



FCC RF Test Report

APPLICANT : Motorola Mobility LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola
MODEL NAME : XT2093-1, XT2093-7
FCC ID : IHDT56ZD3
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 Aug. 07, 2020 and completely tested on Sep. 15, 2020. We, Sporton International (Kunshan) 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 (Kunshan) Inc., the test report shall not be reproduced except in full.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG080709-01B	Rev. 01	Initial issue of report	Sep. 24, 2020

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.4	§2.1046	Conducted Output Power	Reporting Only	PASS	-
	§22.913(a)(5)	Effective Radiated Power (Band 5)	ERP < 7 Watt	PASS	-
	§24.232(c)	Equivalent Isotropic Radiated Power (Band 2)	EIRP < 2Watt	PASS	-
3.5	§24.232(d)	Peak-to-Average Ratio	<13 dB	PASS	-
3.6	§2.1049	Occupied Bandwidth	Reporting Only	PASS	-
3.7	§2.1051 §22.917(a) §24.238(a)	Conducted Band Edge Measurement (Band 2) (Band 5)	< 43+10log ₁₀ (P[Watts])	PASS	-
3.8	§2.1051 §22.917(a) §24.238(a)	Conducted Spurious Emission (Band 2) (Band 5)	< 43+10log ₁₀ (P[Watts])	PASS	-
3.9	§2.1055 §22.355	Frequency Stability Temperature & Voltage	< 2.5 ppm for Part 22H	PASS	-
	§2.1055 §24.235		Within Authorized Band		
4.4	§2.1053 §22.917(a) §24.238(a)	Radiated Spurious Emission (Band 2) (Band 5)	< 43+10log ₁₀ (P[Watts])	PASS	Under limit 38.01 dB at 7488.000 MHz

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.



1 General Description

1.1 Applicant

Motorola Mobility LLC

222 W,Merchandise Mart Plaza,Chicago,IL60654 USA

1.2 Manufacturer

Motorola Mobility LLC

222 W,Merchandise Mart Plaza,Chicago,IL60654 USA

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT2093-1, XT2093-7
FCC ID	IHDT56ZD3
EUT supports Radios application	GSM/WCDMA/LTE WLAN 2.4GHz 802.11b/g/n HT20 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE FM Receiver and GNSS
IMEI Code	Conducted: 004401230050086 Radiation: 356891110021609
HW Version	DVT2
SW Version	QZA30.32
EUT Stage	Identical Prototype

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
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 12 : 699.7 MHz ~ 715.3 MHz LTE Band 66 : 1710.7 MHz ~ 1779.3 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 12 : 729.7 MHz ~ 745.3 MHz LTE Band 66 : 2110.7 MHz ~ 2199.3 MHz
Bandwidth	LTE Band 2 : 1.4MHz / 3MHz / 5MHz / 10MHz / 15MHz / 20MHz LTE Band 5 : 1.4MHz / 3MHz / 5MHz / 10MHz
Maximum Output Power to Antenna	LTE Band 2 : 23.27 dBm LTE Band 5 : 23.24 dBm
Antenna Gain	LTE Band 2 : 0.4 dBi LTE Band 5 : -2.5 dBi
Type of Modulation	QPSK / 16QAM / 64QAM

1.5 Modification of EUT

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

1.6 Specification of Accessory

Specification of Accessory				
AC Adapter 1	Brand Name	Motorola (Salcomp)	Model Name	MC-101
AC Adapter 2	Brand Name	Motorola (Chenyang)	Model Name	MC-101
Battery	Brand Name	Motorola (ATL)	Model Name	JK50
USB Cable 1	Brand Name	Motorola (saibao)	Model Name	SC18C24367
USB Cable 2	Brand Name	Motorola (BSC)	Model Name	SC18C24368
Earphone 1	Brand Name	Motorola (NEW LEADER)	Model Name	NLD-EM301K-06SF



1.7 Re-use of Measured Data

1.7.1 Introduction Section

This application re-uses data collected on a similar device. The subject device of this application (Model: XT2093-1, XT2093-7, FCC ID: IHDT56ZD3) is electrically identical to the reference device (Model: XT2093-3, XT2093DL, XT2093-4, XT2093-2, XT2093-2PP, FCC ID: IHDT56ZD4) for the portions of the circuitry corresponding to the data being re-used, as treated by KDB Publication 484596 D01.

1.7.2 Difference Section

For details concerning the similarity with respect to component placement, mechanical/electrical design etc., please refer to the Product Equality Declaration.

The re-used RF data includes the following bands provided in Appendix D (Sporton RF Report No. FG080709-01B and FG080709-01C for the reference device Model: XT2093-3, XT2093DL, XT2093-4, XT2093-2, XT2093-2PP, FCC ID: IHDT56ZD4).

1.7.3 Reference detail Section:

Equipment Class	Reference FCC ID	Folder Test	Report Title/Section
PCE	IHDT56ZD4	FG080709-01B and FG080709-01C	All sections applicable for LTE Band 4/12/66

1.7.4 Spot Check Verification Data Section

In order to confirm hardware similarity of the subject device with the reference device, spot check measurements were performed on the subject device for the following test items, the test result were consistent with FCC ID: IHDT56ZD4 and LTE Band 2/5 to re-test.

Assertions concerning the similarity of these devices are based on representations by the applicant. The applicant accepts full responsibility for the validity of the similarity claim, and for the determination that verification test data are sufficient to support it.

Test Item	Mode	IHDT56ZD4 Worst Result	IHDT56ZD3 Worst Result	Difference (dB)
Radiated Spurious Emission (dBm)	LTE Band 12	-64.25	-63.59	0.66
	LTE Band 66	-51.59	-52.68	1.09



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

LTE Band 2		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	1850.7 ~ 1909.3	1M09G7D	-	0.2317	1M10W7D	-	0.2070
3	1851.5 ~ 1908.5	2M73G7D	-	0.2312	2M73W7D	-	0.1901
5	1852.5 ~ 1907.5	4M49G7D	-	0.2307	4M51W7D	-	0.1919
10	1855.0 ~ 1905.0	9M05G7D	0.0017	0.2323	9M05W7D	-	0.2046
15	1857.5 ~ 1902.5	13M5G7D	-	0.2323	13M5W7D	-	0.1954
20	1860.0 ~ 1900.0	18M5G7D	-	0.2328	18M5W7D	-	0.1897
LTE Band 2		64QAM					
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)		Frequency Tolerance (ppm)		Maximum EIRP(W)	
1.4	1850.7 ~ 1909.3	1M09W7D		-		0.1476	
3	1851.5 ~ 1908.5	2M74W7D		-		0.1476	
5	1852.5 ~ 1907.5	4M50W7D		-		0.1603	
10	1855.0 ~ 1905.0	9M07W7D		-		0.1589	
15	1857.5 ~ 1902.5	13M5W7D		-		0.1578	
20	1860.0 ~ 1900.0	18M4W7D		-		0.1545	
LTE Band 5		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	824.7 ~ 848.3	1M10G7D	-	0.0721	1M10W7D	-	0.0650
3	825.5 ~ 847.5	2M73G7D	-	0.0719	2M73W7D	-	0.0664
5	826.5 ~ 846.5	4M51G7D	-	0.0719	4M49W7D	-	0.0638
10	829.0 ~ 844.0	9M09G7D	0.0067	0.0723	9M03W7D	-	0.0646
LTE Band 5		64QAM					
BW (MHz)	Frequency Range (MHz)	Emission Designator (99%OBW)		Frequency Tolerance (ppm)		Maximum ERP(W)	
1.4	824.7 ~ 848.3	1M09W7D		-		0.0479	
3	825.5 ~ 847.5	2M73W7D		-		0.0484	
5	826.5 ~ 846.5	4M53W7D		-		0.0488	
10	829.0 ~ 844.0	9M01W7D		-		0.0512	

1.9 Testing Location

Sporton International (Kunshan) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International (Kunshan) Inc.		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH04-KS TH01-KS	CN1257	314309

1.10 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH04-KS	AUDIX	E3	6.2009-8-24a

1.11 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 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

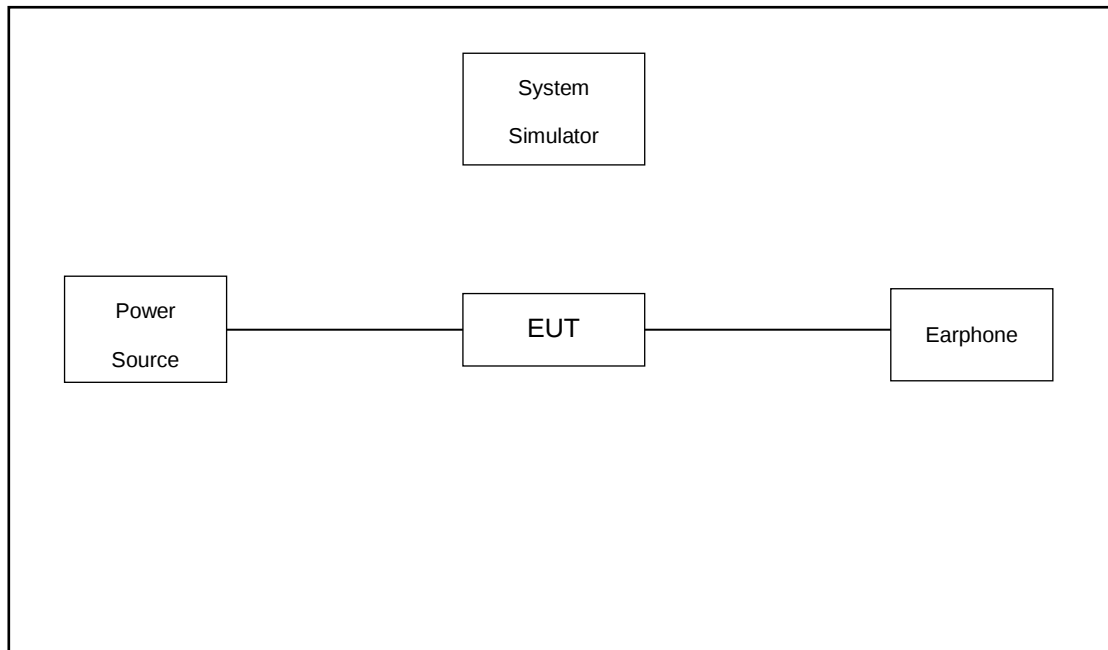
2.1 Test Mode

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	2	v	v	v	v	v	v	v	v	v	v	v	v	v	v	v
	5	v	v	v	v	-	-	v	v	v	v	v	v	v	v	v
Peak-to-Average Ratio	2						v	v	v	v	v		v	v	v	v
	5				v	-	-	v	v	v	v		v	v	v	v
26dB and 99% Bandwidth	2	v	v	v	v	v	v	v	v	v			v	v	v	v
	5	v	v	v	v	-	-	v	v	v			v	v	v	v
Conducted Band Edge	2	v	v	v	v	v	v	v	v	v	v		v	v		v
	5	v	v	v	v	-	-	v	v	v	v		v	v		v
Conducted Spurious Emission	2	v	v	v	v	v	v	v	v	v	v			v	v	v
	5	v	v	v	v	-	-	v	v	v	v			v	v	v
Frequency Stability	2				v			v					v		v	
	5				v	-	-	v					v		v	
E.R.P / E.I.R.P	2	v	v	v	v	v	v	v	v	v	v			v	v	v
	5	v	v	v	v	-	-	v	v	v	v			v	v	v
Radiated Spurious Emission	2	Worst Case													v	
	5	Worst Case													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.	Power Supply	GWINSTEK	PSS-2002	N/A	N/A	Unshielded, 1.8 m
2.	LTE Base Station	Anritsu	MT8820C	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 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 5.6 dB.

Example :

$$\begin{aligned}
 \text{Offset(dB)} &= \text{RF cable loss(dB)}. \\
 &= 5.6 \text{ (dB)}
 \end{aligned}$$



2.5 Frequency List of Low/Middle/High Channels

LTE Band 2 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
20	Channel	18700	18900	19100
	Frequency	1860	1880	1900
15	Channel	18675	18900	19125
	Frequency	1857.5	1880	1902.5
10	Channel	18650	18900	19150
	Frequency	1855	1880	1905
5	Channel	18625	18900	19175
	Frequency	1852.5	1880	1907.5
3	Channel	18615	18900	19185
	Frequency	1851.5	1880	1908.5
1.4	Channel	18607	18900	19193
	Frequency	1850.7	1880	1909.3

LTE Band 5 Channel and Frequency List				
BW [MHz]	Channel/Frequency(MHz)	Lowest	Middle	Highest
10	Channel	20450	20525	20600
	Frequency	829	836.5	844
5	Channel	20425	20525	20625
	Frequency	826.5	836.5	846.5
3	Channel	20415	20525	20635
	Frequency	825.5	836.5	847.5
1.4	Channel	20407	20525	20643
	Frequency	824.7	836.5	848.3

3 Conducted Test Items

3.1 Measuring Instruments

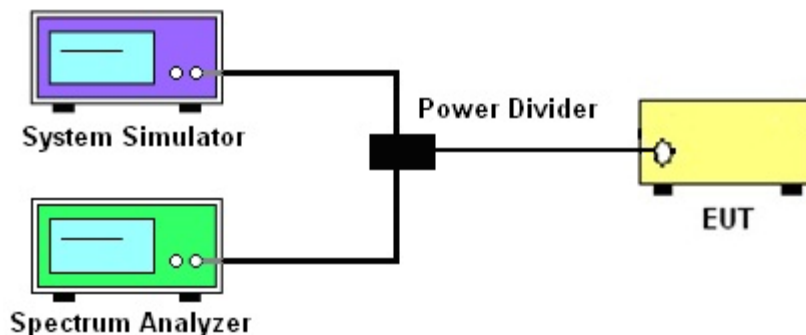
See list of measuring instruments of this test report.

3.2 Test Setup

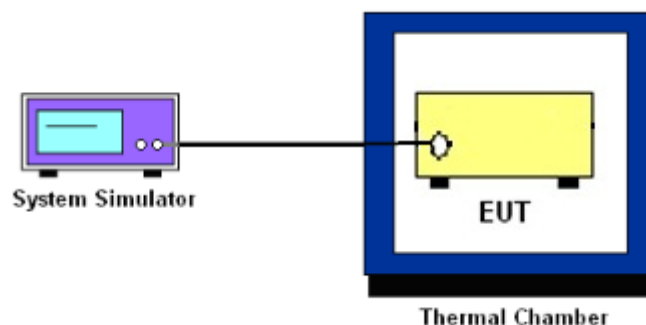
3.2.1 Conducted Output Power



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 7 Watts for LTE Band 5.

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

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

22.917(a)

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 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.

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 $\geq 1\%$ 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 $43 + 10\log(P)\text{dB}$ below the transmitter power $P(\text{Watts})$
 $= P(\text{W}) - [43 + 10\log(P)] (\text{dB})$
 $= [30 + 10\log(P)] (\text{dBm}) - [43 + 10\log(P)] (\text{dB}) = -13\text{dBm}.$

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 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 $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)]$ (dB)
 $= [30 + 10\log(P)]$ (dBm) - $[43 + 10\log(P)]$ (dB)
 $= -13$ 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 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 $20\pm 5^{\circ}\text{C}$ and connected with the system simulator.
3. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value 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.

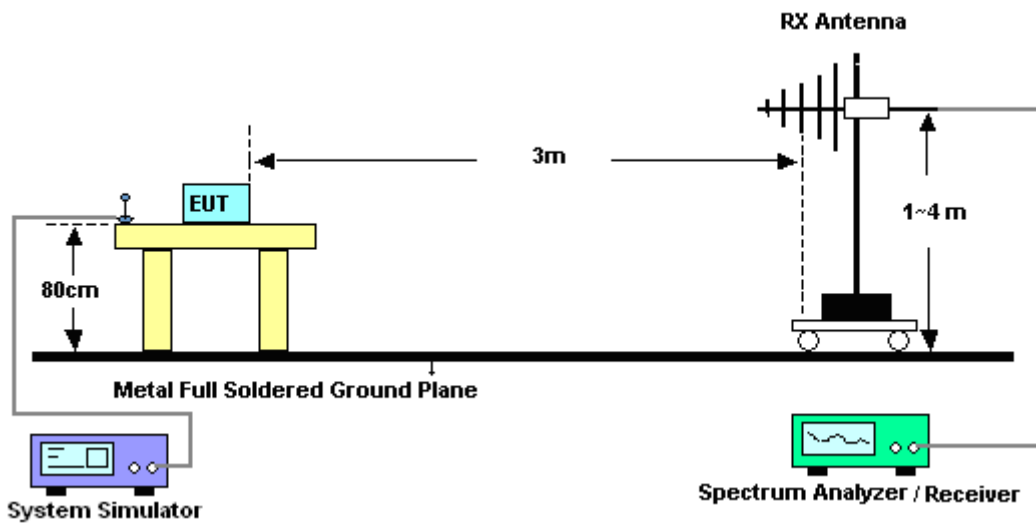
4 Radiated Test Items

4.1 Measuring Instruments

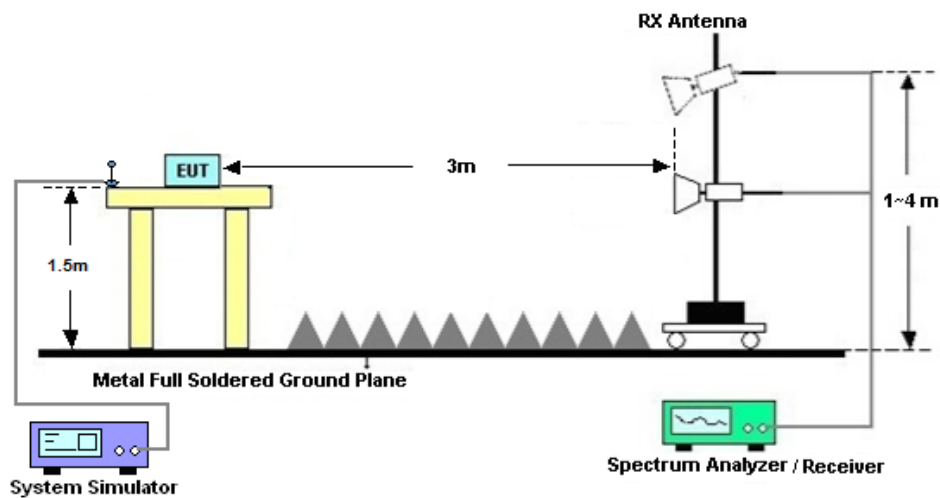
See list of measuring instruments of this test report.

