

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

For

Shandong USR IOT Technology Limited

Floor 11, Building 1, No. 1166 Xinluo Street, Gaoxin Qu, Jinan, Shandong, China

FCC ID: 2AJDAUSR-G806

Report Type: Original Report	Product Type: 4G Router
Report Number: RSZ171011001-00B	
Report Date: 2017-12-08	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Shandong USR IOT Technology Limited's* product, model number: *USR-G806 (FCC ID: 2AJDAUSR-G806)* or the "EUT" in this report was a *4G Router*, which was measured approximately: 110 mm (L) × 99 mm (W) × 30 mm (H), rated with input voltage: DC 12V from adapter.

Adapter Information:

Model: SOY-1200100US

Input: AC 100-240V, 50/60Hz, 0.3A

Output: DC 12V, 1.0 A

Notes: This series products model: USR-G800, USR-G807, USR-G808, USR-G781, USR-G805, USR-G809, USR-G786, USR-G788 and USR-G806 are electrically identical, and only are different for model name. Model USR-G806 was selected for fully testing, the detailed information can be referred to the declaration which was stated and guaranteed by the applicant.

**All measurement and test data in this report was gathered from production sample serial number: 1702223 (Assigned by BACL). The EUT supplied by the applicant was received on 2017-10-11.*

Objective

This type approval report is prepared on behalf of *Shandong USR IOT Technology Limited* in accordance with Part 2, Part 22-Subpart H, Part 24-Subpart E and Part 27 of the Federal Communication Commission's rules.

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

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS submissions with FCC ID: 2AJDAUSR-G806.

Test Methodology

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

Part 22 Subpart H - Public Mobile Services

Part 24 Subpart E - Personal Communication Services

Part 27 – Miscellaneous wireless communications services

Applicable Standards: TIA/EIA 603-D.

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

Measurement Uncertainty

Parameter		uncertainty
Occupied Channel Bandwidth		±5%
RF output power, conducted		±1.5dB
Unwanted Emission, conducted		±1.5dB
Emissions, Radiated	Below 1GHz	±4.70dB
	Above 1GHz	±4.80dB
Temperature		±1 °C
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. : 382179, the FCC Designation No. : CN5001.

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.

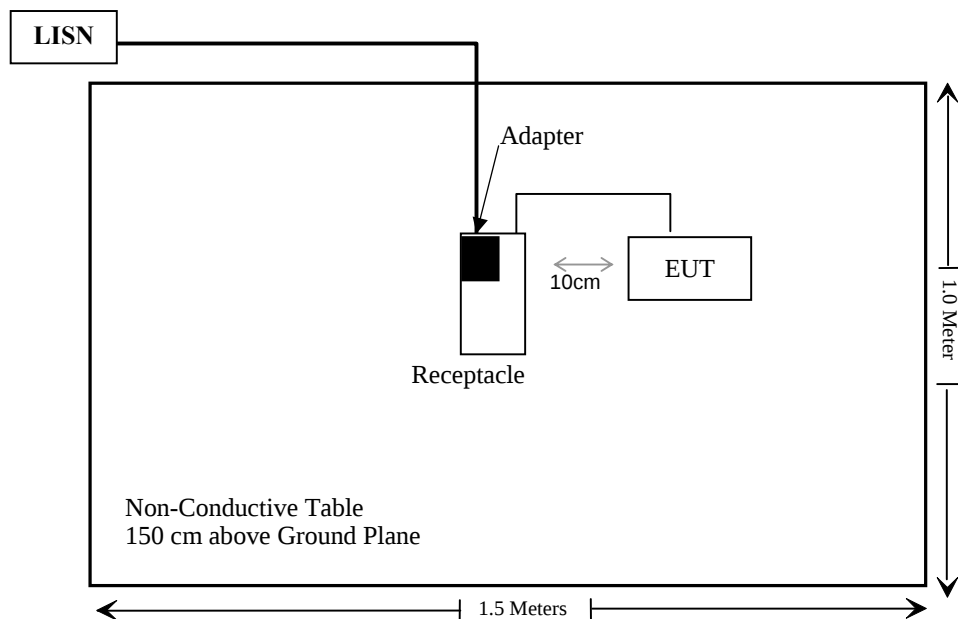
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
/	/	/	/

External I/O Cable

Cable Description	Length (m)	From Port	To
Shielding Detachable USB Cable	1.0	EUT	Adapter

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§ 1.1307 (b) (1) & §2.1091	MAXIMUM PERMISSIBLE EXPOSURE (MPE)	Compliance
§2.1046; § 22.913 (a); § 24.232 (c); §27.50 (d)	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

TEST EQUIPMENT LIST

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

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200120	2016-12-05	2017-12-05
Fluke	Digital Multimeter	287	19000011	2017-04-09	2018-04-09
ESPEC	Temperature & Humidity Chamber	EL-10KA	09107726	2016-11-22	2017-11-22
Long Wei	DC Power Supply	TPR-6420D	398363	NCR	NCR
Rohde & Schwarz	Wideband Radio Communication Tester	CMU200	106891	2017-10-18	2018-10-18
Ducommun technologies	RF Cable	RG-214	3	2016-05-22	2017-11-22
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2017-08-19	2018-08-19
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-146520-wh	2017-04-24	2018-04-24

* 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) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

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

f = frequency in MHz

* = Plane-wave equivalent power density

Result

Calculated Formulary:

Predication of MPE limit at a given distance

$$S = \frac{PG}{4\pi R^2}$$

S = power density (in appropriate units, e.g. mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW).

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain.

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

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

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

Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
	(dBi)	(numeric)	(dBm)	(mW)			
2412-2472 WIFI	3.0	2.00	15	31.62	20	0.013	1.0
1850-1910 WCDMA	3.5	2.24	23.5	223.87	20	0.100	1.0
1710-1755 WCDMA	3.5	2.24	23.5	223.87	20	0.100	1.0
824-849 WCDMA	3.5	2.24	23.5	223.87	20	0.100	0.55
1850-1910 LTE	3.5	2.24	24	251.19	20	0.112	1.0
1710-1755 LTE	3.5	2.24	24	251.19	20	0.112	1.0
699-716 LTE	3.5	2.24	24	251.19	20	0.112	0.47

Note: WIFI Data please refer to DTS report.

Simultaneous transmitting consideration for PCB & WIFI:

$$\sum_i \frac{S_i}{S_{Limit,i}} = 0.112/0.47 + 0.013/1.0 = 0.251 < 1.0$$

Note: To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

Result: Compliance

FCC §2.1047 - MODULATION CHARACTERISTIC

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

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

Applicable 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.

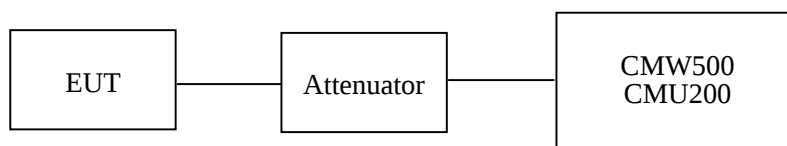
According to §27.50(c), Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

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

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:	25 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Kobe Li on 2017-10-12.

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

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band V)	Normal	RMC12.2k		22.36	22.54	22.40
		HSDPA	1	21.25	21.50	21.34
			2	21.43	21.66	21.46
			3	21.25	21.47	21.28
			4	21.40	21.59	21.48
		HSUPA	1	21.25	21.32	21.23
			2	21.17	21.20	21.16
			3	21.30	21.42	21.33
			4	21.13	21.27	21.20
			5	21.31	21.36	21.26
		HSPA+	1	21.67	21.85	21.82

PCS Band (Part 24E)

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band II)	Normal	RMC12.2k		22.16	22.05	22.29
		HSDPA	1	21.06	21.94	21.22
			2	21.21	21.11	21.35
			3	21.11	21.01	21.24
			4	21.26	21.09	21.37
		HSUPA	1	21.04	20.90	21.16
			2	21.00	20.79	21.11
			3	21.12	21.01	21.19
			4	20.95	20.86	21.09
			5	21.14	21.01	21.25
		HSPA+	1	20.46	20.37	20.62

AWS Band (Part 27)

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band IV)	Normal	RMC12.2k		21.15	21.32	21.66
		HSDPA	1	20.02	20.20	20.56
			2	20.22	20.44	20.74
			3	20.09	20.22	20.57
			4	20.20	20.41	20.75
		HSUPA	1	20.51	20.48	20.47
			2	20.43	20.39	20.44
			3	20.59	20.52	20.57
			4	20.40	20.35	20.36
			5	20.55	20.55	20.56
		HSPA+	1	20.65	20.78	20.88

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

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.15	13
	Middle	3.21	13
	High	3.13	13
HSDPA (16QAM)	Low	3.10	13
	Middle	3.18	13
	High	3.05	13
HSUPA (BPSK)	Low	3.01	13
	Middle	2.93	13
	High	2.85	13
HSPA+	Low	3.22	13
	Middle	3.01	13
	High	2.99	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.18	13
	Middle	2.92	13
	High	3.09	13
HSDPA (16QAM)	Low	3.16	13
	Middle	2.89	13
	High	3.02	13
HSUPA (BPSK)	Low	3.12	13
	Middle	2.86	13
	High	2.97	13
HSPA+	Low	2.68	13
	Middle	2.76	13
	High	2.93	13

AWS Band (Part 27)

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.12	13
	Middle	3.16	13
	High	3.09	13
HSDPA (16QAM)	Low	3.05	13
	Middle	3.09	13
	High	3.03	13
HSUPA (BPSK)	Low	2.95	13
	Middle	2.98	13
	High	2.92	13
HSPA+	Low	3.12	13
	Middle	3.15	13
	High	3.25	13

Radiated Power**WCDMA Mode:**

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H/24E/27	
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
ERP for WCDMA Band V (Part 22H), Middle Channel										
836.6	82.04	262	1.0	H	15.4	0.8	0.0	14.5	38.45	23.95
836.6	85.02	32	1.0	V	20.8	0.8	0.0	20.0	38.45	18.45
EIRP for WCDMA Band II (Part 24E), Middle Channel										
1880.00	82.00	89	2.2	H	12.0	1.30	8.50	19.20	33	13.8
1880.00	84.49	48	1.2	V	14.2	1.30	8.50	21.40	33	11.6
EIRP for WCDMA Band IV (Part 27), Middle Channel										
1732.60	85.44	265	2.2	H	12.3	1.30	9.10	20.10	30	9.9
1732.60	88.39	341	1.3	V	15.8	1.30	9.10	23.60	30	6.4

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	22.65	22.63	22.58
		RB Size=1, RB Offset=2	22.52	22.53	22.61
		RB Size=1, RB Offset=5	22.28	22.56	22.56
		RB Size=3, RB Offset=0	22.40	22.34	22.32
		RB Size=3, RB Offset=1	22.25	22.31	22.20
		RB Size=3, RB Offset=2	22.18	22.14	22.16
		RB Size=6, RB Offset=0	22.13	22.13	22.10
	16QAM	RB Size=1, RB Offset=0	22.17	22.15	22.08
		RB Size=1, RB Offset=2	22.02	22.02	21.94
		RB Size=1, RB Offset=5	21.99	21.92	22.95
		RB Size=3, RB Offset=0	21.75	21.70	22.86
		RB Size=3, RB Offset=1	21.77	21.84	21.81
		RB Size=3, RB Offset=2	21.78	21.78	21.75
		RB Size=6, RB Offset=0	21.70	21.65	21.76
3.0	QPSK	RB Size=1, RB Offset=0	22.80	22.74	22.82
		RB Size=1, RB Offset=7	22.73	22.64	22.74
		RB Size=1, RB Offset=14	22.55	22.61	22.76
		RB Size=8, RB Offset=0	21.86	21.84	21.90
		RB Size=8, RB Offset=4	21.77	21.68	21.77
		RB Size=8, RB Offset=7	21.56	21.58	21.70
		RB Size=15, RB Offset=0	21.77	21.72	21.76
	16QAM	RB Size=1, RB Offset=0	22.08	22.06	22.00
		RB Size=1, RB Offset=7	22.07	21.96	22.00
		RB Size=1, RB Offset=14	22.16	21.78	21.89
		RB Size=8, RB Offset=0	20.84	20.77	20.88
		RB Size=8, RB Offset=4	20.62	20.75	20.88
		RB Size=8, RB Offset=7	20.39	20.58	20.78
		RB Size=15, RB Offset=0	20.72	20.72	20.75

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	22.83	22.78	22.83
		RB Size=1, RB Offset=12	22.76	22.74	22.66
		RB Size=1, RB Offset=24	22.50	22.84	22.43
		RB Size=12, RB Offset=0	21.80	21.78	21.85
		RB Size=12, RB Offset=6	21.81	21.70	21.68
		RB Size=12, RB Offset=11	21.81	21.50	21.72
		RB Size=25, RB Offset=0	21.72	21.69	21.73
	16QAM	RB Size=1, RB Offset=0	21.98	21.56	21.64
		RB Size=1, RB Offset=12	21.79	21.36	21.68
		RB Size=1, RB Offset=24	21.80	21.37	21.53
		RB Size=12, RB Offset=0	20.78	20.74	20.75
		RB Size=12, RB Offset=6	20.76	20.67	20.64
		RB Size=12, RB Offset=11	20.55	20.46	20.56
		RB Size=25, RB Offset=0	20.73	20.68	20.72
10.0	QPSK	RB Size=1, RB Offset=0	22.79	22.76	22.69
		RB Size=1, RB Offset=24	22.73	22.79	22.62
		RB Size=1, RB Offset=49	22.60	22.68	22.58
		RB Size=25, RB Offset=0	21.77	21.73	21.70
		RB Size=25, RB Offset=12	21.75	21.67	21.63
		RB Size=25, RB Offset=24	21.82	21.54	21.50
		RB Size=50, RB Offset=0	21.53	21.51	21.53
	16QAM	RB Size=1, RB Offset=0	21.64	21.61	21.63
		RB Size=1, RB Offset=24	21.60	21.48	21.61
		RB Size=1, RB Offset=49	21.40	21.37	21.69
		RB Size=25, RB Offset=0	22.61	20.66	20.73
		RB Size=25, RB Offset=12	22.49	20.47	20.54
		RB Size=25, RB Offset=24	22.57	20.25	20.33
		RB Size=50, RB Offset=0	20.48	20.46	20.48

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	22.10	22.05	22.34
		RB Size=1, RB Offset=37	22.00	21.92	22.18
		RB Size=1, RB Offset=74	22.01	21.99	22.19
		RB Size=36, RB Offset=0	22.01	21.98	22.01
		RB Size=36, RB Offset=18	22.03	21.94	21.88
		RB Size=36, RB Offset=37	22.10	21.66	21.59
		RB Size=75, RB Offset=0	21.87	21.88	21.99
	16QAM	RB Size=1, RB Offset=0	21.82	21.84	21.70
		RB Size=1, RB Offset=37	21.80	21.83	21.54
		RB Size=1, RB Offset=74	21.76	21.80	21.38
		RB Size=36, RB Offset=0	21.79	21.79	22.02
		RB Size=36, RB Offset=18	21.79	21.68	21.97
		RB Size=36, RB Offset=37	21.53	21.56	21.81
		RB Size=75, RB Offset=0	21.16	21.1	20.97
20.0	QPSK	RB Size=1, RB Offset=0	22.89	22.87	22.95
		RB Size=1, RB Offset=49	22.90	22.85	22.83
		RB Size=1, RB Offset=99	22.77	22.80	22.76
		RB Size=50, RB Offset=0	21.82	21.79	21.93
		RB Size=50, RB Offset=24	21.79	21.83	21.84
		RB Size=50, RB Offset=49	21.65	21.64	21.64
		RB Size=100, RB Offset=0	21.76	21.75	21.83
	16QAM	RB Size=1, RB Offset=0	22.00	21.95	22.04
		RB Size=1, RB Offset=49	21.93	21.86	21.86
		RB Size=1, RB Offset=99	21.89	21.67	21.87
		RB Size=50, RB Offset=0	20.87	20.84	20.98
		RB Size=50, RB Offset=24	20.75	20.83	20.96
		RB Size=50, RB Offset=49	20.48	20.69	20.87
		RB Size=100, RB Offset=0	20.77	20.77	20.91

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	5.68	13	Pass
QPSK (100RB Size)	5.95	13	Pass
16QAM (1RB Size)	5.65	13	Pass
16QAM (100%RB Size)	6.15	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
1880.00	76.08	250	2.3	H	6.0	1.30	8.50	13.20	33
1880.00	82.15	336	1.4	V	11.9	1.30	8.50	19.10	33
3 MHz Bandwidth									
1800.00	76.48	303	1.0	H	4.4	1.30	8.50	11.60	33
1800.00	82.37	147	2.1	V	10.7	1.30	8.50	17.90	33
5 MHz Bandwidth									
1880.00	75.95	5	1.6	H	5.9	1.30	8.50	13.10	33
1880.00	81.59	172	2.1	V	11.3	1.30	8.50	18.50	33
10 MHz Bandwidth									
1880.00	78.05	83	2.3	H	8.0	1.30	8.50	15.20	33
1880.00	81.49	288	2.1	V	11.2	1.30	8.50	18.40	33
15 MHz Bandwidth									
1800.00	76.59	250	2.2	H	4.5	1.30	8.50	11.70	33
1800.00	82.36	158	1.8	V	10.7	1.30	8.50	17.90	33
20 MHz Bandwidth									
1880.00	75.81	350	2.1	H	5.8	1.30	8.50	13.00	33
1880.00	81.09	175	2.3	V	10.8	1.30	8.50	18.00	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 (dB)		
Middle Channel									
1.4 MHz Bandwidth									
1880.00	78.65	20	1.9	H	8.6	1.30	8.50	15.80	33
1880.00	82.34	210	1.6	V	12.1	1.30	8.50	19.30	33
3 MHz Bandwidth									
1880.00	78.18	220	1.5	H	8.1	1.30	8.50	15.30	33
1880.00	83.21	349	2.4	V	12.9	1.30	8.50	20.10	33
5 MHz Bandwidth									
1880.00	78.65	157	2.4	H	8.6	1.30	8.50	15.80	33
1880.00	82.59	325	2.3	V	12.3	1.30	8.50	19.50	33
10 MHz Bandwidth									
1880.00	77.96	336	2.0	H	7.9	1.30	8.50	15.10	33
1880.00	83.12	7	1.8	V	12.9	1.30	8.50	20.10	33
15 MHz Bandwidth									
1880.00	78.38	177	2.5	H	8.3	1.30	8.50	15.50	33
1880.00	82.56	215	2.1	V	12.3	1.30	8.50	19.50	33
20 MHz Bandwidth									
1880.00	78.34	360	1.3	H	8.3	1.30	8.50	15.50	33
1880.00	82.51	211	2.1	V	12.2	1.30	8.50	19.40	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	22.38	22.38	22.49
		RB Size=1, RB Offset=2	22.42	22.22	22.51
		RB Size=1, RB Offset=5	22.39	21.96	22.56
		RB Size=3, RB Offset=0	22.62	22.63	22.64
		RB Size=3, RB Offset=1	22.54	22.58	22.62
		RB Size=3, RB Offset=2	22.43	22.48	22.44
		RB Size=6, RB Offset=0	21.43	21.4	21.39
	16QAM	RB Size=1, RB Offset=0	21.86	21.84	21.91
		RB Size=1, RB Offset=2	21.74	21.79	21.74
		RB Size=1, RB Offset=5	21.71	21.82	21.83
		RB Size=3, RB Offset=0	22.78	21.78	21.74
		RB Size=3, RB Offset=1	22.78	21.66	21.78
		RB Size=3, RB Offset=2	22.58	21.69	21.58
		RB Size=6, RB Offset=0	20.65	20.65	20.67
3.0	QPSK	RB Size=1, RB Offset=0	22.46	22.44	22.41
		RB Size=1, RB Offset=7	22.25	22.36	22.23
		RB Size=1, RB Offset=14	22.31	22.18	22.20
		RB Size=8, RB Offset=0	21.55	21.56	21.62
		RB Size=8, RB Offset=4	21.44	21.42	21.64
		RB Size=8, RB Offset=7	21.30	21.26	21.61
		RB Size=15, RB Offset=0	21.56	21.58	21.64
	16QAM	RB Size=1, RB Offset=0	21.66	21.60	21.55
		RB Size=1, RB Offset=7	21.68	21.57	21.45
		RB Size=1, RB Offset=14	21.67	21.41	21.27
		RB Size=8, RB Offset=0	20.67	20.65	20.71
		RB Size=8, RB Offset=4	20.56	20.56	20.69
		RB Size=8, RB Offset=7	20.59	20.68	20.52
		RB Size=15, RB Offset=0	20.70	20.69	20.70

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	22.66	22.58	22.67
		RB Size=1, RB Offset=12	22.55	22.49	22.56
		RB Size=1, RB Offset=24	22.49	22.48	22.61
		RB Size=12, RB Offset=0	21.75	21.58	21.64
		RB Size=12, RB Offset=6	21.69	21.62	21.63
		RB Size=12, RB Offset=11	21.45	21.67	21.58
		RB Size=25, RB Offset=0	21.71	21.65	21.68
	16QAM	RB Size=1, RB Offset=0	21.90	21.85	21.86
		RB Size=1, RB Offset=12	21.77	21.71	21.66
		RB Size=1, RB Offset=24	21.64	21.68	21.63
		RB Size=12, RB Offset=0	20.87	20.95	20.97
		RB Size=12, RB Offset=6	20.76	20.90	20.84
		RB Size=12, RB Offset=11	20.68	20.68	20.75
		RB Size=25, RB Offset=0	20.80	20.6	20.62
10.0	QPSK	RB Size=1, RB Offset=0	22.69	22.69	22.72
		RB Size=1, RB Offset=24	22.66	22.59	22.72
		RB Size=1, RB Offset=49	22.52	22.65	22.70
		RB Size=25, RB Offset=0	21.73	21.74	21.67
		RB Size=25, RB Offset=12	21.59	21.77	21.70
		RB Size=25, RB Offset=24	21.58	21.48	21.62
		RB Size=50, RB Offset=0	21.78	21.76	21.75
	16QAM	RB Size=1, RB Offset=0	22.13	22.13	22.22
		RB Size=1, RB Offset=24	22.06	22.07	22.23
		RB Size=1, RB Offset=49	22.14	22.09	22.03
		RB Size=25, RB Offset=0	20.80	20.80	20.81
		RB Size=25, RB Offset=12	20.62	20.62	20.86
		RB Size=25, RB Offset=24	20.53	20.65	20.64
		RB Size=50, RB Offset=0	20.88	20.84	20.87

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	22.64	22.54	22.53
		RB Size=1, RB Offset=37	22.62	22.34	22.42
		RB Size=1, RB Offset=74	22.45	22.35	22.42
		RB Size=36, RB Offset=0	21.95	21.86	21.82
		RB Size=36, RB Offset=18	21.85	21.70	21.73
		RB Size=36, RB Offset=37	21.93	21.61	21.69
		RB Size=75, RB Offset=0	21.69	21.53	21.56
	16QAM	RB Size=1, RB Offset=0	21.67	21.56	21.56
		RB Size=1, RB Offset=37	21.57	21.43	21.63
		RB Size=1, RB Offset=74	21.49	21.40	21.48
		RB Size=36, RB Offset=0	20.80	20.64	20.66
		RB Size=36, RB Offset=18	20.75	20.49	20.56
		RB Size=36, RB Offset=37	20.49	20.51	20.45
		RB Size=75, RB Offset=0	20.71	20.68	20.73
20.0	QPSK	RB Size=1, RB Offset=0	22.65	22.36	22.41
		RB Size=1, RB Offset=49	22.60	22.24	22.44
		RB Size=1, RB Offset=99	22.64	22.24	22.16
		RB Size=50, RB Offset=0	21.79	21.85	21.91
		RB Size=50, RB Offset=24	21.75	21.83	21.86
		RB Size=50, RB Offset=49	21.68	21.81	21.74
		RB Size=100, RB Offset=0	21.74	21.45	21.48
	16QAM	RB Size=1, RB Offset=0	22.27	22.16	22.26
		RB Size=1, RB Offset=49	22.11	22.16	22.29
		RB Size=1, RB Offset=99	21.98	22.11	22.32
		RB Size=50, RB Offset=0	21.01	20.98	21.01
		RB Size=50, RB Offset=24	20.95	20.97	20.99
		RB Size=50, RB Offset=49	20.77	20.98	20.96
		RB Size=100, RB Offset=0	20.84	20.75	20.77

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	5.11	13	Pass
QPSK (100RB Size)	5.63	13	Pass
16QAM (1RB Size)	4.93	13	Pass
16QAM (100%RB Size)	5.54	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
1732.50	81.35	262	2.0	H	8.2	1.30	9.10	16.00	30
1732.50	87.48	40	2.2	V	14.9	1.30	9.10	22.70	30
3 MHz Bandwidth									
1732.50	82.26	77	2.2	H	9.1	1.30	9.10	16.90	30
1732.50	87.31	212	1.3	V	14.7	1.30	9.10	22.50	30
5 MHz Bandwidth									
1732.50	81.38	278	2.4	H	8.2	1.30	9.10	16.00	30
1732.50	86.83	54	2.0	V	14.3	1.30	9.10	22.10	30
10 MHz Bandwidth									
1732.50	82.13	251	1.4	H	9.0	1.30	9.10	16.80	30
1732.50	86.64	57	1.2	V	14.1	1.30	9.10	21.90	30
15 MHz Bandwidth									
1732.50	81.42	13	1.8	H	8.3	1.30	9.10	16.10	30
1732.50	86.78	70	1.1	V	14.2	1.30	9.10	22.00	30
20 MHz Bandwidth									
1732.50	81.59	138	1.0	H	8.4	1.30	9.10	16.20	30
1732.50	86.35	31	2.0	V	13.8	1.30	9.10	21.60	30

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
1732.50	82.74	329	1.1	H	9.6	1.30	9.10	17.40	30
1732.50	86.78	108	2.1	V	14.2	1.30	9.10	22.00	30
3 MHz Bandwidth									
1732.50	83.45	93	1.2	H	10.3	1.30	9.10	18.10	30
1732.50	87.63	224	1.6	V	15.1	1.30	9.10	22.90	30
5 MHz Bandwidth									
1732.50	82.57	141	2.0	H	9.4	1.30	9.10	17.20	30
1732.50	87.33	288	2.3	V	14.8	1.30	9.10	22.60	30
10 MHz Bandwidth									
1732.50	83.38	92	2.2	H	10.2	1.30	9.10	18.00	30
1732.50	87.97	74	1.8	V	15.4	1.30	9.10	23.20	30
15 MHz Bandwidth									
1732.50	82.28	153	1.7	H	9.1	1.30	9.10	16.90	30
1732.50	87.02	73	1.6	V	14.5	1.30	9.10	22.30	30
20 MHz Bandwidth									
1732.50	83.26	249	1.9	H	10.1	1.30	9.10	17.90	30
1732.50	87.12	349	1.8	V	14.6	1.30	9.10	22.40	30

LTE Band 12:

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	22.97	22.99	22.96
		RB Size=1, RB Offset=2	22.97	23.03	23.01
		RB Size=1, RB Offset=5	22.88	22.87	22.83
		RB Size=3, RB Offset=0	23.01	23.02	23.09
		RB Size=3, RB Offset=1	22.91	23.01	23.06
		RB Size=3, RB Offset=2	22.70	22.77	22.96
		RB Size=6, RB Offset=0	21.99	21.97	21.95
	16QAM	RB Size=1, RB Offset=0	21.94	21.93	21.96
		RB Size=1, RB Offset=2	21.92	21.89	21.80
		RB Size=1, RB Offset=5	21.92	21.65	21.65
		RB Size=3, RB Offset=0	22.14	22.11	22.16
		RB Size=3, RB Offset=1	22.03	22.13	22.09
		RB Size=3, RB Offset=2	21.85	22.09	22.05
		RB Size=6, RB Offset=0	20.91	20.93	20.96
3	QPSK	RB Size=1, RB Offset=0	22.96	22.96	22.92
		RB Size=1, RB Offset=7	22.76	22.98	22.85
		RB Size=1, RB Offset=14	22.50	22.74	22.67
		RB Size=8, RB Offset=0	22.05	22.00	22.02
		RB Size=8, RB Offset=4	22.02	21.88	22.02
		RB Size=8, RB Offset=7	22.08	21.81	21.82
		RB Size=15, RB Offset=0	22.03	21.99	22.06
	16QAM	RB Size=1, RB Offset=0	22.41	22.42	22.52
		RB Size=1, RB Offset=7	22.27	22.30	22.52
		RB Size=1, RB Offset=14	22.18	22.10	22.31
		RB Size=8, RB Offset=0	21.14	21.10	21.11
		RB Size=8, RB Offset=4	21.05	21.04	21.09
		RB Size=8, RB Offset=7	21.10	21.01	21.17
		RB Size=15, RB Offset=0	21.09	21.04	21.07

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5	QPSK	RB Size=1, RB Offset=0	21.97	21.97	22.00
		RB Size=1, RB Offset=12	21.95	21.86	21.81
		RB Size=1, RB Offset=24	21.87	21.82	21.76
		RB Size=12, RB Offset=0	21.17	21.12	21.14
		RB Size=12, RB Offset=6	20.96	21.11	21.06
		RB Size=12, RB Offset=11	20.70	21.10	20.96
		RB Size=25, RB Offset=0	22.01	21.97	21.96
	16QAM	RB Size=1, RB Offset=0	21.93	21.93	21.97
		RB Size=1, RB Offset=12	21.84	21.73	21.92
		RB Size=1, RB Offset=24	21.95	21.59	21.93
		RB Size=12, RB Offset=0	21.17	21.12	21.17
		RB Size=12, RB Offset=6	20.96	21.05	21.10
		RB Size=12, RB Offset=11	20.90	20.96	20.91
		RB Size=25, RB Offset=0	21.07	21.03	21.08
10	QPSK	RB Size=1, RB Offset=0	23.04	23.01	23.02
		RB Size=1, RB Offset=24	23.05	22.96	22.89
		RB Size=1, RB Offset=49	22.95	23.00	22.80
		RB Size=25, RB Offset=0	22.03	21.99	21.94
		RB Size=25, RB Offset=12	21.97	21.95	22.02
		RB Size=25, RB Offset=24	21.74	21.86	21.83
		RB Size=50, RB Offset=0	22.04	22.02	22.06
	16QAM	RB Size=1, RB Offset=0	22.59	22.58	22.54
		RB Size=1, RB Offset=24	22.53	22.38	22.45
		RB Size=1, RB Offset=49	22.43	22.20	22.23
		RB Size=25, RB Offset=0	21.10	21.09	21.12
		RB Size=25, RB Offset=12	20.96	21.16	20.97
		RB Size=25, RB Offset=24	20.97	21.22	20.92
		RB Size=50, RB Offset=0	21.09	21.05	21.11

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	5.64	13	Pass
QPSK (50RB Size)	5.89	13	Pass
16QAM (1RB Size)	5.86	13	Pass
16QAM (100%RB Size)	6.15	13	Pass

EIRP:**QPSK:**

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
707.5	76.21	53	2.2	H	16.2	0.6	0.0	15.6	34.77
707.5	80.15	323	2.3	V	21.1	0.6	0.0	20.5	34.77
3 MHz Bandwidth									
707.5	77.65	161	1.7	H	17.6	0.6	0.0	17.0	34.77
707.5	80.65	166	2.2	V	21.6	0.6	0.0	21.0	34.77
5 MHz Bandwidth									
707.5	78.36	355	2.4	H	18.3	0.6	0.0	17.7	34.77
707.5	81.21	249	1.5	V	22.1	0.6	0.0	21.5	34.77
10 MHz Bandwidth									
707.5	77.56	122	1.9	H	17.5	0.6	0.0	16.9	34.77
707.5	80.65	302	1.4	V	21.6	0.6	0.0	21.0	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 (dB)		
Middle Channel									
1.4 MHz Bandwidth									
707.5	78.45	360	2.1	H	18.4	0.6	0.0	17.8	34.77
707.5	80.35	216	2.1	V	21.3	0.6	0.0	20.7	34.77
3 MHz Bandwidth									
707.5	77.56	136	1.8	H	17.5	0.6	0.0	16.9	34.77
707.5	81.02	190	1.5	V	22.0	0.6	0.0	21.4	34.77
5 MHz Bandwidth									
707.5	78.54	265	2.3	H	18.5	0.6	0.0	17.9	34.77
707.5	80.65	280	1.1	V	21.6	0.6	0.0	21.0	34.77
10 MHz Bandwidth									
707.5	77.55	45	2.0	H	17.5	0.6	0.0	16.9	34.77
707.5	80.21	70	1.7	V	21.1	0.6	0.0	20.5	34.77

Note:

All above data were tested with no amplifier

Absolute Level = Substituted Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

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

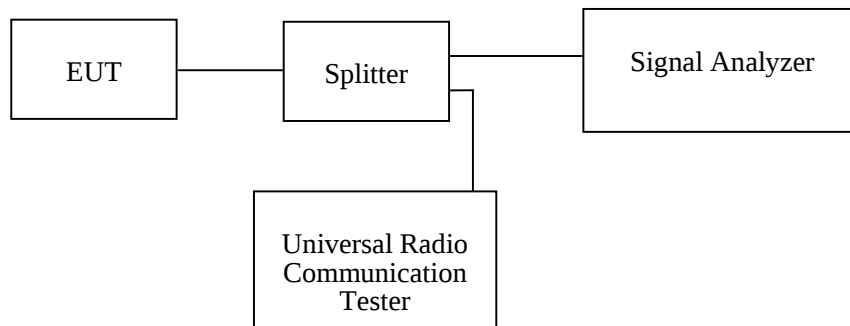
Applicable Standard

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:	24~25 °C
Relative Humidity:	48~50 %
ATM Pressure:	100.0~101.0 kPa

The testing was performed by Kobe Li from 2017-10-12 to 2017-10-15.

EUT operation mode: Transmitting

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

Cellular Band (Part 22H)

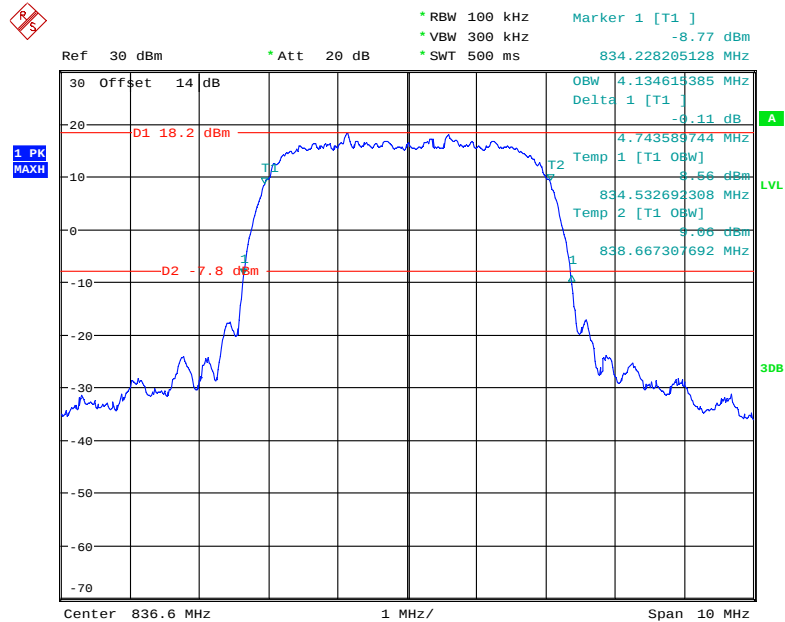
Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	836.6	4.135	4.744
HSUPA (BPSK)	836.6	4.167	4.744
HSDPA (16QAM)	836.6	4.167	4.744

PCS Band (Part 24E)

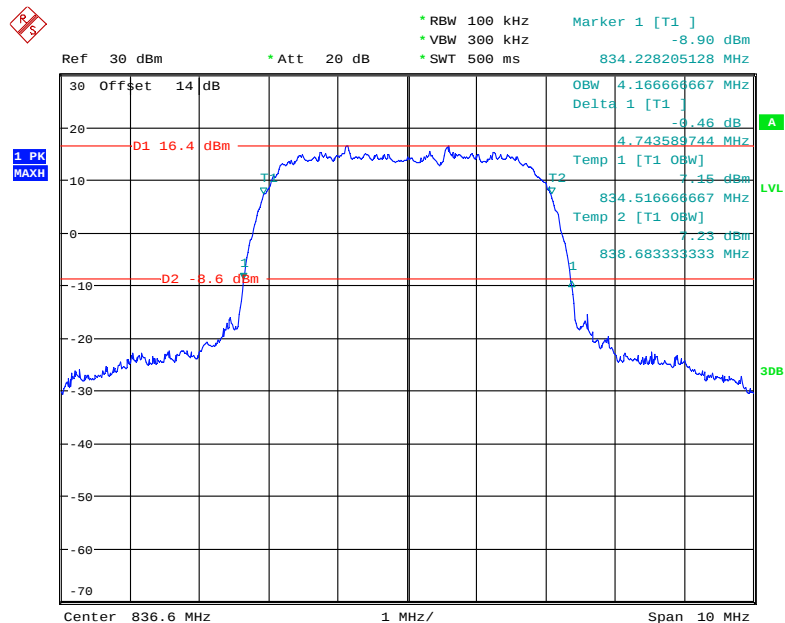
Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1880.0	4.167	4.792
HSUPA (BPSK)	1880.0	4.151	4.776
HSDPA (16QAM)	1880.0	4.151	4.792

AWS Band (Part27)

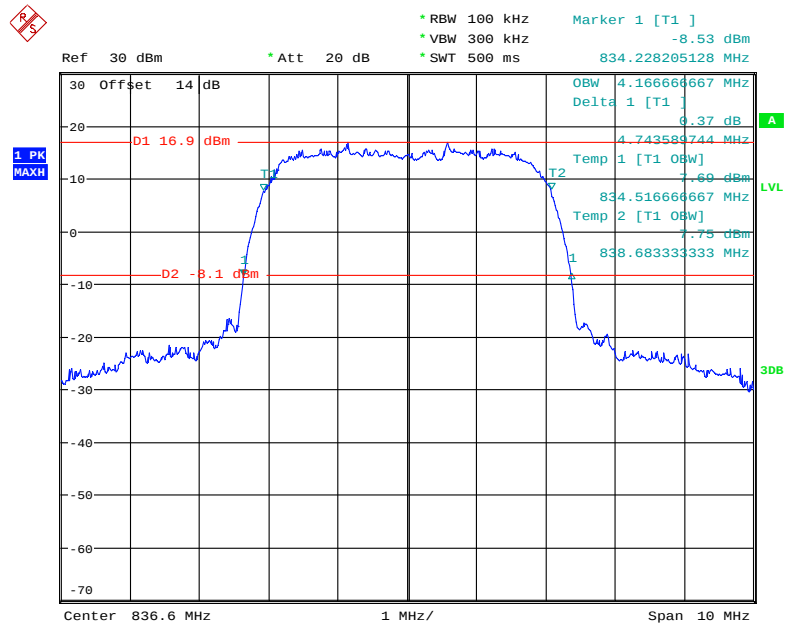
Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1880.0	4.135	4.728
HSUPA (BPSK)	1880.0	4.135	4.712
HSDPA (16QAM)	1880.0	4.135	4.728

Cellular Band (Part 22H)**26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode**

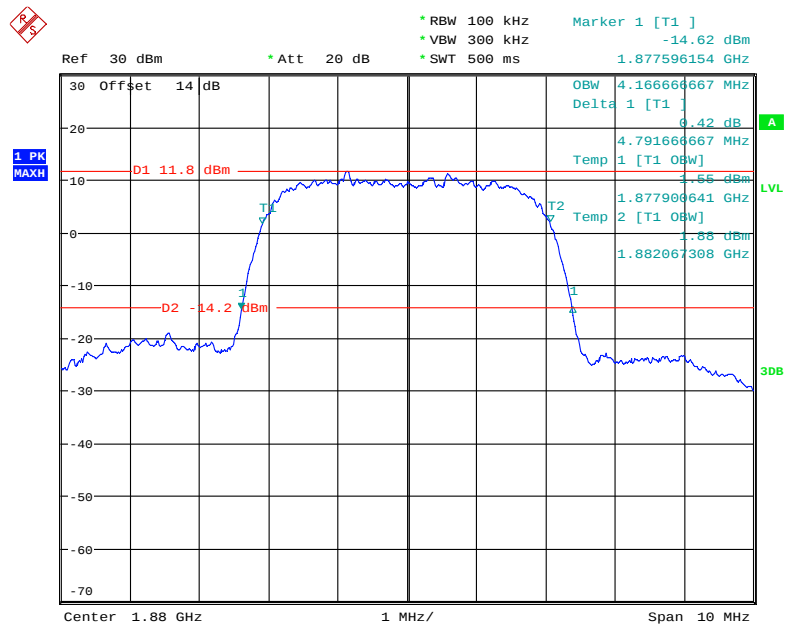
Date: 12.OCT.2017 21:02:33

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

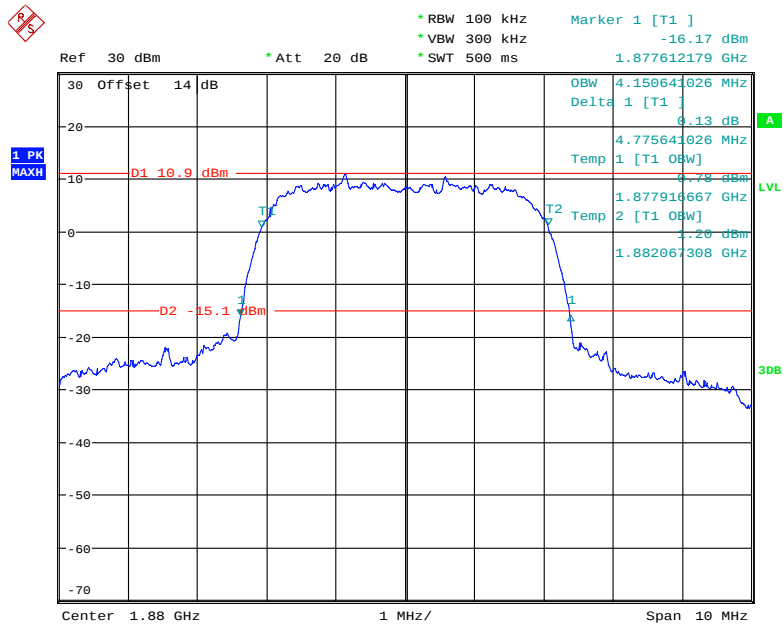
Date: 12.OCT.2017 21:05:58

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

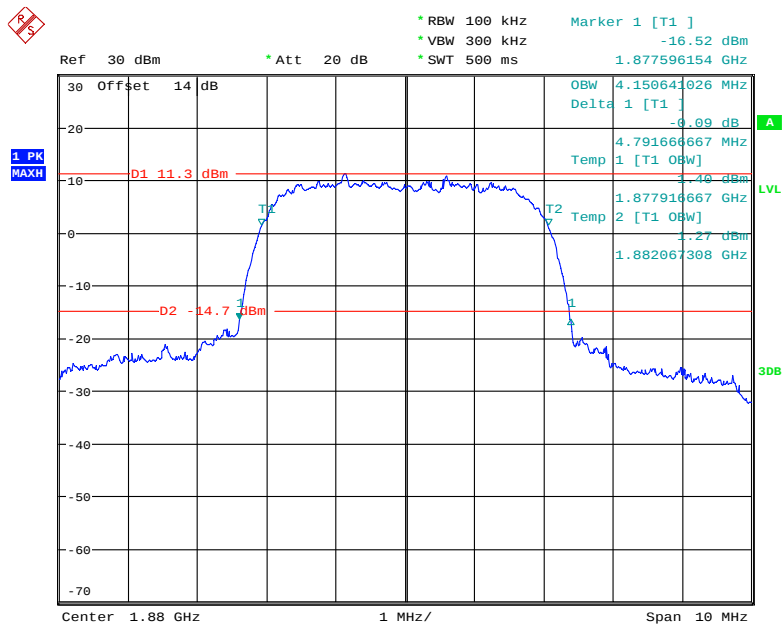
Date: 12.OCT.2017 21:07:17

PCS Band (Part 24E)**26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode**

