TESTING LABORATORY
CERTIFICATE # 4821.01

FCC PART 27

FCC PART 22H, PART 24E

TEST REPORT

For

AVENIR TELECOM

208, Boulevard de Plombieres 13014 Marseille- France

FCC ID: 2AM4J-E500S

Report Type:	**Product Type:**
Original Report	Mobile phone

Report Number: RSZ180515005-00D

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *AVENIR TELECOM's* product, model number: *ENERGY E500S (FCC ID: 2AM4J-E500S)* or the "EUT" in this report was a *Mobile phone*, which was measured approximately: 14.0 cm (L) * 7.2 cm (W) * 1.0 cm (H), rated with input voltage: DC 3.8 V from rechargeable li-ion battery or DC 5.0V from adapter.

Adapter Information:
Model: YW1000M
Input: 100-240V, 50/60Hz, 0.2A
Output: 5.0V, 1 A

Notes: This series products model: EM500SUS and ENERGY E500S are electrically identical, the difference between them is only model name due to marketing purpose. Model ENERGY E500S was selected for fully testing, the detailed information can be referred to the declaration letter which was stated and guaranteed by the applicant.

**All measurement and test data in this report was gathered from production sample serial number: 180515005 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2018-05-15.*

Objective

This test report is prepared on behalf of *AVENIR TELECOM* in accordance with Part 2-Subpart J, Part 22-Subpart H and Part 24-Subpart E and Subpart 27 of the Federal Communication Commissions rules.

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

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS & DSS submissions with FCC ID: 2AM4J-E500S.

Test Methodology

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

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

Applicable Standards: TIA/EIA 603-D and KDB 971168 D01 v03.

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

Measurement Uncertainty

Parameter		uncertainty
Occupied Channel Bandwidth		±5%
RF output power, conducted		±1.5dB
Unwanted Emission, conducted		±1.5dB
Emissions, radiated	Below 1GHz	±4.70dB
	Above 1GHz	±4.80dB
Temperature		±1℃
Supply voltages		±0.4%

Test Facility

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

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 342867, the FCC Designation No.: CN1221.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

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

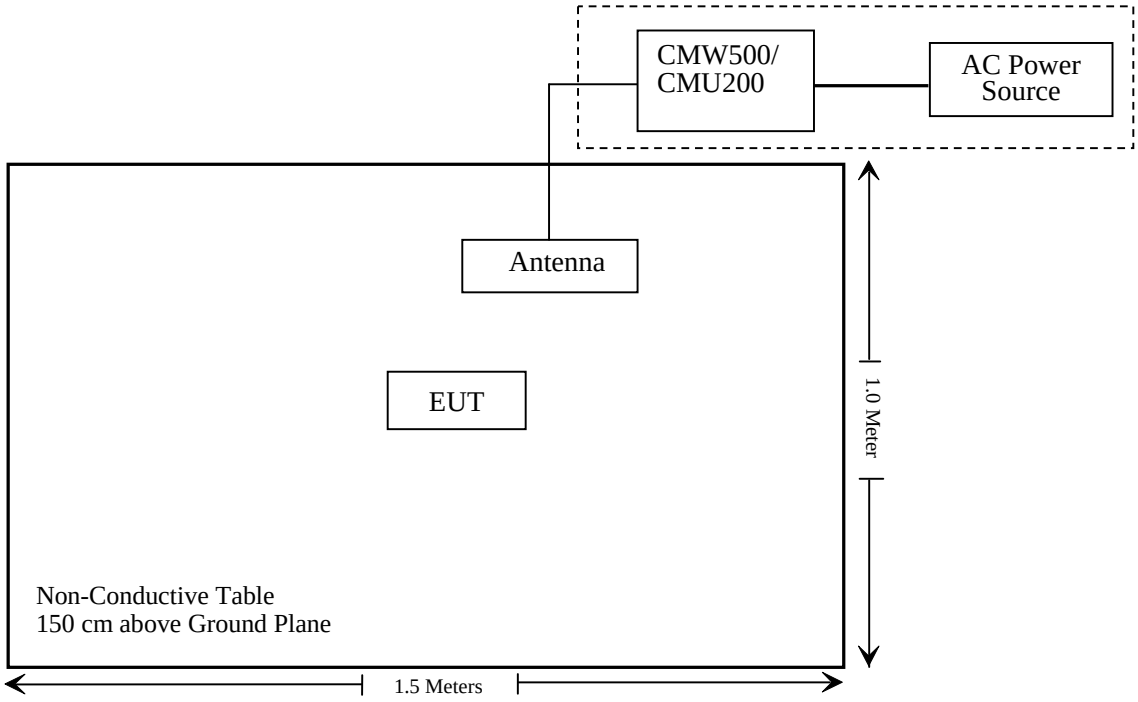
Equipment Modifications

No modification was made to the EUT.

Support Equipment List and Details

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

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

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

Note: * Please refer to SAR report released by BACL, report number: RSZ180515005-20.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Sunol Sciences	Horn Antenna	DRH-118	A052604	2017-12-22	2020-12-21
Rohde & Schwarz	Signal Analyzer	FSEM	845987/005	2018-04-24	2019-04-24
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017-12-22	2020-12-21
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2018-05-21	2019-05-21
HP	Amplifier	HP8447E	1937A01046	2018-05-21	2018-11-19
Anritsu	Signal Generator	68369B	004114	2017-12-24	2018-12-24
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2018-01-11	2019-01-11
COM POWER	Dipole Antenna	AD-100	041000	NCR	NCR
A.H. System	Horn Antenna	SAS-200/571	135	2015-08-18	2018-08-17
Ducommun technologies	RF Cable	UFA210A-1-4724-30050U	MFR64369 223410-001	2018-05-21	2018-11-19
Ducommun technologies	RF Cable	104PEA	218124002	2018-05-21	2018-11-19
Ducommun technologies	RF Cable	RG-214	1	2018-05-21	2018-11-19
Ducommun technologies	RF Cable	RG-214	2	2018-05-22	2018-11-22
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-04	2017-12-29	2020-12-28
Ducommun technologies	Horn Antenna	ARH-4223-02	1007726-03	2017-12-29	2020-12-28
Ducommun technologies	Pre-amplifier	ALN-22093530-01	991373-01	2017-08-03	2018-08-03

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200120	2017-12-24	2018-12-24
ESPEC	Temperature & Humidity Chamber	EL-10KA	09107726	2017-12-21	2018-12-21
Long Wei	DC Power Supply	TPR-6420D	398363	NCR	NCR
Fluke	Digital Multimeter	287	19000011	2018-04-12	2019-04-12
Rohde & Schwarz	Wideband Radio Communication Tester	CMU200	106891	2017-12-14	2018-12-14
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-146520-wh	2018-04-24	2019-04-24
Ducommun technologies	RF Cable	RG-214	3	Each Time	
WEINSCHEL	10dB Attenuator	5324	AU 3842	Each Time	
N/A	Power Splitter	N/A	N/A	2018-05-21	2019-05-21

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

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

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliance, please refer to the SAR report: RSZ180515005-20.

FCC §2.1047 - MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H & 24E & 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) (h) - RF OUTPUT POWER

Applicable Standard

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

According to FCC §2.1046 and §24.232 (C), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

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

According to §27.50(c), Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

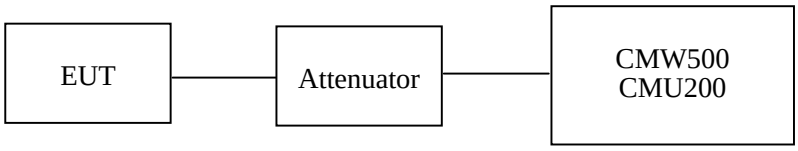
According to §27.50(d), the maximum EIRP must not exceed 1Watts (30dBm) for 1710-1755MHz.

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

Test Procedure

Conducted method:

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



Radiated method:

TIA 603-D section 2.2.17

Test Data

Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Hill He on 2018-07-02.

Conducted Power

Cellular Band (Part 22H)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	128	824.2	32.75	38.45
	190	836.6	32.64	38.45
	251	848.8	32.91	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	33.03	32.34	30.45	29.05	38.45
	190	836.6	33.06	32.39	30.62	29.17	38.45
	251	848.8	32.97	32.25	30.41	29.00	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	128	824.2	27.63	26.76	25.78	24.94	38.45
	190	836.6	27.31	26.37	25.47	24.65	38.45
	251	848.8	26.83	25.92	25.13	24.36	38.45

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band V)	Normal	RMC12.2k		22.08	22.06	21.83
		HSDPA	1	22.06	22.08	21.70
			2	21.95	21.95	21.61
			3	22.10	22.16	21.79
			4	22.02	21.96	21.67
		HSUPA	1	22.52	22.47	22.25
			2	22.42	22.40	22.15
			3	22.57	22.54	22.35
			4	22.42	22.37	22.18
			5	22.56	22.52	22.35
		HSPA+	1	20.78	21.13	21.56

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	512	1850.2	31.05	33
	661	1880.0	30.36	33
	810	1909.8	29.75	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	31.10	30.66	29.31	28.26	33
	661	1880.0	30.38	29.99	28.53	27.28	33
	810	1909.8	30.64	29.76	27.80	27.29	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	512	1850.2	27.15	26.66	25.32	24.67	33
	661	1880.0	27.38	26.80	25.49	24.56	33
	810	1909.8	26.52	25.94	24.88	24.13	33

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band II)	Normal	RMC12.2k		21.39	21.28	21.18
		HSDPA	1	21.44	21.30	20.18
			2	21.40	21.21	20.13
			3	21.51	21.36	20.31
			4	21.36	21.19	20.07
		HSUPA	1	21.91	21.76	21.62
			2	21.88	21.67	21.54
			3	21.99	21.80	21.72
			4	21.84	21.71	21.52
			5	22.03	21.86	21.71
		HSPA+	1	21.85	21.79	21.31

Peak-to-average ratio (PAR)

Cellular Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	0.26	13
	Middle	0.13	13
	High	0.29	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	0.36	13
	Middle	0.34	13
	High	0.28	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	2.84	13
	Middle	2.63	13
	High	2.85	13
HSDPA (16QAM)	Low	2.87	13
	Middle	2.69	13
	High	2.82	13
HSUPA (BPSK)	Low	2.88	13
	Middle	2.64	13
	High	2.85	13
HSPA+	Low	2.92	13
	Middle	3.05	13
	High	3.32	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	0.23	13
	Middle	0.08	13
	High	0.14	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	0.32	13
	Middle	0.26	13
	High	0.45	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.85	13
	Middle	3.64	13
	High	3.87	13
HSDPA (16QAM)	Low	3.84	13
	Middle	3.66	13
	High	3.87	13
HSUPA (BPSK)	Low	3.83	13
	Middle	3.66	13
	High	3.82	13
HSPA+	Low	3.45	13
	Middle	3.15	13
	High	3.24	13

Radiated Power

GSM Mode:

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H/24E	
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dBi)		Limit (dBm)	Margin (dB)
ERP for Cellular Band (Part 22H), Middle Channel										
836.6	94.15	246	2.4	H	31.8	0.7	0.0	31.10	38.45	7.35
836.6	89.28	338	1.5	V	28.8	0.7	0.0	28.10	38.45	10.35
EIRP for PCS Band (Part 24E), Middle Channel										
1880.00	91.18	19	1.6	H	21.1	1.30	8.50	28.30	33	4.7
1880.00	87.71	120	2.0	V	17.4	1.30	8.50	24.60	33	8.4

EDGE Mode:

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dBi)			
ERP, Cellular Band (Part 22H), Middle Channel										
836.6	89.30	170	2.4	H	26.9	0.7	0.0	26.20	38.45	12.25
836.6	84.81	2	2.2	V	24.4	0.7	0.0	23.70	38.45	14.75
EIRP, PCS Band (Part 24E), Middle Channel										
1880.00	89.06	268	2.3	H	19.0	1.30	8.50	26.20	33	6.8
1880.00	85.56	116	2.3	V	15.3	1.30	8.50	22.50	33	10.5

WCDMA Mode:

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H/24E	
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dBi)		Limit (dBm)	Margin (dB)
ERP for WCDMA Band V (Part 22H), Middle Channel										
836.6	84.91	65	1.7	H	21.5	0.7	0.0	21.80	38.45	16.65
836.6	81.08	184	2.3	V	20.6	0.7	0.0	19.90	38.45	18.55
EIRP for WCDMA Band II (Part 24E), Middle Channel										
1880.00	83.52	84	1.6	H	13.5	1.30	8.50	20.70	33	12.3
1880.00	82.68	339	1.5	V	12.4	1.30	8.50	19.60	33	13.4

Note:
Absolute Level = Substituted Level - Cable loss + Antenna Gain
Margin = Limit- Absolute Level

LTE Band 2:

Maximum Output Power

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	21.84	21.24	21.43
		RB Size=1, RB Offset=2	21.65	21.88	21.54
		RB Size=1, RB Offset=5	21.76	22.14	21.63
		RB Size=3, RB Offset=0	21.31	21.91	21.83
		RB Size=3, RB Offset=1	21.57	21.76	21.94
		RB Size=3, RB Offset=2	22.03	21.71	21.20
		RB Size=6, RB Offset=0	22.18	21.46	21.70
	16QAM	RB Size=1, RB Offset=0	21.37	21.62	21.25
		RB Size=1, RB Offset=2	21.58	21.74	21.92
		RB Size=1, RB Offset=5	21.57	21.71	21.29
		RB Size=3, RB Offset=0	21.45	21.62	21.90
		RB Size=3, RB Offset=1	21.31	21.47	21.94
		RB Size=3, RB Offset=2	21.70	21.75	21.21
		RB Size=6, RB Offset=0	21.38	22.14	21.89
3.0	QPSK	RB Size=1, RB Offset=0	21.52	22.06	21.80
		RB Size=1, RB Offset=7	22.15	21.58	21.44
		RB Size=1, RB Offset=14	21.73	21.75	21.24
		RB Size=8, RB Offset=0	21.58	21.52	21.32
		RB Size=8, RB Offset=4	21.44	21.98	21.98
		RB Size=8, RB Offset=7	22.05	21.67	21.78
		RB Size=15, RB Offset=0	21.72	21.46	21.45
	16QAM	RB Size=1, RB Offset=0	21.70	21.79	21.27
		RB Size=1, RB Offset=7	21.21	21.62	21.36
		RB Size=1, RB Offset=14	21.38	21.81	22.12
		RB Size=8, RB Offset=0	21.31	22.11	21.75
		RB Size=8, RB Offset=4	22.11	21.78	21.55
		RB Size=8, RB Offset=7	21.23	21.71	21.73
		RB Size=15, RB Offset=0	21.46	21.44	21.37

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	21.35	21.33	21.55
		RB Size=1, RB Offset=12	21.42	21.98	21.96
		RB Size=1, RB Offset=24	22.10	21.67	22.11
		RB Size=12, RB Offset=0	21.54	21.47	22.05
		RB Size=12, RB Offset=6	21.74	21.93	21.62
		RB Size=12, RB Offset=11	22.03	21.54	22.17
		RB Size=25, RB Offset=0	22.15	21.23	21.74
	16QAM	RB Size=1, RB Offset=0	21.91	22.17	21.50
		RB Size=1, RB Offset=12	21.62	21.95	21.38
		RB Size=1, RB Offset=24	21.70	21.84	21.57
		RB Size=12, RB Offset=0	21.95	22.01	21.93
		RB Size=12, RB Offset=6	22.05	21.88	21.69
		RB Size=12, RB Offset=11	21.30	22.03	21.26
		RB Size=25, RB Offset=0	22.05	21.37	21.97
10.0	QPSK	RB Size=1, RB Offset=0	21.52	21.25	21.39
		RB Size=1, RB Offset=24	22.16	21.60	21.70
		RB Size=1, RB Offset=49	21.36	22.02	21.28
		RB Size=25, RB Offset=0	21.44	21.60	22.11
		RB Size=25, RB Offset=12	21.94	21.62	21.93
		RB Size=25, RB Offset=24	21.23	22.13	22.16
		RB Size=50, RB Offset=0	22.09	21.68	21.29
	16QAM	RB Size=1, RB Offset=0	21.93	21.36	22.10
		RB Size=1, RB Offset=24	21.24	21.73	21.74
		RB Size=1, RB Offset=49	22.16	21.63	21.51
		RB Size=25, RB Offset=0	21.74	21.50	21.56
		RB Size=25, RB Offset=12	21.31	22.10	21.28
		RB Size=25, RB Offset=24	22.02	21.93	21.73
		RB Size=50, RB Offset=0	21.25	21.44	21.93

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15.0	QPSK	RB Size=1, RB Offset=0	21.61	21.41	21.94
		RB Size=1, RB Offset=37	21.85	21.87	21.32
		RB Size=1, RB Offset=74	22.02	21.36	21.55
		RB Size=36, RB Offset=0	21.96	22.09	21.75
		RB Size=36, RB Offset=18	21.77	22.14	21.66
		RB Size=36, RB Offset=37	21.41	21.25	21.23
		RB Size=75, RB Offset=0	21.88	21.27	22.06
	16QAM	RB Size=1, RB Offset=0	21.57	21.71	21.55
		RB Size=1, RB Offset=37	21.58	21.53	21.44
		RB Size=1, RB Offset=74	21.60	21.96	22.14
		RB Size=36, RB Offset=0	21.97	21.47	21.98
		RB Size=36, RB Offset=18	21.50	21.28	22.03
		RB Size=36, RB Offset=37	21.56	21.87	21.81
		RB Size=75, RB Offset=0	21.60	21.60	21.82
20.0	QPSK	RB Size=1, RB Offset=0	21.64	21.35	22.03
		RB Size=1, RB Offset=49	21.20	21.76	21.89
		RB Size=1, RB Offset=99	21.44	21.39	21.87
		RB Size=50, RB Offset=0	21.25	21.77	21.25
		RB Size=50, RB Offset=24	21.57	21.68	21.25
		RB Size=50, RB Offset=49	22.03	22.15	21.45
		RB Size=100, RB Offset=0	21.54	21.32	21.50
	16QAM	RB Size=1, RB Offset=0	22.13	21.35	21.55
		RB Size=1, RB Offset=49	21.30	22.13	21.56
		RB Size=1, RB Offset=99	21.62	21.97	21.51
		RB Size=50, RB Offset=0	21.39	22.19	22.02
		RB Size=50, RB Offset=24	22.04	21.65	22.18
		RB Size=50, RB Offset=49	21.22	21.27	22.03
		RB Size=100, RB Offset=0	21.41	21.56	21.23

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.79	13	Pass
QPSK (100RB Size)	6.32	13	Pass
16QAM (1RB Size)	7.25	13	Pass
16QAM (100RB Size)	7.36	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
1880.00	85.48	217	2.5	H	15.4	1.30	9.40	23.50	33
1880.00	84.23	141	1.1	V	14.0	1.30	9.40	22.10	33
3 MHz Bandwidth									
1880.00	84.27	237	2.2	H	14.2	1.30	9.40	22.30	33
1880.00	83.56	200	1.8	V	13.3	1.30	9.40	21.40	33
5 MHz Bandwidth									
1880.00	83.62	92	2.2	H	13.6	1.30	9.40	21.70	33
1880.00	82.86	45	1.1	V	12.6	1.30	9.40	20.70	33
10 MHz Bandwidth									
1880.00	85.02	94	1.1	H	15.0	1.30	9.40	23.10	33
1880.00	83.76	310	1.0	V	13.5	1.30	9.40	21.60	33
15 MHz Bandwidth									
1880.00	83.28	232	2.4	H	13.2	1.30	9.40	21.30	33
1880.00	82.86	329	2.2	V	12.6	1.30	9.40	20.70	33
20 MHz Bandwidth									
1880.00	82.36	263	1.7	H	12.3	1.30	9.40	20.40	33
1880.00	83.19	157	1.9	V	12.9	1.30	9.40	21.00	33

16QAM:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
1880.00	84.54	104	1.1	H	14.5	1.30	9.40	22.60	33
1880.00	83.61	102	2.0	V	13.3	1.30	9.40	21.40	33
3 MHz Bandwidth									
1880.00	83.26	133	1.8	H	13.2	1.30	9.40	21.30	33
1880.00	82.21	204	1.5	V	11.9	1.30	9.40	20.00	33
5 MHz Bandwidth									
1880.00	82.63	160	1.2	H	12.6	1.30	9.40	20.70	33
1880.00	83.26	286	2.4	V	13.0	1.30	9.40	21.10	33
10 MHz Bandwidth									
1880.00	82.15	110	1.5	H	12.1	1.30	9.40	20.20	33
1880.00	82.33	123	1.1	V	12.1	1.30	9.40	20.20	33
15 MHz Bandwidth									
1880.00	85.42	224	1.4	H	16.7	1.40	7.30	22.60	33
1880.00	84.32	302	1.1	V	14.1	1.30	9.40	22.20	33
20 MHz Bandwidth									
1880.00	84.59	244	1.3	H	15.9	1.40	7.30	21.80	33
1880.00	83.12	320	1.3	V	12.9	1.30	9.40	21.00	33

LTE Band 4:

Maximum Output Power

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	22.59	22.12	22.49
		RB Size=1, RB Offset=2	22.63	22.22	22.07
		RB Size=1, RB Offset=5	22.15	22.28	22.63
		RB Size=3, RB Offset=0	22.02	22.04	22.30
		RB Size=3, RB Offset=1	22.85	22.89	22.74
		RB Size=3, RB Offset=2	22.84	22.31	22.95
		RB Size=6, RB Offset=0	22.35	22.84	22.92
	16QAM	RB Size=1, RB Offset=0	22.09	22.35	22.33
		RB Size=1, RB Offset=2	22.51	22.89	22.65
		RB Size=1, RB Offset=5	22.08	22.04	22.60
		RB Size=3, RB Offset=0	22.68	22.26	22.07
		RB Size=3, RB Offset=1	22.08	22.22	22.47
		RB Size=3, RB Offset=2	22.21	22.10	22.34
		RB Size=6, RB Offset=0	22.17	22.09	22.14
3.0	QPSK	RB Size=1, RB Offset=0	22.20	22.18	22.33
		RB Size=1, RB Offset=7	22.42	22.91	22.25
		RB Size=1, RB Offset=14	22.06	22.66	22.62
		RB Size=8, RB Offset=0	22.10	22.70	22.52
		RB Size=8, RB Offset=4	22.10	22.08	22.93
		RB Size=8, RB Offset=7	22.17	22.54	22.89
		RB Size=15, RB Offset=0	22.42	22.78	22.89
	16QAM	RB Size=1, RB Offset=0	22.07	22.90	22.60
		RB Size=1, RB Offset=7	22.49	22.97	22.97
		RB Size=1, RB Offset=14	22.74	22.92	22.08
		RB Size=8, RB Offset=0	22.35	22.36	22.73
		RB Size=8, RB Offset=4	22.83	22.48	22.70
		RB Size=8, RB Offset=7	22.01	22.33	22.68
		RB Size=15, RB Offset=0	22.14	22.10	22.15

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	22.95	22.66	22.04
		RB Size=1, RB Offset=12	22.07	22.38	22.58
		RB Size=1, RB Offset=24	22.30	22.84	22.86
		RB Size=12, RB Offset=0	22.55	22.37	22.78
		RB Size=12, RB Offset=6	22.65	22.89	22.58
		RB Size=12, RB Offset=11	22.40	22.68	22.55
		RB Size=25, RB Offset=0	22.16	22.34	22.36
	16QAM	RB Size=1, RB Offset=0	22.94	22.18	22.52
		RB Size=1, RB Offset=12	22.81	22.37	22.76
		RB Size=1, RB Offset=24	21.99	22.23	22.59
		RB Size=12, RB Offset=0	22.81	21.98	22.17
		RB Size=12, RB Offset=6	22.30	22.11	22.30
		RB Size=12, RB Offset=11	22.55	22.05	22.59
		RB Size=25, RB Offset=0	22.00	22.01	22.34
10.0	QPSK	RB Size=1, RB Offset=0	22.45	22.92	22.35
		RB Size=1, RB Offset=24	22.66	22.45	22.84
		RB Size=1, RB Offset=49	22.17	22.41	22.35
		RB Size=25, RB Offset=0	22.33	22.68	22.08
		RB Size=25, RB Offset=12	22.09	22.58	22.32
		RB Size=25, RB Offset=24	22.93	22.65	22.76
		RB Size=50, RB Offset=0	22.48	22.23	22.93
	16QAM	RB Size=1, RB Offset=0	22.44	22.76	22.70
		RB Size=1, RB Offset=24	22.76	22.24	22.83
		RB Size=1, RB Offset=49	22.94	22.27	22.05
		RB Size=25, RB Offset=0	22.79	22.63	22.05
		RB Size=25, RB Offset=12	22.26	22.08	22.11
		RB Size=25, RB Offset=24	22.29	22.52	22.07
		RB Size=50, RB Offset=0	22.12	22.15	22.04

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15.0	QPSK	RB Size=1, RB Offset=0	22.37	22.64	22.24
		RB Size=1, RB Offset=37	22.69	22.71	22.19
		RB Size=1, RB Offset=74	22.15	22.56	22.67
		RB Size=36, RB Offset=0	22.54	22.23	22.49
		RB Size=36, RB Offset=18	22.11	22.87	22.37
		RB Size=36, RB Offset=37	22.65	22.65	22.46
		RB Size=75, RB Offset=0	22.21	22.71	22.20
	16QAM	RB Size=1, RB Offset=0	22.88	22.56	22.21
		RB Size=1, RB Offset=37	22.35	22.05	22.70
		RB Size=1, RB Offset=74	22.75	22.84	22.34
		RB Size=36, RB Offset=0	22.13	22.46	22.55
		RB Size=36, RB Offset=18	22.91	22.48	22.62
		RB Size=36, RB Offset=37	22.55	22.45	22.67
		RB Size=75, RB Offset=0	22.00	22.04	22.19
20.0	QPSK	RB Size=1, RB Offset=0	22.92	22.41	22.84
		RB Size=1, RB Offset=49	22.24	22.20	22.18
		RB Size=1, RB Offset=99	22.46	22.35	22.50
		RB Size=50, RB Offset=0	22.70	22.96	22.18
		RB Size=50, RB Offset=24	21.98	22.49	22.68
		RB Size=50, RB Offset=49	22.67	22.81	22.17
		RB Size=100, RB Offset=0	22.10	22.85	22.01
	16QAM	RB Size=1, RB Offset=0	22.18	22.54	22.08
		RB Size=1, RB Offset=49	22.58	22.58	22.49
		RB Size=1, RB Offset=99	22.11	22.31	22.60
		RB Size=50, RB Offset=0	22.43	22.09	22.73
		RB Size=50, RB Offset=24	22.69	22.09	22.42
		RB Size=50, RB Offset=49	22.01	22.72	22.29
		RB Size=100, RB Offset=0	22.09	22.33	22.17

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.80	13	Pass
QPSK (100RB Size)	4.52	13	Pass
16QAM (1RB Size)	5.23	13	Pass
16QAM (100RB Size)	4.82	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
1732.50	86.32	46	1.7	H	13.2	1.30	8.90	20.80	30
1732.50	84.18	263	2.3	V	11.6	1.30	8.90	19.20	30
3 MHz Bandwidth									
1732.50	85.92	12	2.3	H	12.8	1.30	8.90	20.40	30
1732.50	86.33	296	2.4	V	13.8	1.30	8.90	21.40	30
5 MHz Bandwidth									
1732.50	87.32	149	2.4	H	14.2	1.30	8.90	21.80	30
1732.50	86.98	21	1.7	V	14.4	1.30	8.90	22.00	30
10 MHz Bandwidth									
1732.50	86.32	141	2.0	H	13.2	1.30	8.90	20.80	30
1732.50	88.12	240	2.2	V	15.6	1.30	8.90	23.20	30
15 MHz Bandwidth									
1732.50	86.88	301	2.1	H	13.7	1.30	8.90	21.30	30
1732.50	89.32	66	1.7	V	16.8	1.30	8.90	24.40	30
20 MHz Bandwidth									
1732.50	85.89	179	2.5	H	12.7	1.30	8.90	20.30	30
1732.50	86.35	220	2.1	V	13.8	1.30	8.90	21.40	30

16QAM:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
1732.50	87.23	259	1.2	H	14.1	1.30	8.90	21.70	30
1732.50	85.63	289	1.6	V	13.1	1.30	8.90	20.70	30
3 MHz Bandwidth									
1732.50	86.99	112	2.2	H	18.2	1.60	6.90	23.50	30
1732.50	86.85	15	2.2	V	17.6	1.60	6.90	22.90	30
5 MHz Bandwidth									
1732.50	87.96	174	1.6	H	19.2	1.60	6.90	24.50	30
1732.50	86.89	255	2.1	V	17.7	1.60	6.90	23.00	30
10 MHz Bandwidth									
1732.50	88.32	108	2.4	H	15.2	1.30	8.90	22.80	30
1732.50	86.69	111	2.3	V	14.1	1.30	8.90	21.70	30
15 MHz Bandwidth									
1732.50	88.11	235	1.3	H	19.3	1.60	6.90	24.60	30
1732.50	87.61	282	1.3	V	18.4	1.60	6.90	23.70	30
20 MHz Bandwidth									
1732.50	87.86	322	1.3	H	19.1	1.60	6.90	24.40	30
1732.50	88.13	73	1.6	V	15.6	1.30	8.90	23.20	30

LTE Band 5:

Maximum Output Power

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	21.50	21.20	21.55
		RB Size=1, RB Offset=2	21.72	21.88	21.88
		RB Size=1, RB Offset=5	21.20	21.97	21.79
		RB Size=3, RB Offset=0	21.33	21.84	21.20
		RB Size=3, RB Offset=1	21.98	21.75	21.83
		RB Size=3, RB Offset=2	21.62	21.96	21.16
		RB Size=6, RB Offset=0	21.47	21.14	21.78
	16QAM	RB Size=1, RB Offset=0	21.68	21.94	22.07
		RB Size=1, RB Offset=2	21.69	21.20	21.99
		RB Size=1, RB Offset=5	21.27	21.51	21.33
		RB Size=3, RB Offset=0	21.85	22.01	21.50
		RB Size=3, RB Offset=1	21.79	21.82	21.10
		RB Size=3, RB Offset=2	21.93	21.18	21.74
		RB Size=6, RB Offset=0	21.86	21.12	21.25
3.0	QPSK	RB Size=1, RB Offset=0	21.79	21.90	21.95
		RB Size=1, RB Offset=7	21.36	21.55	21.34
		RB Size=1, RB Offset=14	21.47	21.11	21.22
		RB Size=8, RB Offset=0	21.10	21.23	21.12
		RB Size=8, RB Offset=4	21.99	21.85	21.53
		RB Size=8, RB Offset=7	21.81	21.44	21.46
		RB Size=15, RB Offset=0	21.64	21.29	21.87
	16QAM	RB Size=1, RB Offset=0	21.91	21.60	21.91
		RB Size=1, RB Offset=7	22.00	21.32	21.15
		RB Size=1, RB Offset=14	21.30	22.04	21.87
		RB Size=8, RB Offset=0	21.48	21.44	21.66
		RB Size=8, RB Offset=4	21.75	21.37	21.50
		RB Size=8, RB Offset=7	21.38	21.24	21.14
		RB Size=15, RB Offset=0	21.25	21.07	21.15

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	21.98	21.87	22.03
		RB Size=1, RB Offset=12	22.03	21.78	21.63
		RB Size=1, RB Offset=24	21.89	21.42	22.06
		RB Size=12, RB Offset=0	21.56	21.43	21.20
		RB Size=12, RB Offset=6	21.17	21.57	21.42
		RB Size=12, RB Offset=11	21.16	22.06	21.51
		RB Size=25, RB Offset=0	21.59	21.76	22.04
	16QAM	RB Size=1, RB Offset=0	21.99	21.14	21.58
		RB Size=1, RB Offset=12	22.08	21.60	21.44
		RB Size=1, RB Offset=24	21.18	22.00	21.31
		RB Size=12, RB Offset=0	21.11	21.56	21.64
		RB Size=12, RB Offset=6	21.26	21.99	21.54
		RB Size=12, RB Offset=11	21.58	21.96	21.56
		RB Size=25, RB Offset=0	21.37	21.13	21.30
10.0	QPSK	RB Size=1, RB Offset=0	21.72	21.45	21.51
		RB Size=1, RB Offset=24	21.43	21.53	21.65
		RB Size=1, RB Offset=49	21.86	21.97	21.14
		RB Size=25, RB Offset=0	21.09	21.50	21.23
		RB Size=25, RB Offset=12	21.30	21.41	21.34
		RB Size=25, RB Offset=24	21.24	21.37	21.79
		RB Size=50, RB Offset=0	21.46	21.23	21.41
	16QAM	RB Size=1, RB Offset=0	21.54	21.20	21.26
		RB Size=1, RB Offset=24	21.91	21.44	21.82
		RB Size=1, RB Offset=49	22.08	21.33	21.68
		RB Size=25, RB Offset=0	21.89	21.22	21.26
		RB Size=25, RB Offset=12	22.00	21.86	21.52
		RB Size=25, RB Offset=24	21.59	21.73	21.37
		RB Size=50, RB Offset=0	21.04	21.37	21.19

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.45	13	Pass
QPSK (50RB Size)	6.53	13	Pass
16QAM (1RB Size)	7.15	13	Pass
16QAM (50RB Size)	6.73	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
836.5	85.15	96	2.3	H	22.8	0.7	0.0	22.10	38.45
836.5	83.99	316	2.4	V	23.6	0.7	0.0	22.90	38.45
3 MHz Bandwidth									
836.5	85.36	313	1.7	H	23.0	0.7	0.0	22.30	38.45
836.5	83.47	310	1.0	V	23.0	0.7	0.0	22.30	38.45
5 MHz Bandwidth									
836.5	85.95	260	2.1	H	23.6	0.7	0.0	22.90	38.45
836.5	83.05	157	2.3	V	22.6	0.7	0.0	21.90	38.45
10 MHz Bandwidth									
836.5	85.86	120	1.4	H	23.5	0.7	0.0	22.80	38.45
836.5	83.73	239	1.7	V	23.3	0.7	0.0	22.60	38.45

16QAM:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
836.5	85.11	27	1.3	H	22.7	0.7	0.0	22.00	38.45
836.5	83.94	237	1.8	V	23.5	0.7	0.0	22.80	38.45
3 MHz Bandwidth									
836.5	85.76	302	1.5	H	23.4	0.7	0.0	22.70	38.45
836.5	84.50	221	2.4	V	24.1	0.7	0.0	23.40	38.45
5 MHz Bandwidth									
836.5	85.30	26	1.0	H	22.9	0.7	0.0	22.20	38.45
836.5	83.16	237	1.2	V	22.7	0.7	0.0	22.00	38.45
10 MHz Bandwidth									
836.5	85.52	226	1.0	H	23.1	0.7	0.0	22.40	38.45
836.5	83.44	216	2.3	V	23.0	0.7	0.0	22.30	38.45

LTE Band 7:

Maximum Output Power

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	22.27	22.25	21.83
		RB Size=1, RB Offset=12	22.63	21.98	22.58
		RB Size=1, RB Offset=24	22.24	21.91	21.88
		RB Size=12, RB Offset=0	22.03	22.38	22.37
		RB Size=12, RB Offset=6	22.49	21.85	21.75
		RB Size=12, RB Offset=11	22.16	21.67	22.07
		RB Size=25, RB Offset=0	21.90	21.99	22.32
	16QAM	RB Size=1, RB Offset=0	22.51	21.82	21.80
		RB Size=1, RB Offset=12	22.50	21.66	21.85
		RB Size=1, RB Offset=24	22.52	22.06	21.87
		RB Size=12, RB Offset=0	22.12	21.88	22.17
		RB Size=12, RB Offset=6	22.01	22.42	22.01
		RB Size=12, RB Offset=11	21.64	21.51	21.55
		RB Size=25, RB Offset=0	21.29	21.28	21.33
10.0	QPSK	RB Size=1, RB Offset=0	22.63	21.67	22.31
		RB Size=1, RB Offset=24	21.83	22.08	22.35
		RB Size=1, RB Offset=49	21.97	21.88	22.09
		RB Size=25, RB Offset=0	22.08	22.14	22.06
		RB Size=25, RB Offset=12	21.83	21.66	22.36
		RB Size=25, RB Offset=24	22.27	21.85	22.32
		RB Size=50, RB Offset=0	21.93	22.41	22.58
	16QAM	RB Size=1, RB Offset=0	21.83	22.34	22.42
		RB Size=1, RB Offset=24	21.83	22.38	22.26
		RB Size=1, RB Offset=49	21.69	22.24	21.66
		RB Size=25, RB Offset=0	21.78	21.77	22.57
		RB Size=25, RB Offset=12	22.25	22.43	21.65
		RB Size=25, RB Offset=24	22.28	22.03	21.52
		RB Size=50, RB Offset=0	21.71	21.37	21.34

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15.0	QPSK	RB Size=1, RB Offset=0	22.57	21.93	22.62
		RB Size=1, RB Offset=37	21.96	22.43	22.22
		RB Size=1, RB Offset=74	21.78	22.26	22.44
		RB Size=36, RB Offset=0	22.56	22.14	22.06
		RB Size=36, RB Offset=18	21.70	22.34	21.84
		RB Size=36, RB Offset=37	22.18	22.30	22.63
		RB Size=75, RB Offset=0	22.15	21.76	22.26
	16QAM	RB Size=1, RB Offset=0	21.88	22.50	22.15
		RB Size=1, RB Offset=37	22.22	22.44	22.49
		RB Size=1, RB Offset=74	22.54	22.09	21.72
		RB Size=36, RB Offset=0	22.22	22.03	22.27
		RB Size=36, RB Offset=18	22.03	22.56	22.41
		RB Size=36, RB Offset=37	22.21	22.03	21.69
		RB Size=75, RB Offset=0	22.18	22.16	21.66
20.0	QPSK	RB Size=1, RB Offset=0	21.70	21.91	22.44
		RB Size=1, RB Offset=49	21.74	22.27	21.96
		RB Size=1, RB Offset=99	22.24	22.43	21.67
		RB Size=50, RB Offset=0	22.37	22.18	22.08
		RB Size=50, RB Offset=24	21.76	22.58	22.45
		RB Size=50, RB Offset=49	22.41	21.71	21.69
		RB Size=100, RB Offset=0	22.45	22.37	22.40
	16QAM	RB Size=1, RB Offset=0	22.57	21.86	22.50
		RB Size=1, RB Offset=49	22.46	21.83	22.23
		RB Size=1, RB Offset=99	22.48	21.92	21.68
		RB Size=50, RB Offset=0	21.90	22.00	22.20
		RB Size=50, RB Offset=24	22.01	21.65	22.37
		RB Size=50, RB Offset=49	22.34	22.04	22.08
		RB Size=100, RB Offset=0	22.07	22.56	21.98

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.84	13	Pass
QPSK (100RB Size)	5.32	13	Pass
16QAM (1RB Size)	5.90	13	Pass
16QAM (100RB Size)	6.17	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
5 MHz Bandwidth									
2350.00	82.63	89	1.8	H	12.4	2.30	10.10	20.20	33
2350.00	83.96	190	2.1	V	14.7	2.30	10.10	22.50	33
10 MHz Bandwidth									
2350.00	81.32	314	1.6	H	11.1	2.30	10.10	18.90	33
2350.00	82.12	359	1.2	V	12.8	2.30	10.10	20.60	33
15 MHz Bandwidth									
2350.00	84.32	346	2.3	H	14.1	2.30	10.10	21.90	33
2350.00	83.23	85	1.2	V	14.0	2.30	10.10	21.80	33
20 MHz Bandwidth									
2350.00	82.32	260	1.7	H	12.1	2.30	10.10	19.90	33
2350.00	83.24	207	2.4	V	14.0	2.30	10.10	21.80	33

16QAM:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
5 MHz Bandwidth									
2535.00	84.36	212	1.1	H	14.9	2.60	10.20	22.50	33
2535.00	85.32	297	1.9	V	16.4	2.60	10.20	24.00	33
10 MHz Bandwidth									
2535.00	85.66	210	2.4	H	16.2	2.60	10.20	23.80	33
2535.00	84.87	331	1.7	V	16.0	2.60	10.20	23.60	33
15 MHz Bandwidth									
2535.00	84.78	87	1.1	H	15.3	2.60	10.20	22.9	33
2535.00	83.65	276	1.9	V	14.8	2.60	10.20	22.4	33
20 MHz Bandwidth									
2535.00	85.32	159	2.1	H	15.8	2.60	10.20	23.40	33
2535.00	82.21	302	1.8	V	13.3	2.60	10.20	20.90	33

Note:
All above data were tested with no amplifier
Absolute Level = Substituted Level - Cable loss + Antenna Gain
Margin = Limit- Absolute Level

LTE Band 17:

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	21.67	21.72	22.14
		RB Size=1, RB Offset=12	21.34	22.22	21.35
		RB Size=1, RB Offset=24	21.73	21.47	21.93
		RB Size=12, RB Offset=0	21.89	22.08	21.66
		RB Size=12, RB Offset=6	21.48	21.37	21.46
		RB Size=12, RB Offset=11	22.27	21.84	21.95
		RB Size=25, RB Offset=0	22.01	22.20	21.85
	16QAM	RB Size=1, RB Offset=0	21.46	21.43	22.27
		RB Size=1, RB Offset=12	21.89	21.53	22.27
		RB Size=1, RB Offset=24	22.23	21.46	22.19
		RB Size=12, RB Offset=0	21.57	21.79	21.43
		RB Size=12, RB Offset=6	21.79	21.71	21.54
		RB Size=12, RB Offset=11	21.49	21.51	21.42
		RB Size=25, RB Offset=0	21.62	21.33	21.27
10.0	QPSK	RB Size=1, RB Offset=0	22.02	21.34	22.17
		RB Size=1, RB Offset=24	22.13	21.72	22.29
		RB Size=1, RB Offset=49	22.08	21.78	21.34
		RB Size=25, RB Offset=0	22.21	21.84	21.64
		RB Size=25, RB Offset=12	21.70	21.49	21.96
		RB Size=25, RB Offset=24	21.38	21.48	21.40
		RB Size=50, RB Offset=0	22.24	21.95	22.00
	16QAM	RB Size=1, RB Offset=0	22.08	21.89	21.79
		RB Size=1, RB Offset=24	22.17	21.94	22.14
		RB Size=1, RB Offset=49	21.53	22.07	21.90
		RB Size=25, RB Offset=0	21.41	22.29	21.78
		RB Size=25, RB Offset=12	21.78	22.04	22.11
		RB Size=25, RB Offset=24	21.34	21.32	21.92
		RB Size=50, RB Offset=0	21.17	21.16	21.34

Peak-to-average ratio (PAR):

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.08	13	Pass
QPSK (50RB Size)	5.77	13	Pass
16QAM (1RB Size)	6.92	13	Pass
16QAM (50RB Size)	6.85	13	Pass

EIRP:

QPSK:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
5 MHz Bandwidth									
710	86.08	138	1.8	H	23.7	0.7	0.0	23.00	34.77
710	83.93	31	2.0	V	23.5	0.7	0.0	22.80	34.77
10 MHz Bandwidth									
710	85.37	346	2.2	H	23.0	0.7	0.0	22.30	34.77
710	83.30	184	1.2	V	22.9	0.7	0.0	22.20	34.77

16QAM:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
5 MHz Bandwidth									
710	85.61	359	2.4	H	23.2	0.7	0.0	22.50	34.77
710	83.92	20	2.3	V	23.5	0.7	0.0	22.80	34.77
10 MHz Bandwidth									
710	85.35	28	2.2	H	23.0	0.7	0.0	22.30	34.77
710	83.23	128	1.4	V	22.8	0.7	0.0	22.10	34.77

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

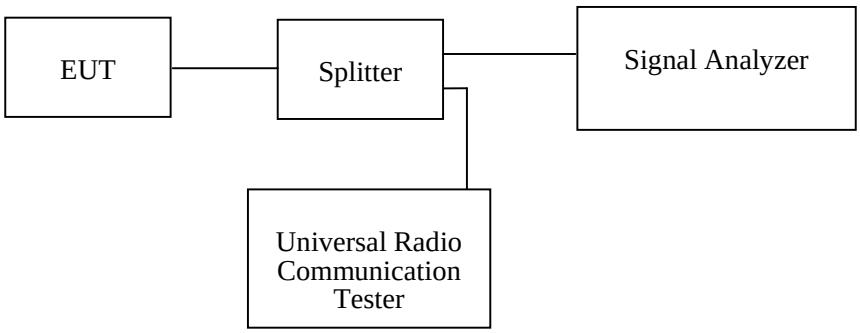
Applicable Standard

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

Test Procedure

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

The resolution bandwidth of the spectrum analyzer was set at 1% to 5% of the anticipated emission bandwidth and the 26 dB & 99% bandwidth was recorded.



Test Data

Environmental Conditions

Temperature:	25~26 ℃
Relative Humidity:	52~55 %
ATM Pressure:	100.5~101.0 kPa

The testing was performed by Hill He from 2018-06-21 to 2018-06-28.

EUT operation mode: Transmitting

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

Cellular Band (Part 22H)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	836.6	243.590	314.103
EGPRS(8PSK)	836.6	251.603	317.308

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	836.6	4.215	4.904
HSUPA (BPSK)	836.6	4.199	4.840
HSDPA (16QAM)	836.6	4.215	4.888

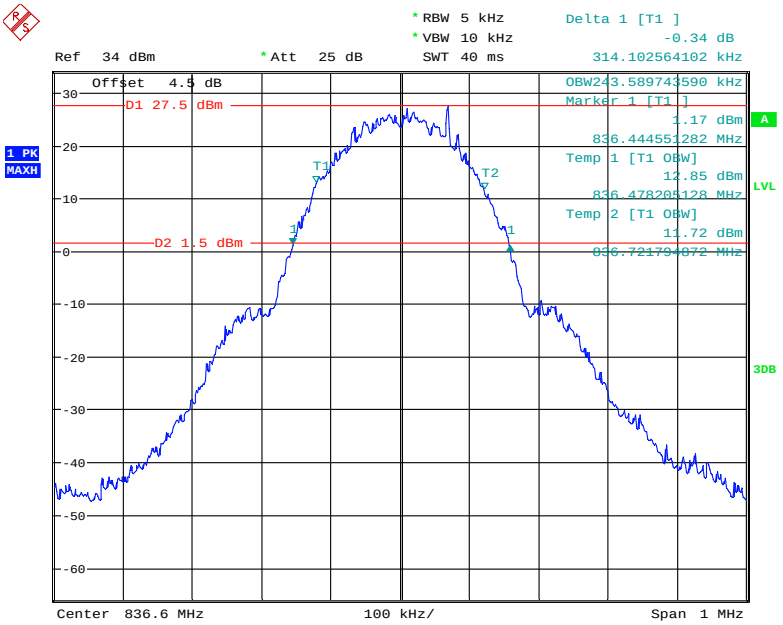
PCS Band (Part 24E)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	1880.0	246.795	315.705
EGPRS(8PSK)	1880.0	261.218	325.321

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1880.0	4.231	4.904
HSUPA (BPSK)	1880.0	4.231	4.888
HSDPA (16QAM)	1880.0	4.215	4.872

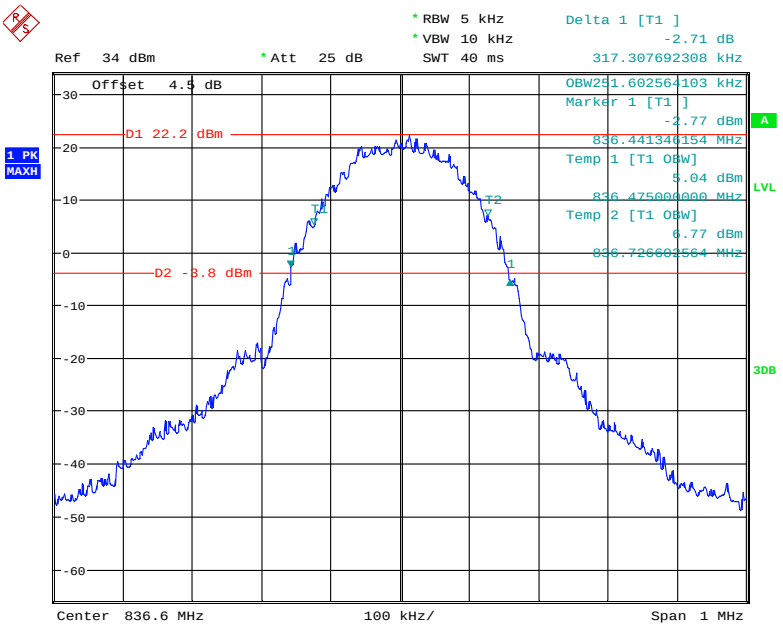
Cellular Band (Part 22H)

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



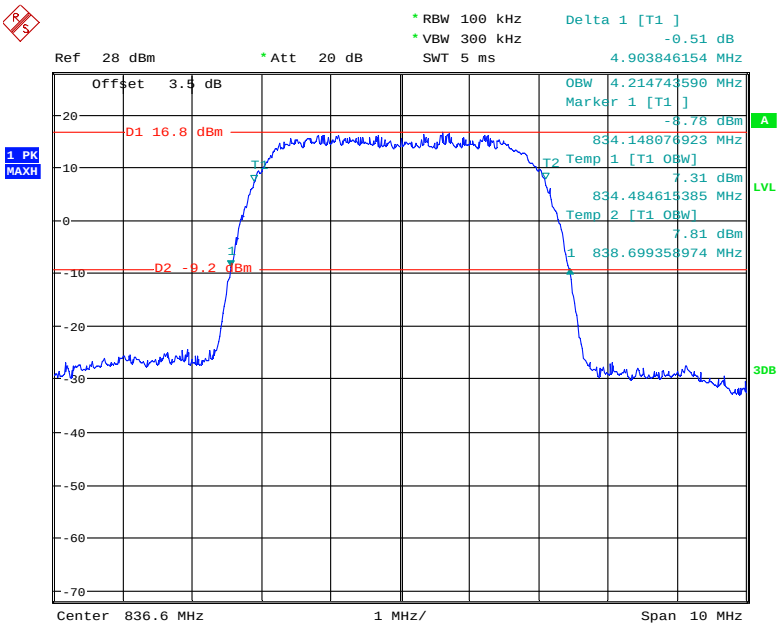
Date: 21.JUN.2018 00:02:20

26 dB Emissions &99% Occupied Bandwidth for EDGE Mode



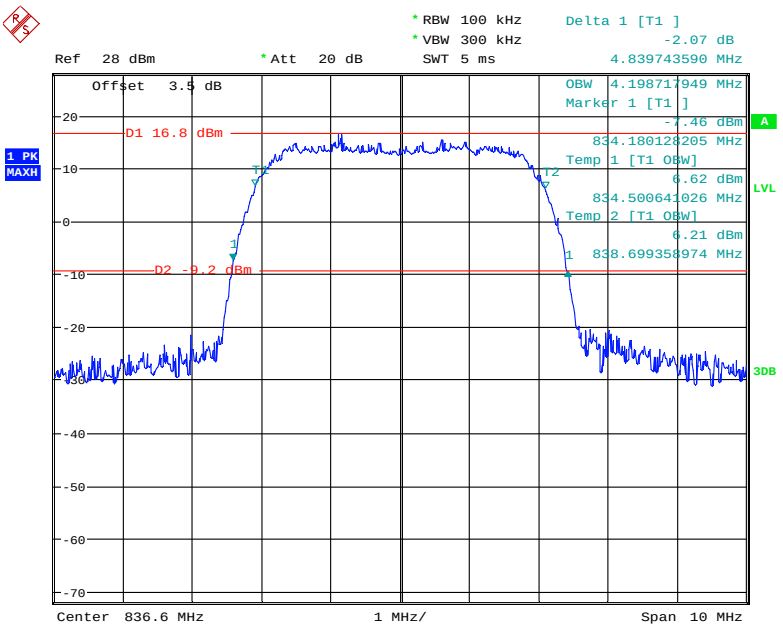
Date: 21.JUN.2018 00:29:58

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



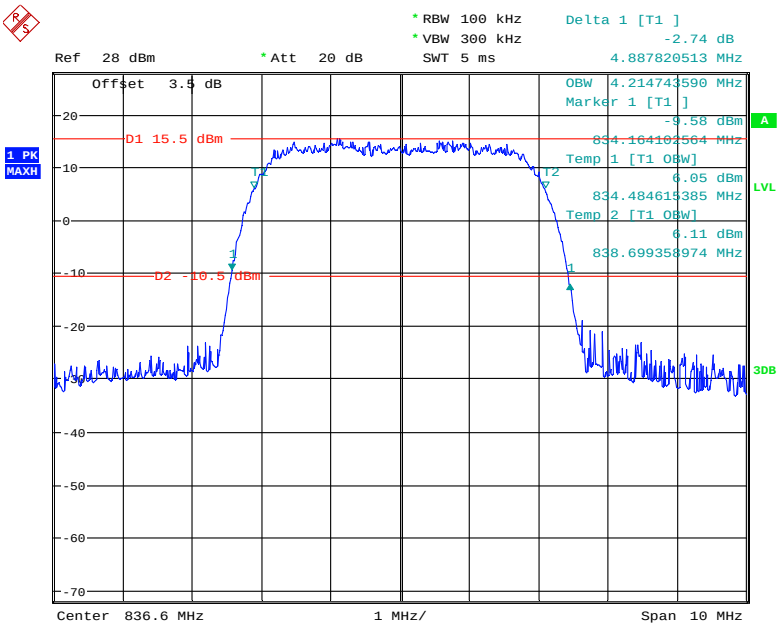
Date: 21.JUN.2018 01:44:01

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



Date: 21.JUN.2018 02:10:11

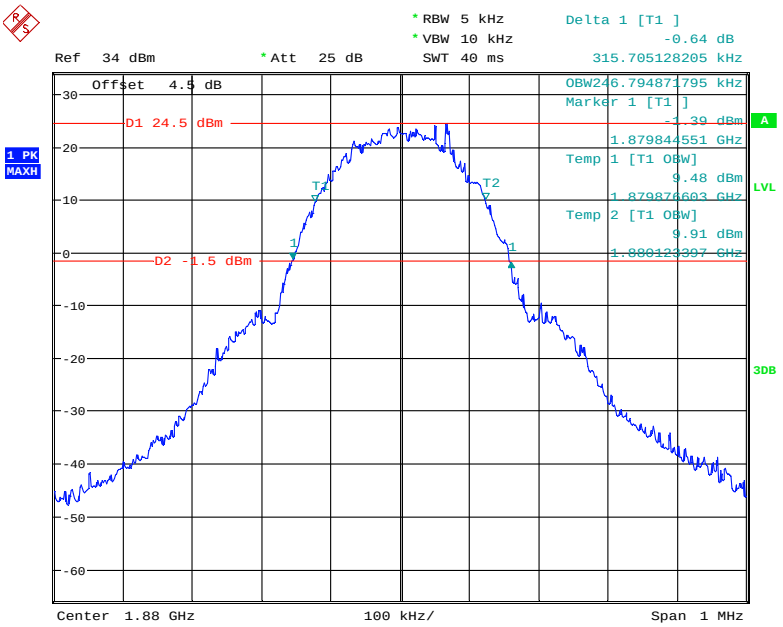
26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode



Date: 21.JUN.2018 01:47:56

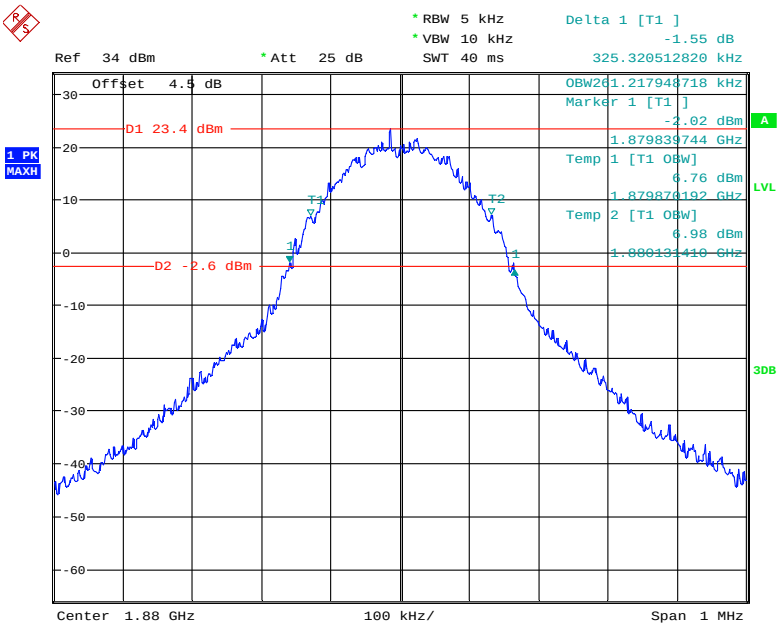
PCS Band (Part 24E)

