FCC RF Test Report

APPLICANT	**: Planet Avvio LLC**
EQUIPMENT	**: router**
BRAND NAME	**: Avvio**
MODEL NAME	**: RT400**
FCC ID	**: 2ALTART400X**
STANDARD	**: 47 CFR Part 2, 27(L), 27(H), 27(M)**
CLASSIFICATION	**: PCS Licensed Transmitter (PCB)**

The product was received on May 25, 2018 and completely tested on Jun. 07, 2018. We, Sporton International (Shenzhen) Inc., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Shenzhen) Inc., the test report shall not be reproduced except in full.

Eric Shih

Approved by: Eric Shih / Manager

NVLAP TESTING
NVLAP LAB CODE 600156-0

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TABLE OF CONTENTS

REVISION HISTORY **3**

SUMMARY OF TEST RESULT **4**

1 GENERAL DESCRIPTION **5**

1.1 Applicant 5
1.2 Manufacturer 5
1.3 Product Feature of Equipment Under Test 5
1.4 Product Specification of Equipment Under Test 6
1.5 Modification of EUT 6
1.6 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator 7
1.7 Testing Location 8
1.8 Applicable Standards 8

2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST **9**

2.1 Test Mode 9
2.2 Connection Diagram of Test System 10
2.3 Support Unit used in test configuration and system 10
2.4 Measurement Results Explanation Example 10
2.5 Frequency List of Low/Middle/High Channels 11

3 CONDUCTED TEST ITEMS **13**

3.1 Measuring Instruments 13
3.2 Test Setup 13
3.3 Test Result of Conducted Test 13
3.4 Conducted Output Power and ERP/EIRP 14
3.5 Peak-to-Average Ratio 15
3.6 Occupied Bandwidth 16
3.7 Conducted Band Edge 17
3.8 Conducted Spurious Emission 19
3.9 Frequency Stability 20

4 RADIATED TEST ITEMS **21**

4.1 Measuring Instruments 21
4.2 Test Setup 21
4.3 Test Result of Radiated Test 21
4.4 Effective Radiated Power and Effective Isotropic Radiated Power 22
4.5 Radiated Spurious Emission 24

5 LIST OF MEASURING EQUIPMENT **25**

6 UNCERTAINTY OF EVALUATION **26**

APPENDIX A. TEST RESULTS OF CONDUCTED TEST

APPENDIX B. TEST RESULTS OF RADIATED TEST

APPENDIX C. TEST SETUP PHOTOGRAPHS

REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG850504B	Rev. 01	Initial issue of report	Jun. 11, 2018

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	Reporting Only	PASS	-
	§27.50(c)(10)	Effective Radiated Power (Band 12)	ERP < 3 Watt		
	§27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 41)	EIRP < 2Watt		
	§27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4)	EIRP < 1Watt		
3.5	§24.232(d)	Peak-to-Average Ratio	<13 dB	N/A	-
3.6	§2.1049	Occupied Bandwidth	Reporting Only	PASS	-
3.7	§2.1051 §27.53(g) §27.53(h)	Conducted Band Edge Measurement (Band 4) (Band 12)	< 43+10log10(P[Watts])	PASS	-
	§27.53(m)(4)	Conducted Band Edge Measurement (Band 41)	§27.53(m)(4)		
3.8	§2.1051 §27.53(g) §27.53(h)	Conducted Spurious Emission (Band 4) (Band 12)	< 43+10log10(P[Watts])	PASS	-
	§2.1051 §27.53(m)(4)	Conducted Spurious Emission (Band 41)	< 55+10log$_{10}$(P[Watts])		
3.9	§2.1055 §22.355	Frequency Stability Temperature & Voltage	< 2.5 ppm for Part 22	PASS	-
	§2.1055 §24.235 §27.54		Within Authorized Band		
4.5	§2.1053 §27.53(g) §27.53(h)	Radiated Spurious Emission (Band 4) (Band 12)	< 43+10log$_{10}$(P[Watts])	PASS	Under limit 2.58 dB at 5177.180 MHz
	§2.1053 §27.53(m)(4)	Radiated Spurious Emission (Band 41)	< 55+10log$_{10}$(P[Watts])		

1 General Description

1.1 Applicant

Planet Avvio LLC
9725 NW 117th Ave.,Medley,FL 33178, United States

1.2 Manufacturer

MeiG Smart Technology Co., Ltd
#5 Lingxia Road, Fenghuang the 4th Industrial Park,Fuyong Street,Bao'an District, Shenzhen

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	router
Brand Name	Avvio
Model Name	RT400
FCC ID	2ALTART400X
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/ HSPA+(16QAM uplink is not supported)/LTE WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80
IMEI Code	Conduction: 869715033008170 Radiation: NA
HW Version	SLT768_V1.03_PCB
SW Version	SLT768-TAQ_1.0.5_EQ103
EUT Stage	Production Unit

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	LTE Band 4 : 1710.7 MHz ~ 1754.3 MHz LTE Band 12 : 699.7 MHz ~ 715.3 MHz LTE Band 41 : 2498.5 MHz ~ 2687.5 MHz
Rx Frequency	LTE Band 4 : 2110.7 MHz ~ 2154.3 MHz LTE Band 12 : 729.7 MHz ~ 745.3 MHz LTE Band 41 : 2498.5 MHz ~ 2687.5 MHz
Bandwidth	LTE Band 4 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 12 : 1.4MHz / 3MHz / 5MHz / 10MHz LTE Band 41 : 5MHz / 10MHz / 15MHz / 20MHz
Maximum Output Power to Antenna	LTE Band 4 : 22.43 dBm LTE Band 12 : 22.50 dBm LTE Band 41 : 22.99 dBm
Antenna Gain	LTE Band 4 : 2.60 dBi LTE Band 12 : 3.10 dBi LTE Band 41 : 3.50 dBi
Type of Modulation	QPSK / 16QAM

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator

LTE Band 4		QPSK			16QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)
1.4	1710.7 ~ 1754.3	1M09G7D	-	0.3006	1M10W7D	-	0.2286
3	1711.5 ~ 1753.5	2M74G7D	-	0.2931	2M72W7D	-	0.2366
5	1712.5 ~ 1752.5	4M53G7D	-	0.2938	4M48W7D	-	0.2228
10	1715.0 ~ 1750.0	9M03G7D	0.0071	0.3126	9M01W7D	-	0.2523
15	1717.5 ~ 1747.5	13M5G7D	-	0.3097	13M5W7D	-	0.2339
20	1720.0 ~ 1745.0	18M3G7D	-	0.3184	18M4W7D	-	0.2228
LTE Band 12		QPSK			16QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum ERP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum ERP(W)
1.4	699.7 ~ 715.3	1M10G7D		0.2109	1M10W7D	-	0.1750
3	700.5 ~ 714.5	2M73G7D		0.2208	2M72W7D	-	0.1722
5	701.5 ~ 713.5	4M49G7D		0.2153	4M49W7D	-	0.1648
10	704.0 ~ 711.0	8M99G7D	0.0083	0.2213	9M01W7D	-	0.1607
LTE Band 41		QPSK			16QAM		
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)
5	2498.5 ~ 2687.5	4M51G7D	-	0.4355	4M51W7D	-	0.3289
10	2501.0 ~ 2685.0	9M05G7D	0.0019	0.4355	9M03W7D	-	0.3311
15	2503.5 ~ 2682.5	13M5G7D	-	0.4315	13M4W7D	-	0.3162
20	2506.0 ~ 2680.0	18M5G7D	-	0.4111	18M4W7D	-	0.3251

1.7 Testing Location

Sporton International (Shenzhen) Inc. is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600156-0) and the FCC designation No are CN5018 and CN5019.

Test Site	Sporton International (Shenzhen) Inc.	
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan Shenzhen City Guangdong Province 518055 China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595	
Test Site No.	**Sporton Site No.**	**FCC Test Firm Registration No.**
	TH01-SZ	251365

Test Site	Sporton International (Shenzhen) Inc.	
Test Site Location	No. 3 Bldg the third floor of south, Shahe River west, Fengzeyuan Warehouse, Nanshan District Shenzhen City Guangdong Province 518055 China TEL: +86-755-3320-2398	
Test Site No.	**Sporton Site No.**	**FCC Test Firm Registration No.**
	03CH04-SZ	577730

Note: The test site complies with ANSI C63.4 2014 requirement.

1.8 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 2, 27(L), 27(H), 27(M)
- ANSI C63.26-2015
- FCC KDB 971168 D01 Power Meas License Digital Systems v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

2 Test Configuration of Equipment Under Test

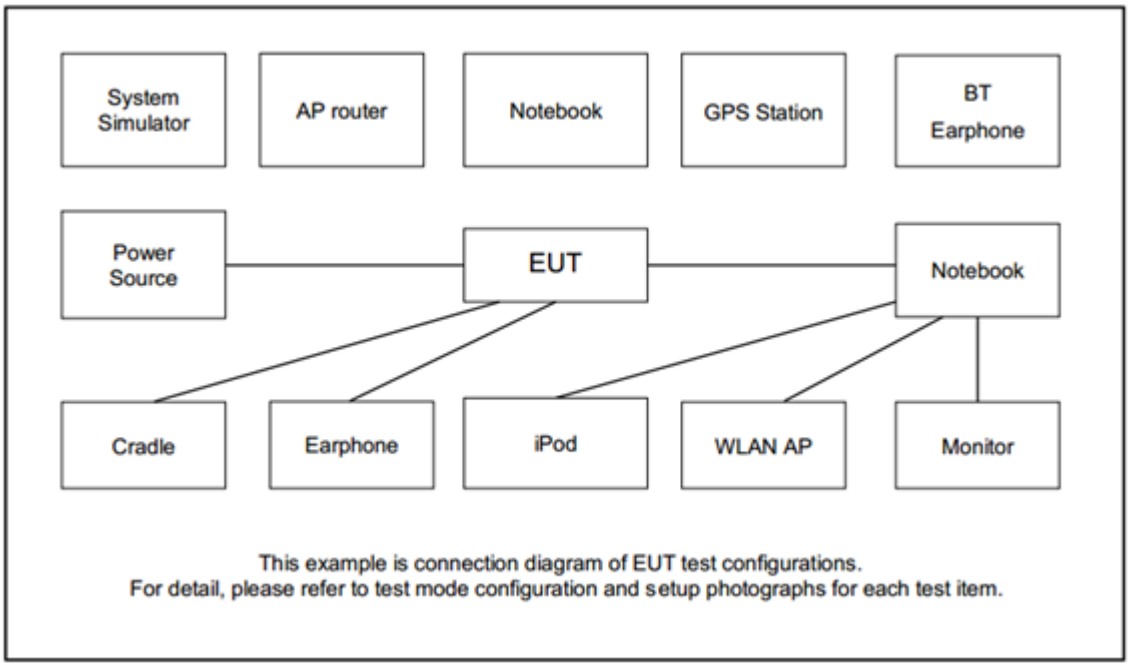
2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas License Digital Systems v03r01 with maximum output power.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission.

Test Items	Band	Bandwidth (MHz)						Modulation			RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Max. Output Power	4	v	v	v	v	v	v	v	v		v	v	v	v	v	v
	12	v	v	v	v	-	-	v	v		v	v	v	v	v	v
	41	-	-	v	v	v	v	v	v		v	v	v	v	v	v
Peak-to-Average Ratio	4						v	v	v		v		v	v	v	v
	12				v	-	-	v	v		v		v	v	v	v
	41	-	-				v	v	v		v		v	v	v	v
26dB and 99% Bandwidth	4	v	v	v	v	v	v	v	v				v	v	v	v
	12	v	v	v	v	-	-	v	v				v	v	v	v
	41	-	-	v	v	v	v	v	v				v	v	v	v
Conducted Band Edge	4	v	v	v	v	v	v	v	v		v		v	v		v
	12	v	v	v	v	-	-	v	v		v		v	v		v
	41	-	-	v	v	v	v	v	v		v		v	v		v
Conducted Spurious Emission	4	v	v	v	v	v	v	v	v		v			v	v	v
	12	v	v	v	v	-	-	v	v		v			v	v	v
	41	-	-	v	v	v	v	v	v		v			v	v	v
Frequency Stability	4				v			v					v		v	
	12				v	-	-	v					v		v	
	41	-	-		v			v					v		v	
E.R.P / E.I.R.P	4	v	v	v	v	v	v	v	v		v			v	v	v
	12	v	v	v	v	-	-	v	v		v			v	v	v
	41	-	-	v	v	v	v	v	v		v			v	v	v
Radiated Spurious Emission	4	v	v	v	v	v	v	v			v				v	
	12	v	v	v	v			v			v				v	
	41			v	v	v	v	v			v				v	
Note	1. The mark "**v** " means that this configuration is chosen for testing 2. The mark "-" means that this bandwidth is not supported. 3. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.															

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model No.	FCC ID	Data Cable	Power Cord
1.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	DC Power Supply	GW	GPS-3030D	N/A	N/A	Unshielded, 1.8 m

2.4 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 3.7 dB and 10dB attenuator.

Example :

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 3.7 + 10 = 13.7 (dB)

2.5 Frequency List of Low/Middle/High Channels

LTE Band 4 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
20	Channel	20050	20175	20300
	Frequency	1720	1732.5	1745
15	Channel	20025	20175	20325
	Frequency	1717.5	1732.5	1747.5
10	Channel	20000	20175	20350
	Frequency	1715	1732.5	1750
5	Channel	19975	20175	20375
	Frequency	1712.5	1732.5	1752.5
3	Channel	19965	20175	20385
	Frequency	1711.5	1732.5	1753.5
1.4	Channel	19957	20175	20393
	Frequency	1710.7	1732.5	1754.3

LTE Band 12 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
10	Channel	23060	23095	23130
	Frequency	704	707.5	711
5	Channel	23035	23095	23155
	Frequency	701.5	707.5	713.5
3	Channel	23025	23095	23165
	Frequency	700.5	707.5	714.5
1.4	Channel	23017	23095	23173
	Frequency	699.7	707.5	715.3

LTE Band 41 Channel and Frequency List				
BW [MHz]	**Channel/Frequency(MHz)**	**Lowest**	**Middle**	**Highest**
20	Channel	39750	40620	41490
	Frequency	2506	2593	2680
15	Channel	39725	40620	41515
	Frequency	2503.5	2593	2682.5
10	Channel	39700	40620	41540
	Frequency	2501	2593	2685
5	Channel	39675	40620	41565
	Frequency	2498.5	2593	2687.5

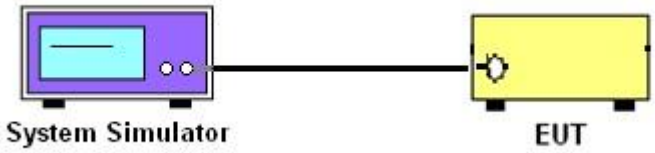
3 Conducted Test Items

3.1 Measuring Instruments

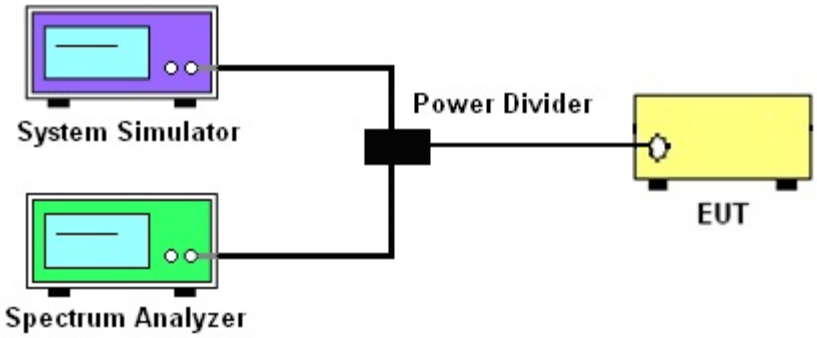
See list of measuring instruments of this test report.

3.2 Test Setup

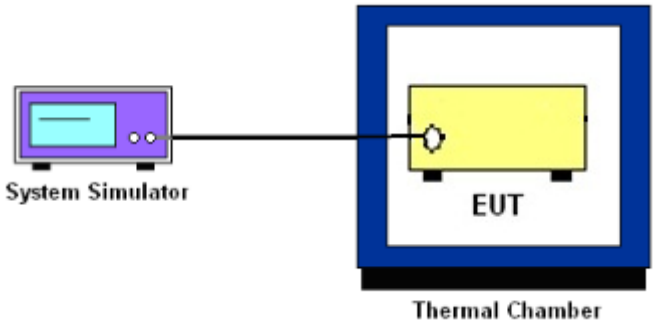
3.2.1 Conducted Output Power



3.2.2 Peak-to-Average Ratio, Occupied Bandwidth ,Conducted Band-Edge and Conducted Spurious Emission



3.2.3 Frequency Stability



3.3 Test Result of Conducted Test

Please refer to Appendix A.

3.4 Conducted Output Power and ERP/EIRP

3.4.1 Description of the Conducted Output Power Measurement and ERP/EIRP Measurement

A system simulator was used to establish communication with the EUT. Its parameters were set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The ERP of mobile transmitters must not exceed 3 Watts for LTE Band 12,

The EIRP of mobile transmitters must not exceed 2 Watts for LTE Band 41.

The EIRP of mobile transmitters must not exceed 1 Watts for LTE Band 4.

According to KDB 412172 D01 Power Approach,

EIRP = $P_T + G_T – L_C$, ERP = EIRP -2.15, where

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

3.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2
2. The transmitter output port was connected to the system simulator.
3. Set EUT at maximum power through the system simulator.
4. Select lowest, middle, and highest channels for each band and different modulation.
5. Measure and record the power level from the system simulator.

3.5 Peak-to-Average Ratio

3.5.1 Description of the PAR Measurement

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

3.5.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.2.3.4 (CCDF).
2. The EUT was connected to spectrum and system simulator via a power divider.
3. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
4. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
5. Record the deviation as Peak to Average Ratio.

3.6 Occupied Bandwidth

3.6.1 Description of Occupied Bandwidth Measurement

The occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

3.6.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.4
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be between two and five times the anticipated OBW.
4. The nominal resolution bandwidth (RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
5. Set the detection mode to peak, and the trace mode to max hold.
6. Determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace. (this is the reference value)
7. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
8. Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below the “–X dB down amplitude” determined in step 6. If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.
9. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

3.7 Conducted Band Edge

3.7.1 Description of Conducted Band Edge Measurement

27.53 (g)

For operations in the 600MHz band and 698 -746 MHz band, the FCC limit is 43 + 10log10(P[Watts]) dB below the transmitter power P(Watts) in a 100 kHz bandwidth. 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.

27.53 (h)

For operations in the 1710 – 1755 MHz band, the FCC limit is 43 + $10\log_{10}$(P[Watts]) dB below the transmitter power P(Watts) in a 1 MHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

27.53(m)(4)

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 that 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.

3.7.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The band edges of low and high channels for the highest RF powers were measured.
4. Set RBW >= 1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
5. Beyond the 1 MHz band from the band edge, RBW=1MHz was used or a narrower RBW was used and the measured power was integrated over the full required measurement bandwidth of 1 MHz.
6. Set spectrum analyzer with RMS detector.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
8. Checked that all the results comply with the emission limit line.
   Example:
   The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
   = P(W)- [43 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB) = -13dBm.
9. For LTE Band 41, the other 40 dB, and 55 dB have additionally applied same calculation above.

3.8 Conducted Spurious Emission

3.8.1 Description of Conducted Spurious Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

For Band 41:

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 55 + 10 log (P) dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10^{th} harmonic.