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 Radiated Spurious Emission

4.4.1 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.

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

4.4.2 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. $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
11. $ERP \text{ (dBm)} = EIRP - 2.15$
12. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$



5 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Nov. 02, 2019	Sep. 03, 2020	Nov. 01, 2020	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Nov. 18, 2019	Sep. 03, 2020	Nov. 17, 2020	Conducted (TH01-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz~44G,MAX 30dB	Apr. 15, 2020	Sep. 15, 2020	Apr. 14, 2021	Radiation (03CH04-KS)
Bilog Antenna	TeseQ	CBL6111D	49922	30MHz-1GHz	Jan. 03, 2020	Sep. 15, 2020	Jan. 02, 2021	Radiation (03CH04-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 10, 2019	Sep. 15, 2020	Nov. 09, 2020	Radiation (03CH04-KS)
SHF-EHF Horn	Com-power	AH-840	101115	18GHz~40GHz	Nov. 10, 2019	Sep. 15, 2020	Nov. 09, 2020	Radiation (03CH04-KS)
Amplifier	SONOMA	310N	187289	9KHz-1GHz	Jan. 03, 2020	Sep. 15, 2020	Jan. 02, 2021	Radiation (03CH04-KS)
Amplifier	MITEQ	EM18G40G GA	060728	18~40GHz	Jan. 08, 2020	Sep. 15, 2020	Jan. 07, 2021	Radiation (03CH04-KS)
high gain Amplifier	MITEQ	AMF-7D-00 101800-30-1 0P	2025788	1Ghz-18Ghz	Jan. 03, 2020	Sep. 15, 2020	Jan. 02, 2021	Radiation (03CH04-KS)
Amplifier	Keysight	83017A	MY57280106	500MHz~26.5GHz	Oct. 15, 2019	Sep. 15, 2020	Oct. 14, 2020	Radiation (03CH04-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Sep. 15, 2020	NCR	Radiation (03CH04-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Sep. 15, 2020	NCR	Radiation (03CH04-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Sep. 15, 2020	NCR	Radiation (03CH04-KS)

NCR: No Calibration Required



6 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage $K=2$ to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	3.3dB
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Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.8dB
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Appendix A. Test Results of Conducted Test

Conducted Output Power(Average power)

LTE Band 2						
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.
Channel				18700	18900	19100
Frequency (MHz)				1860	1880	1900
20	QPSK	1	0	23.21	23.27	23.22
20	QPSK	1	49	23.09	23.10	23.22
20	QPSK	1	99	23.12	23.12	23.21
20	QPSK	50	0	22.41	22.43	22.12
20	QPSK	50	24	22.32	22.09	21.95
20	QPSK	50	50	22.04	21.97	22.00
20	QPSK	100	0	22.26	22.27	22.08
20	16QAM	1	0	22.32	22.36	22.29
20	16QAM	1	49	22.38	21.99	22.01
20	16QAM	1	99	22.24	22.19	22.03
20	16QAM	50	0	21.35	21.53	21.40
20	16QAM	50	24	21.36	21.35	21.24
20	16QAM	50	50	21.22	21.26	21.41
20	16QAM	100	0	21.57	21.29	21.39
20	64QAM	1	0	21.37	21.37	21.49
20	64QAM	1	49	21.33	21.08	21.37
20	64QAM	1	99	21.15	21.26	21.45
20	64QAM	50	0	20.01	19.91	19.81
20	64QAM	50	24	20.03	19.82	19.77
20	64QAM	50	50	19.74	19.83	19.94
20	64QAM	100	0	19.94	19.87	19.86
Channel				18675	18900	19125
Frequency (MHz)				1857.5	1880	1902.5
15	QPSK	1	0	23.14	23.21	23.26
15	QPSK	1	37	23.24	23.22	23.19
15	QPSK	1	74	23.21	23.21	23.21
15	QPSK	36	0	22.19	22.11	21.95
15	QPSK	36	20	21.95	22.05	22.06
15	QPSK	36	39	22.19	22.05	22.03
15	QPSK	75	0	22.16	22.00	22.03
15	16QAM	1	0	22.51	22.24	22.50
15	16QAM	1	37	22.25	22.41	22.12
15	16QAM	1	74	22.42	22.10	22.31
15	16QAM	36	0	21.21	21.40	21.20
15	16QAM	36	20	21.46	21.35	21.26
15	16QAM	36	39	21.50	21.26	21.32
15	16QAM	75	0	21.57	21.39	21.33
15	64QAM	1	0	21.35	21.39	21.45



15	64QAM	1	37	21.20	21.15	21.36
15	64QAM	1	74	21.58	21.42	21.30
15	64QAM	36	0	19.78	19.91	19.74
15	64QAM	36	20	19.94	19.80	19.80
15	64QAM	36	39	19.77	19.92	19.62
15	64QAM	75	0	19.92	19.83	19.75
Channel				18650	18900	19150
Frequency (MHz)				1855	1880	1905
10	QPSK	1	0	23.15	23.26	23.09
10	QPSK	1	25	23.17	23.18	23.24
10	QPSK	1	49	23.15	23.15	23.21
10	QPSK	25	0	22.26	22.20	22.30
10	QPSK	25	12	22.15	22.25	22.12
10	QPSK	25	25	22.06	22.36	22.16
10	QPSK	50	0	22.33	22.29	22.10
10	16QAM	1	0	22.37	22.71	22.25
10	16QAM	1	25	22.30	22.36	22.34
10	16QAM	1	49	22.33	22.36	22.47
10	16QAM	25	0	21.56	21.42	21.29
10	16QAM	25	12	21.46	21.47	21.26
10	16QAM	25	25	21.25	21.48	21.24
10	16QAM	50	0	21.32	21.42	21.34
10	64QAM	1	0	21.32	21.35	21.24
10	64QAM	1	25	21.22	21.11	21.11
10	64QAM	1	49	21.61	21.32	21.19
10	64QAM	25	0	19.92	19.74	19.70
10	64QAM	25	12	19.85	19.93	19.74
10	64QAM	25	25	20.05	19.87	19.72
10	64QAM	50	0	19.69	19.88	19.81
Channel				18625	18900	19175
Frequency (MHz)				1852.5	1880	1907.5
5	QPSK	1	0	23.21	23.23	23.16
5	QPSK	1	12	23.13	23.19	23.00
5	QPSK	1	24	23.16	23.17	23.16
5	QPSK	12	0	22.40	22.17	22.09
5	QPSK	12	7	22.34	22.23	22.14
5	QPSK	12	13	22.12	22.15	22.12
5	QPSK	25	0	22.36	22.33	22.18
5	16QAM	1	0	22.43	22.20	22.11
5	16QAM	1	12	22.24	22.10	22.03
5	16QAM	1	24	22.24	22.21	22.40
5	16QAM	12	0	21.59	21.49	21.35
5	16QAM	12	7	21.45	21.33	21.32
5	16QAM	12	13	21.32	21.48	21.29
5	16QAM	25	0	21.59	21.68	21.34
5	64QAM	1	0	21.32	21.46	21.65
5	64QAM	1	12	21.24	21.18	21.17
5	64QAM	1	24	21.21	21.17	21.47
5	64QAM	12	0	19.99	19.75	19.73
5	64QAM	12	7	19.94	19.85	19.74



5	64QAM	12	13	19.95	19.79	19.71
5	64QAM	25	0	20.07	19.97	19.70
Channel				18615	18900	19185
Frequency (MHz)				1851.5	1880	1908.5
3	QPSK	1	0	23.15	23.02	23.21
3	QPSK	1	8	23.24	23.18	23.00
3	QPSK	1	14	23.17	23.04	23.15
3	QPSK	8	0	22.30	22.13	22.05
3	QPSK	8	4	22.22	22.02	22.04
3	QPSK	8	7	22.18	22.13	22.04
3	QPSK	15	0	22.24	22.35	22.11
3	16QAM	1	0	22.18	22.12	22.16
3	16QAM	1	8	22.10	22.29	22.12
3	16QAM	1	14	22.02	22.12	22.39
3	16QAM	8	0	21.48	21.39	21.35
3	16QAM	8	4	21.45	21.55	21.31
3	16QAM	8	7	21.47	21.42	21.34
3	16QAM	15	0	21.41	21.37	21.26
3	64QAM	1	0	21.29	21.25	21.06
3	64QAM	1	8	21.18	21.15	21.11
3	64QAM	1	14	21.10	21.17	21.03
3	64QAM	8	0	19.77	19.72	19.72
3	64QAM	8	4	19.79	19.80	19.73
3	64QAM	8	7	19.86	19.78	19.65
3	64QAM	15	0	19.89	19.72	19.65
Channel				18607	18900	19193
Frequency (MHz)				1850.7	1880	1909.3
1.4	QPSK	1	0	23.20	23.10	23.10
1.4	QPSK	1	3	23.15	23.20	23.13
1.4	QPSK	1	5	23.21	23.10	23.01
1.4	QPSK	3	0	23.19	23.25	23.11
1.4	QPSK	3	1	23.23	23.14	23.25
1.4	QPSK	3	3	23.21	23.25	23.15
1.4	QPSK	6	0	22.26	22.29	22.14
1.4	16QAM	1	0	22.40	22.48	22.38
1.4	16QAM	1	3	22.76	22.64	22.37
1.4	16QAM	1	5	22.61	22.56	22.69
1.4	16QAM	3	0	22.35	22.15	22.19
1.4	16QAM	3	1	22.30	22.31	22.10
1.4	16QAM	3	3	22.38	22.18	22.16
1.4	16QAM	6	0	21.45	21.35	21.22
1.4	64QAM	1	0	21.21	21.09	21.12
1.4	64QAM	1	3	21.23	21.25	21.13
1.4	64QAM	1	5	21.24	21.29	21.03
1.4	64QAM	3	0	21.16	21.07	21.05
1.4	64QAM	3	1	21.23	21.17	21.05
1.4	64QAM	3	3	21.23	21.16	21.10
1.4	64QAM	6	0	19.84	19.74	19.71



LTE Band 5						
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.
Channel				20450	20525	20600
Frequency (MHz)				829	836.5	844
10	QPSK	1	0	23.21	23.24	23.21
10	QPSK	1	25	23.06	23.21	23.21
10	QPSK	1	49	23.21	23.23	23.21
10	QPSK	25	0	22.28	22.51	22.34
10	QPSK	25	12	22.27	22.38	22.48
10	QPSK	25	25	22.50	22.44	22.50
10	QPSK	50	0	22.39	22.49	22.47
10	16QAM	1	0	22.75	22.72	22.72
10	16QAM	1	25	22.36	22.53	22.67
10	16QAM	1	49	22.75	22.60	22.73
10	16QAM	25	0	21.16	21.38	21.44
10	16QAM	25	12	21.34	21.45	21.37
10	16QAM	25	25	21.44	21.44	21.51
10	16QAM	50	0	21.57	21.47	21.37
10	64QAM	1	0	21.39	21.59	21.46
10	64QAM	1	25	21.70	21.26	21.54
10	64QAM	1	49	21.26	21.70	21.74
10	64QAM	25	0	20.06	20.01	20.28
10	64QAM	25	12	20.26	20.09	20.11
10	64QAM	25	25	20.01	20.10	20.20
10	64QAM	50	0	20.22	20.11	20.13
Channel				20425	20525	20625
Frequency (MHz)				826.5	836.5	846.5
5	QPSK	1	0	23.12	23.21	23.21
5	QPSK	1	12	23.22	23.14	23.21
5	QPSK	1	24	23.15	23.12	23.21
5	QPSK	12	0	22.32	22.36	22.44
5	QPSK	12	7	22.25	22.23	22.41
5	QPSK	12	13	22.25	22.33	22.35
5	QPSK	25	0	22.24	22.19	22.45
5	16QAM	1	0	22.50	22.52	22.65
5	16QAM	1	12	22.70	22.54	22.48
5	16QAM	1	24	22.30	22.62	22.53
5	16QAM	12	0	21.30	21.37	21.48
5	16QAM	12	7	21.33	21.30	21.40
5	16QAM	12	13	21.16	21.42	21.32
5	16QAM	25	0	21.14	21.43	21.44
5	64QAM	1	0	21.40	21.38	21.17
5	64QAM	1	12	21.27	21.31	21.53
5	64QAM	1	24	21.15	21.45	21.26
5	64QAM	12	0	20.04	20.03	20.23
5	64QAM	12	7	20.11	20.11	20.15
5	64QAM	12	13	19.92	20.22	20.07
5	64QAM	25	0	20.06	20.18	20.16



Channel				20415	20525	20635
Frequency (MHz)				825.5	836.5	847.5
3	QPSK	1	0	23.22	23.14	23.21
3	QPSK	1	8	23.22	23.12	23.21
3	QPSK	1	14	23.12	23.22	23.11
3	QPSK	8	0	22.19	22.31	22.32
3	QPSK	8	4	22.20	22.32	22.33
3	QPSK	8	7	22.36	22.52	22.24
3	QPSK	15	0	22.20	22.23	22.33
3	16QAM	1	0	22.73	22.63	22.54
3	16QAM	1	8	22.43	22.61	22.47
3	16QAM	1	14	22.79	22.87	22.70
3	16QAM	8	0	21.31	21.40	21.44
3	16QAM	8	4	21.24	21.38	21.34
3	16QAM	8	7	21.31	21.47	21.34
3	16QAM	15	0	21.14	21.32	21.33
3	64QAM	1	0	21.37	21.50	21.08
3	64QAM	1	8	21.36	21.29	21.50
3	64QAM	1	14	21.19	21.40	21.50
3	64QAM	8	0	20.02	19.96	20.02
3	64QAM	8	4	19.83	20.02	19.95
3	64QAM	8	7	19.99	20.09	20.07
3	64QAM	15	0	19.97	19.99	20.06
Channel				20407	20525	20643
Frequency (MHz)				824.7	836.5	848.3
1.4	QPSK	1	0	23.21	23.19	23.01
1.4	QPSK	1	3	23.13	23.13	23.21
1.4	QPSK	1	5	23.12	23.13	23.14
1.4	QPSK	3	0	23.01	23.22	23.12
1.4	QPSK	3	1	23.21	23.23	23.21
1.4	QPSK	3	3	23.07	23.14	23.21
1.4	QPSK	6	0	22.00	22.20	22.19
1.4	16QAM	1	0	22.78	22.47	22.43
1.4	16QAM	1	3	22.44	22.47	22.64
1.4	16QAM	1	5	22.77	22.54	22.62
1.4	16QAM	3	0	22.24	22.16	22.25
1.4	16QAM	3	1	22.13	22.18	22.48
1.4	16QAM	3	3	22.19	22.17	22.25
1.4	16QAM	6	0	21.28	21.20	21.34
1.4	64QAM	1	0	21.24	21.31	21.45
1.4	64QAM	1	3	21.30	21.44	21.18
1.4	64QAM	1	5	21.16	21.32	21.28
1.4	64QAM	3	0	21.07	21.35	21.15
1.4	64QAM	3	1	21.23	21.33	21.20
1.4	64QAM	3	3	21.09	21.28	21.12
1.4	64QAM	6	0	19.90	19.97	19.97

ERP/EIRP

LTE Band 2 (GT - LC = 0.4 dB) QPSK									
Bandwidth	1.4M			3M			5M		
Channel	18607	18900	19193	18615	18900	19185	18625	18900	19175
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency	1850.7	1880	1909.3	1851.5	1880	1908.5	1852.5	1880	1907.5
(MHz)									
Conducted Power (dBm)	23.23	23.14	23.25	23.24	23.18	23.00	23.21	23.23	23.16
Conducted Power (Watts)	0.2104	0.2061	0.2113	0.2109	0.2080	0.1995	0.2094	0.2104	0.2070
EIRP(dBm)	23.63	23.54	23.65	23.64	23.58	23.40	23.61	23.63	23.56
EIRP(Watts)	0.2307	0.2259	0.2317	0.2312	0.2280	0.2188	0.2296	0.2307	0.2270

LTE Band 2 (GT - LC = 0.4 dB) QPSK									
Bandwidth	10M			15M			20M		
Channel	18650	18900	19150	18675	18900	19125	18650	18900	19100
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency	1855	1880	1905	1857.5	1880	1902.5	1860	1880	1900
(MHz)									
Conducted Power (dBm)	23.15	23.26	23.09	23.14	23.21	23.26	23.21	23.27	23.22
Conducted Power (Watts)	0.2065	0.2118	0.2037	0.2061	0.2094	0.2118	0.2094	0.2123	0.2099
EIRP(dBm)	23.55	23.66	23.49	23.54	23.61	23.66	23.61	23.67	23.62
EIRP(Watts)	0.2265	0.2323	0.2234	0.2259	0.2296	0.2323	0.2296	0.2328	0.2301



LTE Band 2 (GT - LC = 0.4 dB) 16QAM									
Bandwidth	1.4M			3M			5M		
Channel	18607	18900	19193	18615	18900	19185	18625	18900	19175
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency	1850.7	1880	1909.3	1851.5	1880	1908.5	1852.5	1880	1907.5
(MHz)									
Conducted Power (dBm)	22.76	22.64	22.37	22.02	22.12	22.39	22.43	22.20	22.11
Conducted Power (Watts)	0.1888	0.1837	0.1726	0.1592	0.1629	0.1734	0.1750	0.1660	0.1626
EIRP(dBm)	23.16	23.04	22.77	22.42	22.52	22.79	22.83	22.60	22.51
EIRP(Watts)	0.2070	0.2014	0.1892	0.1746	0.1786	0.1901	0.1919	0.1820	0.1782

LTE Band 2 (GT - LC = 0.4 dB) 16QAM									
Bandwidth	10M			15M			20M		
Channel	18650	18900	19150	18675	18900	19125	18650	18900	19100
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency	1855	1880	1905	1857.5	1880	1902.5	1860	1880	1900
(MHz)									
Conducted Power (dBm)	22.37	22.71	22.25	22.51	22.24	22.50	22.38	21.99	22.01
Conducted Power (Watts)	0.1726	0.1866	0.1679	0.1782	0.1675	0.1778	0.1730	0.1581	0.1589
EIRP(dBm)	22.77	23.11	22.65	22.91	22.64	22.90	22.78	22.39	22.41
EIRP(Watts)	0.1892	0.2046	0.1841	0.1954	0.1837	0.1950	0.1897	0.1734	0.1742



