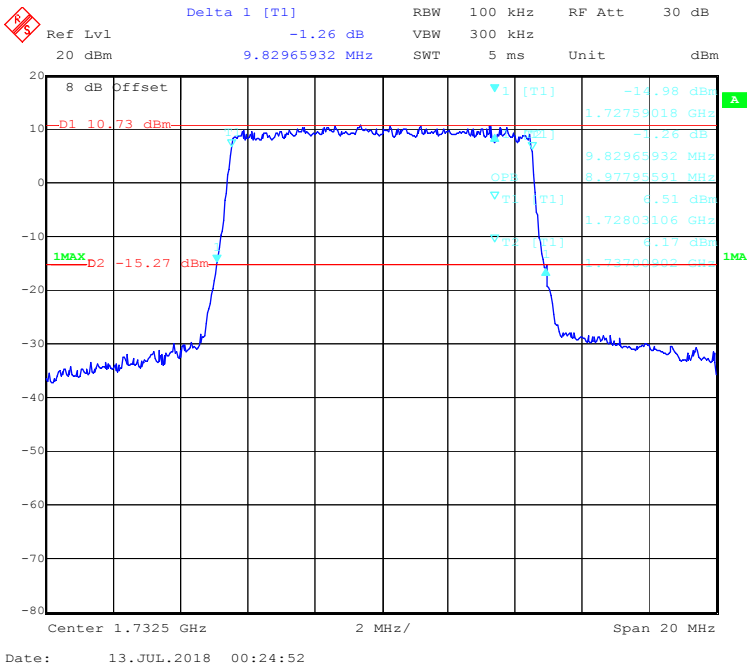
QPSK (3.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



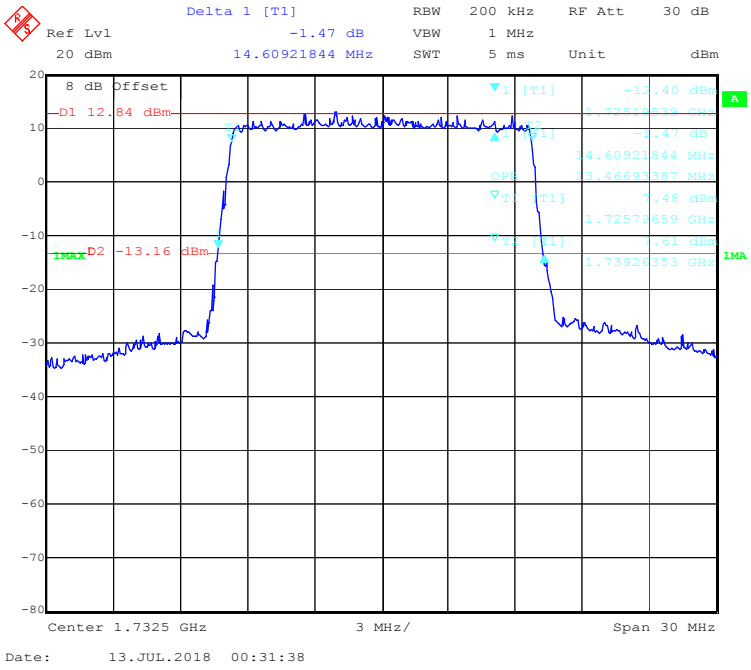
QPSK (5.0MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



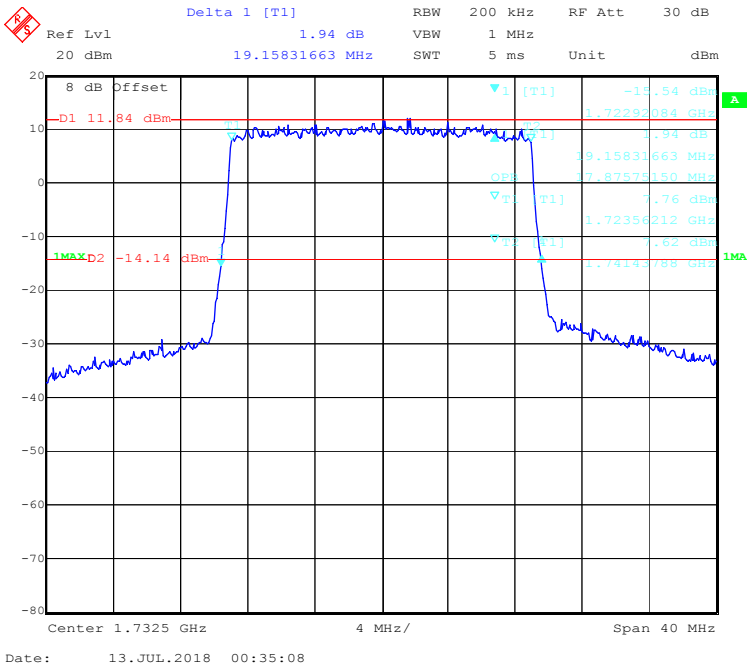
QPSK (10.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



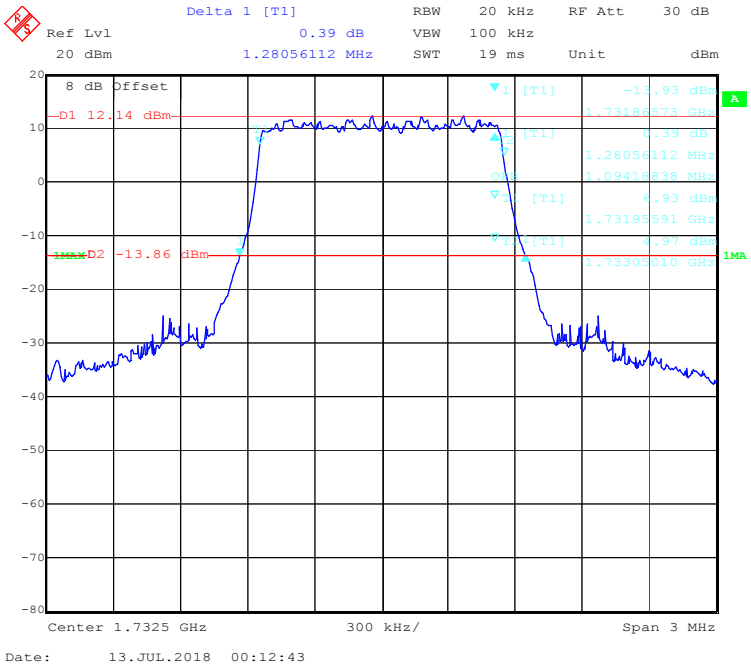
QPSK (15.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



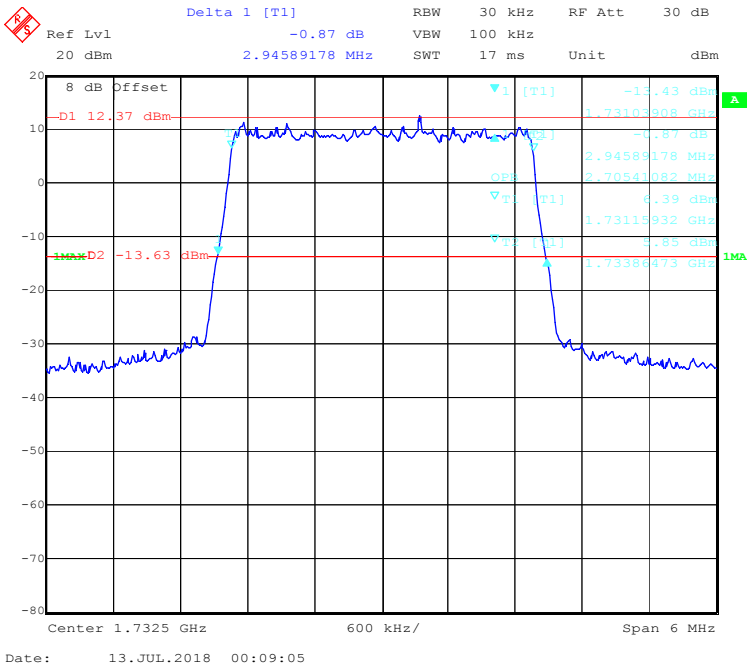
QPSK (20.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



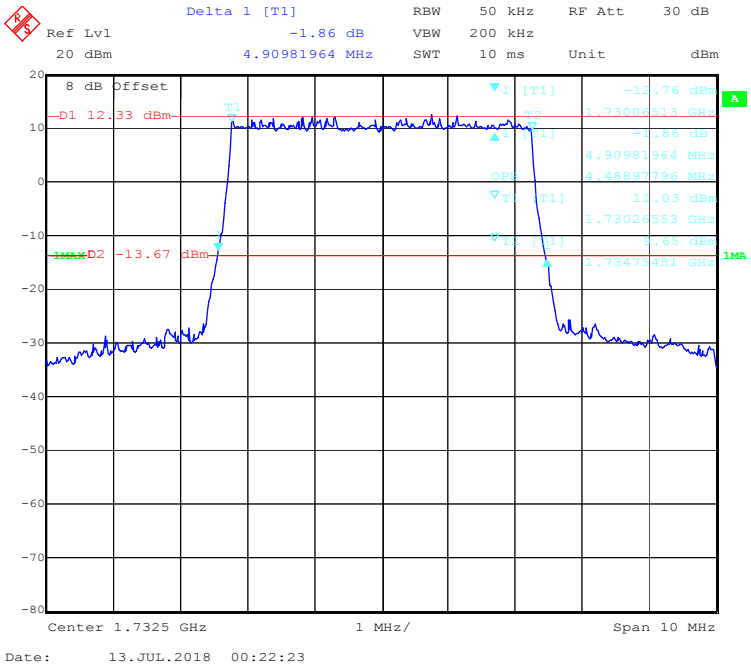
16-QAM (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



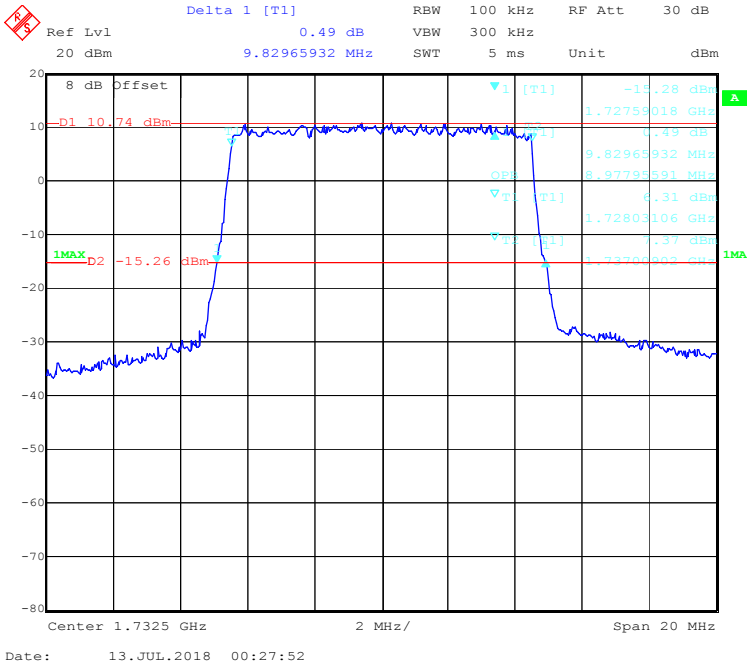
16-QAM (3.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



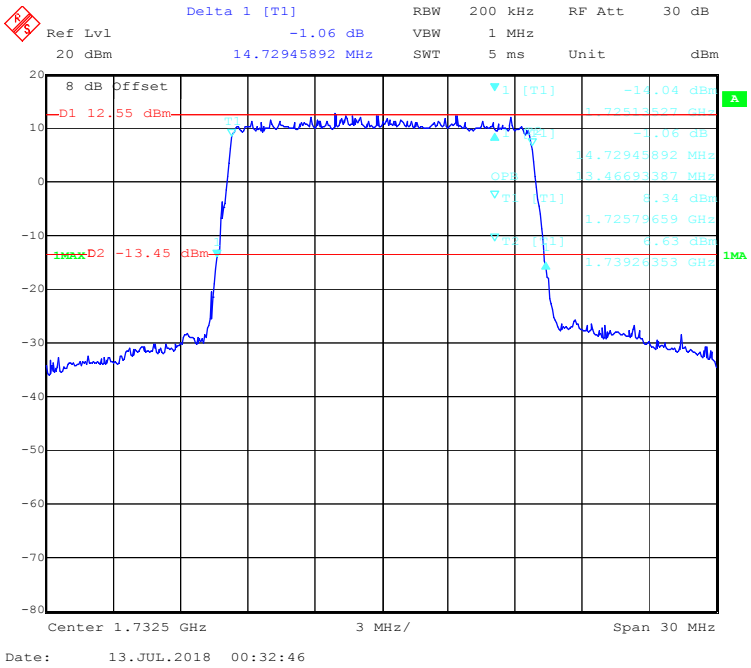
16-QAM (5.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



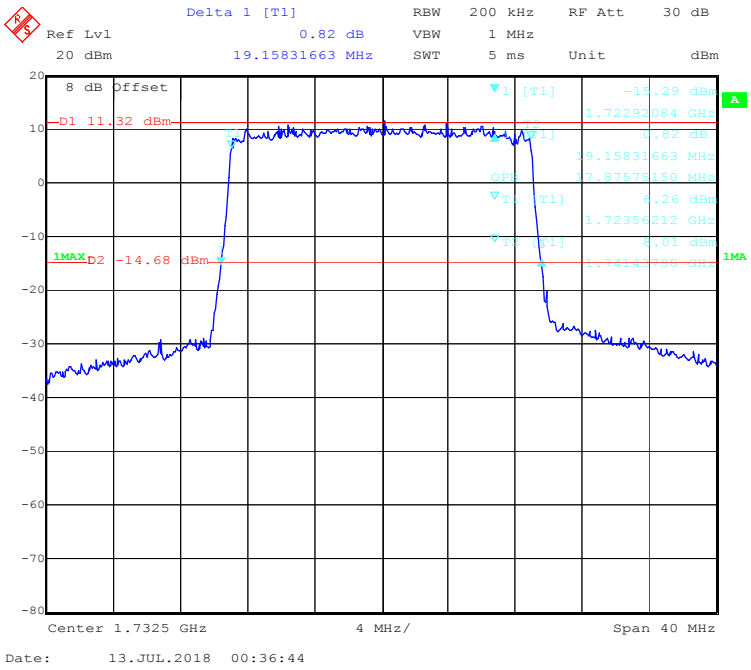
16-QAM (10.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



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



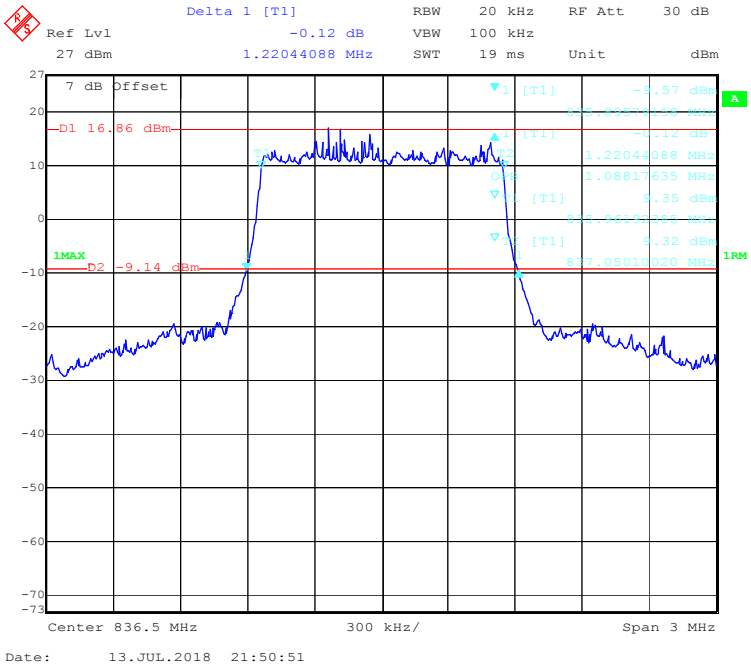
16-QAM (20.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



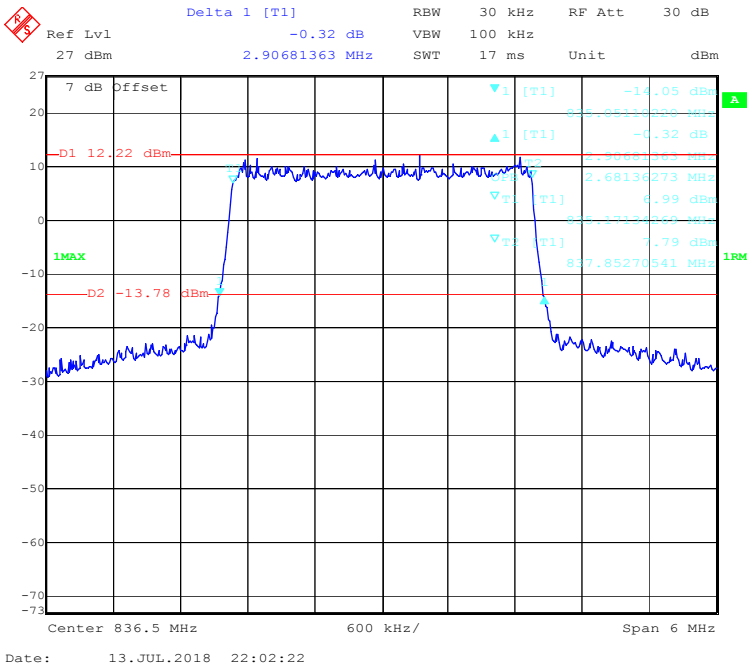
LTE Band 5:

Test Modulation	Test Bandwidth	Test Channel	26 dB Bandwidth	99% Occupied Bandwidth
			MHz	MHz
QPSK	1.4M	Middle	1.220	1.088
	3M		2.907	2.681
	5M		4.890	4.489
	10M		9.699	8.978
16-QAM	1.4M	Middle	1.244	1.094
	3M		2.907	2.705
	5M		4.890	4.489
	10M		9.699	8.978

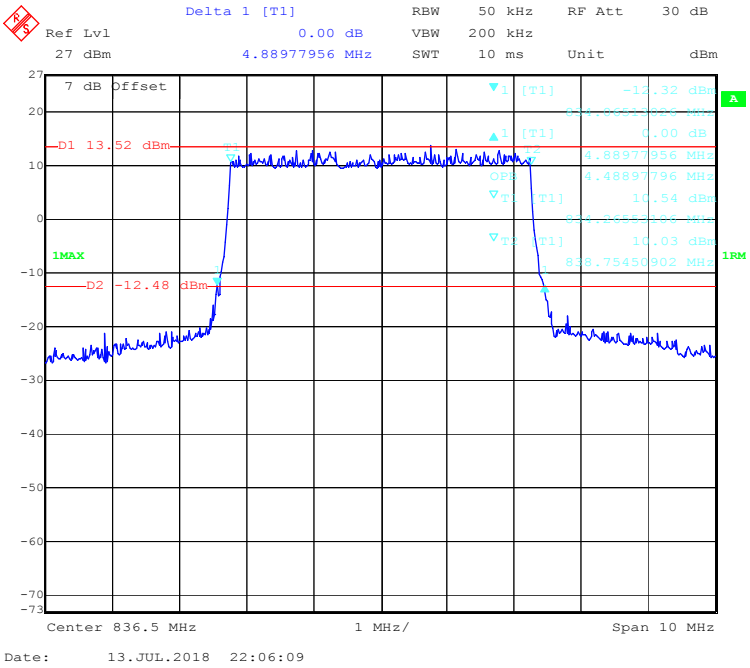
QPSK (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



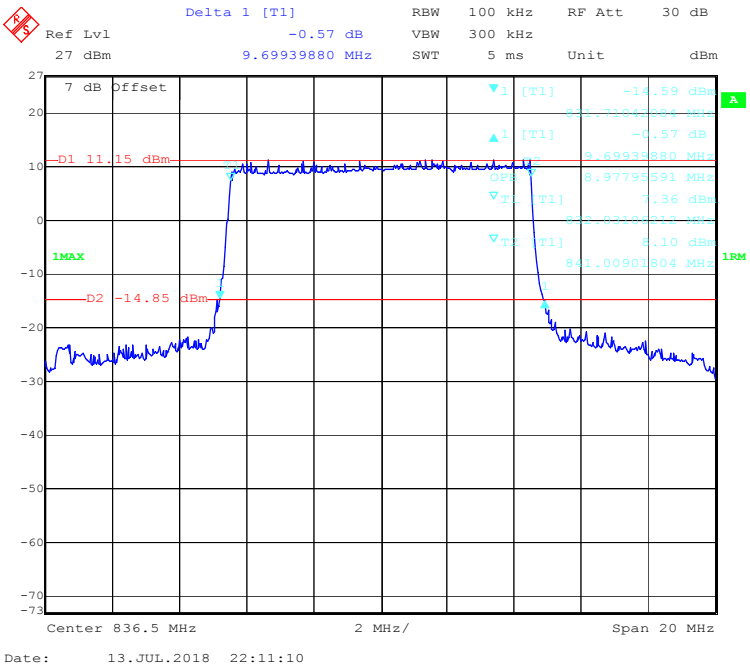
QPSK (3.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



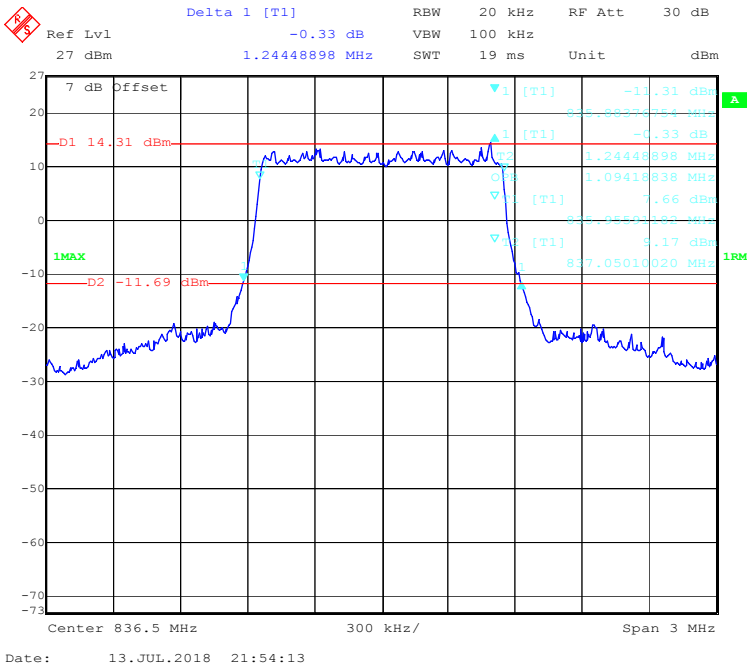
QPSK (5.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



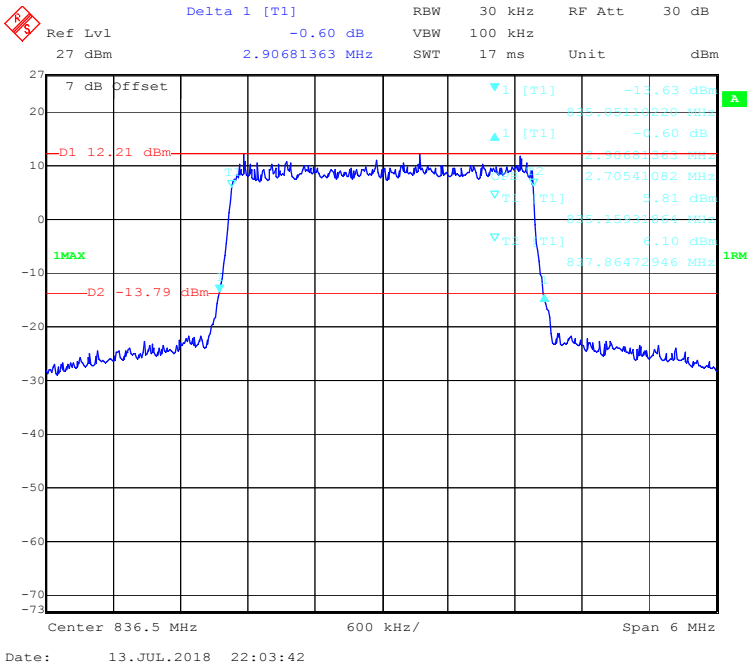
QPSK (10.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



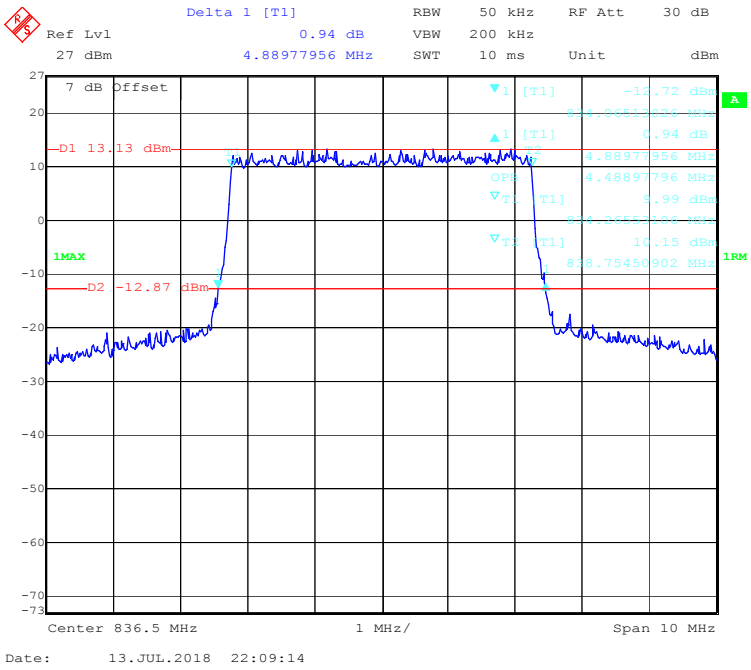
16-QAM (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



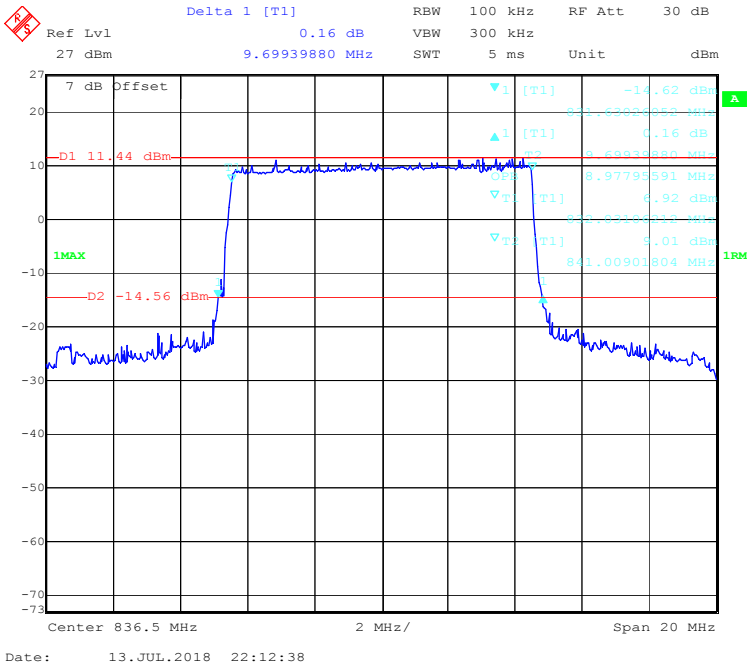
16-QAM (3.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



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



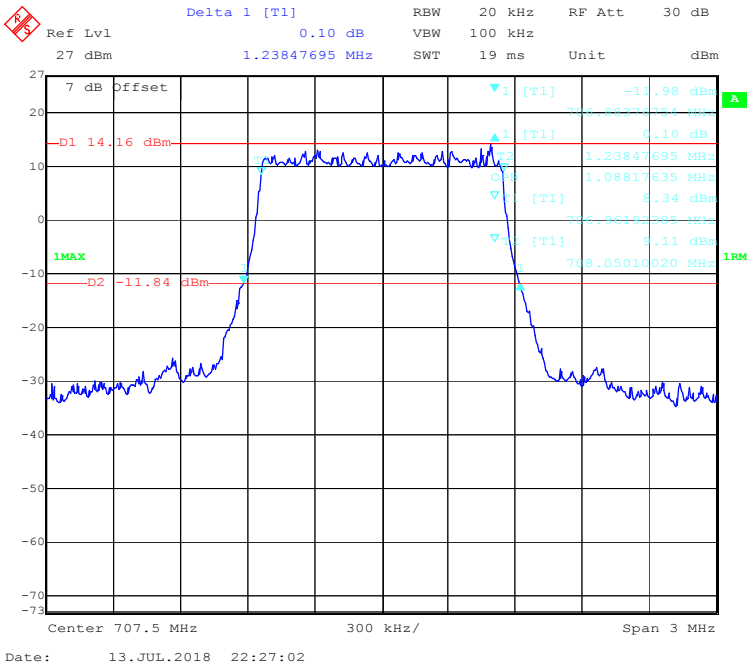
16-QAM (10.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



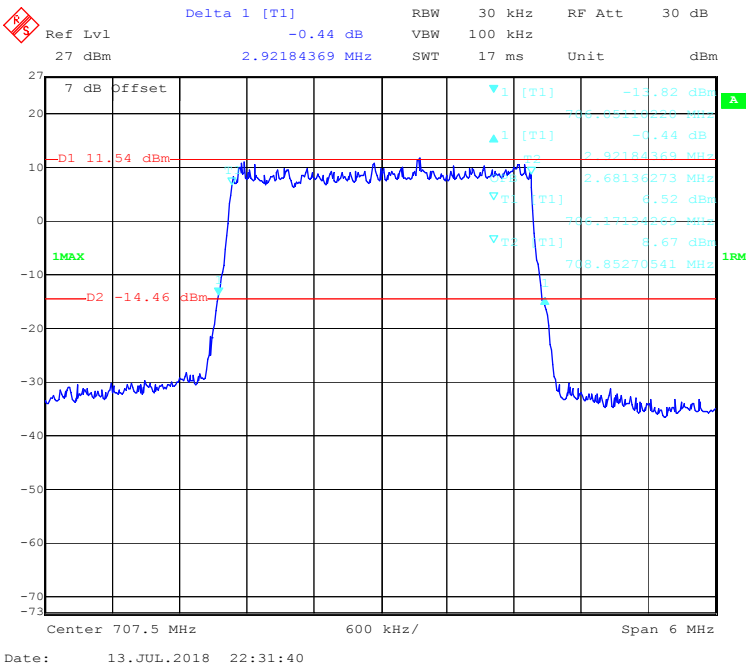
LTE Band 12:

Test Modulation	Test Bandwidth	Test Channel	26 dB Bandwidth	99% Occupied Bandwidth
			MHz	MHz
QPSK	1.4M	Middle	1.238	1.088
	3M		2.922	2.681
	5M		4.830	4.489
	10M		9.629	8.978
16-QAM	1.4M	Middle	1.263	1.094
	3M		2.922	2.693
	5M		4.870	4.489
	10M		9.669	8.978

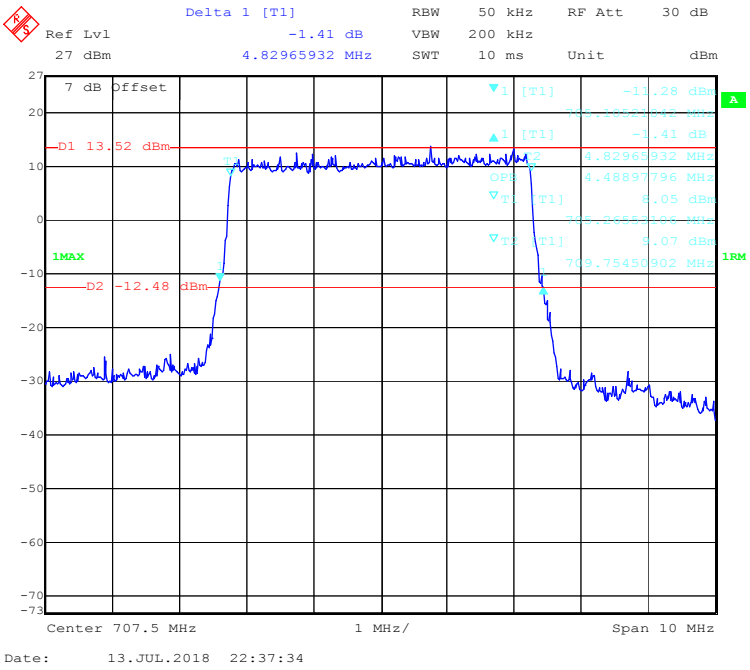
QPSK (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



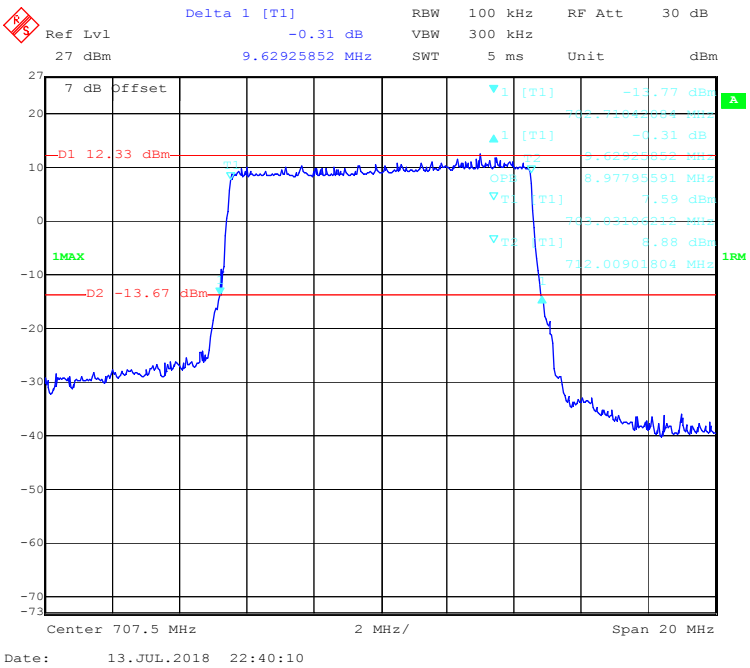
QPSK (3.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



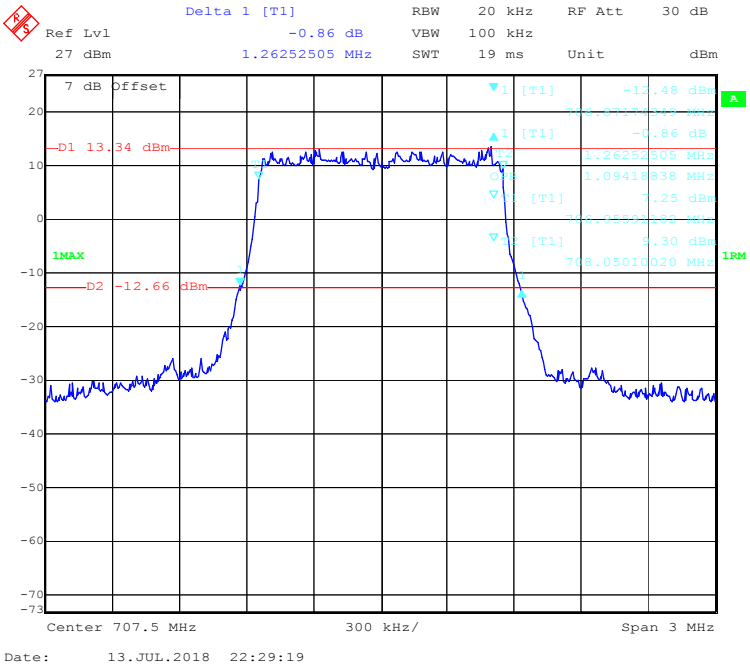
QPSK (5.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



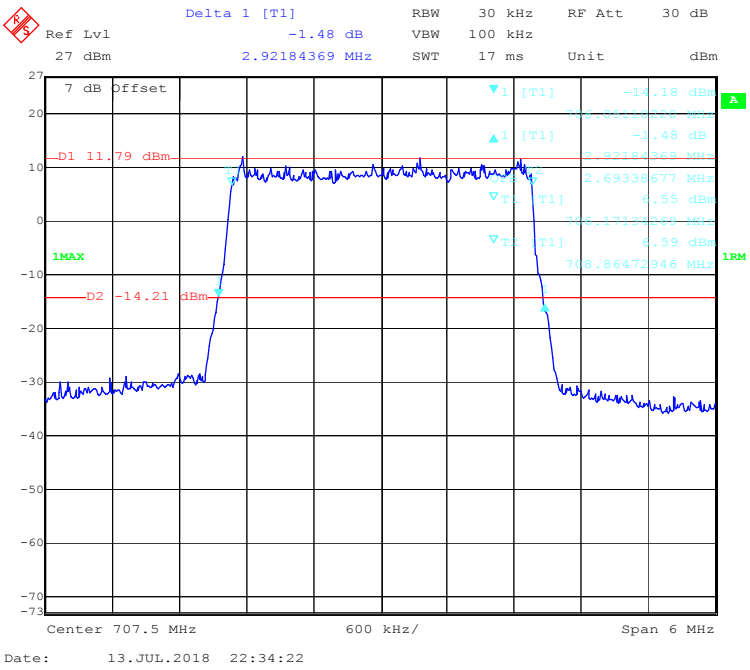
QPSK (10.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



