



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

For

BLU Products, Inc.

10814 NW 33rd St # 100 Doral, FL 33172, United States

FCC ID: YHLBLUGRANDM3

Report Type: Original Report	Product Type: Smart Phone
Report Number: <u>RSZ180206001-00D</u>	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *BLU Products, Inc.*'s product, model number: GRAND M3 (FCC ID: YHLBLUGRANDM3) or the "EUT" in this report was a *Smart Phone*, which was measured approximately: 15.0 cm (L) × 8.0 cm (W) × 0.8 cm (H), rated with input voltage: DC 3.8 V battery or DC 5V from adapter.

Adapter Information:

Model: US-BB-1000

Input: AC 100-240V, 50/60Hz, 0.2A

Output: DC 5V, 1A

**All measurement and test data in this report was gathered from production sample serial number: 1800136 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2018-01-09.*

Objective

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

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

Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS & DSS and Part 15B JBP submissions with FCC ID: YHLBLUGRANDM3.

Test Methodology

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

Part 22 Subpart H - Public Mobile Services

Part 24 Subpart E - Personal Communication Services

Part 27 – Miscellaneous wireless communications services

Applicable Standards: TIA/EIA 603-D.

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

Measurement Uncertainty

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

Test Facility

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

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 382179, the FCC Designation No. : CN5001.

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

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

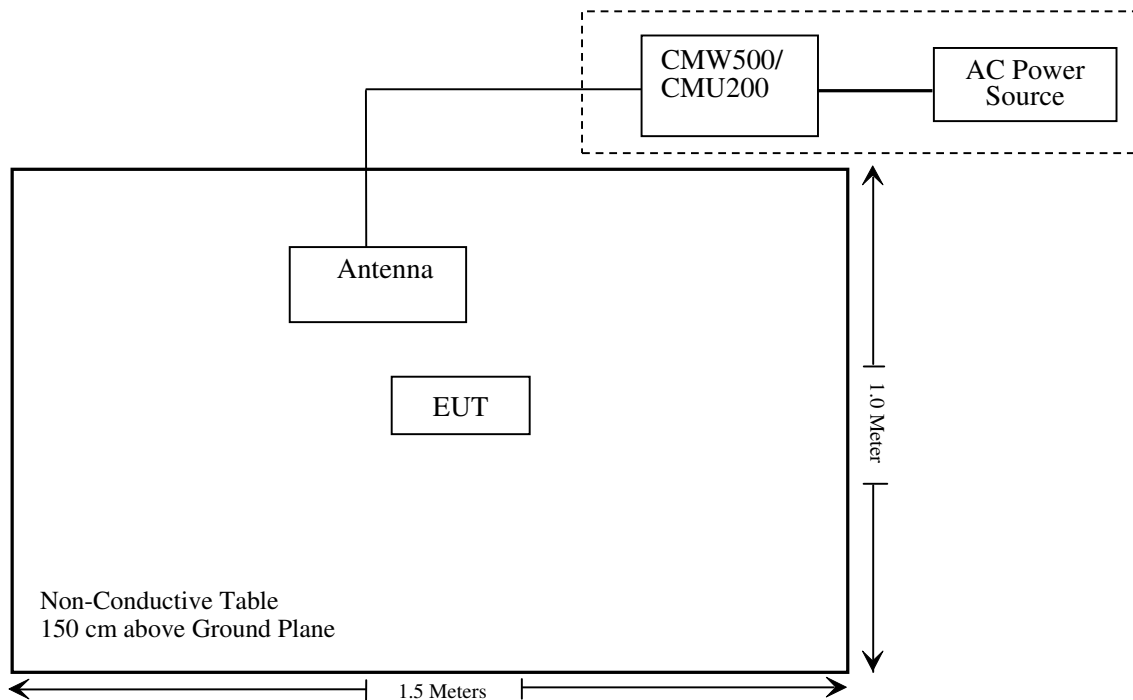
Equipment Modifications

No modification was made to the EUT.

Support Equipment List and Details

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

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

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

Note: * Please refer to SAR report released by BACL, report number: RSZ180206001-20

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Sunol Sciences	Horn Antenna	DRH-118	A052604	2017-12-22	2020-12-21
Rohde & Schwarz	Signal ANALYZER	FSIQ26	8386001028	2017-04-24	2018-04-24
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2017-12-17	2020-12-16
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2017-05-21	2018-05-21
HP	Amplifier	HP8447E	1937A01046	2017-11-19	2018-05-21
Anritsu	Signal Generator	68369B	004114	2017-12-24	2018-12-24
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2018-01-11	2019-01-11
COM POWER	Dipole Antenna	AD-100	041000	NCR	NCR
A.H. System	Horn Antenna	SAS-200/571	135	2015-08-18	2018-08-17
Ducommun technologies	RF Cable	UFA210A-1-4724-30050U	MFR64369 223410-001	2017-11-19	2018-05-21
Ducommun technologies	RF Cable	104PEA	218124002	2017-11-19	2018-05-21
Ducommun technologies	RF Cable	RG-214	1	2017-11-19	2018-05-21
Ducommun technologies	RF Cable	RG-214	2	2017-11-22	2018-05-22
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-04	2017-12-29	2020-12-28
Ducommun technologies	Horn Antenna	ARH-4223-02	1007726-03	2017-12-29	2020-12-28
Ducommun technologies	Pre-amplifier	ALN-22093530-01	991373-01	2017-08-03	2018-08-03

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200120	2017-12-24	2018-12-24
ESPEC	Temperature & Humidity Chamber	EL-10KA	09107726	2017-12-21	2018-12-21
Long Wei	DC Power Supply	TPR-6420D	398363	NCR	NCR
Aglient	ESG Vector Signal Generator	E4438C	MY42080875	2017-05-09	2018-05-09
Rohde & Schwarz	Wideband Radio Communication Tester	CMU200	106891	2017-12-14	2018-12-14
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-146520-wh	2017-04-24	2018-04-24
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2017-08-19	2018-08-19
Ducommun technologies	RF Cable	RG-214	3	2017-11-22	2018-05-22
WEINSCHEL	10dB Attenuator	5324	AU 3842	2017-11-22	2018-05-23
WEINSCHEL	3dB Attenuator	N/A	N/A	2017-11-22	2018-05-23
N/A	Power Splitter	N/A	N/A	2017-05-21	2018-05-21

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

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

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliance, please refer to the SAR report: RSZ180206001-20.

FCC §2.1047 - MODULATION CHARACTERISTIC

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

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

Applicable Standard

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

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

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

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

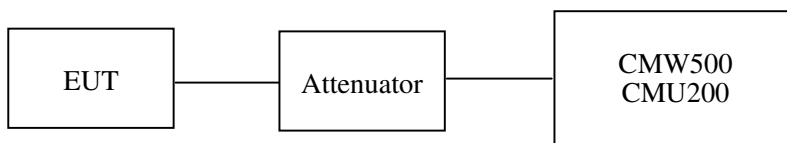
According to §27.50(d), the maximum EIRP must not exceed 1Watts (30dBm) for 1710-1755MHz.

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

Test Procedure

Conducted method:

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



Radiated method:

TIA 603-D section 2.2.17

Test Data

Environmental Conditions

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

The testing was performed by Tracy Hu on 2018-02-10.

Conducted Power

Cellular Band (Part 22H)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	128	824.2	32.33	38.45
	190	836.6	32.34	38.45
	251	848.8	32.20	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	32.36	31.54	29.76	28.59	38.45
	190	836.6	32.35	31.58	29.78	28.65	38.45
	251	848.8	32.23	31.46	29.67	28.57	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	128	824.2	27.29	26.25	24.14	22.76	38.45
	190	836.6	27.32	26.26	24.19	22.79	38.45
	251	848.8	27.43	26.37	24.29	23.17	38.45

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band V)	Normal	RMC12.2k		22.69	22.67	22.61
		HSDPA	1	21.68	21.67	21.58
			2	21.58	21.62	21.53
			3	21.74	21.72	21.65
			4	21.55	21.59	21.52
		HSUPA	1	21.27	21.11	21.14
			2	21.24	21.06	21.02
			3	21.38	21.16	21.26
			4	21.16	20.98	21.10
			5	21.34	21.22	21.18
		HSPA+	1	21.07	21.15	21.13

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	512	1850.2	29.00	33
	661	1880.0	28.74	33
	810	1909.8	28.42	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	29.03	28.06	26.56	25.27	33
	661	1880.0	28.83	27.84	26.28	25.05	33
	810	1909.8	28.52	27.52	25.98	24.72	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	512	1850.2	26.15	24.95	22.96	21.75	33
	661	1880.0	26.17	24.99	22.96	21.75	33
	810	1909.8	26.17	25.01	22.96	21.72	33

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band II)	Normal	RMC12.2k		22.00	22.04	22.16
		HSDPA	1	21.01	21.06	21.11
			2	20.95	20.95	21.03
			3	21.08	21.18	21.22
			4	20.91	20.98	21.03
		HSUPA	1	20.57	20.68	20.77
			2	20.52	20.60	20.67
			3	20.68	20.80	20.86
			4	20.44	20.62	20.67
			5	20.67	20.73	20.82
		HSPA+	1	20.55	20.51	20.46

AWS Band (Part 27)

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band IV)	Normal	RMC12.2k		22.58	22.58	22.64
		HSDPA	1	21.54	21.54	21.57
			2	21.43	21.51	21.51
			3	21.60	21.59	21.63
			4	21.48	21.47	21.49
		HSUPA	1	21.07	21.10	21.11
			2	20.98	21.01	21.05
			3	21.17	21.13	21.23
			4	21.01	21.03	20.99
			5	21.15	21.18	21.14
		HSPA+	1	20.47	20.62	20.39

Peak-to-average ratio (PAR)

Cellular Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	0.48	13
	Middle	0.35	13
	High	0.46	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	2.58	13
	Middle	2.42	13
	High	2.57	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	4.36	13
	Middle	4.12	13
	High	4.37	13
HSDPA (16QAM)	Low	4.32	13
	Middle	4.17	13
	High	4.39	13
HSUPA (BPSK)	Low	4.34	13
	Middle	4.15	13
	High	4.33	13
HSPA+	Low	3.54	13
	Middle	3.27	13
	High	3.19	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	0.45	13
	Middle	0.32	13
	High	0.46	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	2.58	13
	Middle	2.42	13
	High	2.53	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.64	13
	Middle	3.44	13
	High	3.62	13
HSDPA (16QAM)	Low	3.67	13
	Middle	3.47	13
	High	3.65	13
HSUPA (BPSK)	Low	3.69	13
	Middle	3.46	13
	High	3.67	13
HSPA+	Low	3.82	13
	Middle	3.75	13
	High	3.67	13

AWS Band (Part 27)

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.35	13
	Middle	3.11	13
	High	3.39	13
HSDPA (16QAM)	Low	3.34	13
	Middle	3.16	13
	High	3.35	13
HSUPA (BPSK)	Low	3.39	13
	Middle	3.12	13
	High	3.34	13
HSPA+	Low	3.95	13
	Middle	3.77	13
	High	3.61	13

**Radiated Power
GSM Mode:**

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H/24E	
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
ERP for Cellular Band (Part 22H), Middle Channel										
836.6	91.73	121	2.3	H	31.7	0.7	0.0	31.00	38.45	7.45
836.6	83.11	235	1.9	V	23.1	0.7	0.0	22.40	38.45	16.05
EIRP for PCS Band (Part 24E), Middle Channel										
1880.00	89.31	179	2.3	H	19.3	1.30	8.50	26.50	33	6.5
1880.00	85.49	275	2.5	V	15.2	1.30	8.50	22.40	33	10.6

EDGE Mode:

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dB)			
ERP, Cellular Band (Part 22H), Middle Channel										
836.6	86.25	276	2.0	H	26.3	0.7	0.0	25.60	38.45	12.85
836.6	81.04	270	2.5	V	21.0	0.7	0.0	20.30	38.45	18.15
EIRP, PCS Band (Part 24E), Middle Channel										
1880.00	84.25	321	2.0	H	14.2	1.30	8.50	21.40	33	11.6
1880.00	80.24	109	2.2	V	10.0	1.30	8.50	17.20	33	15.8

WCDMA Mode:

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H/24E/27	
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
ERP for WCDMA Band V (Part 22H), Middle Channel										
836.6	78.25	212	2.0	H	18.3	0.7	0.0	17.6	38.45	20.85
836.6	74.64	77	1.2	V	14.6	0.7	0.0	13.9	38.45	24.55
EIRP for WCDMA Band II (Part 24E), Middle Channel										
1880.00	80.93	219	1.6	H	10.9	1.30	8.50	18.10	33	14.9
1880.00	78.19	56	1.9	V	7.9	1.30	8.50	15.10	33	17.9
EIRP for WCDMA Band IV (Part 27), Middle Channel										
1732.60	85.99	29	1.7	H	12.8	1.30	9.10	20.60	30	9.4
1732.60	82.54	326	1.0	V	10.0	1.30	9.10	17.80	30	12.2

Note:

Absolute Level = Substituted Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

LTE Band 2:

Maximum Output Power

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	22.21	22.40	22.22
		RB Size=1, RB Offset=2	22.11	22.32	22.12
		RB Size=1, RB Offset=5	22.26	22.52	22.32
		RB Size=3, RB Offset=0	21.34	21.86	21.38
		RB Size=3, RB Offset=1	21.26	21.79	21.29
		RB Size=3, RB Offset=2	21.44	21.91	21.50
		RB Size=6, RB Offset=0	21.14	21.46	21.67
	16QAM	RB Size=1, RB Offset=0	22.26	22.41	22.27
		RB Size=1, RB Offset=2	22.16	22.29	22.17
		RB Size=1, RB Offset=5	22.32	22.44	22.32
		RB Size=3, RB Offset=0	21.45	21.84	21.48
		RB Size=3, RB Offset=1	21.42	21.80	21.39
		RB Size=3, RB Offset=2	21.55	21.92	21.56
		RB Size=6, RB Offset=0	21.16	21.47	21.15
3.0	QPSK	RB Size=1, RB Offset=0	22.29	22.47	22.25
		RB Size=1, RB Offset=7	22.22	22.41	22.19
		RB Size=1, RB Offset=14	22.40	22.58	22.31
		RB Size=8, RB Offset=0	21.43	21.86	21.41
		RB Size=8, RB Offset=4	21.34	21.77	21.35
		RB Size=8, RB Offset=7	21.56	21.91	21.46
		RB Size=15, RB Offset=0	21.21	21.47	21.15
	16QAM	RB Size=1, RB Offset=0	22.23	22.46	22.21
		RB Size=1, RB Offset=7	22.19	22.37	22.16
		RB Size=1, RB Offset=14	22.35	22.52	22.30
		RB Size=8, RB Offset=0	21.47	21.89	21.43
		RB Size=8, RB Offset=4	21.39	21.82	21.40
		RB Size=8, RB Offset=7	21.59	21.98	21.52
		RB Size=15, RB Offset=0	21.15	21.44	21.18

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	22.17	22.35	22.13
		RB Size=1, RB Offset=12	22.09	22.25	22.03
		RB Size=1, RB Offset=24	22.28	22.41	22.23
		RB Size=12, RB Offset=0	21.42	21.81	21.46
		RB Size=12, RB Offset=6	21.34	21.69	21.41
		RB Size=12, RB Offset=11	21.48	21.86	21.54
		RB Size=25, RB Offset=0	21.26	21.45	21.15
	16QAM	RB Size=1, RB Offset=0	22.12	22.35	22.14
		RB Size=1, RB Offset=12	22.02	22.31	22.10
		RB Size=1, RB Offset=24	22.21	22.45	22.23
		RB Size=12, RB Offset=0	21.44	21.75	21.49
		RB Size=12, RB Offset=6	21.38	21.72	21.38
		RB Size=12, RB Offset=11	21.50	21.84	21.58
		RB Size=25, RB Offset=0	21.24	21.47	21.15
10.0	QPSK	RB Size=1, RB Offset=0	22.17	22.43	22.15
		RB Size=1, RB Offset=24	22.13	22.31	22.07
		RB Size=1, RB Offset=49	22.22	22.54	22.25
		RB Size=25, RB Offset=0	21.41	21.78	21.42
		RB Size=25, RB Offset=12	21.29	21.70	21.39
		RB Size=25, RB Offset=24	21.49	21.83	21.48
		RB Size=50, RB Offset=0	21.24	21.55	21.17
	16QAM	RB Size=1, RB Offset=0	22.13	22.45	22.18
		RB Size=1, RB Offset=24	22.04	22.38	22.06
		RB Size=1, RB Offset=49	22.25	22.51	22.25
		RB Size=25, RB Offset=0	21.42	21.74	21.44
		RB Size=25, RB Offset=12	21.29	21.68	21.39
		RB Size=25, RB Offset=24	21.45	21.81	21.56
		RB Size=50, RB Offset=0	21.24	21.55	21.27

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15.0	QPSK	RB Size=1, RB Offset=0	22.19	22.35	22.13
		RB Size=1, RB Offset=37	22.13	22.31	22.05
		RB Size=1, RB Offset=74	22.31	22.43	22.23
		RB Size=36, RB Offset=0	21.47	21.76	21.42
		RB Size=36, RB Offset=18	21.43	21.71	21.38
		RB Size=36, RB Offset=37	21.50	21.87	21.54
		RB Size=75, RB Offset=0	21.34	21.52	21.25
	16QAM	RB Size=1, RB Offset=0	22.11	22.35	22.17
		RB Size=1, RB Offset=37	21.99	22.29	22.11
		RB Size=1, RB Offset=74	22.18	22.38	22.24
		RB Size=36, RB Offset=0	21.51	21.94	21.62
		RB Size=36, RB Offset=18	21.45	21.81	21.58
		RB Size=36, RB Offset=37	21.57	22.07	21.74
		RB Size=75, RB Offset=0	21.24	21.61	21.27
20.0	QPSK	RB Size=1, RB Offset=0	22.04	22.24	22.07
		RB Size=1, RB Offset=49	21.96	22.11	21.96
		RB Size=1, RB Offset=99	22.17	22.29	22.16
		RB Size=50, RB Offset=0	21.57	21.95	21.67
		RB Size=50, RB Offset=24	21.46	21.88	21.56
		RB Size=50, RB Offset=49	21.60	22.07	21.78
		RB Size=100, RB Offset=0	21.34	21.59	21.24
	16QAM	RB Size=1, RB Offset=0	22.01	22.14	22.02
		RB Size=1, RB Offset=49	21.92	22.04	21.94
		RB Size=1, RB Offset=99	22.13	22.24	22.12
		RB Size=50, RB Offset=0	21.51	21.84	21.62
		RB Size=50, RB Offset=24	21.44	21.76	21.59
		RB Size=50, RB Offset=49	21.56	21.90	21.74
		RB Size=100, RB Offset=0	21.23	21.51	21.24

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.77	13	Pass
QPSK (100RB Size)	4.67	13	Pass
16QAM (1RB Size)	4.87	13	Pass
16QAM (100RB Size)	4.86	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
1880.00	85.62	88	1.1	H	15.6	1.30	8.50	22.80	33
1880.00	84.33	123	1.1	V	14.1	1.30	8.50	21.30	33
3 MHz Bandwidth									
1880.00	86.31	330	1.7	H	16.3	1.30	8.50	23.50	33
1880.00	85.22	96	2.4	V	15.0	1.30	8.50	22.20	33
5 MHz Bandwidth									
1880.00	85.31	357	1.6	H	15.3	1.30	8.50	22.50	33
1880.00	83.11	343	2.2	V	12.8	1.30	8.50	20.00	33
10 MHz Bandwidth									
1880.00	85.42	324	1.1	H	15.4	1.30	8.50	22.60	33
1880.00	85.72	116	1.1	V	15.5	1.30	8.50	22.70	33
15 MHz Bandwidth									
1880.00	85.44	356	2.3	H	15.4	1.30	8.50	22.60	33
1880.00	85.58	346	1.1	V	15.3	1.30	8.50	22.50	33
20 MHz Bandwidth									
1880.00	84.44	33	1.6	H	14.4	1.30	8.50	21.60	33
1880.00	84.58	154	1.5	V	14.3	1.30	8.50	21.50	33

16QAM:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
1880.00	86.89	49	1.1	H	16.8	1.30	8.50	24.00	33
1880.00	86.4	12	2.4	V	16.1	1.30	8.50	23.30	33
3 MHz Bandwidth									
1880.00	86.34	141	2.1	H	16.3	1.30	8.50	23.50	33
1880.00	85.72	205	2.3	V	15.5	1.30	8.50	22.70	33
5 MHz Bandwidth									
1880.00	86.37	167	1.7	H	16.3	1.30	8.50	23.50	33
1880.00	86.22	192	1.5	V	16.0	1.30	8.50	23.20	33
10 MHz Bandwidth									
1880.00	88.22	355	2.2	H	18.2	1.30	8.50	25.40	33
1880.00	86.25	60	1.0	V	16.0	1.30	8.50	23.20	33
15 MHz Bandwidth									
1880.00	87.14	30	1.9	H	17.1	1.30	8.50	24.30	33
1880.00	86.67	248	1.6	V	16.4	1.30	8.50	23.60	33
20 MHz Bandwidth									
1880.00	86.88	250	2.4	H	16.8	1.30	8.50	24.00	33
1880.00	86.54	70	2.0	V	16.3	1.30	8.50	23.50	33

LTE Band 4:

Maximum Output Power

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	22.75	23.1	22.79
		RB Size=1, RB Offset=2	22.69	22.98	22.67
		RB Size=1, RB Offset=5	22.86	23.14	22.83
		RB Size=3, RB Offset=0	22.14	22.53	22.17
		RB Size=3, RB Offset=1	22.04	22.47	22.08
		RB Size=3, RB Offset=2	22.23	22.65	22.23
		RB Size=6, RB Offset=0	21.54	22.10	21.58
	16QAM	RB Size=1, RB Offset=0	23.45	23.76	23.28
		RB Size=1, RB Offset=2	23.32	23.71	23.16
		RB Size=1, RB Offset=5	23.52	23.82	23.34
		RB Size=3, RB Offset=0	22.57	22.95	22.54
		RB Size=3, RB Offset=1	22.48	22.85	22.51
		RB Size=3, RB Offset=2	22.64	22.98	22.66
		RB Size=6, RB Offset=0	21.85	22.10	21.75
3.0	QPSK	RB Size=1, RB Offset=0	22.78	23.19	22.75
		RB Size=1, RB Offset=7	22.75	23.09	22.62
		RB Size=1, RB Offset=14	22.85	23.28	22.87
		RB Size=8, RB Offset=0	22.41	22.67	22.34
		RB Size=8, RB Offset=4	22.33	22.55	22.27
		RB Size=8, RB Offset=7	22.53	22.71	22.44
		RB Size=15, RB Offset=0	22.04	22.21	22.05
	16QAM	RB Size=1, RB Offset=0	22.76	23.2	22.79
		RB Size=1, RB Offset=7	22.68	23.12	22.71
		RB Size=1, RB Offset=14	22.79	23.24	22.86
		RB Size=8, RB Offset=0	22.27	22.57	22.18
		RB Size=8, RB Offset=4	22.20	22.45	22.14
		RB Size=8, RB Offset=7	22.32	22.61	22.24
		RB Size=15, RB Offset=0	22.05	22.17	22.07

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	22.85	23.13	22.72
		RB Size=1, RB Offset=12	22.80	23.03	22.66
		RB Size=1, RB Offset=24	22.97	23.17	22.77
		RB Size=12, RB Offset=0	22.24	22.54	22.12
		RB Size=12, RB Offset=6	22.13	22.49	22.05
		RB Size=12, RB Offset=11	22.33	22.57	22.20
		RB Size=25, RB Offset=0	22.01	22.23	22.04
	16QAM	RB Size=1, RB Offset=0	22.89	23.16	22.78
		RB Size=1, RB Offset=12	22.86	23.07	22.67
		RB Size=1, RB Offset=24	23.01	23.21	22.83
		RB Size=12, RB Offset=0	22.29	22.68	22.27
		RB Size=12, RB Offset=6	22.17	22.62	22.21
		RB Size=12, RB Offset=11	22.35	22.78	22.39
		RB Size=25, RB Offset=0	22.04	22.23	22.03
10.0	QPSK	RB Size=1, RB Offset=0	22.82	23.25	22.73
		RB Size=1, RB Offset=24	22.79	23.20	22.61
		RB Size=1, RB Offset=49	22.89	23.31	22.78
		RB Size=25, RB Offset=0	22.24	22.61	22.23
		RB Size=25, RB Offset=12	22.12	22.53	22.13
		RB Size=25, RB Offset=24	22.28	22.64	22.32
		RB Size=50, RB Offset=0	22.12	22.33	22.15
	16QAM	RB Size=1, RB Offset=0	22.87	23.23	22.79
		RB Size=1, RB Offset=24	22.82	23.12	22.72
		RB Size=1, RB Offset=49	22.91	23.36	22.88
		RB Size=25, RB Offset=0	22.27	22.65	22.28
		RB Size=25, RB Offset=12	22.14	22.60	22.18
		RB Size=25, RB Offset=24	22.36	22.75	22.40
		RB Size=50, RB Offset=0	22.04	22.29	22.05

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15.0	QPSK	RB Size=1, RB Offset=0	22.89	23.15	22.71
		RB Size=1, RB Offset=37	22.86	23.09	22.59
		RB Size=1, RB Offset=74	22.94	23.24	22.75
		RB Size=36, RB Offset=0	22.34	22.79	22.36
		RB Size=36, RB Offset=18	22.30	22.70	22.27
		RB Size=36, RB Offset=37	22.46	22.87	22.47
		RB Size=75, RB Offset=0	22.04	22.37	22.08
	16QAM	RB Size=1, RB Offset=0	22.81	23.15	22.77
		RB Size=1, RB Offset=37	22.73	23.08	22.70
		RB Size=1, RB Offset=74	22.90	23.23	22.84
		RB Size=36, RB Offset=0	22.37	22.84	22.45
		RB Size=36, RB Offset=18	22.29	22.79	22.37
		RB Size=36, RB Offset=37	22.47	22.91	22.54
		RB Size=75, RB Offset=0	22.12	22.50	22.17
20.0	QPSK	RB Size=1, RB Offset=0	22.85	23.03	22.82
		RB Size=1, RB Offset=49	22.78	22.99	22.78
		RB Size=1, RB Offset=99	22.95	23.12	22.85
		RB Size=50, RB Offset=0	22.31	22.75	22.42
		RB Size=50, RB Offset=24	22.25	22.65	22.36
		RB Size=50, RB Offset=49	22.34	22.82	22.46
		RB Size=100, RB Offset=0	22.12	22.35	22.17
	16QAM	RB Size=1, RB Offset=0	22.81	23.04	22.84
		RB Size=1, RB Offset=49	22.77	22.92	22.72
		RB Size=1, RB Offset=99	22.92	23.08	22.96
		RB Size=50, RB Offset=0	22.24	22.64	22.26
		RB Size=50, RB Offset=24	22.20	22.59	22.15
		RB Size=50, RB Offset=49	22.35	22.73	22.34
		RB Size=100, RB Offset=0	22.04	22.27	22.08

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.64	13	Pass
QPSK (100RB Size)	4.50	13	Pass
16QAM (1RB Size)	4.69	13	Pass
16QAM (100RB Size)	4.43	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
1732.50	86.41	323	1.5	H	13.2	1.30	8.90	20.80	30
1732.50	83.34	74	2.1	V	10.8	1.30	8.90	18.40	30
3 MHz Bandwidth									
1732.50	85.94	205	2.0	H	12.8	1.30	8.90	20.40	30
1732.50	85.15	258	2.0	V	12.6	1.30	8.90	20.20	30
5 MHz Bandwidth									
1732.50	85.46	309	2.0	H	12.3	1.30	8.90	19.90	30
1732.50	85.31	172	1.9	V	12.7	1.30	8.90	20.30	30
10 MHz Bandwidth									
1732.50	86.23	77	2.2	H	13.1	1.30	8.90	20.70	30
1732.50	84.58	127	1.9	V	12.0	1.30	8.90	19.60	30
15 MHz Bandwidth									
1732.50	86.79	293	2.2	H	13.6	1.30	8.90	21.20	30
1732.50	85.31	185	1.4	V	12.7	1.30	8.90	20.30	30
20 MHz Bandwidth									
1732.50	85.79	313	2.3	H	12.6	1.30	8.90	20.20	30
1732.50	85.11	292	1.1	V	12.5	1.30	8.90	20.10	30

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
1732.50	86.24	183	1.2	H	13.1	1.30	8.90	20.70	30
1732.50	86.11	245	1.3	V	13.5	1.30	8.90	21.10	30
3 MHz Bandwidth									
1732.50	85.96	304	1.9	H	12.8	1.30	8.90	20.40	30
1732.50	86.43	76	1.7	V	13.9	1.30	8.90	21.50	30
5 MHz Bandwidth									
1732.50	86.24	177	1.8	H	13.1	1.30	8.90	20.70	30
1732.50	87.31	216	2.4	V	14.7	1.30	8.90	22.30	30
10 MHz Bandwidth									
1732.50	86.54	283	2.3	H	13.4	1.30	8.90	21.00	30
1732.50	87.52	30	1.2	V	15.0	1.30	8.90	22.60	30
15 MHz Bandwidth									
1732.50	86.14	186	1.8	H	13.0	1.30	8.90	20.60	30
1732.50	86.85	252	1.9	V	14.3	1.30	8.90	21.90	30
20 MHz Bandwidth									
1732.50	85.74	109	1.9	H	12.6	1.30	8.90	20.20	30
1732.50	86.69	240	1.4	V	14.1	1.30	8.90	21.70	30

LTE Band 5:

Maximum Output Power

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	23.15	23.54	23.24
		RB Size=1, RB Offset=2	23.09	23.43	23.12
		RB Size=1, RB Offset=5	23.26	23.59	23.28
		RB Size=3, RB Offset=0	22.78	23.02	22.81
		RB Size=3, RB Offset=1	22.74	22.98	22.72
		RB Size=3, RB Offset=2	22.89	23.09	22.88
		RB Size=6, RB Offset=0	22.26	22.59	22.34
	16QAM	RB Size=1, RB Offset=0	23.17	23.54	23.29
		RB Size=1, RB Offset=2	23.12	23.43	23.25
		RB Size=1, RB Offset=5	23.22	23.58	23.38
		RB Size=3, RB Offset=0	22.73	23.07	22.89
		RB Size=3, RB Offset=1	22.63	23.03	22.82
		RB Size=3, RB Offset=2	22.85	23.13	23.01
		RB Size=6, RB Offset=0	22.35	22.57	22.15
3.0	QPSK	RB Size=1, RB Offset=0	23.26	23.63	23.12
		RB Size=1, RB Offset=7	23.20	23.59	23.01
		RB Size=1, RB Offset=14	23.39	23.73	23.22
		RB Size=8, RB Offset=0	22.84	23.09	22.82
		RB Size=8, RB Offset=4	22.78	23.05	22.76
		RB Size=8, RB Offset=7	22.94	23.14	22.86
		RB Size=15, RB Offset=0	22.26	22.51	22.31
	16QAM	RB Size=1, RB Offset=0	23.22	23.61	23.17
		RB Size=1, RB Offset=7	23.13	23.53	23.08
		RB Size=1, RB Offset=14	23.31	23.70	23.29
		RB Size=8, RB Offset=0	22.87	23.04	22.86
		RB Size=8, RB Offset=4	22.80	22.94	22.75
		RB Size=8, RB Offset=7	22.99	23.09	22.94
		RB Size=15, RB Offset=0	22.12	22.50	22.24

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	23.27	23.56	23.14
		RB Size=1, RB Offset=12	23.22	23.49	23.09
		RB Size=1, RB Offset=24	23.36	23.68	23.17
		RB Size=12, RB Offset=0	22.82	23.09	22.81
		RB Size=12, RB Offset=6	22.73	22.97	22.78
		RB Size=12, RB Offset=11	22.86	23.17	22.90
		RB Size=25, RB Offset=0	22.13	22.45	22.25
	16QAM	RB Size=1, RB Offset=0	23.24	23.55	23.21
		RB Size=1, RB Offset=12	23.12	23.48	23.11
		RB Size=1, RB Offset=24	23.32	23.68	23.27
		RB Size=12, RB Offset=0	22.87	23.04	22.84
		RB Size=12, RB Offset=6	22.82	23.00	22.73
		RB Size=12, RB Offset=11	22.91	23.12	22.93
		RB Size=25, RB Offset=0	22.26	22.51	22.15
10.0	QPSK	RB Size=1, RB Offset=0	23.28	23.64	23.25
		RB Size=1, RB Offset=24	23.21	23.52	23.18
		RB Size=1, RB Offset=49	23.40	23.74	23.30
		RB Size=25, RB Offset=0	22.84	23.12	22.85
		RB Size=25, RB Offset=12	22.73	23.06	22.75
		RB Size=25, RB Offset=24	22.96	23.16	22.96
		RB Size=50, RB Offset=0	22.32	22.59	22.14
	16QAM	RB Size=1, RB Offset=0	23.25	23.62	23.27
		RB Size=1, RB Offset=24	23.16	23.56	23.15
		RB Size=1, RB Offset=49	23.31	23.69	23.33
		RB Size=25, RB Offset=0	22.87	23.17	22.72
		RB Size=25, RB Offset=12	22.77	23.08	22.60
		RB Size=25, RB Offset=24	22.93	23.22	22.80
		RB Size=50, RB Offset=0	22.21	22.49	22.17

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK(1RB Size)	4.11	13	Pass
QPSK(50RB Size)	5.36	13	Pass
16QAM (1RB Size)	3.83	13	Pass
16QAM (100RB Size)	5.39	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
836.5	79.36	48	1.1	H	17.0	0.7	0.0	16.30	38.45
836.5	72.19	240	1.3	V	11.8	0.7	0.0	11.10	38.45
3 MHz Bandwidth									
836.5	80.21	21	2.3	H	17.8	0.7	0.0	17.10	38.45
836.5	73.69	325	1.9	V	13.3	0.7	0.0	12.60	38.45
5 MHz Bandwidth									
836.5	80.65	159	1.9	H	18.3	0.7	0.0	17.60	38.45
836.5	73.44	170	1.9	V	13.0	0.7	0.0	12.30	38.45
10 MHz Bandwidth									
836.5	81.27	56	2.3	H	18.9	0.7	0.0	18.20	38.45
836.5	74.25	39	1.2	V	13.8	0.7	0.0	13.10	38.45

16QAM:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
836.5	79.66	217	1.3	H	17.6	0.7	0.0	16.90	38.45
836.5	72.18	315	2.0	V	11.7	0.7	0.0	11.00	38.45
3 MHz Bandwidth									
836.5	80.24	284	1.5	H	18.2	0.7	0.0	17.50	38.45
836.5	71.68	228	2.4	V	11.2	0.7	0.0	10.50	38.45
5 MHz Bandwidth									
836.5	81.22	272	2.2	H	19.2	0.7	0.0	18.50	38.45
836.5	72.54	293	1.6	V	12.1	0.7	0.0	11.40	38.45
10 MHz Bandwidth									
836.5	80.61	269	2.3	H	18.6	0.7	0.0	17.90	38.45
836.5	72.05	132	1.4	V	11.6	0.7	0.0	10.90	38.45

LTE Band 7:

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5	QPSK	RB Size=1, RB Offset=0	21.65	22.13	21.72
		RB Size=1, RB Offset=12	21.54	22.01	21.63
		RB Size=1, RB Offset=24	21.78	22.20	21.76
		RB Size=12, RB Offset=0	21.32	21.62	21.24
		RB Size=12, RB Offset=6	21.24	21.56	21.15
		RB Size=12, RB Offset=11	21.43	21.70	21.36
		RB Size=25, RB Offset=0	20.67	21.09	20.72
	16QAM	RB Size=1, RB Offset=0	21.75	22.13	21.79
		RB Size=1, RB Offset=12	21.63	22.09	21.69
		RB Size=1, RB Offset=24	21.88	22.23	21.91
		RB Size=12, RB Offset=0	21.35	21.69	21.27
		RB Size=12, RB Offset=6	21.29	21.63	21.18
		RB Size=12, RB Offset=11	21.41	21.76	21.38
		RB Size=25, RB Offset=0	20.84	21.17	20.87
10	QPSK	RB Size=1, RB Offset=0	21.94	22.25	21.88
		RB Size=1, RB Offset=24	21.90	22.16	21.84
		RB Size=1, RB Offset=49	22.03	22.33	21.97
		RB Size=25, RB Offset=0	21.62	21.84	21.52
		RB Size=25, RB Offset=12	21.57	21.71	21.41
		RB Size=25, RB Offset=24	21.71	21.89	21.60
		RB Size=50, RB Offset=0	21.14	21.31	21.12
	16QAM	RB Size=1, RB Offset=0	22.08	22.3	22.05
		RB Size=1, RB Offset=24	22.05	22.23	21.97
		RB Size=1, RB Offset=49	22.19	22.36	22.15
		RB Size=25, RB Offset=0	21.72	22.01	21.85
		RB Size=25, RB Offset=12	21.67	21.98	21.80
		RB Size=25, RB Offset=24	21.83	22.07	21.95
		RB Size=50, RB Offset=0	21.35	21.74	21.24

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15	QPSK	RB Size=1, RB Offset=0	21.54	21.75	21.34
		RB Size=1, RB Offset=37	21.44	21.68	21.30
		RB Size=1, RB Offset=74	21.64	21.86	21.43
		RB Size=36, RB Offset=0	21.03	21.27	21.08
		RB Size=36, RB Offset=18	20.94	21.19	20.97
		RB Size=36, RB Offset=37	21.06	21.38	21.14
		RB Size=75, RB Offset=0	20.54	20.86	20.25
	16QAM	RB Size=1, RB Offset=0	21.59	21.79	21.48
		RB Size=1, RB Offset=37	21.56	21.69	21.35
		RB Size=1, RB Offset=74	21.63	21.85	21.52
		RB Size=36, RB Offset=0	21.06	21.35	21.02
		RB Size=36, RB Offset=18	21.01	21.25	20.99
		RB Size=36, RB Offset=37	21.10	21.45	21.06
		RB Size=75, RB Offset=0	20.78	21.09	20.84
20	QPSK	RB Size=1, RB Offset=0	21.34	21.59	21.38
		RB Size=1, RB Offset=49	21.26	21.54	21.33
		RB Size=1, RB Offset=99	21.42	21.72	21.47
		RB Size=50, RB Offset=0	21.02	21.33	21.04
		RB Size=50, RB Offset=24	20.94	21.29	20.97
		RB Size=50, RB Offset=49	21.09	21.46	21.11
		RB Size=100, RB Offset=0	20.81	21.08	20.73
	16QAM	RB Size=1, RB Offset=0	21.31	21.53	21.24
		RB Size=1, RB Offset=49	21.25	21.49	21.11
		RB Size=1, RB Offset=99	21.43	21.59	21.28
		RB Size=50, RB Offset=0	21.04	21.26	21.07
		RB Size=50, RB Offset=24	20.95	21.19	20.99
		RB Size=50, RB Offset=49	21.16	21.31	21.15
		RB Size=100, RB Offset=0	20.45	20.73	20.36

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.12	13	Pass
QPSK (100RB Size)	4.21	13	Pass
16QAM (1RB Size)	4.27	13	Pass
16QAM (100RB Size)	4.27	13	Pass

EIRP:

QPSK:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
5 MHz Bandwidth									
2535.00	80.17	19	1.3	H	10.7	2.60	10.20	18.30	33
2535.00	80.43	329	1.6	V	11.6	2.60	10.20	19.20	33
10 MHz Bandwidth									
2535.00	81.23	60	1.0	H	11.7	2.60	10.20	19.30	33
2535.00	80.44	306	1.7	V	11.6	2.60	10.20	19.20	33
15 MHz Bandwidth									
2535.00	80.65	70	1.6	H	11.2	2.60	10.20	18.80	33
2535.00	80.34	17	1.3	V	11.5	2.60	10.20	19.10	33
20 MHz Bandwidth									
2535.00	80.72	315	1.2	H	11.2	2.60	10.20	18.80	33
2535.00	79.71	84	1.7	V	10.8	2.60	10.20	18.40	33

16QAM:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
5 MHz Bandwidth									
2535.00	81.35	210	1.6	H	11.9	2.60	10.20	19.50	33
2535.00	80.47	98	1.6	V	11.6	2.60	10.20	19.20	33
10 MHz Bandwidth									
2535.00	80.43	300	1.1	H	10.9	2.60	10.20	18.50	33
2535.00	80.52	5	2.3	V	11.6	2.60	10.20	19.20	33
15 MHz Bandwidth									
2535.00	80.77	93	2.3	H	11.3	2.60	10.20	18.90	33
2535.00	80.16	118	2.4	V	11.3	2.60	10.20	18.90	33
20 MHz Bandwidth									
2535.00	80.35	161	2.2	H	10.9	2.60	10.20	18.50	33
2535.00	79.68	243	2.4	V	10.8	2.60	10.20	18.40	33

LTE Band 12:

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	22.36	22.73	22.24
		RB Size=1, RB Offset=2	22.31	22.68	22.18
		RB Size=1, RB Offset=5	22.45	22.86	22.37
		RB Size=3, RB Offset=0	22.03	22.26	22.07
		RB Size=3, RB Offset=1	21.91	22.23	22.00
		RB Size=3, RB Offset=2	22.16	22.35	22.11
		RB Size=6, RB Offset=0	21.36	21.88	21.26
	16QAM	RB Size=1, RB Offset=0	22.33	22.74	22.49
		RB Size=1, RB Offset=2	22.27	22.65	22.45
		RB Size=1, RB Offset=5	22.41	22.81	22.59
		RB Size=3, RB Offset=0	22.07	22.38	22.06
		RB Size=3, RB Offset=1	22.01	22.26	21.95
		RB Size=3, RB Offset=2	22.12	22.42	22.11
		RB Size=6, RB Offset=0	21.52	21.90	21.40
3	QPSK	RB Size=1, RB Offset=0	22.65	22.96	22.58
		RB Size=1, RB Offset=7	22.56	22.87	22.53
		RB Size=1, RB Offset=14	22.78	23.02	22.66
		RB Size=8, RB Offset=0	22.32	22.64	22.27
		RB Size=8, RB Offset=4	22.27	22.57	22.15
		RB Size=8, RB Offset=7	22.38	22.74	22.39
		RB Size=15, RB Offset=0	22.05	22.29	22.01
	16QAM	RB Size=1, RB Offset=0	23.05	23.27	23.02
		RB Size=1, RB Offset=7	23.01	23.19	22.97
		RB Size=1, RB Offset=14	23.12	23.37	23.14
		RB Size=8, RB Offset=0	22.39	22.71	22.23
		RB Size=8, RB Offset=4	22.30	22.62	22.18
		RB Size=8, RB Offset=7	22.45	22.84	22.34
		RB Size=15, RB Offset=0	22.08	22.37	22.15

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5	QPSK	RB Size=1, RB Offset=0	23.02	23.26	23.04
		RB Size=1, RB Offset=12	22.95	23.14	22.96
		RB Size=1, RB Offset=24	23.09	23.33	23.17
		RB Size=12, RB Offset=0	22.34	22.78	22.28
		RB Size=12, RB Offset=6	22.29	22.73	22.24
		RB Size=12, RB Offset=11	22.46	22.84	22.40
		RB Size=25, RB Offset=0	22.15	22.36	22.08
	16QAM	RB Size=1, RB Offset=0	22.85	23.09	22.74
		RB Size=1, RB Offset=12	22.78	23.05	22.62
		RB Size=1, RB Offset=24	22.94	23.21	22.79
		RB Size=12, RB Offset=0	22.39	22.62	22.24
		RB Size=12, RB Offset=6	22.31	22.54	22.12
		RB Size=12, RB Offset=11	22.45	22.68	22.35
		RB Size=25, RB Offset=0	22.12	22.36	22.16
10	QPSK	RB Size=1, RB Offset=0	23.06	23.32	23.05
		RB Size=1, RB Offset=24	23.03	23.19	22.97
		RB Size=1, RB Offset=49	23.15	23.38	23.15
		RB Size=25, RB Offset=0	22.72	22.95	22.71
		RB Size=25, RB Offset=12	22.66	22.89	22.62
		RB Size=25, RB Offset=24	22.75	23.05	22.81
		RB Size=50, RB Offset=0	22.31	22.62	22.28
	16QAM	RB Size=1, RB Offset=0	23.12	23.33	23.18
		RB Size=1, RB Offset=24	23.03	23.25	23.07
		RB Size=1, RB Offset=49	23.18	23.43	23.23
		RB Size=25, RB Offset=0	22.75	22.99	22.84
		RB Size=25, RB Offset=12	22.72	22.89	22.72
		RB Size=25, RB Offset=24	22.85	23.06	22.95
		RB Size=50, RB Offset=0	22.37	22.56	22.26

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.06	13	Pass
QPSK (50RB Size)	5.59	13	Pass
16QAM (1RB Size)	4.01	13	Pass
16QAM (100RB Size)	5.40	13	Pass

EIRP:

QPSK:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
707.5	81.36	73	2.2	H	20.4	0.7	0.0	19.70	34.77
707.5	72.15	54	2.0	V	13.7	0.7	0.0	13.00	34.77
3 MHz Bandwidth									
707.5	82.27	49	2.0	H	21.3	0.7	0.0	20.60	34.77
707.5	73.22	330	1.0	V	14.7	0.7	0.0	14.00	34.77
5 MHz Bandwidth									
707.5	81.66	152	2.4	H	20.7	0.7	0.0	20.00	34.77
707.5	73.08	238	1.6	V	14.6	0.7	0.0	13.90	34.77
10 MHz Bandwidth									
707.5	82.19	210	1.2	H	21.2	0.7	0.0	20.50	34.77
707.5	72.09	33	1.4	V	13.6	0.7	0.0	12.90	34.77

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
707.5	81.65	282	2.5	H	20.7	0.7	0.0	20.00	34.77
707.5	73.22	232	1.7	V	14.7	0.7	0.0	14.00	34.77
3 MHz Bandwidth									
707.5	82.21	265	2.1	H	21.2	0.7	0.0	20.50	34.77
707.5	73.36	35	2.0	V	14.9	0.7	0.0	14.20	34.77
5 MHz Bandwidth									
707.5	81.65	124	2.3	H	20.7	0.7	0.0	20.00	34.77
707.5	72.65	191	1.8	V	14.2	0.7	0.0	13.50	34.77
10 MHz Bandwidth									
707.5	81.95	27	2.4	H	21.0	0.7	0.0	20.30	34.77
707.5	72.87	321	1.6	V	14.4	0.7	0.0	13.70	34.77

LTE Band 17:

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	22.87	23.04	22.97
		RB Size=1, RB Offset=12	22.82	22.95	22.89
		RB Size=1, RB Offset=24	22.98	23.16	23.01
		RB Size=12, RB Offset=0	22.42	22.74	22.43
		RB Size=12, RB Offset=6	22.35	22.67	22.32
		RB Size=12, RB Offset=11	22.47	22.77	22.48
		RB Size=25, RB Offset=0	21.68	22.02	21.72
	16QAM	RB Size=1, RB Offset=0	22.85	23.05	22.91
		RB Size=1, RB Offset=12	22.76	23.01	22.82
		RB Size=1, RB Offset=24	22.95	23.16	23.02
		RB Size=12, RB Offset=0	22.47	22.78	22.38
		RB Size=12, RB Offset=6	22.40	22.75	22.28
		RB Size=12, RB Offset=11	22.51	22.87	22.50
		RB Size=25, RB Offset=0	21.68	22.14	21.75
10.0	QPSK	RB Size=1, RB Offset=0	22.89	23.18	22.95
		RB Size=1, RB Offset=24	22.85	23.12	22.84
		RB Size=1, RB Offset=49	22.95	23.22	22.99
		RB Size=25, RB Offset=0	22.32	22.52	22.24
		RB Size=25, RB Offset=12	22.26	22.43	22.20
		RB Size=25, RB Offset=24	22.42	22.56	22.36
		RB Size=50, RB Offset=0	21.73	22.08	21.78
	16QAM	RB Size=1, RB Offset=0	22.75	23.13	22.63
		RB Size=1, RB Offset=24	22.63	23.07	22.57
		RB Size=1, RB Offset=49	22.88	23.23	22.74
		RB Size=25, RB Offset=0	22.37	22.74	22.29
		RB Size=25, RB Offset=12	22.26	22.71	22.19
		RB Size=25, RB Offset=24	22.50	22.82	22.35
		RB Size=50, RB Offset=0	21.71	22.05	22.65

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK(1RB Size)	4.36	13	Pass
QPSK(50RB Size)	5.44	13	Pass
16QAM (1RB Size)	4.45	13	Pass
16QAM (100RB Size)	5.47	13	Pass

ERP:

QPSK:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
5 MHz Bandwidth									
710	81.34	128	1.2	H	20.3	0.7	0.0	19.60	34.77
710	71.28	49	1.6	V	12.8	0.7	0.0	12.10	34.77
10 MHz Bandwidth									
710	81.58	59	1.4	H	20.6	0.7	0.0	19.90	34.77
710	72.16	121	2.4	V	13.7	0.7	0.0	13.00	34.77

16QAM:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
5 MHz Bandwidth									
710	80.62	214	1.6	H	19.6	0.7	0.0	18.90	34.77
710	73.13	165	1.5	V	14.6	0.7	0.0	13.90	34.77
10 MHz Bandwidth									
710	81.23	51	1.7	H	20.2	0.7	0.0	19.50	34.77
710	73.52	35	2.3	V	15.0	0.7	0.0	14.30	34.77

Note:

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

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

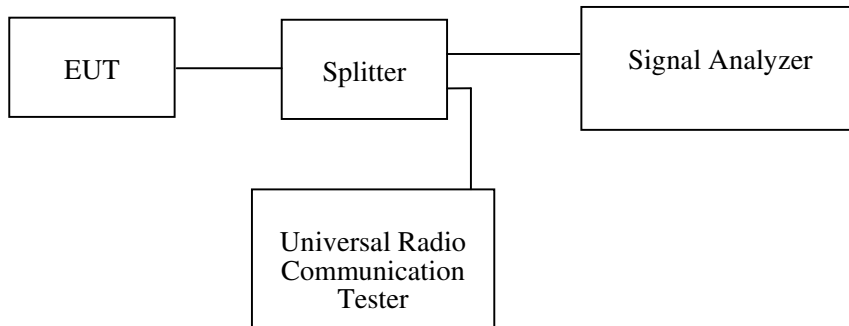
Applicable Standard

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

Test Procedure

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

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



Test Data

Environmental Conditions

Temperature:	24~25 °C
Relative Humidity:	50~52 %
ATM Pressure:	100.0~101.0 kPa

The testing was performed by Tracy Hu from 2018-02-08 to 2018-03-06.