LTE Band 2 (GT - LC = 0.4 dB) 64QAM									
Bandwidth	1.4M			3M			5M		
Channel	18607	18900	19193	18615	18900	19185	18625	18900	19175
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency	1850.7	1880	1909.3	1851.5	1880	1908.5	1852.5	1880	1907.5
(MHz)									
Conducted Power (dBm)	21.24	21.29	21.03	21.29	21.25	21.06	21.32	21.46	21.65
Conducted Power (Watts)	0.1330	0.1346	0.1268	0.1346	0.1334	0.1276	0.1355	0.1400	0.1462
EIRP(dBm)	21.64	21.69	21.43	21.69	21.65	21.46	21.72	21.86	22.05
EIRP(Watts)	0.1459	0.1476	0.1390	0.1476	0.1462	0.1400	0.1486	0.1535	0.1603

LTE Band 2 (GT - LC = 0.4 dB) 64QAM									
Bandwidth	10M			15M			20M		
Channel	18650	18900	19150	18675	18900	19125	18650	18900	19100
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency	1855	1880	1905	1857.5	1880	1902.5	1860	1880	1900
(MHz)									
Conducted Power (dBm)	21.61	21.32	21.19	21.58	21.42	21.30	21.37	21.37	21.49
Conducted Power (Watts)	0.1449	0.1355	0.1315	0.1439	0.1387	0.1349	0.1371	0.1371	0.1409
EIRP(dBm)	22.01	21.72	21.59	21.98	21.82	21.70	21.77	21.77	21.89
EIRP(Watts)	0.1589	0.1486	0.1442	0.1578	0.1521	0.1479	0.1503	0.1503	0.1545

LTE Band 5 (GT - LC = -2.5 dB) QPSK									
Bandwidth	1.4M			3M			5M		
Channel	20407	20525	20643	20415	20525	20635	20425	20525	20625
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency	824.7	836.5	848.3	825.5	836.5	847.5	826.5	836.5	846.5
(MHz)									
Conducted Power (dBm)	23.21	23.23	23.21	23.22	23.14	23.21	23.22	23.14	23.21
Conducted Power (Watts)	0.2094	0.2104	0.2094	0.2099	0.2061	0.2094	0.2099	0.2061	0.2094
ERP(dBm)	18.56	18.58	18.56	18.57	18.49	18.56	18.57	18.49	18.56
ERP(Watts)	0.0718	0.0721	0.0718	0.0719	0.0706	0.0718	0.0719	0.0706	0.0718

LTE Band 5 (GT - LC = -2.5 dB) QPSK			
Bandwidth	10M		
Channel	20450	20525	20600
	(Low)	(Mid)	(High)
Frequency	829	836.5	844
(MHz)			
Conducted Power (dBm)	23.21	23.24	23.21
Conducted Power (Watts)	0.2094	0.2109	0.2094
ERP(dBm)	18.56	18.59	18.56
ERP(Watts)	0.0718	0.0723	0.0718

LTE Band 5 (GT - LC = -2.5 dB) 16QAM									
Bandwidth	1.4M			3M			5M		
Channel	20407	20525	20643	20415	20525	20635	20425	20525	20625
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency	824.7	836.5	848.3	825.5	836.5	847.5	826.5	836.5	846.5
(MHz)									
Conducted Power (dBm)	22.78	22.47	22.43	22.79	22.87	22.70	22.70	22.54	22.48
Conducted Power (Watts)	0.1897	0.1766	0.1750	0.1901	0.1936	0.1862	0.1862	0.1795	0.1770
ERP(dBm)	18.13	17.82	17.78	18.14	18.22	18.05	18.05	17.89	17.83
ERP(Watts)	0.0650	0.0605	0.0600	0.0652	0.0664	0.0638	0.0638	0.0615	0.0607

LTE Band 5 (GT - LC = -2.5 dB) 16QAM			
Bandwidth	10M		
Channel	20450	20525	20600
	(Low)	(Mid)	(High)
Frequency	829	836.5	844
(MHz)			
Conducted Power (dBm)	22.75	22.72	22.72
Conducted Power (Watts)	0.1884	0.1871	0.1871
ERP(dBm)	18.10	18.07	18.07
ERP(Watts)	0.0646	0.0641	0.0641



LTE Band 5 (GT - LC = -2.5 dB) 64QAM									
Bandwidth	1.4M			3M			5M		
Channel	20407	20525	20643	20415	20525	20635	20425	20525	20625
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency	824.7	836.5	848.3	825.5	836.5	847.5	826.5	836.5	846.5
(MHz)									
Conducted Power (dBm)	21.24	21.31	21.45	21.19	21.40	21.50	21.27	21.31	21.53
Conducted Power (Watts)	0.1330	0.1352	0.1396	0.1315	0.1380	0.1413	0.1340	0.1352	0.1422
ERP(dBm)	16.59	16.66	16.80	16.54	16.75	16.85	16.62	16.66	16.88
ERP(Watts)	0.0456	0.0463	0.0479	0.0451	0.0473	0.0484	0.0459	0.0463	0.0488

LTE Band 5 (GT - LC = -2.5 dB) 64QAM			
Bandwidth	10M		
Channel	20450	20525	20600
	(Low)	(Mid)	(High)
Frequency	829	836.5	844
(MHz)			
Conducted Power (dBm)	21.26	21.70	21.74
Conducted Power (Watts)	0.1337	0.1479	0.1493
ERP(dBm)	16.61	17.05	17.09
ERP(Watts)	0.0458	0.0507	0.0512



LTE Band 2

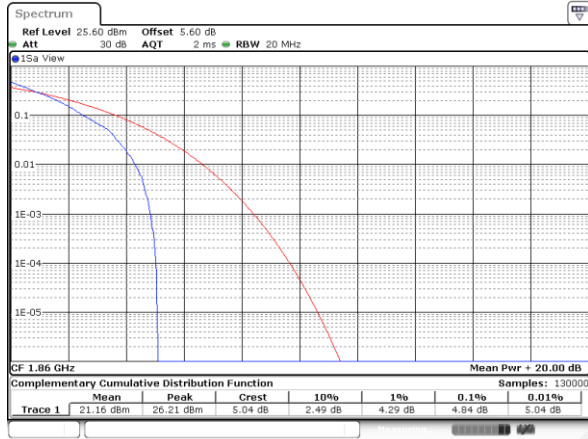
Peak-to-Average Ratio

Mode	LTE Band 2 / 20MHz				
Mod.	QPSK		16QAM		Limit: 13dB
RB Size	1RB	Full RB	1RB	Full RB	Result
Lowest CH	4.84	5.28	6.14	6.12	PASS
Middle CH	5.22	5.16	6.43	6.14	
Highest CH	5.59	5.25	6.52	6.17	
Mode	LTE Band 2 / 20MHz				
Mod.	64QAM				Limit: 13dB
RB Size	1RB	Full RB			Result
Lowest CH	6.03	6.61	-	-	PASS
Middle CH	6.23	6.49	-	-	
Highest CH	6.49	6.67	-	-	

