

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

For

Quanzhou YANTON Electronics Co., Ltd.

YANTON Building, Jinxia Road, Xiamei Town, Nan'an, China

FCC ID: SV8-TM7700

Report Type: Original Report	Product Type: POC Mobile Radio
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Report Number:	RXM191008050-00B
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant	Quanzhou YANTON Electronics Co., Ltd.
Tested Model	TM-7700
Product Type	POC Mobile Radio
Power Supply	DC 12-24V
RF Function	WCDMA, LTE
Operating Band/Frequency	WCDMA Band II: 1850-1910 MHz(TX), 1930-1990MHz(RX) WCDMA Band V: 824-849 MHz(TX), 869-894 MHz(RX) LTE Band 2: 1850-1910 MHz(TX), 1930-1990MHz(RX) LTE Band 4: 1710-1755 MHz(TX), 2110-2155MHz(RX) LTE Band 5: 824-849 MHz(TX), 869-894 MHz(RX) LTE Band 12: 699-716 MHz(TX), 829-846 MHz(RX)
Power Class	WCDMA/LTE: Class 3
Modulation Type	WCDMA/LTE: QPSK,16QAM
Antenna Type	External fixed antenna
Maximum Antenna Gain	WCDMA Band II: 3.0dBi WCDMA Band V: 3.0dBi LTE Band2: 3.0dBi LTE Band4: 3.0dBi LTE Band5: 3.0dBi LTE Band12: 3.0dBi

**All measurement and test data in this report was gathered from production sample serial number: 20191008050.
(Assigned by the BACL. The EUT supplied by the applicant was received on 2019-10-08)*

Objective

This type approval report is prepared on behalf of *Quanzhou YANTON Electronics Co., Ltd.* in accordance with Part 2, Part 22-Subpart H, Part 24-Subpart E and Part 27 of the Federal Communication Commissions' rules.

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

Related Submittal(s)/Grant(s)

No related submittal(s).

Test Methodology

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

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

Applicable Standards: TIA/EIA 603-D.

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

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19dB
RF conducted test with spectrum		0.9dB
RF Output Power with Power meter		0.5dB
Radiated emission	30MHz~1GHz	5.91dB
	1GHz~6GHz	4.68dB
	6GHz~18GHz	4.92dB
	18GHz~40GHz	5.21dB
Occupied Bandwidth		0.5kHz
Temperature		1.0℃
Humidity		6%

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

Test Facility

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

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01 and CAB identifier CN0004 under the ISED requirement. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

SYSTEM TEST CONFIGURATION

Justification

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

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

Channel List

Mode		Channel		Frequency (MHz)
WCDMA Band II		Low	9262	1852.4
		Middle	9400	1880.0
		High	9538	1907.6
WCDMA Band V		Low	4132	826.4
		Middle	4183	836.6
		High	4233	846.6
LTE Band 2	1.4M	Low	18607	1850.7
		Middle	18900	1880.0
		High	19193	1909.3
	3M	Low	18615	1851.5
		Middle	18900	1880.0
		High	19185	1908.5
	5M	Low	18625	1852.5
		Middle	18900	1880.0
		High	19175	1907.5
	10M	Low	18650	1855.0
		Middle	18900	1880.0
		High	19150	1905.0
	15M	Low	18675	1857.5
		Middle	18900	1880.0
		High	19125	1902.5
	20M	Low	18700	1860.0
		Middle	18900	1880.0
		High	19100	1900.0

Mode		Channel		Frequency (MHz)
LTE Band 4	1.4M	Low	19957	1710.7
		Middle	20175	1732.5
		High	20393	1754.3
	3M	Low	19965	1711.5
		Middle	20175	1732.5
		High	20385	1753.5
	5M	Low	19975	1712.5
		Middle	20175	1732.5
		High	20375	1752.5
	10M	Low	20000	1715.0
		Middle	20175	1732.5
		High	20350	1750.0
	15M	Low	20025	1717.5
		Middle	20175	1732.5
		High	20325	1747.5
	20M	Low	20050	1720.0
		Middle	20175	1732.5
		High	20300	1745.0
LTE Band 5	1.4M	Low	20407	824.7
		Middle	20525	836.5
		High	20643	848.3
	3M	Low	20415	825.5
		Middle	20525	836.5
		High	20635	847.5
	5M	Low	20425	826.5
		Middle	20525	836.5
		High	20625	846.5
	10M	Low	20450	829.0
		Middle	20525	836.5
		High	20600	844.0
LTE Band 12	1.4M	Low	23017	699.7
		Middle	23095	707.5
		High	23173	715.3
	3M	Low	23025	700.5
		Middle	23095	707.5
		High	23165	714.5
	5M	Low	23035	701.5
		Middle	23095	707.5
		High	23155	713.5
	10M	Low	23060	704.0
		Middle	23095	707.5
		High	23130	711.0

Equipment Modifications

No modifications were made to the EUT.

Support Equipment List and Details

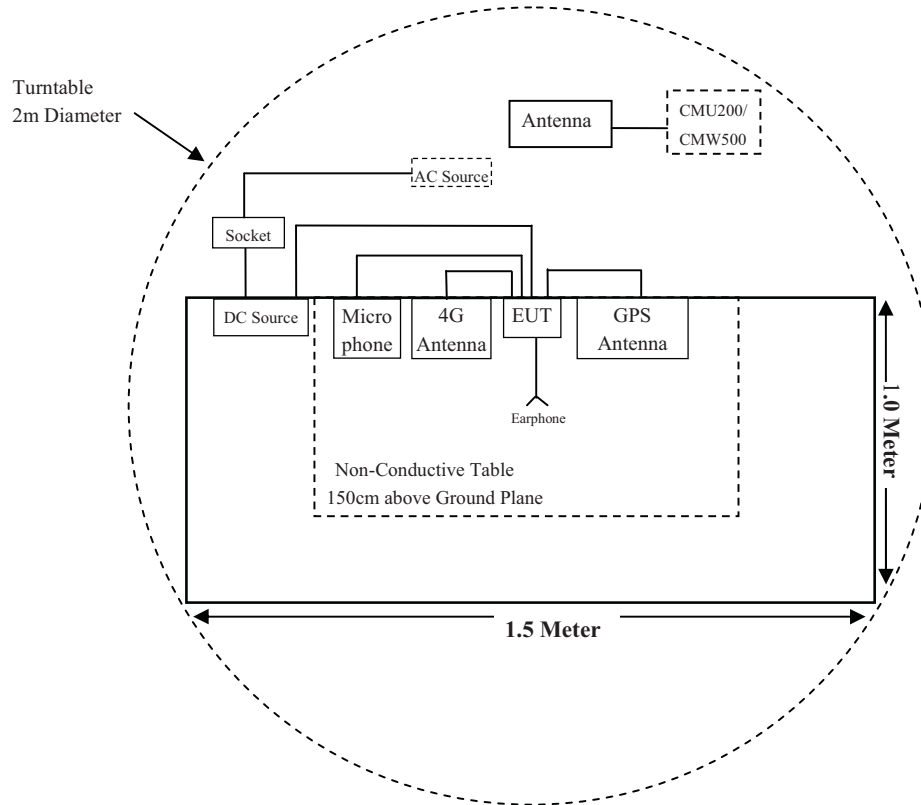
Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Universal Radio Communication Test	CMU200	100184
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	104478
ZHAOXIN	DC Power Supply	RXN-605D	DC002
Aihuaxin technology	Antenna	/	/

External I/O Cable

Cable Description	Length (m)	From Port	To
Data Cable	1.5	EUT	DC Source
Power Cable	0.3	DC Source	Socket
Power Cable	1.0	Socket	AC Source

Block Diagram of Test Setup

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



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1310 & §2.1091	MAXIMUM PERMISSIBLE EXPOSURE (MPE)	Compliant
§2.1046; § 22.913 (a);§ 24.232 (c); § 27.50 (c)(d);	RF Output Power	Compliant
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.905; § 22.917; § 24.238; §27.53;	Occupied Bandwidth	Compliant
§ 2.1051; § 22.917 (a); § 24.238 (a); §27.53;	Spurious Emissions at Antenna Terminal	Compliant
§ 2.1053; § 22.917 (a); § 24.238 (a); §27.53 (g) (h);	Spurious Radiated Emissions	Compliant
§ 22.917 (a); § 24.238 (a); §27.53 (g) (h);	Band Edge	Compliant
§ 2.1055; § 22.355; § 24.235; §27.54;	Frequency Stability	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test (Chamber 1#)					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2018-11-30	2019-11-29
HP	Signal Generator	HP 8341B	2624A00116	2018-11-30	2019-11-29
Sunol Sciences	Broadband Antenna	JB3	A090413-1	2016-12-26	2019-12-25
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2019-01-09	2022-01-08
Sonoma Instrunent	Pre-amplifier	310N	171205	2019-08-14	2020-08-13
Rohde & Schwarz	Auto Test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-6	006	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-8	008	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2019-08-15	2020-08-14
Rohde & Schwarz	Universal Radio Communication Test	CMU200	110605	2018-11-30	2019-11-29
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	104478	2019-08-05	2020-08-04
Radiated Emission Test (Chamber 2#)					
HP	Signal Generator	HP 8341B	2624A00116	2018-11-30	2019-11-29
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2019-05-30	2020-05-29
ETS-LINDGREN	Horn Antenna	3115	9207-3900	2017-07-15	2020-07-14
ETS-LINDGREN	Horn Antenna	3115	6229	2016-12-12	2019-12-11
ETS-LINDGREN	Horn Antenna	3116	00084159	2016-12-12	2019-12-11
ETS-LINDGREN	Horn Antenna	3116	2516	2016-12-12	2019-12-11
A.H.Systems, inc	Amplifier	2641-1	491	2019-02-20	2020-02-19
SELECTOR	Amplifier	EM18G40G	060726	2019-03-22	2020-03-21
Rohde & Schwarz	Auto Test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-6	006	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-11	011	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-12	012	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-13	013	2019-08-15	2020-08-14
MICRO-COAX	Coaxial Cable	Cable-16	016	2019-08-15	2020-08-14
Rohde & Schwarz	Universal Radio Communication Test	CMU200	110605	2018-11-30	2019-11-29
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	104478	2019-08-05	2020-08-04

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	Signal Analyzer	FSIQ26	836131/009	2018-11-30	2019-11-29
Rohde & Schwarz	Universal Radio Communication Test	CMU200	110605	2018-11-30	2019-11-29
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	104478	2019-08-05	2020-08-04
Mini-Circuits	Power Splitter	ZFRSC-14-S+	SF019411452	2018-11-10	2019-11-09
BACL	Temperature & Humidity Chamber	BTH-150	30023	2018-12-20	2019-12-19
Quanzhou YANTON	RF Cable	Quanzhou YANTON C01	C01	Each Time	/

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

FCC §1.1310 & §2.1091 - MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 1.1310 and 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

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

f = frequency in MHz; * = Plane-wave equivalent power density

Calculated Formulary:

Predication of MPE limit at a given distance

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

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

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

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

Calculated Data (worst case):

Mode	Frequency Range (MHz)	Antenna Gain		Target Output Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
WCDMA Band II	1850.0-1910.0	3.0	2.0	22.00	158.49	20	0.0631	1.0
WCDMA Band V	824.0-849.0	3.0	2.0	23.00	199.53	20	0.0794	0.55
FDD (Band 2)	1850.0-1910.0	3.0	2.0	21.50	141.25	20	0.0561	1.0
FDD (Band 4)	1710.0-1755.0	3.0	2.0	22.50	177.83	20	0.0706	1.0
FDD (Band 5)	824.0-849.0	3.0	2.0	22.50	177.83	20	0.0707	0.55
FDD (Band 12)	699.0-716.0	3.0	2.0	24.00	251.19	20	0.0997	0.47

Note: The target output power was declared by the manufacturer.

Conclusion: The device meets MPE at distance 20cm.

FCC §2.1047 - MODULATION CHARACTERISTIC

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

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

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts (38.45dBm).

According to FCC §2.1046 and §24.232 (c), mobile and portable stations are limited to 2 watts (33dBm) EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

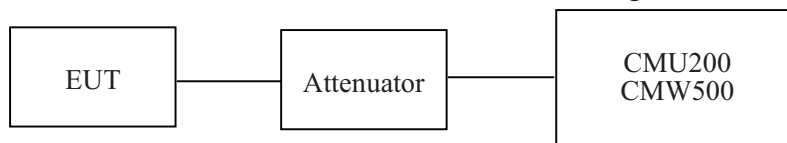
According to §27.50(d), the maximum EIRP must not exceed 1Watts (30dBm) for 1710-1755MHz.

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..

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

Test Procedure**Conducted method:**

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

**Radiated Output Power:**

The measurements procedures specified in ANSI/TIA-603-D were applied.

a) Connect the equipment as illustrated. Mount the equipment with the manufacturer specified antenna in a vertical orientation on a manufacturer specified mounting surface located on a non-conducting rotating platform of a RF anechoic chamber (preferred) or a standard radiation site.

b) Key the transmitter, then rotate the EUT 360o azimuthally and record spectrum analyzer power level (LVL) measurements at angular increments that are sufficiently small to permit resolution of all peaks. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading at each angular increment. (Note: several batteries may be needed to offset the effect of battery voltage droop, which should not exceed 5% of the manufactured specified battery voltage during transmission).

c) Replace the transmitter under test with a vertically polarized half-wave dipole (or an antenna whose gain is known relative to an ideal half-wave dipole). The center of the antenna should be at the same location as the center of the antenna under test.

d) Connect the antenna to a signal generator with a known output power and record the path loss (in dB) as LOSS. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading.
 $\text{LOSS} = \text{Generator Output Power (dBm)} - \text{Analyzer reading (dBm)}$

e) Determine the effective radiated output power at each angular position from the readings in steps b) and d) using the following equation:

$$\text{ERP (dBm)} = \text{LVL (dBm)} + \text{LOSS (dB)}$$

f) The maximum ERP is the maximum value determined in the preceding step.

(Note: Effective Isotropic Radiated Power (EIRP) can be computed using the following:

$$\text{EIRP (dBm)} = \text{ERP (dBm)} + 2.15 \text{ (dB)}$$

Test Data

Environmental Conditions

Temperature:	23.2 °C
Relative Humidity:	51 %
ATM Pressure:	101.3 kPa

The testing was performed by Winnie Yang on 2019-10-23.

Conducted Power:

WCDMA Band V

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band V)	Normal	Rel 99	1	2		
			21.53			
			4	21.49	21.31	21.02
			1	21.85	21.61	21.42
			2	21.61	21.54	21.44
		HSUPA	3	21.51	21.52	21.03
			4	21.06	21.00	20.67
			5	20.50	20.59	20.26
		HSPA+	1	22.17	21.97	21.71

WCDMA Band II

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band II)	Normal	Rel 99	1	21.45	21.22	21.39
		HSDPA	1	20.97	20.56	20.94
			2	20.73	20.56	20.66
			3	20.60	20.12	20.43
			4	20.07	19.56	19.97
		HSUPA	1	20.63	20.25	20.62
			2	20.27	19.99	20.45
			3	20.09	19.77	19.91
			4	19.76	19.58	19.90
			5	19.91	19.47	20.09
		HSPA+	1	20.95	20.78	20.86

Maximum Output Power:**LTE Band 2**

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4M	QPSK	1#0	21.02	21.11	21.34
		1#3	20.76	20.87	21.02
		1#5	20.64	20.85	20.98
		3#0	20.64	20.66	20.85
		3#1	20.65	20.86	21.14
		3#3	20.76	20.88	21.18
		6#0	20.48	20.60	20.87
	16-QAM	1#0	20.25	20.35	20.55
		1#3	19.98	19.99	20.24
		1#5	20.01	19.99	20.09
		3#0	19.98	20.23	20.41
		3#1	20.03	20.13	20.26
		3#3	20.13	20.17	20.31
		6#0	19.75	19.79	20.00
3M	QPSK	1#0	20.88	21.02	20.93
		1#7	20.53	20.67	20.66
		1#14	20.57	20.76	20.60
		8#0	20.52	20.58	20.47
		8#4	20.59	20.89	20.74
		8#7	20.63	20.79	20.56
		15#0	20.24	20.43	20.16
	16-QAM	1#0	20.38	20.65	20.29
		1#7	20.16	20.38	19.90
		1#14	19.98	20.43	20.05
		8#0	20.14	20.27	19.90
		8#4	19.99	20.34	20.04
		8#7	20.23	20.45	19.94
		15#0	19.83	20.24	19.57

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5M	QPSK	1#0	21.24	21.07	21.13
		1#12	21.02	20.82	20.76
		1#24	20.93	20.72	20.92
		12#0	20.98	20.66	20.87
		12#6	21.11	20.91	20.81
		12#11	20.98	20.79	21.01
		25#0	20.63	20.39	20.68
	16-QAM	1#0	20.28	20.15	20.46
		1#12	20.00	19.78	20.11
		1#24	19.88	19.81	20.18
		12#0	19.83	19.81	20.06
		12#6	19.89	19.85	20.29
		12#11	19.91	19.76	20.15
		25#0	19.64	19.36	19.88
10M	QPSK	1#0	21.44	21.23	21.42
		1#24	21.04	20.96	21.11
		1#49	21.07	20.85	21.17
		25#0	21.08	20.89	21.05
		25#12	21.08	20.88	21.30
		25#24	21.30	20.84	21.31
		50#0	20.97	20.47	21.03
	16-QAM	1#0	20.73	20.15	20.82
		1#24	20.34	19.83	20.47
		1#49	20.37	19.76	20.45
		25#0	20.48	19.87	20.51
		25#12	20.46	19.87	20.59
		25#24	20.39	19.98	20.50
		50#0	20.19	19.75	20.18

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15M	QPSK	1#0	21.14	21.27	20.97
		1#37	20.89	20.92	20.76
		1#74	20.77	21.04	20.58
		36#0	20.78	20.80	20.66
		36#17	20.84	21.12	20.76
		36#35	20.86	20.94	20.85
		75#0	20.48	20.68	20.56
	16-QAM	1#0	21.09	21.21	21.15
		1#37	20.80	20.88	20.94
		1#74	20.88	20.94	20.91
		36#0	20.74	20.78	20.76
		36#17	20.77	20.88	20.82
		36#35	20.95	20.99	21.03
		75#0	20.56	20.65	20.82
20M	QPSK	1#0	20.21	20.29	20.57
		1#49	19.95	20.06	20.26
		1#99	19.81	20.01	20.33
		50#0	19.98	19.88	20.28
		50#24	20.03	20.13	20.45
		50#49	20.11	19.95	20.27
		100#0	19.84	19.67	20.04
	16-QAM	1#0	19.57	19.33	19.76
		1#49	19.29	19.07	19.39
		1#99	19.27	19.04	19.47
		50#0	19.24	18.94	19.51
		50#24	19.34	19.05	19.36
		50#49	19.18	19.13	19.56
		100#0	18.82	18.91	19.22

LTE Band 4

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4M	QPSK	1#0	21.66	21.44	21.35
		1#3	21.40	21.12	20.99
		1#5	21.40	21.13	21.05
		3#0	21.16	21.08	21.03
		3#1	21.46	21.31	21.20
		3#3	21.46	21.24	21.01
		6#0	21.17	20.88	20.63
	16-QAM	1#0	20.90	20.67	20.41
		1#3	20.61	20.28	20.05
		1#5	20.51	20.45	20.17
		3#0	20.45	20.30	20.13
		3#1	20.51	20.34	20.05
		3#3	20.66	20.39	20.11
		6#0	20.36	20.13	19.72
3M	QPSK	1#0	20.93	21.09	21.13
		1#7	20.61	20.79	20.89
		1#14	20.66	20.70	20.90
		8#0	20.72	20.68	20.79
		8#4	20.60	20.98	20.91
		8#7	20.71	20.74	21.01
		15#0	20.48	20.48	20.77
	16-QAM	1#0	20.10	20.14	20.40
		1#7	19.75	19.81	20.15
		1#14	19.72	19.85	20.04
		8#0	19.70	19.88	19.94
		8#4	19.85	19.97	20.28
		8#7	19.75	20.04	20.28
		15#0	19.45	19.75	20.01

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5M	QPSK	1#0	21.74	21.63	21.03
		1#12	21.35	21.30	20.72
		1#24	21.38	21.26	20.75
		12#0	21.52	21.23	20.76
		12#6	21.42	21.40	20.79
		12#11	21.37	21.42	20.75
		25#0	21.01	21.09	20.53
	16-QAM	1#0	20.80	20.78	20.17
		1#12	20.57	20.51	19.95
		1#24	20.55	20.50	19.83
		12#0	20.55	20.38	19.88
		12#6	20.47	20.39	19.84
		12#11	20.51	20.61	19.95
		25#0	20.23	20.38	19.56
10M	QPSK	1#0	21.86	21.54	21.37
		1#24	21.51	21.29	21.06
		1#49	21.57	21.15	21.16
		25#0	21.38	21.23	21.06
		25#12	21.52	21.24	21.22
		25#24	21.74	21.18	20.97
		50#0	21.52	20.79	20.71
	16-QAM	1#0	21.17	20.58	20.49
		1#24	20.90	20.37	20.16
		1#49	20.82	20.35	20.11
		25#0	20.91	20.35	20.18
		25#12	21.07	20.34	20.14
		25#24	21.02	20.20	20.37
		50#0	20.79	19.96	20.05

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15M	QPSK	1#0	21.88	22.11	22.02
		1#37	21.54	21.73	21.78
		1#74	21.66	21.81	21.65
		36#0	21.67	21.73	21.78
		36#17	21.74	21.73	21.82
		36#35	21.51	21.90	21.70
		75#0	21.30	21.58	21.42
	16-QAM	1#0	21.04	21.25	21.08
		1#37	20.77	20.89	20.80
		1#74	20.71	20.91	20.78
		36#0	20.58	20.76	20.85
		36#17	20.90	21.00	20.69
		36#35	20.93	21.05	20.79
		75#0	20.57	20.75	20.40
20M	QPSK	1#0	21.77	21.89	21.38
		1#49	21.51	21.59	21.05
		1#99	21.40	21.65	21.15
		50#0	21.54	21.68	20.99
		50#24	21.67	21.57	21.18
		50#49	21.67	21.74	21.22
		100#0	21.45	21.44	20.99
	16-QAM	1#0	21.18	21.12	20.74
		1#49	20.84	20.88	20.54
		1#99	20.87	20.74	20.42
		50#0	20.97	20.78	20.51
		50#24	20.87	20.89	20.53
		50#49	20.97	20.82	20.41
		100#0	20.61	20.56	20.19

LTE Band 5

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4M	QPSK	1#0	22.12	22.27	22.34
		1#3	21.77	22.01	22.02
		1#5	21.77	21.90	22.04
		3#0	21.81	21.89	22.00
		3#1	21.98	22.04	22.09
		3#3	22.02	21.98	22.13
		6#0	21.74	21.76	21.84
	16-QAM	1#0	21.49	21.48	21.60
		1#3	21.26	21.14	21.24
		1#5	21.17	21.27	21.28
		3#0	21.26	21.18	21.36
		3#1	21.18	21.32	21.44
		3#3	21.14	21.25	21.37
		6#0	20.81	20.89	21.00
3M	QPSK	1#0	21.21	21.34	21.23
		1#7	20.98	21.13	20.95
		1#14	20.83	20.98	20.84
		8#0	20.72	21.14	20.99
		8#4	20.83	21.18	21.13
		8#7	21.04	21.10	20.98
		15#0	20.78	20.88	20.73
	16-QAM	1#0	20.42	20.68	20.49
		1#7	20.10	20.42	20.28
		1#14	20.09	20.43	20.23
		8#0	19.94	20.24	20.18
		8#4	20.22	20.55	20.32
		8#7	20.20	20.39	20.19
		15#0	19.95	20.06	19.92

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5M	QPSK	1#0	22.01	21.75	21.39
		1#12	21.63	21.41	21.02
		1#24	21.71	21.43	21.11
		12#0	21.51	21.29	21.06
		12#6	21.80	21.35	21.20
		12#11	21.79	21.54	21.07
		25#0	21.53	21.17	20.73
	16-QAM	1#0	21.15	20.78	20.52
		1#12	20.76	20.41	20.15
		1#24	20.83	20.46	20.14
		12#0	20.79	20.57	20.27
		12#6	20.90	20.42	20.18
		12#11	21.04	20.64	20.27
		25#0	20.81	20.25	20.02
10M	QPSK	1#0	22.13	21.98	22.06
		1#24	21.85	21.75	21.68
		1#49	21.76	21.61	21.76
		25#0	21.77	21.64	21.68
		25#12	21.87	21.67	21.75
		25#24	21.81	21.81	21.95
		50#0	21.60	21.42	21.68
	16-QAM	1#0	21.32	21.21	21.35
		1#24	21.11	20.89	20.97
		1#49	20.93	20.96	21.07
		25#0	20.87	20.98	21.04
		25#12	21.11	21.01	20.99
		25#24	21.03	20.99	21.08
		50#0	20.65	20.67	20.74

LTE Band 12

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4M	QPSK	1#0	23.42	23.56	23.17
		1#3	23.11	23.17	22.84
		1#5	23.08	23.21	22.94
		3#0	23.18	23.27	22.94
		3#1	23.24	23.33	23.05
		3#3	23.04	23.21	22.77
		6#0	22.67	22.84	22.43
	16-QAM	1#0	22.28	22.60	22.05
		1#3	22.01	22.33	21.75
		1#5	21.95	22.36	21.66
		3#0	21.83	22.30	21.84
		3#1	22.05	22.30	21.89
		3#3	21.91	22.29	21.68
		6#0	21.58	21.91	21.44
3M	QPSK	1#0	23.15	23.22	22.99
		1#7	22.86	22.82	22.72
		1#14	22.80	22.90	22.73
		8#0	22.67	22.76	22.54
		8#4	22.88	23.07	22.76
		8#7	22.98	22.94	22.61
		15#0	22.75	22.66	22.26
	16-QAM	1#0	22.35	22.41	22.04
		1#7	21.97	22.19	21.74
		1#14	22.08	22.20	21.83
		8#0	21.88	22.12	21.77
		8#4	22.06	22.06	21.89
		8#7	22.00	22.15	21.91
		15#0	21.65	21.95	21.64

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5M	QPSK	1#0	22.83	23.31	23.11
		1#12	22.50	23.05	22.86
		1#24	22.46	23.08	22.75
		12#0	22.55	23.09	22.62
		12#6	22.62	23.04	22.76
		12#11	22.60	23.04	22.95
		25#0	22.22	22.82	22.70
	16-QAM	1#0	22.35	22.93	22.56
		1#12	21.97	22.55	22.21
		1#24	21.99	22.64	22.35
		12#0	22.09	22.73	22.07
		12#6	22.11	22.54	22.43
		12#11	22.24	22.72	22.30
		25#0	21.91	22.33	21.93
10M	QPSK	1#0	23.12	23.34	23.52
		1#24	22.82	22.96	23.27
		1#49	22.75	23.08	23.29
		25#0	22.88	23.10	23.27
		25#12	22.97	23.00	23.32
		25#24	22.73	23.16	23.28
		50#0	22.49	22.87	23.02
	16-QAM	1#0	22.59	22.76	22.9
		1#24	22.34	22.49	22.56
		1#49	22.22	22.45	22.55
		25#0	22.20	22.52	22.64
		25#12	22.48	22.42	22.69
		25#24	22.45	22.60	22.53
		50#0	22.23	22.20	22.28

Peak-to-average ratio (PAR):**WCDMA Band V:**

Mode	Channel	PAR (dB)	Limit (dB)
WCDMA (Rel99)	Low	5.03	≤ 13
	Middle	5.06	≤ 13
	High	5.14	≤ 13
WCDMA (HSDPA)	Low	4.74	≤ 13
	Middle	4.77	≤ 13
	High	4.80	≤ 13
WCDMA (HSUPA)	Low	4.41	≤ 13
	Middle	4.39	≤ 13
	High	4.35	≤ 13
WCDMA (HSPA+)	Low	4.02	≤ 13
	Middle	4.08	≤ 13
	High	4.07	≤ 13

WCDMA Band II

Mode	Channel	PAR (dB)	Limit (dB)
WCDMA (Rel99)	Low	4.12	≤ 13
	Middle	4.17	≤ 13
	High	4.17	≤ 13
WCDMA (HSDPA)	Low	4.36	≤ 13
	Middle	4.33	≤ 13
	High	4.40	≤ 13
WCDMA (HSUPA)	Low	4.44	≤ 13
	Middle	4.46	≤ 13
	High	4.45	≤ 13
WCDMA (HSPA+)	Low	4.23	≤ 13
	Middle	4.29	≤ 13
	High	4.32	≤ 13

LTE Band 2

Test Modulation		Test Bandwidth	Low Channel (dB)	Middle Channel (dB)	High Channel (dB)	Limit (dB)
QPSK	1 RB	20M	4.54	3.72	3.66	13
	100 RB		6.49	5.69	5.65	13
16-QAM	1 RB	20M	4.43	4.60	4.56	13
	100 RB		6.38	6.63	6.57	13

LTE Band 4

Test Modulation		Test Bandwidth	Low Channel (dB)	Middle Channel (dB)	High Channel (dB)	Limit(dB)
QPSK	1 RB	20M	4.41	3.60	3.66	13
	100 RB		6.47	5.61	5.65	13
16-QAM	1 RB	20M	4.19	4.61	4.56	13
	100 RB		6.14	6.54	6.61	13

LTE Band 5

Test Modulation		Test Bandwidth	Low Channel (dB)	Middle Channel (dB)	High Channel (dB)	Limit(dB)
QPSK	1 RB	10M	4.17	3.66	3.66	13
	50 RB		6.08	5.71	5.72	13
16-QAM	1 RB	10M	4.55	4.71	4.56	13
	50 RB		6.57	6.75	6.57	13

LTE Band 12

Test Modulation		Test Bandwidth	Low Channel (dB)	Middle Channel (dB)	High Channel (dB)	Limit(dB)
QPSK	1 RB	10M	4.35	2.60	3.66	13
	50 RB		6.26	4.70	5.75	13
16-QAM	1 RB	10M	4.52	4.82	4.56	13
	50 RB		6.57	6.80	6.61	13

ERP & EIRP**WCDMA Mode**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Submitted Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
WCDMA Band V, Middle Channel								
836.60	H	89.65	25.96	0.63	-1.1	24.23	38.45	14.22
836.60	V	93.16	26.01	0.63	-1.1	24.28	38.45	14.17
WCDMA Band II, Middle Channel								
1880.00	H	87.24	16.20	0.85	8.8	24.15	33.00	8.85
1880.00	V	89.69	18.34	0.85	8.8	26.29	33.00	6.71

Note:

All above data were tested with no amplifier

Absolute Level = Submitted Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

LTE Band 2

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Submitted Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 1.4M BW Middle Channel								
1880.00	H	88.63	17.59	0.85	8.8	25.54	33.00	7.46
1880.00	V	90.75	19.40	0.85	8.8	27.35	33.00	5.65
16-QAM 1.4M BW Middle Channel								
1880.00	H	88.58	17.54	0.85	8.8	25.49	33.00	7.51
1880.00	V	90.67	19.32	0.85	8.8	27.27	33.00	5.73
QPSK 3M BW Middle Channel								
1880.00	H	88.57	17.53	0.85	8.8	25.48	33.00	7.52
1880.00	V	90.59	19.24	0.85	8.8	27.19	33.00	5.81
16-QAM 3M BW Middle Channel								
1880.00	H	88.39	17.35	0.85	8.8	25.30	33.00	7.70
1880.00	V	90.56	19.21	0.85	8.8	27.16	33.00	5.84
QPSK 5M BW Middle Channel								
1880.00	H	88.53	17.49	0.85	8.8	25.44	33.00	7.56
1880.00	V	90.66	19.31	0.85	8.8	27.26	33.00	5.74
16-QAM 5M BW Middle Channel								
1880.00	H	88.38	17.34	0.85	8.8	25.29	33.00	7.71
1880.00	V	90.48	19.13	0.85	8.8	27.08	33.00	5.92

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Submitted Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 10M BW Middle Channel								
1880.00	H	88.25	17.21	0.85	8.8	25.16	33.00	7.84
1880.00	V	90.34	18.99	0.85	8.8	26.94	33.00	6.06
16-QAM 10M BW Middle Channel								
1880.00	H	88.17	17.13	0.85	8.8	25.08	33.00	7.92
1880.00	V	90.07	18.72	0.85	8.8	26.67	33.00	6.33
QPSK 15M BW Middle Channel								
1880.00	H	87.98	16.94	0.85	8.8	24.89	33.00	8.11
1880.00	V	89.94	18.59	0.85	8.8	26.54	33.00	6.46
16-QAM 15M BW Middle Channel								
1880.00	H	88.1	17.06	0.85	8.8	25.01	33.00	7.99
1880.00	V	89.81	18.46	0.85	8.8	26.41	33.00	6.59
QPSK 20M BW Middle Channel								
1880.00	H	87.52	16.48	0.85	8.8	24.43	33.00	8.57
1880.00	V	89.5	18.15	0.85	8.8	26.10	33.00	6.90
16-QAM 20M BW Middle Channel								
1880.00	H	87.44	16.40	0.85	8.8	24.35	33.00	8.65
1880.00	V	89.35	18.00	0.85	8.8	25.95	33.00	7.05

LTE Band 4

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Submitted Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 1.4M BW Middle Channel								
1732.50	H	80.44	16.19	0.84	8.6	23.95	30.00	6.05
1732.50	V	82.26	17.54	0.84	8.6	25.30	30.00	4.70
16-QAM 1.4M BW Middle Channel								
1732.50	H	80.38	16.13	0.84	8.6	23.89	30.00	6.11
1732.50	V	82.08	17.36	0.84	8.6	25.12	30.00	4.88
QPSK 3M BW Middle Channel								
1732.50	H	80.19	15.94	0.84	8.6	23.70	30.00	6.30
1732.50	V	81.96	17.24	0.84	8.6	25.00	30.00	5.00
16-QAM 3M BW Middle Channel								
1732.50	H	79.98	15.73	0.84	8.6	23.49	30.00	6.51
1732.50	V	81.77	17.05	0.84	8.6	24.81	30.00	5.19
QPSK 5M BW Middle Channel								
1732.50	H	79.77	15.52	0.84	8.6	23.28	30.00	6.72
1732.50	V	81.71	16.99	0.84	8.6	24.75	30.00	5.25
16-QAM 5M BW Middle Channel								
1732.50	H	79.67	15.42	0.84	8.6	23.18	30.00	6.82
1732.50	V	81.55	16.83	0.84	8.6	24.59	30.00	5.41

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Submitted Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 10M BW Middle Channel								
1732.50	H	79.60	15.35	0.84	8.6	23.08	30.00	6.92
1732.50	V	81.31	16.59	0.84	8.6	24.32	30.00	5.68
16-QAM 10M BW Middle Channel								
1732.50	H	79.49	15.24	0.84	8.6	23.00	30.00	7.00
1732.50	V	81.13	16.41	0.84	8.6	24.14	30.00	5.86
QPSK 15M BW Middle Channel								
1732.50	H	79.33	15.08	0.84	8.6	22.84	30.00	7.16
1732.50	V	81.08	16.36	0.84	8.6	24.12	30.00	5.88
16-QAM 15M BW Middle Channel								
1732.50	H	79.26	15.01	0.84	8.6	22.77	30.00	7.23
1732.50	V	80.94	16.22	0.84	8.6	23.98	30.00	6.02
QPSK 20M BW Middle Channel								
1732.50	H	79.01	14.76	0.84	8.6	22.52	30.00	7.48
1732.50	V	80.78	16.06	0.84	8.6	23.82	30.00	6.18
16-QAM 20M BW Middle Channel								
1732.50	H	78.85	14.60	0.84	8.6	22.36	30.00	7.64
1732.50	V	80.61	15.89	0.84	8.6	23.65	30.00	6.35

LTE Band 5

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Submitted Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 1.4M BW Middle Channel								
836.50	H	90.26	24.00	0.63	-1.1	23.53	38.45	14.92
836.50	V	86.45	24.76	0.63	-1.1	24.29	38.45	14.16
16-QAM 1.4M BW Middle Channel								
836.50	H	90.14	24.93	0.63	-1.1	24.46	38.45	13.99
836.50	V	86.27	25.63	0.63	-1.1	25.16	38.45	13.29
QPSK 3M BW Middle Channel								
836.50	H	90.04	23.80	0.63	-1.1	23.33	38.45	15.12
836.50	V	86.19	24.42	0.63	-1.1	23.95	38.45	14.50
16-QAM 3M BW Middle Channel								
836.50	H	89.93	24.64	0.63	-1.1	24.17	38.45	14.28
836.50	V	86.00	25.35	0.63	-1.1	24.88	38.45	13.57
QPSK 5M BW Middle Channel								
836.50	H	89.80	24.43	0.63	-1.1	23.96	38.45	14.49
836.50	V	85.92	25.31	0.63	-1.1	24.84	38.45	13.61
16-QAM 5M BW Middle Channel								
836.50	H	89.61	24.76	0.63	-1.1	23.03	38.45	15.42
836.50	V	85.75	25.99	0.63	-1.1	24.26	38.45	14.19
QPSK 10M BW Middle Channel								
836.50	H	89.49	24.09	0.63	-1.1	23.62	38.45	14.83
836.50	V	85.47	24.74	0.63	-1.1	24.27	38.45	14.18
16-QAM 10M BW Middle Channel								
836.50	H	89.37	23.76	0.63	-1.1	23.29	38.45	15.16
836.50	V	85.23	24.48	0.63	-1.1	24.01	38.45	14.44

LTE Band 12

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Submitted Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 1.4M BW Middle Channel								
707.50	H	91.95	24.8	0.62	-1.7	23.72	33.77	10.05
707.50	V	95.02	26.48	0.62	-1.7	25.40	33.77	8.37
16-QAM 1.4M BW Middle Channel								
707.50	H	92.06	24.91	0.62	-1.7	23.83	33.77	9.94
707.50	V	93.95	25.41	0.62	-1.7	24.33	33.77	9.44
QPSK 3M BW Middle Channel								
707.50	H	91.36	24.21	0.62	-1.7	23.13	33.77	10.64
707.50	V	95.05	26.51	0.62	-1.7	25.43	33.77	8.34
16-QAM 3M BW Middle Channel								
707.50	H	91.93	24.78	0.62	-1.7	23.70	33.77	10.07
707.50	V	93.62	25.08	0.62	-1.7	24.00	33.77	9.77
QPSK 5M BW Middle Channel								
707.50	H	91.35	24.20	0.62	-1.7	23.12	33.77	10.65
707.50	V	93.74	25.20	0.62	-1.7	24.12	33.77	9.65
16-QAM 5M BW Middle Channel								
707.50	H	92.15	25.00	0.62	-1.7	23.92	33.77	9.85
707.50	V	94.77	26.23	0.62	-1.7	25.15	33.77	8.62
QPSK 10M BW Middle Channel								
707.50	H	91.27	24.12	0.62	-1.7	23.04	33.77	10.73
707.50	V	94.10	25.56	0.62	-1.7	24.48	33.77	9.29
16-QAM 10M BW Middle Channel								
707.50	H	91.71	24.56	0.62	-1.7	23.48	33.77	10.29
707.50	V	93.52	24.98	0.62	-1.7	23.90	33.77	9.87

Note:

All above data were tested with no amplifier

Absolute Level = Submitted Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

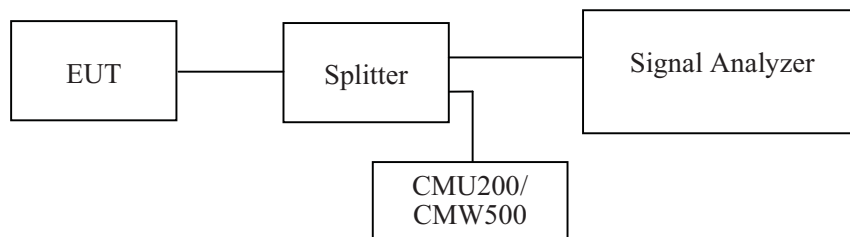
FCC §2.1049, §22.917, §22.905 & §24.238; §27.53- OCCUPIED BANDWIDTH**Applicable Standards**

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

Test Procedure

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

The resolution bandwidth of the spectrum analyzer was set at 100 kHz (WCDMA), 30kHz for LTE 1.4 MHz & 3 MHz , 100 kHz for LTE 5 MHz & 10 MHz, 300 kHz for LTE 15 MHz & 20 MHz, and the 26 dB & 99% bandwidth was recorded.

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

Temperature:	23.2-23.5 °C
Relative Humidity:	51-53 %
ATM Pressure:	101.1-103.3 kPa

The testing was performed by Winnie Yang from 2019-10-16 to 2019-10-18.

EUT operation mode: Transmitting

Test Result: Compliant.

WCDMA Band V

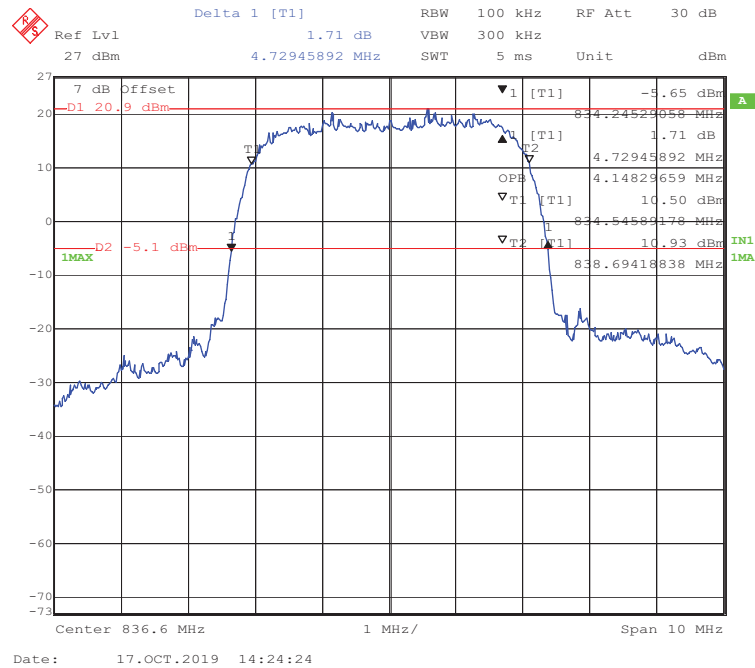
Mode	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
WCDMA (Rel 99)	836.6	4.729	4.148
WCDMA (HSDPA)	836.6	4.770	4.168
WCDMA (HSUPA)	836.6	4.770	4.148
WCDMA (HSPA+)	836.6	4.770	4.168

WCDMA Band II

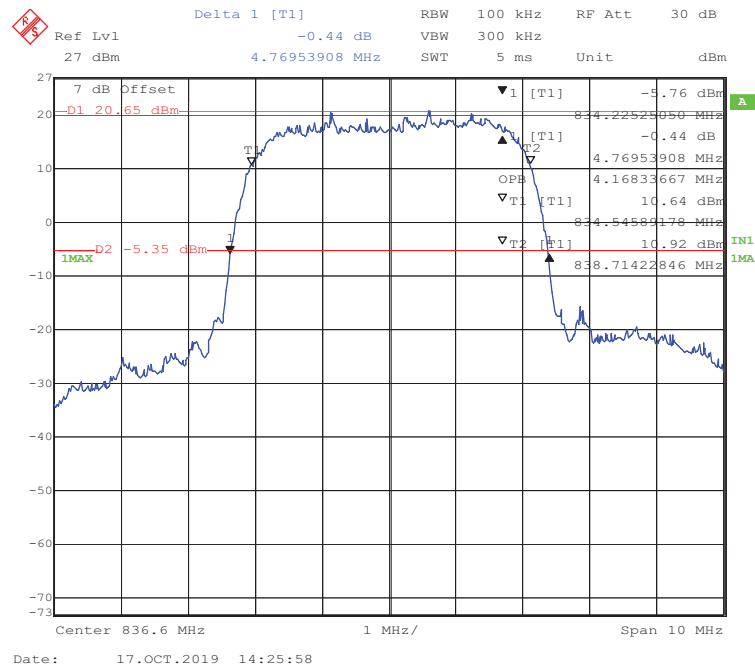
Mode	Frequency (MHz)	26 dB Emission Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
WCDMA (Rel 99)	1880	4.729	4.128
WCDMA (HSDPA)	1880	4.729	4.128
WCDMA (HSUPA)	1880	4.729	4.128
WCDMA (HSPA+)	1880	4.729	4.148

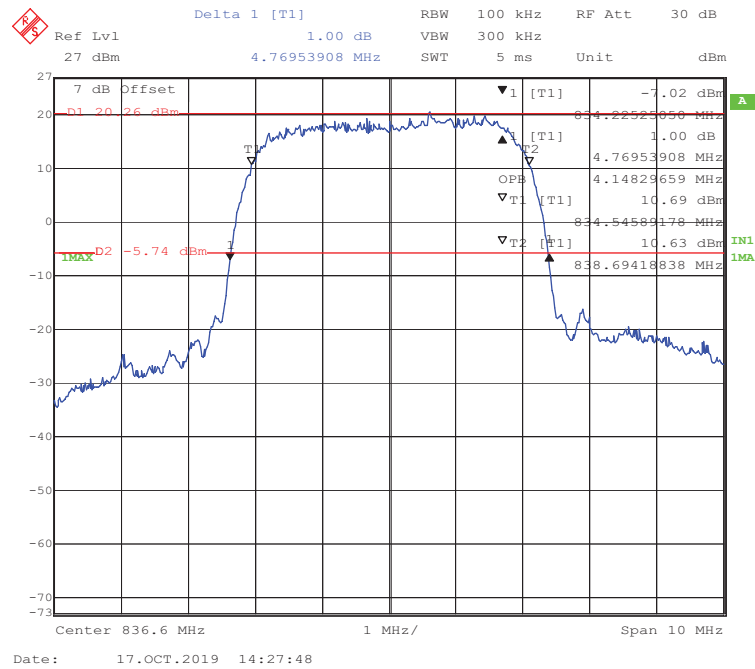
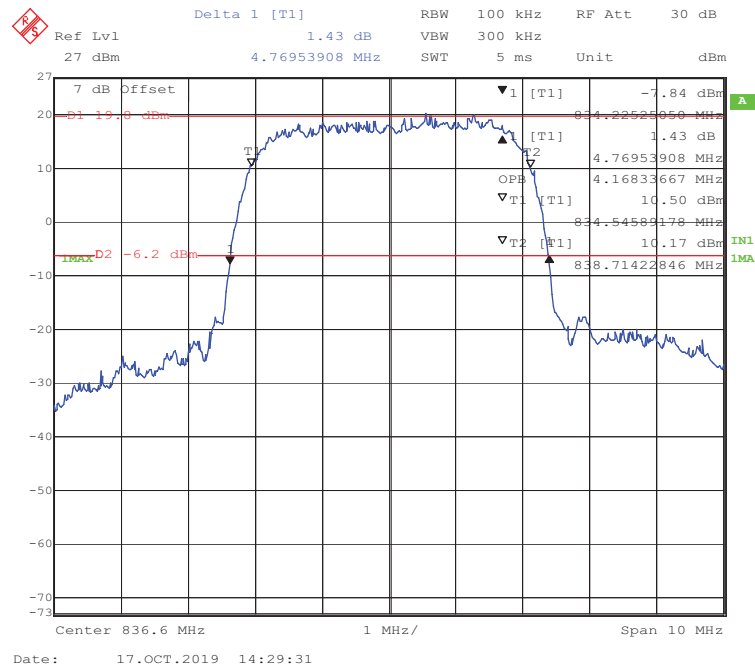
WCDMA Band V

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



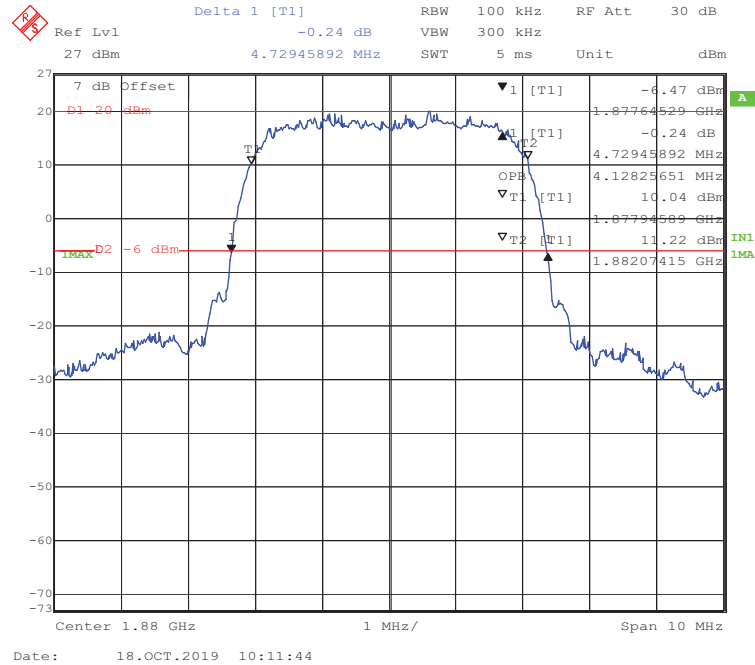
99% Occupied & 26 dB Emissions Bandwidth for WCDMA (HSDPA) Mode



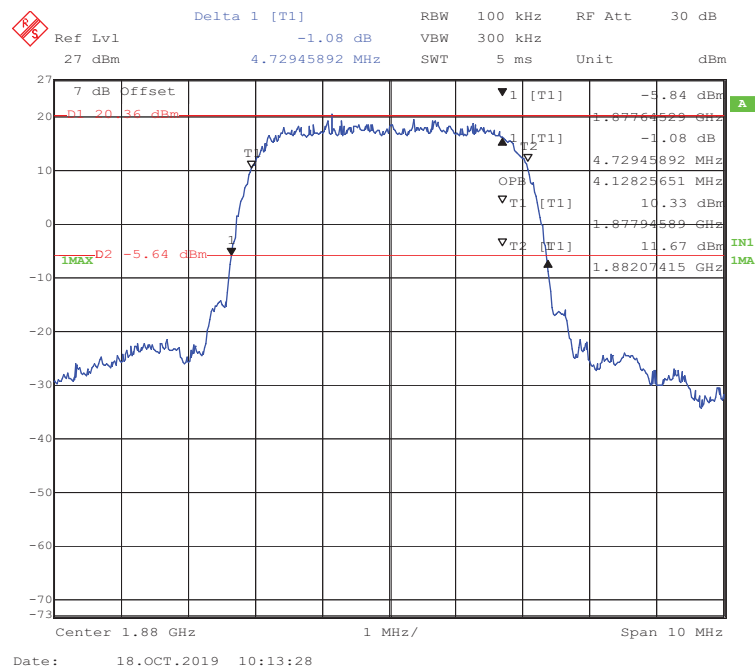
99% Occupied & 26 dB Emissions Bandwidth for WCDMA (HSUPA) Mode**99% Occupied & 26 dB Emissions Bandwidth for WCDMA (HSPA+) Mode**

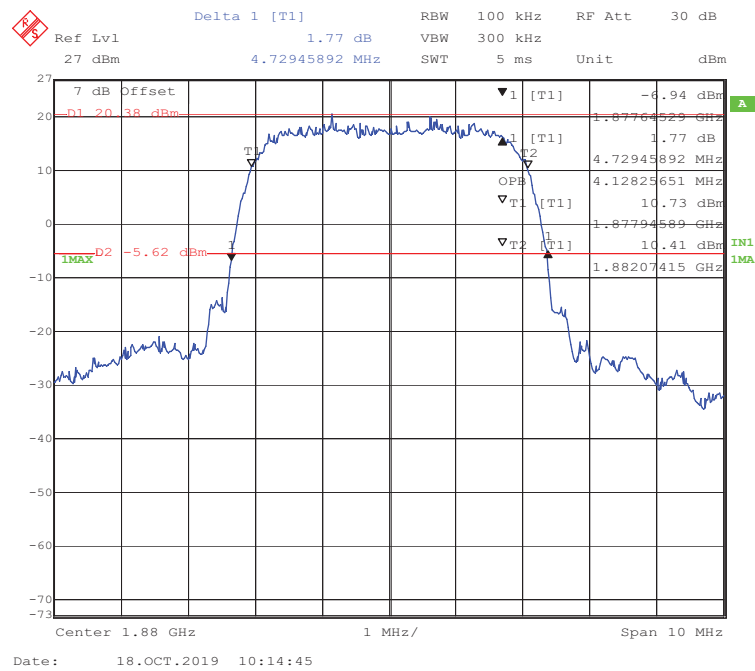
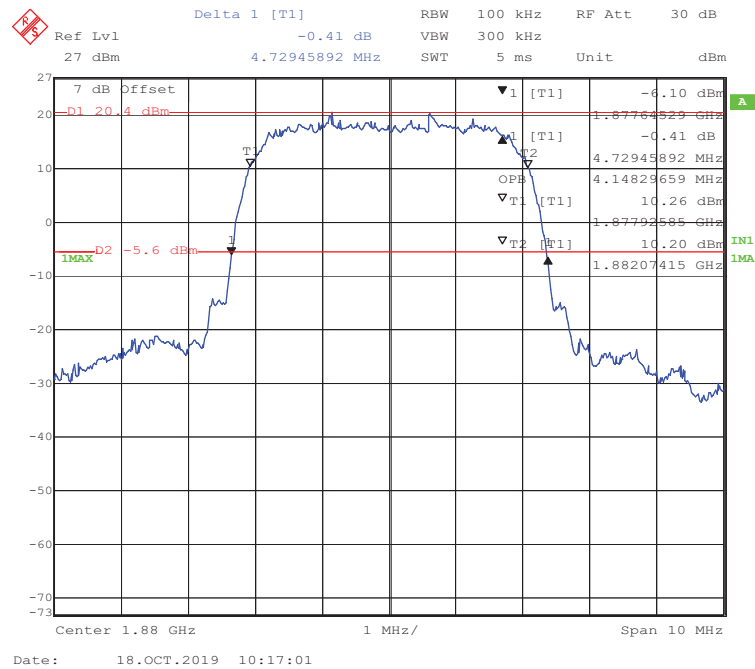
WCDMA Band II

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



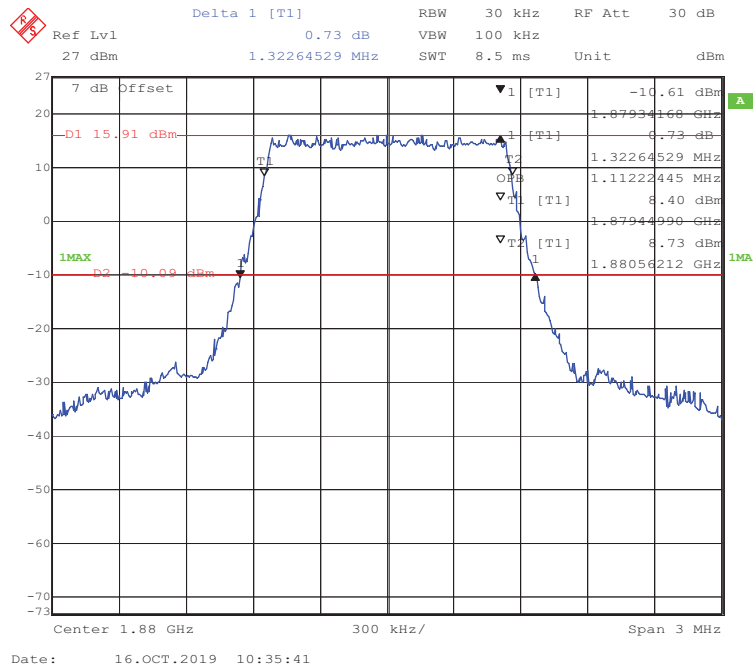
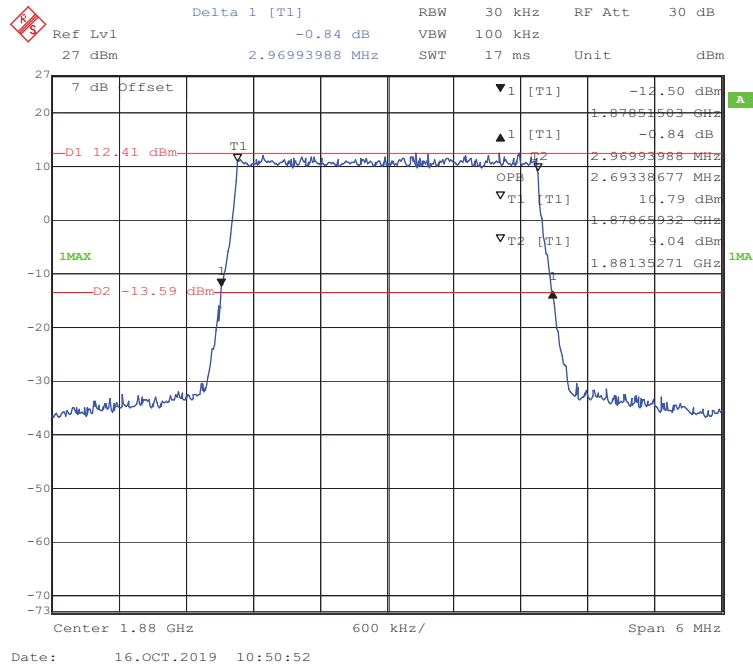
99% Occupied & 26 dB Emissions Bandwidth for WCDMA (HSDPA) Mode