EUT operation mode: Transmitting

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

Cellular Band (Part 22H)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	836.6	246.02	318.40
EGPRS(8PSK)	836.6	257.60	327.10

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	836.6	4.168	4.732
HSUPA (BPSK)	836.6	4.211	4.848
HSDPA (16QAM)	836.6	4.182	4.718

PCS Band (Part 24E)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	1880.0	243.13	321.30
EGPRS(8PSK)	1880.0	248.91	324.20

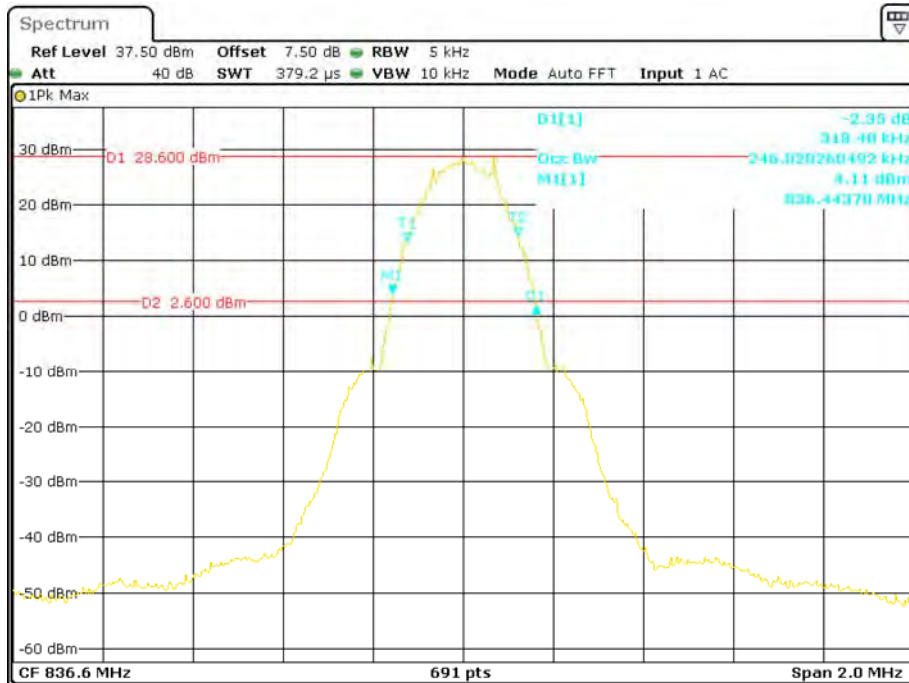
Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1880.0	4.153	4.703
HSUPA (BPSK)	1880.0	4.197	5.022
HSDPA (16QAM)	1880.0	4.197	4.935

AWS Band (Part27)

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1732.6	4.182	4.776
HSUPA (BPSK)	1732.6	4.211	4.848
HSDPA (16QAM)	1732.6	4.182	4.891

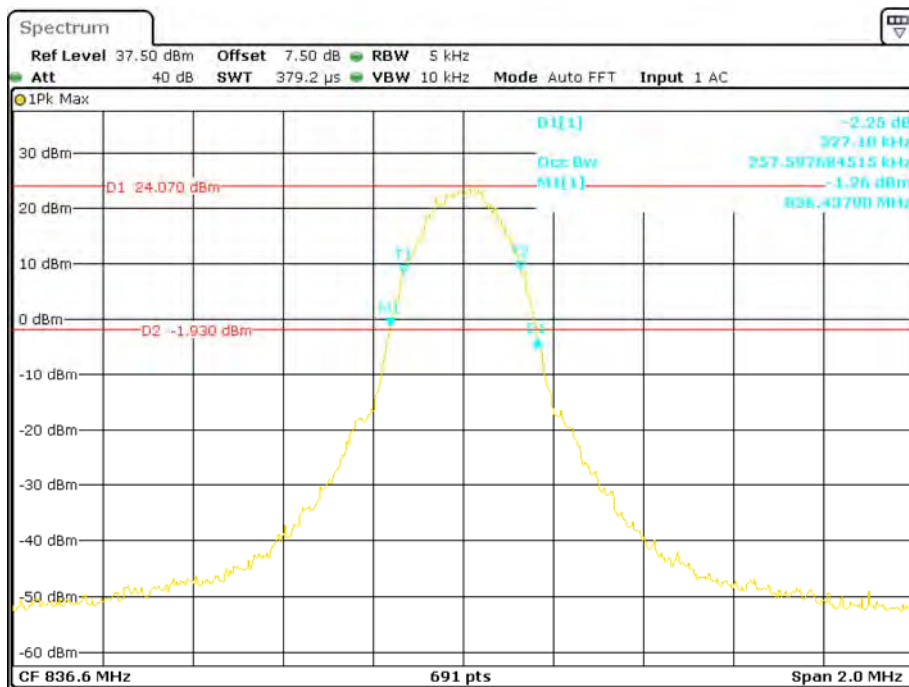
Cellular Band (Part 22H)

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



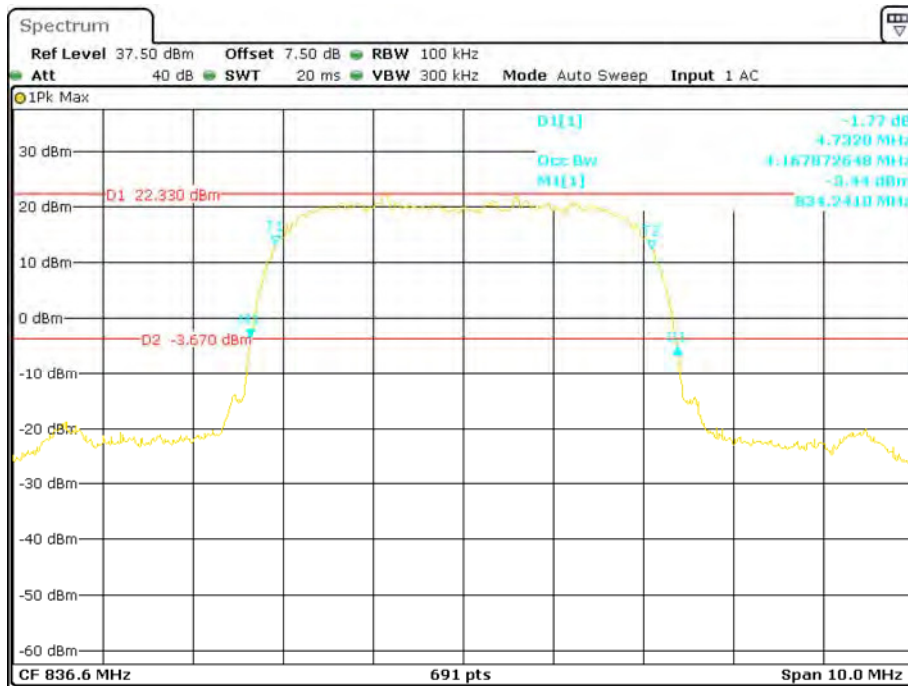
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26 dB Emissions & 99% Occupied Bandwidth for EDGE Mode



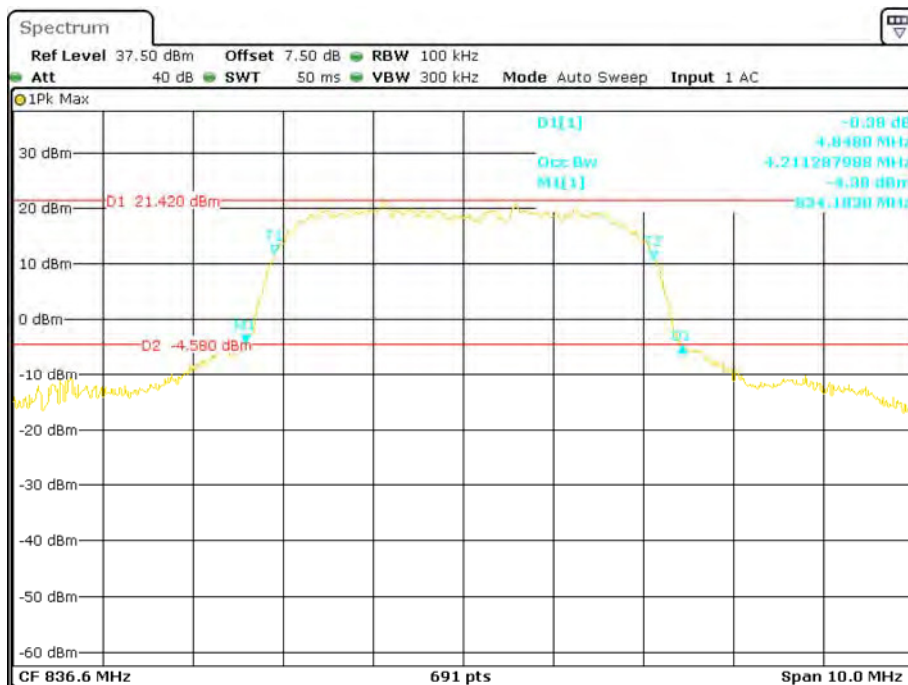
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26 dB Emissions & 99% Occupied Bandwidth for RMC (BPSK) Mode



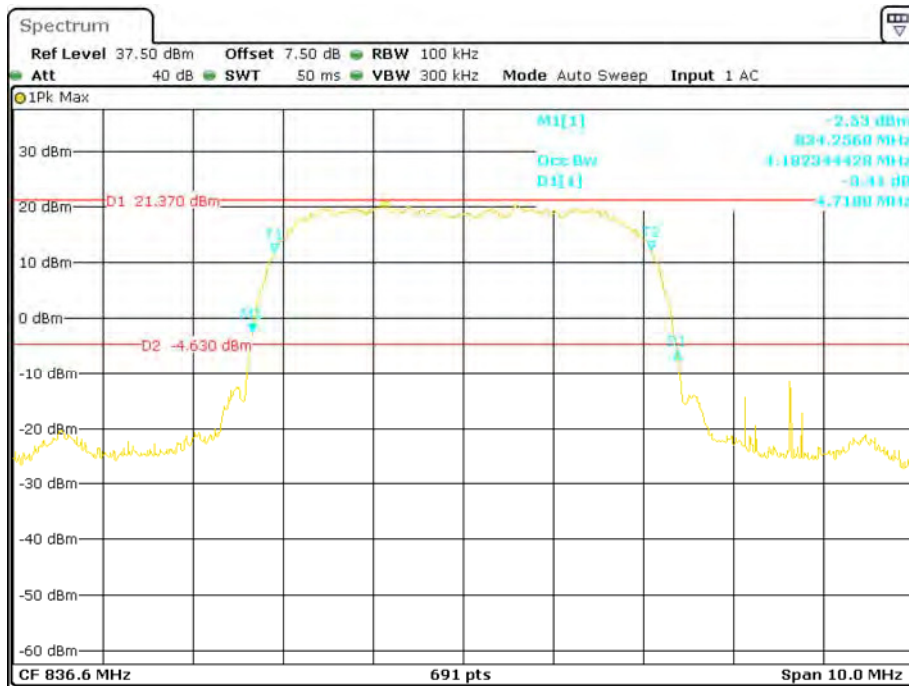
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26 dB Emissions & 99% Occupied Bandwidth for HSUPA (BPSK) Mode



Date: 8.FEB.2018 11:40:02

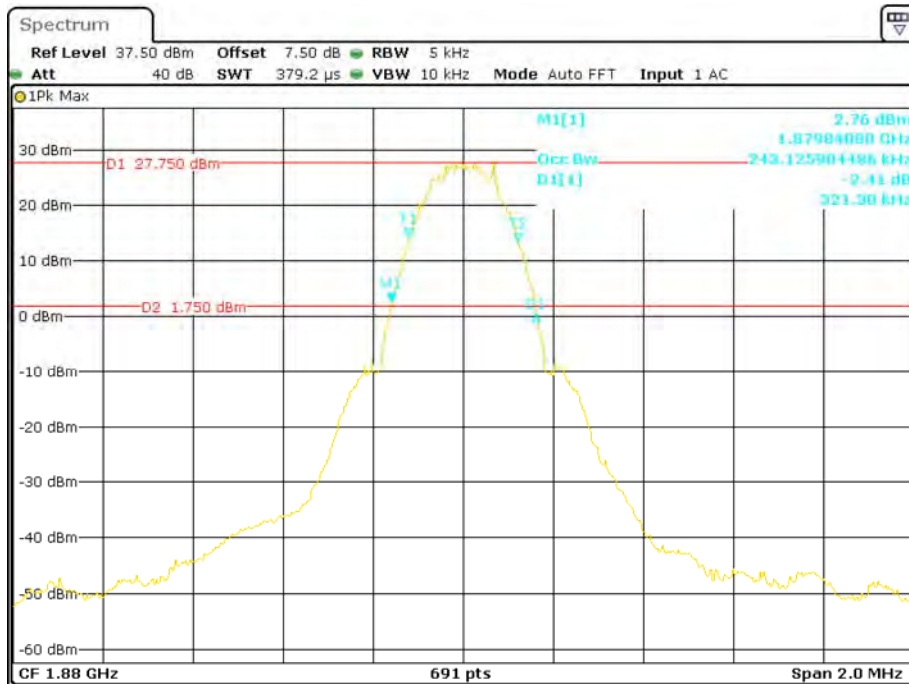
26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode



Date: 8.FEB.2018 11:35:58

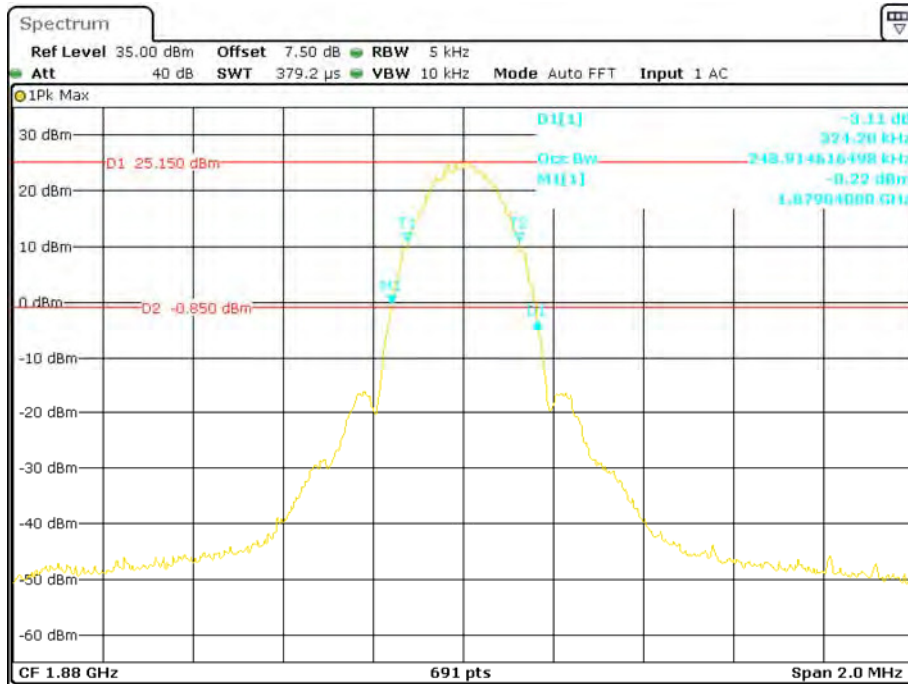
PCS Band (Part 24E)

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



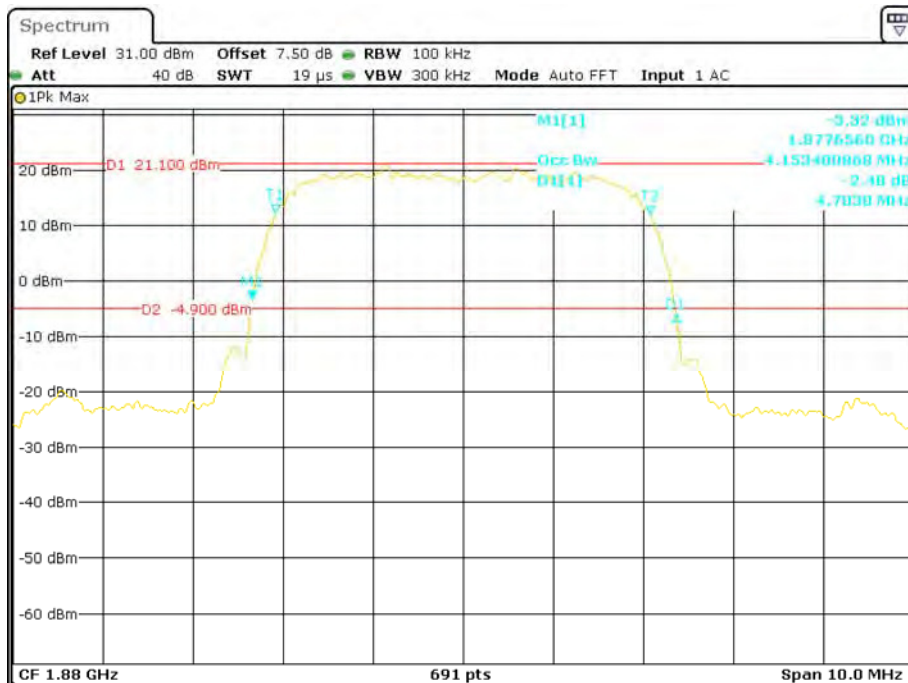
Date: 8.FEB.2018 13:49:36

26 dB Emissions & 99% Occupied Bandwidth for EDGE Mode



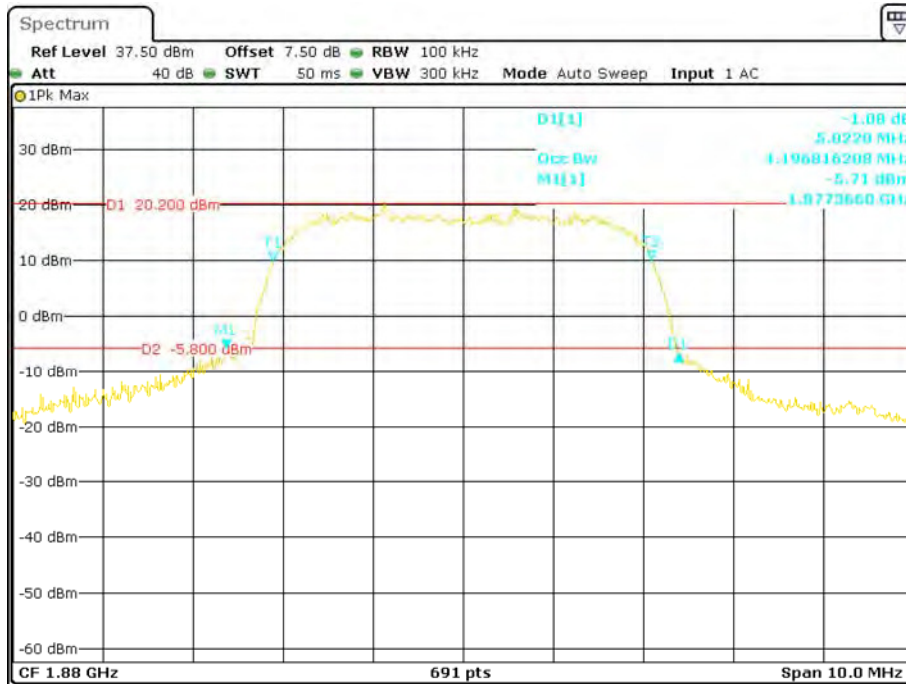
Date: 8.FEB.2018 14:02:53

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



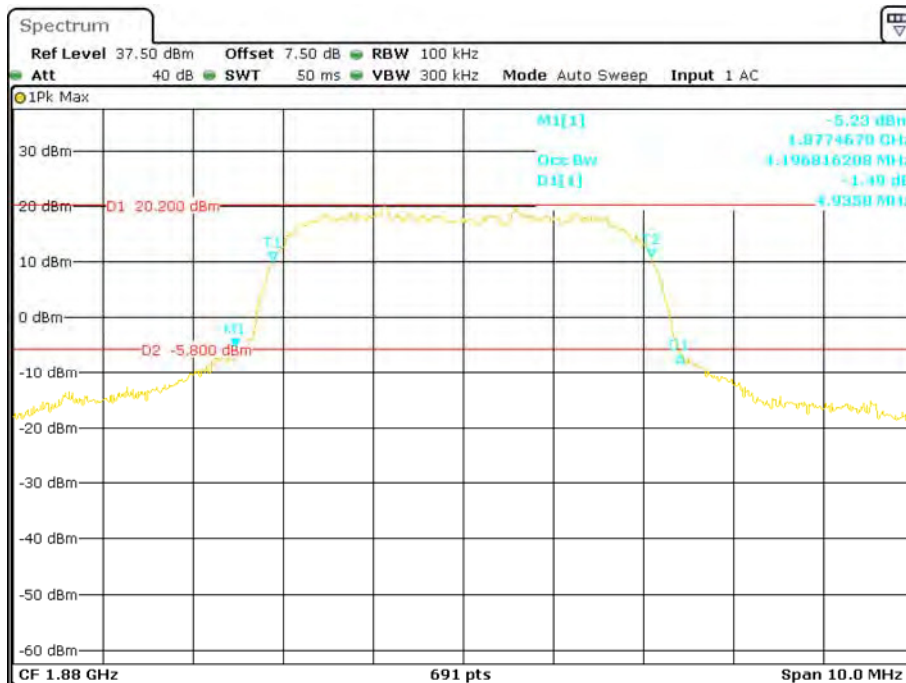
Date: 8.FEB.2018 10:57:13

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



Date: 8.FEB.2018 11:41:11

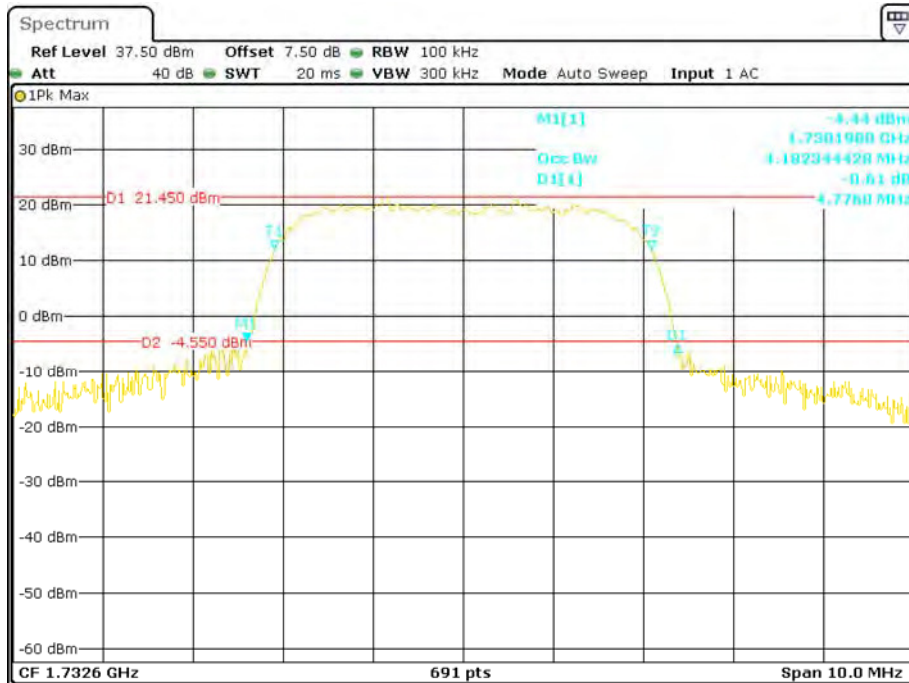
26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode



Date: 8.FEB.2018 11:31:31

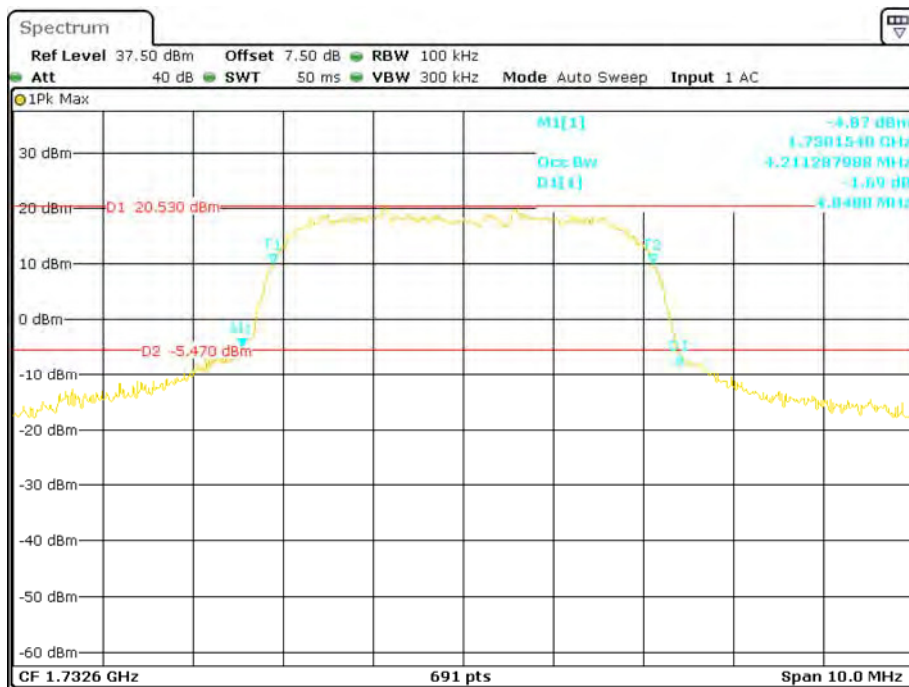
AWS Band (Part 27)

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



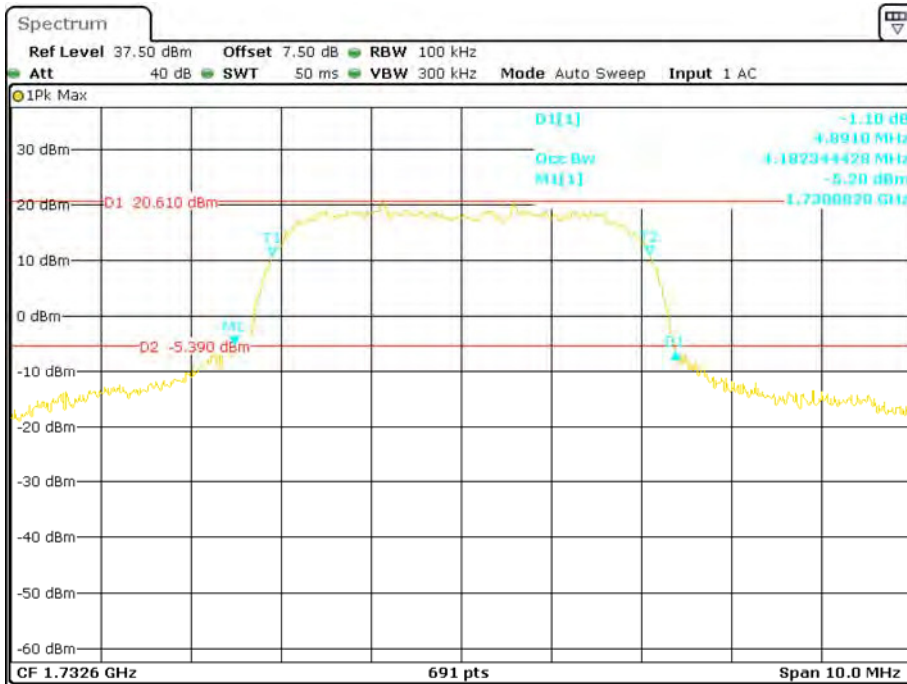
Date: 8.FEB.2018 11:15:10

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



Date: 8.FEB.2018 11:43:28

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

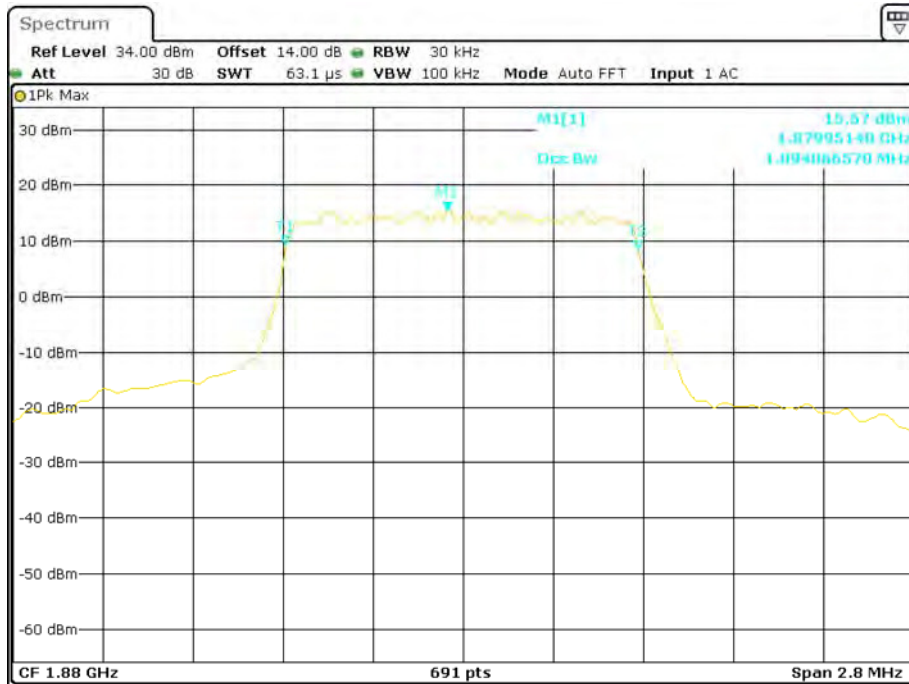


Date: 8.FEB.2018 11:33:18

LTE Band 2: (Middle Channel)

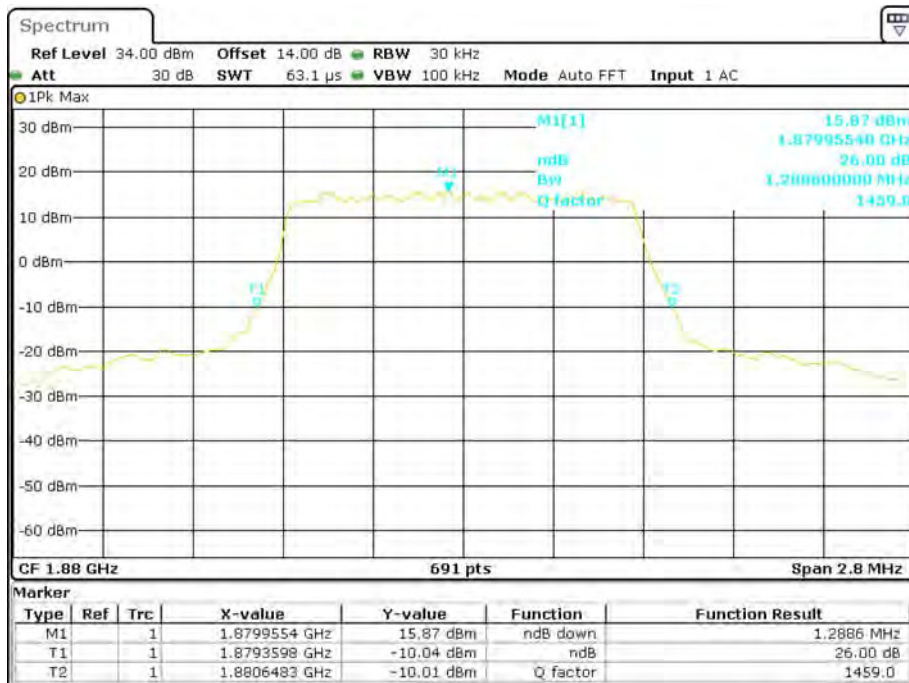
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.094	1.289
	16QAM	1.094	1.293
3.0	QPSK	2.674	2.857
	16QAM	2.683	2.857
5.0	QPSK	4.530	5.181
	16QAM	4.544	5.210
10.0	QPSK	8.973	9.928
	16QAM	9.001	9.957
15.0	QPSK	13.546	15.022
	16QAM	13.502	14.848
20.0	QPSK	17.945	19.219
	16QAM	18.003	19.392