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



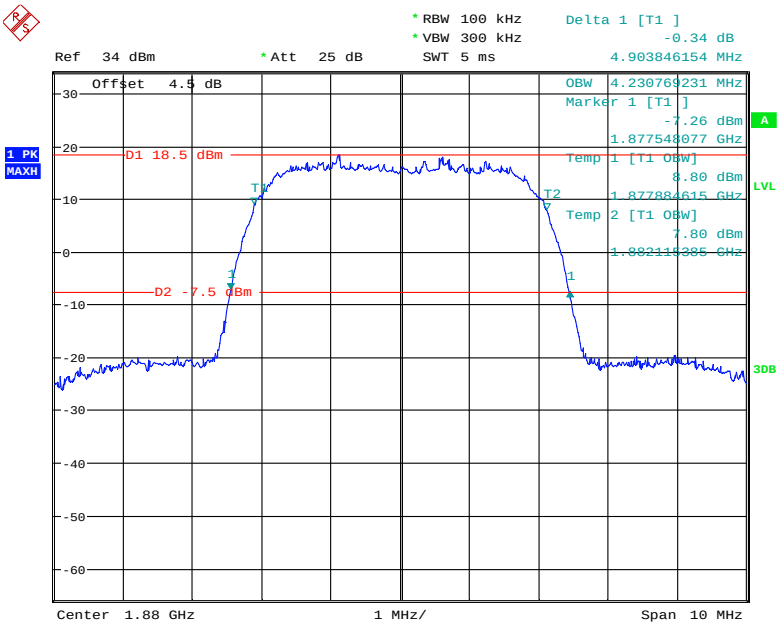
Date: 21.JUN.2018 00:34:43

26 dB Emissions &99% Occupied Bandwidth for EDGE Mode



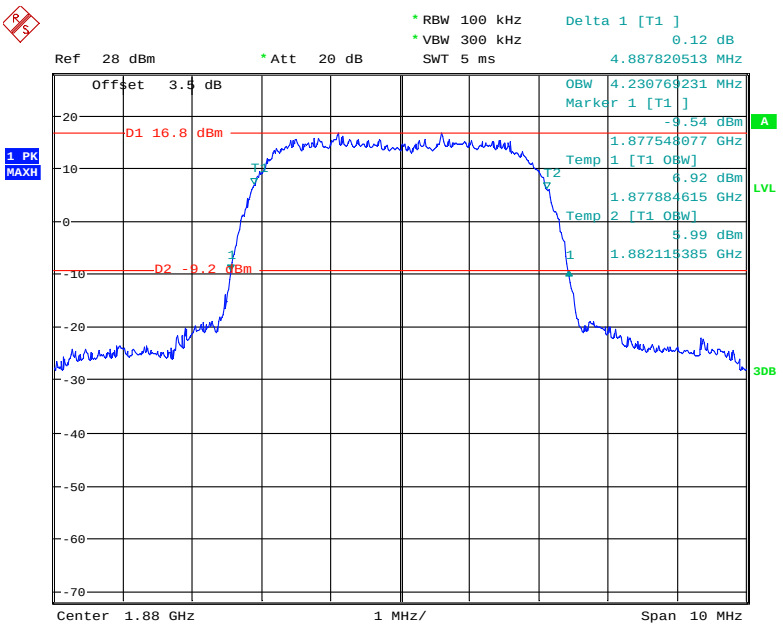
Date: 21.JUN.2018 00:53:48

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



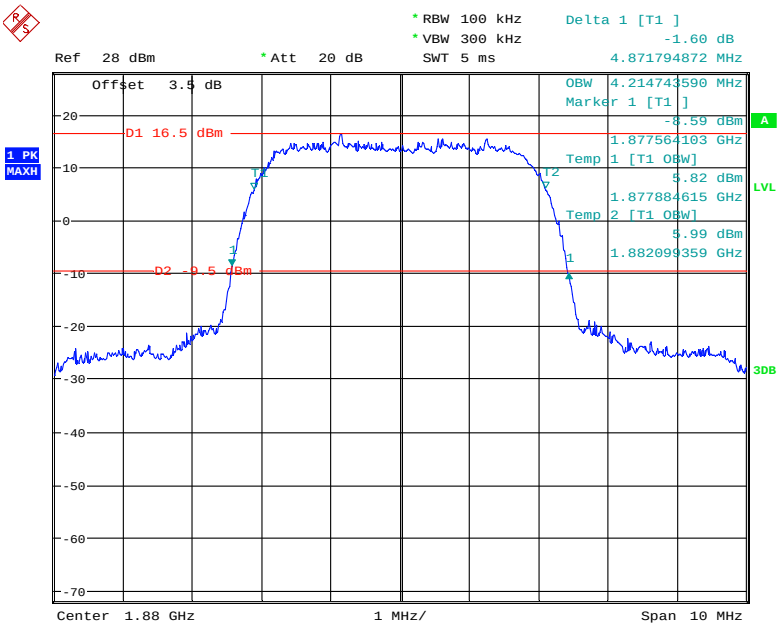
Date: 21.JUN.2018 01:05:32

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



Date: 21.JUN.2018 02:08:11

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

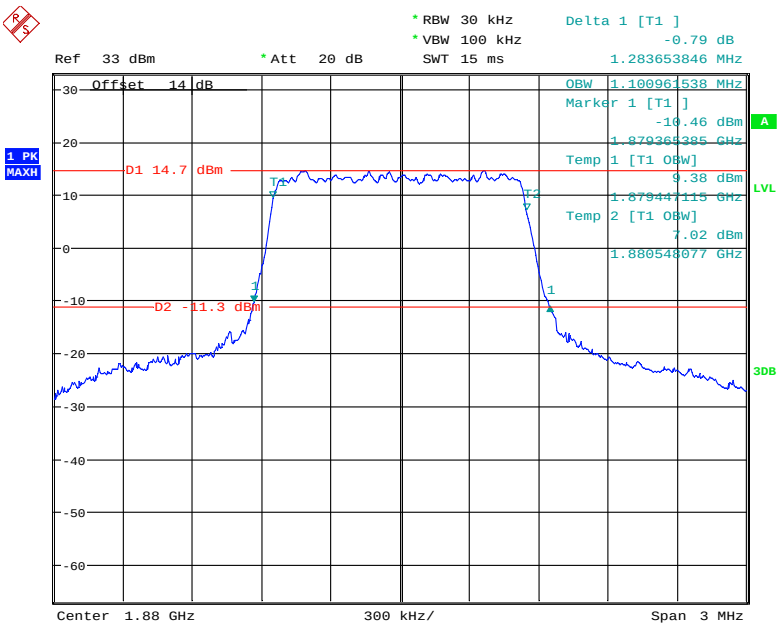


Date: 21.JUN.2018 01:49:58

LTE Band 2: (Middle Channel)

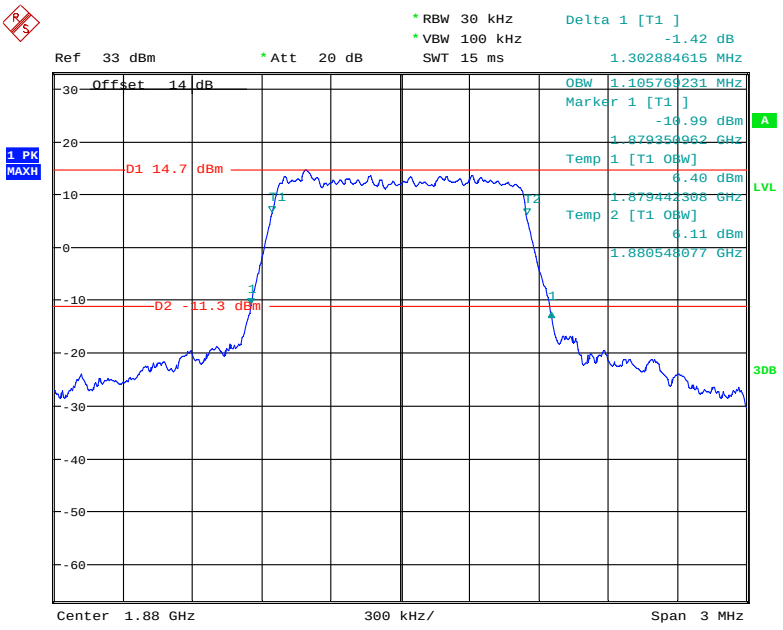
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.101	1.284
	16QAM	1.106	1.303
3.0	QPSK	2.692	2.923
	16QAM	2.692	2.942
5.0	QPSK	4.551	5.103
	16QAM	4.535	5.135
10.0	QPSK	8.974	9.846
	16QAM	8.974	9.718
15.0	QPSK	13.558	14.974
	16QAM	13.510	14.830
20.0	QPSK	17.949	19.141
	16QAM	17.949	19.141

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



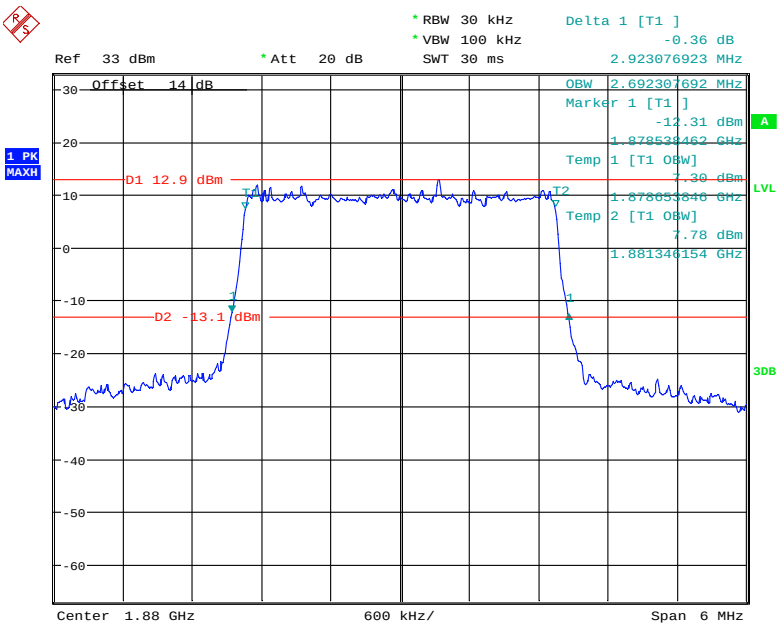
Date: 27.JUN.2018 16:11:40

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



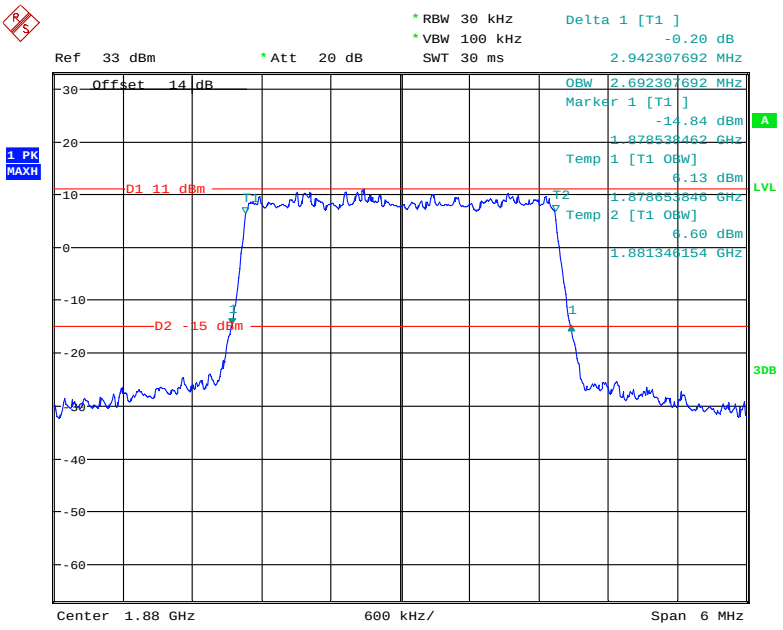
Date: 27.JUN.2018 16:14:04

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



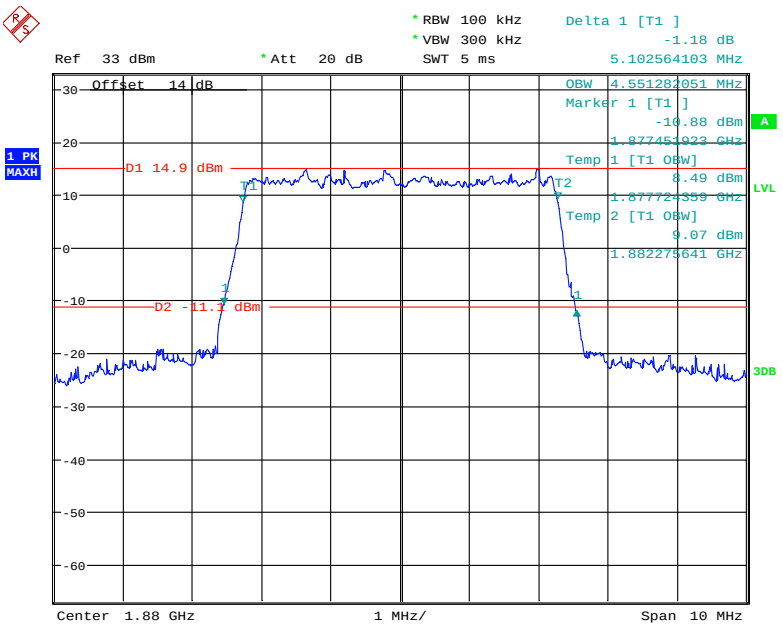
Date: 27.JUN.2018 16:16:06

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



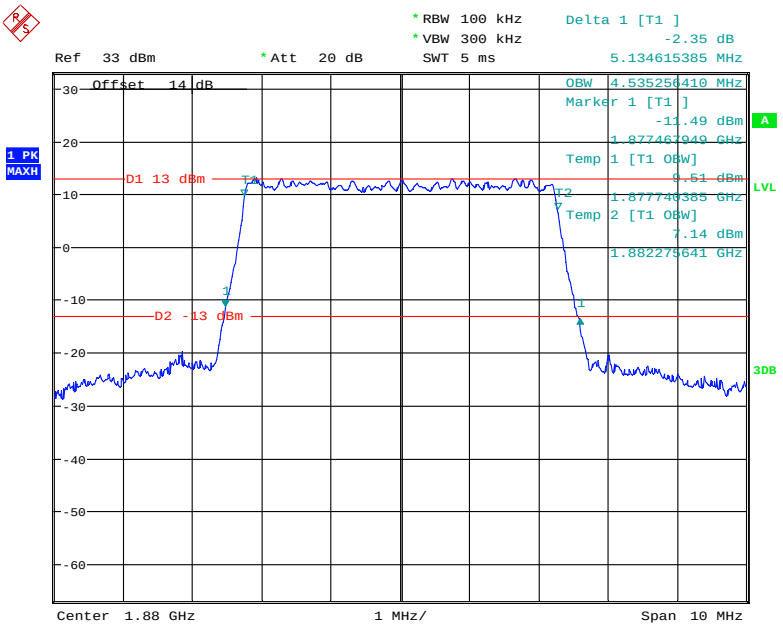
Date: 27.JUN.2018 16:17:03

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



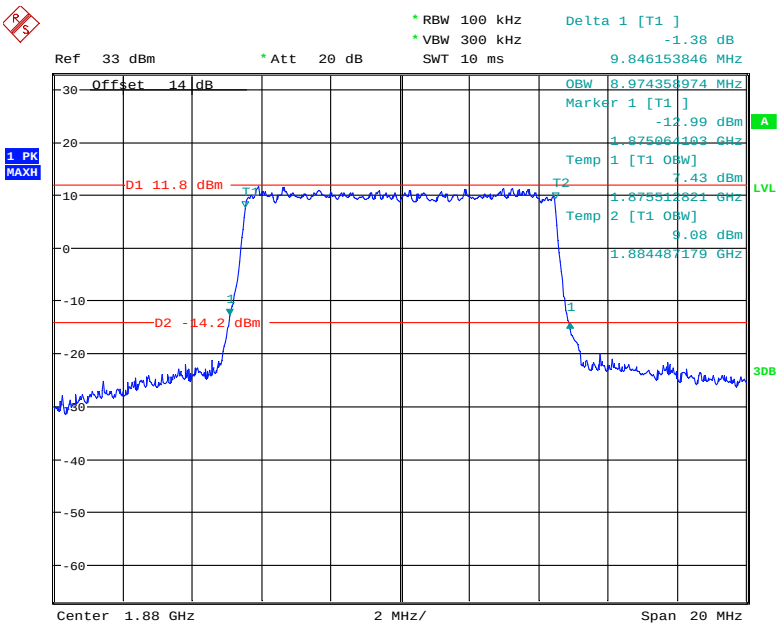
Date: 27.JUN.2018 16:18:38

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



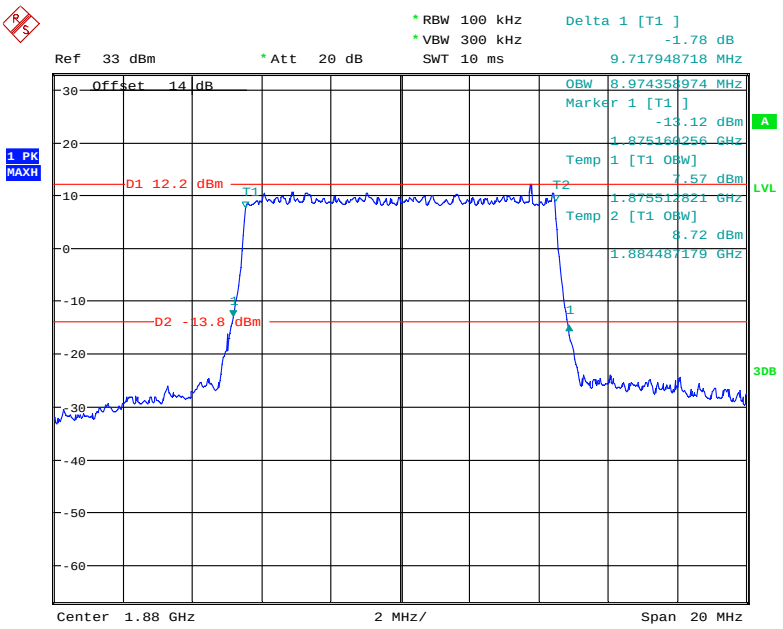
Date: 27.JUN.2018 16:20:40

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



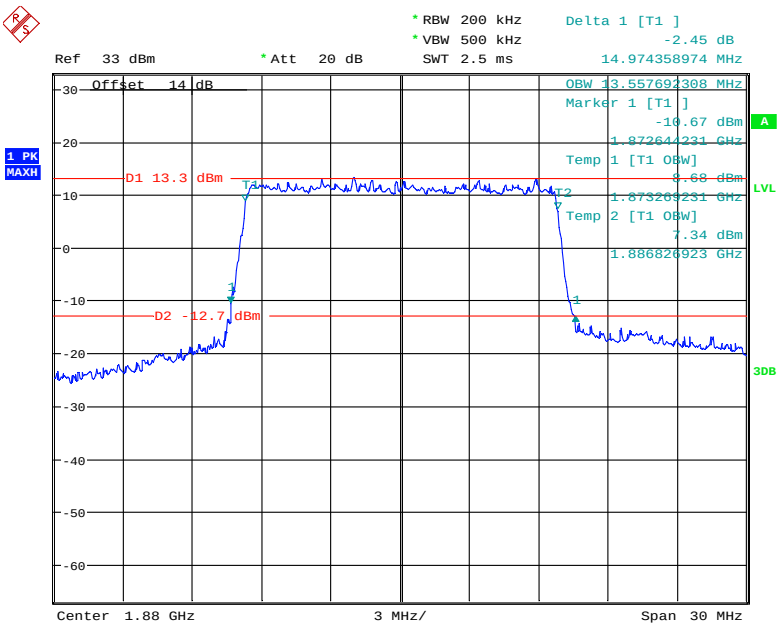
Date: 27.JUN.2018 16:22:59

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



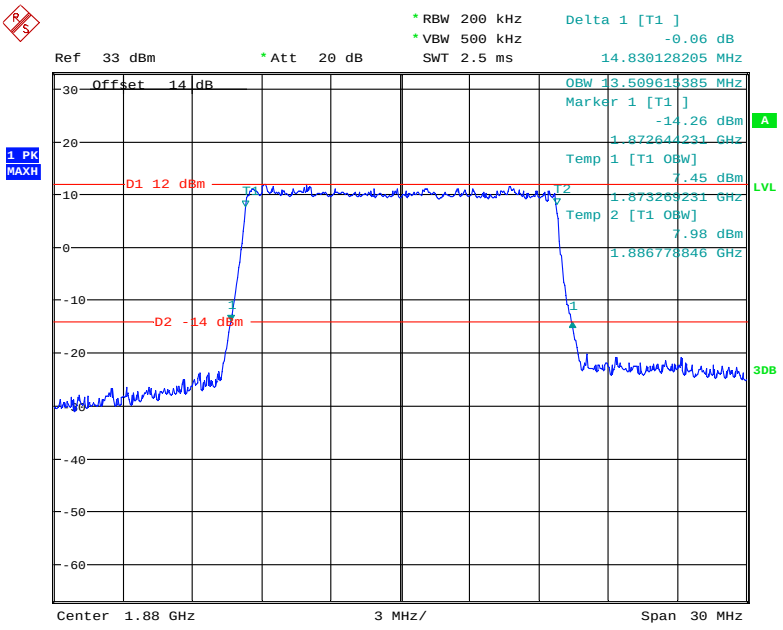
Date: 27.JUN.2018 16:26:02

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



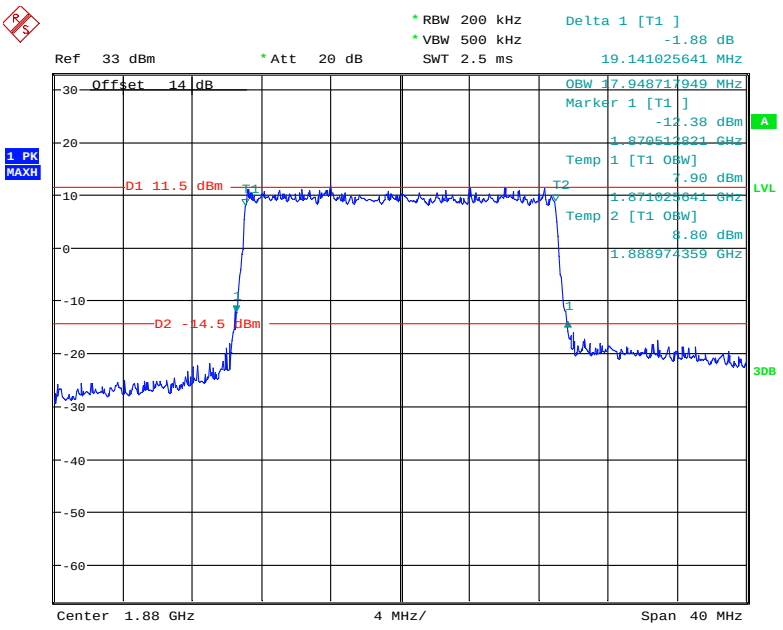
Date: 27.JUN.2018 16:29:28

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



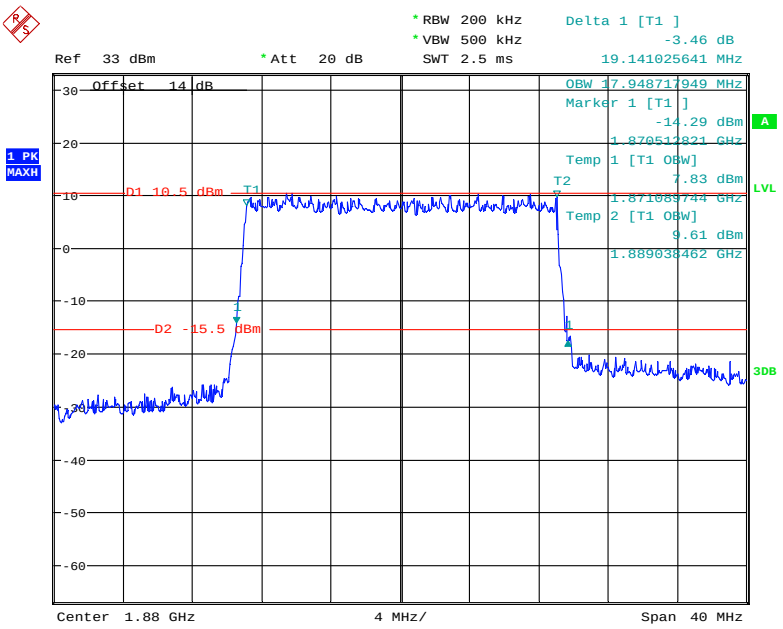
Date: 27.JUN.2018 16:31:14

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



Date: 27.JUN.2018 16:32:05

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

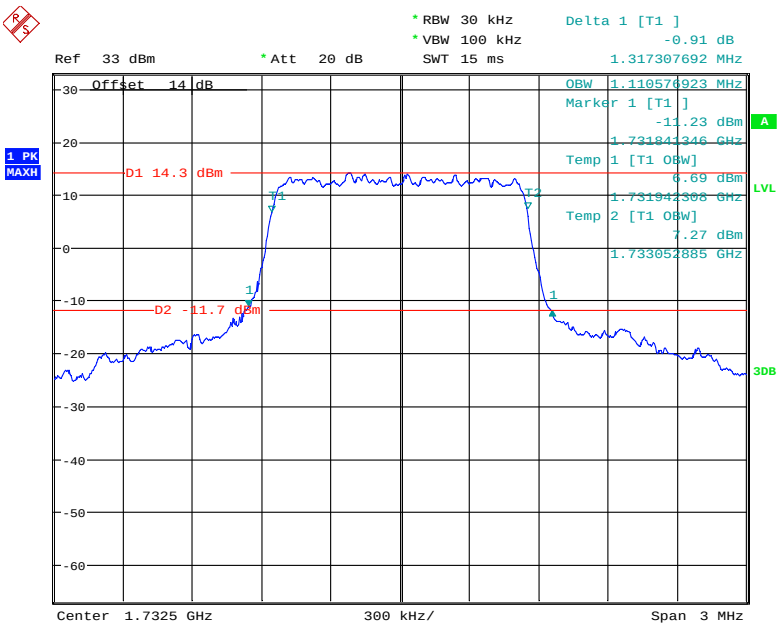


Date: 27.JUN.2018 16:33:08

LTE Band 4: (Middle Channel)

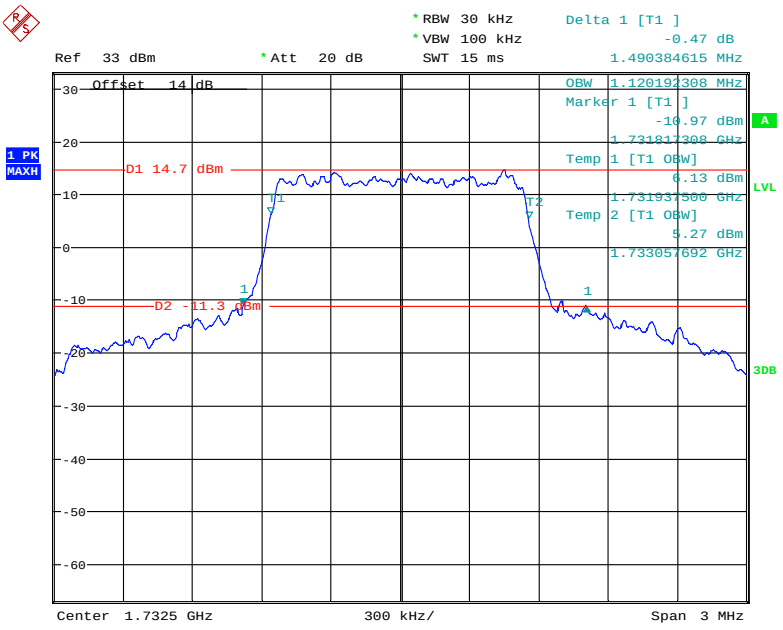
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.111	1.317
	16QAM	1.120	1.490
3.0	QPSK	2.692	2.986
	16QAM	2.692	2.986
5.0	QPSK	4.535	5.117
	16QAM	4.551	5.309
10.0	QPSK	8.974	9.893
	16QAM	8.974	9.989
15.0	QPSK	13.462	14.829
	16QAM	13.510	15.454
20.0	QPSK	17.885	19.059
	16QAM	17.885	19.252

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



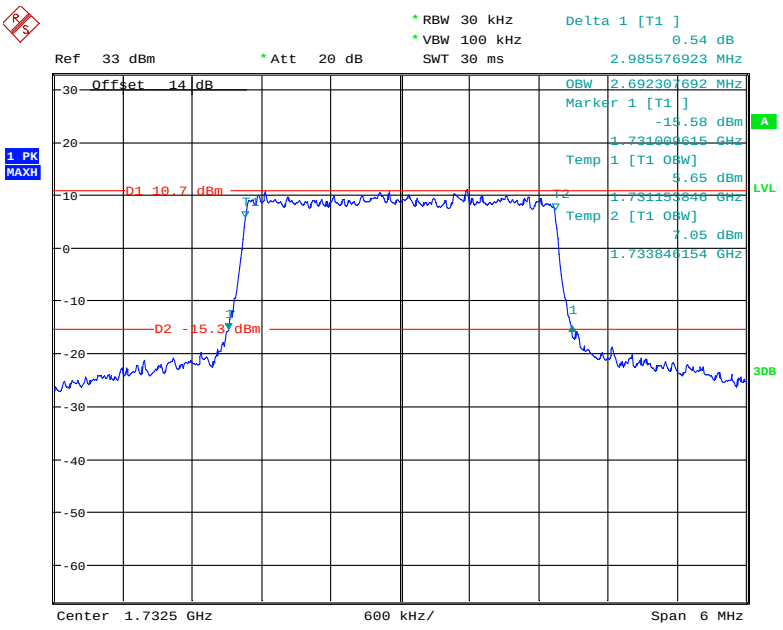
Date: 28.JUN.2018 10:25:48

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



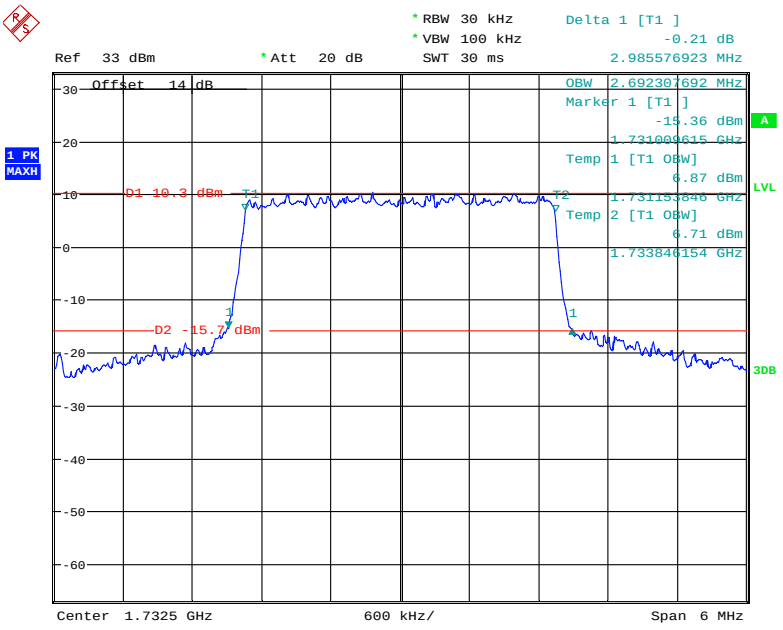
Date: 28.JUN.2018 10:24:29

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



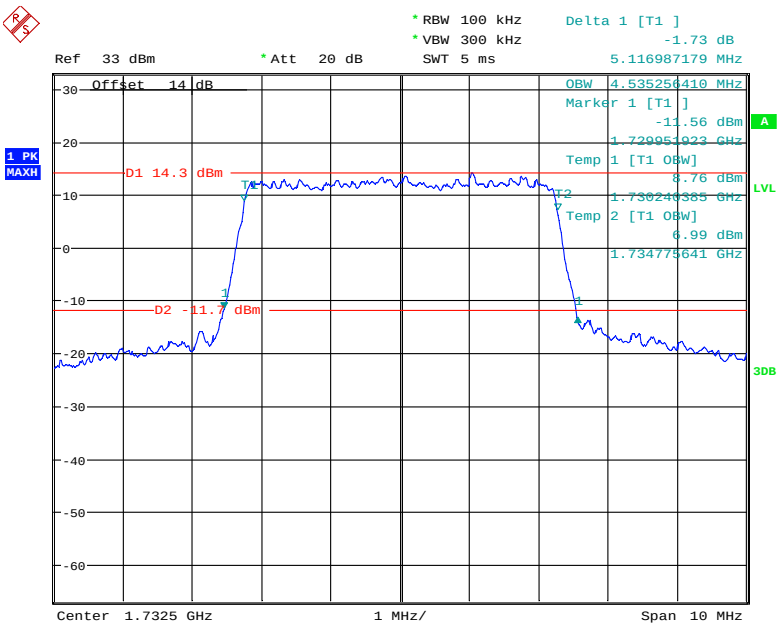
Date: 28.JUN.2018 10:28:42

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



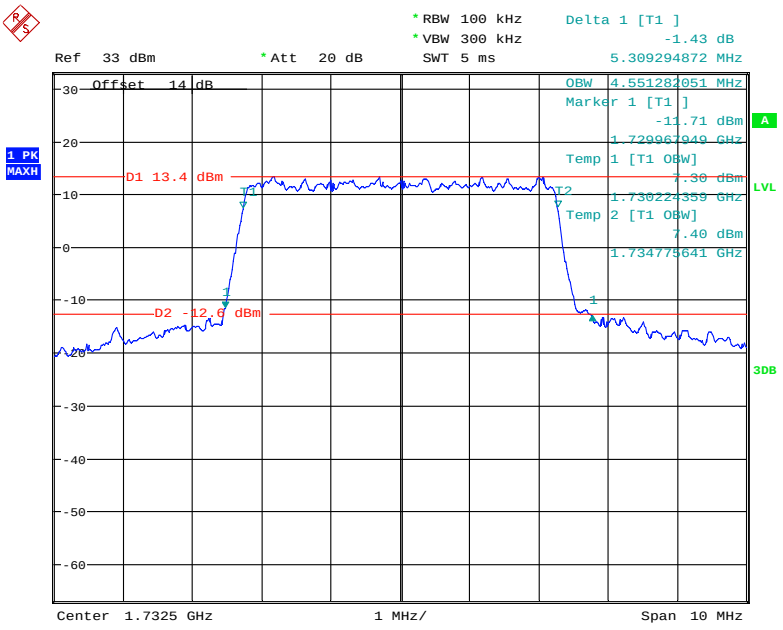
Date: 28.JUN.2018 10:27:24

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



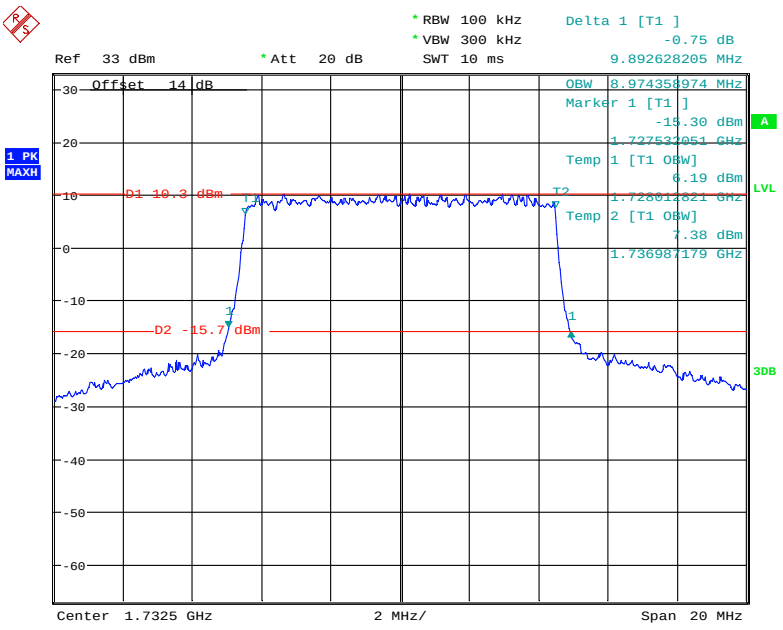
Date: 28.JUN.2018 10:43:03

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



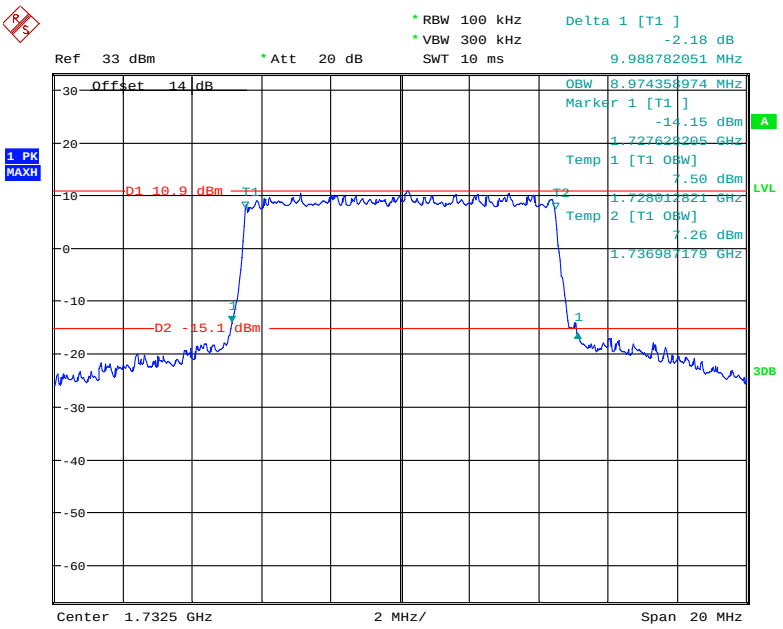
Date: 28.JUN.2018 10:44:14

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



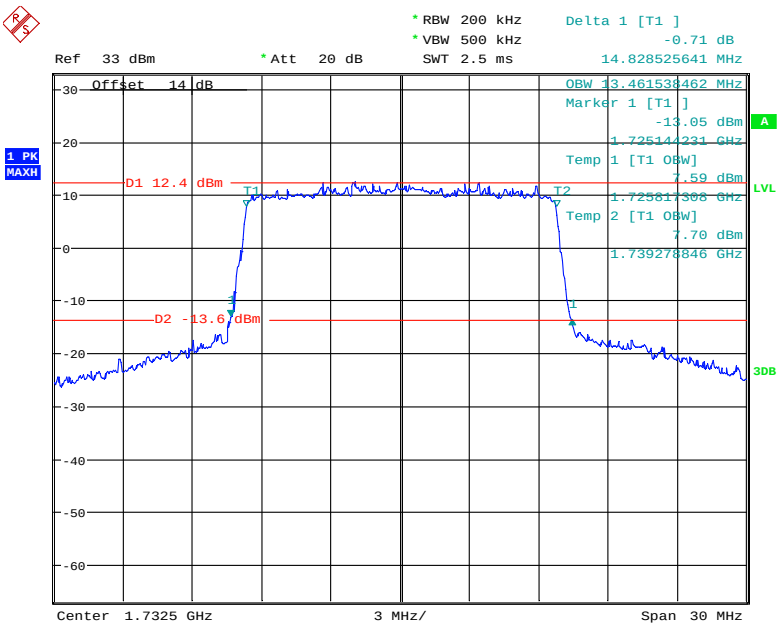
Date: 28.JUN.2018 10:46:01

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



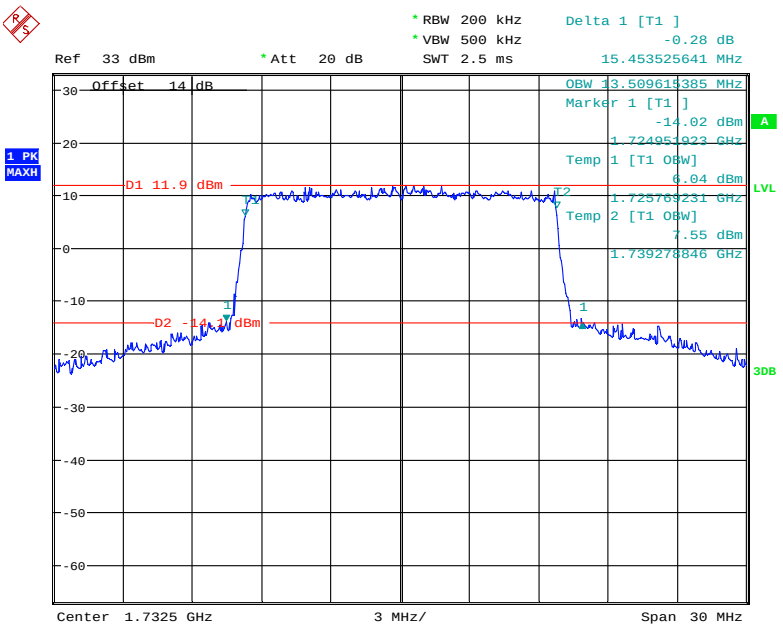
Date: 28.JUN.2018 10:47:10

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



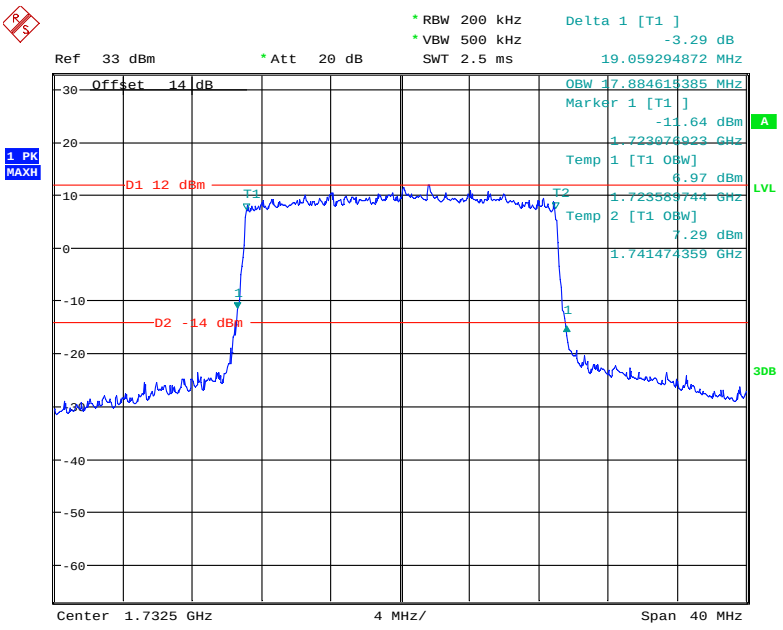
Date: 28.JUN.2018 10:48:47

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



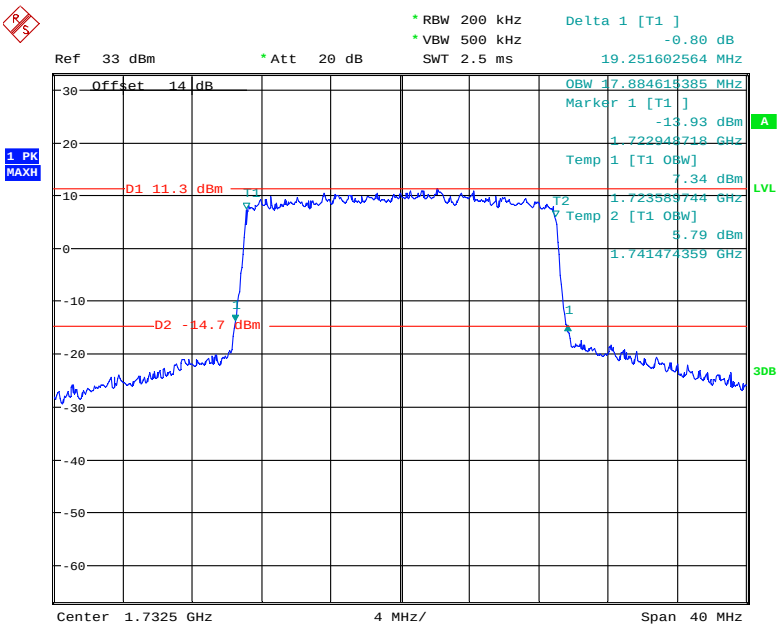
Date: 28.JUN.2018 10:51:11

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



Date: 28.JUN.2018 10:57:22

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

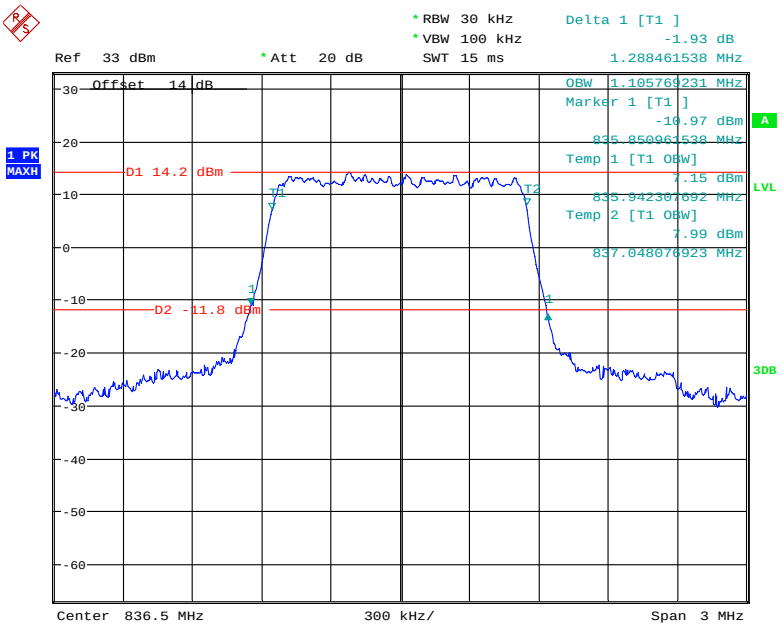


Date: 28.JUN.2018 10:58:57

LTE Band 5: (Middle Channel)

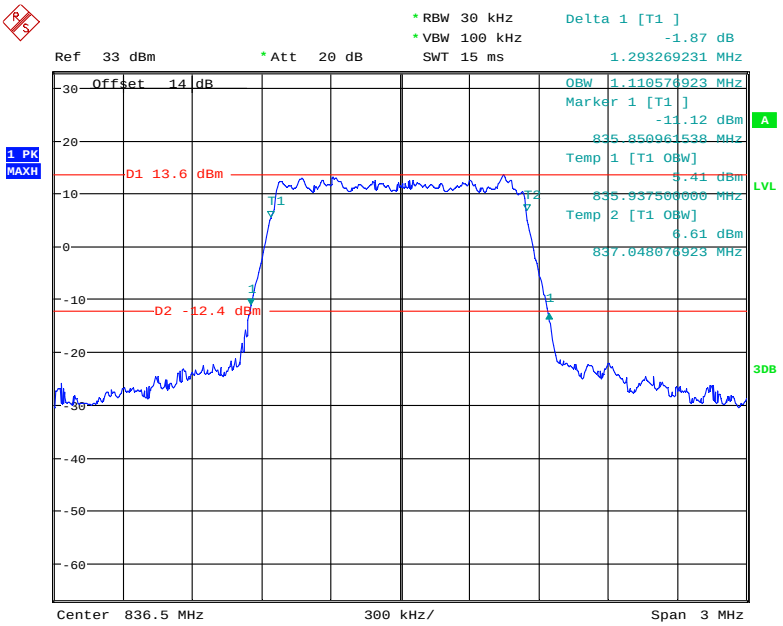
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.106	1.288
	16QAM	1.111	1.293
3.0	QPSK	2.692	2.933
	16QAM	2.702	2.952
5.0	QPSK	4.535	5.029
	16QAM	4.551	5.109
10.0	QPSK	8.974	9.885
	16QAM	8.974	9.788

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



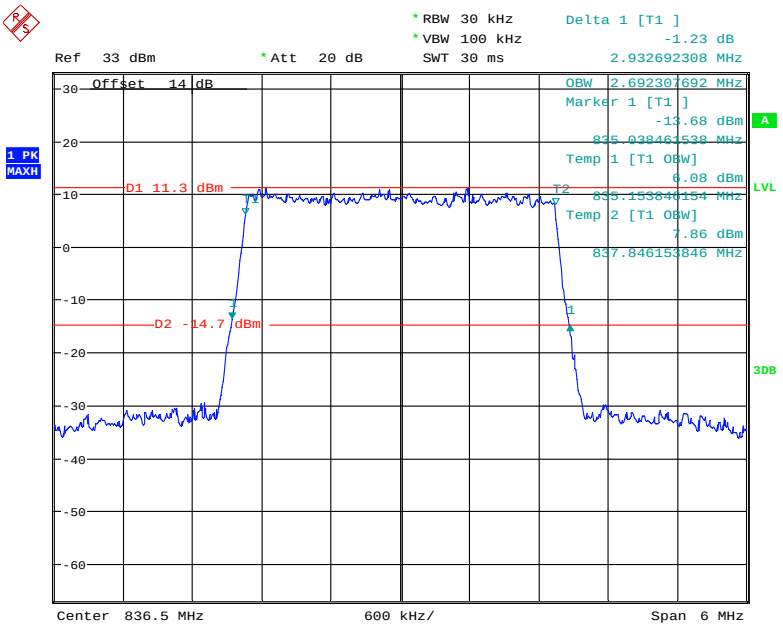
Date: 28.JUN.2018 11:05:49

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



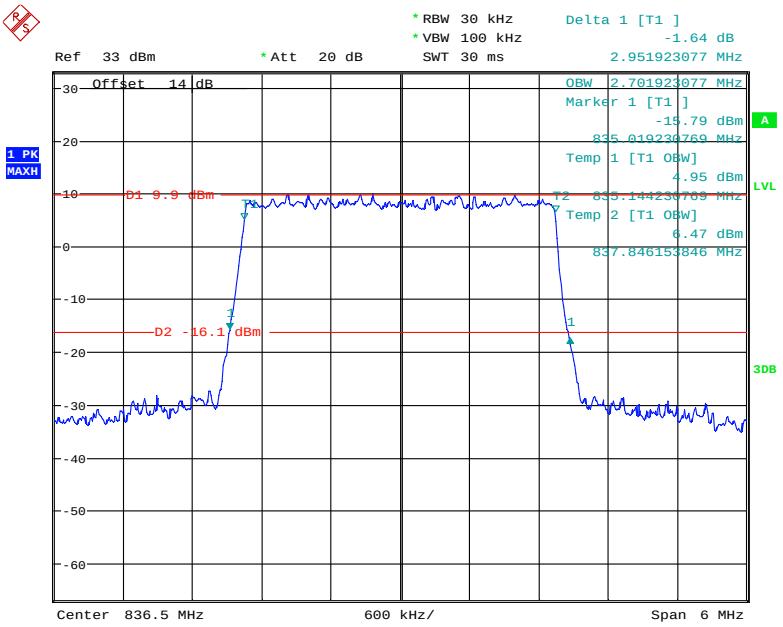
Date: 28.JUN.2018 11:07:24

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



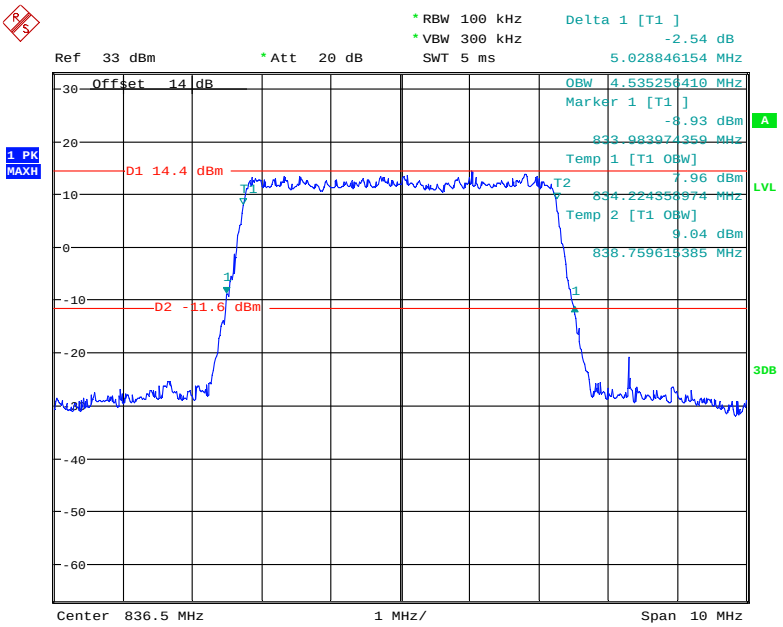
Date: 28.JUN.2018 13:19:54

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



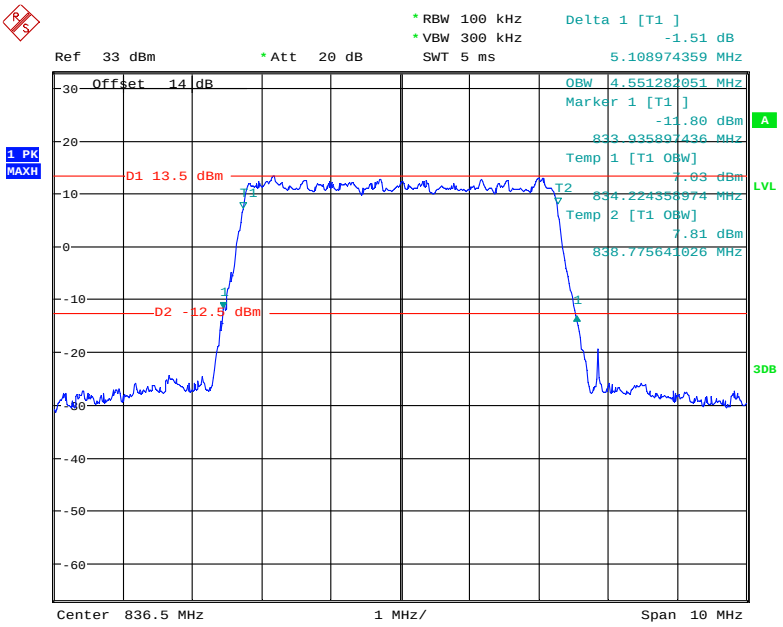
Date: 28.JUN.2018 13:20:59

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



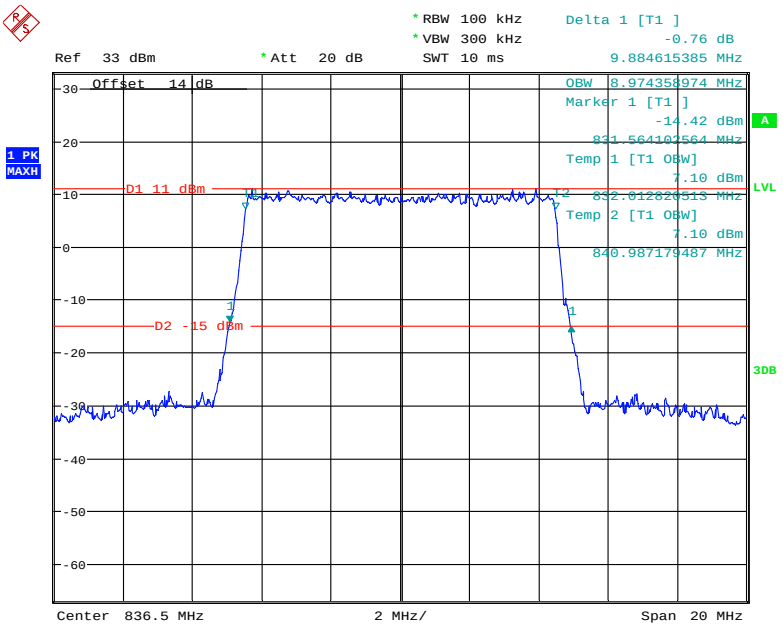
Date: 28.JUN.2018 13:26:57

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



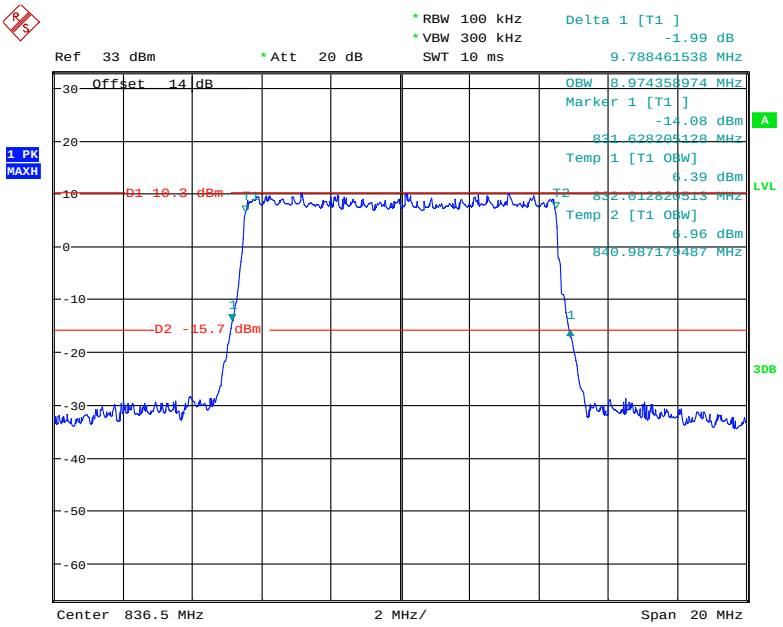
Date: 28.JUN.2018 13:24:48

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



Date: 28.JUN.2018 13:30:57

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

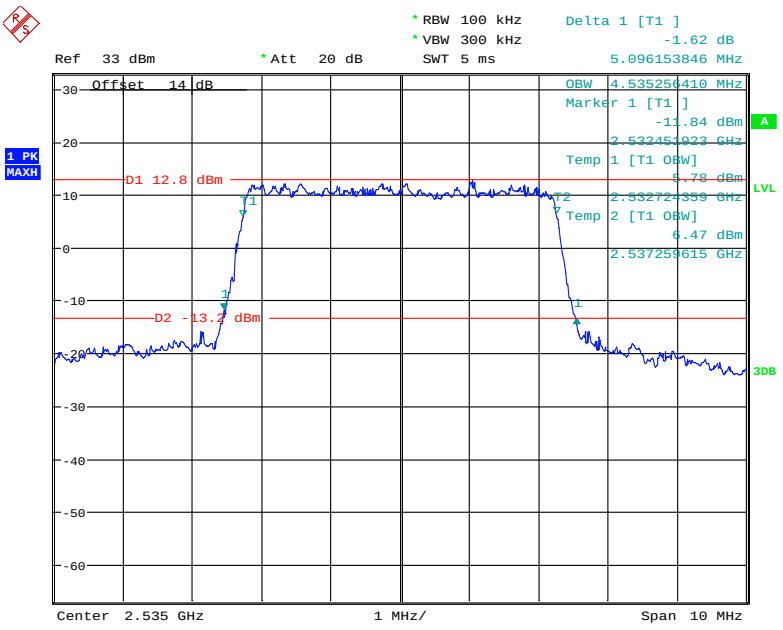


Date: 28.JUN.2018 13:29:13

LTE Band 7: (Middle Channel)