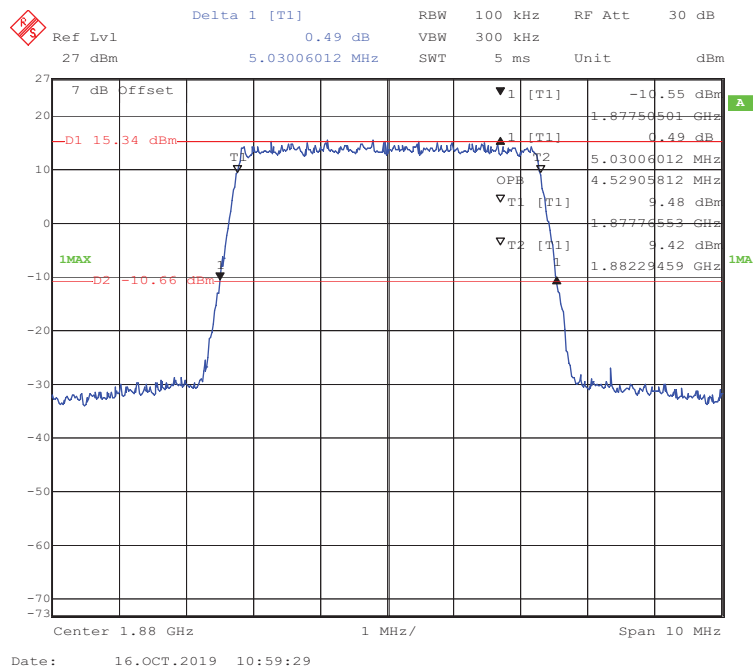
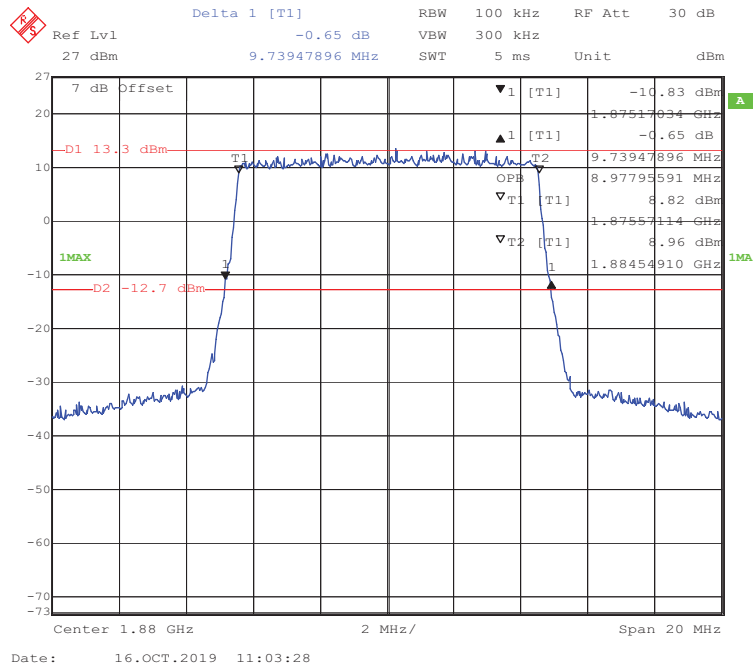


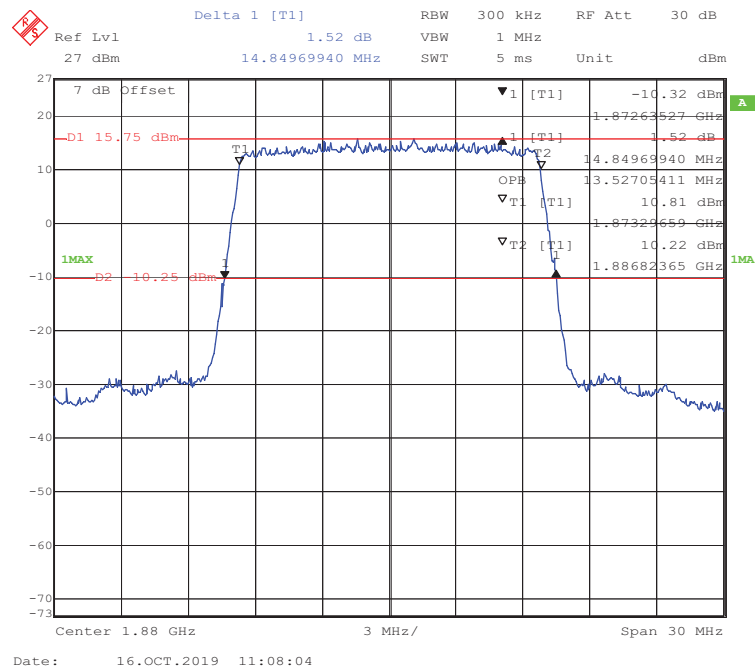
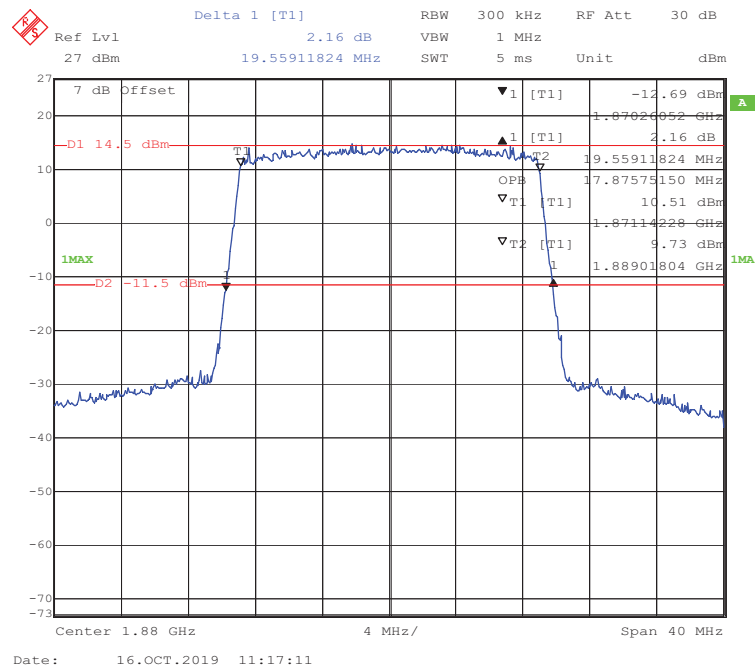
99% Occupied & 26 dB Emissions Bandwidth for WCDMA (HSUPA) Mode**99% Occupied & 26 dB Emissions Bandwidth for WCDMA (HSPA+) Mode**

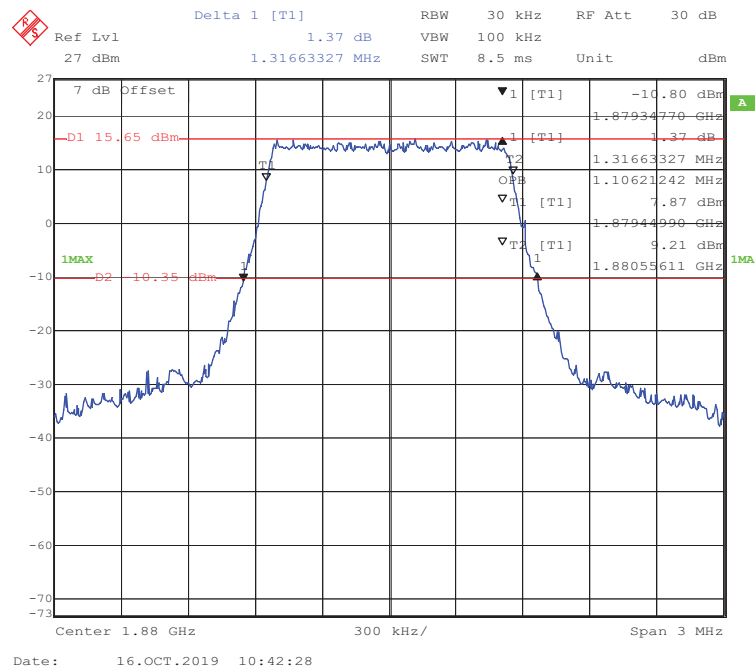
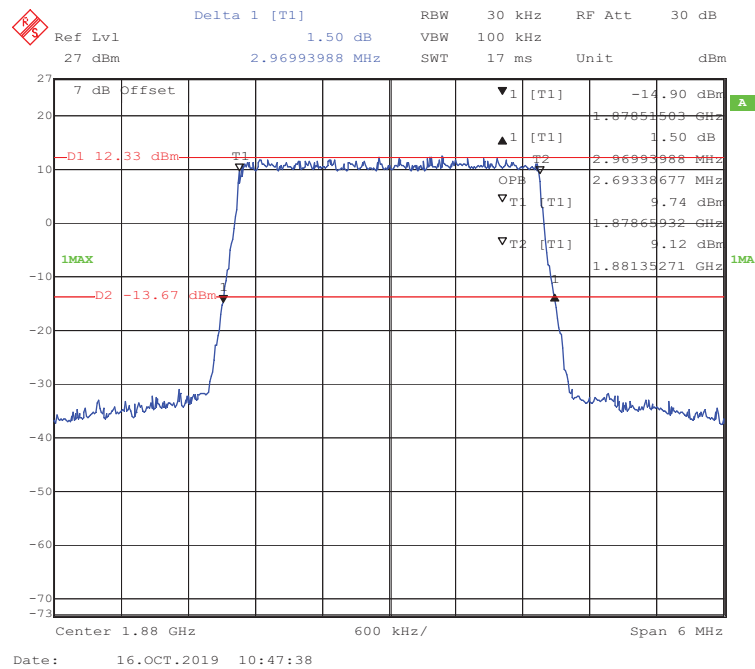
LTE Band 2:

Test Modulation	Test Bandwidth	Test Channel	26 dB Bandwidth	99% Occupied Bandwidth
			MHz	MHz
QPSK	1.4M	Middle	1.323	1.112
	3M		2.970	2.693
	5M		5.030	4.529
	10M		9.739	8.978
	15M		14.850	13.527
	20M		19.559	17.876
16-QAM	1.4M	Middle	1.317	1.106
	3M		2.970	2.693
	5M		5.050	4.529
	10M		9.699	8.938
	15M		14.729	13.467
	20M		19.399	17.876

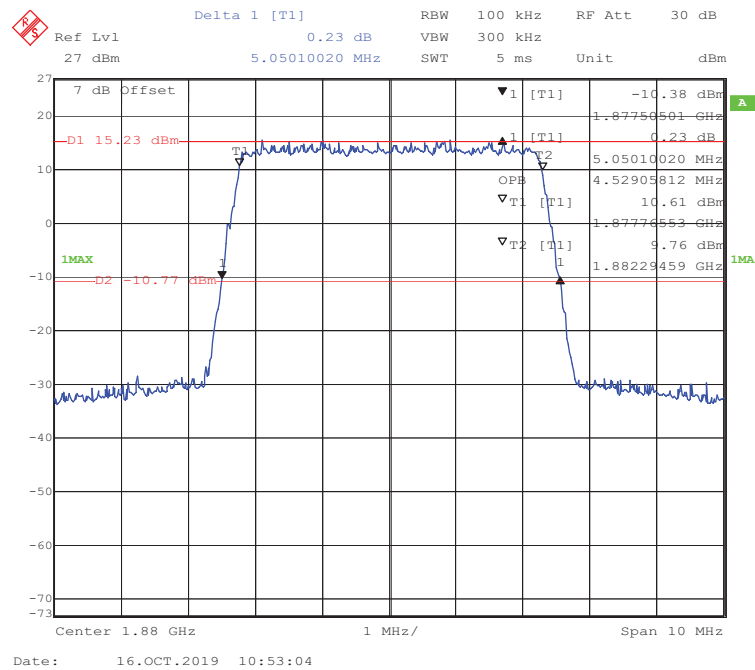
QPSK (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**QPSK (3 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**

QPSK (5 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**QPSK (10MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**

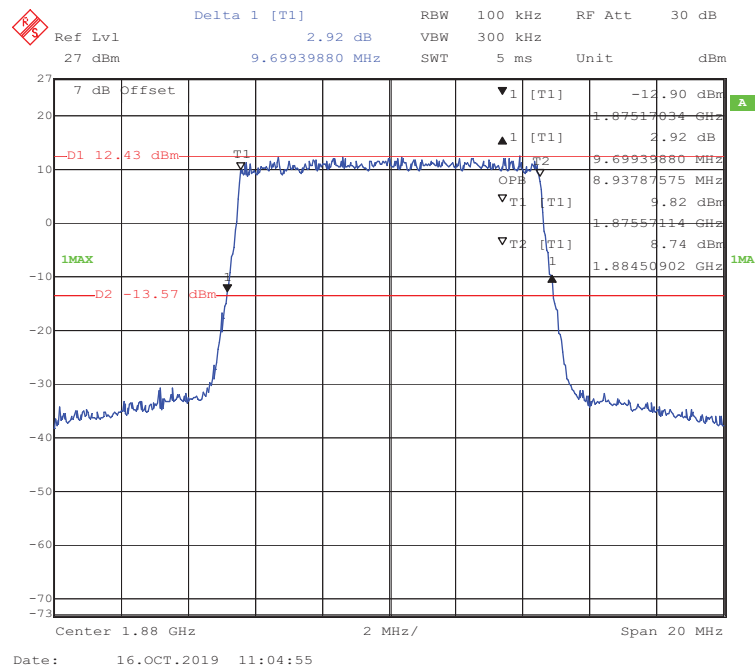
QPSK (15 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**QPSK (20 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**

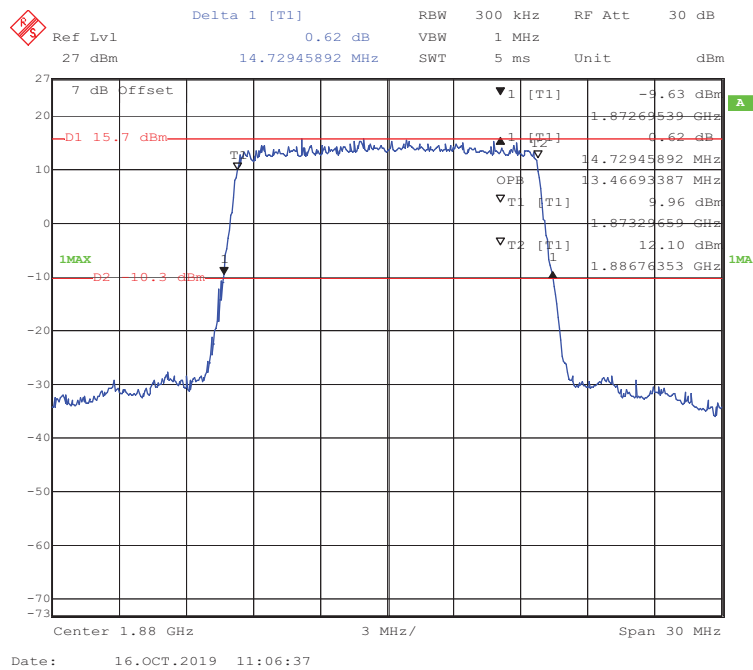
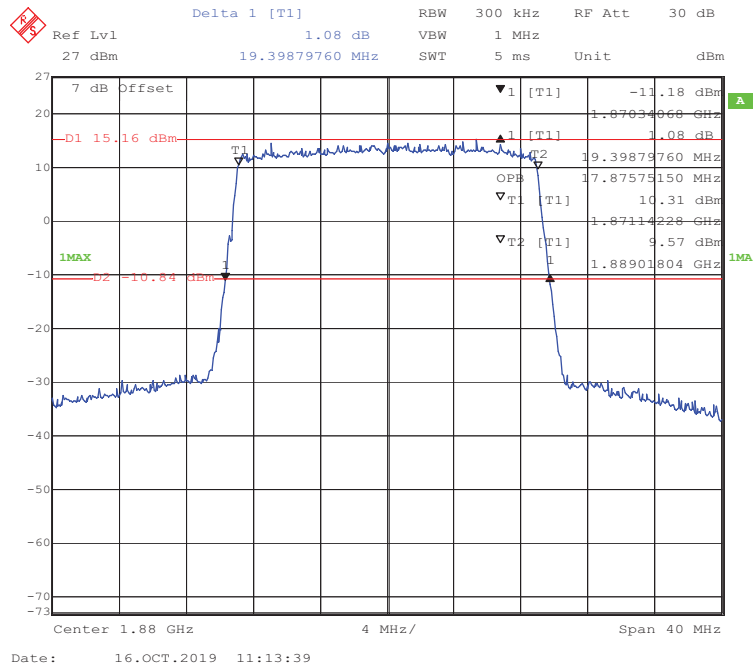
16-QAM (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**16-QAM (3 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**

16-QAM (5 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



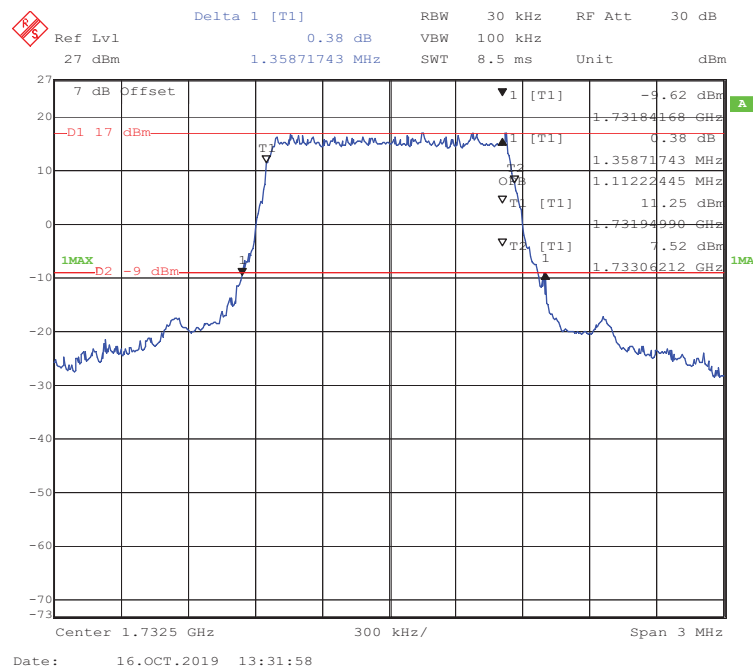
16-QAM (10 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



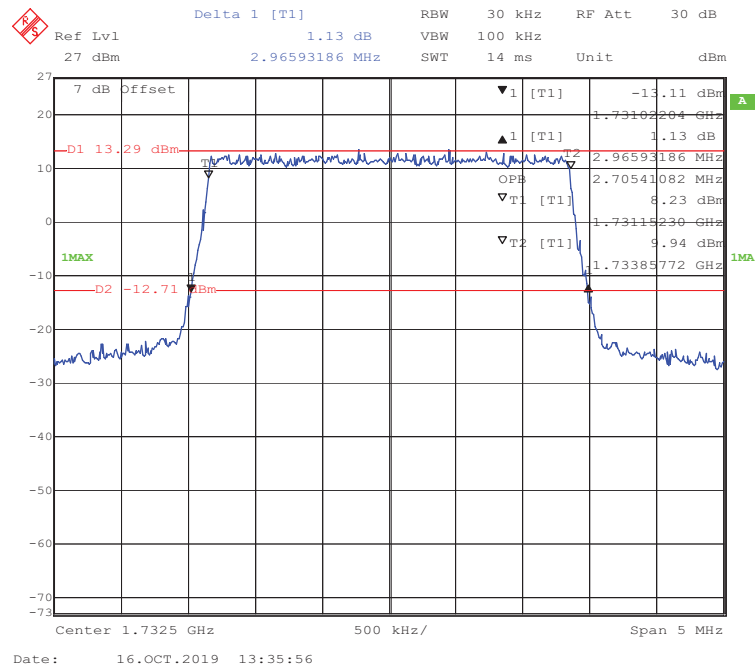
16-QAM (15 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**16-QAM (20 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**

LTE Band 4:

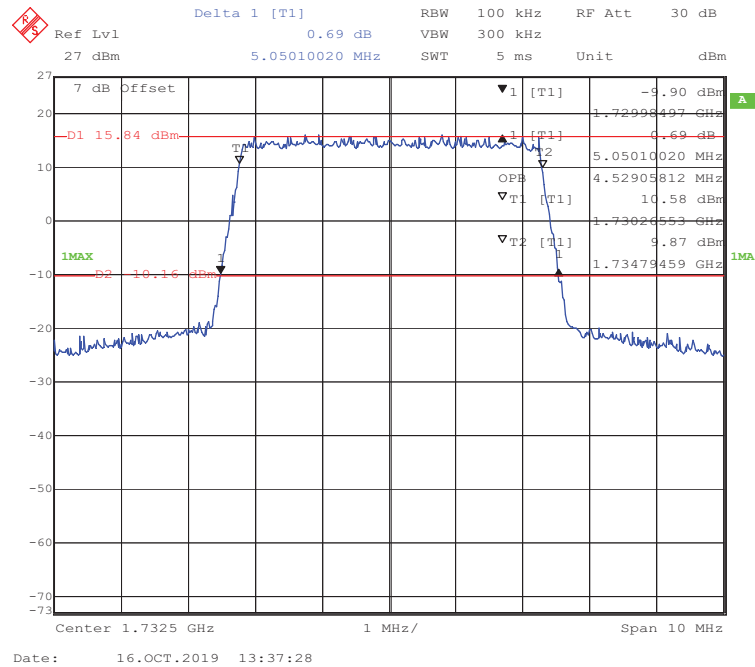
Test Modulation	Test Bandwidth	Test Channel	26 dB Bandwidth	99% Occupied Bandwidth
			MHz	MHz
QPSK	1.4M	Middle	1.359	1.112
	3M		2.966	2.705
	5M		5.050	4.529
	10M		9.780	8.978
	15M		15.030	13.527
	20M		19.399	17.956
16-QAM	1.4M	Middle	1.305	1.106
	3M		2.976	2.695
	5M		5.030	4.529
	10M		1.728	8.978
	15M		15.030	13.527
	20M		19.559	17.956

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

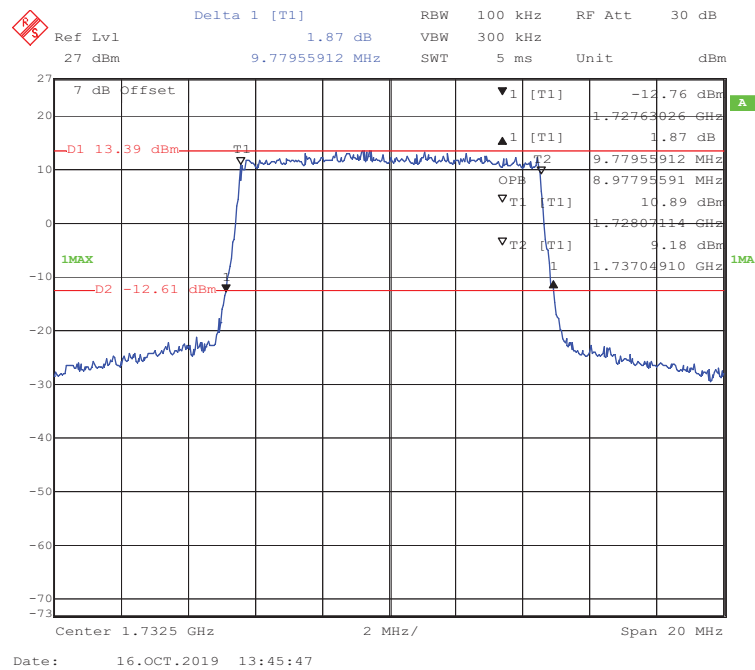
QPSK (3 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



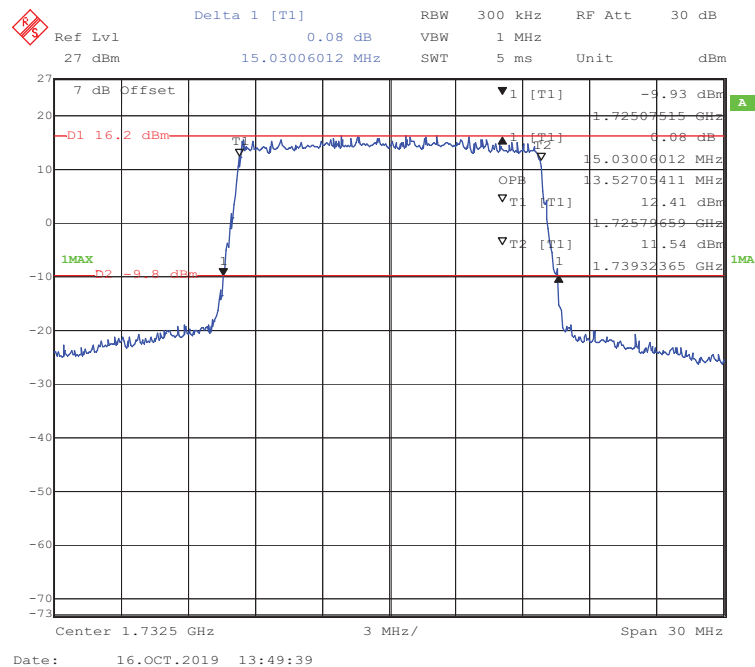
QPSK (5MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel

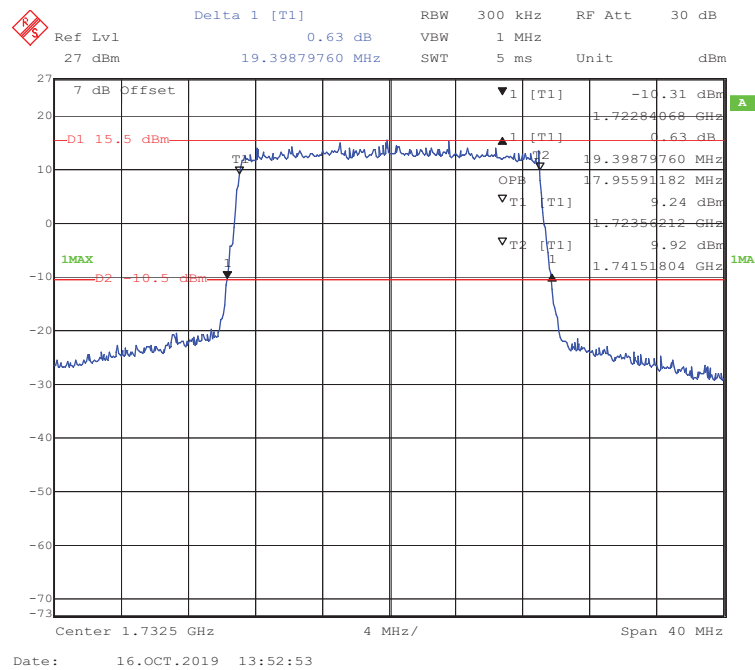
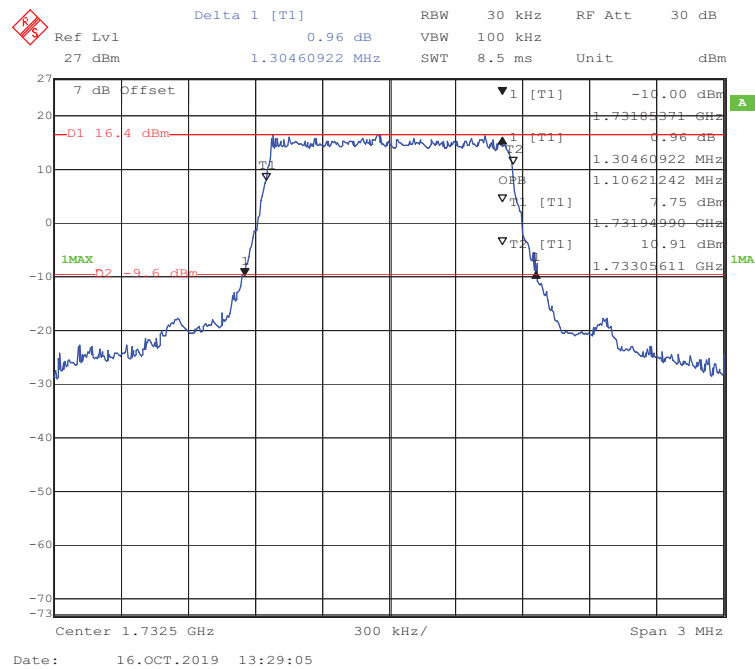


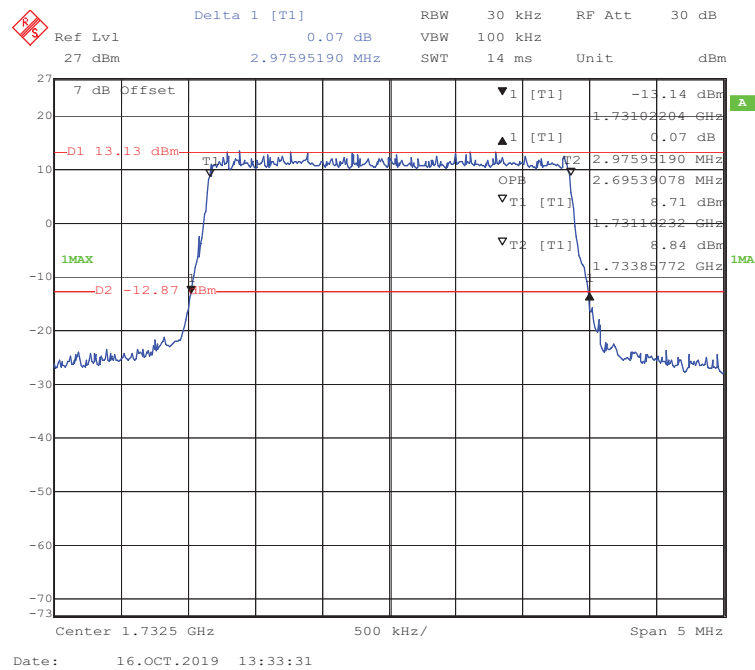
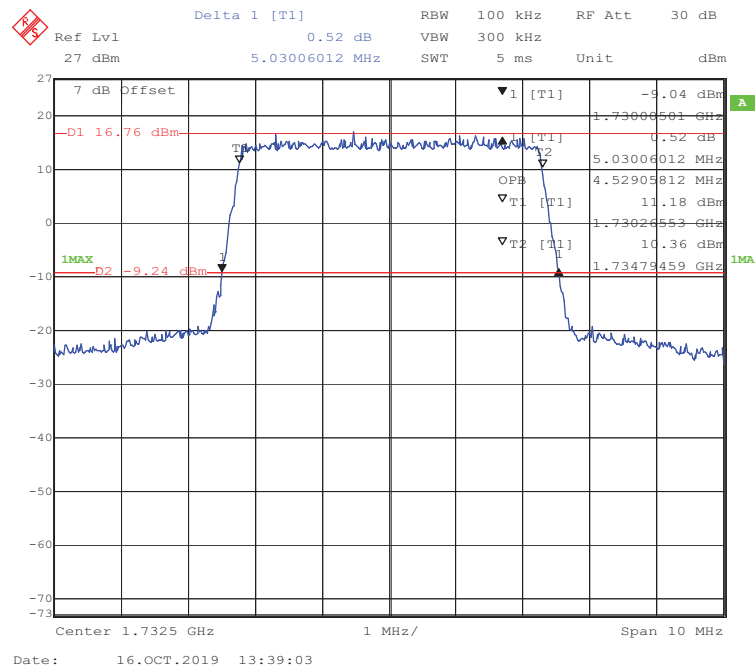
QPSK (10 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



QPSK (15 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel



QPSK (20 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**16-QAM (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**

16-QAM (3 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**16-QAM (5 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**

Marker 1 [T1] -12.79 dBm RBW 100 kHz RF Att 30 dB

Ref Lvl 27 dBm 1.72763026 GHz SWT 5 ms Unit dBm

7 dB Offset

D1 14.52 dBm

1MAX

D2 -11.48 dBm

▼1 [T1] -12.79 dBm 1.72763026 GHz

OPB 8.97795591 MHz

▼T2 [T1] 10.22 dBm 1.72807114 GHz

▼T2 [T1] 10.09 dBm 1.73704910 GHz

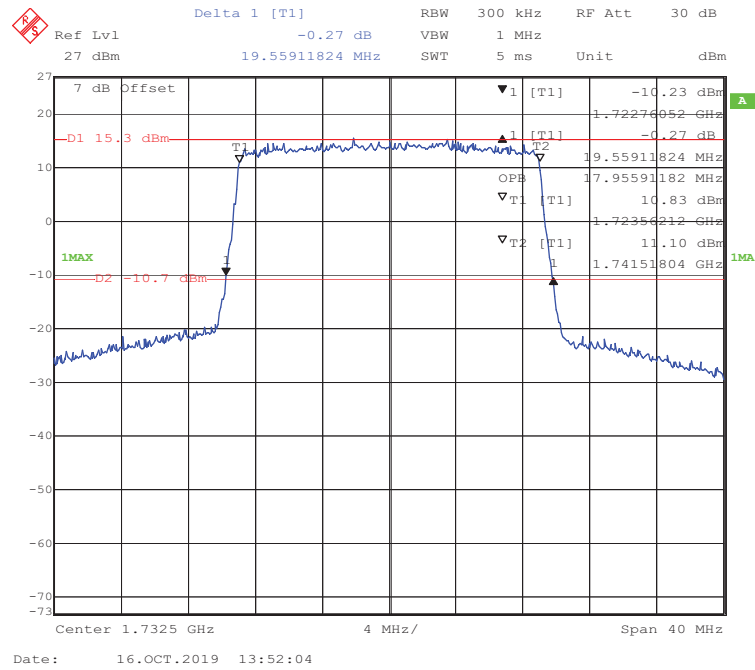
Δ1 [T1] 4.21 dB 9.73947896 MHz

Center 1.7325 GHz 2 MHz/ Span 20 MHz

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

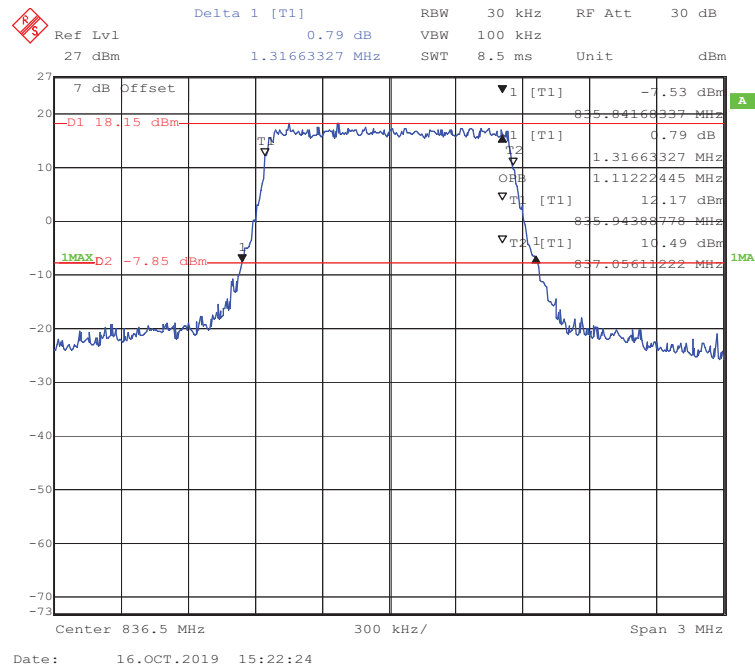
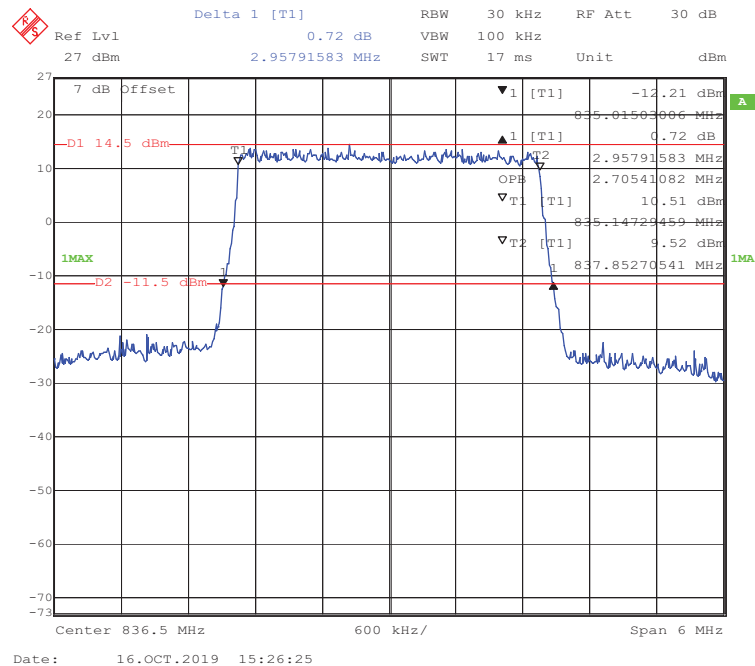
[illegible]

16-QAM (20 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel

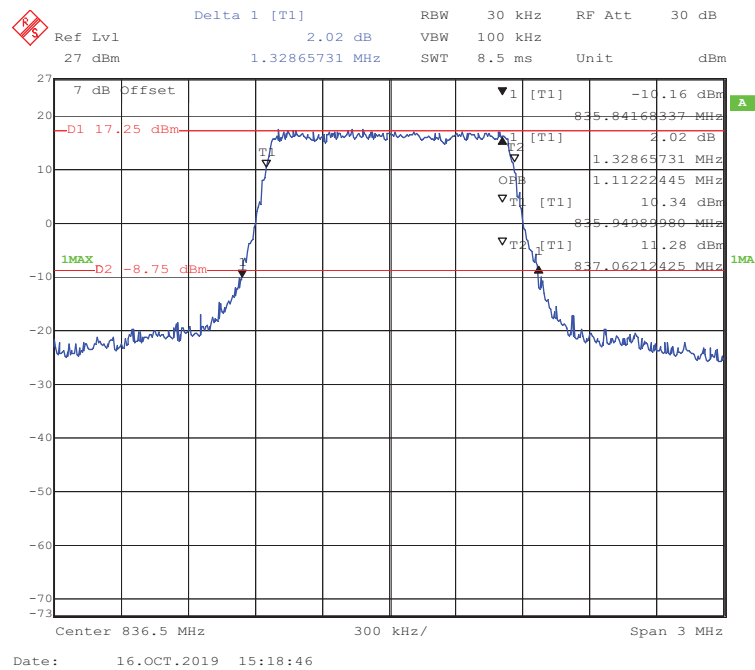
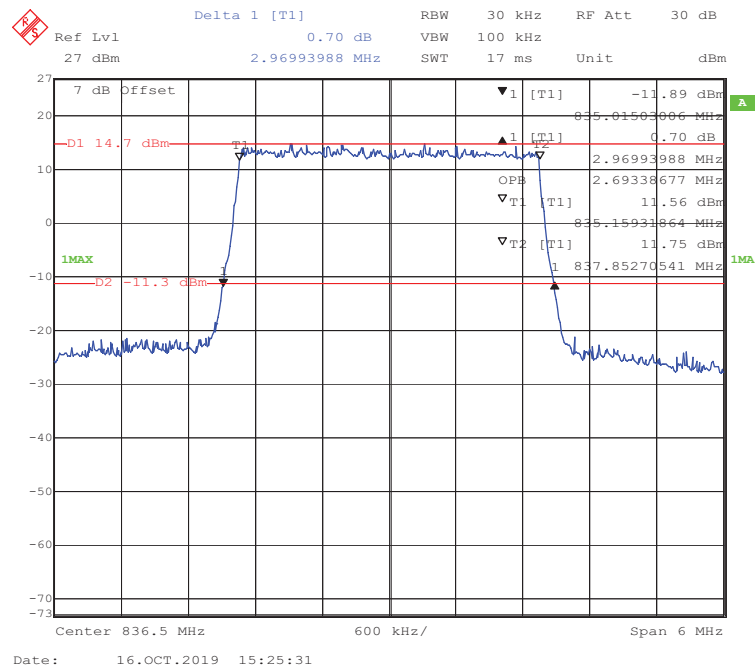


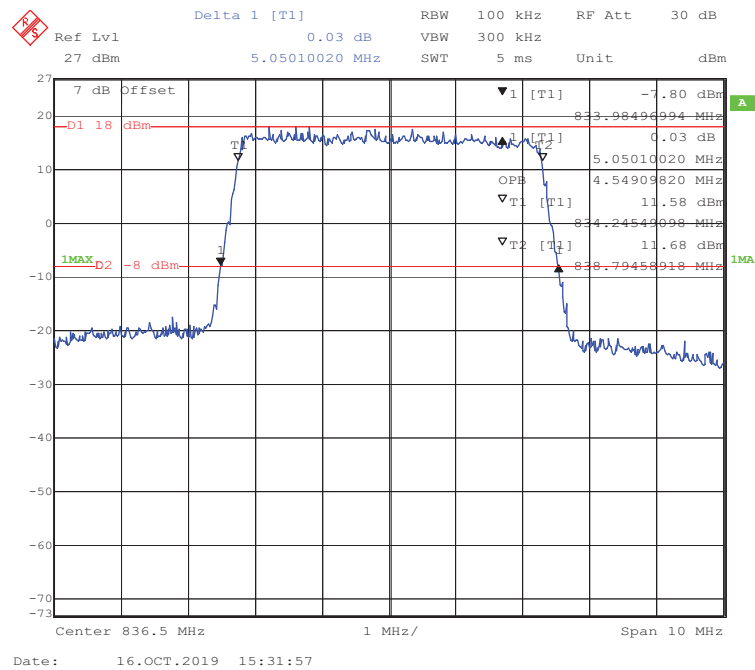
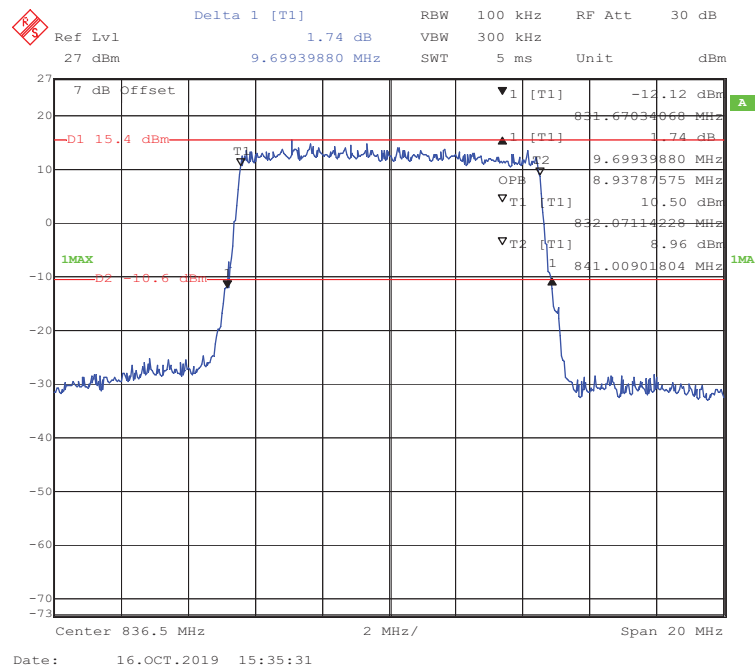
LTE Band 5:

Test Modulation	Test Bandwidth	Test Channel	26 dB Bandwidth	99% Occupied Bandwidth
			MHz	MHz
QPSK	1.4M	Middle	1.317	1.112
	3M		2.958	2.705
	5M		5.030	4.529
	10M		9.699	8.938
16-QAM	1.4M	Middle	1.329	1.112
	3M		2.970	2.693
	5M		5.050	4.549
	10M		9.699	8.938

QPSK (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**QPSK (3 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**

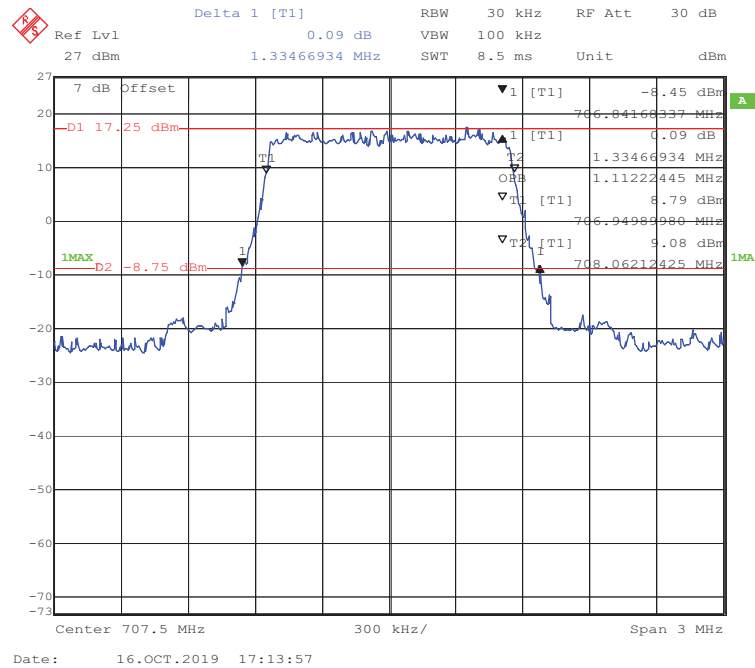
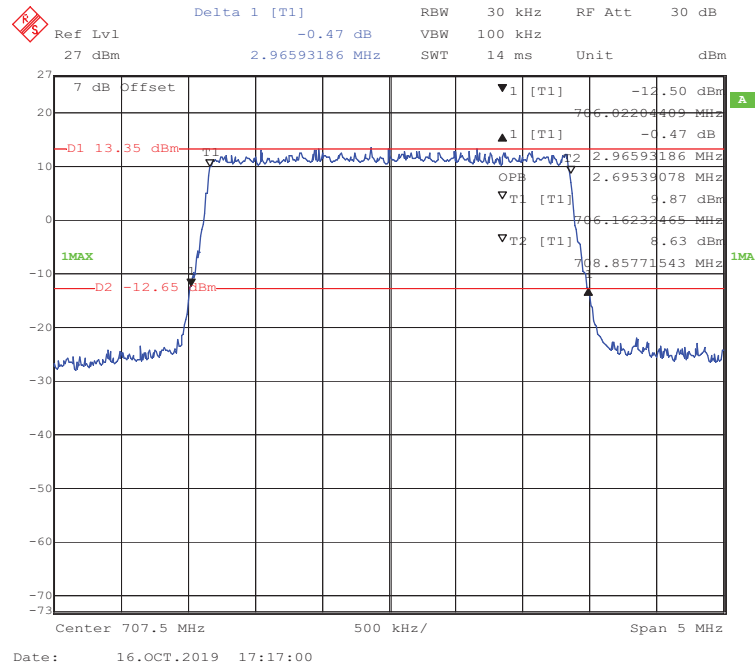
[illegible]

16-QAM (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**16-QAM (3 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**

16-QAM (5 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**16-QAM (10 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**

LTE Band 12:

Test Modulation	Test Bandwidth	Test Channel	26 dB Bandwidth	99% Occupied Bandwidth
			MHz	MHz
QPSK	1.4M	Middle	1.335	1.112
	3M		2.966	2.695
	5M		5.090	4.529
	10M		9.820	9.018
16-QAM	1.4M	Middle	1.317	1.106
	3M		2.956	2.685
	5M		5.070	4.529
	10M		9.820	8.938

QPSK (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**QPSK (3 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**

Delta 1 [T1] RBW 100 kHz RF Att 30 dB
 Ref Lvl -0.71 dB VBW 300 kHz
 27 dBm 5.09018036 MHz SWT 5 ms Unit dBm

7 dB Offset
 D1 17.5 dBm
 IMAX D2 -8.5 dBm

1 [T1] -8.77 dBm
 704.98496994 MHz
 -0.71 dB
 5.09018036 MHz
 OPB 4.52905812 MHz
 T1 [T1] 12.15 dBm
 705.26553106 MHz
 T2 [T1] 12.06 dBm
 709.79458918 MHz

Center 707.5 MHz 1 MHz/ Span 10 MHz

Date: 16.OCT.2019 17:24:22

Delta 1 [T1] -0.56 dB

Ref Lvl 27 dBm RBW 100 kHz VBW 300 kHz RF Att 30 dB

27 dBm 707.5 MHz 2 MHz/ 712.5 MHz Span 20 MHz

7 dB Offset

D1 14.2 dBm

1MAX

D2 -11.8 dBm

▼1 [T1] -11.62 dBm

▲1 [T1] -0.56 dB

9.81963928 MHz

OPB

▼T1 [T1] 9.10 dBm

▼T2 [T1] 8.94 dBm

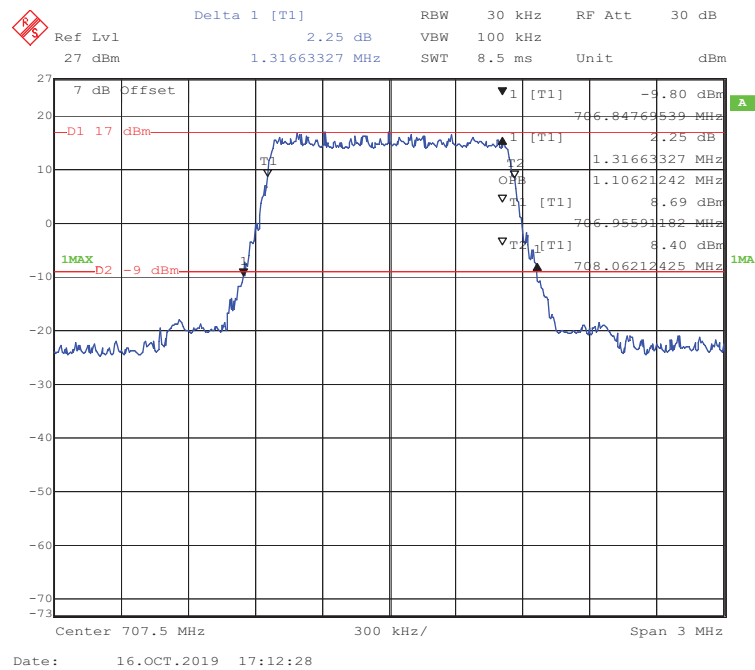
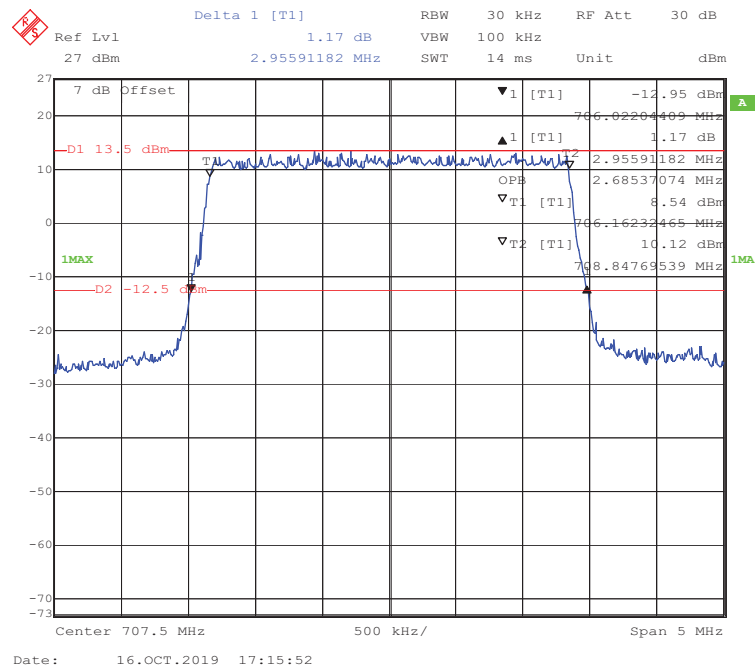
702.63026052 MHz

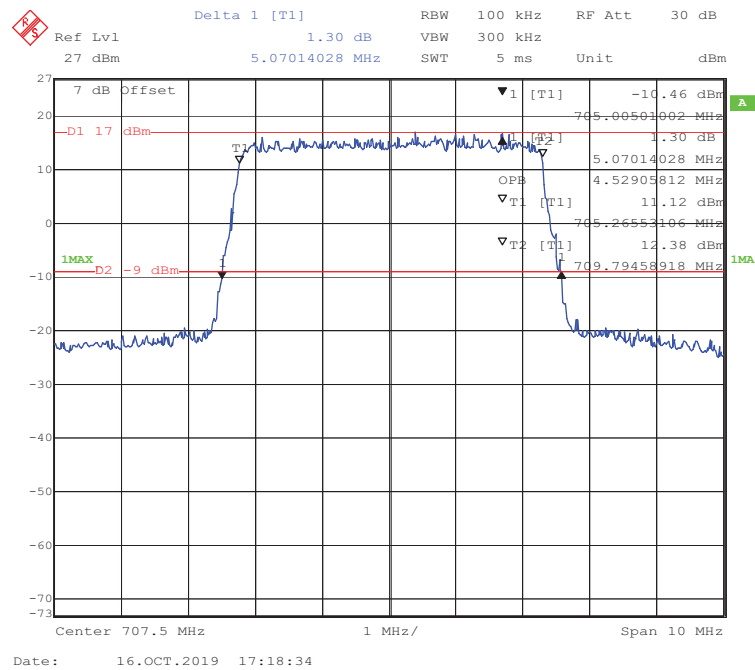
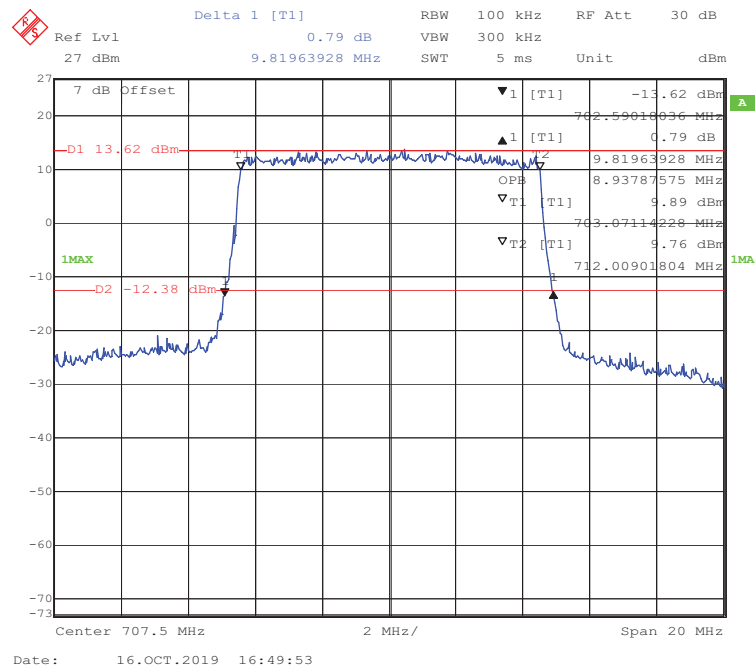
9.01803607 MHz

703.03106212 MHz

712.04909820 MHz

1MA

16-QAM (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**16-QAM (3 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**

16-QAM (5 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**16-QAM (10 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**

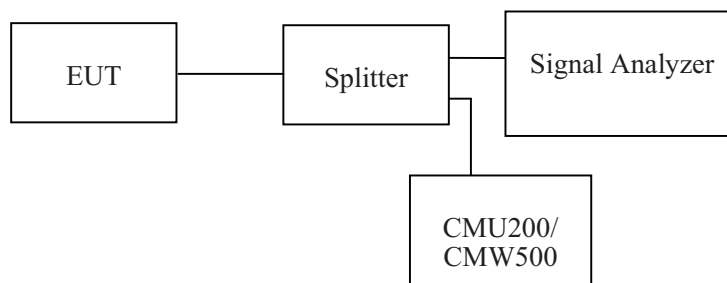
FCC § 2.1051; § 22.917 (a); § 24.238 (a); §27.53(g) (h) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS**Applicable Standards**

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

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

Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz for below 1GHz & 1MHz for above 1GHz. sufficient scans were taken to show any out of band emissions up to 10th harmonic.

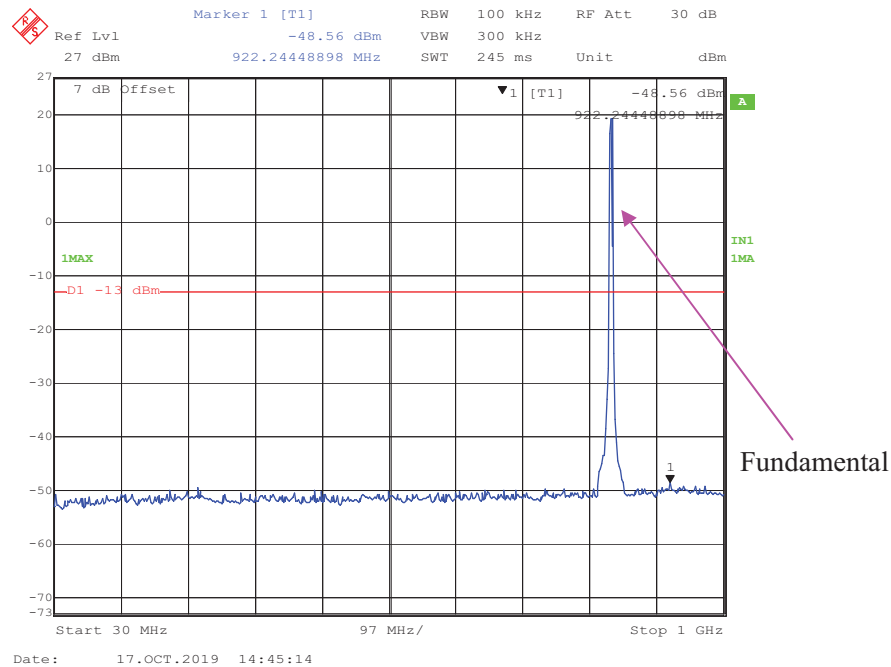
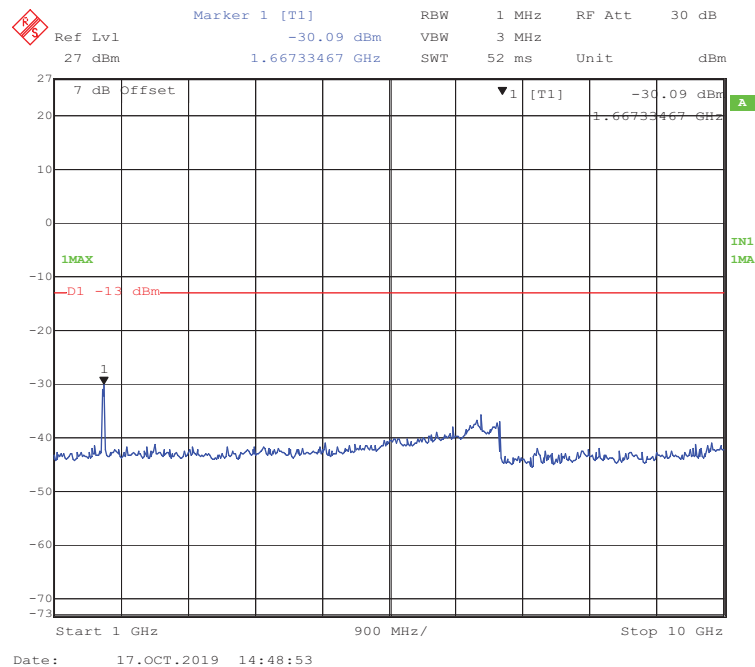
**Test Data****Environmental Conditions**

Temperature:	23.2-23.5 °C
Relative Humidity:	51-53 %
ATM Pressure:	101.1-103. 3kPa

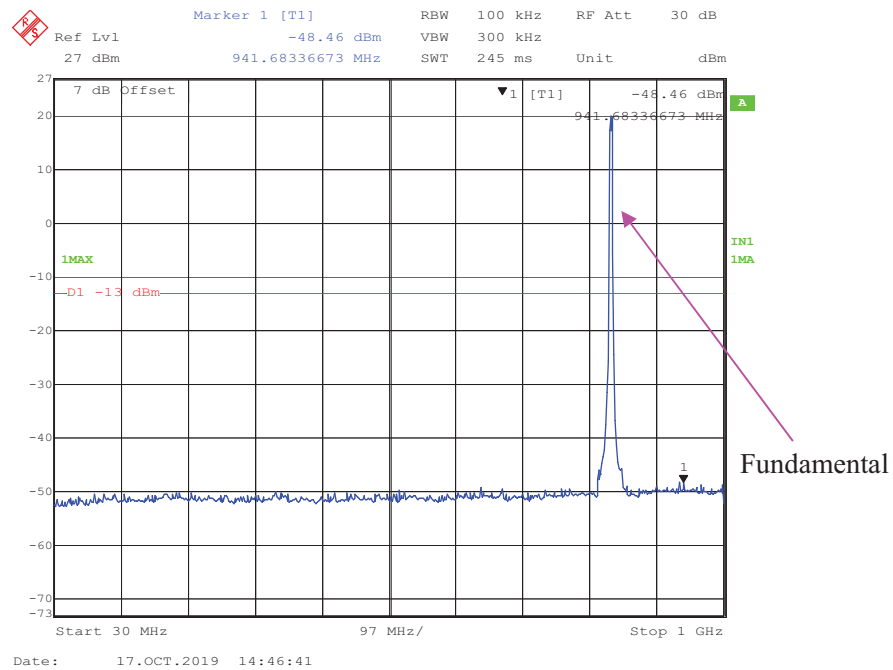
The testing was performed by Winnie Yang from 2019-10-16 to 2019-10-18.