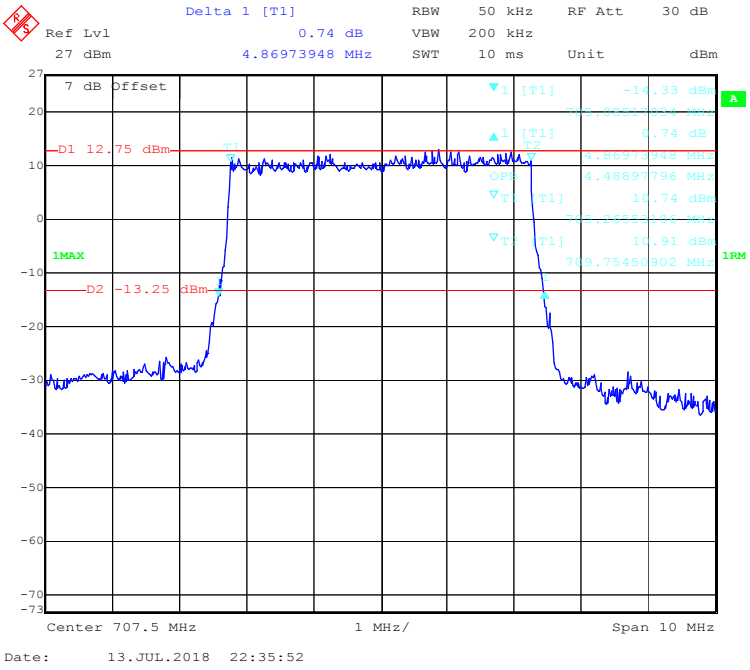
16-QAM (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



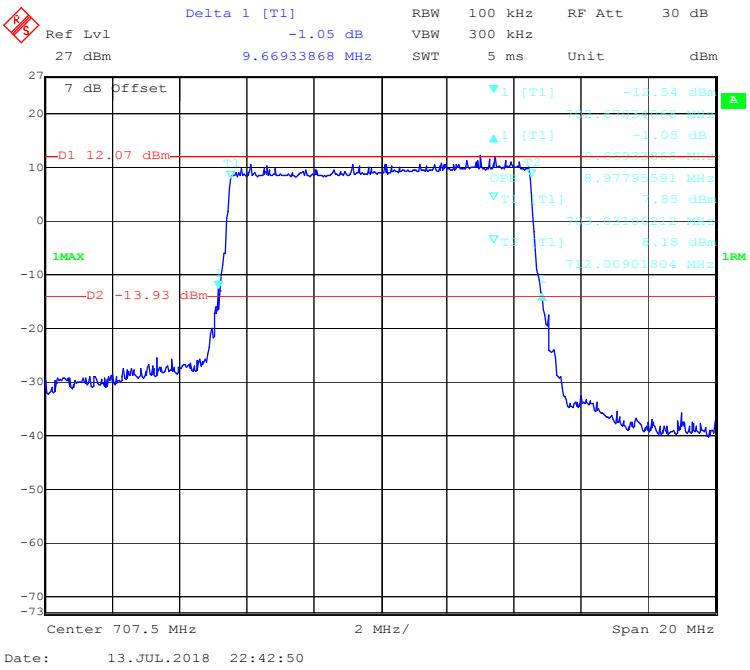
16-QAM (3.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



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



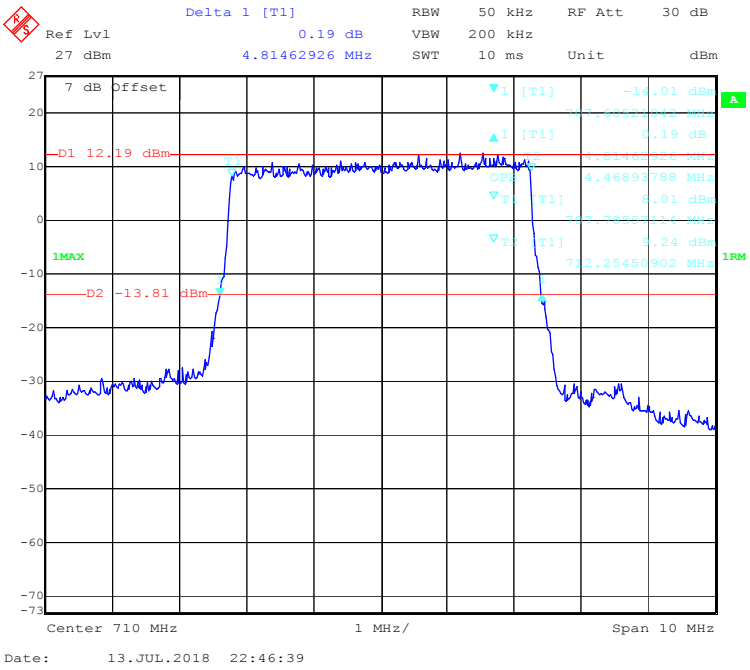
16-QAM (10.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



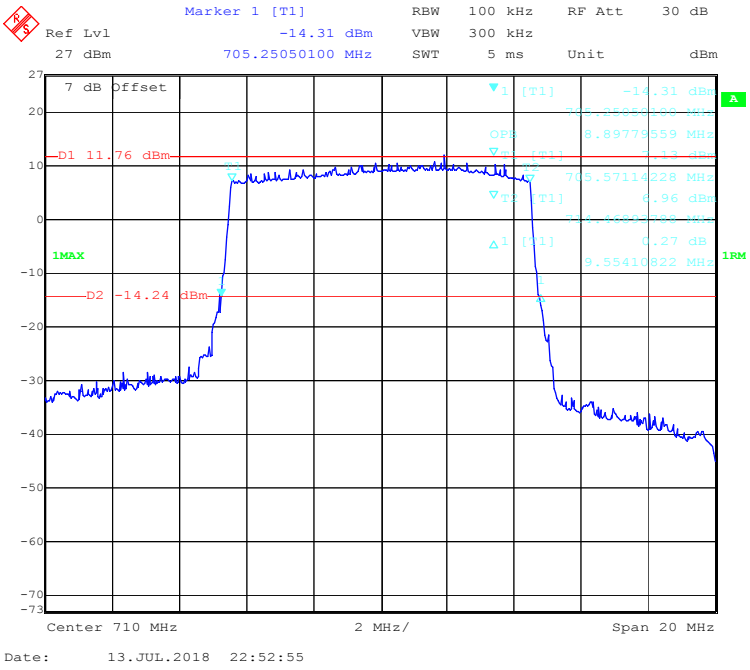
LTE Band 17:

Test Modulation	Test Bandwidth	Test Channel	26 dB Bandwidth	99% Occupied Bandwidth
			MHz	MHz
QPSK	5M	Middle	4.815	4.469
	10M		9.554	8.898
16-QAM	5M	Middle	4.835	4.469
	10M		9.594	8.898

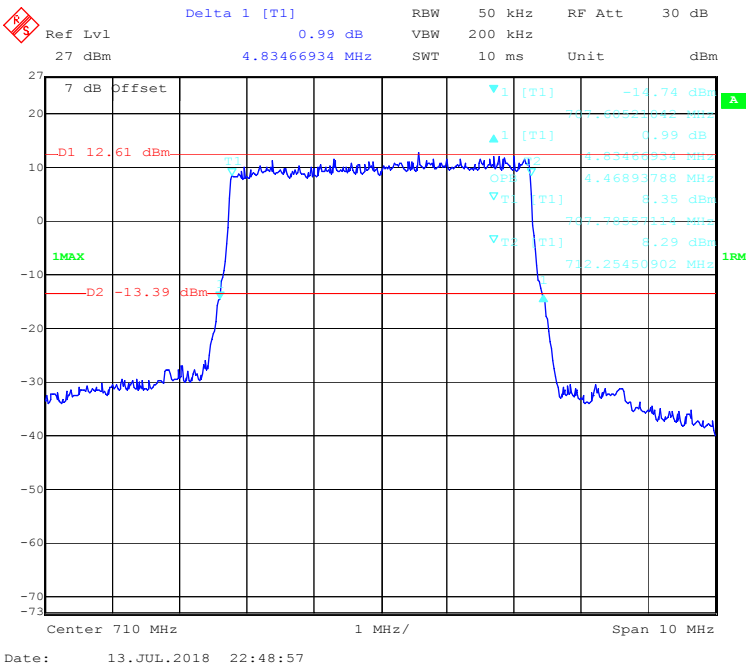
QPSK (5.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



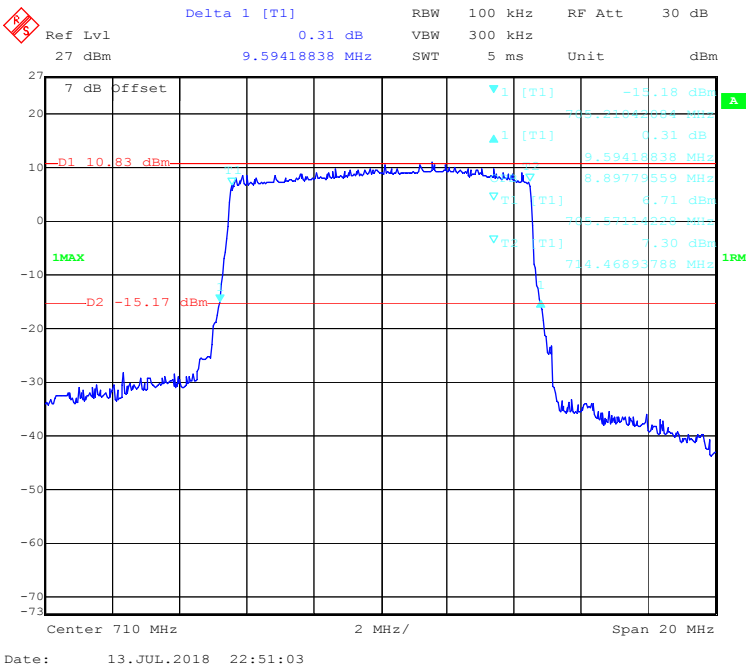
QPSK (10.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



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



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



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

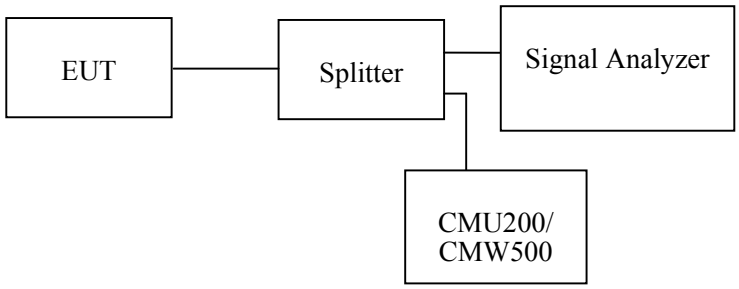
Applicable Standards

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 100 kHz for below 1GHz & 1MHz for above 1GHz. sufficient scans were taken to show any out of band emissions up to 10th harmonic.



Test Data

Environmental Conditions

Temperature:	23.2℃
Relative Humidity:	51 %
ATM Pressure:	101.3kPa

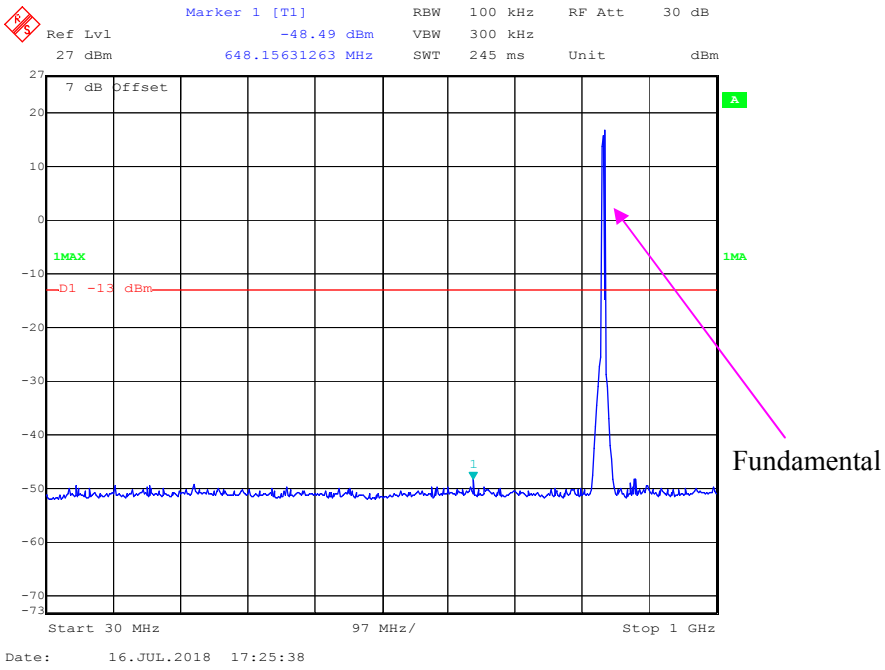
The testing was performed by Alisa Gao from 2018-07-13 to 2018-07-16.

EUT operation mode: Transmitting

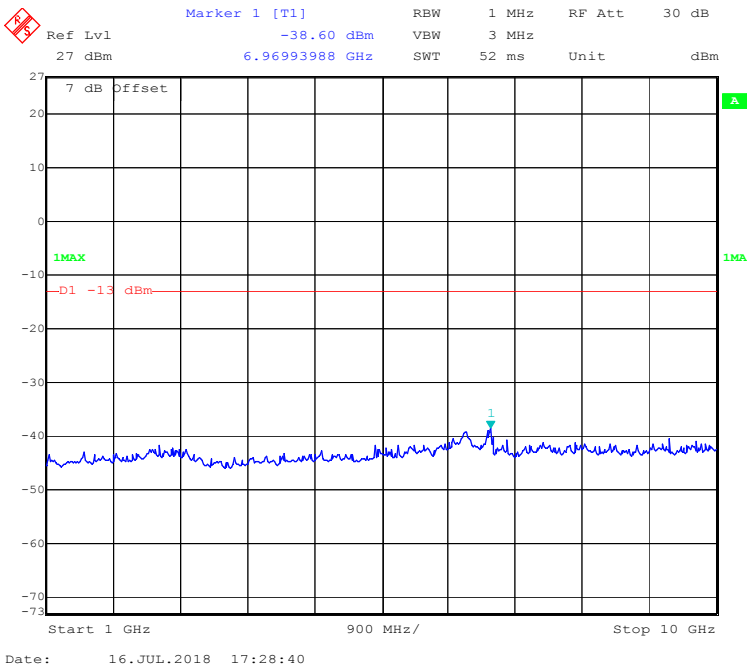
Test Result: Compliance.

WCDMA Band V:

30 MHz – 1GHz(WCDMA Mode)

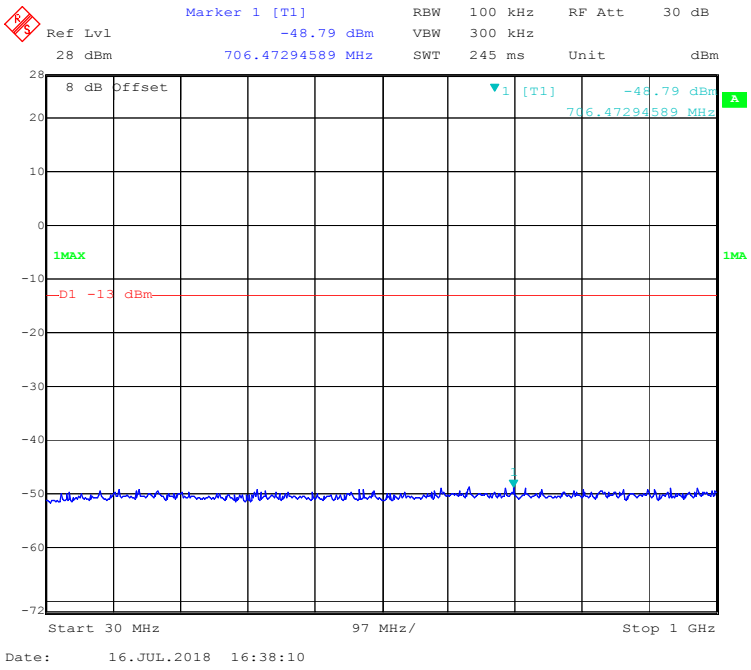


1 GHz – 10 GHz (WCDMA Mode)

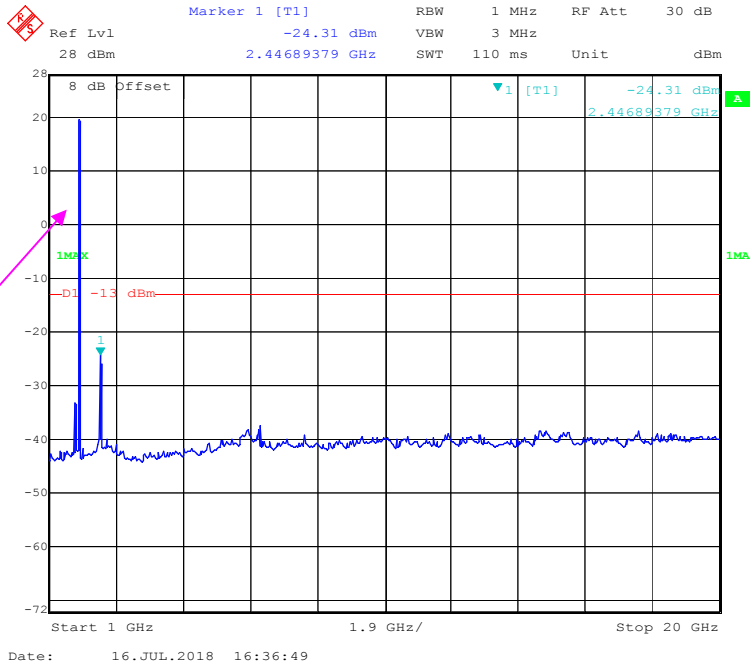


WCDMA Band II:

30 MHz – 1GHz(WCDMA Mode)



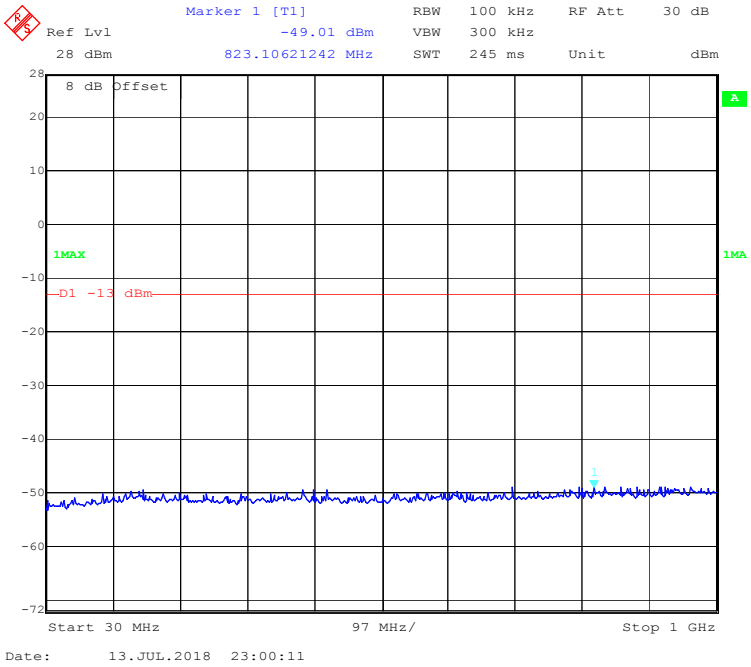
1 GHz – 20 GHz (WCDMA Mode)



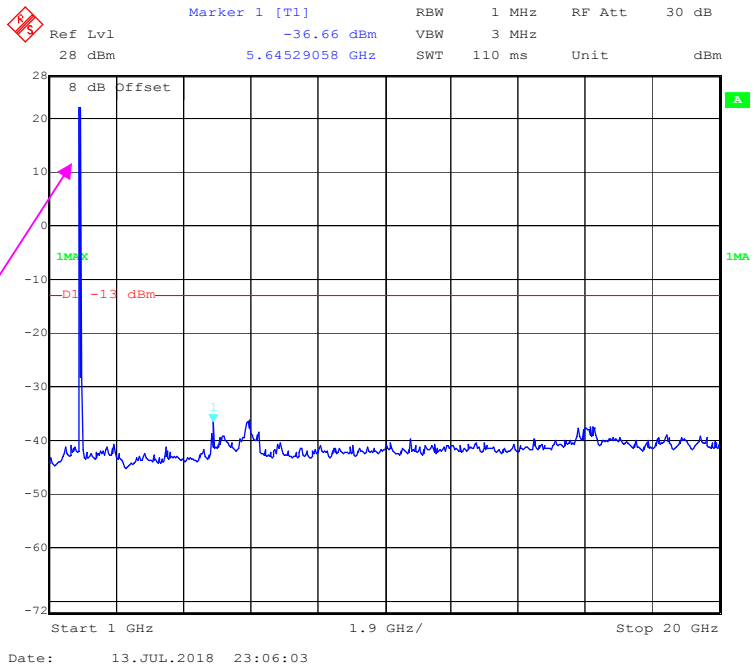
Fundamental

LTE Band 2:

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

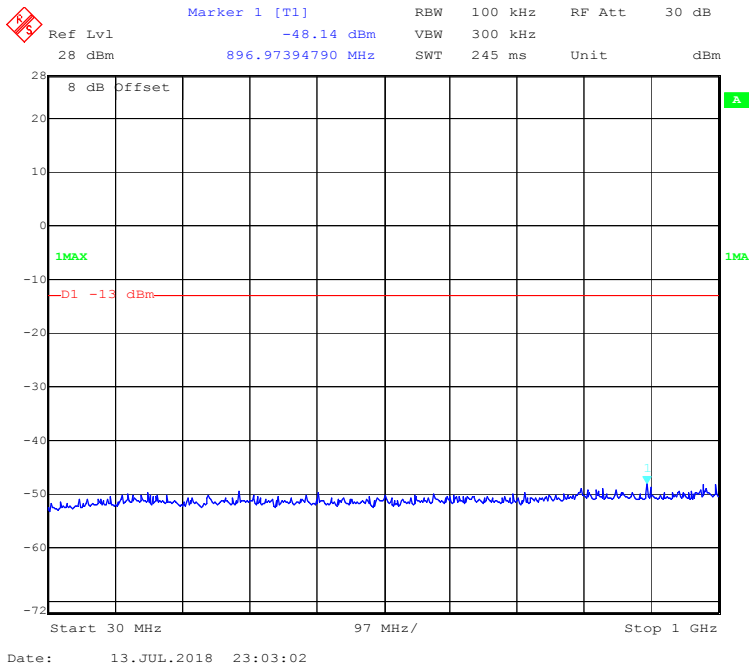


1 GHz – 20 GHz (1.4 MHz, Middle Channel)

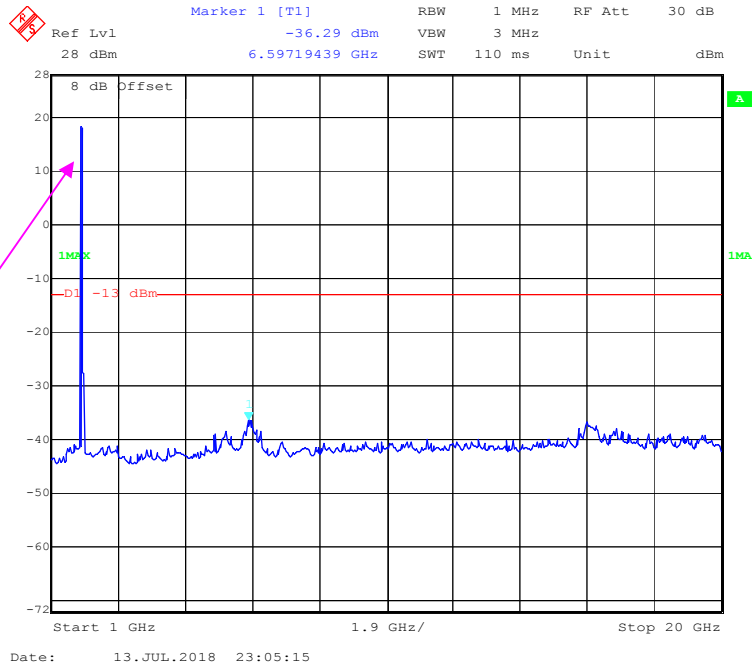


Fundamental

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

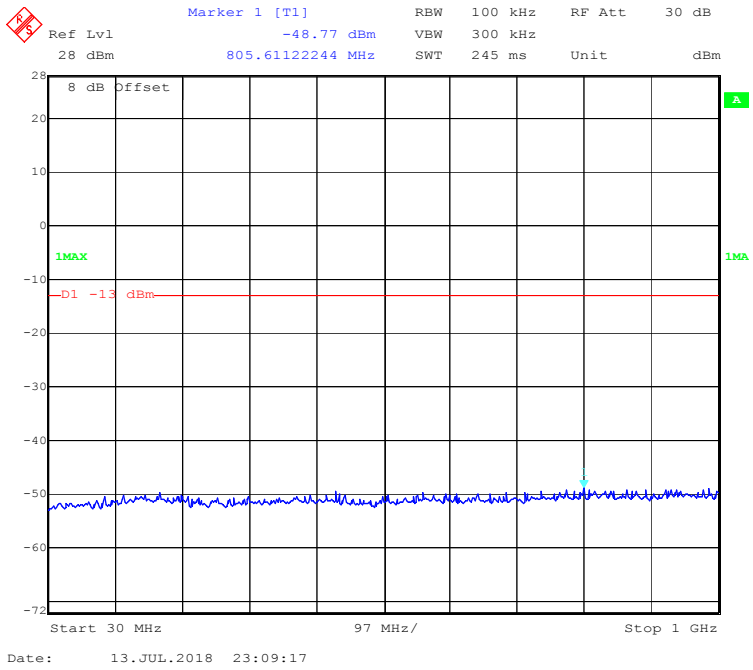


1 GHz – 20 GHz (3.0 MHz, Middle Channel)

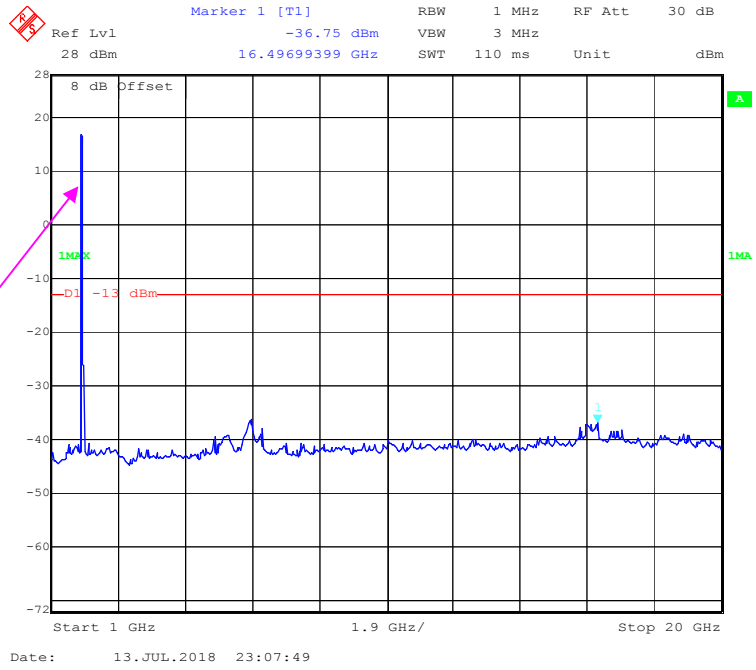


Fundamental

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

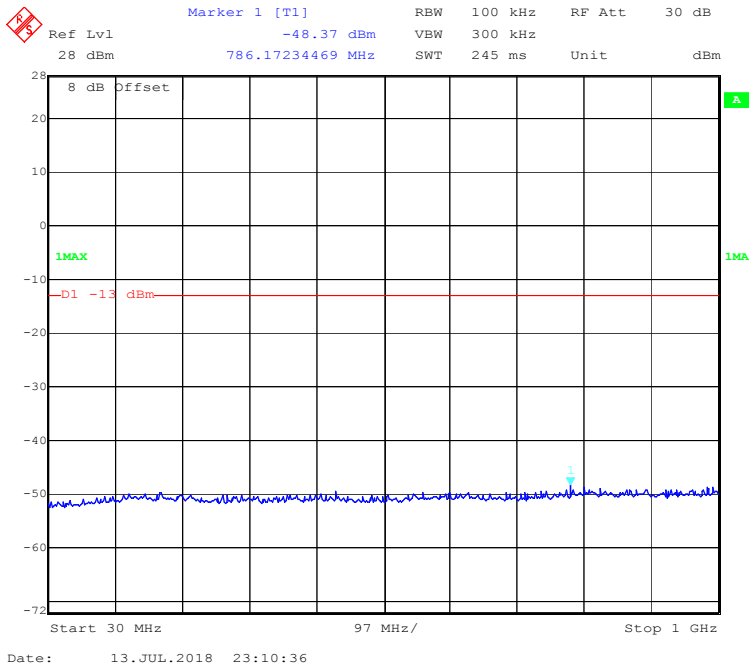


1 GHz – 20 GHz (5.0MHz, Middle Channel)

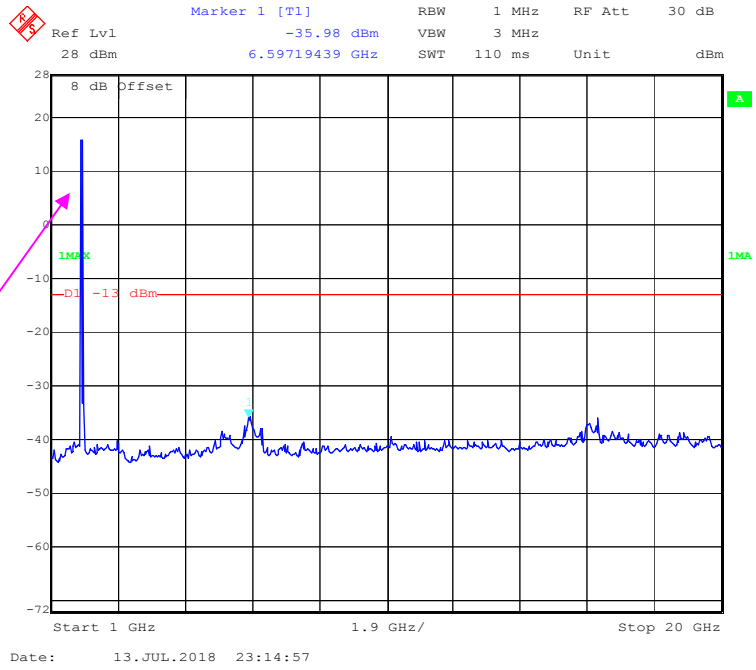


Fundamental

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

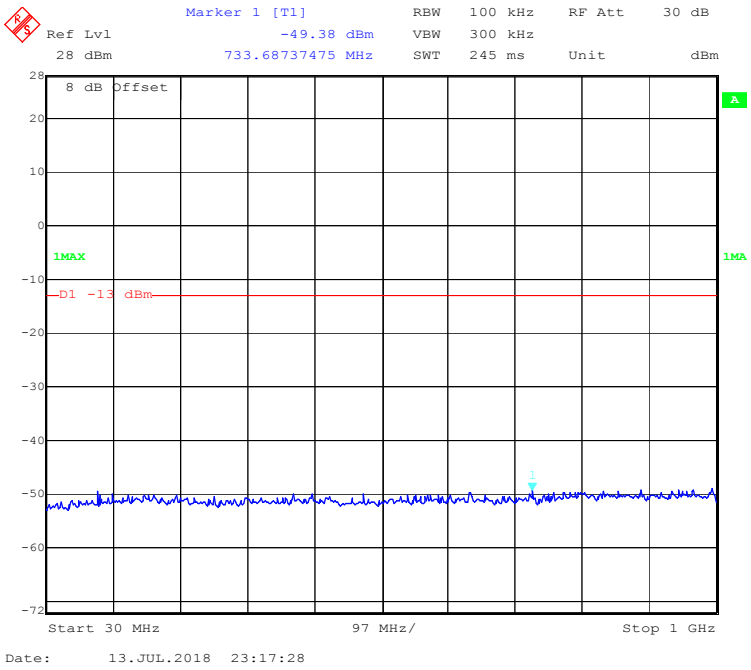


1 GHz – 20 GHz (10.0 MHz, Middle Channel)

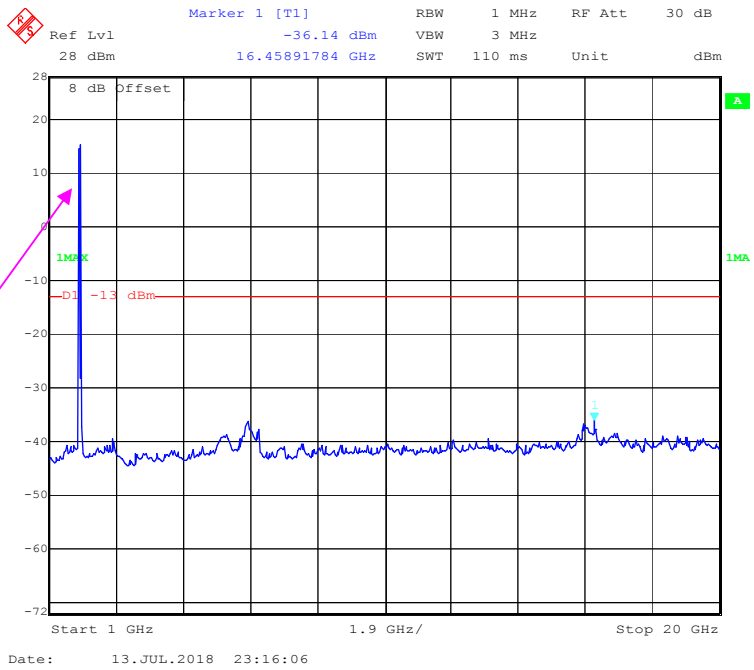


Fundamental

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

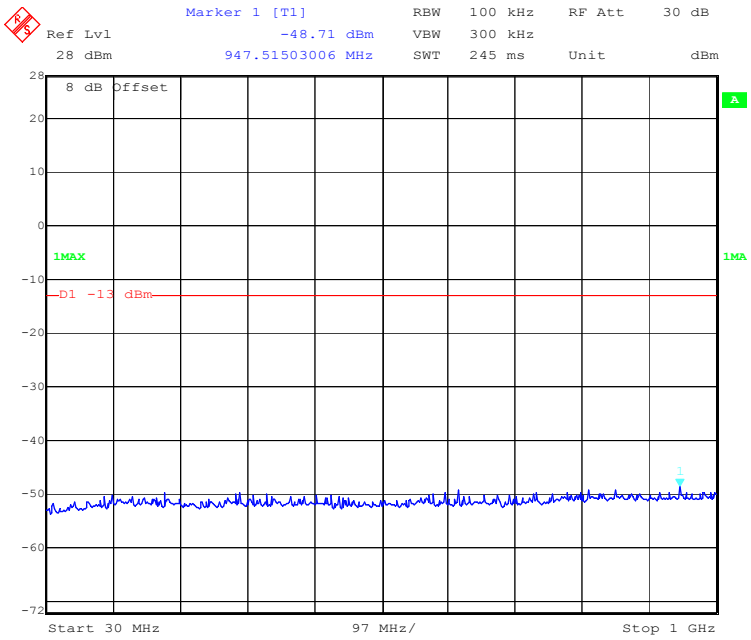


1 GHz – 20 GHz (15.0 MHz, Middle Channel)

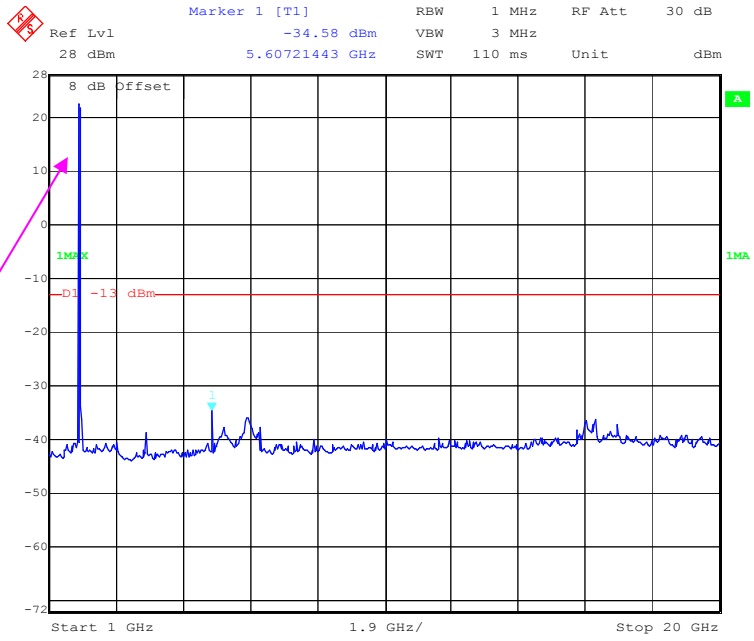


Fundamental

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



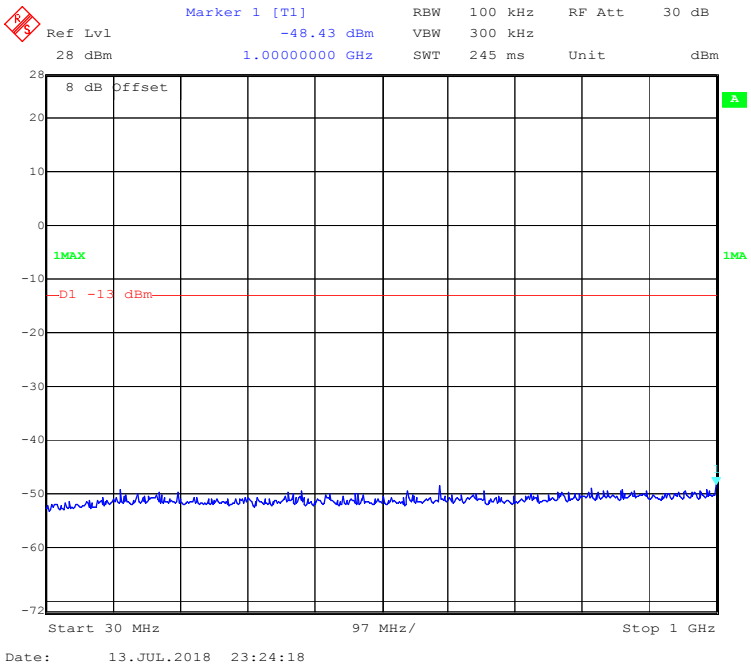
1 GHz – 20 GHz (20.0 MHz, Middle Channel)