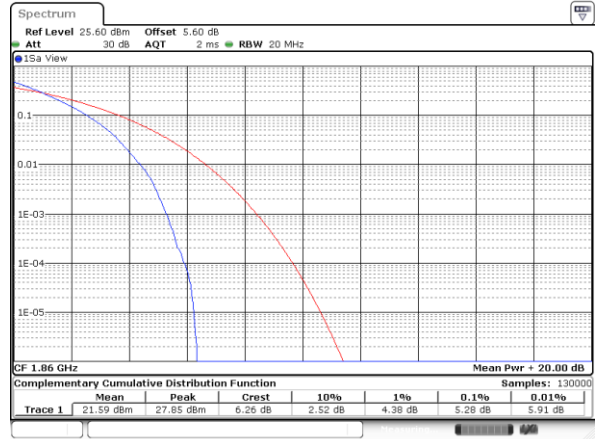


LTE Band 2 / 20MHz / QPSK

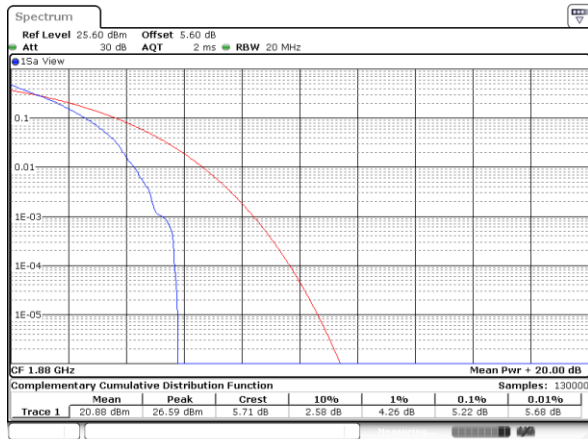
Lowest Channel / 1RB



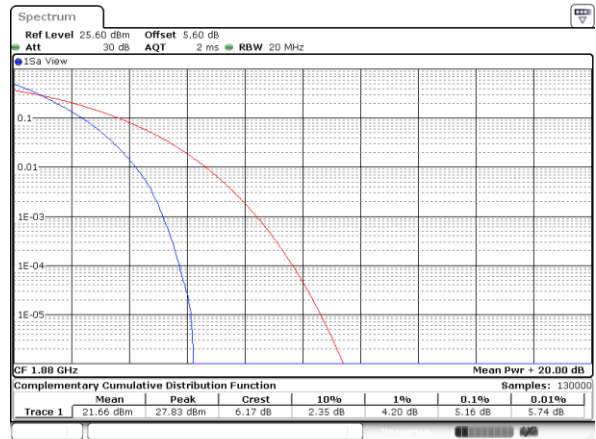
Lowest Channel / Full RB



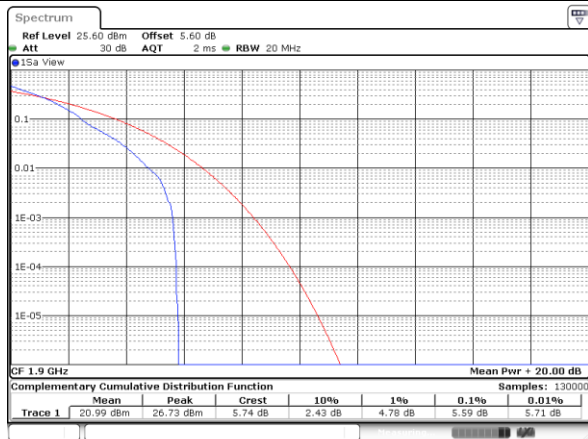
Middle Channel / 1RB



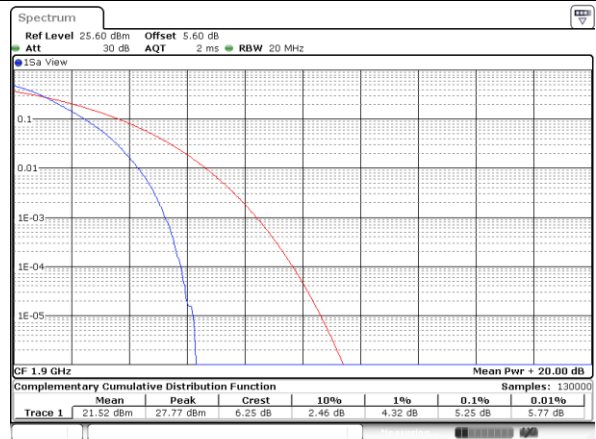
Middle Channel / Full RB



Highest Channel / 1RB



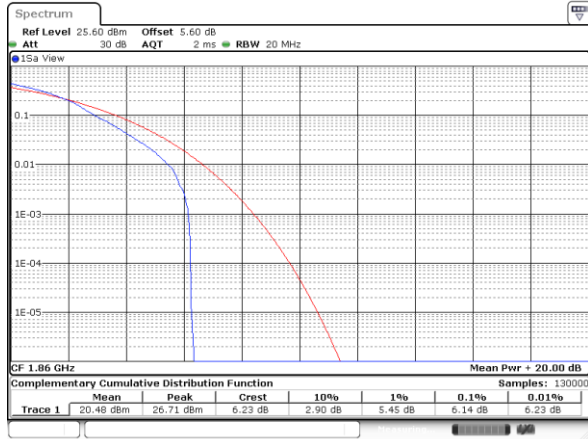
Highest Channel / Full RB



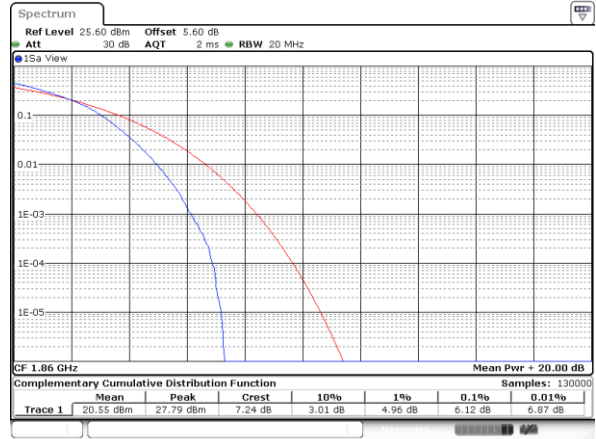


LTE Band 2 / 20MHz / 16QAM

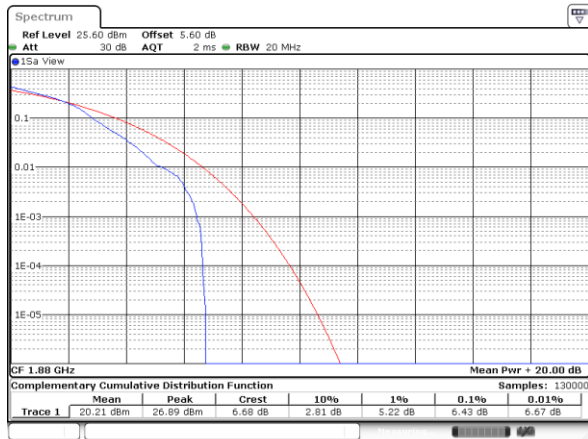
Lowest Channel / 1RB



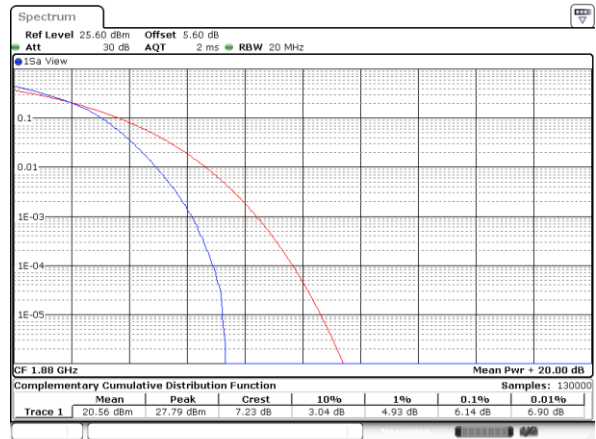
Lowest Channel / Full RB



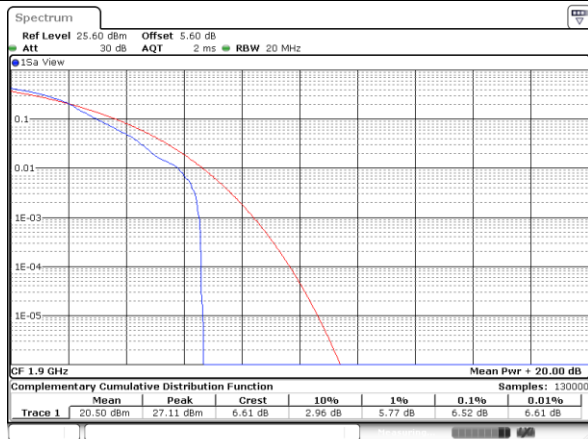
Middle Channel / 1RB



Middle Channel / Full RB



Highest Channel / 1RB



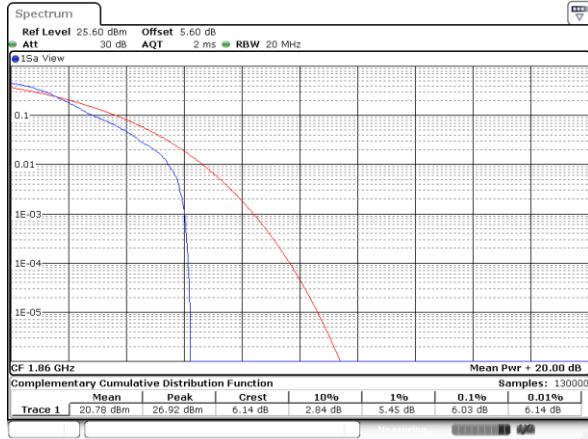
Highest Channel / Full RB



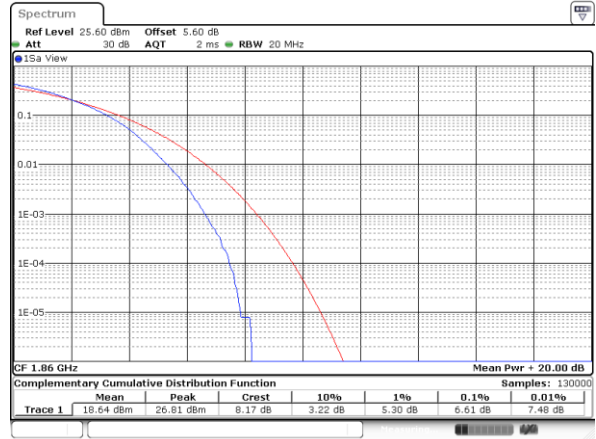


LTE Band 2 / 20MHz / 64QAM

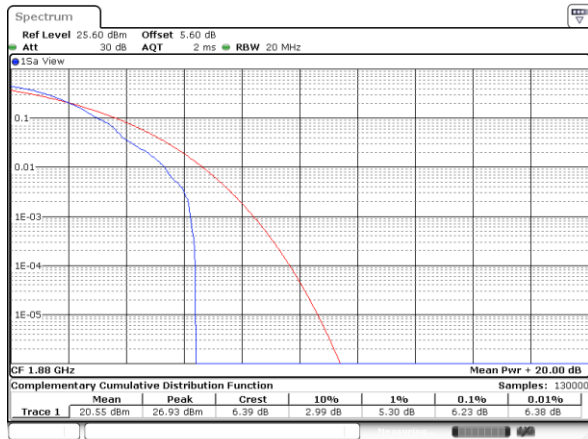
Lowest Channel / 1RB



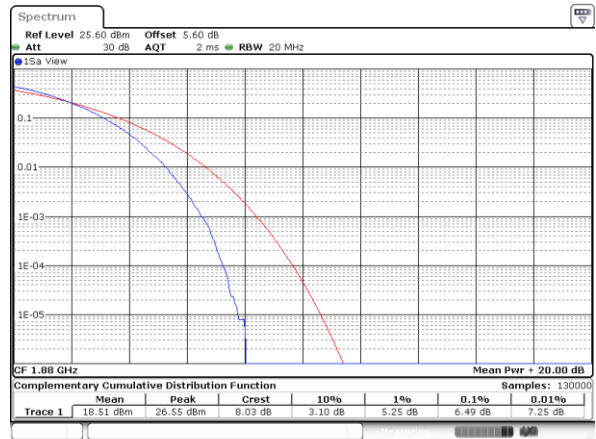
Lowest Channel / Full RB



Middle Channel / 1RB



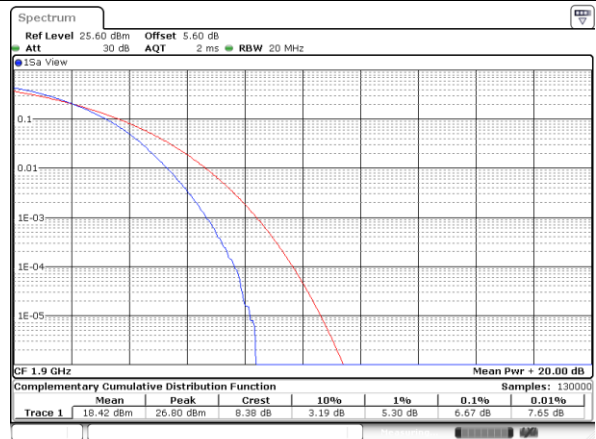
Middle Channel / Full RB



Highest Channel / 1RB



Highest Channel / Full RB



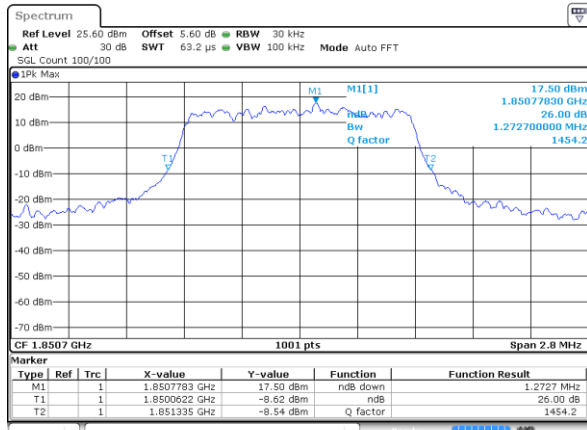
**26dB Bandwidth**

Mode	LTE Band 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	1.27	1.26	2.99	3.03	4.84	4.85	9.75	9.71	14.45	14.27	20.14	20.14
Middle CH	1.28	1.29	2.99	3.00	4.94	4.88	9.81	9.89	14.60	14.57	20.26	20.10
Highest CH	1.27	1.29	3.03	3.02	4.82	4.87	9.73	9.81	14.60	14.15	20.18	20.30
Mode	LTE Band 2 : 26dB BW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH	1.29	-	2.99	-	4.91	-	9.75	-	14.30	-	20.10	-
Middle CH	1.26	-	3.01	-	4.95	-	9.65	-	14.30	-	20.30	-
Highest CH	1.26	-	3.02	-	4.92	-	9.65	-	14.51	-	20.30	-