3.8.2 Test Procedures

1. The testing follows ANSI C63.26 section 5.7
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.
3. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. The middle channel for the highest RF power within the transmitting frequency was measured.
5. The conducted spurious emission for the whole frequency range was taken.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
7. Set spectrum analyzer with RMS detector.
8. Taking the record of maximum spurious emission.
9. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
10. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.
11. For Band 41
    The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [55+ 10log(P)] (dB)
    = [30+ 10log(P)] (dBm) - [55+ 10log(P)] (dB)
    = -25dBm.

3.9 Frequency Stability

3.9.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency.

3.9.2 Test Procedures for Temperature Variation

1. The testing follows ANSI C63.26 section 5.6.4
2. The EUT was set up in the thermal chamber and connected with the system simulator.
3. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized before testing. Power was applied and the maximum change in frequency was recorded within one minute.
4. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.

3.9.3 Test Procedures for Voltage Variation

1. The testing follows ANSI C63.26 section 5.6.5
2. The EUT was placed in a temperature chamber at 20±5°C and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value for other than hand carried battery equipment.
4. For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.
5. The variation in frequency was measured for the worst case.

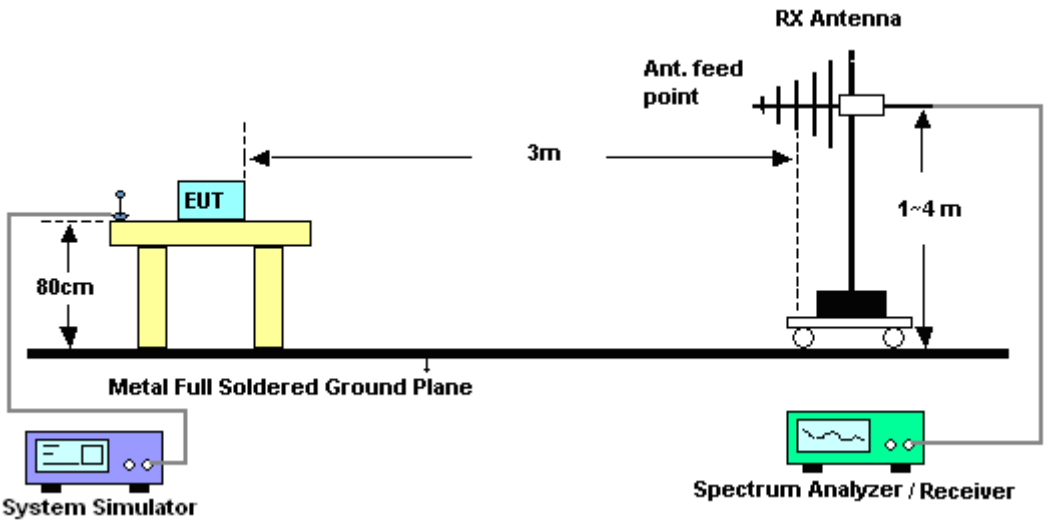
4 Radiated Test Items

4.1 Measuring Instruments

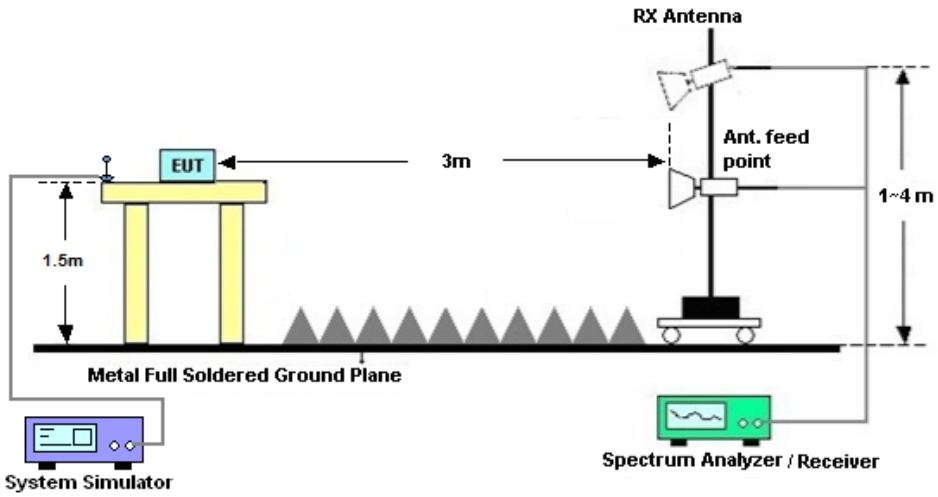
See list of measuring instruments of this test report.

4.2 Test Setup

4.2.1 For radiated test from 30MHz to 1GHz



4.2.2 For radiated test above 1GHz



4.3 Test Result of Radiated Test

Please refer to Appendix B.

4.4 Effective Radiated Power and Effective Isotropic Radiated Power

4.4.1 Description of the ERP/EIRP Measurement

Effective radiated power output measurements by substitution method according to ANSI C63.26, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas License Digital Systems v03r01. Mobile and portable (hand-held) stations operating are limited to average ERP of 7 watts with LTE band 12.

Equivalent isotropic radiated power output measurements by substitution method according to ANSI C63.26, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas License Digital Systems v03r01. Mobile and portable (hand-held) stations operating are limited to average EIRP of 2 watts with LTE 41 and 1 watt with LTE band 4.

4.4.2 Test Procedures

1. The EUT was placed on a non-conductive rotating platform (0.8 meters for frequency below 1GHz and 1.5 meter for frequency above 1GHz) in a semi-anechoic chamber. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with RMS detector per section 5. of KDB 971168 D01.
2. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power. The maximum emission was recorded from analyzer power level (LVL) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
3. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to ANSI C63.26. The EUT was replaced by the substitution antenna at same location, and then a known power from S.G. was applied into the dipole antenna through a Tx cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna. The correction factor (in dB) = S.G. - Tx Cable loss + Substitution antenna gain - Analyzer reading. Then the EUT's EIRP was calculated with the correction factor, EIRP = LVL + Correction factor and ERP = EIRP - 2.15. Take the record of the output power at substitution antenna.

	LTE Average					
LTE BW	1.4M	3M	5M	10M	15M	20M
Span	3MHz	6MHz	10MHz	20MHz	30MHz	40MHz
RBW	30kHz	100kHz	100kHz	300kHz	300kHz	300kHz
VBW	100kHz	300kHz	300kHz	1MHz	1MHz	1MHz
Detector	RMS	RMS	RMS	RMS	RMS	RMS
Trace	Average	Average	Average	Average	Average	Average
Average Type	Power	Power	Power	Power	Power	Power
Sweep Count	100	100	100	100	100	100

4.5 Radiated Spurious Emission

4.5.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI C63.26. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

For Band 41

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 55 + 10 log (P) dB.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

4.5.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.5
2. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
6. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
7. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
8. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
9. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
10. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
11. ERP (dBm) = EIRP - 2.15
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
    The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)
    = P(W)- [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.
13. For Band 41:
    The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)

5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	9kHz~40GHz	Apr.19, 2018	Jun. 04, 2018~ Jun. 07, 2018	Apr.18, 2019	Conducted (TH01-SZ)
DC Power Supply	GWINSTEK	AnritsuGPS-3030D	EM882636	Max 30V	Apr.19, 2018	Jun. 04, 2018~ Jun. 07, 2018	Apr.18, 2019	Conducted (TH01-SZ)
Thermal Chamber	Ten Billion Hongzhangroup	LP-150U	H2014081803	-40~+150°C	Jul. 20, 2017	Jun. 04, 2018~ Jun. 07, 2018	Jul. 19, 2018	Conducted (TH01-SZ)
EMI Test Receiver	R&S	ESR7	101404	9kHz~7GHz	Apr. 19, 2018	Jun. 07, 2018	Apr. 18, 2019	Radiation (03CH04-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Apr. 19, 2018	Jun. 07, 2018	Apr. 18, 2019	Radiation (03CH04-SZ)
Bilog Antenna	TeseQ	CBL6111D	41909	30MHz~1GHz	Aug 29, 2017	Jun. 07, 2018	Aug 28, 2018	Radiation (03CH04-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120 D	9120D-1285	1GHz~18GHz	Dec. 13, 2017	Jun. 07, 2018	Dec. 12, 2018	Radiation (03CH04-SZ)
Horn Antenna	SCHWARZBECK	BBHA9170	9170#679	15GHz~40GHz	Apr 20 2018	Jun. 07, 2018	Apr 19, 2019	Radiation (03CH04-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz ~3000MHz	Oct.19, 2017	Jun. 07, 2018	Oct 18, 2018	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	AMF-7D-00 101800-30-10P-R	1989346	1GHz~18GHz	Jul. 27, 2017	Jun. 07, 2018	Jul. 26, 2018	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	TTA1840-35 -HG	1988315	18GHz~40GHz	Jul. 27, 2017	Jun. 07, 2018	Jul.26, 2018	Radiation (03CH04-SZ)
Amplifier	Agilent Technologies	83017A	MY53270156	500MHz~26.5GHz	Apr. 19, 2018	Jun. 07, 2018	Apr. 18, 2019	Radiation (03CH04-SZ)
AC Power Source	Chroma	61601	N/A	N/A	NCR	Jun. 07, 2018	NCR	Radiation (03CH04-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Jun. 07, 2018	NCR	Radiation (03CH04-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Jun. 07, 2018	NCR	Radiation (03CH04-SZ)

6 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.8 dB**

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.1 dB**

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.9 dB**

Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

LTE Band 4 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
20	1	0	QPSK	21.68	22.02	21.87
20	1	49		22.43	22.36	22.14
20	1	99		21.81	21.77	21.69
20	50	0		21.00	21.14	21.06
20	50	24		20.92	20.94	20.88
20	50	50		20.90	20.91	20.88
20	100	0		21.06	20.94	20.90
20	1	0	16-QAM	20.63	20.87	20.88
20	1	49		20.69	20.74	20.70
20	1	99		20.68	20.51	20.55
20	50	0		20.16	20.32	20.13
20	50	24		20.09	20.11	19.84
20	50	50		19.97	19.98	19.95
20	100	0		20.11	20.02	19.95
15	1	0	QPSK	21.78	22.12	21.86
15	1	37		22.31	22.24	22.22
15	1	74		21.77	21.85	21.87
15	36	0		21.00	21.05	20.84
15	36	20		20.90	20.99	20.78
15	36	39		20.87	20.87	20.81
15	75	0		20.92	20.99	20.80
15	1	0	16-QAM	20.74	20.83	20.65
15	1	37		21.01	20.93	21.09
15	1	74		20.69	20.50	20.68
15	36	0		20.11	20.19	19.79
15	36	20		19.93	20.04	19.83
15	36	39		19.81	19.93	19.77
15	75	0		20.03	20.14	19.76

LTE Band 4 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	21.67	21.85	21.60
10	1	25		22.10	22.35	22.11
10	1	49		21.69	22.00	21.65
10	25	0		20.99	20.99	20.88
10	25	12		21.04	20.94	20.92
10	25	25		20.91	20.88	20.82
10	50	0		20.90	20.97	20.89
10	1	0	16-QAM	20.67	20.89	20.53
10	1	25		21.42	20.71	20.66
10	1	49		20.63	20.57	20.69
10	25	0		20.13	20.04	19.84
10	25	12		20.18	20.18	19.97
10	25	25		19.95	19.93	19.87
10	50	0		19.93	20.13	19.95
5	1	0	QPSK	21.57	21.87	21.89
5	1	12		21.88	22.08	21.77
5	1	24		21.77	21.93	21.63
5	12	0		20.81	20.97	20.94
5	12	7		21.02	20.97	20.85
5	12	13		20.91	20.99	20.83
5	25	0		20.86	20.90	20.89
5	1	0	16-QAM	20.64	20.60	20.75
5	1	12		20.88	20.84	20.52
5	1	24		20.66	20.56	20.66
5	12	0		19.74	19.85	19.90
5	12	7		19.94	20.14	19.81
5	12	13		19.95	20.06	19.93
5	25	0		20.01	19.86	19.74

LTE Band 4 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
3	1	0	QPSK	21.60	21.84	21.83
3	1	8		21.93	22.07	21.77
3	1	14		22.07	21.90	21.71
3	8	0		20.93	20.88	20.78
3	8	4		20.88	20.96	20.78
3	8	7		20.97	20.90	20.71
3	15	0		20.82	20.92	20.74
3	1	0	16-QAM	20.69	20.93	20.53
3	1	8		20.67	21.14	20.61
3	1	14		20.82	20.67	20.69
3	8	0		19.97	20.04	19.70
3	8	4		20.04	20.04	19.76
3	8	7		20.01	20.02	19.80
3	15	0		19.74	20.06	19.79
1.4	1	0	QPSK	21.77	21.96	21.72
1.4	1	3		21.92	22.00	21.75
1.4	1	5		21.86	22.09	21.82
1.4	3	0		21.93	22.18	21.90
1.4	3	1		21.97	22.17	21.92
1.4	3	3		21.97	22.00	21.91
1.4	6	0		20.83	20.90	20.73
1.4	1	0	16-QAM	20.99	20.80	20.50
1.4	1	3		20.67	20.85	20.65
1.4	1	5		20.70	20.84	20.63
1.4	3	0		20.87	20.85	20.69
1.4	3	1		20.92	20.97	20.90
1.4	3	3		20.82	20.97	20.90
1.4	6	0		19.92	19.87	19.67

LTE Band 12 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	21.58	21.71	21.92
10	1	25		22.50	22.03	22.08
10	1	49		21.81	21.72	21.51
10	25	0		21.03	21.24	21.19
10	25	12		21.28	21.15	21.18
10	25	25		21.17	21.06	21.20
10	50	0		21.22	21.18	21.26
10	1	0	16-QAM	20.76	20.94	20.86
10	1	25		21.11	21.09	21.07
10	1	49		20.70	20.80	20.62
10	25	0		20.17	20.16	20.29
10	25	12		20.30	20.21	20.05
10	25	25		19.88	20.11	19.95
10	50	0		20.30	20.01	20.22
5	1	0	QPSK	21.74	22.22	21.74
5	1	12		22.38	22.34	22.21
5	1	24		22.01	21.60	21.93
5	12	0		21.17	21.22	21.07
5	12	7		21.30	21.20	21.35
5	12	13		21.44	21.14	21.24
5	25	0		21.29	21.12	21.27
5	1	0	16-QAM	20.81	20.87	20.98
5	1	12		21.13	21.08	21.22
5	1	24		20.99	20.79	20.88
5	12	0		20.11	20.15	20.12
5	12	7		20.25	20.16	20.40
5	12	13		20.37	20.00	20.41
5	25	0		20.21	20.02	20.41

LTE Band 12 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
3	1	0	QPSK	21.82	22.04	22.01
3	1	8		22.13	22.04	22.49
3	1	14		22.00	21.85	22.07
3	8	0		21.08	21.16	21.36
3	8	4		21.15	21.23	21.35
3	8	7		21.39	21.26	21.30
3	15	0		21.25	21.18	21.26
3	1	0	16-QAM	20.98	20.89	21.09
3	1	8		20.98	21.30	20.91
3	1	14		21.28	21.07	21.41
3	8	0		19.88	20.01	20.24
3	8	4		20.26	20.11	20.35
3	8	7		20.39	20.07	20.29
3	15	0		20.12	20.23	20.31
1.4	1	0	QPSK	22.10	22.06	22.08
1.4	1	3		22.14	22.12	22.24
1.4	1	5		22.15	21.94	22.17
1.4	3	0		22.08	22.08	22.21
1.4	3	1		22.11	22.19	22.29
1.4	3	3		22.10	22.24	22.23
1.4	6	0		21.03	21.24	21.14
1.4	1	0	16-QAM	21.01	20.96	21.00
1.4	1	3		20.98	21.05	21.46
1.4	1	5		21.08	20.98	21.32
1.4	3	0		21.13	21.12	21.16
1.4	3	1		21.18	21.13	21.47
1.4	3	3		21.15	21.21	21.48
1.4	6	0		20.08	20.03	20.04

LTE Band 41 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
20	1	0	QPSK	22.36	22.40	22.40
20	1	49		22.59	22.51	22.56
20	1	99		22.52	22.62	22.64
20	50	0		21.79	21.69	21.68
20	50	24		21.86	21.65	21.74
20	50	50		21.86	21.75	21.85
20	100	0		21.81	21.74	21.66
20	1	0	16-QAM	21.28	21.15	21.12
20	1	49		21.62	21.55	21.55
20	1	99		21.34	21.34	21.34
20	50	0		20.65	20.70	20.65
20	50	24		20.76	20.67	20.82
20	50	50		20.87	20.82	20.82
20	100	0		20.81	20.73	20.64
15	1	0	QPSK	22.34	22.45	22.41
15	1	37		22.85	22.54	22.85
15	1	74		22.67	22.57	22.63
15	36	0		21.74	21.56	21.61
15	36	20		21.94	21.71	21.74
15	36	39		21.86	21.65	21.77
15	75	0		21.82	21.66	21.72
15	1	0	16-QAM	21.41	21.32	21.24
15	1	37		21.48	21.53	21.50
15	1	74		21.40	21.37	21.45
15	36	0		20.70	20.58	20.65
15	36	20		21.00	20.85	20.80
15	36	39		20.94	20.81	20.76
15	75	0		20.84	20.78	20.82

LTE Band 41 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
10	1	0	QPSK	22.55	22.54	22.17
10	1	25		22.89	22.60	22.39
10	1	49		22.69	22.57	22.40
10	25	0		21.93	21.64	21.54
10	25	12		21.95	21.69	21.69
10	25	25		21.90	21.61	21.62
10	50	0		21.95	21.66	21.59
10	1	0	16-QAM	21.47	21.35	21.07
10	1	25		21.70	21.53	21.45
10	1	49		21.52	21.27	21.21
10	25	0		20.87	21.05	20.76
10	25	12		21.18	21.07	20.97
10	25	25		20.93	20.98	20.93
10	50	0		20.97	20.78	20.64
5	1	0	QPSK	22.75	22.42	22.63
5	1	12		22.80	22.64	22.89
5	1	24		22.84	22.40	22.56
5	12	0		22.11	21.67	21.93
5	12	7		22.09	21.66	22.11
5	12	13		22.18	21.63	22.13
5	25	0		22.11	21.65	22.01
5	1	0	16-QAM	21.59	21.23	21.38
5	1	12		21.67	21.48	21.52
5	1	24		21.62	21.34	21.47
5	12	0		21.15	20.67	20.97
5	12	7		21.03	20.66	21.00
5	12	13		20.99	20.62	20.88
5	25	0		21.05	20.66	20.89

ERP/EIRP

LTE Band 4 (GT - LC = 2.60 dB) QPSK									
Bandwidth	1.4M			3M			5M		
Channel	19957	20175	20393	19965	20175	20385	19975	20175	20375
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	1710.7	1732.5	1754.3	1711.5	1732.5	1753.5	1712.5	1732.5	1752.5
Conducted Power (dBm)	21.93	22.18	21.90	21.93	22.07	21.77	21.88	22.08	21.77
Conducted Power (Watts)	0.1560	0.1652	0.1549	0.1560	0.1611	0.1503	0.1542	0.1614	0.1503
EIRP(dBm)	24.53	24.78	24.50	24.53	24.67	24.37	24.48	24.68	24.37
EIRP(Watts)	0.2838	0.3006	0.2818	0.2838	0.2931	0.2735	0.2805	0.2938	0.2735

