



# FCC RADIO TEST REPORT

**FCC ID** : QISLYA-LX9  
**Equipment** : Smartphone  
**Brand Name** : HUAWEI  
**Model Name** : LYA-L29, LYA-L09  
**Applicant** : Huawei Technologies Co., Ltd.  
Administration Building, Headquarters of  
Huawei Technologies Co., Ltd., Bantian,  
Longgang District, Shenzhen, 518129,  
P.R.C  
**Manufacturer** : Huawei Technologies Co., Ltd.  
Administration Building, Headquarters of  
Huawei Technologies Co., Ltd., Bantian,  
Longgang District, Shenzhen, 518129,  
P.R.C  
**Standard** : 47 CFR Part 2, 27

The product was received on Aug. 02, 2018 and testing was started from Aug. 14, 2018 and completed on Sep. 08, 2018. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI / TIA-603-E and has been in compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

*Eric Shih*



Approved by: Eric Shih / Manager

**Sporton International (Shenzhen) Inc.**

**1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan Shenzhen City  
Guangdong Province 518055 China**



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### History of this test report

Report No.	Version	Description	Issued Date
FG880204C	01	Initial issue of report	Sep. 11, 2018



## Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.2	§2.1046	Conducted Output Power	Reporting only	-
	§27.50 (h)(2)	Equivalent Isotropic Radiated Power (Band 7) (Band 38) (Band 41)	Pass	
3.3	-	Peak-to-Average Ratio	Reporting only	-
3.4	§2.1049	Occupied Bandwidth	Reporting only	-
3.5	§2.1051 §27.53 (m)(4)	Conducted Band Edge Measurement (Band 7) (Band 38) (Band 41)	Pass	-
3.6	§2.1051 §27.53 (m)(4)	Conducted Spurious Emission (Band 7) (Band 38) (Band 41)	Pass	-
3.7	§2.1055 §27.54	Frequency Stability Temperature & Voltage	Pass	-
4.2	§2.1053 §27.53 (m)(4)	Radiated Spurious Emission (Band 7) (Band 38) (Band 41)	Pass	Under limit -28.30 dB at 10131.200 MHz

**Reviewed by: Wii Chang**

**Report Producer: Polly Tsai**



# 1 General Description

## 1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	Smartphone
Brand Name	HUAWEI
Model Name	LYA-L29, LYA-L09
FCC ID	QISLYA-LX9
EUT supports Radios application	GSM/WCDMA/HSPA/LTE/NFC/GNSS/WPC WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80/VHT160 Bluetooth BR/EDR/LE
HW Version	HL2LAYAM
SW Version	9.0.0.82(C432E82R1P7)
EUT Stage	Production Unit



Accessories Information				
AC Adapter 1	Brand Name	Huawei Technologies Co., Ltd.	Model Name	HW-100400A00
	Manufacturer	Huawei Technologies Co., Ltd.		
	Power Rating	I/P: 100 - 240 Vac~50/60Hz, 1.2 A; O/P: 5V === 2A or 9V=== 2A or 10V=== 4A		
AC Adapter 2	Brand Name	Huawei Technologies Co., Ltd.	Model Name	HW-100400U00
	Manufacturer	Huawei Technologies Co., Ltd.		
	Power Rating	I/P: 100 - 240 Vac~50/60Hz, 1.2 A; O/P: 5V === 2A or 9V=== 2A or 10V=== 4A		
AC Adapter 3	Brand Name	Huawei Technologies Co., Ltd.	Model Name	HW-100400E00
	Manufacturer	Huawei Technologies Co., Ltd.		
	Power Rating	I/P: 100 - 240 Vac~50/60Hz, 1.2 A; O/P: 5V === 2A or 9V=== 2A or 10V=== 4A		
AC Adapter 4	Brand Name	Huawei Technologies Co., Ltd.	Model Name	HW-100400B00
	Manufacturer	Huawei Technologies Co., Ltd.		
	Power Rating	I/P: 100 - 240 Vac~50/60Hz, 1.2 A; O/P: 5V === 2A or 9V=== 2A or 10V=== 4A		
Battery 1	Brand Name	Huawei Technologies Co., Ltd.	Model Name	HB486486ECW
	Power Rating	Nominal Voltage: ===+3.82Vdc Charging Voltage: ===+4.4V Rated Capacity: 4100mAh	Type	Li-ion Polymer
Battery 2	Brand Name	Huawei Technologies Co., Ltd.	Model Name	HB486486ECW
	Power Rating	Nominal Voltage: ===+3.82Vdc Charging Voltage: ===+4.4V Rated Capacity: 4100mAh	Type	Li-ion Polymer
Battery 3	Brand Name	Huawei Technologies Co., Ltd.	Model Name	HB486486ECW
	Power Rating	Nominal Voltage: ===+3.82Vdc Charging Voltage: ===+4.4V Rated Capacity: 4100mAh	Type	Li-ion Polymer
Earphone 1	Brand Name	Jiangxi Lianchuang Hongsheng Electronic Co., Ltd.		
	Model Name	MEND1632B729003	Number	22040325
Earphone 2	Brand Name	GoerTek Inc.		
	Model Name	Windy-S	Number	22040325
Earphone 3	Brand Name	Boluo County Quancheng Electronic Co., Ltd.		
	Model Name	1331-3301-6001-TC-088	Number	22040325
Earphone 4	Brand Name	Boluo County Quancheng Electronic Co., Ltd.		
	Model Name	630276	Number	N/A



## 1.2 Product Specification of Equipment Under Test

Standards-related Product Specification	
<b>Tx Frequency</b>	LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 38: 2572.5 MHz ~ 2617.5 MHz LTE Band 41: 2498.5 MHz ~ 2687.5 MHz
<b>Rx Frequency</b>	LTE Band 7: 2622.5 MHz ~ 2687.5 MHz LTE Band 38: 2572.5 MHz ~ 2617.5 MHz LTE Band 41: 2498.5 MHz ~ 2687.5 MHz
<b>Bandwidth</b>	LTE Band 7: 5MHz / 10MHz / 15MHz / 20MHz LTE Band 38: 5MHz / 10MHz / 15MHz / 20MHz LTE Band 41: 5MHz / 10MHz / 15MHz / 20MHz
<b>Maximum Output Power to Antenna</b>	<b>&lt;Up Antenna&gt;</b> LTE Band 7 : 24.09 dBm LTE Band 38 : 23.99 dBm LTE Band 41 : 23.09 dBm <b>&lt;Down Antenna&gt;</b> LTE Band 7 : 23.98 dBm LTE Band 38 : 23.86 dBm LTE Band 41 : 23.08 dBm
<b>Antenna Type</b>	IFA Antenna
<b>Antenna Gain</b>	<b>&lt;Up Antenna&gt;</b> LTE Band 7 : 0.19 dBi LTE Band 38 : 0.21 dBi LTE Band 41 : -0.28 dBi <b>&lt;Down Antenna&gt;</b> LTE Band 7 : -1.47 dBi LTE Band 38 : -1.96 dBi LTE Band 41 : -1.80 dBi
<b>Type of Modulation</b>	QPSK / 16QAM / 64QAM

## 1.3 Modification of EUT

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



### 1.4 Maximum EIRP Power, Frequency Tolerance, and Emission Designator

<For Up Antenna>

LTE Band 7 CA	QPSK			16QAM			64QAM		
BW (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)
10MHz+20MHz	28M2G7D	-	0.2193	28M2W7D	-	0.1803	28M2W7D	-	0.1127
15MHz+15MHz	28M8G7D	-	0.2234	28M7W7D	-	0.1837	28M8W7D	-	0.1138
15MHz+20MHz	33M0G7D	-	0.2213	32M9W7D	-	0.1828	32M9W7D	-	0.1132
15MHz+10MHz	23M6G7D	-	0.2270	23M6W7D	-	0.1884	23M6W7D	-	0.1164
20MHz+10MHz	28M2G7D	-	0.2223	28M2W7D	-	0.1841	28M2W7D	-	0.1135
20MHz+15MHz	33M0G7D	-	0.2208	33M0W7D	-	0.1811	33M0W7D	-	0.1132
20MHz+20MHz	37M8G7D	0.03	0.2679	37M8W7D	-	0.2218	37M7W7D	-	0.1849
LTE Band 38 CA	QPSK			16QAM			64QAM		
BW (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)
15MHz+15MHz	28M8G7D	-	0.1991	28M7W7D	-	0.1611	28M7W7D	-	0.0931
20MHz+20MHz	37M9G7D	0.02	0.2630	37M9W7D	-	0.2089	37M9W7D	-	0.2056
LTE Band 41 CA	QPSK			16QAM			64QAM		
BW (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)
5MHz+20MHz	23M5G7D	-	0.1770	23M4W7D	-	0.1413	23M4W7D	-	0.0889
10MHz+20MHz	28M2G7D	-	0.1770	28M1W7D	-	0.1393	28M1W7D	-	0.0885
10MHz+15MHz	23M6G7D	-	0.1738	23M6W7D	-	0.1393	23M5W7D	-	0.0873
15MHz+15MHz	28M7G7D	-	0.1799	28M8W7D	-	0.1426	28M6W7D	-	0.0906
15MHz+20MHz	33M0G7D	-	0.1726	32M9W7D	-	0.1377	33M0W7D	-	0.0865
15MHz+10MHz	23M6G7D	-	0.1816	23M6W7D	-	0.1416	23M6W7D	-	0.0899
20MHz+20MHz	37M9G7D	0.01	0.1910	38M0W7D	-	0.1517	37M9W7D	-	0.1462





<For Down Antenna>

LTE Band 7 CA	QPSK			16QAM			64QAM		
BW (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)
10MHz+20MHz	28M2G7D	-	0.1521	28M2W7D	-	0.1236	28M2W7D	-	0.0802
15MHz+15MHz	28M8G7D	-	0.1524	28M7W7D	-	0.1265	28M8W7D	-	0.0796
15MHz+20MHz	33M0G7D	-	0.1514	32M9W7D	-	0.1247	32M9W7D	-	0.0787
15MHz+10MHz	23M6G7D	-	0.1556	23M6W7D	-	0.1297	23M6W7D	-	0.0800
20MHz+10MHz	28M2G7D	-	0.1524	28M2W7D	-	0.1245	28M2W7D	-	0.0802
20MHz+15MHz	33M0G7D	-	0.1578	33M0W7D	-	0.1288	33M0W7D	-	0.0793
20MHz+20MHz	37M8G7D	0.03	0.1782	37M8W7D	-	0.1449	37M7W7D	-	0.1127
LTE Band 38 CA	QPSK			16QAM			64QAM		
BW (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)
15MHz+15MHz	28M8G7D	-	0.1472	28M7W7D	-	0.1143	28M7W7D	-	0.0711
20MHz+20MHz	37M9G7D	0.02	0.1549	37M9W7D	-	0.1197	37M9W7D	-	0.1253
LTE Band 41 CA	QPSK			16QAM			64QAM		
BW (MHz)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)	Emission Designator (99%OBW)	Frequency Tolerance (ppm)	Maximum EIRP(W)
5MHz+20MHz	23M5G7D	-	0.1297	23M4W7D	-	0.1005	23M4W7D	-	0.0625
10MHz+20MHz	28M2G7D	-	0.1288	28M1W7D	-	0.1028	28M1W7D	-	0.0634
10MHz+15MHz	23M6G7D	-	0.1309	23M6W7D	-	0.1014	23M5W7D	-	0.0631
15MHz+15MHz	28M7G7D	-	0.1285	28M8W7D	-	0.0998	28M6W7D	-	0.0625
15MHz+20MHz	33M0G7D	-	0.1279	32M9W7D	-	0.1019	33M0W7D	-	0.0640
15MHz+10MHz	23M6G7D	-	0.1297	23M6W7D	-	0.0998	23M6W7D	-	0.0622
20MHz+20MHz	37M9G7D	0.01	0.1343	38M0W7D	-	0.1167	37M9W7D	-	0.0883



### 1.5 Testing Location

Sporton International (Kunshan) Inc. is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600155-0) and the FCC designation No. is CN5013.

<b>Test Site</b>	Sporton International (Kunshan) Inc.		
<b>Test Site Location</b>	No. 1098, Pengxi North Road, Kunshan Economic Development Zone, Jiangsu Province 215335, China TEL : 86-512-57900158 FAX : 86-512-57900958		
<b>Test Site No.</b>	<b>Sporton Site No.</b>	<b>FCC designation No.</b>	<b>FCC Test Firm Registration No.</b>
	TH01-KS	CN5013	630927

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

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

<b>Test Site</b>	Sporton International (Shenzhen) Inc.	
<b>Test Site Location</b>	No. 3 Bldg the third floor of south, Shahe River west, Fengzeyuan Warehouse, Nanshan District Shenzhen City Guangdong Province 518055 China TEL: +86-755-3320-2398	
<b>Test Site No.</b>	<b>Sporton Site No.</b>	<b>FCC Test Firm Registration No.</b>
	03CH01-SZ	577730

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

### 1.6 Applicable Standards

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

- ♦ ANSI C63.26-2015
- ♦ ANSI / TIA-603-E
- ♦ 47 CFR Part 2, 22(H), 27
- ♦ FCC KDB 971168 D01 Power Meas. License Digital Systems v03r01
- ♦ FCC KDB 412172 D01 Determining ERP and EIRP v01r01

**Remark:** All test items were verified and recorded according to the standards and without any deviation during the test.



