



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

For

WizarPos International Co., Ltd.

4F, No 507 Wuning Rd, Shanghai, China

FCC ID: 2AG97-WIZARPOSQ2

Report Type: Original Report	Product Type: WIZARPOS
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TEST DATA123

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	WizarPos International Co., Ltd.
Tested Model	WIZARPOS Q2
Product Type	WIZARPOS
Dimension	184 mm (L)* 85 mm (W)*72 mm(H)
Power Supply	DC 7.2V by battery and 5V charging by adapter

Adapter Information:

Model: TPA-46050200UU

Input: AC100-240 V 50/60Hz 0.3A

Output: 5.0V, 2000mA

**All measurement and test data in this report was gathered from production sample serial number: 20171228001.
(Assigned by the BACL. The EUT supplied by the applicant was received on 2017-12-28)*

Objective

This type approval report is prepared on behalf of WizarPos International Co., Ltd. in accordance with Part 2, Part 22-Subpart H, Part 24-Subpart E and Part 27 of the Federal Communication Commission's rules.

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

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS, Part 15.247 DSS and Part 15.225 DXX submissions with FCC ID: 2AG97-WIZARPOSQ2.

Test Methodology

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

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

Applicable Standards: TIA/EIA 603-D.

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

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19dB
RF conducted test with spectrum		0.9dB
RF Output Power with Power meter		0.5dB
Radiated emission	30MHz~1GHz	6.11dB
	1GHz~6GHz	4.45dB
	6GHz~18GHz	5.23dB
	18GHz~40GHz	5.65dB
Occupied Bandwidth		0.5kHz
Temperature		1.0℃
Humidity		6%

Test Facility

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

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

SYSTEM TEST CONFIGURATION

Justification

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

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

Channel List

Mode		Channel		Frequency
GSM/GPRS/EDGE 850		Low	128	824.2
		Middle	190	836.6
		High	251	848.8
PCS/GPRS/EDGE 1900		Low	512	1850.2
		Middle	661	1880.0
		High	810	1909.8
WCDMA Band V		Low	4132	826.4
		Middle	4183	836.6
		High	4233	846.6
CDMA850 Band		Low	1013	824.70
		Middle	384	836.52
		High	777	848.31
LTE Band 5	1.4M	Low	20407	824.7
		Middle	20525	836.5
		High	20643	848.3
	3M	Low	20415	825.5
		Middle	20525	836.5
		High	20635	847.5
	5M	Low	20425	826.5
		Middle	20525	836.5
		High	20625	846.5
	10M	Low	20450	829.0
		Middle	20525	836.5
		High	20600	844.0

Mode		Channel		Frequency
LTE Band 38	5M	Low	37775	2572.5
		Middle	38000	2595.0
		High	38225	2617.5
	10M	Low	37800	2575.0
		Middle	38000	2595.0
		High	38200	2615.0
	15M	Low	37825	2577.5
		Middle	38000	2595.0
		High	38175	2612.5
	20M	Low	37850	2580.0
		Middle	38000	2595.0
		High	38150	2610.0
LTE Band 40	5M	Low	39175	2352.5
		Middle	39200	2355.0
		High	39225	2357.5
	10M	/	39200	2355.0
LTE Band 41	5M	Low	40265	2557.5
		Middle	40740	2605.0
		High	41215	2652.5
	10M	Low	40290	2560.0
		Middle	40740	2605.0
		High	41190	2650.0
	15M	Low	40315	2562.5
		Middle	40740	2605.0
		High	41165	2647.5
	20M	Low	40340	2565.0
		Middle	40740	2605.0
		High	41140	2645.0

Equipment Modifications

No modifications were made to the EUT.

Support Equipment List and Details

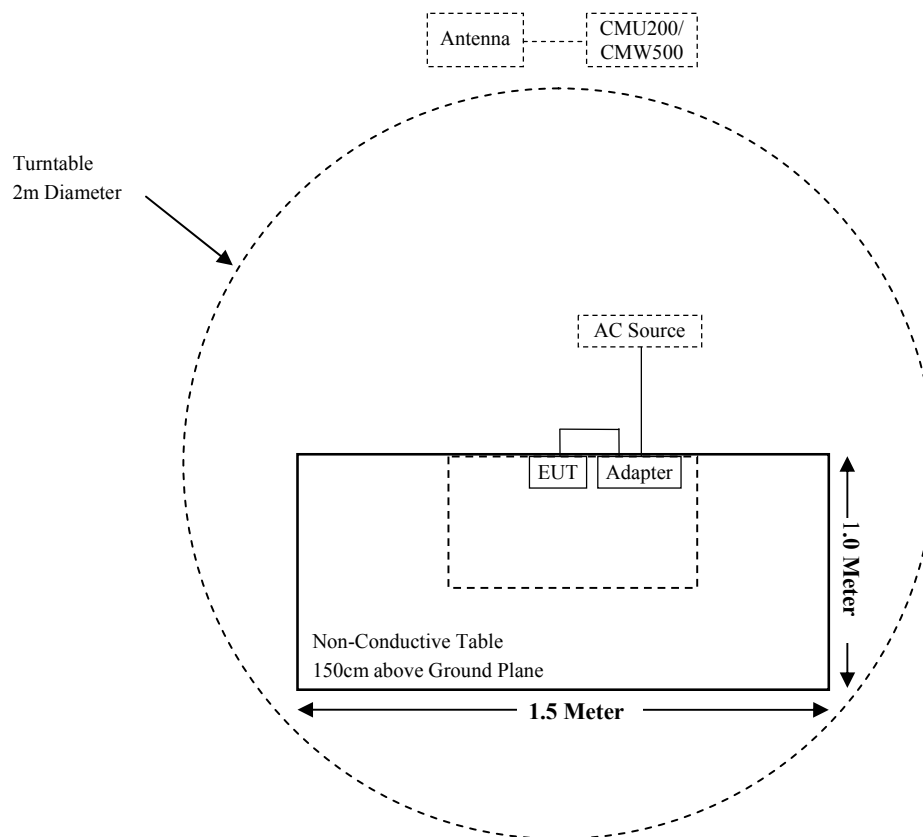
Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	110605
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	104478
WizarPos International Co., Ltd.	Antenna	/	/

External Cable List and Details

Cable Description	Shielding Type	Length (m)	From Port	To
DC Cable	Un-shielding	0.5	EUT	Adapter

Block Diagram of Test Setup

For Radiated Emissions(Below 1GHz&Above 1GHz)



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307(b)(1)& §2.1093	RF Exposure Information	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 (m)	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053; § 22.917 (a); § 24.238 (a); §27.53 (m)	Spurious Radiated Emissions	Compliance
§ 22.917 (a); § 24.238 (a); §27.53 (m)	Band Edge	Compliance
§ 2.1055; § 22.355; § 24.235; §27.54;	Frequency stability	Compliance

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test (Chamber 1#)					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2017-11-12	2018-11-11
HP	Signal Generator	HP 8341B	2624A00116	2017-08-29	2018-08-28
Sunol Sciences	Broadband Antenna	JB3	A090413-1	2016-12-26	2019-12-25
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2016-01-09	2019-01-08
Sonoma Instrunent	Pre-amplifier	310N	171205	2017-08-15	2018-08-14
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-7	007	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-8	008	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2017-08-15	2018-08-14
Rohde & Schwarz	UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	110605	2017-11-12	2018-11-11
R & S	Wideband Radio Communication Tester	CMW500	104478	2017-07-22	2018-07-21
Radiated Emission Test (Chamber 2#)					
HP	Signal Generator	HP 8341B	2624A00116	2017-08-29	2018-08-28
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2017-08-27	2018-08-26
ETS-LINDGREN	Horn Antenna	3115	9311-4159	2016-01-11	2019-01-10
ETS-LINDGREN	Horn Antenna	3115	6229	2016-01-11	2019-01-10
ETS-LINDGREN	Horn Antenna	3116	00084159	2016-10-18	2019-10-17
ETS-LINDGREN	Horn Antenna	3116	2516	2016-12-12	2019-12-12
Narda	Pre-amplifier	AFS42-00101800	2001270	2017-12-22	2018-12-21
QuinStar	Amplifier	QLW-18405536-J0	15964001009	2017-12-22	2018-12-21
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-6	006	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-11	011	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-12	012	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-13	013	2017-08-15	2018-08-14
MICRO-COAX	Coaxial Cable	Cable-16	016	2017-08-15	2018-08-14
Rohde & Schwarz	UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	110605	2017-11-12	2018-11-11
R & S	Wideband Radio Communication Tester	CMW500	104478	2017-07-22	2018-07-21

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	Signal Analyzer	FSIQ26	836131/009	2017-09-21	2018-09-20
R & S	Wideband Radio Communication Tester	CMW500	104478	2017-07-22	2018-07-21
Rohde & Schwarz	UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	110605	2017-11-12	2018-11-11
BACL	Temperature & Humidity Chamber	BTH-150	30023	2017-10-10	2018-10-09
EAST	Regulated DC Power Supply	MCH-303D-II	14070562	2017-10-10	2018-10-09
WizarPos	RF Cable	/	/	/	/

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

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

Applicable Standard

FCC§1.1307,§2.1093.

Test Result

Compliance, please refer to the SAR report: RKSA171228001-20.

FCC §2.1047 - MODULATION CHARACTERISTIC

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

§2.1046; § 22.913 (a);§ 24.232 (c); §27.50 (h) - RF OUTPUT POWER**Applicable Standards**

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

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..

According to FCC §24.232 (d), The peak-to-average ratio (PAR) of the transmission must not exceed 13 dB.

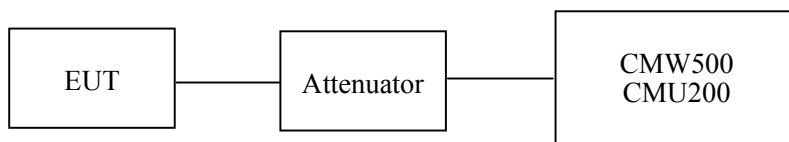
According to FCC §27.50 (h) The following power limits shall apply in the BRS and EBS:

(2) Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

Equipment employed must be authorized in accordance with the provisions of §24.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

Test Procedure*Conducted method:*

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

**Test Data****Environmental Conditions**

Temperature:	23.4℃
Relative Humidity:	50 %
ATM Pressure:	101.2kPa

The testing was performed by Ada Yu on 2018-01-24.

Conducted Power:**GSM 850 Band**

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	128	824.2	32.40	38.45
	190	836.6	32.50	38.45
	251	848.8	32.30	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	32.46	32.23	32.07	31.76	38.45
	190	836.6	32.52	32.36	32.08	31.76	38.45
	251	848.8	32.31	32.17	31.84	31.76	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	128	824.2	26.65	26.48	26.24	26.03	38.45
	190	836.6	26.63	26.43	26.20	26.15	38.45
	251	848.8	26.71	26.50	26.25	26.30	38.45

WCDMA Band V

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA	Normal	RMC12.2k		23.05	22.94	23.16
		Rel 99	1	22.76	22.65	22.88
		HSDPA	1	22.52	22.41	22.60
			2	22.25	22.18	22.35
			3	22.01	21.91	22.11
			4	21.75	21.68	21.86
		HSUPA	1	21.48	21.48	21.61
			2	21.27	21.19	21.35
			3	21.00	20.91	21.07
			4	20.76	20.83	20.83
			5	22.76	22.65	22.88

CDMA850 Band

Mode	Test Mode	Channel	Frequency (MHz)	Average Output Power (dBm)
CDMA	1xRTT	1013	824.70	23.89
		384	836.52	23.34
		777	848.31	23.70
	EV-DO	1013	824.70	23.70
		384	836.52	23.20
		777	848.31	23.54

PCS 1900 Band

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	512	1850.2	30.20	33
	661	1880.0	30.30	33
	810	1909.8	30.20	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	30.01	29.85	29.49	29.24	33
	661	1880.0	30.08	29.91	29.60	29.39	33
	810	1909.8	30.02	29.88	29.52	29.37	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	512	1850.2	26.16	26.04	25.95	25.73	33
	661	1880.0	26.26	26.08	26.03	25.73	33
	810	1909.8	26.24	26.13	26.04	25.72	33

Maximum Output Power:**LTE Band 5**

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)	Limit (dBm)
1.4M	QPSK	1#0	22.49	22.67	22.39	38.45
		1#3	22.19	22.33	21.88	
		1#5	21.82	22.09	21.53	
		3#0	21.34	21.84	21.02	
		3#1	20.92	21.36	20.56	
		3#3	20.67	21.06	20.11	
		6#0	20.3	20.59	19.85	
	16-QAM	1#0	22.01	21.84	22.05	
		1#3	21.68	21.39	21.56	
		1#5	21.31	20.95	21.21	
		3#0	20.94	20.69	20.71	
		3#1	20.69	20.25	20.38	
		3#3	20.29	19.76	20.01	
		6#0	19.75	19.42	19.76	
3M	QPSK	1#0	22.36	22.19	22.28	38.45
		1#7	21.96	21.95	21.87	
		1#14	21.45	21.64	21.53	
		8#0	21.06	21.16	21.12	
		8#4	20.6	20.7	20.85	
		8#7	20.3	20.25	20.38	
		15#0	19.77	20	19.85	
	16-QAM	1#0	21.81	22.18	22.01	
		1#7	21.56	21.71	21.48	
		1#14	21.21	21.27	21.11	
		8#0	20.9	20.81	20.66	
		8#4	20.43	20.42	20.2	
		8#7	20.02	20.17	19.93	
		15#0	19.63	19.73	19.54	

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)	Limit (dBm)
5M	QPSK	1#0	22.16	22.35	22.18	38.45
		1#12	21.92	21.81	21.67	
		1#24	21.59	21.46	21.35	
		12#0	21.05	21.22	20.8	
		12#6	20.65	20.92	20.55	
		12#11	20.39	20.52	20.19	
		25#0	20.07	19.97	19.93	
	16-QAM	1#0	22.11	21.59	21.83	
		1#12	21.85	21.1	21.28	
		1#24	21.36	20.6	21.01	
		12#0	21.08	20.1	20.57	
		12#6	20.63	19.83	20.17	
		12#11	20.34	19.49	19.85	
		25#0	19.8	19.15	19.3	
10M	QPSK	1#0	22.68	22.53	22.43	38.45
		1#24	22.16	22.23	21.9	
		1#49	21.84	21.71	21.61	
		25#0	21.57	21.32	21.06	
		25#12	21.06	20.92	20.7	
		25#24	20.63	20.42	20.42	
		50#0	20.28	19.87	20.17	
	16-QAM	1#0	22.45	22.38	21.77	
		1#24	22.18	21.86	21.36	
		1#49	21.81	21.52	21.11	
		25#0	21.53	21.13	20.64	
		25#12	21.29	20.7	20.11	
		25#24	20.76	20.16	19.57	
		50#0	20.34	19.89	19.2	

LTE Band 38

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)	Limit (dBm)
5M	QPSK	1#0	22.69	22.73	22.64	33
		1#12	22.38	22.29	22.35	
		1#24	21.86	21.78	21.89	
		12#0	21.47	21.53	21.62	
		12#6	21.11	21.28	21.29	
		12#11	20.66	20.89	20.78	
		25#0	20.22	20.45	20.32	
	16-QAM	1#0	22.57	22.41	21.63	
		1#12	22.14	22.07	21.37	
		1#24	21.61	21.61	21.11	
		12#0	21.27	21.16	20.84	
		12#6	20.73	20.64	20.33	
		12#11	20.33	20.36	20.06	
		25#0	20	19.83	19.57	
10M	QPSK	1#0	22.19	22.33	22.49	33
		1#24	21.82	21.88	22.16	
		1#49	21.53	21.53	21.75	
		25#0	21.22	21.19	21.29	
		25#12	20.91	20.68	20.92	
		25#24	20.4	20.24	20.4	
		50#0	19.94	19.95	19.97	
	16-QAM	1#0	21.82	21.73	22.19	
		1#24	21.47	21.37	21.72	
		1#49	21.01	20.84	21.27	
		25#0	20.59	20.54	20.82	
		25#12	20.23	20.23	20.47	
		25#24	19.96	19.7	19.95	
		50#0	19.51	19.17	19.64	

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)	Limit (dBm)
15M	QPSK	1#0	22.59	22.68	22.74	33
		1#37	22.07	22.22	22.4	
		1#74	21.78	21.83	21.98	
		36#0	21.34	21.57	21.64	
		36#17	20.8	21.32	21.12	
		36#35	20.4	20.92	20.66	
		75#0	19.97	20.61	20.37	
	16-QAM	1#0	22.25	22.67	21.84	
		1#37	21.81	22.18	21.57	
		1#74	21.26	21.68	21.04	
		36#0	20.89	21.27	20.55	
		36#17	20.58	20.91	20.11	
		36#35	20.19	20.56	19.79	
		75#0	19.91	20.2	19.49	
20M	QPSK	1#0	22.53	22.48	22.37	33
		1#49	22.16	22.06	21.98	
		1#99	21.67	21.66	21.62	
		50#0	21.34	21.28	21.36	
		50#24	21.07	20.79	21.09	
		50#49	20.78	20.29	20.6	
		100#0	20.41	19.83	20.2	
	16-QAM	1#0	22.28	22.17	21.75	
		1#49	21.79	21.9	21.48	
		1#99	21.41	21.49	21.17	
		50#0	21.06	21.18	20.72	
		50#24	20.8	20.66	20.27	
		50#49	20.27	20.34	19.96	
		100#0	20.02	20.01	19.57	

LTE Band 40

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)	Limit (dBm)
5M	QPSK	1#0	23.01	22.56	22.67	33
		1#12	22.69	22.26	22.34	
		1#24	22.17	21.97	22.04	
		12#0	21.79	21.61	21.56	
		12#6	21.4	21.11	21.06	
		12#11	20.91	20.62	20.75	
		25#0	20.43	20.38	20.2	
	16-QAM	1#0	22.4	22.01	22.4	
		1#12	21.95	21.58	22.12	
		1#24	21.46	21.16	21.79	
		12#0	21.06	20.68	21.47	
		12#6	20.76	20.43	21.06	
		12#11	20.51	19.95	20.73	
		25#0	20.01	19.56	20.46	
10M	QPSK	1#0	22.64	22.97	22.81	33
		1#24	22.18	22.49	22.54	
		1#49	21.75	22.18	22.25	
		25#0	21.46	21.87	21.86	
		25#12	21.01	21.59	21.44	
		25#24	20.64	21.12	21.09	
		50#0	20.25	20.88	20.6	
	16-QAM	1#0	22.62	22.68	22.79	
		1#24	22.29	22.3	22.48	
		1#49	21.84	21.95	21.99	
		25#0	21.48	21.53	21.67	
		25#12	20.98	21.05	21.17	
		25#24	20.59	20.71	20.78	
		50#0	20.29	20.31	20.53	

LTE Band 41

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)	Limit (dBm)
5M	QPSK	1#0	22.49	22.67	22.39	33
		1#12	21.97	22.37	22.12	
		1#24	21.63	22.01	21.72	
		12#0	21.33	21.69	21.29	
		12#6	21.05	21.29	20.89	
		12#11	20.76	20.76	20.47	
		25#0	20.51	20.45	20.20	
	16-QAM	1#0	21.61	21.9	21.54	
		1#12	21.37	21.56	21.12	
		1#24	20.94	21.13	20.61	
		12#0	20.44	20.67	20.35	
		12#6	19.93	20.39	19.95	
		12#11	19.49	19.87	19.49	
		25#0	19.17	19.33	19.02	
10M	QPSK	1#0	22.36	22.19	22.28	33
		1#24	21.94	21.75	21.98	
		1#49	21.54	21.28	21.55	
		25#0	21.14	20.74	21.14	
		25#12	20.70	20.27	20.84	
		25#24	20.20	19.84	20.46	
		50#0	19.8	19.41	20.03	
	16-QAM	1#0	21.41	21.41	21.71	
		1#24	20.98	21.03	21.46	
		1#49	20.73	20.56	20.93	
		25#0	20.34	20.09	20.50	
		25#12	20.06	19.75	20.04	
		25#24	19.60	19.25	19.51	
		50#0	19.23	18.74	19.03	

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)	Limit (dBm)
15M	QPSK	1#0	22.16	22.35	22.18	33
		1#37	21.92	21.99	21.71	
		1#74	21.67	21.57	21.25	
		36#0	21.22	21.29	20.82	
		36#17	20.87	20.76	20.35	
		36#35	20.62	20.42	19.91	
		75#0	20.31	19.87	19.59	
	16-QAM	1#0	22.03	21.94	22.04	
		1#37	21.59	21.44	21.51	
		1#74	21.27	20.9	21.18	
		36#0	20.86	20.39	20.66	
		36#17	20.55	19.88	20.35	
		36#35	20.21	19.63	19.82	
		75#0	19.83	19.13	19.3	
20M	QPSK	1#0	22.68	22.53	22.43	33
		1#49	22.4	22.25	22.17	
		1#99	21.86	21.78	21.63	
		50#0	21.47	21.38	21.13	
		50#24	21.21	20.91	20.63	
		50#49	20.68	20.43	20.23	
		100#0	20.2	20.12	19.92	
	16-QAM	1#0	22.17	22.46	21.61	
		1#49	21.81	21.94	21.26	
		1#99	21.47	21.56	20.93	
		50#0	21.03	21.15	20.59	
		50#24	20.67	20.83	20.33	
		50#49	20.18	20.44	19.97	
		100#0	19.87	19.95	19.42	

Peak-to-average ratio (PAR):**PCS 1900 Band**

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	4.32	13
	Middle	4.21	13
	High	4.16	13

Mode	Channel	PAR (dB)	Limit (dB)
GPRS	Low	4.22	13
	Middle	4.30	13
	High	4.19	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	5.10	13
	Middle	5.21	13
	High	5.23	13

LTE Band 38

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	5.20	13	Pass
QPSK (100%RB Size)	5.14	13	Pass
16QAM (1RB Size)	5.01	13	Pass
16QAM (100%RB Size)	5.41	13	Pass

LTE Band 40

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	5.18	13	Pass
QPSK (100%RB Size)	4.93	13	Pass
16QAM (1RB Size)	5.05	13	Pass
16QAM (100%RB Size)	5.21	13	Pass

LTE Band 41

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	5.37	13	Pass
QPSK (100%RB Size)	5.15	13	Pass
16QAM (1RB Size)	4.91	13	Pass
16QAM (100%RB Size)	5.28	13	Pass

Radiated Power:**GSM Mode**

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
GSM850 Band, Middle Channel (ERP)										
836.60	83.59	125	156	H	27.45	0.26	4.86	32.05	38.45	6.40
836.60	85.16	228	211	V	27.20	0.26	4.86	30.56	38.45	7.89
PCS1900 Band, Middle Channel (EIRP)										
1880.00	88.97	264	231	H	20.52	0.44	8.81	28.89	33	4.11
1880.00	90.68	301	193	V	20.02	0.44	8.81	28.39	33	4.61

EGPRS Mode

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
GSM850 Band, Middle Channel(ERP)										
836.6	76.13	57	154	H	19.99	0.26	4.86	24.59	38.45	13.86
836.6	79.52	245	169	V	21.56	0.26	4.86	26.16	38.45	12.29
PCS1900 Band, Middle Channel(EIRP)										
1880.0	85.07	228	203	H	16.62	0.44	8.81	24.99	33	8.01
1880.0	88.19	134	196	V	17.53	0.44	8.81	25.90	33	7.10

WCDMA Mode

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
WCDMA Band V, Middle Channel(ERP)										
836.6	72.28	253	182	H	16.14	0.26	4.86	20.74	38.45	17.71
836.6	74.11	23	202	V	16.15	0.26	4.86	20.75	38.45	17.70

CDMA Mode

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
CDMA850 Band, Middle Channel(ERP)										
836.52	70.37	76	195	H	15.62	0.30	4.86	20.18	38.50	18.32
836.52	69.61	116	193	V	17.23	0.30	4.86	21.79	38.50	16.71

Note:

All above data were tested with no amplifier

Absolute Level = Submitted Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

ERP:

LTE Band 5

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Submitted Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 1.4M BW Middle Channel								
836.5	H	70.64	14.50	0.26	4.86	19.10	38.45	19.35
836.5	V	74.28	16.32	0.26	4.86	20.92	38.45	17.53
16-QAM 1.4M BW Middle Channel								
836.5	H	72.18	16.04	0.26	4.86	20.64	38.45	17.81
836.5	V	74.22	16.26	0.26	4.86	20.86	38.45	17.59
QPSK 3M BW Middle Channel								
836.5	H	71.69	15.55	0.26	4.86	20.15	38.45	18.30
836.5	V	72.63	14.67	0.26	4.86	19.27	38.45	19.18
16-QAM 3M BW Middle Channel								
836.5	H	72.29	16.15	0.26	4.86	20.75	38.45	17.70
836.5	V	73.87	15.91	0.26	4.86	20.51	38.45	17.94
QPSK 5M BW Middle Channel								
836.5	H	71.84	15.70	0.26	4.86	20.30	38.45	18.15
836.5	V	74.12	16.16	0.26	4.86	20.76	38.45	17.69
16-QAM 5M BW Middle Channel								
836.5	H	72.38	16.24	0.26	4.86	20.84	38.45	17.61
836.5	V	75.14	17.18	0.26	4.86	21.78	38.45	16.67
QPSK 10M BW Middle Channel								
836.5	H	71.91	15.77	0.26	4.86	20.37	38.45	18.08
836.5	V	72.78	14.82	0.26	4.86	19.42	38.45	19.03
16-QAM 10M BW Middle Channel								
836.5	H	72.51	16.37	0.26	4.86	20.97	38.45	17.48
836.5	V	73.64	15.68	0.26	4.86	20.28	38.45	18.17

EIRP:**LTE Band 38**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Submitted Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 5M BW Middle Channel								
2595.0	H	78.26	9.91	0.90	9.97	18.98	33	14.02
2595.0	V	80.97	12.55	0.90	9.97	21.62	33	11.38
16-QAM 5M BW Middle Channel								
2595.0	H	77.53	9.18	0.90	9.97	18.25	33	14.75
2595.0	V	80.11	11.69	0.90	9.97	20.76	33	12.24
QPSK 10M BW Middle Channel								
2595.0	H	78.69	10.34	0.90	9.97	19.41	33	13.59
2595.0	V	81.23	12.81	0.90	9.97	21.88	33	11.12
16-QAM 10M BW Middle Channel								
2595.0	H	77.91	9.56	0.90	9.97	18.63	33	14.37
2595.0	V	80.37	11.95	0.90	9.97	21.02	33	11.98
QPSK 15M BW Middle Channel								
2595.0	H	77.13	8.78	0.90	9.97	17.85	33	15.15
2595.0	V	79.28	10.86	0.90	9.97	19.93	33	13.07
16-QAM 15M BW Middle Channel								
2595.0	H	76.59	8.24	0.90	9.97	17.31	33	15.69
2595.0	V	78.36	9.94	0.90	9.97	19.01	33	13.99
QPSK 20M BW Middle Channel								
2595.0	H	76.29	7.94	0.90	9.97	17.01	33	15.99
2595.0	V	78.53	10.11	0.90	9.97	19.18	33	13.82
16-QAM 20M BW Middle Channel								
2595.0	H	76.58	8.23	0.90	9.97	17.30	33	15.70
2595.0	V	77.64	9.22	0.90	9.97	18.29	33	14.71

LTE Band 40

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Submitted Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 5M BW Middle Channel								
2355.0	H	76.81	8.16	0.88	9.77	17.05	33	15.95
2355.0	V	79.35	10.55	0.88	9.77	19.44	33	13.56
16-QAM 5M BW Middle Channel								
2355.0	H	76.29	7.64	0.88	9.77	16.53	33	16.47
2355.0	V	78.36	9.56	0.88	9.77	18.45	33	14.55
QPSK 10M BW Middle Channel								
2355.0	H	76.66	8.01	0.88	9.77	16.90	33	16.10
2355.0	V	78.23	9.43	0.88	9.77	18.32	33	14.68
16-QAM 10M BW Middle Channel								
2355.0	H	76.13	7.48	0.88	9.77	16.37	33	16.63
2355.0	V	79.68	10.88	0.88	9.77	19.77	33	13.23

LTE Band 41

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Submitted Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 5M BW Middle Channel								
2605.0	H	78.64	10.32	0.90	9.95	19.37	33	13.63
2605.0	V	81.28	12.90	0.90	9.95	21.95	33	11.05
16-QAM 5M BW Middle Channel								
2605.0	H	77.18	8.86	0.90	9.95	17.91	33	15.09
2605.0	V	80.22	11.84	0.90	9.95	20.89	33	12.11
QPSK 10M BW Middle Channel								
2605.0	H	77.69	9.37	0.90	9.95	18.42	33	14.58
2605.0	V	80.63	12.25	0.90	9.95	21.30	33	11.70
16-QAM 10M BW Middle Channel								
2605.0	H	76.29	7.97	0.90	9.95	17.02	33	15.98
2605.0	V	79.87	11.49	0.90	9.95	20.54	33	12.46
QPSK 15M BW Middle Channel								
2605.0	H	76.84	8.52	0.90	9.95	17.57	33	15.43
2605.0	V	79.12	10.74	0.90	9.95	19.79	33	13.21
16-QAM 15M BW Middle Channel								
2605.0	H	75.38	7.06	0.90	9.95	16.11	33	16.89
2605.0	V	79.14	9.76	0.90	9.95	19.81	33	14.19
QPSK 20M BW Middle Channel								
2605.0	H	75.91	7.59	0.90	9.95	16.64	33	16.36
2605.0	V	78.78	10.40	0.90	9.95	19.45	33	13.55
16-QAM 20M BW Middle Channel								
2605.0	H	74.51	6.19	0.90	9.95	15.24	33	17.76
2605.0	V	78.64	9.26	0.90	9.95	19.31	33	14.69

Note:

All above data were tested with no amplifier

Absolute Level = Submitted Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

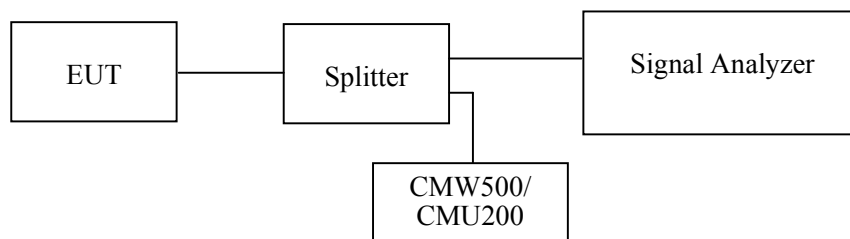
FCC §2.1049, §22.917, §22.905 §24.238 & §27.53 - OCCUPIED BANDWIDTH**Applicable Standards**

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

Test Procedure

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

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

**Test Data****Environmental Conditions**

Temperature:	23 °C
Relative Humidity:	50 %
ATM Pressure:	101.0kPa

The testing was performed by Ada Yu from 2018-01-10 to 2018-02-05.

EUT operation mode: Transmitting

Test Result: Compliance.

GSM 850 Band

Mode	Frequency (MHz)	26 dB Emission Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
GSM (GMSK)	836.6	0.317	0.244
GPRS (GMSK)	836.6	0.313	0.244
EGPRS (8PSK)	836.6	0.315	0.244

WCDMA Band V

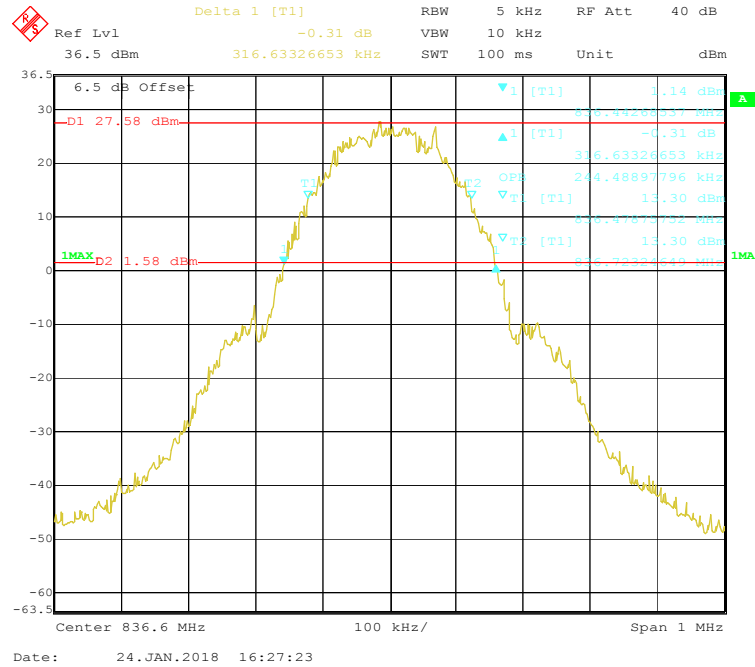
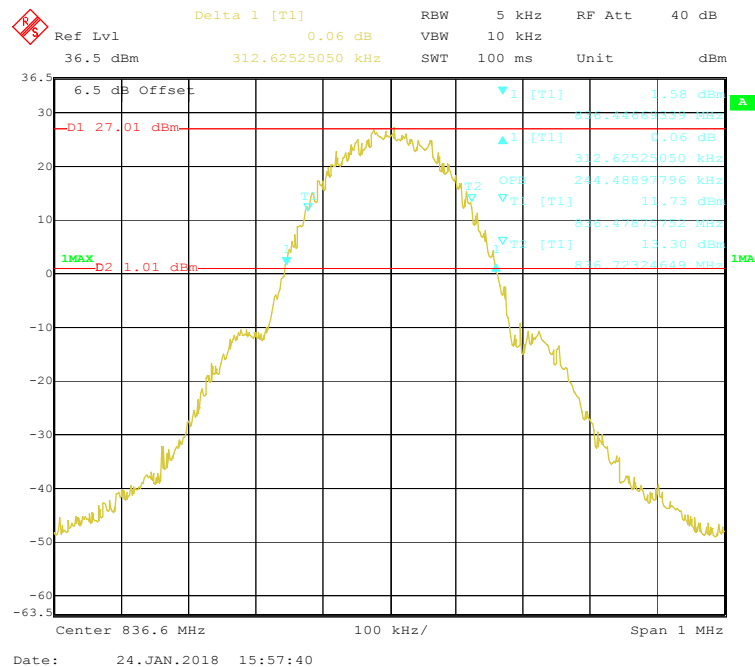
Mode	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
WCDMA (HSDPA)	836.6	4.709	4.168
WCDMA (HSUPA)	836.6	4.729	4.168
WCDMA (RMC)	836.6	4.709	4.148

CDMA850 Band

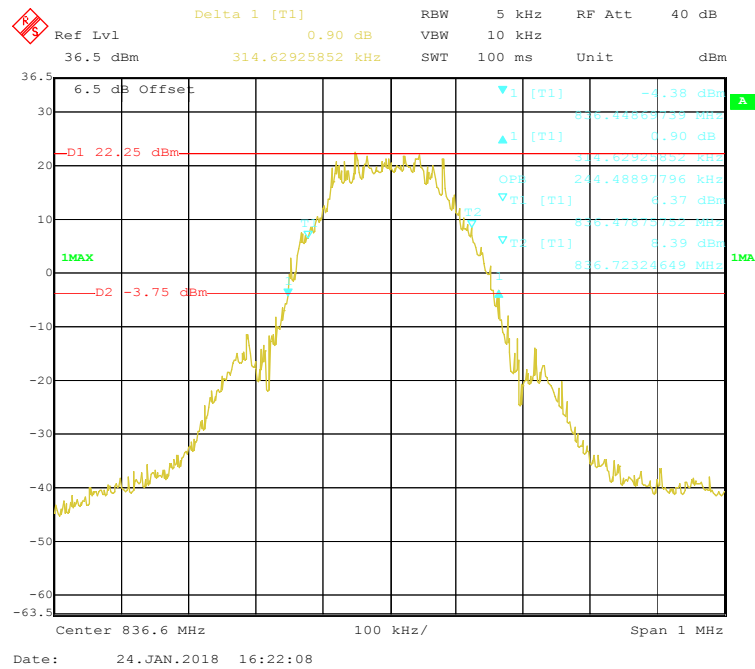
Mode	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
CDMA (1xRTT)	836.52	1.425	1.275
CDMA (EV-DO)	836.52	1.431	1.275

PCS1900 Band

Mode	Frequency (MHz)	26 dB Emission Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
GSM (GMSK)	1880.0	0.319	0.244
GPRS (GMSK)	1880.0	0.321	0.244
EGPRS (8PSK)	1880.0	0.321	0.244

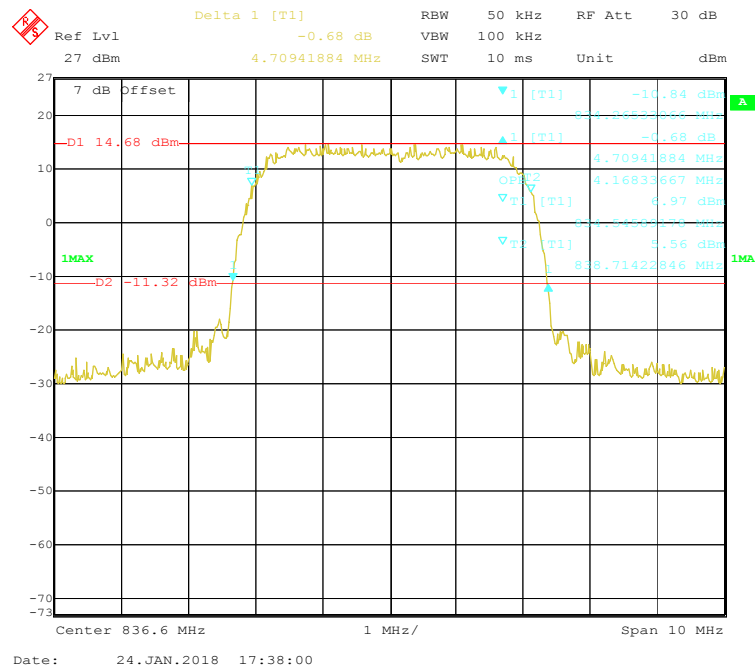
GSM 850 Band**99% Occupied & 26 dB Emissions Bandwidth for GSM (GMSK) Mode****99% Occupied & 26 dB Emissions Bandwidth for GPRS (GMSK) Mode**

