



FCC RF Test Report

APPLICANT : ZTE CORPORATION
EQUIPMENT : LTE/WCDMA/GSM Tri-Mode Digital Mobile Phone
BRAND NAME : ZTE
MODEL NAME : Z955L
FCC ID : SRQ-Z955L
STANDARD : 47 CFR Part 2, 22(H), 24(E), 27(L), 27(H)
CLASSIFICATION : PCS Licensed Transmitter Held to Ear (PCE)

The product was received on Mar. 16, 2015 and completely tested on Apr. 13, 2015. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA / EIA-603-C-2004 and the testing has shown the tested sample to be in 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 (KUNSHAN) INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG531605B	Rev. 01	Initial issue of report	May 11, 2015

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	Reporting Only	PASS	-
3.5	§24.232(d)	Peak-to-Average Ratio	<13 dB	PASS	-
3.6	§2.1049 §22.917(b) §24.238(b) §27.53(h)(3)	Occupied Bandwidth	Reporting Only	PASS	-
3.7	§2.1051 §22.917(a) §24.238(a) §27.53(g)	Conducted Band Edge Measurement (Band 2) (Band 4) (Band 5) (Band 17)	< 43+10log10(P[Watts])	PASS	-
3.8	§2.1051 §22.917(a) §24.238(a) §27.53(g)	Conducted Spurious Emission (Band 2) (Band 4) (Band 5) (Band 17)	< 43+10log10(P[Watts])	PASS	-
3.9	§2.1055 §22.355 §24.235 §27.54	Frequency Stability Temperature & Voltage	< 2.5 ppm for Part 22 Within Authorized Band	PASS	



4.4	§22.913(a)(2)	Effective Radiated Power (Band 5)	ERP < 7 Watt	PASS	-
	§27.50(c)(10)	Effective Radiated Power (Band 17)	ERP < 3 Watt		
	§24.232(c)	Equivalent Isotropic Radiated Power (Band 2)	EIRP < 2Watt		
	§27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4)	EIRP < 1Watt		
4.5	§2.1053 §22.917(a) §24.238(a) §27.53(g) §27.53(h)	Radiated Spurious Emission (Band 2) (Band 4) (Band 5) (Band 17)	< 43+10log ₁₀ (P[Watts])	PASS	Under limit 33.49 dB at 3749.000 MHz



1 General Description

1.1 Applicant

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057,
P. R. China

1.2 Manufacturer

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057,
P. R. China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	LTE/WCDMA/GSM Tri-Mode Digital Mobile Phone
Brand Name	ZTE
Model Name	Z955L
FCC ID	SRQ-Z955L
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/HSPA+(Downlink Only)/LTE WLAN2.4GHz 802.11b/g/n HT20 Bluetooth v3.0+EDR Bluetooth v4.0 LE
IMEI Number	Conducted: 866599020004473 Radiation: 866599020004424 ERP/EIRP: 866599020004424
HW Version	wsaA
SW Version	Z955LV1.0.0B01
EUT Stage	Identical Prototype



1.4 Product Specification subjective to this standard

Product Specification subjective to this standard	
Tx Frequency	LTE Band 2 : 1850.7 MHz ~ 1909.3 MHz LTE Band 4 : 1710.7 MHz ~ 1754.3 MHz LTE Band 5 : 824.7 MHz ~ 848.3 MHz LTE Band 17 : 706.5 MHz ~ 713.5 MHz
Rx Frequency	LTE Band 2 : 1930.7 MHz ~ 1989.3 MHz LTE Band 4 : 2110.7 MHz ~ 2154.3 MHz LTE Band 5 : 869.7 MHz ~ 893.3 MHz LTE Band 17 : 736.5 MHz ~ 743.5 MHz
Bandwidth	LTE Band 2 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 4 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 5 : 1.4MHz / 3MHz / 5MHz / 10MHz LTE Band 17 : 5MHz / 10MHz
Maximum Output Power to Antenna	LTE Band 2 : 23.01 dBm LTE Band 4 : 23.96 dBm LTE Band 5 : 23.56 dBm LTE Band 17 : 23.31 dBm
Type of Modulation	QPSK / 16QAM

1.5 Modification of EUT

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

1.6 Emission Designator

LTE Band 2	QPSK			16QAM		
BW(MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)
1.4	1M10G7D	-	0.2028	1M11W7D	-	0.2183
3	2M74G7D	-	0.2449	2M73W7D	-	0.2203
5	4M51G7D	-	0.2512	4M51W7D	-	0.2178
10	9M11G7D	0.0119	0.2518	9M05W7D	-	0.2193
15	13M5G7D	-	0.2512	13M5W7D	-	0.2084
20	18M4G7D	-	0.2979	18M5W7D	-	0.2371
LTE Band 4	QPSK			16QAM		
BW(MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)
1.4	1M11G7D	-	0.1618	1M10W7D	-	0.1690
3	2M75G7D	-	0.1644	2M73W7D	-	0.1730
5	4M51G7D	-	0.1581	4M51W7D	-	0.1710
10	9M09G7D	0.0147	0.1574	9M07W7D	-	0.1770
15	13M5G7D	-	0.1660	13M5W7D	-	0.1807
20	18M4G7D	-	0.1622	18M5W7D	-	0.1770



LTE Band 5	QPSK			16QAM		
BW(MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum ERP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum ERP(W)
1.4	1M10G7D	-	0.0977	1M10W7D	-	0.0782
3	2M74G7D	-	0.0964	2M74W7D	-	0.0791
5	4M52G7D	-	0.0871	4M51W7D	-	0.0733
10	9M07G7D	0.0127	0.0861	9M05W7D	-	0.0681
LTE Band 17	QPSK			16QAM		
BW(MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum ERP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum ERP(W)
5	4M50G7D	-	0.0745	4M51W7D	-	0.0661
10	9M07G7D	0.0155	0.0656	9M05W7D	-	0.0550

1.7 Testing Location

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.	
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958	
Test Site No.	Sporton Site No.	
	TH01-KS	

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	Sporton Site No.	FCC Registration No.
	03CH07-HY	TW1022

Note: The test site complies with ANSI C63.4 2009 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, 22(H), 24(E), 27(L), 27(H)
- ANSI / TIA / EIA-603-C-2004
- FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02

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 v02r02 with maximum output power.

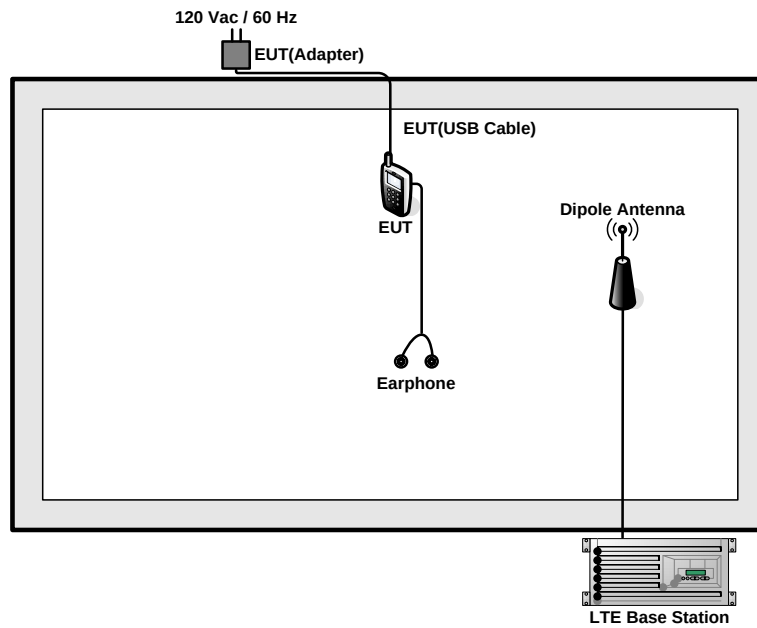
Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission.

Test Items	Band	Bandwidth (MHz)						Modulation		RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Max. Output Power	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	5	✓	✓	✓	✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓
	17	-	-	✓	✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓
Peak-to-Average Ratio	2						✓	✓	✓	✓		✓	✓	✓	✓
	4						✓	✓	✓	✓		✓	✓	✓	✓
	5				✓	-	-	✓	✓	✓		✓	✓	✓	✓
	17	-	-		✓	-	-	✓	✓	✓		✓	✓	✓	✓
26dB and 99% Bandwidth	2	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
	4	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
	5	✓	✓	✓	✓	-	-	✓	✓			✓	✓	✓	✓
	17	-	-	✓	✓	-	-	✓	✓			✓	✓	✓	✓
Conducted Band Edge	2	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓
	4	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓
	5	✓	✓	✓	✓	-	-	✓	✓	✓		✓	✓		✓
	17	-	-	✓	✓	-	-	✓	✓	✓		✓	✓		✓



Test Items	Band	Bandwidth (MHz)						Modulation		RB #			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Conducted Spurious Emission	2	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
	4	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
	5	✓	✓	✓	✓	-	-	✓	✓	✓			✓	✓	✓
	17	-	-	✓	✓	-	-	✓	✓	✓			✓	✓	✓
Frequency Stability	2				✓			✓				✓		✓	
	4				✓			✓				✓		✓	
	5				✓	-	-	✓				✓		✓	
	17	-	-		✓	-	-	✓				✓		✓	
E.R.P./ E.I.R.P.	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
	5	✓	✓	✓	✓	-	-	✓	✓	✓			✓	✓	✓
	17	-	-	✓	✓	-	-	✓	✓	✓			✓	✓	✓
Radiated Spurious Emission	2	✓	✓	✓	✓	✓	✓	✓		✓				✓	
	4	✓	✓	✓	✓	✓	✓	✓		✓				✓	
	5	✓	✓	✓	✓	-	-	✓		✓				✓	
	17	-	-	✓	✓	-	-	✓		✓				✓	
Note	1. The mark “✓” 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.	DC Power Supply	GW INSTEK	GPS-3030D	N/A	N/A	Unshielded, 1.8 m
2.	LTE Base Station	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
3.	Earphone	Lenovo	SH100	N/A	N/A	N/A

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 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.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 5.0 dB.

Example :

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)}. \\ &= 5.0 \text{ (dB)}\end{aligned}$$

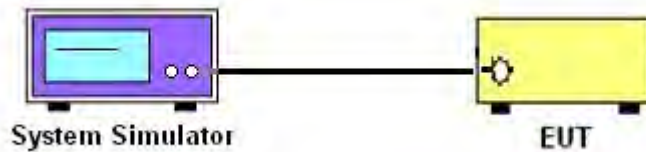
3 Conducted Test Items

3.1 Measuring Instruments

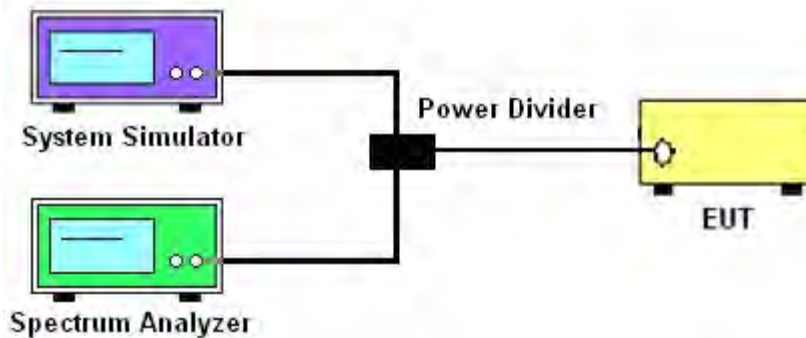
See list of measuring instruments of this test report.

3.2 Test Setup

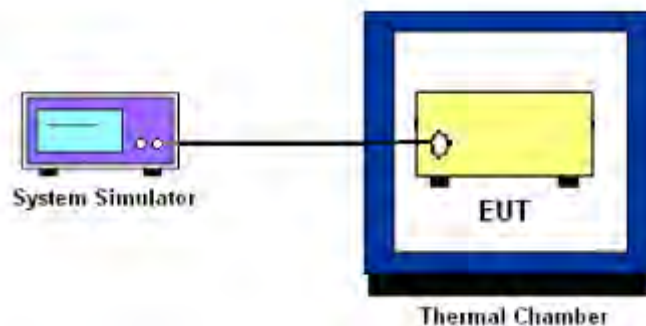
3.2.1 Conducted Output Power



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

3.4.1 Description of the Conducted Output Power 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.

3.4.2 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through the system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. 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 FCC KDB 971168 v02r02 Section 5.7.1.
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 FCC KDB 971168 v02r02 Section 4.2.
2. The EUT was connected to spectrum analyzer and system simulator via a power divider.

3.7 Conducted Band Edge

3.7.1 Description of Conducted Band Edge Measurement

22.917(a) for Band 5

For operations in the 824 – 849 MHz band, the FCC limit is $43 + 10\log_{10}(P[\text{Watts}])$ dB below the transmitter power $P(\text{Watts})$ in a 100kHz 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.

24.238 (a) for Band 2

For operations in the 1850-1910 and 1930-1990 MHz band, the FCC limit is $43 + 10\log_{10}(P[\text{Watts}])$ dB below the transmitter power $P(\text{Watts})$ in a 1MHz bandwidth. However, in the 1 MHz bands immediately outside and adjacent to the 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 (g) for Band 17

For operations in the 698 -746 MHz band, the FCC limit is $43 + 10\log_{10}(P[\text{Watts}])$ dB below the transmitter power $P(\text{Watts})$ 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 Band 4

For operations in the 1710 – 1755 MHz band, the FCC limit is $43 + 10\log_{10}(P[\text{Watts}])$ dB below the transmitter power $P(\text{Watts})$ 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.

3.7.2 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 6.0.
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. Set RBW $\geq 1\%$ EBW in the 1MHz band immediately outside and adjacent to the band edge.
4. Set spectrum analyzer with RMS detector.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)]$ (dB)
 $= [30 + 10\log(P)]$ (dBm) - $[43 + 10\log(P)]$ (dB)
 $= -13\text{dBm}$.

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.

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

3.8.2 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 6.0.
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, taking the record of maximum spurious emission.
7. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
8. The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$

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 $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency.

3.9.2 Test Procedures for Temperature Variation

1. The EUT was set up in the thermal chamber and connected with the system simulator.
2. 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.
3. 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 FCC KDB 971168 v02r02 Section 9.0.
2. The EUT was placed in a temperature chamber at $25\pm 5^{\circ}\text{C}$ and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
4. The variation in frequency was measured for the worst case.

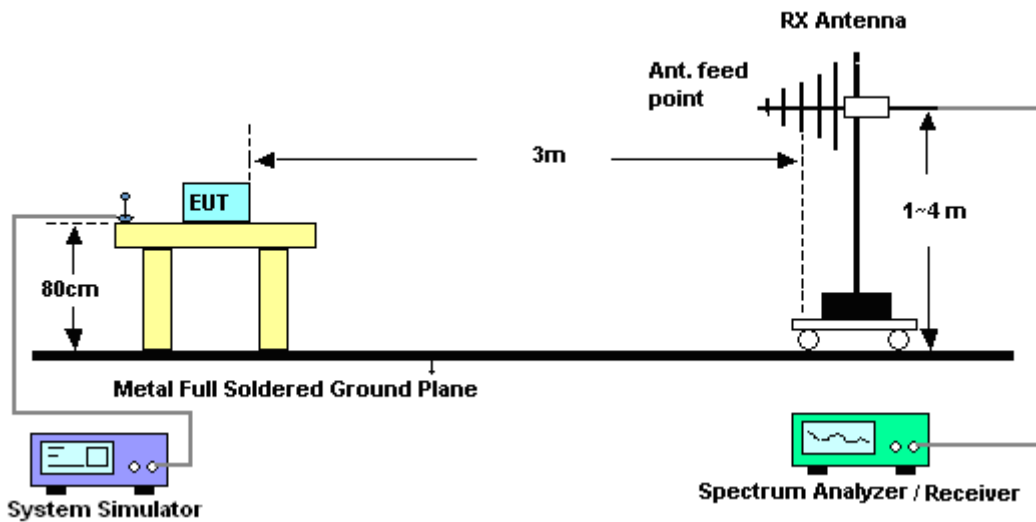
4 Radiated Test Items

4.1 Measuring Instruments

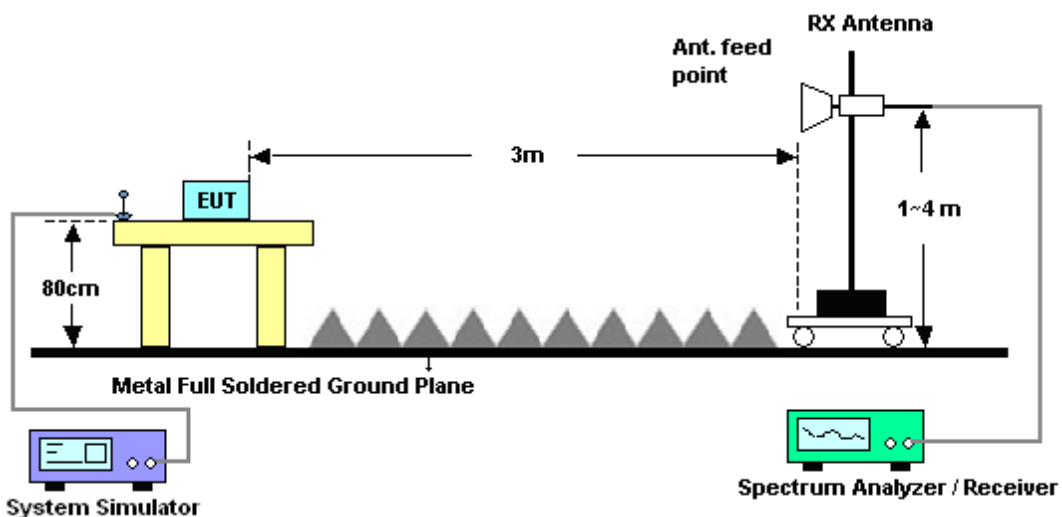
See list of measuring instruments of this test report.

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 / TIA / EIA-603-C-2004, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r02. Mobile and portable (hand-held) stations operating are limited to average ERP of 7 watts with LTE band 5 and 3 watts with LTE band 17.

Equivalent isotropic radiated power output measurements by substitution method according to ANSI / TIA / EIA-603-C-2004, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r02. Mobile and portable (hand-held) stations operating are limited to average EIRP of 2 watts with LTE band 2 and 1 watt with LTE band 4.

4.4.2 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 5.2.1. and ANSI / TIA-603-C-2004 Section 2.2.17.
2. The EUT was placed on a non-conductive rotating platform 0.8 meters high 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.
3. 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.
4. Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-C. 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, $EIRP = LVL + \text{Correction factor}$ and $ERP = EIRP - 2.15$. Take the record of the output power at substitution antenna.



	LTE					
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 / TIA / EIA-603-C-2004. 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 LTE Band 17

For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.

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

4.5.2 Test Procedures

1. The testing follows FCC KDB 971168 v02r02 Section 5.8 and ANSI / TIA-603-C-2004 Section 2.2.12.
2. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
3. The EUT was set 3 meters from the receiving antenna, which was 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 one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
6. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
7. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
8. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
9. Taking the record of output power at antenna port.
10. Repeat step 7 to step 8 for another polarization.
11. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)

$$= P(W) - [43 + 10\log(P)] \text{ (dB)}$$

$$= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$$

$$= -13\text{dBm}.$$

12. $\text{EIRP (dBm)} = \text{S.G. Power} - \text{Tx Cable Loss} + \text{Tx Antenna Gain}$
13. $\text{ERP (dBm)} = \text{EIRP} - 2.15$



5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV30	101338	9kHz~30GHz	May 04, 2014	Mar. 28, 2015	May 03, 2015	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Oct. 25, 2014	Mar. 28, 2015	Oct. 24, 2015	Conducted (TH01-KS)
Signal Analyzer	Rohde & Schwarz	FSV 30	101749	10Hz ~ 30GHz	Mar. 10, 2015	Apr. 08, 2015~ Apr. 13, 2015	Mar. 09, 2016	Radiation (03CH07-HY)
Bilog Antenna	Schaffner	CBL6111C	2726	30MHz ~ 1GHz	Sep. 27, 2014	Apr. 08, 2015~ Apr. 13, 2015	Sep. 26, 2015	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	75962	1GHz~18GHz	Aug. 19, 2014	Apr. 08, 2015~ Apr. 13, 2015	Aug. 18, 2015	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	18GHz~40GHz	Oct. 02, 2014	Apr. 08, 2015~ Apr. 13, 2015	Oct. 01, 2015	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10 MHz ~ 1000MHz	Mar. 12, 2015	Apr. 08, 2015~ Apr. 13, 2015	Mar. 11, 2016	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1 GHz~26.5 GHz	Oct. 21, 2014	Apr. 08, 2015~ Apr. 13, 2015	Oct. 20, 2015	Radiation (03CH07-HY)
Turn Table	ChainTek	ChainTek 3000	N/A	0 ~ 360 degree	N/A	Apr. 08, 2015~ Apr. 13, 2015	N/A	Radiation (03CH07-HY)
Antenna Mast	ChainTek	M-400-0	114/8000604/L	N/A	N/A	Apr. 08, 2015~ Apr. 13, 2015	N/A	Radiation (03CH07-HY)



6 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.5 dB
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Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)



LTE Band 2 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
1.4	1	0	QPSK	22.36	22.39	22.78
1.4	1	2		22.48	22.54	22.76
1.4	1	5		22.29	22.35	22.75
1.4	3	0		22.40	22.49	22.83
1.4	3	1		22.37	22.61	22.85
1.4	3	2		22.49	22.49	22.70
1.4	6	0	16-QAM	21.47	21.43	21.88
1.4	1	0		21.84	21.54	21.76
1.4	1	2		22.01	21.60	22.24
1.4	1	5		21.68	21.92	21.68
1.4	3	0		21.53	21.65	21.95
1.4	3	1		21.58	21.67	22.07
1.4	3	2		21.68	21.66	22.03
1.4	6	0		20.53	20.47	20.88
3	1	0	QPSK	22.51	22.60	22.90
3	1	7		22.53	22.69	22.95
3	1	14		22.54	22.59	22.81
3	8	0		21.60	21.61	22.14
3	8	4		21.54	21.64	21.92
3	8	7		21.62	21.65	21.91
3	15	0		21.52	21.53	21.98
3	1	0	16-QAM	21.89	21.89	22.19
3	1	7		21.85	21.83	22.07
3	1	14		21.90	21.78	21.73
3	8	0		20.70	20.81	21.00
3	8	4		20.66	20.73	20.96
3	8	7		20.66	20.75	21.04
3	15	0		20.65	20.69	20.92



LTE Band 2 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
5	1	0	QPSK	22.58	22.59	22.94
5	1	12		22.63	22.65	22.90
5	1	24		22.55	22.39	22.68
5	12	0		21.56	21.58	22.12
5	12	6		21.60	21.56	21.86
5	12	11		21.48	21.55	21.85
5	25	0		21.54	21.51	21.91
5	1	0	16-QAM	21.89	22.21	22.32
5	1	12		21.86	21.90	21.99
5	1	24		22.07	21.75	21.97
5	12	0		20.46	20.83	20.99
5	12	6		20.49	20.47	20.93
5	12	11		20.44	20.62	20.85
5	25	0		20.43	20.48	21.00
10	1	0	QPSK	22.65	22.68	22.89
10	1	24		22.59	22.76	22.95
10	1	49		22.65	22.43	22.89
10	25	0		21.71	21.61	22.04
10	25	12		21.52	21.61	22.02
10	25	24		21.49	21.61	21.93
10	50	0		21.52	21.57	21.93
10	1	0	16-QAM	21.94	21.88	22.22
10	1	24		21.81	21.81	22.19
10	1	49		22.13	21.78	22.29
10	25	0		20.88	20.77	20.90
10	25	12		20.63	20.78	20.96
10	25	24		20.67	20.69	20.99
10	50	0		20.53	20.63	21.06