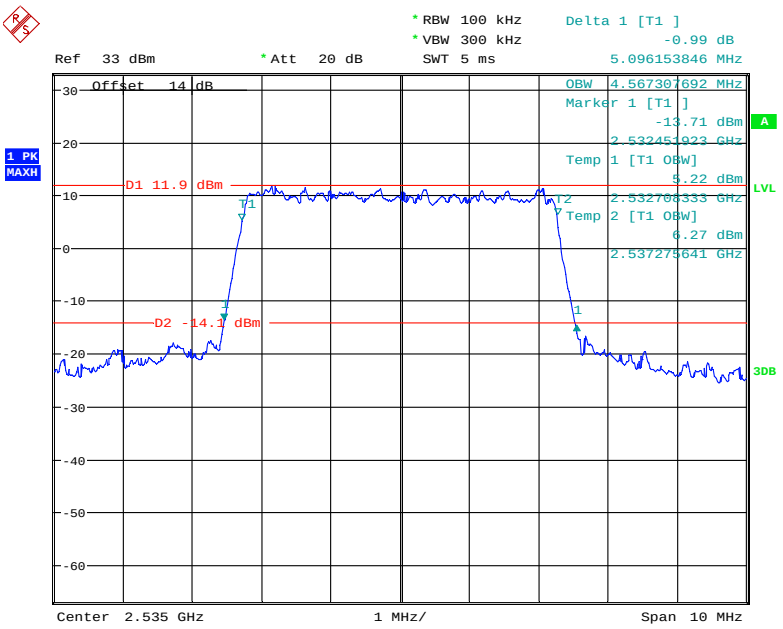
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.535	5.096
	16QAM	4.567	5.096
10.0	QPSK	8.974	9.920
	16QAM	8.974	9.824
15.0	QPSK	13.510	14.776
	16QAM	13.462	14.728
20.0	QPSK	17.949	19.343
	16QAM	17.885	19.087

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



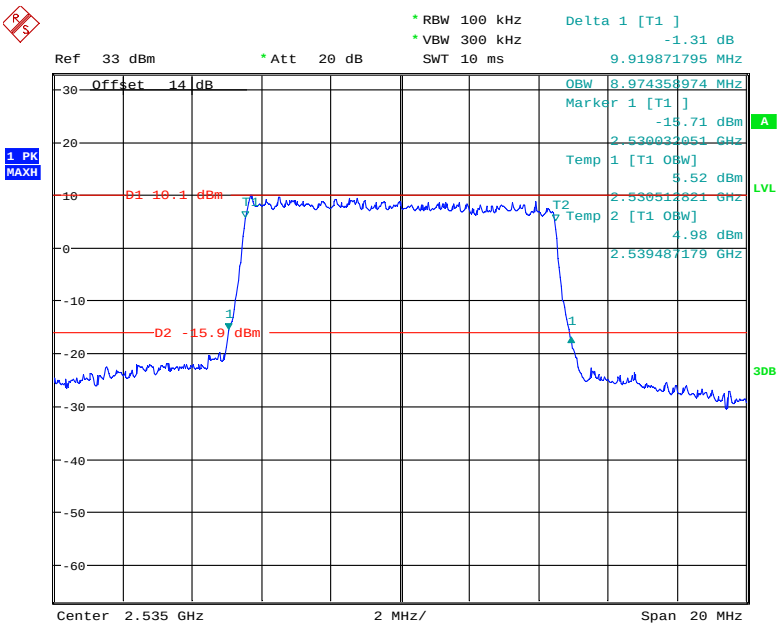
Date: 28.JUN.2018 13:34:31

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



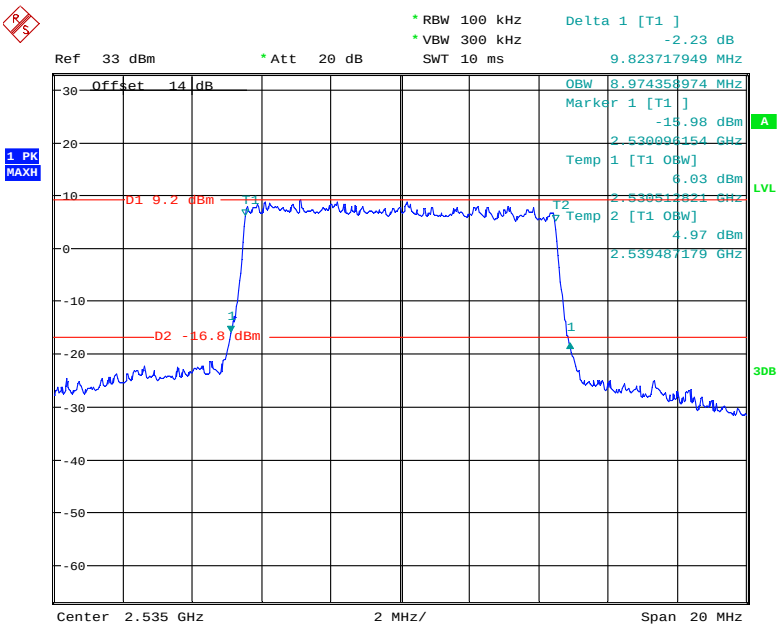
Date: 28.JUN.2018 13:37:37

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



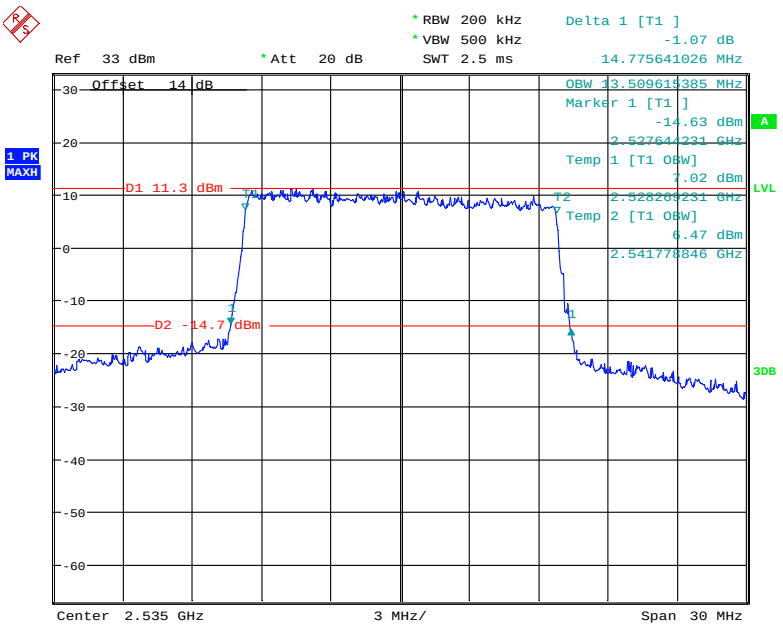
Date: 28.JUN.2018 13:40:04

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



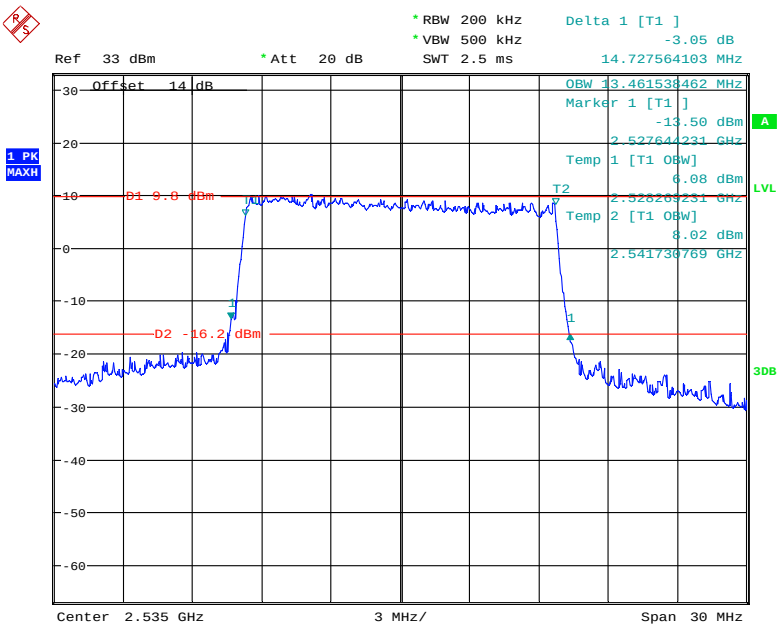
Date: 28.JUN.2018 13:41:30

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



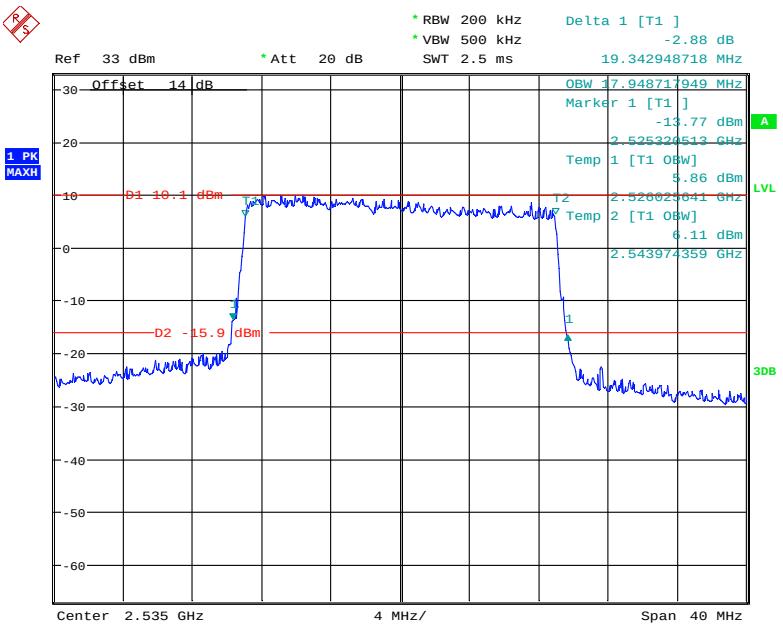
Date: 28.JUN.2018 13:43:55

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



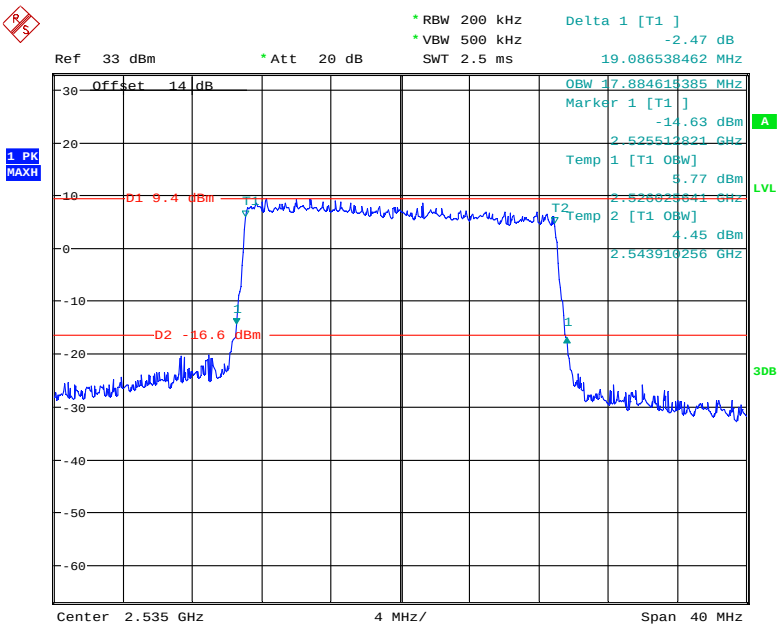
Date: 28.JUN.2018 13:42:57

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



Date: 28.JUN.2018 13:46:39

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

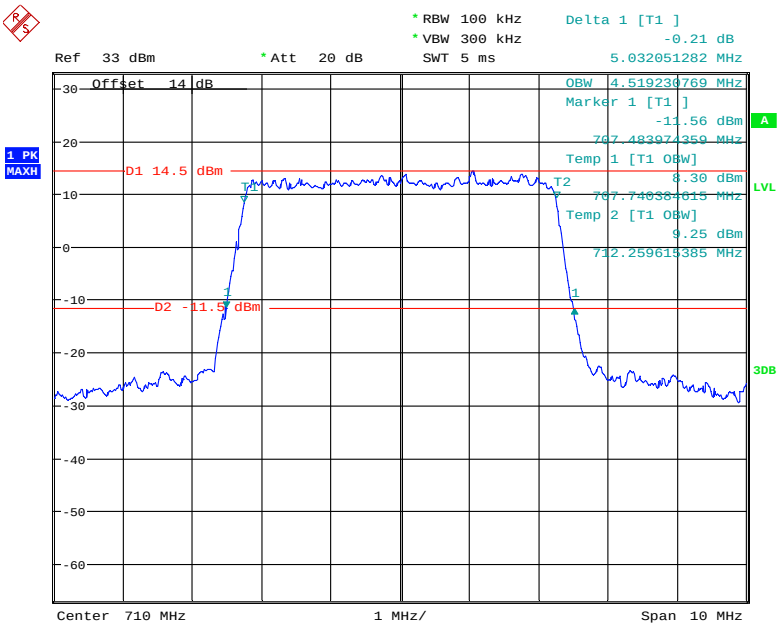


Date: 28.JUN.2018 13:45:15

LTE Band 17: (Middle Channel)

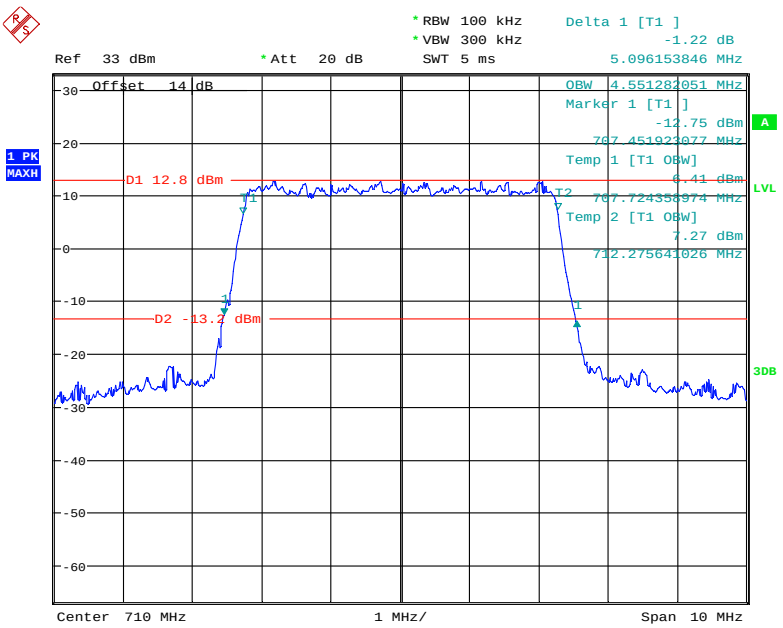
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.519	5.032
	16QAM	4.551	5.096
10.0	QPSK	8.942	9.824
	16QAM	8.974	9.728

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



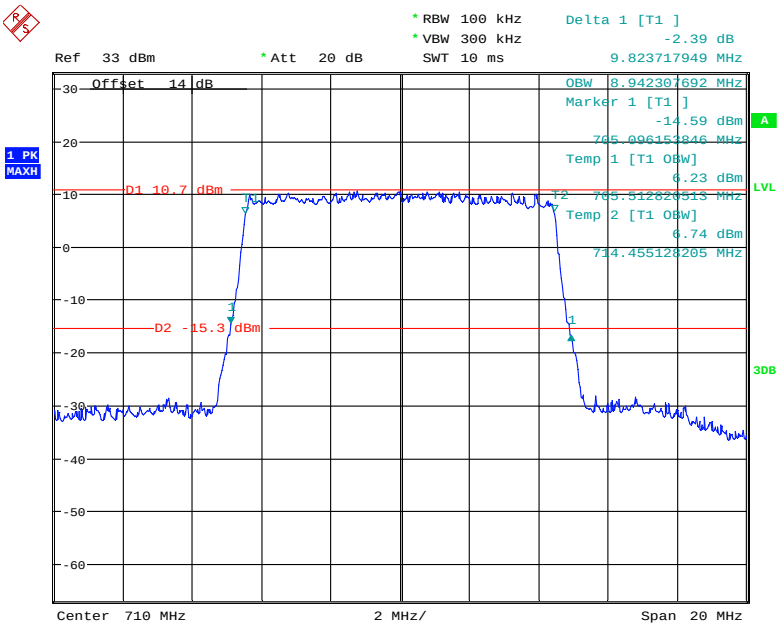
Date: 28.JUN.2018 13:50:52

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



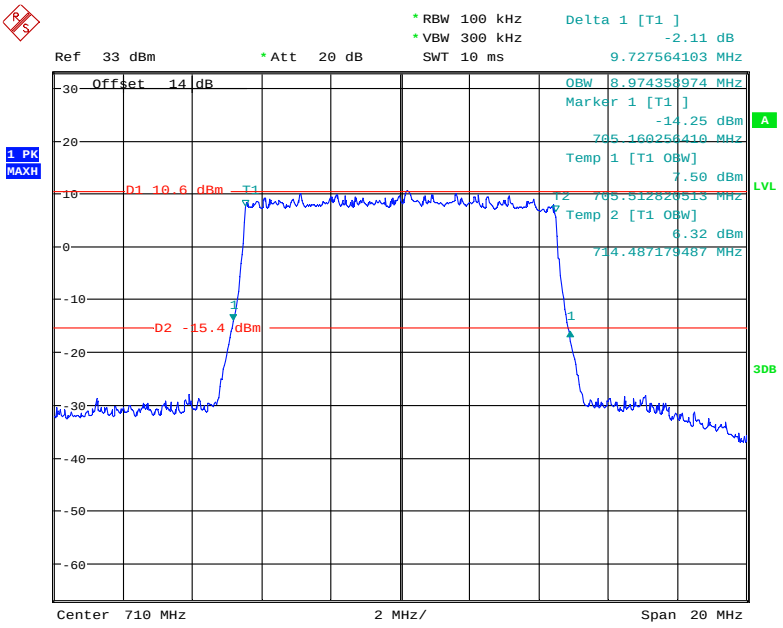
Date: 28.JUN.2018 13:48:55

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



Date: 28.JUN.2018 13:53:16

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



Date: 28.JUN.2018 13:52:13

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

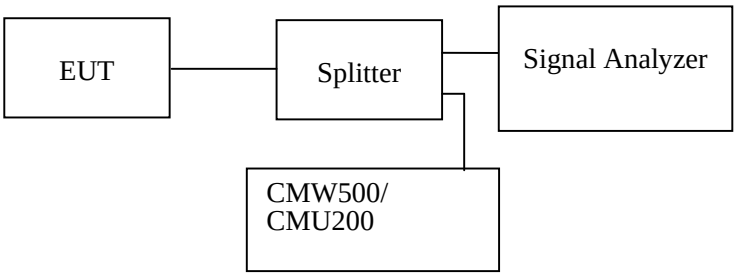
Applicable Standard

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

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



Test Data

Environmental Conditions

Temperature:	24~25 ℃
Relative Humidity:	50~55 %
ATM Pressure:	100.0~101.0 kPa

The testing was performed by Hill He from 2018-06-21 to 2018-06-30.

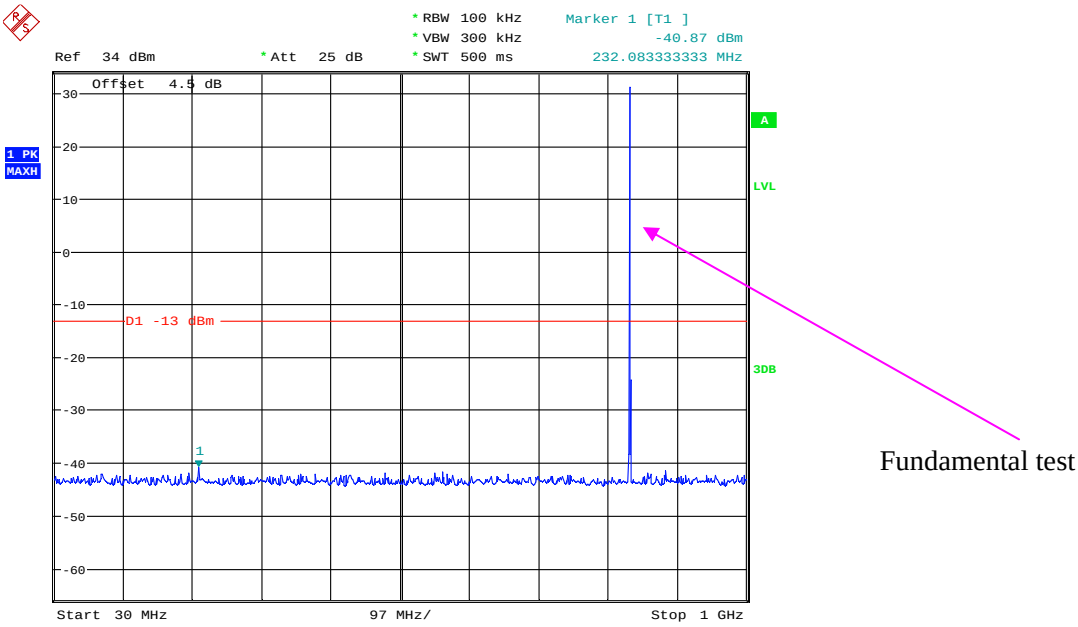
Test result: Compliance

EUT operation mode: transmitting

Please refer to the following plots.

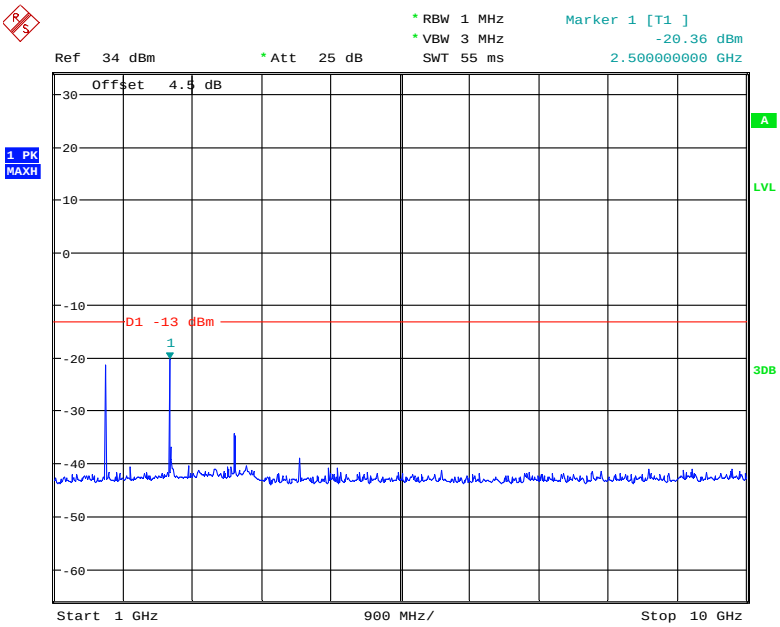
Cellular Band (Part 22H)

30 MHz – 1 GHz (GSM Mode)



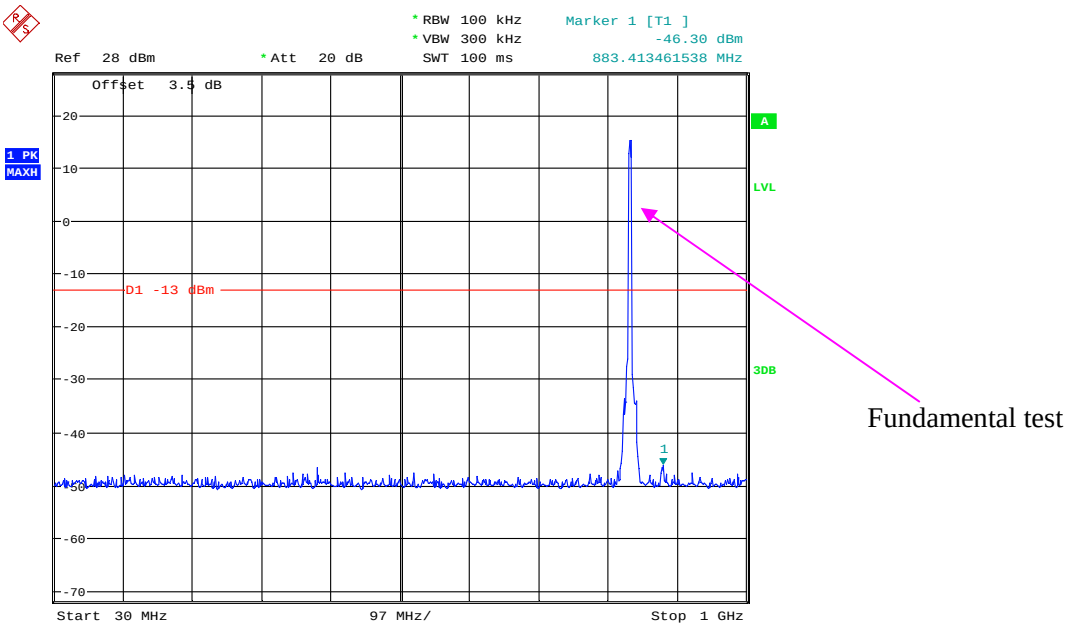
Date: 21.JUN.2018 00:12:58

1 GHz – 10 GHz (GSM Mode)



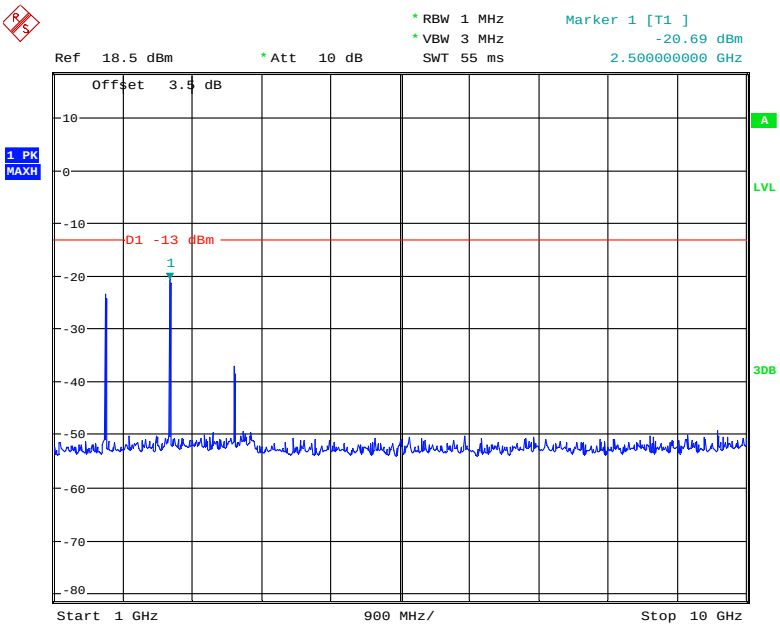
Date: 21.JUN.2018 00:14:34

30 MHz – 1 GHz (WCDMA Mode)



Date: 21.JUN.2018 01:30:17

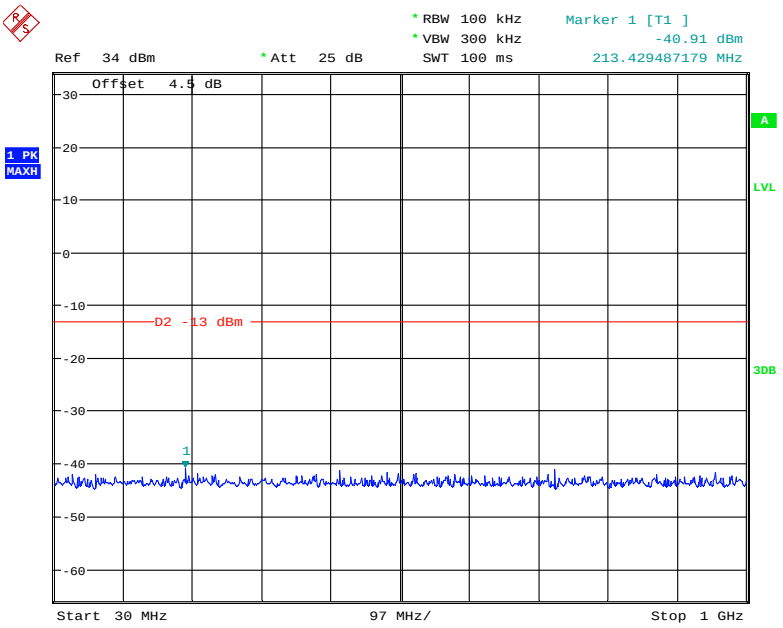
1 GHz – 10 GHz (WCDMA Mode)



Date: 21.JUN.2018 01:28:37

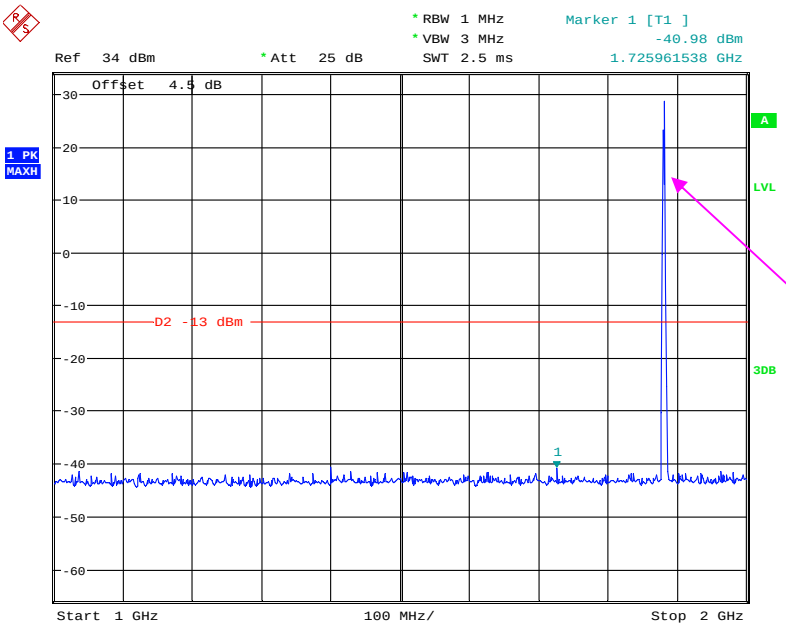
PCS Band (Part 24E)

30 MHz – 1 GHz (GSM Mode)



Date: 21.JUN.2018 00:43:37

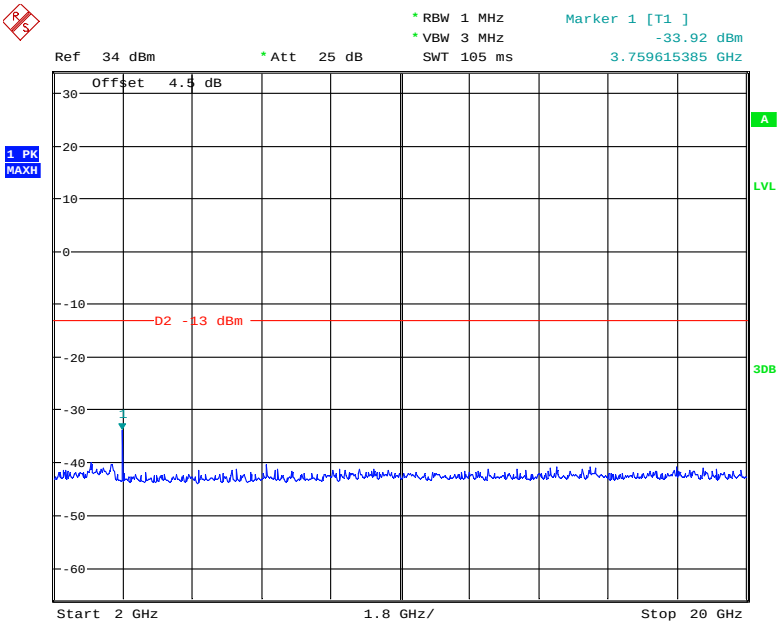
1 GHz – 2 GHz (GSM Mode)



Fundamental test

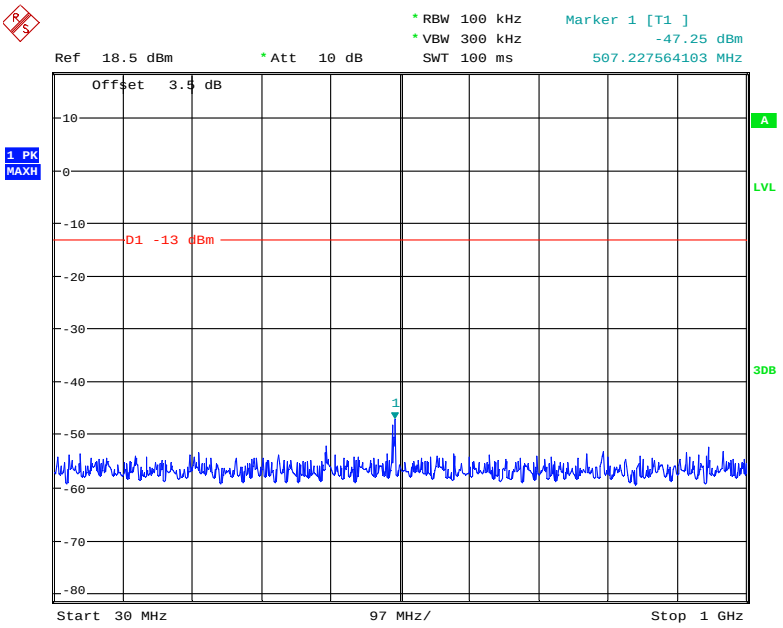
Date: 21.JUN.2018 00:42:00

2 GHz – 20 GHz (GSM Mode)



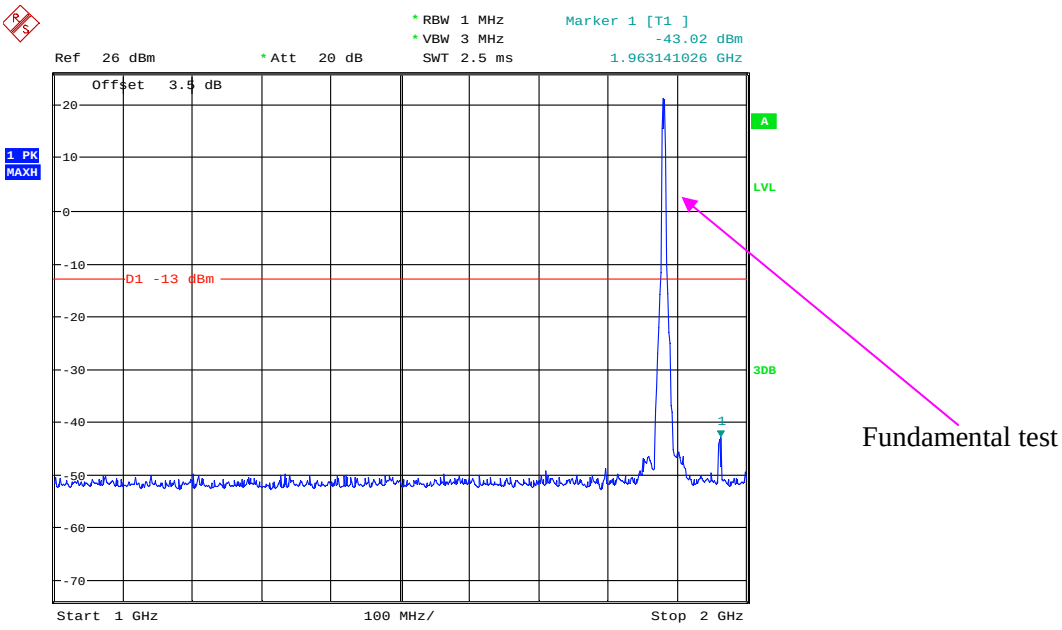
Date: 21.JUN.2018 00:42:46

30 MHz – 1 GHz (WCDMA Mode)



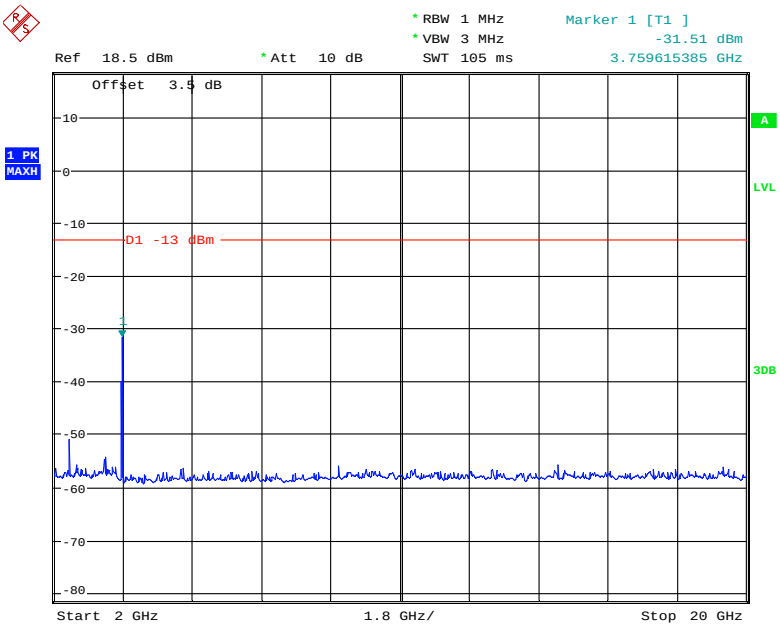
Date: 21.JUN.2018 01:25:02

1 GHz – 2 GHz (WCDMA Mode)



Date: 21.JUN.2018 01:26:48

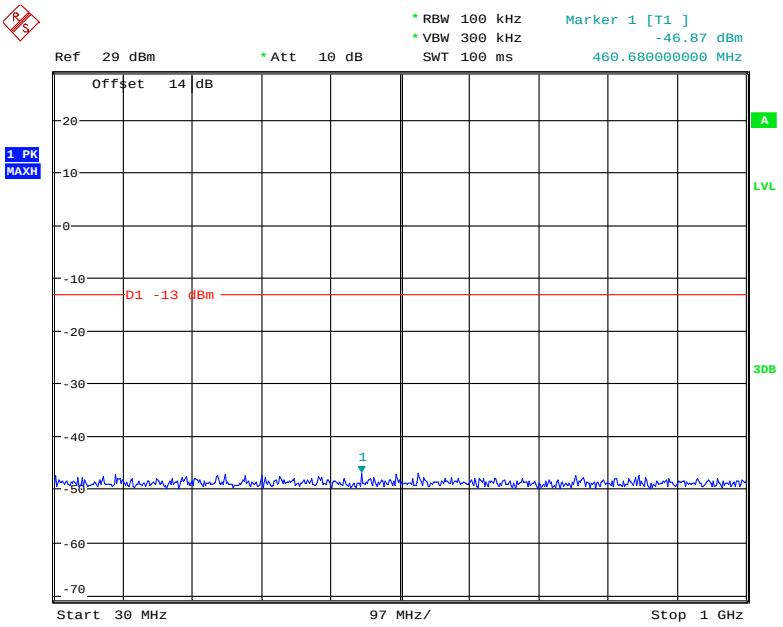
2 GHz – 20 GHz (WCDMA Mode)



Date: 21.JUN.2018 01:26:00

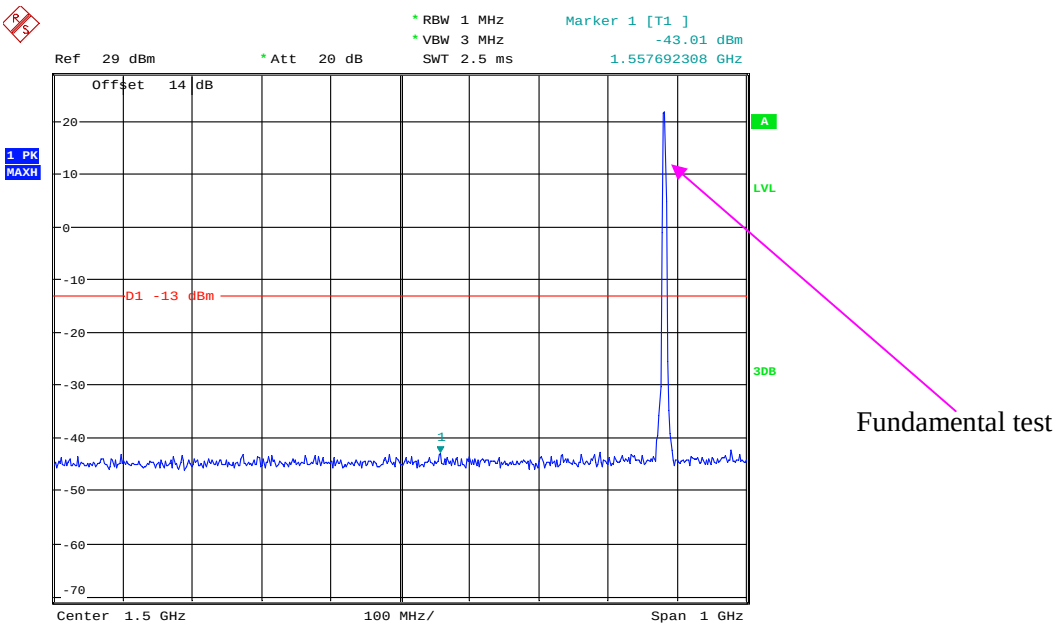
LTE Band 2: (QPSK)

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



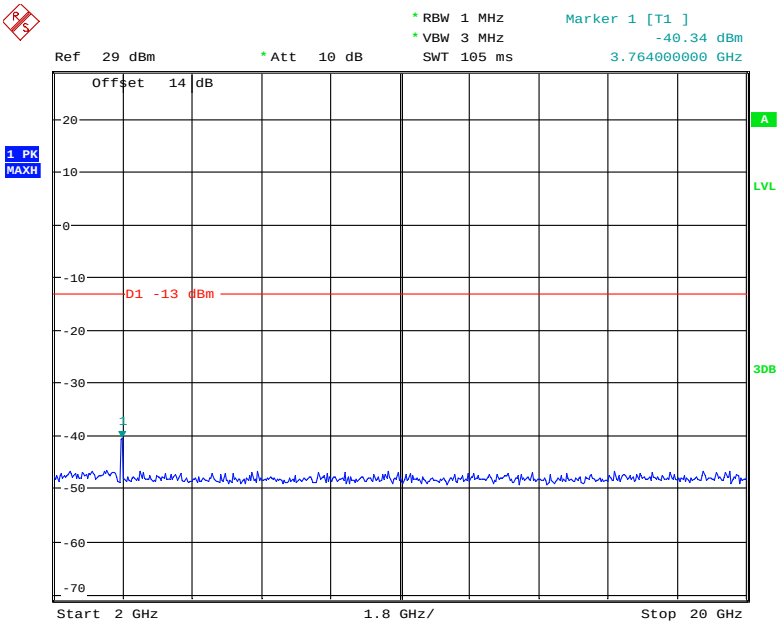
Date: 28.JUN.2018 15:54:22

1 GHz – 2 GHz (1.4 MHz, Middle Channel)



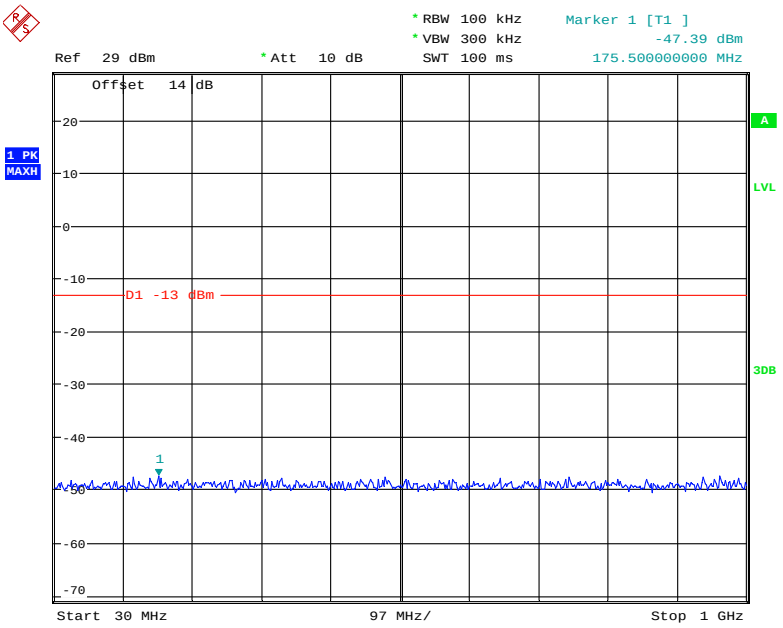
Date: 28.JUN.2018 16:29:38

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



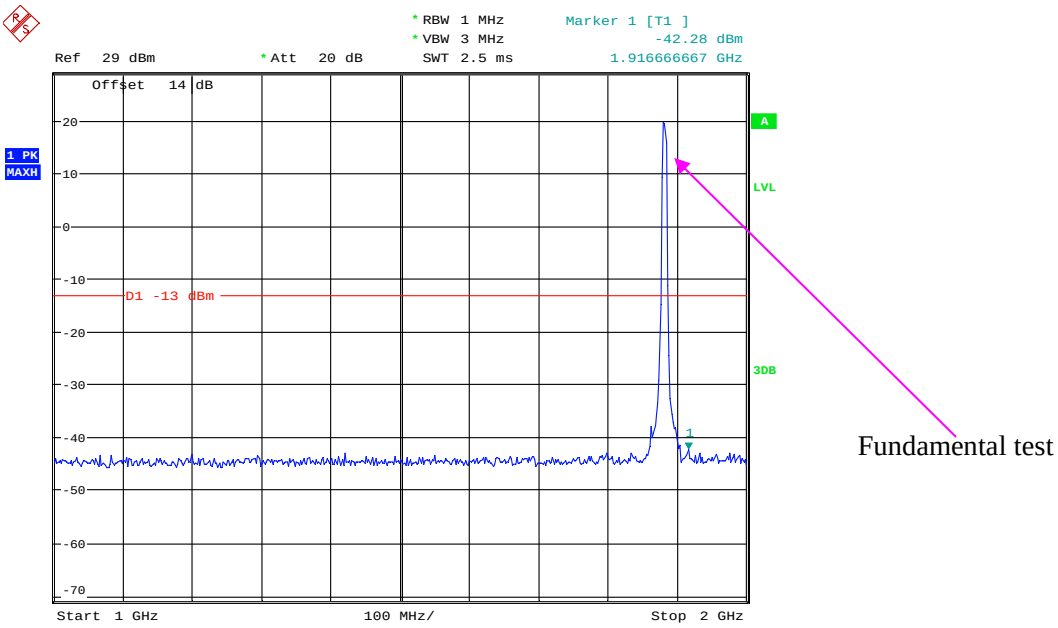
Date: 28.JUN.2018 16:41:29

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



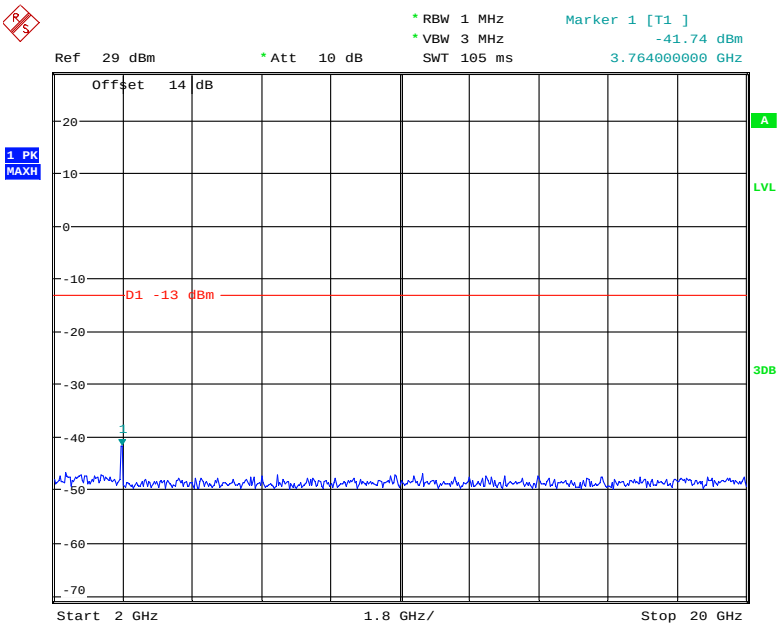
Date: 28.JUN.2018 16:43:07

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



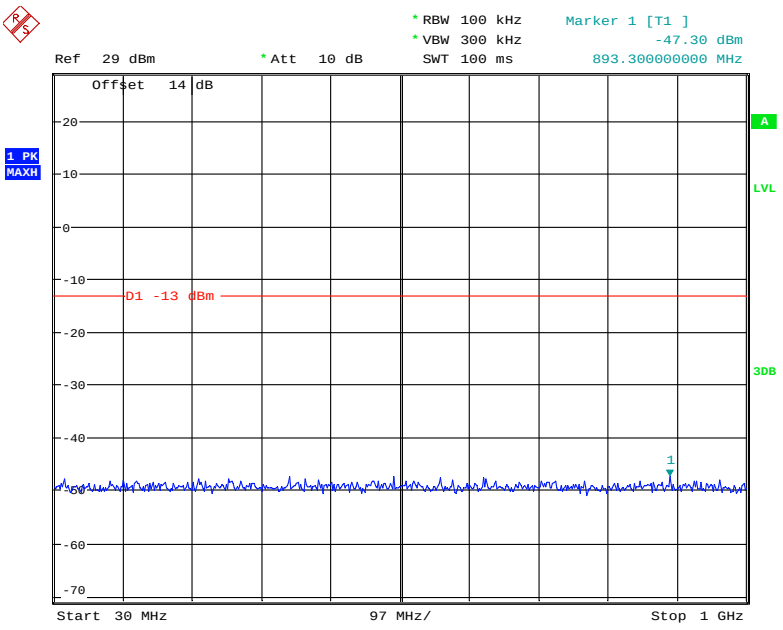
Date: 28.JUN.2018 16:42:36

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



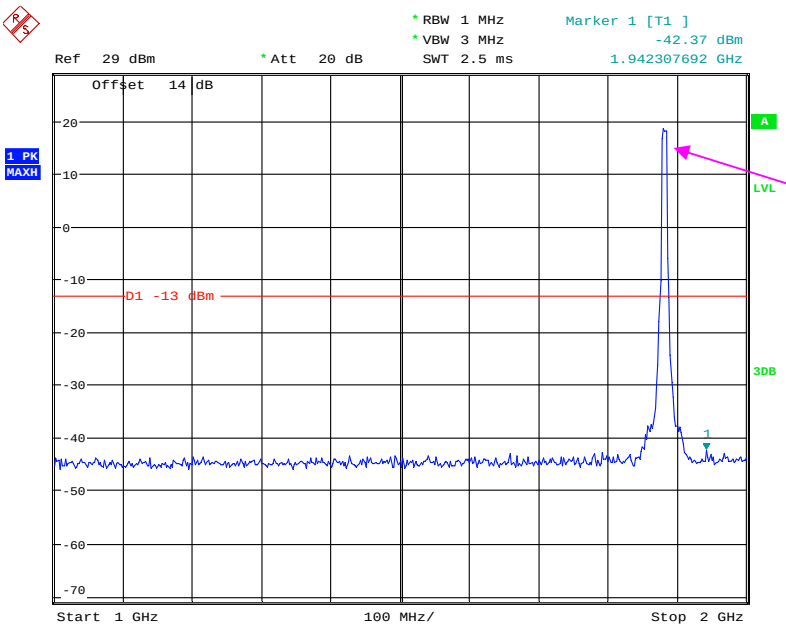
Date: 28.JUN.2018 16:41:45

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



Date: 28.JUN.2018 16:43:29

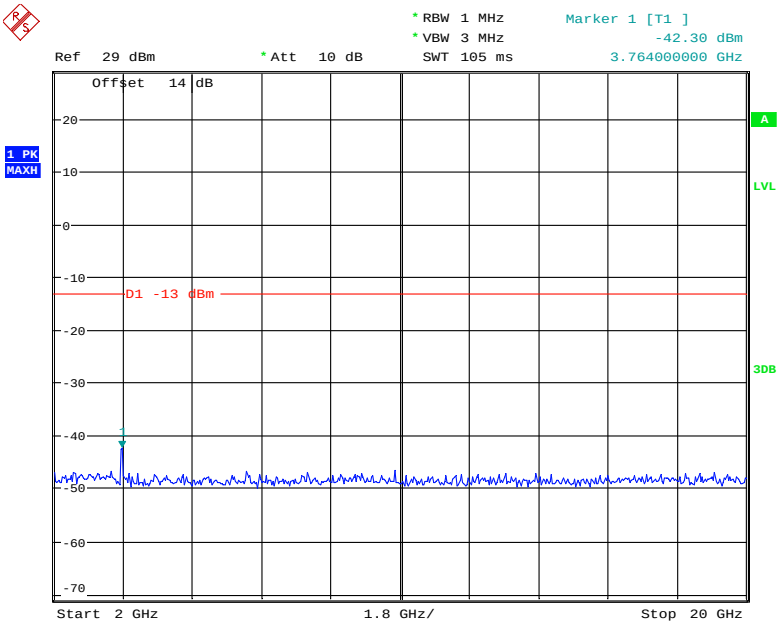
1 GHz – 2 GHz (5.0 MHz, Middle Channel)