Date: 12.OCT.2017 20:43:37

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

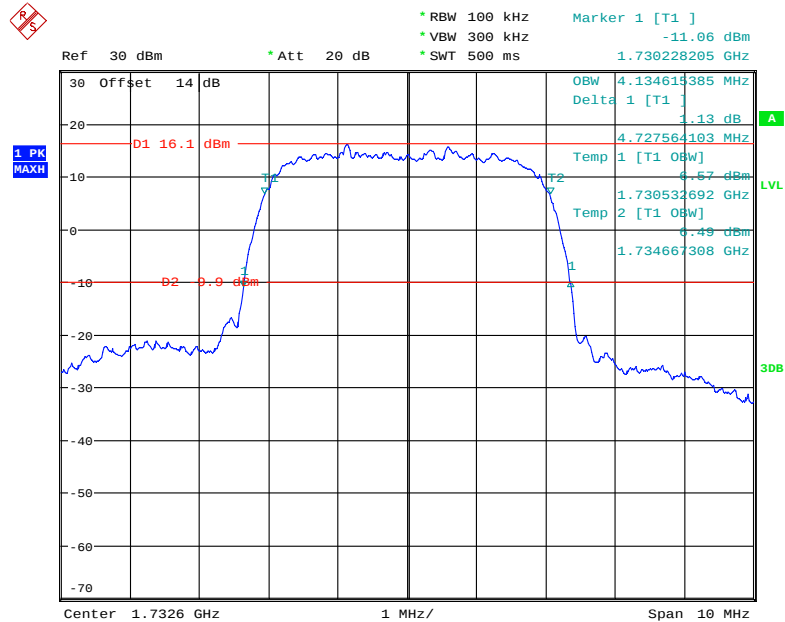
Date: 12.OCT.2017 20:59:04

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

Date: 12.OCT.2017 20:49:05

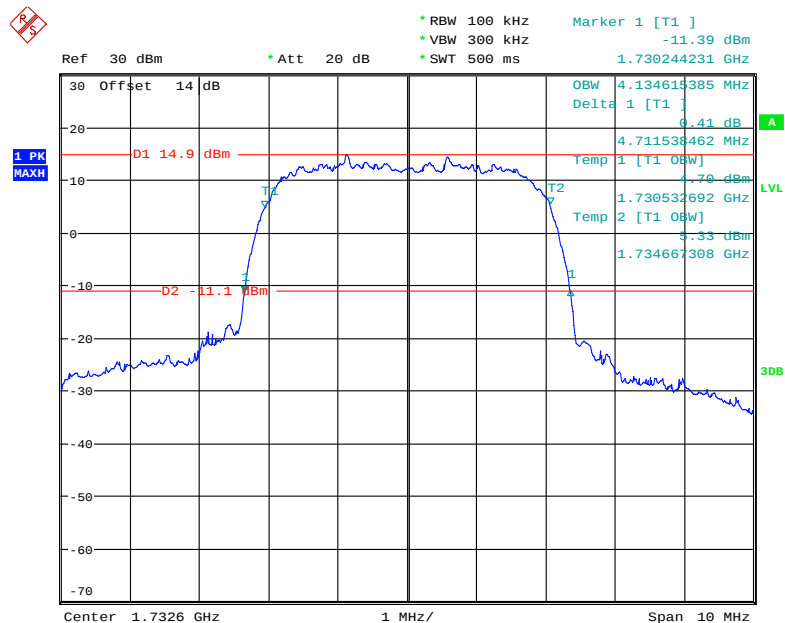
AWS Band (Part 27)

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



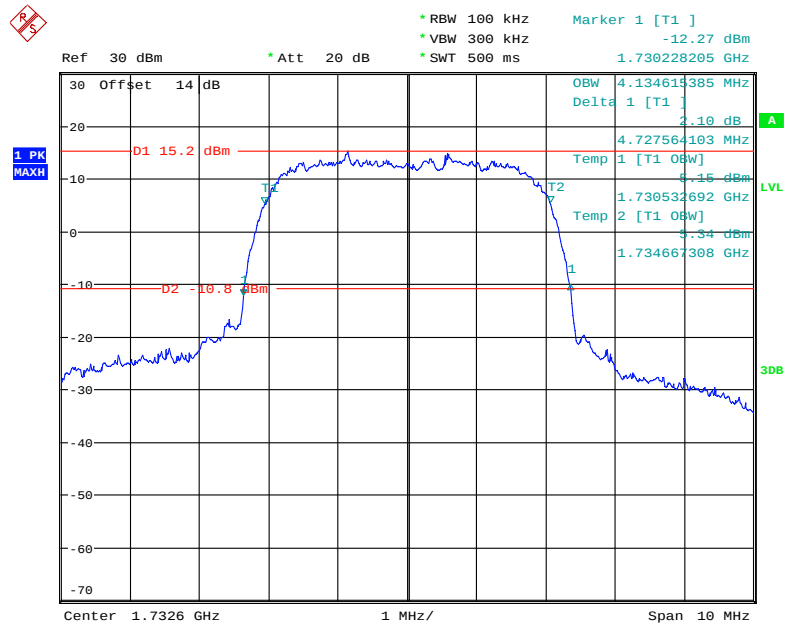
Date: 12.OCT.2017 20:32:20

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



Date: 12.OCT.2017 20:36:51

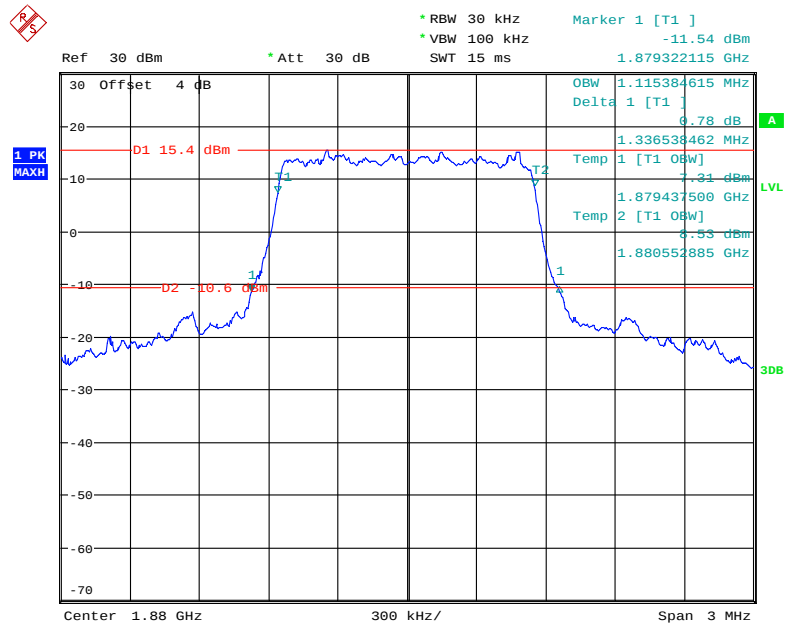
26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode



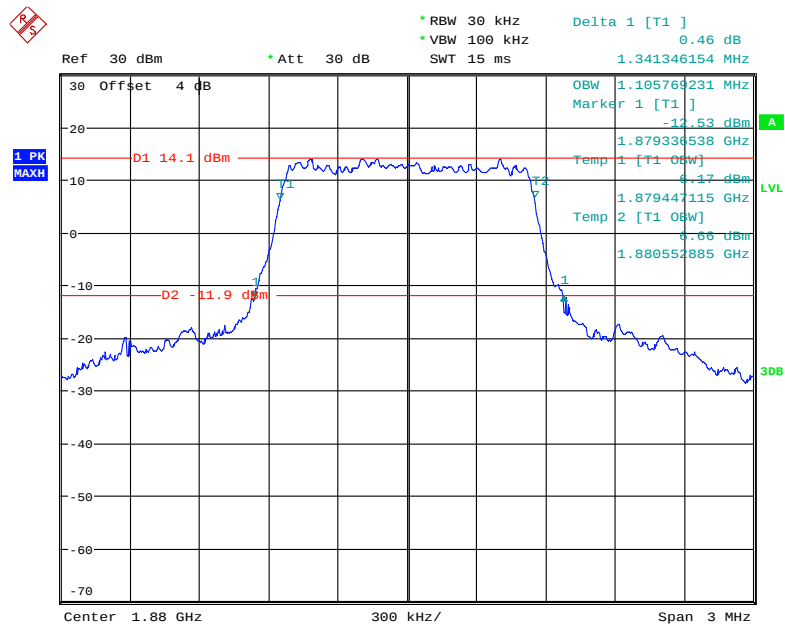
Date: 12.OCT.2017 20:40:14

LTE Band 2: (Middle Channel)

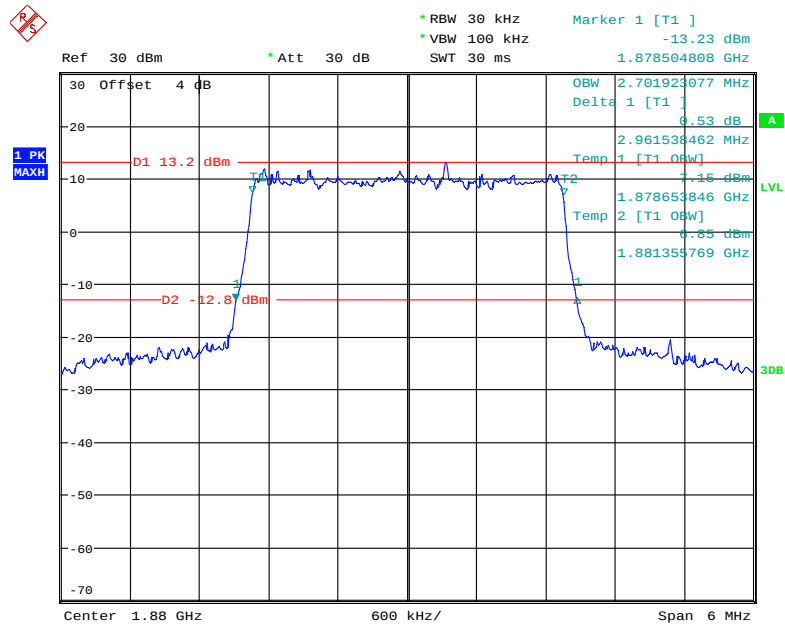
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.115	1.336
	16QAM	1.106	1.341
3.0	QPSK	2.702	2.962
	16QAM	2.702	2.981
5.0	QPSK	4.535	5.045
	16QAM	4.519	5.061
10.0	QPSK	8.974	9.880
	16QAM	8.942	9.752
15.0	QPSK	13.462	14.704
	16QAM	13.413	14.702
20.0	QPSK	17.885	19.255
	16QAM	17.885	19.191

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

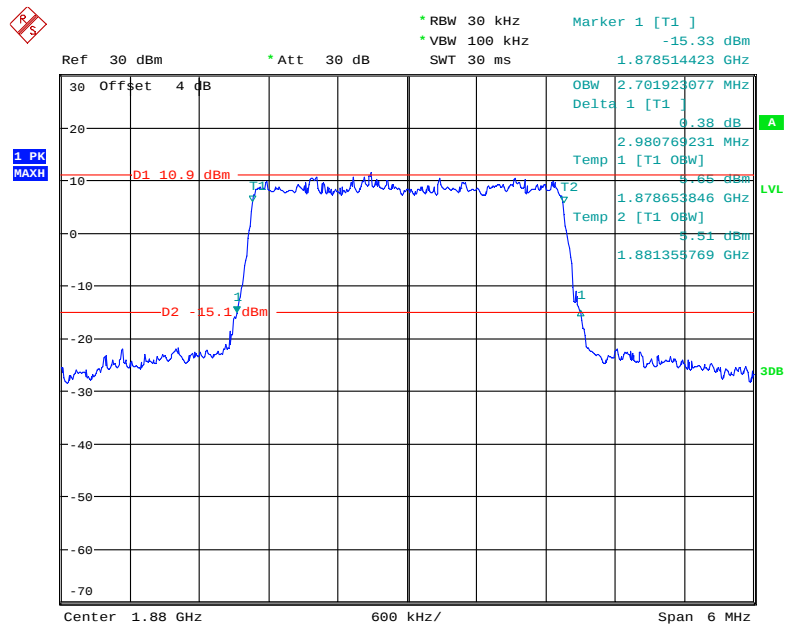
Date: 15.OCT.2017 15:09:26

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

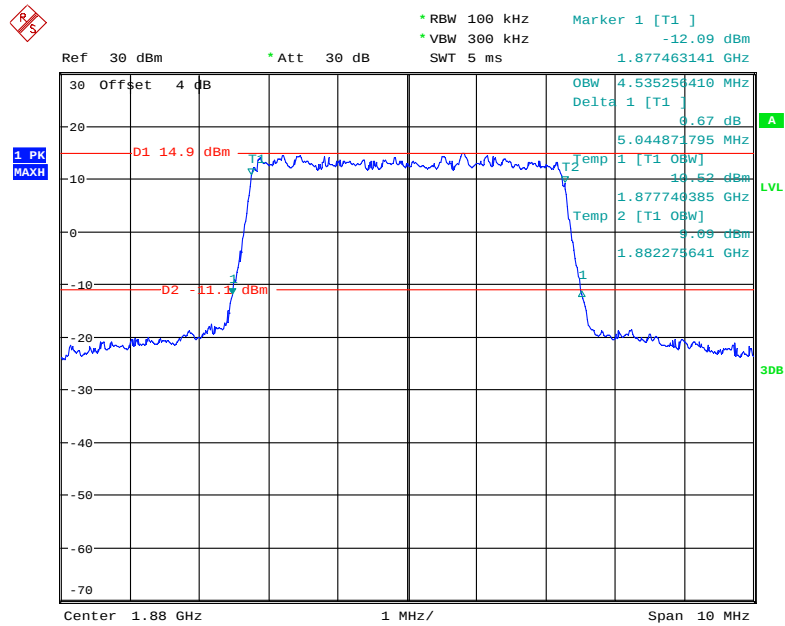
Date: 15.OCT.2017 15:08:18

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

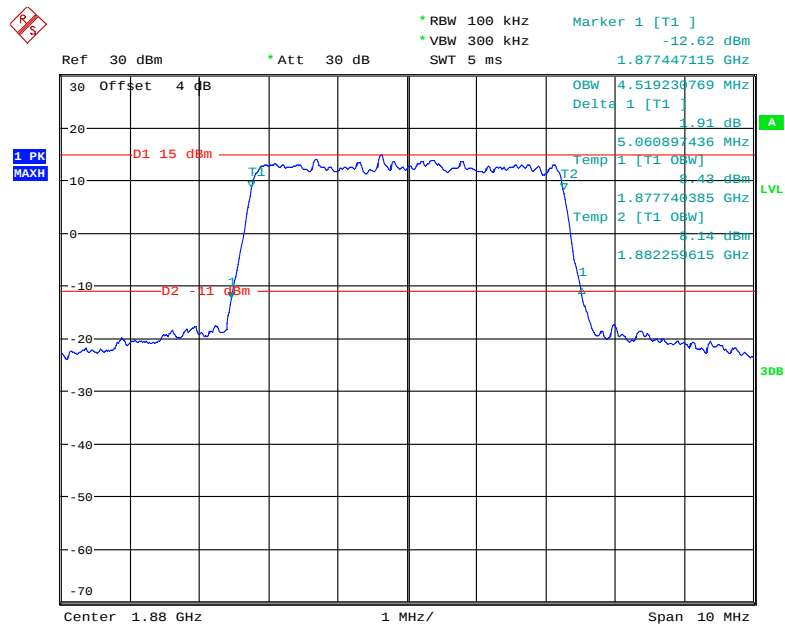
Date: 15.OCT.2017 15:10:47

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

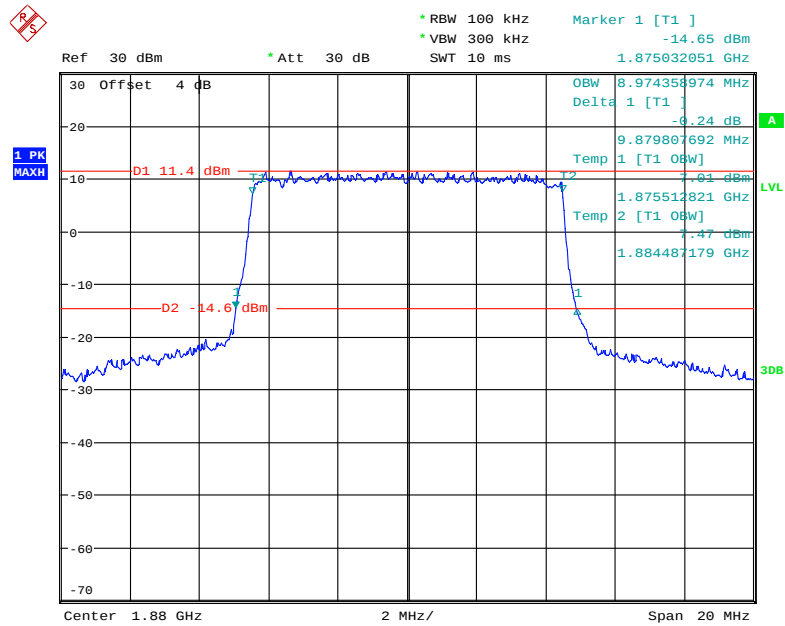
Date: 15.OCT.2017 15:10:00

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

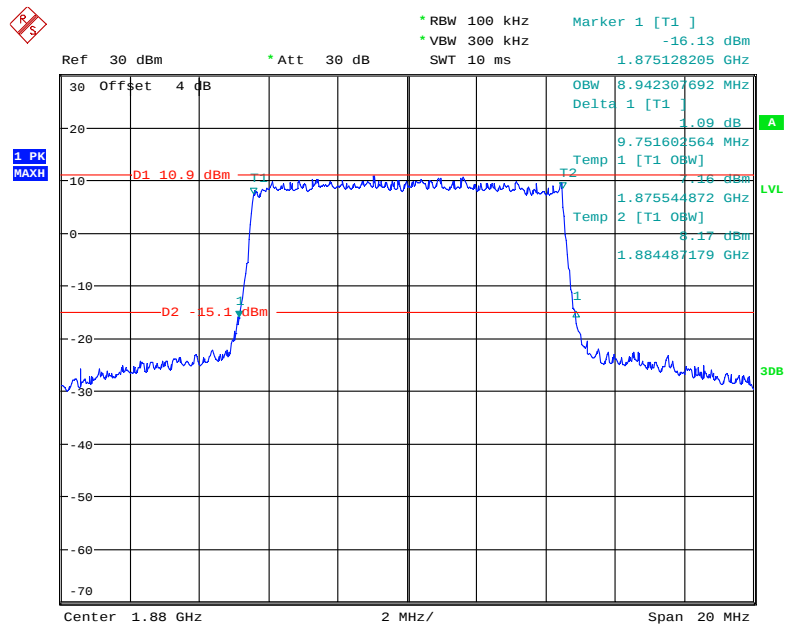
Date: 15.OCT.2017 15:11:53

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

Date: 15.OCT.2017 15:45:31

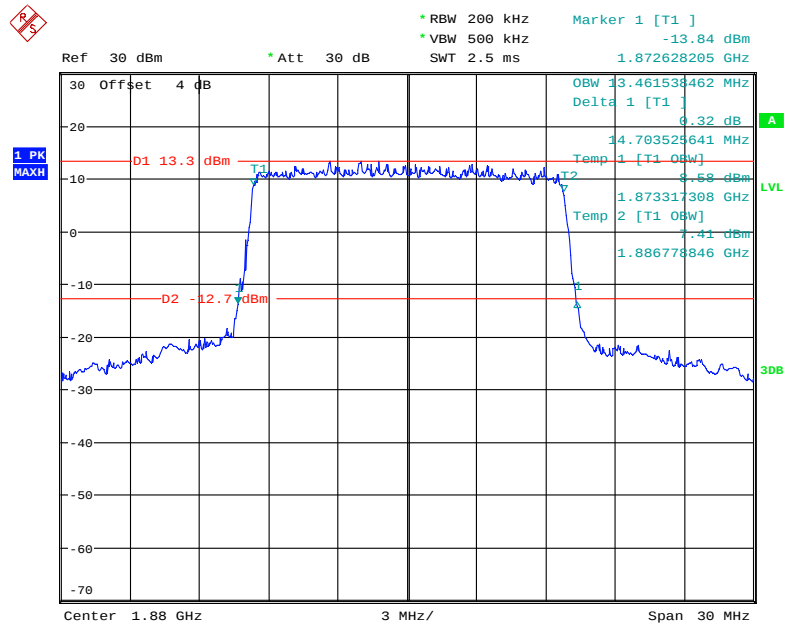
QPSK (10.0 MHz) - 99% Occupied&26 dB Bandwidth, Middle channel

Date: 15.OCT.2017 15:54:56

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

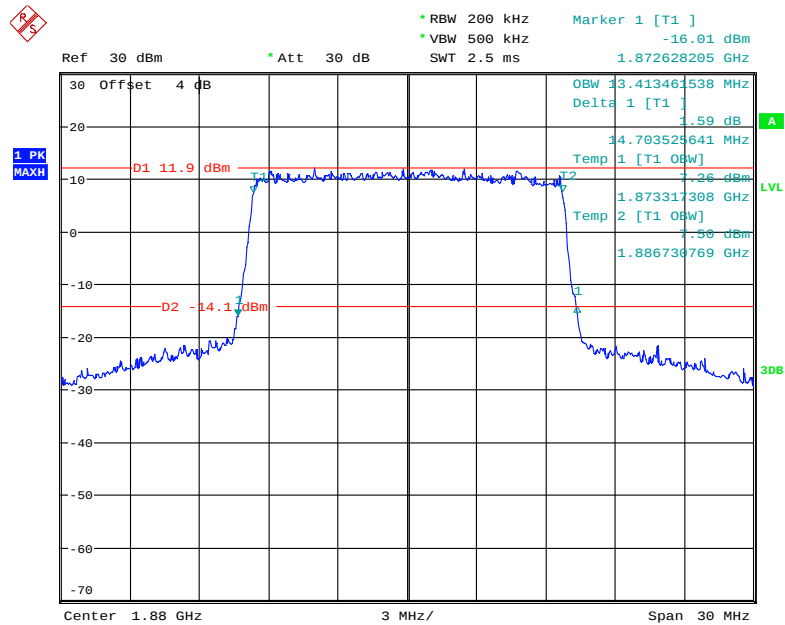
Date: 15.OCT.2017 15:55:30

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



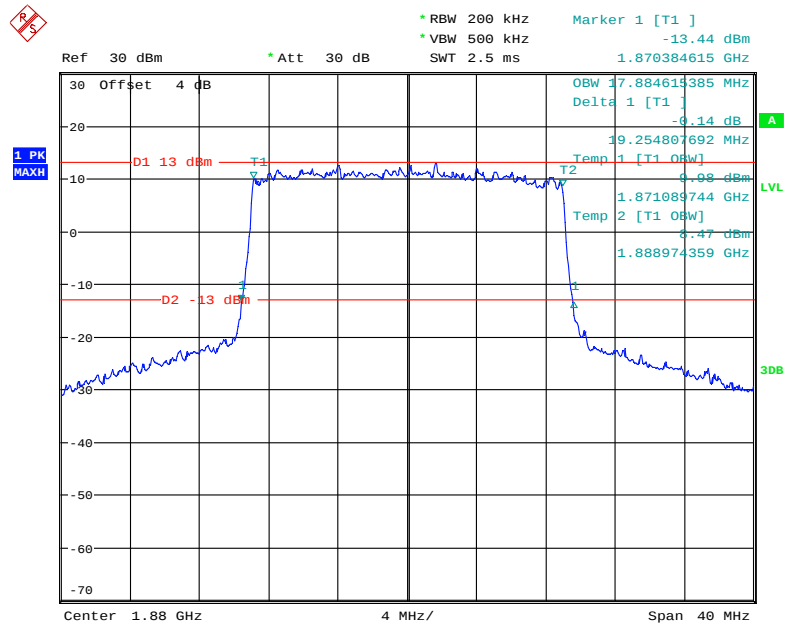
Date: 15.OCT.2017 15:57:24

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



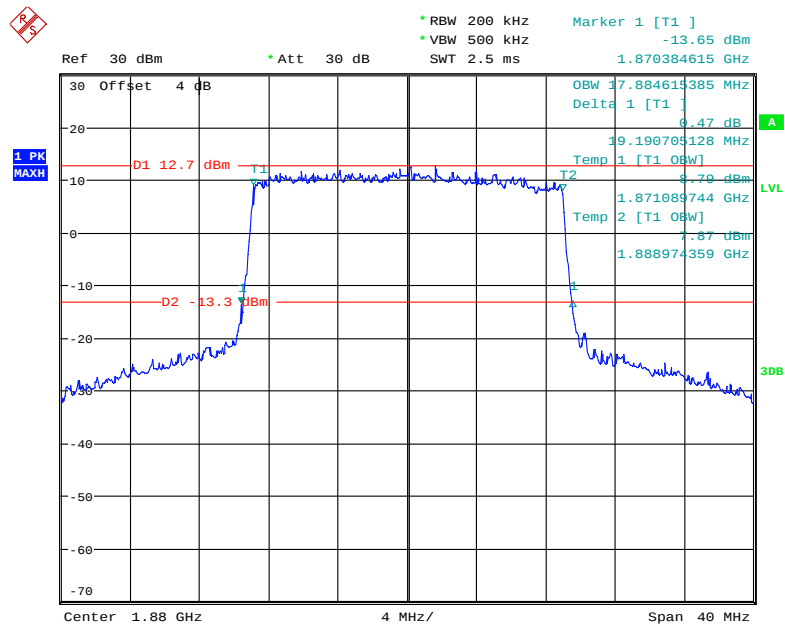
Date: 15.OCT.2017 15:56:39

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



Date: 15.OCT.2017 16:06:07

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

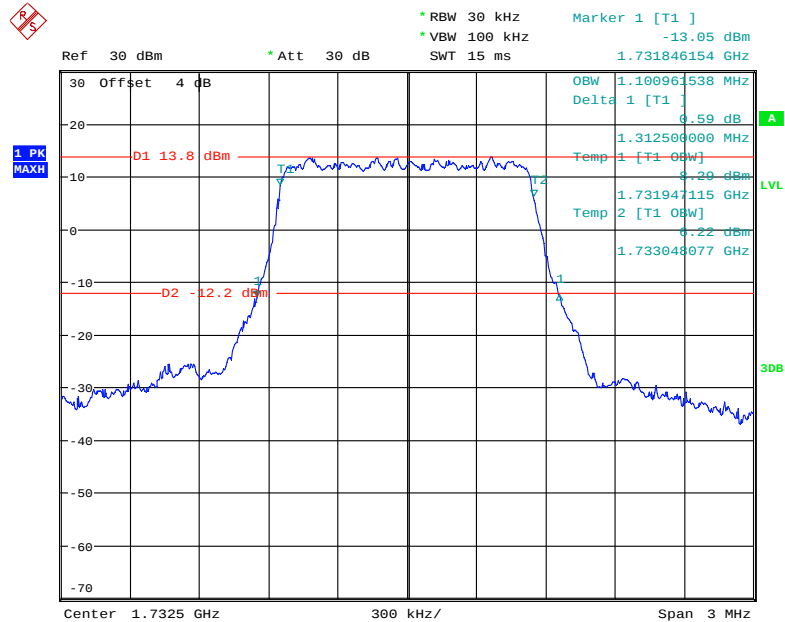


Date: 15.OCT.2017 15:59:33

LTE Band 4: (Middle Channel)

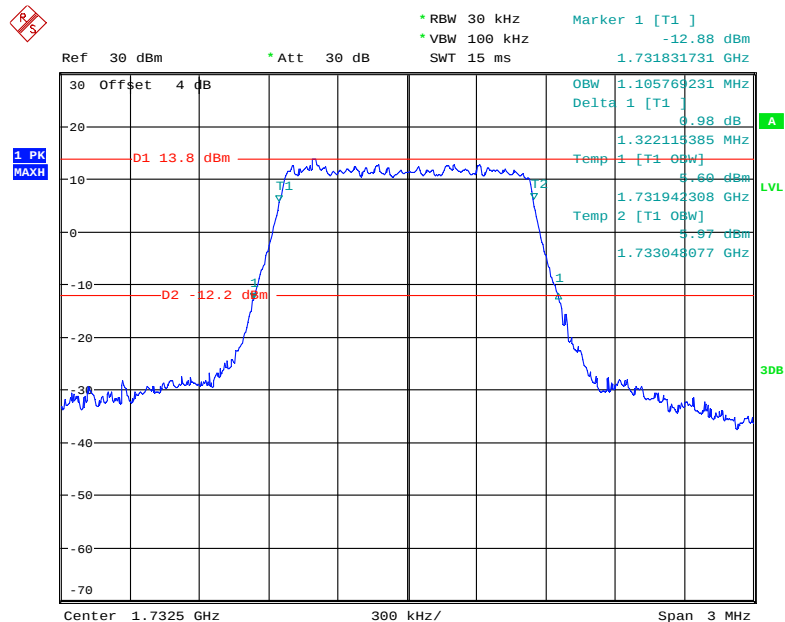
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.101	1.313
	16QAM	1.106	1.322
3.0	QPSK	2.692	2.947
	16QAM	2.692	2.976
5.0	QPSK	4.519	5.043
	16QAM	4.503	4.995
10.0	QPSK	8.974	9.785
	16QAM	8.910	9.689
15.0	QPSK	13.413	14.593
	16QAM	13.413	14.545
20.0	QPSK	17.821	19.032
	16QAM	17.821	19.160

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

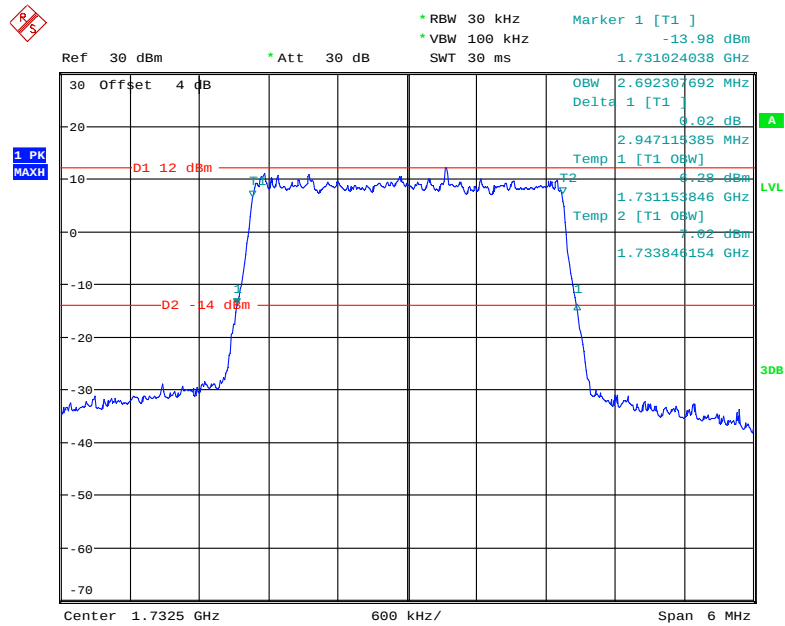


Date: 15.OCT.2017 14:53:17

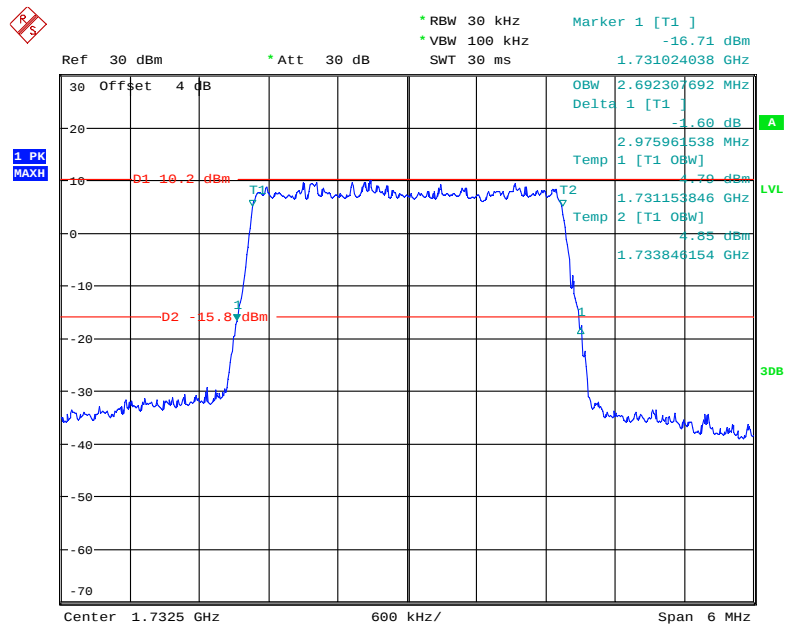
16-QAM (1.4 MHz) - 99% Occupied&26 dB Bandwidth, Middle channel



Date: 15.OCT.2017 14:54:28

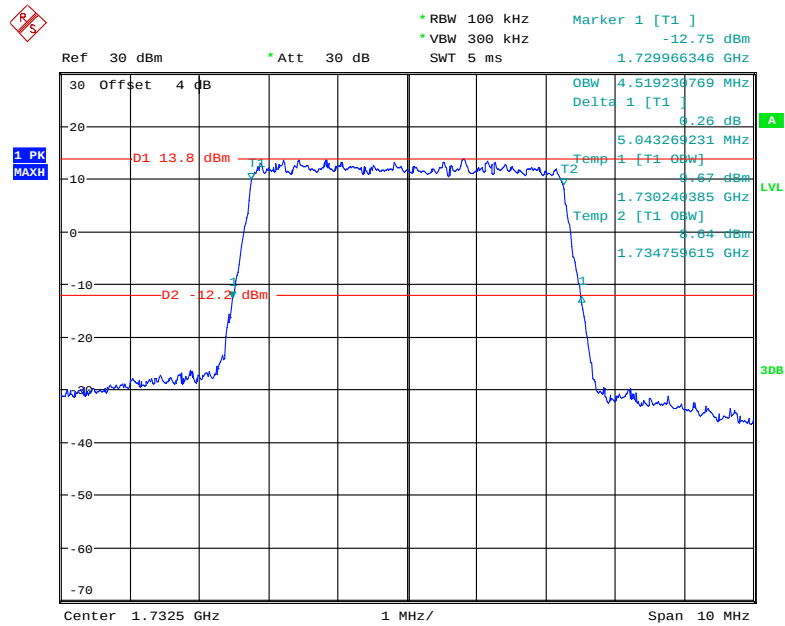
QPSK (3.0 MHz) - 99% Occupied&26 dB Bandwidth, Middle channel

Date: 15.OCT.2017 14:55:51

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

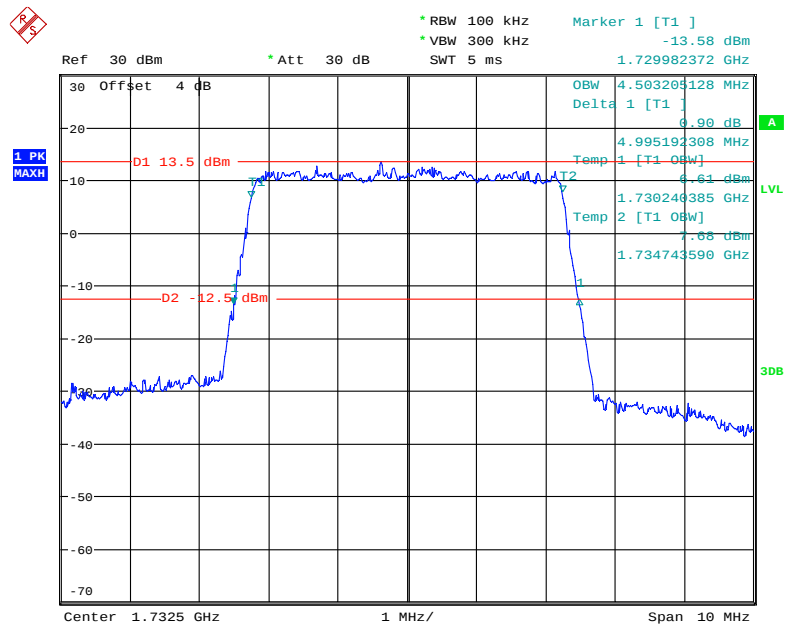
Date: 15.OCT.2017 14:56:37

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

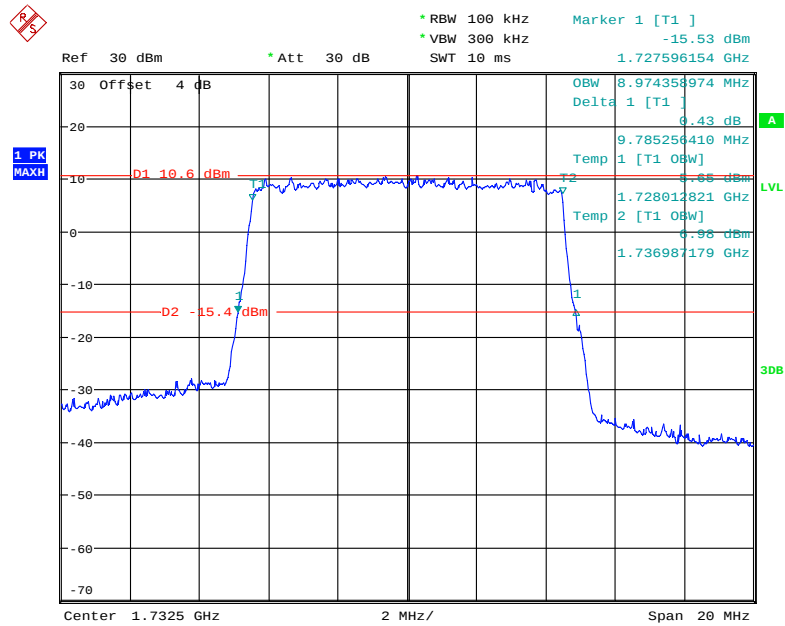


Date: 15.OCT.2017 14:58:29

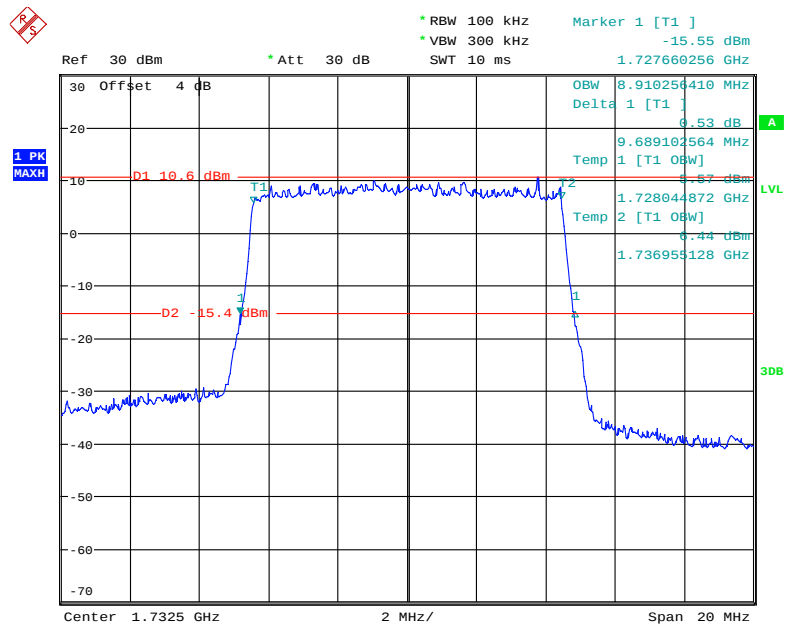
16-QAM (5.0 MHz) - 99% Occupied&26 dB Bandwidth, Middle channel



Date: 15.OCT.2017 14:57:34

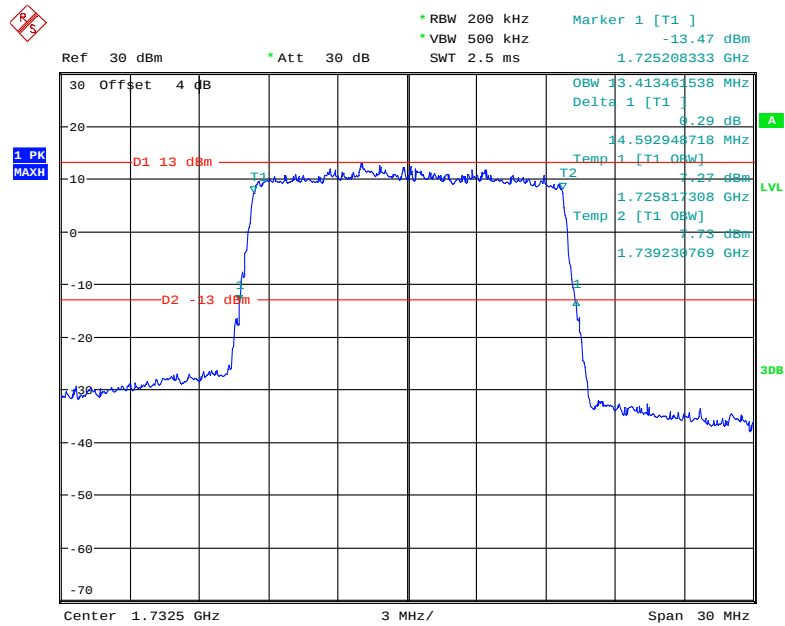
QPSK (10.0 MHz) - 99% Occupied&26 dB Bandwidth, Middle channel