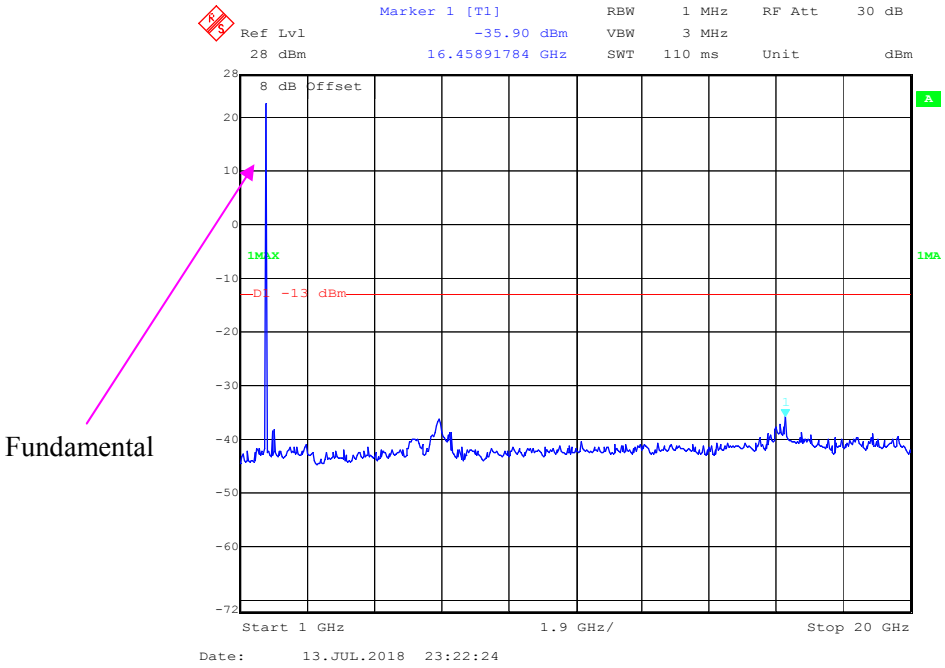
Fundamental

LTE Band 4:

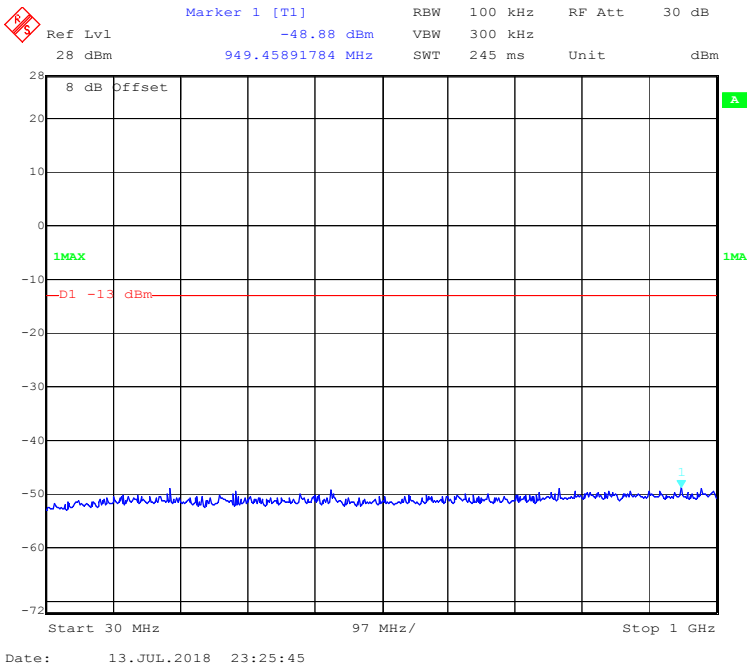
30 MHz - 1 GHz (1.4 MHz, Middle Channel)



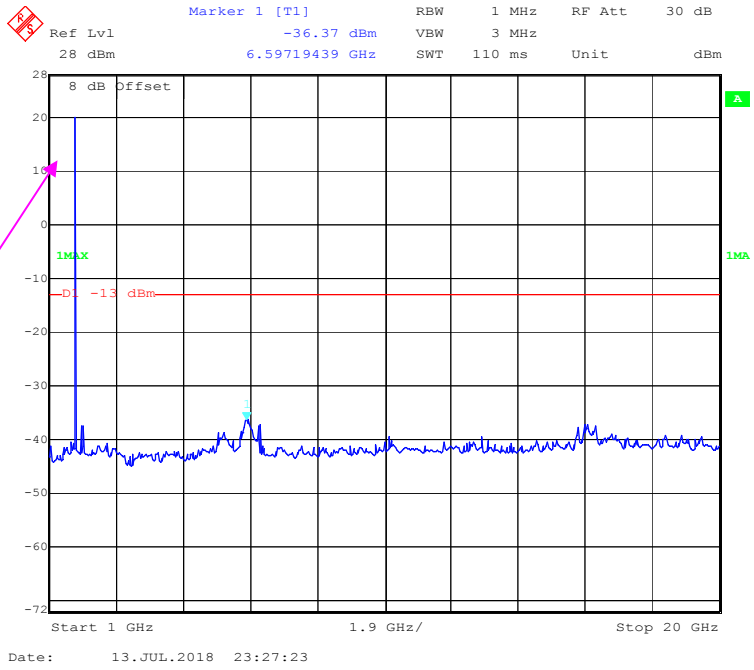
1 GHz – 20 GHz (1.4 MHz, Middle Channel)



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

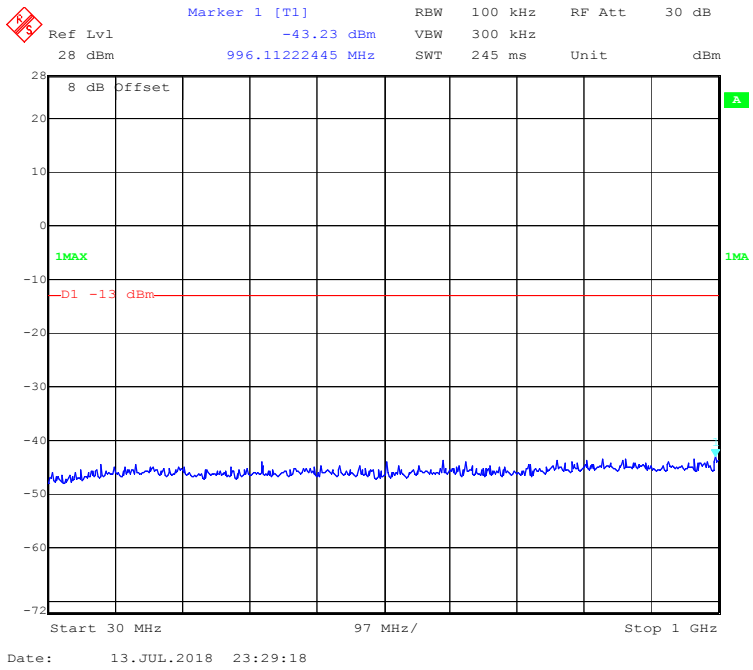


1 GHz – 20 GHz (3.0 MHz, Middle Channel)

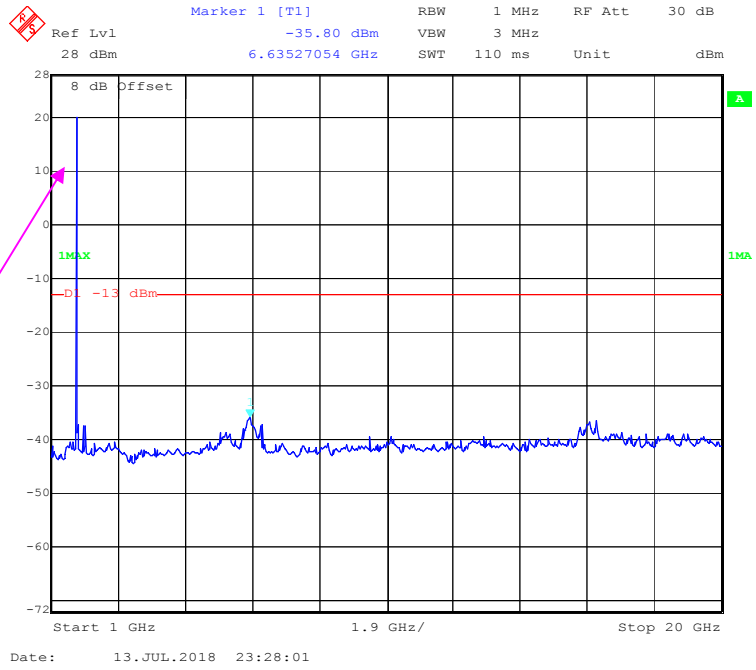


Fundamental

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

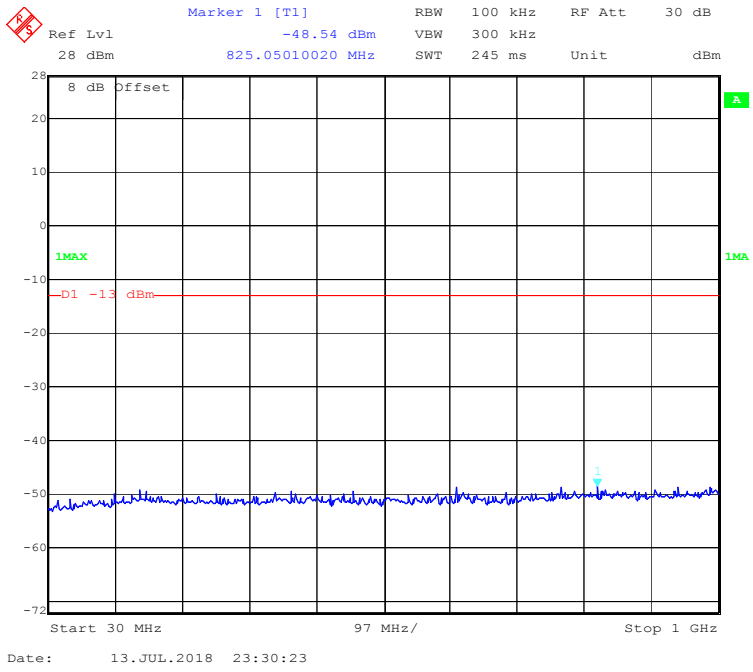


1 GHz – 20 GHz (5.0MHz, Middle Channel)

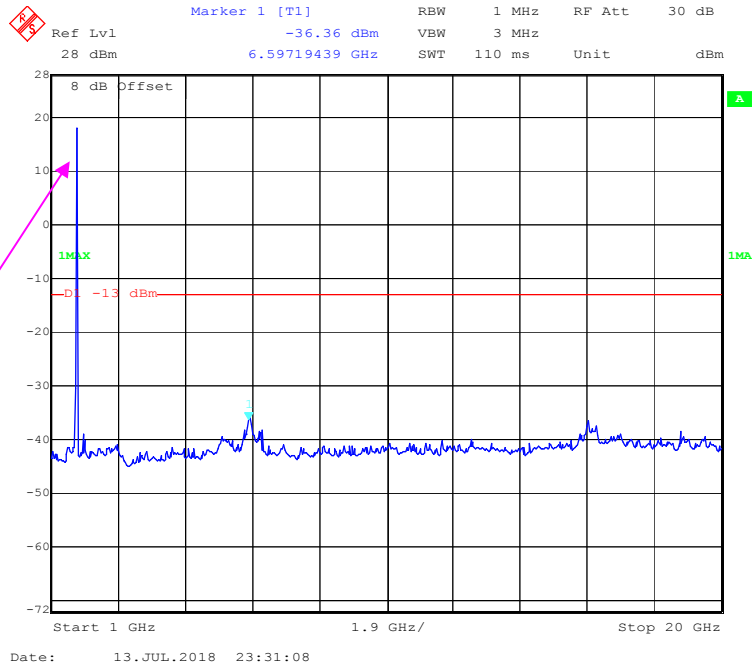


Fundamental

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

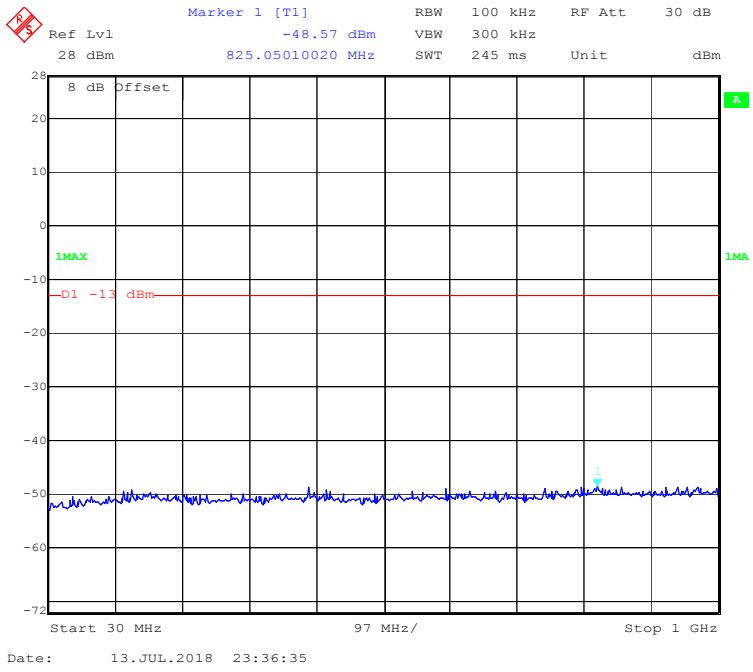


1 GHz – 20 GHz (10.0 MHz, Middle Channel)

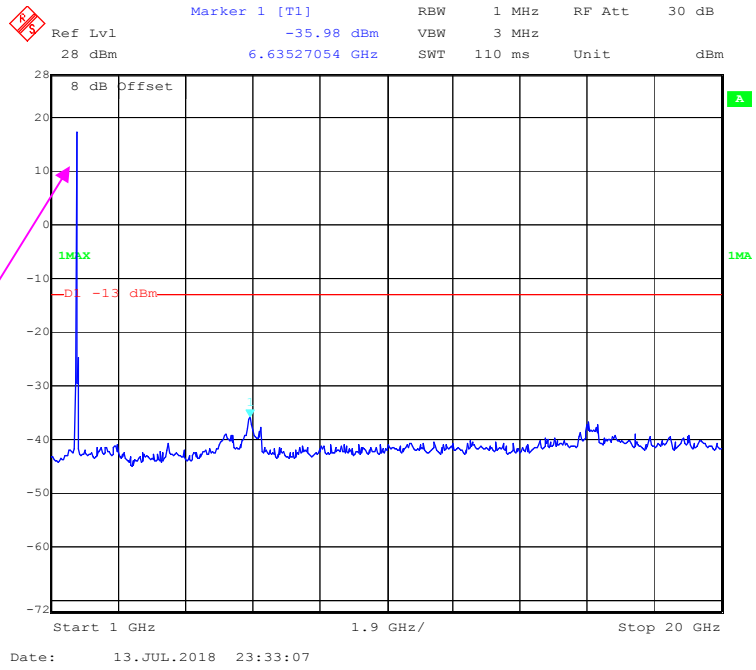


Fundamental

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

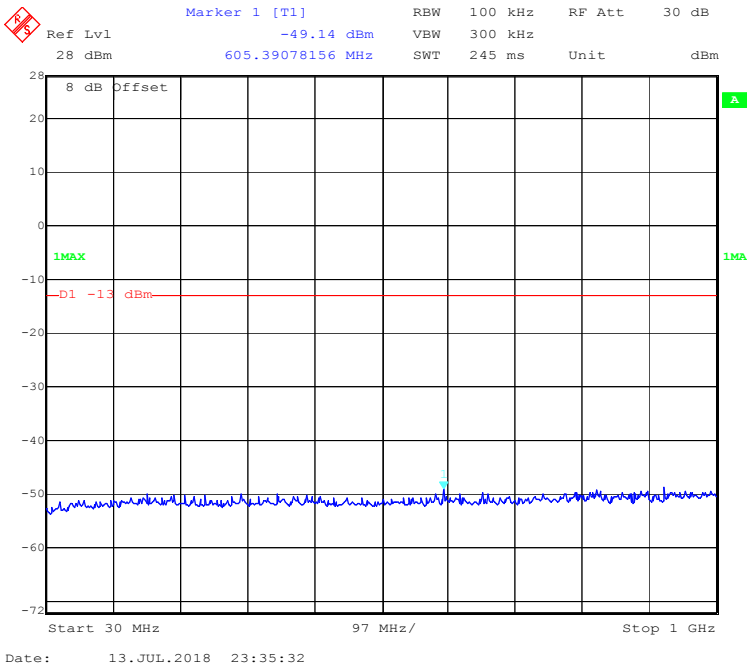


1 GHz – 20 GHz (15.0 MHz, Middle Channel)

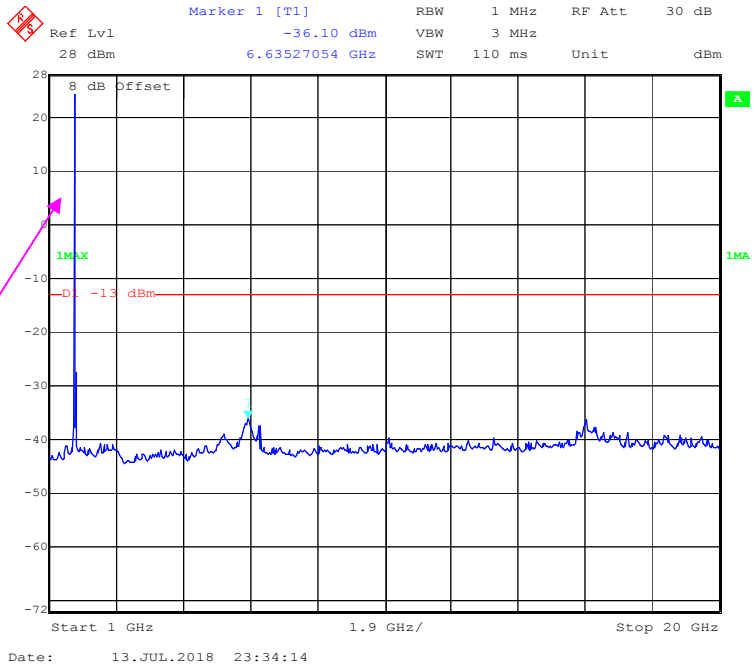


Fundamental

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



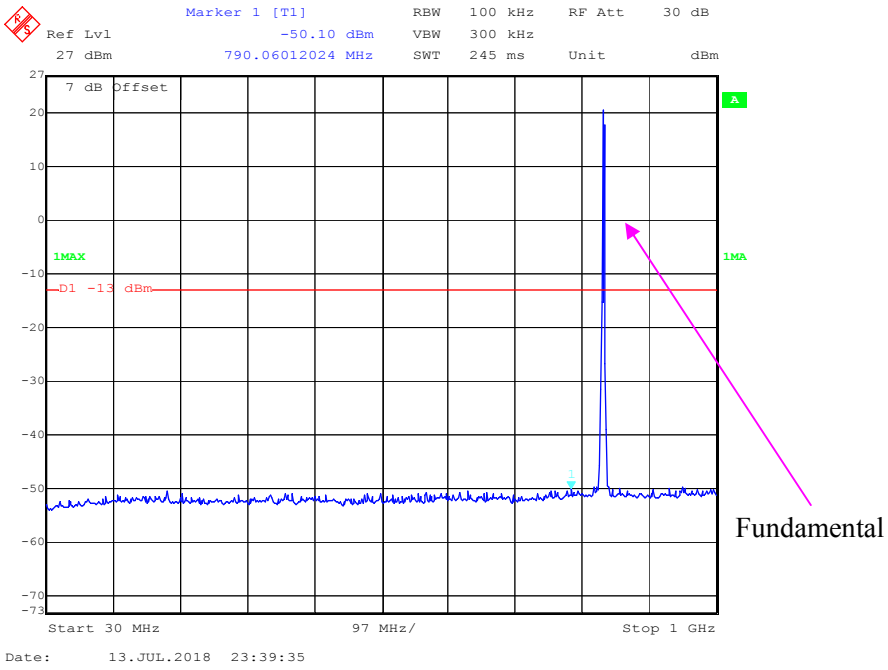
1 GHz – 20 GHz (20.0 MHz, Middle Channel)



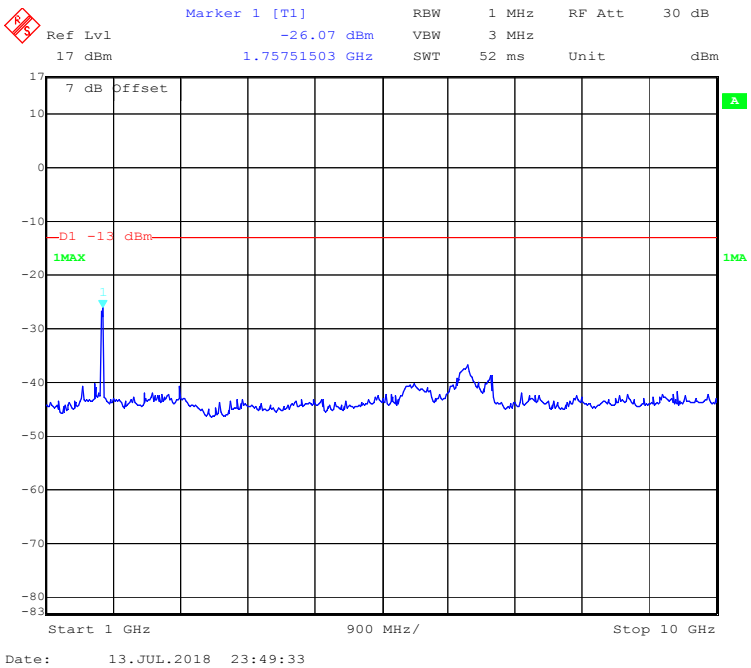
Fundamental

LTE Band 5:

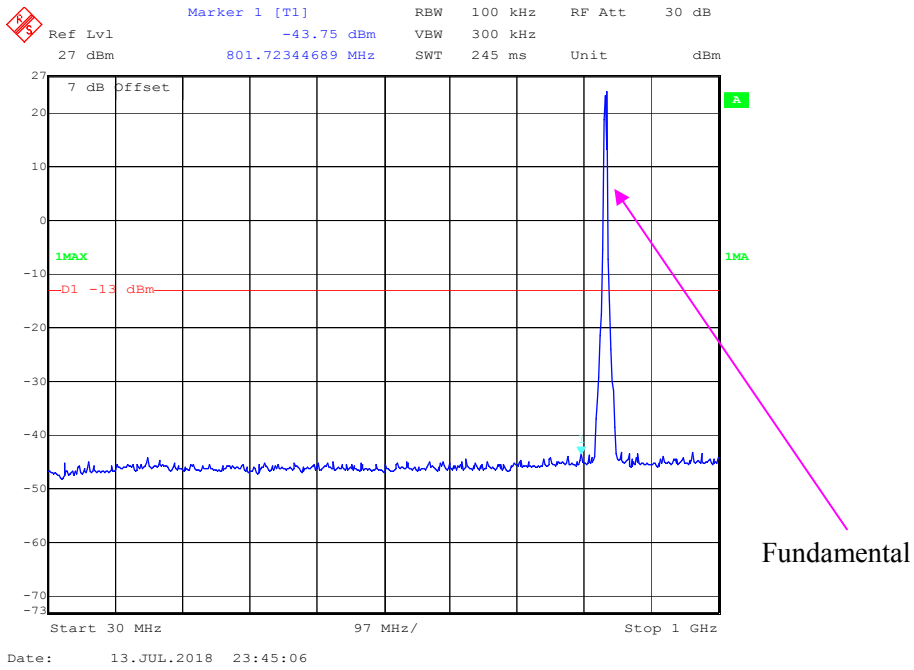
30 MHz - 1 GHz (1.4 MHz, Middle Channel)



1 GHz – 10 GHz (1.4 MHz, Middle Channel)

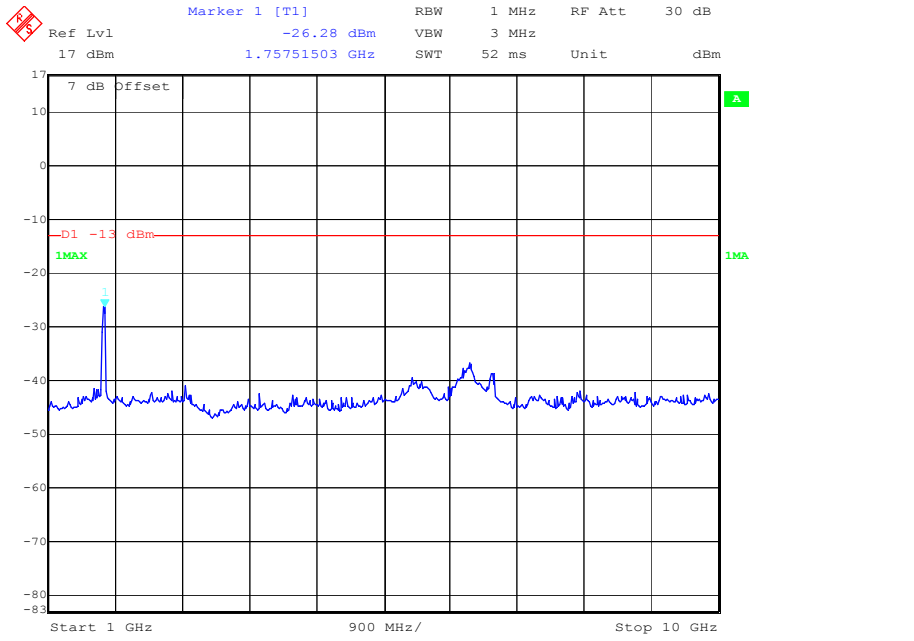


30 MHz - 1 GHz (3.0 MHz, Middle Channel)



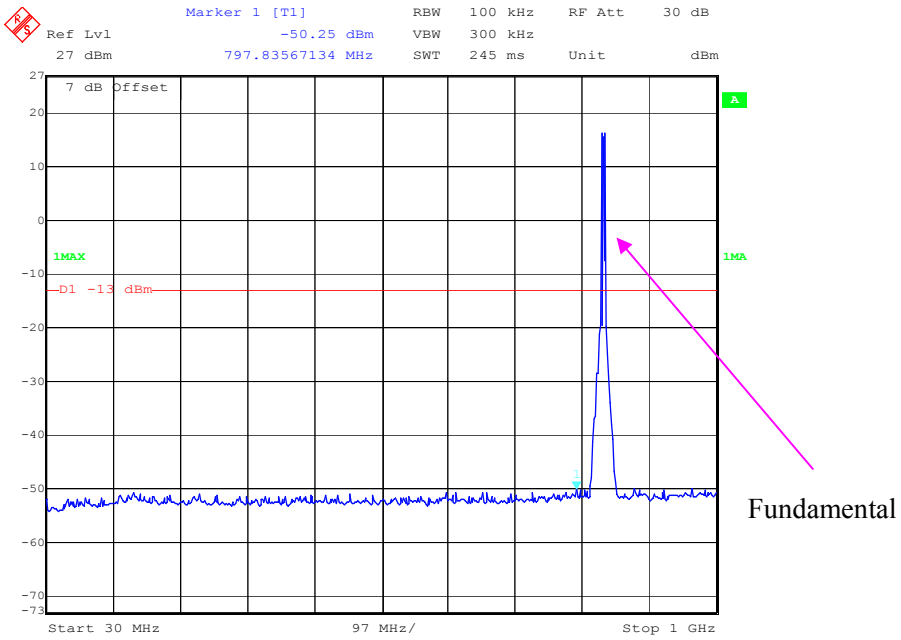
Date: 13.JUL.2018 23:45:06

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



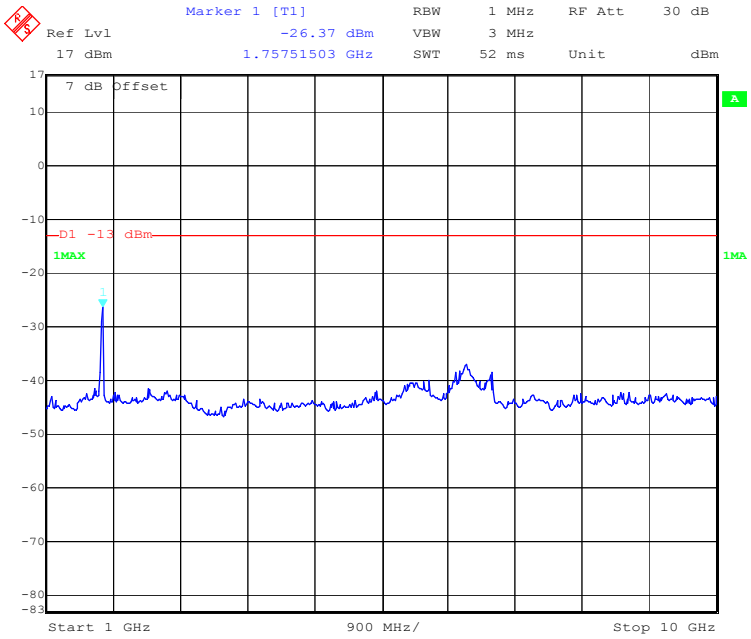
Date: 13.JUL.2018 23:50:07

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



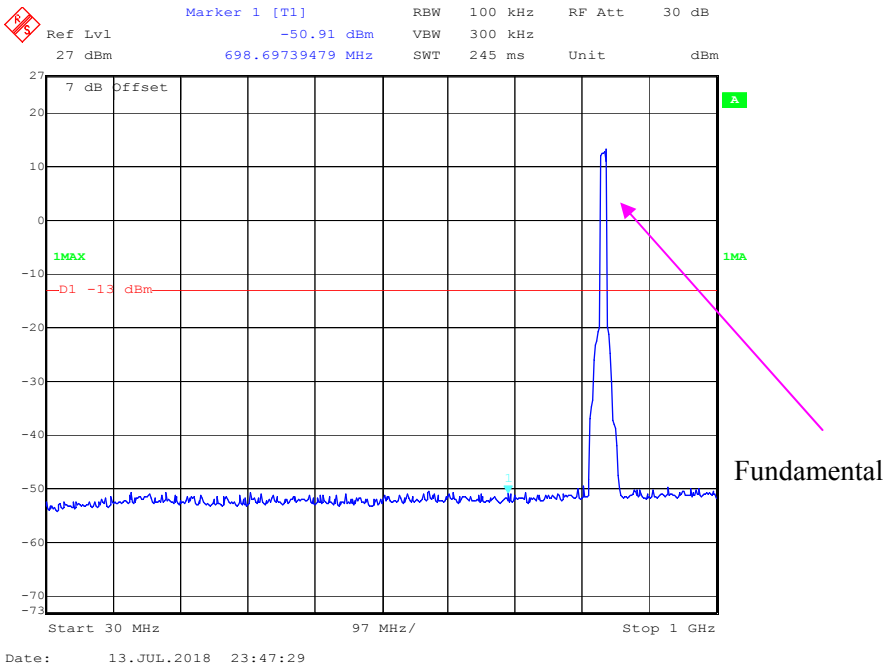
Date: 13.JUL.2018 23:46:26

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



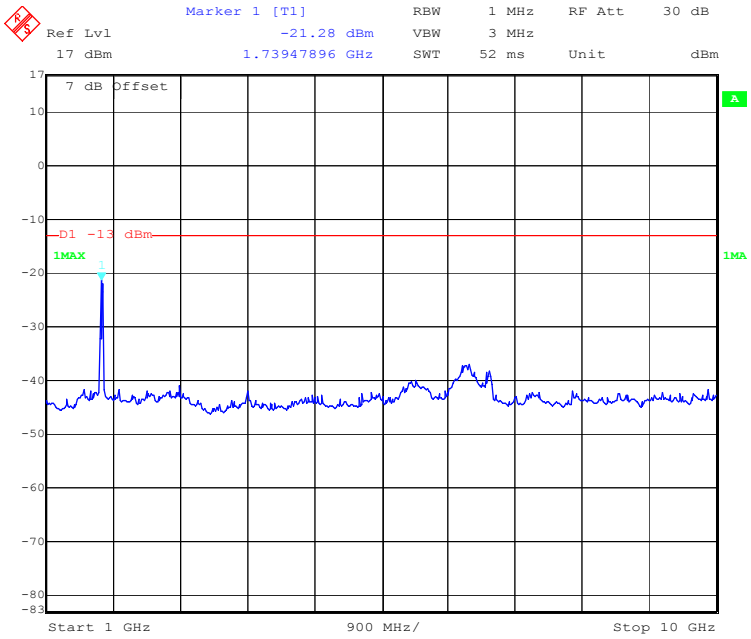
Date: 13.JUL.2018 23:52:18

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



Date: 13.JUL.2018 23:47:29

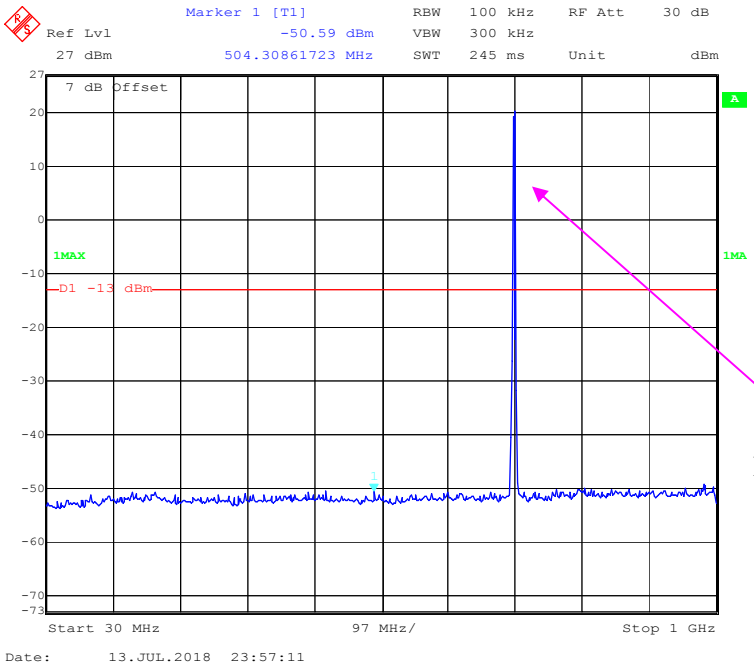
1 GHz – 10 GHz (10.0 MHz, Middle Channel)



Date: 13.JUL.2018 23:53:53

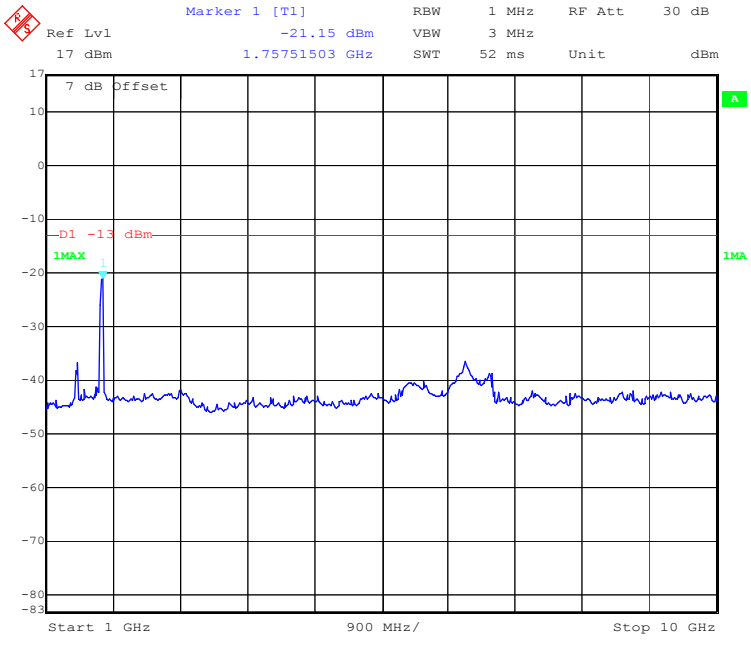
LTE Band 12:

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



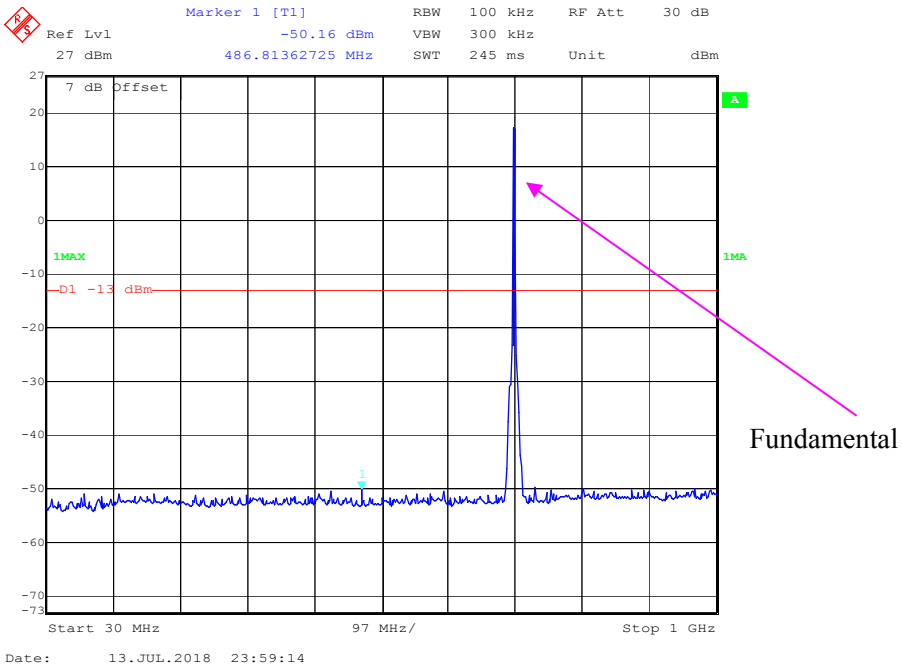
Date: 13.JUL.2018 23:57:11

1 GHz – 10 GHz (1.4 MHz, Middle Channel)



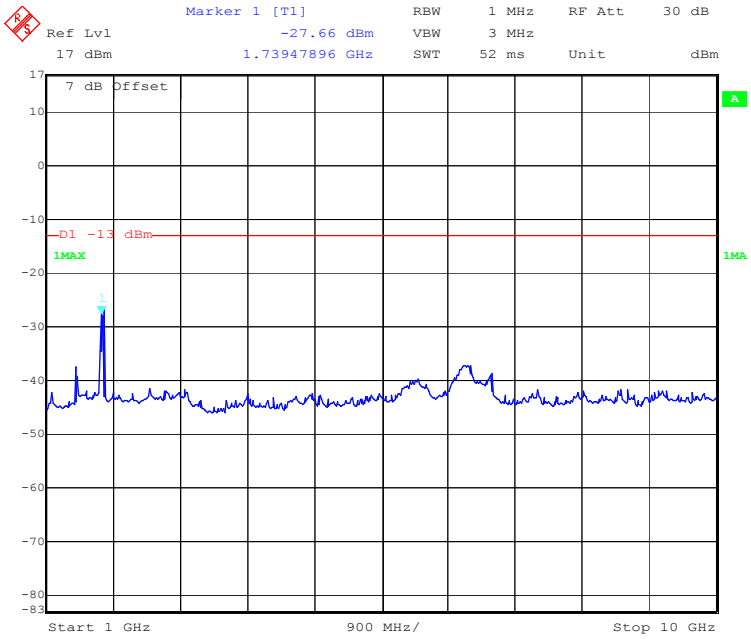
Date: 14.JUL.2018 00:02:24

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



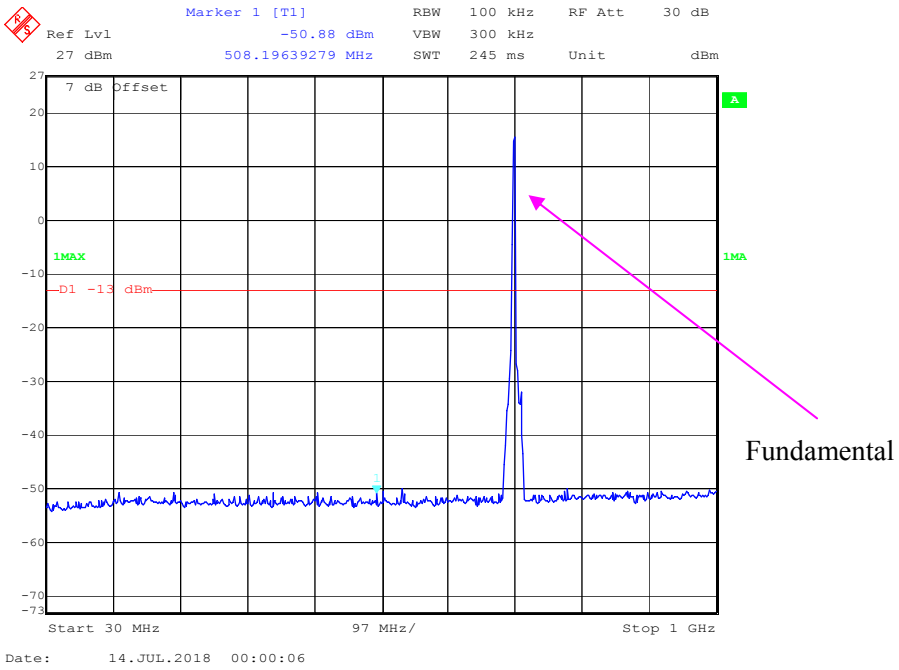
Date: 13.JUL.2018 23:59:14

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



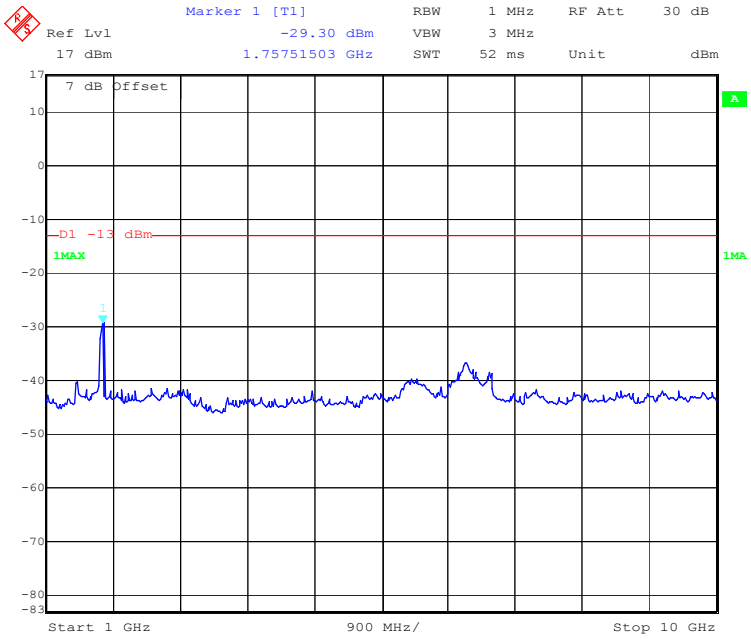
Date: 14.JUL.2018 00:03:56

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



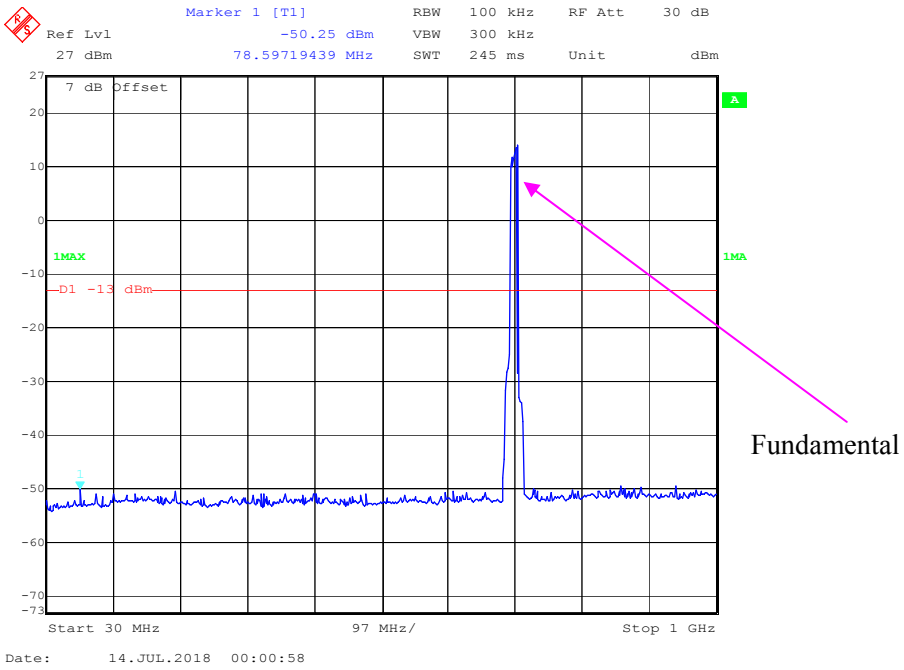
Date: 14.JUL.2018 00:00:06

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



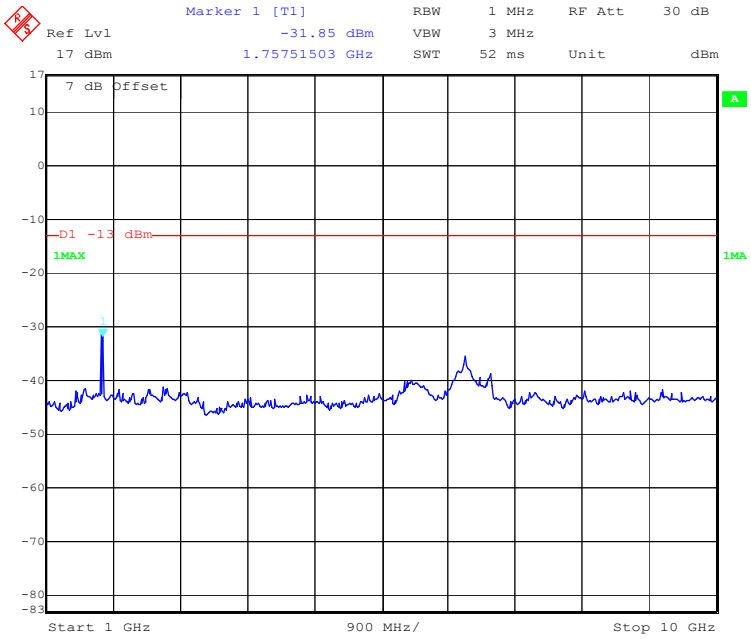
Date: 14.JUL.2018 00:05:24

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



Date: 14.JUL.2018 00:00:58

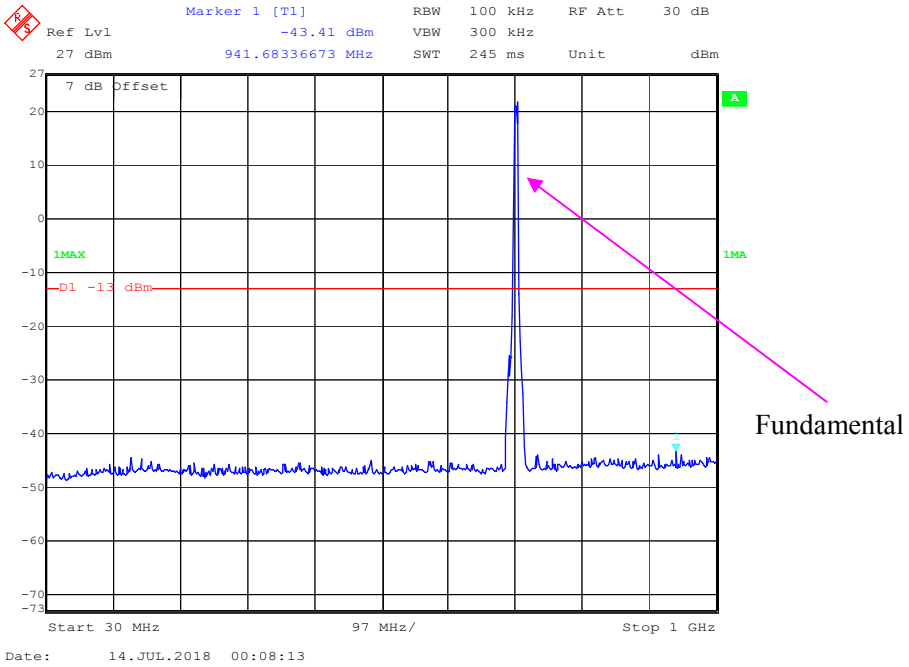
1 GHz – 10 GHz (10.0 MHz, Middle Channel)



Date: 14.JUL.2018 00:06:28

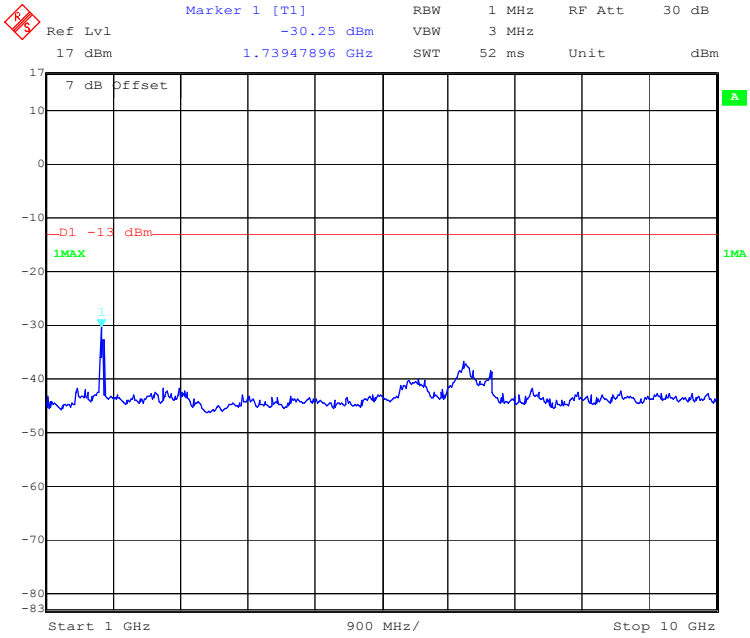
LTE Band 17:

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



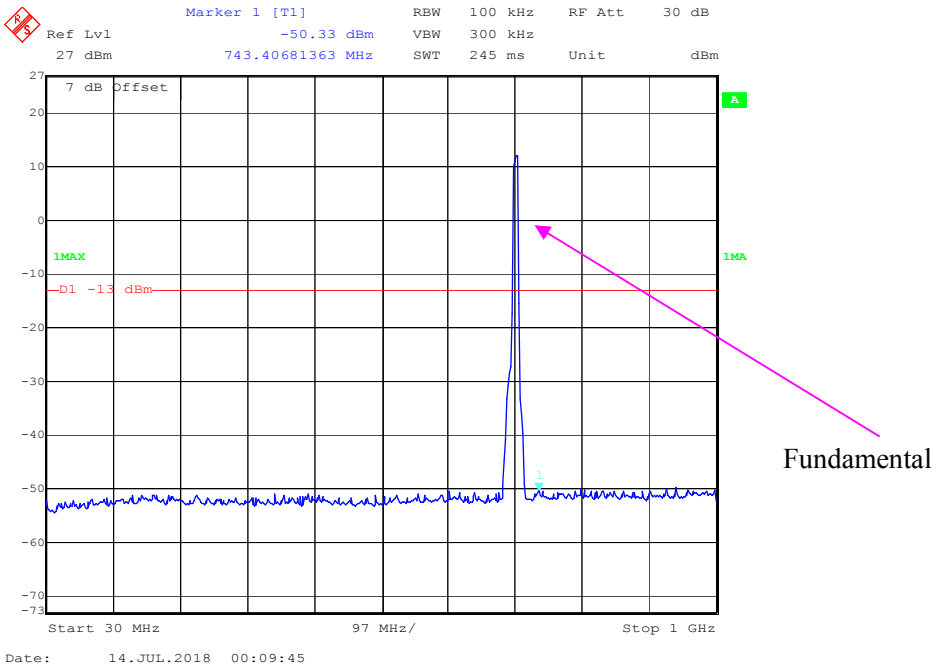
Date: 14.JUL.2018 00:08:13

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



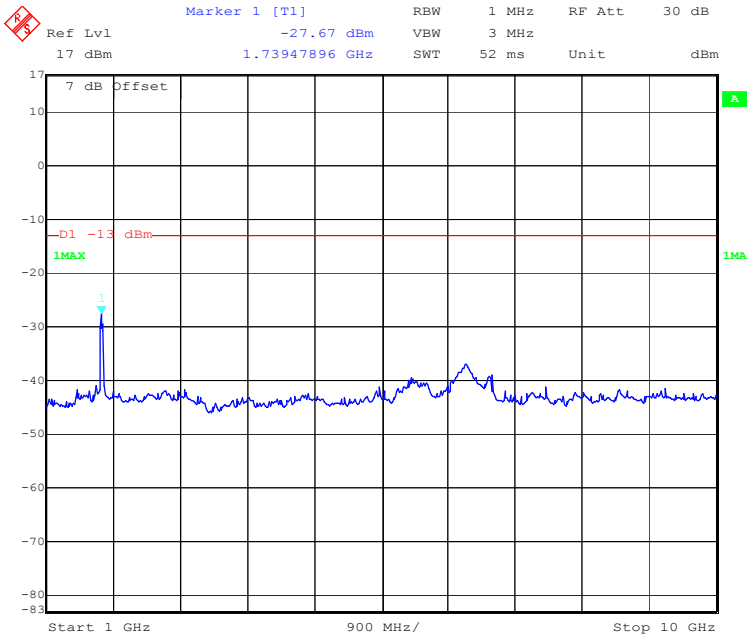
Date: 14.JUL.2018 00:11:38

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



Date: 14.JUL.2018 00:09:45

1 GHz – 10 GHz (10.0 MHz, Middle Channel)



Date: 14.JUL.2018 00:10:44

FCC § 2.1053; § 22.917 (a); § 24.238 (a); §27.53 (h) (m) - SPURIOUS RADIATED EMISSIONS

Applicable Standards

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

22.917 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

24.238 (a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.

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

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

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

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

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

Spurious attenuation limit in dB = 43 + 10 Log_{10} (power out in Watts)

Test Data

Environmental Conditions

Temperature:	23.2℃
Relative Humidity:	51 %
ATM Pressure:	101.3kPa

The testing was performed by Alisa Gao from 2018-07-13 & 2018-07-16.

Test mode: Transmitting (Pre-scan with low, middle and high channels, and the worse case data as below)

30 MHz ~ 10 GHz:

WCDMA Band V

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
WCDMA Mode, Middle channel										
396.53	53.18	122	142	H	-52.26	0.53	-1.38	-54.17	-13	41.17
396.53	52.44	233	150	V	-51.99	0.53	-1.38	-53.90	-13	40.90
1673.20	47.06	18	133	H	-56.33	0.84	8.48	-48.69	-13	35.69
1673.20	47.21	250	101	V	-56.68	0.84	8.48	-49.04	-13	36.04
2509.80	47.38	349	195	H	-53.56	0.89	10.09	-44.36	-13	31.36
2509.80	47.13	40	193	V	-53.81	0.89	10.09	-44.61	-13	31.61

30 MHz ~ 20 GHz:

WCDMA Band II

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
WCDMA Mode, Middle channel										
396.21	53.49	134	134	H	-51.97	0.53	-1.38	-53.88	-13	40.88
396.21	52.62	36	237	V	-51.81	0.53	-1.38	-53.72	-13	40.72
3760.00	47.39	322	241	H	-49.32	0.95	9.74	-40.53	-13	27.53
3760.00	46.82	276	245	V	-50.06	0.95	9.74	-41.27	-13	28.27
5640.00	47.12	3	171	H	-46.81	1.15	10.47	-37.49	-13	24.49
5640.00	46.48	168	176	V	-47.48	1.15	10.47	-38.16	-13	25.16

Note:
1) Absolute Level (dBm) = Submitted Level (dBm) - Cable loss (dB) + Antenna Gain (dBd/dBi)
2) Margin (dB) = Limit (dBm) - Absolute Level (dBm)

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

30 MHz ~ 10 GHz:

LTE Band 5

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 1.4MHz Bandwidth Middle Channel										
396.45	53.06	324	181	H	-52.39	0.53	-1.38	-54.30	-13	41.30
396.45	52.17	353	238	V	-52.26	0.53	-1.38	-54.17	-13	41.17
1673.00	47.70	59	207	H	-55.69	0.95	9.74	-46.90	-13	33.90
1673.00	46.85	221	134	V	-57.04	0.95	9.74	-48.25	-13	35.25
2509.50	47.67	10	228	H	-53.27	1.15	10.47	-43.95	-13	30.95
2509.50	46.92	332	188	V	-54.02	1.15	10.47	-44.70	-13	31.70
16-QAM 1.4MHz Bandwidth Middle Channel										
396.45	52.88	333	113	H	-52.57	0.53	-1.38	-54.48	-13	41.48
396.45	51.26	205	196	V	-53.17	0.53	-1.38	-55.08	-13	42.08
1673.00	47.52	296	182	H	-55.87	0.95	9.74	-47.08	-13	34.08
1673.00	46.68	65	156	V	-57.21	0.95	9.74	-48.42	-13	35.42
2509.50	47.44	21	174	H	-53.50	1.15	10.47	-44.18	-13	31.18
2509.50	46.25	11	184	V	-54.69	1.15	10.47	-45.37	-13	32.37

LTE Band 12:

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 10MHz Bandwidth Middle Channel										
398.45	52.94	134	182	H	-52.38	0.53	-1.36	-54.27	-13	41.27
398.45	51.68	257	109	V	-52.76	0.53	-1.36	-54.65	-13	41.65
1415.00	48.01	144	189	H	-56.74	0.82	7.96	-49.60	-13	36.60
1415.00	47.33	227	233	V	-57.82	0.82	7.96	-50.68	-13	37.68
2122.50	47.25	49	137	H	-54.01	0.86	9.27	-45.60	-13	32.60
2122.50	46.99	103	121	V	-54.55	0.86	9.27	-46.14	-13	33.14
16-QAM 10MHz Bandwidth Middle Channel										
398.45	52.76	291	191	H	-52.56	0.53	-1.36	-54.45	-13	41.45
398.45	51.43	24	186	V	-53.01	0.53	-1.36	-54.90	-13	41.90
1415.00	47.94	228	249	H	-56.81	0.82	7.96	-49.67	-13	36.67
1415.00	46.57	72	157	V	-58.58	0.82	7.96	-51.44	-13	38.44
2122.50	47.19	202	153	H	-54.07	0.86	9.27	-45.66	-13	32.66
2122.50	46.77	113	196	V	-54.77	0.86	9.27	-46.36	-13	33.36

LTE Band 17:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 5MHz Bandwidth Middle Channel										
398.13	52.66	359	149	H	-52.68	0.53	-1.36	-54.57	-13	41.57
398.13	51.54	284	246	V	-52.90	0.53	-1.36	-54.79	-13	41.79
1420.00	47.20	93	201	H	-57.53	0.82	7.98	-50.37	-13	37.37
1420.00	47.37	32	219	V	-57.77	0.82	7.98	-50.61	-13	37.61
2130.00	47.69	329	194	H	-53.56	0.86	9.29	-45.13	-13	32.13
2130.00	47.85	46	142	V	-53.68	0.86	9.29	-45.25	-13	32.25
16-QAM 5MHz Bandwidth Middle Channel										
398.13	52.48	153	130	H	-52.86	0.53	-1.36	-54.75	-13	41.75
398.13	51.39	22	162	V	-53.05	0.53	-1.36	-54.94	-13	41.94
1420.00	47.13	31	151	H	-57.60	0.82	7.98	-50.44	-13	37.44
1420.00	47.81	213	224	V	-57.33	0.82	7.98	-50.17	-13	37.17
2130.00	47.39	262	211	H	-53.86	0.86	9.29	-45.43	-13	32.43
2130.00	47.63	202	159	V	-53.90	0.86	9.29	-45.47	-13	32.47

30 MHz ~ 20 GHz:

LTE Band 2:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 20MHz Bandwidth Middle Channel										
396.05	53.28	4	241	H	-52.19	0.53	-1.38	-54.10	-13	41.10
396.05	52.15	89	143	V	-52.28	0.53	-1.38	-54.19	-13	41.19
3760.00	48.80	208	191	H	-47.91	0.95	9.74	-39.12	-13	26.12
3760.00	47.31	39	152	V	-49.57	0.95	9.74	-40.78	-13	27.78
5640.00	48.60	44	239	H	-45.33	1.15	10.47	-36.01	-13	23.01
5640.00	47.92	242	234	V	-46.04	1.15	10.47	-36.72	-13	23.72
16-QAM 20MHz Bandwidth Middle Channel										
396.05	53.09	183	228	H	-52.38	0.53	-1.38	-54.29	-13	41.29
396.05	52.11	48	235	V	-52.32	0.53	-1.38	-54.23	-13	41.23
3760.00	48.24	217	198	H	-48.47	0.95	9.74	-39.68	-13	26.68
3760.00	47.13	292	130	V	-49.75	0.95	9.74	-40.96	-13	27.96
5640.00	47.98	271	160	H	-45.95	1.15	10.47	-36.63	-13	23.63
5640.00	46.53	202	176	V	-47.43	1.15	10.47	-38.11	-13	25.11

LTE Band 4:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 20MHz Bandwidth Middle Channel										
398.22	53.56	267	223	H	-51.77	0.53	-1.36	-53.66	-13	40.66
398.22	52.27	278	145	V	-52.17	0.53	-1.36	-54.06	-13	41.06
3465.00	47.79	356	149	H	-49.82	0.93	9.87	-40.88	-13	27.88
3465.00	47.21	294	130	V	-51.04	0.93	9.87	-42.10	-13	29.10
5197.50	47.62	323	226	H	-47.25	1.10	10.30	-38.05	-13	25.05
5197.50	47.14	269	199	V	-48.02	1.10	10.30	-38.82	-13	25.82
16-QAM 20MHz Bandwidth Middle Channel										
398.22	52.86	227	163	H	-33.48	0.53	-1.36	-35.37	-13	22.37
398.22	52.03	203	206	V	-41.26	0.53	-1.36	-43.15	-13	30.15
3465.00	47.62	341	141	H	-49.99	0.93	9.87	-41.05	-13	28.05
3465.00	47.17	350	196	V	-51.08	0.93	9.87	-42.14	-13	29.14
5197.50	47.54	308	208	H	-47.33	1.10	10.30	-38.13	-13	25.13
5197.50	47.23	166	246	V	-47.93	1.10	10.30	-38.73	-13	25.73

Note:
1) Absolute Level (dBm) = Submitted Level (dBm) - Cable loss (dB) + Antenna Gain (dBd/dBi)
2) Margin (dB) = Limit (dBm) - Absolute Level (dBm)

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.

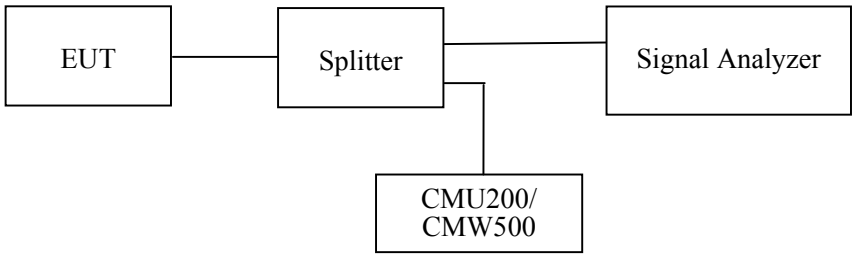
According to FCC §27.53 (h) (m), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

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 that 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:	23.2℃
Relative Humidity:	51 %
ATM Pressure:	101.3kPa

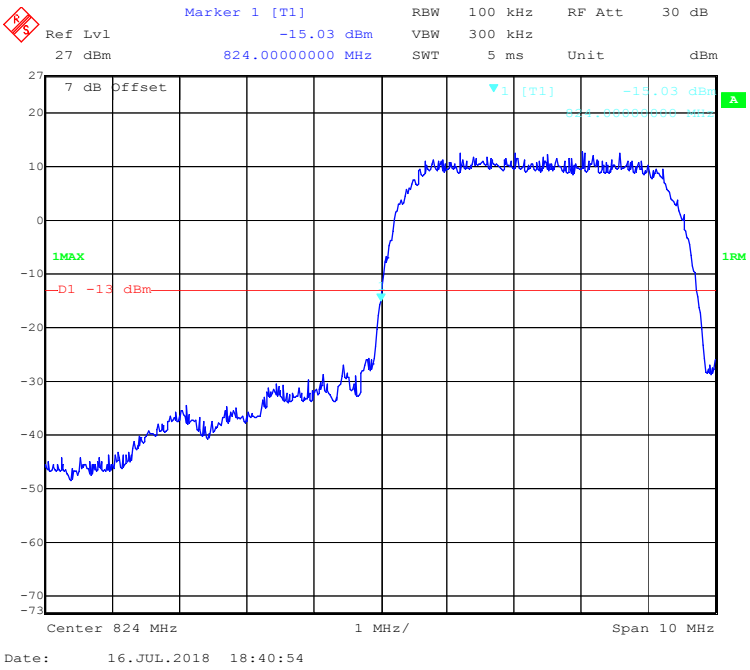
The testing was performed by Alisa Gao from 2018-07-14 to 2018-07-17.

EUT operation mode: Transmitting

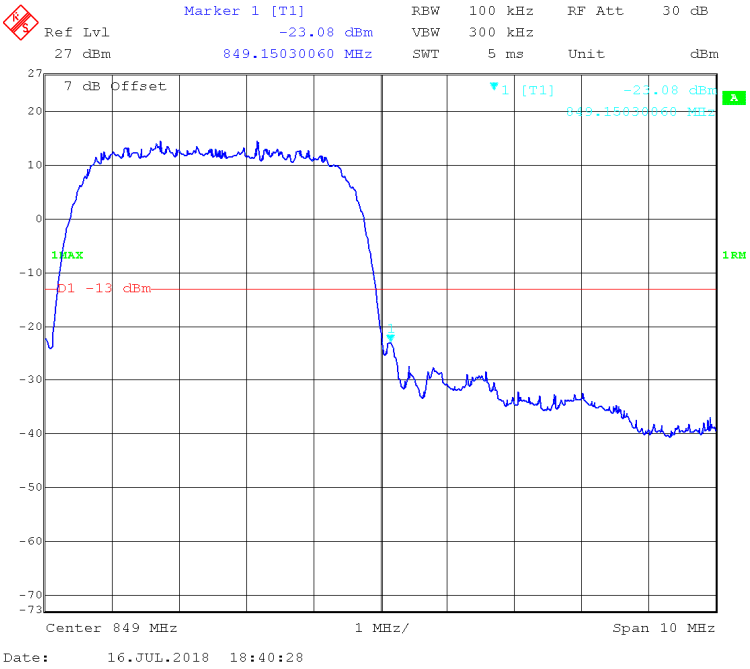
Test Result: Compliance.