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



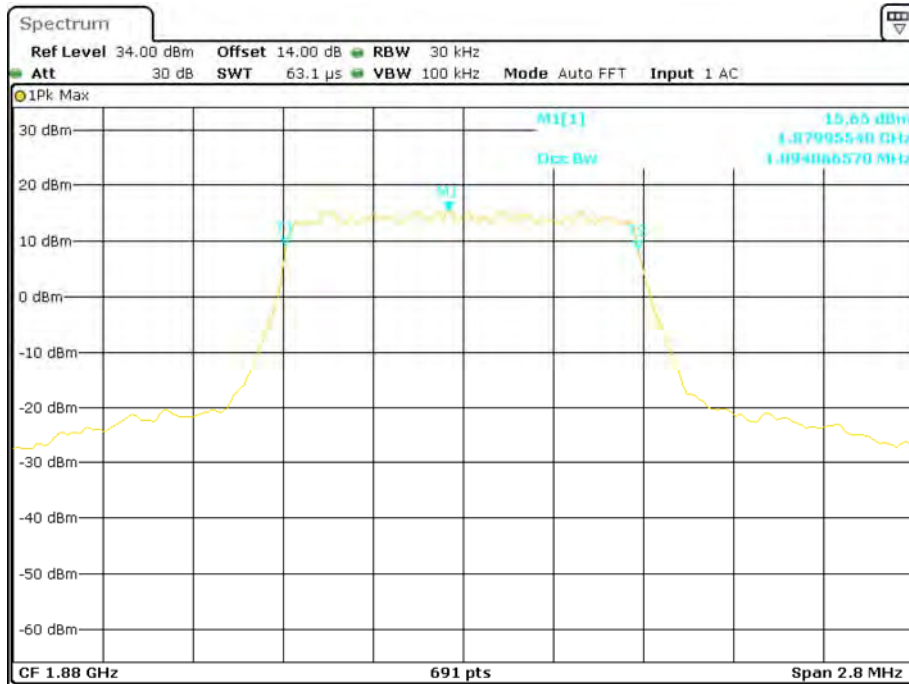
Date: 8.FEB.2018 15:02:36

QPSK (1.4 MHz) - 26 dB Bandwidth, Middle channel



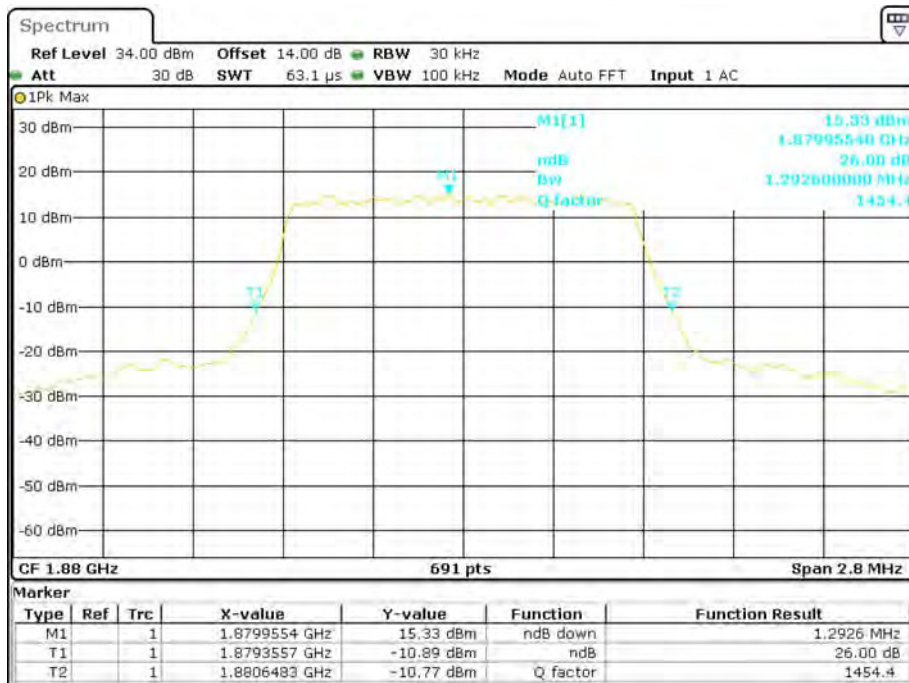
Date: 8.FEB.2018 16:38:10

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



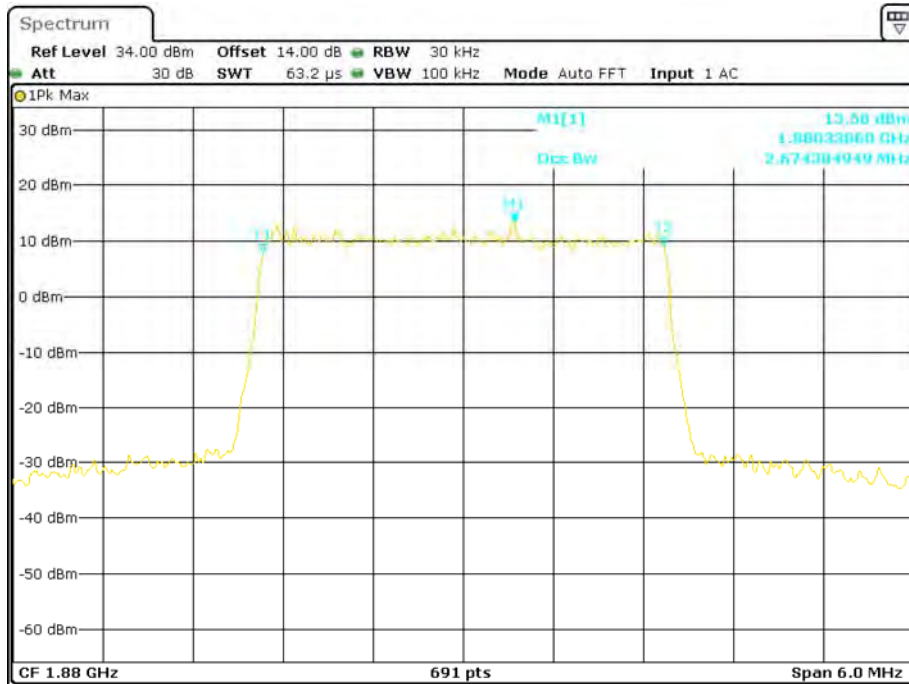
Date: 8.FEB.2018 15:05:06

16-QAM (1.4 MHz) - 26 dB Bandwidth, Middle channel



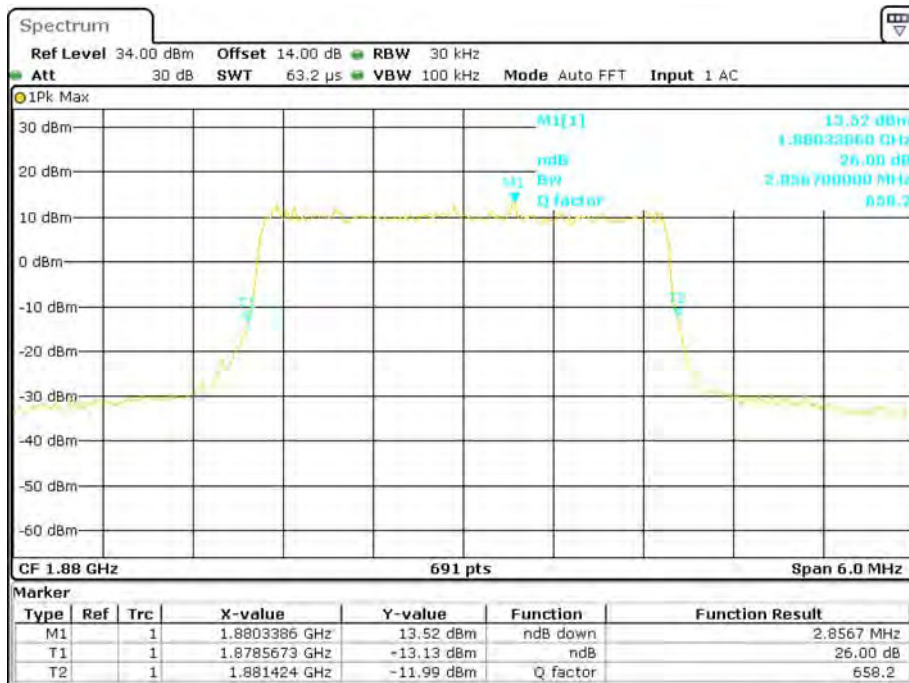
Date: 8.FEB.2018 16:38:00

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



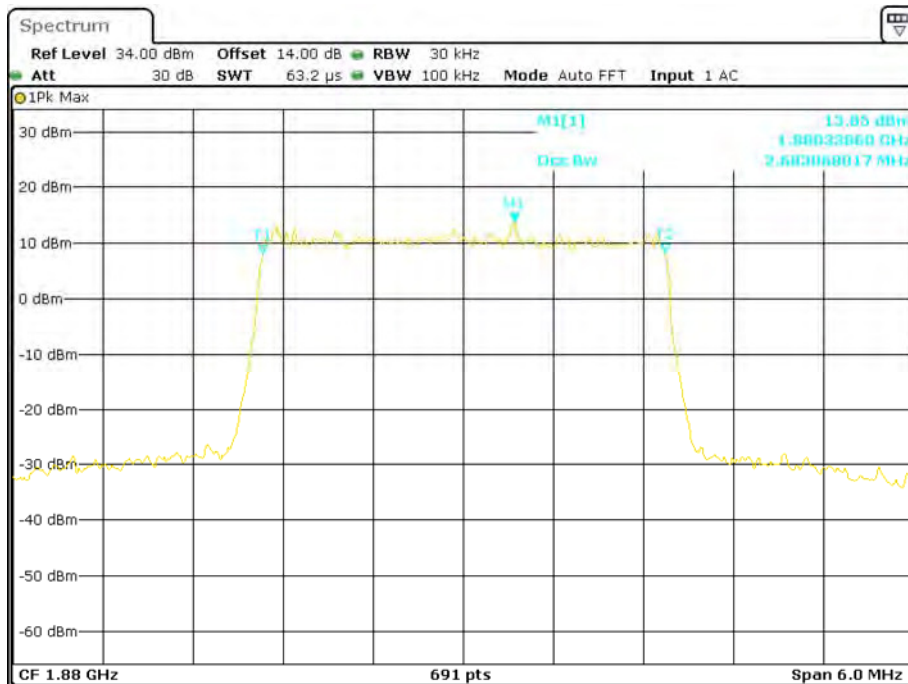
Date: 8.FEB.2018 15:17:03

QPSK (3.0 MHz) - 26 dB Bandwidth, Middle channel



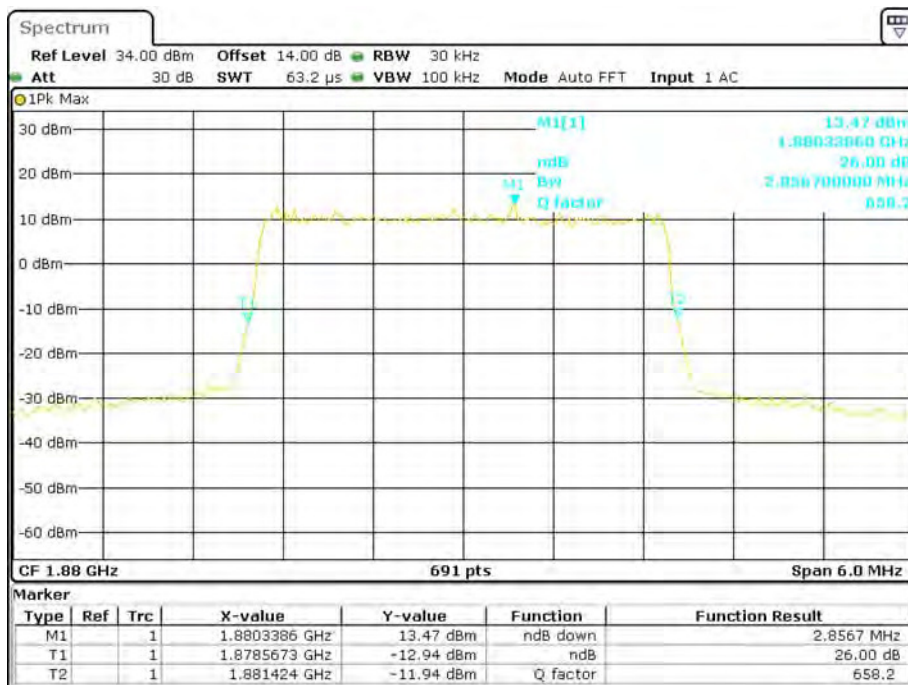
Date: 8.FEB.2018 16:53:03

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



Date: 8.FEB.2018 15:16:34

16-QAM (3.0 MHz) - 26 dB Bandwidth, Middle channel



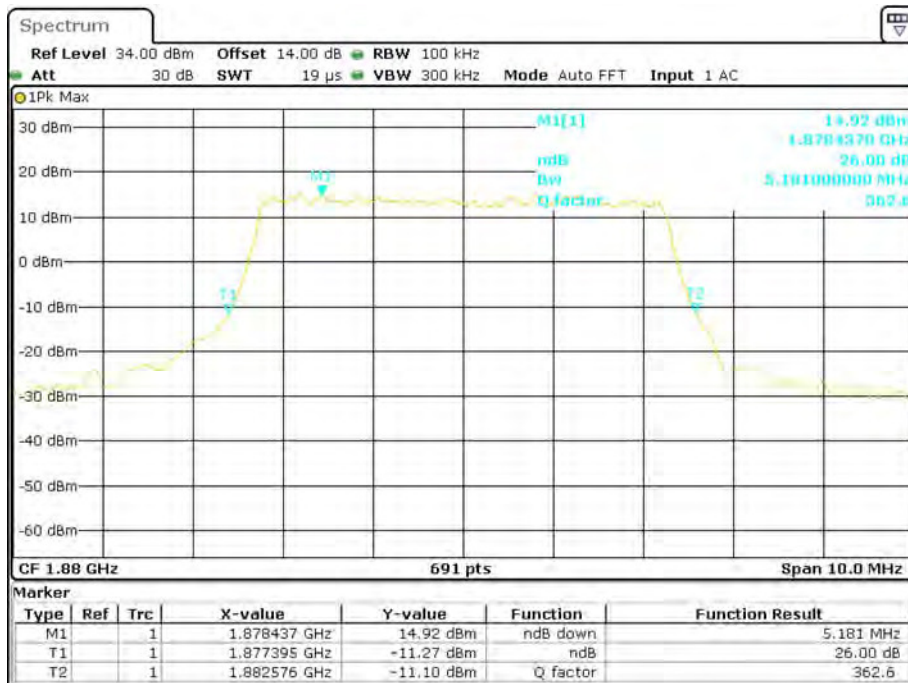
Date: 8.FEB.2018 16:52:35

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



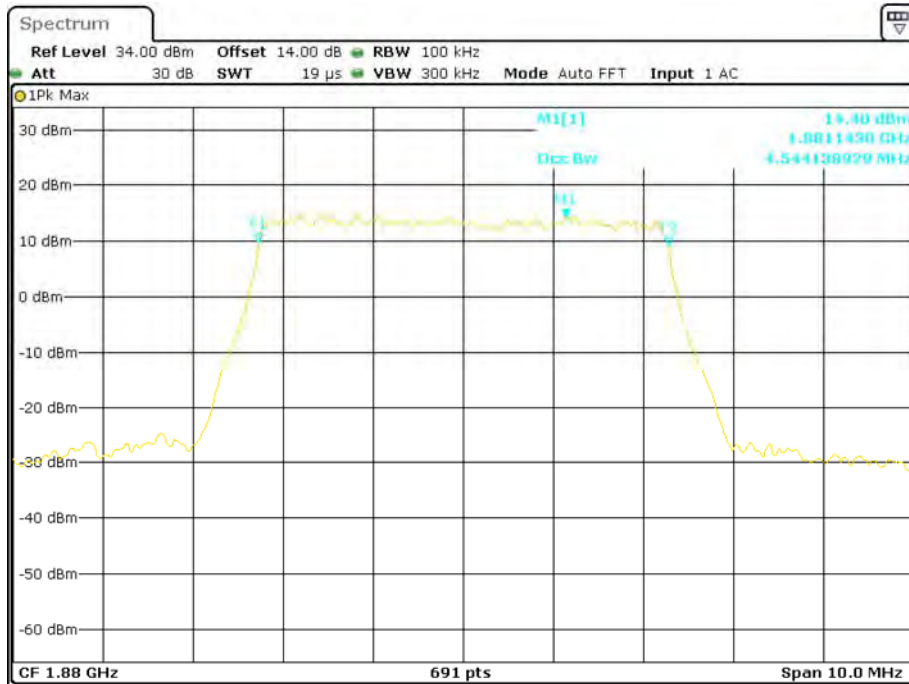
Date: 8.FEB.2018 15:17:55

QPSK (5.0 MHz) - 26 dB Bandwidth, Middle channel



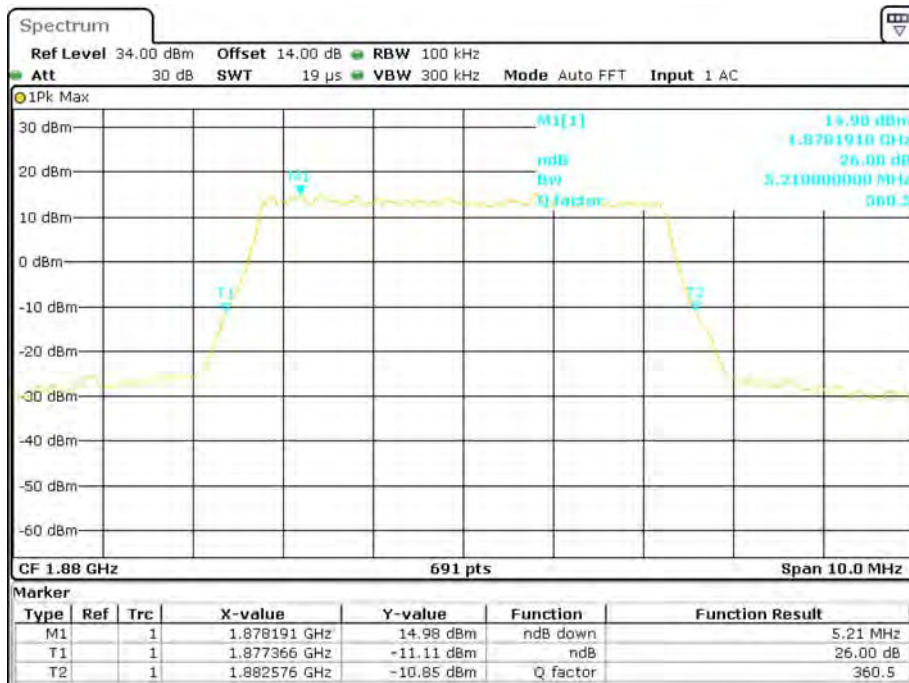
Date: 8.FEB.2018 16:53:03

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



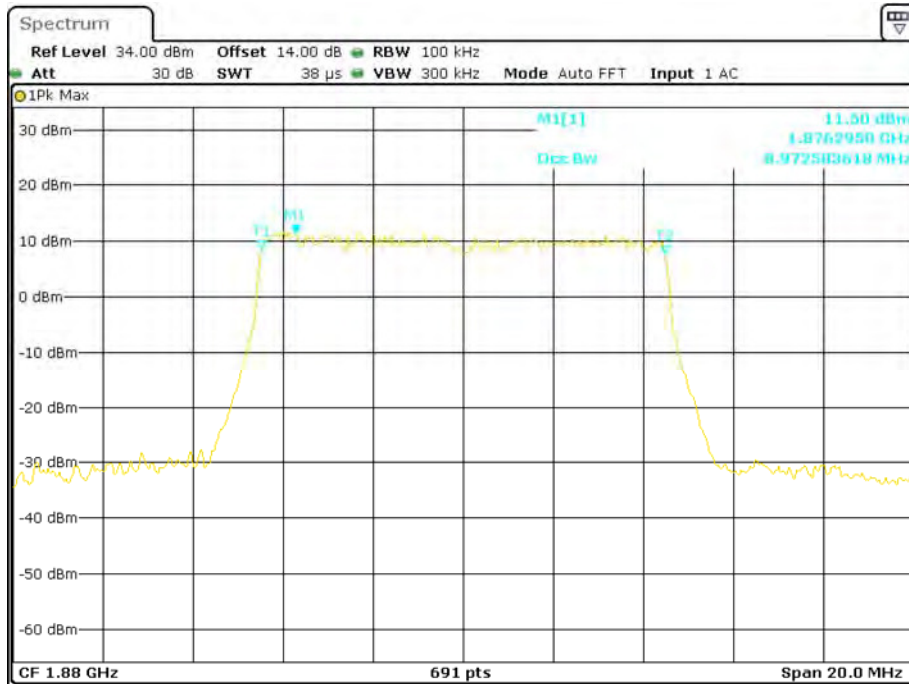
Date: 8.FEB.2018 15:24:38

16-QAM (5.0 MHz) - 26 dB Bandwidth, Middle channel



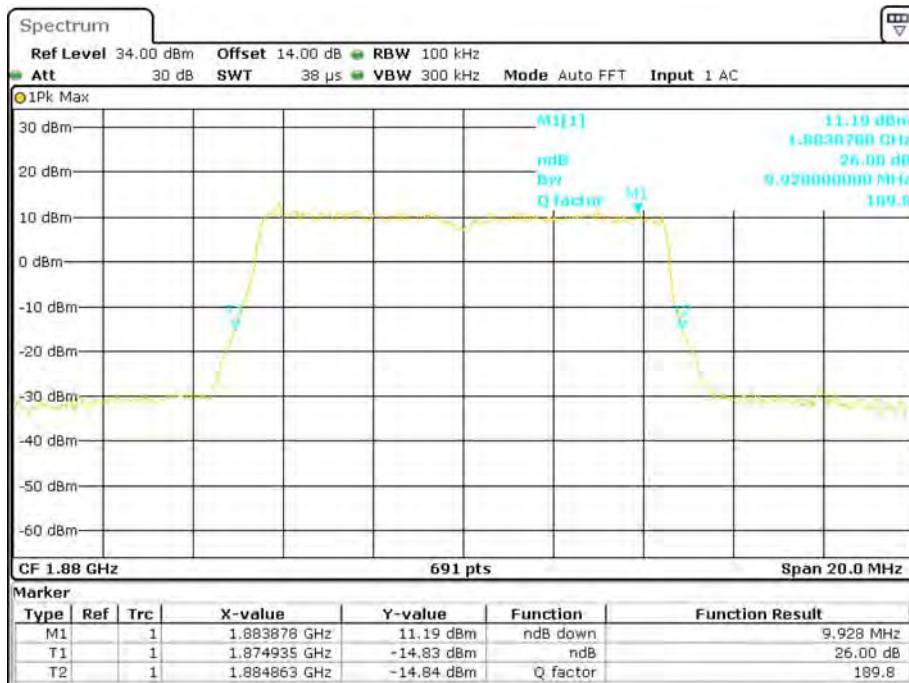
Date: 8.FEB.2018 16:54:10

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



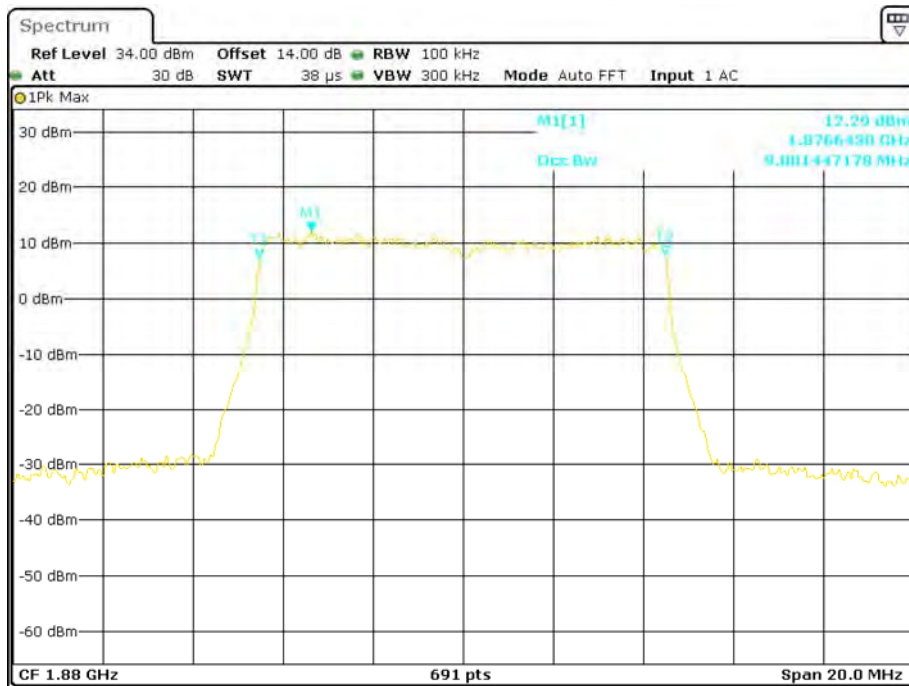
Date: 8.FEB.2018 15:26:13

QPSK (10.0 MHz) - 26 dB Bandwidth, Middle channel



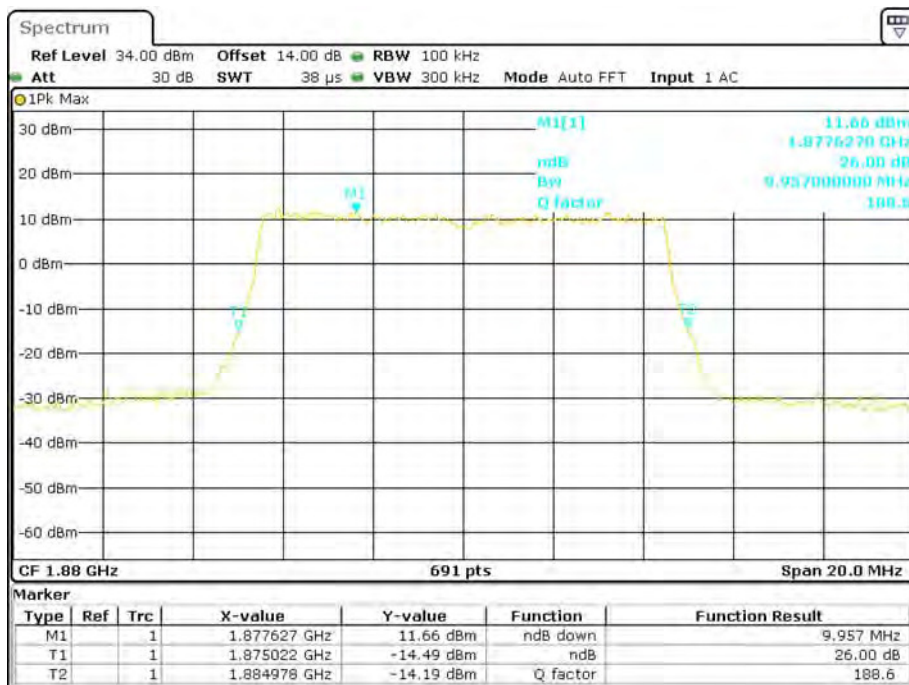
Date: 8.FEB.2018 16:55:02

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



Date: 8.FEB.2018 15:25:41

16-QAM (10.0 MHz) - 26 dB Bandwidth, Middle channel



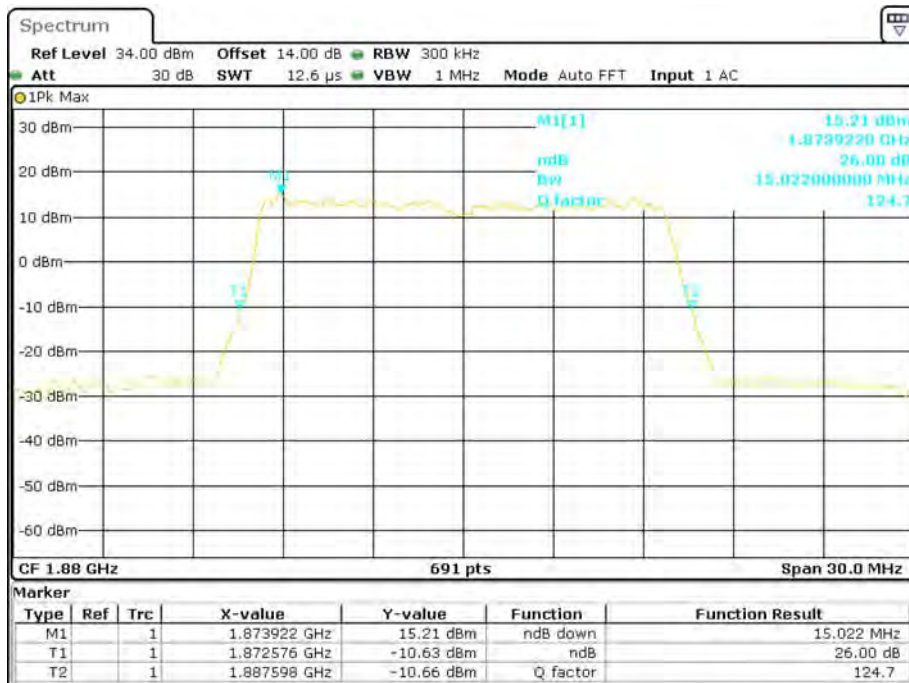
Date: 8.FEB.2018 16:54:39

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



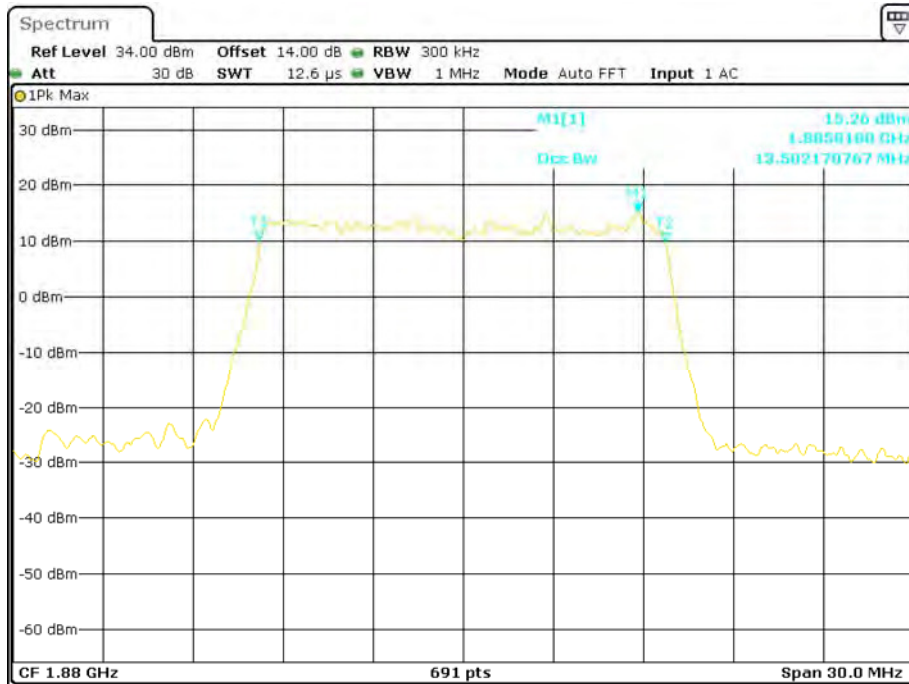
Date: 8.FEB.2018 15:27:50

QPSK (15.0 MHz) - 26 dB Bandwidth, Middle channel



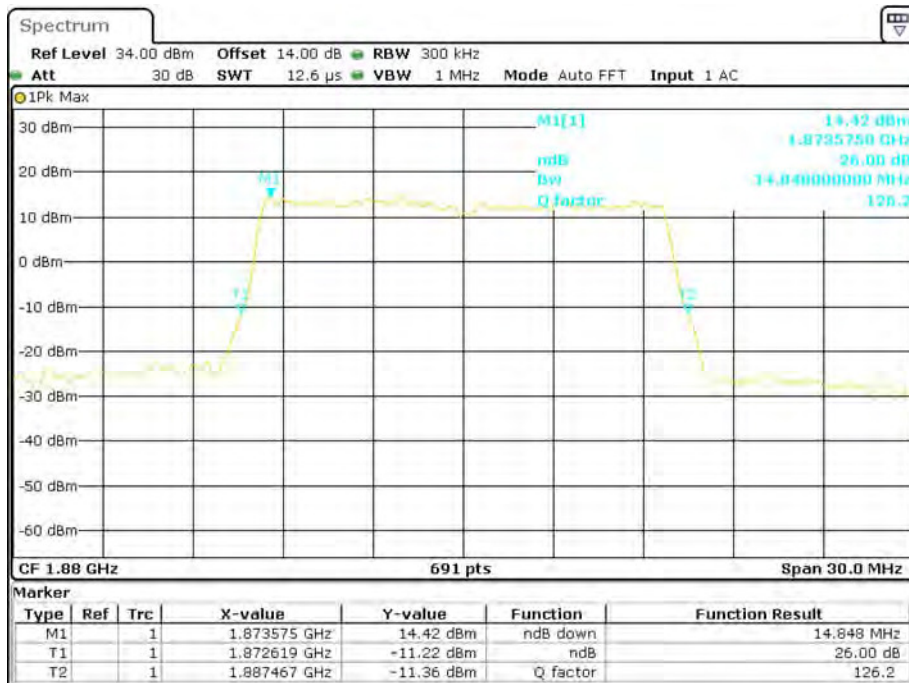
Date: 8.FEB.2018 16:55:11

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



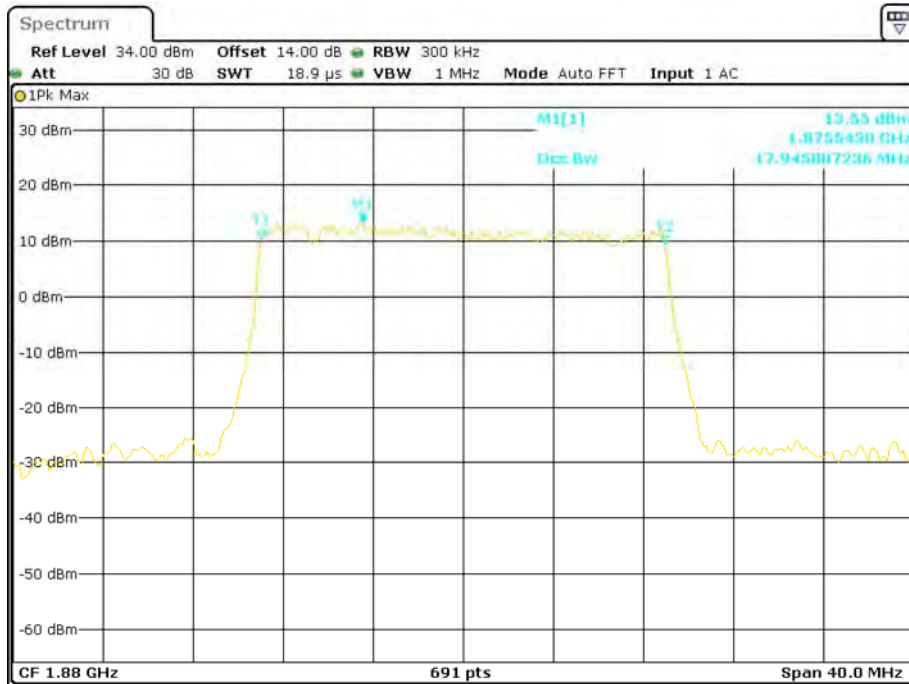
Date: 8.FEB.2018 15:28:13

16-QAM (15.0 MHz) - 26 dB Bandwidth, Middle channel



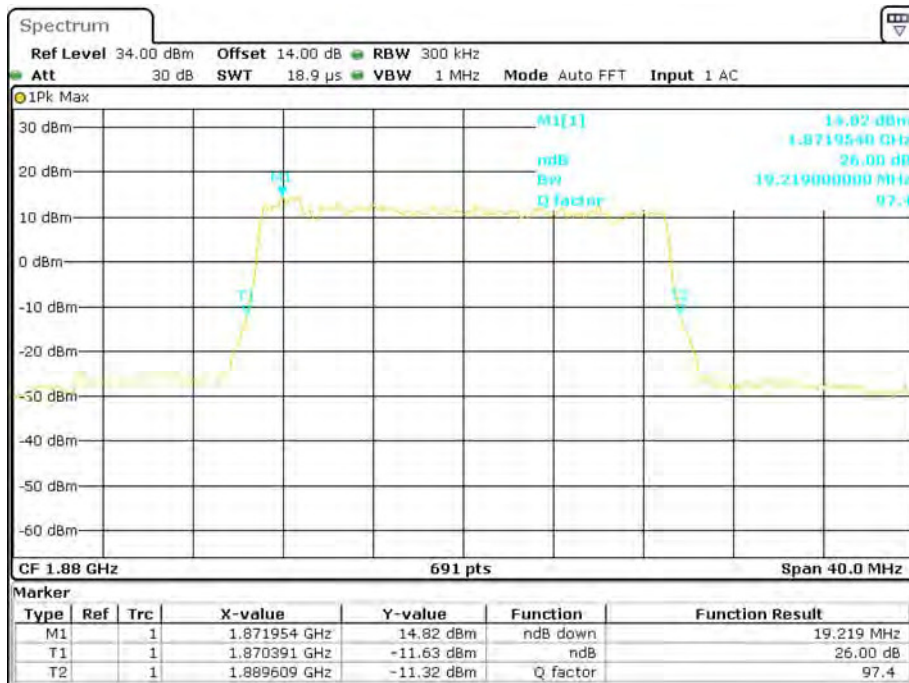
Date: 8.FEB.2018 16:55:53

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



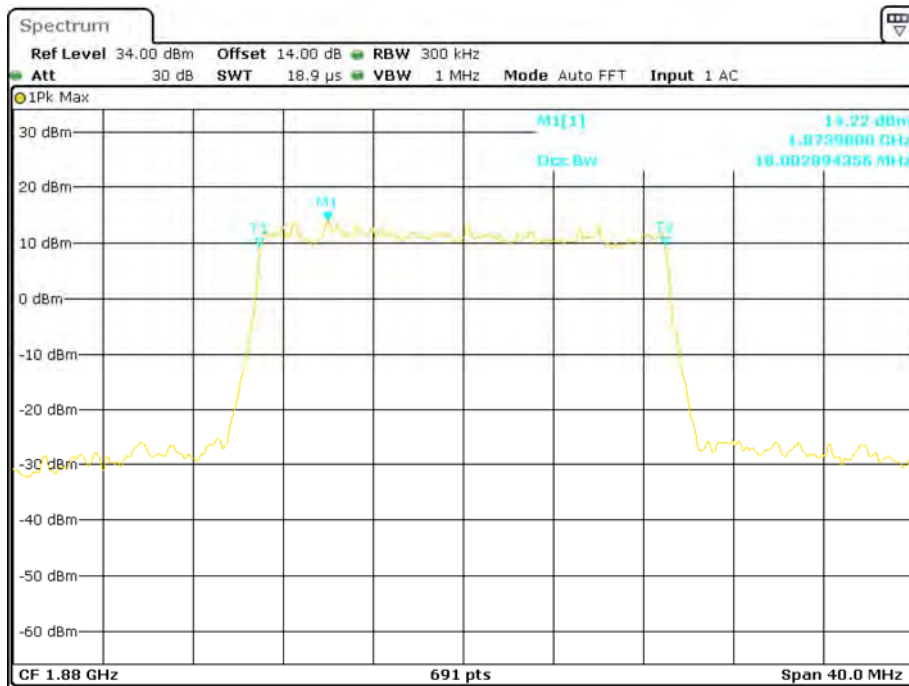
Date: 8.FEB.2018 15:29:14

QPSK (20.0 MHz) - 26 dB Bandwidth, Middle channel



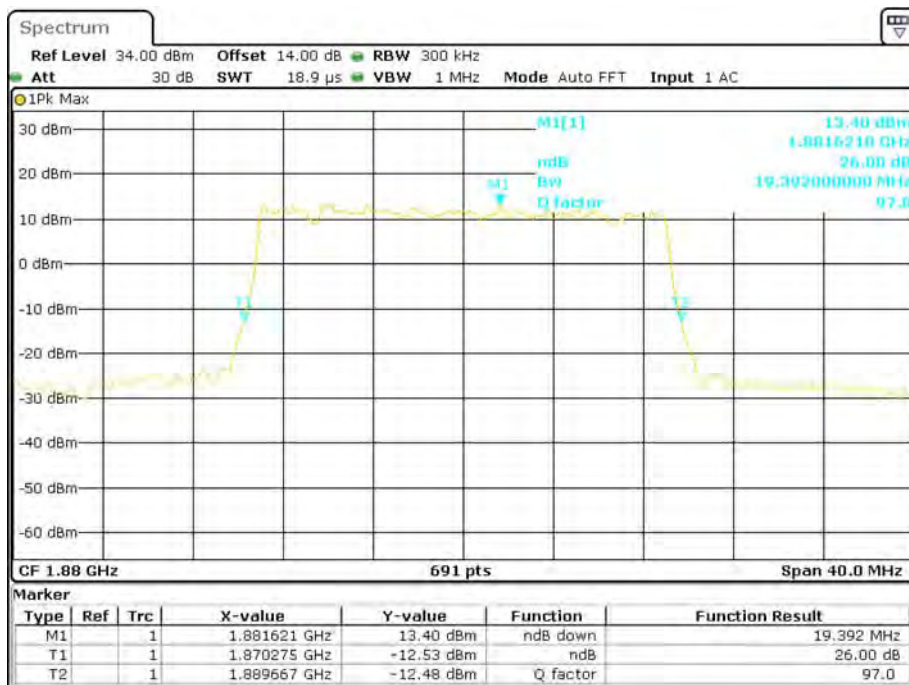
Date: 8.FEB.2018 16:56:46

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



Date: 8.FEB.2018 15:28:43

16-QAM (20.0 MHz) - 26 dB Bandwidth, Middle channel

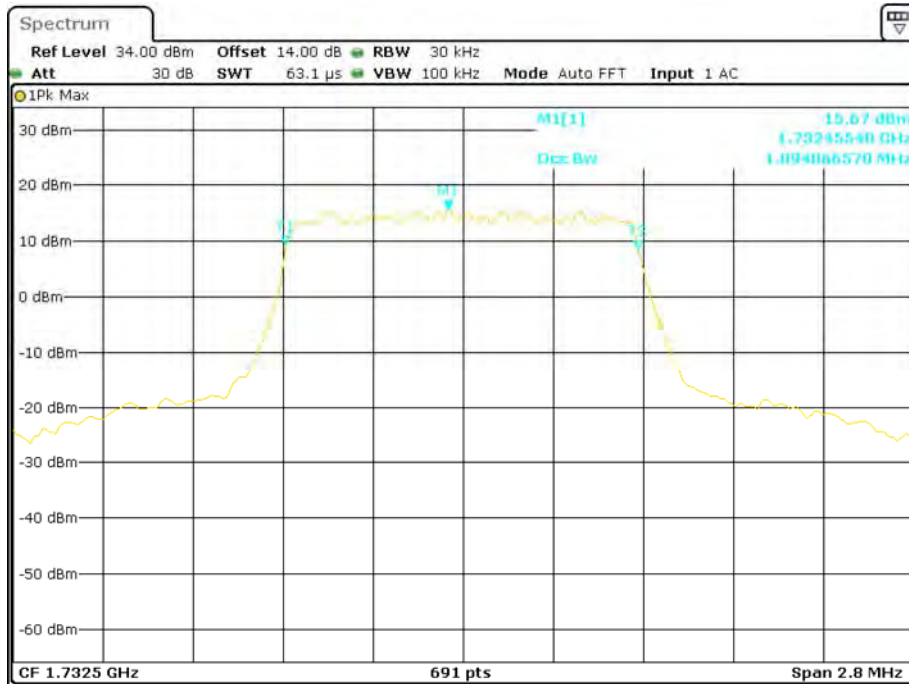


Date: 8.FEB.2018 16:56:00

LTE Band 4: (Middle Channel)

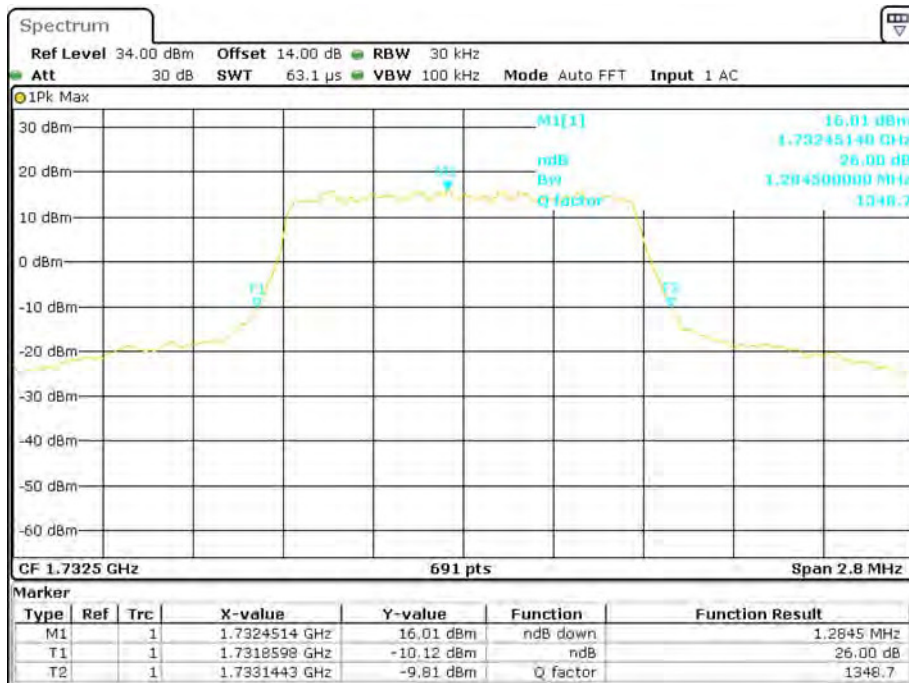
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.094	1.285
	16QAM	1.090	1.285
3.0	QPSK	2.683	2.865
	16QAM	2.683	2.865
5.0	QPSK	4.530	5.181
	16QAM	4.544	5.195
10.0	QPSK	8.973	9.957
	16QAM	8.973	9.899
15.0	QPSK	13.546	14.935
	16QAM	13.502	15.326
20.0	QPSK	17.945	19.508
	16QAM	17.887	19.392

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



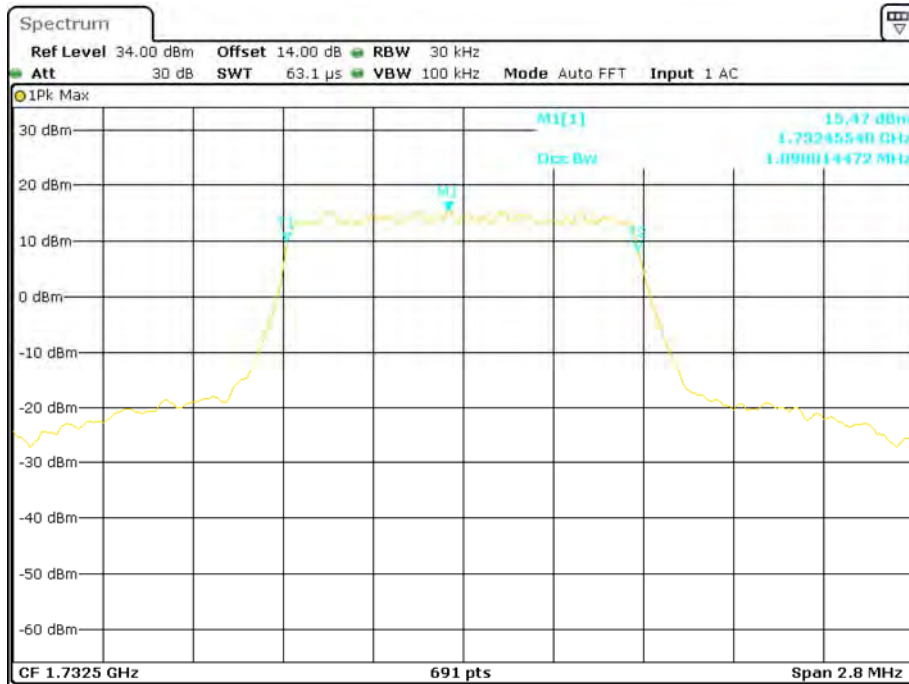
Date: 8.FEB.2018 15:40:21

QPSK (1.4 MHz) - 26 dB Bandwidth, Middle channel



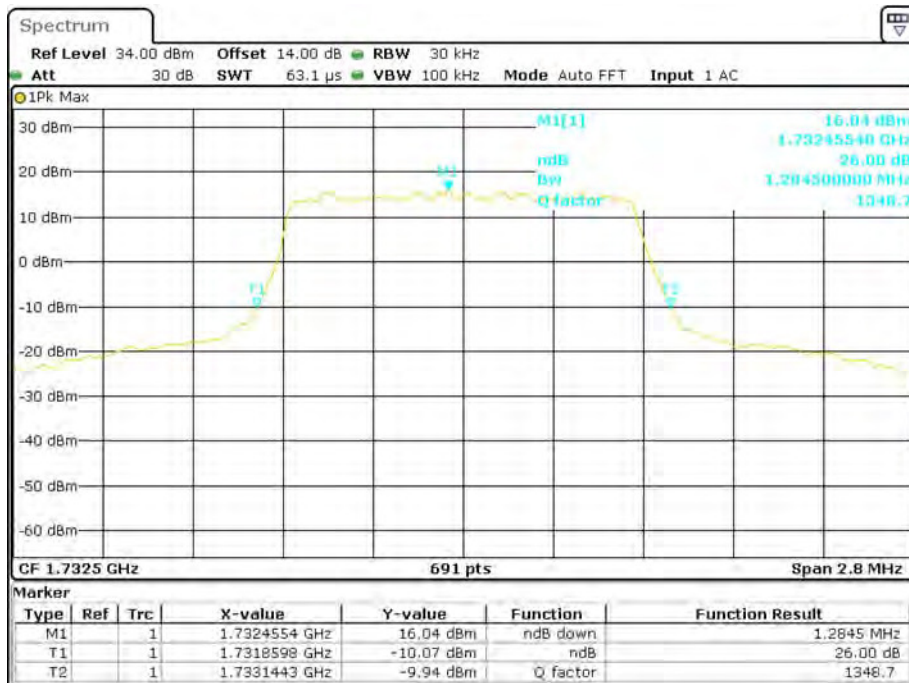
Date: 8.FEB.2018 08:10:55

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



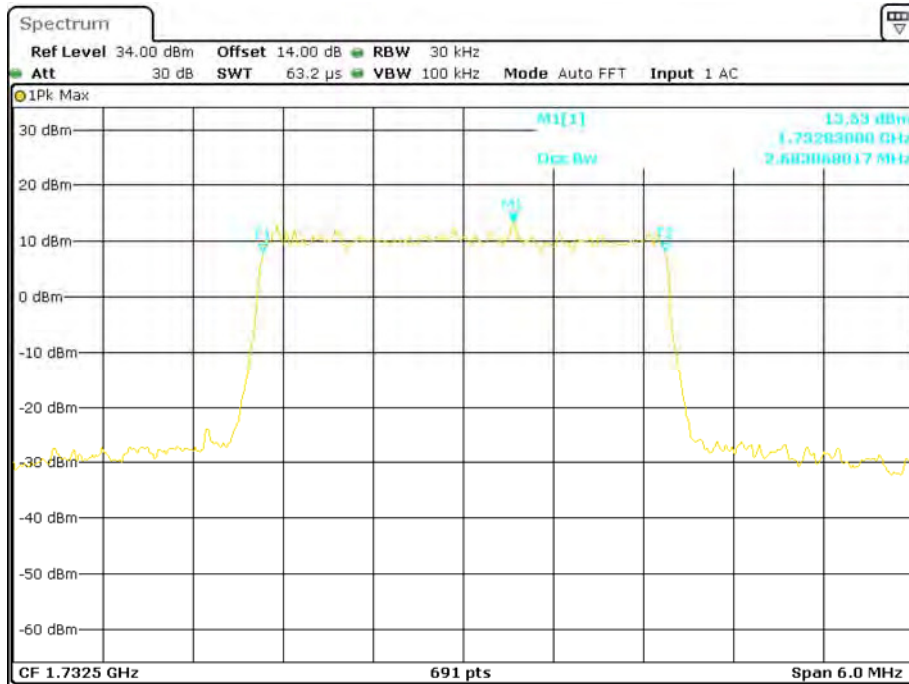
Date: 8.FEB.2018 15:40:52

16-QAM (1.4 MHz) - 26 dB Bandwidth, Middle channel



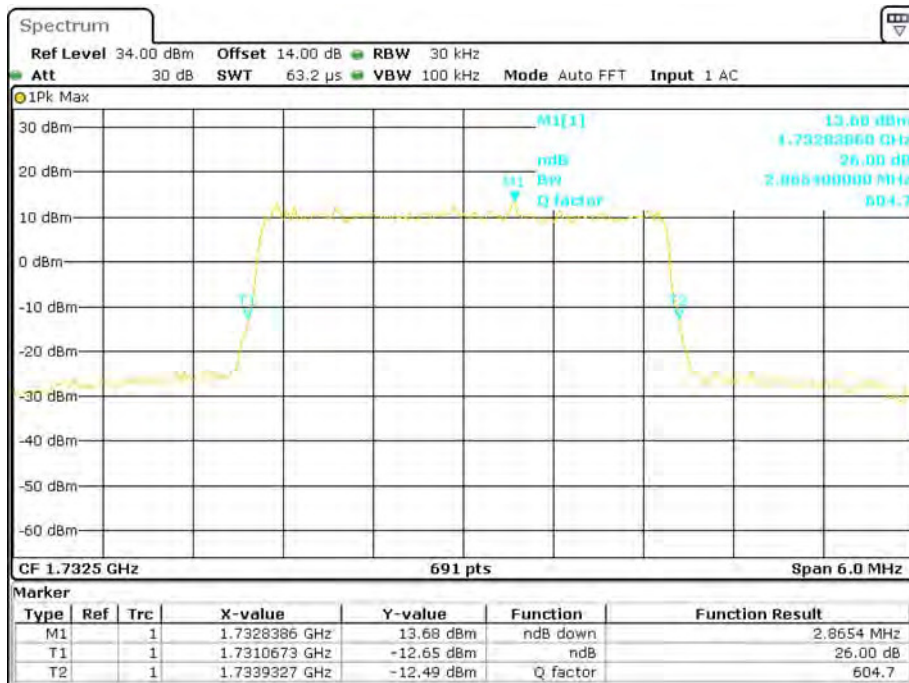
Date: 8.FEB.2018 15:53:57

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



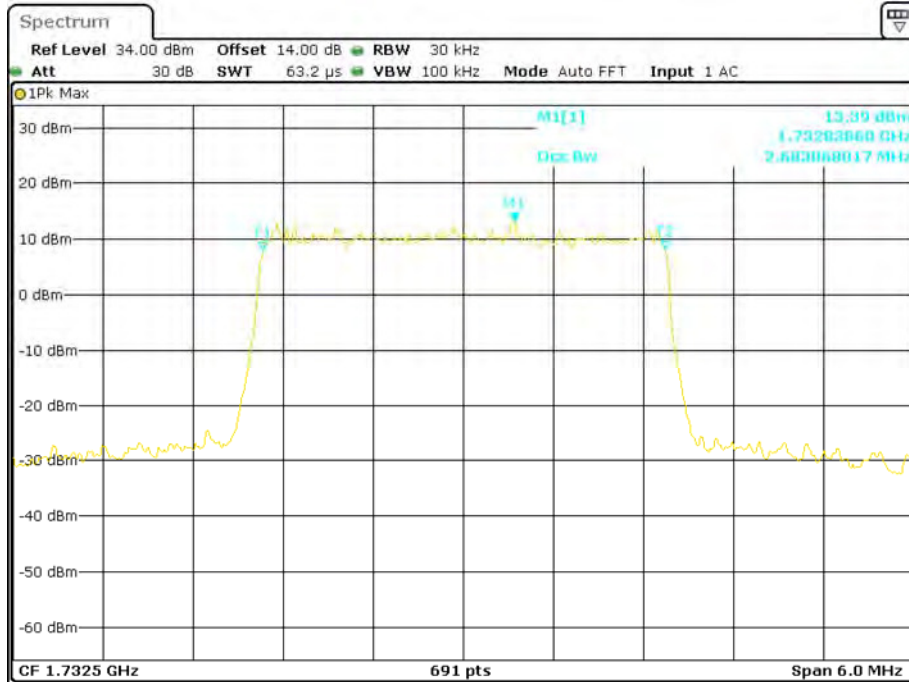
Date: 8.FEB.2018 15:42:05

QPSK (3.0 MHz) - 26 dB Bandwidth, Middle channel



Date: 9.FEB.2018 08:24:02

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



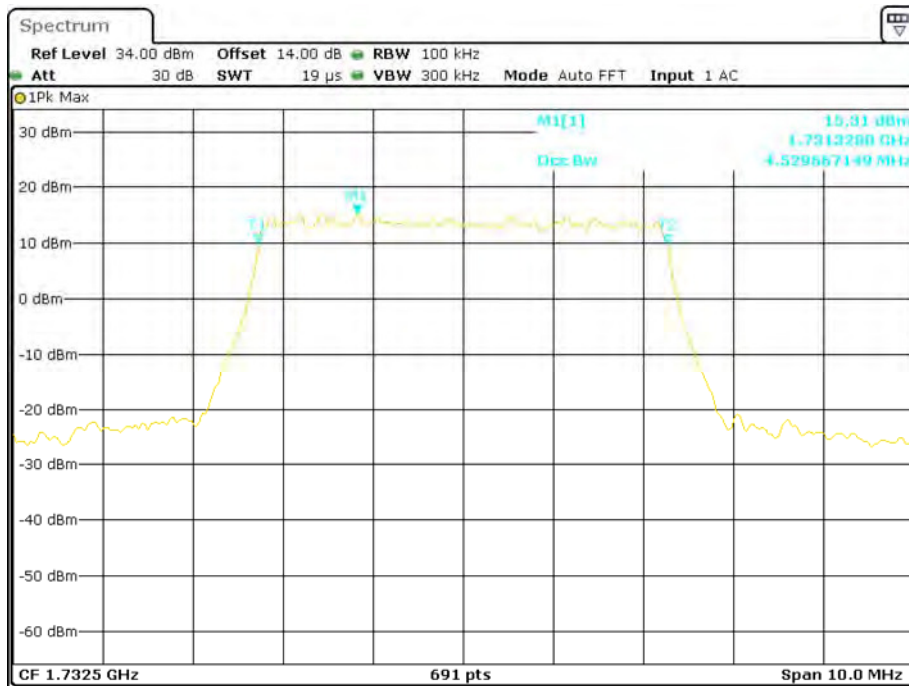
Date: 8.FEB.2018 15:41:29

16-QAM (3.0 MHz) - 26 dB Bandwidth, Middle channel



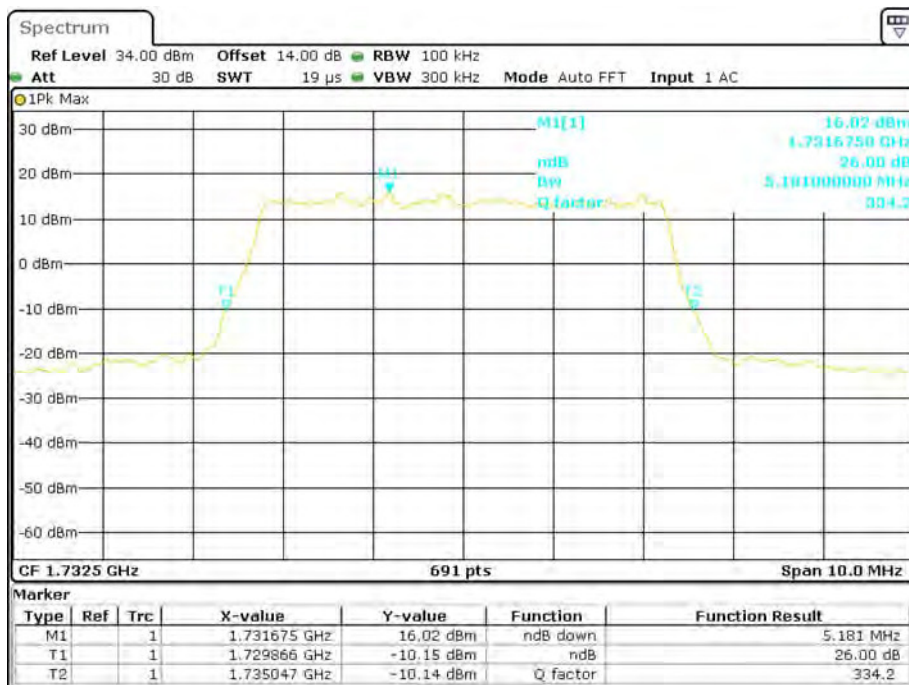
Date: 9.FEB.2018 08:19:09

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



Date: 8.FEB.2018 15:43:53

QPSK (5.0 MHz) - 26 dB Bandwidth, Middle channel



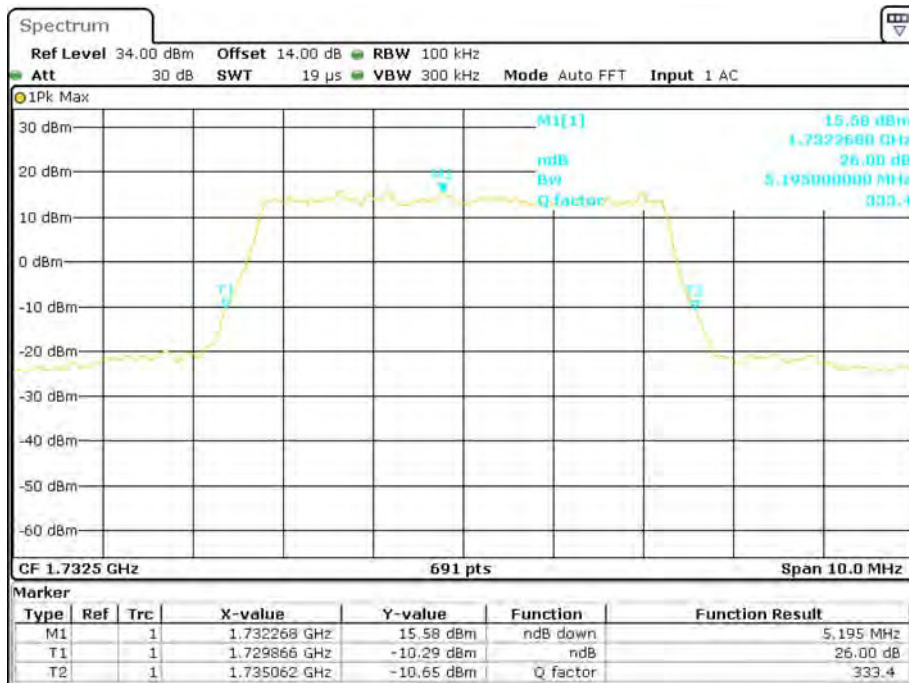
Date: 8.FEB.2018 15:43:53

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



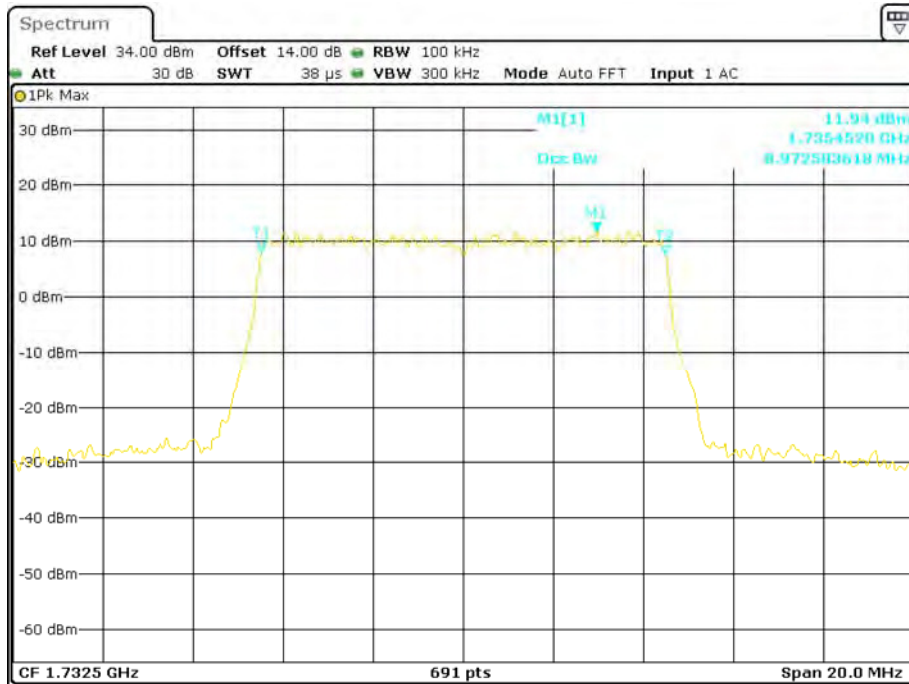
Date: 8.FEB.2018 15:44:19

16-QAM (5.0 MHz) - 26 dB Bandwidth, Middle channel



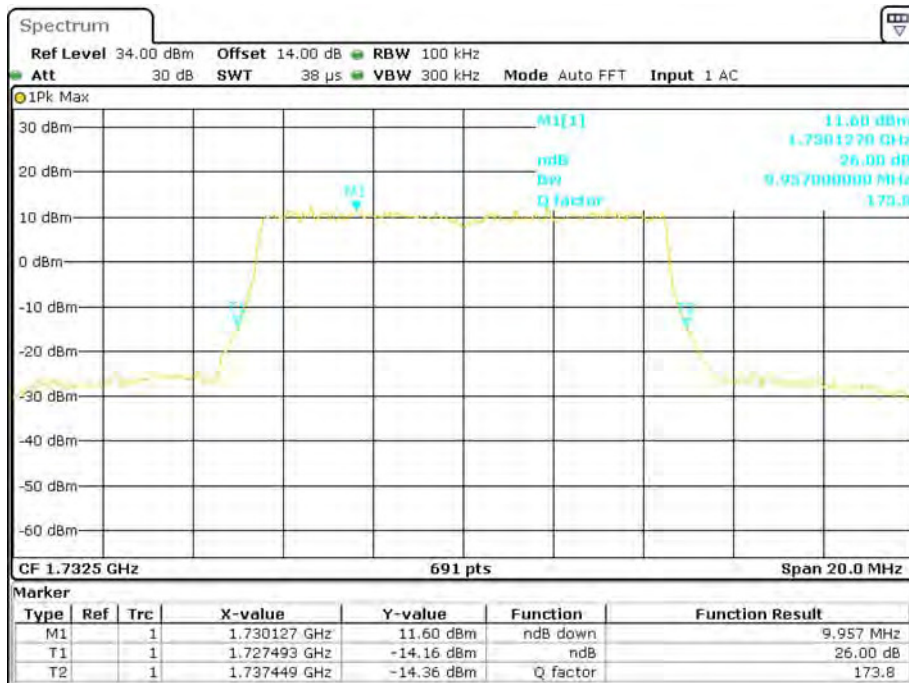
Date: 8.FEB.2018 15:26:00

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



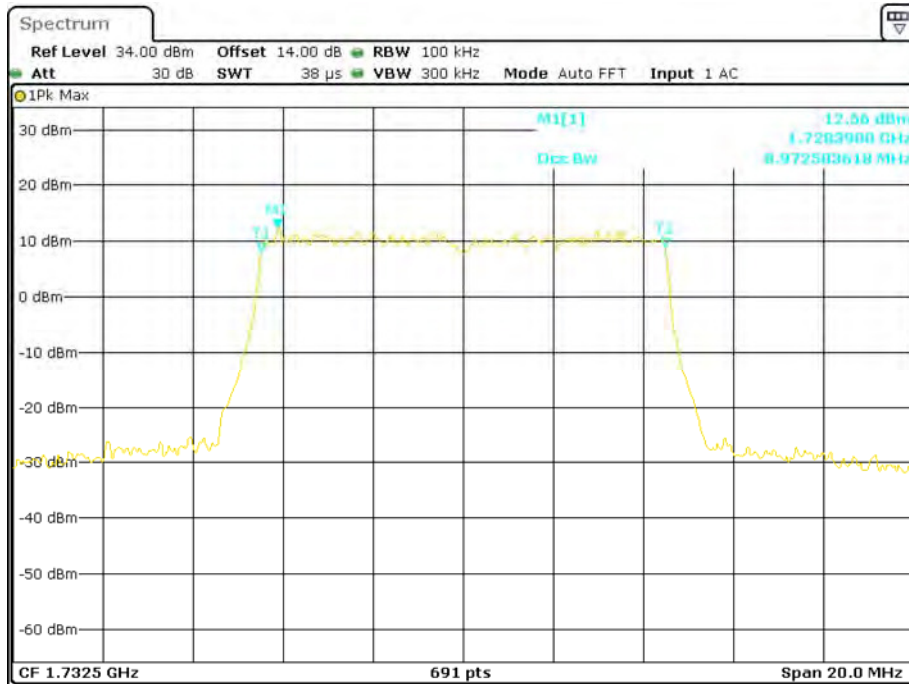
Date: 8.FEB.2018 15:45:32

QPSK (10.0 MHz) - 26 dB Bandwidth, Middle channel



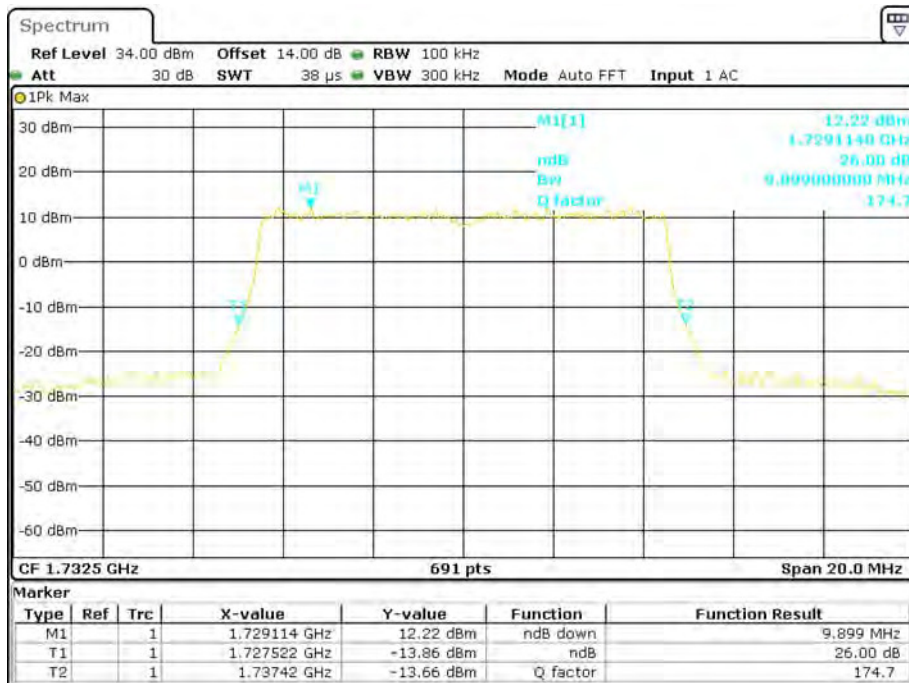
Date: 9.FEB.2018 08:28:13

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



Date: 8.FEB.2018 15:44:59

16-QAM (10.0 MHz) - 26 dB Bandwidth, Middle channel



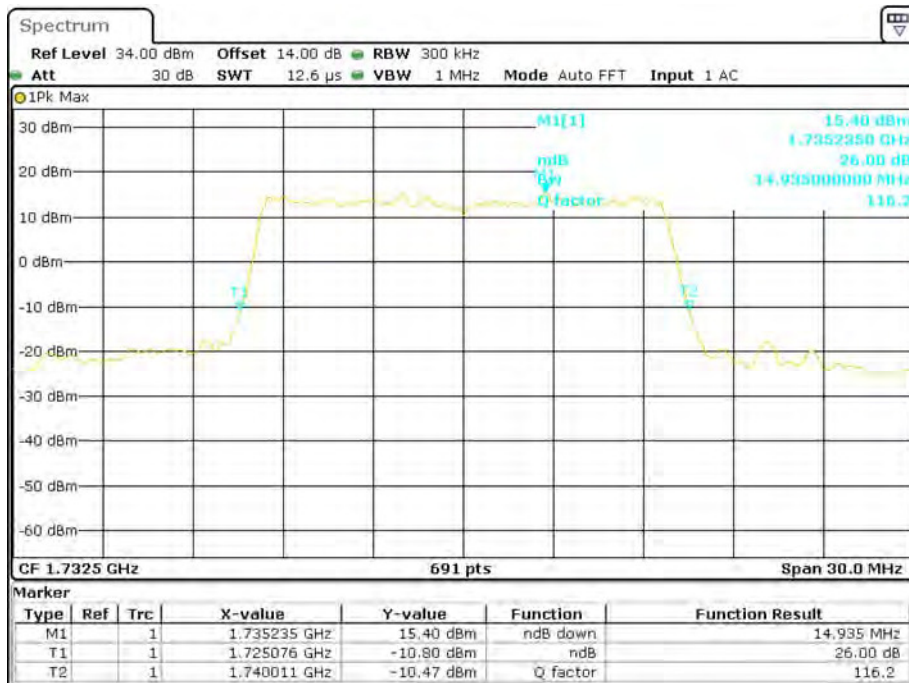
Date: 9.FEB.2018 08:27:39

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



Date: 8.FEB.2018 15:48:05

QPSK (15.0 MHz) - 26 dB Bandwidth, Middle channel



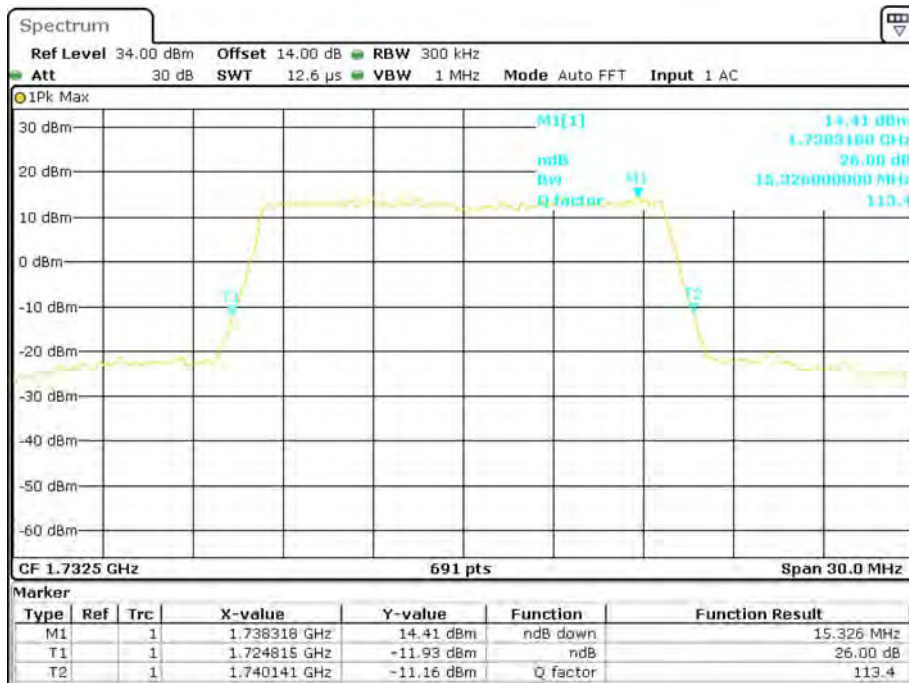
Date: 8.FEB.2018 15:50:07

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



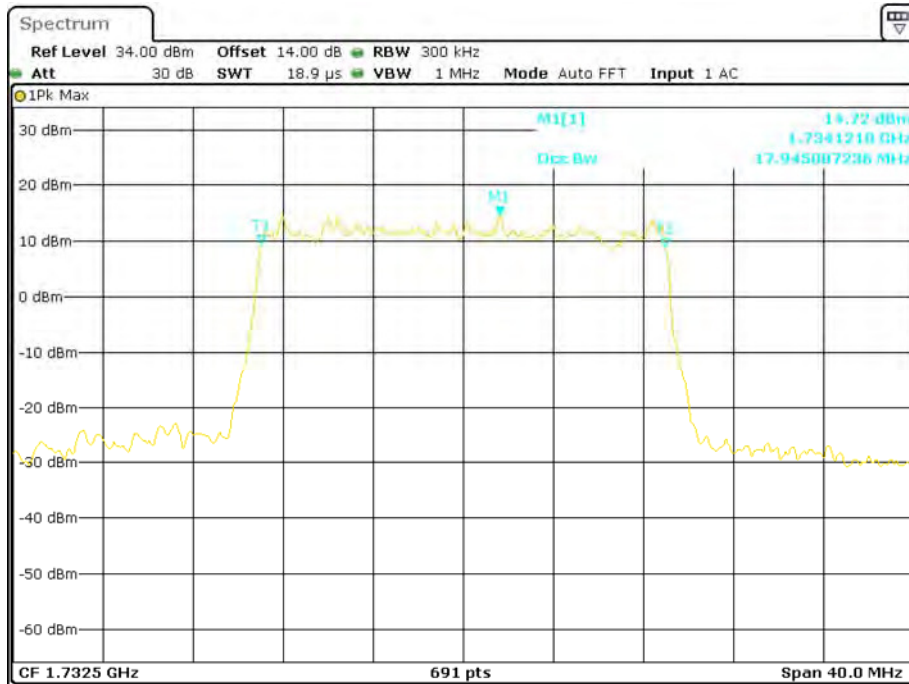
Date: 8.FEB.2018 15:48:28

16-QAM (15.0 MHz) - 26 dB Bandwidth, Middle channel



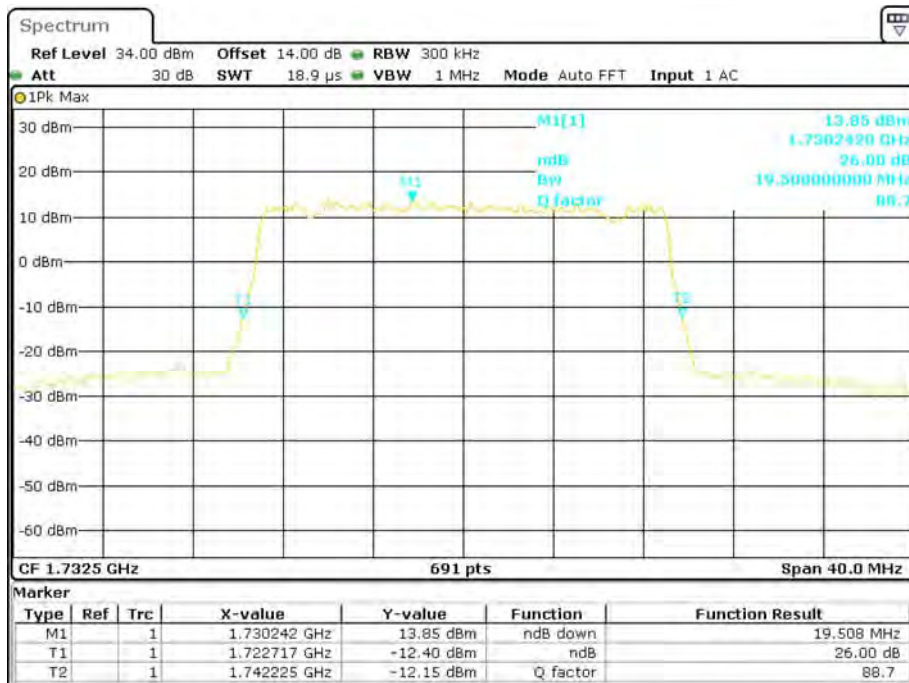
Date: 8.FEB.2018 16:28:56

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



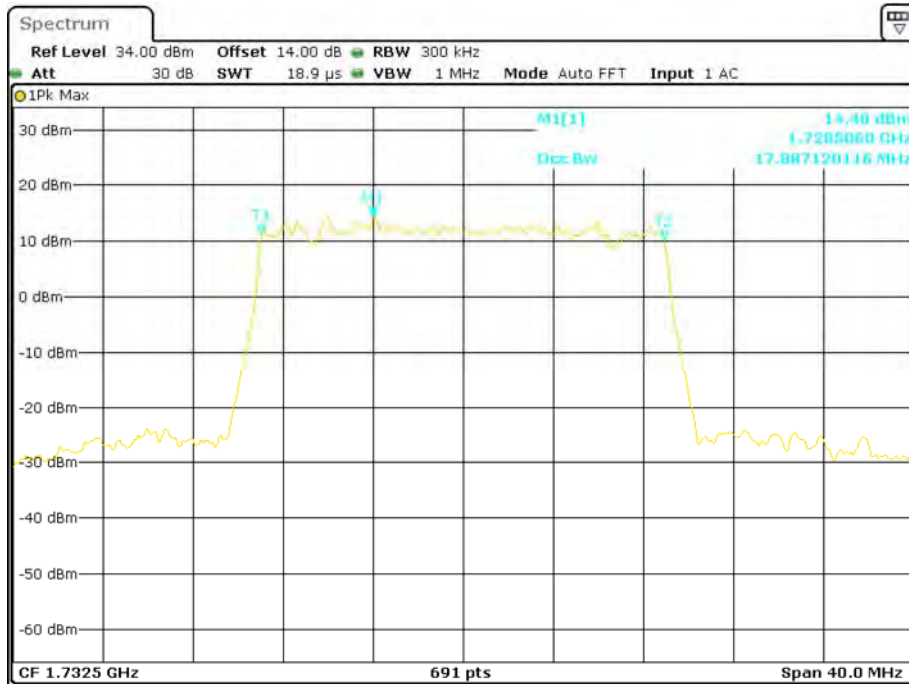
Date: 8.FEB.2018 15:49:27

QPSK (20.0 MHz) - 26 dB Bandwidth, Middle channel



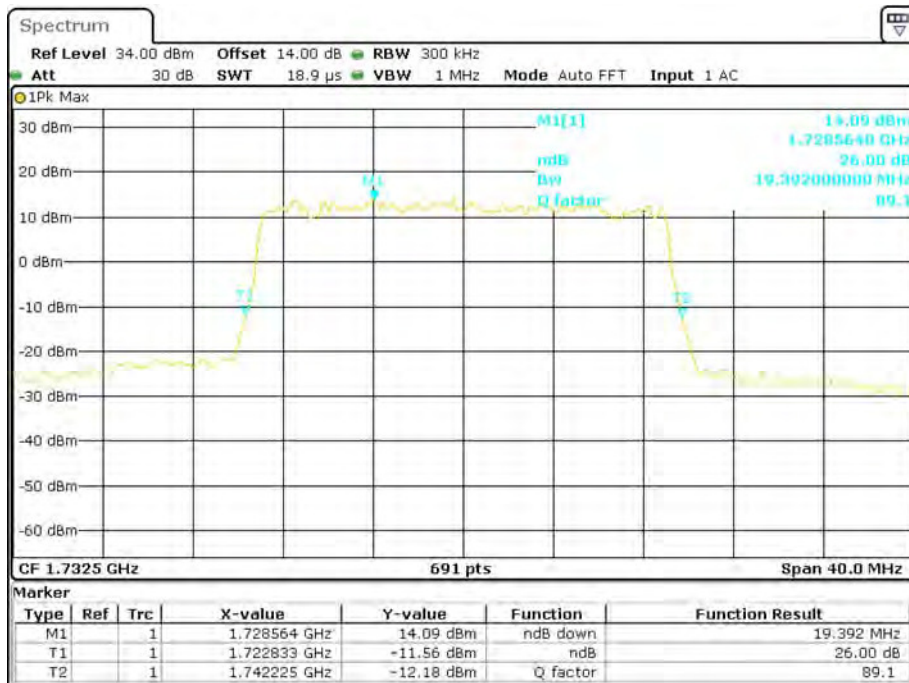
Date: 9.FEB.2018 08:31:05

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



Date: 8.FEB.2018 15:49:00

16-QAM (20.0 MHz) - 26 dB Bandwidth, Middle channel



Date: 9.FEB.2018 08:58:34

LTE Band 5: (Middle Channel)