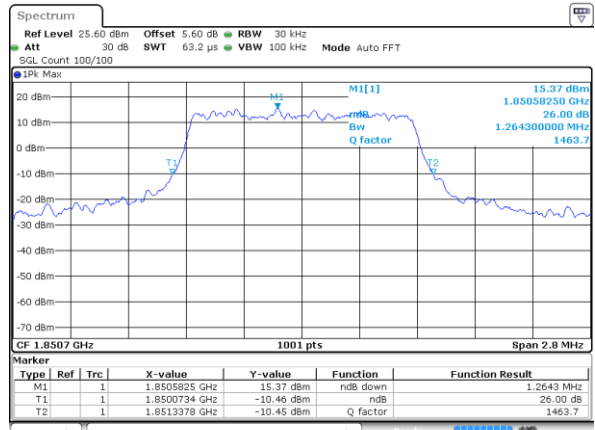
LTE Band 2

Lowest Channel / 1.4MHz / QPSK



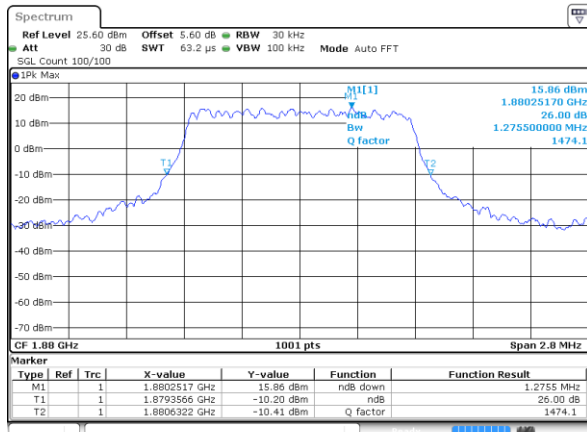
Date: 3 SEP 2020 01:05:29

Lowest Channel / 1.4MHz / 16QAM



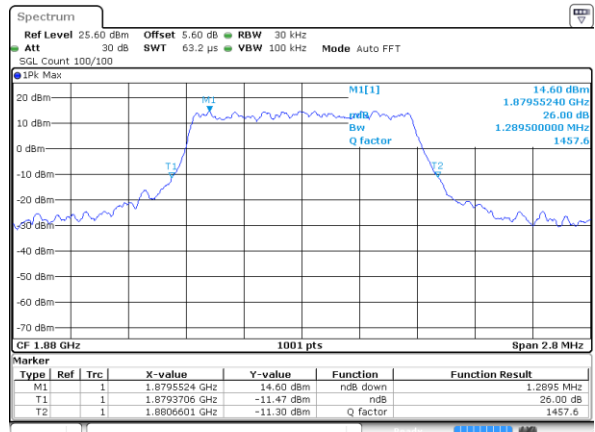
Date: 3 SEP 2020 01:05:39

Middle Channel / 1.4MHz / QPSK



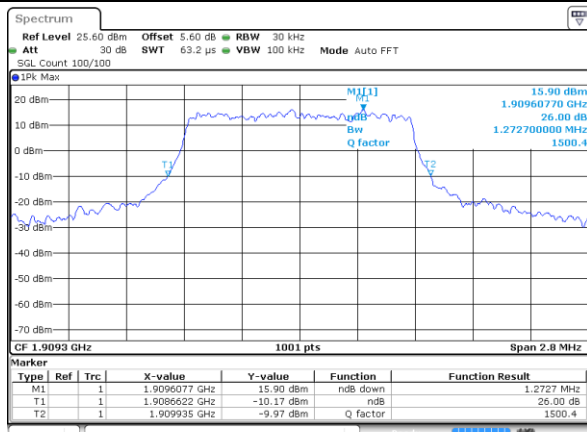
Date: 3 SEP 2020 01:12:27

Middle Channel / 1.4MHz / 16QAM



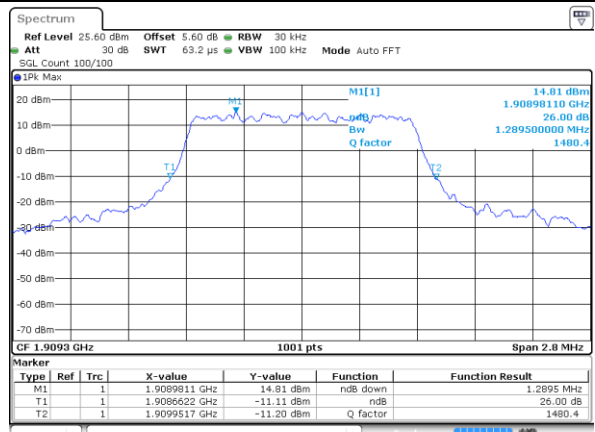
Date: 3 SEP 2020 01:12:37

Highest Channel / 1.4MHz / QPSK



Date: 3 SEP 2020 01:14:55

Highest Channel / 1.4MHz / 16QAM

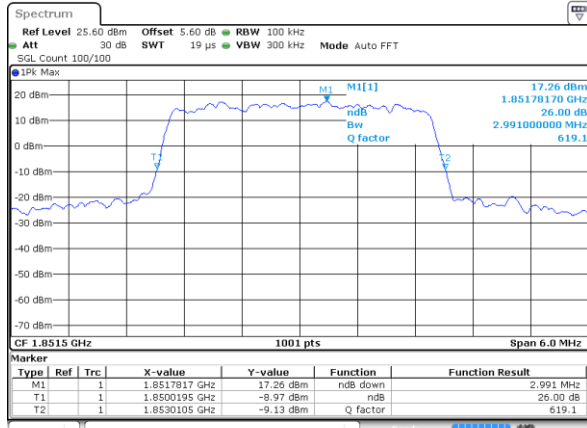


Date: 3 SEP 2020 01:15:05



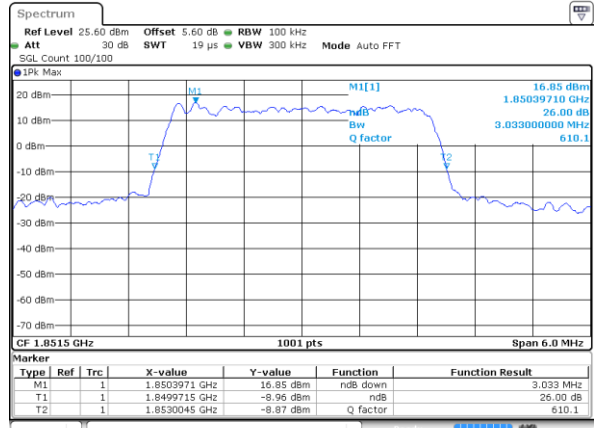
LTE Band 2

Lowest Channel / 3MHz / QPSK



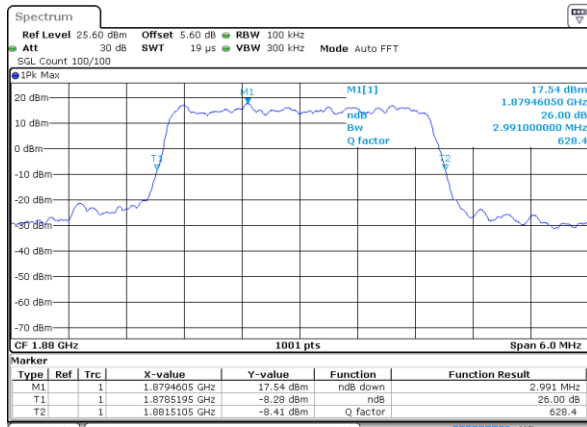
Date: 3 SEP 2020 01:50:45

Lowest Channel / 3MHz / 16QAM



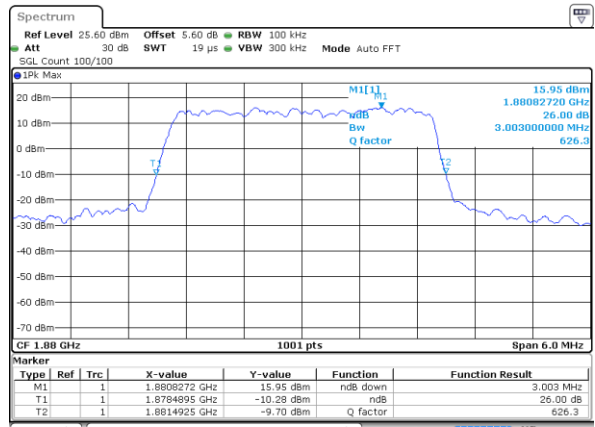
Date: 3 SEP 2020 01:50:55

Middle Channel / 3MHz / QPSK



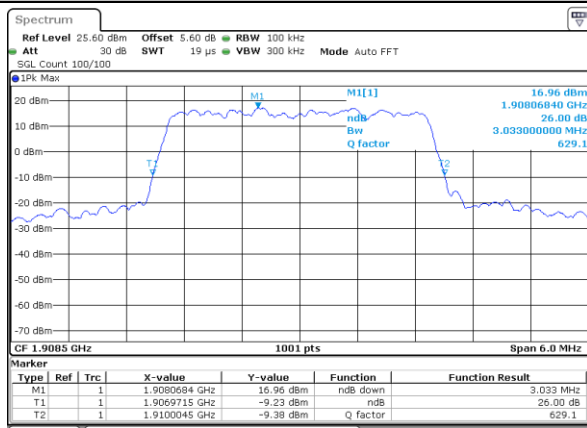
Date: 3 SEP 2020 01:57:43

Middle Channel / 3MHz / 16QAM



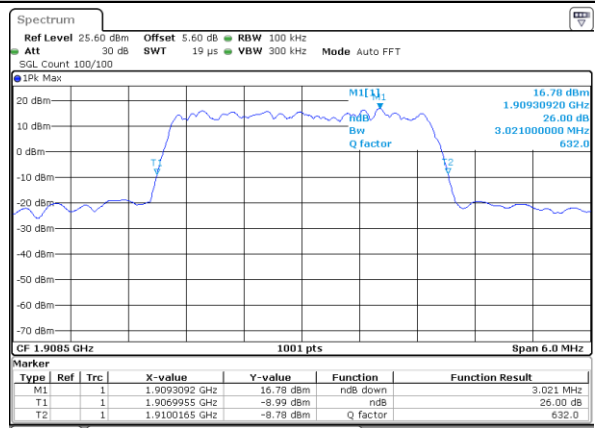
Date: 3 SEP 2020 01:57:53

Highest Channel / 3MHz / QPSK



Date: 3 SEP 2020 02:03:47

Highest Channel / 3MHz / 16QAM

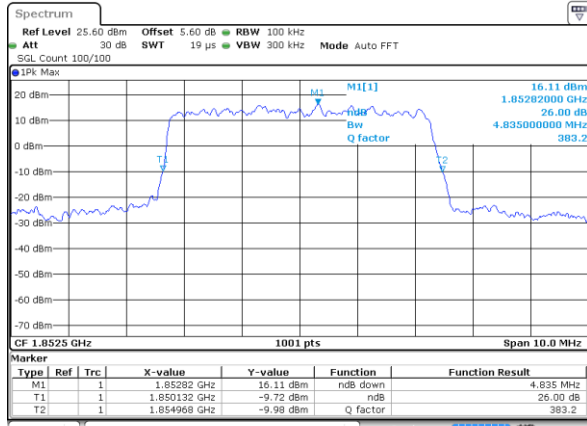


Date: 3 SEP 2020 02:03:57



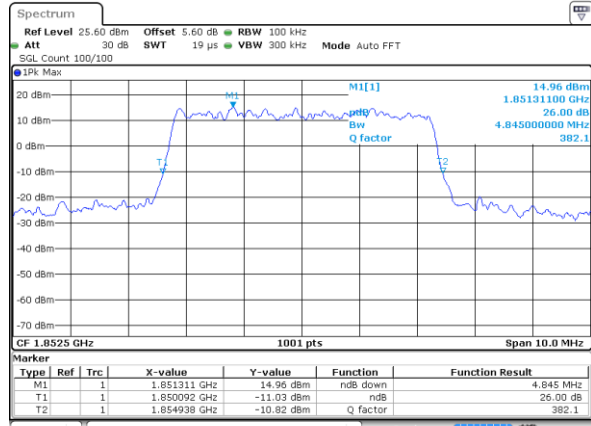
LTE Band 2

Lowest Channel / 5MHz / QPSK



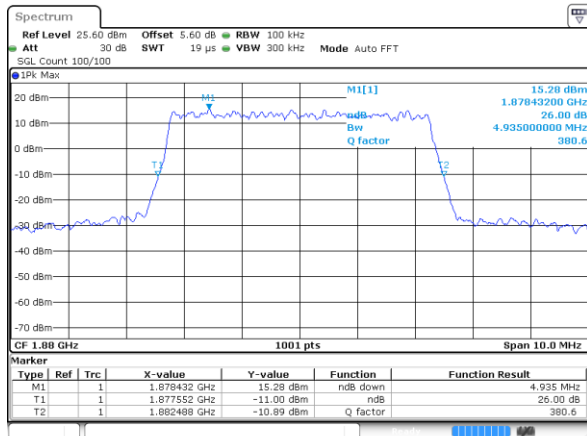
Date: 3 SEP 2020 02:16:13

Lowest Channel / 5MHz / 16QAM



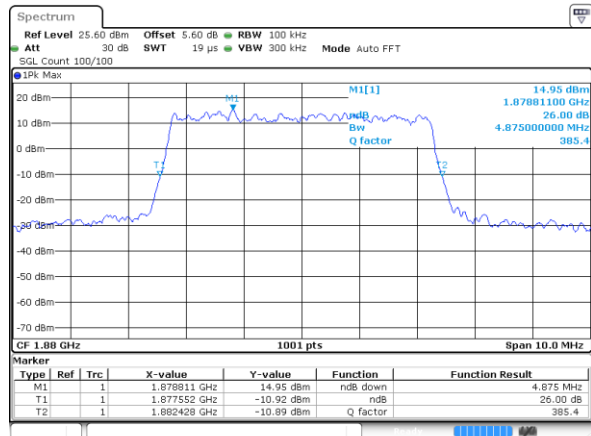
Date: 3 SEP 2020 02:16:23

Middle Channel / 5MHz / QPSK



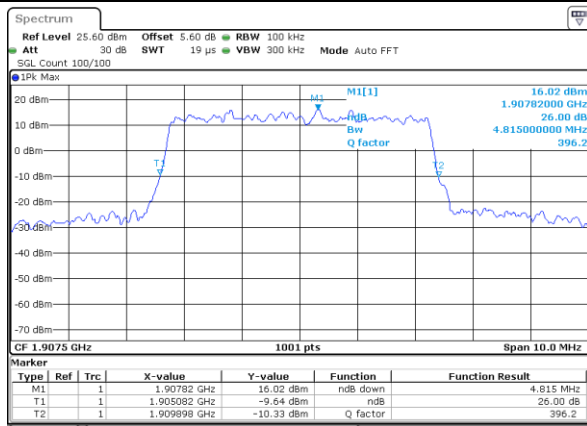
Date: 3 SEP 2020 02:23:11

Middle Channel / 5MHz / 16QAM



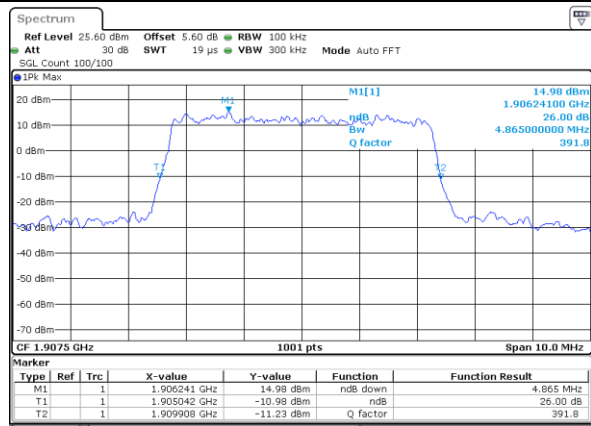
Date: 3 SEP 2020 02:23:21

Highest Channel / 5MHz / QPSK



Date: 3 SEP 2020 02:25:39

Highest Channel / 5MHz / 16QAM

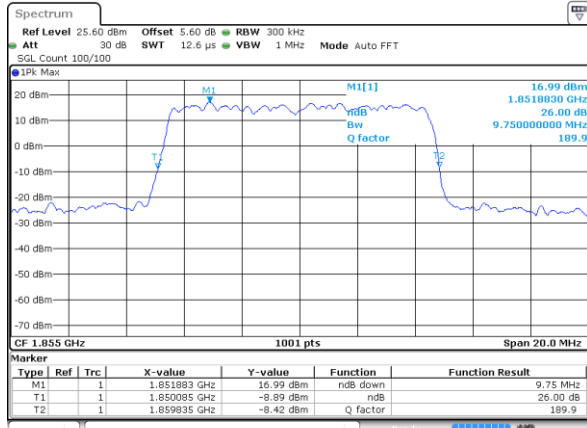


Date: 3 SEP 2020 02:25:49



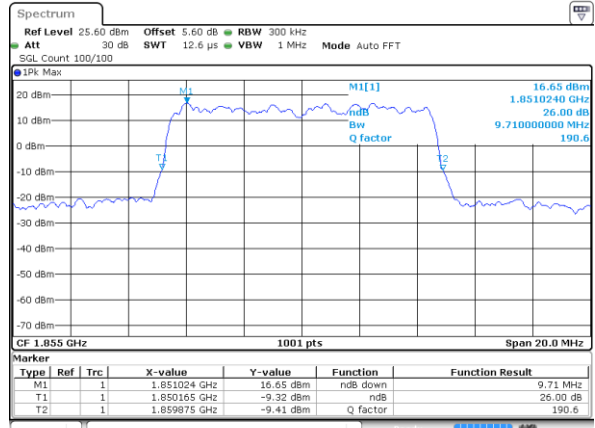
LTE Band 2

Lowest Channel / 10MHz / QPSK



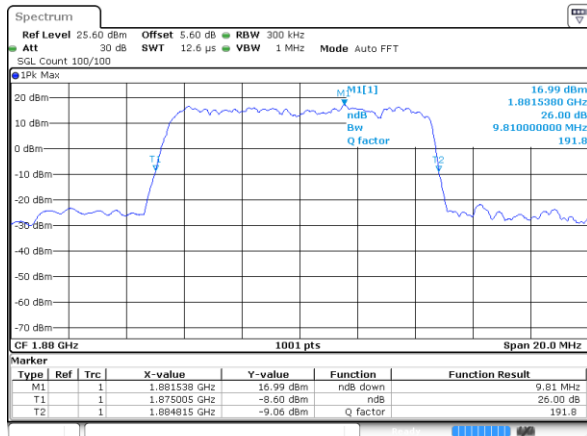
Date: 3 SEP 2020 02:34:21

Lowest Channel / 10MHz / 16QAM



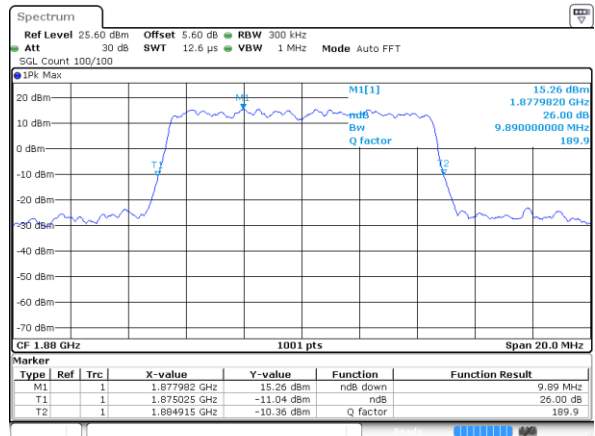
Date: 3 SEP 2020 02:34:31

Middle Channel / 10MHz / QPSK



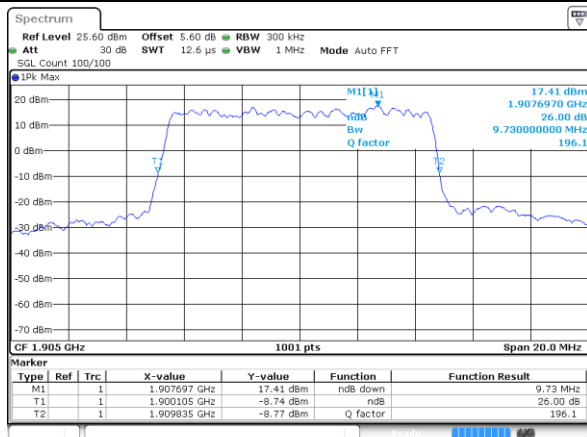
Date: 3 SEP 2020 02:41:19

Middle Channel / 10MHz / 16QAM



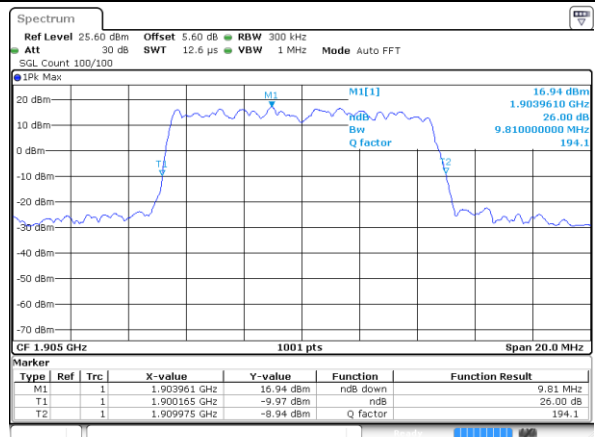
Date: 3 SEP 2020 02:41:29

Highest Channel / 10MHz / QPSK



Date: 3 SEP 2020 02:43:47

Highest Channel / 10MHz / 16QAM

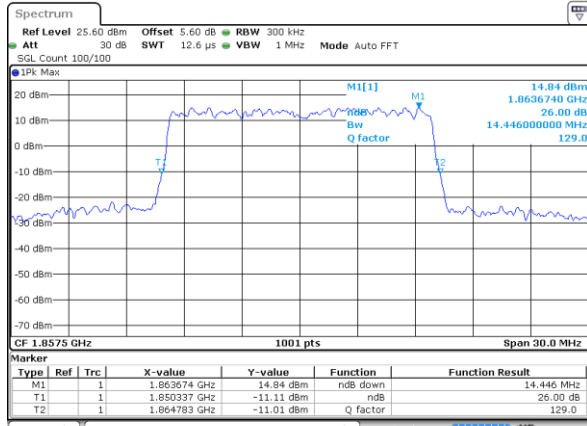


Date: 3 SEP 2020 02:43:57



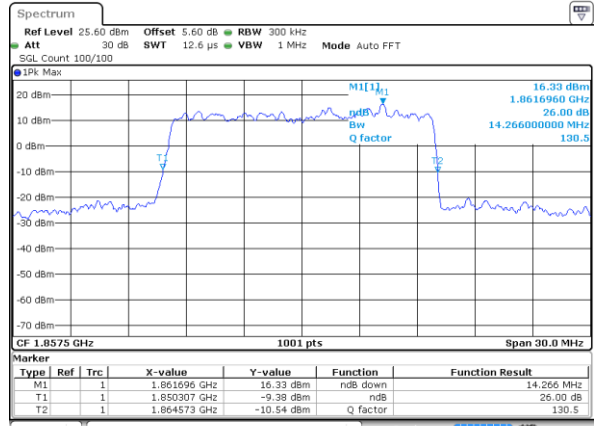
LTE Band 2

Lowest Channel / 15MHz / QPSK



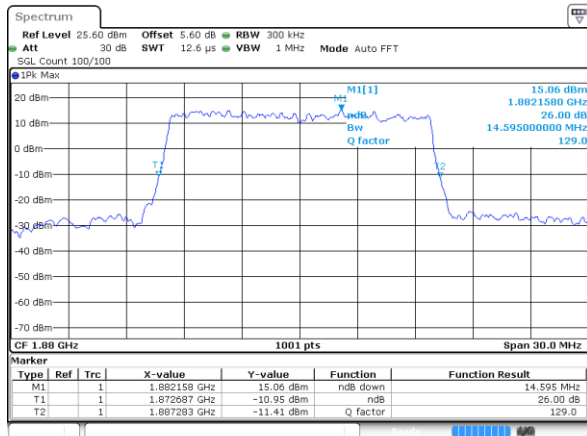
Date: 3 SEP 2020 02:52:56

Lowest Channel / 15MHz / 16QAM



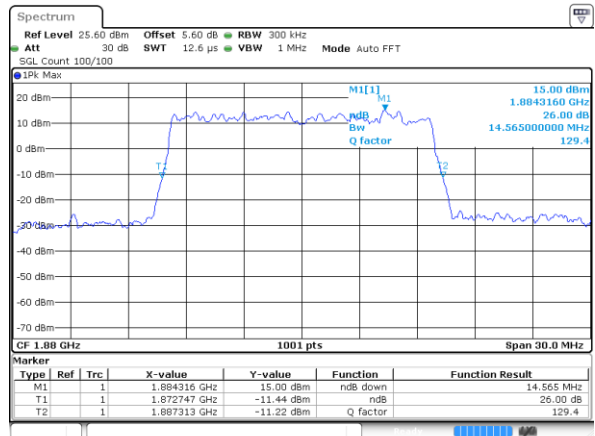
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Middle Channel / 15MHz / QPSK