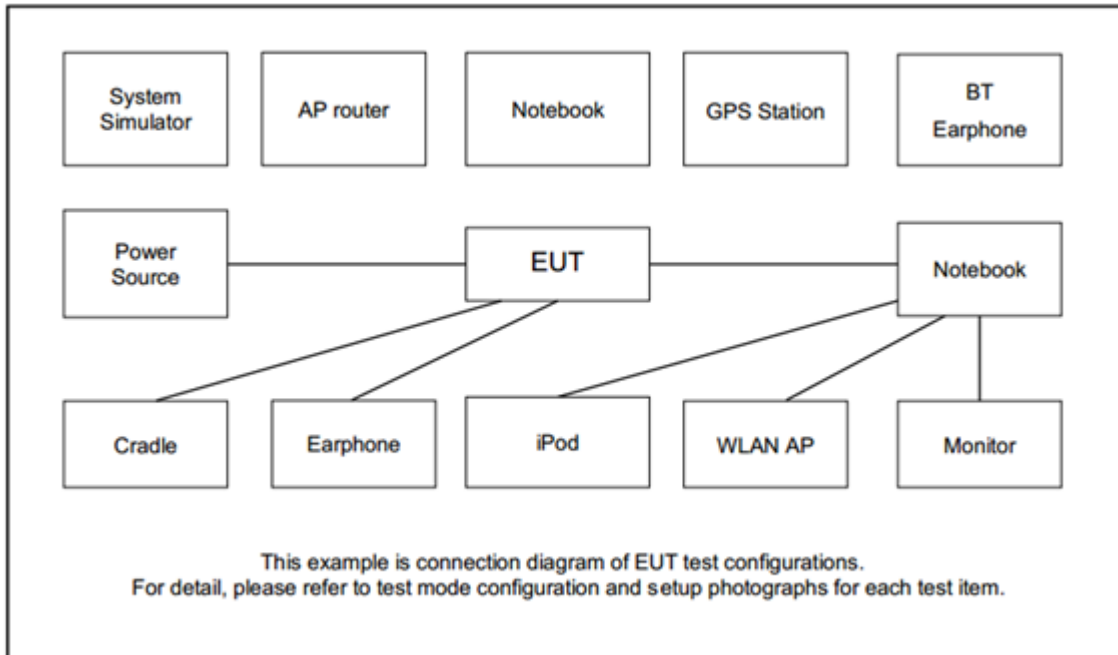
## 2 Test Configuration of Equipment Under Test

### 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.  
 For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (X plane) were recorded in this report.

Test Items	Band	Bandwidth (MHz)									Modulation			RB #			Test Channel			
		20+20	20+15	15+20	20+10	10+20	20+5	5+20	15+15	15+10	10+15	QPSK	16QAM	64QAM	1	Half	Full	L	M	H
Max. Output Power	7_CA	v	v	v	v	v	-	-	v	v	-	v	v	v	v	v	v	v	v	v
	38_CA	v	-	-	-	-	-	-	v	-	-	v	v	v	v	v	v	v	v	v
	41_CA	v	-	v	-	v	-	v	v	v	v	v	v	v	v	v	v	v	v	v
26dB Bandwidth	7_CA	v	v	v	v	v	-	-	v	v	-	v	v	v			v	v	v	v
	38_CA	Covered by Band 41																		
	41_CA	v	-	v	-	v	-	v	v	v	v	v	v	v			v	v	v	v
99% Bandwidth	7_CA	v	v	v	v	v	-	-	v	v	-	v	v	v			v	v	v	v
	38_CA	v	-	-	-	-	-	-	v	-	-	v	v	v			v	v	v	v
	41_CA	v	-	v	-	v	-	v	v	v	v	v	v	v			v	v	v	v
Conducted Band Edge	7_CA	v	v	v	v	v	-	-	v	v	-	v	v	v	v		v	v		v
	38_CA	Covered by Band 41																		
	41_CA	v	-	v	-	v	-	v	v	v	v	v	v	v	v		v	v		v
Conducted Spurious Emission	7_CA	v	v	v	v	v	-	-	v	v	-	v	v	v	v		v	v		v
	38_CA	Covered by Band 41																		
	41_CA	v	-	v	-	v	-	v	v	v	v	v	v	v	v		v	v		v
E.I.R.P.	7_CA	v	v	v	v	v	-	-	v	v	-	v	v	v	v		v	v		v
	38_CA	v	-	-	-	-	-	-	v	-	-	v	v	v	v		v	v		v
	41_CA	v	-	v	-	v	-	v	v	v	v	v	v	v	v		v	v		v
Radiated Spurious Emission	7_CA	Worst Case															v	v	v	
	38_CA	Worst Case															v	v	v	
	41_CA	Worst Case															v	v	v	
Remark	<ol style="list-style-type: none"> <li>The mark "v" means that this configuration is chosen for testing</li> <li>The mark "-" means that this bandwidth is not supported.</li> <li>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.</li> <li>All the radiated test cases were performed with Earphone 1 and USB Cable 1.</li> </ol>																			

## 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.	System Simulator	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 and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

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

*Offset = RF cable loss + attenuator factor.*

Following shows an offset computation example with cable loss 4.2 dB and 10dB attenuator.

Example :

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

$$= 4.2 + 10 = 14.2 \text{ (dB)}$$



## 2.5 Frequency List of Low/Middle/High Channels

LTE Band 7 Channel and Frequency List_CA					
BW [MHz]	Channel/Frequency(MHz)		Lowest	Middle	Highest
20 + 20	PCC	Channel	20850	21001	21152
		Frequency	2510.0	2525.1	2540.2
	SCC	Channel	21048	21199	21350
		Frequency	2529.8	2544.9	2560.0
20 + 15	PCC	Channel	20850	21026	21201
		Frequency	2510.0	2527.6	2545.1
	SCC	Channel	21021	21197	21372
		Frequency	2527.1	2544.7	2562.2
15 + 20	PCC	Channel	20828	21003	21179
		Frequency	2507.8	2525.3	2542.9
	SCC	Channel	20999	21174	21350
		Frequency	2524.9	2542.4	2560.0
20 + 10	PCC	Channel	20850	21051	21251
		Frequency	2510.0	2530.1	2550.1
	SCC	Channel	20994	21195	21395
		Frequency	2524.4	2544.5	2564.5
10 + 20	PCC	Channel	20805	21006	21206
		Frequency	2505.5	2525.6	2545.6
	SCC	Channel	20949	21150	21350
		Frequency	2519.9	2540.0	2560.0
15 + 15	PCC	Channel	20825	21025	21225
		Frequency	2507.5	2527.5	2547.5
	SCC	Channel	20975	21175	21375
		Frequency	2522.5	2542.5	2562.5
15 + 10	PCC	Channel	20825	21051	21277
		Frequency	2507.5	2530.1	2552.7
	SCC	Channel	20945	21171	21397
		Frequency	2519.5	2542.1	2564.7



LTE Band 38 Channel and Frequency List					
BW [MHz]	Channel/Frequency(MHz)		Lowest	Middle	Highest
20 + 20	PCC	Channel	37850	37901	37952
		Frequency	2580.0	2585.1	2590.2
	SCC	Channel	38048	38099	38150
		Frequency	2599.8	2604.9	2610.0
15+ 15	PCC	Channel	37825	37925	38025
		Frequency	2577.5	2587.5	2597.5
	SCC	Channel	37975	38075	38175
		Frequency	2592.5	2602.5	2612.5

LTE Band 41 Channel and Frequency List					
BW [MHz]	Channel/Frequency(MHz)		Lowest	Middle	Highest
20 + 20	PCC	Channel	40240	40541	40942
		Frequency	2555.0	2585.1	2625.2
	SCC	Channel	40438	40739	41140
		Frequency	2574.8	2604.9	2645.0
15 + 20	PCC	Channel	40218	40542	40969
		Frequency	2552.8	2585.2	2627.9
	SCC	Channel	40389	40713	41140
		Frequency	2569.9	2602.3	2645.0
10 + 20	PCC	Channel	40195	40543	40996
		Frequency	2550.5	2585.3	2630.6
	SCC	Channel	40339	40687	41140
		Frequency	2564.9	2599.7	2645.0



LTE Band 41 Channel and Frequency List					
BW [MHz]	Channel/Frequency(MHz)		Lowest	Middle	Highest
5 + 20	PCC	Channel	40173	40544	41023
		Frequency	2548.3	2585.4	2633.3
	SCC	Channel	40290	40661	41140
		Frequency	2560.0	2597.1	2645.0
15 + 15	PCC	Channel	40215	40565	41015
		Frequency	2552.5	2587.5	2632.5
	SCC	Channel	40365	40715	41165
		Frequency	2567.5	2602.5	2647.5
10 + 15	PCC	Channel	40193	40579	41045
		Frequency	2550.3	2588.9	2635.5
	SCC	Channel	40313	40699	41165
		Frequency	2562.3	2600.9	2647.5
15 + 10	PCC	Channel	40215	40620	41070
		Frequency	2552.5	2593.0	2638.0
	SCC	Channel	40335	40740	41190
		Frequency	2564.5	2605.0	2650.0

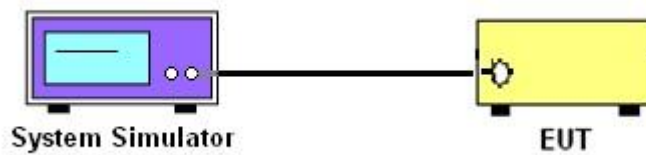
### 3 Conducted Test Items

#### 3.1 Measuring Instruments

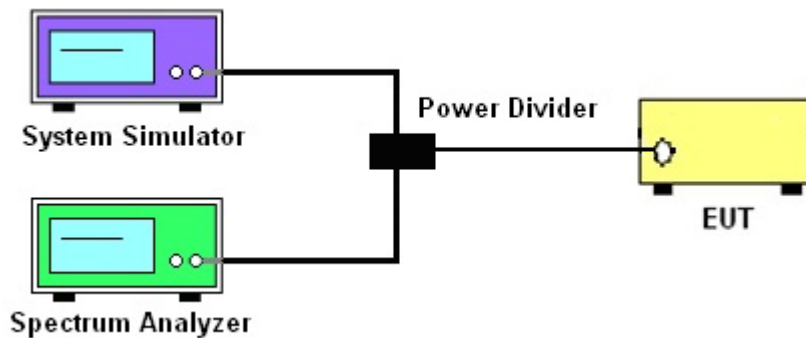
See list of measuring instruments of this test report.

##### 3.1.1 Test Setup

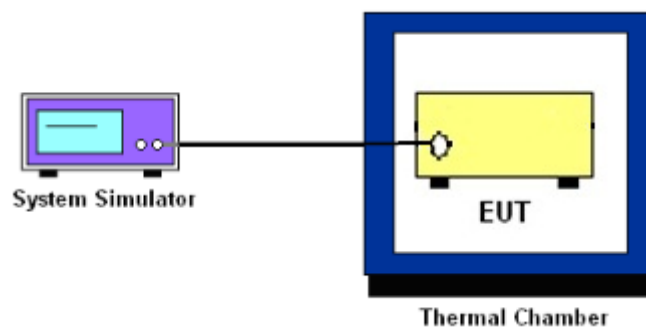
##### 3.1.2 Conducted Output Power



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



##### 3.1.4 Frequency Stability



##### 3.1.5 Test Result of Conducted Test

Please refer to Appendix A.





## 3.2 Conducted Output Power and EIRP

### 3.2.1 Description of the Conducted Output Power Measurement and 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 EIRP of mobile transmitters must not exceed 2 Watts for LTE Band 7, Band 38, and Band 41.

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

### 3.2.2 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.



### **3.3 Peak-to-Average Ratio**

#### **3.3.1 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.

#### **3.3.2 Test Procedures**

The testing follows FCC KDB 971168 D01 v03r01 Section 5.7.1

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



## 3.4 Occupied Bandwidth

### 3.4.1 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.

### 3.4.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 4.2

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. 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.
3. 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.
4. Set the detection mode to peak, and the trace mode to max hold.
5. 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)
6. Determine the “-26 dB down amplitude” as equal to (Reference Value – X).
7. 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.
8. Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.