LTE Band 2 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
15	1	0	QPSK	22.68	22.58	22.81
15	1	37		22.44	22.62	22.95
15	1	74		22.48	22.29	22.77
15	36	0		21.56	21.65	22.02
15	36	18		21.55	21.55	22.03
15	36	37		21.55	21.56	21.94
15	75	0		21.56	21.62	21.97
15	1	0	16-QAM	22.03	21.90	21.92
15	1	37		21.75	21.83	22.21
15	1	74		21.93	21.65	21.73
15	36	0		20.64	20.71	20.95
15	36	18		20.62	20.70	21.05
15	36	37		20.62	20.52	20.97
15	75	0		20.55	20.58	20.93
20	1	0	QPSK	22.78	22.46	22.83
20	1	49		22.80	22.85	23.01
20	1	99		22.38	22.57	22.90
20	50	0		21.67	21.70	21.90
20	50	24		21.59	21.66	21.89
20	50	49		21.43	21.47	21.86
20	100	0		21.61	21.58	21.87
20	1	0	16-QAM	21.68	21.80	22.15
20	1	49		22.10	21.92	22.44
20	1	99		21.74	21.80	21.97
20	50	0		20.72	20.67	20.95
20	50	24		20.54	20.71	21.04
20	50	49		20.48	20.55	21.10
20	100	0		20.66	20.51	21.01



LTE Band 4 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
1.4	1	0	QPSK	23.51	23.46	23.70
1.4	1	2		23.66	23.71	23.76
1.4	1	5		23.57	23.40	23.69
1.4	3	0		23.61	23.63	23.63
1.4	3	1		23.86	23.68	23.72
1.4	3	2		23.62	23.70	23.72
1.4	6	0		22.72	22.66	22.77
1.4	1	0	16-QAM	22.63	23.00	22.98
1.4	1	2		22.94	22.95	22.99
1.4	1	5		23.05	22.99	23.02
1.4	3	0		22.97	22.72	22.75
1.4	3	1		23.00	22.78	22.84
1.4	3	2		22.76	22.80	22.82
1.4	6	0		21.70	21.68	21.84
3	1	0	QPSK	23.60	23.77	23.46
3	1	7		23.59	23.57	23.82
3	1	14		23.64	23.37	23.91
3	8	0		22.68	22.79	22.73
3	8	4		22.71	22.78	22.80
3	8	7		22.77	22.73	22.82
3	15	0		22.70	22.67	22.77
3	1	0	16-QAM	23.11	23.11	23.05
3	1	7		22.96	23.04	23.03
3	1	14		22.93	22.76	23.12
3	8	0		21.63	21.88	21.68
3	8	4		21.82	21.85	21.62
3	8	7		21.89	21.82	21.67
3	15	0		21.92	21.63	21.43



LTE Band 4 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
5	1	0	QPSK	23.64	23.89	23.50
5	1	12		23.55	23.75	23.64
5	1	24		23.59	23.45	23.54
5	12	0		22.63	22.67	22.67
5	12	6		22.56	22.71	22.66
5	12	11		22.62	22.75	22.68
5	25	0		22.61	22.69	22.72
5	1	0	16-QAM	23.05	22.91	23.02
5	1	12		22.86	23.02	22.97
5	1	24		22.94	22.92	23.03
5	12	0		21.62	21.72	21.66
5	12	6		21.56	21.66	21.65
5	12	11		21.62	21.66	21.68
5	25	0		21.72	21.60	21.81
10	1	0	QPSK	23.69	23.89	23.66
10	1	24		23.65	23.78	23.68
10	1	49		23.57	23.46	23.79
10	25	0		22.69	22.76	22.84
10	25	12		22.78	22.72	22.86
10	25	24		22.71	22.62	22.81
10	50	0		22.73	22.71	22.84
10	1	0	16-QAM	23.03	23.14	23.12
10	1	24		22.95	22.53	23.05
10	1	49		22.96	22.88	23.09
10	25	0		21.80	21.80	21.94
10	25	12		21.78	21.67	21.90
10	25	24		21.82	21.67	21.73
10	50	0		21.58	21.62	21.76



LTE Band 4 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
15	1	0	QPSK	23.64	23.87	23.86
15	1	37		23.90	23.59	23.66
15	1	74		23.46	23.46	23.77
15	36	0		22.75	22.91	22.89
15	36	18		22.78	22.74	22.86
15	36	37		22.69	22.68	22.76
15	75	0		22.71	22.78	22.82
15	1	0	16-QAM	23.19	23.16	23.28
15	1	37		22.91	23.07	23.13
15	1	74		22.93	22.92	23.13
15	36	0		21.81	21.85	21.88
15	36	18		21.71	21.76	21.72
15	36	37		21.73	21.48	21.78
15	75	0		21.72	21.73	21.79
20	1	0	QPSK	23.85	23.96	23.86
20	1	49		23.83	23.70	23.63
20	1	99		23.61	23.50	23.58
20	50	0		22.77	22.81	22.80
20	50	24		22.68	22.71	22.75
20	50	49		22.64	22.66	22.66
20	100	0		22.70	22.75	22.72
20	1	0	16-QAM	23.16	23.31	23.24
20	1	49		22.91	22.95	22.98
20	1	99		22.95	22.92	22.90
20	50	0		21.70	21.94	21.85
20	50	24		21.71	21.83	21.65
20	50	49		21.74	21.49	21.54
20	100	0		21.82	21.69	21.71



LTE Band 5 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
1.4	1	0	QPSK	23.13	23.26	23.24
1.4	1	2		23.50	23.33	23.32
1.4	1	5		23.16	23.14	23.21
1.4	3	0		23.45	23.22	23.29
1.4	3	1		23.49	23.32	23.29
1.4	3	2		23.24	23.31	23.27
1.4	6	0	16-QAM	22.17	22.36	22.36
1.4	1	0		22.74	22.61	22.48
1.4	1	2		22.88	22.62	22.55
1.4	1	5		22.89	22.50	22.50
1.4	3	0		22.52	22.40	22.39
1.4	3	1		22.65	22.44	22.38
1.4	3	2		22.58	22.38	22.36
1.4	6	0		21.01	21.37	21.31
3	1	0	QPSK	23.14	23.18	23.34
3	1	7		23.33	23.33	23.19
3	1	14		22.96	23.28	23.10
3	8	0		22.25	22.30	22.38
3	8	4		22.28	22.43	22.40
3	8	7		22.23	22.46	22.33
3	15	0		22.18	22.33	22.31
3	1	0	16-QAM	22.90	22.56	22.58
3	1	7		22.68	22.60	22.57
3	1	14		22.47	22.69	22.59
3	8	0		21.12	21.19	21.37
3	8	4		21.36	21.40	21.32
3	8	7		21.20	21.33	21.26
3	15	0		20.94	21.09	21.18



LTE Band 5 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
5	1	0	QPSK	22.98	23.08	23.50
5	1	12		23.25	23.43	23.23
5	1	24		23.11	23.36	23.10
5	12	0		22.23	22.30	22.53
5	12	6		22.20	22.22	22.44
5	12	11		22.19	22.38	22.37
5	25	0		22.29	22.29	22.40
5	1	0	16-QAM	22.34	22.34	22.74
5	1	12		22.78	22.67	22.62
5	1	24		22.59	22.61	22.55
5	12	0		21.06	21.24	21.46
5	12	6		21.03	21.27	21.30
5	12	11		21.23	21.32	21.15
5	25	0		21.25	21.34	21.26
10	1	0	QPSK	23.40	23.43	23.56
10	1	24		23.14	23.42	23.50
10	1	49		23.19	23.40	23.18
10	25	0		22.39	22.40	22.49
10	25	12		22.26	22.39	22.48
10	25	24		22.38	22.37	22.42
10	50	0		22.31	22.43	22.45
10	1	0	16-QAM	22.63	22.75	22.79
10	1	24		22.62	22.63	22.71
10	1	49		22.60	22.70	22.59
10	25	0		21.43	21.47	21.53
10	25	12		21.34	21.37	21.46
10	25	24		21.50	21.33	21.55
10	50	0		21.38	21.25	21.31



LTE Band 17 Maximum Average Power [dBm]						
BW [MHz]	RB Size	RB Offset	Mod	Lowest	Middle	Highest
5	1	0	QPSK	23.05	23.09	22.99
5	1	12		23.20	23.13	22.89
5	1	24		23.08	23.18	22.89
5	12	0		22.02	22.02	21.95
5	12	6		22.06	22.02	22.01
5	12	11		22.03	22.02	22.07
5	25	0		22.13	22.09	21.90
5	1	0	16-QAM	22.34	22.27	22.70
5	1	12		22.32	22.25	22.35
5	1	24		22.39	22.44	22.35
5	12	0		20.99	20.87	20.99
5	12	6		21.04	20.97	20.98
5	12	11		21.00	20.98	20.94
5	25	0		21.19	20.95	20.97
10	1	0	QPSK	23.10	23.00	23.25
10	1	24		23.17	23.08	23.26
10	1	49		23.31	23.13	23.27
10	25	0		22.14	22.12	22.13
10	25	12		22.03	22.10	22.12
10	25	24		22.10	22.09	22.11
10	50	0		22.17	22.11	22.16
10	1	0	16-QAM	22.49	22.48	22.44
10	1	24		22.24	22.34	22.40
10	1	49		22.71	22.58	22.53
10	25	0		21.12	21.06	21.06
10	25	12		21.03	21.04	21.14
10	25	24		21.10	21.14	21.23
10	50	0		20.95	20.98	21.02

**Peak-to-Average Ratio**

Mode	LTE Band 2 / 20MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	Full RB	Result
Lowest CH	2.78	4.35	3.68	5.28	PASS
Middle CH	3.65	4.35	4.35	5.36	
Highest CH	3.48	4.43	4.17	5.39	

Mode	LTE Band 4 / 20MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	RB Size	Result
Lowest CH	3.62	4.52	4.41	5.36	PASS
Middle CH	4.32	4.29	5.33	5.25	
Highest CH	3.59	3.97	4.49	4.90	

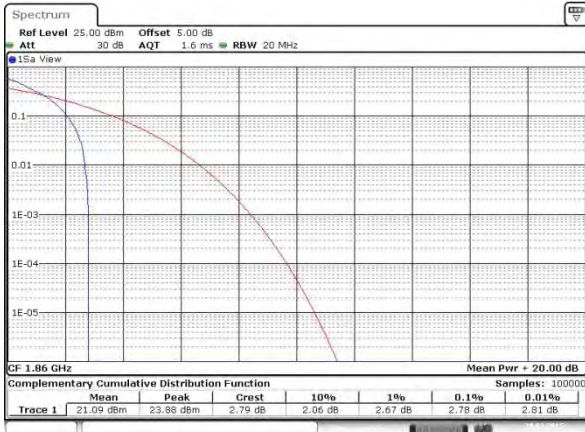
Mode	LTE Band 5 / 10MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	RB Size	Result
Lowest CH	3.74	4.58	4.61	5.65	PASS
Middle CH	3.54	4.67	4.12	5.71	
Highest CH	3.74	4.46	4.61	5.59	

Mode	LTE Band 17 / 10MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	RB Size	Result
Lowest CH	3.45	4.64	3.59	5.68	PASS
Middle CH	3.48	4.64	4.55	5.59	
Highest CH	3.57	4.70	4.87	5.59	