99% Occupied & 26 dB Emissions Bandwidth for EGPRS (8PSK) Mode

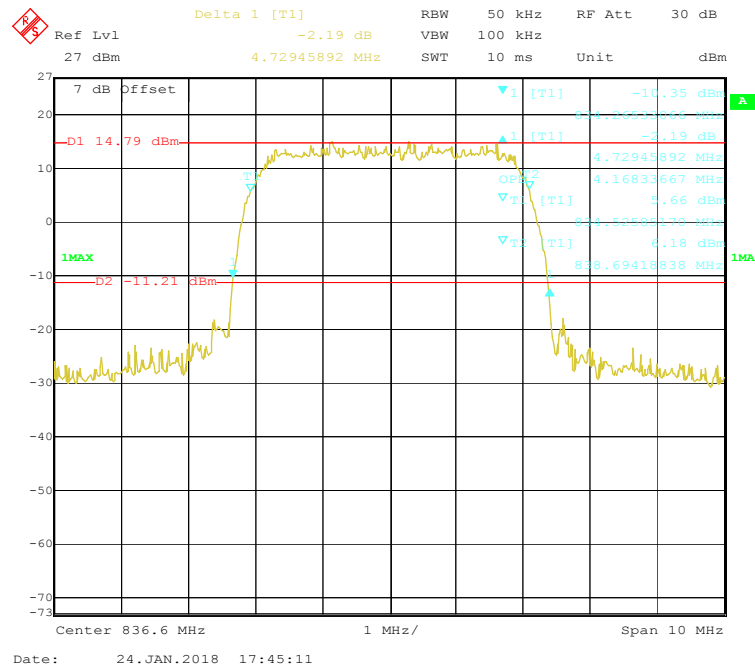


WCDMA Band V

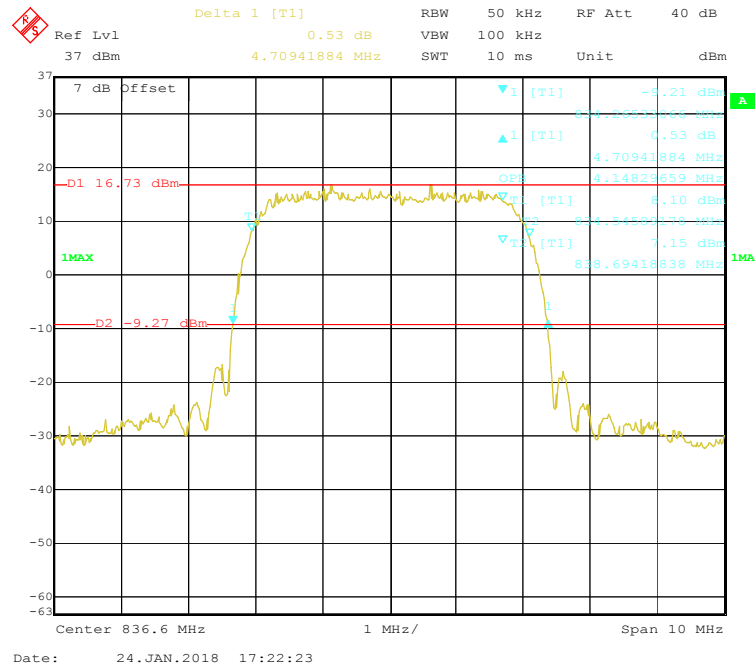
99% Occupied & 26 dB Emissions Bandwidth for WCDMA (HSDPA) Mode

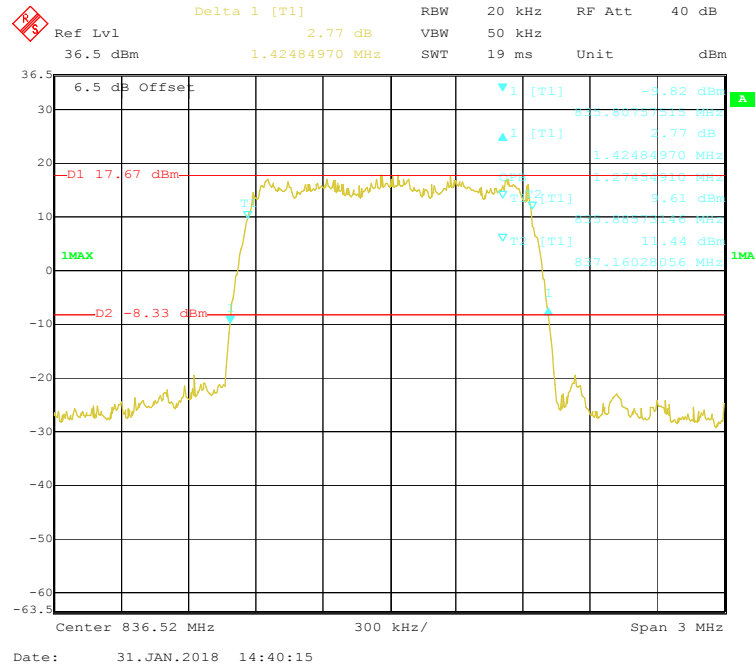
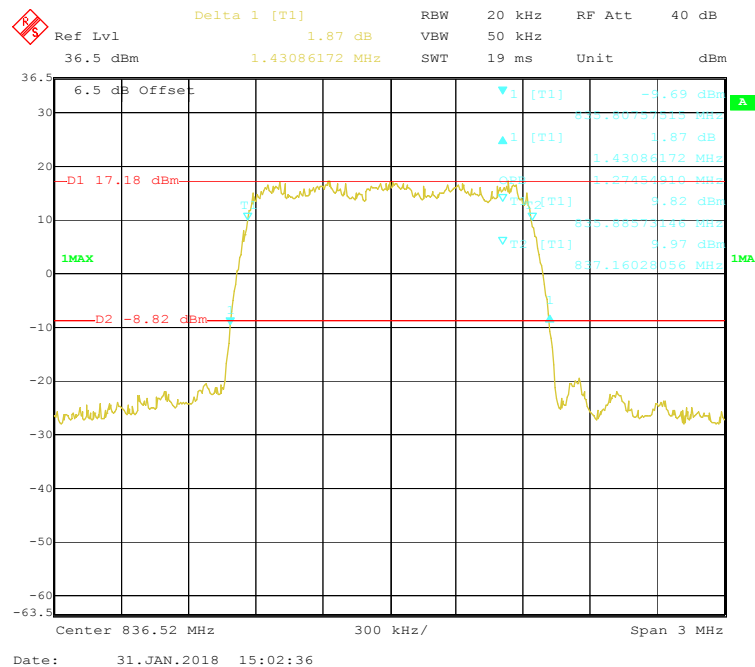


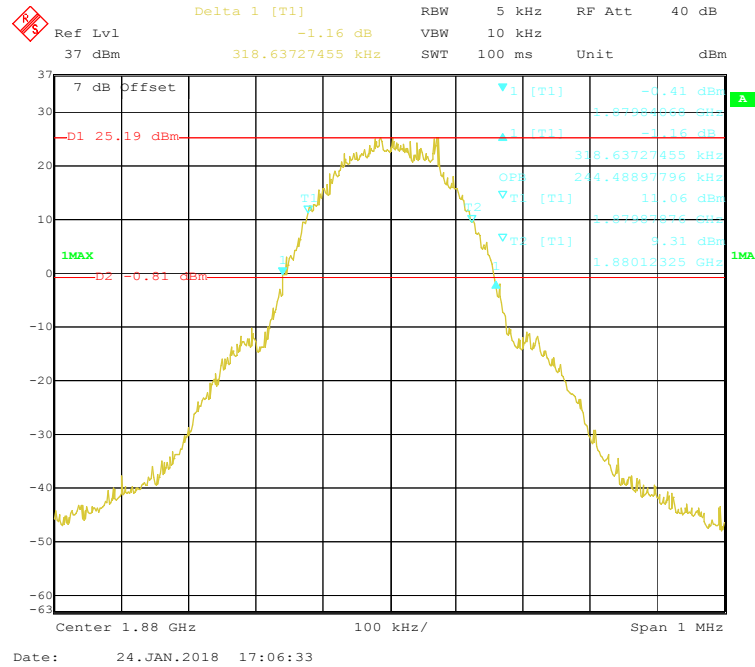
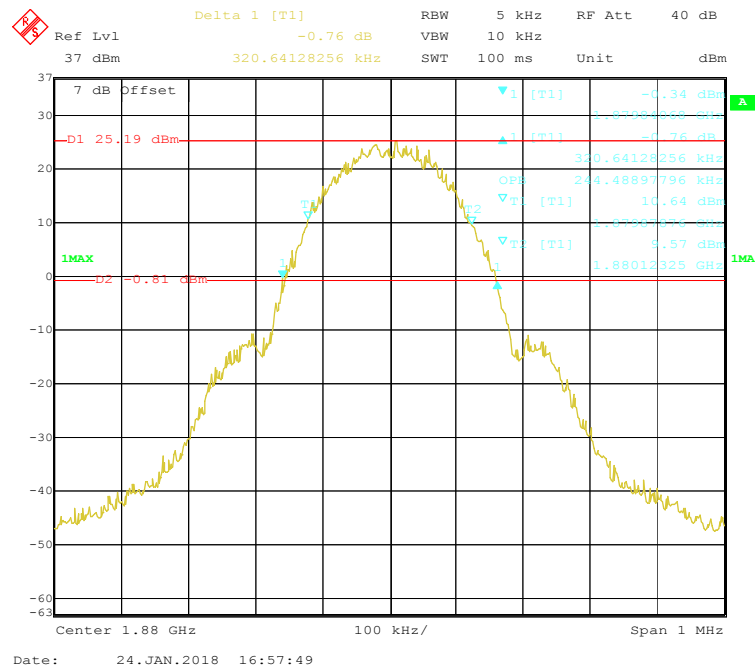
99% Occupied & 26 dB Emissions Bandwidth for WCDMA (HSUPA) Mode



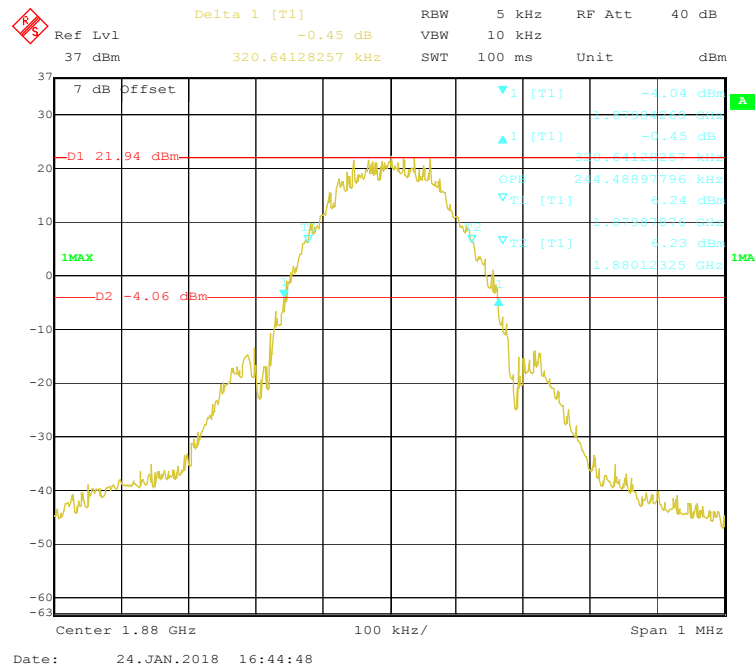
99% Occupied & 26 dB Emissions Bandwidth for WCDMA (RMC) Mode



CDMA850 Band**99% Occupied & 26 dB Emissions Bandwidth for CDMA (1xRTT) Mode****99% Occupied & 26 dB Emissions Bandwidth for CDMA (EV-DO) Mode**

PCS 1900 Band**99% Occupied & 26 dB Emissions Bandwidth for GSM (GMSK) Mode****99% Occupied & 26 dB Emissions Bandwidth for GPRS (GMSK) Mode**

99% Occupied & 26 dB Emissions Bandwidth for EGPRS (8PSK) Mode



LTE Band 5:

Test Modulation	Test Bandwidth	Test Channel	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
QPSK	1.4M	Middle	1.295	1.100
	3M		2.946	2.695
	5M		4.970	4.489
	10M		9.860	8.978
16-QAM	1.4M	Middle	1.305	1.106
	3M		2.932	2.695
	5M		4.910	4.489
	10M		9.734	8.978

LTE Band 38:

Test Modulation	Test Bandwidth	Test Channel	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
QPSK	5M	Middle	4.950	4.489
	10M		10.180	8.978
	15M		15.511	13.527
	20M		19.158	17.956
16-QAM	5M	Middle	4.890	4.489
	10M		9.780	8.978
	15M		15.631	13.527
	20M		19.639	17.956

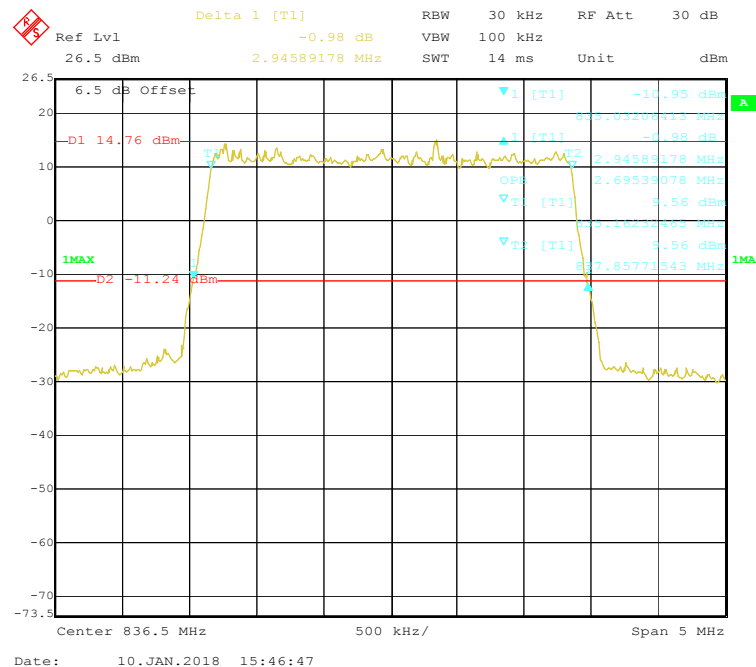
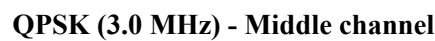
LTE Band 40:

Test Modulation	Test Bandwidth	Test Channel	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
QPSK	5M	Middle	4.910	4.489
	10M		9.820	8.978
16-QAM	5M	Middle	4.930	4.509
	10M		9.739	8.978

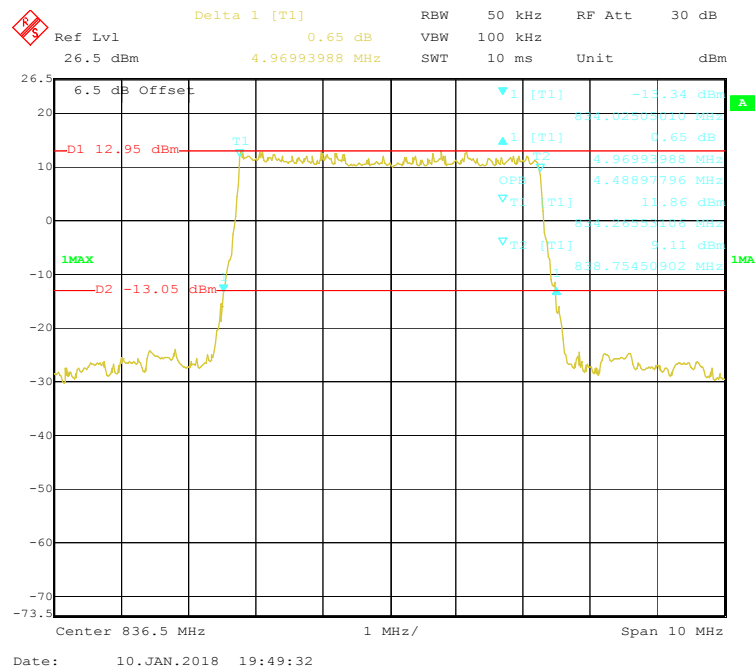
LTE Band 41:

Test Modulation	Test Bandwidth	Test Channel	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
QPSK	5M	Middle	4.950	4.489
	10M		9.890	9.018
	15M		15.150	13.527
	20M		19.349	17.956
16-QAM	5M	Middle	4.890	4.489
	10M		9.729	8.978
	15M		15.331	13.527
	20M		19.429	17.956

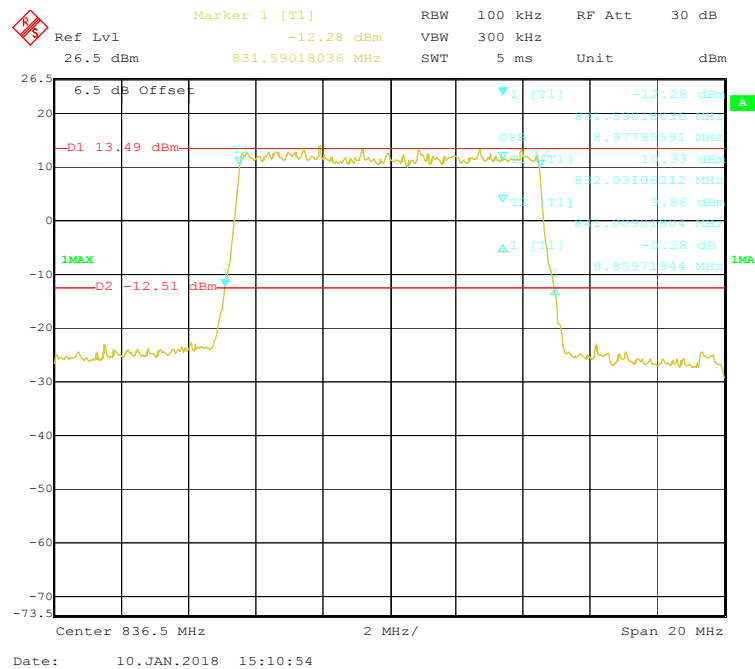
QPSK (1.4 MHz) - Middle channel



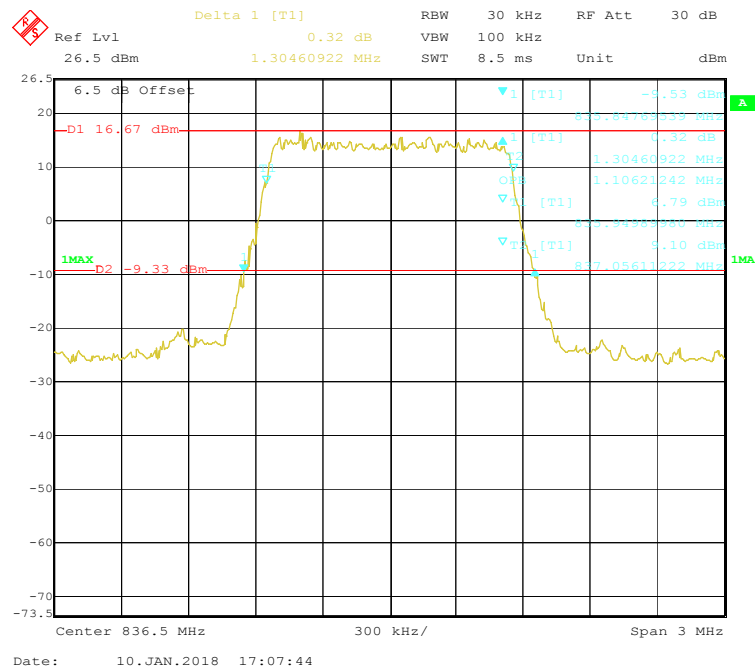
QPSK (5.0 MHz) - Middle channel



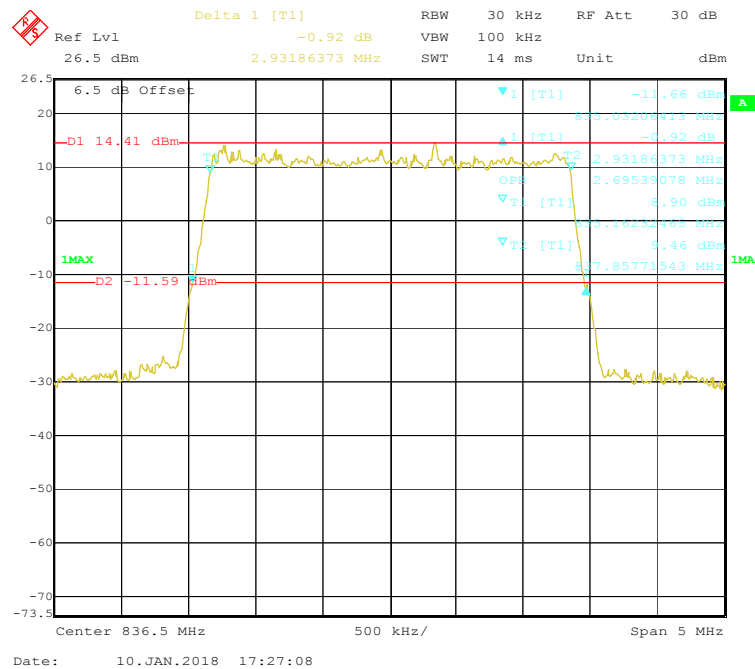
QPSK (10.0MHz) - Middle channel

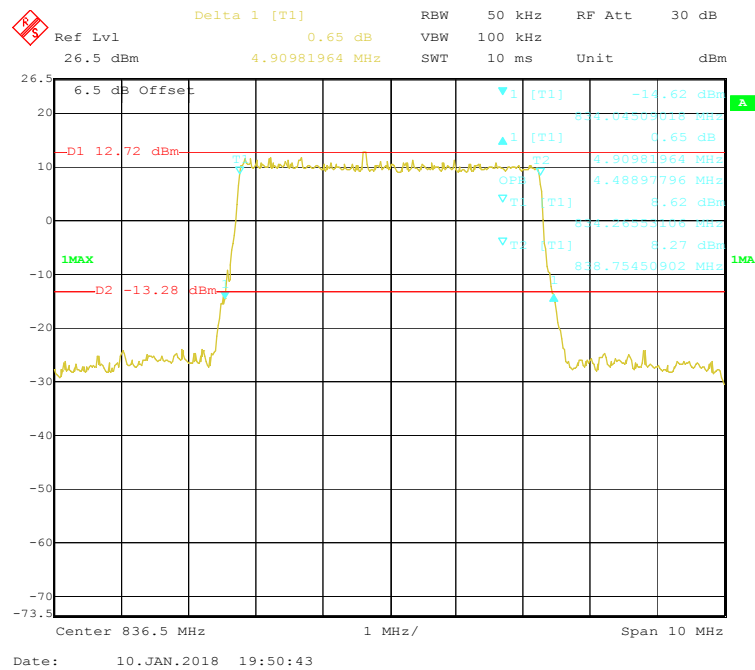
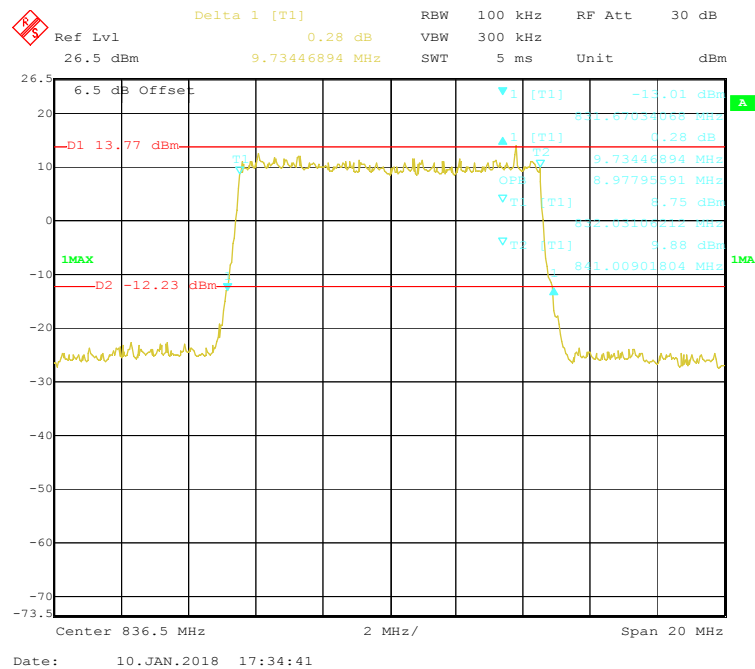


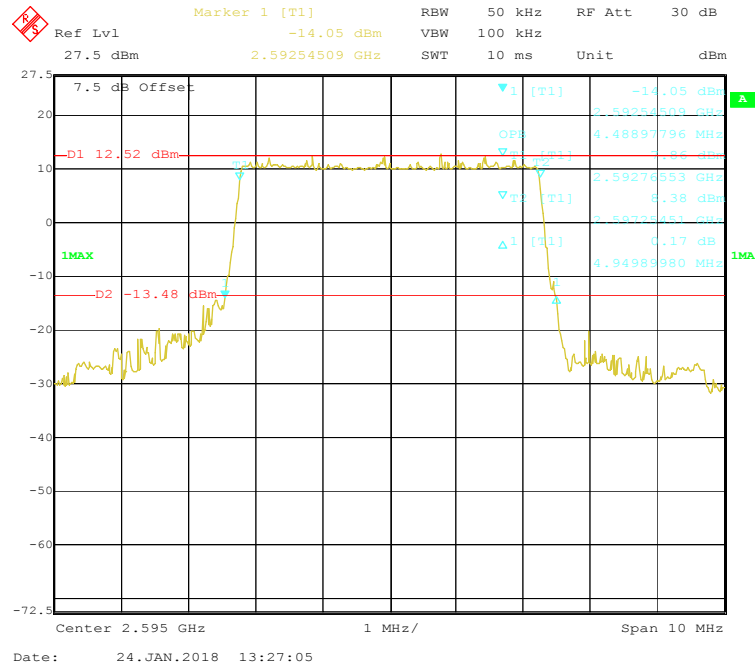
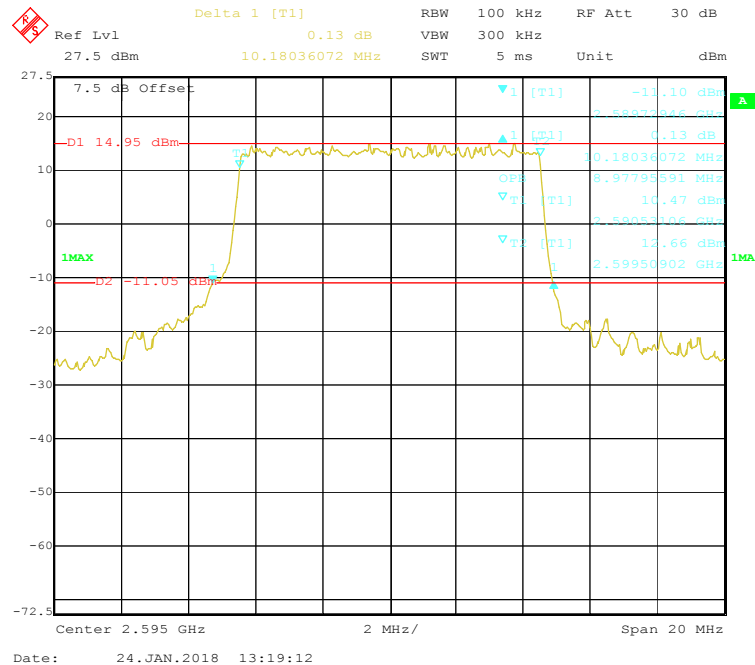
16-QAM (1.4 MHz) - Middle channel



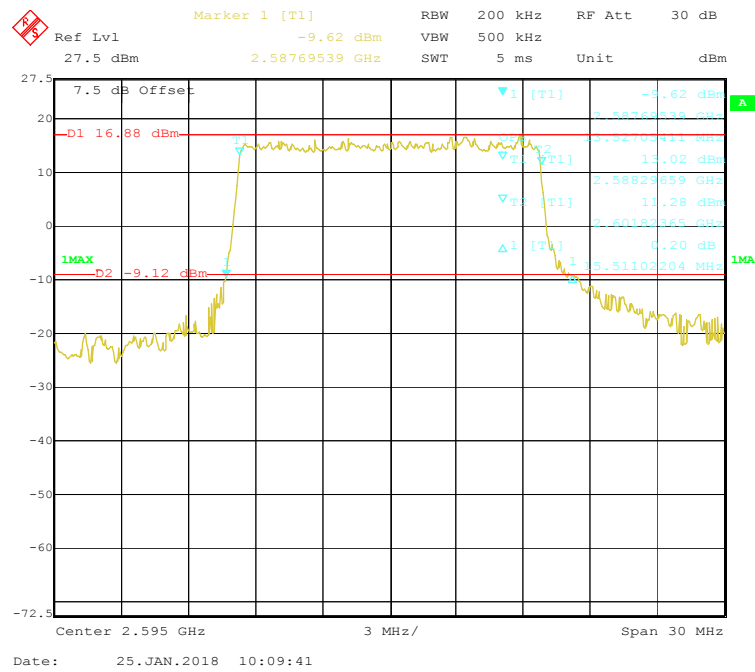
16-QAM (3.0 MHz) - Middle channel



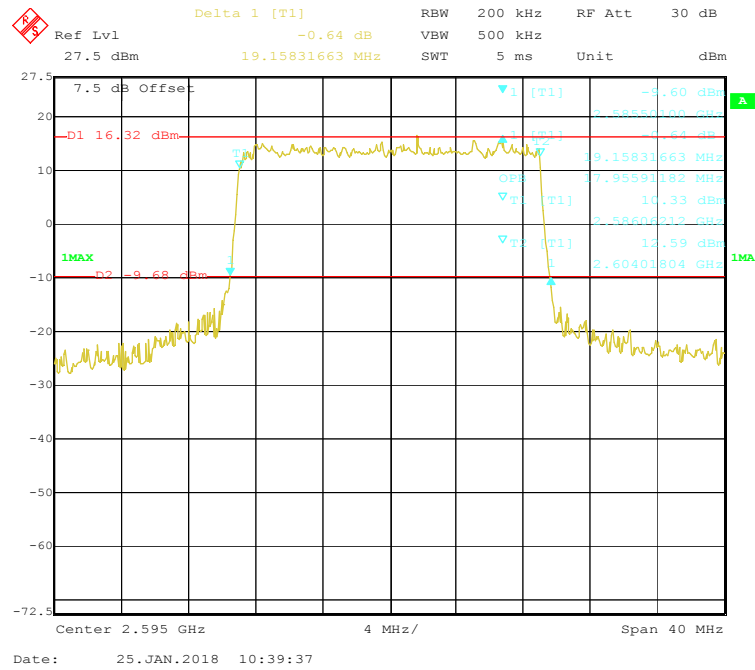
16-QAM (5.0 MHz) - Middle channel**16-QAM (10.0 MHz) - Middle channel**

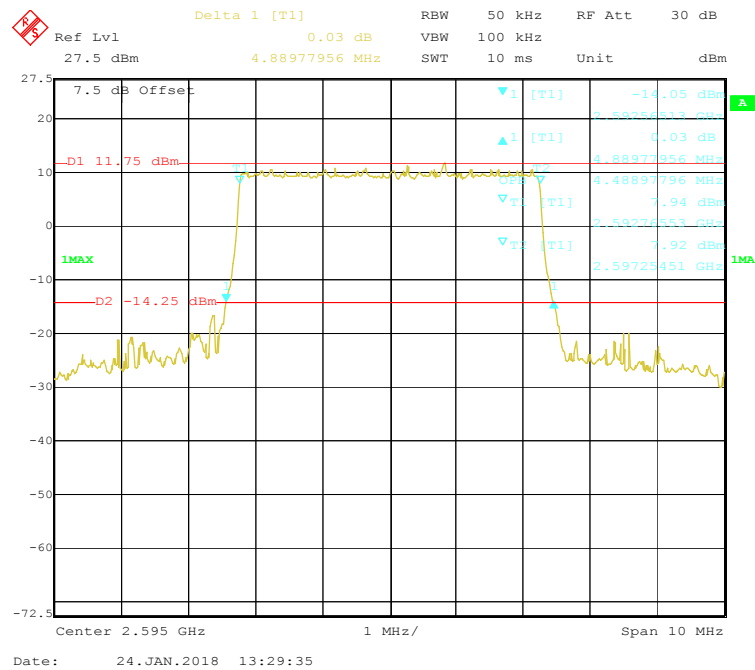
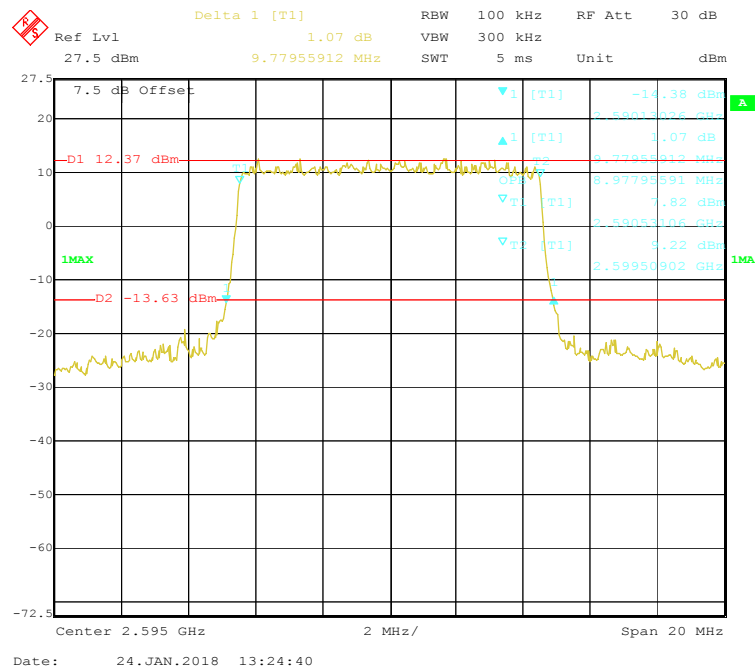
LTE Band 38:**QPSK (5 MHz) - Middle channel****QPSK (10 MHz) - Middle channel**

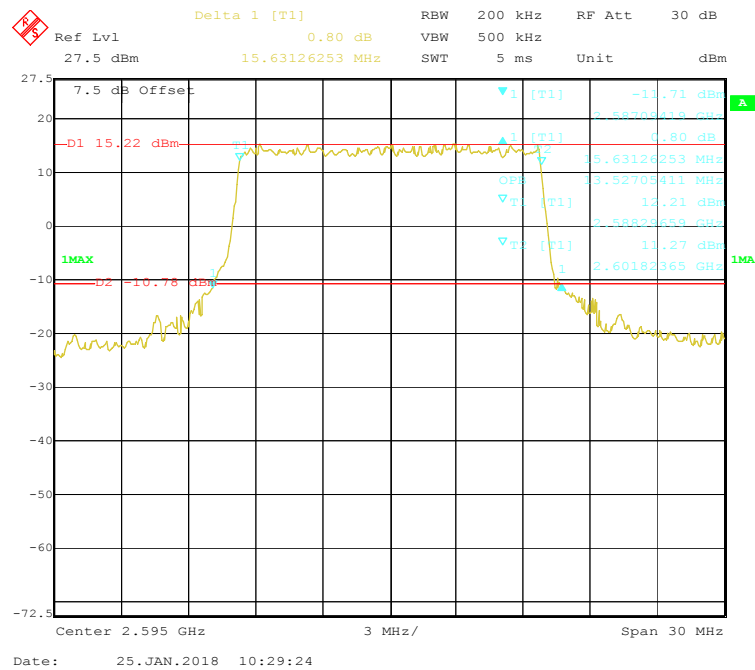
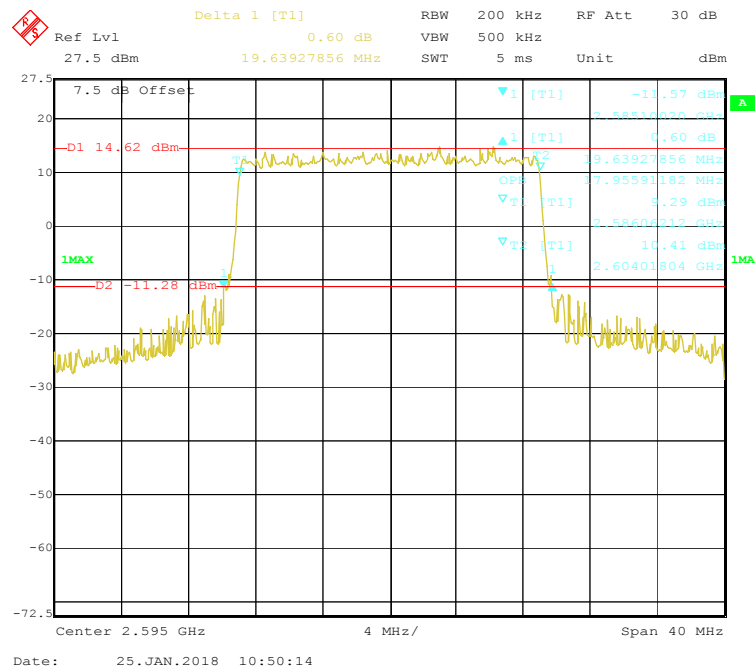
QPSK (15MHz) - Middle channel

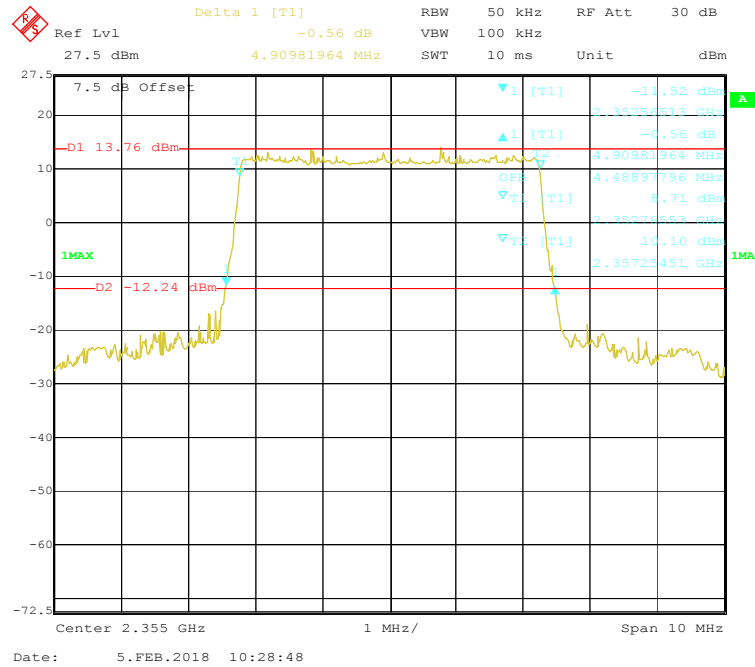
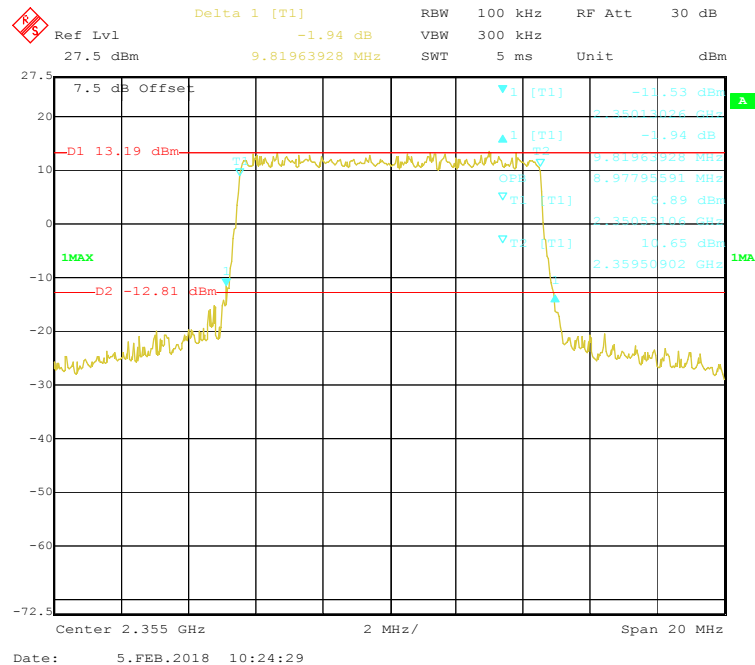


