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CERTIFICATE # 4821.01

BACL
Bay Area Compliance Labs Corp.

FCC PART 27

FCC PART 22H, PART 24E

TEST REPORT

For

LAVA International Limited

A-56, Sector 64, Noida 201301, U.P., India

FCC ID: 2ARTXT101

Report Type:	Product Type:
Original Report	Tablet

Report Number:	RSZ190107001-00D
Report Date:	2019-01-24
Reviewed By:	Simon Wang RF Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn

Note: This report must not be used by the customer to claim product certification, approval, or endorsement by A2LA* or any agency of the Federal Government. * This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "*".

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Tablet
Model	T101
Frequency Range	GSM850:TX:824-849MHz,RX:869-894 MHz PCS1900:TX:1850-1910 MHz,RX:1930-1990 MHz LTE band 5: TX:824-849 MHz,RX:869-894 MHz LTE band 41: TX&RX:2555-2650 MHz
Transmit Power(Conducted)	Maximum Power: GSM850: GSM&GPRS:32.41 dBm,EDGE:27.92 dBm PCS1900: GSM&GPRS:29.05 dBm,EDGE:25.96dBm LTE band 5: 23.09dBm LTE band 41: 22.73dBm
Modulation Technique	GSM&PCS:GMSK,8PSK; LTE: QPSK, 16QAM
Antenna Specification	GSM850: -0.87 dBi; GSM1900: 0.54 dBi; LTE Band 5: 0.87 dBi; Band 41: -0.15dBi;
Voltage Range	DC 3.8V from battery
Date of Test	11 Jan, 2019~24 Jan, 2019

**All measurement and test data in this report was gathered from production sample serial number: 190107001. (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2019-01-07.*

Objective

This test report is prepared on behalf of *LAVA International Limited* 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 & DTS submissions with FCC ID: 2ARTXT101.

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

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℃
Supply voltages		±0.4%

Test Facility

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

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

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

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

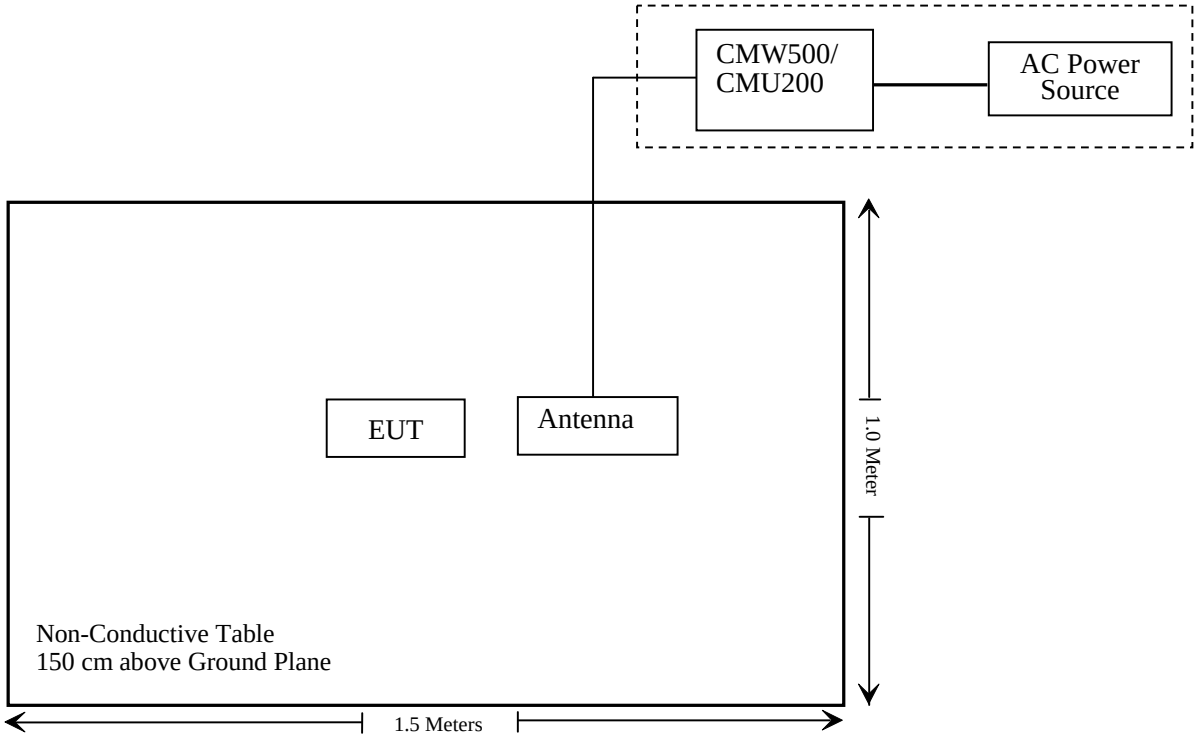
Equipment Modifications

No modification was made to the EUT.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-116218-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 (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)	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053; § 22.917 (a); § 24.238 (a); §27.53 (h)	Field Strength of Spurious Radiation	Compliance
§ 22.917 (a); § 24.238 (a); §27.53 (h)	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: RSZ190107001-SA.

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	2018-11-22	2019-05-22
Sonoma instrument	Amplifier	310N	186238	2018-11-12	2019-05-12
Anritsu	Signal Generator	68369B	004114	2018-12-24	2019-12-24
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2018-08-01	2019-02-01
COM POWER	Dipole Antenna	AD-100	041000	NCR	NCR
A.H. System	Horn Antenna	SAS-200/571	135	2018-08-18	2021-08-17
Ducommun technologies	RF Cable	UFA147A-2362-100100	MFR64639 231029-003	2018-08-01	2019-02-01
Ducommun technologies	RF Cable	104PEA	218124002	2018-11-21	2019-05-21
Ducommun technologies	RF Cable	RG-214	1	2018-11-21	2019-05-21
Ducommun technologies	RF Cable	RG-214	2	2018-11-22	2019-05-22
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-04	2017-12-29	2020-12-28
Ducommun technologies	Horn Antenna	ARH-4223-02	1007726-03	2017-12-29	2020-12-28
Heatsink Required	Amplifier	QLW-18405536-J0	15964001002	2018-08-01	2019-02-01

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	09107726	2018-12-21	2019-12-21
Long Wei	DC Power Supply	TPR-6420D	398363	NCR	NCR
Rohde & Schwarz	Wideband 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	
WEINSCHEL	10dB Attenuator	5324	AU 3842	Each Time	
N/A	Power Splitter	N/A	N/A	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: RSZ190107001-SA.

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(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.

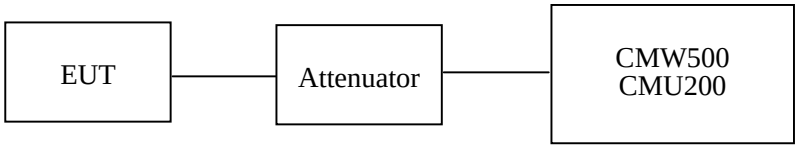
The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

According to §27.50(h), Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

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 ℃
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Kiki Kong on 2019-01-12.

Conducted Power

Cellular Band (Part 22H)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	128	824.2	32.40	38.45
	190	836.6	32.35	38.45
	251	848.8	31.70	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	31.93	31.08	29.49	28.10	38.45
	190	836.6	32.41	31.56	29.15	28.41	38.45
	251	848.8	31.27	31.36	29.19	28.16	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	128	824.2	27.12	26.47	25.13	23.29	38.45
	190	836.6	27.75	26.04	25.37	23.67	38.45
	251	848.8	27.92	26.78	25.65	23.45	38.45

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	512	1850.2	28.40	33
	661	1880.0	28.63	33
	810	1909.8	29.05	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	28.73	27.81	25.89	24.55	33
	661	1880.0	28.61	27.78	25.46	24.79	33
	810	1909.8	29.01	28.36	26.19	25.11	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	512	1850.2	25.63	24.67	23.02	22.25	33
	661	1880.0	25.96	24.03	23.15	22.55	33
	810	1909.8	25.68	24.80	23.75	21.80	33

Peak-to-average ratio (PAR)

Cellular Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	1.44	13
	Middle	1.50	13
	High	1.40	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	1.82	13
	Middle	1.87	13
	High	1.81	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	10.36	13
	Middle	10.06	13
	High	10.38	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	10.45	13
	Middle	10.62	13
	High	10.14	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	82.89	58	1.8	H	22.6	1.9	0	20.7	38.45	17.75
836.6	88.21	48	2.1	V	28.2	1.9	0	26.3	38.45	12.15
EIRP for PCS Band (Part 24E), Middle Channel										
1880.00	86.02	35	1.7	H	16	1.3	9.4	24.1	33	4.3
1880.00	85.27	197	1.3	V	15	1.3	9.4	23.1	33	5.6

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	79.72	199	2.1	H	19.4	1.9	0	17.5	38.45	20.95
836.6	84.14	15	2.4	V	24.1	1.9	0	22.2	38.45	16.25
EIRP, PCS Band (Part 24E), Middle Channel										
1880.00	83.02	341	1.8	H	13	1.3	9.4	21.1	33	4.3
1880.00	82.69	34	1.1	V	12.4	1.3	9.4	20.5	33	5.6

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

LTE Band 5:

Maximum Output Power

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	22.05	22.22	22.07
		RB Size=1, RB Offset=2	21.98	22.13	21.99
		RB Size=1, RB Offset=5	22.11	22.31	22.12
		RB Size=3, RB Offset=0	22.78	23.02	22.81
		RB Size=3, RB Offset=1	22.74	22.98	22.72
		RB Size=3, RB Offset=2	22.89	23.09	22.88
		RB Size=6, RB Offset=0	21.78	21.00	21.74
	16QAM	RB Size=1, RB Offset=0	22.09	22.26	22.03
		RB Size=1, RB Offset=2	22.05	22.14	21.90
		RB Size=1, RB Offset=5	22.19	22.33	22.06
		RB Size=3, RB Offset=0	21.56	21.84	21.61
		RB Size=3, RB Offset=1	21.50	21.73	21.55
		RB Size=3, RB Offset=2	21.64	21.94	21.71
		RB Size=6, RB Offset=0	21.26	21.54	21.28
3.0	QPSK	RB Size=1, RB Offset=0	22.07	22.30	22.08
		RB Size=1, RB Offset=7	21.94	22.18	22.00
		RB Size=1, RB Offset=14	22.15	22.42	22.18
		RB Size=8, RB Offset=0	21.67	21.91	21.64
		RB Size=8, RB Offset=4	21.56	21.80	21.59
		RB Size=8, RB Offset=7	21.76	21.99	21.73
		RB Size=15, RB Offset=0	21.32	21.60	21.24
	16QAM	RB Size=1, RB Offset=0	22.01	22.28	22.03
		RB Size=1, RB Offset=7	21.91	22.16	21.93
		RB Size=1, RB Offset=14	22.13	22.33	22.12
		RB Size=8, RB Offset=0	21.64	21.97	21.69
		RB Size=8, RB Offset=4	21.55	21.85	21.62
		RB Size=8, RB Offset=7	21.71	22.05	21.80
		RB Size=15, RB Offset=0	21.35	21.62	21.42

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	22.15	22.36	22.16
		RB Size=1, RB Offset=12	22.03	22.26	22.07
		RB Size=1, RB Offset=24	22.27	22.43	22.26
		RB Size=12, RB Offset=0	21.67	21.95	21.62
		RB Size=12, RB Offset=6	21.62	21.82	21.51
		RB Size=12, RB Offset=11	21.73	22.00	21.67
		RB Size=25, RB Offset=0	21.32	21.66	21.27
	16QAM	RB Size=1, RB Offset=0	22.26	22.40	22.21
		RB Size=1, RB Offset=12	22.19	22.33	22.12
		RB Size=1, RB Offset=24	22.36	22.46	22.31
		RB Size=12, RB Offset=0	21.63	21.92	21.66
		RB Size=12, RB Offset=6	21.57	21.87	21.55
		RB Size=12, RB Offset=11	21.75	21.96	21.76
		RB Size=25, RB Offset=0	21.32	21.64	21.27
10.0	QPSK	RB Size=1, RB Offset=0	22.12	22.37	22.15
		RB Size=1, RB Offset=24	22.00	22.29	22.04
		RB Size=1, RB Offset=49	22.23	22.50	22.26
		RB Size=25, RB Offset=0	21.71	21.95	21.73
		RB Size=25, RB Offset=12	21.59	21.84	21.63
		RB Size=25, RB Offset=24	21.82	22.03	21.83
		RB Size=50, RB Offset=0	21.25	21.64	21.34
	16QAM	RB Size=1, RB Offset=0	22.15	22.31	22.17
		RB Size=1, RB Offset=24	22.06	22.19	22.12
		RB Size=1, RB Offset=49	22.19	22.39	22.25
		RB Size=25, RB Offset=0	21.61	21.94	21.63
		RB Size=25, RB Offset=12	21.49	21.82	21.54
		RB Size=25, RB Offset=24	21.70	22.02	21.75
		RB Size=50, RB Offset=0	21.24	21.56	21.34

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.73	13	Pass
QPSK (50RB Size)	7.14	13	Pass
16QAM (1RB Size)	7.08	13	Pass
16QAM (50RB Size)	7.82	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
836.5	78.21	357	1.1	H	18.8	1.90	0.0	16.90	38.45
836.5	79.08	138	1.6	V	19.1	1.90	0.0	17.20	38.45
3 MHz Bandwidth									
836.5	78.24	204	1.2	H	18.9	1.9	0	16.9	38.45
836.5	78.97	55	2.4	V	19	1.9	0	17.0	38.45
5 MHz Bandwidth									
836.5	77.65	155	1.5	H	18.3	1.9	0	16.3	38.45
836.5	79.02	178	2.1	V	19	1.9	0	17.0	38.45
10 MHz Bandwidth									
836.5	77.88	108	1.3	H	18.5	1.9	0	16.5	38.45
836.5	78.84	115	1.8	V	18.8	1.9	0	16.8	38.45

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
836.5	77.81	241	1.6	H	18.4	1.9	0	16.4	38.45
836.5	79.06	207	1.9	V	19.1	1.9	0	17.1	38.45
3 MHz Bandwidth									
836.5	77.51	117	1.7	H	18.1	1.9	0	16.1	38.45
836.5	79.14	206	1.4	V	19.1	1.9	0	17.1	38.45
5 MHz Bandwidth									
836.5	77.62	41	1.2	H	18.2	1.9	0	16.2	38.45
836.5	78.96	9	1.5	V	19	1.9	0	17.0	38.45
10 MHz Bandwidth									
836.5	77.25	93	1.2	H	17.9	1.9	0	15.9	38.45
836.5	78.76	107	2.1	V	18.8	1.9	0	16.8	38.45

LTE Band 41:

Maximum Output Power

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	22.29	22.22	22.11
		RB Size=1, RB Offset=12	21.35	21.33	21.25
		RB Size=1, RB Offset=24	21.39	21.37	21.26
		RB Size=12, RB Offset=0	22.51	22.48	22.43
		RB Size=12, RB Offset=6	22.36	22.32	22.29
		RB Size=12, RB Offset=11	22.12	22.14	22.01
		RB Size=25, RB Offset=0	22.72	22.73	22.60
	16QAM	RB Size=1, RB Offset=0	22.02	21.96	21.86
		RB Size=1, RB Offset=12	21.14	21.04	20.97
		RB Size=1, RB Offset=24	21.19	21.14	21.04
		RB Size=12, RB Offset=0	22.38	22.27	22.15
		RB Size=12, RB Offset=6	22.17	22.04	21.98
		RB Size=12, RB Offset=11	21.96	21.89	21.84
		RB Size=25, RB Offset=0	22.53	22.47	22.35
10.0	QPSK	RB Size=1, RB Offset=0	22.54	22.48	22.39
		RB Size=1, RB Offset=24	22.13	22.10	22.05
		RB Size=1, RB Offset=49	22.93	22.95	22.90
		RB Size=25, RB Offset=0	22.44	22.40	22.34
		RB Size=25, RB Offset=12	22.41	22.36	22.28
		RB Size=25, RB Offset=24	21.81	21.80	21.75
		RB Size=50, RB Offset=0	22.57	22.55	22.46
	16QAM	RB Size=1, RB Offset=0	22.29	22.17	22.08
		RB Size=1, RB Offset=24	21.94	21.86	21.78
		RB Size=1, RB Offset=49	22.82	22.76	22.70
		RB Size=25, RB Offset=0	22.24	22.11	22.01
		RB Size=25, RB Offset=12	22.15	22.07	22.01
		RB Size=25, RB Offset=24	21.63	21.52	21.47
		RB Size=50, RB Offset=0	22.41	22.33	22.23

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15.0	QPSK	RB Size=1, RB Offset=0	21.76	21.74	21.61
		RB Size=1, RB Offset=37	21.41	21.38	21.32
		RB Size=1, RB Offset=74	21.26	21.27	21.20
		RB Size=36, RB Offset=0	22.02	21.98	21.92
		RB Size=36, RB Offset=18	22.16	22.10	22.02
		RB Size=36, RB Offset=37	21.61	21.57	21.54
		RB Size=75, RB Offset=0	22.14	22.13	22.05
	16QAM	RB Size=1, RB Offset=0	21.52	21.45	21.33
		RB Size=1, RB Offset=37	21.27	21.18	21.10
		RB Size=1, RB Offset=74	21.11	21.05	21.00
		RB Size=36, RB Offset=0	21.87	21.81	21.77
		RB Size=36, RB Offset=18	21.92	21.86	21.82
		RB Size=36, RB Offset=37	21.49	21.42	21.31
		RB Size=75, RB Offset=0	21.94	21.90	21.86
20.0	QPSK	RB Size=1, RB Offset=0	22.13	22.13	22.05
		RB Size=1, RB Offset=49	22.07	22.07	21.97
		RB Size=1, RB Offset=99	22.40	22.34	22.26
		RB Size=50, RB Offset=0	21.76	21.78	21.68
		RB Size=50, RB Offset=24	21.47	21.42	21.33
		RB Size=50, RB Offset=49	21.26	21.23	21.16
		RB Size=100, RB Offset=0	21.28	21.26	21.15
	16QAM	RB Size=1, RB Offset=0	22.00	21.97	21.92
		RB Size=1, RB Offset=49	21.88	21.83	21.78
		RB Size=1, RB Offset=99	22.15	22.06	21.99
		RB Size=50, RB Offset=0	21.64	21.54	21.45
		RB Size=50, RB Offset=24	21.25	21.16	21.04
		RB Size=50, RB Offset=49	21.13	21.06	21.02
		RB Size=100, RB Offset=0	21.04	20.97	20.93

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.76	13	Pass
QPSK (100RB Size)	6.17	13	Pass
16QAM (1RB Size)	7.15	13	Pass
16QAM (100RB Size)	7.89	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									
2602.50	76.96	49	1.4	H	7.4	2.2	10.2	15.4	33
2602.50	77.88	78	2.2	V	8.7	2.2	10.2	16.7	33
10 MHz Bandwidth									
2602.50	76.36	99	1.4	H	6.8	2.2	10.2	14.8	33
2602.50	77.69	152	1.5	V	8.5	2.2	10.2	16.5	33
15 MHz Bandwidth									
2602.50	76.15	39	1.3	H	6.6	2.2	10.2	14.6	33
2602.50	77.52	29	1.9	V	8.3	2.2	10.2	16.3	33
20 MHz Bandwidth									
2602.50	76.35	80	1.7	H	6.8	2.2	10.2	14.8	33
2602.50	77.26	302	2.0	V	8.1	2.2	10.2	16.1	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									
2602.50	76.62	98	1.5	H	7.1	2.2	10.2	15.1	33
2602.50	77.43	207	1.6	V	8.2	2.2	10.2	16.2	33
10 MHz Bandwidth									
2602.50	76.24	96	1.5	H	6.7	2.2	10.2	14.7	33
2602.50	77.21	147	1.8	V	8	2.2	10.2	16.0	33
15 MHz Bandwidth									
2602.50	76.29	63	1.3	H	6.7	2.2	10.2	14.7	33
2602.50	77.13	112	1.9	V	7.9	2.2	10.2	15.9	33
20 MHz Bandwidth									
2602.50	75.96	39	1.5	H	6.4	2.2	10.2	14.4	33
2602.50	76.61	97	2.1	V	7.4	2.2	10.2	15.4	33

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

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

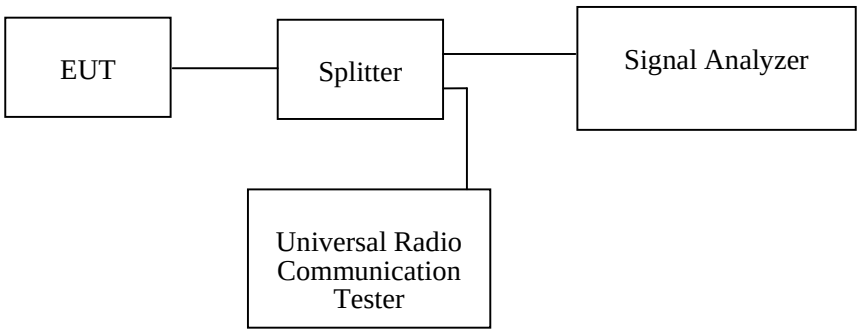
Applicable Standard

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

Test Procedure

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

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



Test Data

Environmental Conditions

Temperature:	24~25 ℃
Relative Humidity:	52~53 %
ATM Pressure:	101.0~101.2 kPa

The testing was performed by Kiki Kong from 2019-01-11 to 2019-01-14.