Date: 15.OCT.2017 15:01:20

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

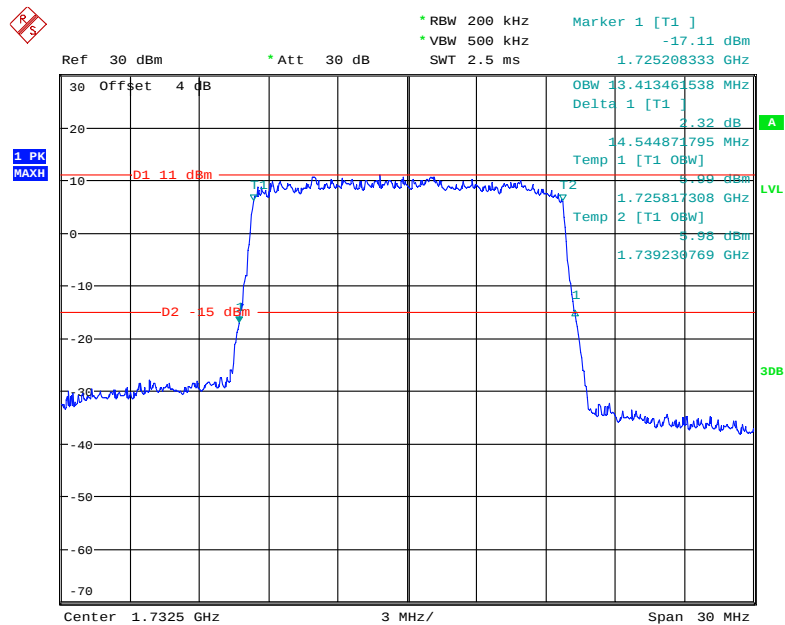
Date: 15.OCT.2017 15:02:09

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



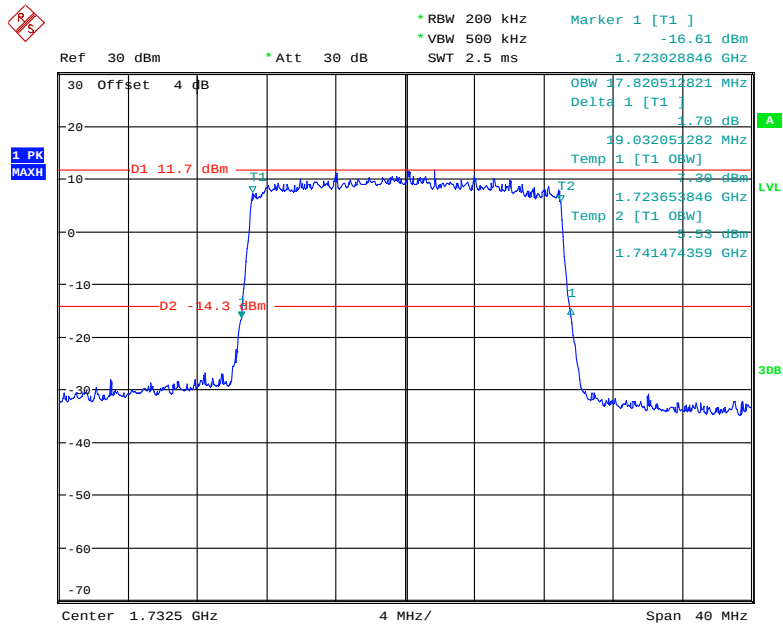
Date: 15.OCT.2017 15:03:47

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



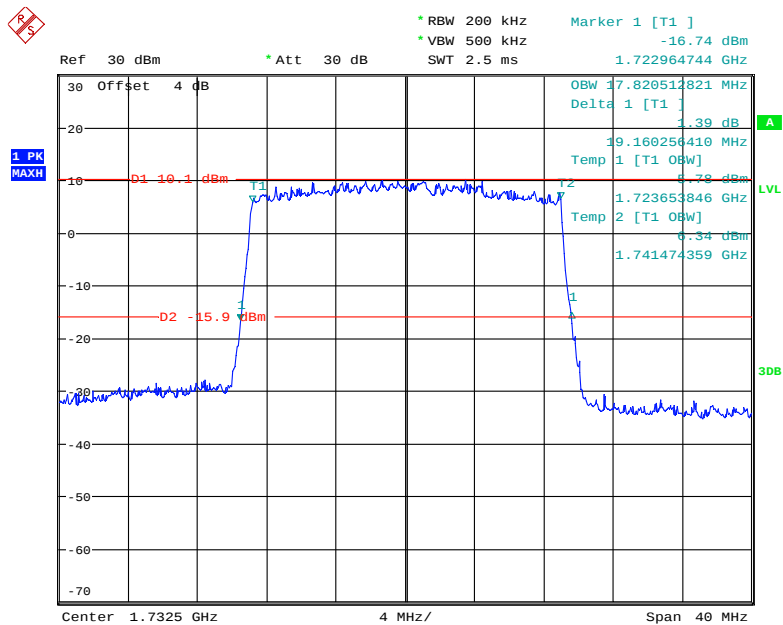
Date: 15.OCT.2017 15:04:32

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



Date: 15.OCT.2017 15:05:41

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



Date: 15.OCT.2017 15:06:53

BAND 12:

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.096	1.293
	16QAM	1.111	1.327
3.0	QPSK	2.692	2.962
	16QAM	2.692	2.962
5.0	QPSK	4.519	5.071
	16QAM	4.519	5.022
10.0	QPSK	8.974	9.750
	16QAM	8.942	9.686

* RBW 30 kHz
 * VBW 100 kHz
 SWT 15 ms
 Ref 30 dBm
 Att 30 dB
 Marker 1 [T1]
 -10.39 dBm
 706.855769231 MHz

30 Offset 4 dB
 20
 10
 0
 -10
 -20
 -30
 -40
 -50
 -60
 -70

1 RM
 MAXH

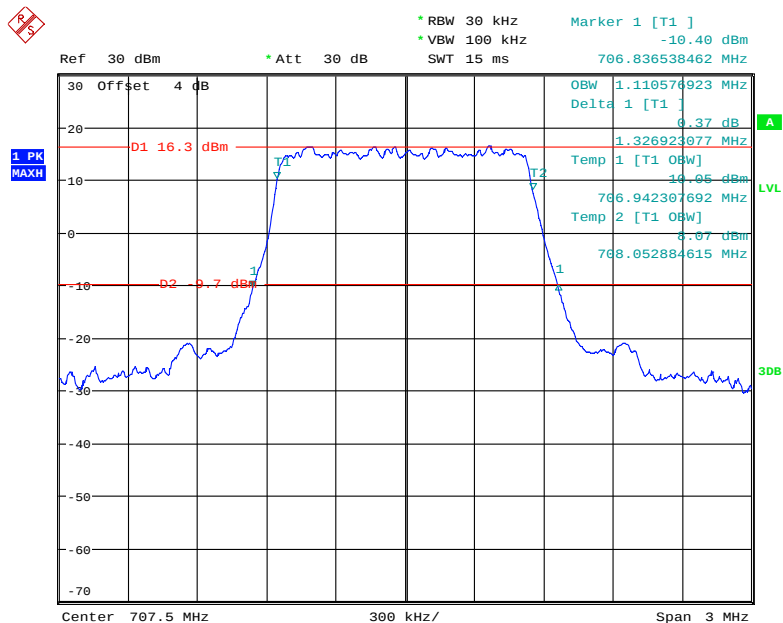
D1 15.4 dBm
 D2 -10.6 dBm

OBW 1.096153846 MHz
 Delta 1 [T1]
 -0.64 dB
 1.293269231 MHz
 Temp 1 [T1 OBW]
 -0.46 dBm
 706.947119385 MHz
 Temp 2 [T1 OBW]
 -0.59 dBm
 708.043269231 MHz

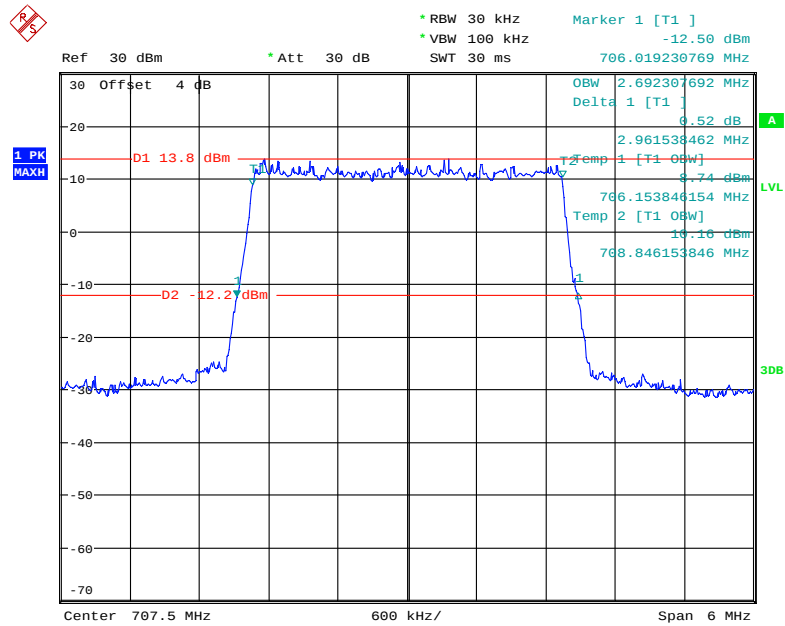
LVL
 3DB

Center 707.5 MHz
 300 kHz/
 Span 3 MHz

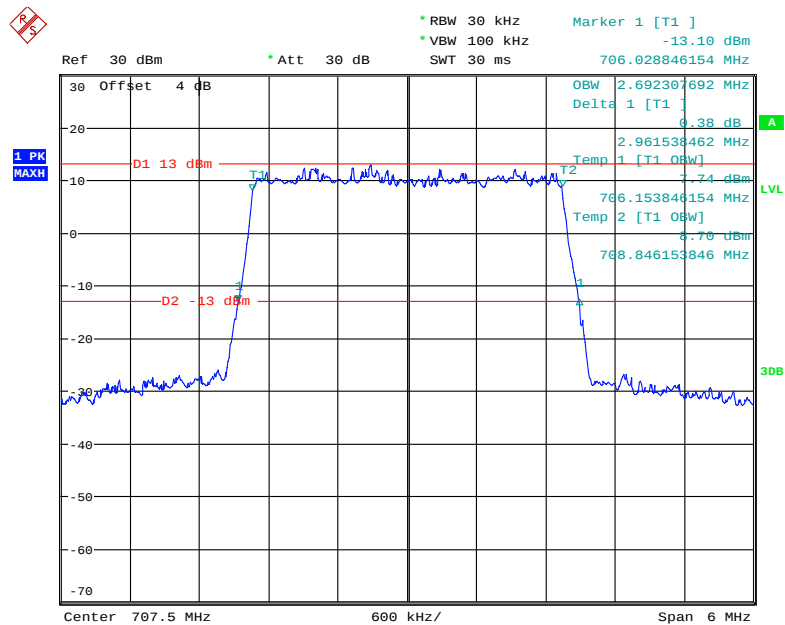
16-QAM (1.4 MHz) - 99% Occupied&26 dB Bandwidth, Middle channel



Page 54 of 136

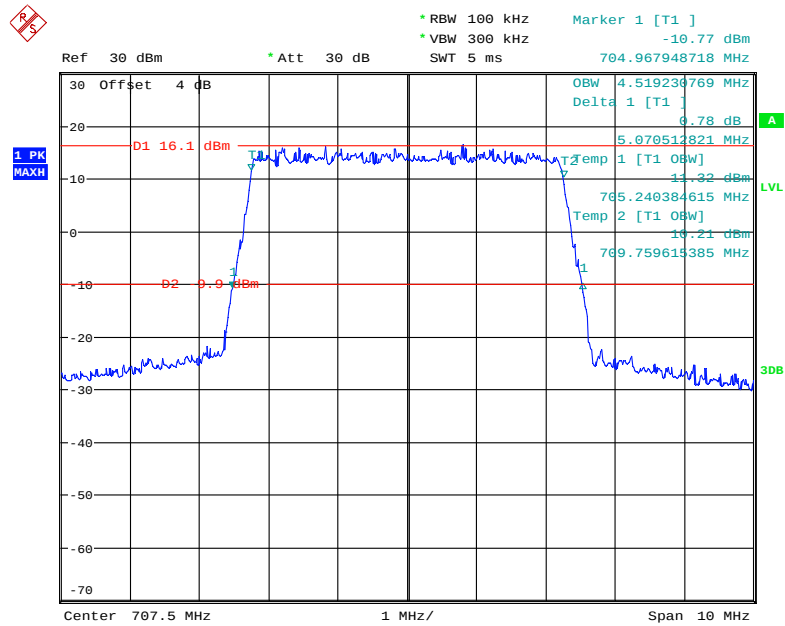
QPSK (3.0 MHz) - 99% Occupied&26 dB Bandwidth, Middle channel

Date: 15.OCT.2017 14:49:03

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

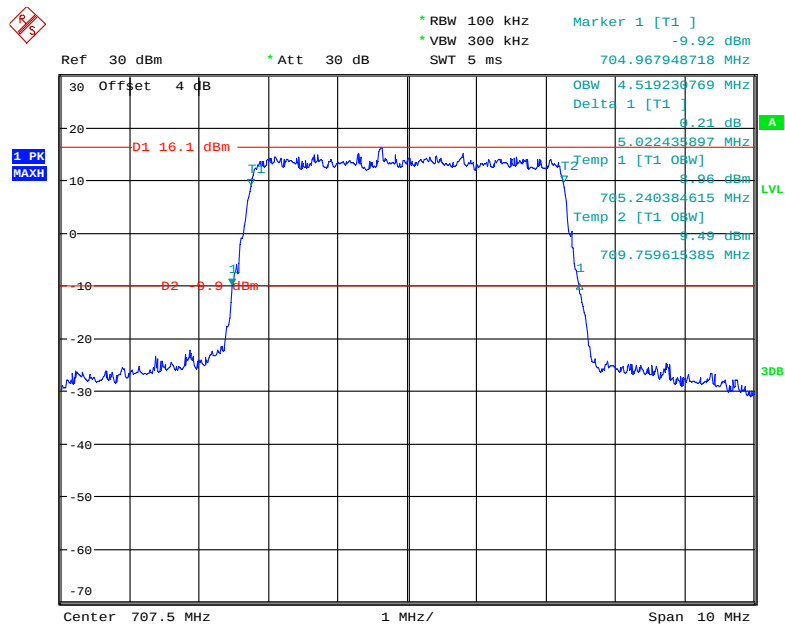
Date: 15.OCT.2017 14:48:18

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



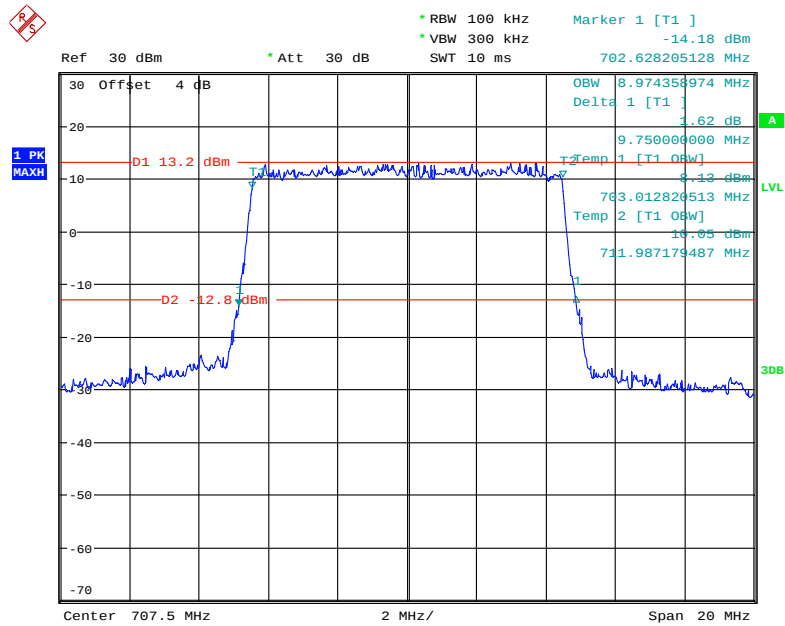
Date: 15.OCT.2017 14:50:43

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

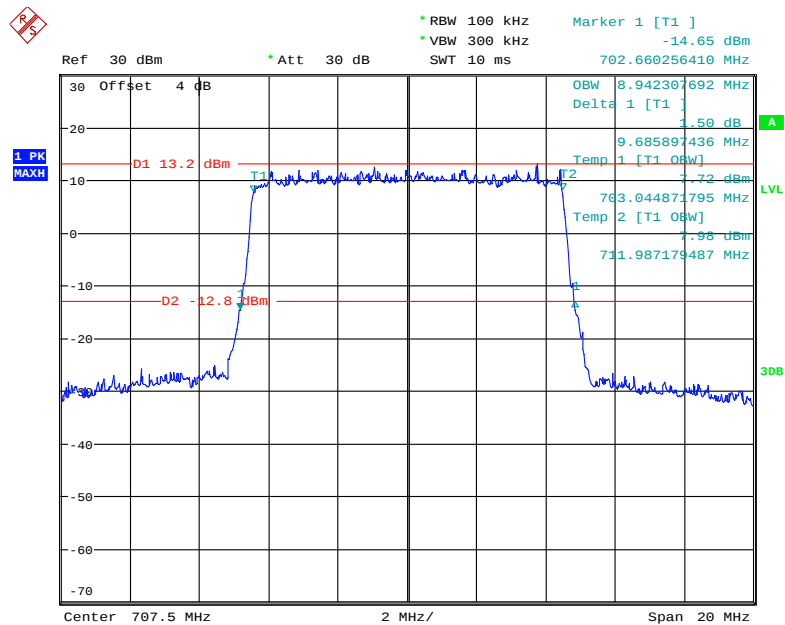


Date: 15.OCT.2017 14:49:59

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



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



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

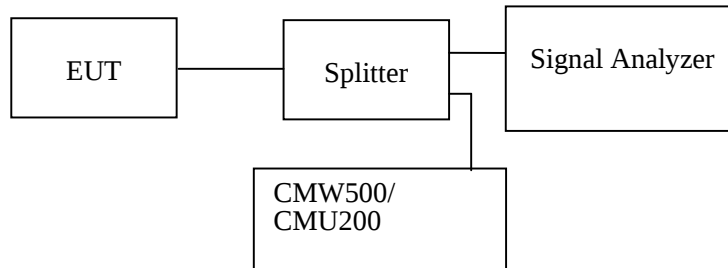
Applicable Standard

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 °C
Relative Humidity:	48~50 %
ATM Pressure:	100.0~101.0 kPa

The testing was performed by Kobe Li from 2017-10-12 to 2017-10-15.

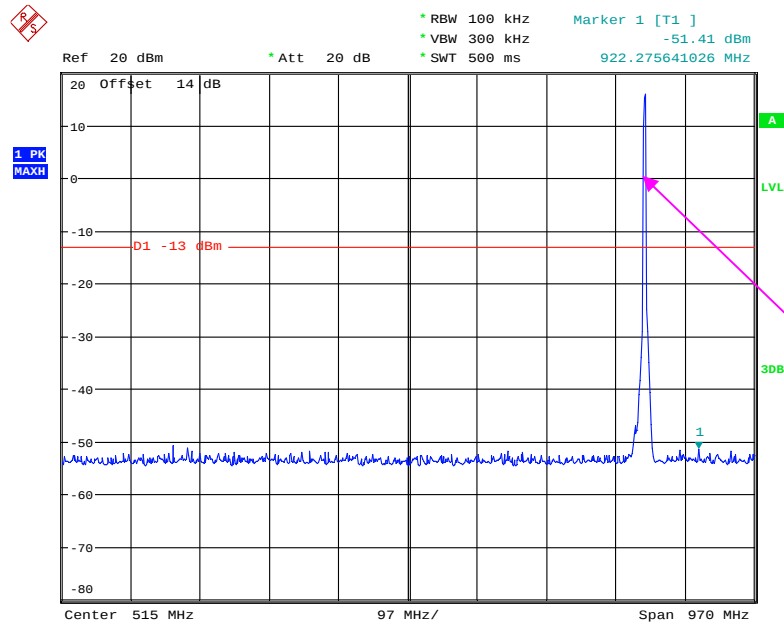
Test result: Compliance,

EUT operation mode: transmitting

Please refer to the following plots.

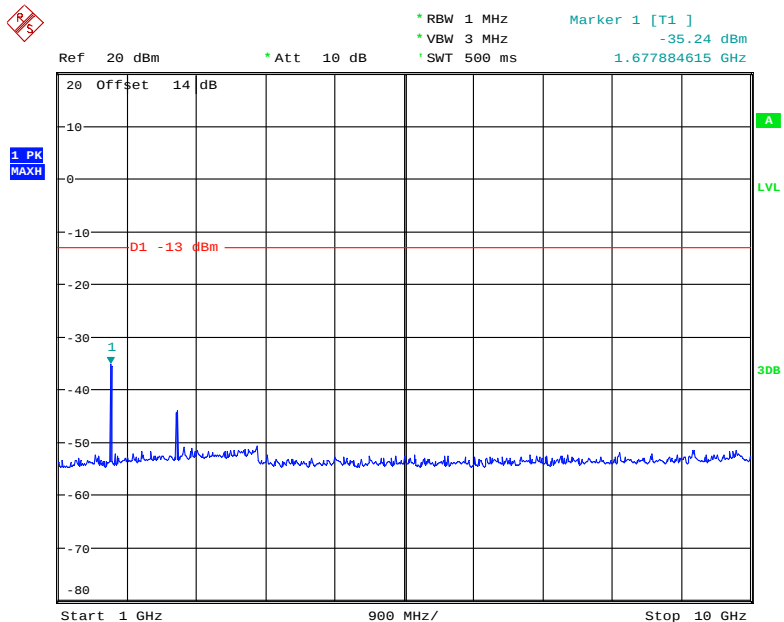
Cellular Band (Part 22H)

30 MHz – 1 GHz (WCDMA Mode)



Date: 12.OCT.2017 22:12:30

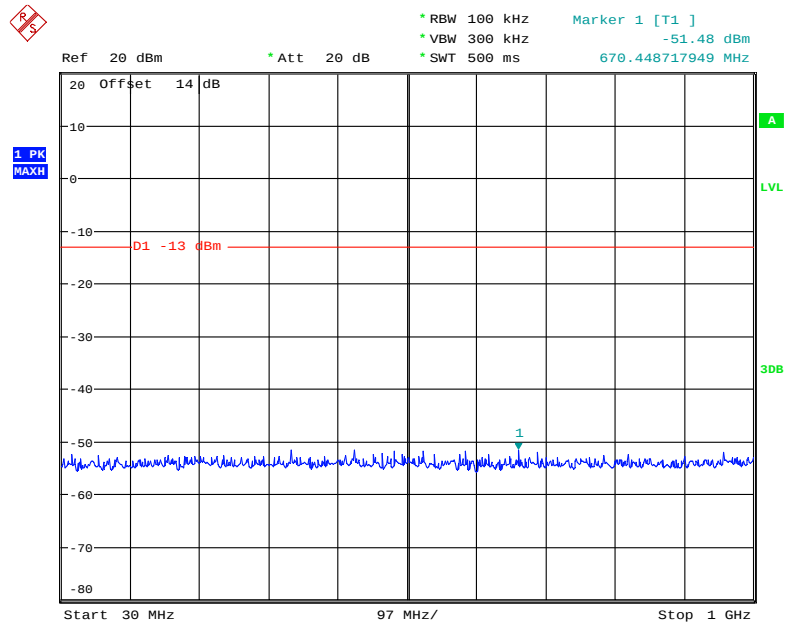
1 GHz – 10 GHz (WCDMA Mode)



Date: 12.OCT.2017 22:14:06

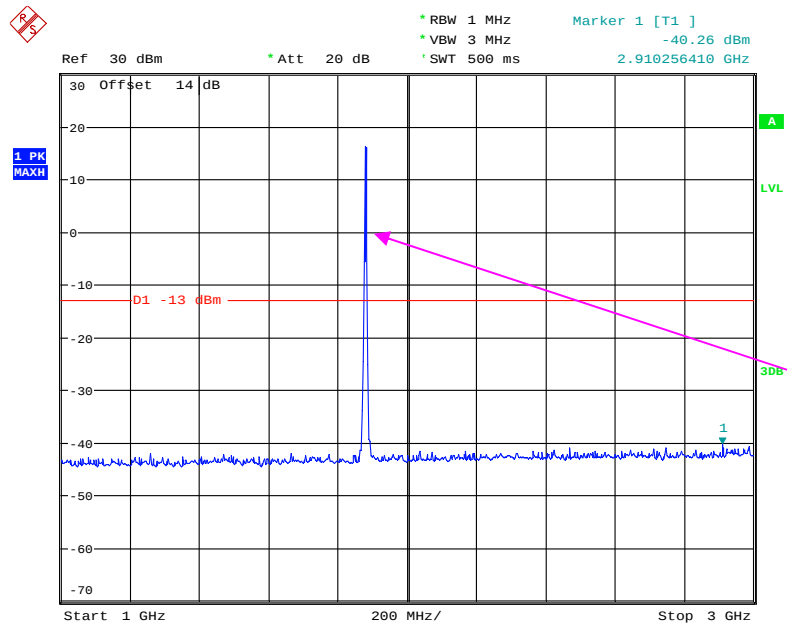
PCS Band (Part 24E)

30 MHz – 1 GHz (WCDMA Mode)



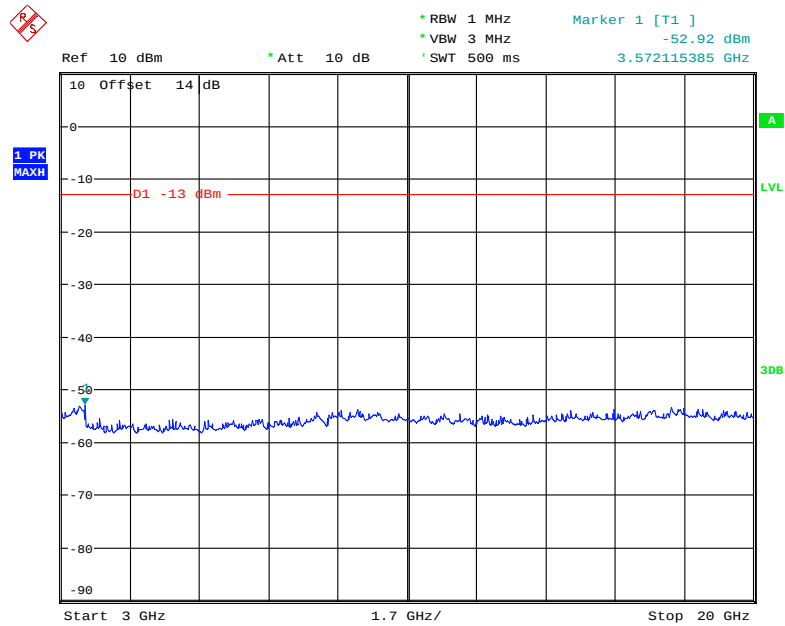
Date: 12.OCT.2017 22:08:05

1 GHz – 3 GHz (WCDMA Mode)



Date: 12.OCT.2017 22:18:11

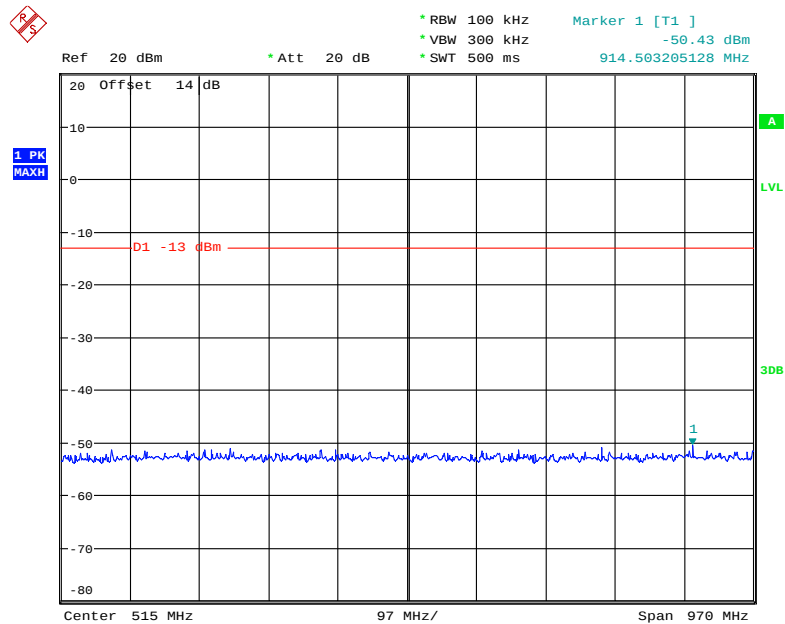
3 GHz – 20 GHz (WCDMA Mode)



Date: 12.OCT.2017 22:18:54

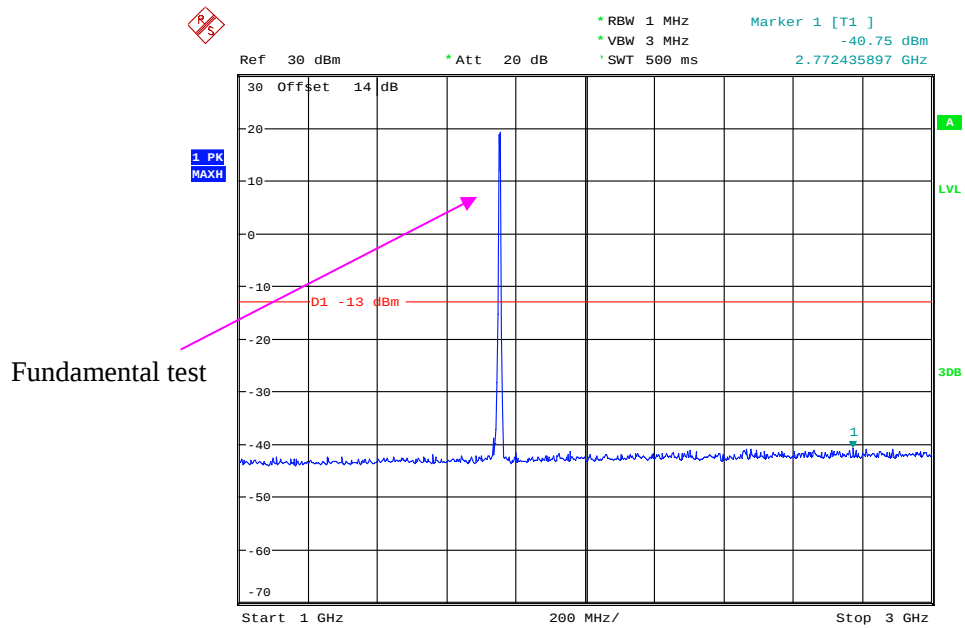
AWS Band (Part 27)

30 MHz – 1 GHz (WCDMA Mode)



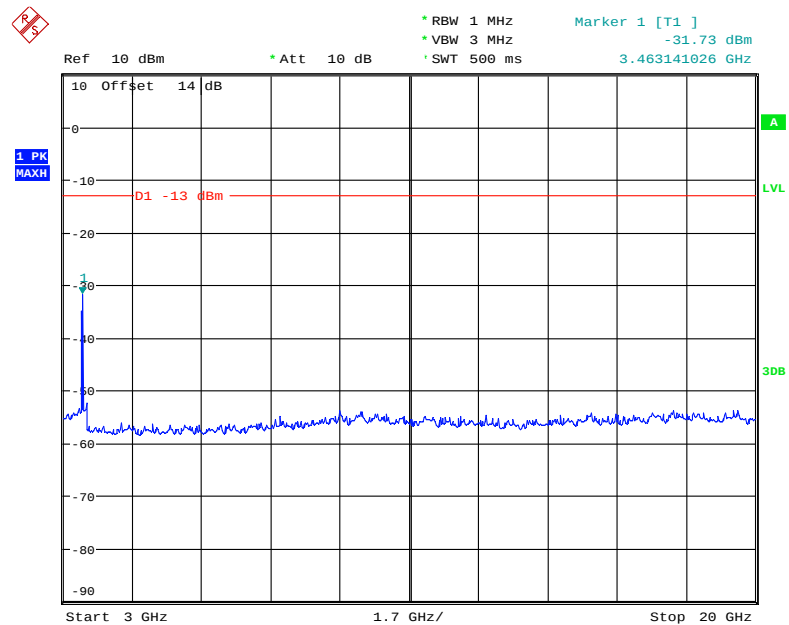
Date: 12.OCT.2017 22:10:07

1 GHz – 3 GHz (WCDMA Mode)



Date: 12.OCT.2017 22:15:16

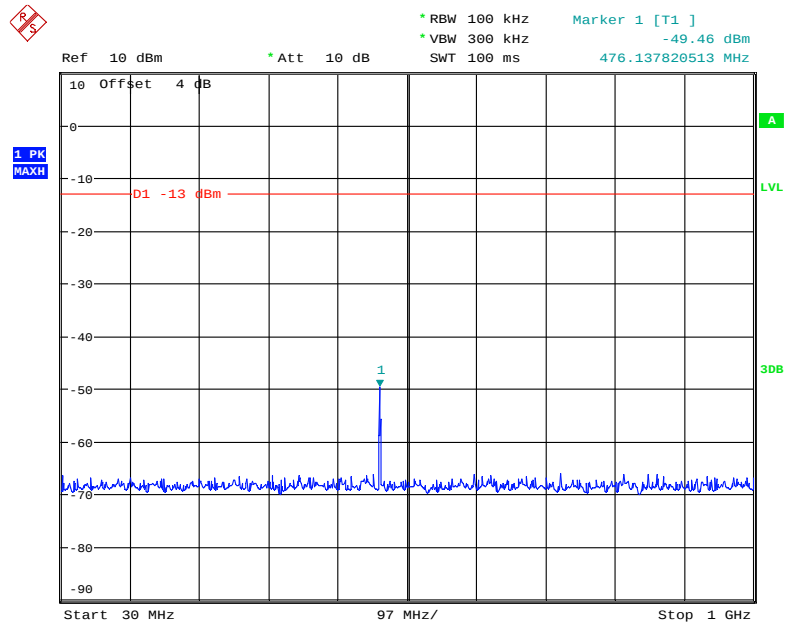
3 GHz – 20 GHz (WCDMA Mode)



Date: 12.OCT.2017 22:20:02

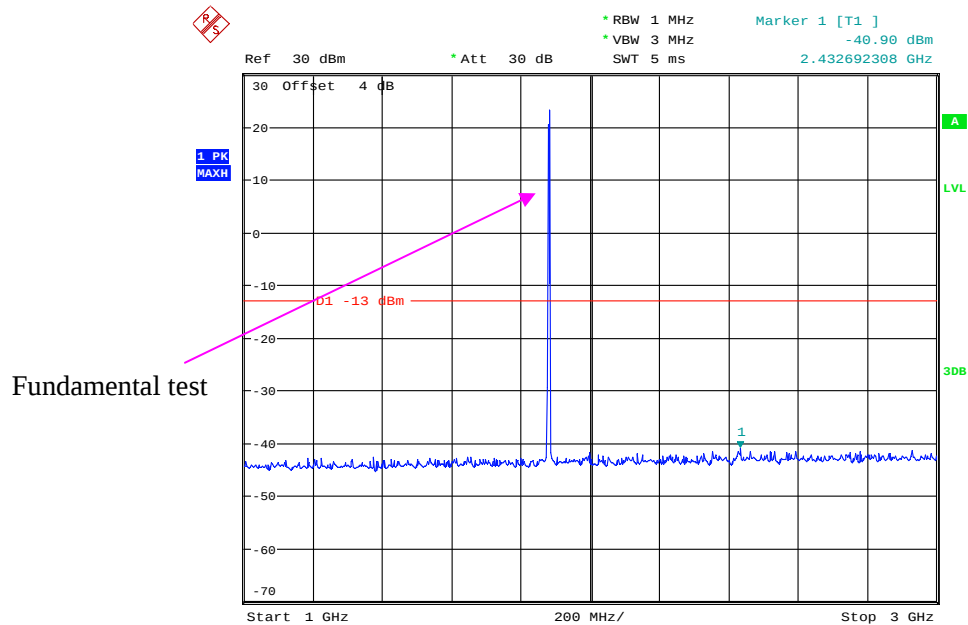
LTE Band 2:

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



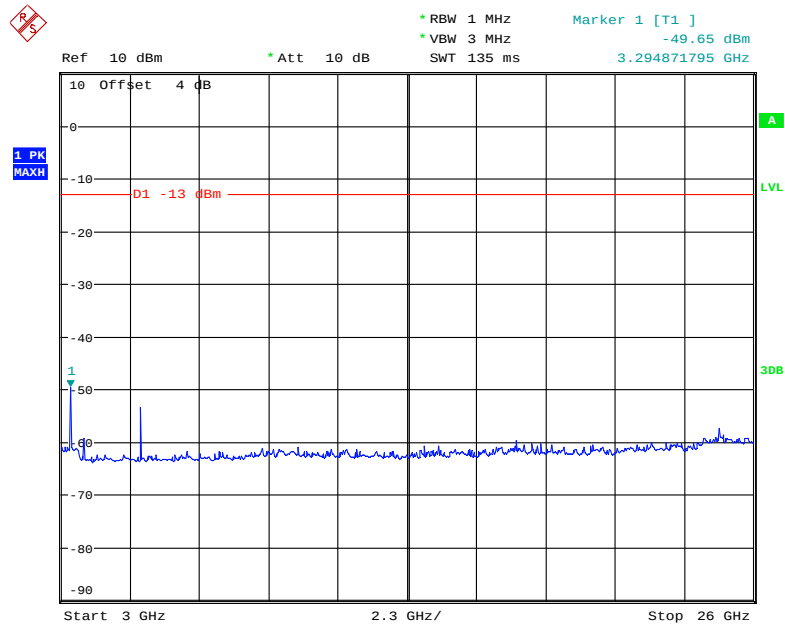
Date: 15.OCT.2017 16:52:42

1 GHz - 3 GHz (1.4 MHz, Middle Channel)



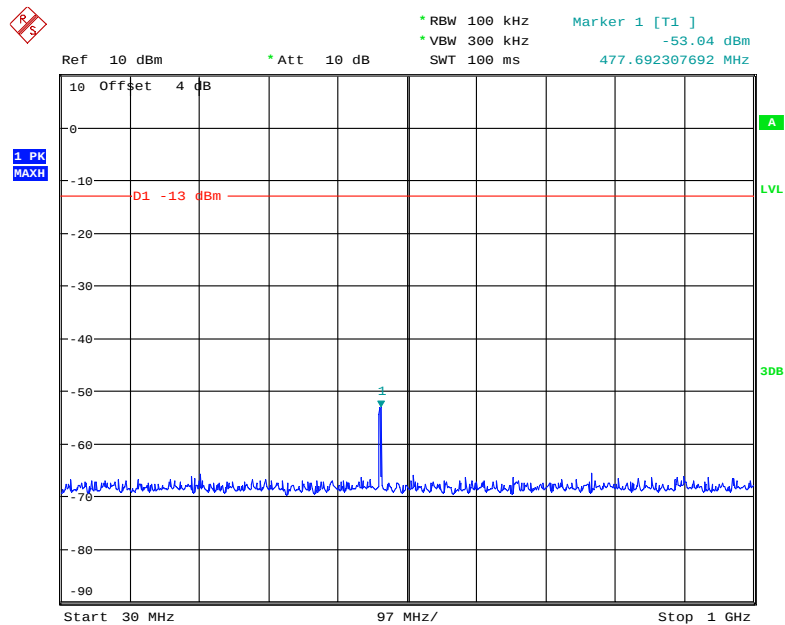
Date: 15.OCT.2017 17:00:03

3 GHz – 26 GHz (1.4 MHz, Middle Channel)



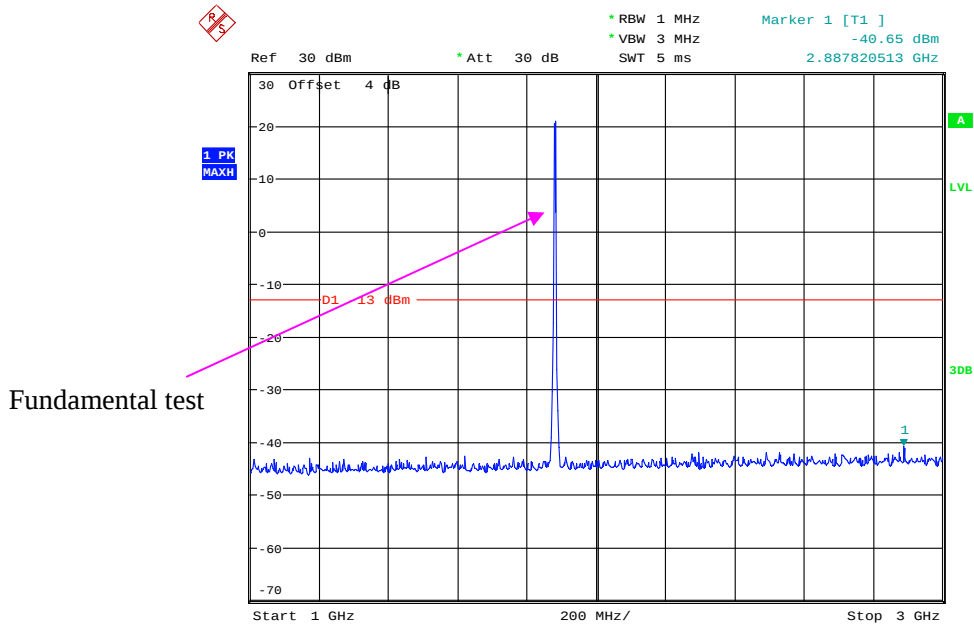
Date: 15.OCT.2017 17:08:46

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



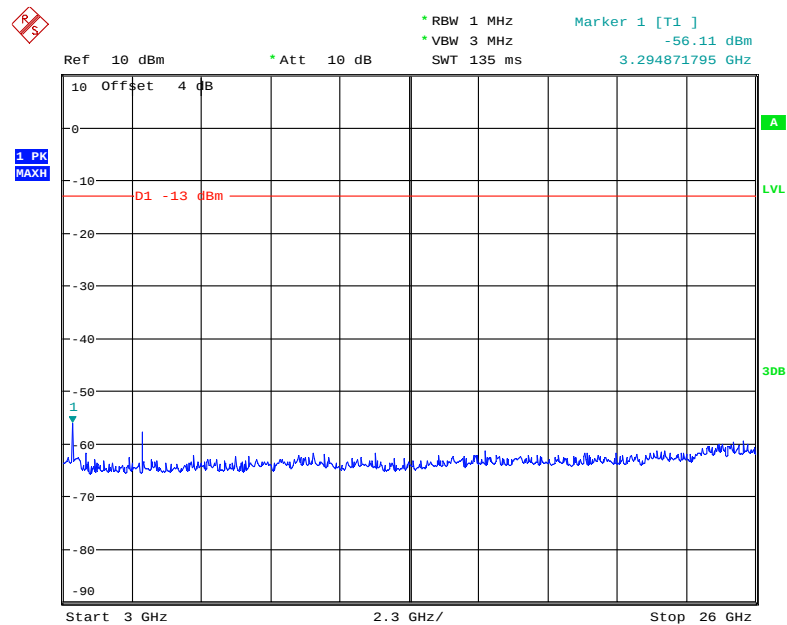
Date: 15.OCT.2017 16:52:56

1 GHz – 3 GHz (3.0 MHz, Middle Channel)



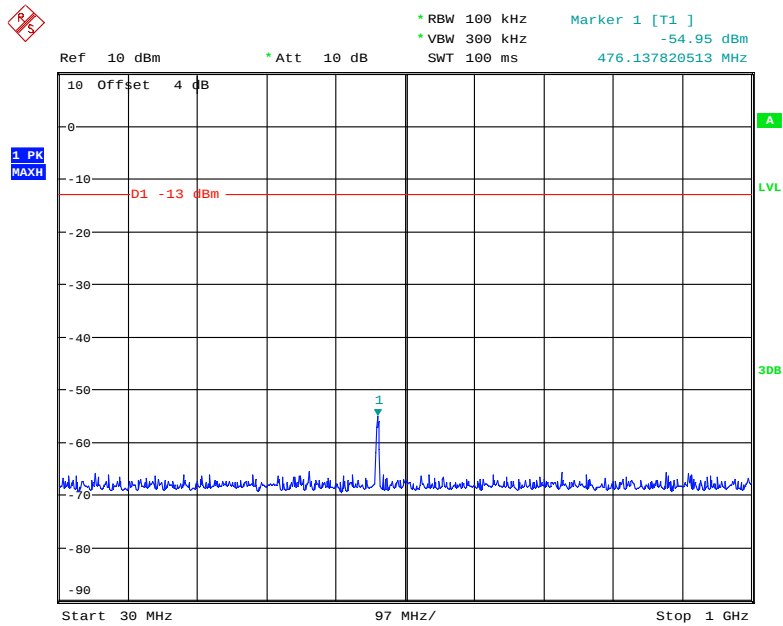
Date: 15.OCT.2017 17:00:31

3 GHz – 26 GHz (3.0 MHz, Middle Channel)



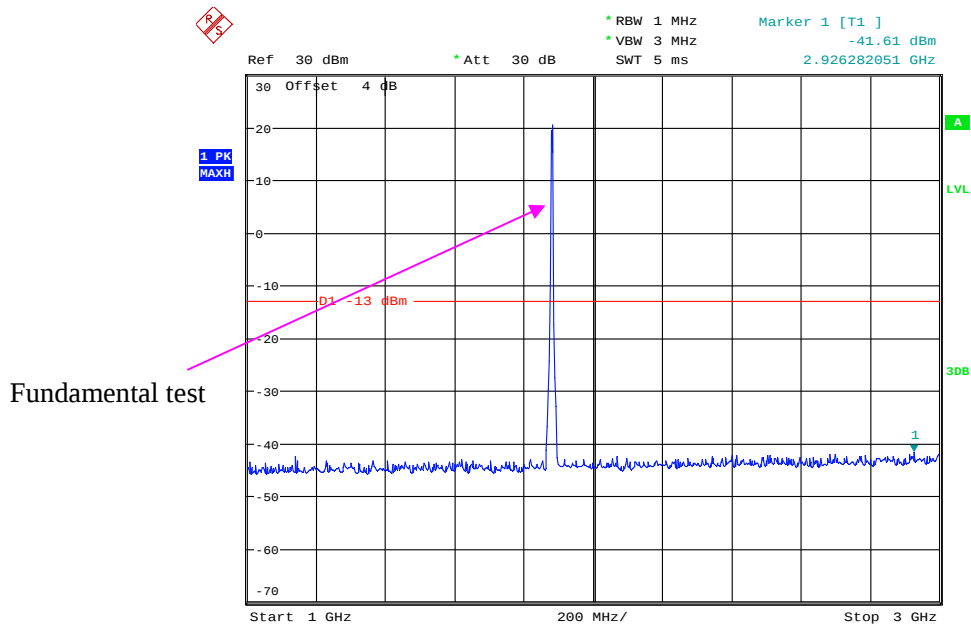
Date: 15.OCT.2017 17:07:10

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



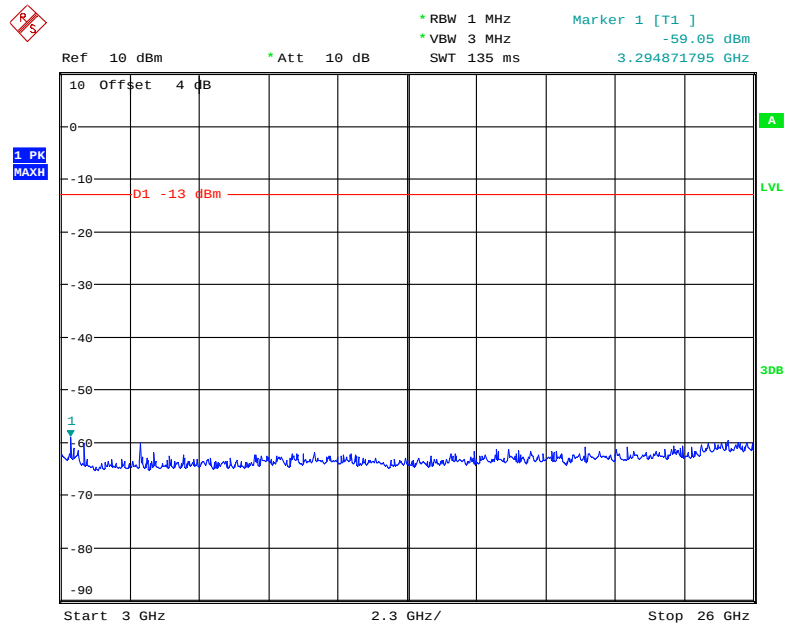
Date: 15.OCT.2017 16:53:09

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



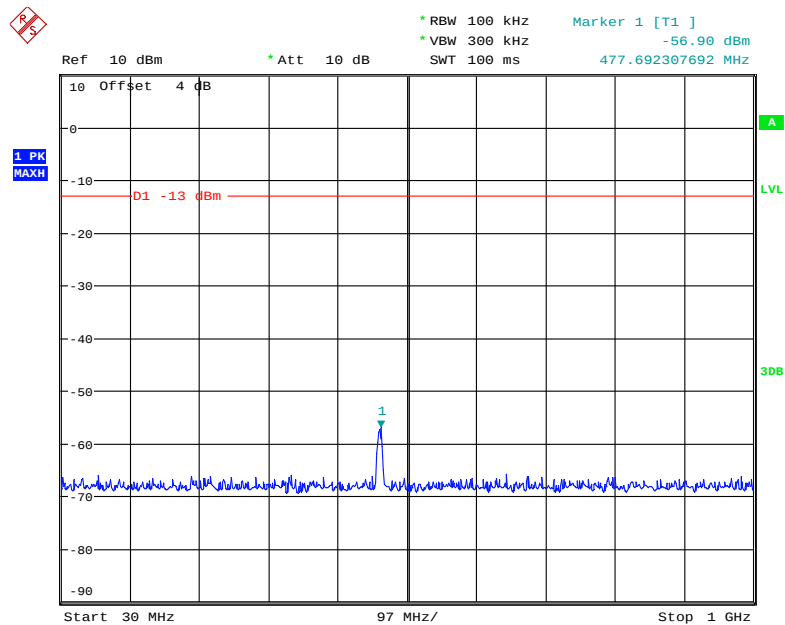
Date: 15.OCT.2017 17:00:52

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



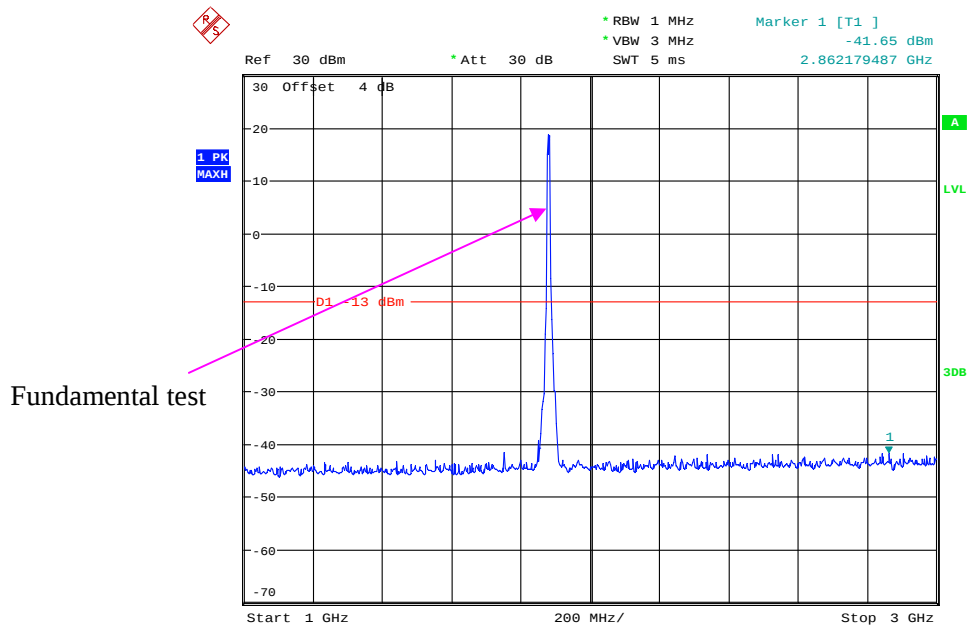
Date: 15.OCT.2017 17:07:00

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



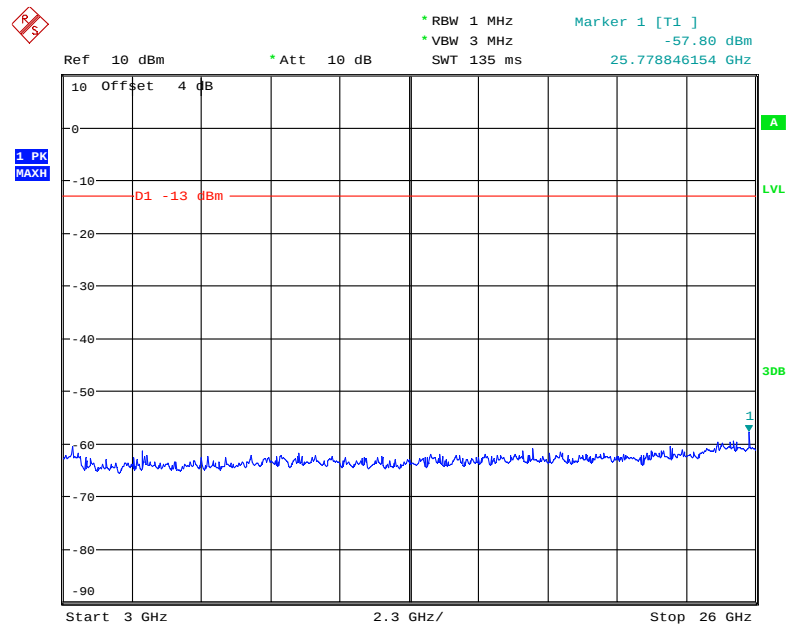
Date: 15.OCT.2017 16:53:24

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



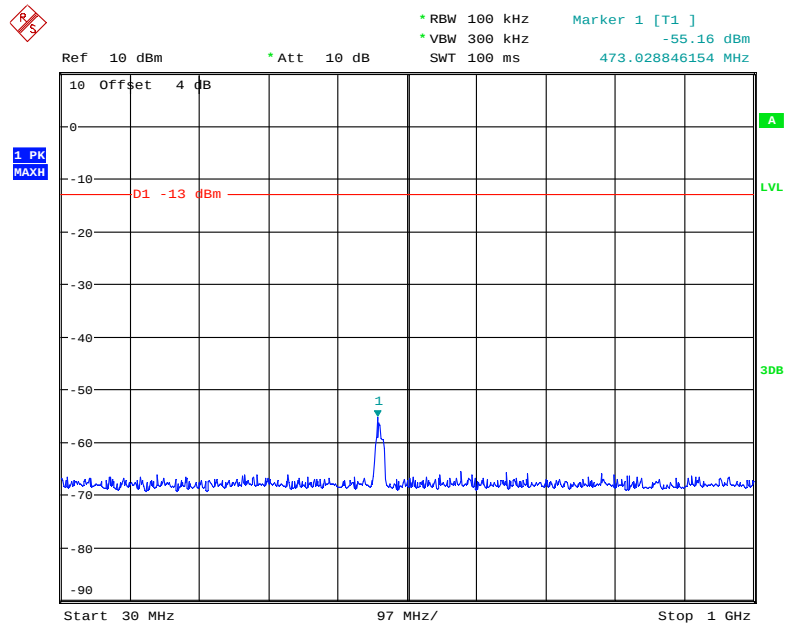
Date: 15.OCT.2017 17:01:10

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



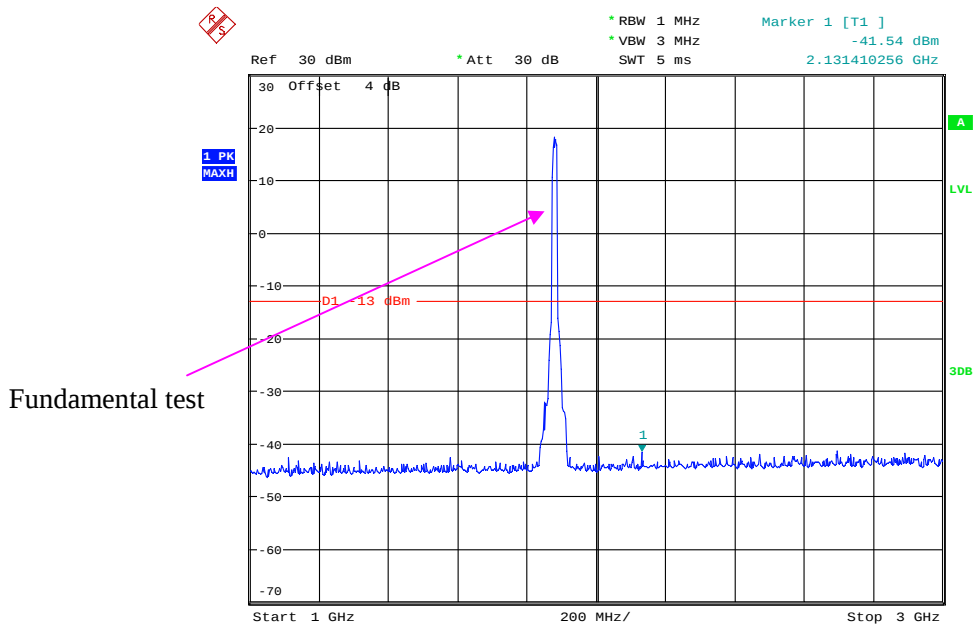
Date: 15.OCT.2017 17:06:48

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



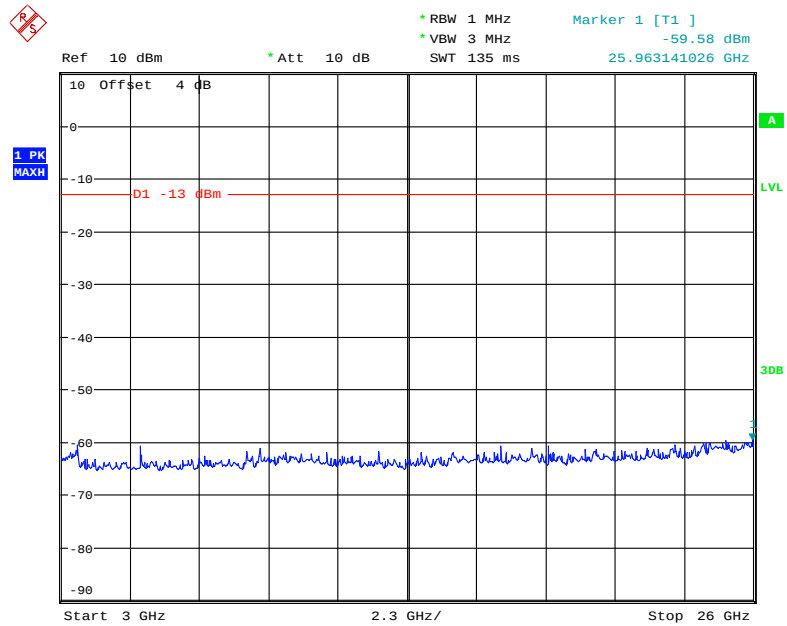
Date: 15.OCT.2017 16:53:40

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



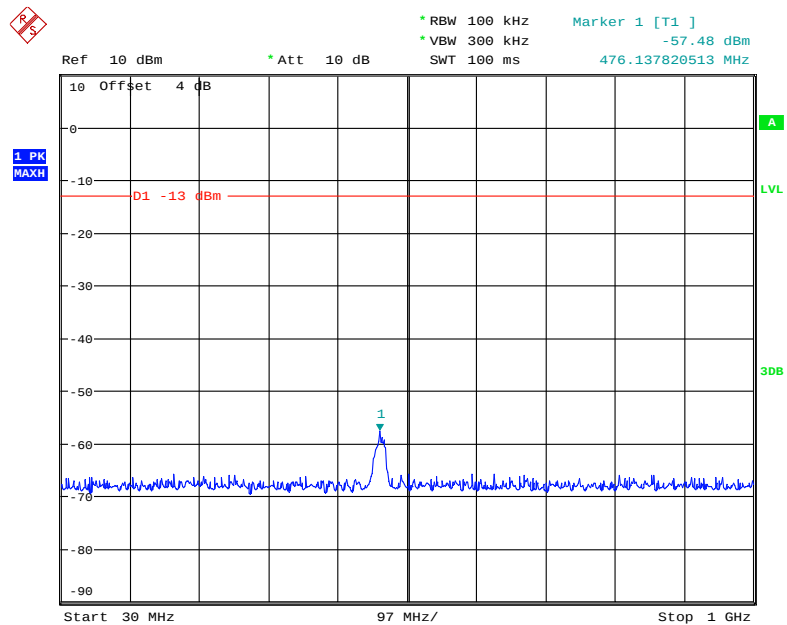
Date: 15.OCT.2017 17:01:26

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



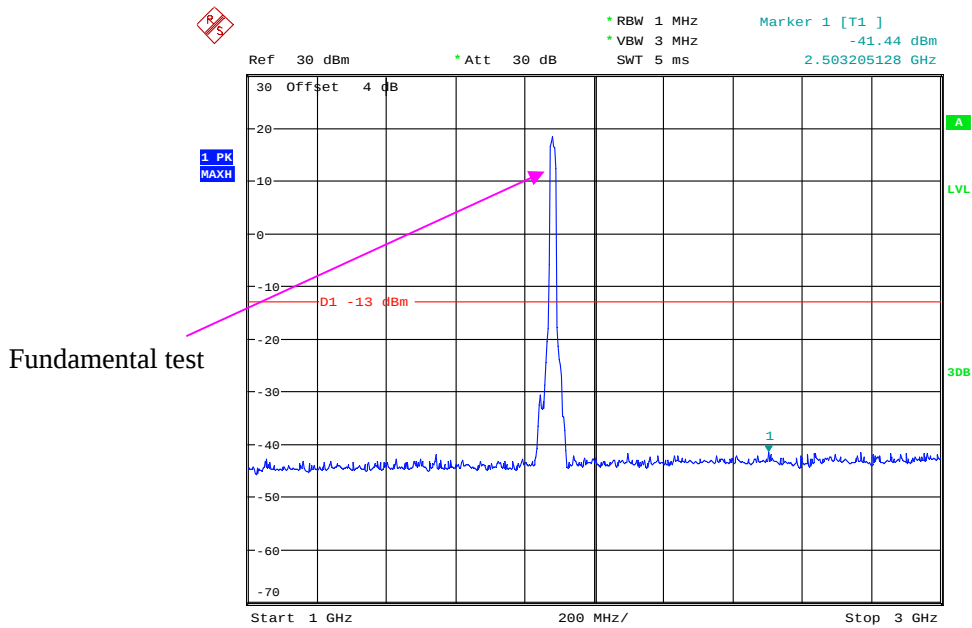
Date: 15.OCT.2017 17:06:34

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



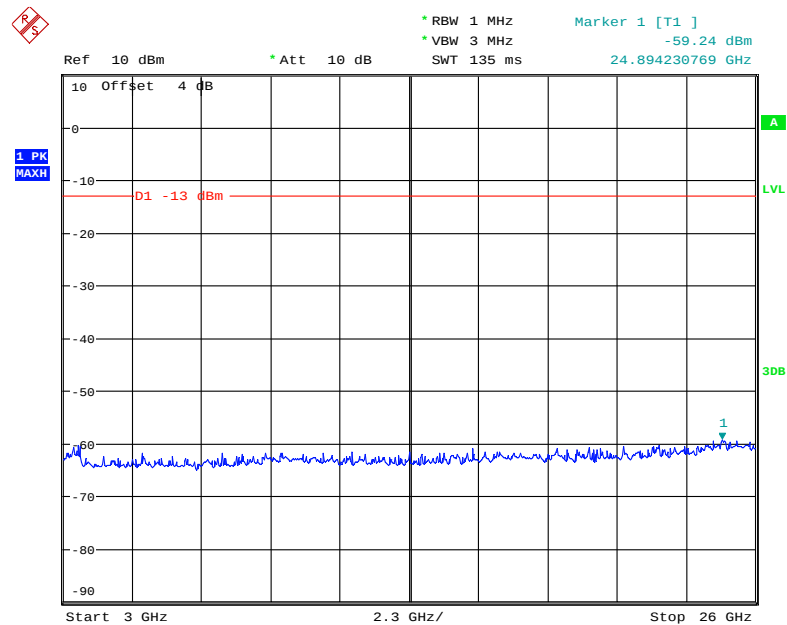
Date: 15.OCT.2017 16:53:56

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



Date: 15.OCT.2017 17:01:59

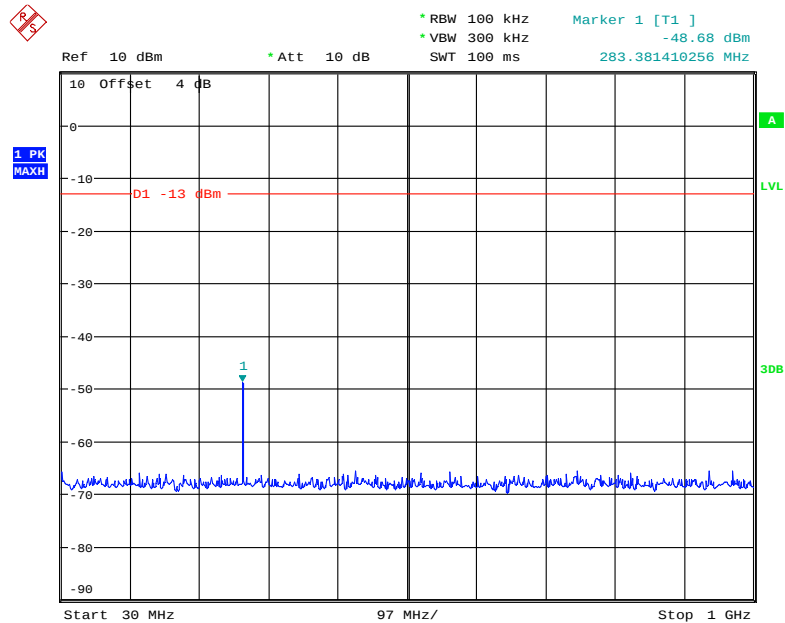
3 GHz – 26 GHz (20.0 MHz, Middle Channel)



Date: 15.OCT.2017 17:06:20

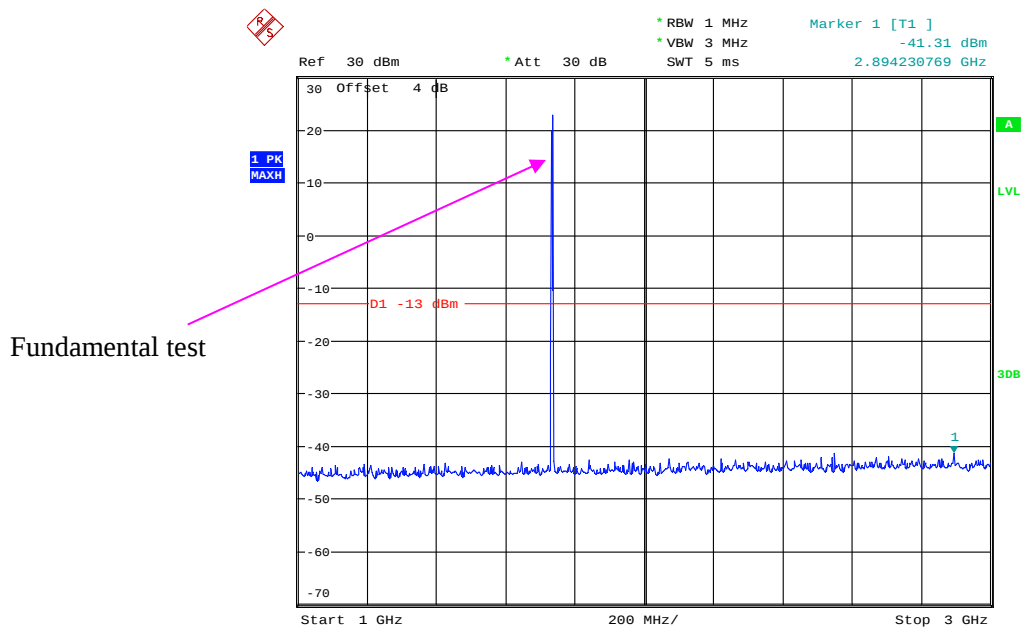
LTE Band 4:

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



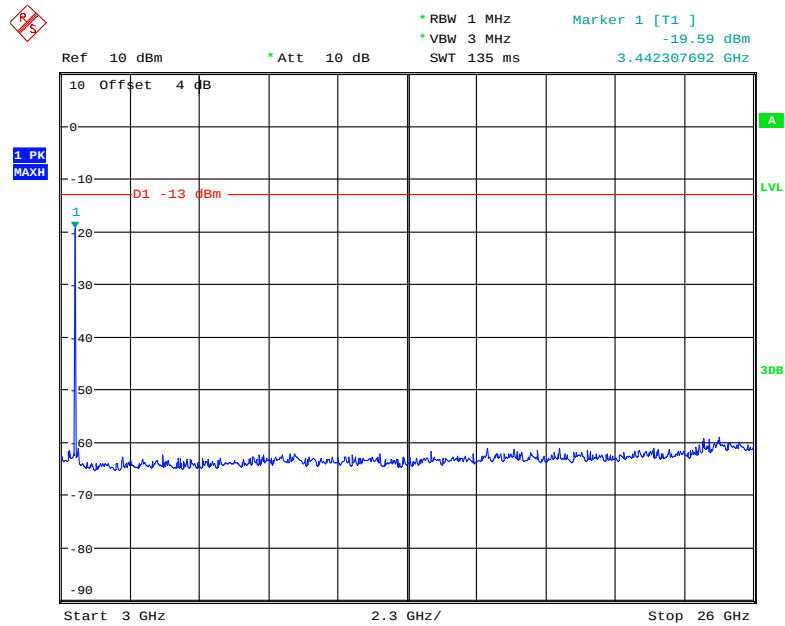
Date: 15.OCT.2017 16:50:18

1 GHz - 3 GHz (1.4 MHz, Middle Channel)



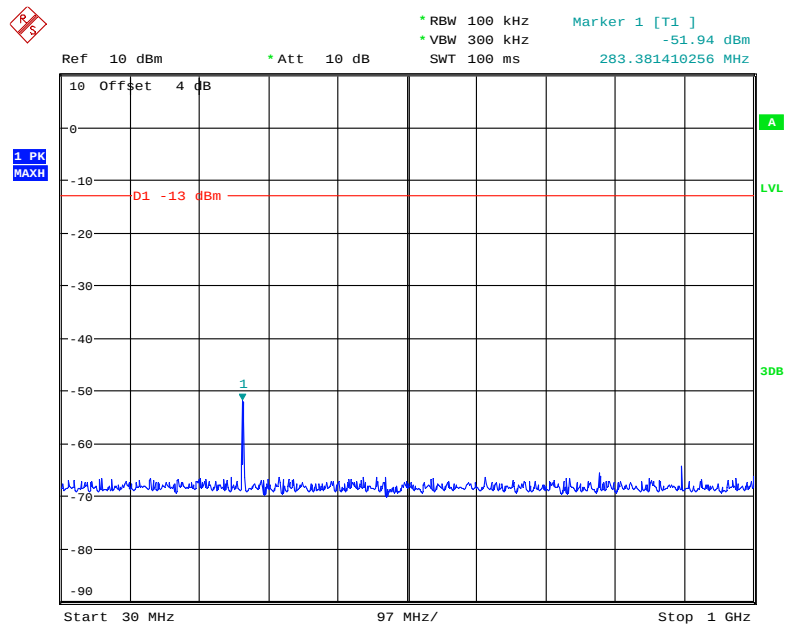
Date: 15.OCT.2017 17:04:24

3 GHz – 26 GHz (1.4 MHz, Middle Channel)



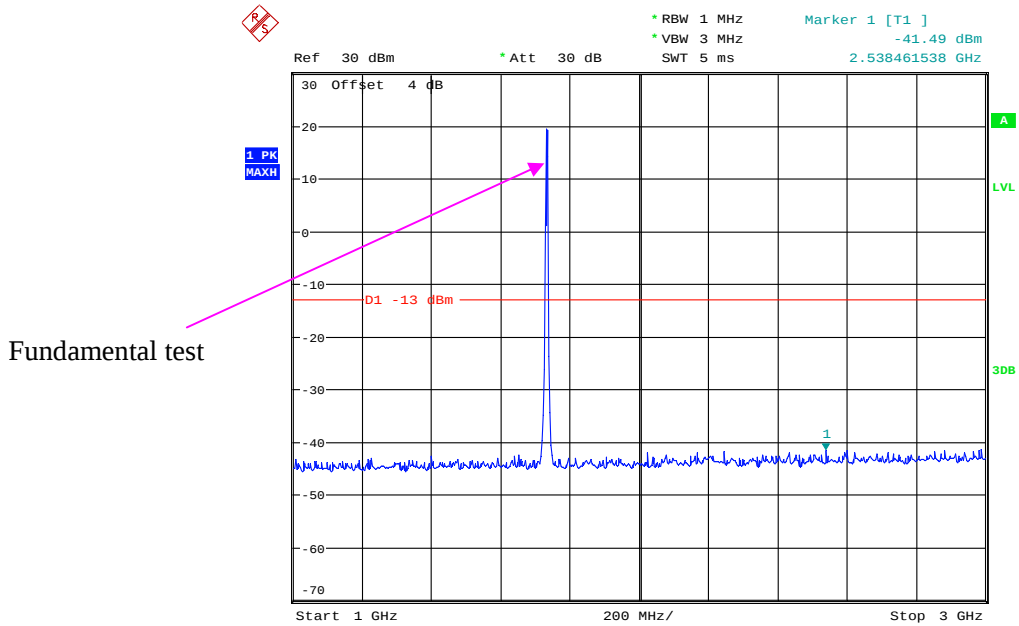
Date: 15.OCT.2017 17:04:48

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



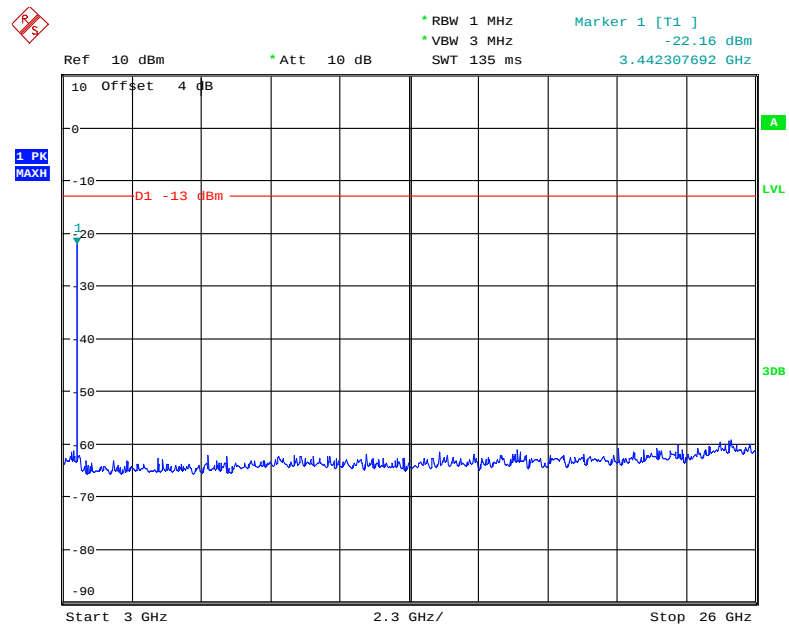
Date: 15.OCT.2017 16:50:55

1 GHz – 3 GHz (3.0 MHz, Middle Channel)



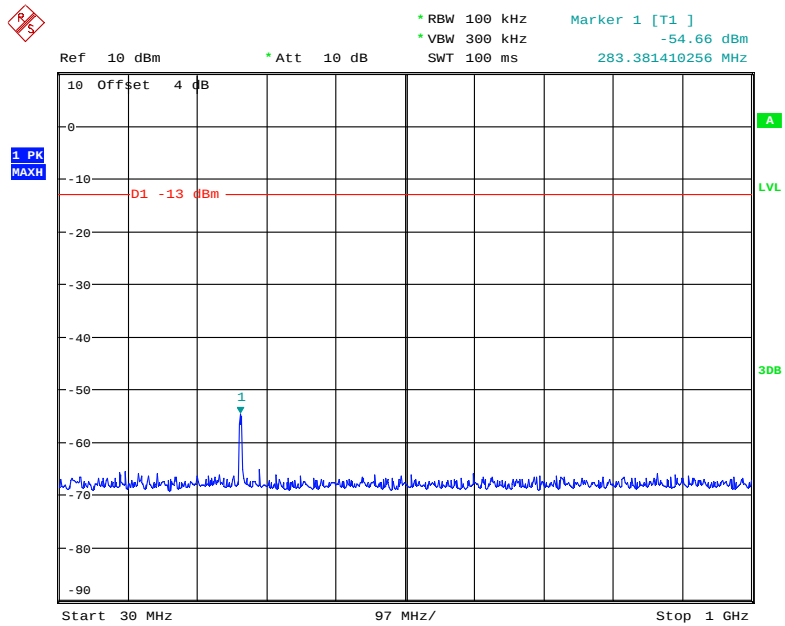
Date: 15.OCT.2017 17:03:52

3 GHz – 26 GHz (3.0 MHz, Middle Channel)



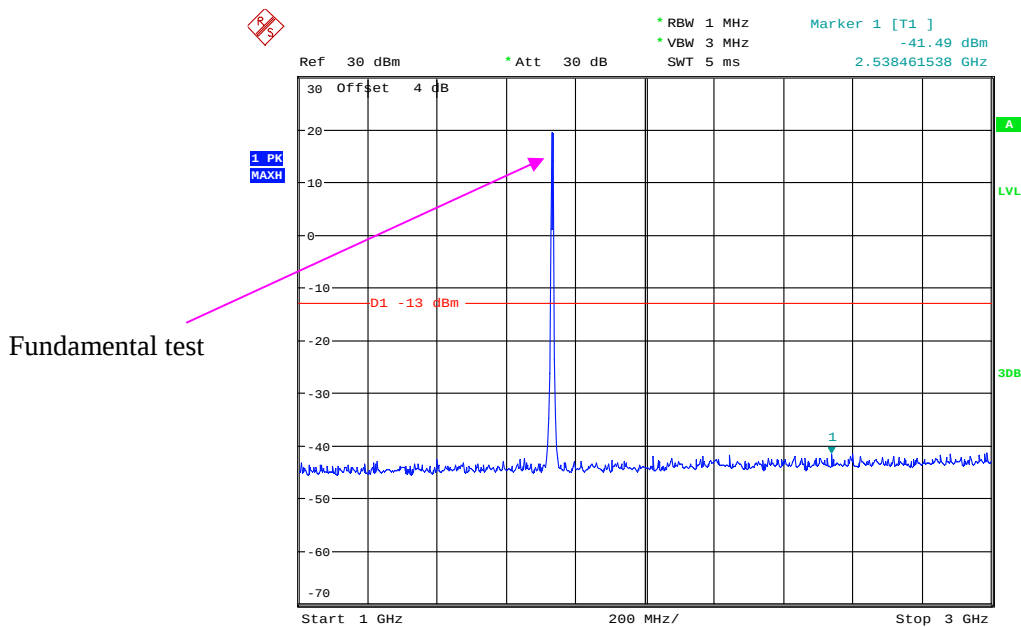
Date: 15.OCT.2017 17:05:04

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



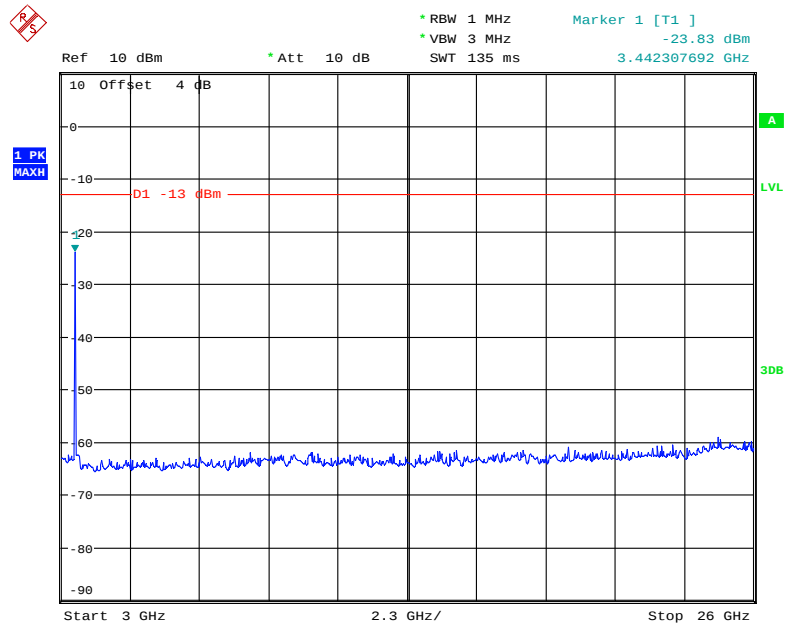
Date: 15.OCT.2017 16:51:12

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



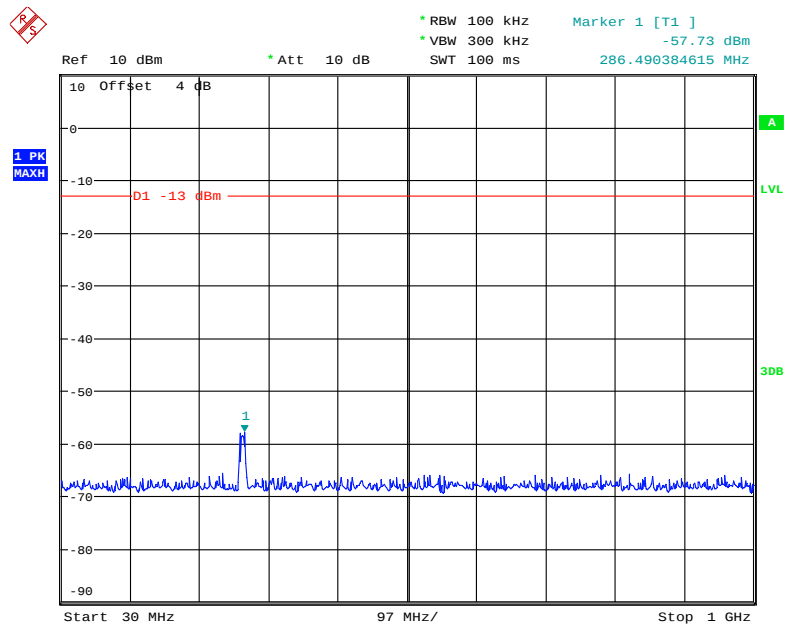
Date: 15.OCT.2017 17:03:52

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



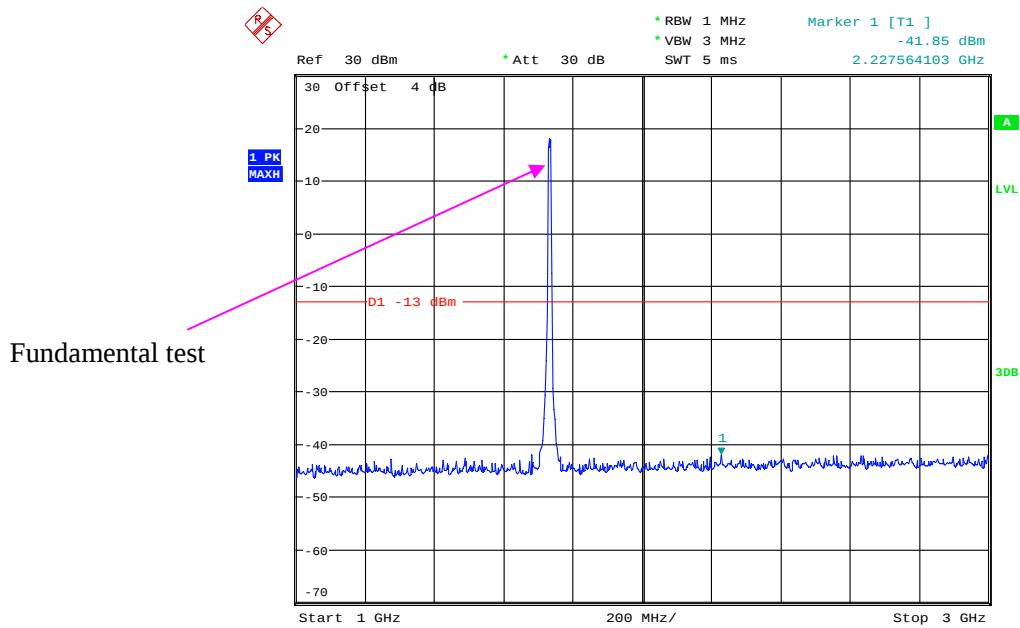
Date: 15.OCT.2017 17:05:17

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



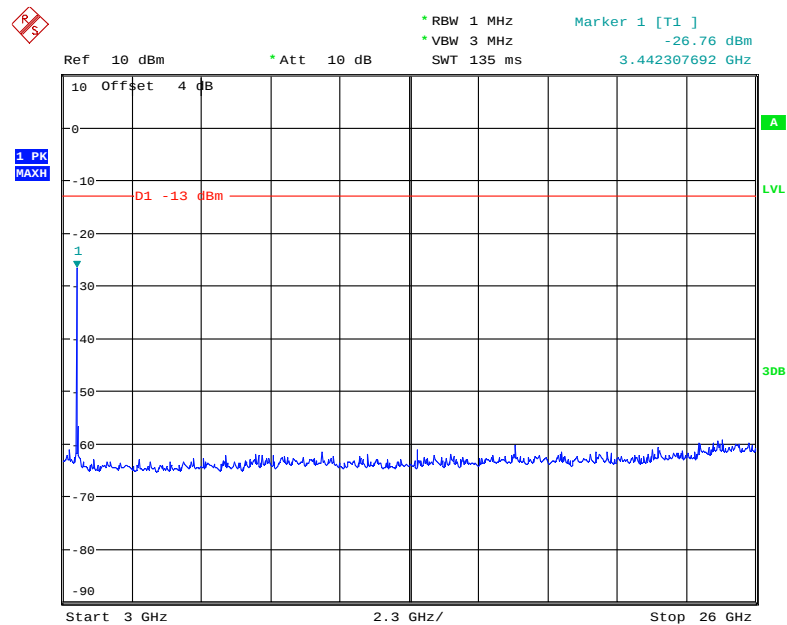
Date: 15.OCT.2017 16:51:30

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



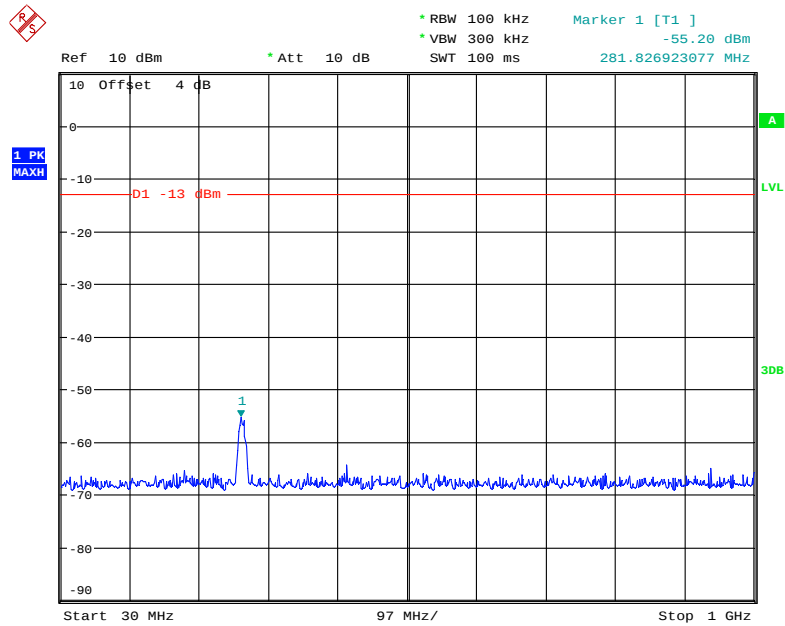
Date: 15.OCT.2017 17:03:04

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



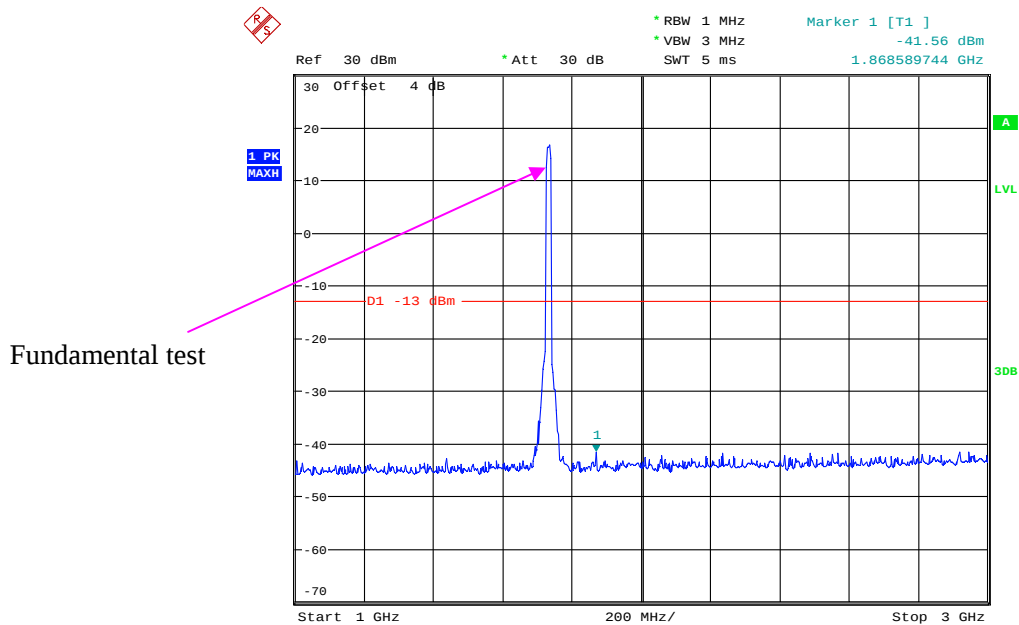
Date: 15.OCT.2017 17:05:28

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



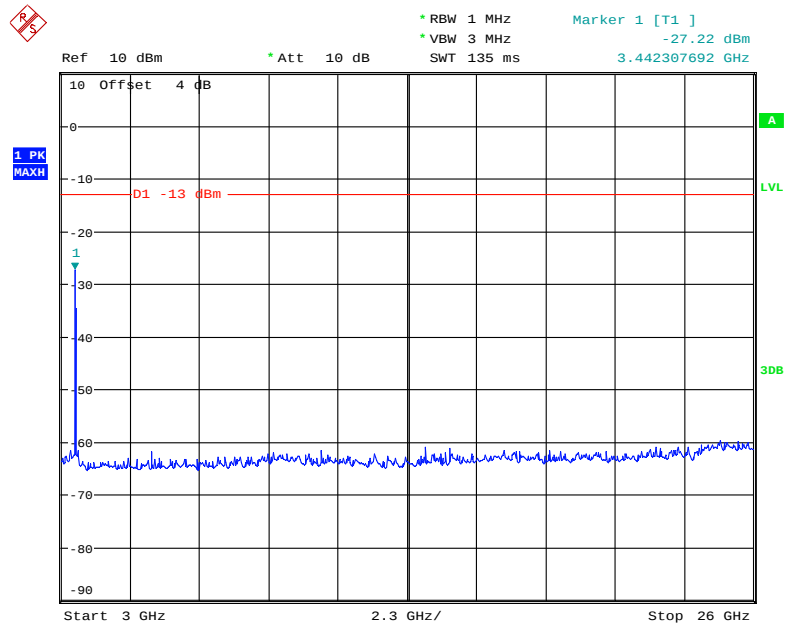
Date: 15.OCT.2017 16:51:47

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



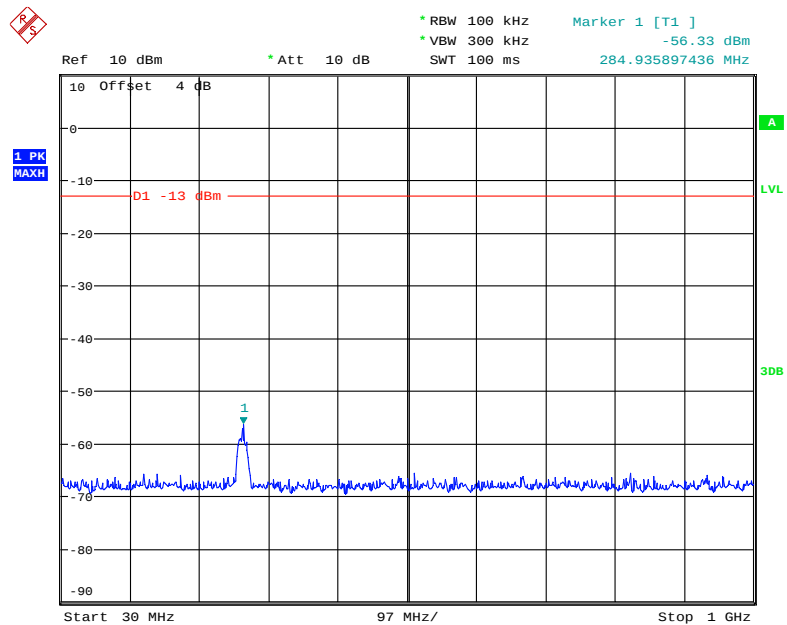
Date: 15.OCT.2017 17:02:49

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



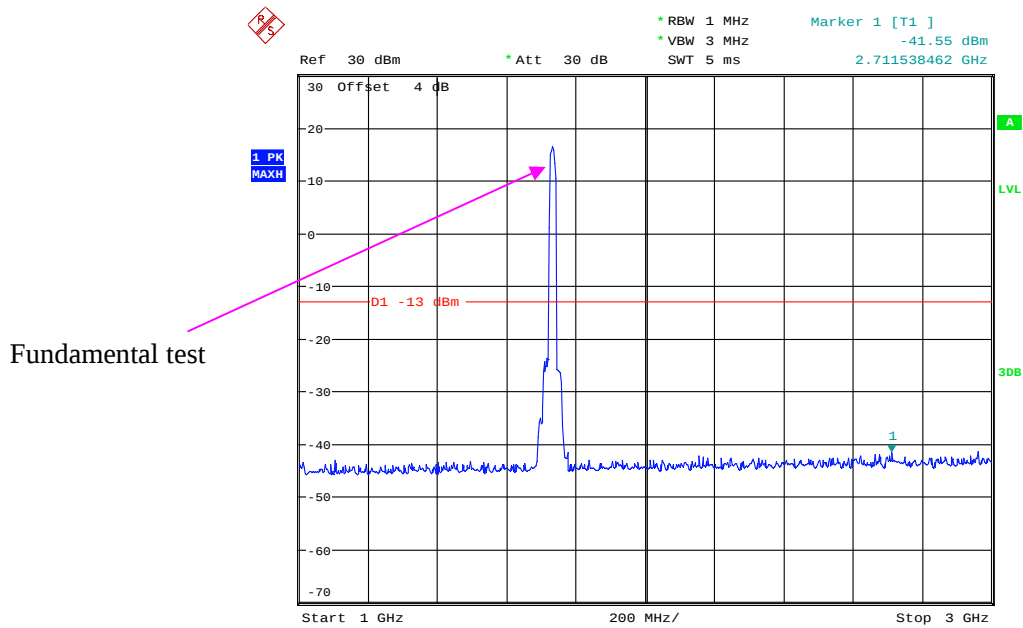
Date: 15.OCT.2017 17:05:40

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



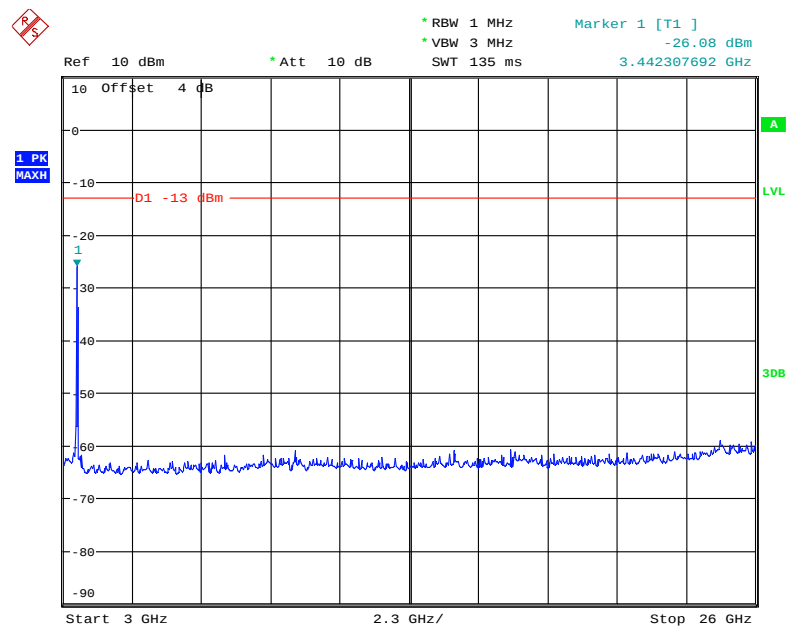
Date: 15.OCT.2017 16:52:03

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

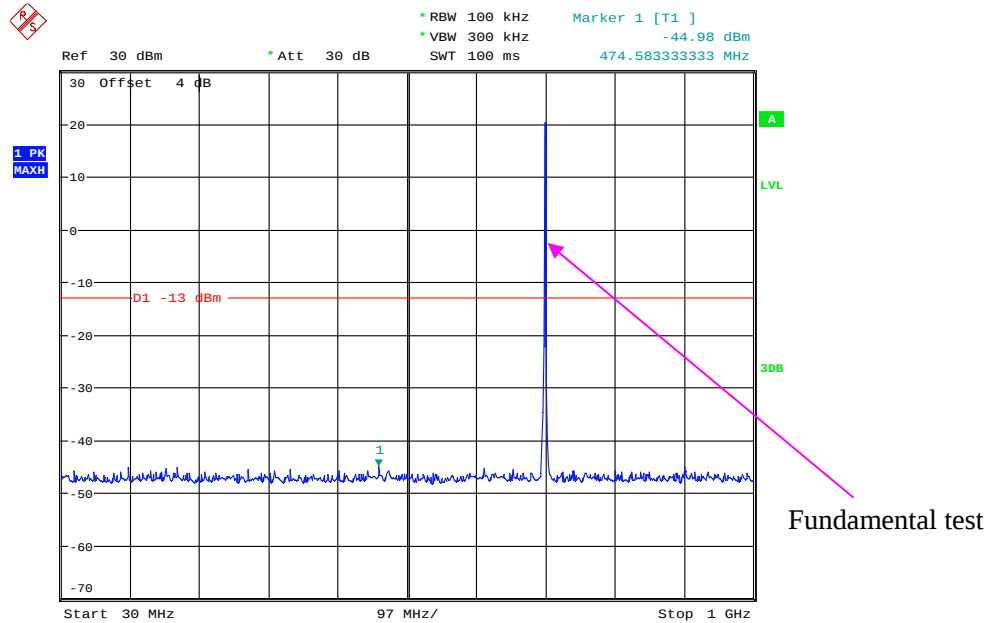


Date: 15.OCT.2017 17:02:27

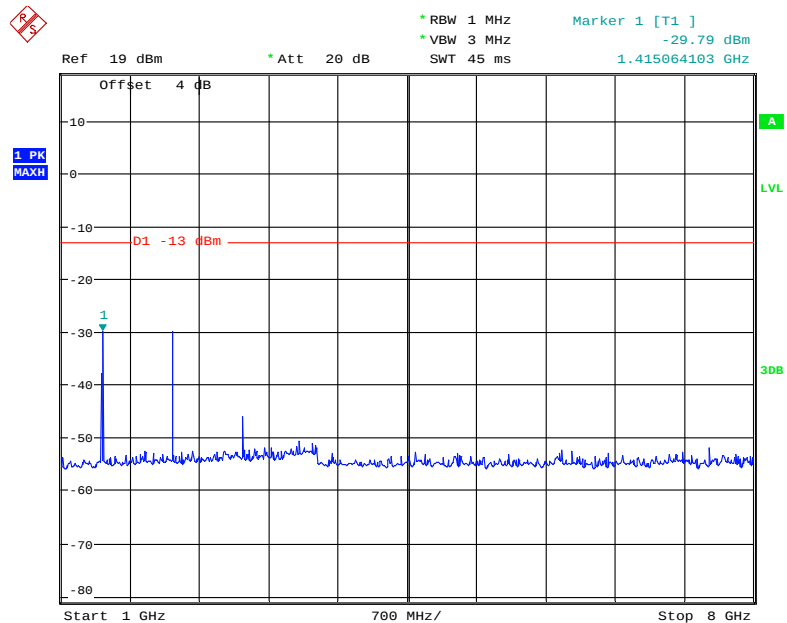
3 GHz – 26 GHz (20.0 MHz, Middle Channel)



Date: 15.OCT.2017 17:05:52

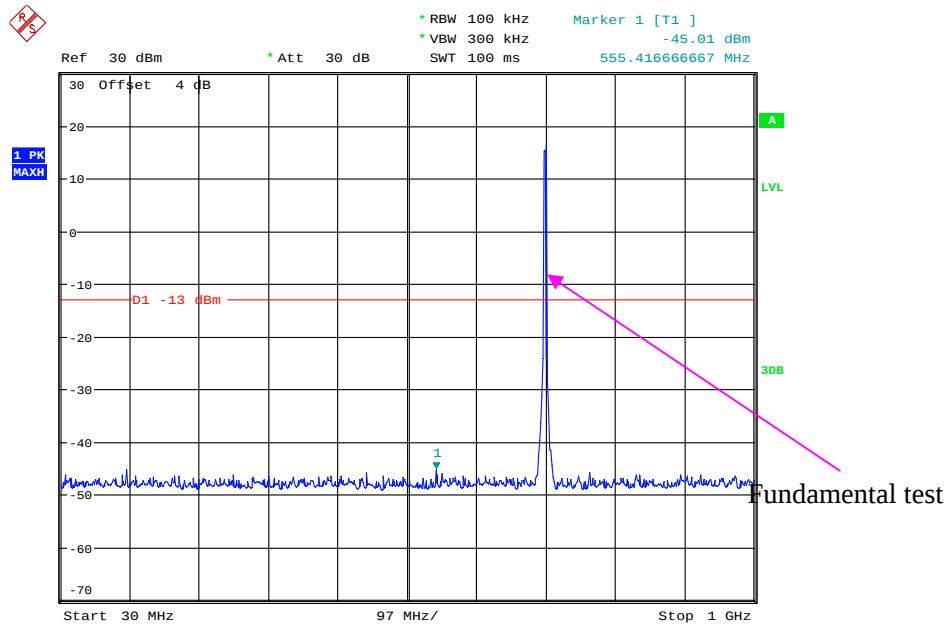
LTE Band 12:**30 MHz - 1 GHz (1.4 MHz, Middle Channel)**

Date: 15.OCT.2017 16:55:13

1 GHz – 8 GHz (1.4 MHz, Middle Channel)

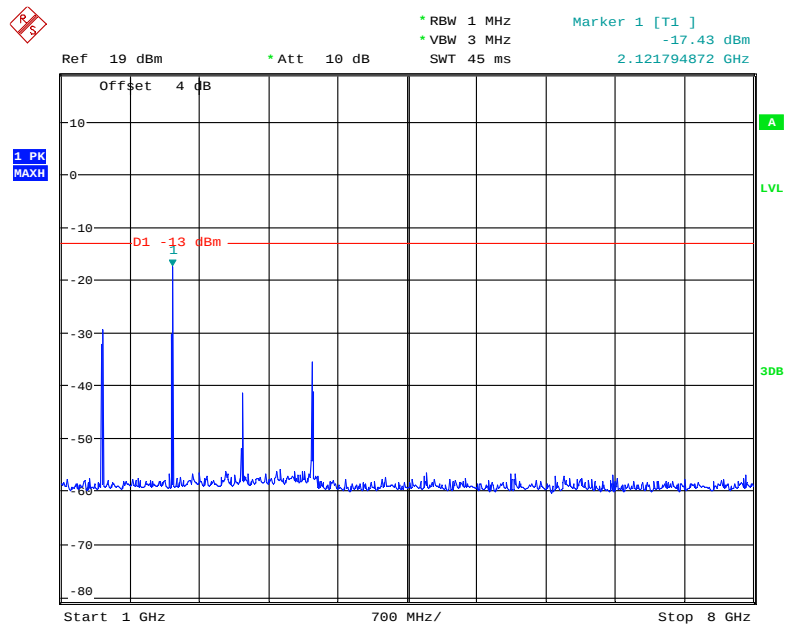
Date: 15.OCT.2017 16:58:19

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



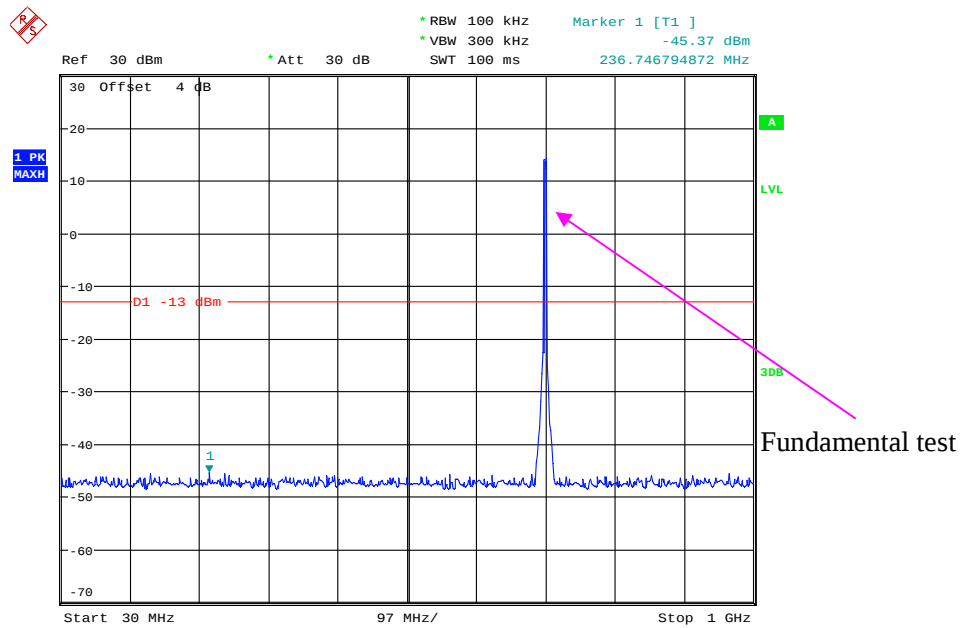
Date: 15.OCT.2017 16:55:45

1 GHz – 8 GHz (3.0 MHz, Middle Channel)



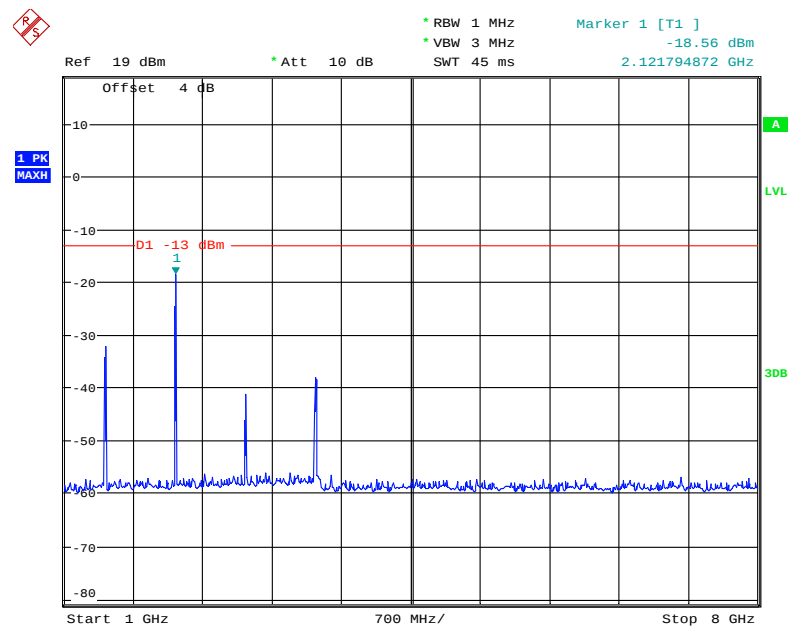
Date: 15.OCT.2017 16:57:59

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



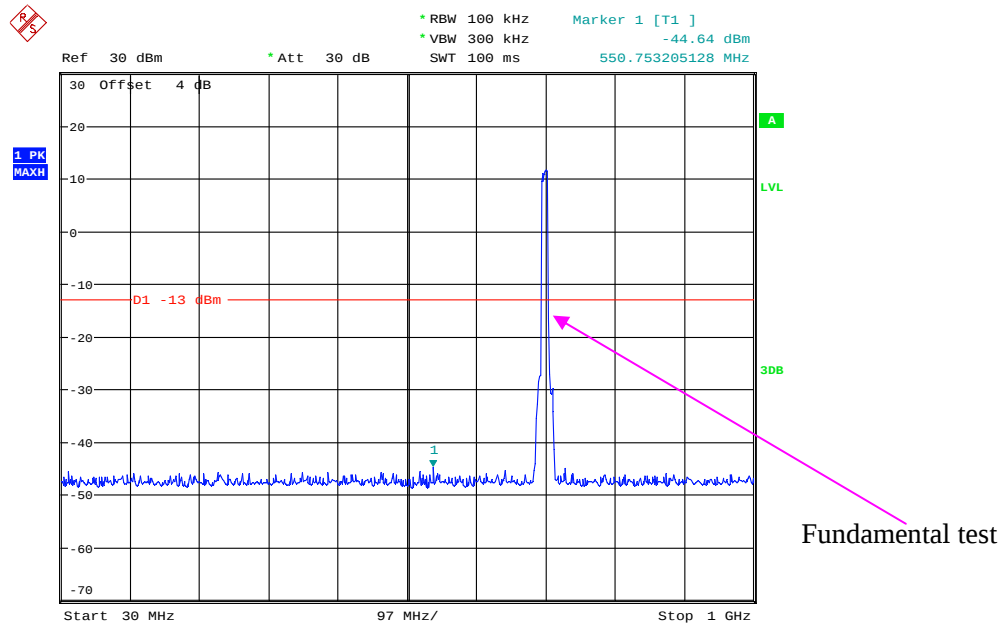
Date: 15.OCT.2017 16:56:15

1 GHz – 8 GHz (5.0 MHz, Middle Channel)



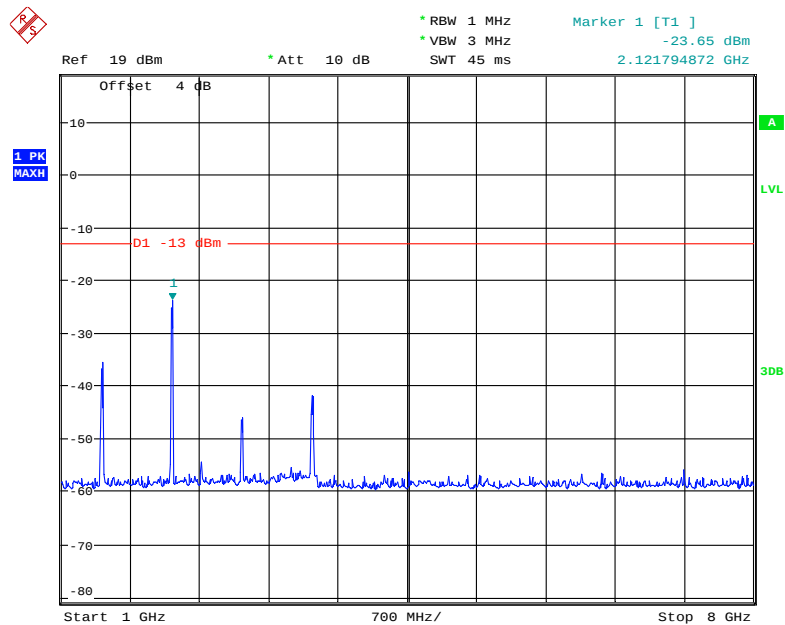
Date: 15.OCT.2017 16:57:48

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



Date: 15.OCT.2017 16:56:42

1 GHz – 8 GHz (10.0 MHz, Middle Channel)



Date: 15.OCT.2017 16:57:37

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:	25 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Kobe Li on 2017-10-27.

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)
WCDMA Mode, Middle channel										
400.27	34.25	154	1.6	H	-33	0.67	0	-33.67	-13	20.67
400.27	33.45	219	1.0	V	-33.8	0.67	0	-34.47	-13	21.47
1673.20	51.53	96	1.5	H	-55.5	1.30	9.10	-47.70	-13	34.70
1673.20	53.33	141	2.3	V	-53.1	1.30	9.10	-45.30	-13	32.30
2509.80	51.91	78	1.9	H	-51.6	2.60	9.30	-44.90	-13	31.90
2509.80	47.32	50	1.1	V	-55.6	2.60	9.30	-48.90	-13	35.90
3346.40	44.65	345	1.8	H	-55.7	1.50	9.60	-47.60	-13	34.60
3346.40	45.38	281	1.2	V	-55.0	1.50	9.60	-46.90	-13	33.90

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)
WCDMA Mode Band II, Middle channel										
400.27	33.29	111	1.5	H	-33.9	0.67	0	-34.57	-13	21.57
400.27	32.14	333	2.2	V	-35.1	0.67	0	-35.77	-13	22.77
3760.00	42.11	71	2.0	H	-59.1	1.50	9.70	-50.90	-13	37.90
3760.00	42.45	257	2.4	V	-58.3	1.50	9.70	-50.10	-13	37.10

30 MHz ~ 20 GHz:

AWS Band (Part 27)

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 27	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
WCDMA Mode Band IV, Middle channel										
400.27	35.12	344	1.4	H	-32.1	0.67	0	-32.77	-13	19.77
400.27	34.16	297	2.2	V	-33.1	0.67	0	-33.77	-13	20.77
3465.20	43.03	249	2.4	H	-57.4	1.50	9.70	-49.20	-13	36.20
3465.20	44.37	291	1.8	V	-56.8	1.50	9.70	-48.60	-13	35.60

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

Frequency	Receiver	Turntable	Rx Antenna		Substituted			Absolute Level	Limit	Margin
(MHz)	Reading (dBμV)	Angle Degree	Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)	(dBm)	(dBm)	(dB)
Band 2										
Test frequency range:30 MHz ~ 20 GHz										
399.88	32.15	229	1.7	H	-35.1	0.67	0	-35.77	-13	22.77
399.88	33.45	12	2.2	V	-33.8	0.67	0	-34.47	-13	21.47
3760.00	42.81	227	2.3	H	-58.4	1.50	9.70	-50.20	-13	37.20
3760.00	43.22	123	1.1	V	-57.5	1.50	9.70	-49.30	-13	36.30
Band 4										
Test frequency range:30 MHz ~ 18 GHz										
399.88	32.45	192	1.7	H	-34.8	0.67	0	-35.47	-13	21.47
399.88	33.78	274	1.3	V	-33.5	0.67	0	-34.17	-13	21.17
3465.00	43.08	320	2.2	H	-57.3	1.50	9.70	-49.10	-13	36.10
3465.00	44.67	262	1.9	V	-56.5	1.50	9.70	-48.30	-13	35.30
Band 12										
Test frequency range: 30 MHz ~ 10 GHz										
399.88	32.24	261	2.0	H	-35	0.67	0	-35.67	-13	22.67
399.88	33.64	221	2.1	V	-33.6	0.67	0	-34.27	-13	21.27
1415.00	46.99	42	1.2	H	-60.8	1.60	8.30	-54.10	-13	41.10
1415.00	48.05	165	1.0	V	-60.0	1.60	8.30	-53.30	-13	40.30
2122.50	48.92	43	1.9	H	-53.2	1.30	8.80	-45.70	-13	32.70
2122.50	41.72	245	2.0	V	-61.2	1.30	8.80	-53.70	-13	40.70

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.

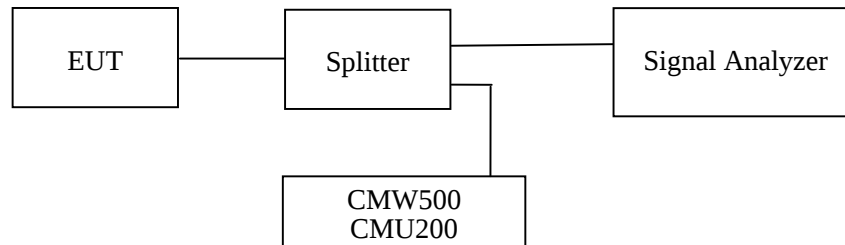
According to § 24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

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**

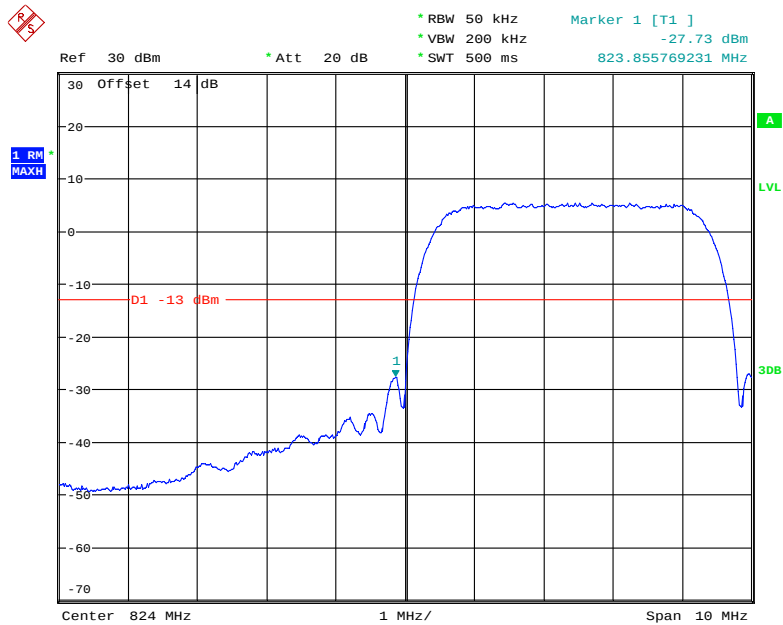
Temperature:	24~25°C
Relative Humidity:	48~50 %
ATM Pressure:	100.0~101.0 kPa

The testing was performed by Kobe Li from 2017-10-12 to 2017-12-15.

EUT operation mode: Transmitting

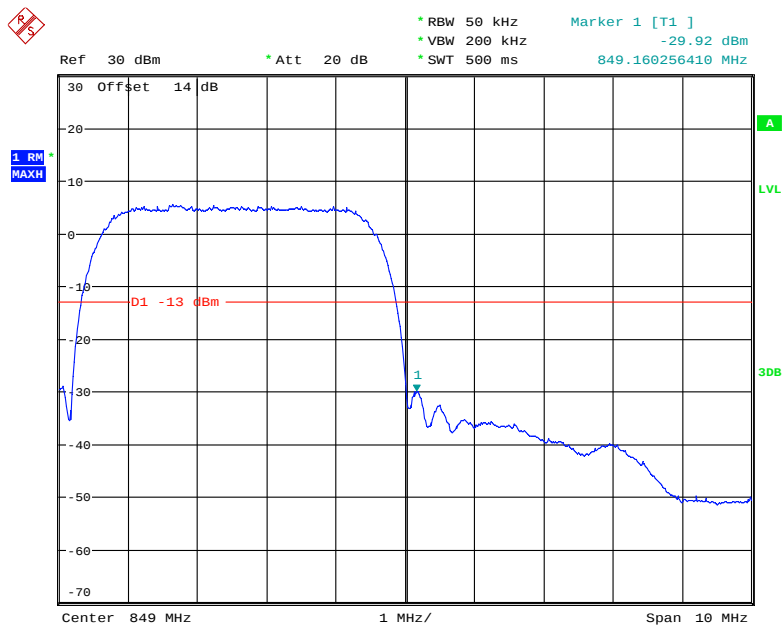
Test Result: Compliance. Please refer to the following plots.