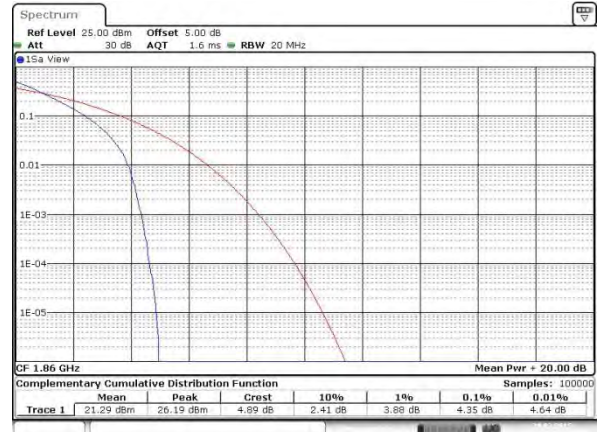


LTE Band 2 / 20MHz / QPSK

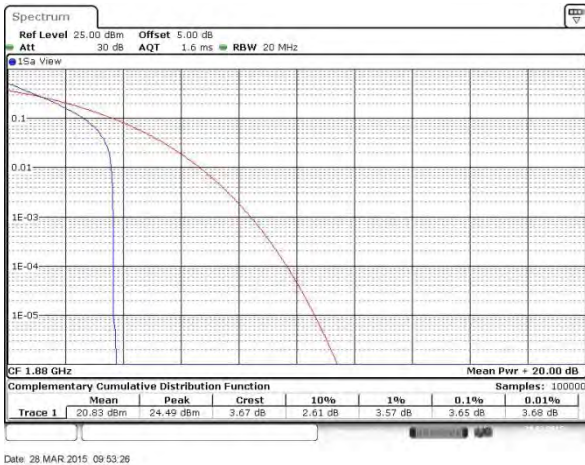
Lowest Channel / 1RB



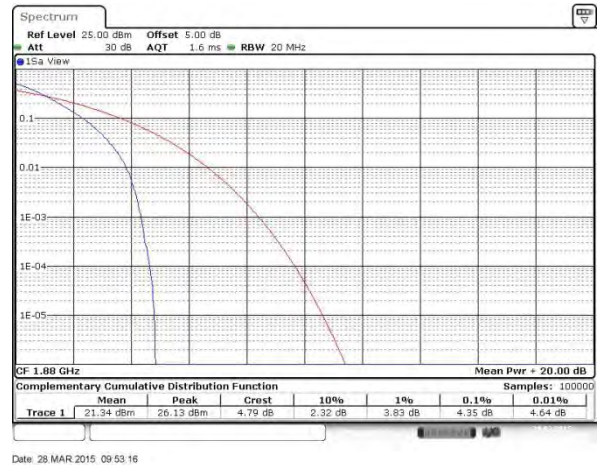
Lowest Channel / Full RB



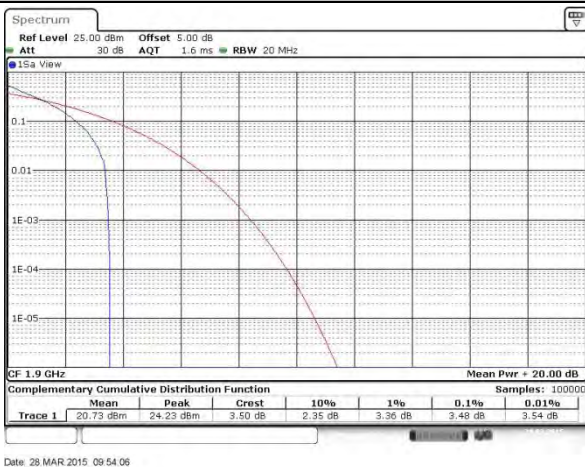
Middle Channel / 1RB



Middle Channel / Full RB



Highest Channel / 1RB



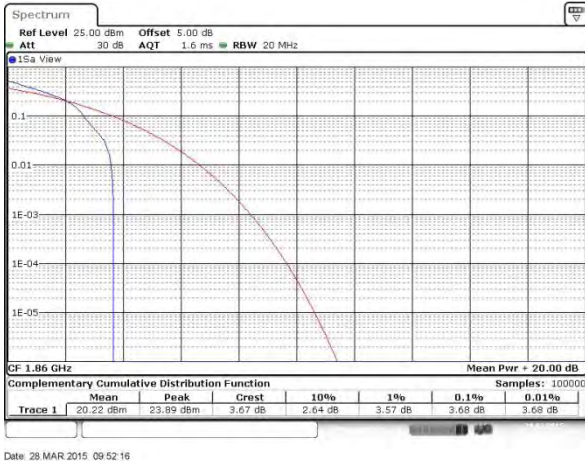
Highest Channel / Full RB



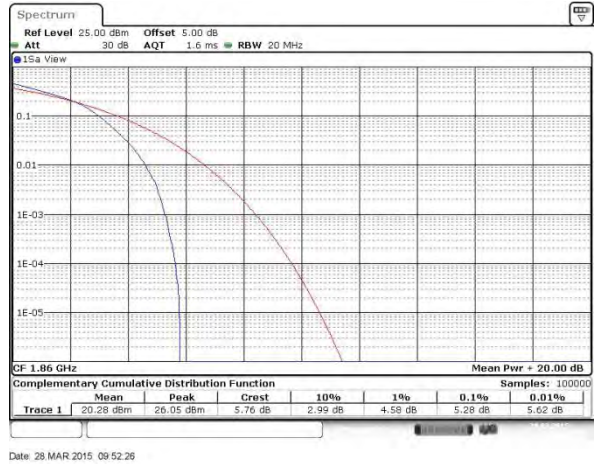


LTE Band 2 / 20MHz / 16QAM

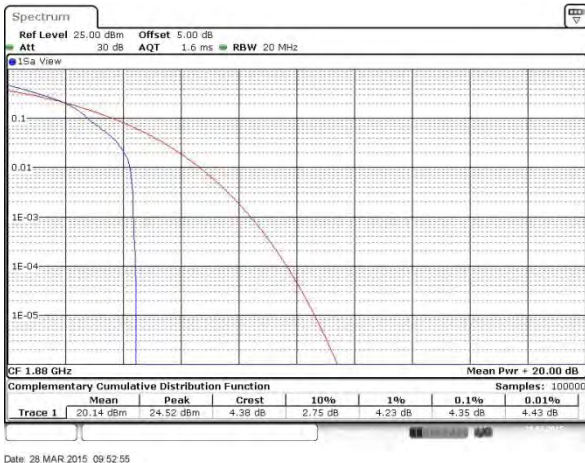
Lowest Channel / 1RB



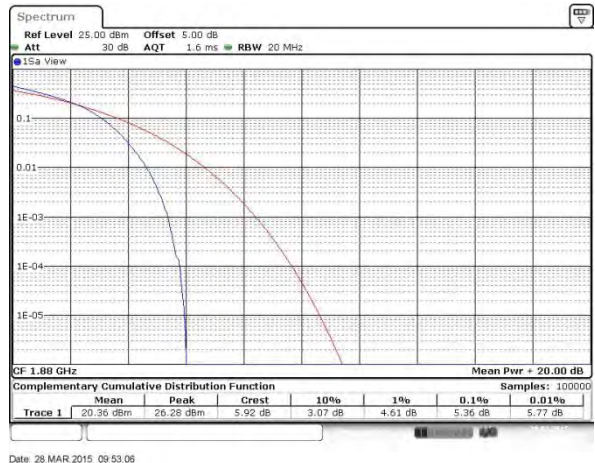
Lowest Channel / Full RB



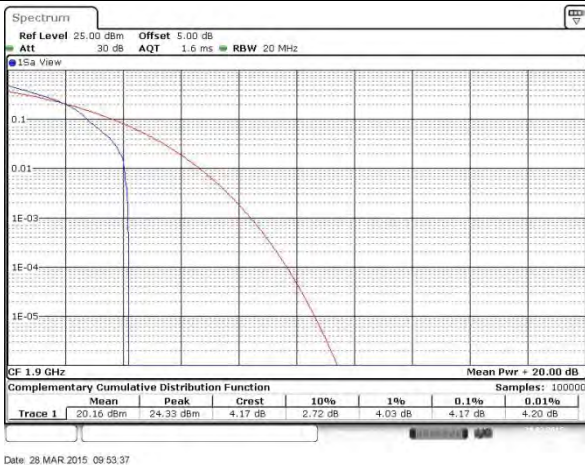
Middle Channel / 1RB



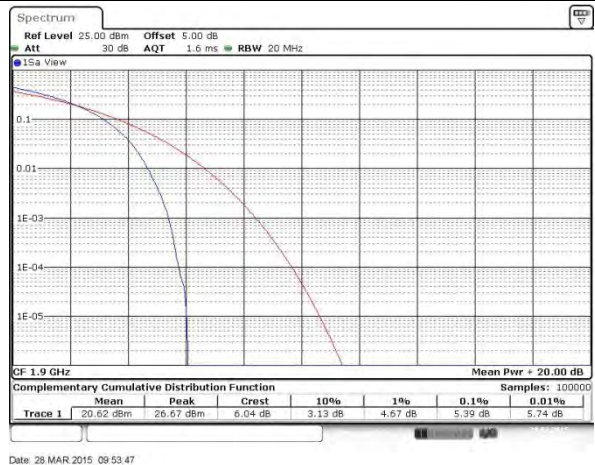
Middle Channel / Full RB



Highest Channel / 1RB



Highest Channel / Full RB





LTE Band 4 / 20MHz / QPSK

Lowest Channel / 1RB



Date: 28 MAR 2015 12:35:21

Lowest Channel / Full RB



Date: 28 MAR 2015 12:35:09

Middle Channel / 1RB



Date: 28 MAR 2015 12:36:07

Middle Channel / Full RB



Date: 28 MAR 2015 12:35:57

Highest Channel / 1RB



Date: 28 MAR 2015 12:36:32

Highest Channel / Full RB



Date: 28 MAR 2015 12:36:17



LTE Band 4 / 20MHz / 16QAM

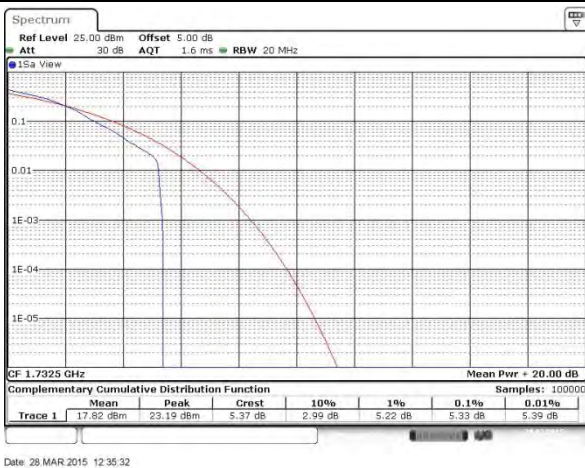
Lowest Channel / 1RB



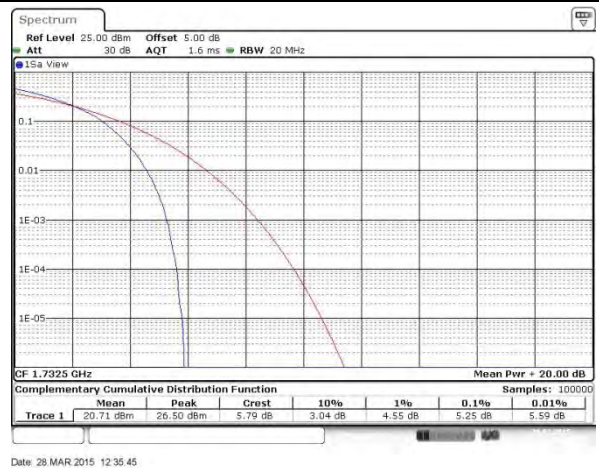
Lowest Channel / Full RB



Middle Channel / 1RB



Middle Channel / Full RB



Highest Channel / 1RB



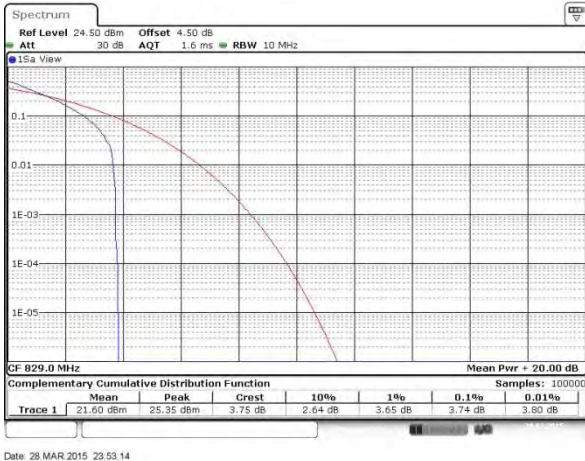
Highest Channel / Full RB



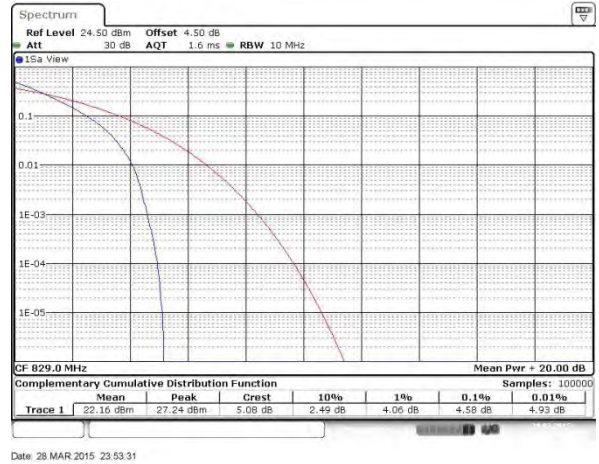


LTE Band 5 / 10MHz / QPSK

Lowest Channel / 1RB



Lowest Channel / Full RB



Middle Channel / 1RB



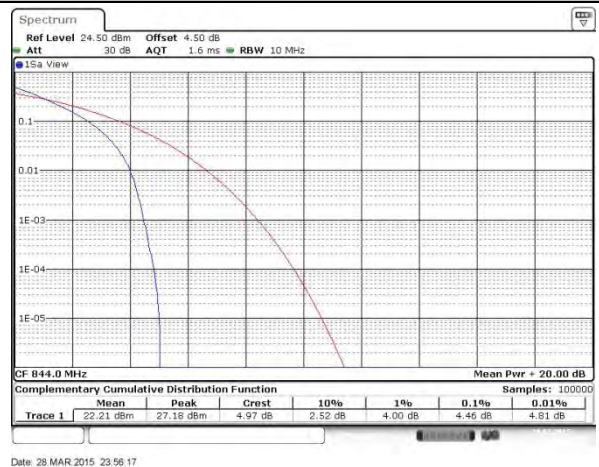
Middle Channel / Full RB



Highest Channel / 1RB



Highest Channel / Full RB



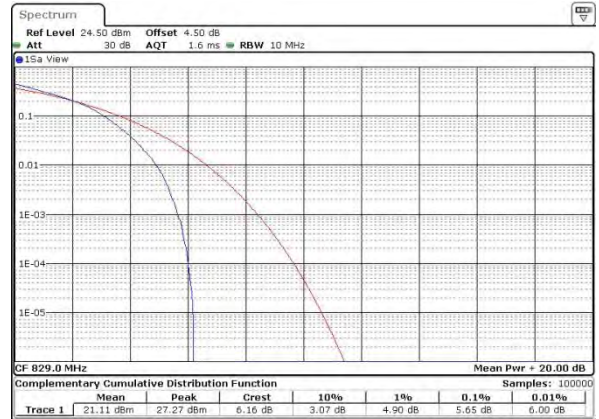


LTE Band 5 / 10MHz / 16QAM

Lowest Channel / 1RB



Lowest Channel / Full RB



Middle Channel / 1RB



Middle Channel / Full RB



Highest Channel / 1RB



Highest Channel / Full RB





LTE Band 17 / 10MHz / QPSK

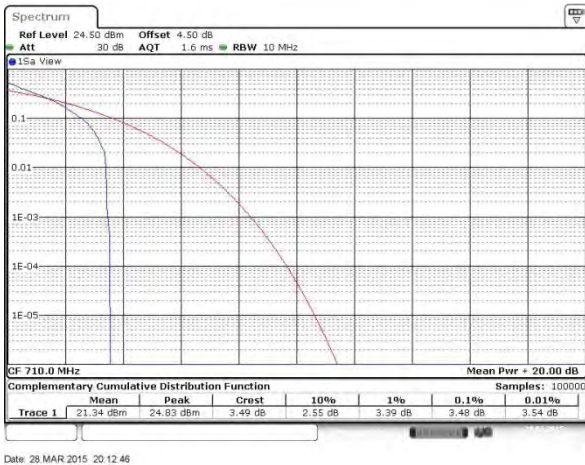
Lowest Channel / 1RB



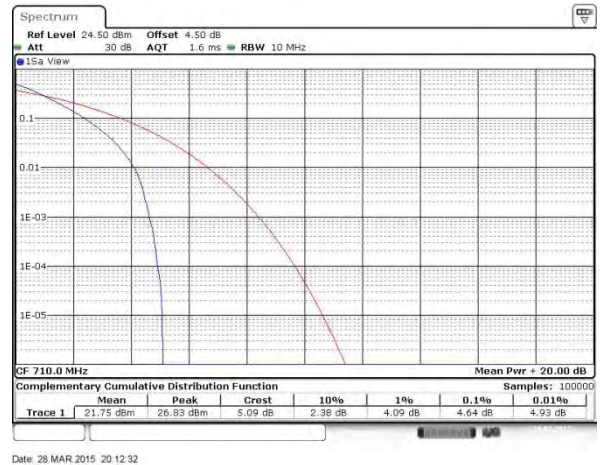
Lowest Channel / Full RB



Middle Channel/ 1RB



Middle Channel / Full RB



Highest Channel/ 1RB



Highest Channel / Full RB





LTE Band 17 / 10MHz / 16QAM

Lowest Channel / 1RB



Date: 28 MAR 2015 20:11:34

Lowest Channel / Full RB



Date: 28 MAR 2015 20:11:50

Middle Channel/ 1RB



Date: 28 MAR 2015 20:12:59

Middle Channel / Full RB



Date: 28 MAR 2015 20:13:12

Highest Channel/ 1RB



Date: 28 MAR 2015 20:13:29

Highest Channel / Full RB



Date: 28 MAR 2015 20:13:44

**26dB Bandwidth**

Mode	LTE Band 2 : 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	1.295	1.323	3.057	3.069	5.065	5.055	10.110	9.970	14.565	14.685	20.460	20.500
Middle CH	1.318	1.323	3.051	3.057	5.065	5.035	10.050	9.950	14.715	14.625	20.140	20.140
Highest CH	1.418	1.332	3.093	3.051	5.085	5.025	9.910	10.050	14.835	14.655	20.220	20.260

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	1.390	1.346	3.087	3.111	5.125	5.095	10.010	10.090	14.775	14.505	20.500	20.380
Middle CH	1.334	1.332	3.063	3.081	5.065	5.065	10.070	10.050	14.595	14.895	20.300	20.340
Highest CH	1.323	1.337	3.051	3.069	5.065	5.055	10.030	10.030	14.745	14.715	20.180	20.579

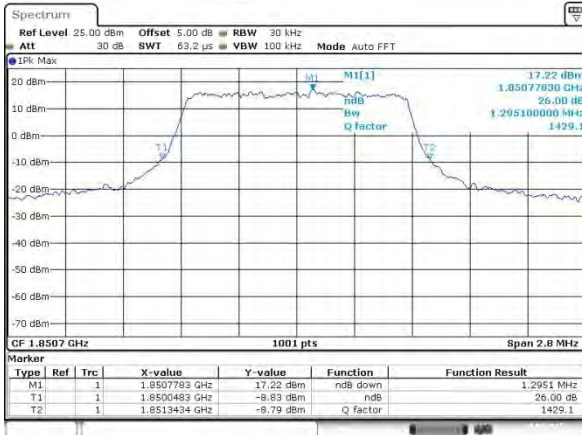
Mode	LTE Band 5 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	1.278	1.298	3.039	3.057	5.025	5.055	10.130	9.950	-	-	-	-
Middle CH	1.278	1.295	3.039	3.045	5.045	5.055	10.150	10.050	-	-	-	-
Highest CH	1.298	1.312	3.087	3.069	5.055	5.045	10.030	9.970	-	-	-	-

Mode	LTE Band 17 : 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	-	-	-	-	5.075	5.045	10.050	9.990	-	-	-	-
Middle CH	-	-	-	-	5.055	5.045	10.130	9.970	-	-	-	-
Highest CH	-	-	-	-	5.035	5.055	10.010	9.990	-	-	-	-



