



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

For

KRIPTO MOBILE CORPORATION

7236 NW 31ST ST., MIAMI Florida United States

FCC ID: 2APX7K650A

Report Type: Original Report	Product Type: Mobile phone
Report Number: RSZ190115002-00D	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Mobile phone
Tested Model	K65
Frequency Range(transmit)	Cellular: 824.2-848.8 MHz(GSM/GPRS/EDGE) 826.4-846.6 MHz(WCDMA/HSPA) PCS: 1850.2-1909.8 MHz(GSM/GPRS/EDGE) 1852.4-1907.6 MHz(WCDMA/HSPA) LTE B4: 1710.7-1754.3 MHz, 1711.5-1753.5 MHz, 1712.5-1752.5 MHz, 1715-1750 MHz, 1717.5-1747.5 MHz, 1720-1745 MHz LTE B7: 2502.5-2567.5 MHz, 2505-2565 MHz,2507.5-2562.5 MHz, 2510-2560 MHz, LTE B12: 699.7-715.3 MHz, 700.5-714.5 MHz,701.5-713.5 MHz, 704-711 MHz, LTE B17: 706.5-713.5 MHz, 709-711 MHz
Transmit Power(Conducted power)	Cellular: 32.60dBm(GSM/GPRS), 26.37dBm (EDGE), 22.42dBm(WCDMA/HSPA) PCS: 30.30dBm (GSM/GPRS), 25.75dBm (EDGE), 22.45dBm (WCDMA/HSPA) LTE: 22.90dBm (B4), 23.88dBm (B7), 23.66dBm (B12), 23.10dBm (B17)
Modulation Technique	GSM/PCS: GMSK EDGE:8PSK WCDMA: Uplink: BPSK; Downlink: QPSK/16QAM LTE: QPSK,16QAM
Antenna Specification	2G/3G/4G:FPC Antennas
Voltage Range	DC 3.85V battery or DC 5.0V from adapter
Date of Test	Jan 21, 2019~ Mar 21, 2019
Sample serial number	190115002
Received date	2019-01-15
Sample/EUT Status	Good condition
Adapter information	Model: C650 Input: AC 100-240V, 50/60Hz, 0.5A Output: DC 5.0V, 1.5A

Objective

This test report is prepared on behalf of *KRIPTO MOBILE CORPORATION* 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 DSS, Part 15.247 DTS, Part 15.407 NII and Part 15B JBP submissions with FCC ID: 2APX7K650A.

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.

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		±0.5dB
Unwanted Emission, conducted		±1.5dB
Radiated Emissions	Below 1GHz	±4.75dB
	Above 1GHz	±4.88dB
Temperature		±3°C
Supply voltages		±0.4%

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

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.

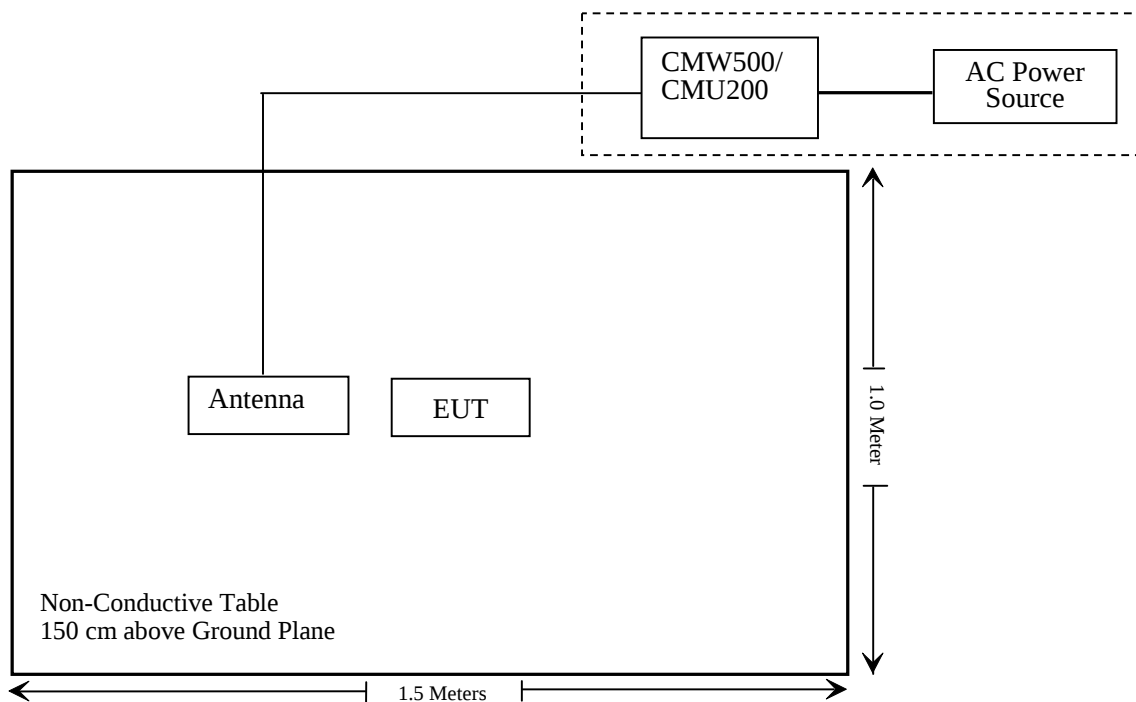
Equipment Modifications

No modification was made to the EUT.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-116218-UY
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	110605

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: RSZ190115002-20A.

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	2018-06-23	2019-06-23
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017-12-22	2020-12-21
COM-POWER	Pre-amplifier	PA-122	181919	2018-11-12	2019-11-12
Sonoma Instrument	Amplifier	310N	186238	2018-11-12	2019-11-12
Anritsu	Signal Generator	68369B	004114	2018-12-24	2019-12-24
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2019-01-11	2020-01-11
COM-POWER	Dipole Antenna	AD-100	41000	NCR	NCR
A.H. System	Horn Antenna	SAS-200/571	135	2018-09-01	2021-08-31
UTiFLEX MICRO-C0AX	RF Cable	UFA147A-2362-100100	MFR64639 231029-003	2018-07-11	2021-07-10
Ducommun Technologies	RF Cable	104PEA	218124002	2018-11-12	2019-11-12
Ducommun Technologies	RF Cable	RG-214	1	2018-11-19	2019-05-21
Ducommun Technologies	RF Cable	RG-214	2	2018-11-12	2019-11-12
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
Heatsink Required	Amplifier	QLW-18405536-J0	15964001002	2018-11-12	2019-11-12

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSU26	200120	2018-12-24	2019-12-24
ESPEC	Temperature & Humidity Chamber	EL-10KA	9107726	2018-12-21	2019-12-21
Long Wei	DC Power Supply	TPR-6420D	398363	NCR	NCR
KEYSIGHT	Vector signal source	N5182B	MY53051503	2018-06-23	2019-06-23
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891	2018-12-14	2019-12-14
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-146520-wh	2018-06-23	2019-06-23
Ducommun Technologies	RF Cable	RG-214	3	Each Time	
WEINSCHL	10dB Attenuator	5324	AU 3842	Each Time	
WEINSCHL	3dB Attenuator	6231	666	Each Time	
Unknown	Power Splitter	1620	129	Each Time	

* 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: RSZ190115002-20A.

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.

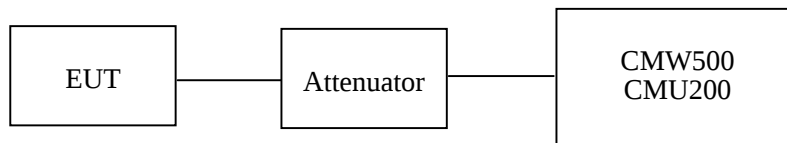
According to §27.50(d), the maximum EIRP must not exceed 1Watts (30dBm) for 1710-1755MHz.

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:	25 °C
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Tracy Hu on 2019-02-25.

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

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	128	824.2	32.6	38.45
	190	836.6	32.3	38.45
	251	848.8	32.0	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	32.5	31.6	30.5	28.6	38.45
	190	836.6	32.3	31.2	30.1	28.2	38.45
	251	848.8	31.9	30.8	29.2	27.3	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	128	824.2	26.37	25.38	23.19	21.82	38.45
	190	836.6	26.20	25.36	23.12	21.83	38.45
	251	848.8	25.91	25.04	22.80	21.47	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		22.20	22.35	22.42
		HSDPA	1	21.35	21.23	21.05
			2	21.73	21.93	21.34
			3	21.82	22.08	21.43
			4	21.74	21.96	21.35
		HSUPA	1	21.50	21.25	21.03
			2	21.72	21.92	21.26
			3	21.86	22.08	21.43
			4	21.66	21.92	21.27
			5	21.84	22.08	21.42

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	512	1850.2	28.9	33
	661	1880.0	29.4	33
	810	1909.8	30.3	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	28.9	27.6	26.2	25.3	33
	661	1880.0	29.4	27.8	26.0	25.4	33
	810	1909.8	30.3	29.3	27.6	25.6	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	512	1850.2	25.64	24.51	22.33	21.21	33
	661	1880.0	25.69	24.60	22.45	21.38	33
	810	1909.8	25.75	24.92	22.90	21.65	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		22.24	22.45	22.36
		HSDPA	1	20.80	20.63	20.74
			2	20.38	20.53	20.87
			3	20.48	20.68	20.66
			4	20.36	20.35	20.74
		HSUPA	1	20.96	20.83	20.72
			2	20.84	20.79	20.64
			3	20.74	20.61	20.74
			4	20.61	20.86	20.64
			5	20.86	20.72	20.87

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

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	1.24	13
	Middle	1.44	13
	High	1.20	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	122	13
	Middle	1.23	13
	High	1.22	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.80	13
	Middle	3.65	13
	High	3.85	13
HSDPA (16QAM)	Low	3.87	13
	Middle	3.66	13
	High	3.96	13
HSUPA (BPSK)	Low	3.68	13
	Middle	3.64	13
	High	3.64	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	1.16	13
	Middle	1.06	13
	High	1.32	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	1.35	13
	Middle	1.64	13
	High	1.19	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.63	13
	Middle	3.63	13
	High	3.87	13
HSDPA (16QAM)	Low	3.84	13
	Middle	3.66	13
	High	3.65	13
HSUPA (BPSK)	Low	3.89	13
	Middle	3.61	13
	High	3.82	13

**Radiated Power
GSM Mode:**

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dB)			
ERP for Cellular Band (Part 22H), Middle Channel										
836.6	85.7	229	2.2	H	26.3	1.90	0.0	24.40	38.45	14.05
836.6	93.04	233	1.6	V	33.0	1.90	0.0	31.10	38.45	7.35
EIRP for PCS Band (Part 24E), Middle Channel										
1880.00	90.66	320	1.5	H	20.9	1.30	9.40	29.00	33	4.0
1880.00	88.53	231	1.6	V	20.4	1.30	9.40	28.50	33	4.5

EDGE Mode:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dB)			
ERP, Cellular Band (Part 22H), Middle Channel										
836.6	82.37	64	1.0	H	23.0	1.9	0.0	21.10	38.45	17.35
836.6	87.24	258	2.4	V	27.2	1.9	0.0	25.30	38.45	13.15
EIRP, PCS Band (Part 24E), Middle Channel										
1880.00	85.17	76	1.6	H	15.4	1.30	9.40	23.50	33	9.5
1880.00	82.39	185	1.7	V	14.2	1.30	9.40	22.30	33	10.7

WCDMA Mode:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dB)			
ERP for WCDMA Band V (Part 22H), Middle Channel										
836.6	82.65	295	2.1	H	22.7	1.9	0	20.8	38.45	17.65
836.6	82.19	56	2.4	V	22.8	1.9	0	20.9	38.45	17.55
EIRP for WCDMA Band II (Part 24E), Middle Channel										
1880.00	85.59	311	1.6	H	15.5	1.30	9.40	23.60	33.00	9.4
1880.00	82.95	185	2.3	V	12.7	1.30	9.40	20.80	33.00	12.2

Note:

Absolute Level = Substituted Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

LTE Band 4:**Maximum Output Power**

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	22.48	22.50	22.49
		RB Size=1, RB Offset=2	22.55	22.25	22.59
		RB Size=1, RB Offset=5	22.37	21.91	22.59
		RB Size=3, RB Offset=0	22.66	22.63	22.67
		RB Size=3, RB Offset=1	22.62	22.63	22.70
		RB Size=3, RB Offset=2	22.44	22.45	22.55
		RB Size=6, RB Offset=0	21.53	21.32	21.34
	16QAM	RB Size=1, RB Offset=0	21.97	21.86	21.84
		RB Size=1, RB Offset=2	21.82	21.82	21.73
		RB Size=1, RB Offset=5	21.81	21.79	21.89
		RB Size=3, RB Offset=0	22.80	21.89	21.84
		RB Size=3, RB Offset=1	22.75	21.83	21.89
		RB Size=3, RB Offset=2	22.75	21.74	21.57
		RB Size=6, RB Offset=0	20.64	20.76	20.77
3.0	QPSK	RB Size=1, RB Offset=0	22.47	22.40	22.47
		RB Size=1, RB Offset=7	22.27	22.35	22.37
		RB Size=1, RB Offset=14	22.30	22.24	22.23
		RB Size=8, RB Offset=0	21.54	21.51	21.65
		RB Size=8, RB Offset=4	21.57	21.56	21.73
		RB Size=8, RB Offset=7	21.41	21.29	21.64
		RB Size=15, RB Offset=0	21.61	21.52	21.69
	16QAM	RB Size=1, RB Offset=0	21.77	21.60	21.65
		RB Size=1, RB Offset=7	21.74	21.62	21.52
		RB Size=1, RB Offset=14	21.72	21.44	21.30
		RB Size=8, RB Offset=0	20.82	20.61	20.72
		RB Size=8, RB Offset=4	20.63	20.56	20.68
		RB Size=8, RB Offset=7	20.64	20.70	20.52
		RB Size=15, RB Offset=0	20.71	20.70	20.80

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	22.62	22.57	22.79
		RB Size=1, RB Offset=12	22.50	22.44	22.64
		RB Size=1, RB Offset=24	22.53	22.44	22.63
		RB Size=12, RB Offset=0	21.91	21.68	21.72
		RB Size=12, RB Offset=6	21.77	21.69	21.77
		RB Size=12, RB Offset=11	21.57	21.78	21.58
		RB Size=25, RB Offset=0	21.71	21.79	21.79
	16QAM	RB Size=1, RB Offset=0	22.01	21.90	21.80
		RB Size=1, RB Offset=12	21.70	21.66	21.74
		RB Size=1, RB Offset=24	21.67	21.74	21.59
		RB Size=12, RB Offset=0	20.96	20.88	20.99
		RB Size=12, RB Offset=6	20.80	21.02	20.88
		RB Size=12, RB Offset=11	20.68	20.79	20.78
		RB Size=25, RB Offset=0	20.77	20.76	20.60
10.0	QPSK	RB Size=1, RB Offset=0	22.71	22.69	22.90
		RB Size=1, RB Offset=24	22.79	22.69	22.75
		RB Size=1, RB Offset=49	22.55	22.77	22.68
		RB Size=25, RB Offset=0	21.80	21.81	21.77
		RB Size=25, RB Offset=12	21.59	21.74	21.83
		RB Size=25, RB Offset=24	21.59	21.61	21.56
		RB Size=50, RB Offset=0	21.74	21.89	21.72
	16QAM	RB Size=1, RB Offset=0	22.17	22.18	22.33
		RB Size=1, RB Offset=24	21.99	22.00	22.29
		RB Size=1, RB Offset=49	22.14	22.06	22.23
		RB Size=25, RB Offset=0	20.89	20.97	20.72
		RB Size=25, RB Offset=12	20.70	20.63	20.80
		RB Size=25, RB Offset=24	20.51	20.66	20.64
		RB Size=50, RB Offset=0	20.96	20.99	20.94

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	22.78	22.60	22.65
		RB Size=1, RB Offset=37	22.62	22.34	22.45
		RB Size=1, RB Offset=74	22.55	22.47	22.50
		RB Size=36, RB Offset=0	22.06	22.03	21.96
		RB Size=36, RB Offset=18	21.98	21.65	21.82
		RB Size=36, RB Offset=37	21.85	21.70	21.87
		RB Size=75, RB Offset=0	21.82	21.53	21.59
	16QAM	RB Size=1, RB Offset=0	21.82	21.53	21.66
		RB Size=1, RB Offset=37	21.62	21.46	21.80
		RB Size=1, RB Offset=74	21.65	21.35	21.59
		RB Size=36, RB Offset=0	20.82	20.73	20.65
		RB Size=36, RB Offset=18	20.75	20.50	20.64
		RB Size=36, RB Offset=37	20.57	20.54	20.45
		RB Size=75, RB Offset=0	20.74	20.68	20.73
20.0	QPSK	RB Size=1, RB Offset=0	22.65	22.49	22.57
		RB Size=1, RB Offset=49	22.67	22.19	22.43
		RB Size=1, RB Offset=99	22.71	22.31	22.10
		RB Size=50, RB Offset=0	21.82	21.85	22.02
		RB Size=50, RB Offset=24	21.73	21.95	21.91
		RB Size=50, RB Offset=49	21.66	21.85	21.76
		RB Size=100, RB Offset=0	21.79	21.58	21.59
	16QAM	RB Size=1, RB Offset=0	22.24	22.13	22.35
		RB Size=1, RB Offset=49	22.21	22.16	22.26
		RB Size=1, RB Offset=99	22.09	22.14	22.47
		RB Size=50, RB Offset=0	21.09	21.08	21.00
		RB Size=50, RB Offset=24	20.99	20.98	21.04
		RB Size=50, RB Offset=49	20.82	20.97	21.10
		RB Size=100, RB Offset=0	20.84	20.72	20.93

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.26	13	Pass
QPSK (100RB Size)	6.31	13	Pass
16QAM (1RB Size)	7.44	13	Pass
16QAM (100RB Size)	7.47	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	84.97	307	1.3	H	11.8	1.30	8.90	19.40	30
1732.50	80.44	359	2.5	V	7.9	1.30	8.90	15.50	30
3 MHz Bandwidth									
1732.50	84.25	158	1.1	H	11.1	1.3	8.9	18.70	30
1732.50	79.9	347	1.5	V	7.3	1.3	8.9	14.90	30
5 MHz Bandwidth									
1732.50	84.22	72	2.3	H	11.1	1.3	8.9	18.70	30
1732.50	79.36	210	1.1	V	6.8	1.3	8.9	14.40	30
10 MHz Bandwidth									
1732.50	84.16	44	1.3	H	11	1.3	8.9	18.60	30
1732.50	80.4	207	1.8	V	7.8	1.3	8.9	15.40	30
15 MHz Bandwidth									
1732.50	83.79	238	1.3	H	10.6	1.3	8.9	18.20	30
1732.50	79.06	273	1.1	V	6.5	1.3	8.9	14.10	30
20 MHz Bandwidth									
1732.50	83.55	310	1.1	H	10.4	1.3	8.9	18.00	30
1732.50	79.16	298	1.7	V	6.6	1.3	8.9	14.20	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	85.49	75	2.1	H	12.3	1.3	8.9	19.9	30
1732.50	80.24	71	1.9	V	7.7	1.3	8.9	15.3	30
3 MHz Bandwidth									
1732.50	85.46	31	1.3	H	12.3	1.3	8.9	19.9	30
1732.50	80.22	112	2	V	7.7	1.3	8.9	15.3	30
5 MHz Bandwidth									
1732.50	85.32	136	1.8	H	12.2	1.3	8.9	19.8	30
1732.50	80.47	206	1.7	V	7.9	1.3	8.9	15.5	30
10 MHz Bandwidth									
1732.50	85.02	51	1.9	H	11.9	1.30	8.90	19.50	30
1732.50	80.79	340	1.9	V	8.2	1.30	8.90	15.80	30
15 MHz Bandwidth									
1732.50	84.90	177	1.7	H	11.7	1.30	8.90	19.30	30
1732.50	80.77	13	1.9	V	8.2	1.30	8.90	15.80	30
20 MHz Bandwidth									
1732.50	84.65	187	1.1	H	11.5	1.30	8.90	19.10	30
1732.50	80.59	105	2.1	V	8.0	1.30	8.90	15.60	30

LTE Band 7:

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5	QPSK	RB Size=1, RB Offset=0	23.28	22.96	22.58
		RB Size=1, RB Offset=12	22.79	22.35	22.28
		RB Size=1, RB Offset=24	23.45	23.06	22.92
		RB Size=12, RB Offset=0	21.97	21.59	21.38
		RB Size=12, RB Offset=6	22.09	21.49	21.40
		RB Size=12, RB Offset=11	22.06	21.62	21.46
		RB Size=25, RB Offset=0	22.13	21.53	22.38
	16QAM	RB Size=1, RB Offset=0	22.48	21.92	22.07
		RB Size=1, RB Offset=12	22.52	21.91	22.08
		RB Size=1, RB Offset=24	22.58	22.00	22.33
		RB Size=12, RB Offset=0	21.83	20.84	21.21
		RB Size=12, RB Offset=6	21.69	21.08	21.26
		RB Size=12, RB Offset=11	21.68	21.05	21.45
		RB Size=25, RB Offset=0	21.02	20.76	20.56
10	QPSK	RB Size=1, RB Offset=0	22.63	22.41	22.75
		RB Size=1, RB Offset=24	22.81	22.38	22.61
		RB Size=1, RB Offset=49	22.70	22.36	22.80
		RB Size=25, RB Offset=0	21.89	21.57	22.05
		RB Size=25, RB Offset=12	21.88	21.72	21.97
		RB Size=25, RB Offset=24	21.78	21.71	22.13
		RB Size=50, RB Offset=0	21.93	21.50	21.40
	16QAM	RB Size=1, RB Offset=0	21.88	22.17	21.91
		RB Size=1, RB Offset=24	21.74	22.25	21.94
		RB Size=1, RB Offset=49	21.92	22.12	22.01
		RB Size=25, RB Offset=0	21.15	21.28	21.35
		RB Size=25, RB Offset=12	21.25	21.13	21.07
		RB Size=25, RB Offset=24	20.95	21.36	21.34
		RB Size=50, RB Offset=0	21.15	20.59	20.72

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15	QPSK	RB Size=1, RB Offset=0	22.76	22.72	23.77
		RB Size=1, RB Offset=37	22.69	22.83	23.72
		RB Size=1, RB Offset=74	22.89	22.69	23.88
		RB Size=36, RB Offset=0	21.98	21.95	22.79
		RB Size=36, RB Offset=18	22.02	21.60	23.09
		RB Size=36, RB Offset=37	22.07	21.94	22.96
		RB Size=75, RB Offset=0	22.09	21.35	22.17
	16QAM	RB Size=1, RB Offset=0	22.06	21.83	22.61
		RB Size=1, RB Offset=37	21.97	21.50	22.75
		RB Size=1, RB Offset=74	21.98	21.71	22.75
		RB Size=36, RB Offset=0	21.23	20.89	21.95
		RB Size=36, RB Offset=18	21.37	20.92	21.77
		RB Size=36, RB Offset=37	21.13	21.05	21.84
		RB Size=75, RB Offset=0	20.70	20.42	21.35
20	QPSK	RB Size=1, RB Offset=0	22.83	22.95	23.64
		RB Size=1, RB Offset=49	22.59	23.02	23.38
		RB Size=1, RB Offset=99	23.09	23.23	23.75
		RB Size=50, RB Offset=0	22.13	22.25	22.87
		RB Size=50, RB Offset=24	22.11	22.15	22.75
		RB Size=50, RB Offset=49	22.10	22.04	22.79
		RB Size=100, RB Offset=0	22.30	21.72	22.57
	16QAM	RB Size=1, RB Offset=0	21.97	22.15	22.74
		RB Size=1, RB Offset=49	22.02	22.31	22.65
		RB Size=1, RB Offset=99	21.99	22.34	22.92
		RB Size=50, RB Offset=0	21.29	21.37	22.02
		RB Size=50, RB Offset=24	21.26	21.54	22.01
		RB Size=50, RB Offset=49	21.22	21.43	21.97
		RB Size=100, RB Offset=0	21.25	20.80	21.45

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.27	13	Pass
QPSK (100RB Size)	6.32	13	Pass
16QAM (1RB Size)	7.28	13	Pass
16QAM (100RB Size)	7.33	13	Pass

EIRP:**QPSK:**

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
5 MHz Bandwidth									
2535.00	81.05	356	2.2	H	11.6	2.60	10.20	19.20	33
2535.00	79.33	313	1.6	V	10.5	2.60	10.20	18.10	33
10 MHz Bandwidth									
2535.00	80.45	73	2.3	H	11	2.6	10.2	18.60	33
2535.00	78.9	144	2.2	V	10	2.6	10.2	17.60	33
15 MHz Bandwidth									
2535.00	80.43	302	1.1	H	10.9	2.6	10.2	18.50	33
2535.00	78.99	115	2.2	V	10.1	2.6	10.2	17.70	33
20 MHz Bandwidth									
2535.00	80.16	153	2.3	H	10.7	2.60	10.20	18.30	33
2535.00	79.13	9	1.7	V	10.3	2.60	10.20	17.90	33

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
5 MHz Bandwidth									
2535.00	81.67	244	1.8	H	12.2	2.60	10.20	19.80	33
2535.00	79.58	293	2.3	V	10.7	2.60	10.20	18.30	33
10 MHz Bandwidth									
2535.00	81.63	230	1.4	H	12.1	2.60	10.20	19.70	33
2535.00	79.28	22	1.3	V	10.4	2.60	10.20	18.00	33
15 MHz Bandwidth									
2535.00	81.41	122	1.0	H	11.9	2.60	10.20	19.50	33
2535.00	79.01	344	1.0	V	10.1	2.60	10.20	17.70	33
20 MHz Bandwidth									
2535.00	81.32	291	2.3	H	11.8	2.60	10.20	19.40	33
2535.00	79.06	293	1.3	V	10.2	2.60	10.20	17.80	33

LTE Band 12:**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	22.88	23.10	22.97
		RB Size=1, RB Offset=2	22.98	23.00	23.01
		RB Size=1, RB Offset=5	22.82	22.80	22.94
		RB Size=3, RB Offset=0	23.19	22.94	23.07
		RB Size=3, RB Offset=1	23.02	23.12	23.12
		RB Size=3, RB Offset=2	22.83	22.80	23.03
	16QAM	RB Size=6, RB Offset=0	21.91	22.06	22.14
		RB Size=1, RB Offset=0	21.94	22.02	22.05
		RB Size=1, RB Offset=2	21.91	22.02	21.77
		RB Size=1, RB Offset=5	21.96	21.69	21.72
		RB Size=3, RB Offset=0	22.28	22.11	22.18
		RB Size=3, RB Offset=1	22.16	22.30	22.18
		RB Size=3, RB Offset=2	22.04	22.24	22.12
		RB Size=6, RB Offset=0	21.00	20.94	21.00
3.0	QPSK	RB Size=1, RB Offset=0	22.91	22.92	22.95
		RB Size=1, RB Offset=7	22.89	22.92	22.90
		RB Size=1, RB Offset=14	22.63	22.72	22.77
		RB Size=8, RB Offset=0	22.06	22.02	22.06
		RB Size=8, RB Offset=4	22.12	22.01	22.11
		RB Size=8, RB Offset=7	22.05	21.90	21.78
		RB Size=15, RB Offset=0	22.18	22.13	22.22
	16QAM	RB Size=1, RB Offset=0	22.46	22.39	22.66
		RB Size=1, RB Offset=7	22.24	22.32	22.56
		RB Size=1, RB Offset=14	22.29	22.26	22.41
		RB Size=8, RB Offset=0	21.20	21.05	21.14
		RB Size=8, RB Offset=4	21.17	21.07	21.14
		RB Size=8, RB Offset=7	21.19	21.10	21.31
		RB Size=15, RB Offset=0	21.12	21.04	21.14

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	22.02	21.97	21.98
		RB Size=1, RB Offset=12	21.97	21.94	21.84
		RB Size=1, RB Offset=24	21.82	21.89	21.87
		RB Size=12, RB Offset=0	21.24	21.13	21.14
		RB Size=12, RB Offset=6	21.11	21.12	21.16
		RB Size=12, RB Offset=11	20.74	21.05	21.08
		RB Size=25, RB Offset=0	22.16	22.14	22.01
	16QAM	RB Size=1, RB Offset=0	22.04	21.88	22.10
		RB Size=1, RB Offset=12	21.86	21.82	22.07
		RB Size=1, RB Offset=24	22.05	21.63	21.97
		RB Size=12, RB Offset=0	21.13	21.03	21.25
		RB Size=12, RB Offset=6	20.92	21.19	21.10
		RB Size=12, RB Offset=11	20.98	21.08	20.91
		RB Size=25, RB Offset=0	21.03	21.20	21.27
10.0	QPSK	RB Size=1, RB Offset=0	22.90	22.98	23.64
		RB Size=1, RB Offset=24	22.69	22.95	23.39
		RB Size=1, RB Offset=49	23.05	23.17	23.66
		RB Size=25, RB Offset=0	21.91	22.31	22.77
		RB Size=25, RB Offset=12	22.03	22.06	22.77
		RB Size=25, RB Offset=24	22.02	22.24	22.85
		RB Size=50, RB Offset=0	22.21	21.64	22.47
	16QAM	RB Size=1, RB Offset=0	22.02	22.19	22.91
		RB Size=1, RB Offset=24	21.94	22.36	22.65
		RB Size=1, RB Offset=49	22.07	22.39	23.03
		RB Size=25, RB Offset=0	21.27	21.38	22.02
		RB Size=25, RB Offset=12	21.40	21.56	22.18
		RB Size=25, RB Offset=24	21.10	21.50	21.93
		RB Size=50, RB Offset=0	21.19	20.65	21.57

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.37	13	Pass
QPSK (100RB Size)	6.43	13	Pass
16QAM (1RB Size)	7.02	13	Pass
16QAM (100RB Size)	7.05	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									
5 MHz Bandwidth									
707.5	88.68	187	2.5	H	20.9	1.6	0.0	19.30	34.77
707.5	83.26	119	1.8	V	16.9	1.6	0.0	15.30	34.77
10 MHz Bandwidth									
707.5	88.48	139	1.1	H	20.7	1.6	0.0	19.10	34.77
707.5	82.76	161	2.4	V	16.4	1.6	0.0	14.80	34.77
15 MHz Bandwidth									
707.5	88.31	134	1.1	H	20.5	1.6	0	18.90	34.77
707.5	82.62	356	2	V	16.3	1.6	0	14.70	34.77
20 MHz Bandwidth									
707.5	87.96	64	1.8	H	20.2	1.6	0	18.60	34.77
707.5	82.53	75	2.1	V	16.2	1.6	0	14.60	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									
5 MHz Bandwidth									
707.5	89.11	352	1.8	H	21.3	1.6	0	19.70	34.77
707.5	82.17	188	1.1	V	15.8	1.6	0	14.20	34.77
10 MHz Bandwidth									
707.5	88.59	232	1.5	H	20.8	1.6	0	19.2	34.77
707.5	83.15	345	2.2	V	16.8	1.6	0	15.2	34.77
15 MHz Bandwidth									
707.5	88.54	293	2.2	H	20.8	1.6	0	19.20	34.77
707.5	83.59	313	1.2	V	17.3	1.6	0	15.70	34.77
20 MHz Bandwidth									
707.5	88.28	178	1.9	H	20.5	1.6	0.0	18.90	34.77
707.5	82.19	226	2.1	V	15.9	1.6	0.0	14.30	34.77

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	22.04	22.08	22.05
		RB Size=1, RB Offset=12	22.02	21.85	21.84
		RB Size=1, RB Offset=24	21.88	21.84	21.83
		RB Size=12, RB Offset=0	21.22	21.10	21.17
		RB Size=12, RB Offset=6	21.10	21.10	21.22
		RB Size=12, RB Offset=11	20.75	21.07	21.11
		RB Size=25, RB Offset=0	22.17	22.10	22.08
	16QAM	RB Size=1, RB Offset=0	21.98	21.92	21.96
		RB Size=1, RB Offset=12	21.84	21.89	21.93
		RB Size=1, RB Offset=24	22.02	21.72	22.02
		RB Size=12, RB Offset=0	21.27	21.09	21.17
		RB Size=12, RB Offset=6	20.96	21.02	21.21
		RB Size=12, RB Offset=11	20.91	20.88	21.02
		RB Size=25, RB Offset=0	21.12	21.09	21.07
10.0	QPSK	RB Size=1, RB Offset=0	23.03	23.04	23.08
		RB Size=1, RB Offset=24	23.10	22.92	22.98
		RB Size=1, RB Offset=49	23.10	22.96	22.91
		RB Size=25, RB Offset=0	22.14	22.05	22.04
		RB Size=25, RB Offset=12	22.09	22.14	22.20
		RB Size=25, RB Offset=24	21.72	21.98	21.84
		RB Size=50, RB Offset=0	22.07	22.09	22.06
	16QAM	RB Size=1, RB Offset=0	22.69	22.59	22.56
		RB Size=1, RB Offset=24	22.58	22.54	22.43
		RB Size=1, RB Offset=49	22.46	22.36	22.33
		RB Size=25, RB Offset=0	21.13	21.22	21.10
		RB Size=25, RB Offset=12	20.93	21.18	21.15
		RB Size=25, RB Offset=24	20.92	21.33	21.03
		RB Size=50, RB Offset=0	21.21	21.16	21.25

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.27	13	Pass
QPSK (50RB Size)	6.35	13	Pass
16QAM (1RB Size)	7.24	13	Pass
16QAM (50RB Size)	7.29	13	Pass

ERP:**QPSK:**

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
5 MHz Bandwidth									
710	88.78	158	1.5	H	21.0	1.6	0.0	19.40	34.77
710	83.19	37	1.7	V	16.9	1.6	0.0	15.30	34.77
10 MHz Bandwidth									
710	88.55	346	1.2	H	20.8	1.6	0.0	19.20	34.77
710	82.81	231	2.5	V	16.5	1.6	0.0	14.90	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									
5 MHz Bandwidth									
710	88.18	128	2.1	H	20.4	1.6	0.0	18.80	34.77
710	83.35	74	1.9	V	17.0	1.6	0.0	15.40	34.77
10 MHz Bandwidth									
710	88.47	84	1.5	H	20.7	1.6	0.0	19.10	34.77
710	82.35	94	1.5	V	16.0	1.6	0.0	14.40	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

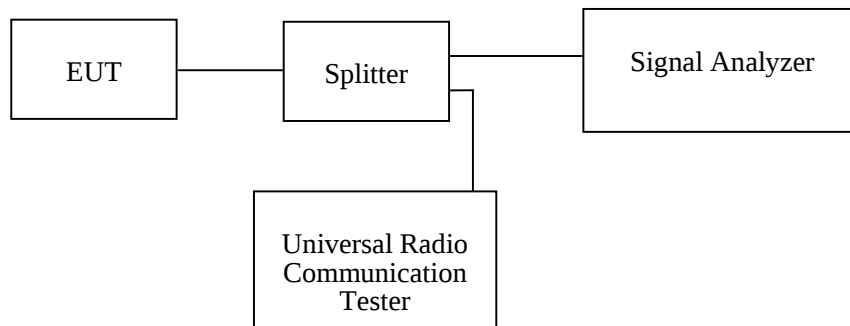
Applicable Standard

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:	23~25 °C
Relative Humidity:	50~52 %
ATM Pressure:	100.0~101.0 kPa

The testing was performed by Tracy Hu from 2019-01-21 and 2019-02-27.

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	246.8	315.7
EGPRS(8PSK)	836.6	250.0	317.3

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	836.6	4.167	4.696
HSUPA (BPSK)	836.6	4.183	4.696
HSDPA (16QAM)	836.6	4.183	4.712

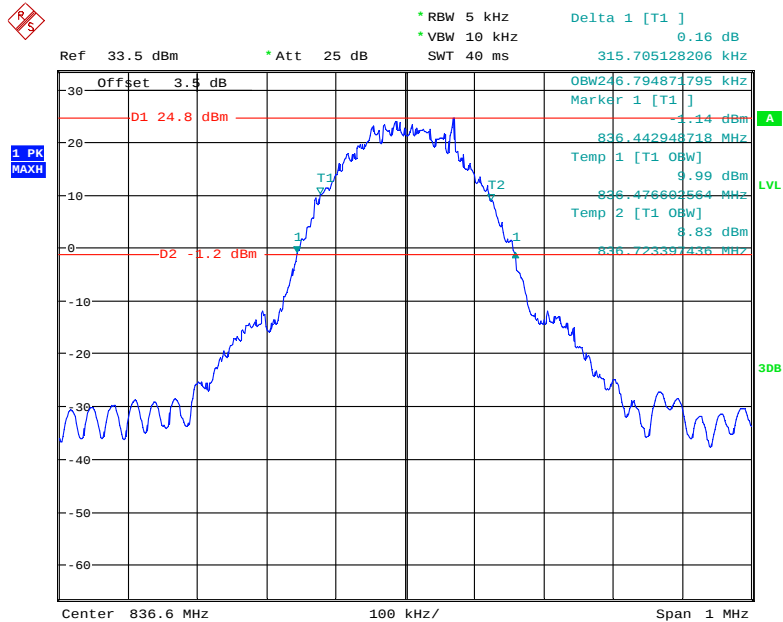
PCS Band (Part 24E)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	1880.0	245.2	315.7
EGPRS(8PSK)	1880.0	256.4	325.3

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1880.0	4.183	4.728
HSUPA (BPSK)	1880.0	4.199	4.936
HSDPA (16QAM)	1880.0	4.183	4.712

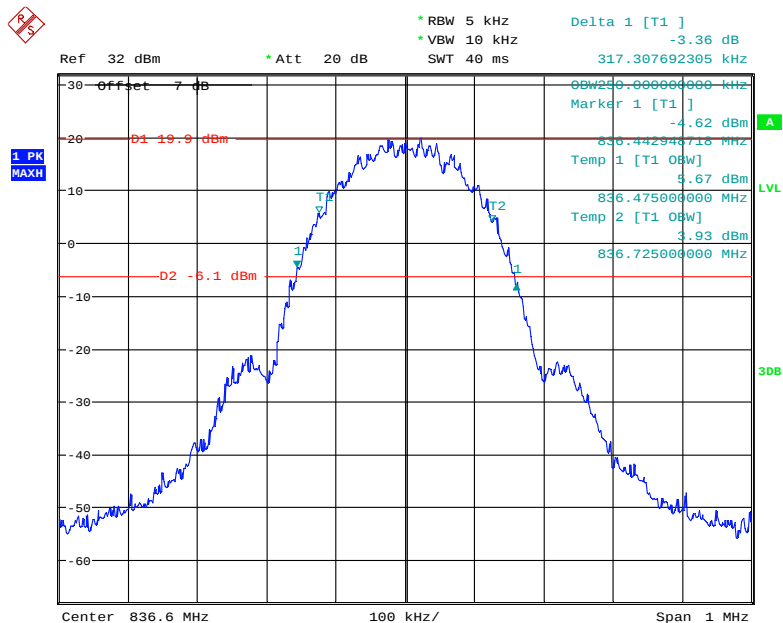
Cellular Band (Part 22H)