LTE Band 4 (GT - LC = 2.60 dB) QPSK									
Bandwidth	10M			15M			20M		
Channel	20000	20175	20350	20025	20175	20325	20050	20175	20300
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	1715	1732.5	1750	1717.5	1732.5	1747.5	1720	1732.5	1745
Conducted Power (dBm)	22.10	22.35	22.11	22.31	22.24	22.22	22.43	22.36	22.14
Conducted Power (Watts)	0.1622	0.1718	0.1626	0.1702	0.1675	0.1667	0.1750	0.1722	0.1637
EIRP(dBm)	24.70	24.95	24.71	24.91	24.84	24.82	25.03	24.96	24.74
EIRP(Watts)	0.2951	0.3126	0.2958	0.3097	0.3048	0.3034	0.3184	0.3133	0.2979

LTE Band 4 (GT - LC = 2.60 dB) 16QAM									
Bandwidth	1.4M			3M			5M		
Channel	19957	20175	20393	19965	20175	20385	19975	20175	20375
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	1710.7	1732.5	1754.3	1711.5	1732.5	1753.5	1712.5	1732.5	1752.5
Conducted Power (dBm)	20.99	20.80	20.50	20.67	21.14	20.61	20.88	20.84	20.52
Conducted Power (Watts)	0.1256	0.1202	0.1122	0.1167	0.1300	0.1151	0.1225	0.1213	0.1127
EIRP(dBm)	23.59	23.40	23.10	23.27	23.74	23.21	23.48	23.44	23.12
EIRP(Watts)	0.2286	0.2188	0.2042	0.2123	0.2366	0.2094	0.2228	0.2208	0.2051

LTE Band 4 (GT - LC = 2.60 dB) 16QAM									
Bandwidth	10M			15M			20M		
Channel	20000	20175	20350	20025	20175	20325	20050	20175	20300
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	1715	1732.5	1750	1717.5	1732.5	1747.5	1720	1732.5	1745
Conducted Power (dBm)	21.42	20.71	20.66	21.01	20.93	21.09	20.63	20.87	20.88
Conducted Power (Watts)	0.1387	0.1178	0.1164	0.1262	0.1239	0.1285	0.1156	0.1222	0.1225
EIRP(dBm)	24.02	23.31	23.26	23.61	23.53	23.69	23.23	23.47	23.48
EIRP(Watts)	0.2523	0.2143	0.2118	0.2296	0.2254	0.2339	0.2104	0.2223	0.2228

LTE Band 12 (GT - LC = 3.10 dB) QPSK									
Bandwidth	1.4M			3M			5M		
Channel	23017	23095	23173	23025	23095	23165	23035	23095	23155
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	699.7	707.5	715.3	700.5	707.5	714.5	701.5	707.5	713.5
Conducted Power (dBm)	22.11	22.19	22.29	22.13	22.04	22.49	22.38	22.34	22.21
Conducted Power (Watts)	0.1626	0.1656	0.1694	0.1633	0.1600	0.1774	0.1730	0.1714	0.1663
ERP(dBm)	23.06	23.14	23.24	23.08	22.99	23.44	23.33	23.29	23.16
ERP(Watts)	0.2023	0.2061	0.2109	0.2032	0.1991	0.2208	0.2153	0.2133	0.2070

LTE Band 12 (GT - LC = 3.10 dB) QPSK			
Bandwidth	10M		
Channel	23060	23095	23130
	(Low)	(Mid)	(High)
Frequency (MHz)	704	707.5	711
Conducted Power (dBm)	22.50	22.03	22.08
Conducted Power (Watts)	0.1778	0.1596	0.1614
ERP(dBm)	23.45	22.98	23.03
ERP(Watts)	0.2213	0.1986	0.2009

LTE Band 12 (GT - LC = 3.10 dB) 16QAM									
Bandwidth	1.4M			3M			5M		
Channel	23017	23095	23173	23025	23095	23165	23035	23095	23155
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	699.7	707.5	715.3	700.5	707.5	714.5	701.5	707.5	713.5
Conducted Power (dBm)	21.15	21.21	21.48	21.28	21.07	21.41	21.13	21.08	21.22
Conducted Power (Watts)	0.1303	0.1321	0.1406	0.1343	0.1279	0.1384	0.1297	0.1282	0.1324
ERP(dBm)	22.10	22.16	22.43	22.23	22.02	22.36	22.08	22.03	22.17
ERP(Watts)	0.1622	0.1644	0.1750	0.1671	0.1592	0.1722	0.1614	0.1596	0.1648

LTE Band 12 (GT - LC = 3.10 dB) 16QAM			
Bandwidth	10M		
Channel	23060	23095	23130
	(Low)	(Mid)	(High)
Frequency (MHz)	704	707.5	711
Conducted Power (dBm)	21.11	21.09	21.07
Conducted Power (Watts)	0.1291	0.1285	0.1279
ERP(dBm)	22.06	22.04	22.02
ERP(Watts)	0.1607	0.1600	0.1592

LTE Band 41 (G_T - L_C = 3.50dB) QPSK									
Bandwidth	**5M**			**10M**			**15M**		
Channel	**39675**	**40620**	**41565**	**39700**	**40620**	**41540**	**39725**	**40620**	**41515**
	(Low)	**(Mid)**	**(High)**	**(Low)**	**(Mid)**	**(High)**	**(Low)**	**(Mid)**	**(High)**
Frequency (MHz)	**2498.5**	**2593**	**2687.5**	**2501**	**2593**	**2685**	**2503.5**	**2593**	**2682.5**
Conducted Power (dBm)	22.80	22.64	22.89	22.89	22.60	22.39	22.85	22.54	22.85
Conducted Power (Watts)	0.1905	0.1837	0.1945	0.1945	0.1820	0.1734	0.1928	0.1795	0.1928
EIRP(dBm)	26.30	26.14	26.39	26.39	26.10	25.89	26.35	26.04	26.35
EIRP(Watts)	0.4266	0.4111	0.4355	0.4355	0.4074	0.3882	0.4315	0.4018	0.4315

LTE Band 41 (G_T - L_C = 3.50dB) QPSK			
Bandwidth	**20M**		
Channel	**39750**	**40620**	**41490**
	(Low)	**(Mid)**	**(High)**
Frequency (MHz)	**2506**	**2593**	**2680**
Conducted Power (dBm)	22.52	22.62	22.64
Conducted Power (Watts)	0.1786	0.1828	0.1837
EIRP(dBm)	26.02	26.12	26.14
EIRP(Watts)	0.3999	0.4093	0.4111

LTE Band 41 (G_T - L_C = 3.50dB) 16QAM									
Bandwidth	**5M**			**10M**			**15M**		
Channel	**39675**	**40620**	**41565**	**39700**	**40620**	**41540**	**39725**	**40620**	**41515**
	(Low)	**(Mid)**	**(High)**	**(Low)**	**(Mid)**	**(High)**	**(Low)**	**(Mid)**	**(High)**
Frequency (MHz)	**2498.5**	**2593**	**2687.5**	**2501**	**2593**	**2685**	**2503.5**	**2593**	**2682.5**
Conducted Power (dBm)	21.67	21.48	21.52	21.70	21.53	21.45	21.48	21.53	21.50
Conducted Power (Watts)	0.1469	0.1406	0.1419	0.1479	0.1422	0.1396	0.1406	0.1422	0.1413
EIRP(dBm)	25.17	24.98	25.02	25.20	25.03	24.95	24.98	25.03	25.00
EIRP(Watts)	0.3289	0.3148	0.3177	0.3311	0.3184	0.3126	0.3148	0.3184	0.3162

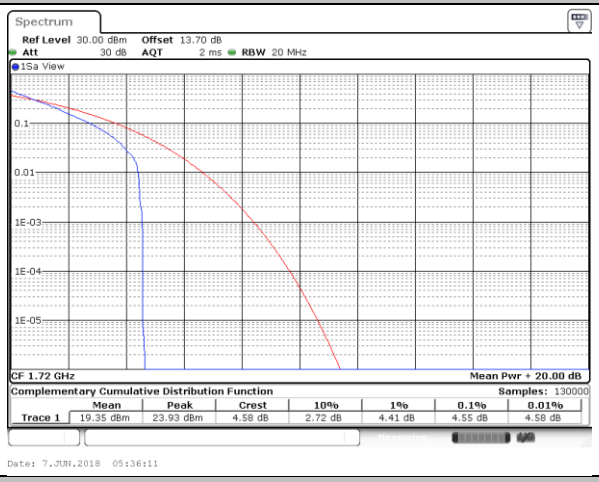
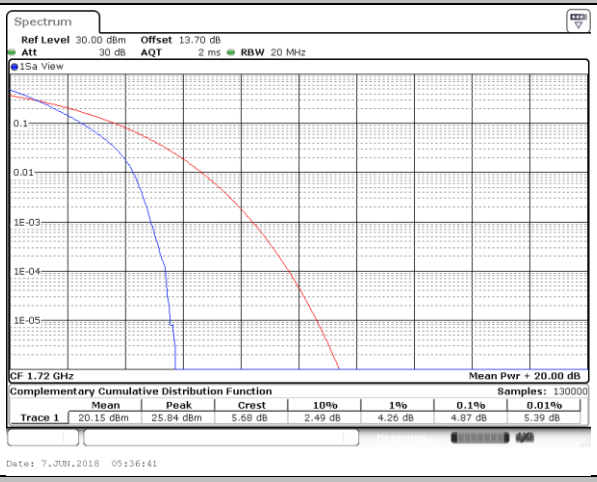
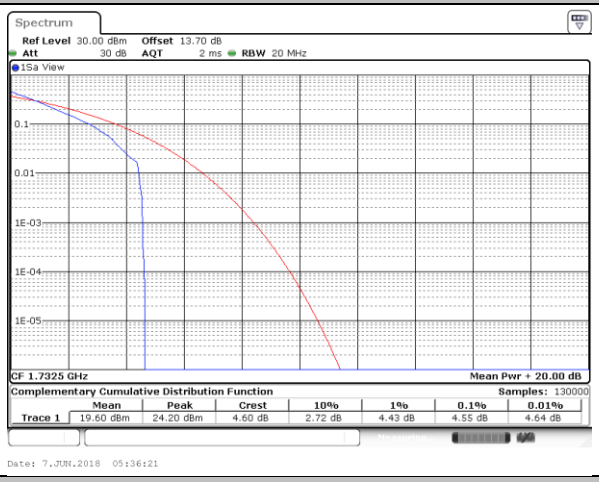
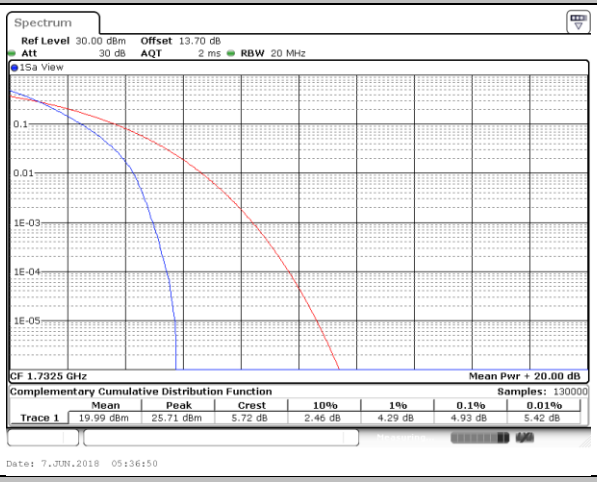
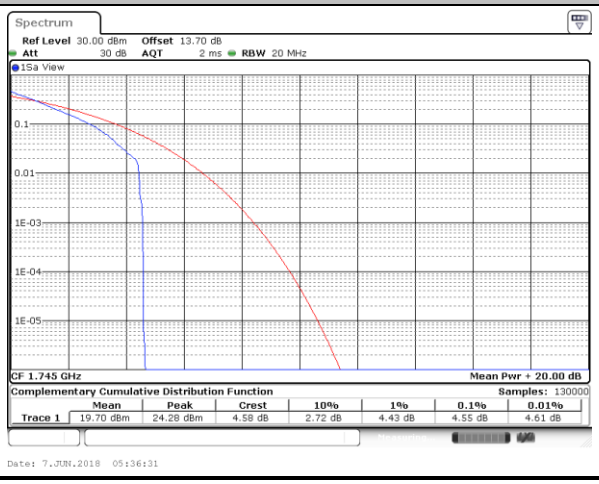
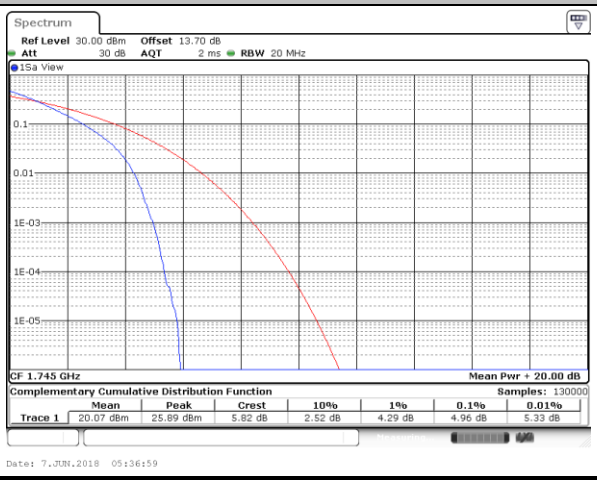
LTE Band 41 (G_T - L_C = 3.50dB) 16QAM			
Bandwidth	**20M**		
Channel	**39750**	**40620**	**41490**
	(Low)	**(Mid)**	**(High)**
Frequency (MHz)	**2506**	**2593**	**2680**
Conducted Power (dBm)	21.62	21.55	21.55
Conducted Power (Watts)	0.1452	0.1429	0.1429
EIRP(dBm)	25.12	25.05	25.05
EIRP(Watts)	0.3251	0.3199	0.3199

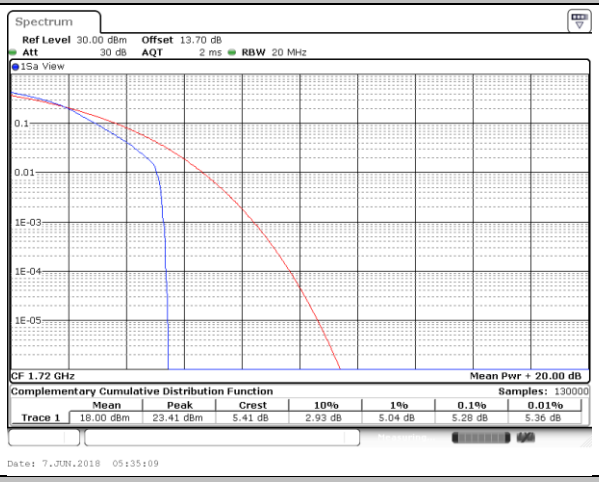
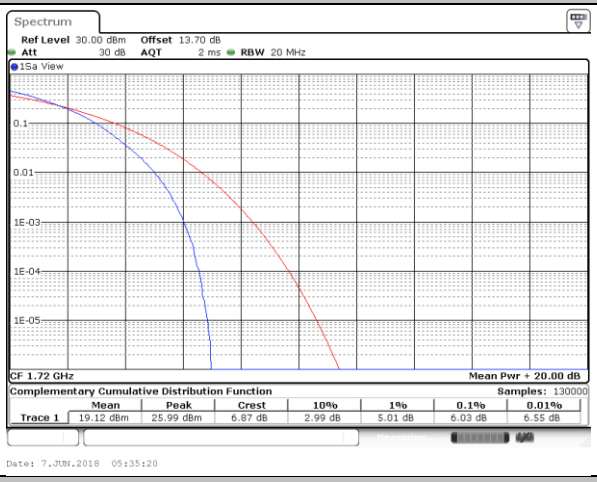
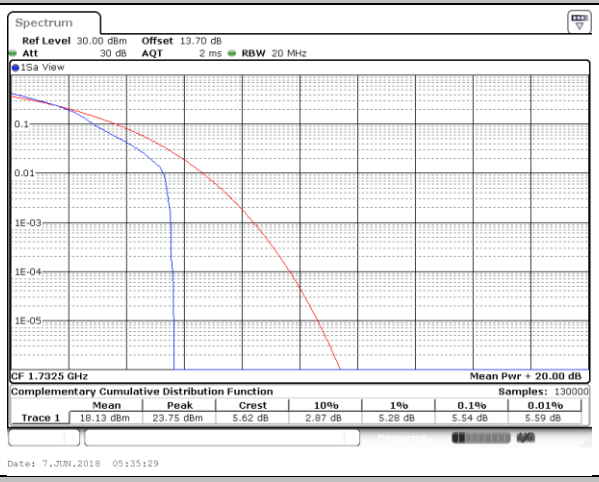
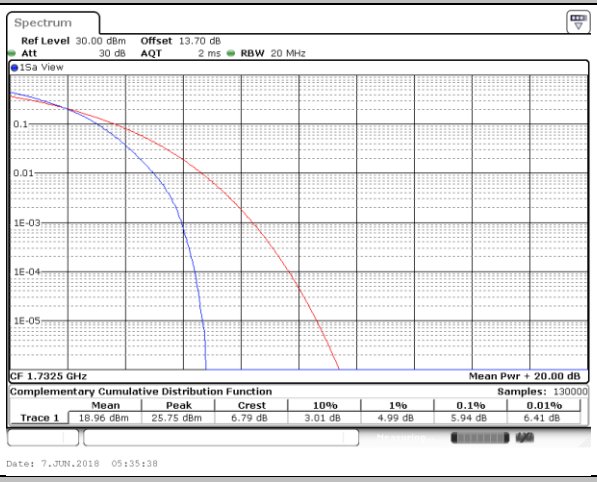
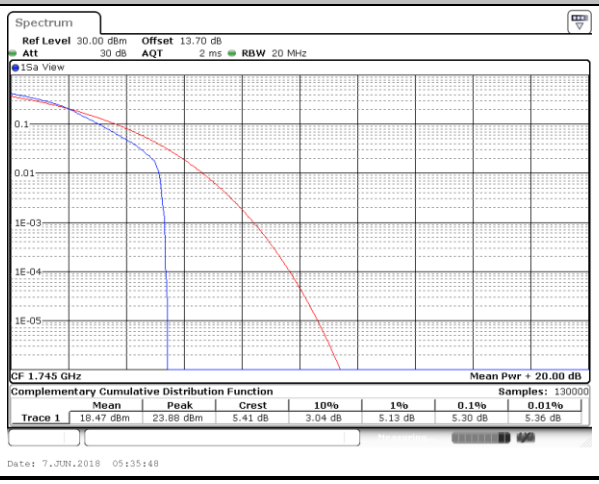
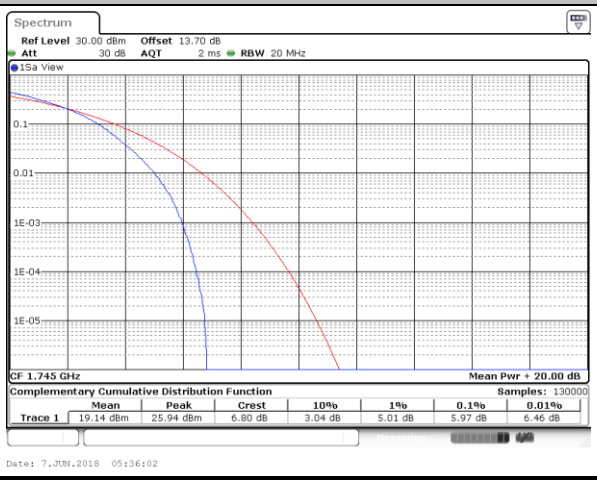
Peak-to-Average Ratio