EUT operation mode: Transmitting

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

Cellular Band (Part 22H)

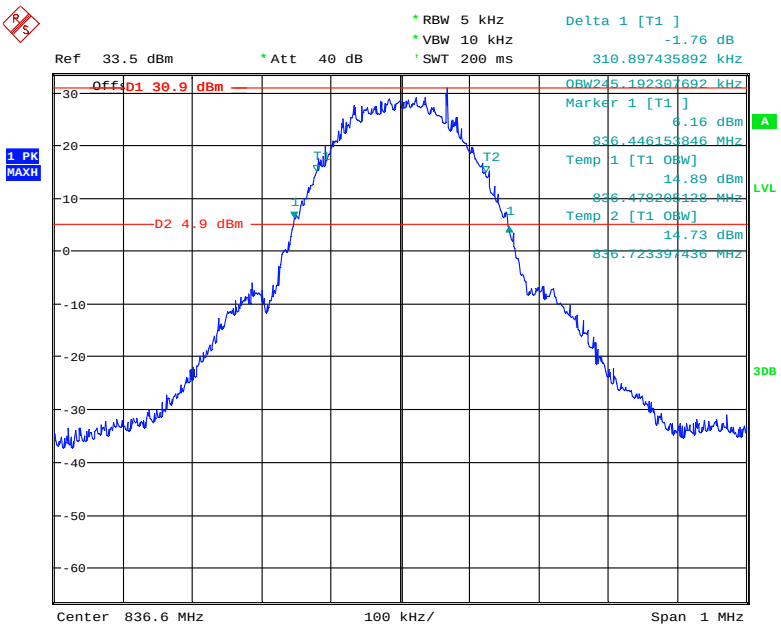
Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	836.6	245.19	310.90
EGPRS(8PSK)	836.6	245.19	318.91

PCS Band (Part 24E)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	1880.0	245.19	318.91
EGPRS(8PSK)	1880.0	240.38	307.69

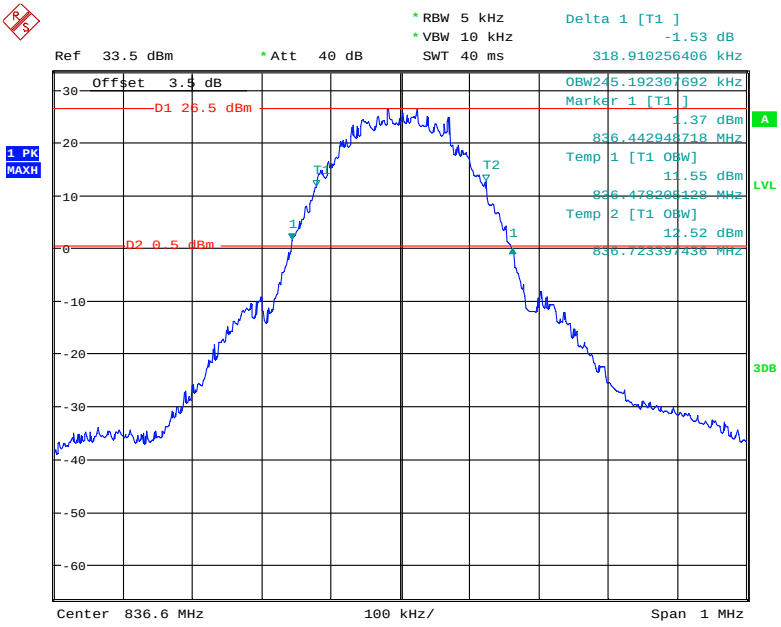
Cellular Band (Part 22H)

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



Date: 11.JAN.2019 11:00:41

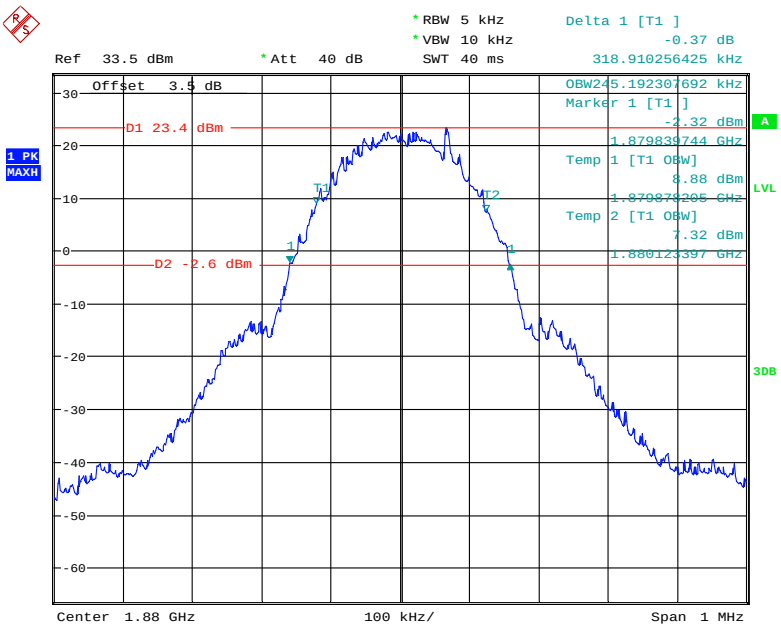
26 dB Emissions &99% Occupied Bandwidth for EDGE Mode



Date: 11.JAN.2019 11:36:38

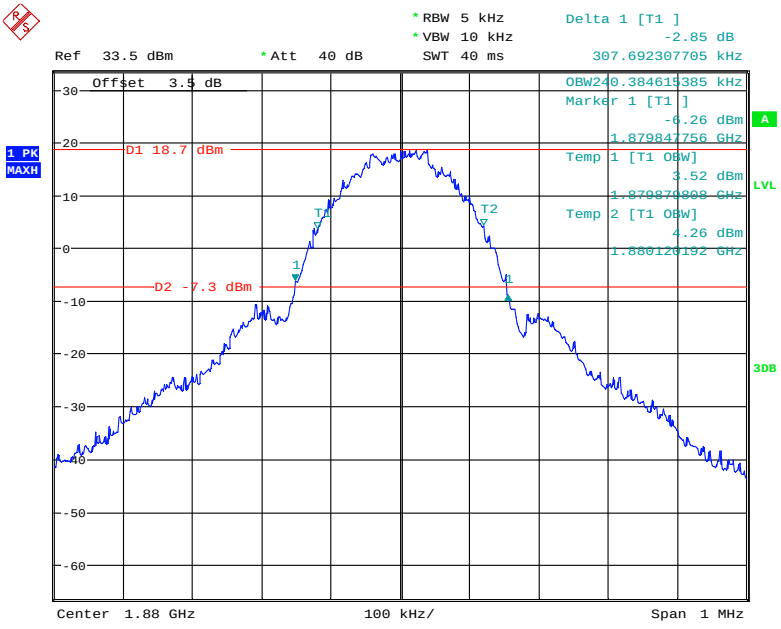
PCS Band (Part 24E)

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



Date: 11.JAN.2019 10:13:05

26 dB Emissions &99% Occupied Bandwidth for EDGE Mode

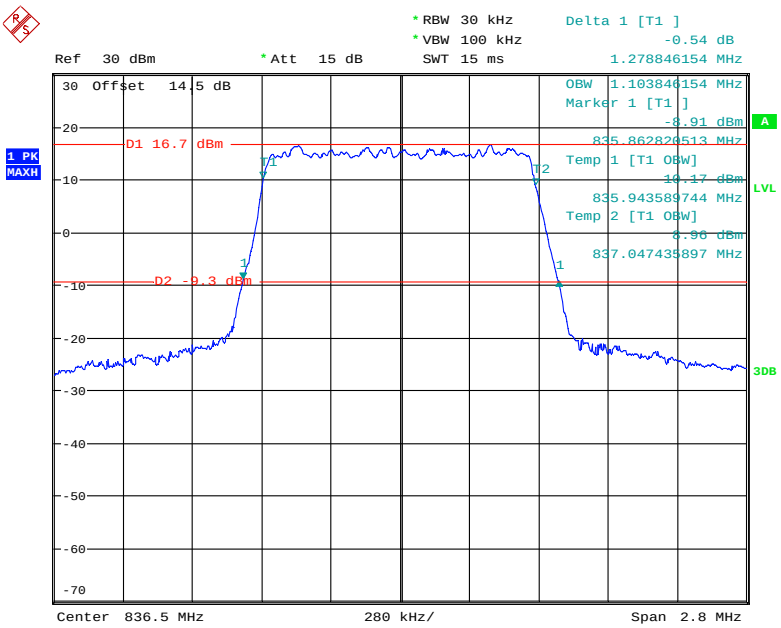


Date: 11.JAN.2019 10:21:01

LTE Band 5: (Middle Channel)

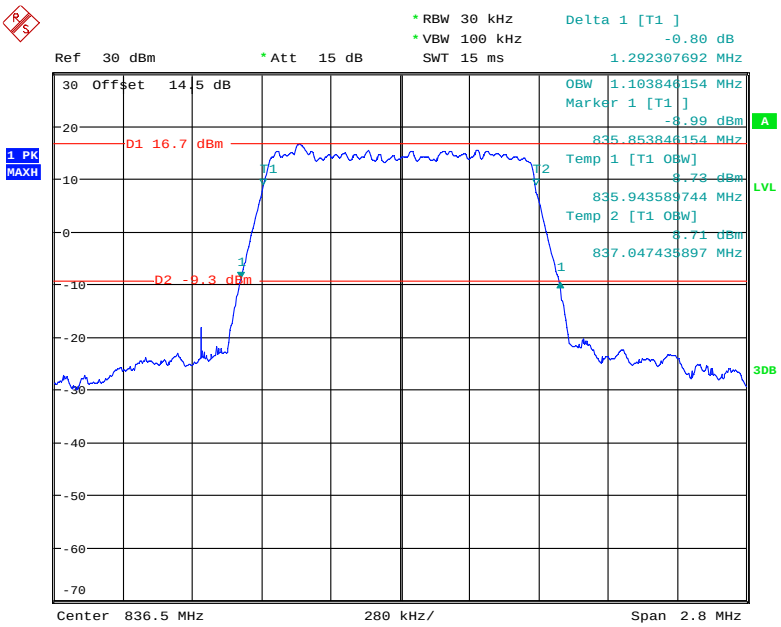
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.104	1.279
	16QAM	1.104	1.292
3.0	QPSK	2.692	2.923
	16QAM	2.692	2.920
5.0	QPSK	4.535	5.112
	16QAM	4.519	5.032
10.0	QPSK	8.974	9.808
	16QAM	8.974	9.712

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



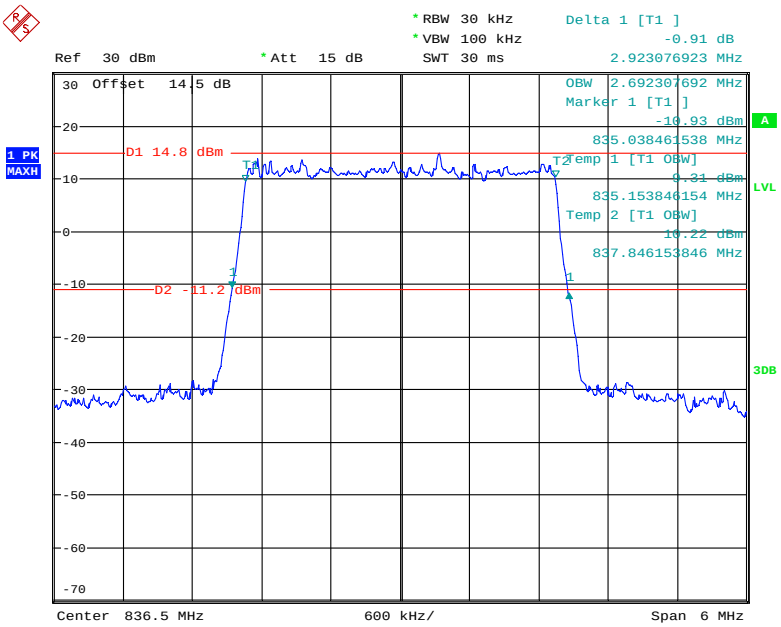
Date: 13.JAN.2019 15:35:12

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



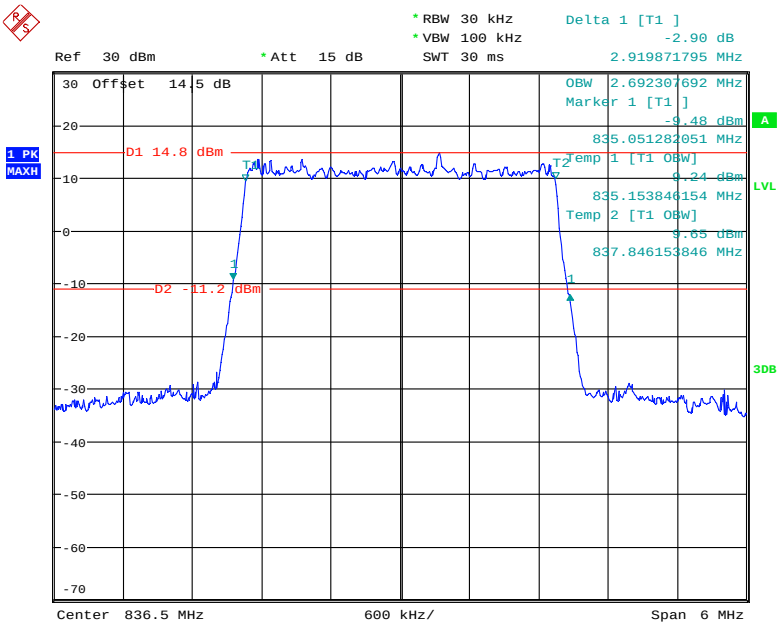
Date: 13.JAN.2019 15:28:59

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



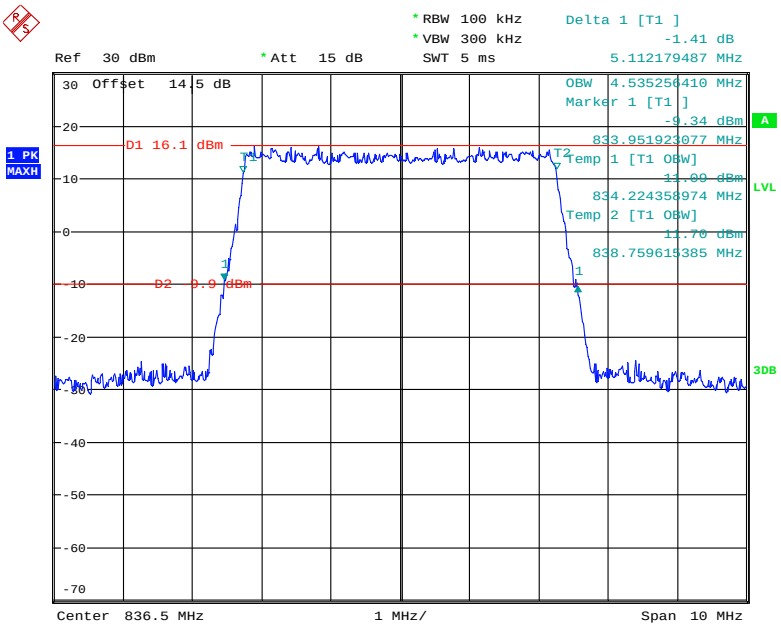
Date: 13.JAN.2019 15:37:06

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



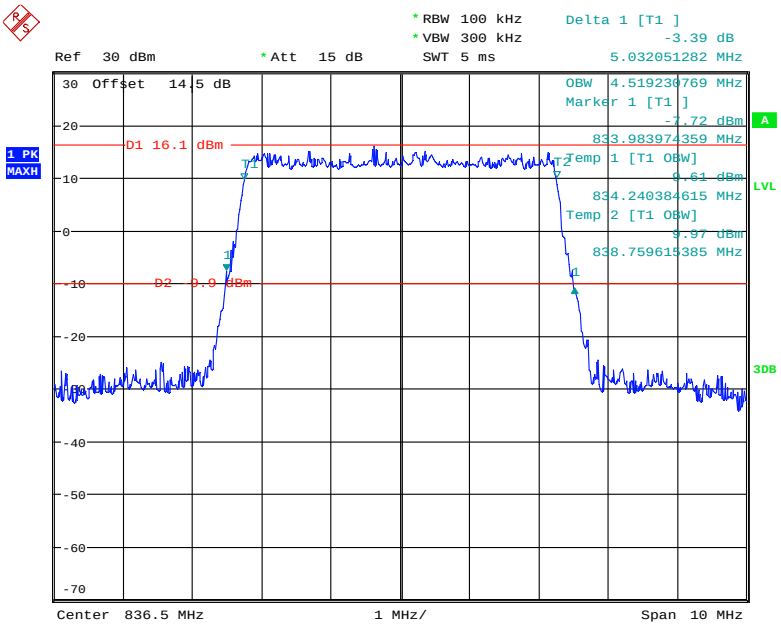
Date: 13.JAN.2019 15:58:04

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



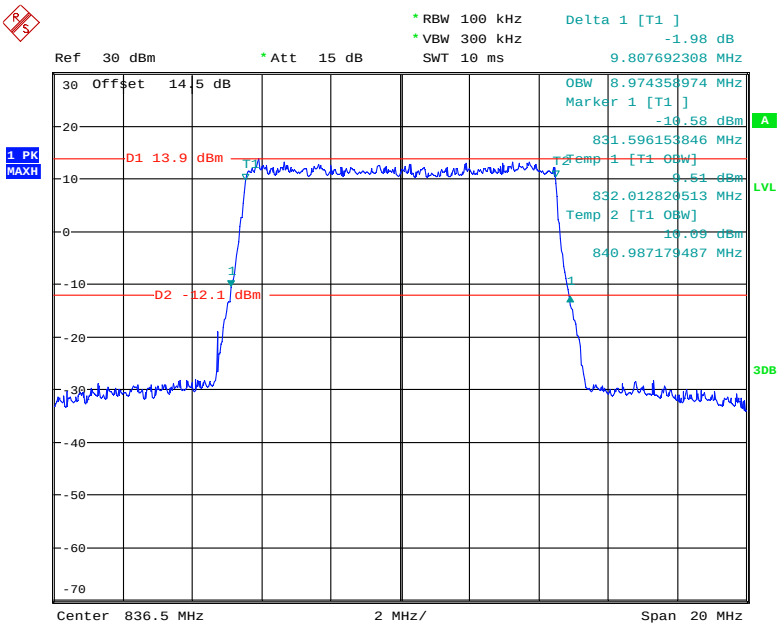
Date: 13.JAN.2019 15:40:41

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



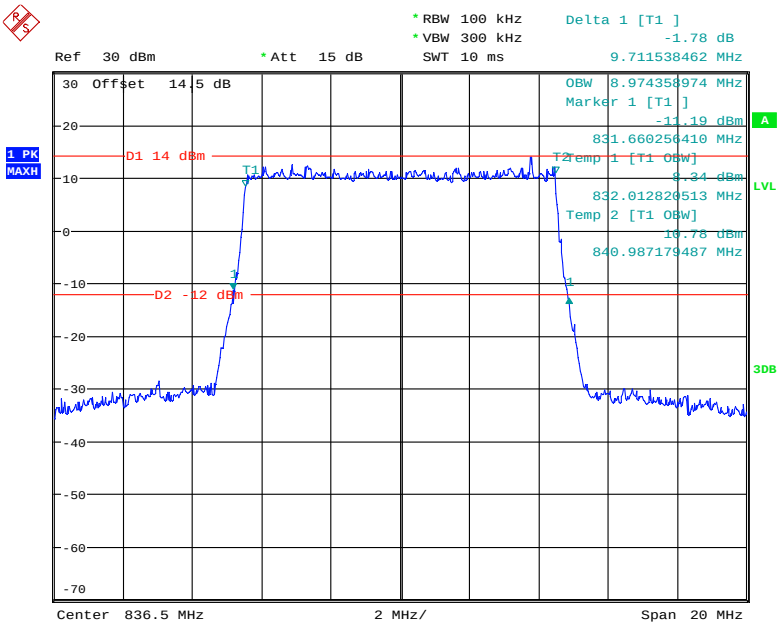
Date: 13.JAN.2019 15:56:12

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



Date: 13.JAN.2019 15:42:18

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

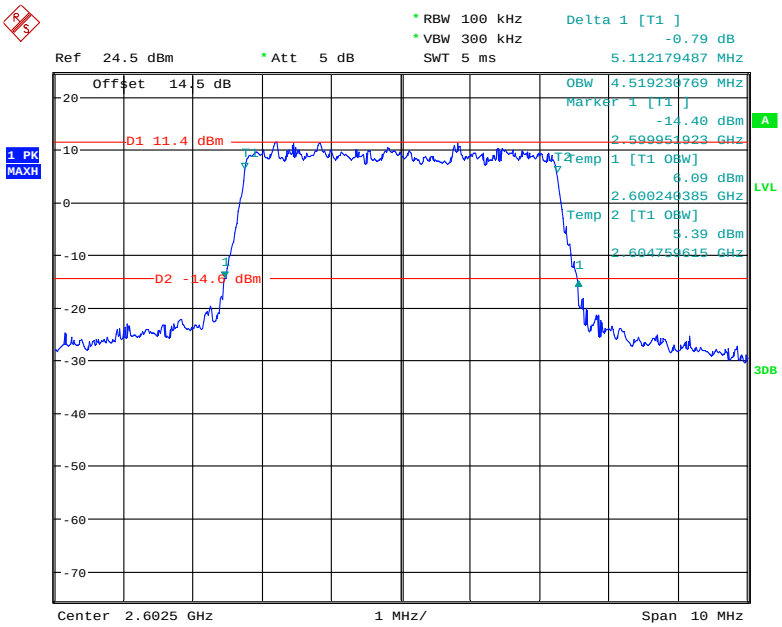


Date: 13.JAN.2019 15:54:50

LTE Band 41: (Middle Channel)