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



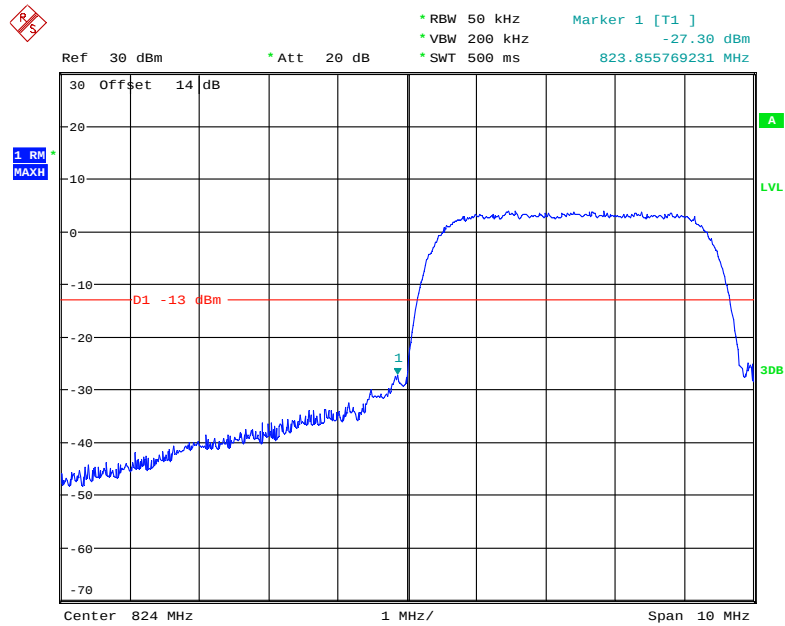
Date: 12.OCT.2017 21:23:36

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



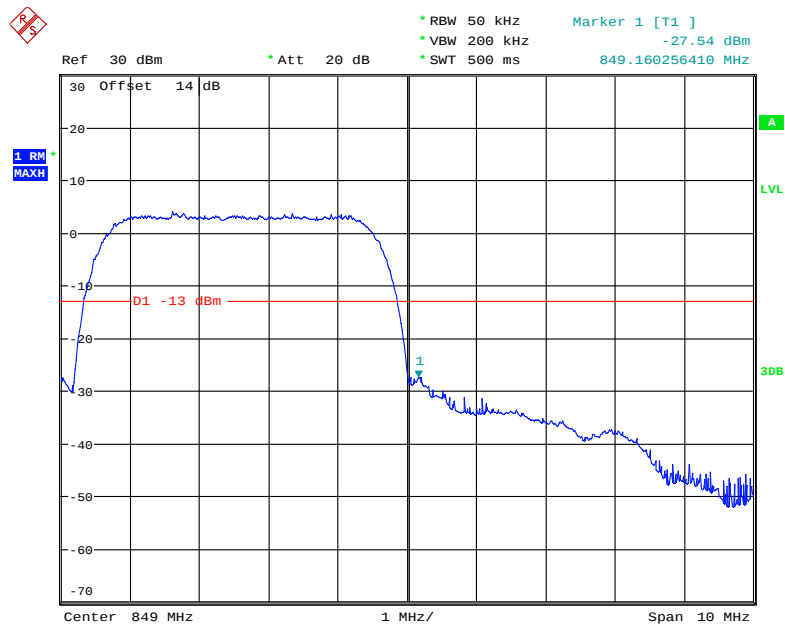
Date: 12.OCT.2017 21:26:17

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



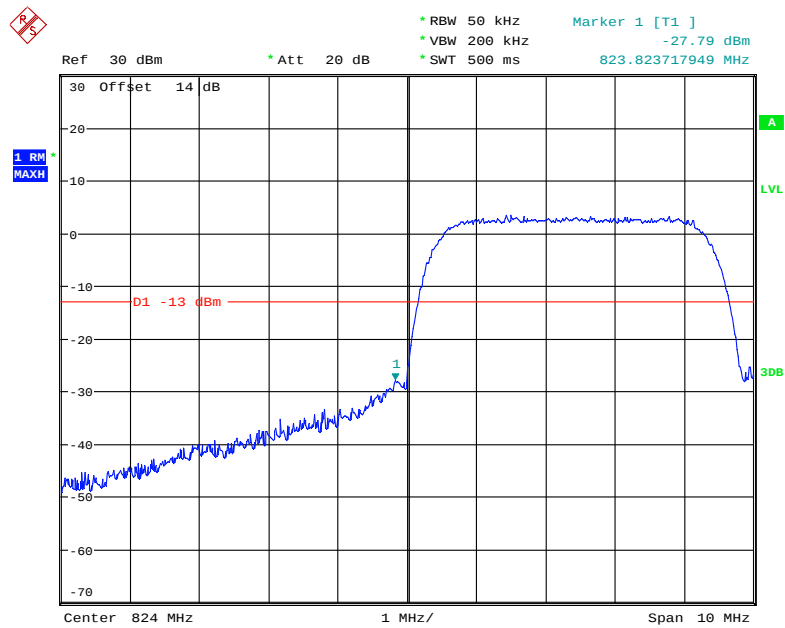
Date: 12.OCT.2017 21:14:56

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



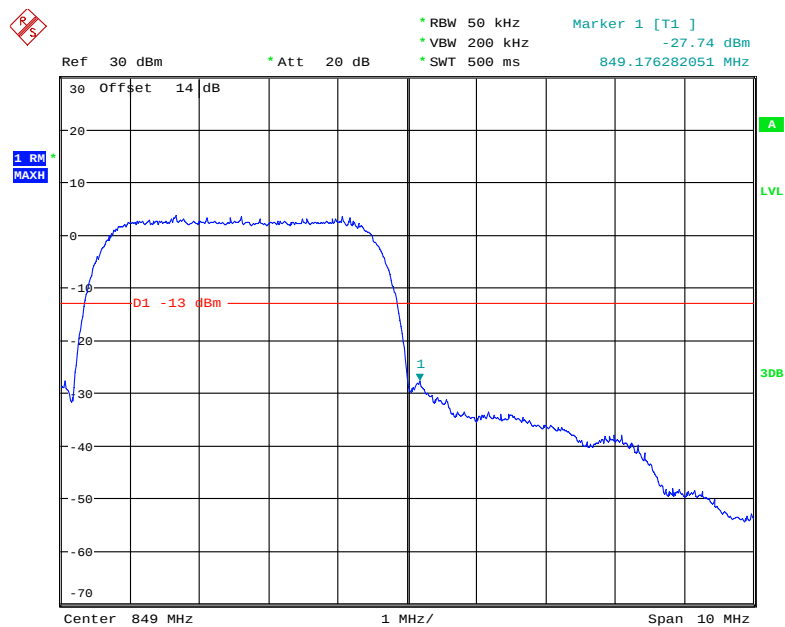
Date: 12.OCT.2017 21:50:08

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



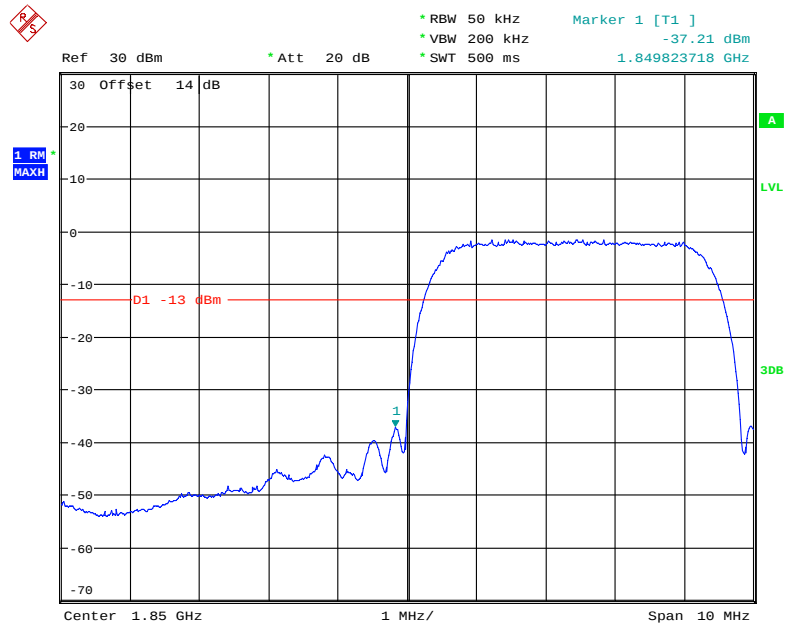
Date: 12.OCT.2017 21:18:15

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



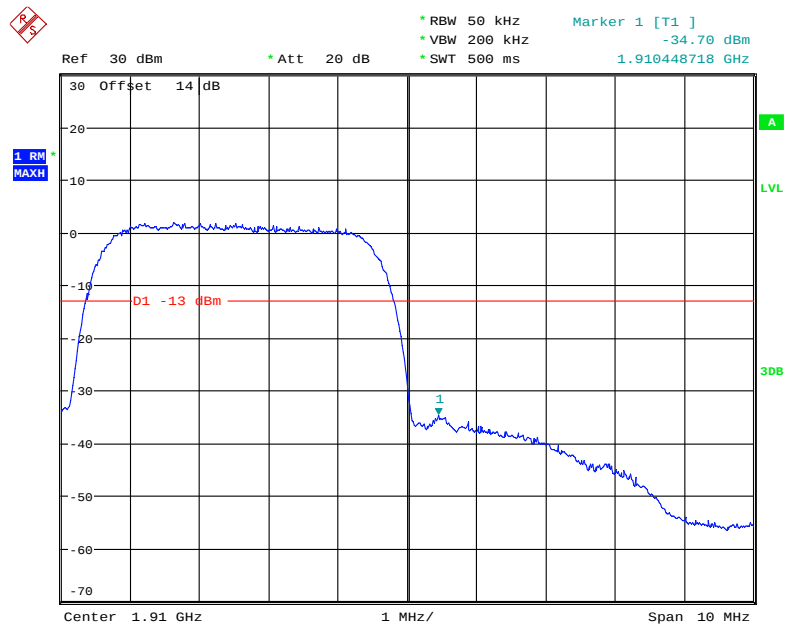
Date: 12.OCT.2017 21:17:36

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



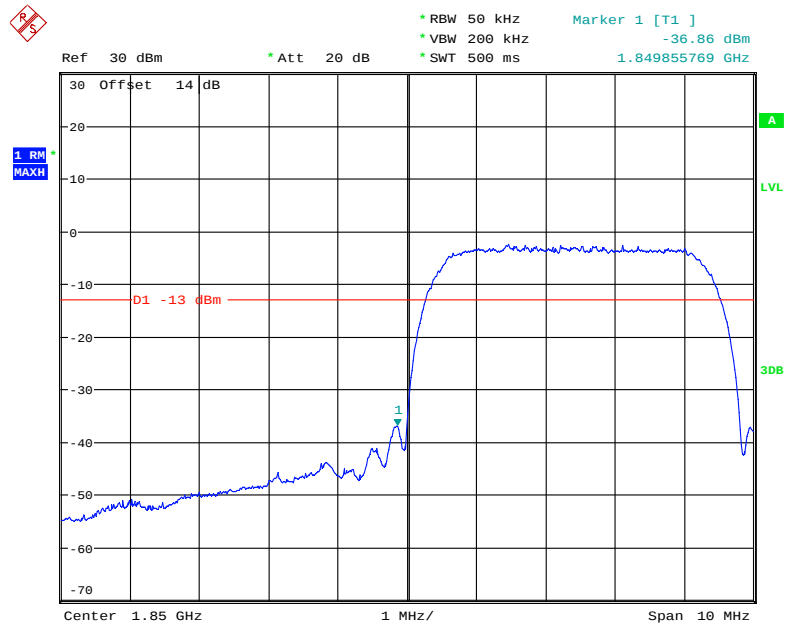
Date: 12.OCT.2017 21:54:38

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



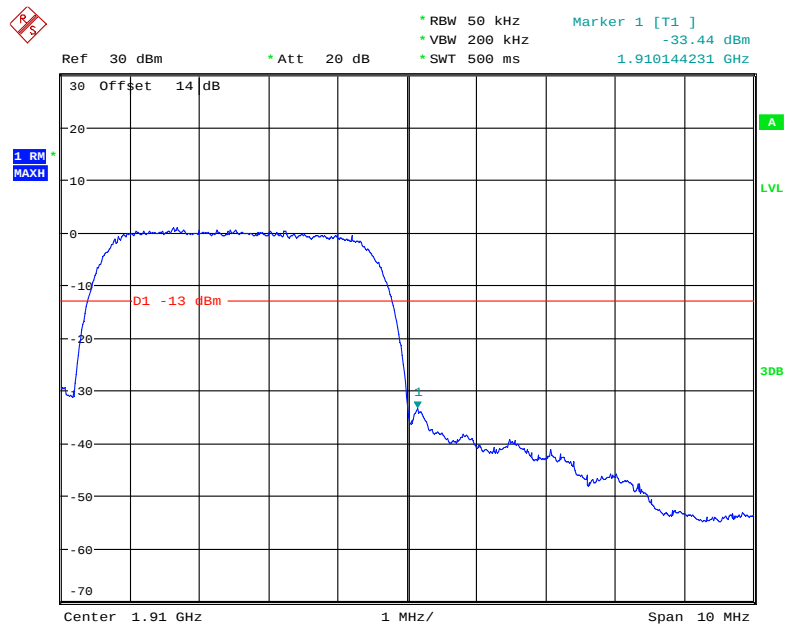
Date: 12.OCT.2017 21:55:07

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



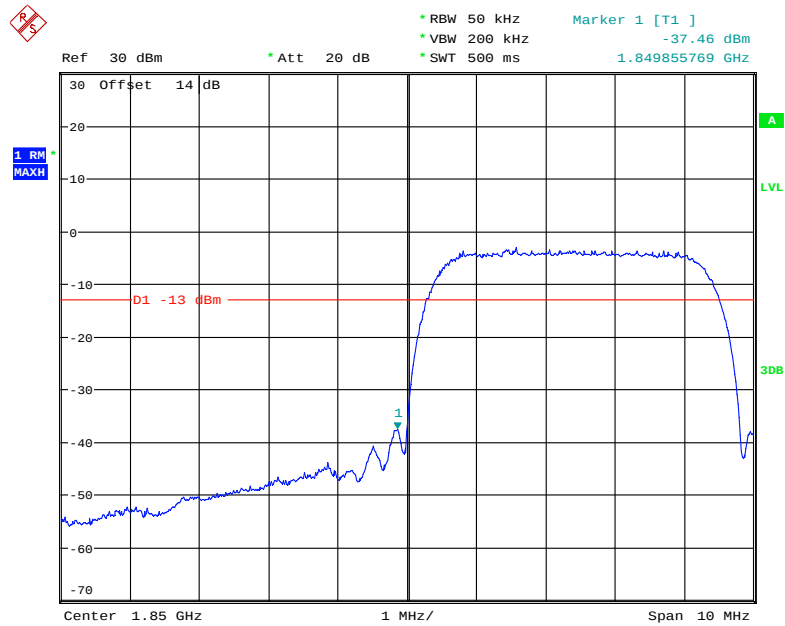
Date: 12.OCT.2017 22:01:40

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



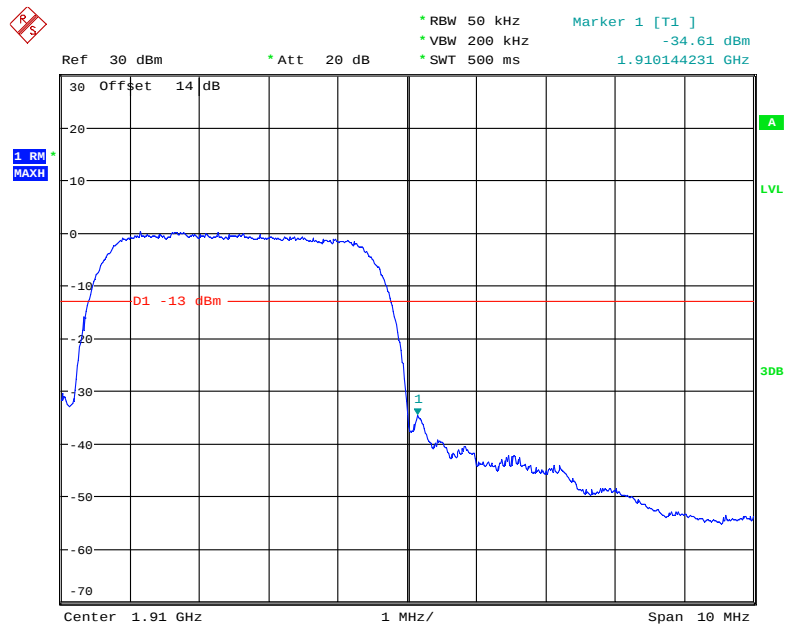
Date: 12.OCT.2017 22:00:29

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



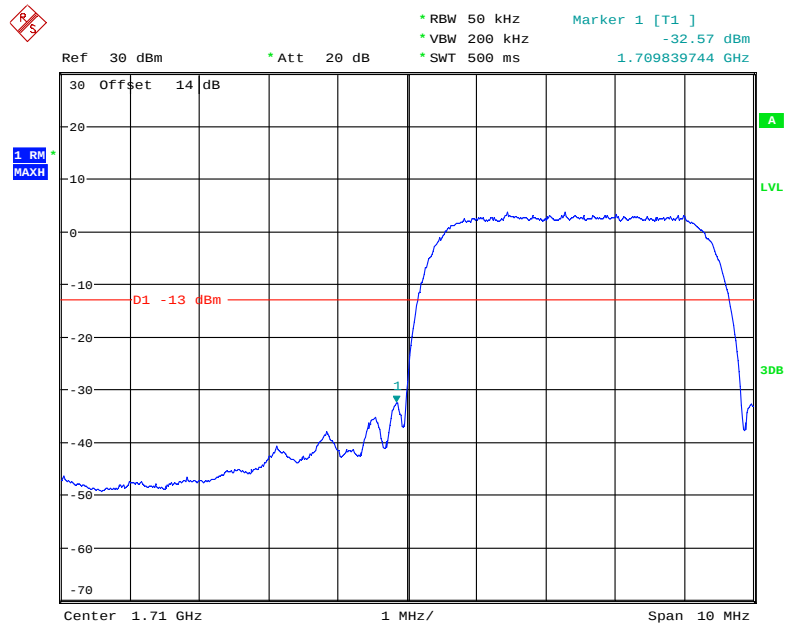
Date: 12.OCT.2017 22:03:09

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



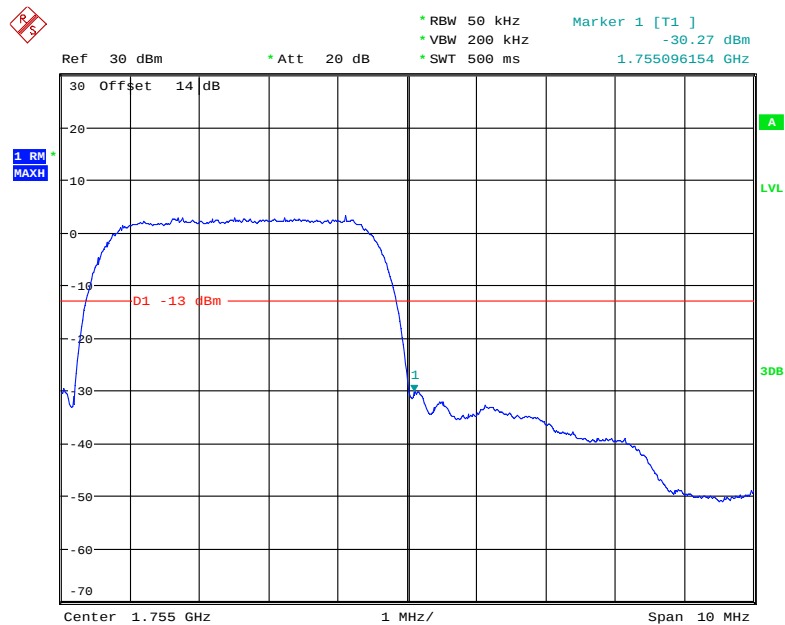
Date: 12.OCT.2017 22:06:21

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



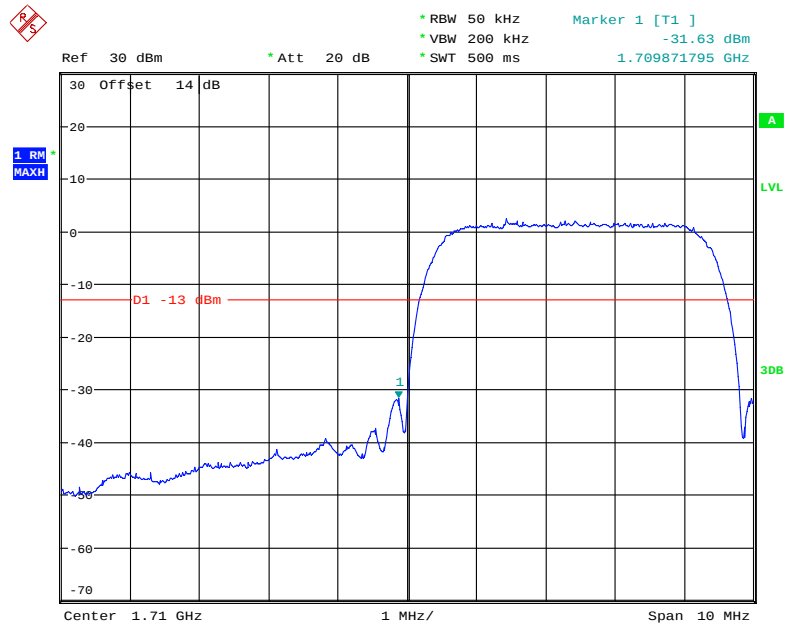
Date: 12.OCT.2017 21:30:56

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



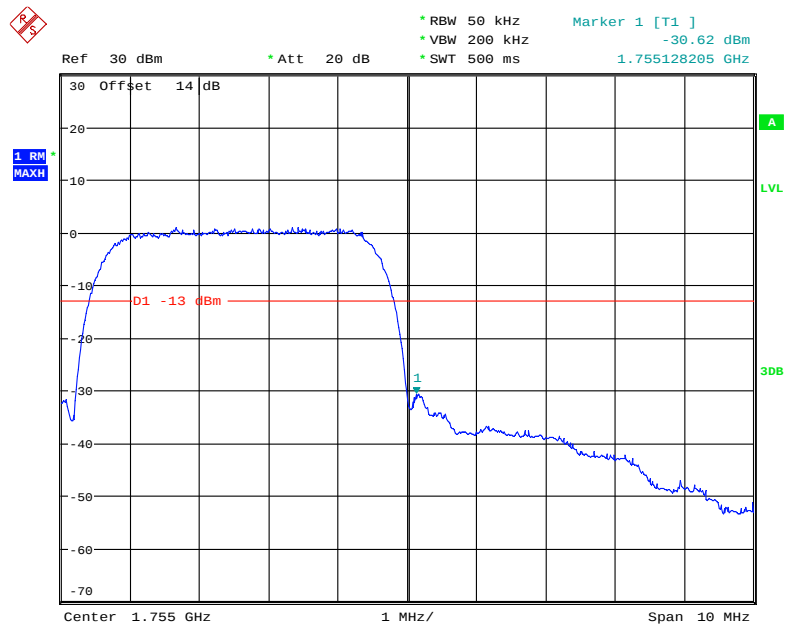
Date: 12.OCT.2017 21:32:53

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



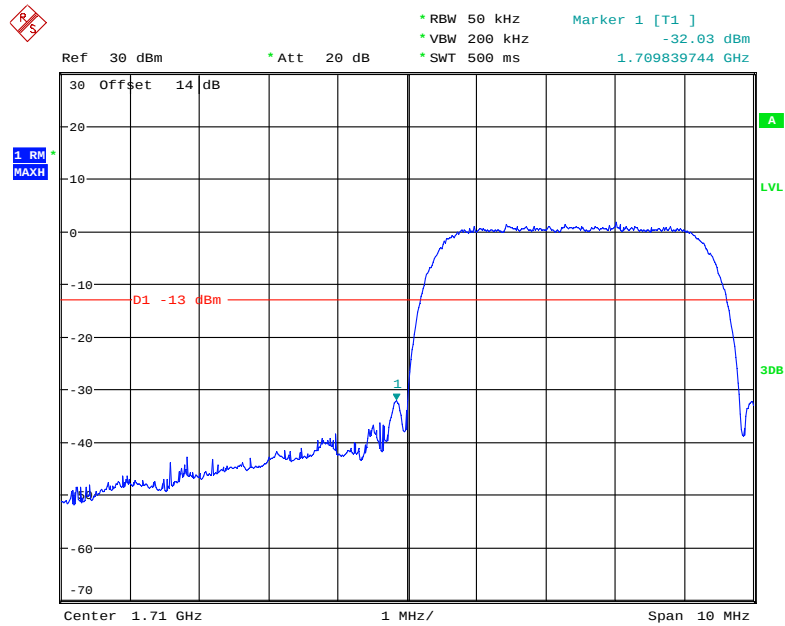
Date: 12.OCT.2017 21:44:37

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



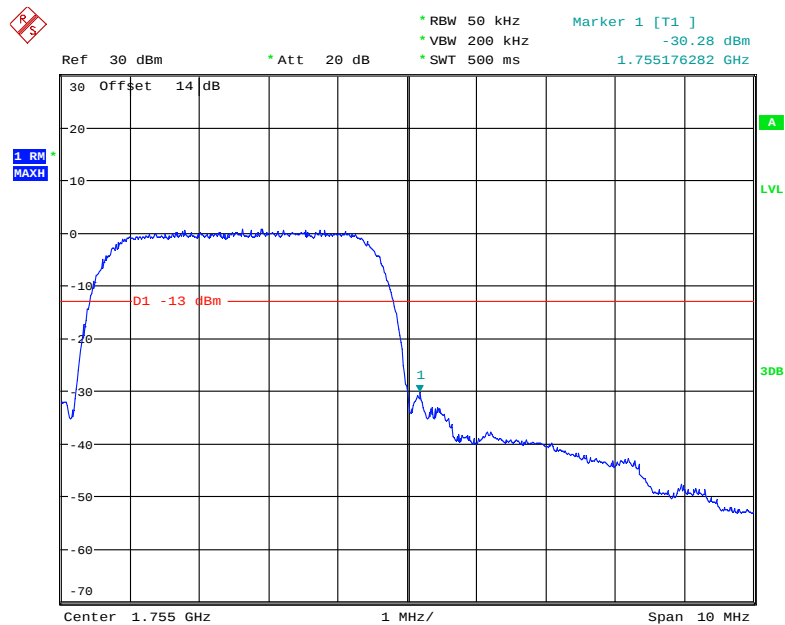
Date: 12.OCT.2017 21:45:11

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



Date: 12.OCT.2017 21:42:05

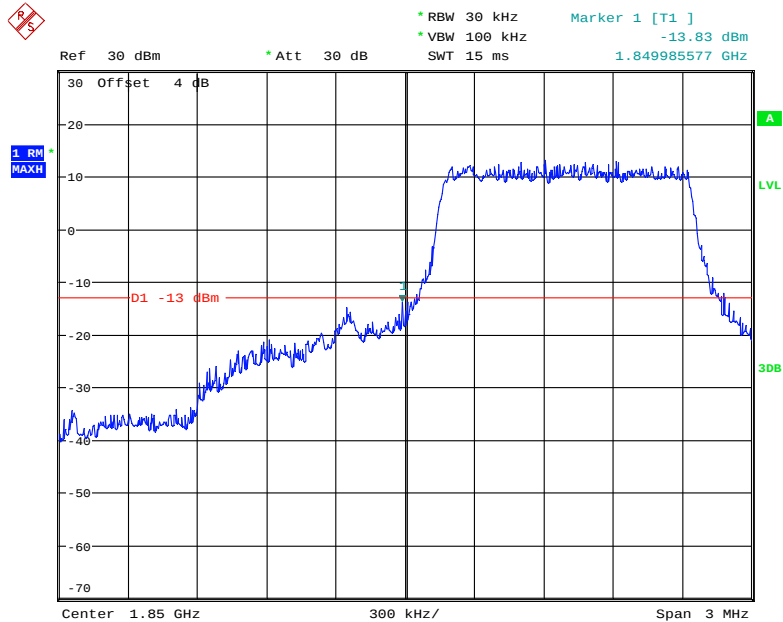
AWS Band, Right Band Edge for HSUPA (BPSK) Mode



Date: 12.OCT.2017 21:41:17

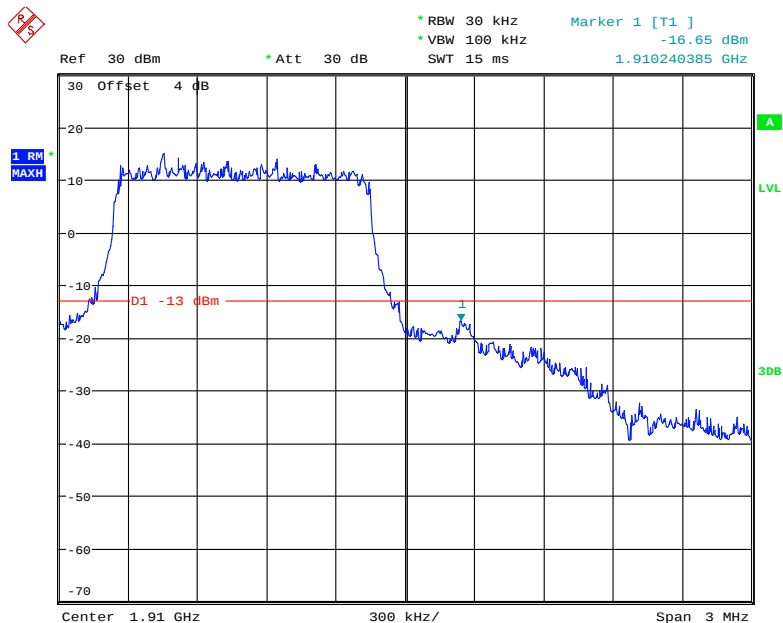
Band 2:

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



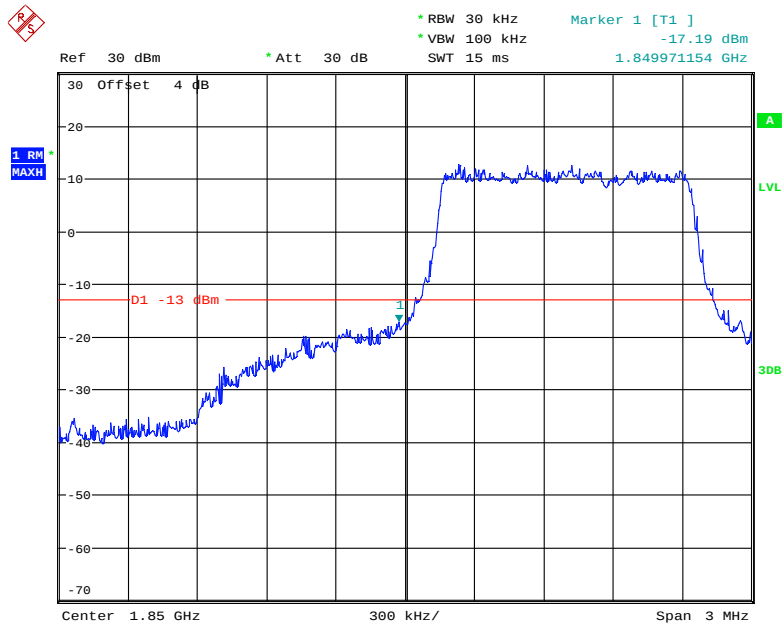
Date: 15.OCT.2017 16:21:03

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



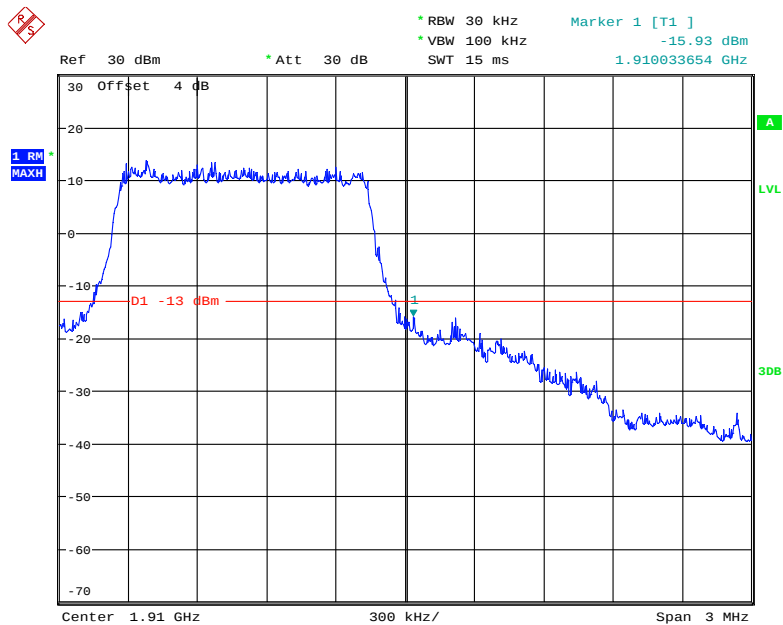
Date: 15.OCT.2017 16:21:33

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



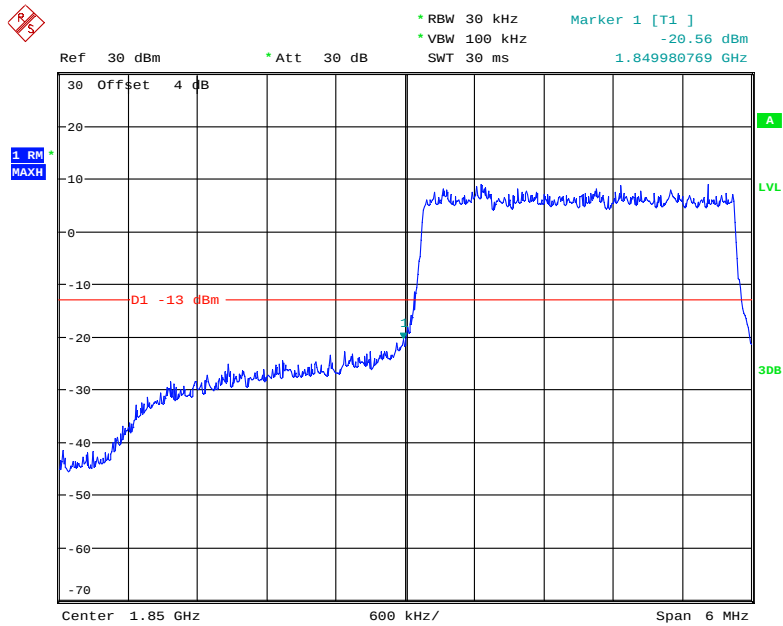
Date: 15.OCT.2017 16:20:36

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



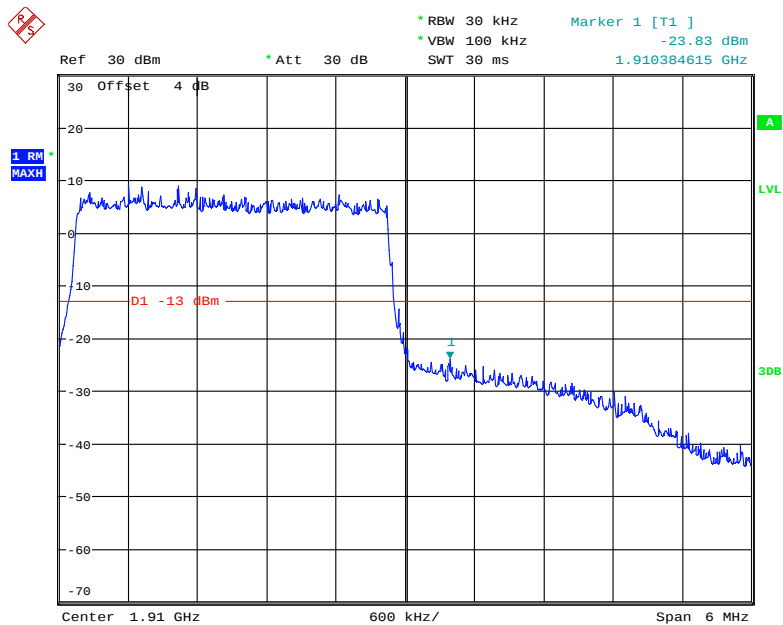
Date: 15.OCT.2017 16:22:03

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



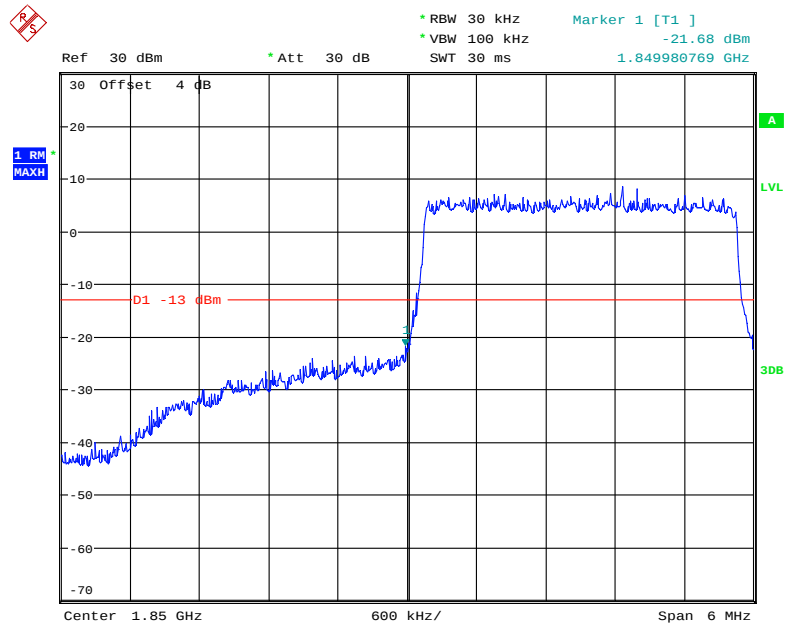
Date: 15.OCT.2017 16:24:28

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



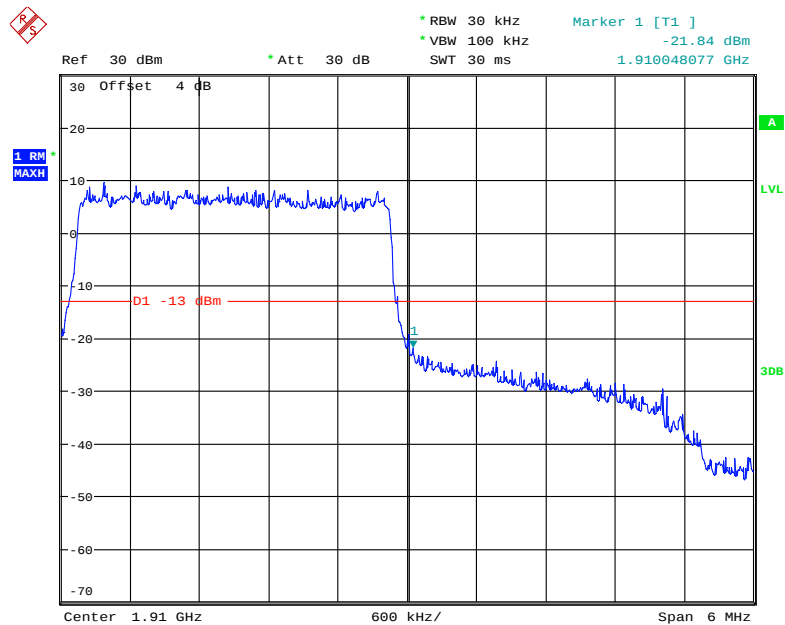
Date: 15.OCT.2017 16:23:05

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



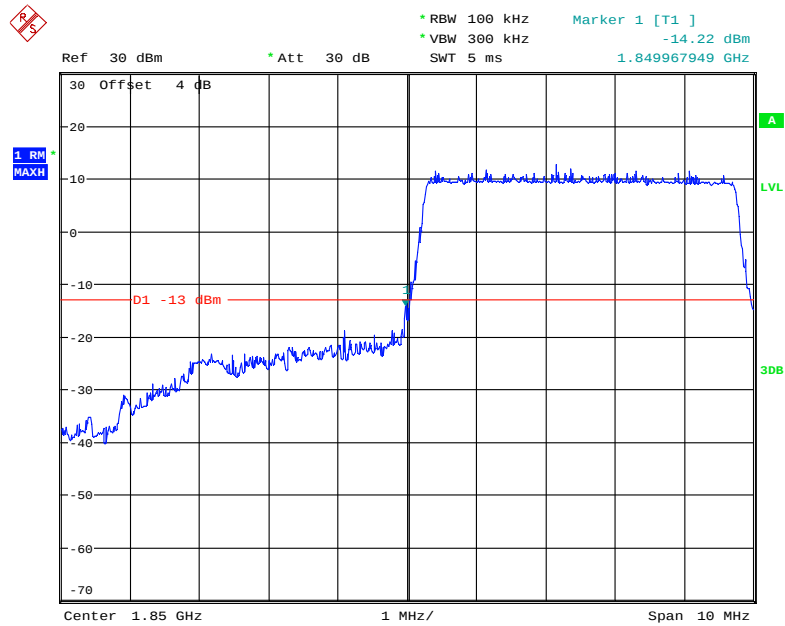
Date: 15.OCT.2017 16:23:54

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



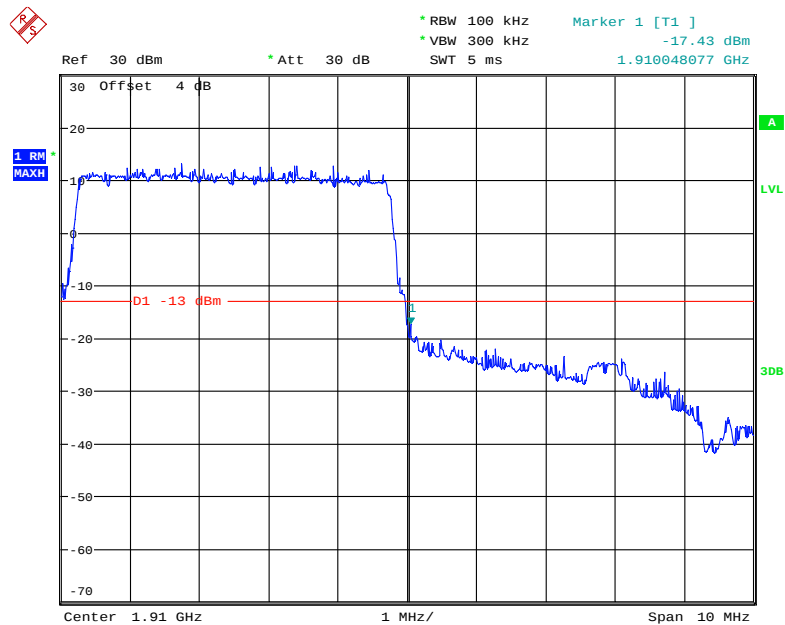
Date: 15.OCT.2017 16:22:41

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



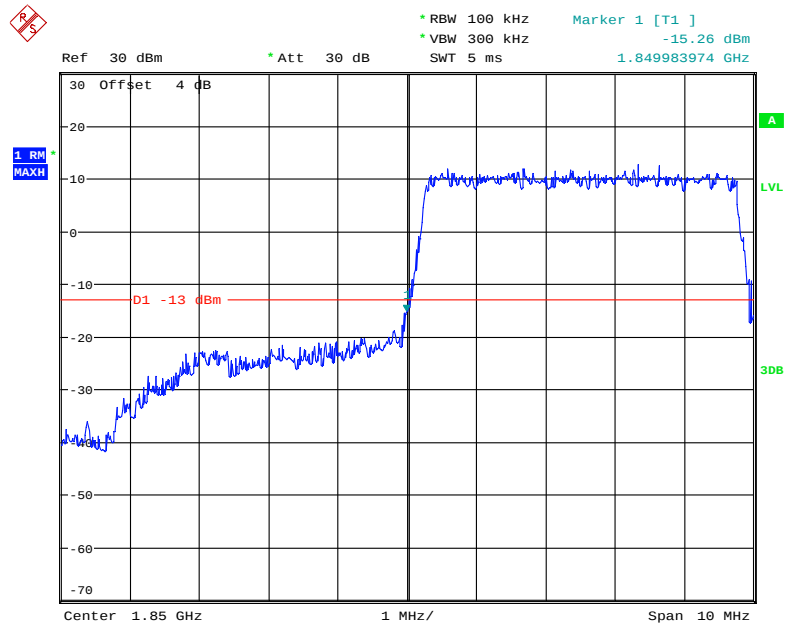
Date: 15.OCT.2017 16:25:06

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



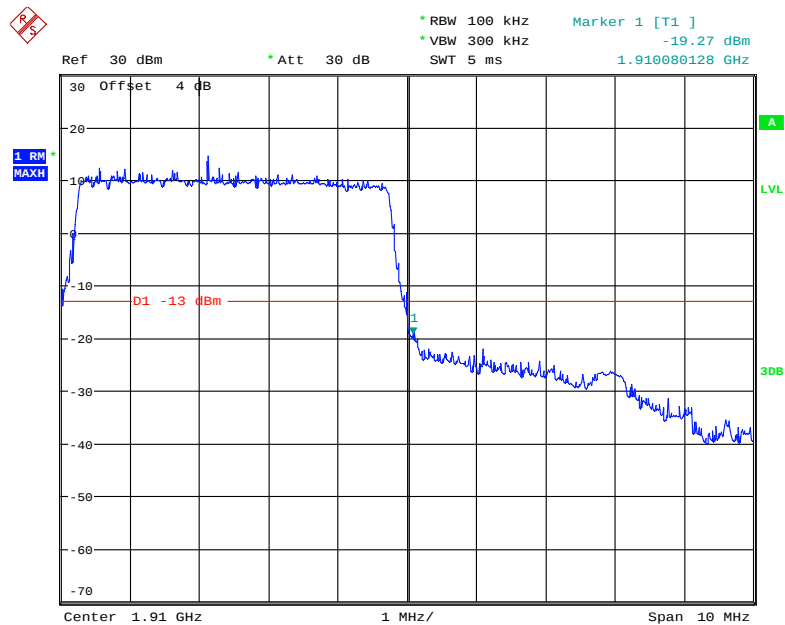
Date: 15.OCT.2017 16:25:51

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



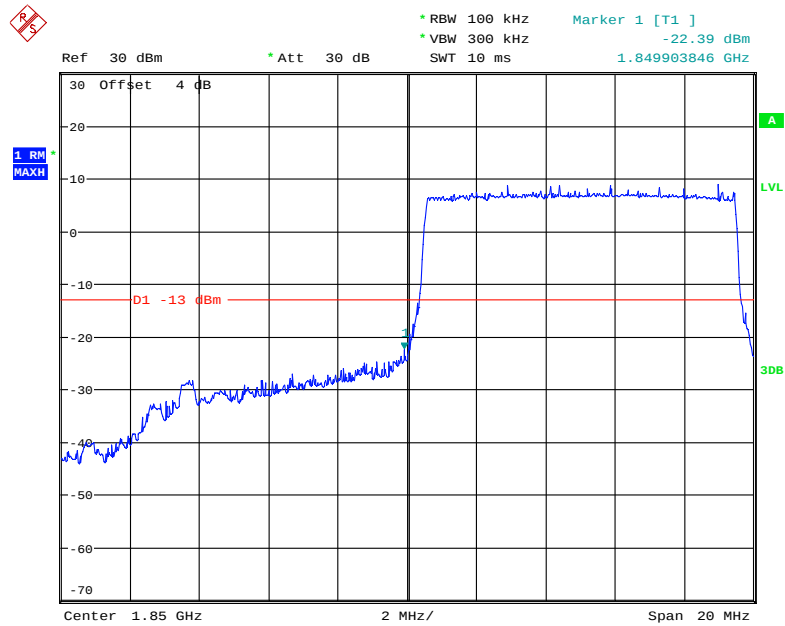
Date: 15.OCT.2017 16:25:25

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



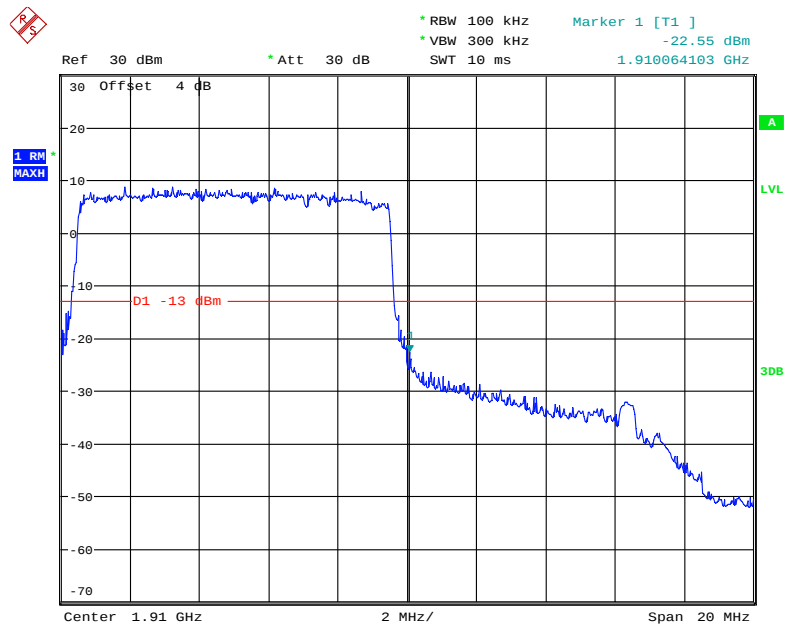
Date: 15.OCT.2017 16:26:46

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



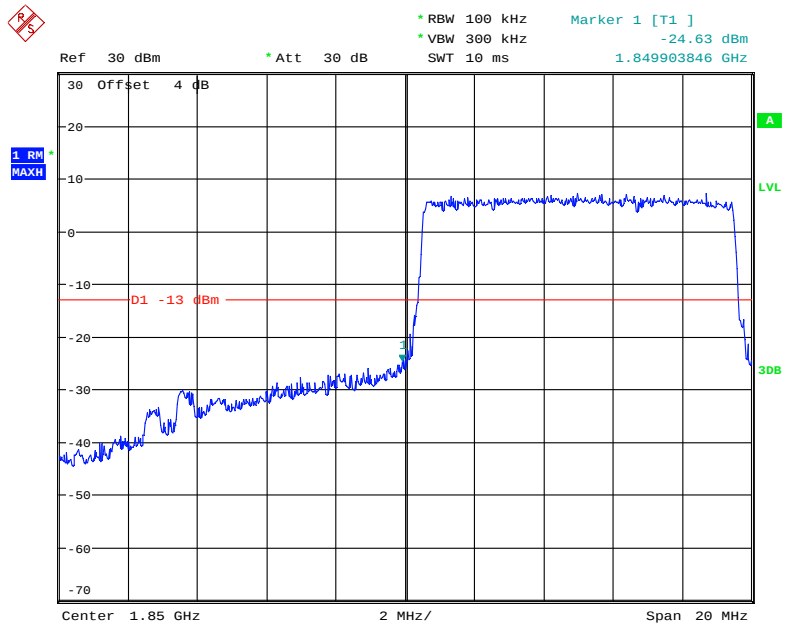
Date: 15.OCT.2017 16:28:40

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



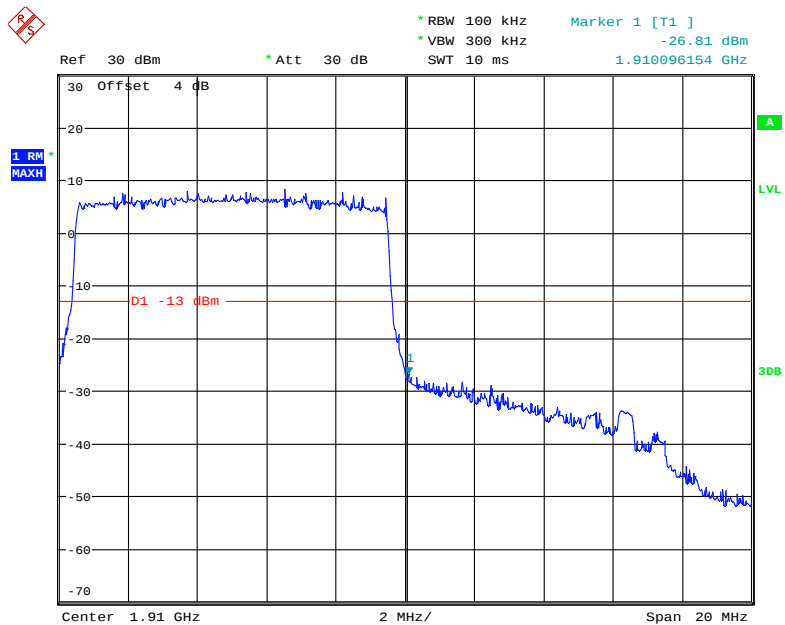
Date: 15.OCT.2017 16:28:01

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

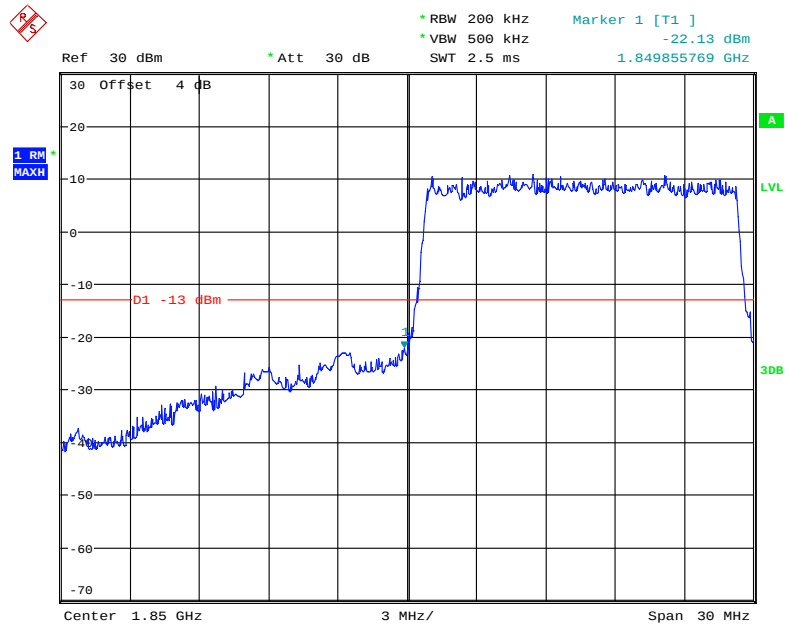


Date: 15.OCT.2017 16:28:59

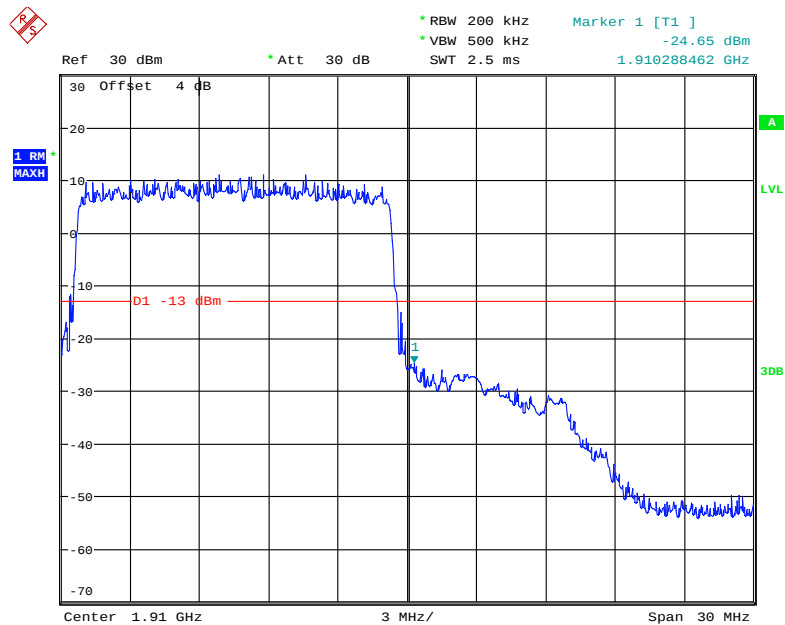
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