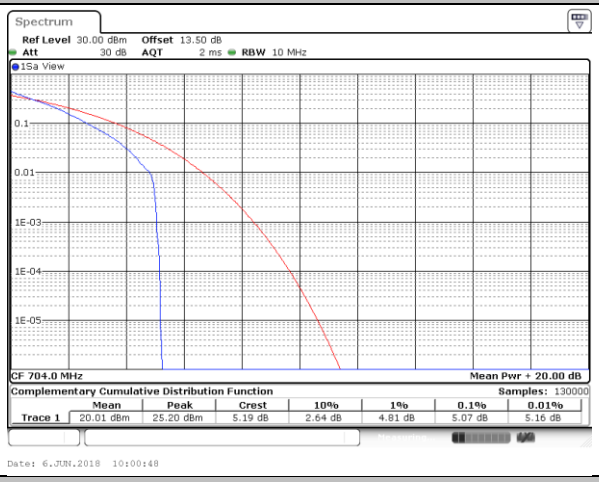
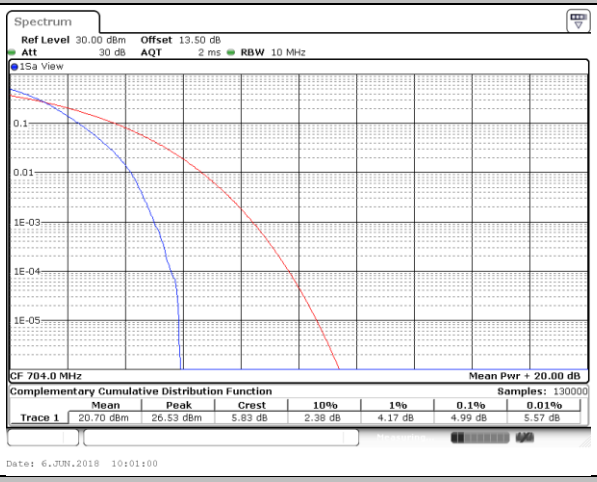
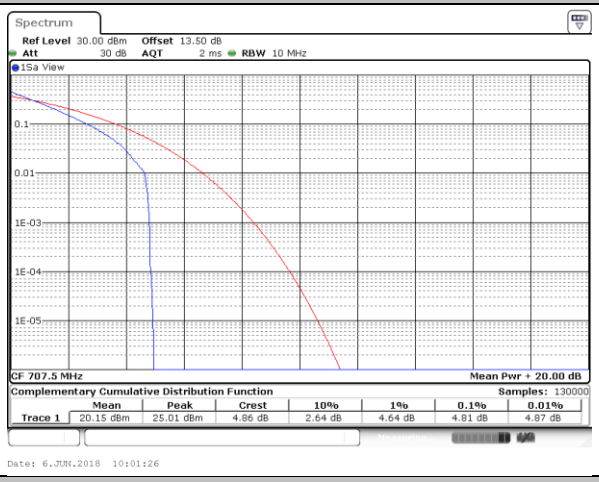
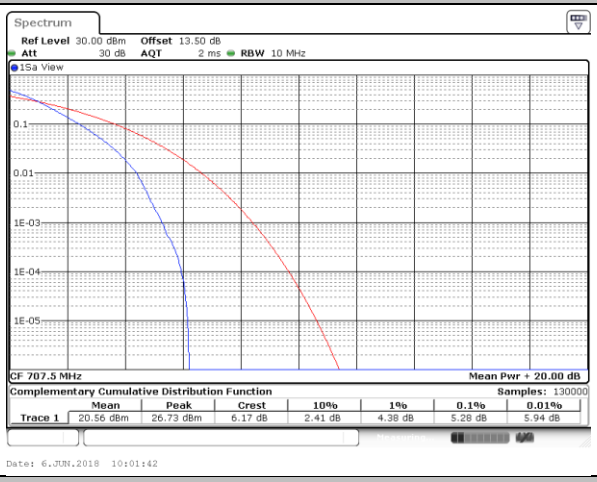
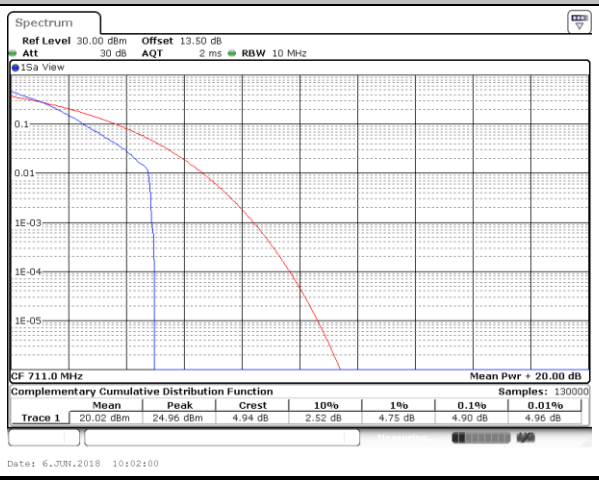
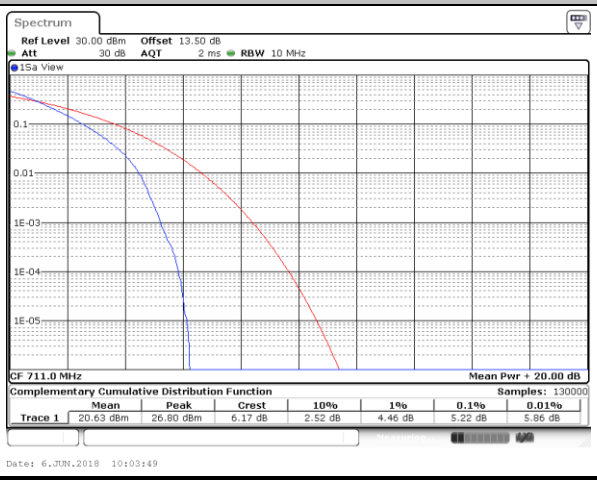
Mode	LTE Band 4 / 20MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	Full RB	Result
Lowest CH	4.55	4.87	5.28	6.03	PASS
Middle CH	4.55	4.93	5.54	5.94	
Highest CH	4.55	4.96	5.3	5.97	

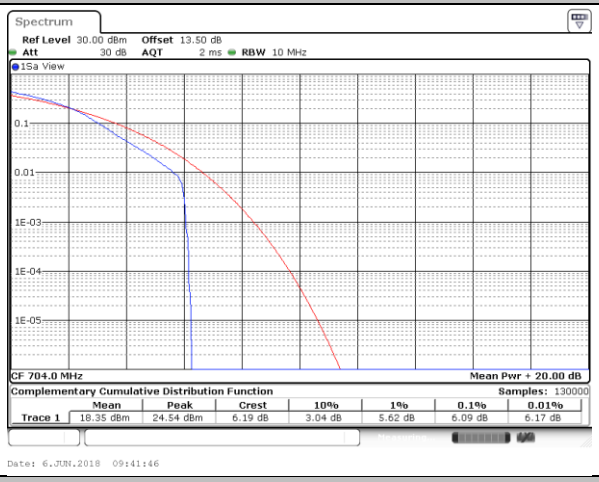
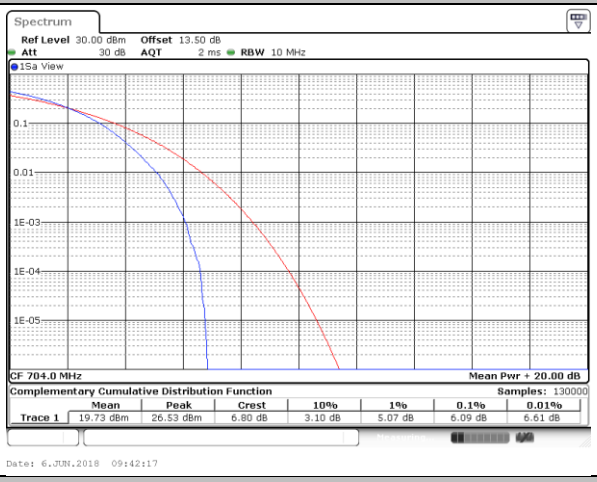
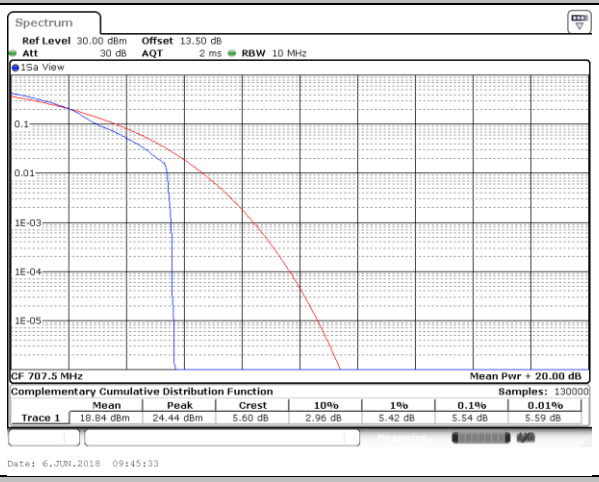
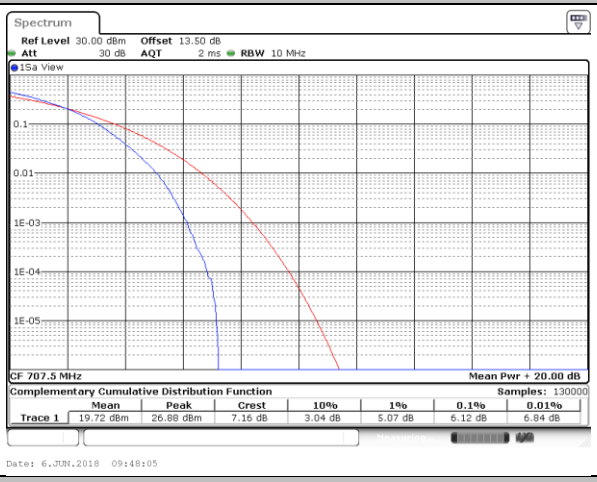
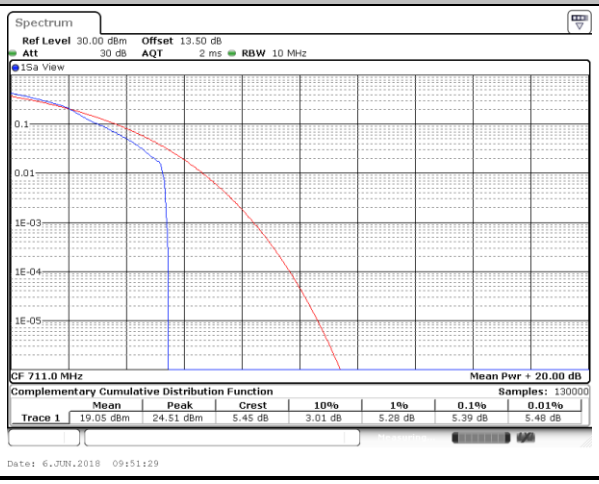
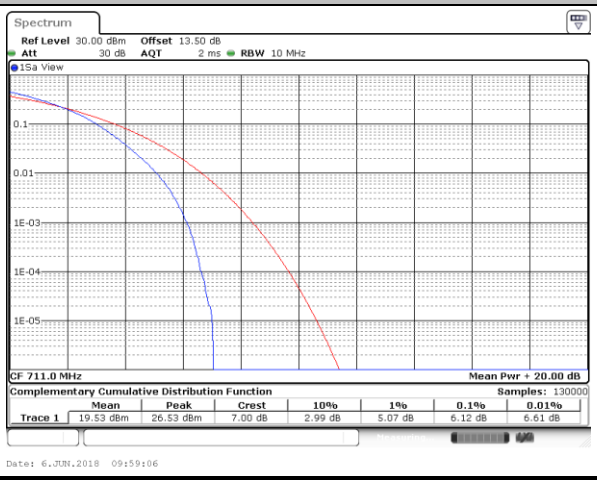
Mode	LTE Band 12 / 10MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	Full RB	Result
Lowest CH	5.07	4.99	6.09	6.09	PASS
Middle CH	4.81	5.28	5.54	6.12	
Highest CH	4.9	5.22	5.39	6.12	

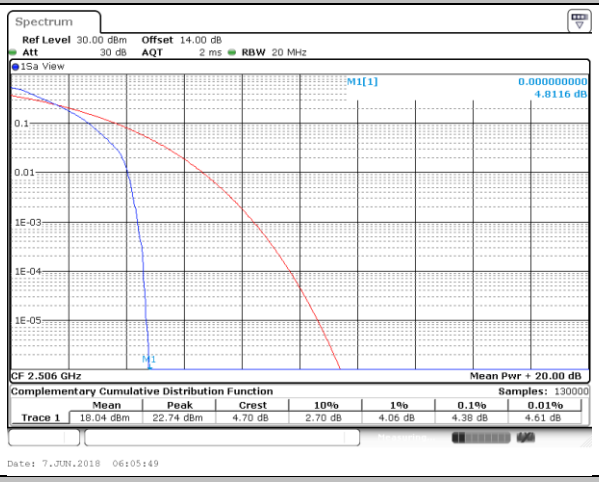
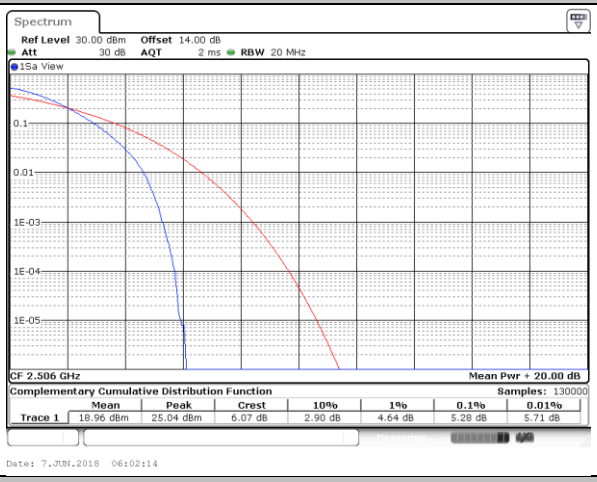
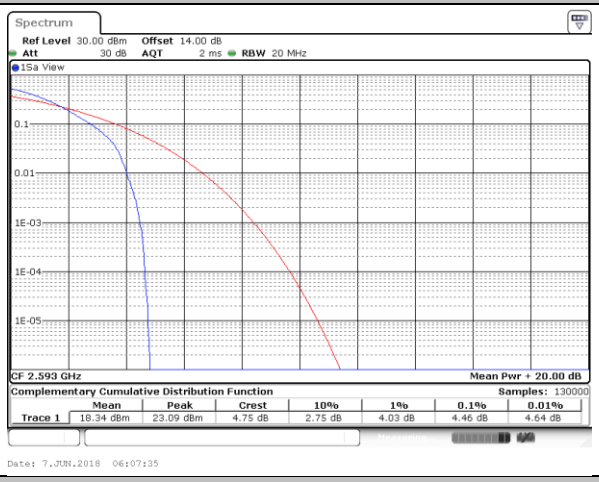
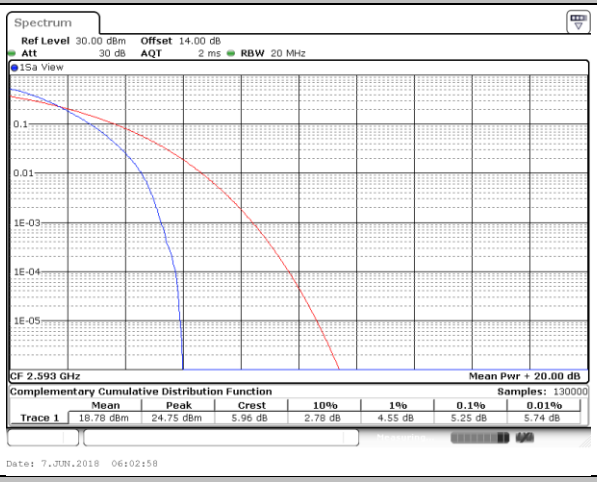
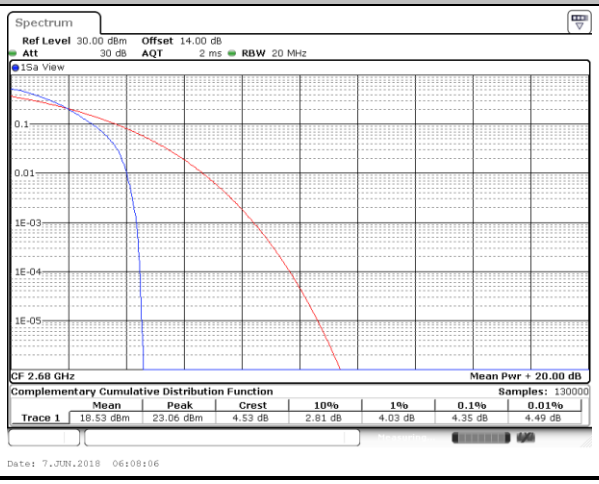
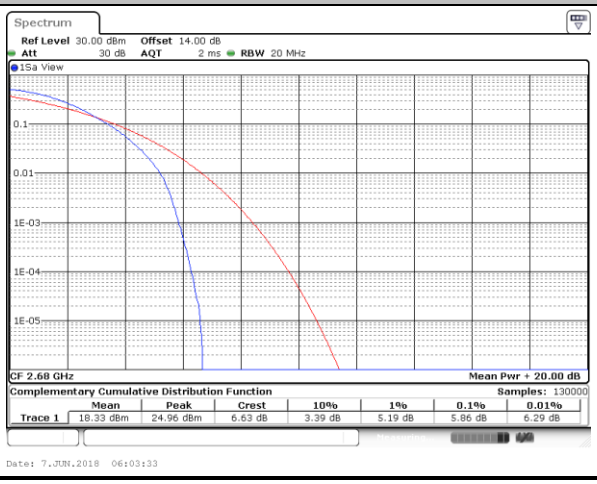
Mode	LTE Band 41 / 20MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	Full RB	Result
Lowest CH	4.38	5.28	5.13	5.86	PASS
Middle CH	4.46	5.25	5.45	5.91	
Highest CH	4.35	5.86	5.39	5.91	

LTE Band 4 / 20MHz / QPSK	
Lowest Channel / 1RB	**Lowest Channel / Full RB**
	
Middle Channel / 1RB	**Middle Channel / Full RB**
	
Highest Channel / 1RB	**Highest Channel / Full RB**
	

LTE Band 4 / 20MHz / 16QAM	
Lowest Channel / 1RB	**Lowest Channel / Full RB**
	
Middle Channel / 1RB	**Middle Channel / Full RB**
	
Highest Channel / 1RB	**Highest Channel / Full RB**
	

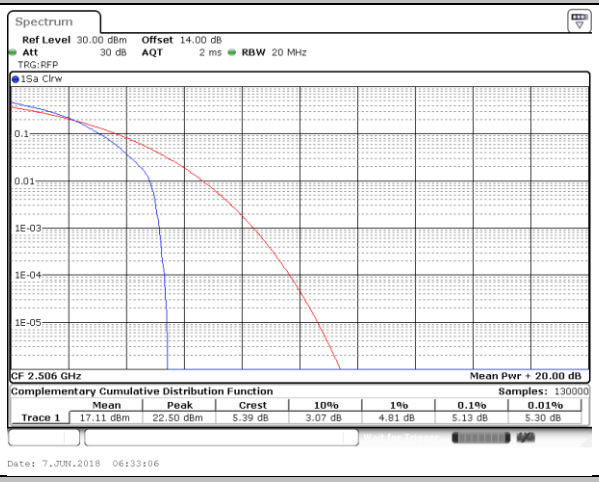
LTE Band 12 / 10MHz / QPSK	
Lowest Channel / 1RB	**Lowest Channel / Full RB**
	