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



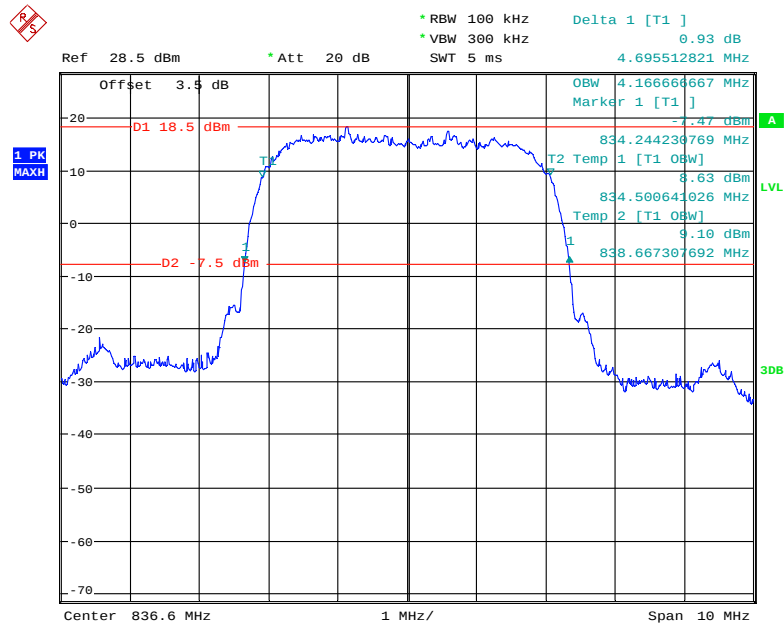
Date: 21.JAN.2019 13:26:41

26 dB Emissions & 99% Occupied Bandwidth for EDGE Mode



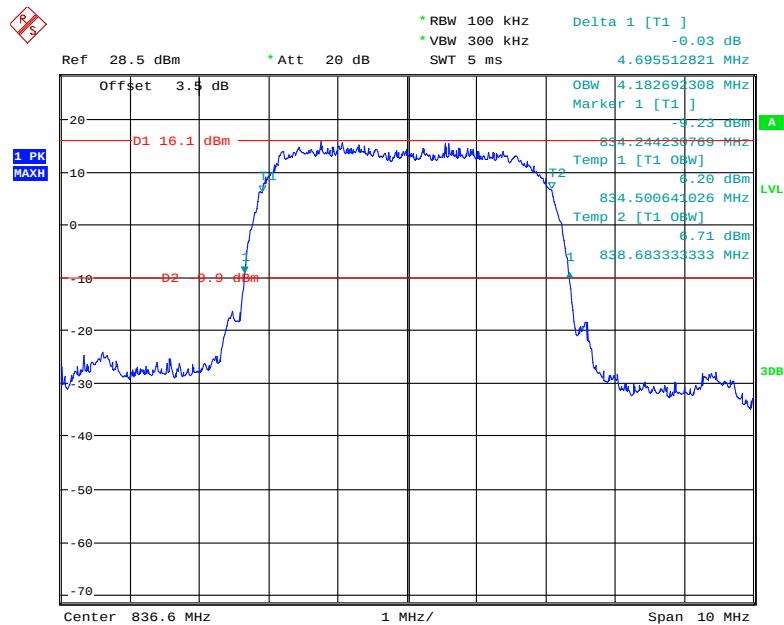
Date: 27.FEB.2019 19:24:58

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



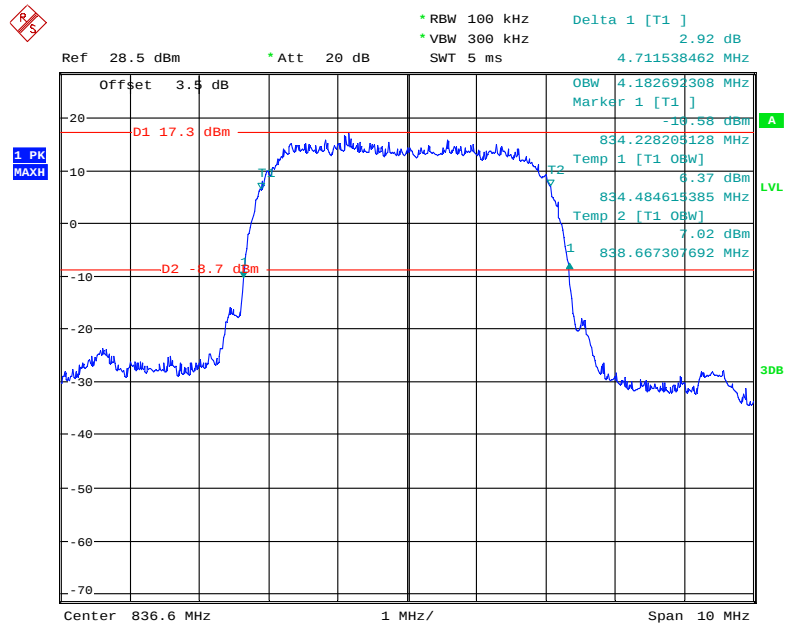
Date: 21.JAN.2019 15:06:33

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



Date: 21.JAN.2019 15:22:41

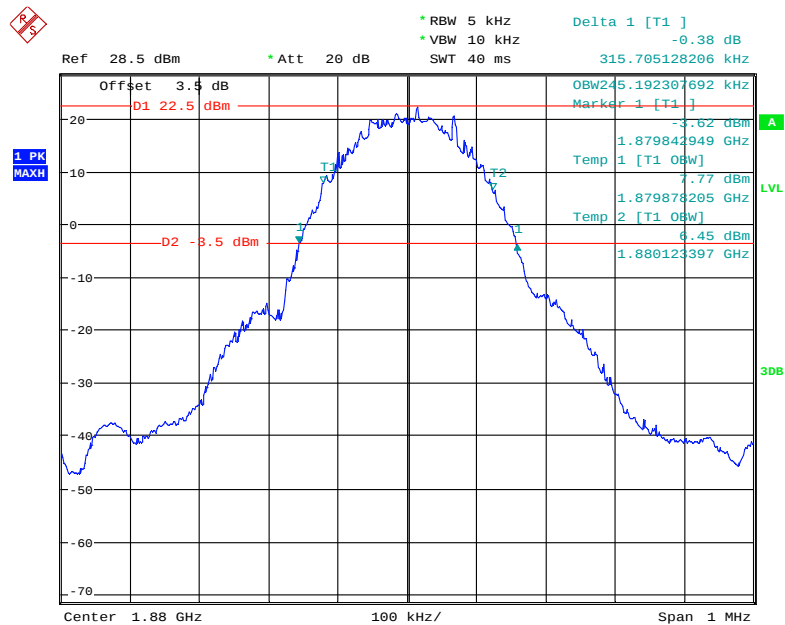
26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode



Date: 21.JAN.2019 15:20:17

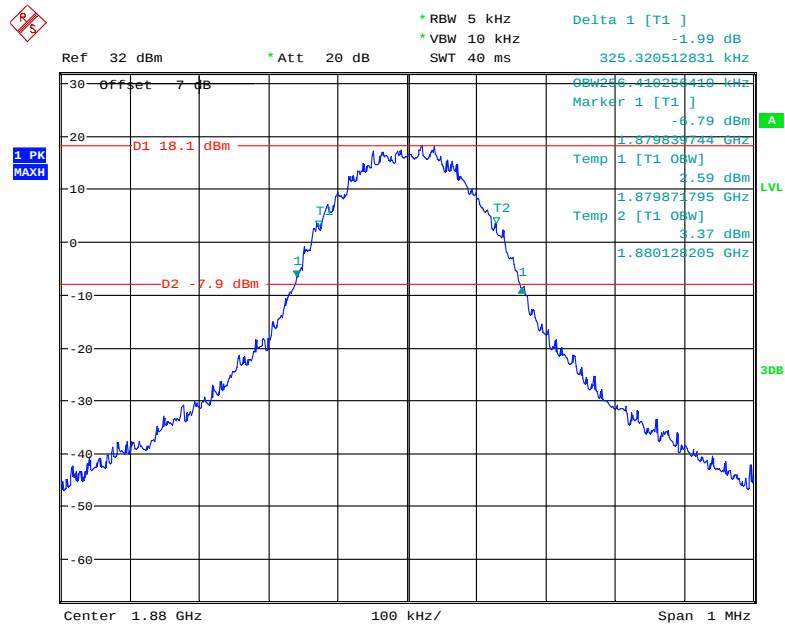
PCS Band (Part 24E)

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



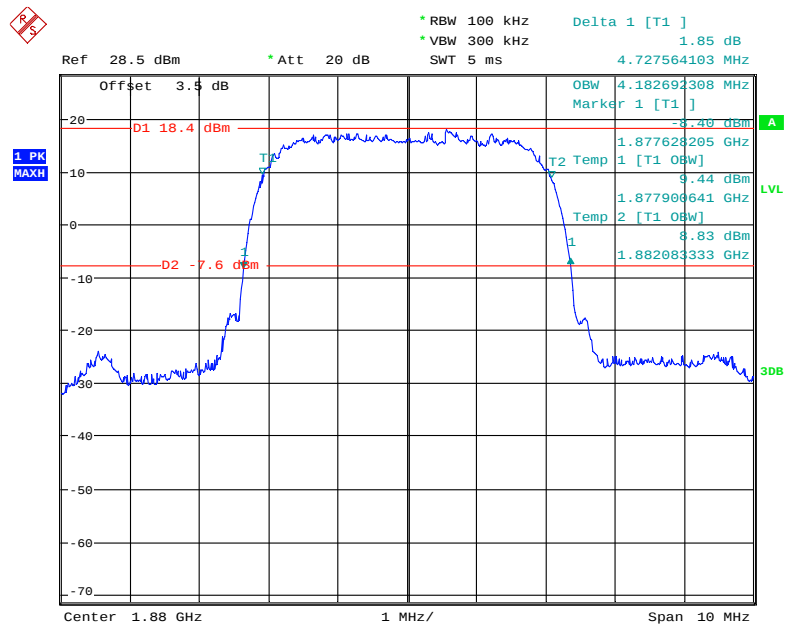
Date: 21.JAN.2019 14:05:41

26 dB Emissions & 99% Occupied Bandwidth for EDGE Mode



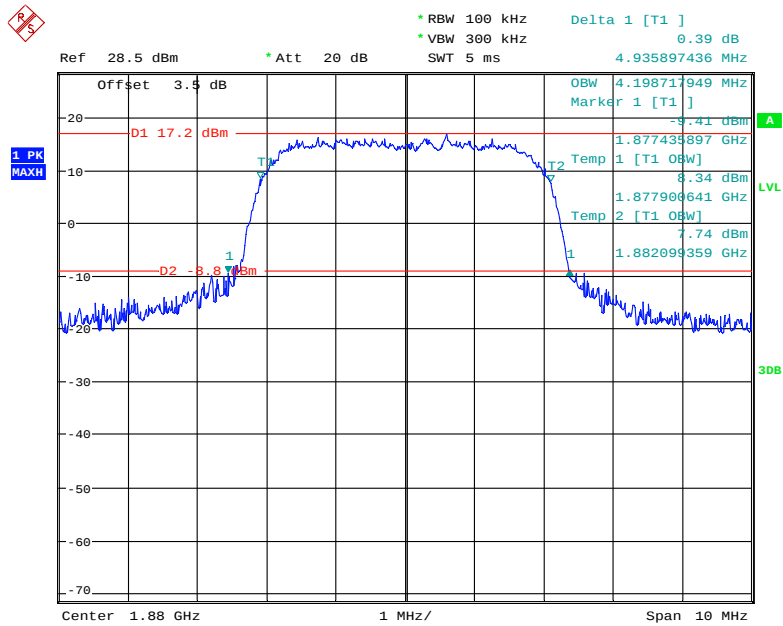
Date: 27.FEB.2019 19:17:15

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



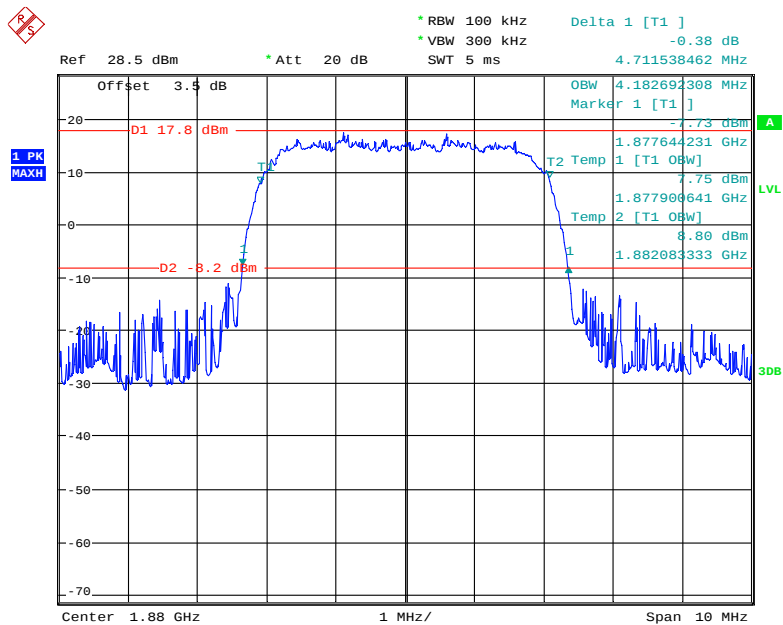
Date: 21.JAN.2019 14:40:12

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



Date: 21.JAN.2019 14:56:28

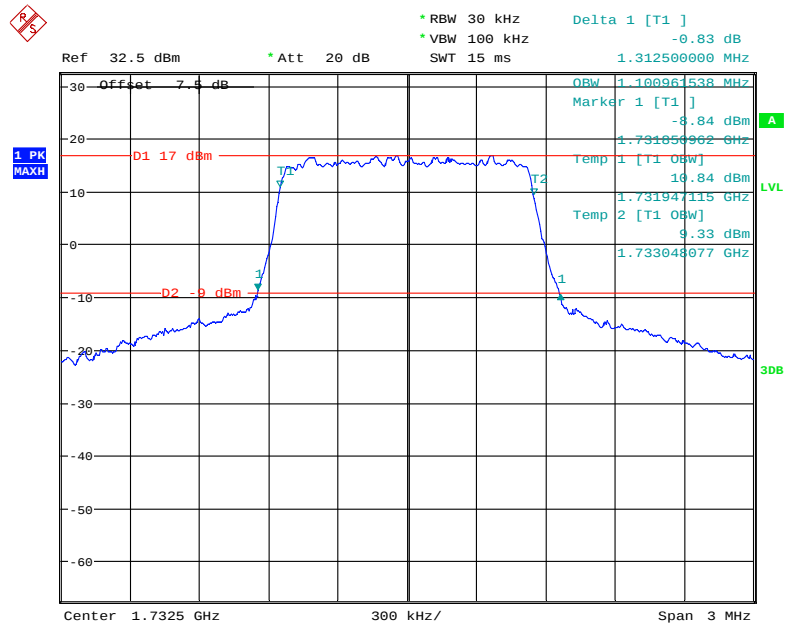
26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode



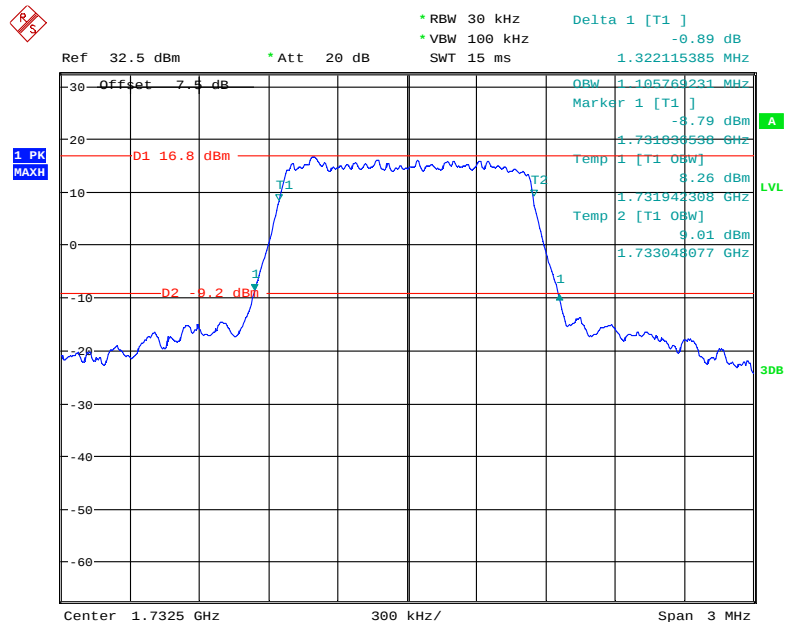
Date: 21.JAN.2019 14:54:13

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	2.875
	16QAM	2.692	2.894
5.0	QPSK	4.519	4.984
	16QAM	4.519	4.952
10.0	QPSK	8.974	9.551
	16QAM	8.974	9.744
15.0	QPSK	13.510	14.567
	16QAM	13.510	14.567
20.0	QPSK	17.885	19.103
	16QAM	17.949	19.231

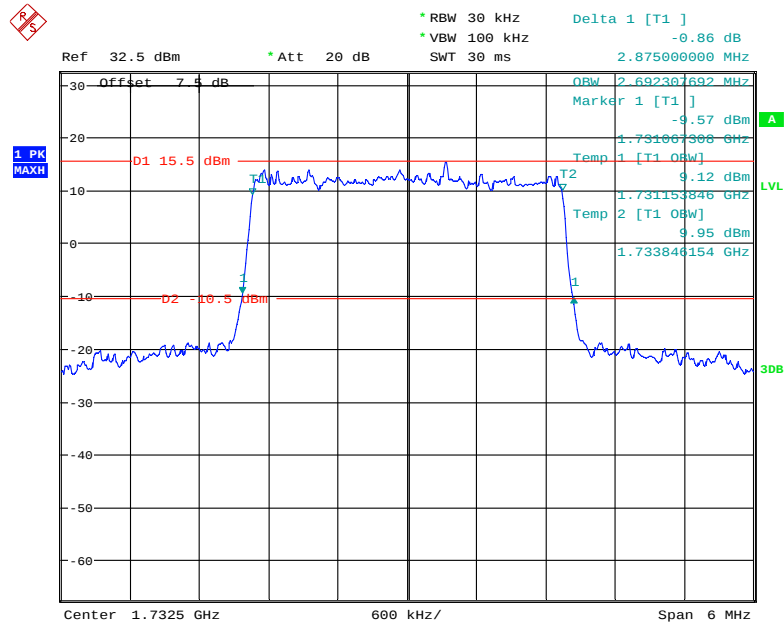
QPSK (1.4 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

Date: 11.FEB.2019 17:23:09

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

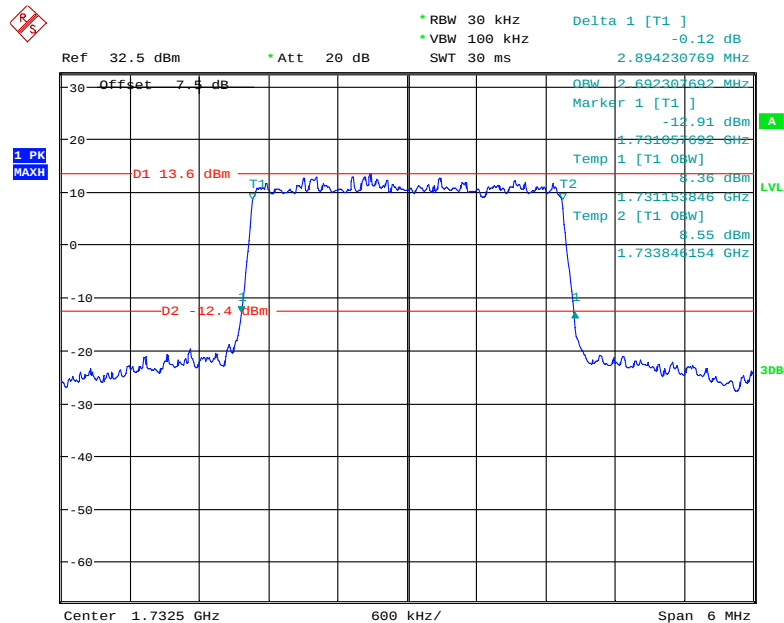
Date: 11.FEB.2019 17:26:17

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

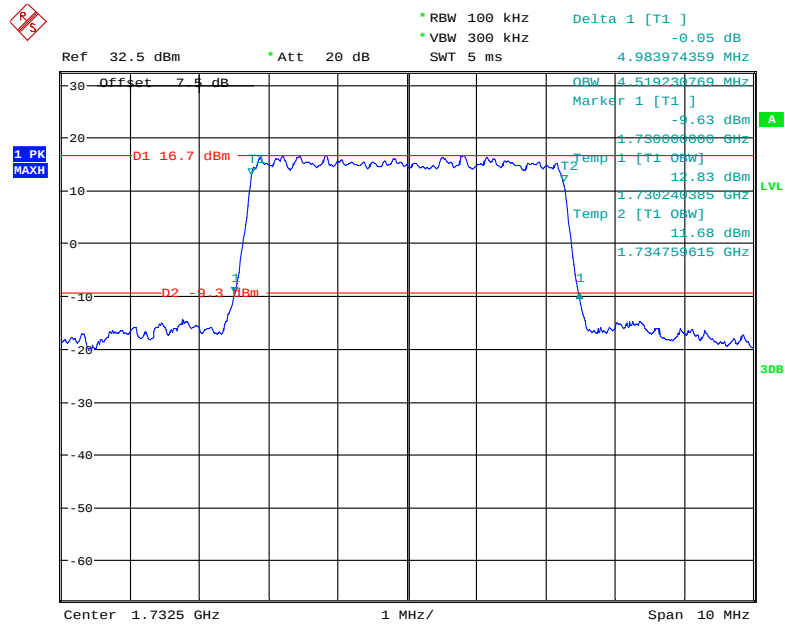


Date: 11.FEB.2019 18:32:05

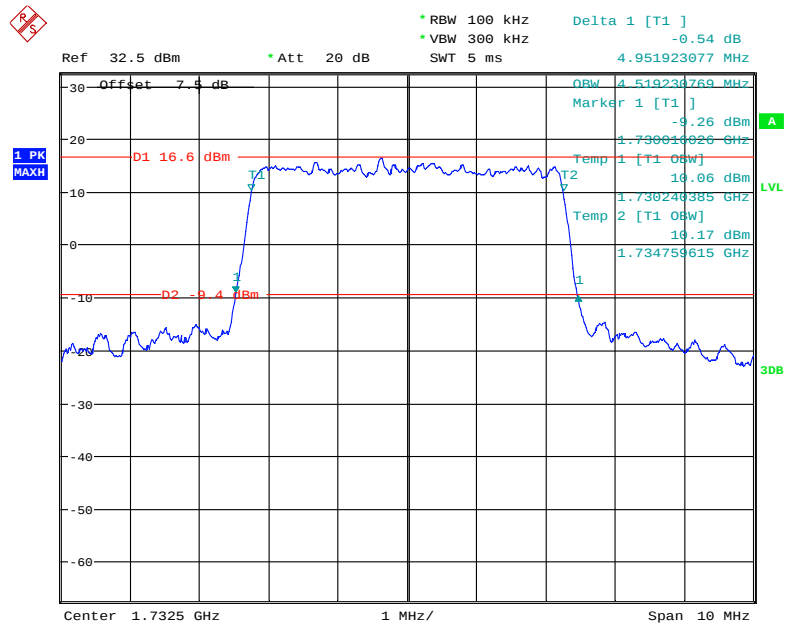
16-QAM (3.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel



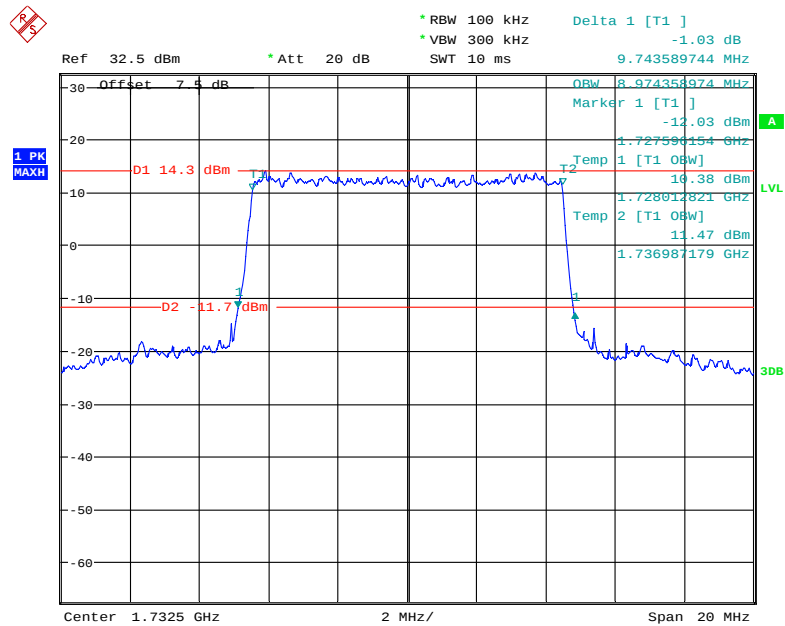
Date: 11.FEB.2019 18:35:43

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

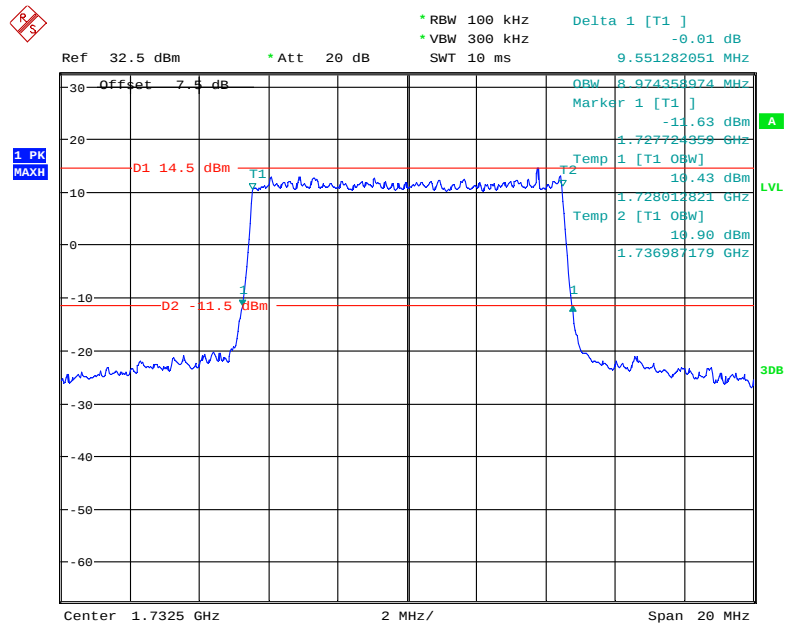
Date: 11.FEB.2019 18:37:56

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

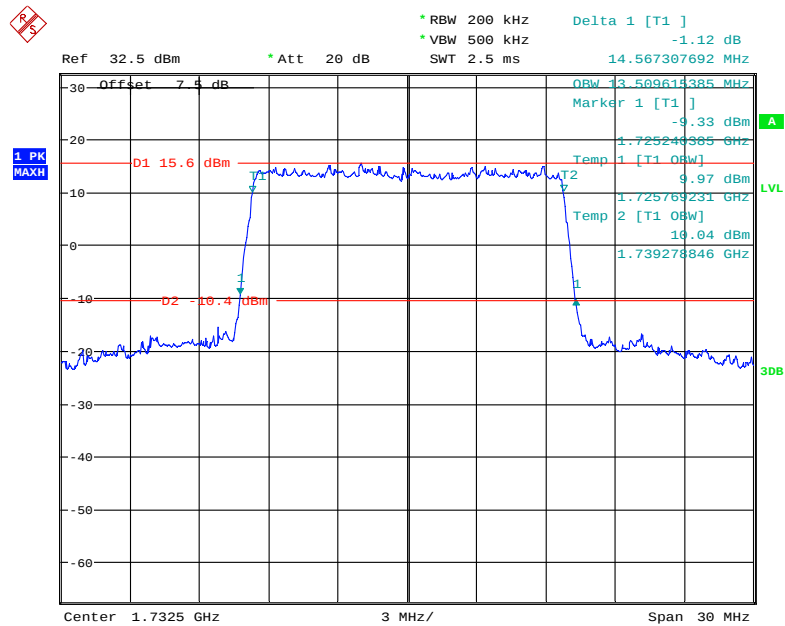
Date: 11.FEB.2019 18:39:46

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

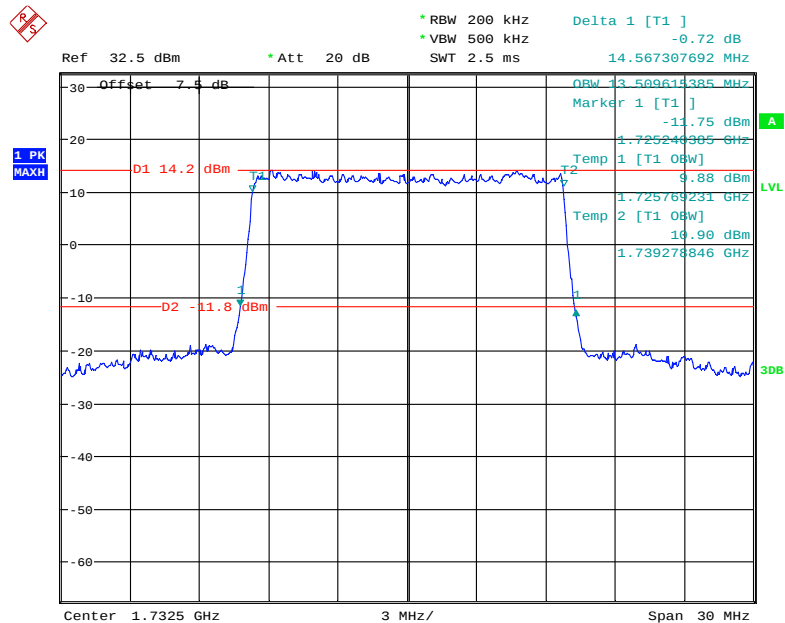
Date: 11.FEB.2019 18:52:11

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

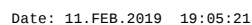
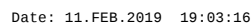
Date: 11.FEB.2019 18:54:26

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

Date: 11.FEB.2019 18:57:36

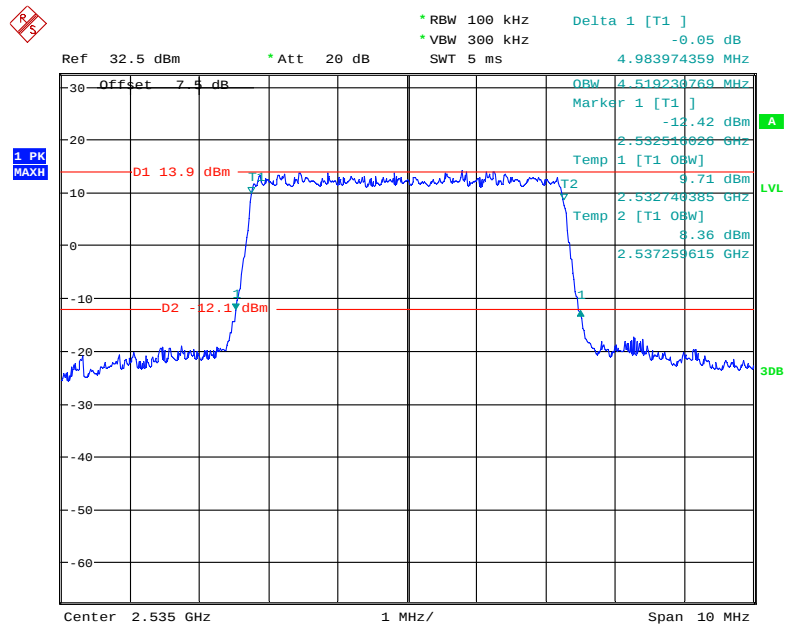
16-QAM (15.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

Date: 11.FEB.2019 19:01:13

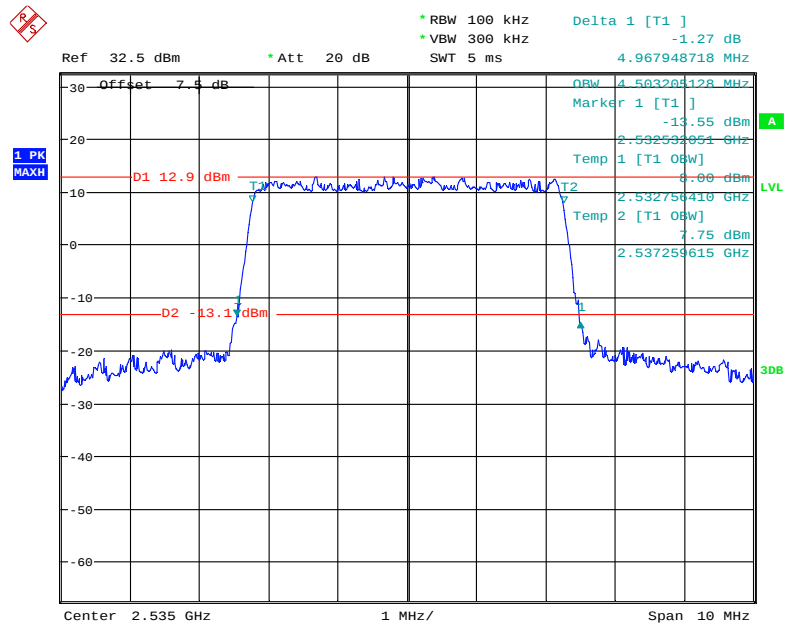


LTE Band 7: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.519	4.984
	16QAM	4.503	4.968
10.0	QPSK	8.974	9.776
	16QAM	8.942	9.519
15.0	QPSK	13.462	14.615
	16QAM	13.462	14.567
20.0	QPSK	17.949	19.038
	16QAM	17.949	19.167

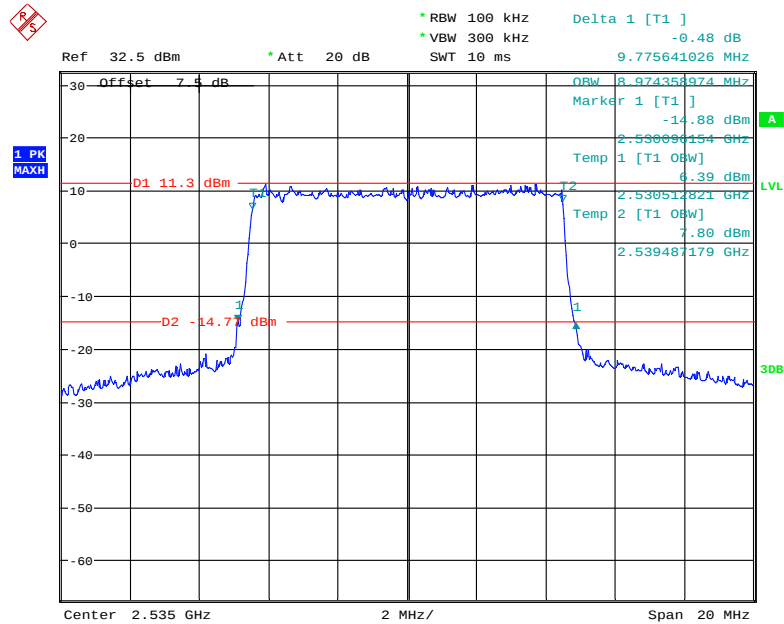
QPSK (5.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

Date: 23.JAN.2019 18:29:33

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

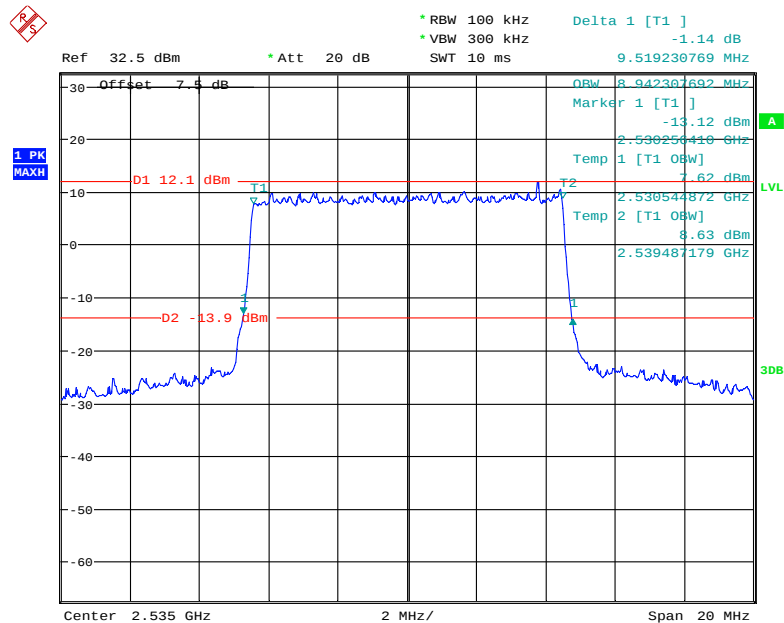
Date: 23.JAN.2019 18:31:15

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

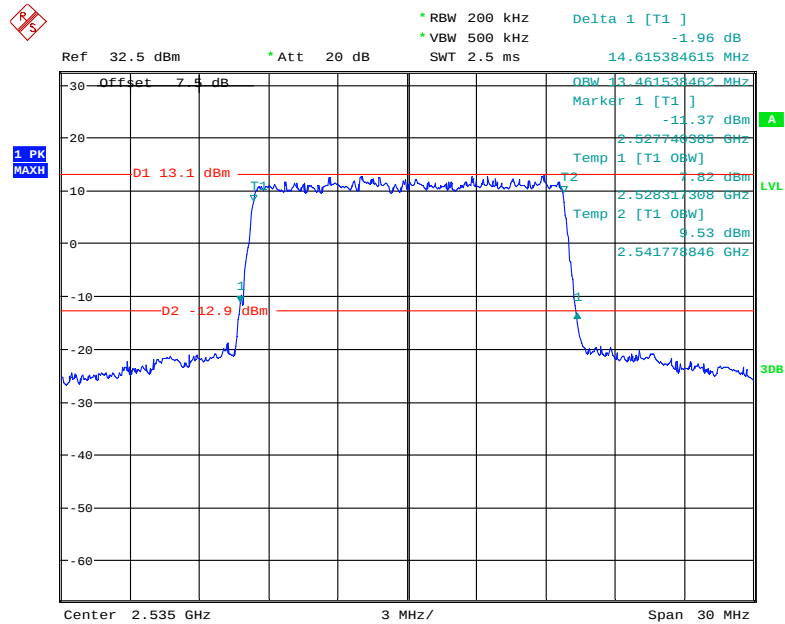


Date: 23.JAN.2019 18:32:28

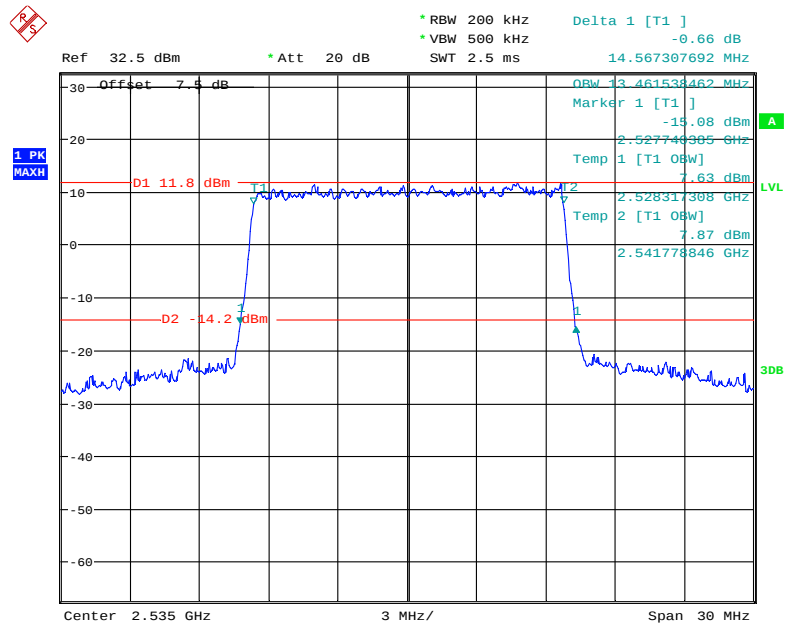
16-QAM (10.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel



Date: 23.JAN.2019 18:34:23

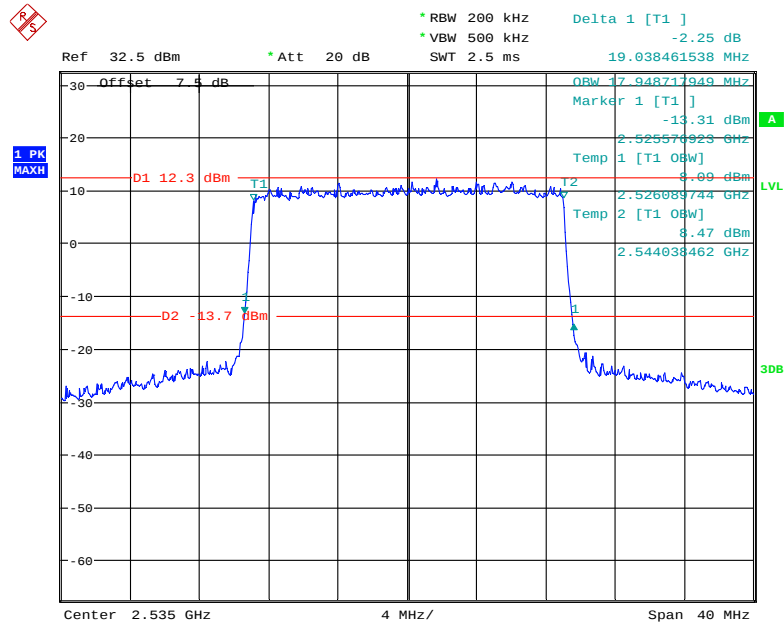
QPSK (15.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

Date: 23.JAN.2019 18:36:16

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

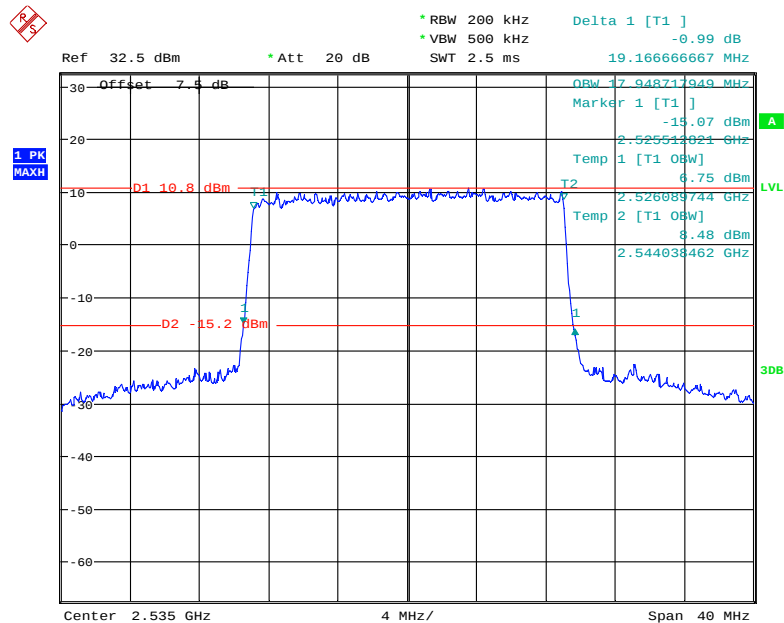
Date: 23.JAN.2019 18:38:02

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



Date: 23.JAN.2019 18:40:48

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

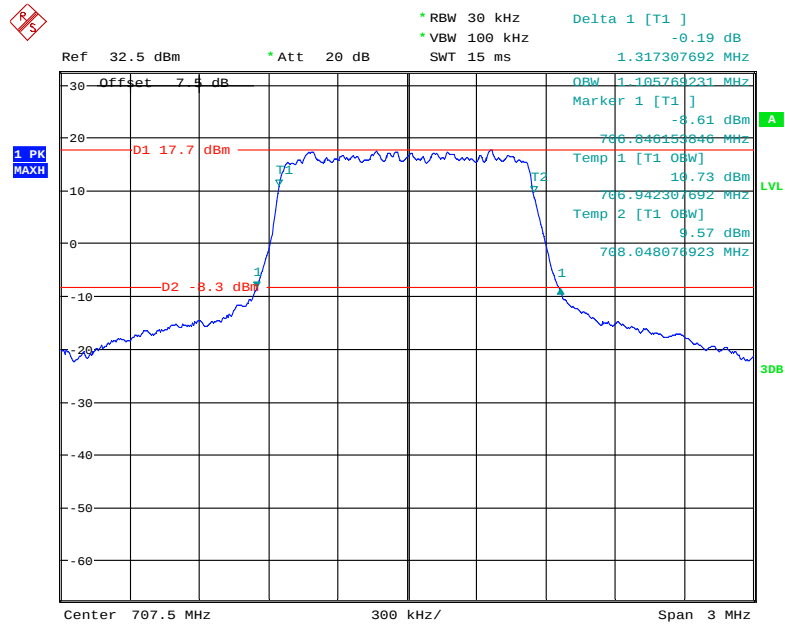


Date: 23.JAN.2019 18:45:57

LTE Band 12: (Middle Channel)