Fundamental test

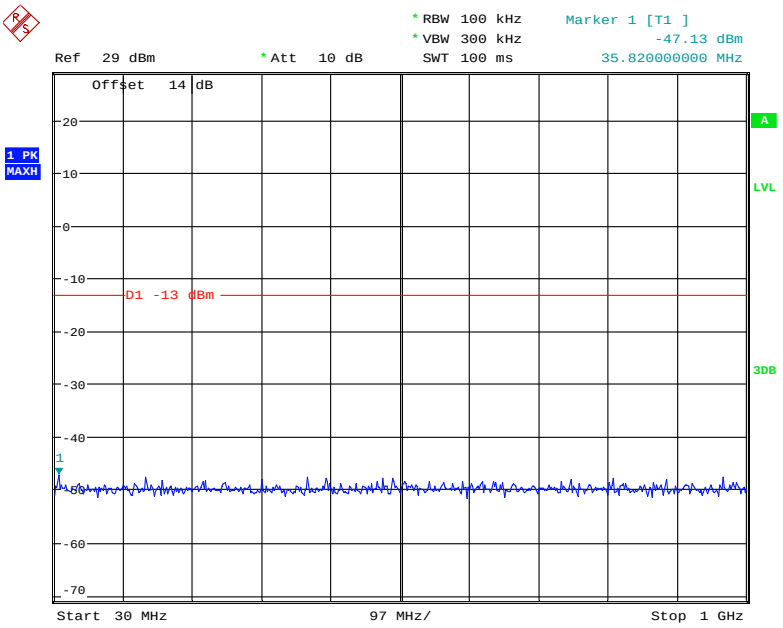
Date: 28.JUN.2018 16:44:09

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



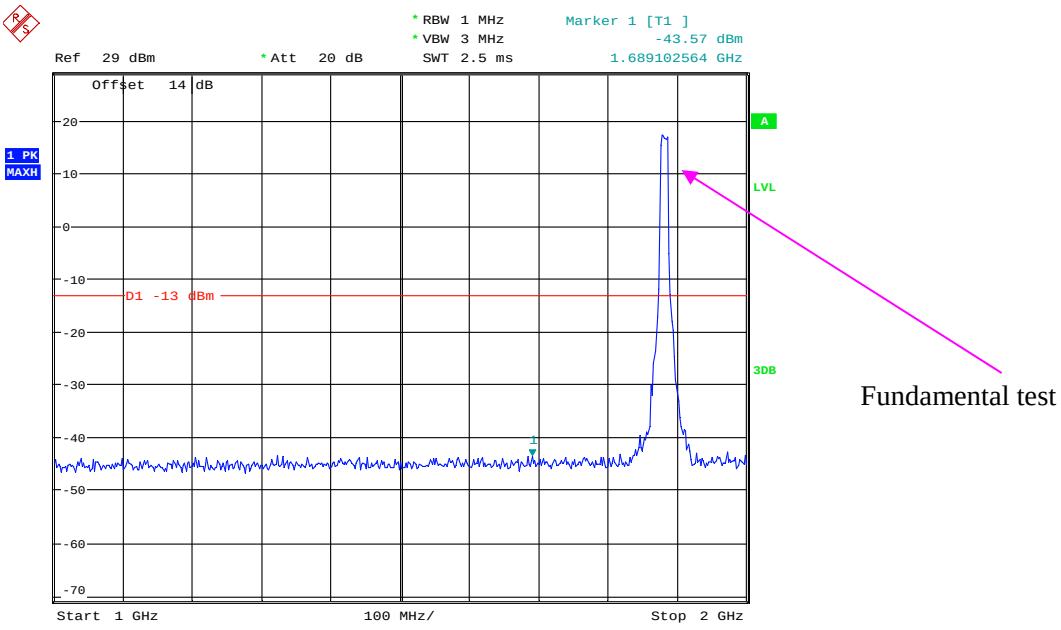
Date: 28.JUN.2018 16:44:41

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



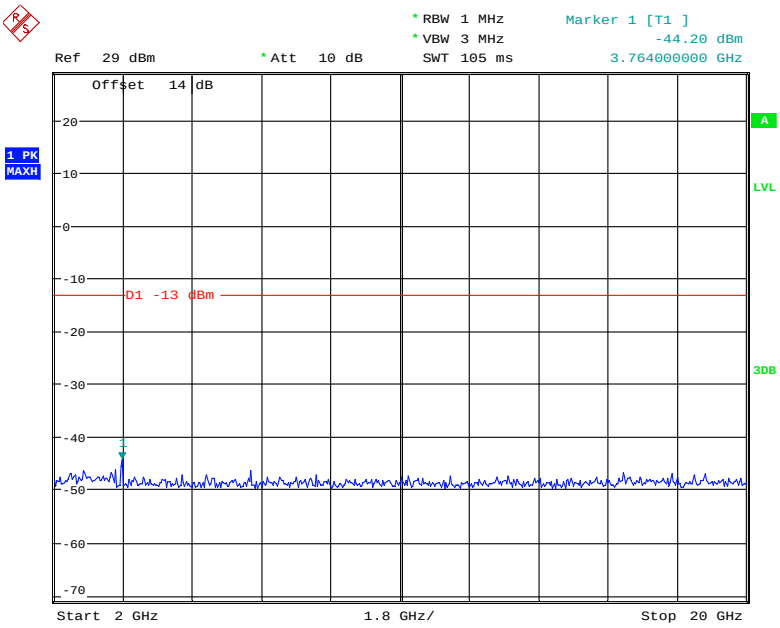
Date: 28.JUN.2018 16:47:24

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



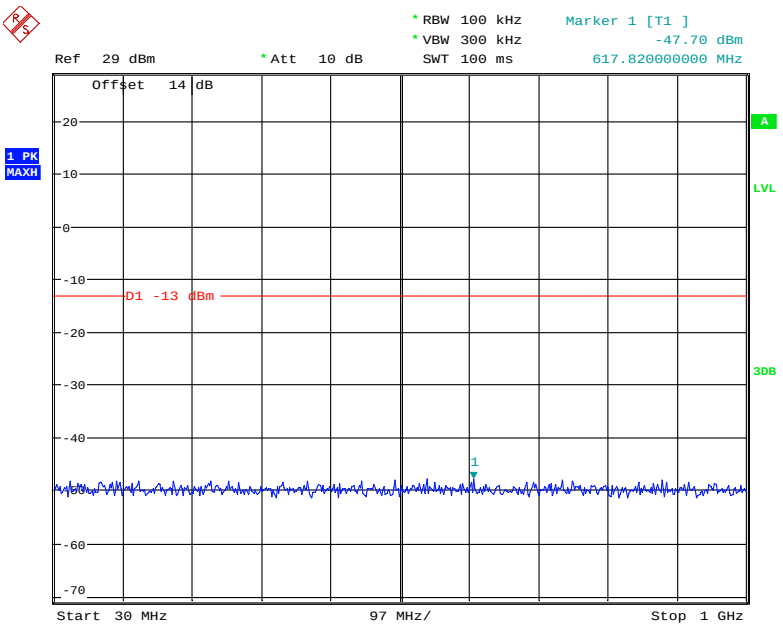
Date: 28.JUN.2018 16:47:03

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



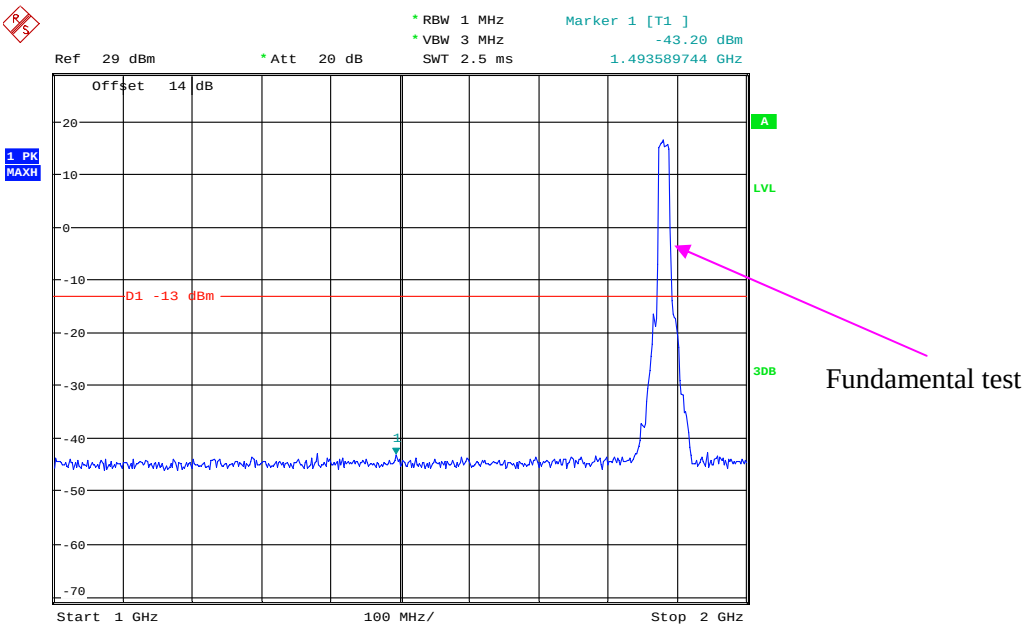
Date: 28.JUN.2018 16:46:06

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



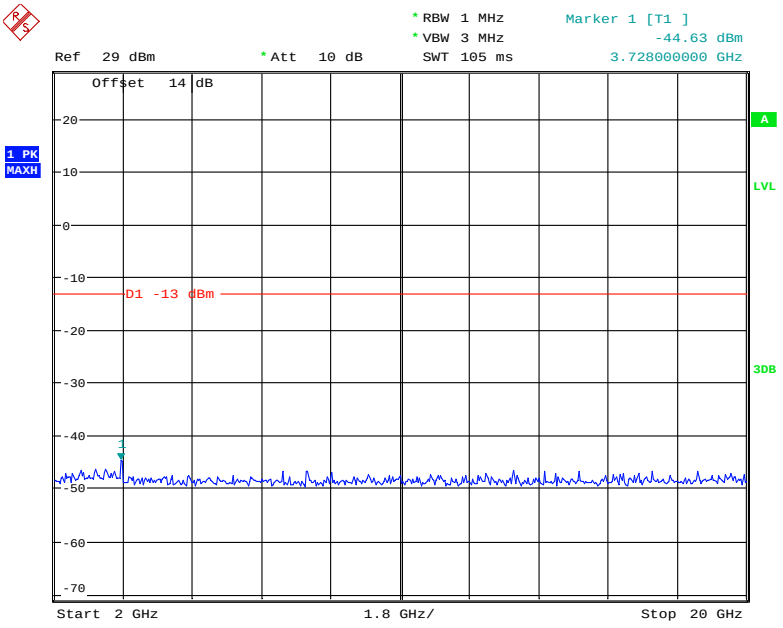
Date: 28.JUN.2018 16:47:53

1 GHz – 2 GHz (15.0 MHz, Middle Channel)



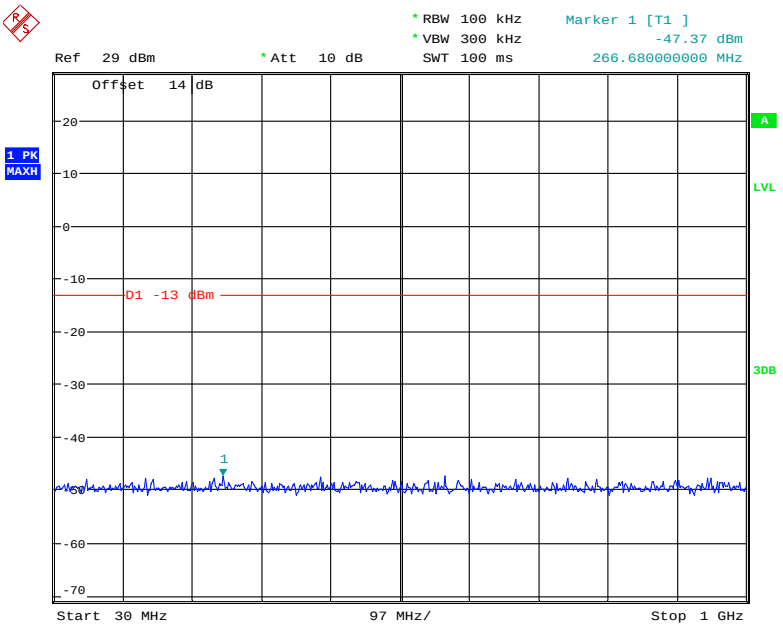
Date: 28.JUN.2018 16:50:25

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



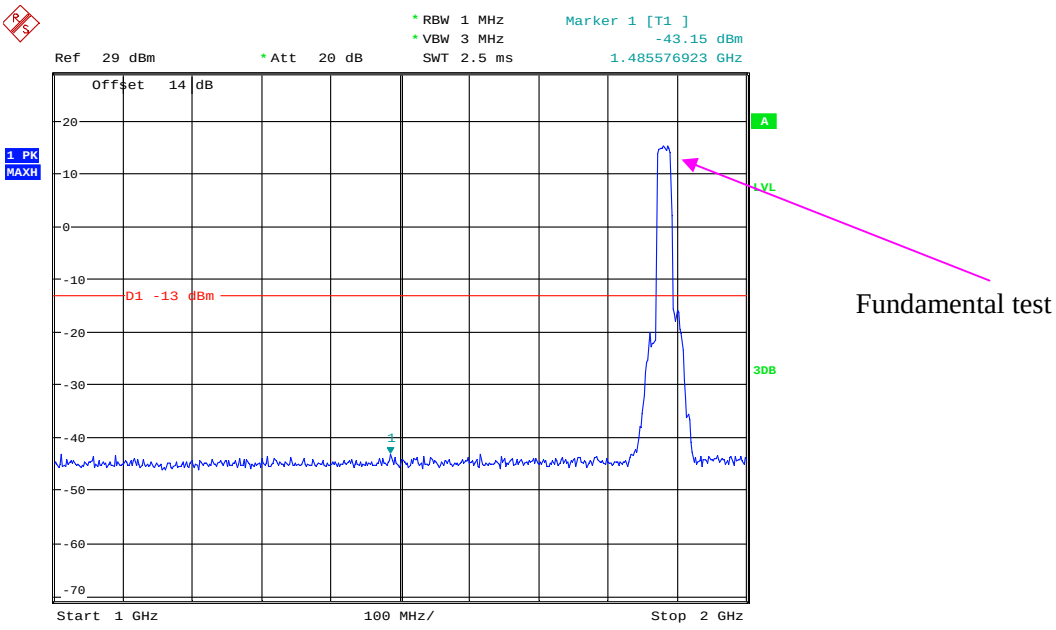
Date: 28.JUN.2018 16:50:51

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



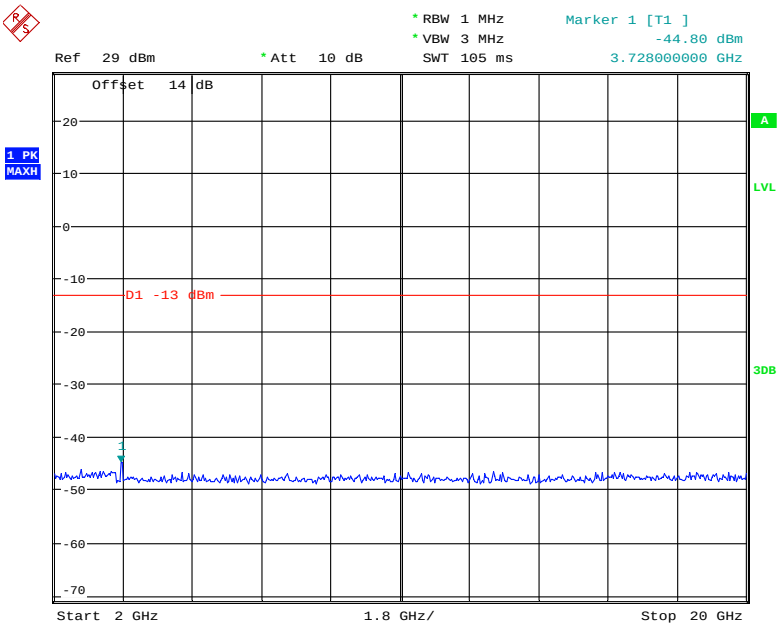
Date: 28.JUN.2018 16:52:11

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



Date: 28.JUN.2018 16:51:47

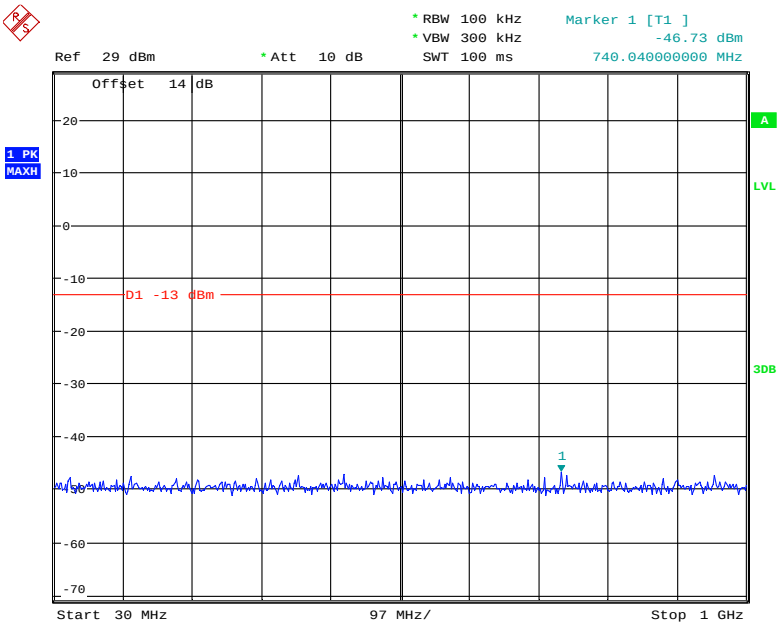
2 GHz – 20 GHz (20.0 MHz, Middle Channel)



Date: 28.JUN.2018 16:51:18

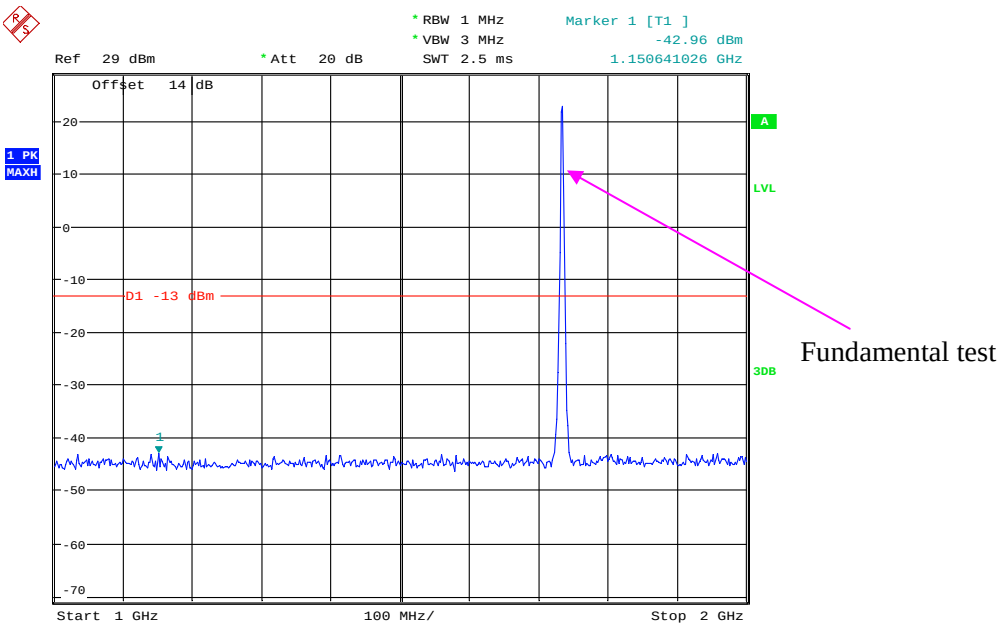
LTE Band 4: (QPSK)

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



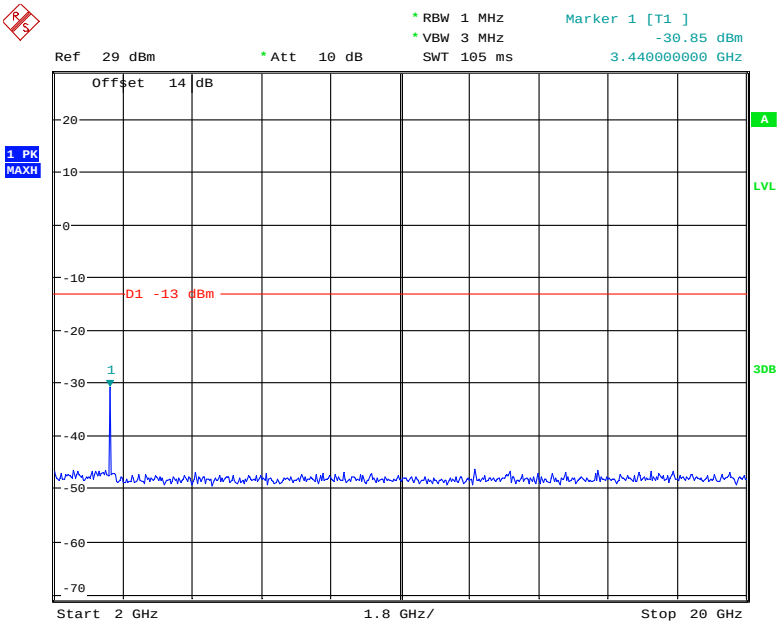
Date: 28.JUN.2018 16:59:00

1 GHz – 2 GHz (1.4 MHz, Middle Channel)



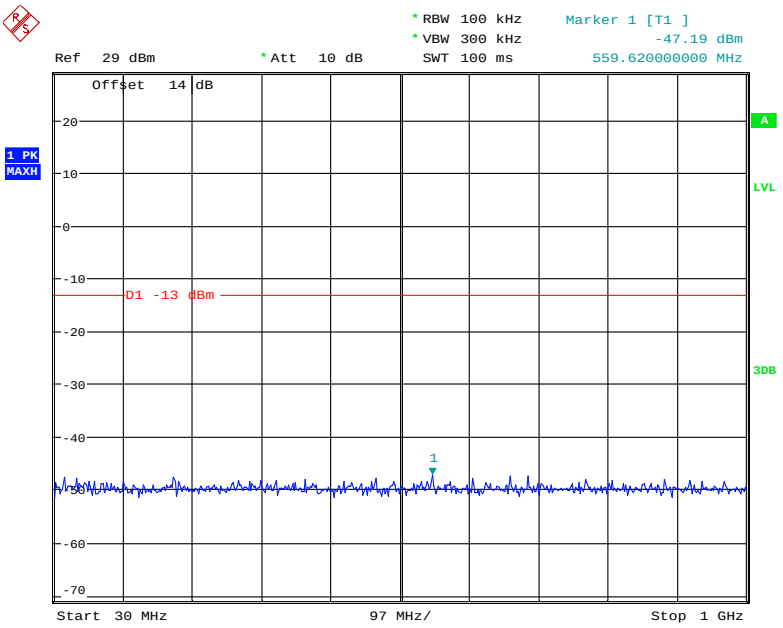
Date: 28.JUN.2018 17:01:09

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



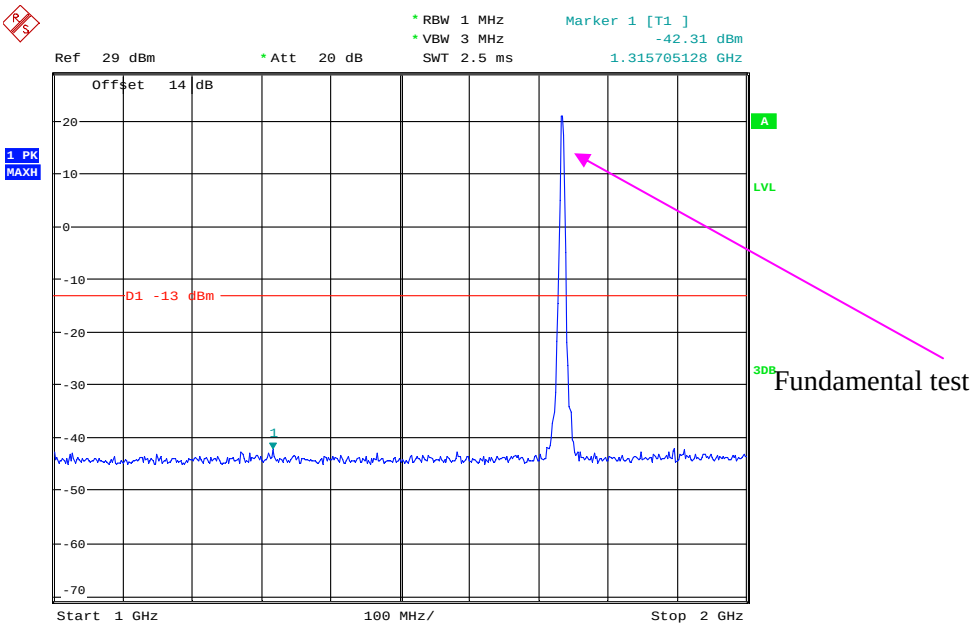
Date: 28.JUN.2018 17:01:43

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



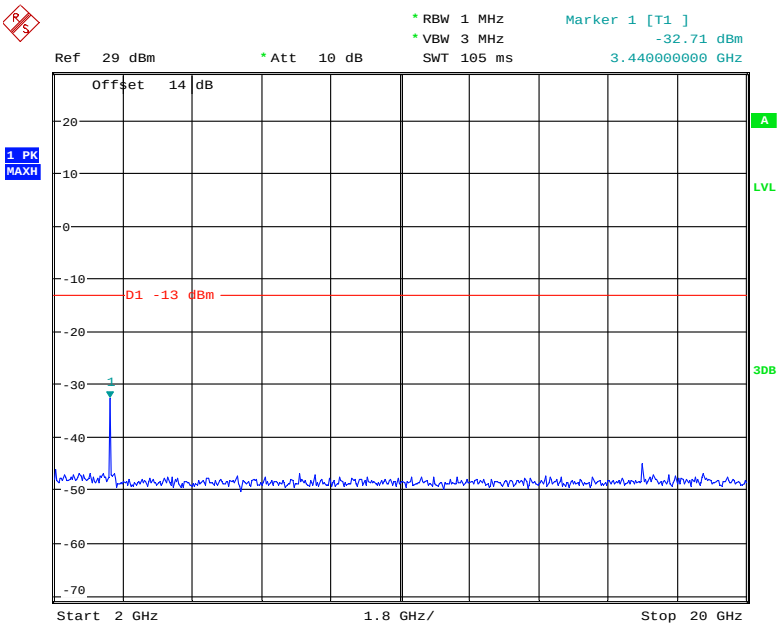
Date: 28.JUN.2018 17:05:18

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



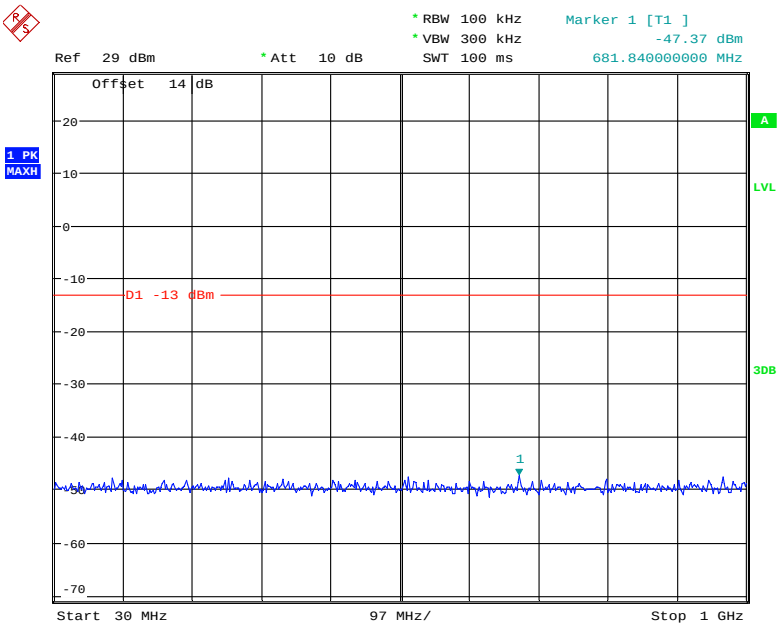
Date: 28.JUN.2018 17:04:51

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



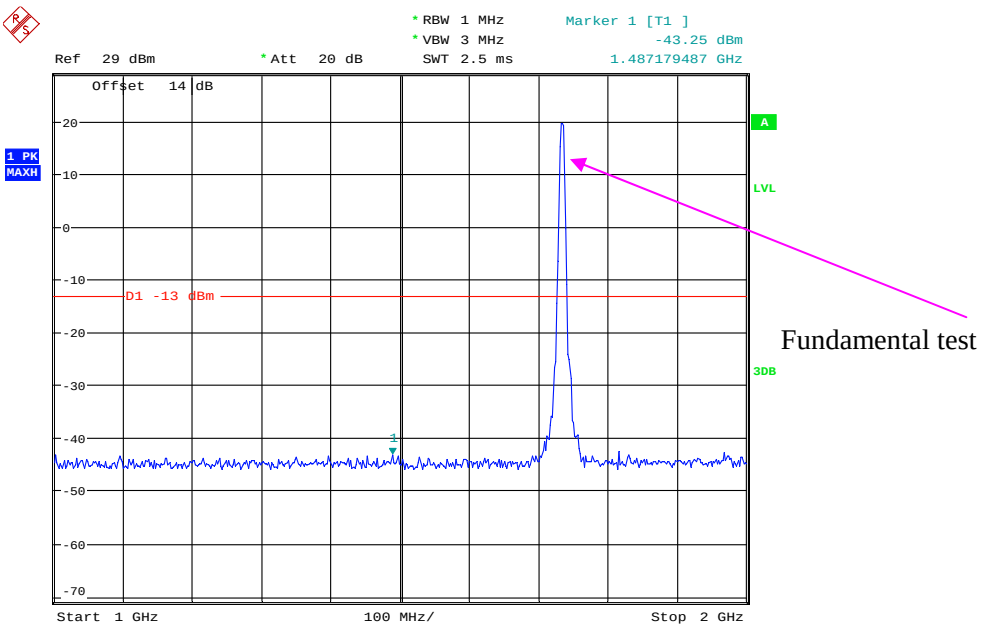
Date: 28.JUN.2018 17:03:18

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



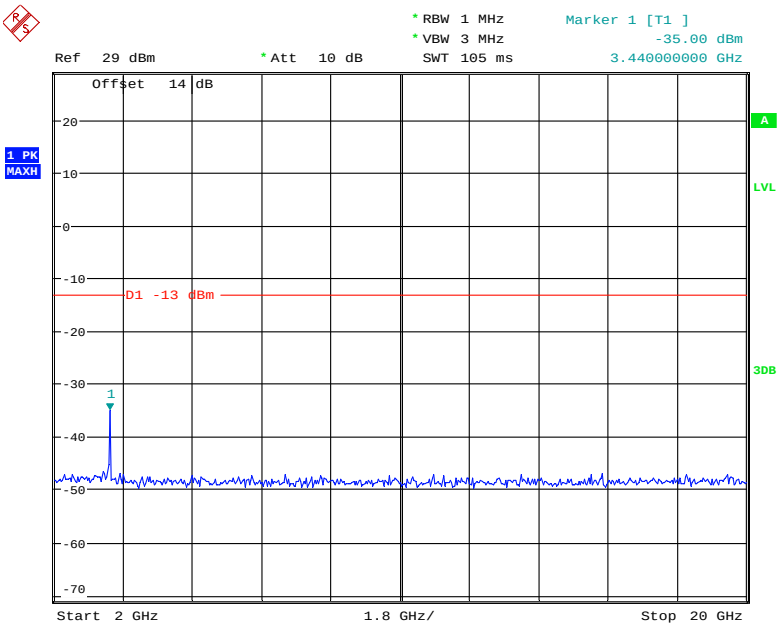
Date: 28.JUN.2018 17:05:39

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



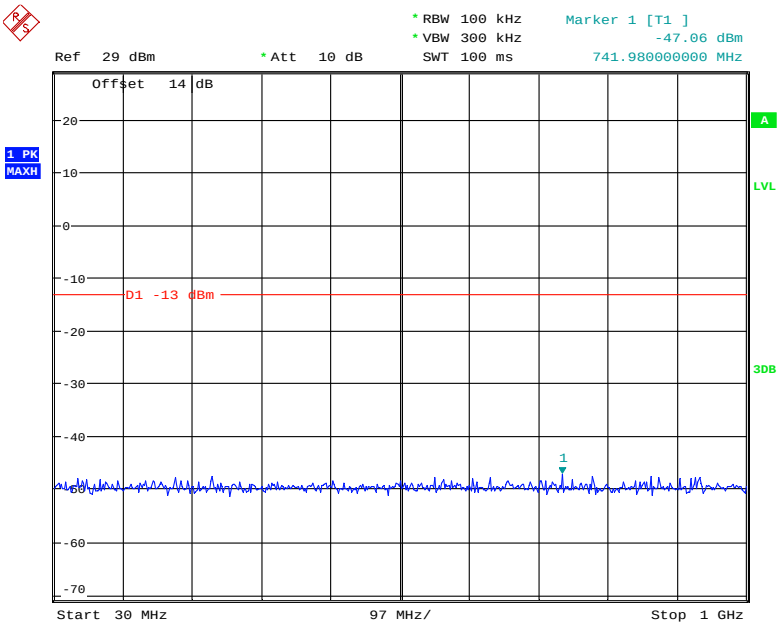
Date: 28.JUN.2018 17:06:15

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



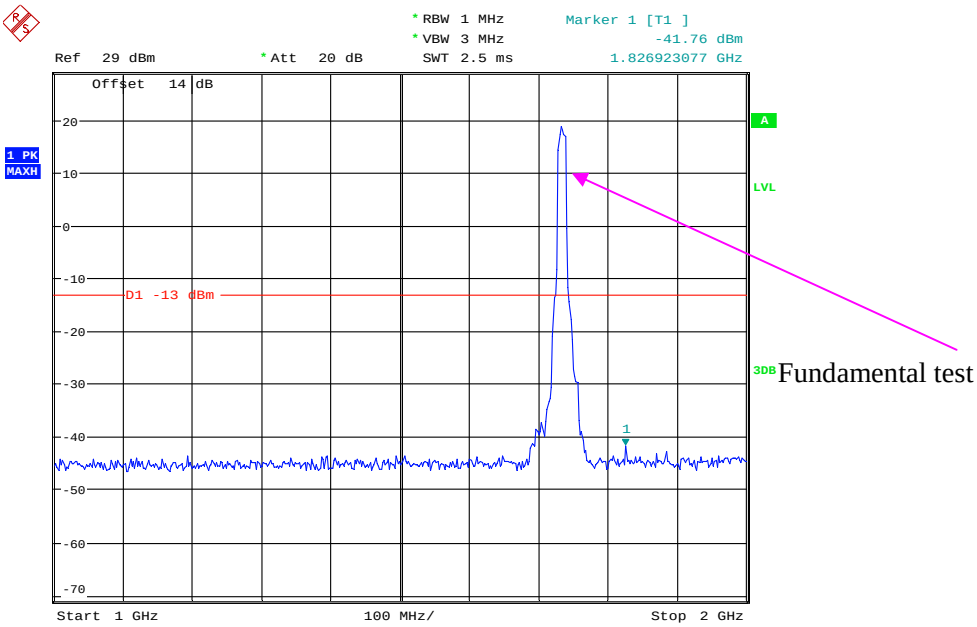
Date: 28.JUN.2018 17:06:34

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



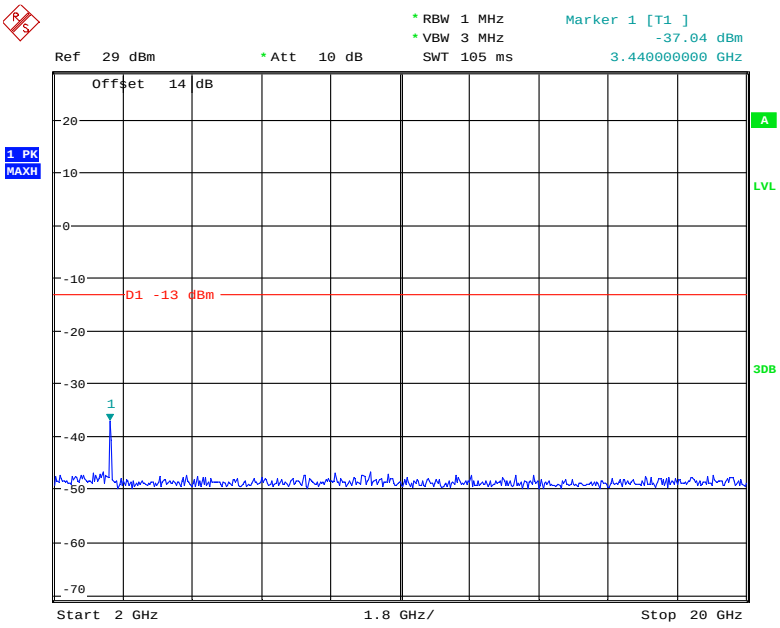
Date: 28.JUN.2018 17:07:42

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



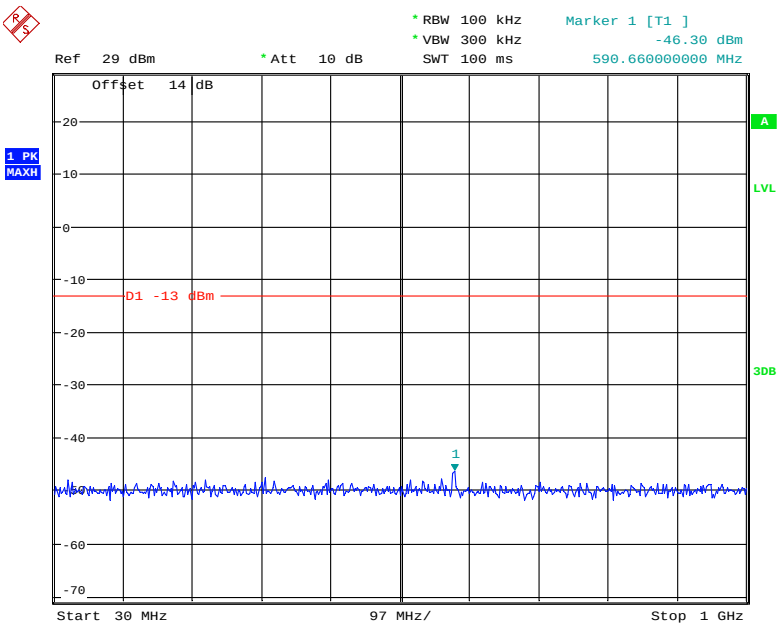
Date: 28.JUN.2018 17:07:19

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



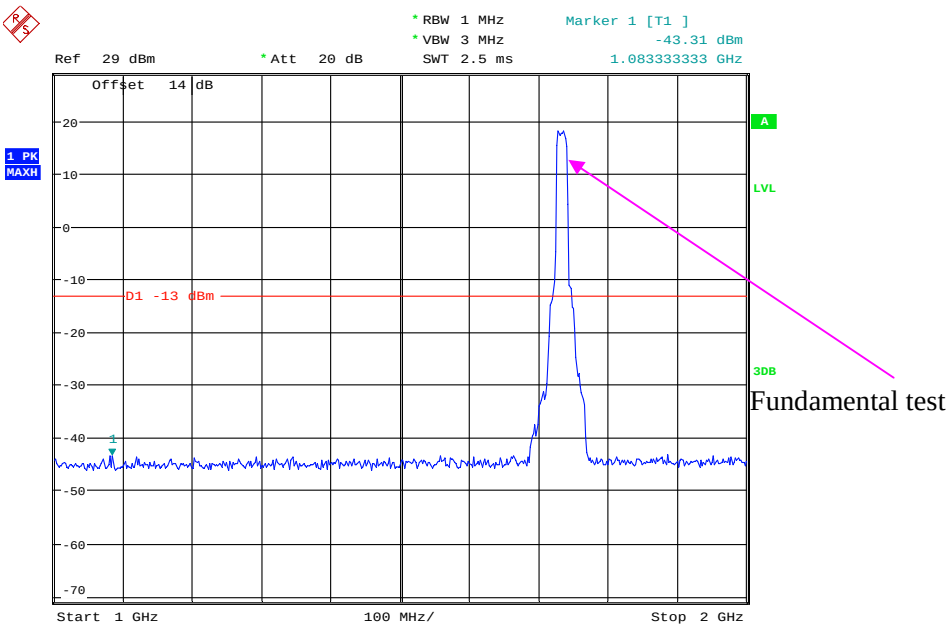
Date: 28.JUN.2018 17:06:48

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



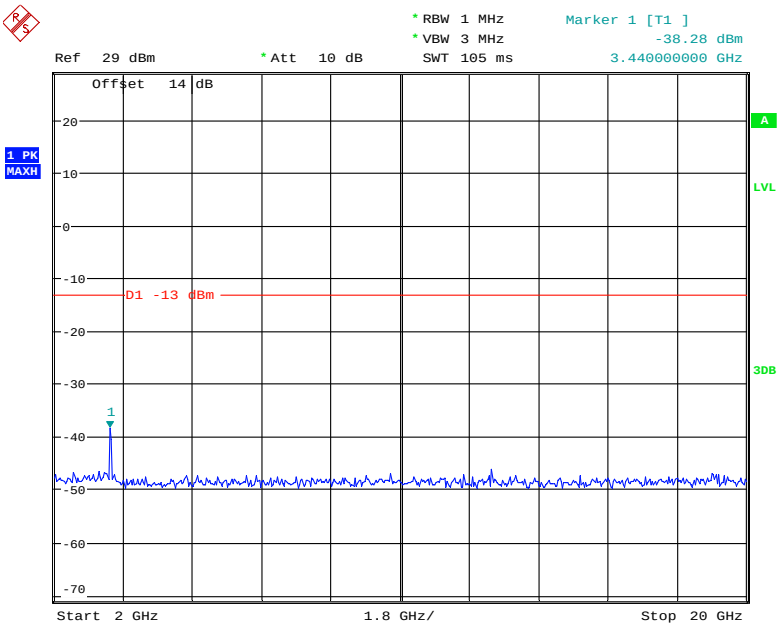
Date: 28.JUN.2018 17:07:57

1 GHz – 2 GHz (15.0 MHz, Middle Channel)



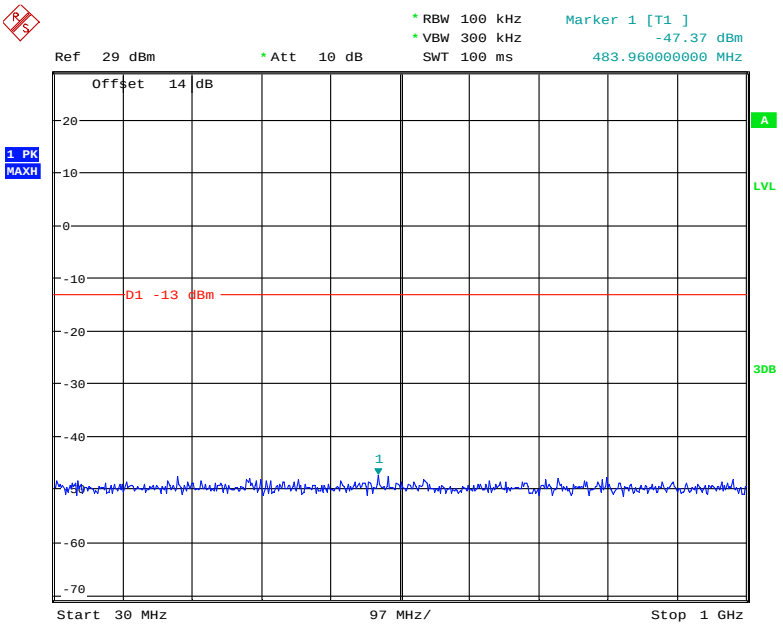
Date: 28.JUN.2018 17:08:27

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



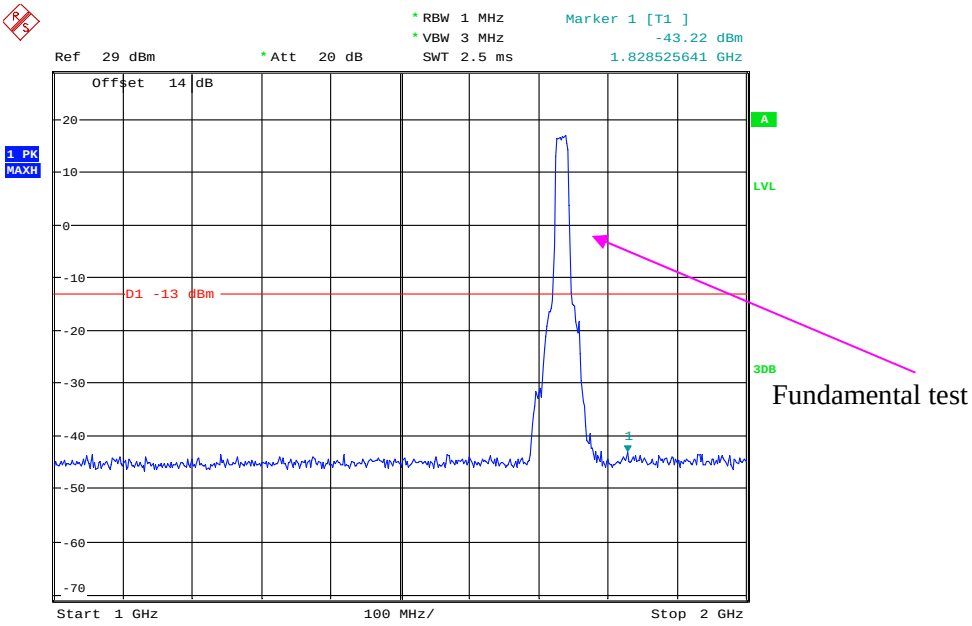
Date: 28.JUN.2018 17:08:48

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



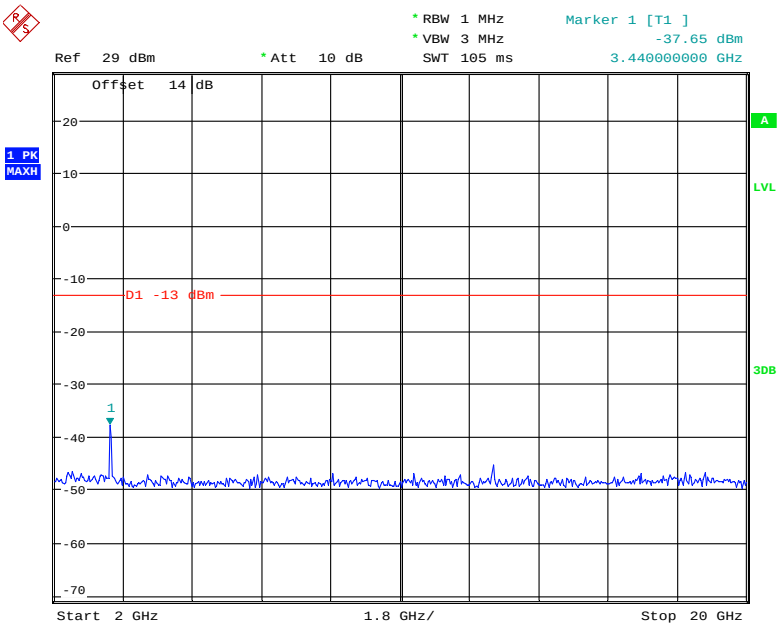
Date: 28.JUN.2018 17:09:47

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



Date: 28.JUN.2018 17:09:23

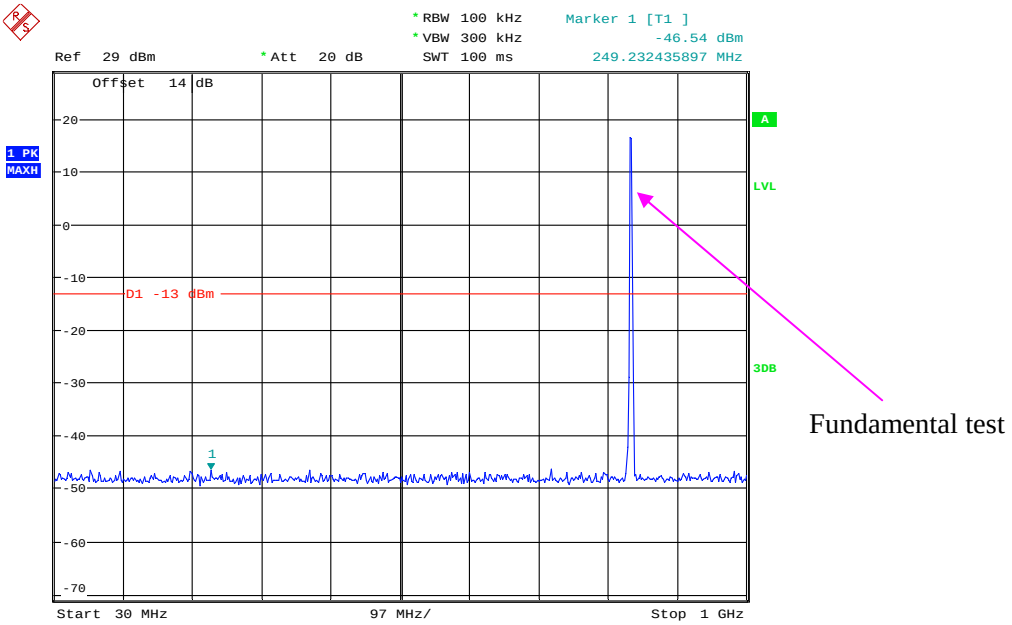
2 GHz – 20 GHz (20.0 MHz, Middle Channel)



Date: 28.JUN.2018 17:09:04

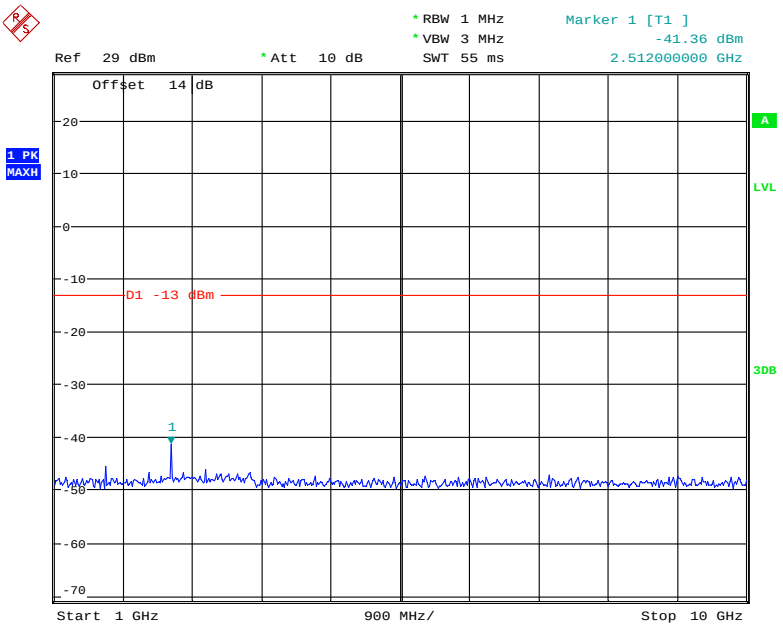
LTE Band 5:

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



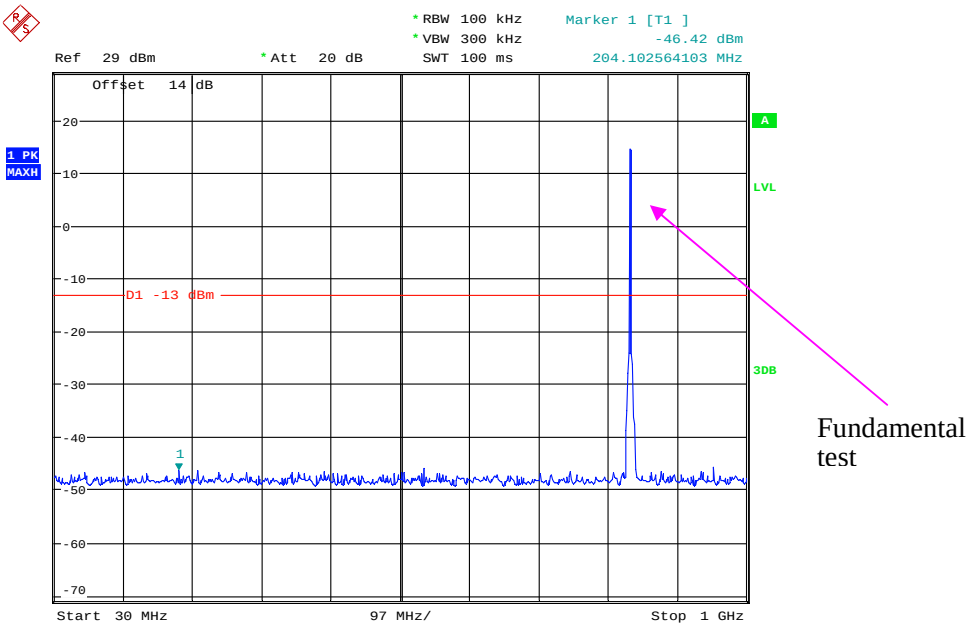
Date: 28.JUN.2018 17:12:23

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



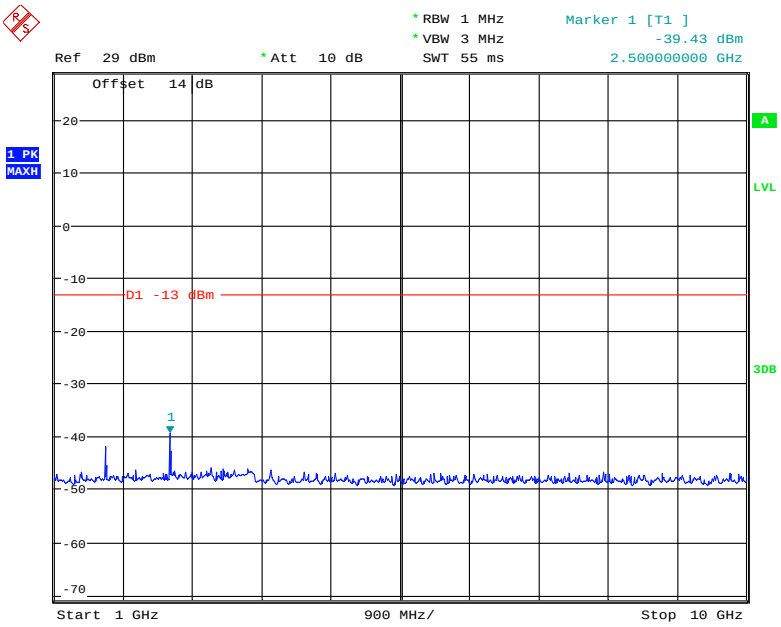
Date: 28.JUN.2018 17:13:54

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



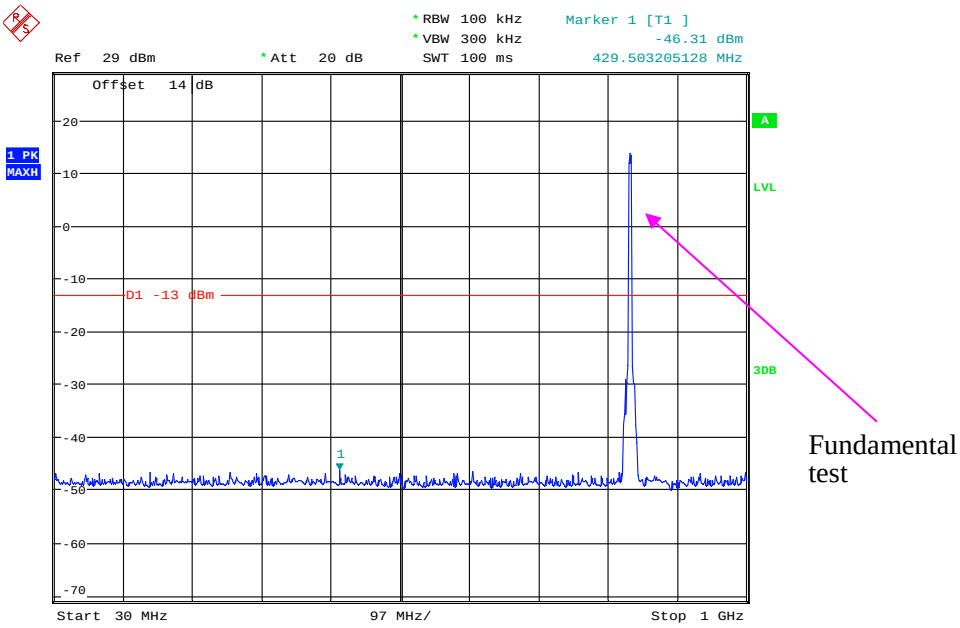
Date: 30.JUN.2018 09:56:43

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



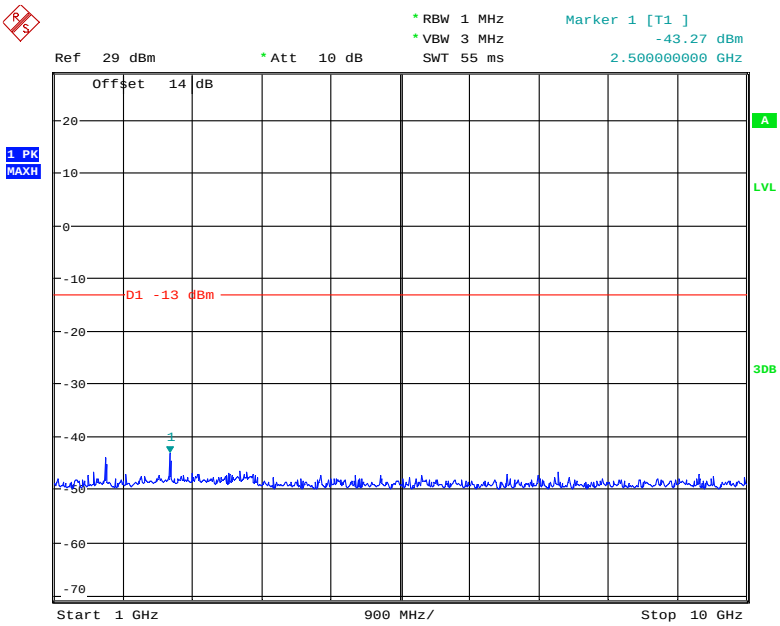
Date: 30.JUN.2018 09:58:33

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



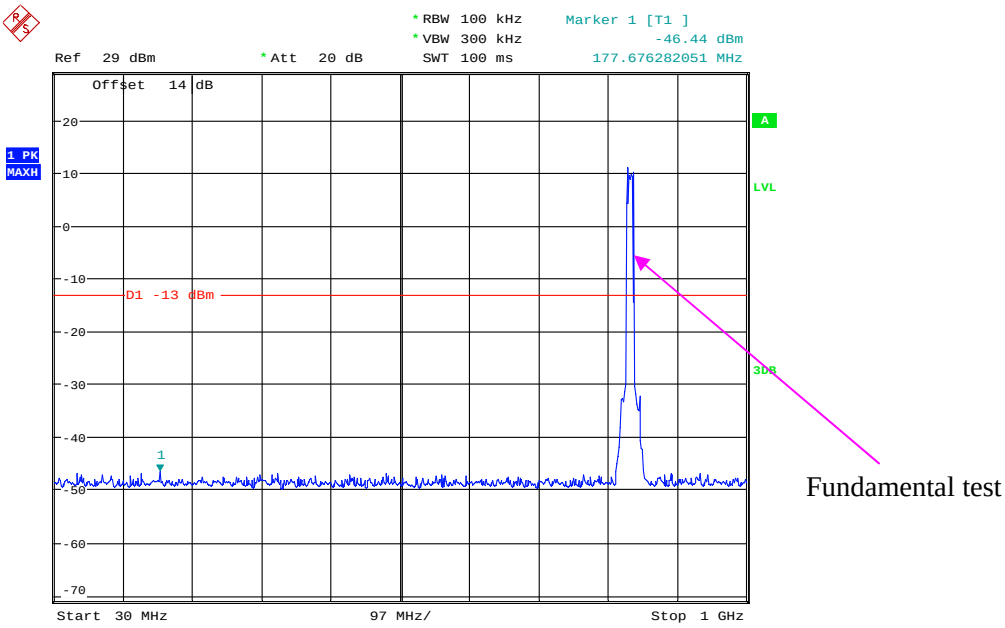
Date: 30.JUN.2018 09:59:48

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



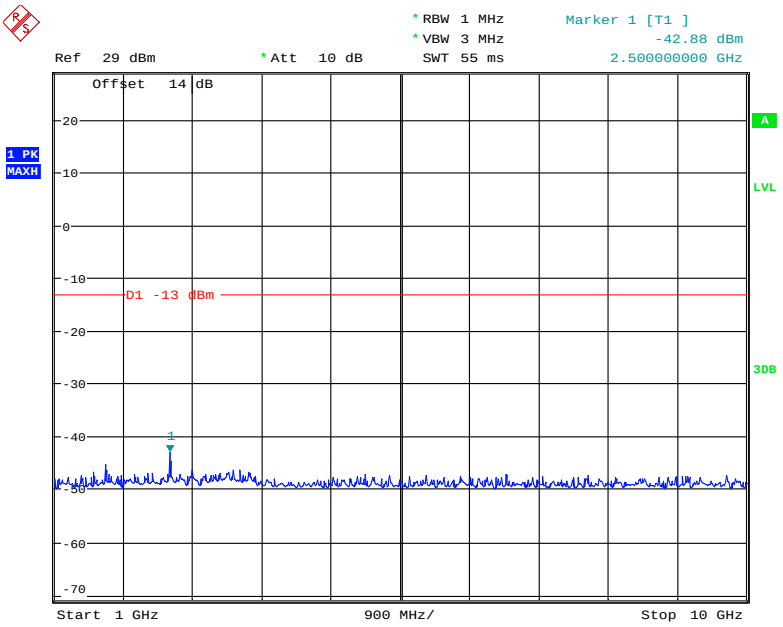
Date: 30.JUN.2018 09:59:07

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



Date: 30.JUN.2018 10:00:28

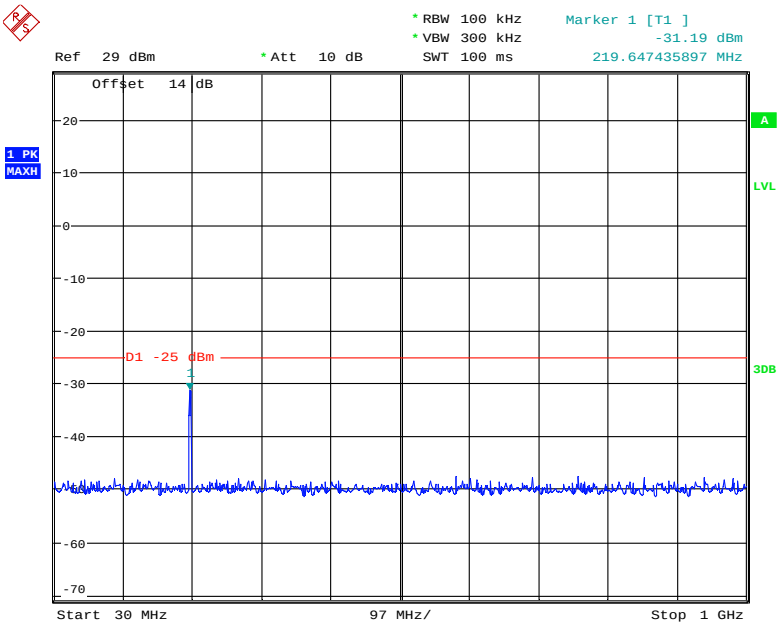
1 GHz – 10 GHz (10.0 MHz, Middle Channel)



Date: 30.JUN.2018 10:01:00

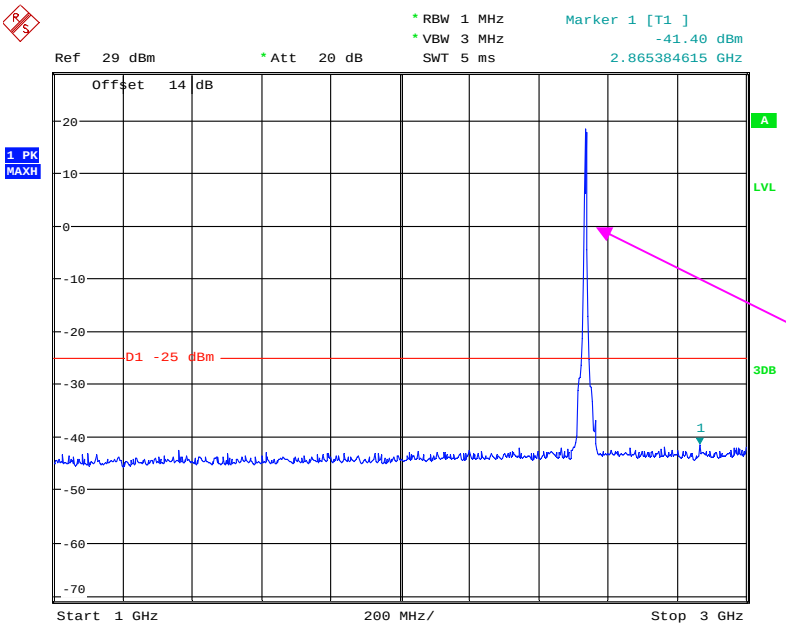
LTE Band 7: (QPSK)

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



Date: 30.JUN.2018 10:05:49

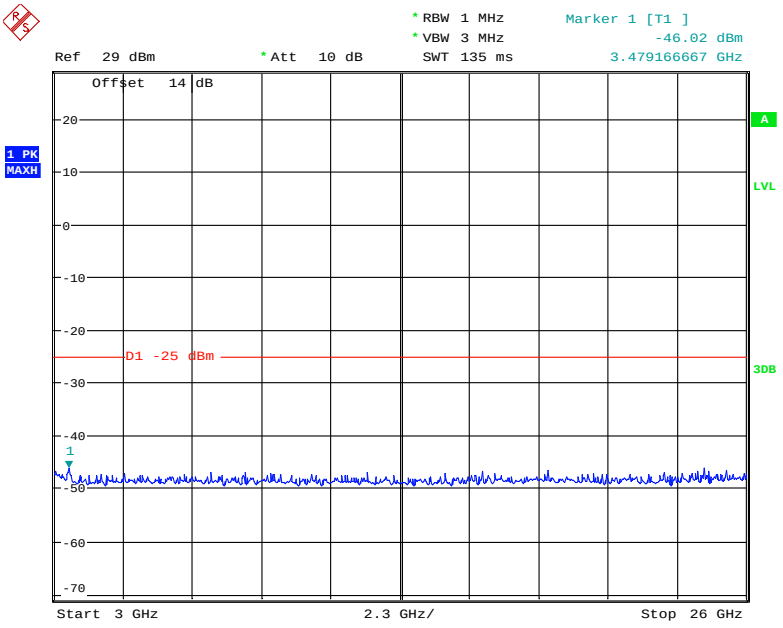
1 GHz – 3 GHz (5.0 MHz, Middle Channel)



Fundamental test

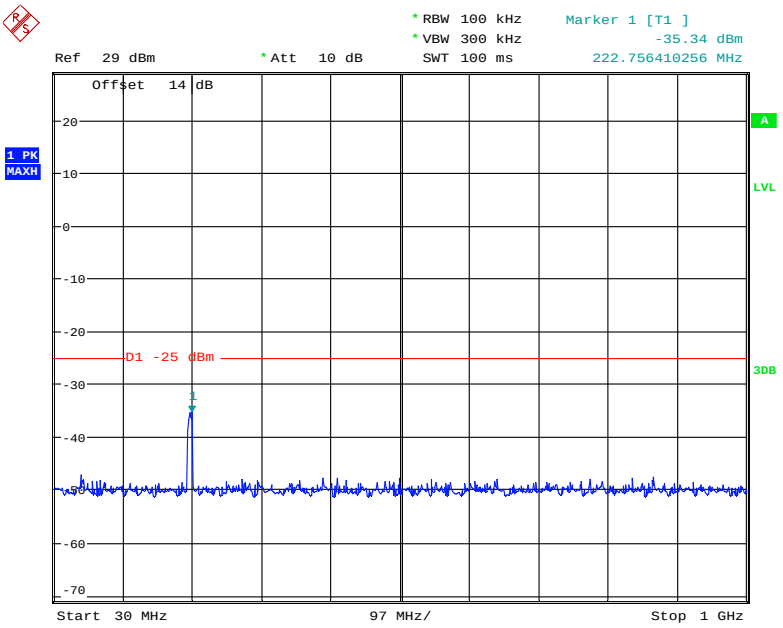
Date: 30.JUN.2018 10:07:00

3 GHz – 26 GHz (5.0 MHz, Middle Channel)



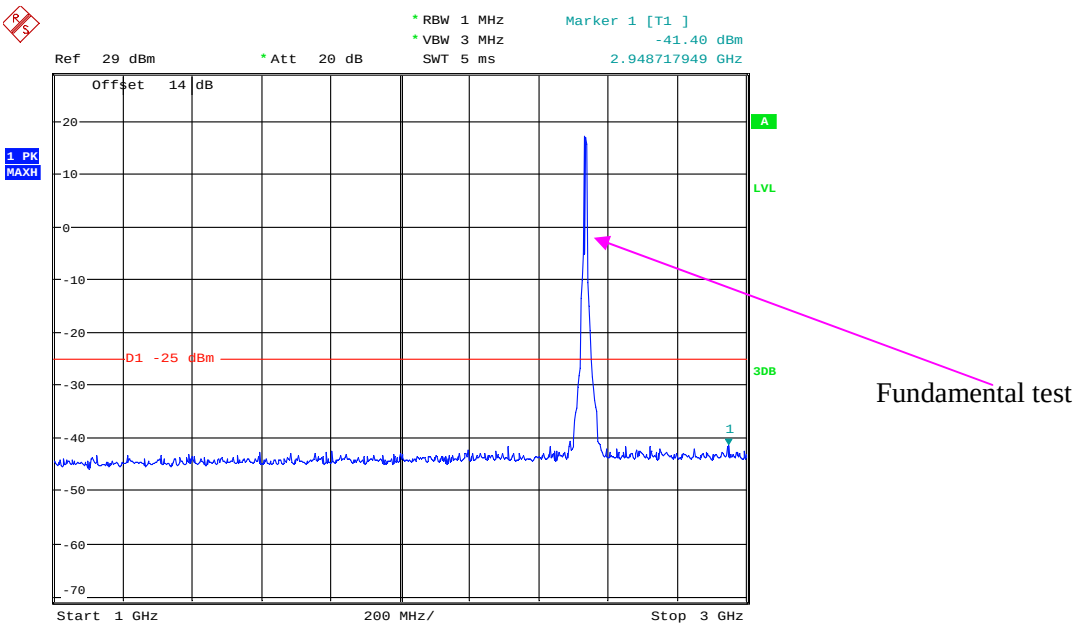
Date: 30.JUN.2018 10:08:00

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



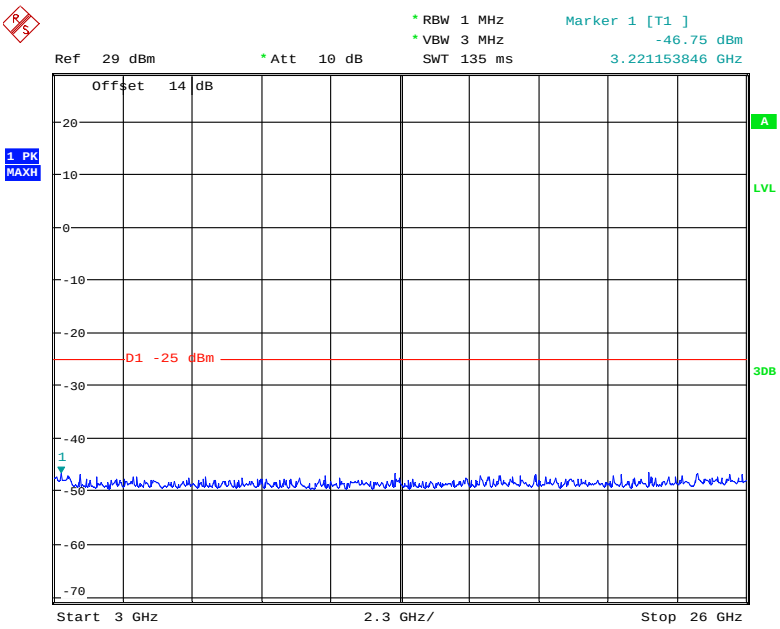
Date: 30.JUN.2018 10:09:25

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



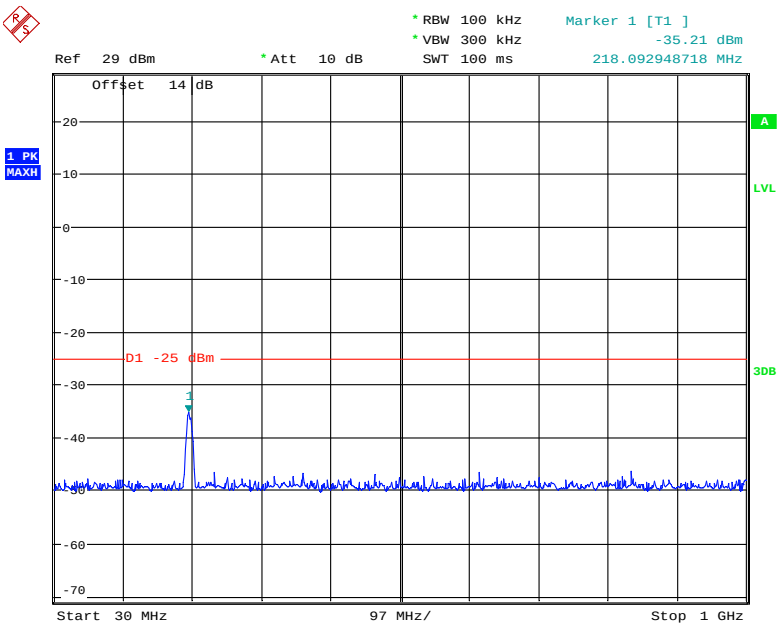
Date: 30.JUN.2018 10:09:00

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



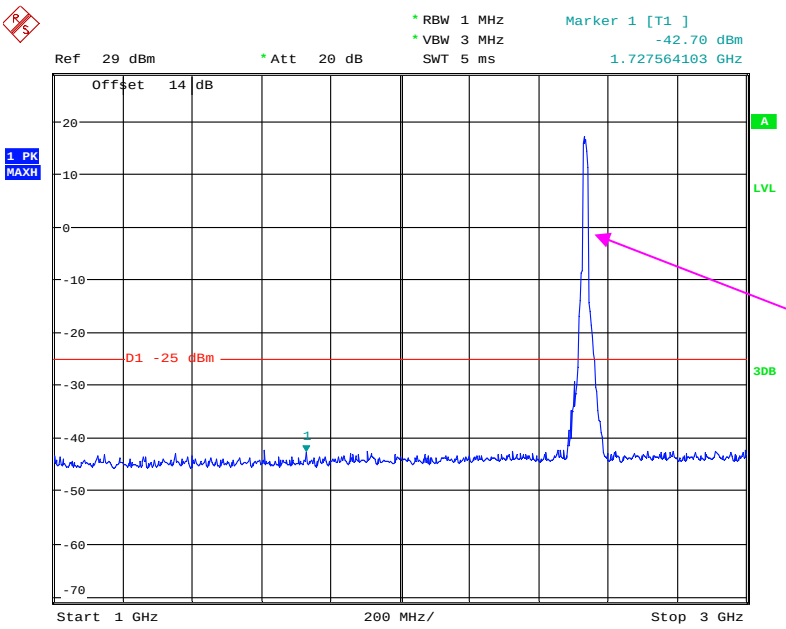
Date: 30.JUN.2018 10:08:22

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



Date: 30.JUN.2018 10:10:00

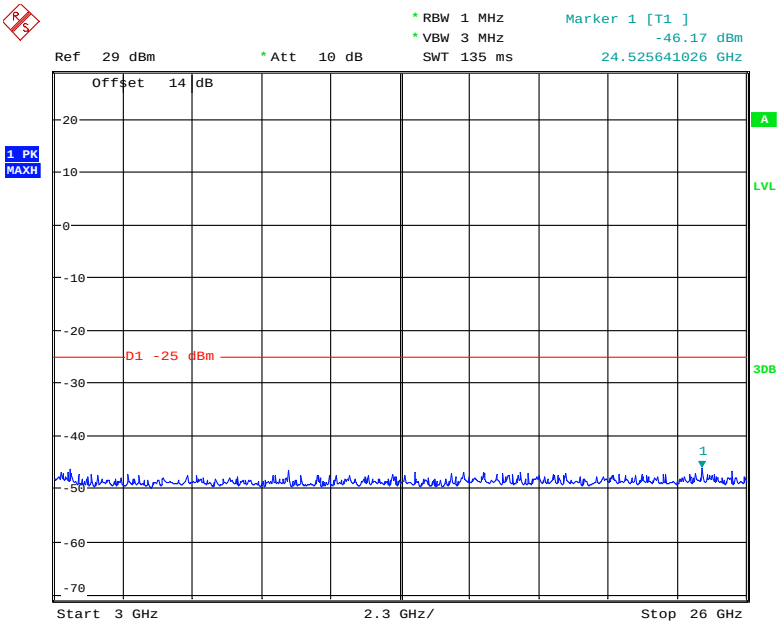
1 GHz – 3 GHz (15.0 MHz, Middle Channel)



Fundamental test

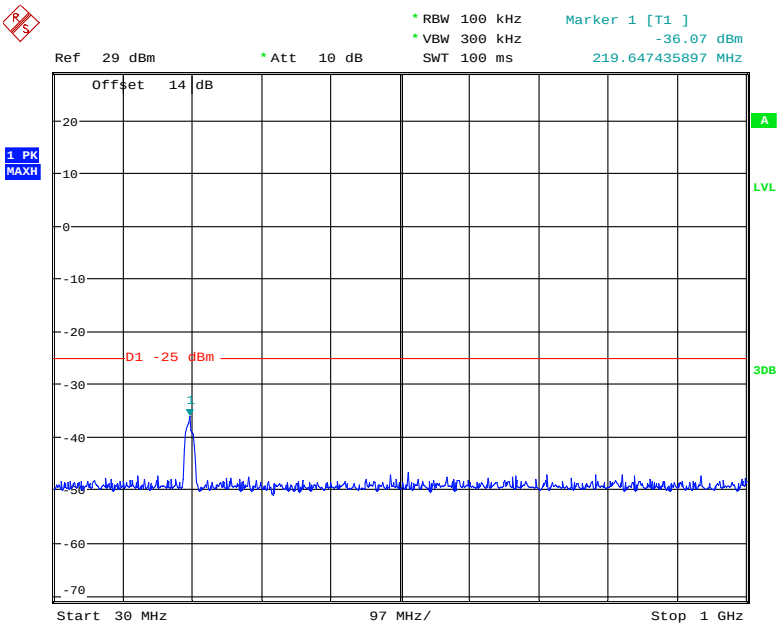
Date: 30.JUN.2018 10:10:31

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



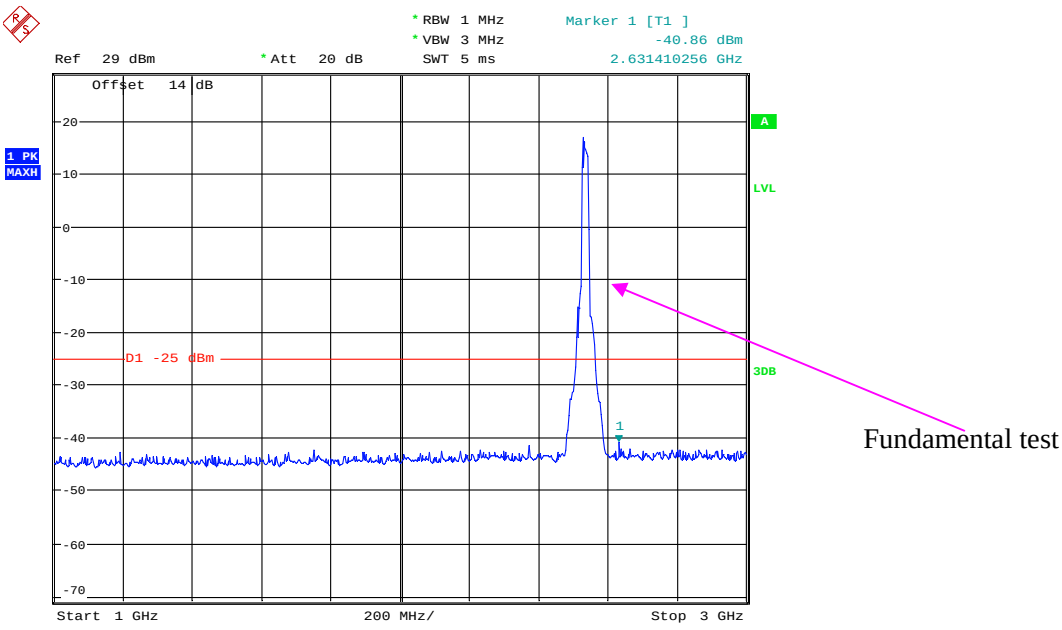
Date: 30.JUN.2018 10:10:51

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



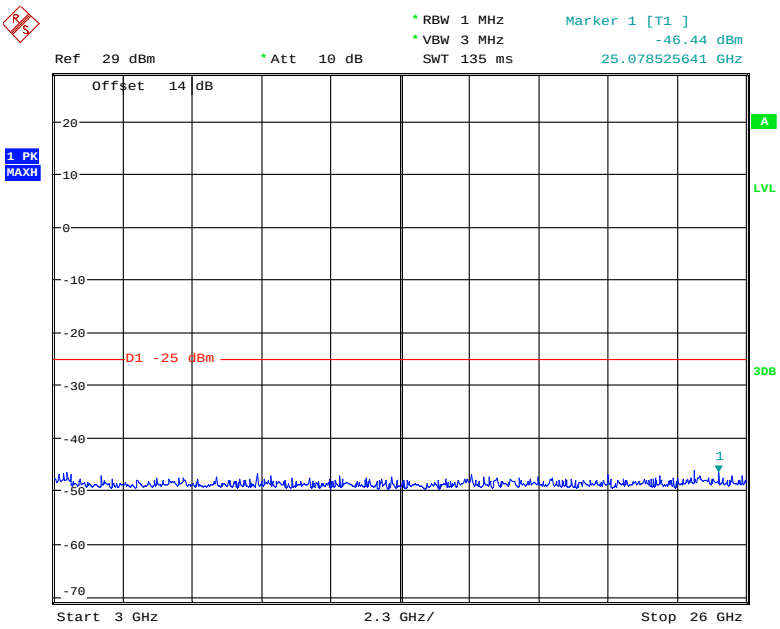
Date: 30.JUN.2018 10:12:27

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



Date: 30.JUN.2018 10:11:53

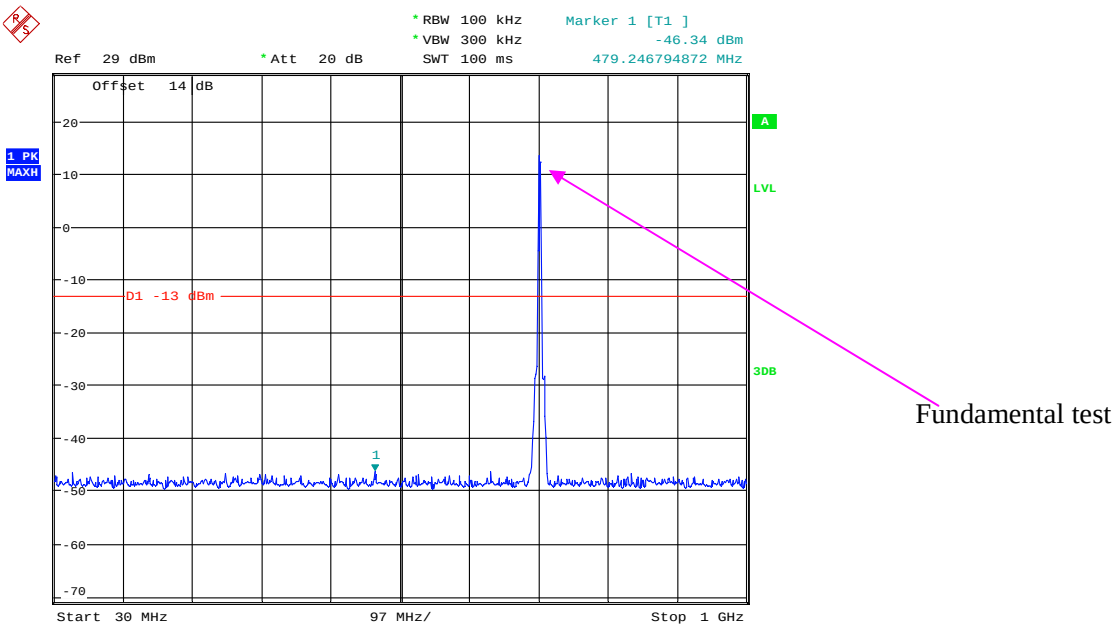
3 GHz – 26 GHz (20.0 MHz, Middle Channel)



Date: 30.JUN.2018 10:11:15

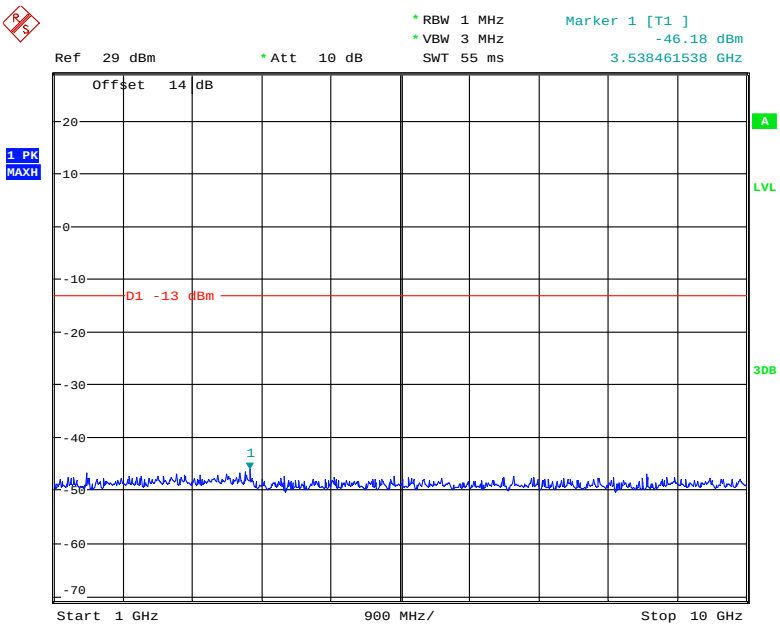
LTE Band 17:

30 MHz – 1.0 GHz (5.0 MHz, Middle Channel)



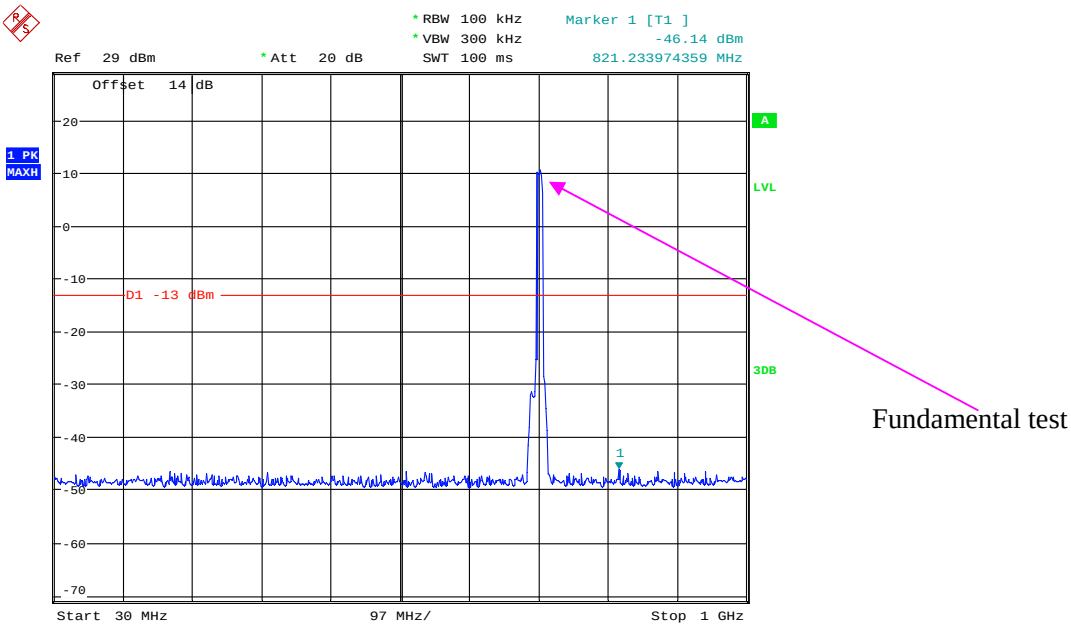
Date: 30.JUN.2018 10:14:43

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



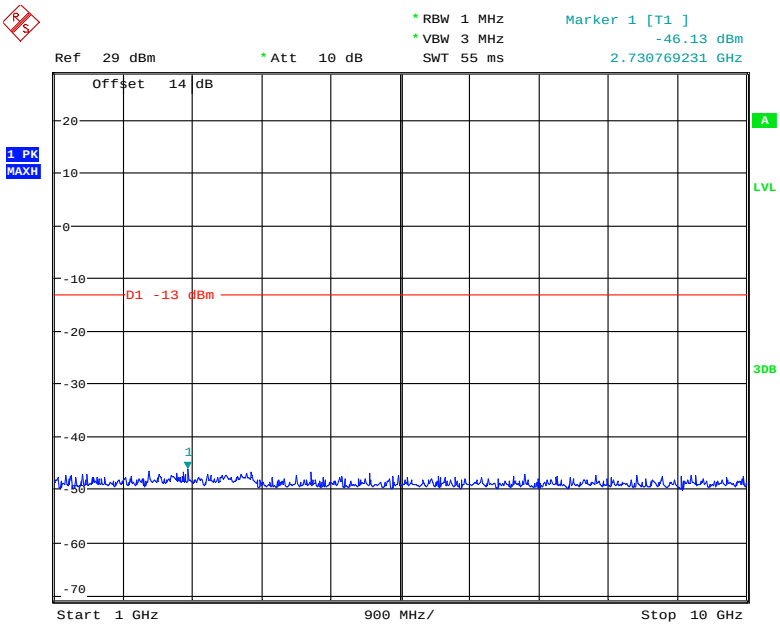
Date: 30.JUN.2018 10:15:48

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



Date: 30.JUN.2018 10:16:55

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



Date: 30.JUN.2018 10:16:09

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

Applicable Standard

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

Test Procedure

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

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

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

Test Data

Environmental Conditions

Temperature:	26 ℃
Relative Humidity:	48 %
ATM Pressure:	110.0 kPa

The testing was performed by Hill He on 2018-07-02.

EUT operation mode: Transmitting

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

30 MHz ~ 10 GHz:

Cellular Band (Part 22H)

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
GSM Mode, Middle channel										
225.31	36.97	220	1.8	H	-60.0	0.31	0	-60.31	-13	47.31
225.31	36.40	165	1.7	V	-60.6	0.31	0	-60.91	-13	47.91
1673.20	67.62	72	1.4	H	-39.5	1.30	8.90	-31.90	-13	18.90
1673.20	65.17	57	1.9	V	-41.3	1.30	8.90	-33.70	-13	20.70
2509.80	60.01	171	1.8	H	-43.5	2.60	10.20	-35.90	-13	22.90
2509.80	60.41	307	2.2	V	-42.5	2.60	10.20	-34.90	-13	21.90
3346.40	52.11	264	1.3	H	-48.2	1.50	11.70	-38.00	-13	25.00
3346.40	51.74	202	1.5	V	-48.6	1.50	11.70	-38.40	-13	25.40
WCDMA Mode, Middle channel										
225.31	37.20	213	1.1	H	-59.8	0.31	0	-60.11	-13	47.11
225.31	37.94	85	1.6	V	-59.1	0.31	0	-59.41	-13	46.41
1673.20	55.48	354	1.5	H	-51.6	1.30	8.90	-44.00	-13	31.00
1673.20	49.45	264	1.1	V	-57.0	1.30	8.90	-49.40	-13	36.40

30 MHz ~ 20 GHz:

PCS Band (Part 24E)

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 24E	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
GSM Mode, Middle channel										
225.31	36.38	1	2.4	H	-60.6	0.31	0	-60.91	-13	47.91
225.31	36.32	63	1.1	V	-60.7	0.31	0	-61.01	-13	48.01
3760.00	58.93	7	2.4	H	-42.3	1.50	11.80	-32.00	-13	19.00
3760.00	64.24	333	1.3	V	-36.5	1.50	11.80	-26.20	-13	13.20
5640.00	53.56	179	1.2	H	-44.0	1.70	12.40	-33.30	-13	20.30
5640.00	52.11	141	1.5	V	-45.1	1.70	12.40	-34.40	-13	21.40
WCDMA Mode, Middle channel										
225.31	37.19	104	1.9	H	-59.8	0.31	0	-60.11	-13	47.11
225.31	37.11	196	1.8	V	-59.9	0.31	0	-60.21	-13	47.21
3760.00	52.72	63	1.1	H	-48.5	1.50	11.80	-38.20	-13	25.20
3760.00	56.01	141	1.6	V	-44.7	1.50	11.80	-34.40	-13	21.40
7520.00	50.71	243	1.4	H	-43.2	1.90	10.70	-34.40	-13	21.40
7520.00	48.35	221	1.2	V	-45.2	1.90	10.70	-36.40	-13	23.40

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

Frequency	Receiver	Turntable	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
(MHz)	Reading (dBμV)	Angle Degree	Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
Band 2, Middle channel										
Test frequency range: 30 MHz ~ 20 GHz										
225.31	36.40	32	1.6	H	-60.6	0.31	0	-60.91	-13	47.91
225.31	37.09	292	1.1	V	-59.9	0.31	0	-60.21	-13	47.21
3760.00	49.67	1	1.9	H	-51.9	1.50	11.80	-41.60	-13	28.60
3760.00	53.1	25	2.0	V	-48.0	1.50	11.80	-37.70	-13	24.70
5640.00	41.76	51	2.1	H	-51.9	1.70	12.40	-41.20	-13	28.20
5640.00	41.91	329	2.2	V	-51.4	1.70	12.40	-40.70	-13	27.70
Band 4, Middle channel										
Test frequency range: 30 MHz ~ 18 GHz										
225.31	36.61	263	1.6	H	-60.4	0.31	0	-60.71	-13	47.71
225.31	36.44	313	2.1	V	-60.6	0.31	0	-60.91	-13	47.91
3465.00	47.12	62	1.7	H	-53.4	1.50	12.00	-42.90	-13	29.90
3465.00	46.35	19	1.9	V	-54.9	1.50	12.00	-44.40	-13	31.40
5197.50	46.56	299	2.4	H	-48.8	1.60	12.10	-38.30	-13	25.30
5197.50	48.02	56	2.1	V	-46.8	1.60	12.10	-36.30	-13	23.30
Band 5, Middle channel										
Test frequency range:30 MHz ~ 10 GHz										
225.31	36.76	13	2.4	H	-60.2	0.31	0	-60.51	-13	47.51
225.31	37.01	344	1.1	V	-60.0	0.31	0	-60.31	-13	47.31
1673.00	48.96	10	1.3	H	-58.1	1.30	8.90	-50.50	-13	37.50
1673.00	49.22	291	2.0	V	-57.3	1.30	8.90	-49.70	-13	36.70
2509.50	44.27	68	2.2	H	-59.3	2.60	10.20	-51.70	-13	38.70
2509.50	47.05	259	2.2	V	-55.9	2.60	10.20	-48.30	-13	35.30
Band 7, Middle channel										
Test frequency range: 30 MHz ~26 GHz										
225.31	36.31	173	1.7	H	-60.7	0.31	0	-61.01	-25	36.01
225.31	37.36	277	2.0	V	-59.6	0.31	0	-59.91	-25	34.91
5070.00	48.96	175	2.3	H	-48.9	1.60	12.10	-38.40	-25	13.40
5070.00	47.87	107	1.5	V	-50.0	1.60	12.10	-39.50	-25	14.50
7605.00	53.49	102	1.8	H	-41.7	2.10	10.50	-33.30	-25	8.30
7605.00	46.64	253	1.4	V	-48.3	2.10	10.50	-39.90	-25	14.90
Band 17, Middle channel										
Test frequency range:30 MHz ~ 10 GHz										
225.31	36.33	148	2.1	H	-60.7	0.31	0	-61.01	-13	48.01
225.31	37.22	157	1.0	V	-59.8	0.31	0	-60.11	-13	47.11
1420.00	46.25	52	2.0	H	-61.6	1.60	7.90	-55.30	-13	42.30
1420.00	45.41	222	1.8	V	-62.7	1.60	7.90	-56.40	-13	43.40
2130.00	43.51	258	1.5	H	-58.6	1.30	9.70	-50.20	-13	37.20
2130.00	43.82	140	1.9	V	-59.1	1.30	9.70	-50.70	-13	37.70

Note:
1) Absolute Level = Substituted Level - Cable loss + Antenna Gain
2) Margin = Limit- Absolute Level

FCC § 22.917 (a); § 24.238 (a); §27.53 (h)(m) - BAND EDGES

Applicable Standard

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

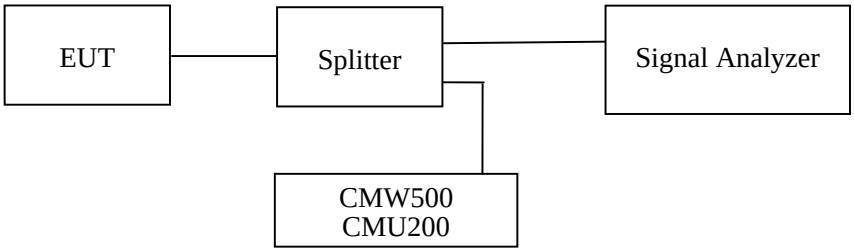
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

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.

Test Procedure

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

The center of the spectrum analyzer was set to block edge frequency



Test Data

Environmental Conditions

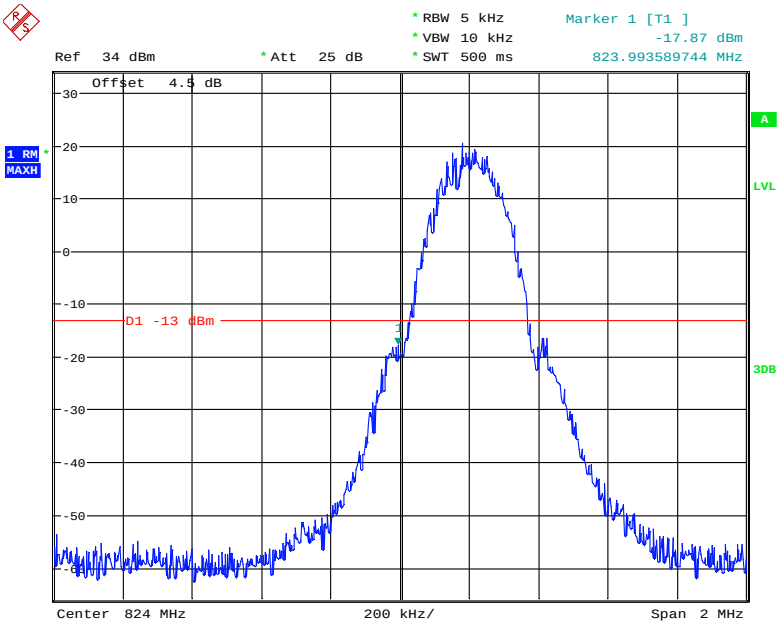
Temperature:	24~25 ℃
Relative Humidity:	48~50 %
ATM Pressure:	100.5~101.0 kPa

The testing was performed by Hill He from 2018-06-21 to 2018-06-30.

EUT operation mode: Transmitting

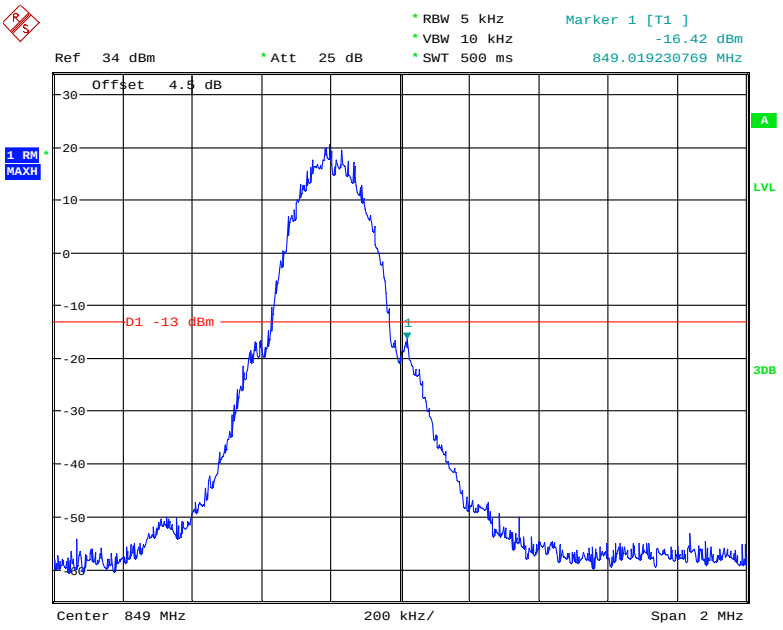
Test Result: Compliance. Please refer to the following plots.