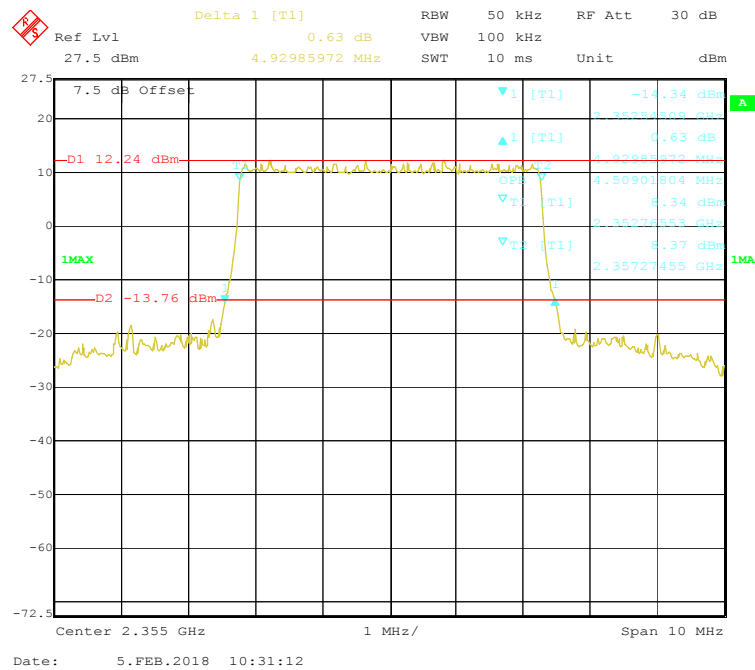
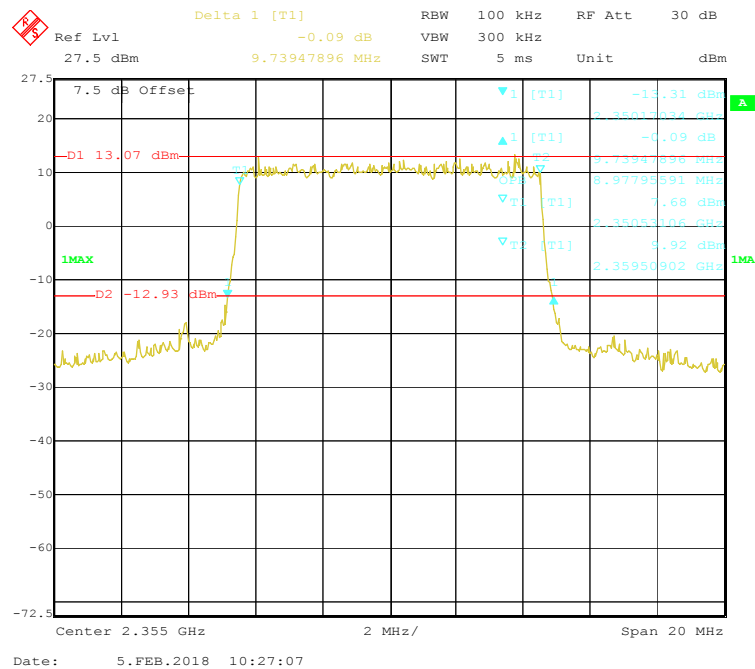
QPSK (20 MHz) - Middle channel

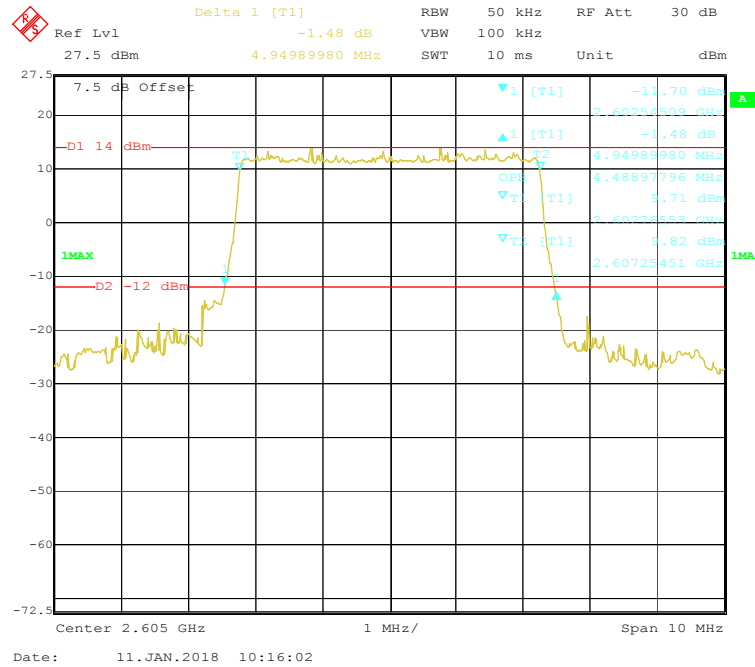
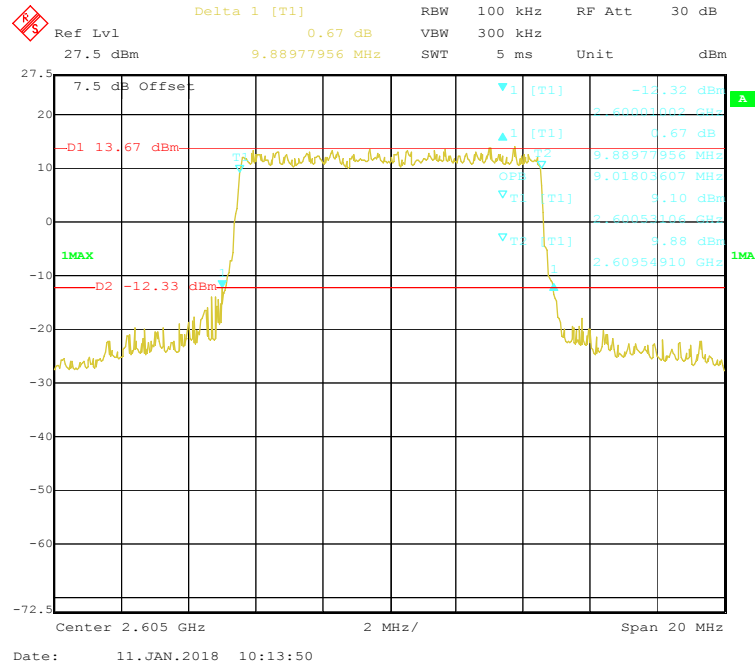


16-QAM (5 MHz) - Middle channel**16-QAM (10 MHz) - Middle channel**

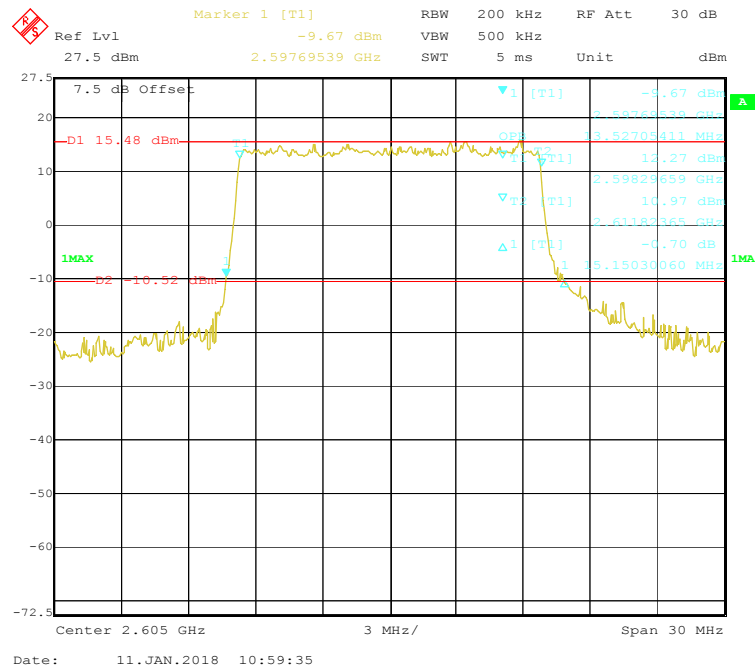
16-QAM (15 MHz) - Middle channel**16-QAM (20 MHz) - Middle channel**

LTE Band 40:**QPSK (5 MHz) - Middle channel****QPSK (10 MHz) - Middle channel**

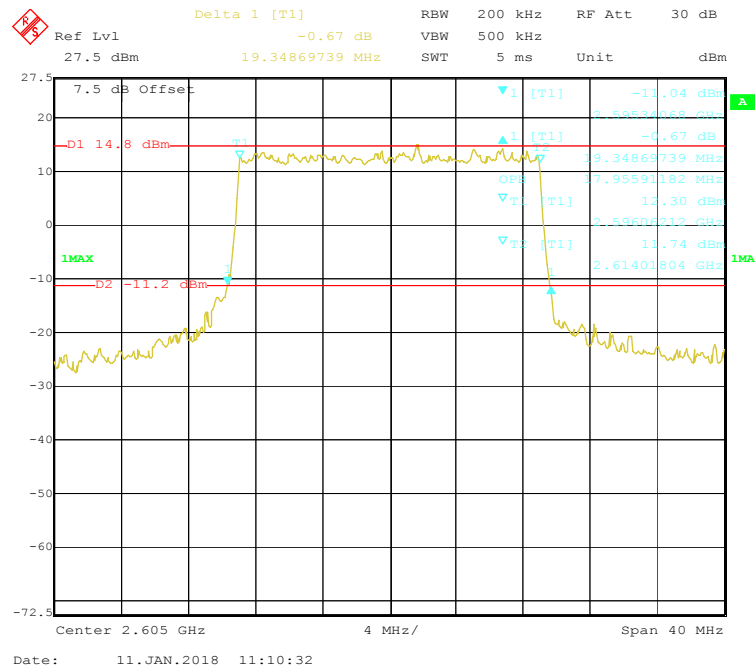
16-QAM (5 MHz) - Middle channel**16-QAM (10 MHz) - Middle channel**

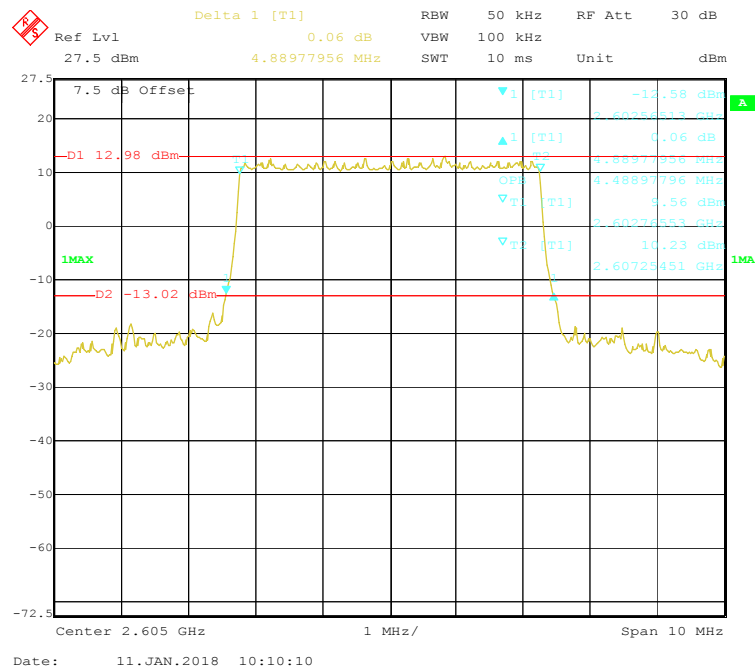
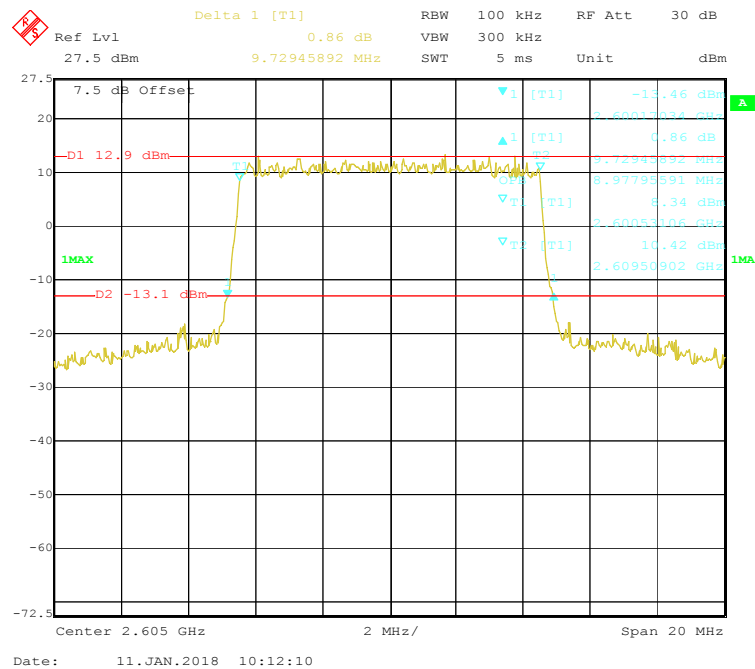
LTE Band 41:**QPSK (5MHz) - Middle channel****QPSK (10 MHz) - Middle channel**

QPSK (15 MHz) - Middle channel



QPSK (20 MHz) - Middle channel



16-QAM (5 MHz) - Middle channel**16-QAM (10 MHz) - Middle channel**

7.5 dB Offset

D1 14.4 dBm

D2 -11.6 dBm

1MAX

Marker 1 [T1] -11.21 dBm

RBW 200 kHz RF Att 30 dB

VSWR 5 ms Unit dBm

3 MHz/ Span 30 MHz

Date: 11.JAN.2018 10:55:30

Delta 1 [T1]

Ref Lvl -1.04 dB

RBW 200 kHz RF Att 30 dB

27.5 dBm 19.42885772 MHz SWT 5 ms Unit dBm

7.5 dB Offset

D1 13.14 dBm

D2 -12.86 dBm

1MAX

1MA

▼1 [T1] -12.89 dBm

▲1 [T1] -1.04 dB

OP8 27.95591182 MHz

▼T1 [T1] 10.01 dBm

▼T2 [T1] 8.96 dBm

2.59334068 GHz

2.59604012 GHz

2.61401804 GHz

Center 2.605 GHz 4 MHz/ Span 40 MHz

Date: 11.JAN.2018 11:02:12

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

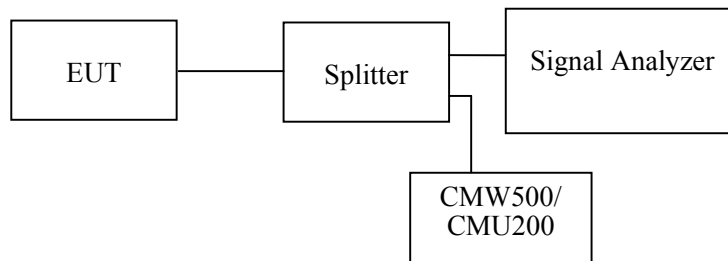
Applicable Standards

FCC §2.1051, §22.917(a) and §24.238(a) and §27.53(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 100kHz for below 1GHz & 1MHz for above 1GHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



Test Data

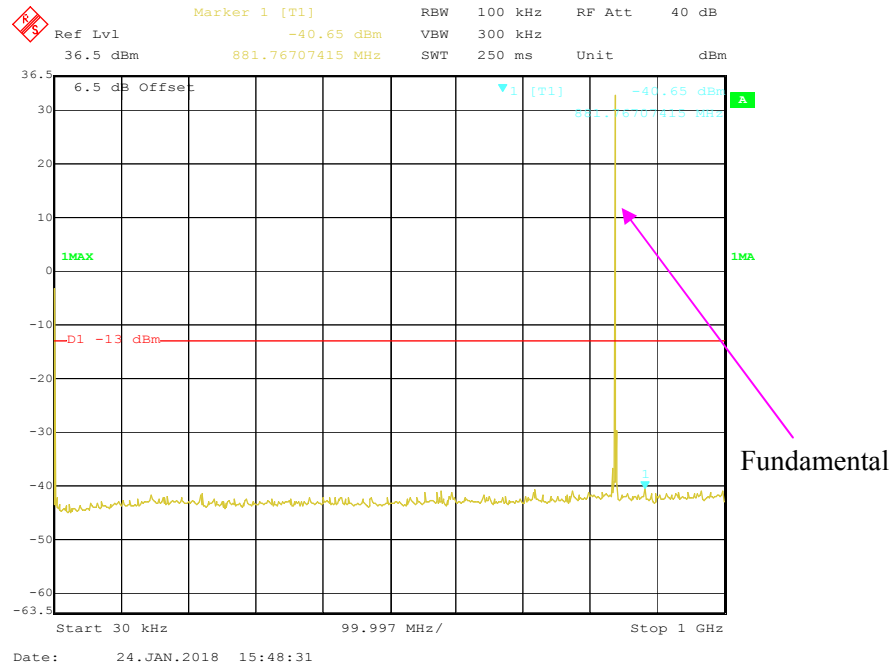
Environmental Conditions

Temperature:	23.2 °C
Relative Humidity:	50 %
ATM Pressure:	101.2kPa

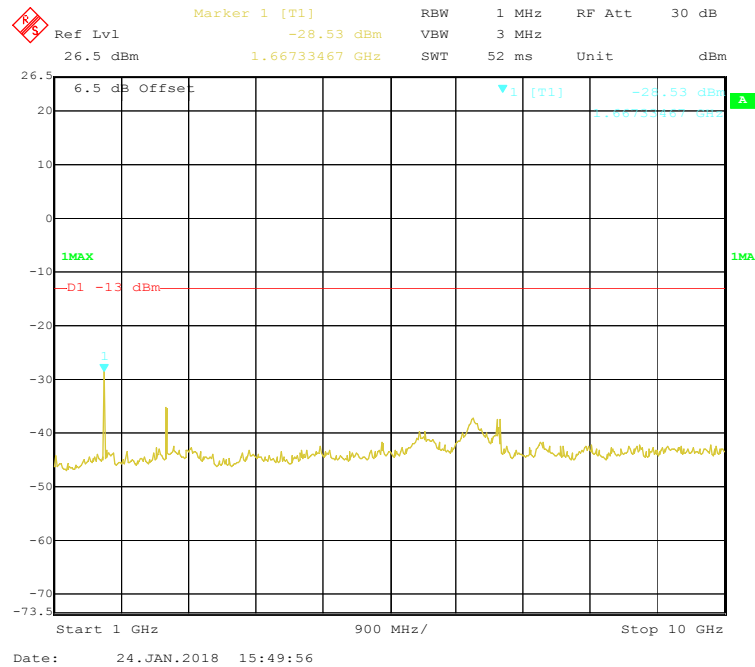
The testing was performed by Ada Yu from 2018-01-10 to 2018-01-31.

GSM 850 Band:

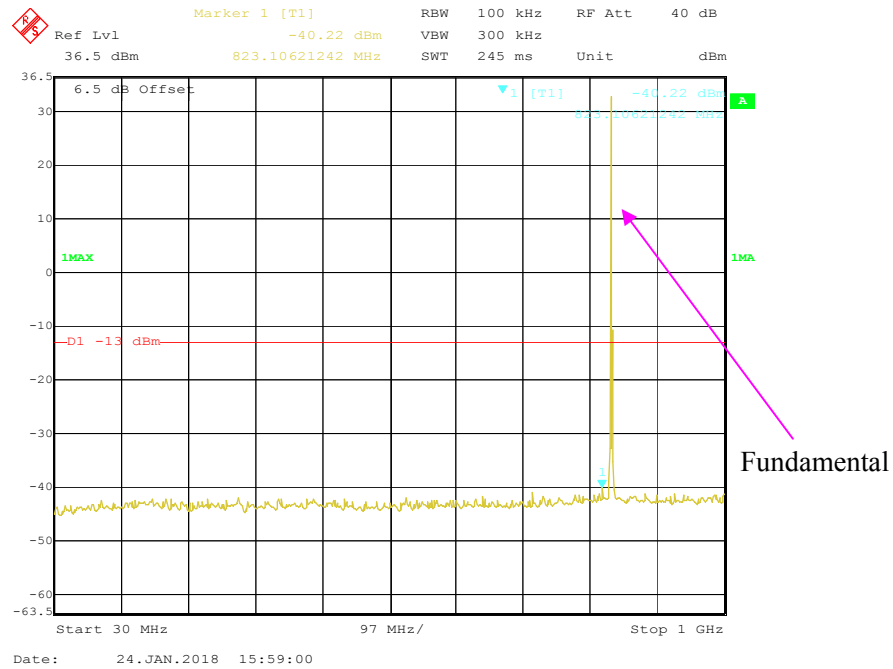
30 MHz – 1GHz(GSM Mode)



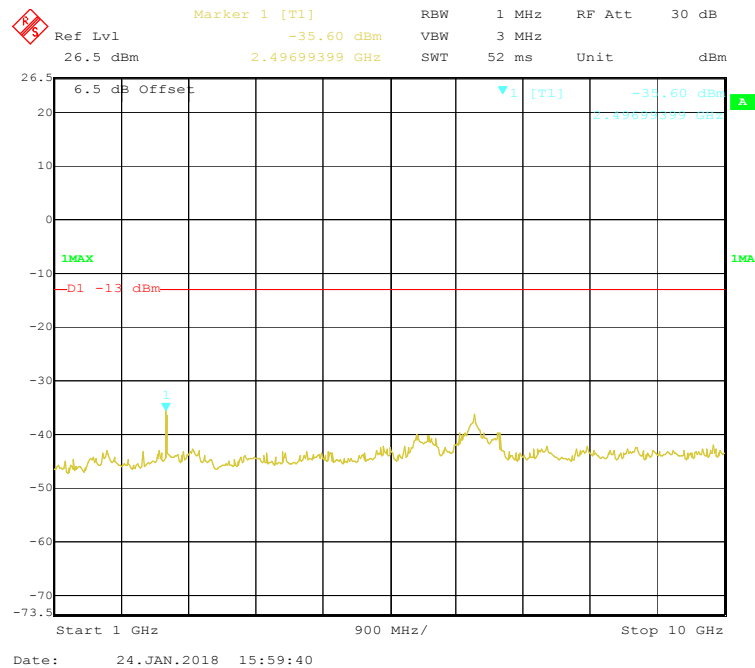
1 GHz – 10 GHz (GSM Mode)



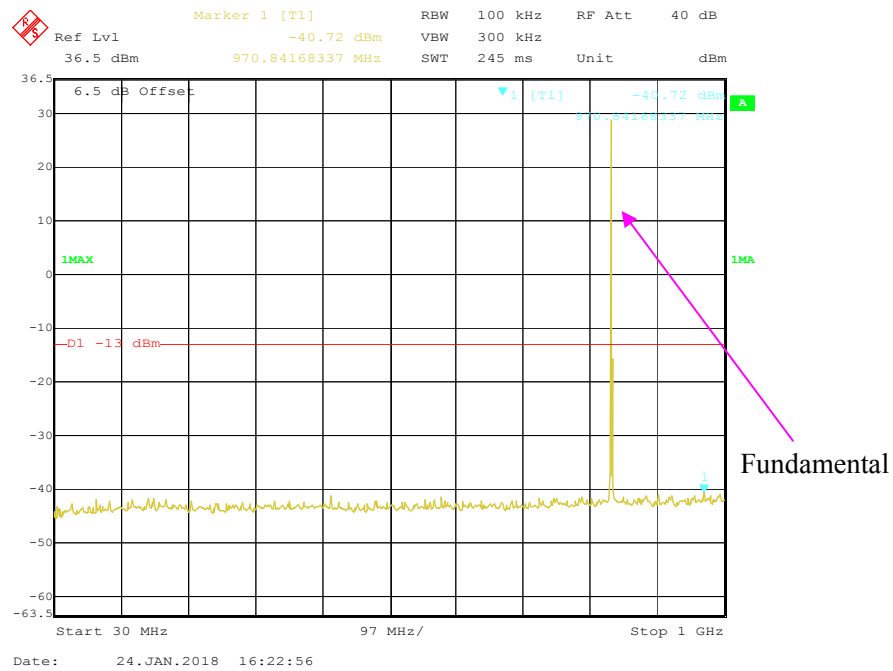
30 MHz – 1GHz(GPRS Mode)



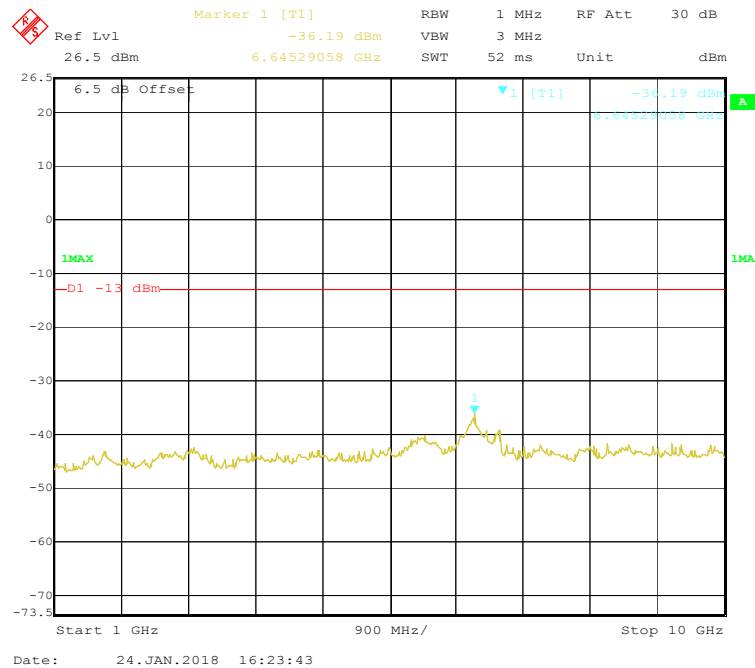
1 GHz – 10 GHz (GPRS Mode)



30 MHz – 1GHz(EGPRS Mode)

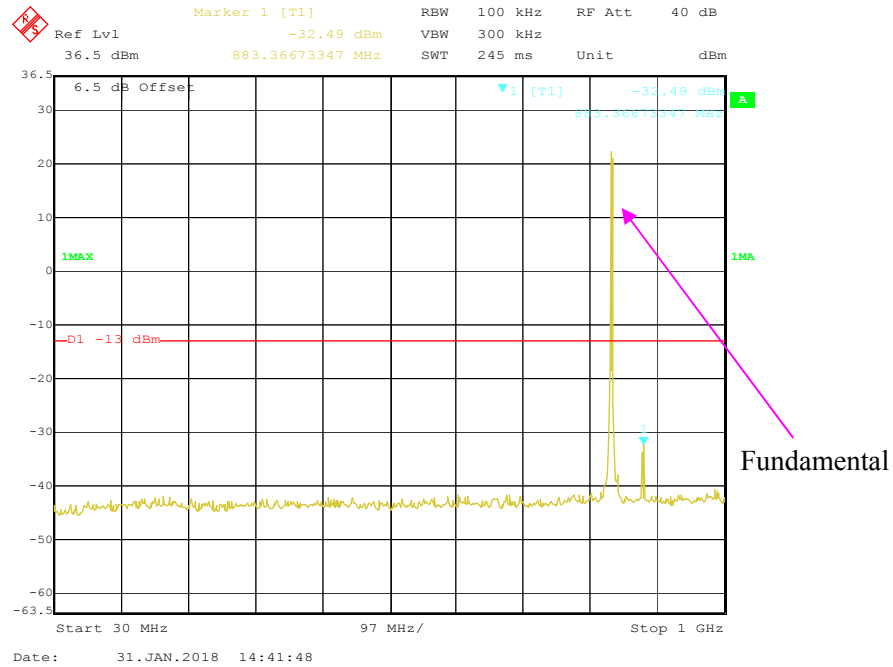


1 GHz – 10 GHz (EGPRS Mode)

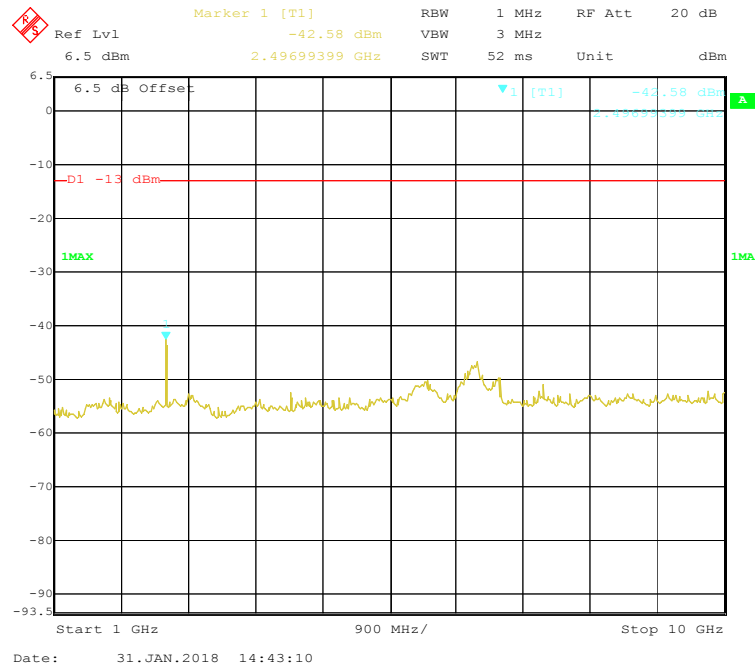


WCDMA Band V:

30 MHz – 1GHz(WCDMA Mode)

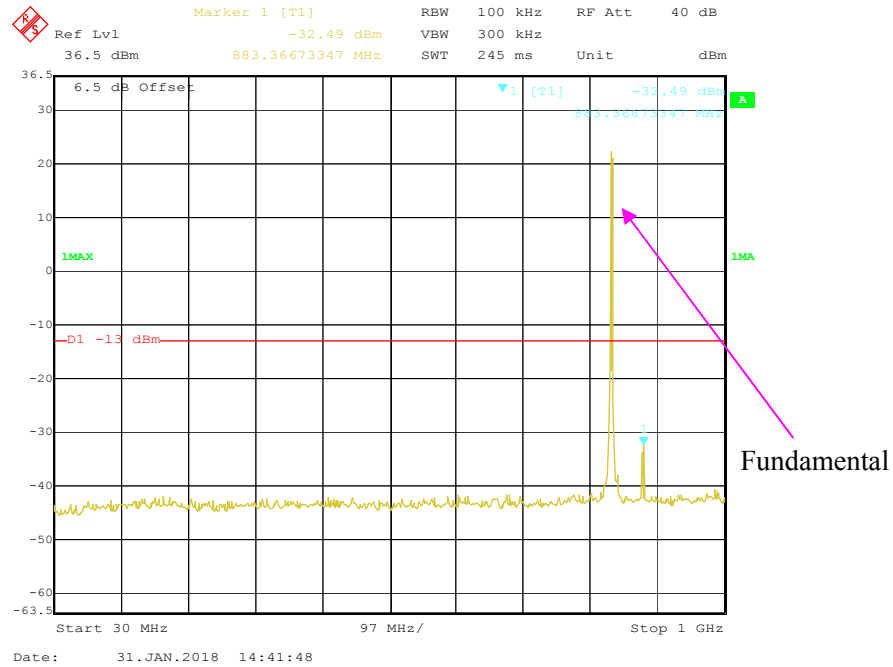


1 GHz – 10 GHz (WCDMA Mode)

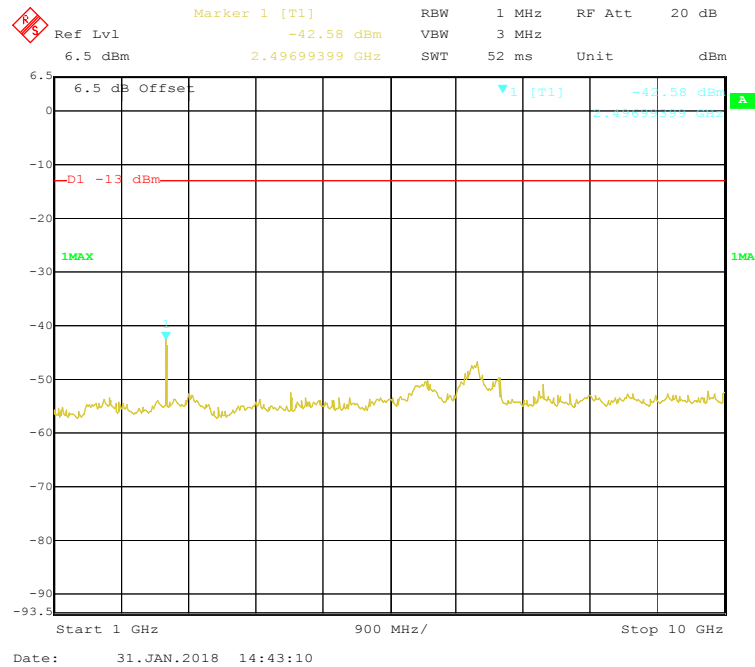


CDMA850 Band:

30 MHz – 1GHz(CDMA Mode)

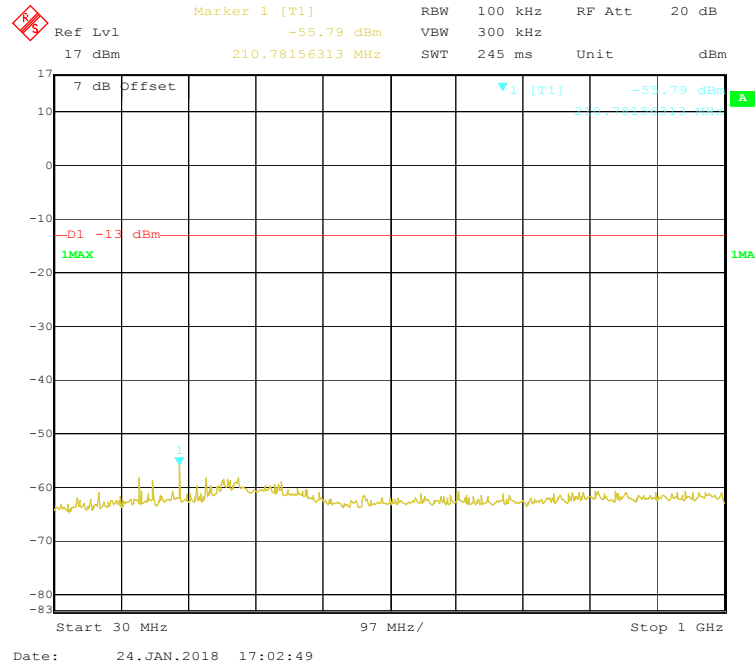


1 GHz – 10 GHz (CDMA Mode)

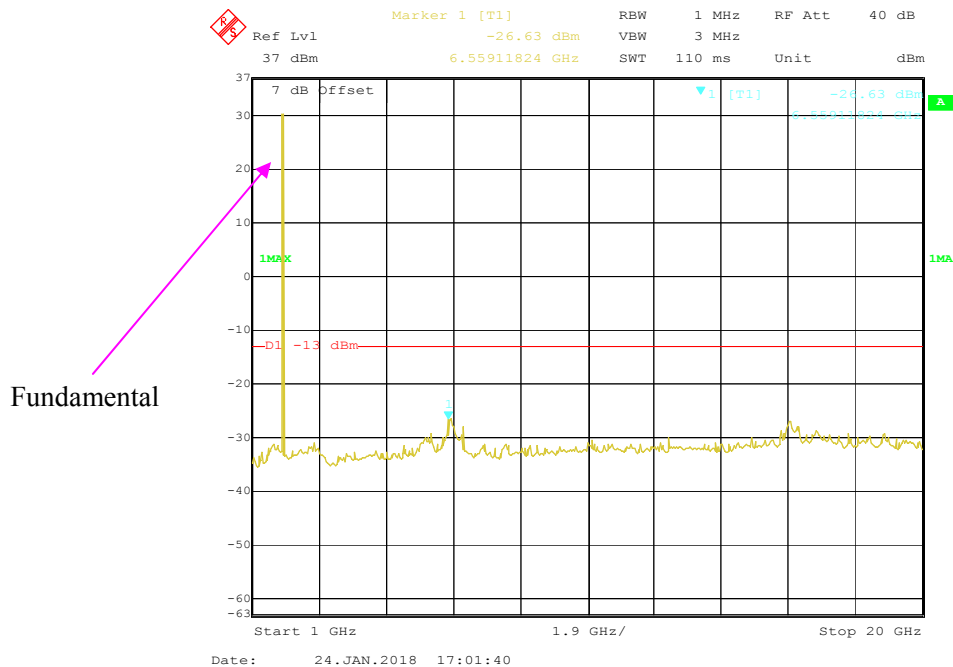


PCS 1900 Band:

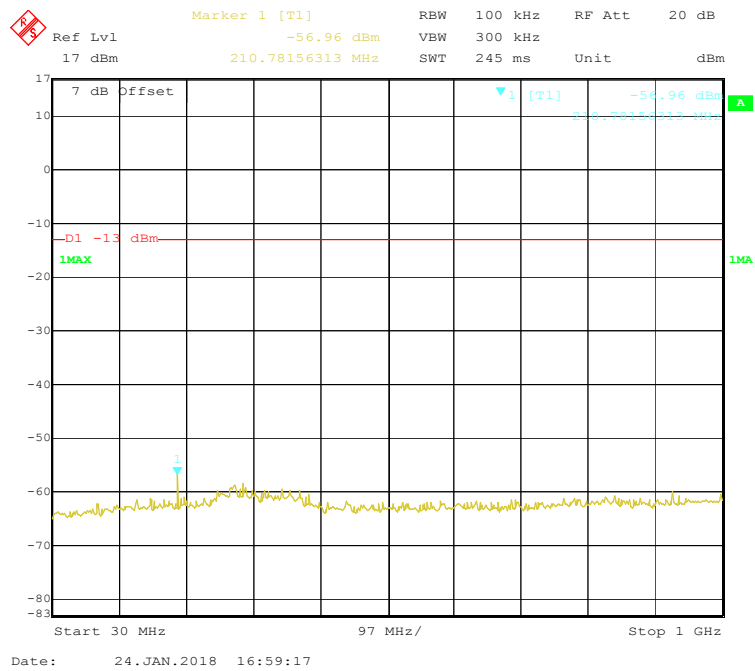
30 MHz – 1GHz(GSM Mode)