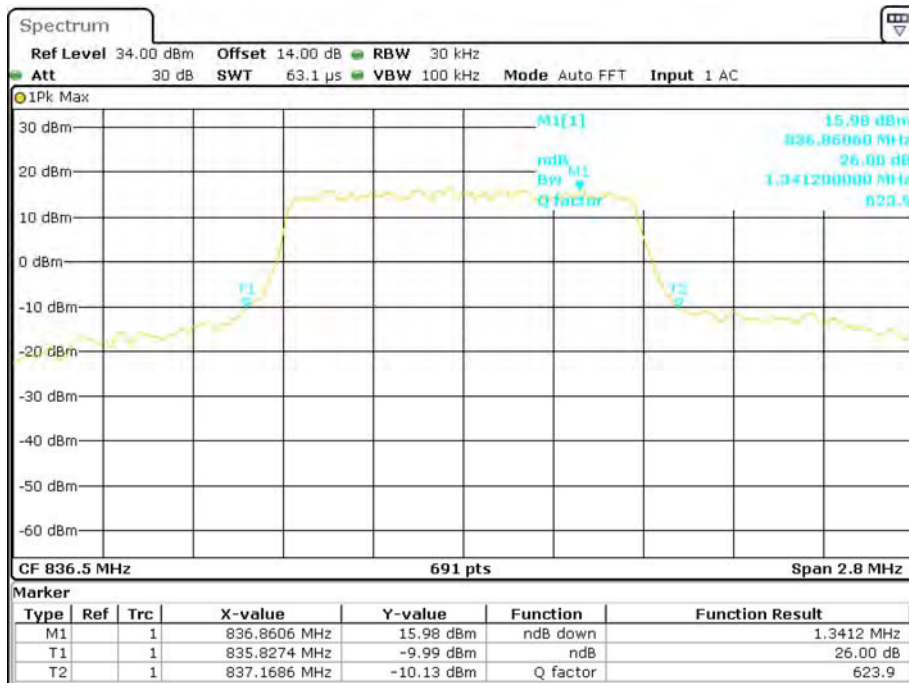
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.098	1.341
	16QAM	1.098	1.540
3.0	QPSK	2.683	2.865
	16QAM	2.683	2.865
5.0	QPSK	4.559	5.210
	16QAM	4.559	5.210
10.0	QPSK	9.001	9.986
	16QAM	9.001	9.986

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



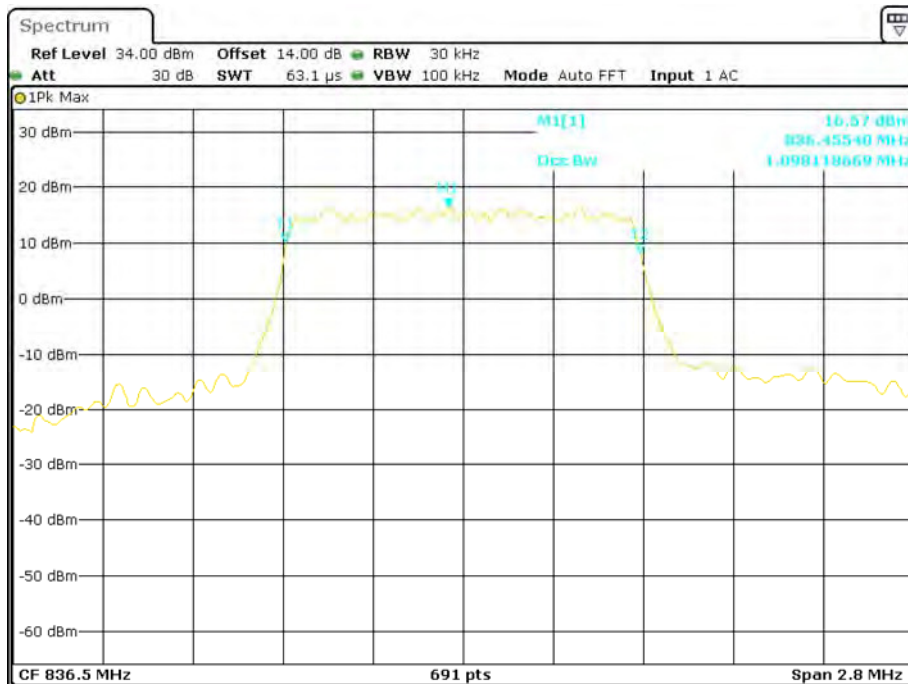
Date: 8.FEB.2018 15:59:35

QPSK (1.4 MHz) - 26 dB Bandwidth, Middle channel



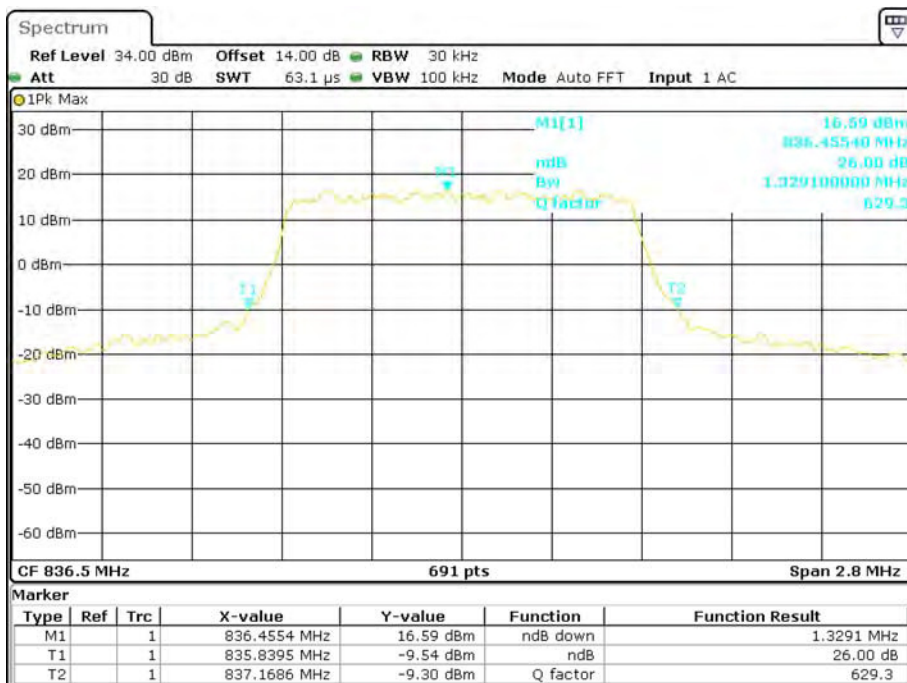
Date: 9.FEB.2018 08:37:18

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



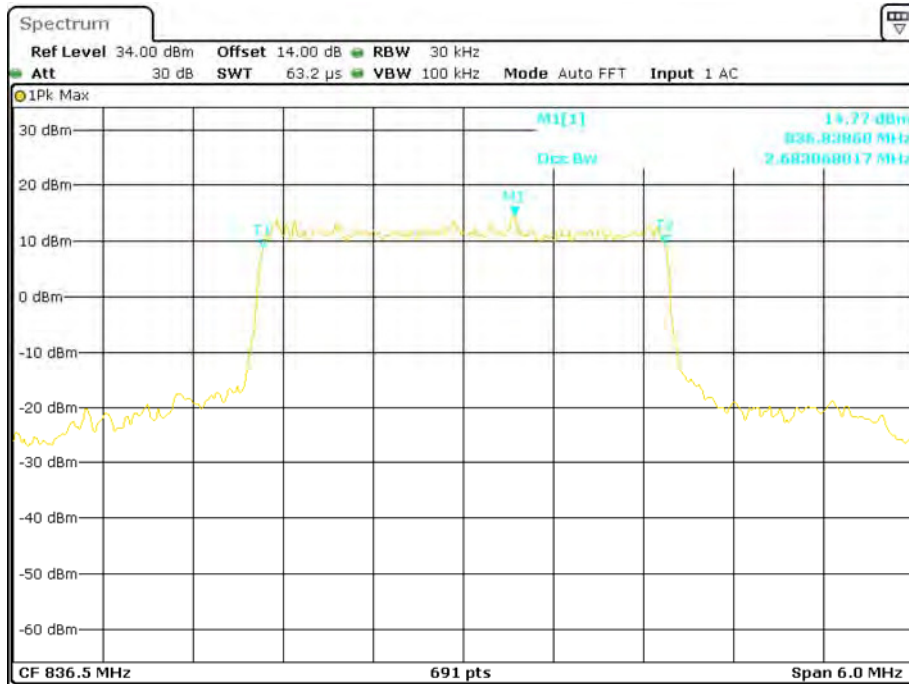
Date: 8.FEB.2018 16:00:10

16-QAM (1.4 MHz) - 26 dB Bandwidth, Middle channel



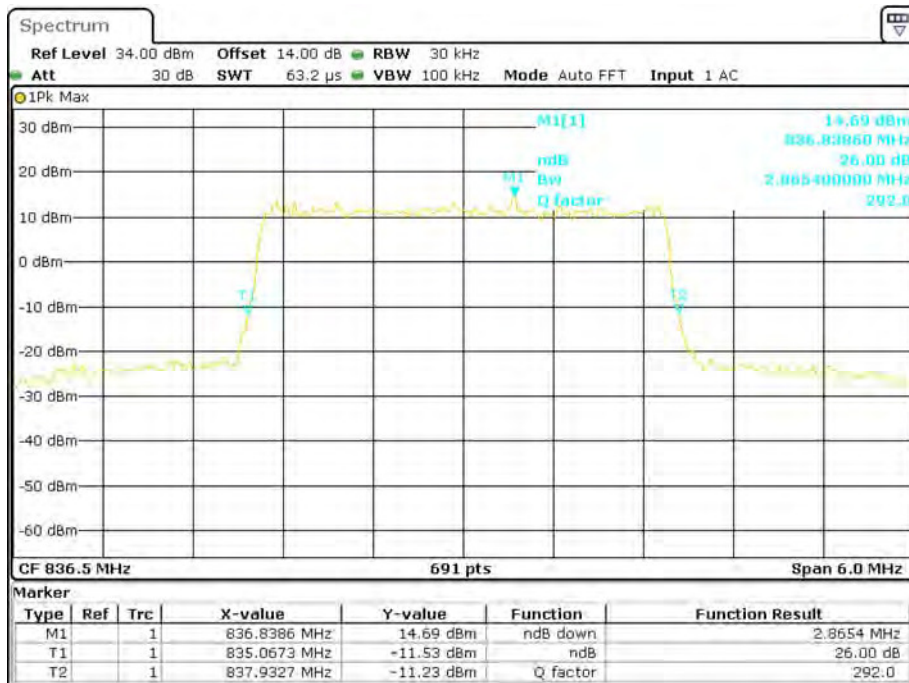
Date: 6.MAR.2018 13:53:08

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



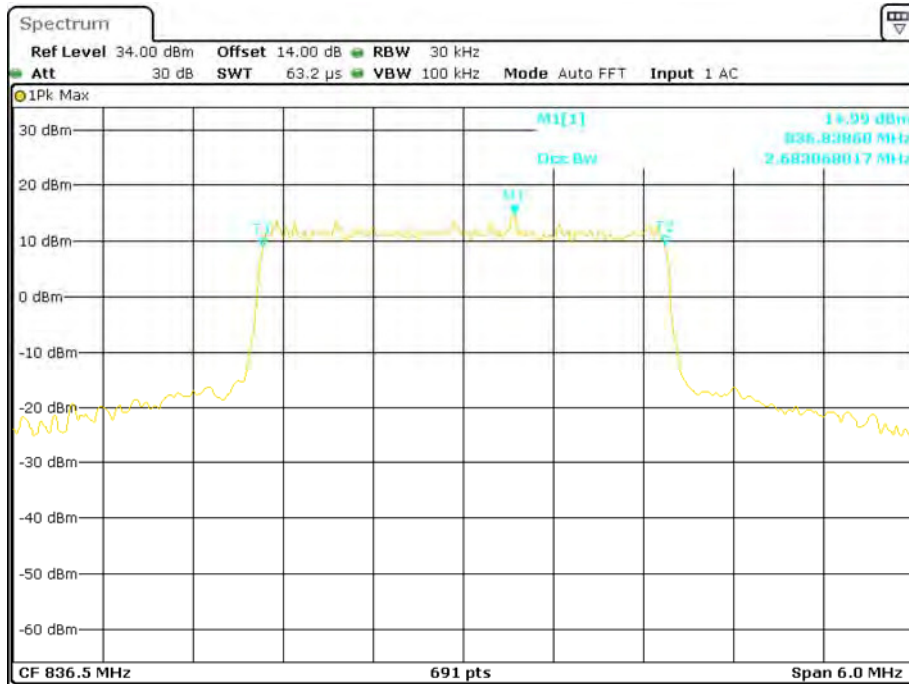
Date: 8.FEB.2018 16:01:08

QPSK (3.0 MHz) - 26 dB Bandwidth, Middle channel



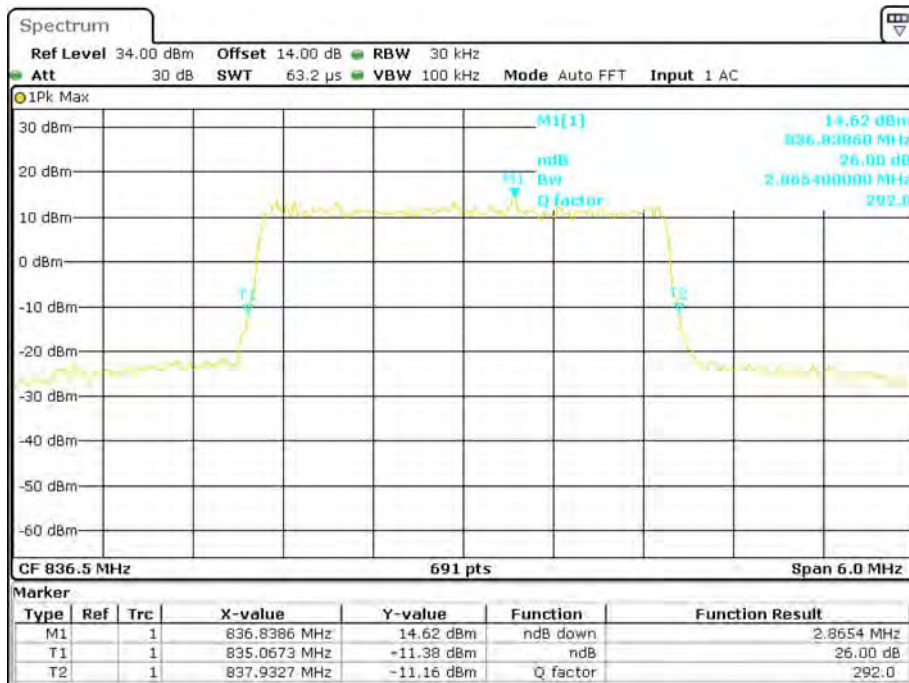
Date: 8.FEB.2018 08:30:34

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



Date: 8.FEB.2018 16:00:43

16-QAM (3.0 MHz) - 26 dB Bandwidth, Middle channel



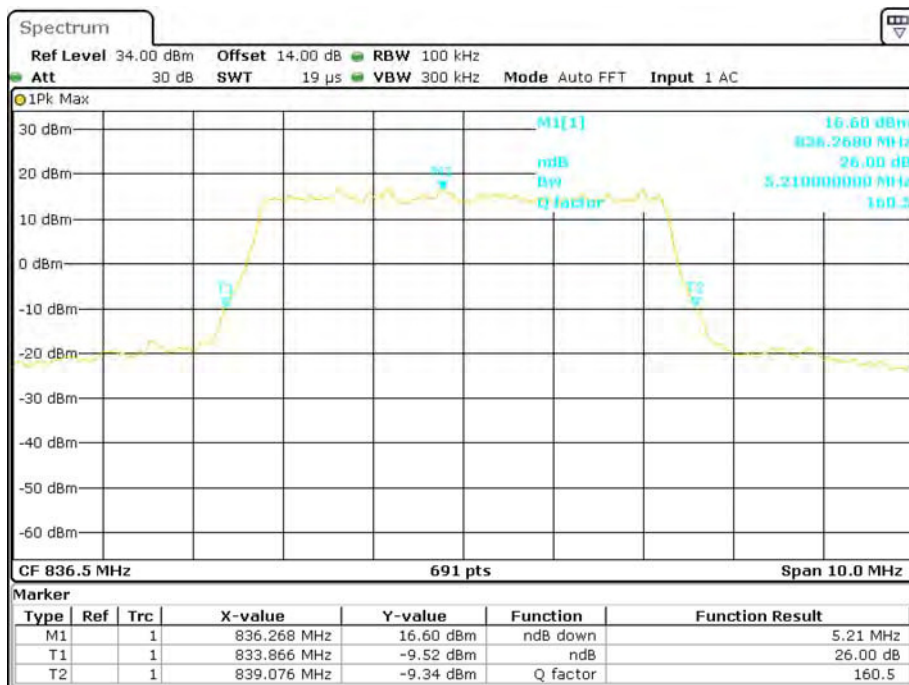
Date: 9.FEB.2018 08:58:58

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



Date: 8.FEB.2018 16:01:45

QPSK (5.0 MHz) - 26 dB Bandwidth, Middle channel



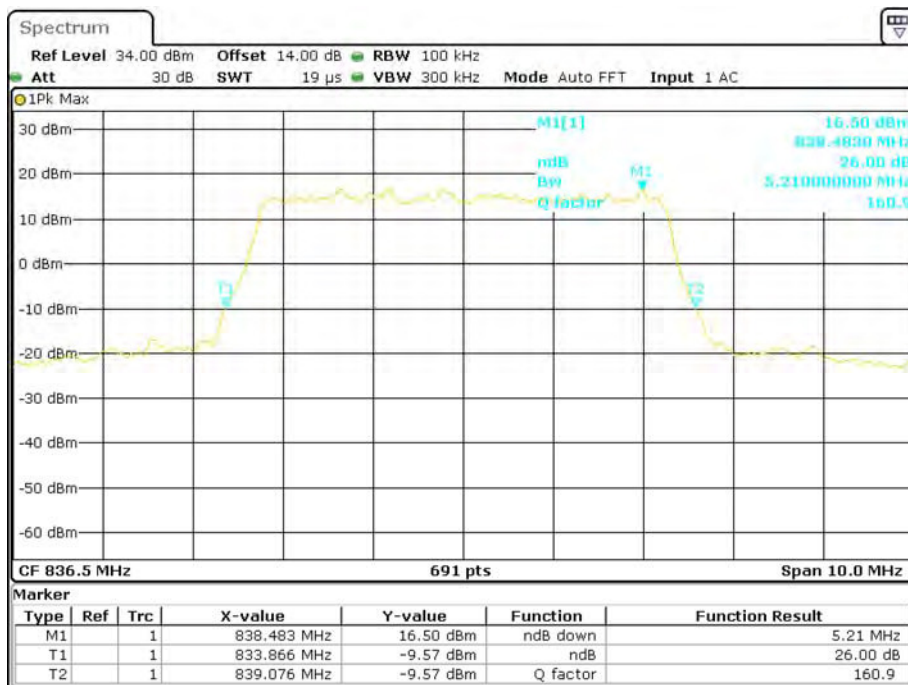
Date: 9.FEB.2018 08:40:23

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



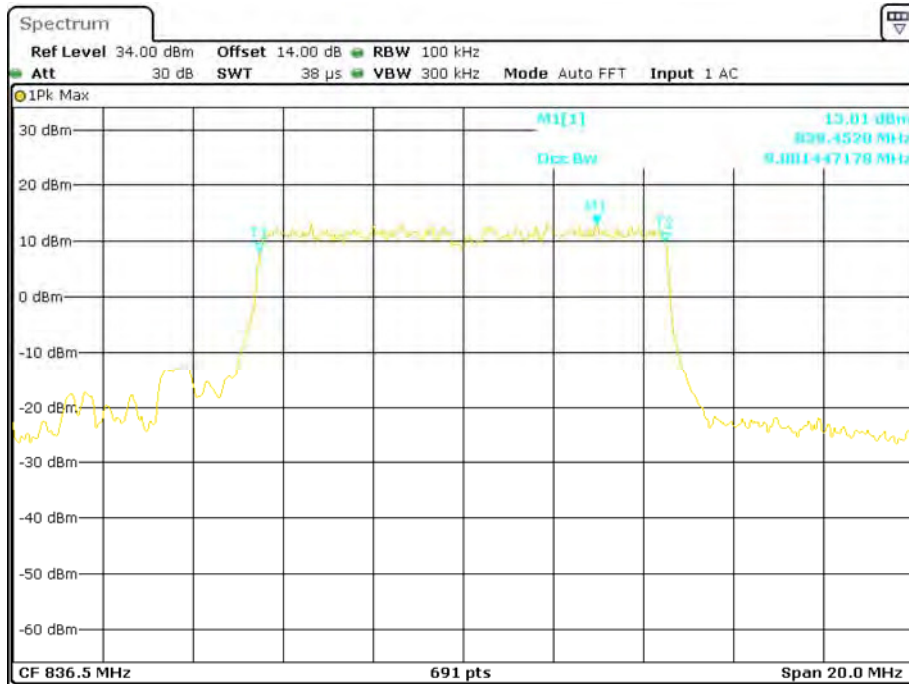
Date: 8.FEB.2018 16:02:12

16-QAM (5.0 MHz) - 26 dB Bandwidth, Middle channel



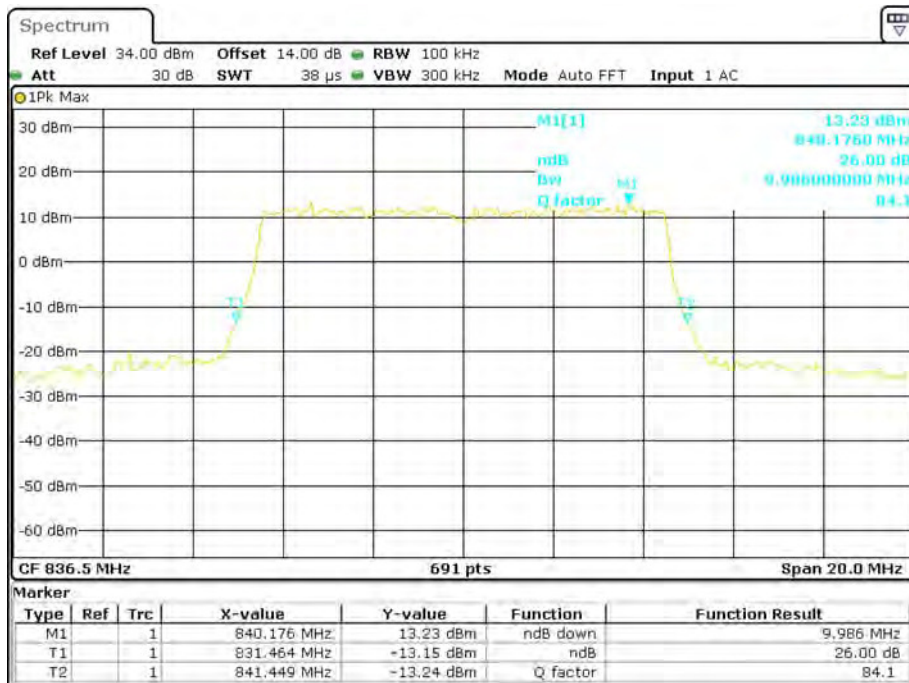
Date: 9.FEB.2018 08:40:51

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



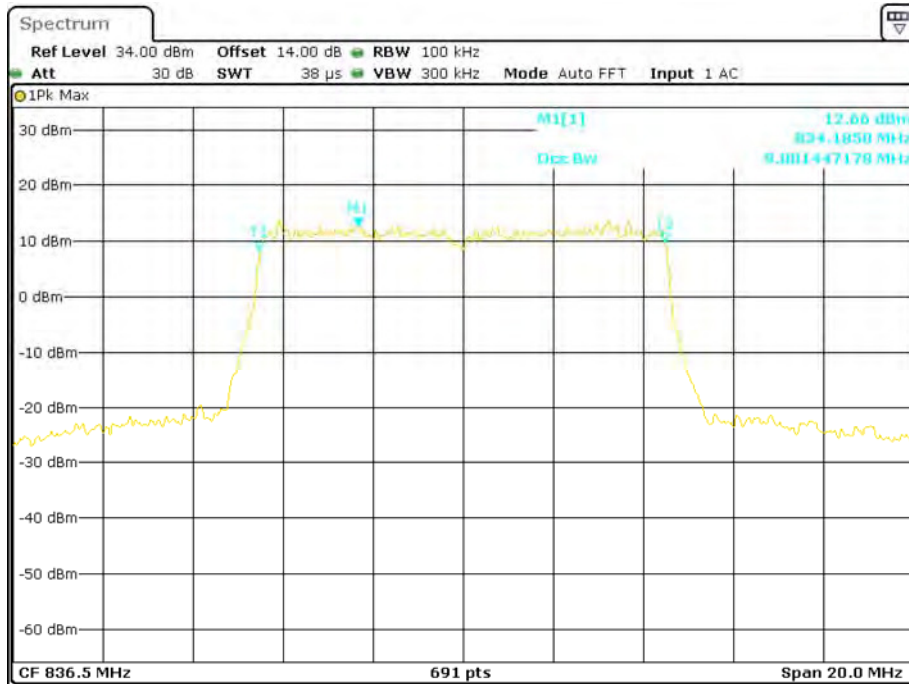
Date: 8.FEB.2018 16:03:22

QPSK (10.0 MHz) - 26 dB Bandwidth, Middle channel



Date: 8.FEB.2018 08:01:53

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



Date: 8.FEB.2018 16:02:43

16-QAM (10.0 MHz) - 26 dB Bandwidth, Middle channel

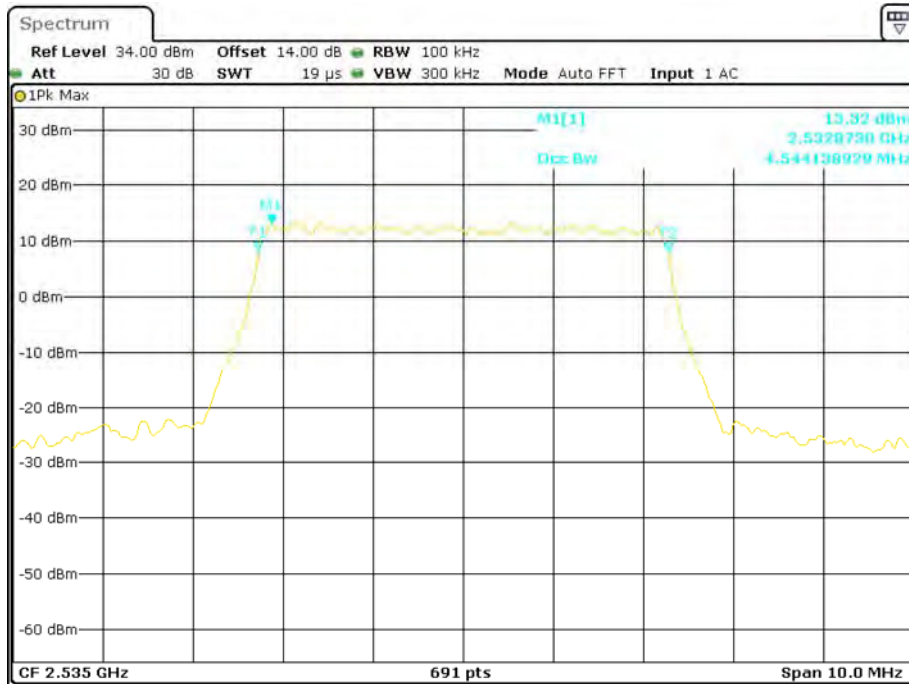


Date: 9.FEB.2018 08:41:52

LTE Band 7: (Middle Channel)

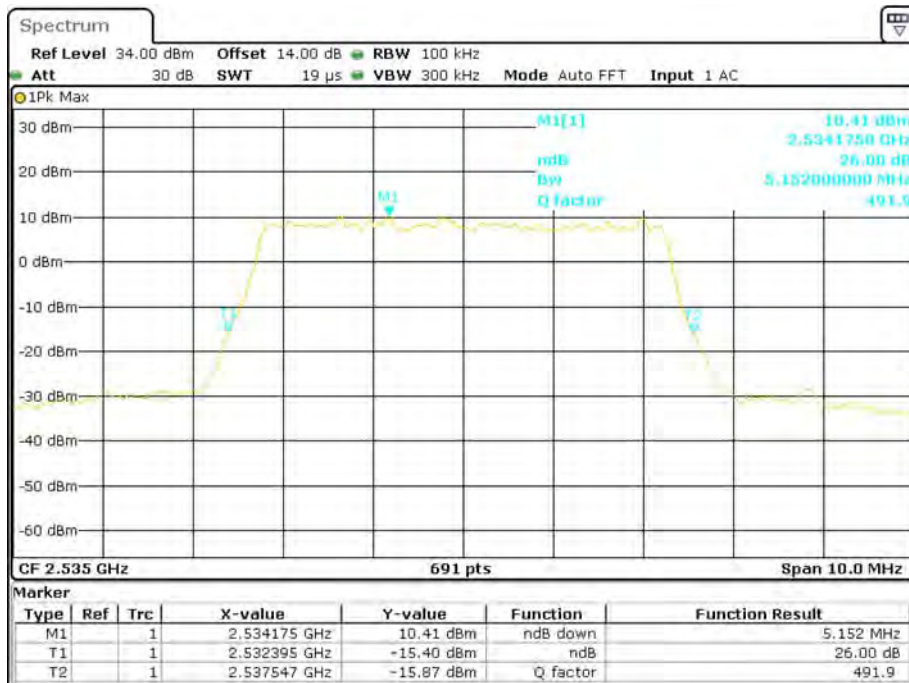
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.544	5.152
	16QAM	4.544	5.152
10.0	QPSK	8.973	9.928
	16QAM	9.001	9.754
15.0	QPSK	13.502	15.239
	16QAM	13.546	15.109
20.0	QPSK	17.945	19.392
	16QAM	17.945	19.392