EUT operation mode: Transmitting

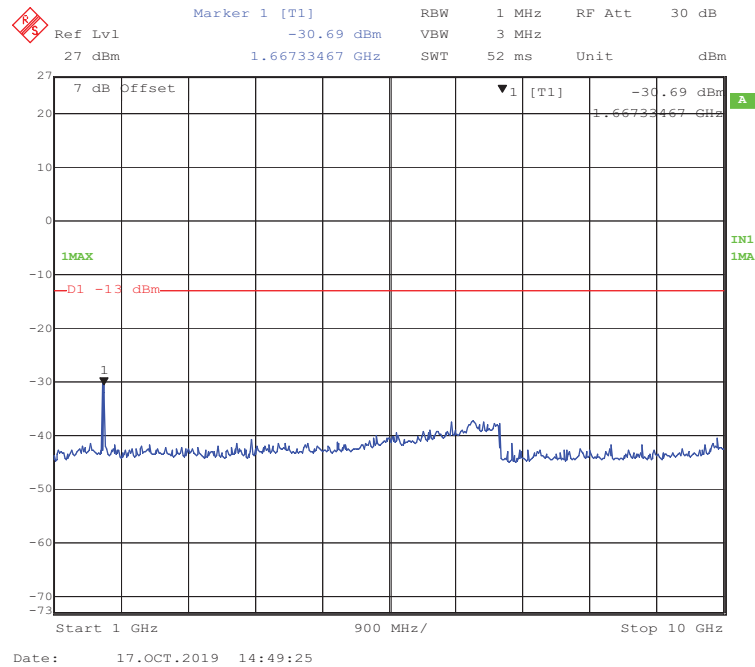
Test Result: Compliant.

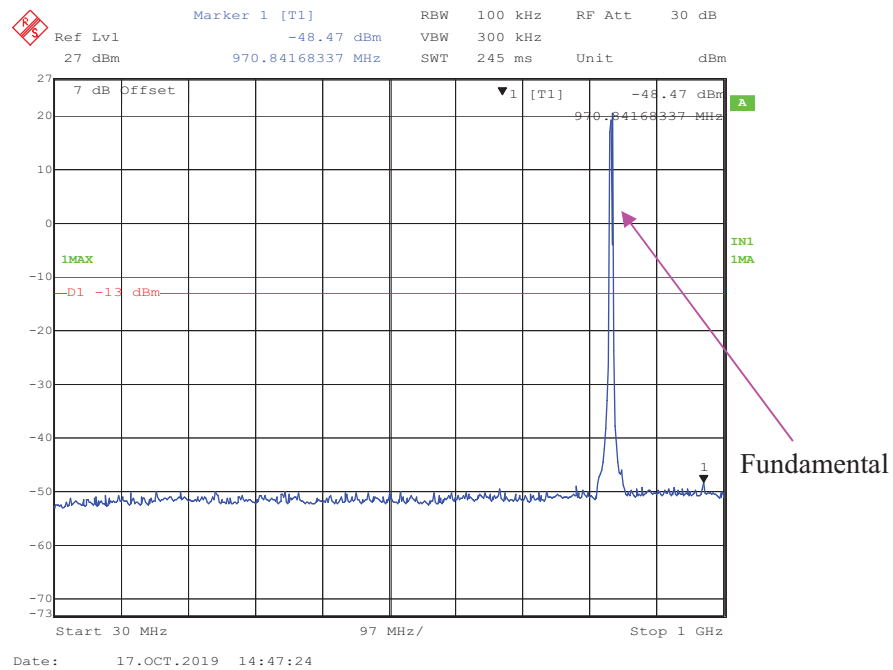
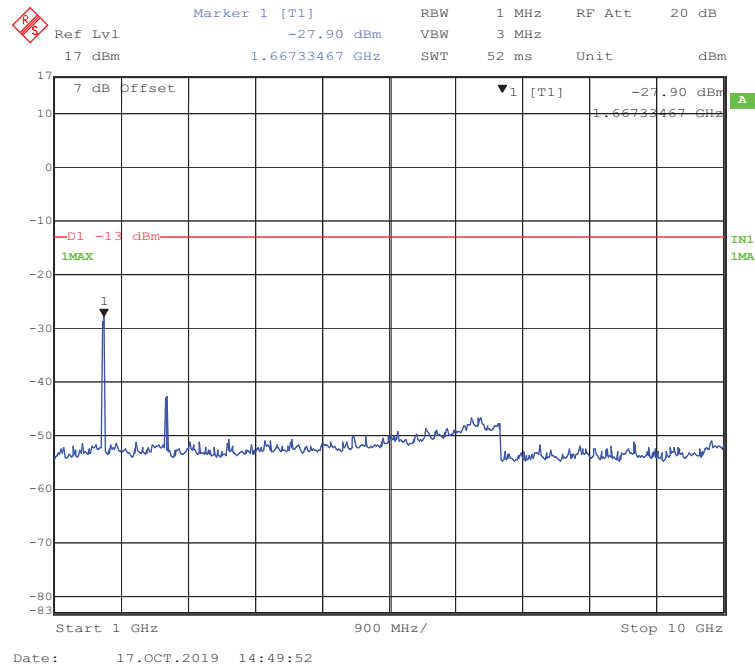
WCDMA Band V:**30 MHz – 1GHz WCDMA (Rel 99) Mode, Middle channel****1 GHz – 10 GHz WCDMA (Rel 99) Mode, Middle channel**

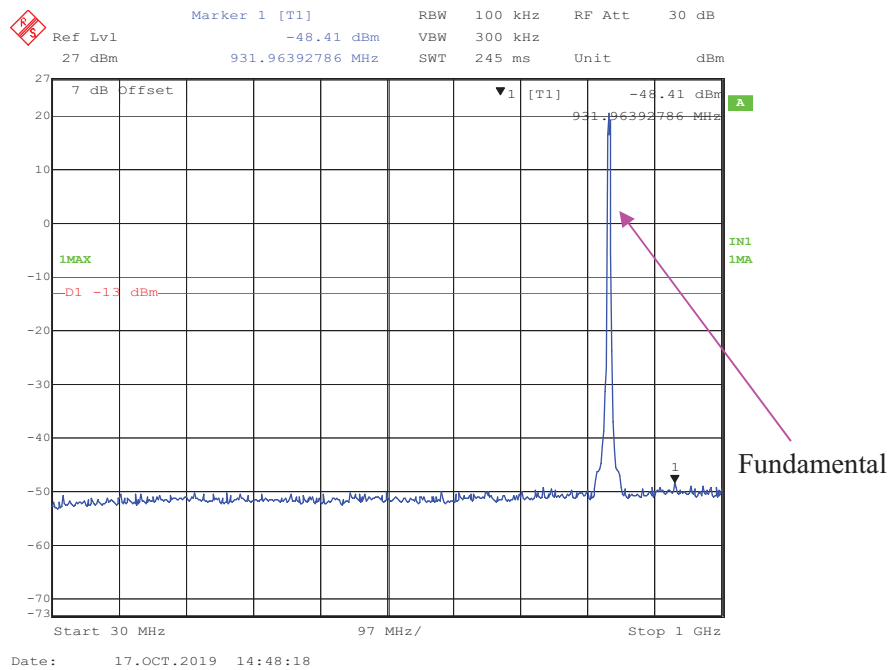
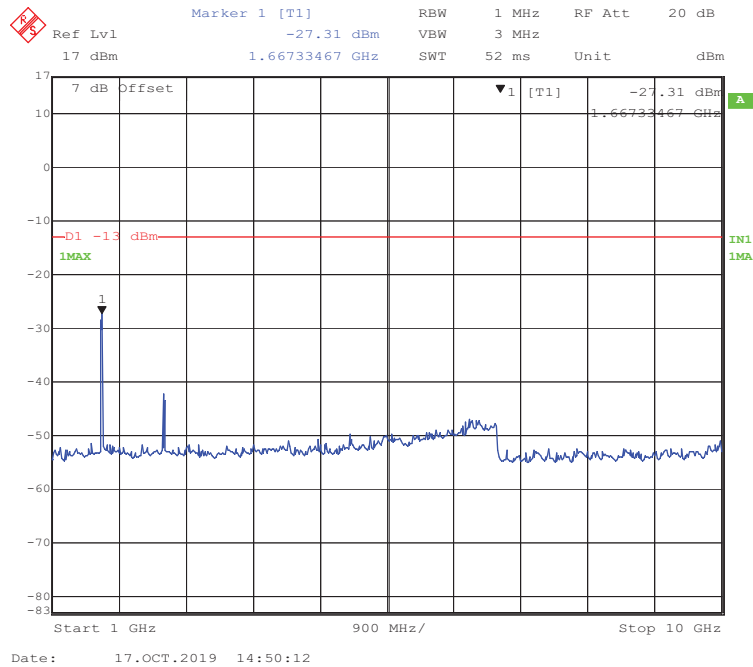
30 MHz – 1GHz WCDMA (HSDPA) Mode, Middle channel



1 GHz – 10 GHz WCDMA (HSDPA) Mode, Middle channel

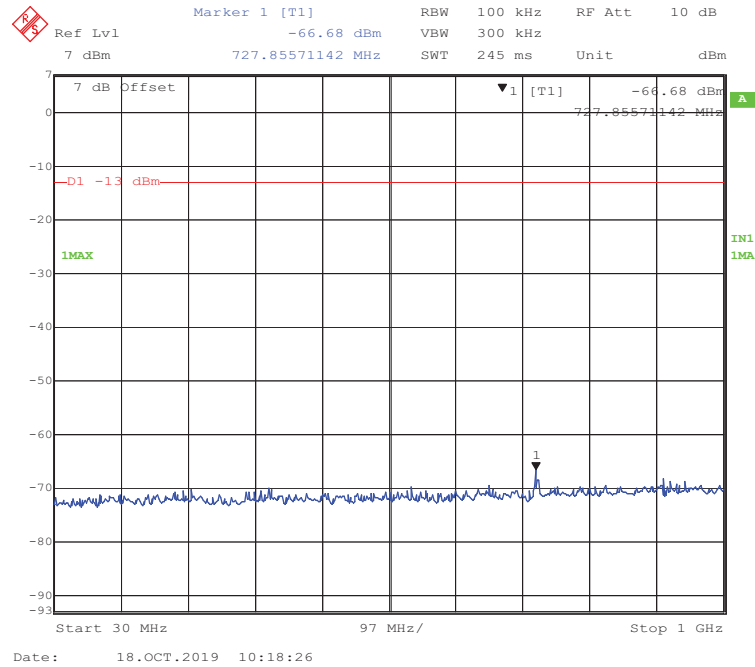


30 MHz – 1GHz WCDMA (HSUPA) Mode, Middle channel**1 GHz – 10 GHz WCDMA (HSUPA) Mode, Middle channel**

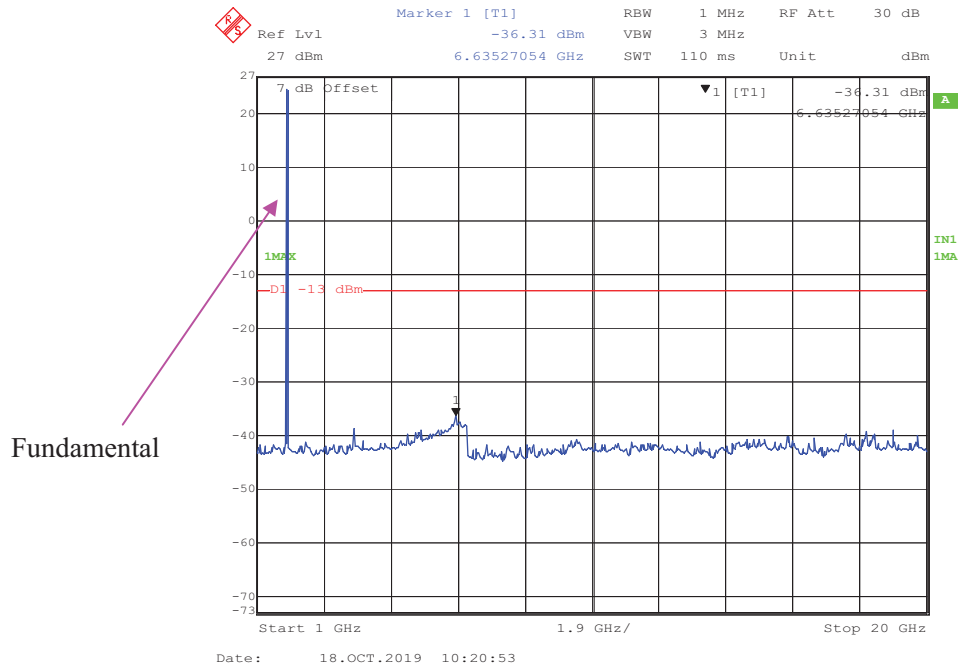
30 MHz – 1GHz WCDMA (HSPA+) Mode, Middle channel**1 GHz – 10 GHz WCDMA (HSPA+) Mode, Middle channel**

WCDMA Band II:

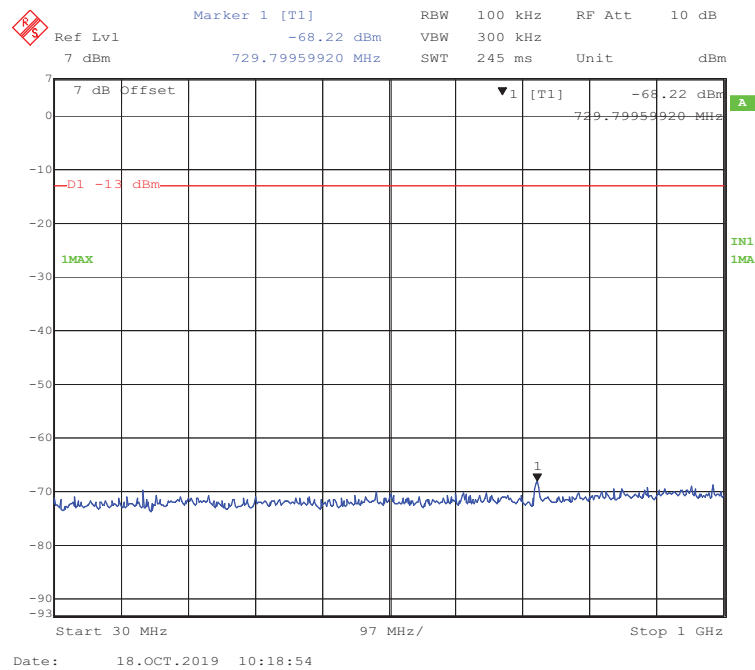
30 MHz – 1GHz WCDMA (Rel 99) Mode, Middle channel



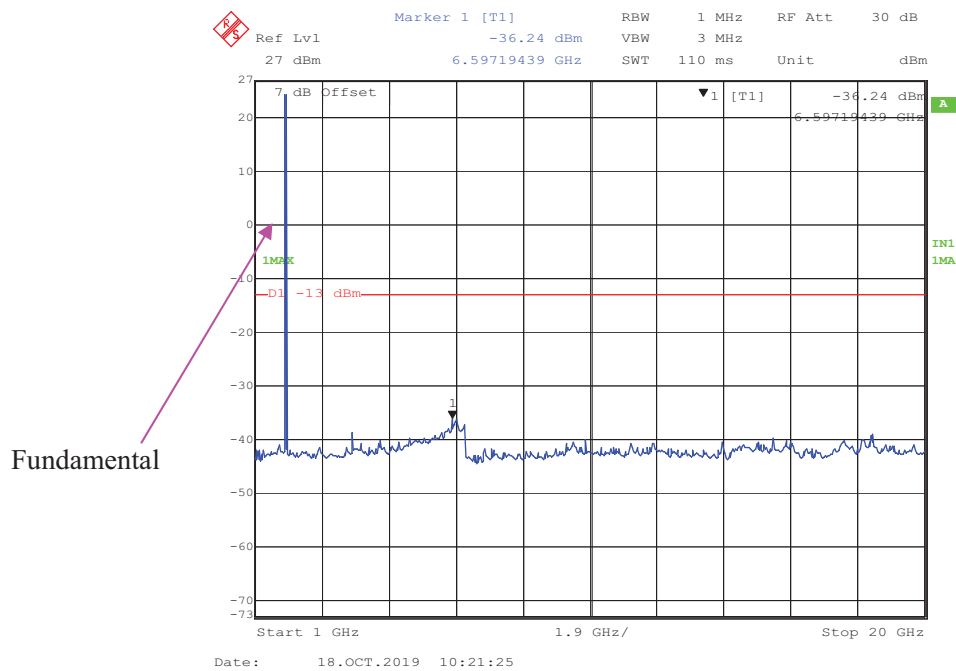
1 GHz – 20 GHz WCDMA (Rel 99) Mode, Middle channel

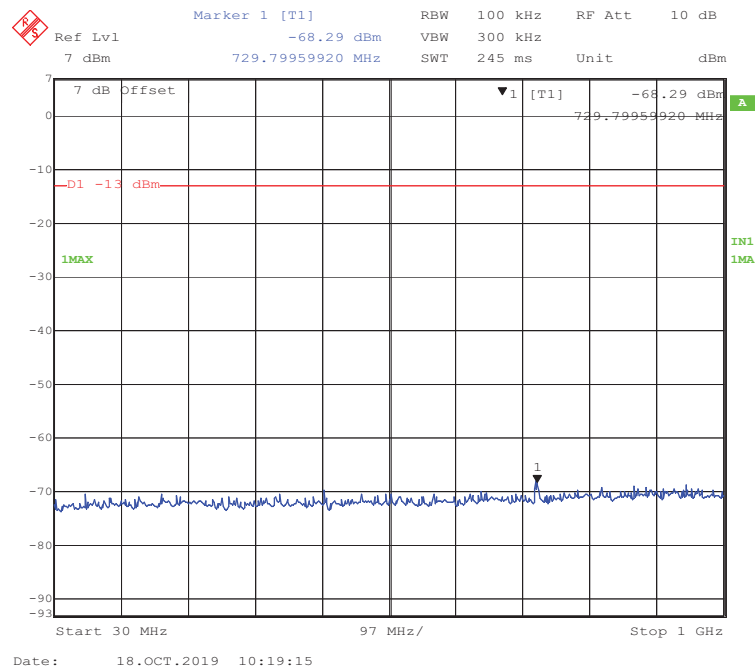
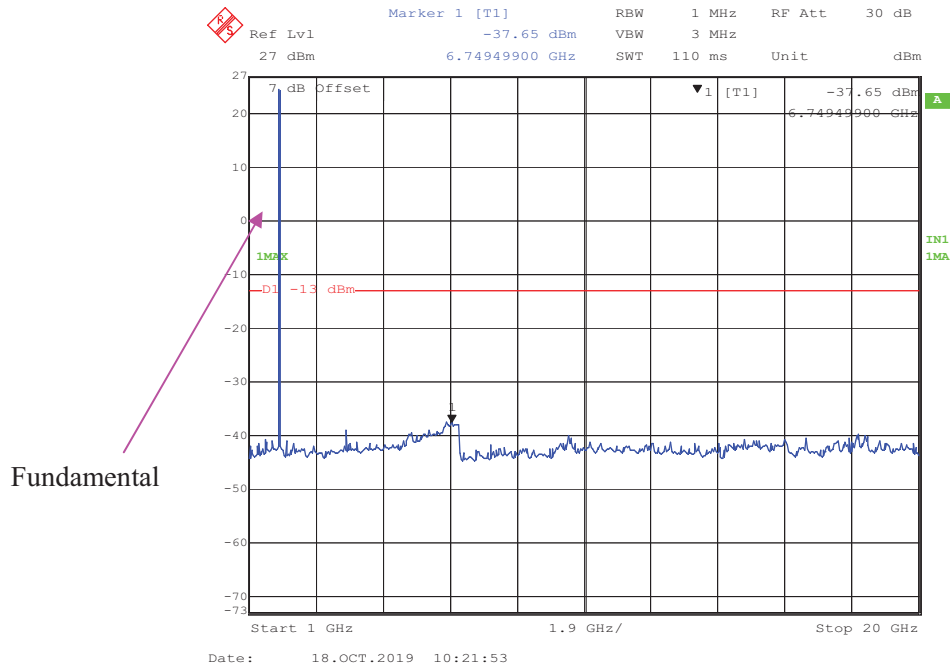


30 MHz – 1GHz WCDMA (HSDPA) Mode, Middle channel

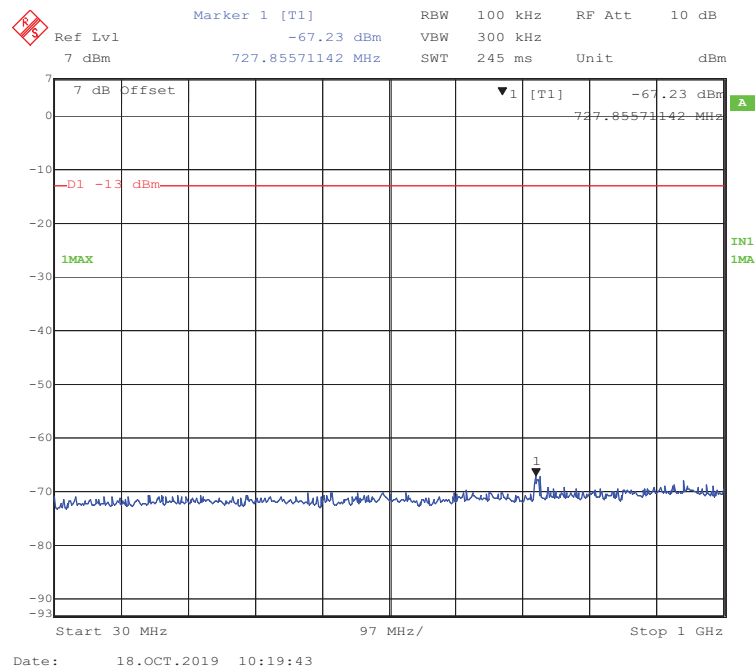


1 GHz – 20 GHz WCDMA (HSDPA) Mode, Middle channel

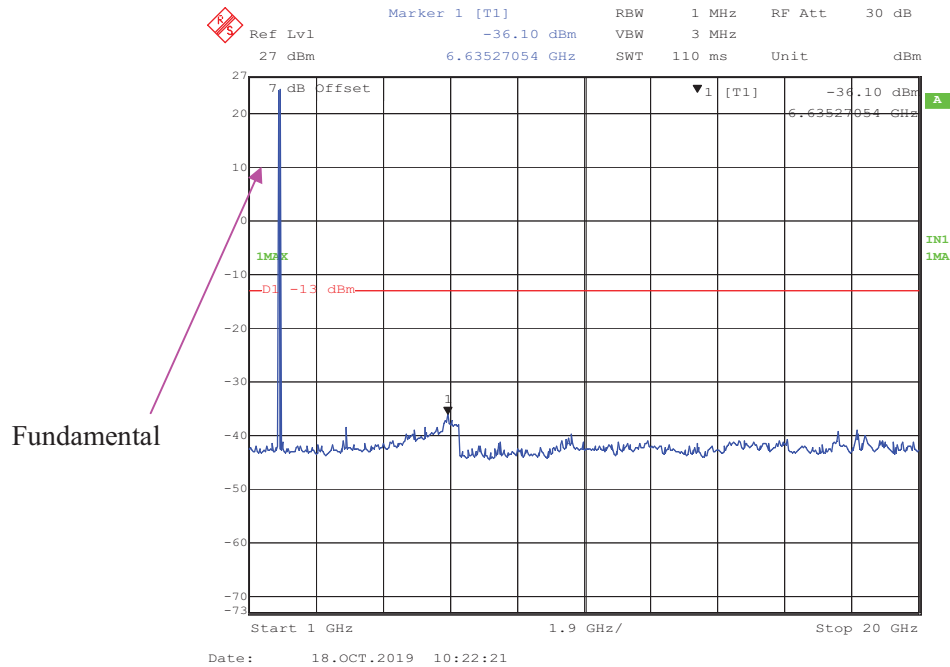


30 MHz – 1GHz WCDMA (HSUPA) Mode, Middle channel**1 GHz – 20 GHz WCDMA (HSUPA) Mode, Middle channel**

30 MHz – 1GHz WCDMA (HSPA+) Mode, Middle channel

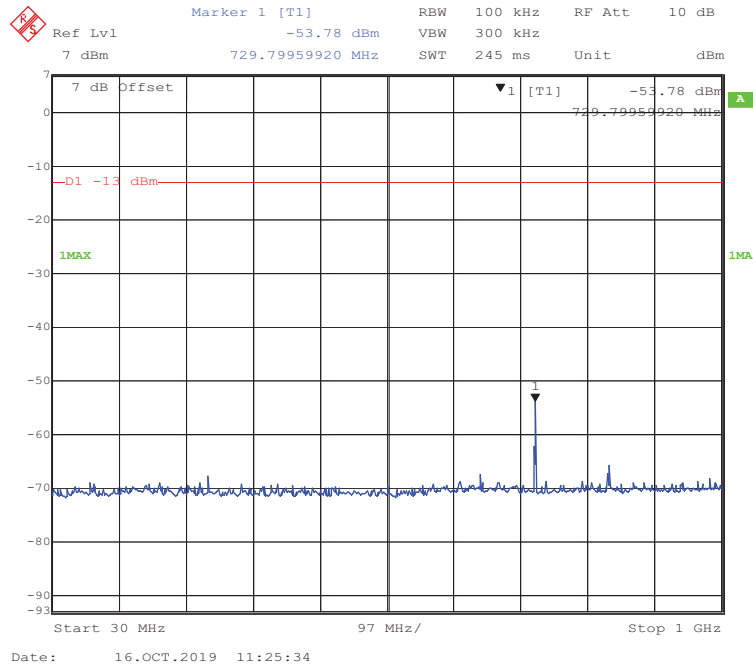


1 GHz – 20 GHz WCDMA (HSPA+) Mode, Middle channel

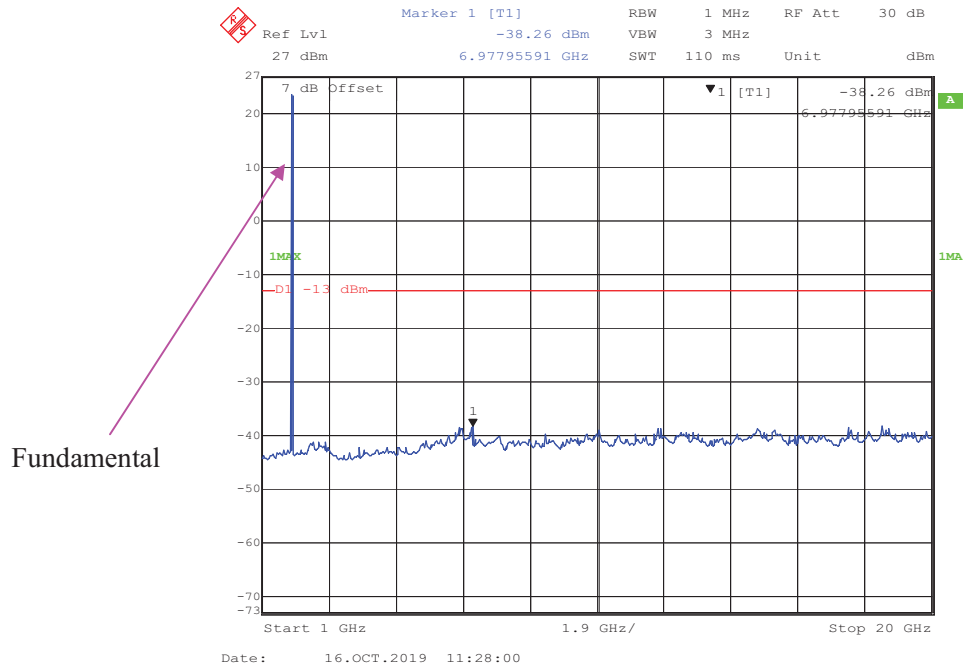


LTE Band 2:

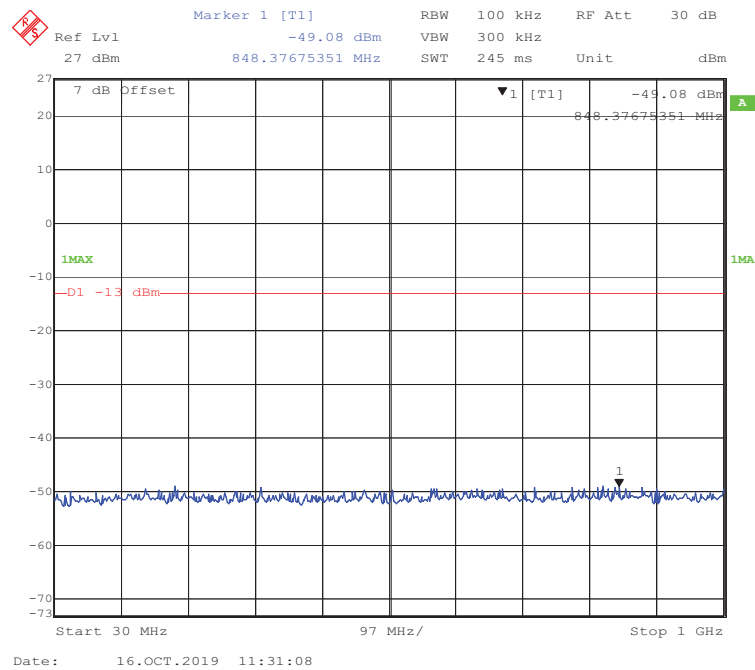
30 MHz - 1 GHz (1.4 MHz, QPSK, Middle Channel)



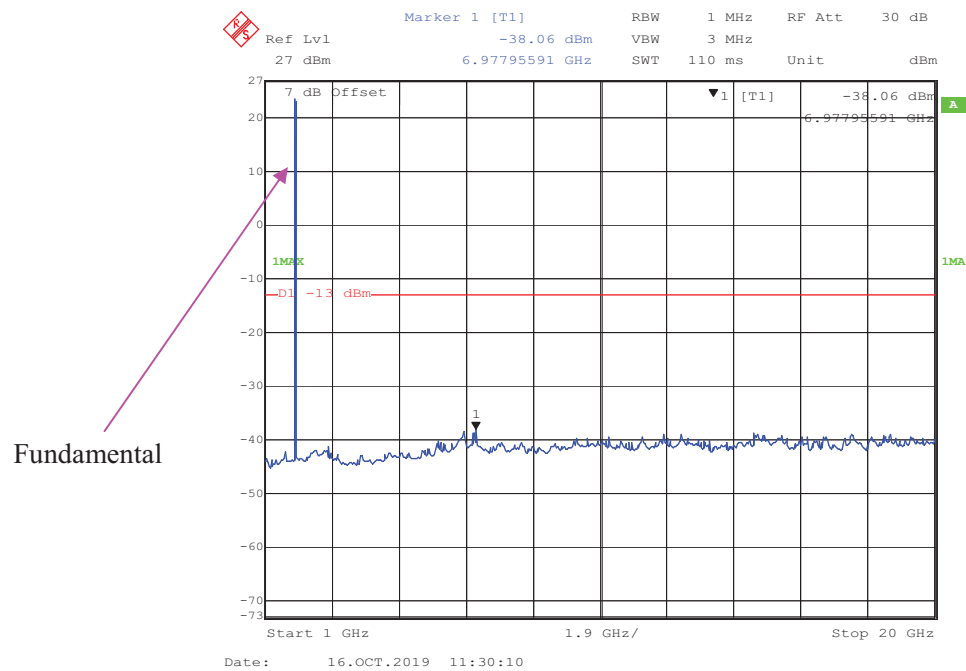
1 GHz – 20 GHz (1.4 MHz, QPSK, Middle Channel)



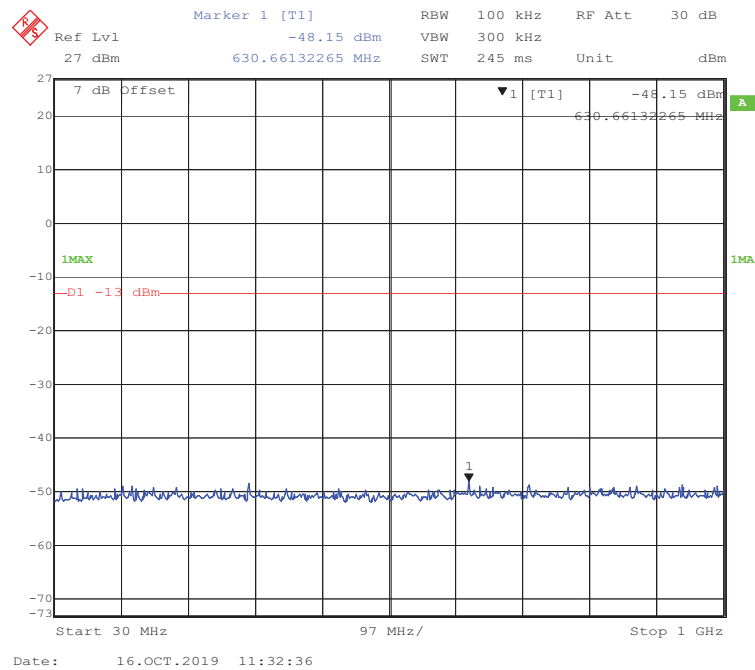
30 MHz - 1 GHz (1.4 MHz, 16-QAM, Middle Channel)



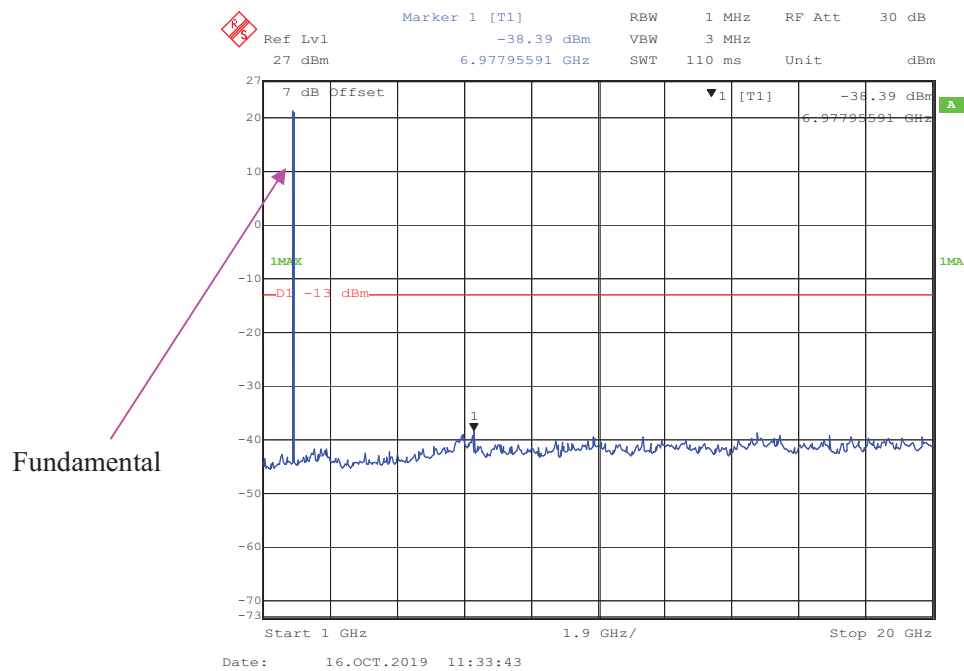
1 GHz – 20 GHz (1.4 MHz, 16-QAM, Middle Channel)



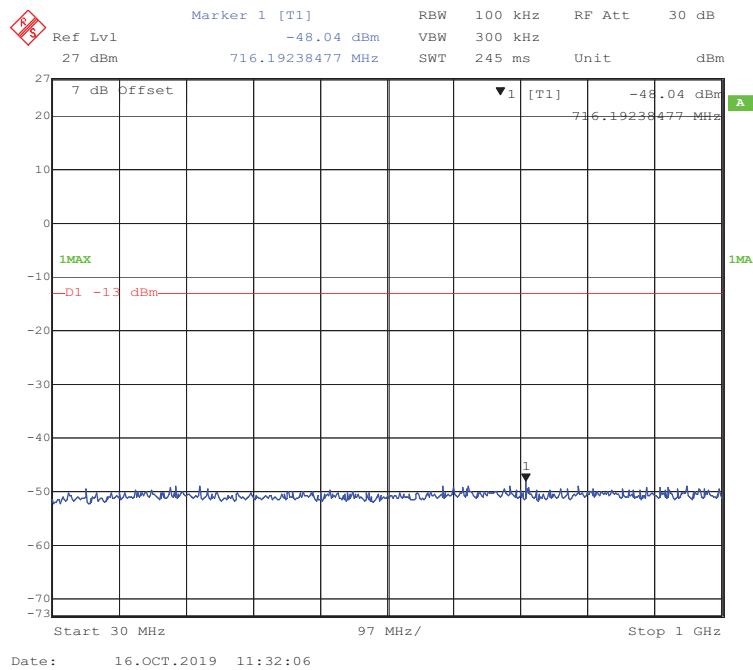
30 MHz - 1 GHz (3 MHz, QPSK, Middle Channel)



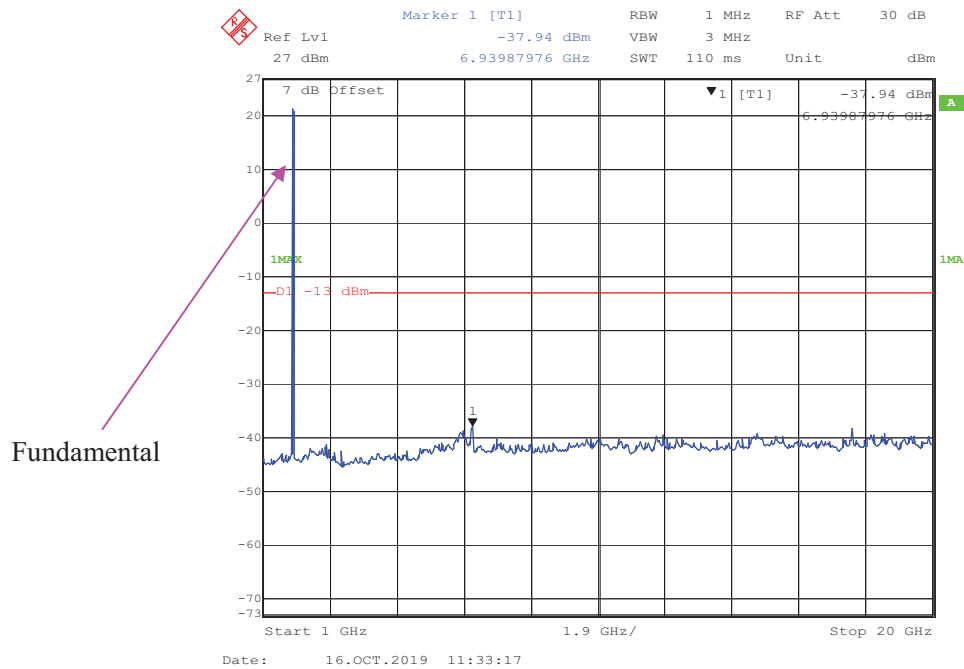
1 GHz – 20 GHz (3 MHz, QPSK, Middle Channel)



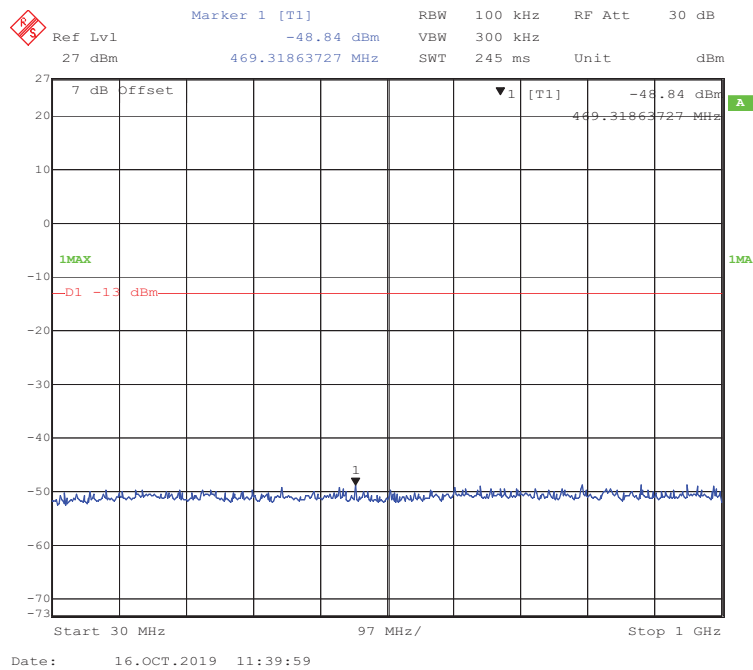
30 MHz - 1 GHz (3 MHz, 16-QAM, Middle Channel)



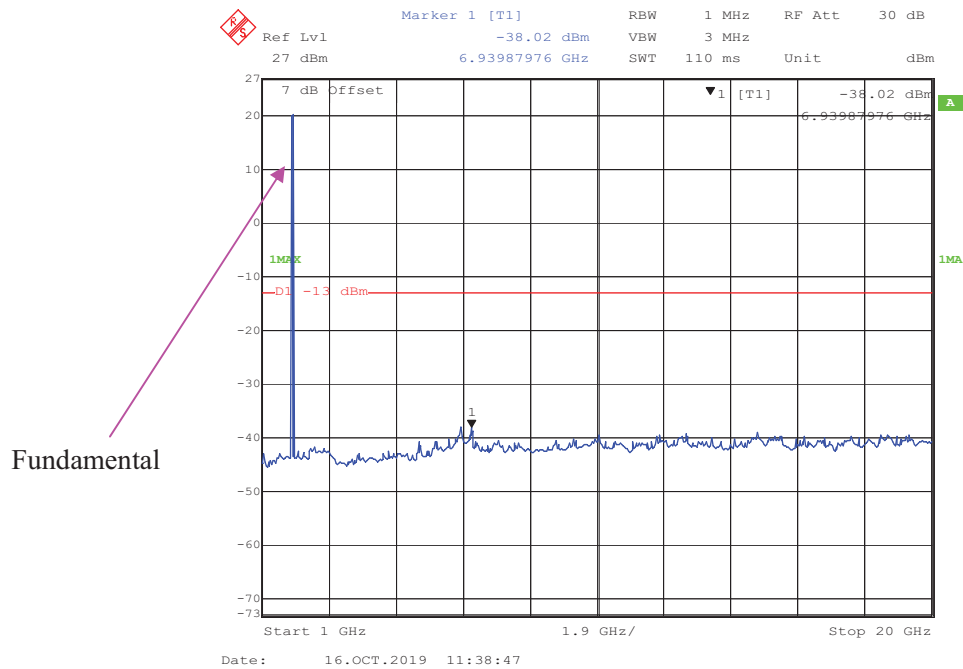
1 GHz – 20 GHz (3 MHz, 16-QAM, Middle Channel)



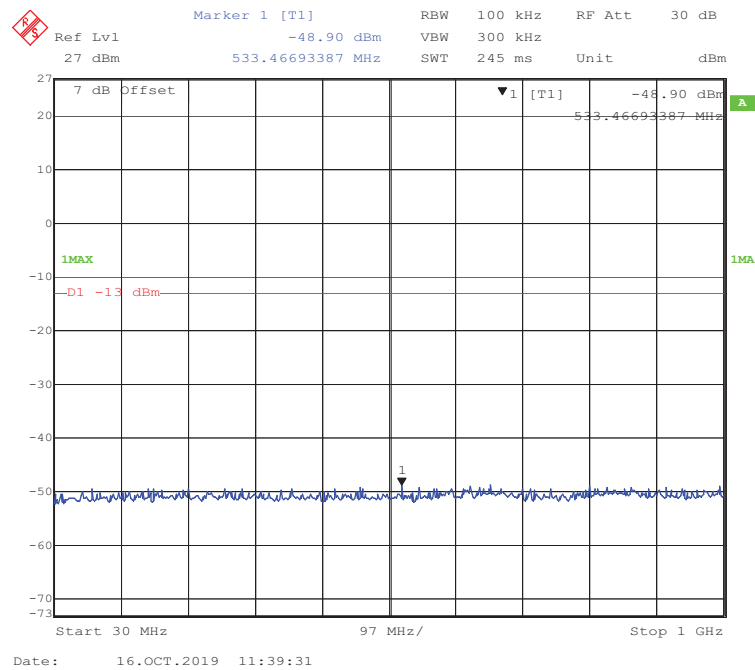
30 MHz - 1 GHz (5 MHz, QPSK, Middle Channel)



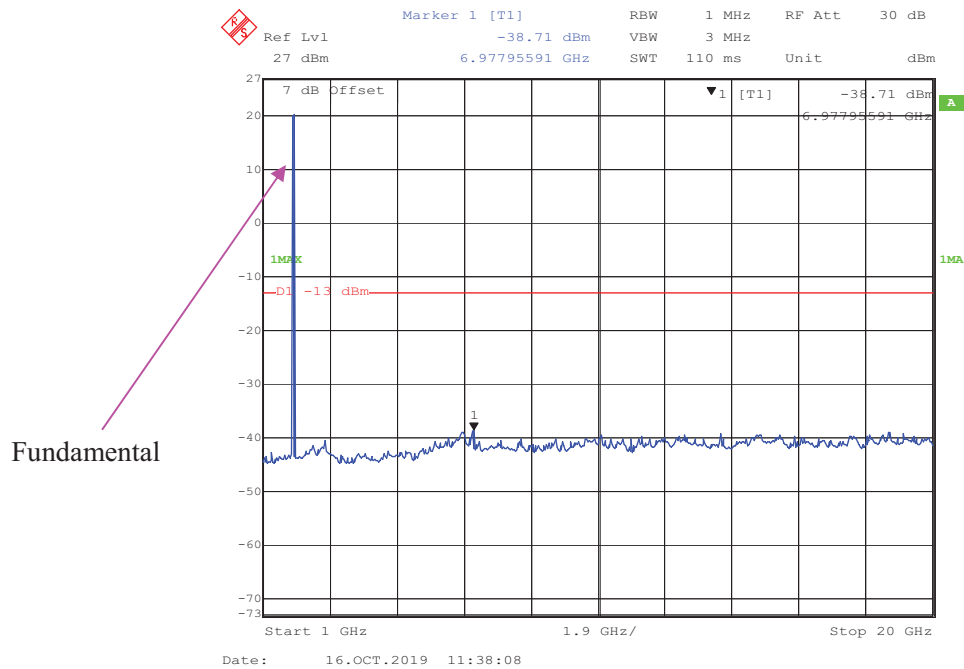
1 GHz – 20 GHz (5 MHz, QPSK, Middle Channel)



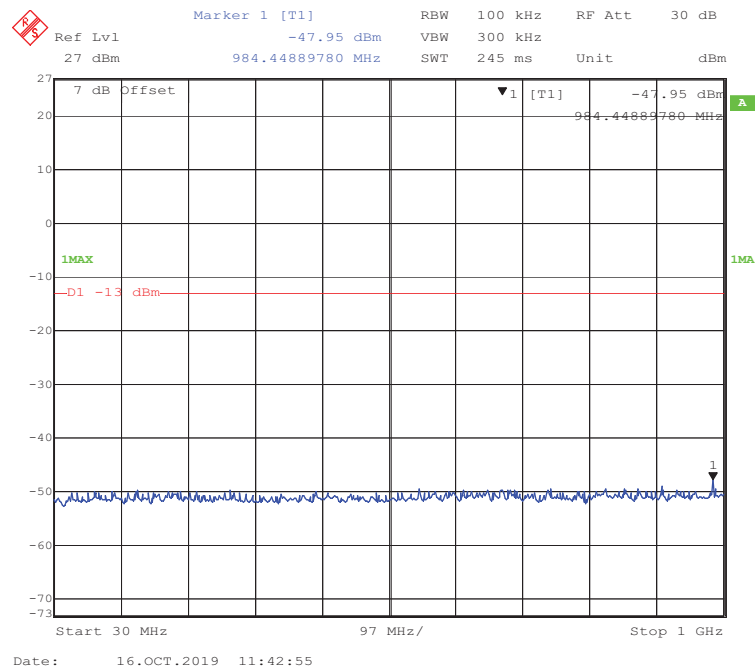
30 MHz - 1 GHz (5 MHz, 16-QAM, Middle Channel)



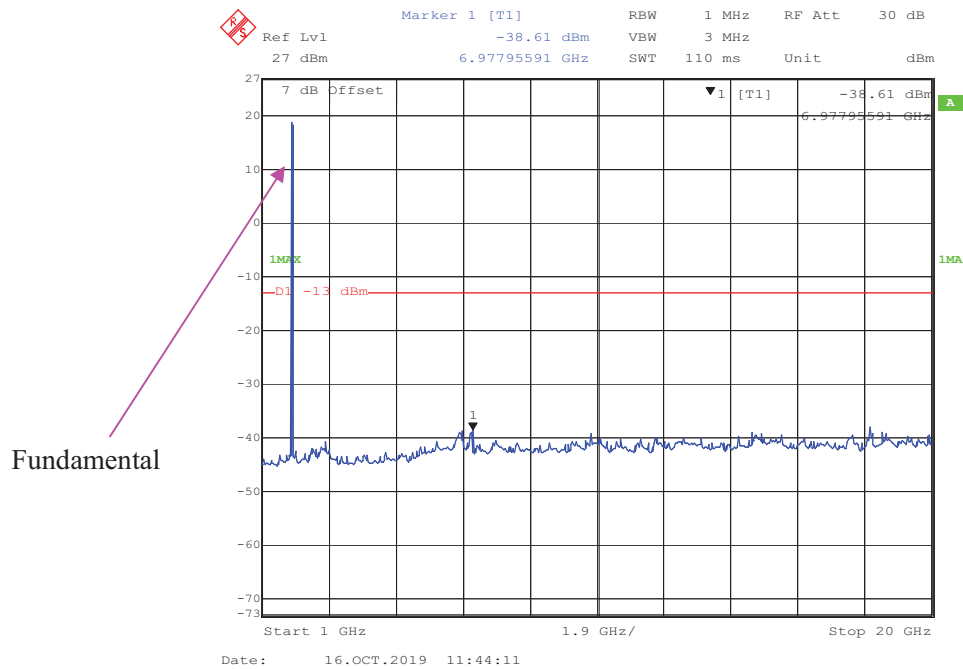
1 GHz – 20 GHz (5 MHz, 16-QAM, Middle Channel)



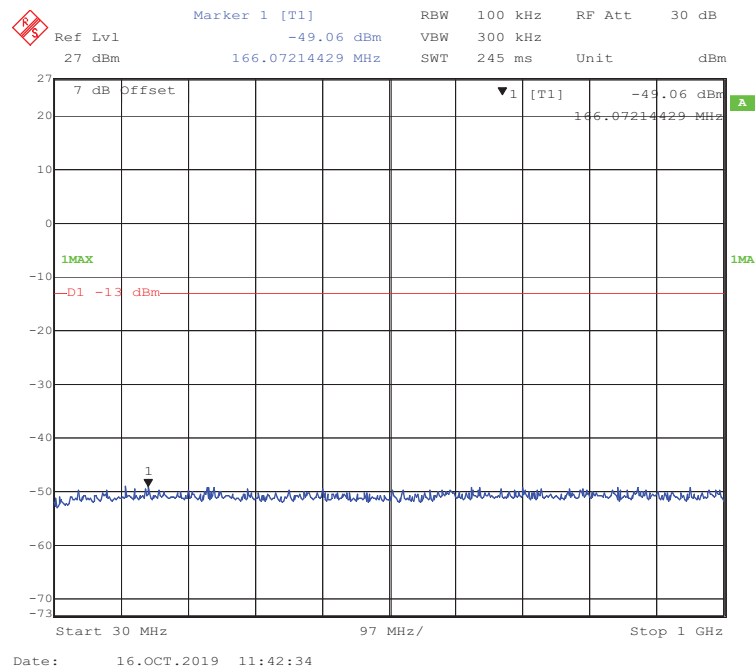
30 MHz - 1 GHz (10 MHz, QPSK, Middle Channel)



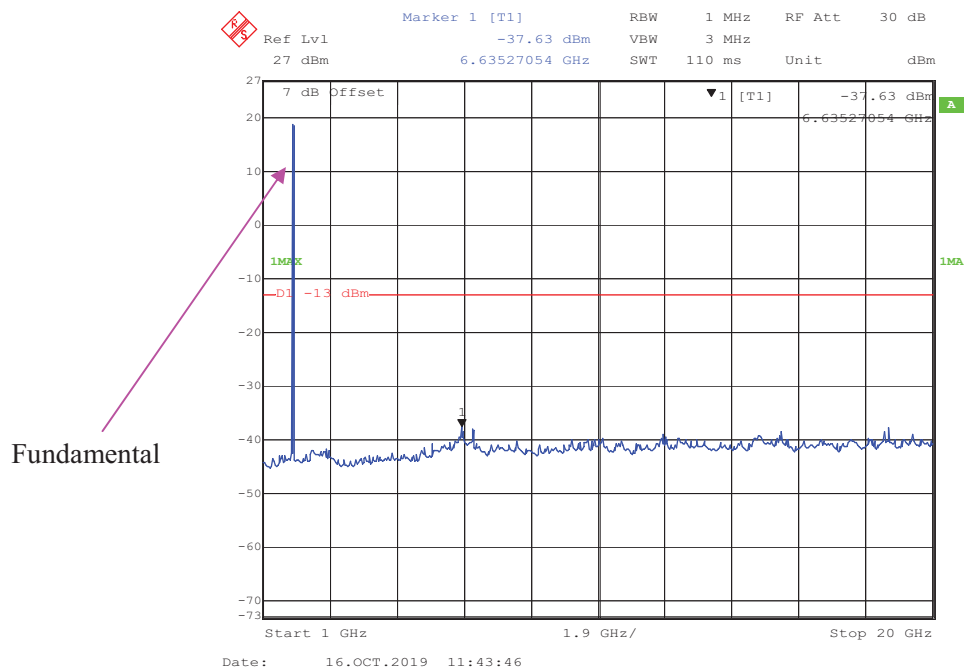
1 GHz – 20 GHz (10 MHz, QPSK, Middle Channel)



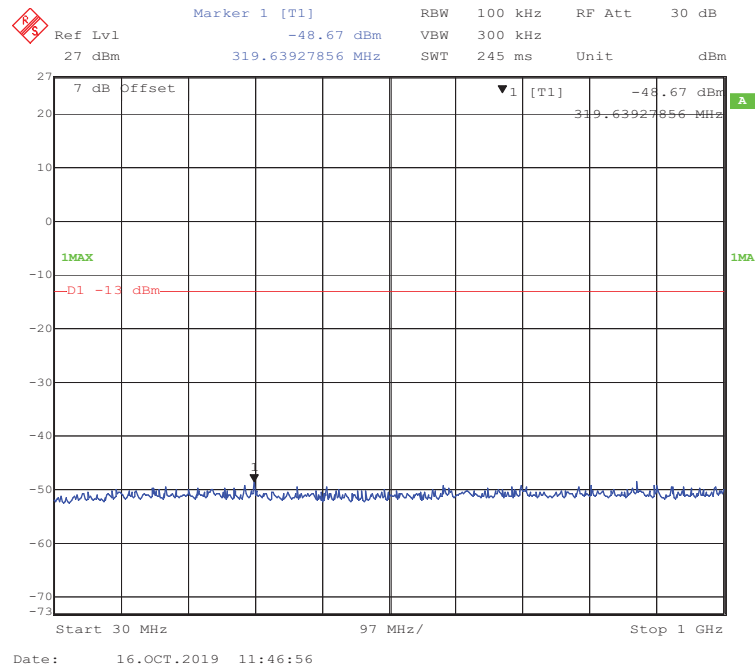
30 MHz - 1 GHz (10 MHz, 16-QAM, Middle Channel)