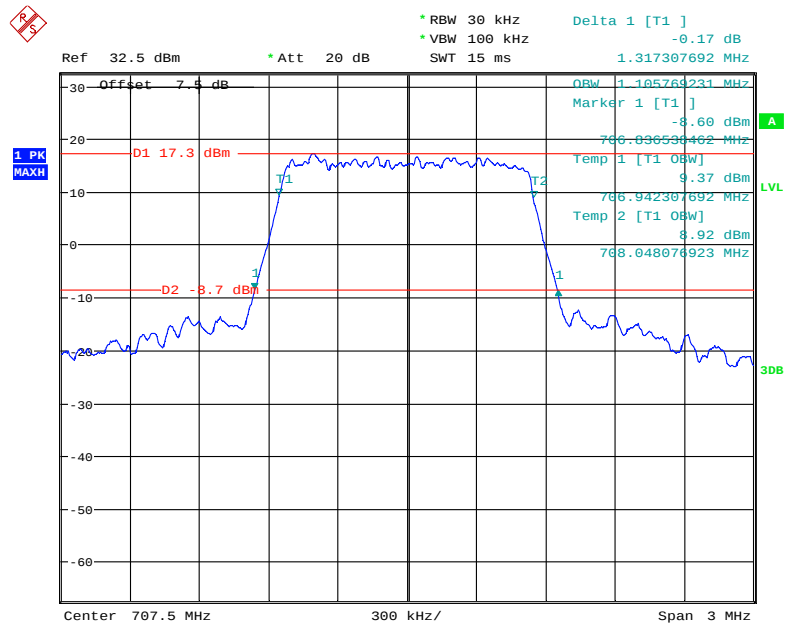
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.106	1.317
	16QAM	1.106	1.317
3.0	QPSK	2.692	2.885
	16QAM	2.692	2.894
5.0	QPSK	4.551	5.224
	16QAM	4.535	5.208
10.0	QPSK	9.038	10.000
	16QAM	8.974	9.808

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



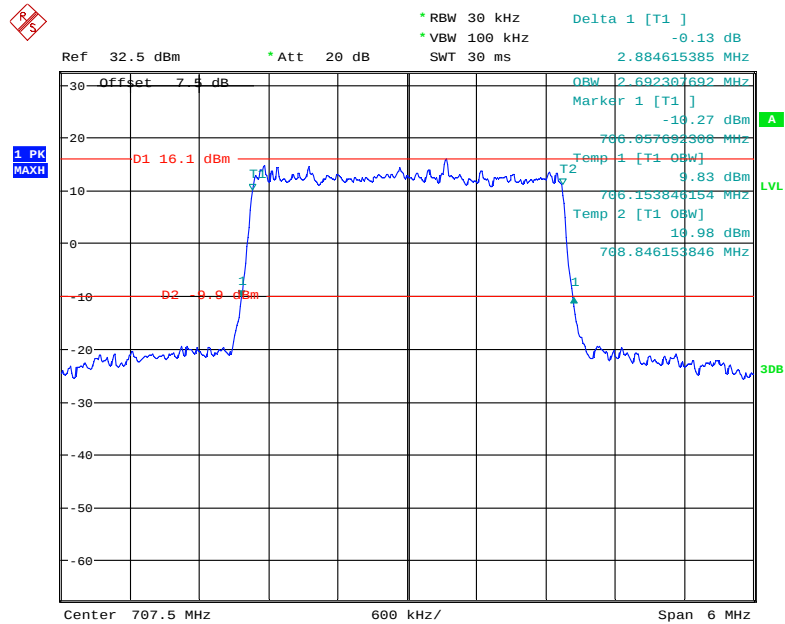
Date: 23.JAN.2019 18:48:30

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



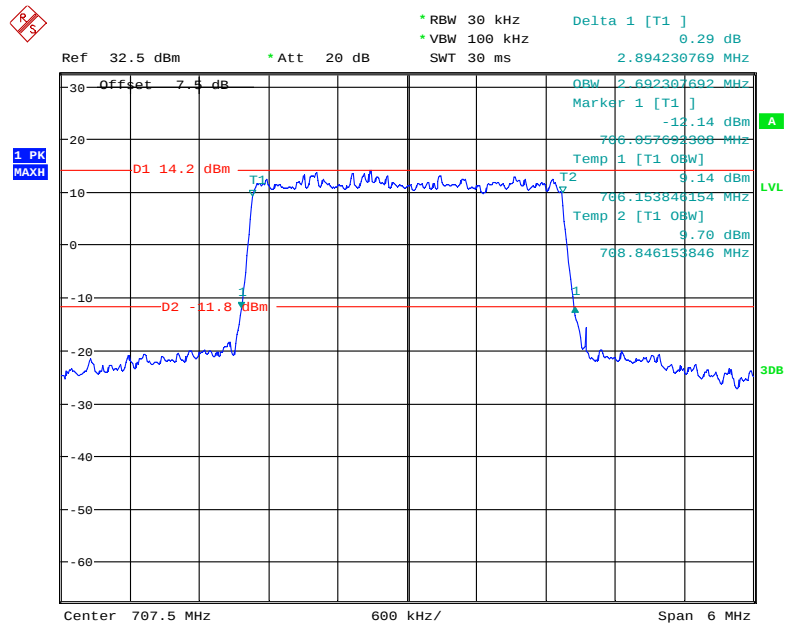
Date: 23.JAN.2019 18:51:27

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

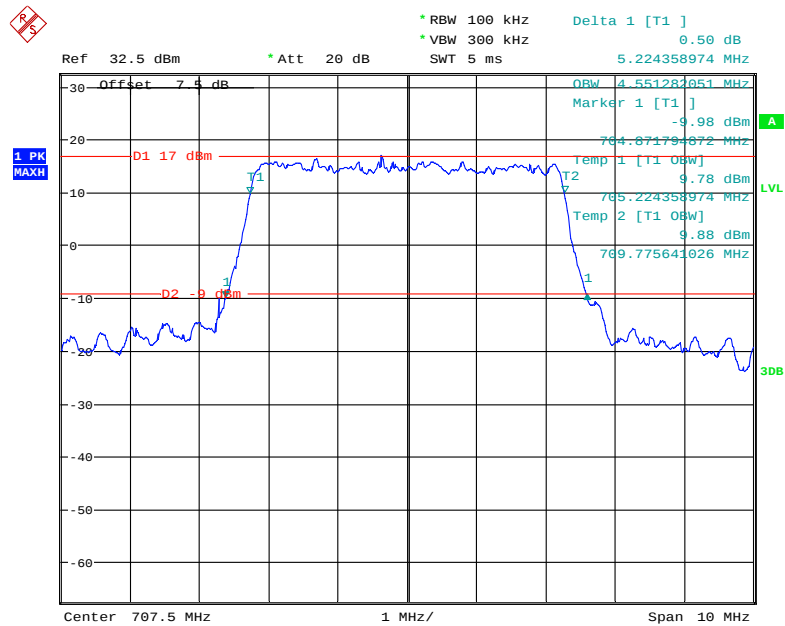


Date: 23.JAN.2019 18:53:49

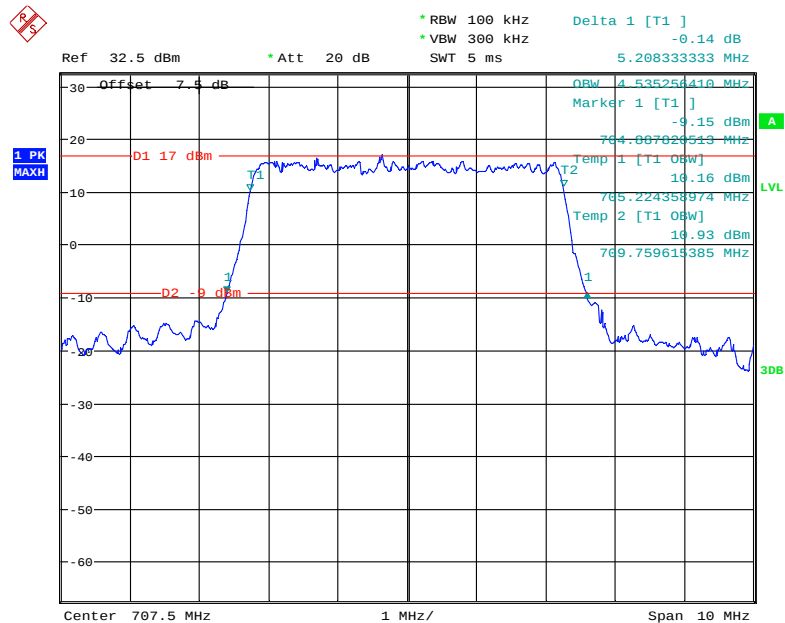
16-QAM (3.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel



Date: 23.JAN.2019 18:56:20

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

Date: 23.JAN.2019 19:06:15

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

Date: 23.JAN.2019 19:08:38

* RBW 100 kHz
 * VBW 300 kHz
 * Att 20 dB
 * Delta 1 [T1] -0.27 dB
 * SWT 10 ms
 10.000000000 MHz

Ref 32.5 dBm
 Offset 7.5 dB
 1 PK MAXH

D1 15.1 dBm
 D2 -10.9 dBm

1
 2
 1
 2

707.5 MHz
 2 MHz/
 Span 20 MHz

30
 20
 10
 0
 -10
 -20
 -30
 -40
 -50
 -60

707.5 MHz
 708.0 MHz
 708.5 MHz
 709.0 MHz
 709.5 MHz
 710.0 MHz
 710.5 MHz
 711.0 MHz
 711.5 MHz
 712.0 MHz
 712.5 MHz

10.038461538 MHz
 Marker 1 [T1]
 -10.99 dBm
 702.500000000 MHz
 Temp 1 [T1 0BW]
 9.63 dBm
 702.980759231 MHz
 Temp 2 [T1 0BW]
 10.47 dBm
 712.019230769 MHz

30dB

* RBW 100 kHz
 * VBW 300 kHz
 SWT 10 ms
 Delta 1 [T1]
 0.62 dB
 9.807692308 MHz

Ref 32.5 dBm
 * Att 20 dB
 Offset 7.5 dB

1 PK
 MAXH

D1 15.2 dBm
 T1
 D2 -10.8 dBm
 T2

OBW 8.974354974 MHz
 Marker 1 [T1]
 -11.36 dBm
 762.564102564 MHz
 Temp 1 [T1 OBW]
 11.19 dBm
 763.012820513 MHz
 Temp 2 [T1 OBW]
 11.53 dBm
 711.987179487 MHz

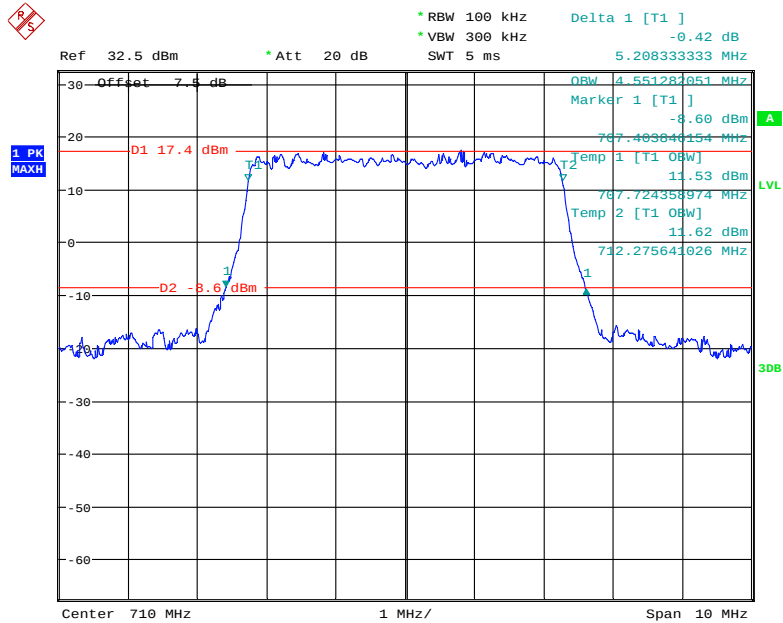
LVL
 3DB

Center 707.5 MHz
 2 MHz/
 Span 20 MHz

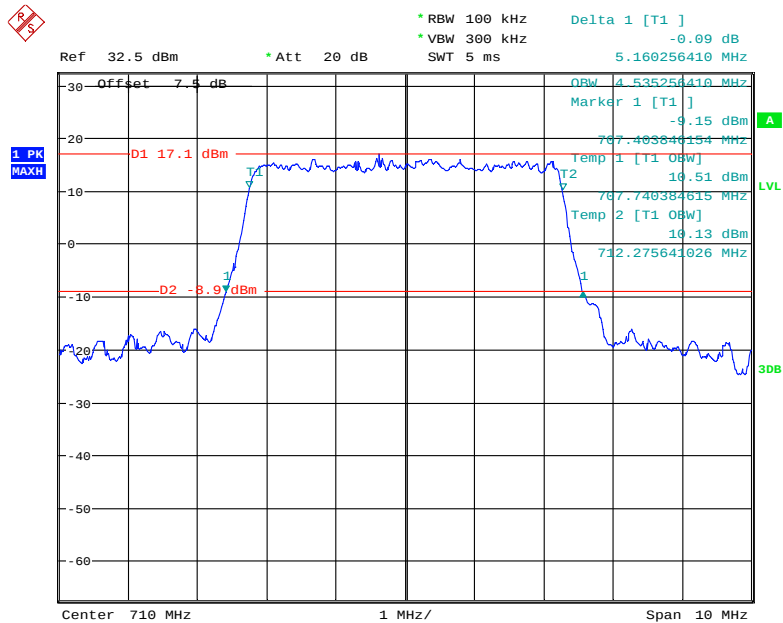
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LTE Band 17: (Middle Channel)

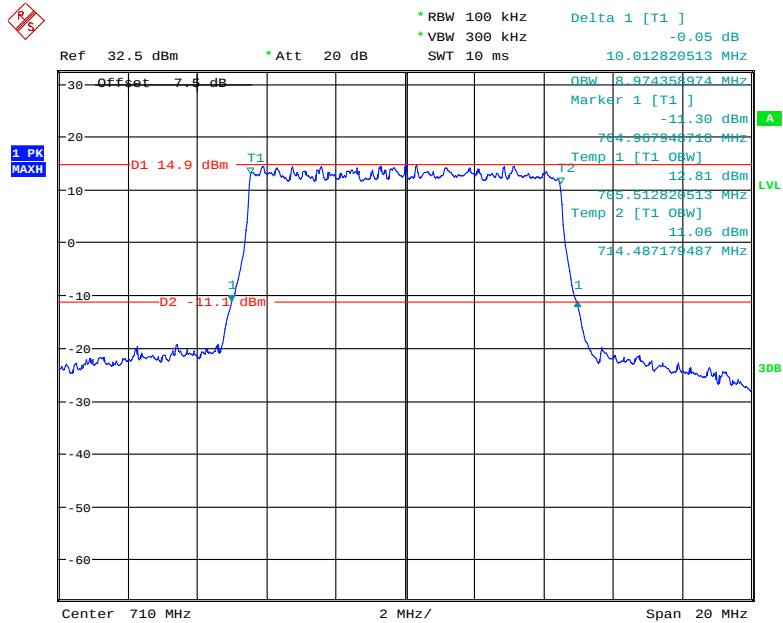
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.551	5.208
	16QAM	4.535	5.160
10.0	QPSK	8.974	10.013
	16QAM	8.974	9.776

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

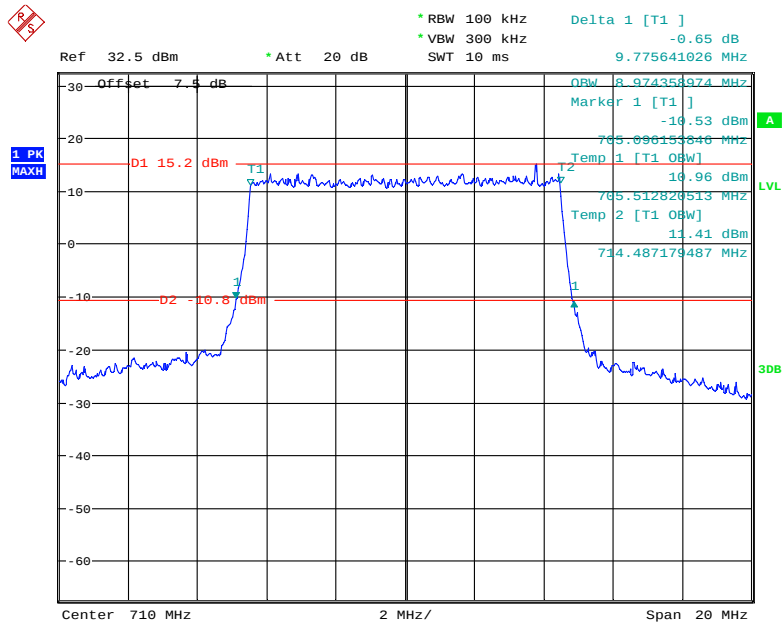
Date: 23.JAN.2019 19:29:43

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

Date: 23.JAN.2019 19:31:14

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

Date: 23.JAN.2019 19:18:58

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

Date: 23.JAN.2019 19:28:25

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

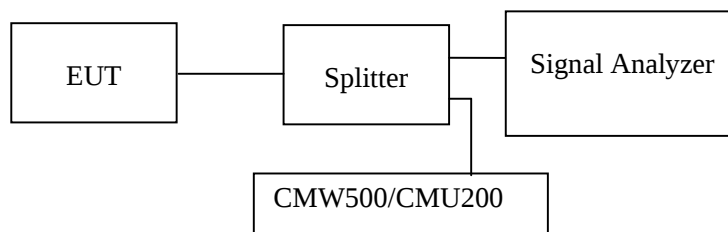
Applicable Standard

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:	52~55 %
ATM Pressure:	100.9~101.0 kPa

The testing was performed by Tracy Hu on 2019-01-21 and 2019-03-21.

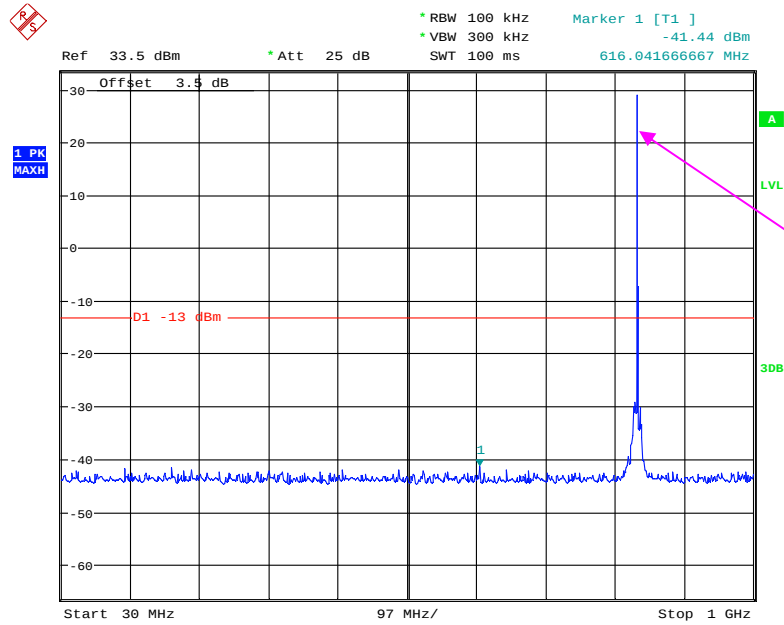
Test result: Compliance.

EUT operation mode: transmitting

Please refer to the following plots.

Cellular Band (Part 22H)

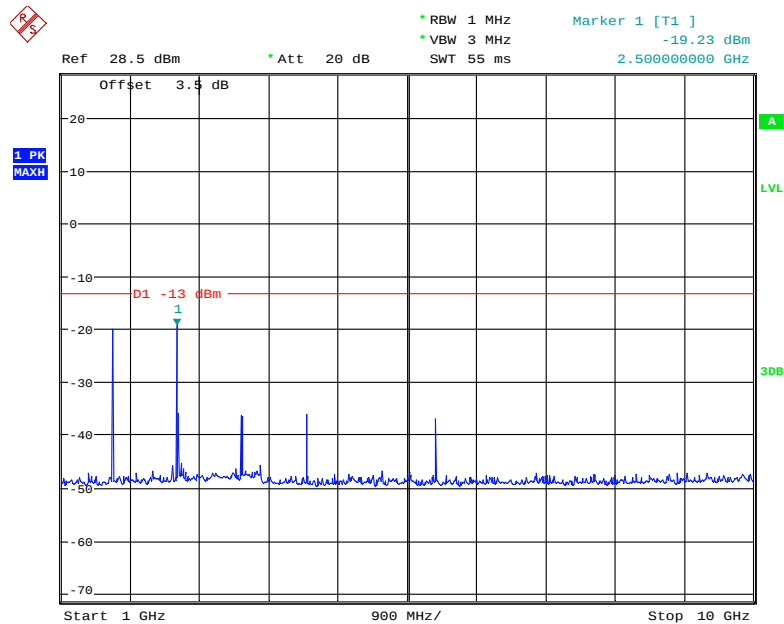
30 MHz – 1 GHz (GSM Mode)



Fundamental test

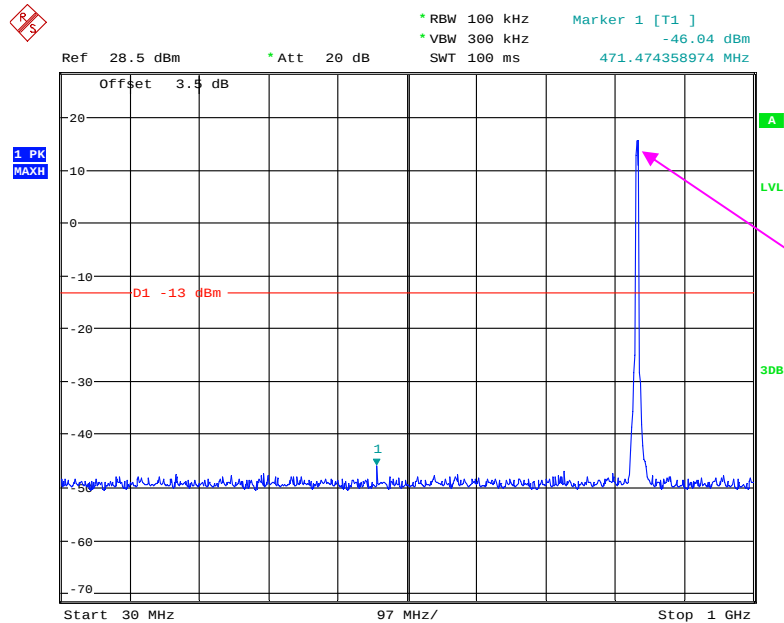
Date: 21.JAN.2019 14:29:21

1 GHz – 10 GHz (GSM Mode)



Date: 21.JAN.2019 13:31:19

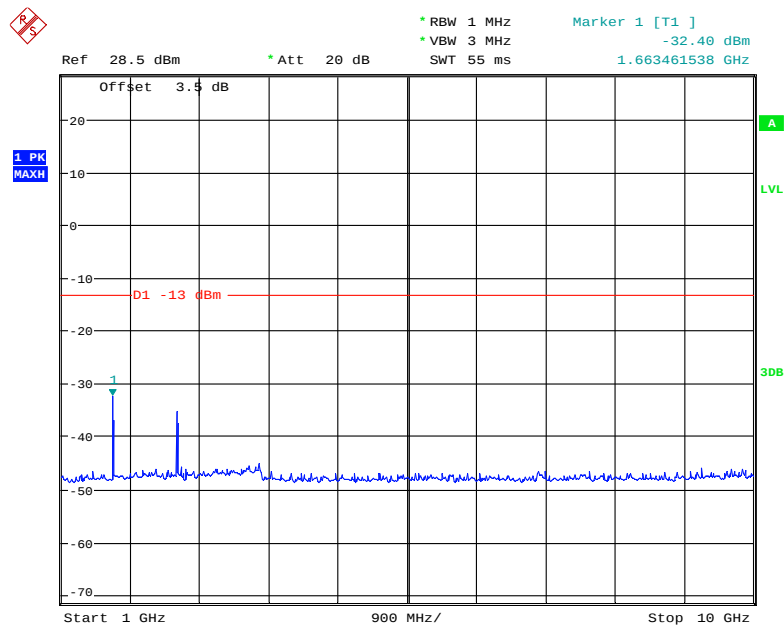
30 MHz – 1 GHz (WCDMA Mode)



Fundamental test

Date: 21.JAN.2019 15:12:50

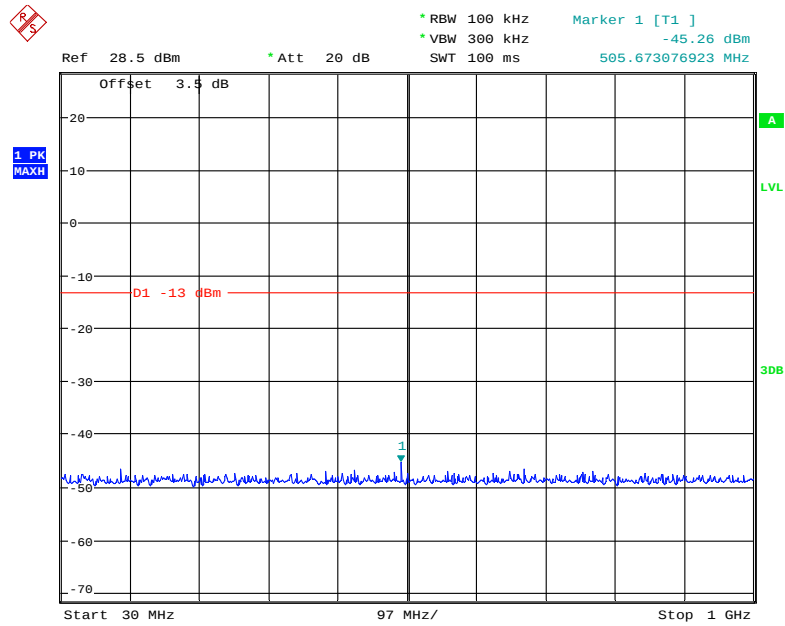
1 GHz – 10 GHz (WCDMA Mode)



Date: 21.JAN.2019 15:09:44

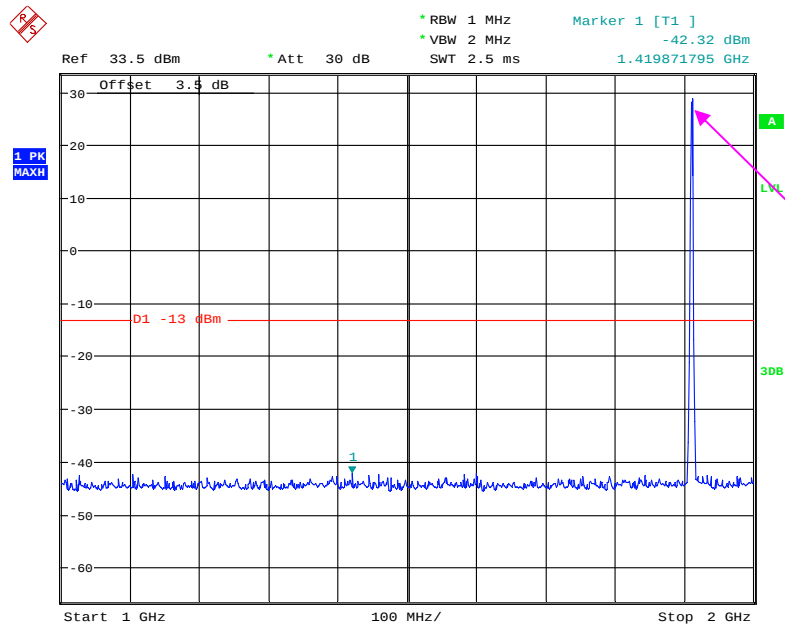
PCS Band (Part 24E)

30 MHz – 1 GHz (GSM Mode)



Date: 21.JAN.2019 14:18:54

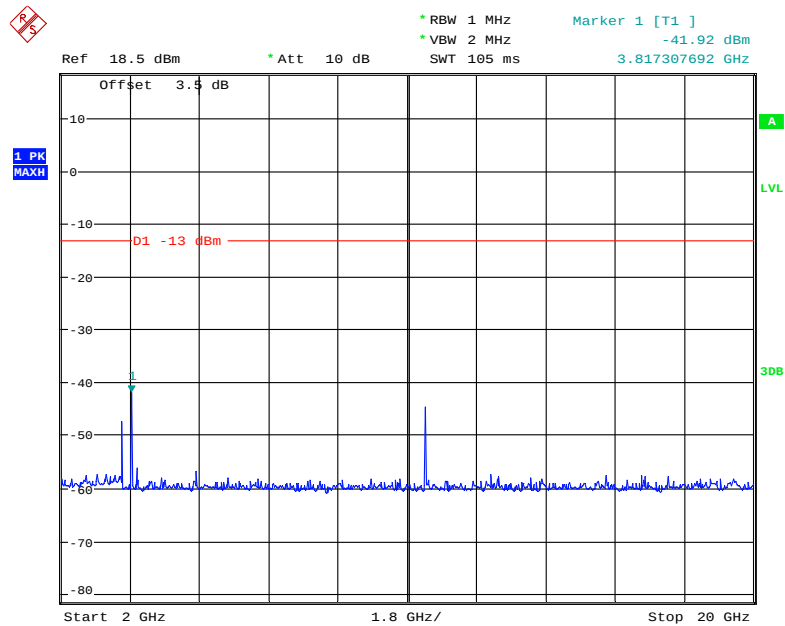
1 GHz – 10GHz (GSM Mode)



fundamental test

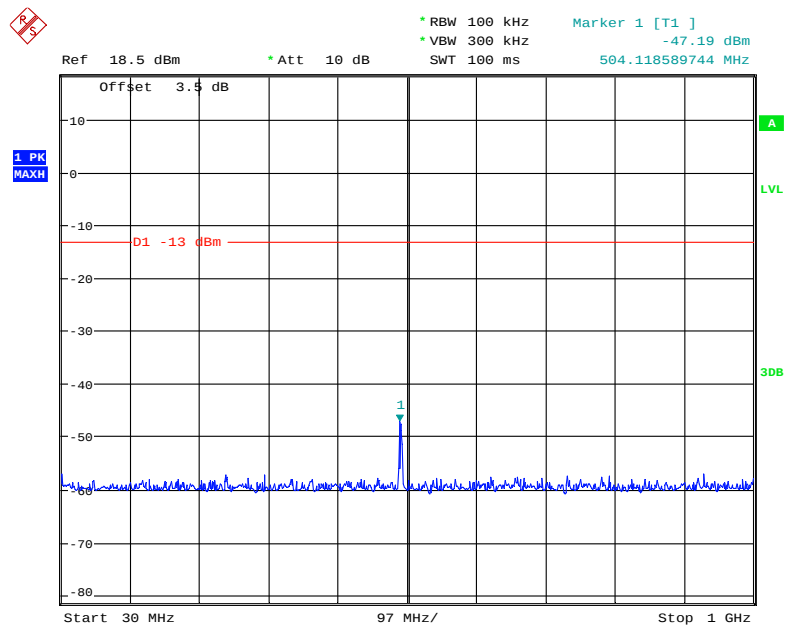
Date: 21.MAR.2019 16:44:24

2 GHz – 20 GHz (GSM Mode)



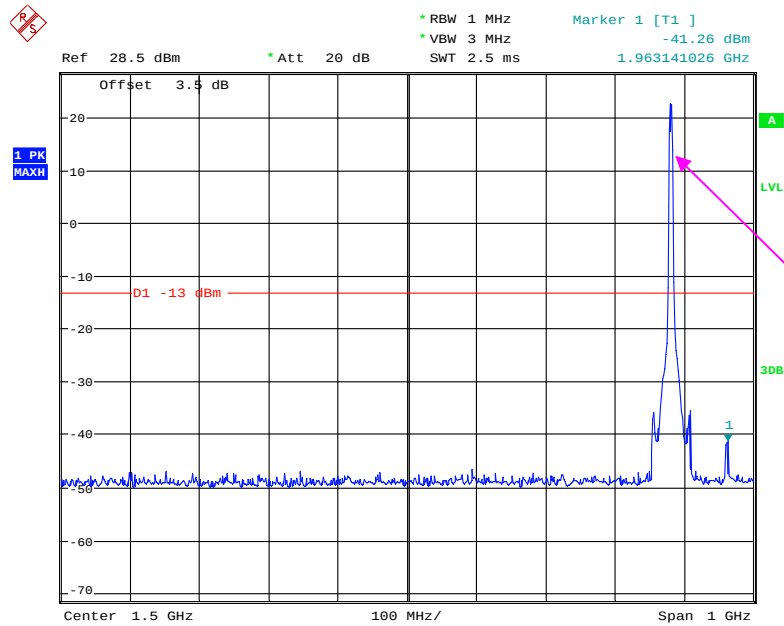
Date: 21.MAR.2019 16:45:01

30 MHz – 1 GHz (WCDMA Mode)



Date: 21.JAN.2019 14:41:38

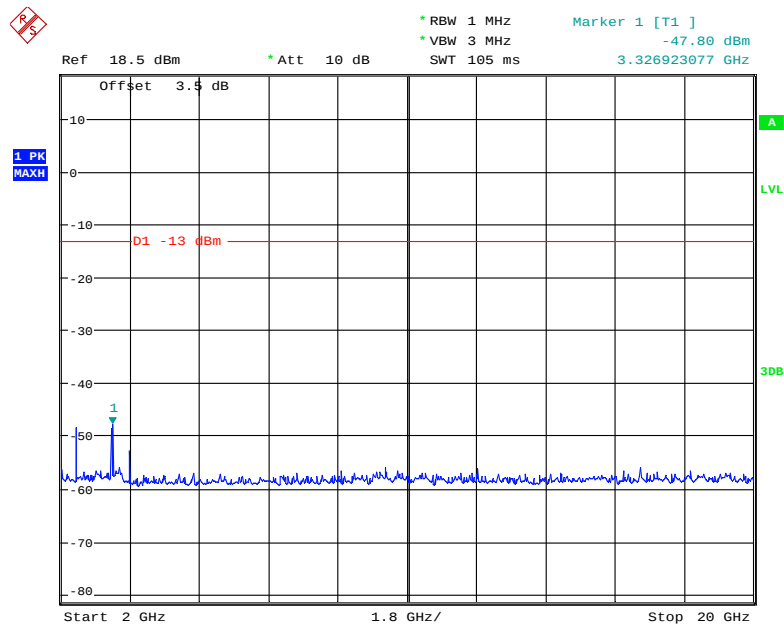
1 GHz – 2 GHz (WCDMA Mode)



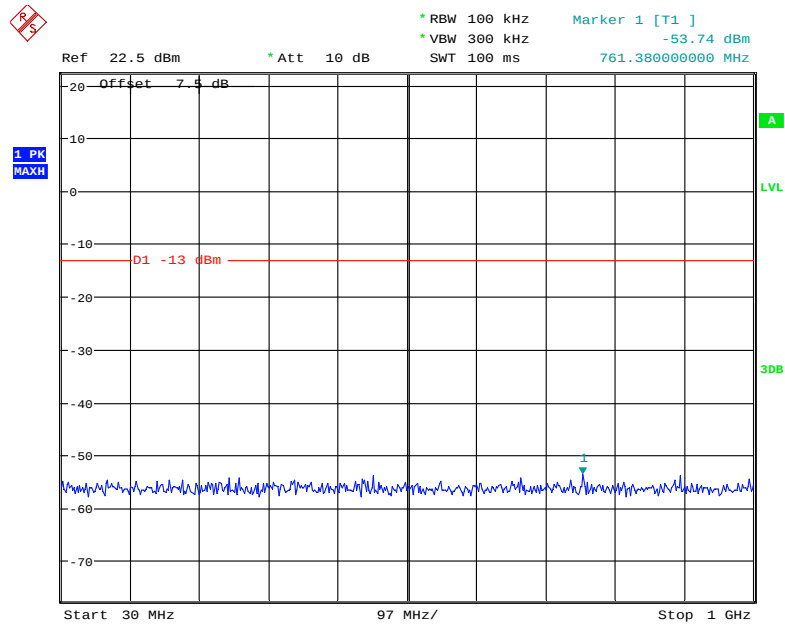
Fundamental test

Date: 21.JAN.2019 14:43:16

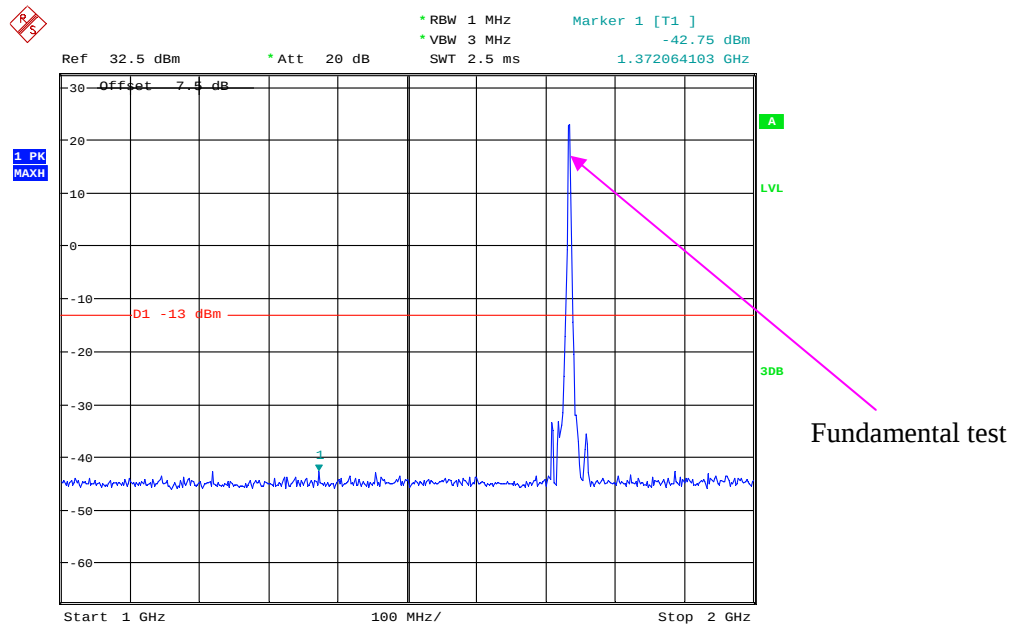
2 GHz – 20 GHz (WCDMA Mode)



Date: 21.JAN.2019 14:44:42

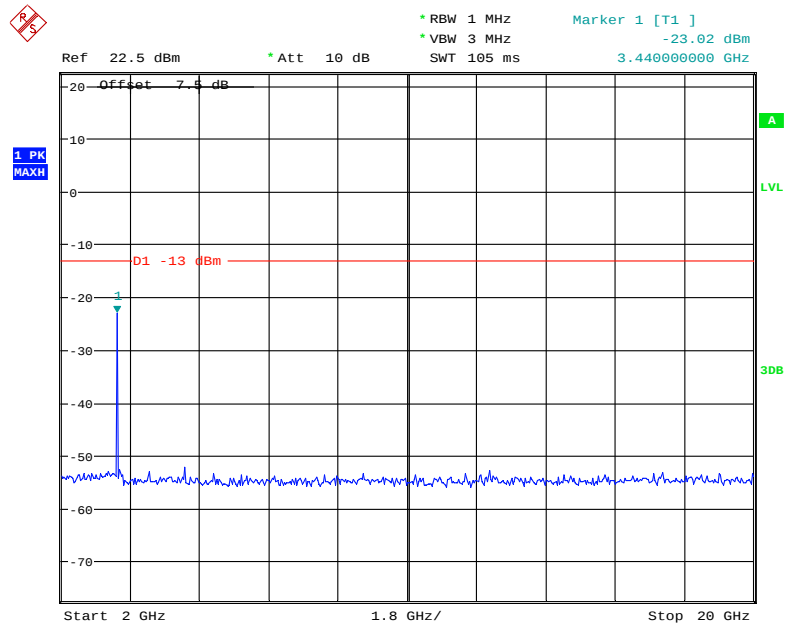
LTE Band 4:**30 MHz - 1 GHz (1.4 MHz, Middle Channel)**