## **3.5 Conducted Band Edge**

### **3.5.1 Description of Conducted Band Edge Measurement**

27.53(m)(4)

For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that  $43 + 10 \log (P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

### **3.5.2 Test Procedures**

The testing follows FCC KDB 971168 D01 v03r01 Section 6.0.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The band edges of low and high channels for the highest RF powers were measured.
3. Set RBW  $\geq$  1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
4. Beyond the 1 MHz band from the band edge, RBW=1MHz was used.
5. Set spectrum analyzer with RMS detector.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. Checked that all the results comply with the emission limit line.
8. The other 40 dB, and 55 dB have additionally applied same calculation above.



## 3.6 Conducted Spurious Emission

### 3.6.1 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  $55 + 10 \log (P)$  dB.

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

### 3.6.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 6.0.

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. 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.
3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz.
6. Set spectrum analyzer with RMS detector.
7. Taking the record of maximum spurious emission.
8. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
9. The limit line is derived from  $55 + 10\log(P)$ dB below the transmitter power P(Watts)



## 3.7 Frequency Stability

### 3.7.1 Description of Frequency Stability Measurement

27.54

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

### 3.7.2 Test Procedures for Temperature Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

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  $-30^{\circ}\text{C}$  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  $10^{\circ}\text{C}$  step up to  $50^{\circ}\text{C}$ . 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.

### 3.7.3 Test Procedures for Voltage Variation

The testing follows FCC KDB 971168 D01 v03r01 Section 9.0.

1. The EUT was placed in a temperature chamber at  $20\pm 5^{\circ}\text{C}$  and connected with the system simulator.
2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

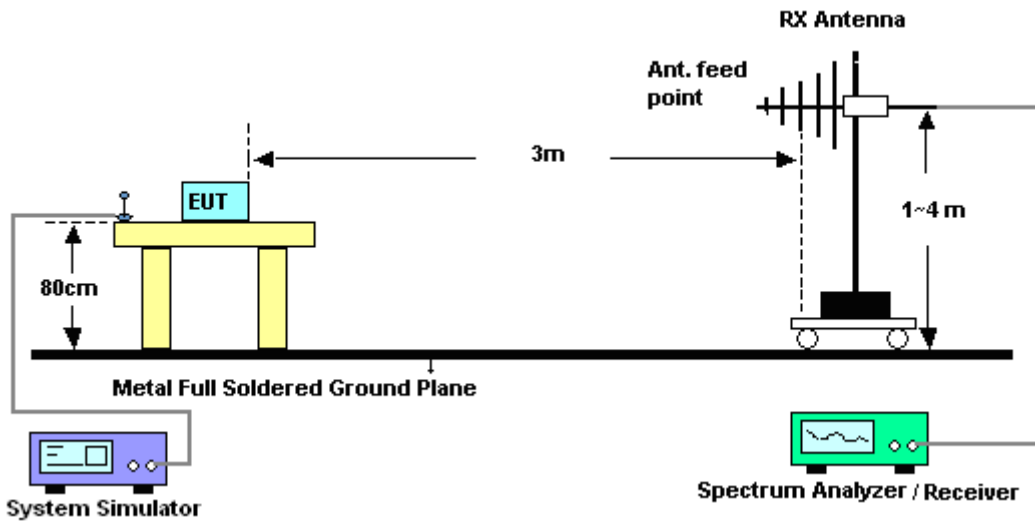
## 4 Radiated Test Items

### 4.1 Measuring Instruments

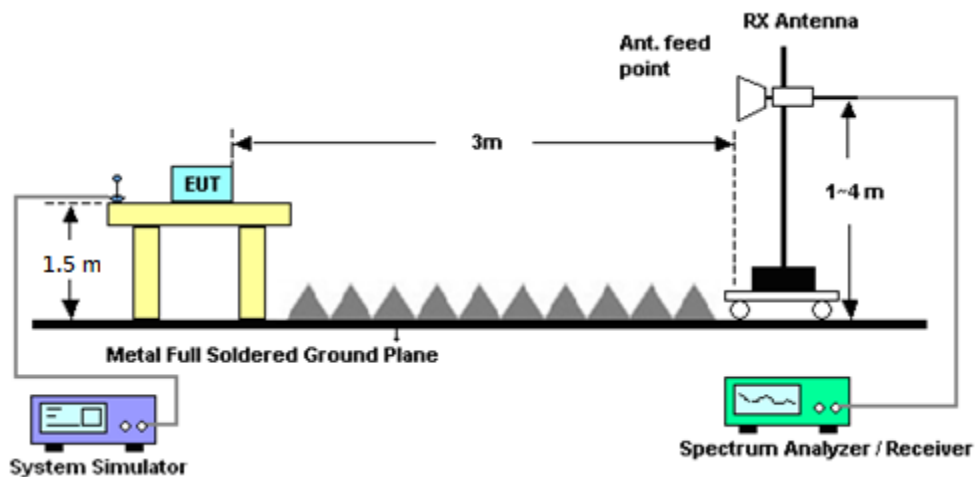
See list of measuring instruments of this test report.

#### 4.1.1 Test Setup

For radiated test from 30MHz to 1GHz



For radiated test above 1GHz



#### 4.1.2 Test Result of Radiated Test

Please refer to Appendix B.



## 4.2 Radiated Spurious Emission

### 4.2.1 Description of Radiated Spurious Emission

The radiated spurious emission was measured by substitution method according to ANSI / TIA-603-E. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least  $55 + 10 \log (P)$  dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

### 4.2.2 Test Procedures

The testing follows FCC KDB 971168 D01 v03r01 Section 5.8 and ANSI / TIA-603-E Section 2.2.12.

1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. 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.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
11. The limit line is derived from  $55 + 10\log(P)$ dB below the transmitter power P(Watts)  
EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain  
ERP (dBm) = 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	FSP40	100319	9kHz~40GHz	Oct.12, 2017	Aug. 20, 2018~ Sep. 08, 2018	Oct.11, 2018	Conducted (TH01-KS)
Spectrum Analyzer	R&S	FSV30	101338	10Hz~30GHz	Apr. 19, 2018	Aug. 20, 2018~ Sep. 08, 2018	Apr. 18, 2019	Conducted (TH01-KS)
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Aug. 07, 2018	Aug. 20, 2018~ Sep. 08, 2018	Aug. 06, 2019	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-9605 02	-40~+150°C	Oct.12, 2017	Aug. 20, 2018~ Sep. 08, 2018	Oct. 11, 2018	Conducted (TH01-KS)
EMI Test Receiver&SA	Agilent	N9038A	MY522601 85	20Hz~26.5GHz	Apr. 19, 2018	Aug. 14, 2018~ Aug. 30, 2018	Apr. 18, 2019	Radiation (03CH01-SZ)
Bilog Antenna	TeseQ	CBL6112D	35408	30MHz~2GHz	Apr. 19, 2018	Aug. 14, 2018~ Aug. 30, 2018	Apr. 18, 2019	Radiation (03CH01-SZ)
Double Ridge Horn Antenna	ETS Lindgren	3117	119436	1GHz~18GHz	Jul. 28, 2018	Aug. 14, 2018~ Aug. 30, 2018	Jul. 27, 2019	Radiation (03CH01-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz~40GHz	Mar. 30, 2018	Aug. 14, 2018~ Aug. 30, 2018	Mar. 29, 2019	Radiation (03CH01-SZ)
LF Amplifier	Burgeon	BPA-530	102209	0.01~3000Mhz	Apr. 19, 2018	Aug. 14, 2018~ Aug. 30, 2018	Apr. 18, 2019	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	AMF-7D-0010 1800-30-10P- R	1707137	1GHz~18GHz	Oct.19, 2017	Aug. 14, 2018~ Aug. 30, 2018	Oct. 18, 2018	Radiation (03CH01-SZ)
HF Amplifier	KEYSIGHT	83017A	MY532701 04	0.5GHz~26.5Gh z	Oct.19, 2017	Aug. 14, 2018~ Aug. 30, 2018	Oct. 18, 2018	Radiation (03CH01-SZ)
HF Amplifier	MITEQ	TTA1840-35- HG	1871923	18GHz~40GHz	Jul. 30, 2018	Aug. 14, 2018~ Aug. 30, 2018	Jul. 30, 2019	Radiation (03CH01-SZ)
AC Power Source	Chroma	61601	616010001 985	N/A	NCR	Aug. 14, 2018~ Aug. 30, 2018	NCR	Radiation (03CH01-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Aug. 14, 2018~ Aug. 30, 2018	NCR	Radiation (03CH01-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Aug. 14, 2018~ Aug. 30, 2018	NCR	Radiation (03CH01-SZ)



## 6 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	2.5
-------------------------------------------------------------------------	-----

### Uncertainty of Radiated Emission Measurement (1 GHz ~ 18 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	3.5
-------------------------------------------------------------------------	-----

### Uncertainty of Radiated Emission Measurement (18 GHz ~ 40 GHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	4.0
-------------------------------------------------------------------------	-----



## Appendix A. Test Results of Conducted Test

### Conducted Output Power(Average power)

<Up Antenna>

LTE Band 7_CA Maximum Average Power [dBm]									
BW [MHz]	PCC		SCC		Mod	Lowest	Middle	Highest	
	RB Size	RB Offset	RB Size	RB Offset					
20+20	0	0	1	99	QPSK	23.81	23.85	23.88	
20+20	1	0	0	0		24.09	23.98	24.05	
20+20	100	0	0	0		22.63	22.54	22.61	
20+20	100	0	100	0		21.42	21,35	21.59	
20+20	1	0	1	99		15.37	15.24	15.49	
20+20	1	0	1	0		19.31	19.27	19.22	
20+20	1	99	1	0		23.20	23.23	23.21	
20+20	100	0	1	99		20.05	20.10	20.13	
20+20	0	0	1	99		23.17	23.03	23.23	
20+20	1	0	0	0	16-QAM	23.27	23.27	23.05	
20+20	100	0	0	0		21.47	21.33	21.50	
20+20	100	0	100	0		20.50	20.51	20.33	
20+20	1	0	1	99		15.65	15.42	15.50	
20+20	1	0	1	0		19.38	19.23	19.54	
20+20	1	99	1	0		22.36	22.11	22.29	
20+20	100	0	1	99		20.08	20.08	20.06	
20+20	0	0	1	99		64-QAM	21.77	21.91	21.88
20+20	1	0	0	0			22.36	22.14	22.48
20+20	100	0	0	0	20.50		20.32	20.47	
20+20	100	0	100	0	20.53		20.37	20.53	
20+20	1	0	1	99	15.61		15.46	15.54	
20+20	1	0	1	0	19.28		19.09	19.23	
20+20	1	99	1	0	20.28		20.30	20.37	
20+20	100	0	1	99	20.06		20.07	19.97	



LTE Band 7_CA Maximum Average Power [dBm]								
BW [MHz]	PCC		SCC		Mod	Lowest	Middle	Highest
	RB Size	RB Offset	RB Size	RB Offset				
20+15	1	99	1	0	QPSK	23.18	23.13	23.25
20+15	1	99	1	0	16-QAM	22.39	22.14	22.37
20+15	1	99	1	0	64-QAM	20.33	20.35	20.28
15+20	1	74	1	0	QPSK	23.14	23.26	23.12
15+20	1	74	1	0	16-QAM	22.43	22.29	22.34
15+20	1	74	1	0	64-QAM	20.25	20.35	20.24
20+10	1	99	1	0	QPSK	23.16	23.28	23.13
20+10	1	99	1	0	16-QAM	22.46	22.31	22.36
20+10	1	99	1	0	64-QAM	20.27	20.36	20.26
10+20	1	74	1	0	QPSK	23.17	23.12	23.22
10+20	1	74	1	0	16-QAM	22.37	22.11	22.34
10+20	1	74	1	0	64-QAM	20.32	20.33	20.25
15+15	1	74	1	0	QPSK	23.16	23.30	23.14
15+15	1	74	1	0	16-QAM	22.45	22.31	22.36
15+15	1	74	1	0	64-QAM	20.27	20.37	20.24
15+10	1	74	1	0	QPSK	23.27	23.37	23.24
15+10	1	74	1	0	16-QAM	22.56	22.41	22.48
15+10	1	74	1	0	64-QAM	20.36	20.47	20.38