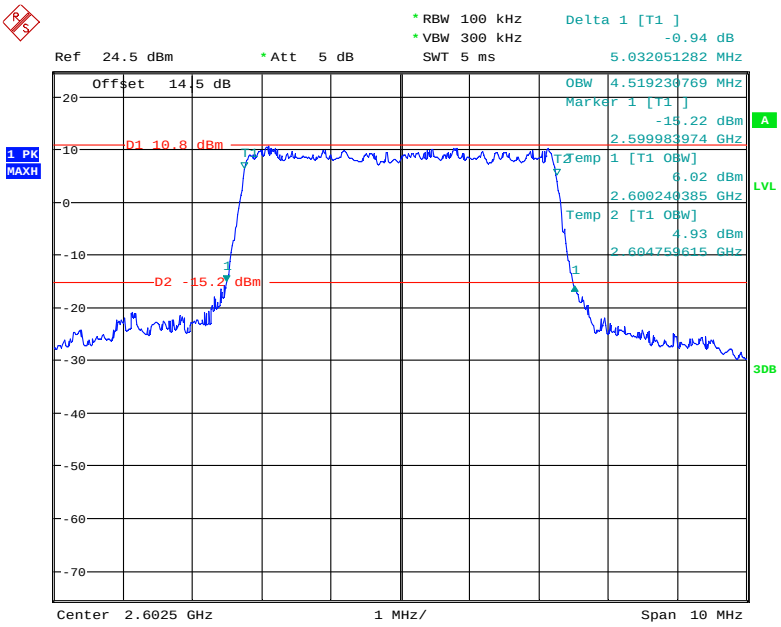
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.519	5.112
	16QAM	4.519	5.032
10.0	QPSK	8.974	9.792
	16QAM	8.974	9.663
15.0	QPSK	13.462	14.984
	16QAM	13.462	14.936
20.0	QPSK	17.949	19.103
	16QAM	17.885	19.295

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



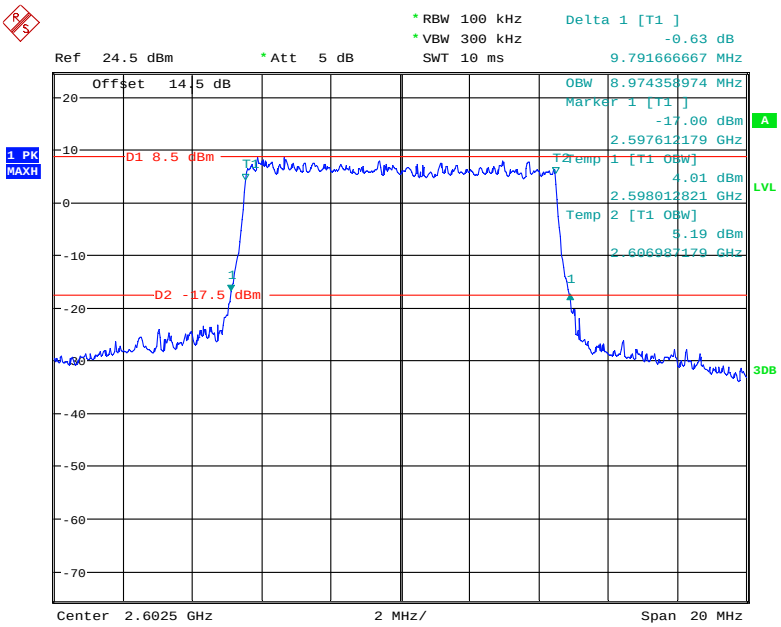
Date: 14.JAN.2019 20:17:03

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



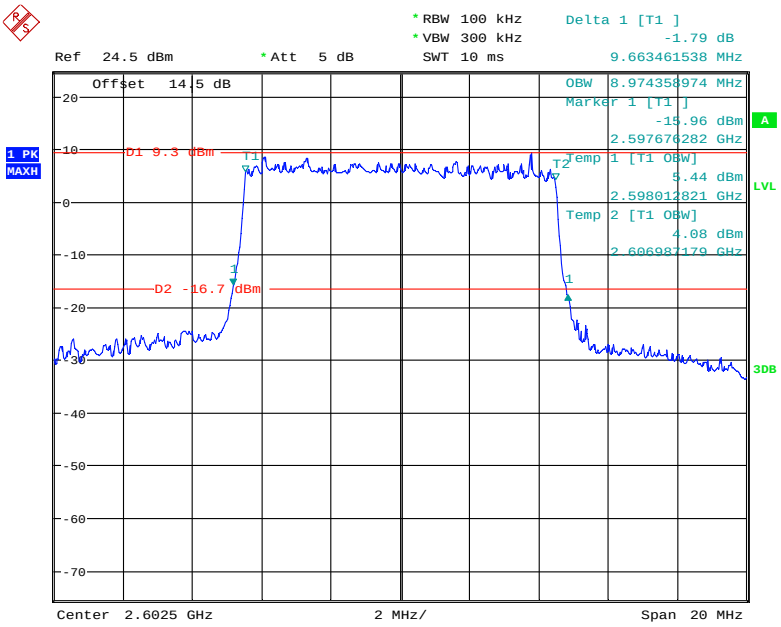
Date: 14.JAN.2019 20:18:30

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



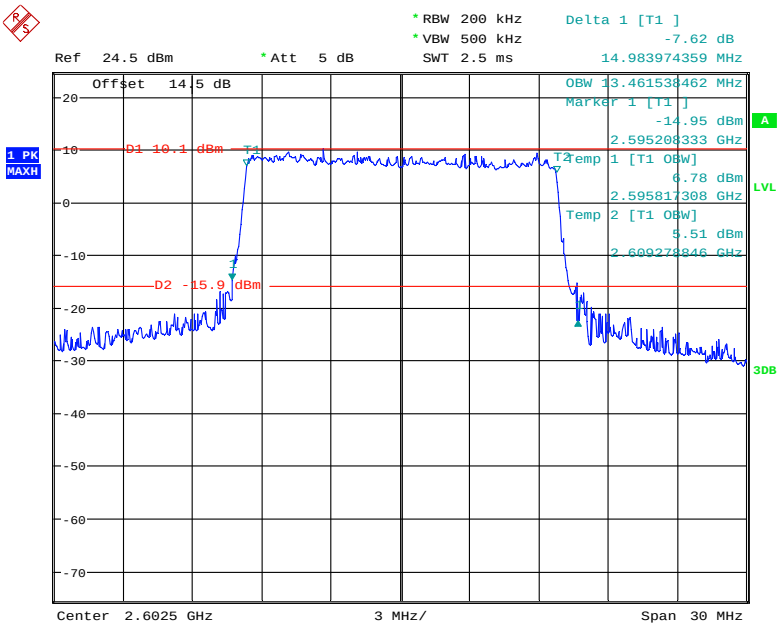
Date: 14.JAN.2019 20:14:01

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



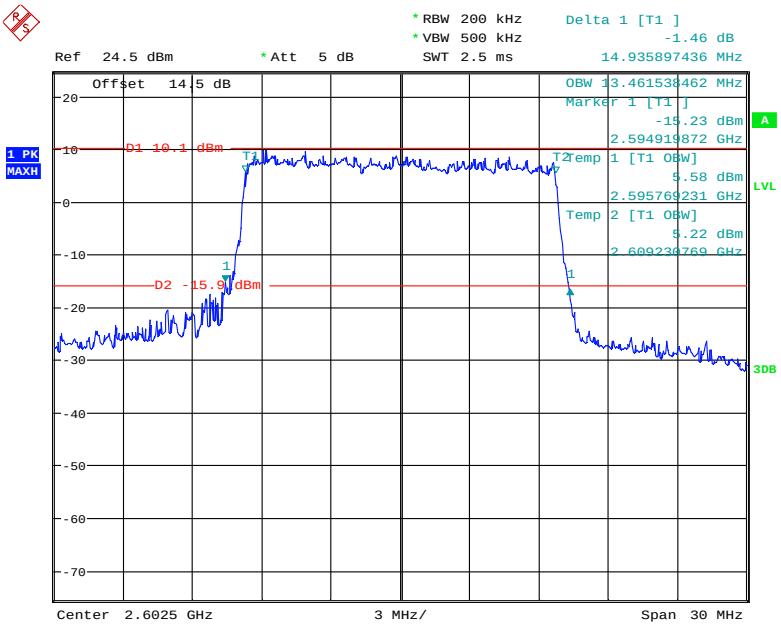
Date: 14.JAN.2019 20:15:42

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



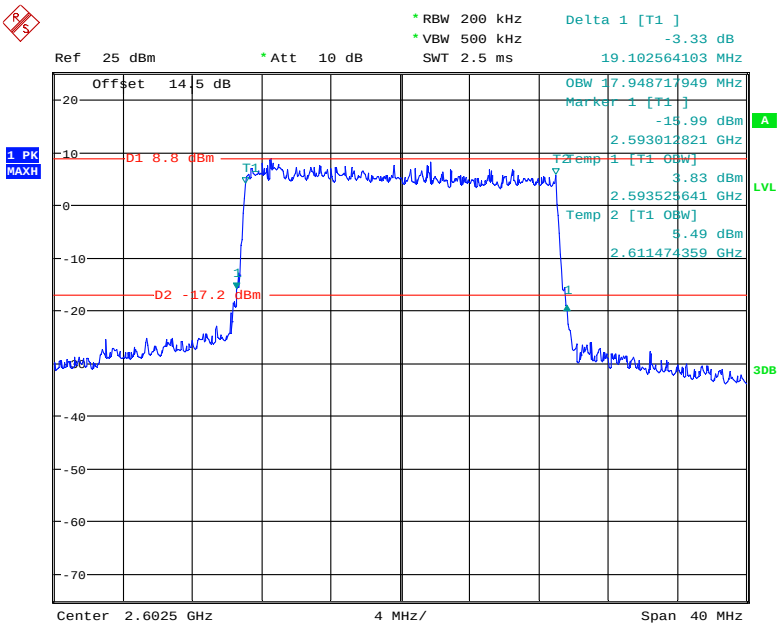
Date: 14.JAN.2019 20:10:14

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



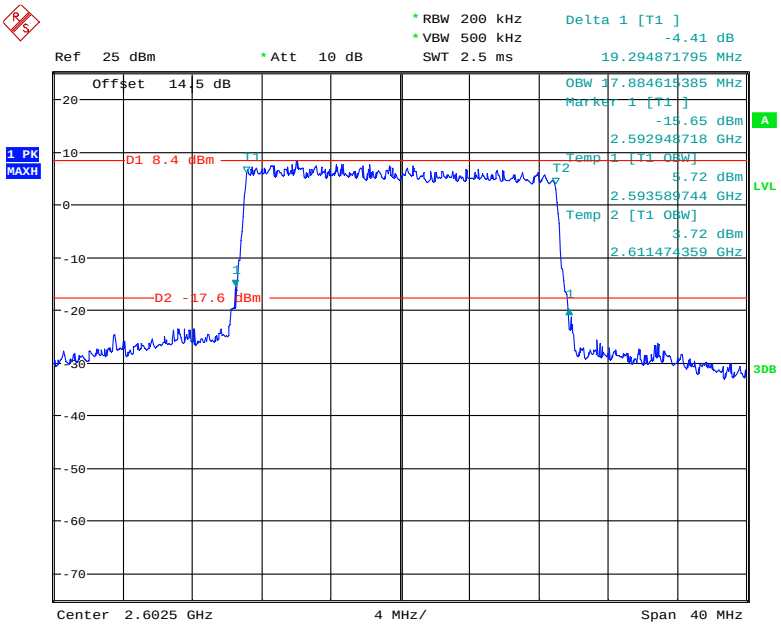
Date: 14.JAN.2019 20:12:05

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



Date: 14.JAN.2019 20:04:10

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



Date: 14.JAN.2019 20:06:47

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

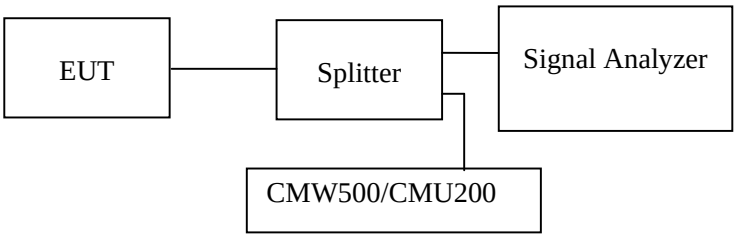
Applicable Standard

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

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:	25~26 ℃
Relative Humidity:	52~54 %
ATM Pressure:	101.0~101.5 kPa

The testing was performed by Kiki Kong from 2019-01-11 to 2019-01-24.

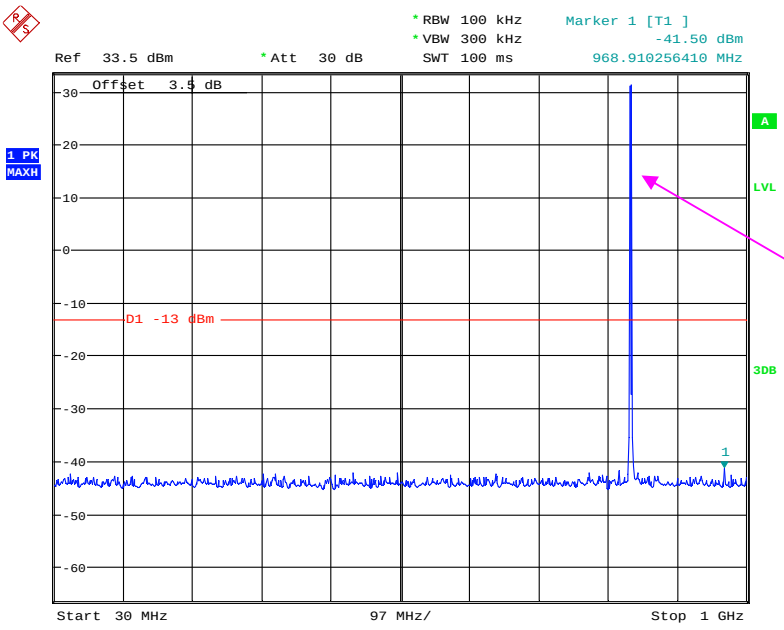
Test result: Compliance.

EUT operation mode: transmitting

Please refer to the following plots.

Cellular Band (Part 22H)

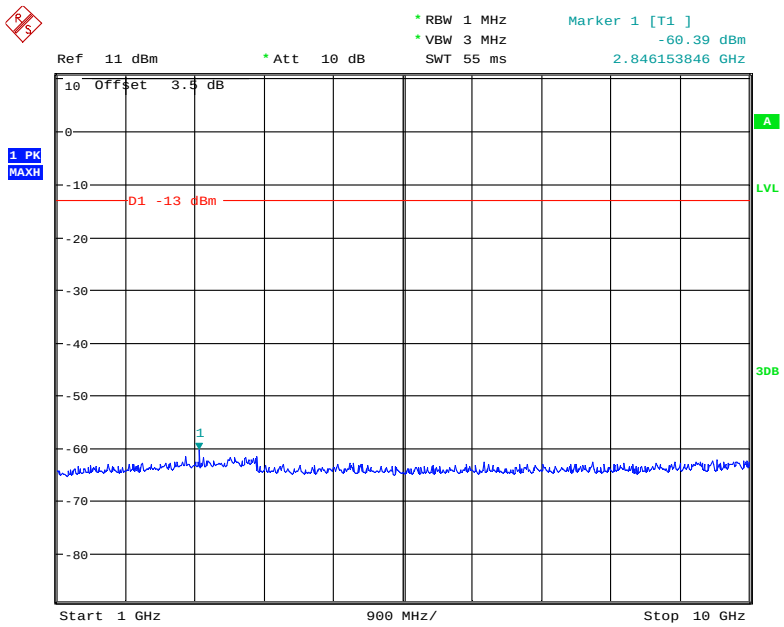
30 MHz – 1 GHz (GSM Mode)



Fundamental test

Date: 17.JAN.2019 13:11:33

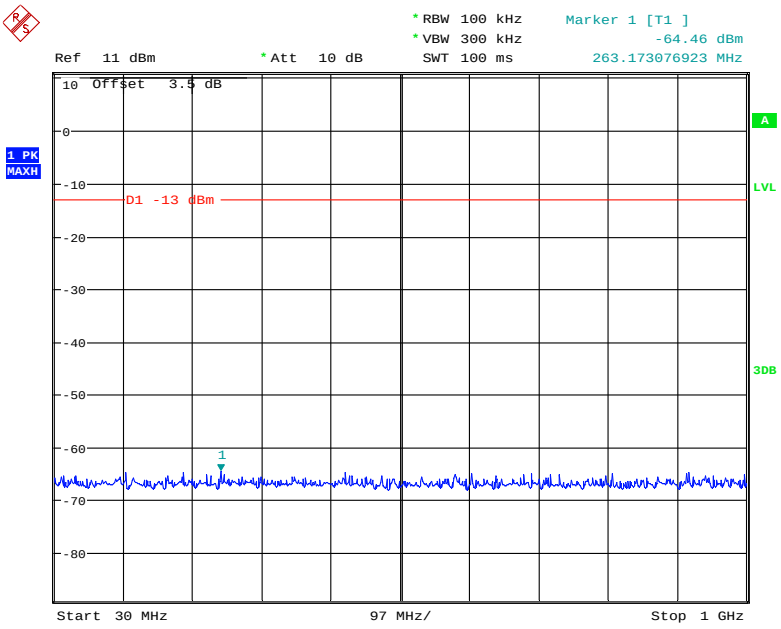
1 GHz – 10 GHz (GSM Mode)



Date: 17.JAN.2019 13:05:28

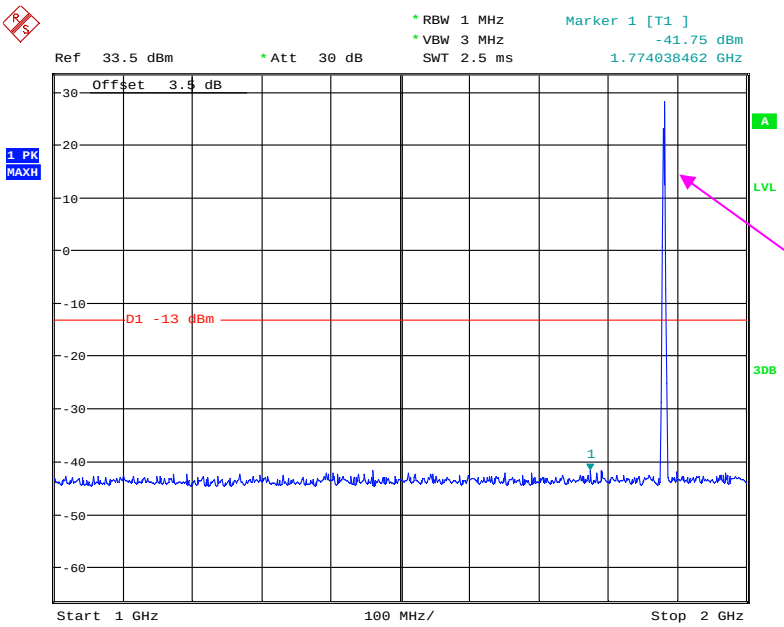
PCS Band (Part 24E)