Date: 21.JAN.2019 23:39:47

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

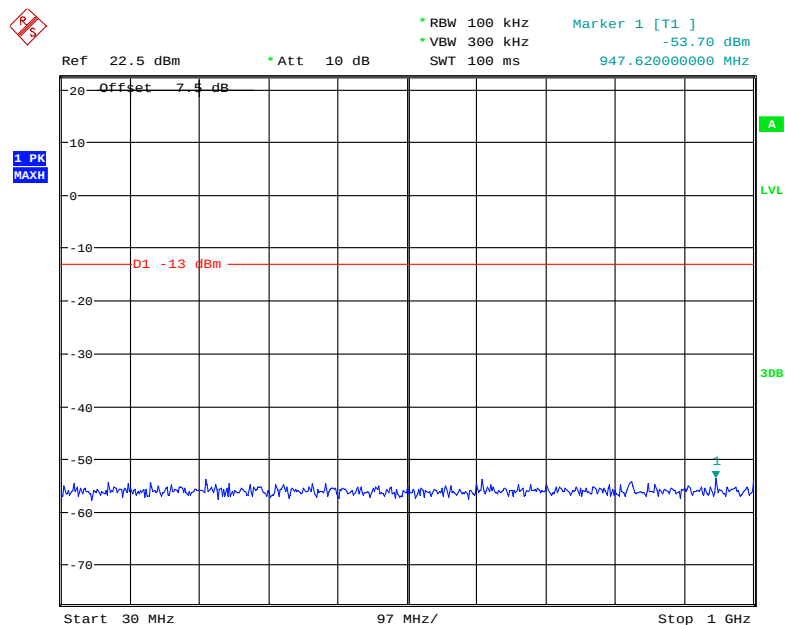
Date: 21.JAN.2019 23:45:28

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



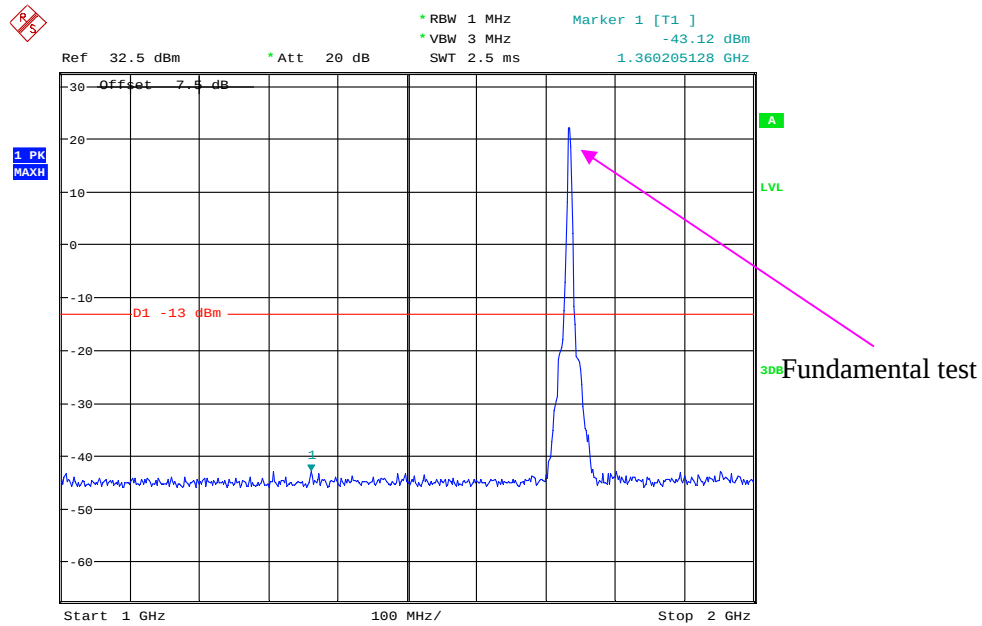
Date: 21.JAN.2019 23:46:12

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



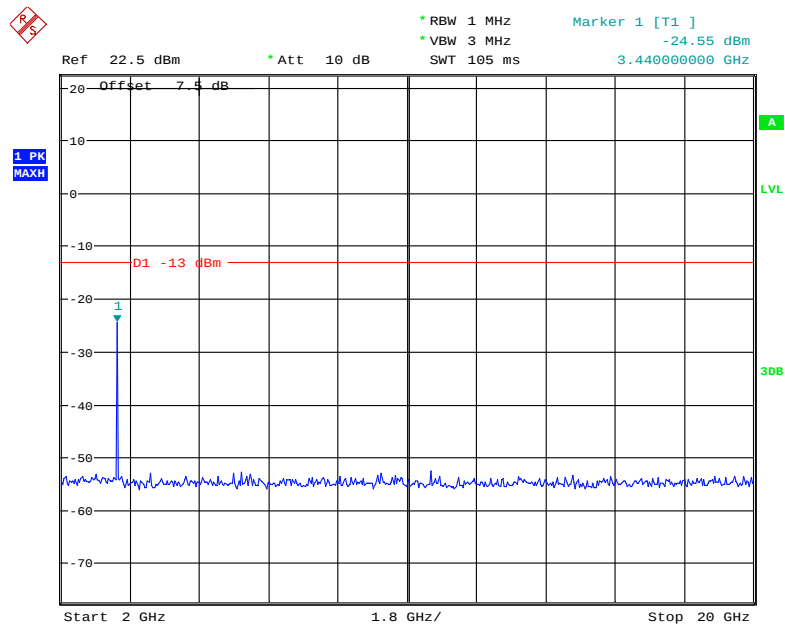
Date: 21.JAN.2019 23:40:29

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



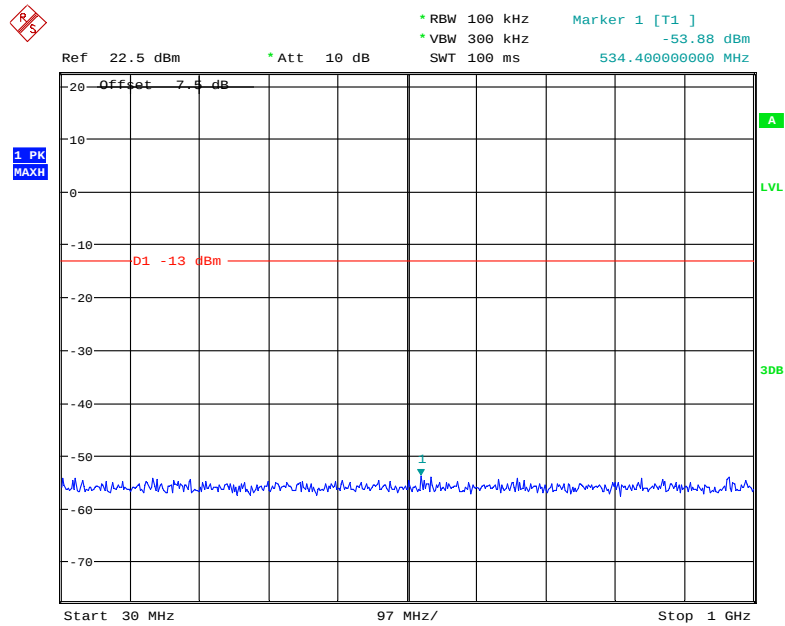
Date: 21.JAN.2019 23:45:00

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



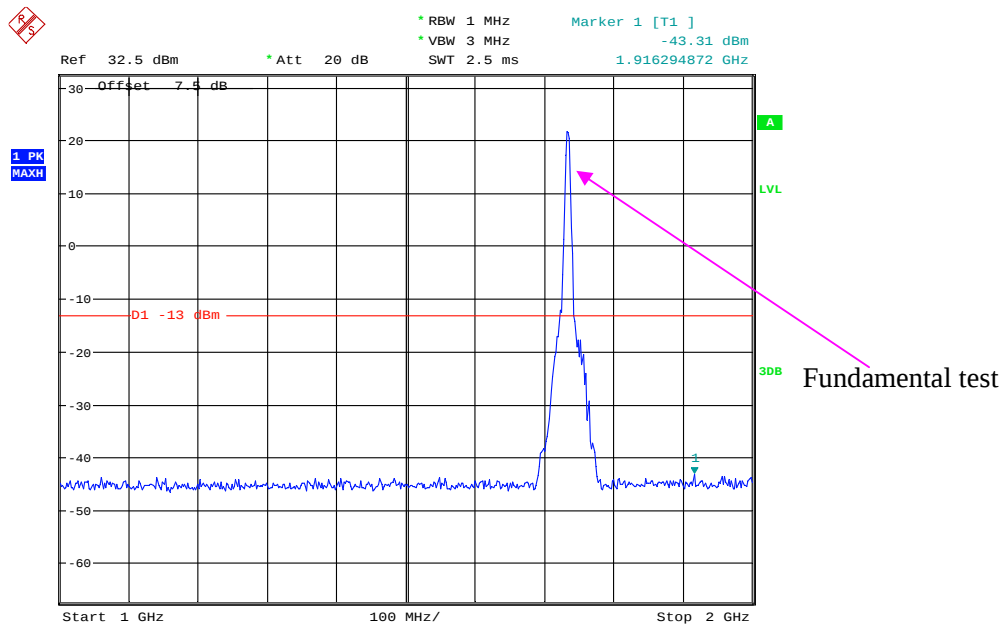
Date: 21.JAN.2019 23:46:27

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



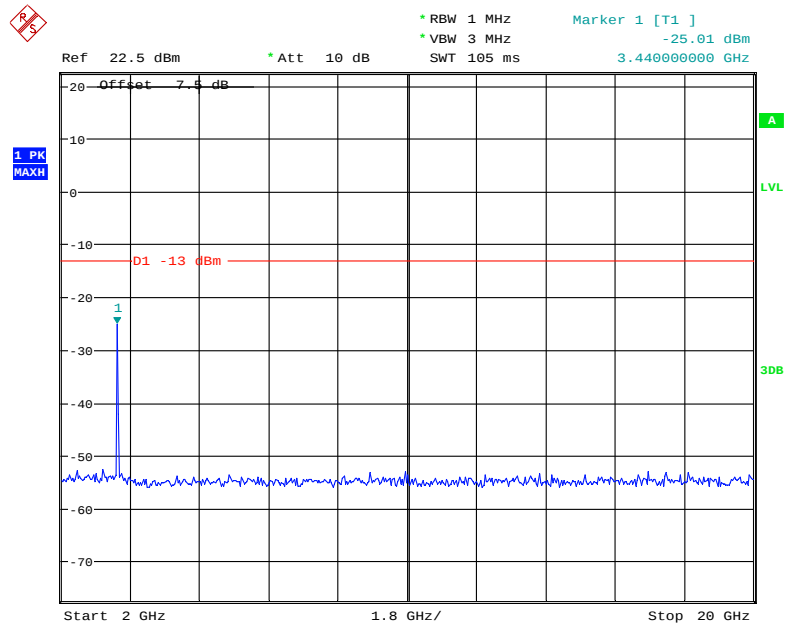
Date: 21.JAN.2019 23:40:48

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



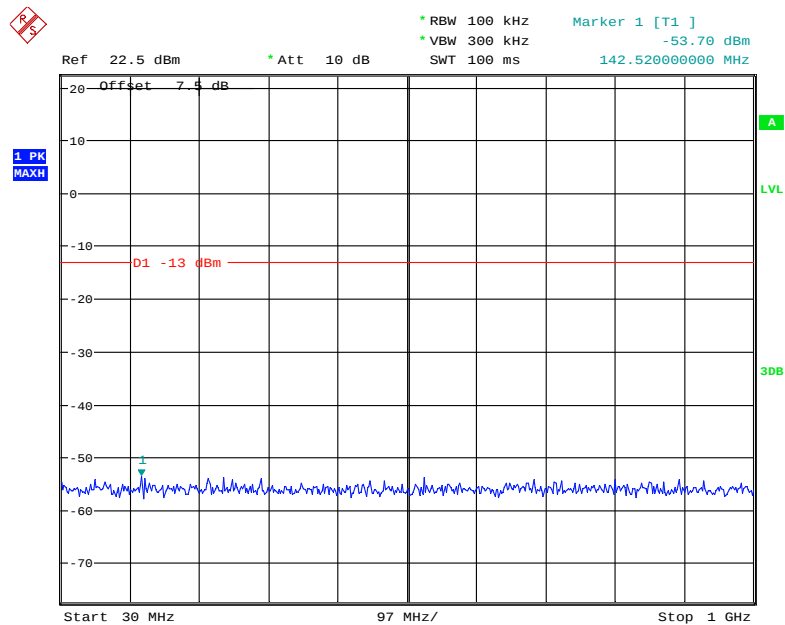
Date: 21.JAN.2019 23:44:30

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



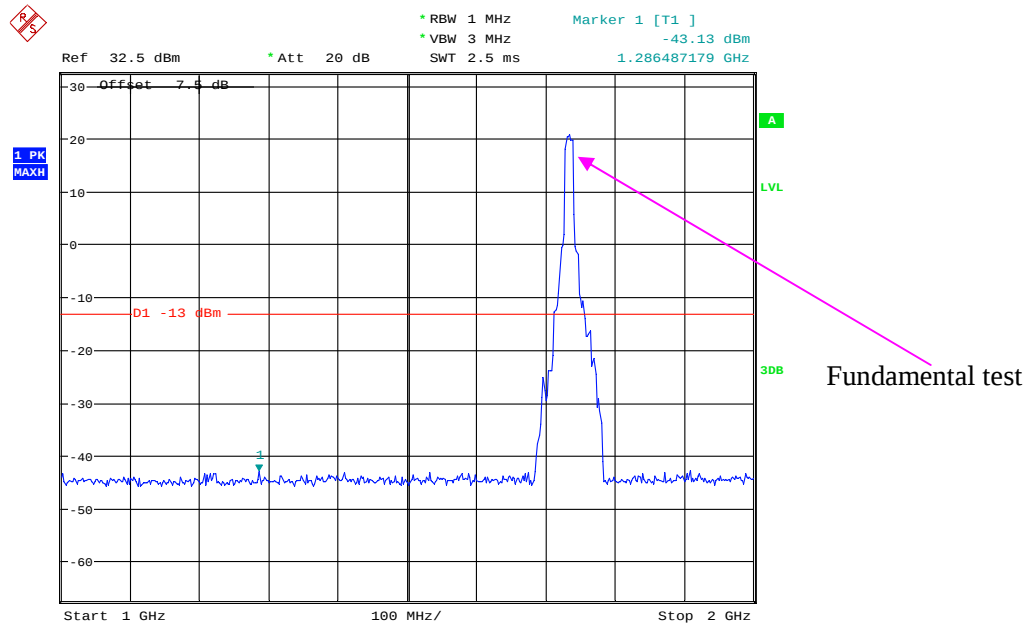
Date: 21.JAN.2019 23:46:40

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



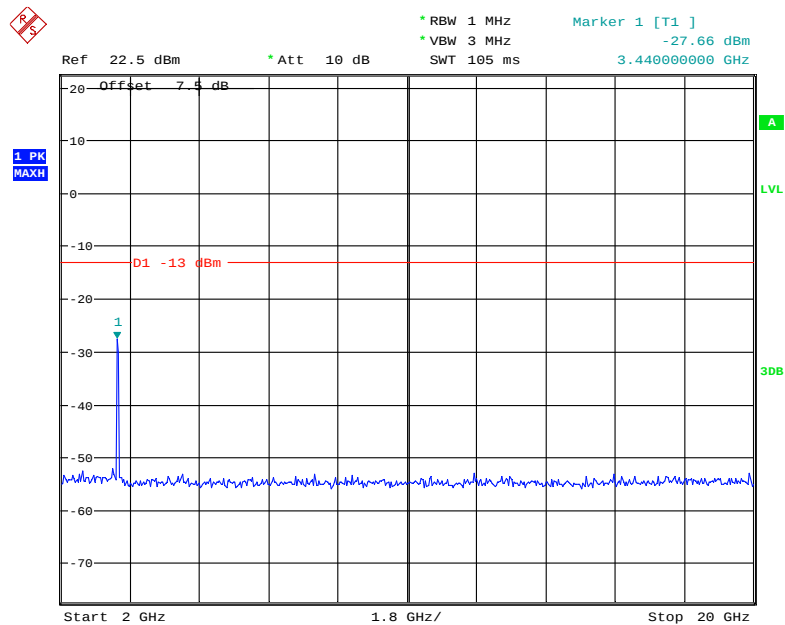
Date: 21.JAN.2019 23:41:02

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



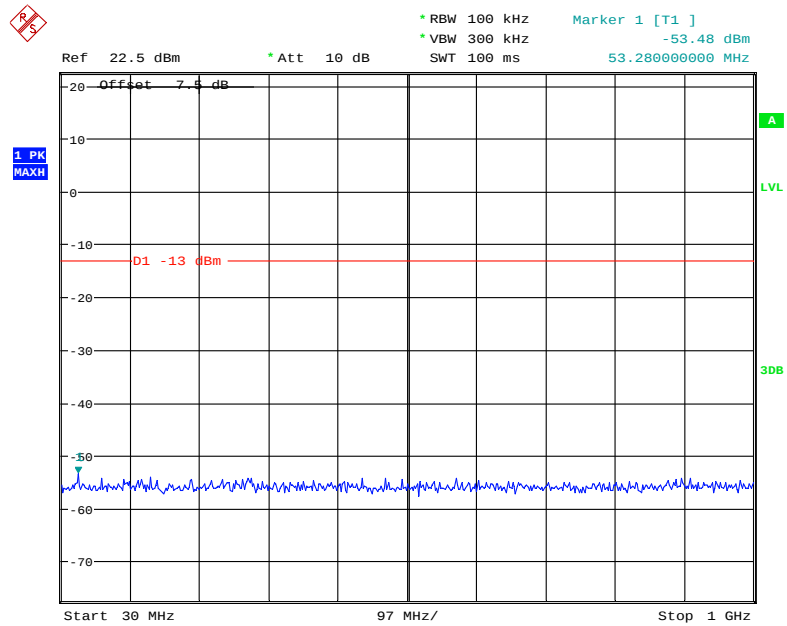
Date: 21.JAN.2019 23:44:10

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



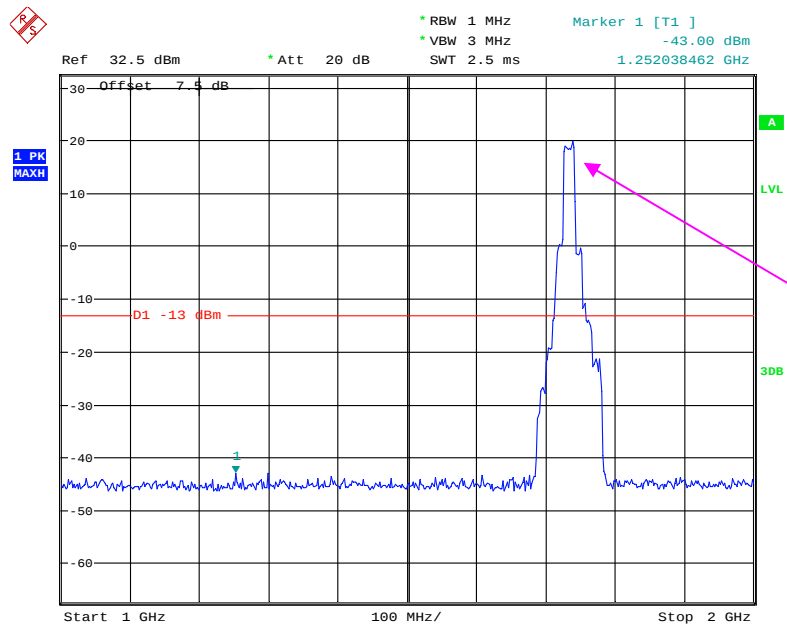
Date: 21.JAN.2019 23:46:54

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



Date: 21.JAN.2019 23:41:20

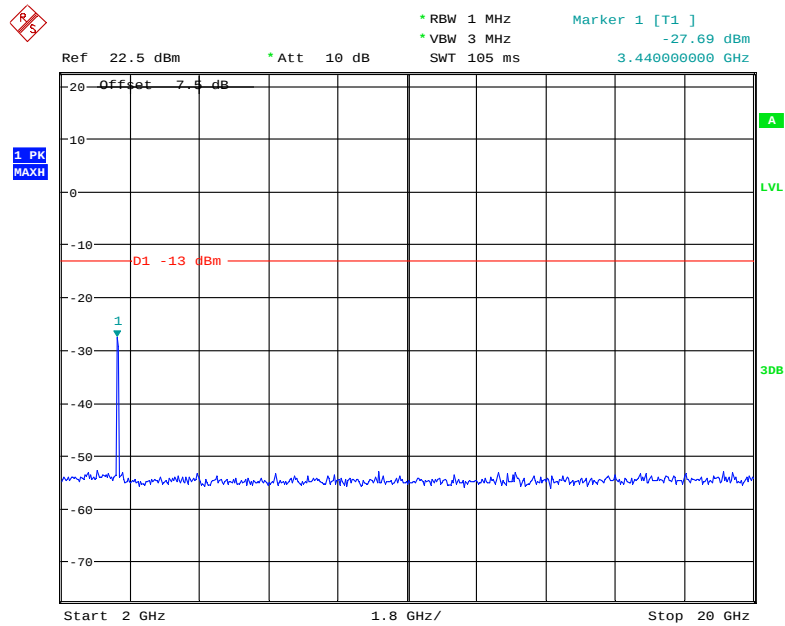
1 GHz – 2 GHz (15.0 MHz, Middle Channel)



Fundamental test

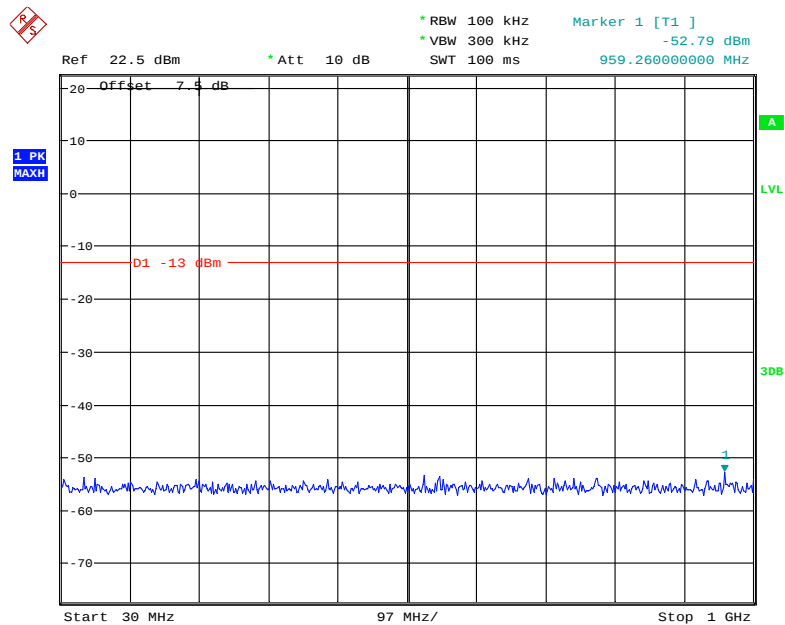
Date: 21.JAN.2019 23:43:26

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



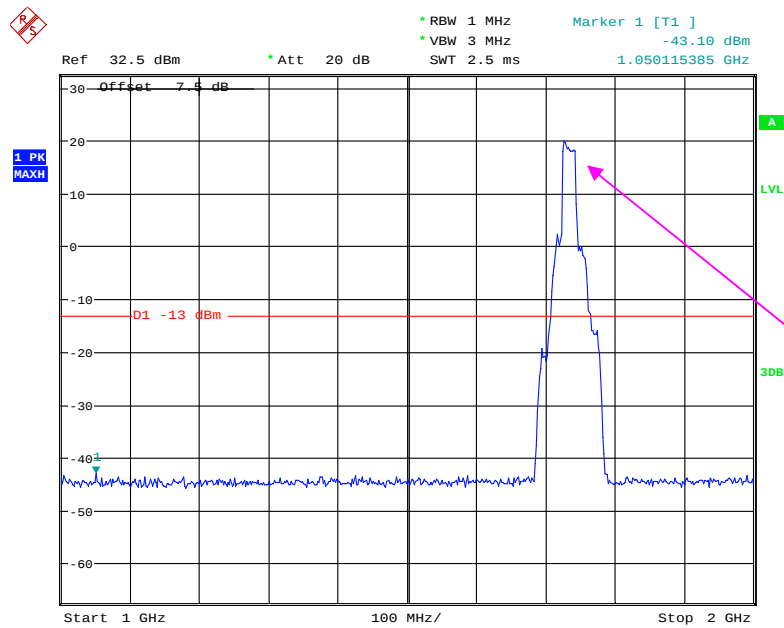
Date: 21.JAN.2019 23:47:09

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



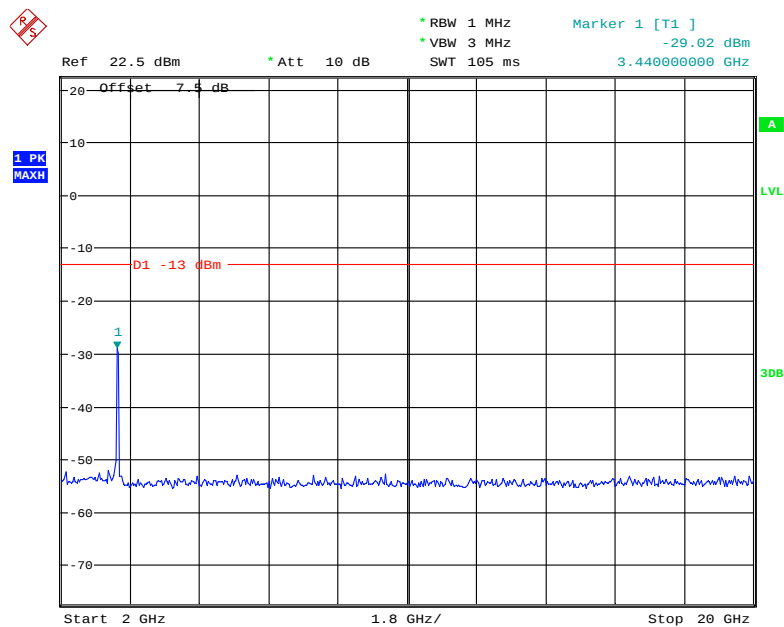
Date: 21.JAN.2019 23:41:38

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



Date: 21.JAN.2019 23:42:54

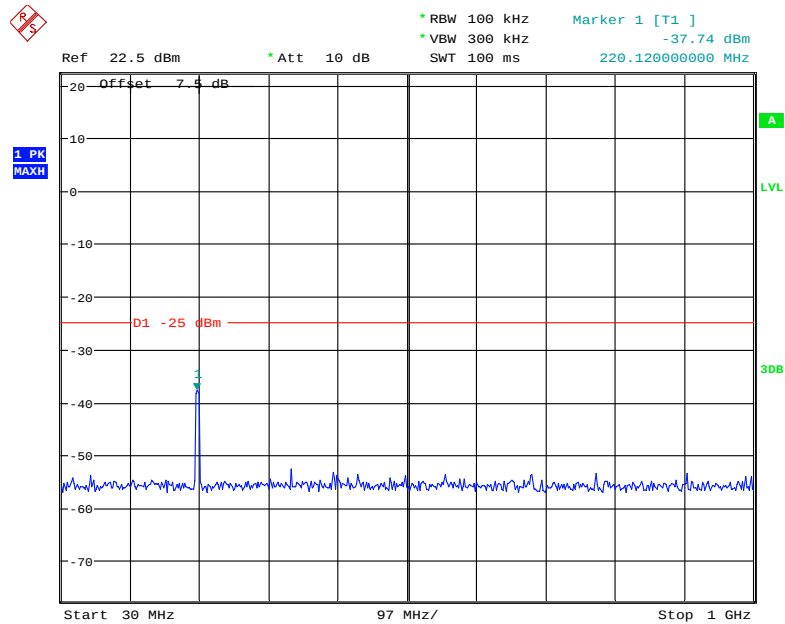
2 GHz – 20 GHz (20.0 MHz, Middle Channel)



Date: 21.JAN.2019 23:47:28

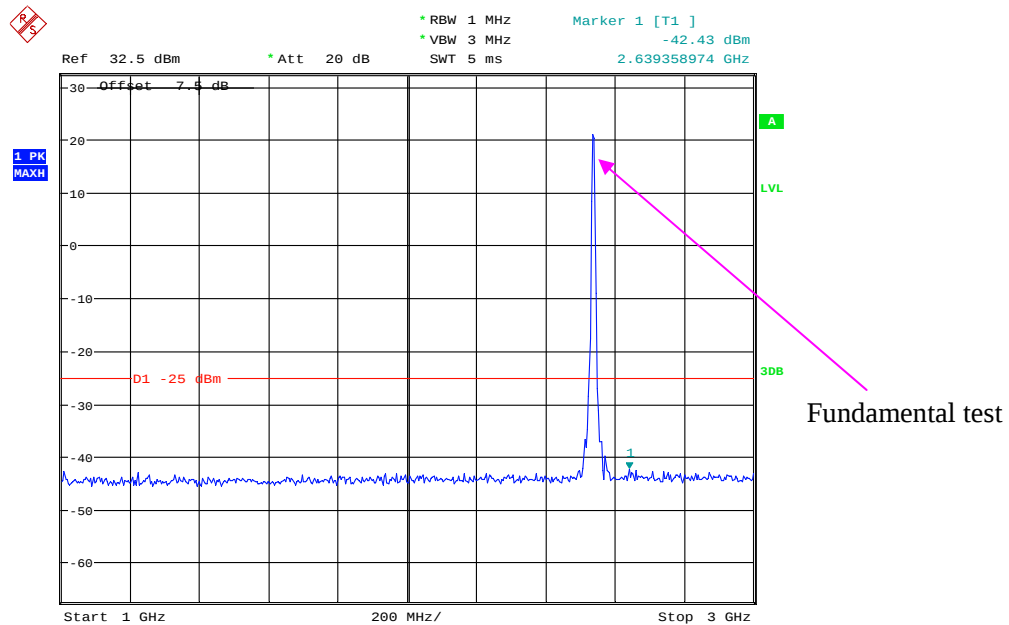
LTE Band 7:

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



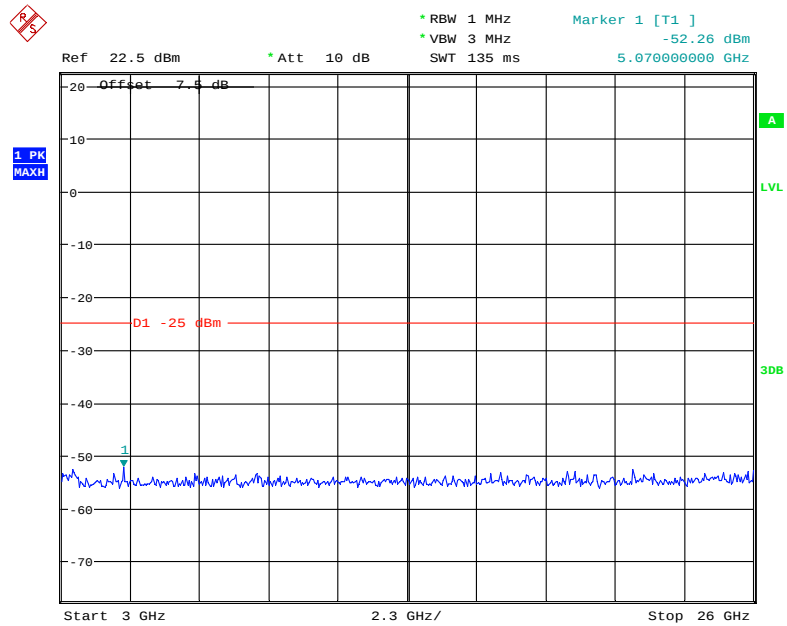
Date: 21.JAN.2019 23:52:22

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



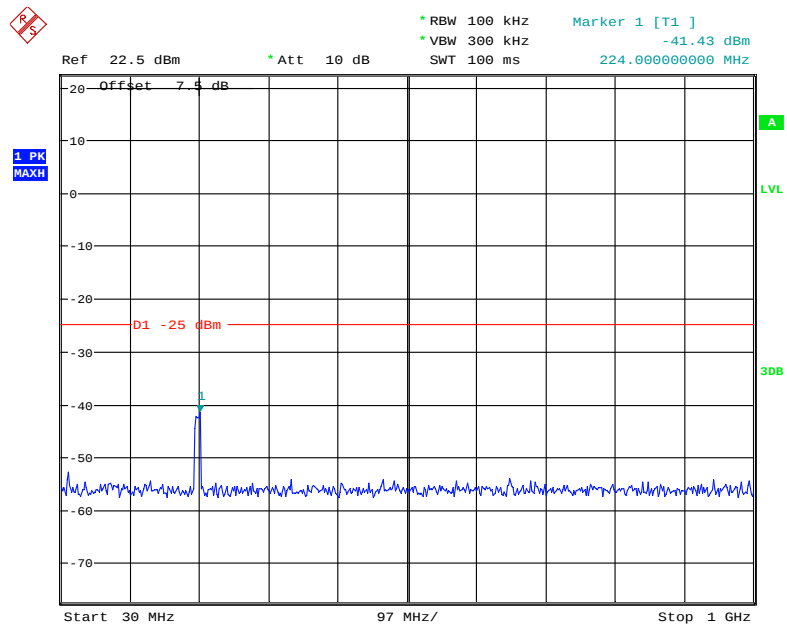
Date: 22.JAN.2019 00:07:17

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



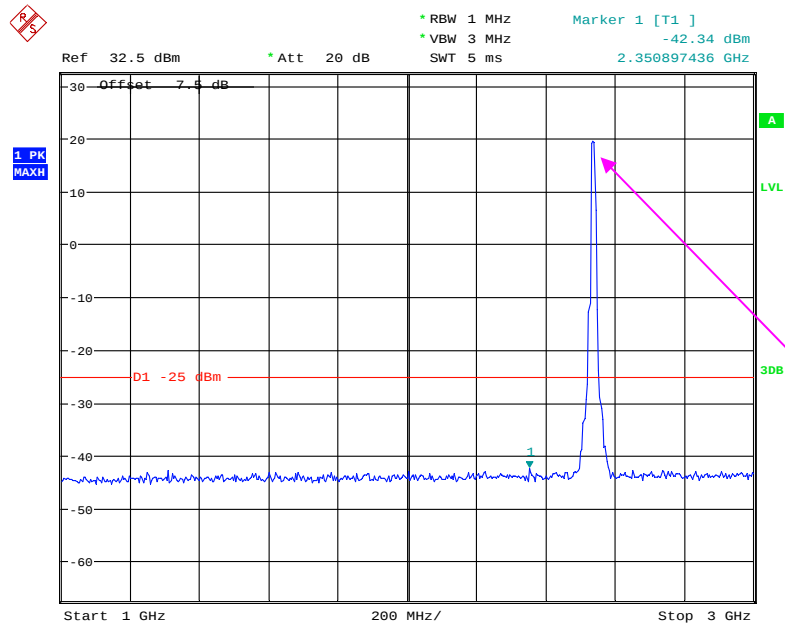
Date: 22.JAN.2019 00:07:52

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



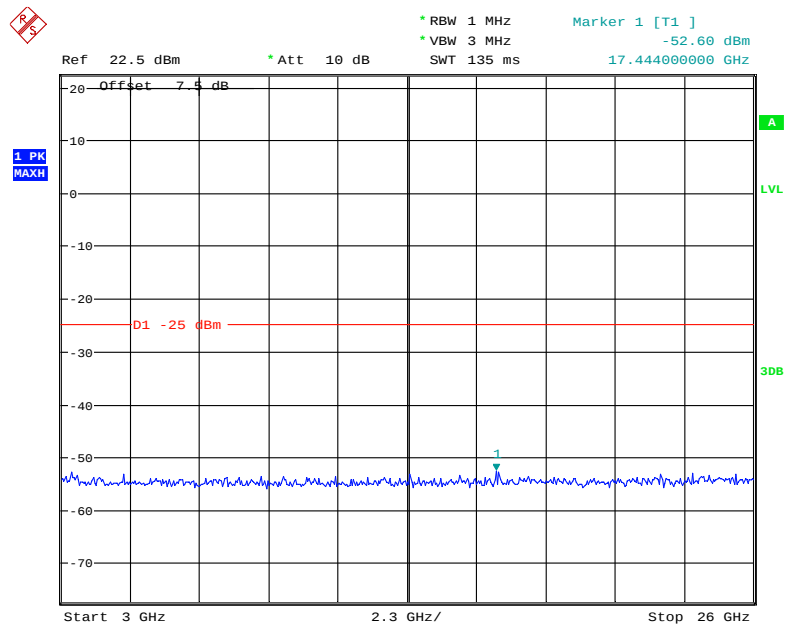
Date: 21.JAN.2019 23:52:47

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



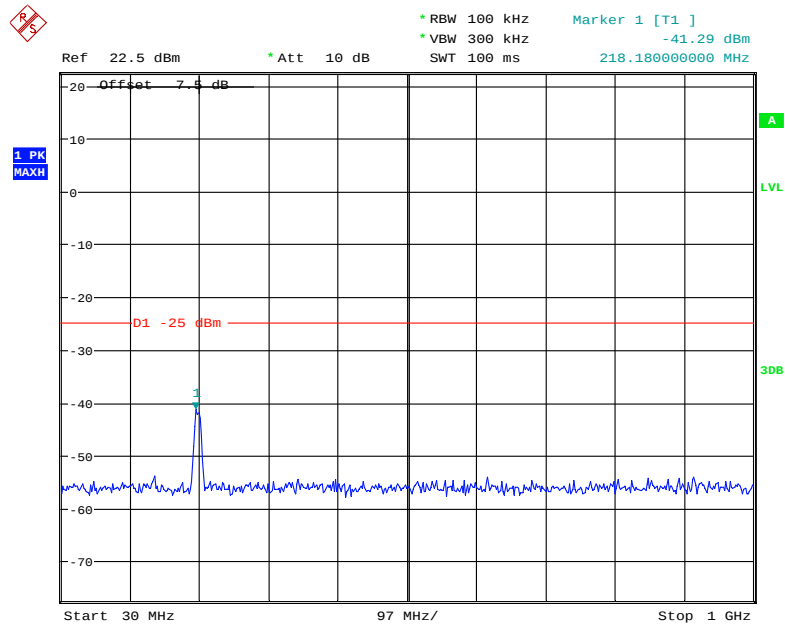
Date: 22.JAN.2019 00:06:45

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



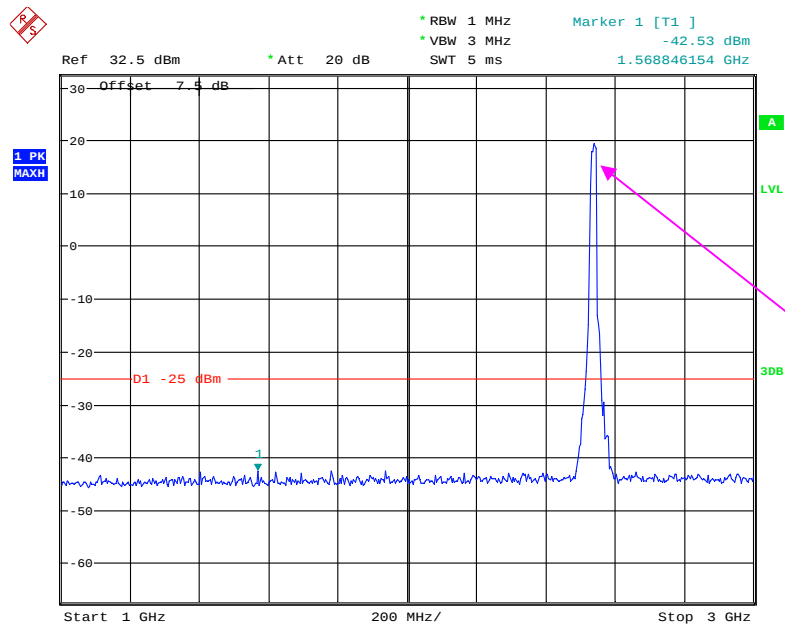
Date: 22.JAN.2019 00:08:09

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



Date: 21.JAN.2019 23:53:01

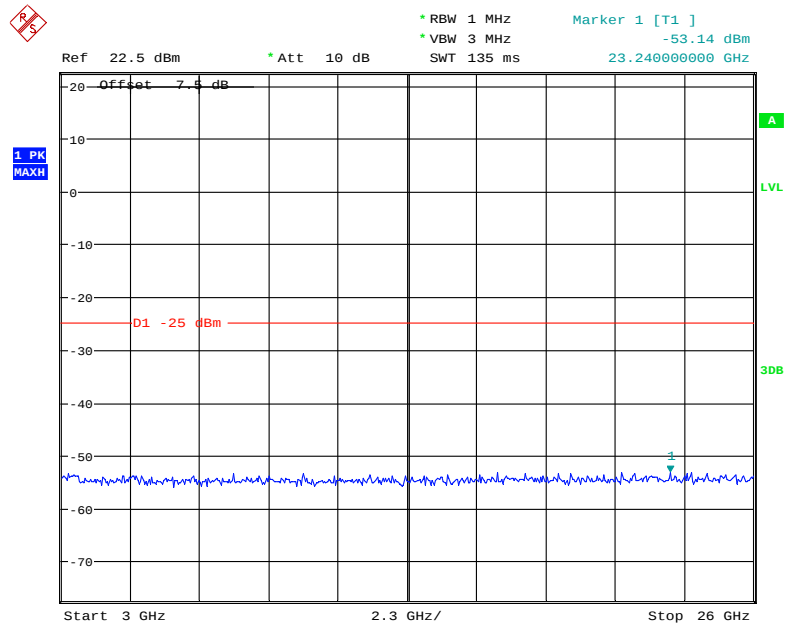
1 GHz – 3 GHz (15.0 MHz, Middle Channel)