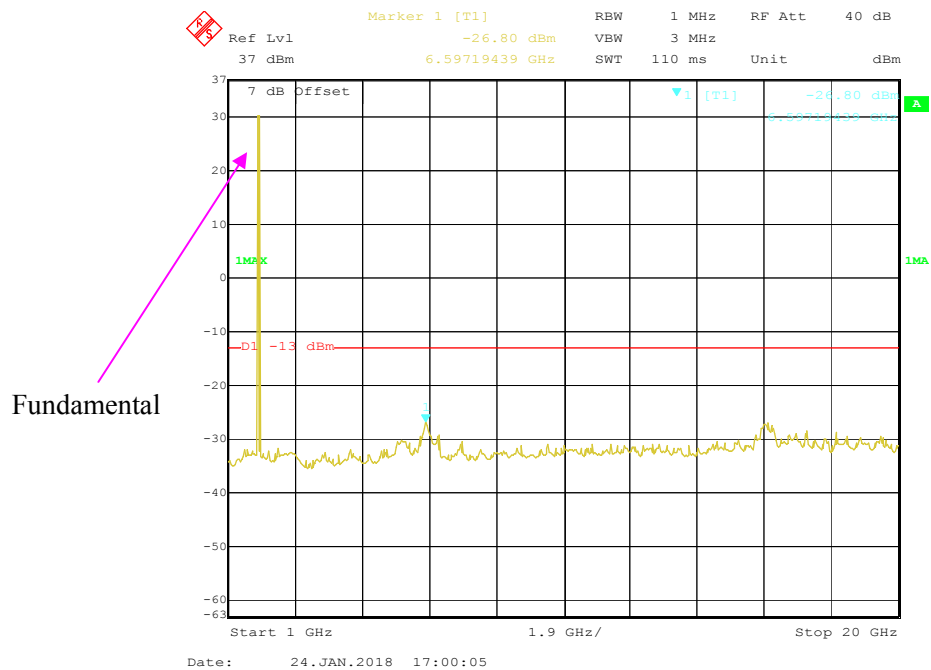
1 GHz – 20 GHz (GSM Mode)



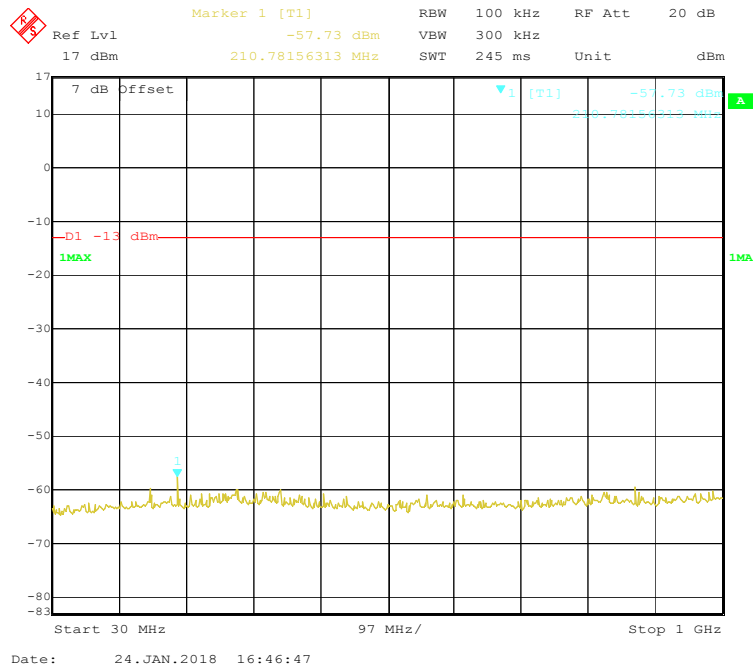
30 MHz – 1GHz((GPRS Mode)



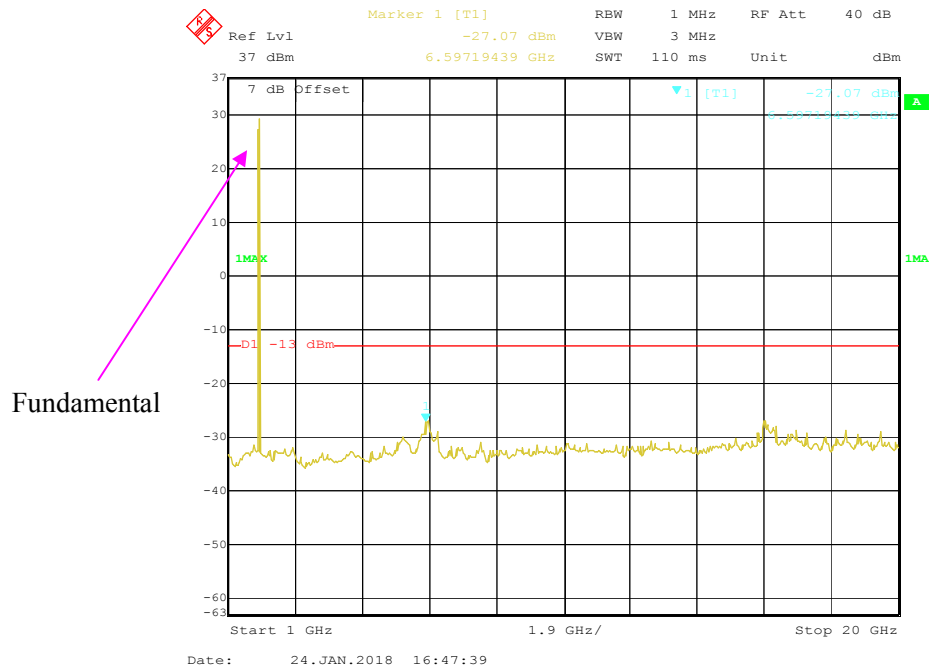
1 GHz – 20 GHz (GPRS Mode)



30 MHz – 1GHz((EGPRS Mode)

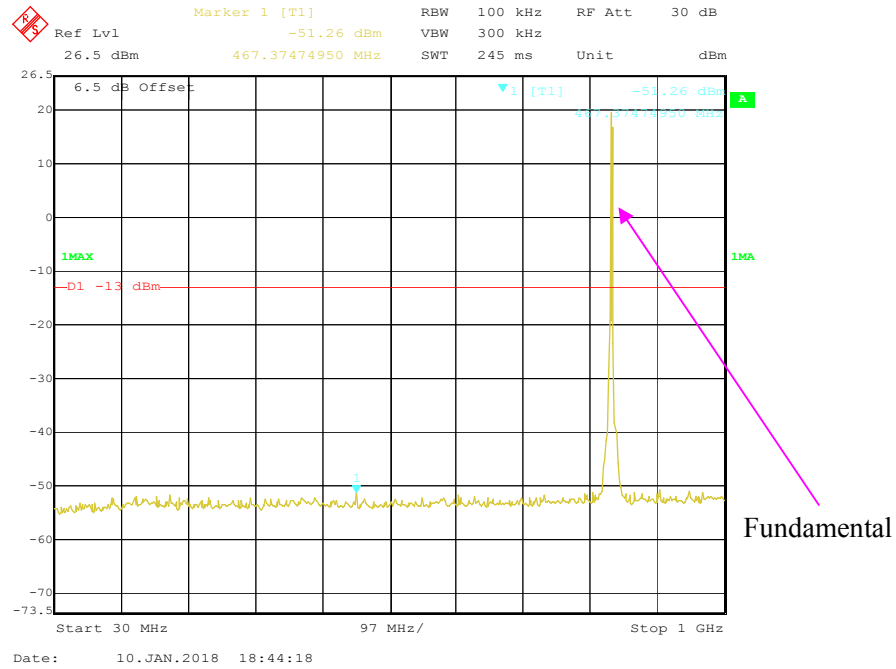


1 GHz – 20 GHz (EGPRS Mode)

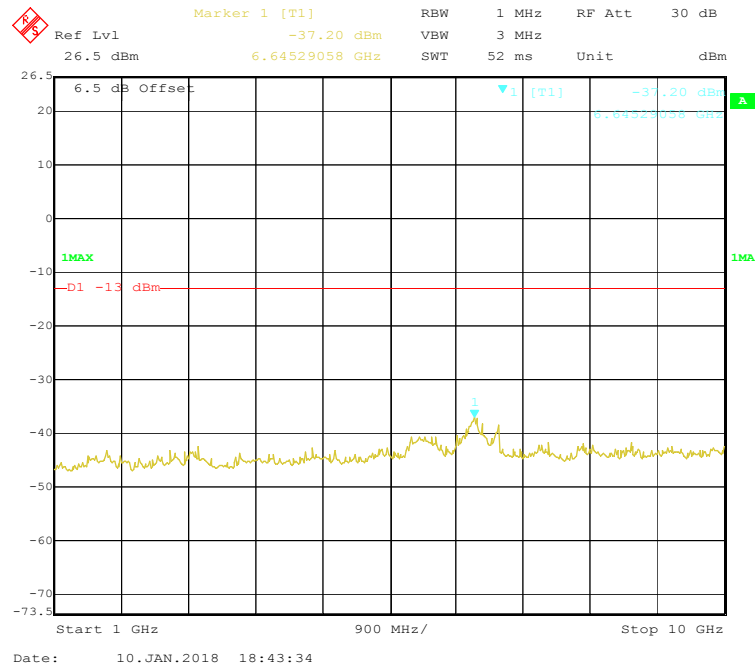


LTE Band 5:

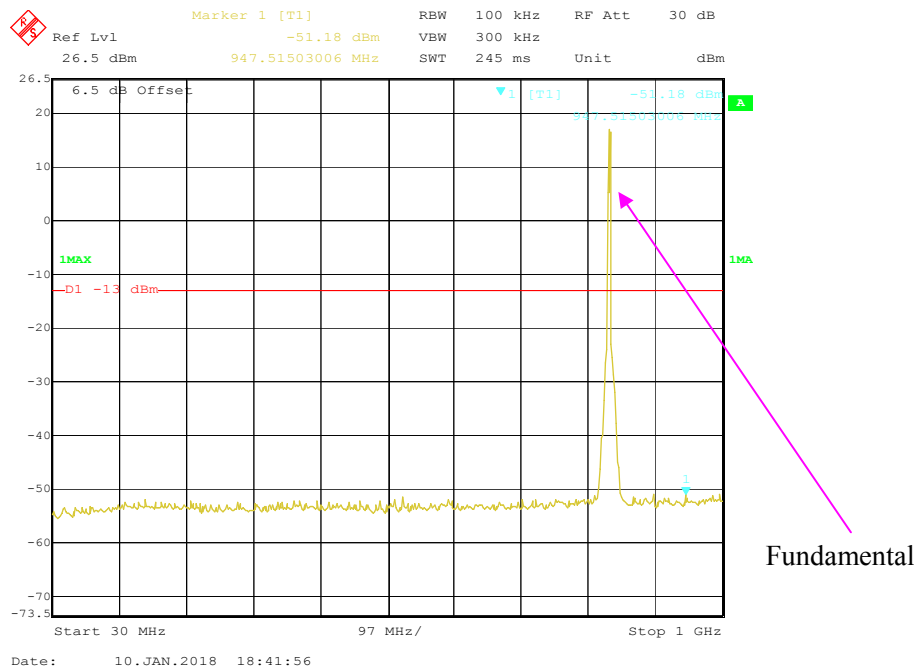
30 MHz - 1 GHz (1.4 MHz, Middle Channel)



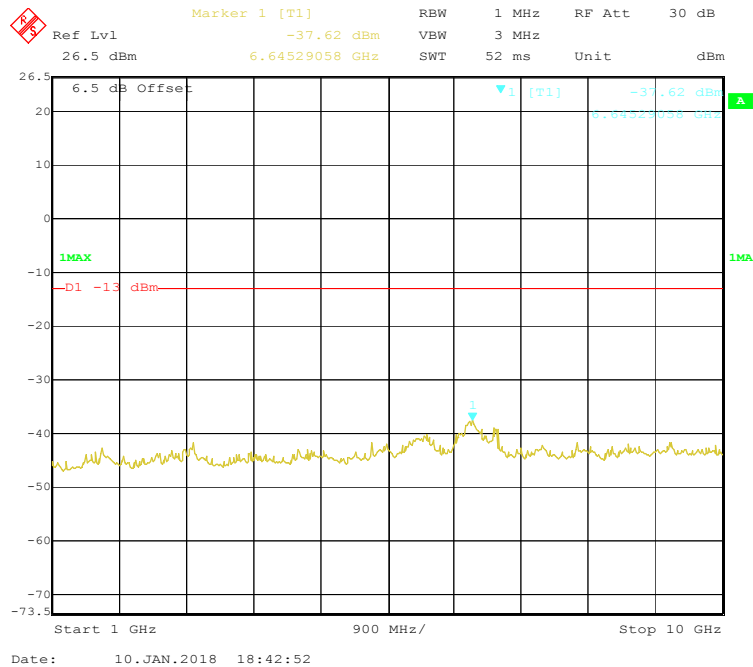
1 GHz – 10 GHz (1.4 MHz, Middle Channel)



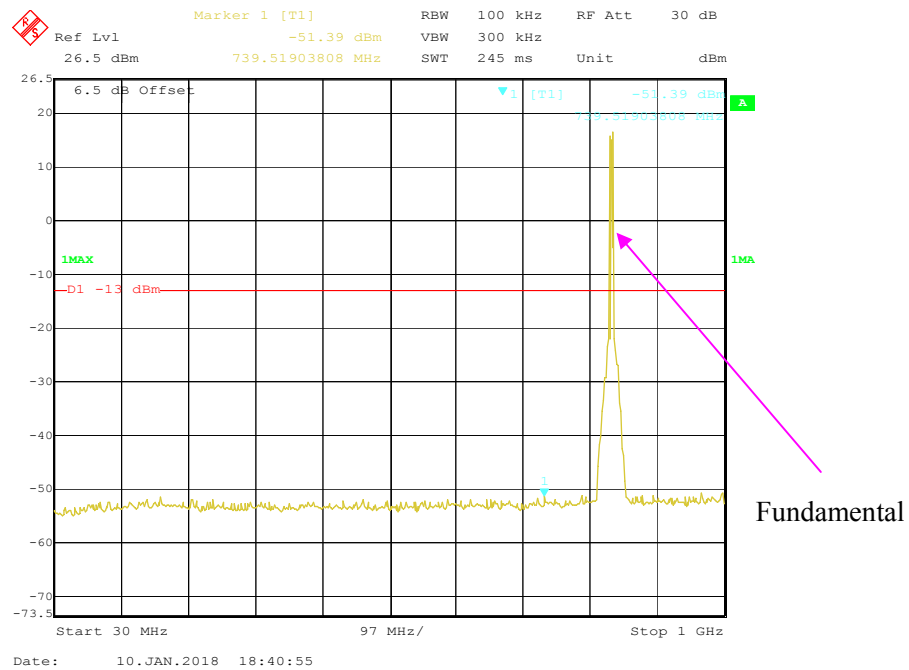
30 MHz - 1 GHz (3.0 MHz, Middle Channel)



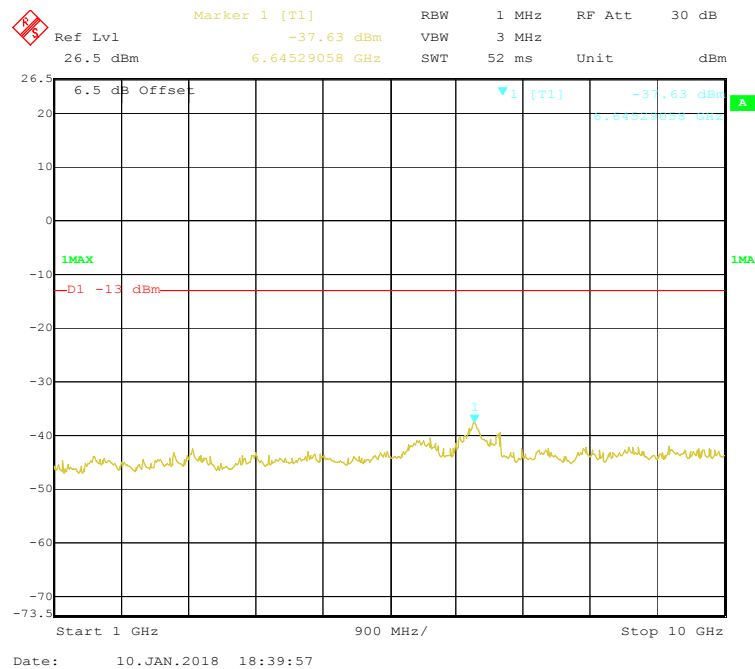
1 GHz – 10 GHz (3.0 MHz, Middle Channel)



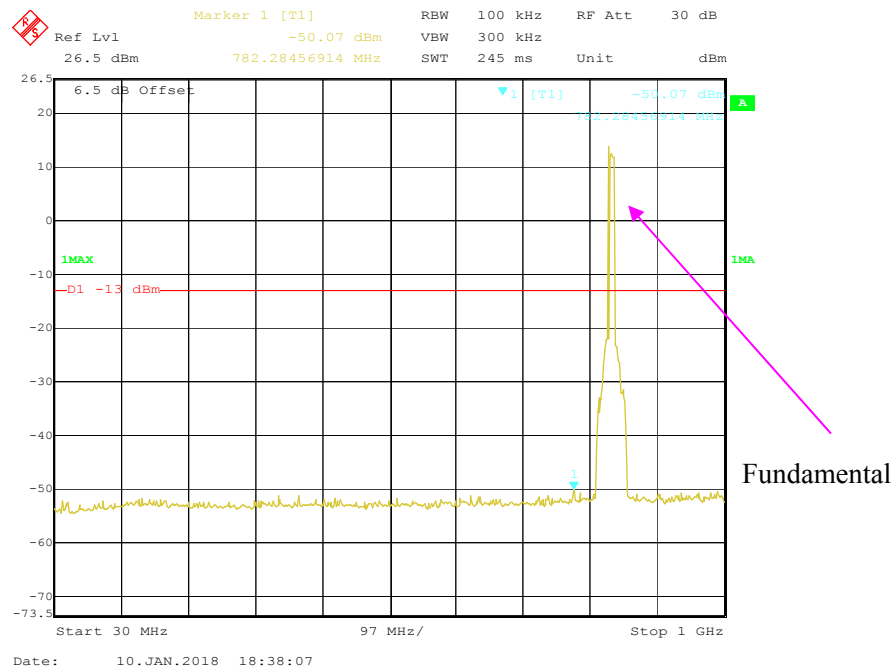
30 MHz - 1 GHz (5.0 MHz, Middle Channel)



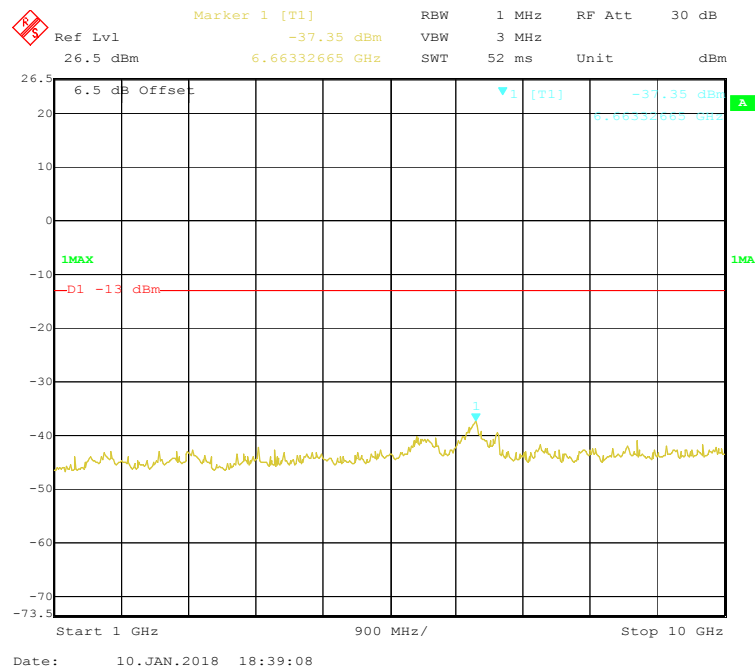
1 GHz – 10 GHz (5.0MHz, Middle Channel)

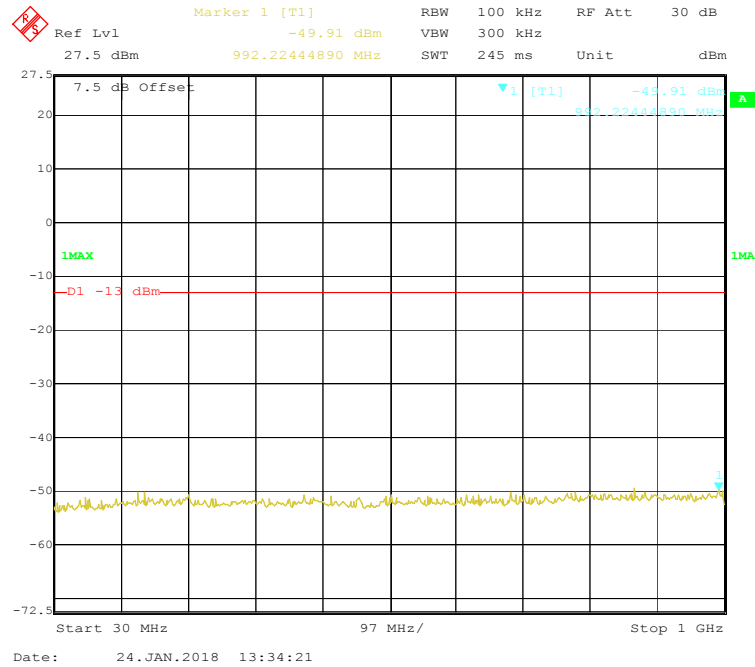
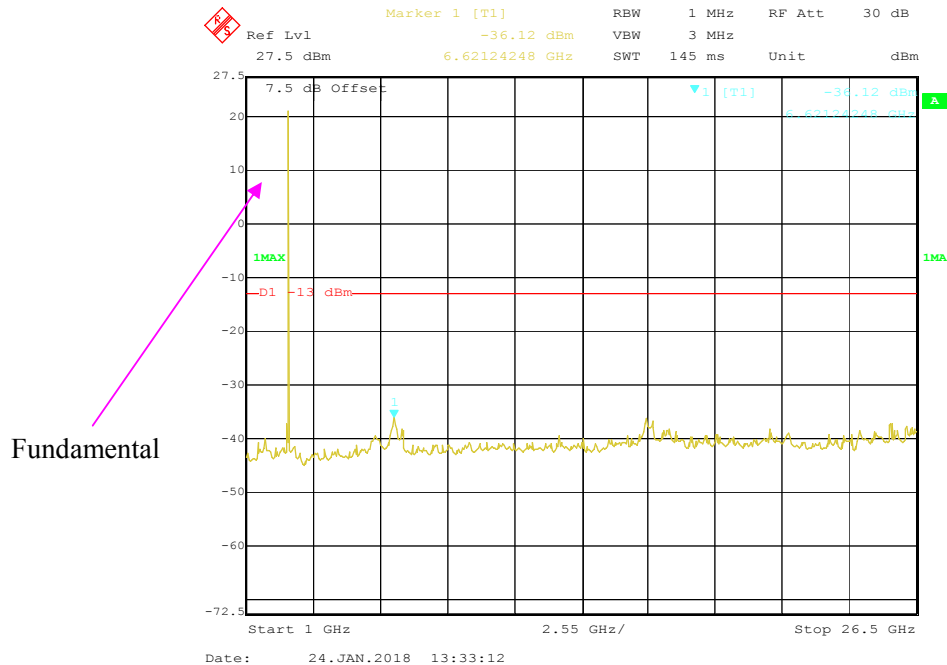


30 MHz - 1 GHz (10.0 MHz, Middle Channel)

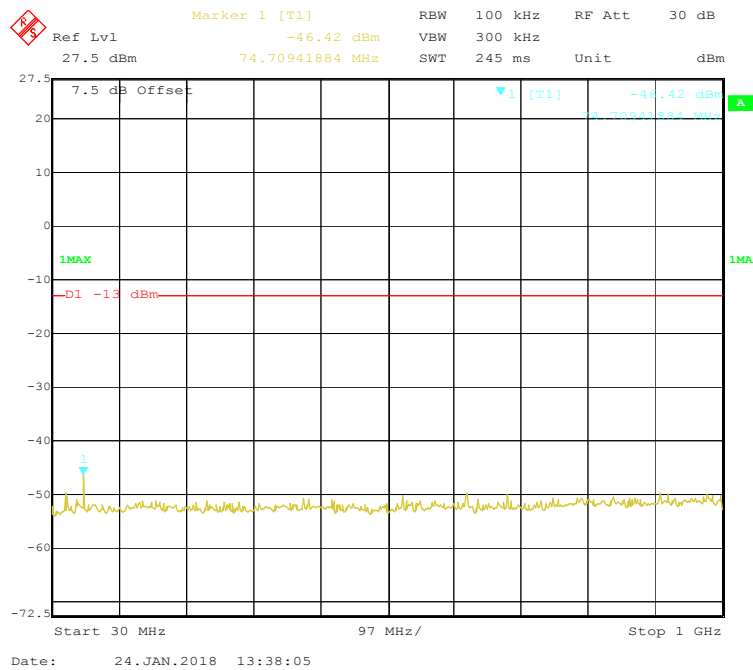


1 GHz – 10 GHz (10.0 MHz, Middle Channel)

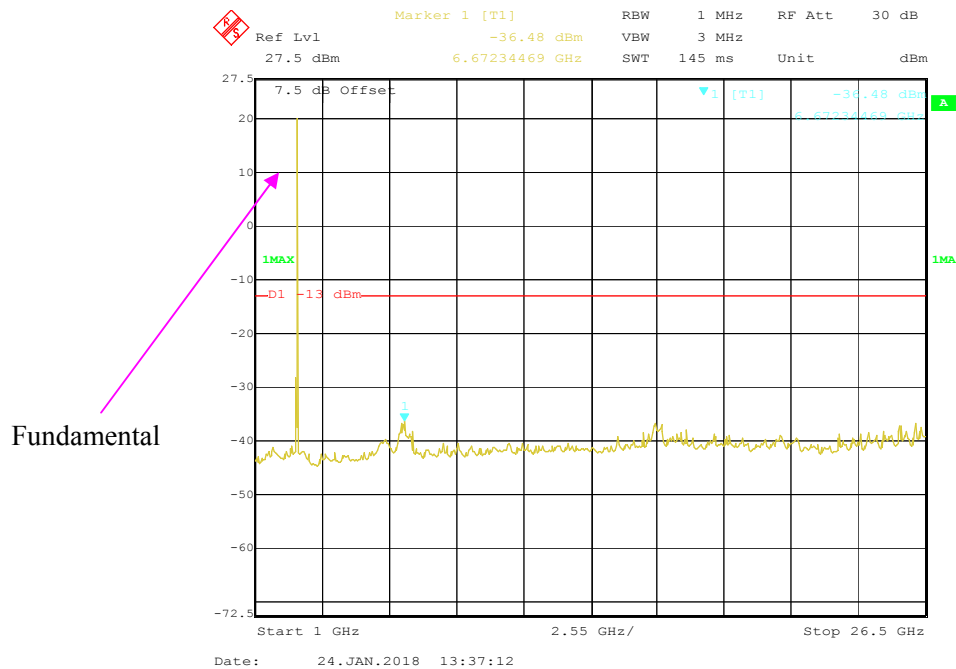


LTE Band 38:**30 MHz - 1 GHz (5 MHz, Middle Channel)****1 GHz – 26.5 GHz (5 MHz, Middle Channel)**

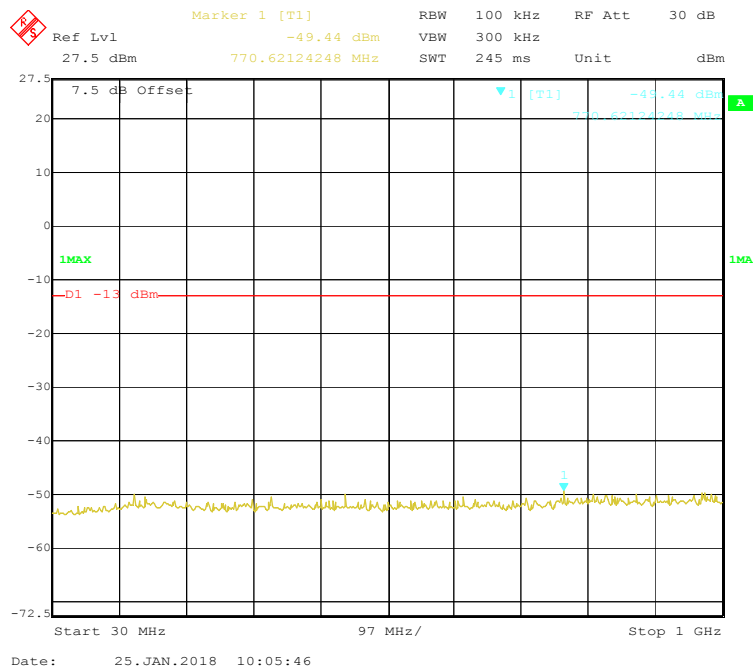
30 MHz - 1 GHz (10MHz, Middle Channel)



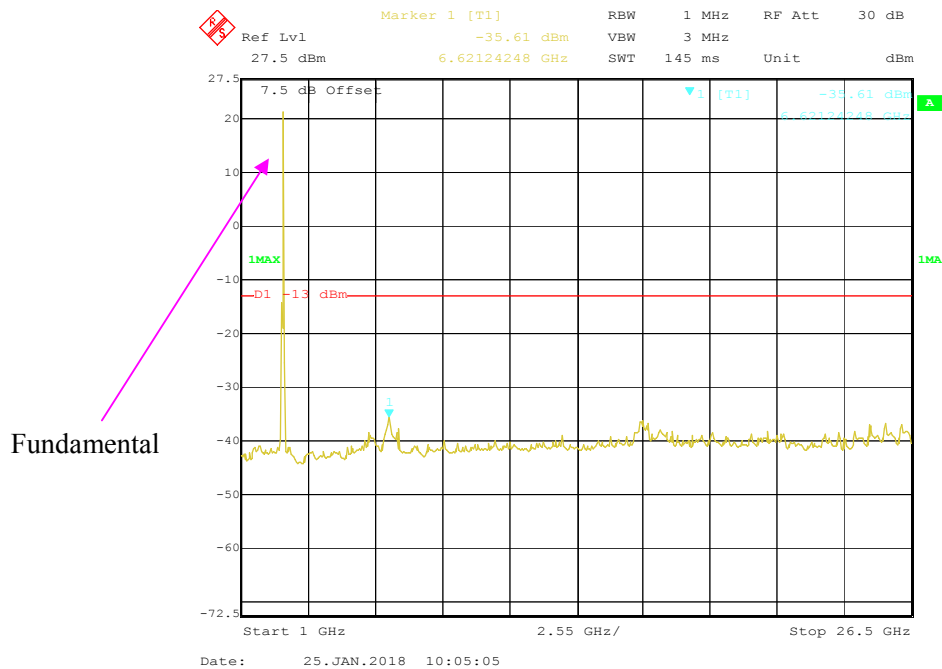
1 GHz – 26.5 GHz (10 MHz, Middle Channel)



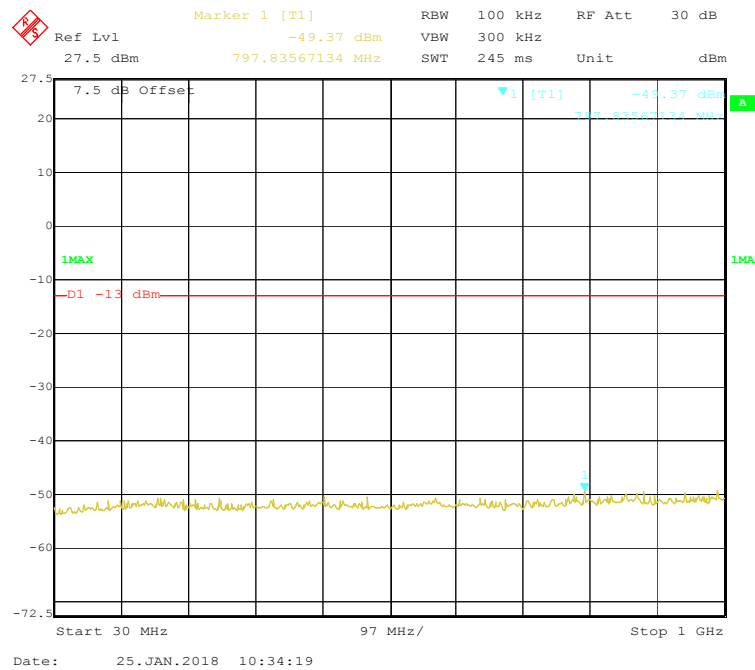
30 MHz - 1 GHz (15 MHz, Middle Channel)



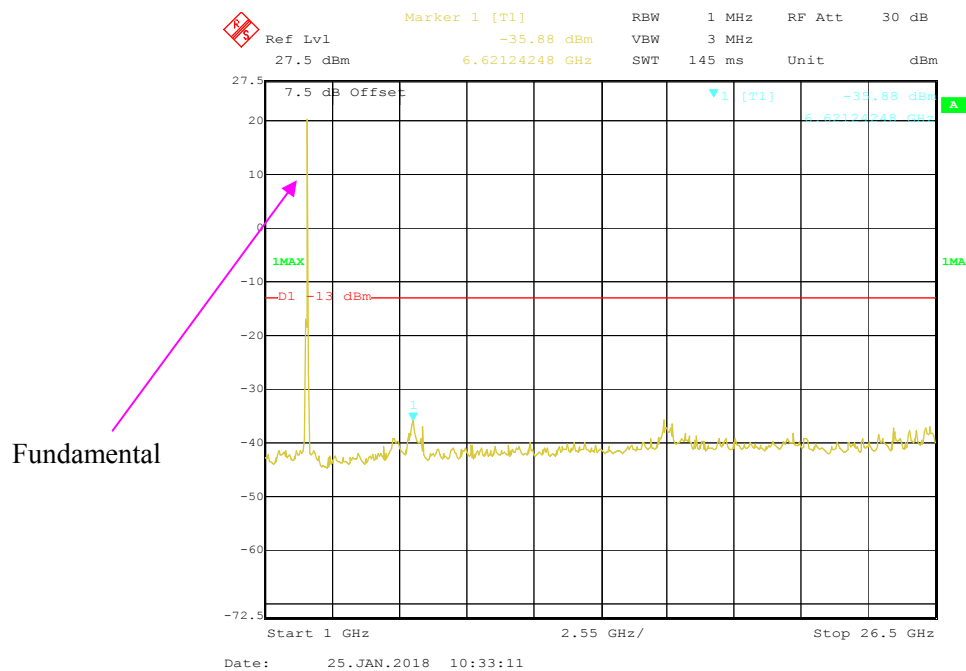
1 GHz – 26.5 GHz (15MHz, Middle Channel)

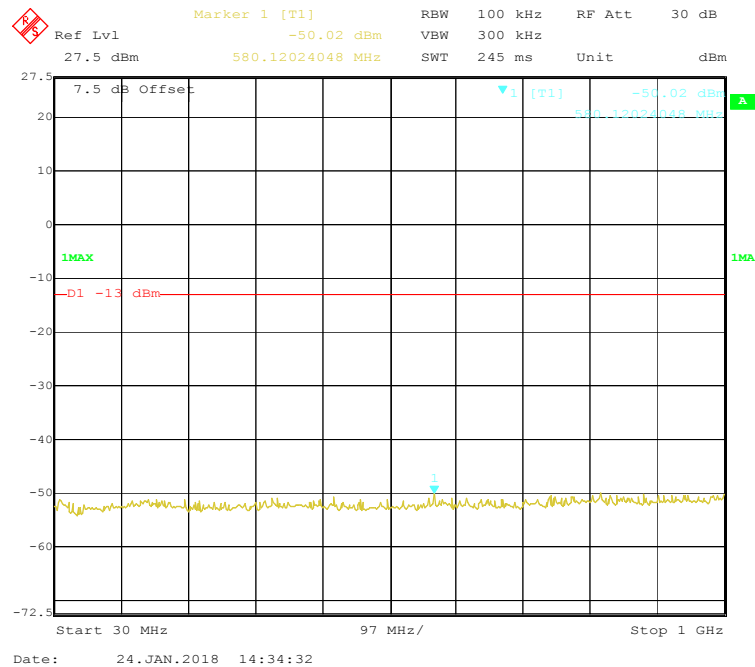
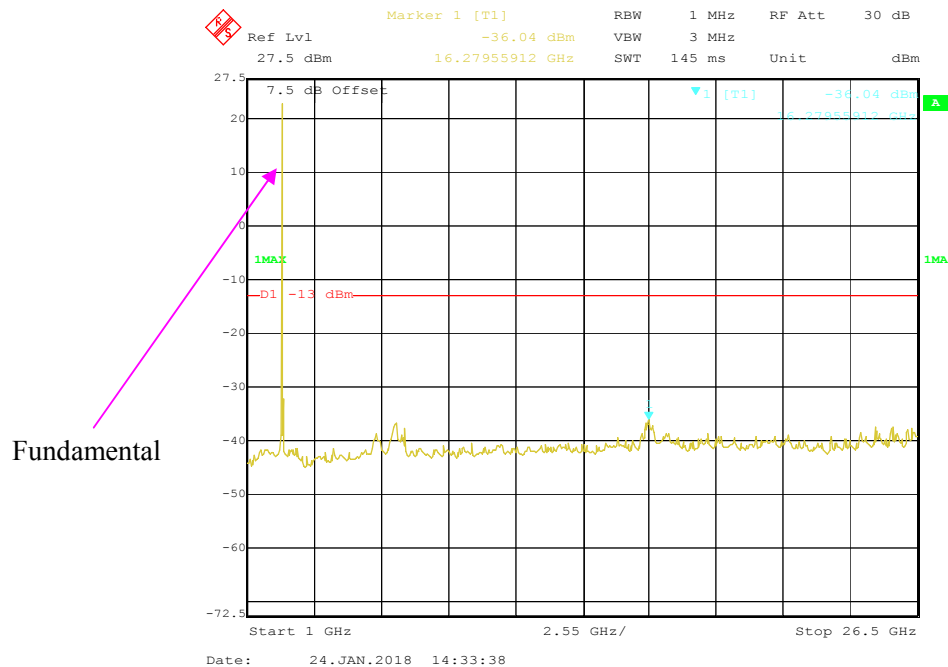