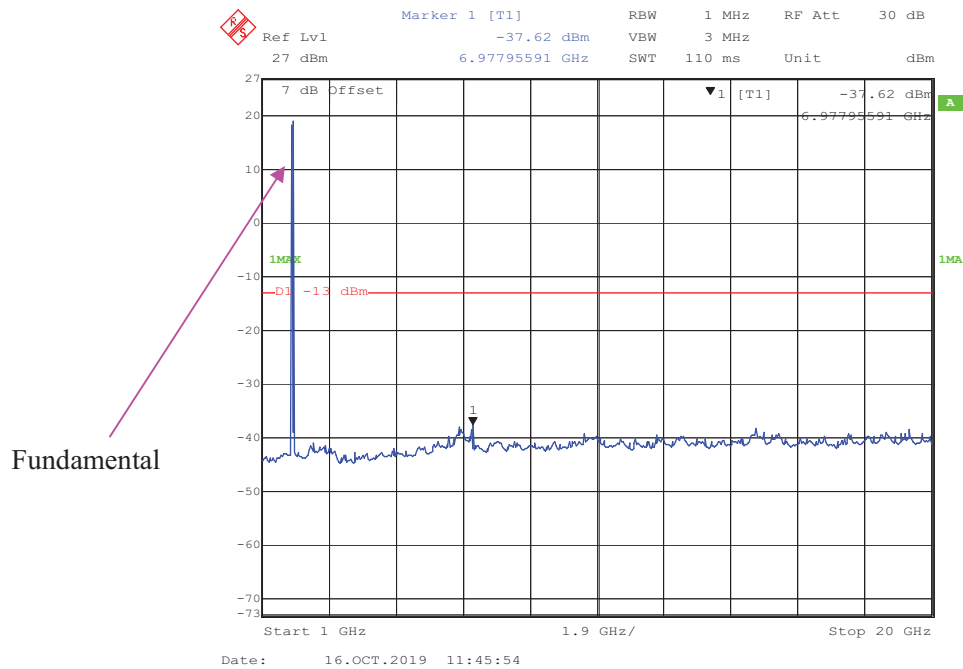
1 GHz – 20 GHz (10 MHz, 16-QAM, Middle Channel)



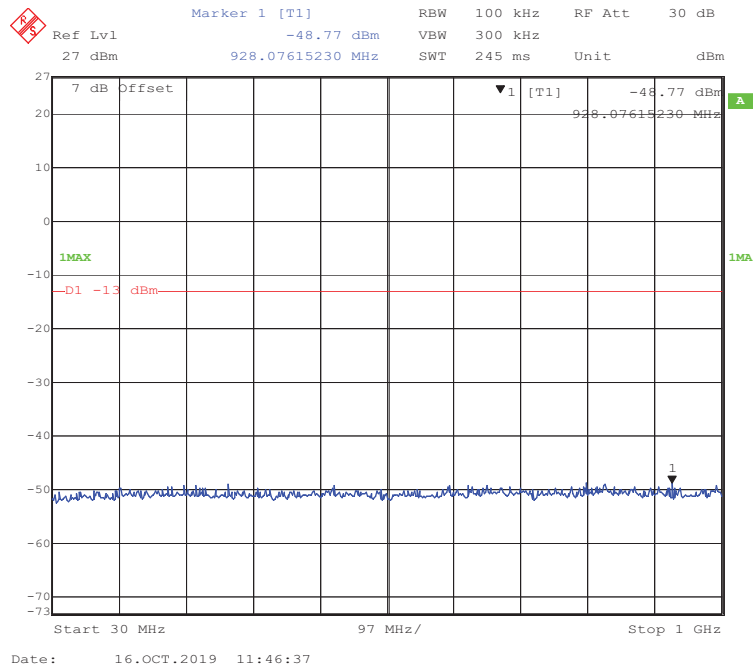
30 MHz - 1 GHz (15 MHz, QPSK, Middle Channel)



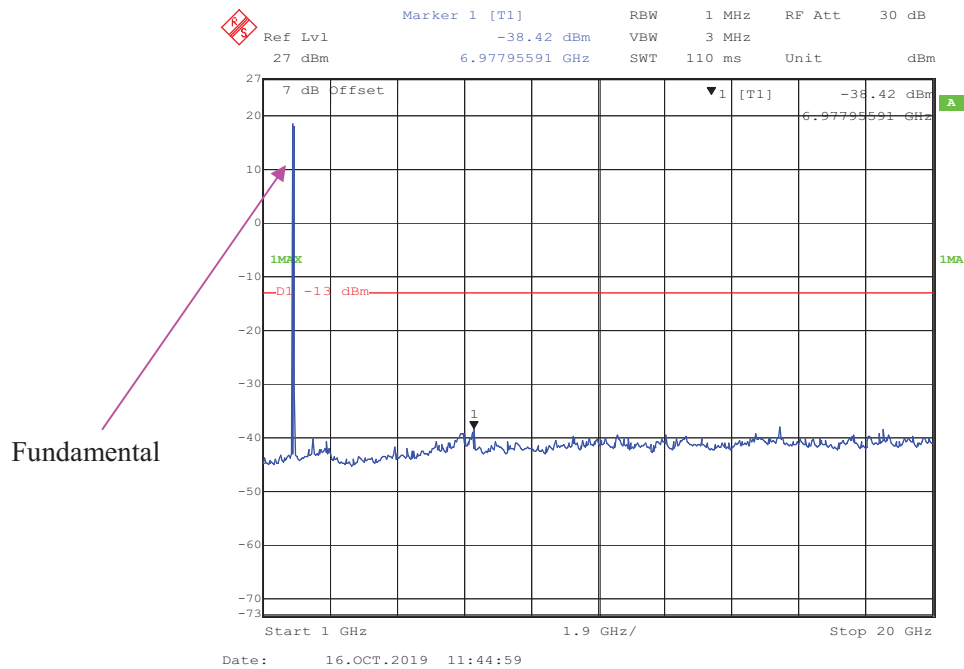
1 GHz – 20 GHz (15 MHz, QPSK, Middle Channel)



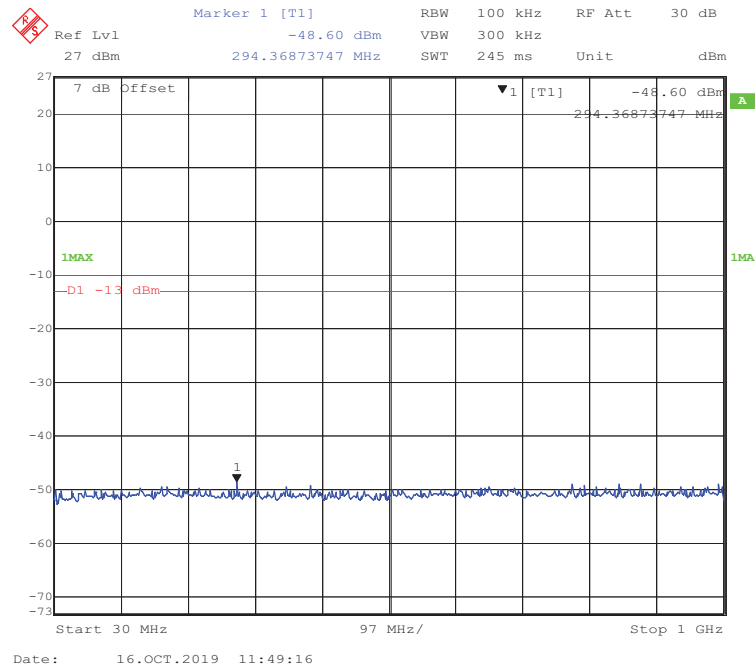
30 MHz - 1 GHz (15 MHz, 16-QAM, Middle Channel)



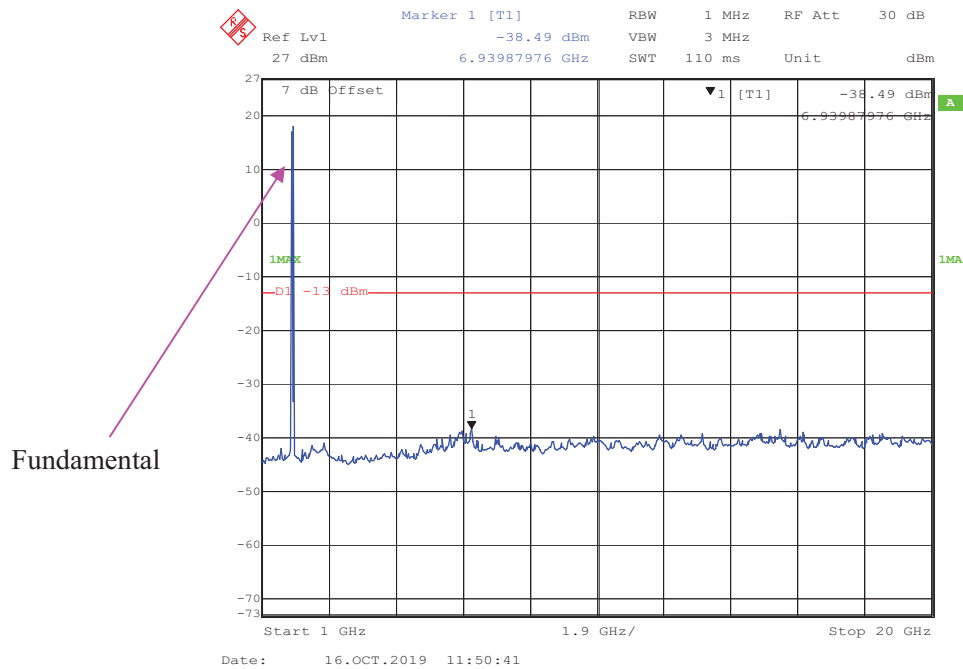
1 GHz – 20 GHz (15 MHz, 16-QAM, Middle Channel)



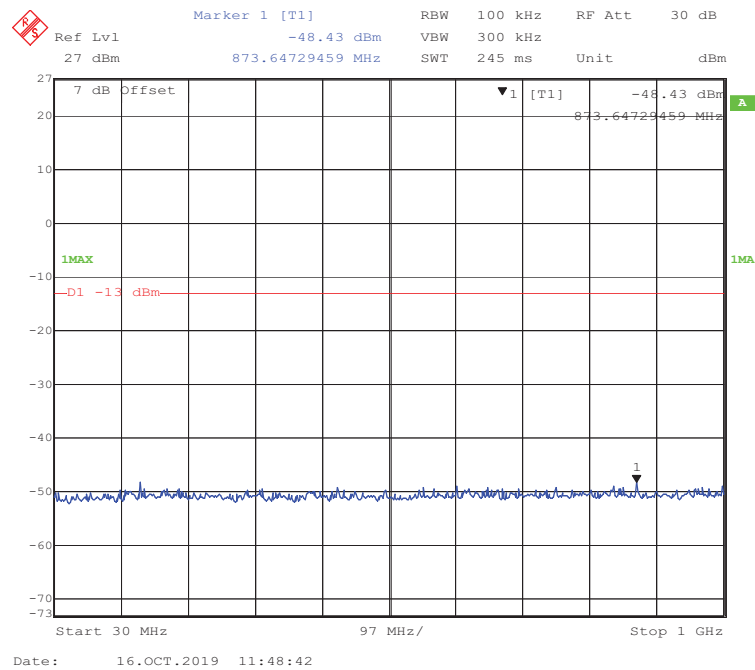
30 MHz - 1 GHz (20 MHz, QPSK, Middle Channel)



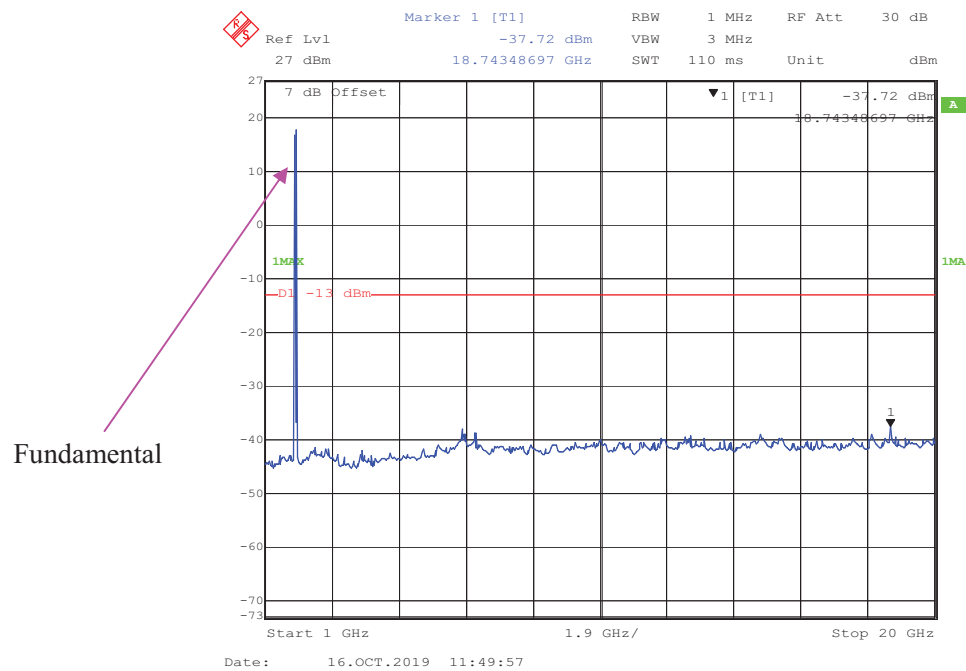
1 GHz – 20 GHz (20 MHz, QPSK, Middle Channel)



30 MHz - 1 GHz (20 MHz, 16-QAM, Middle Channel)

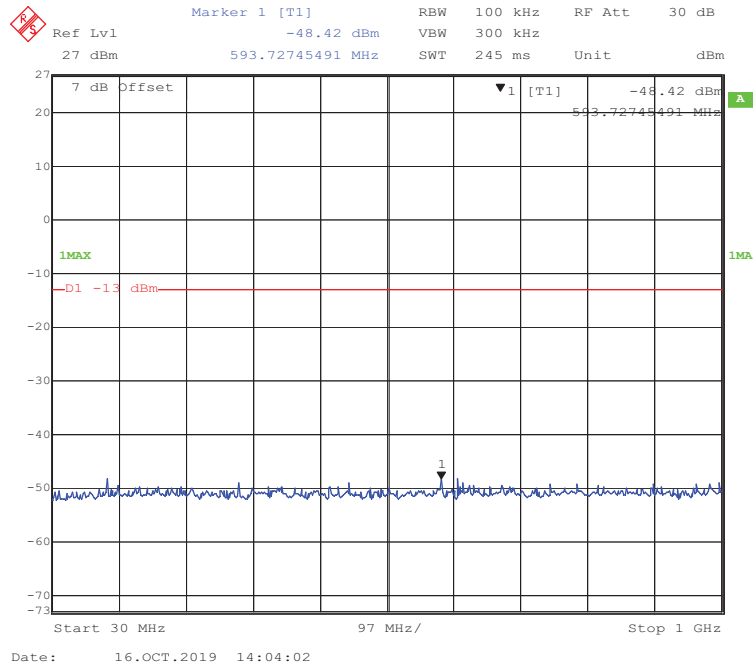


1 GHz – 20 GHz (20 MHz, 16-QAM, Middle Channel)

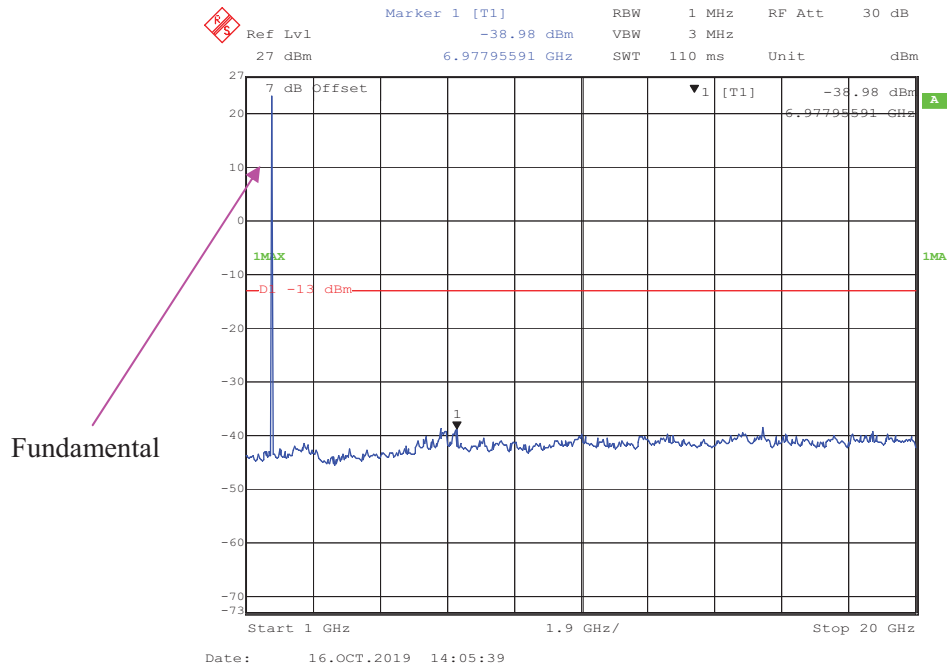


LTE Band 4:

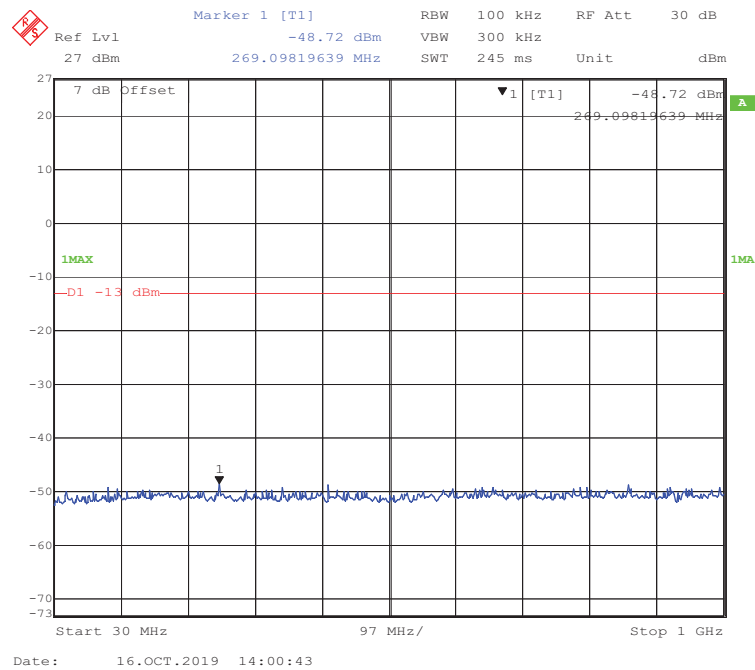
30 MHz - 1 GHz (1.4 MHz, QPSK, Middle Channel)



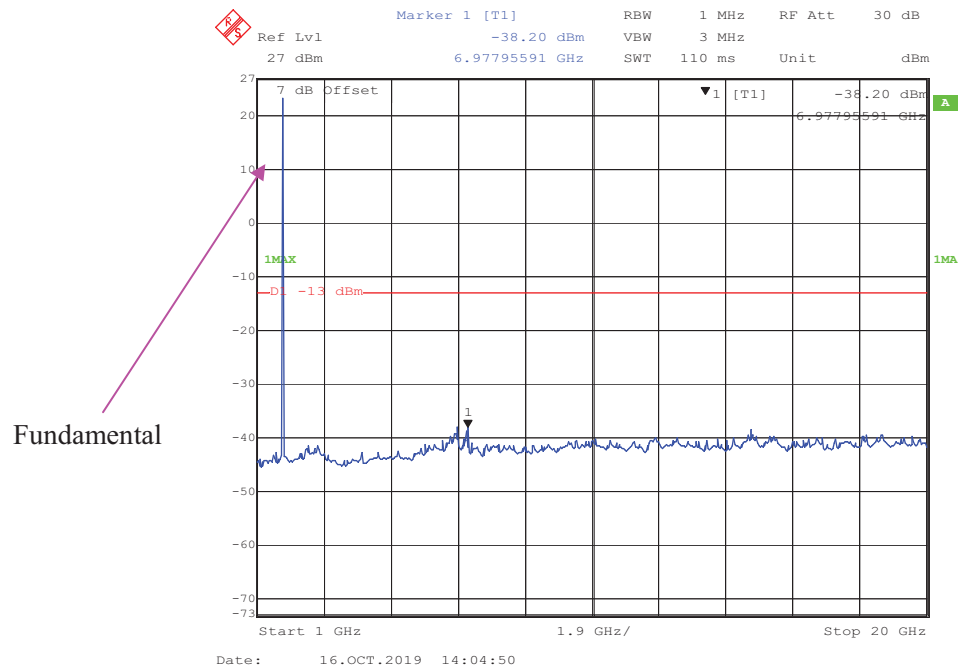
1 GHz – 20 GHz (1.4 MHz, QPSK, Middle Channel)



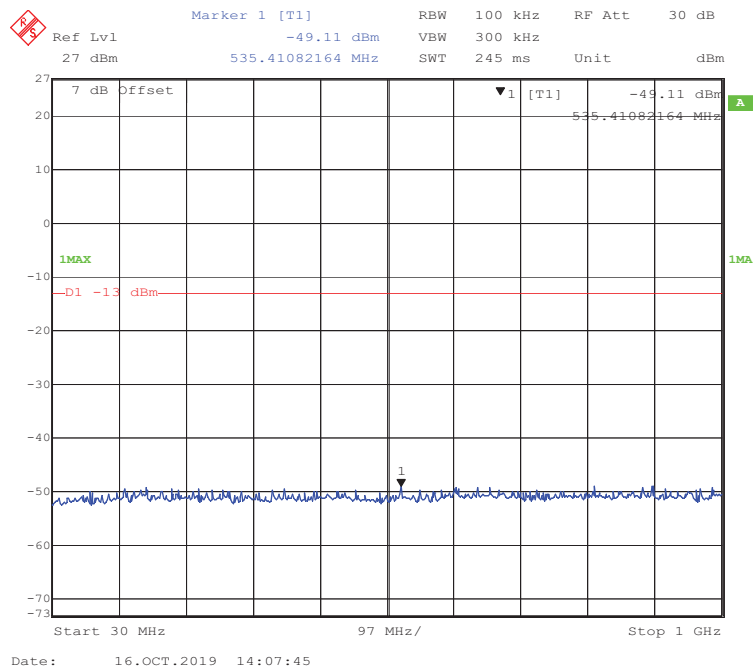
30 MHz - 1 GHz (1.4 MHz, 16-QAM, Middle Channel)



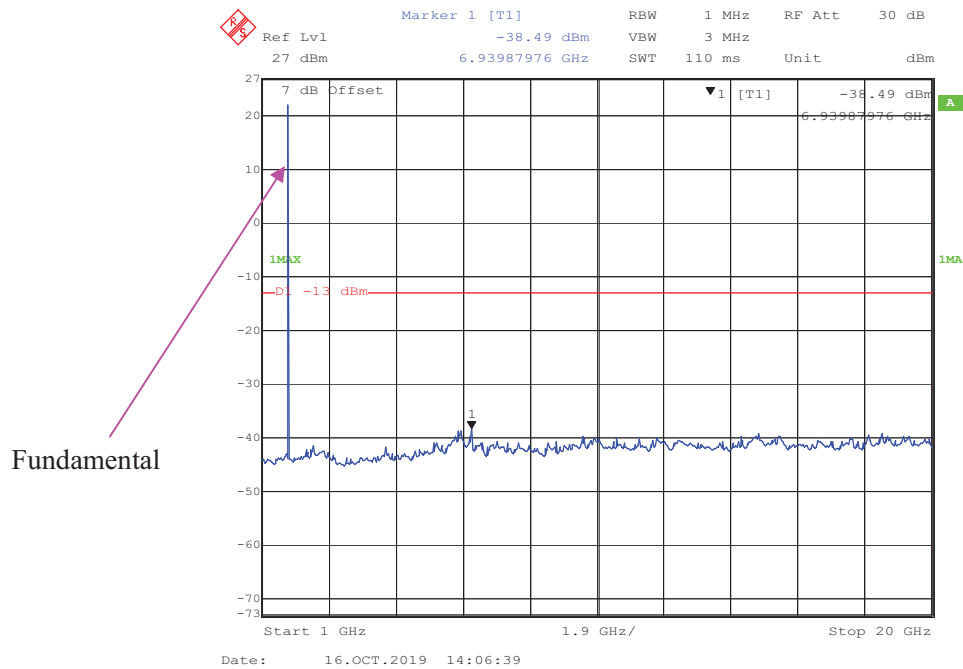
1 GHz – 20 GHz (1.4 MHz, 16-QAM, Middle Channel)



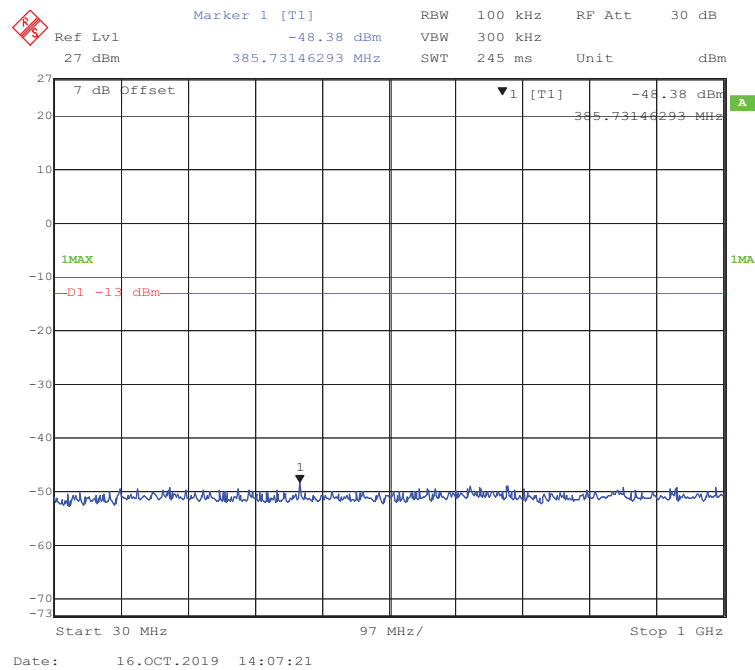
30 MHz - 1 GHz (3 MHz, QPSK, Middle Channel)



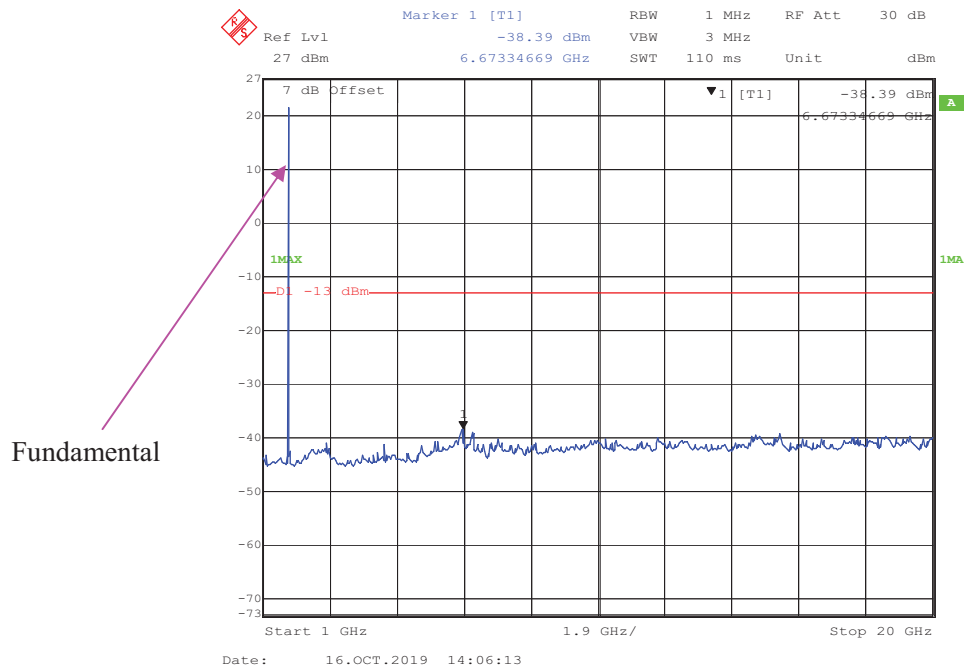
1 GHz – 20 GHz (3 MHz, QPSK, Middle Channel)



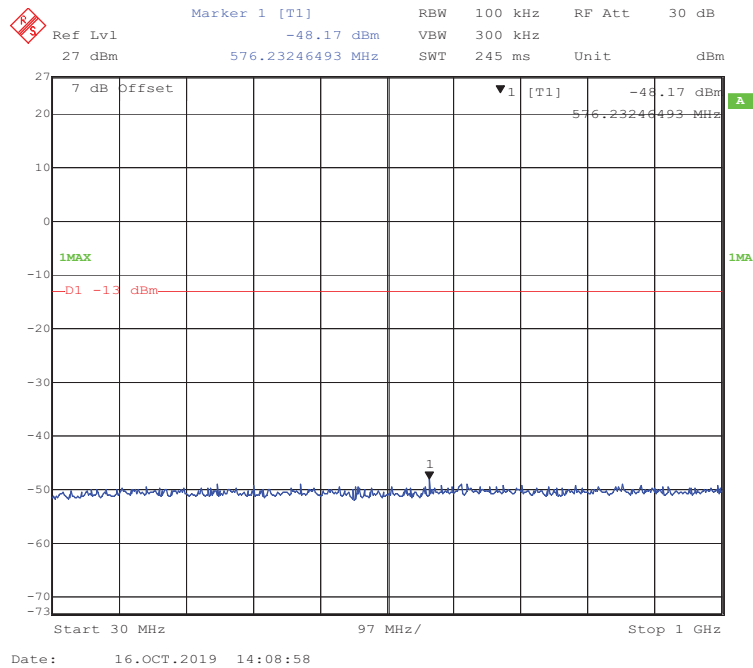
30 MHz - 1 GHz (3 MHz, 16-QAM, Middle Channel)



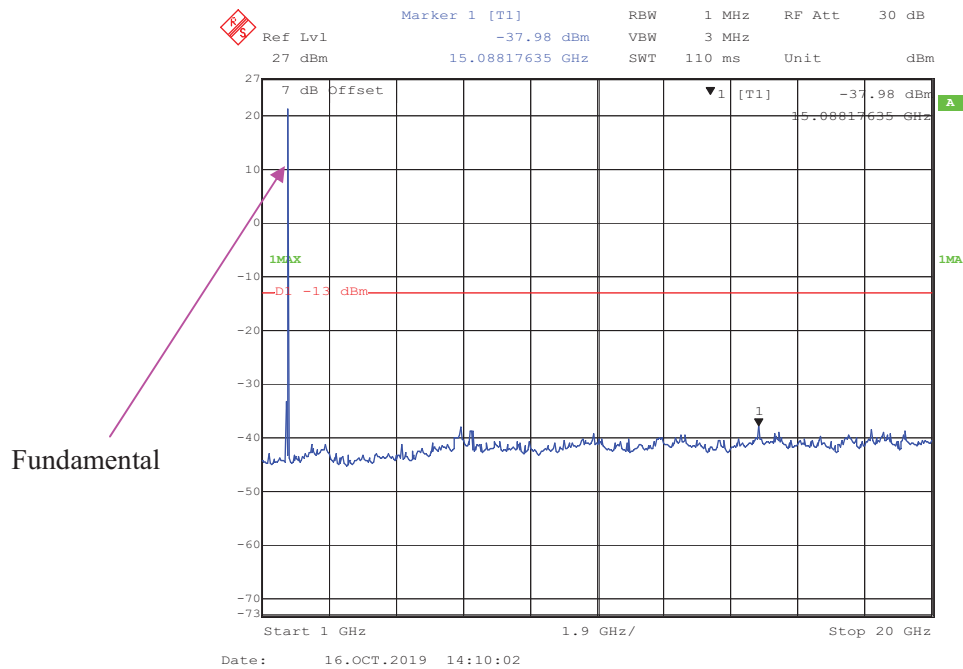
1 GHz – 20 GHz (3 MHz, 16-QAM, Middle Channel)



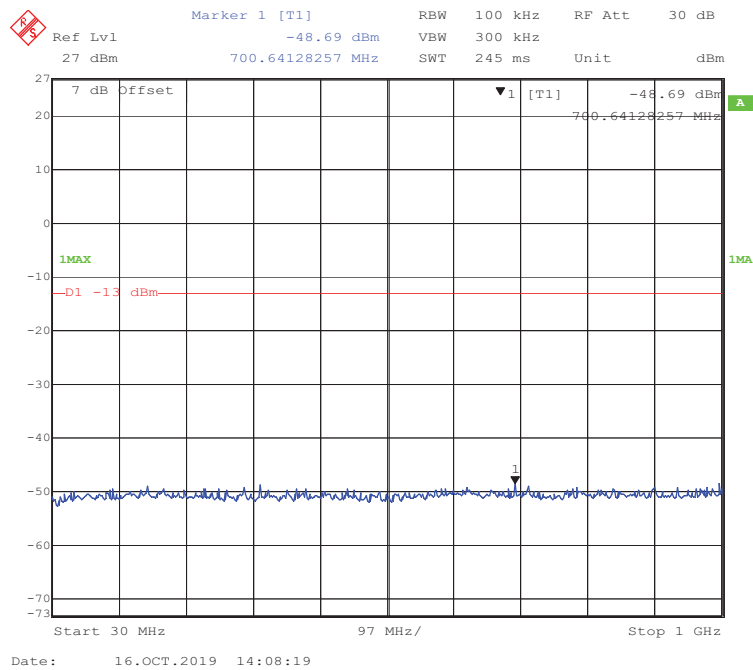
30 MHz - 1 GHz (5 MHz, QPSK, Middle Channel)



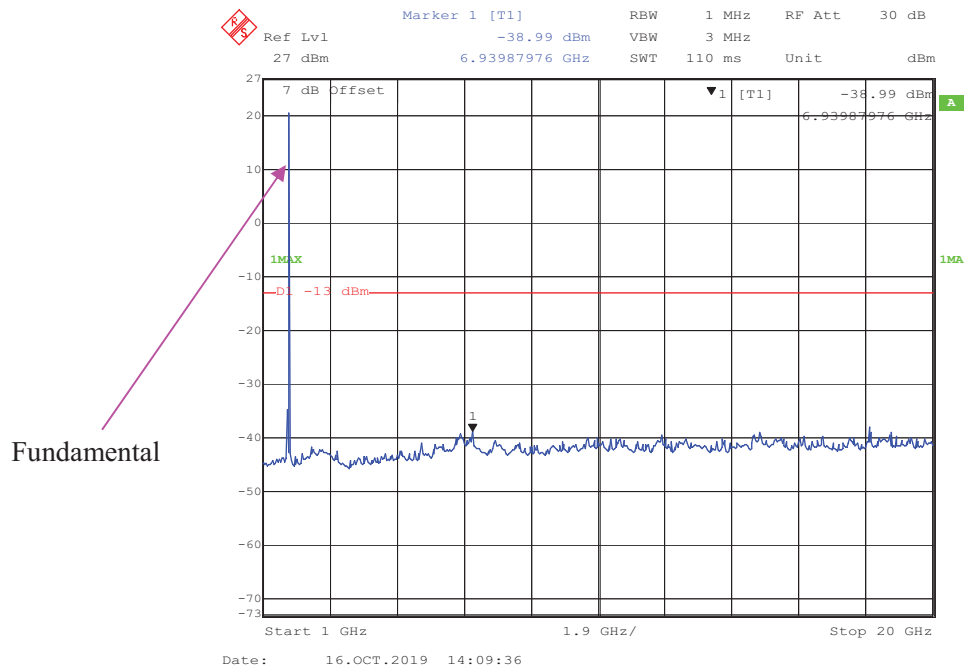
1 GHz – 20 GHz (5 MHz, QPSK, Middle Channel)



30 MHz - 1 GHz (5 MHz, 16-QAM, Middle Channel)



1 GHz – 20 GHz (5 MHz, 16-QAM, Middle Channel)



Marker 1 [T1] -48.86 dBm RBW 100 kHz RF Att 30 dB

Ref Lvl 27 dBm 245.77154309 MHz SWT 245 ms Unit dBm

7 dB Offset

▼ 1 [T1] -48.86 dBm

245.77154309 MHz

1MAX

-D1 -13 dBm

1

Start 30 MHz 97 MHz/ Stop 1 GHz

Date: 16.OCT.2019 14:13:41

Marker 1 [T1] RBW 1 MHz RF Att 30 dB
 Ref Lvl -38.59 dBm VBW 3 MHz
 27 dBm 6.67334669 GHz SWT 110 ms Unit dBm

7 dB Offset
 27
 20
 10
 0
 -10
 -20
 -30
 -40
 -50
 -60
 -70
 -73

▼1 [T1] -38.59 dBm
 6.67334669 GHz

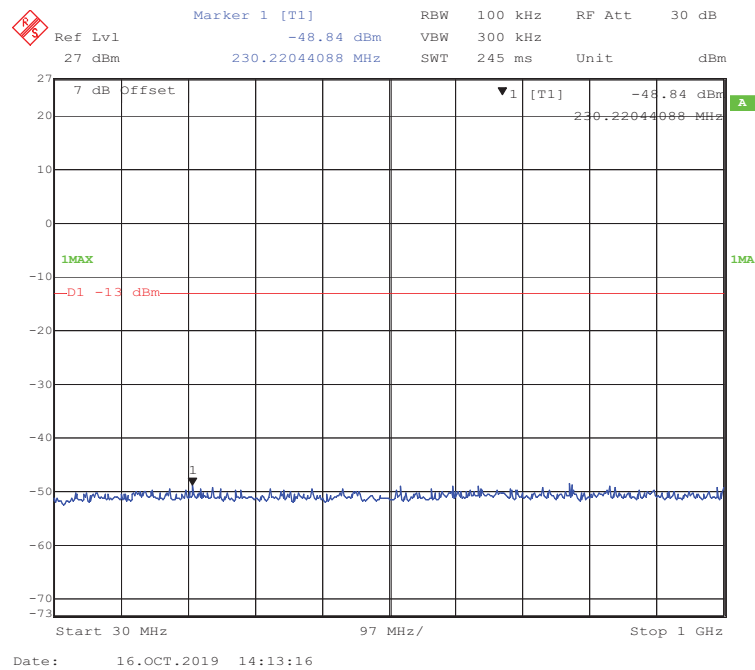
1MAX
 -13 dBm

Start 1 GHz 1.9 GHz/ Stop 20 GHz

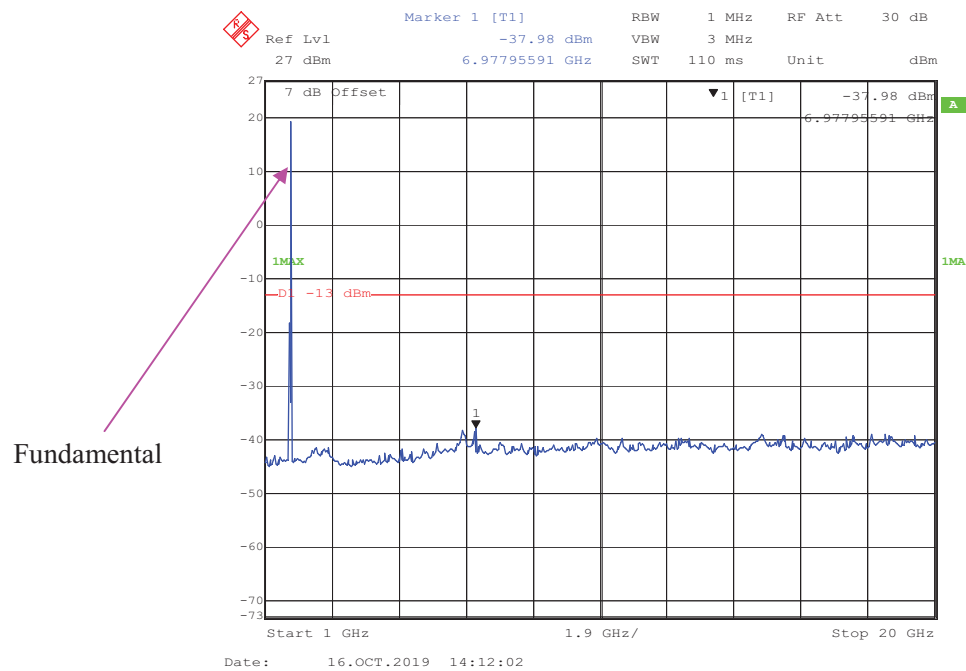
Date: 16.OCT.2019 14:12:37

Fundamental

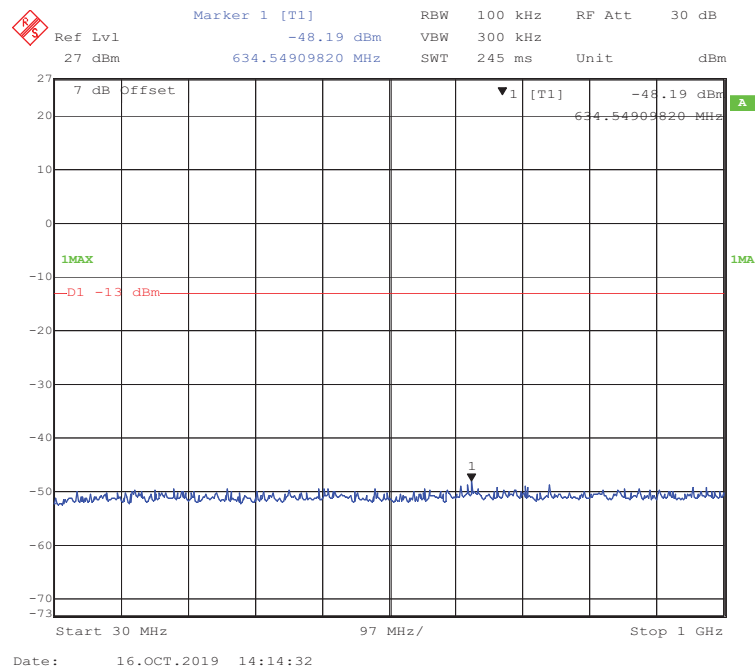
30 MHz - 1 GHz (10 MHz, 16-QAM, Middle Channel)



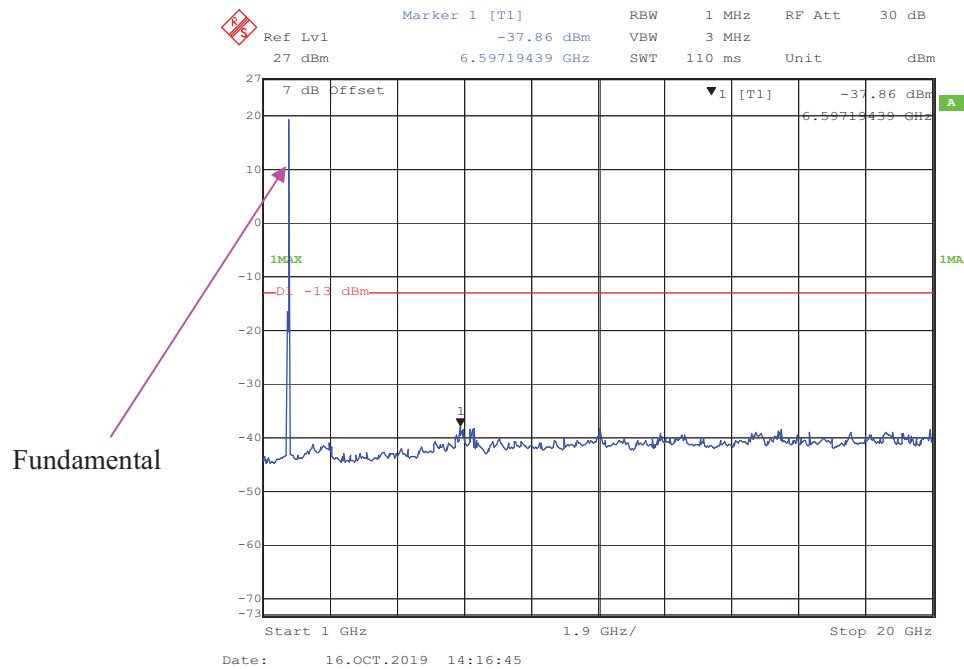
1 GHz – 20 GHz (10 MHz, 16-QAM, Middle Channel)



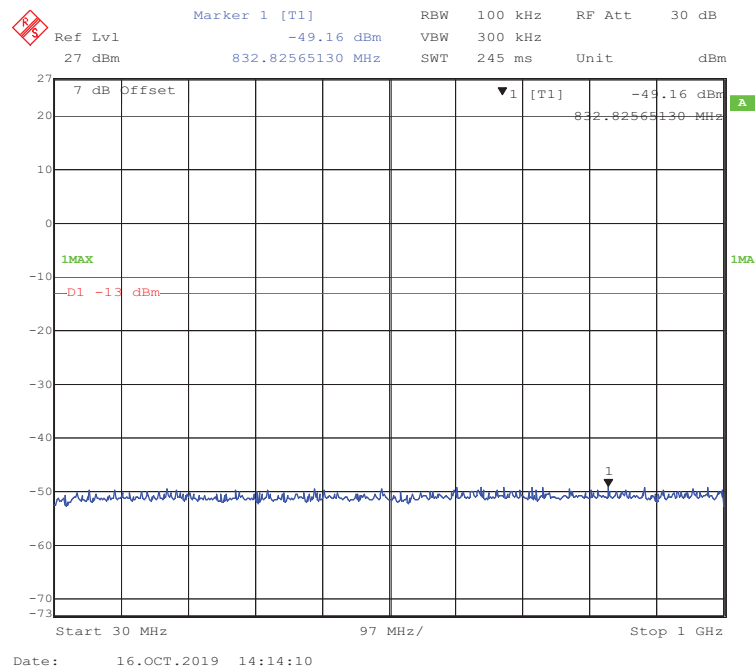
30 MHz - 1 GHz (15 MHz, QPSK, Middle Channel)



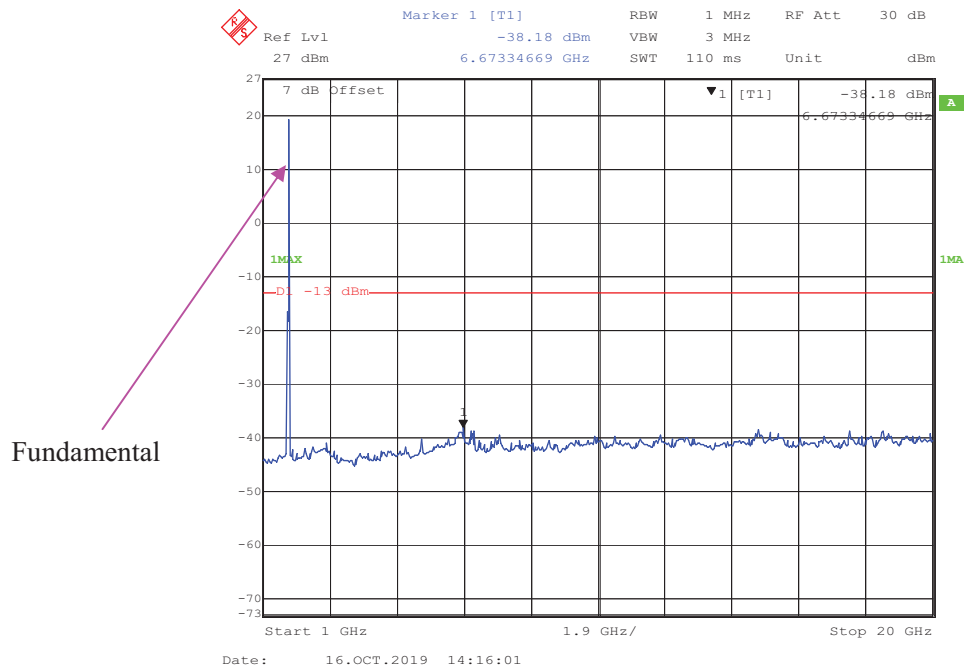
1 GHz – 20 GHz (15 MHz, QPSK, Middle Channel)



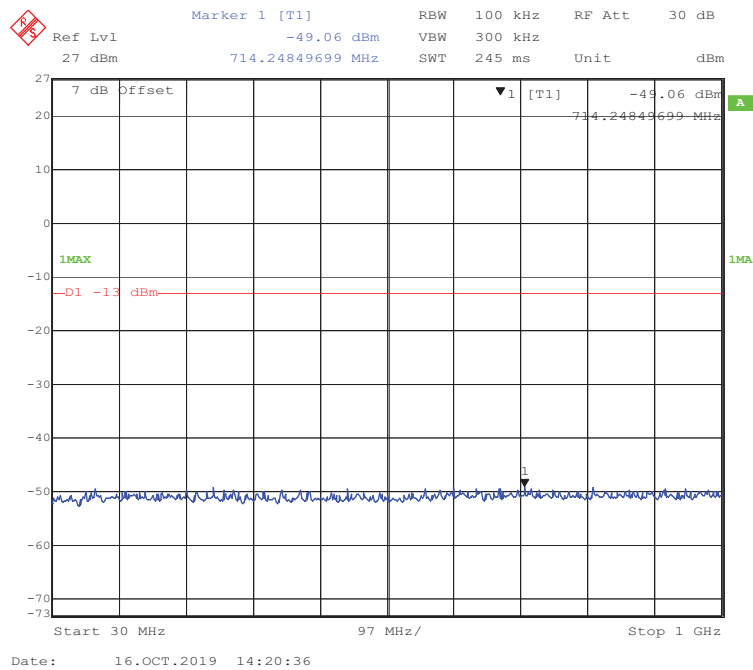
30 MHz - 1 GHz (15 MHz, 16-QAM, Middle Channel)



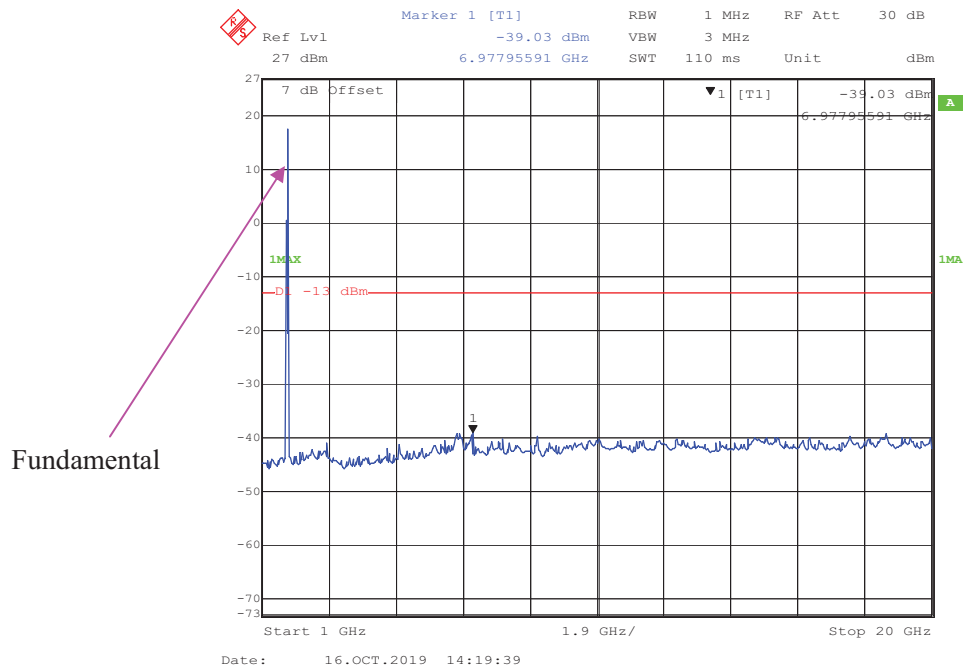
1 GHz – 20 GHz (15 MHz, 16-QAM, Middle Channel)



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



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



Marker 1 [T1] -48.58 dBm RBW 100 kHz RF Att 30 dB

Ref Lvl 27 dBm 988.33667335 MHz SWT 245 ms Unit dBm

7 dB Offset

1MAX

D1 -13 dBm

Start 30 MHz 97 MHz/ Stop 1 GHz

Date: 16.OCT.2019 14:20:12

7 dB Offset

Ref Lvl 27 dBm

Marker 1 [T1] -38.18 dBm

RBW 1 MHz RF Att 30 dB

VBW 3 MHz

SWT 110 ms Unit dBm

6.93987976 GHz

▼1 [T1] -38.18 dBm

1MAX

-13 dBm

1

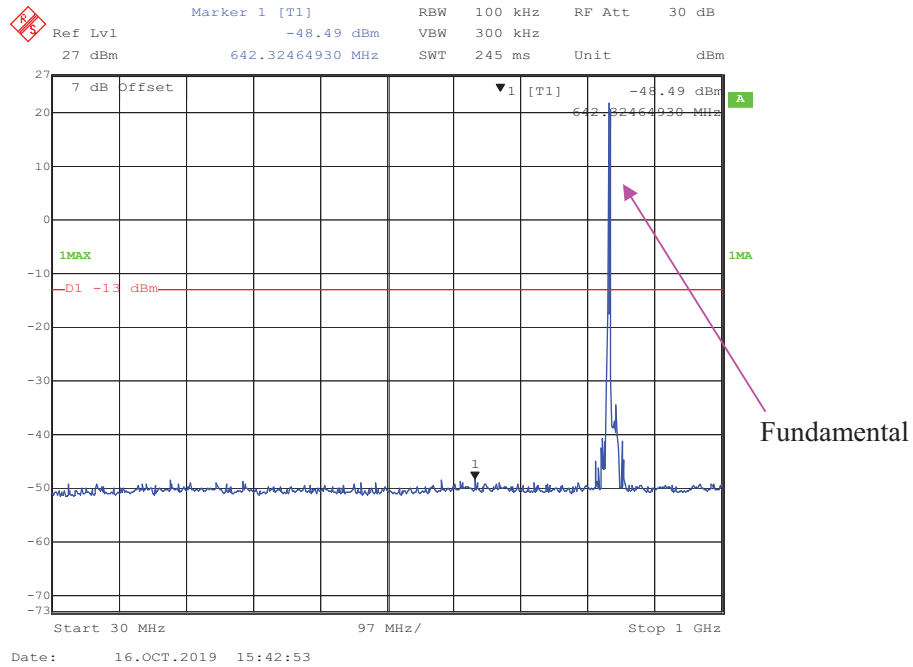
Start 1 GHz 1.9 GHz/ Stop 20 GHz

Date: 16.OCT.2019 14:19:15

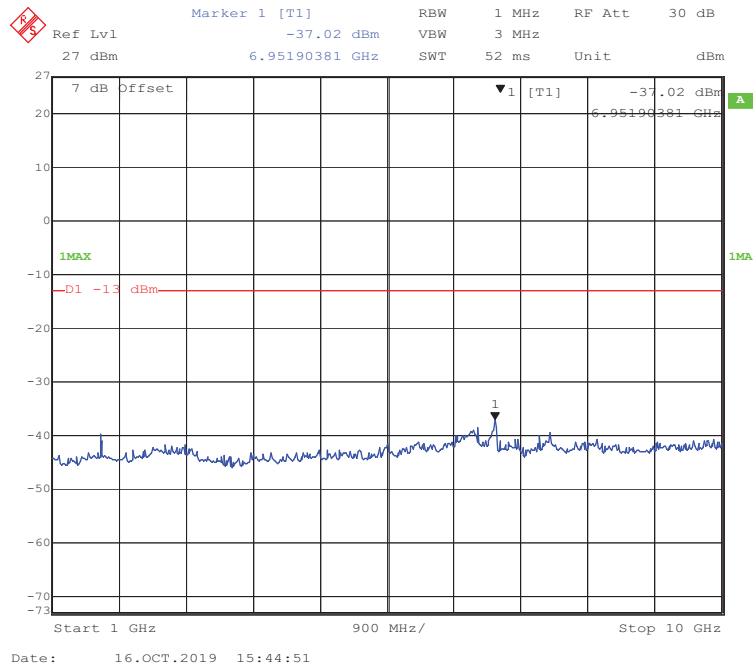
Fundamental

LTE Band 5:

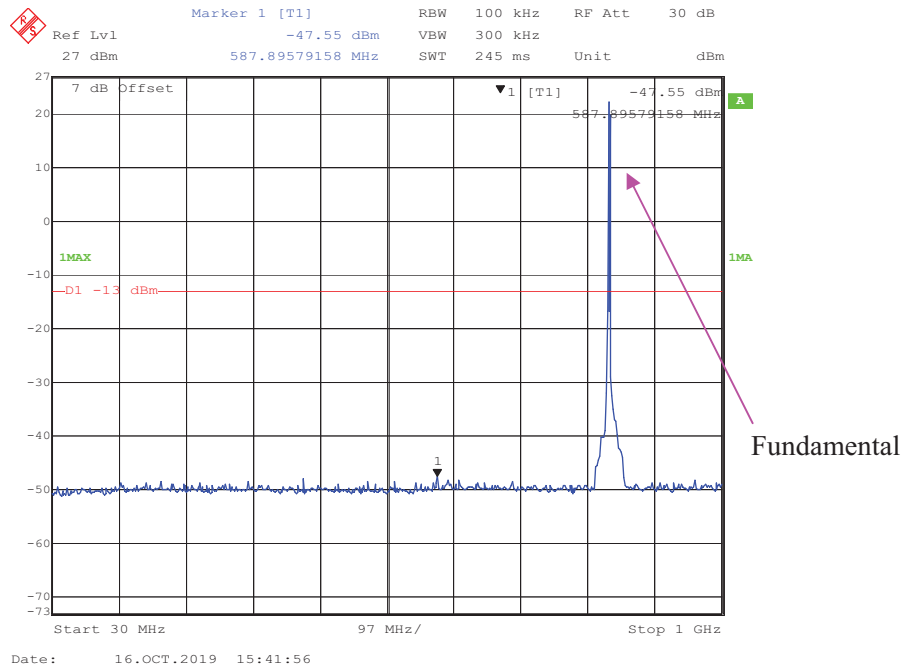
30 MHz - 1 GHz (1.4 MHz, QPSK, Middle Channel)