WCDMA Band V

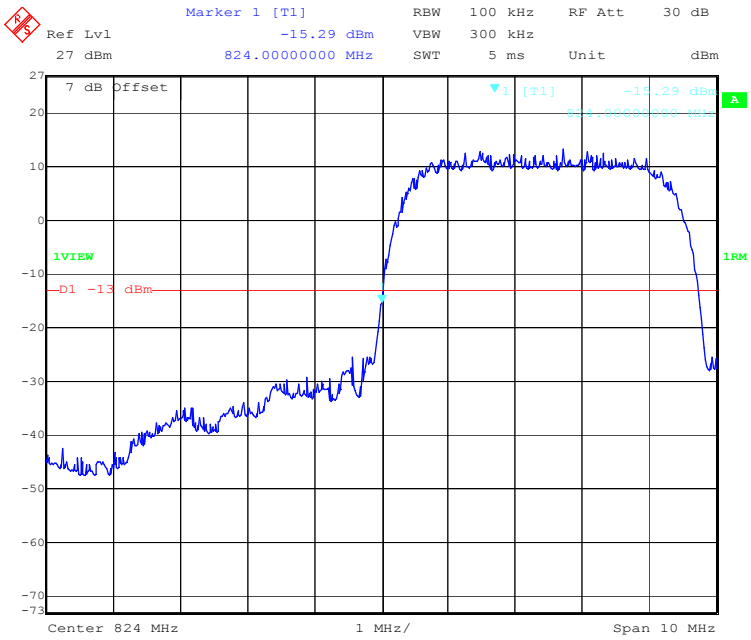
WCDMA (Rel 99) Mode, Left Band Edge



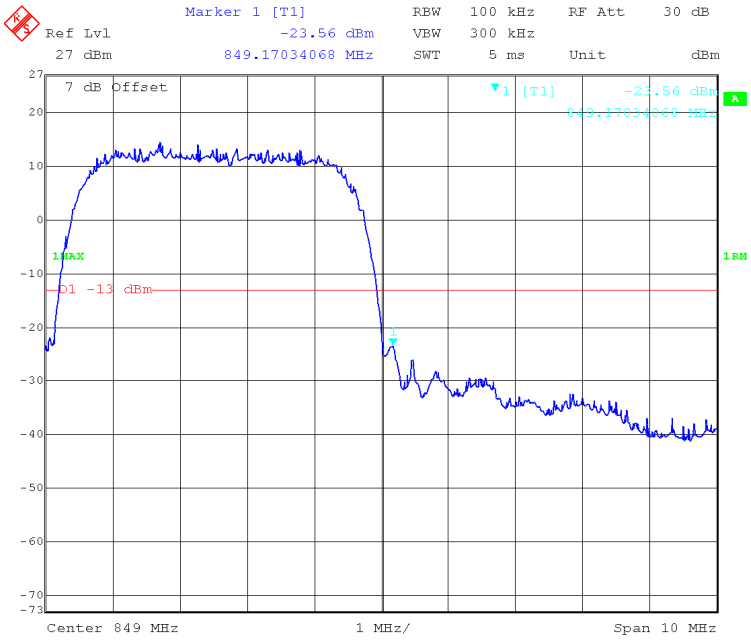
WCDMA (Rel 99) Mode, Right Band Edge



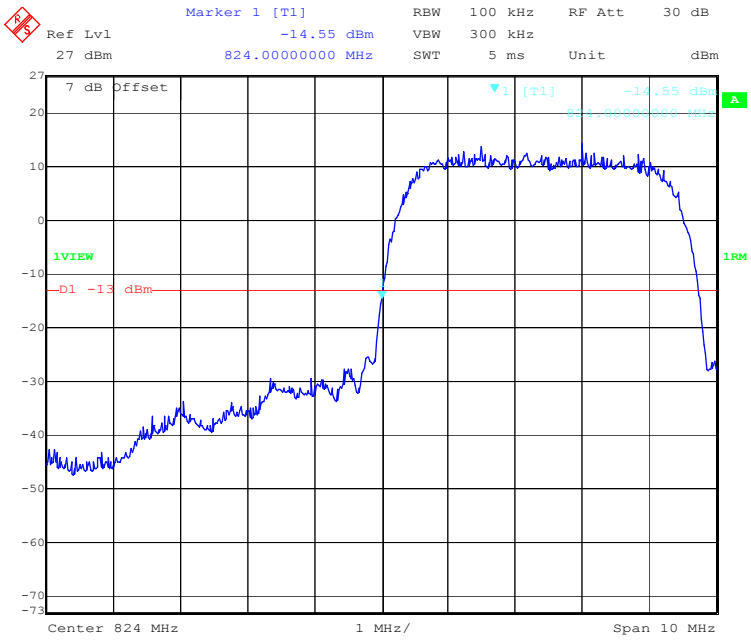
WCDMA (HSDPA) Mode, Left Band Edge



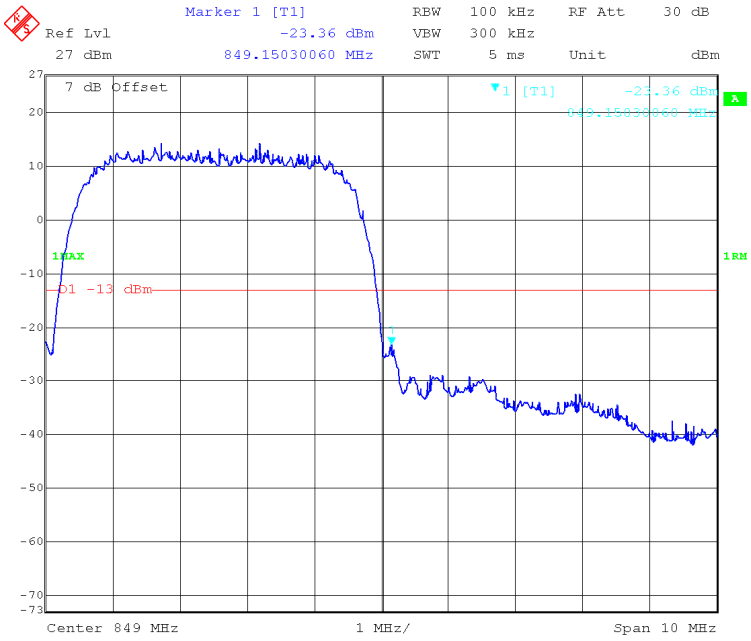
WCDMA (HSDPA) Mode, Right Band Edge



WCDMA (HSUPA) Mode, Left Band Edge

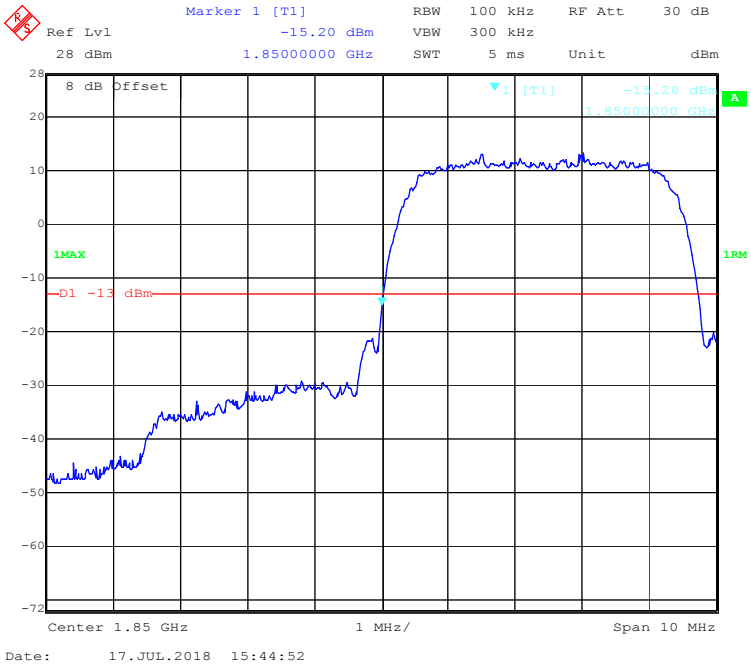


WCDMA (HSUPA) Mode, Right Band Edge

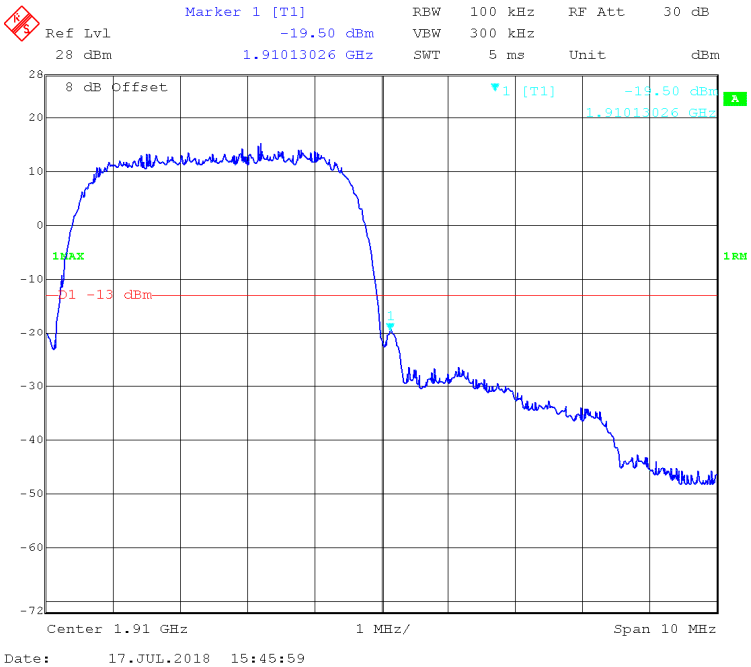


WCDMA Band II

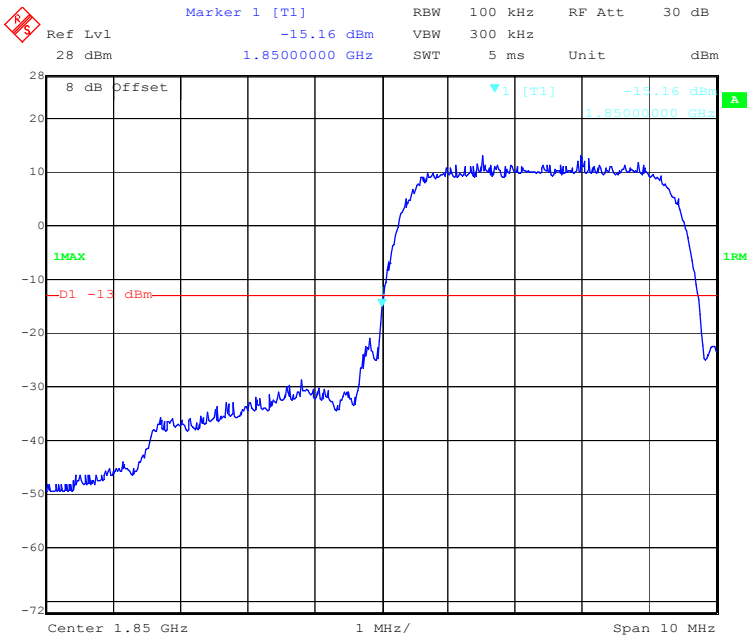
WCDMA (Rel99) Mode, Left Band Edge



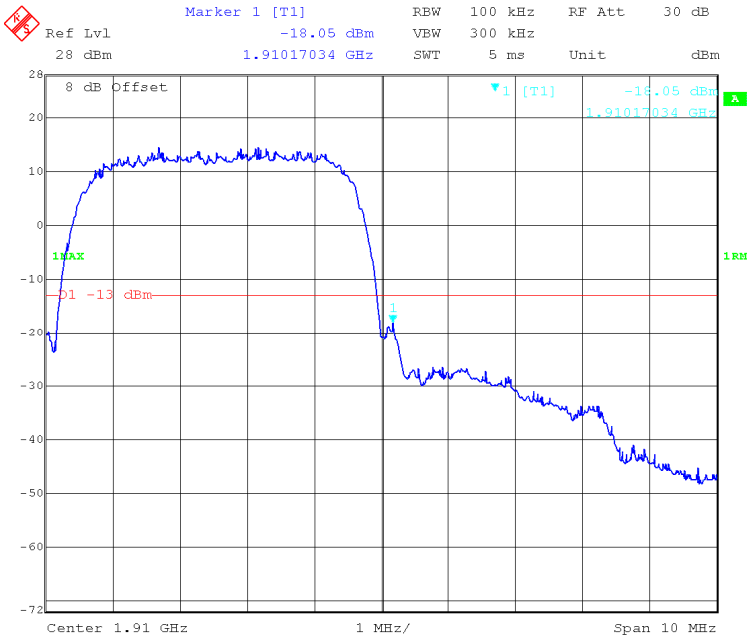
WCDMA (Rel99) Mode, Right Band Edge



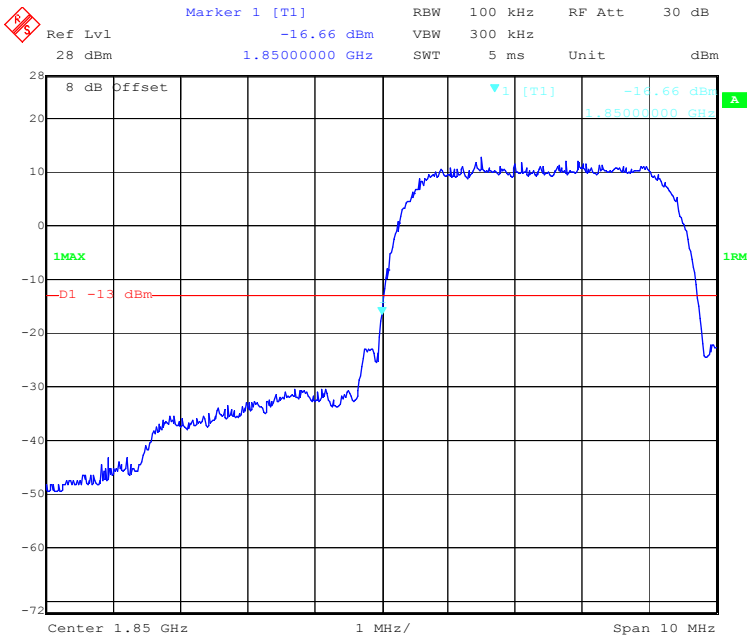
WCDMA (HSDPA) Mode, Left Band Edge



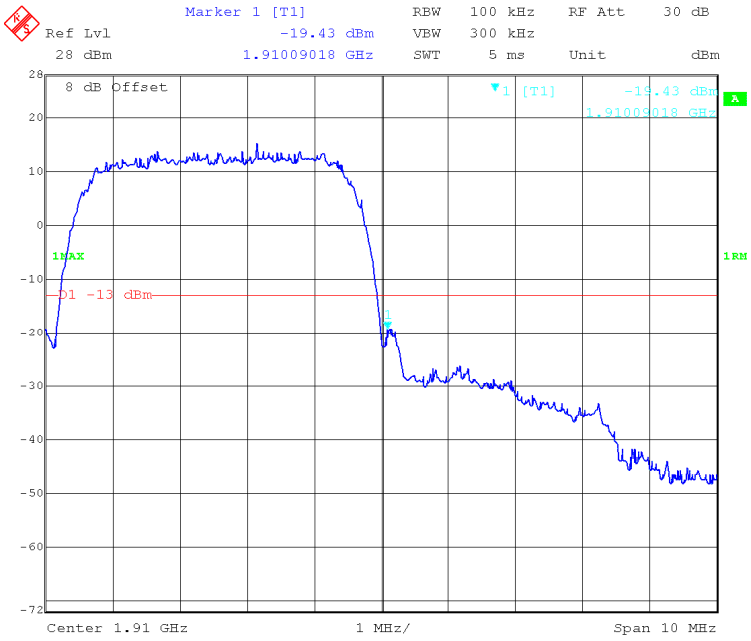
WCDMA (HSDPA) Mode, Right Band Edge



WCDMA (HSUPA) Mode, Left Band Edge

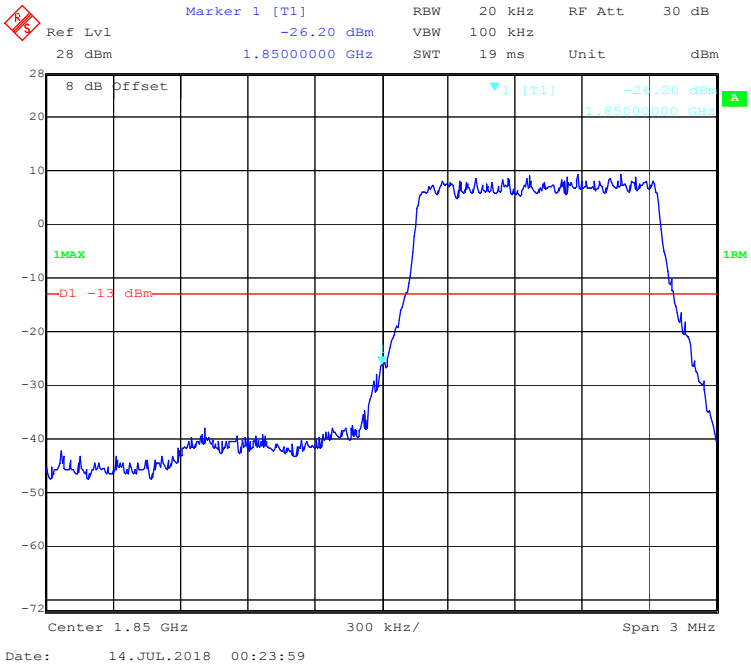


WCDMA (HSUPA) Mode, Right Band Edge

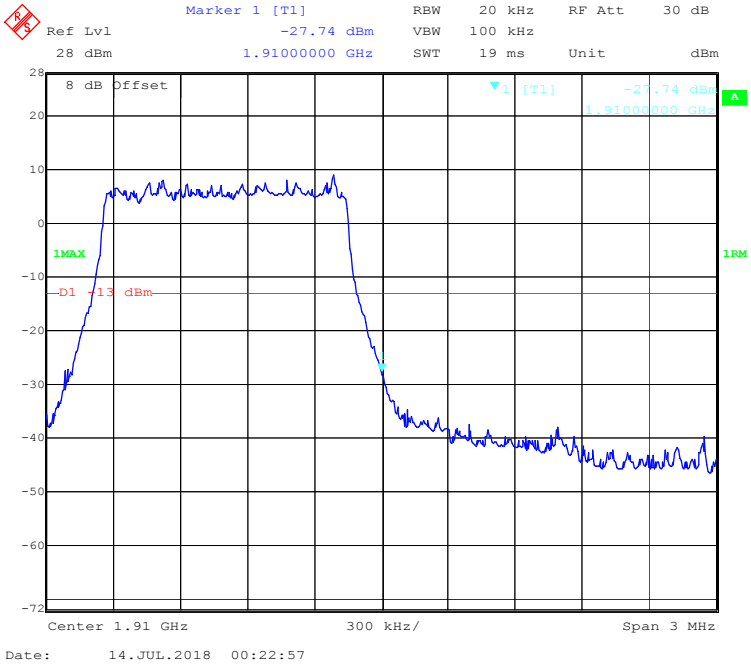


LTE Band 2:

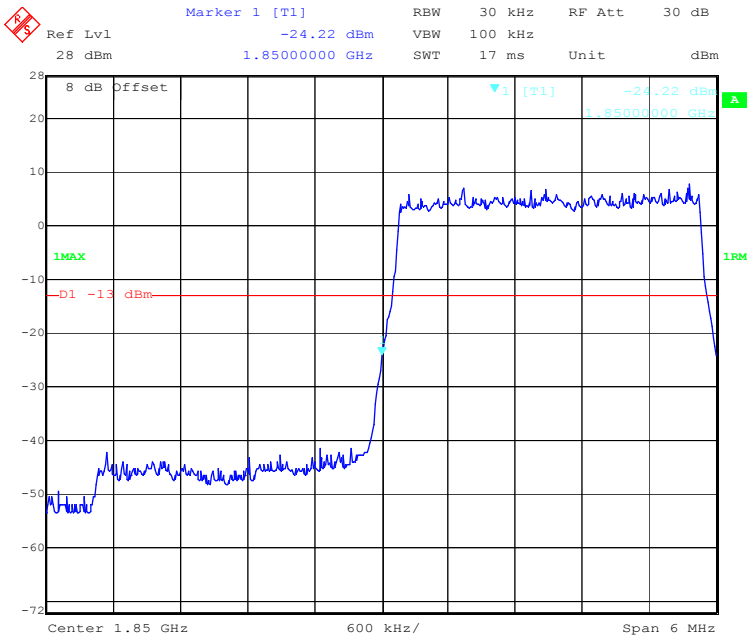
QPSK (1.4 MHz, FULL RB) - Left Band Edge



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

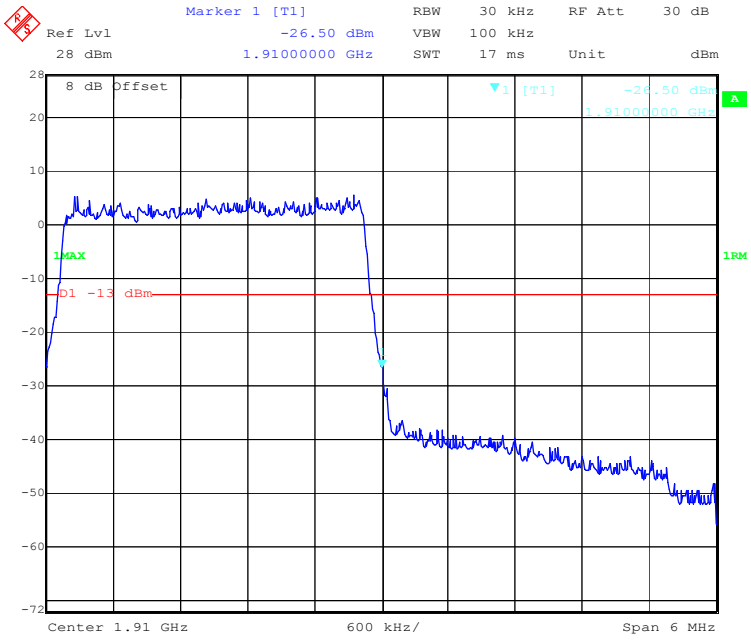


QPSK (3.0 MHz, FULL RB) - Left Band Edge



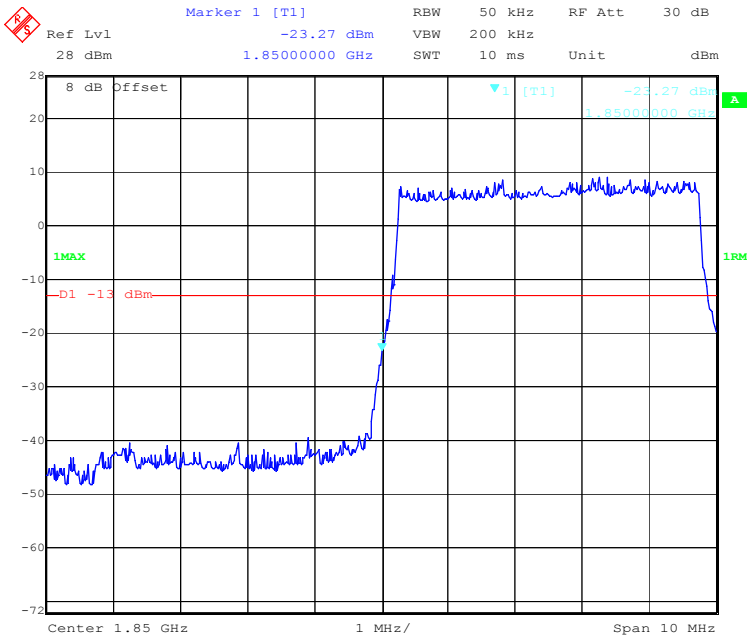
Date: 14.JUL.2018 00:26:10

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

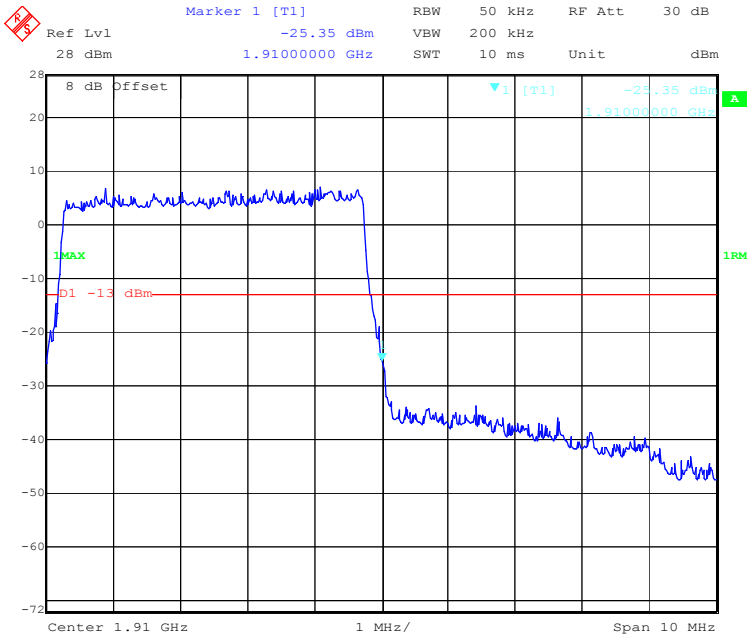


Date: 14.JUL.2018 00:27:23

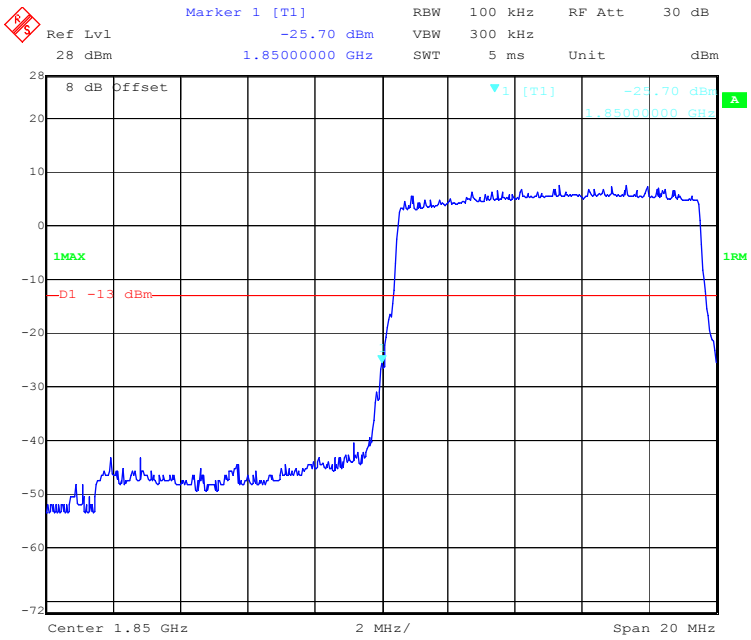
QPSK (5.0 MHz, FULL RB) - Left Band Edge



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

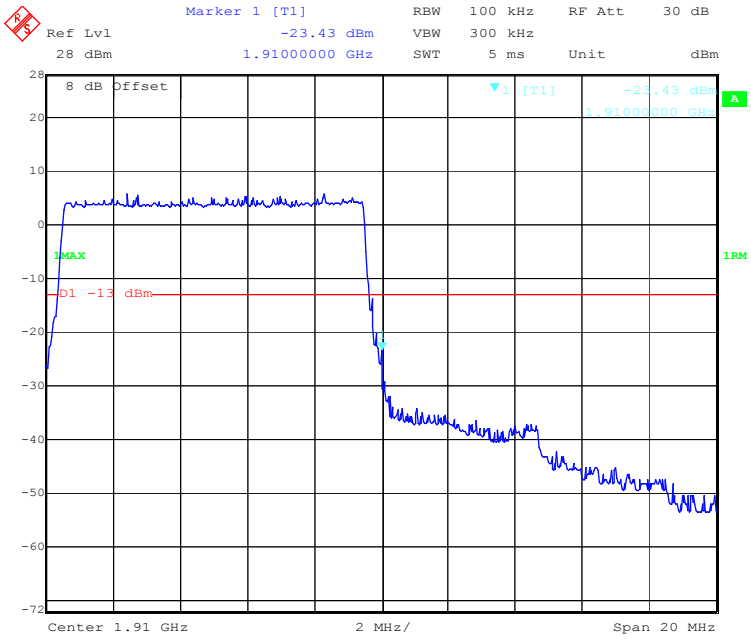


QPSK (10.0 MHz, FULL RB) - Left Band Edge



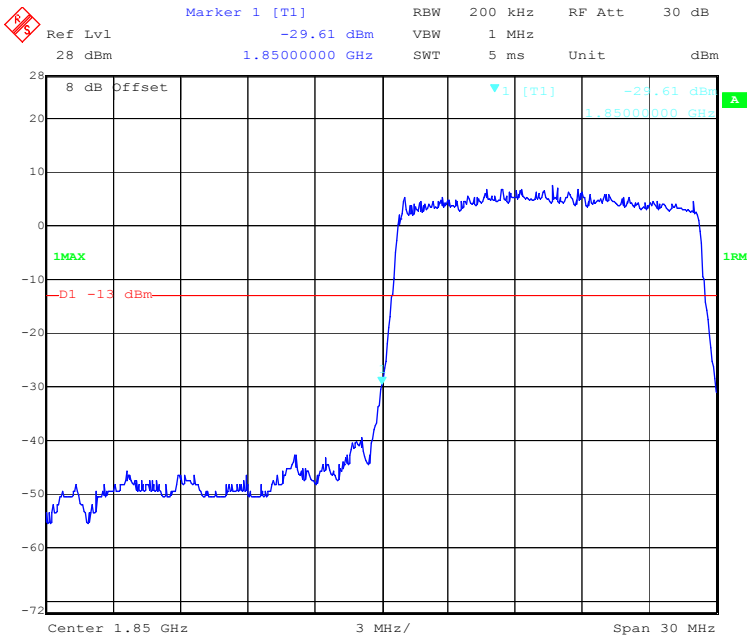
Date: 14.JUL.2018 00:31:53

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



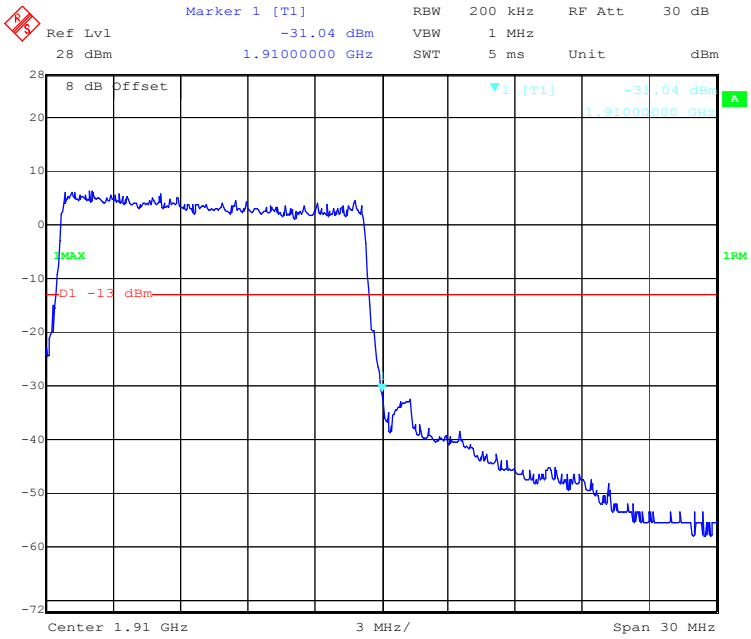
Date: 14.JUL.2018 00:32:59

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



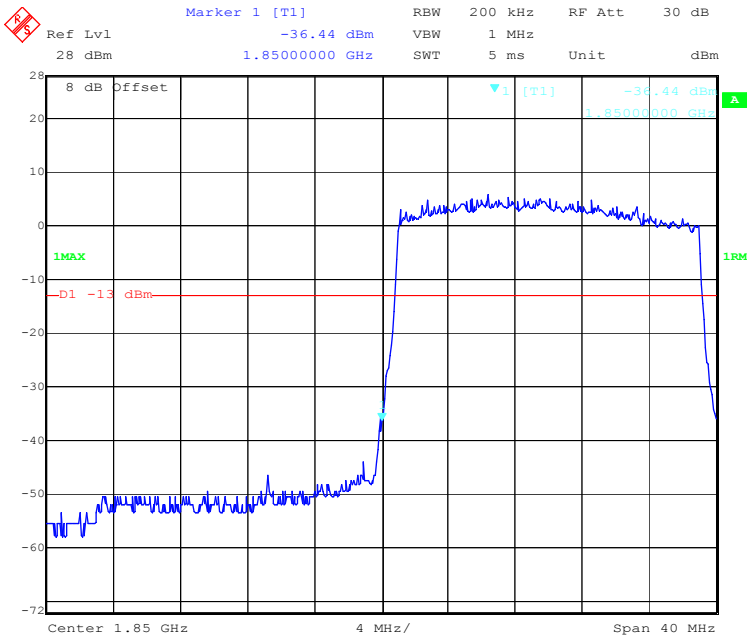
Date: 14.JUL.2018 00:36:15

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

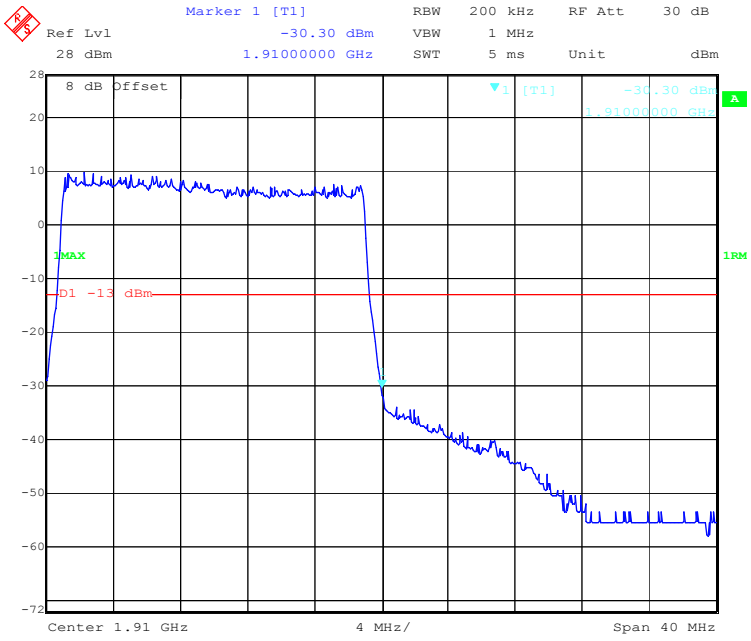


Date: 14.JUL.2018 00:35:03

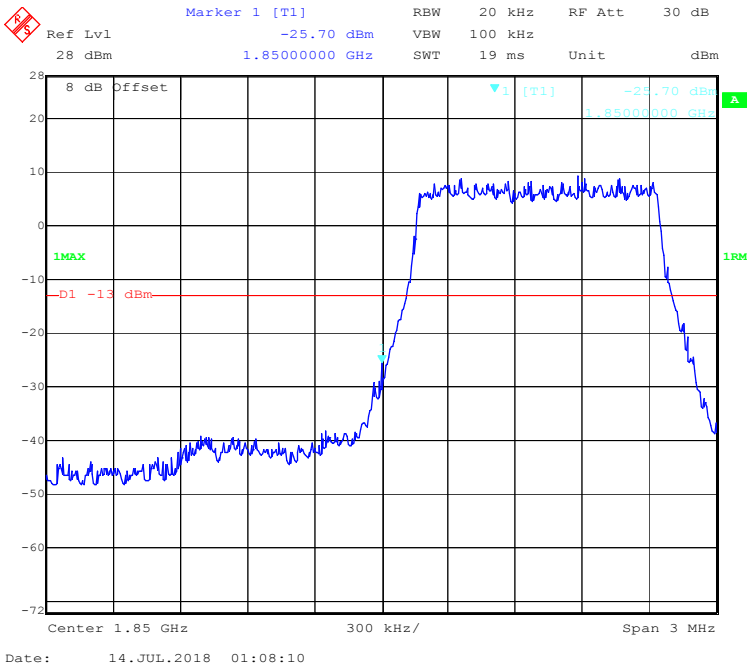
QPSK (20.0 MHz, FULL RB) - Left Band Edge



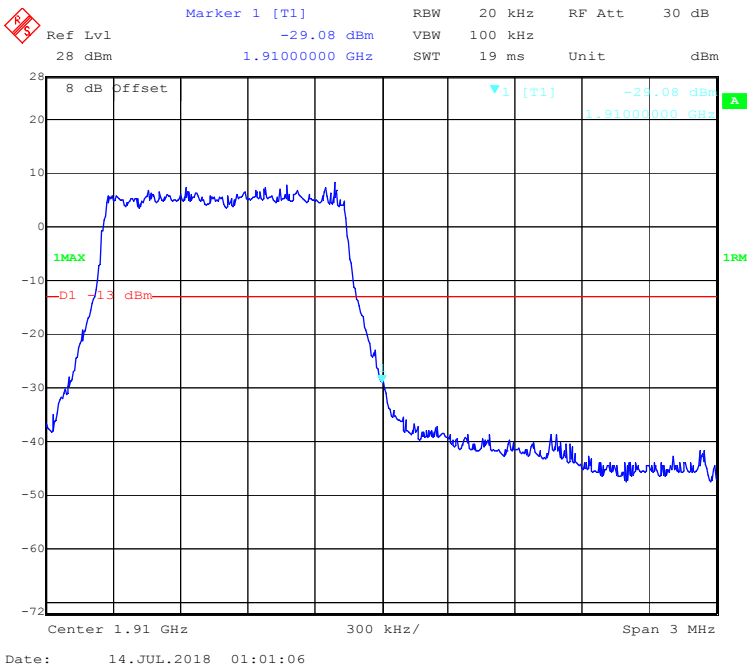
QPSK (20.0 MHz, FULL RB) - Right Band Edge



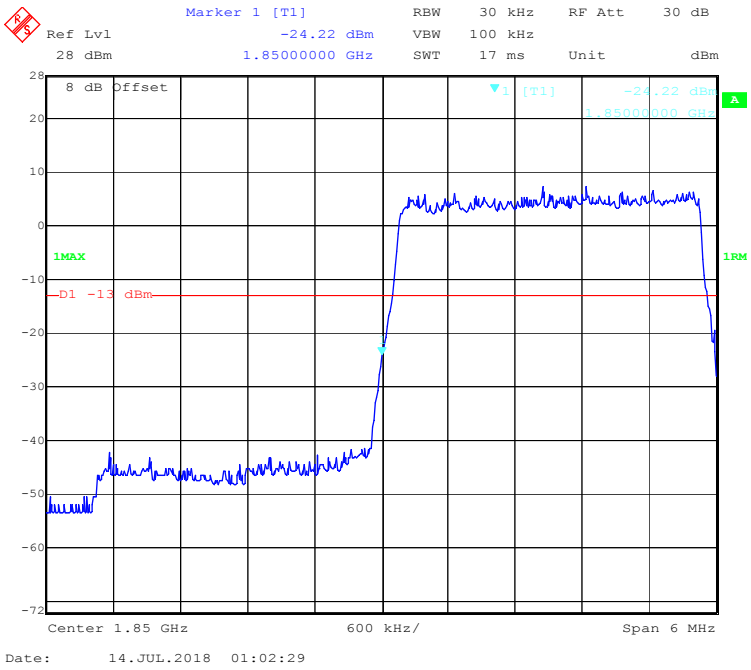
16-QAM (1.4 MHz, FULL RB) - Left Band Edge



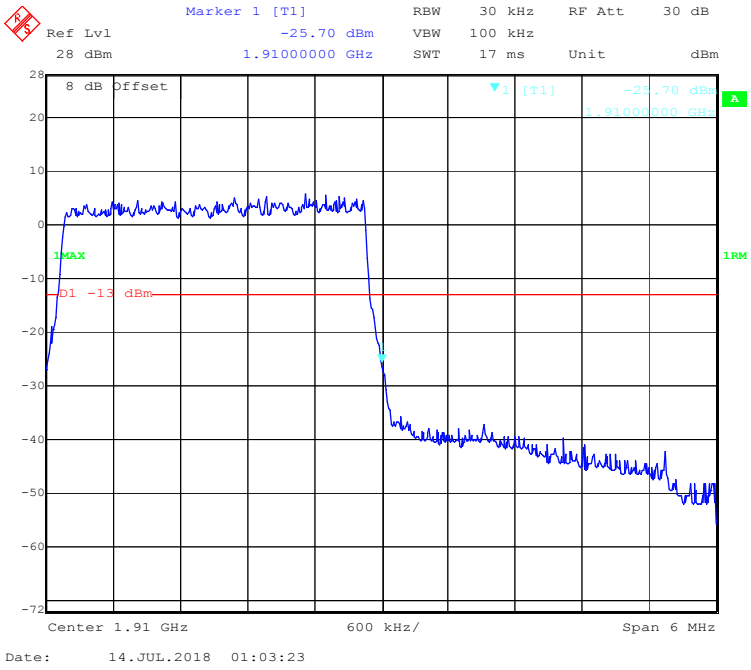
16-QAM (1.4 MHz, FULL RB) - Right Band Edge



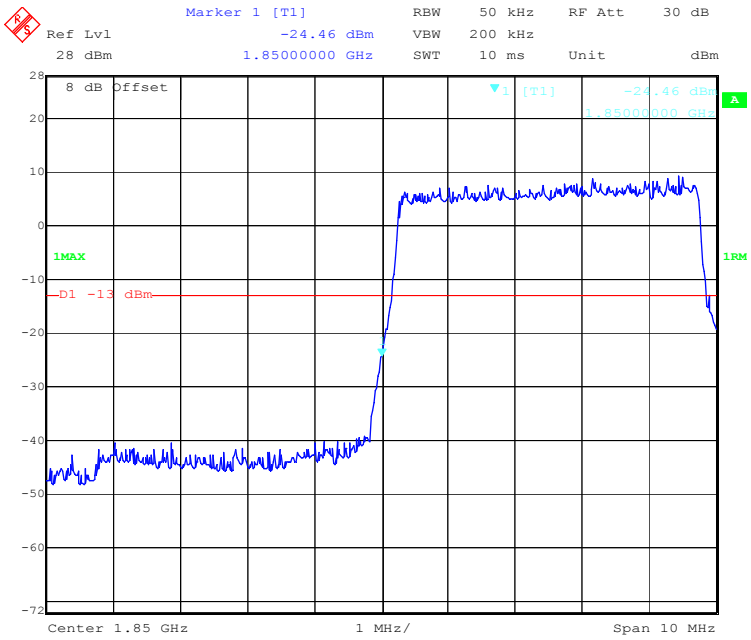
16-QAM (3.0 MHz, FULL RB) - Left Band Edge



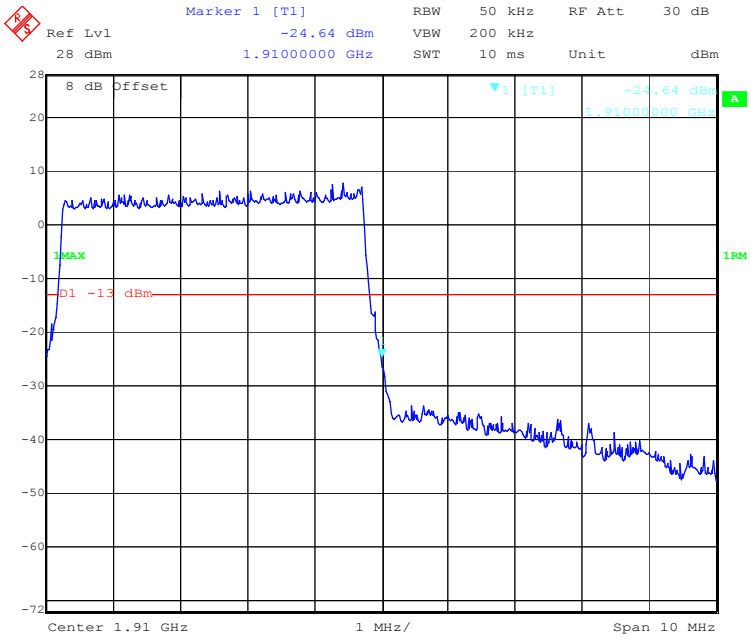
16-QAM (3.0 MHz, FULL RB) - Right Band Edge



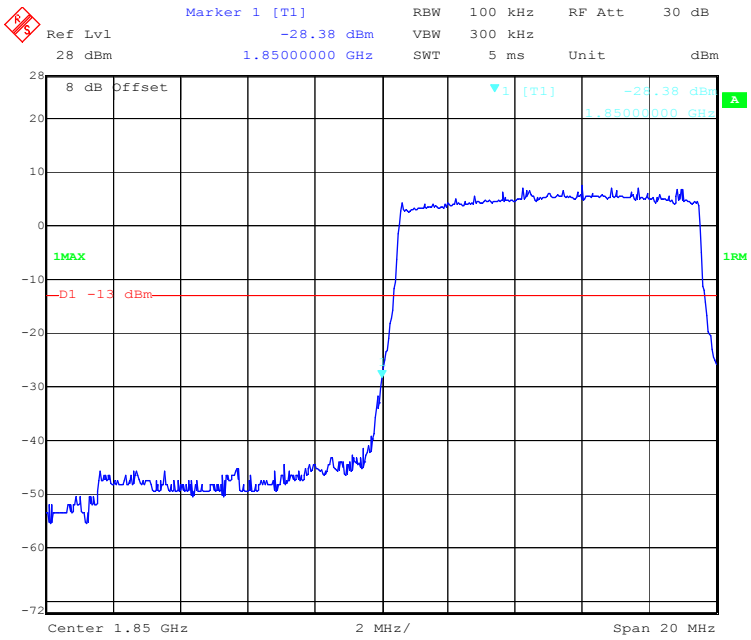
16-QAM (5.0 MHz, FULL RB) - Left Band Edge