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



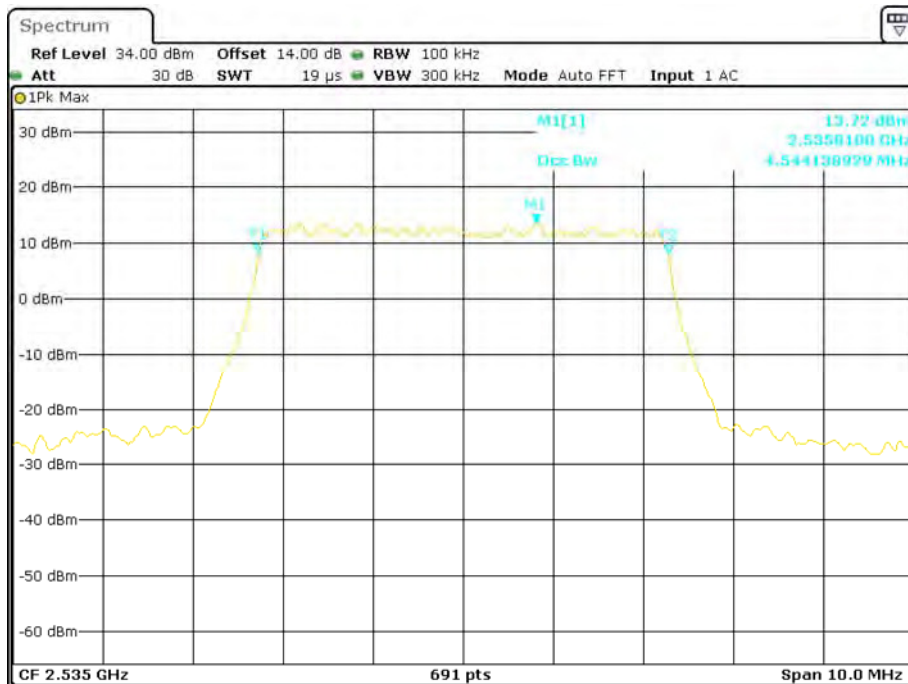
Date: 8.FEB.2018 16:17:23

QPSK (5.0 MHz) - 26 dB Bandwidth, Middle channel



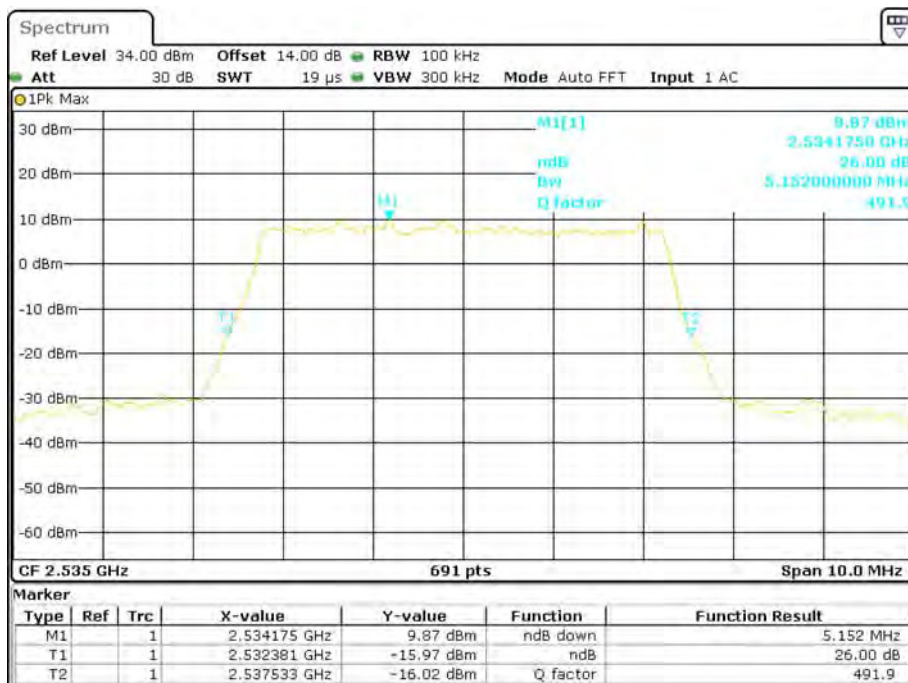
Date: 9.FEB.2018 08:43:46

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



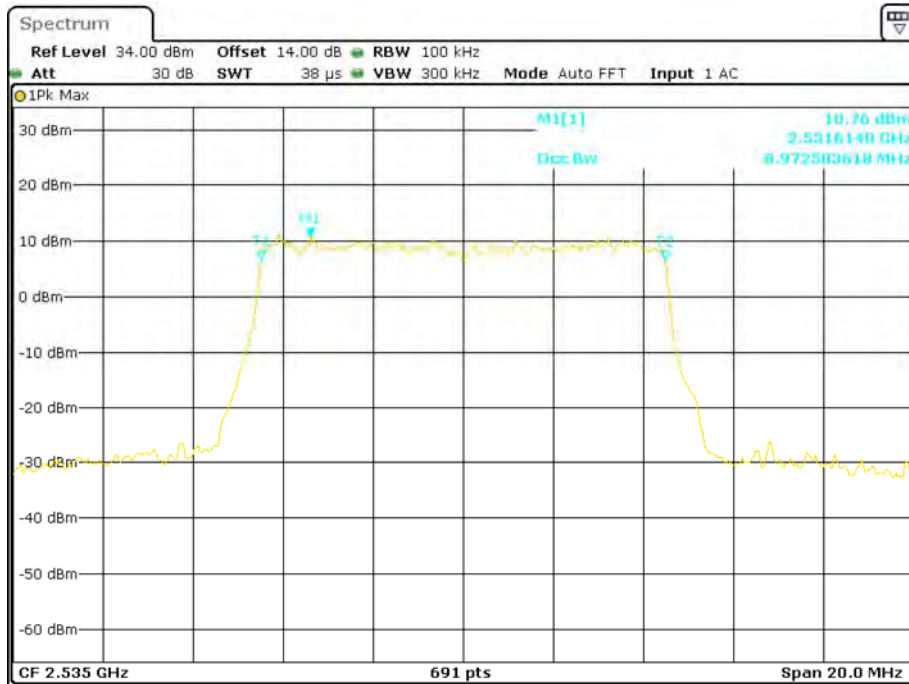
Date: 8.FEB.2018 16:17:01

16-QAM (5.0 MHz) - 26 dB Bandwidth, Middle channel



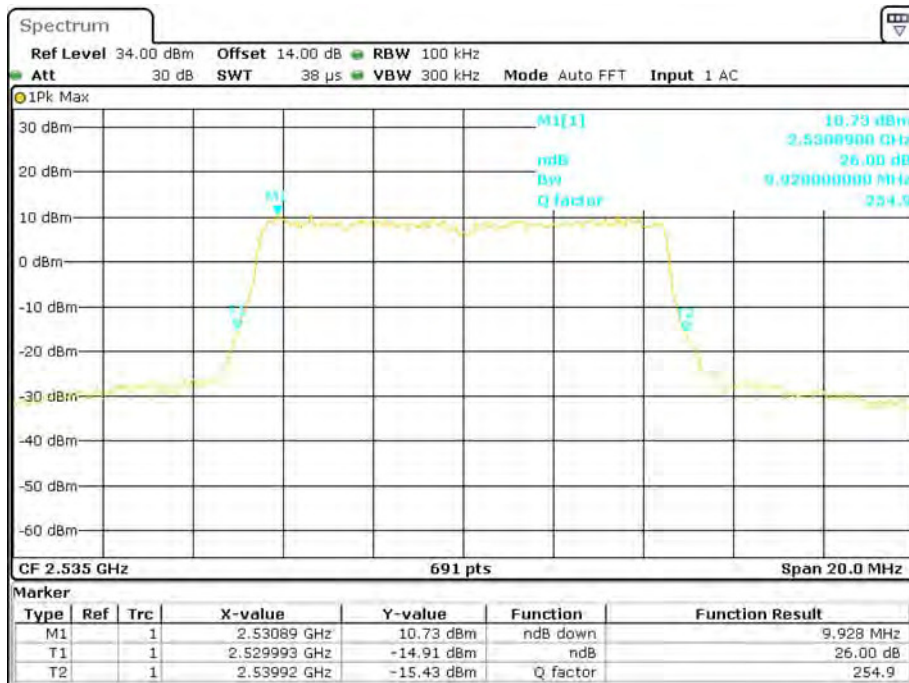
Date: 9.FEB.2018 08:44:00

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



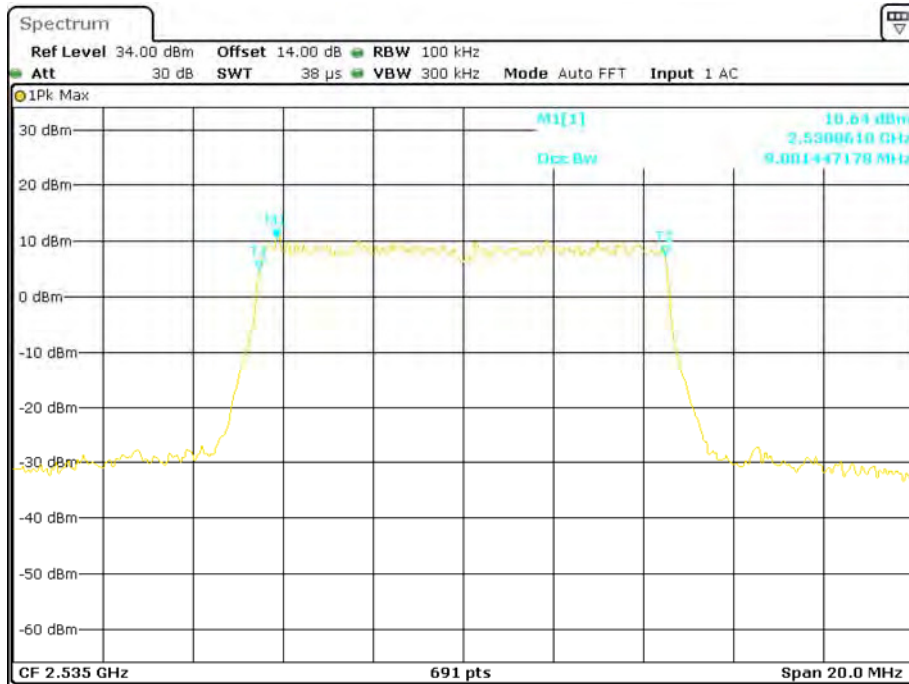
Date: 8.FEB.2018 16:16:18

QPSK (10.0 MHz) - 26 dB Bandwidth, Middle channel



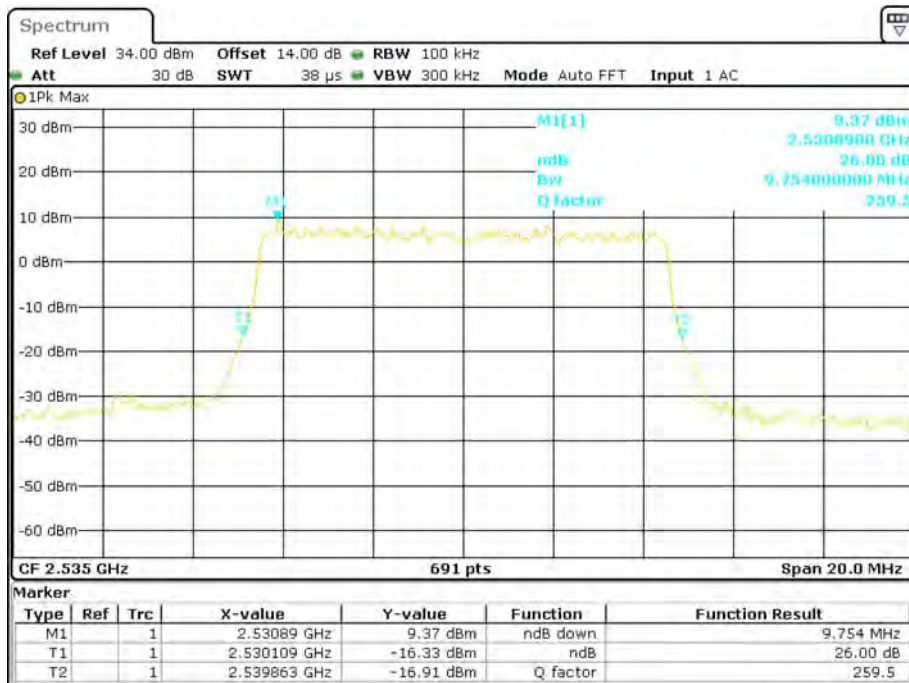
Date: 9.FEB.2018 08:52:50

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



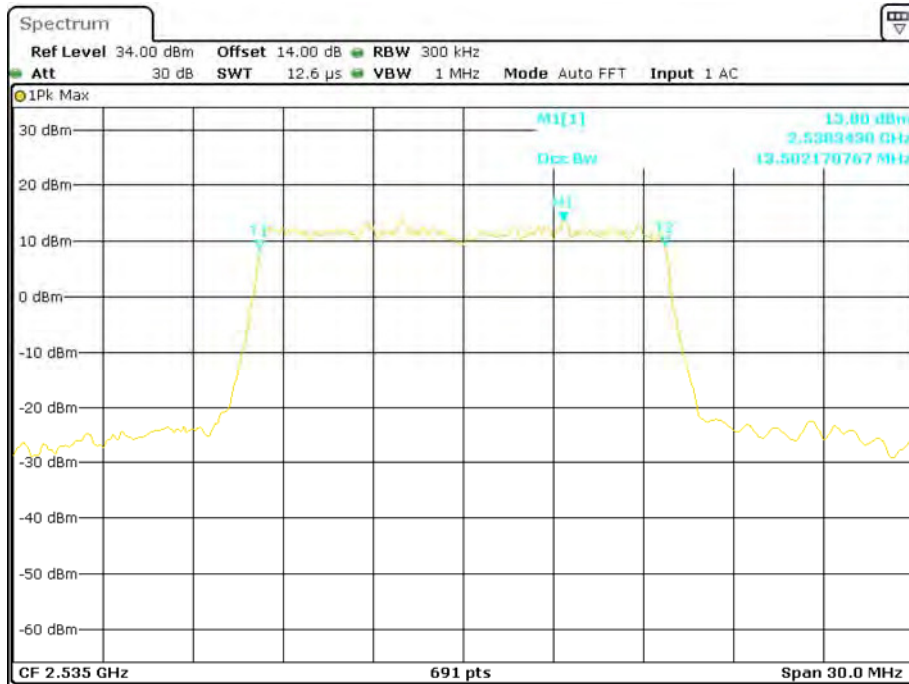
Date: 8.FEB.2018 16:16:37

16-QAM (10.0 MHz) - 26 dB Bandwidth, Middle channel



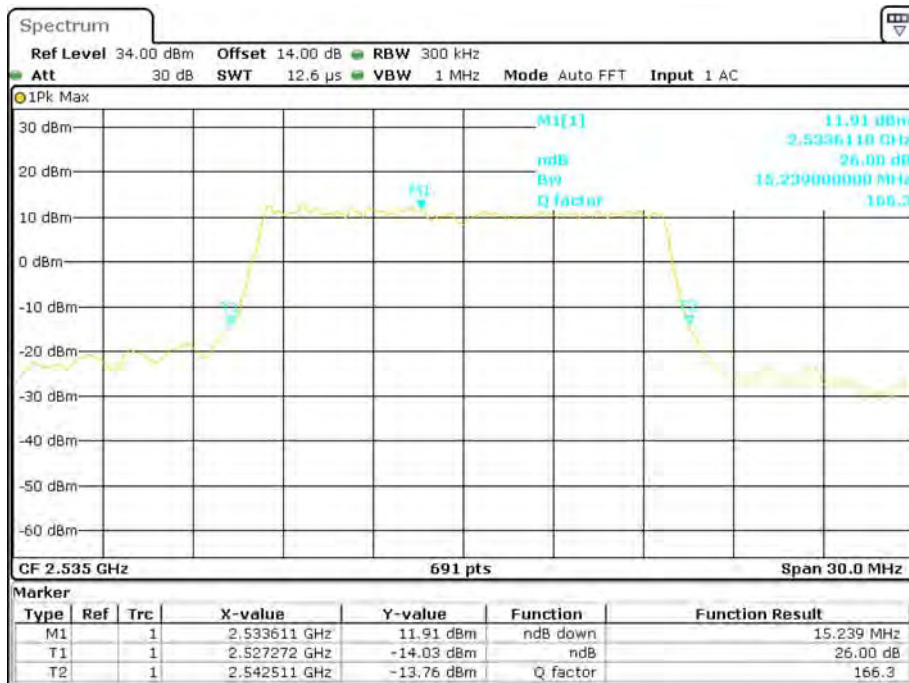
Date: 9.FEB.2018 08:47:48

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



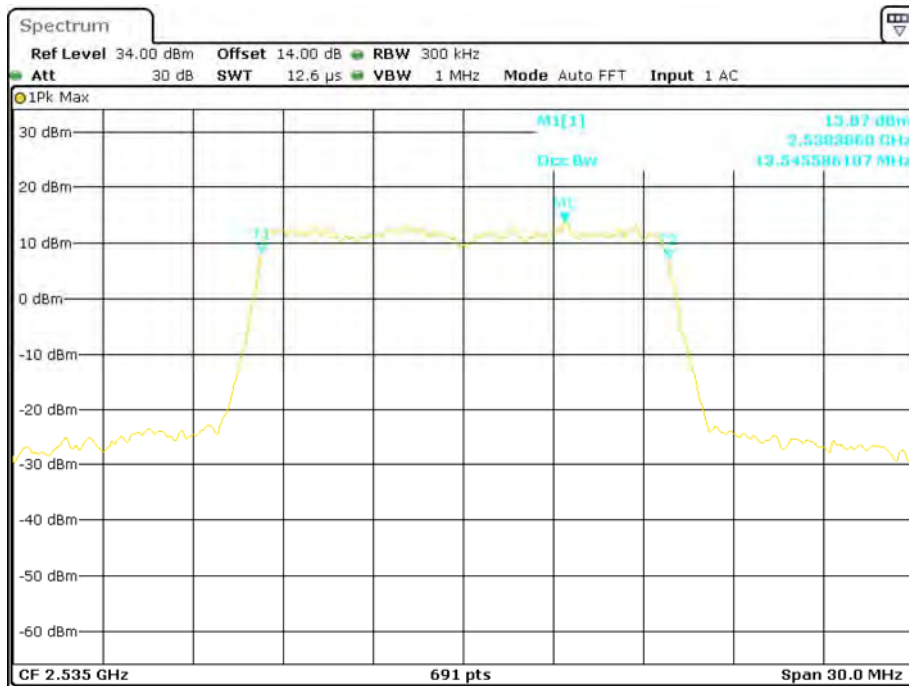
Date: 8.FEB.2018 16:18:00

QPSK (15.0 MHz) - 26 dB Bandwidth, Middle channel



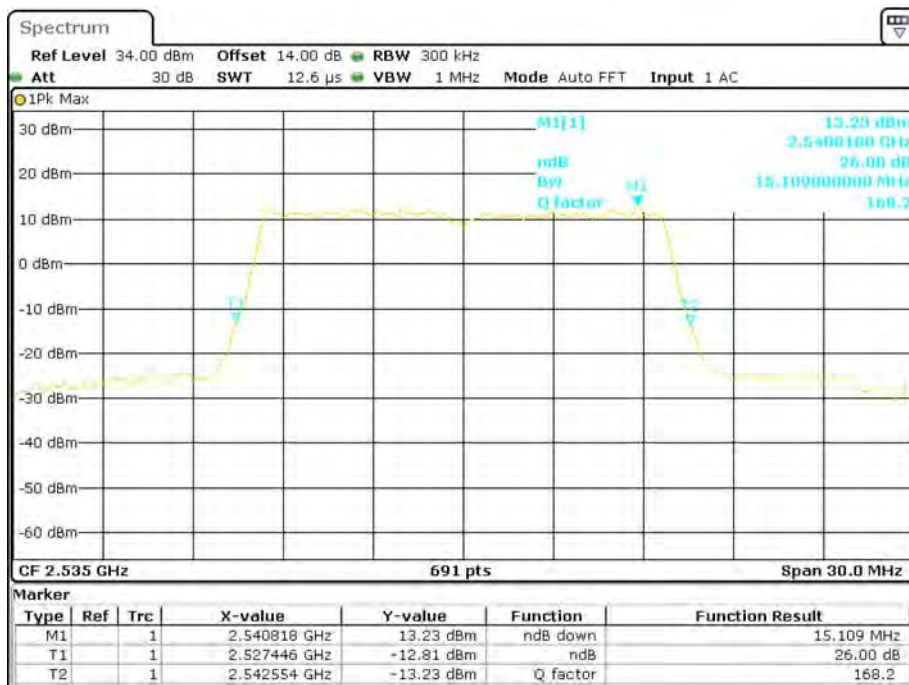
Date: 8.FEB.2018 08:53:00

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



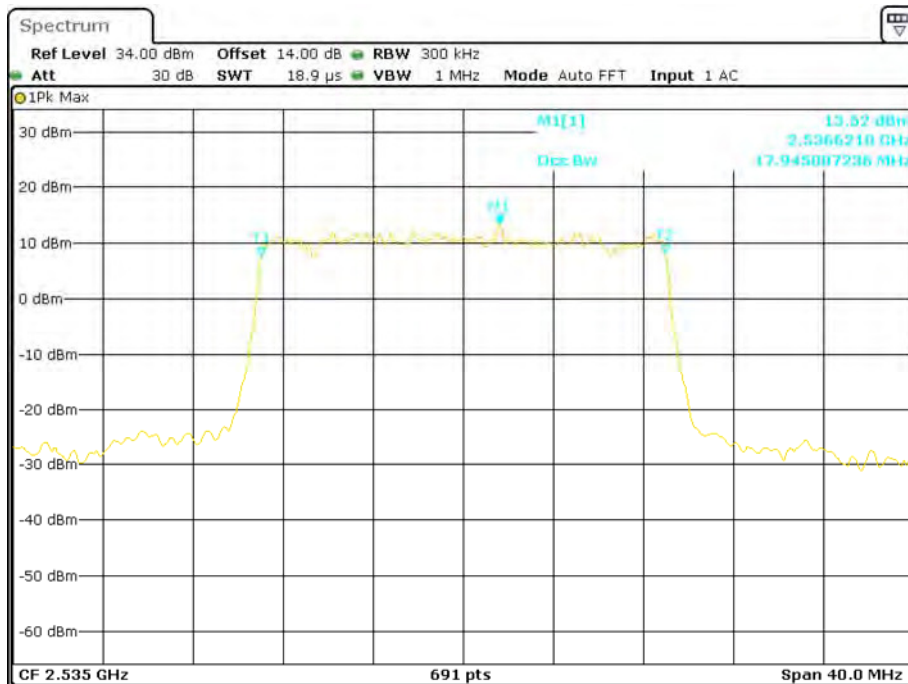
Date: 8.FEB.2018 16:18:31

16-QAM (15.0 MHz) - 26 dB Bandwidth, Middle channel



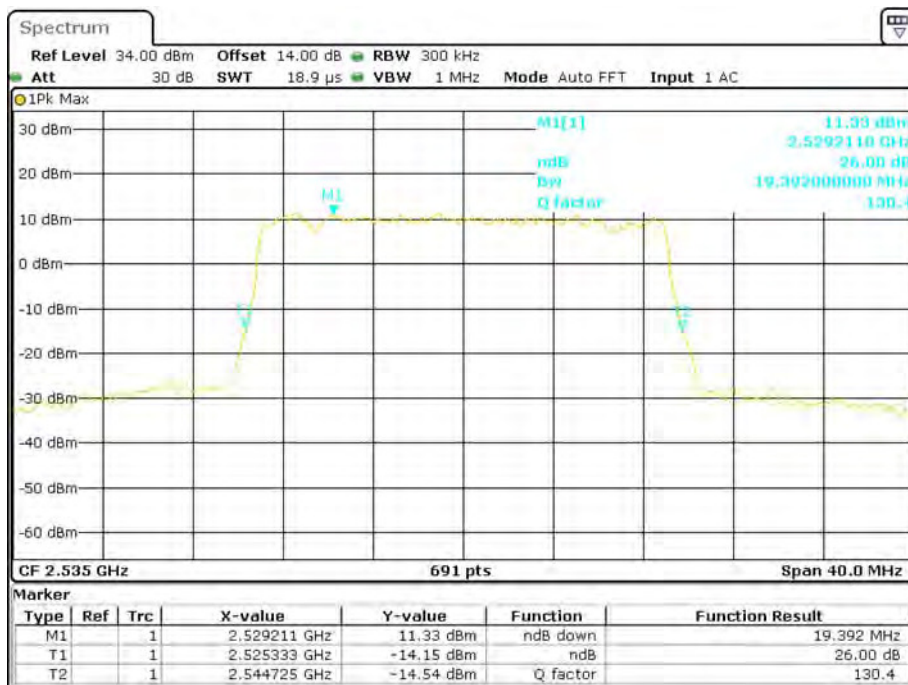
Date: 9.FEB.2018 08:53:51

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



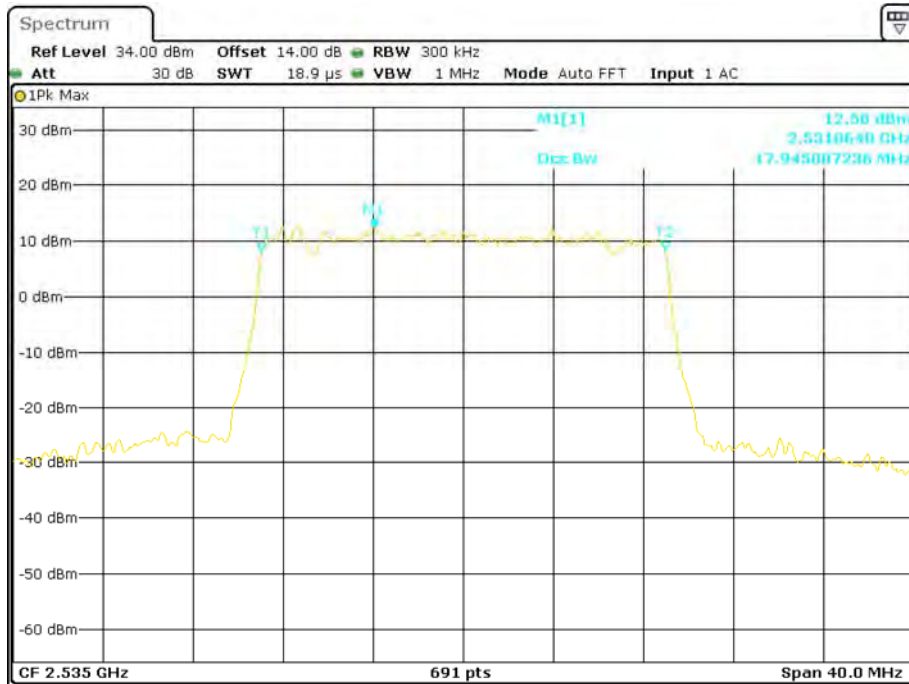
Date: 8.FEB.2018 16:19:43

QPSK (20.0 MHz) - 26 dB Bandwidth, Middle channel



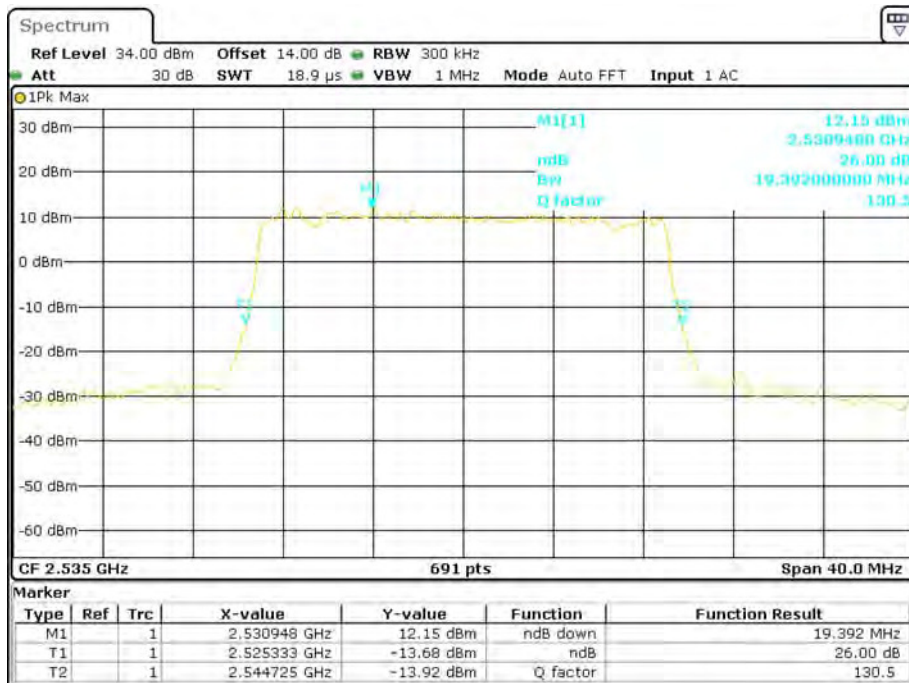
Date: 9.FEB.2018 08:54:54

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



Date: 8.FEB.2018 16:19:06

16-QAM (20.0 MHz) - 26 dB Bandwidth, Middle channel

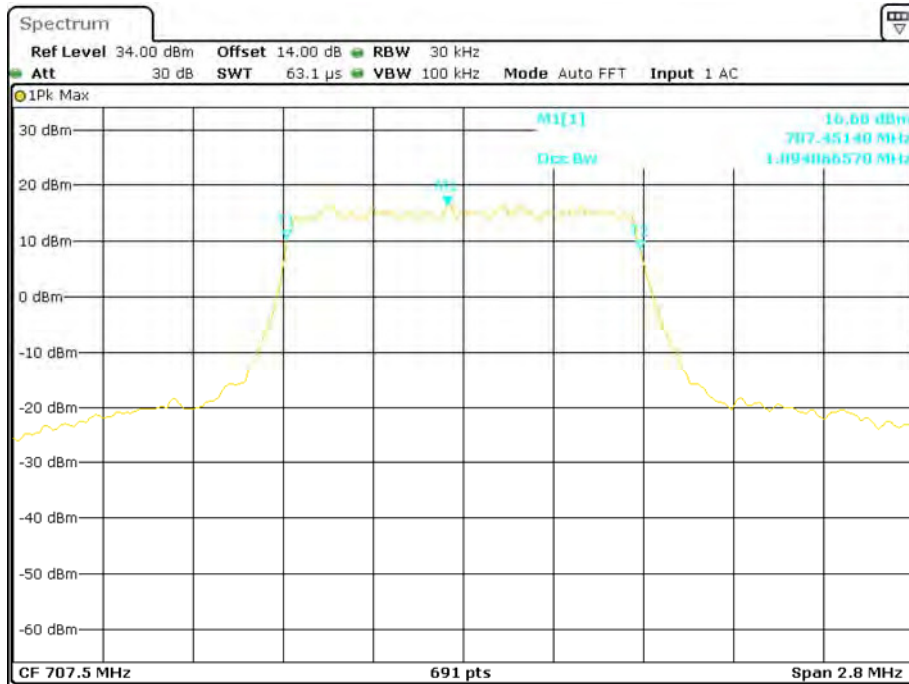


Date: 9.FEB.2018 08:54:23

BAND 12:

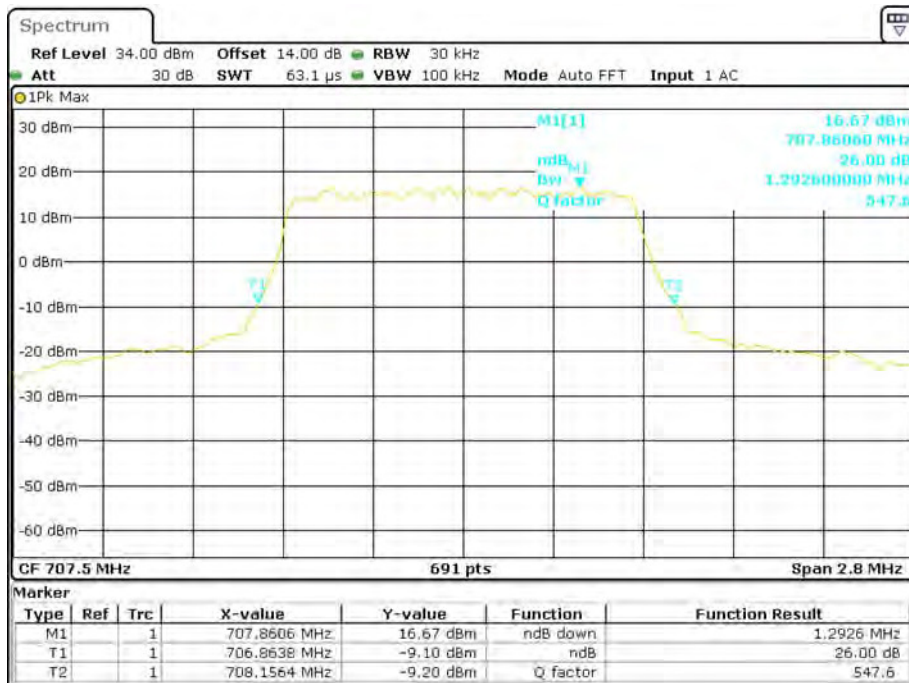
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.094	1.293
	16QAM	1.090	1.293
3.0	QPSK	2.683	2.857
	16QAM	2.683	2.857
5.0	QPSK	4.530	5.195
	16QAM	4.530	5.166
10.0	QPSK	8.944	9.928
	16QAM	8.973	9.870

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



Date: 8.FEB.2018 16:22:42

QPSK (1.4 MHz) -26 dB Bandwidth, Middle channel



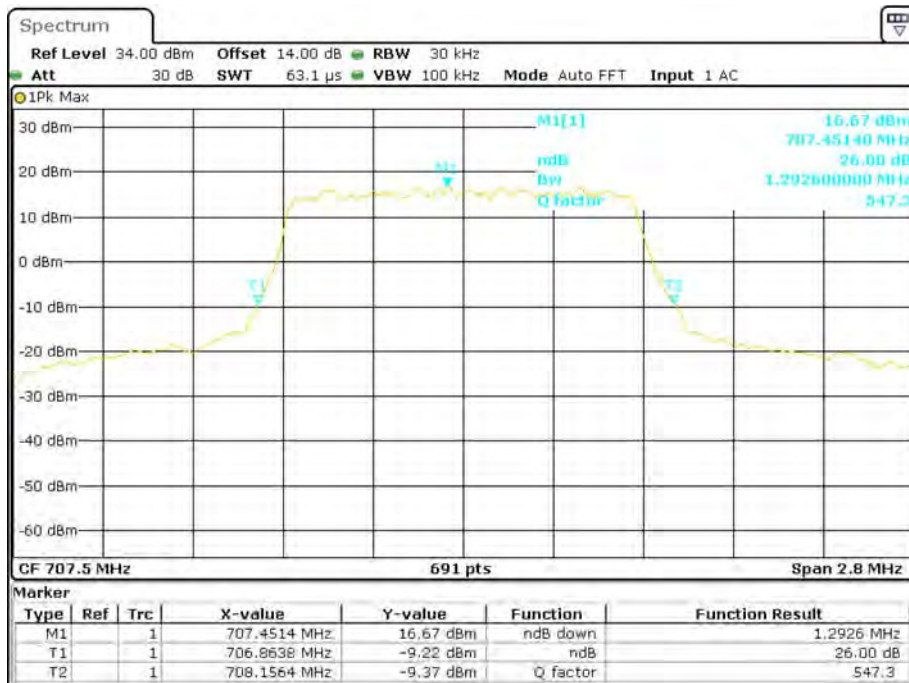
Date: 8.FEB.2018 08:50:56

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



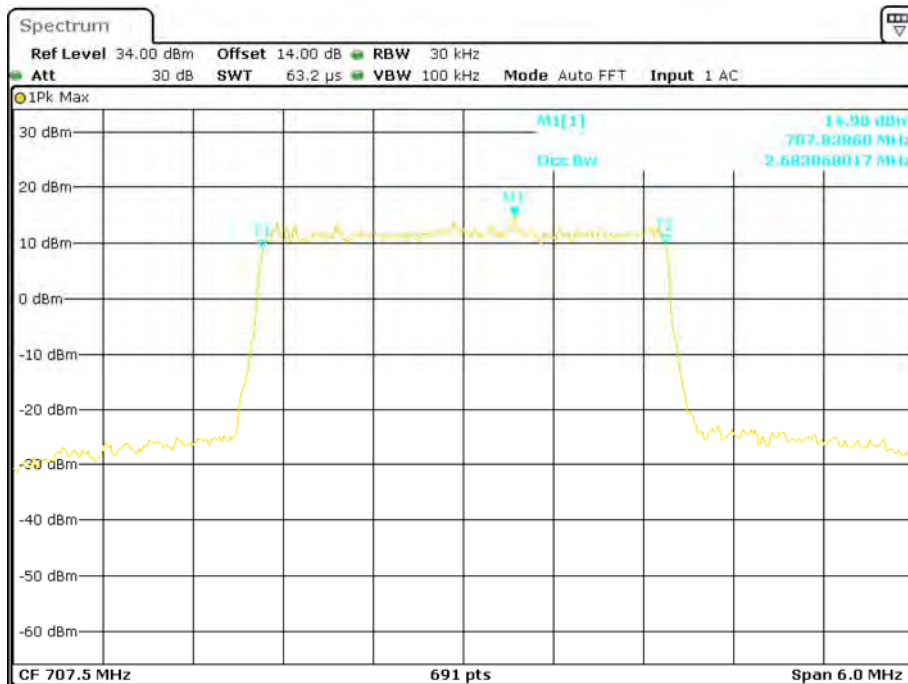
Date: 8.FEB.2018 16:23:15

16-QAM (1.4 MHz) - 26 dB Bandwidth, Middle channel



Date: 8.FEB.2018 16:23:15

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



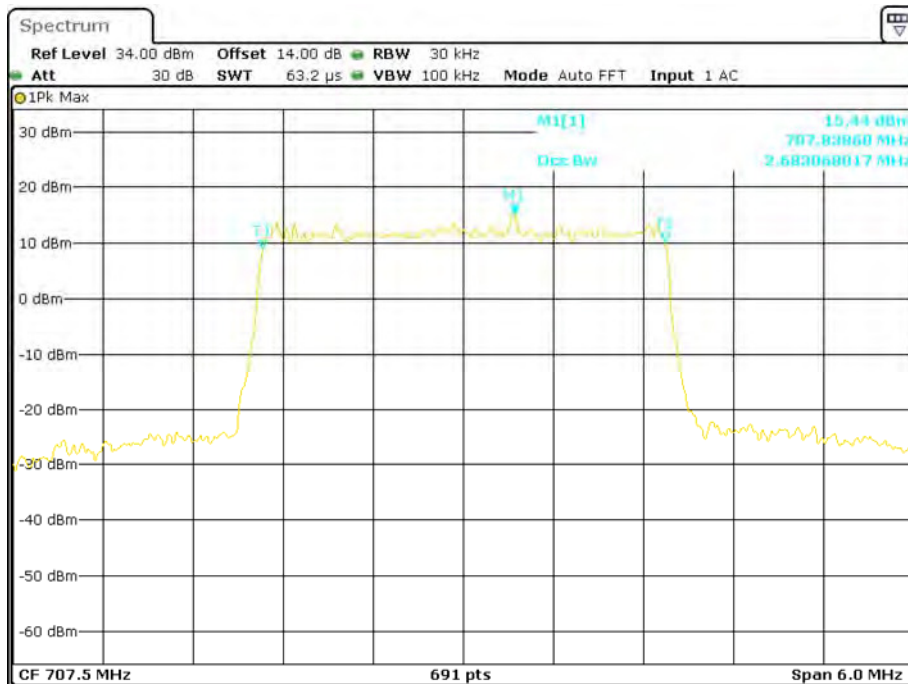
Date: 8.FEB.2018 16:24:12

QPSK (3.0 MHz) - 26 dB Bandwidth, Middle channel



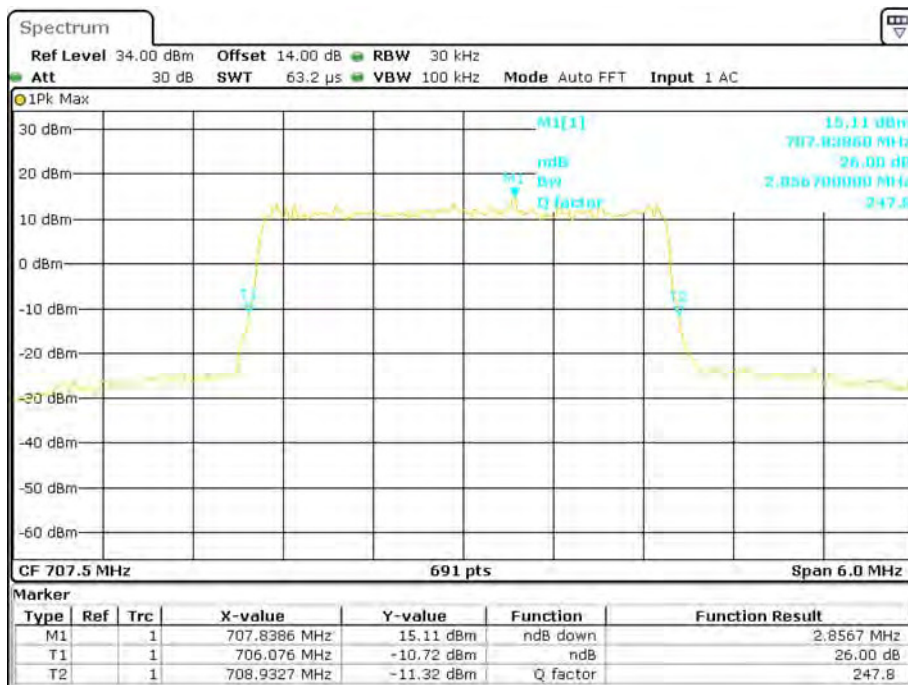
Date: 9.FEB.2018 08:31:39

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



Date: 8.FEB.2018 16:23:46

16-QAM (3.0 MHz) - 26 dB Bandwidth, Middle channel



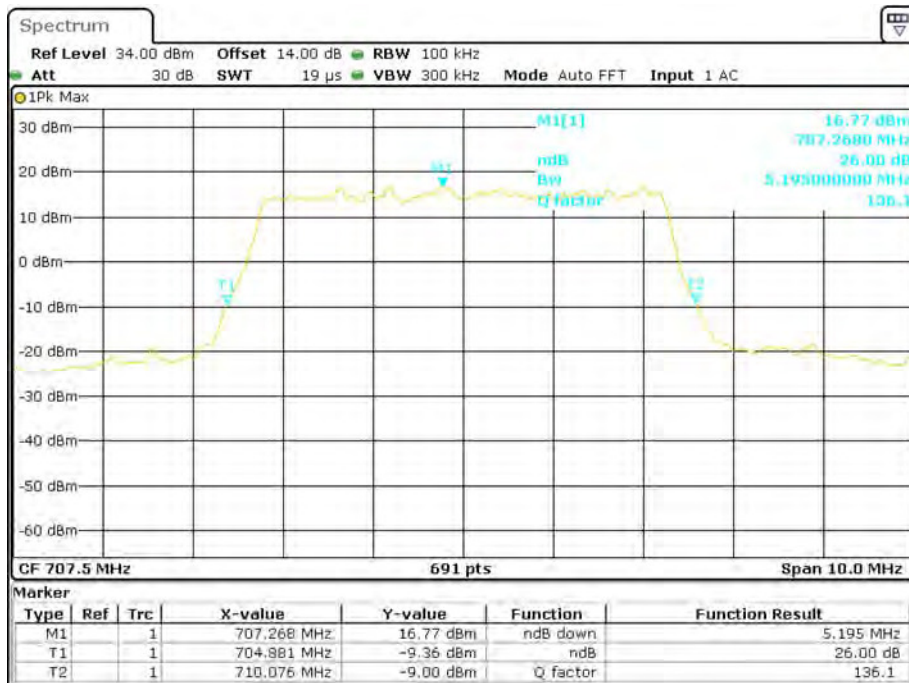
Date: 9.FEB.2018 08:31:07

QPSK (5 MHz) - 99% Occupied Bandwidth, Middle channel



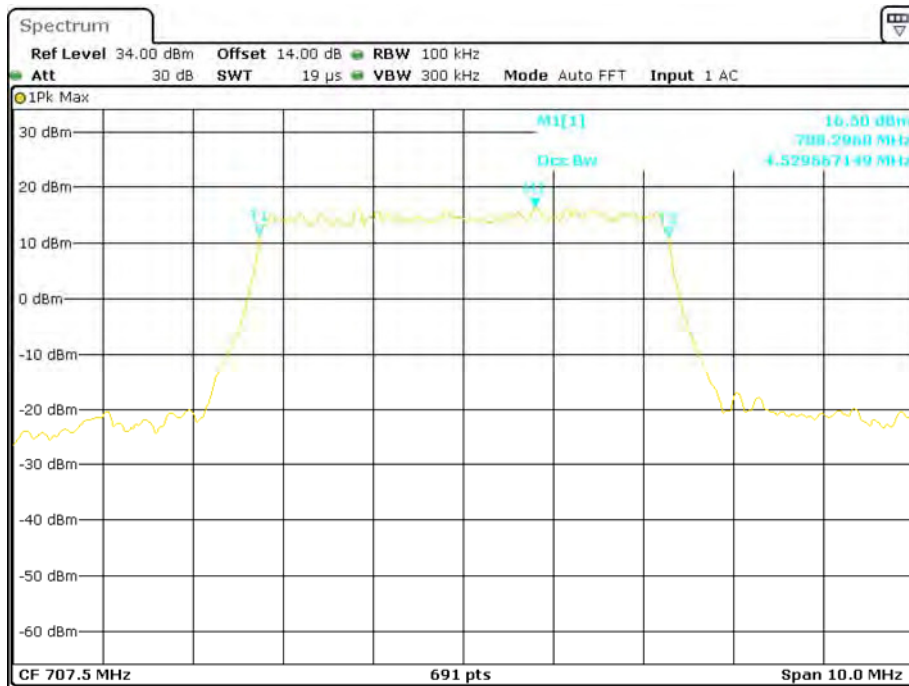
Date: 8.FEB.2018 16:24:42

QPSK (5 MHz) - 26 dB Bandwidth, Middle channel



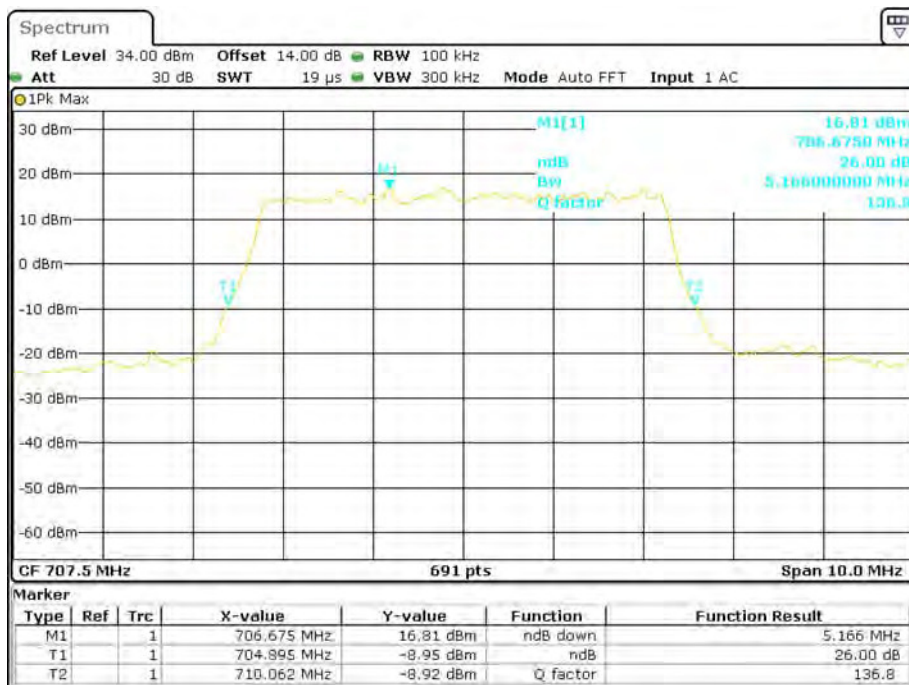
Date: 8.FEB.2018 16:23:16

16-QAM (5 MHz) - 99% Occupied Bandwidth, Middle channel



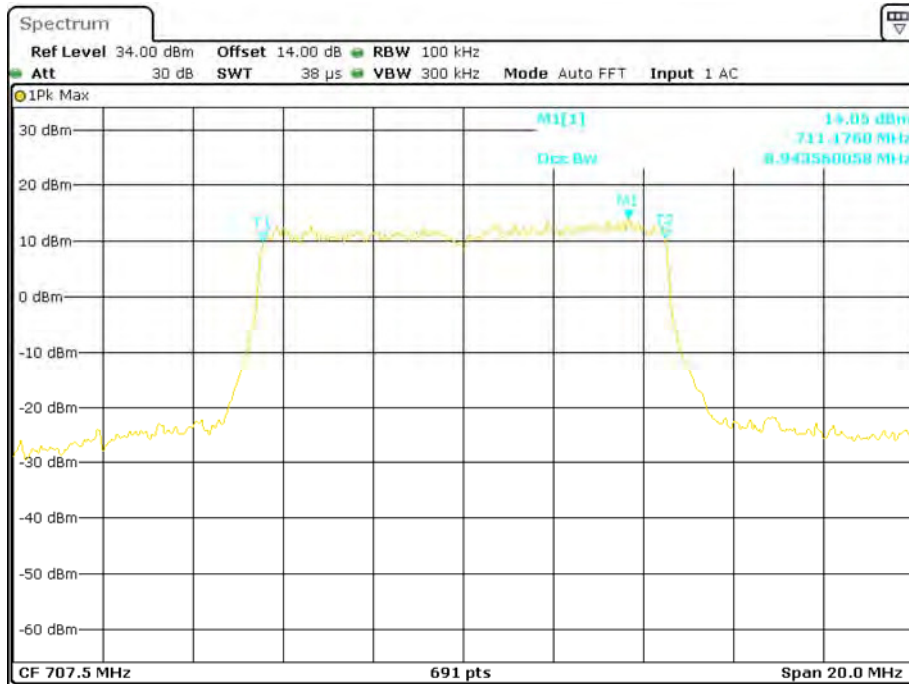
Date: 8.FEB.2018 16:25:08

16-QAM (5MHz) - 26 dB Bandwidth, Middle channel



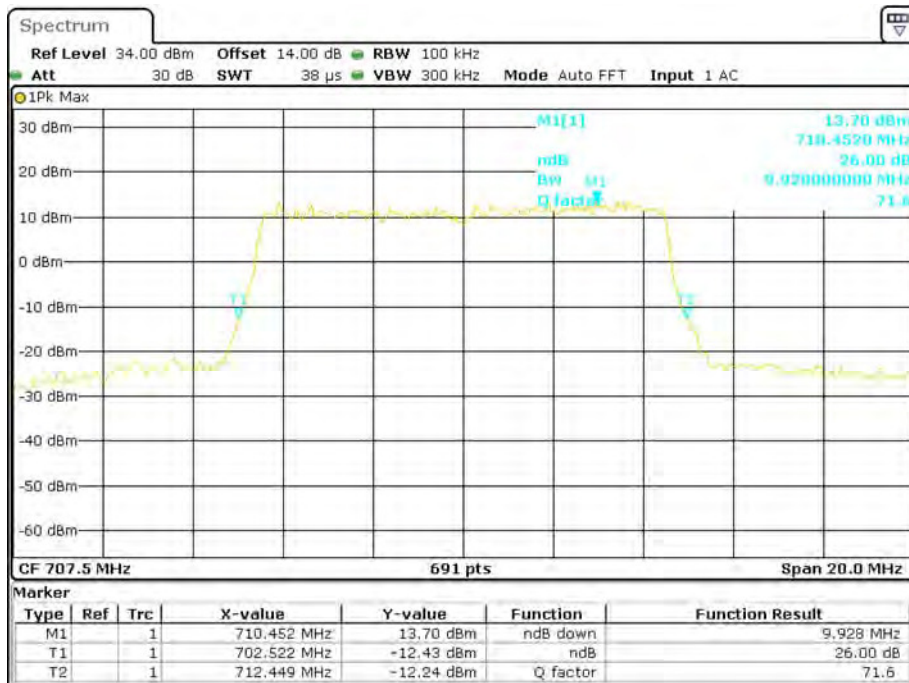
Date: 8.FEB.2018 16:25:08

QPSK (10 MHz) - 99% Occupied Bandwidth, Middle channel



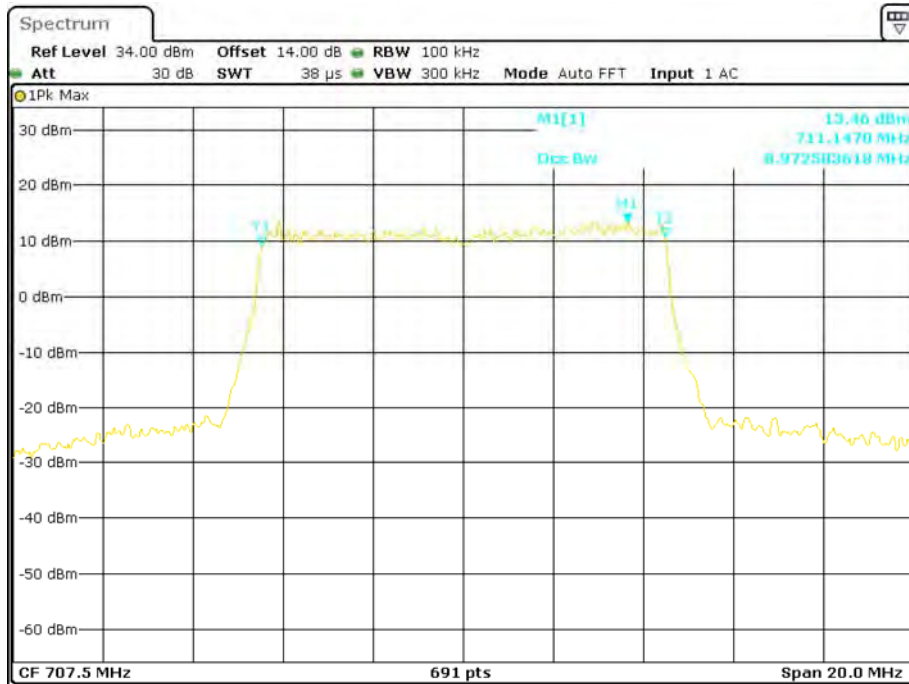
Date: 8.FEB.2018 16:26:04

QPSK (10 MHz) - 26 dB Bandwidth, Middle channel



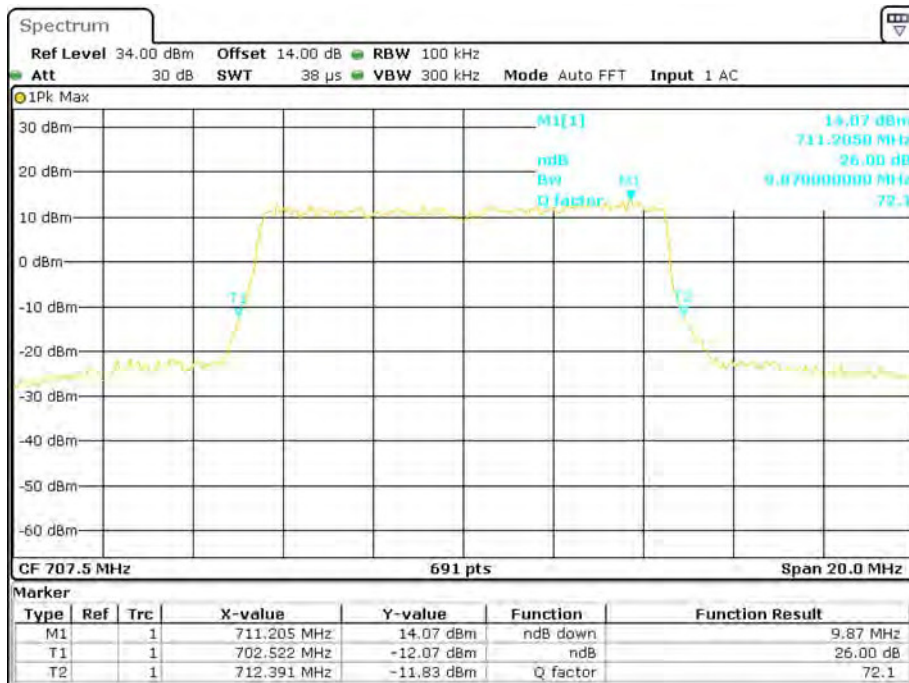
Date: 9.FEB.2018 09:13:56

16-QAM (10MHz) - 99% Occupied Bandwidth, Middle channel



Date: 8.FEB.2018 16:25:34

16-QAM (10MHz) - 26 dB Bandwidth, Middle channel

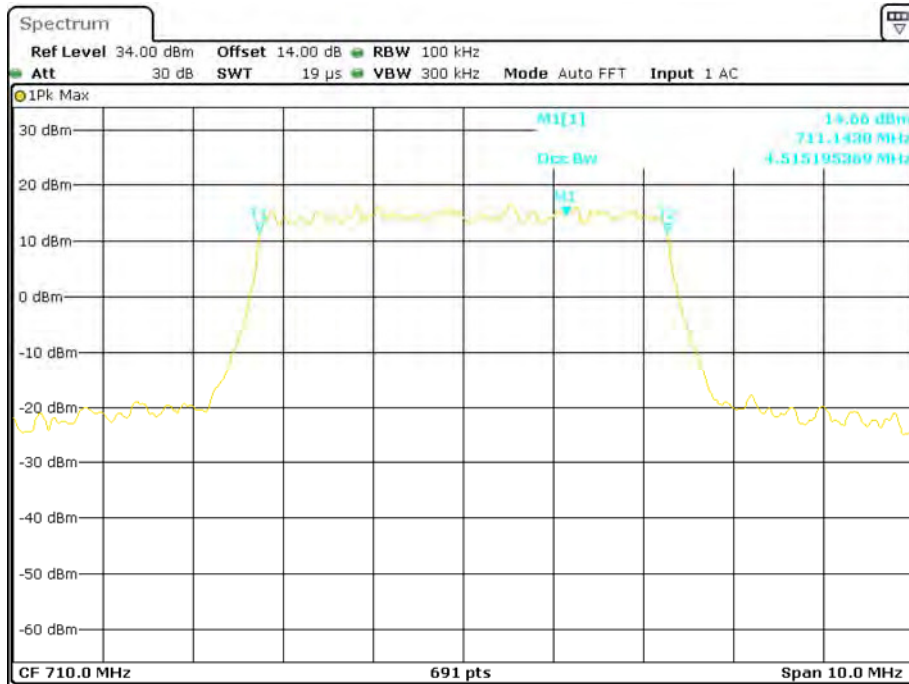


Date: 9.FEB.2018 08:23:17

LTE Band 17: (Middle Channel)

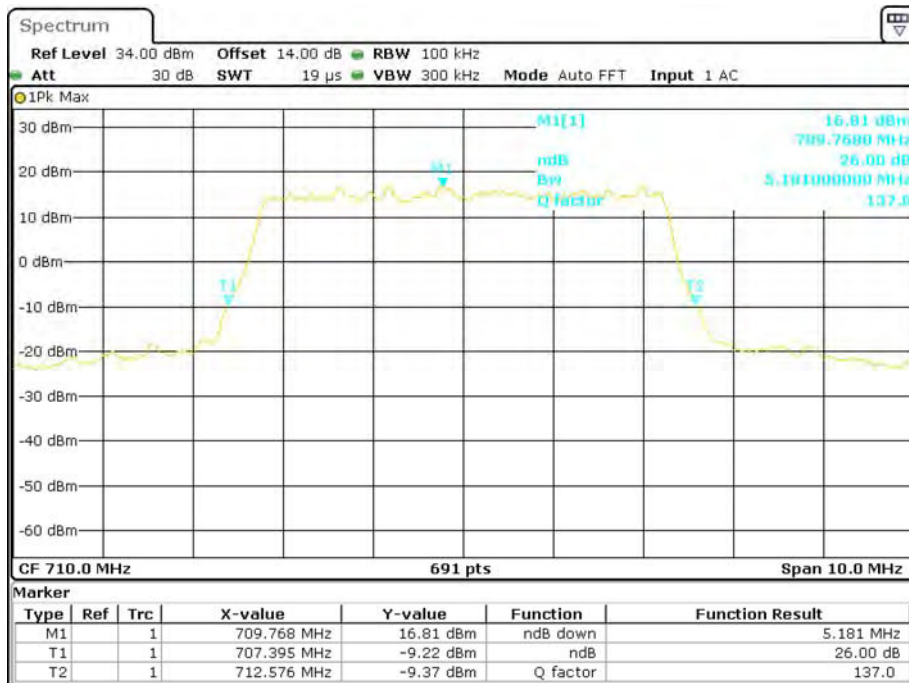
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.515	5.181
	16QAM	4.530	5.195
10.0	QPSK	8.973	9.870
	16QAM	8.944	9.899

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



Date: 8.FEB.2018 16:27:03

QPSK (5.0 MHz) - 26 dB Bandwidth, Middle channel



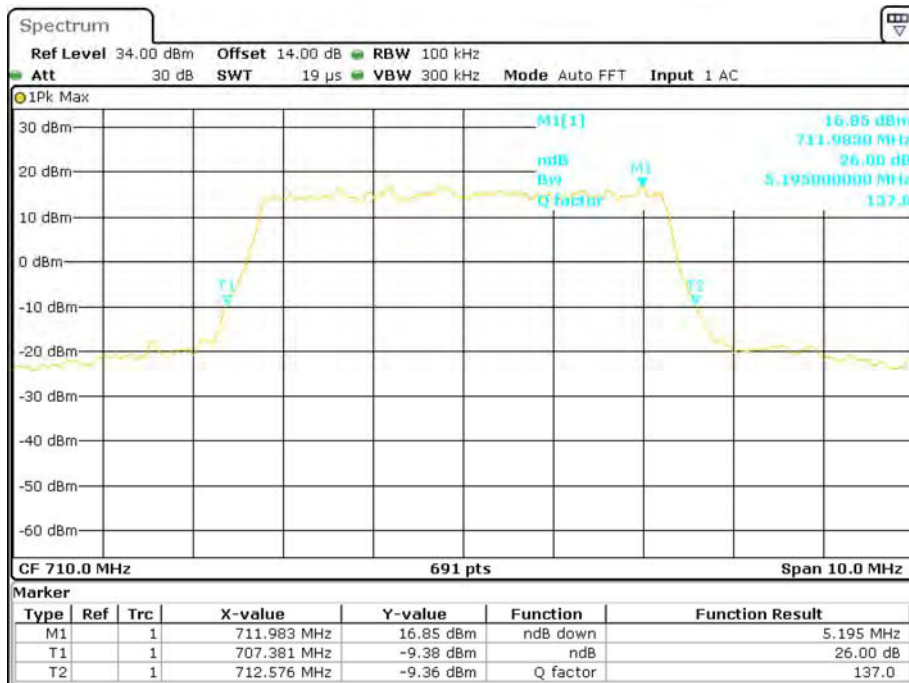
Date: 9.FEB.2018 09:25:08

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



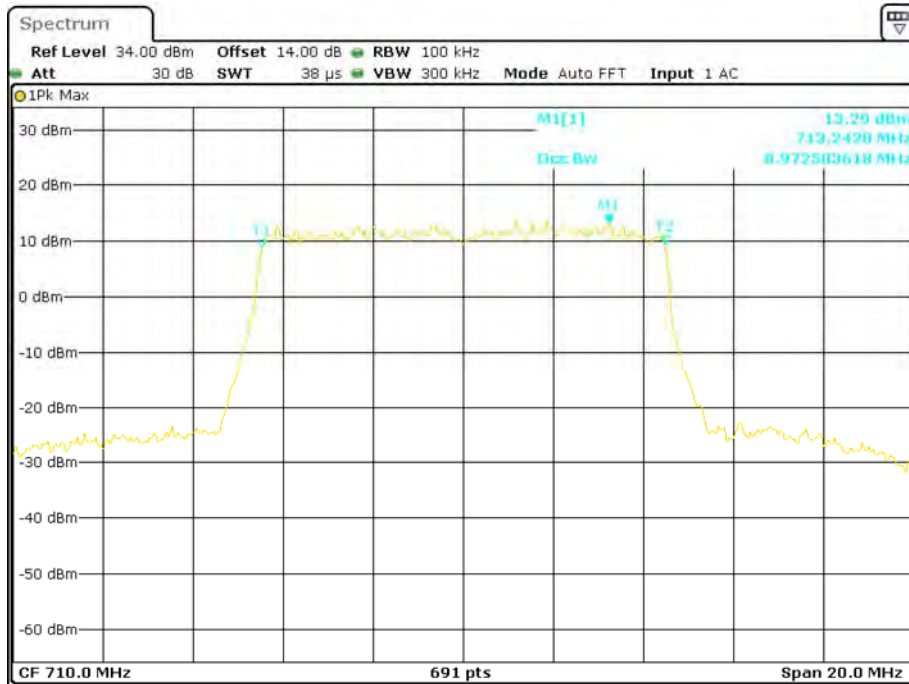
Date: 8.FEB.2018 16:27:33

16-QAM (5.0 MHz) - 26 dB Bandwidth, Middle channel



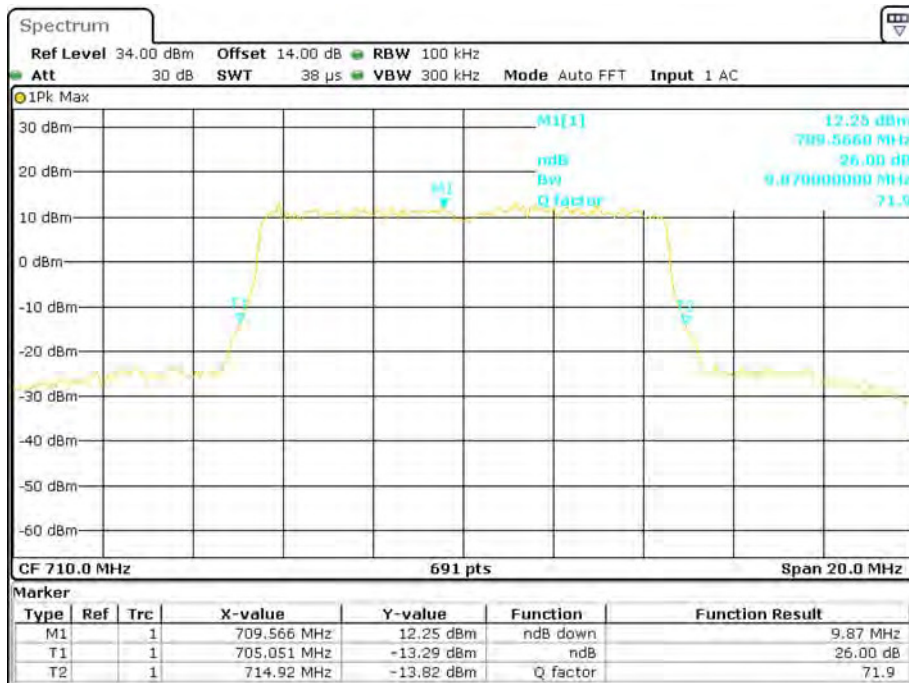
Date: 9.FEB.2018 09:25:41

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



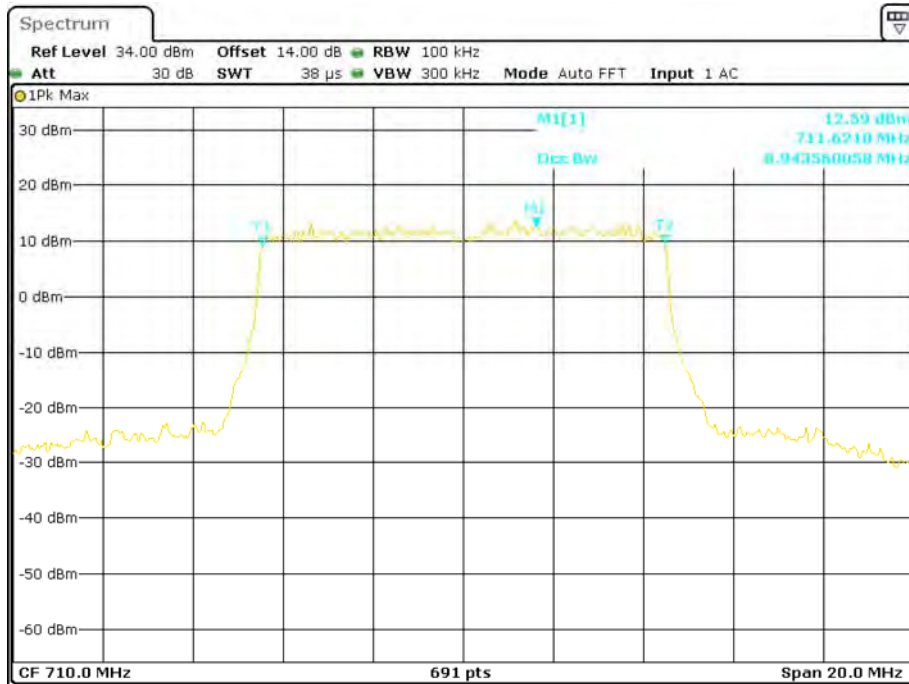
Date: 8.FEB.2018 16:28:28

QPSK (10.0 MHz) - 26 dB Bandwidth, Middle channel



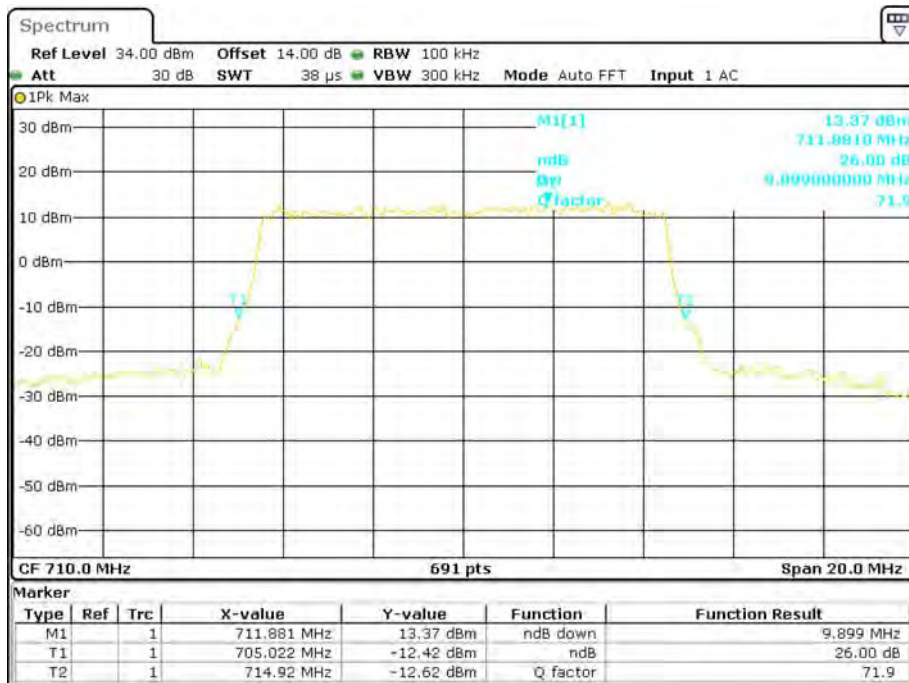
Date: 9.FEB.2018 09:26:34

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



Date: 8.FEB.2018 16:28:03

16-QAM (10.0 MHz) - 26 dB Bandwidth, Middle channel



Date: 9.FEB.2018 08:26:10

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

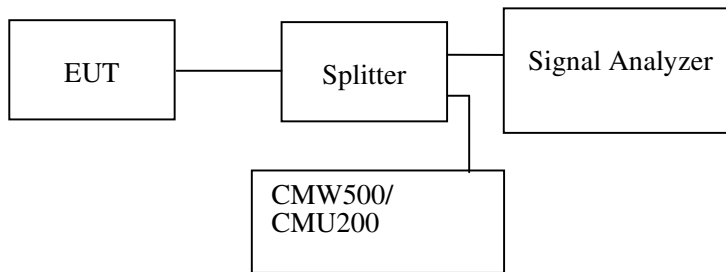
Applicable Standard

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

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

Test Procedure

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



Test Data

Environmental Conditions

Temperature:	24~25 °C
Relative Humidity:	50~52 %
ATM Pressure:	100.0~101.0 kPa

The testing was performed by Tracy Hu from 2018-02-08 to 2018-03-06.

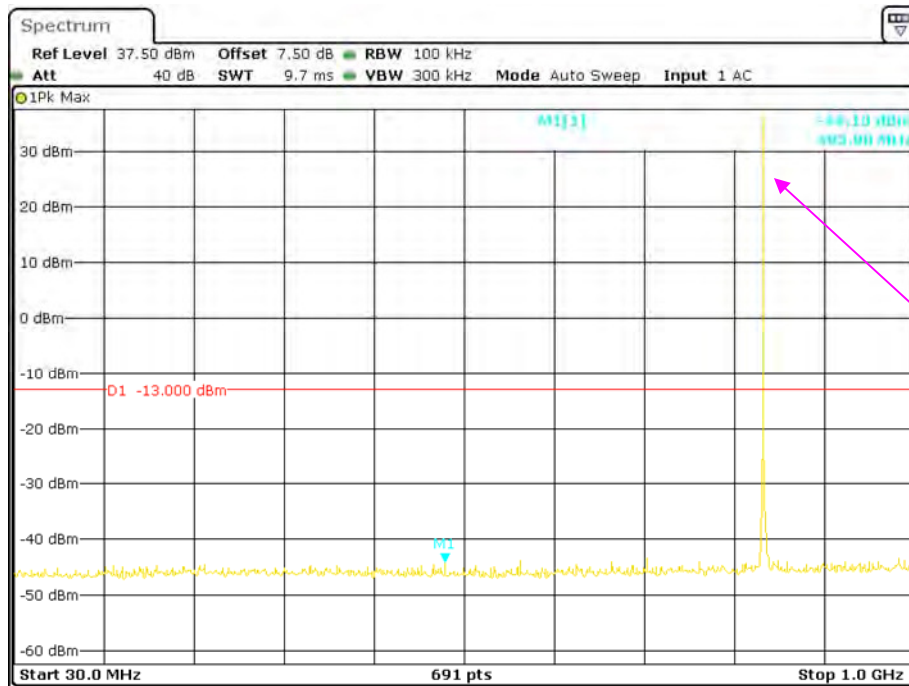
Test result: Compliance,

EUT operation mode: transmitting

Please refer to the following plots.