LTE Band 38_CA Maximum Average Power [dBm]									
BW [MHz]	PCC		SCC		Mod	Lowest	Middle	Highest	
	RB Size	RB Offset	RB Size	RB Offset					
20+20	0	0	1	99	QPSK	23.58	23.67	23.86	
20+20	1	0	0	0		23.96	23.92	<b>23.99</b>	
20+20	100	0	0	0		22.63	22.69	22.71	
20+20	100	0	100	0		21.67	21.59	21.65	
20+20	1	0	1	99		11.02	10.45	10.55	
20+20	1	0	1	0		14.75	14.49	14.62	
20+20	1	99	1	0		23.27	23.15	23.16	
20+20	100	0	1	99		20.15	20.05	20.15	
20+20	0	0	1	99		22.48	22.73	22.86	
20+20	1	0	0	0	16-QAM	22.83	22.85	22.99	
20+20	100	0	0	0		21.64	21.57	21.59	
20+20	100	0	100	0		20.53	20.61	20.61	
20+20	1	0	1	99		11.03	10.78	10.27	
20+20	1	0	1	0		14.66	14.60	14.51	
20+20	1	99	1	0		22.13	22.08	22.05	
20+20	100	0	1	99		20.11	19.93	20.05	
20+20	0	0	1	99		21.51	21.37	21.72	
20+20	1	0	0	0		22.73	22.92	22.91	
20+20	100	0	0	0	64-QAM	21.60	21.60	21.57	
20+20	100	0	100	0		20.56	20.47	20.61	
20+20	1	0	1	99		11.00	10.38	10.43	
20+20	1	0	1	0		14.51	14.40	14.46	
20+20	1	99	1	0		20.10	20.06	20.04	
20+20	100	0	1	99		20.01	20.03	20.02	
15+15	1	74	1	0		QPSK	23.21	23.24	23.27
15+15	1	74	1	0		16-QAM	21.96	22.24	22.35
15+15	1	74	1	0		64-QAM	19.90	19.92	19.97



LTE Band 41_CA Maximum Average Power [dBm]									
BW [MHz]	PCC		SCC		Mod	Lowest	Middle	Highest	
	RB Size	RB Offset	RB Size	RB Offset					
20+20	0	0	1	99	QPSK	23.01	22.94	22.93	
20+20	1	0	0	0		22.96	22.98	23.09	
20+20	100	0	0	0		21.87	22.01	21.92	
20+20	100	0	100	0		20.77	20.95	20.98	
20+20	1	0	1	99		10.06	9.82	9.92	
20+20	1	0	1	0		13.33	13.52	13.59	
20+20	1	99	1	0		22.64	22.81	22.59	
20+20	100	0	1	99		19.44	19.55	19.55	
20+20	0	0	1	99		22.09	22.06	21.92	
20+20	1	0	0	0	16-QAM	21.79	21.91	21.91	
20+20	100	0	0	0		20.74	20.85	20.96	
20+20	100	0	100	0		19.82	19.76	19.75	
20+20	1	0	1	99		9.71	9.61	9.82	
20+20	1	0	1	0		13.24	13.58	13.87	
20+20	1	99	1	0		21.44	21.68	21.65	
20+20	100	0	1	99		19.38	19.20	19.38	
20+20	0	0	1	99		20.45	20.97	20.88	
20+20	1	0	0	0		21.79	21.93	21.78	
20+20	100	0	0	0	64-QAM	20.70	20.87	19.90	
20+20	100	0	100	0		19.80	19.78	19.88	
20+20	1	0	1	99		10.02	9.75	9.76	
20+20	1	0	1	0		13.31	13.44	13.35	
20+20	1	99	1	0		19.43	19.59	19.59	
20+20	100	0	1	99		19.13	19.40	19.45	
15+20	1	74	1	0		QPSK	22.43	22.52	22.65
15+20	1	74	1	0		16-QAM	21.47	21.63	21.67
15+20	1	74	1	0		64-QAM	19.40	19.65	19.54
10+20	1	49	1	0	QPSK	22.45	22.69	22.76	
10+20	1	49	1	0	16-QAM	21.51	21.61	21.72	
10+20	1	49	1	0	64-QAM	19.58	19.53	19.75	
5+20	1	24	1	0	QPSK	22.55	22.65	22.76	
5+20	1	24	1	0	16-QAM	21.60	21.75	21.78	
5+20	1	24	1	0	64-QAM	19.53	19.77	19.53	
15+10	1	74	1	0	QPSK	22.52	22.78	22.87	
15+10	1	74	1	0	16-QAM	21.58	21.70	21.79	
15+10	1	74	1	0	64-QAM	19.67	19.64	19.82	
10+15	1	0	1	74	QPSK	22.47	22.55	22.68	
10+15	1	0	1	74	16-QAM	21.52	21.67	21.72	
10+15	1	0	1	74	64-QAM	19.43	19.69	19.47	
15+15	1	74	1	0	QPSK	22.55	22.76	22.83	
15+15	1	74	1	0	16-QAM	21.58	21.68	21.82	
15+15	1	74	1	0	64-QAM	19.65	19.60	19.85	



<Down Antenna>

LTE Band 7_CA Maximum Average Power [dBm]								
BW [MHz]	PCC		SCC		Mod	Lowest	Middle	Highest
	RB Size	RB Offset	RB Size	RB Offset				
20+20	0	0	1	99	QPSK	23.44	23.54	23.56
20+20	1	0	0	0		23.98	23.88	23.84
20+20	100	0	0	0		22.48	22.56	22.56
20+20	100	0	100	0		21.47	21.51	21.46
20+20	1	0	1	99		15.35	15.15	15.17
20+20	1	0	1	0		19.26	19.07	19.13
20+20	1	99	1	0		23.15	23.07	23.16
20+20	100	0	1	99		20.01	19.98	19.92
20+20	0	0	1	99	16-QAM	22.61	22.48	22.98
20+20	1	0	0	0		23.08	22.98	22.96
20+20	100	0	0	0		21.50	21.38	21.34
20+20	100	0	100	0		20.31	20.21	20.27
20+20	1	0	1	99		15.31	15.37	15.36
20+20	1	0	1	0		19.17	19.36	19.27
20+20	1	99	1	0		22.31	22.38	22.25
20+20	100	0	1	99		19.98	20.01	19.84
20+20	0	0	1	99	64-QAM	21.73	21.56	21.89
20+20	1	0	0	0		21.87	21.97	21.99
20+20	100	0	0	0		20.53	21.38	20.35
20+20	100	0	100	0		20.36	20.21	20.78
20+20	1	0	1	99		15.16	15.26	15.36
20+20	1	0	1	0		19.19	19.31	19.23
20+20	1	99	1	0		20.44	20.34	20.08
20+20	100	0	1	99		19.95	19.99	19.95
20+15	1	99	1	0	QPSK	23.45	23.44	23.21
20+15	1	99	1	0	16-QAM	22.41	22.57	22.35
20+15	1	99	1	0	64-QAM	20.46	20.39	20.18
15+20	1	74	1	0	QPSK	23.27	23.25	23.19
15+20	1	74	1	0	16-QAM	22.43	22.40	22.32
15+20	1	74	1	0	64-QAM	20.43	20.39	20.34
20+10	1	99	1	0	QPSK	23.30	23.19	23.15
20+10	1	99	1	0	16-QAM	22.42	22.33	22.22
20+10	1	99	1	0	64-QAM	20.51	20.38	20.30
10+20	1	74	1	0	QPSK	23.29	23.27	23.24
10+20	1	74	1	0	16-QAM	22.39	22.39	22.36
10+20	1	74	1	0	64-QAM	20.51	20.27	20.19
15+15	1	74	1	0	QPSK	23.30	23.22	23.16
15+15	1	74	1	0	16-QAM	22.49	22.47	22.33
15+15	1	74	1	0	64-QAM	20.48	20.39	20.24
15+10	1	74	1	0	QPSK	23.39	23.25	23.22
15+10	1	74	1	0	16-QAM	22.60	22.48	22.40
15+10	1	74	1	0	64-QAM	20.50	20.40	20.34



LTE Band 38_CA Maximum Average Power [dBm]									
BW [MHz]	PCC		SCC		Mod	Lowest	Middle	Highest	
	RB Size	RB Offset	RB Size	RB Offset					
20+20	0	0	1	99	QPSK	23.74	23.79	23.81	
20+20	1	0	0	0		<b>23.86</b>	23.75	23.77	
20+20	100	0	0	0		22.54	22.48	22.41	
20+20	100	0	100	0		21.36	21.53	21.35	
20+20	1	0	1	99		11.14	10.79	10.99	
20+20	1	0	1	0		14.54	14.43	14.62	
20+20	1	99	1	0		22.94	23.03	23.13	
20+20	100	0	1	99		20.11	19.95	19.96	
20+20	0	0	1	99		22.60	22.15	22.44	
20+20	1	0	0	0	16-QAM	22.73	22.74	22.65	
20+20	100	0	0	0		21.50	21.42	21.42	
20+20	100	0	100	0		20.49	20.51	20.30	
20+20	1	0	1	99		10.68	10.78	10.91	
20+20	1	0	1	0		14.39	14.45	14.48	
20+20	1	99	1	0		21.85	22.06	21.88	
20+20	100	0	1	99		20.05	19.87	19.87	
20+20	0	0	1	99		21.77	21.41	21.49	
20+20	1	0	0	0		22.74	22.80	22.94	
20+20	100	0	0	0	64-QAM	21.39	21.37	21.43	
20+20	100	0	100	0		20.34	20.51	20.30	
20+20	1	0	1	99		10.46	10.81	10.60	
20+20	1	0	1	0		14.37	14.43	14.39	
20+20	1	99	1	0		20.06	20.03	19.98	
20+20	100	0	1	99		19.99	19.87	19.84	
15+15	1	74	1	0		QPSK	23.25	23.43	23.48
15+15	1	74	1	0		16-QAM	22.26	22.38	22.21
15+15	1	74	1	0		64-QAM	20.32	20.26	20.30





LTE Band 41_CA Maximum Average Power [dBm]									
BW [MHz]	PCC		SCC		Mod	Lowest	Middle	Highest	
	RB Size	RB Offset	RB Size	RB Offset					
20+20	0	0	1	99	QPSK	22.84	22.89	22.78	
20+20	1	0	0	0		23.08	23.07	22.89	
20+20	100	0	0	0		22.05	22.06	21.67	
20+20	100	0	100	0		20.09	20.93	20.54	
20+20	1	0	1	99		10.39	9.86	10.20	
20+20	1	0	1	0		13.61	13.75	14.02	
20+20	1	99	1	0		22.89	22.81	22.82	
20+20	100	0	1	99		19.44	19.42	19.65	
20+20	0	0	1	99		22.27	22.13	21.83	
20+20	1	0	0	0	16-QAM	22.08	22.47	21.92	
20+20	100	0	0	0		20.97	21.12	20.85	
20+20	100	0	100	0		19.81	19.90	19.74	
20+20	1	0	1	99		10.05	10.14	10.12	
20+20	1	0	1	0		13.73	13.95	13.87	
20+20	1	99	1	0		21.76	21.96	22.01	
20+20	100	0	1	99		19.48	19.56	19.46	
20+20	0	0	1	99		21.26	21.07	21.03	
20+20	1	0	0	0		21.14	21.05	21.12	
20+20	100	0	0	0	64-QAM	20.31	20.19	20.13	
20+20	100	0	100	0		19.80	20.15	20.21	
20+20	1	0	1	99		9.92	9.87	9.92	
20+20	1	0	1	0		13.59	12.89	12.99	
20+20	1	99	1	0		19.62	20.05	20.12	
20+20	100	0	1	99		19.31	20.54	20.67	
15+20	1	74	1	0		QPSK	22.85	22.79	22.87
15+20	1	74	1	0		16-QAM	21.76	21.88	21.73
15+20	1	74	1	0		64-QAM	19.58	19.82	19.86
10+20	1	49	1	0	QPSK	22.79	22.73	22.90	
10+20	1	49	1	0	16-QAM	21.56	21.67	21.92	
10+20	1	49	1	0	64-QAM	19.65	19.76	19.82	
5+20	1	24	1	0	QPSK	22.88	22.91	22.93	
5+20	1	24	1	0	16-QAM	21.79	21.82	21.76	
5+20	1	24	1	0	64-QAM	19.68	19.76	19.56	
15+10	1	74	1	0	QPSK	22.90	22.87	22.93	
15+10	1	74	1	0	16-QAM	21.79	21.78	21.76	
15+10	1	74	1	0	64-QAM	19.68	19.74	19.58	
10+15	1	0	1	74	QPSK	22.90	22.94	22.97	
10+15	1	0	1	74	16-QAM	21.82	21.86	21.79	
10+15	1	0	1	74	64-QAM	19.71	19.80	19.59	
15+15	1	74	1	0	QPSK	22.77	22.89	22.89	
15+15	1	74	1	0	16-QAM	21.67	21.79	21.75	
15+15	1	74	1	0	64-QAM	19.57	19.76	19.56	



# LTE Band 7

## 26dB Bandwidth

Mode	LTE Band 7 : 26dB BW(MHz)			
QPSK				
BW	10MHz+20MHz	15MHz+5MHz	15MHz+10MHz	15MHz+15MHz
Lowest CH	30.27		25.624	30.929
Middle CH	30.21		25.574	30.869
Highest CH	30.21		25.674	30.869
BW	15MHz+20MHz	20MHz+10MHz	20MHz+15MHz	20MHz+20MHz
Lowest CH	35.245	30.33	35.385	40.12
Middle CH	35.035	30.21	35.315	40.04
Highest CH	35.175	30.27	35.175	40.12