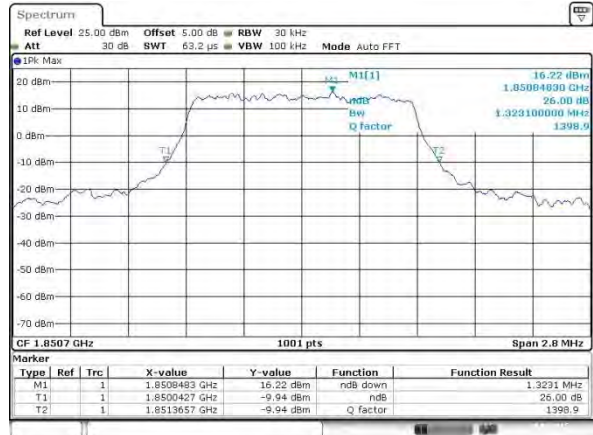
LTE Band 2

Lowest Channel / 1.4MHz / QPSK



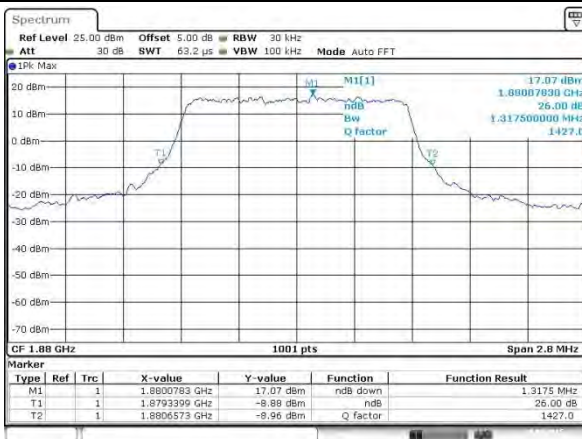
Date: 28 MAR 2015 08:49:40

Lowest Channel / 1.4MHz / 16QAM



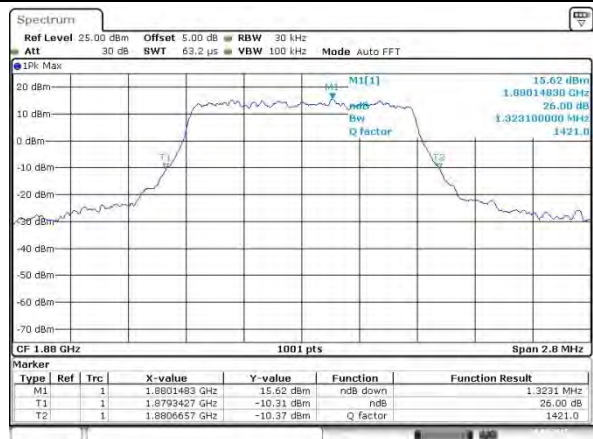
Date: 28 MAR 2015 08:49:52

Middle Channel / 1.4MHz / QPSK



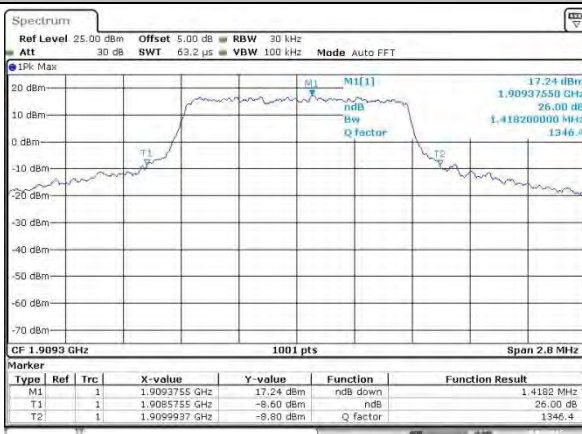
Date: 28 MAR 2015 08:53:01

Middle Channel / 1.4MHz / 16QAM



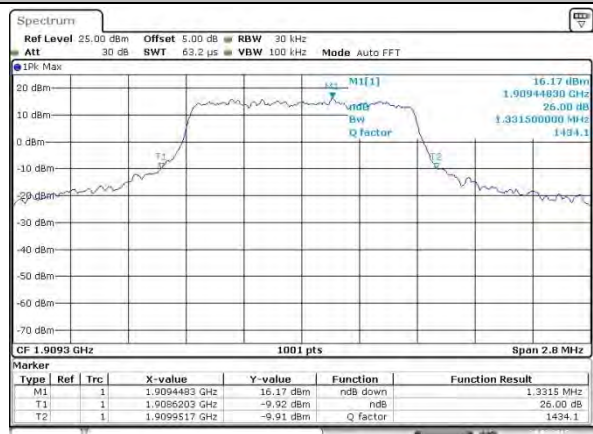
Date: 28 MAR 2015 08:53:13

Highest Channel / 1.4MHz / QPSK



Date: 28 MAR 2015 08:56:21

Highest Channel / 1.4MHz / 16QAM

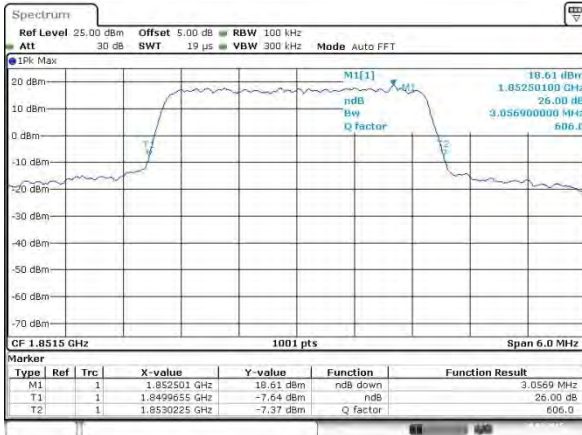


Date: 28 MAR 2015 08:56:33



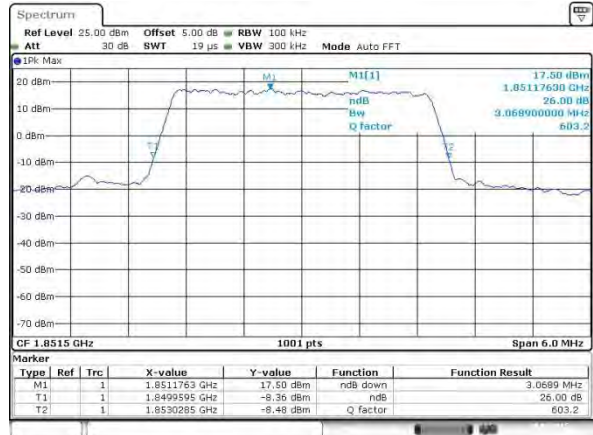
LTE Band 2

Lowest Channel / 3MHz / QPSK



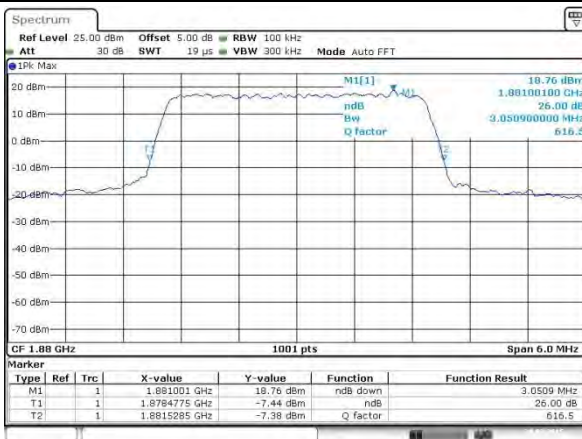
Date: 28 MAR 2015 09:01:30

Lowest Channel / 3MHz / 16QAM



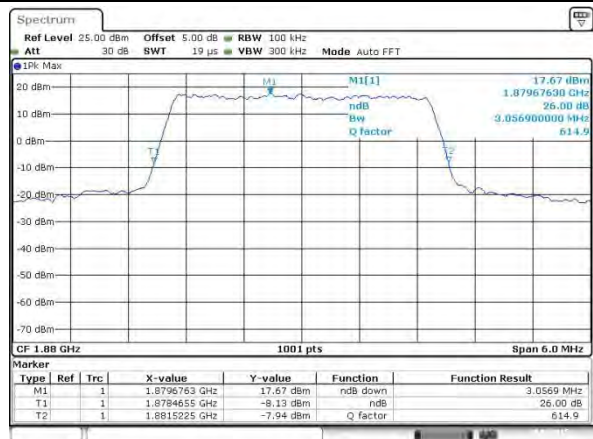
Date: 28 MAR 2015 09:01:42

Middle Channel / 3MHz / QPSK



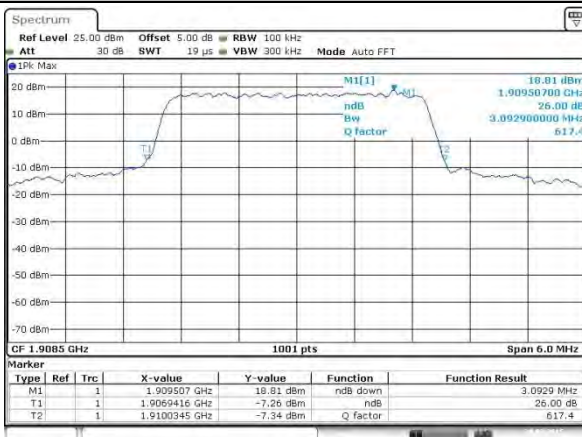
Date: 28 MAR 2015 09:04:51

Middle Channel / 3MHz / 16QAM



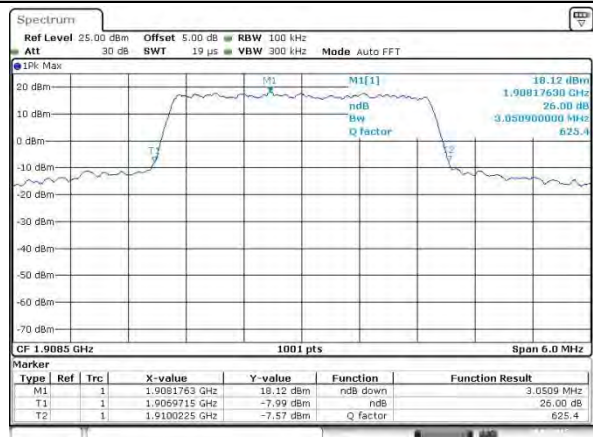
Date: 28 MAR 2015 09:05:03

Highest Channel / 3MHz / QPSK



Date: 28 MAR 2015 09:08:11

Highest Channel / 3MHz / 16QAM

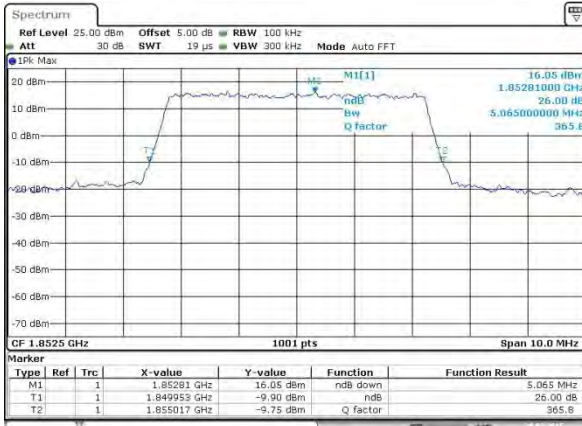


Date: 28 MAR 2015 09:08:23

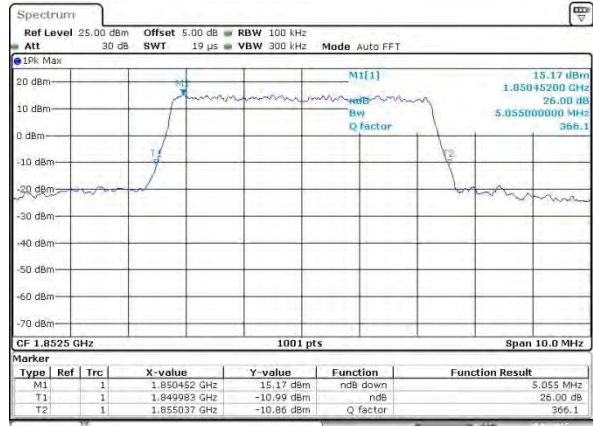


LTE Band 2

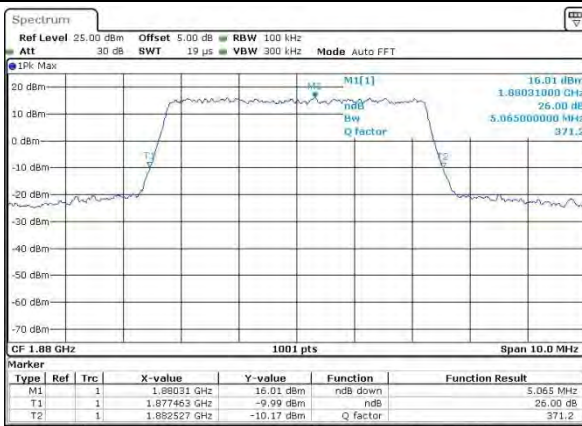
Lowest Channel / 5MHz / QPSK



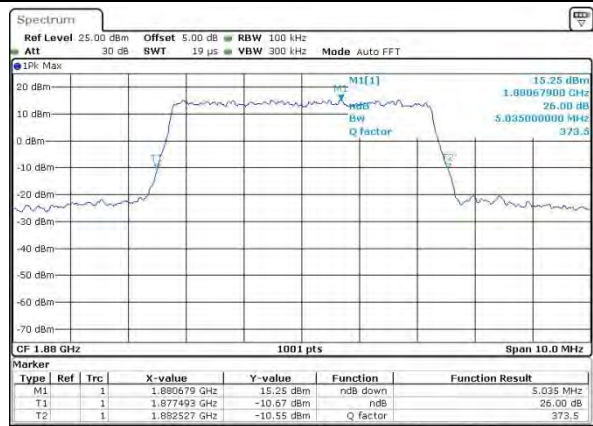
Lowest Channel / 5MHz / 16QAM



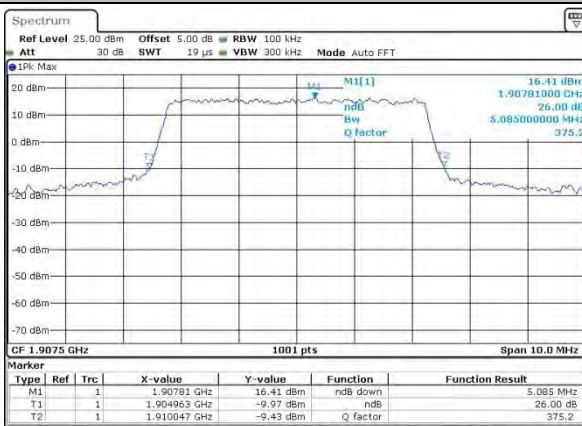
Middle Channel / 5MHz / QPSK



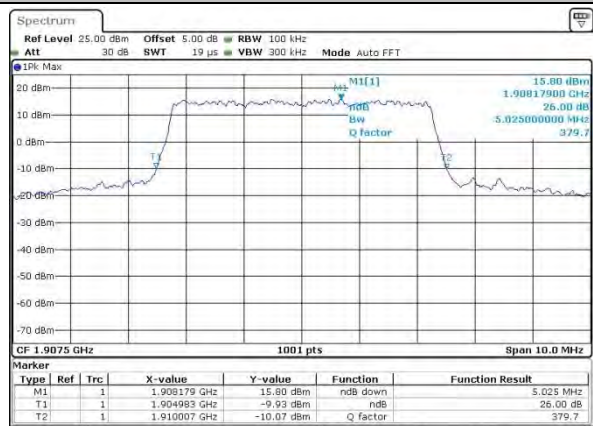
Middle Channel / 5MHz / 16QAM



Highest Channel / 5MHz / QPSK



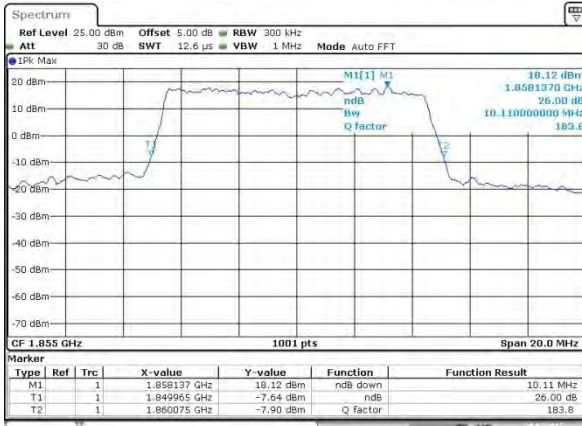
Highest Channel / 5MHz / 16QAM



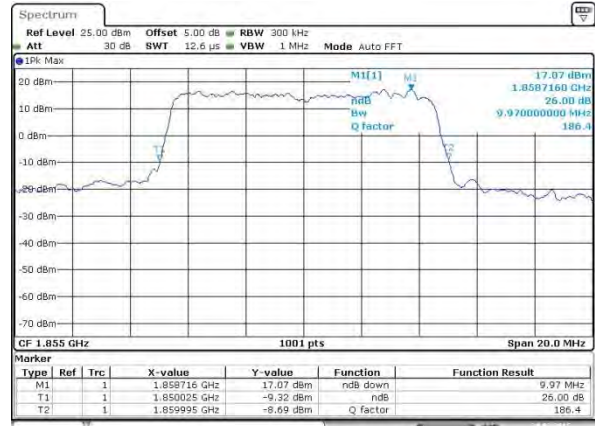


LTE Band 2

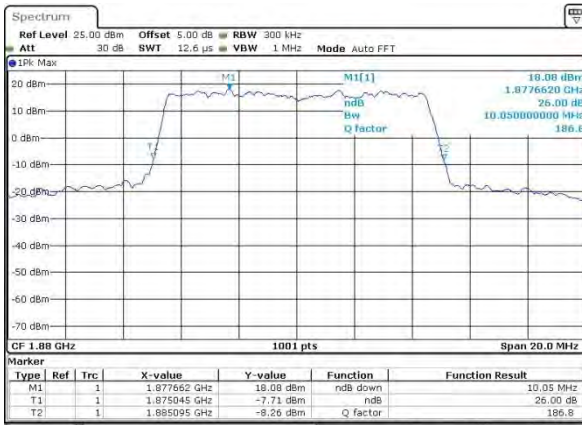
Lowest Channel / 10MHz / QPSK



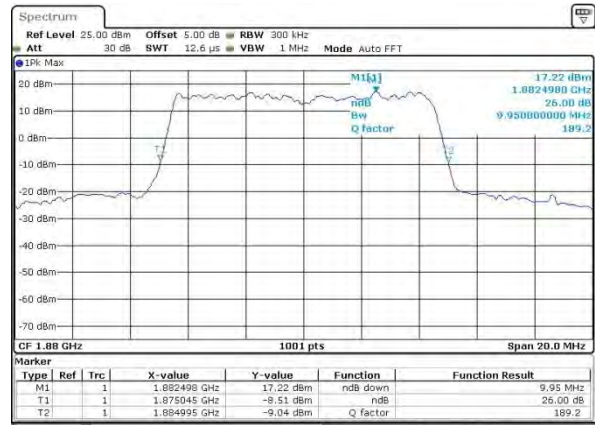
Lowest Channel / 10MHz / 16QAM



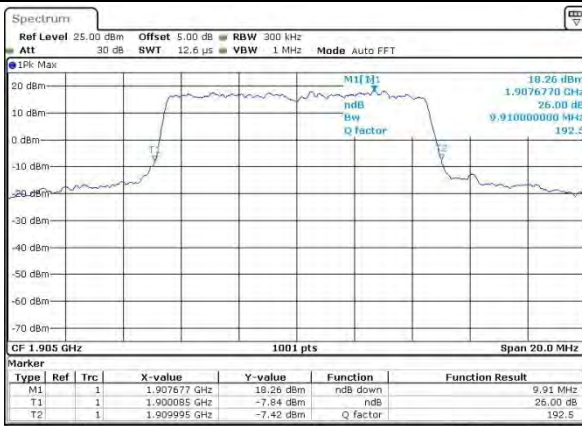
Middle Channel / 10MHz / QPSK



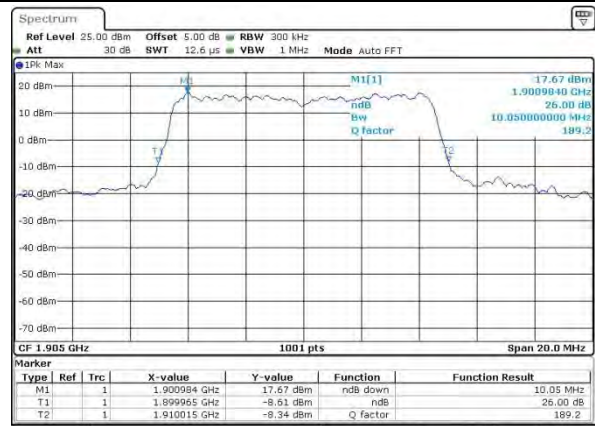
Middle Channel / 10MHz / 16QAM



Highest Channel / 10MHz / QPSK



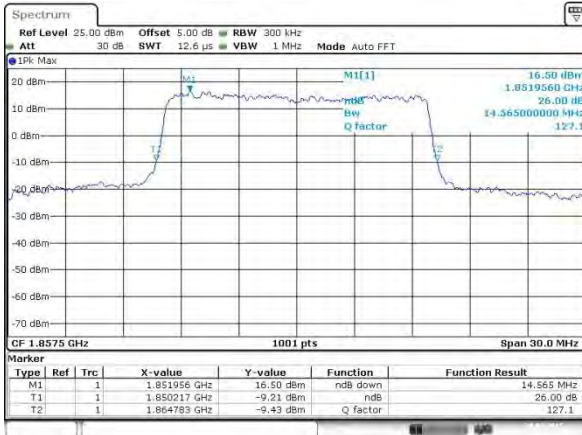
Highest Channel / 10MHz / 16QAM





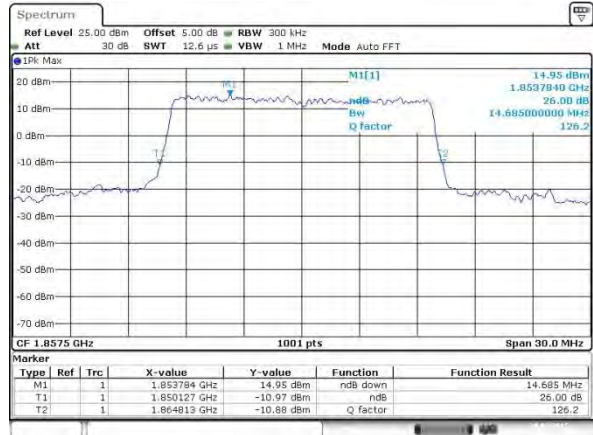
LTE Band 2

Lowest Channel / 15MHz / QPSK



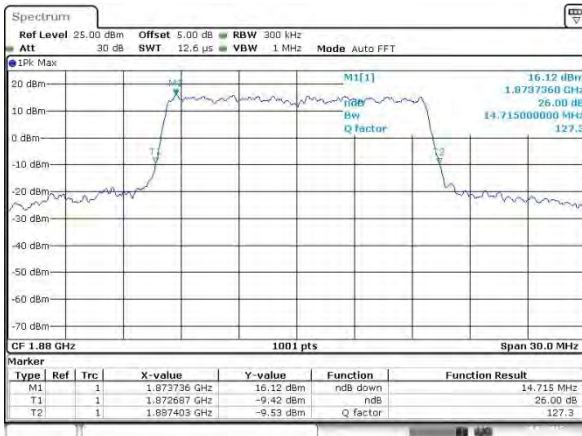
Date: 28 MAR 2015 09:32:05

Lowest Channel / 15MHz / 16QAM



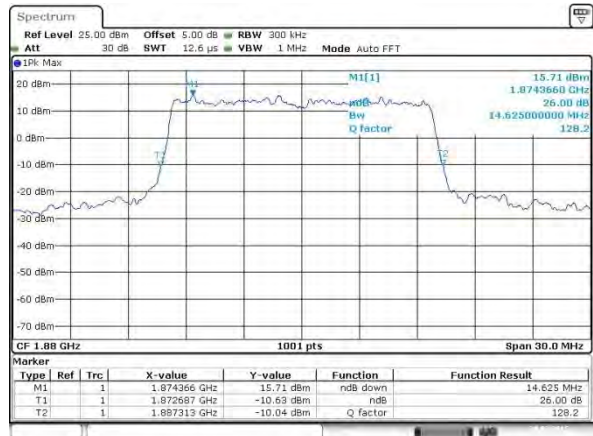
Date: 28 MAR 2015 09:32:17

Middle Channel / 15MHz / QPSK



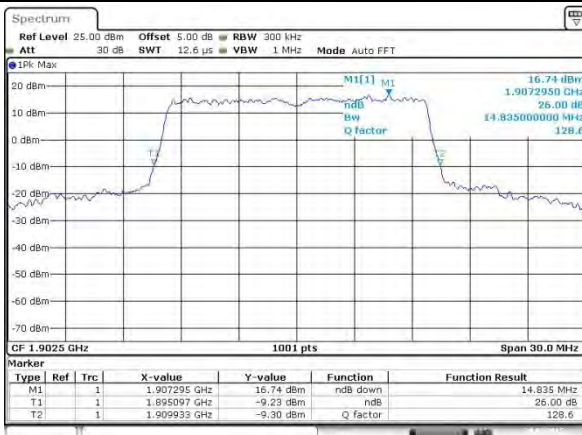
Date: 28 MAR 2015 09:35:29

Middle Channel / 15MHz / 16QAM



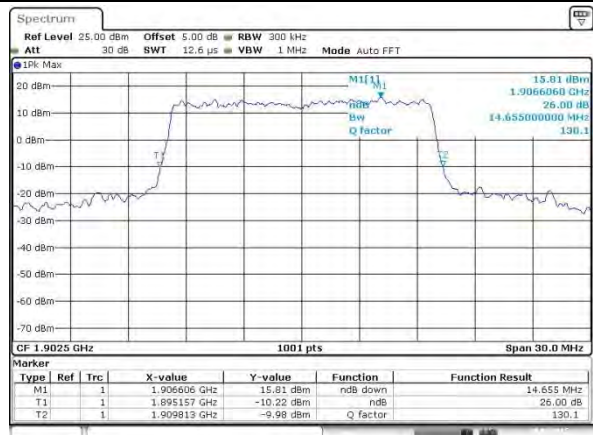