Middle Channel / 1RB	**Middle Channel / Full RB**
	
Highest Channel / 1RB	**Highest Channel / Full RB**
	

LTE Band 12 / 10MHz / 16QAM	
Lowest Channel / 1RB	**Lowest Channel / Full RB**
	
Middle Channel / 1RB	**Middle Channel / Full RB**
	
Highest Channel / 1RB	**Highest Channel / Full RB**
	

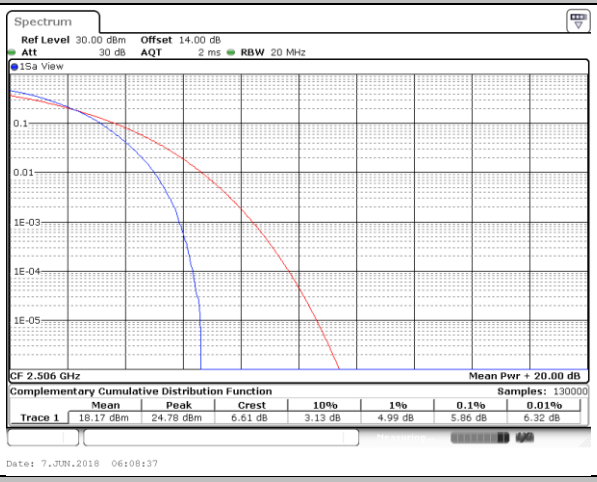
LTE Band 41 / 20MHz / QPSK	
Lowest Channel / 1RB	**Lowest Channel / Full RB**
	
Middle Channel / 1RB	**Middle Channel / Full RB**
	
Highest Channel / 1RB	**Highest Channel / Full RB**
	

LTE Band 41 / 20MHz / 16QAM

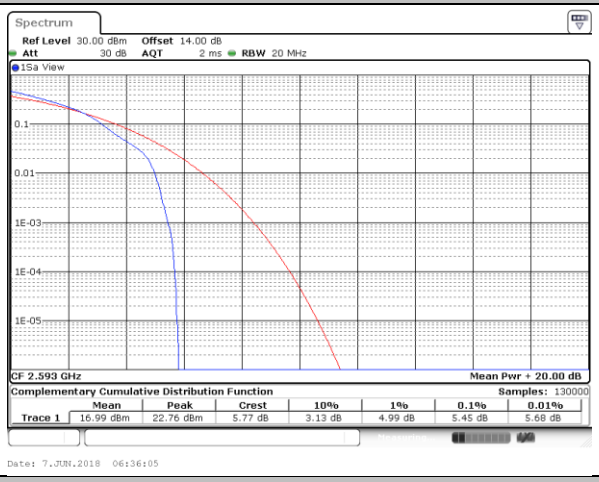
Lowest Channel / 1RB



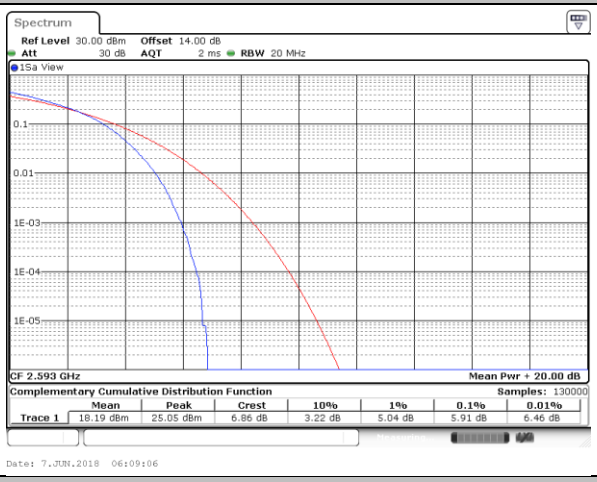
Lowest Channel / Full RB



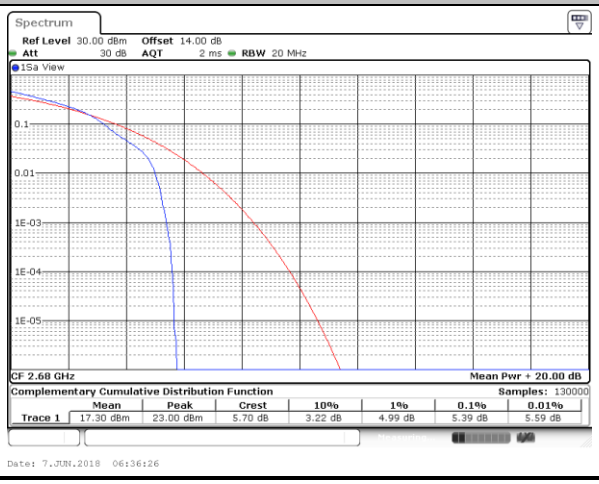
Middle Channel / 1RB



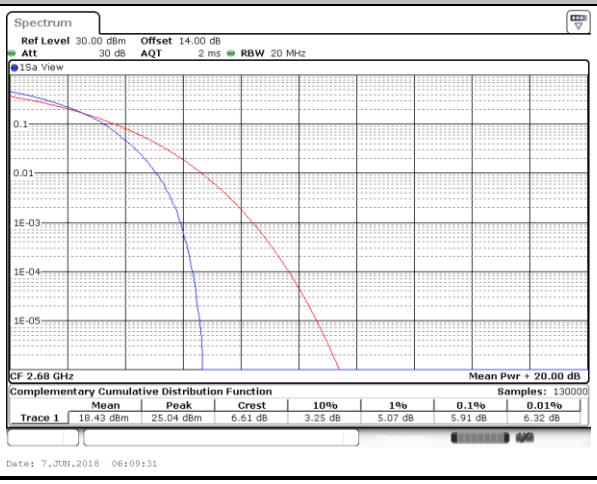
Middle Channel / Full RB



Highest Channel / 1RB



Highest Channel / Full RB



26dB Bandwidth

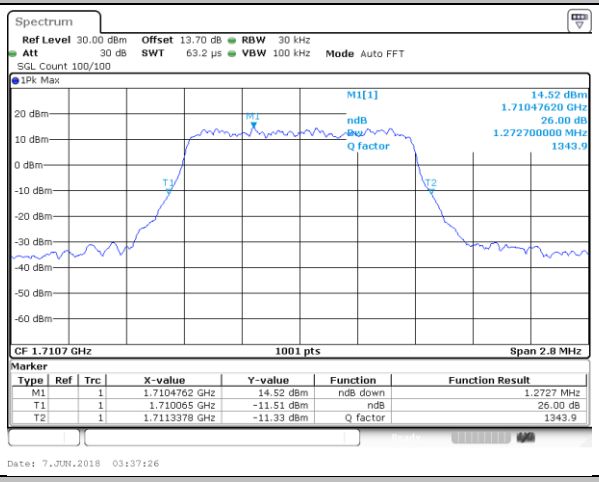
Mode	LTE Band 4 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	1.273	1.287	3.015	3.039	4.945	4.905	9.79	9.77	14.296	14.476	20.1	20.06
Middle CH	1.267	1.273	3.027	3.027	4.905	4.915	9.79	9.59	14.446	14.416	20.14	20.3
Highest CH	1.276	1.239	3.015	2.979	4.835	4.865	9.77	9.79	14.386	14.296	20.14	20.06

Mode	LTE Band 12 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	1.253	1.298	3.021	2.991	4.875	4.885	9.69	9.75	-	-	-	-
Middle CH	1.276	1.278	3.003	2.979	4.945	4.875	9.77	9.73	-	-	-	-
Highest CH	1.287	1.281	2.997	3.015	4.885	4.885	9.67	9.87	-	-	-	-

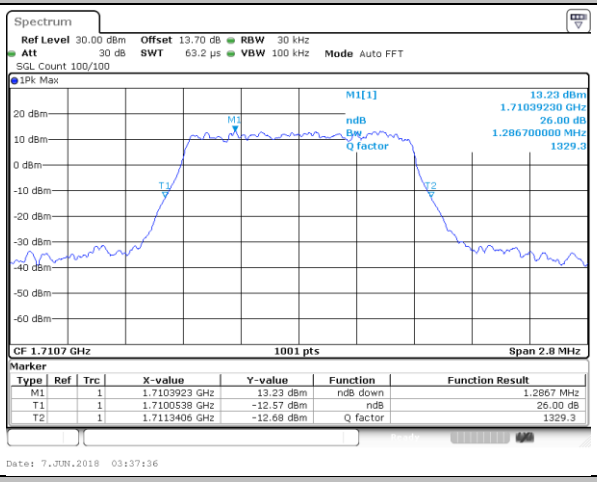
Mode	LTE Band 41 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	4.925	4.775	9.65	9.75	14.416	14.146	20.1	19.98
Middle CH	-	-	-	-	4.855	4.895	9.69	9.73	14.356	14.116	20.34	20.06
Highest CH	-	-	-	-	4.845	4.885	9.67	9.75	14.386	14.116	20.02	20.02