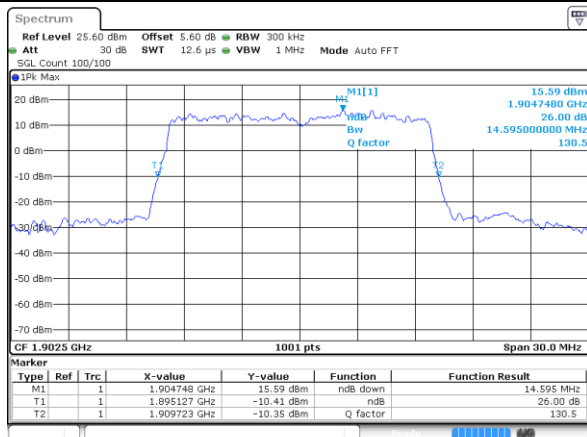
Date: 3 SEP 2020 02:59:54

Middle Channel / 15MHz / 16QAM



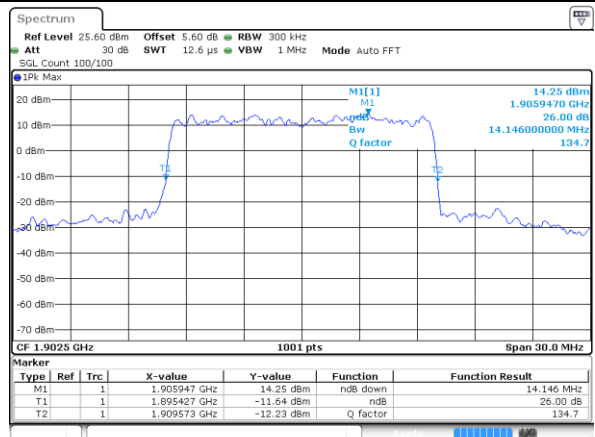
Date: 3 SEP 2020 03:00:04

Highest Channel / 15MHz / QPSK



Date: 3 SEP 2020 03:02:23

Highest Channel / 15MHz / 16QAM

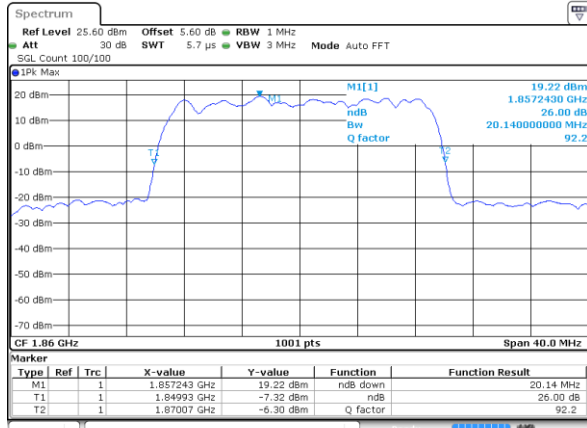


Date: 3 SEP 2020 03:02:32



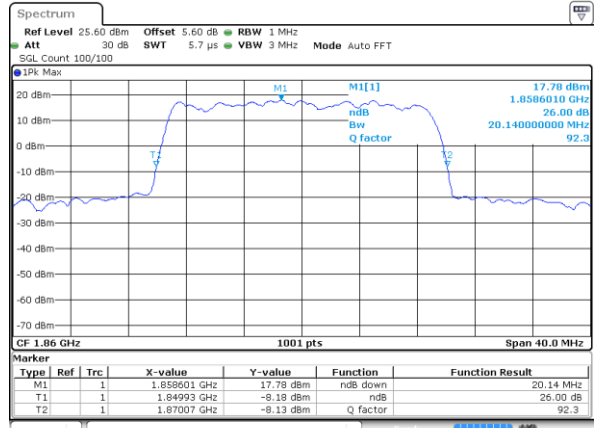
LTE Band 2

Lowest Channel / 20MHz / QPSK



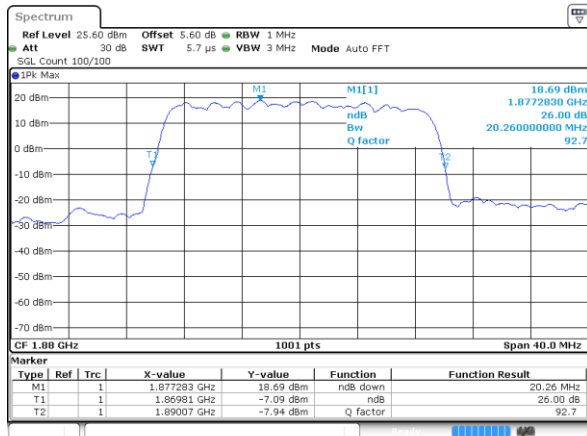
Date: 3 SEP 2020 03:12:04

Lowest Channel / 20MHz / 16QAM



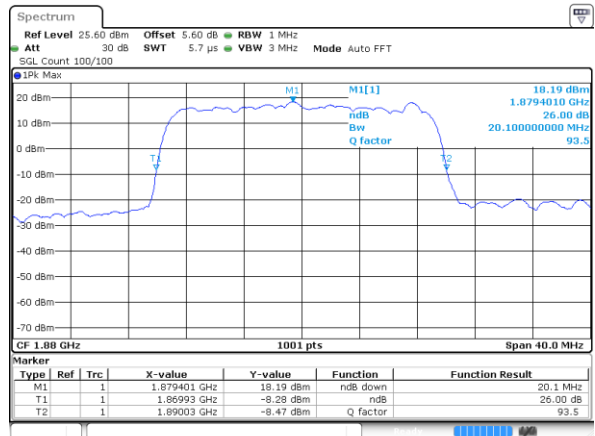
Date: 3 SEP 2020 03:12:13

Middle Channel / 20MHz / QPSK



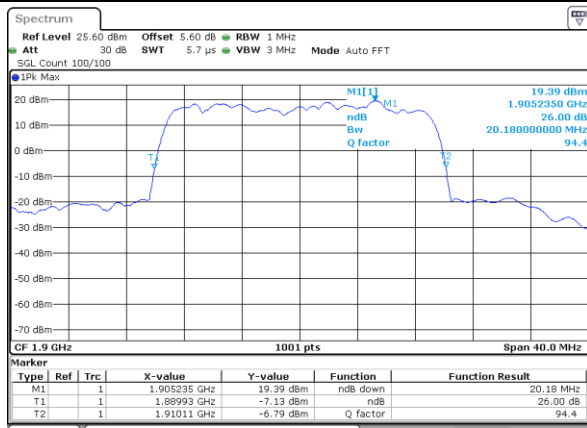
Date: 3 SEP 2020 03:19:02

Middle Channel / 20MHz / 16QAM



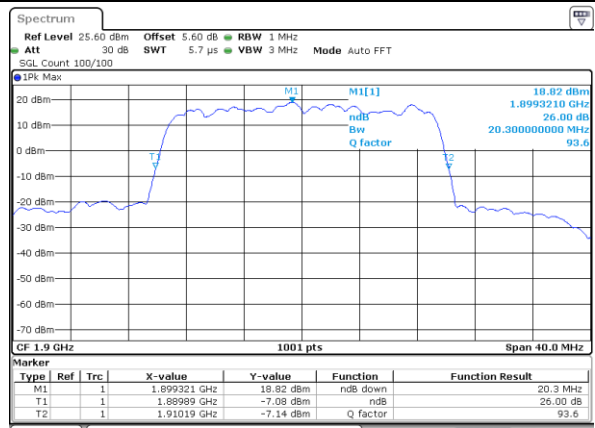
Date: 3 SEP 2020 03:19:11

Highest Channel / 20MHz / QPSK



Date: 3 SEP 2020 03:21:30

Highest Channel / 20MHz / 16QAM

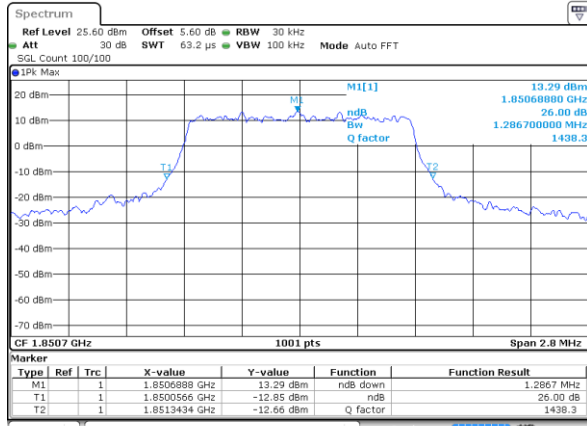


Date: 3 SEP 2020 03:21:40



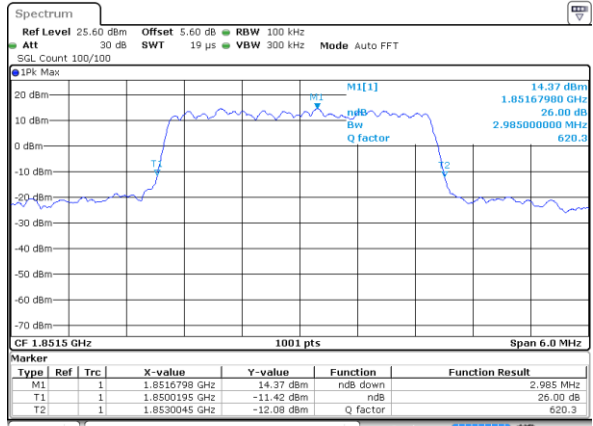
LTE Band 2

Lowest Channel / 1.4MHz / 64QAM



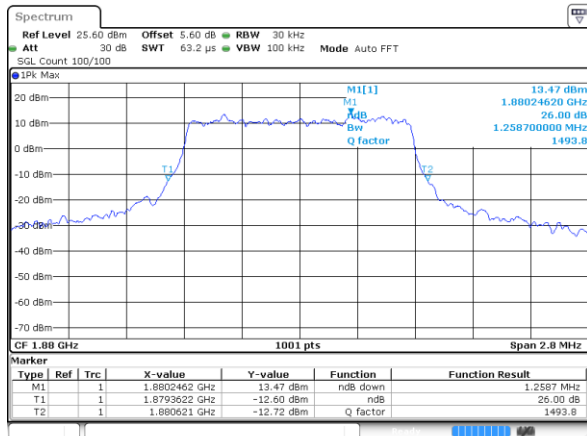
Date: 3 SEP 2020 03:34:55

Lowest Channel / 3MHz / 64QAM



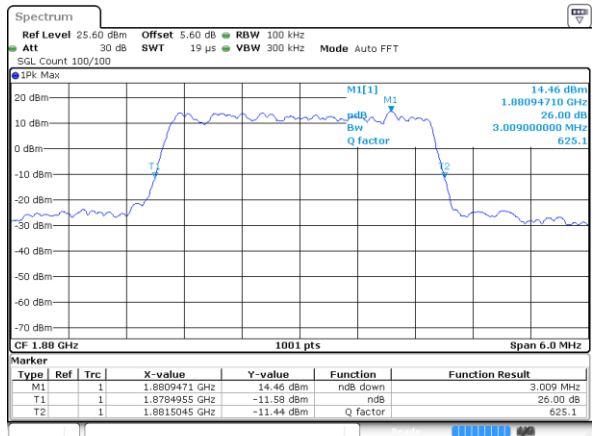
Date: 3 SEP 2020 03:35:38

Middle Channel / 1.4MHz / 64QAM



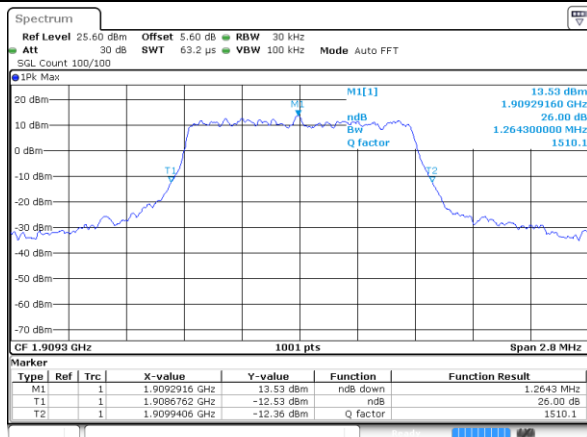
Date: 3 SEP 2020 03:35:05

Middle Channel / 3MHz / 64QAM



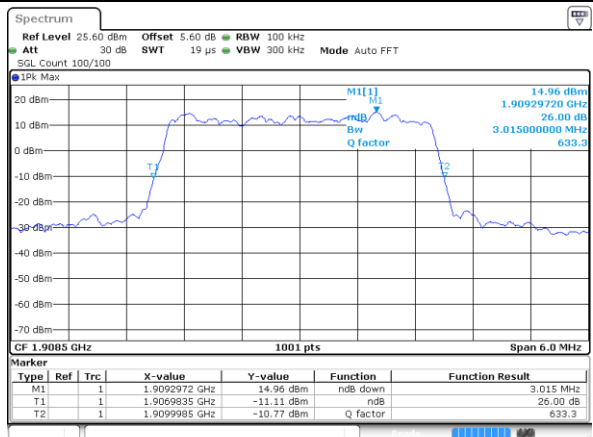
Date: 3 SEP 2020 03:35:48

Highest Channel / 1.4MHz / 64QAM



Date: 3 SEP 2020 03:35:15

Highest Channel / 3MHz / 64QAM

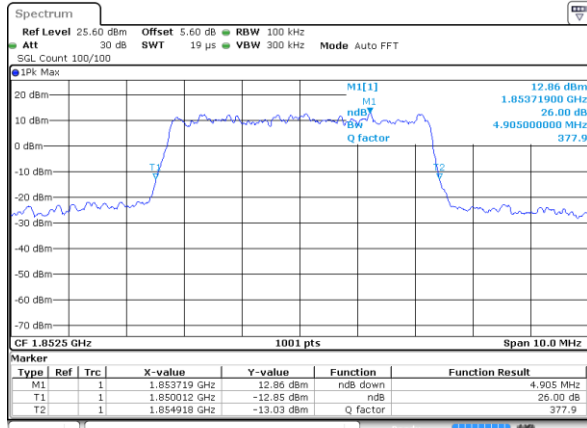


Date: 3 SEP 2020 03:35:58



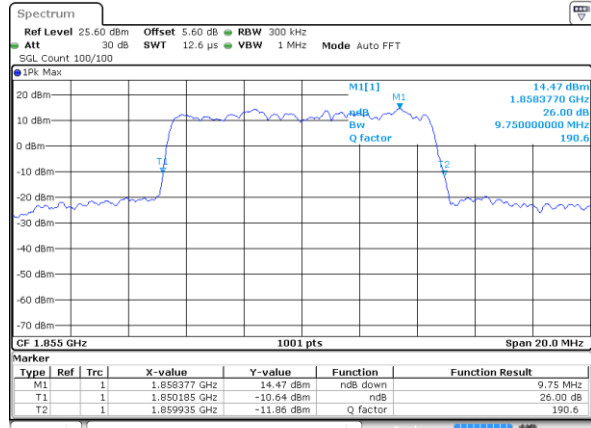
LTE Band 2

Lowest Channel / 5MHz / 64QAM



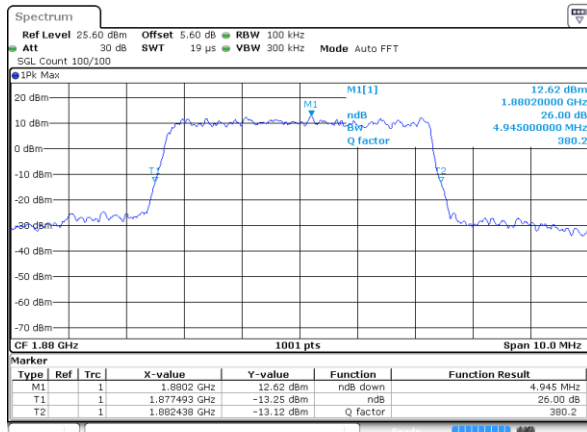
Date: 3 SEP 2020 03:36:30

Lowest Channel / 10MHz / 64QAM



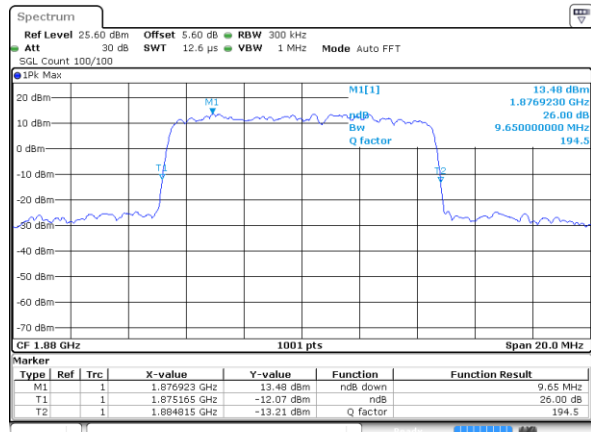
Date: 3 SEP 2020 03:37:15

Middle Channel / 5MHz / 64QAM



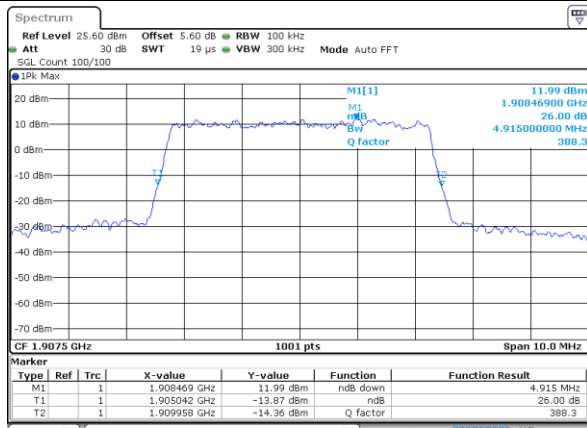
Date: 3 SEP 2020 03:36:40

Middle Channel / 10MHz / 64QAM



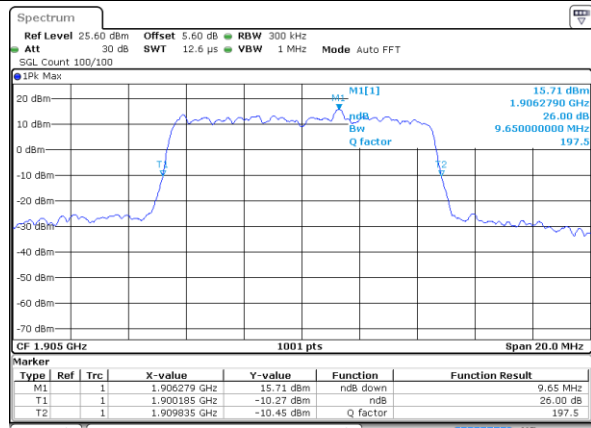
Date: 3 SEP 2020 03:37:25

Highest Channel / 5MHz / 64QAM



Date: 3 SEP 2020 03:36:50

Highest Channel / 10MHz / 64QAM

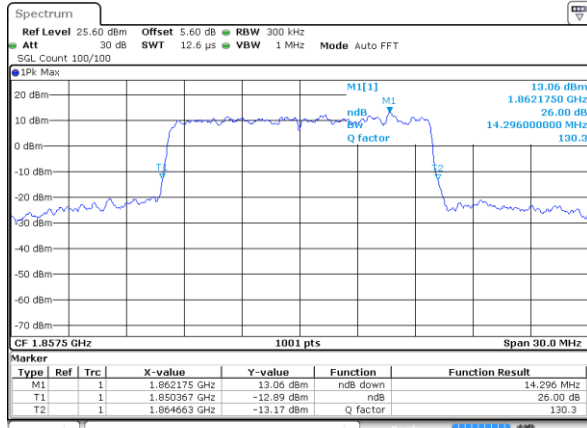


Date: 3 SEP 2020 03:37:35

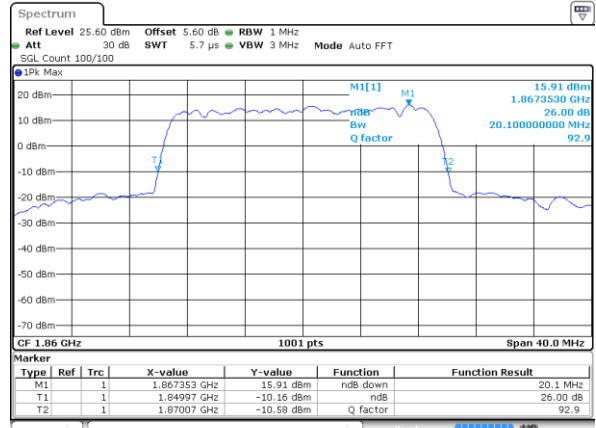


LTE Band 2

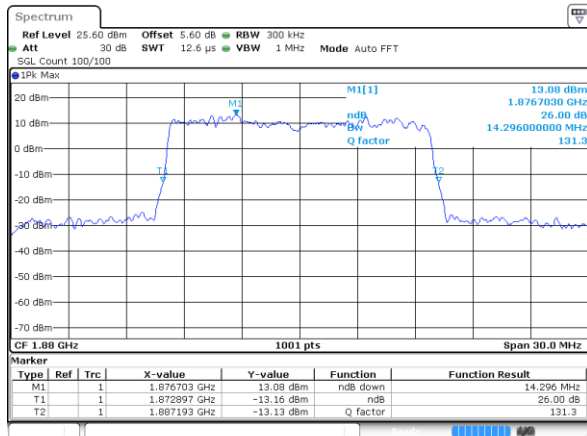
Lowest Channel / 15MHz / 64QAM



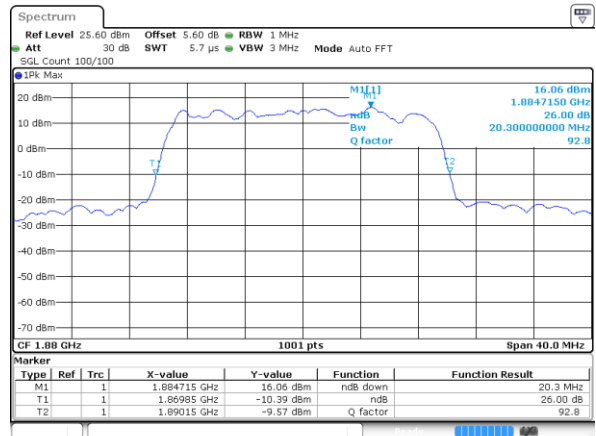
Lowest Channel / 20MHz / 64QAM



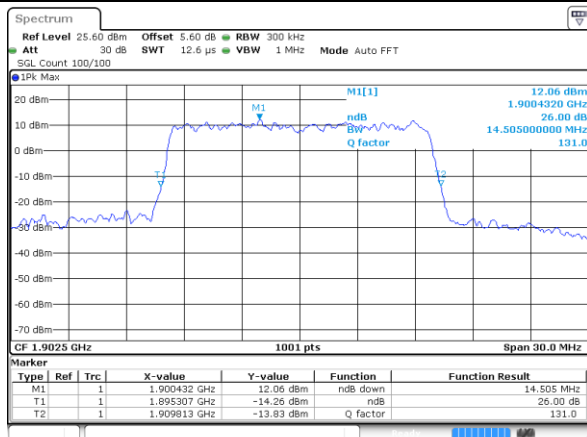
Middle Channel / 15MHz / 64QAM



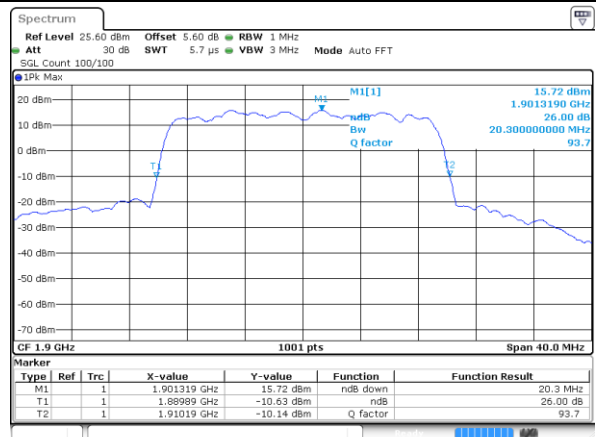
Middle Channel / 20MHz / 64QAM



Highest Channel / 15MHz / 64QAM



Highest Channel / 20MHz / 64QAM



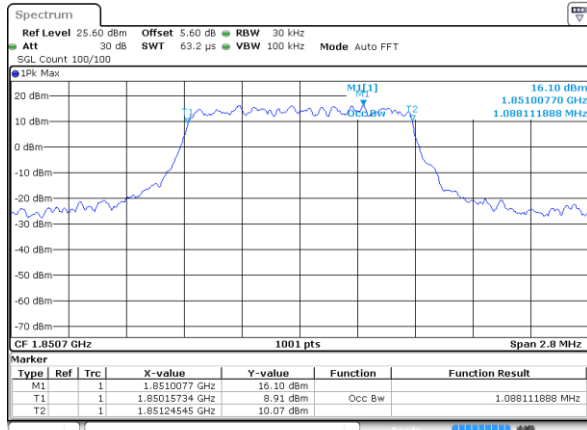
**Occupied Bandwidth**

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	1.09	1.10	2.72	2.73	4.49	4.50	9.01	9.05	13.49	13.52	18.38	18.42
Middle CH	1.09	1.10	2.73	2.72	4.48	4.51	9.03	8.99	13.40	13.43	18.50	18.50
Highest CH	1.09	1.09	2.72	2.70	4.49	4.48	9.05	9.05	13.40	13.40	18.42	18.22
Mode	LTE Band 2 : 99%OBW(MHz)											
BW	1.4MHz		3MHz		5MHz		10MHz		15MHz		20MHz	
Mod.	64QAM		64QAM		64QAM		64QAM		64QAM		64QAM	
Lowest CH	1.09	-	2.72	-	4.49	-	9.07	-	13.43	-	18.38	-
Middle CH	1.09	-	2.73	-	4.49	-	9.01	-	13.43	-	18.26	-
Highest CH	1.09	-	2.74	-	4.50	-	9.03	-	13.46	-	18.22	-