Date: 28 MAR 2015 09:35:41

Highest Channel / 15MHz / QPSK



Date: 28 MAR 2015 09:38:56

Highest Channel / 15MHz / 16QAM

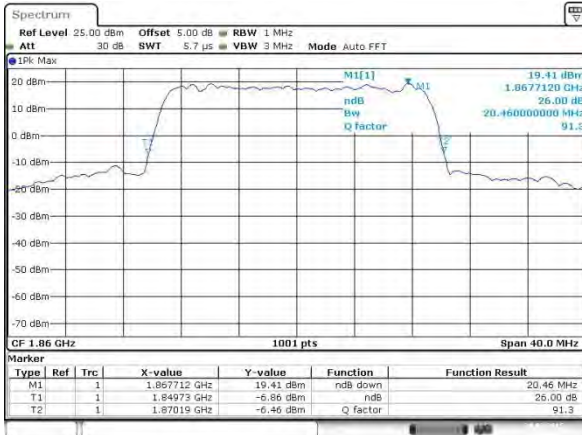


Date: 28 MAR 2015 09:39:08

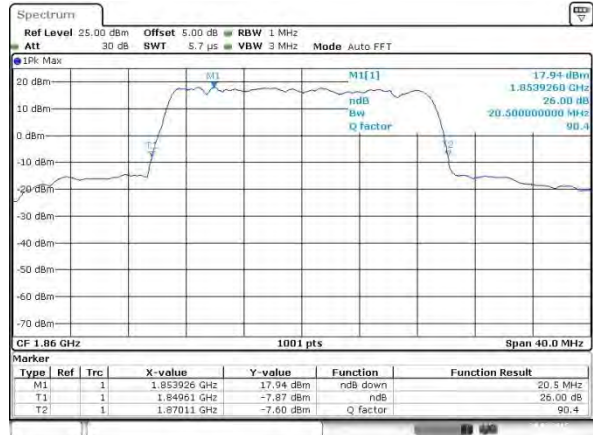


LTE Band 2

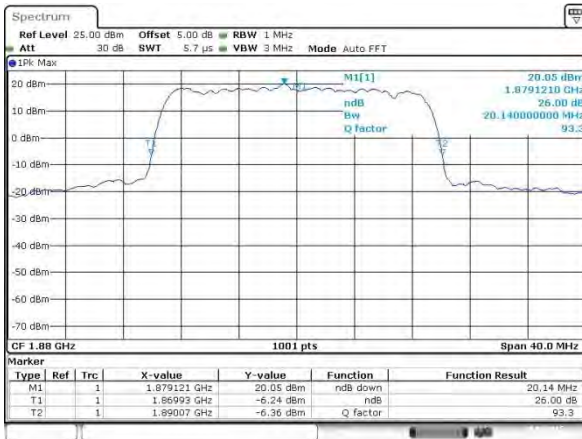
Lowest Channel / 20MHz / QPSK



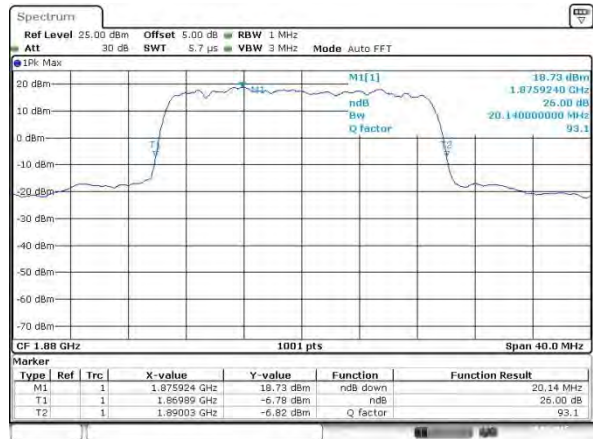
Lowest Channel / 20MHz / 16QAM



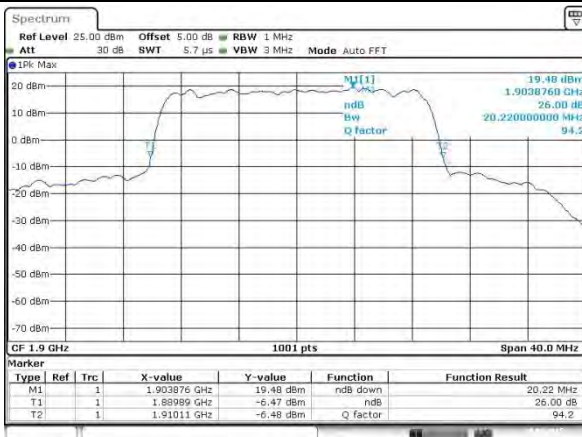
Middle Channel / 20MHz / QPSK



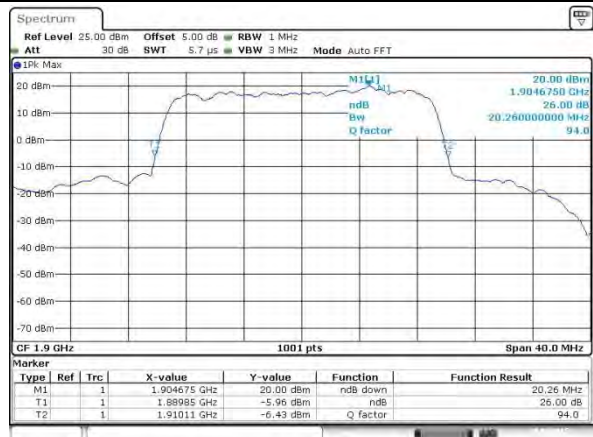
Middle Channel / 20MHz / 16QAM



Highest Channel / 20MHz / QPSK



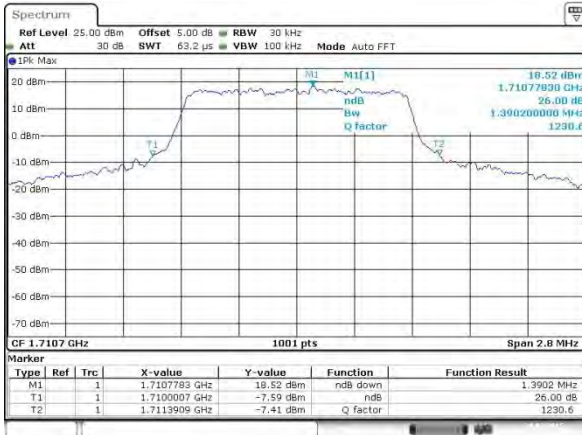
Highest Channel / 20MHz / 16QAM



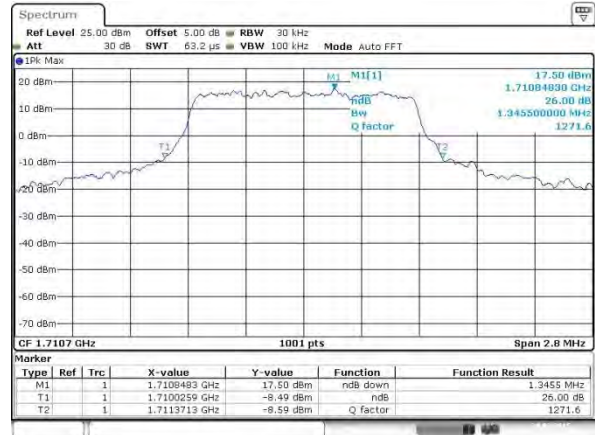


LTE Band 4

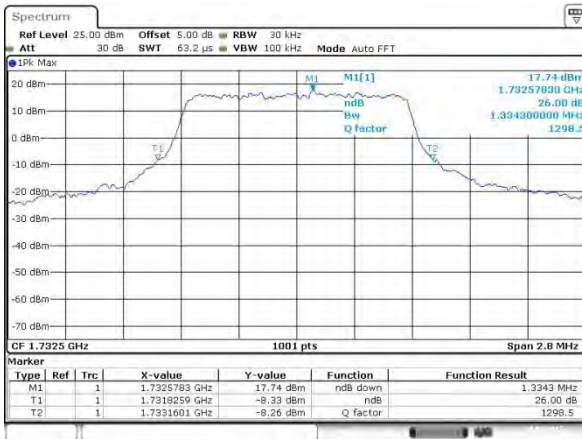
Lowest Channel / 1.4MHz / QPSK



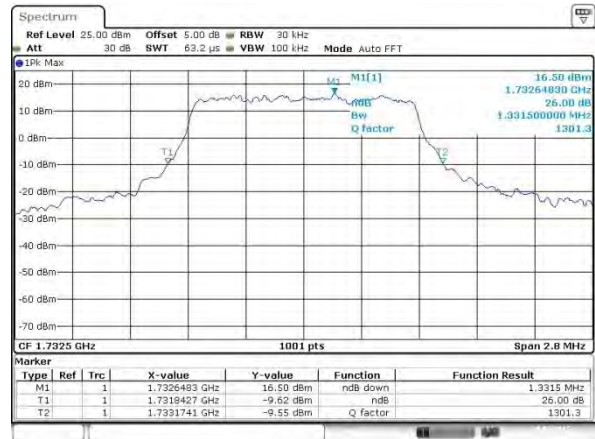
Lowest Channel / 1.4MHz / 16QAM



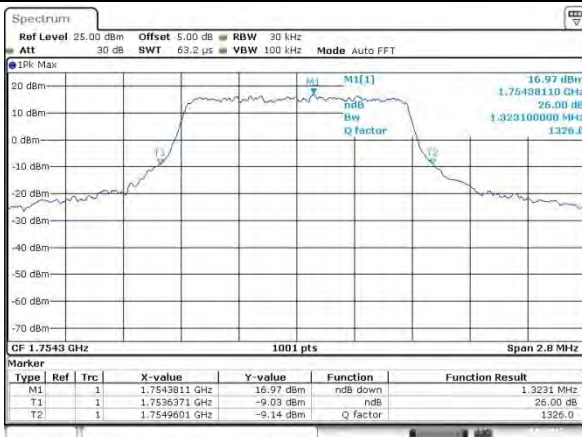
Middle Channel / 1.4MHz / QPSK



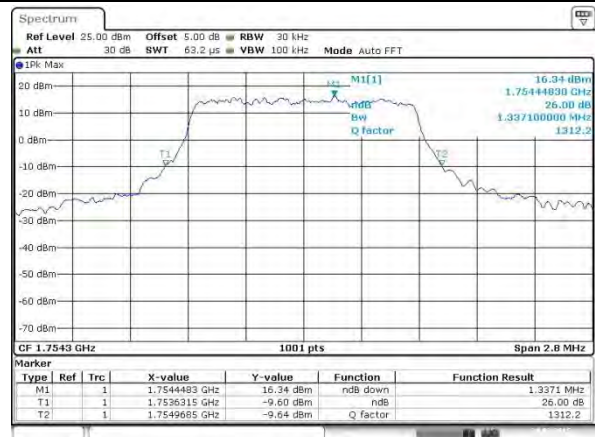
Middle Channel / 1.4MHz / 16QAM



Highest Channel / 1.4MHz / QPSK



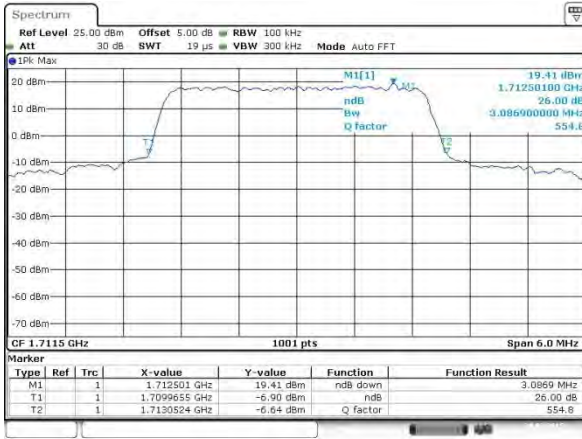
Highest Channel / 1.4MHz / 16QAM



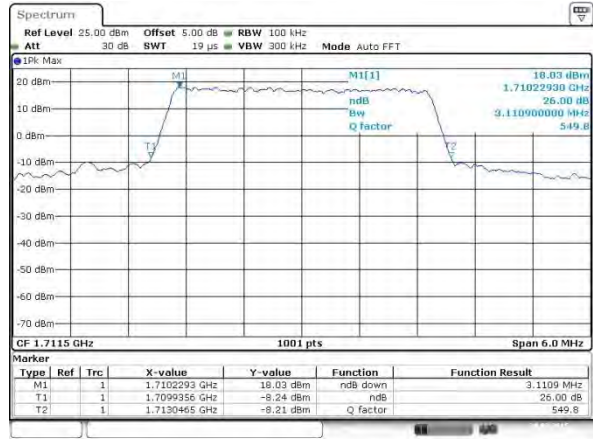


LTE Band 4

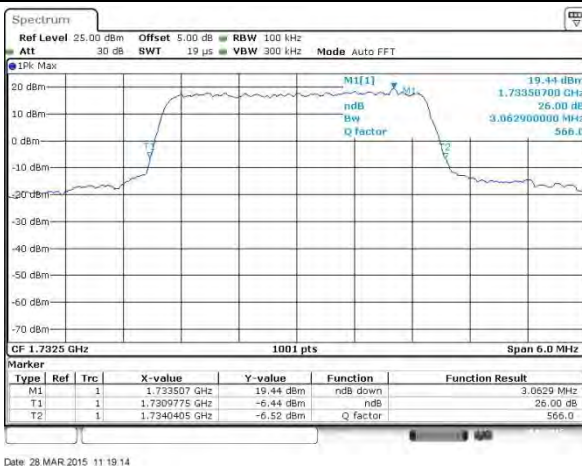
Lowest Channel / 3MHz / QPSK



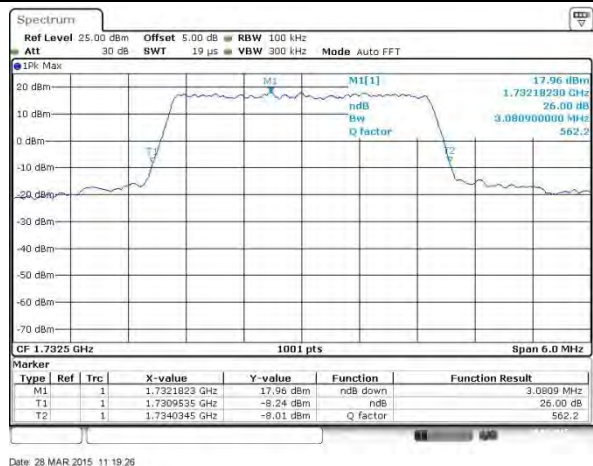
Lowest Channel / 3MHz / 16QAM



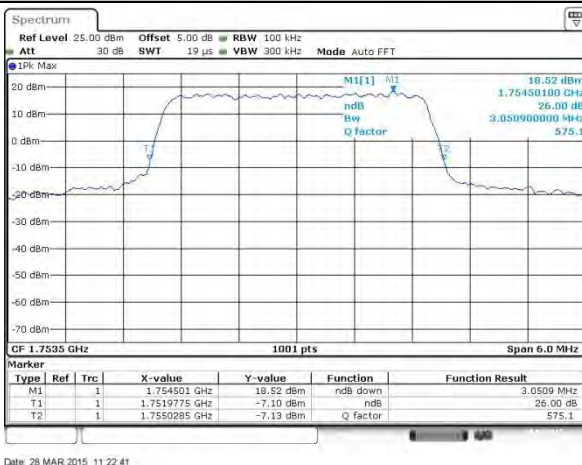
Middle Channel / 3MHz / QPSK



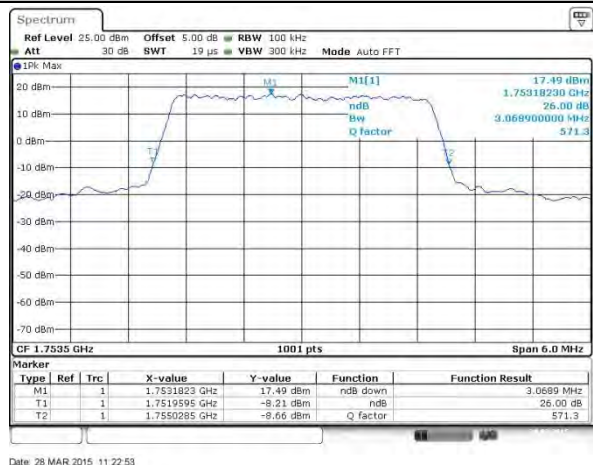
Middle Channel / 3MHz / 16QAM



Highest Channel / 3MHz / QPSK



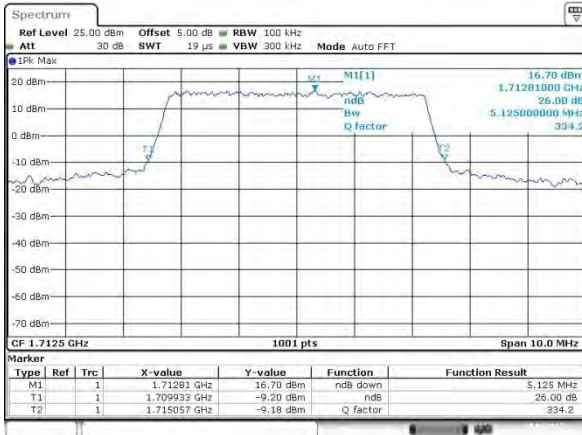
Highest Channel / 3MHz / 16QAM



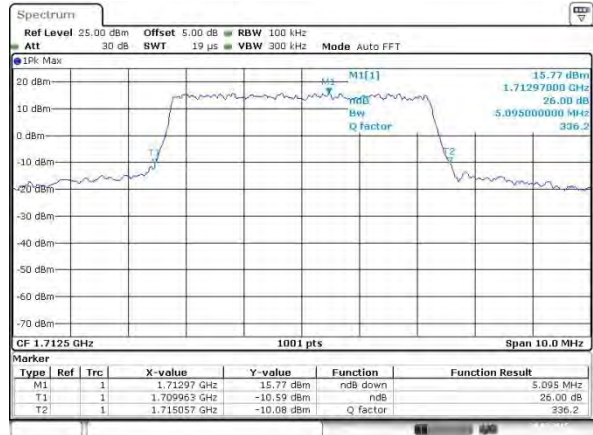


LTE Band 4

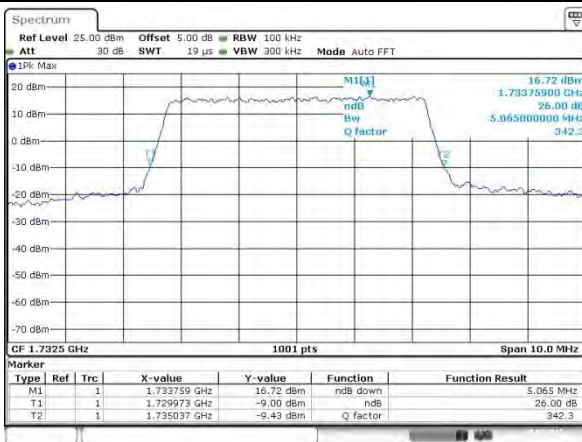
Lowest Channel / 5MHz / QPSK



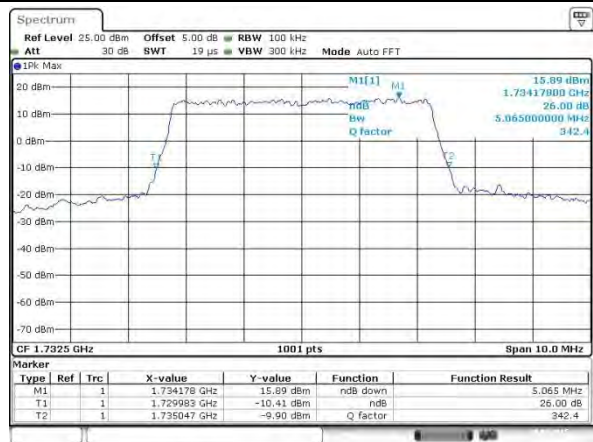
Lowest Channel / 5MHz / 16QAM



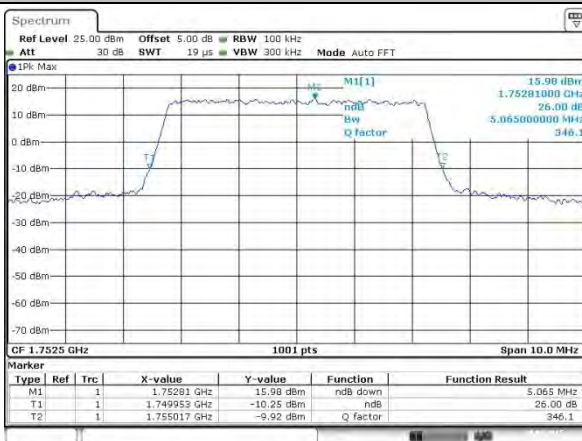
Middle Channel / 5MHz / QPSK



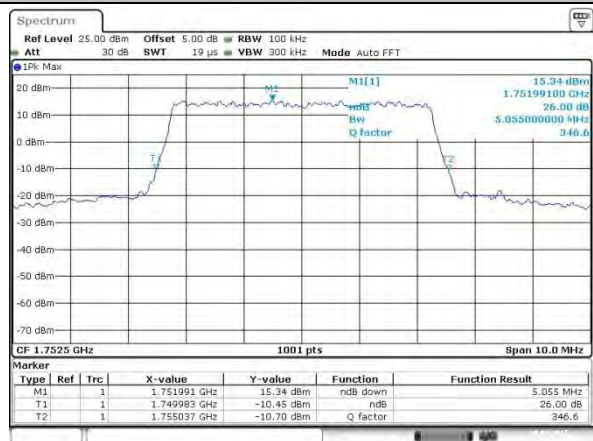
Middle Channel / 5MHz / 16QAM



Highest Channel / 5MHz / QPSK



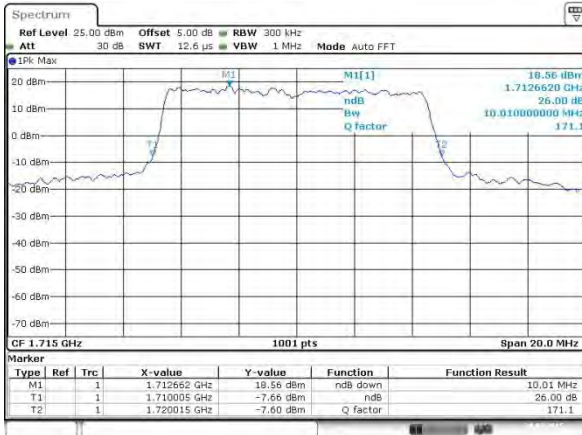
Highest Channel / 5MHz / 16QAM





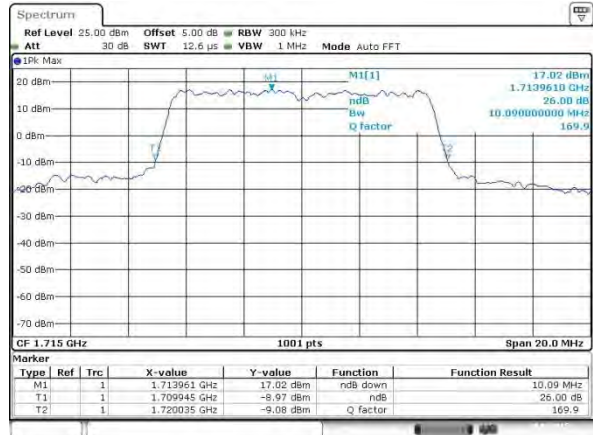
LTE Band 4

Lowest Channel / 10MHz / QPSK



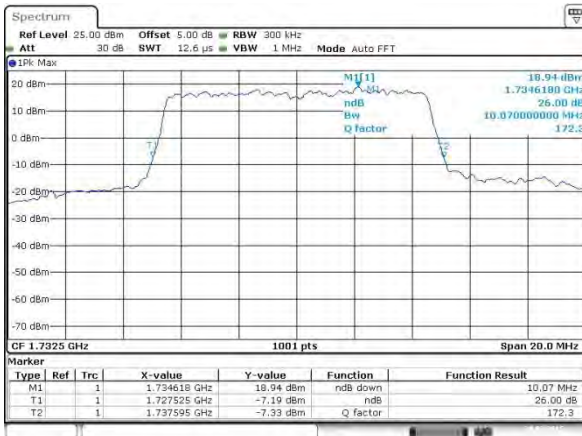
Date: 28 MAR 2015 11:36:20

Lowest Channel / 10MHz / 16QAM



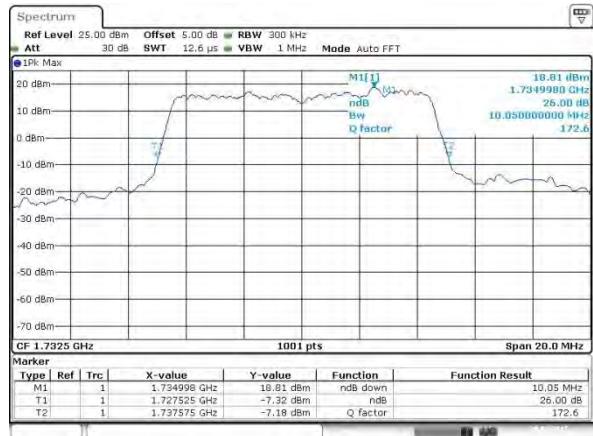
Date: 28 MAR 2015 11:36:32

Middle Channel / 10MHz / QPSK



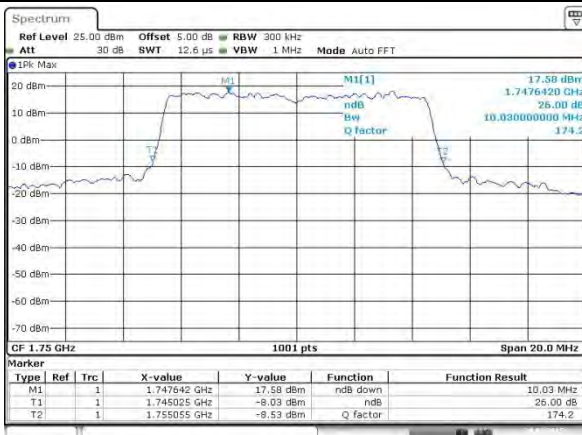
Date: 28 MAR 2015 11:39:41

Middle Channel / 10MHz / 16QAM



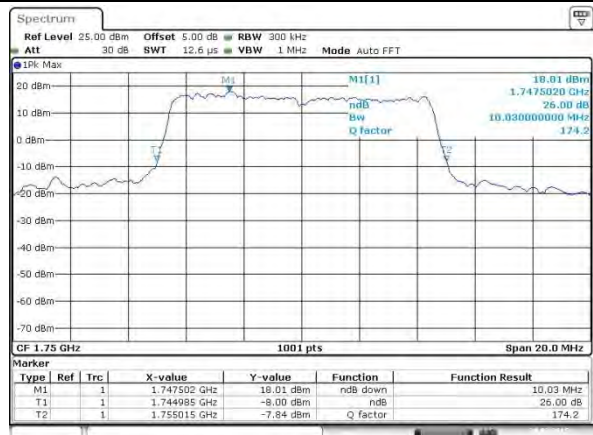
Date: 28 MAR 2015 11:39:53

Highest Channel / 10MHz / QPSK



Date: 28 MAR 2015 11:43:03

Highest Channel / 10MHz / 16QAM