Mode	LTE Band 7 : 26dB BW(MHz)			
16QAM				
BW	10MHz+20MHz	15MHz+5MHz	15MHz+10MHz	15MHz+15MHz
Lowest CH	30.03		25.574	30.749
Middle CH	30.09		25.574	30.689
Highest CH	30.15		25.524	30.749
BW	15MHz+20MHz	20MHz+10MHz	20MHz+15MHz	20MHz+20MHz
Lowest CH	35.175	30.33	35.245	40.04
Middle CH	35.175	30.27	35.245	40.04
Highest CH	34.965	30.33	35.105	40.12

Mode	LTE Band 7 : 26dB BW(MHz)			
64QAM				
BW	10MHz+20MHz	15MHz+5MHz	15MHz+10MHz	15MHz+15MHz
Lowest CH	30.15		25.524	30.869
Middle CH	30.03		25.624	30.869
Highest CH	29.97		25.724	30.929
BW	15MHz+20MHz	20MHz+10MHz	20MHz+15MHz	20MHz+20MHz
Lowest CH	35.105	30.21	35.175	40.04
Middle CH	35.035	30.33	35.315	40.2
Highest CH	35.035	30.21	35.315	40.12

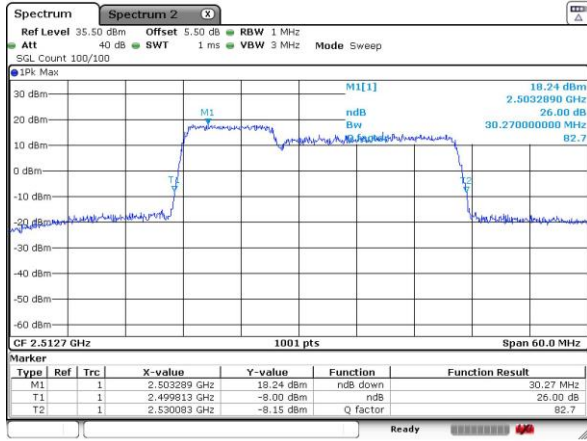


LTE Band 7

QPSK

Lowest Channel / 10MHz+20MHz

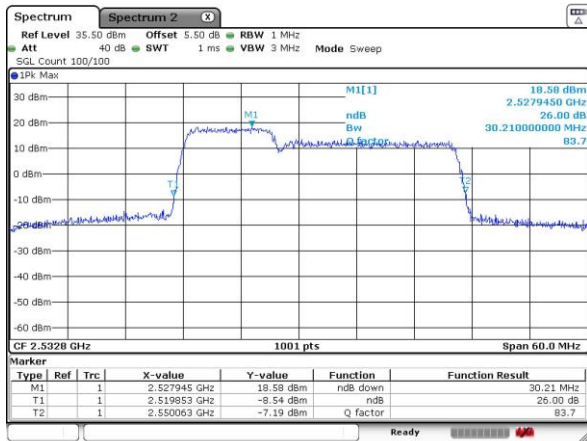
Lowest Channel / 15MHz+5MHz



Date: 21 AUG 2018 14:05:15

Middle Channel / 10MHz+20MHz

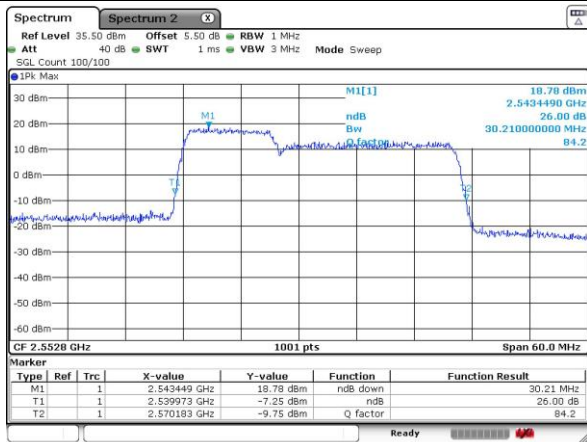
Middle Channel / 15MHz+5MHz



Date: 21 AUG 2018 14:16:25

Highest Channel / 10MHz+20MHz

Highest Channel / 15MHz+5MHz



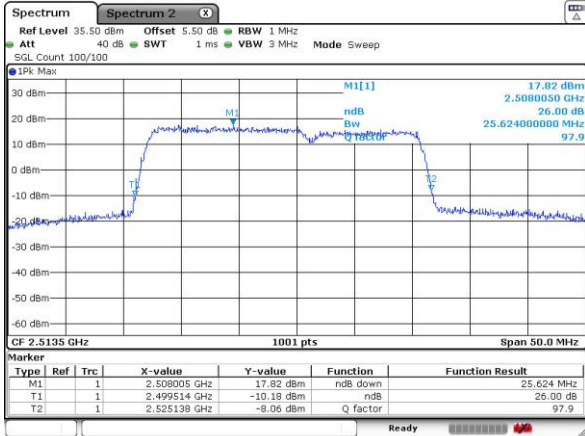
Date: 21 AUG 2018 14:20:17



LTE Band 7

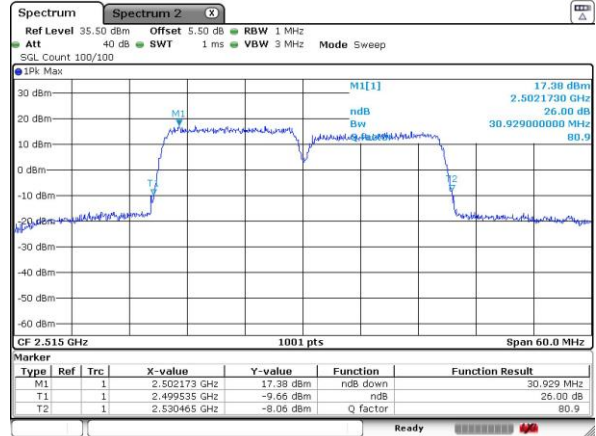
QPSK

Lowest Channel / 15MHz+10MHz



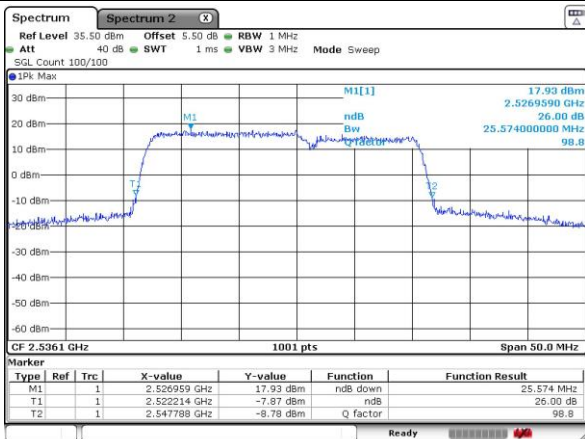
Date: 21 AUG 2018 15:47:06

Lowest Channel / 15MHz+15MHz



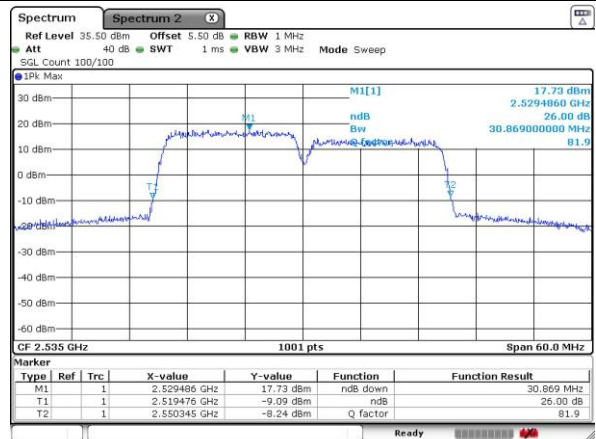
Date: 21 AUG 2018 14:43:21

Middle Channel / 15MHz+10MHz



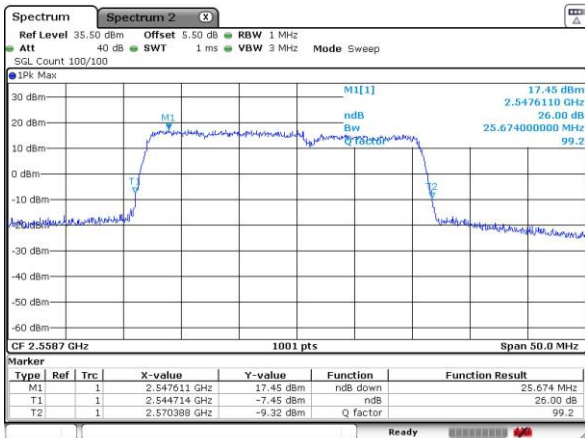
Date: 21 AUG 2018 15:54:08

Middle Channel / 15MHz+15MHz



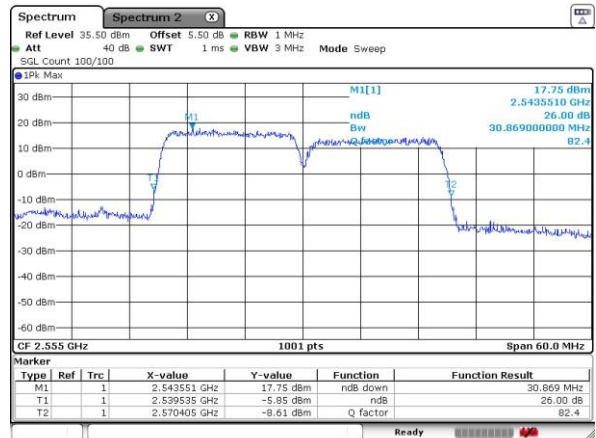
Date: 21 AUG 2018 14:48:02

Highest Channel / 15MHz+10MHz



Date: 21 AUG 2018 15:55:17

Highest Channel / 15MHz+15MHz



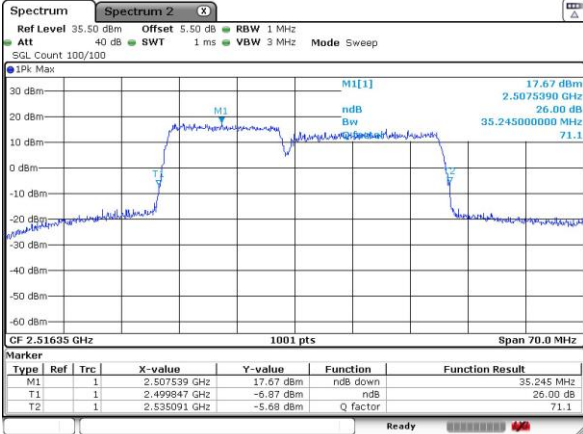
Date: 21 AUG 2018 14:49:56