Cellular Band (Part 22H)

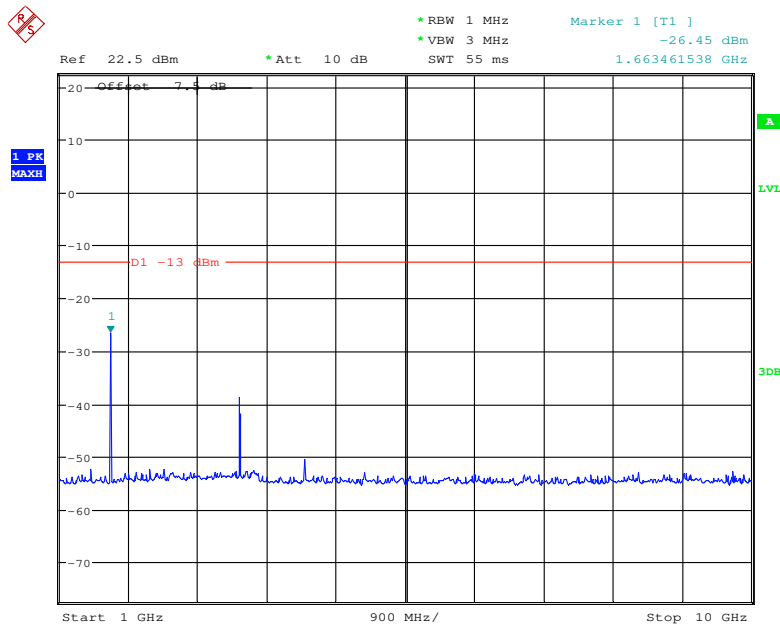
30 MHz – 1 GHz (GSM Mode)



Fundamental test

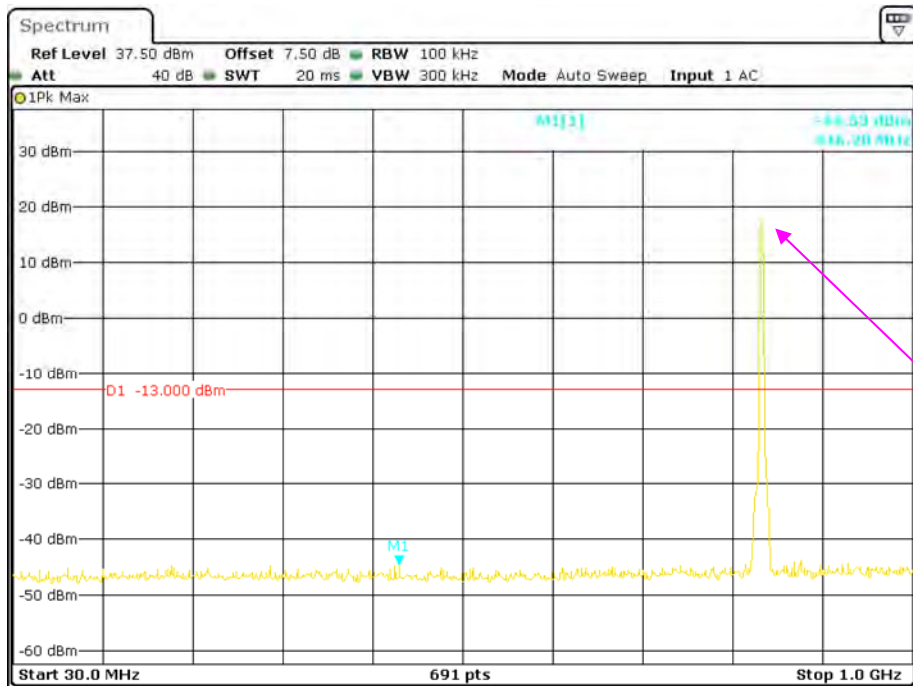
Date: 8.FEB.2018 14:13:03

1 GHz – 10 GHz (GSM Mode)



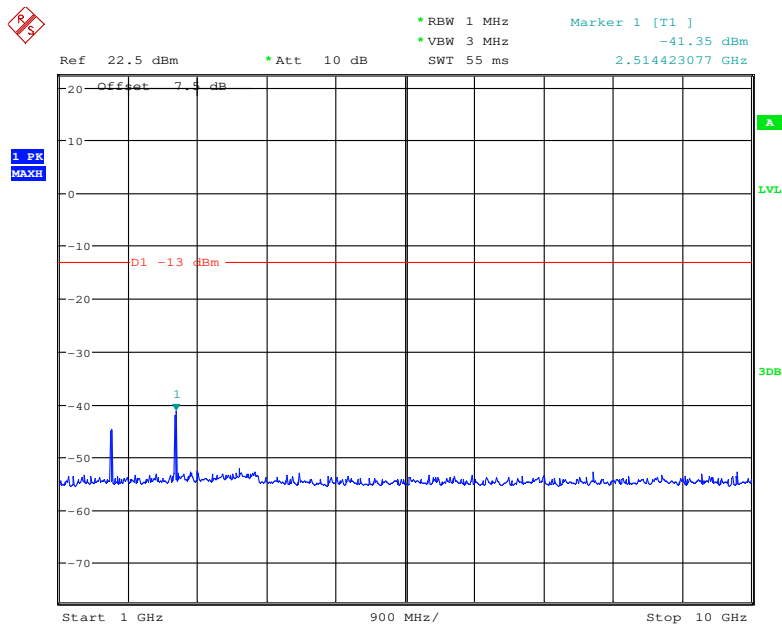
Date: 12.FEB.2018 08:45:54

30 MHz – 1 GHz (WCDMA Mode)



Date: 8.FEB.2018 11:19:34

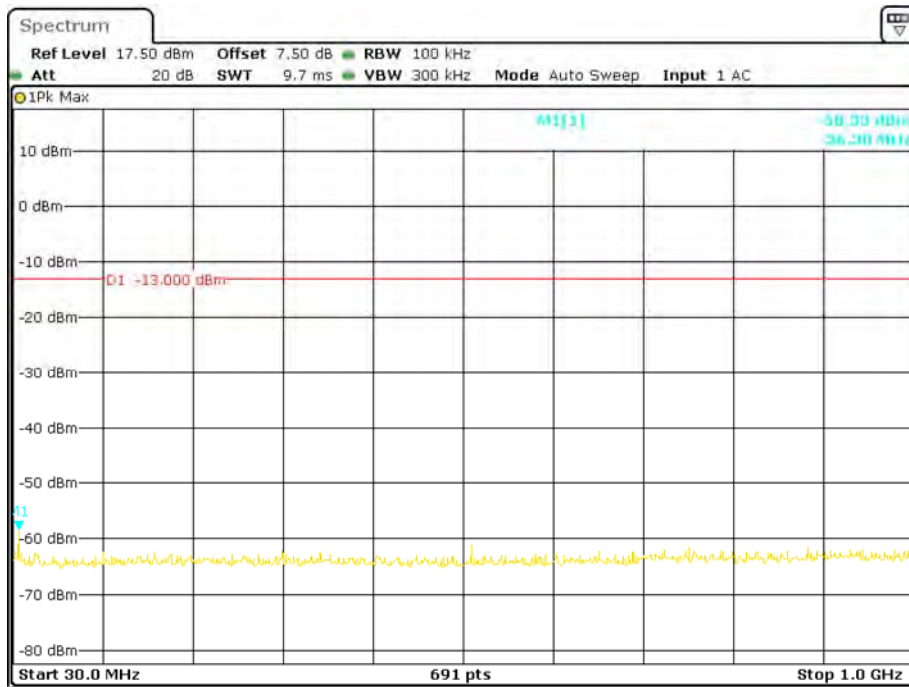
1 GHz – 10 GHz (WCDMA Mode)



Date: 12.FEB.2018 08:59:53

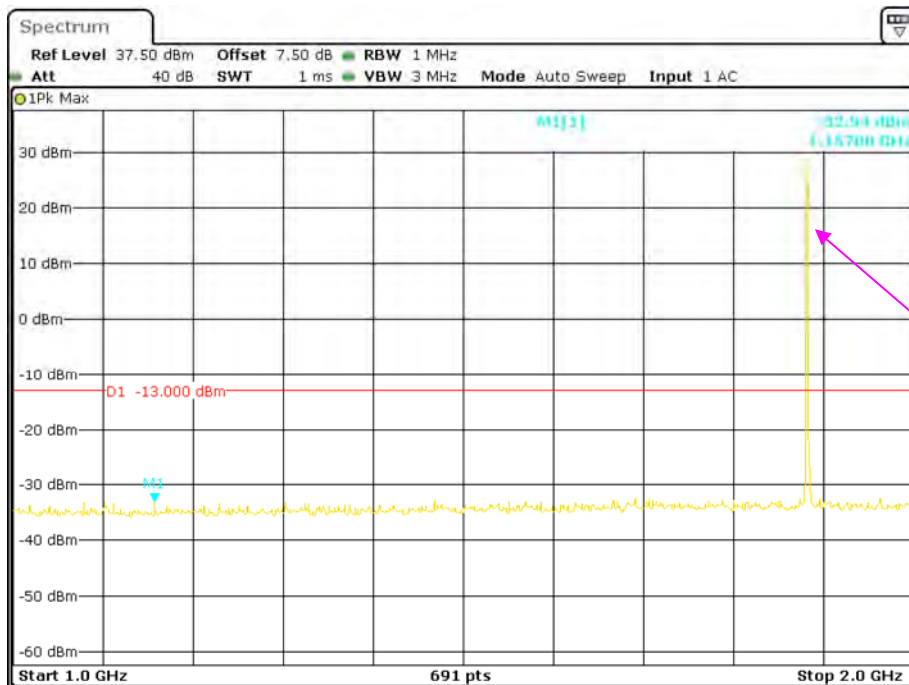
PCS Band (Part 24E)

30 MHz – 1 GHz (GSM Mode)



Date: 8.FEB.2018 13:51:35

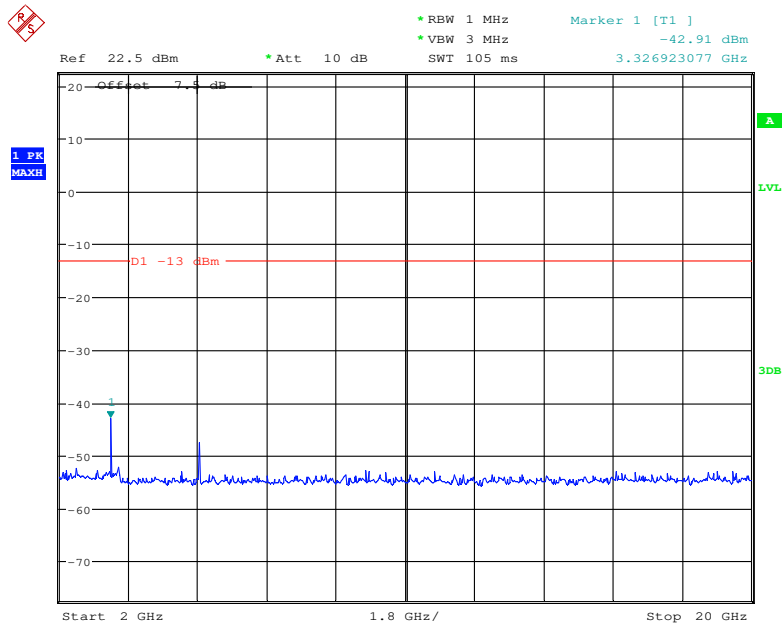
1 GHz – 2 GHz (GSM Mode)



Fundamental test

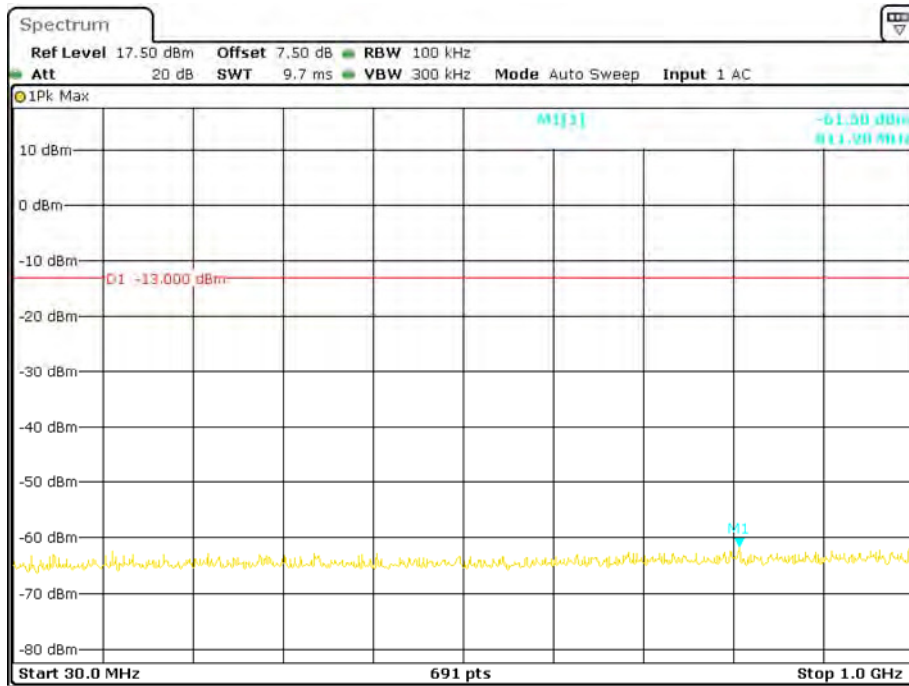
Date: 8.FEB.2018 13:52:29

2 GHz – 20 GHz (GSM Mode)



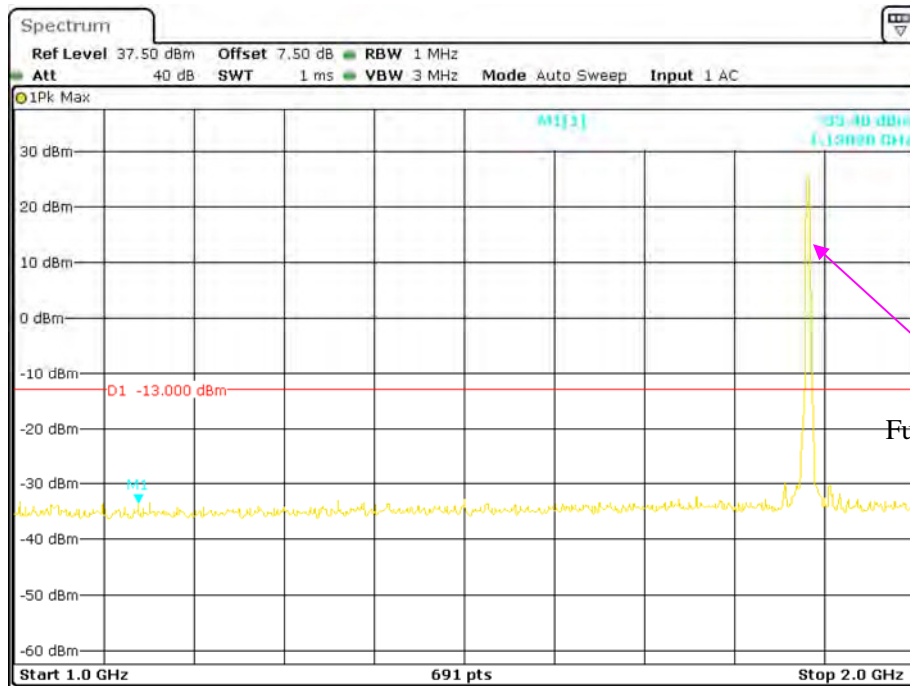
Date: 12.FEB.2018 08:50:16

30 MHz – 1 GHz (WCDMA Mode)



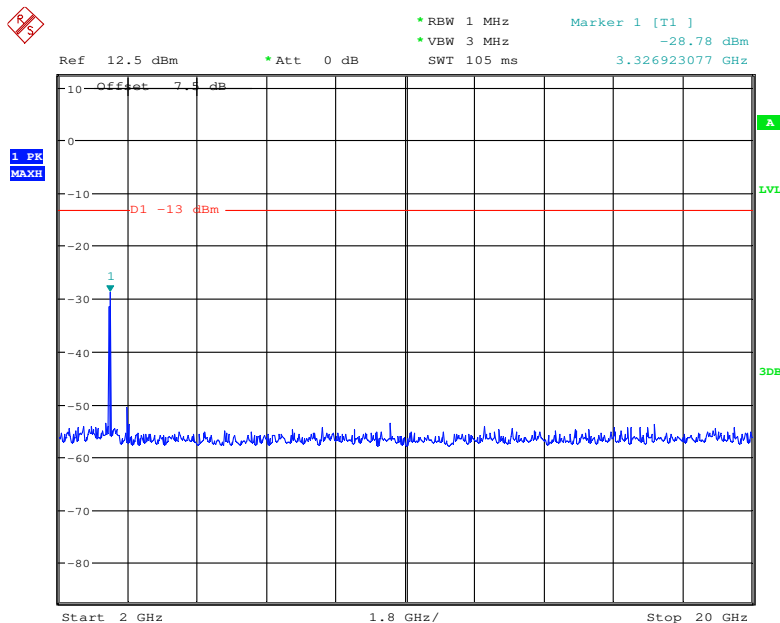
Date: 8.FEB.2018 10:58:27

1 GHz – 2 GHz (WCDMA Mode)



Date: 8.FEB.2018 10:59:38

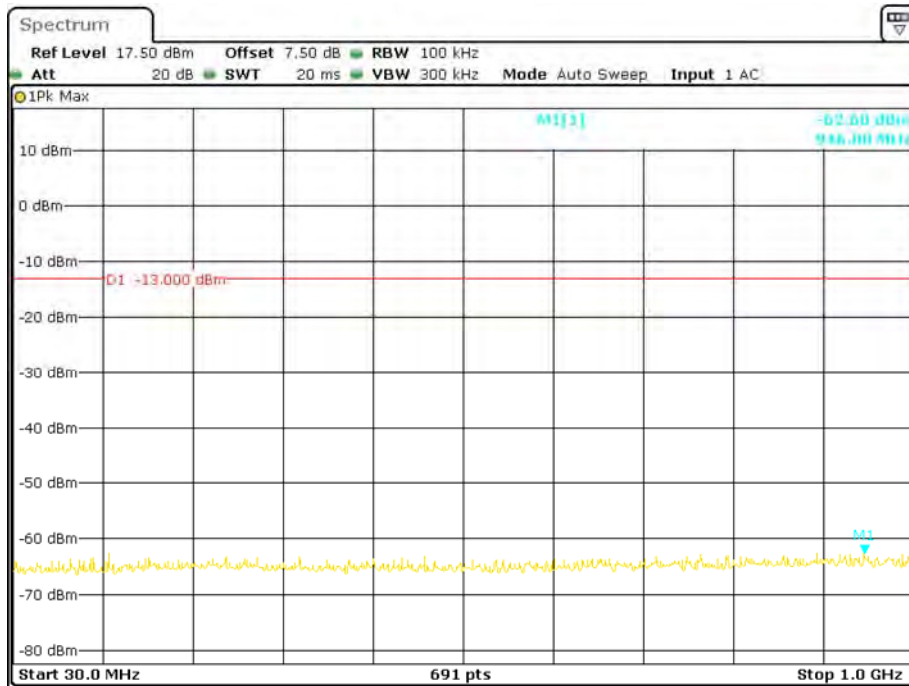
2 GHz – 20 GHz (WCDMA Mode)



Date: 12.FEB.2018 09:01:50

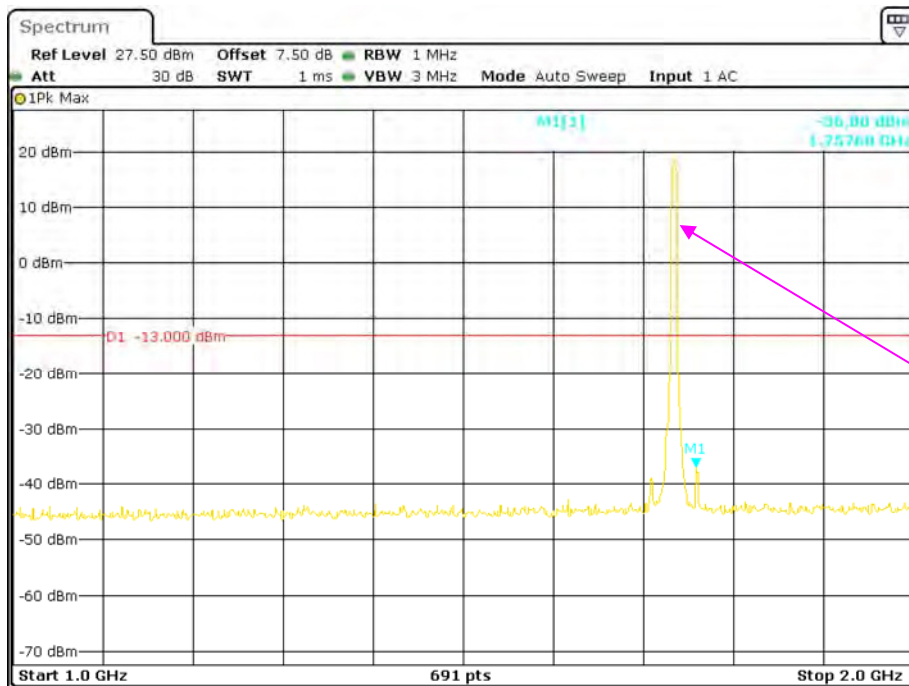
AWS Band (Part 27)

30 MHz – 1 GHz (WCDMA Mode)



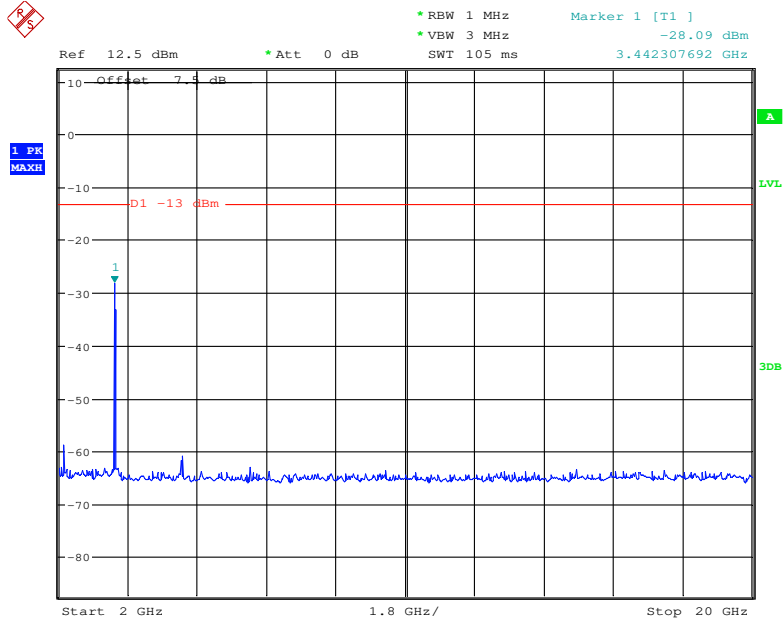
Date: 8.FEB.2018 11:11:13

1 GHz – 2 GHz (WCDMA Mode)



Date: 6.MAR.2018 14:05:24

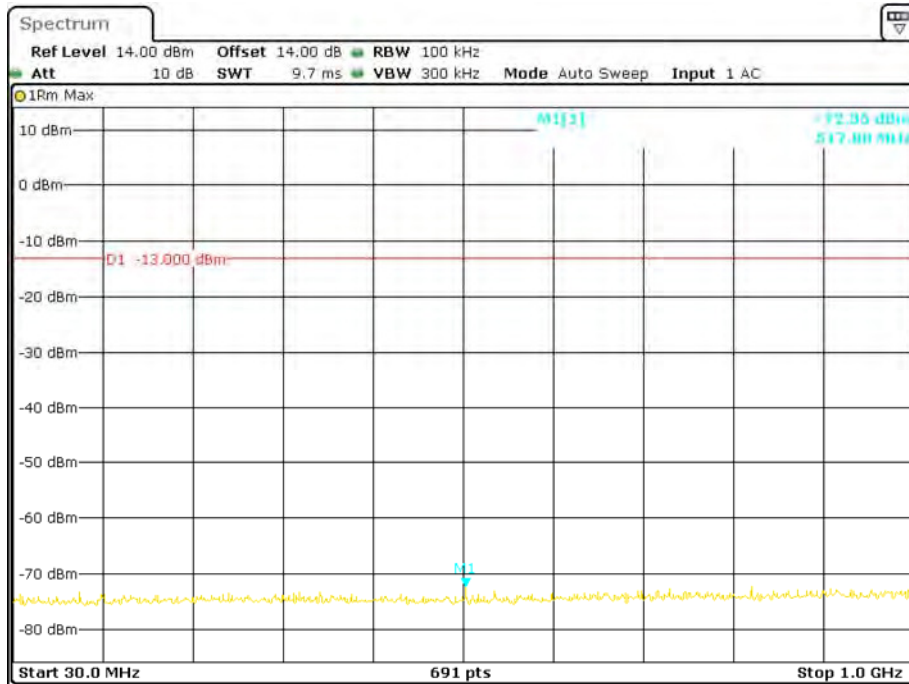
2 GHz – 20 GHz (WCDMA Mode)



Date: 12.FEB.2018 09:02:48

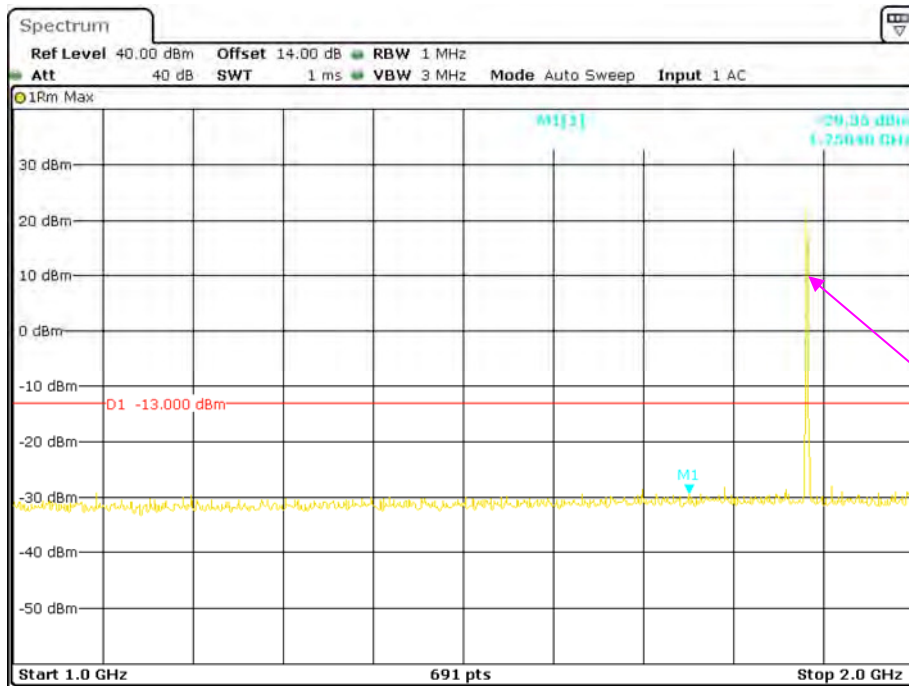
LTE Band 2:

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



Date: 9.FEB.2018 09:30:25

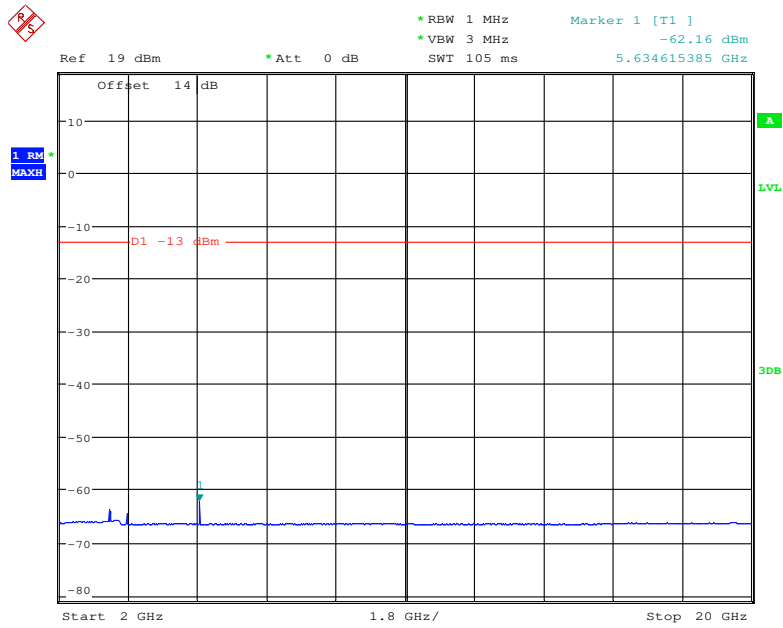
1 GHz - 2 GHz (1.4 MHz, Middle Channel)



Date: 9.FEB.2018 09:37:16

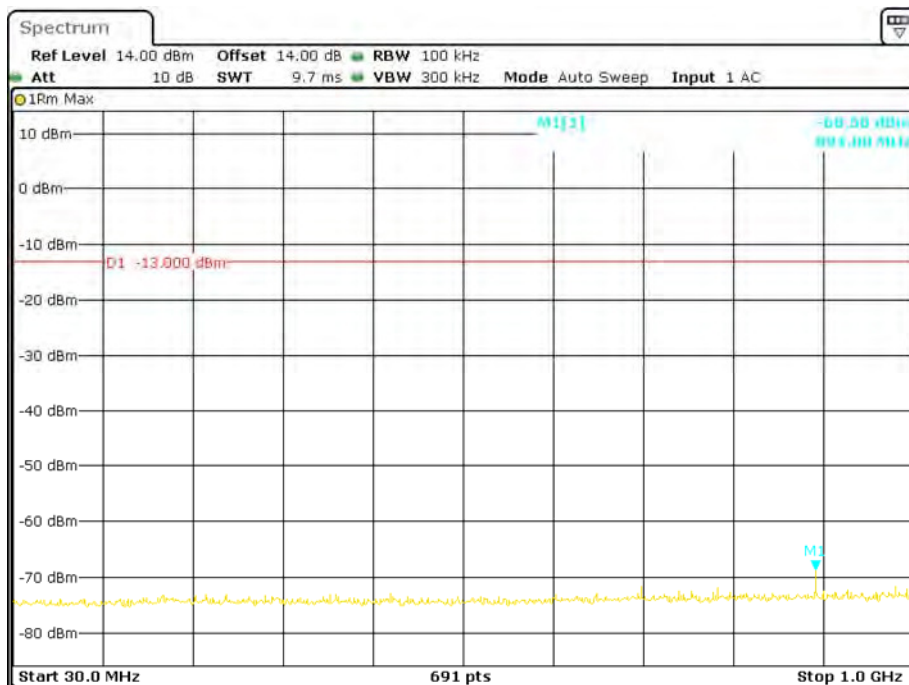
Fundamental test

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



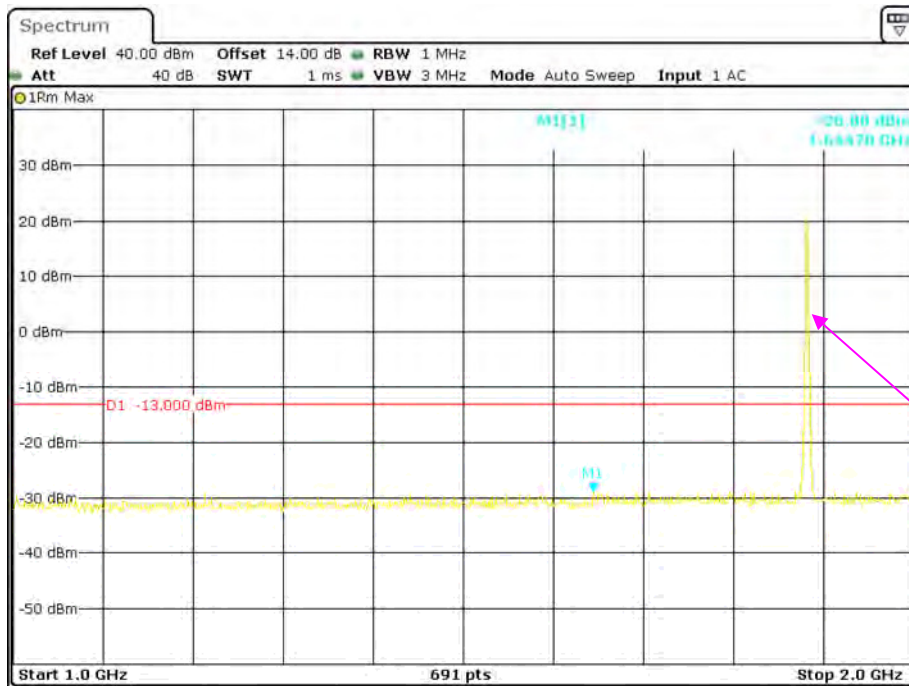
Date: 12.FEB.2018 09:19:55

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



Date: 9.FEB.2018 09:33:46

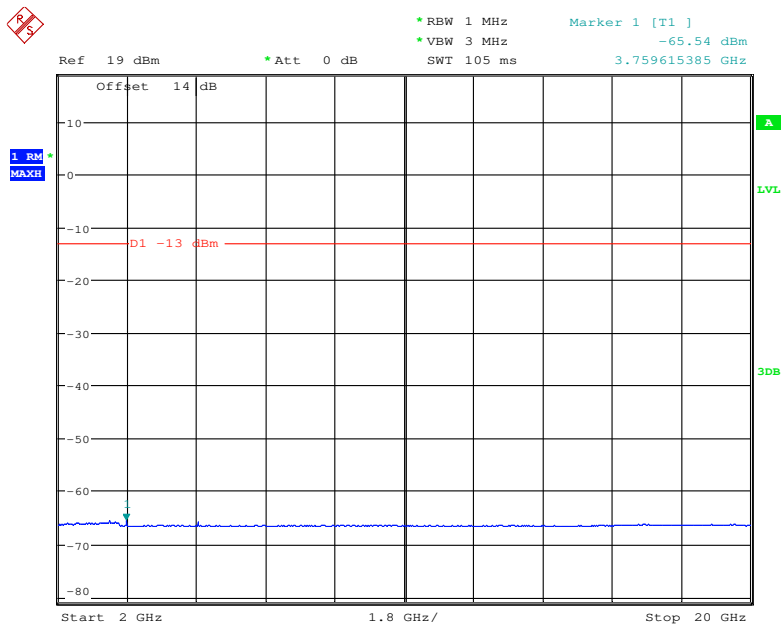
1 GHz – 2 GHz (3.0 MHz, Middle Channel)



Date: 9.FEB.2018 09:38:31

Fundamental test

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



Date: 12.FEB.2018 09:20:26

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



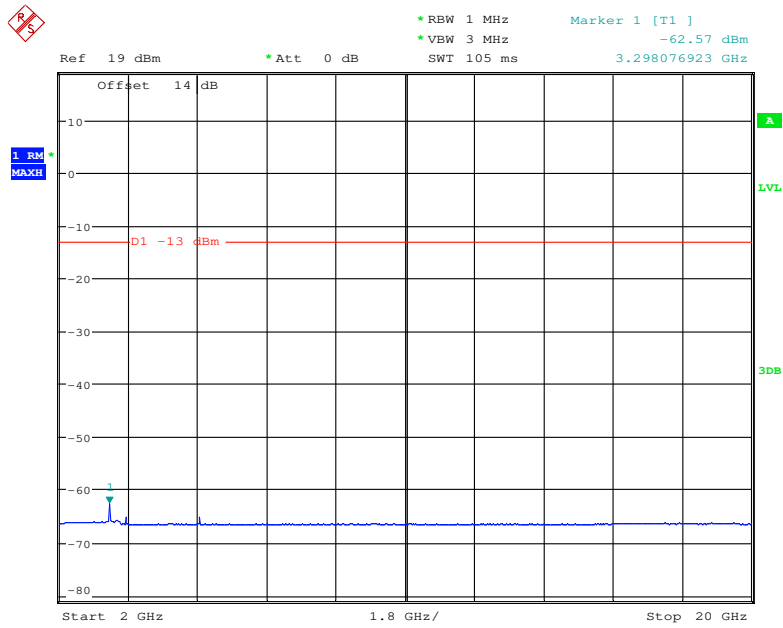
Date: 9.FEB.2018 09:34:14

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



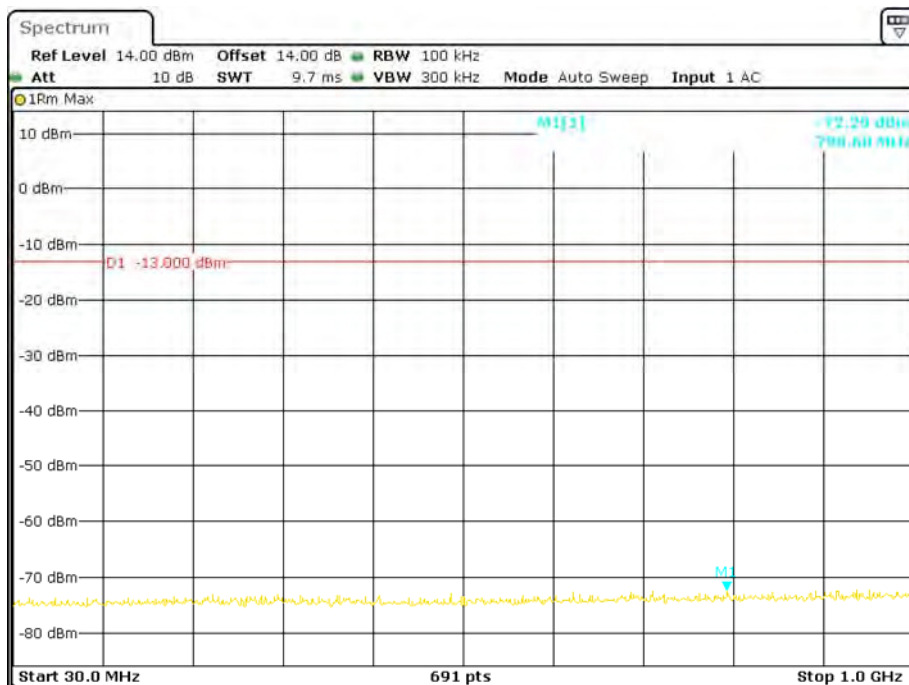
Date: 9.FEB.2018 09:39:05

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



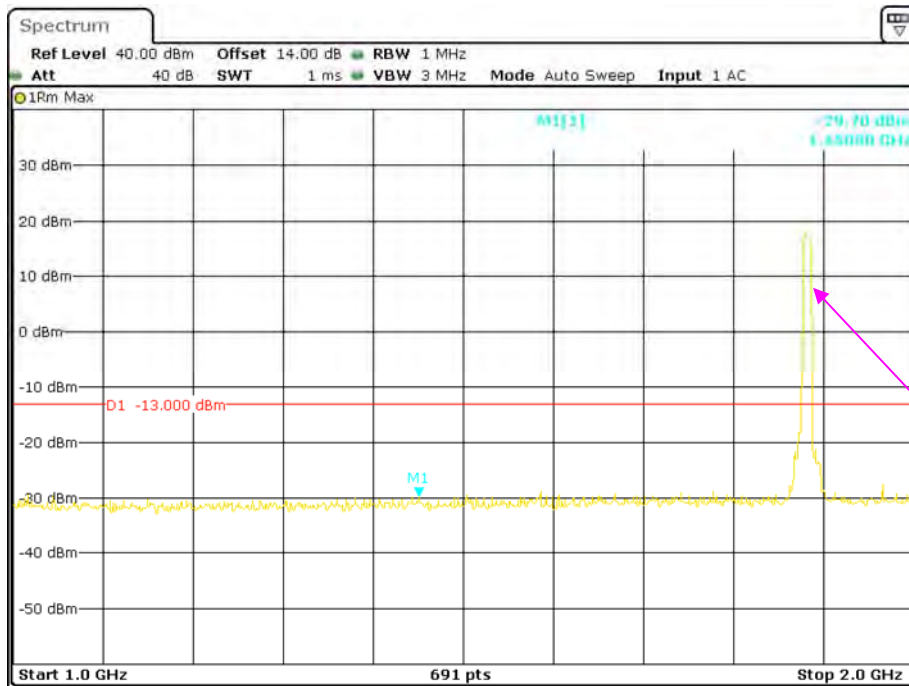
Date: 12.FEB.2018 09:20:44

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



Date: 9.FEB.2018 09:34:48

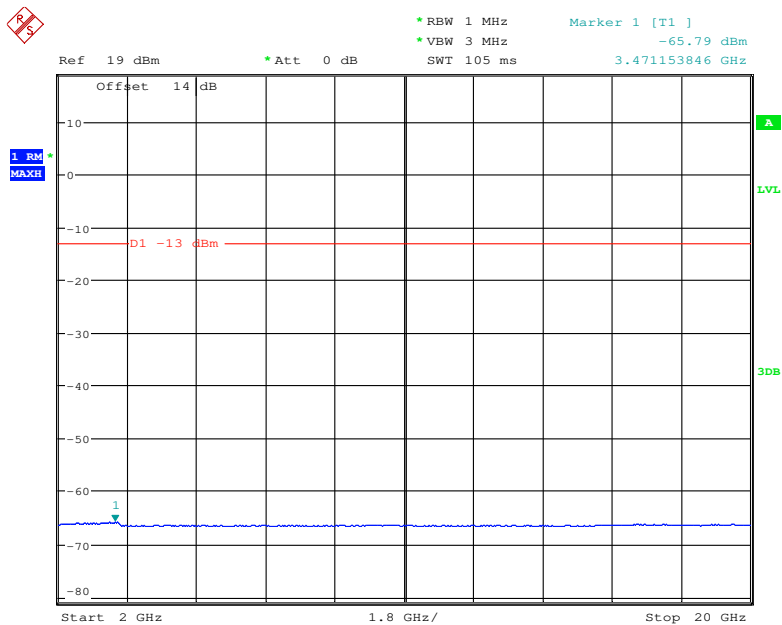
1 GHz – 2 GHz (10.0 MHz, Middle Channel)



Date: 9.FEB.2018 09:39:40

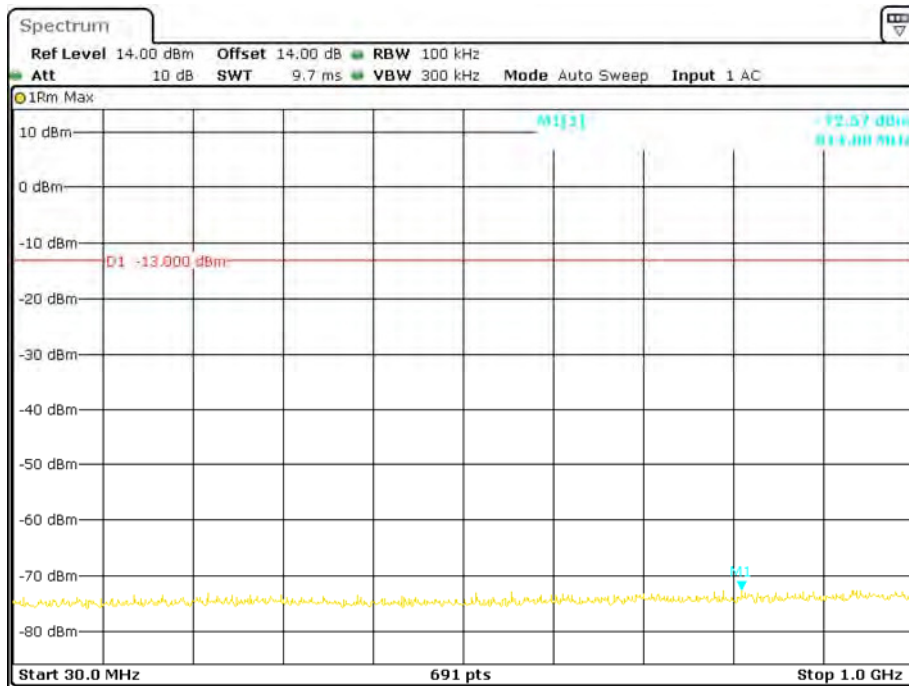
Fundamental test

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



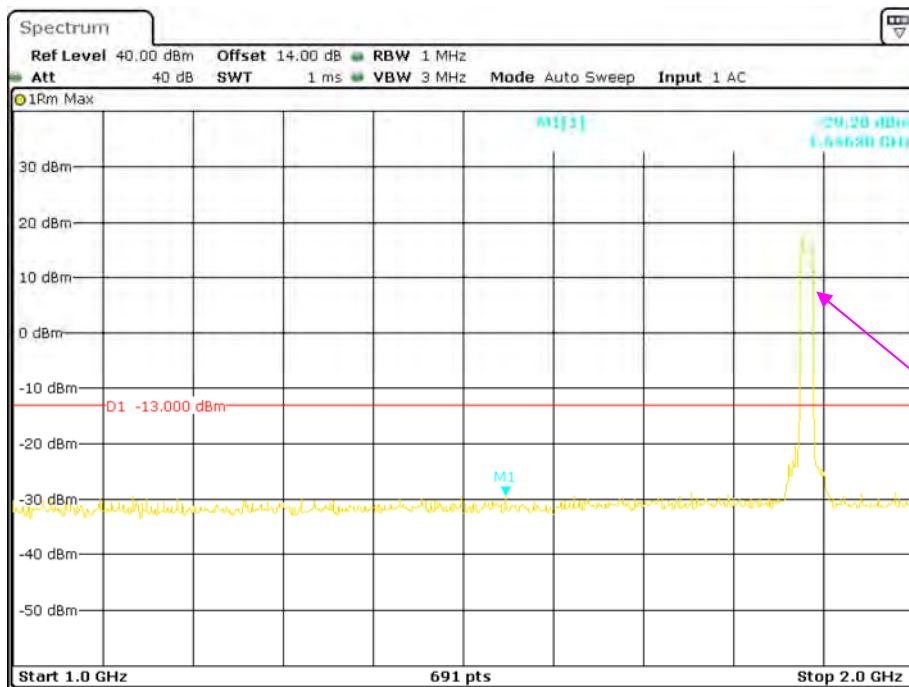
Date: 12.FEB.2018 09:21:07

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



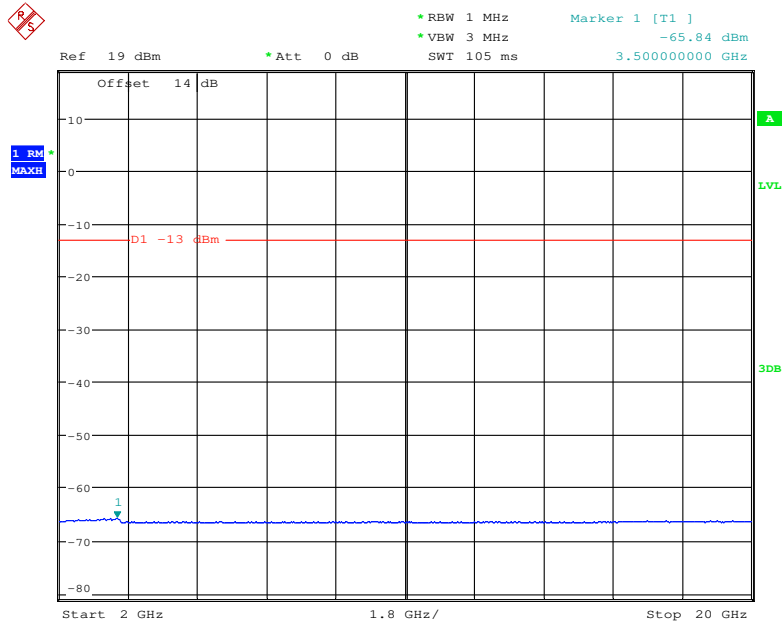
Date: 9.FEB.2018 09:35:09

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



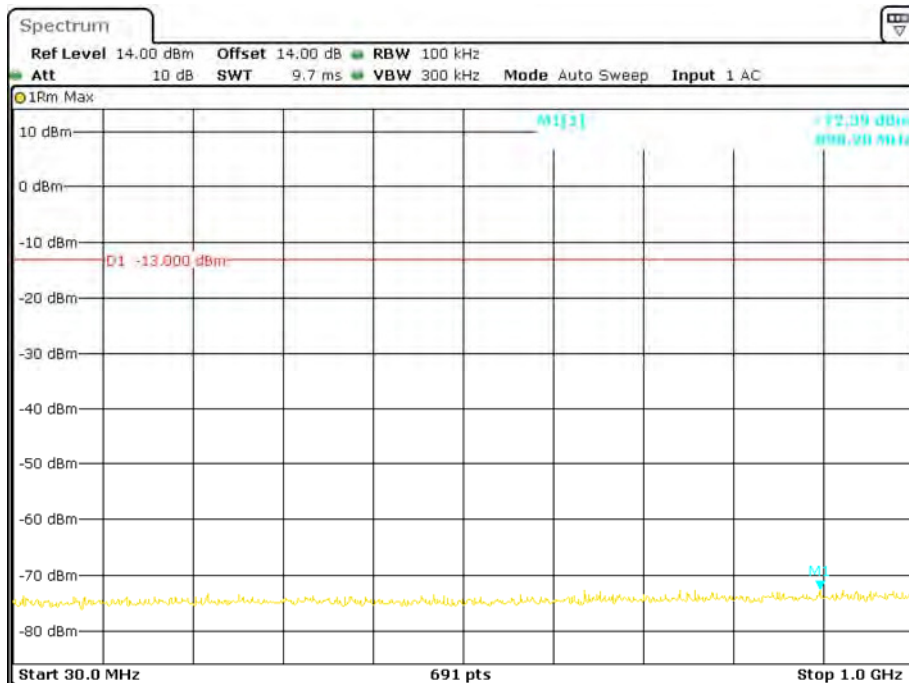
Date: 9.FEB.2018 09:40:11

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



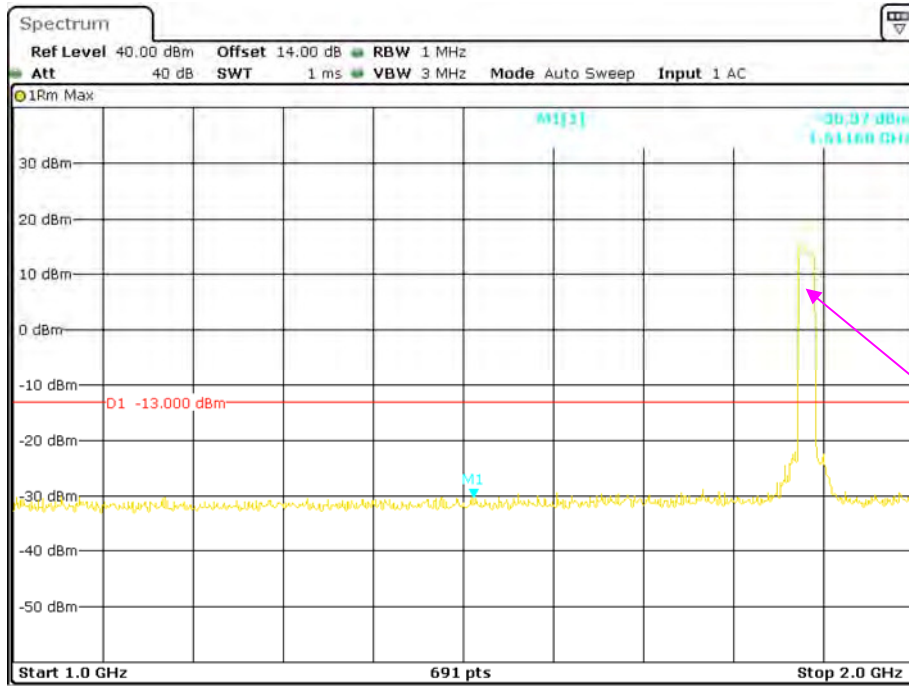
Date: 12.FEB.2018 09:21:27

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



Date: 9.FEB.2018 09:35:30

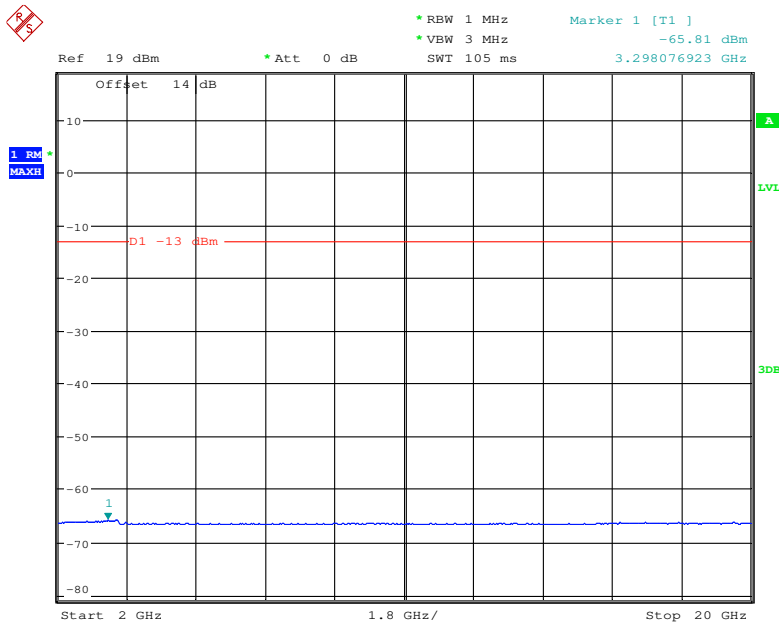
1 GHz – 2 GHz (20.0 MHz, Middle Channel)



Date: 9.FEB.2018 09:40:38

Fundamental test

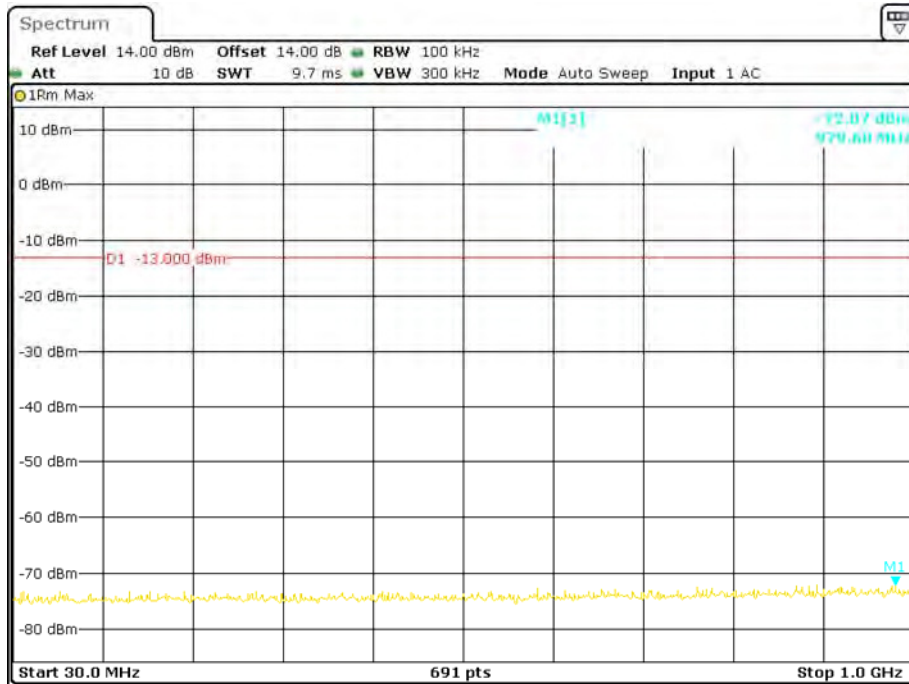
2 GHz – 20 GHz (20.0 MHz, Middle Channel)