30 MHz - 1 GHz (20 MHz, Middle Channel)

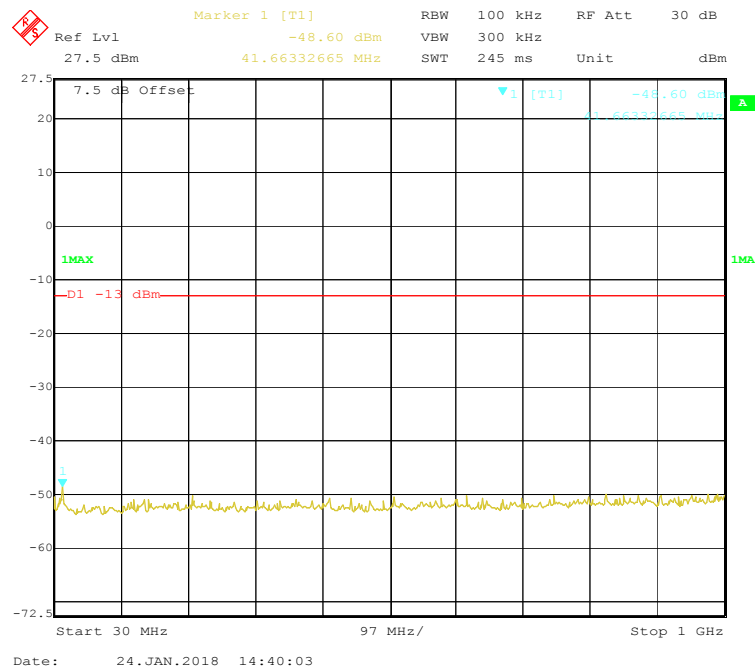


1 GHz – 26.5 GHz (20 MHz, Middle Channel)

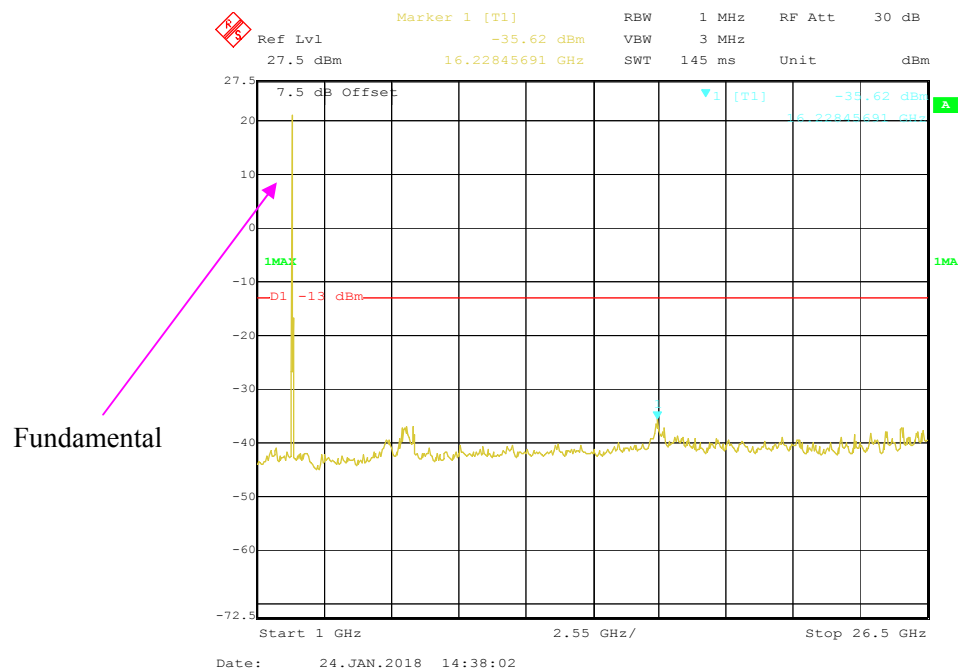


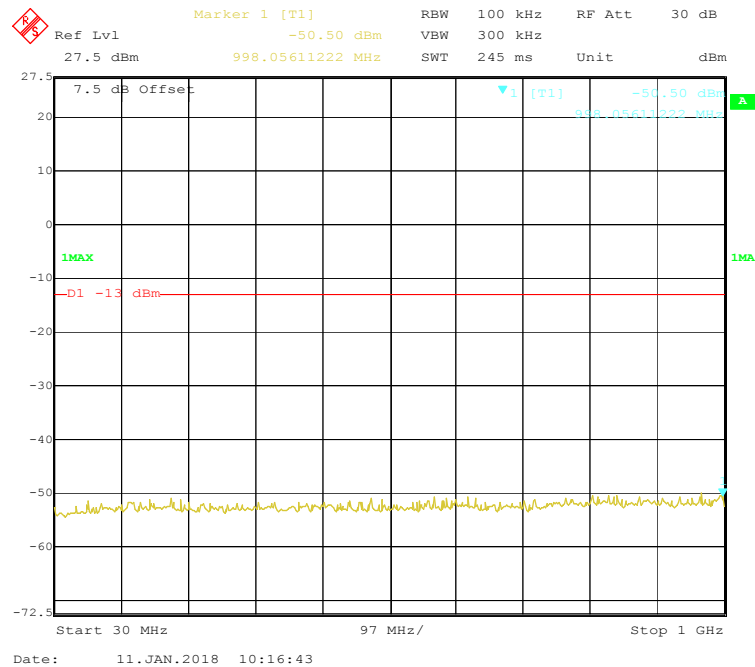
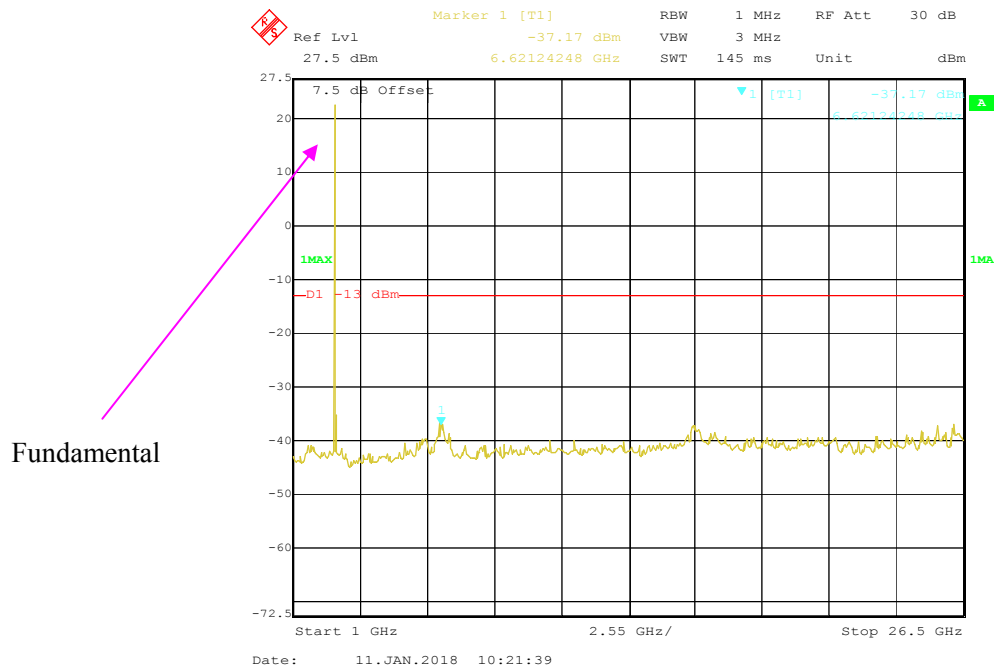
LTE Band 40:**30 MHz - 1 GHz (5 MHz, Middle Channel)****1 GHz – 26.5 GHz (5 MHz, Middle Channel)**

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

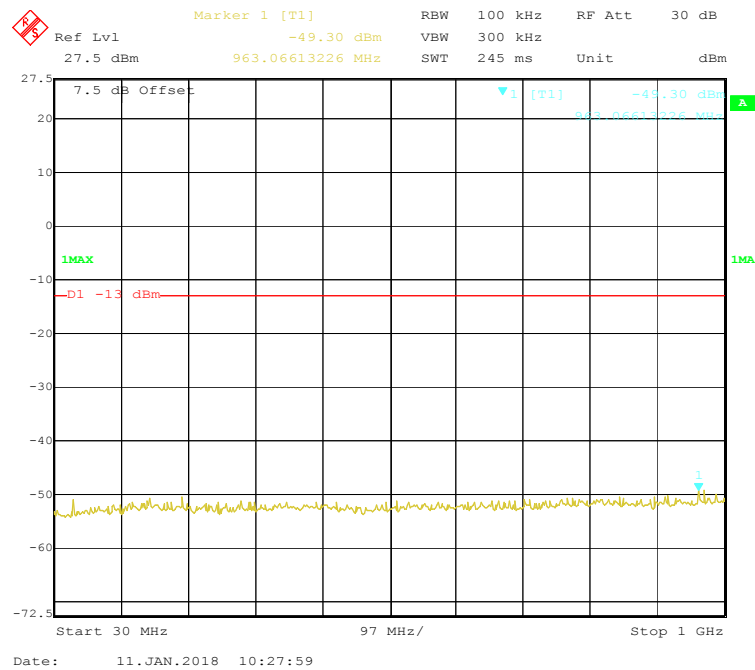


1 GHz – 26.5 GHz (10 MHz, Middle Channel)

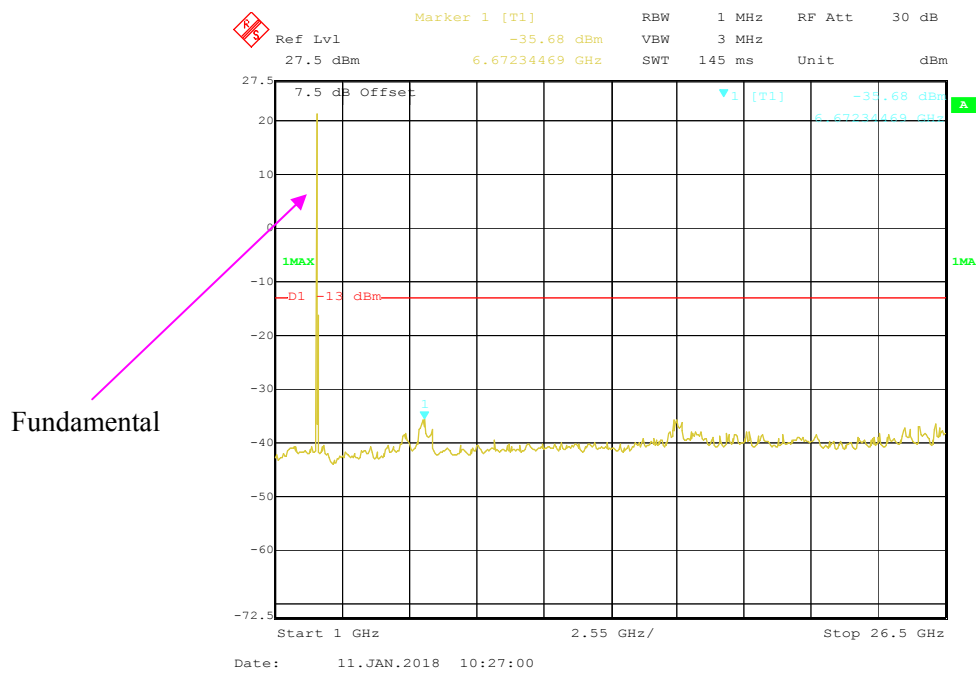


LTE Band 41:**30 MHz - 1 GHz (5 MHz, Middle Channel)****1 GHz – 26.5 GHz (5 MHz, Middle Channel)**

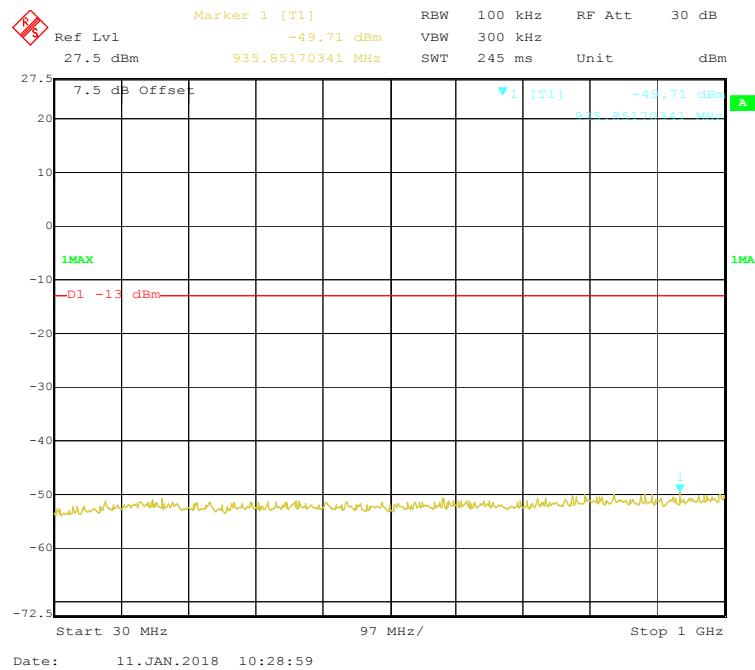
30 MHz - 1 GHz (10 MHz, Middle Channel)



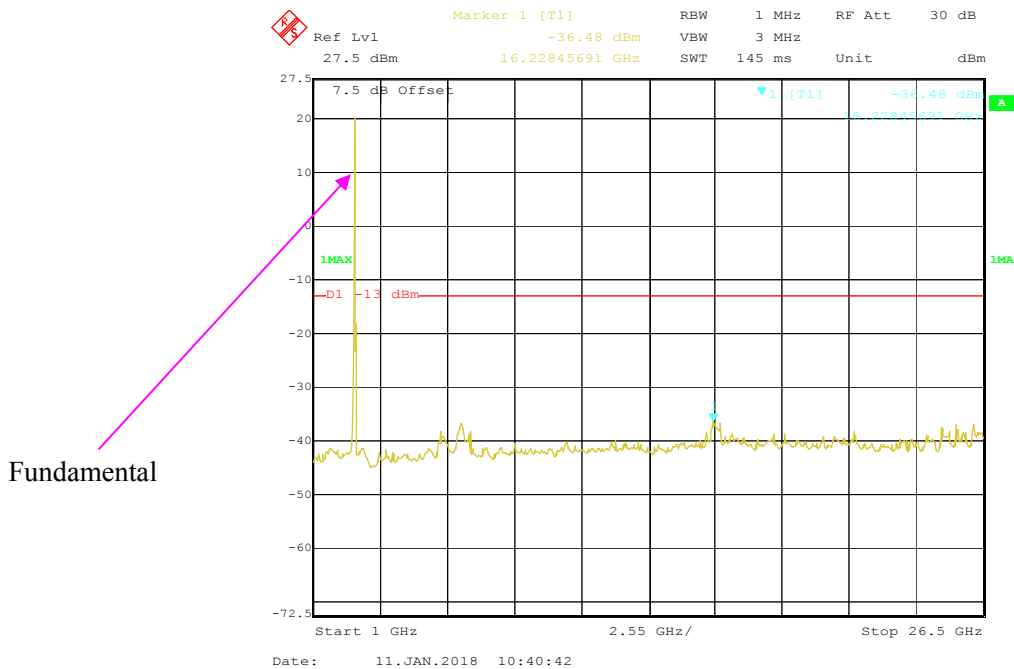
1 GHz -26.5 GHz (10 MHz, Middle Channel)



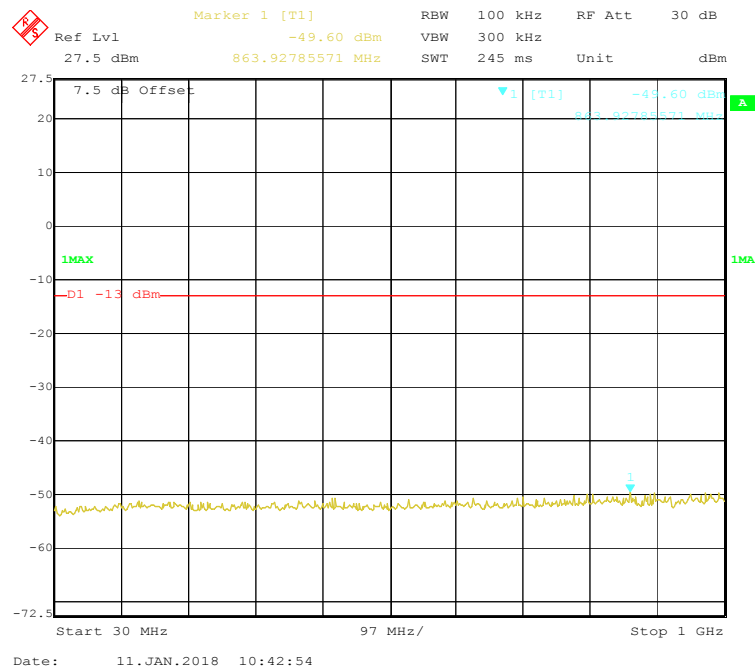
30 MHz - 1 GHz (15 MHz, Middle Channel)



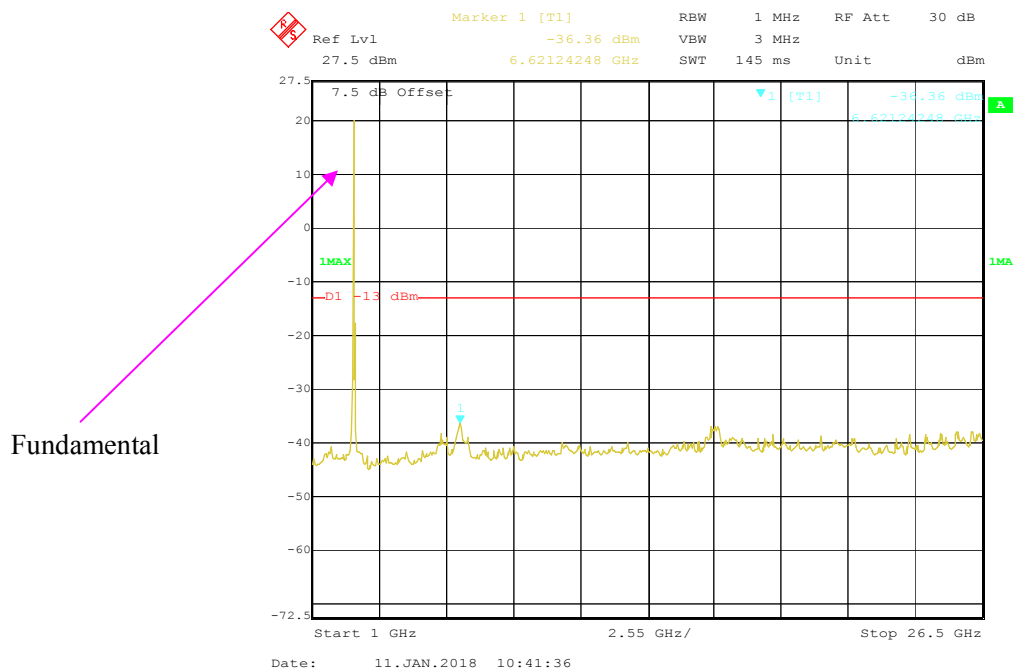
1 GHz – 26.5 GHz (15MHz, Middle Channel)



30 MHz - 1 GHz (20 MHz, Middle Channel)



1 GHz – 26.5 GHz (20 MHz, Middle Channel)



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

Applicable Standards

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

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

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

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

Test Procedure

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

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

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

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

Spurious emissions in dB = $10 \lg(\text{TX pwr in Watts}/0.001)$ – the absolute level

Spurious attenuation limit in dB = $43 + 10 \log_{10}(\text{power out in Watts})$

Test Data**Environmental Conditions**

Temperature:	23.3 °C
Relative Humidity:	50 %
ATM Pressure:	101.2kPa

The testing was performed by Ada Yu on 2018-01-31.

Test mode: Transmitting (Pre-scan with Low, Middle, High channel, and the worse case data as below)

GSM 850 Band (30 MHz ~ 10 GHz):

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
GSM Mode, Middle channel										
489.34	46.89	271	121	H	-55.24	0.57	-1.89	-57.70	-13	44.70
489.34	47.61	243	149	V	-54.90	0.57	-1.89	-57.36	-13	44.36
1673.20	59.61	339	177	H	-50.55	0.39	8.48	-42.46	-13	29.46
1673.20	60.34	216	149	V	-51.76	0.39	8.48	-43.67	-13	30.67
2509.80	45.29	317	224	H	-65.62	0.49	10.09	-56.02	-13	43.02
2509.80	46.37	315	182	V	-65.25	0.49	10.09	-55.65	-13	42.65

WCDMA Band V (30 MHz ~ 10 GHz):

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
WCDMA Mode, Middle channel										
489.34	46.96	214	159	H	-55.17	0.57	-1.89	-57.63	-13	44.63
489.34	47.38	47	141	V	-55.13	0.57	-1.89	-57.59	-13	44.59
1673.20	52.28	106	240	H	-57.88	0.39	8.48	-49.79	-13	36.79
1673.20	52.54	129	140	V	-59.56	0.39	8.48	-51.47	-13	38.47
2509.80	45.55	13	173	H	-65.36	0.49	10.09	-55.76	-13	42.76
2509.80	45.67	289	220	V	-65.95	0.49	10.09	-56.35	-13	43.35

CDMA850 Band(30 MHz ~ 10 GHz):

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
CDMA Mode, Middle channel										
429.34	46.68	87	160	H	-54.42	0.3	4.47	-50.25	-13	37.25
429.34	45.37	216	173	V	-53.55	0.3	4.47	-49.38	-13	36.38
1673.04	53.68	84	111	H	-56.48	0.39	8.48	-48.39	-13	35.39
1673.04	55.17	144	168	V	-56.93	0.39	8.48	-48.84	-13	35.84
2509.56	46.15	315	126	H	-64.76	0.49	10.09	-55.16	-13	42.16
2509.56	46.59	282	114	V	-65.03	0.49	10.09	-55.43	-13	42.43

PCS 1900 Band (30 MHz ~ 20GHz):

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
GSM Mode, Middle channel										
541.63	45.36	325	112	H	-59.33	0.58	-1.41	-61.32	-13	48.32
541.63	43.79	333	222	V	-56.97	0.58	-1.41	-58.96	-13	45.96
3760.00	56.52	10	184	H	-48.81	0.59	9.74	-39.66	-13	26.66
3760.00	56.94	119	240	V	-49.51	0.59	9.74	-40.36	-13	27.36
5640.00	46.37	148	183	H	-55.28	0.67	10.47	-45.48	-13	32.48
5640.00	45.34	179	149	V	-58.18	0.67	10.47	-48.38	-13	35.38

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

LTE Band 5 (30 MHz ~ 10GHz):

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 1.4MHz Bandwidth Middle Channel										
256.71	45.29	185	117	H	-56.91	0.44	-2.24	-59.59	-13	46.59
256.71	47.53	64	116	V	-61.68	0.44	-2.24	-64.36	-13	51.36
1673.00	54.39	114	165	H	-56.56	0.84	8.48	-48.92	-13	35.92
1673.00	54.62	2	105	V	-56.58	0.84	8.48	-48.94	-13	35.94
2509.50	43.67	12	220	H	-64.95	0.89	10.09	-55.75	-13	42.75
2509.50	43.81	1	165	V	-64.88	0.89	10.09	-55.68	-13	42.68
16-QAM 1.4MHz Bandwidth Middle Channel										
256.71	45.53	59	247	H	-56.67	0.44	-2.24	-59.35	-13	46.35
256.71	47.60	175	227	V	-61.61	0.44	-2.24	-64.29	-13	51.29
1673.00	50.81	259	222	H	-60.14	0.84	8.48	-52.50	-13	39.50
1673.00	51.70	55	160	V	-59.50	0.84	8.48	-51.86	-13	38.86
2509.50	42.76	299	120	H	-65.86	0.89	10.09	-56.66	-13	43.66
2509.50	43.52	269	194	V	-65.17	0.89	10.09	-55.97	-13	42.97

LTE Band 38 (30 MHz ~ 26.5 GHz):

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 5MHz Bandwidth Middle Channel										
629.18	44.17	246	232	H	-54.11	0.60	-0.97	-55.68	-13	42.68
629.18	46.22	137	120	V	-54.96	0.60	-0.97	-56.53	-13	43.53
5190.00	53.67	344	180	H	-48.44	1.10	10.30	-39.24	-13	26.24
5190.00	52.49	151	228	V	-49.83	1.10	10.30	-40.63	-13	27.63
7785.00	45.11	281	153	H	-50.37	1.81	10.04	-42.14	-13	29.14
7785.00	44.34	151	186	V	-51.25	1.81	10.04	-43.02	-13	30.02
16-QAM 5MHz Bandwidth Middle Channel										
629.18	44.01	63	233	H	-54.27	0.60	-0.97	-55.84	-13	42.84
629.18	45.94	327	239	V	-55.24	0.60	-0.97	-56.81	-13	43.81
5190.00	49.99	156	207	H	-52.12	1.10	10.30	-42.92	-13	29.92
5190.00	48.67	80	236	V	-53.65	1.10	10.30	-44.45	-13	31.45
7785.00	44.74	116	213	H	-50.74	1.81	10.04	-42.51	-13	29.51
7785.00	44.11	85	213	V	-51.48	1.81	10.04	-43.25	-13	30.25

LTE Band 40 (30 MHz ~ 26.5 GHz):

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 5MHz Bandwidth Middle Channel										
378.61	46.27	160	147	H	-60.33	0.51	-1.52	-62.36	-13	49.36
378.61	44.76	292	137	V	-59.56	0.51	-1.52	-61.59	-13	48.59
4710.00	53.79	274	219	H	-49.90	1.04	10.06	-40.88	-13	27.88
4710.00	53.15	59	173	V	-50.61	1.04	10.06	-41.59	-13	28.59
7065.00	45.21	333	111	H	-52.64	1.69	10.19	-44.14	-13	31.14
7065.00	44.67	247	121	V	-53.42	1.69	10.19	-44.92	-13	31.92
16-QAM 5MHz Bandwidth Middle Channel										
378.61	46.09	225	217	H	-60.51	0.51	-1.52	-62.54	-13	49.54
378.61	45.10	149	194	V	-59.22	0.51	-1.52	-61.25	-13	48.25
4710.00	50.83	144	235	H	-52.86	1.04	10.06	-43.84	-13	30.84
4710.00	49.74	220	161	V	-54.02	1.04	10.06	-45.00	-13	32.00
7065.00	44.24	224	123	H	-53.61	1.69	10.19	-45.11	-13	32.11
7065.00	44.66	76	142	V	-53.43	1.69	10.19	-44.93	-13	31.93

LTE Band 41 (30 MHz ~ 26.5 GHz):

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 5MHz Bandwidth Middle Channel										
469.17	45.81	267	185	H	-54.44	0.56	-1.77	-56.77	-13	43.77
469.17	46.97	170	233	V	-56.36	0.56	-1.77	-58.69	-13	45.69
5210.00	54.09	13	221	H	-47.94	1.11	10.30	-38.75	-13	25.75
5210.00	53.26	179	116	V	-48.98	1.11	10.30	-39.79	-13	26.79
7815.00	46.11	360	222	H	-49.28	1.82	10.04	-41.06	-13	28.06
7815.00	45.13	223	216	V	-50.36	1.82	10.04	-42.14	-13	29.14
16-QAM 5MHz Bandwidth Middle Channel										
469.17	45.49	268	186	H	-54.76	0.24	4.96	-50.04	-13	37.04
469.17	46.76	274	129	V	-56.57	0.24	4.96	-51.85	-13	38.85
5210.00	50.21	252	159	H	-51.82	1.11	10.30	-42.63	-13	29.63
5210.00	49.44	333	150	V	-52.80	1.11	10.30	-43.61	-13	30.61
7815.00	45.15	296	159	H	-50.24	1.82	10.04	-42.02	-13	29.02
7815.00	45.33	321	146	V	-50.16	1.82	10.04	-41.94	-13	28.94

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

Applicable Standards

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

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

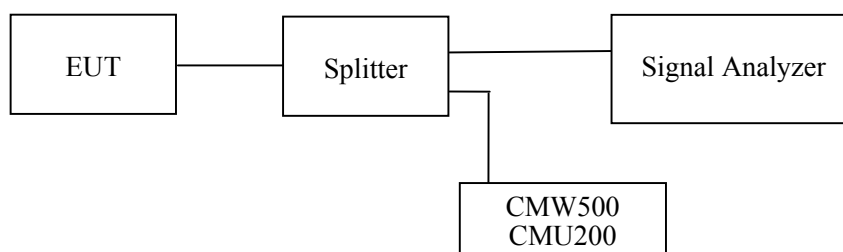
According to FCC §27.53 (m), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

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

Test Procedure

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

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



Test Data

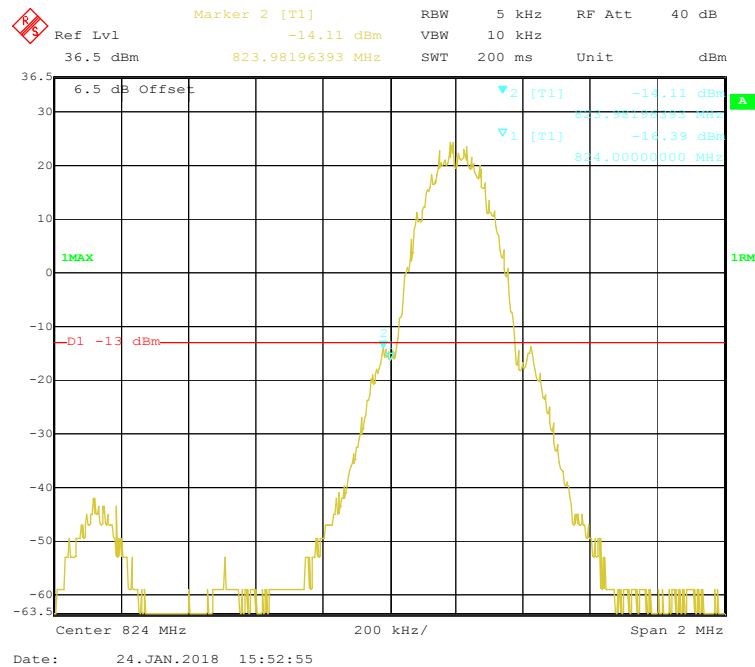
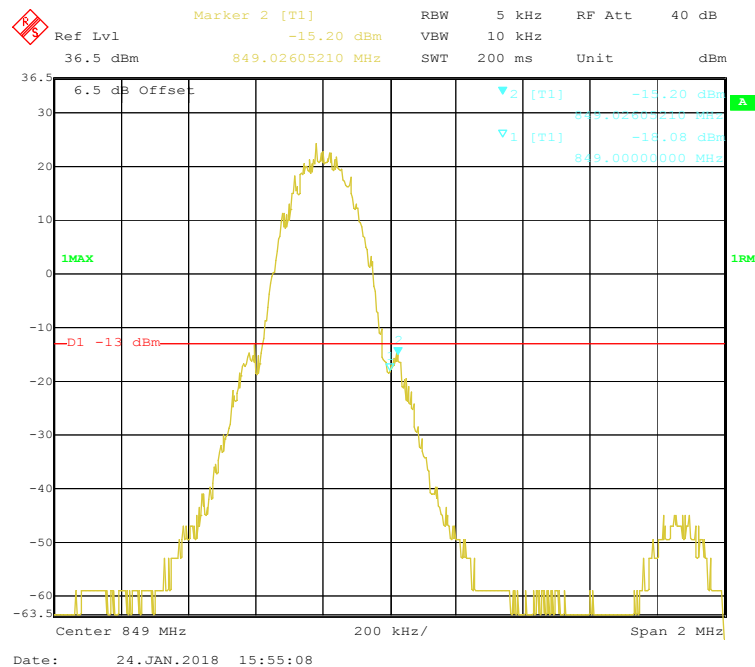
Environmental Conditions

Temperature:	23.3 °C
Relative Humidity:	50 %
ATM Pressure:	101.2kPa

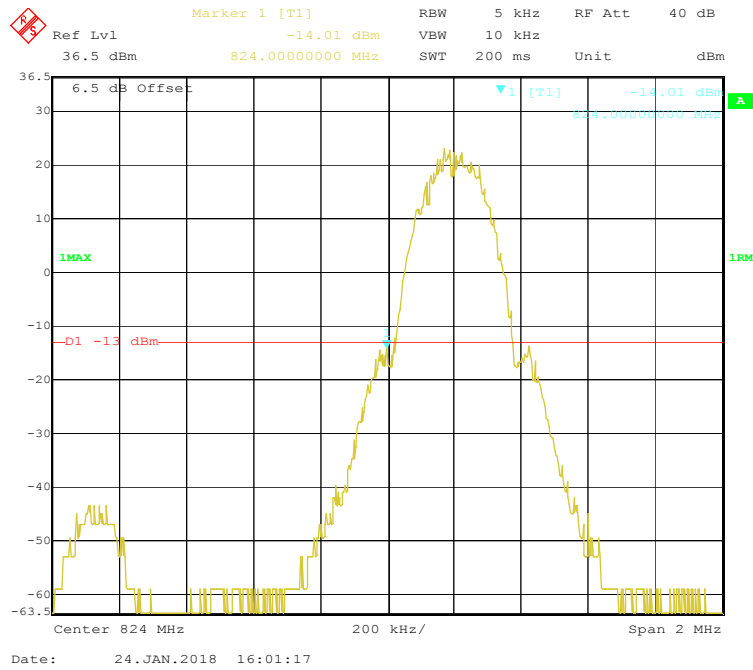
The testing was performed by Ada Yu from 2018-01-10 to 2018-04-08

EUT operation mode: Transmitting

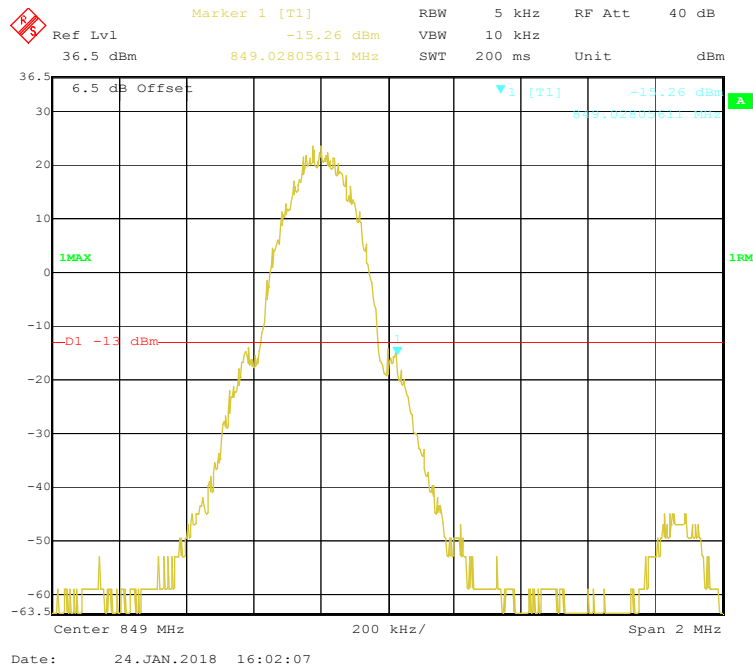
Test Result: Compliance.