LTE Band 7

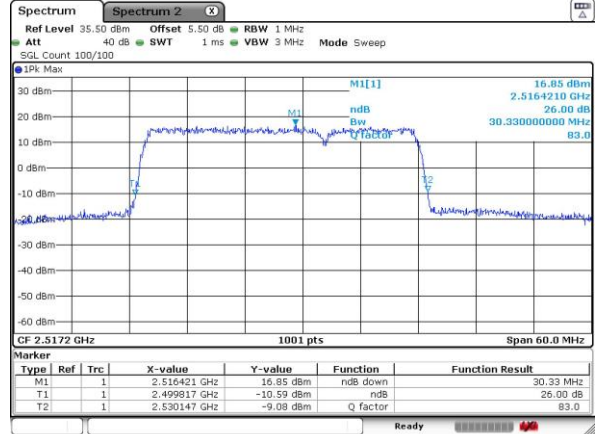
QPSK

Lowest Channel / 15MHz+20MHz



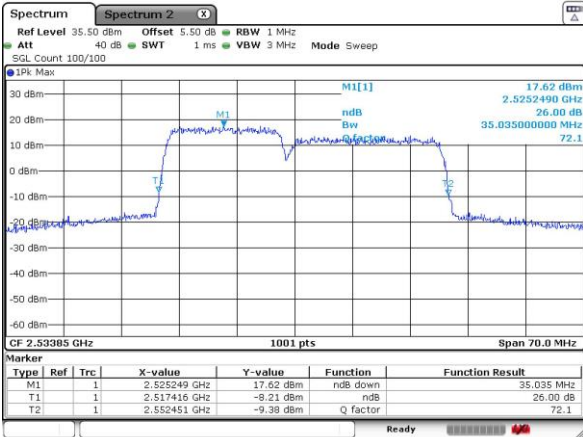
Date: 21 AUG 2018 15:13:28

Lowest Channel / 20MHz+10MHz



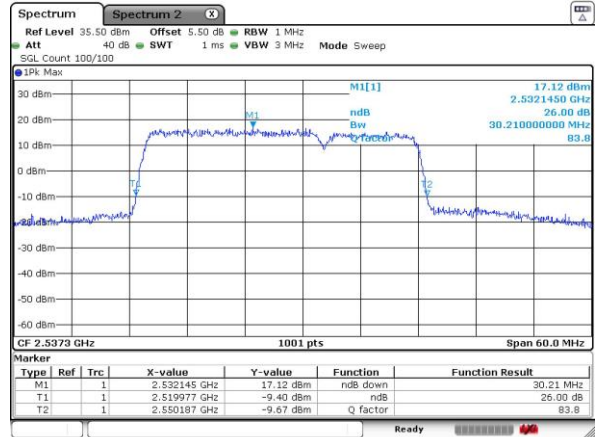
Date: 21 AUG 2018 14:28:27

Middle Channel / 15MHz+20MHz



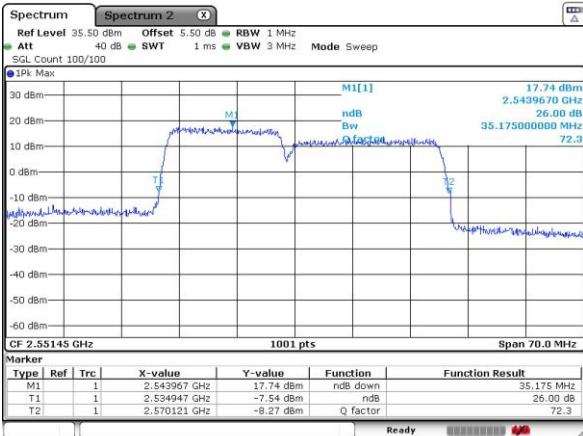
Date: 21 AUG 2018 15:19:53

Middle Channel / 20MHz+10MHz



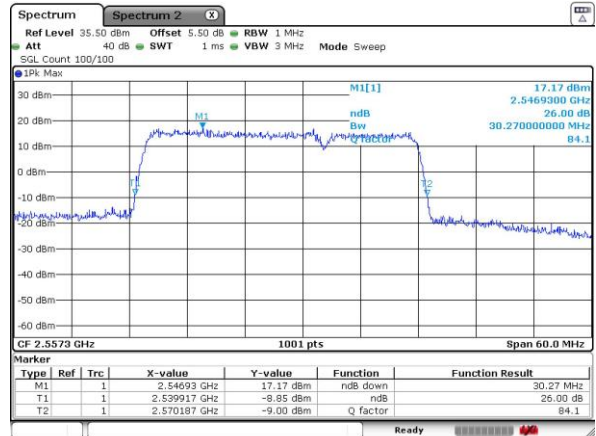
Date: 21 AUG 2018 14:28:58

Highest Channel / 15MHz+20MHz



Date: 21 AUG 2018 15:30:27

Highest Channel / 20MHz+10MHz



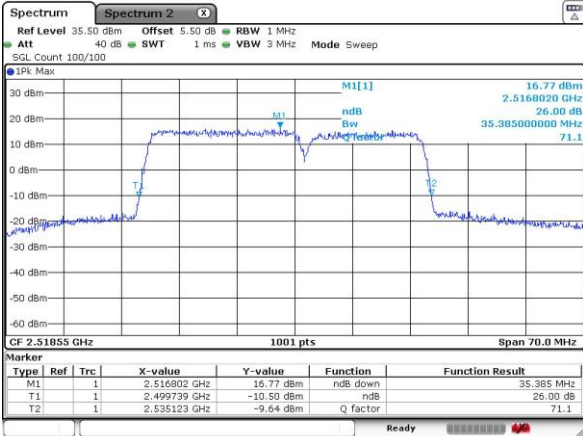
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LTE Band 7

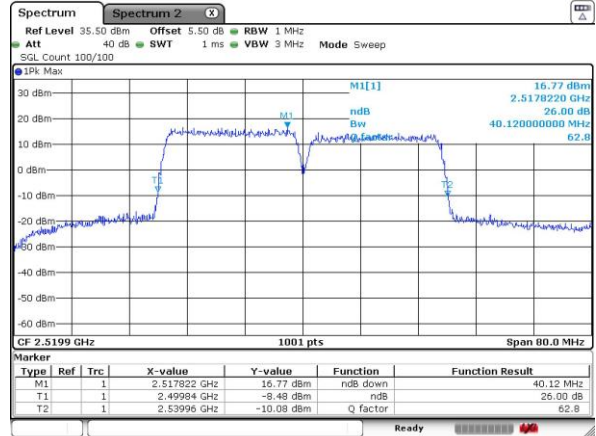
QPSK

Lowest Channel / 20MHz+15MHz



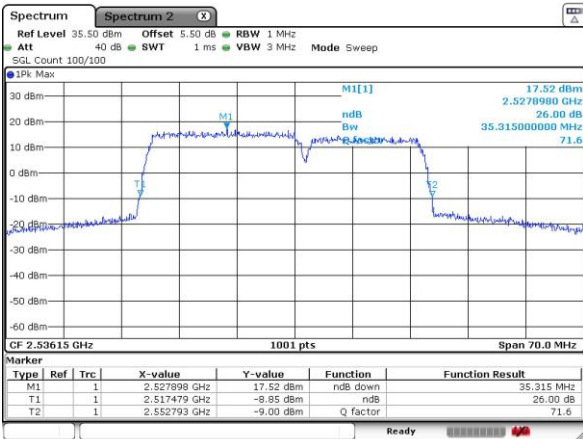
Date: 21 AUG 2018 15:37:12

Lowest Channel / 20MHz+20MHz



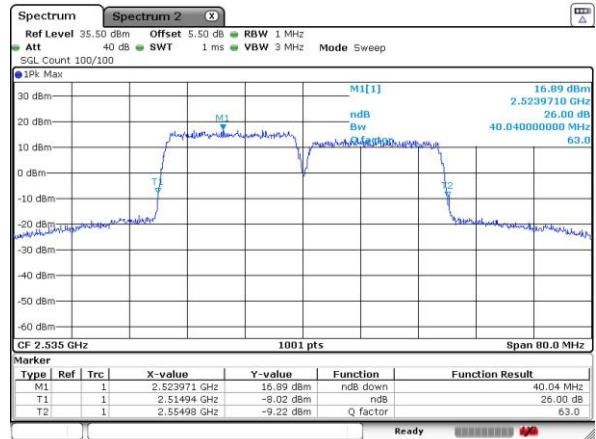
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Middle Channel / 20MHz+15MHz



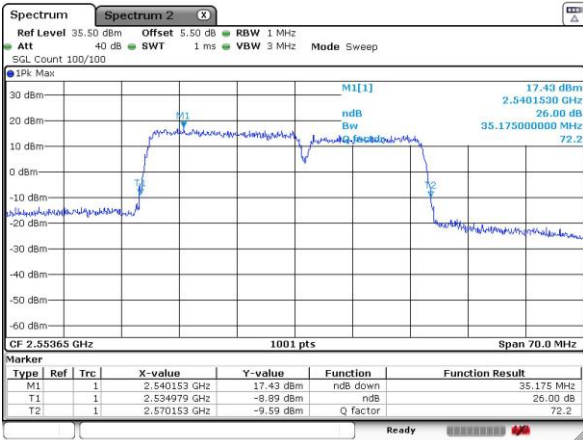
Date: 21 AUG 2018 15:38:16

Middle Channel / 20MHz+20MHz



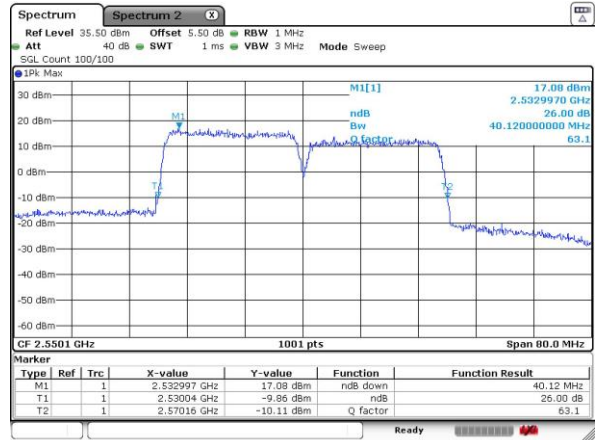
Date: 21 AUG 2018 13:49:43

Highest Channel / 20MHz+15MHz



Date: 21 AUG 2018 15:45:21

Highest Channel / 20MHz+20MHz



Date: 21 AUG 2018 13:47:00

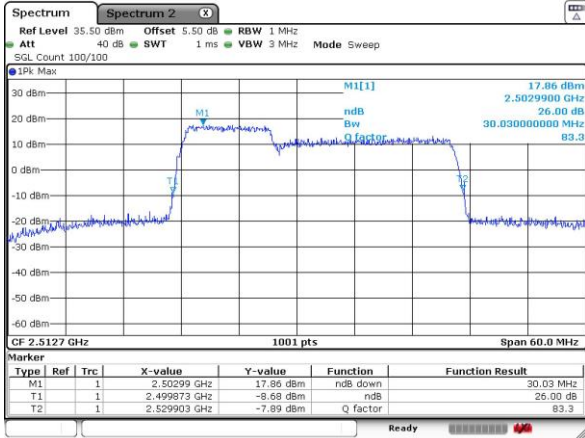


LTE Band 7

16QAM

Lowest Channel / 10MHz+20MHz

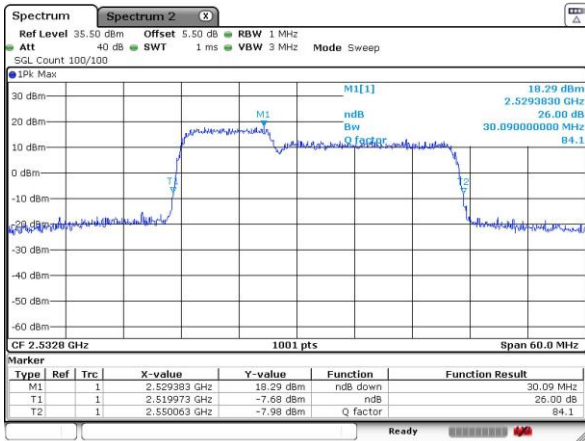
Lowest Channel / 15MHz+5MHz



Date: 21 AUG 2018 14:05:53

Middle Channel / 10MHz+20MHz

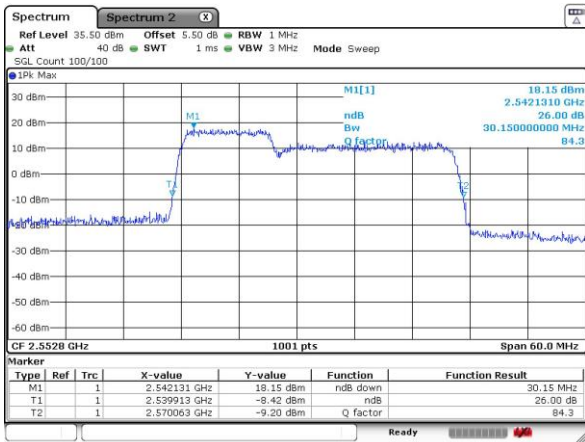
Middle Channel / 15MHz+5MHz



Date: 21 AUG 2018 14:15:51

Highest Channel / 10MHz+20MHz

Highest Channel / 15MHz+5MHz



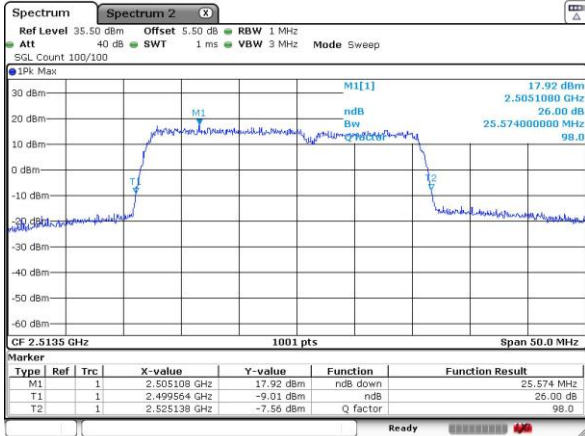
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LTE Band 7