Date: 15.OCT.2017 16:27:19

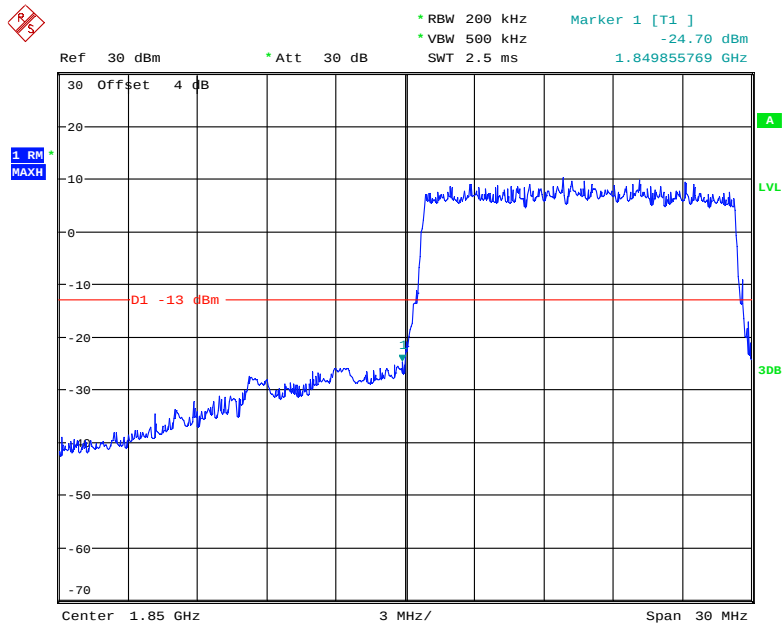
QPSK (15.0 MHz, FULL RB) - Left Band Edge

Date: 15.OCT.2017 16:29:56

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

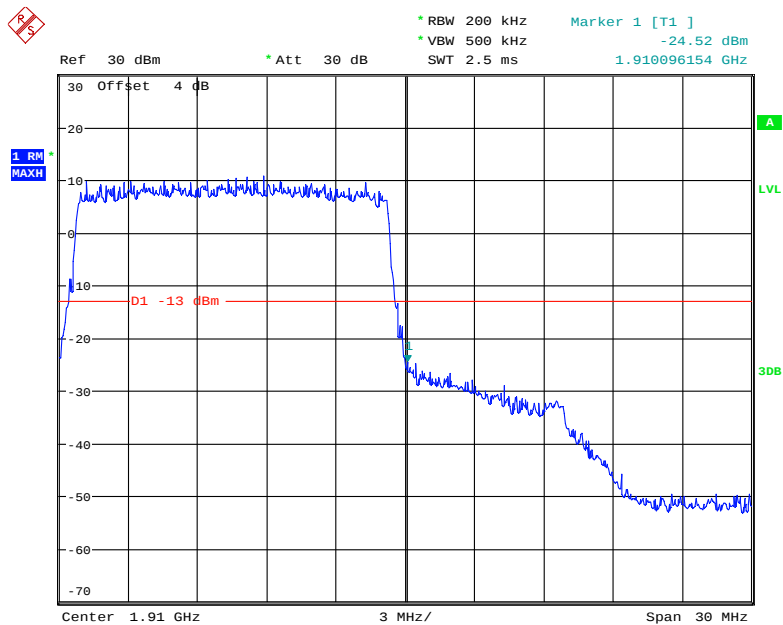
Date: 15.OCT.2017 16:31:15

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



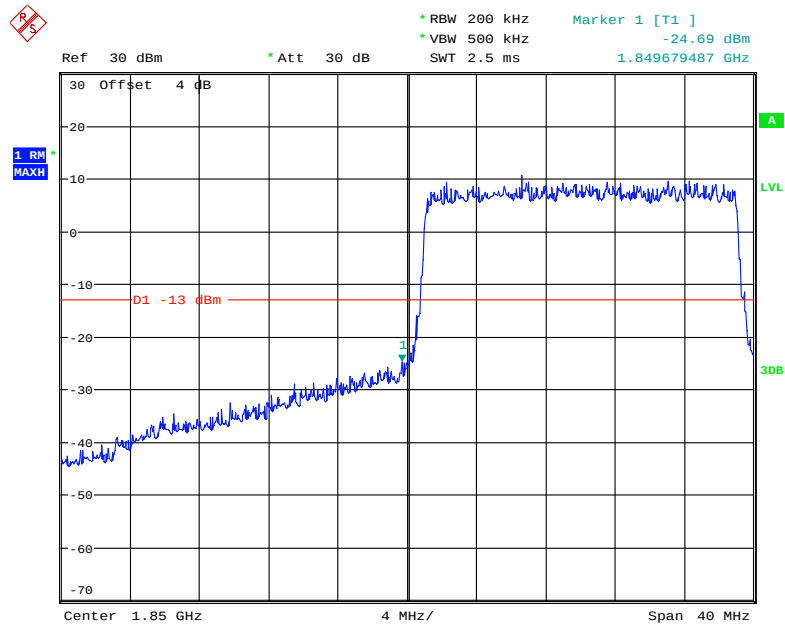
Date: 15.OCT.2017 16:30:21

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



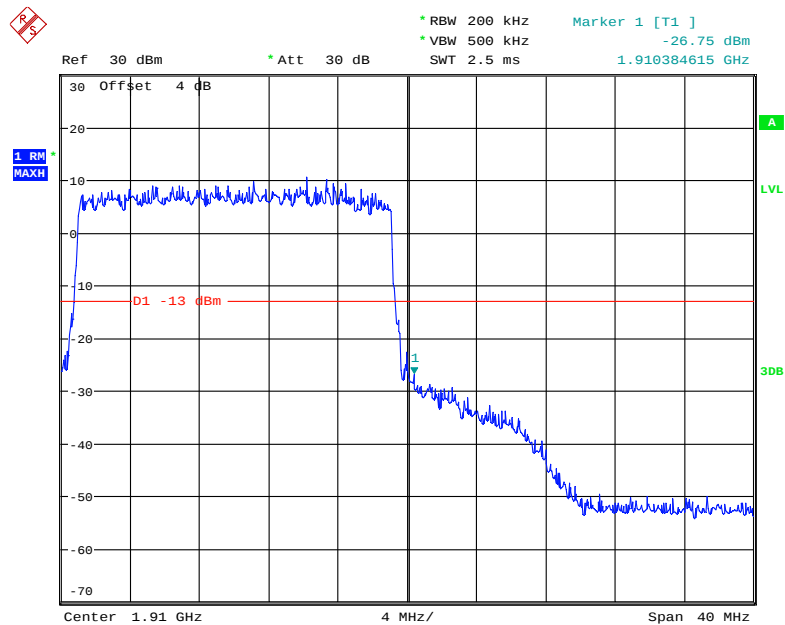
Date: 15.OCT.2017 16:30:59

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



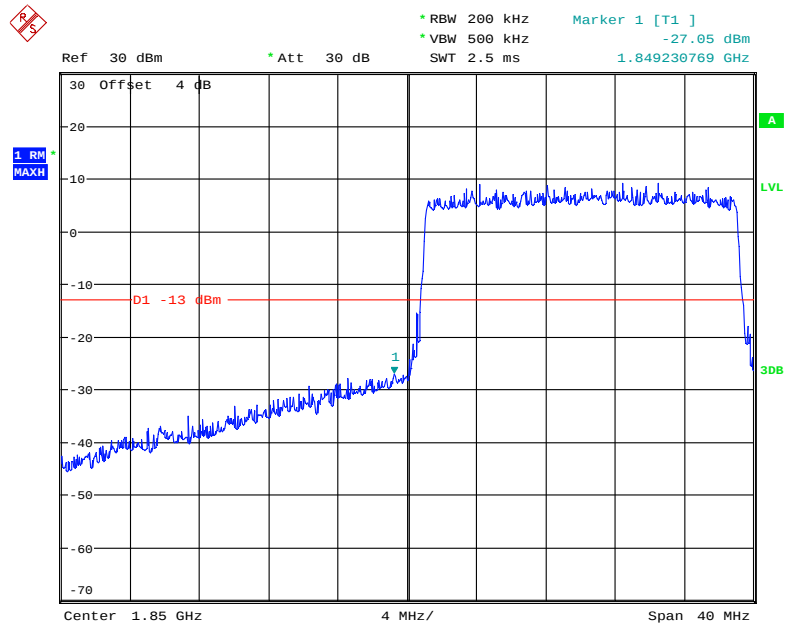
Date: 15.OCT.2017 16:33:04

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



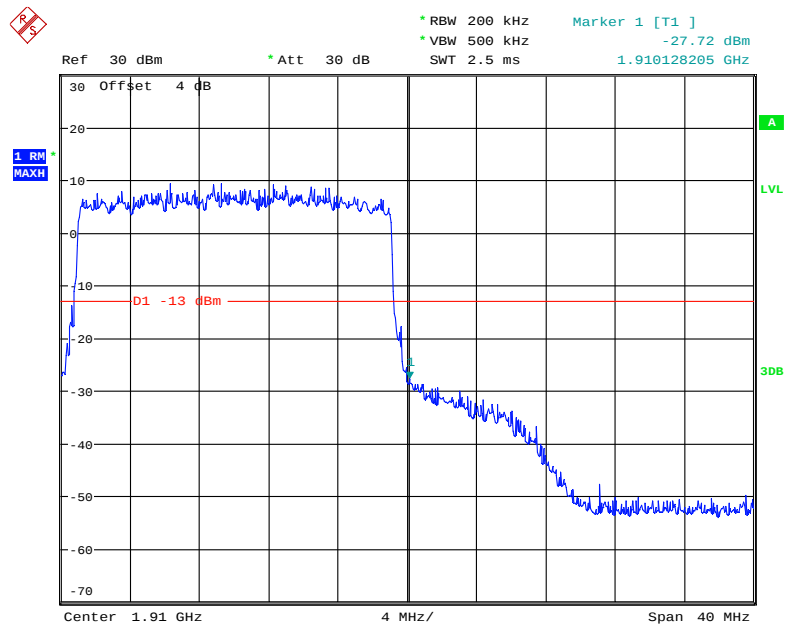
Date: 15.OCT.2017 16:31:37

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



Date: 15.OCT.2017 16:32:39

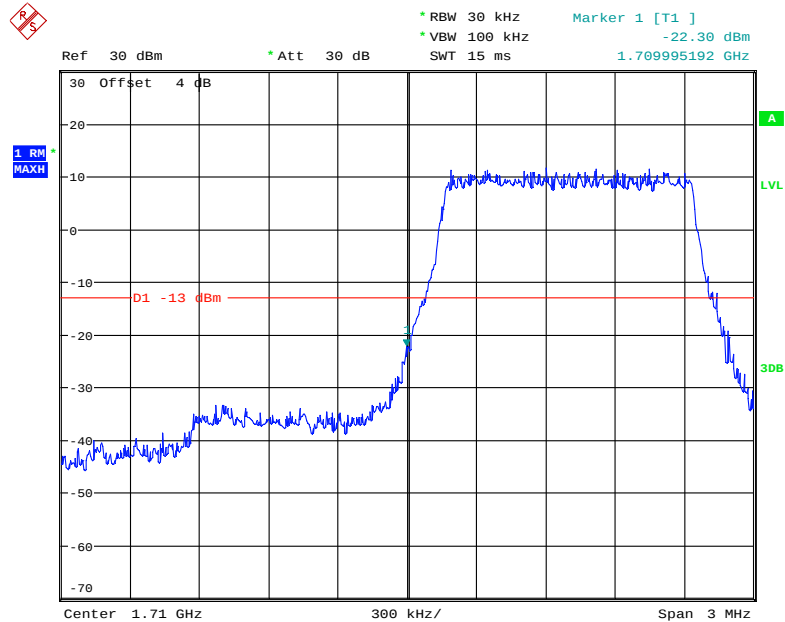
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 15.OCT.2017 16:32:07

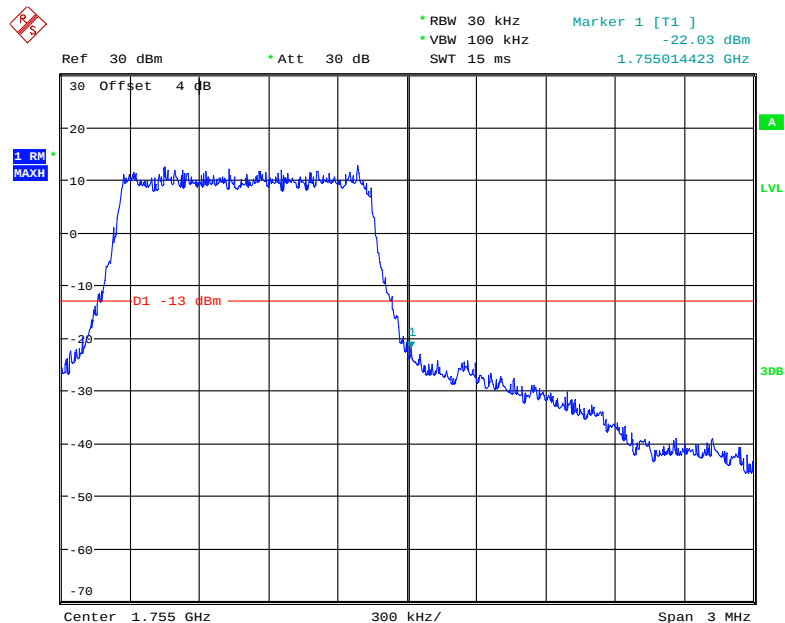
Band 4:

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



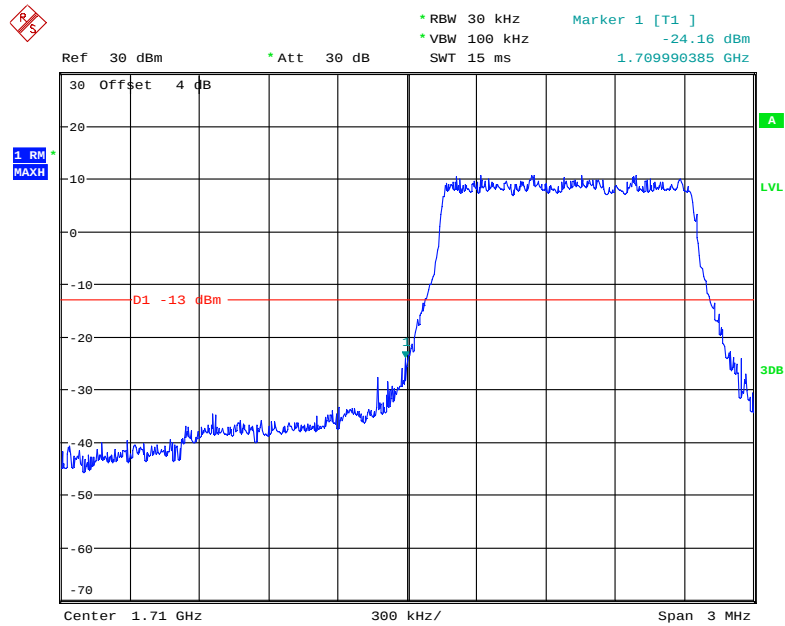
Date: 15.OCT.2017 16:34:55

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



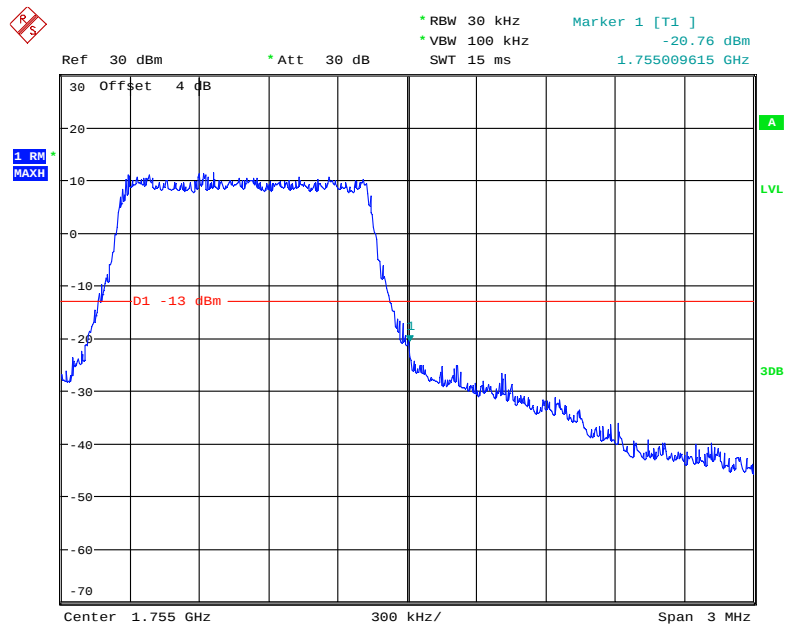
Date: 15.OCT.2017 16:35:20

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



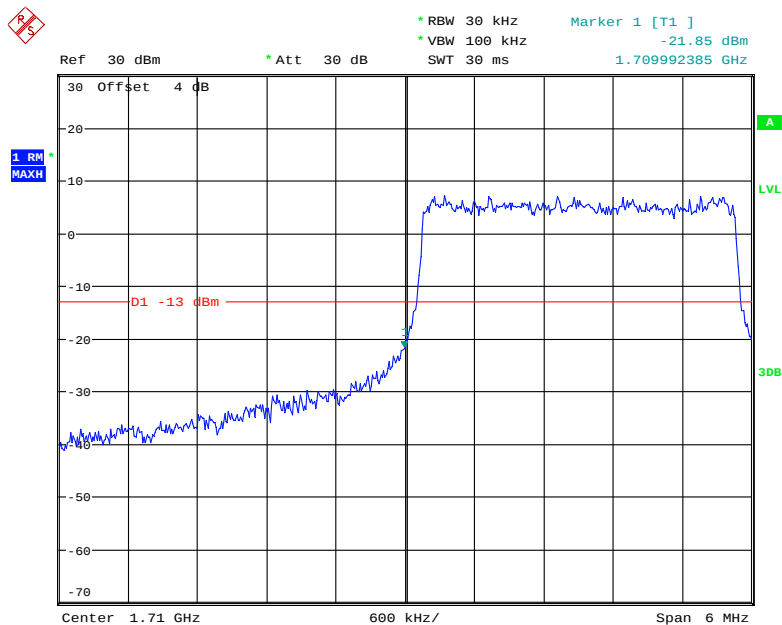
Date: 15.OCT.2017 16:34:32

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



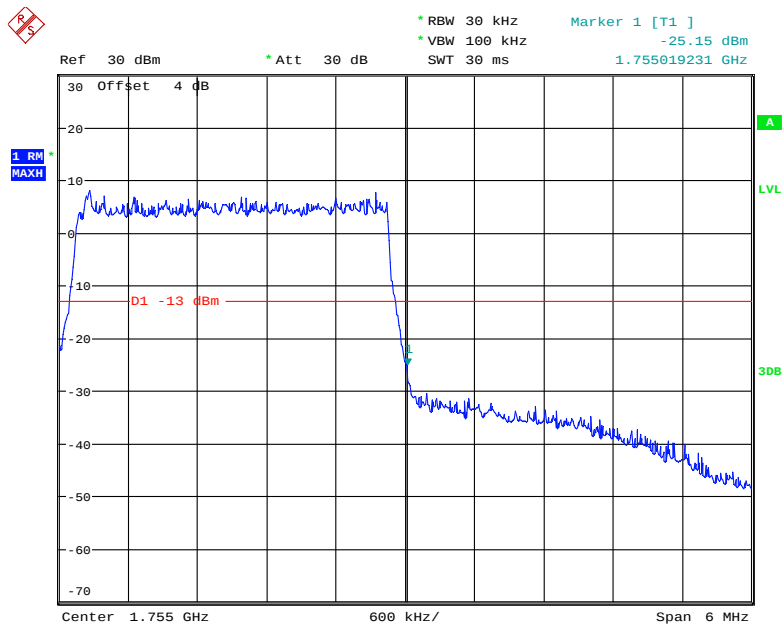
Date: 15.OCT.2017 16:35:42

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



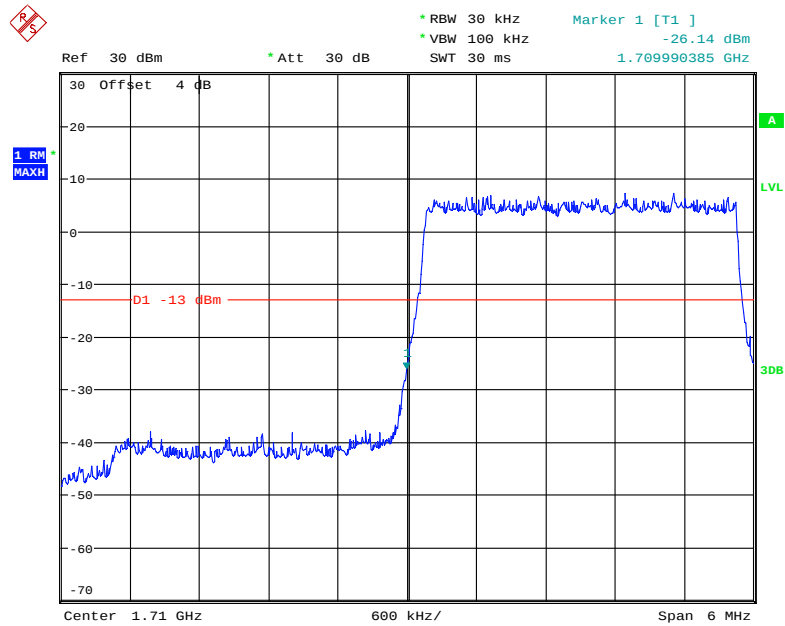
Date: 13.DEC.2017 21:49:50

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



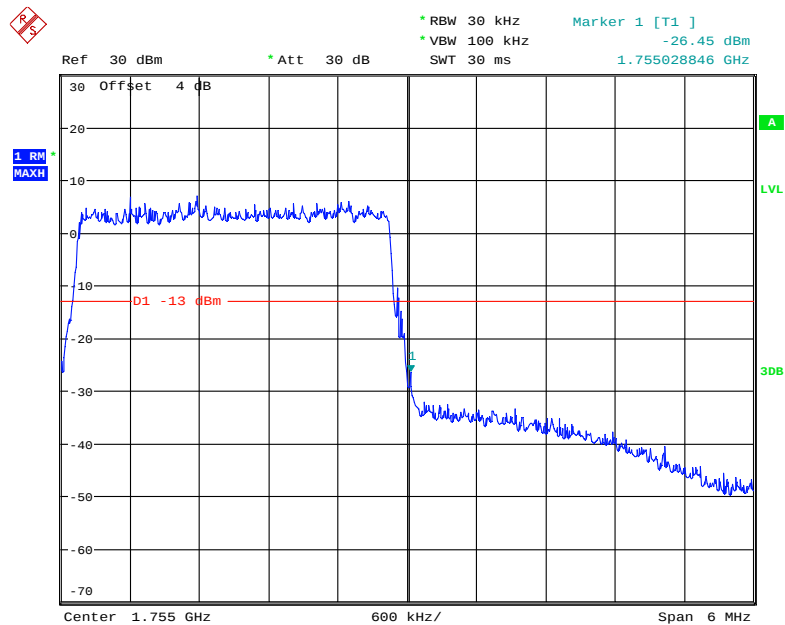
Date: 15.OCT.2017 16:36:19

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



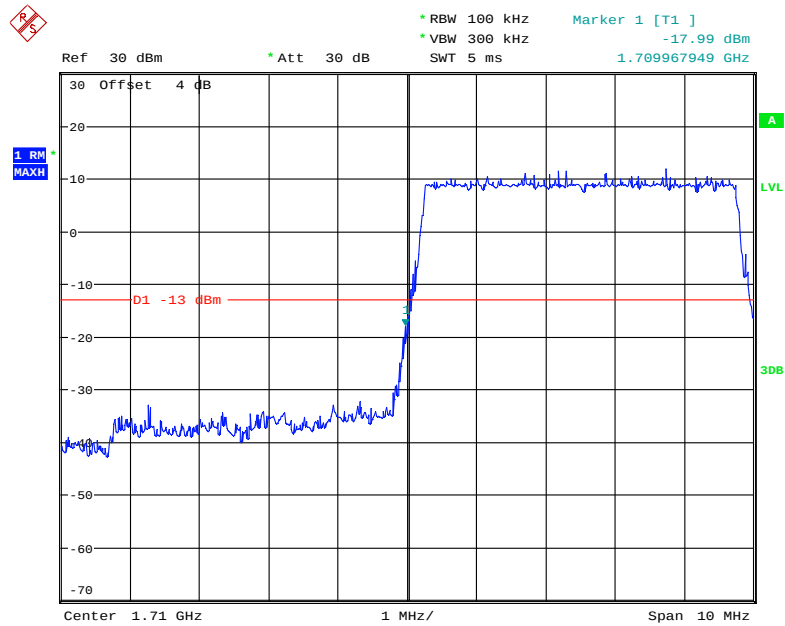
Date: 15.OCT.2017 16:38:04

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



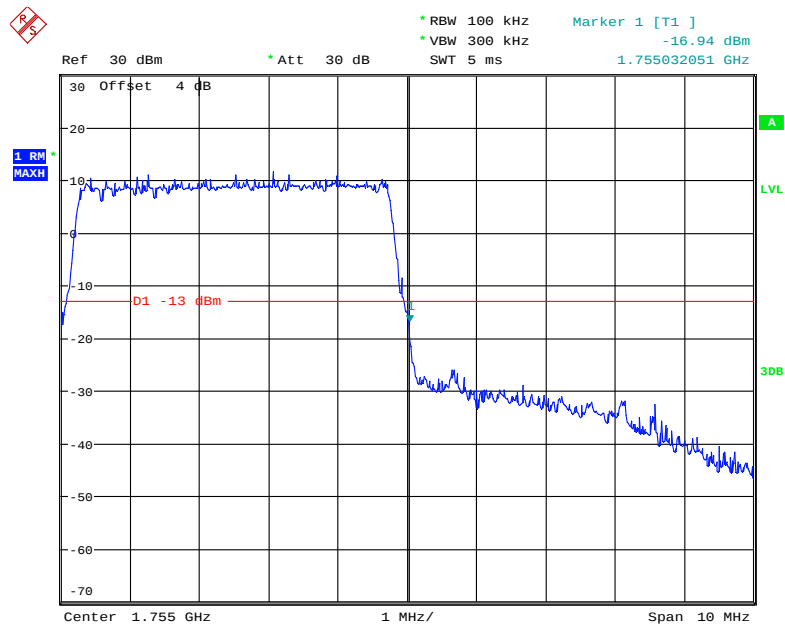
Date: 15.OCT.2017 16:36:45

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



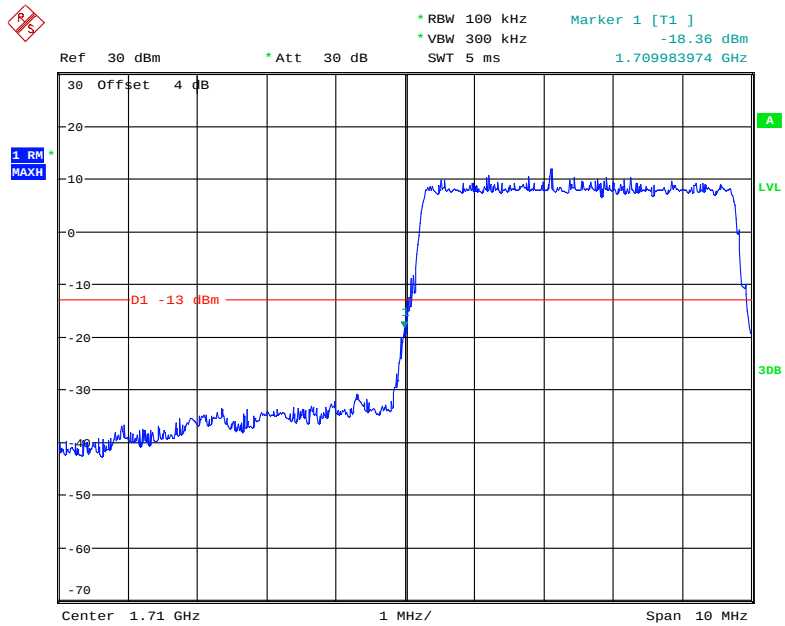
Date: 15.OCT.2017 16:39:08

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



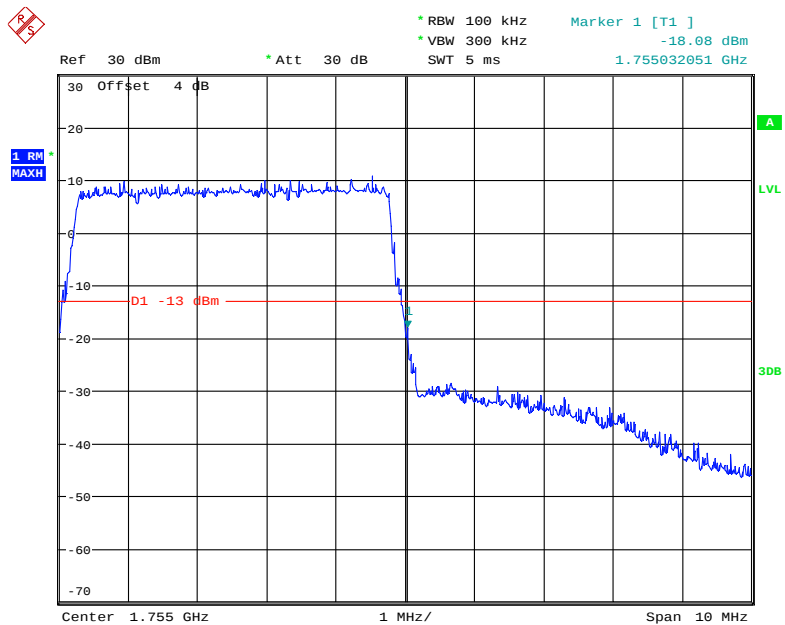
Date: 15.OCT.2017 16:39:36

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



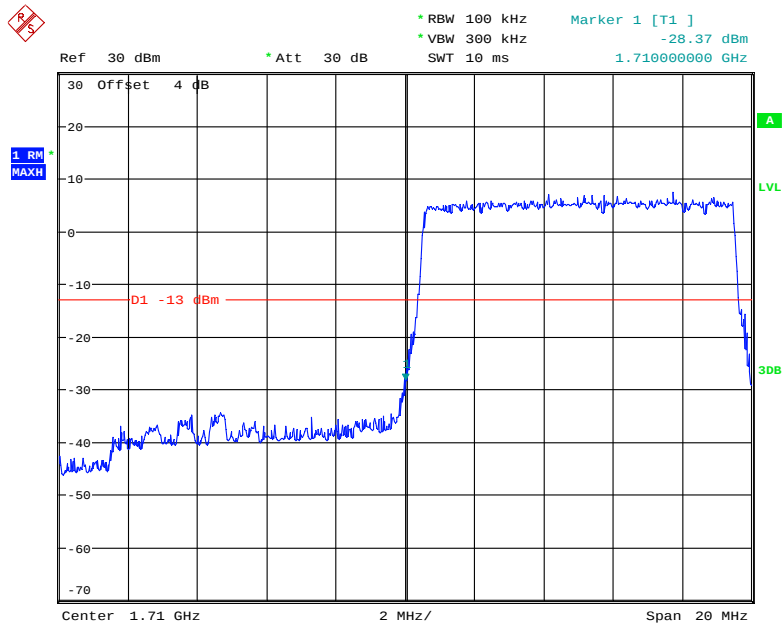
Date: 15.OCT.2017 16:38:47

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



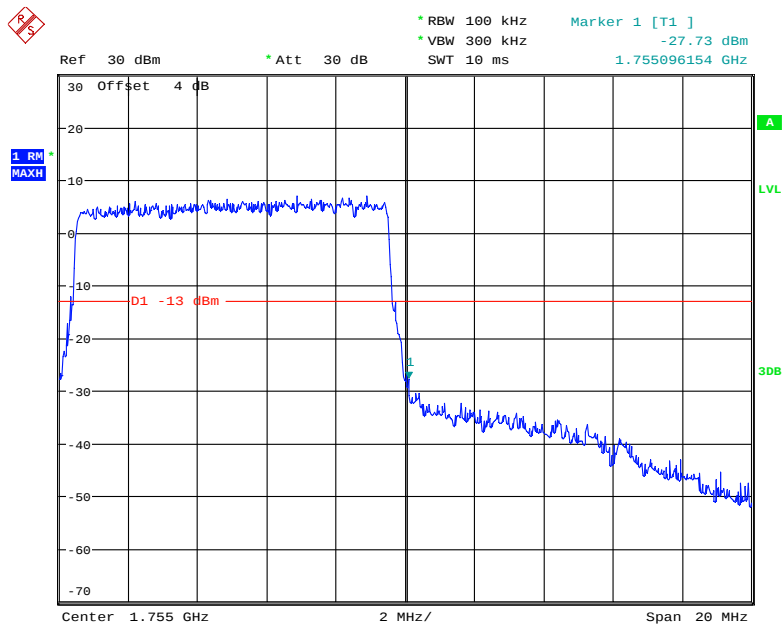
Date: 15.OCT.2017 16:39:54

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



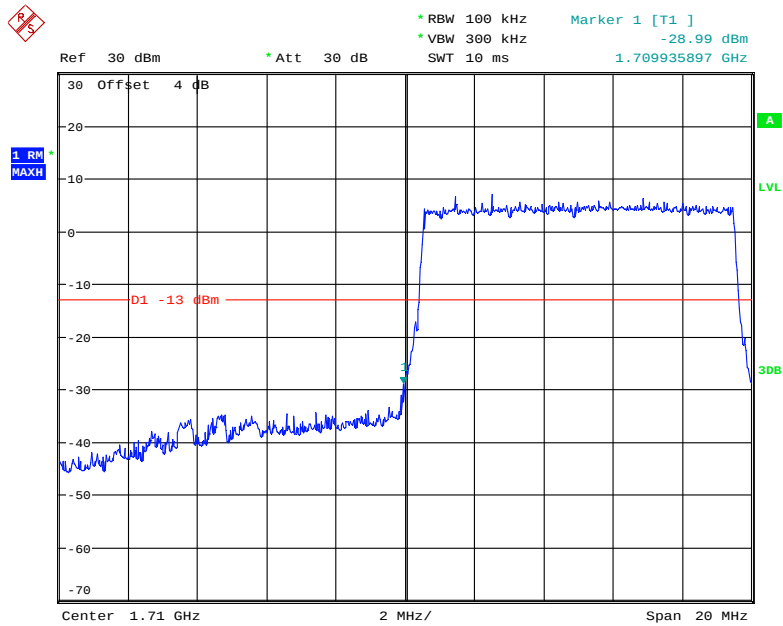
Date: 15.OCT.2017 16:41:03

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



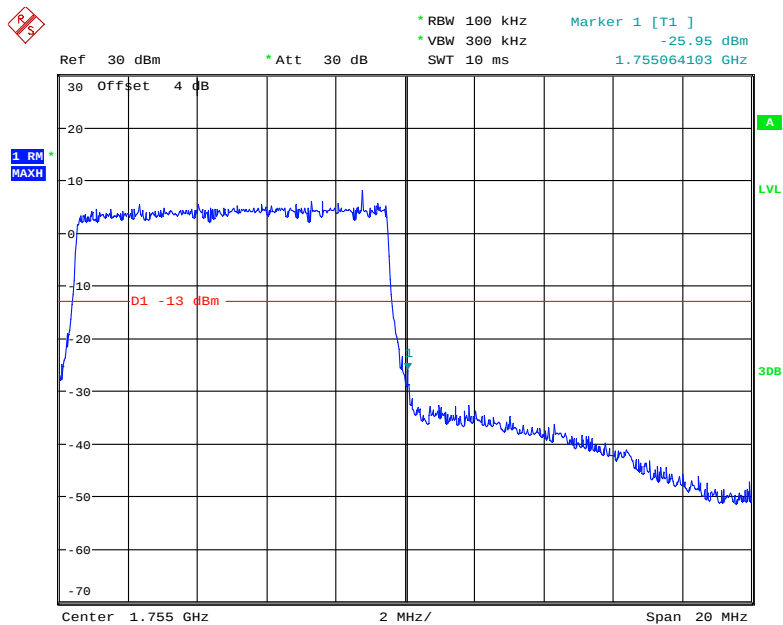
Date: 15.OCT.2017 16:40:36

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



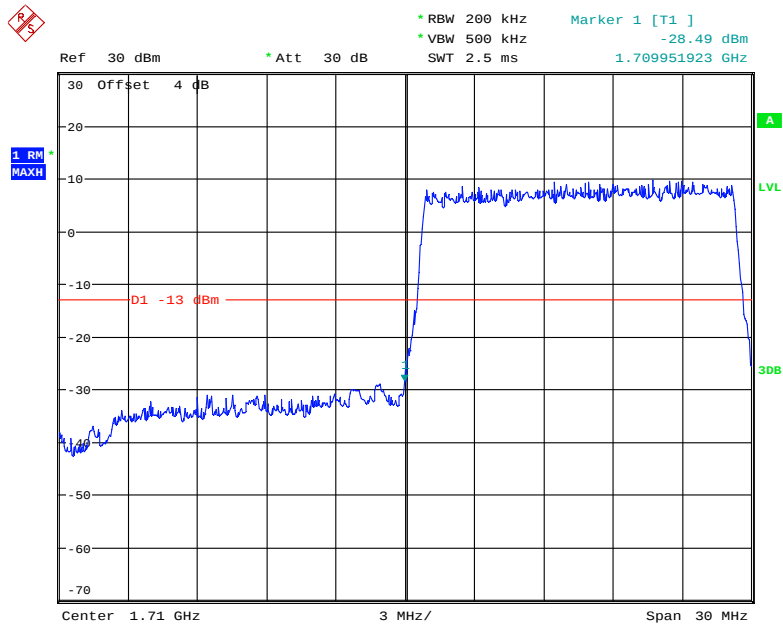
Date: 15.OCT.2017 16:41:26

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



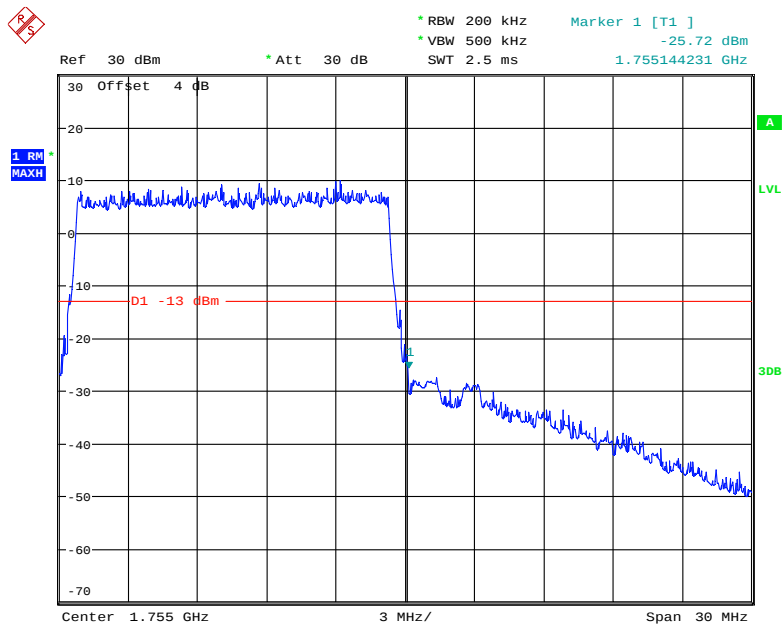
Date: 15.OCT.2017 16:40:20

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

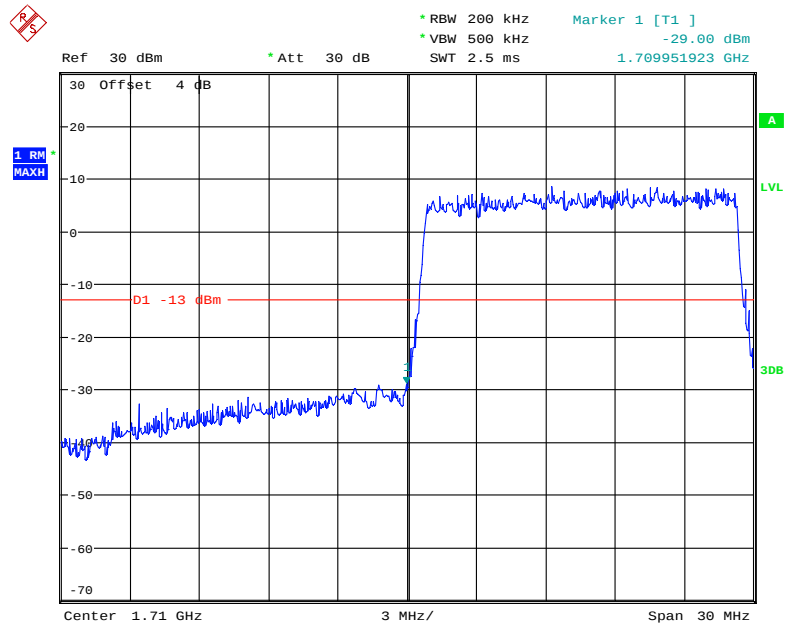


Date: 15.OCT.2017 16:42:13

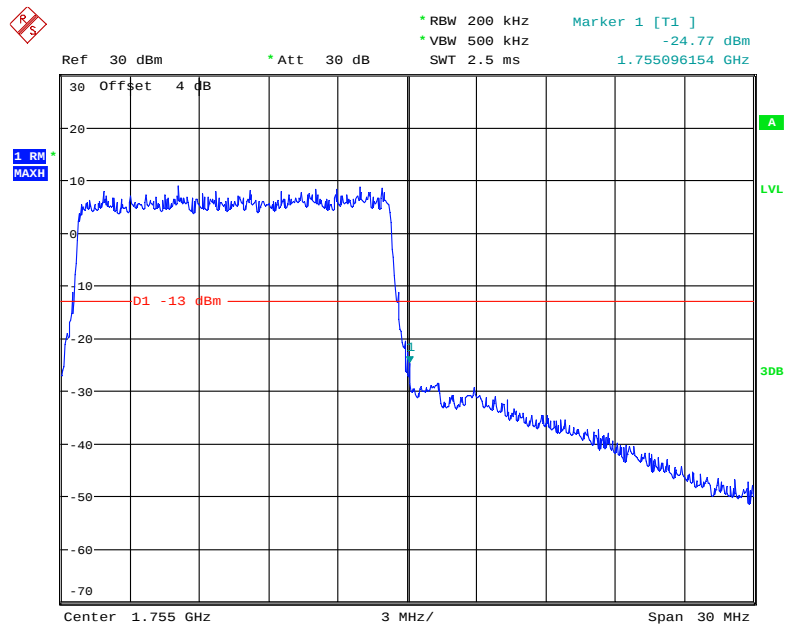
QPSK (15.0 MHz, FULL RB) - Right Band Edge