Date: 12.FEB.2018 09:21:54

LTE Band 4:

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



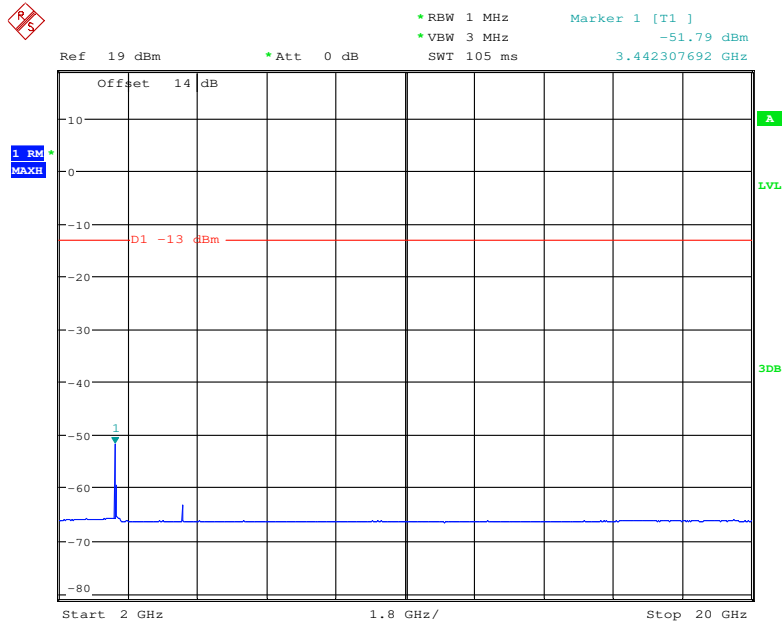
Date: 9.FEB.2018 09:51:09

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



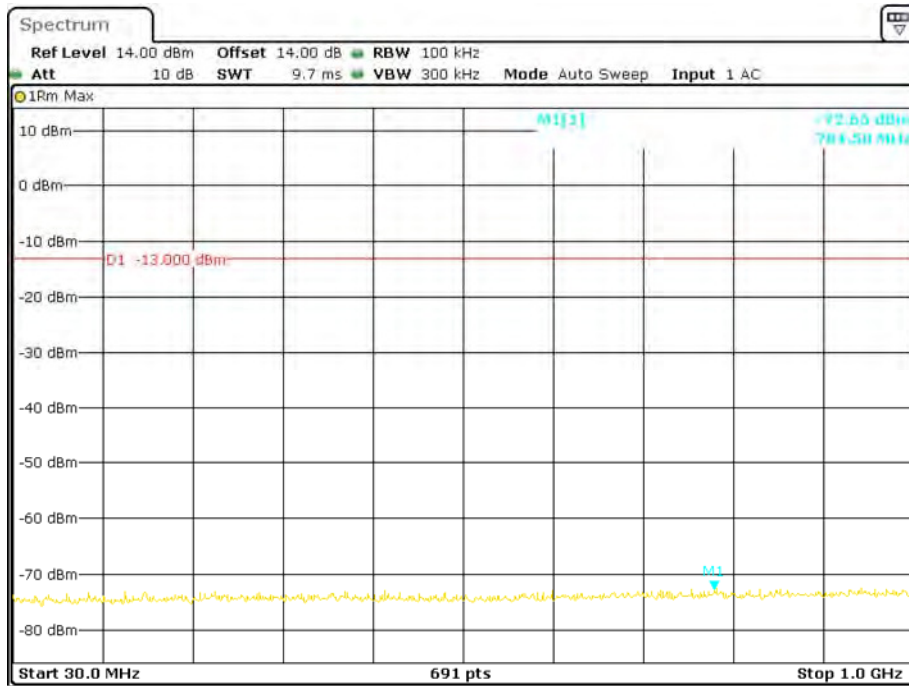
Date: 9.FEB.2018 09:44:51

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



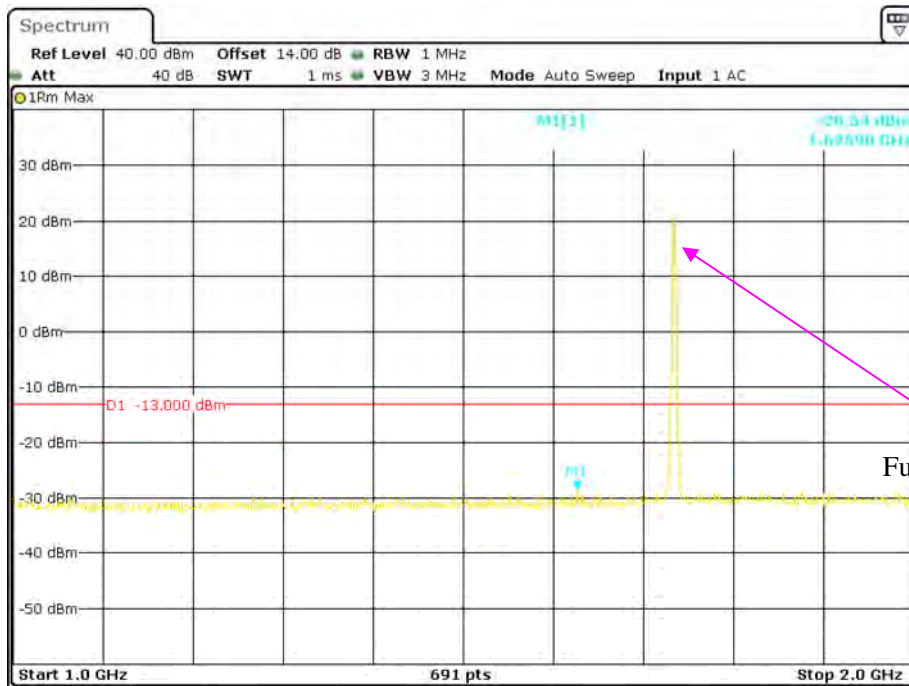
Date: 12.FEB.2018 09:24:23

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



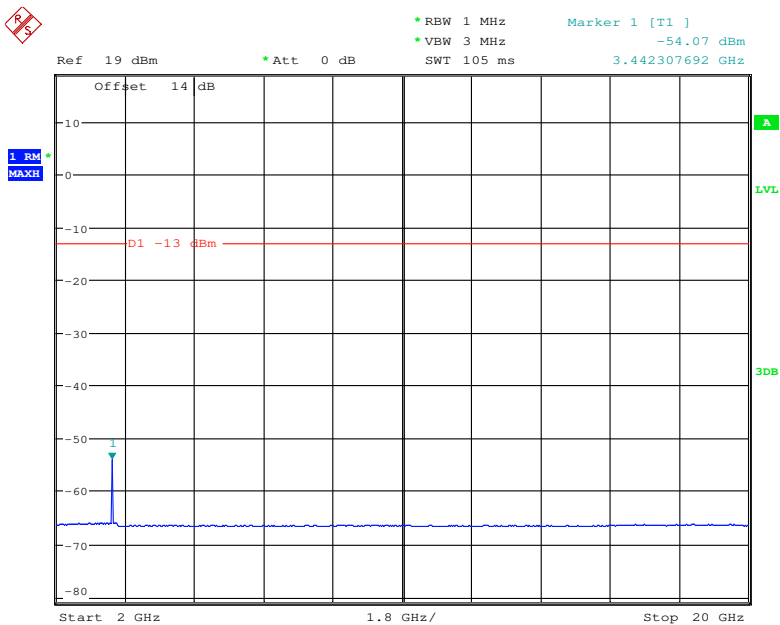
Date: 9.FEB.2018 09:52:13

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



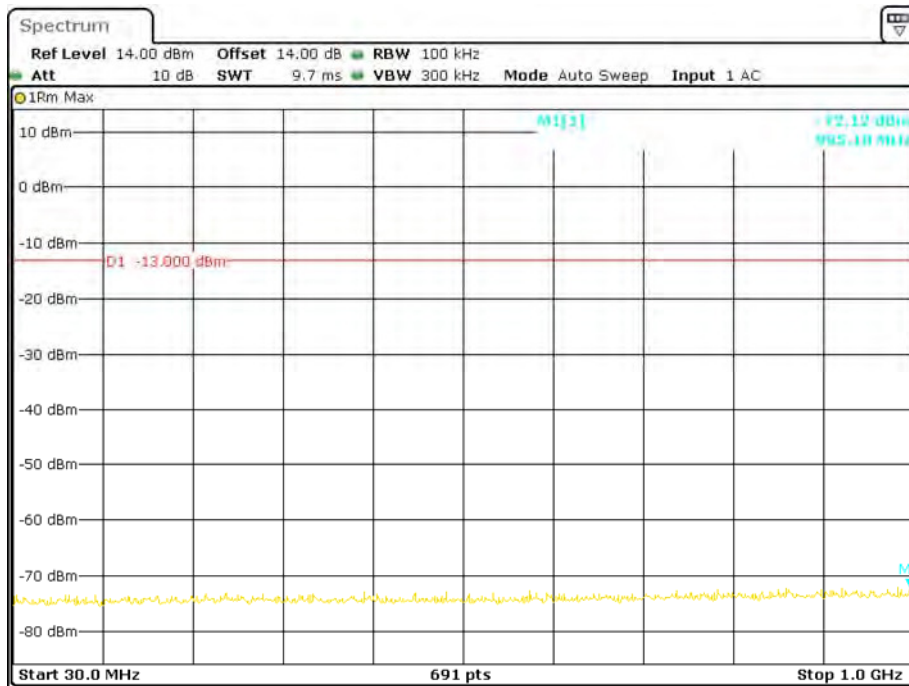
Date: 9.FEB.2018 09:45:58

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



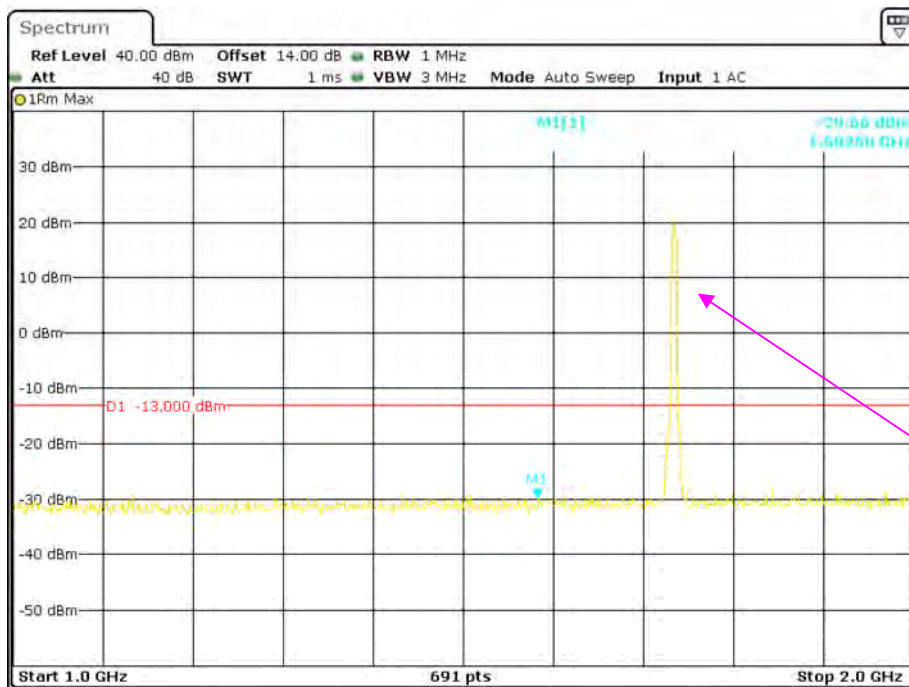
Date: 12.FEB.2018 09:24:45

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



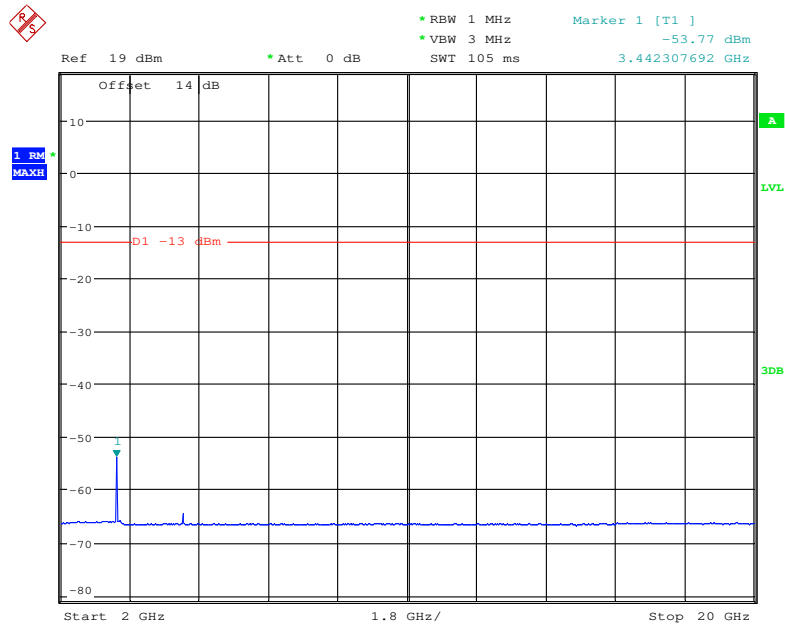
Date: 9.FEB.2018 09:54:31

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



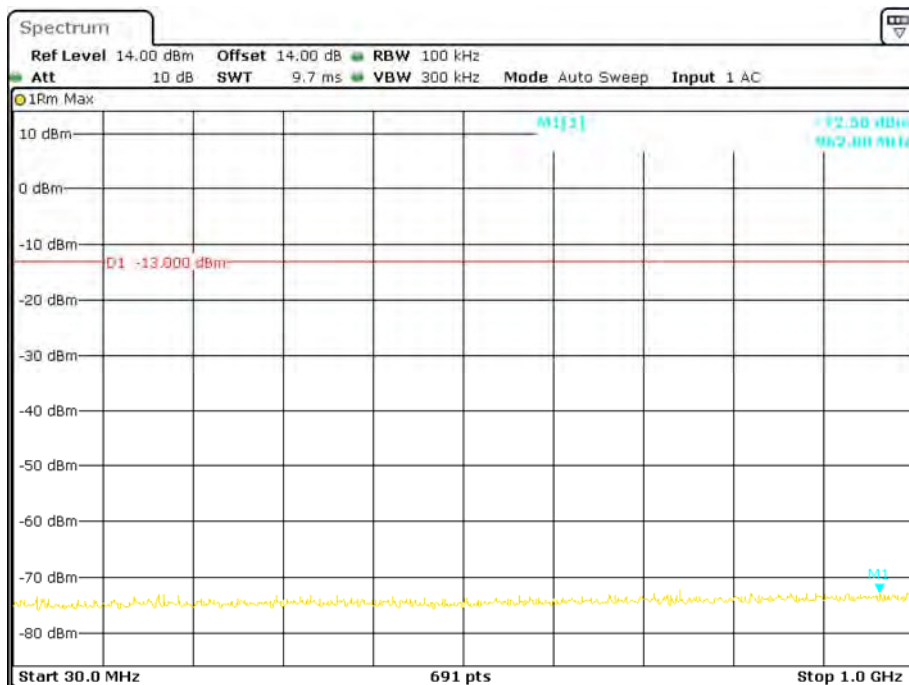
Date: 9.FEB.2018 09:46:46

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



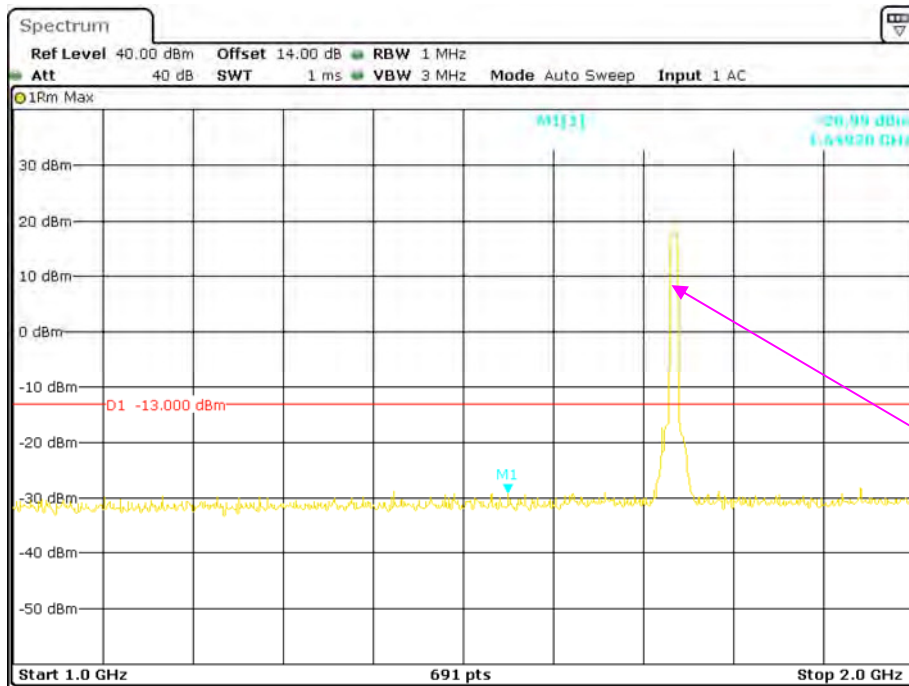
Date: 12.FEB.2018 09:25:02

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



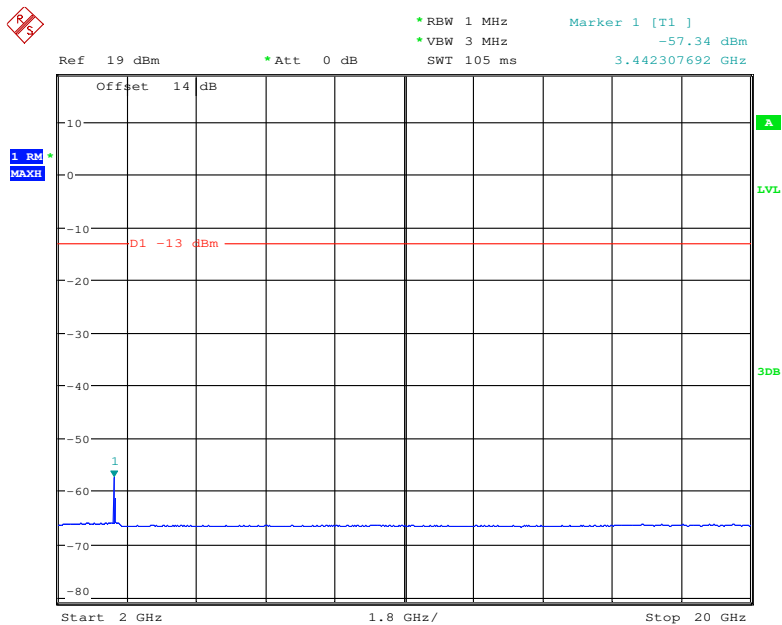
Date: 9.FEB.2018 09:54:57

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



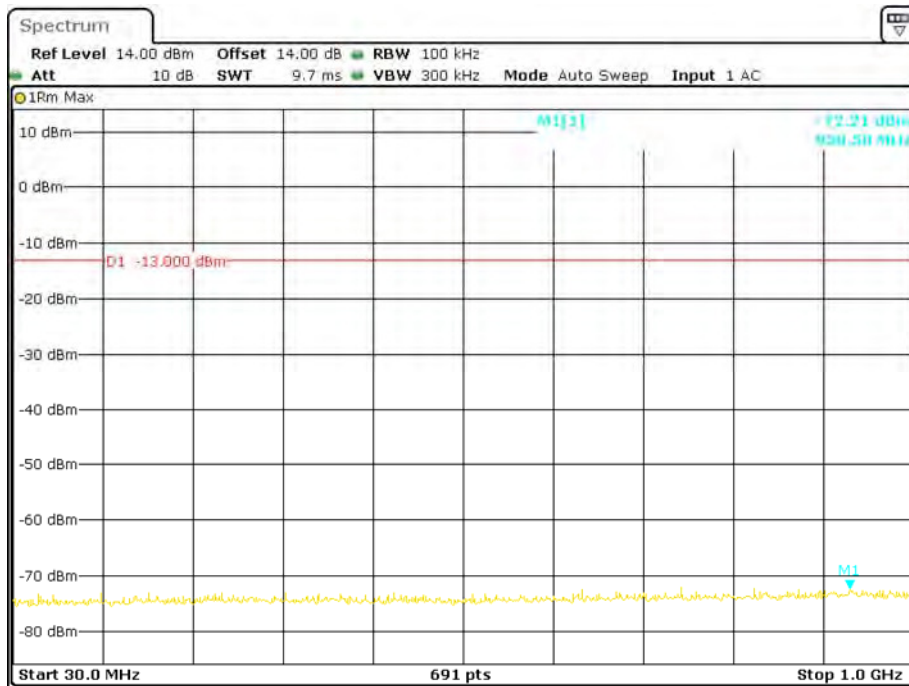
Date: 9.FEB.2018 09:47:15

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

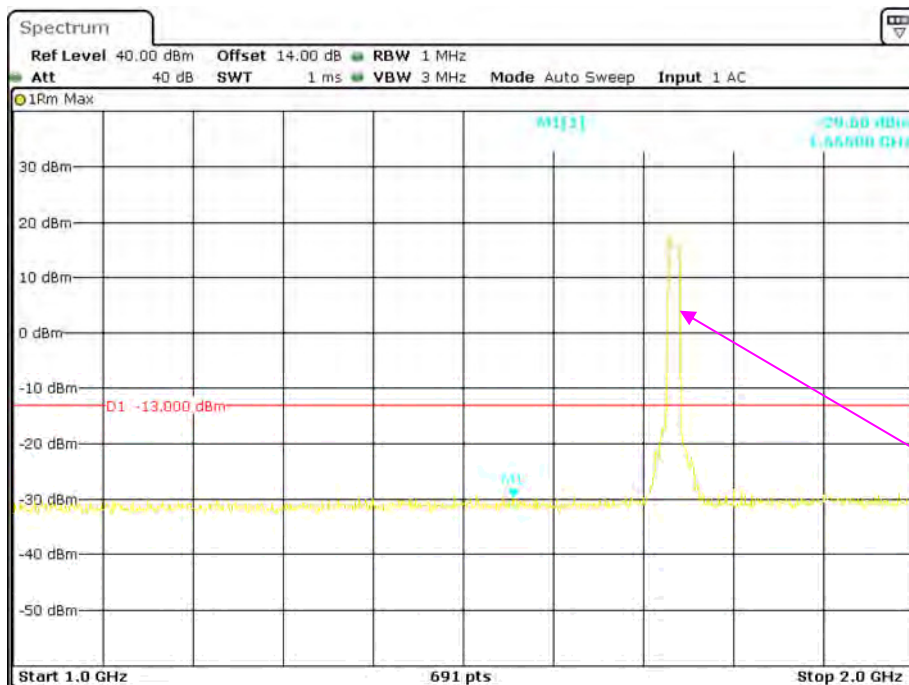


Date: 12.FEB.2018 09:25:16

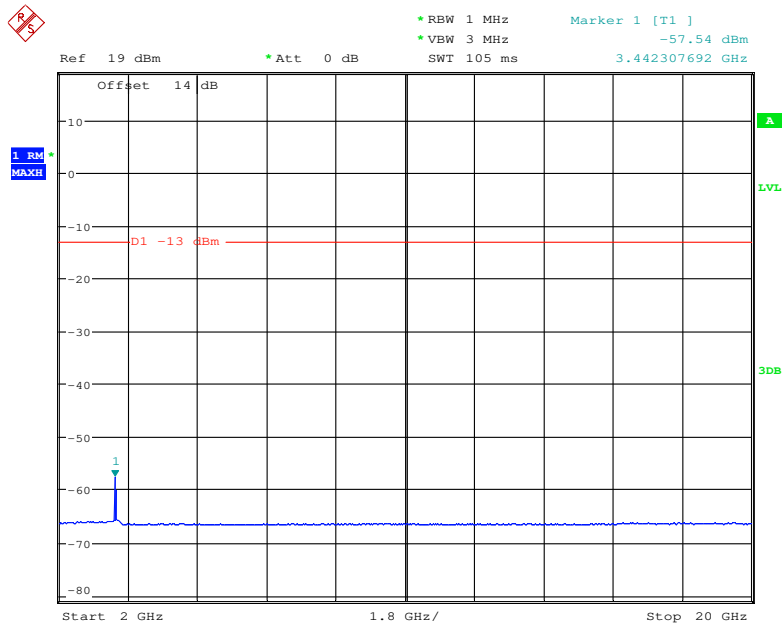
30 MHz - 1 GHz (15.0 MHz, Middle Channel)



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

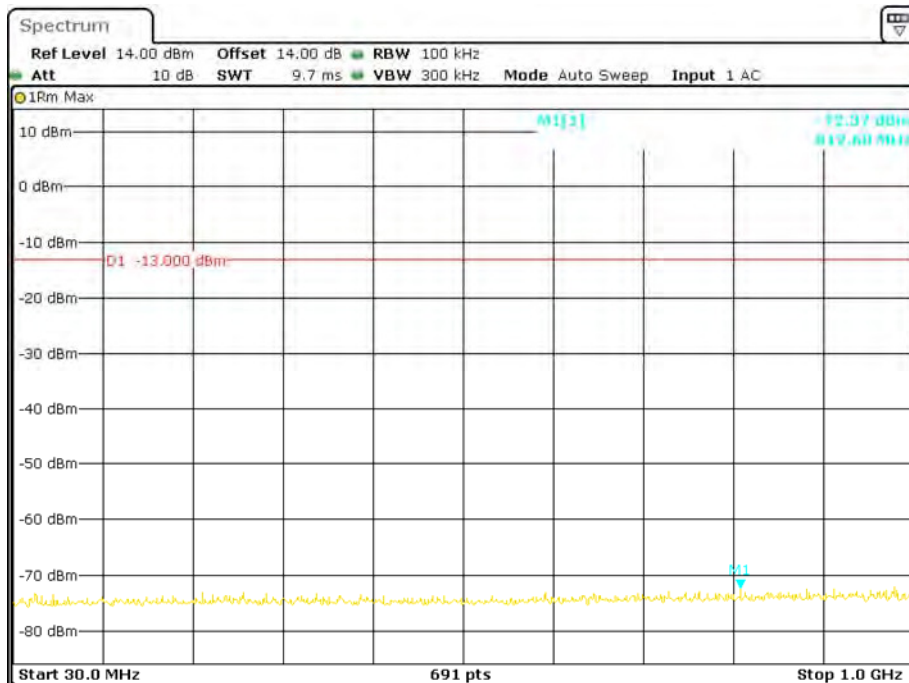


2 GHz – 20 GHz (15.0 MHz, Middle Channel)



Date: 12.FEB.2018 09:25:30

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



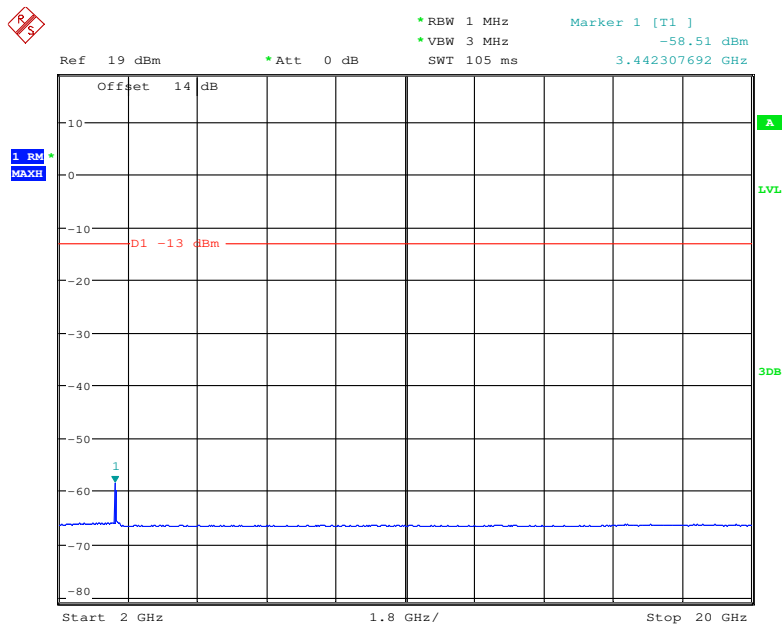
Date: 9.FEB.2018 09:56:00

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



Date: 9.FEB.2018 09:48:17

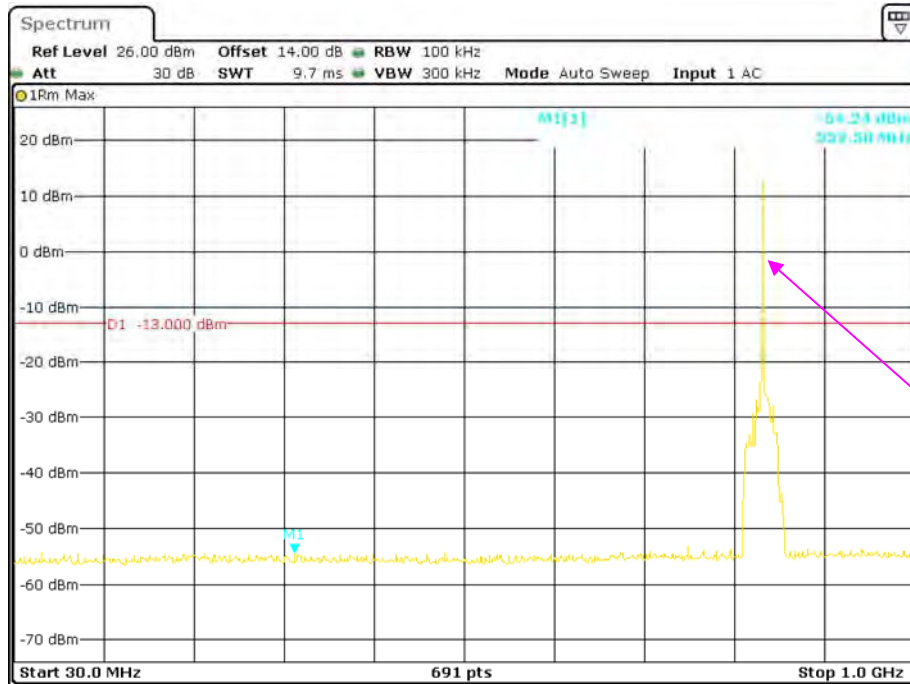
2 GHz – 20 GHz (20.0 MHz, Middle Channel)



Date: 12.FEB.2018 09:25:42

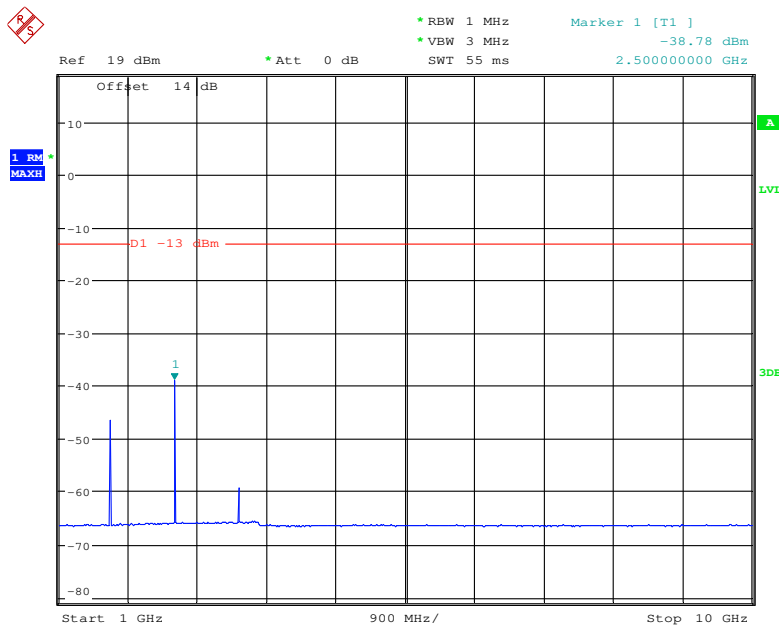
LTE Band 5:

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



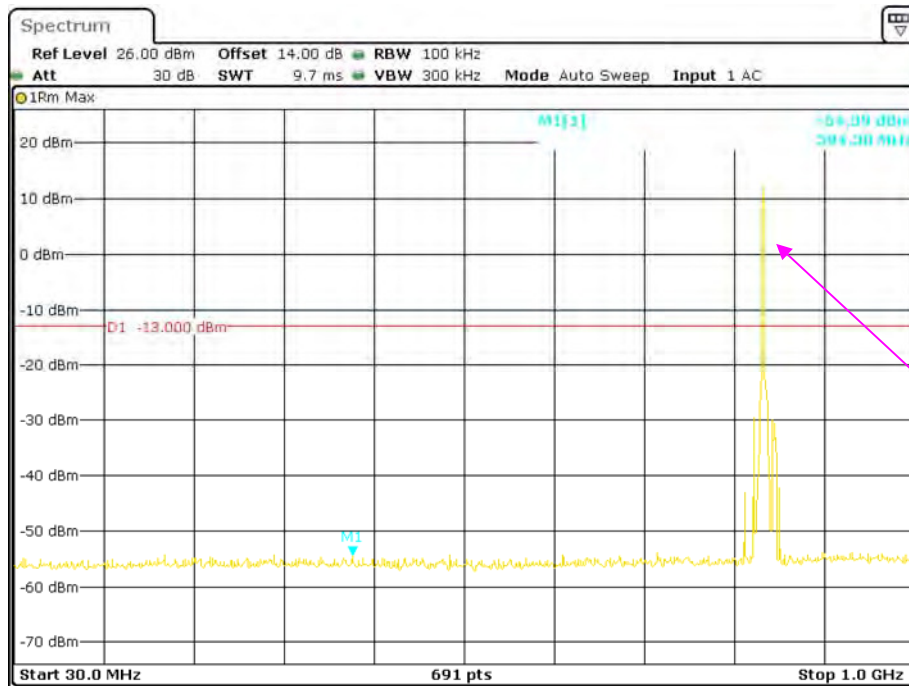
Date: 9.FEB.2018 09:58:20

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



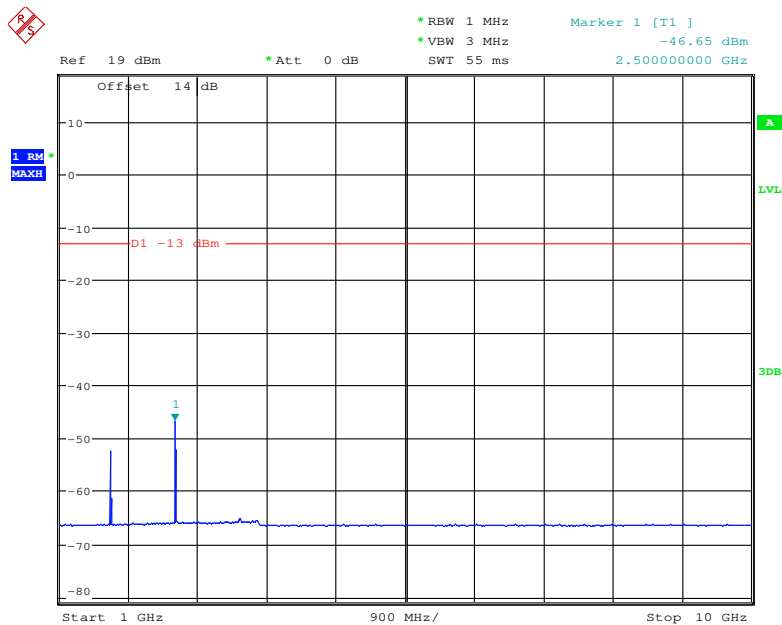
Date: 12.FEB.2018 09:27:39

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



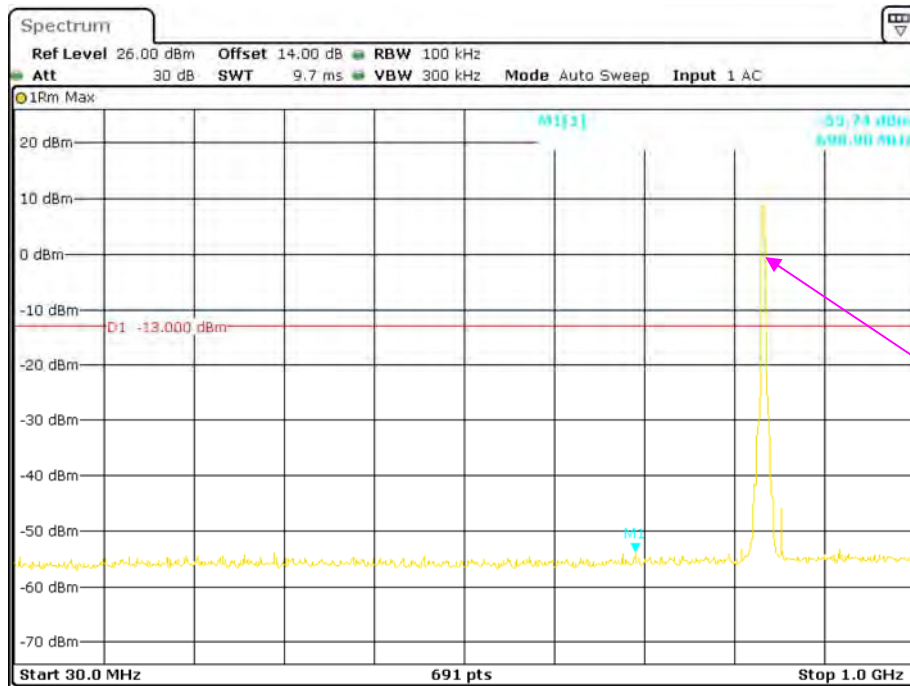
Date: 9.FEB.2018 09:59:27

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



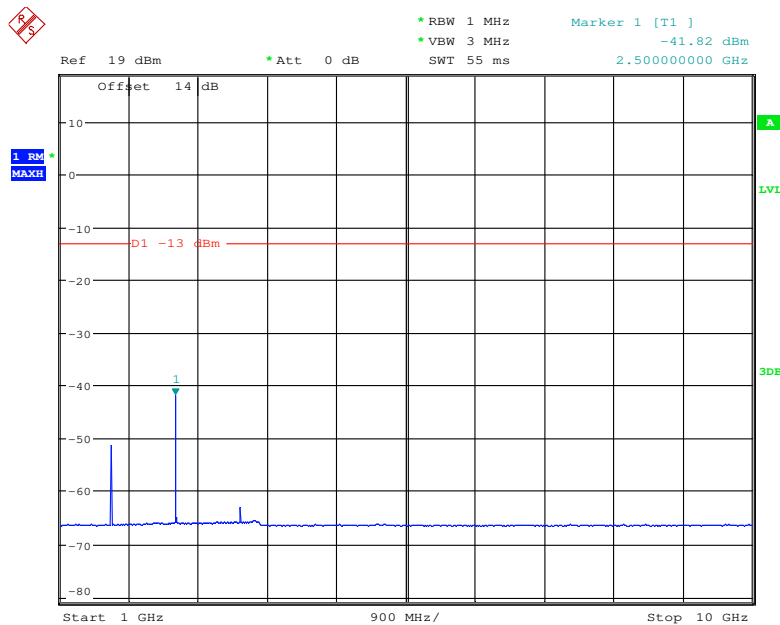
Date: 12.FEB.2018 09:28:15

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



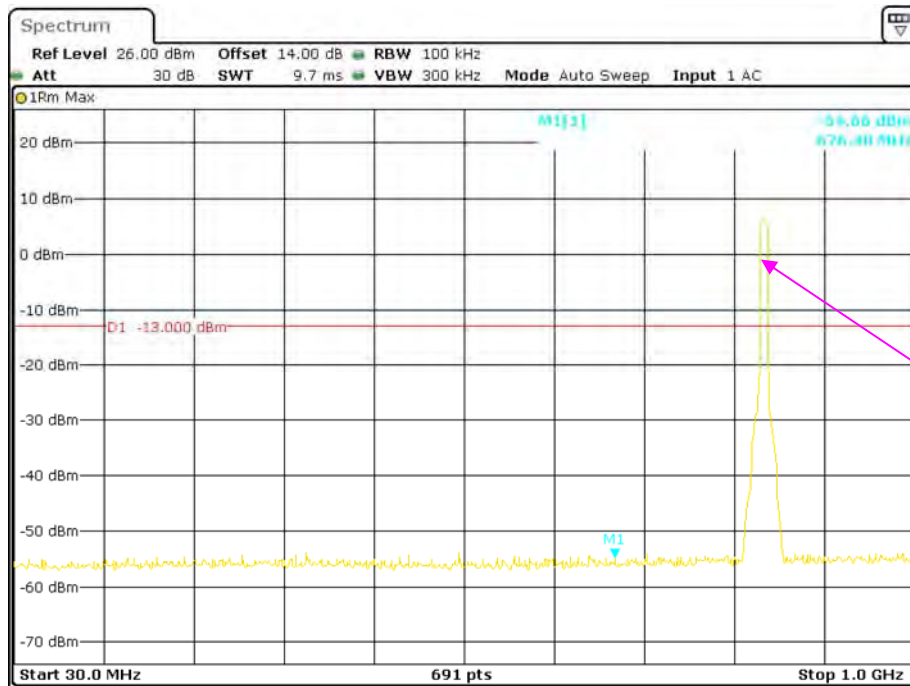
Date: 9.FEB.2018 10:00:00

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



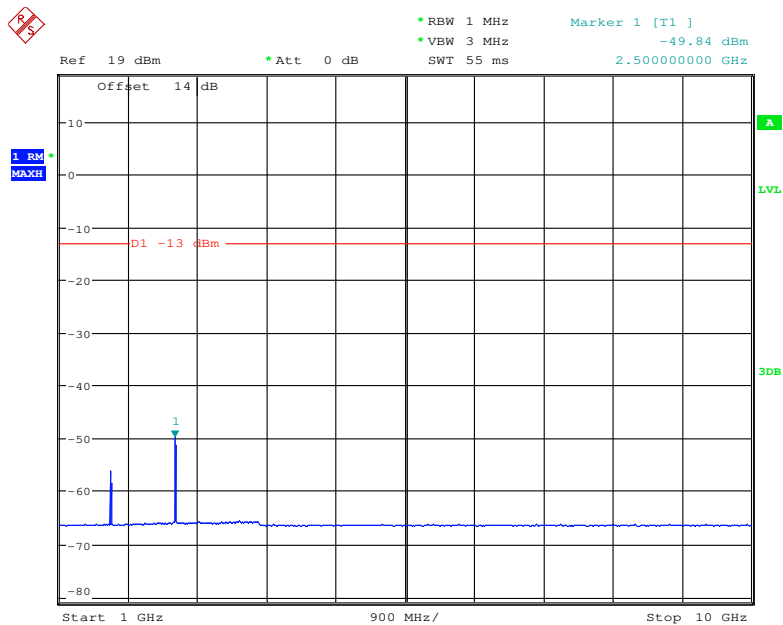
Date: 12.FEB.2018 09:28:30

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



Date: 9.FEB.2018 10:00:26

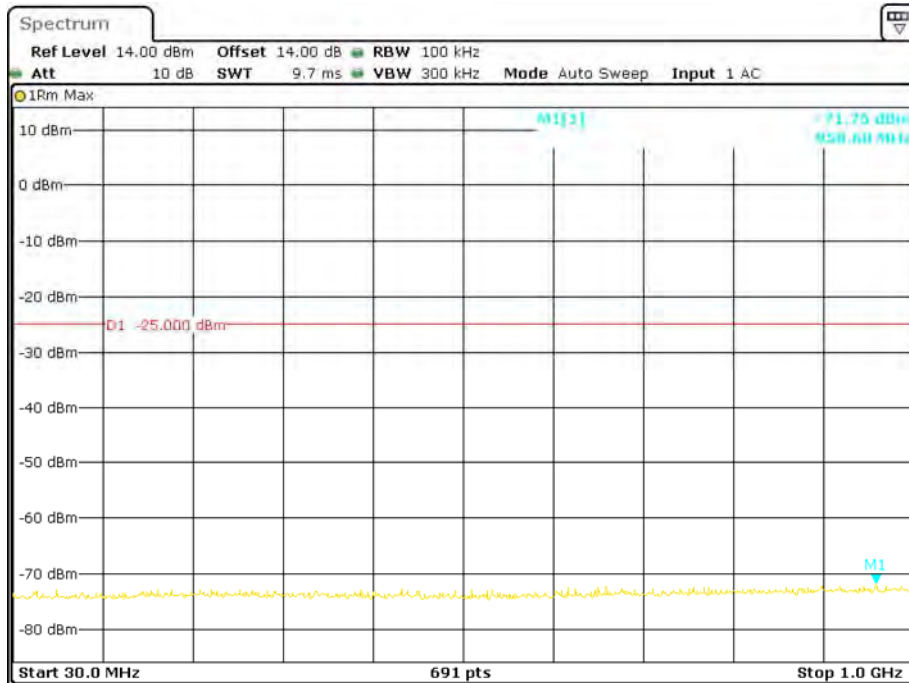
1 GHz - 10 GHz (10.0 MHz, Middle Channel)



Date: 12.FEB.2018 09:28:44

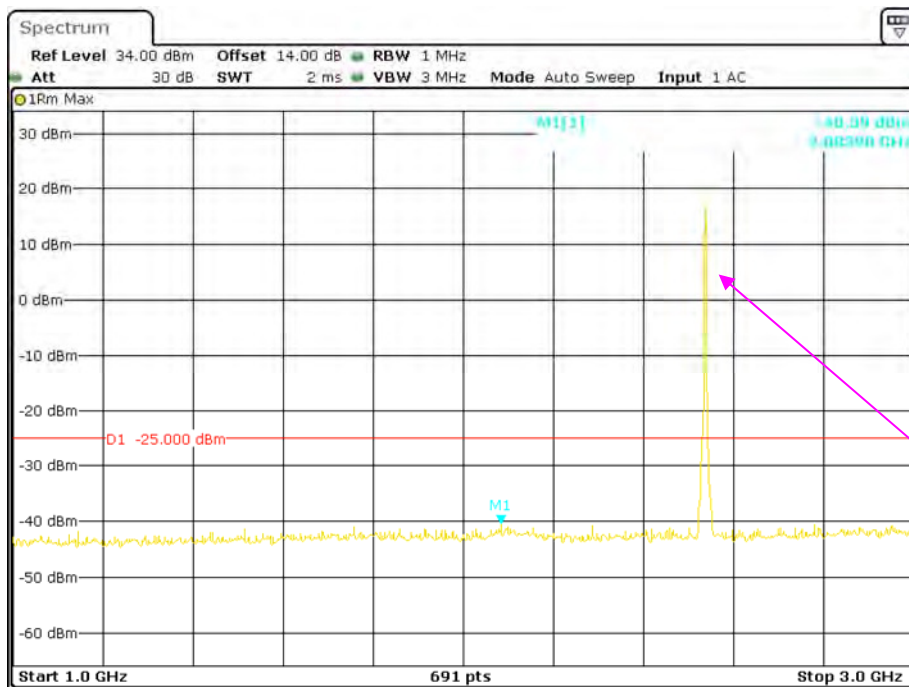
LTE Band 7:

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



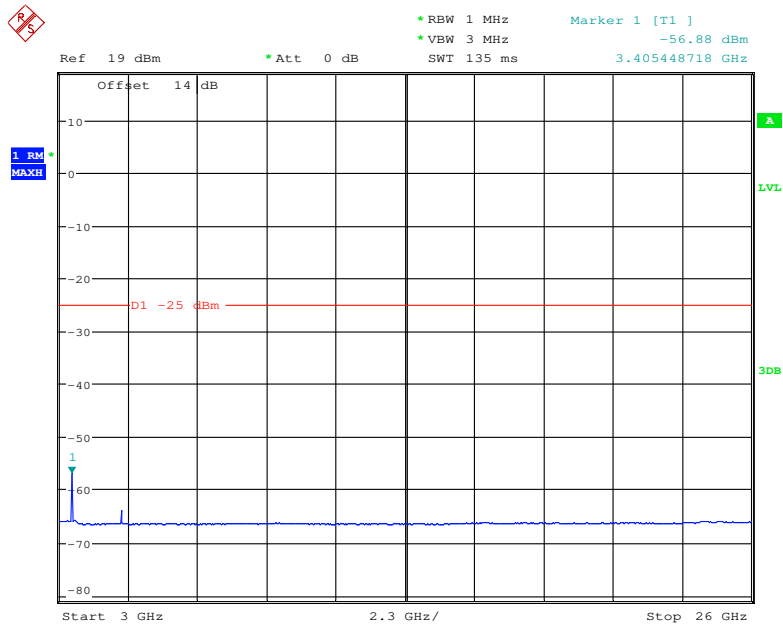
Date: 9.FEB.2018 10:06:35

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



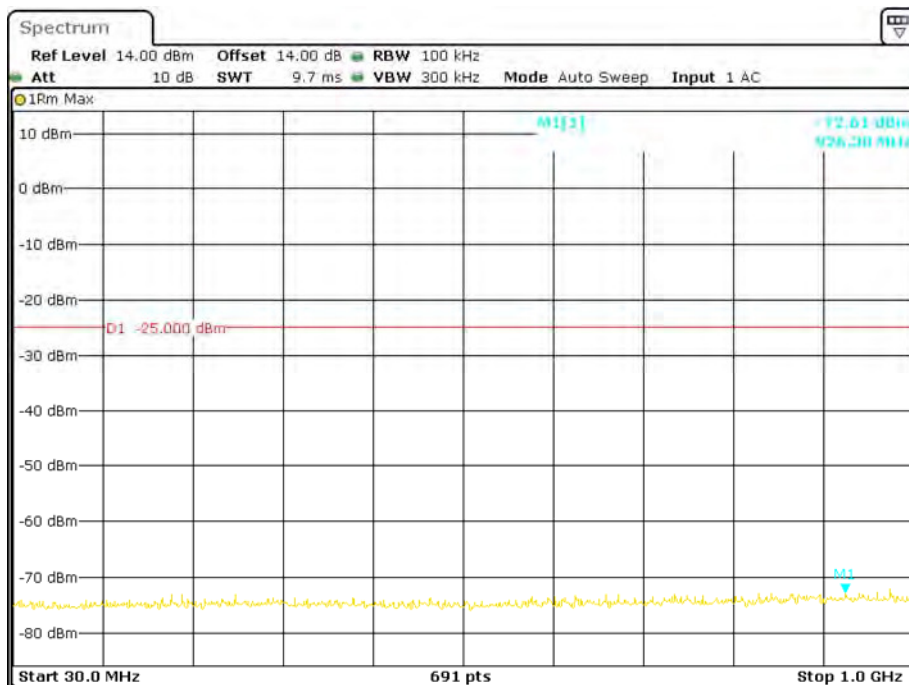
Date: 9.FEB.2018 10:09:50

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



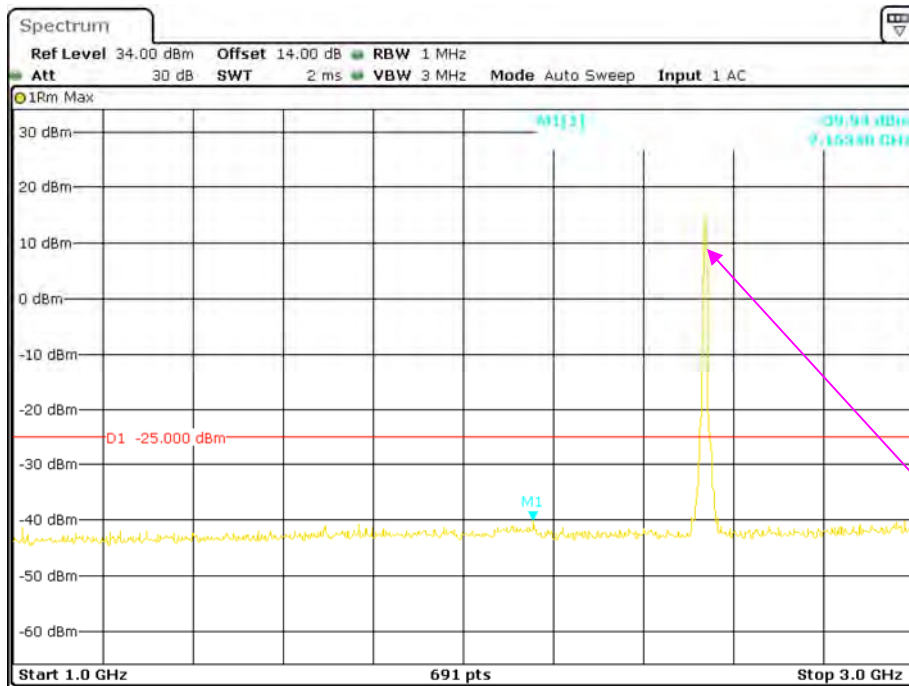
Date: 12.FEB.2018 09:30:13

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



Date: 9.FEB.2018 10:07:02

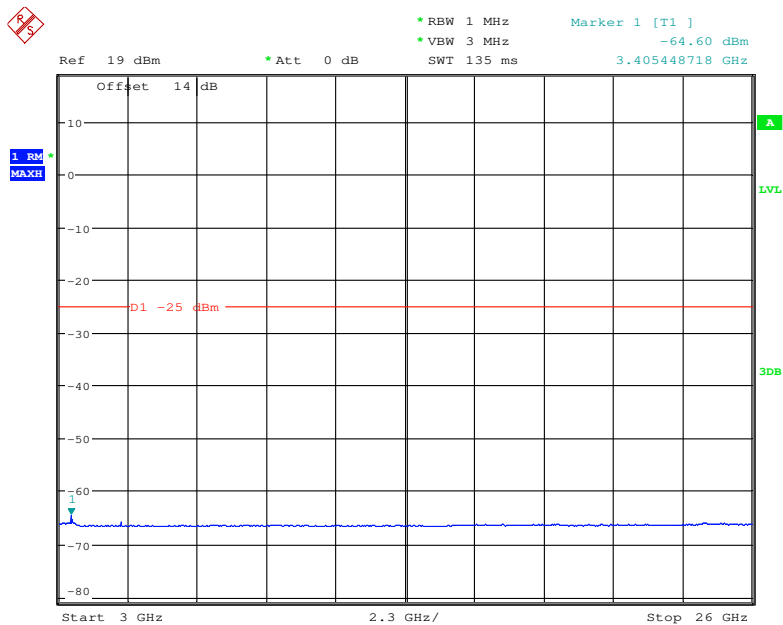
1 GHz – 3 GHz (10.0 MHz, Middle Channel)