GSM 850 Band:**GSM Mode, Left Band Edge****GSM Mode, Right Band Edge**

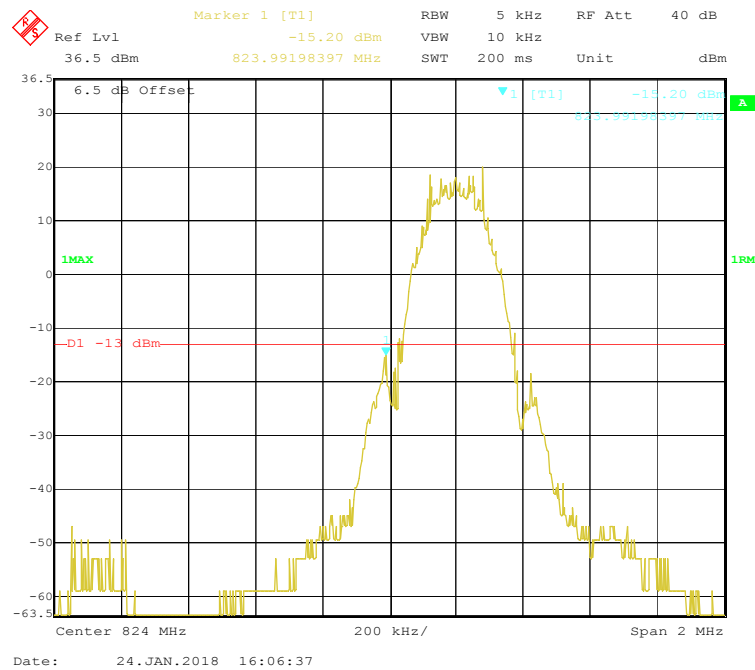
GPRS Mode, Left Band Edge



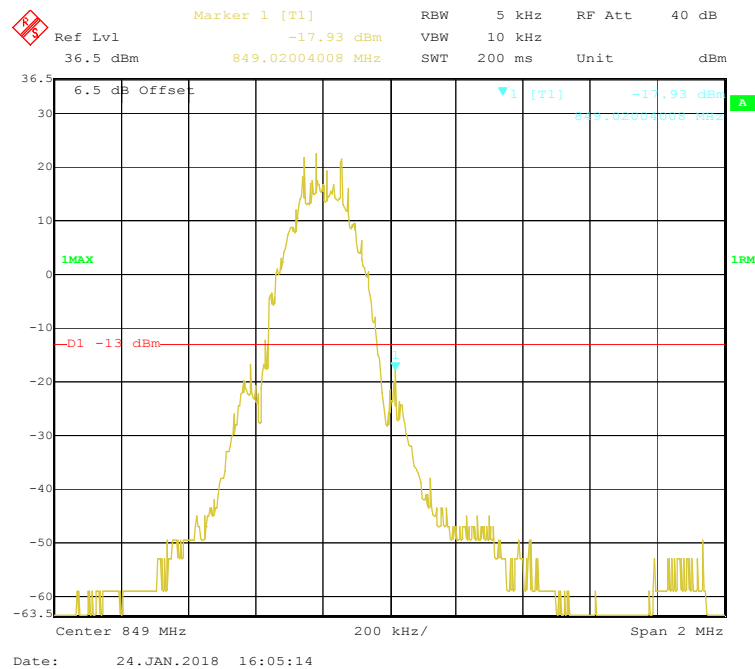
GPRS Mode, Right Band Edge



EGPRS Mode, Left Band Edge

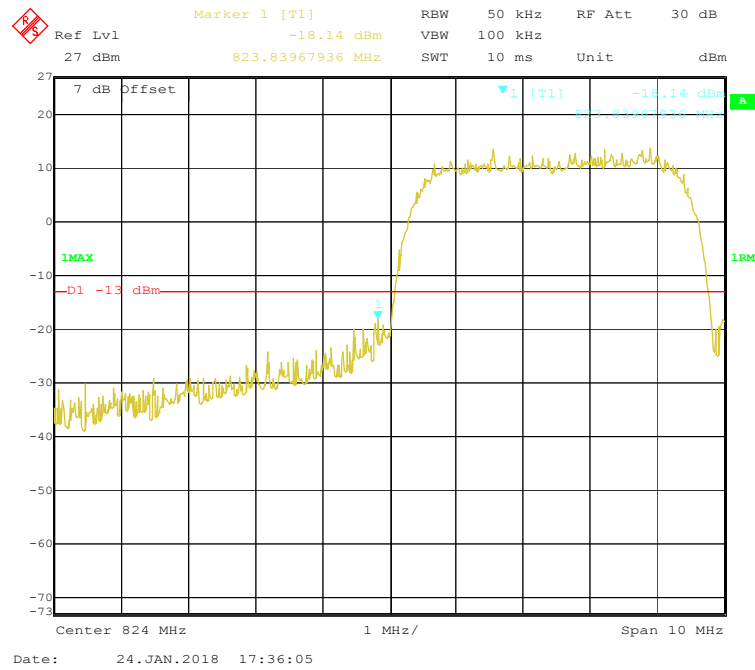


EGPRS Mode, Right Band Edge

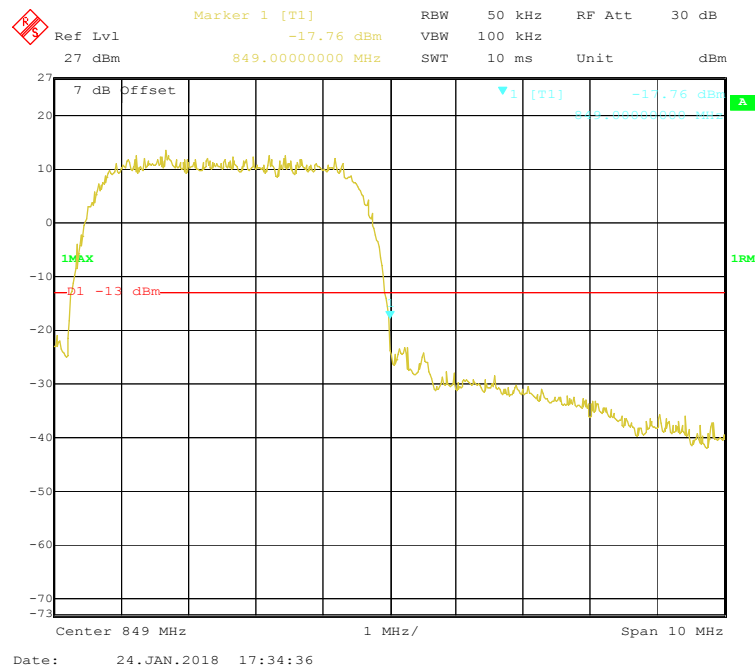


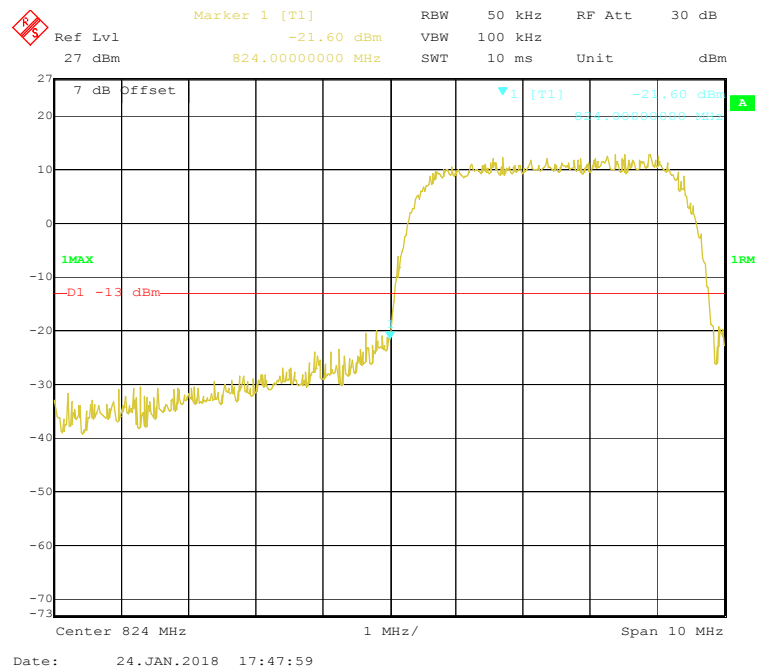
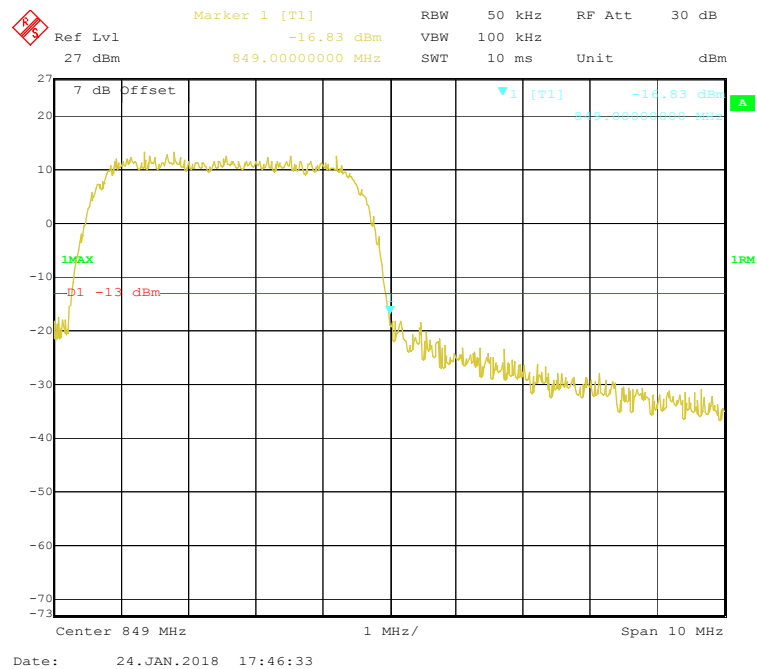
WCDMA Band V:

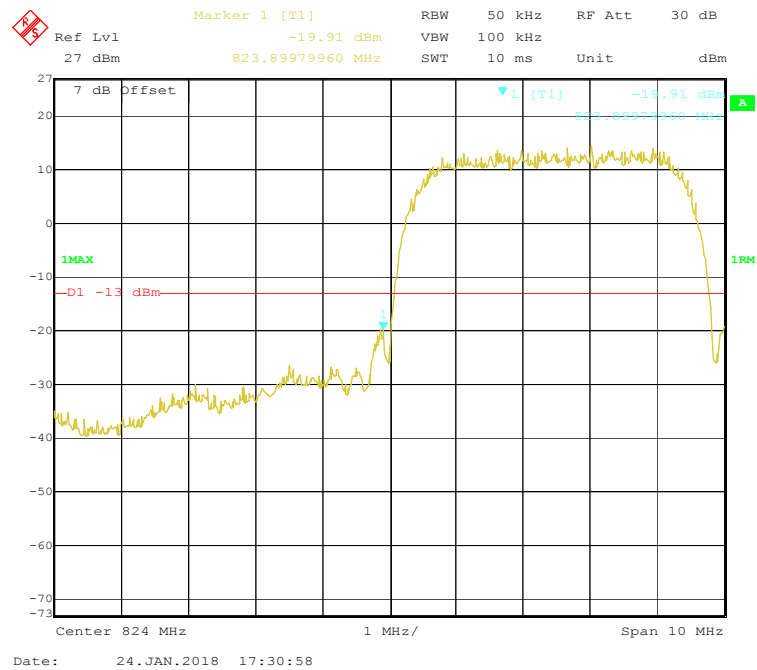
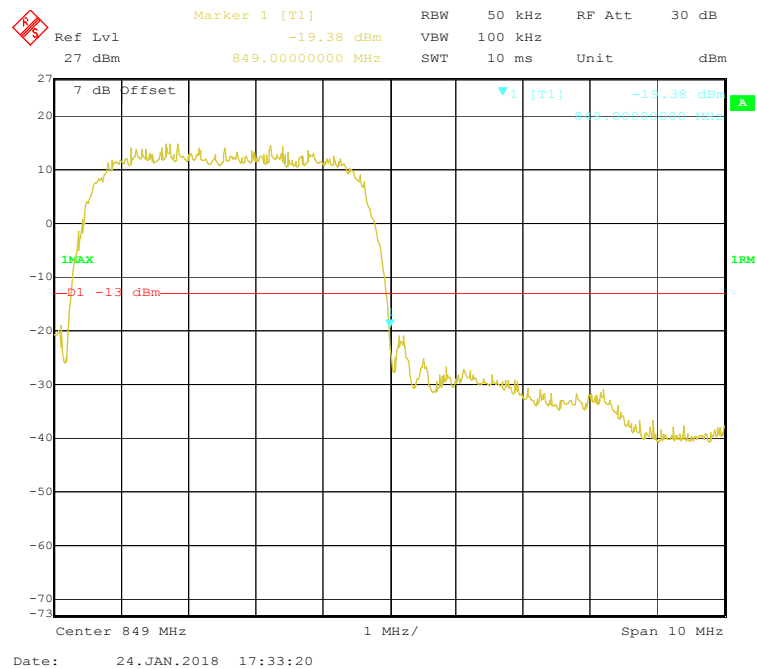
WCDMA Mode(HSDPA), Left Band Edge



WCDMA Mode(HSDPA), Right Band Edge

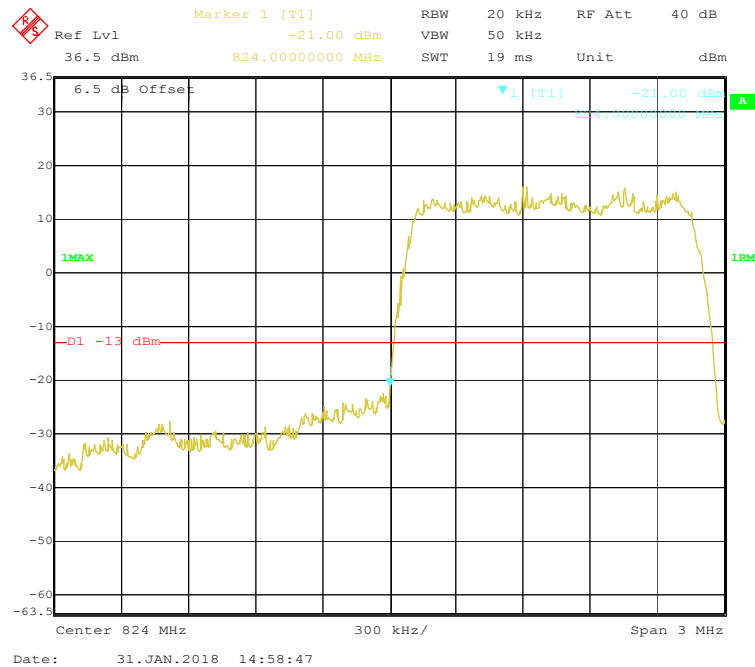


WCDMA Mode(HSUPA), Left Band Edge**WCDMA Mode(HSUPA), Right Band Edge**

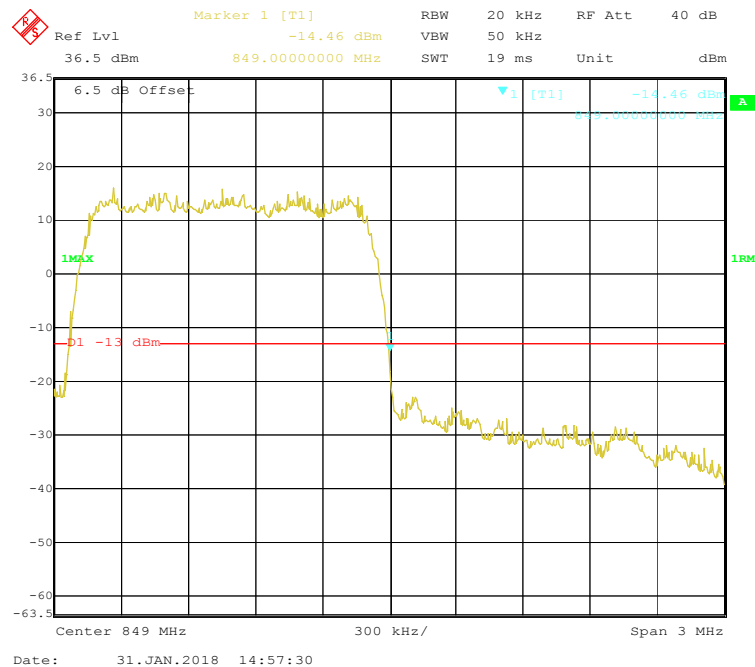
WCDMA Mode(RMC), Left Band Edge**WCDMA Mode(RMC), Right Band Edge**

CDMA850 Band:

CDMA Mode(1xRTT), Left Band Edge



CDMA Mode(1xRTT), Right Band Edge



6.5 dB Offset

Marker 1 [T1]

Ref Lvl -20.90 dBm

36.5 dBm

824.00000000 MHz

RBW 20 kHz

VBW 50 kHz

SWT 19 ms

RF Att 40 dB

Unit dBm

▼1 [T1]

-20.90 dBm

824.000000000 MHz

1MAX

D1 -13 dBm

1RM

Center 824 MHz

300 kHz/

Span 3 MHz

Date: 31.JAN.2018 14:59:45

Marker 1 [T1] RBW 20 kHz RF Att 40 dB
 Ref Lvl -16.39 dBm VBW 50 kHz
 36.5 dBm 849.00000000 MHz SWT 19 ms Unit dBm

6.5 dB Offset

1MAX

1RM

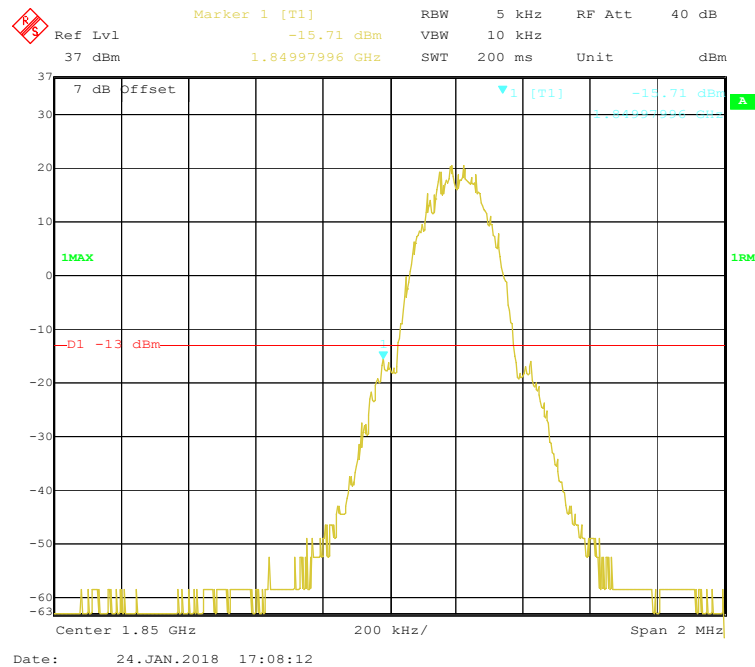
Marker 1 [T1] -16.39 dBm 849.00000000 MHz

Center 849 MHz 300 kHz/ Span 3 MHz

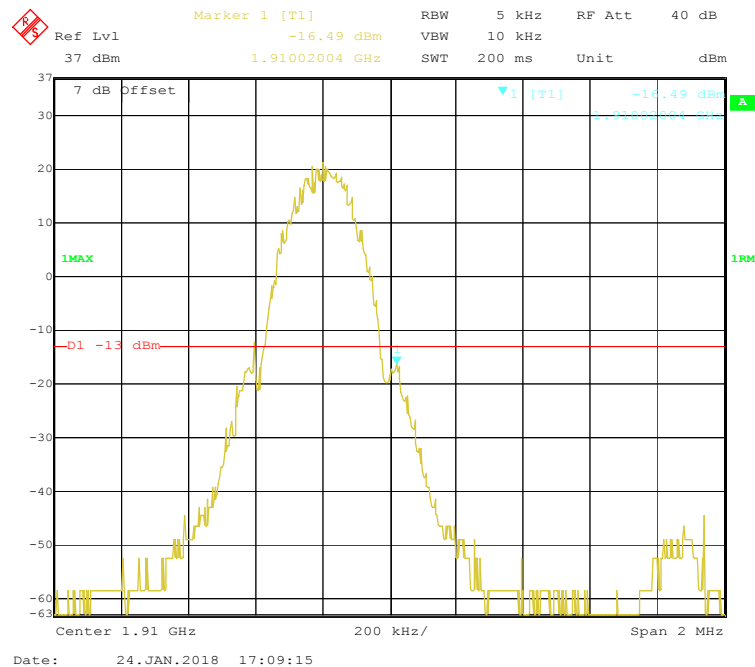
Date: 31.JAN.2018 15:00:58

PCS 1900 Band:

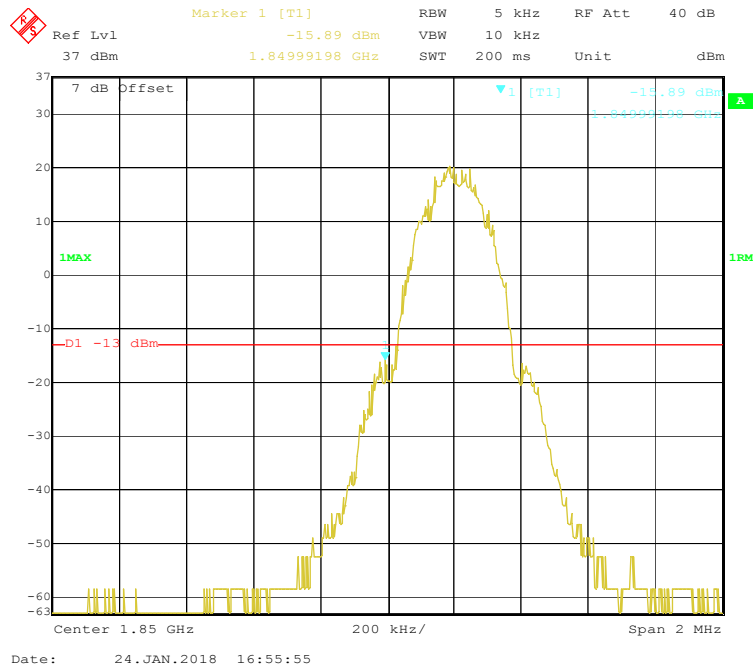
GSM Mode, Left Band Edge



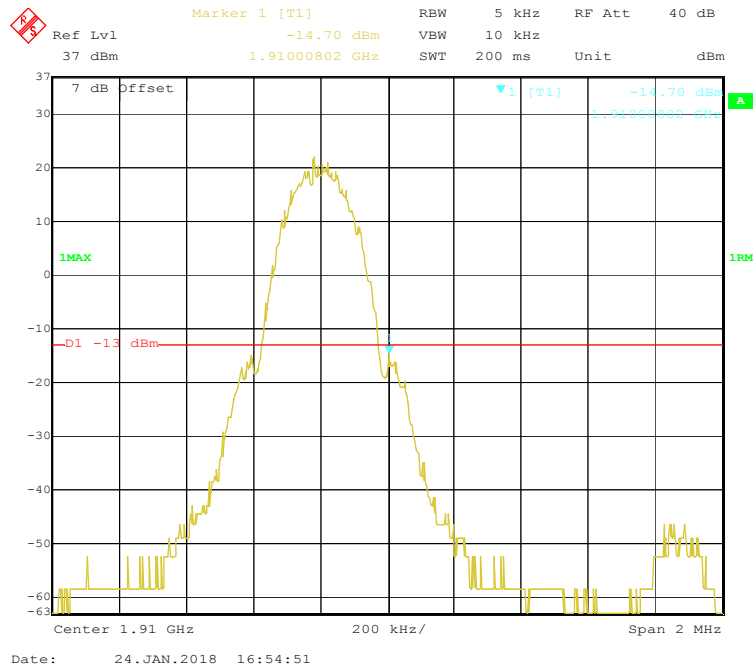
GSM Mode, Right Band Edge

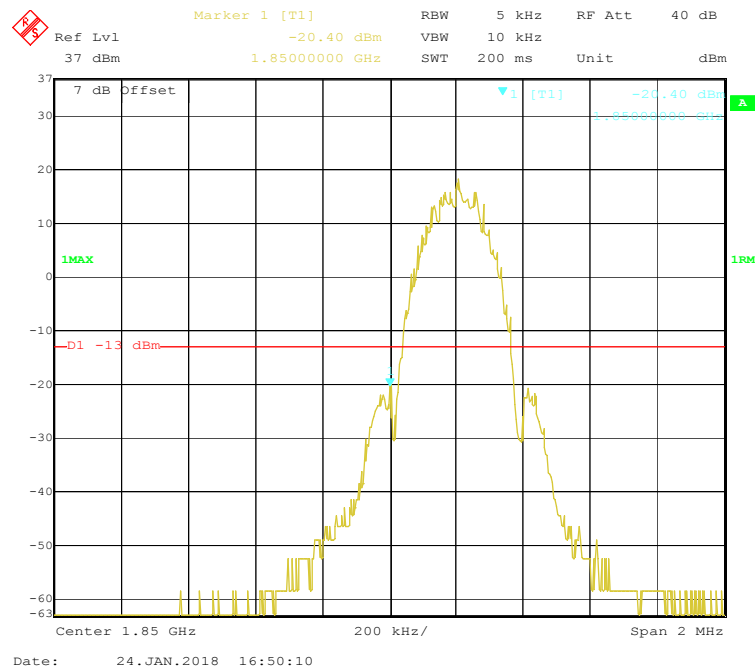
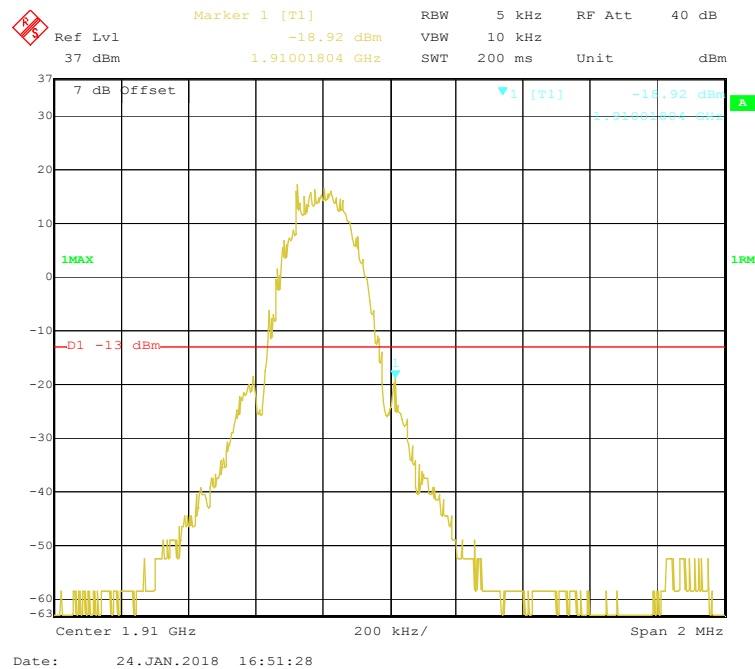


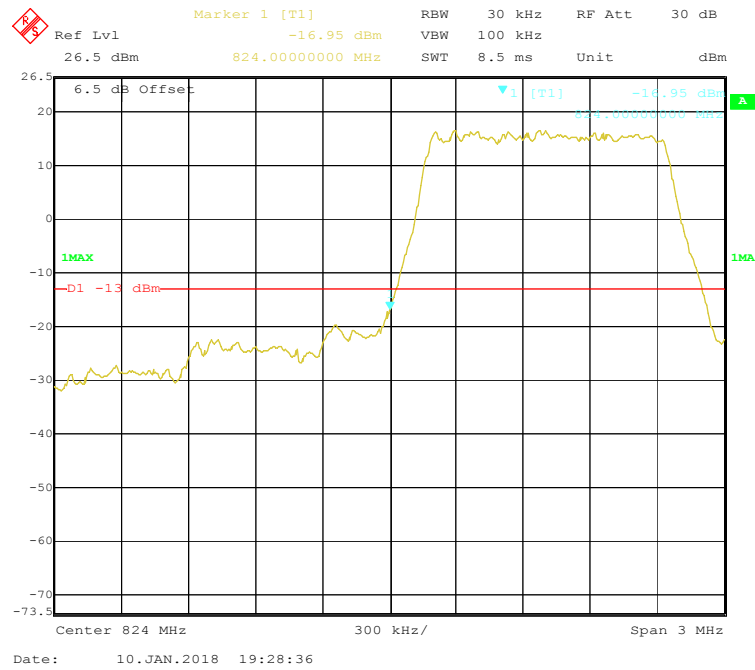
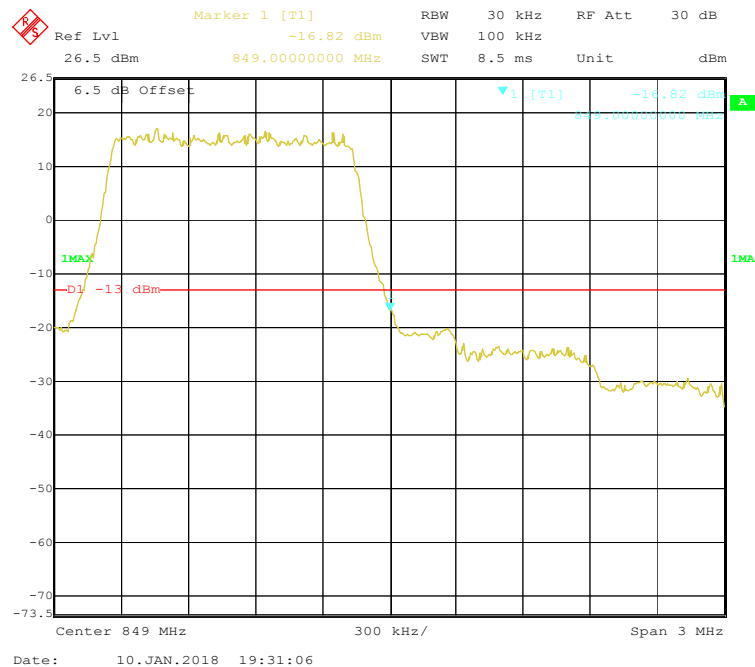
GPRS Mode, Left Band Edge



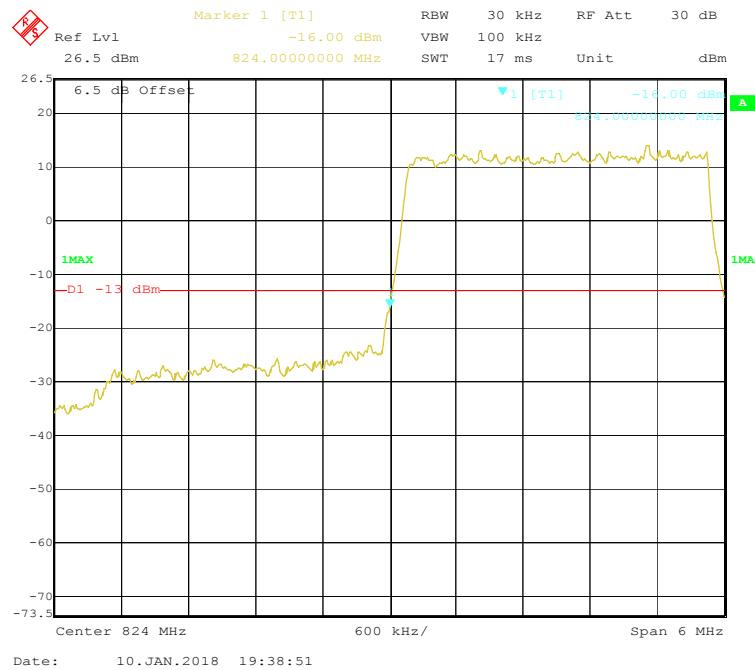
GPRS Mode, Right Band Edge



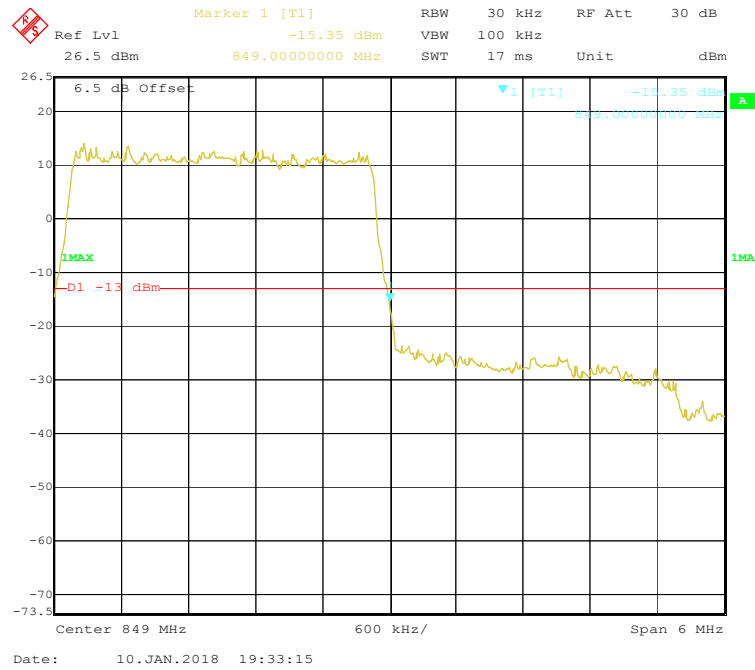
EGPRS Mode, Left Band Edge**EGPRS Mode, Right Band Edge**

LTE Band 5:**QPSK (1.4 MHz, FULL RB) - Left Band Edge****QPSK (1.4 MHz, FULL RB) - Right Band Edge**

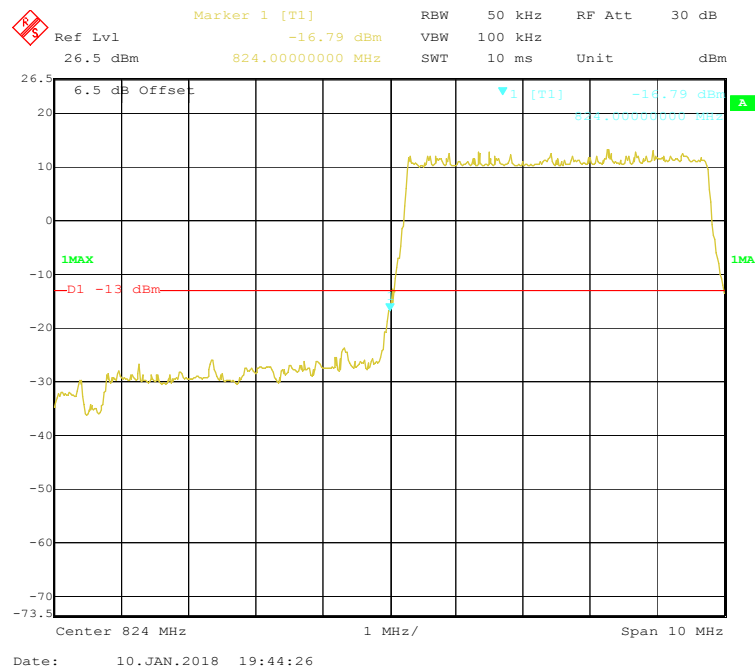
QPSK (3.0 MHz, FULL RB) - Left Band Edge



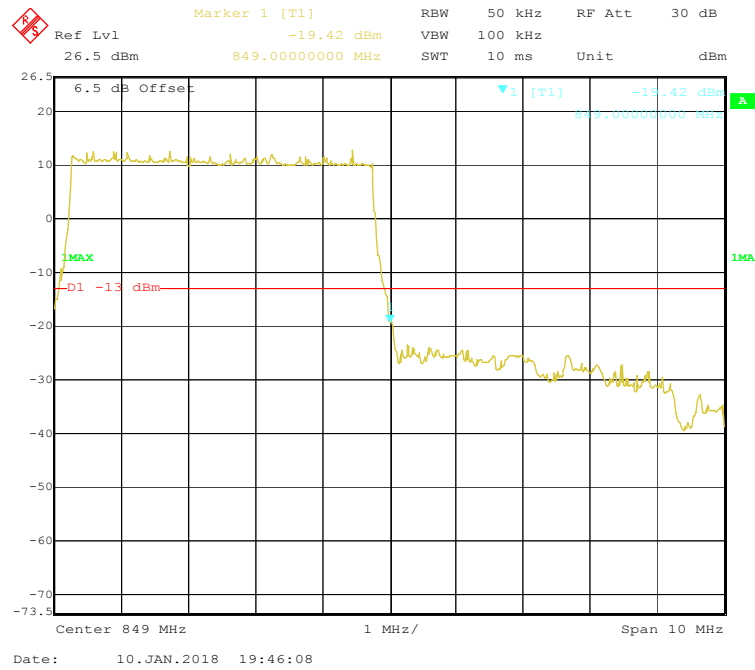
QPSK (3.0 MHz, FULL RB) - Right Band Edge



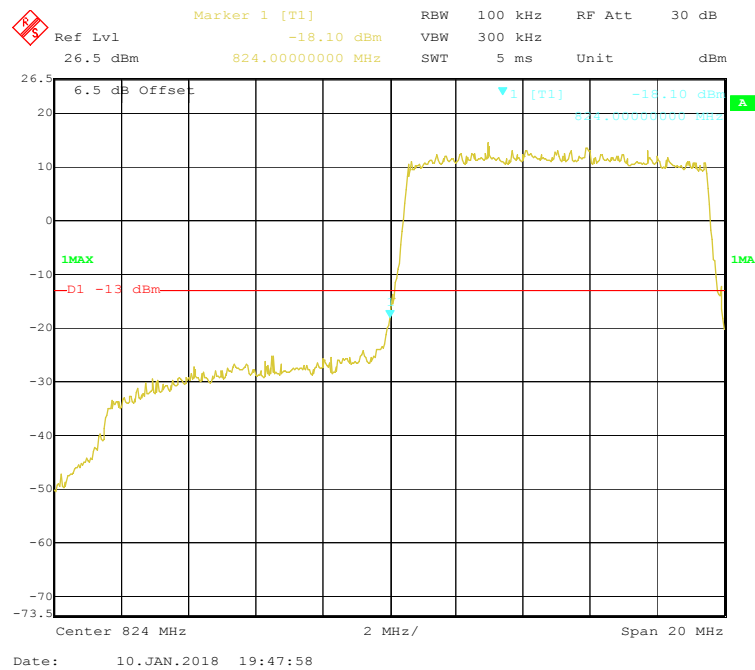
QPSK (5.0 MHz, FULL RB) - Left Band Edge



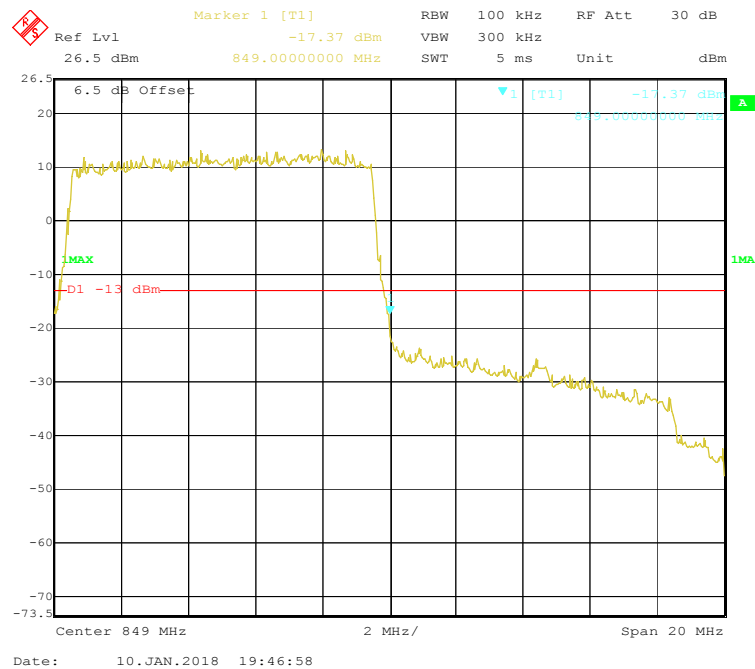
QPSK (5.0 MHz, FULL RB) - Right Band Edge



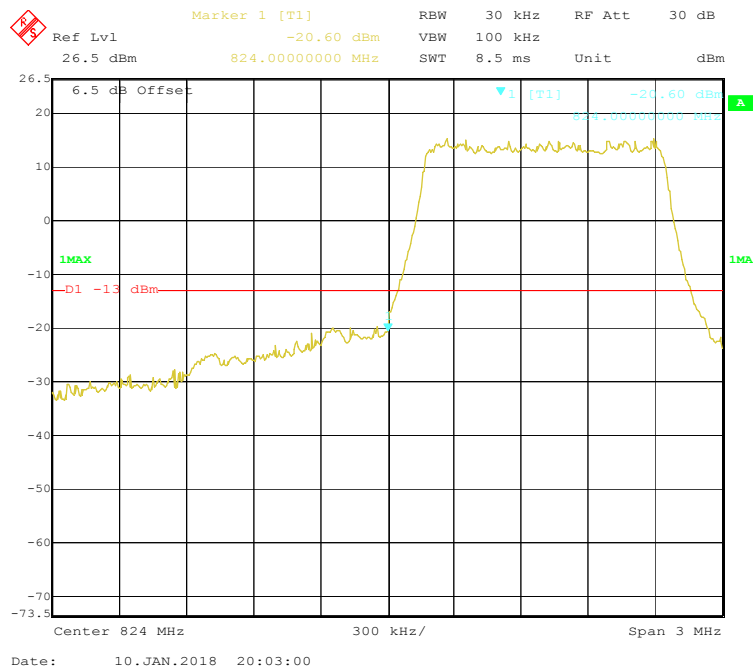
QPSK (10.0 MHz, FULL RB) - Left Band Edge



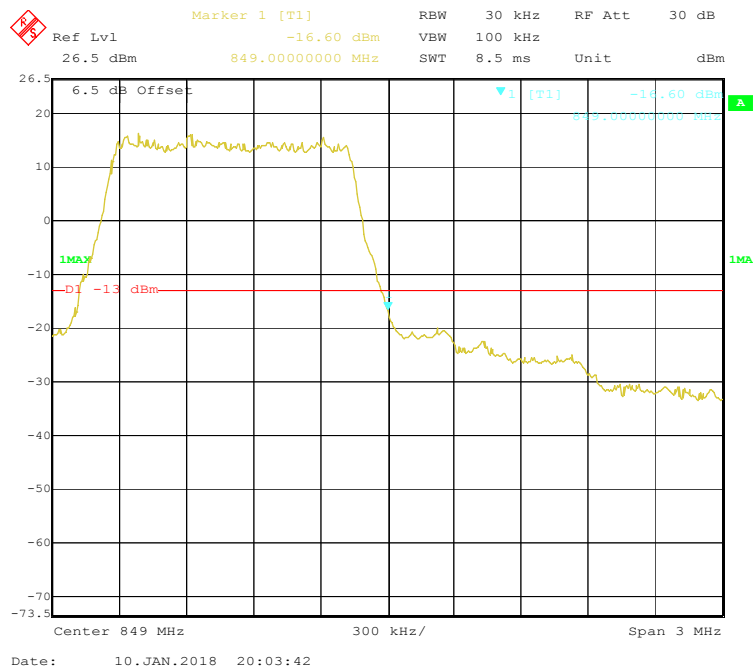
QPSK (10.0 MHz, FULL RB) - Right Band Edge



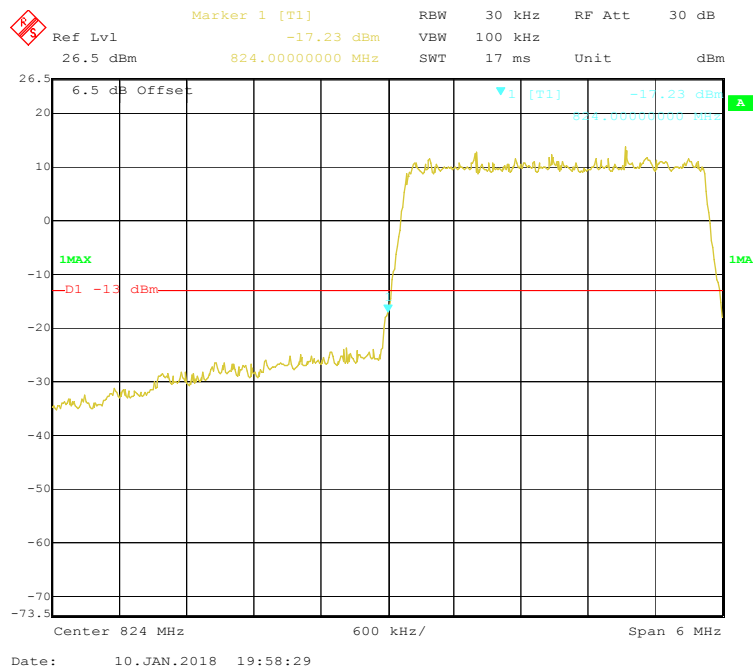
16-QAM (1.4 MHz, FULL RB) - Left Band Edge