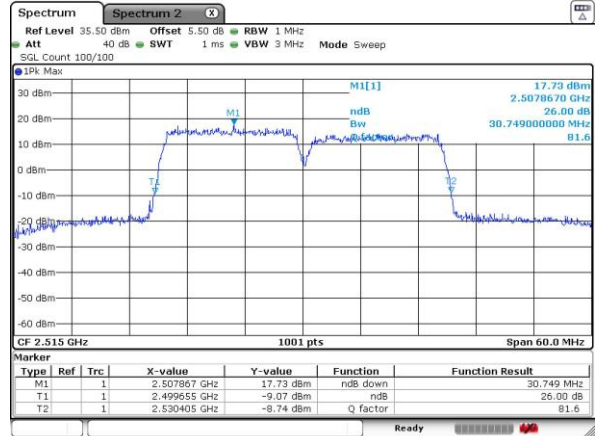
16QAM

Lowest Channel / 15MHz+10MHz



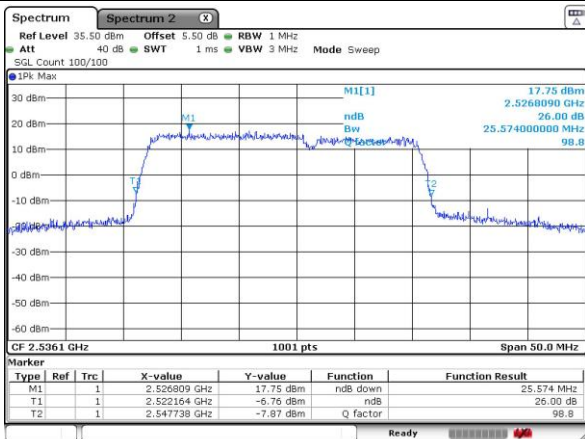
Date: 21 AUG 2018 15:48:36

Lowest Channel / 15MHz+15MHz



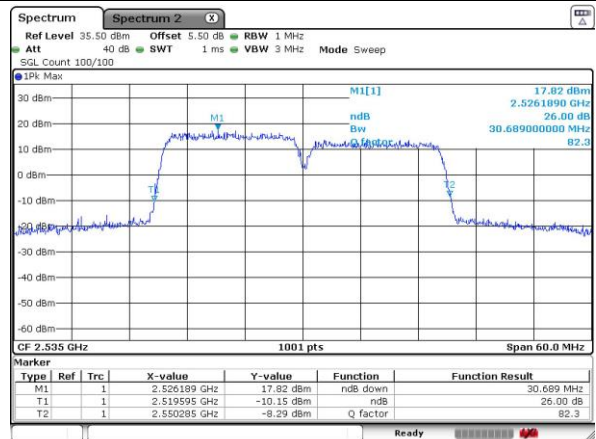
Date: 21 AUG 2018 14:43:52

Middle Channel / 15MHz+10MHz



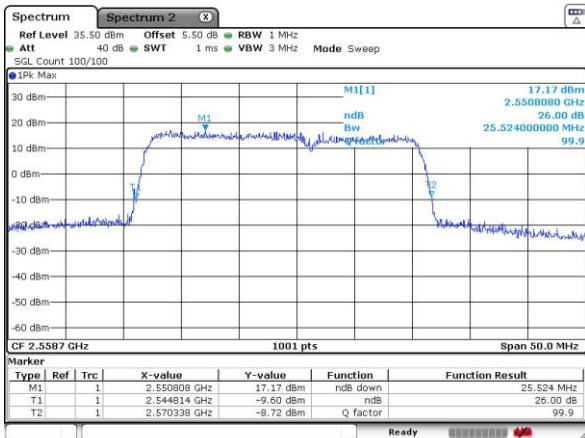
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Middle Channel / 15MHz+15MHz



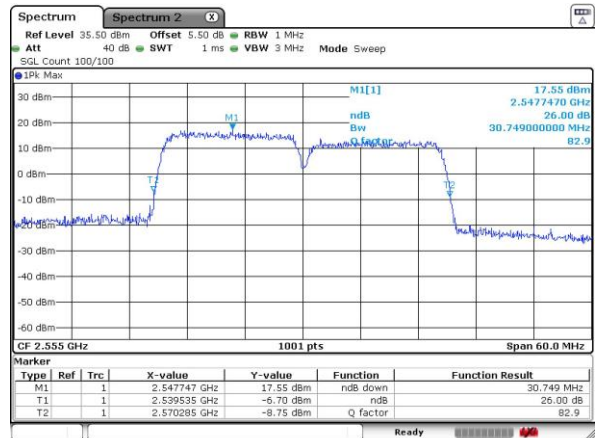
Date: 21 AUG 2018 14:47:31

Highest Channel / 15MHz+10MHz



Date: 21 AUG 2018 15:56:42

Highest Channel / 15MHz+15MHz



Date: 21 AUG 2018 14:50:33

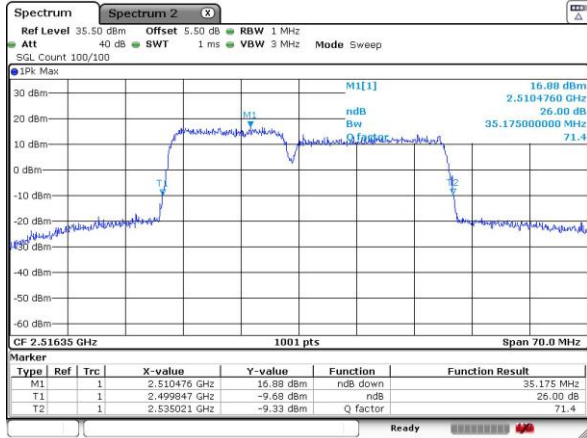




LTE Band 7

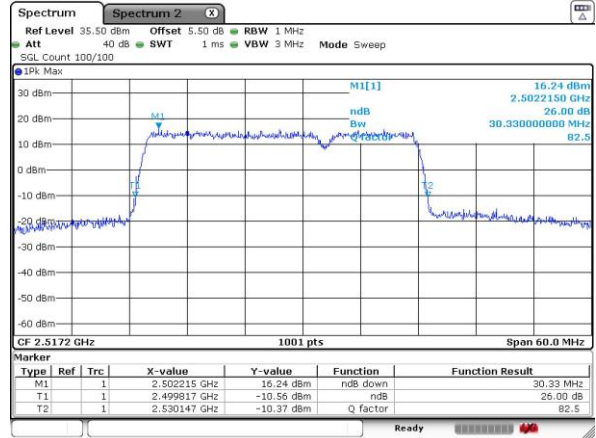
16QAM

Lowest Channel / 15MHz+20MHz



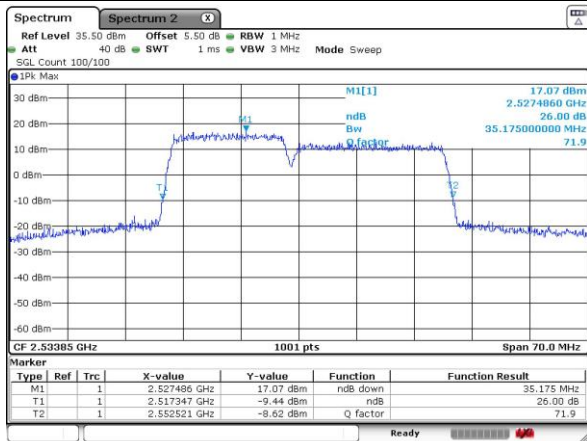
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Lowest Channel / 20MHz+10MHz



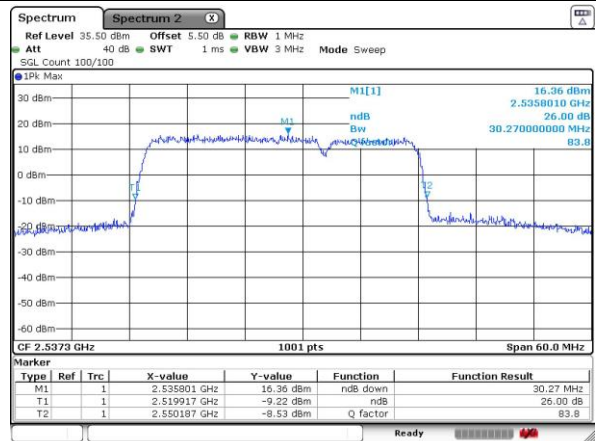
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Middle Channel / 15MHz+20MHz



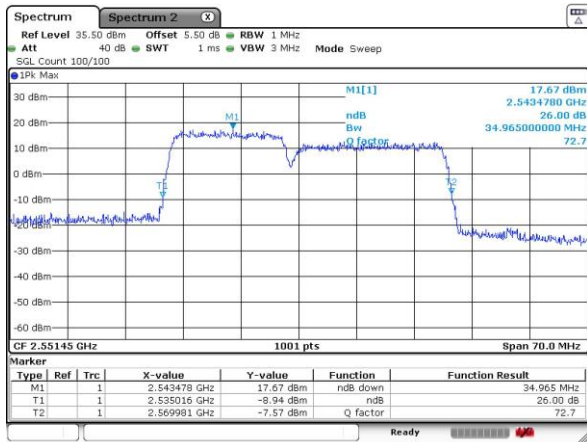
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Middle Channel / 20MHz+10MHz



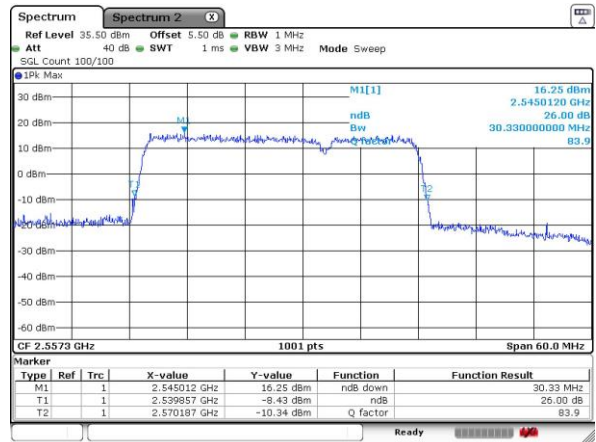
Date: 21 AUG 2018 14:30:22

Highest Channel / 15MHz+20MHz



Date: 21 AUG 2018 15:31:50

Highest Channel / 20MHz+10MHz



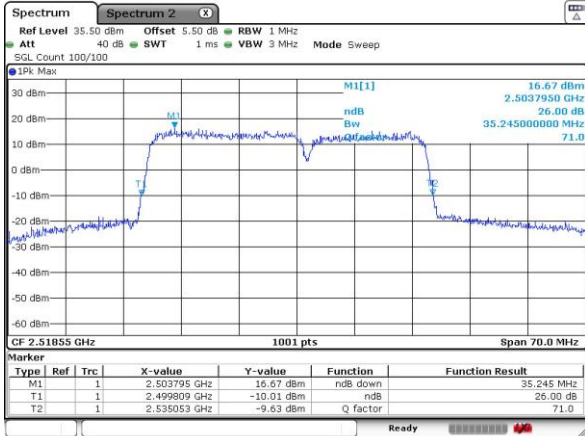
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LTE Band 7

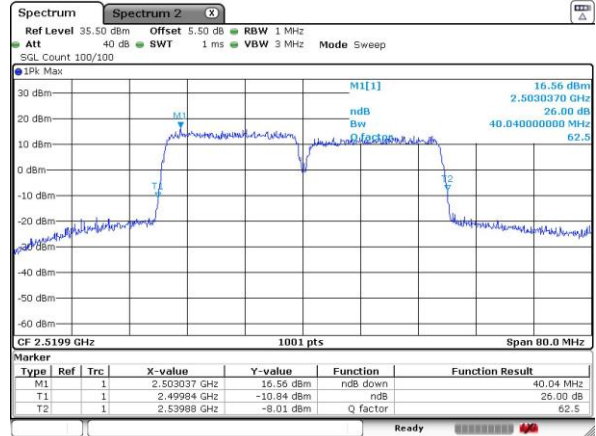
16QAM

Lowest Channel / 20MHz+15MHz



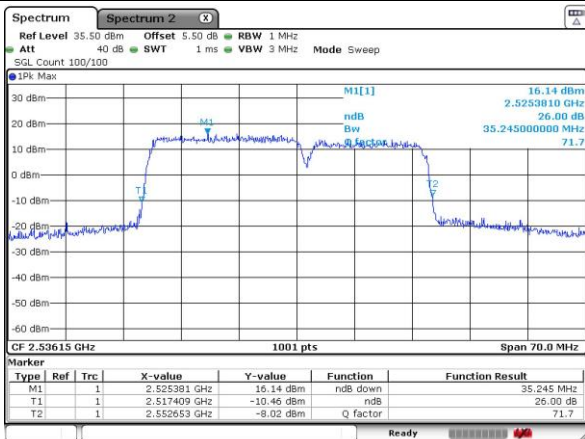
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Lowest Channel / 20MHz+20MHz