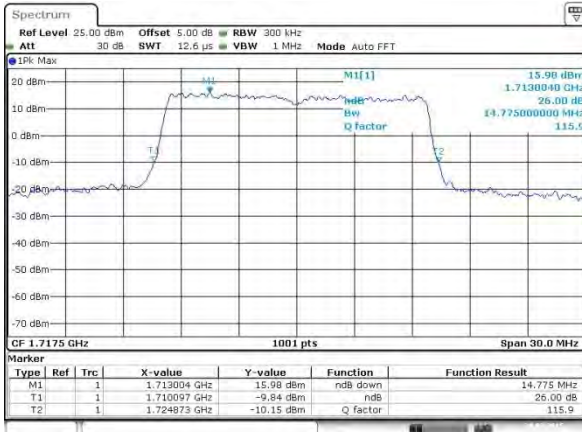


Date: 28 MAR 2015 11:43:15

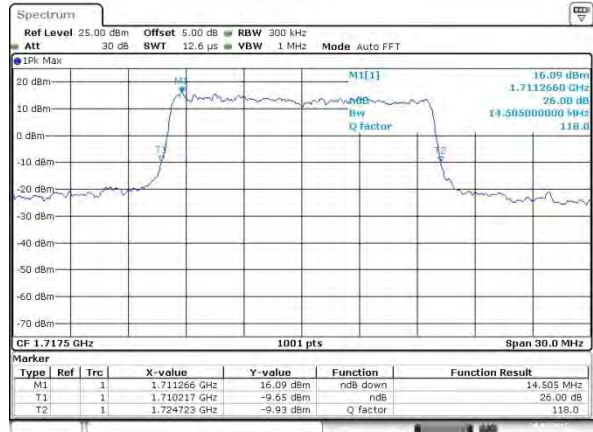


LTE Band 4

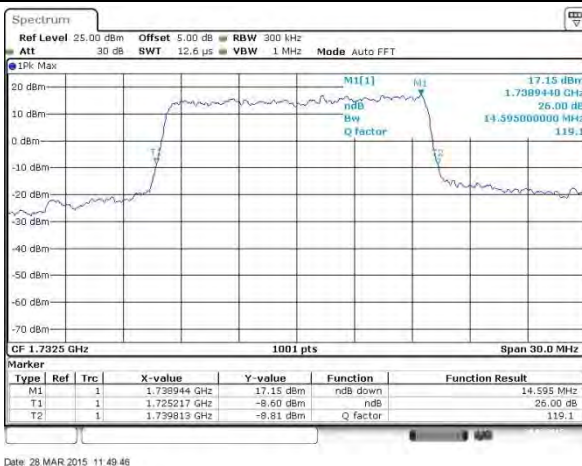
Lowest Channel / 15MHz / QPSK



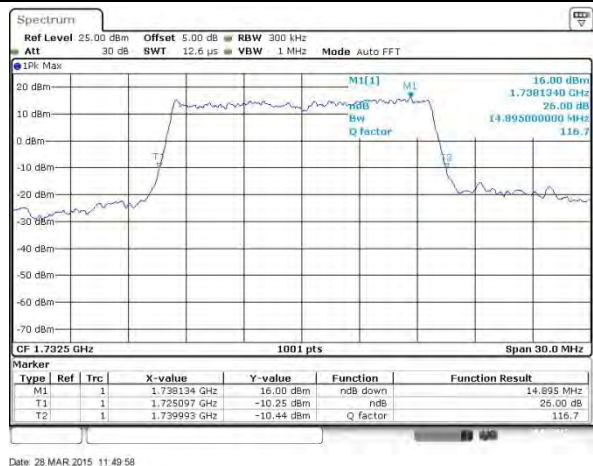
Lowest Channel / 15MHz / 16QAM



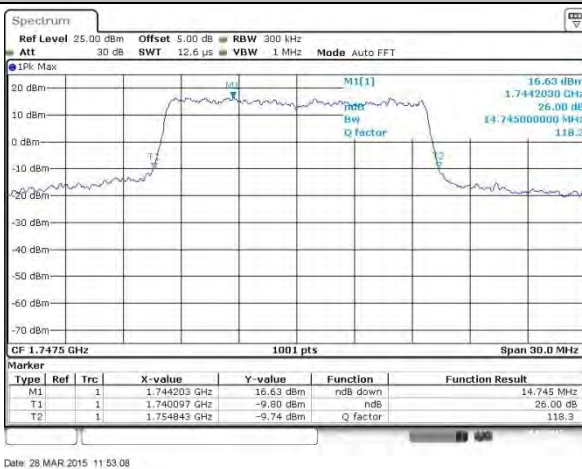
Middle Channel / 15MHz / QPSK



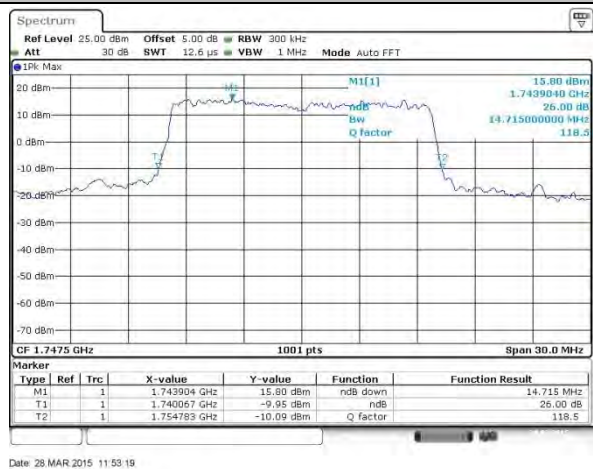
Middle Channel / 15MHz / 16QAM



Highest Channel / 15MHz / QPSK



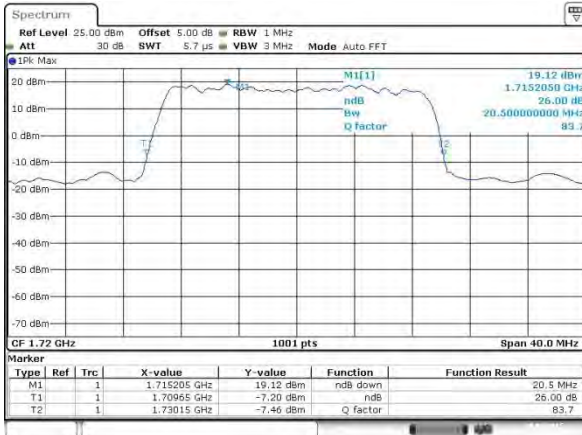
Highest Channel / 15MHz / 16QAM



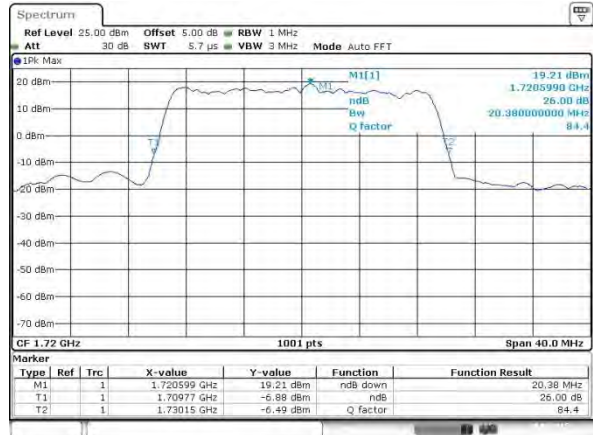


LTE Band 4

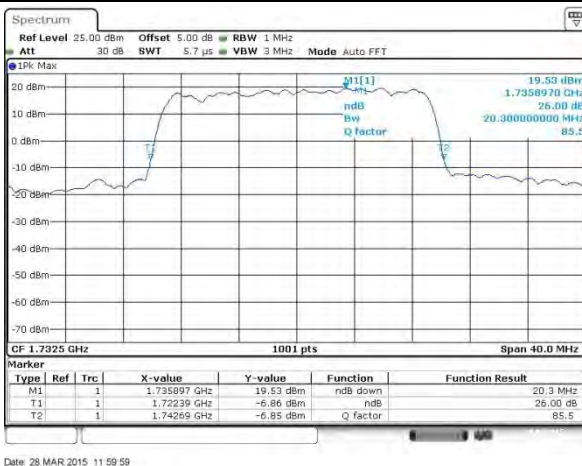
Lowest Channel / 20MHz / QPSK



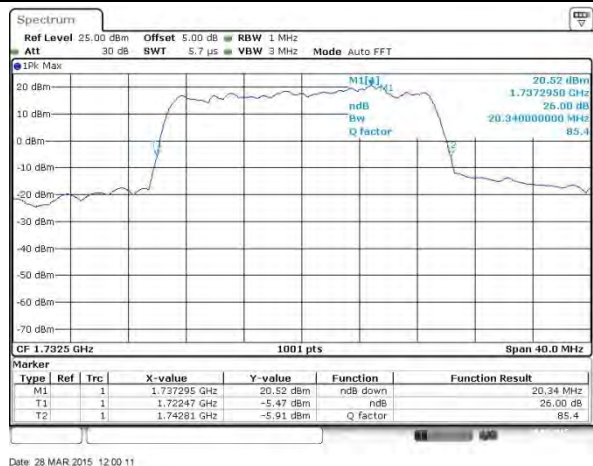
Lowest Channel / 20MHz / 16QAM



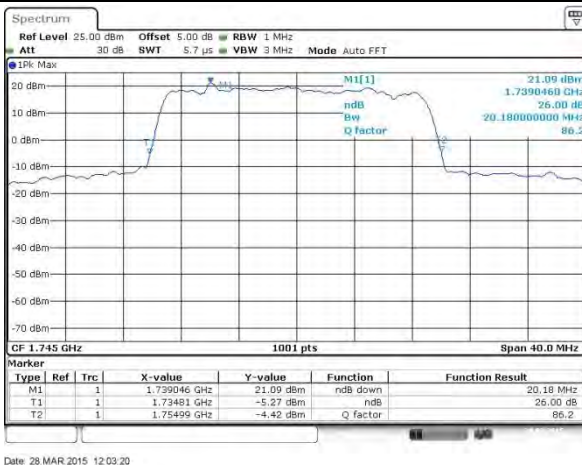
Middle Channel / 20MHz / QPSK



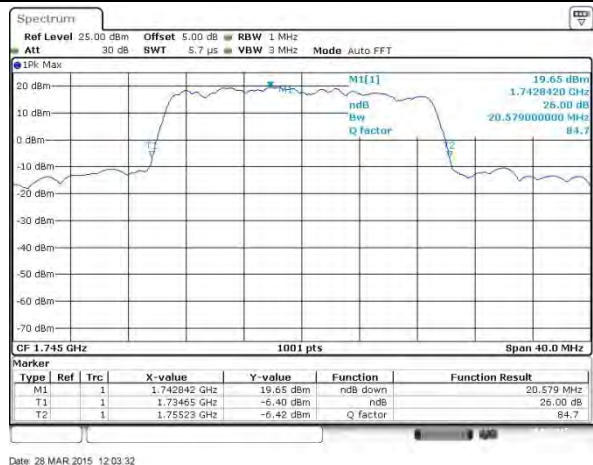
Middle Channel / 20MHz / 16QAM



Highest Channel / 20MHz / QPSK



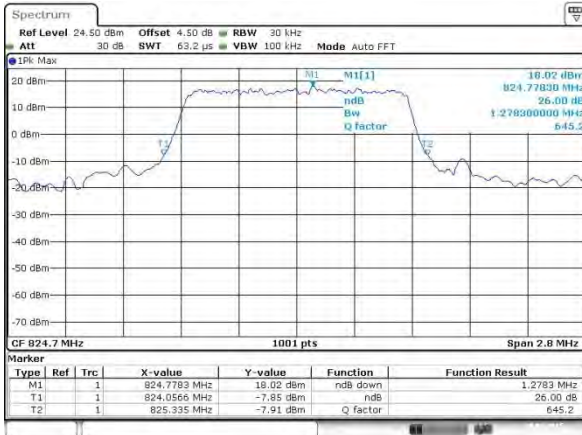
Highest Channel / 20MHz / 16QAM



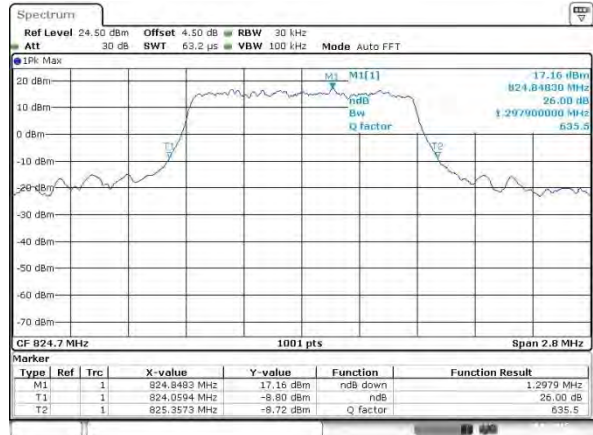


LTE Band 5

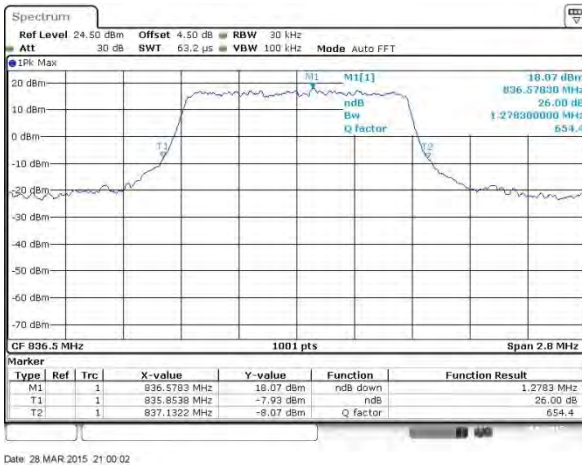
Lowest Channel / 1.4MHz / QPSK



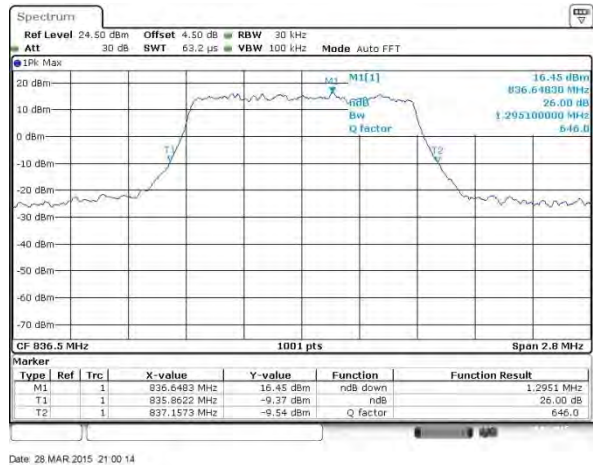
Lowest Channel / 1.4MHz / 16QAM



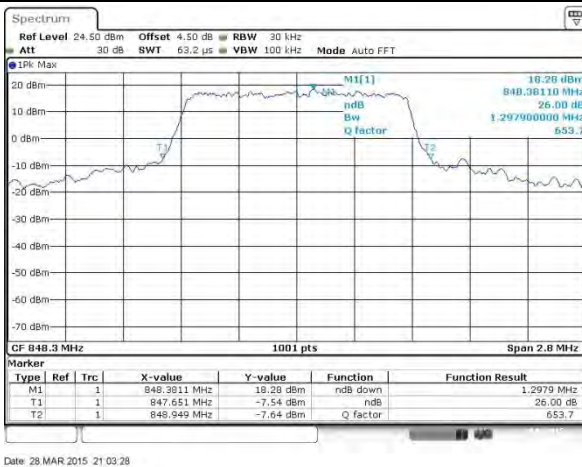
Middle Channel / 1.4MHz / QPSK



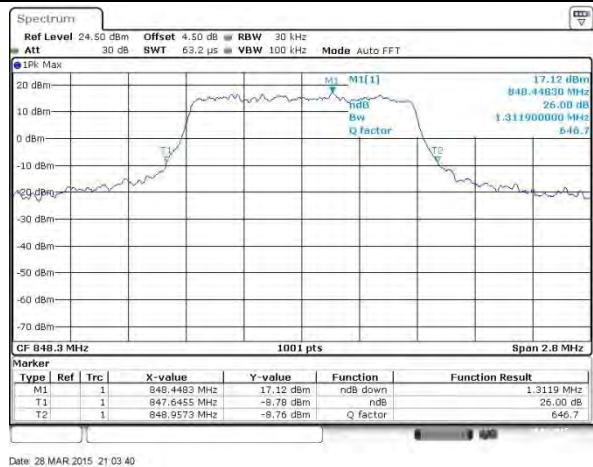
Middle Channel / 1.4MHz / 16QAM



Highest Channel / 1.4MHz / QPSK



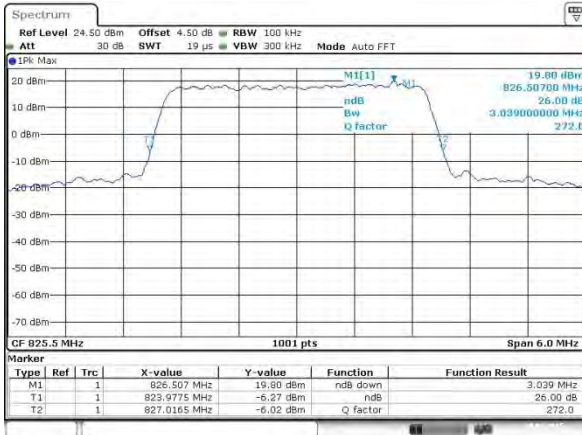
Highest Channel / 1.4MHz / 16QAM





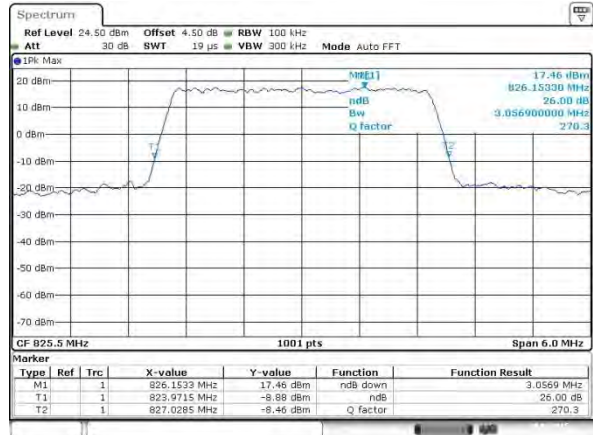
LTE Band 5

Lowest Channel / 3MHz / QPSK



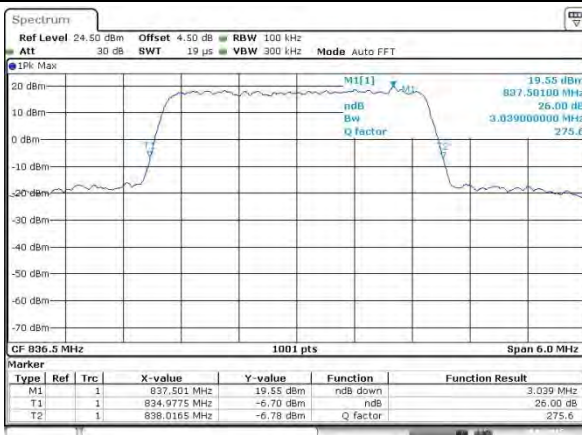
Date: 28 MAR 2015 21:06:51

Lowest Channel / 3MHz / 16QAM



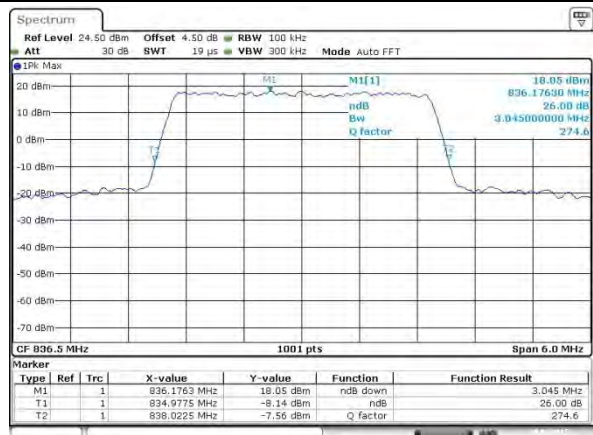
Date: 28 MAR 2015 21:07:03

Middle Channel / 3MHz / QPSK



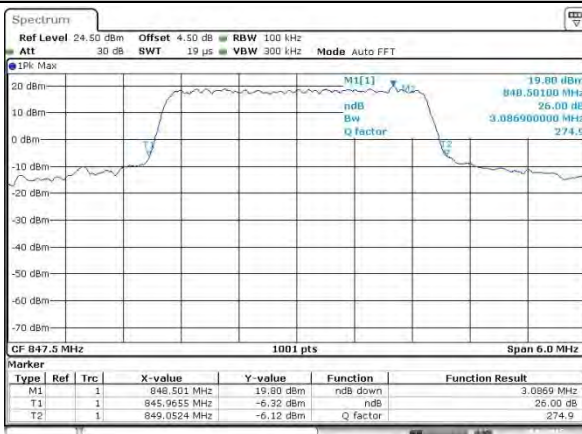
Date: 28 MAR 2015 21:10:15

Middle Channel / 3MHz / 16QAM



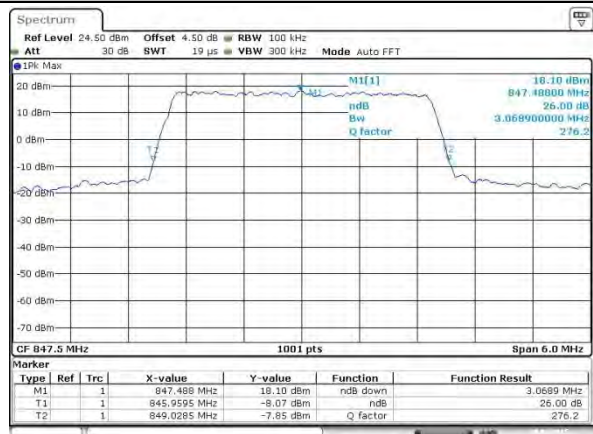
Date: 28 MAR 2015 21:10:27

Highest Channel / 3MHz / QPSK



Date: 28 MAR 2015 21:13:36

Highest Channel / 3MHz / 16QAM

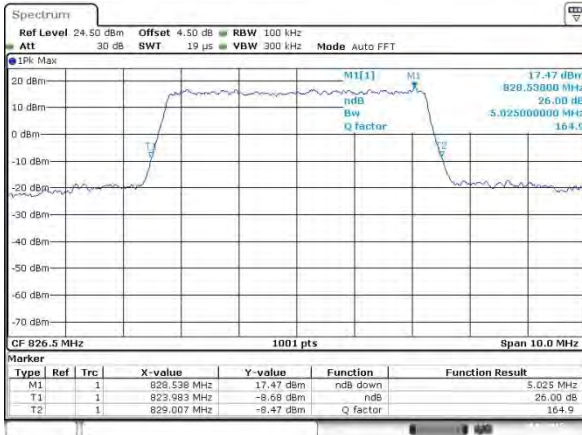


Date: 28 MAR 2015 21:13:48



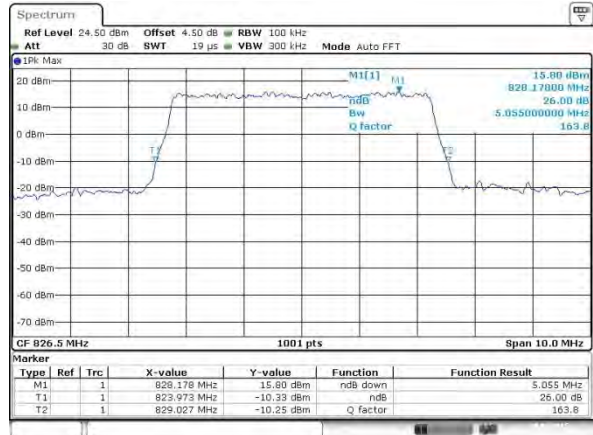
LTE Band 5

Lowest Channel / 5MHz / QPSK



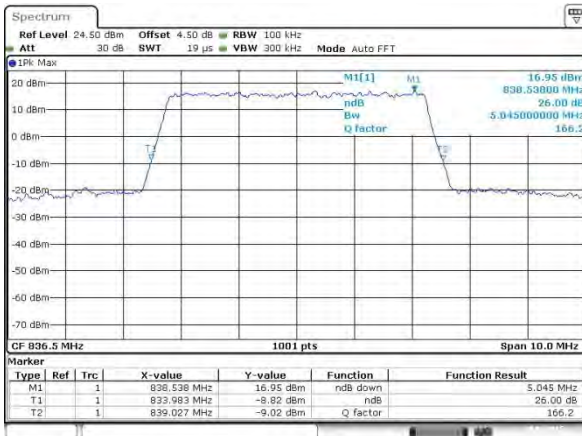
Date: 28 MAR 2015 21:17:02

Lowest Channel / 5MHz / 16QAM



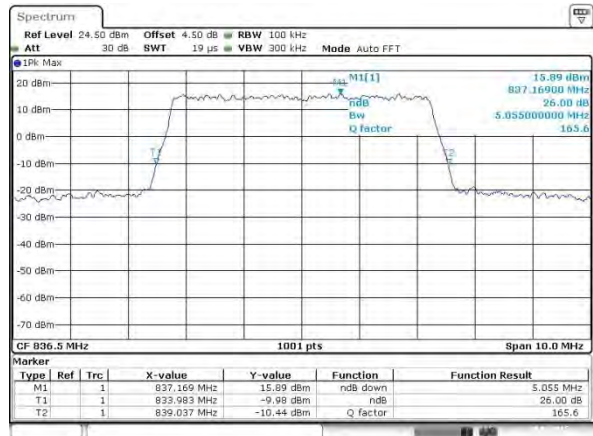
Date: 28 MAR 2015 21:17:14

Middle Channel / 5MHz / QPSK



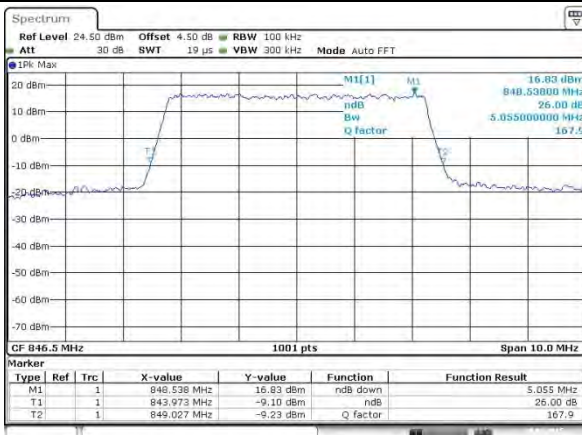
Date: 28 MAR 2015 21:20:25

Middle Channel / 5MHz / 16QAM



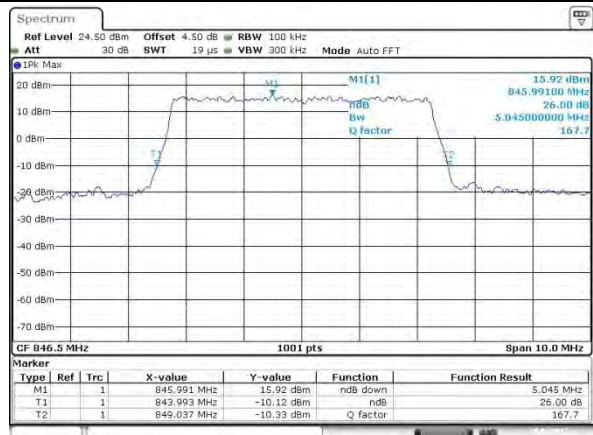
Date: 28 MAR 2015 21:20:37

Highest Channel / 5MHz / QPSK



Date: 28 MAR 2015 21:23:51

Highest Channel / 5MHz / 16QAM