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



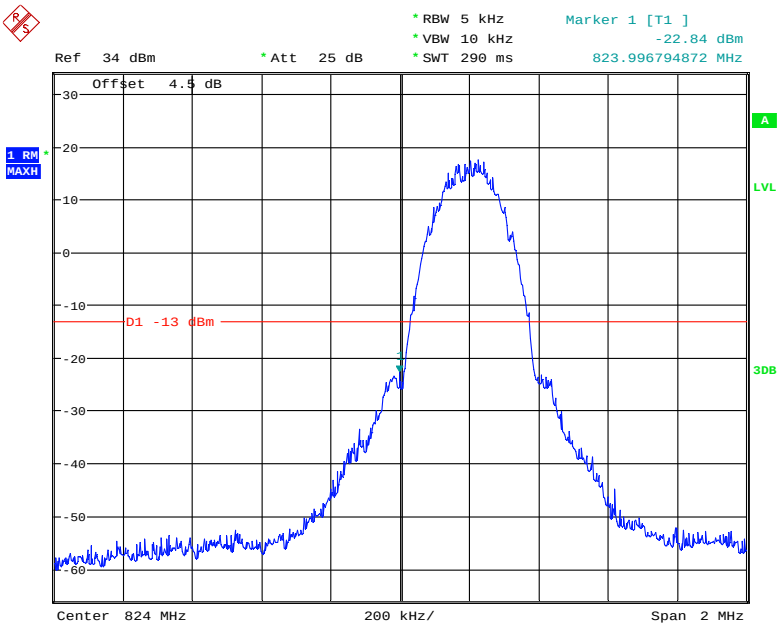
Date: 21.JUN.2018 00:08:18

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



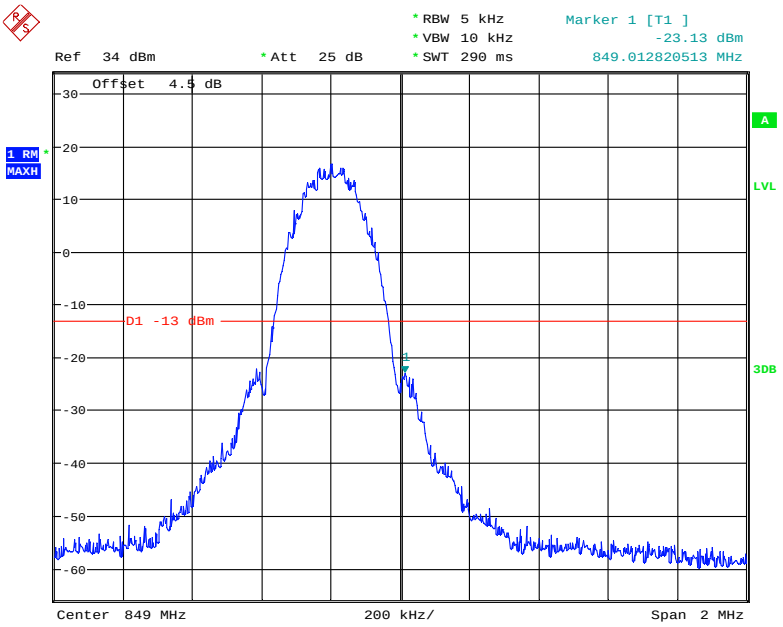
Date: 21.JUN.2018 00:10:33

Cellular Band, Left Band Edge for EDGE Mode



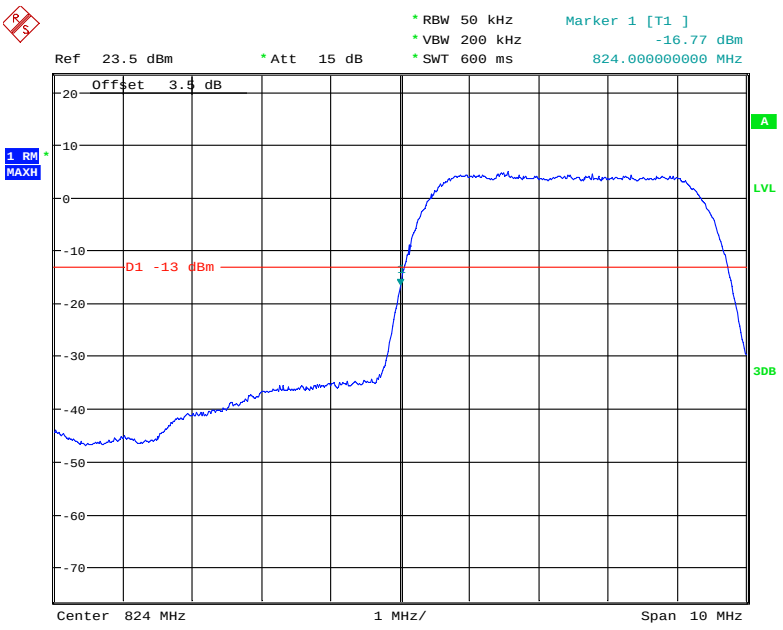
Date: 21.JUN.2018 00:21:22

Cellular Band, Right Band Edge for EDGE Mode



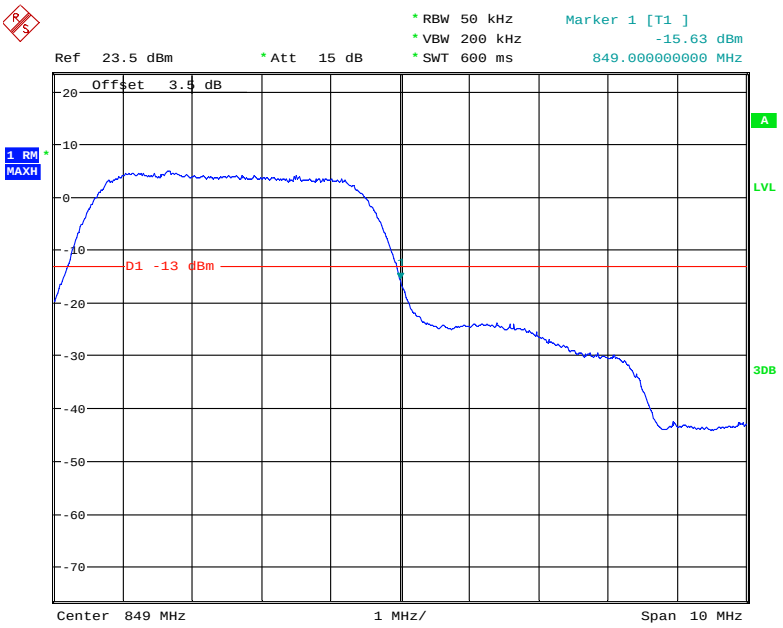
Date: 21.JUN.2018 00:26:20

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



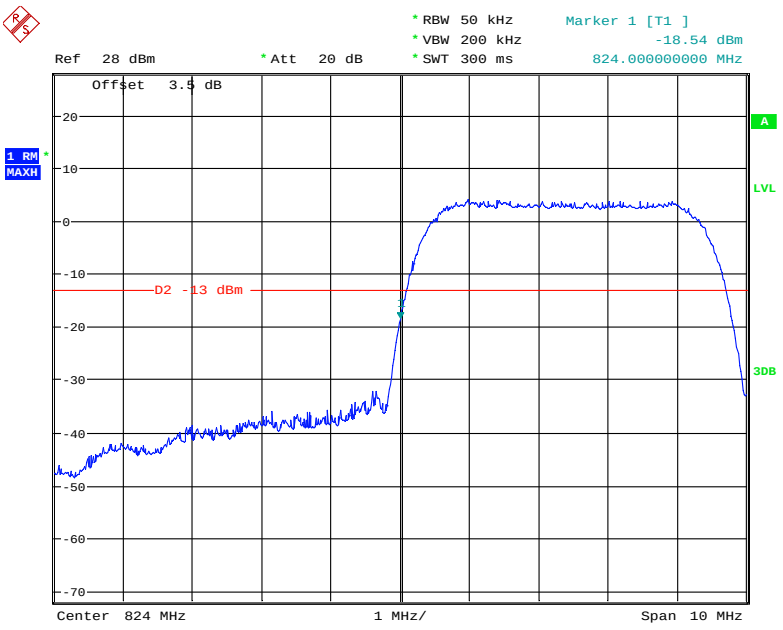
Date: 21.JUN.2018 01:38:49

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



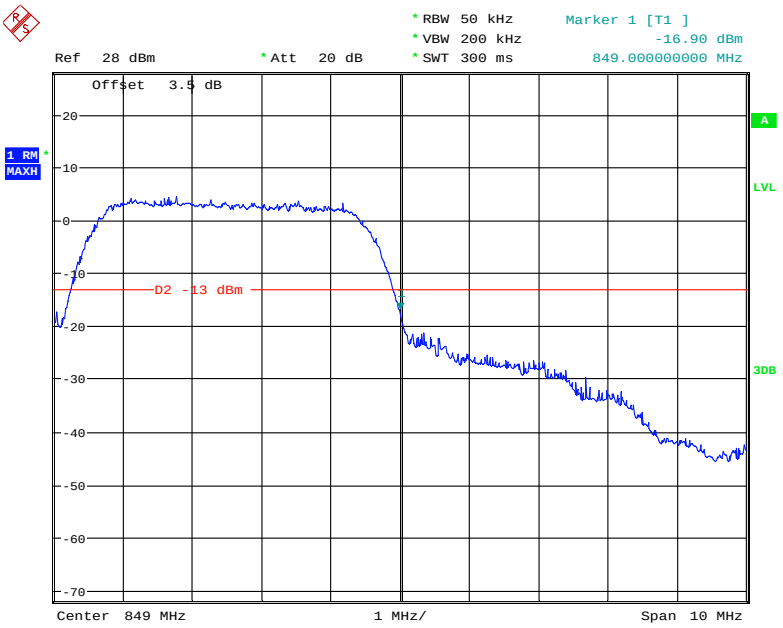
Date: 21.JUN.2018 01:37:41

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



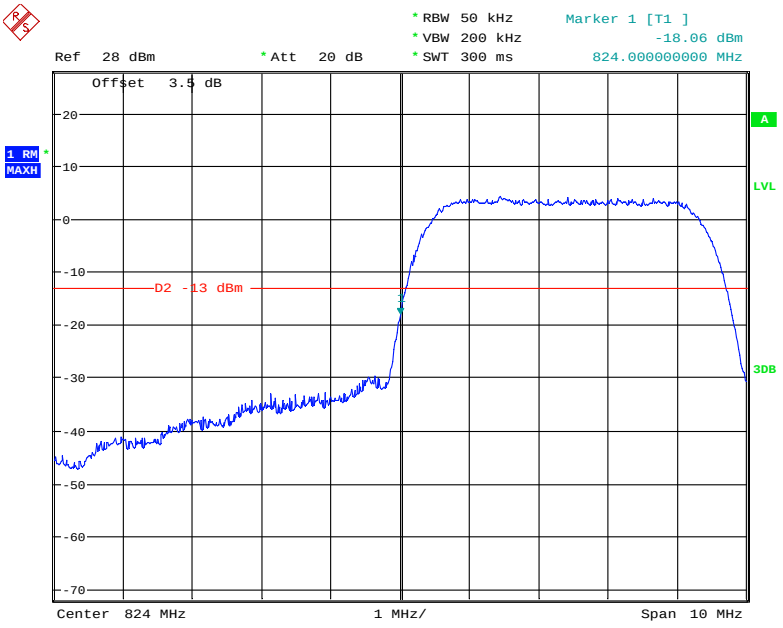
Date: 21.JUN.2018 01:55:01

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



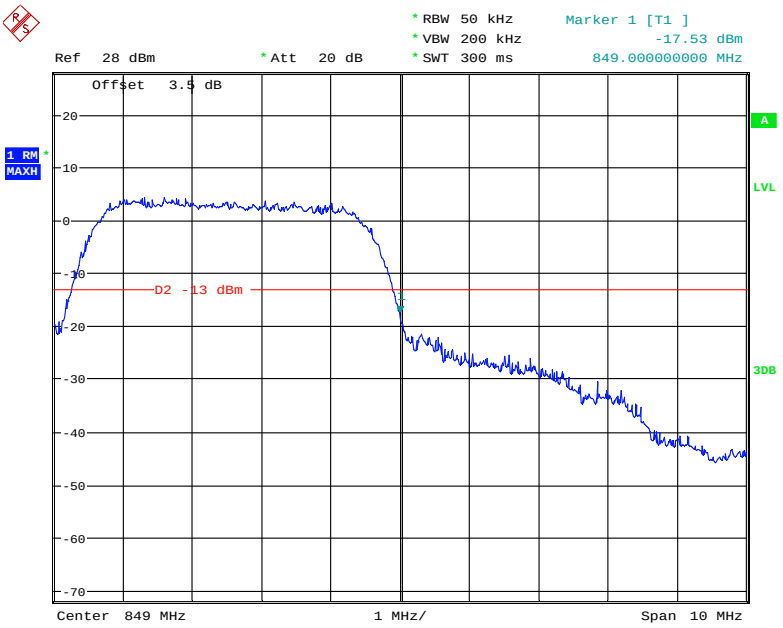
Date: 21.JUN.2018 01:55:49

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



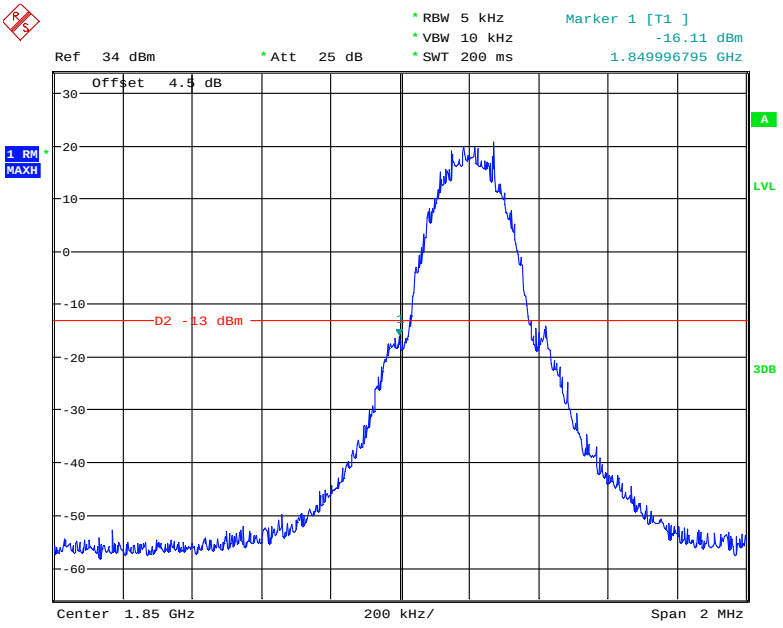
Date: 21.JUN.2018 02:00:06

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



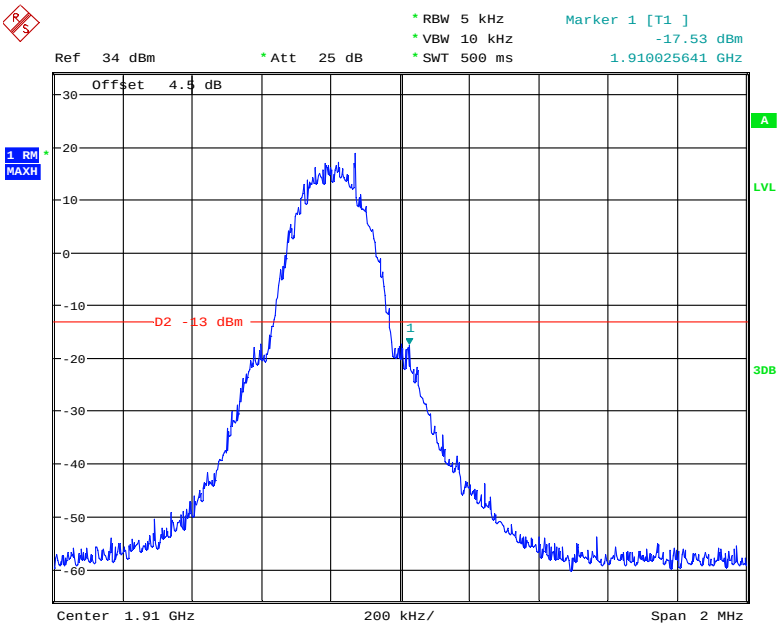
Date: 21.JUN.2018 01:59:16

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



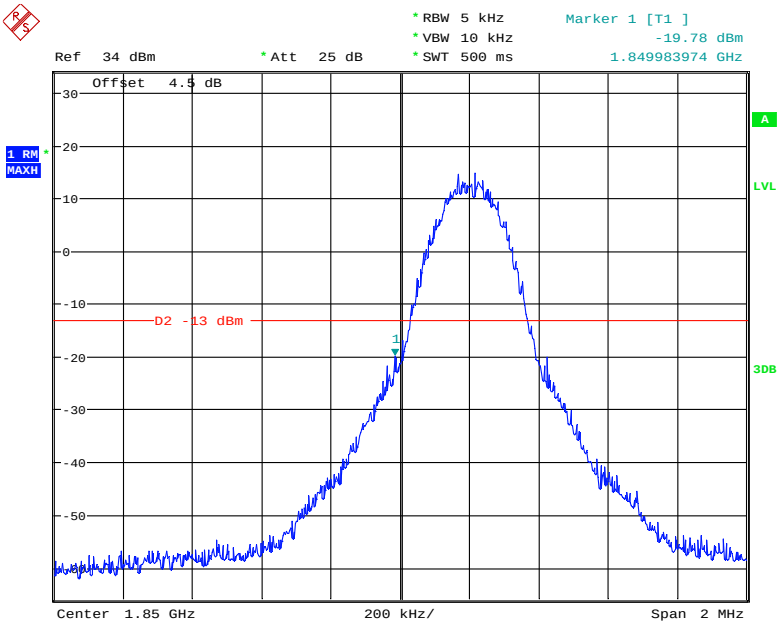
Date: 21.JUN.2018 00:37:47

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



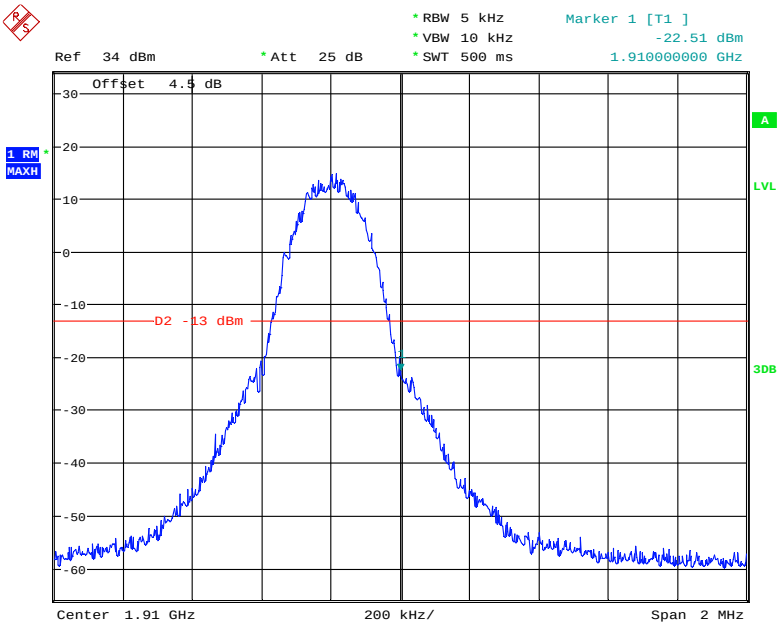
Date: 21.JUN.2018 00:40:05

PCS Band, Left Band Edge for EDGE Mode



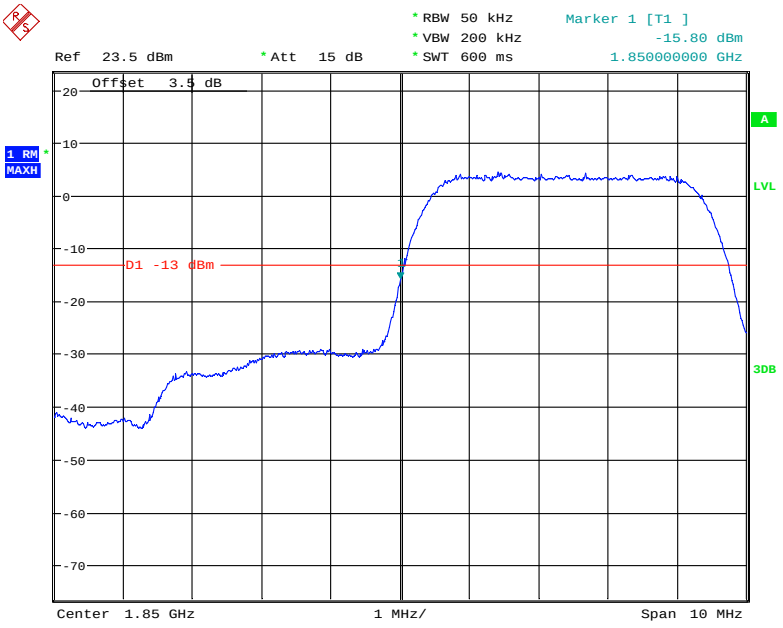
Date: 21.JUN.2018 00:48:13

PCS Band, Right Band Edge for EDGE Mode



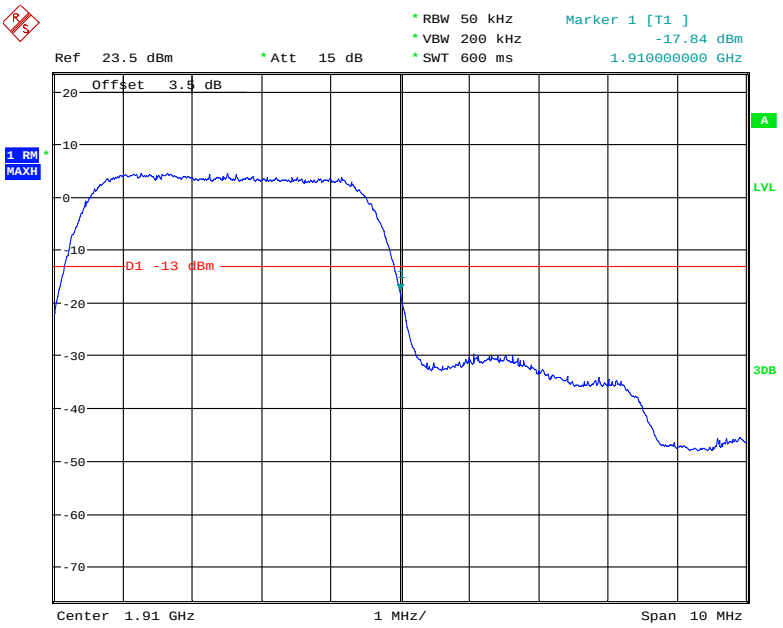
Date: 21.JUN.2018 00:50:27

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



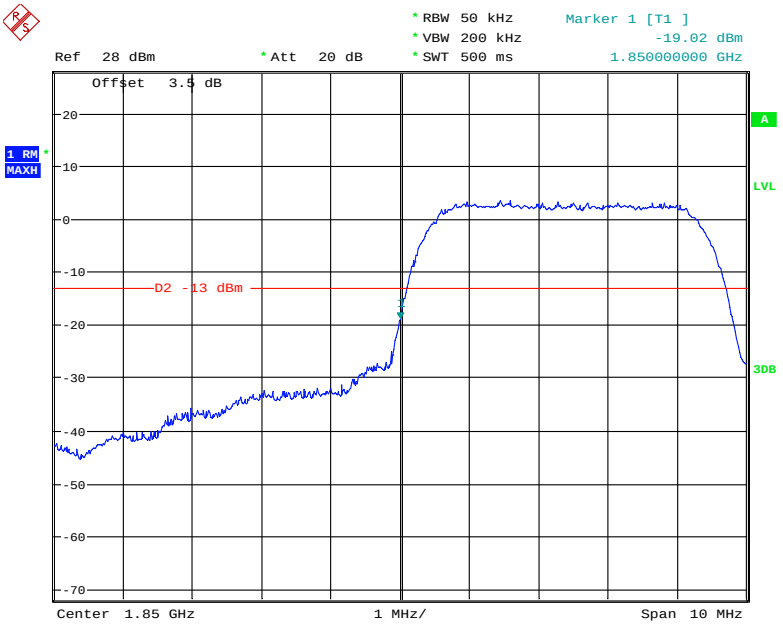
Date: 21.JUN.2018 01:40:46

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



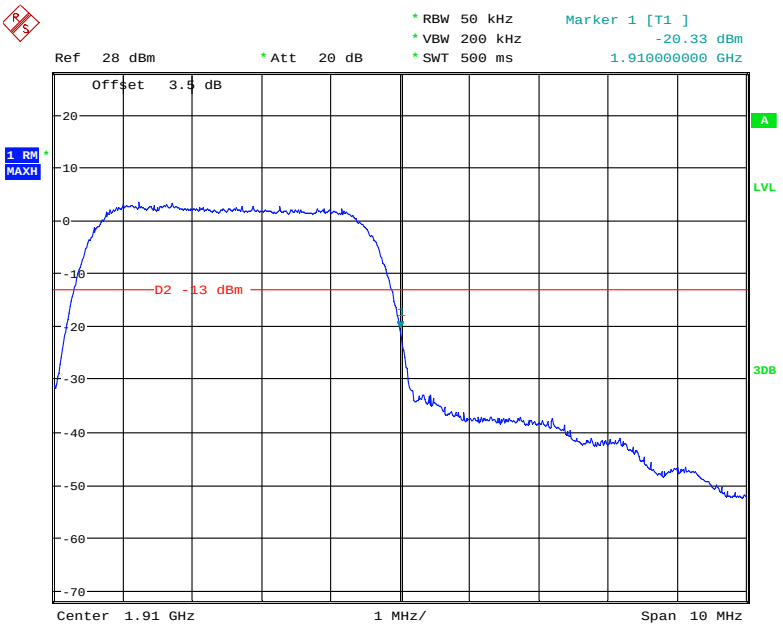
Date: 21.JUN.2018 01:41:37

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



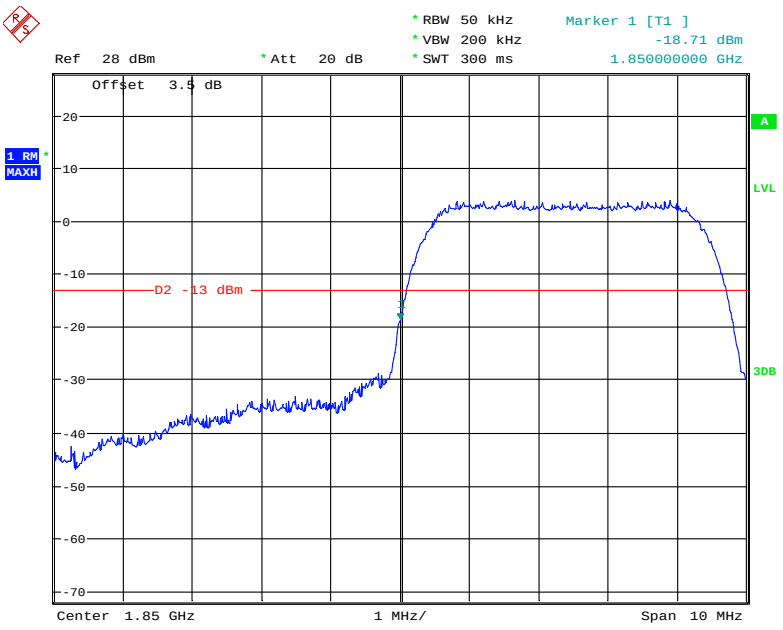
Date: 21.JUN.2018 01:52:04

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



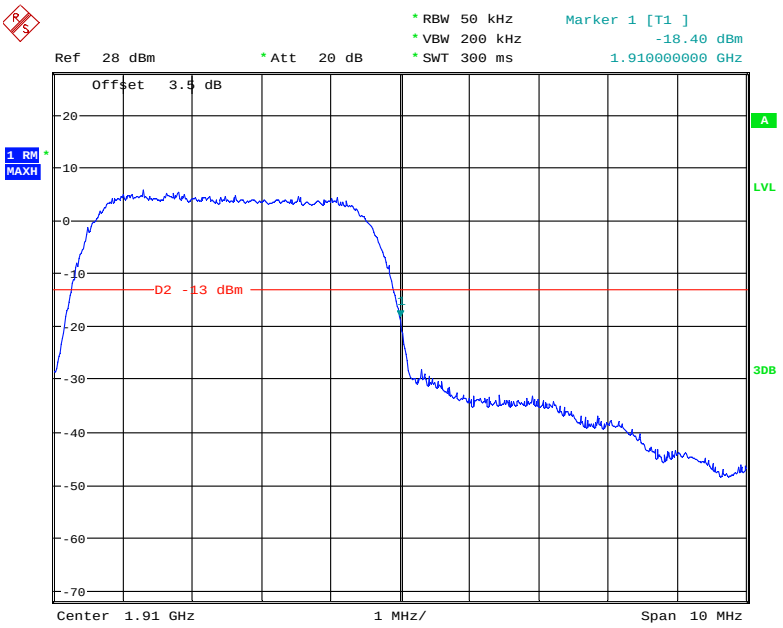
Date: 21.JUN.2018 01:53:18

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



Date: 21.JUN.2018 02:05:41

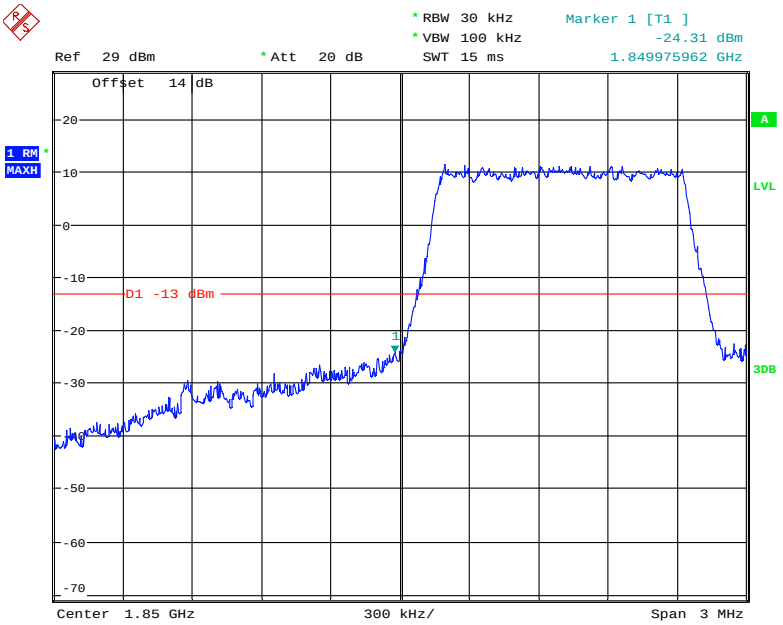
PCS Band, Right Band Edge for HSUPA (BPSK) Mode



Date: 21.JUN.2018 02:04:55

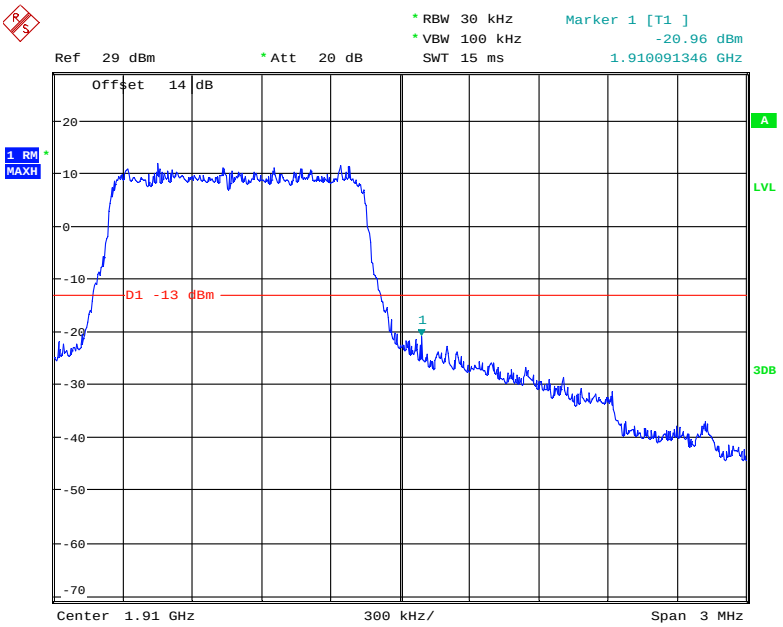
LTE Band 2:

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



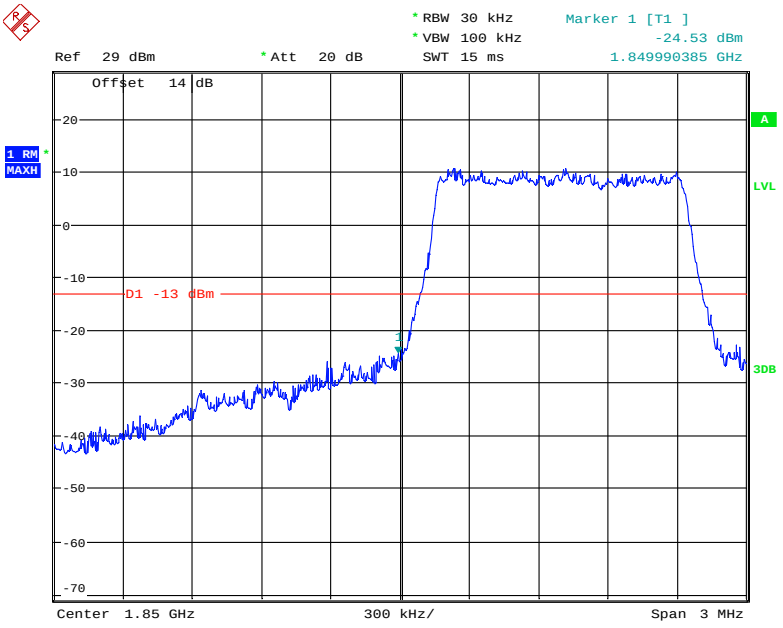
Date: 30.JUN.2018 10:45:40

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



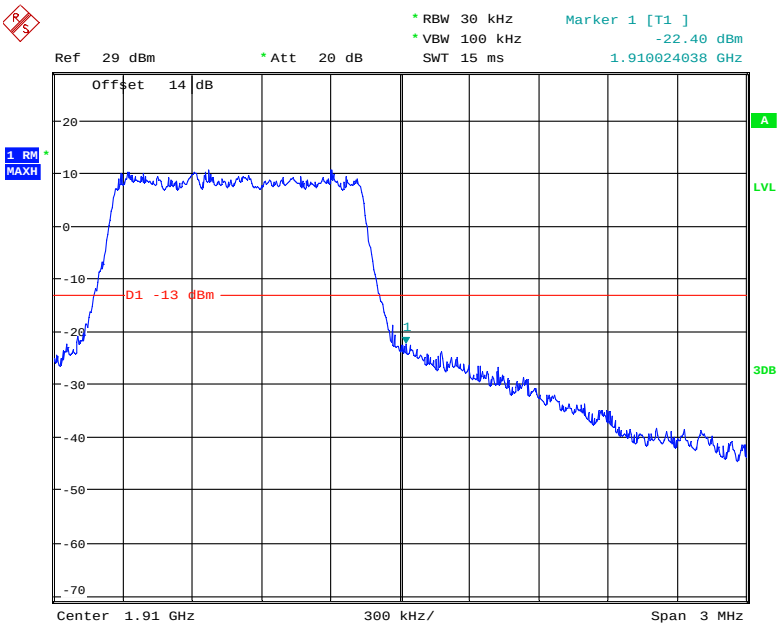
Date: 30.JUN.2018 10:49:37

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



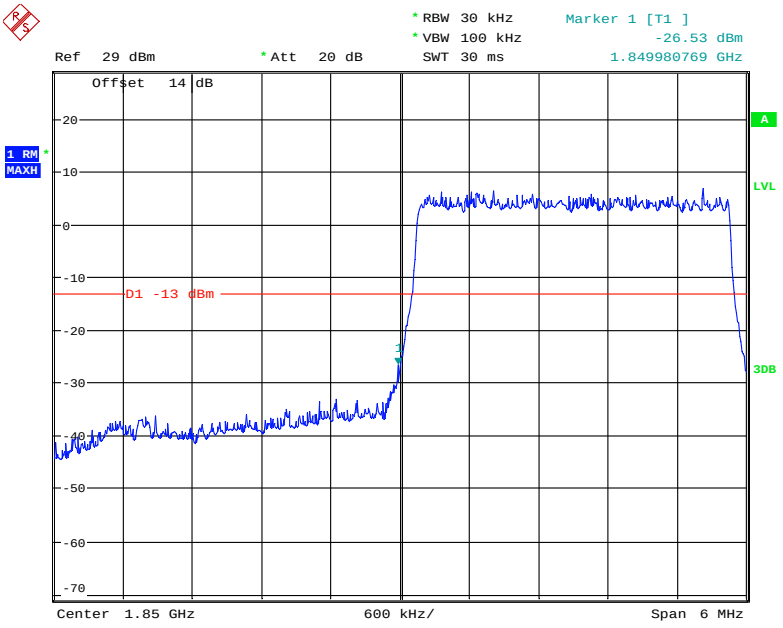
Date: 30.JUN.2018 10:46:41

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



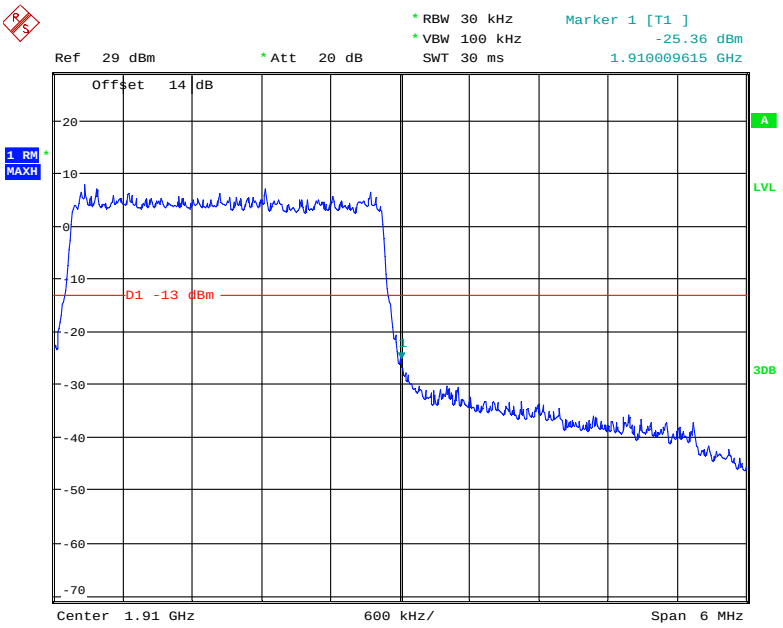
Date: 30.JUN.2018 10:48:56

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



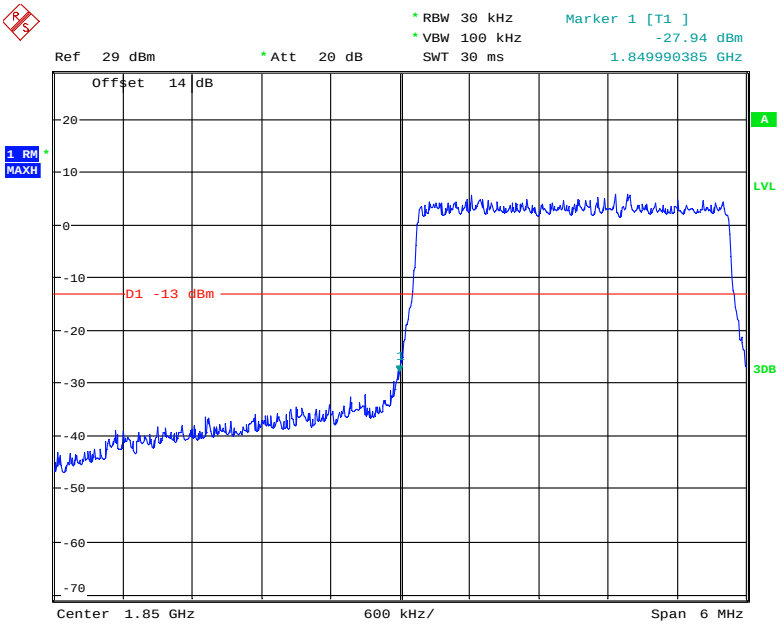
Date: 30.JUN.2018 10:52:50

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



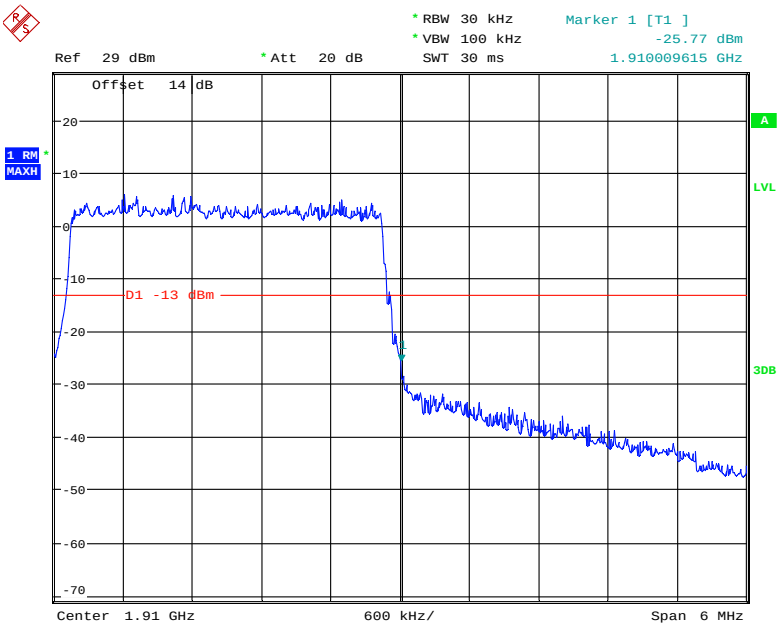
Date: 30.JUN.2018 10:51:06

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



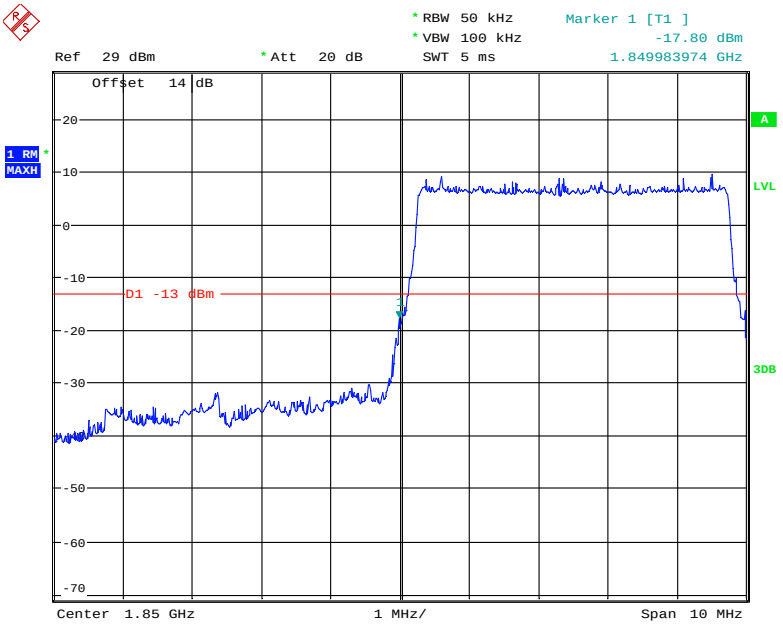
Date: 30.JUN.2018 10:52:25

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



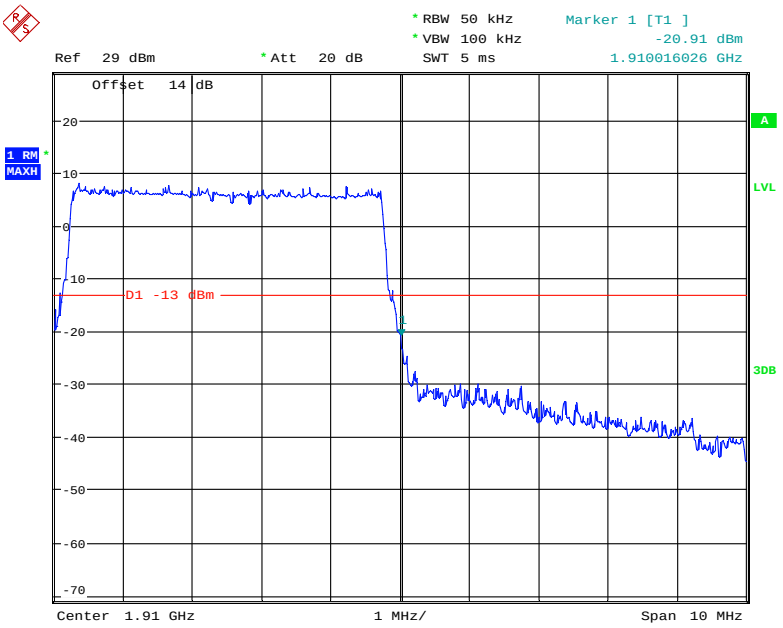
Date: 30.JUN.2018 10:51:40

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



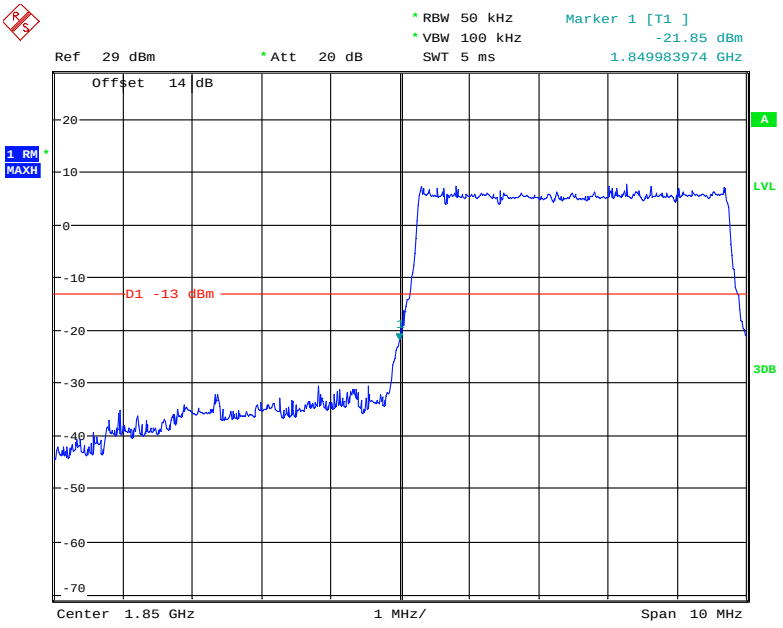
Date: 30.JUN.2018 10:55:28

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



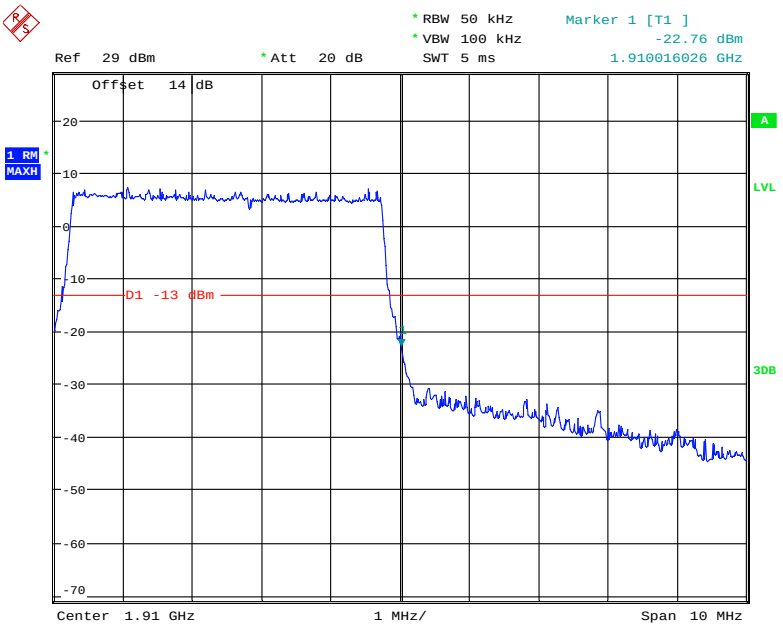
Date: 30.JUN.2018 10:57:26

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



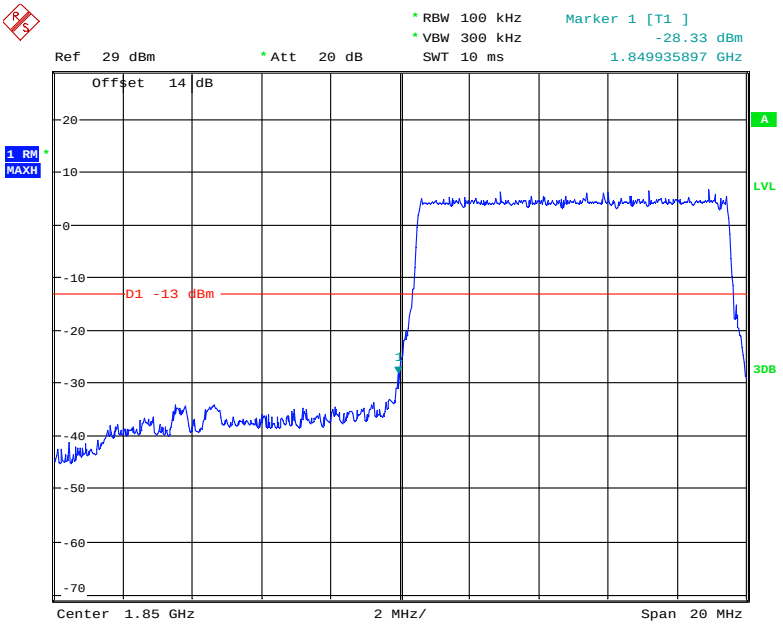
Date: 30.JUN.2018 10:55:50

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



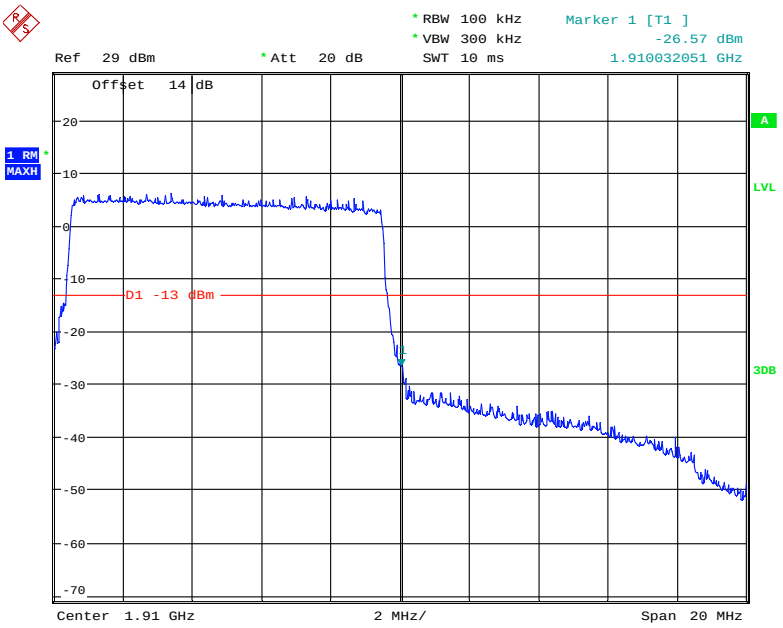
Date: 30.JUN.2018 10:56:56

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



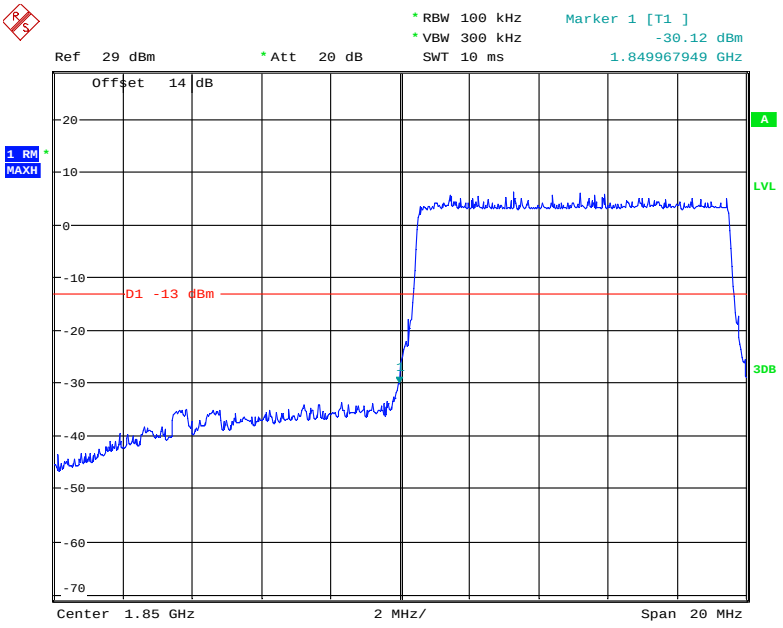
Date: 30.JUN.2018 11:01:13

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



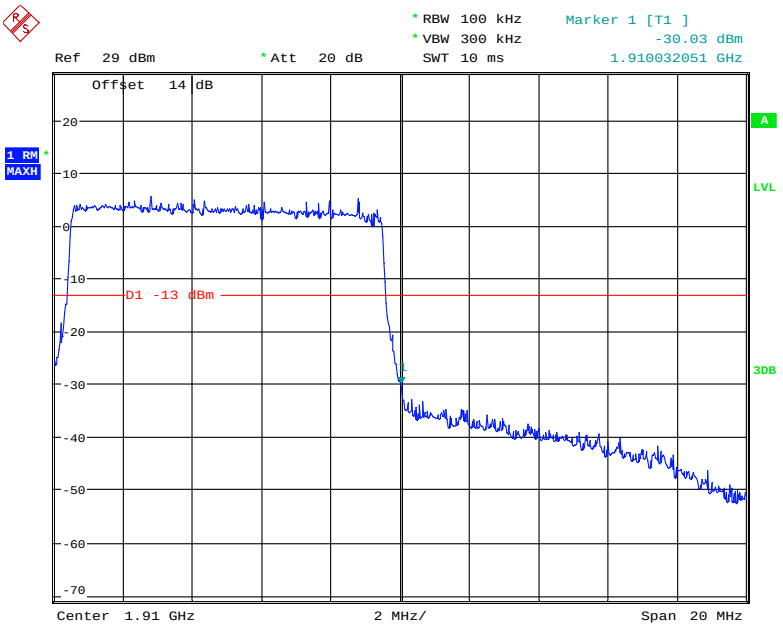
Date: 30.JUN.2018 10:59:31

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



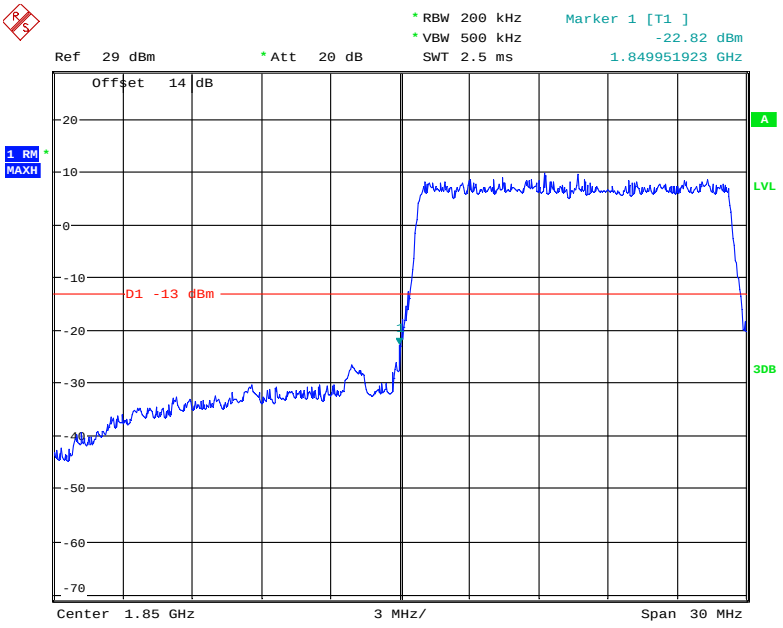
Date: 30.JUN.2018 11:00:51

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



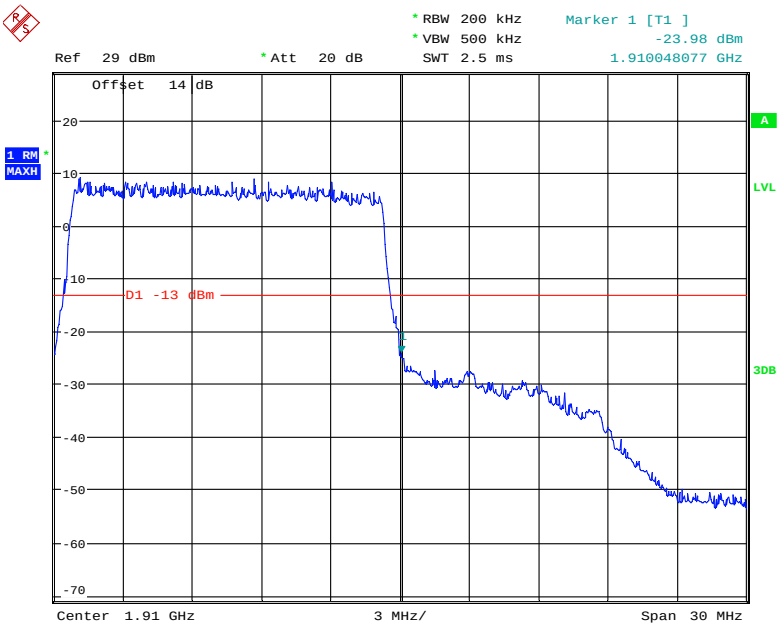
Date: 30.JUN.2018 10:59:56

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



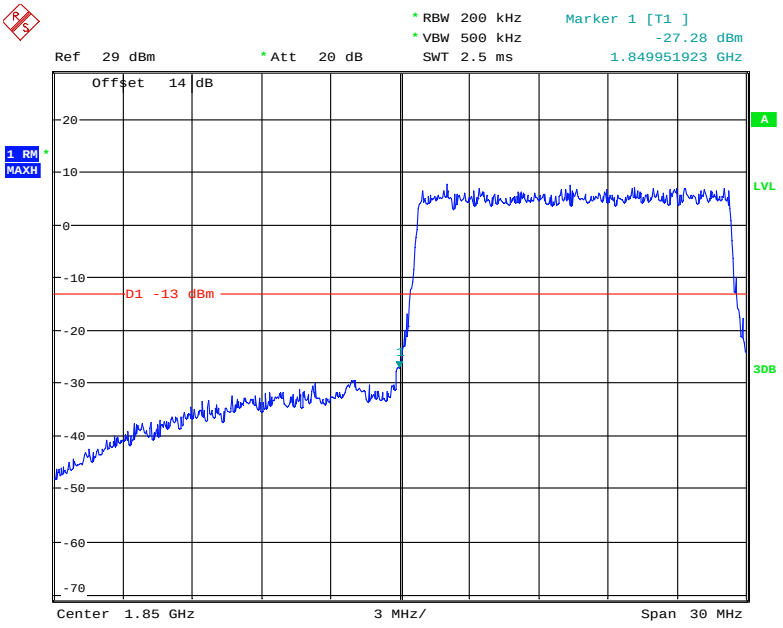
Date: 30.JUN.2018 11:02:46

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



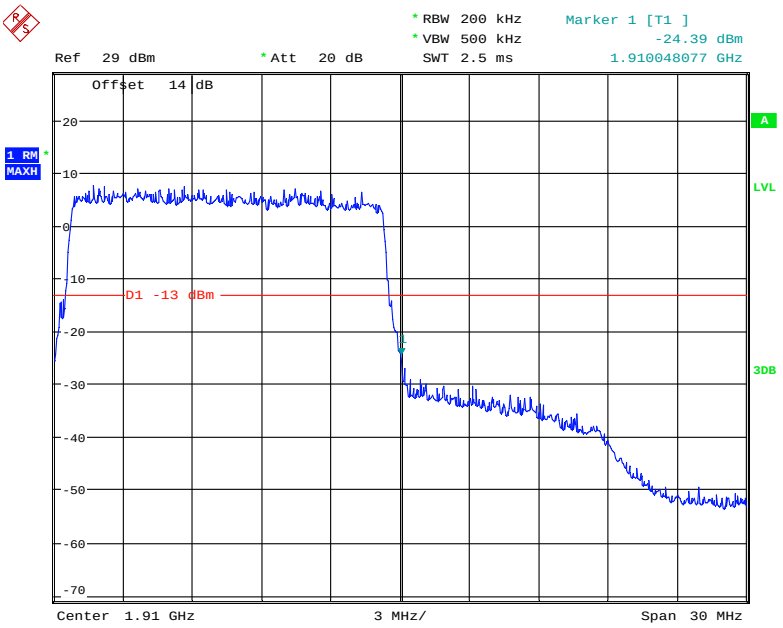
Date: 30.JUN.2018 11:04:36

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



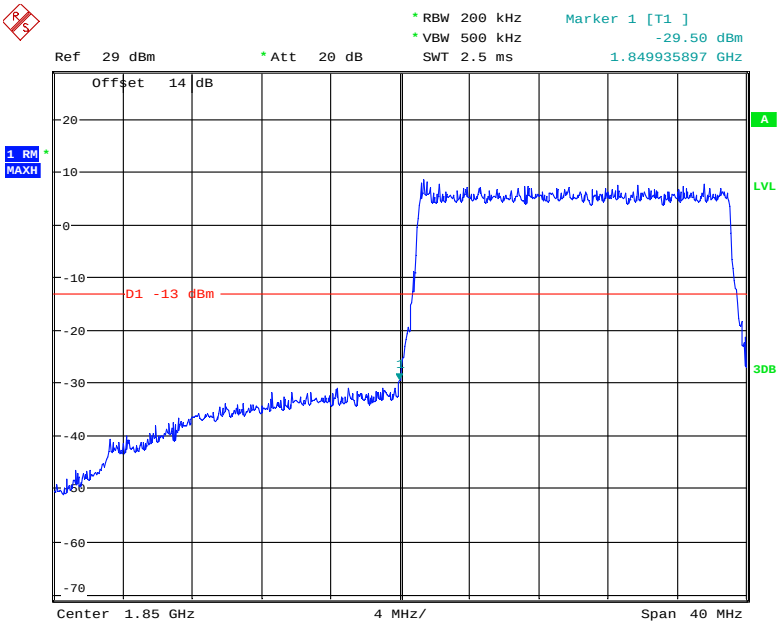
Date: 30.JUN.2018 11:03:07

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



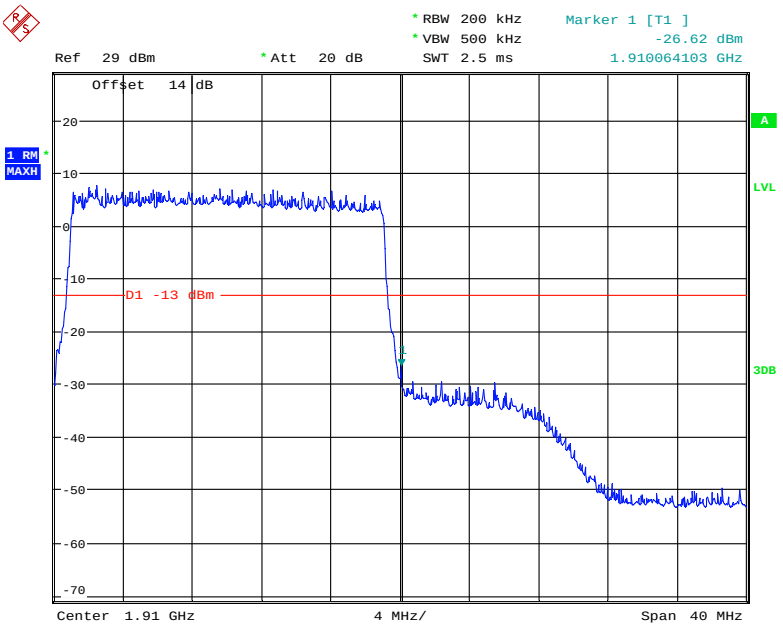
Date: 30.JUN.2018 11:03:58

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



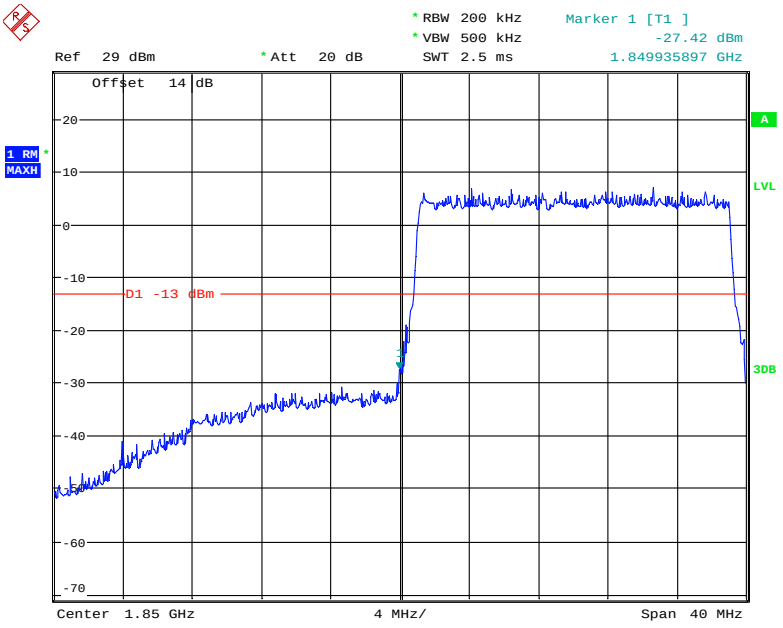
Date: 30.JUN.2018 11:07:53

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



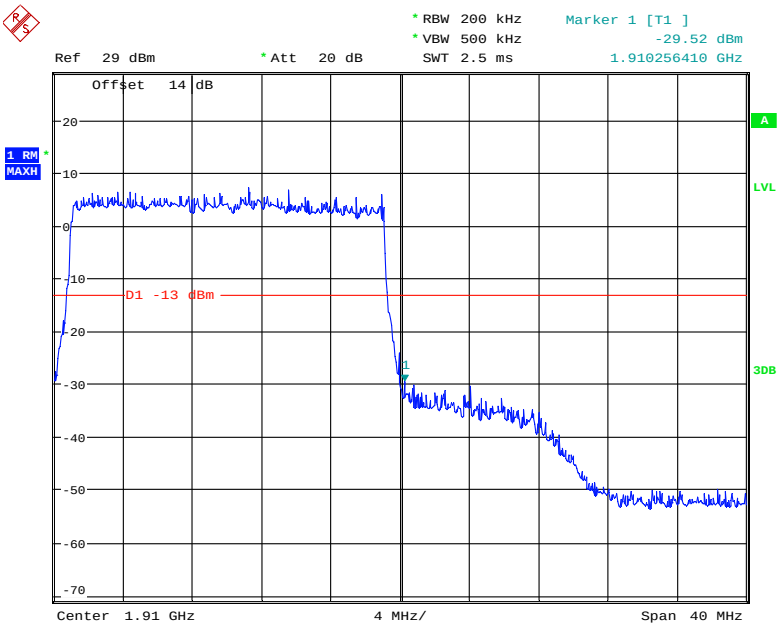
Date: 30.JUN.2018 11:05:37

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



Date: 30.JUN.2018 11:07:13

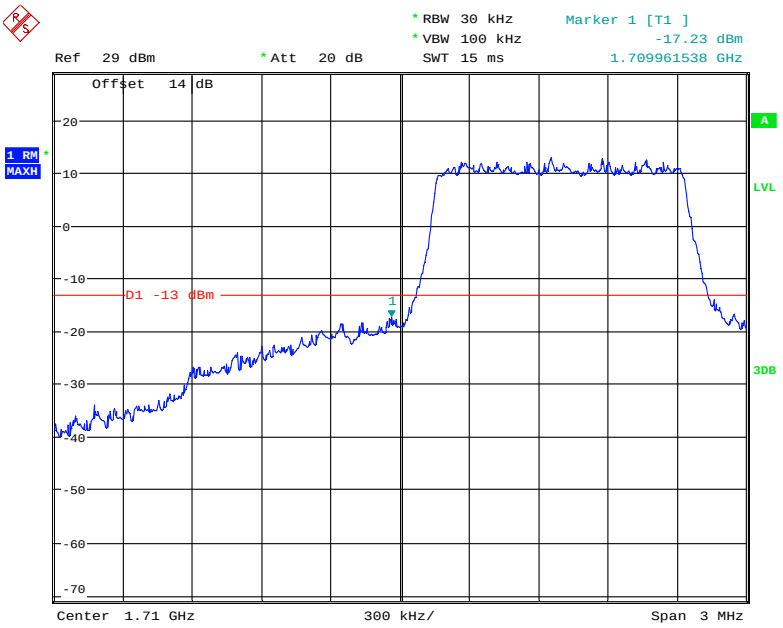
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 30.JUN.2018 11:06:19