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

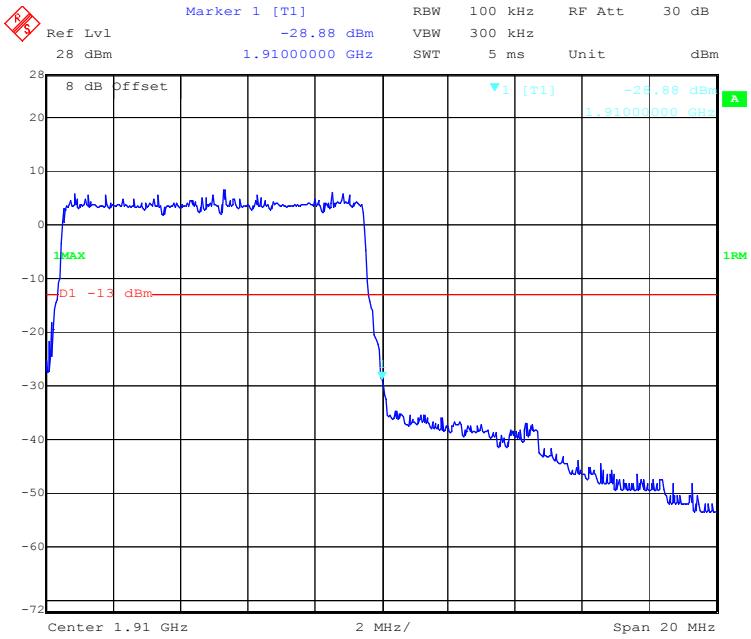


16-QAM (10.0 MHz, FULL RB) - Left Band Edge



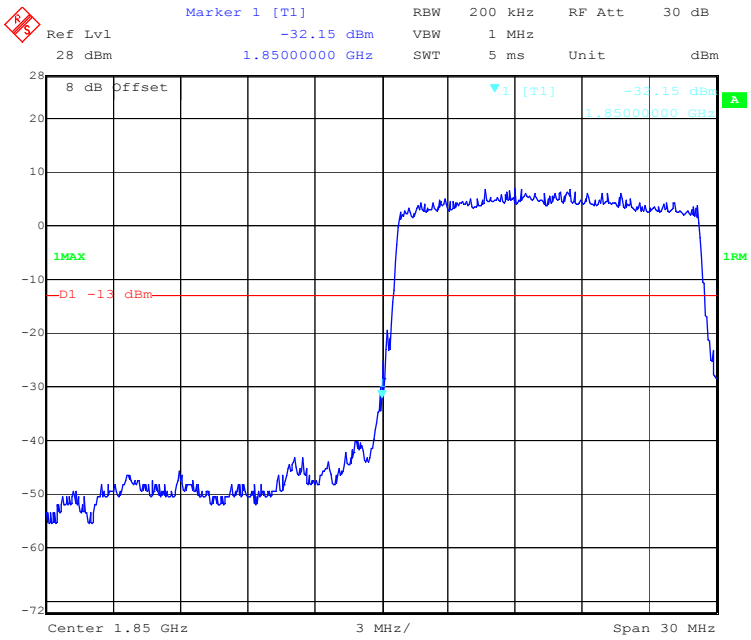
Date: 14.JUL.2018 01:12:05

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

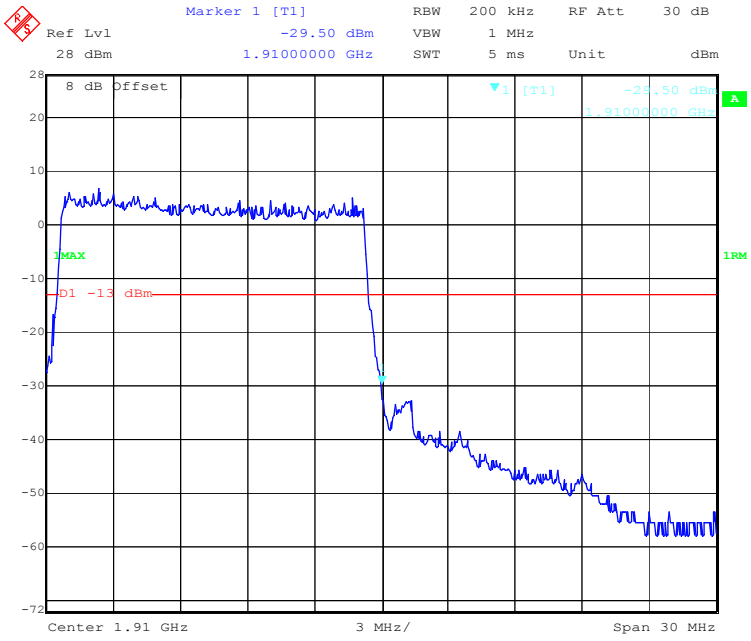


Date: 14.JUL.2018 01:13:01

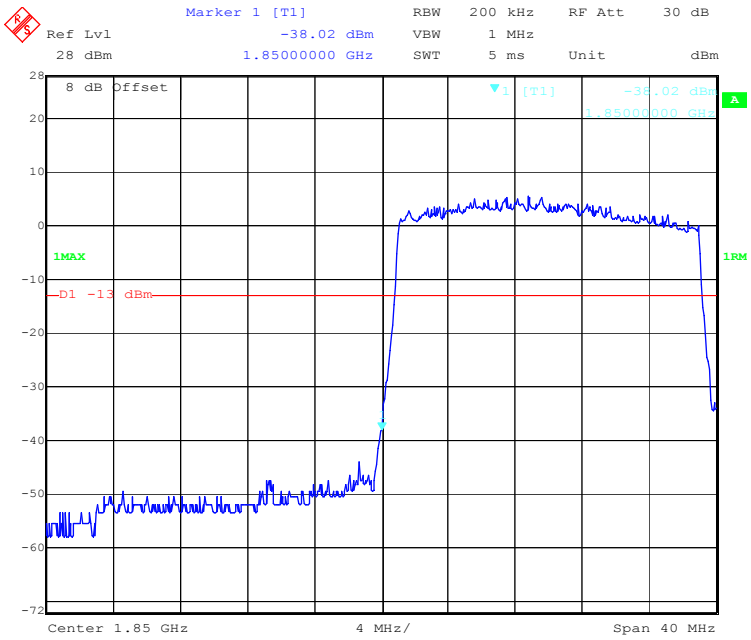
16-QAM (15.0 MHz, FULL RB) - Left Band Edge



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



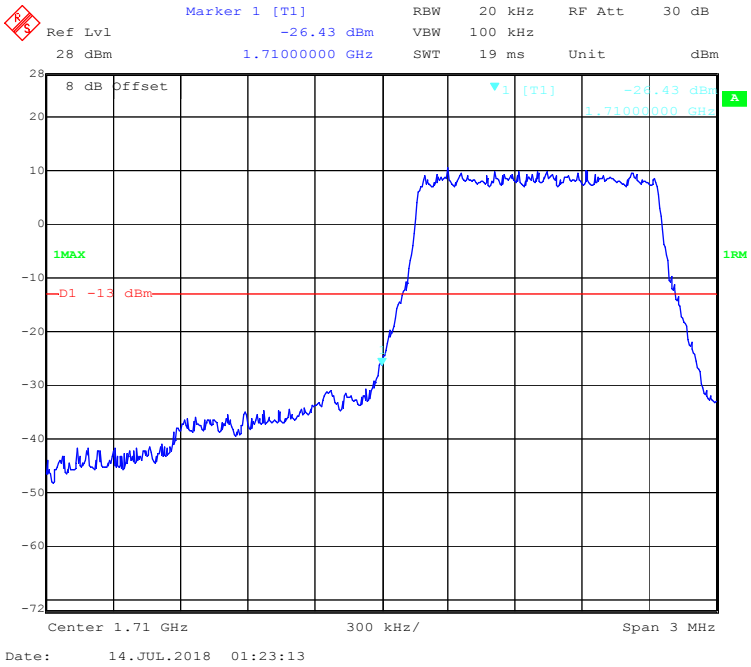
16-QAM (20.0 MHz, FULL RB) - Left Band Edge



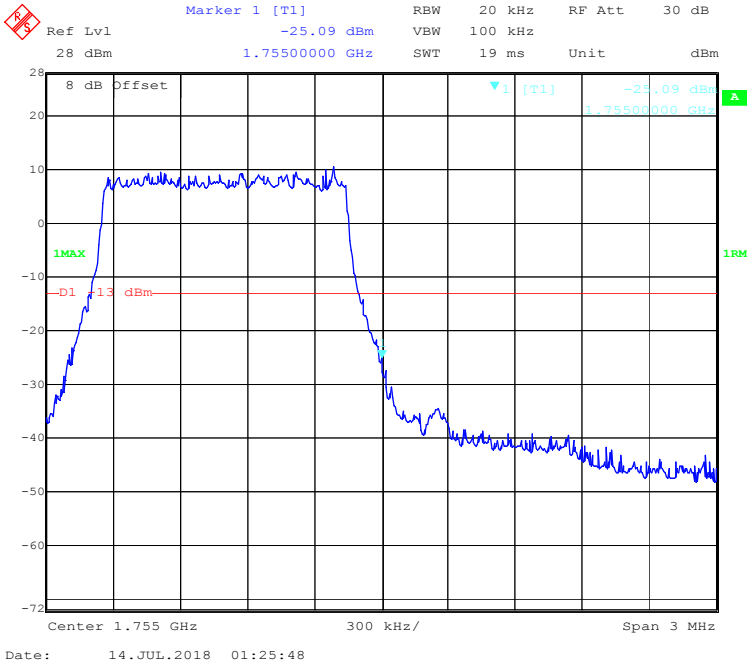
16-QAM (20.0 MHz, FULL RB) - Right Band Edge

LTE Band 4:

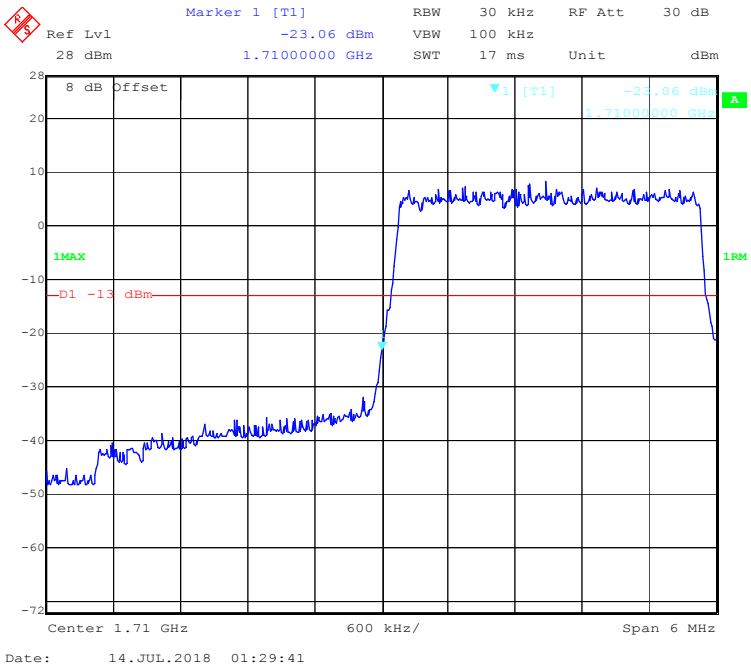
QPSK (1.4 MHz, FULL RB) - Left Band Edge



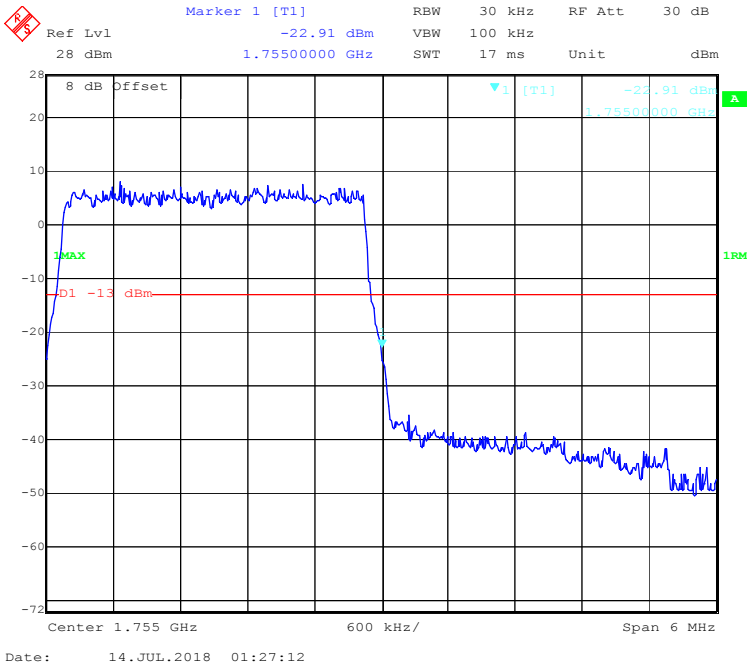
QPSK (1.4 MHz, FULL RB) - Right Band Edge



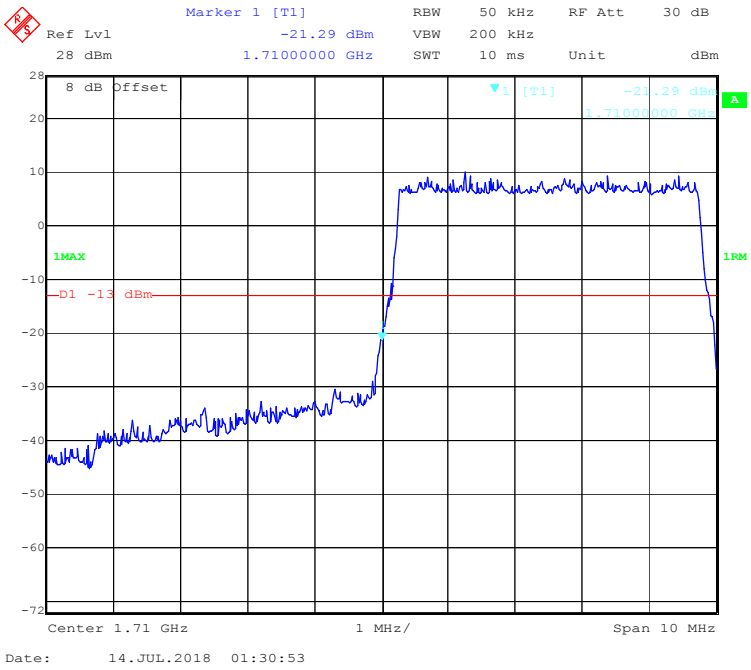
QPSK (3.0 MHz, FULL RB) - Left Band Edge



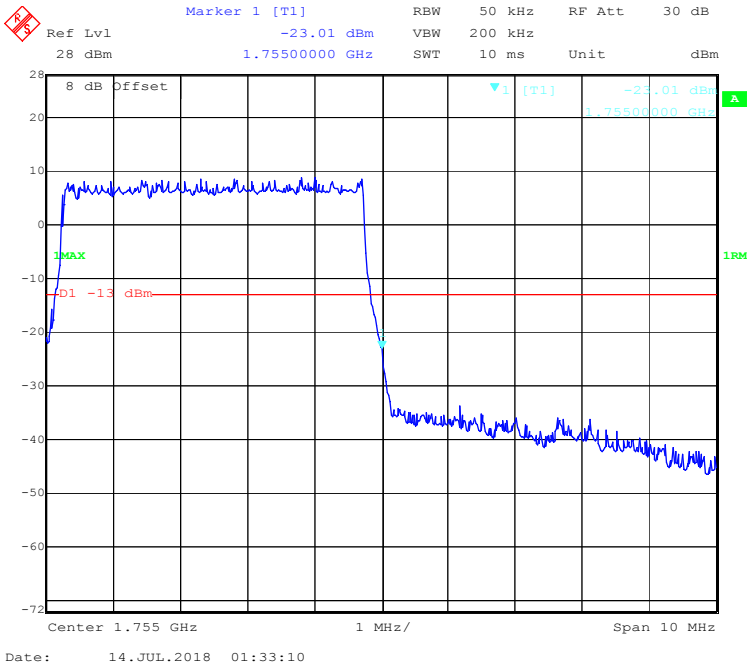
QPSK (3.0 MHz, FULL RB) - Right Band Edge



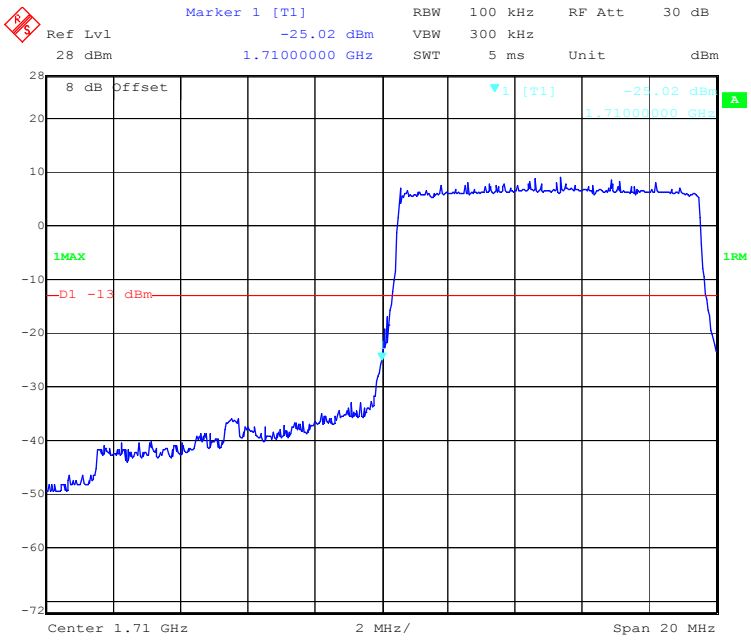
QPSK (5.0 MHz, FULL RB) - Left Band Edge



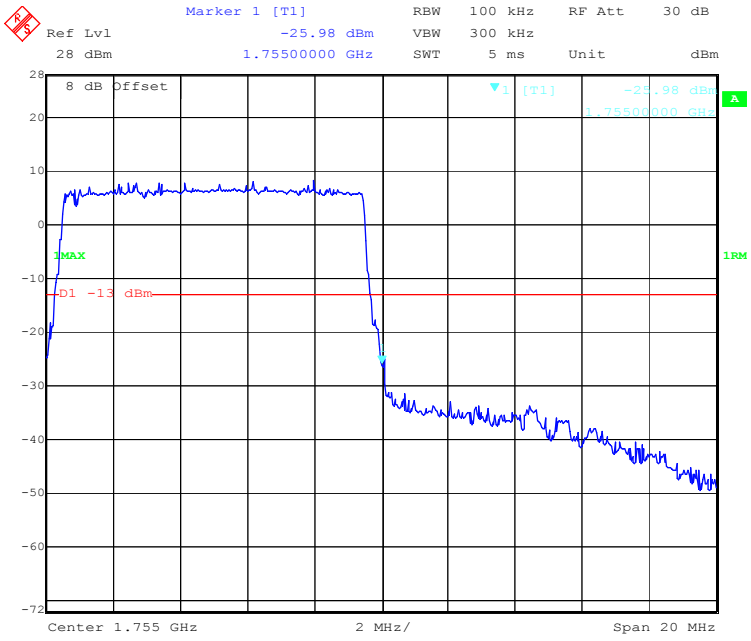
QPSK (5.0 MHz, FULL RB) - Right Band Edge



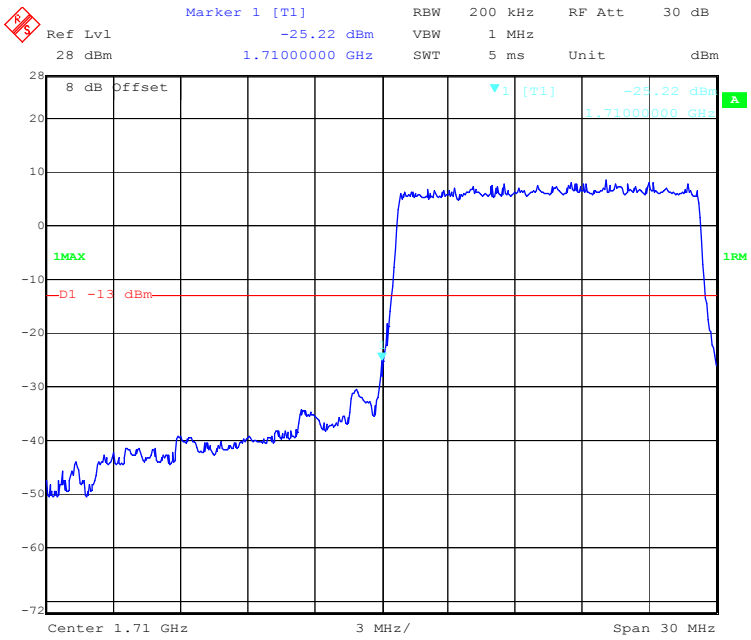
QPSK (10.0 MHz, FULL RB) - Left Band Edge



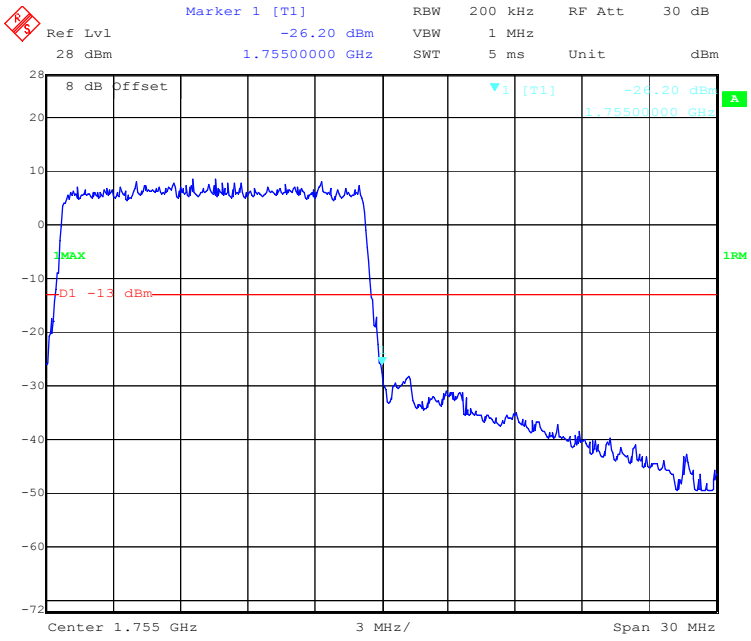
QPSK (10.0 MHz, FULL RB) - Right Band Edge



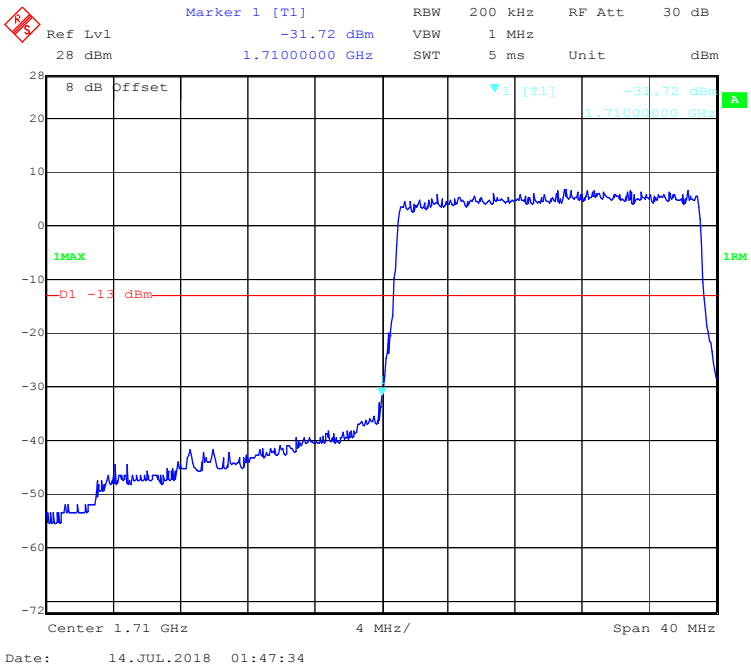
QPSK (15.0 MHz, FULL RB) - Left Band Edge



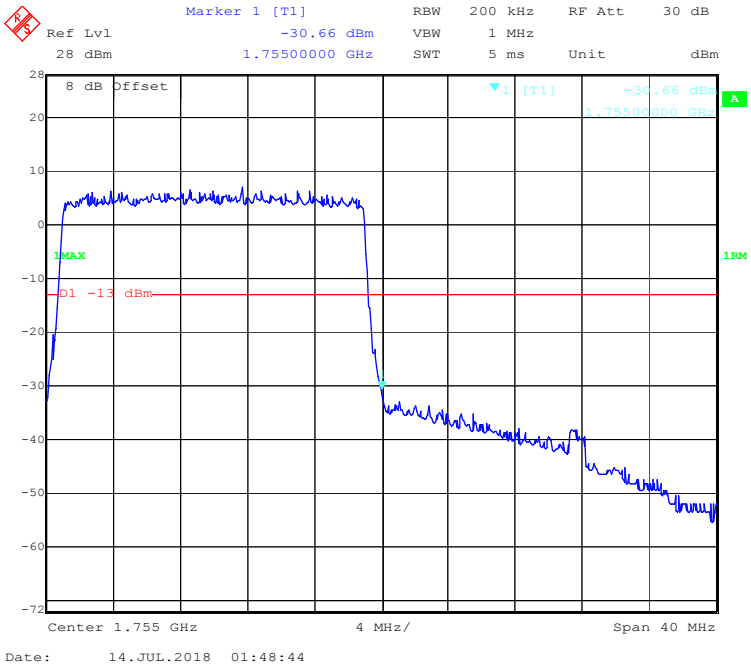
QPSK (15.0 MHz, FULL RB) - Right Band Edge



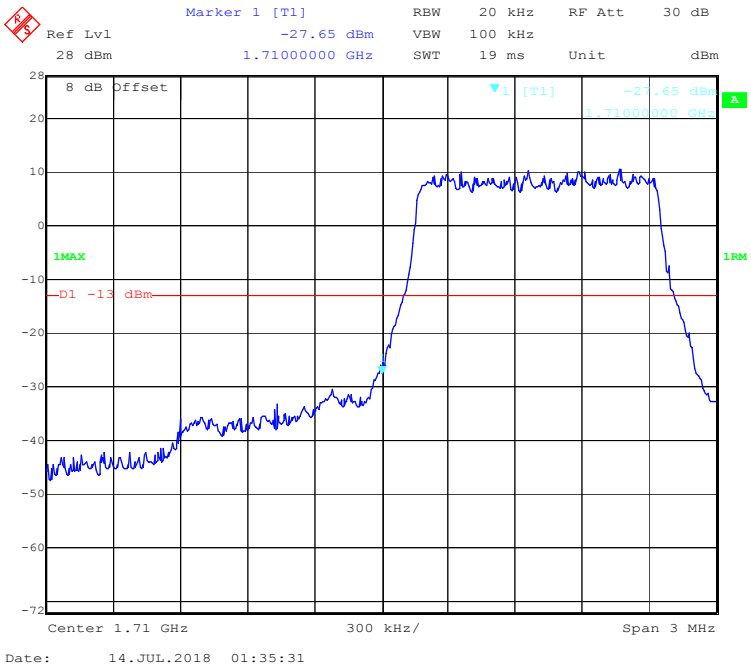
QPSK (20.0 MHz, FULL RB) - Left Band Edge



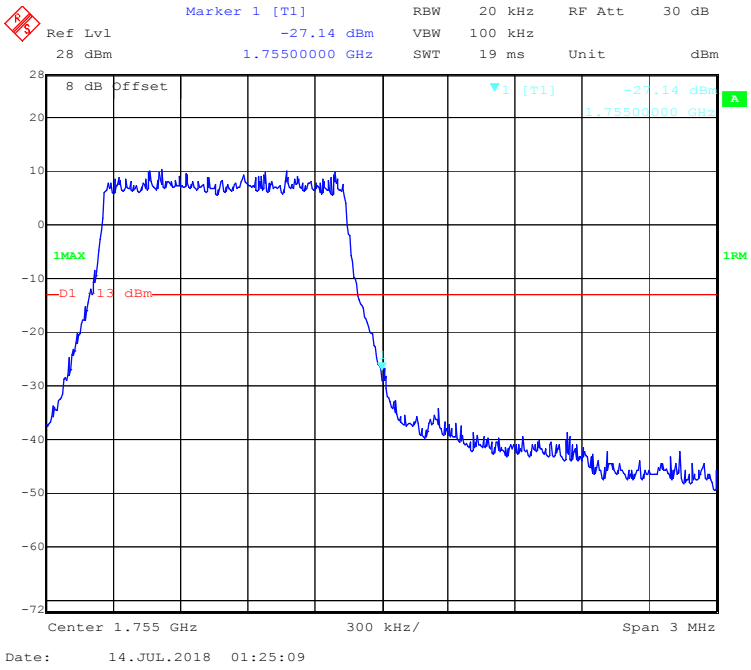
QPSK (20.0 MHz, FULL RB) - Right Band Edge



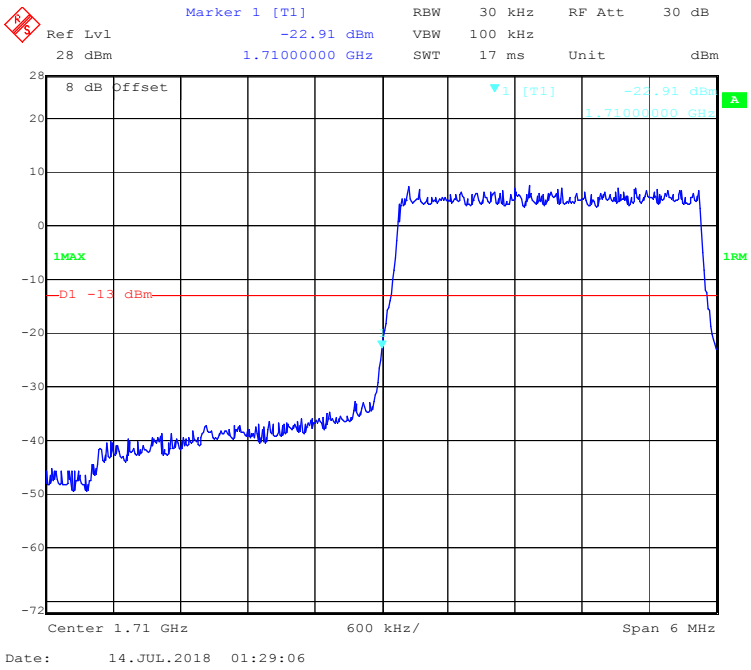
16-QAM (1.4 MHz, FULL RB) - Left Band Edge



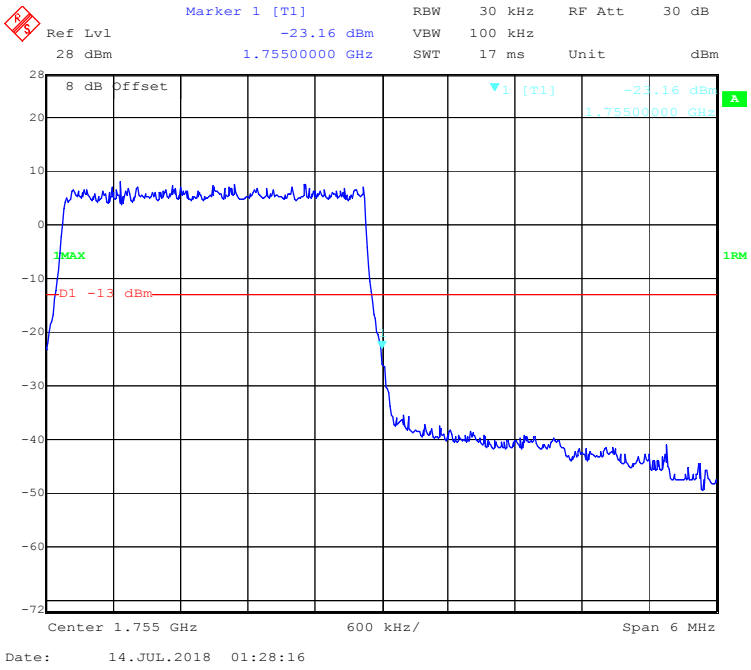
16-QAM (1.4 MHz, FULL RB) - Right Band Edge



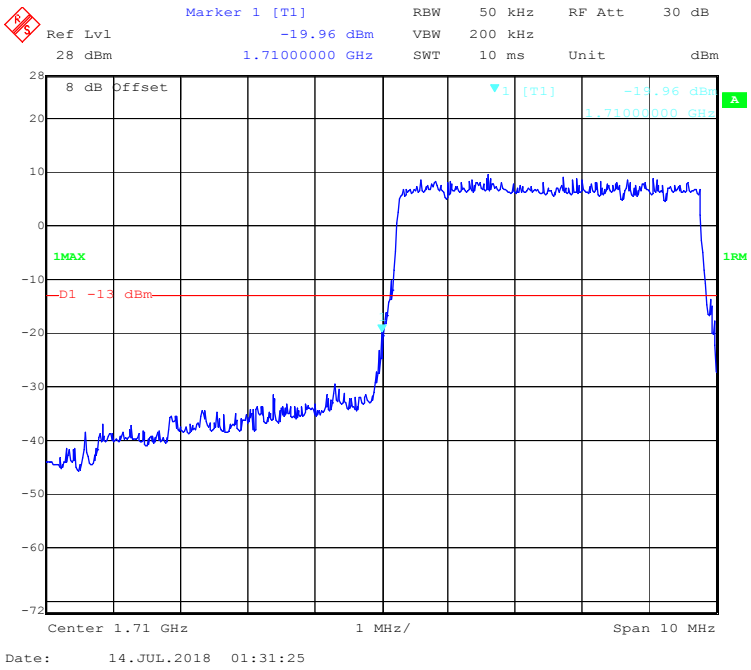
16-QAM (3.0 MHz, FULL RB) - Left Band Edge



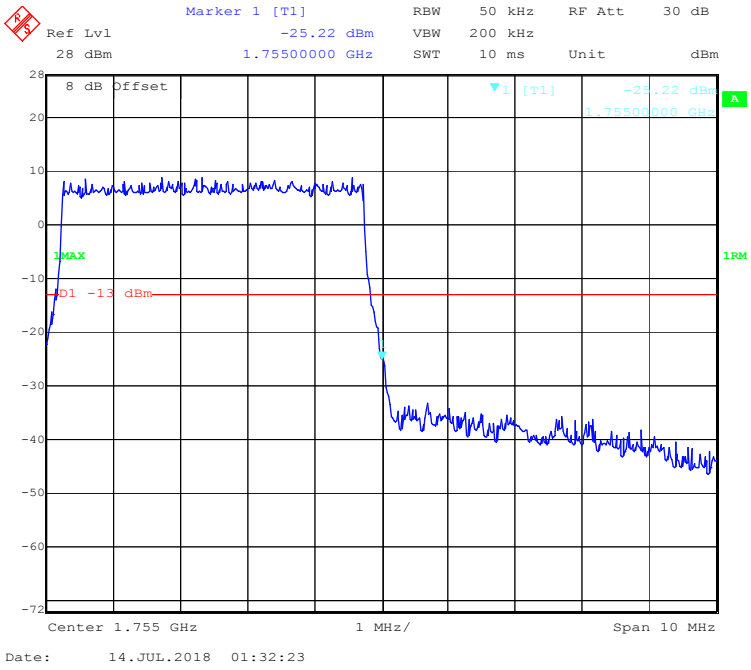
16-QAM (3.0 MHz, FULL RB) - Right Band Edge



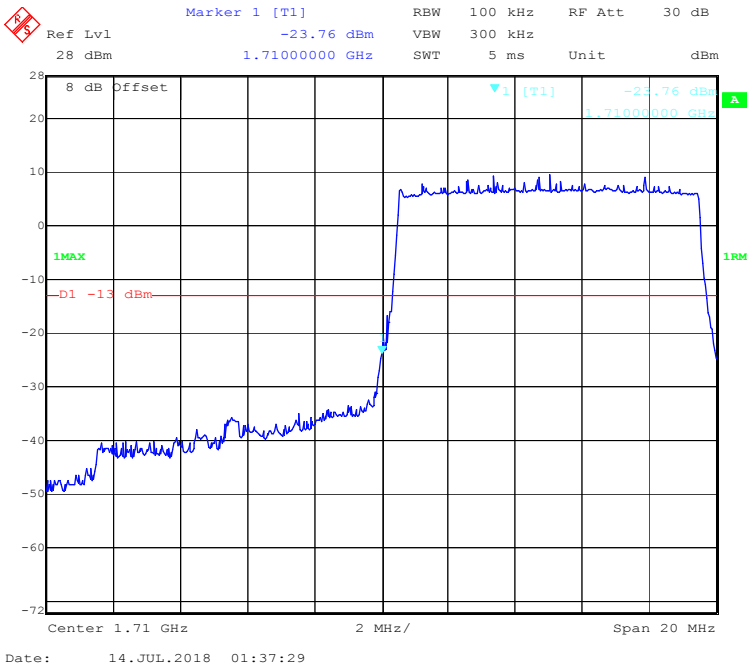
16-QAM (5.0 MHz, FULL RB) - Left Band Edge



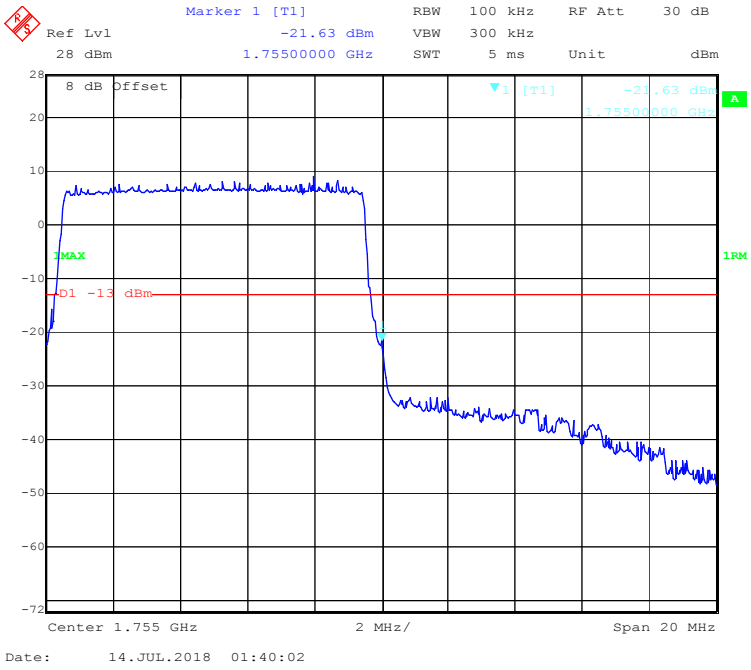
16-QAM (5.0 MHz, FULL RB) - Right Band Edge



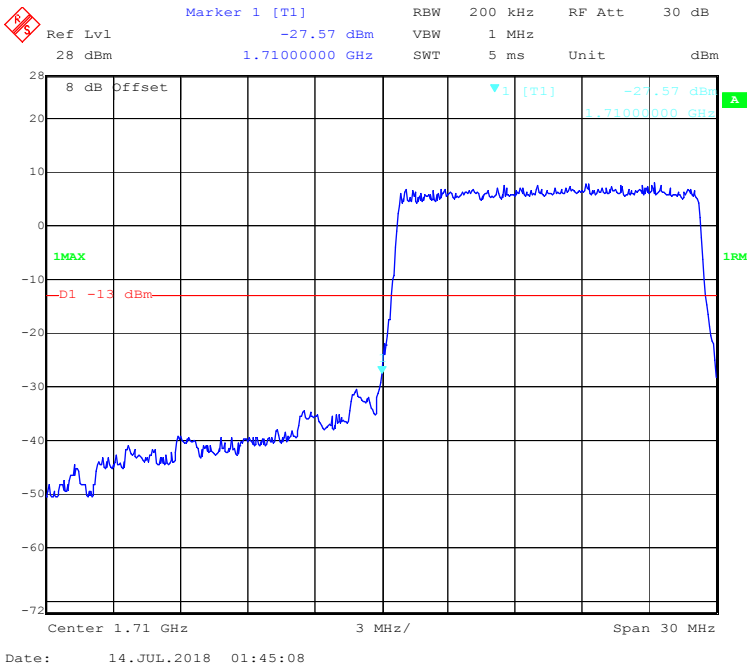
16-QAM (10.0 MHz, FULL RB) - Left Band Edge