Fundamental test

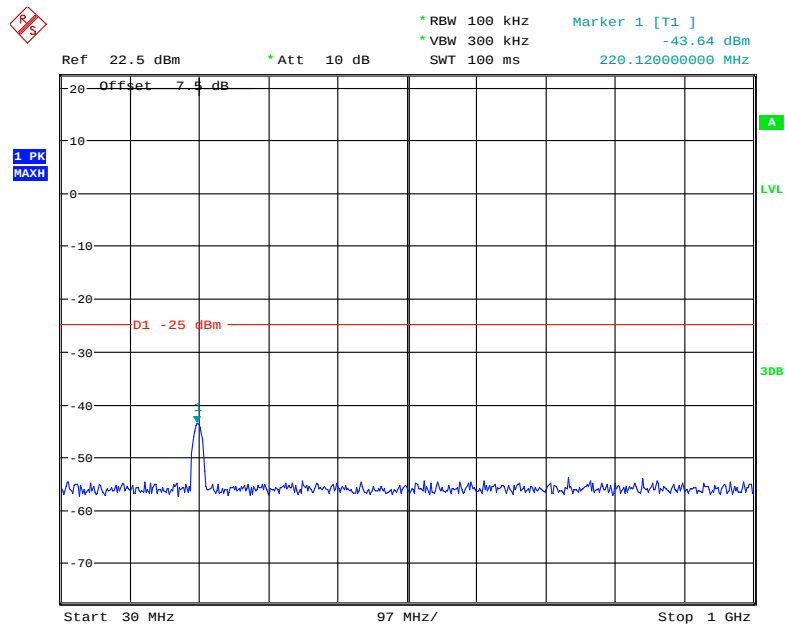
Date: 22.JAN.2019 00:05:50

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



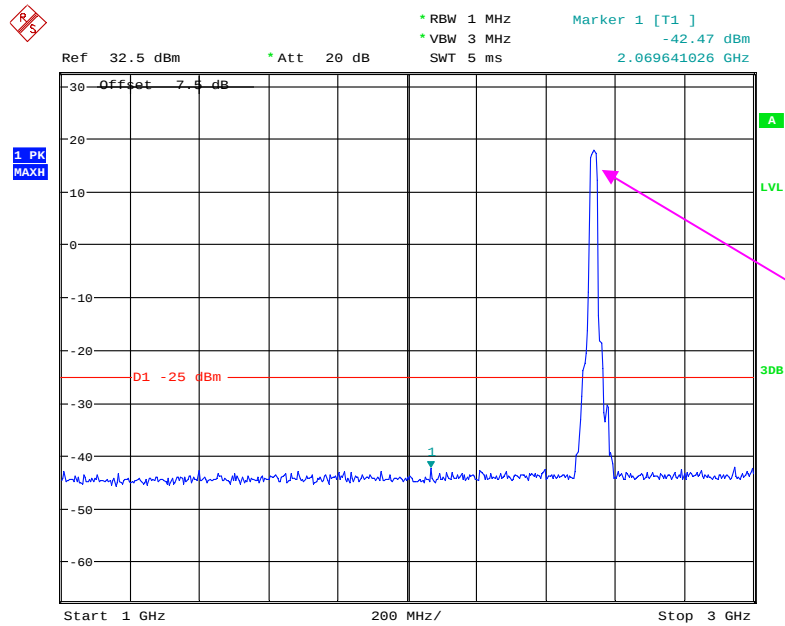
Date: 22.JAN.2019 00:08:25

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



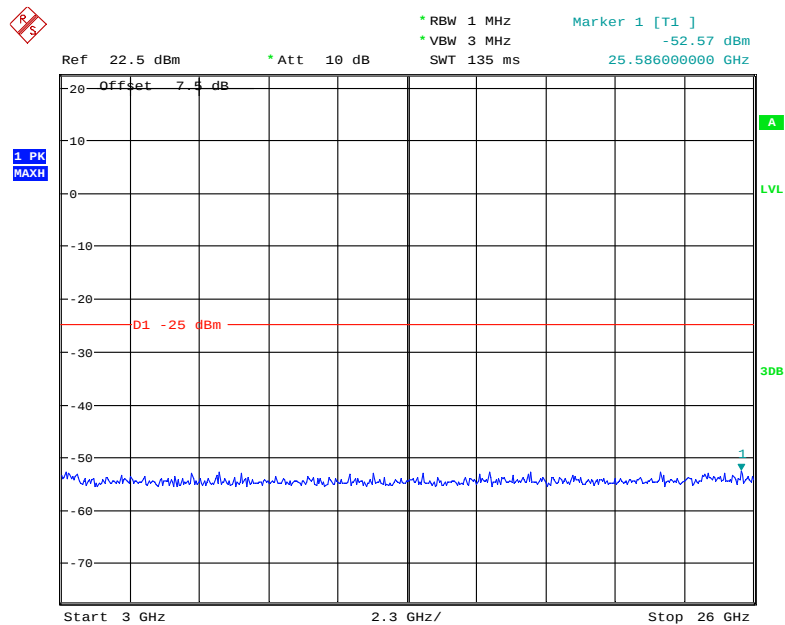
Date: 21.JAN.2019 23:53:15

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



Date: 22.JAN.2019 00:05:17

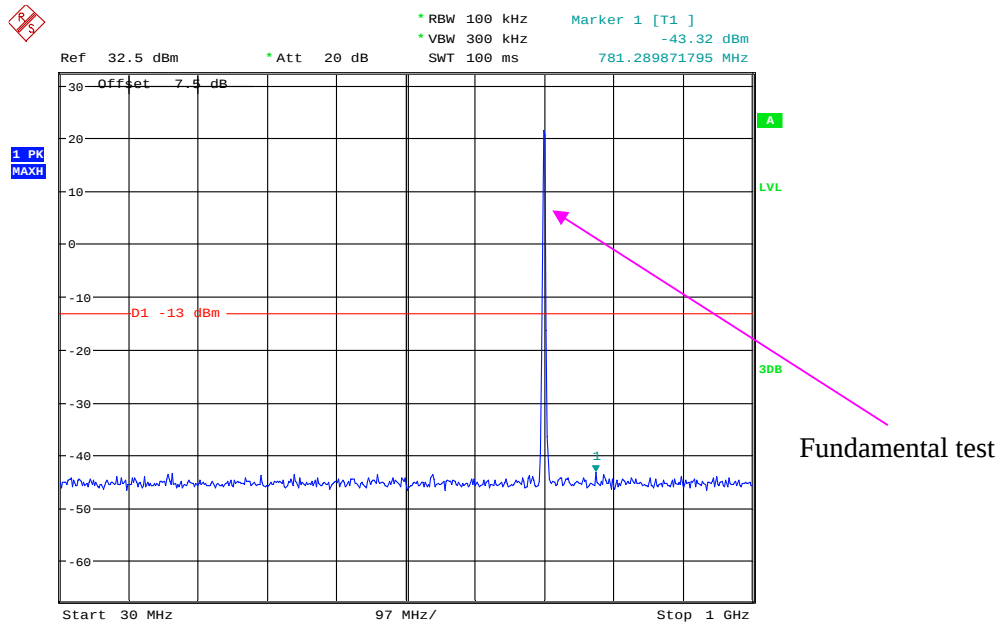
3 GHz – 26 GHz (20.0 MHz, Middle Channel)



Date: 22.JAN.2019 00:08:43

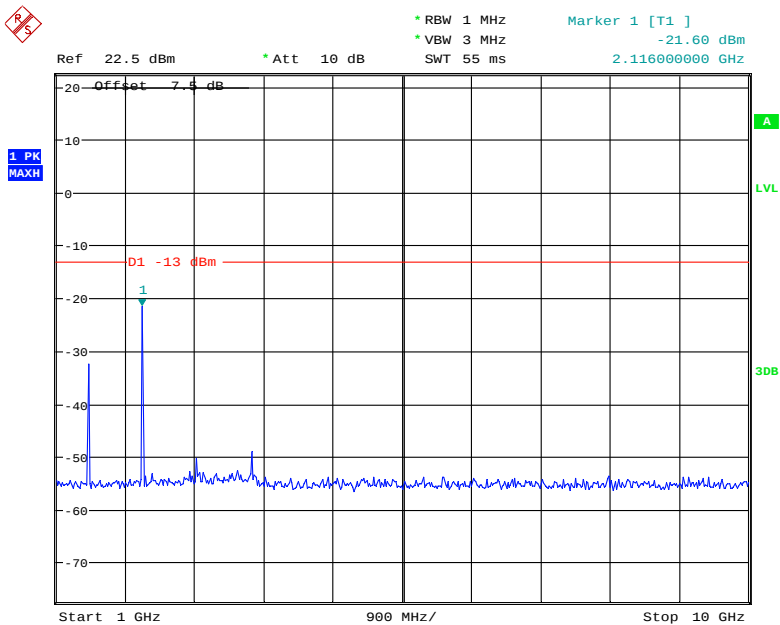
LTE Band 12:

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



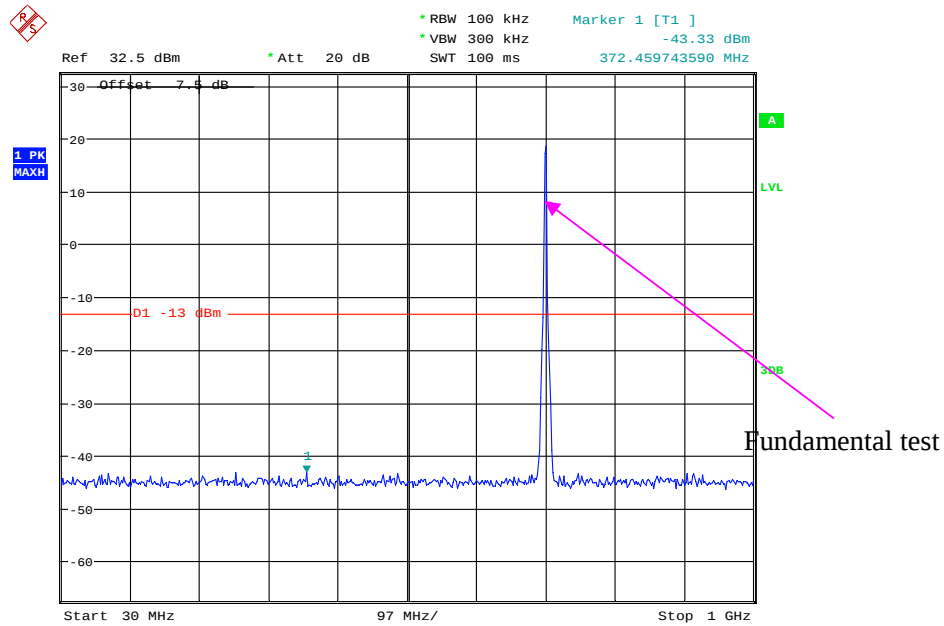
Date: 22.JAN.2019 00:17:34

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



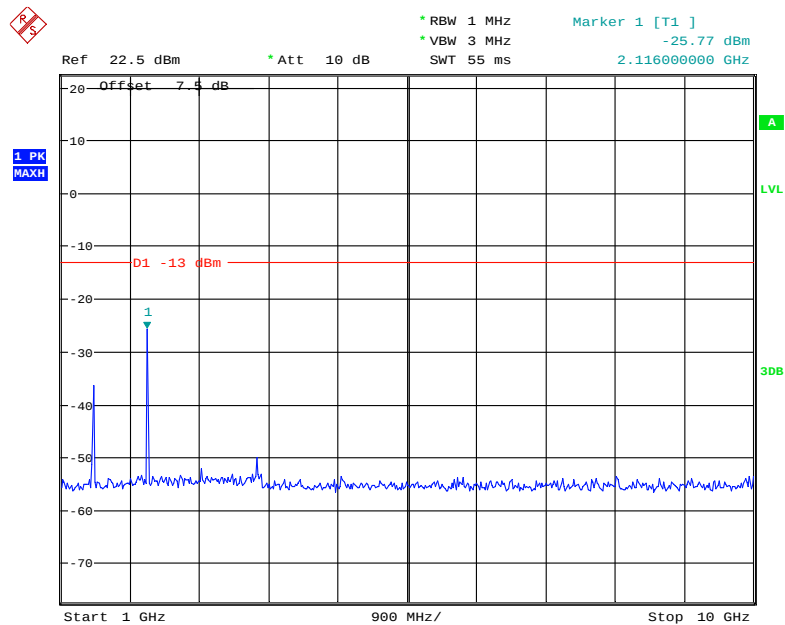
Date: 22.JAN.2019 00:18:05

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



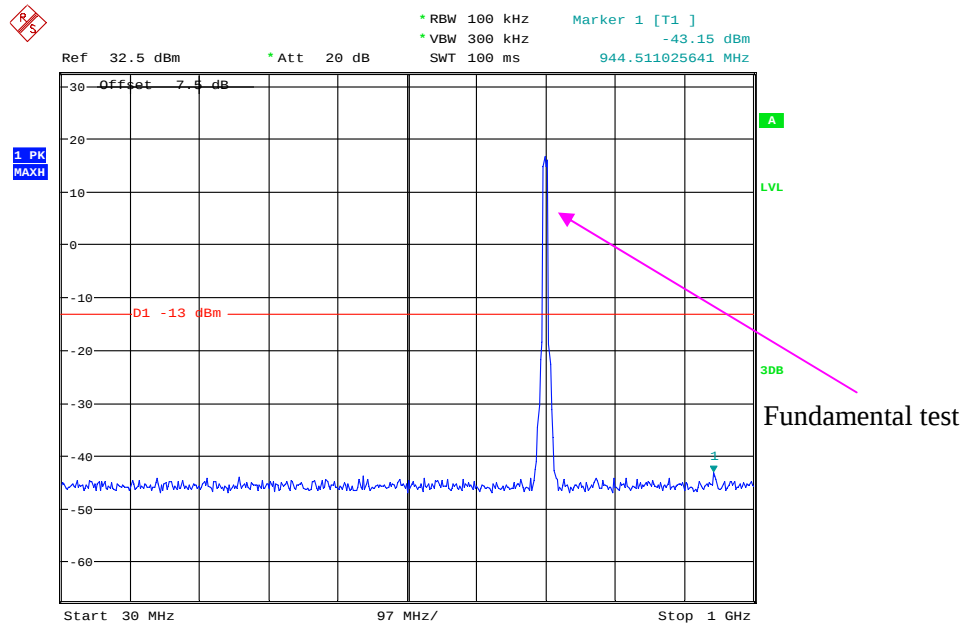
Date: 22.JAN.2019 00:17:01

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



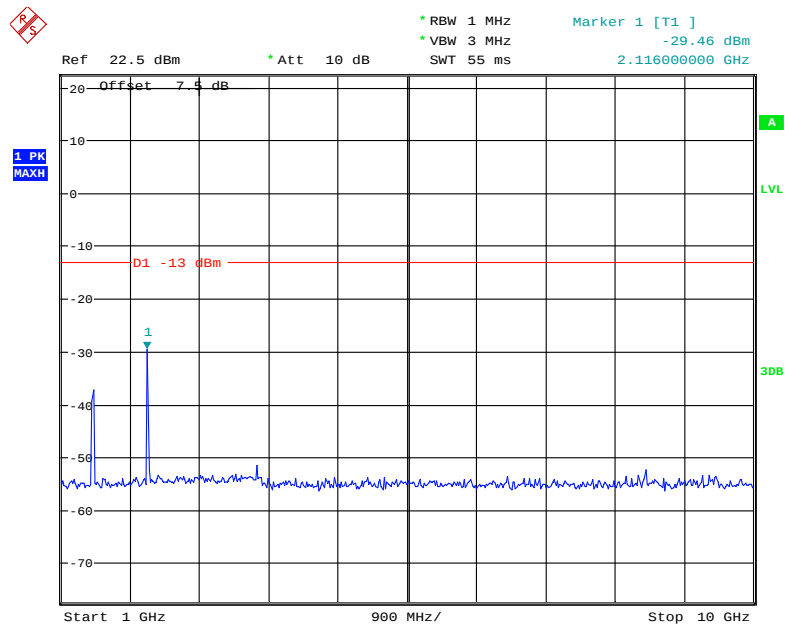
Date: 22.JAN.2019 00:18:21

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



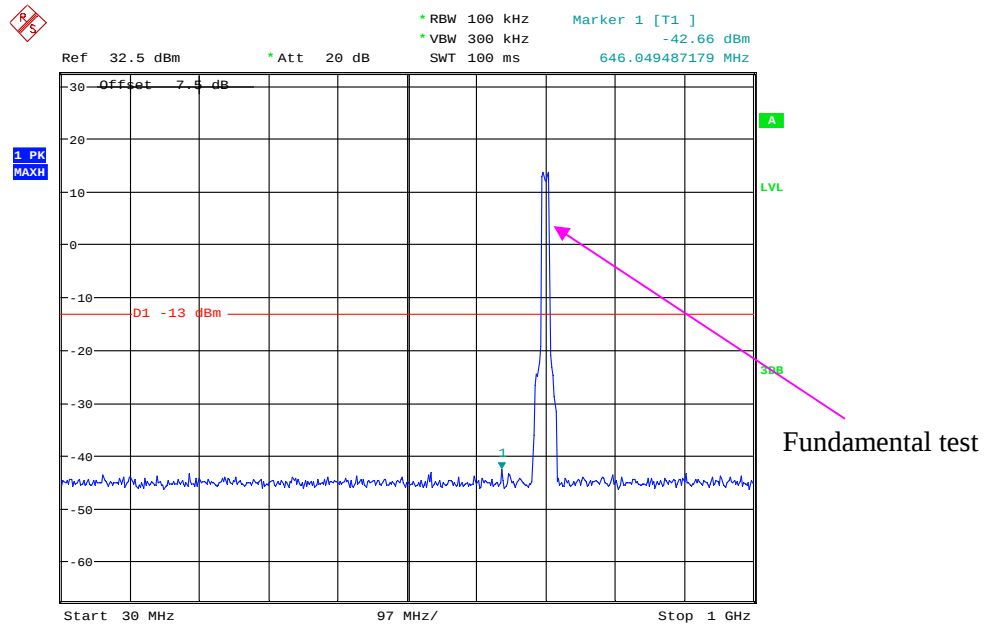
Date: 22.JAN.2019 00:16:15

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



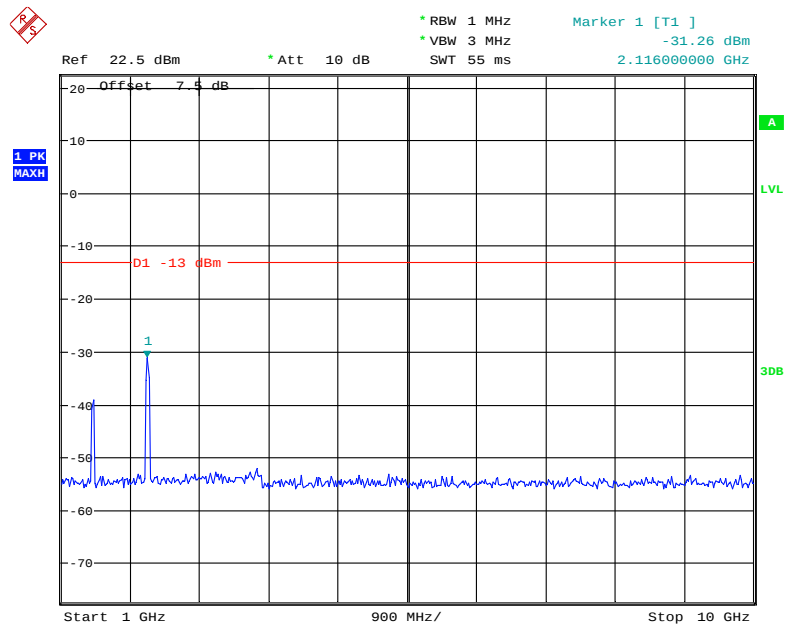
Date: 22.JAN.2019 00:18:36

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



Date: 22.JAN.2019 00:15:49

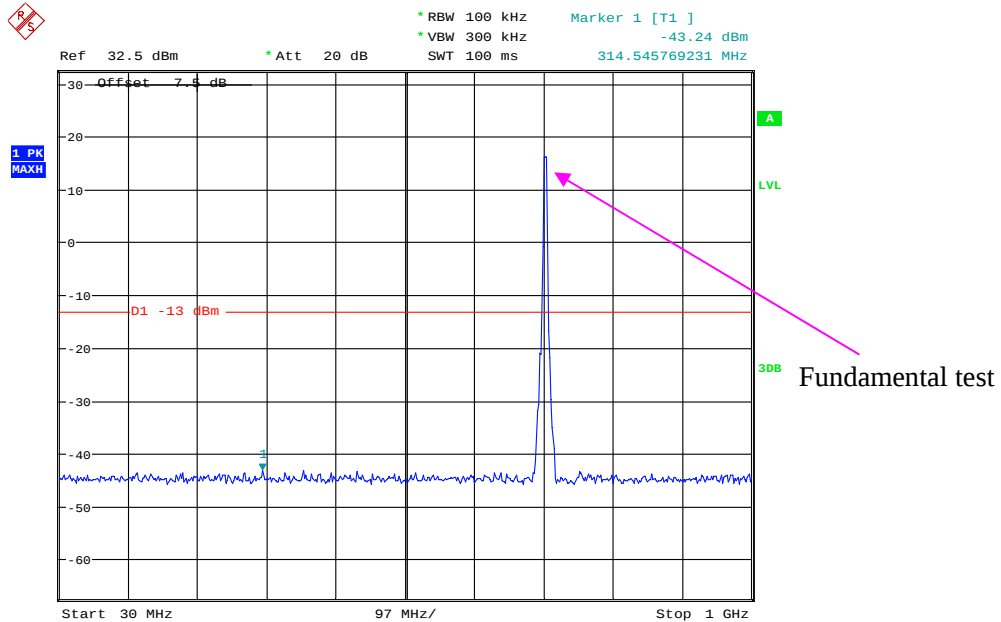
1 GHz – 10 GHz (10.0 MHz, Middle Channel)



Date: 22.JAN.2019 00:18:51

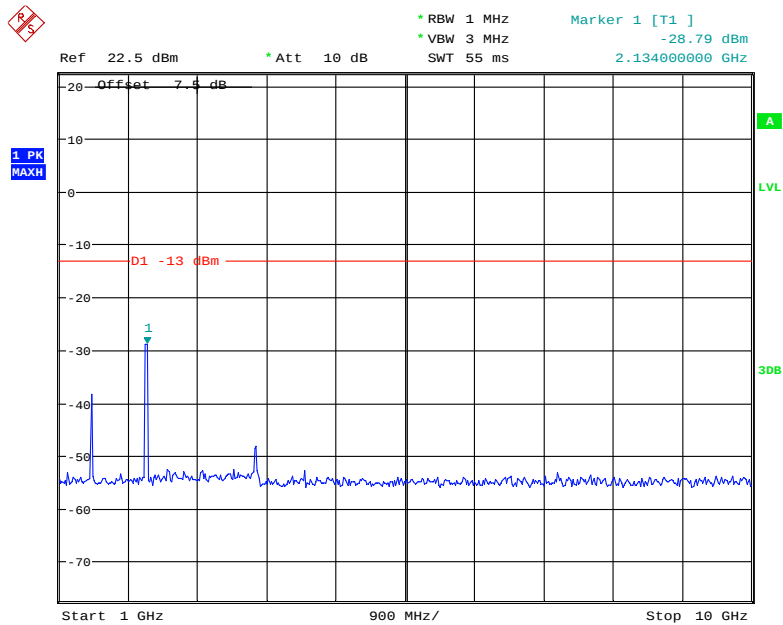
LTE Band 17:

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



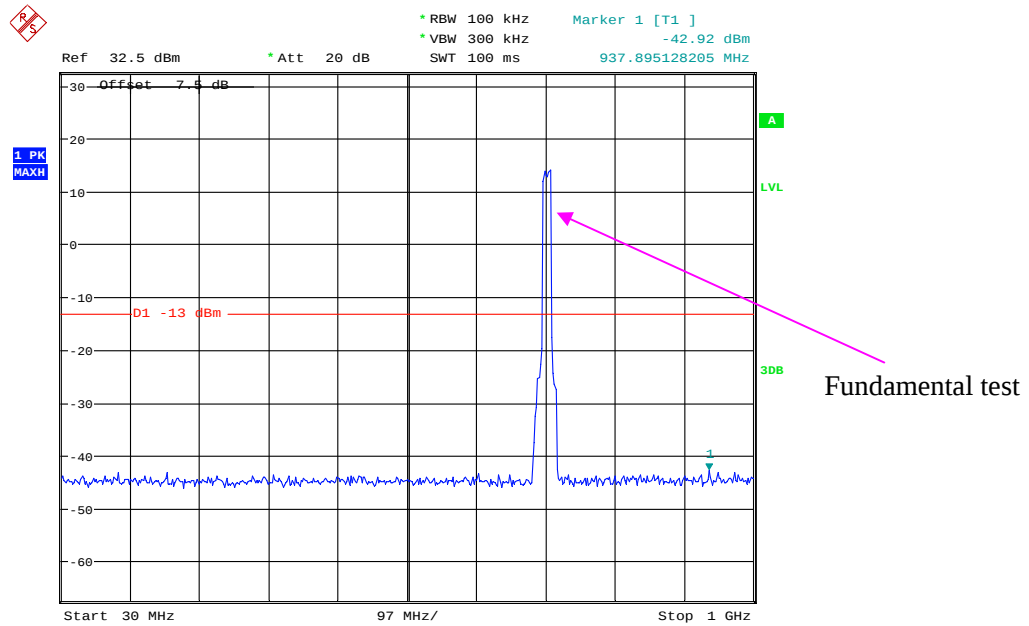
Date: 22.JAN.2019 00:20:56

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



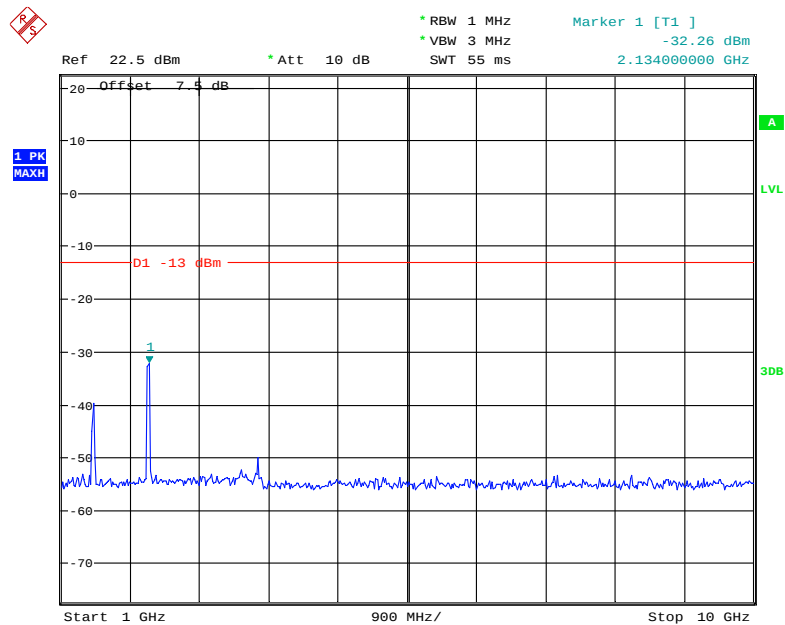
Date: 22.JAN.2019 00:23:26

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



Date: 22.JAN.2019 00:22:09

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



Date: 22.JAN.2019 00:23:10

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:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Tracy Hu on 2019-02-21.

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										
184.25	33.37	242	2.4	H	-63.60	0.28	0	-63.88	-13	50.88
184.25	31.52	253	1.0	V	-65.50	0.28	0	-65.78	-13	52.78
1673.20	58.74	295	1.5	H	-47.6	1.30	8.90	-40.00	-13	27.00
1673.20	58.20	88	2.4	V	-47.8	1.30	8.90	-40.20	-13	27.20
2509.80	55.62	170	2.4	H	-47.3	2.60	10.20	-39.70	-13	26.70
2509.80	54.18	200	1.3	V	-48.0	2.60	10.20	-40.40	-13	27.40
WCDMA Mode, Middle channel										
184.25	33.50	49	1.8	H	-63.50	0.28	0	-63.78	-13	50.78
184.25	31.92	161	1.5	V	-65.10	0.28	0	-65.38	-13	52.38
1673.20	58.48	216	1.2	H	-48.6	1.30	8.90	-41.00	-13	28.00
1673.20	56.87	322	2.4	V	-49.6	1.30	8.90	-42.00	-13	29.00

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										
184.25	32.74	177	1.9	H	-64.30	0.28	0	-64.58	-13	51.58
184.25	30.73	83	2.0	V	-66.30	0.28	0	-66.58	-13	53.58
3760.00	44.69	168	1.8	H	-55.3	1.50	11.80	-45.00	-13	32.00
3760.00	44.30	133	2.3	V	-55.7	1.50	11.80	-45.40	-13	32.40
5640.00	53.20	242	1.3	H	-42.3	1.70	12.40	-31.60	-13	18.60
5640.00	52.16	222	1.9	V	-43.5	1.70	12.40	-32.80	-13	19.80
WCDMA Mode Band II, Middle channel										
184.25	33.79	275	1.7	H	-63.20	0.28	0	-63.48	-13	50.48
184.25	31.81	70	2.1	V	-65.20	0.28	0	-65.48	-13	52.48
3760.00	44.36	110	2.2	H	-56.9	1.50	11.80	-46.60	-13	33.60
3760.00	44.15	210	1.0	V	-56.6	1.50	11.80	-46.30	-13	33.30

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 4										
Test frequency range:30 MHz ~ 18 GHz,middle channel										
184.25	33.72	277	2.5	H	-63.30	0.28	0	-63.58	-13	50.58
184.25	30.42	312	1.8	V	-66.60	0.28	0	-66.88	-13	53.88
3465.00	43.16	311	1.1	H	-57.2	1.50	12.00	-46.70	-13	33.70
3465.00	42.90	196	2.1	V	-58.2	1.50	12.00	-47.70	-13	34.70
Band 7										
Test frequency range:30 MHz ~ 26 GHz, middle channel										
184.25	32.97	271	1.9	H	-64.00	0.28	0	-64.28	-25	39.28
184.25	30.66	91	2.2	V	-66.30	0.28	0	-66.58	-25	41.58
5070.00	44.21	275	1.8	H	-53.7	1.60	12.10	-43.20	-25	18.20
5070.00	43.70	182	1.0	V	-54.2	1.60	12.10	-43.70	-25	18.70
Band 12										
Test frequency range: 30 MHz ~ 10GHz, middle channel										
184.25	33.44	66	2.0	H	-63.60	0.28	0	-63.88	-13	50.88
184.25	31.47	317	1.5	V	-65.50	0.28	0	-65.78	-13	52.78
1415.00	42.61	297	1.7	H	-65.2	1.60	7.90	-58.90	-13	45.90
1415.00	42.05	113	1.4	V	-66.0	1.60	7.90	-59.70	-13	46.70
Band 17										
Test frequency range: 30 MHz ~ 10GHz, middle channel										
184.25	32.49	199	1.2	H	-64.50	0.28	0	-64.78	-13	51.78
184.25	31.34	47	2.4	V	-65.70	0.28	0	-65.98	-13	52.98
1420.00	43.05	291	1.2	H	-64.8	1.60	7.90	-58.50	-13	45.50
1420.00	42.61	65	1.7	V	-65.5	1.60	7.90	-59.20	-13	46.20

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.

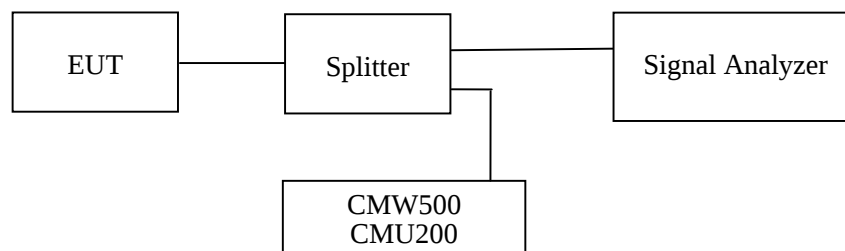
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

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**

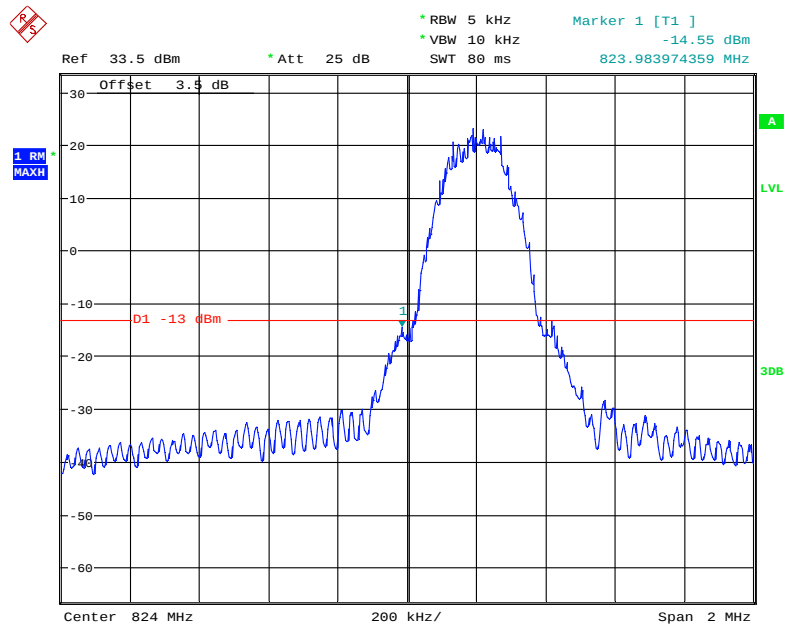
Temperature:	23~25 °C
Relative Humidity:	50~52 %
ATM Pressure:	100.0~101.0 kPa

The testing was performed by Tracy Hu from 2019-02-21 to 2019-02-27.

EUT operation mode: Transmitting

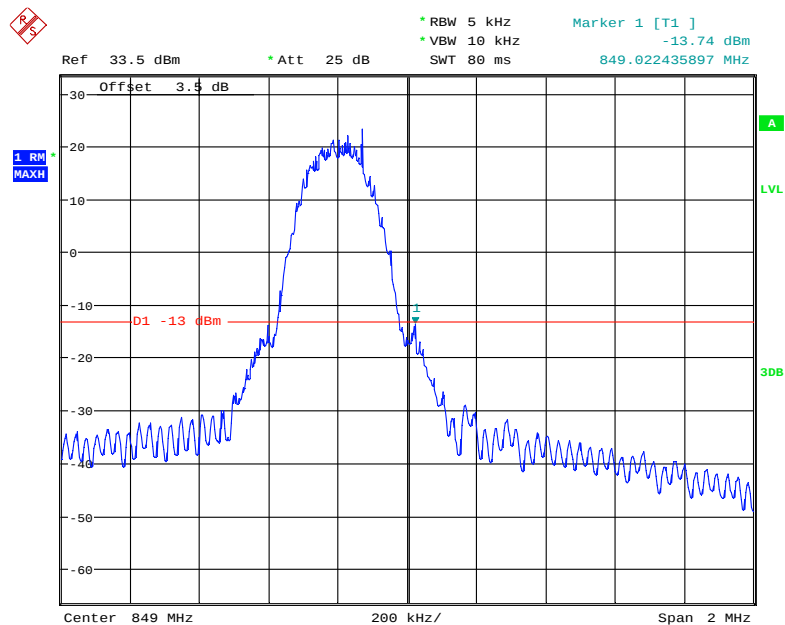
Test Result: Compliance. Please refer to the following plots.