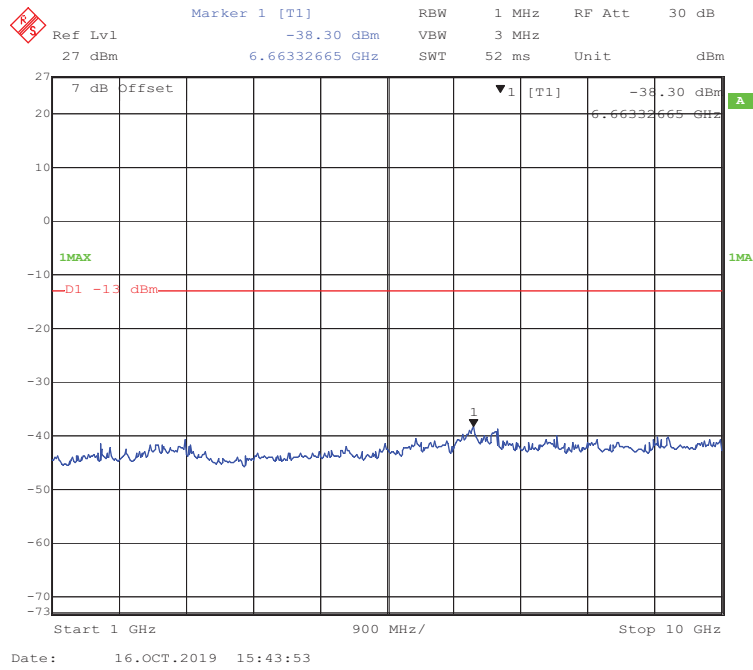
1 GHz – 10 GHz (1.4 MHz, QPSK, Middle Channel)



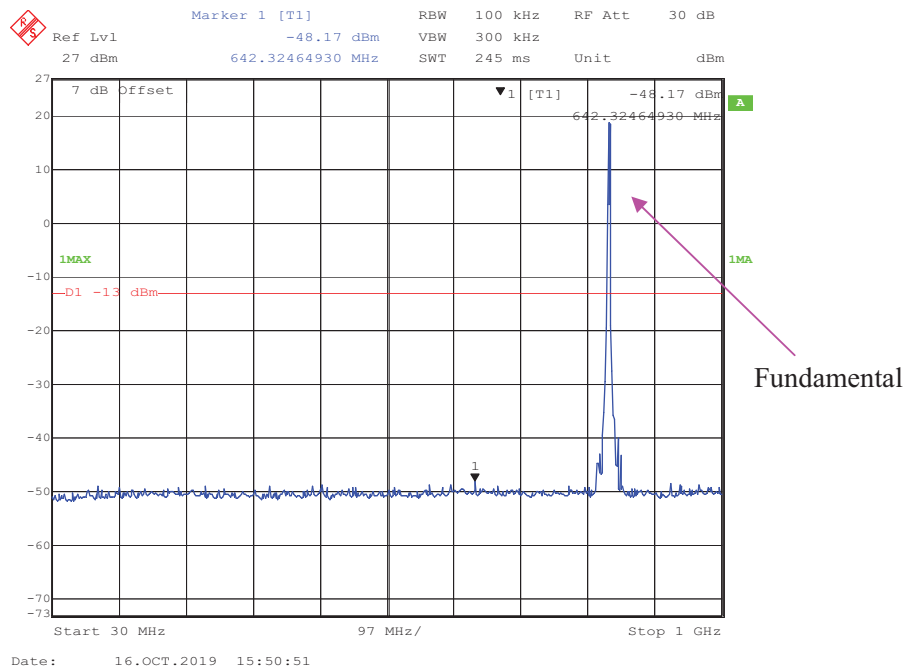
30 MHz - 1 GHz (1.4 MHz, 16-QAM, Middle Channel)



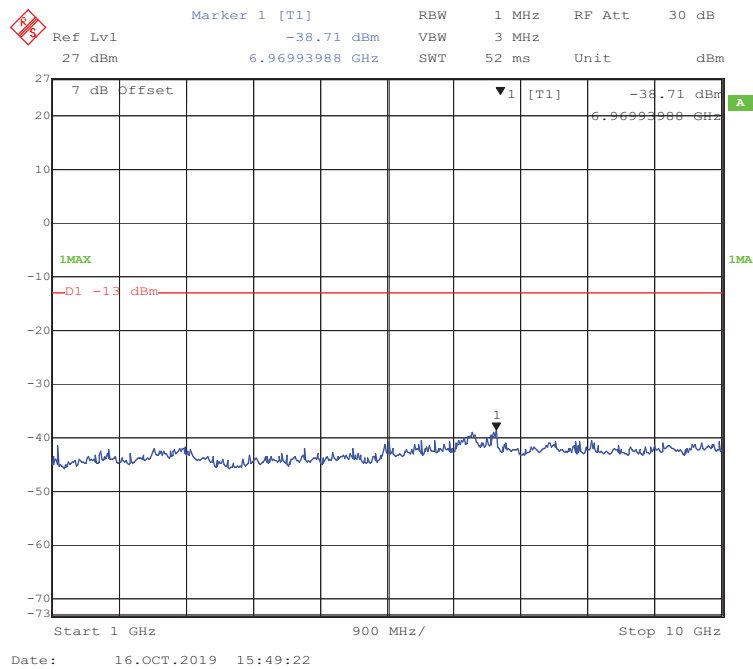
1 GHz – 10 GHz (1.4 MHz, 16-QAM, Middle Channel)



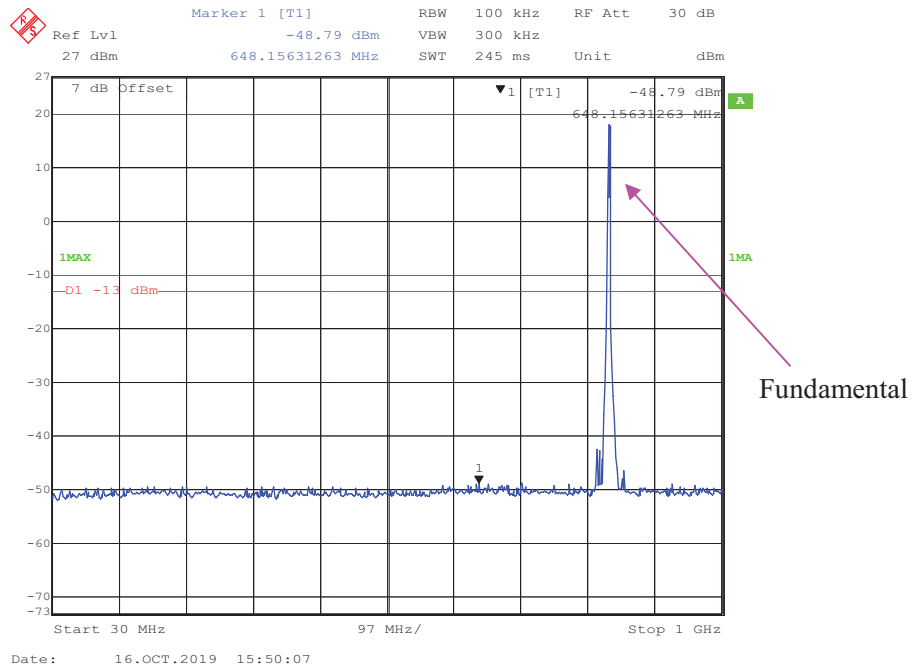
30 MHz - 1 GHz (3 MHz, QPSK, Middle Channel)



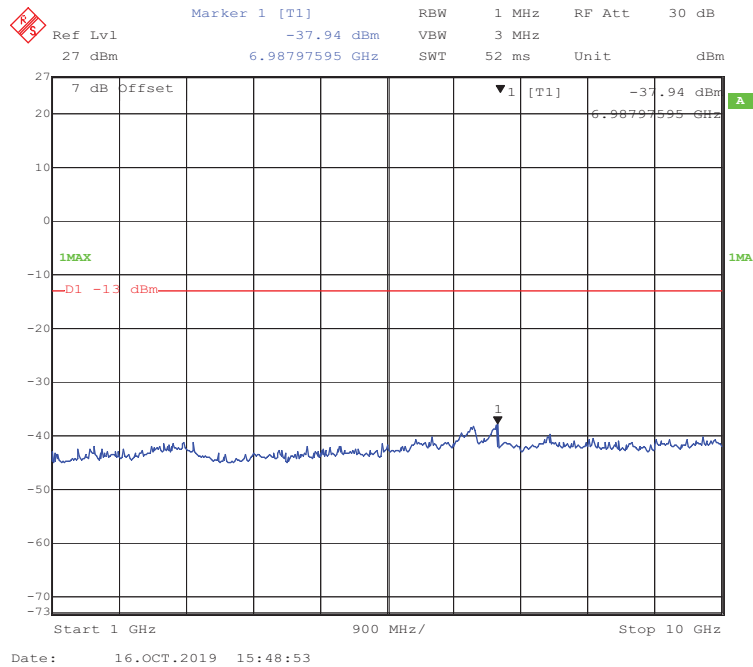
1 GHz – 10 GHz (3 MHz, QPSK, Middle Channel)



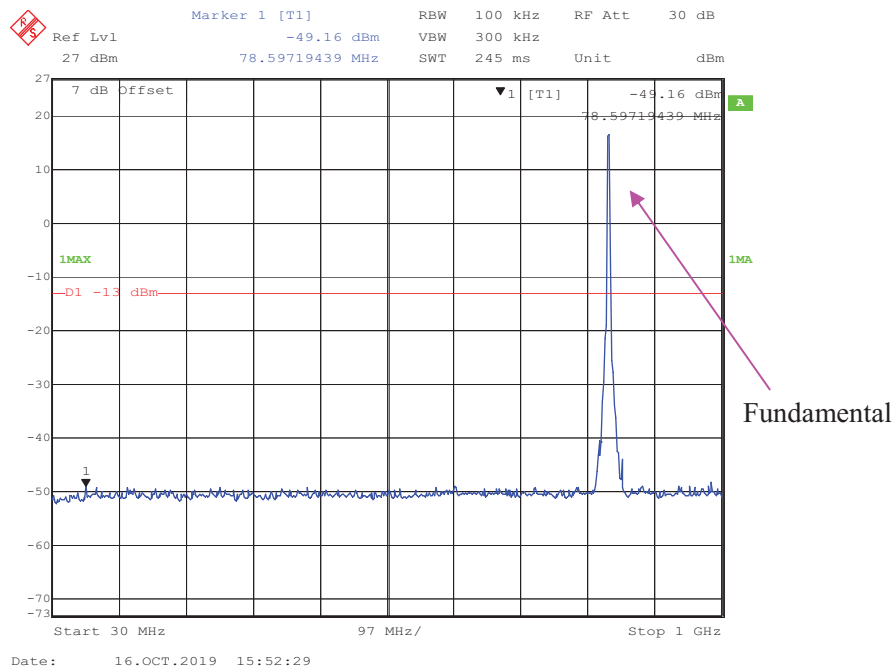
30 MHz - 1 GHz (3 MHz, 16-QAM, Middle Channel)



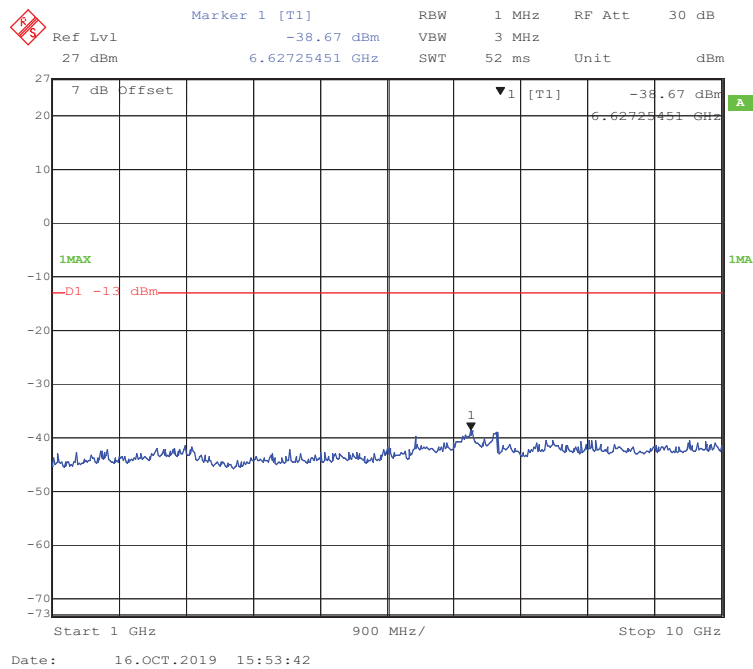
1 GHz – 10 GHz (3 MHz, 16-QAM, Middle Channel)

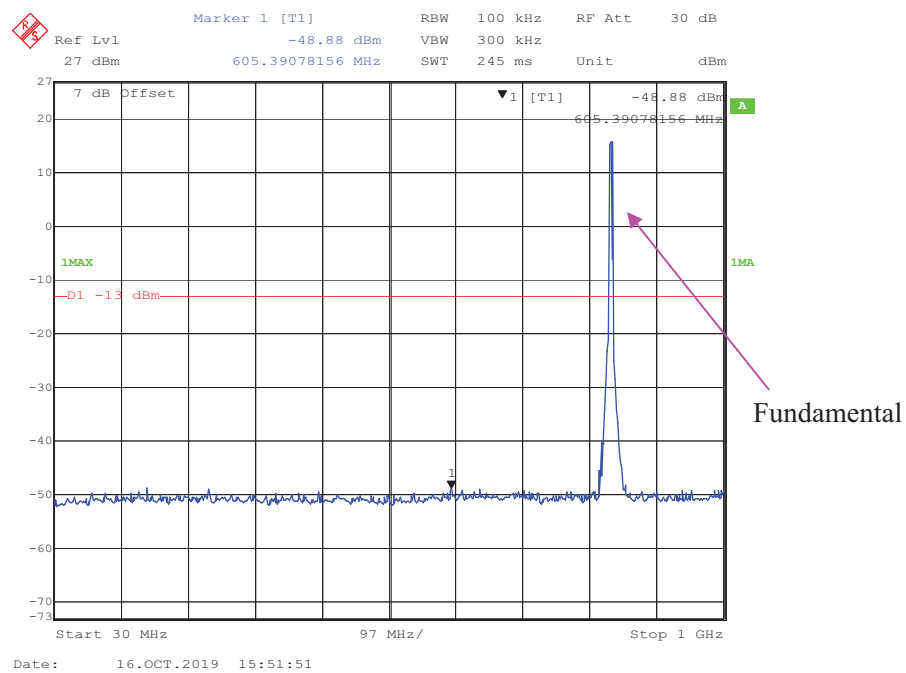
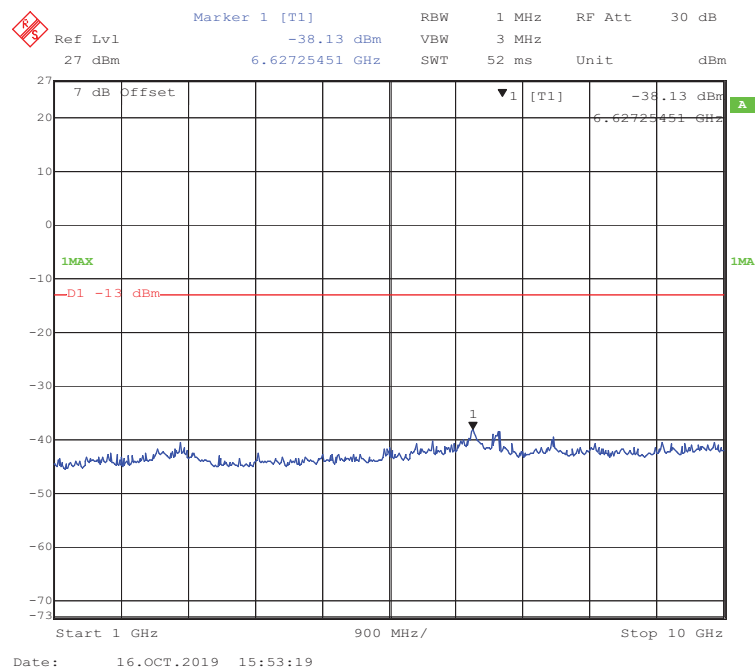


30 MHz - 1 GHz (5 MHz, QPSK, Middle Channel)

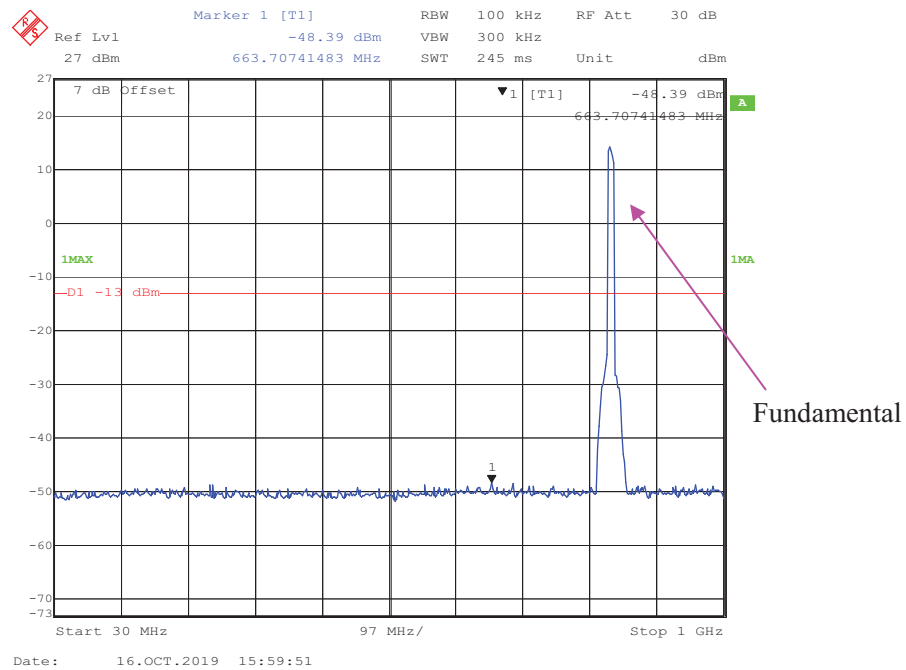


1 GHz – 10 GHz (5 MHz, QPSK, Middle Channel)

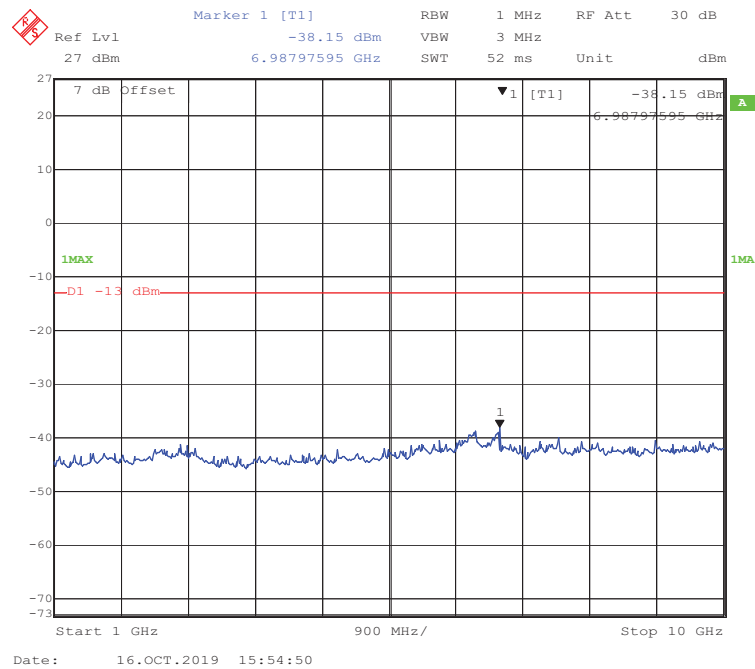


30 MHz - 1 GHz (5 MHz, 16-QAM, Middle Channel)**1 GHz – 10 GHz (5 MHz, 16-QAM, Middle Channel)**

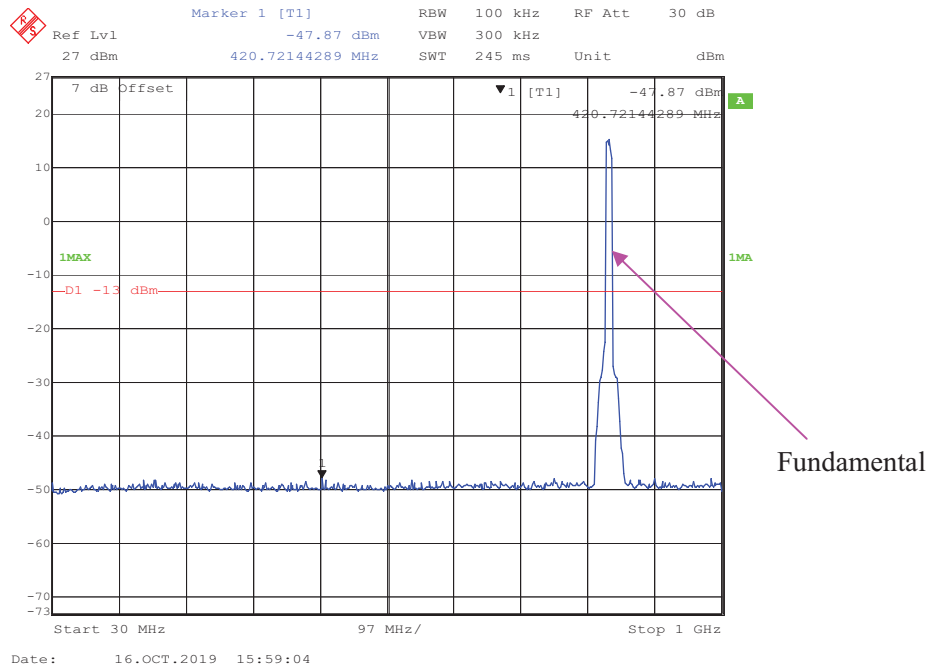
30 MHz - 1 GHz (10 MHz, QPSK, Middle Channel)



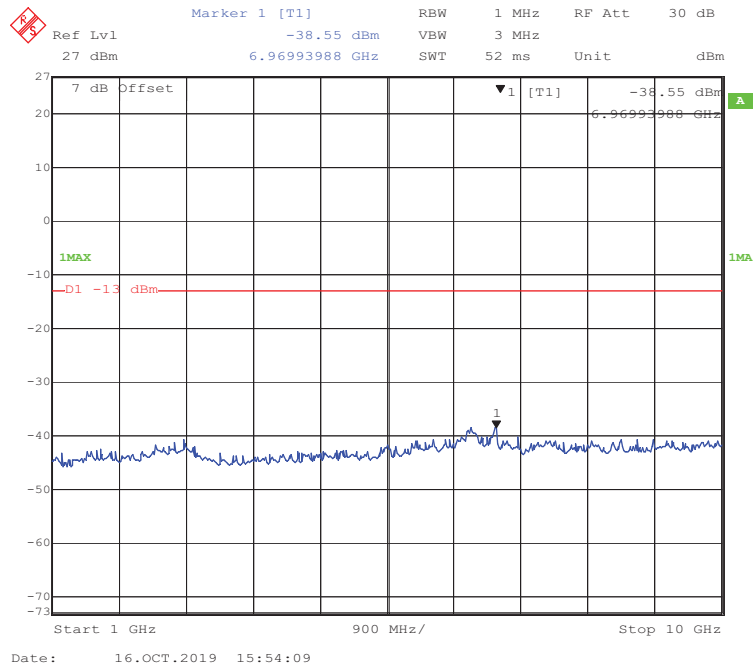
1 GHz – 10 GHz (10 MHz, QPSK, Middle Channel)



30 MHz - 1 GHz (10 MHz, 16-QAM, Middle Channel)

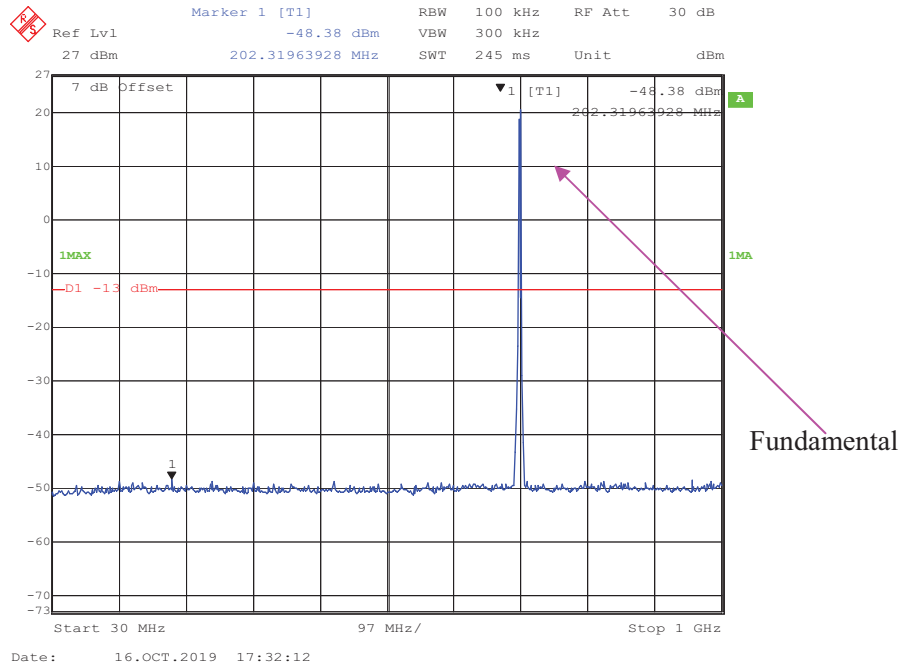


1 GHz – 10 GHz (10 MHz, 16-QAM, Middle Channel)

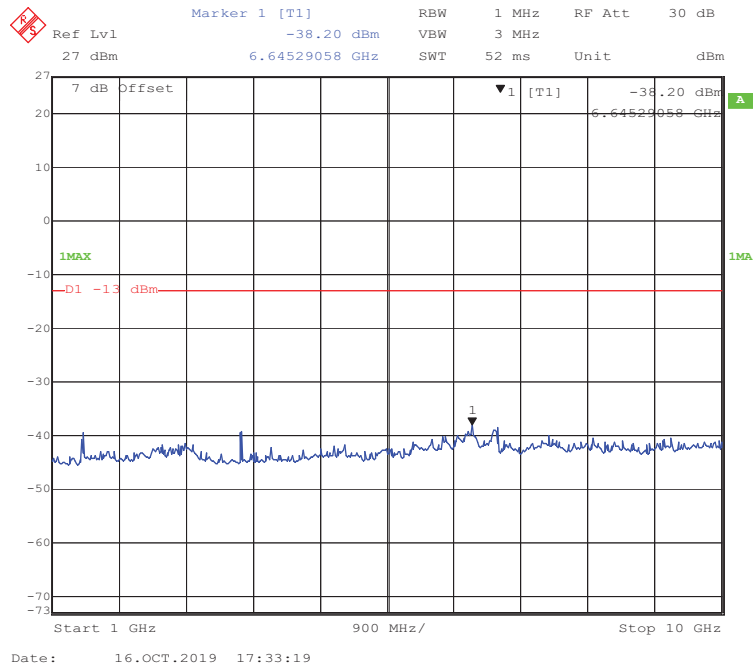


LTE Band 12:

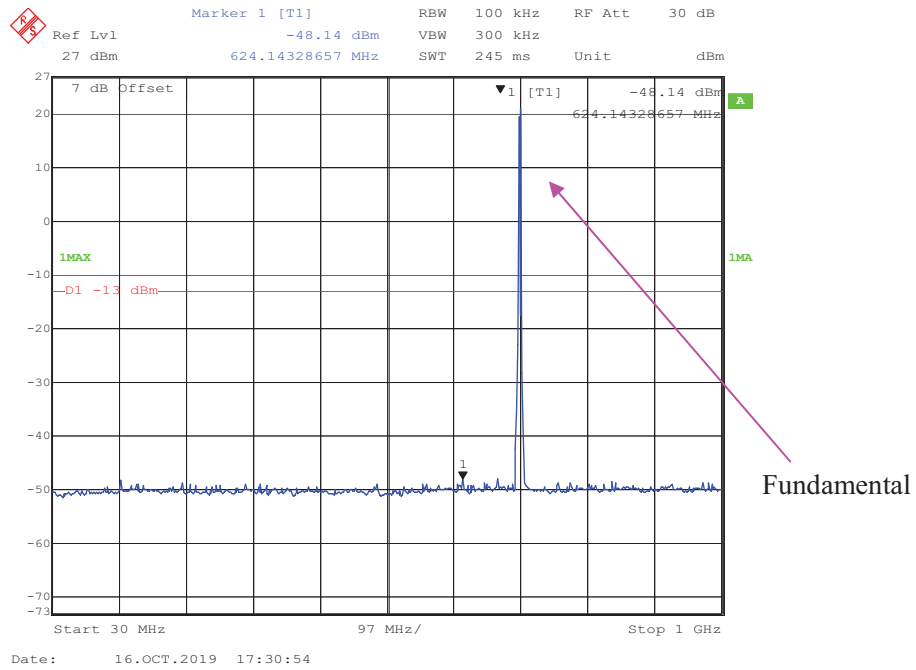
30 MHz - 1 GHz (1.4 MHz, QPSK, Middle Channel)



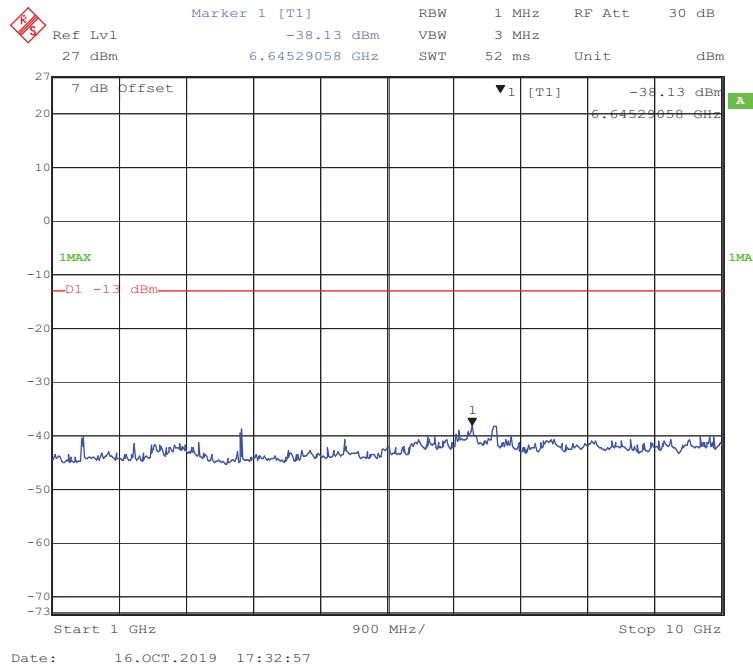
1 GHz – 10 GHz (1.4 MHz, QPSK, Middle Channel)

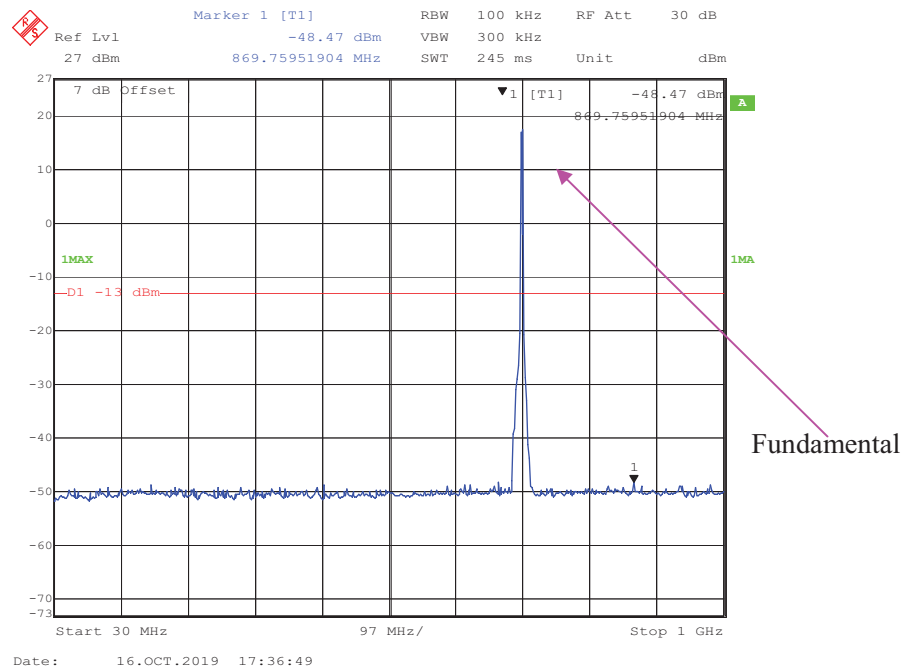
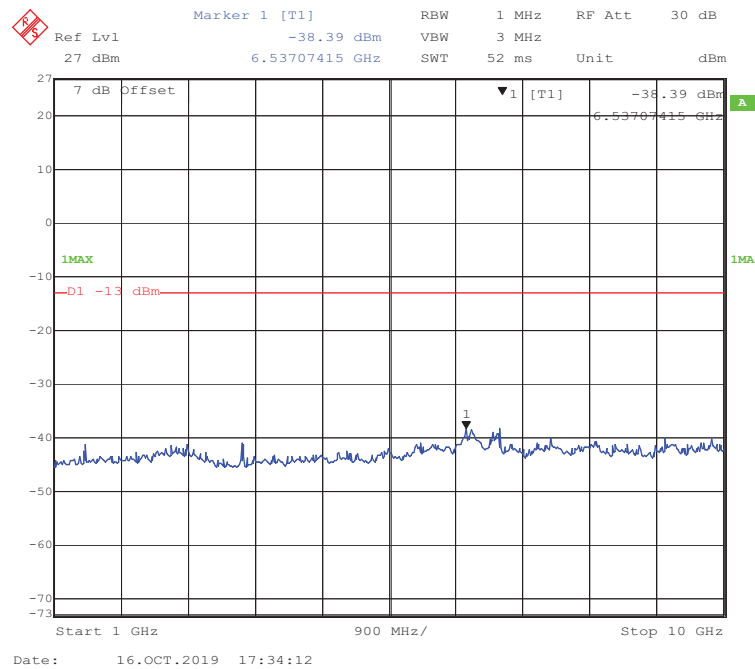


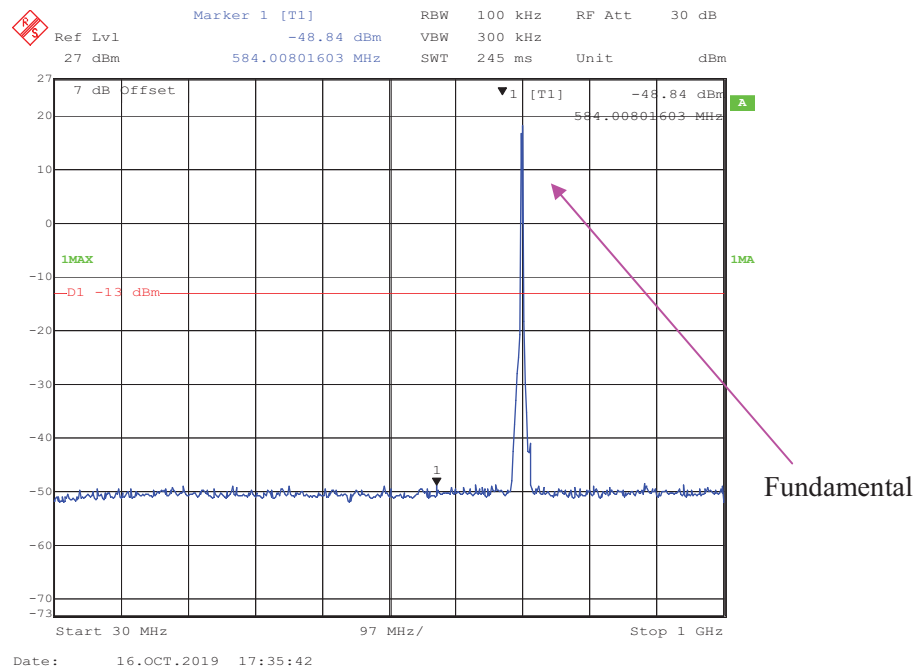
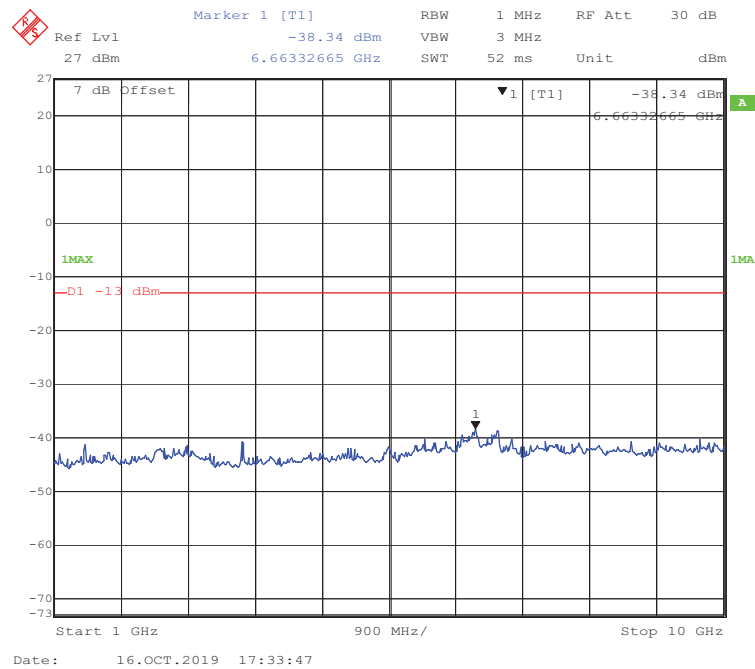
30 MHz - 1 GHz (1.4 MHz, 16-QAM, Middle Channel)



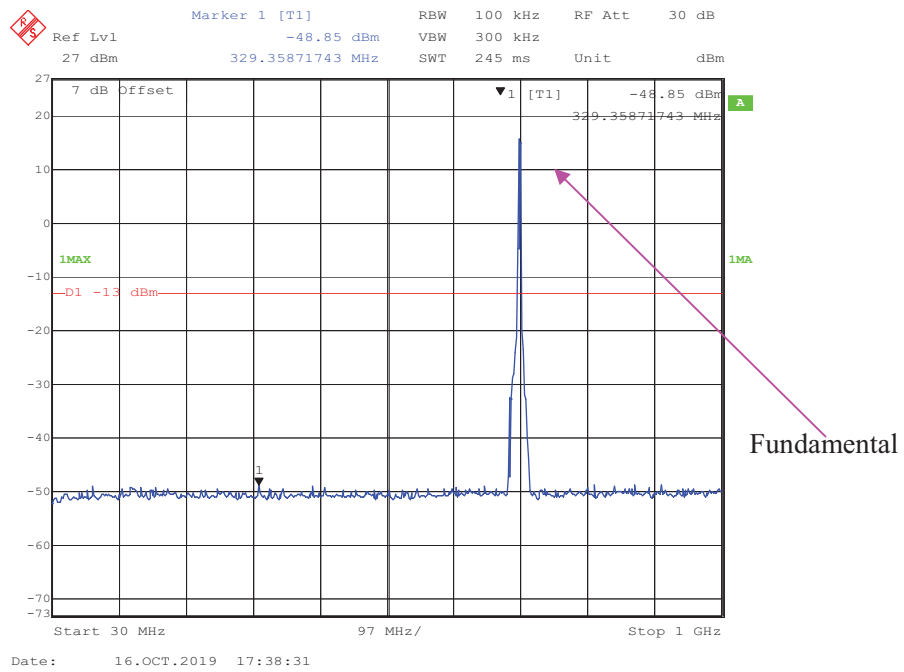
1 GHz – 10 GHz (1.4 MHz, 16-QAM, Middle Channel)



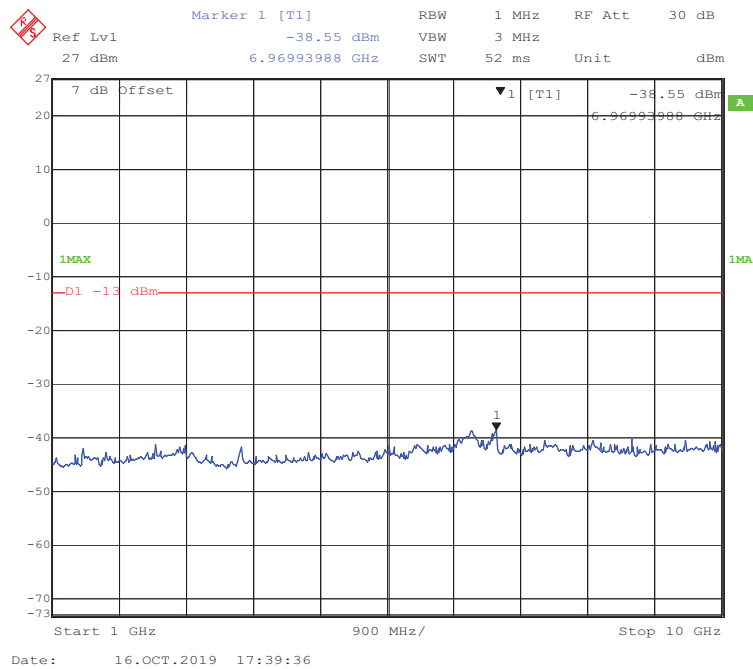
30 MHz - 1 GHz (3 MHz, QPSK, Middle Channel)**1 GHz – 10 GHz (3 MHz, QPSK, Middle Channel)**

30 MHz - 1 GHz (3 MHz, 16-QAM, Middle Channel)**1 GHz – 10 GHz (3 MHz, 16-QAM, Middle Channel)**

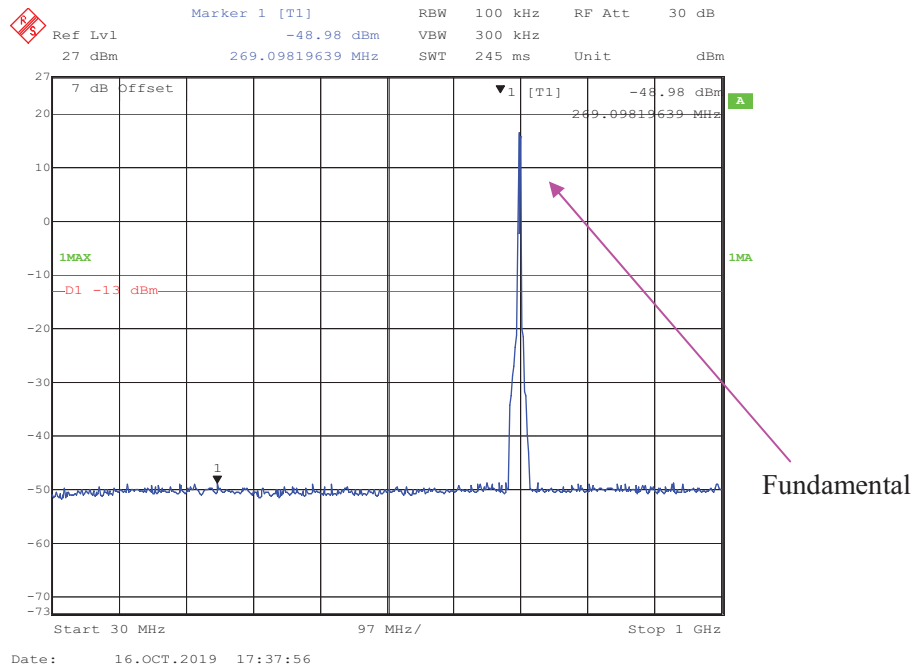
30 MHz - 1 GHz (5 MHz, QPSK, Middle Channel)



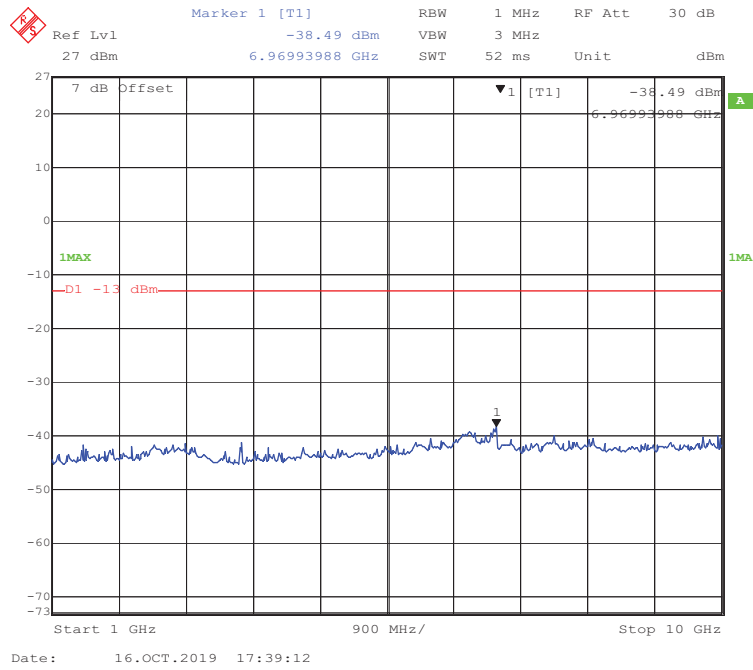
1 GHz – 10 GHz (5 MHz, QPSK, Middle Channel)



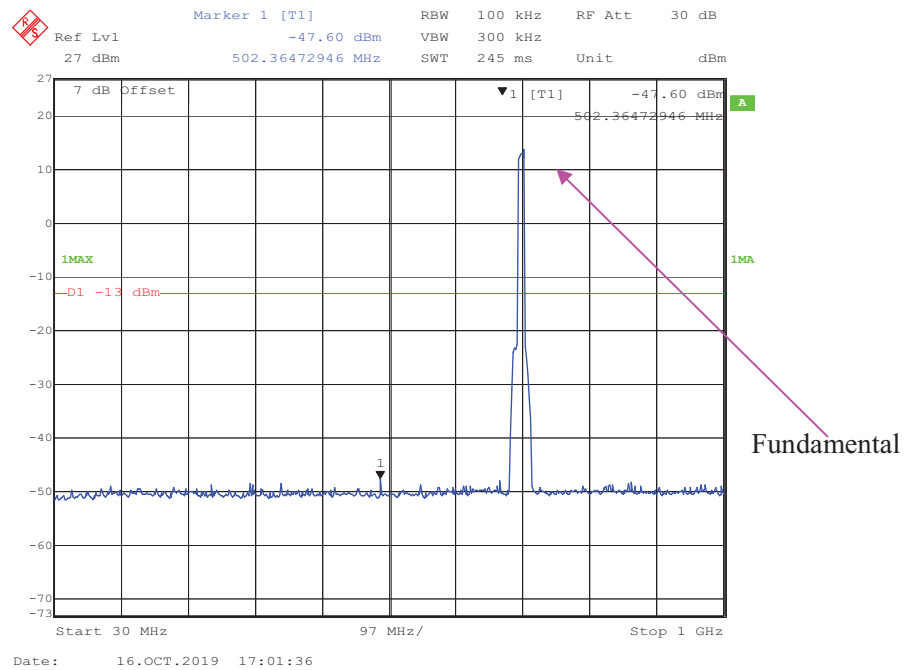
30 MHz - 1 GHz (5 MHz, 16-QAM, Middle Channel)



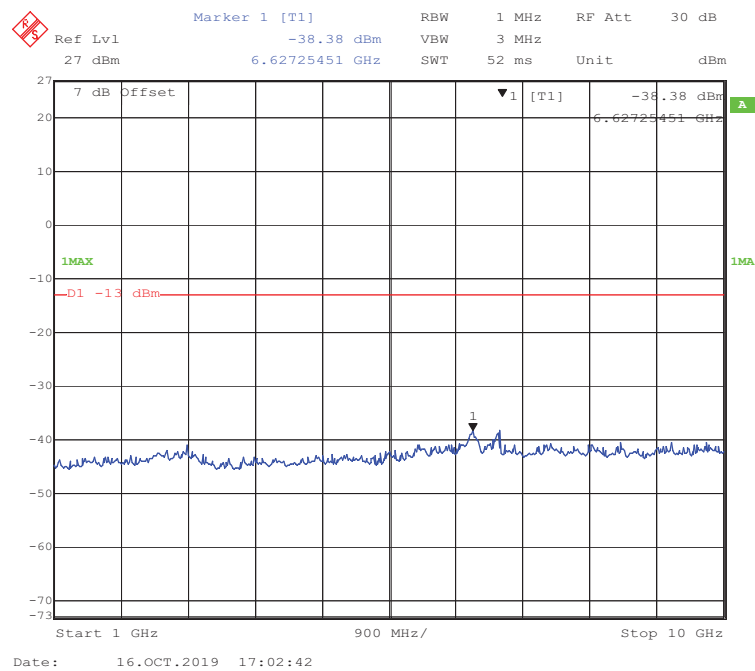
1 GHz – 10 GHz (5 MHz, 16-QAM, Middle Channel)

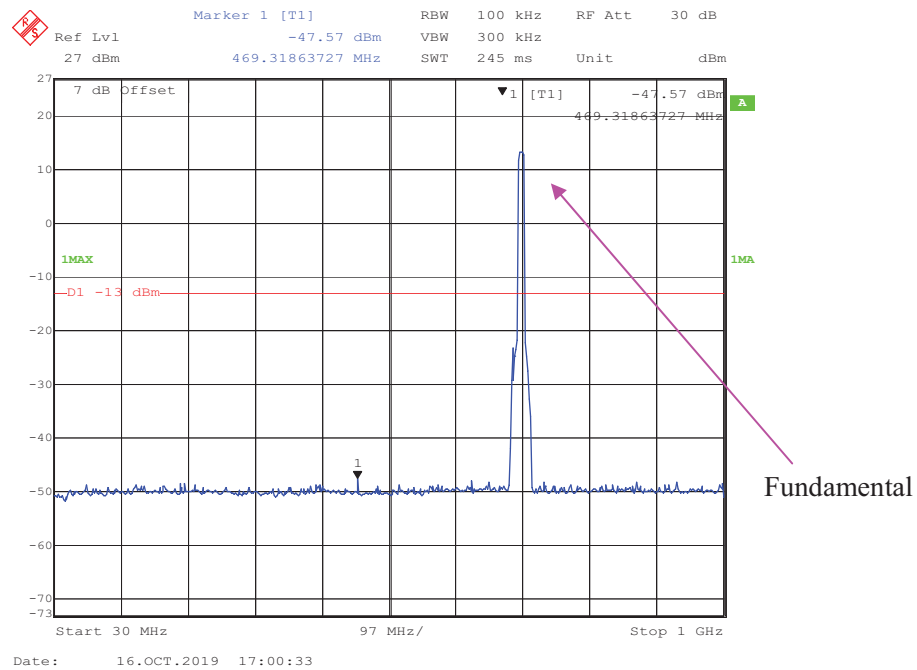
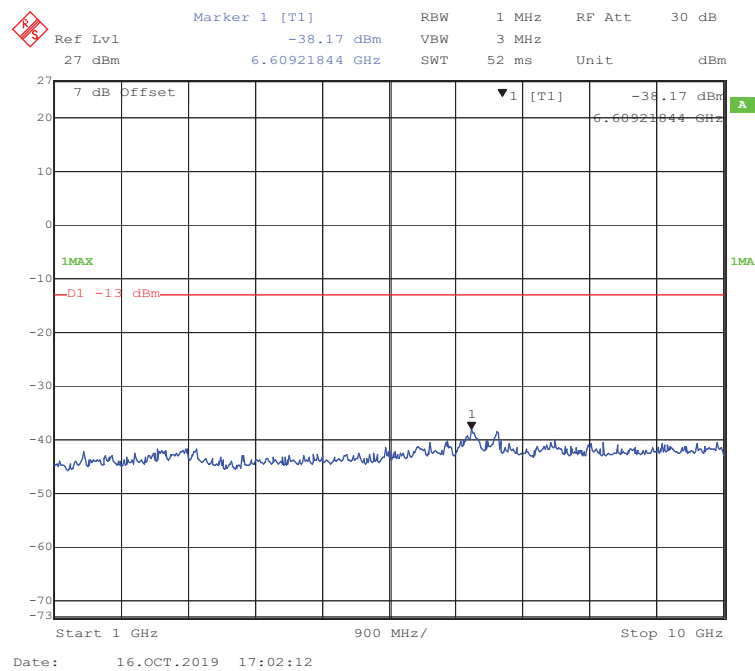


30 MHz - 1 GHz (10 MHz, QPSK, Middle Channel)



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



30 MHz - 1 GHz (10 MHz, 16-QAM, Middle Channel)**1 GHz – 10 GHz (10 MHz, 16-QAM, Middle Channel)**

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

Applicable Standards

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

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

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

(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log (P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

(h) AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB.

Test Procedure

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

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

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

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

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

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

Test Data**Environmental Conditions**

Temperature:	23.2 °C
Relative Humidity:	51 %
ATM Pressure:	101.3 kPa

The testing was performed by Winnie Yang on 2019-10-20.

Test mode: Transmitting (Pre-scan with low, middle and high channels, and the worse case data as below)

30 MHz ~ 10 GHz:**WCDMA Band V**

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
WCDMA Mode, Middle channel										
190.41	53.67	222	100	H	-51.79	0.41	-4.4	-56.60	-13	43.60
190.41	57.14	109	100	V	-47.09	0.41	-4.4	-51.90	-13	38.90
1673.20	44.06	154	200	H	-66.89	0.84	8.5	-59.23	-13	46.23
1673.20	46.66	321	250	V	-63.54	0.84	8.5	-55.88	-13	42.88
2509.80	51.42	190	200	H	-57.2	0.89	10.1	-47.99	-13	34.99
2509.80	53.01	120	100	V	-55.68	0.89	10.1	-46.47	-13	33.47

30 MHz ~ 20 GHz:**WCDMA Band II**

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
WCDMA Mode, Middle channel										
187.75	53.18	130	200	H	-52.23	0.41	-4.5	-57.14	-13	44.14
187.75	56.63	26	200	V	-47.37	0.41	-4.5	-52.28	-13	39.28
3760.00	42.39	214	100	H	-61.30	0.95	9.7	-52.55	-13	39.55
3760.00	46.14	119	200	V	-57.87	0.95	9.7	-49.12	-13	36.12
5640.00	42.15	136	200	H	-58.36	1.15	10.5	-49.01	-13	36.01
5640.00	46.10	40	100	V	-54.71	1.15	10.5	-45.36	-13	32.36

Note:

- 1) Antenna gain is dBd for frequency below 1GHz and dBi for frequency above 1GHz
- 2) Absolute Level (dBm) = Submitted Level (dBm) - Cable loss (dB) + Antenna Gain (dBd/dBi)
- 3) Margin (dB) = Limit (dBm) - Absolute Level (dBm)

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

30 MHz ~ 20 GHz:

LTE Band 2:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 1.4MHz Bandwidth Middle Channel										
161.47	53.62	164	200	H	-50.48	0.38	-6.2	-57.06	-13	44.06
161.47	55.39	79	200	V	-45.8	0.38	-6.2	-52.38	-13	39.38
3760.00	45.45	272	100	H	-58.24	0.95	9.7	-49.49	-13	36.49
3760.00	45.17	268	100	V	-58.84	0.95	9.7	-50.09	-13	37.09
5640.00	41.81	174	250	H	-58.70	1.15	10.5	-49.35	-13	36.35
5640.00	43.98	250	100	V	-56.83	1.15	10.5	-47.48	-13	34.48
16-QAM 1.4MHz Bandwidth Middle Channel										
161.47	54.05	352	200	H	-50.05	0.38	-6.2	-56.63	-13	43.63
161.47	55.89	338	100	V	-45.30	0.38	-6.2	-51.88	-13	38.88
3760.00	45.32	125	150	H	-58.37	0.95	9.7	-49.62	-13	36.62
3760.00	45.14	314	150	V	-58.87	0.95	9.7	-50.12	-13	37.12
5640.00	42.48	250	150	H	-58.03	1.15	10.5	-48.68	-13	35.68
5640.00	45.43	130	150	V	-55.38	1.15	10.5	-46.03	-13	33.03

30 MHz ~ 20 GHz:

LTE Band 4:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 1.4MHz Bandwidth Middle Channel										
196.51	53.26	311	150	H	-52.31	0.42	-4.1	-56.83	-13	43.83
196.51	57.27	95	200	V	-47.5	0.42	-4.1	-52.02	-13	39.02
3465.00	52.15	255	200	H	-52.64	0.93	9.9	-43.67	-13	30.67
3465.00	54.32	113	250	V	-50.9	0.93	9.9	-41.93	-13	28.93
5197.50	45.05	258	150	H	-57.03	1.10	10.3	-47.83	-13	34.83
5197.50	47.10	206	100	V	-55.19	1.10	10.3	-45.99	-13	32.99
16-QAM 1.4MHz Bandwidth Middle Channel										
196.51	53.32	178	150	H	-52.25	0.42	-4.1	-56.77	-13	43.77
196.51	57.43	123	250	V	-47.34	0.42	-4.1	-51.86	-13	38.86
3465.00	51.92	138	100	H	-52.87	0.93	9.9	-43.90	-13	30.90
3465.00	53.83	305	250	V	-51.39	0.93	9.9	-42.42	-13	29.42
5197.50	44.79	133	150	H	-57.29	1.10	10.3	-48.09	-13	35.09
5197.50	46.97	293	250	V	-55.32	1.10	10.3	-46.12	-13	33.12

30 MHz ~ 10 GHz:**LTE Band 5:**

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 1.4MHz Bandwidth Middle Channel										
160.35	53.83	242	150	H	-50.33	0.38	-6.2	-56.91	-13	43.91
160.35	55.36	88	250	V	-45.78	0.38	-6.2	-52.36	-13	39.36
1673.00	51.55	188	250	H	-59.40	0.84	8.5	-51.74	-13	38.74
1673.00	48.62	354	100	V	-61.58	0.84	8.5	-53.92	-13	40.92
2509.50	49.72	66	150	H	-58.90	0.89	10.1	-49.69	-13	36.69
2509.50	51.00	73	250	V	-57.69	0.89	10.1	-48.48	-13	35.48
16-QAM 1.4MHz Bandwidth Middle Channel										
160.35	53.91	258	100	H	-50.25	0.38	-6.2	-56.83	-13	43.83
160.35	55.44	64	150	V	-45.7	0.38	-6.2	-52.28	-13	39.28
1673.00	51.41	304	250	H	-59.54	0.84	8.5	-51.88	-13	38.88
1673.00	48.51	157	200	V	-61.69	0.84	8.5	-54.03	-13	41.03
2509.50	49.14	348	200	H	-59.48	0.89	10.1	-50.27	-13	37.27
2509.50	50.82	38	250	V	-57.87	0.89	10.1	-48.66	-13	35.66

30 MHz ~ 10 GHz:**LTE Band 12:**

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 1.4MHz Bandwidth Middle Channel										
161.47	53.47	89	200	H	-50.63	0.38	-6.2	-57.21	-13	44.21
161.47	55.65	2	100	V	-45.54	0.38	-6.2	-52.12	-13	39.12
1415.00	54.98	82	250	H	-57.07	0.82	8.0	-49.89	-13	36.89
1415.00	56.09	320	250	V	-56.26	0.82	8.0	-49.08	-13	36.08
2122.50	45.15	64	100	H	-63.49	0.86	9.3	-55.05	-13	42.05
2122.50	45.65	223	100	V	-63.27	0.86	9.3	-54.83	-13	41.83
16-QAM 1.4MHz Bandwidth Middle Channel										
161.47	53.77	89	200	H	-50.33	0.38	-6.2	-56.91	-13	43.91
161.47	55.55	2	150	V	-45.64	0.38	-6.2	-52.22	-13	39.22
1415.00	54.44	90	100	H	-57.61	0.82	8.0	-50.43	-13	37.43
1415.00	55.64	197	100	V	-56.71	0.82	8.0	-49.53	-13	36.53
2122.50	44.62	8	200	H	-64.02	0.86	9.3	-55.58	-13	42.58
2122.50	46.12	89	100	V	-62.80	0.86	9.3	-54.36	-13	41.36

Note:

- 1) Antenna gain is dBd for frequency below 1GHz and dBi for frequency above 1GHz
- 2) Absolute Level (dBm) = Submitted Level (dBm) - Cable loss (dB) + Antenna Gain (dBd/dBi)
- 3) Margin (dB) = Limit (dBm) - Absolute Level (dBm)

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

Applicable Standards

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

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

According to FCC §27.53 (g) (h), the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log(P)$ dB.