30 MHz – 1 GHz (GSM Mode)



Date: 17.JAN.2019 13:08:21

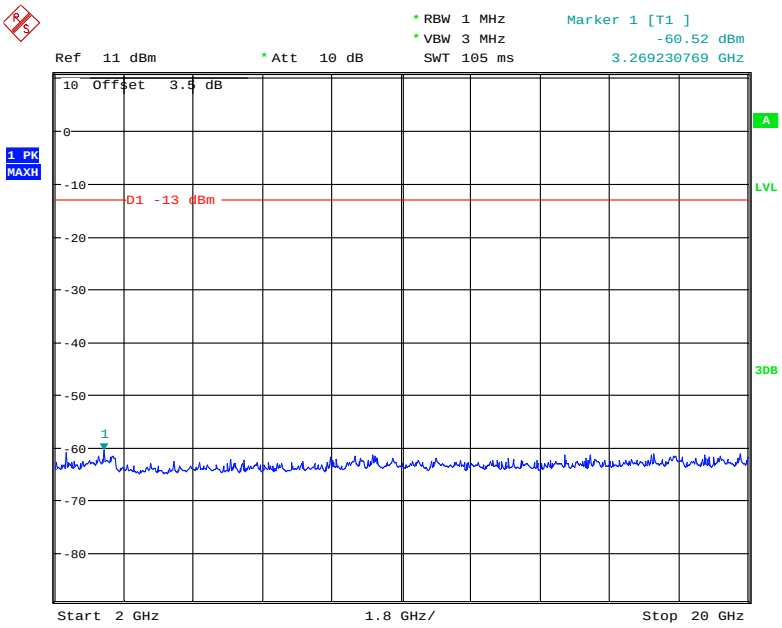
1 GHz – 2 GHz (GSM Mode)



Fundamental test

Date: 11.JAN.2019 10:33:31

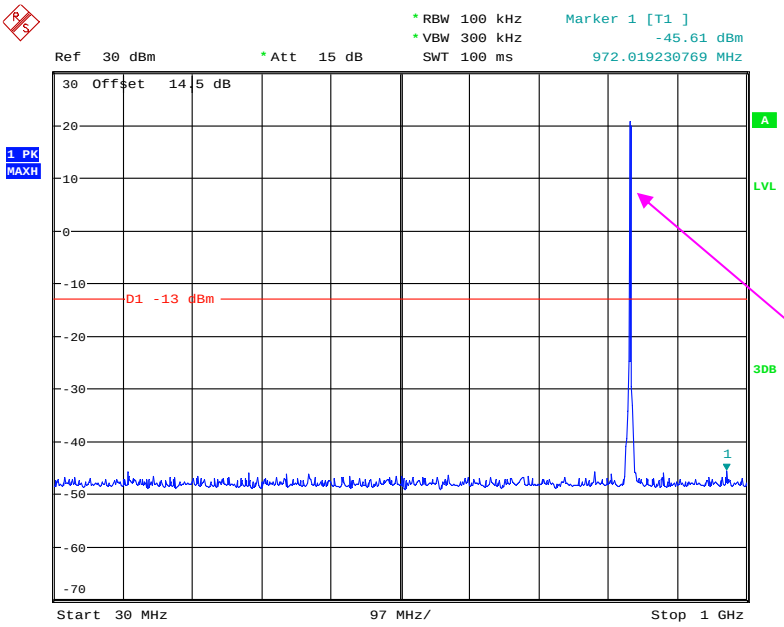
2 GHz – 20 GHz (GSM Mode)



Date: 17.JAN.2019 13:06:48

LTE Band 5:

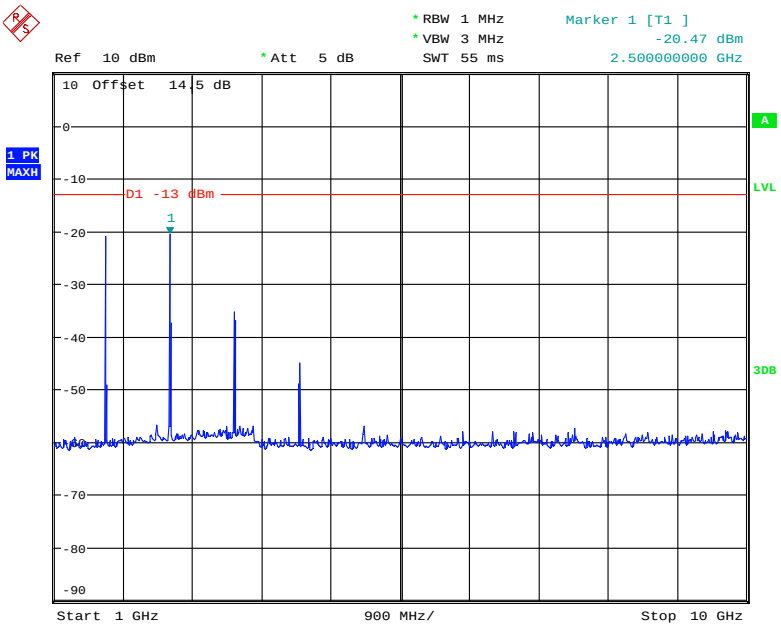
30 MHz - 1 GHz (1.4 MHz, Middle Channel)



Fundamental test

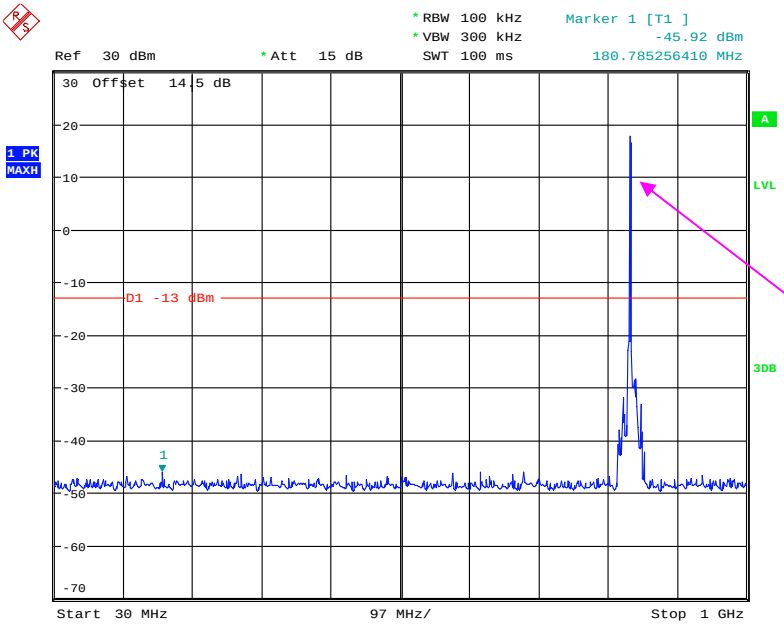
Date: 13.JAN.2019 16:41:36

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



Date: 13.JAN.2019 16:44:21

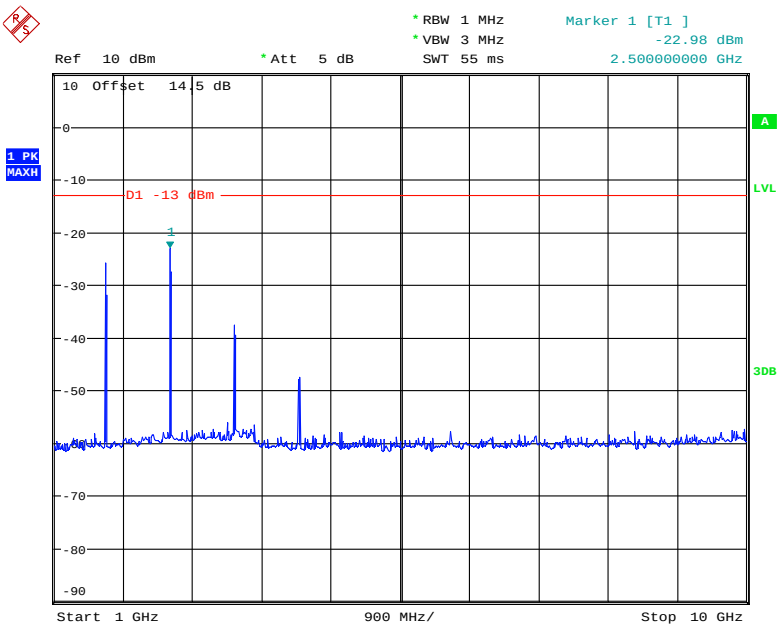
30 MHz - 1 GHz (3.0 MHz, Middle Channel)



Fundamental test

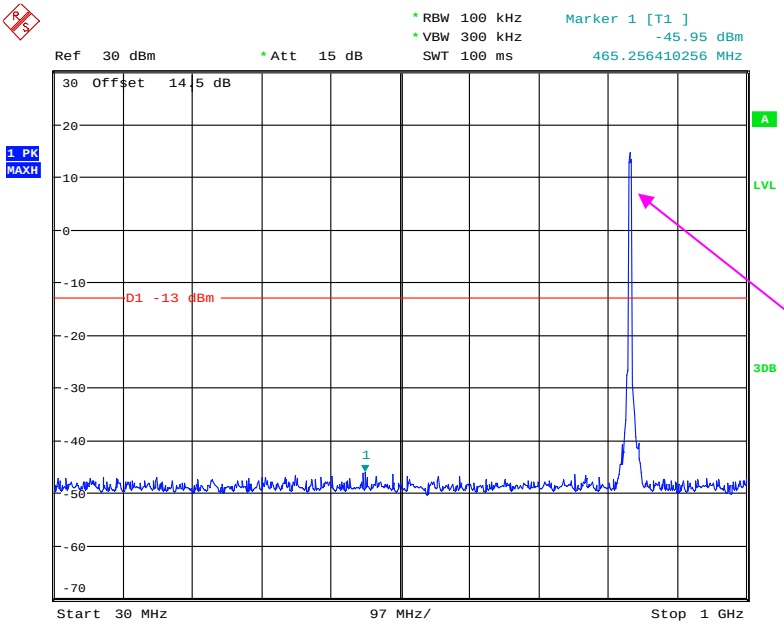
Date: 13.JAN.2019 16:41:57

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



Date: 13.JAN.2019 16:44:04

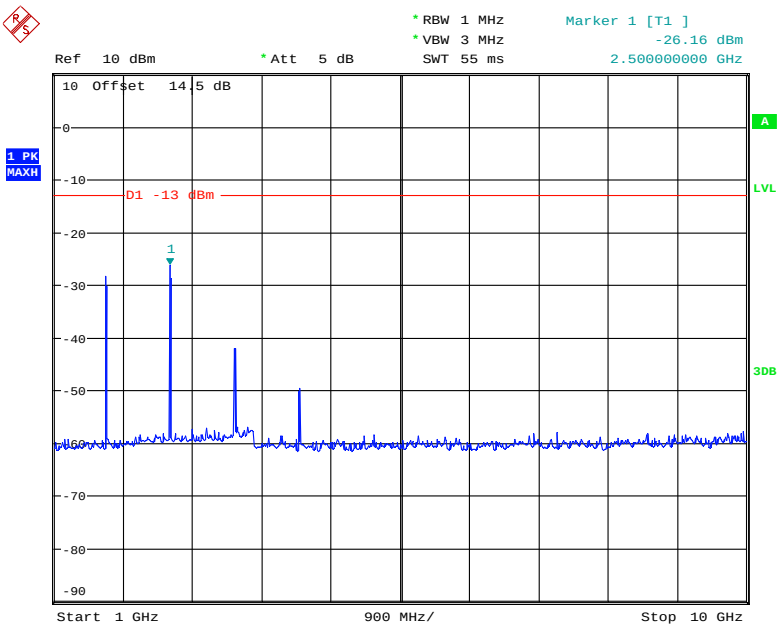
30 MHz - 1 GHz (5.0 MHz, Middle Channel)



Fundamental test

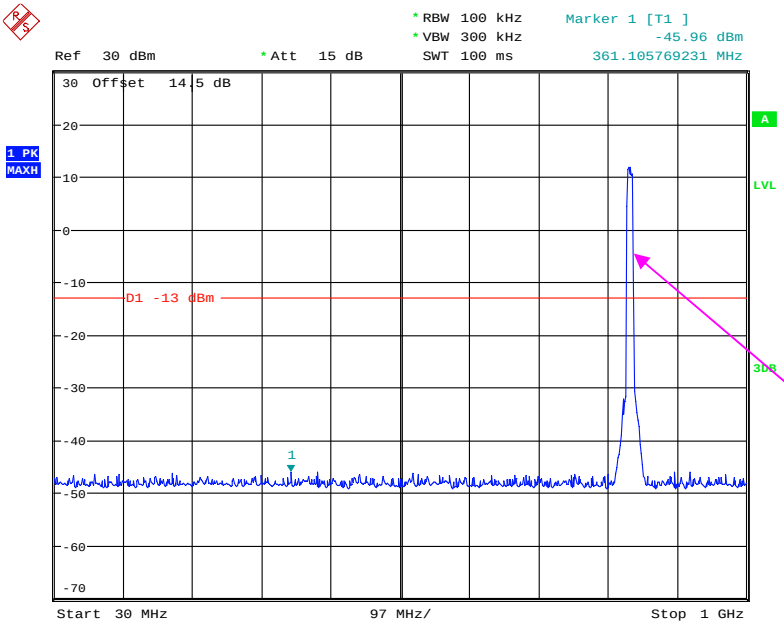
Date: 13.JAN.2019 16:42:15

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



Date: 13.JAN.2019 16:43:41

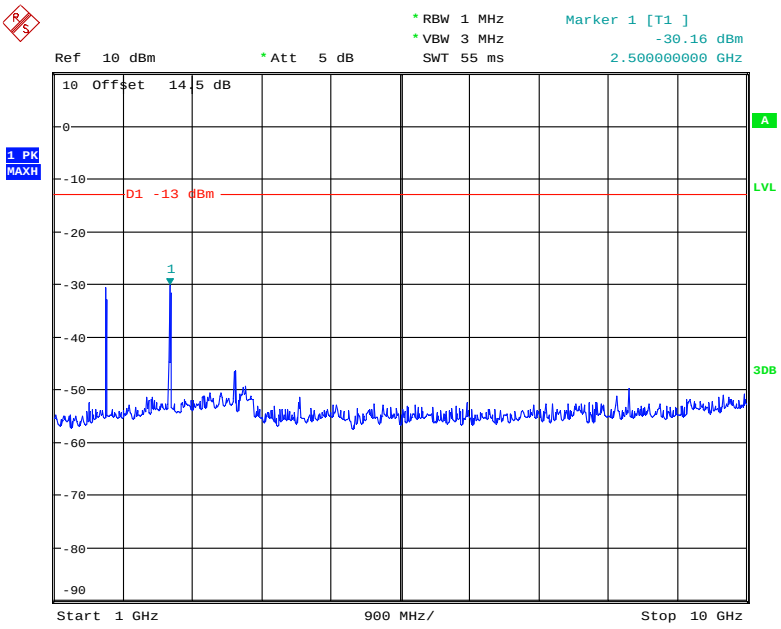
30 MHz - 1 GHz (10.0 MHz, Middle Channel)



Fundamental test

Date: 13.JAN.2019 16:42:43

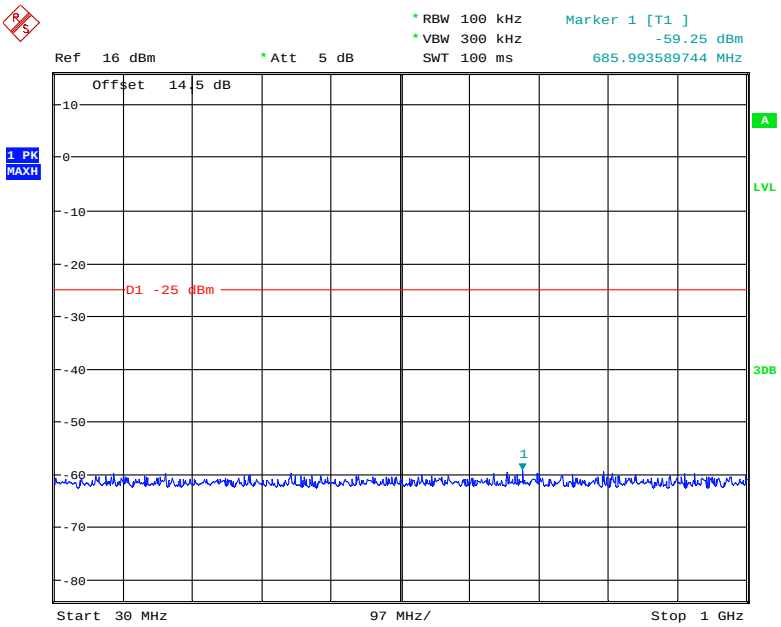
1 GHz – 10 GHz (10.0 MHz, Middle Channel)



Date: 13.JAN.2019 16:43:23

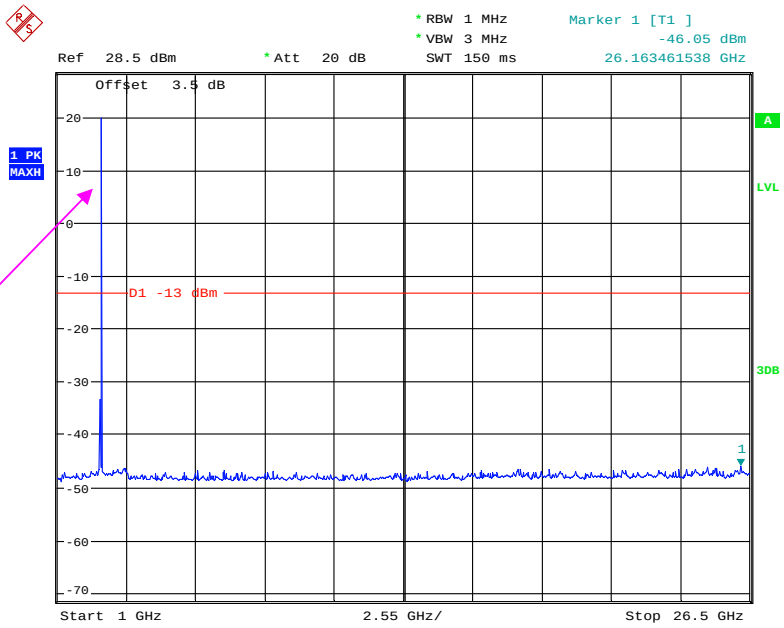
LTE Band 41:

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



Date: 17.JAN.2019 14:25:03

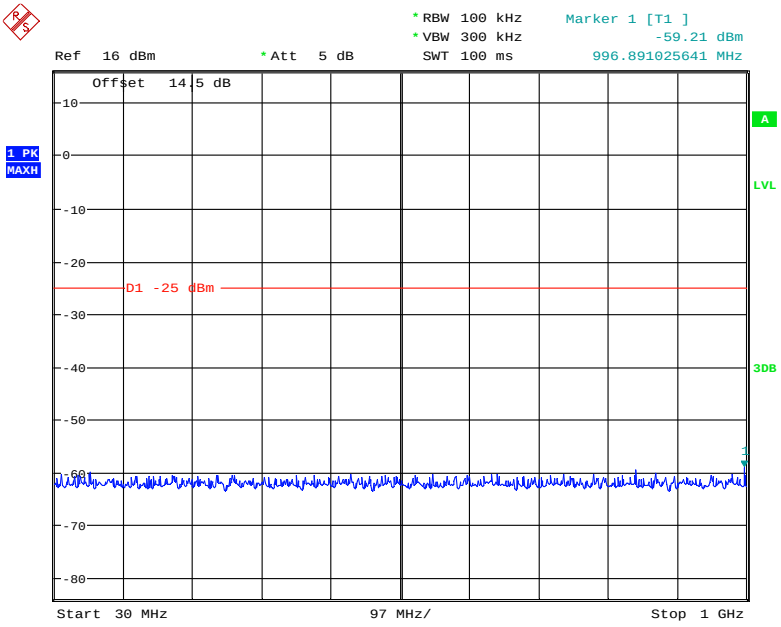
1 GHz – 26.5 GHz (5.0 MHz, Middle Channel)