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



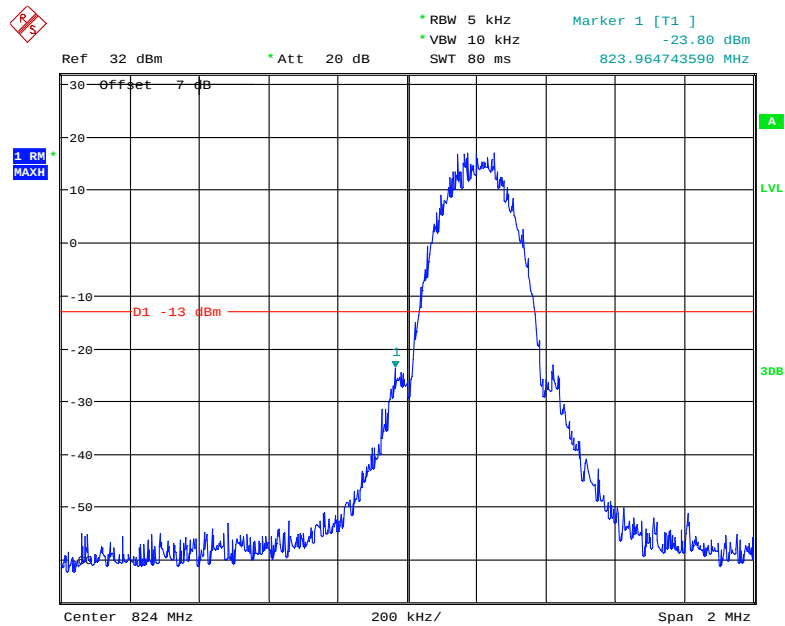
Date: 21.JAN.2019 13:16:01

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



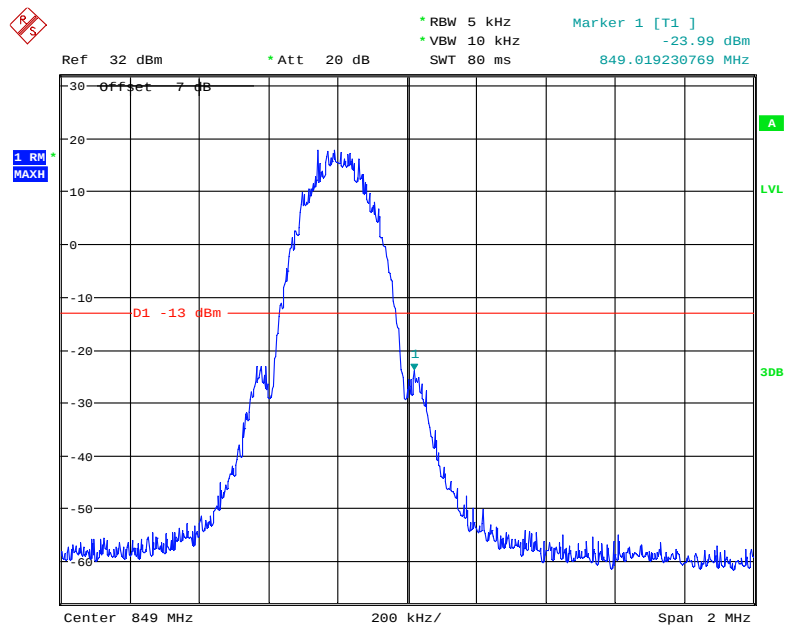
Date: 21.JAN.2019 13:22:49

Cellular Band, Left Band Edge for EDGE Mode



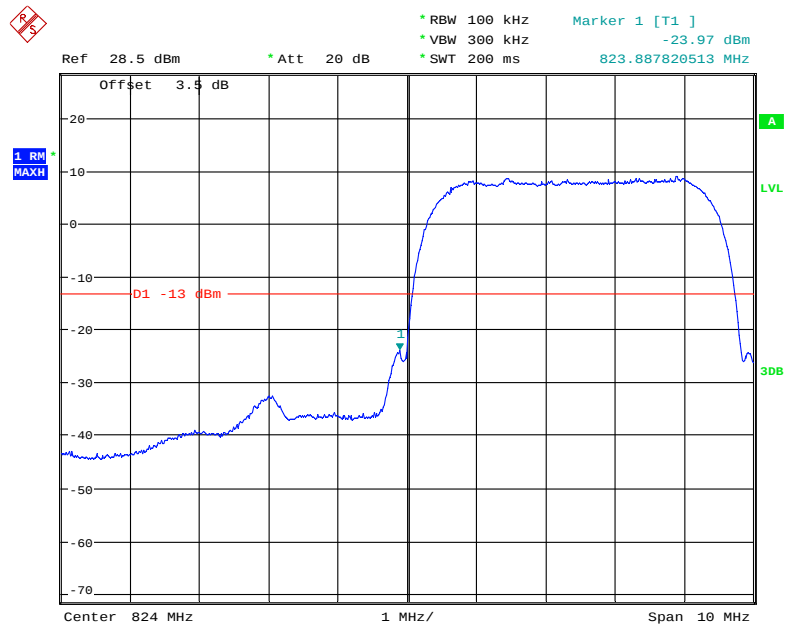
Date: 27.FEB.2019 19:22:36

Cellular Band, Right Band Edge for EDGE Mode



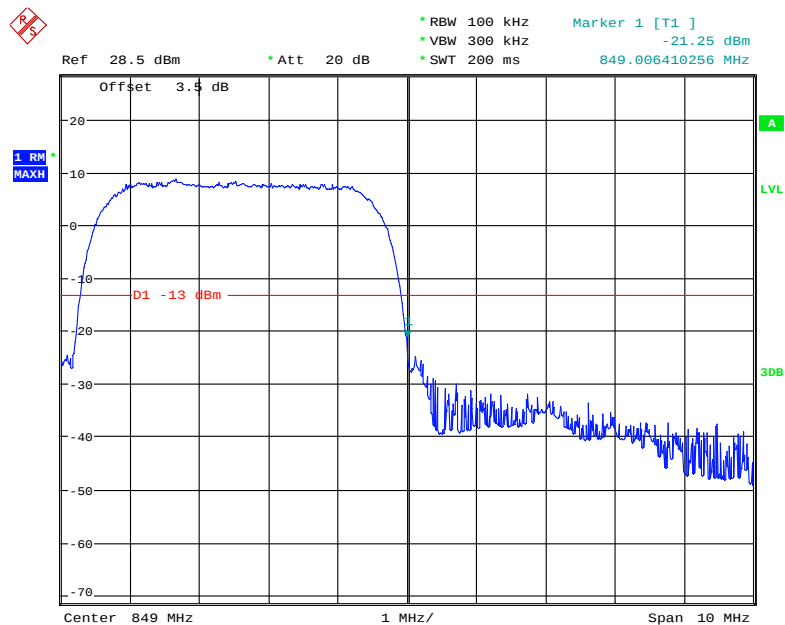
Date: 27.FEB.2019 19:22:02

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



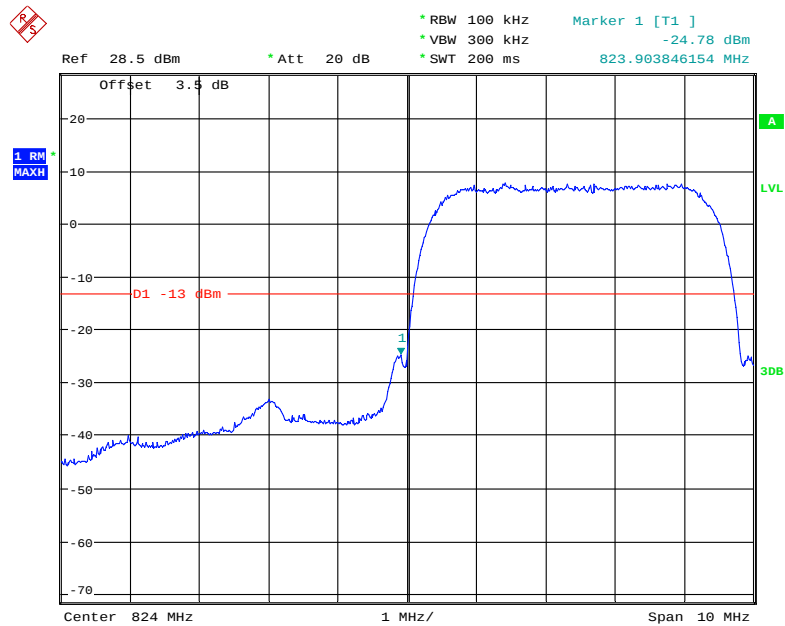
Date: 21.JAN.2019 15:02:13

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



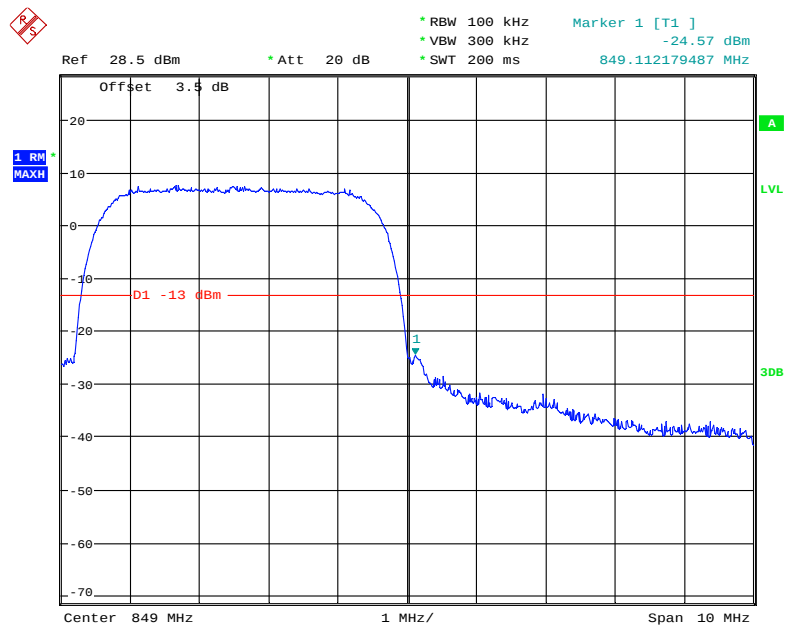
Date: 21.JAN.2019 15:03:18

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



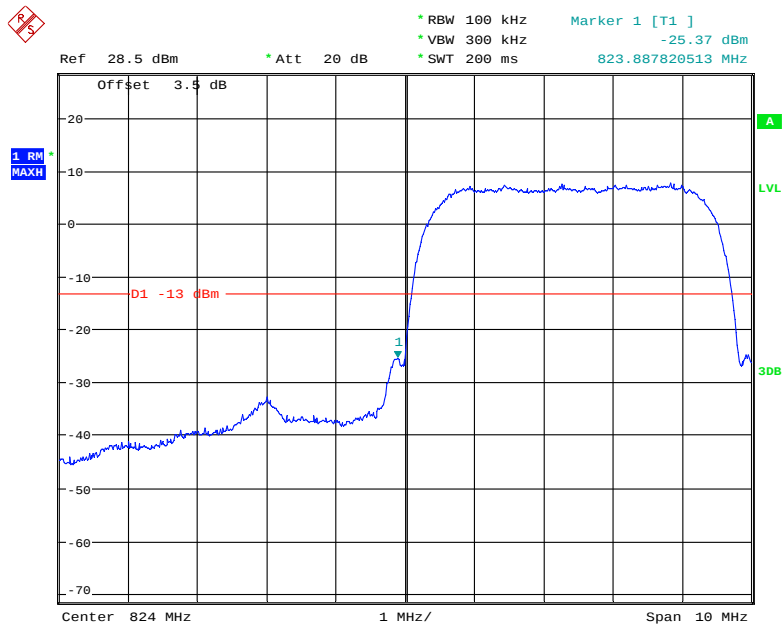
Date: 21.JAN.2019 15:18:43

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



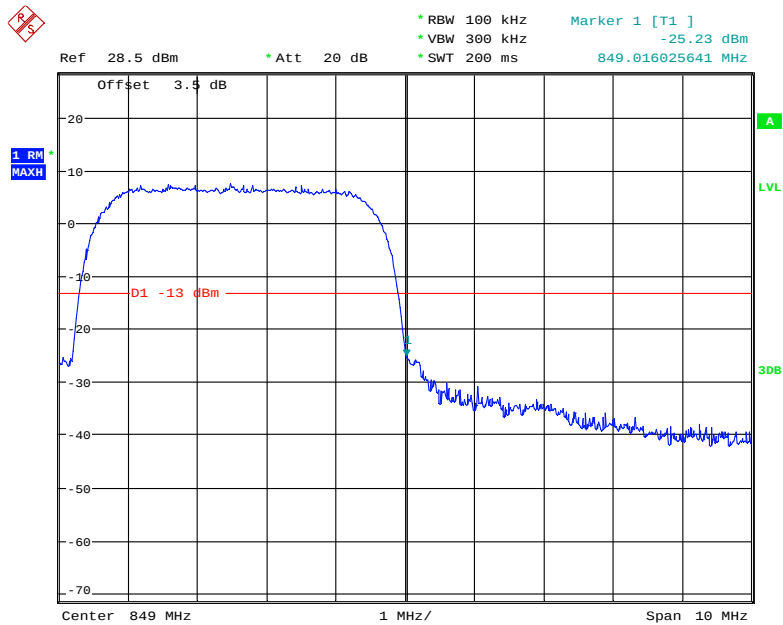
Date: 21.JAN.2019 15:18:09

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



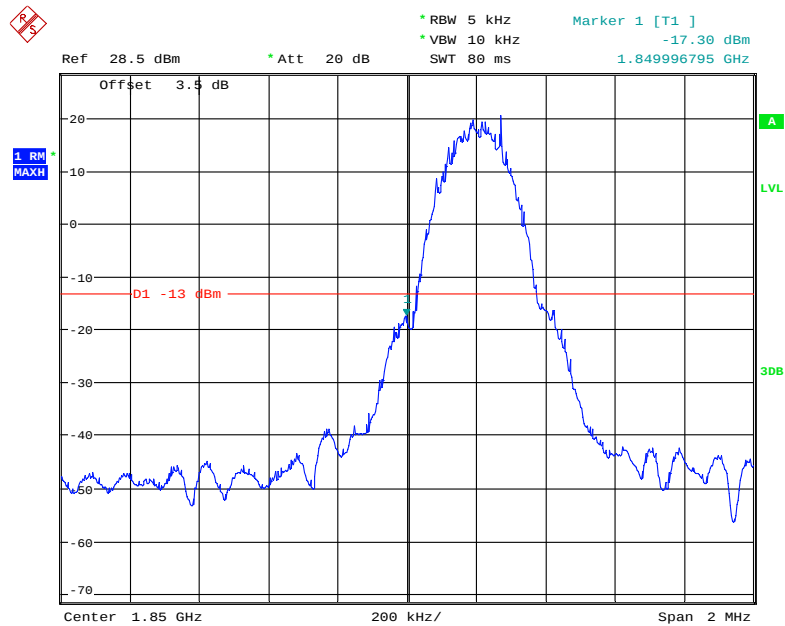
Date: 21.JAN.2019 15:16:10

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



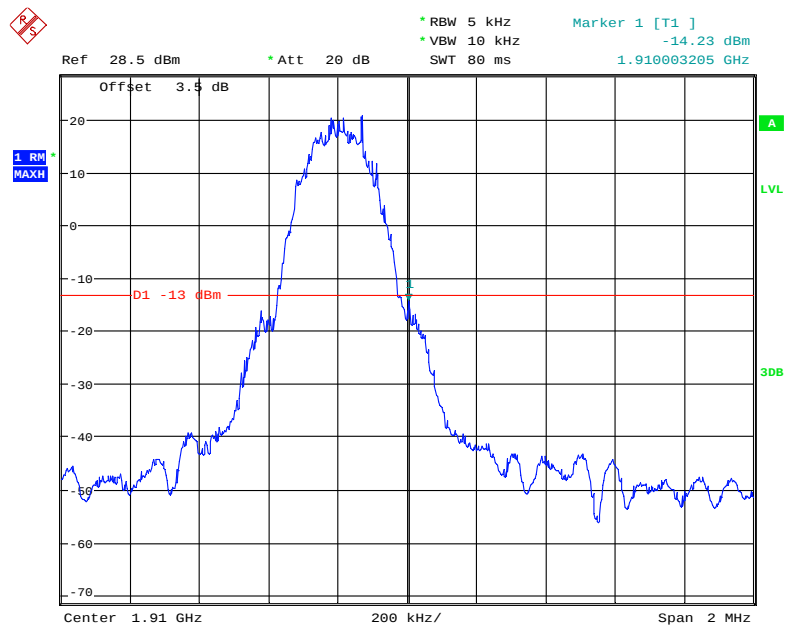
Date: 21.JAN.2019 15:17:01

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



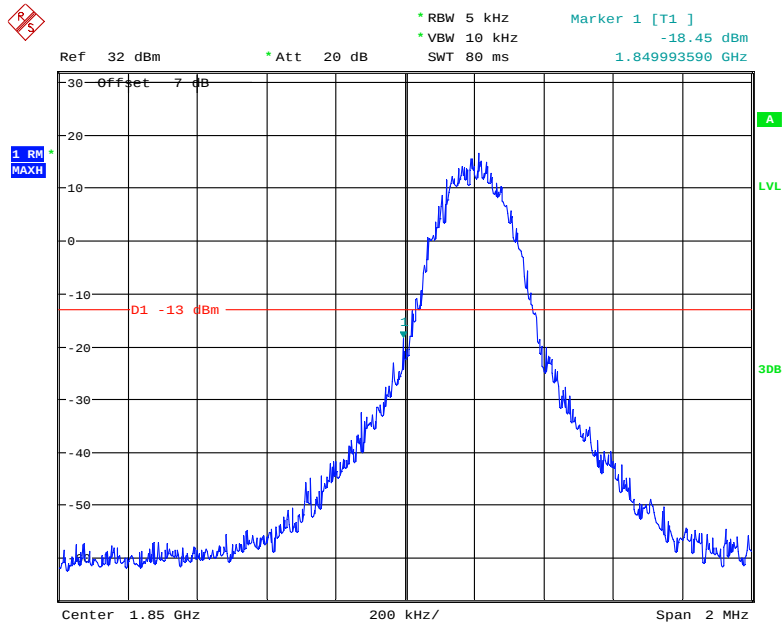
Date: 21.JAN.2019 14:01:18

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



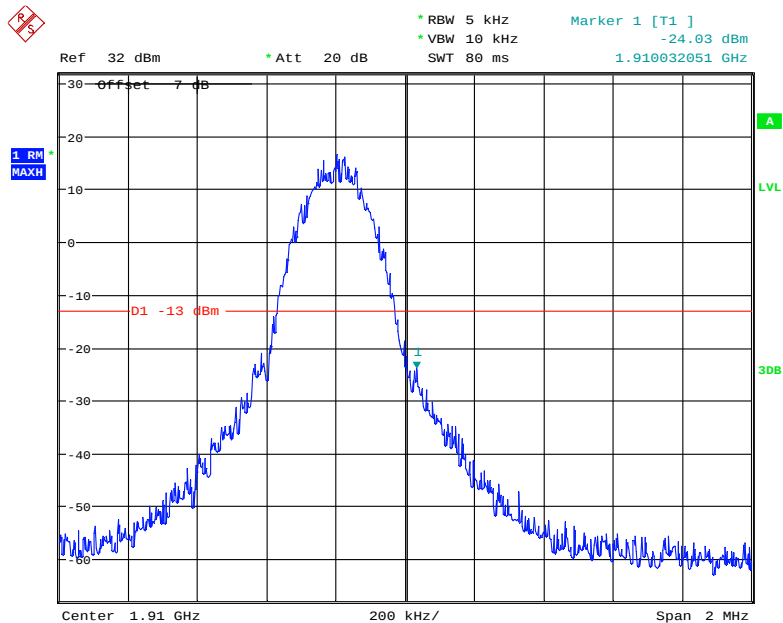
Date: 21.JAN.2019 13:59:49

PCS Band, Left Band Edge for EDGE Mode

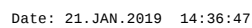
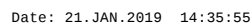


Date: 27.FEB.2019 19:19:28

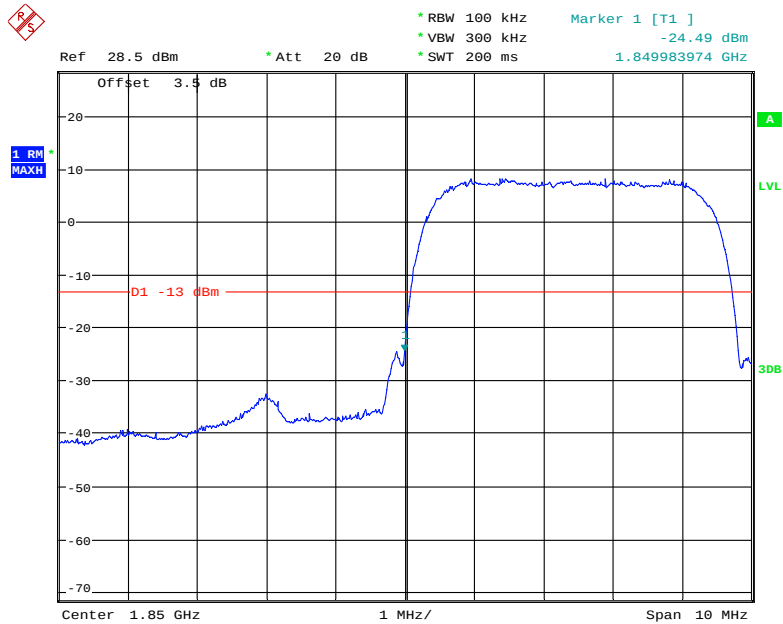
PCS Band, Right Band Edge for EDGE Mode



Date: 27.FEB.2019 19:20:07

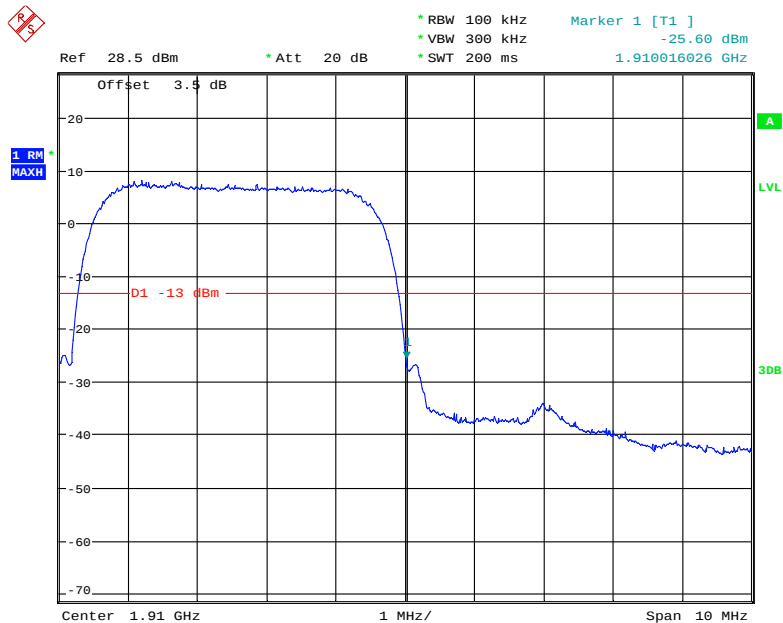


PCS Band, Left Band Edge for HSDPA (16QAM) Mode

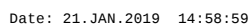
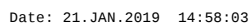


Date: 21.JAN.2019 14:47:02

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

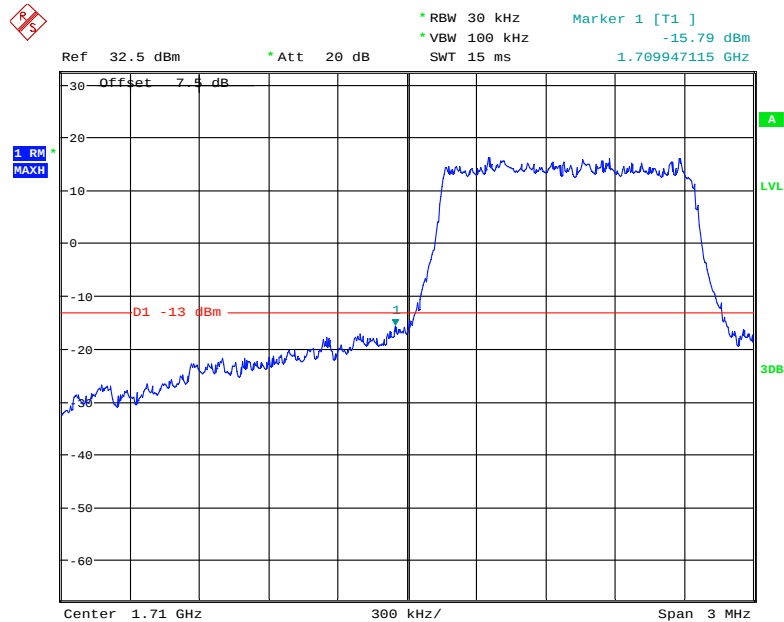


Date: 21.JAN.2019 14:48:11



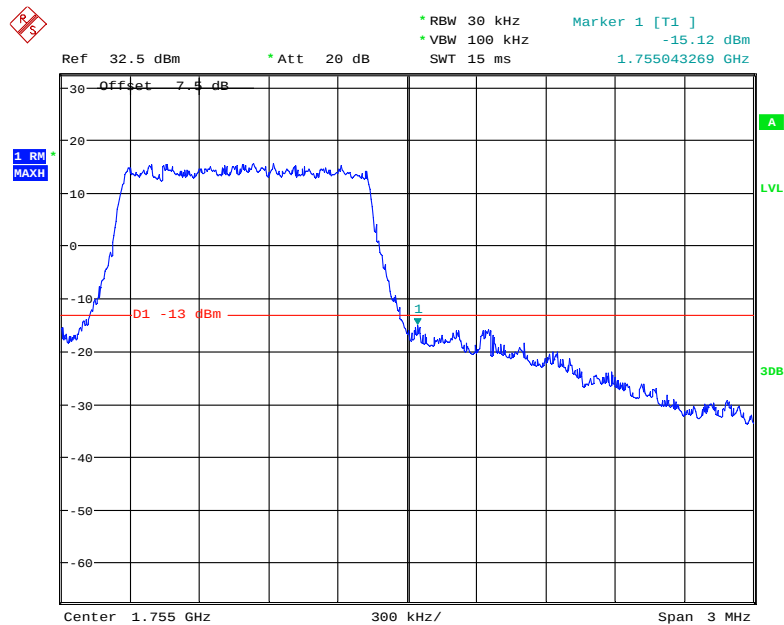
Band 4:

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



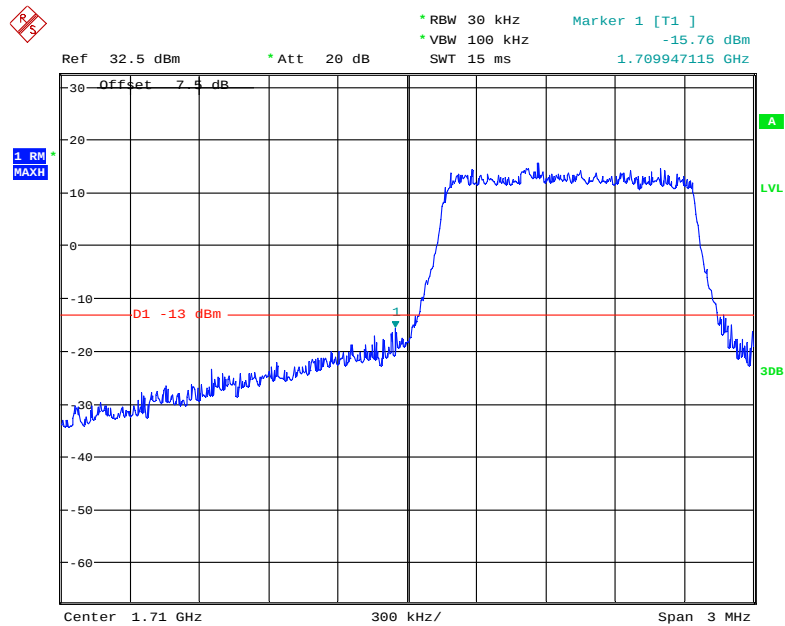
Date: 11.FEB.2019 20:00:08

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



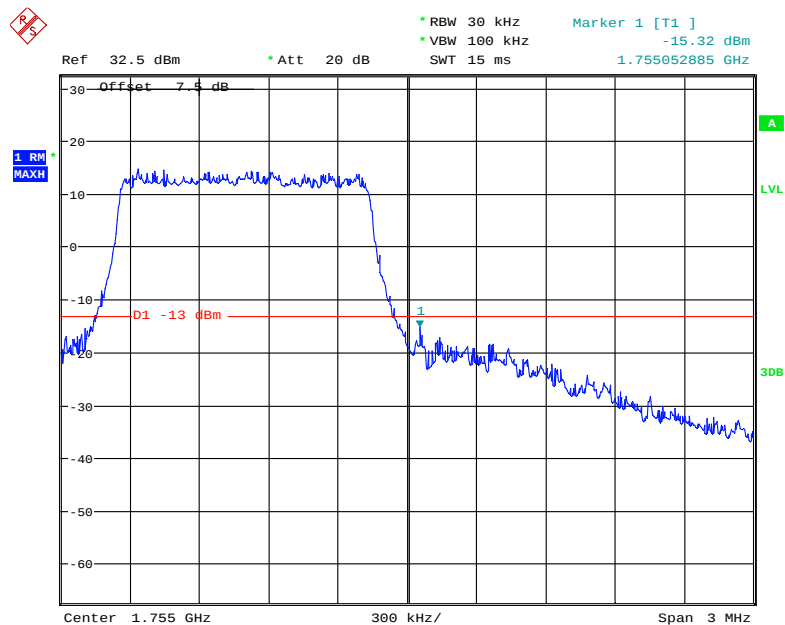
Date: 11.FEB.2019 19:58:50

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



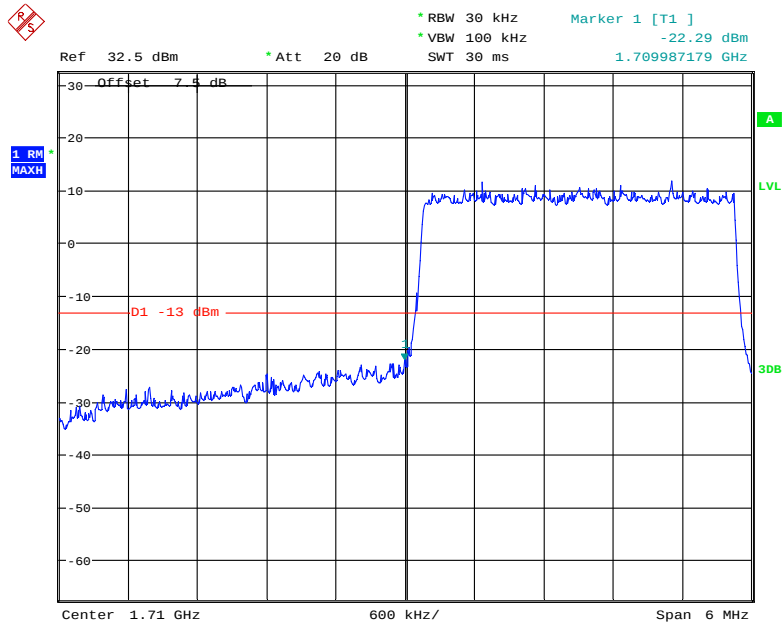
Date: 11.FEB.2019 20:00:33

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



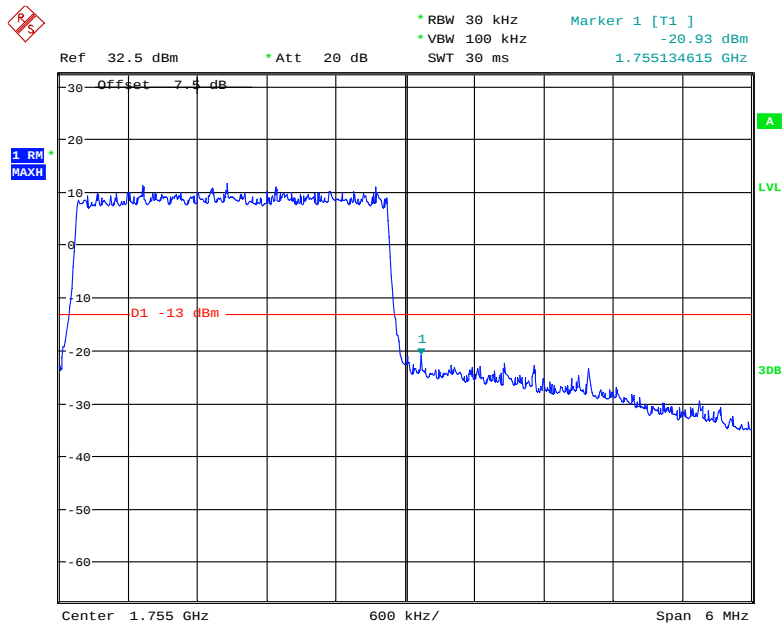
Date: 11.FEB.2019 19:58:01

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



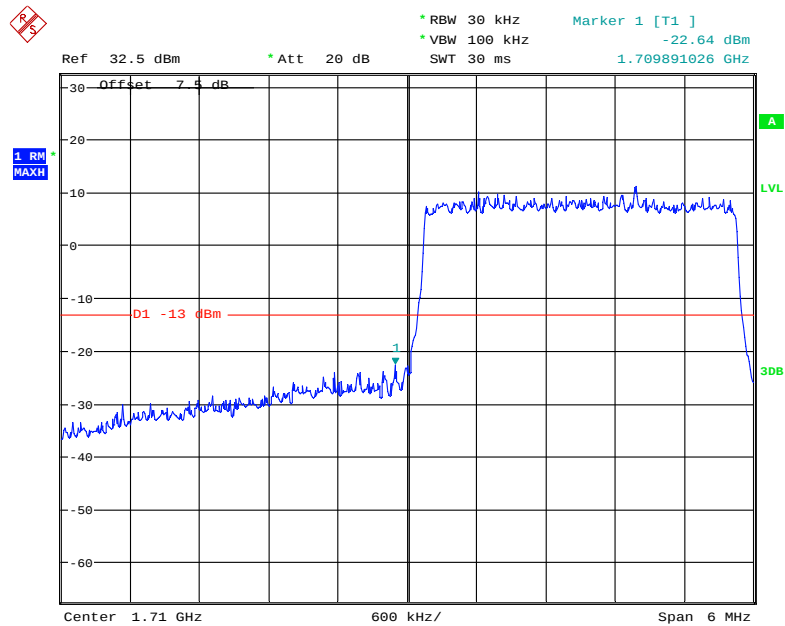
Date: 11.FEB.2019 19:54:32

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



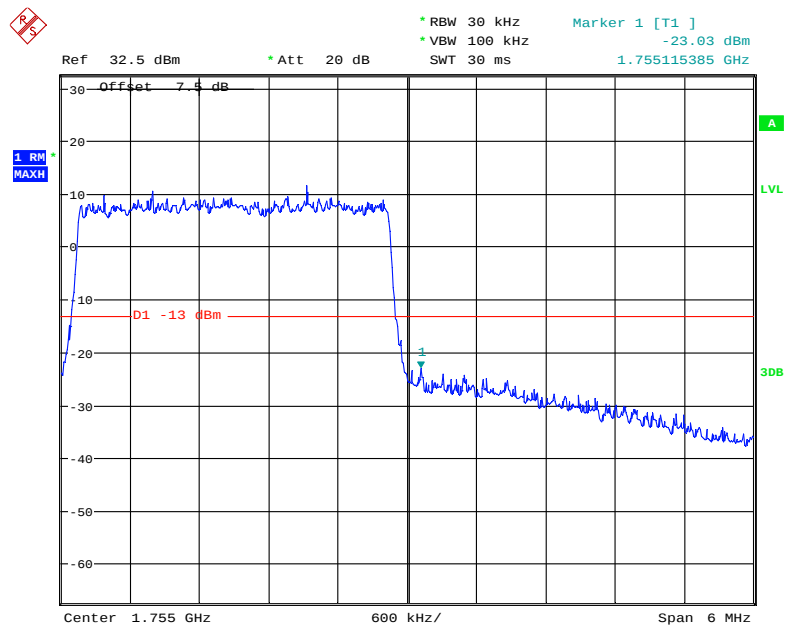
Date: 11.FEB.2019 19:55:14

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



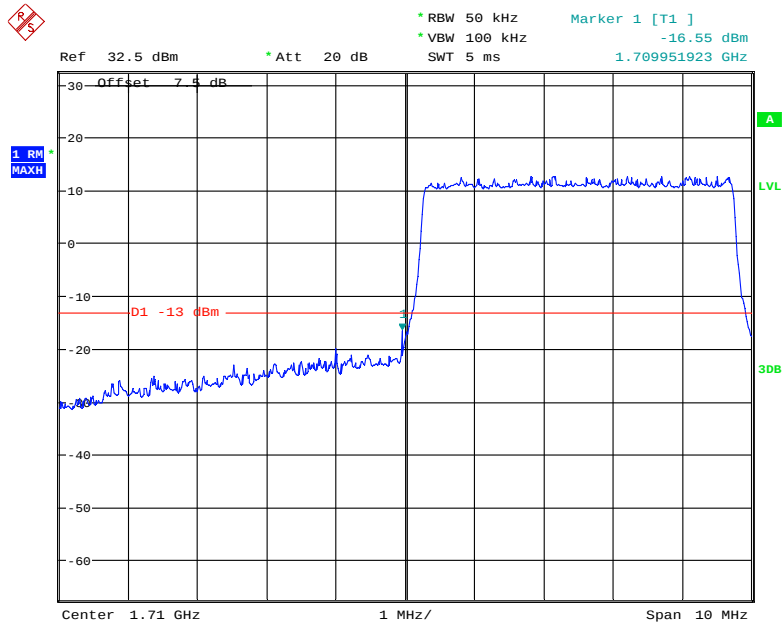
Date: 11.FEB.2019 19:53:45

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



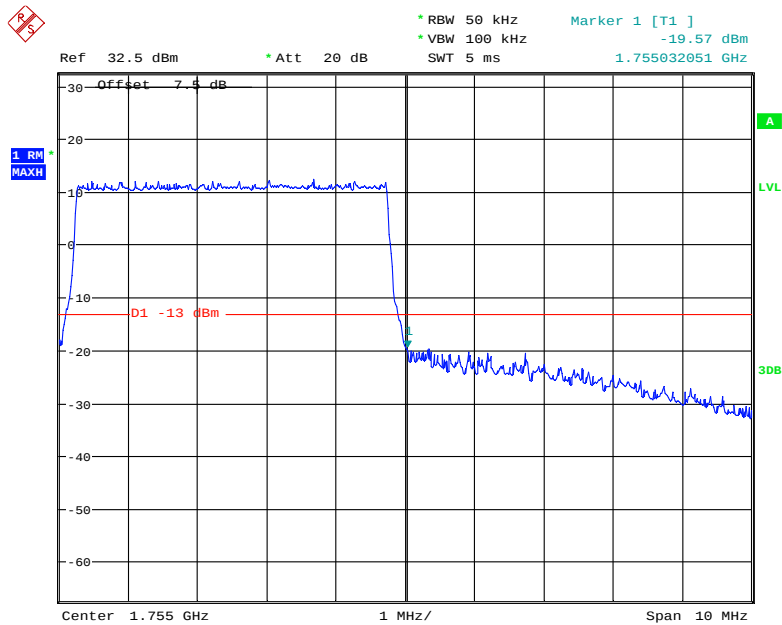
Date: 11.FEB.2019 19:57:10

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



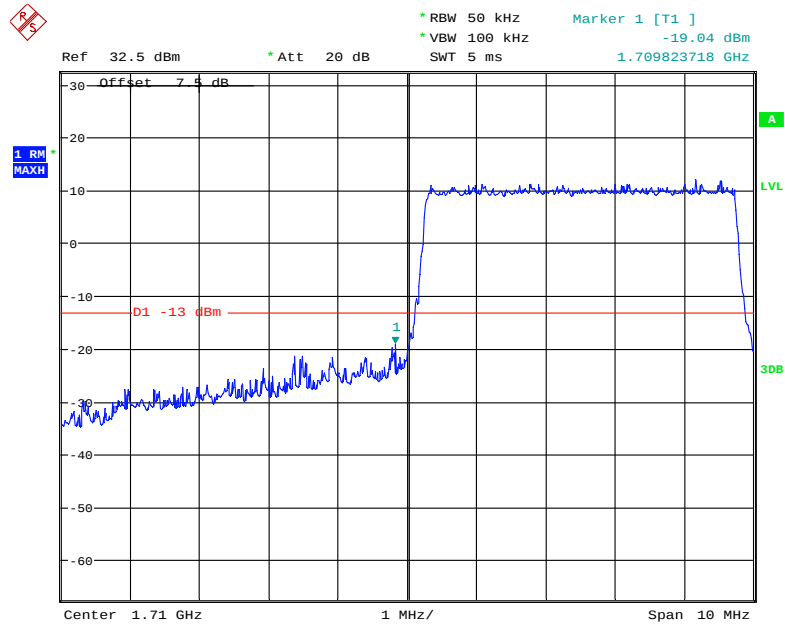
Date: 11.FEB.2019 19:49:40

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



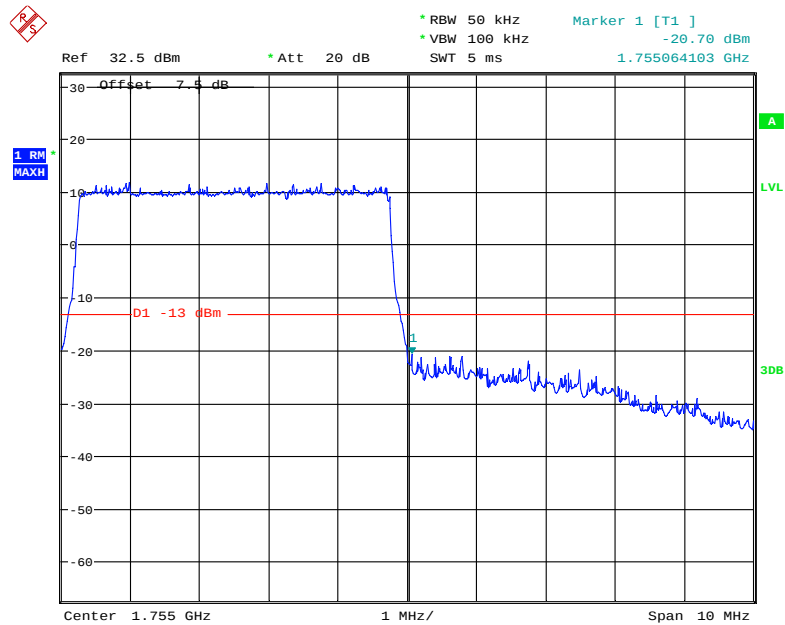
Date: 11.FEB.2019 19:47:09

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



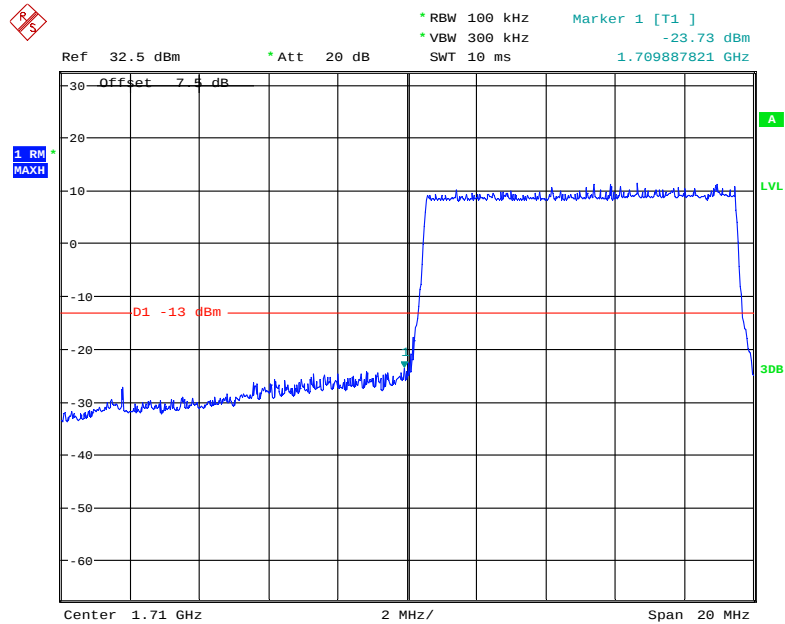
Date: 11.FEB.2019 19:51:17

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



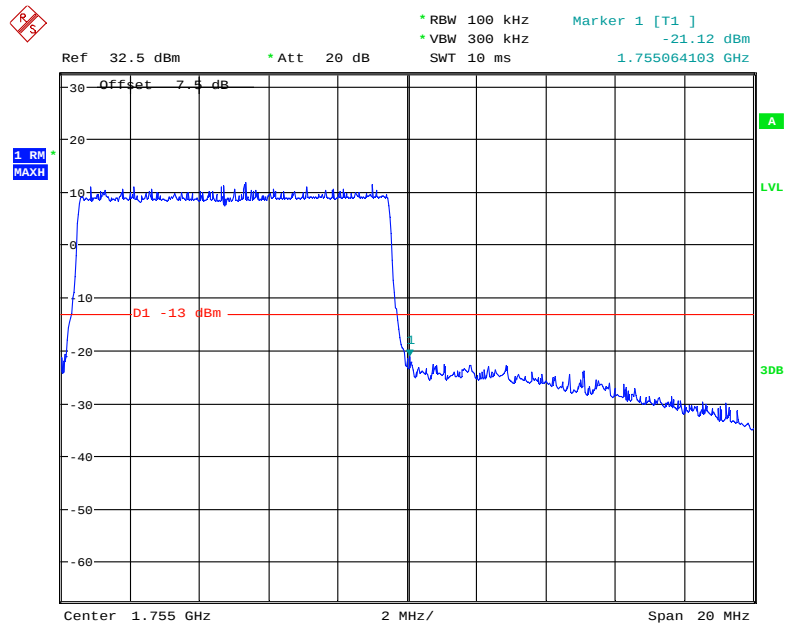
Date: 11.FEB.2019 19:46:26

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

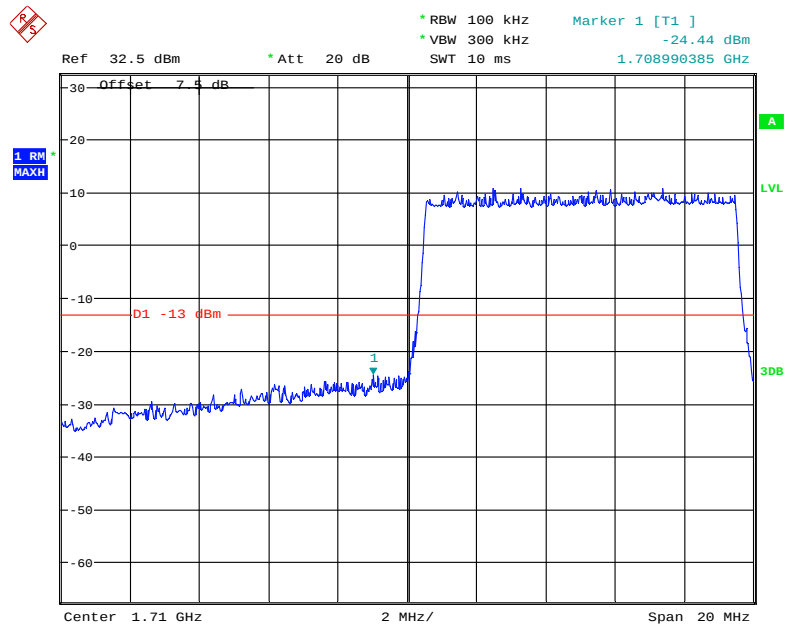


Date: 11.FEB.2019 19:43:45

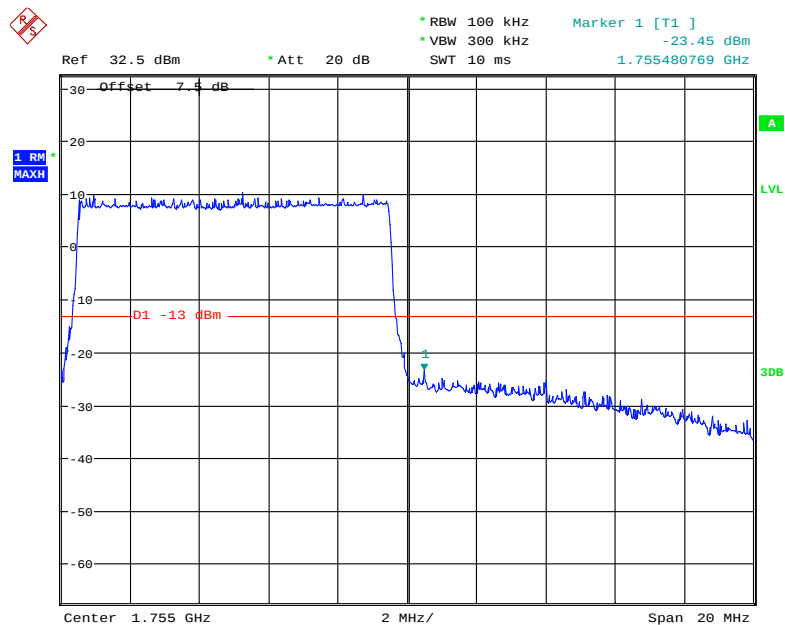
QPSK (10.0 MHz, FULL RB) - Right Band Edge



Date: 11.FEB.2019 19:44:55

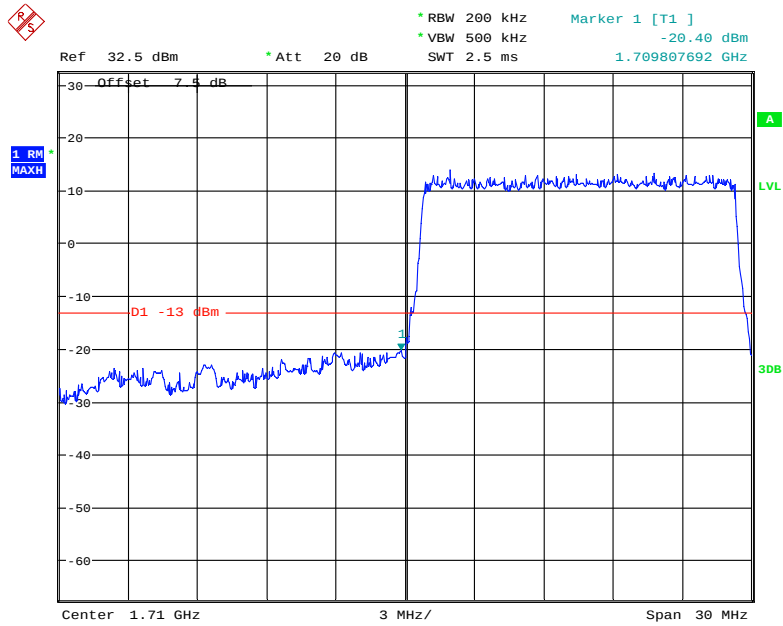
16-QAM (10.0 MHz, FULL RB) - Left Band Edge