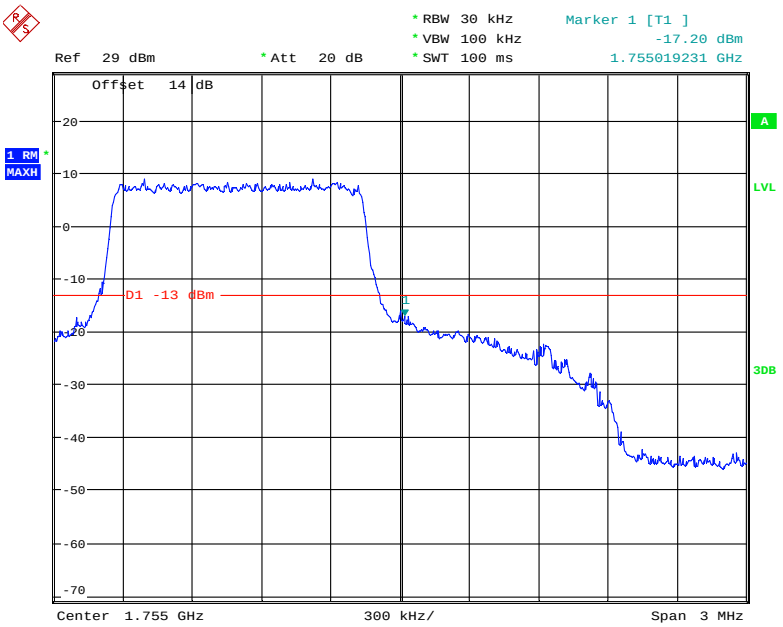
LTE Band 4:

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



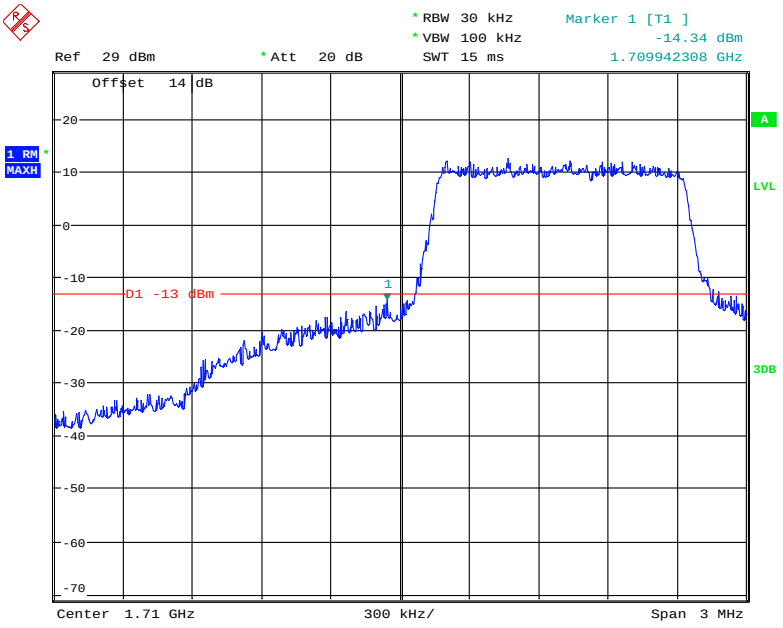
Date: 30.JUN.2018 11:13:45

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



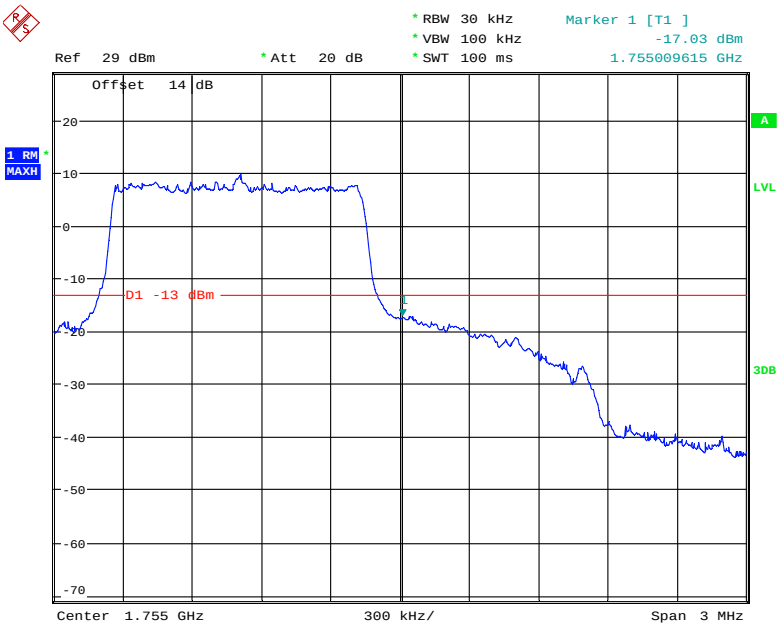
Date: 30.JUN.2018 11:17:46

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



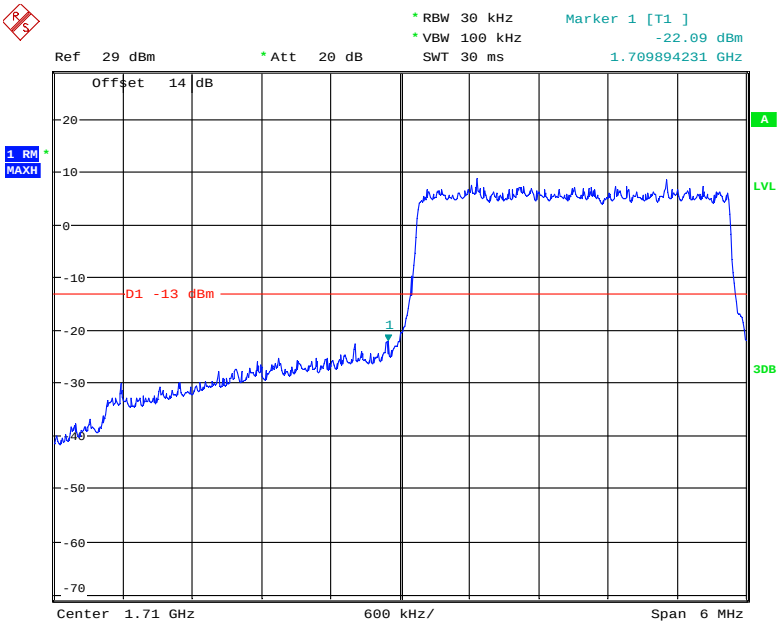
Date: 30.JUN.2018 11:14:31

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



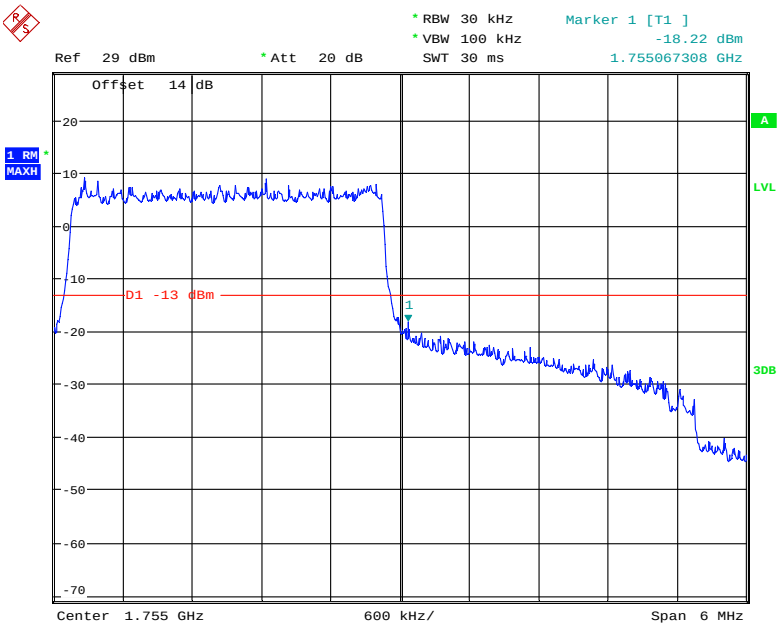
Date: 30.JUN.2018 11:16:33

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



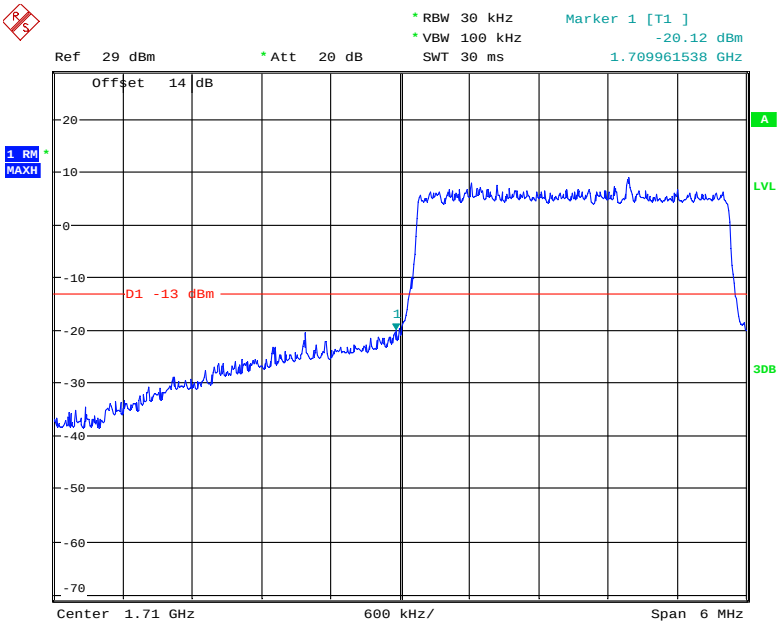
Date: 30.JUN.2018 11:21:34

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



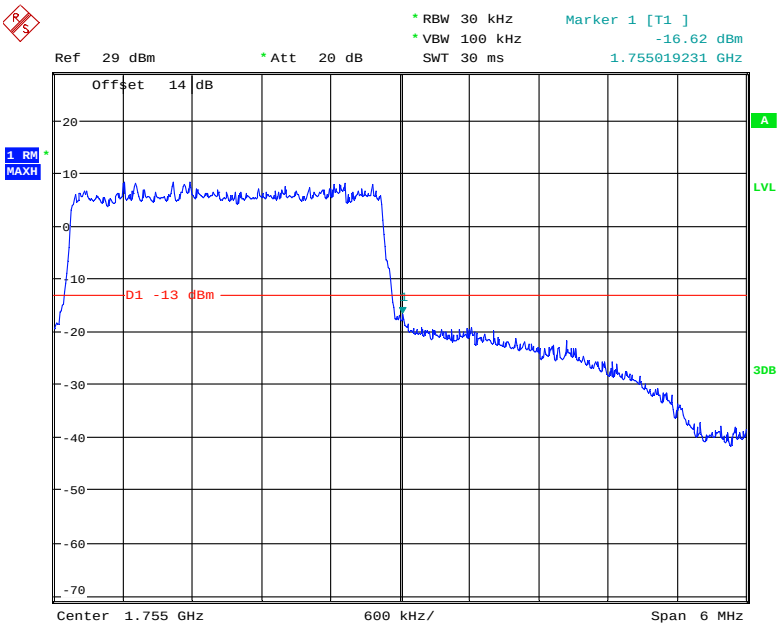
Date: 30.JUN.2018 11:18:48

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



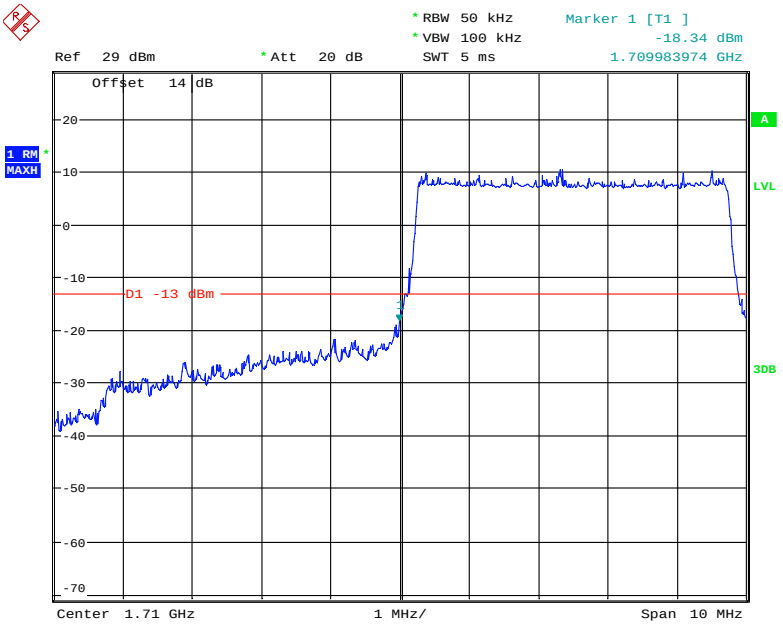
Date: 30.JUN.2018 11:20:39

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



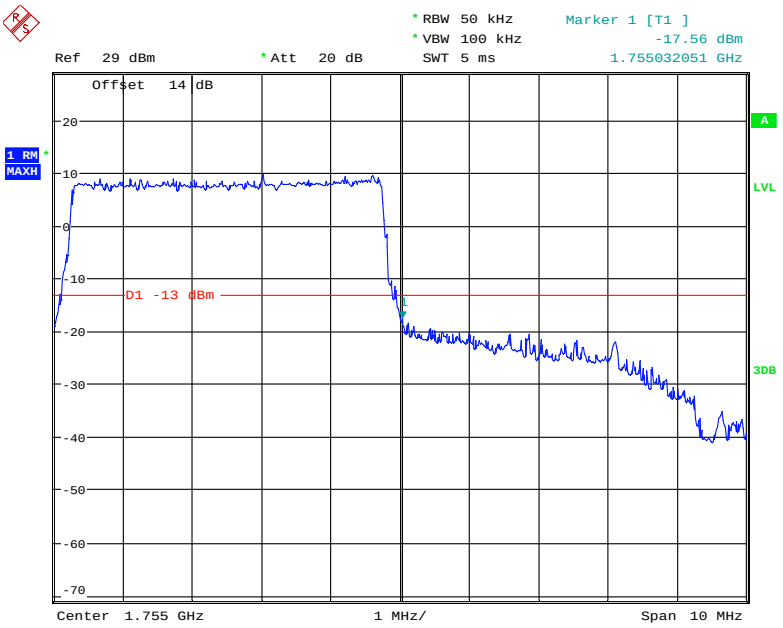
Date: 30.JUN.2018 11:19:34

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



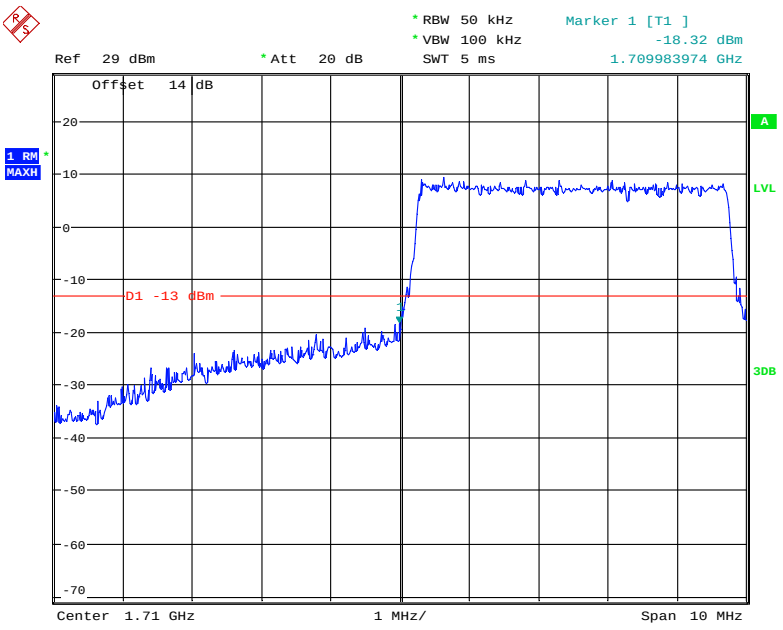
Date: 30.JUN.2018 11:23:07

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



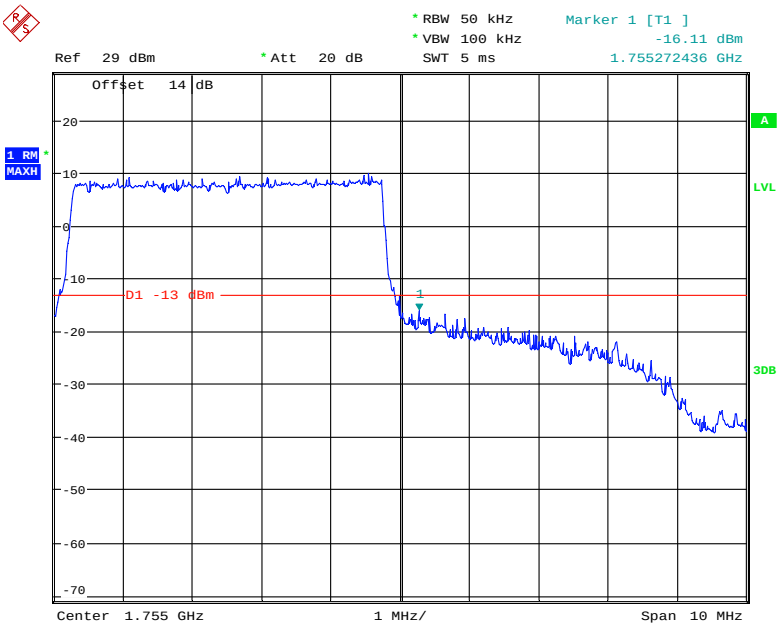
Date: 30.JUN.2018 11:24:30

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



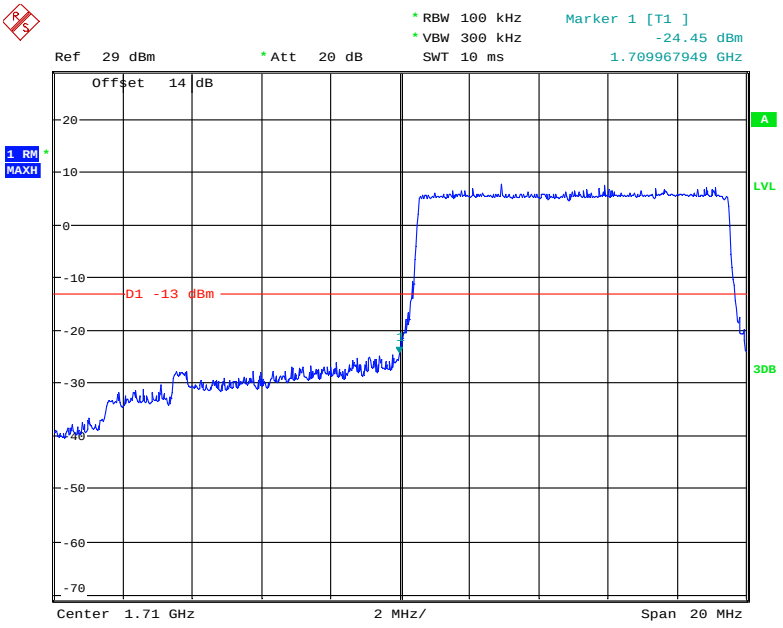
Date: 30.JUN.2018 11:23:28

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



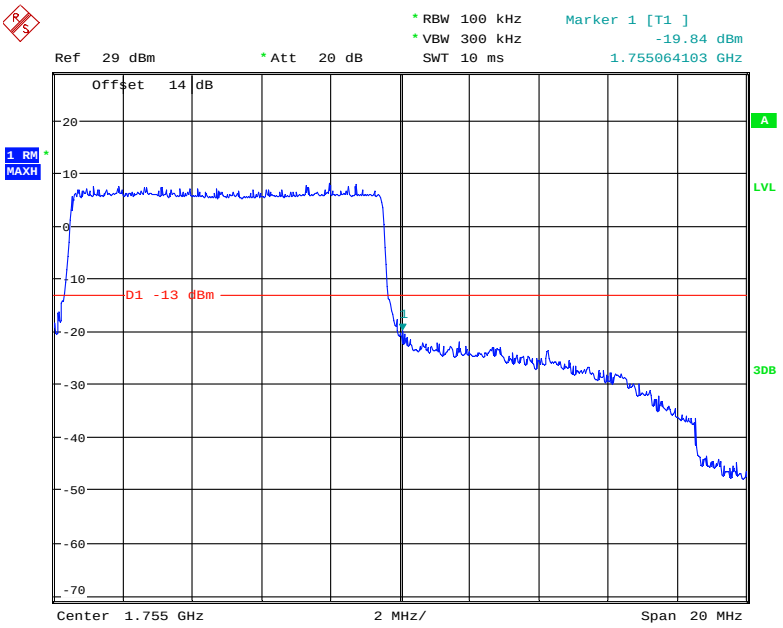
Date: 30.JUN.2018 11:24:06

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



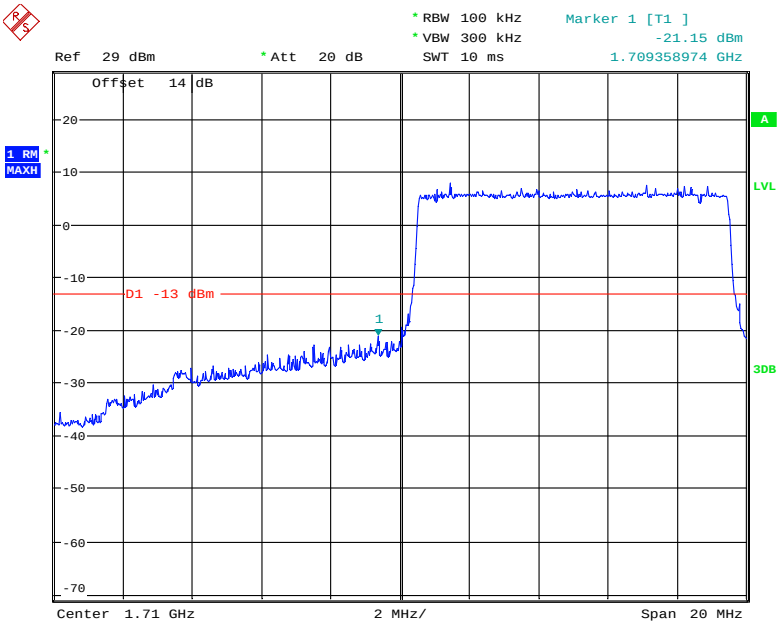
Date: 30.JUN.2018 11:27:11

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



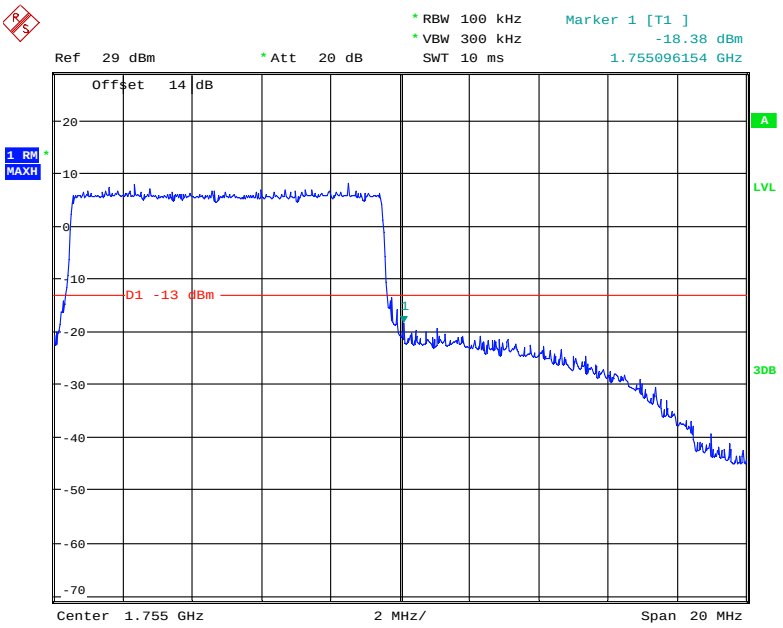
Date: 30.JUN.2018 11:25:39

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



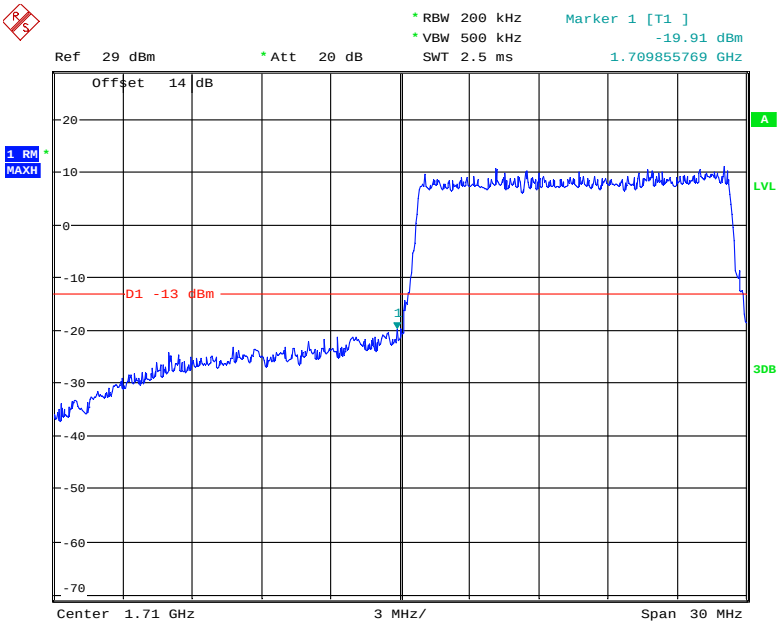
Date: 30.JUN.2018 11:26:44

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



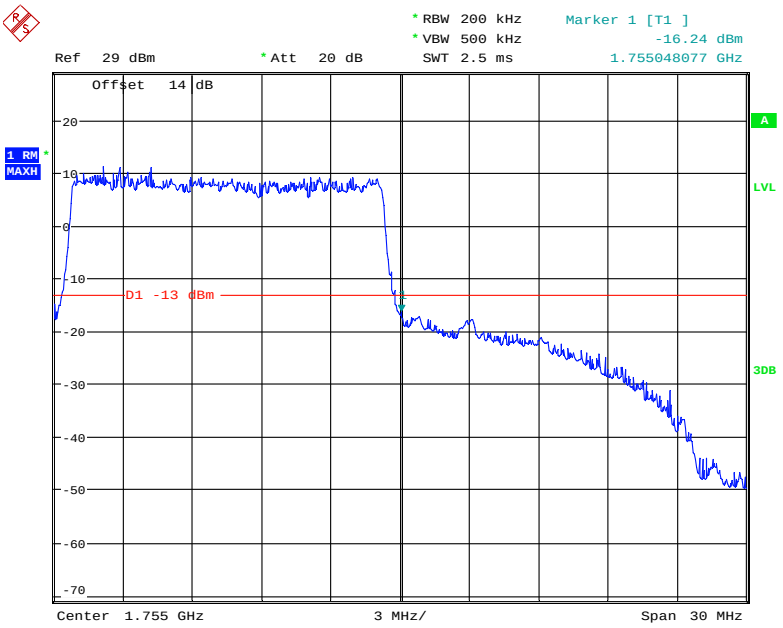
Date: 30.JUN.2018 11:26:06

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



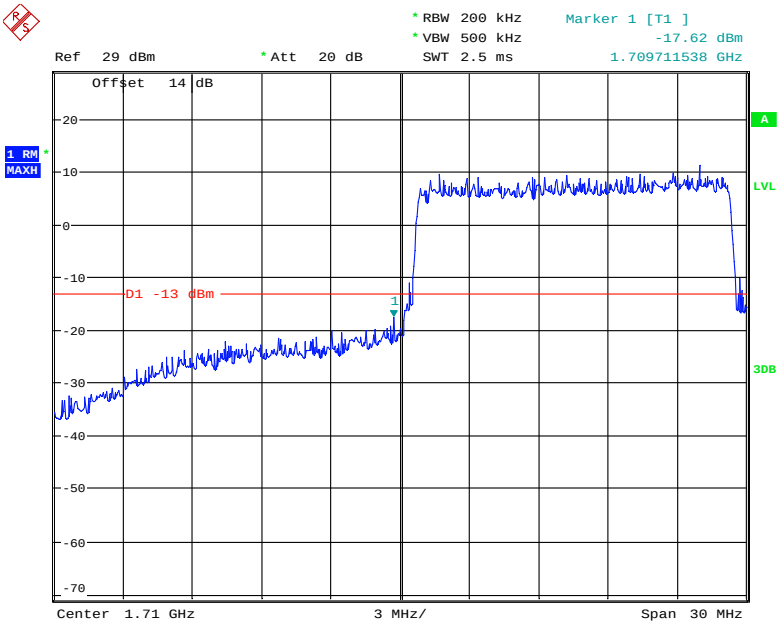
Date: 30.JUN.2018 11:28:23

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



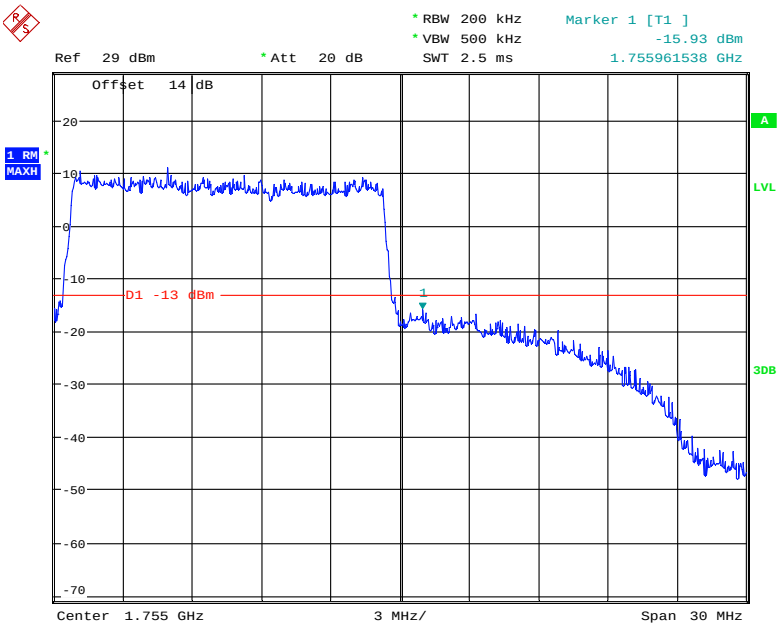
Date: 30.JUN.2018 11:29:43

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



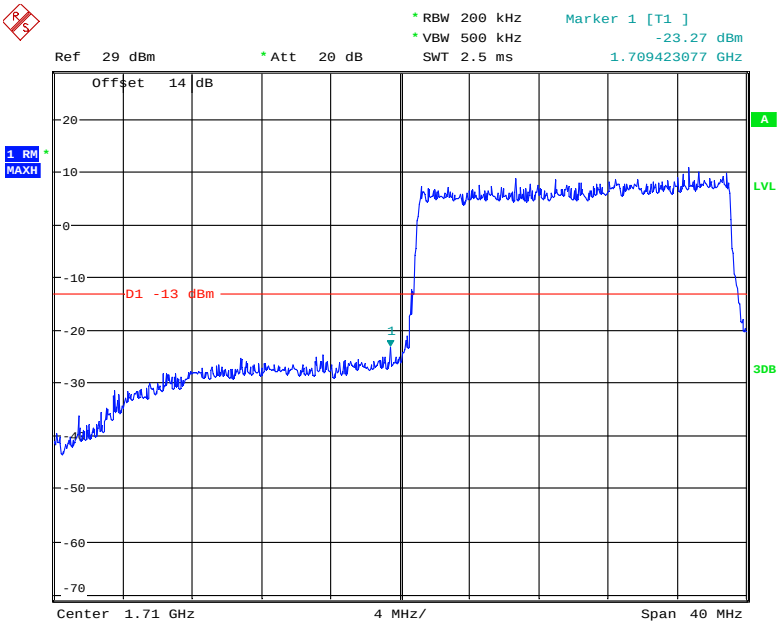
Date: 30.JUN.2018 11:28:46

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



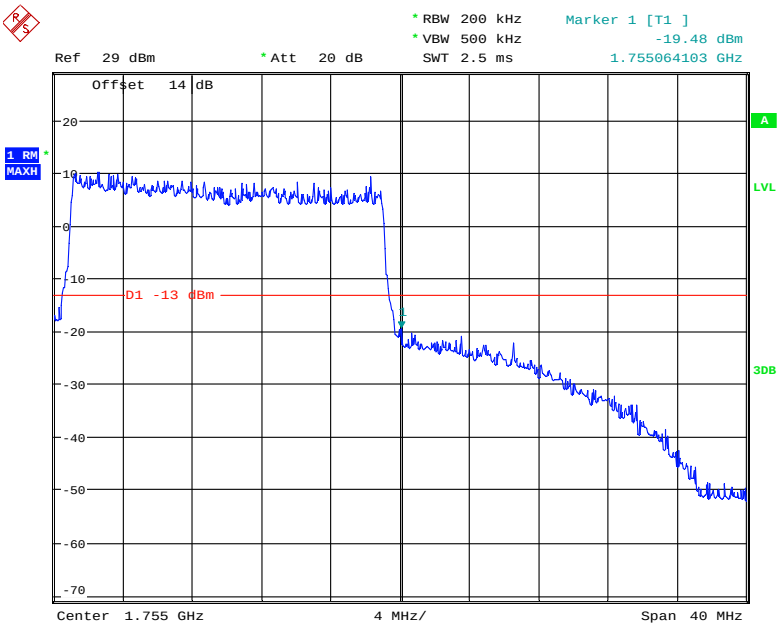
Date: 30.JUN.2018 11:29:15

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



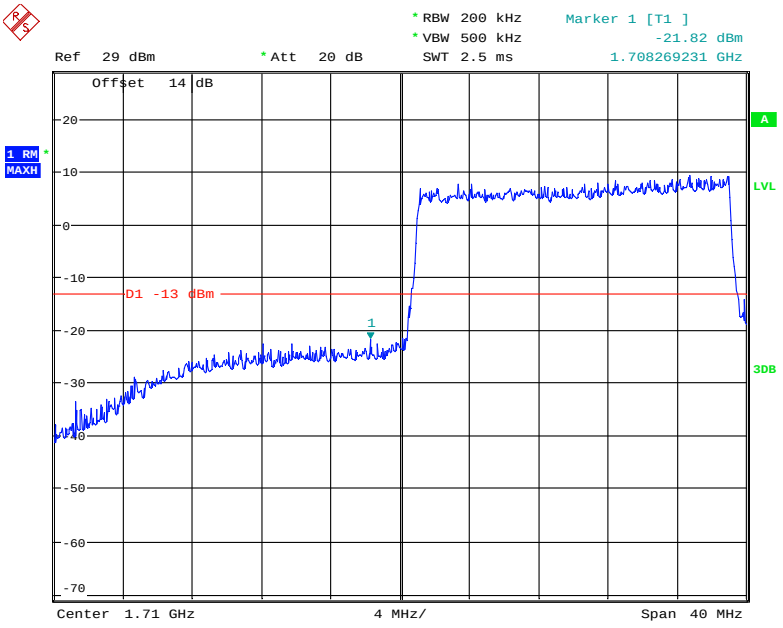
Date: 30.JUN.2018 11:32:39

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



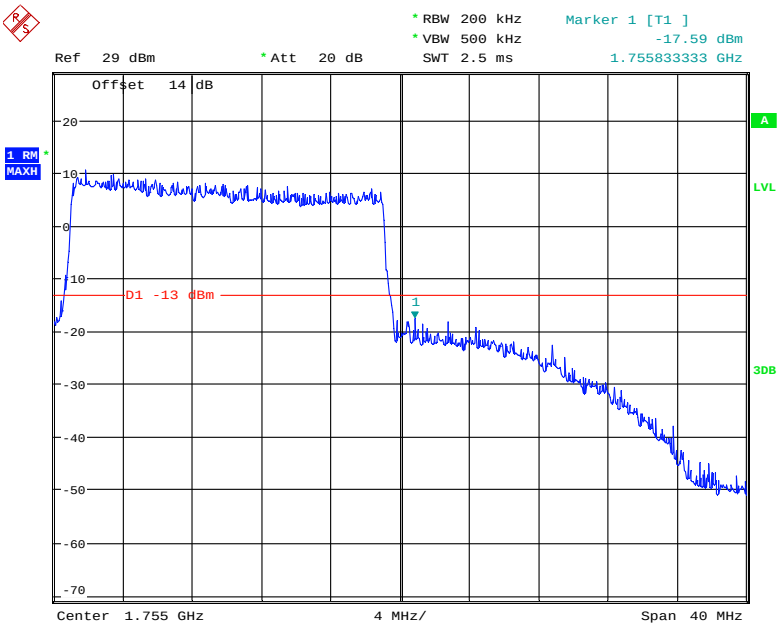
Date: 30.JUN.2018 11:30:45

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



Date: 30.JUN.2018 11:32:09

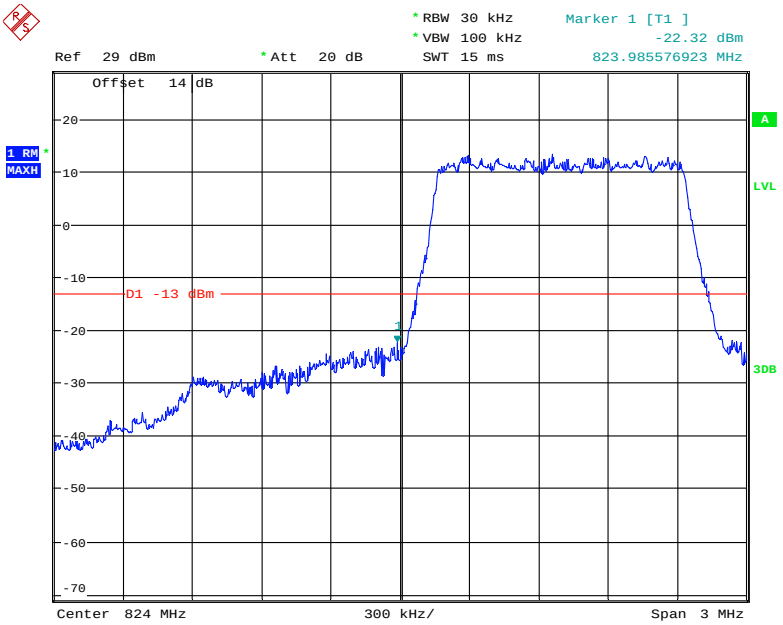
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 30.JUN.2018 11:31:23

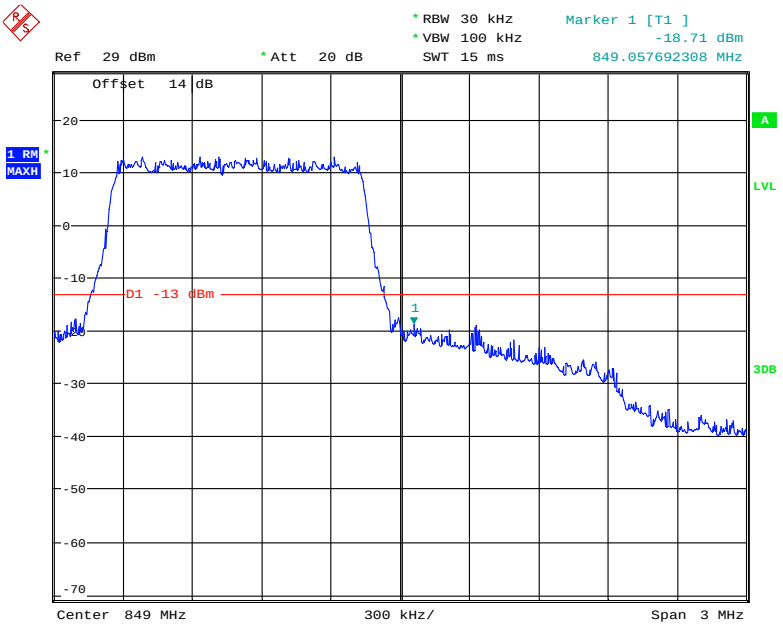
Band 5:

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



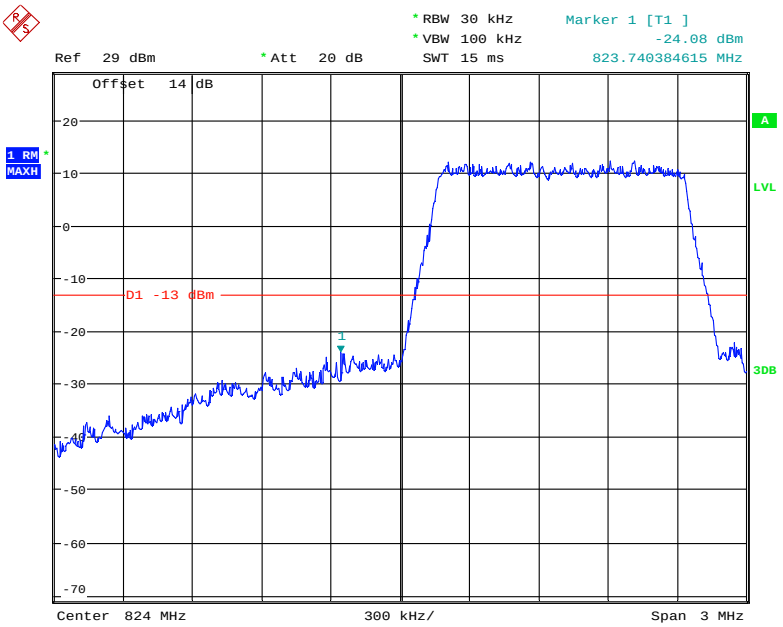
Date: 30.JUN.2018 11:42:12

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



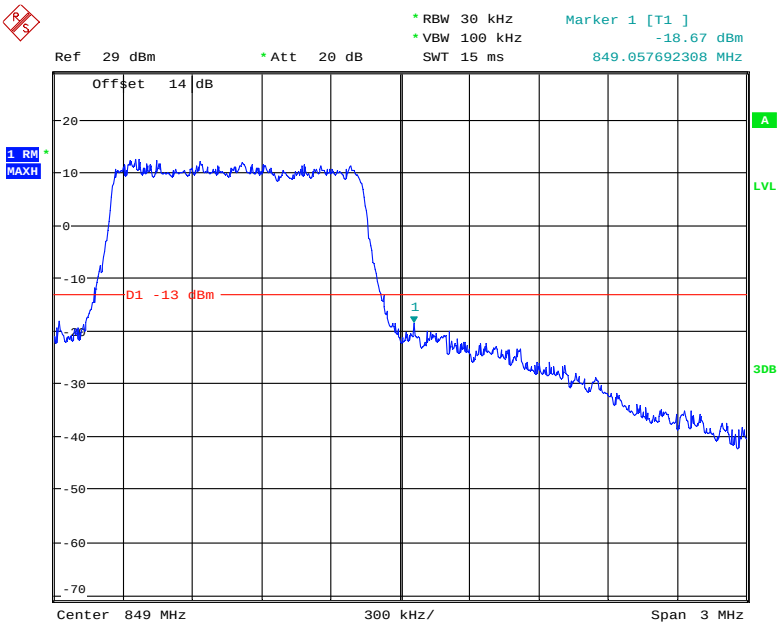
Date: 30.JUN.2018 11:44:07

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



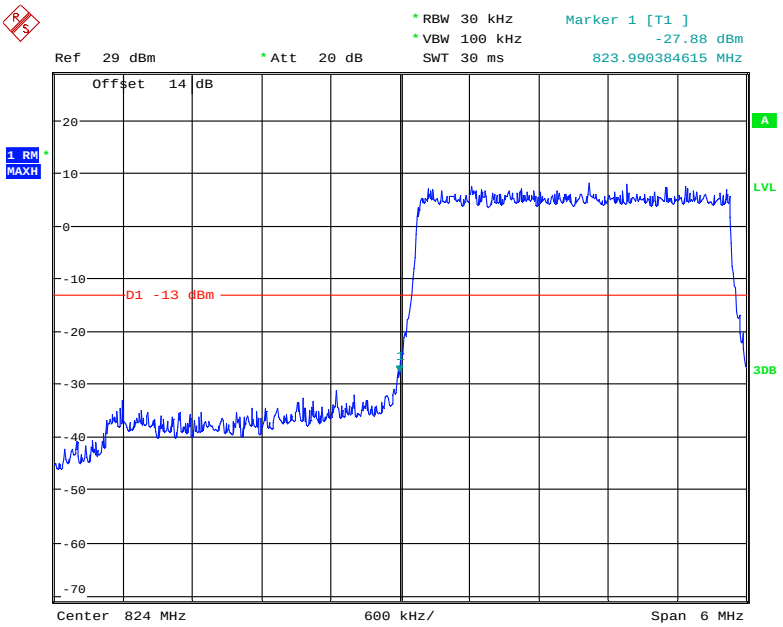
Date: 30.JUN.2018 11:42:56

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



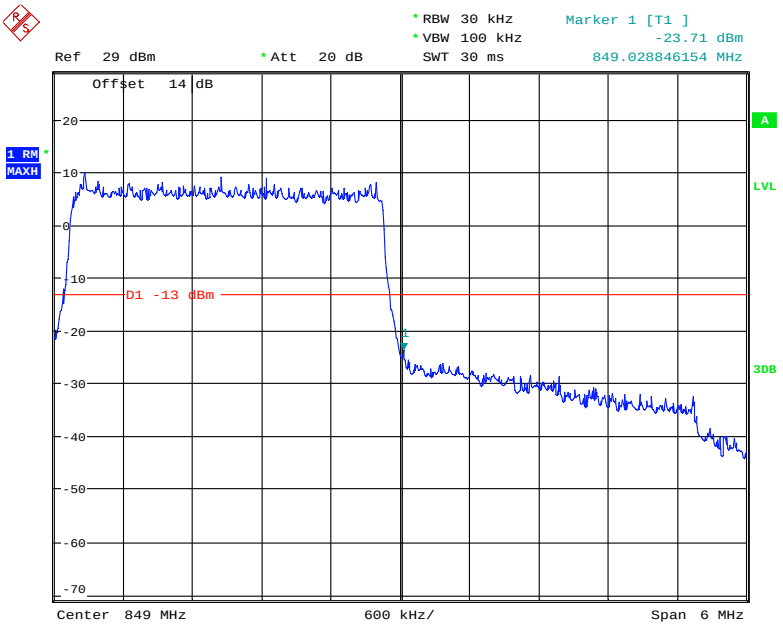
Date: 30.JUN.2018 11:43:41

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



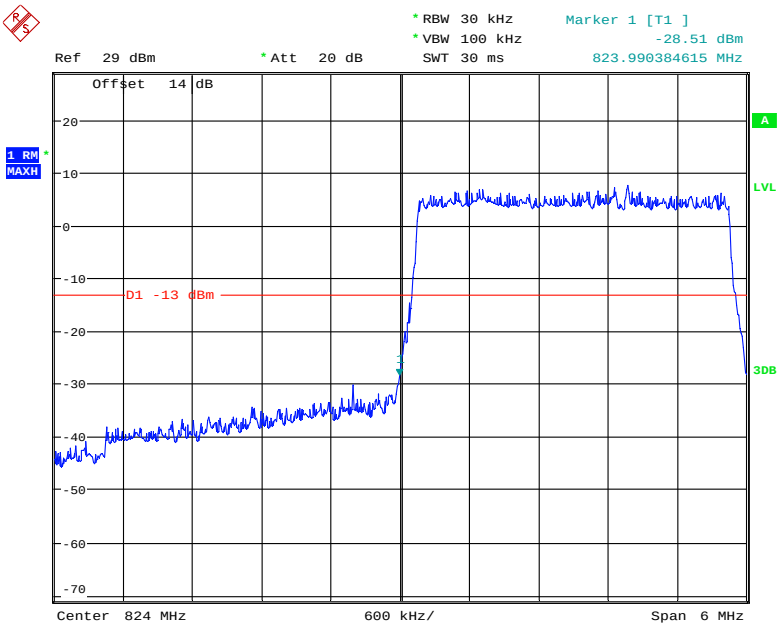
Date: 30.JUN.2018 11:46:36

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



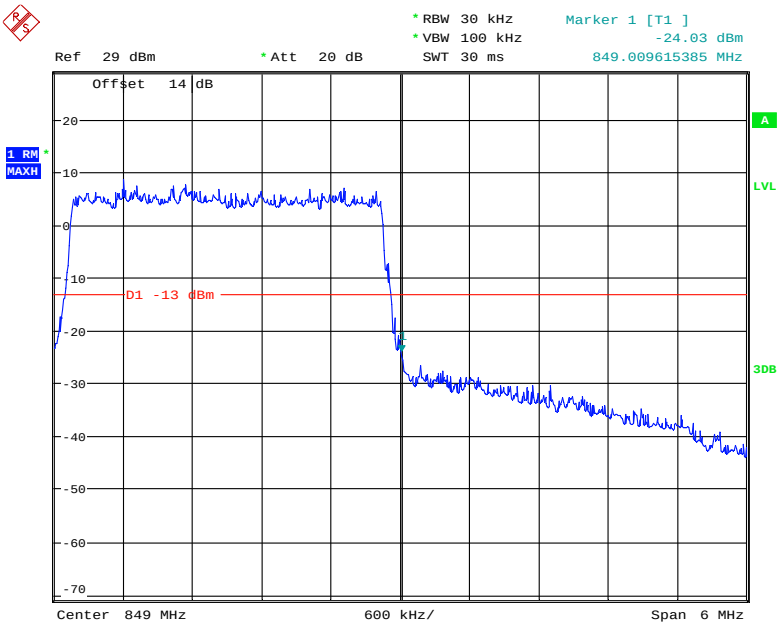
Date: 30.JUN.2018 11:45:05

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



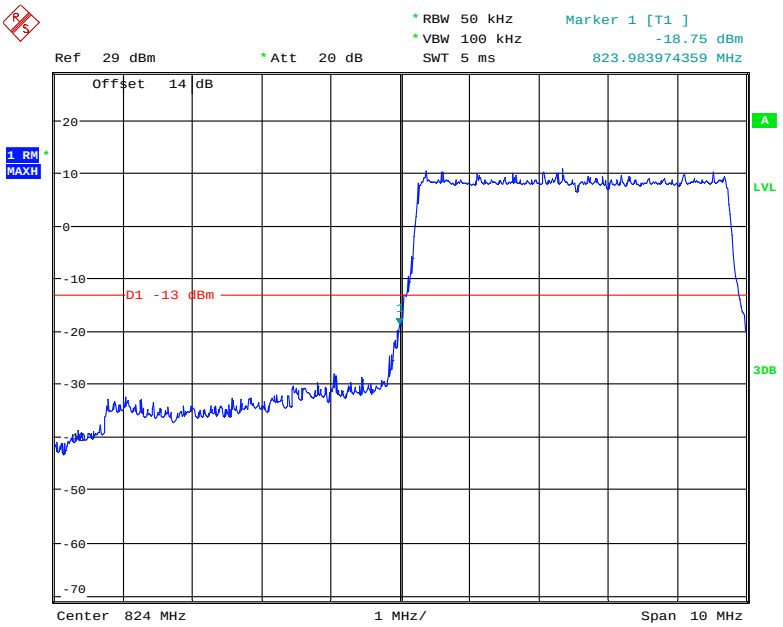
Date: 30.JUN.2018 11:46:14

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



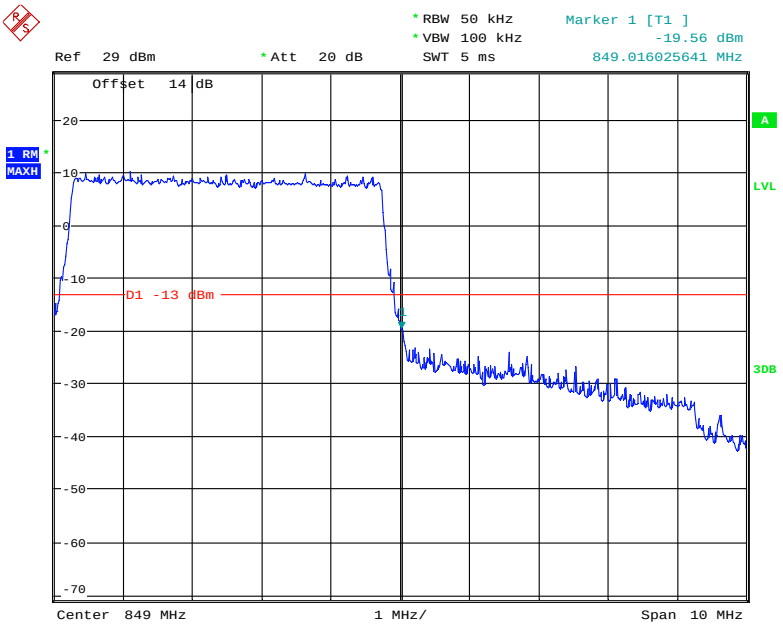
Date: 30.JUN.2018 11:45:38

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



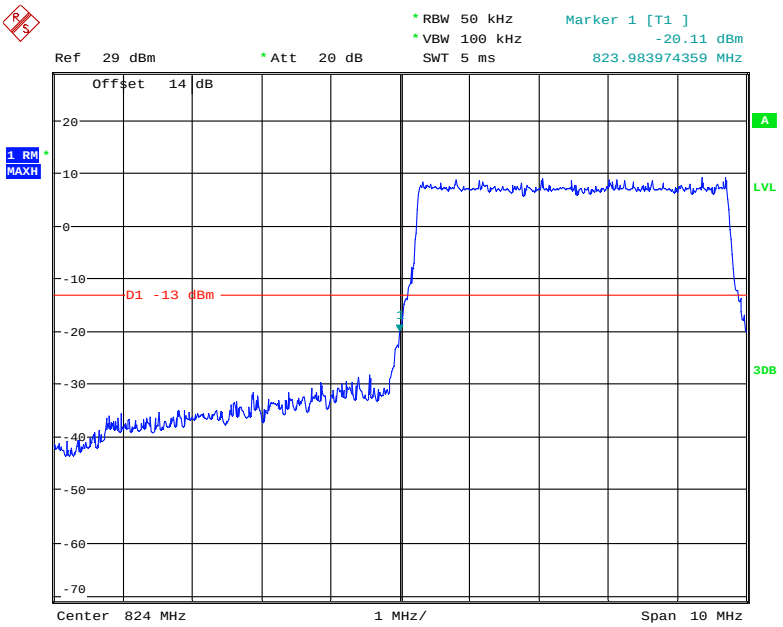
Date: 30.JUN.2018 11:47:54

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



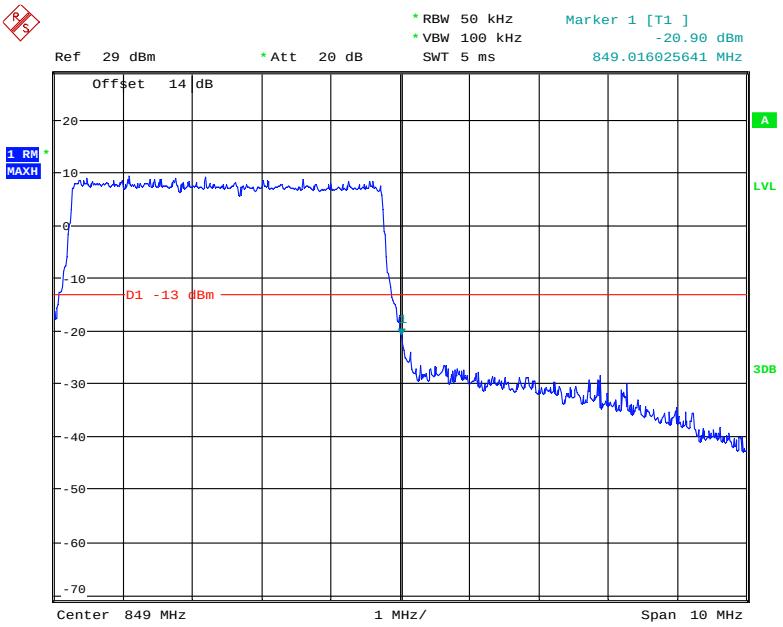
Date: 30.JUN.2018 11:49:34

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



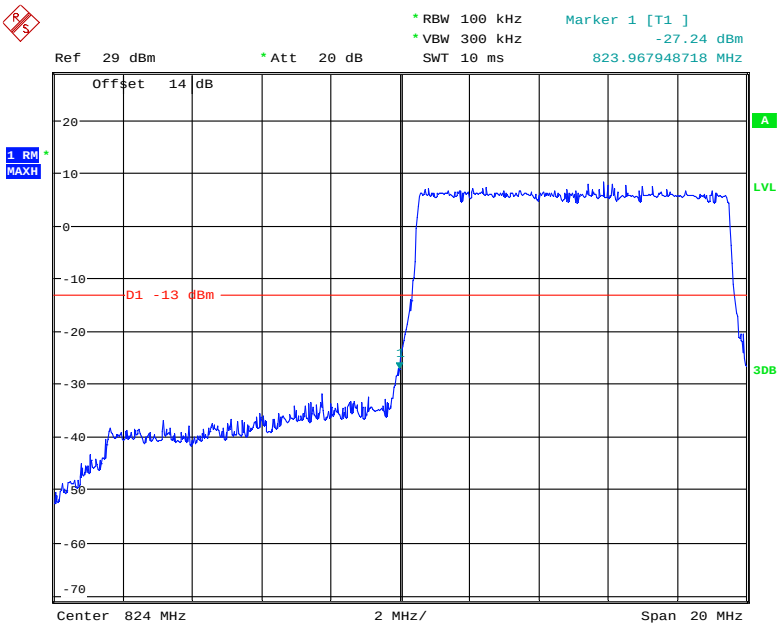
Date: 30.JUN.2018 11:48:16

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



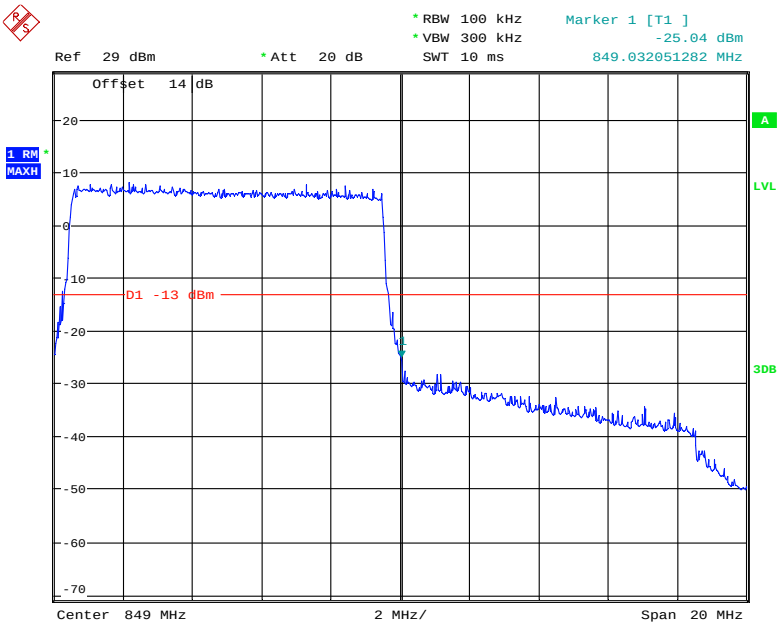
Date: 30.JUN.2018 11:49:08

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



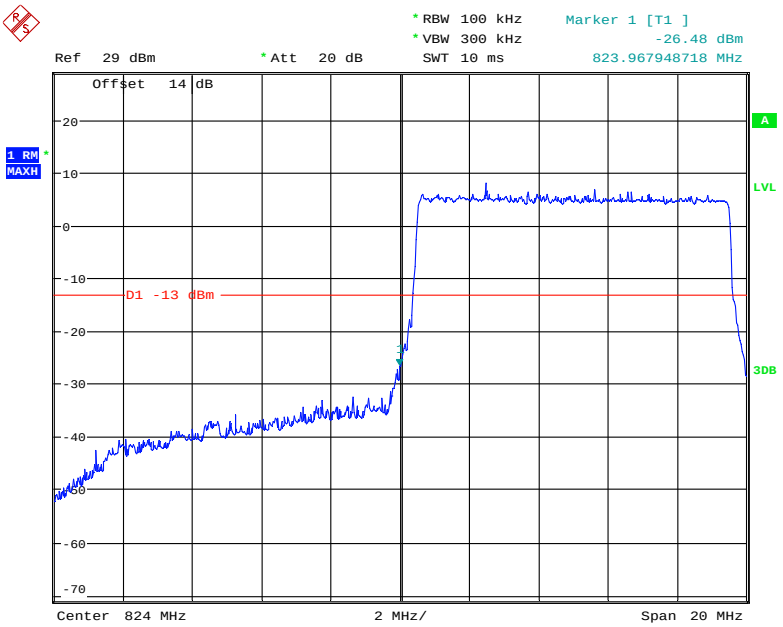
Date: 30.JUN.2018 11:52:15

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



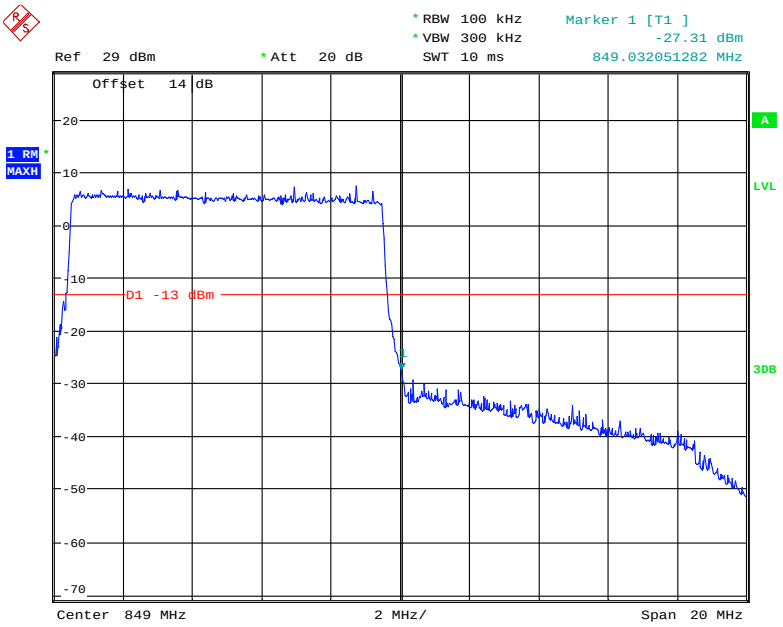
Date: 30.JUN.2018 11:50:50

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



Date: 30.JUN.2018 11:51:52

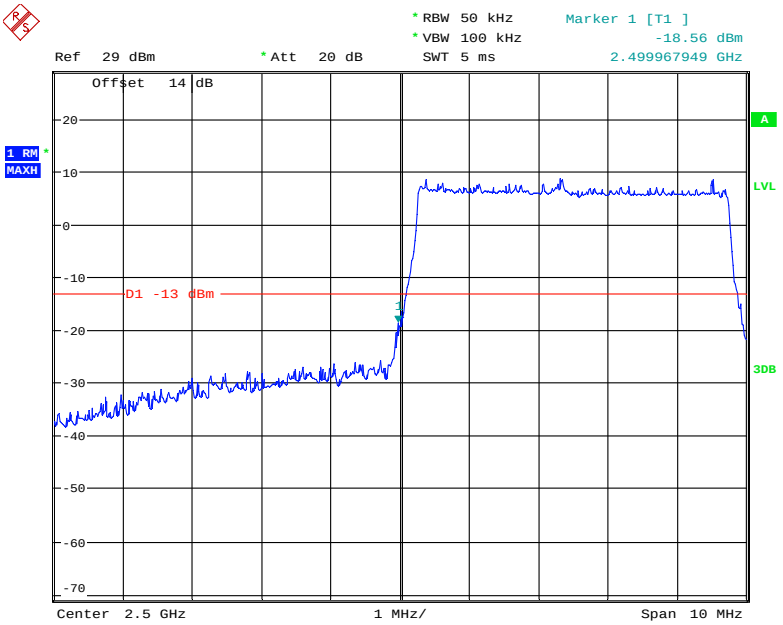
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



Date: 30.JUN.2018 11:51:20

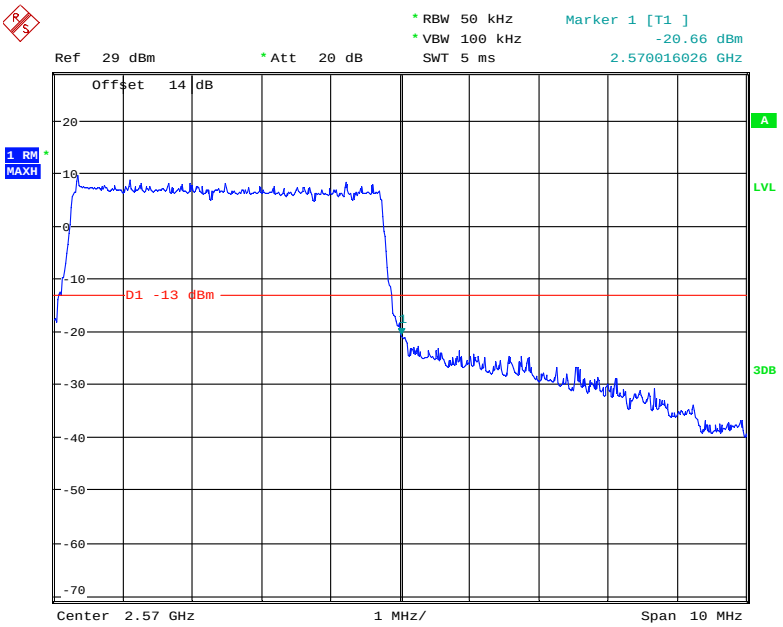
LTE Band 7:

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



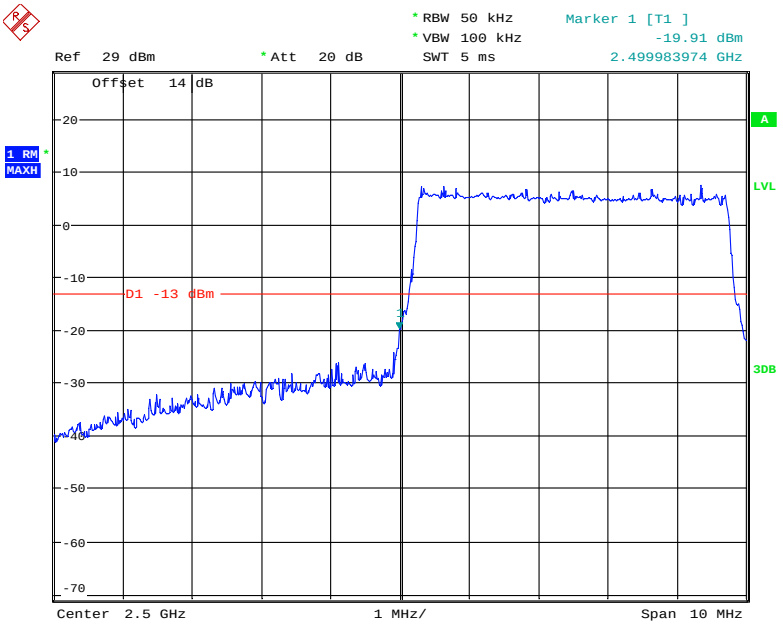
Date: 30.JUN.2018 13:12:38

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



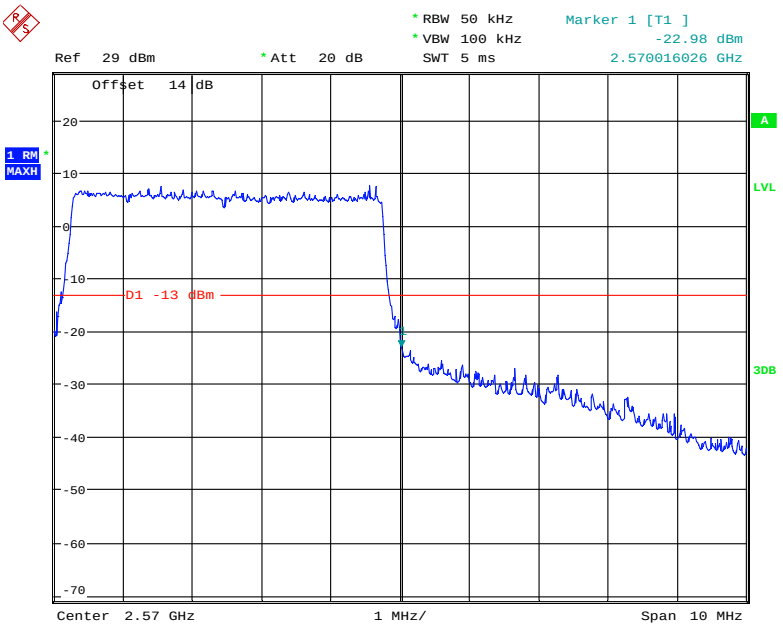
Date: 30.JUN.2018 13:14:54

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



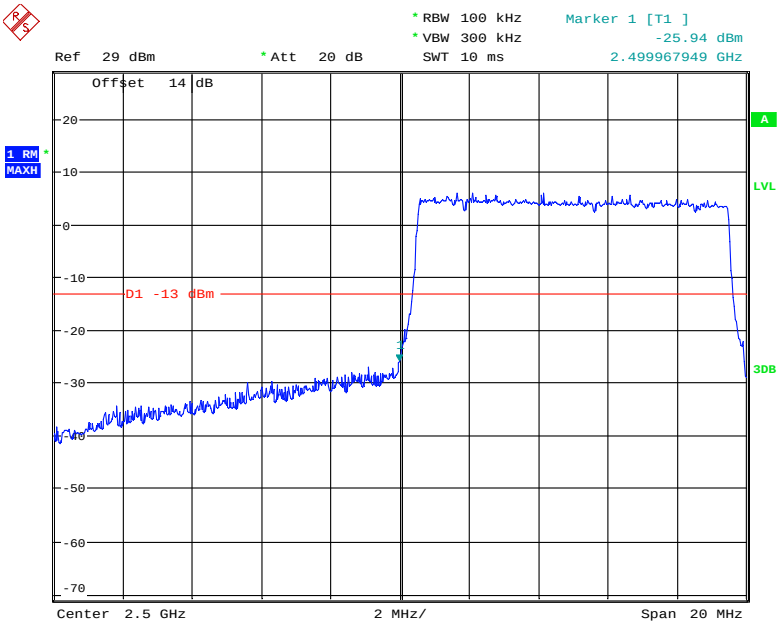
Date: 30.JUN.2018 13:13:44

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



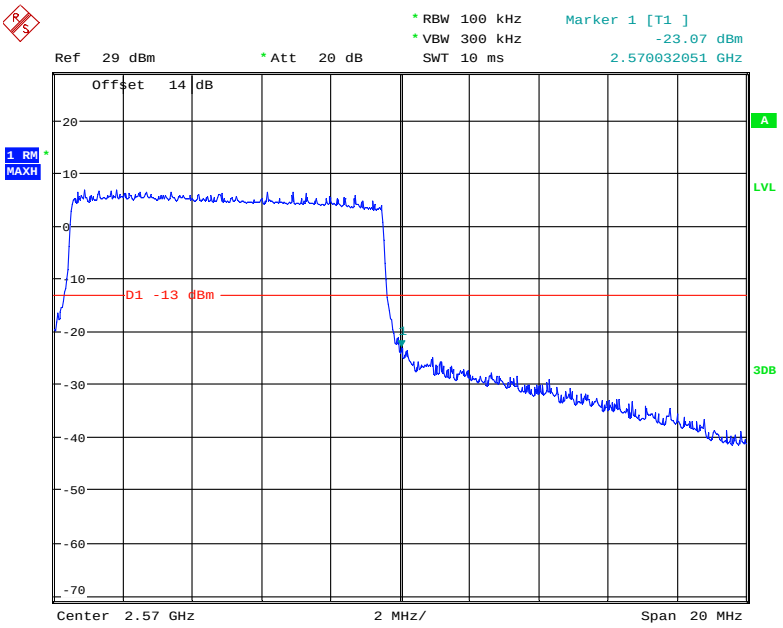
Date: 30.JUN.2018 13:14:23

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



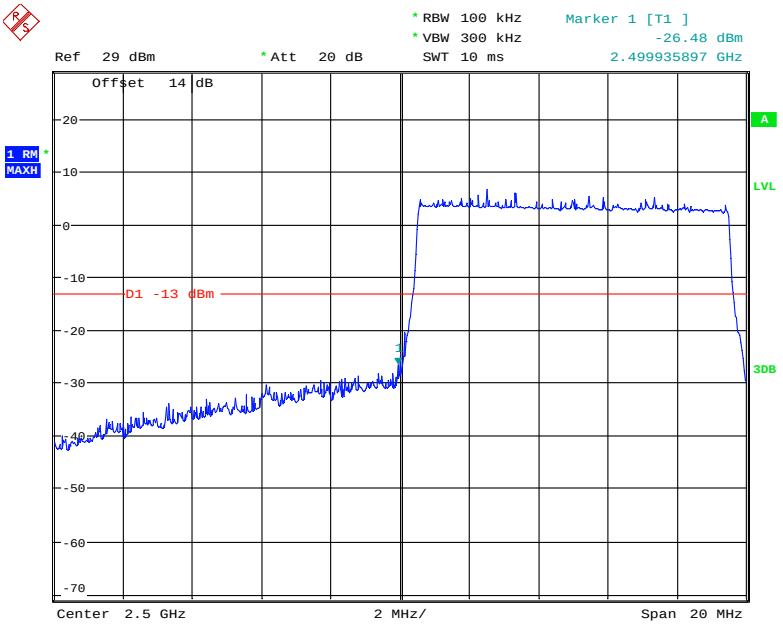
Date: 30.JUN.2018 13:18:59

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



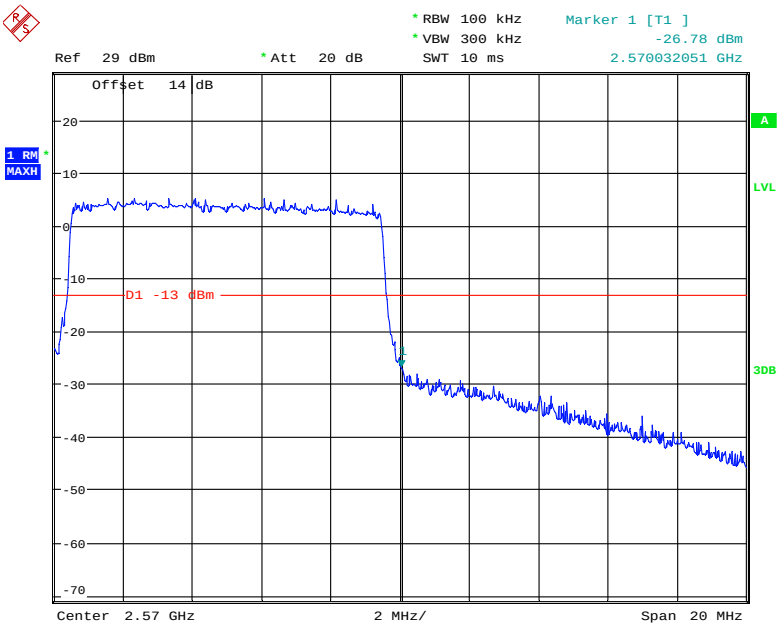
Date: 30.JUN.2018 13:16:47

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



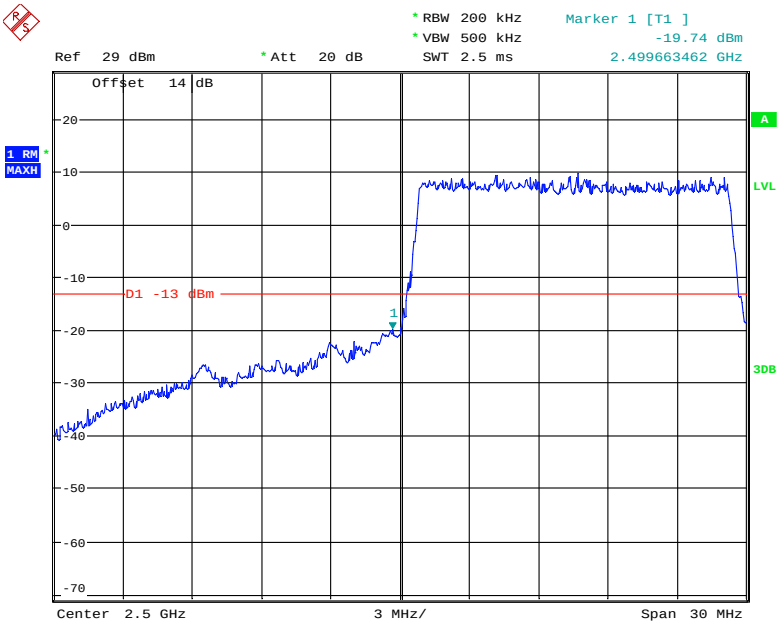
Date: 30.JUN.2018 13:18:35

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



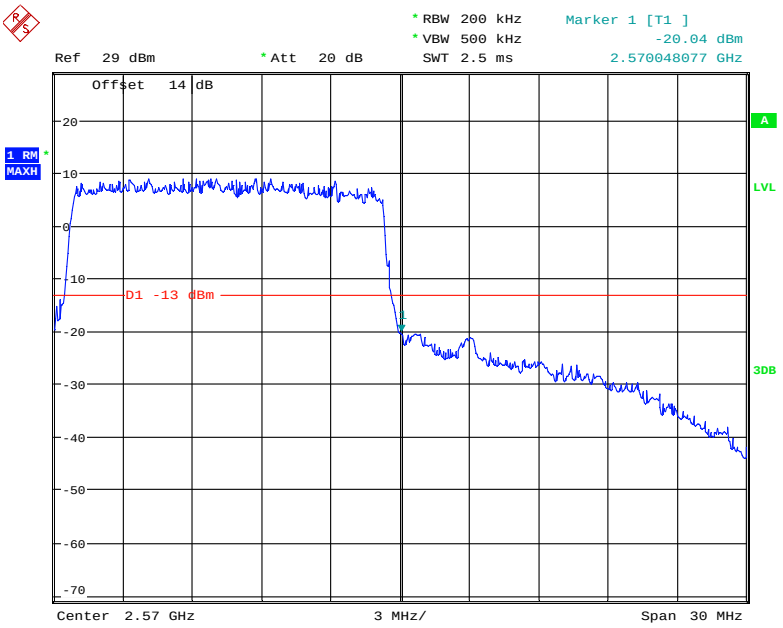
Date: 30.JUN.2018 13:17:52

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



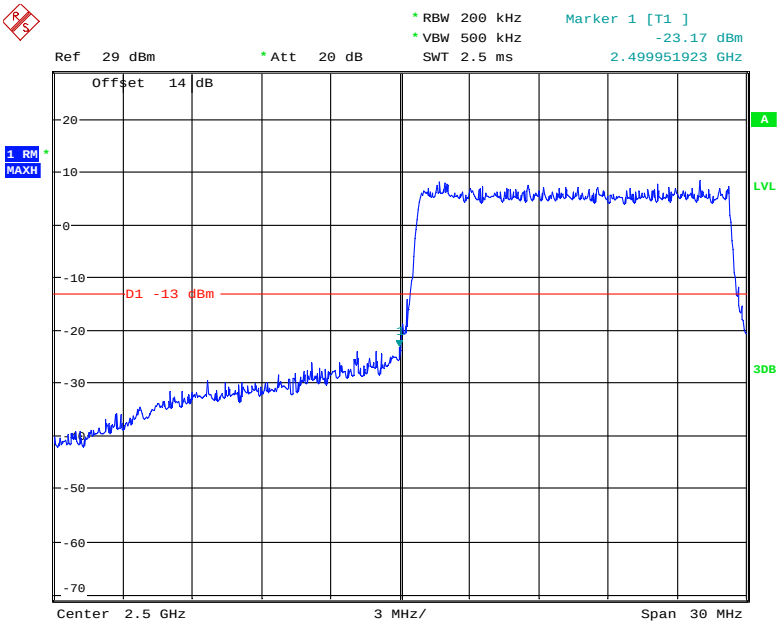
Date: 30.JUN.2018 13:20:48

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



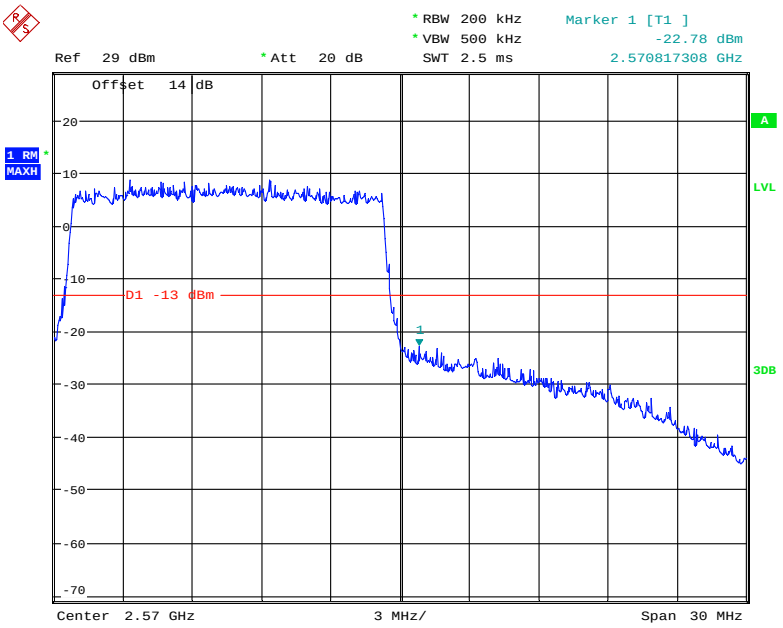
Date: 30.JUN.2018 13:22:41

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



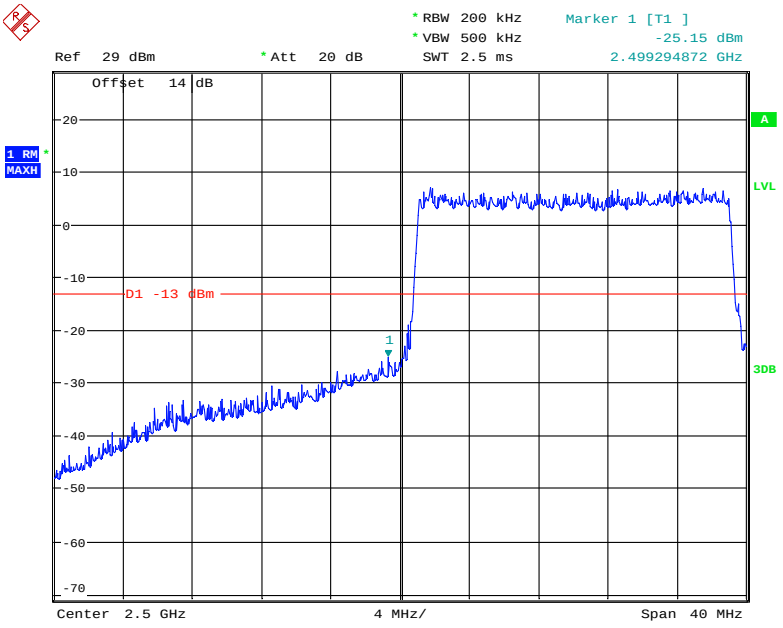
Date: 30.JUN.2018 13:21:22

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



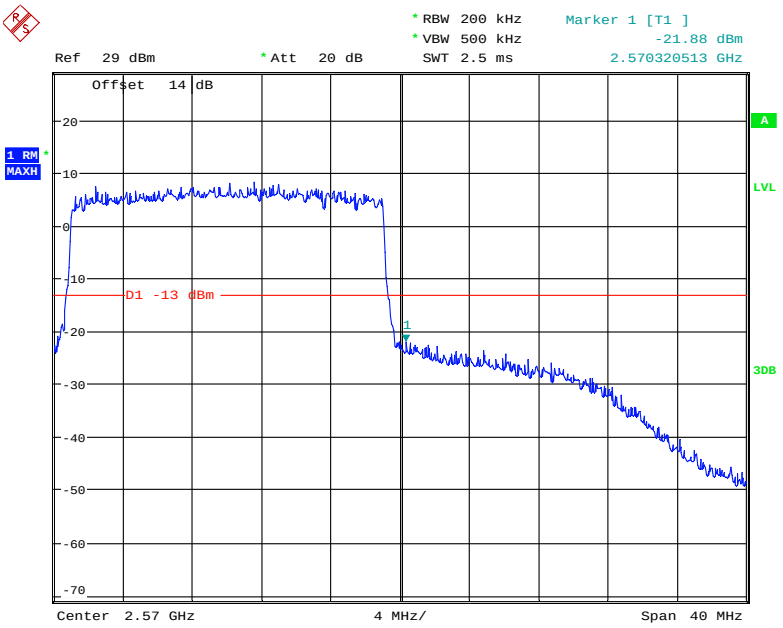
Date: 30.JUN.2018 13:22:07

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



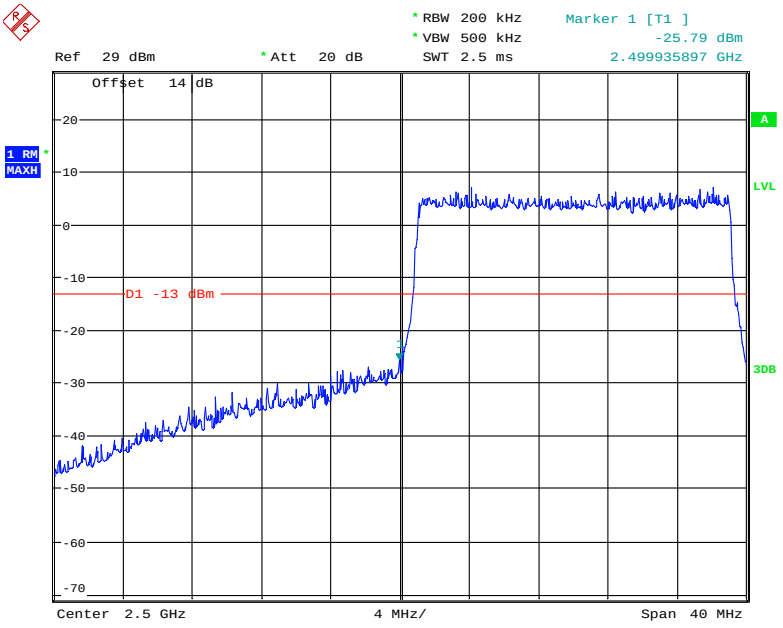
Date: 30.JUN.2018 13:25:55

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



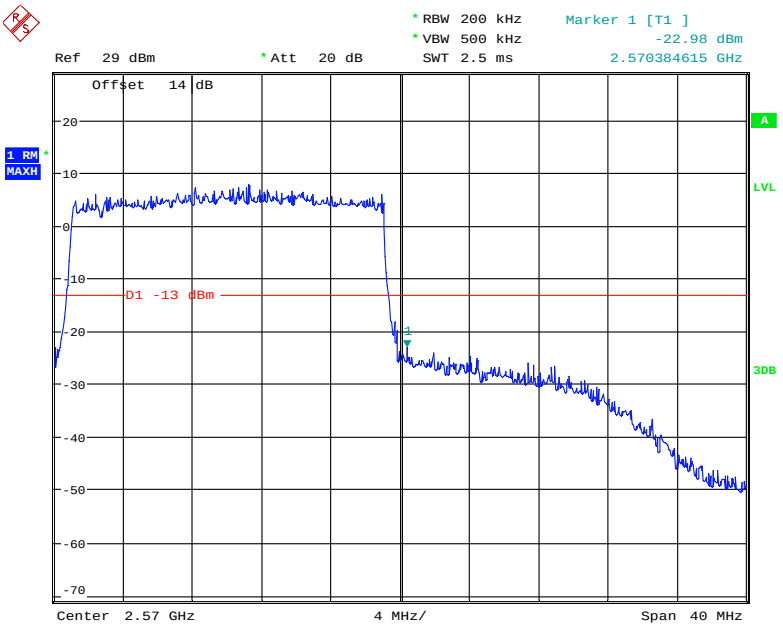
Date: 30.JUN.2018 13:23:48

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



Date: 30.JUN.2018 13:25:32

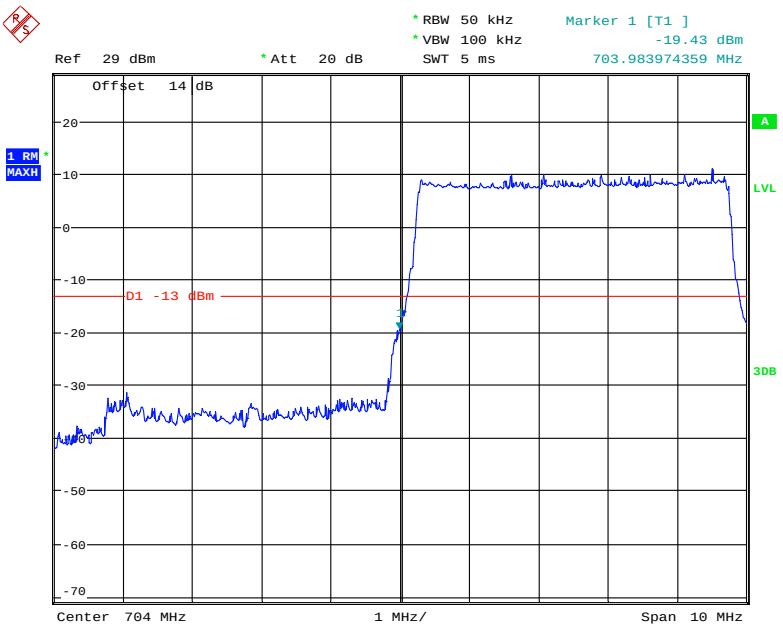
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 30.JUN.2018 13:24:46

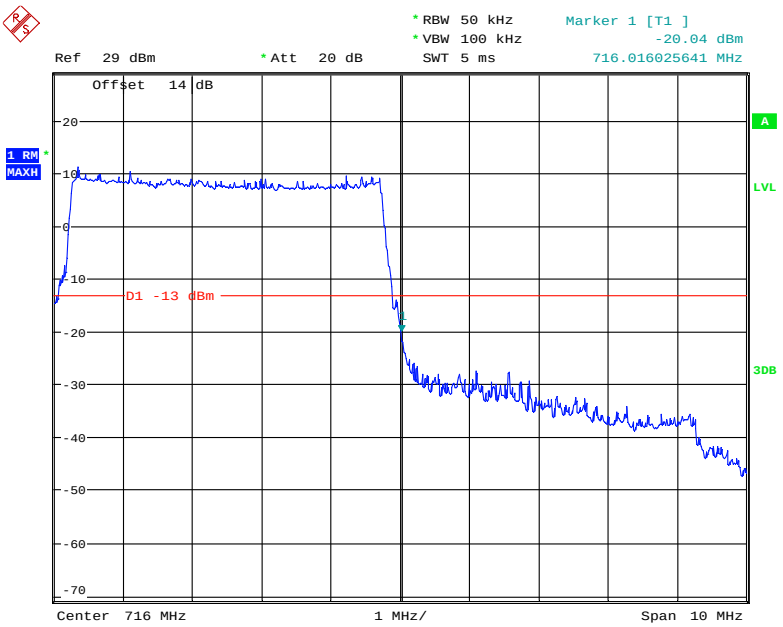
LTE Band 17:

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



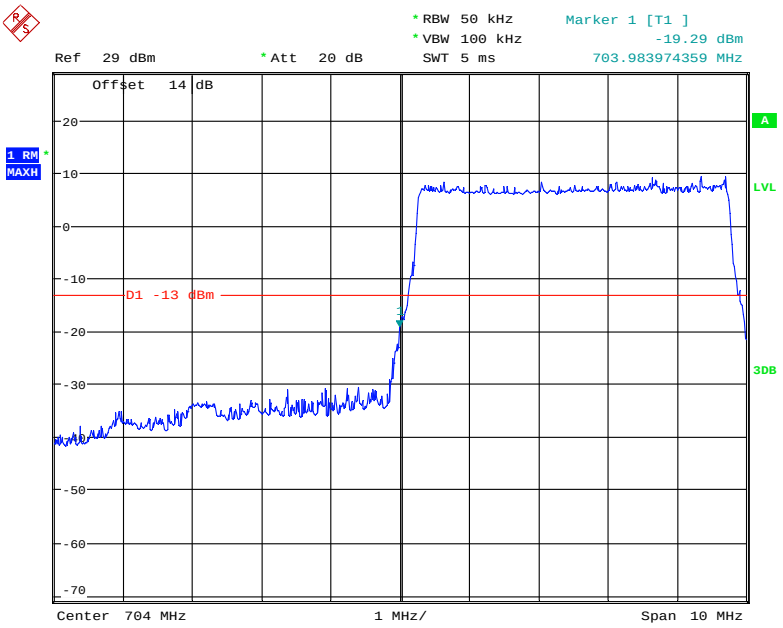
Date: 30.JUN.2018 13:30:06

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



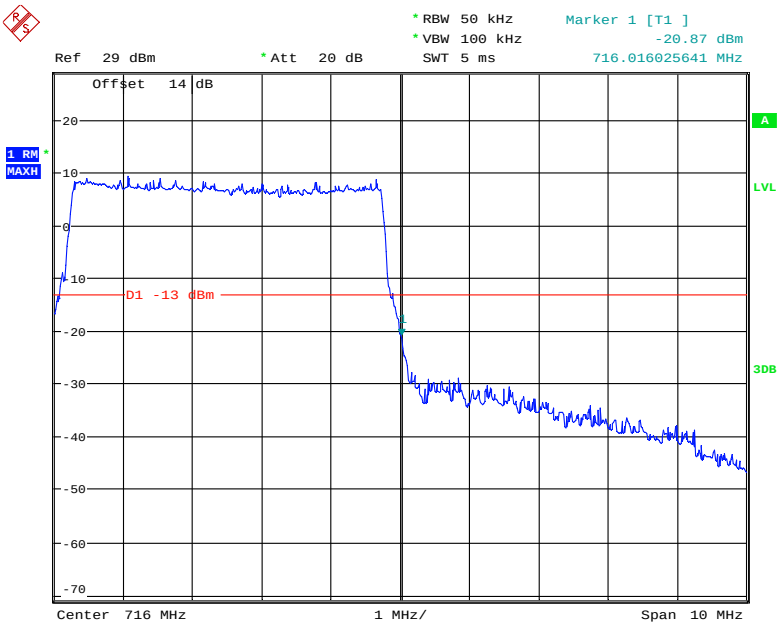
Date: 30.JUN.2018 13:31:49

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



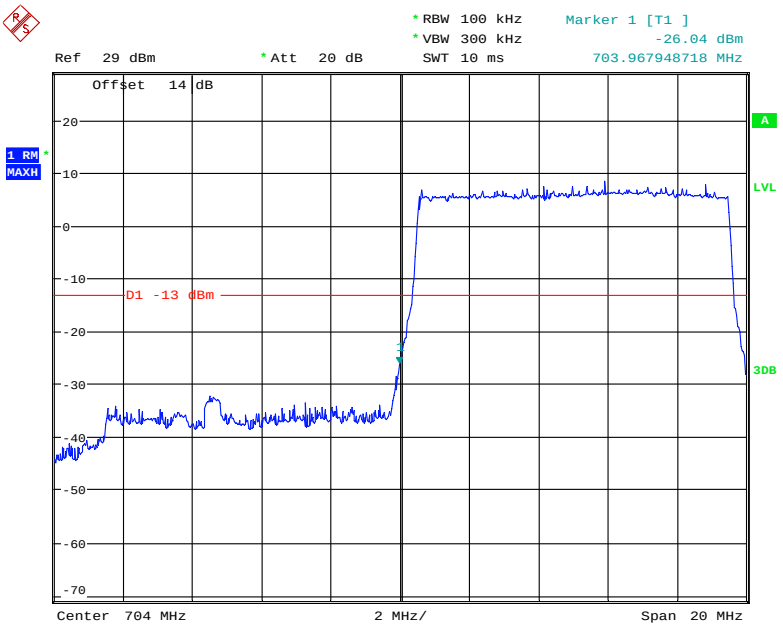
Date: 30.JUN.2018 13:30:46

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



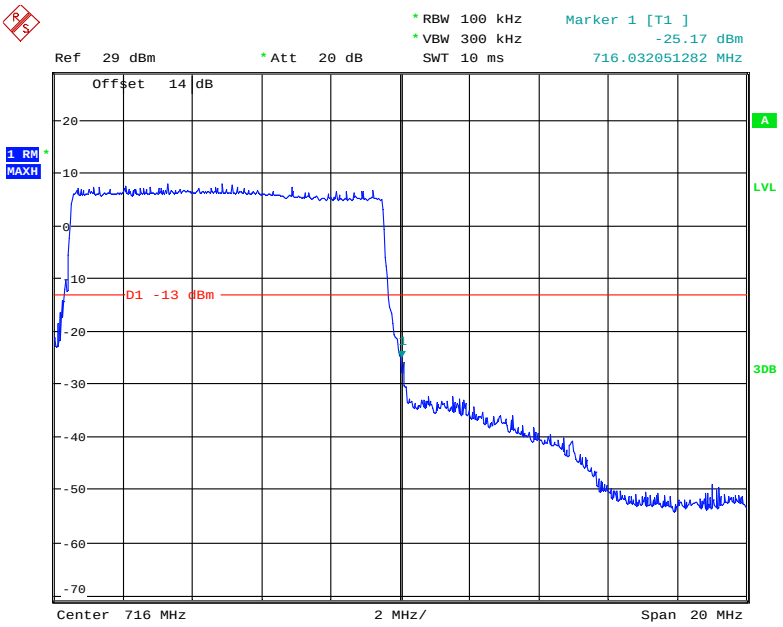
Date: 30.JUN.2018 13:31:25

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



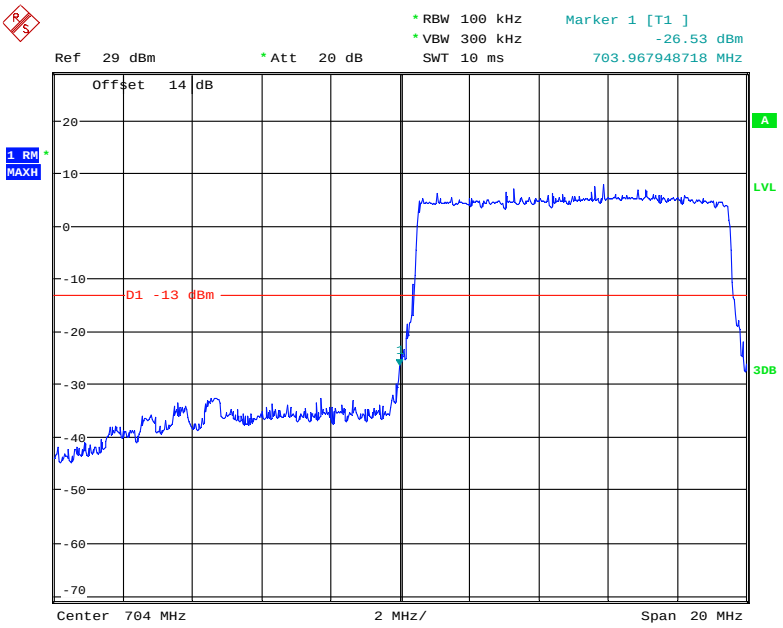
Date: 30.JUN.2018 13:34:24

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



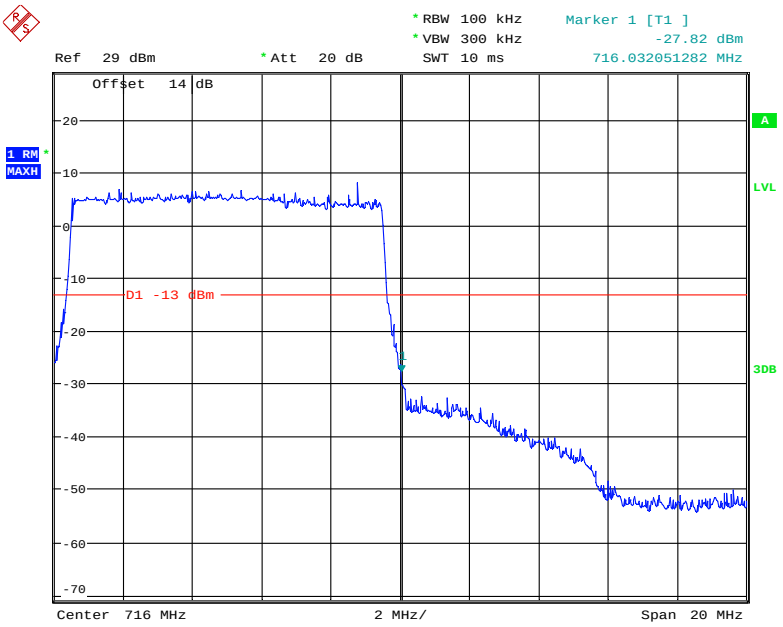
Date: 30.JUN.2018 13:32:51

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



Date: 30.JUN.2018 13:33:59

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



Date: 30.JUN.2018 13:33:15

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

Applicable Standard

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

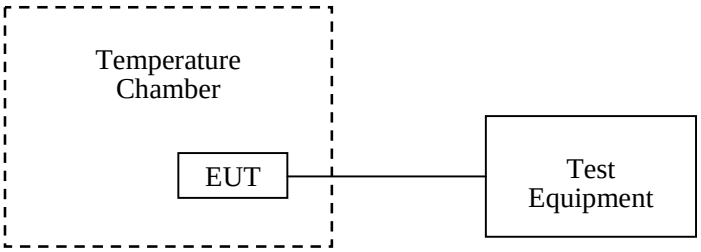
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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:	26 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Hill He on 2018-07-04.

EUT operation mode: Transmitting

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

Cellular Band (Part 22H)

GSM Mode

Middle Channel, f_o =836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	10	0.011953	2.5
-20		-18	-0.021516	2.5
-10		13	0.015539	2.5
0		-15	-0.017930	2.5
10		6	0.007172	2.5
20		8	0.009563	2.5
30		-5	-0.005977	2.5
40		3	0.003586	2.5
50		-6	-0.007172	2.5
25	V min.= 3.6	-7	-0.008367	2.5
	V max.= 4.35	16	0.019125	2.5

EDGE Mode

Middle Channel, f_o =836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	9	0.0105	2.5
-20		10	0.0116	2.5
-10		7	0.0089	2.5
0		10	0.0118	2.5
10		7	0.0081	2.5
20		8	0.0099	2.5
30		8	0.0096	2.5
40		7	0.0089	2.5
50		10	0.0116	2.5
25	V min.= 3.6	9	0.0111	2.5
	V max.= 4.35	8	0.0101	2.5

WCDMA Mode

Middle Channel, f_o =836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	-7	-0.008367	2.5
-20		-5	-0.005977	2.5
-10		4	0.004781	2.5
0		-3	-0.003586	2.5
10		2	0.002391	2.5
20		-11	-0.013148	2.5
30		15	0.017930	2.5
40		-17	-0.020320	2.5
50		-9	-0.010758	2.5
25	V min.= 3.6	-1	-0.001195	2.5
	V max.= 4.35	-4	-0.004781	2.5

PCS Band (Part 24E)

GSM Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	Voltage Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	13	0.006915	pass
-20		-9	-0.004787	pass
-10		10	0.005319	pass
0		1	0.000532	pass
10		12	0.006383	pass
20		8	0.004255	pass
30		-9	-0.004787	pass
40		16	0.008511	pass
50		3	0.001596	pass
25	V min.= 3.6	5	0.002660	pass
	V max.= 4.35	-7	-0.003723	pass

EDGE Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	Voltage Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	15	0.0078	pass
-20		16	0.0087	pass
-10		14	0.0073	pass
0		15	0.0081	pass
10		16	0.0087	pass
20		15	0.0079	pass
30		15	0.0080	pass
40		14	0.0074	pass
50		14	0.0073	pass
25	V min.= 3.6	14	0.0077	pass
	V max.= 4.35	16	0.0087	pass

WCDMA Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	1	0.000532	pass
-20		10	0.005319	pass
-10		7	0.003723	pass
0		-3	-0.001596	pass
10		4	0.002128	pass
20		5	0.002660	pass
30		-2	-0.001064	pass
40		-12	-0.006383	pass
50		6	0.003191	pass
25	V min.= 3.6	9	0.004787	pass
	V max.= 4.35	16	0.008511	pass

LTE:
QPSK:

Band 2:

20.0 MHz Middle Channel, f_o =1880 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	-5	-0.002660	pass
-20		-4	-0.002128	pass
-10		-7	-0.003723	pass
0		1	0.000532	pass
10		-4	-0.002128	pass
20		-3.13	-0.001665	pass
30		3	0.001596	pass
40		6	0.003191	pass
50		-6	-0.003191	pass
25	V min.= 3.6	-6	-0.003191	pass
	V max.= 4.35	2	0.001064	pass

Band 4:

20 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	1710.401	1754.596	1710	1755
-20		1710.429	1754.591	1710	1755
-10		1710.428	1754.591	1710	1755
0		1710.423	1754.589	1710	1755
10		1710.419	1754.592	1710	1755
20		1710.419	1754.590	1710	1755
30		1710.416	1754.589	1710	1755
40		1710.417	1754.588	1710	1755
50		1710.413	1754.583	1710	1755
25	V min.= 3.6	1710.416	1754.585	1710	1755
	V max.= 4.35	1710.421	1754.582	1710	1755

Band 5:

10.0 MHz Middle Channel, f_o = 836.5MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	1	0.001195	2.5
-20		-2	-0.002391	2.5
-10		4	0.004782	2.5
0		2	0.002391	2.5
10		3	0.003586	2.5
20		0.64	0.000765	2.5
30		-2	-0.002391	2.5
40		-5	-0.005977	2.5
50		-6	-0.007173	2.5
25	V min.= 3.6	5	0.005977	2.5
	V max.= 4.35	-4	-0.004782	2.5

Band 7:

20 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	2500.532	2569.655	2500	2570
-20		2500.530	2569.651	2500	2570
-10		2500.529	2569.648	2500	2570
0		2500.524	2569.651	2500	2570
10		2500.523	2569.650	2500	2570
20		2500.522	2569.655	2500	2570
30		2500.521	2569.650	2500	2570
40		2500.522	2569.653	2500	2570
50		2500.519	2569.651	2500	2570
25	V min.= 3.6	2500.515	2569.647	2500	2570
	V max.= 4.35	2500.519	2569.649	2500	2570

Band 17:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	704.402	715.533	704	716
-20		704.416	715.532	704	716
-10		704.414	715.530	704	716
0		704.412	715.527	704	716
10		704.414	715.531	704	716
20		704.415	715.531	704	716
30		704.412	715.528	704	716
40		704.415	715.524	704	716
50		704.414	715.526	704	716
25	V min.= 3.6	704.418	715.527	704	716
	V max.= 4.35	704.420	715.531	704	716

LTE:
16QAM:

Band 2:

20.0 MHz Middle Channel, f_o=1880 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	-5	-0.002660	pass
-20		-2	-0.001064	pass
-10		-4	-0.002128	pass
0		2	0.001064	pass
10		-3	-0.001596	pass
20		-3.54	-0.001883	pass
30		1	0.000532	pass
40		4	0.002128	pass
50		-8	-0.004255	pass
25	V min.= 3.6	-7	-0.009043	pass
	V max.= 4.35	5	0.007979	pass

Band 4:

20 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	1710.409	1754.591	1710	1755
-20		1710.406	1754.594	1710	1755
-10		1710.407	1754.594	1710	1755
0		1710.402	1754.590	1710	1755
10		1710.402	1754.589	1710	1755
20		1710.398	1754.592	1710	1755
30		1710.396	1754.588	1710	1755
40		1710.399	1754.587	1710	1755
50		1710.402	1754.588	1710	1755
25	V min.= 3.6	1710.406	1754.589	1710	1755
	V max.= 4.35	1710.407	1754.593	1710	1755

Band 5:

10.0 MHz Middle Channel, f_o=836.5MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	1	0.001195	2.5
-20		-2	-0.002391	2.5
-10		4	0.004782	2.5
0		2	0.002391	2.5
10		3	0.003586	2.5
20		0.52	0.000622	2.5
30		-1	-0.001195	2.5
40		-5	-0.005977	2.5
50		-7	-0.008368	2.5
25	V min.= 3.6	15	0.017932	2.5
	V max.= 4.35	6	0.007173	2.5

Band 7:

20 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	2500.535	2569.653	2500	2570
-20		2500.557	2569.654	2500	2570
-10		2500.560	2569.652	2500	2570
0		2500.564	2569.651	2500	2570
10		2500.567	2569.654	2500	2570
20		2500.564	2569.658	2500	2570
30		2500.566	2569.660	2500	2570
40		2500.570	2569.663	2500	2570
50		2500.570	2569.660	2500	2570
25	V min.= 3.6	2500.572	2569.657	2500	2570
	V max.= 4.35	2500.576	2569.655	2500	2570

Band 17

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	704.442	715.530	704	716
-20		704.440	715.533	704	716
-10		704.440	715.534	704	716
0		704.440	715.538	704	716
10		704.438	715.539	704	716
20		704.434	715.544	704	716
30		704.435	715.540	704	716
40		704.434	715.543	704	716
50		704.431	715.546	704	716
25	V min.= 3.6	704.429	715.541	704	716
	V max.= 4.35	704.427	715.538	704	716

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