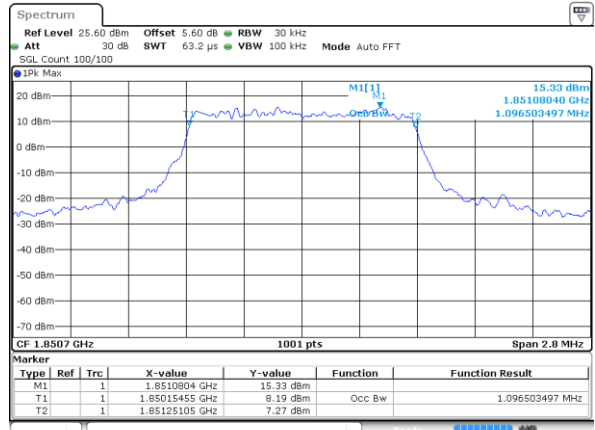


LTE Band 2

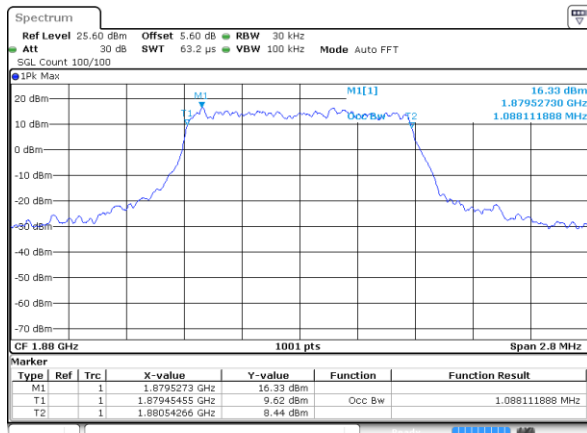
Lowest Channel / 1.4MHz / QPSK



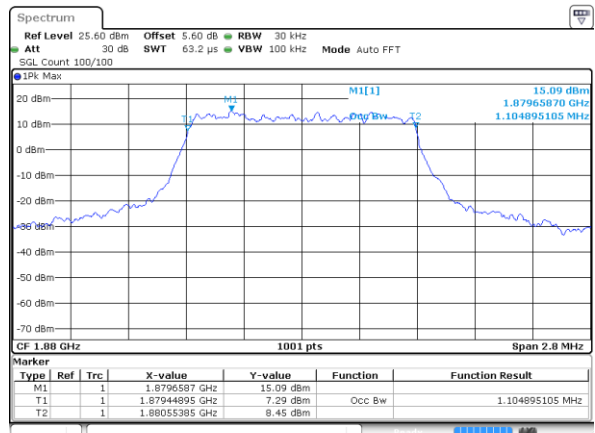
Lowest Channel / 1.4MHz / 16QAM



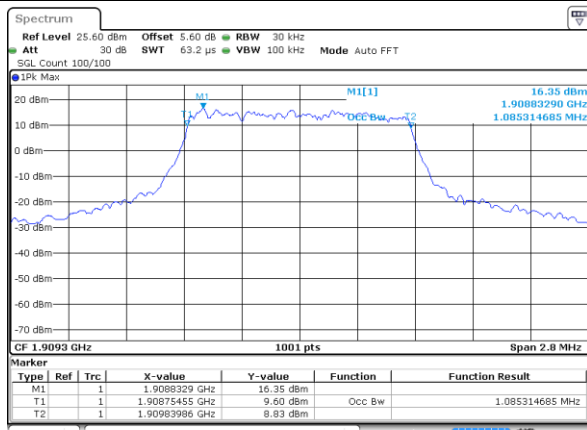
Middle Channel / 1.4MHz / QPSK



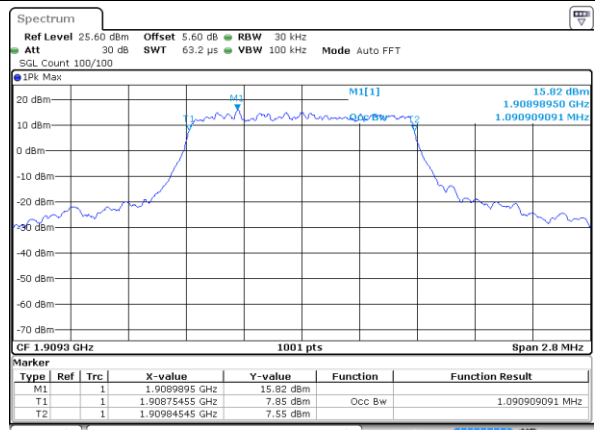
Middle Channel / 1.4MHz / 16QAM



Highest Channel / 1.4MHz / QPSK



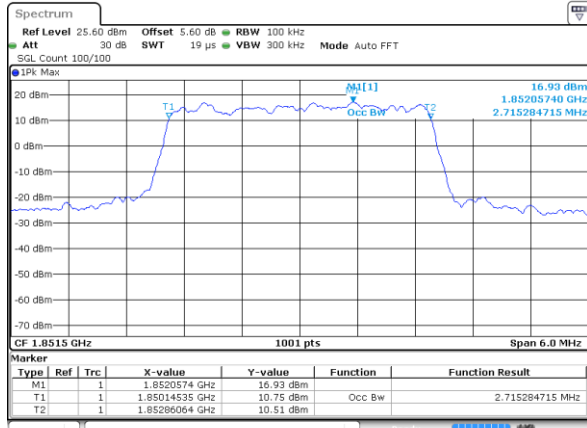
Highest Channel / 1.4MHz / 16QAM





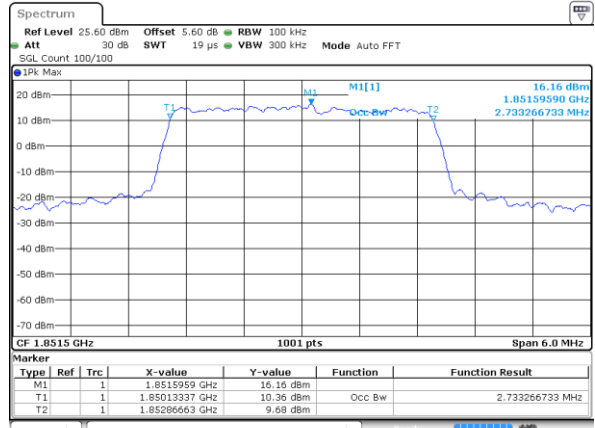
LTE Band 2

Lowest Channel / 3MHz / QPSK



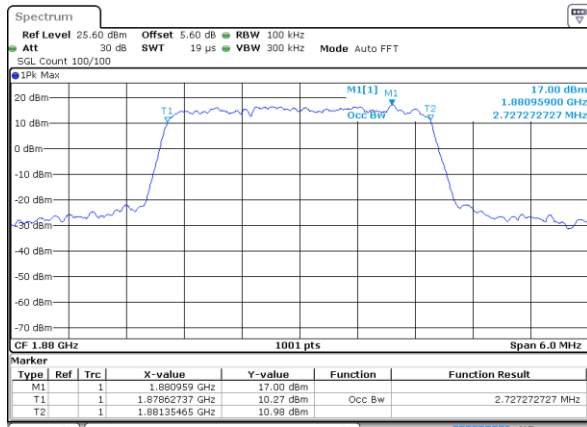
Date: 3 SEP 2020 01:50:25

Lowest Channel / 3MHz / 16QAM



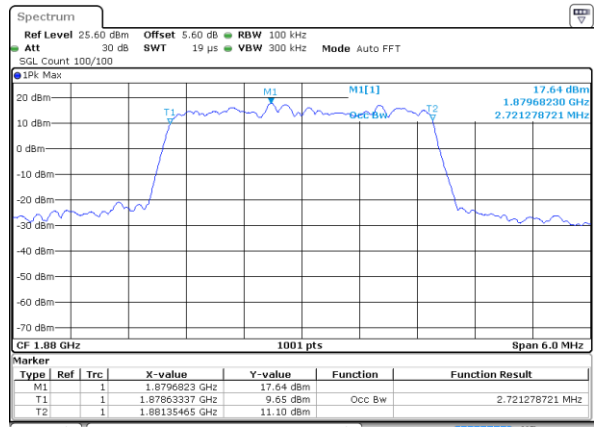
Date: 3 SEP 2020 01:50:35

Middle Channel / 3MHz / QPSK



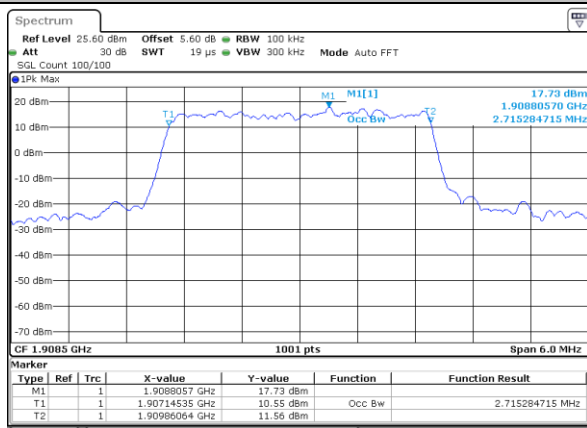
Date: 3 SEP 2020 01:57:23

Middle Channel / 3MHz / 16QAM



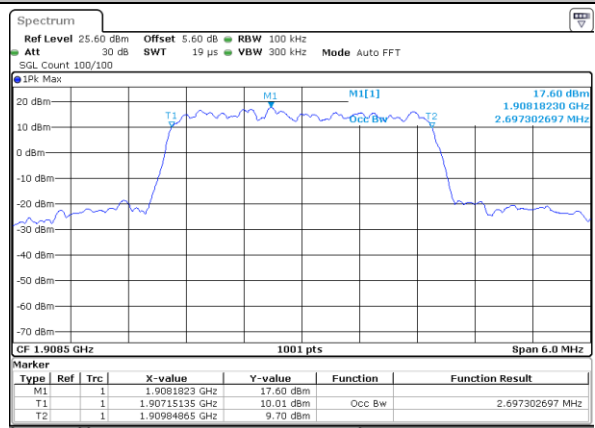
Date: 3 SEP 2020 01:57:33

Highest Channel / 3MHz / QPSK



Date: 3 SEP 2020 02:02:57

Highest Channel / 3MHz / 16QAM

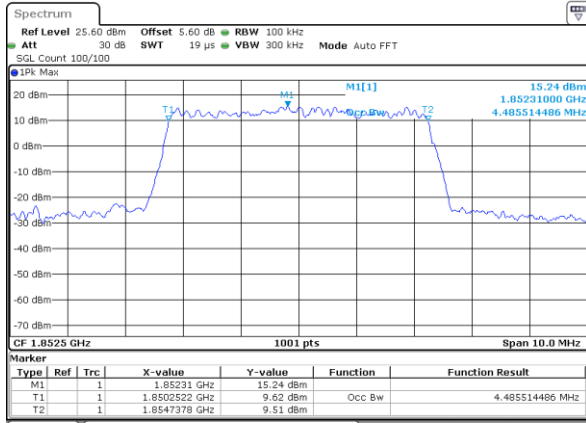


Date: 3 SEP 2020 02:03:07



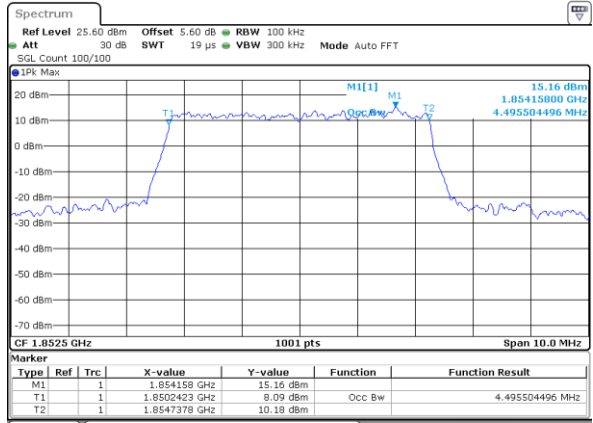
LTE Band 2

Lowest Channel / 5MHz / QPSK



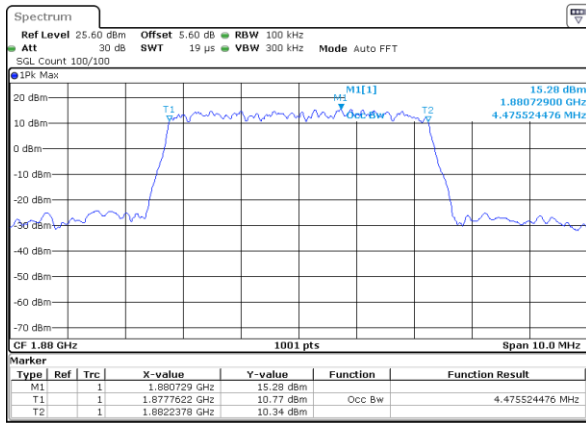
Date: 3 SEP 2020 02:15:53

Lowest Channel / 5MHz / 16QAM



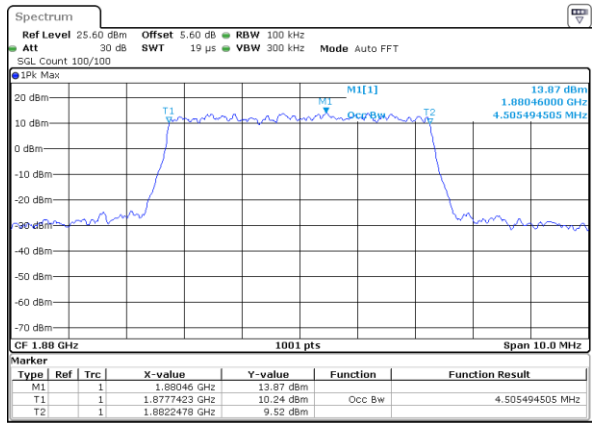
Date: 3 SEP 2020 02:16:03

Middle Channel / 5MHz / QPSK



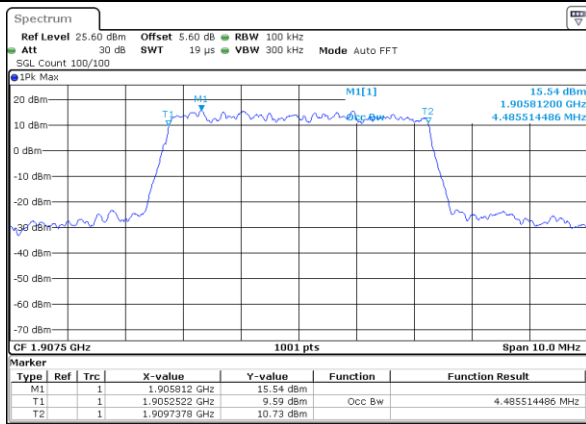
Date: 3 SEP 2020 02:22:51

Middle Channel / 5MHz / 16QAM



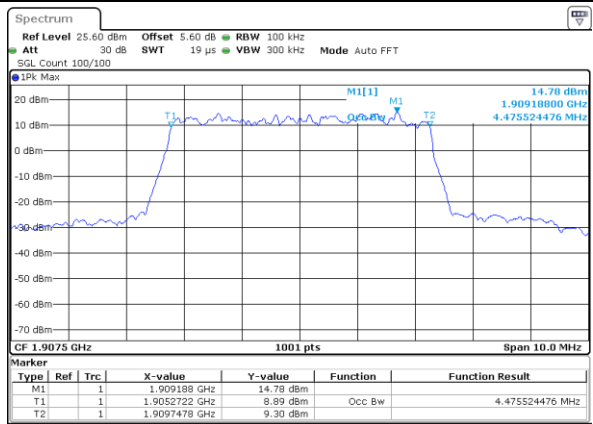
Date: 3 SEP 2020 02:23:01

Highest Channel / 5MHz / QPSK



Date: 3 SEP 2020 02:25:20

Highest Channel / 5MHz / 16QAM

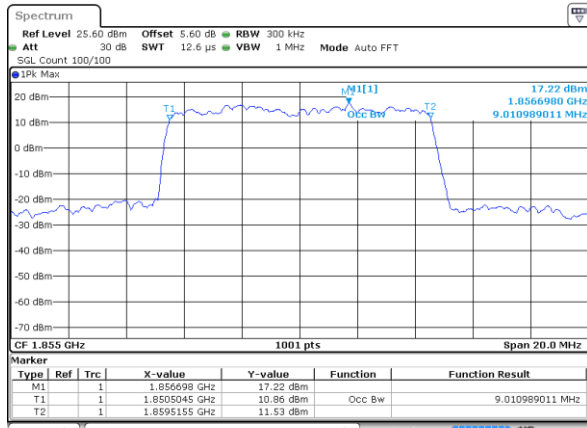


Date: 3 SEP 2020 02:25:29

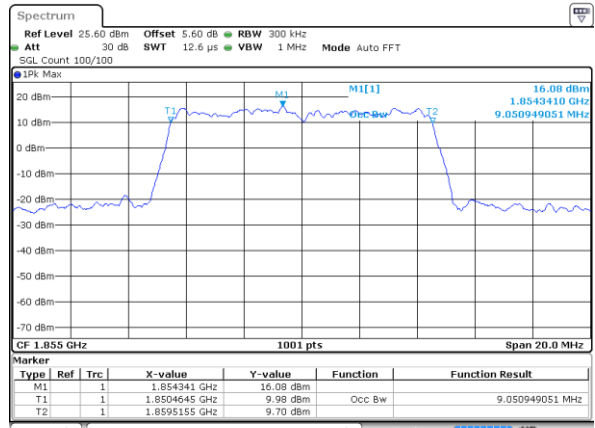


LTE Band 2

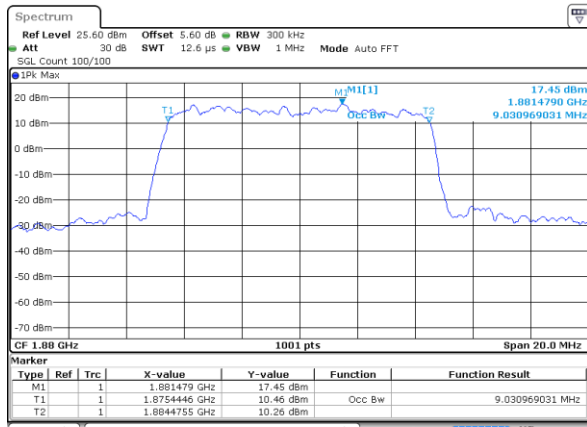
Lowest Channel / 10MHz / QPSK



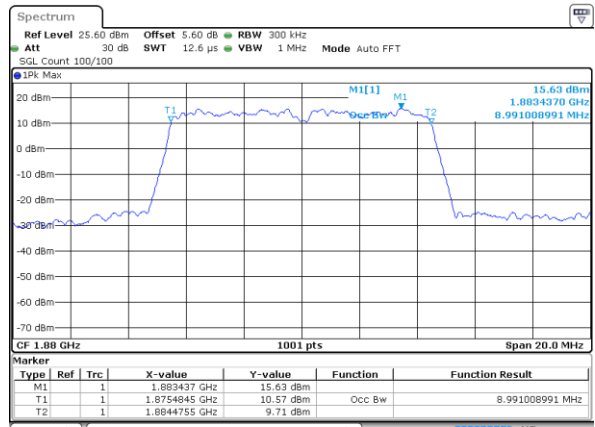
Lowest Channel / 10MHz / 16QAM