Date: 11.FEB.2019 19:42:40

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

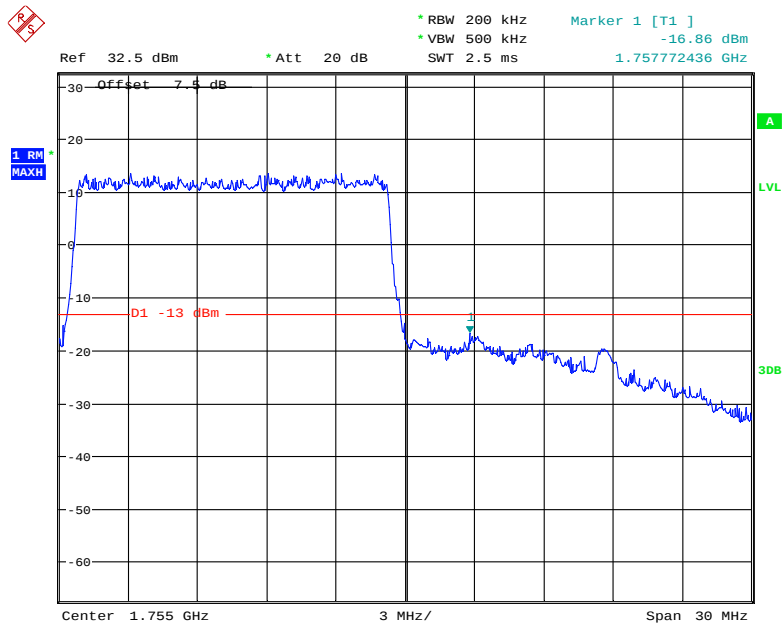
Date: 11.FEB.2019 19:45:30

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



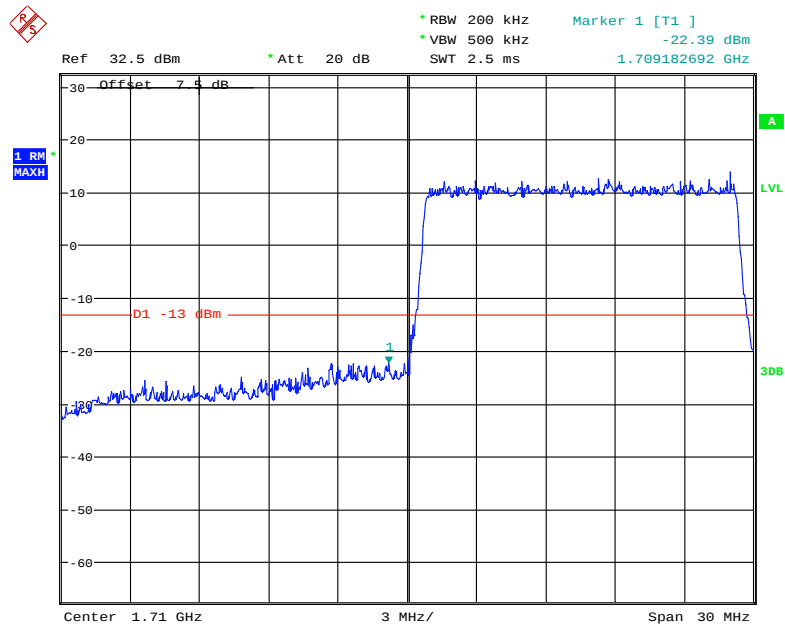
Date: 11.FEB.2019 19:27:34

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



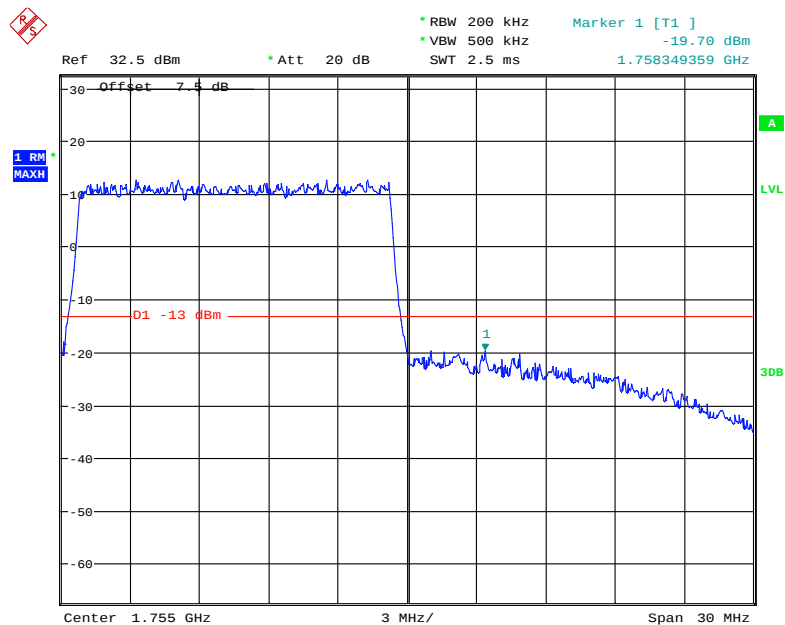
Date: 11.FEB.2019 19:24:46

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



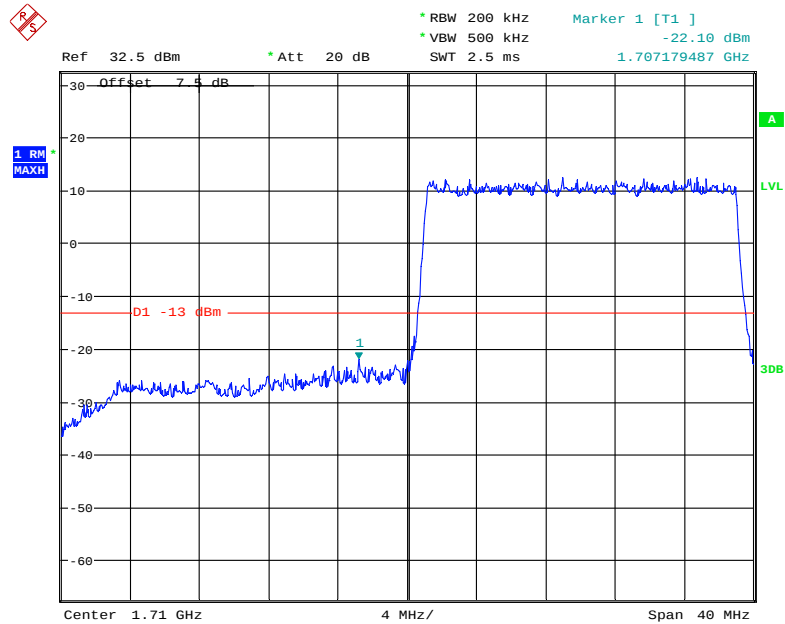
Date: 11.FEB.2019 19:30:24

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



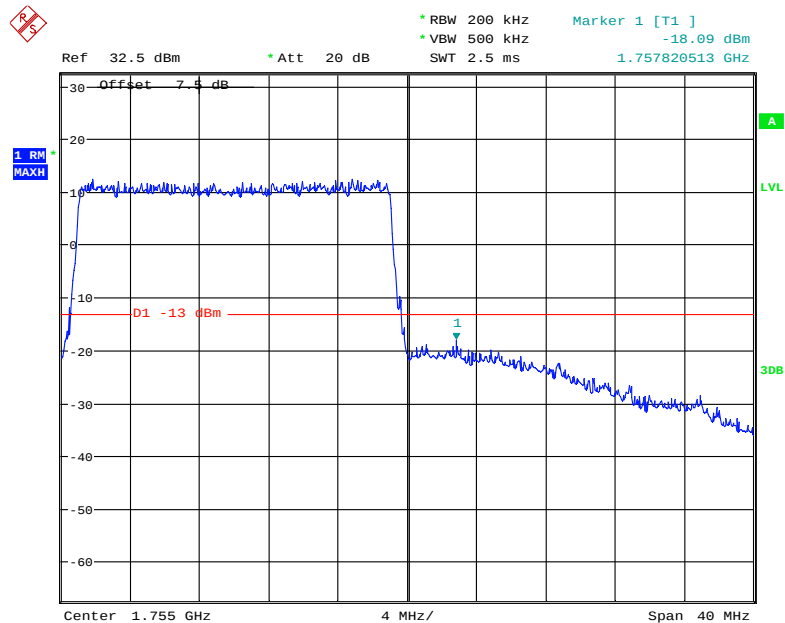
Date: 11.FEB.2019 19:23:22

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



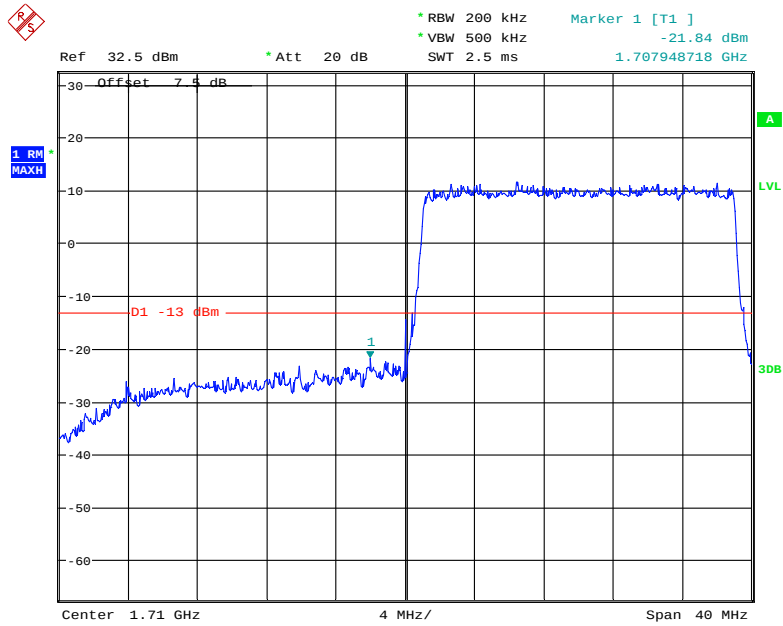
Date: 11.FEB.2019 19:14:34

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



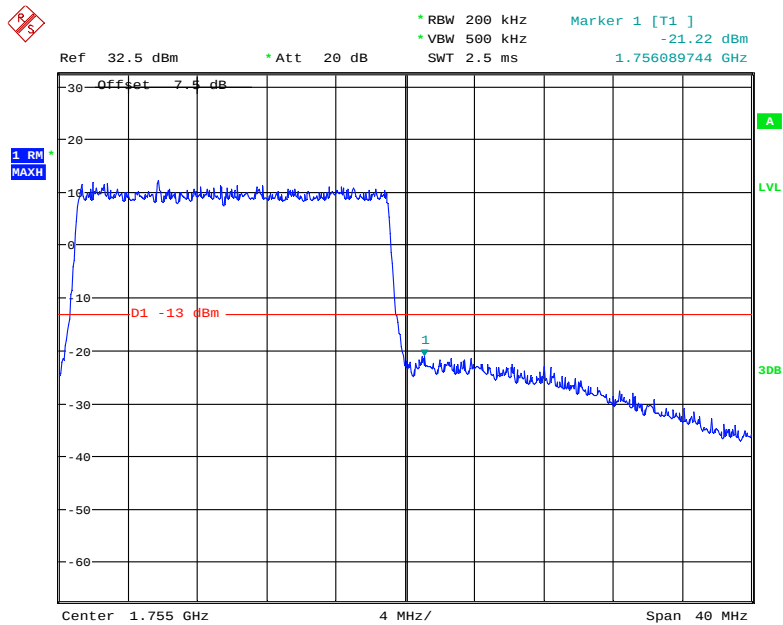
Date: 11.FEB.2019 19:18:14

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



Date: 11.FEB.2019 19:12:19

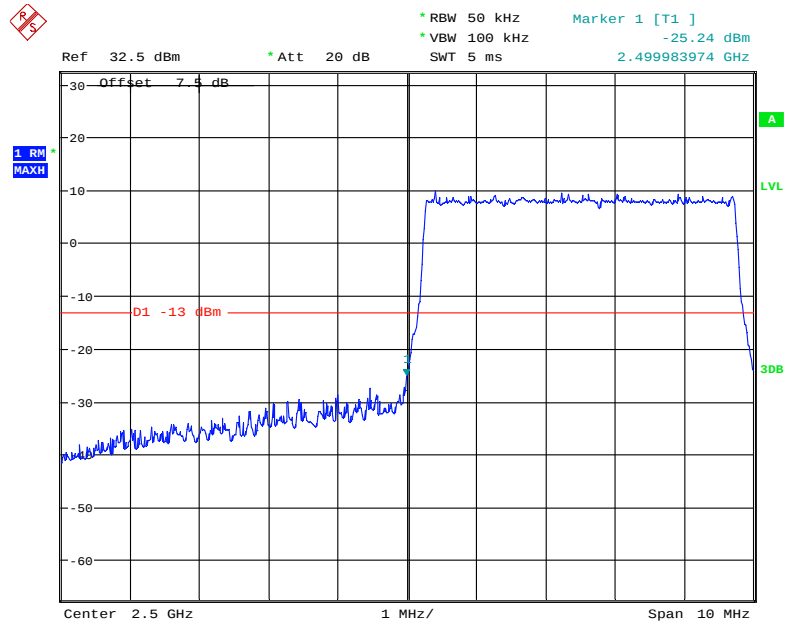
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 11.FEB.2019 19:20:00

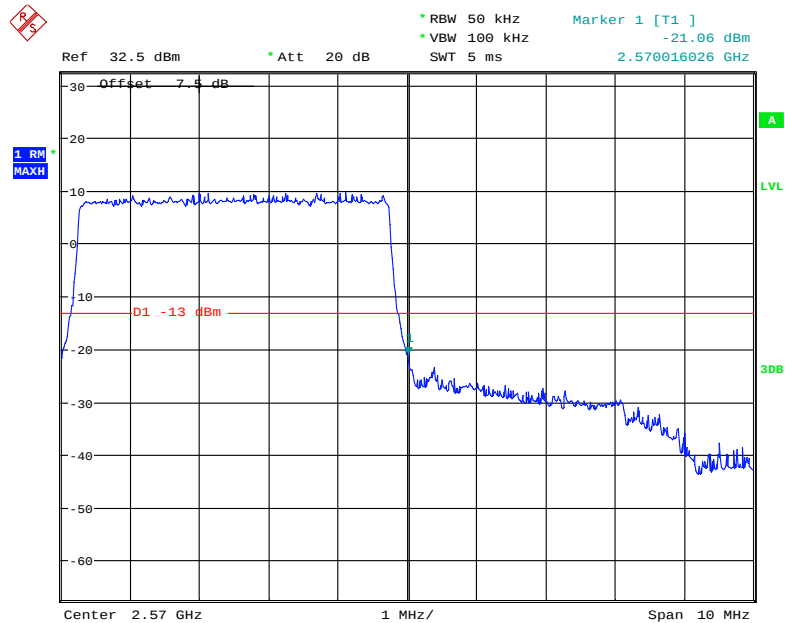
Band 7:

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



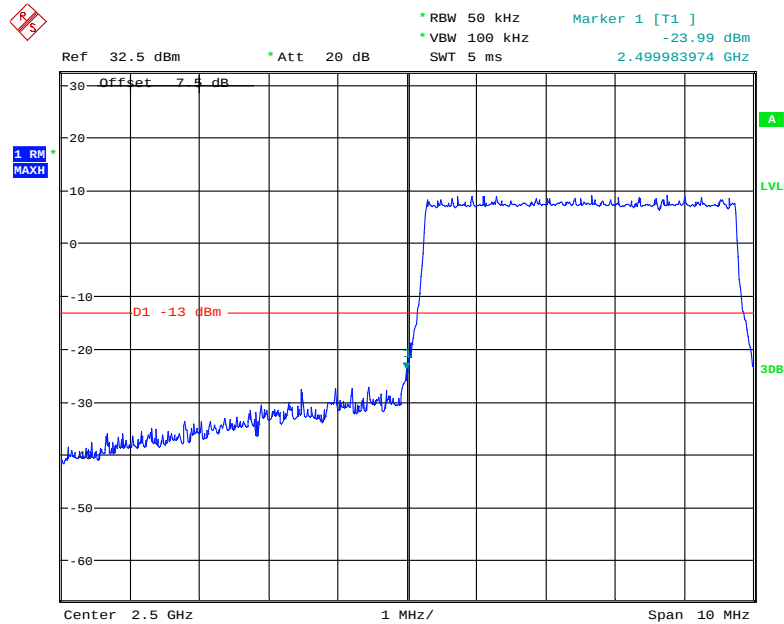
Date: 23.JAN.2019 20:31:17

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



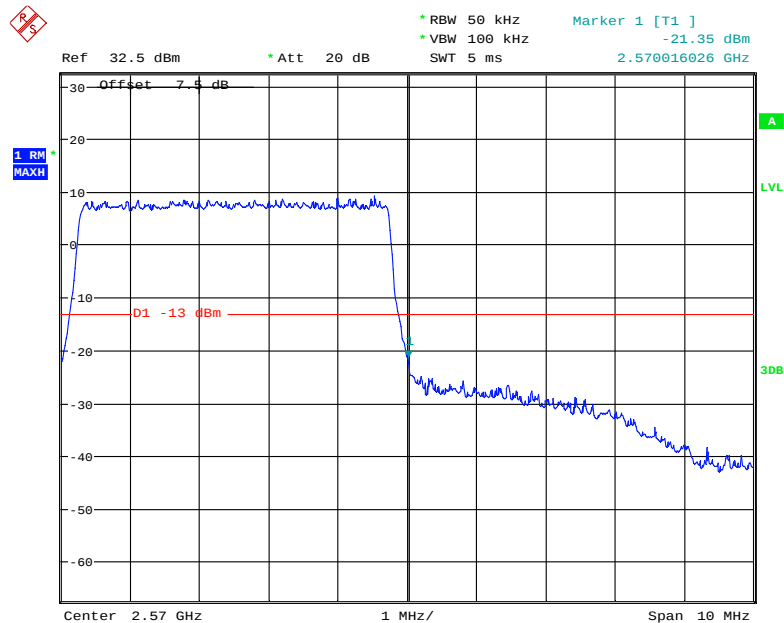
Date: 23.JAN.2019 20:34:13

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



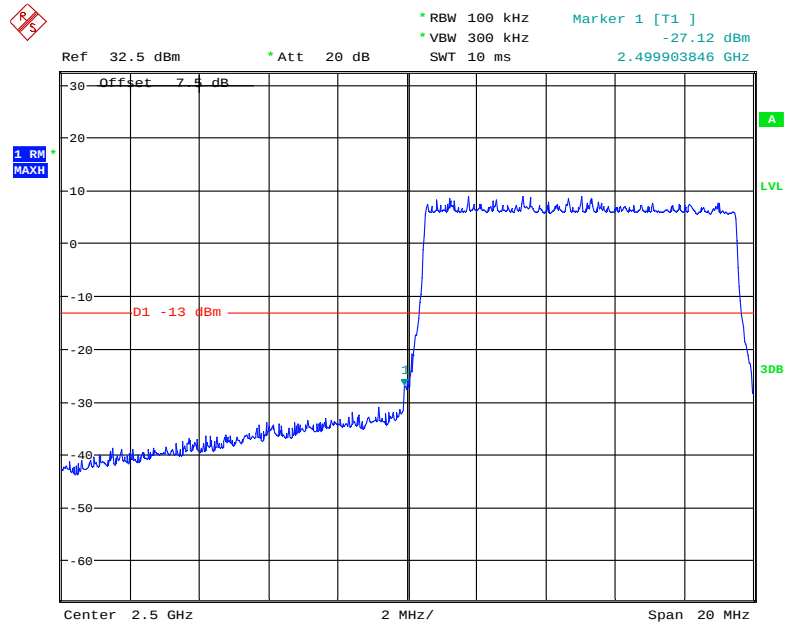
Date: 23.JAN.2019 20:29:45

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



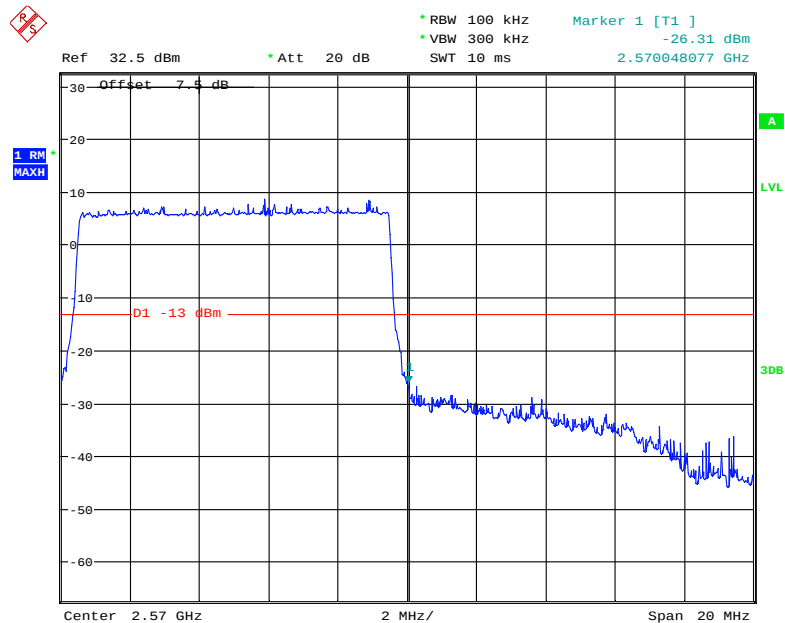
Date: 23.JAN.2019 20:36:18

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



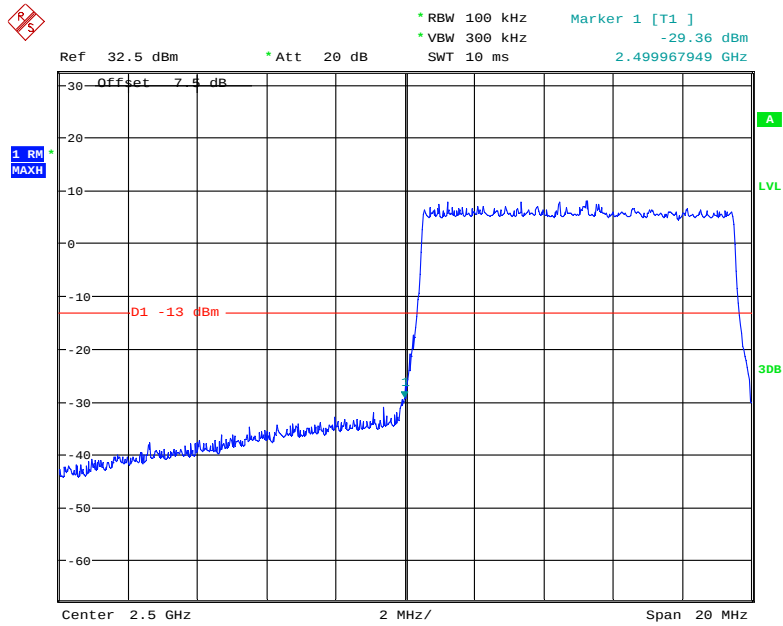
Date: 23.JAN.2019 20:42:30

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



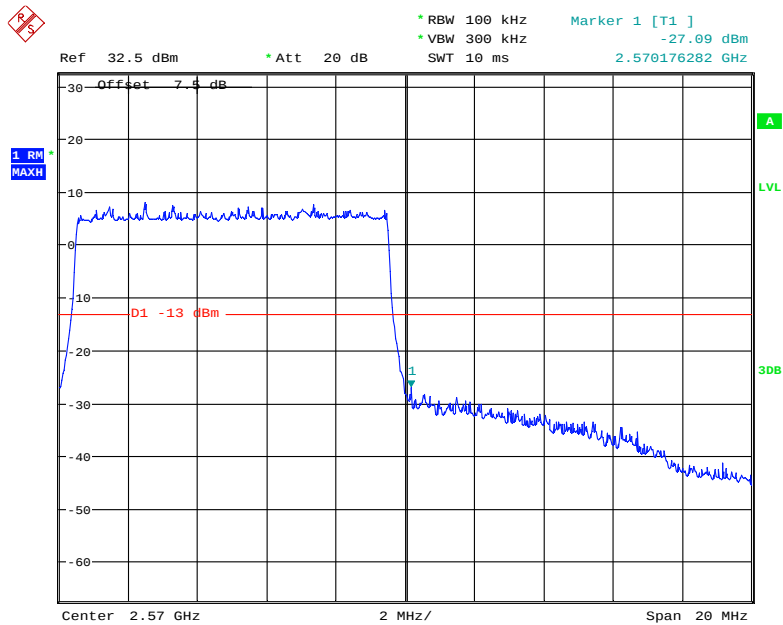
Date: 23.JAN.2019 20:40:18

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



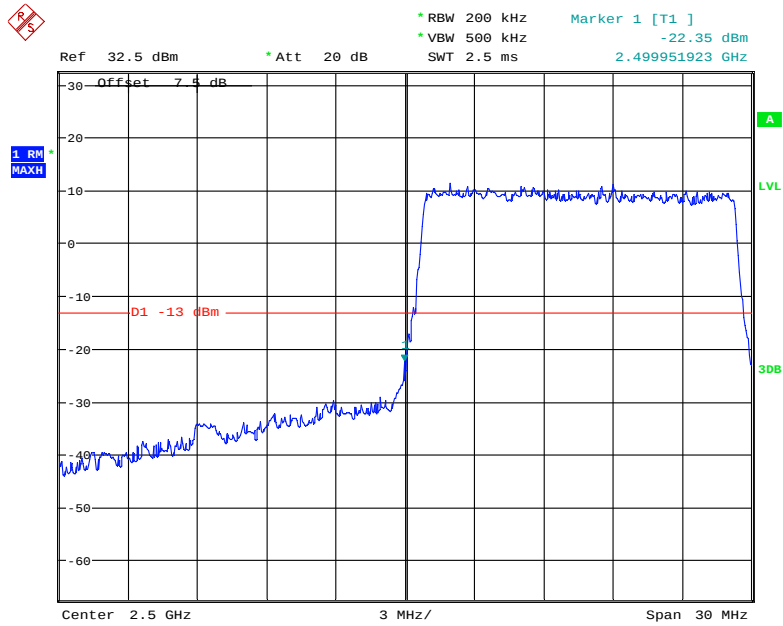
Date: 23.JAN.2019 20:50:39

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



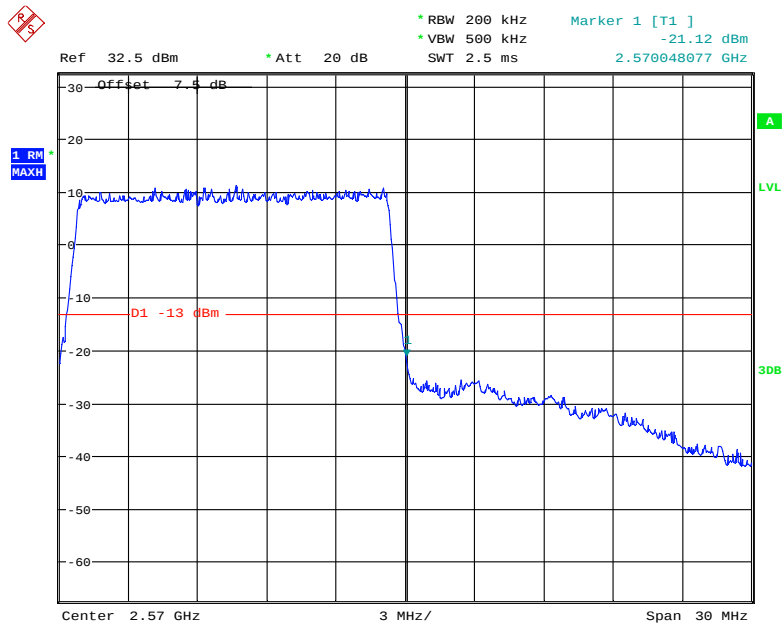
Date: 23.JAN.2019 20:39:24

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



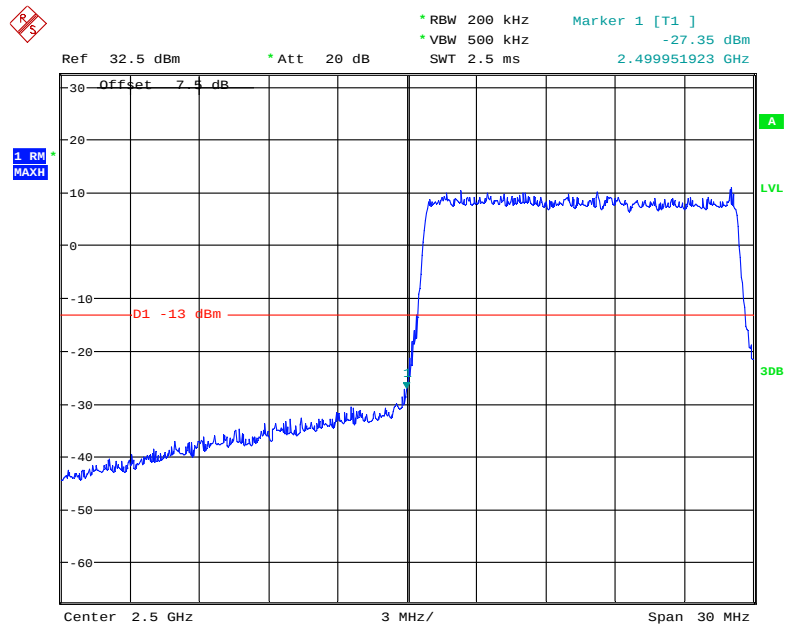
Date: 23.JAN.2019 20:54:54

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



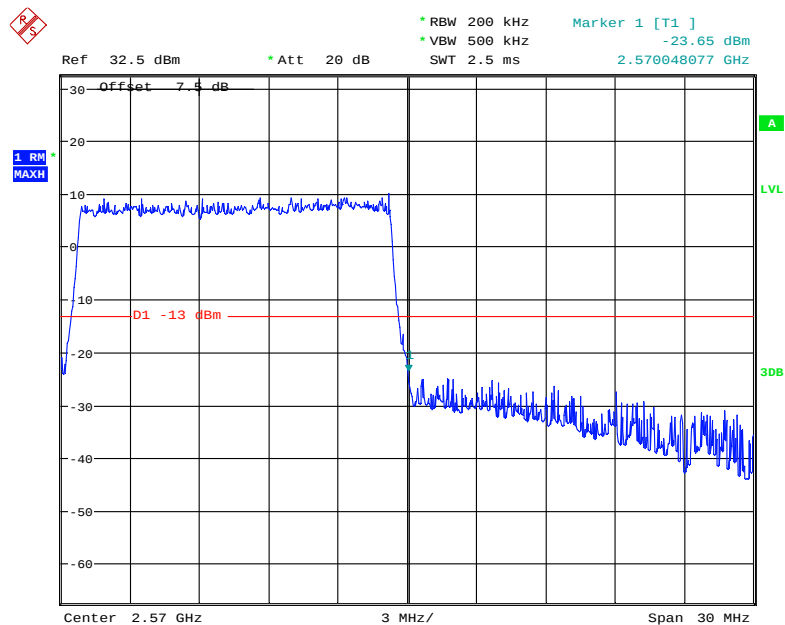
Date: 23.JAN.2019 20:57:43

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



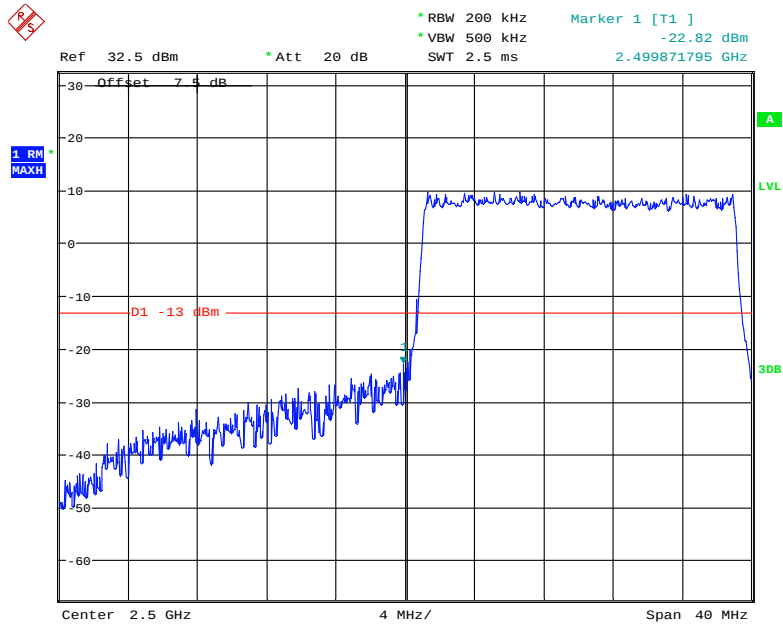
Date: 23.JAN.2019 20:53:00

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



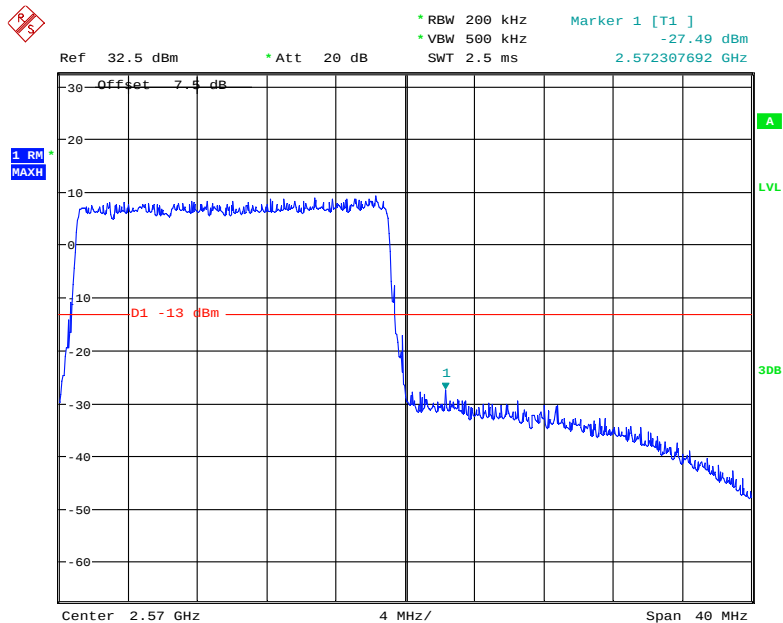
Date: 23.JAN.2019 20:58:23

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



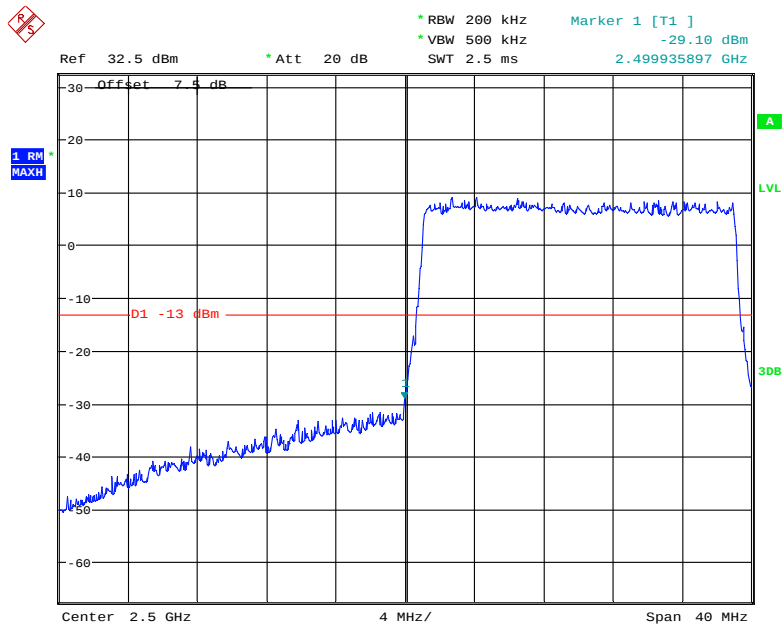
Date: 23.JAN.2019 21:03:57

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



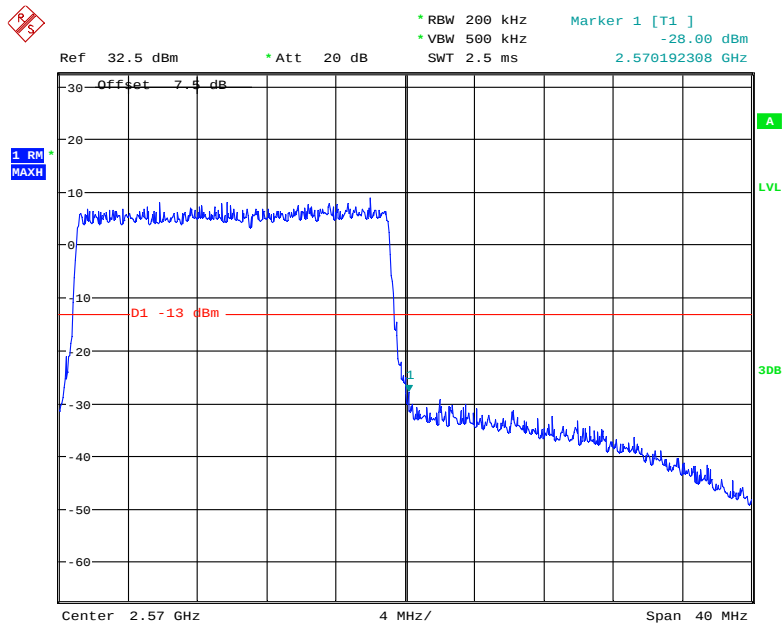
Date: 23.JAN.2019 21:05:07

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

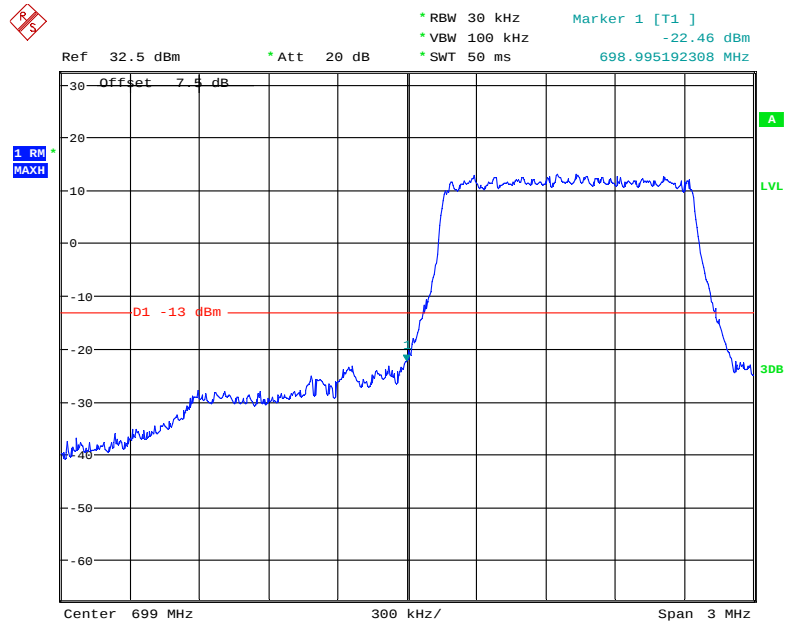


Date: 23.JAN.2019 21:01:54

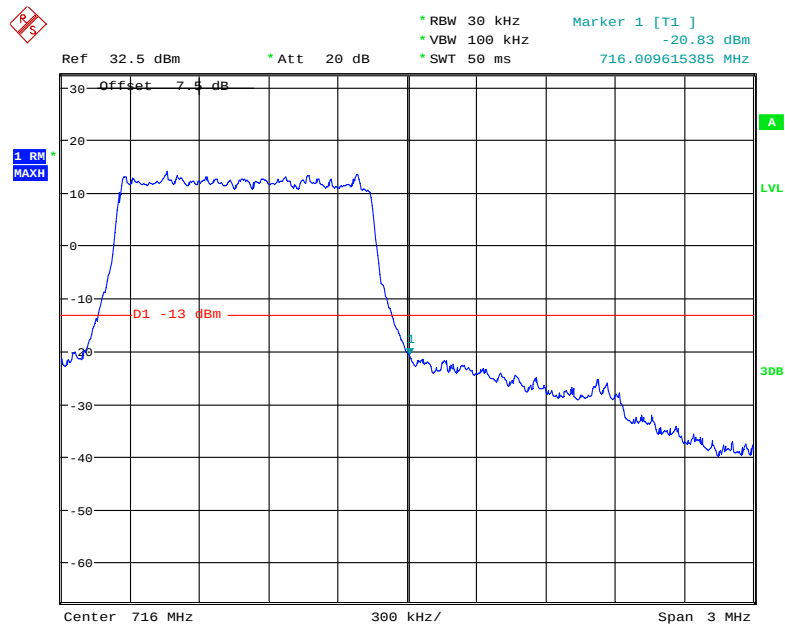
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 23.JAN.2019 21:06:22

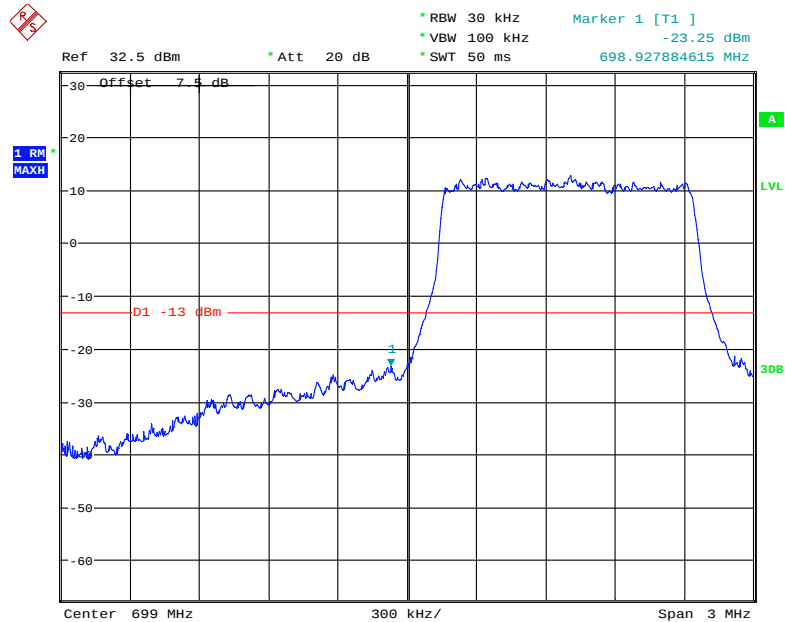
Band 12:**QPSK (1.4 MHz, FULL RB) - Left Band Edge**