For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log(P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log(P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log(P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor

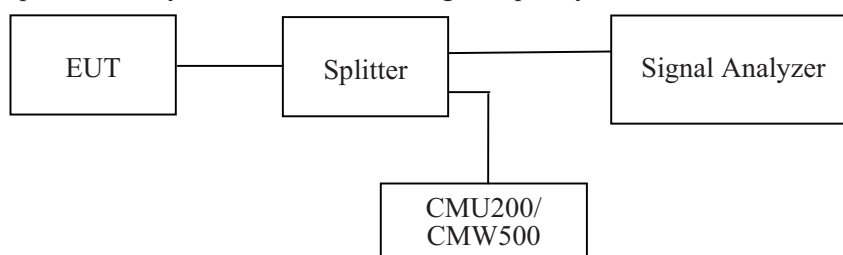
shall not be less than $43 + 10 \log(P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log(P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

FCC §2.1051. The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log(P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or less, but at least one percent of the emission bandwidth of the fundamental emission of the transmitter, provided the measured energy is integrated over a 1 MHz bandwidth.

Test Procedure

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

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



Test Data

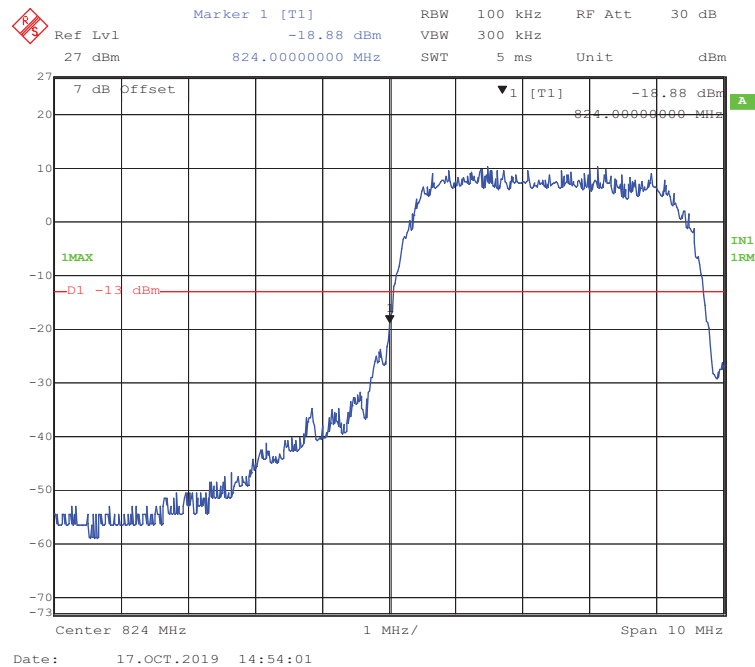
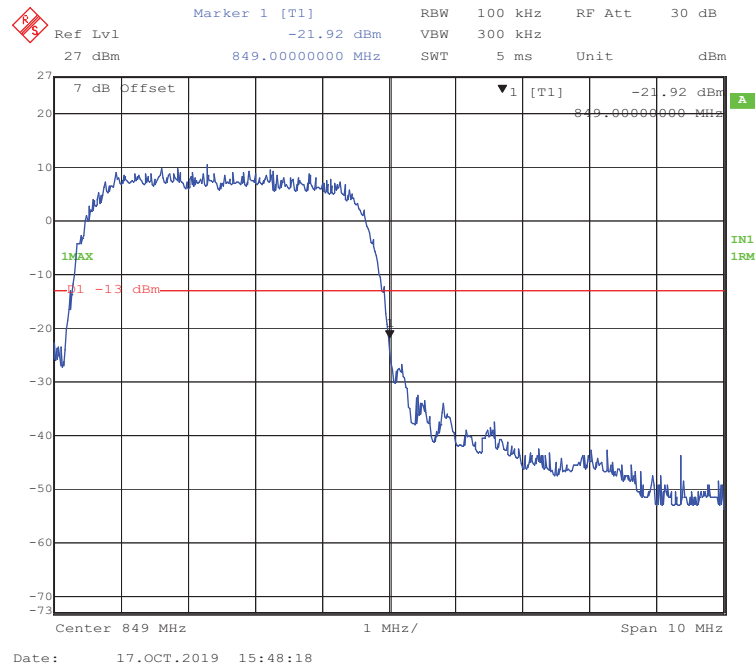
Environmental Conditions

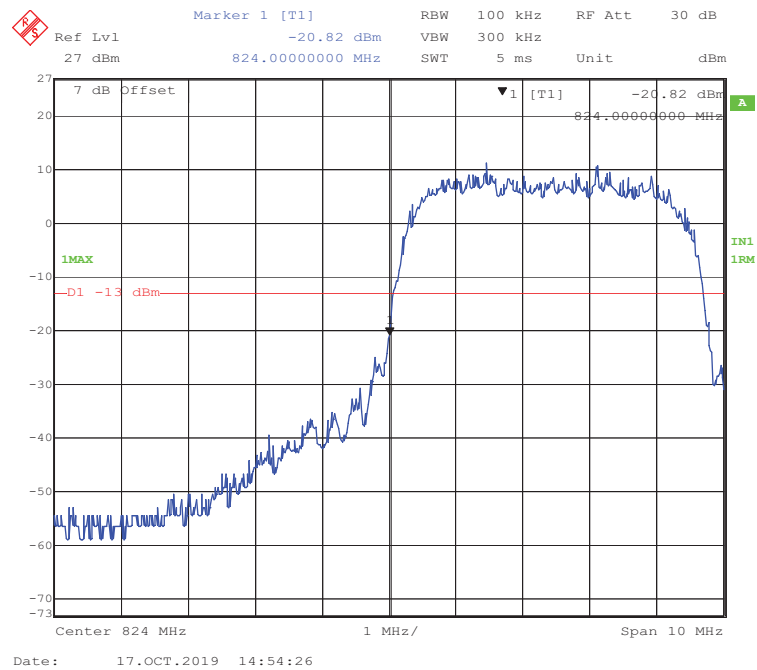
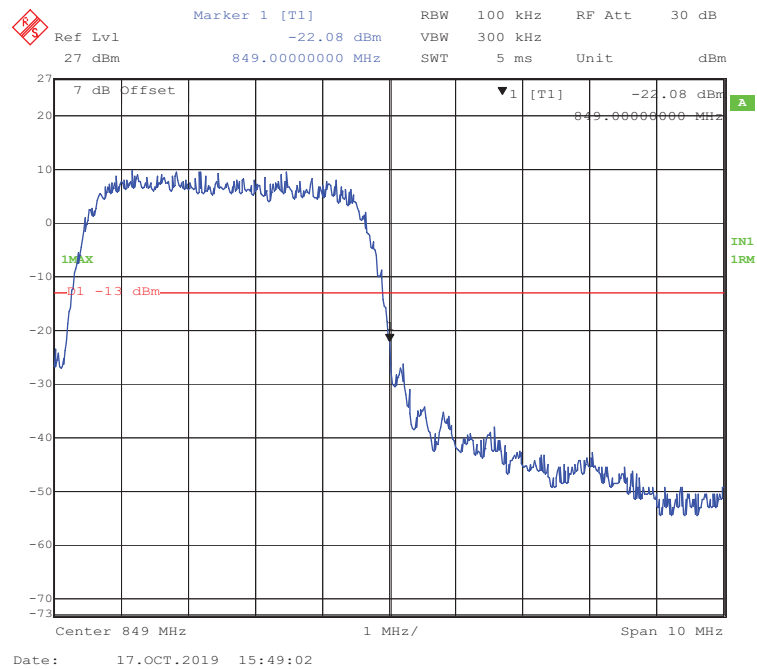
Temperature:	23.2-23.5 °C
Relative Humidity:	51-53 %
ATM Pressure:	101.1-103.3 kPa

The testing was performed by Winnie Yang from 2019-10-16 to 2019-10-18.

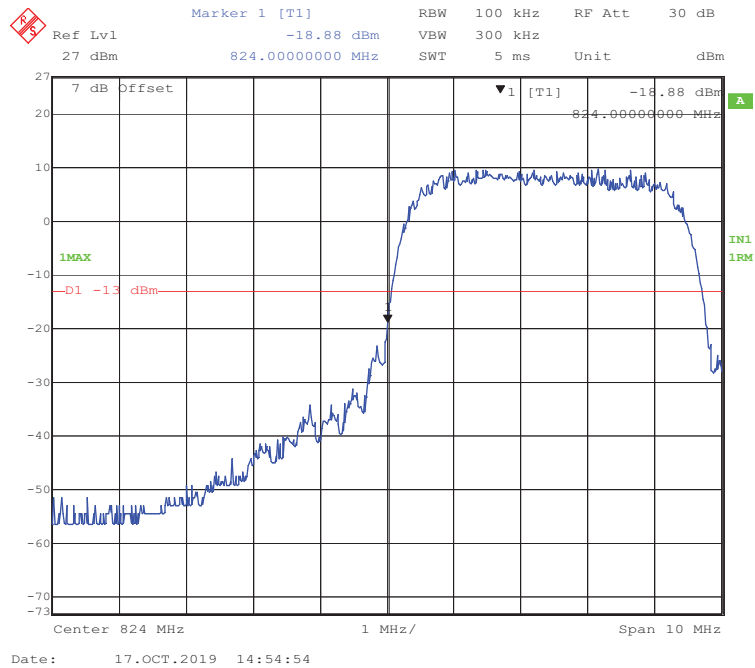
EUT operation mode: Transmitting

Test Result: Compliant.

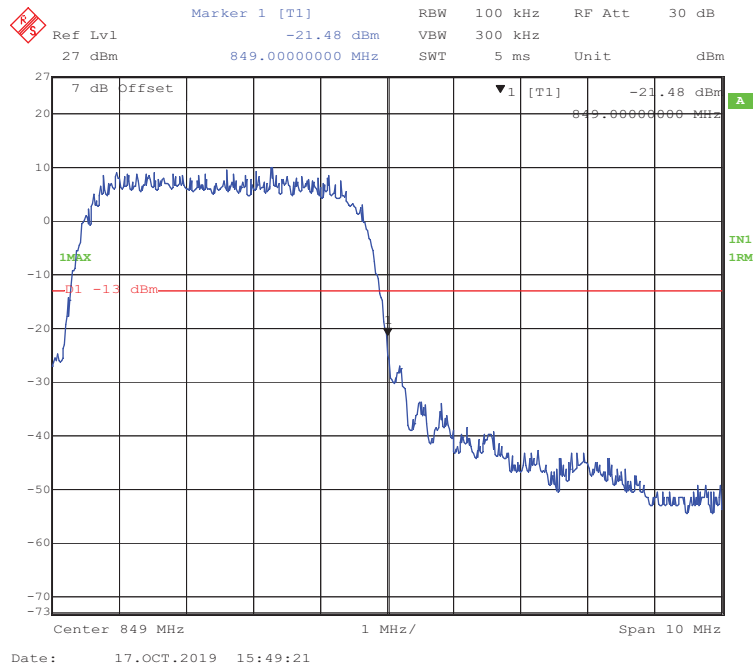
WCDMA Band V**WCDMA (Rel 99) Mode, Left Band Edge****WCDMA (Rel 99) Mode, Right Band Edge**

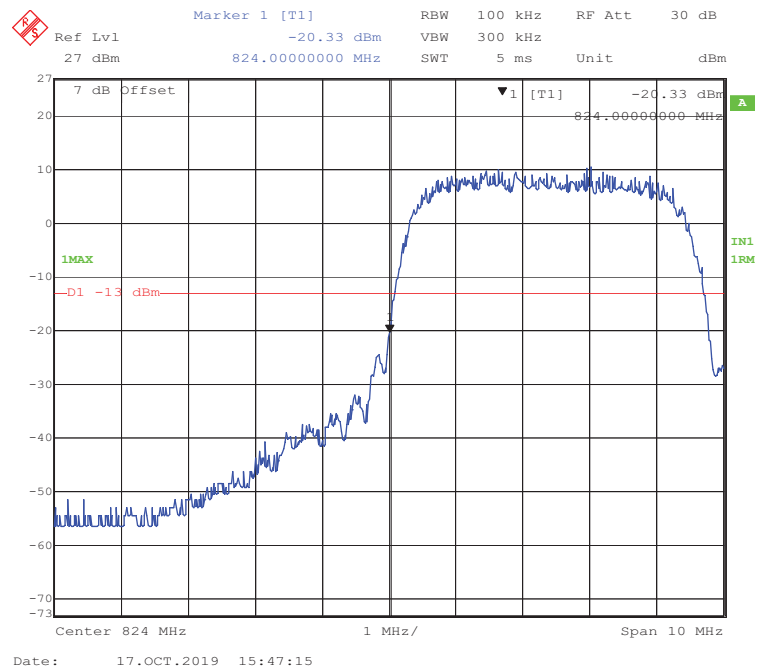
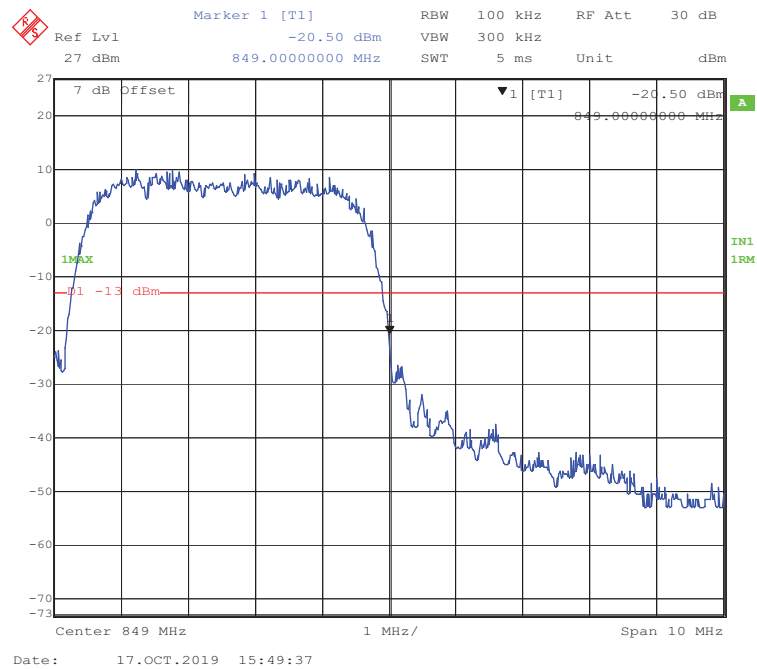
WCDMA (HSDPA) Mode, Left Band Edge**WCDMA (HSDPA) Mode, Right Band Edge**

WCDMA (HSUPA) Mode, Left Band Edge



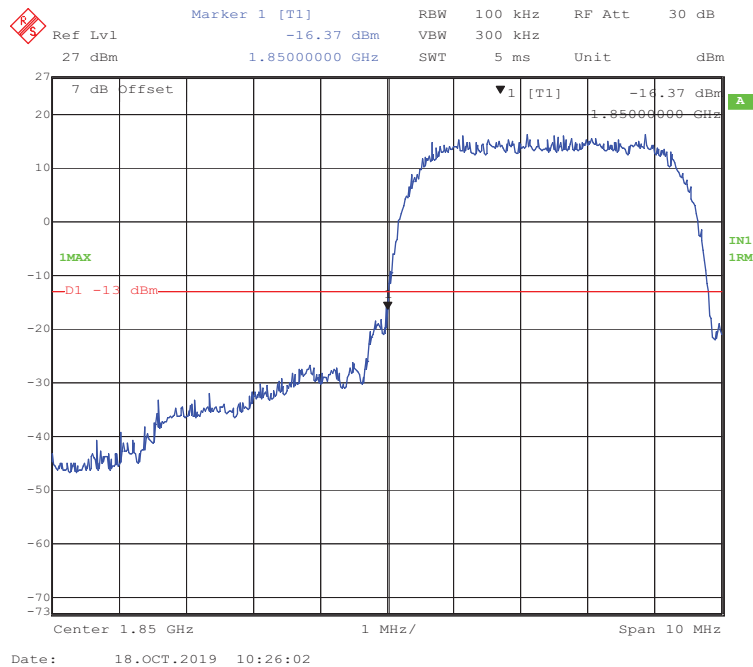
WCDMA (HSUPA) Mode, Right Band Edge



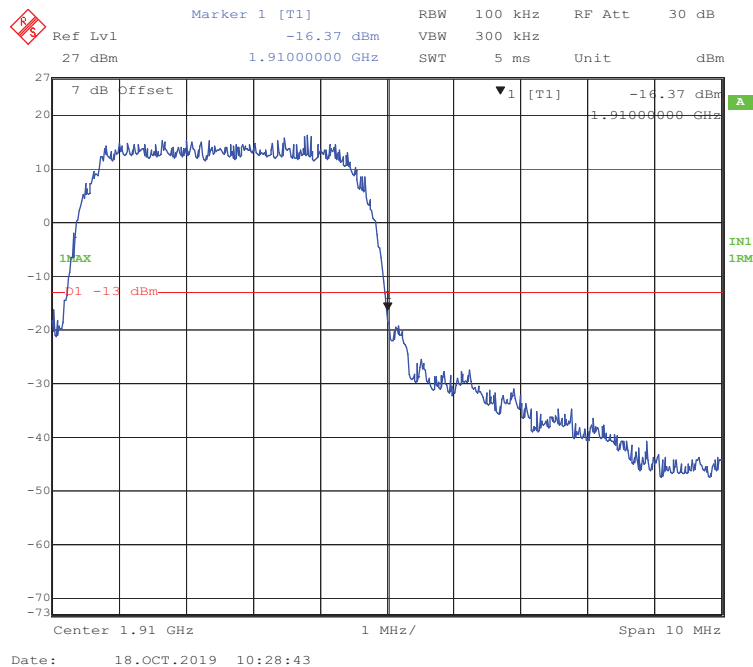
WCDMA (HSPA+) Mode, Left Band Edge**WCDMA (HSPA+) Mode, Right Band Edge**

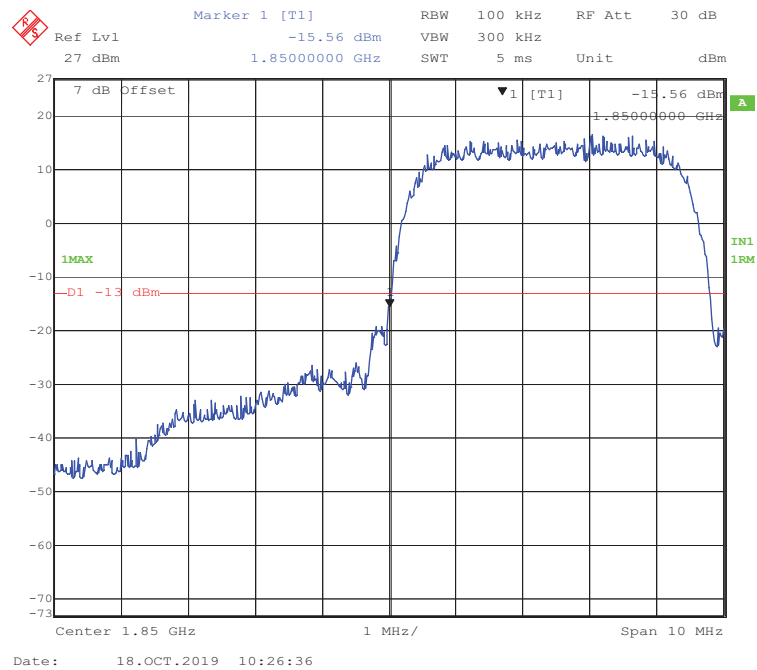
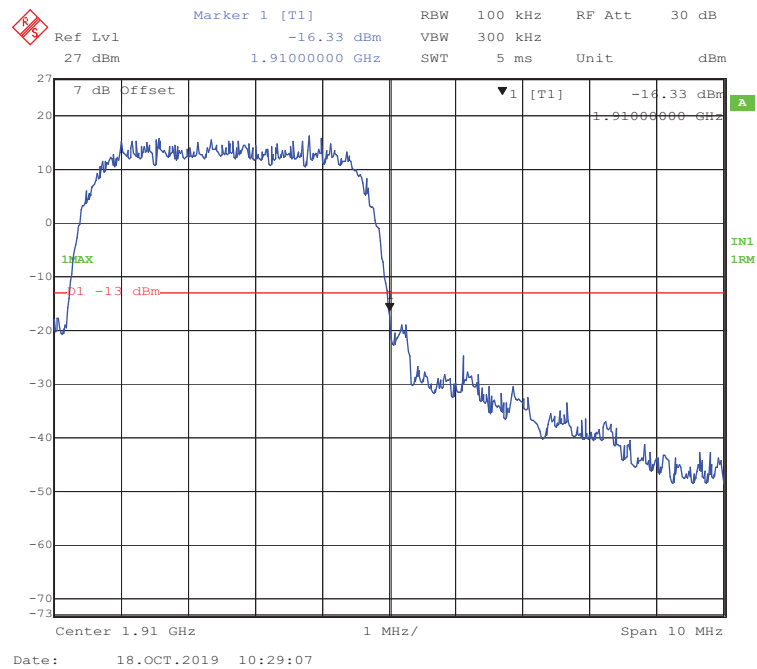
WCDMA Band II

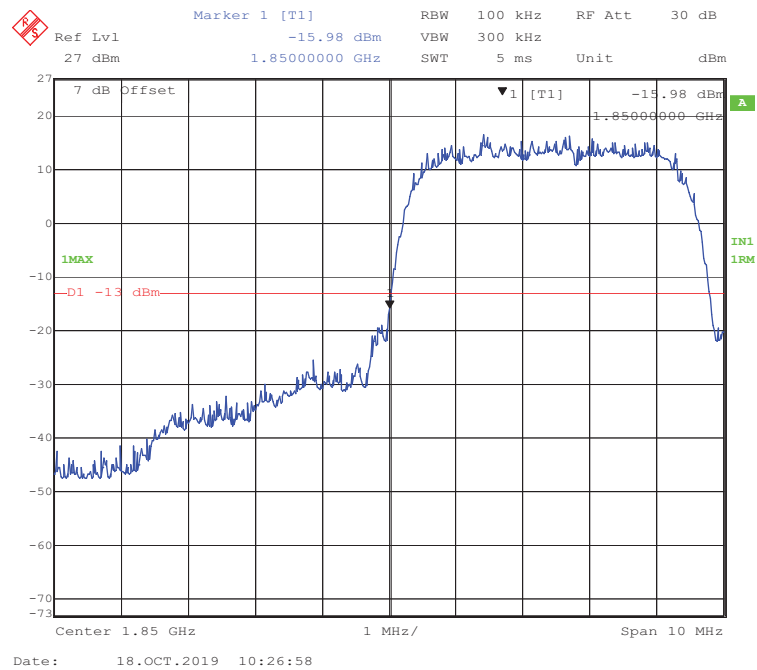
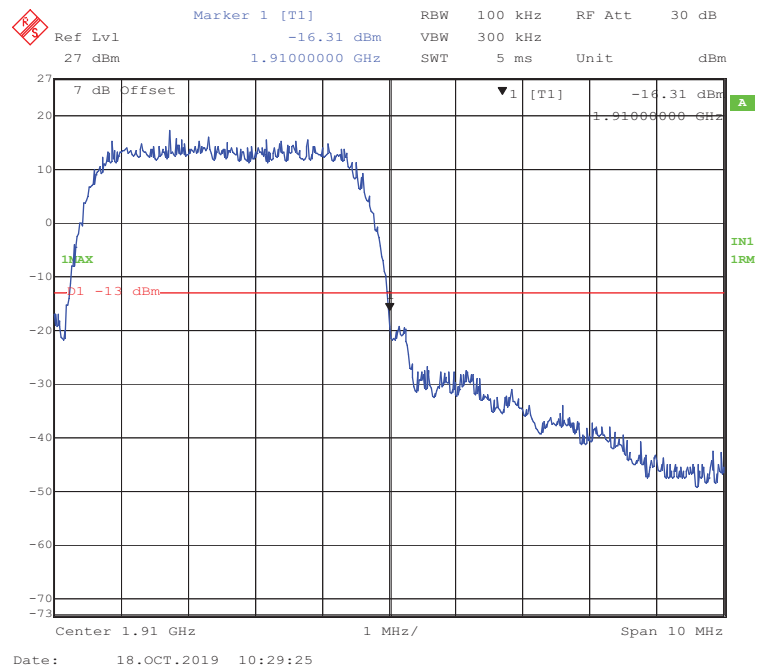
WCDMA (Rel99) Mode, Left Band Edge

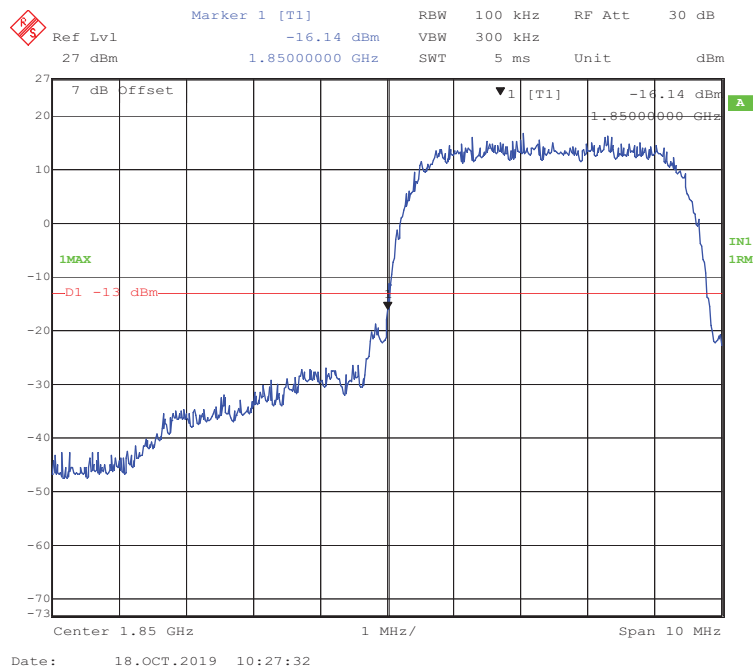
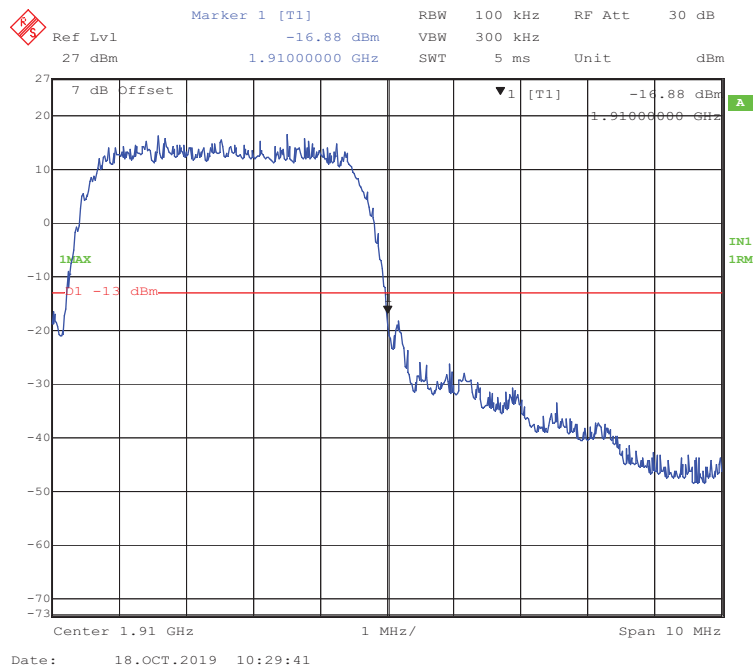


WCDMA (Rel99) Mode, Right Band Edge



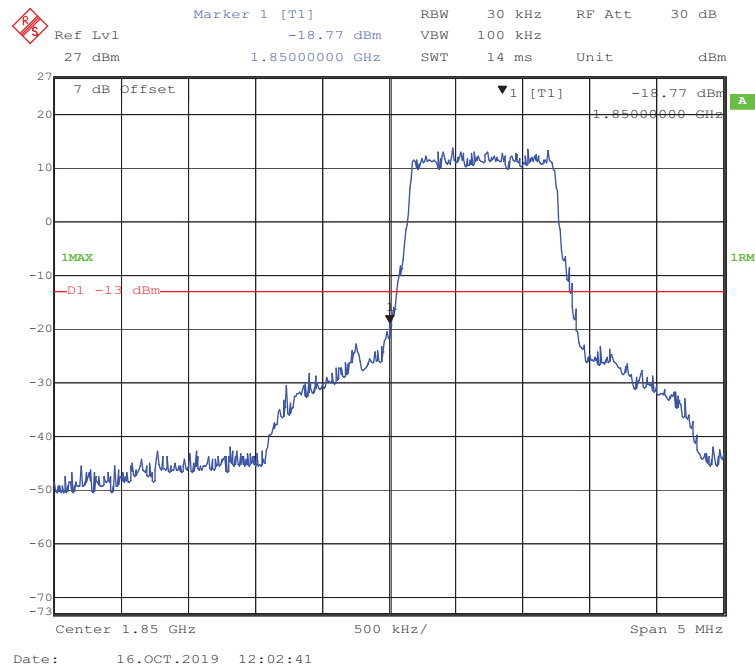
WCDMA (HSDPA) Mode, Left Band Edge**WCDMA (HSDPA) Mode, Right Band Edge**

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

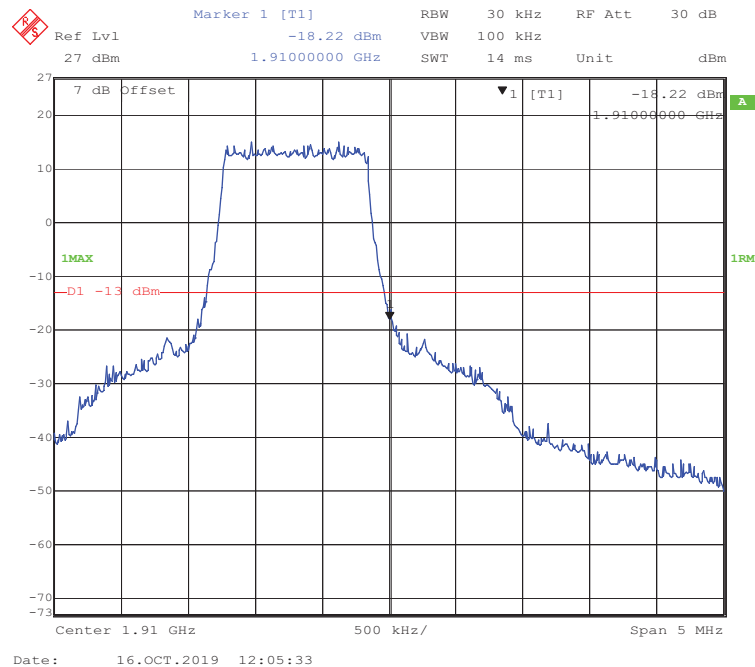
WCDMA (HSPA+) Mode, Left Band Edge**WCDMA (HSPA+) Mode, Right Band Edge**

LTE Band 2:

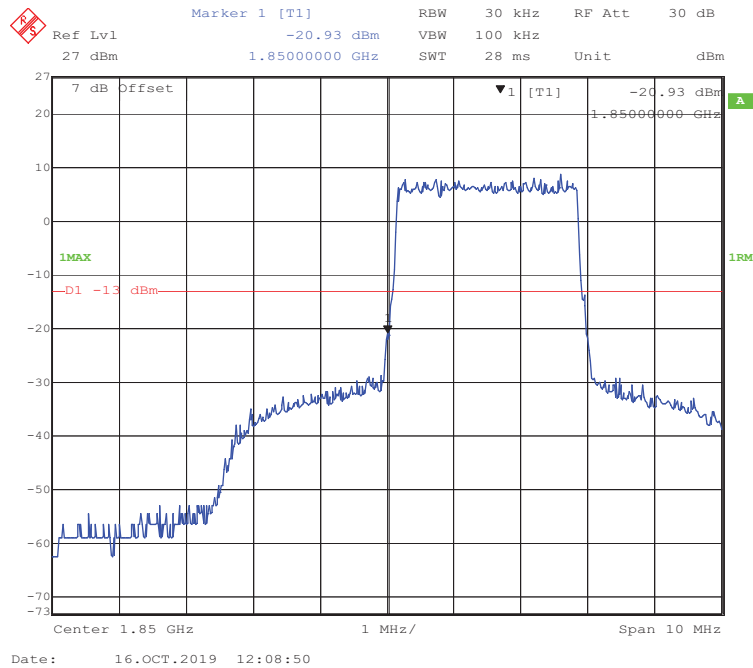
QPSK (1.4 MHz, FULL RB) - Left Band Edge



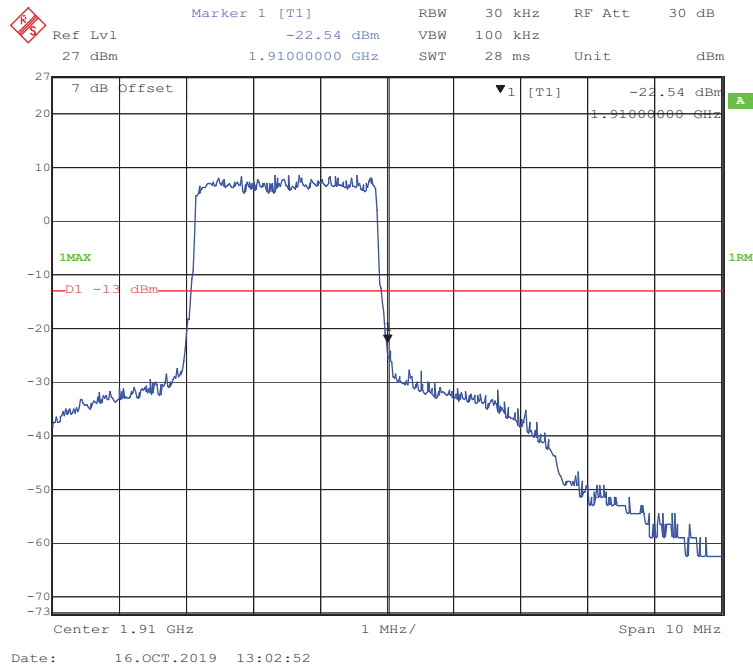
QPSK (1.4 MHz, FULL RB) - Right Band Edge

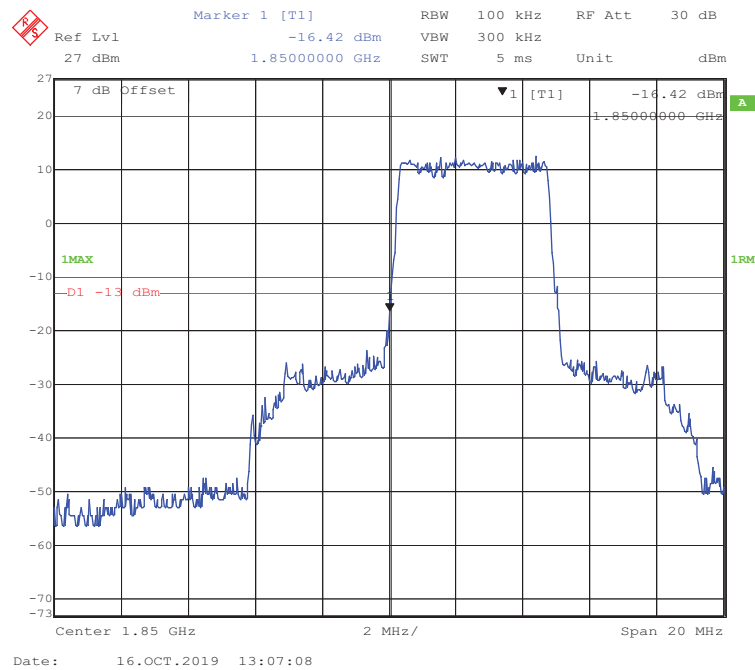
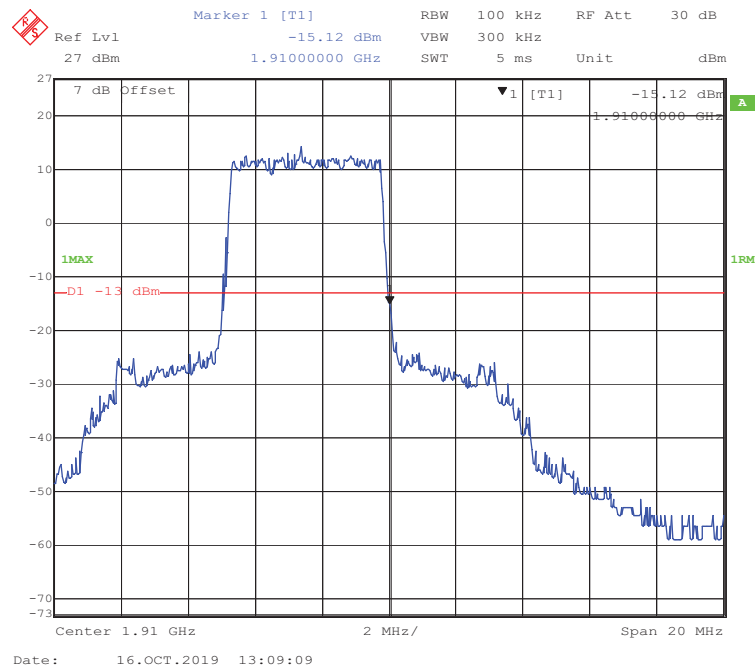


QPSK (3 MHz, FULL RB) - Left Band Edge

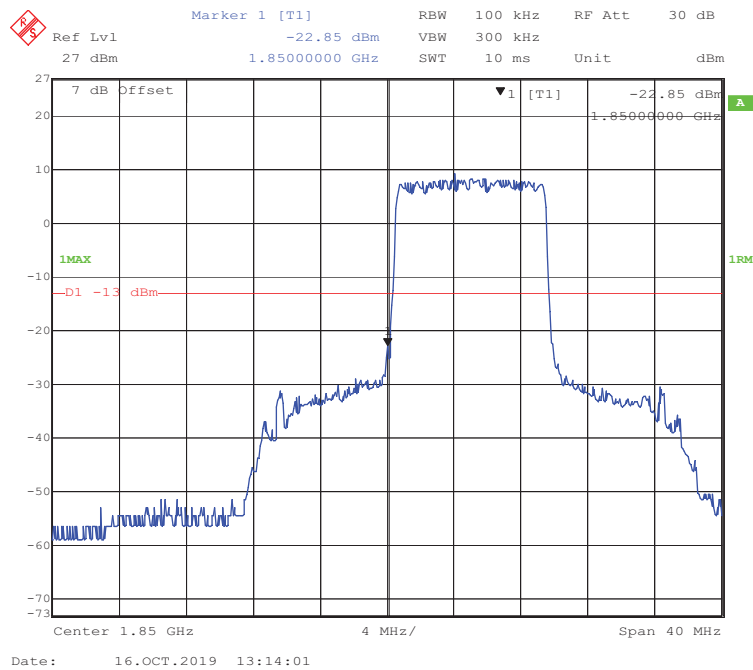


QPSK (3 MHz, FULL RB) - Right Band Edge

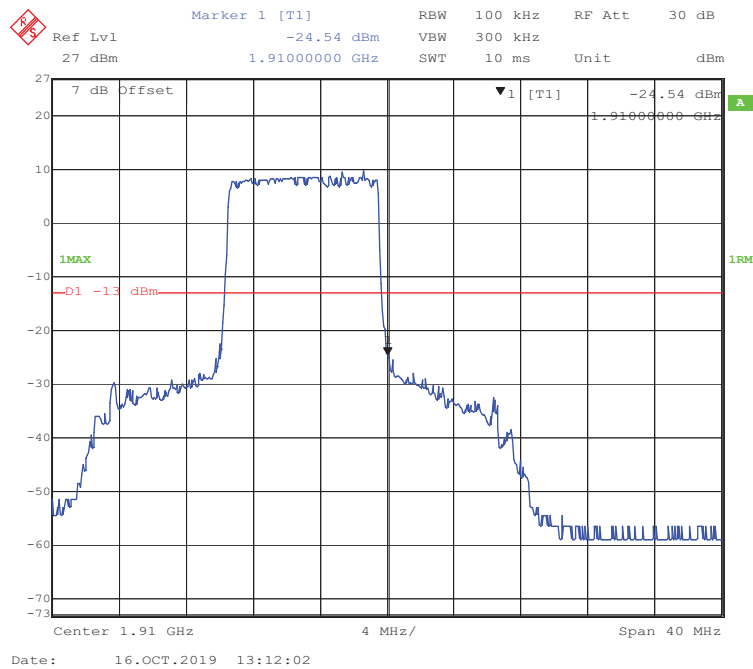


QPSK (5 MHz, FULL RB) - Left Band Edge**QPSK (5 MHz, FULL RB) - Right Band Edge**

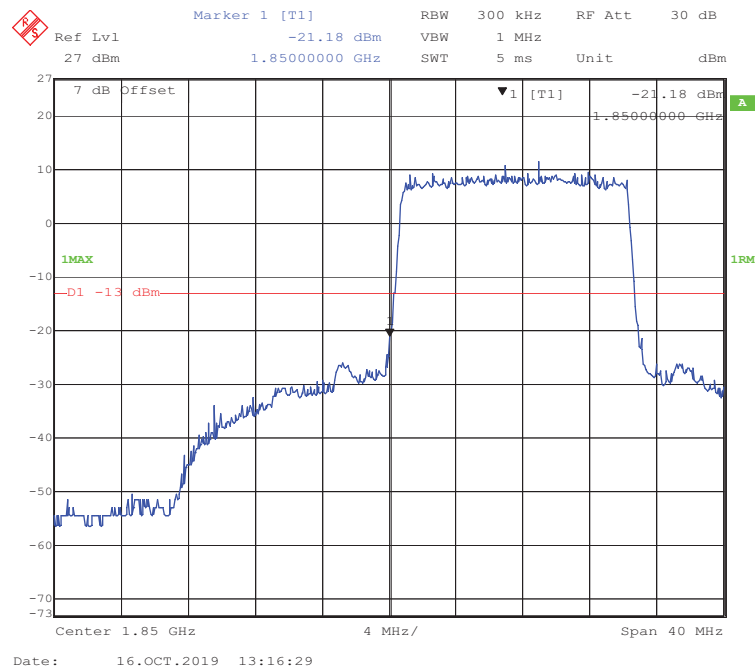
QPSK (10 MHz, FULL RB) - Left Band Edge



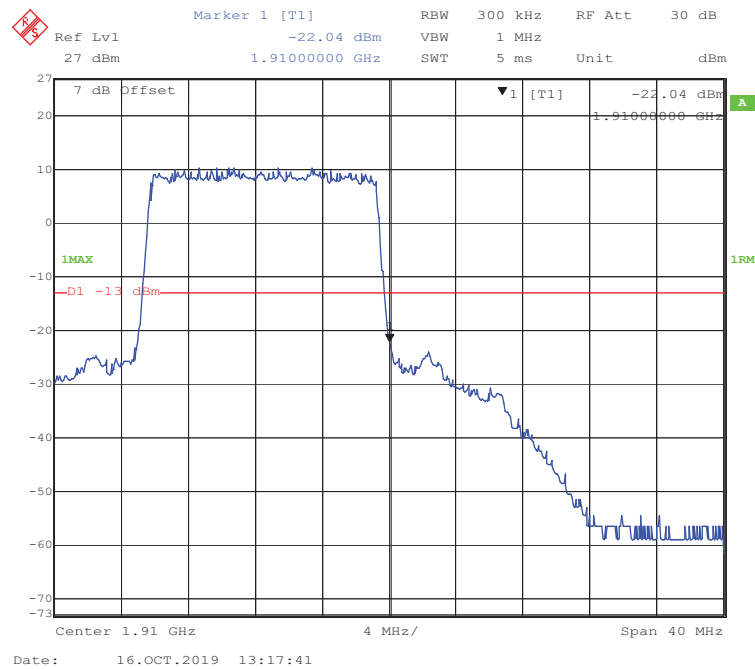
QPSK (10 MHz, FULL RB) - Right Band Edge

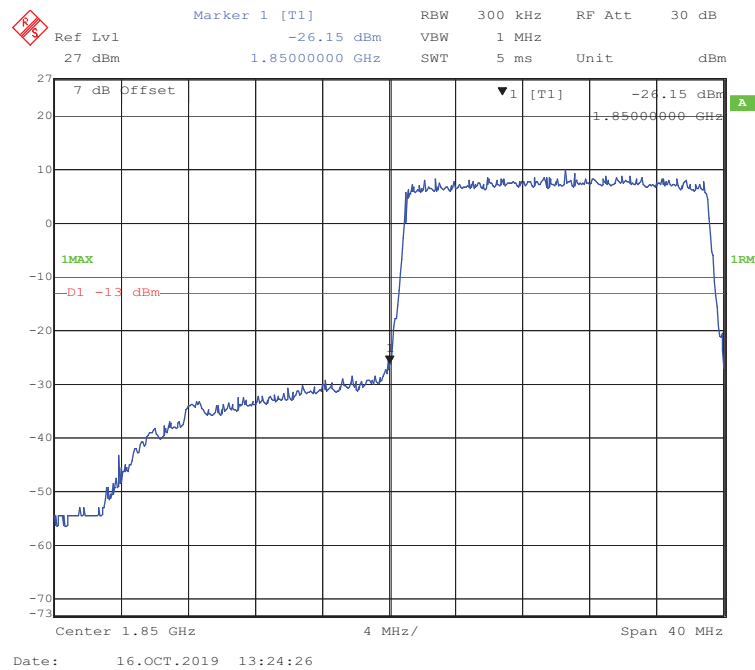
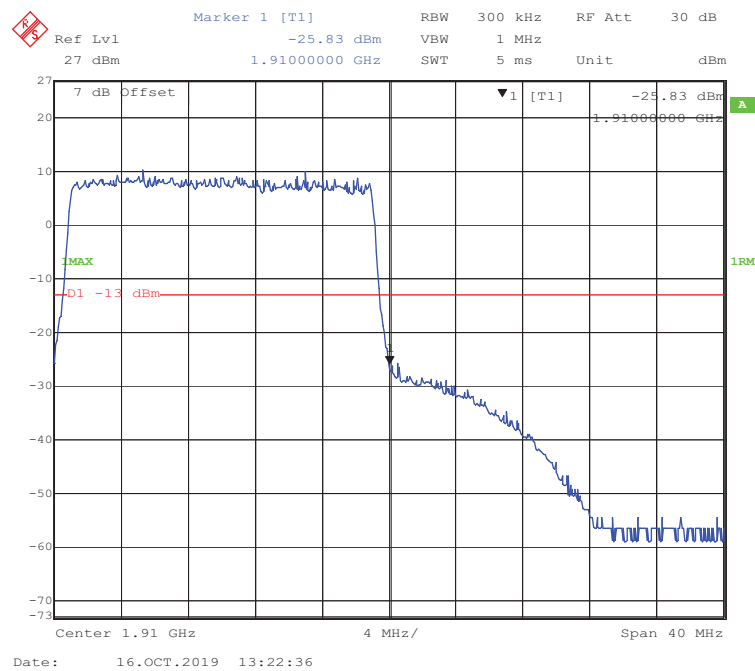


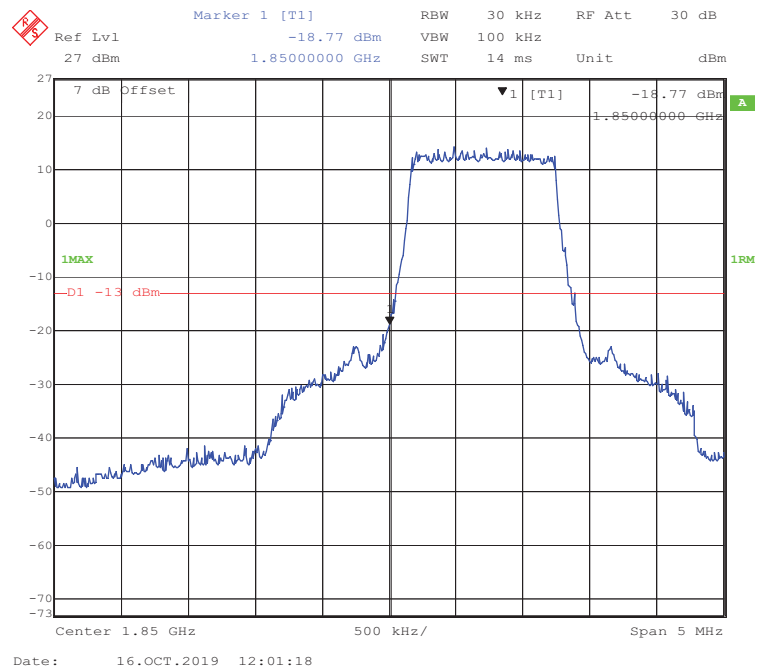
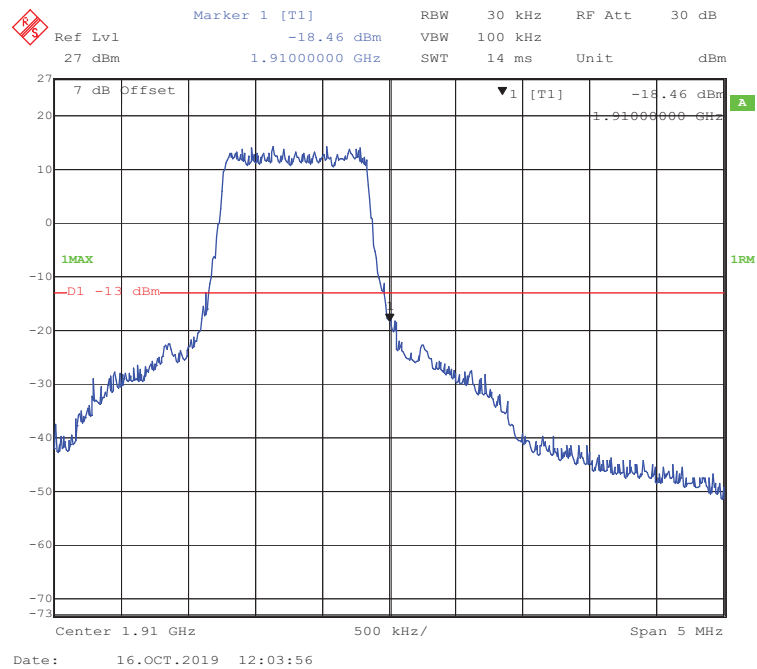
QPSK (15 MHz, FULL RB) - Left Band Edge

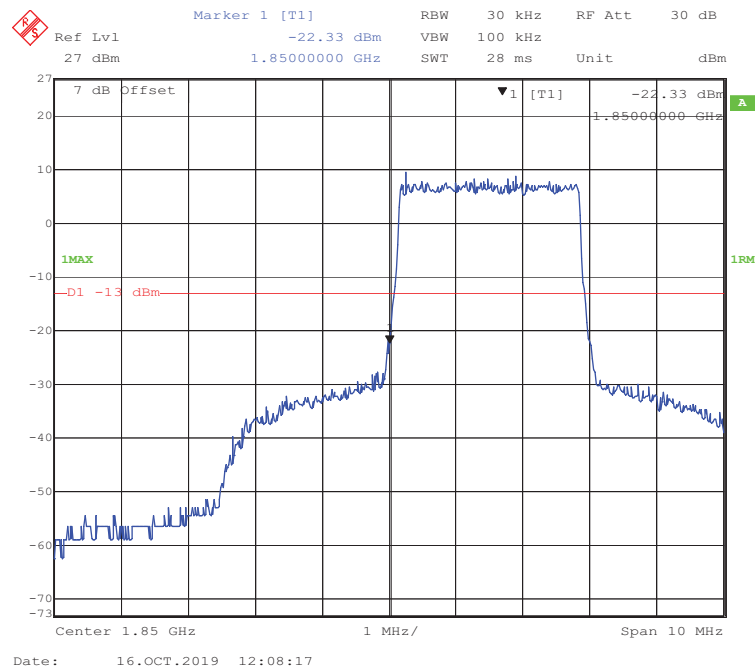
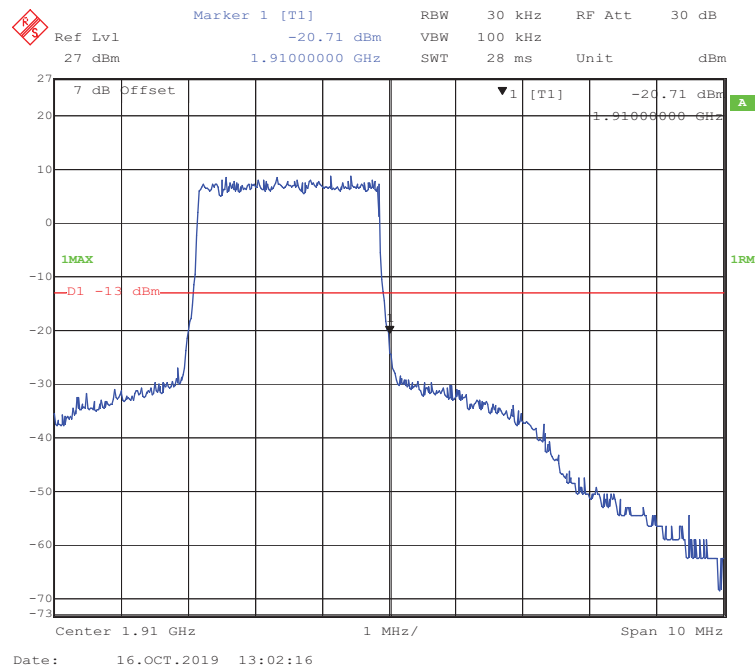