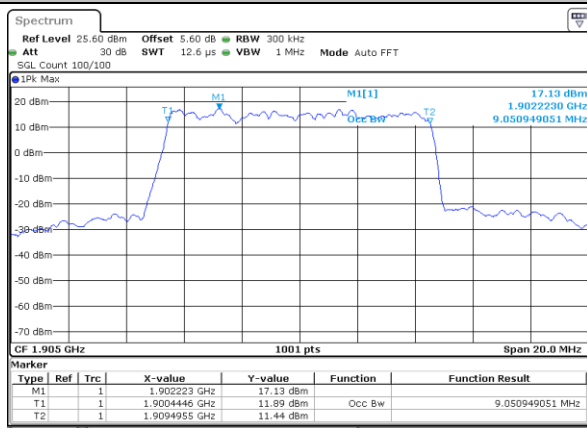
Middle Channel / 10MHz / QPSK



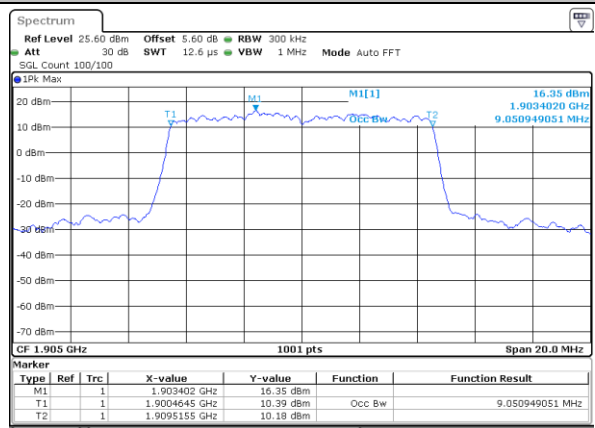
Middle Channel / 10MHz / 16QAM



Highest Channel / 10MHz / QPSK



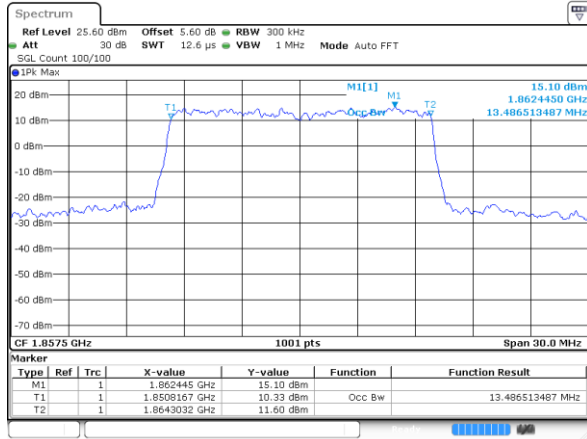
Highest Channel / 10MHz / 16QAM





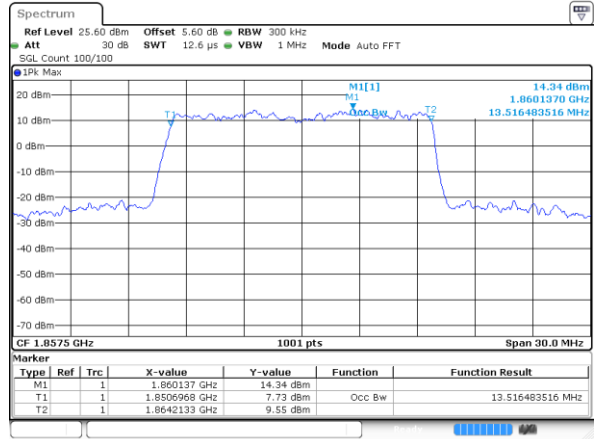
LTE Band 2

Lowest Channel / 15MHz / QPSK



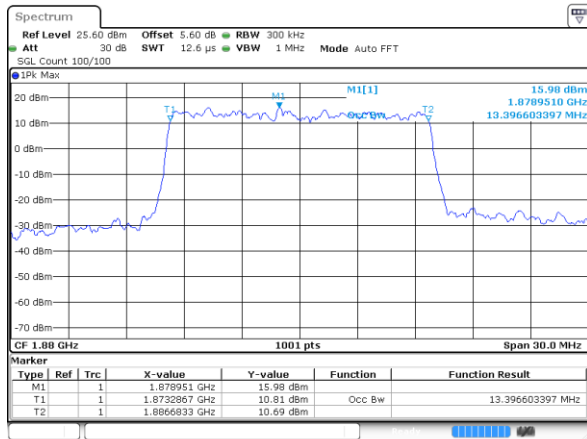
Date: 3 SEP 2020 02:52:36

Lowest Channel / 15MHz / 16QAM



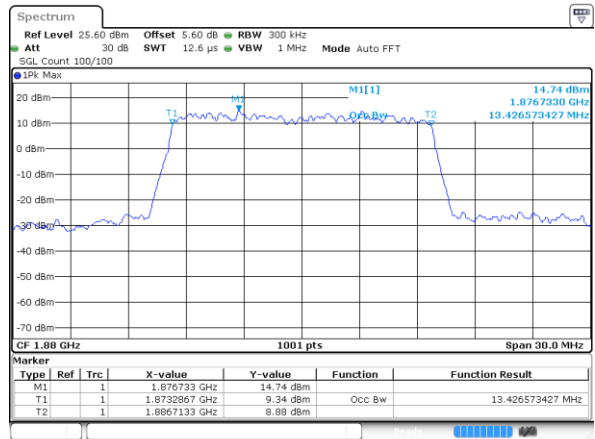
Date: 3 SEP 2020 02:52:46

Middle Channel / 15MHz / QPSK



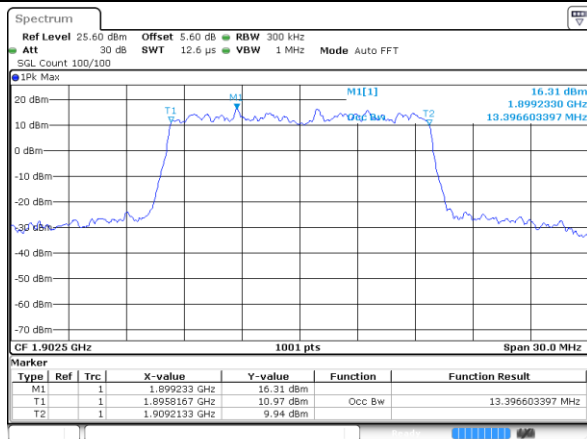
Date: 3 SEP 2020 02:59:34

Middle Channel / 15MHz / 16QAM



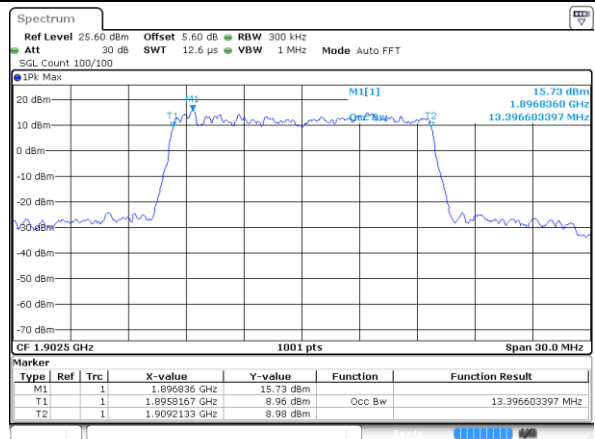
Date: 3 SEP 2020 02:59:44

Highest Channel / 15MHz / QPSK



Date: 3 SEP 2020 03:02:03

Highest Channel / 15MHz / 16QAM

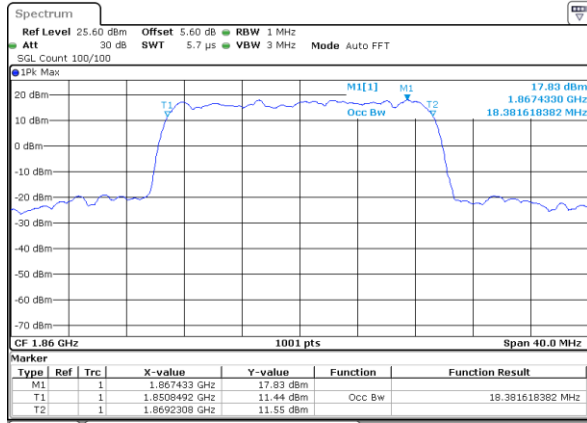


Date: 3 SEP 2020 03:02:13



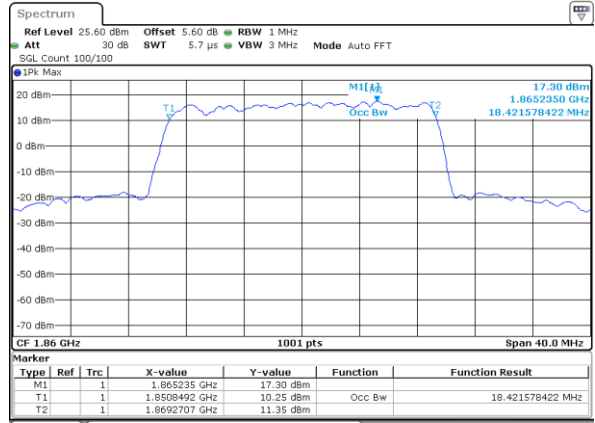
LTE Band 2

Lowest Channel / 20MHz / QPSK



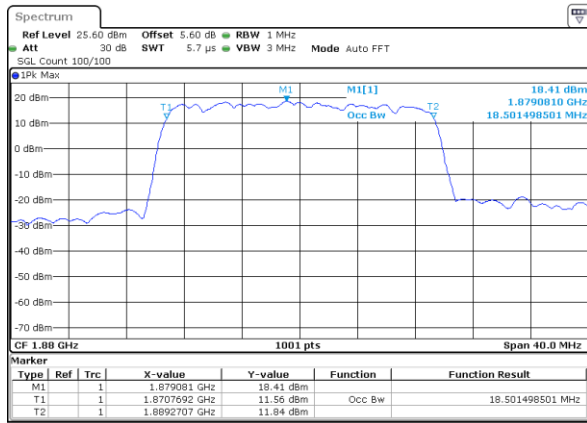
Date: 3 SEP 2020 03:11:44

Lowest Channel / 20MHz / 16QAM



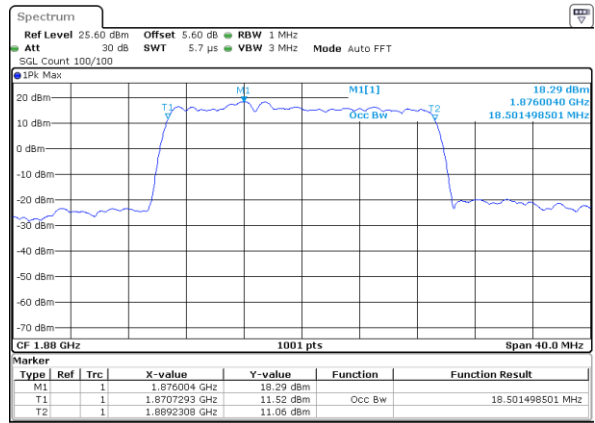
Date: 3 SEP 2020 03:11:54

Middle Channel / 20MHz / QPSK



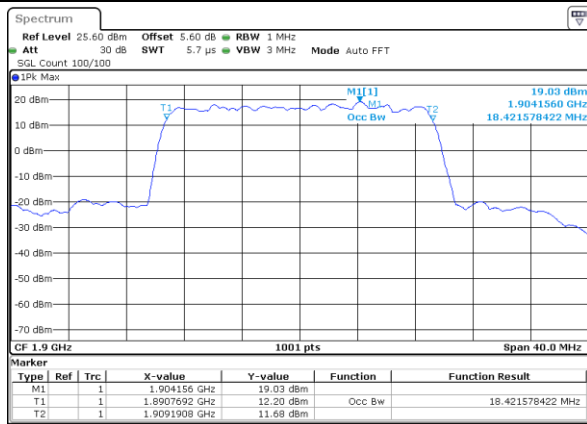
Date: 3 SEP 2020 03:18:42

Middle Channel / 20MHz / 16QAM



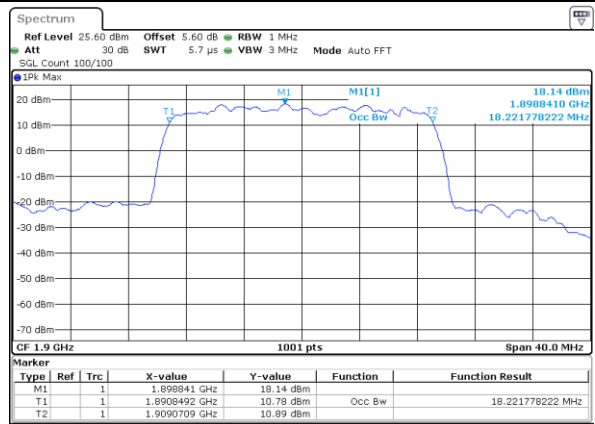
Date: 3 SEP 2020 03:18:52

Highest Channel / 20MHz / QPSK



Date: 3 SEP 2020 03:21:10

Highest Channel / 20MHz / 16QAM

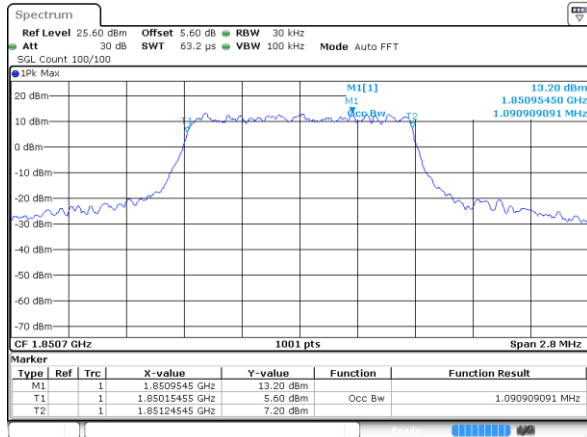


Date: 3 SEP 2020 03:21:20

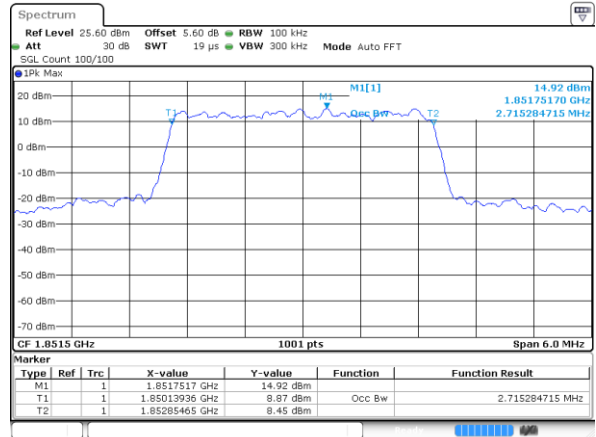


LTE Band 2

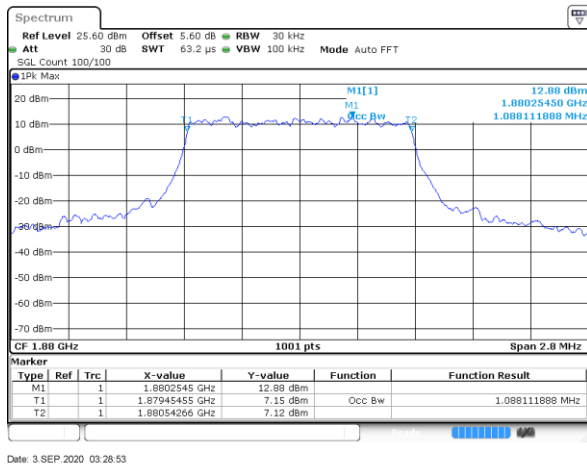
Lowest Channel / 1.4MHz / 64QAM



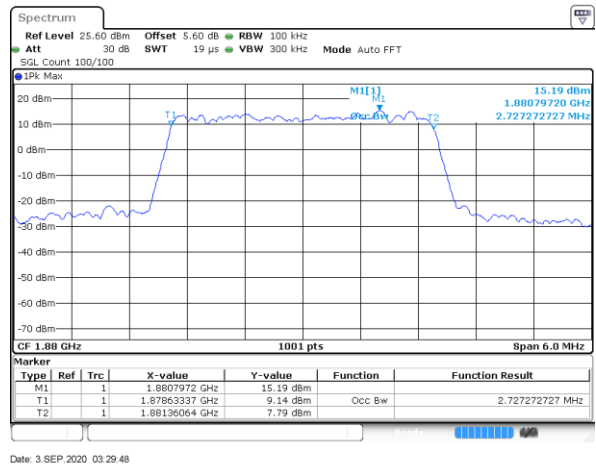
Lowest Channel / 3MHz / 64QAM



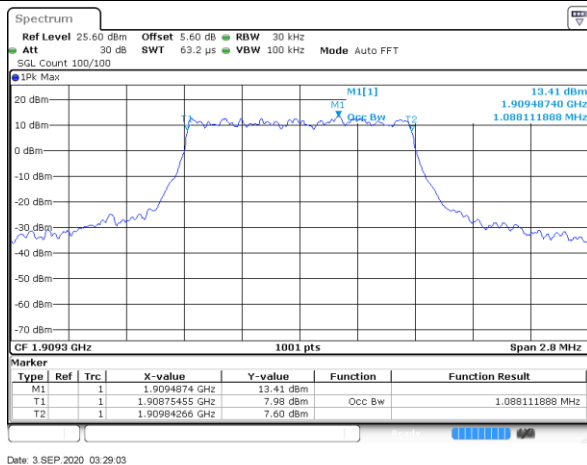
Middle Channel / 1.4MHz / 64QAM



Middle Channel / 3MHz / 64QAM



Highest Channel / 1.4MHz / 64QAM



Highest Channel / 3MHz / 64QAM