LTE Band 4

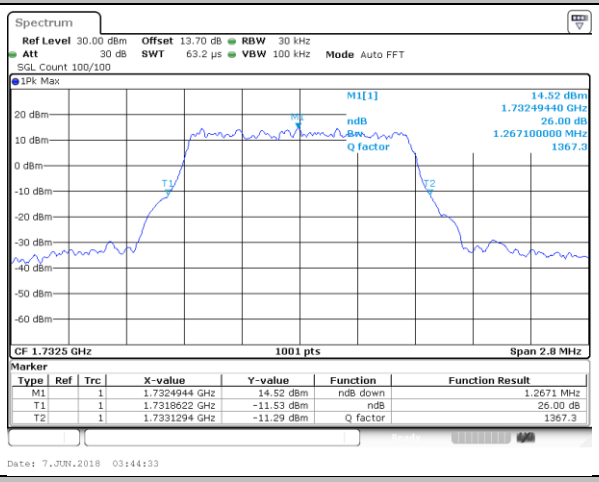
Lowest Channel / 1.4MHz / QPSK



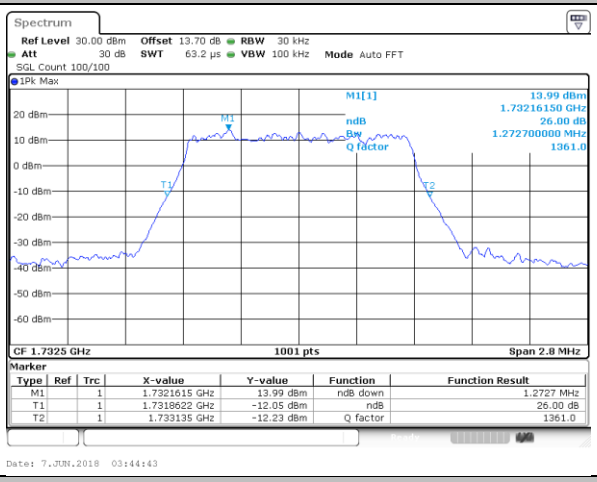
Lowest Channel / 1.4MHz / 16QAM



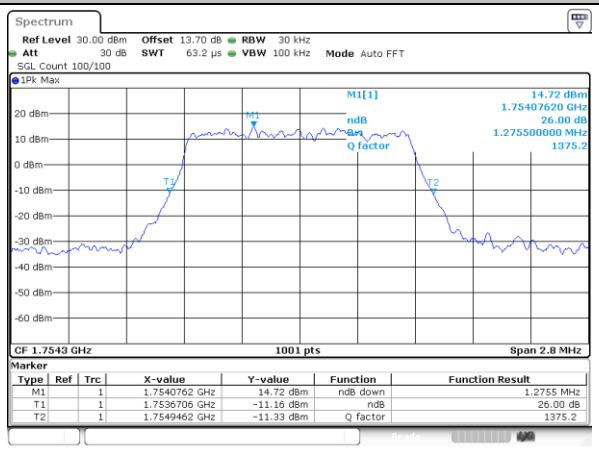
Middle Channel / 1.4MHz / QPSK



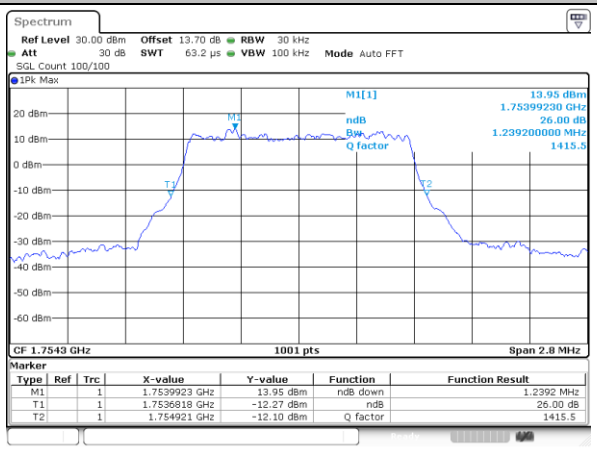
Middle Channel / 1.4MHz / 16QAM



Highest Channel / 1.4MHz / QPSK

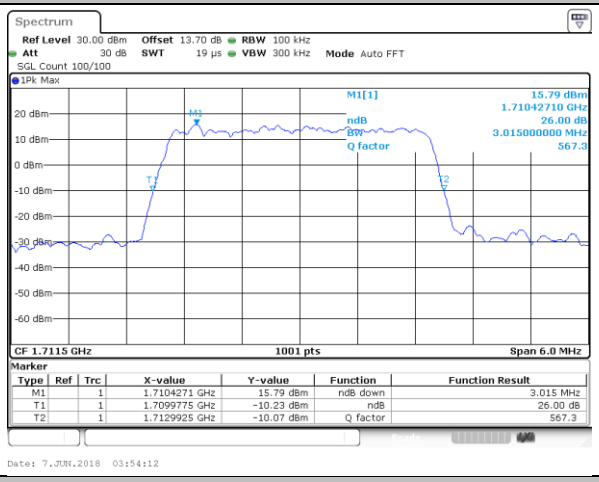


Highest Channel / 1.4MHz / 16QAM

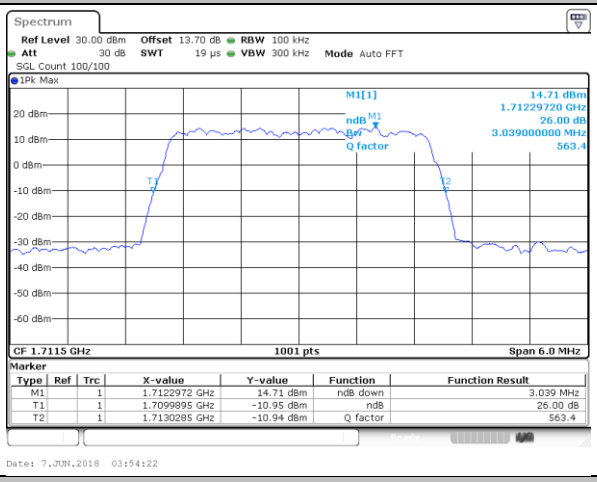


LTE Band 4

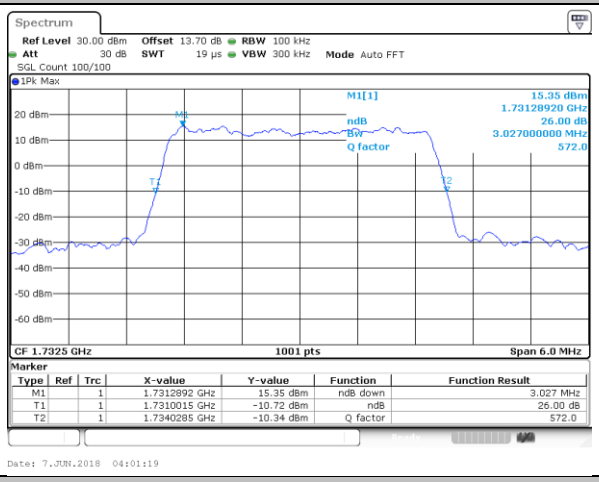
Lowest Channel / 3MHz / QPSK



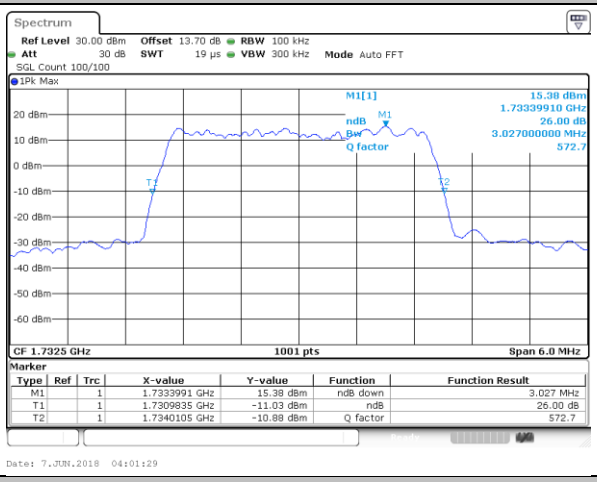
Lowest Channel / 3MHz / 16QAM



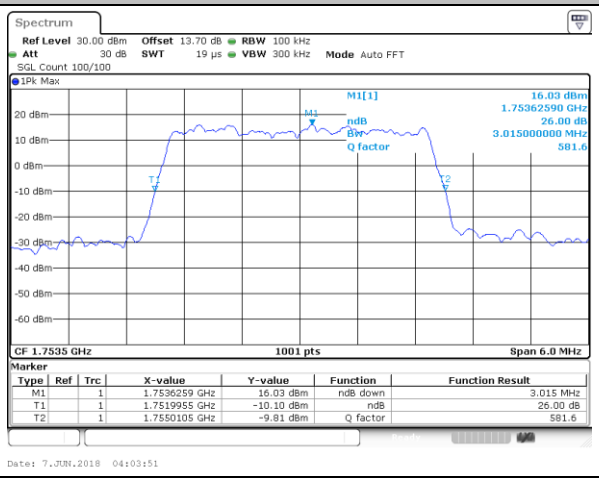
Middle Channel / 3MHz / QPSK



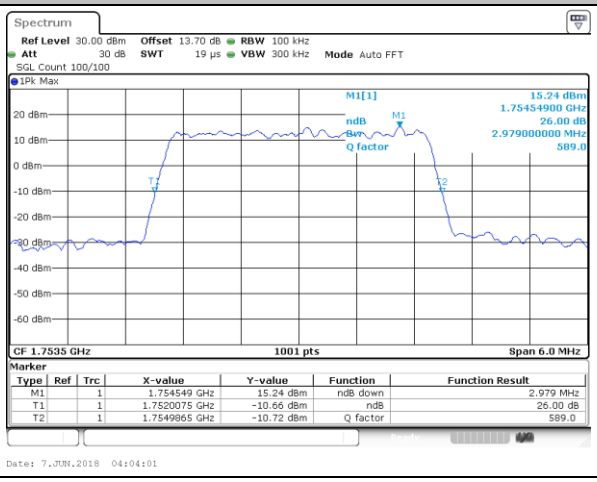
Middle Channel /3MHz / 16QAM



Highest Channel /3MHz / QPSK

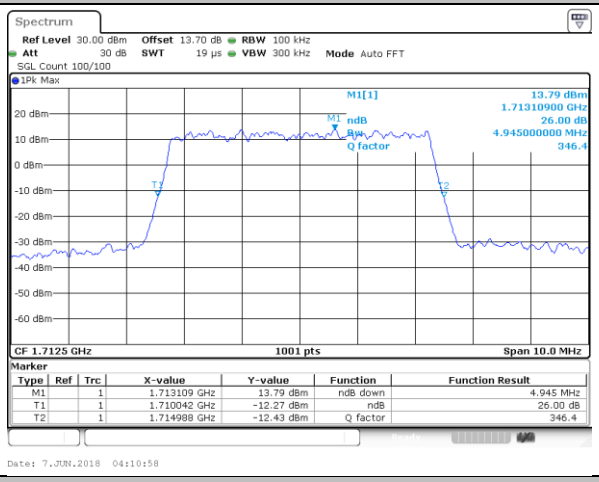


Highest Channel /3MHz / 16QAM

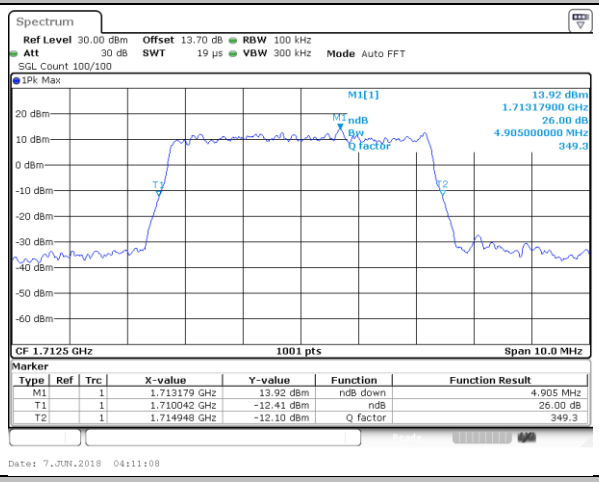


LTE Band 4

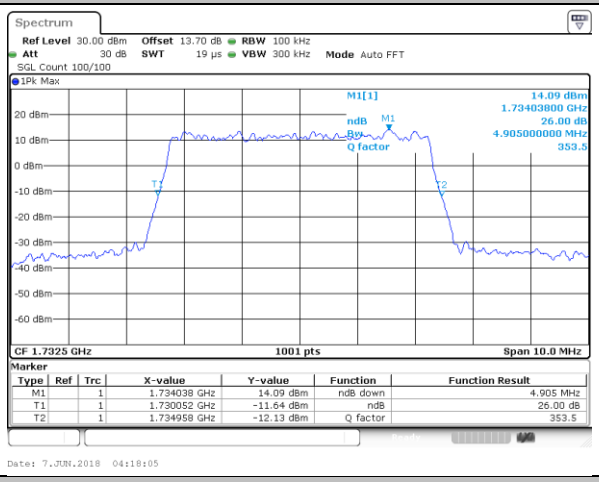
Lowest Channel / 5MHz / QPSK



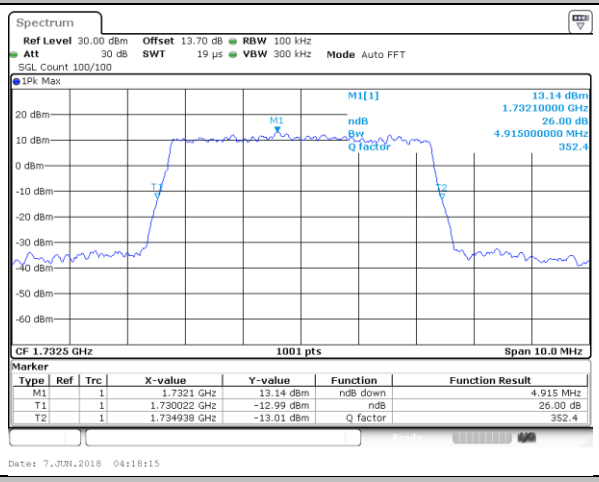
Lowest Channel / 5MHz / 16QAM



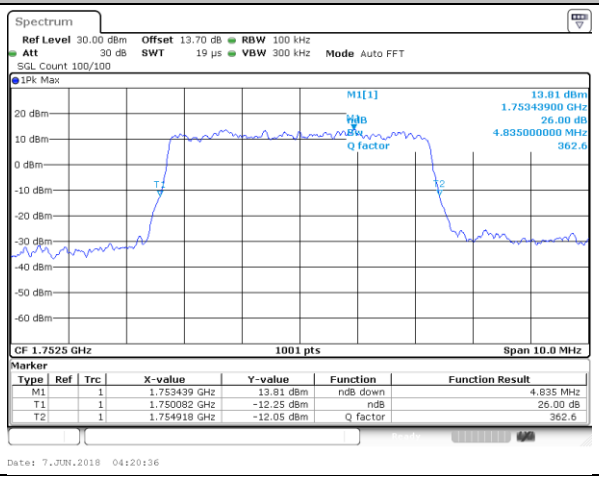
Middle Channel / 5MHz / QPSK



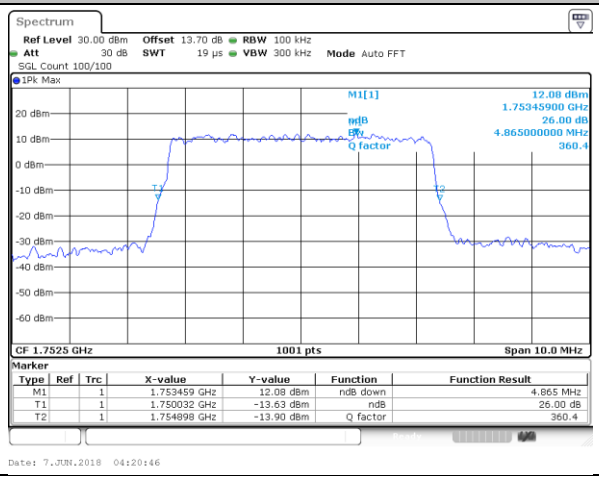
Middle Channel / 5MHz / 16QAM



Highest Channel / 5MHz / QPSK

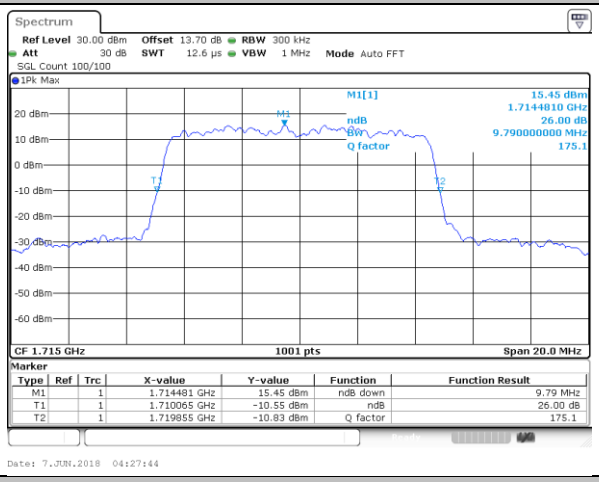


Highest Channel / 5MHz / 16QAM

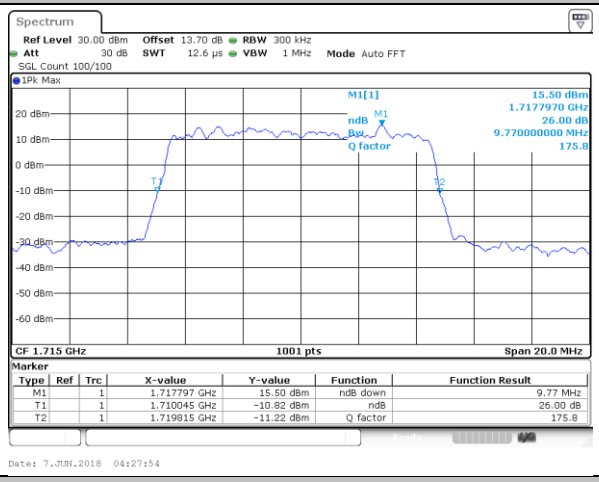


LTE Band 4

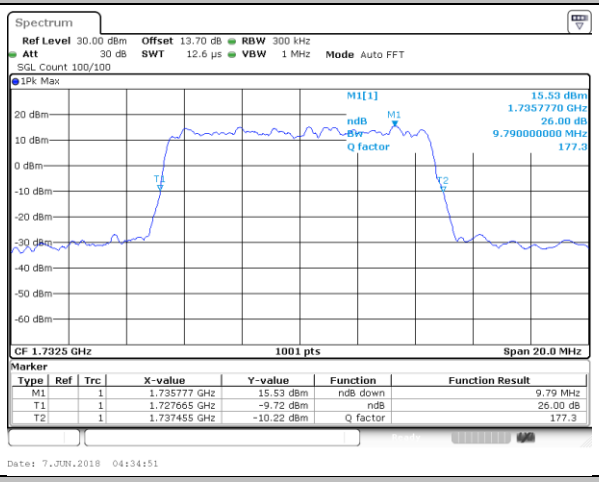
Lowest Channel / 10MHz / QPSK



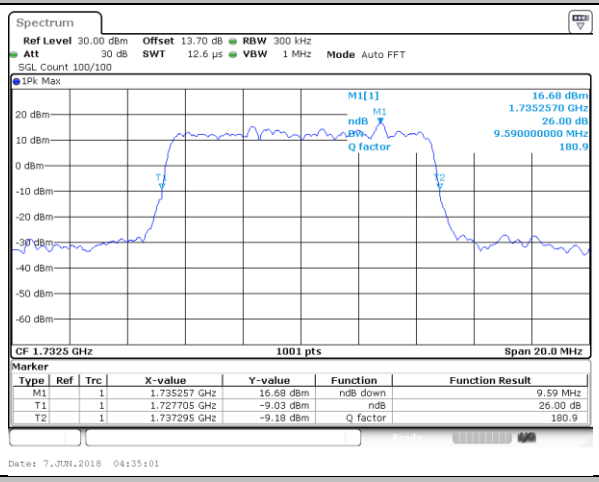
Lowest Channel / 10MHz / 16QAM



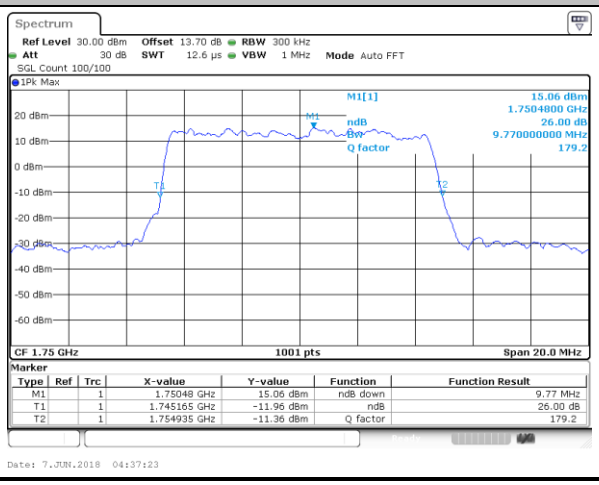
Middle Channel / 10MHz / QPSK



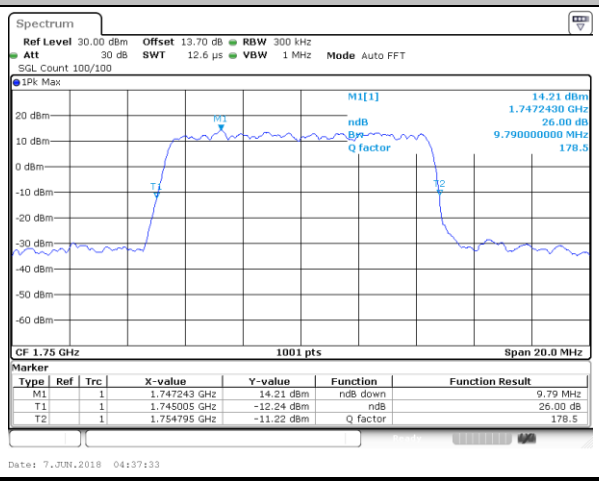
Middle Channel / 10MHz / 16QAM



Highest Channel / 10MHz / QPSK

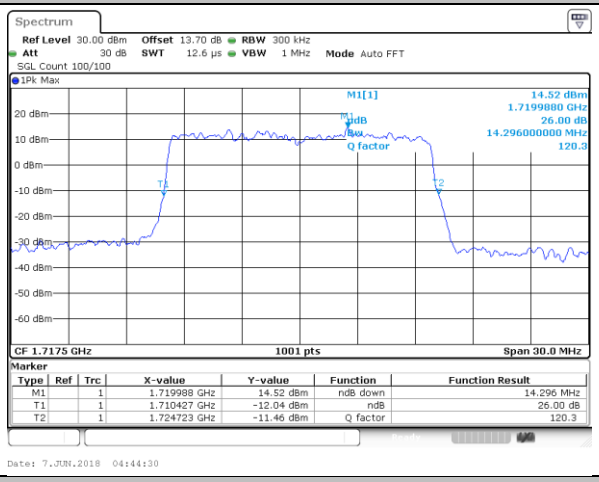


Highest Channel / 10MHz / 16QAM