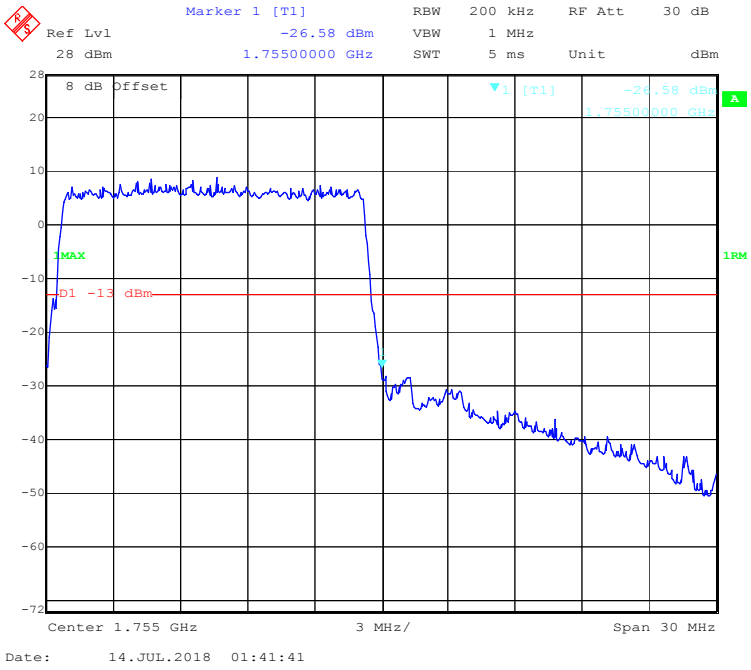
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



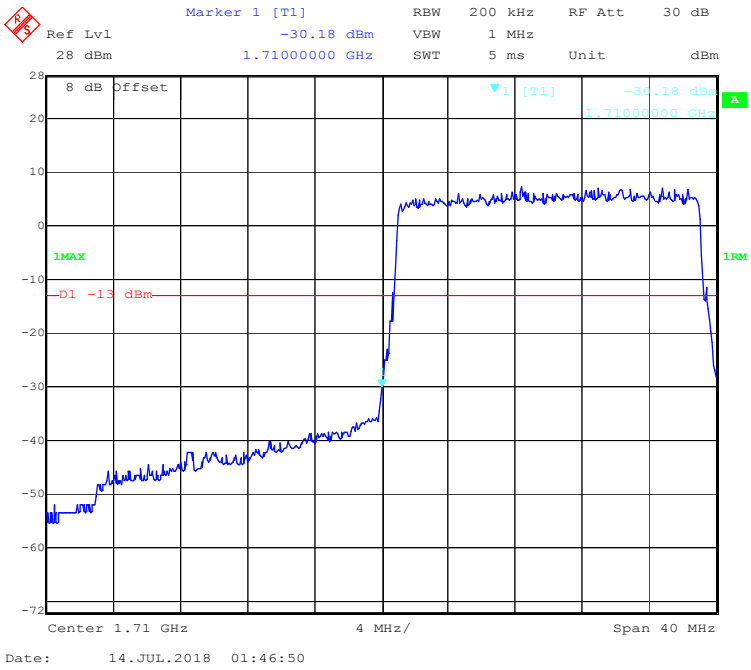
16-QAM (15.0 MHz, FULL RB) - Left Band Edge



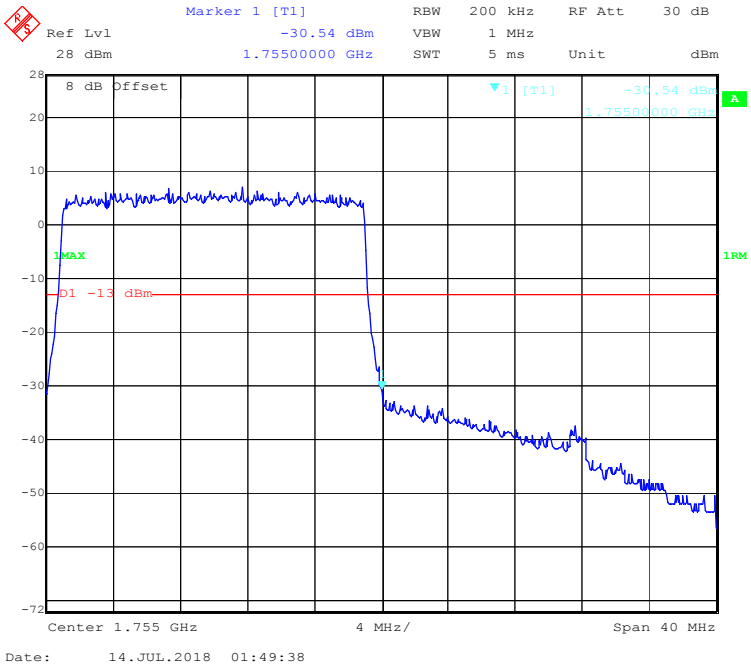
16-QAM (15.0 MHz, FULL RB) - Right Band Edge



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

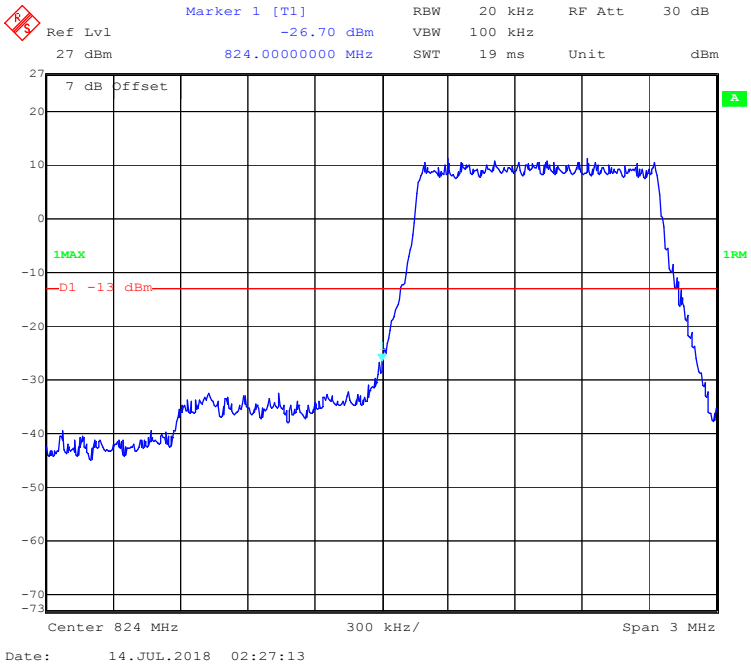


16-QAM (20.0 MHz, FULL RB) - Right Band Edge

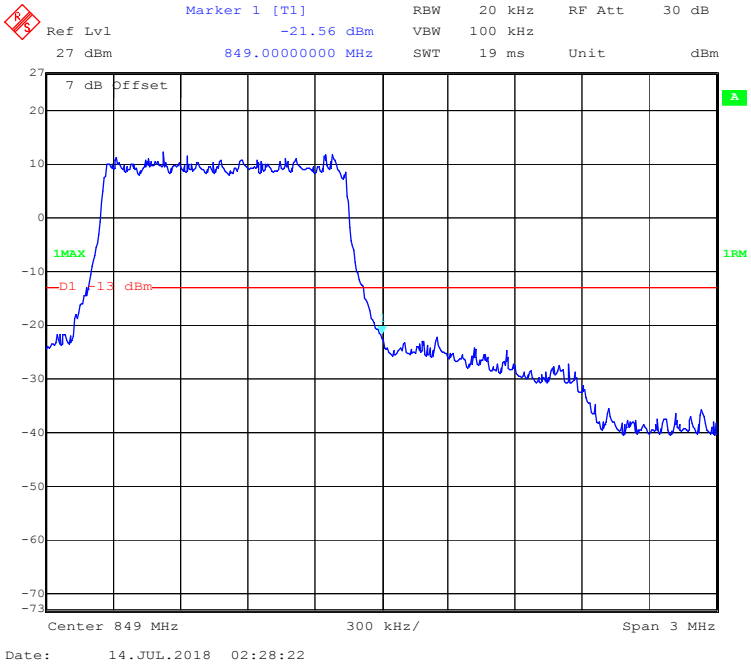


LTE Band 5:

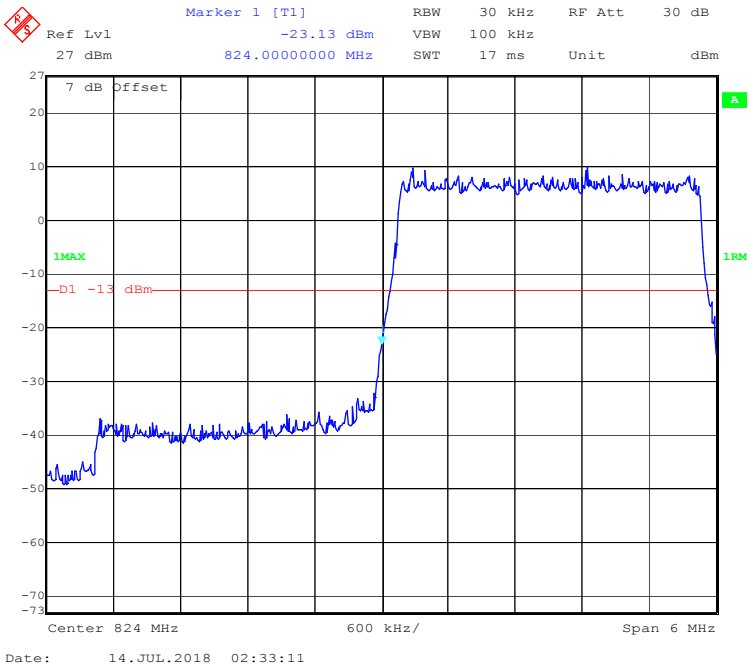
QPSK (1.4 MHz, FULL RB) - Left Band Edge



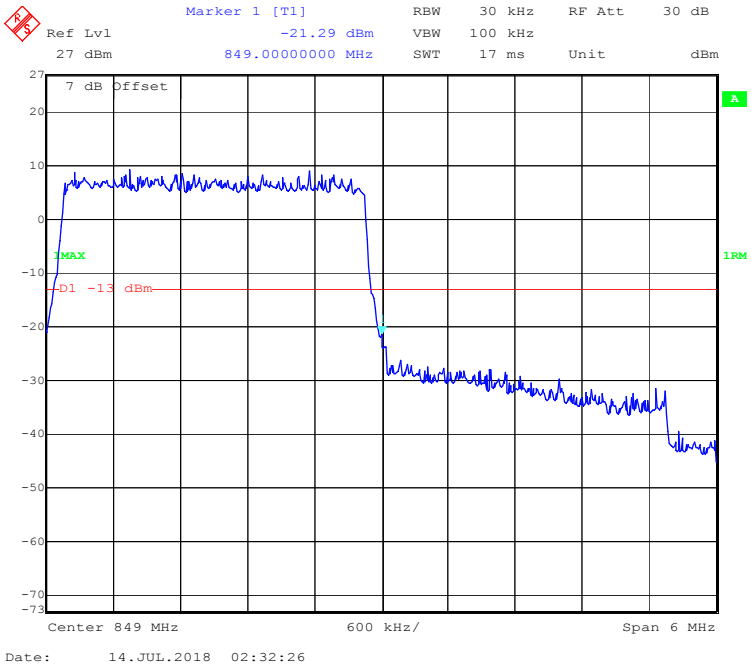
QPSK (1.4 MHz, FULL RB) - Right Band Edge



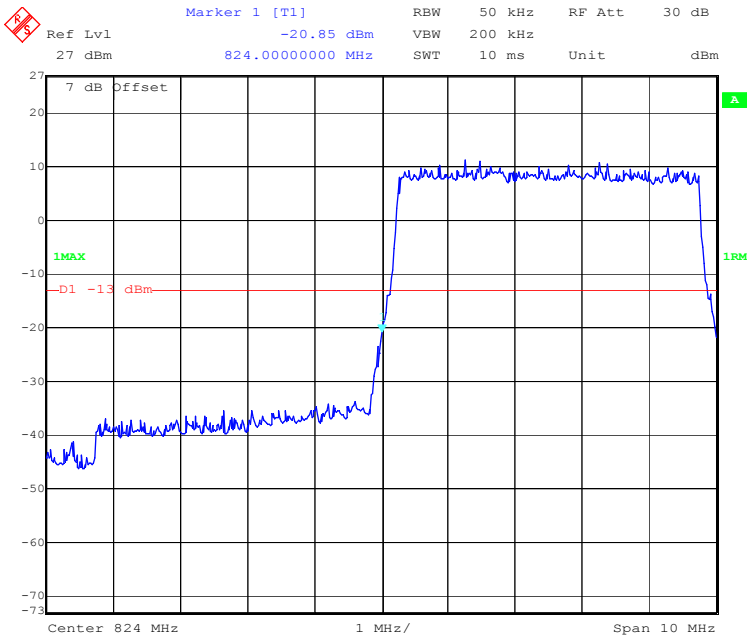
QPSK (3.0 MHz, FULL RB) - Left Band Edge



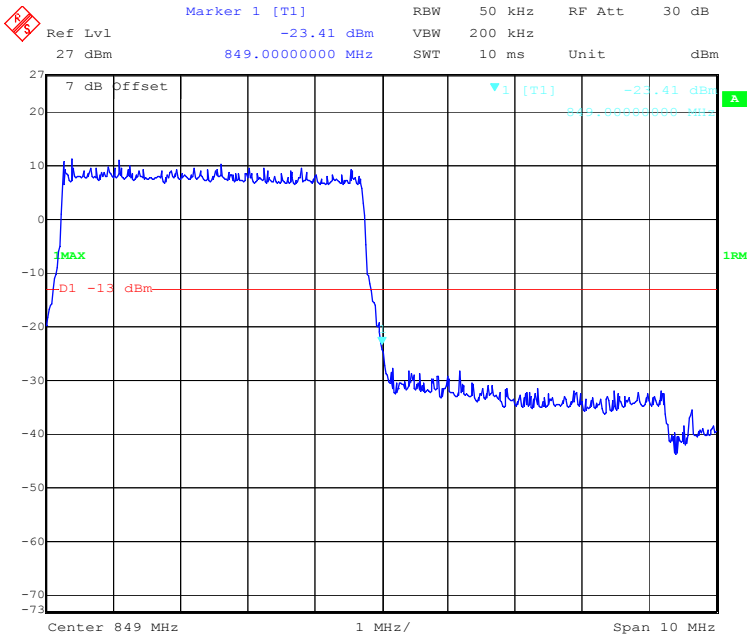
QPSK (3.0 MHz, FULL RB) - Right Band Edge



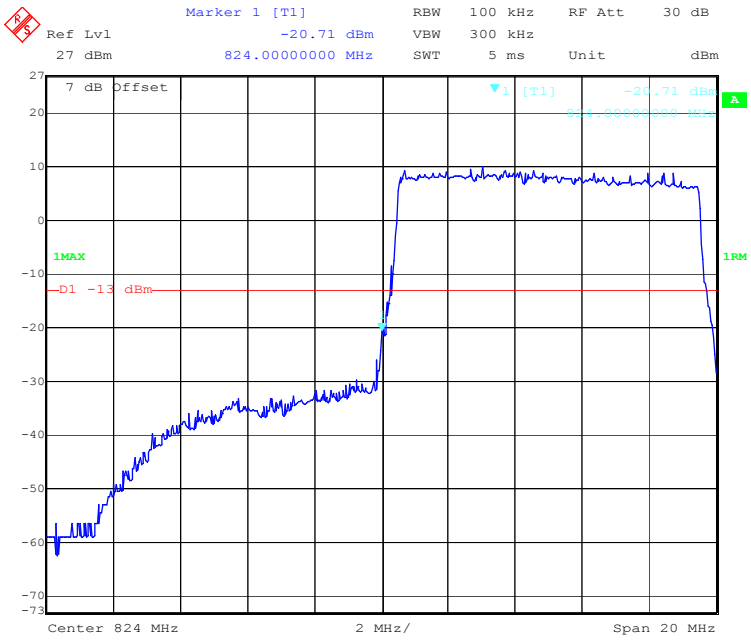
QPSK (5.0 MHz, FULL RB) - Left Band Edge



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

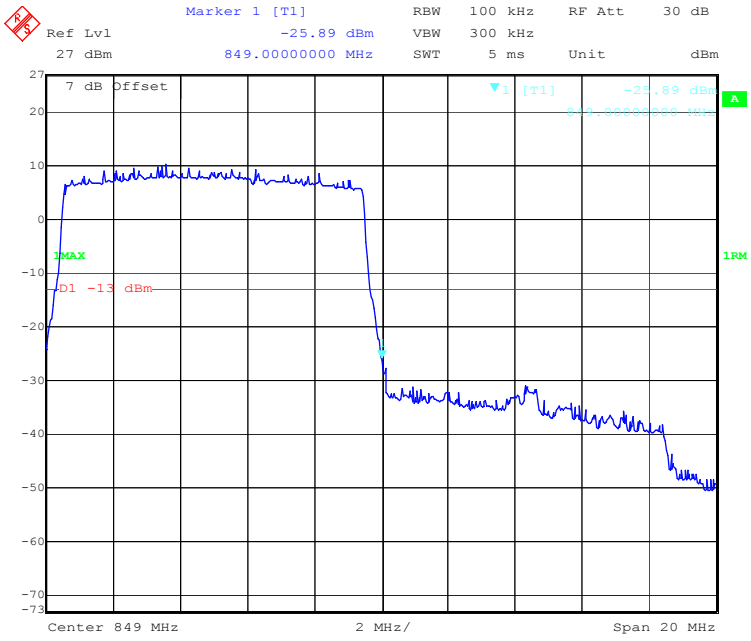


QPSK (10.0 MHz, FULL RB) - Left Band Edge



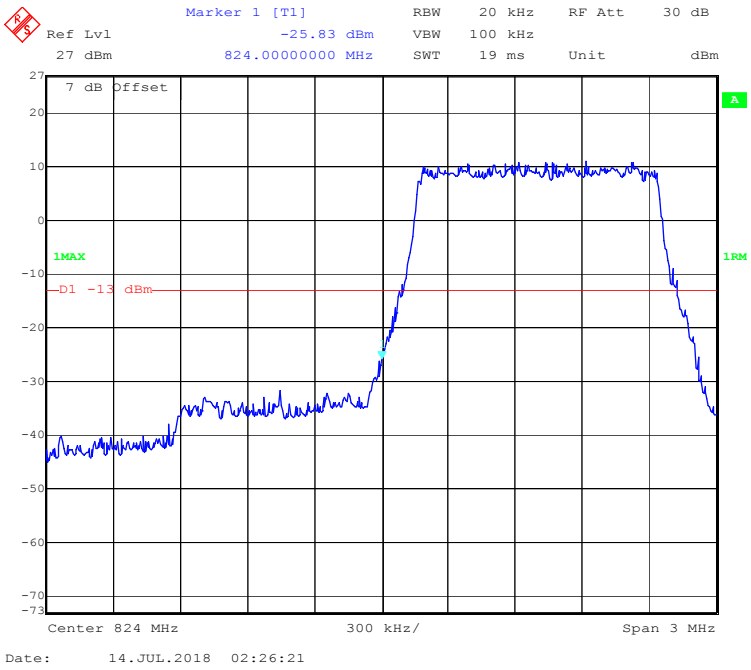
Date: 14.JUL.2018 02:47:47

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

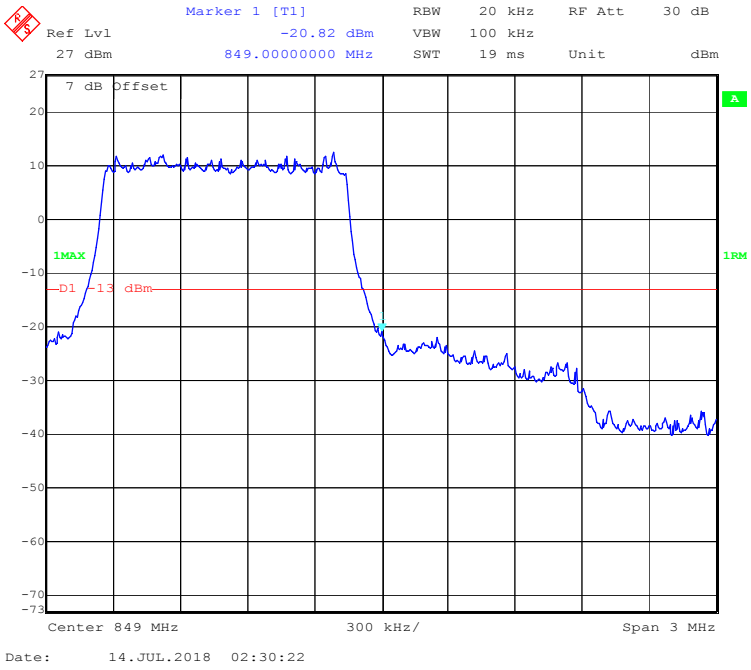


Date: 14.JUL.2018 02:47:00

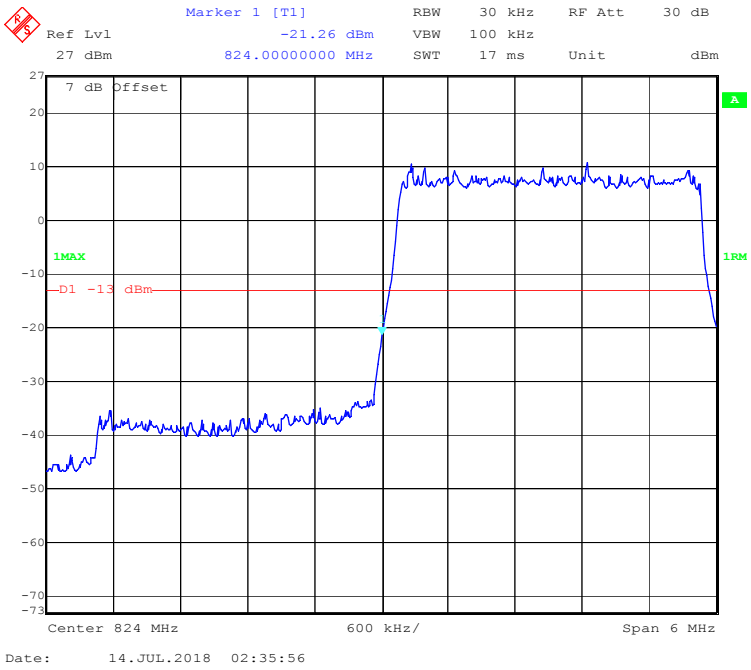
16-QAM (1.4 MHz, FULL RB) - Left Band Edge



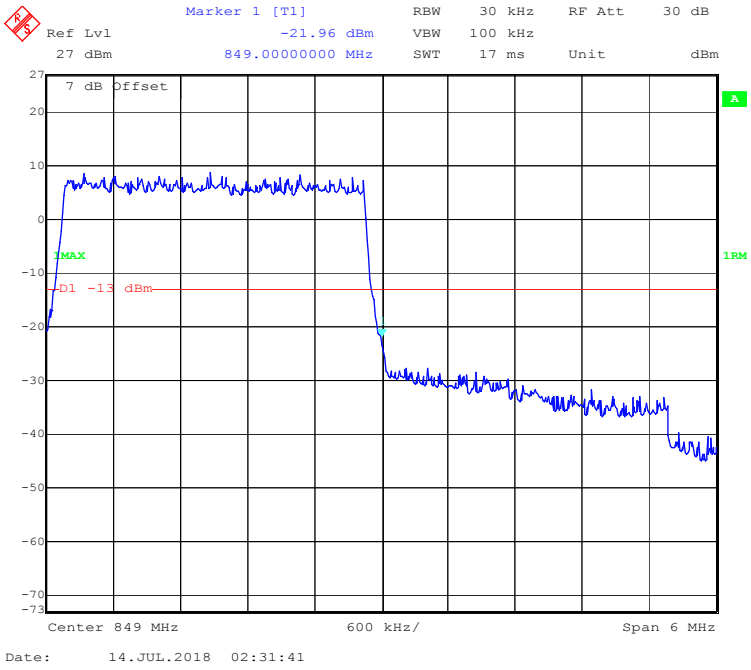
16-QAM (1.4 MHz, FULL RB) - Right Band Edge



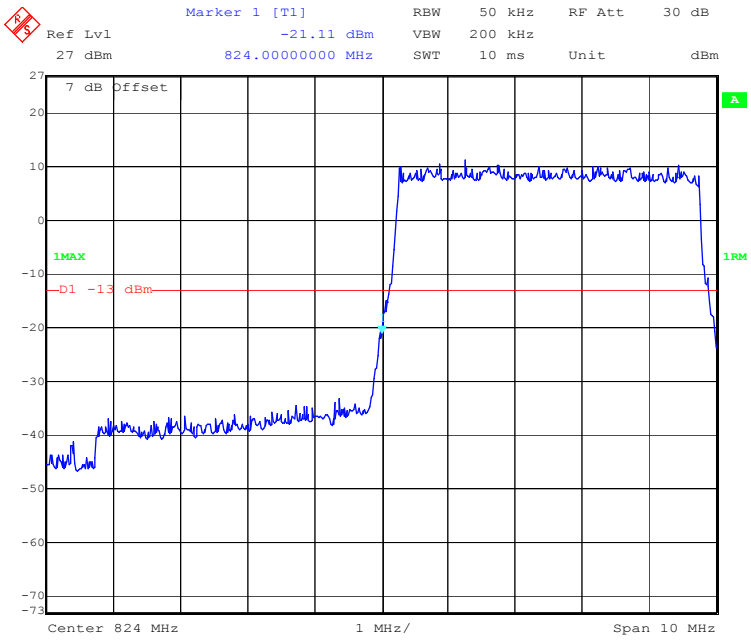
16-QAM (3.0 MHz, FULL RB) - Left Band Edge



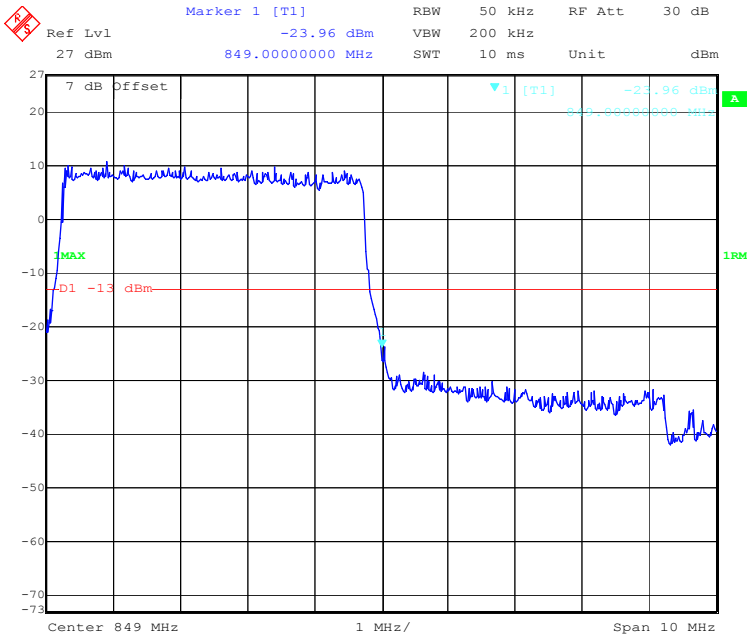
16-QAM (3.0 MHz, FULL RB) - Right Band Edge



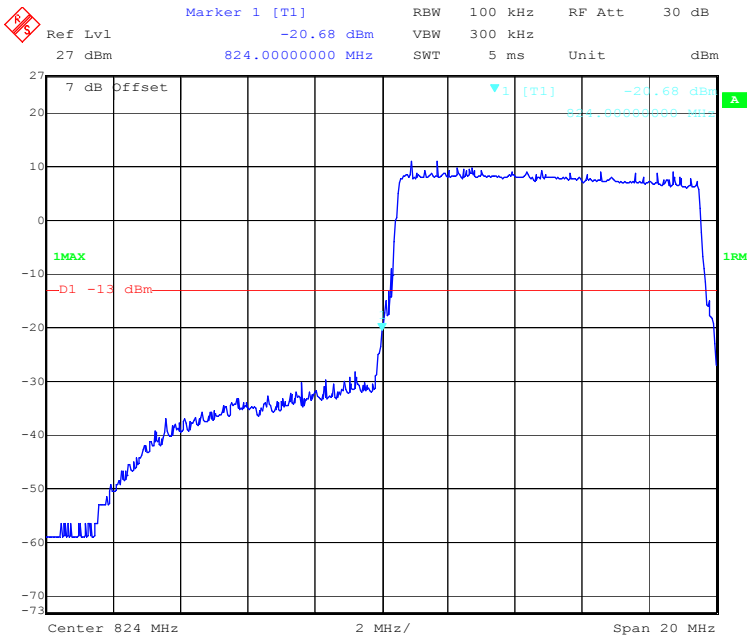
16-QAM (5.0 MHz, FULL RB) - Left Band Edge



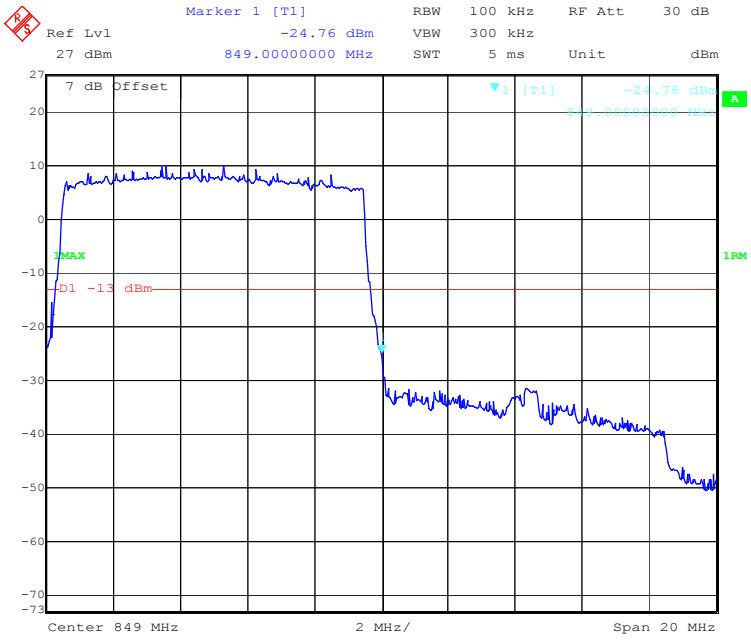
16-QAM (5.0 MHz, FULL RB) - Right Band Edge



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

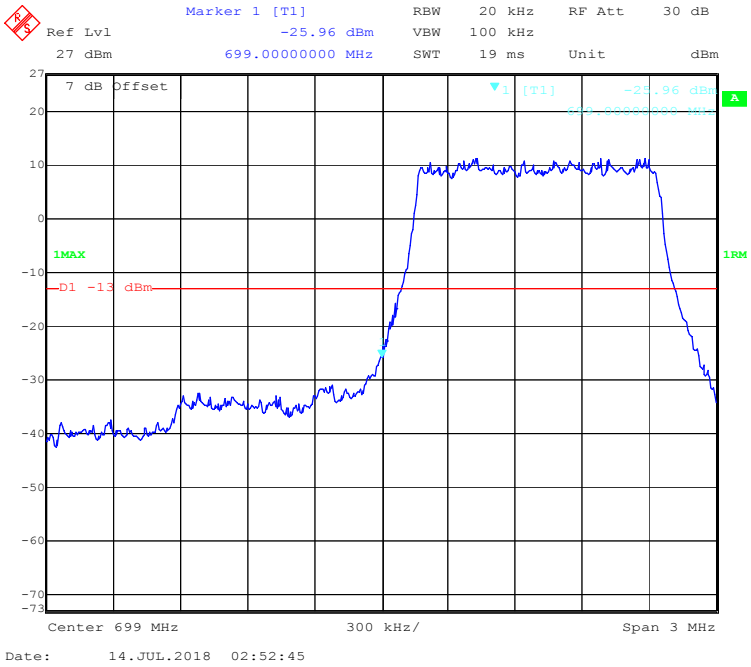


16-QAM (10.0 MHz, FULL RB) - Right Band Edge

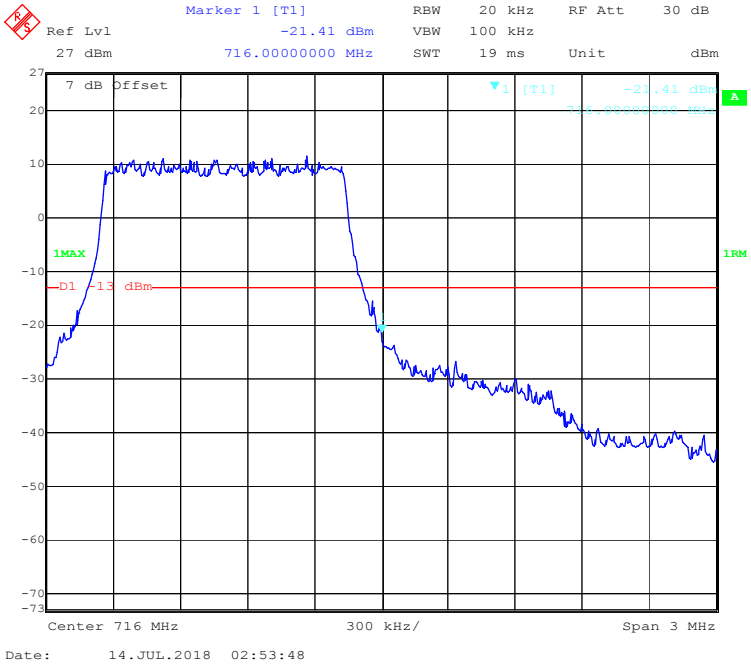


LTE Band 12:

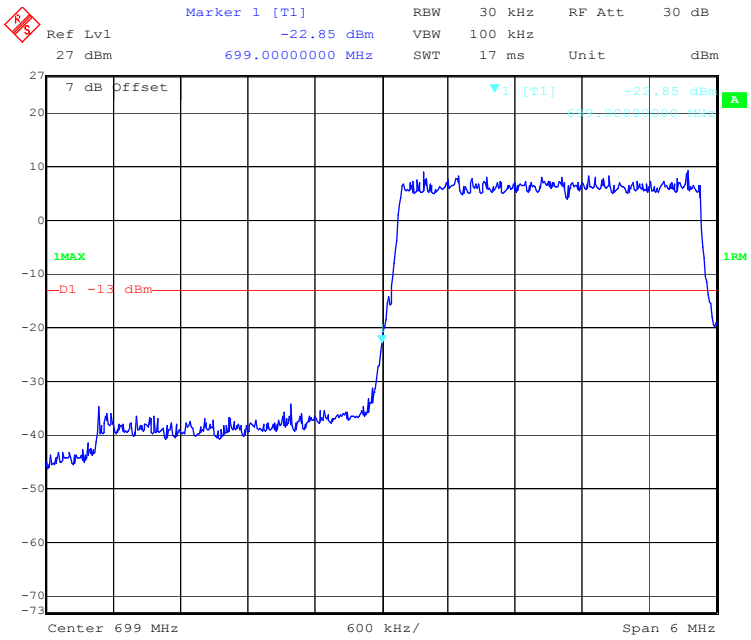
QPSK (1.4 MHz, FULL RB) - Left Band Edge



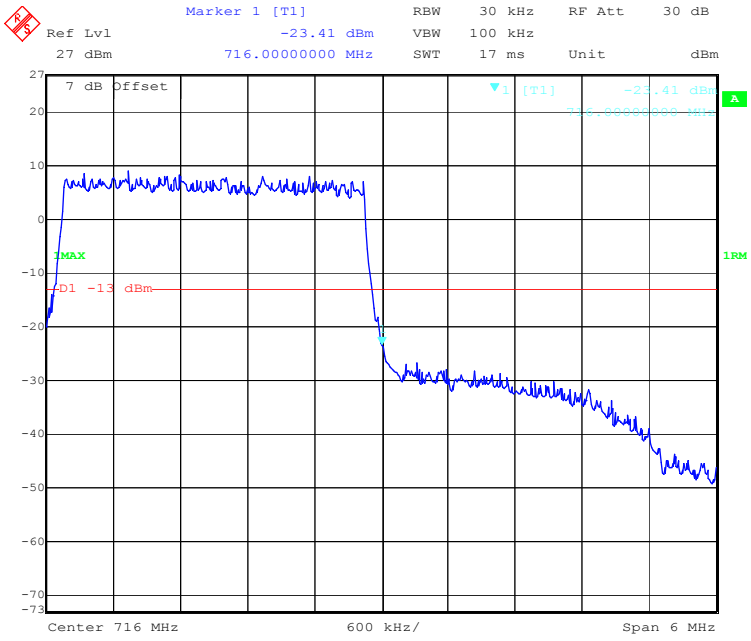
QPSK (1.4 MHz, FULL RB) - Right Band Edge