Fundamental test

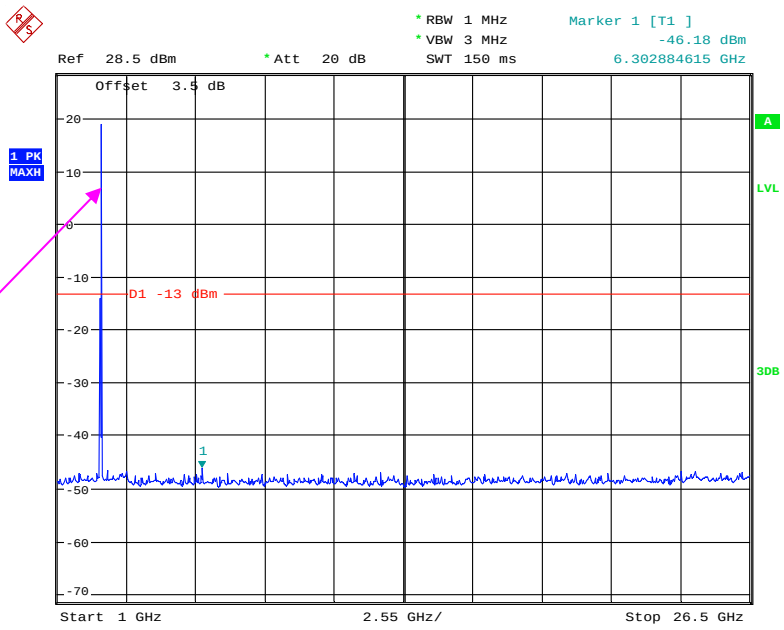
Date: 24.JAN.2019 13:53:11

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



Date: 17.JAN.2019 14:25:19

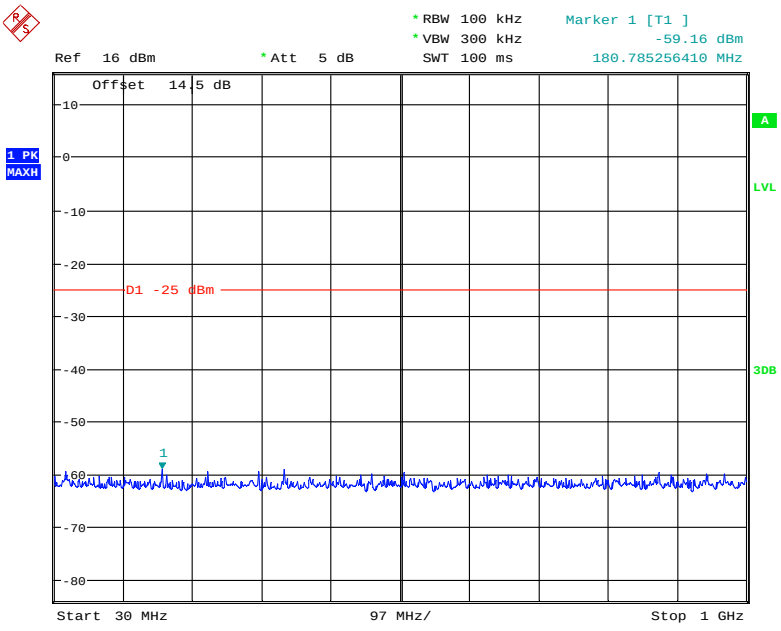
1 GHz – 26.5 GHz (10.0 MHz, Middle Channel)



Fundamental test

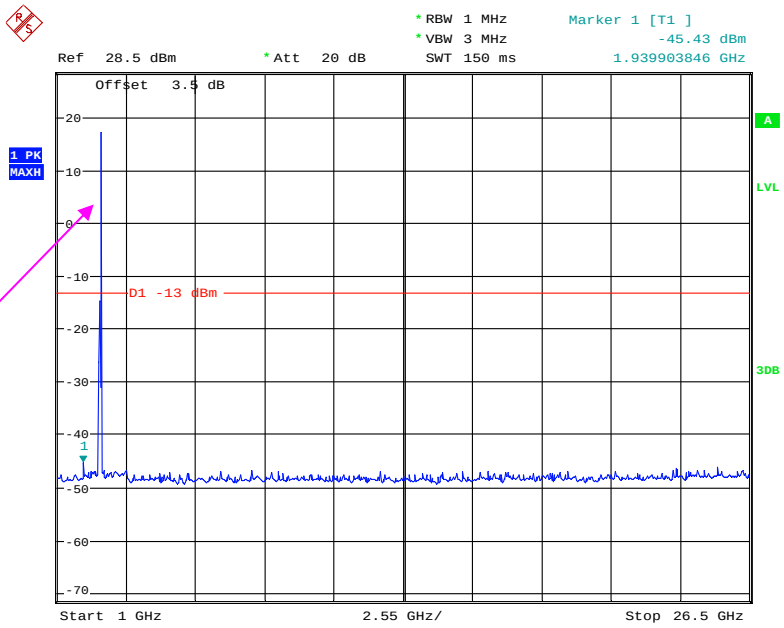
Date: 24.JAN.2019 13:54:51

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



Date: 17.JAN.2019 14:25:38

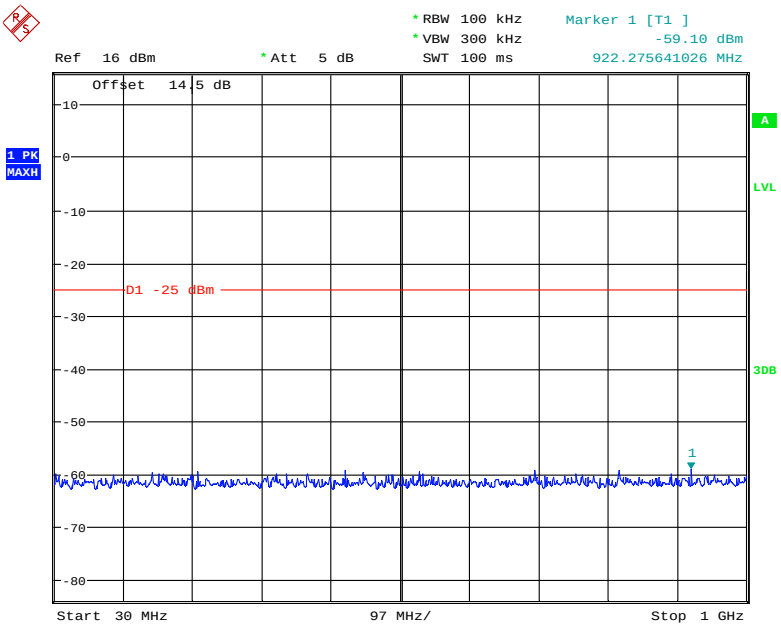
1 GHz – 26.5 GHz (15.0 MHz, Middle Channel)



Fundamental test

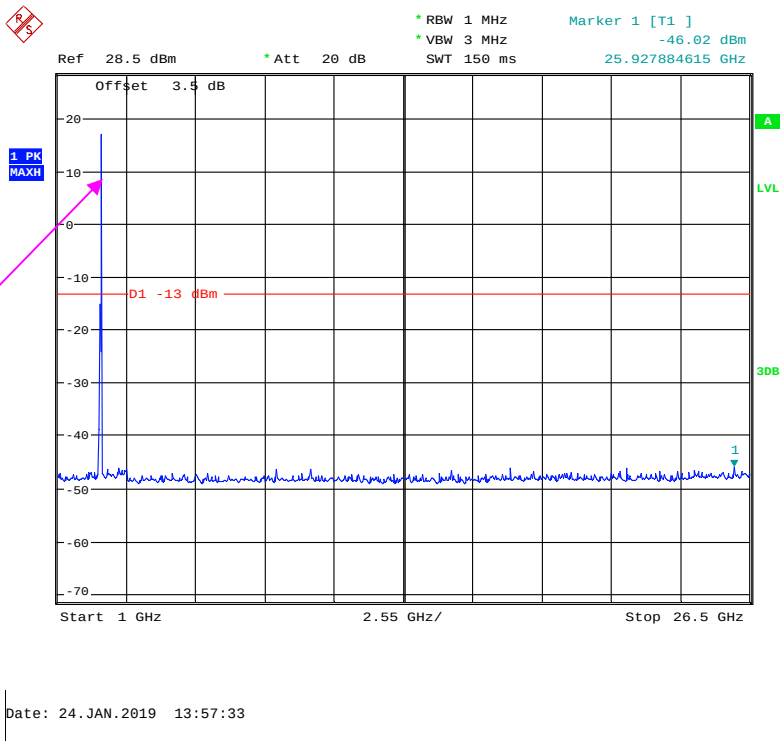
Date: 24.JAN.2019 13:56:22

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



Date: 17.JAN.2019 14:26:03

1 GHz – 26.5 GHz (20.0 MHz, Middle Channel)



Fundamental test

FCC § 2.1053; § 22.917 (a);§ 24.238 (a); §27.53 (h) 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 ℃
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Leo Huang on 2019-01-12.

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										
348.29	32.84	97	2.4	H	-64.2	0.38	0	-64.58	-13	51.58
348.29	31.76	204	1.8	V	-65.2	0.38	0	-65.58	-13	52.58
1673.20	58.19	53	1.4	H	-48.9	1.30	8.90	-41.30	-13	28.30
1673.20	59.71	19	2.2	V	-46.8	1.30	8.90	-39.20	-13	26.20
2509.80	63.71	254	1.8	H	-39.8	2.60	10.20	-32.20	-13	19.20
2509.80	70.96	261	2.0	V	-32.0	2.60	10.20	-24.40	-13	11.40
3346.40	44.82	234	2.0	H	-55.5	1.50	11.70	-45.30	-13	32.30
3346.40	46.91	229	1.6	V	-53.5	1.50	11.70	-43.30	-13	30.30

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										
348.29	31.47	285	2.2	V	-65.5	0.38	0	-65.88	-13	52.88
3760.00	49.96	125	2.5	H	-51.3	1.50	11.80	-41.00	-13	28.00
3760.00	46.84	120	1.5	V	-53.9	1.50	11.80	-43.60	-13	30.60

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 5										
Test frequency range:30 MHz ~ 10 GHz										
348.29	32.45	102	2.5	H	-64.6	0.38	0	-64.98	-13	51.98
348.29	31.26	112	1.8	V	-65.7	0.38	0	-66.08	-13	53.08
1673.00	43.90	3	1.1	H	-63.2	1.30	8.90	-55.60	-13	42.60
1673.00	43.73	323	1.1	V	-62.7	1.30	8.90	-55.10	-13	42.10
2509.50	45.48	354	1.7	H	-58.0	2.60	10.20	-50.40	-13	37.40
2509.50	42.08	46	1.7	V	-60.8	2.60	10.20	-53.20	-13	40.20
Band 41										
Test frequency range: 30 MHz ~ 26GHz										
348.29	32.79	68	1.7	H	-64.2	0.38	0	-64.58	-25	39.58
348.29	31.04	129	2.5	V	-66.0	0.38	0	-66.38	-25	41.38
5205.00	50.96	80	2.0	H	-47.7	1.60	12.10	-37.20	-25	12.20
5205.00	44.86	28	1.4	V	-53.3	1.60	12.10	-42.80	-25	17.80

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) - 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.

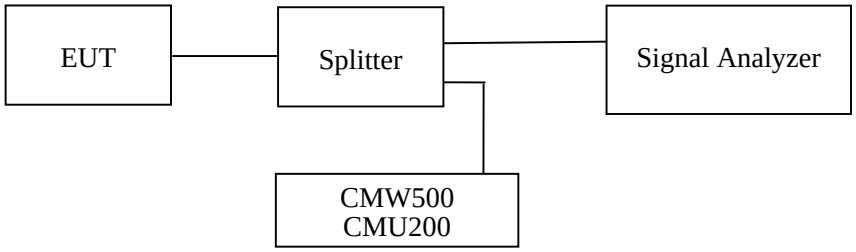
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

According to FCC §27.53 (h), 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

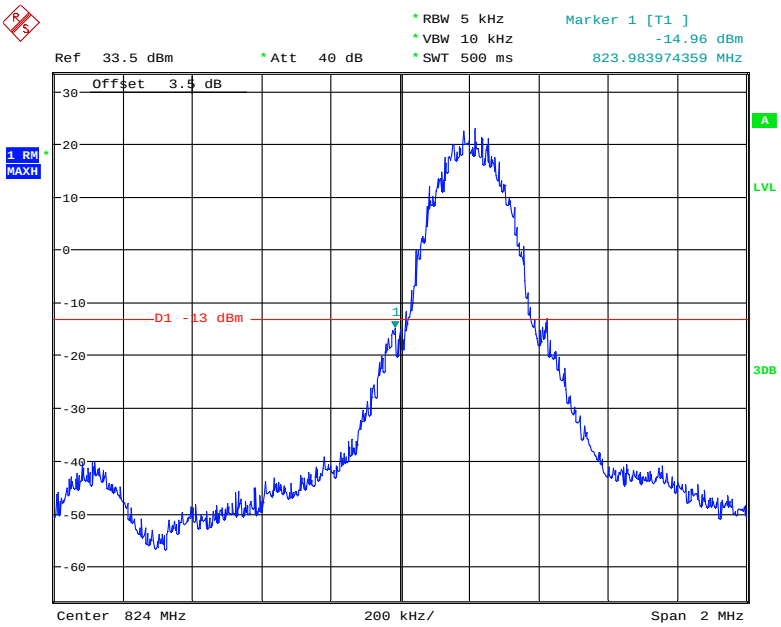
Temperature:	21~25 ℃
Relative Humidity:	51~52 %
ATM Pressure:	100.5~101.0 kPa

The testing was performed by Kiki Kong from 2019-01-11to 2019-01-14.

EUT operation mode: Transmitting

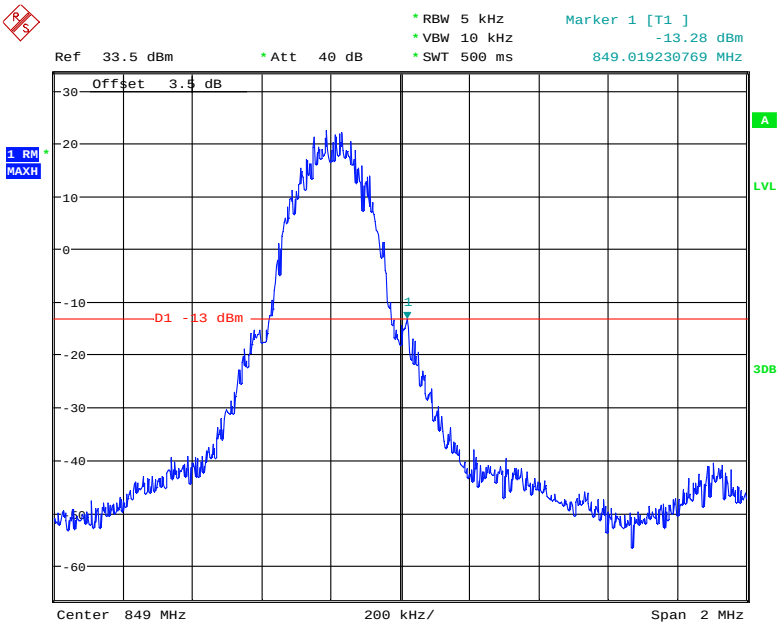
Test Result: Compliance. Please refer to the following plots.