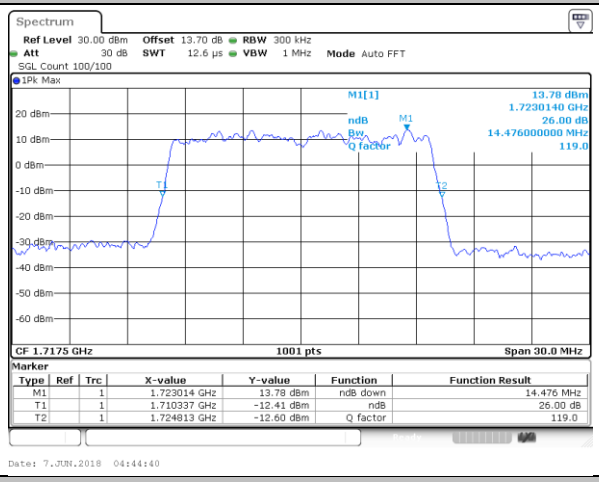


LTE Band 4

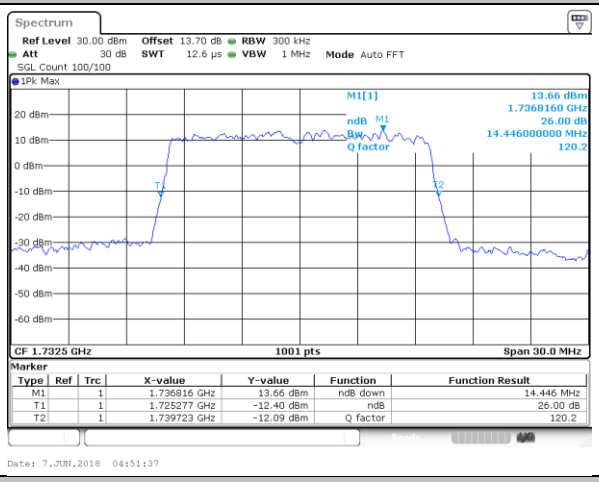
Lowest Channel / 15MHz / QPSK



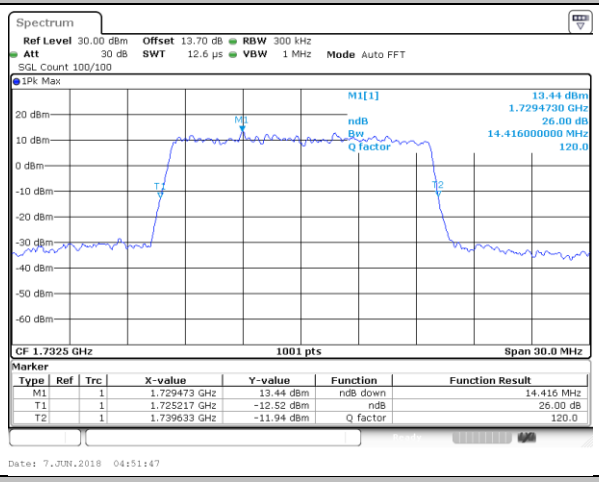
Lowest Channel / 15MHz / 16QAM



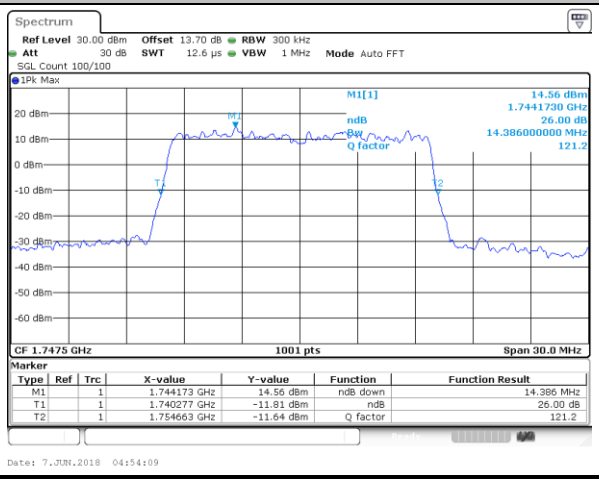
Middle Channel / 15MHz / QPSK



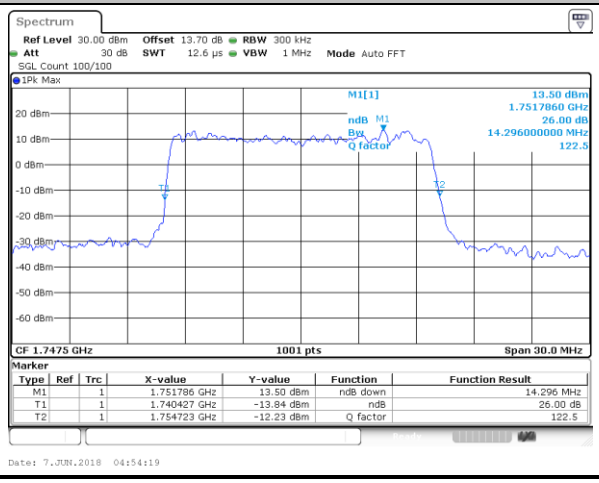
Middle Channel / 15MHz / 16QAM



Highest Channel / 15MHz / QPSK

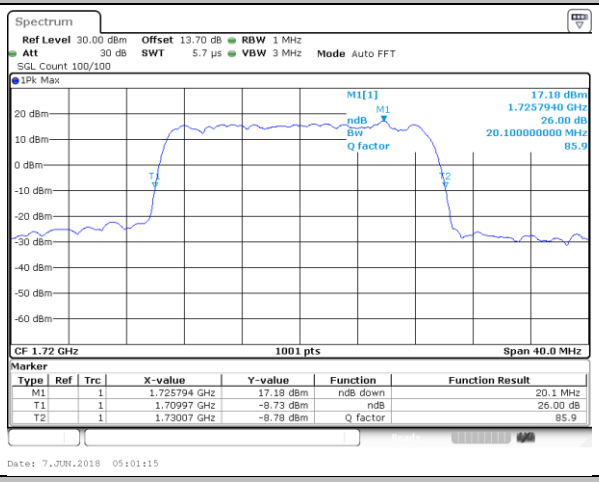


Highest Channel / 15MHz / 16QAM

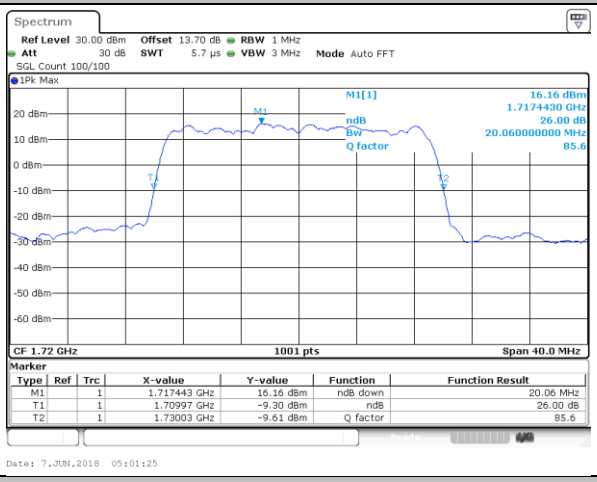


LTE Band 4

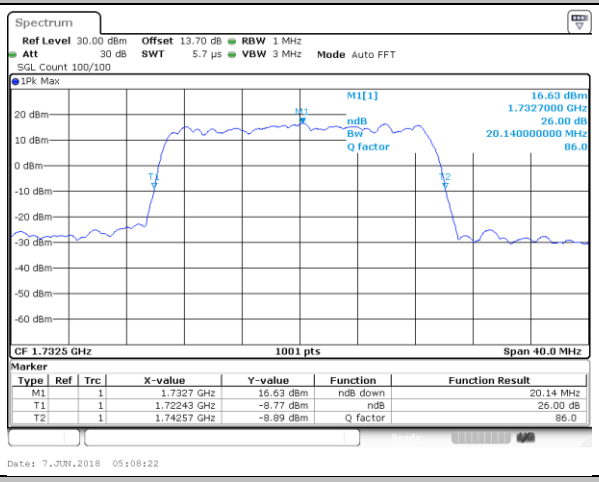
Lowest Channel / 20MHz / QPSK



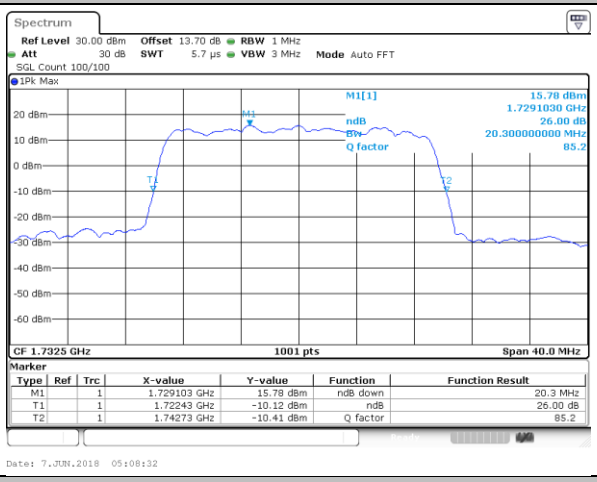
Lowest Channel / 20MHz / 16QAM



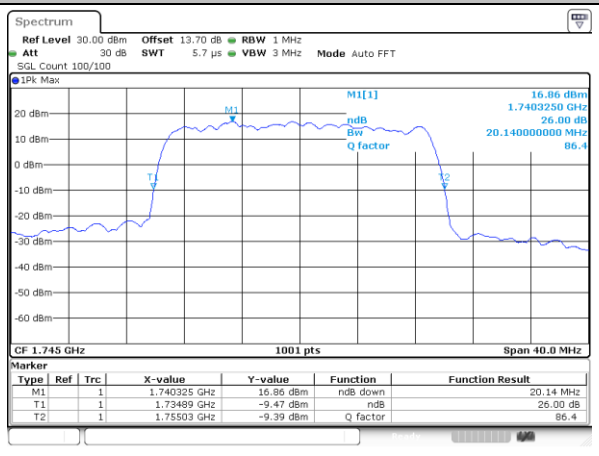
Middle Channel / 20MHz / QPSK



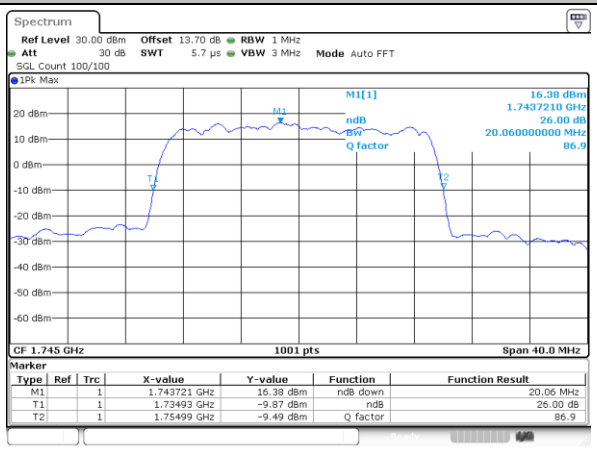
Middle Channel / 20MHz / 16QAM



Highest Channel / 20MHz / QPSK

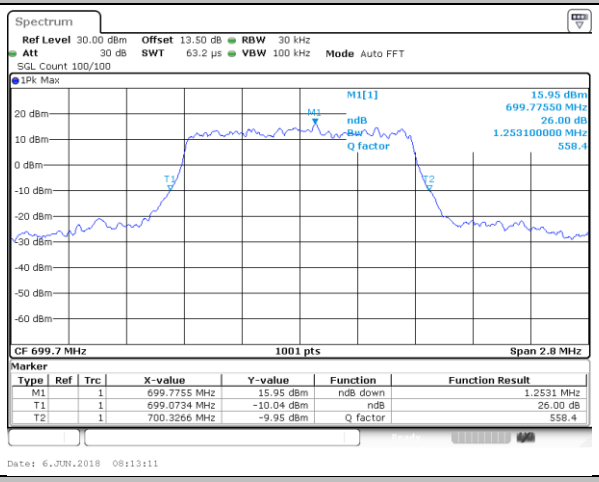


Highest Channel / 20MHz / 16QAM

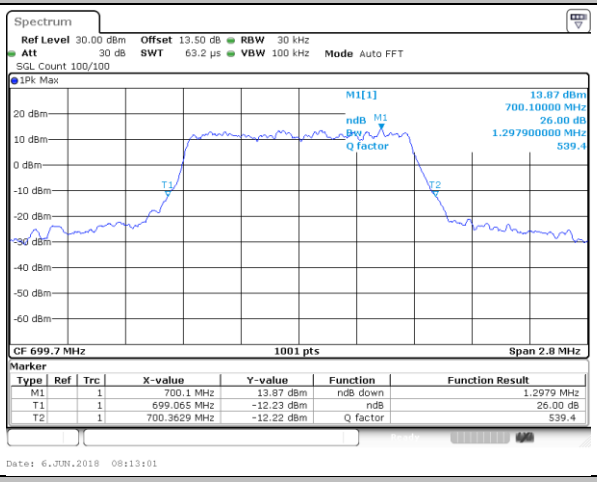


LTE Band 12

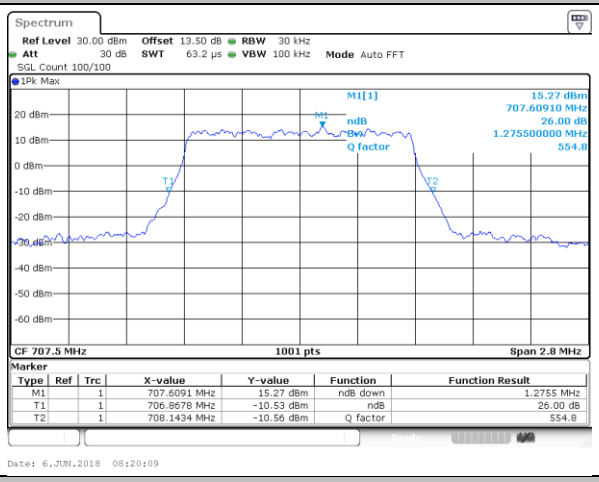
Lowest Channel / 1.4MHz / QPSK



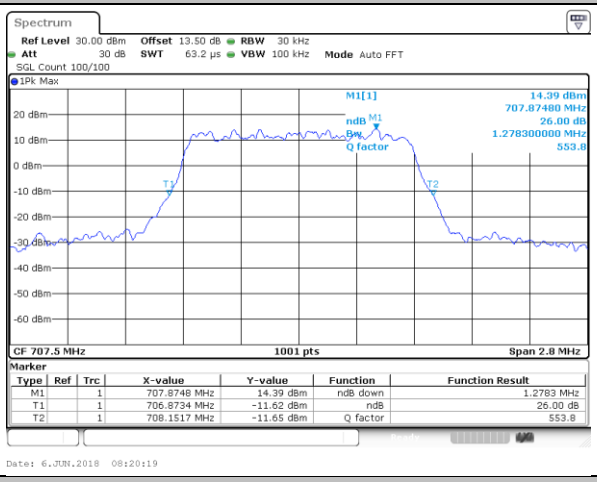
Lowest Channel / 1.4MHz / 16QAM



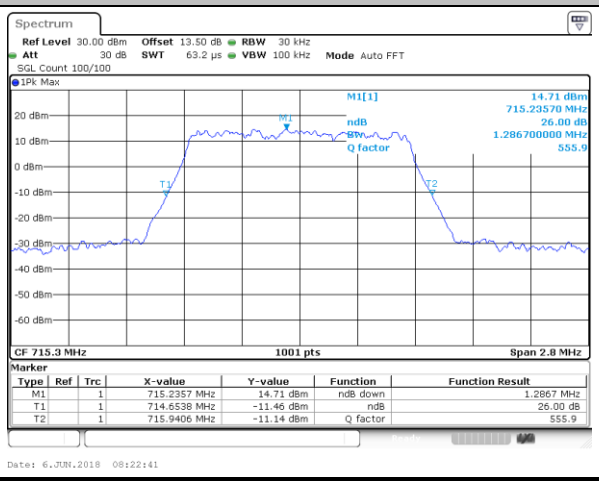
Middle Channel / 1.4MHz / QPSK



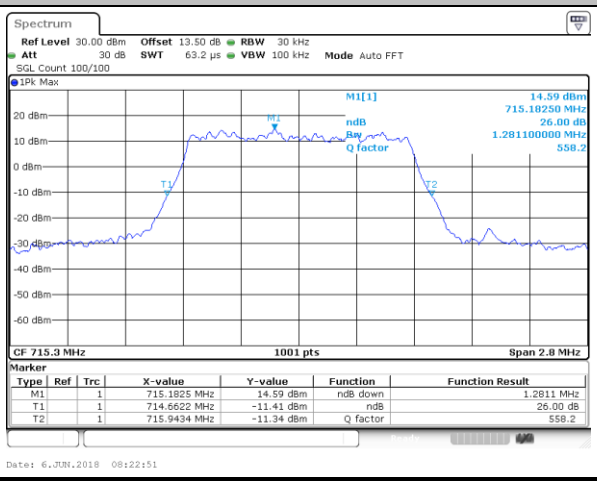
Middle Channel / 1.4MHz / 16QAM



Highest Channel / 1.4MHz / QPSK

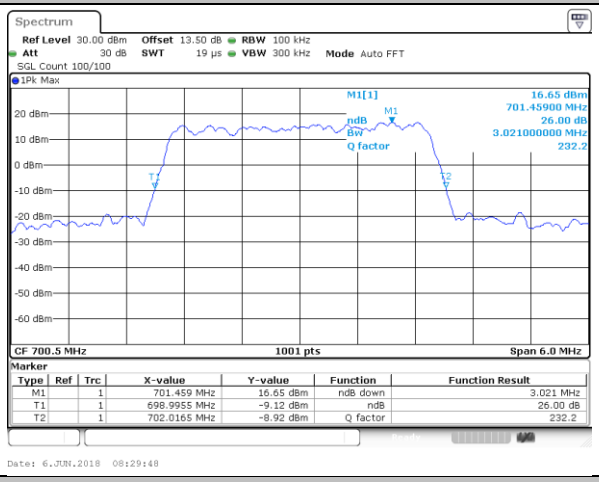


Highest Channel / 1.4MHz / 16QAM

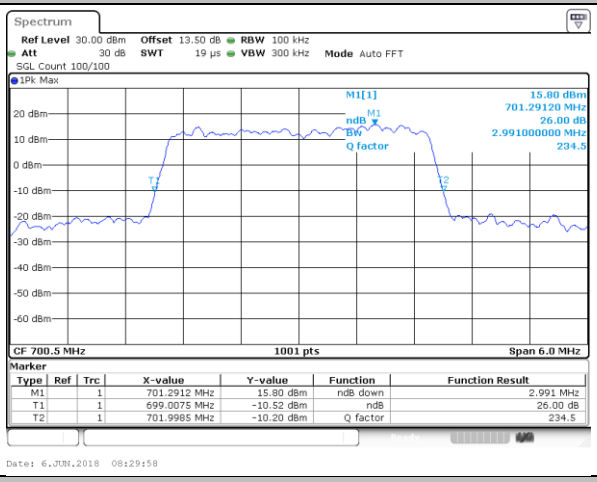


LTE Band 12

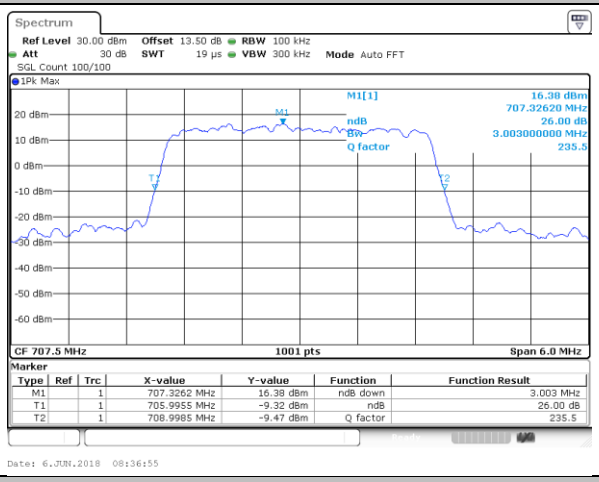
Lowest Channel / 3MHz / QPSK



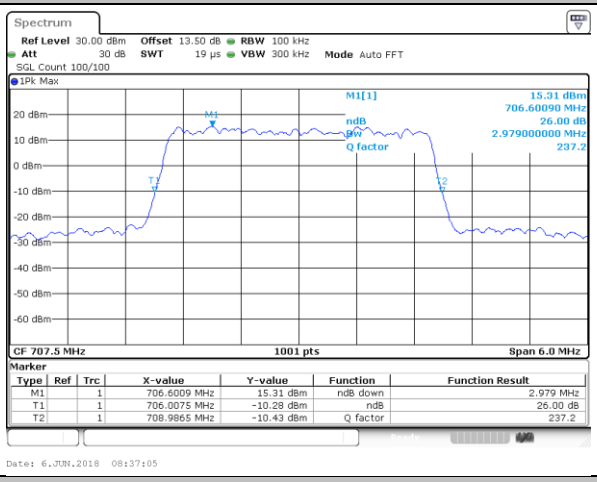
Lowest Channel / 3MHz / 16QAM



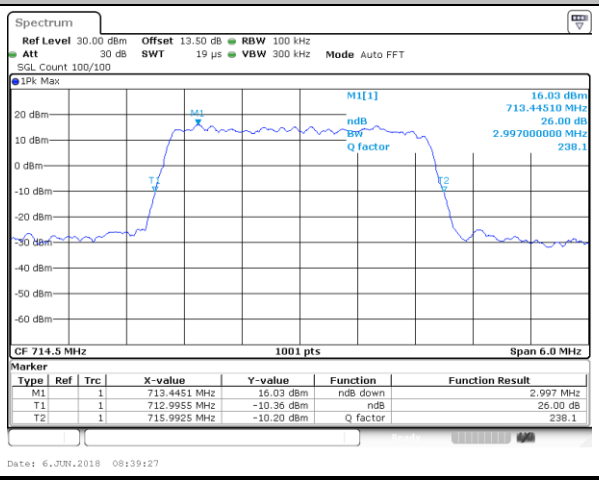
Middle Channel / 3MHz / QPSK



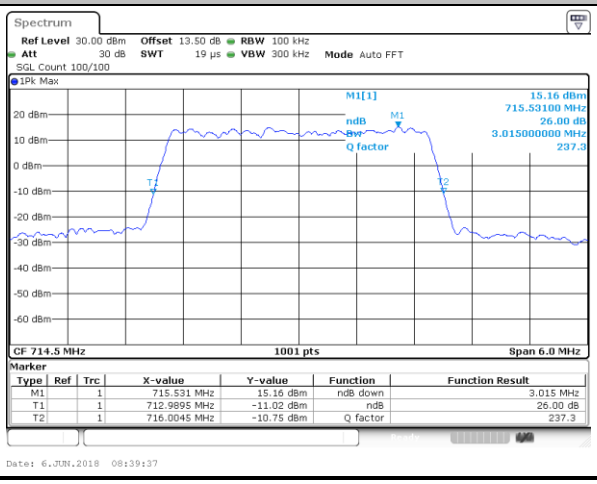
Middle Channel /3MHz / 16QAM



Highest Channel /3MHz / QPSK

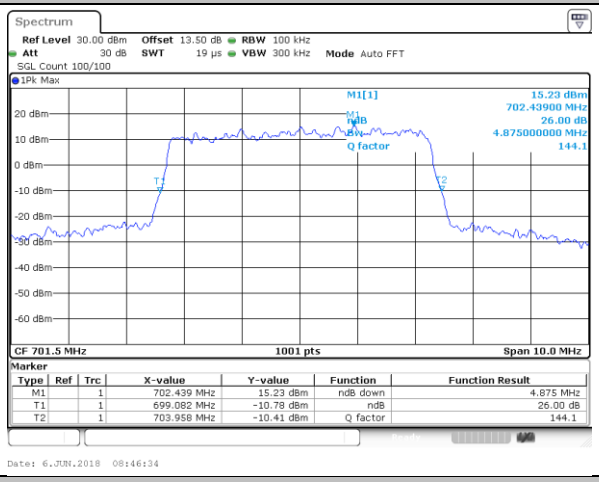