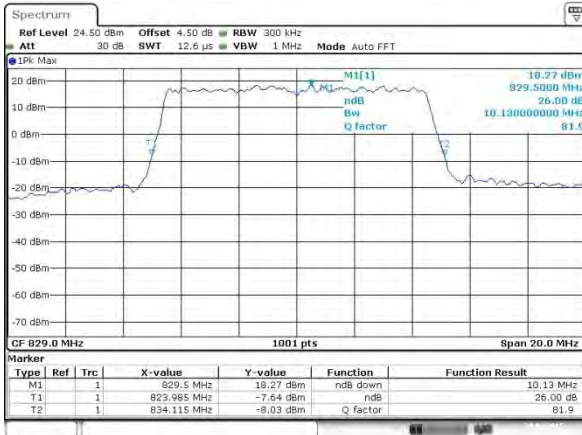


Date: 28 MAR 2015 21:24:03

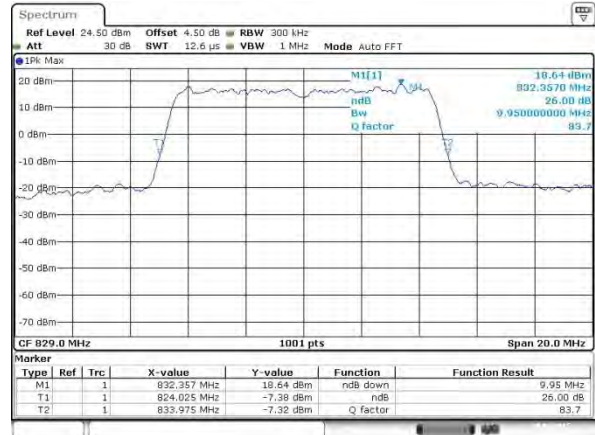


LTE Band 5

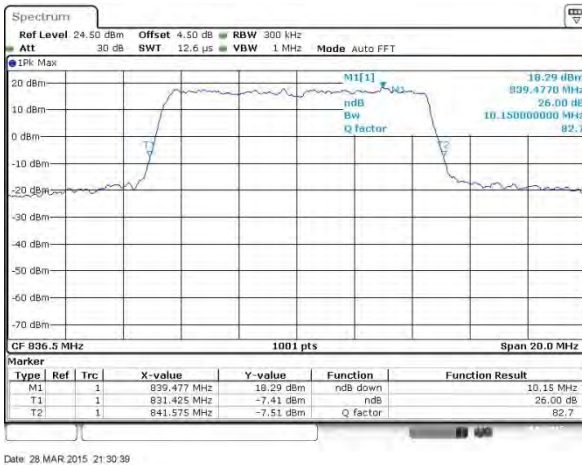
Lowest Channel / 10MHz / QPSK



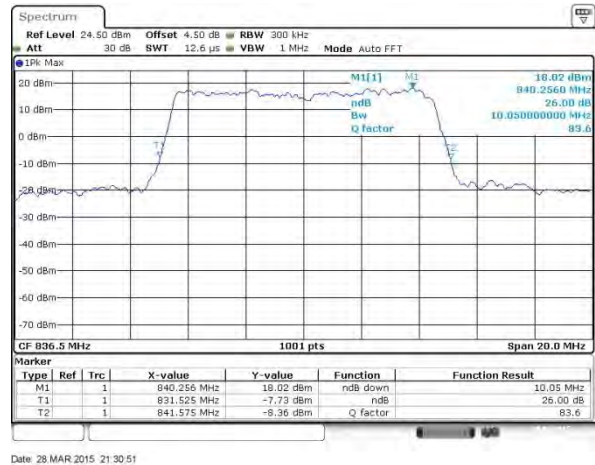
Lowest Channel / 10MHz / 16QAM



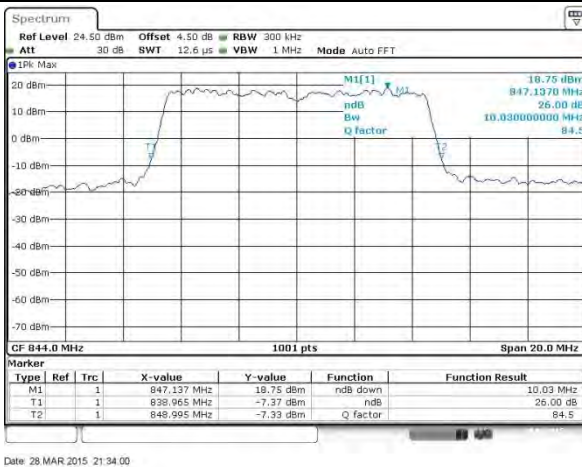
Middle Channel / 10MHz / QPSK



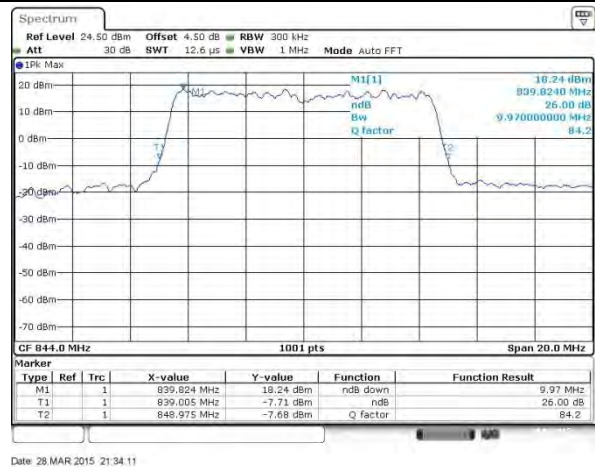
Middle Channel / 10MHz / 16QAM



Highest Channel / 10MHz / QPSK



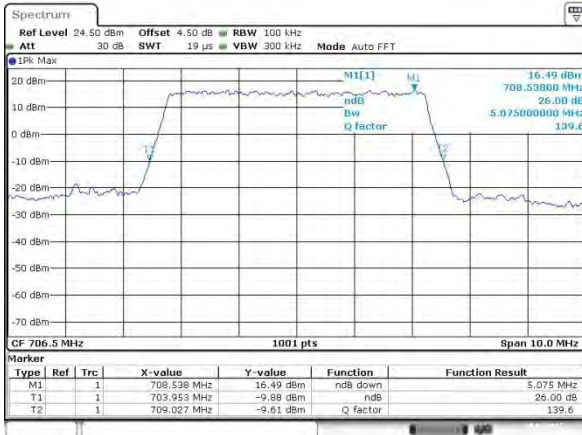
Highest Channel / 10MHz / 16QAM



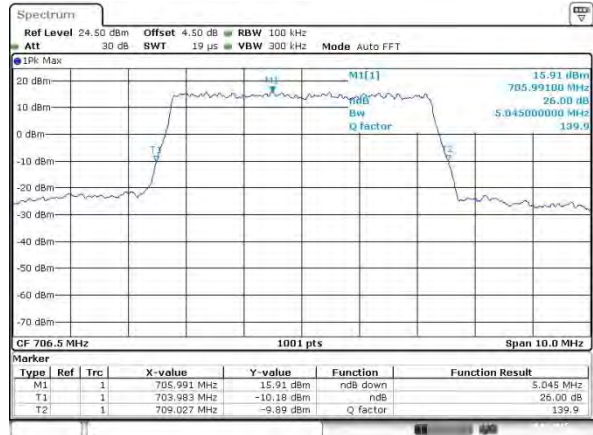


LTE Band 17

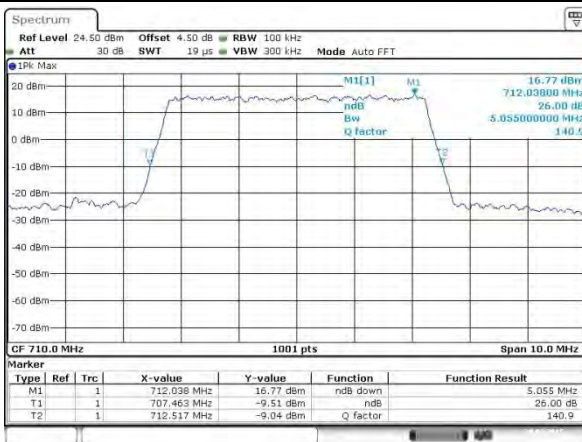
Lowest Channel / 5MHz / QPSK



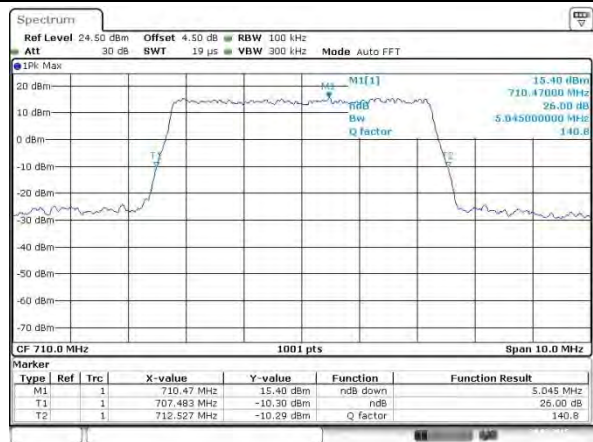
Lowest Channel / 5MHz / 16QAM



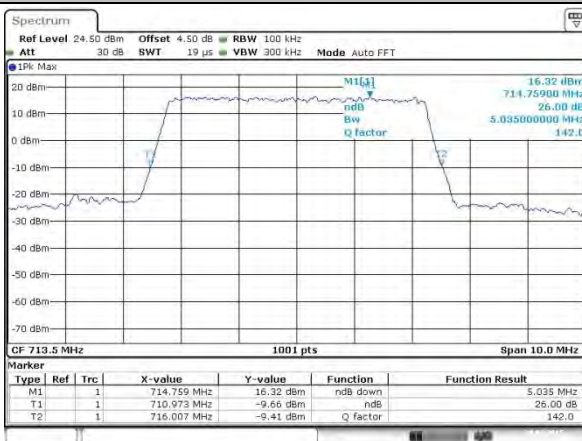
Middle Channel / 5MHz / QPSK



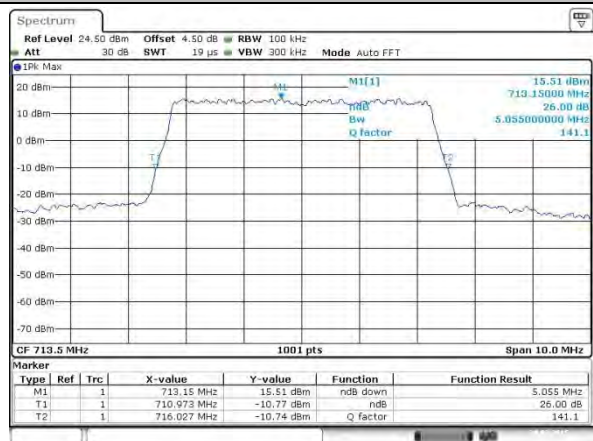
Middle Channel / 5MHz / 16QAM



Highest Channel / 5MHz / QPSK



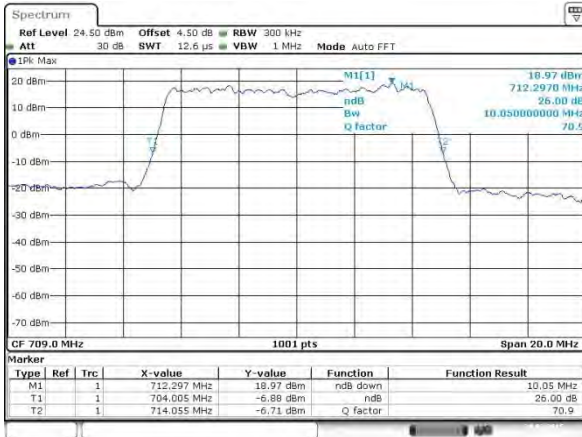
Highest Channel / 5MHz / 16QAM



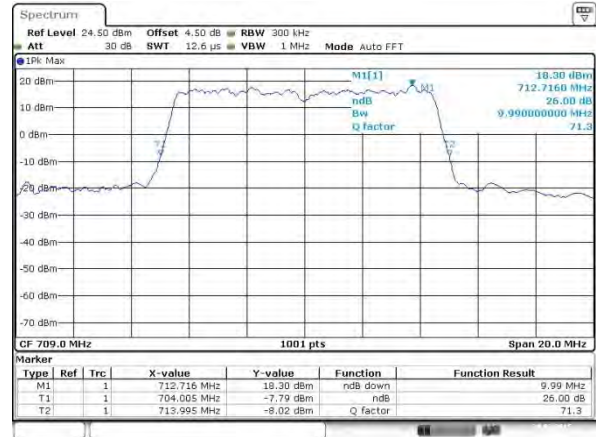


LTE Band 17

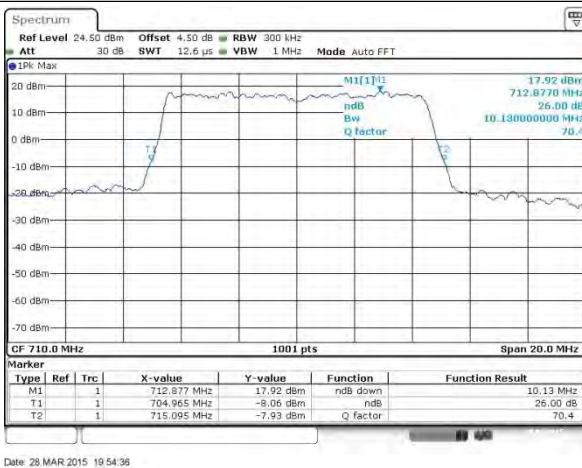
Lowest Channel / 10MHz / QPSK



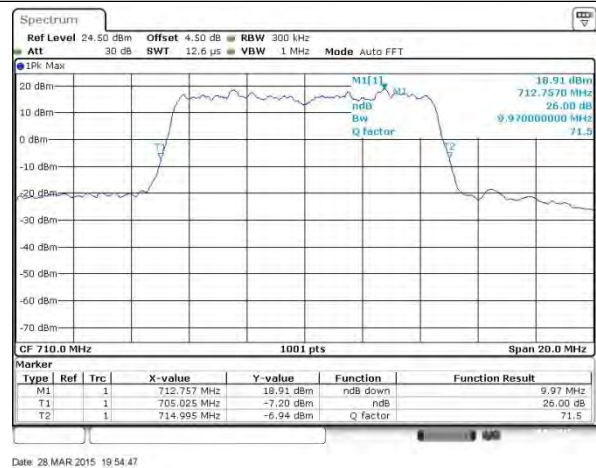
Lowest Channel / 10MHz / 16QAM



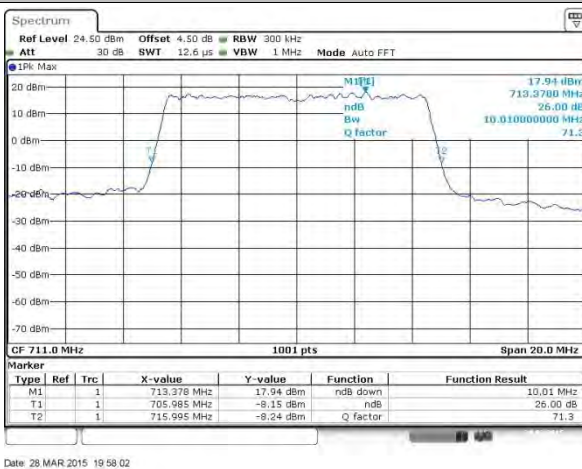
Middle Channel / 10MHz / QPSK



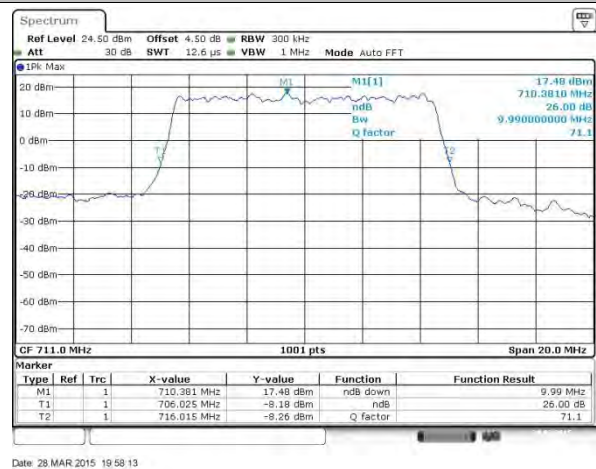
Middle Channel / 10MHz / 16QAM



Highest Channel / 10MHz / QPSK



Highest Channel / 10MHz / 16QAM



**Occupied Bandwidth**

Mode	LTE Band 2 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	1.097	1.097	2.721	2.727	4.505	4.505	9.111	9.051	13.516	13.487	18.382	18.501
Middle CH	1.097	1.097	2.727	2.721	4.505	4.496	9.051	9.031	13.457	13.457	18.422	18.382
Highest CH	1.099	1.105	2.739	2.721	4.505	4.505	9.051	9.031	13.457	13.427	18.422	18.342

Mode	LTE Band 4 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	1.105	1.102	2.745	2.721	4.505	4.505	9.071	9.071	13.457	13.457	18.422	18.501
Middle CH	1.099	1.099	2.733	2.727	4.505	4.496	9.071	9.071	13.487	13.457	18.302	18.462
Highest CH	1.097	1.099	2.733	2.727	4.505	4.505	9.091	9.031	13.487	13.516	18.302	18.342

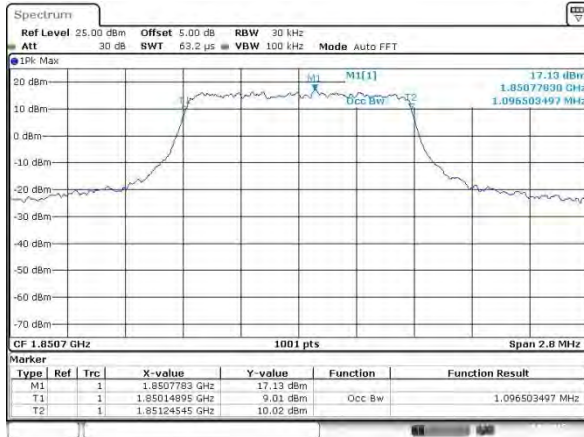
Mode	LTE Band 5 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	1.097	1.099	2.727	2.727	4.515	4.496	9.051	9.051	-	-	-	-
Middle CH	1.094	1.097	2.727	2.721	4.496	4.496	9.071	9.031	-	-	-	-
Highest CH	1.102	1.099	2.739	2.739	4.505	4.505	9.071	9.051	-	-	-	-

Mode	LTE Band 17 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM	QPSK	16QAM
Lowest CH	-	-	-	-	4.496	4.505	9.071	9.051	-	-	-	-
Middle CH	-	-	-	-	4.496	4.496	9.071	9.051	-	-	-	-
Highest CH	-	-	-	-	4.486	4.486	9.031	9.031	-	-	-	-