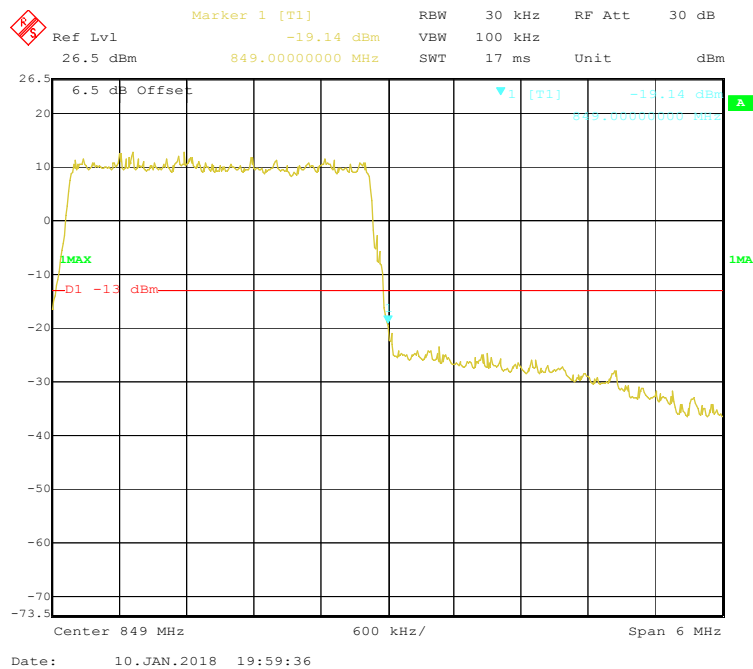
16-QAM (1.4 MHz, FULL RB) - Right Band Edge



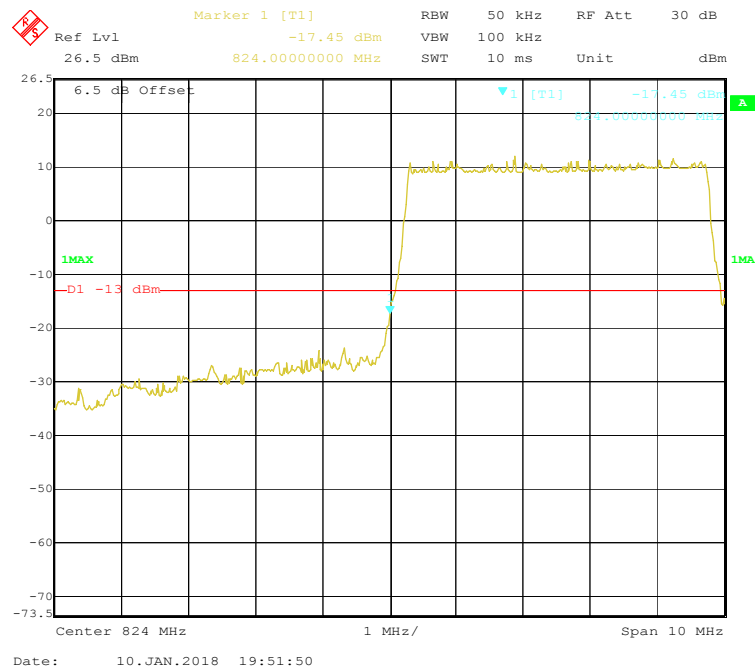
16-QAM (3.0 MHz, FULL RB) - Left Band Edge



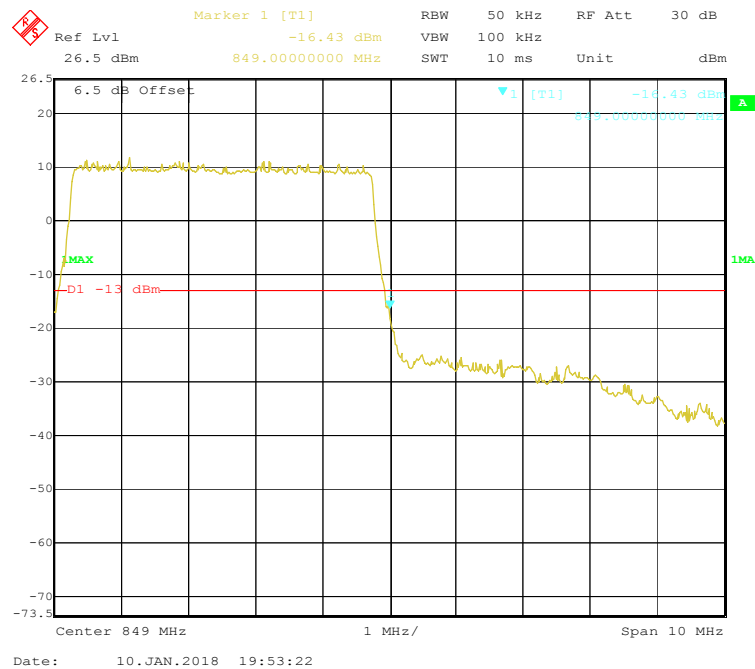
16-QAM (3.0 MHz, FULL RB) - Right Band Edge



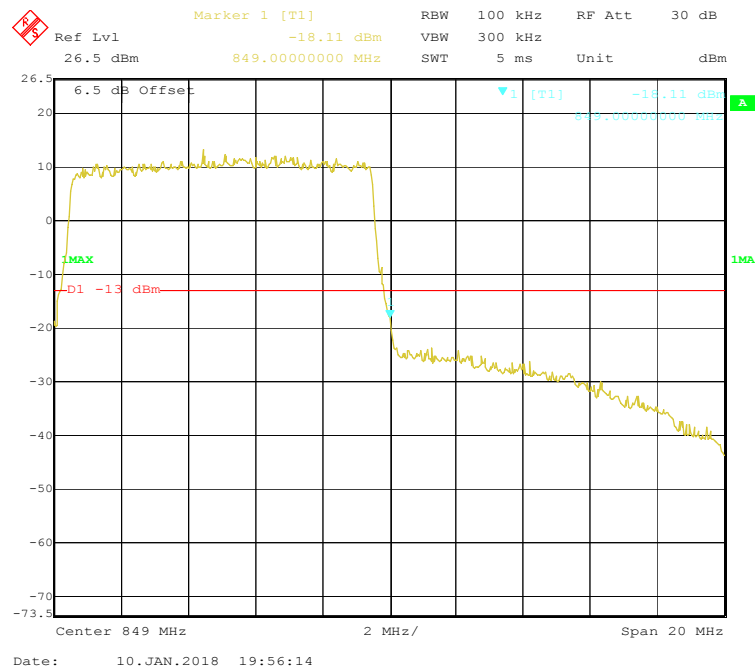
16-QAM (5.0 MHz, FULL RB) - Left Band Edge



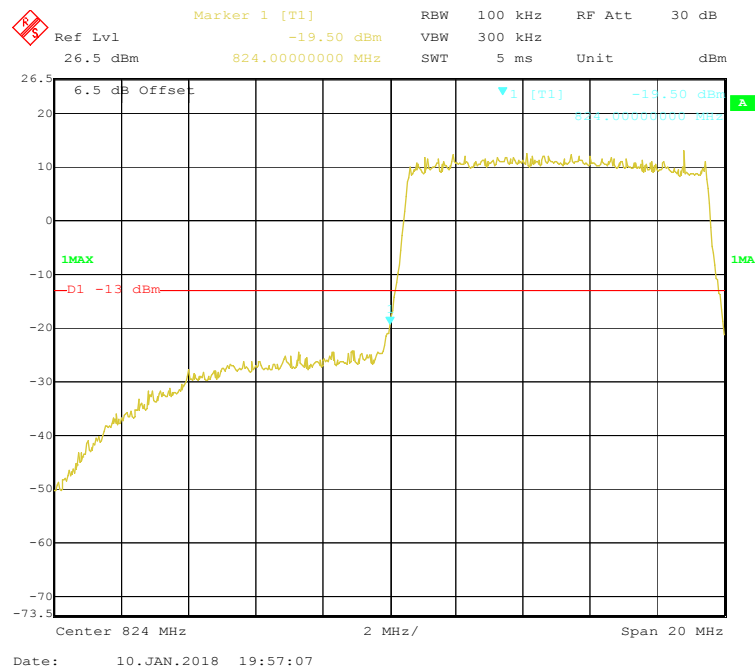
16-QAM (5.0 MHz, FULL RB) - Right Band Edge

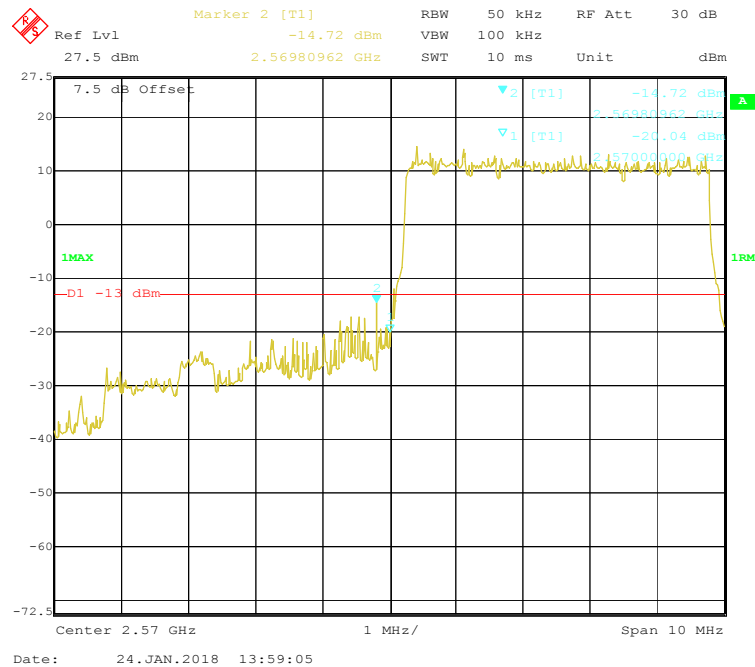
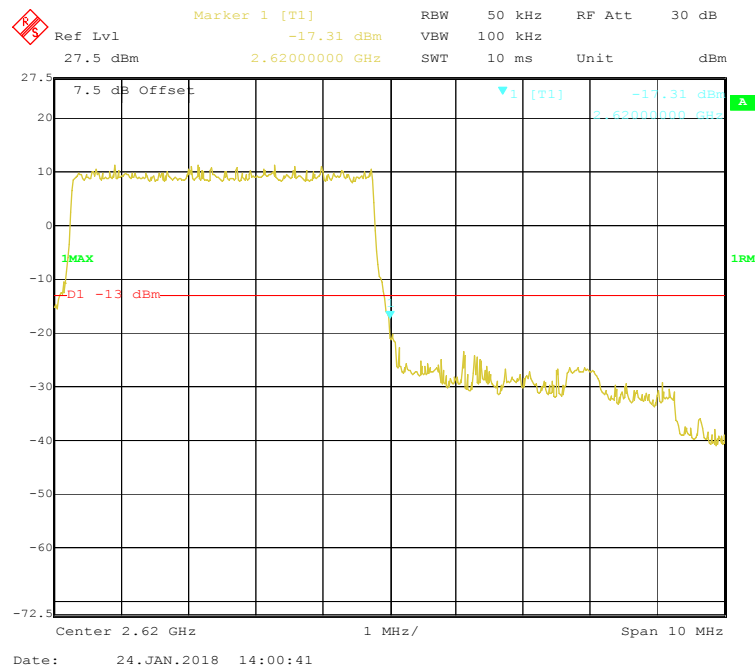


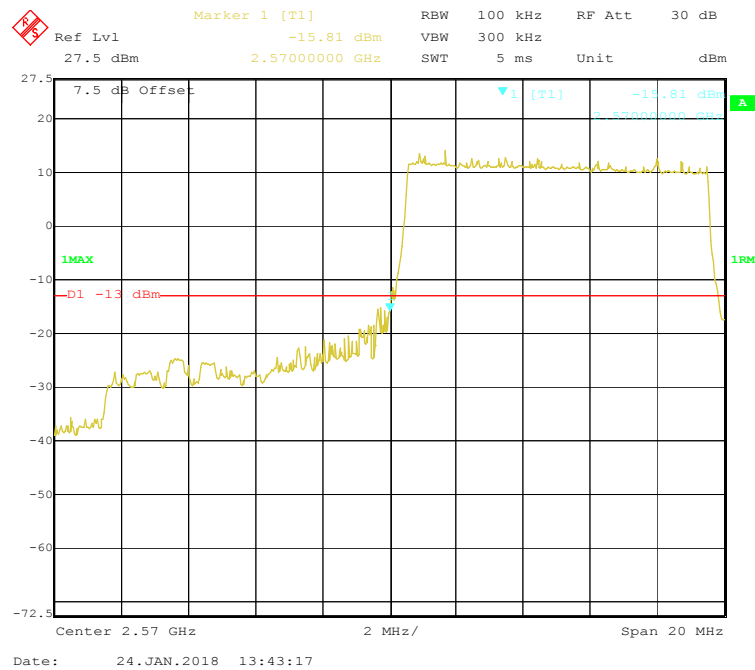
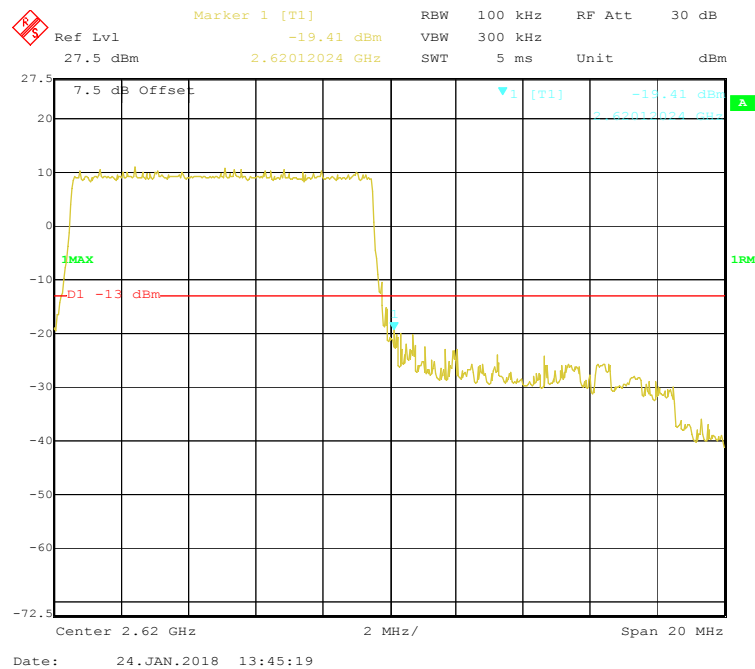
16-QAM (10.0 MHz, FULL RB) - Left Band Edge

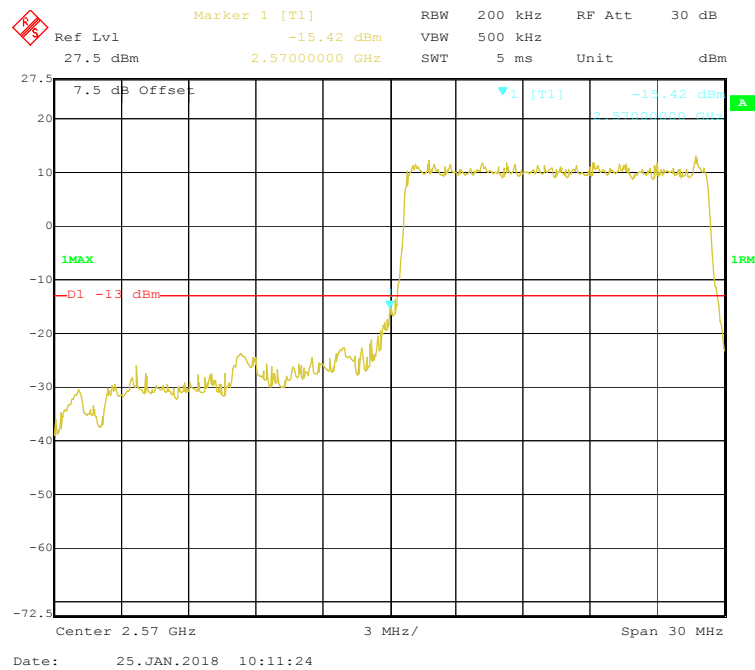
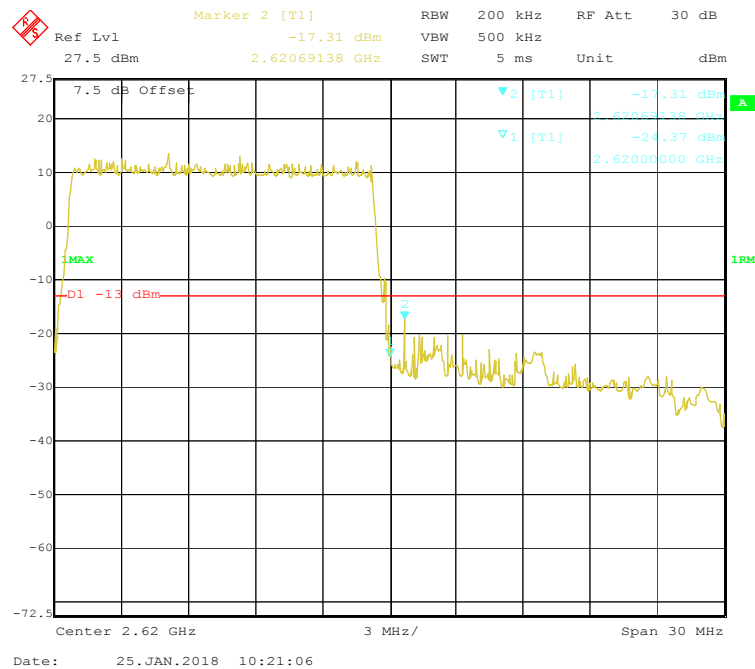


16-QAM (10.0 MHz, FULL RB) - Right Band Edge

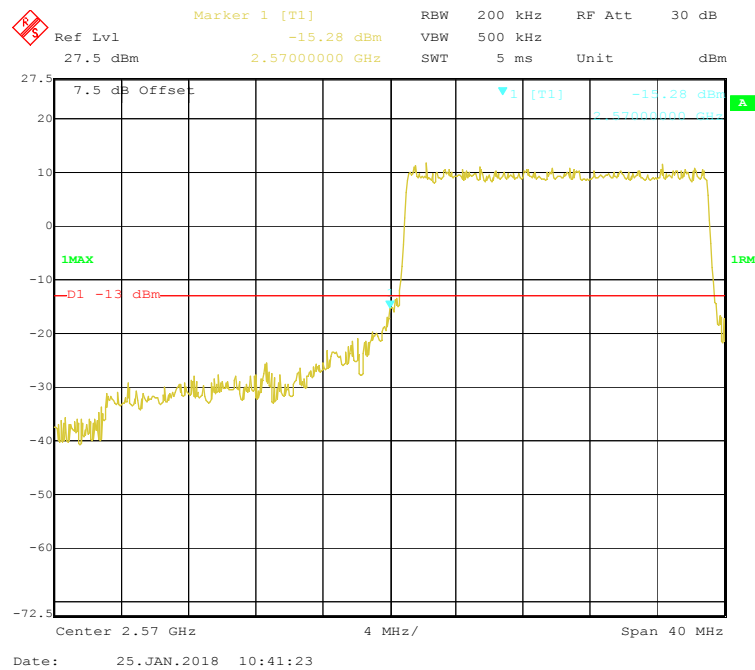


LTE Band 38:**QPSK (5 MHz, FULL RB) - Left Band Edge****QPSK (5 MHz, FULL RB) - Right Band Edge**

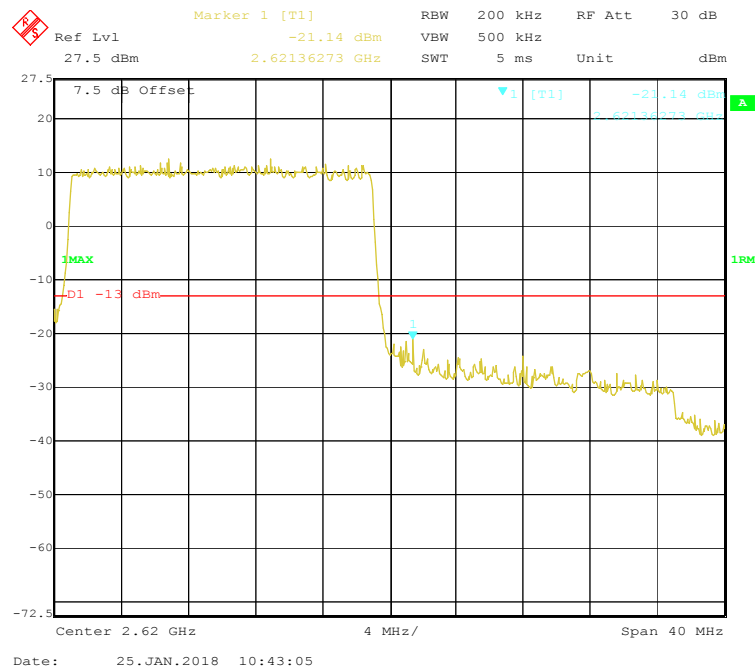
QPSK (10 MHz, FULL RB) - Left Band Edge**QPSK (10 MHz, FULL RB) - Right Band Edge**

QPSK (15 MHz, FULL RB) - Left Band Edge**QPSK (15 MHz, FULL RB) - Right Band Edge**

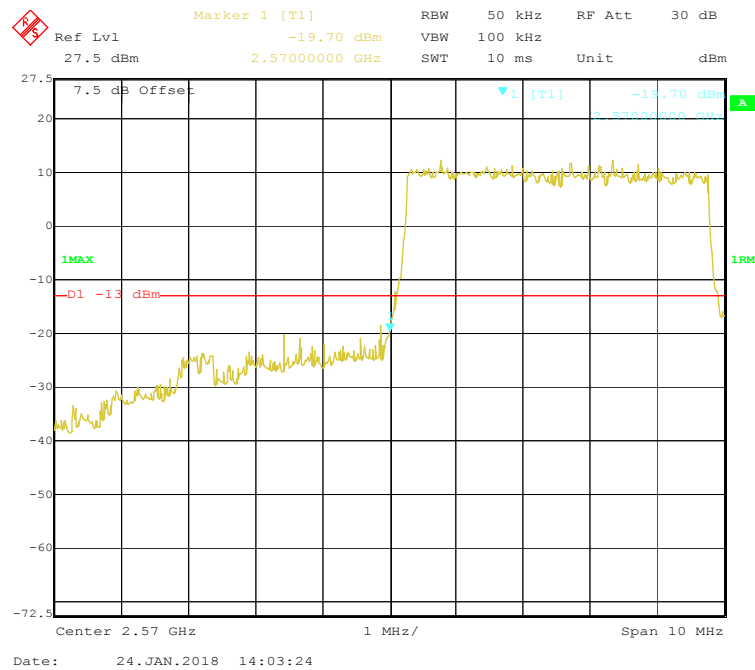
QPSK (20 MHz, FULL RB) - Left Band Edge



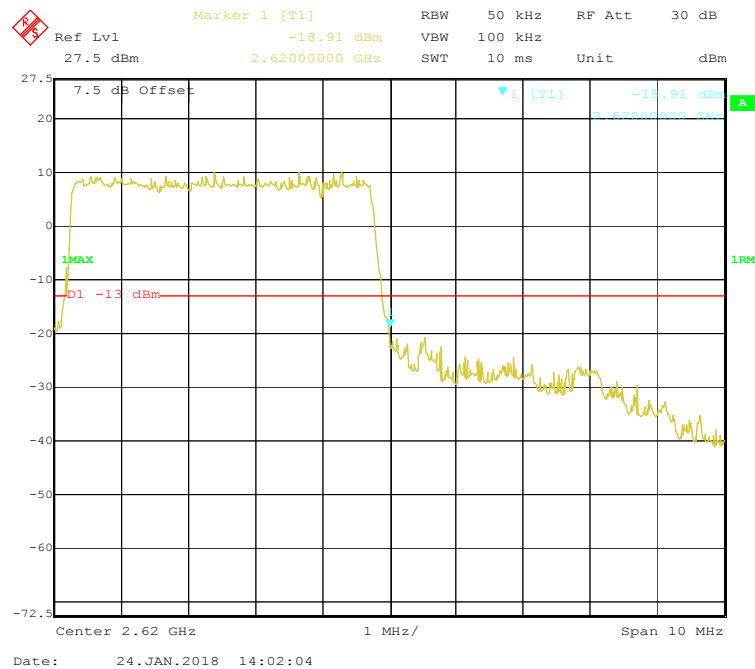
QPSK (20 MHz, FULL RB) - Right Band Edge

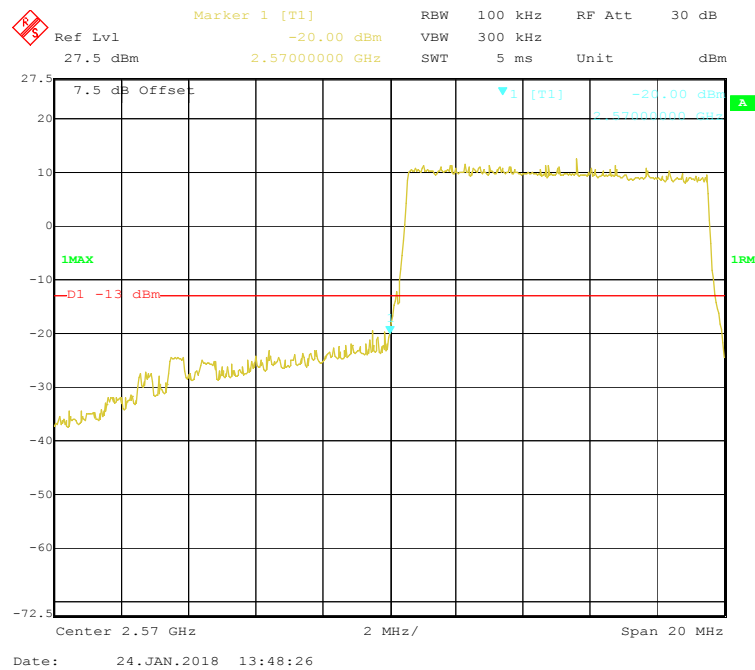
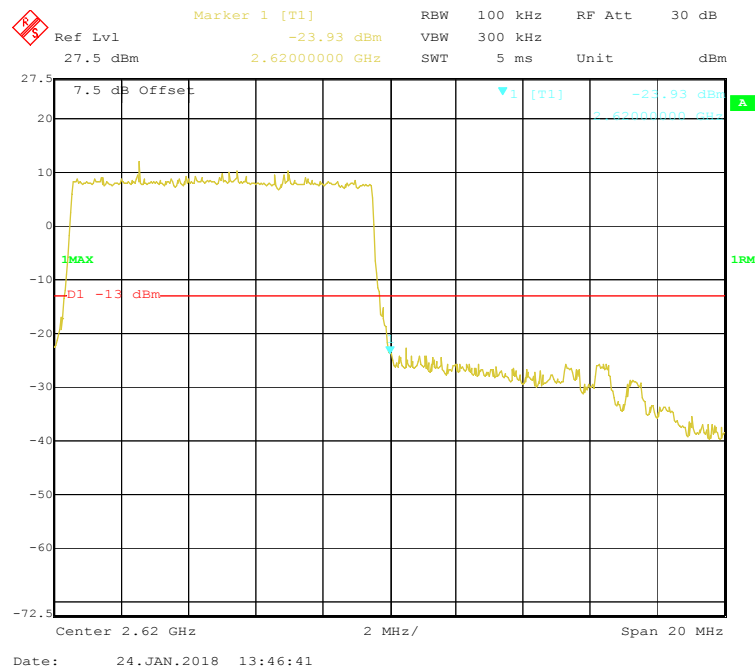


16QAM (5 MHz, FULL RB) - Left Band Edge



16QAM (5 MHz, FULL RB) - Right Band Edge



16QAM (10 MHz, FULL RB) - Left Band Edge**16QAM (10 MHz, FULL RB) - Right Band Edge**

Marker 2 [T1]
 Ref Lvl -15.81 dBm
 27.5 dBm 2.56978958 GHz
 RBW 200 kHz RF Att 30 dB
 VBW 500 kHz
 SWT 5 ms Unit dBm

7.5 dB Offset
 1MAX
 D1 -13 dBm
 -15.81 dBm
 -15.93 dBm
 2.56978958 GHz
 2.57000000 GHz
 1RM

Center 2.57 GHz 3 MHz/
 Span 30 MHz
 Date: 25.JAN.2018 10:24:46

Marker 1 [T1]
 Ref Lvl -19.06 dBm
 27.5 dBm 2.62000000 GHz
 RBW 200 kHz RF Att 30 dB
 VBW 500 kHz
 SWT 5 ms Unit dBm

7.5 dB Offset
 -19.06 dBm
 2.62000000 GHz
 1MAX
 -13 dBm
 1RM

Center 2.62 GHz 3 MHz/
 Span 30 MHz

Date: 25.JAN.2018 10:22:50

Marker 1 [T1]
 Ref Lvl -19.37 dBm
 27.5 dBm 2.5700000 GHz
 RBW 200 kHz
 VBW 500 kHz
 Unit dBm
 RF Att 30 dB
 SWT 5 ms

7.5 dB Offset
 1MAX
 D1 -13 dBm
 -19.37 dBm
 2.5700000 GHz

Center 2.57 GHz
 4 MHz/
 Span 40 MHz

Date: 25.JAN.2018 10:46:53

REF Lvl 27.5 dBm
 Ref Lvl -20.98 dBm
 2.6200000 GHz
 RBW 200 kHz
 VBW 500 kHz
 SWT 5 ms
 RF Att 30 dB
 Unit dBm

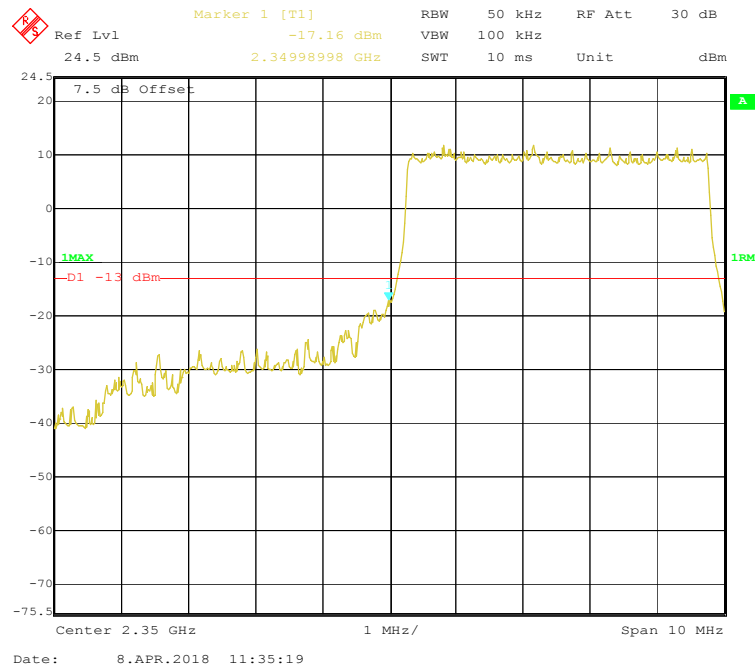
7.5 dB Offset
 1MAX
 D1 -13 dBm
 -20.98 dBm
 1RM

Center 2.62 GHz
 4 MHz/
 Span 40 MHz

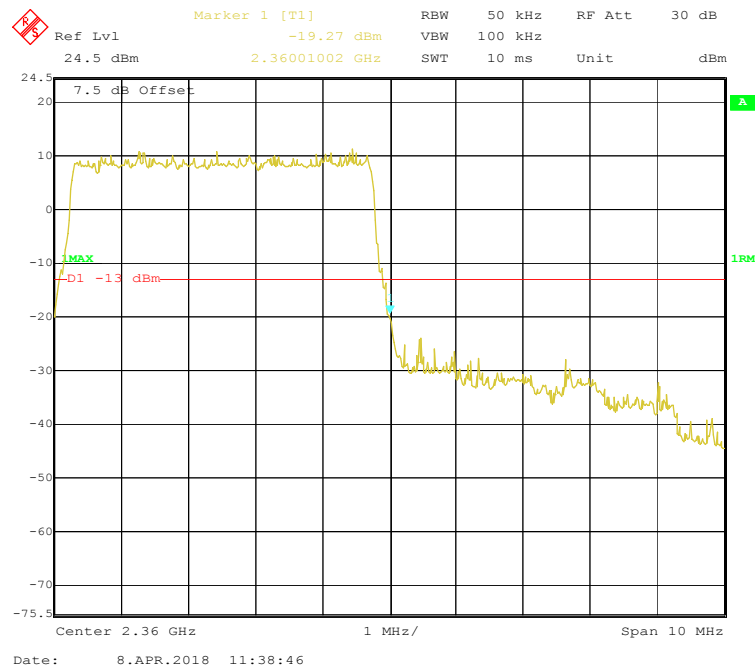
Date: 25.JAN.2018 10:44:50

LTE Band 40:

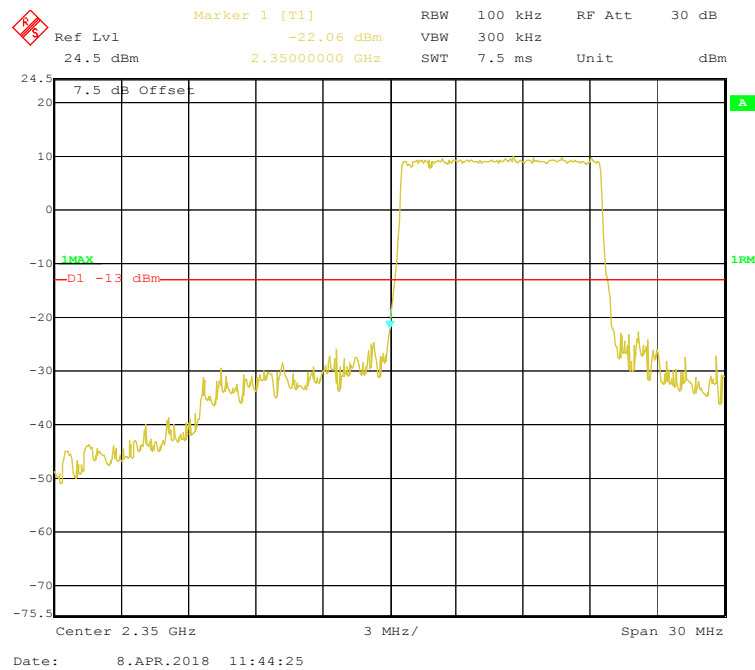
QPSK (5 MHz, FULL RB) - Left Band Edge



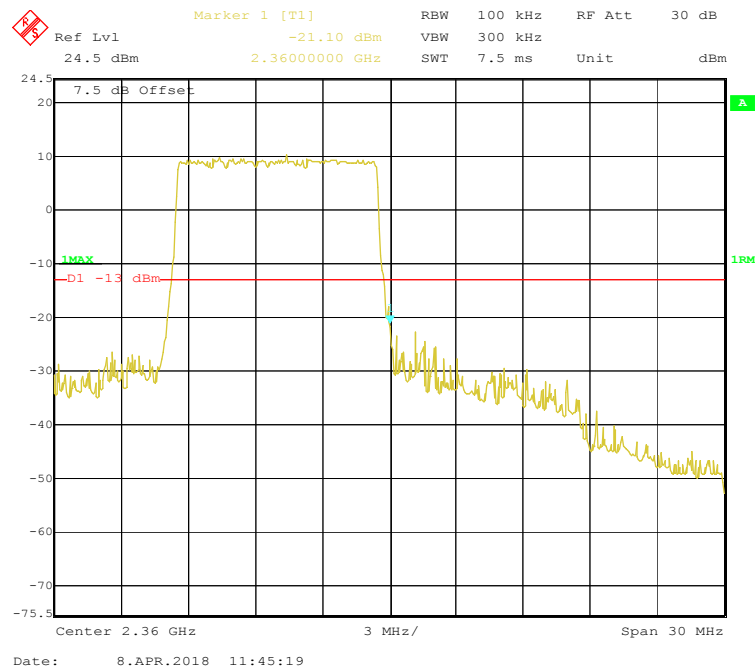
QPSK (5 MHz, FULL RB) - Right Band Edge



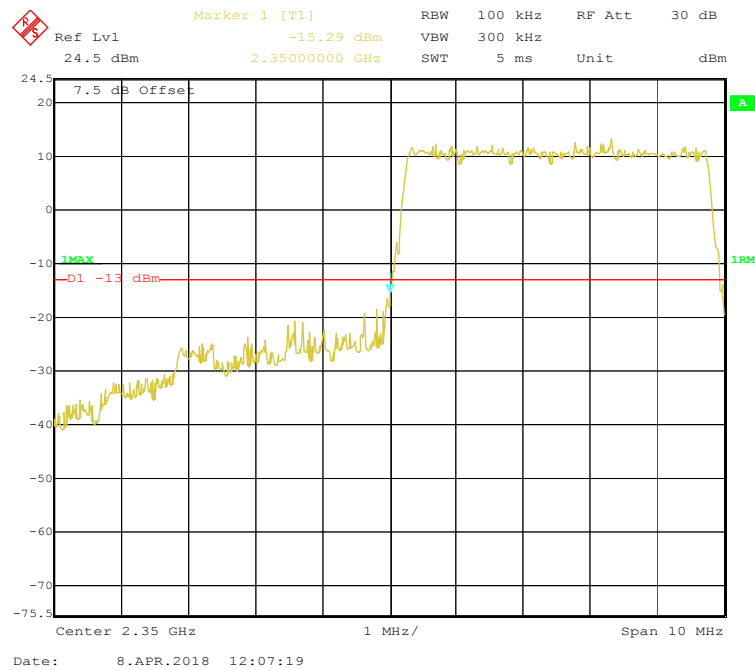
QPSK (10 MHz, FULL RB) - Left Band Edge



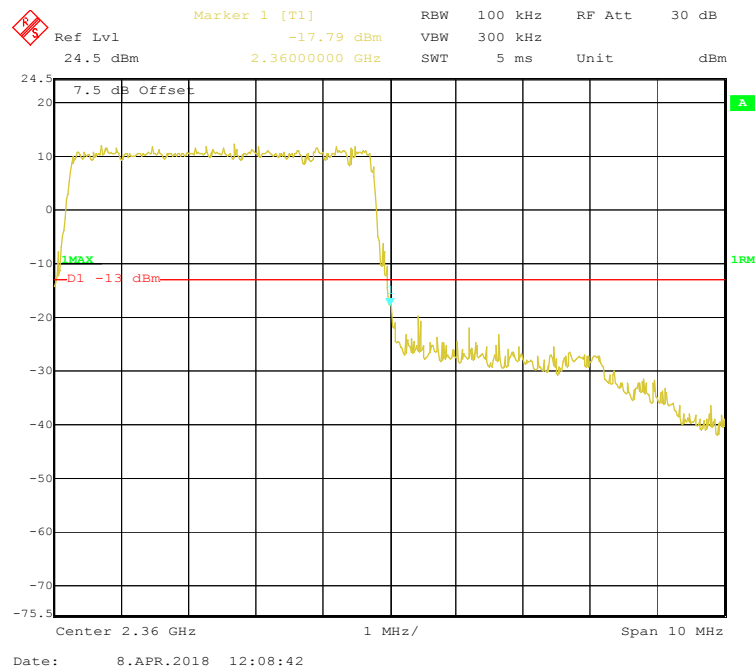
QPSK (10 MHz, FULL RB) - Right Band Edge