Highest Channel /3MHz / 16QAM

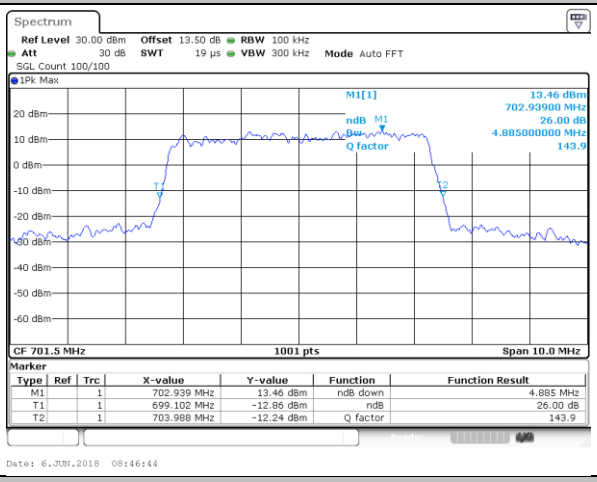


LTE Band 12

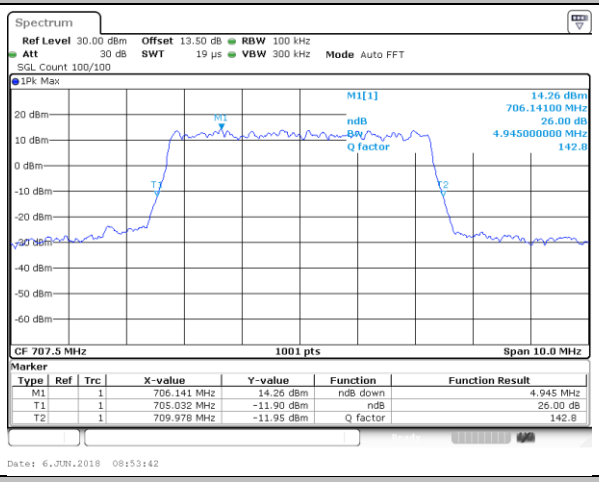
Lowest Channel / 5MHz / QPSK



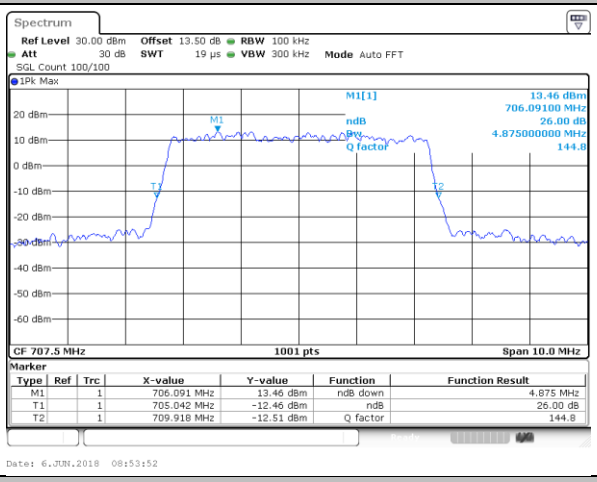
Lowest Channel / 5MHz / 16QAM



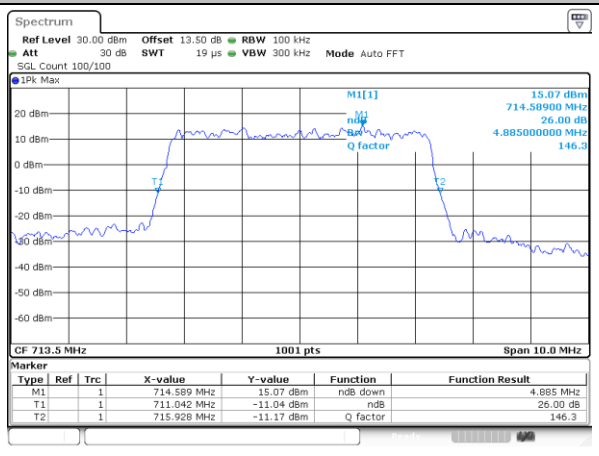
Middle Channel / 5MHz / QPSK



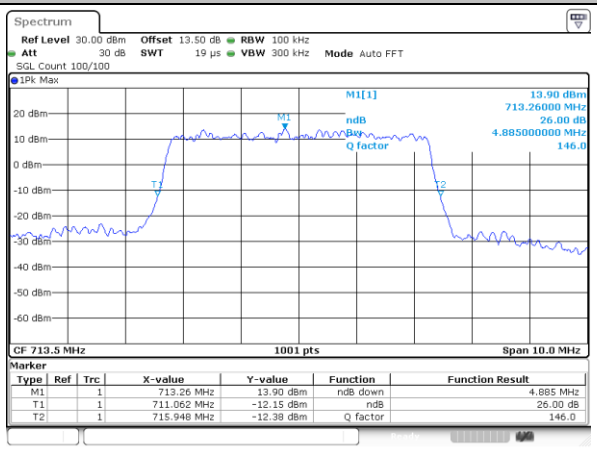
Middle Channel / 5MHz / 16QAM



Highest Channel / 5MHz / QPSK

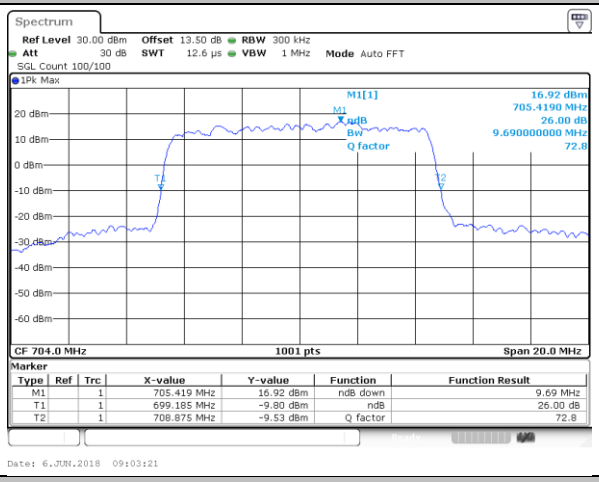


Highest Channel / 5MHz / 16QAM

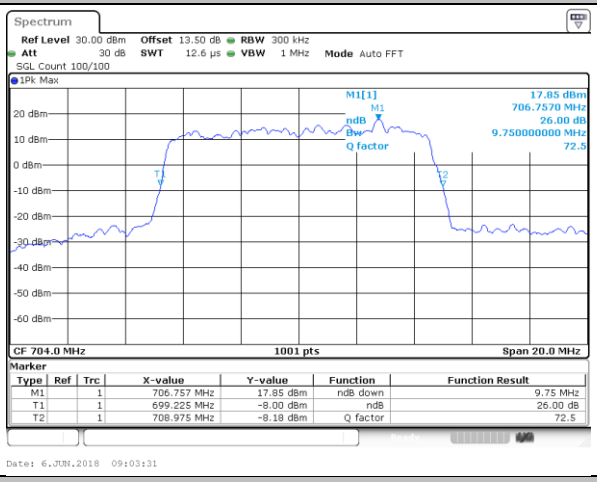


LTE Band 12

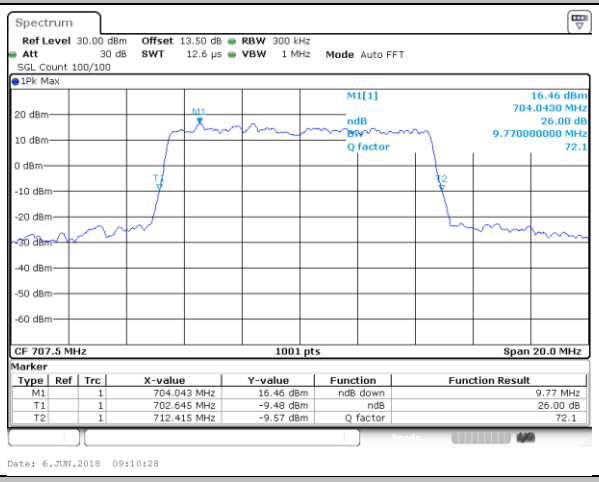
Lowest Channel / 10MHz / QPSK



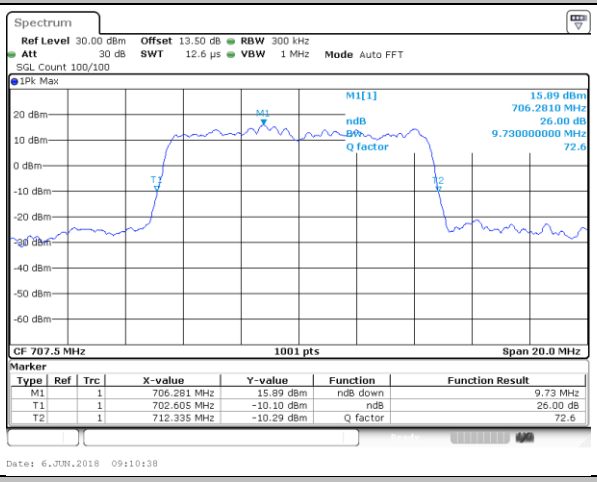
Lowest Channel / 10MHz / 16QAM



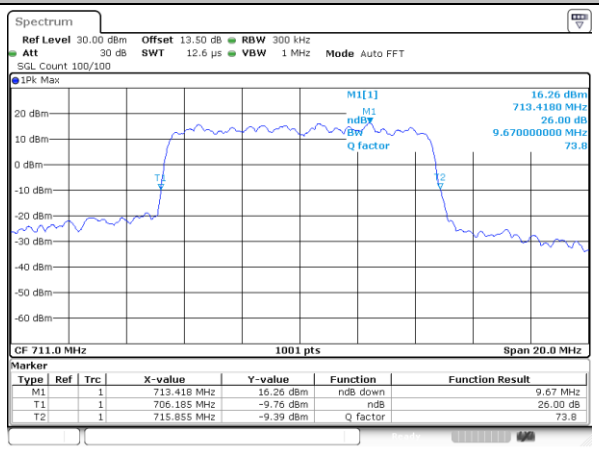
Middle Channel / 10MHz / QPSK



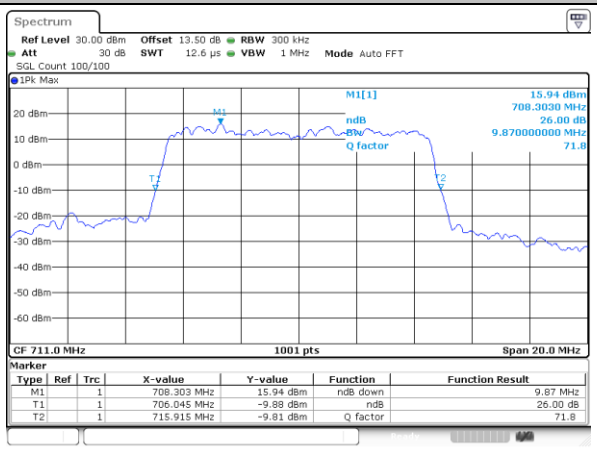
Middle Channel / 10MHz / 16QAM



Highest Channel / 10MHz / QPSK

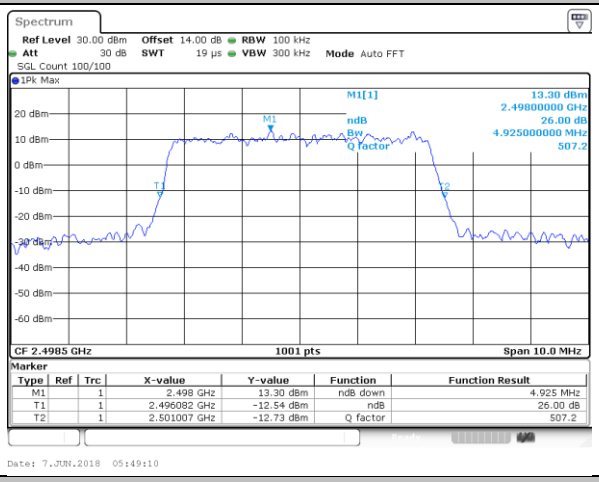


Highest Channel / 10MHz / 16QAM

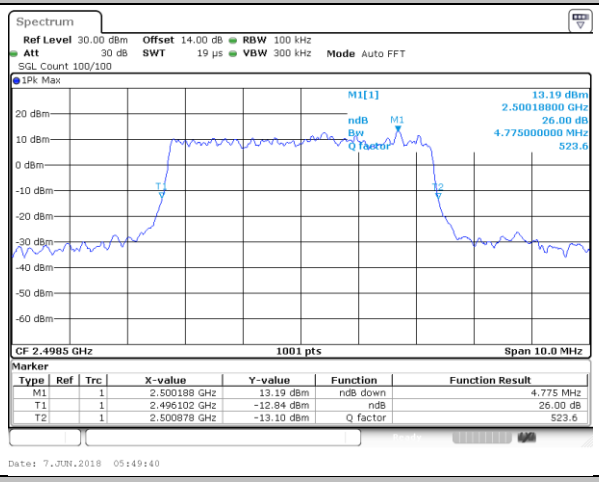


LTE Band 41

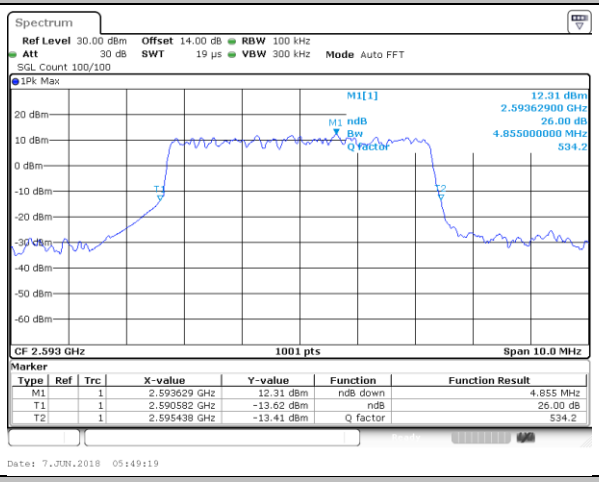
Lowest Channel / 5MHz / QPSK



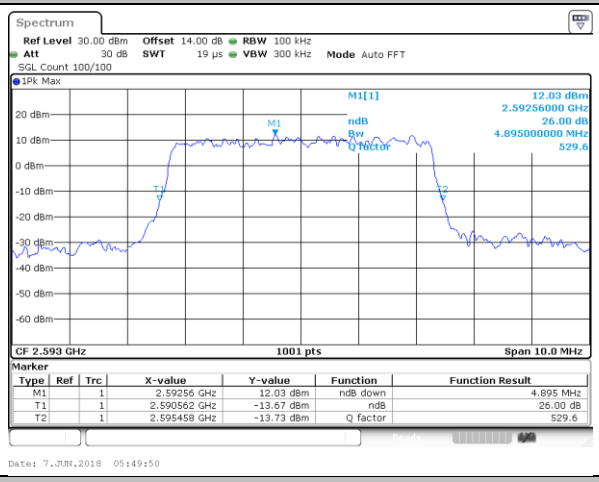
Lowest Channel / 5MHz / 16QAM



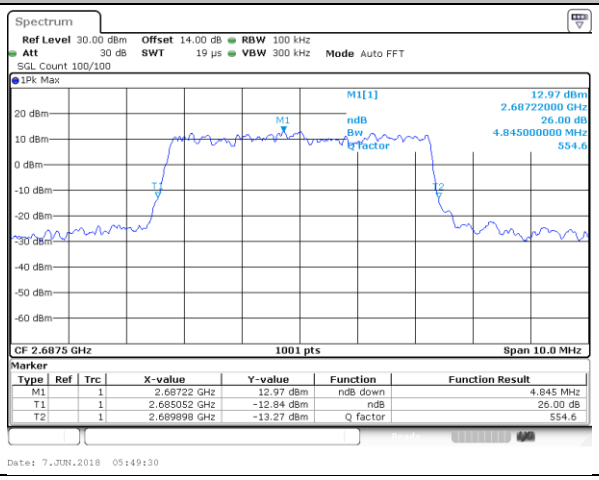
Middle Channel / 5MHz / QPSK



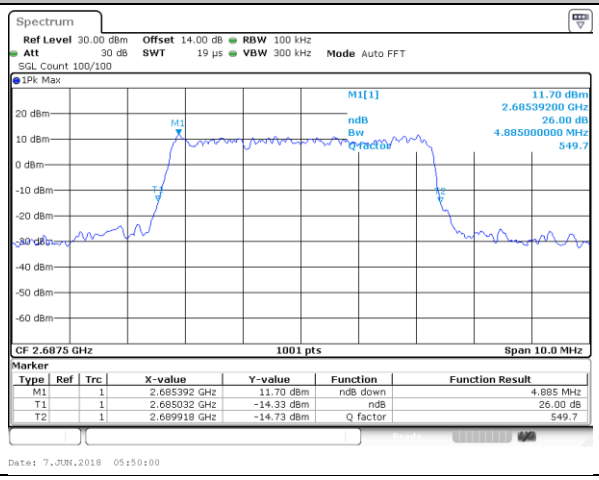
Middle Channel / 5MHz / 16QAM



Highest Channel / 5MHz / QPSK

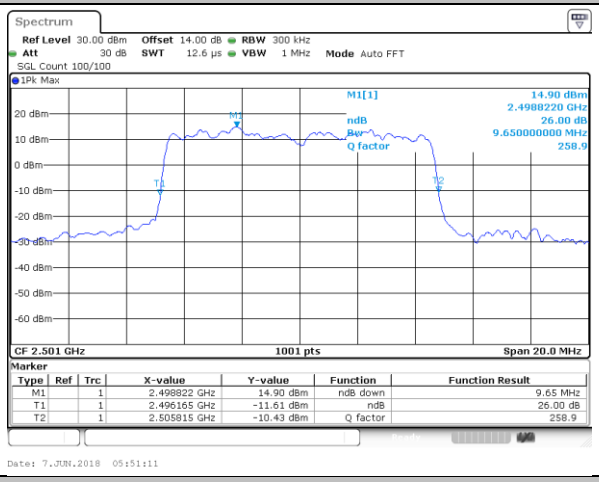


Highest Channel / 5MHz / 16QAM

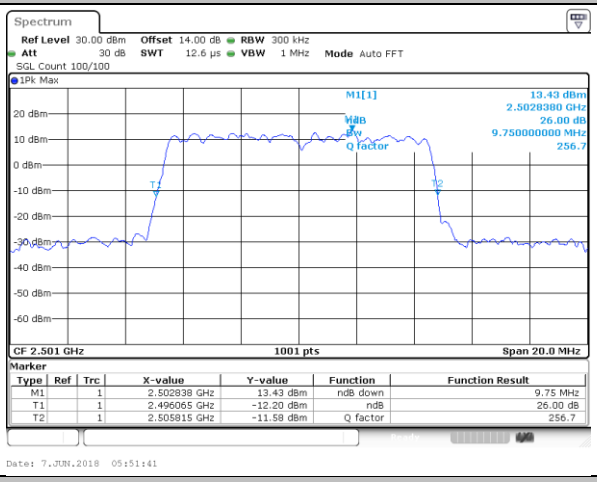


LTE Band 41

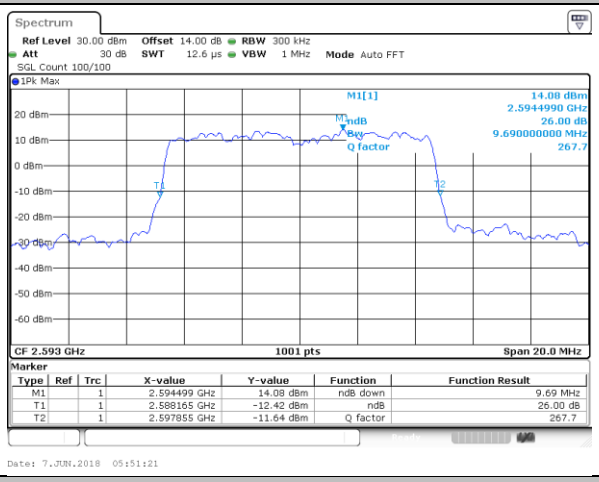
Lowest Channel / 10MHz / QPSK



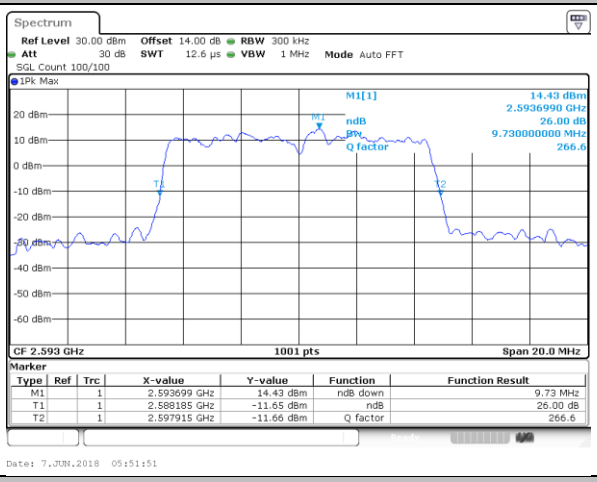
Lowest Channel / 10MHz / 16QAM



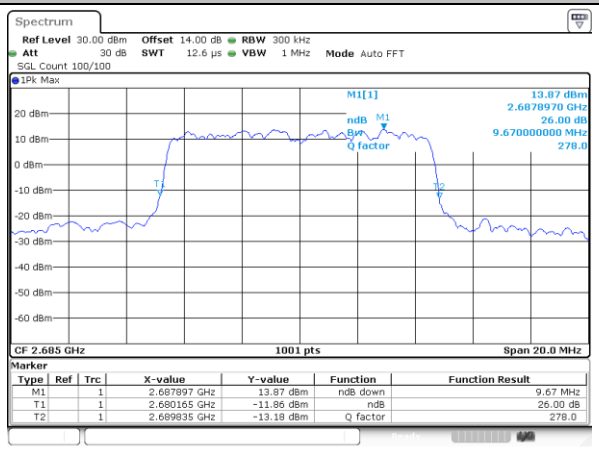
Middle Channel / 10MHz / QPSK



Middle Channel / 10MHz / 16QAM



Highest Channel / 10MHz / QPSK



Highest Channel / 10MHz / 16QAM