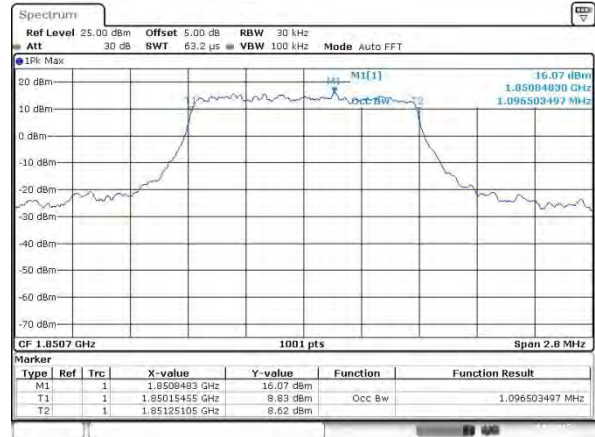


LTE Band 2

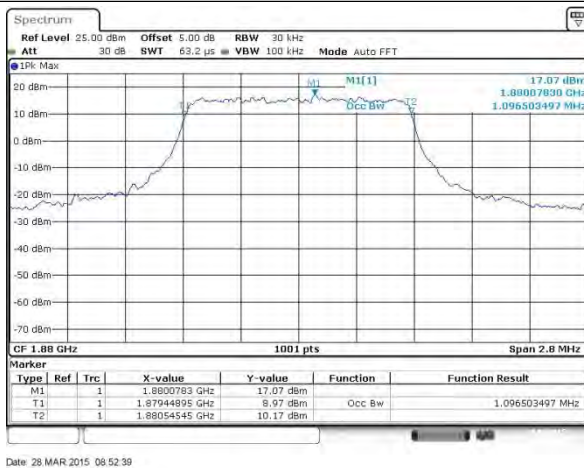
Lowest Channel / 1.4MHz / QPSK



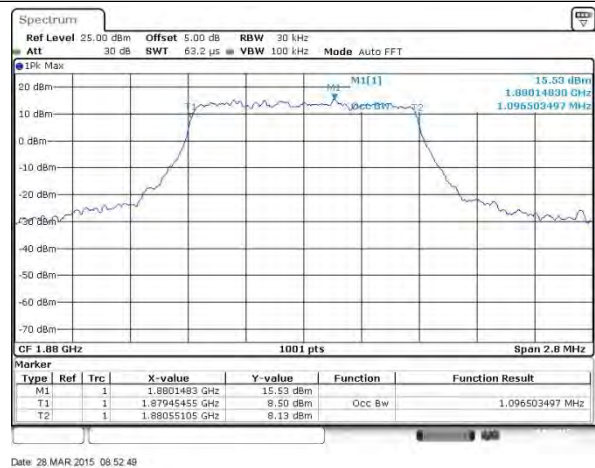
Lowest Channel / 1.4MHz / 16QAM



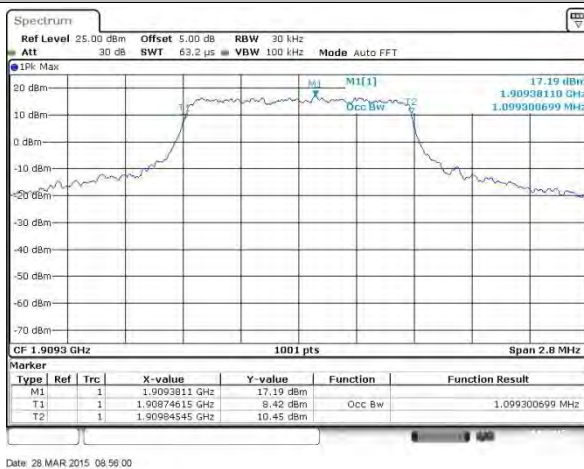
Middle Channel / 1.4MHz / QPSK



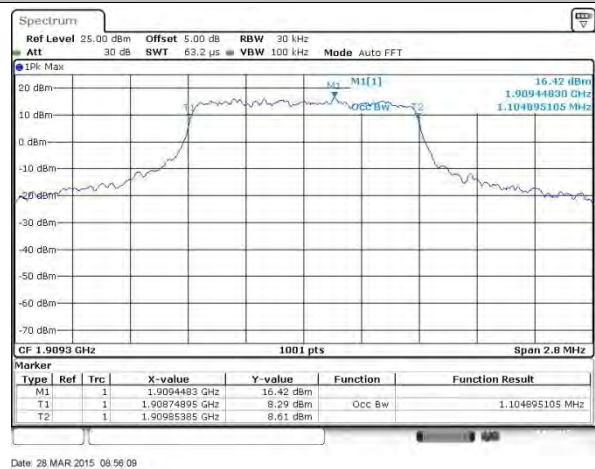
Middle Channel / 1.4MHz / 16QAM



Highest Channel / 1.4MHz / QPSK



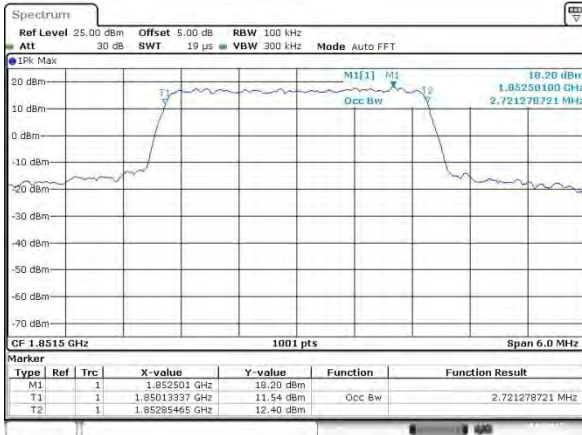
Highest Channel / 1.4MHz / 16QAM



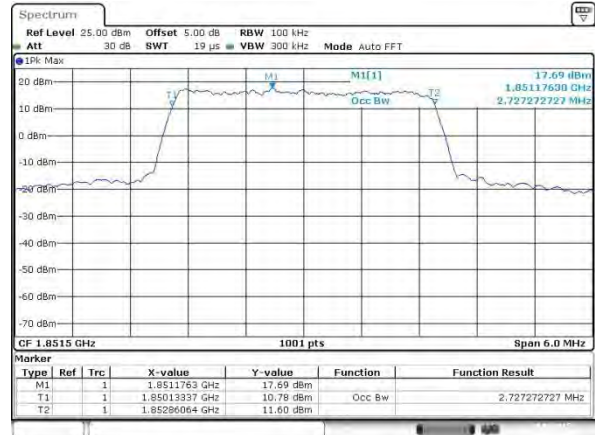


LTE Band 2

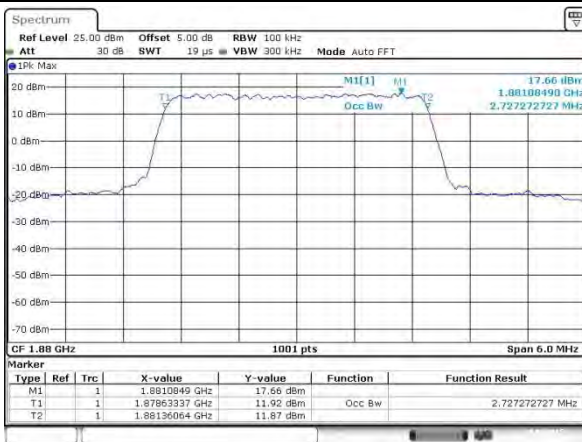
Lowest Channel / 3MHz / QPSK



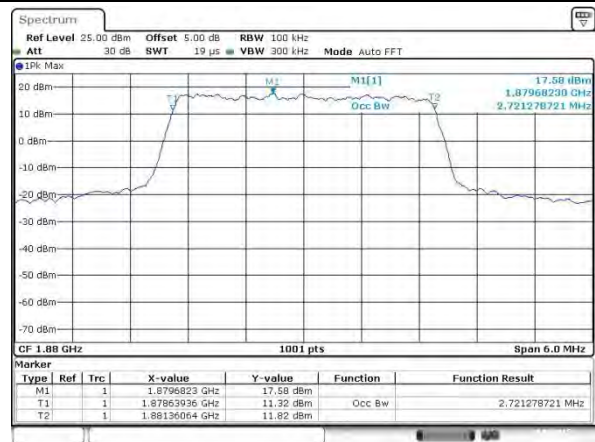
Lowest Channel / 3MHz / 16QAM



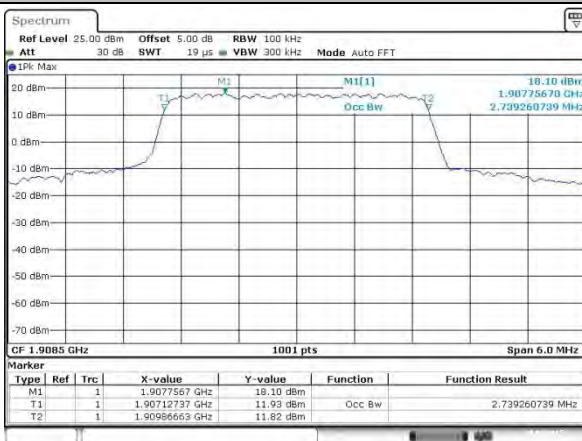
Middle Channel / 3MHz / QPSK



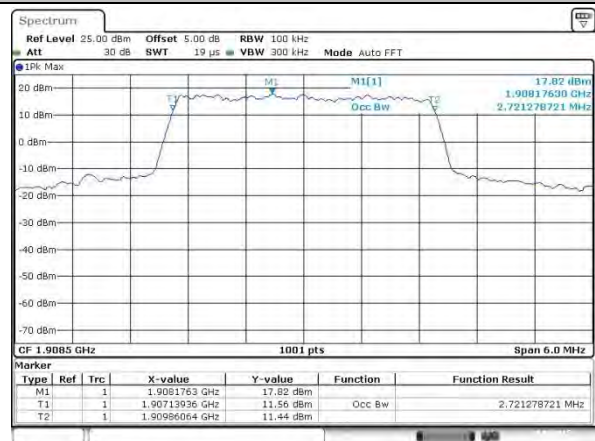
Middle Channel / 3MHz / 16QAM



Highest Channel / 3MHz / QPSK



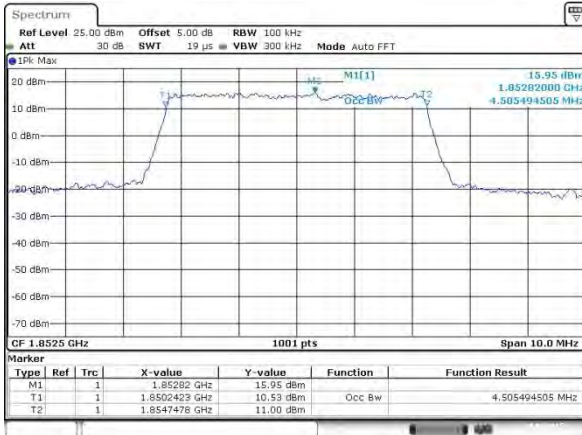
Highest Channel / 3MHz / 16QAM



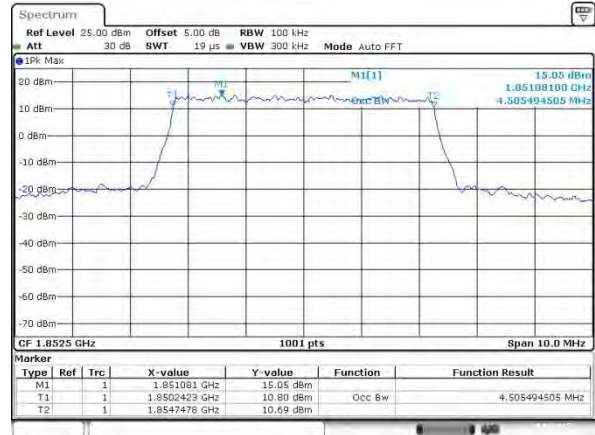


LTE Band 2

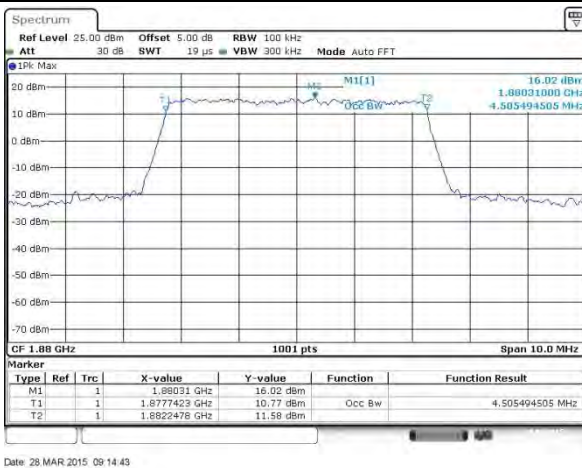
Lowest Channel / 5MHz / QPSK



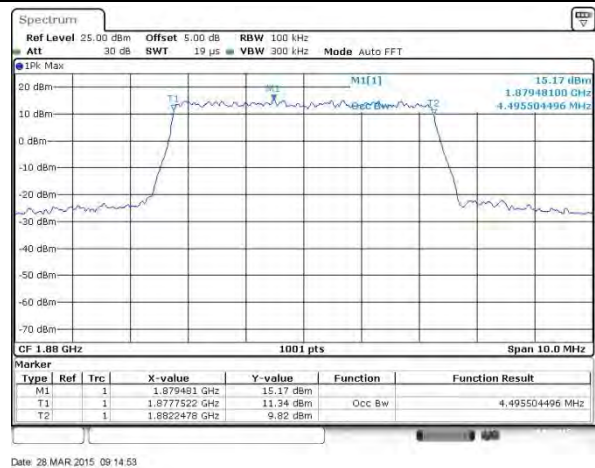
Lowest Channel / 5MHz / 16QAM



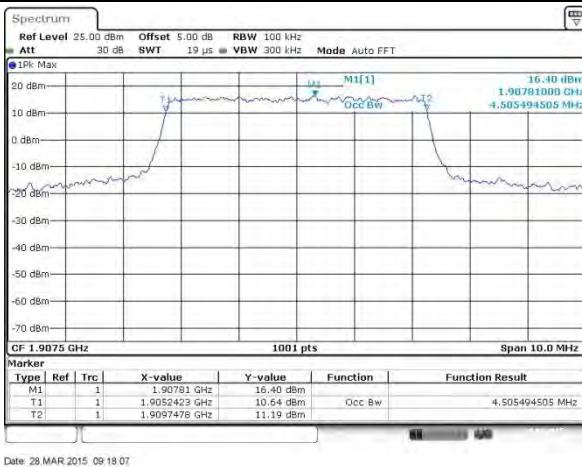
Middle Channel / 5MHz / QPSK



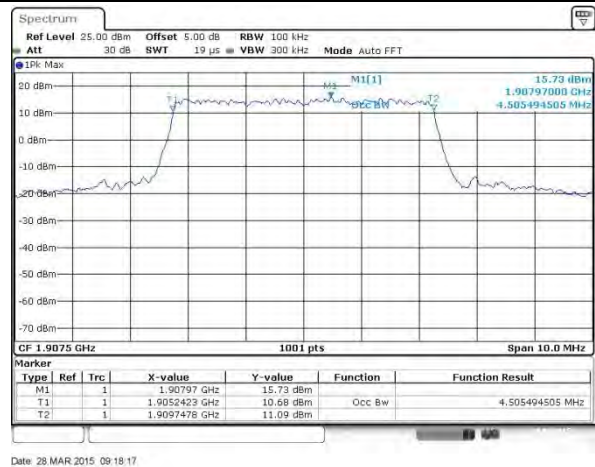
Middle Channel / 5MHz / 16QAM



Highest Channel / 5MHz / QPSK



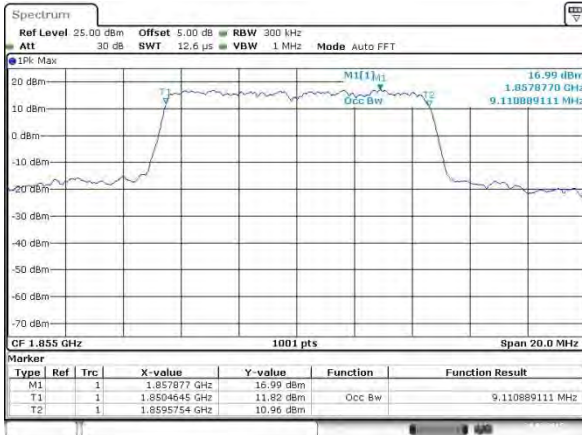
Highest Channel / 5MHz / 16QAM



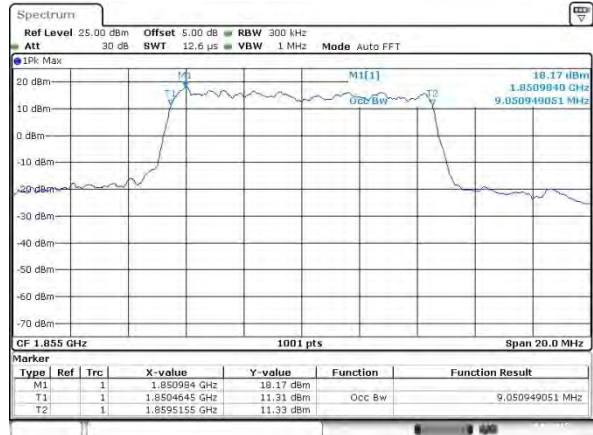


LTE Band 2

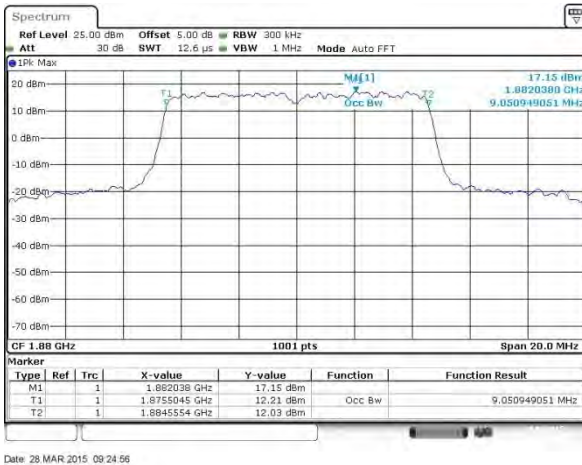
Lowest Channel / 10MHz / QPSK



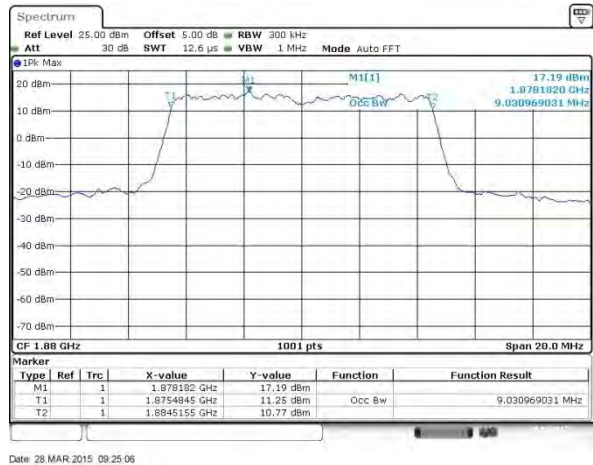
Lowest Channel / 10MHz / 16QAM



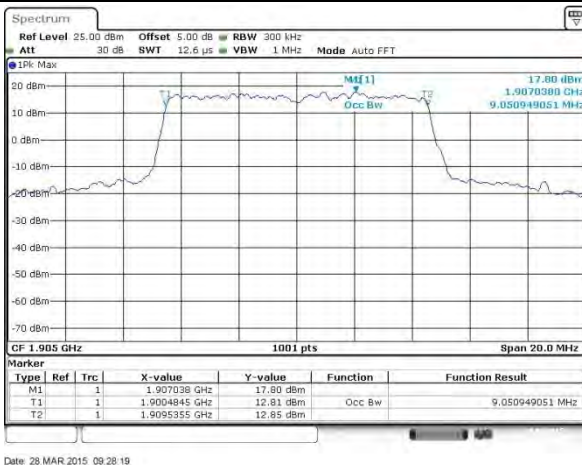
Middle Channel / 10MHz / QPSK



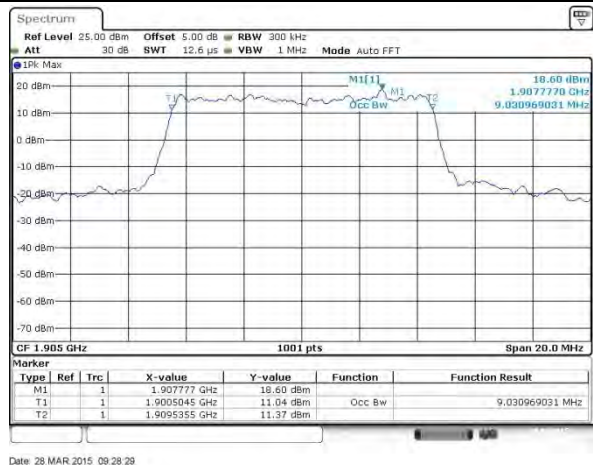
Middle Channel / 10MHz / 16QAM



Highest Channel / 10MHz / QPSK



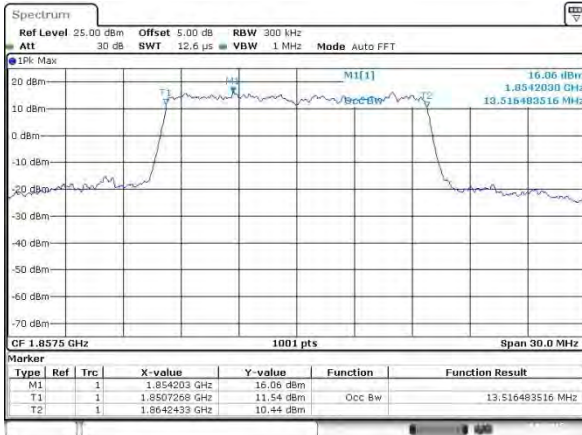
Highest Channel / 10MHz / 16QAM



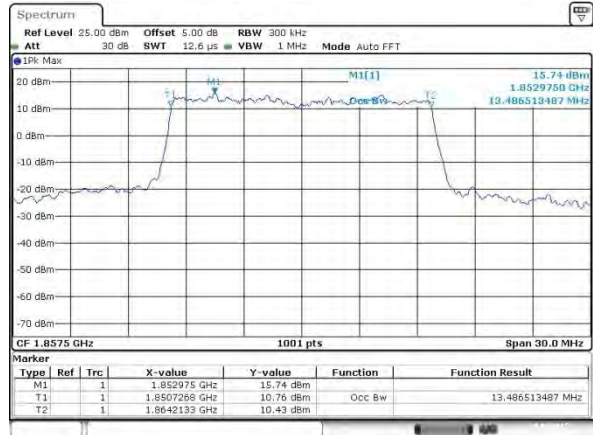


LTE Band 2

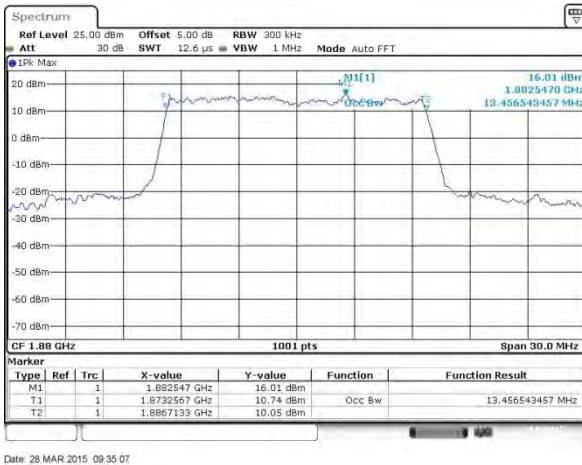
Lowest Channel / 15MHz / QPSK



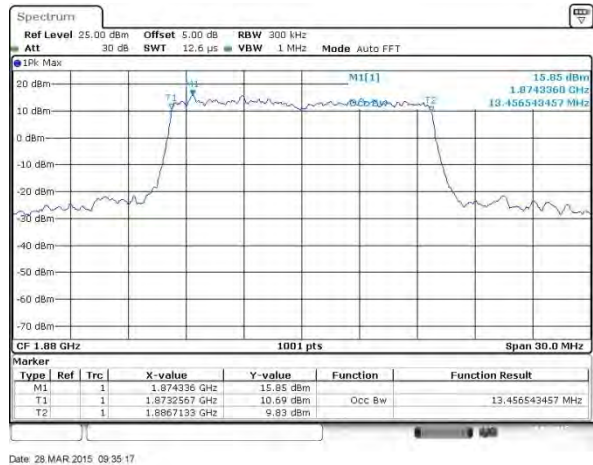
Lowest Channel / 15MHz / 16QAM



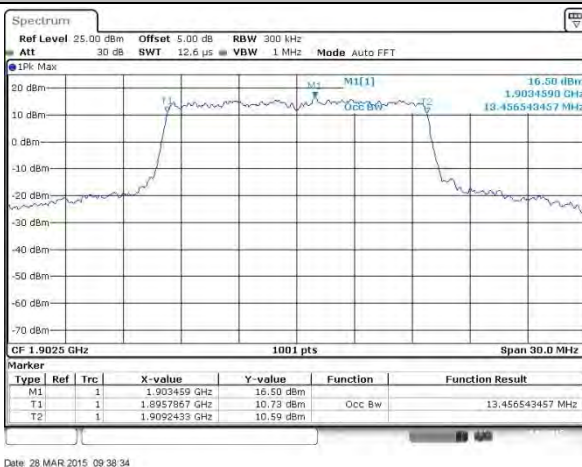
Middle Channel / 15MHz / QPSK



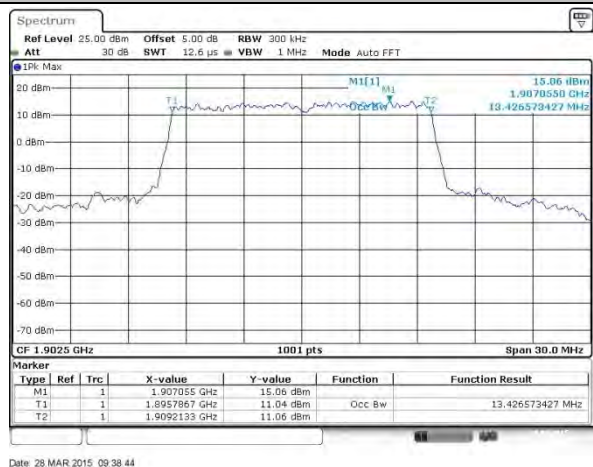
Middle Channel / 15MHz / 16QAM



Highest Channel / 15MHz / QPSK



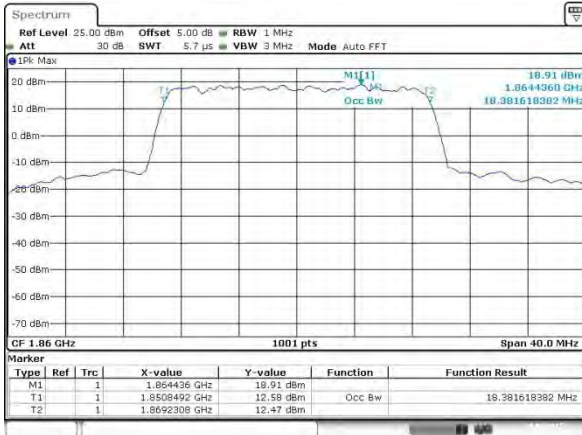
Highest Channel / 15MHz / 16QAM





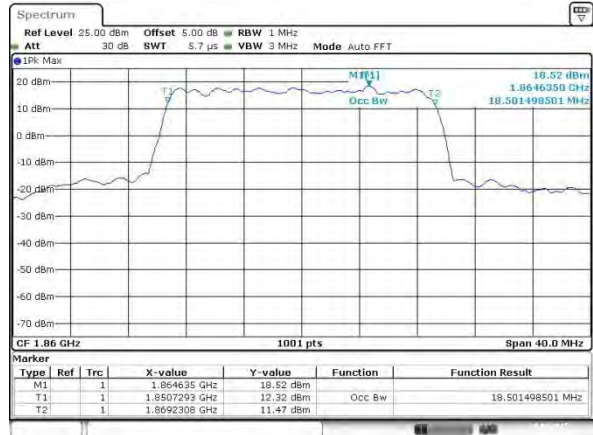
LTE Band 2

Lowest Channel / 20MHz / QPSK



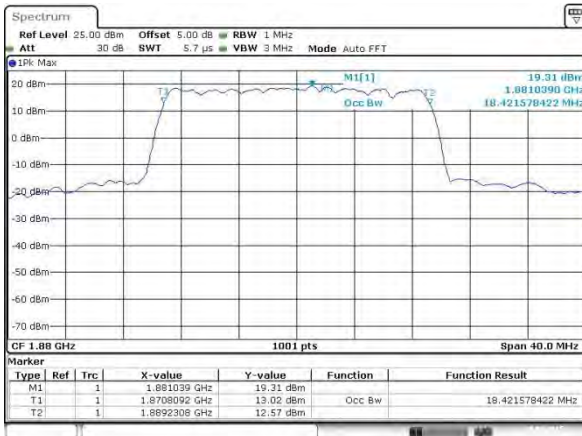
Date: 28 MAR 2015 09:42:01

Lowest Channel / 20MHz / 16QAM



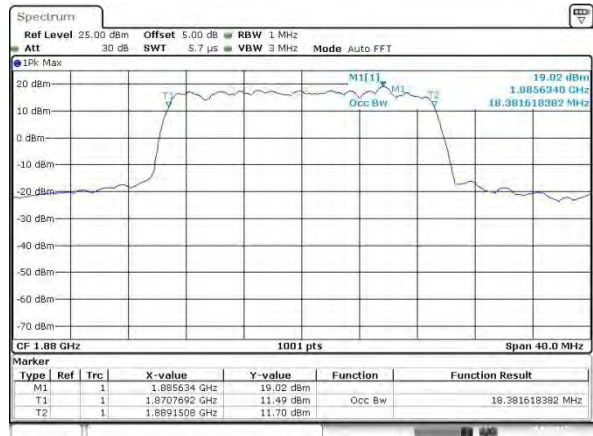
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Middle Channel / 20MHz / QPSK



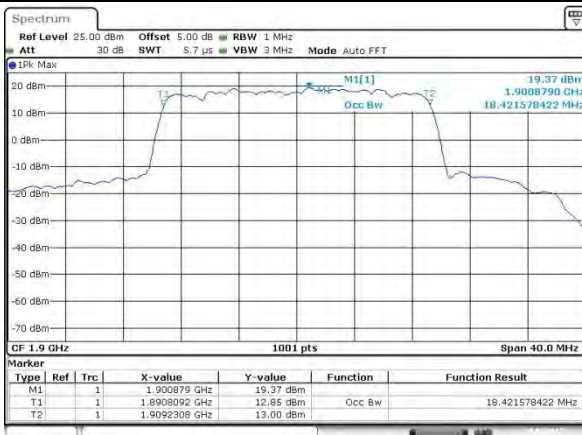
Date: 28 MAR 2015 09:45:24

Middle Channel / 20MHz / 16QAM



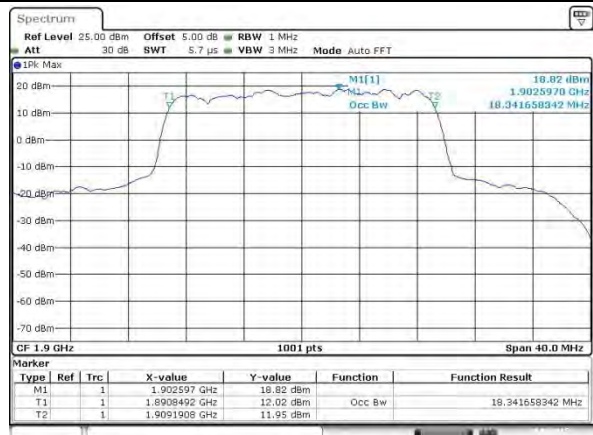
Date: 28 MAR 2015 09:45:34

Highest Channel / 20MHz / QPSK



Date: 28 MAR 2015 09:48:51

Highest Channel / 20MHz / 16QAM



Date: 28 MAR 2015 09:49:01