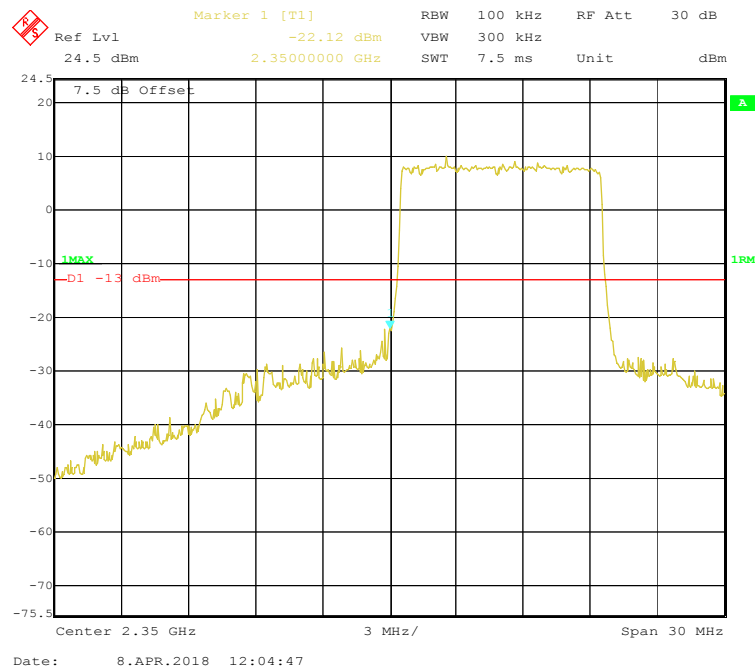
16QAM (5 MHz, FULL RB) - Left Band Edge



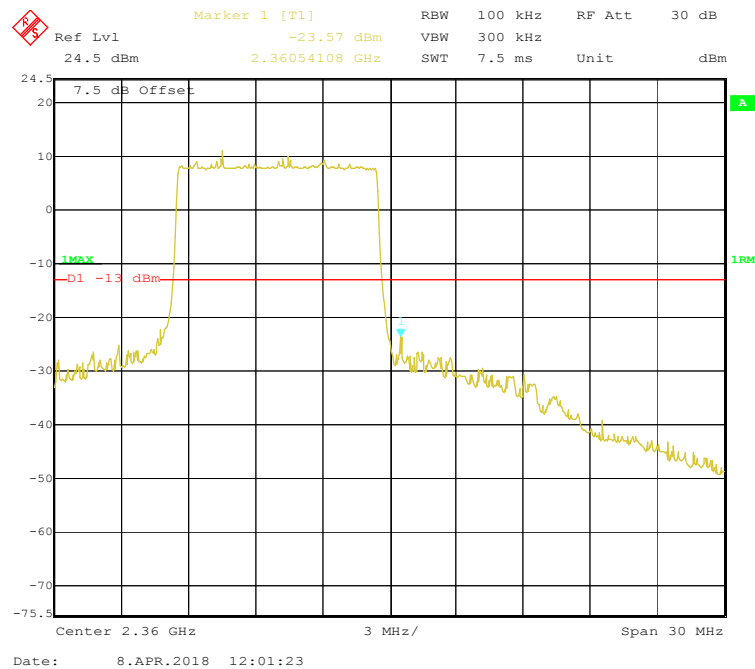
16QAM (5 MHz, FULL RB) - Right Band Edge



16QAM (10 MHz, FULL RB) - Left Band Edge

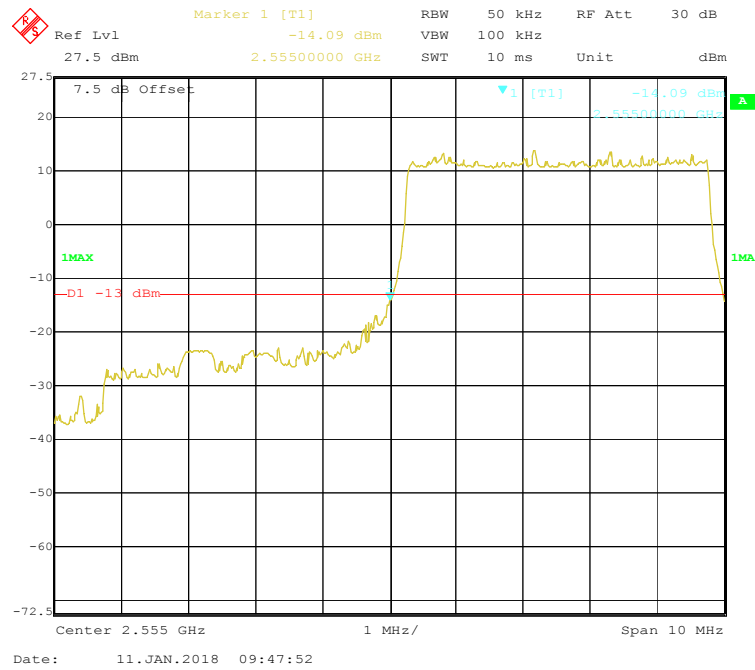


16QAM (10 MHz, FULL RB) - Right Band Edge

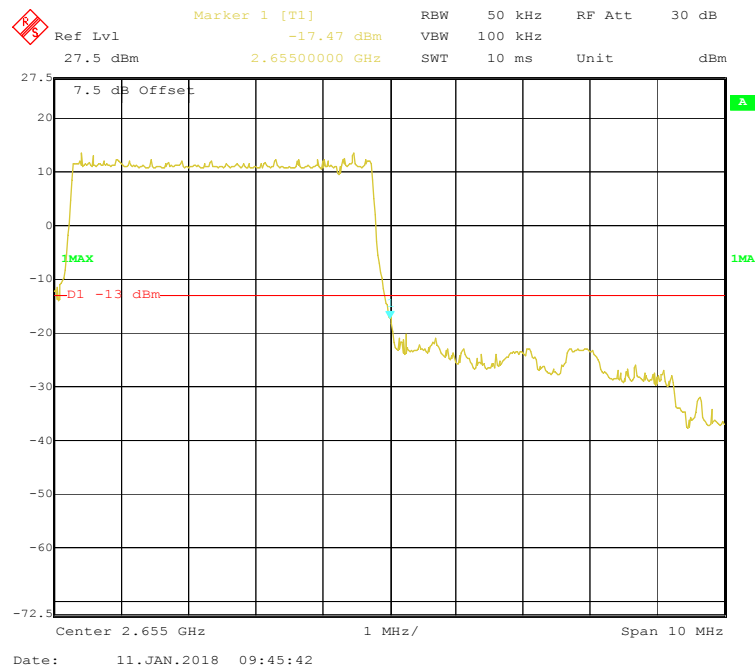


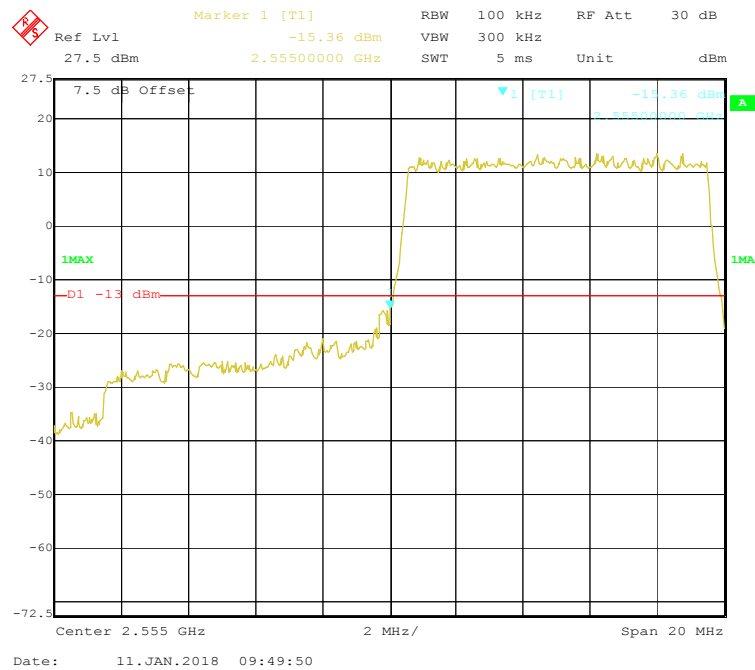
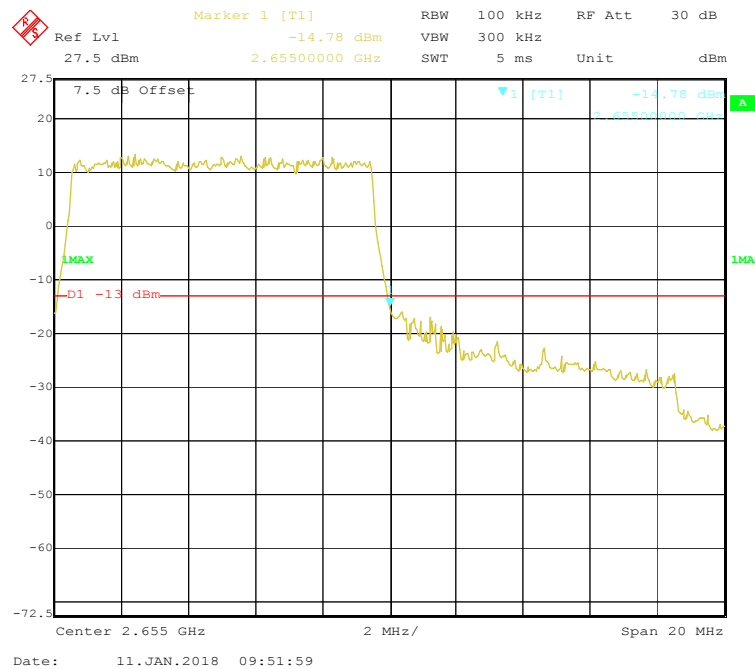
LTE Band 41:

QPSK (5 MHz, FULL RB) - Left Band Edge

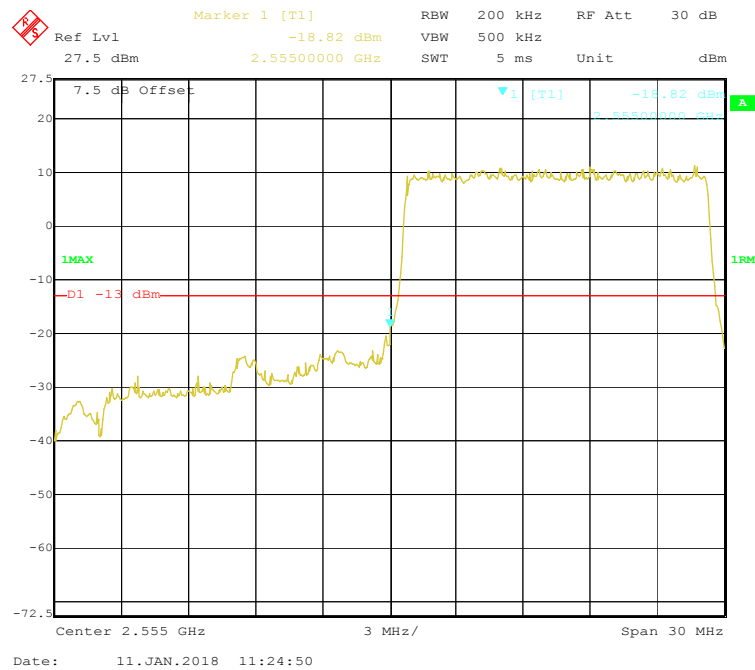


QPSK (5 MHz, FULL RB) - Right Band Edge

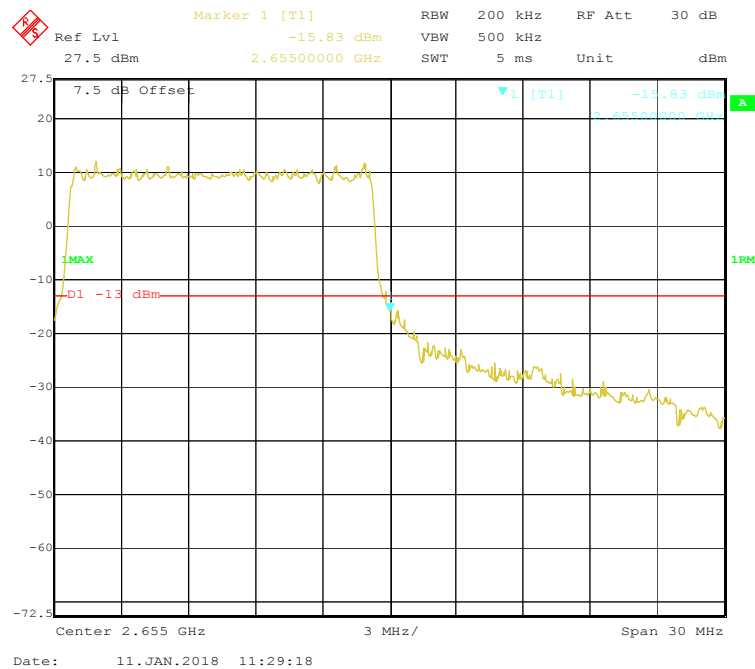


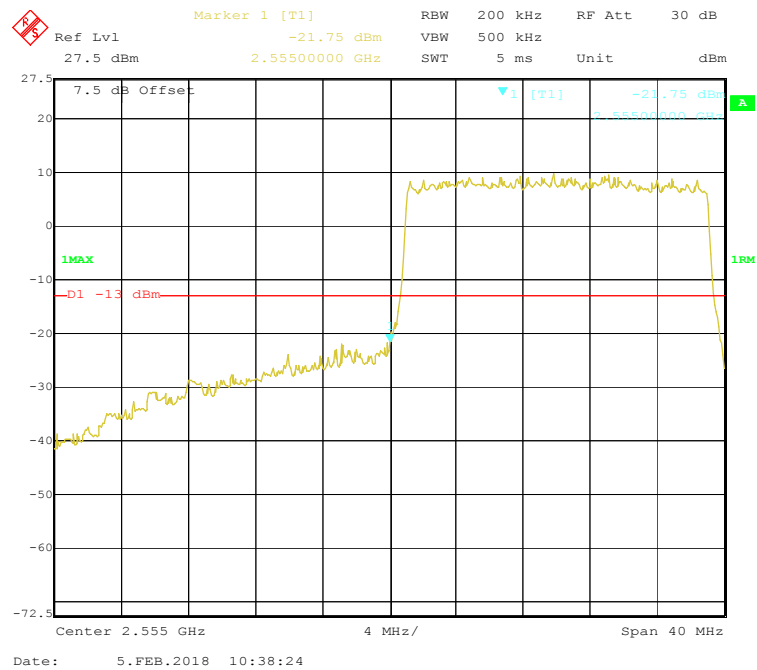
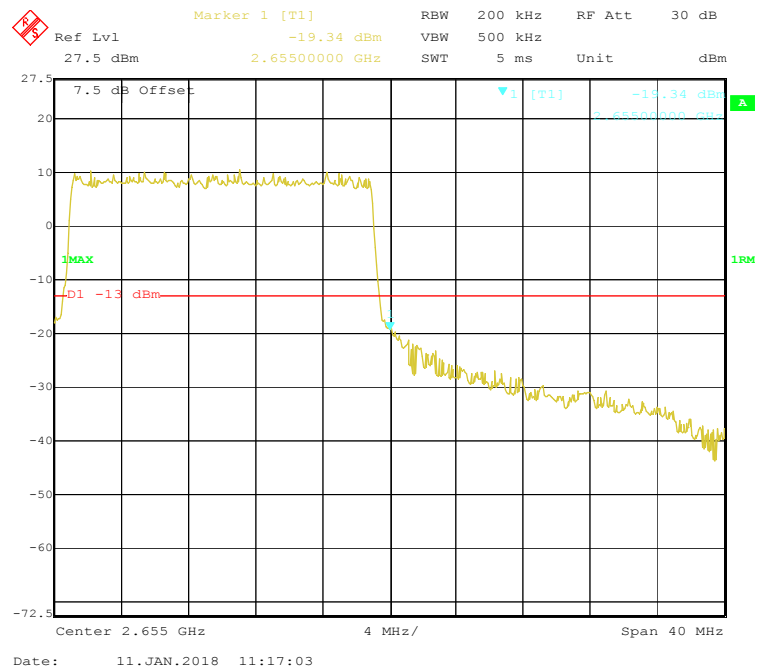
QPSK (10 MHz, FULL RB) - Left Band Edge**QPSK (10 MHz, FULL RB) - Right Band Edge**

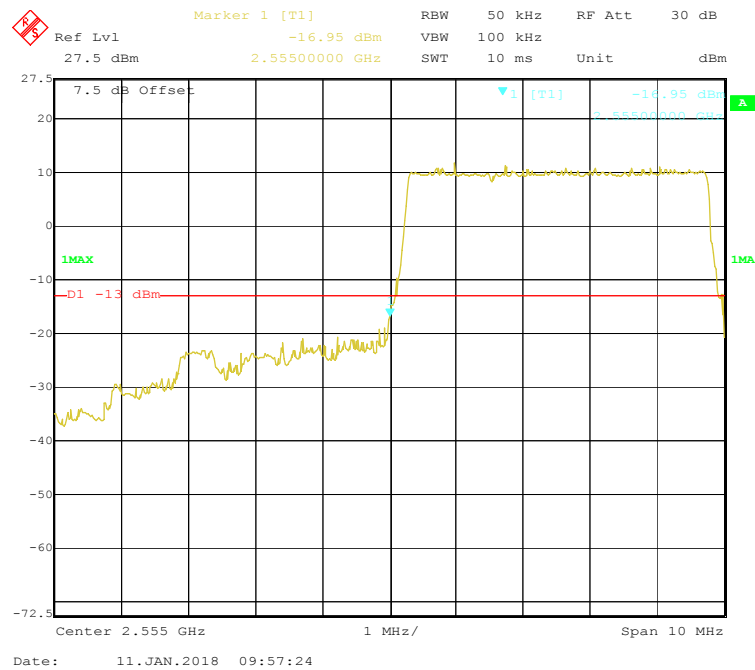
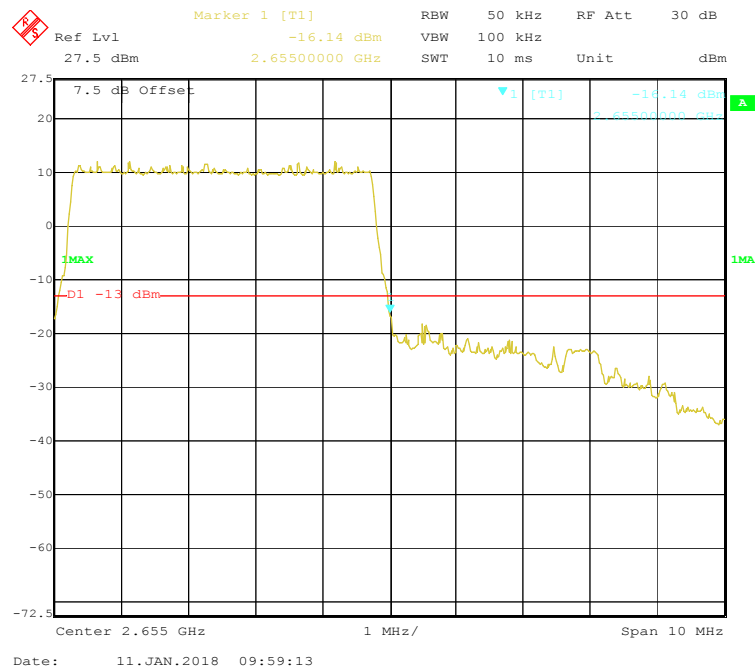
QPSK (15MHz, FULL RB) - Left Band Edge



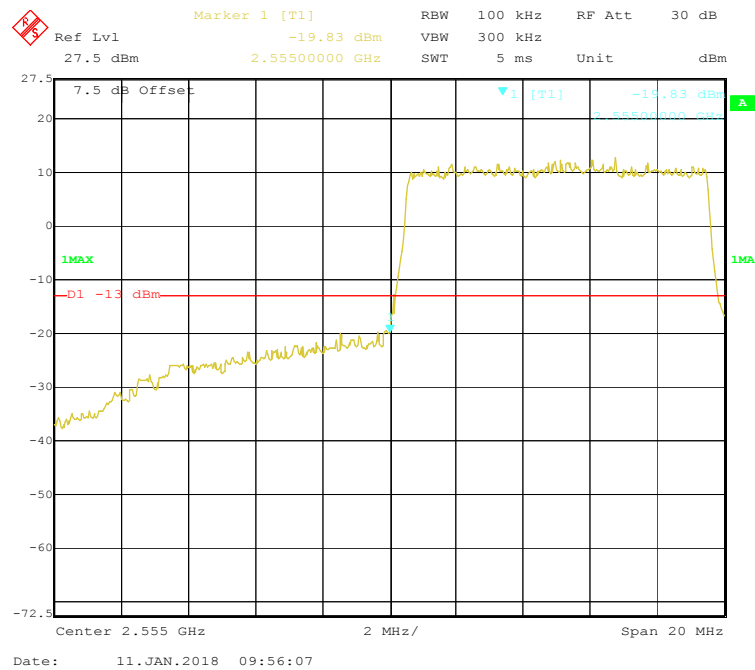
QPSK (15 MHz, FULL RB) - Right Band Edge



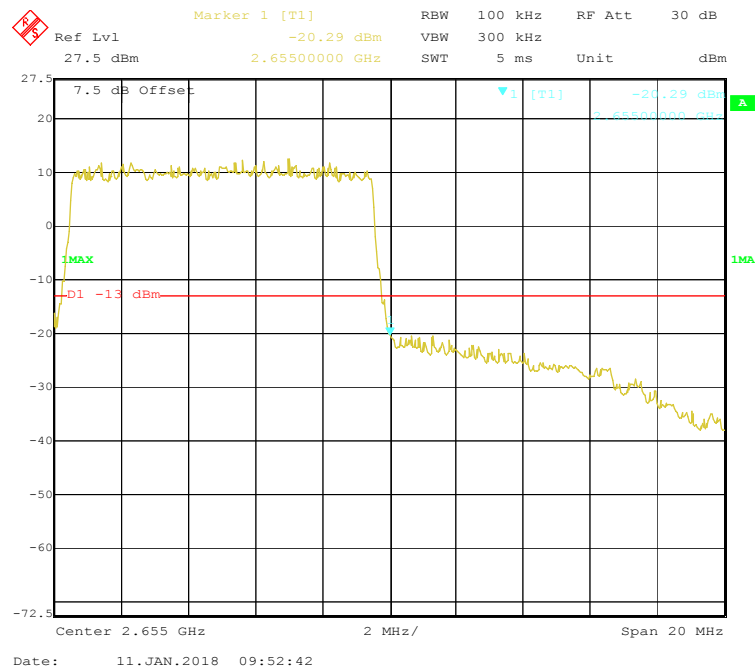
QPSK (20MHz, FULL RB) - Left Band Edge**QPSK (20 MHz, FULL RB) - Right Band Edge**

16-QAM (5MHz, FULL RB) - Left Band Edge**16-QAM (5MHz, FULL RB) - Right Band Edge**

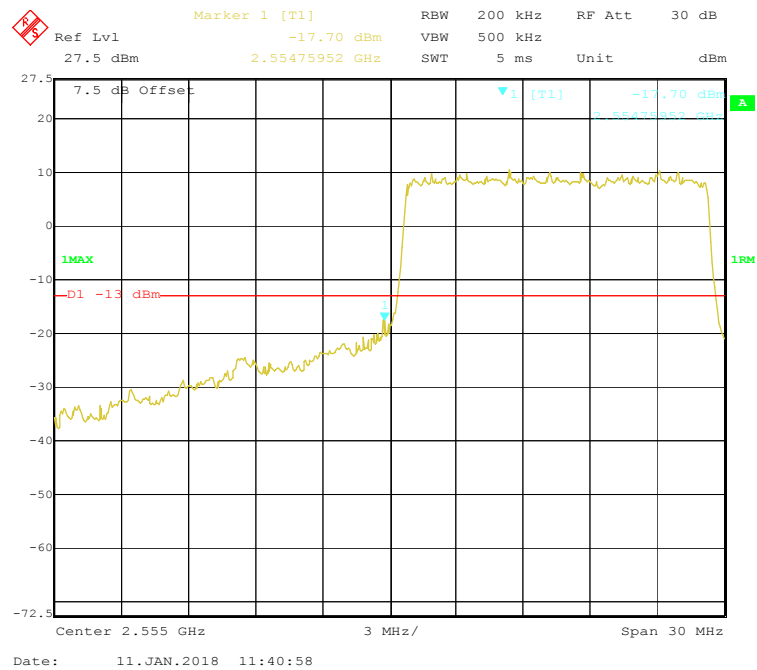
16-QAM (10 MHz, FULL RB) - Left Band Edge



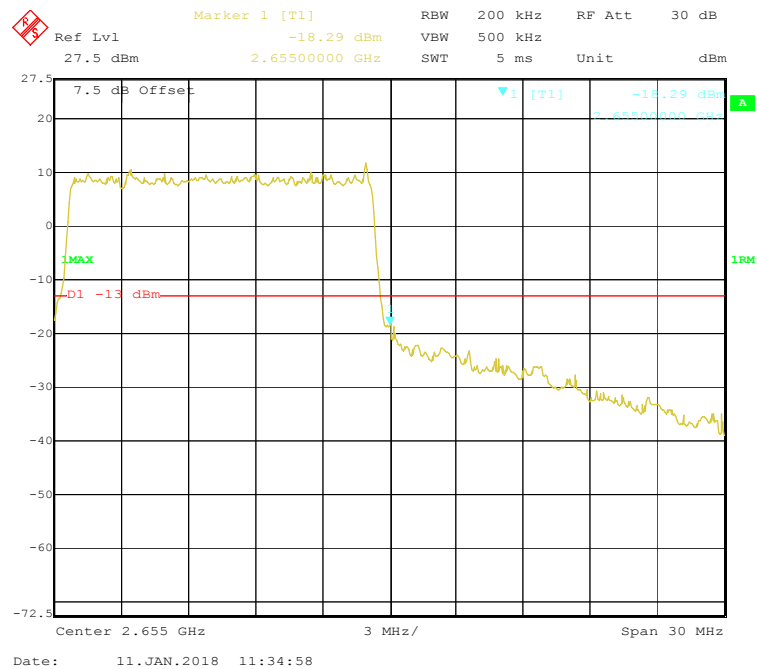
16-QAM (10 MHz, FULL RB) - Right Band Edge



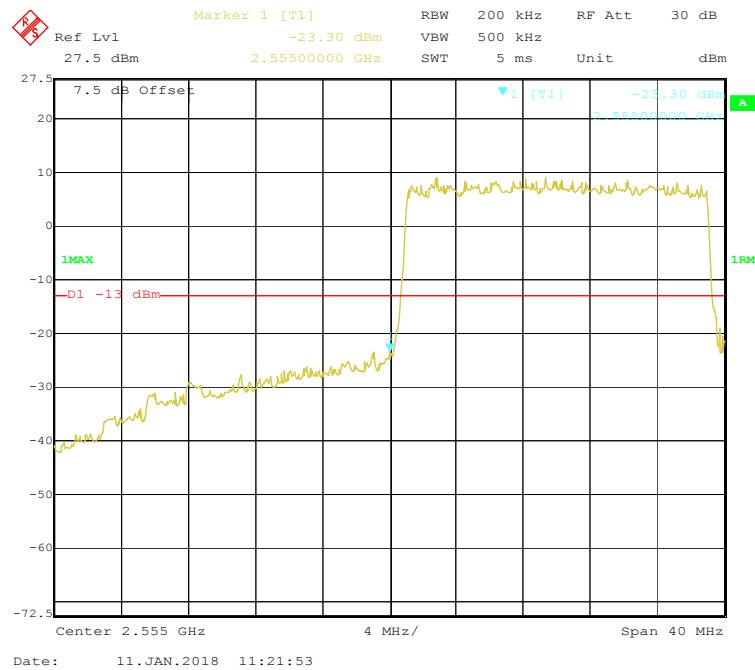
16-QAM (15 MHz, FULL RB) - Left Band Edge



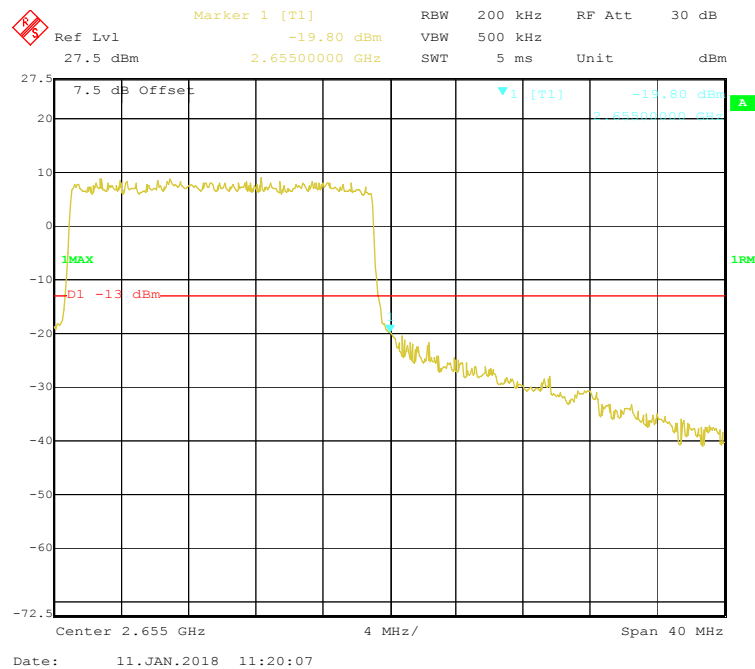
16-QAM (15 MHz, FULL RB) - Right Band Edge



16-QAM (20 MHz, FULL RB) - Left Band Edge



16-QAM (20 MHz, FULL RB) - Right Band Edge



FCC § 2.1055; § 22.355; § 24.235; §27.54; - FREQUENCY STABILITY**Applicable Standards**

FCC § 2.1055, §22.355, §24.235 and §27.54.

According to FCC §2.1055, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency Range (MHz)	Base, fixed (ppm)	Mobile > 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929.	5.0	N/A	N/A
929 to 960.	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

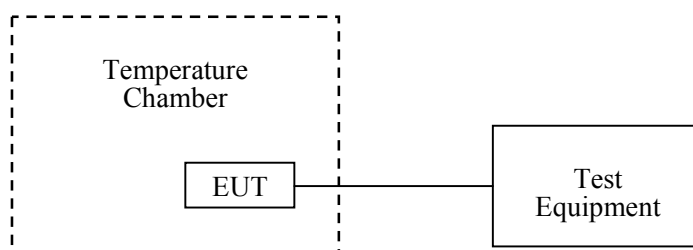
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



Test Data**Environmental Conditions**

Temperature:	23.2 °C
Relative Humidity:	50 %
ATM Pressure:	101.2kPa

The testing was performed by Ada Yu on 2018-01-31.

EUT operation mode: Transmitting

Test Result: Compliance.

GSM 850 Band

GSM Mode, Middle Channel, $f_0=836.6$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	7.2	15	0.0179	2.5
-20		13	0.0155	2.5
-10		12	0.0143	2.5
0		14	0.0167	2.5
10		11	0.0131	2.5
20		2	0.0024	2.5
30		6	0.0072	2.5
40		8	0.0096	2.5
50		13	0.0155	2.5
25	V min.= 6.8	9	0.0108	2.5
25	V max.= 8.4	10	0.0120	2.5

GPRS Mode, Middle Channel, $f_0=836.6$ MHz				
Temperature (°C)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	7.2	15	0.0179	2.5
-20		14	0.0167	2.5
-10		13	0.0155	2.5
0		11	0.0131	2.5
10		10	0.0120	2.5
20		2	0.0024	2.5
30		10	0.0120	2.5
40		11	0.0131	2.5
50		5	0.0060	2.5
25	V min.= 6.8	9	0.0108	2.5
25	V max.= 8.4	10	0.0120	2.5

EGPRS Mode, Middle Channel, $f_0=836.6$ MHz				
Temperature (°C)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	7.2	14	0.0167	2.5
-20		13	0.0155	2.5
-10		16	0.0191	2.5
0		12	0.0143	2.5
10		14	0.0167	2.5
20		3	0.0036	2.5
30		7	0.0084	2.5
40		6	0.0072	2.5
50		13	0.0155	2.5
25	V min.= 6.8	9	0.0108	2.5
25	V max.= 8.4	7	0.0084	2.5

WCDMA Band V

Middle Channel, $f_0 = 836.6$ MHz				
Temperature (°C)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	7.2	10	0.0120	2.5
-20		9	0.0108	2.5
-10		10	0.0120	2.5
0		8	0.0096	2.5
10		7	0.0084	2.5
20		6	0.0072	2.5
30		3	0.0036	2.5
40		3	0.0036	2.5
50		5	0.0060	2.5
25	V min.= 6.8	8	0.0096	2.5
25	V max.= 8.4	9	0.0108	2.5

CDMA850 Band

Middle Channel, $f_0 = 836.52$ MHz				
Temperature (°C)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	7.2	15	0.0179	2.5
-20		14	0.0167	2.5
-10		12	0.0143	2.5
0		13	0.0155	2.5
10		16	0.0191	2.5
20		10	0.0120	2.5
30		9	0.0110	2.5
40		11	0.0131	2.5
50		6	0.0072	2.5
25	V min.= 6.8	8	0.0096	2.5
25	V max.= 8.4	10	0.0114	2.5

PCS 1900 Band

GSM Mode, Middle Channel, $f_0=1880.0$ MHz				
Temperature (°C)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	7.2	9	0.0048	pass
-20		13	0.0069	pass
-10		12	0.0064	pass
0		14	0.0074	pass
10		10	0.0053	pass
20		6	0.0032	pass
30		7	0.0037	pass
40		10	0.0053	pass
50		9	0.0048	pass
25	V min.= 6.8	8	0.0043	pass
25	V max.= 8.4	10	0.0053	pass

GPRS Mode, Middle Channel, $f_0=1880.0$ MHz				
Temperature (°C)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	7.2	11	0.0059	pass
-20		10	0.0053	pass
-10		13	0.0069	pass
0		12	0.0064	pass
10		9	0.0048	pass
20		7	0.0037	pass
30		8	0.0043	pass
40		6	0.0032	pass
50		8	0.0043	pass
25	V min.= 6.8	9	0.0048	pass
25	V max.= 8.4	11	0.0059	pass

EGPRS Mode, Middle Channel, $f_0=1880.0$ MHz				
Temperature (°C)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	7.2	12	0.0064	pass
-20		10	0.0053	pass
-10		11	0.0059	pass
0		13	0.0069	pass
10		9	0.0048	pass
20		5	0.0027	pass
30		8	0.0043	pass
40		6	0.0032	pass
50		7	0.0037	pass
25	V min.= 6.8	9	0.0048	pass
25	V max.= 8.4	10	0.0053	pass

LTE Band 5:

1.4 MHz Middle Channel, $f_0=836.5$ MHz (QPSK)				
Temperature (°C)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	7.2	15	0.0179	2.5
-20		13	0.0155	2.5
-10		16	0.0191	2.5
0		12	0.0143	2.5
10		14	0.0167	2.5
20		3	0.0036	2.5
30		8	0.0096	2.5
40		15	0.0179	2.5
50		9	0.0108	2.5
25	V min.= 6.8	8	0.0096	2.5
25	V max.= 8.4	10	0.0120	2.5

1.4 MHz Middle Channel, $f_0=836.5$ MHz (16QAM)				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	7.2	8	0.0096	2.5
-20		11	0.0132	2.5
-10		10	0.0120	2.5
0		8	0.0096	2.5
10		9	0.0108	2.5
20		-4	-0.0048	2.5
30		2	0.0024	2.5
40		4	0.0048	2.5
50		5	0.0060	2.5
25	V min.= 6.8	6	0.0072	2.5
25	V max.= 8.4	8	0.0096	2.5

LTE Band 38:

5 MHz Middle Channel, $f_0=2595$ MHz (QPSK)				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	7.2	10	0.0039	pass
-20		8	0.0031	pass
-10		11	0.0042	pass
0		9	0.0035	pass
10		7	0.0027	pass
20		-2	-0.0008	pass
30		0	0.0000	pass
40		10	0.0039	pass
50		6	0.0023	pass
25	V min.= 6.8	9	0.0035	pass
25	V max.= 8.4	4	0.0015	pass

5 MHz Middle Channel, $f_0 = 2595$ MHz (16QAM)				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	7.2	13	0.0050	pass
-20		11	0.0042	pass
-10		13	0.0050	pass
0		12	0.0046	pass
10		14	0.0054	pass
20		1	0.0004	pass
30		10	0.0039	pass
40		13	0.0050	pass
50		12	0.0046	pass
25	V min.= 6.8	10	0.0039	pass
25	V max.= 8.4	7	0.0027	pass

LTE Band 40:

5 MHz Middle Channel, $f_0 = 2355$ MHz (QPSK)				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	7.2	4	0.0017	pass
-20		-5	-0.0021	pass
-10		1	0.0004	pass
0		3	0.0013	pass
10		4	0.0017	pass
20		-9	-0.0038	pass
30		-3	-0.0013	pass
40		0	0.0000	pass
50		-1	-0.0004	pass
25	V min.= 6.8	-2	-0.0008	pass
25	V max.= 8.4	1	0.0004	pass

5 MHz Middle Channel, $f_o = 2355$ MHz (16QAM)				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	7.2	5	0.0021	pass
-20		2	0.0008	pass
-10		3	0.0013	pass
0		2	0.0008	pass
10		-1	-0.0004	pass
20		-5	-0.0021	pass
30		-1	-0.0004	pass
40		2	0.0008	pass
50		-6	-0.0025	pass
25	V min.= 6.8	-5	-0.0021	pass
25	V max.= 8.4	-8	-0.0034	pass

LTE Band 41:

5 MHz Middle Channel, $f_o = 2605$ MHz (QPSK)				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	7.2	16	0.0061	pass
-20		11	0.0042	pass
-10		14	0.0054	pass
0		13	0.0050	pass
10		16	0.0061	pass
20		3	0.0012	pass
30		9	0.0035	pass
40		11	0.0042	pass
50		11	0.0042	pass
25	V min.= 6.8	8	0.0031	pass
25	V max.= 8.4	11	0.0042	pass

5 MHz Middle Channel, $f_o = 2605$ MHz (16QAM)				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	7.2	18	0.0069	pass
-20		16	0.0061	pass
-10		17	0.0065	pass
0		15	0.0058	pass
10		17	0.0065	pass
20		5	0.0019	pass
30		9	0.0035	pass
40		14	0.0054	pass
50		10	0.0038	pass
25	V min.= 6.8	9	0.0035	pass
25	V max.= 8.4	10	0.0038	pass

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