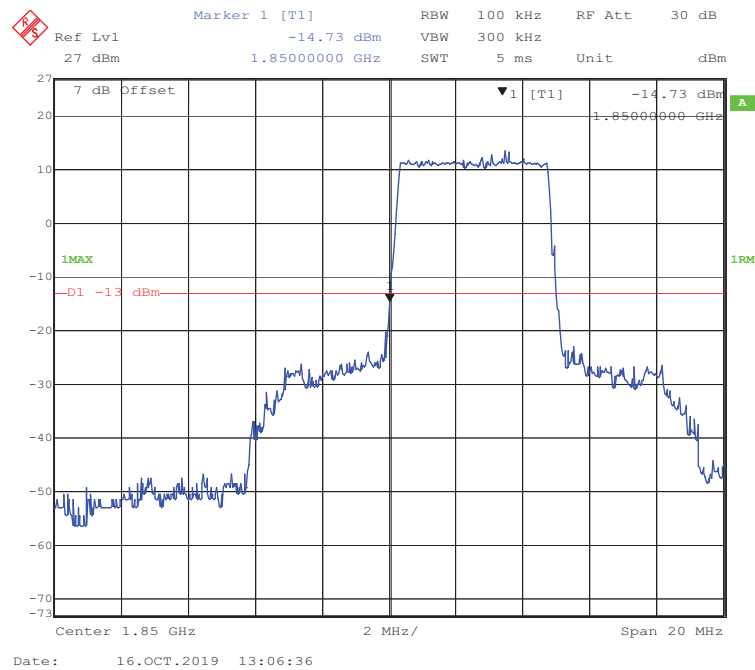
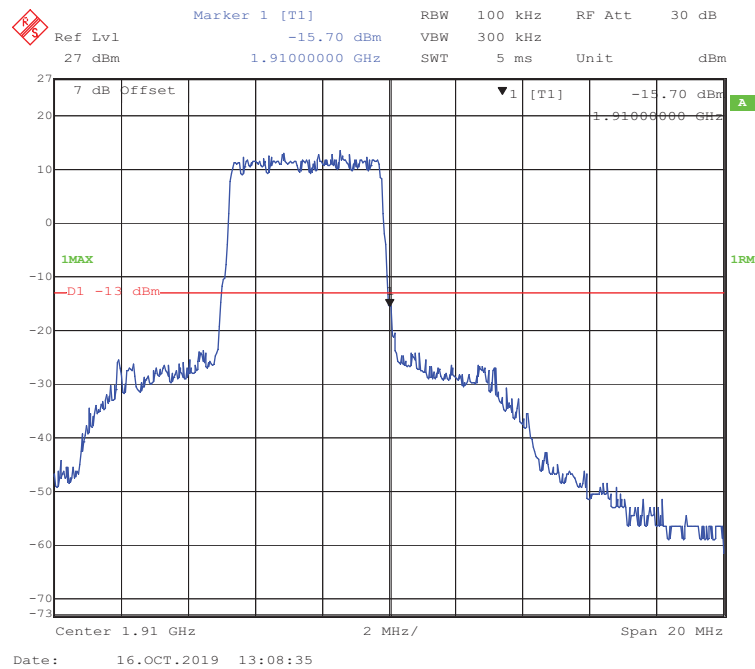
QPSK (15 MHz, FULL RB) - Right Band Edge

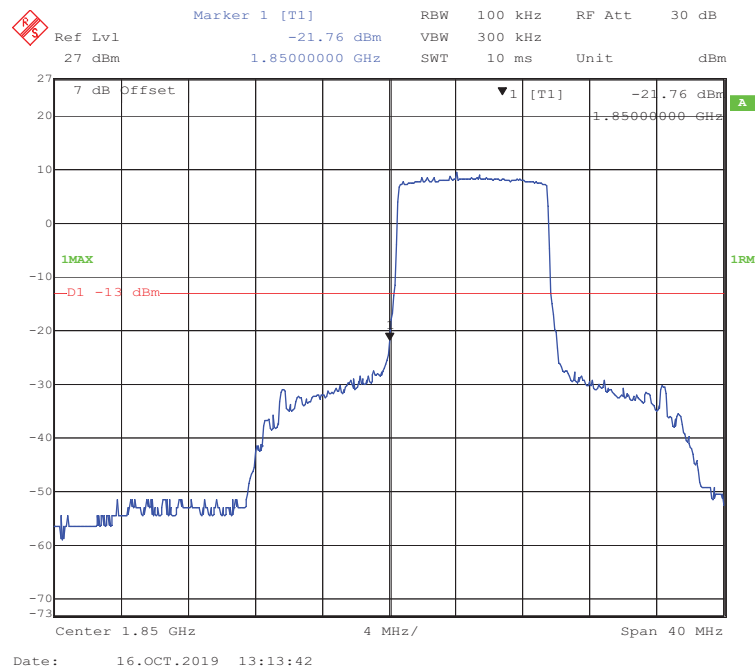
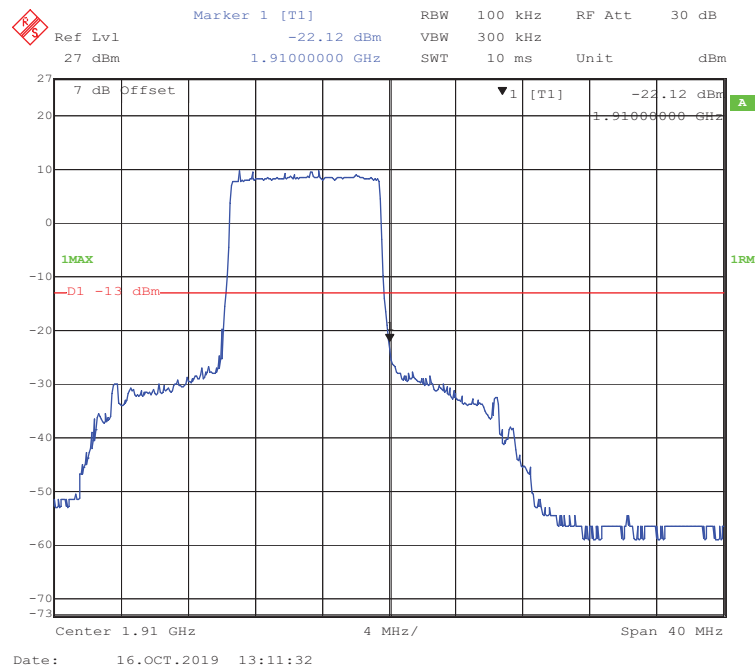


QPSK (20 MHz, FULL RB) - Left Band Edge**QPSK (20 MHz, FULL RB) - Right Band Edge**

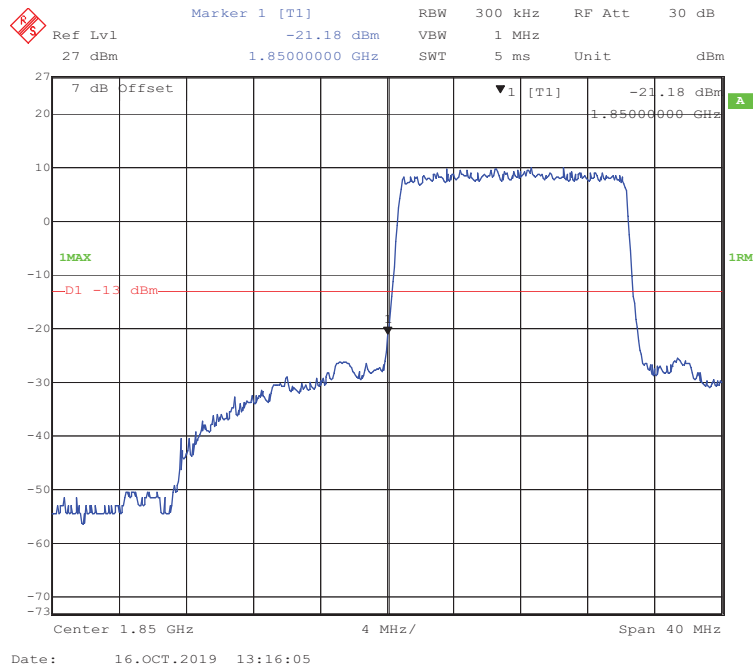
16-QAM (1.4 MHz, FULL RB) - Left Band Edge**16-QAM (1.4 MHz, FULL RB) - Right Band Edge**

16-QAM (3 MHz, FULL RB) - Left Band Edge**16-QAM (3 MHz, FULL RB) - Right Band Edge**

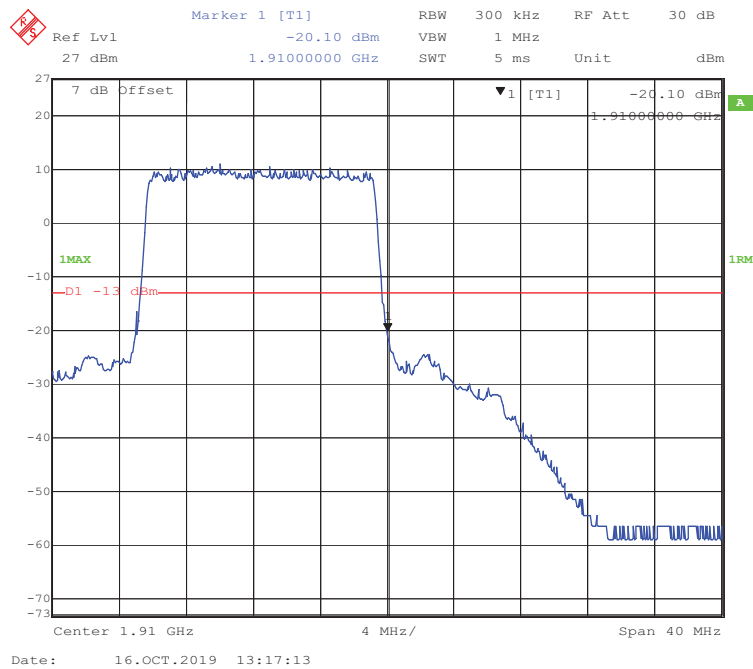
16-QAM (5 MHz, FULL RB) - Left Band Edge**16-QAM (5 MHz, FULL RB) - Right Band Edge**

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

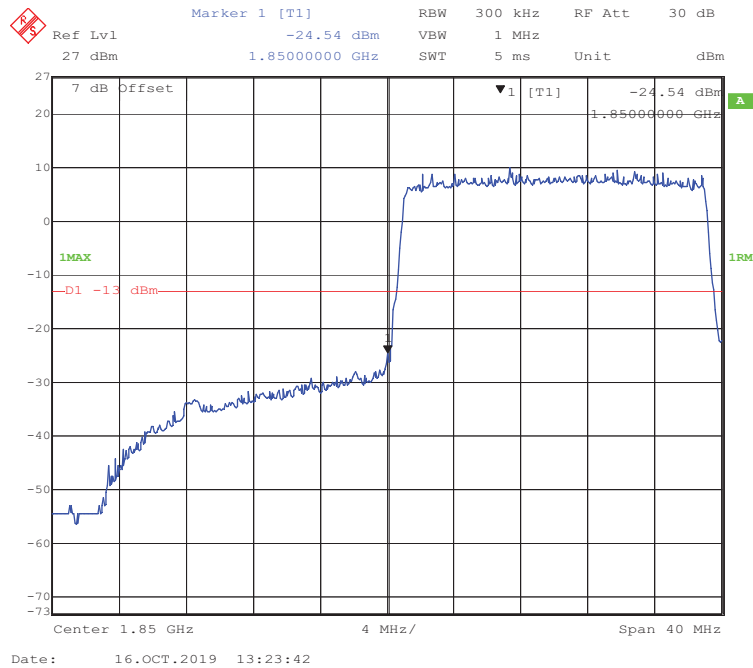
16-QAM (15 MHz, FULL RB) - Left Band Edge



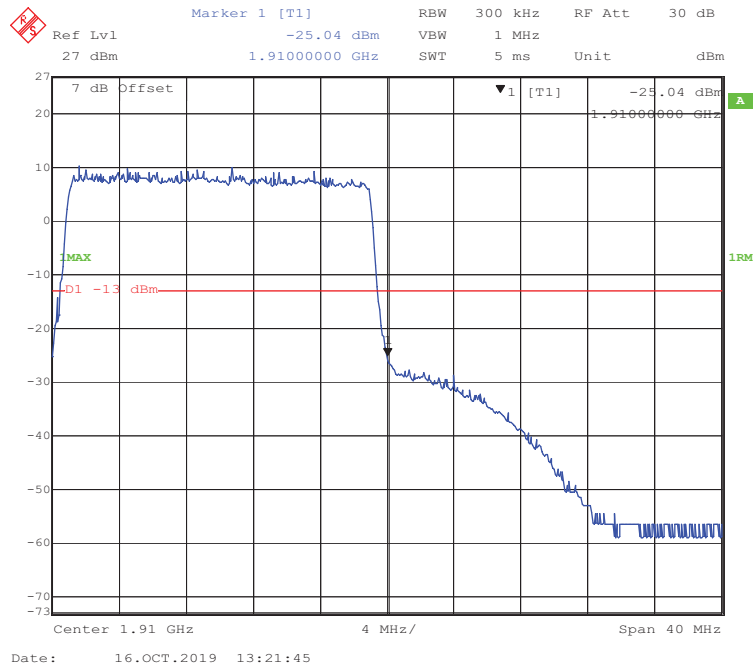
16-QAM (15 MHz, FULL RB) - Right Band Edge

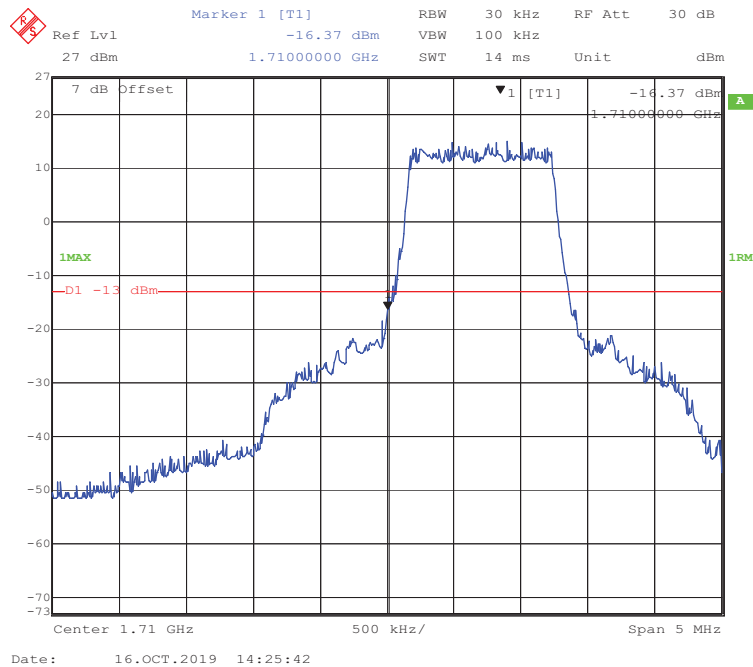
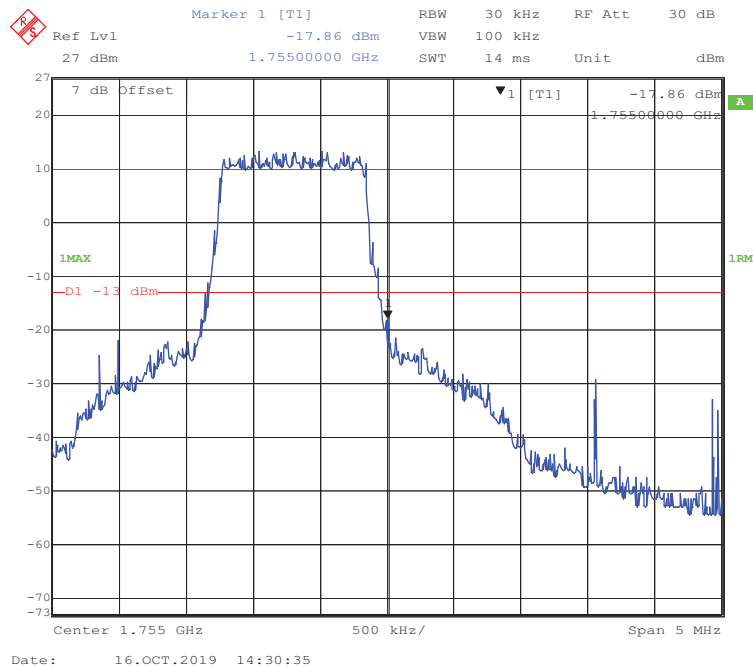


16-QAM (20 MHz, FULL RB) - Left Band Edge

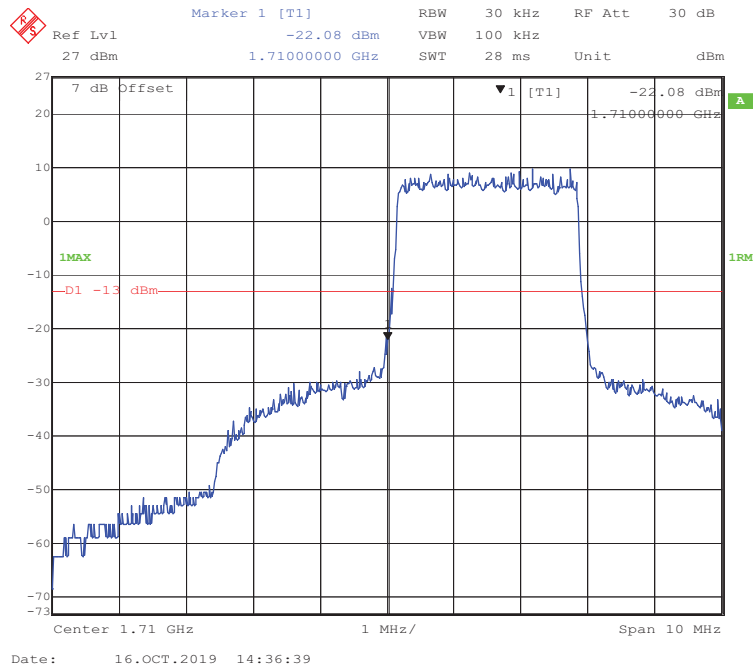


16-QAM (20 MHz, FULL RB) - Right Band Edge

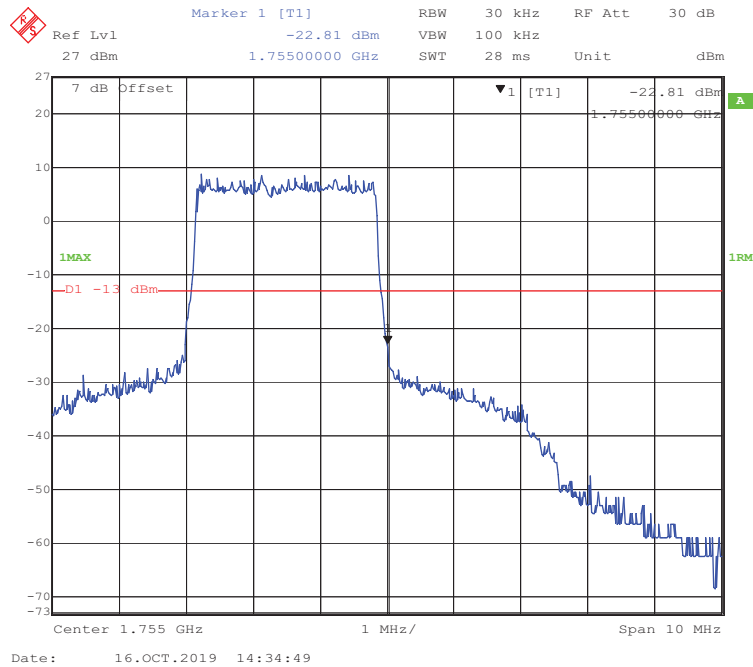


LTE Band 4:**QPSK (1.4 MHz, FULL RB) - Left Band Edge****QPSK (1.4 MHz, FULL RB) - Right Band Edge**

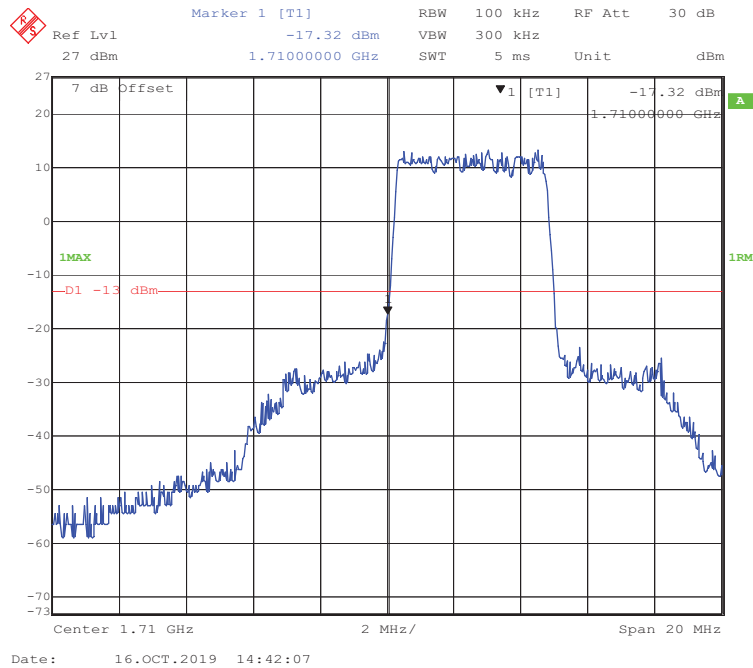
QPSK (3 MHz, FULL RB) - Left Band Edge



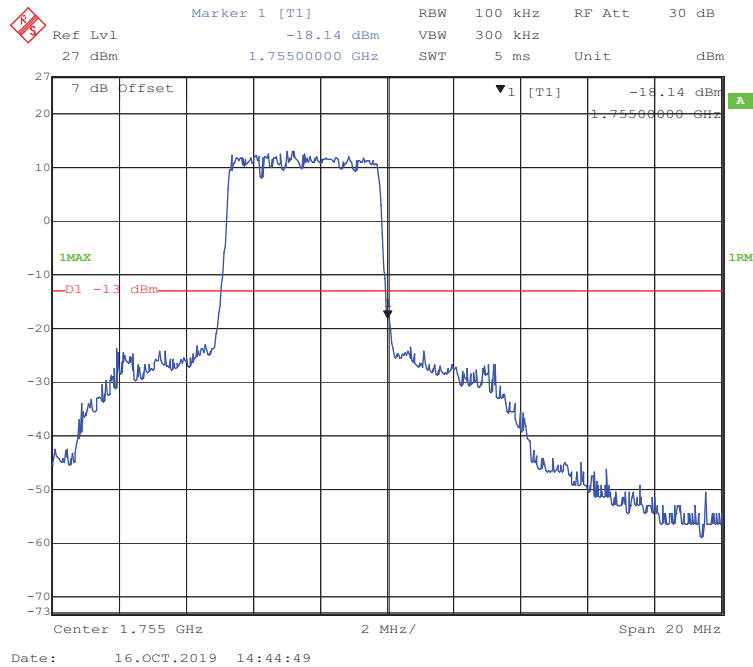
QPSK (3 MHz, FULL RB) - Right Band Edge



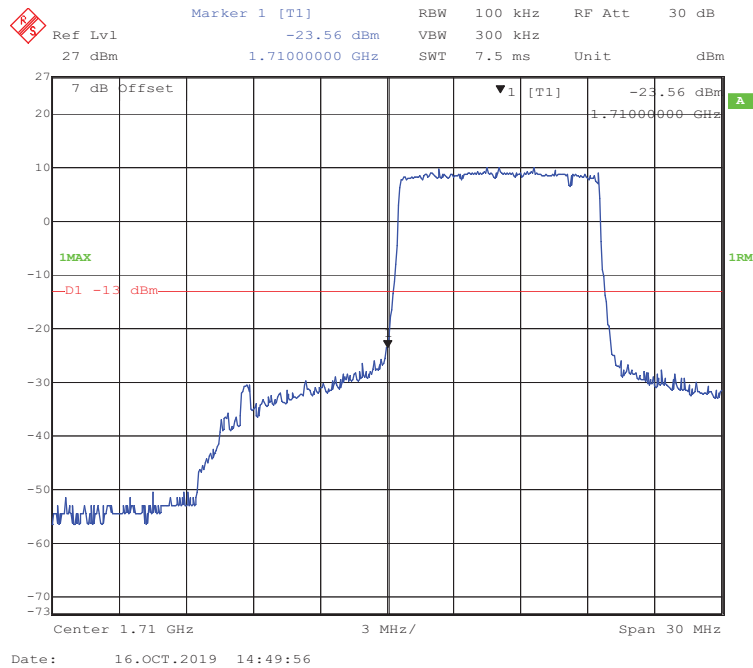
QPSK (5 MHz, FULL RB) - Left Band Edge



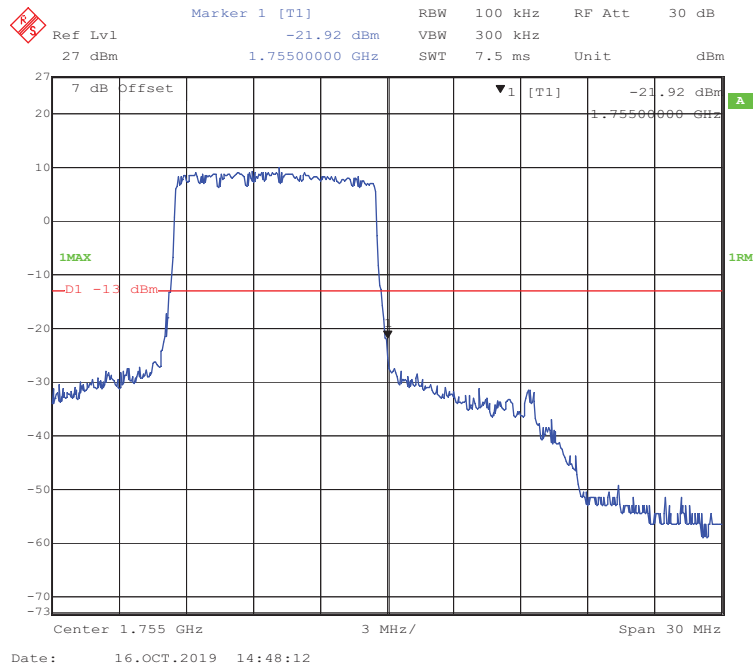
QPSK (5 MHz, FULL RB) - Right Band Edge



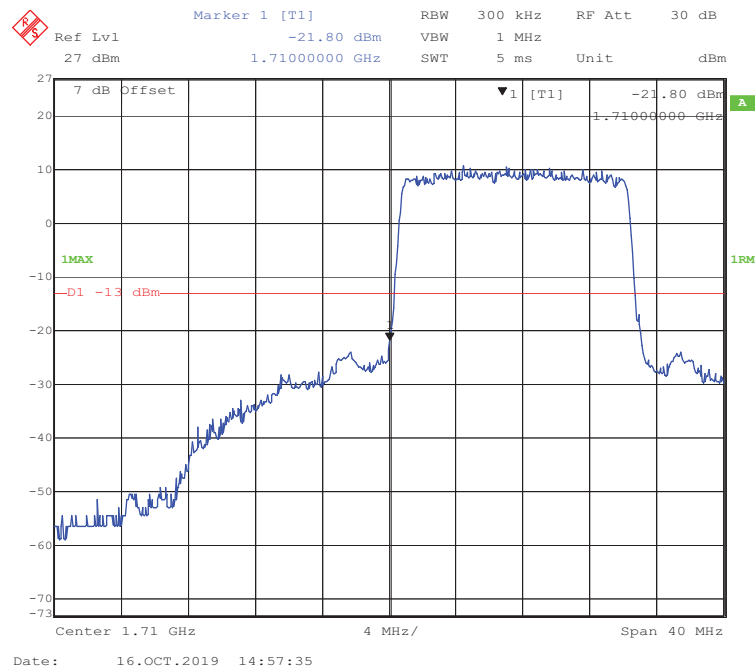
QPSK (10 MHz, FULL RB) - Left Band Edge



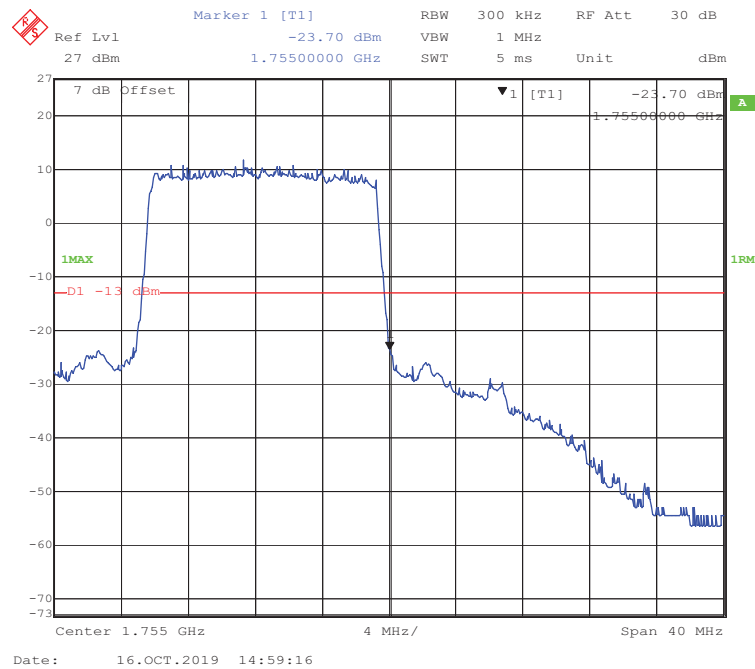
QPSK (10 MHz, FULL RB) - Right Band Edge



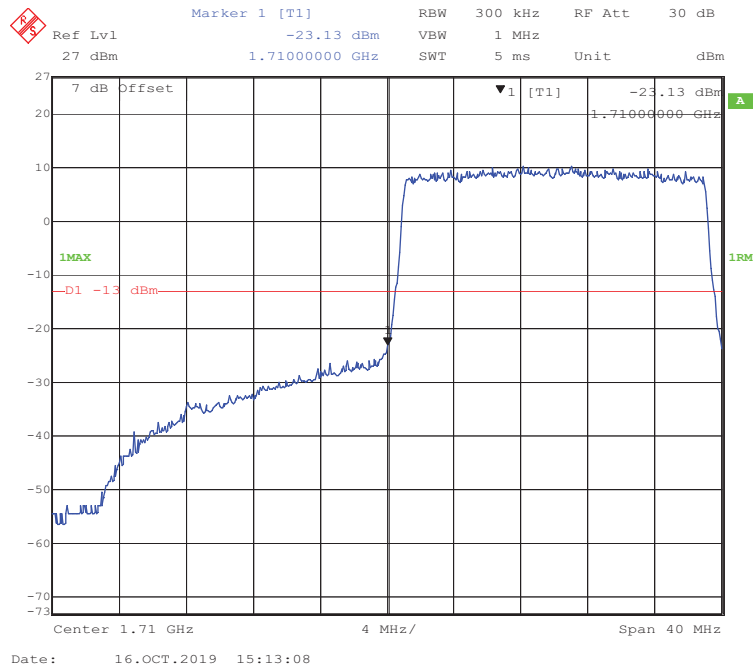
QPSK (15 MHz, FULL RB) - Left Band Edge



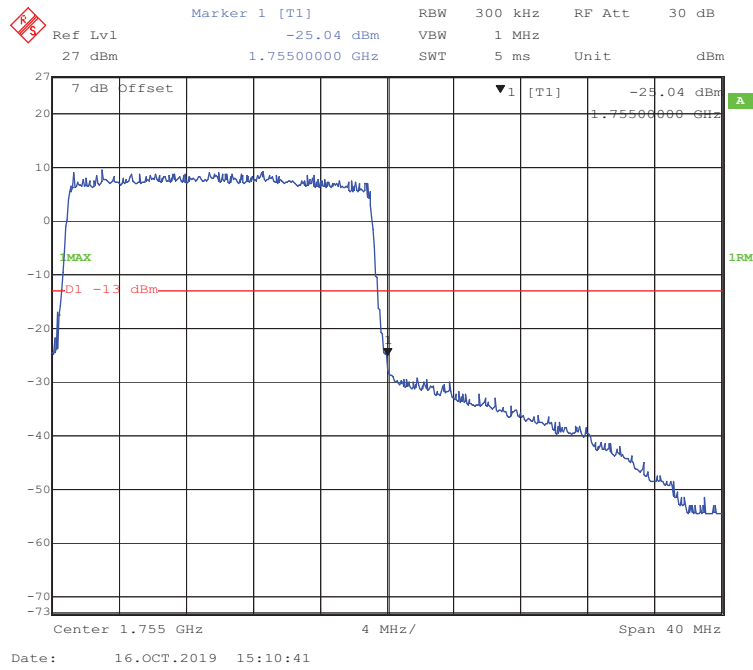
QPSK (15 MHz, FULL RB) - Right Band Edge



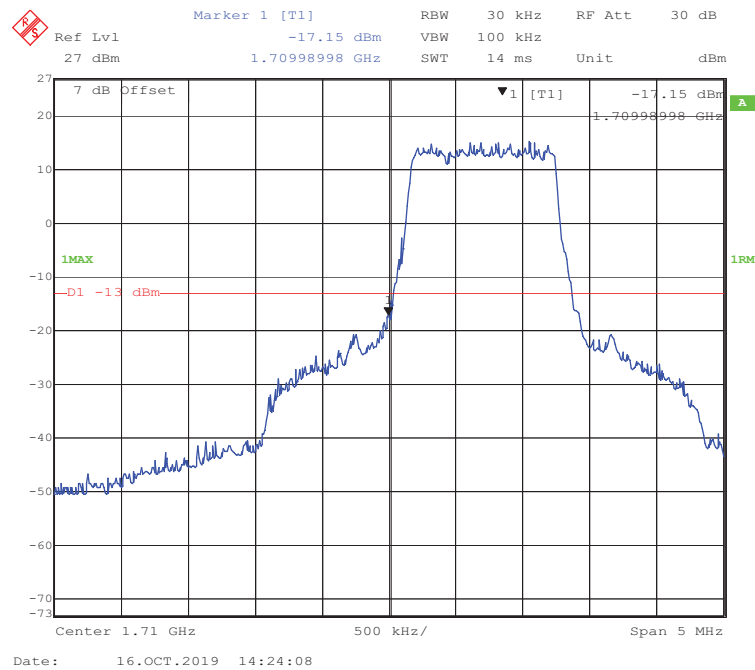
QPSK (20 MHz, FULL RB) - Left Band Edge



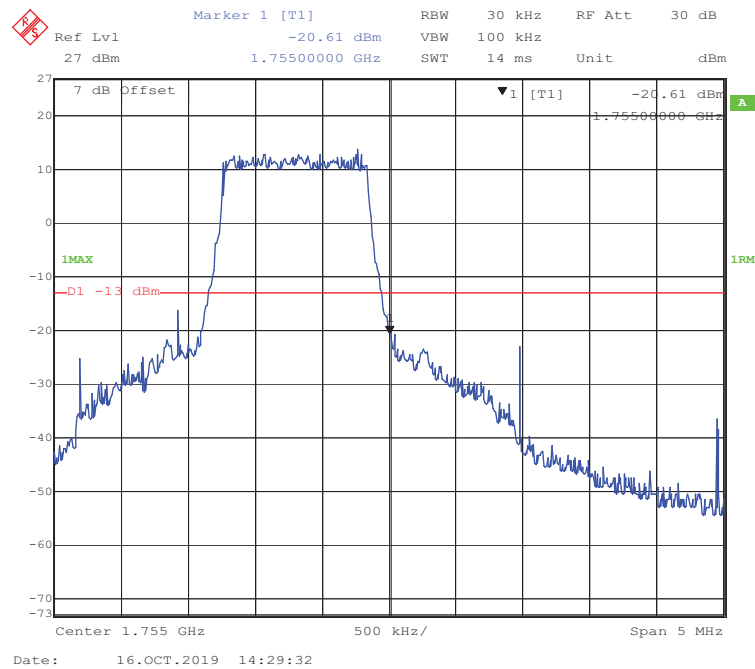
QPSK (20 MHz, FULL RB) - Right Band Edge



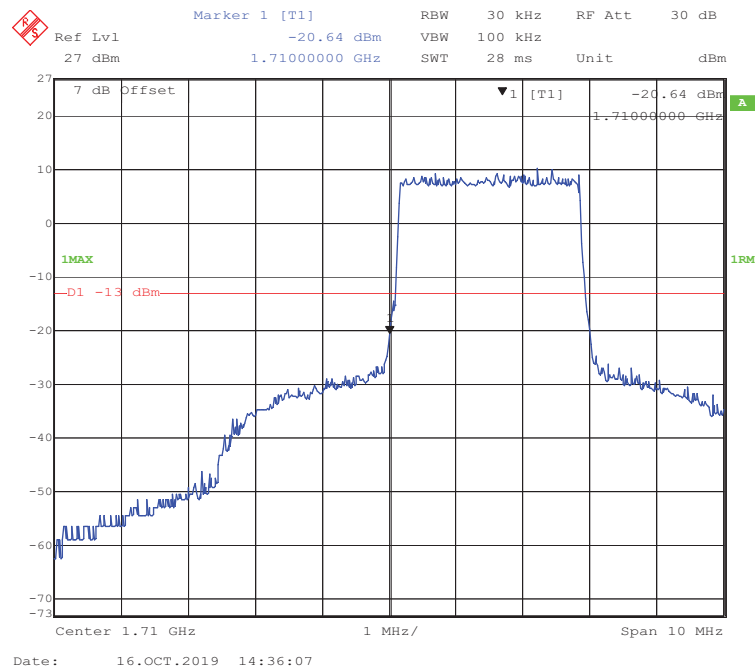
16-QAM (1.4 MHz, FULL RB) - Left Band Edge



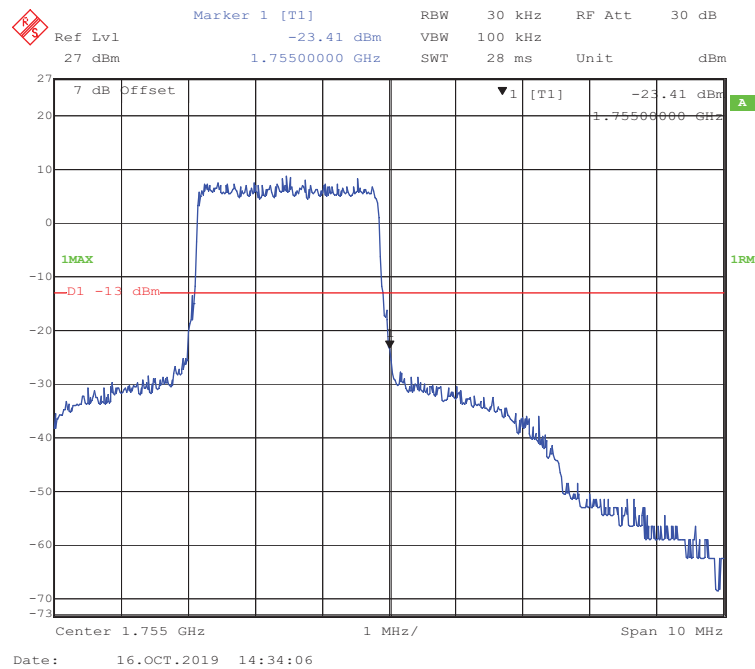
16-QAM (1.4 MHz, FULL RB) - Right Band Edge

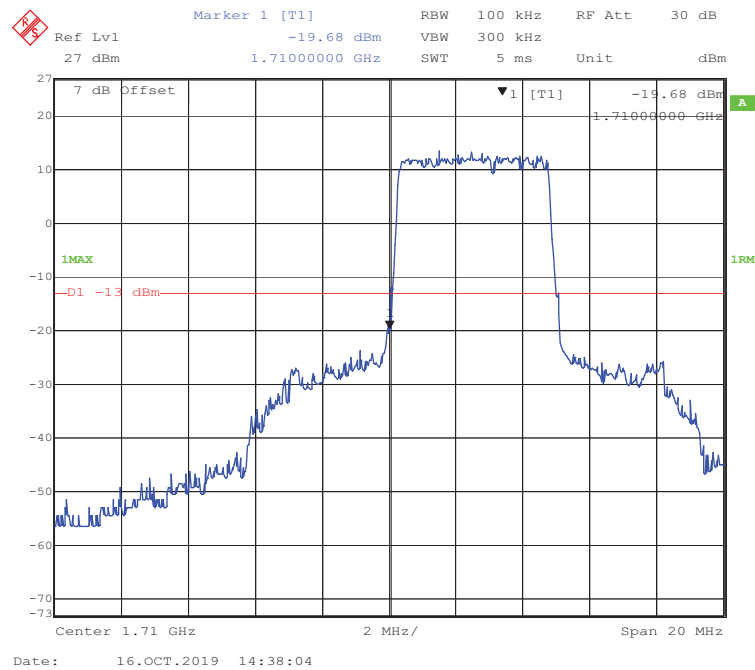
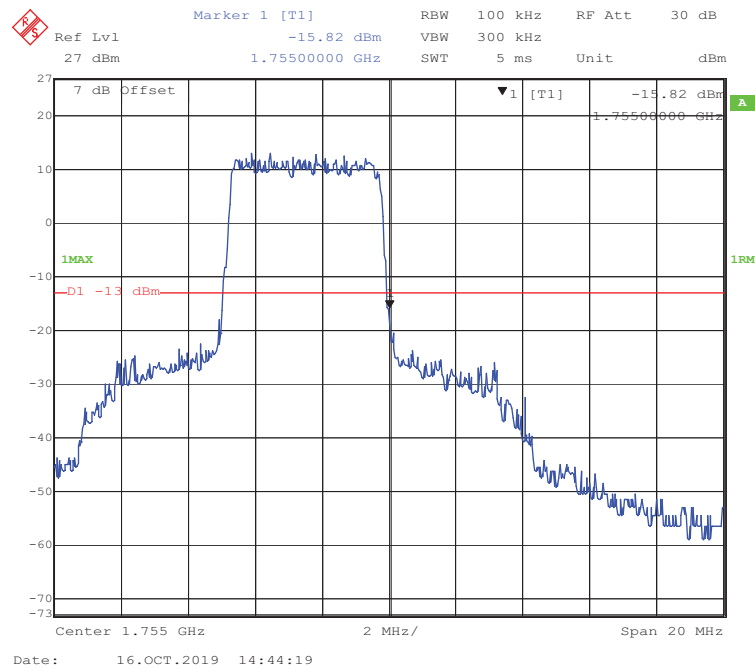


16-QAM (3 MHz, FULL RB) - Left Band Edge

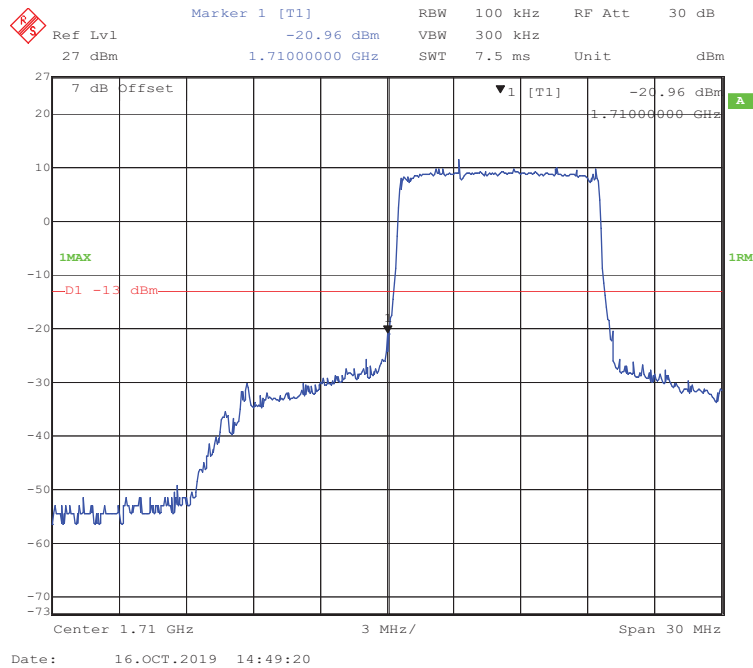


16-QAM (3 MHz, FULL RB) - Right Band Edge

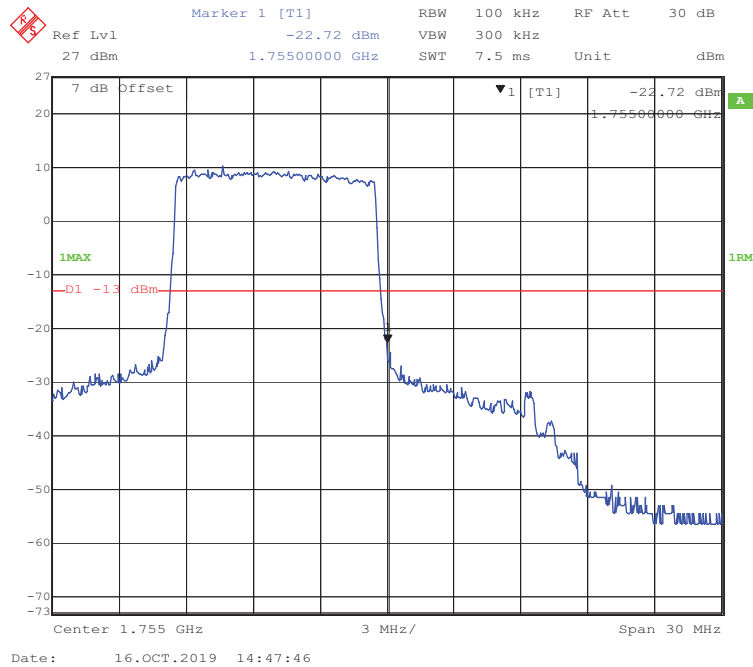


16-QAM (5 MHz, FULL RB) - Left Band Edge**16-QAM (5 MHz, FULL RB) - Right Band Edge**

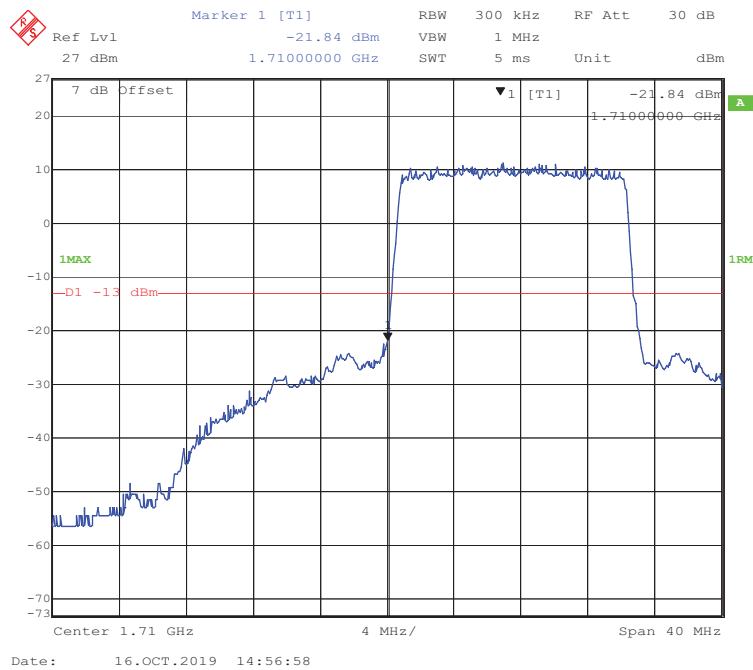
16-QAM (10 MHz, FULL RB) - Left Band Edge



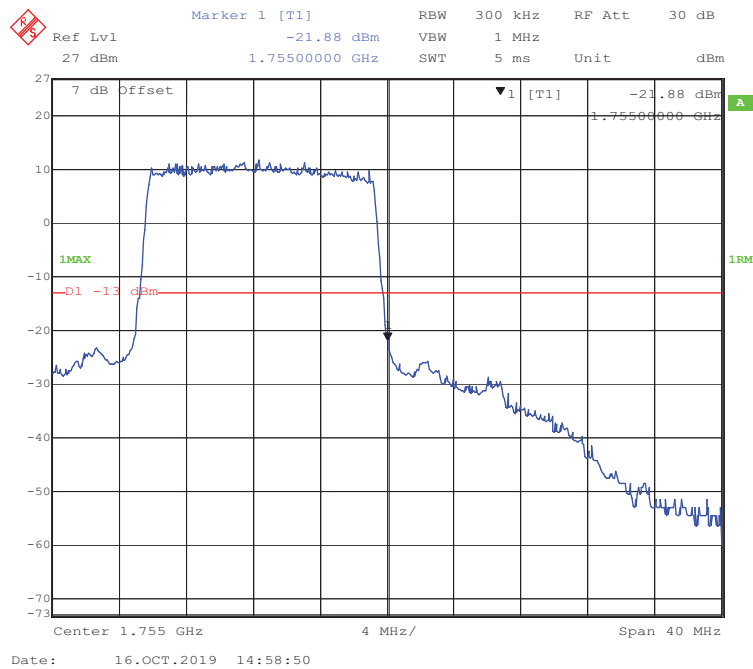
16-QAM (10 MHz, FULL RB) - Right Band Edge



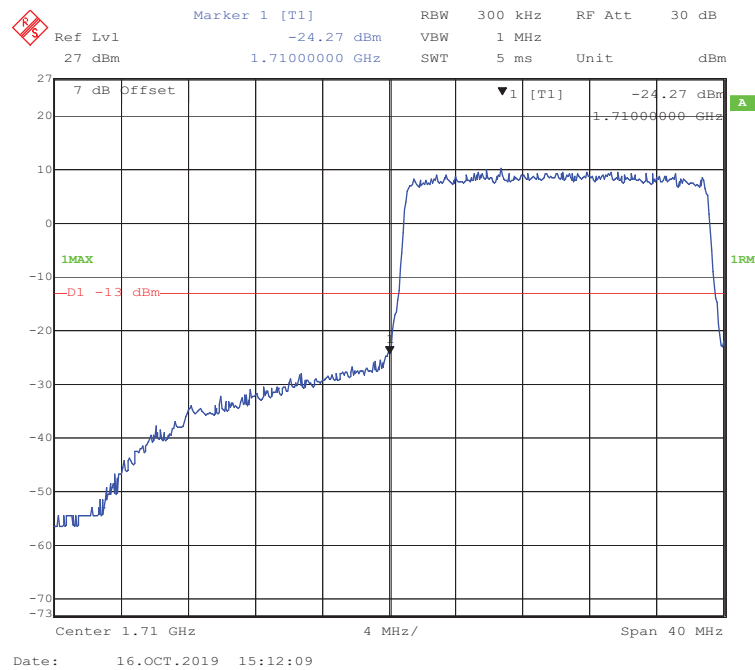
16-QAM (15 MHz, FULL RB) - Left Band Edge



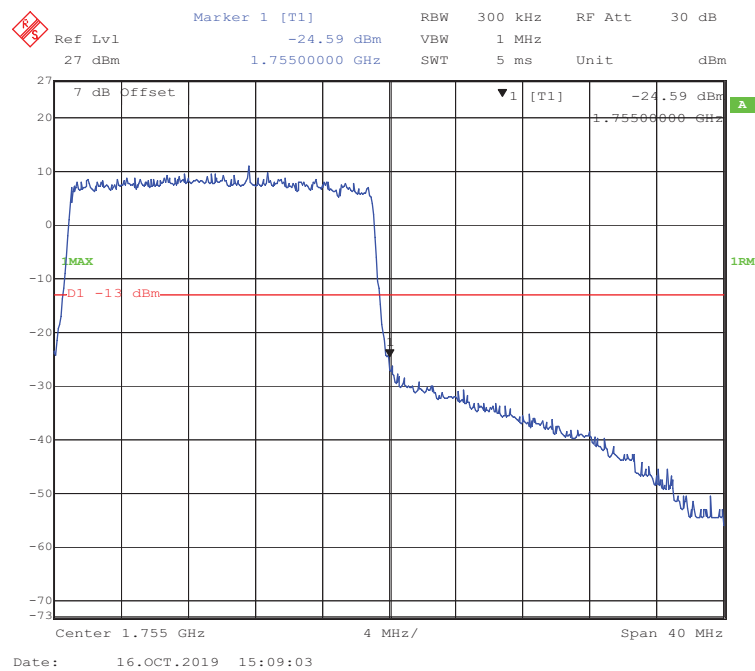
16-QAM (15 MHz, FULL RB) - Right Band Edge

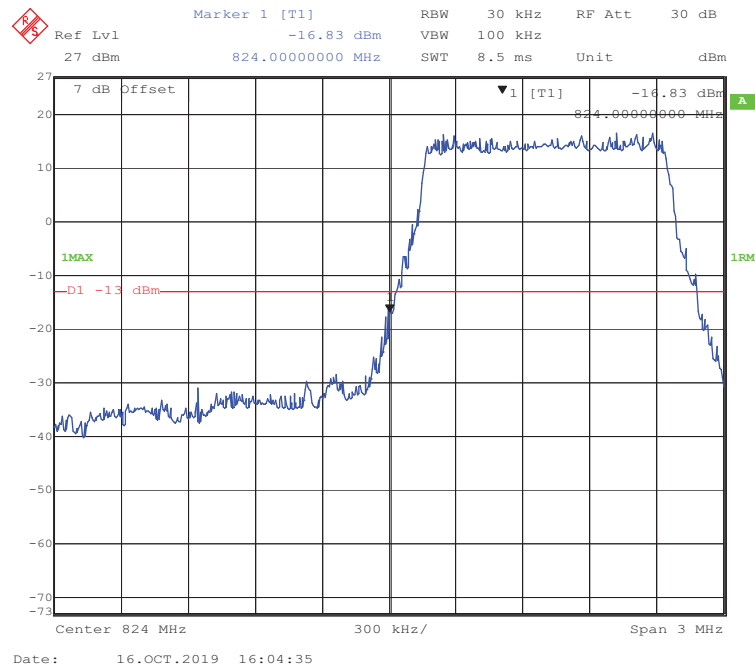
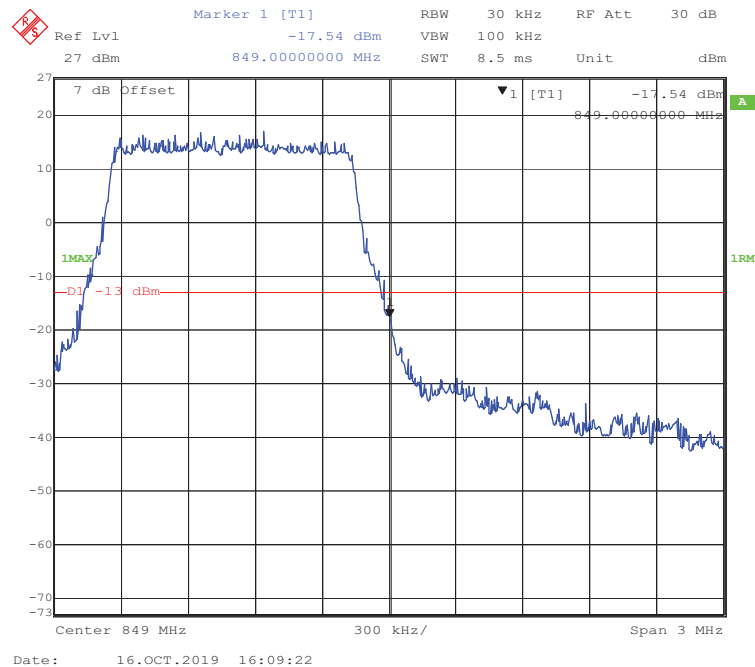


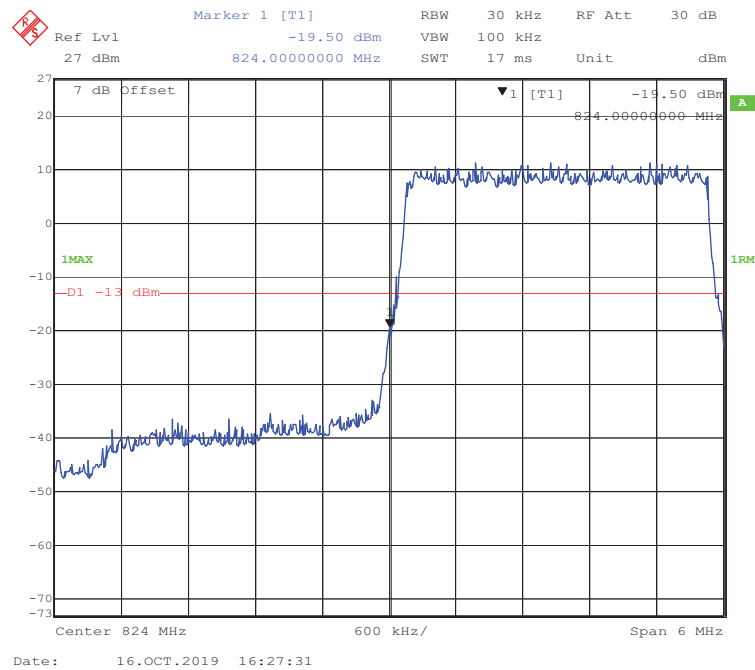
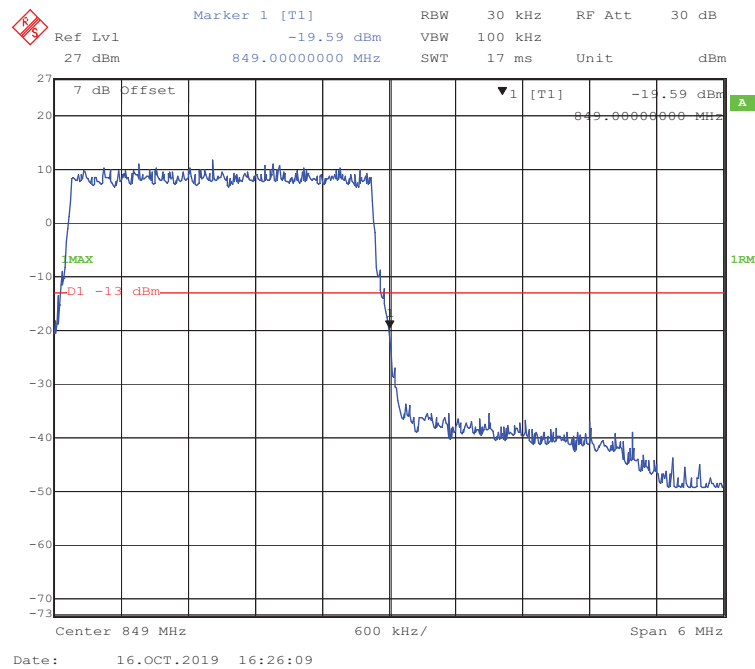
16-QAM (20 MHz, FULL RB) - Left Band Edge