Date: 15.OCT.2017 16:44:19

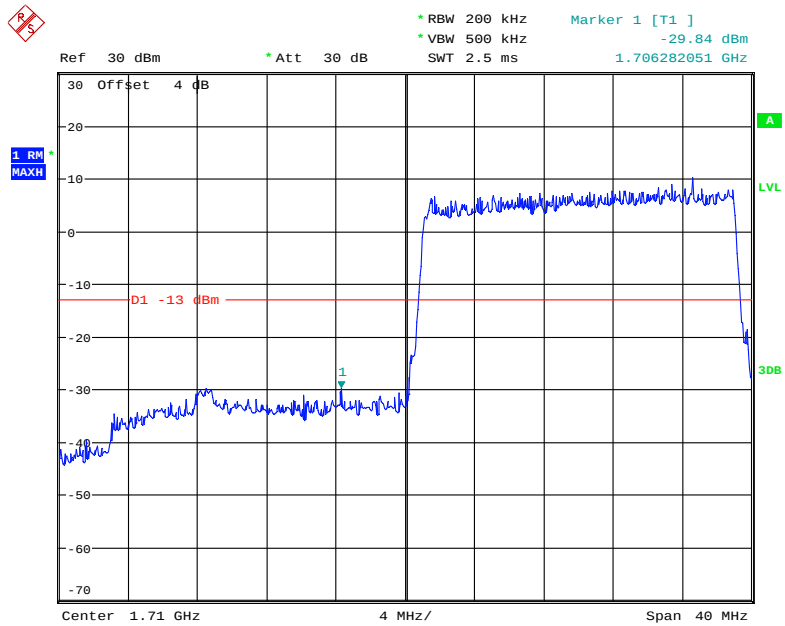
16-QAM (15.0 MHz, FULL RB) - Left Band Edge

Date: 15.OCT.2017 16:42:42

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

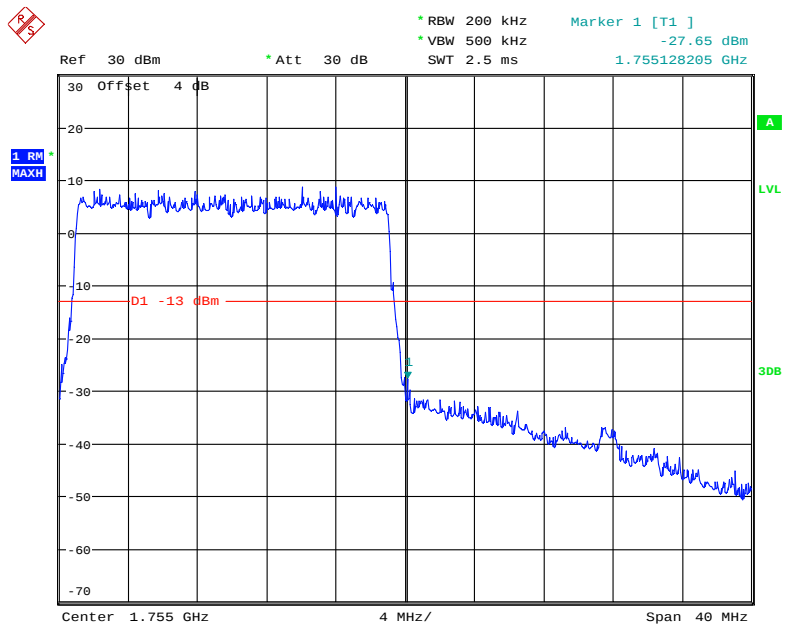
Date: 15.OCT.2017 16:43:49

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

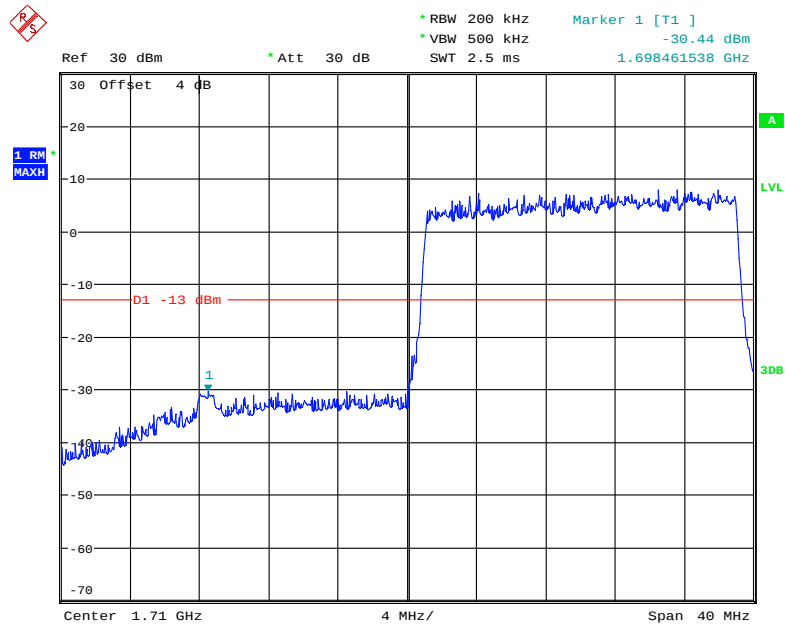


Date: 15.OCT.2017 16:46:13

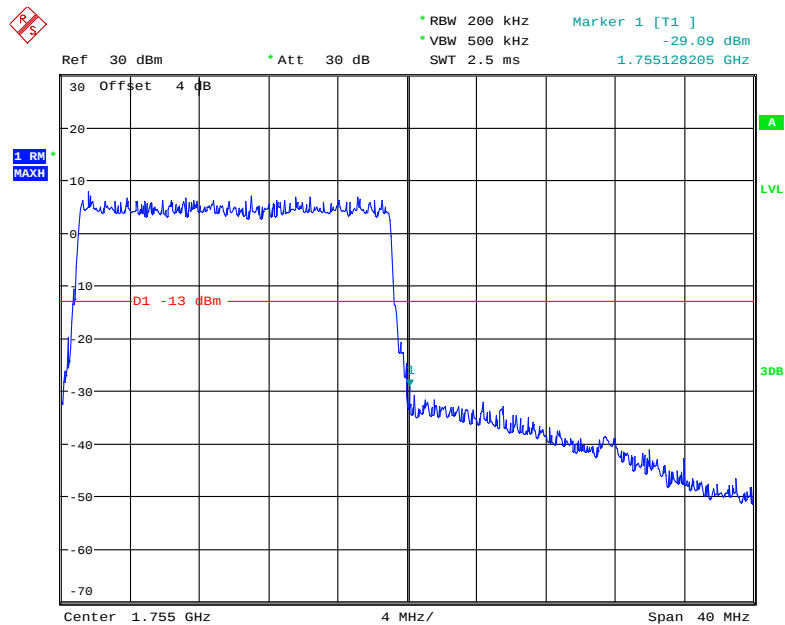
QPSK (20.0 MHz, FULL RB) - Right Band Edge



Date: 15.OCT.2017 16:44:45

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

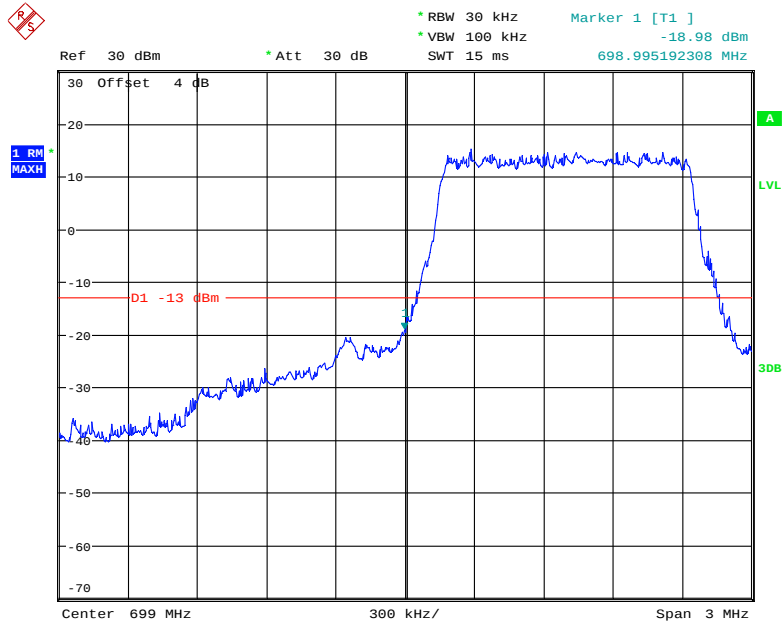
Date: 15.OCT.2017 16:45:39

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

Date: 15.OCT.2017 16:45:11

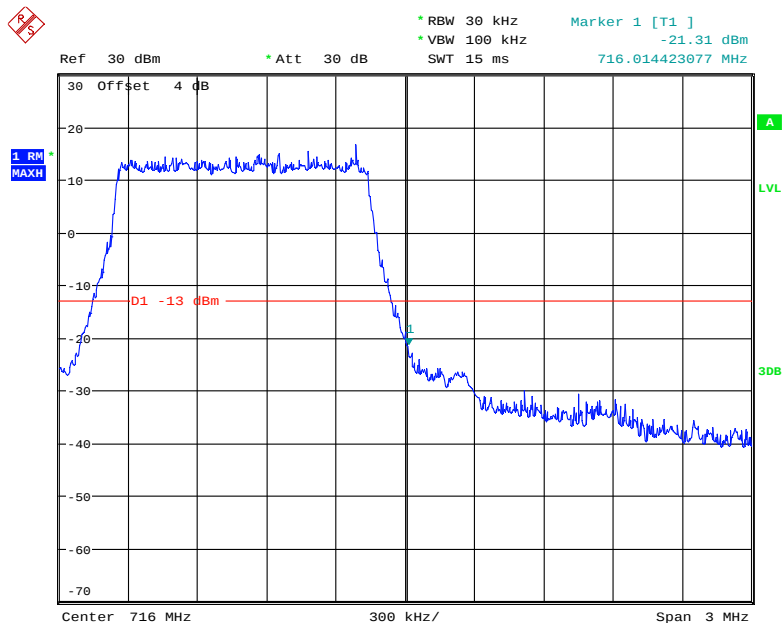
Band 12:

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



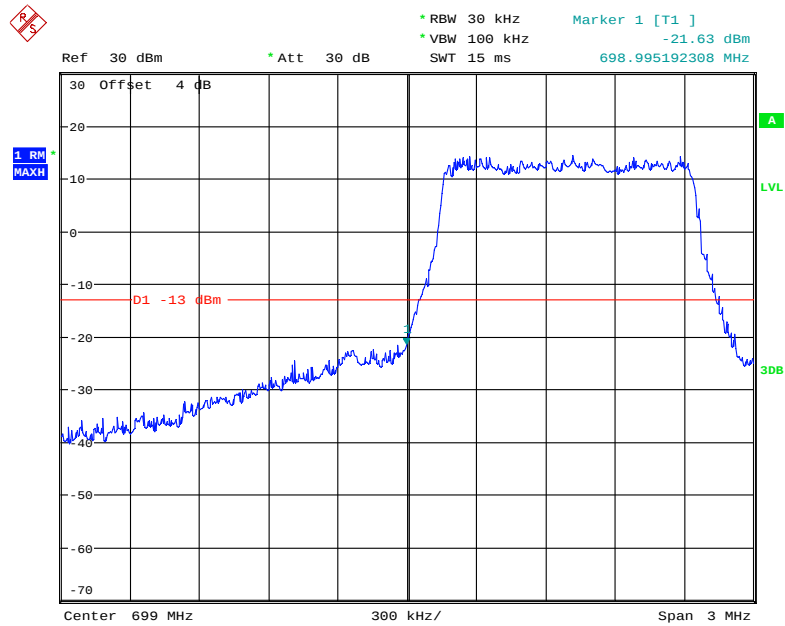
Date: 15.OCT.2017 16:14:56

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



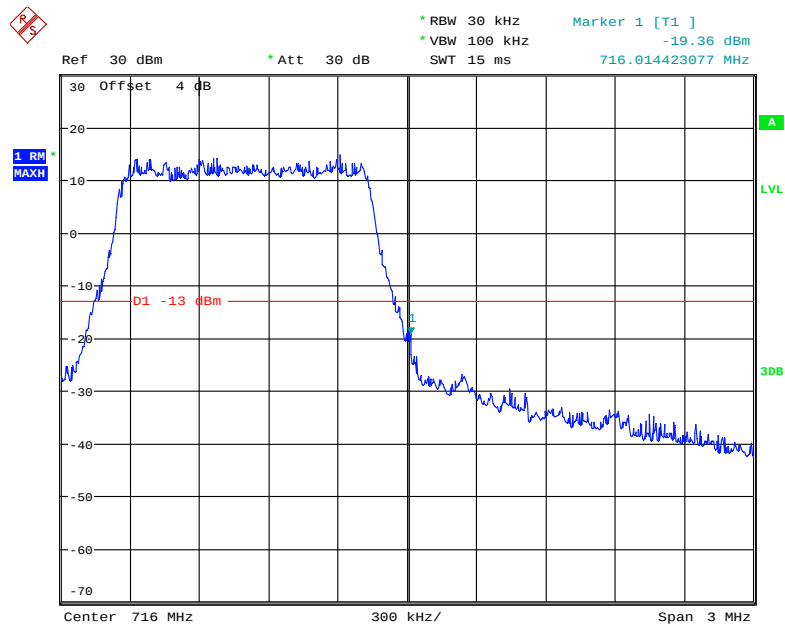
Date: 15.OCT.2017 16:15:21

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



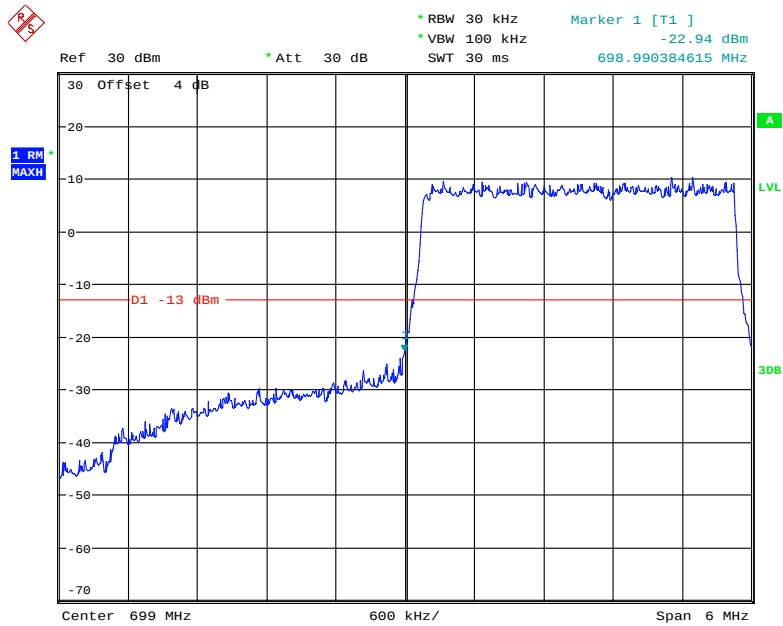
Date: 15.OCT.2017 16:14:24

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



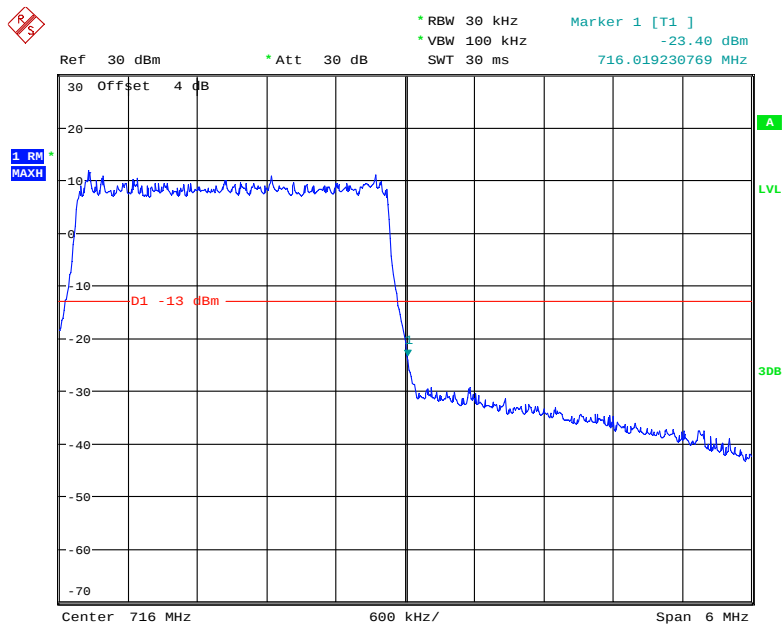
Date: 15.OCT.2017 16:15:41

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



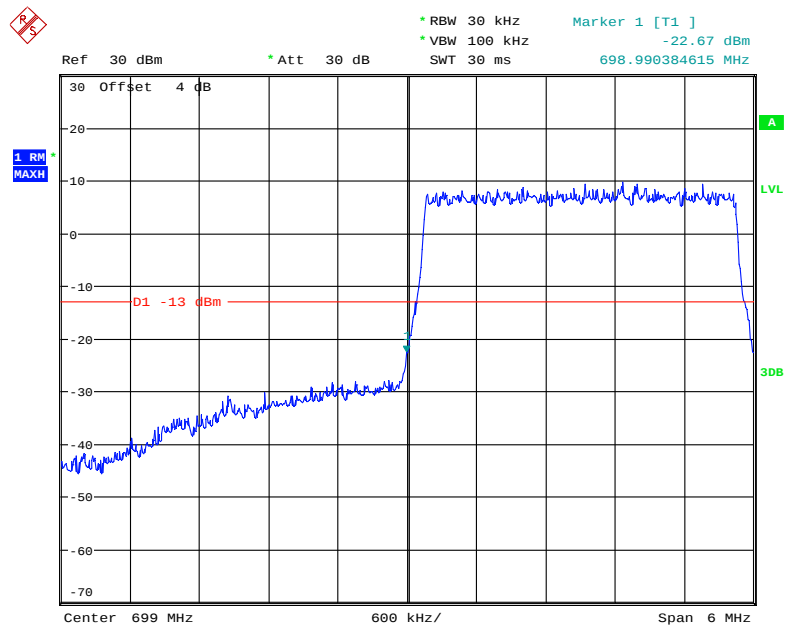
Date: 15.OCT.2017 16:13:48

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



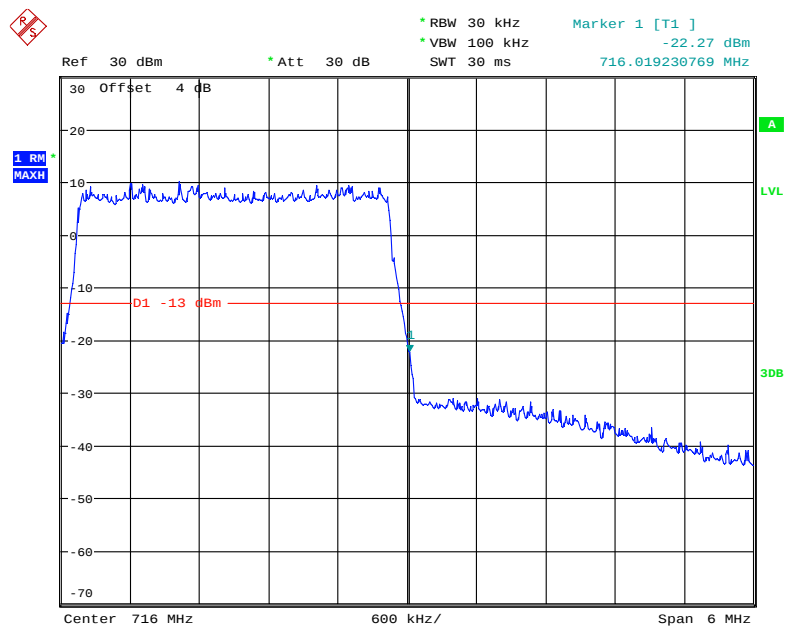
Date: 15.OCT.2017 16:11:49

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



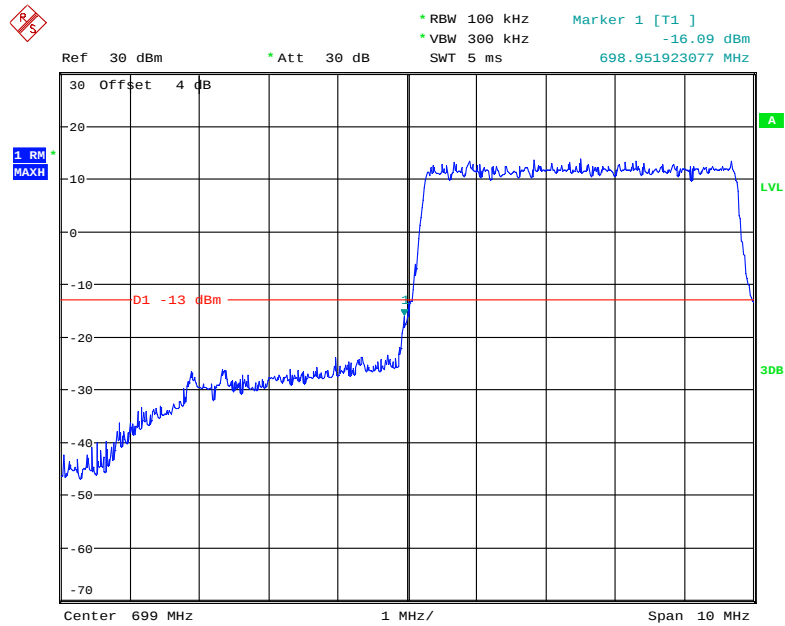
Date: 15.OCT.2017 16:13:19

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



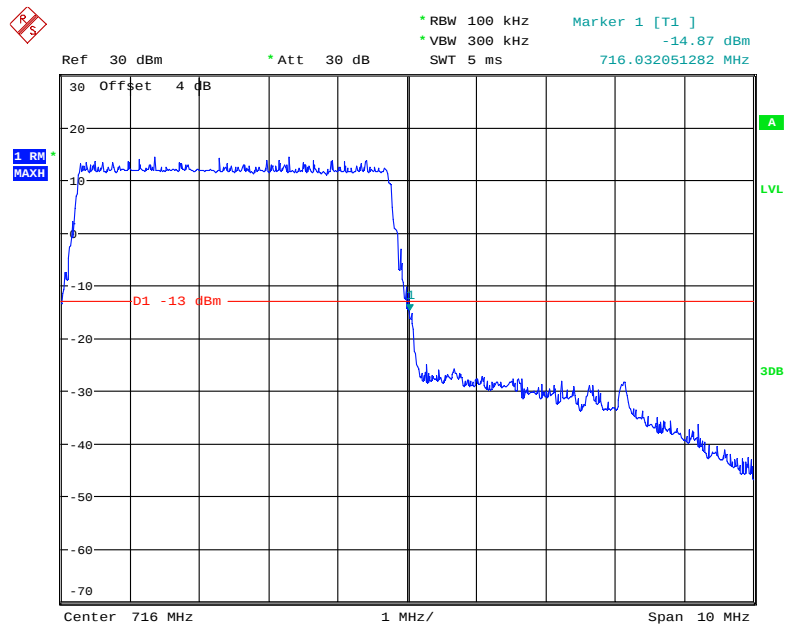
Date: 15.OCT.2017 16:12:47

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



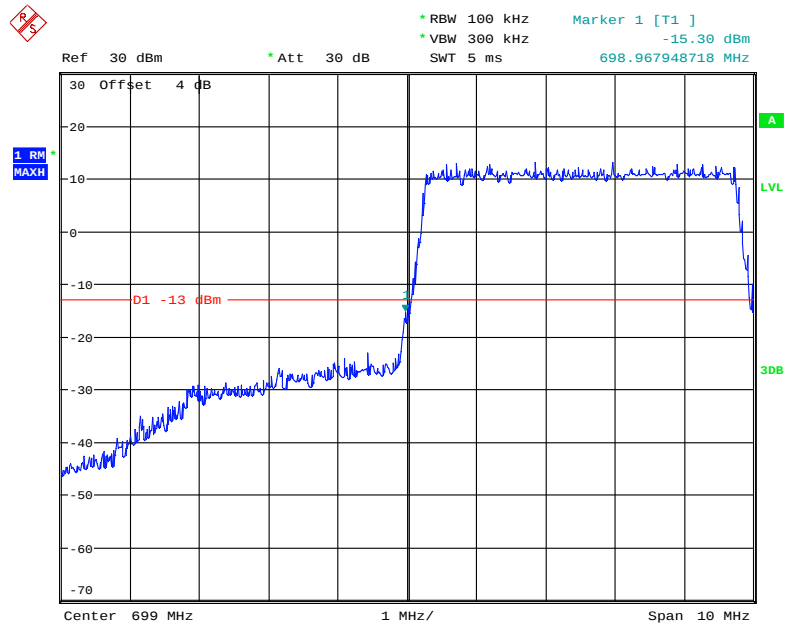
Date: 15.OCT.2017 16:17:15

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



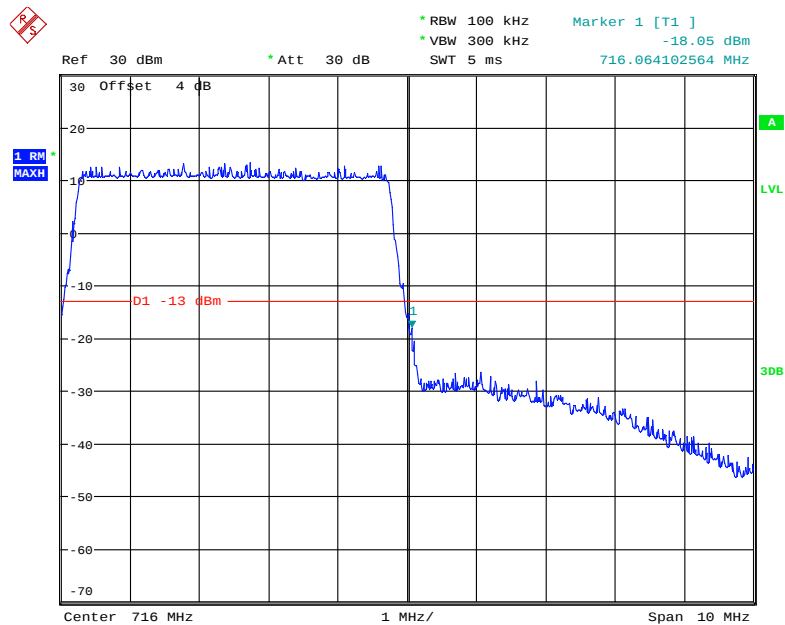
Date: 15.OCT.2017 16:16:40

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

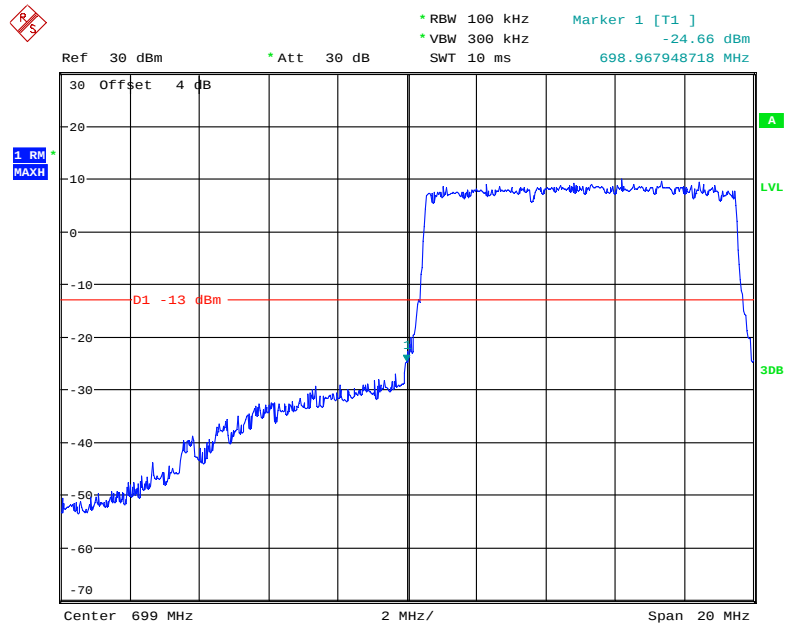


Date: 15.OCT.2017 16:17:35

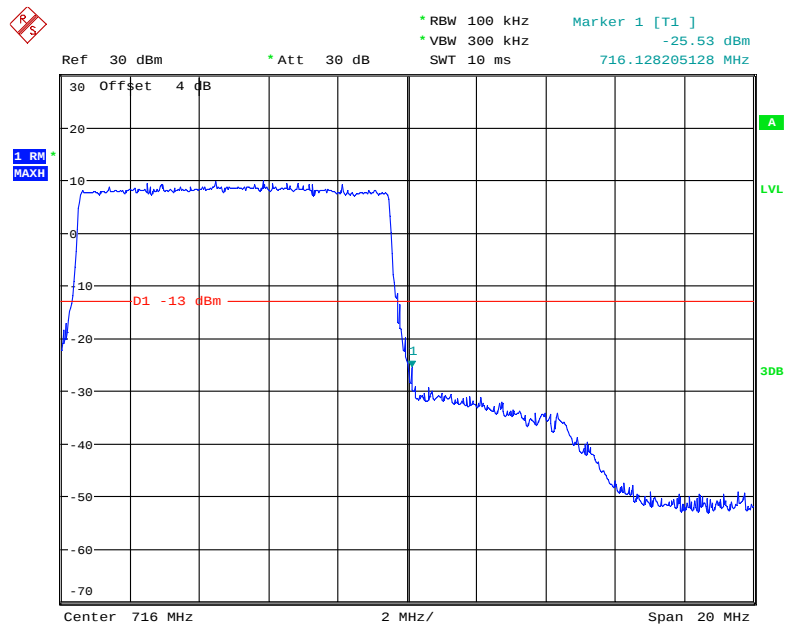
16-QAM (5.0 MHz, FULL RB) - Right Band Edge



Date: 15.OCT.2017 16:16:15

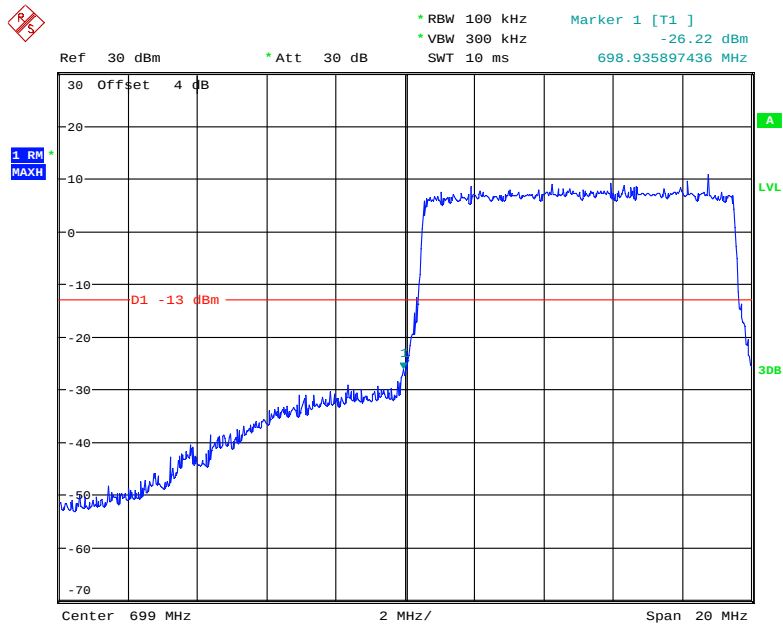
QPSK (10.0 MHz, FULL RB) - Left Band Edge

Date: 15.OCT.2017 16:18:30

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

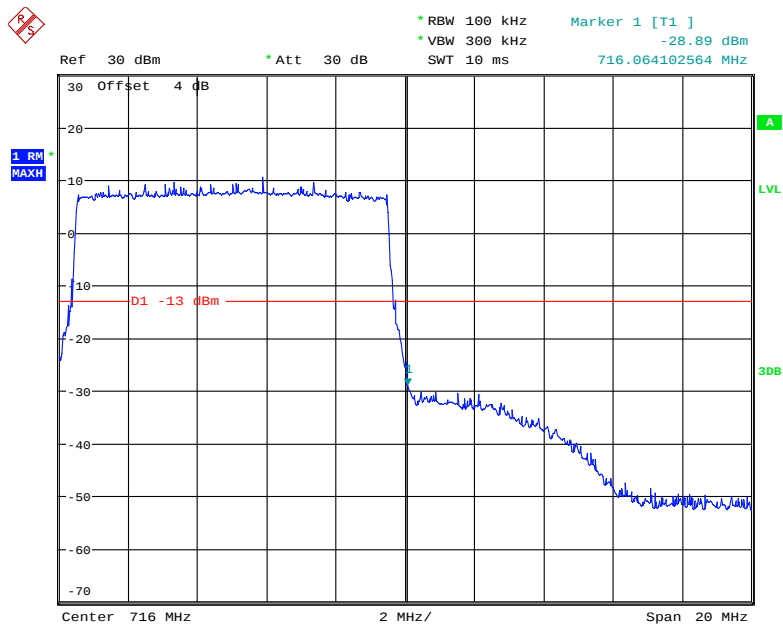
Date: 15.OCT.2017 16:19:02

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



Date: 15.OCT.2017 16:18:06

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



Date: 15.OCT.2017 16:19:34

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

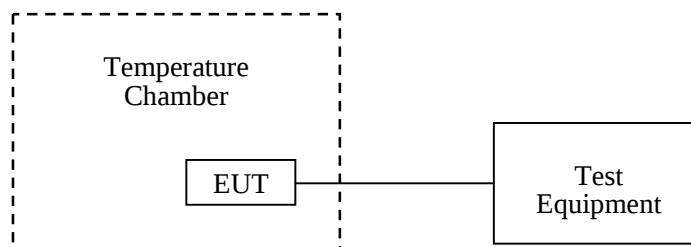
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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:	25 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Kobe Li on 2017-10-12.

EUT operation mode: Transmitting

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

Cellular Band (Part 22H)**WCDMA Mode**

Middle Channel, $f_0 = 836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (Vac)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	120	2	0.002391	2.5
-20		-1	-0.001195	2.5
-10		-3	-0.003586	2.5
0		1	0.001195	2.5
10		2	0.002391	2.5
20		0	0.000000	2.5
30		-1	-0.001195	2.5
40		3	0.003586	2.5
50		1	0.001195	2.5
25	V min.= 102	4	0.004781	2.5
	V max.= 138	6	0.007172	2.5

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

Middle Channel, $f_0 = 1880.0\text{ MHz}$				
Temperature (°C)	Voltage Supplied (Vac)	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	120	2	0.001064	pass
-20		-1	-0.000532	pass
-10		2	0.001064	pass
0		-2	-0.001064	pass
10		-3	-0.001596	pass
20		2	0.001064	pass
30		-1	-0.000532	pass
40		4	0.002128	pass
50		5	0.002660	pass
25	V min.= 102	3	0.001596	pass
	V max.= 138	6	0.003191	pass

AWS Band (Part 27)**WCDMA Mode**

Middle Channel, $f_o=1732.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (Vac)	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	120	3	0.00173	pass
-20		1	0.00058	pass
-10		2	0.00115	pass
0		-3	-0.00173	pass
10		0	0.00000	pass
20		1	0.00058	pass
30		-2	-0.00115	pass
40		3	0.00173	pass
50		4	0.00231	pass
25	V min.= 102	5	0.00289	pass
	V max.= 138	8	0.00462	pass

LTE:
QPSK:

Band 2:

QPSK 10.0 MHz Middle Channel, $f_o=1880\text{MHz}$				
Temperature (°C)	Voltage Supplied (Vac)	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	120	2	0.001064	pass
-20		-4	-0.002128	pass
-10		2	0.001064	pass
0		-3	-0.001596	pass
10		-1	-0.000532	pass
20		1	0.000532	pass
30		-2	-0.001064	pass
40		3	0.001596	pass
50		6	0.003191	pass
20	V min.= 102	5	0.002660	pass
	V max.= 138	9	0.004787	pass

Band 4:

QPSK 10.0 MHz Middle Channel, $f_o = 1732.5$ MHz				
Temperature (°C)	Voltage Supplied (Vac)	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	120	2	0.00115	pass
-20		1	0.00058	pass
-10		-1	-0.00058	pass
0		1	0.00058	pass
10		0	0.00000	pass
20		1	0.00058	pass
30		-2	-0.00115	pass
40		2	0.00115	pass
50		4	0.00231	pass
20	V min.= 102	6	0.00346	pass
	V max.= 138	9	0.00519	pass

Band 12:

QPSK 10.0 MHz Middle Channel, $f_o = 707.5$ MHz				
Temperature (°C)	Voltage Supplied (Vac)	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	120	3	0.00424	pass
-20		2	0.00283	pass
-10		4	0.00566	pass
0		-1	-0.00141	pass
10		2	0.00283	pass
20		1	0.00141	pass
30		-2	-0.00283	pass
40		4	0.00566	pass
50		6	0.00848	pass
20	V min.= 102	4	0.00566	pass
	V max.= 138	9	0.01273	pass

16QAM:**Band 2:**

16QAM 10.0 MHz Middle Channel, $f_0=1880\text{MHz}$				
Temperature (°C)	Voltage Supplied (Vac)	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	120	1	0.000532	1
-20		2	0.001064	2
-10		-1	-0.000532	-1
0		1	0.000532	1
10		-2	-0.001064	-2
20		-1	-0.000532	-1
30		2	0.001064	2
40		-2	-0.001064	-2
50		-1	-0.000532	-1
20	V min.= 102	2	0.001064	pass
	V max.= 138	-1	-0.000532	pass

Band 4:

16QAM 10.0 MHz Middle Channel, $f_0=1732.5\text{ MHz}$				
Temperature (°C)	Voltage Supplied (Vac)	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	120	1	0.000577	pass
-20		-1	-0.000577	pass
-10		-2	-0.001154	pass
0		-1	-0.000577	pass
10		2	0.001154	pass
20		1	0.000577	pass
30		-1	-0.000577	pass
40		2	0.001154	pass
50		-2	-0.001154	pass
20	V min.= 102	2	0.001154	pass
	V max.= 138	1	0.000577	pass

Band 12:

16QAM 10.0 MHz Middle Channel, $f_o = 707.5$ MHz				
Temperature (°C)	Voltage Supplied (Vac)	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	120	3	0.004240	pass
-20		1	0.001413	pass
-10		2	0.002827	pass
0		-1	-0.001413	pass
10		1	0.001413	pass
20		3	0.004240	pass
30		-2	-0.002827	pass
40		2	0.002827	pass
50		1	0.001413	pass
20	V min.= 102	1	0.001413	pass
	V max.= 138	2	0.002827	pass

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