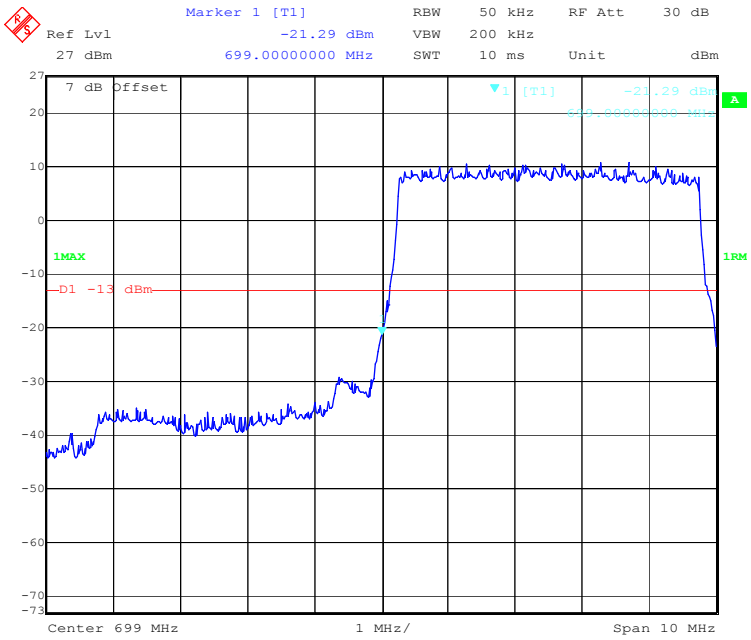
QPSK (3.0 MHz, FULL RB) - Left Band Edge



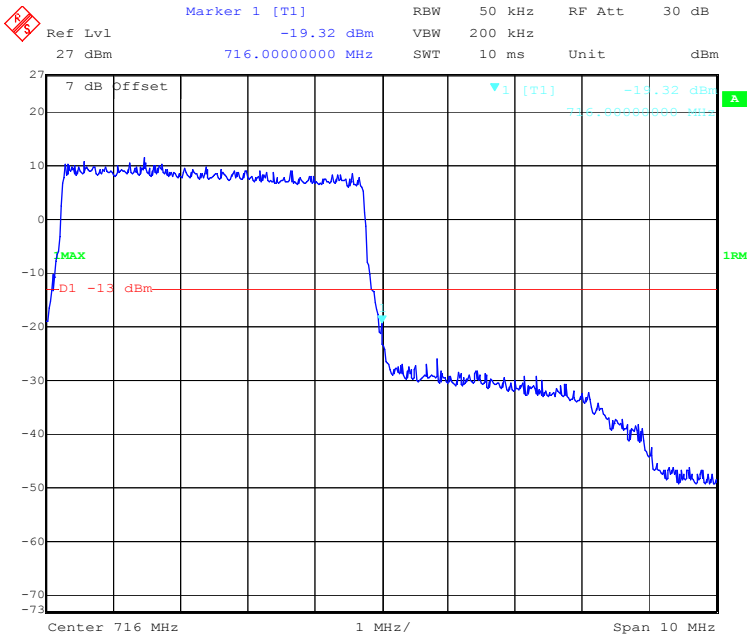
QPSK (3.0 MHz, FULL RB) - Right Band Edge



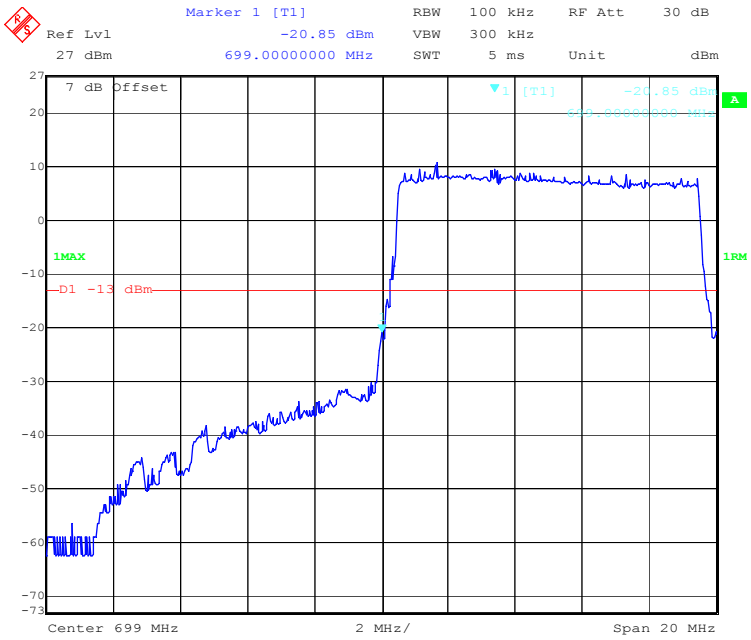
QPSK (5.0 MHz, FULL RB) - Left Band Edge



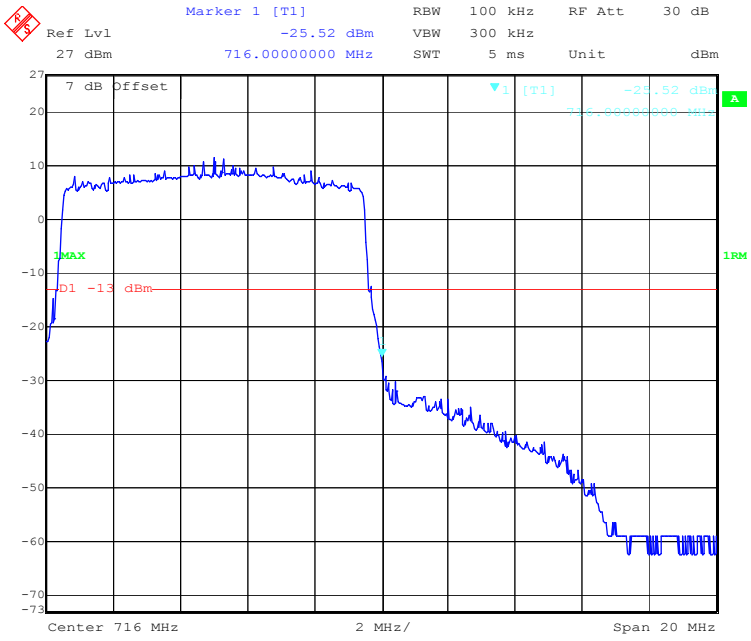
QPSK (5.0 MHz, FULL RB) - Right Band Edge



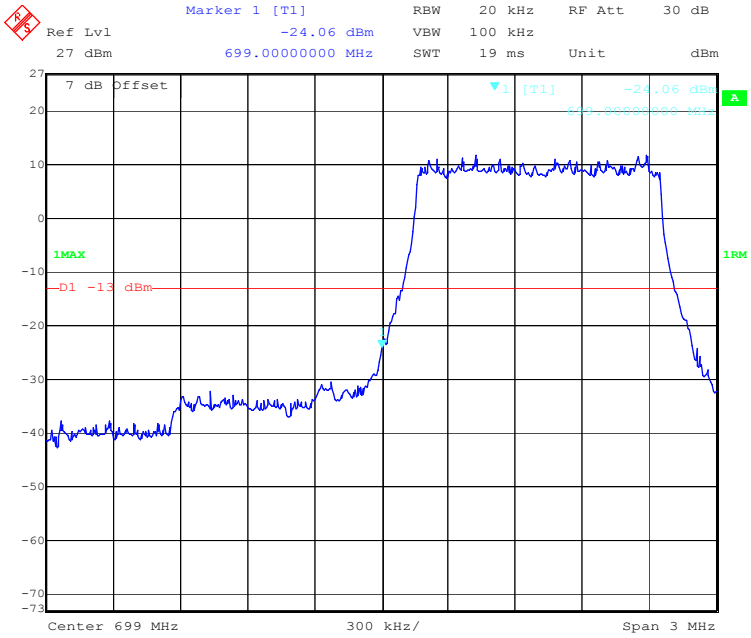
QPSK (10.0 MHz, FULL RB) - Left Band Edge



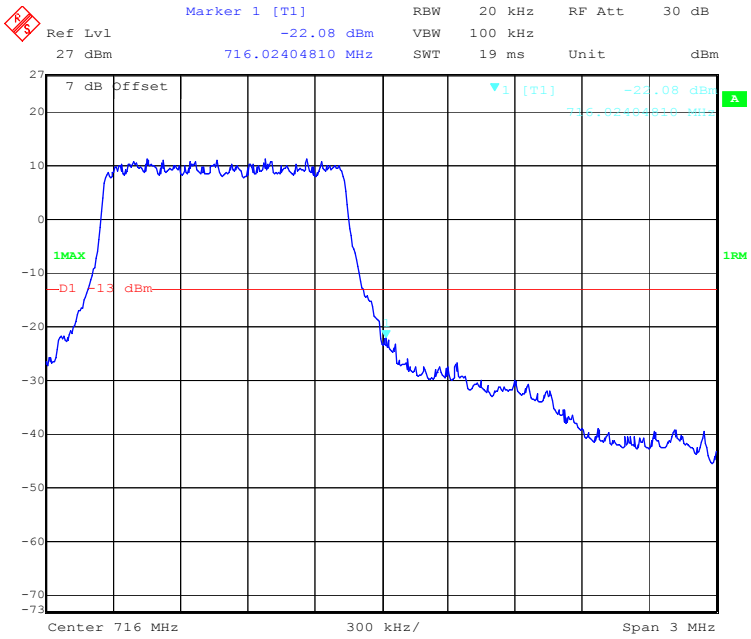
QPSK (10.0 MHz, FULL RB) - Right Band Edge



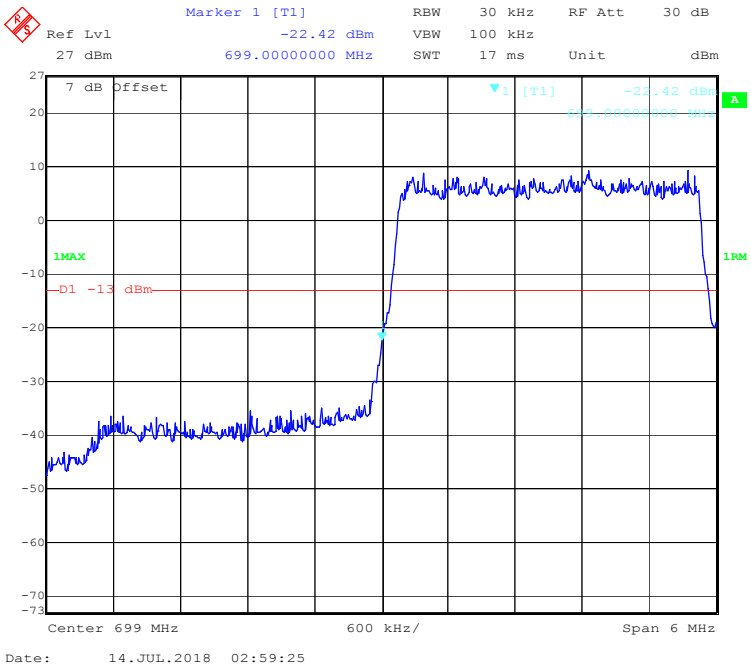
16-QAM (1.4 MHz, FULL RB) - Left Band Edge



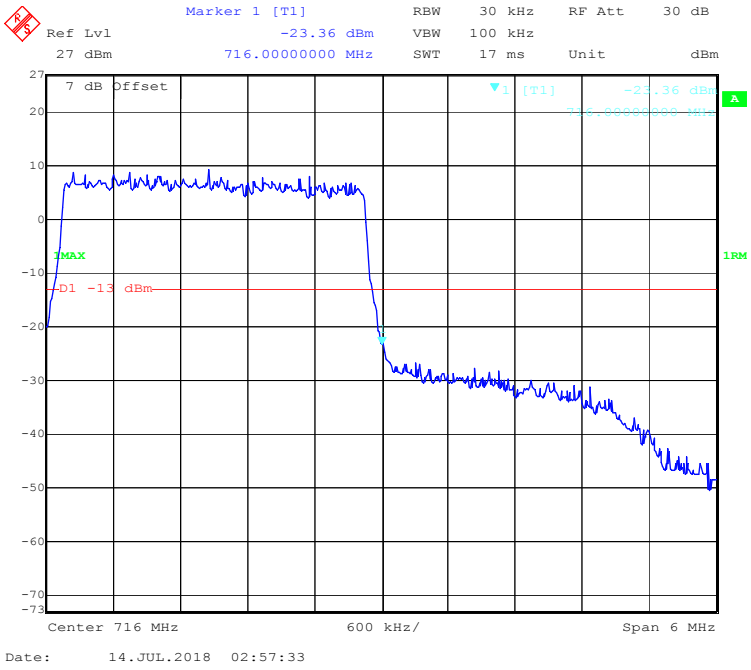
16-QAM (1.4 MHz, FULL RB) - Right Band Edge



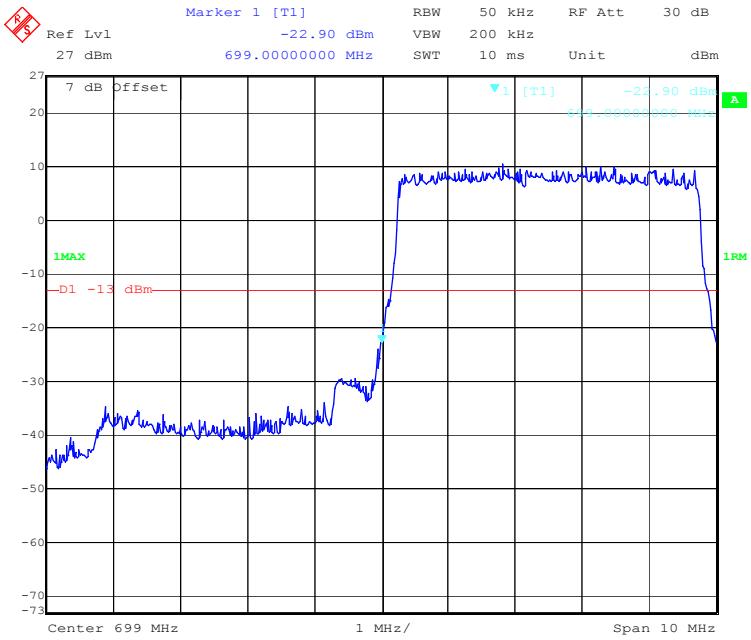
16-QAM (3.0 MHz, FULL RB) - Left Band Edge



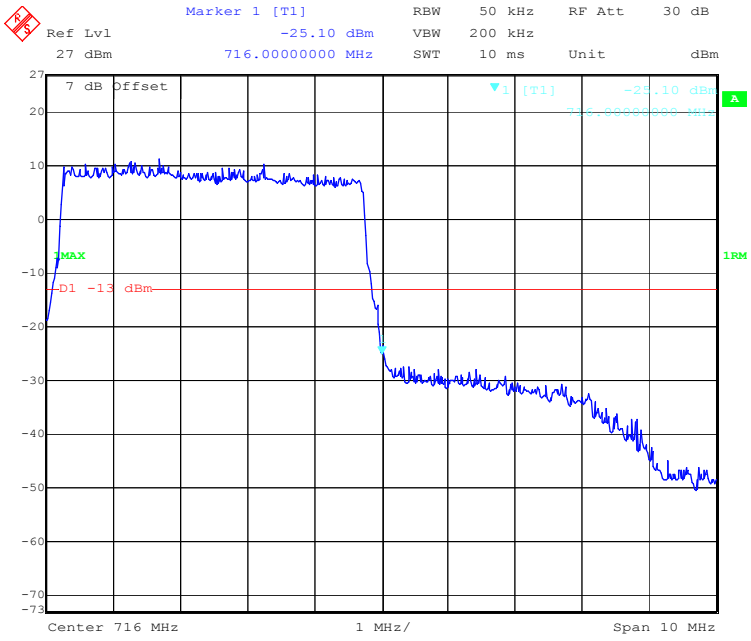
16-QAM (3.0 MHz, FULL RB) - Right Band Edge



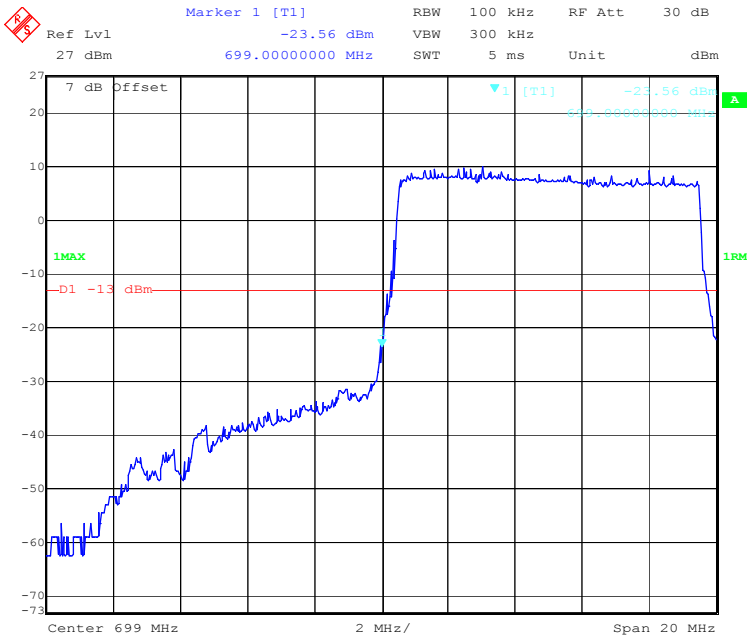
16-QAM (5.0 MHz, FULL RB) - Left Band Edge



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



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



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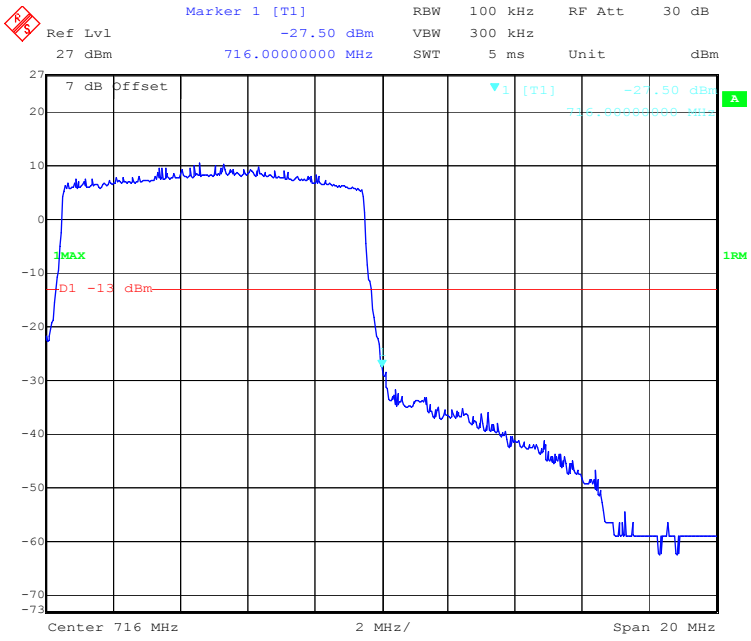
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



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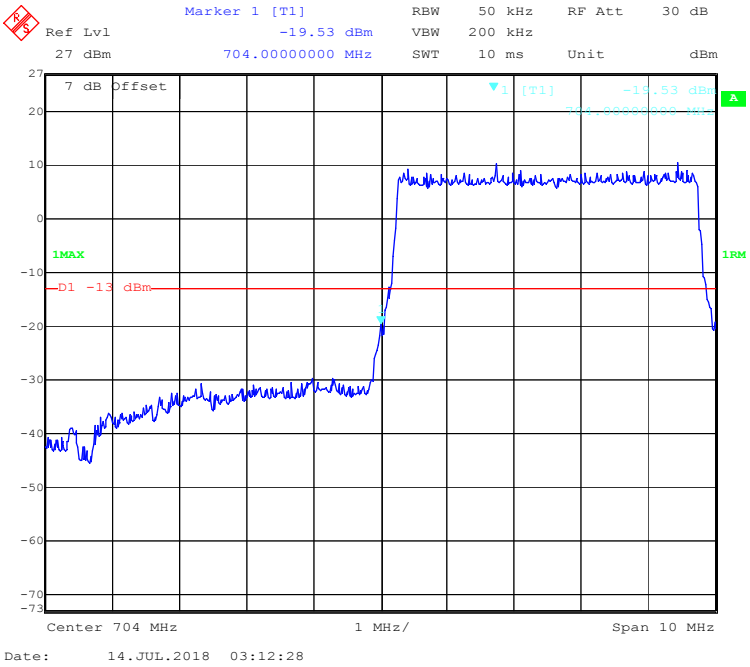
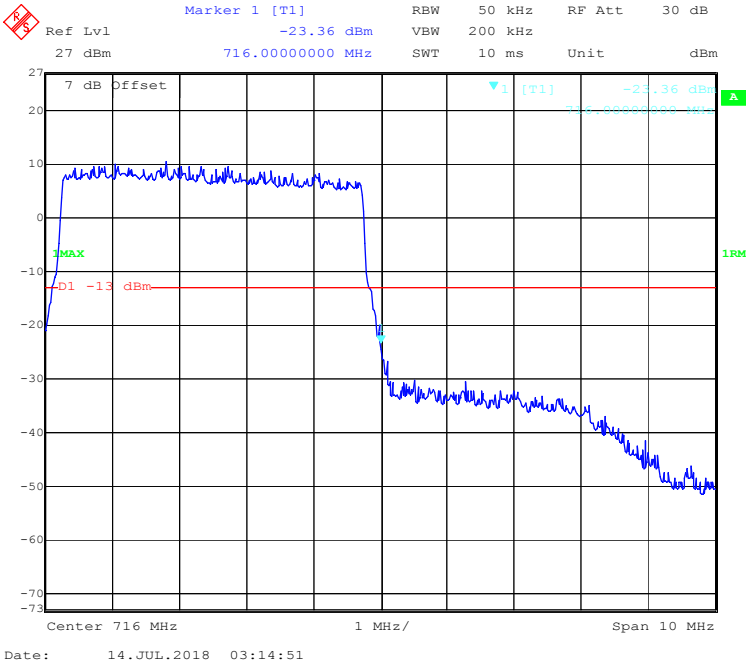
LTE Band 17:

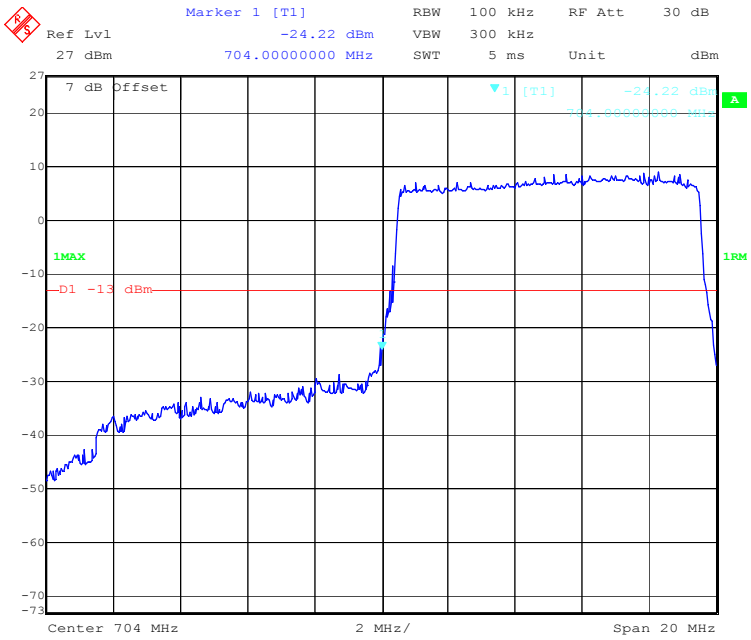
QPSK (5.0 MHz, FULL RB) - Left Band Edge



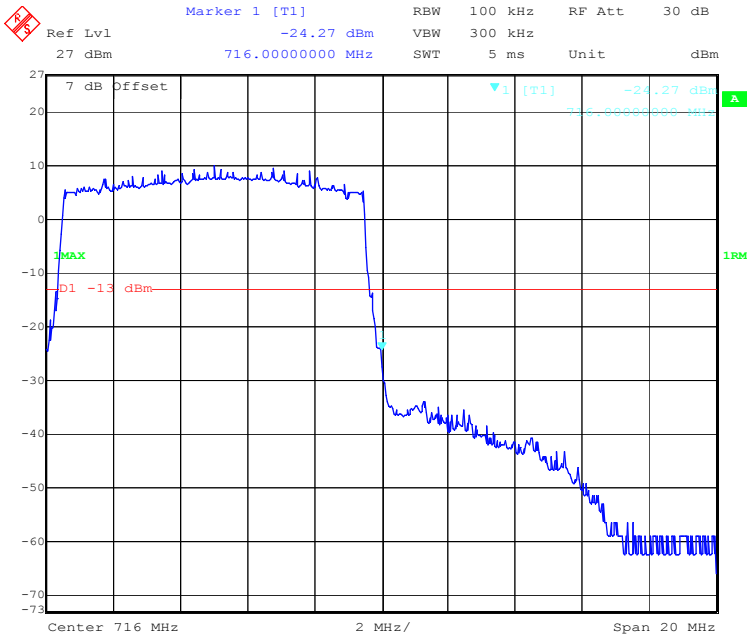
QPSK (5.0 MHz, FULL RB) - Right Band Edge



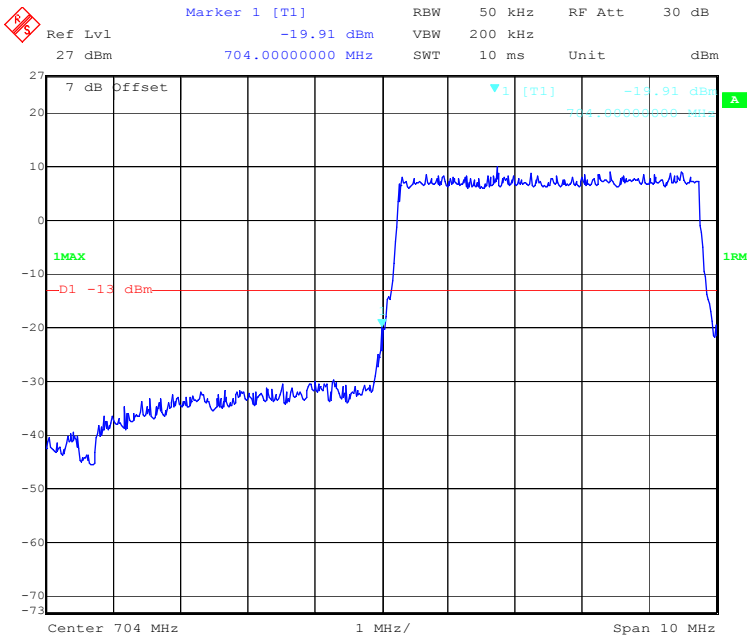
QPSK (10.0 MHz, FULL RB) - Left Band Edge



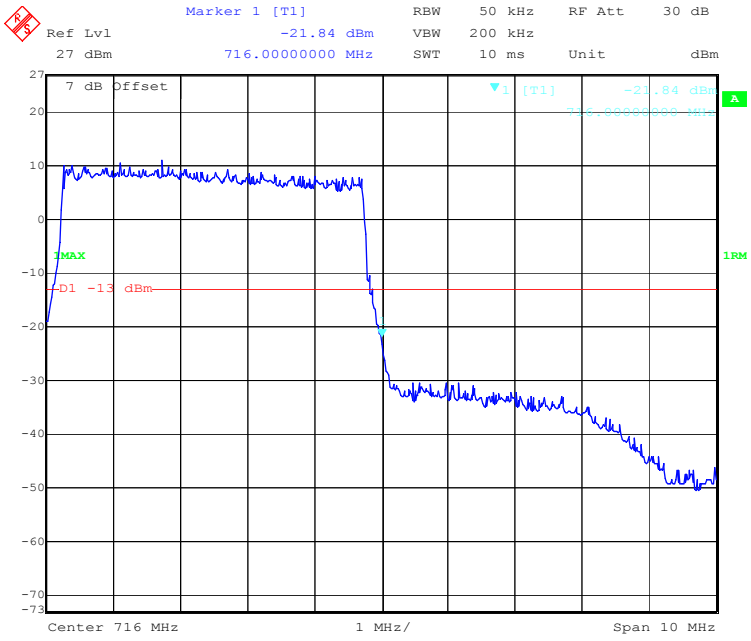
QPSK (10.0 MHz, FULL RB) - Right Band Edge



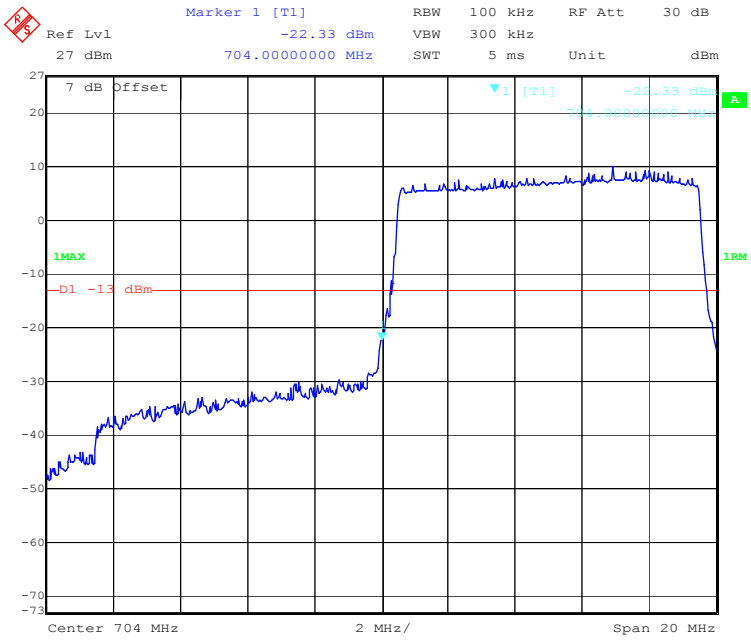
16-QAM (5.0 MHz, FULL RB) - Left Band Edge



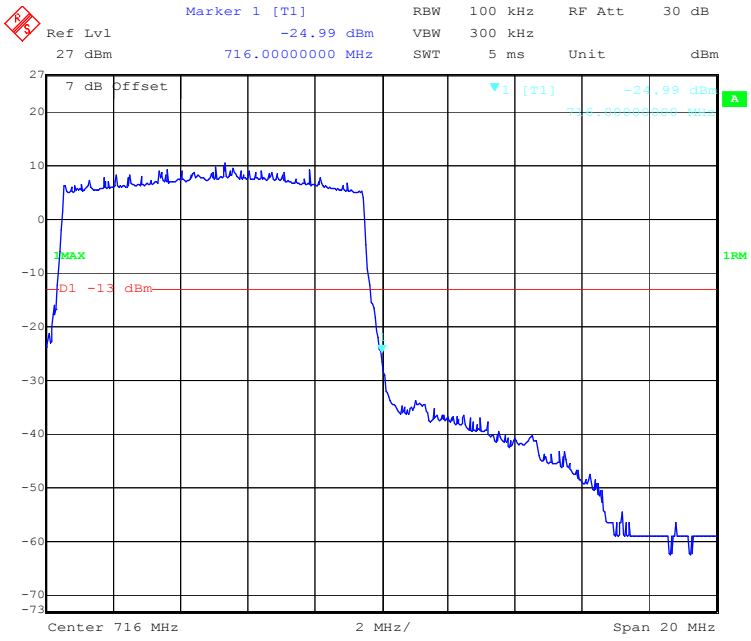
16-QAM (5.0 MHz, FULL RB) - Right Band Edge



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



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



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

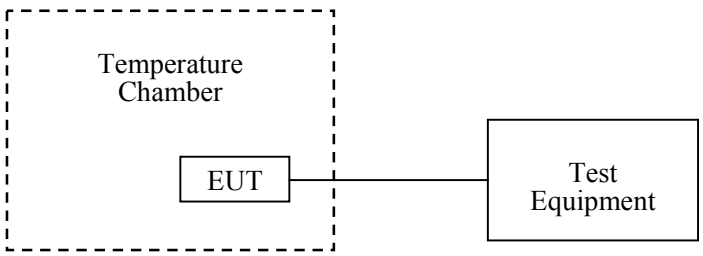
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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

Temperature:	23.2℃
Relative Humidity:	51 %
ATM Pressure:	101.3kPa

The testing was performed by Alisa Gao from 2018-07-12 to 2018-07-16.

EUT operation mode: Transmitting

Test Result: Compliance.

WCDMA Band V:

Middle Channel, f_o = 836.6 MHz				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	12	3	0.00359	2.5
-20		7	0.00837	2.5
-10		8	0.00956	2.5
0		8	0.00956	2.5
10		-1	-0.00120	2.5
20		6	0.00717	2.5
30		9	0.01076	2.5
40		-2	-0.00239	2.5
50		4	0.00478	2.5
25	V min.= 10.2	2	0.00239	2.5
25	V max.= 13.8	3	0.00359	2.5

WCDMA Band II:

WCDMA Mode, Middle Channel, f_o=1880.0 MHz				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	12	3	0.00160	pass
-20		9	0.00479	pass
-10		6	0.00319	pass
0		5	0.00266	pass
10		4	0.00213	pass
20		-2	-0.00106	pass
30		1	0.00053	pass
40		-1	-0.00053	pass
50		2	0.00106	pass
25	V min.= 10.2	3	0.00160	pass
25	V max.= 13.8	4	0.00213	pass

LTE Band 2:

20.0 MHz Middle Channel, f_o=1880.0 MHz (QPSK)				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	12	-6	-0.00319	pass
-20		-5	-0.00266	pass
-10		0	0.00000	pass
0		2	0.00106	pass
10		-4	-0.00213	pass
20		1	0.00053	pass
30		-4	-0.00213	pass
40		-3	-0.00160	pass
50		-2	-0.00106	pass
25	V min.= 10.2	-4	-0.00213	pass
25	V max.= 13.8	-7	-0.00372	pass

20.0 MHz Middle Channel, f_0 =1880.0 MHz (16QAM)				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	12	-6	-0.00319	pass
-20		-4	-0.00213	pass
-10		2	0.00106	pass
0		0	0.00000	pass
10		-7	-0.00372	pass
20		-5	-0.00266	pass
30		-3	-0.00160	pass
40		-4	-0.00213	pass
50		-5	-0.00266	pass
25	V min.= 10.2	-2	-0.00106	pass
25	V max.= 13.8	-5	-0.00266	pass

LTE Band 4:

20.0 MHz Middle Channel, QPSK					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	12	1711.0618	1753.9376	1710	1755
-20		1711.0614	1753.9373	1710	1755
-10		1711.0623	1753.9383	1710	1755
0		1711.0622	1753.9383	1710	1755
10		1711.0624	1753.9384	1710	1755
20		1711.0620	1753.9380	1710	1755
30		1711.0619	1753.9380	1710	1755
40		1711.0627	1753.9389	1710	1755
50		1711.0618	1753.9377	1710	1755
25	V min.= 10.2	1711.0626	1753.9388	1710	1755
25	V max.= 13.8	1711.0631	1753.9393	1710	1755

20.0 MHz Middle Channel, 16QAM					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	12	1711.0617	1753.9374	1710	1755
-20		1711.0618	1753.9376	1710	1755
-10		1711.0625	1753.9384	1710	1755
0		1711.0620	1753.9380	1710	1755
10		1711.0629	1753.9390	1710	1755
20		1711.0619	1753.9378	1710	1755
30		1711.0614	1753.9374	1710	1755
40		1711.0628	1753.9386	1710	1755
50		1711.0612	1753.9371	1710	1755
25	V min.= 10.2	1711.0625	1753.9387	1710	1755
25	V max.= 13.8	1711.0630	1753.9391	1710	1755

LTE Band 5:

10.0 MHz Middle Channel, f_o =836.5MHz (QPSK)				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	12	-5	-0.00598	2.5
-20		-3	-0.00359	2.5
-10		-2	-0.00239	2.5
0		1	0.00120	2.5
10		0	0.00000	2.5
20		1	0.00120	2.5
30		2	0.00239	2.5
40		-6	-0.00717	2.5
50		-3	-0.00359	2.5
25	V min.= 10.2	3	0.00359	2.5
25	V max.= 13.8	0	0.00000	2.5

10.0 MHz Middle Channel, f_o =836.5MHz (16QAM)				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	12	-5	-0.00598	2.5
-20		-2	-0.00239	2.5
-10		-2	-0.00239	2.5
0		2	0.00239	2.5
10		0	0.00000	2.5
20		1	0.00120	2.5
30		-4	-0.00478	2.5
40		-6	-0.00717	2.5
50		0	0.00000	2.5
25	V min.= 10.2	1	0.00120	2.5
25	V max.= 13.8	2	0.00239	2.5

LTE Band 12:

10.0 MHz Middle Channel, QPSK					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	12	699.5108	715.4889	699	716
-20		699.5106	715.4885	699	716
-10		699.5111	715.4891	699	716
0		699.5114	715.4894	699	716
10		699.5117	715.4898	699	716
20		699.5110	715.4890	699	716
30		699.5111	715.4891	699	716
40		699.5109	715.4890	699	716
50		699.5100	715.4880	699	716
25	V min.= 10.2	699.5112	715.4894	699	716
25	V max.= 13.8	699.5110	715.4893	699	716

10.0 MHz Middle Channel, 16QAM					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	12	699.5099	715.4879	699	716
-20		699.5107	715.4886	699	716
-10		699.5122	715.4903	699	716
0		699.5117	715.4897	699	716
10		699.5114	715.4895	699	716
20		699.5111	715.4891	699	716
30		699.5116	715.4895	699	716
40		699.5102	715.4882	699	716
50		699.5105	715.4886	699	716
25	V min.= 10.2	699.5119	715.4901	699	716
25	V max.= 13.8	699.5113	715.4894	699	716

LTE Band 17:

10.0 MHz Middle Channel, QPSK					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	12	704.5507	715.4486	704	716
-20		704.5504	715.4482	704	716
-10		704.5519	715.4499	704	716
0		704.5516	715.4497	704	716
10		704.5512	715.4492	704	716
20		704.5510	715.4490	704	716
30		704.5500	715.4481	704	716
40		704.5508	715.4487	704	716
50		704.5516	715.4496	704	716
25	V min.= 10.2	704.5514	715.4495	704	716
25	V max.= 13.8	704.5517	715.4499	704	716

10.0 MHz Middle Channel, 16QAM					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	12	704.5505	715.4483	704	716
-20		704.5503	715.4482	704	716
-10		704.5510	715.4490	704	716
0		704.5518	715.4499	704	716
10		704.5514	715.4494	704	716
20		704.5510	715.4491	704	716
30		704.5509	715.4490	704	716
40		704.5501	715.4480	704	716
50		704.5519	715.4509	704	716
25	V min.= 10.2	704.5516	715.4497	704	716
25	V max.= 13.8	704.5517	715.4499	704	716

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