Date: 23.JAN.2019 19:56:06

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

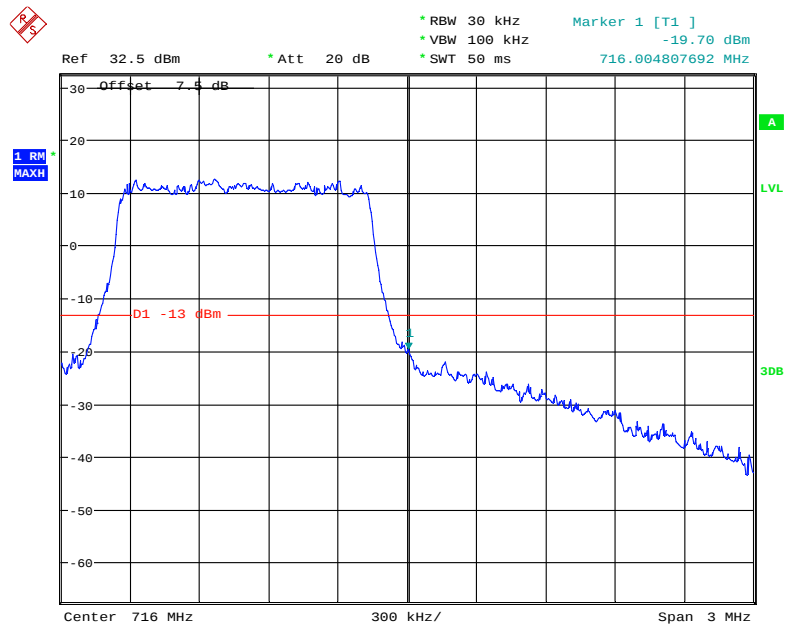
Date: 23.JAN.2019 19:57:42

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



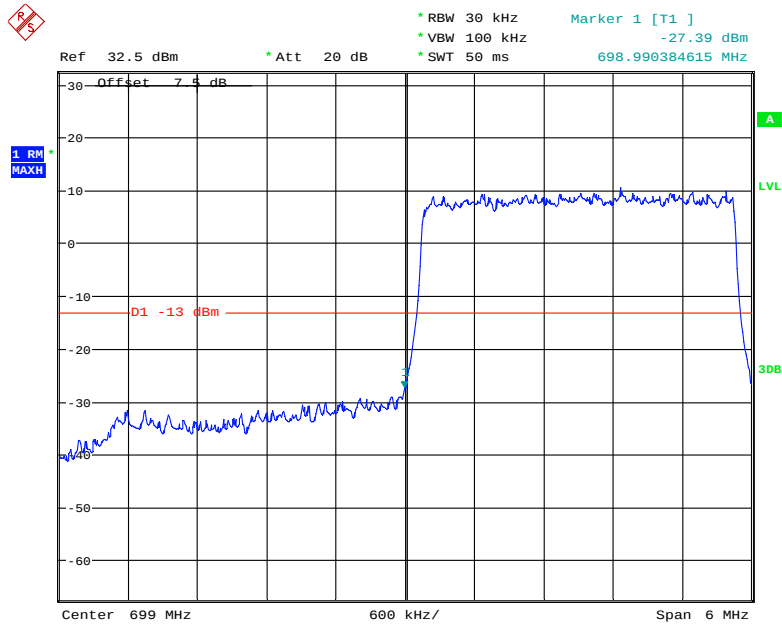
Date: 23.JAN.2019 19:54:56

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



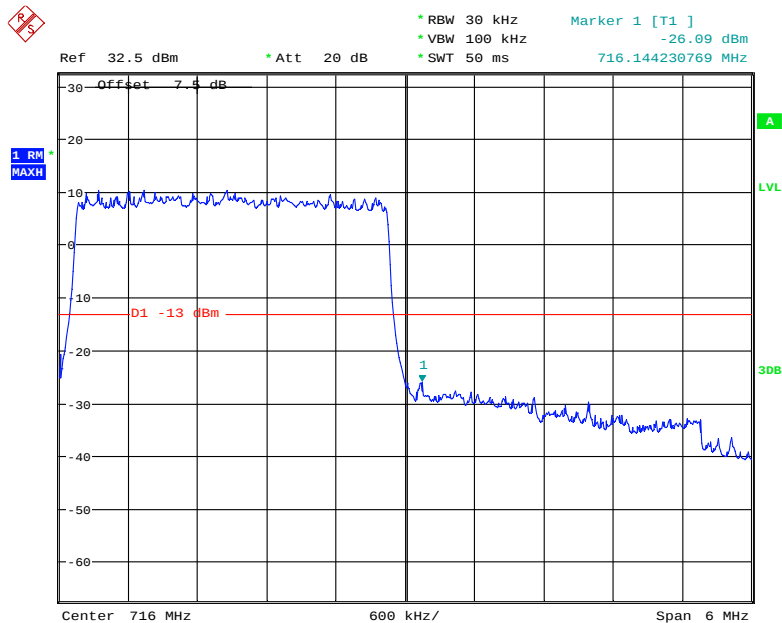
Date: 23.JAN.2019 20:01:17

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



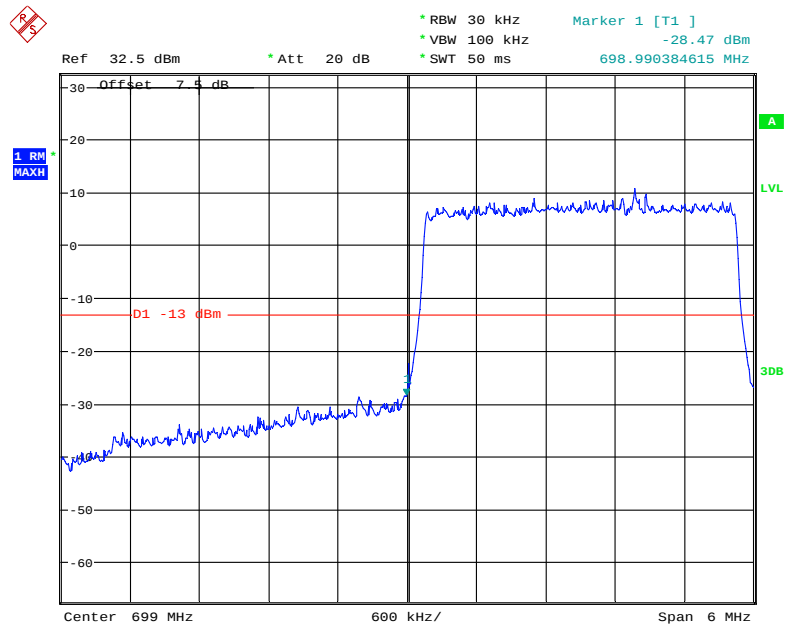
Date: 23.JAN.2019 20:07:04

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



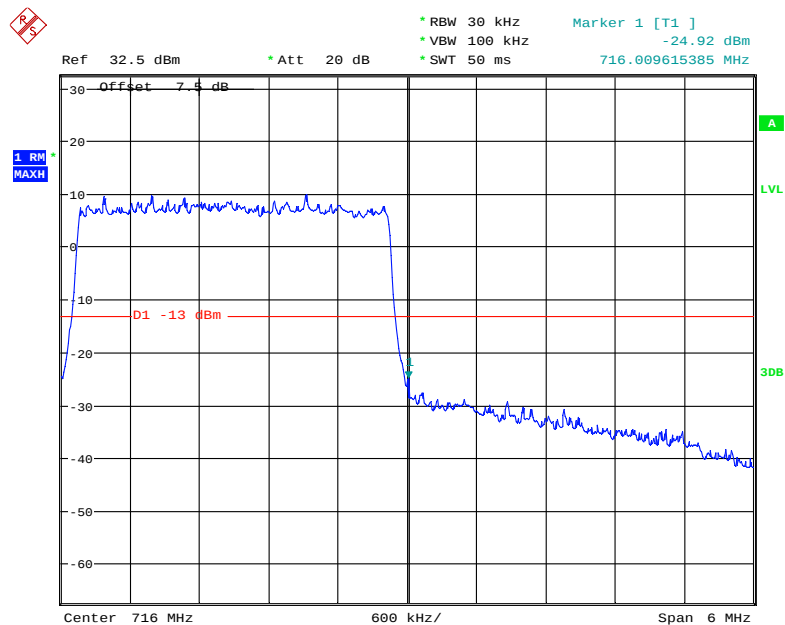
Date: 23.JAN.2019 20:10:05

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



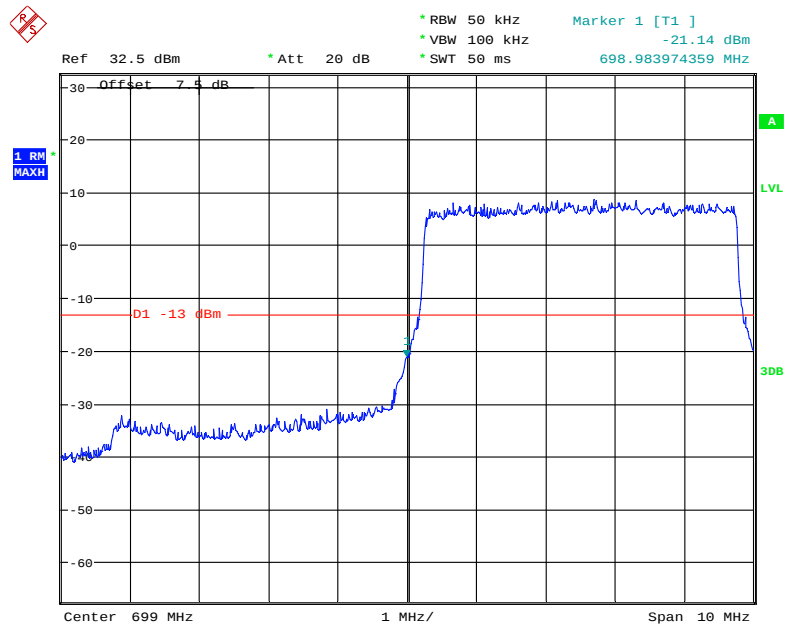
Date: 23.JAN.2019 20:02:49

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



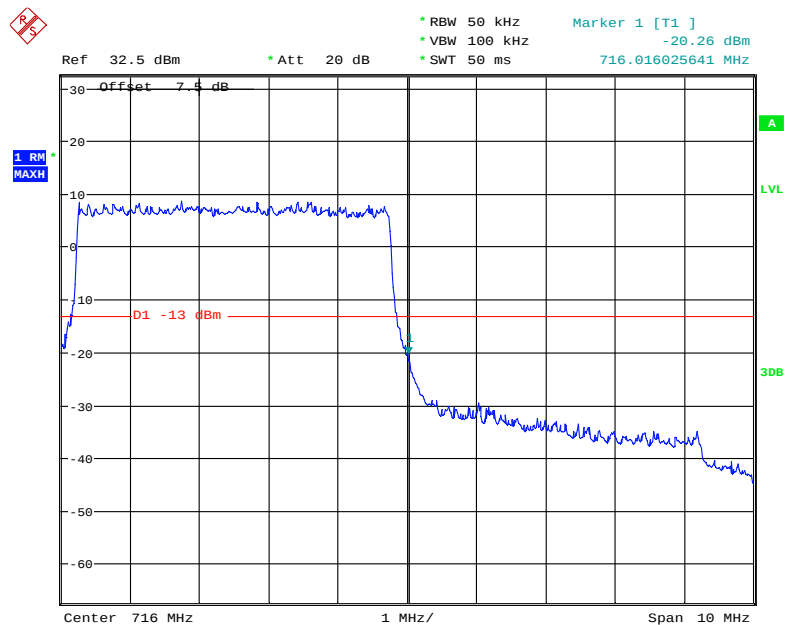
Date: 23.JAN.2019 20:14:48

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



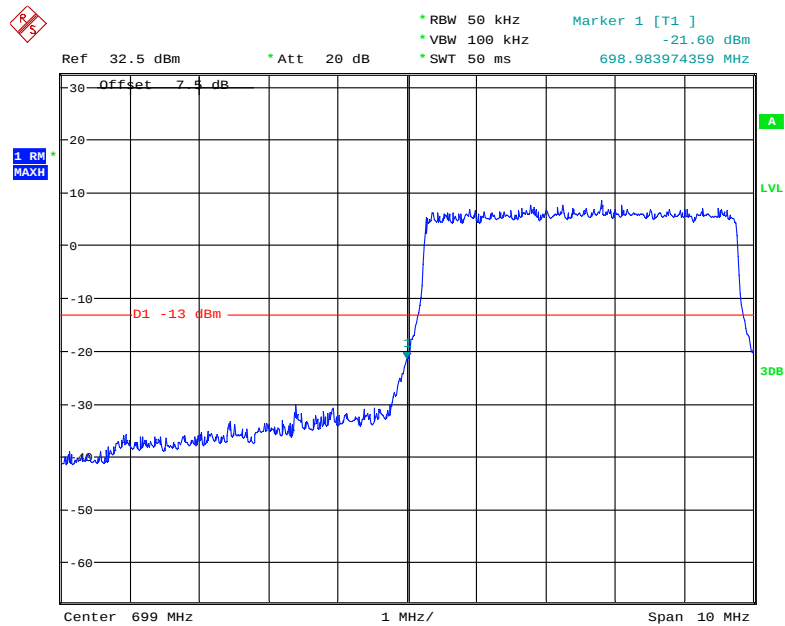
Date: 23.JAN.2019 20:20:42

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



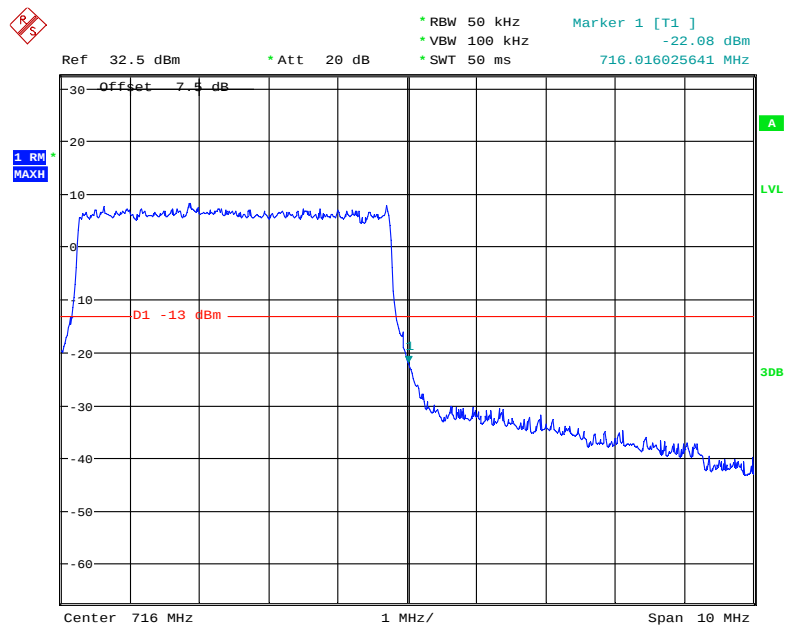
Date: 23.JAN.2019 20:19:22

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



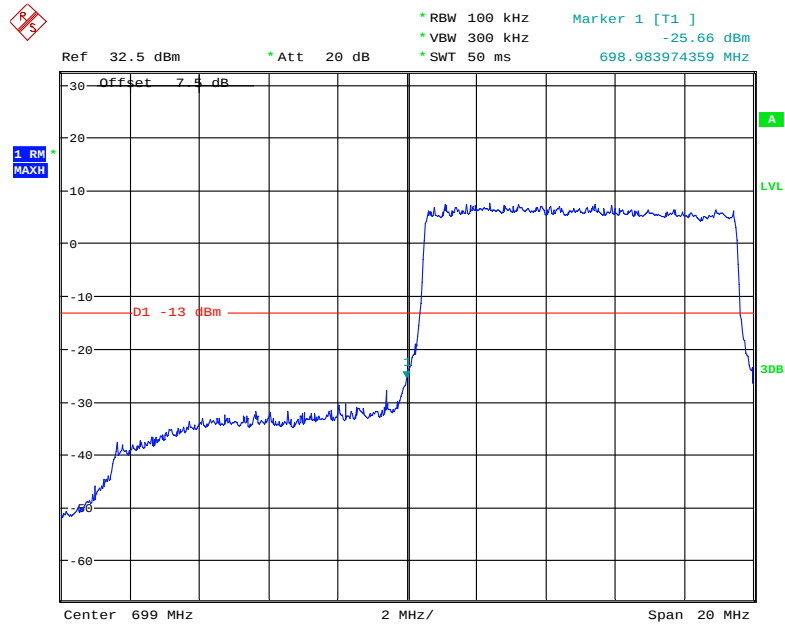
Date: 23.JAN.2019 20:21:24

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



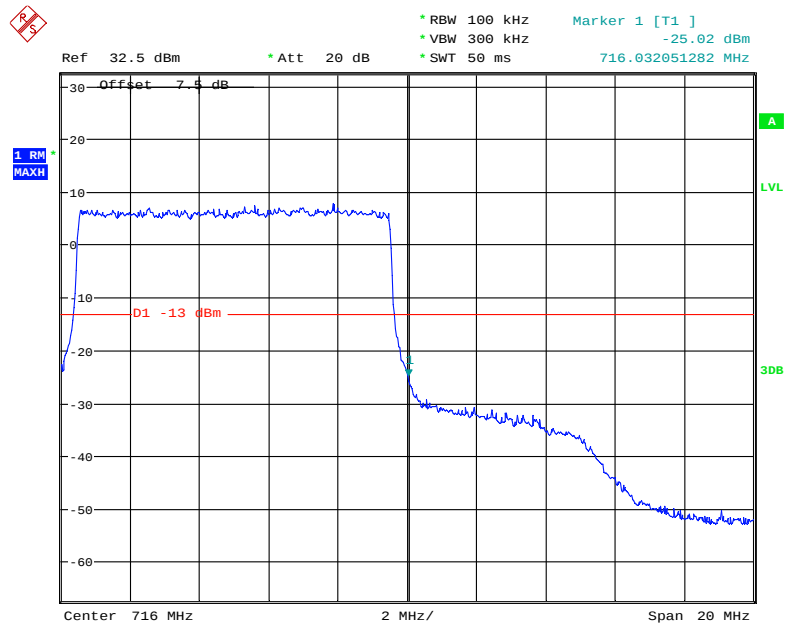
Date: 23.JAN.2019 20:17:01

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



Date: 23.JAN.2019 20:26:43

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



Date: 23.JAN.2019 20:27:34

Ref 32.5 dBm * Att 20 dB * RBW 100 kHz * VBW 300 kHz * SWT 50 ms Marker 1 [T1] -26.11 dBm 698.983974359 MHz

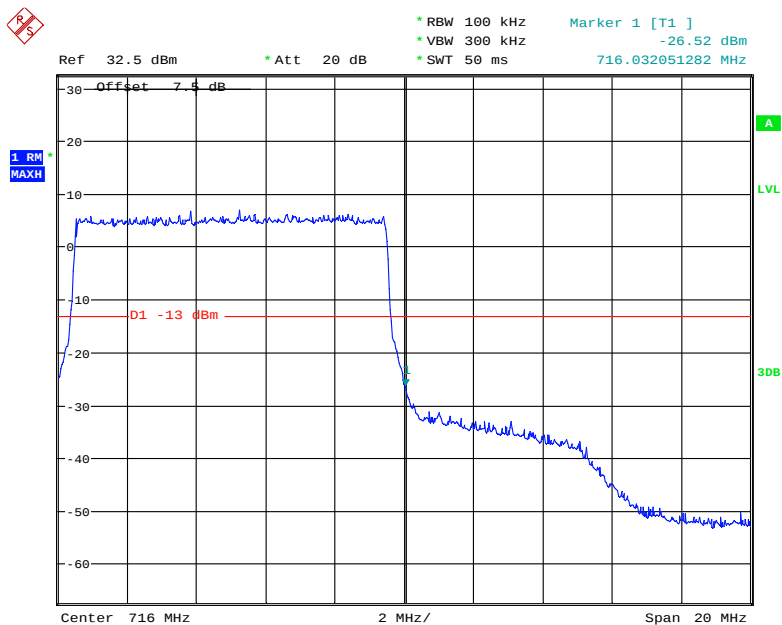
Offset 7.5 dB

1 RM MAXH

D1 -13 dBm

Center 699 MHz 2 MHz/ Span 20 MHz

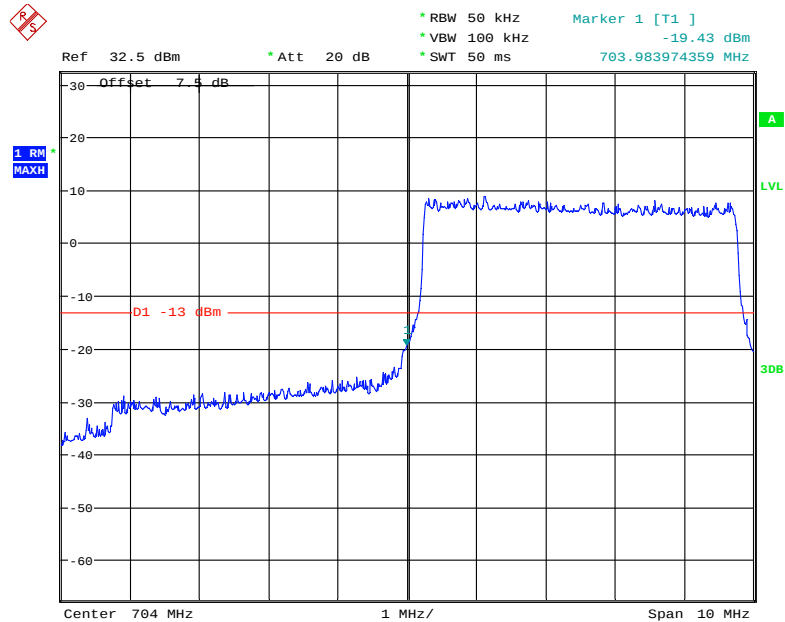
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



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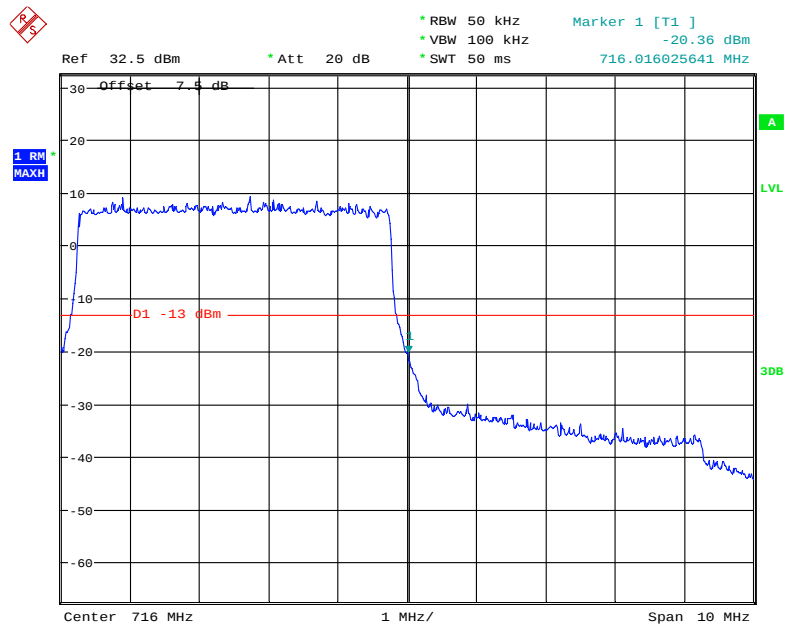
Band 17:

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



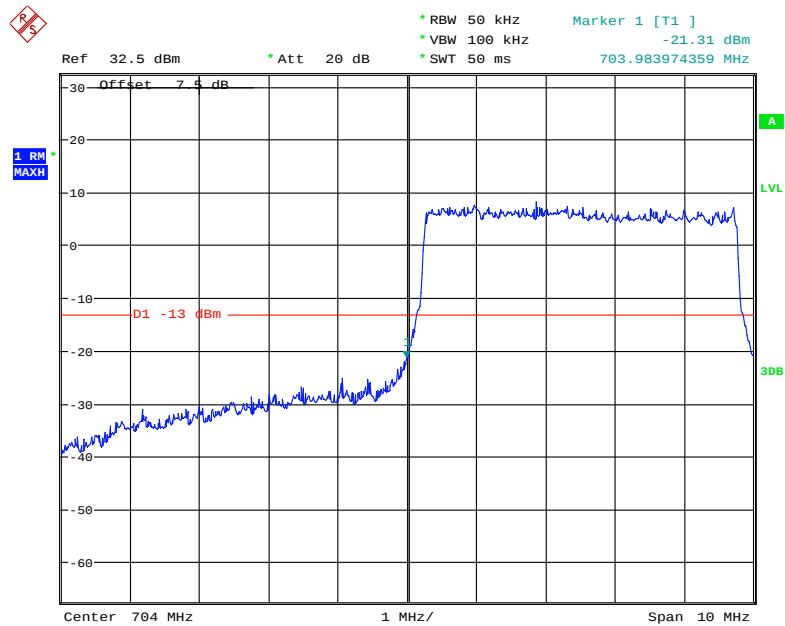
Date: 23.JAN.2019 19:50:16

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



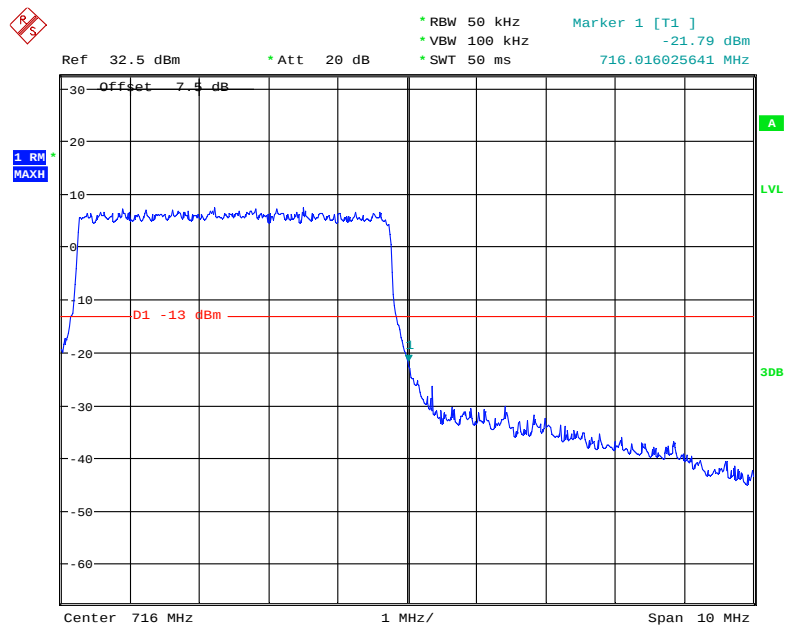
Date: 23.JAN.2019 19:51:04

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



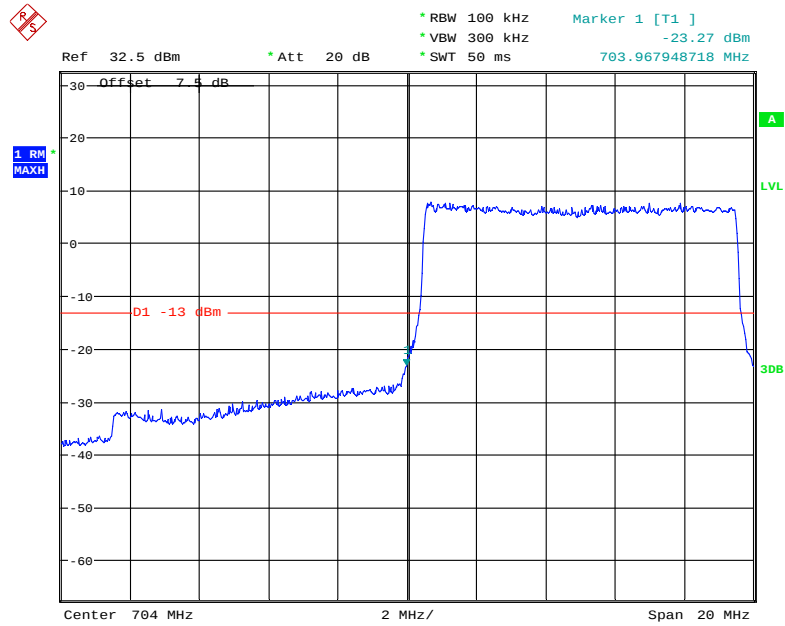
Date: 23.JAN.2019 19:49:45

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



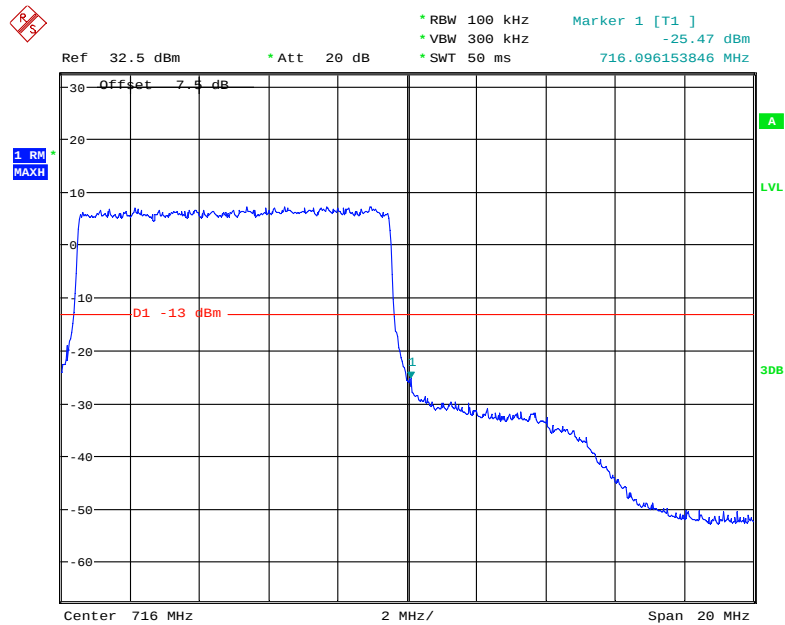
Date: 23.JAN.2019 19:51:46

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



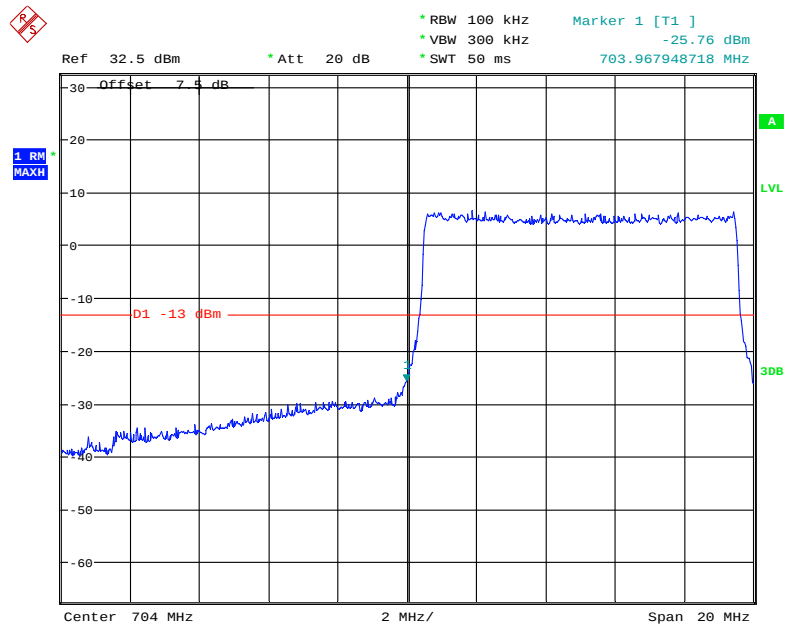
Date: 23.JAN.2019 19:48:07

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



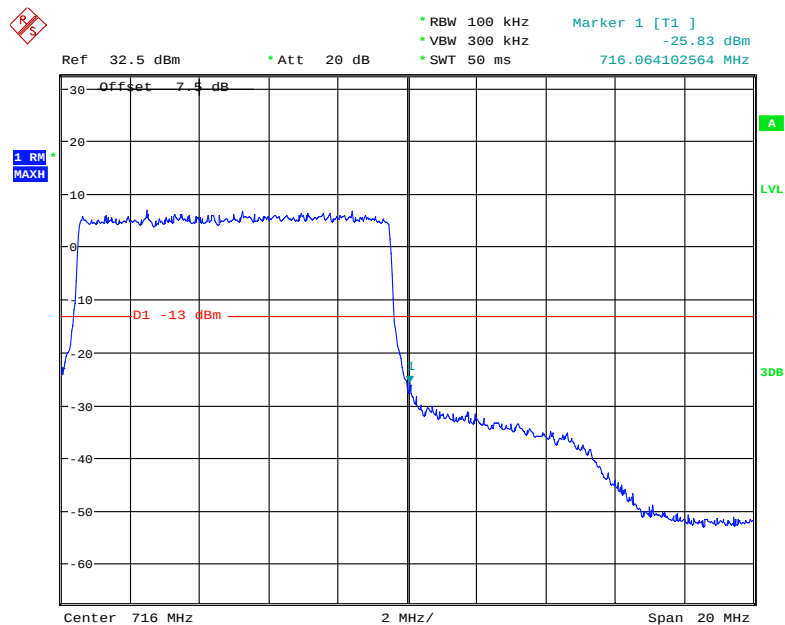
Date: 23.JAN.2019 19:46:55

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



Date: 23.JAN.2019 19:48:54

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



Date: 23.JAN.2019 19:39:17

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

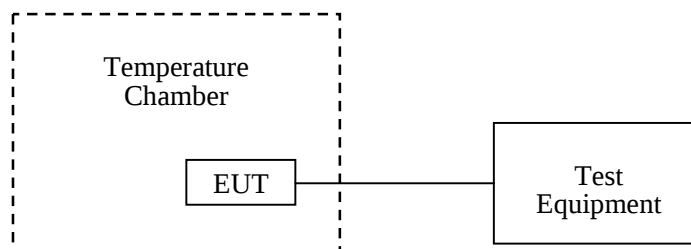
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Tracy Hu on 2019-02-21.

EUT operation mode: Transmitting

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

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

Middle Channel, $f_0=836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.85	8	0.009563	2.5
-20		8	0.009563	2.5
-10		12	0.014344	2.5
0		10	0.011953	2.5
10		6	0.007172	2.5
20		3	0.003586	2.5
30		9	0.010758	2.5
40		11	0.013148	2.5
50		15	0.017930	2.5
20	V min.= 3.3	14	0.016734	2.5
	V max.= 4.4	16	0.019125	2.5

EDGE Mode

Middle Channel, $f_0=836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.85	4	0.004781	2.5
-20		4	0.004781	2.5
-10		3	0.003586	2.5
0		1	0.001195	2.5
10		7	0.008367	2.5
20		2	0.002391	2.5
30		5	0.005977	2.5
40		8	0.009563	2.5
50		9	0.010758	2.5
20	V min.= 3.3	10	0.011953	2.5
	V max.= 4.4	6	0.007172	2.5

WCDMA Mode

Middle Channel, $f_0=836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.85	-13	-0.0155	2.5
-20		-12	-0.0143	2.5
-10		-11	-0.0131	2.5
0		-13	-0.0155	2.5
10		-12	-0.0143	2.5
20		-13	-0.0155	2.5
30		-13	-0.0155	2.5
40		-11	-0.0131	2.5
50		-13	-0.0155	2.5
20	V min.= 3.3	-12	-0.0143	2.5
	V max.= 4.4	-10	-0.0120	2.5

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

Middle Channel, $f_0=1880.0\text{ MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.85	18	0.009574	pass
-20		18	0.009574	pass
-10		19	0.010106	pass
0		12	0.006383	pass
10		11	0.005851	pass
20		14	0.007447	pass
30		20	0.010638	pass
40		21	0.011170	pass
50		15	0.007979	pass
20	V min.= 3.3	29	0.015426	pass
	V max.= 4.4	28	0.014894	pass

EDGE Mode

Middle Channel, $f_o = 1880.0$ MHz				
Temperature (°C)	Voltage Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.85	8	0.004255	pass
-20		8	0.004255	pass
-10		19	0.010106	pass
0		13	0.006915	pass
10		16	0.008511	pass
20		5	0.002660	pass
30		12	0.006383	pass
40		17	0.009043	pass
50		6	0.003191	pass
20	V min.= 3.3	20	0.010638	pass
	V max.= 4.4	18	0.009574	pass

WCDMA Mode

Middle Channel, $f_o = 1880.0$ MHz				
Temperature (°C)	Voltage Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.85	-13	-0.0069	pass
-20		-13	-0.0069	pass
-10		-14	-0.0074	pass
0		-12	-0.0064	pass
10		-13	-0.0069	pass
20		-14	-0.0074	pass
30		-14	-0.0074	pass
40		-13	-0.0069	pass
50		-13	-0.0069	pass
20	V min.= 3.3	-10	-0.0053	pass
	V max.= 4.4	-13	-0.0069	pass

LTE:
QPSK:

Band 4:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.85	1710.4591	1754.4963	1710	1755
-20		1710.4630	1754.4872	1710	1755
-10		1710.4507	1754.4943	1710	1755
0		1710.4481	1754.5102	1710	1755
10		1710.4398	1754.4885	1710	1755
20		1710.4579	1754.4843	1710	1755
30		1710.4476	1754.4964	1710	1755
40		1710.4557	1754.5021	1710	1755
50		1710.4584	1754.4887	1710	1755
20	V min.= 3.3	1710.4471	1754.4978	1710	1755
	V max.= 4.4	1710.4603	1754.4980	1710	1755

Band 7:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.85	2500.4549	2569.4980	2500	2570
-20		2500.4453	2569.4884	2500	2570
-10		2500.4650	2569.5038	2500	2570
0		2500.4530	2569.5008	2500	2570
10		2500.4603	2569.5048	2500	2570
20		2500.4586	2569.4998	2500	2570
30		2500.4586	2569.4845	2500	2570
40		2500.4479	2569.4986	2500	2570
50		2500.4482	2569.4837	2500	2570
20	V min.= 3.3	2500.4462	2569.4933	2500	2570
	V max.= 4.4	2500.4626	2569.4978	2500	2570

Band 12:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.85	699.4521	715.4965	699	716
-20		699.4536	715.4988	699	716
-10		699.4579	715.4897	699	716
0		699.4490	715.4936	699	716
10		699.4418	715.5016	699	716
20		699.4467	715.4893	699	716
30		699.4578	715.5005	699	716
40		699.4465	715.4975	699	716
50		699.4525	715.4827	699	716
20	V min.= 3.3	699.4465	715.4850	699	716
	V max.= 4.4	699.4415	715.5007	699	716

Band 17:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.85	704.4568	715.4861	704	716
-20		704.4685	715.4885	704	716
-10		704.4597	715.5003	704	716
0		704.4459	715.4910	704	716
10		704.4626	715.5022	704	716
20		704.4581	715.4910	704	716
30		704.4662	715.4880	704	716
40		704.4550	715.4854	704	716
50		704.4662	715.5010	704	716
20	V min.= 3.3	704.4506	715.4967	704	716
	V max.= 4.4	704.4561	715.5043	704	716

16QAM:**Band 4:**

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.85	1710.4452	1754.5011	1710	1755
-20		1710.4641	1754.4848	1710	1755
-10		1710.4434	1754.4859	1710	1755
0		1710.4590	1754.4958	1710	1755
10		1710.4525	1754.4885	1710	1755
20		1710.4665	1754.5091	1710	1755
30		1710.4570	1754.4916	1710	1755
40		1710.4581	1754.5025	1710	1755
50		1710.4588	1754.4995	1710	1755
20	V min. = 3.3	1710.4514	1754.4937	1710	1755
	V max. = 4.4	1710.4612	1754.4967	1710	1755

Band 7:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.85	2500.4581	2569.4990	2500	2570
-20		2500.4636	2569.4953	2500	2570
-10		2500.4421	2569.4923	2500	2570
0		2500.4449	2569.5047	2500	2570
10		2500.4517	2569.4802	2500	2570
20		2500.4533	2569.4983	2500	2570
30		2500.4526	2569.4956	2500	2570
40		2500.4492	2569.4790	2500	2570
50		2500.4556	2569.4911	2500	2570
20	V min. = 3.3	2500.4586	2569.4976	2500	2570
	V max. = 4.4	2500.4513	2569.4971	2500	2570

Band 12:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.85	699.4478	715.4825	699	716
-20		699.4404	715.4962	699	716
-10		699.4582	715.4972	699	716
0		699.4576	715.4885	699	716
10		699.4549	715.4974	699	716
20		699.4494	715.4938	699	716
30		699.4535	715.4813	699	716
40		699.4657	715.4892	699	716
50		699.4525	715.4970	699	716
20	V min.= 3.3	699.4538	715.4977	699	716
	V max.= 4.4	699.4577	715.4977	699	716

Band 17:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.85	704.4471	715.4987	704	716
-20		704.4489	715.4997	704	716
-10		704.4597	715.4912	704	716
0		704.4567	715.4952	704	716
10		704.4556	715.4875	704	716
20		704.4677	715.4844	704	716
30		704.4609	715.5033	704	716
40		704.4561	715.4903	704	716
50		704.4651	715.4784	704	716
20	V min.= 3.3	704.4509	715.4869	704	716
	V max.= 4.4	704.4589	715.4934	704	716

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