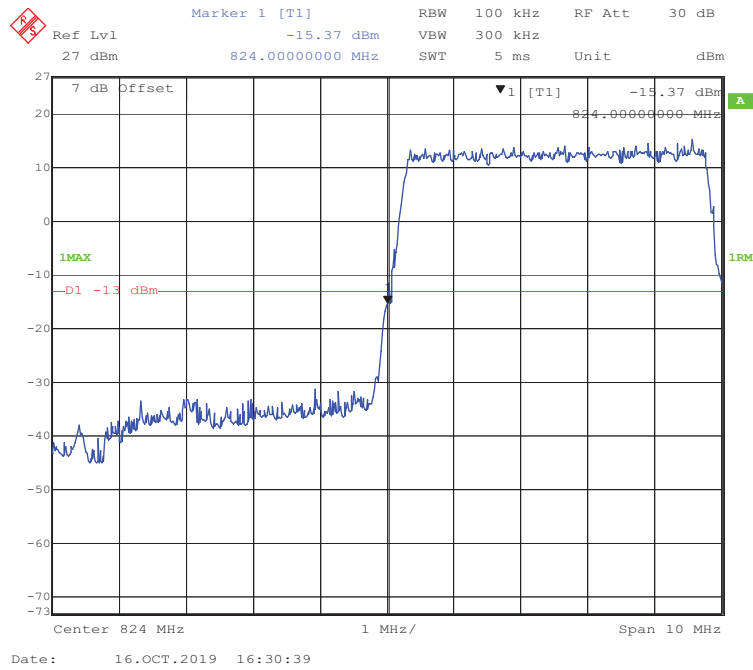
16-QAM (20 MHz, FULL RB) - Right Band Edge



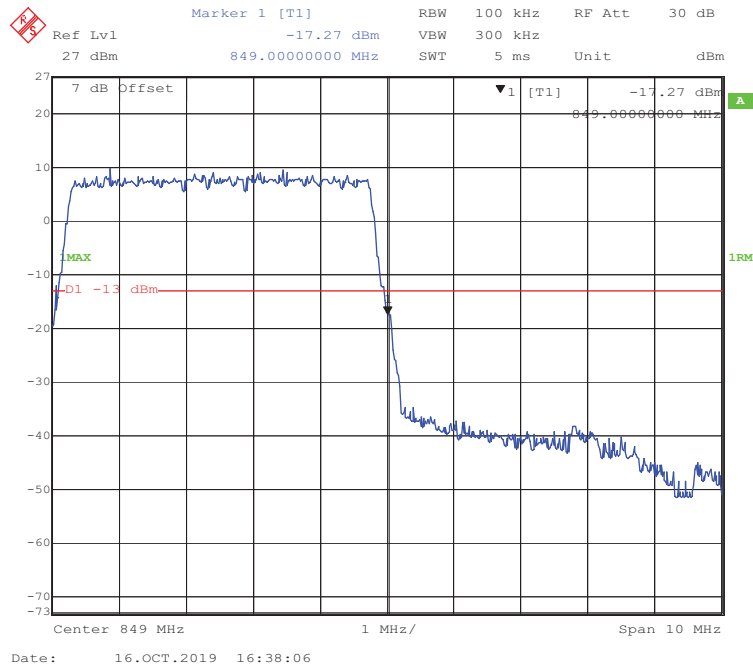
LTE Band 5:**QPSK (1.4 MHz, FULL RB) - Left Band Edge****QPSK (1.4 MHz, FULL RB) - Right Band Edge**

QPSK (3 MHz, FULL RB) - Left Band Edge**QPSK (3 MHz, FULL RB) - Right Band Edge**

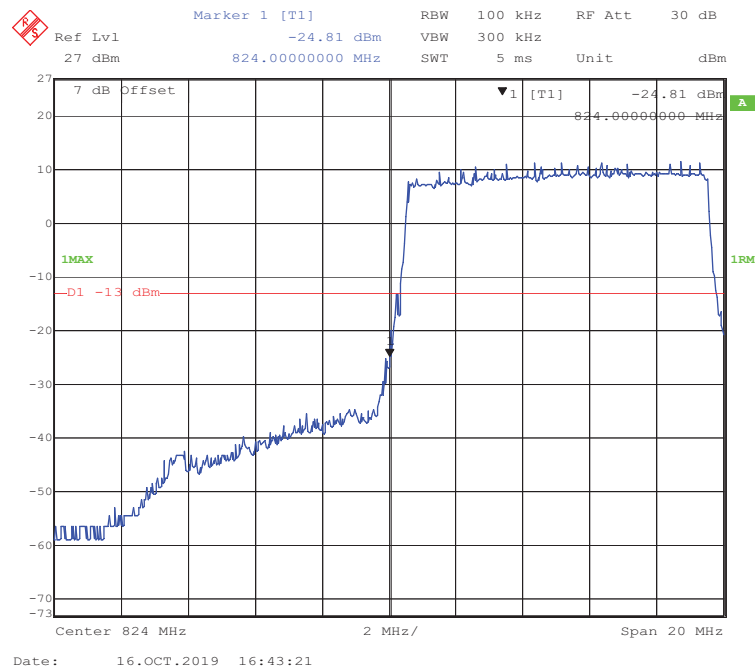
QPSK (5 MHz, FULL RB) - Left Band Edge



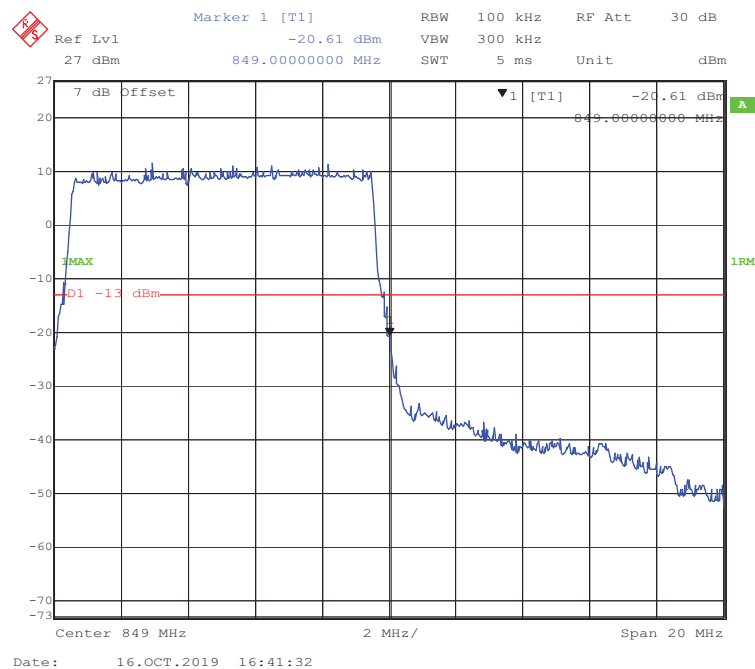
QPSK (5 MHz, FULL RB) - Right Band Edge

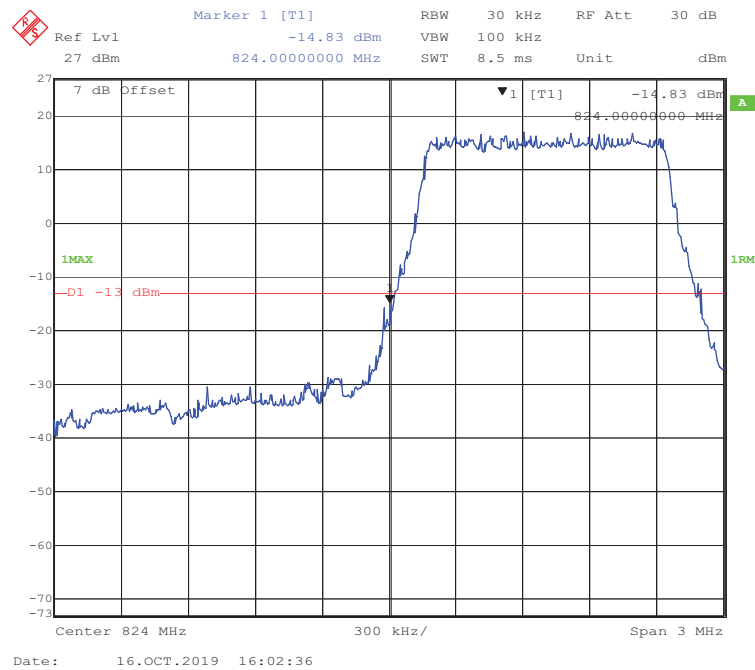
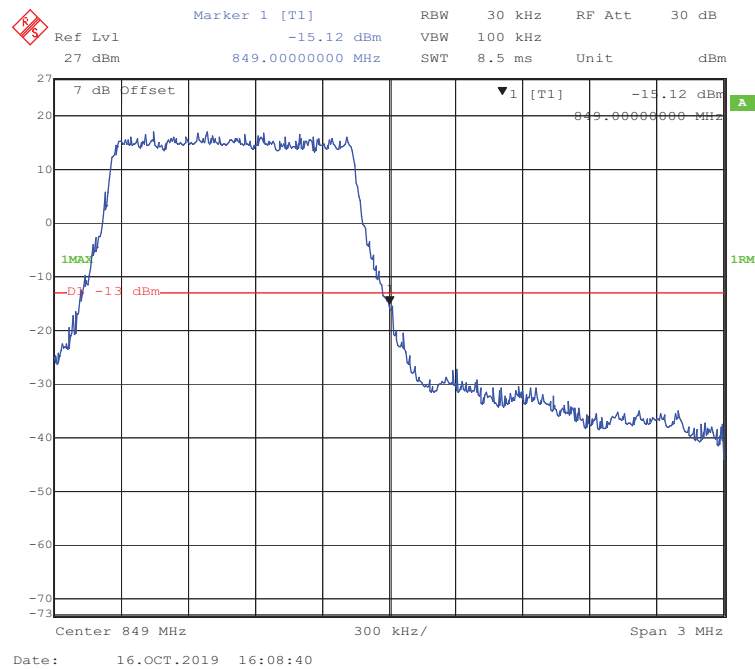


QPSK (10 MHz, FULL RB) - Left Band Edge

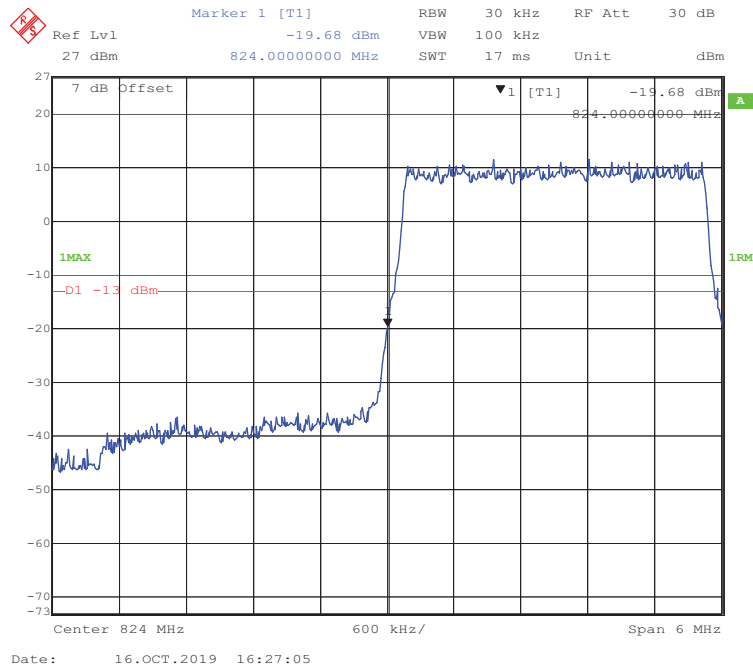


QPSK (10 MHz, FULL RB) - Right Band Edge

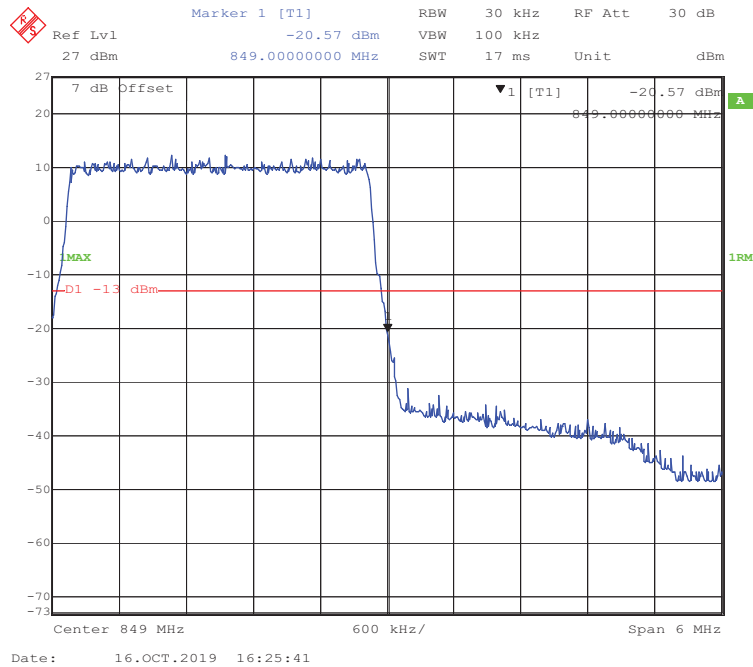


16-QAM (1.4 MHz, FULL RB) - Left Band Edge**16-QAM (1.4 MHz, FULL RB) - Right Band Edge**

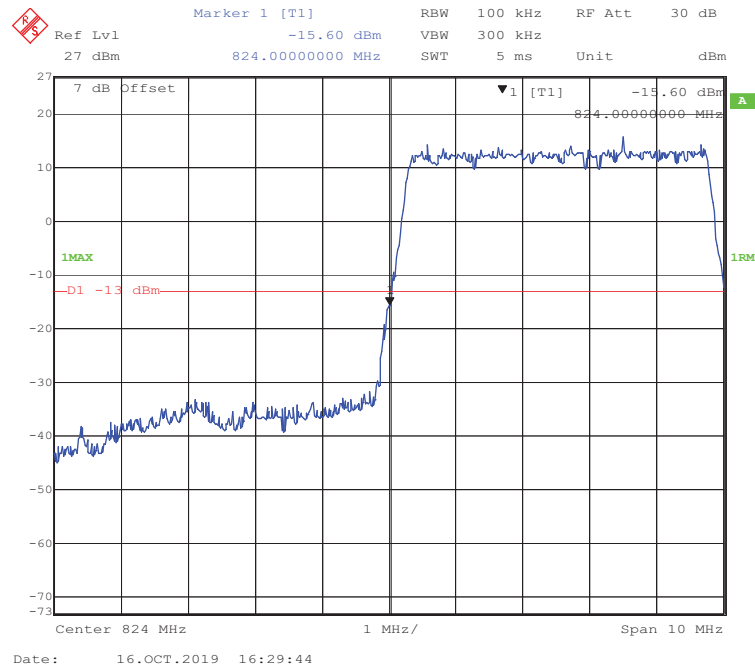
16-QAM (3 MHz, FULL RB) - Left Band Edge



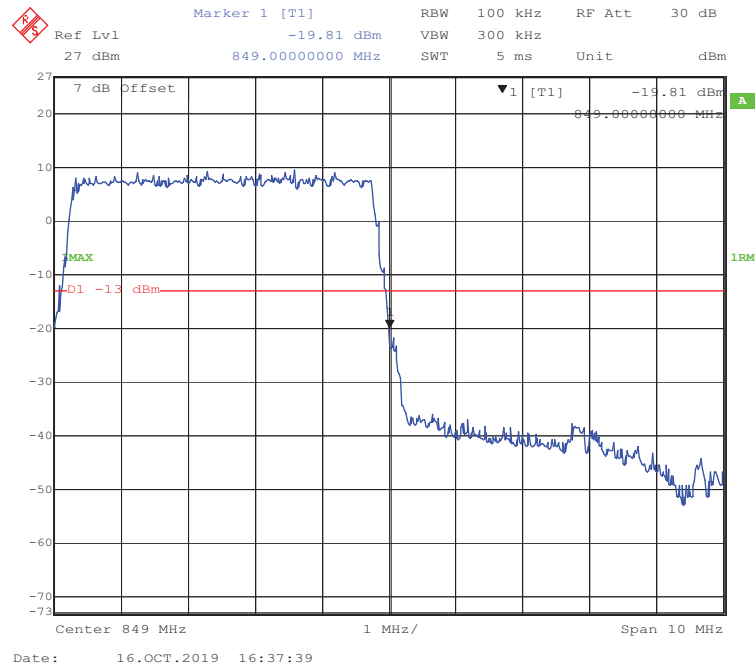
16-QAM (3 MHz, FULL RB) - Right Band Edge



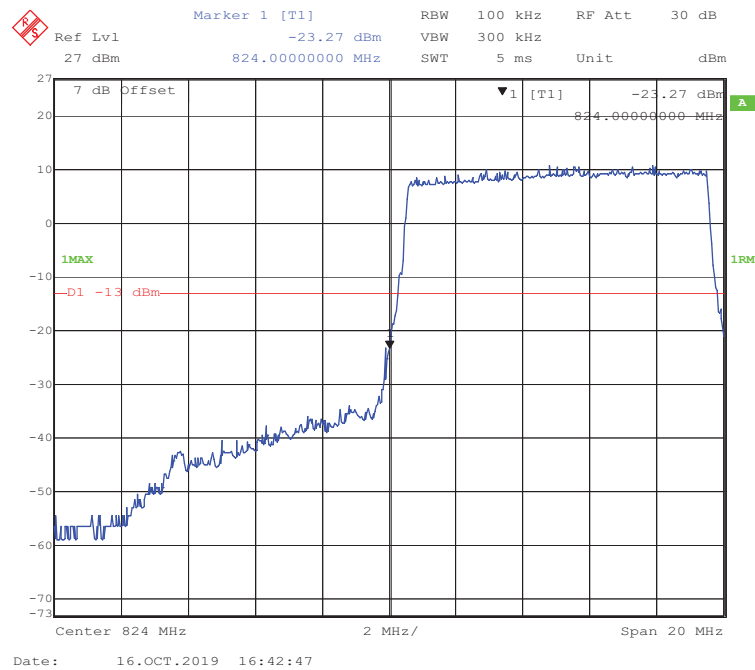
16-QAM (5 MHz, FULL RB) - Left Band Edge



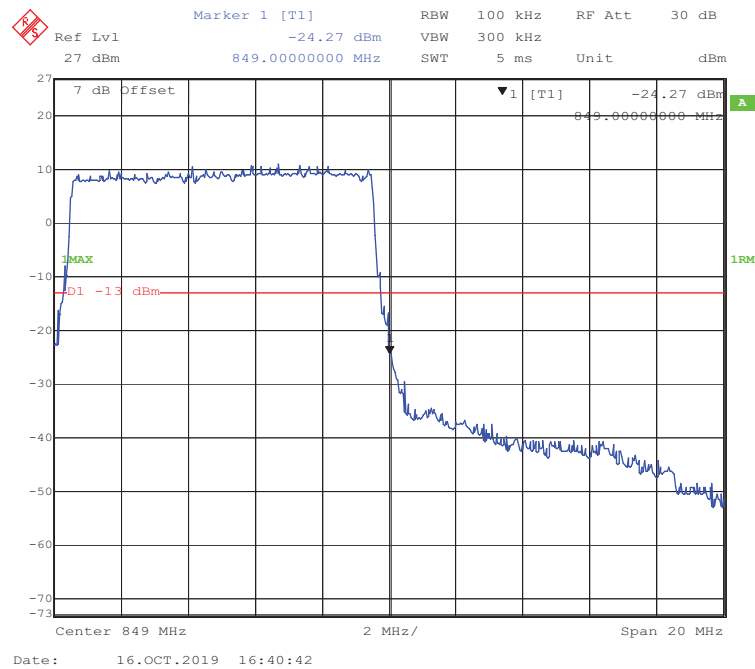
16-QAM (5 MHz, FULL RB) - Right Band Edge

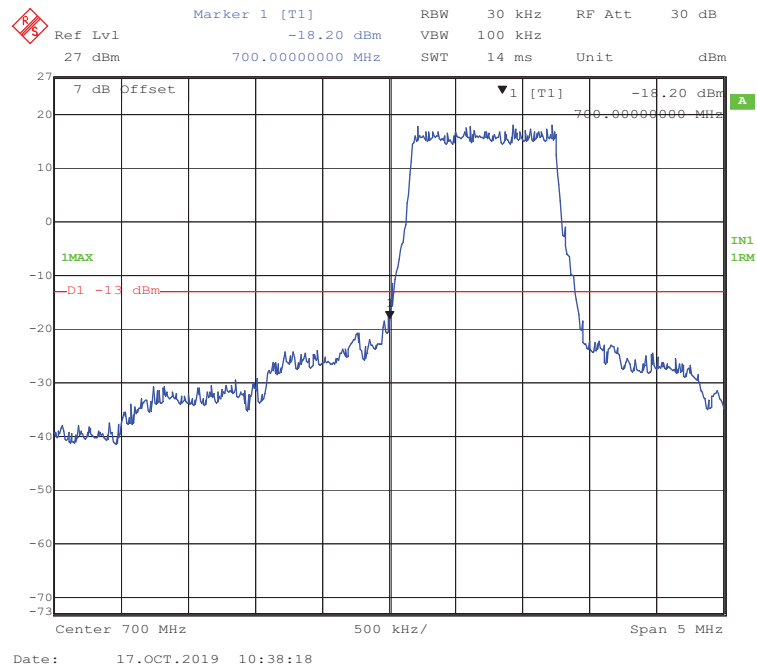
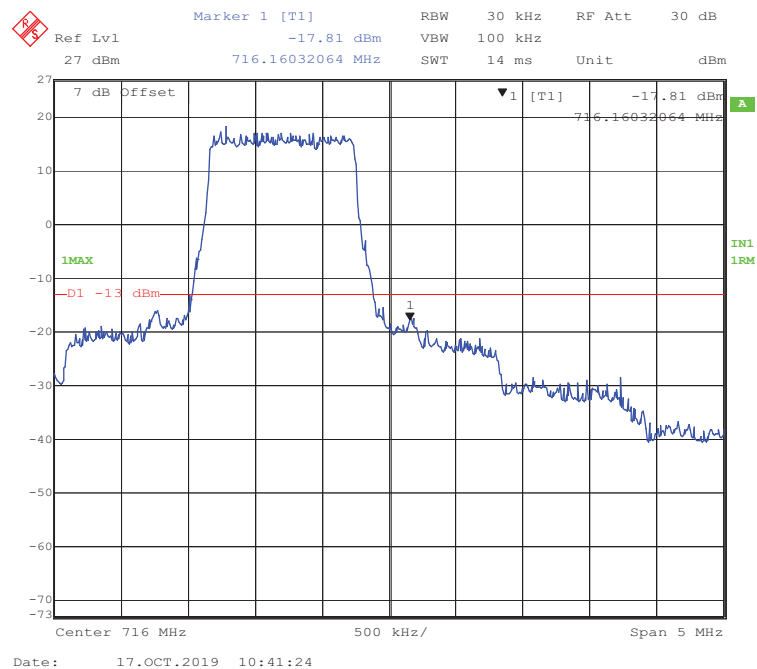


16-QAM (10 MHz, FULL RB) - Left Band Edge

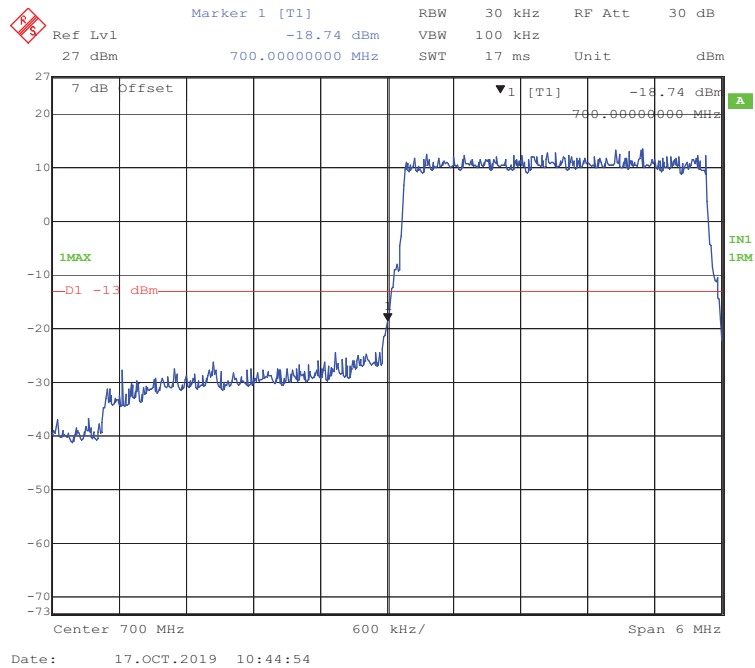


16-QAM (10 MHz, FULL RB) - Right Band Edge

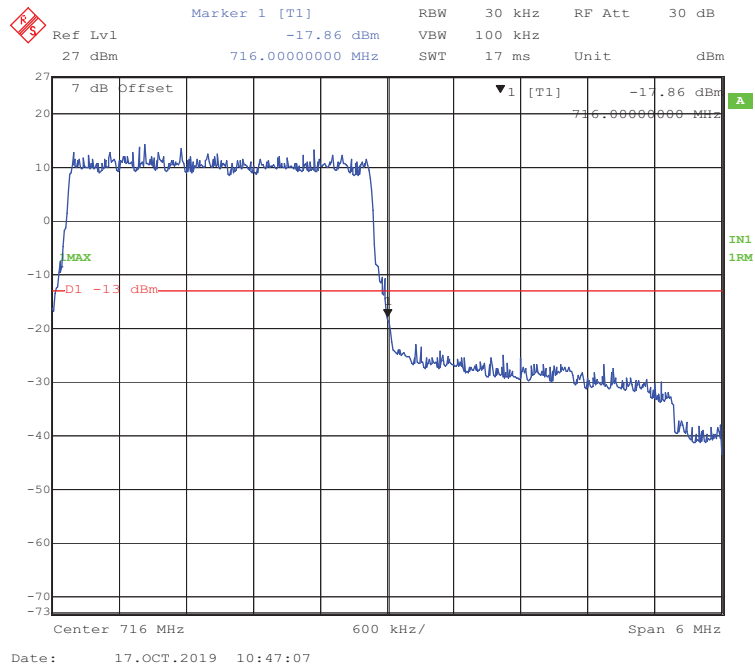


LTE Band 12:**QPSK (1.4 MHz, FULL RB) - Left Band Edge****QPSK (1.4 MHz, FULL RB) - Right Band Edge**

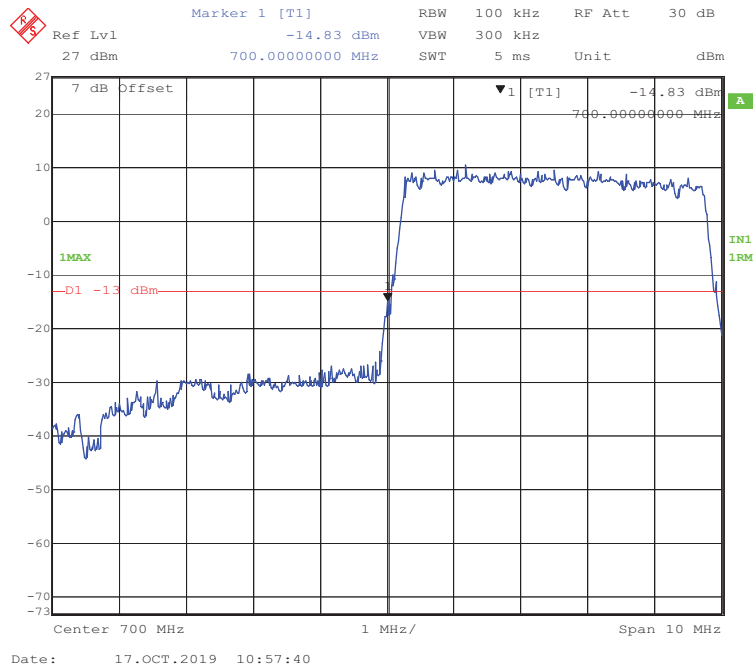
QPSK (3 MHz, FULL RB) - Left Band Edge



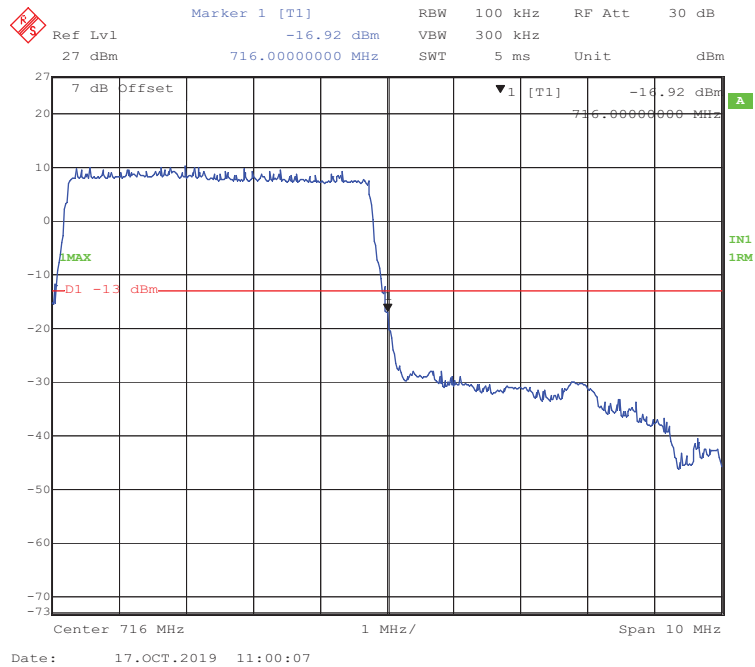
QPSK (3 MHz, FULL RB) - Right Band Edge



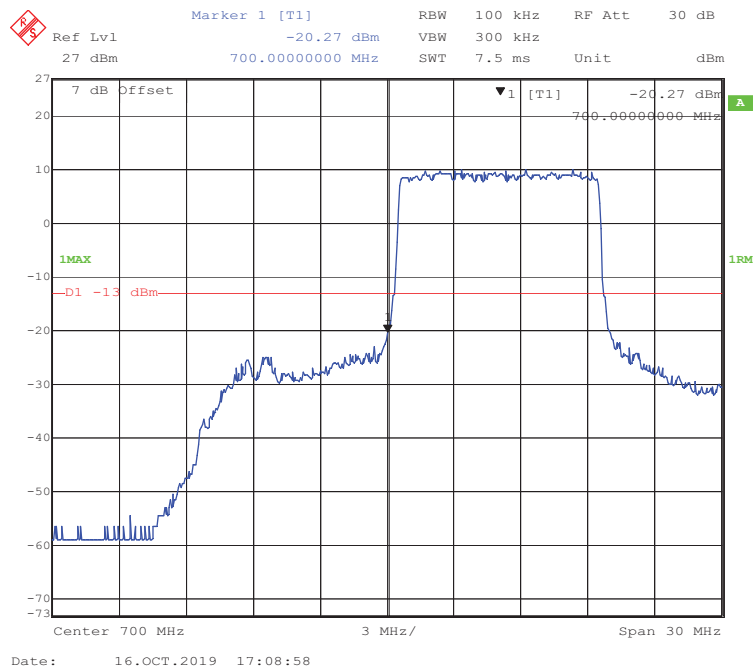
QPSK (5 MHz, FULL RB) - Left Band Edge



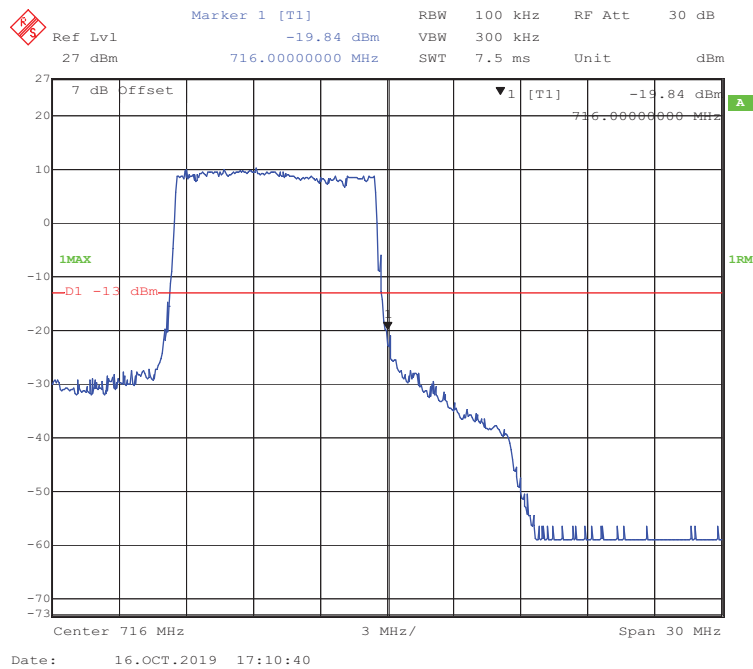
QPSK (5 MHz, FULL RB) - Right Band Edge



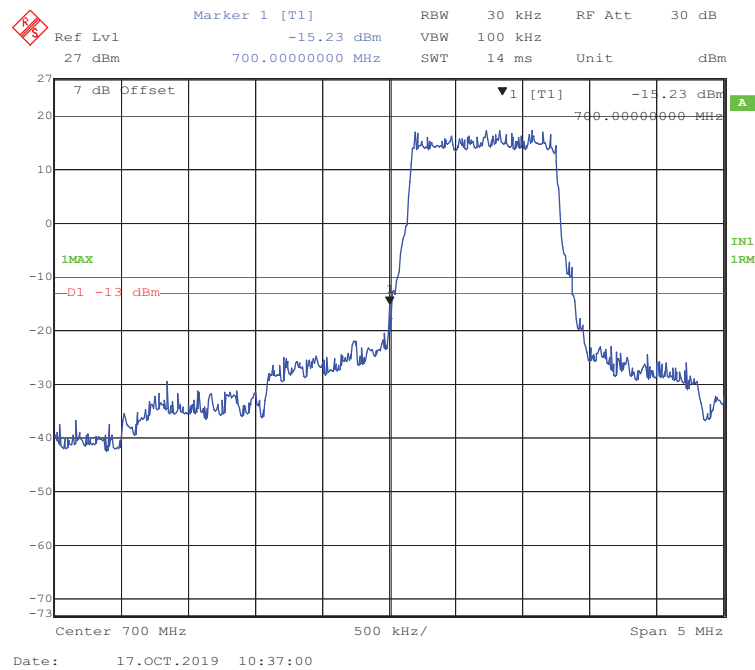
QPSK (10 MHz, FULL RB) - Left Band Edge



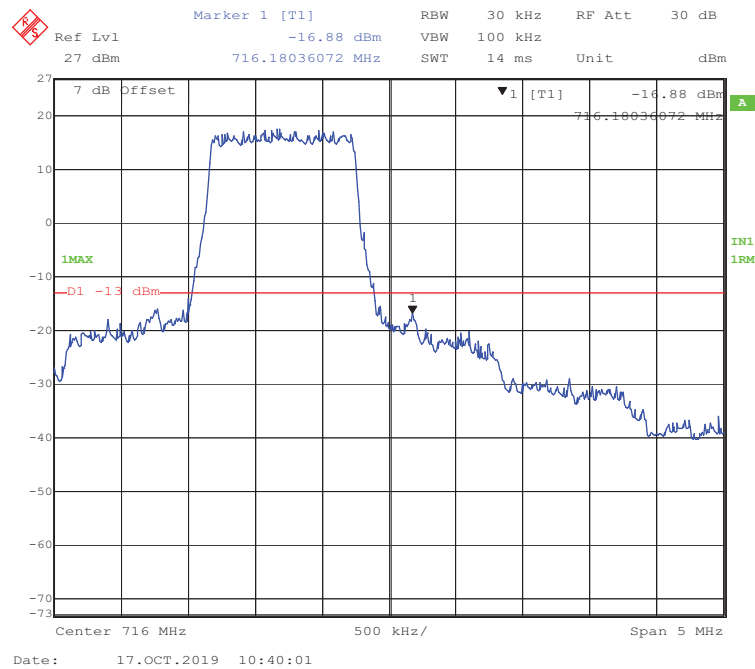
QPSK (10 MHz, FULL RB) - Right Band Edge

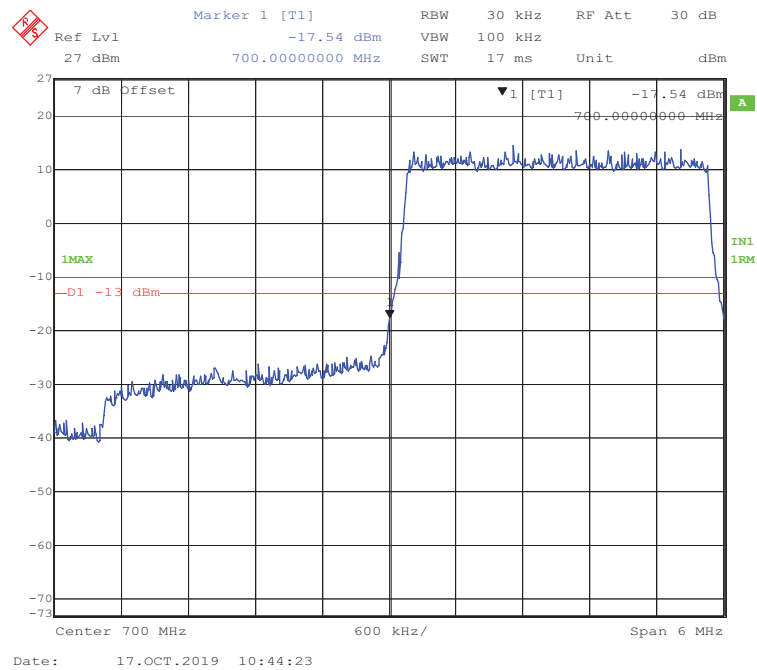
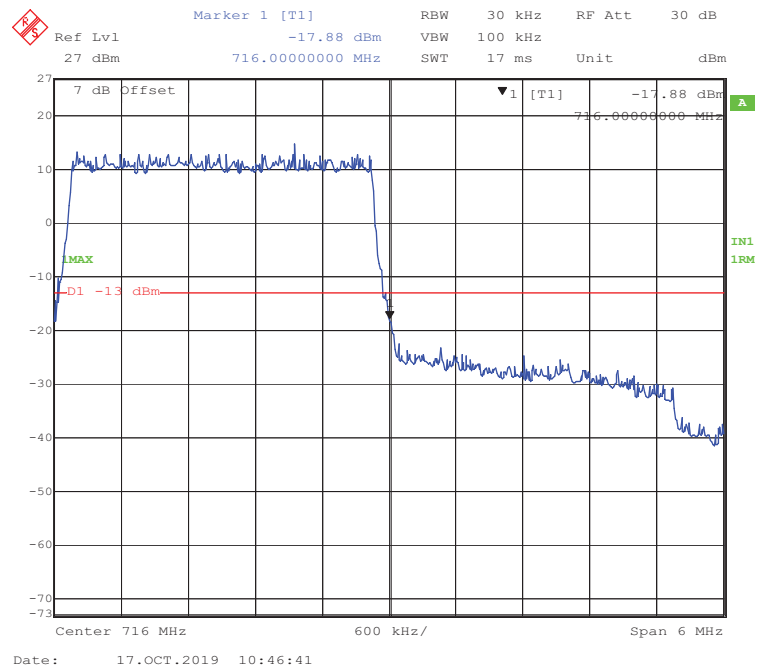


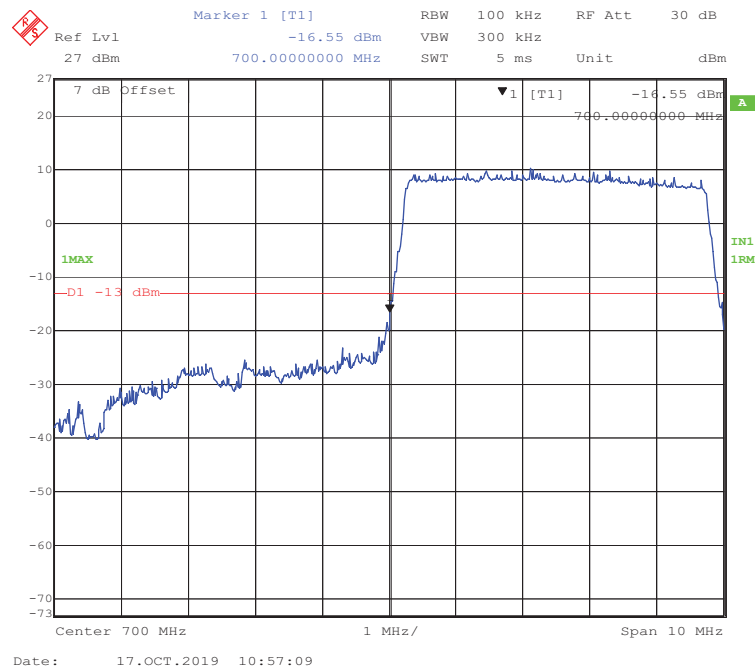
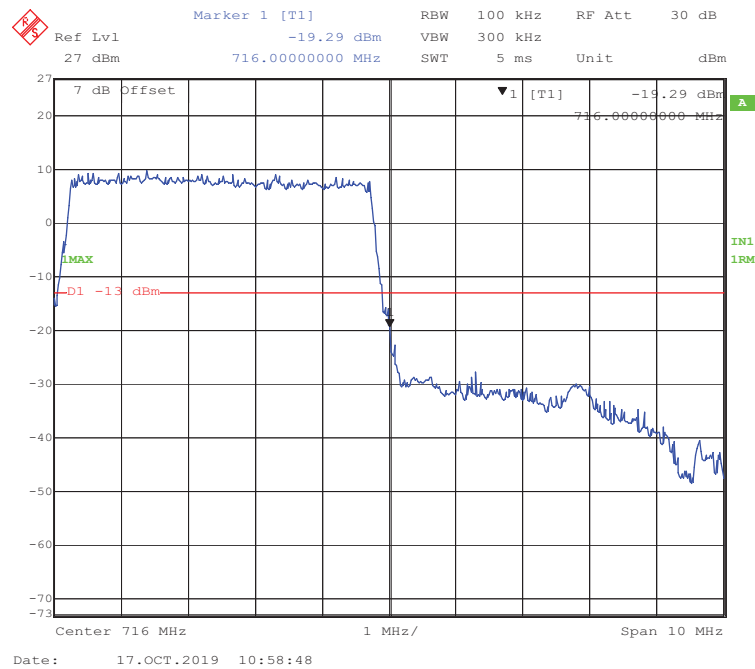
16-QAM (1.4 MHz, FULL RB) - Left Band Edge



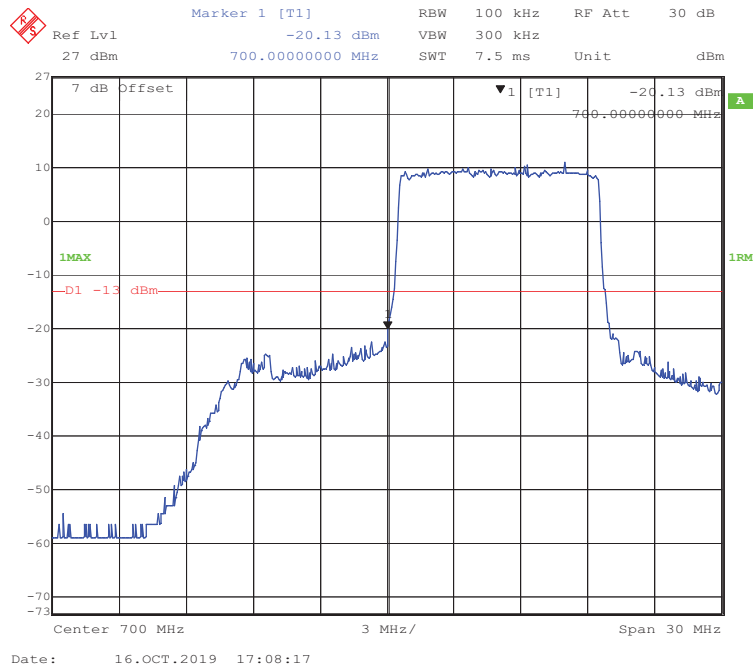
16-QAM (1.4 MHz, FULL RB) - Right Band Edge



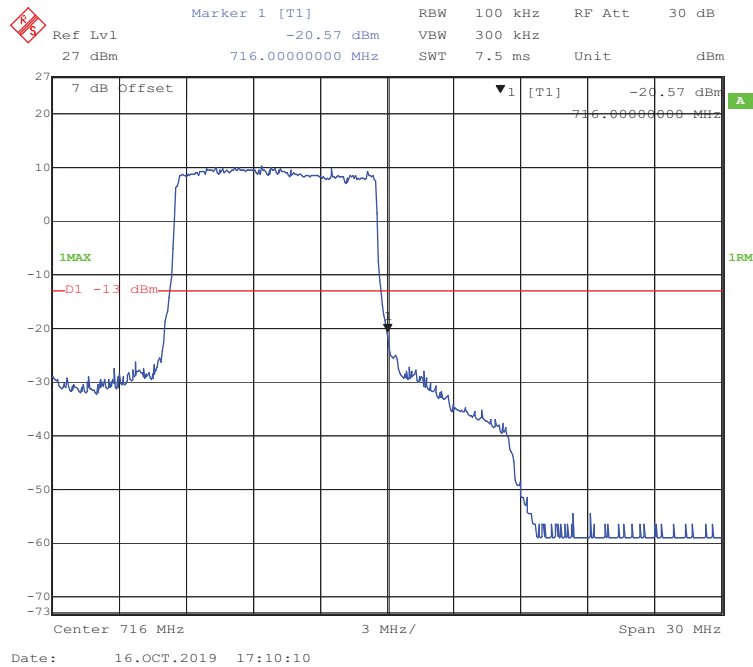
16-QAM (3 MHz, FULL RB) - Left Band Edge**16-QAM (3 MHz, FULL RB) - Right Band Edge**

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

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



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



FCC § 2.1055; § 22.355; § 24.235; §27.54- FREQUENCY STABILITY

Applicable Standards

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

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

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

Frequency Tolerance for Transmitters in the Public Mobile Services

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

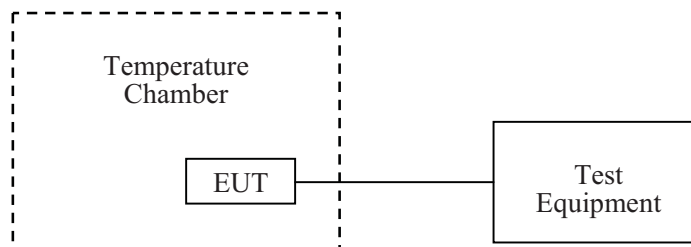
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

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

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

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



Test Data**Environmental Conditions**

Temperature:	23.2 °C
Relative Humidity:	51 %
ATM Pressure:	101.3 kPa

The testing was performed by Winnie Yang on 2019-10-20.

EUT operation mode: Transmitting

Test Result: Compliant.

Power supply :24V

WCDMA Band V:

Middle Channel, $f_0 = 836.6$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	24	12	0.0143	2.5
-20		11	0.0131	2.5
-10		15	0.0179	2.5
0		9	0.0108	2.5
10		7	0.0084	2.5
20		7	0.0084	2.5
30		5	0.0060	2.5
40		4	0.0048	2.5
50		6	0.0072	2.5
25	V min.= 21.6	8	0.0096	2.5
25	V max.= 26.4	7	0.0084	2.5

WCDMA Band II:

Middle Channel, $f_o=1880.0$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	24	13	0.0069	Pass
-20		9	0.0048	Pass
-10		14	0.0074	Pass
0		9	0.0048	Pass
10		6	0.0032	Pass
20		7	0.0037	Pass
30		7	0.0037	Pass
40		8	0.0043	Pass
50		5	0.0027	Pass
25	V min.= 21.6	8	0.0043	Pass
25	V max.= 26.4	7	0.0037	Pass

LTE Band 2:

f₀ =1880.0 MHz (QPSK)				
Temperature (°C)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	24	16	0.0085	Pass
-20		11	0.0059	Pass
-10		15	0.0080	Pass
0		10	0.0053	Pass
10		12	0.0064	Pass
20		6	0.0032	Pass
30		5	0.0027	Pass
40		13	0.0069	Pass
50		8	0.0043	Pass
25	V min.= 21.6	9	0.0048	Pass
25	V max.= 26.4	11	0.0059	Pass

f₀ =1880.0 MHz (16-QAM)				
Temperature (°C)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	24	12	0.0064	Pass
-20		9	0.0048	Pass
-10		11	0.0059	Pass
0		10	0.0053	Pass
10		12	0.0064	Pass
20		5	0.0027	Pass
30		6	0.0032	Pass
40		3	0.0016	Pass
50		6	0.0032	Pass
25	V min.= 21.6	7	0.0037	Pass
25	V max.= 26.4	8	0.0043	Pass

LTE Band 4:

Low Channel & High Channel (QPSK)					
Temperature	Power Supplied	F _L	F _H	F _L Limit	F _H Limit
(°C)	(V _{DC})	(MHz)	(MHz)	(MHz)	(MHz)
-30	24	1710.0424	1754.9412	1710	1755
-20		1710.0417	1754.9442	1710	1755
-10		1710.0434	1754.9401	1710	1755
0		1710.0444	1754.9474	1710	1755
10		1710.0457	1754.9434	1710	1755
20		1710.0451	1754.9498	1710	1755
30		1710.0458	1754.9463	1710	1755
40		1710.0450	1754.9420	1710	1755
50		1710.0418	1754.9433	1710	1755
25	V min.= 21.6	1710.0467	1754.9485	1710	1755
25	V max.= 26.4	1710.0454	1754.9491	1710	1755

Low Channel & High Channel (16-QAM)					
Temperature	Power Supplied	F _L	F _H	F _L Limit	F _H Limit
(°C)	(V _{DC})	(MHz)	(MHz)	(MHz)	(MHz)
-30	24	1710.0441	1754.9445	1710	1755
-20		1710.0431	1754.9495	1710	1755
-10		1710.0442	1754.9437	1710	1755
0		1710.0472	1754.9430	1710	1755
10		1710.0487	1754.9420	1710	1755
20		1710.0497	1754.9418	1710	1755
30		1710.0436	1754.9496	1710	1755
40		1710.0453	1754.9477	1710	1755
50		1710.0472	1754.9492	1710	1755
25	V min.= 21.6	1710.0466	1754.9460	1710	1755
25	V max.= 26.4	1710.0499	1754.9486	1710	1755

LTE Band 5:

Middle Channel, f_0 =836.5 MHz (QPSK)				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	24	13	0.0155	2.5
-20		11	0.0132	2.5
-10		9	0.0108	2.5
0		12	0.0143	2.5
10		11	0.0132	2.5
20		6	0.0072	2.5
30		5	0.0060	2.5
40		9	0.0108	2.5
50		8	0.0096	2.5
25	V min.= 21.6	10	0.0120	2.5
25	V max.= 26.4	9	0.0108	2.5

Middle Channel, f_0 =836.5 MHz(16-QAM)				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	24	9	0.0108	2.5
-20		12	0.0143	2.5
-10		11	0.0132	2.5
0		9	0.0108	2.5
10		8	0.0096	2.5
20		13	0.0155	2.5
30		11	0.0132	2.5
40		7	0.0084	2.5
50		6	0.0072	2.5
25	V min.= 21.6	10	0.0120	2.5
25	V max.= 26.4	12	0.0143	2.5

LTE Band 12:

Low Channel & High Channel (QPSK)					
Temperature	Power Supplied	F _L	F _H	F _L Limit	F _H Limit
(°C)	(V _{DC})	(MHz)	(MHz)	(MHz)	(MHz)
-30	24	699.0195	715.9701	699	716
-20		699.0176	715.9801	699	716
-10		699.0103	715.9764	699	716
0		699.0224	715.9744	699	716
10		699.0195	715.9719	699	716
20		699.0113	715.9796	699	716
30		699.0231	715.9714	699	716
40		699.0146	715.9731	699	716
50		699.0179	715.9781	699	716
25	V min.= 21.6	699.0108	715.9850	699	716
25	V max.= 26.4	699.0124	715.9708	699	716

Low Channel & High Channel (16-QAM)					
Temperature	Power Supplied	F _L	F _H	F _L Limit	F _H Limit
(°C)	(V _{DC})	(MHz)	(MHz)	(MHz)	(MHz)
-30	24	699.0175	715.9775	699	716
-20		699.0171	715.9868	699	716
-10		699.0277	715.9774	699	716
0		699.0147	715.9847	699	716
10		699.0160	715.9729	699	716
20		699.0163	715.9773	699	716
30		699.0137	715.9868	699	716
40		699.0207	715.9746	699	716
50		699.0233	715.9740	699	716
25	V min.= 21.6	699.0123	715.9765	699	716
25	V max.= 26.4	699.0115	715.9701	699	716

Power supply :12V

WCDMA Band V:

Middle Channel, $f_0 = 836.6$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	12	11	0.0131	2.5
-20		11	0.0131	2.5
-10		13	0.0155	2.5
0		9	0.0108	2.5
10		8	0.0096	2.5
20		7	0.0084	2.5
30		5	0.0060	2.5
40		4	0.0048	2.5
50		6	0.0072	2.5
25	V min.= 10.8	7	0.0084	2.5
25	V max.= 13.2	8	0.0096	2.5

WCDMA Band II:

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	12	12	0.0064	Pass
-20		8	0.0043	Pass
-10		15	0.0080	Pass
0		7	0.0037	Pass
10		6	0.0032	Pass
20		6	0.0032	Pass
30		9	0.0048	Pass
40		8	0.0043	Pass
50		5	0.0027	Pass
25	V min.= 10.8	7	0.0037	Pass
25	V max.= 13.2	5	0.0027	Pass

LTE Band 2:

f₀ =1880.0 MHz (QPSK)				
Temperature (°C)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	12	15	0.0080	Pass
-20		12	0.0064	Pass
-10		14	0.0074	Pass
0		10	0.0053	Pass
10		13	0.0069	Pass
20		7	0.0037	Pass
30		5	0.0027	Pass
40		11	0.0059	Pass
50		8	0.0043	Pass
25	V min.= 10.8	10	0.0053	Pass
25	V max.= 13.2	11	0.0059	Pass

f₀ =1880.0 MHz (16-QAM)				
Temperature (°C)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	12	11	0.0059	Pass
-20		9	0.0048	Pass
-10		12	0.0064	Pass
0		10	0.0053	Pass
10		13	0.0069	Pass
20		5	0.0027	Pass
30		7	0.0037	Pass
40		4	0.0021	Pass
50		6	0.0032	Pass
25	V min.= 10.8	8	0.0043	Pass
25	V max.= 13.2	9	0.0048	Pass

LTE Band 4:

Low Channel & High Channel (QPSK)					
Temperature	Power Supplied	F _L	F _H	F _L Limit	F _H Limit
(°C)	(V _{DC})	(MHz)	(MHz)	(MHz)	(MHz)
-30	12	1710.0440	1754.9487	1710	1755
-20		1710.0423	1754.9463	1710	1755
-10		1710.0495	1754.9486	1710	1755
0		1710.0456	1754.9443	1710	1755
10		1710.0432	1754.9402	1710	1755
20		1710.0449	1754.9457	1710	1755
30		1710.0485	1754.9401	1710	1755
40		1710.0429	1754.9431	1710	1755
50		1710.0479	1754.9493	1710	1755
25	V min.= 10.8	1710.0439	1754.9443	1710	1755
25	V max.= 13.2	1710.0465	1754.9443	1710	1755

Low Channel & High Channel (16-QAM)					
Temperature	Power Supplied	F _L	F _H	F _L Limit	F _H Limit
(°C)	(V _{DC})	(MHz)	(MHz)	(MHz)	(MHz)
-30	12	1710.0416	1754.9458	1710	1755
-20		1710.0451	1754.9432	1710	1755
-10		1710.0441	1754.9492	1710	1755
0		1710.0428	1754.9445	1710	1755
10		1710.0490	1754.9495	1710	1755
20		1710.0403	1754.9415	1710	1755
30		1710.0428	1754.9466	1710	1755
40		1710.0443	1754.9418	1710	1755
50		1710.0469	1754.9450	1710	1755
25	V min.= 10.8	1710.0447	1754.9447	1710	1755
25	V max.= 13.2	1710.0496	1754.9406	1710	1755

LTE Band 5:

Middle Channel, f_0 =836.5 MHz (QPSK)				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	12	12	0.0143	2.5
-20		10	0.0120	2.5
-10		9	0.0108	2.5
0		11	0.0132	2.5
10		10	0.0120	2.5
20		6	0.0072	2.5
30		6	0.0072	2.5
40		9	0.0108	2.5
50		7	0.0084	2.5
25	V min.= 10.8	10	0.0120	2.5
25	V max.= 13.2	8	0.0096	2.5

Middle Channel, f_0 =836.5 MHz(16-QAM)				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	12	10	0.0120	2.5
-20		12	0.0143	2.5
-10		9	0.0108	2.5
0		9	0.0108	2.5
10		10	0.0120	2.5
20		11	0.0132	2.5
30		13	0.0155	2.5
40		7	0.0084	2.5
50		6	0.0072	2.5
25	V min.= 10.8	9	0.0108	2.5
25	V max.= 13.2	11	0.0132	2.5

LTE Band 12:

Low Channel & High Channel (QPSK)					
Temperature	Power Supplied	F _L	F _H	F _L Limit	F _H Limit
(°C)	(V _{DC})	(MHz)	(MHz)	(MHz)	(MHz)
-30	12	699.0186	715.9741	699	716
-20		699.0144	715.9848	699	716
-10		699.0182	715.9737	699	716
0		699.0260	715.9711	699	716
10		699.0183	715.9765	699	716
20		699.0164	715.9786	699	716
30		699.0258	715.9706	699	716
40		699.0117	715.9726	699	716
50		699.0184	715.9794	699	716
25	V min.= 10.8	699.0143	715.9878	699	716
25	V max.= 13.2	699.0155	715.9753	699	716

Low Channel & High Channel (16-QAM)					
Temperature	Power Supplied	F _L	F _H	F _L Limit	F _H Limit
(°C)	(V _{DC})	(MHz)	(MHz)	(MHz)	(MHz)
-30	12	699.0134	715.9770	699	716
-20		699.0136	715.9825	699	716
-10		699.0263	715.9716	699	716
0		699.0125	715.9849	699	716
10		699.0116	715.9796	699	716
20		699.0155	715.9756	699	716
30		699.0171	715.9873	699	716
40		699.0210	715.9740	699	716
50		699.0209	715.9711	699	716
25	V min.= 10.8	699.0199	715.9754	699	716
25	V max.= 13.2	699.0104	715.9769	699	716

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