Date: 9.FEB.2018 10:10:37

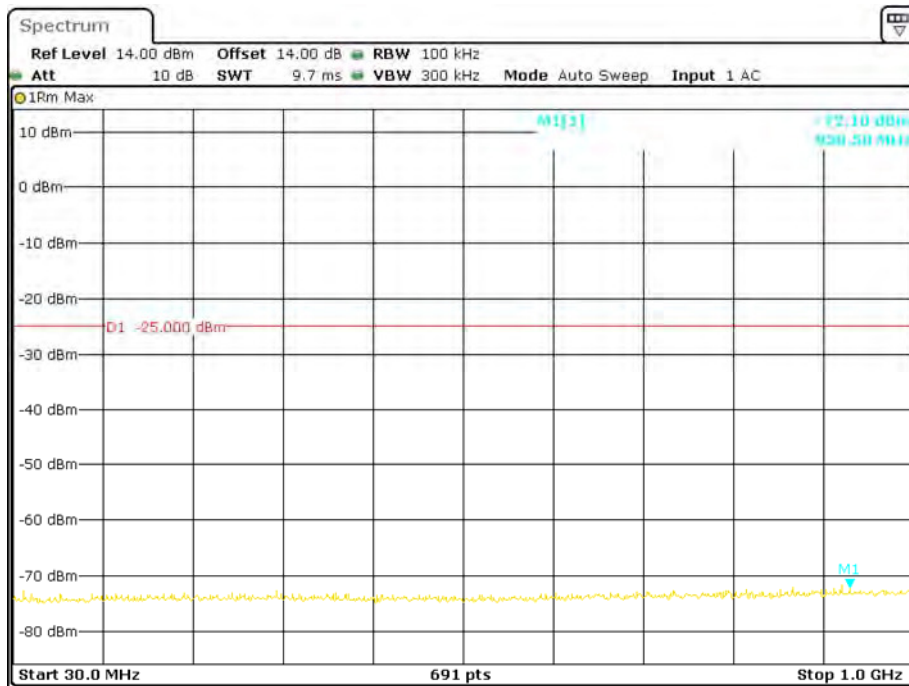
Fundamental test

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



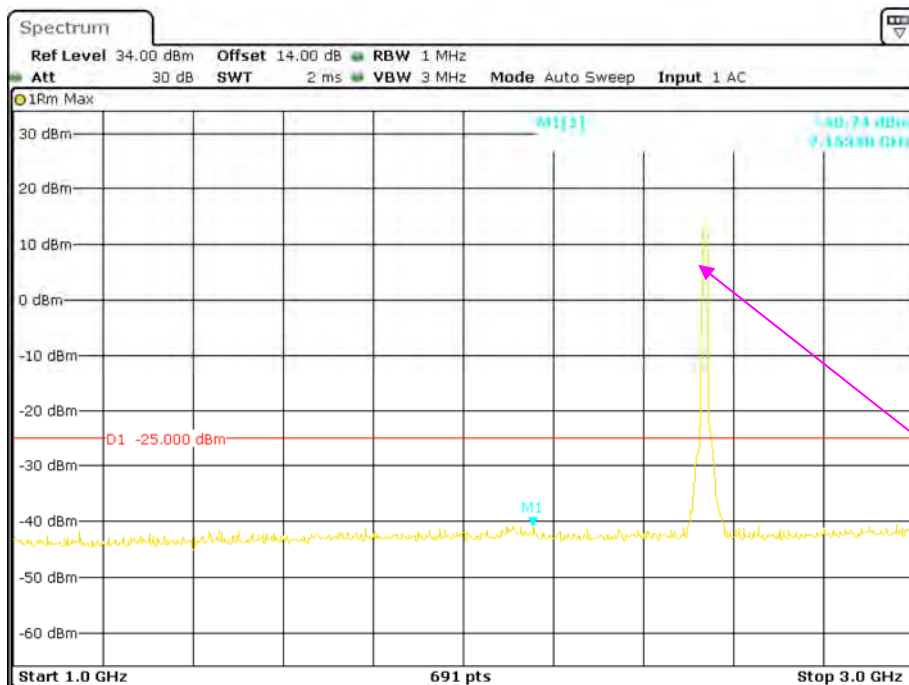
Date: 12.FEB.2018 09:30:49

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



Date: 9.FEB.2018 10:08:01

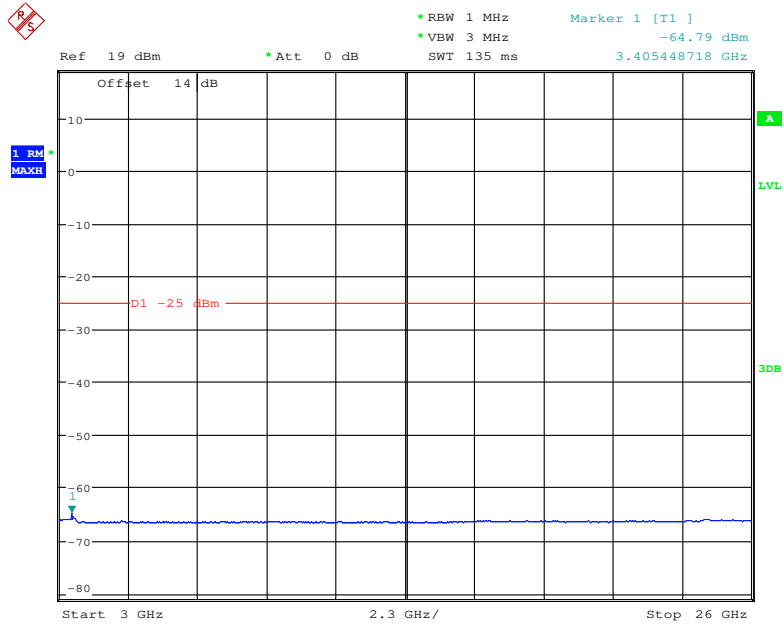
1 GHz – 3 GHz (15.0 MHz, Middle Channel)



Date: 9.FEB.2018 10:11:11

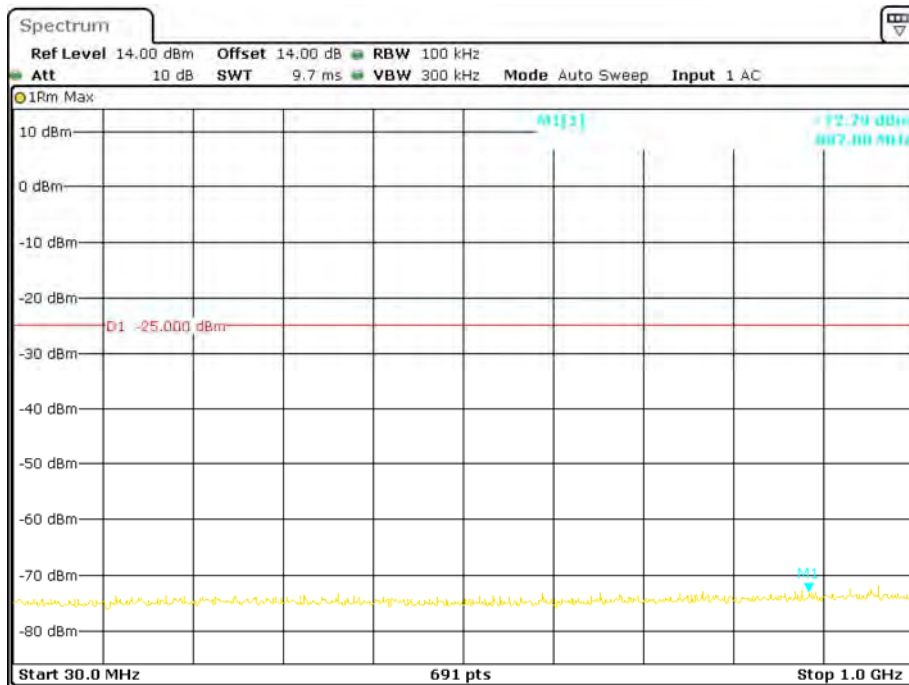
Fundamental test

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



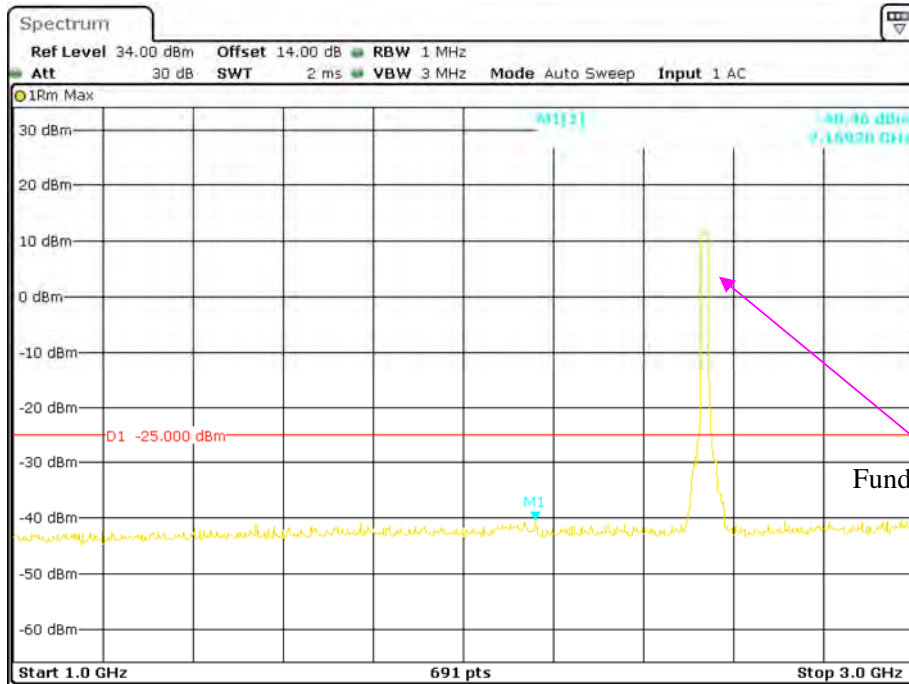
Date: 12.FEB.2018 09:31:05

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



Date: 9.FEB.2018 10:08:20

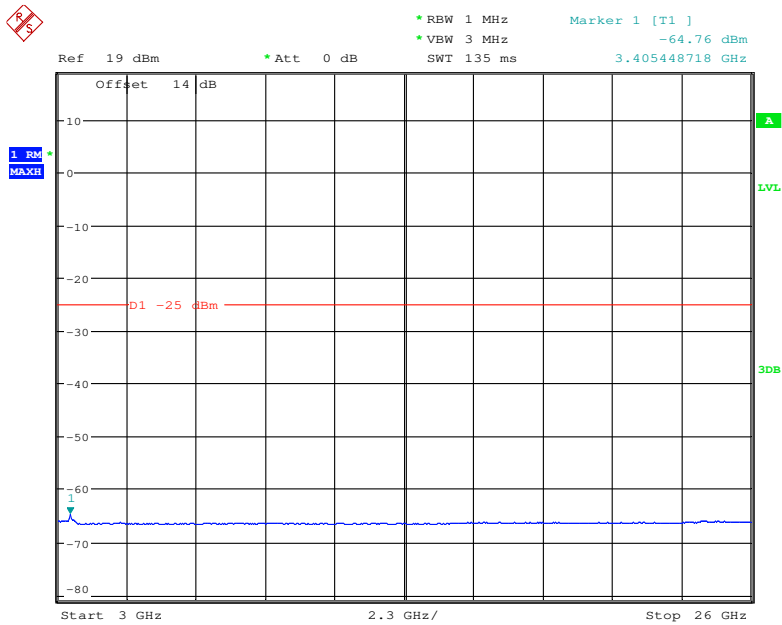
1 GHz – 3 GHz (20.0 MHz, Middle Channel)



Fundamental test

Date: 9.FEB.2018 10:11:50

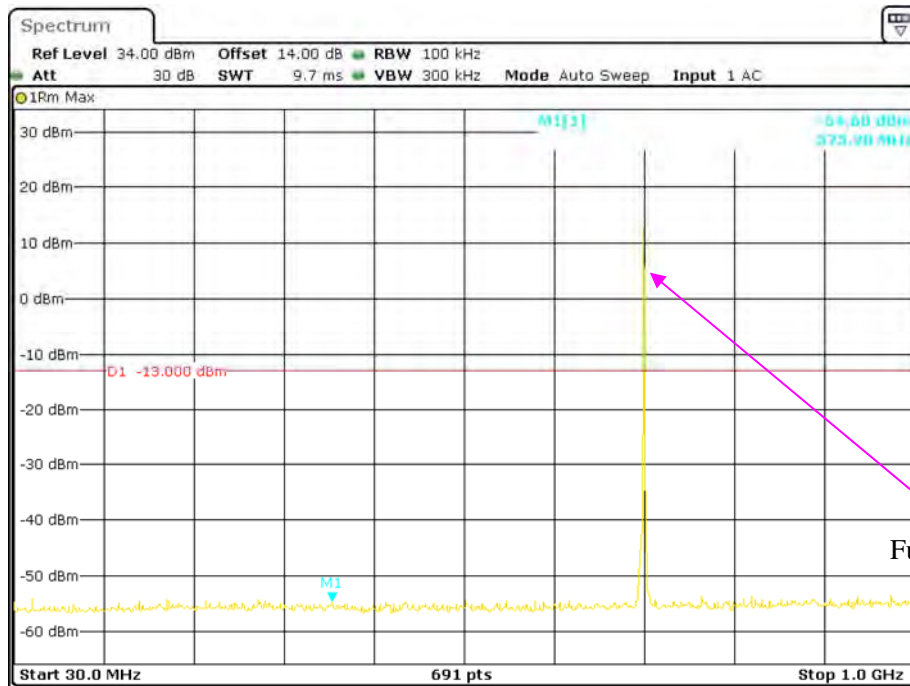
3 GHz – 26 GHz (20.0 MHz, Middle Channel)



Date: 12.FEB.2018 09:31:25

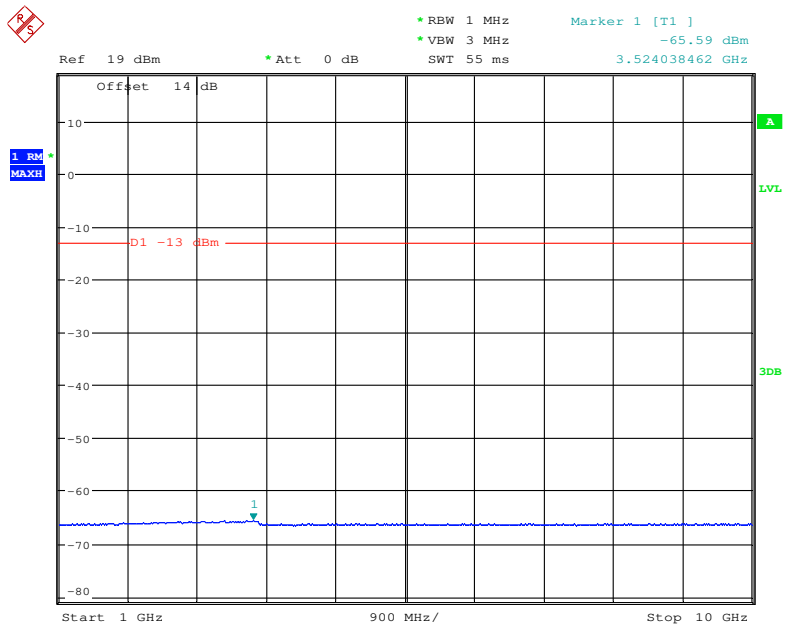
LTE Band 12:

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



Date: 9.FEB.2018 10:14:14

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



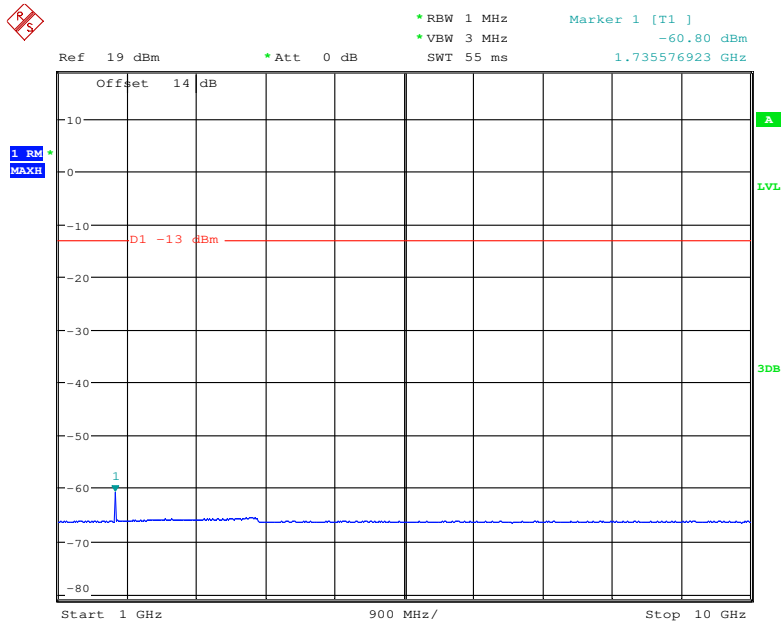
Date: 12.FEB.2018 09:36:55

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



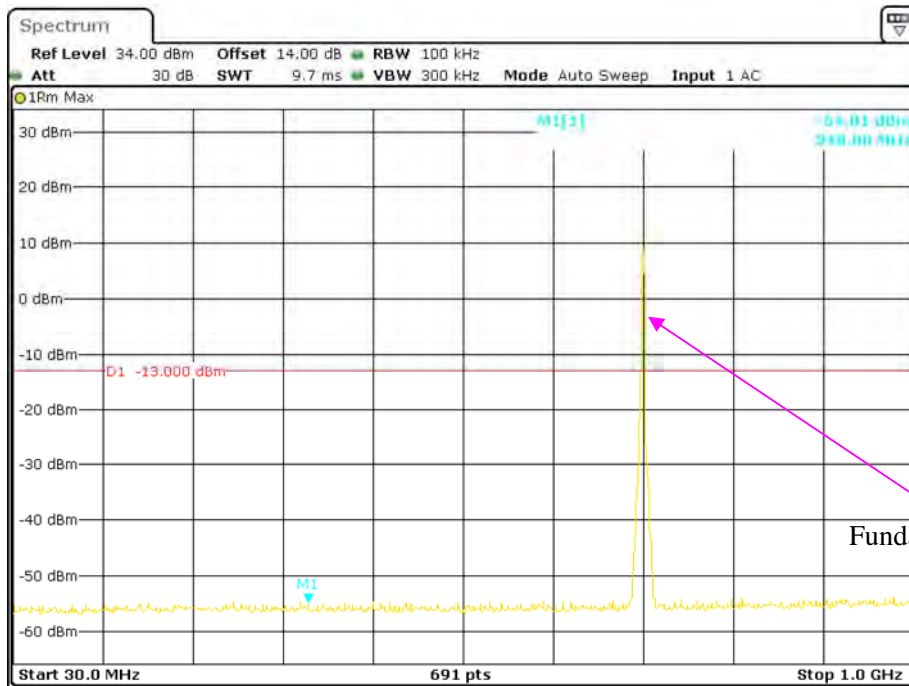
Date: 9.FEB.2018 10:14:54

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



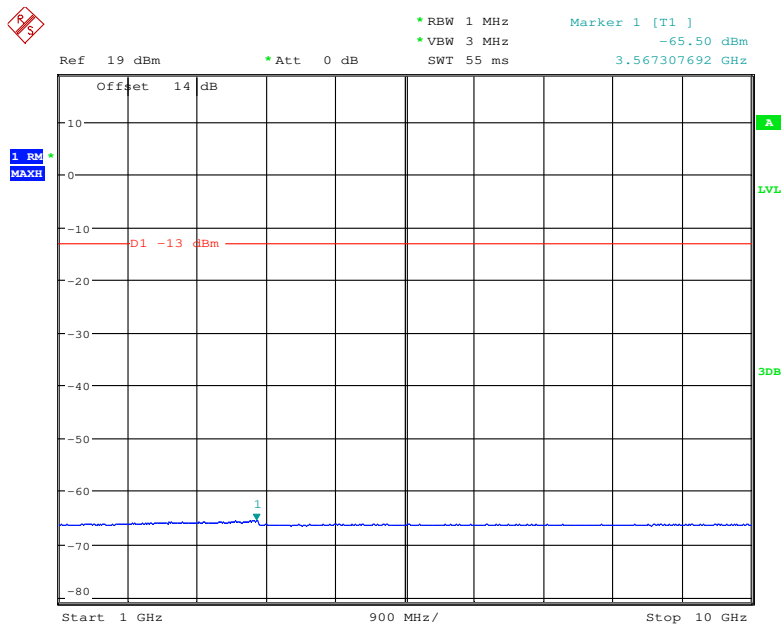
Date: 12.FEB.2018 09:37:32

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



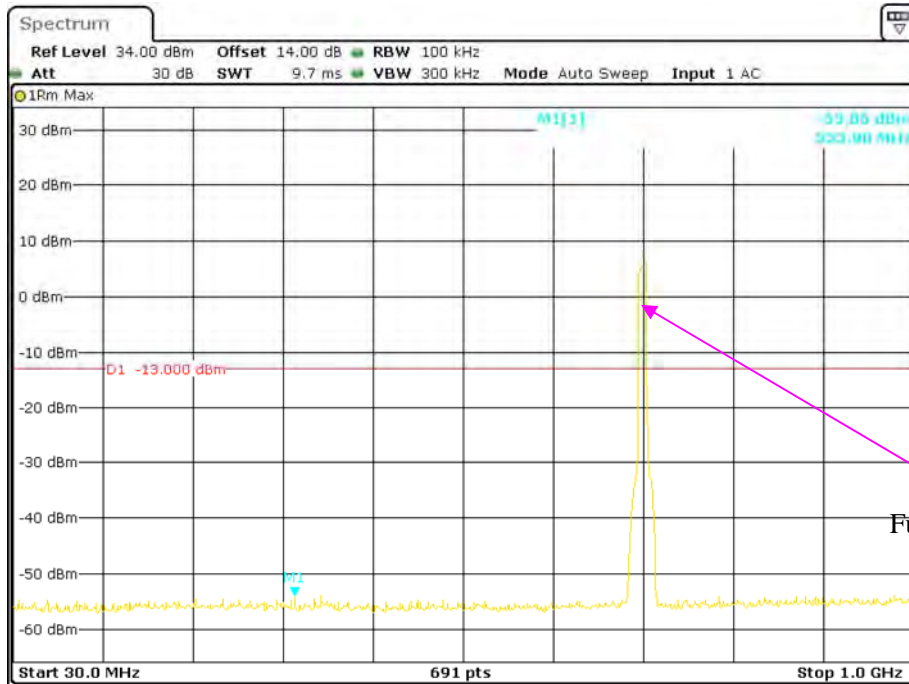
Date: 9.FEB.2018 10:15:18

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



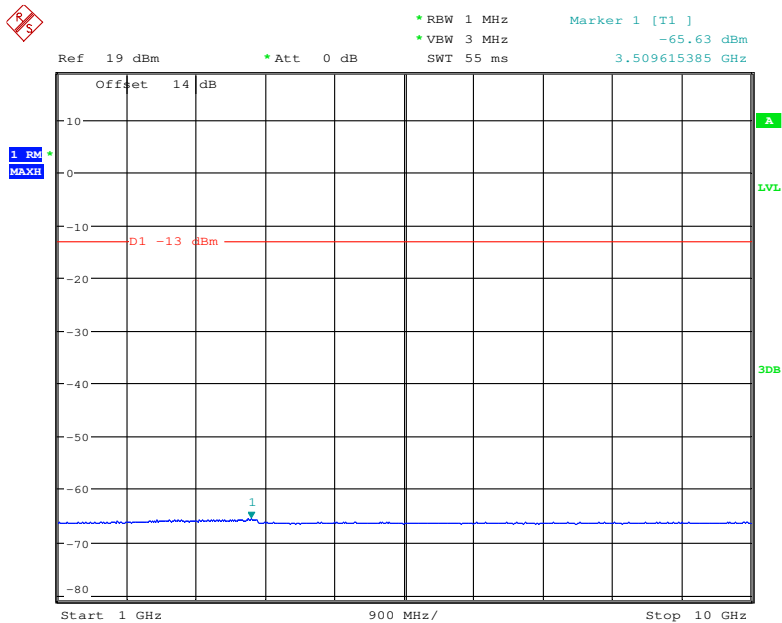
Date: 12.FEB.2018 09:37:53

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



Date: 9.FEB.2018 10:15:41

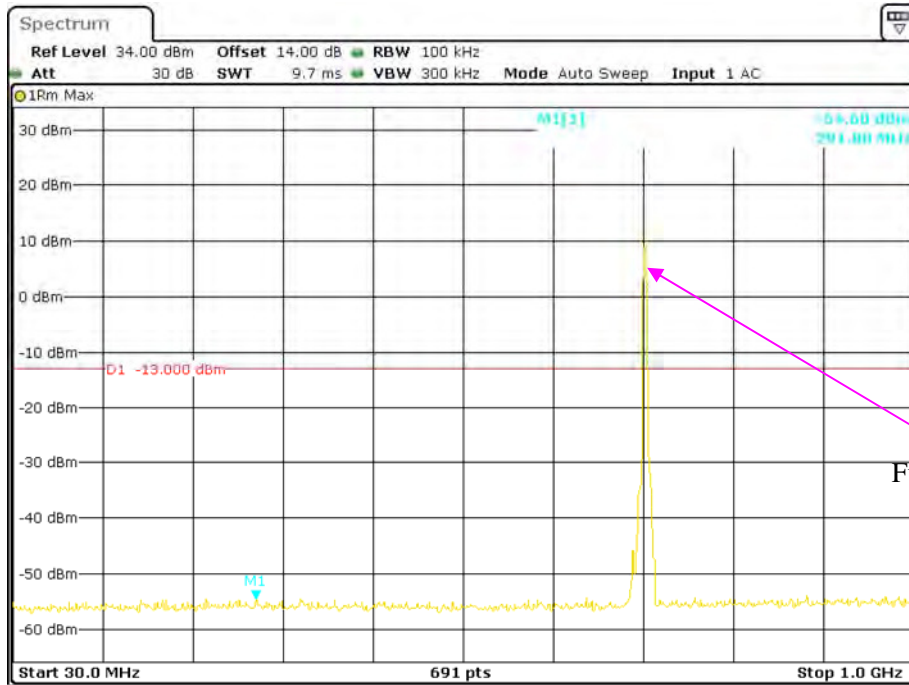
1 GHz - 10 GHz (10.0 MHz, Middle Channel)



Date: 12.FEB.2018 09:38:16

LTE Band 17:

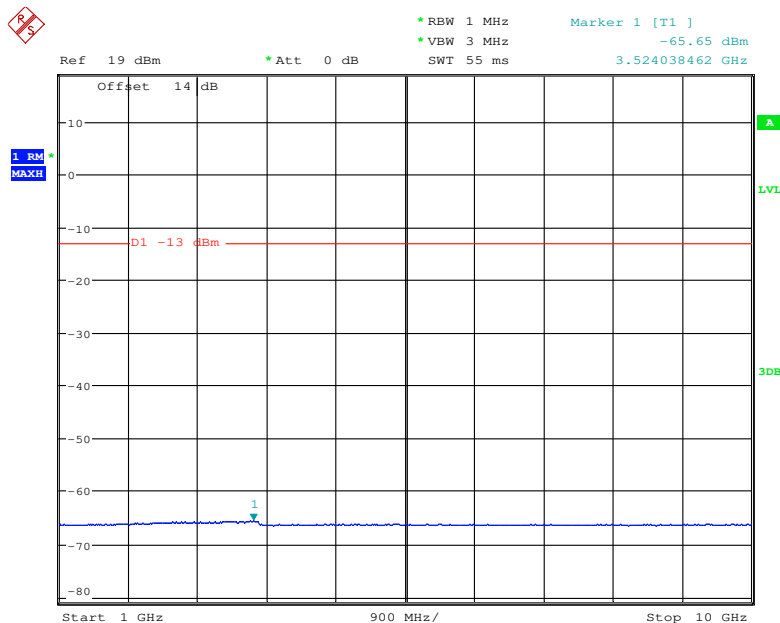
30 MHz - 1 GHz (5.0 MHz, Middle Channel)



Date: 9.FEB.2018 10:16:49

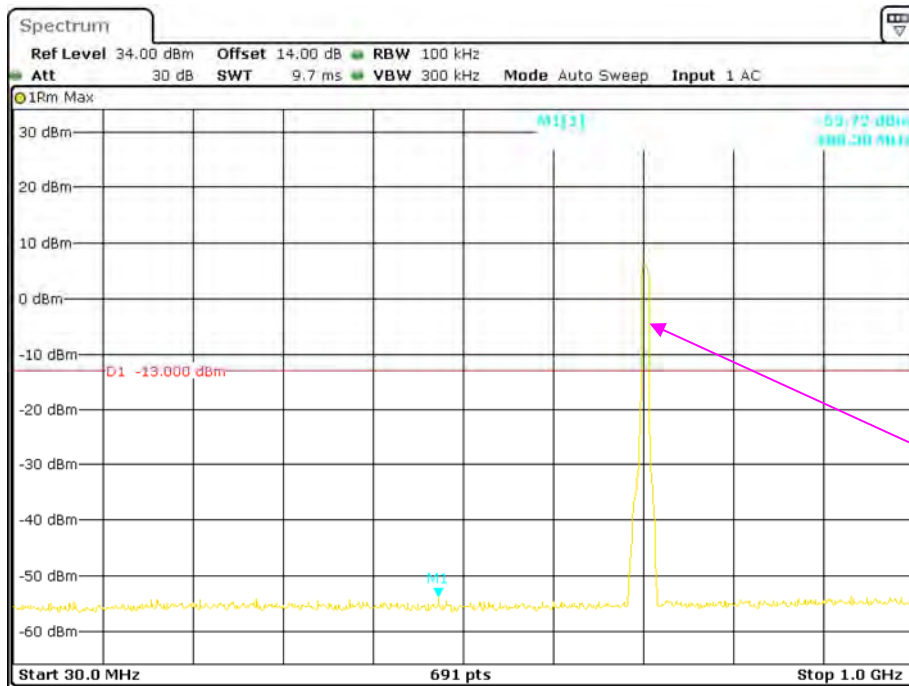
Fundamental test

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



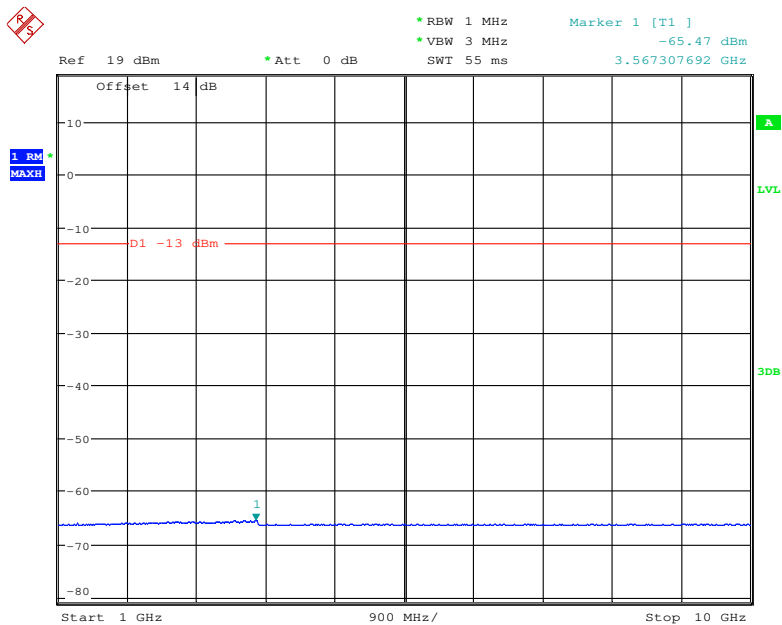
Date: 12.FEB.2018 09:39:12

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



Date: 9.FEB.2018 10:17:34

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



Date: 12.FEB.2018 09:39:42

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

Applicable Standard

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

Test Procedure

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

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

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

Test Data**Environmental Conditions**

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

The testing was performed by Tracy Hu on 2018-02-09.

EUT operation mode: Transmitting

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

30 MHz ~ 10 GHz:

Cellular Band (Part 22H)

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
GSM Mode, Middle channel										
140.02	33.02	216	2.2	H	-64.00	0.26	0	-64.26	-13	51.26
140.02	33.90	236	1.0	V	-63.10	0.26	0	-63.36	-13	50.36
1673.20	54.15	128	1.3	H	-52.9	1.30	8.90	-45.30	-13	32.30
1673.20	52.22	59	2.5	V	-54.3	1.30	8.90	-46.70	-13	33.70
2509.80	48.32	290	2.2	H	-55.2	2.60	10.20	-47.60	-13	34.60
2509.80	48.63	121	1.1	V	-54.3	2.60	10.20	-46.70	-13	33.70
3346.40	43.45	244	2.1	H	-56.9	1.50	11.70	-46.70	-13	33.70
3346.40	42.68	255	1.6	V	-57.7	1.50	11.70	-47.50	-13	34.50
WCDMA Mode, Middle channel										
140.02	34.75	351	1.3	H	-62.20	0.26	0	-62.46	-13	49.46
140.02	32.72	170	1.0	V	-64.30	0.26	0	-64.56	-13	51.56
1673.20	43.68	59	1.3	H	-63.4	1.30	8.90	-55.80	-13	42.80
1673.20	43.38	82	2.1	V	-63.1	1.30	8.90	-55.50	-13	42.50
2509.80	44.12	329	1.3	H	-59.4	2.60	10.20	-51.80	-13	38.80
2509.80	43.8	189	1.4	V	-59.1	2.60	10.20	-51.50	-13	38.50

30 MHz ~ 20 GHz:

PCS Band (Part 24E)

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 24E	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
GSM Mode, Middle channel										
140.02	33.57	351	2.3	H	-63.40	0.26	0	-63.66	-13	50.66
140.02	32.09	136	1.8	V	-64.90	0.26	0	-65.16	-13	52.16
3760.00	44.38	2	1.3	H	-56.8	1.50	11.80	-46.50	-13	33.50
3760.00	44.43	108	1.0	V	-56.3	1.50	11.80	-46.00	-13	33.00
WCDMA Mode Band II, Middle channel										
140.02	33.98	148	1.2	H	-63.00	0.26	0	-63.26	-13	50.26
140.02	32.60	27	2.3	V	-64.40	0.26	0	-64.66	-13	51.66
3760.00	46.35	302	1.1	H	-54.9	1.50	11.80	-44.60	-13	31.60
3760.00	44.28	331	1.5	V	-56.5	1.50	11.80	-46.20	-13	33.20

30 MHz ~ 20 GHz:

AWS Band (Part 27)

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 27	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
WCDMA Mode Band IV, Middle channel										
140.02	34.17	48	1.7	H	-62.80	0.26	0	-63.06	-13	50.06
140.02	32.17	34	2.0	V	-64.80	0.26	0	-65.06	-13	52.06
3465.20	43.89	325	1.3	H	-56.5	1.50	12.00	-46.00	-13	33.00
3465.20	43.11	83	1.3	V	-58.0	1.50	12.00	-47.50	-13	34.50

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

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
Band 2										
Test frequency range:30 MHz ~ 20 GHz										
140.02	34.39	359	1.8	H	-62.60	0.26	0	-62.86	-13	49.86
140.02	32.62	358	1.5	V	-64.40	0.26	0	-64.66	-13	51.66
3760.00	45.36	192	2.0	H	-55.9	1.50	11.80	-45.60	-13	32.60
3760.00	44.28	252	1.6	V	-56.5	1.50	11.80	-46.20	-13	33.20
Band 4										
Test frequency range:30 MHz ~ 18 GHz										
140.02	33.80	105	1.2	H	-63.20	0.26	0	-63.46	-13	50.46
140.02	33.61	290	1.2	V	-63.40	0.26	0	-63.66	-13	50.66
3465.00	43.44	232	1.2	H	-56.9	1.50	12.00	-46.40	-13	33.40
3465.00	43.72	249	1.5	V	-57.4	1.50	12.00	-46.90	-13	33.90
Band 5										
Test frequency range:30 MHz ~ 10 GHz										
140.02	33.12	4	2.0	H	-63.90	0.26	0	-64.16	-13	51.16
140.02	32.72	197	2.2	V	-64.30	0.26	0	-64.56	-13	51.56
1673.00	46.35	230	1.9	H	-60.7	1.30	8.90	-53.10	-13	40.10
1673.00	45.48	275	1.3	V	-61.0	1.30	8.90	-53.40	-13	40.40
2509.50	43.03	289	1.1	H	-60.5	2.60	10.20	-52.90	-13	39.90
2509.50	42.84	42	2.2	V	-60.1	2.60	10.20	-52.50	-13	39.50
Band 7										
Test frequency range:30 MHz ~ 26 GHz										
140.02	33.2	185	2.1	H	-63.80	0.26	0	-64.06	-25	39.06
140.02	32.85	347	2.4	V	-64.10	0.26	0	-64.36	-25	39.36
5070.00	45.11	43	1.5	H	-53.6	1.60	11.20	-44.00	-25	19.00
5070.00	44.36	300	1.1	V	-54.4	1.60	11.20	-44.80	-25	19.80

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
Band 12										
Test frequency range: 30 MHz ~ 10 GHz										
140.02	34.11	173	2.2	H	-62.90	0.26	0	-63.16	-13	50.16
140.02	33.48	328	1.8	V	-63.50	0.26	0	-63.76	-13	50.76
1415.00	46.38	162	1.9	H	-61.5	1.60	7.90	-55.20	-13	42.20
1415.00	45.27	119	1.1	V	-62.8	1.60	7.90	-56.50	-13	43.50
2122.50	45.56	104	1.6	H	-56.5	1.30	9.70	-48.10	-13	35.10
2122.50	44.14	37	2.0	V	-58.8	1.30	9.70	-50.40	-13	37.40
Band 17										
Test frequency range: 30 MHz ~ 10GHz										
140.02	33.77	286	1.8	H	-63.20	0.26	0	-63.46	-13	50.46
140.02	33.82	307	2.3	V	-63.20	0.26	0	-63.46	-13	50.46
1420.00	45.33	101	1.7	H	-62.5	1.60	7.90	-56.20	-13	43.20
1420.00	44.72	163	1.0	V	-63.4	1.60	7.90	-57.10	-13	44.10
2130.00	43.54	209	2.0	H	-58.5	1.30	9.70	-50.10	-13	37.10
2130.00	43.11	105	1.6	V	-59.8	1.30	9.70	-51.40	-13	38.40

Note:

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

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

Applicable Standard

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

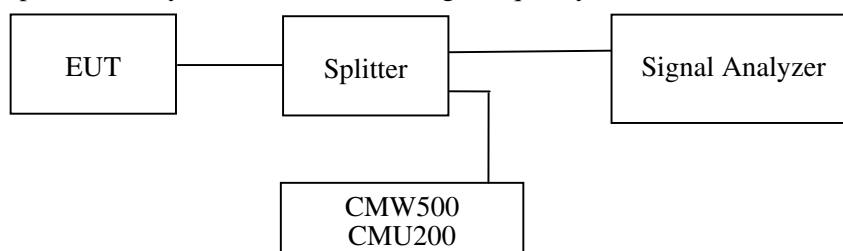
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

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

Test Procedure

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

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



Test Data

Environmental Conditions

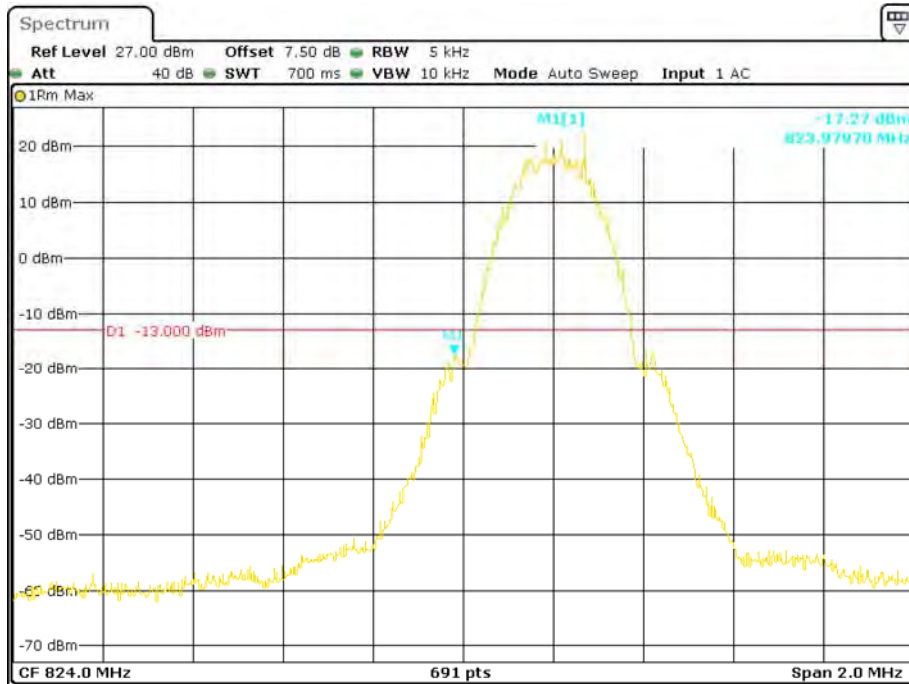
Temperature:	24~25°C
Relative Humidity:	50~52 %
ATM Pressure:	100.0~101.0 kPa

The testing was performed by Tracy Hu from 2018-02-08 to 2018-02-09.

EUT operation mode: Transmitting

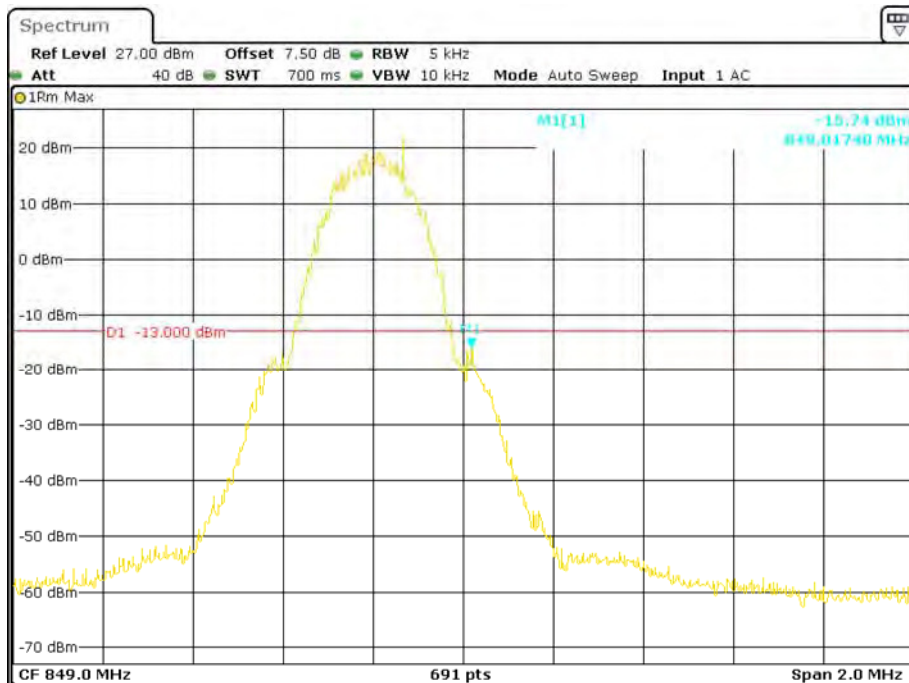
Test Result: Compliance. Please refer to the following plots.

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



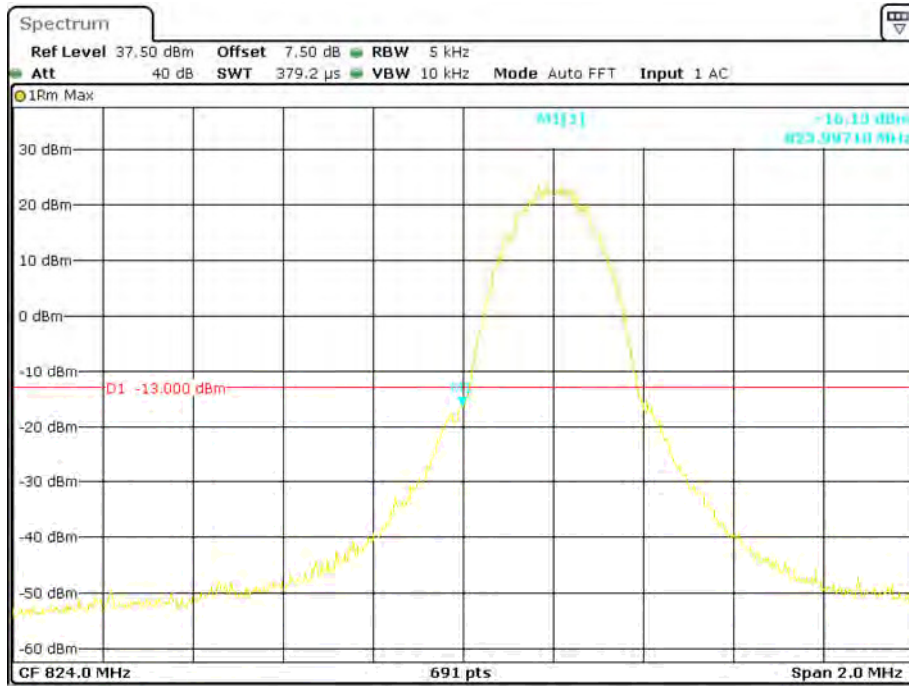
Date: 8.FEB.2018 13:24:36

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



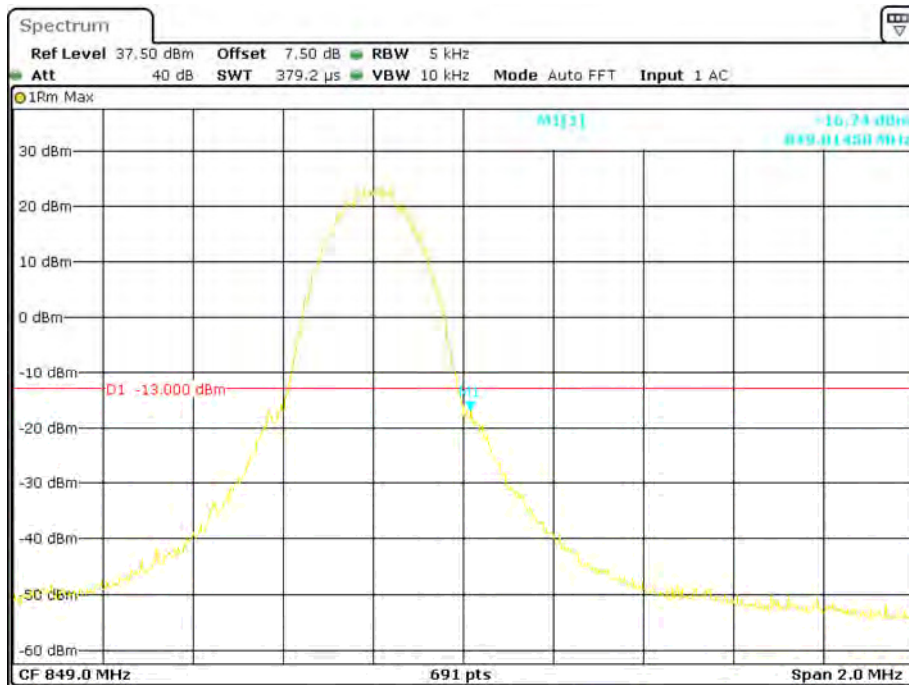
Date: 8.FEB.2018 13:25:45

Cellular Band, Left Band Edge for EDGE Mode



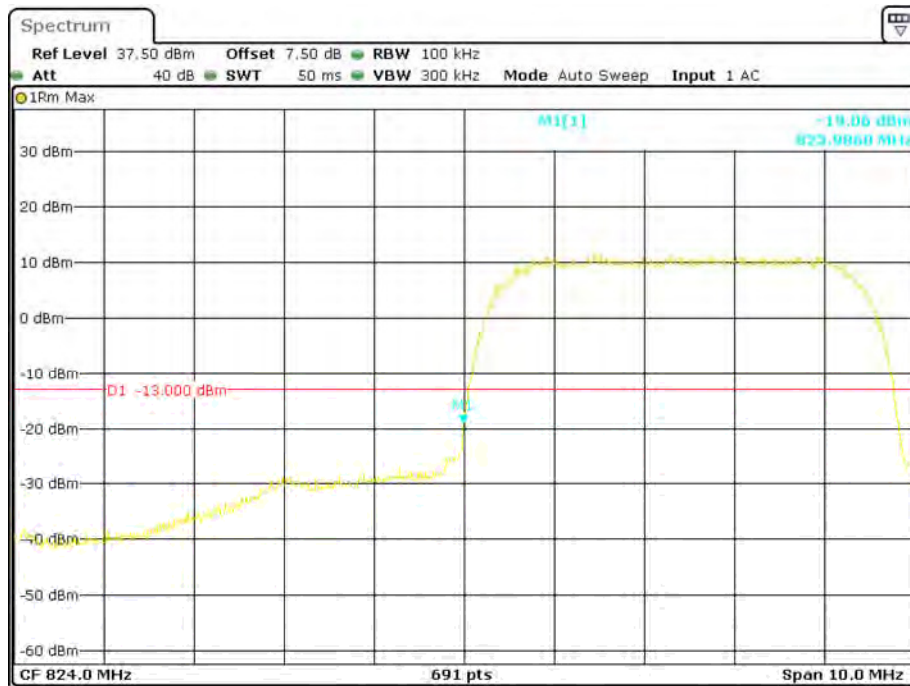
Date: 8.FEB.2018 13:37:53

Cellular Band, Right Band Edge for EDGE Mode



Date: 8.FEB.2018 13:39:13

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



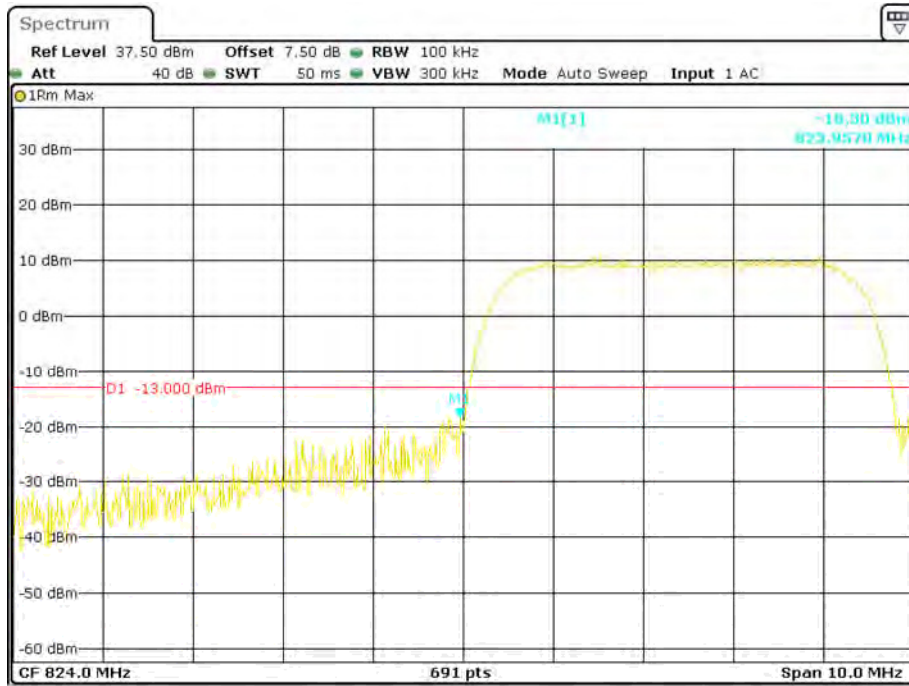
Date: 8.FEB.2018 11:21:11

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



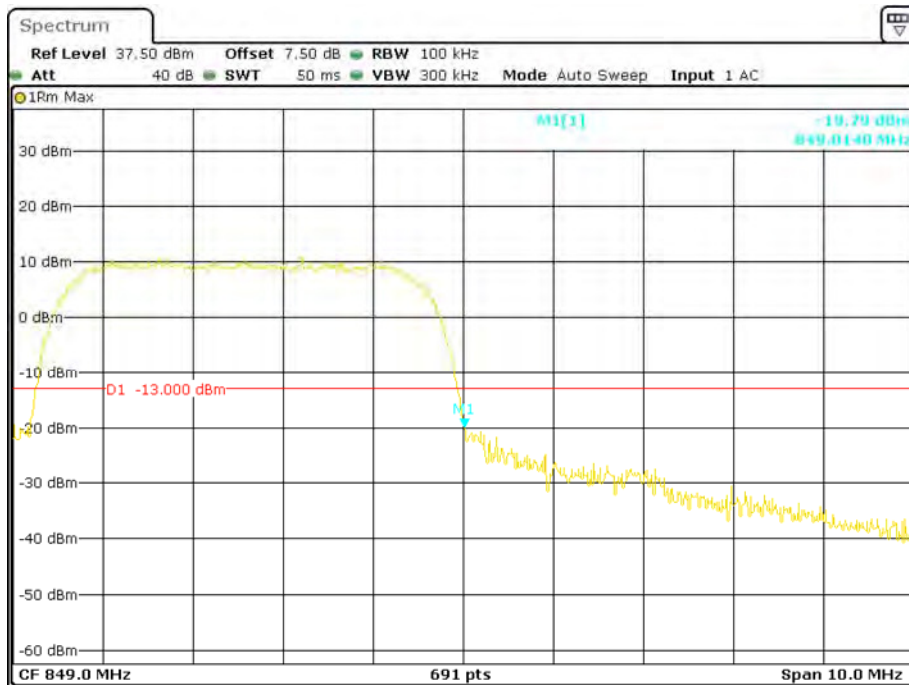
Date: 8.FEB.2018 11:21:50

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



Date: 8.FEB.2018 11:23:46

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



Date: 8.FEB.2018 11:22:59