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



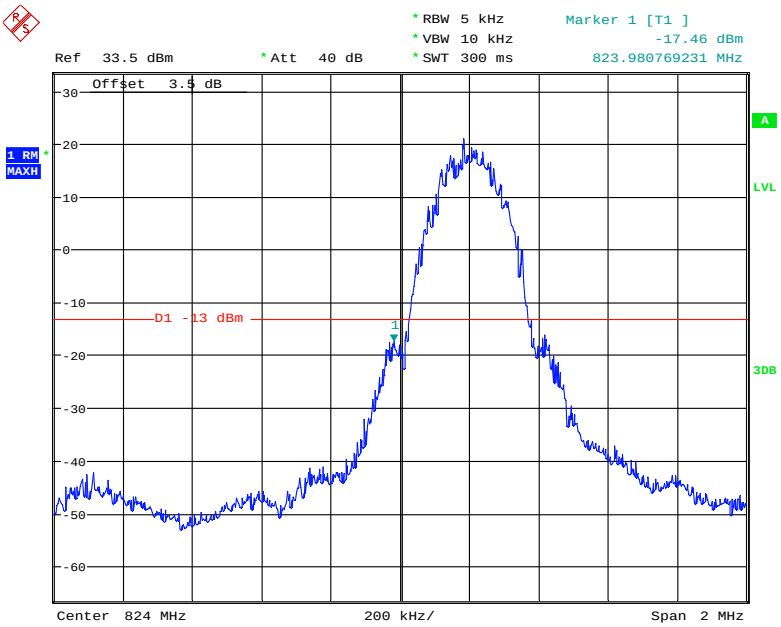
Date: 11.JAN.2019 11:03:17

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



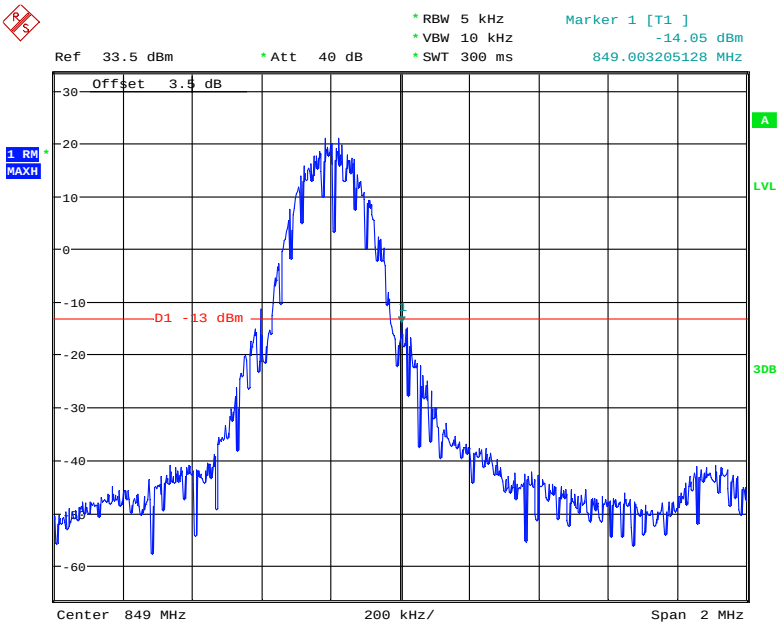
Date: 11.JAN.2019 11:03:59

Cellular Band, Left Band Edge for EDGE Mode



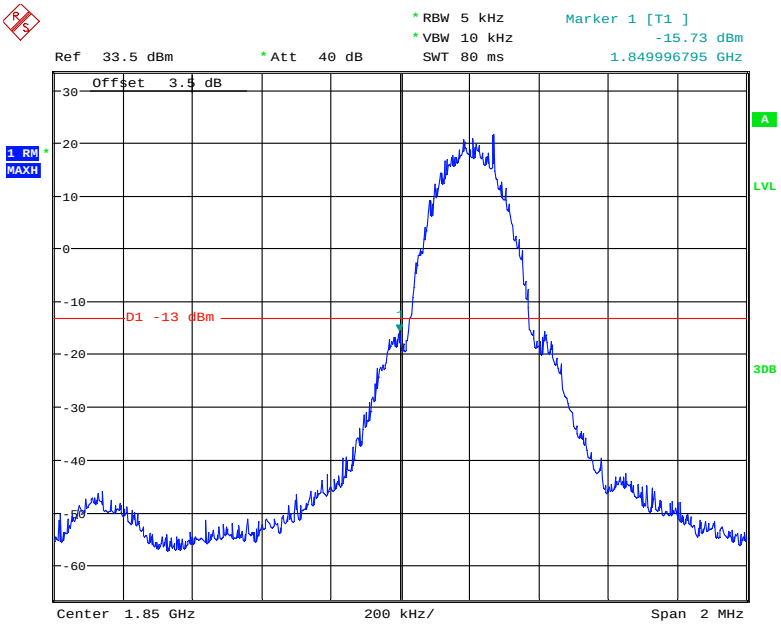
Date: 11.JAN.2019 11:39:43

Cellular Band, Right Band Edge for EDGE Mode



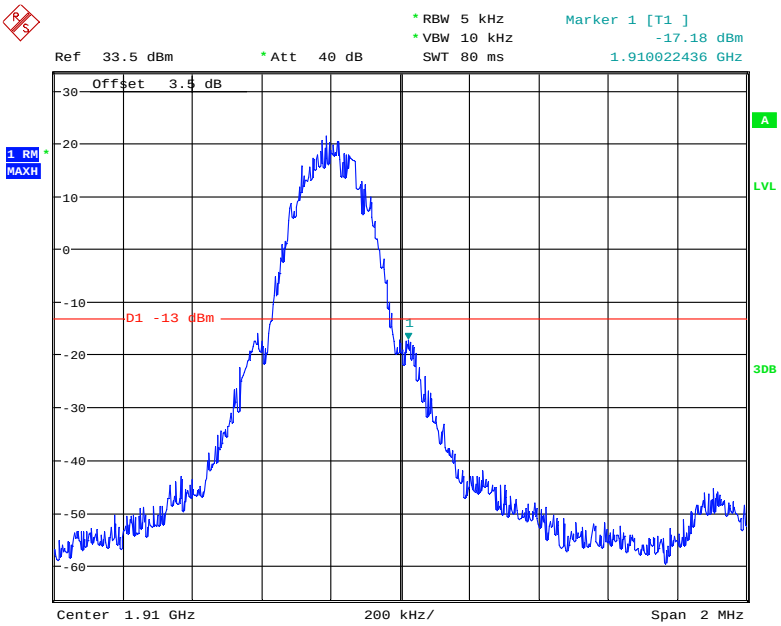
Date: 11.JAN.2019 11:40:51

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



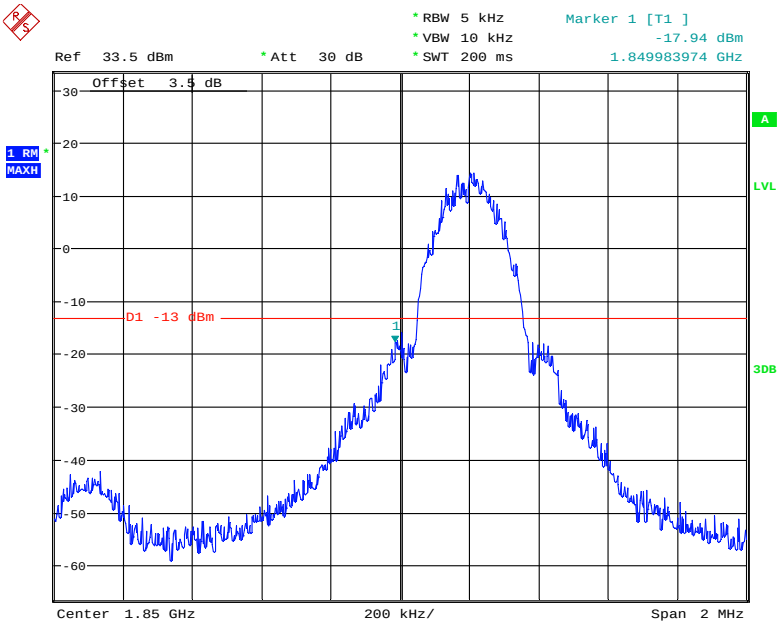
Date: 11.JAN.2019 10:28:05

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



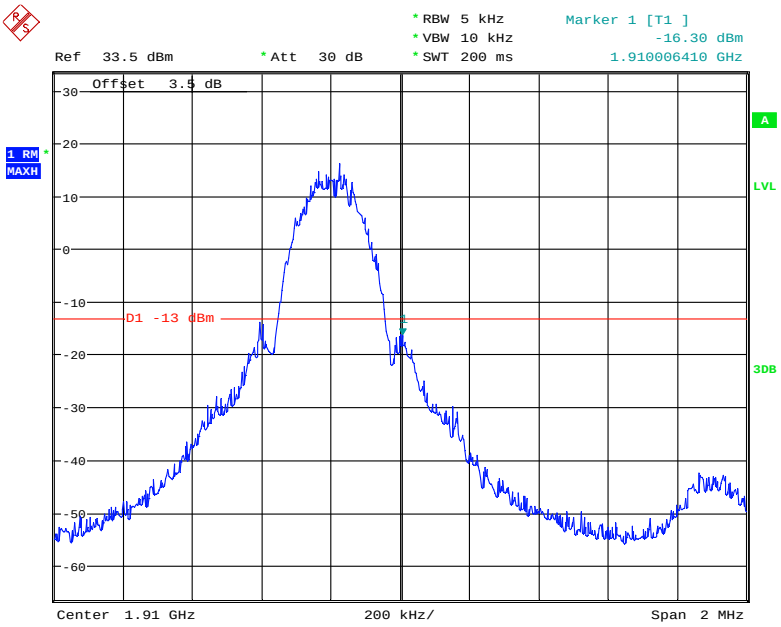
Date: 11.JAN.2019 10:29:18

PCS Band, Left Band Edge for EDGE Mode



Date: 11.JAN.2019 10:44:38

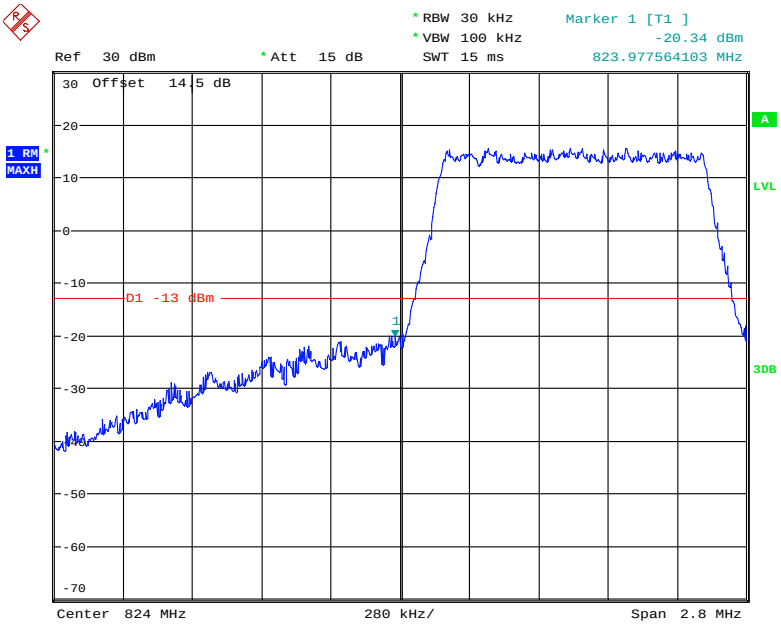
PCS Band, Right Band Edge for EDGE Mode



Date: 11.JAN.2019 10:46:21

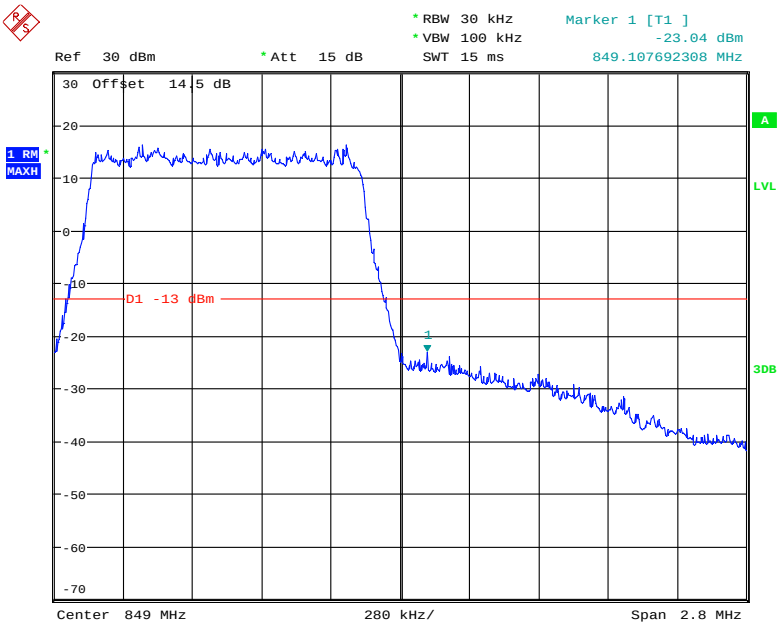
Band 5:

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



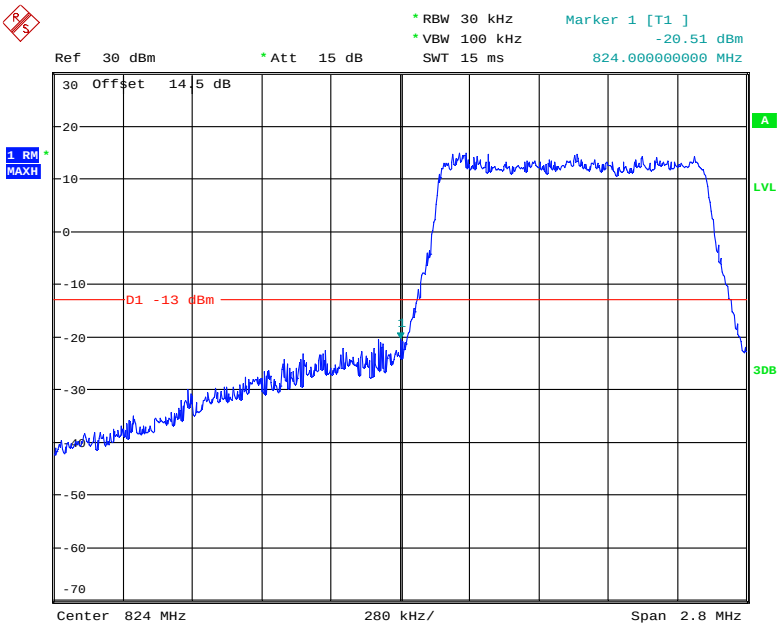
Date: 13.JAN.2019 16:06:56

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



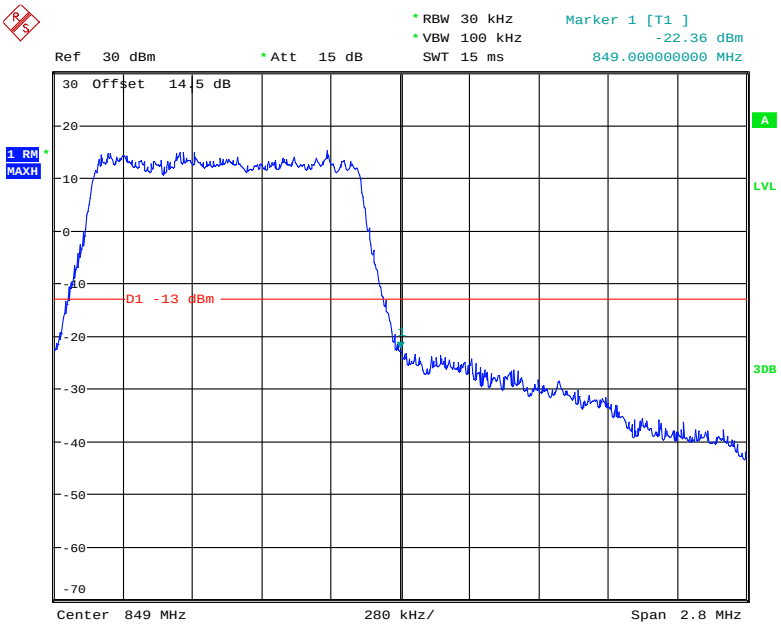
Date: 13.JAN.2019 16:10:36

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



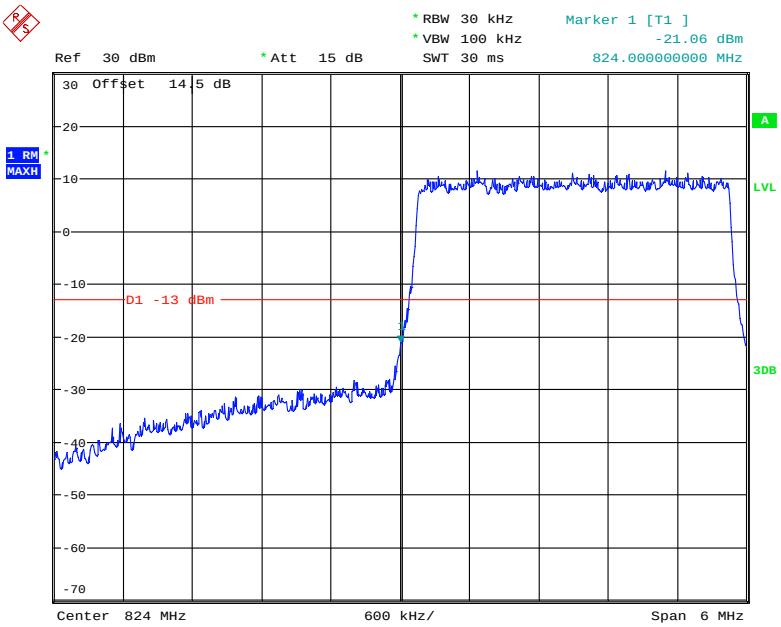
Date: 13.JAN.2019 16:05:13

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



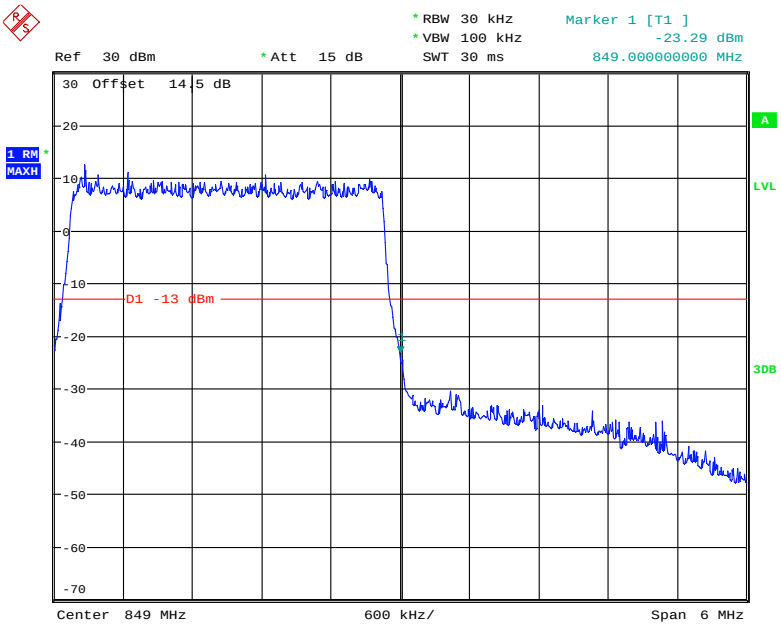
Date: 13.JAN.2019 16:12:38

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



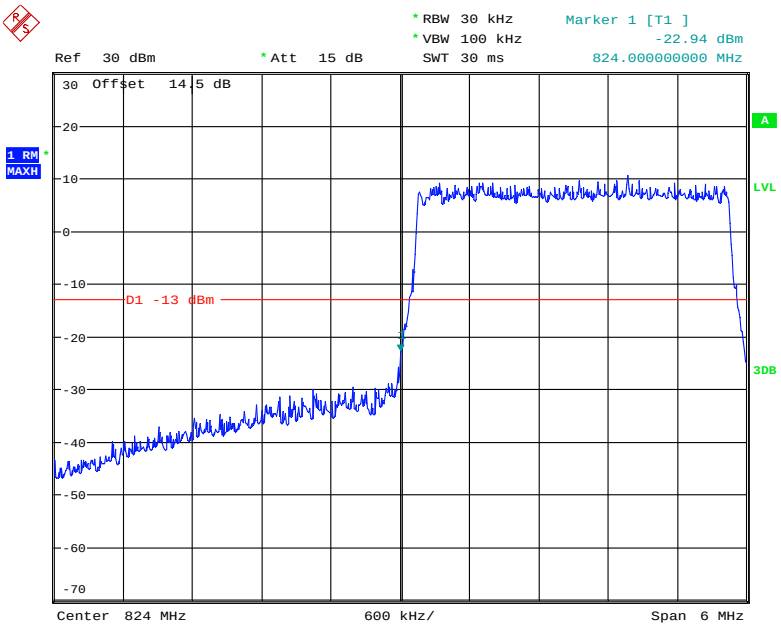
Date: 13.JAN.2019 16:20:55

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



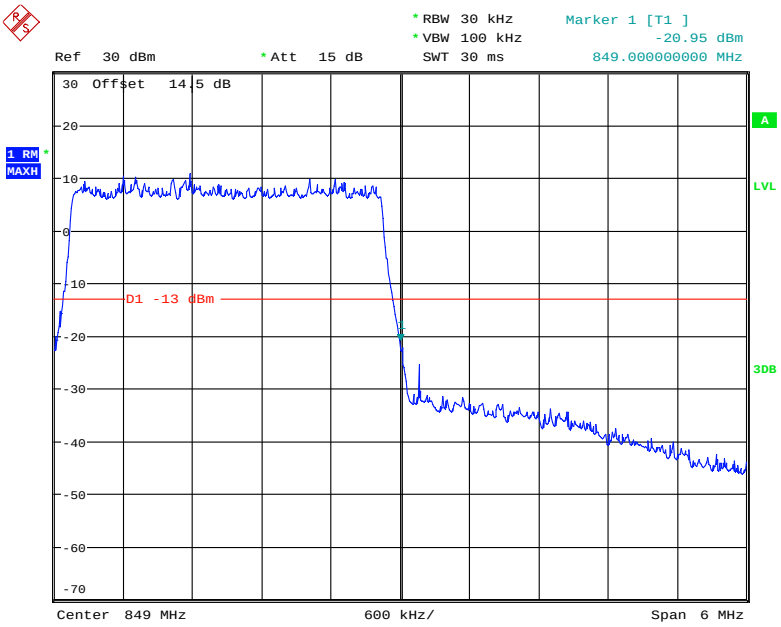
Date: 13.JAN.2019 16:14:12

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



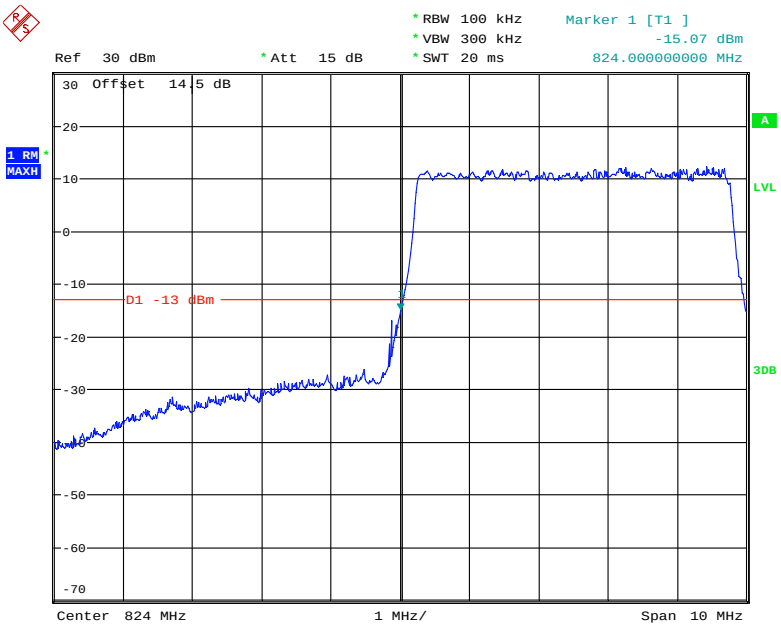
Date: 13.JAN.2019 16:19:21

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



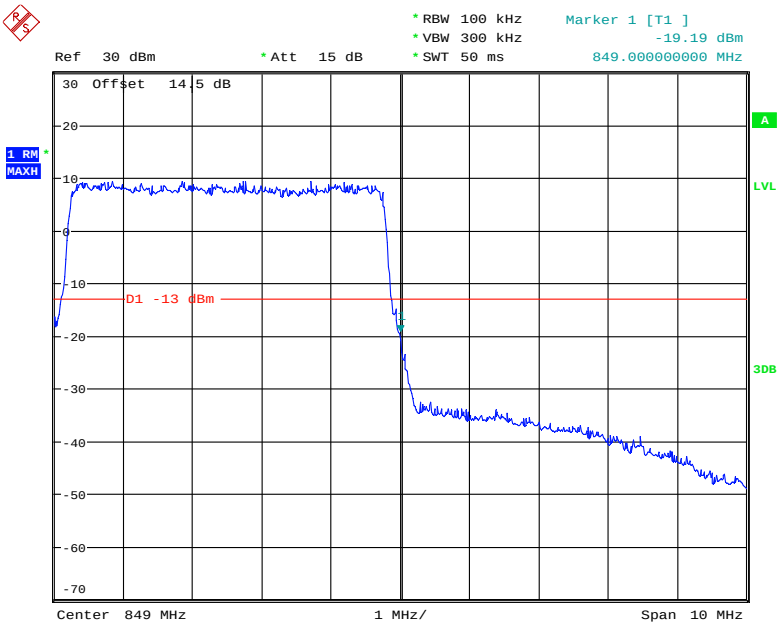
Date: 13.JAN.2019 16:18:14

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



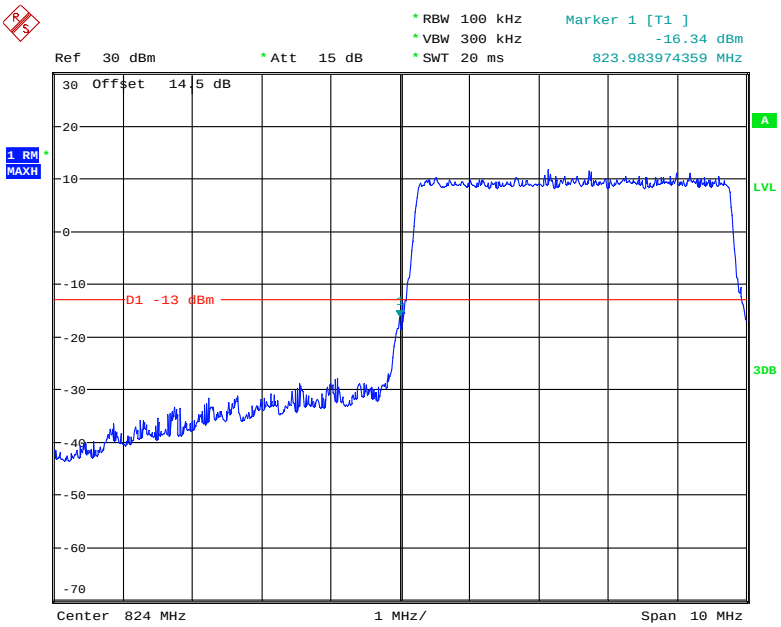
Date: 13.JAN.2019 16:25:36

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



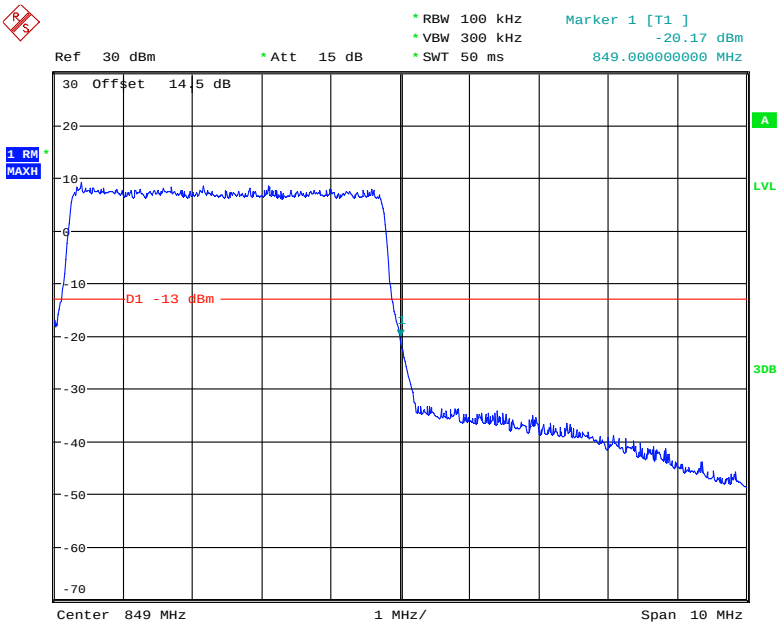
Date: 13.JAN.2019 16:26:55

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



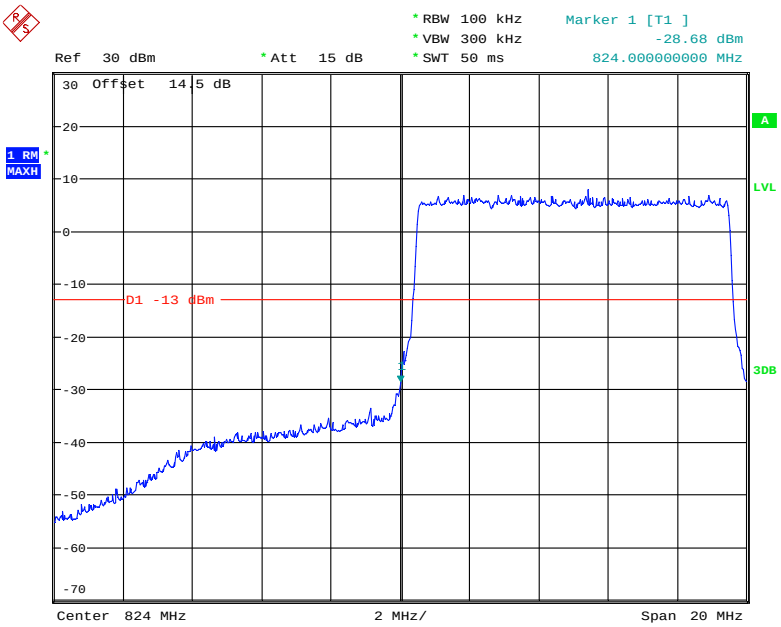
Date: 13.JAN.2019 16:22:58

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



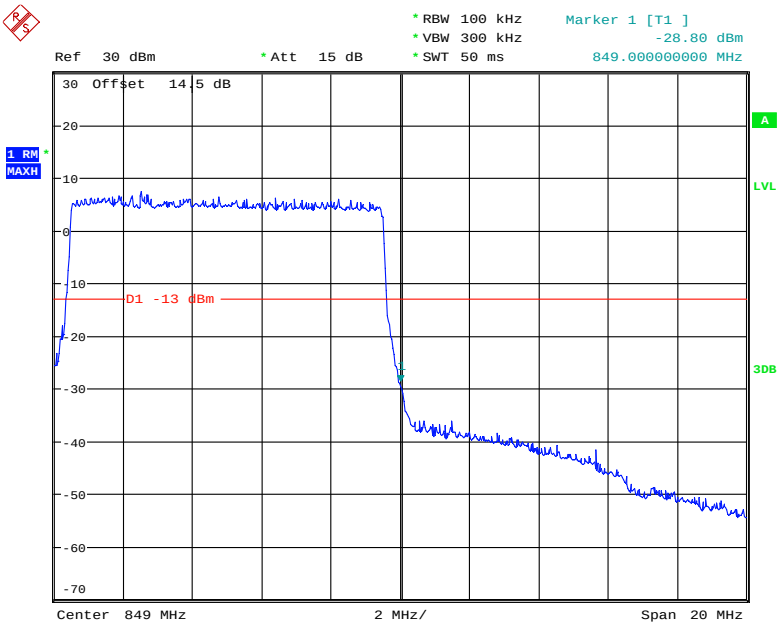
Date: 13.JAN.2019 16:27:28

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



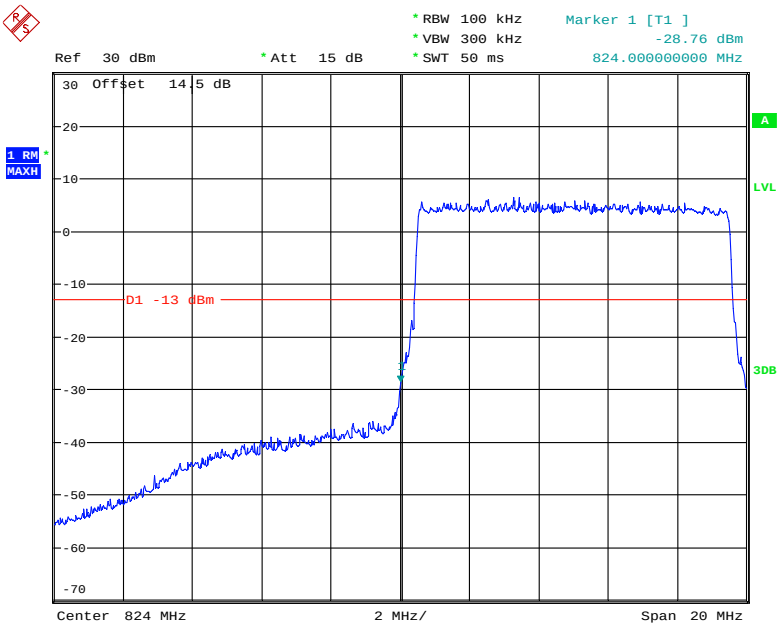
Date: 13.JAN.2019 16:29:53

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



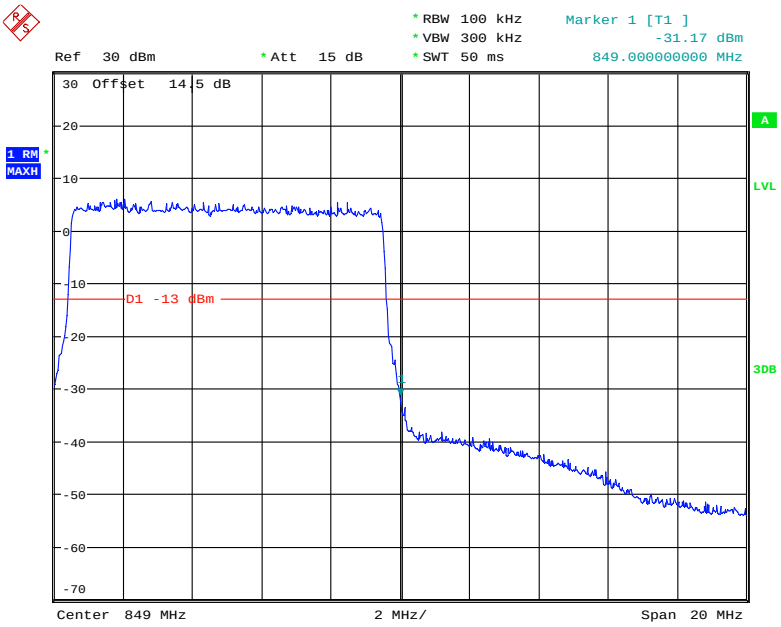
Date: 13.JAN.2019 16:29:11

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



Date: 13.JAN.2019 16:30:19

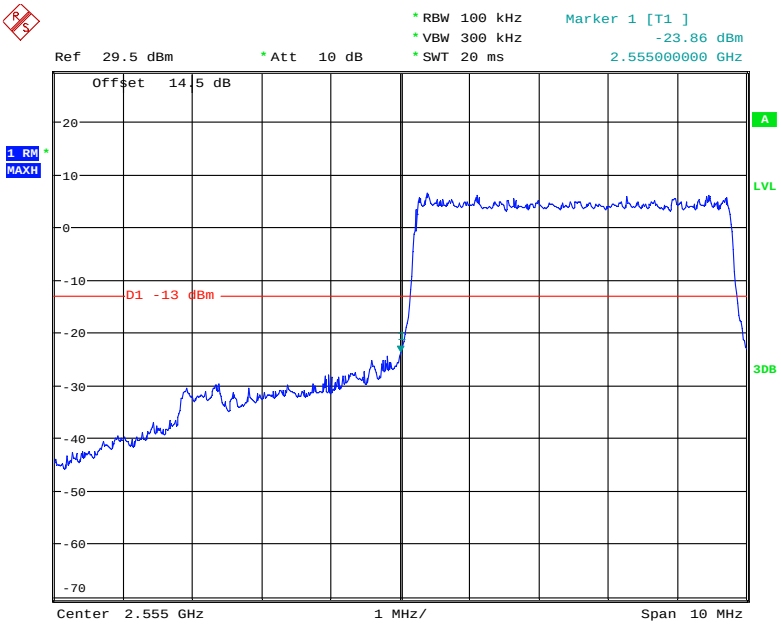
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



Date: 13.JAN.2019 16:28:37

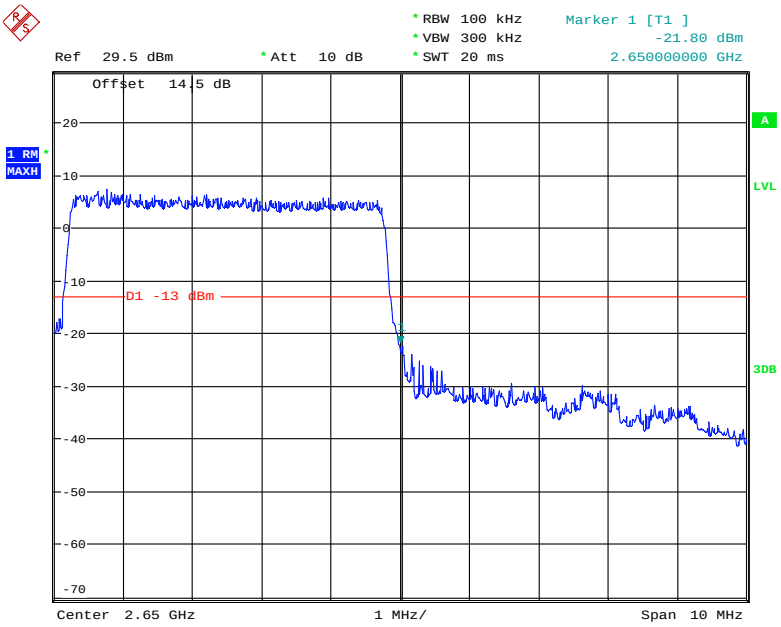
Band 41:

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



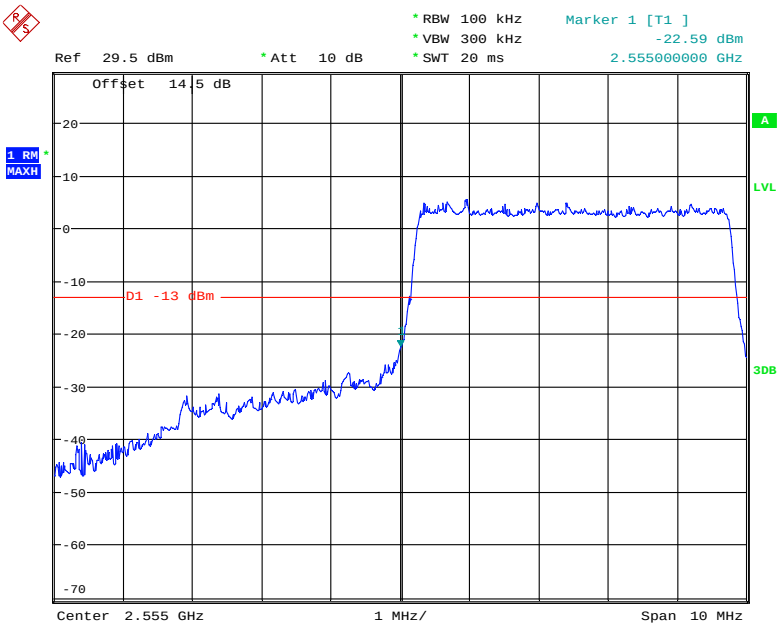
Date: 14.JAN.2019 19:20:33

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



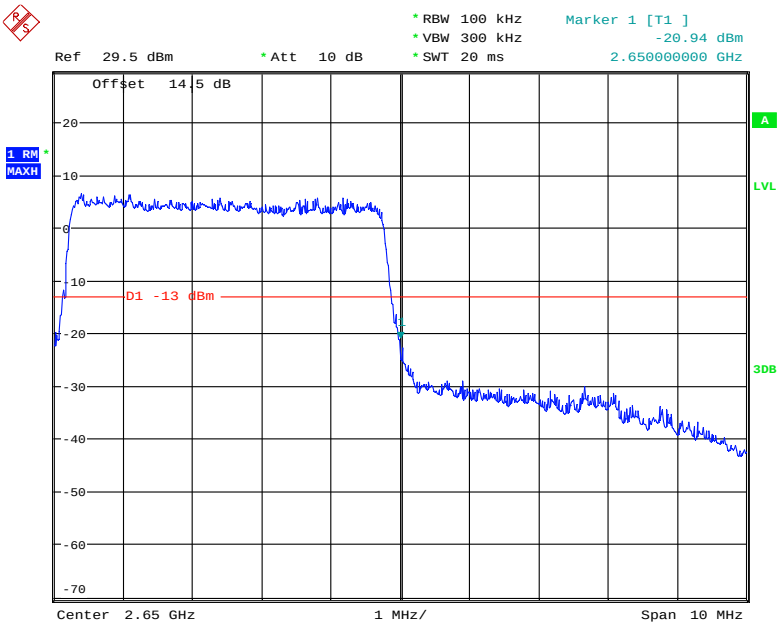
Date: 14.JAN.2019 19:24:16

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



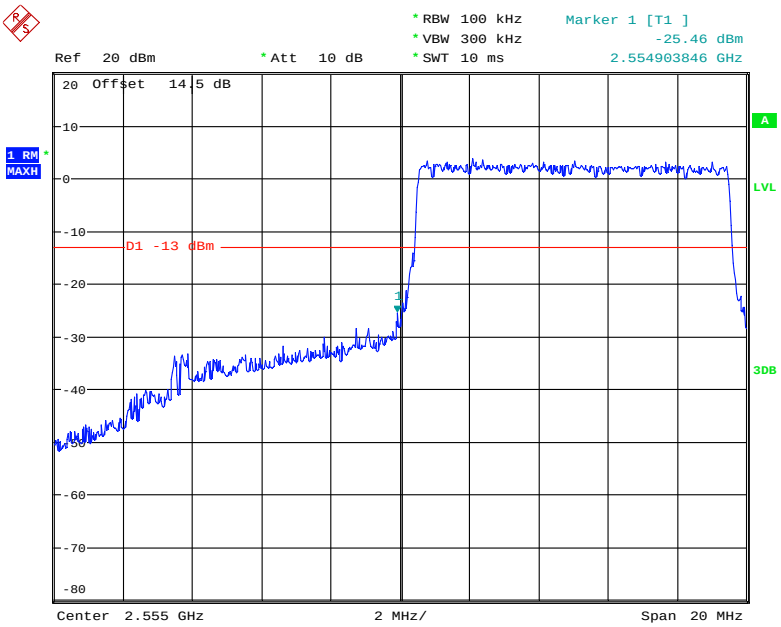
Date: 14.JAN.2019 19:22:12

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



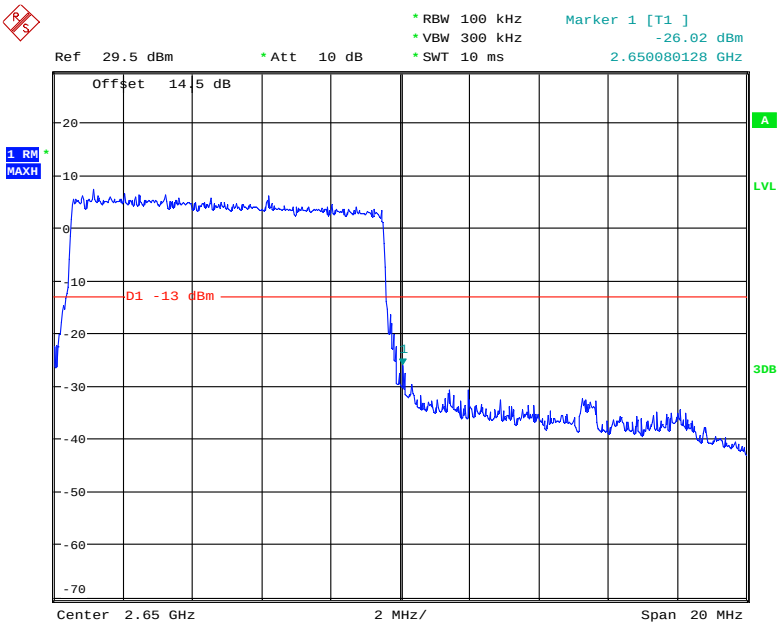
Date: 14.JAN.2019 19:23:23

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



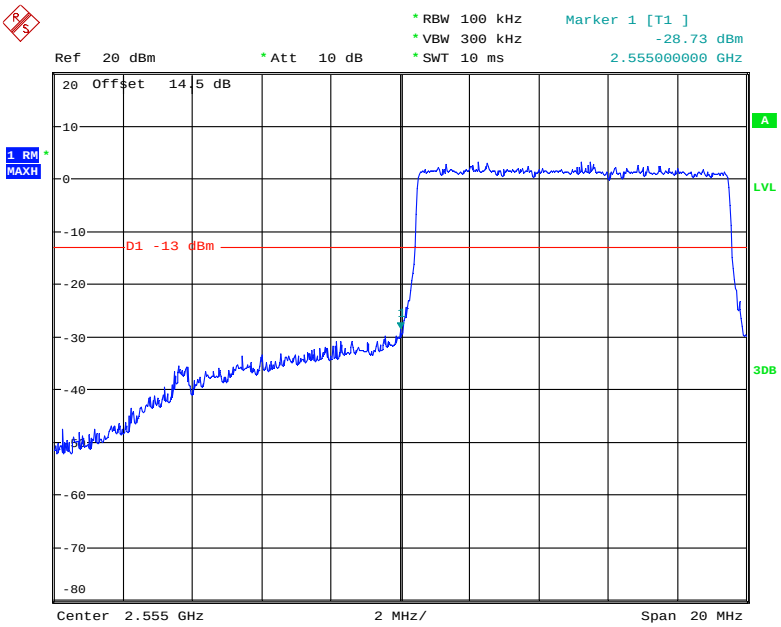
Date: 14.JAN.2019 19:29:22

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



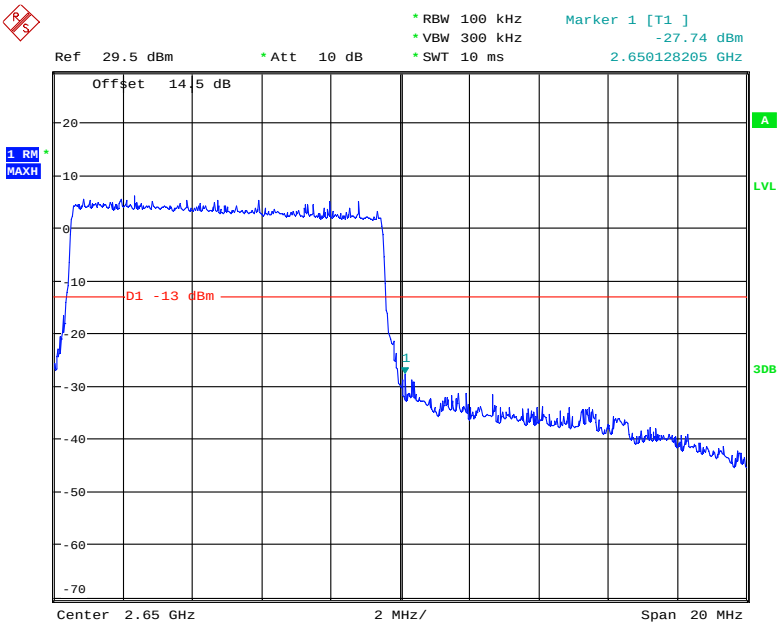
Date: 14.JAN.2019 19:26:07

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



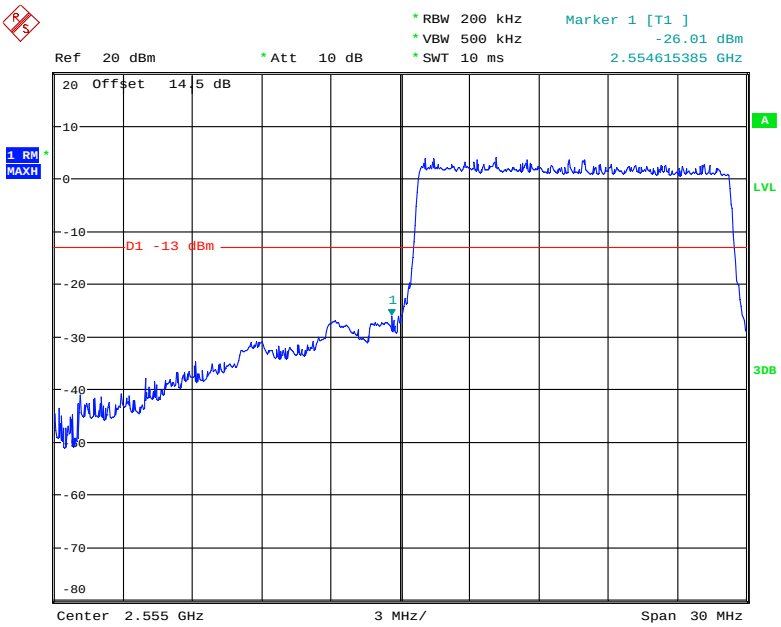
Date: 14.JAN.2019 19:28:42

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



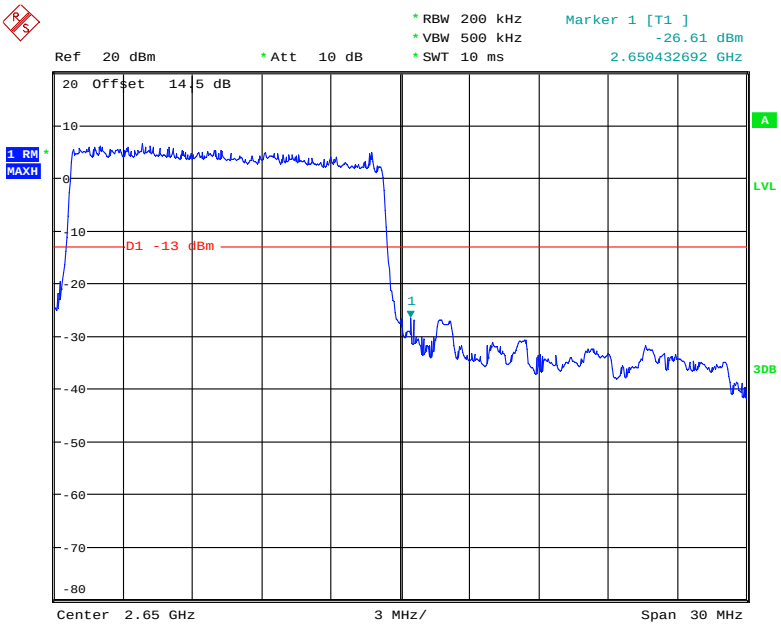
Date: 14.JAN.2019 19:27:06

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



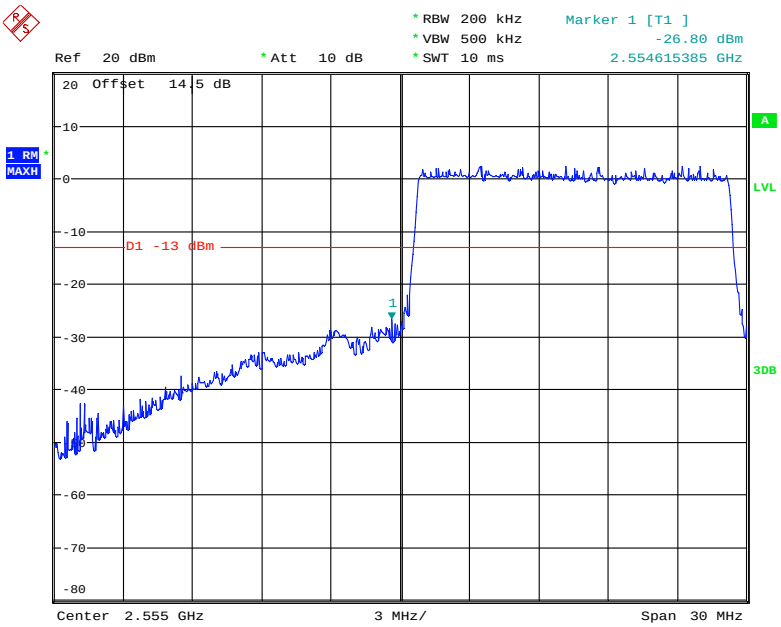
Date: 14.JAN.2019 19:32:35

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



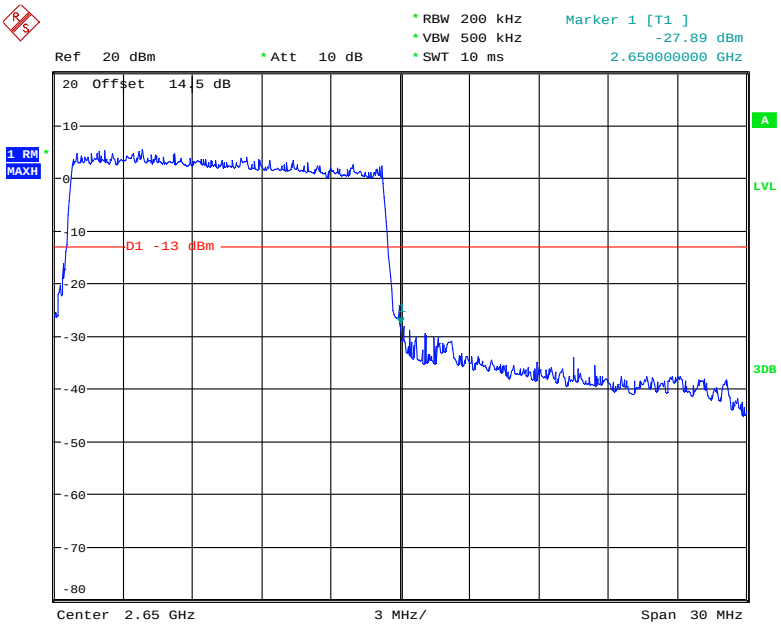
Date: 14.JAN.2019 19:35:47

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



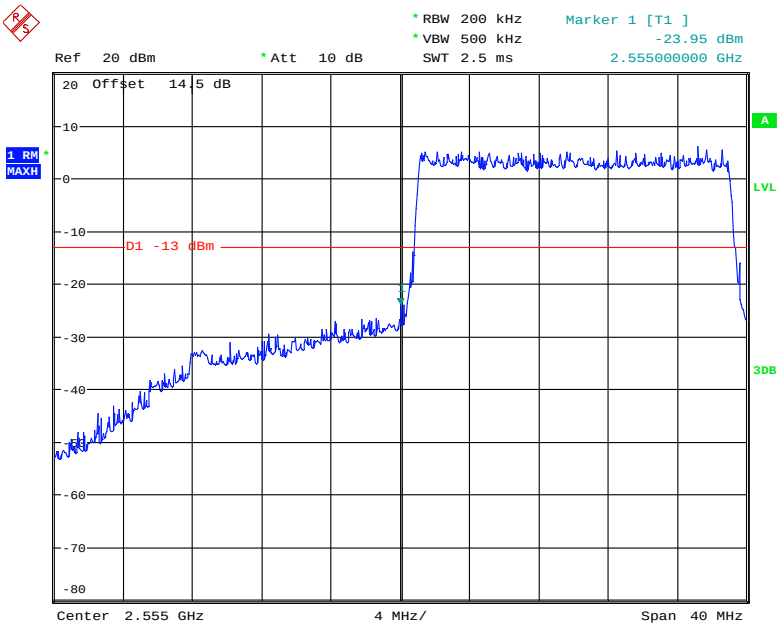
Date: 14.JAN.2019 19:33:13

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



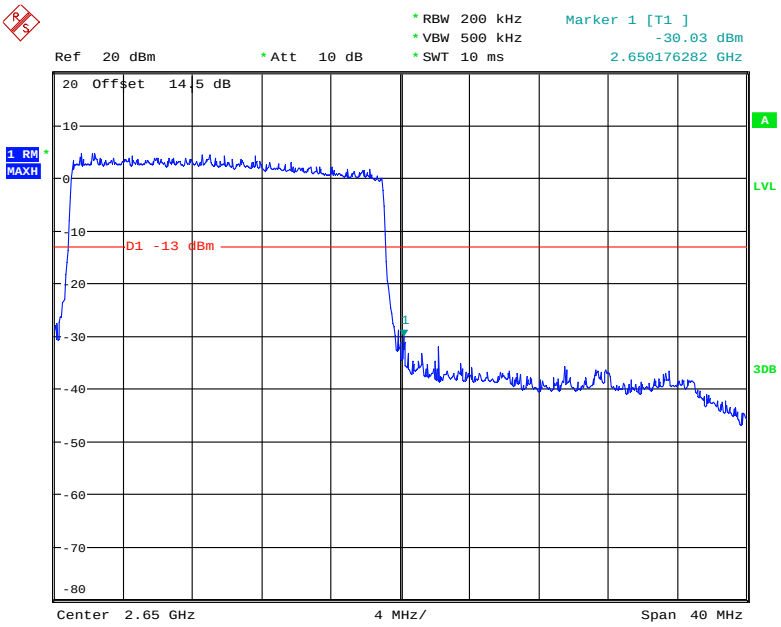
Date: 14.JAN.2019 19:34:03

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



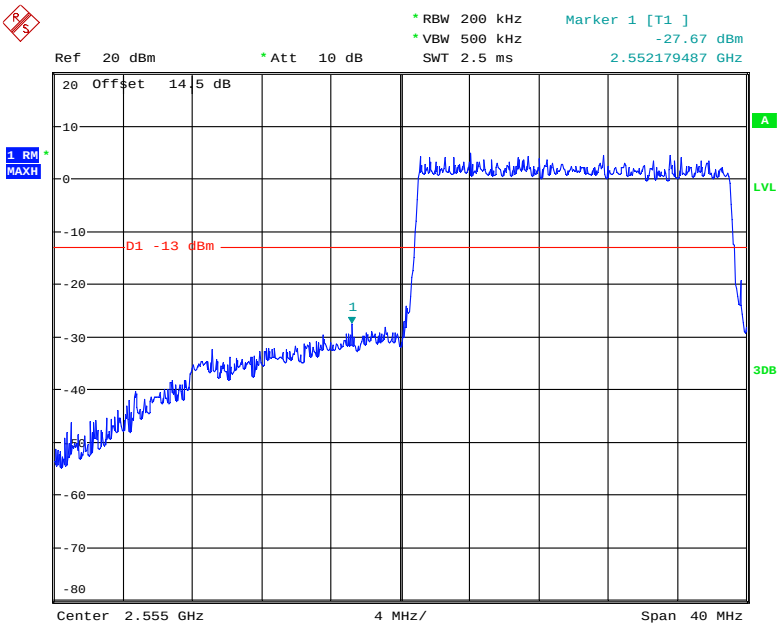
Date: 14.JAN.2019 19:48:16

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



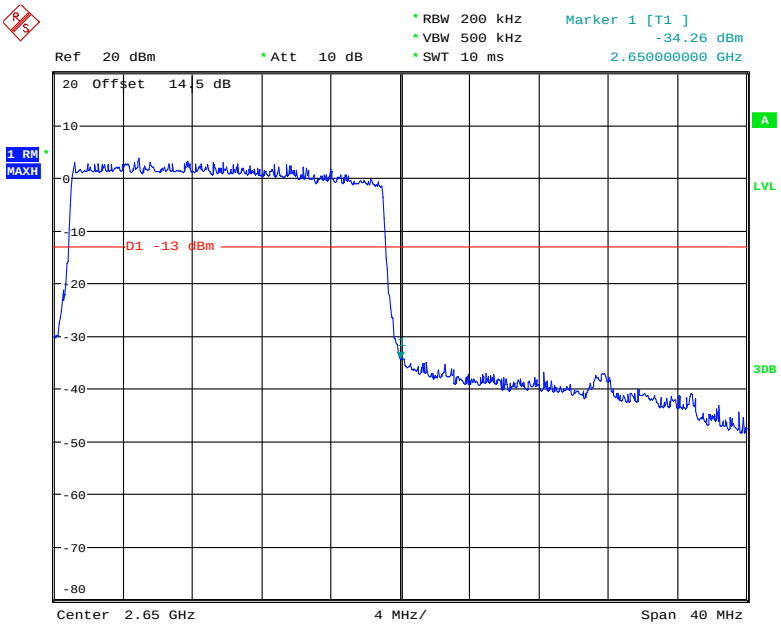
Date: 14.JAN.2019 19:44:44

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



Date: 14.JAN.2019 19:46:50

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



Date: 14.JAN.2019 19:45:31

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

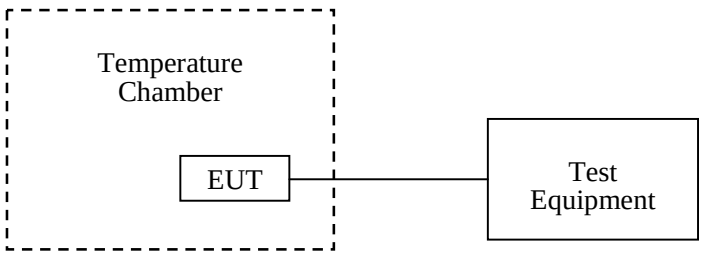
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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:	24~25 ℃
Relative Humidity:	52~53 %
ATM Pressure:	101.0 kPa

The testing was performed by Kiki Kong from 2018-01-11 to 2019-01-17.

EUT operation mode: Transmitting

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

Cellular Band (Part 22H)

GSM Mode

Middle Channel, f_o =836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	2	0.002391	2.5
-20		7	0.008367	2.5
-10		5	0.005977	2.5
0		9	0.010758	2.5
10		7	0.008367	2.5
20		4	0.004781	2.5
30		8	0.009563	2.5
40		5	0.005977	2.5
50		7	0.008367	2.5
25	V min.= 3.6	3	0.003586	2.5
	V max.= 4.2	0	0.000000	2.5

EDGE Mode

Middle Channel, f_o =836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	-2	-0.002391	2.5
-20		1	0.001195	2.5
-10		-4	-0.004781	2.5
0		7	0.008367	2.5
10		-2	-0.002391	2.5
20		0	0.000000	2.5
30		3	0.003586	2.5
40		2	0.002391	2.5
50		0	0.000000	2.5
25	V min.= 3.6	4	0.004781	2.5
	V max.= 4.2	-6	-0.007172	2.5

PCS Band (Part 24E)

GSM Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	-5	-0.002660	pass
-20		-1	-0.000532	pass
-10		1	0.000532	pass
0		0	0.000000	pass
10		2	0.001064	pass
20		3	0.001596	pass
30		-4	-0.002128	pass
40		4	0.002128	pass
50		4	0.002128	pass
25	V min.= 3.6	0	0.000000	pass
	V max.= 4.2	1	0.000532	pass

EDGE Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	5	0.002660	pass
-20		12	0.006383	pass
-10		11	0.005851	pass
0		14	0.007447	pass
10		8	0.004255	pass
20		9	0.004787	pass
30		8	0.004255	pass
40		8	0.004255	pass
50		10	0.005319	pass
25	V min.= 3.6	8	0.004255	pass
	V max.= 4.2	11	0.005851	pass

LTE:
QPSK:

Band 5:

10.0 MHz Middle Channel, f_o = 836.5MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	-4	-0.004781	2.5
-20		-2	-0.002391	2.5
-10		-3	-0.003586	2.5
0		-2	-0.002391	2.5
10		-3	-0.003586	2.5
20		-2	-0.002391	2.5
30		-1	-0.001195	2.5
40		-2	-0.002391	2.5
50		-2	-0.002391	2.5
20	V min.= 3.6	-3	-0.003586	2.5
	V max.= 4.2	-1	-0.001195	2.5

Band41:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	2555.13341	2649.85581	2555.0000	2650.0000
-20		2555.13333	2649.85585	2555.0000	2650.0000
-10		2555.13343	2649.85577	2555.0000	2650.0000
0		2555.13336	2649.85586	2555.0000	2650.0000
10		2555.13337	2649.85586	2555.0000	2650.0000
20		2555.13348	2649.85567	2555.0000	2650.0000
30		2555.13339	2649.85587	2555.0000	2650.0000
40		2555.13339	2649.85585	2555.0000	2650.0000
50		2555.13337	2649.85587	2555.0000	2650.0000
25	V min.= 3.6	2555.13338	2649.85582	2555.0000	2650.0000
	V max.= 4.2	2555.13339	2649.85579	2555.0000	2650.0000

16QAM:

Band 5:

10.0 MHz Middle Channel, f_o=836.5MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	-6	-0.0072	2.5
-20		-4	-0.0048	2.5
-10		-1	-0.0012	2.5
0		-4	-0.0048	2.5
10		-3	-0.0036	2.5
20		-3	-0.0036	2.5
30		-5	-0.0060	2.5
40		-3	-0.0036	2.5
50		-1	-0.0012	2.5
20	V min.= 3.6	-5	-0.0060	2.5
	V max.= 4.2	-6	-0.0072	2.5

Band 41:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	2555.133313	2649.855022	2555.0000	2650.0000
-20		2555.133319	2649.855030	2555.0000	2650.0000
-10		2555.133311	2649.855028	2555.0000	2650.0000
0		2555.133315	2649.855029	2555.0000	2650.0000
10		2555.13300	2649.855720	2555.0000	2650.0000
20		2555.13331	2649.855020	2555.0000	2650.0000
30		2555.133307	2649.855010	2555.0000	2650.0000
40		2555.133299	2649.855009	2555.0000	2650.0000
50		2555.133296	2649.855001	2555.0000	2650.0000
25	V min.= 3.6	2555.133288	2649.854994	2555.0000	2650.0000
	V max.= 4.2	2555.13330	2649.855710	2555.0000	2650.0000

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