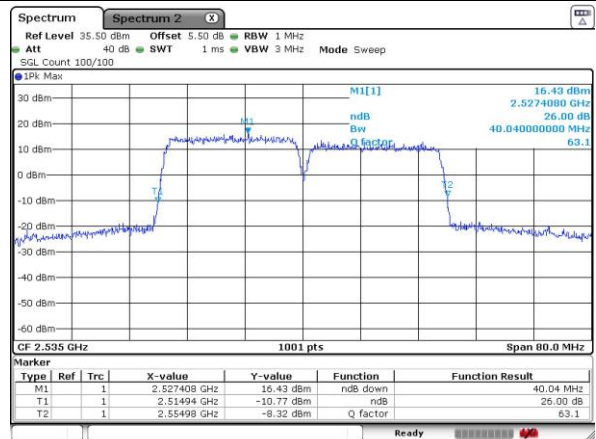
Date: 21 AUG 2018 14:00:48

Middle Channel / 20MHz+15MHz



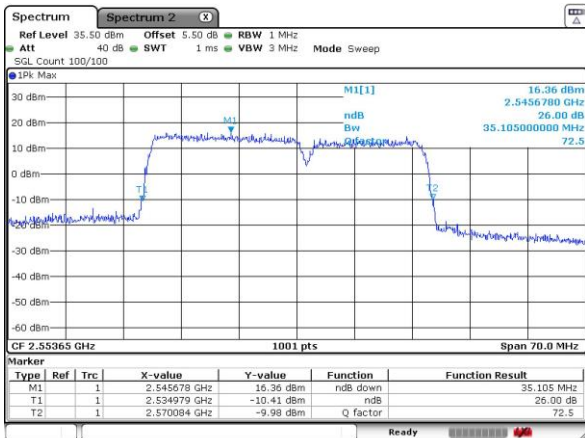
Date: 21 AUG 2018 15:39:43

Middle Channel / 20MHz+20MHz



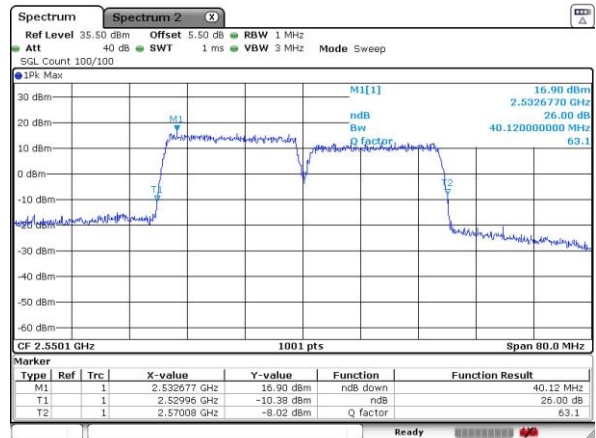
Date: 21 AUG 2018 15:03:01

Highest Channel / 20MHz+15MHz



Date: 21 AUG 2018 15:43:57

Highest Channel / 20MHz+20MHz



Date: 21 AUG 2018 13:46:29

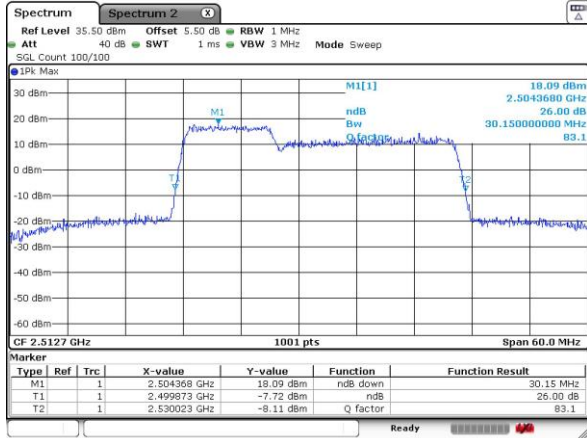


LTE Band 7

64QAM

Lowest Channel / 10MHz+20MHz

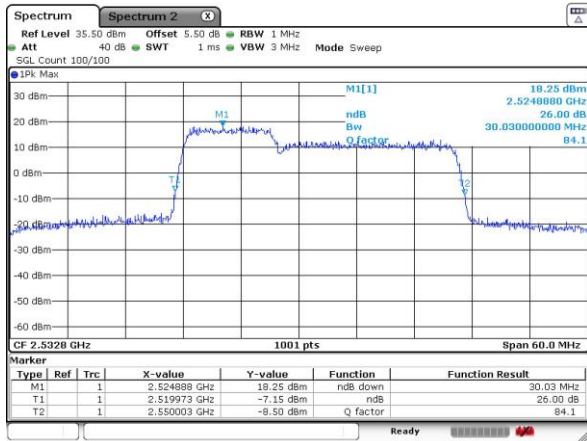
Lowest Channel / 15MHz+5MHz



Date: 21 AUG 2016 14:07:10

Middle Channel / 10MHz+20MHz

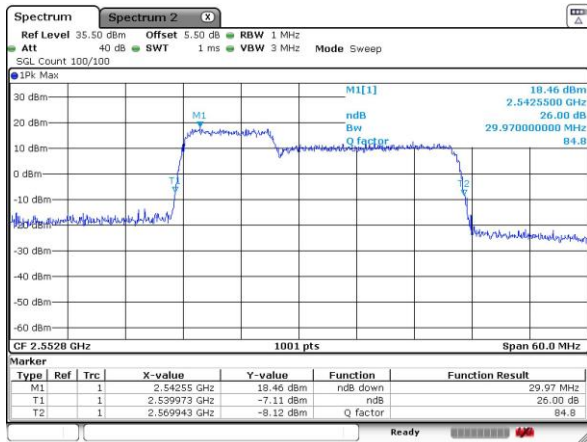
Middle Channel / 15MHz+5MHz



Date: 21 AUG 2016 14:08:36

Highest Channel / 10MHz+20MHz

Highest Channel / 15MHz+5MHz



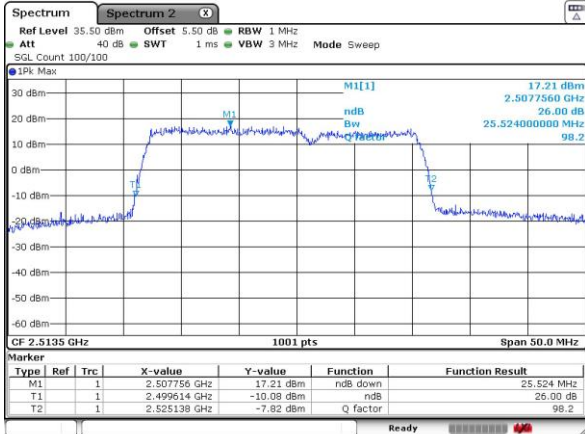
Date: 21 AUG 2016 14:22:34



LTE Band 7

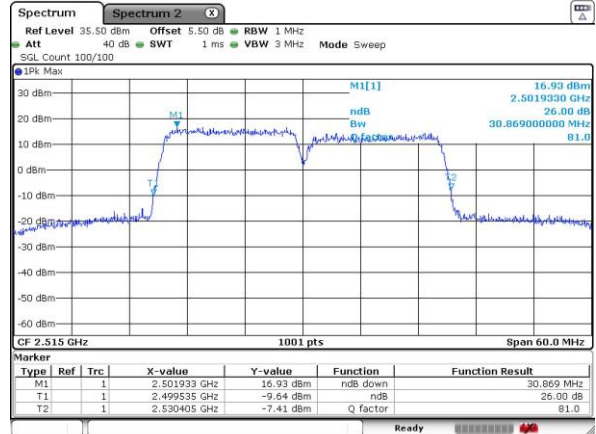
64QAM

Lowest Channel / 15MHz+10MHz



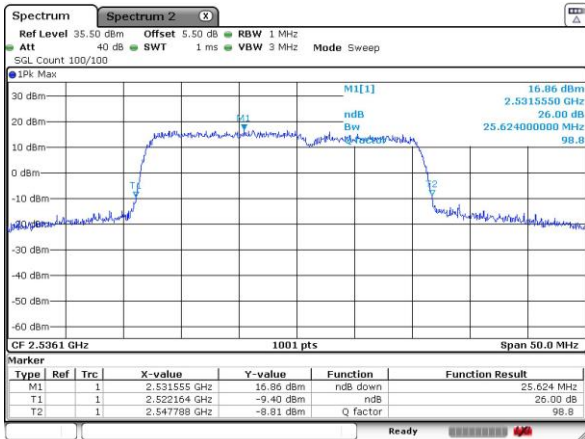
Date: 21 AUG 2018 15:49:36

Lowest Channel / 15MHz+15MHz



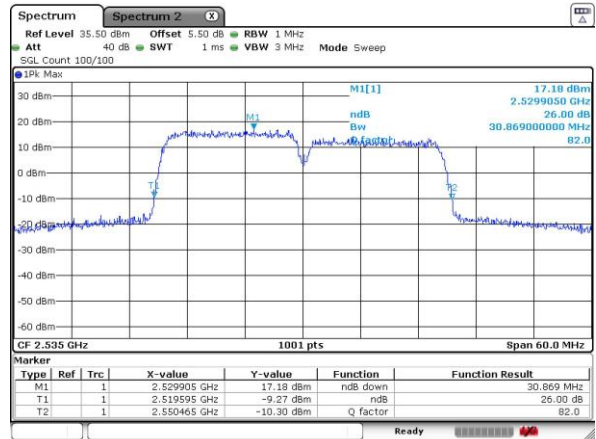
Date: 21 AUG 2018 14:44:59

Middle Channel / 15MHz+10MHz



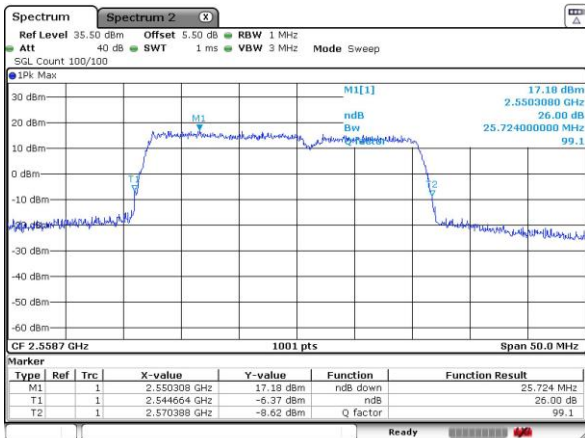
Date: 21 AUG 2018 15:51:47

Middle Channel / 15MHz+15MHz



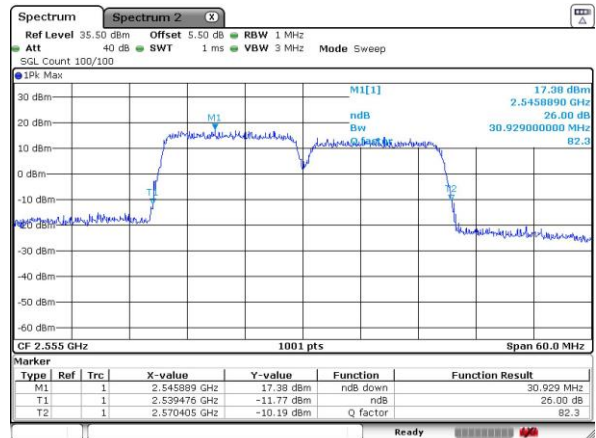
Date: 21 AUG 2018 14:46:18

Highest Channel / 15MHz+10MHz



Date: 21 AUG 2018 15:57:46

Highest Channel / 15MHz+15MHz



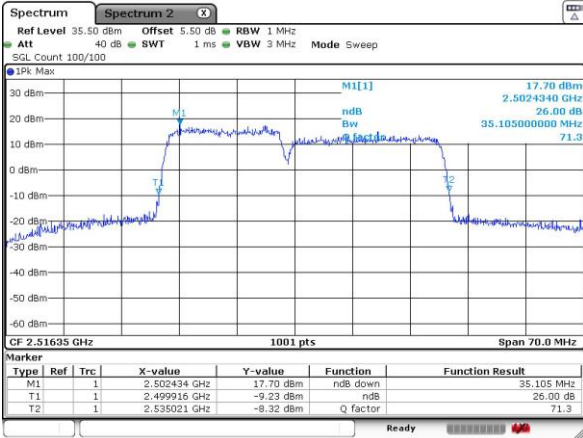
Date: 21 AUG 2018 14:51:48



LTE Band 7

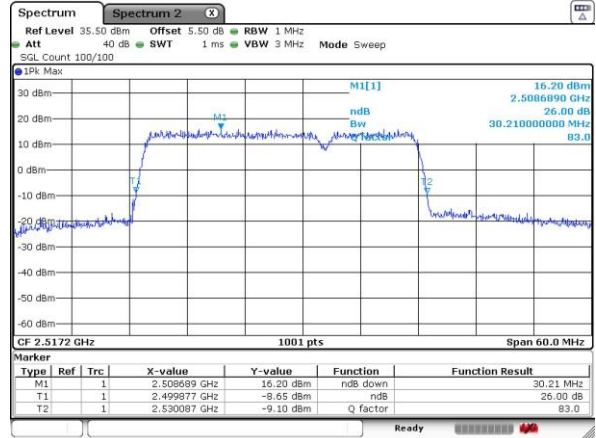
64QAM

Lowest Channel / 15MHz+20MHz



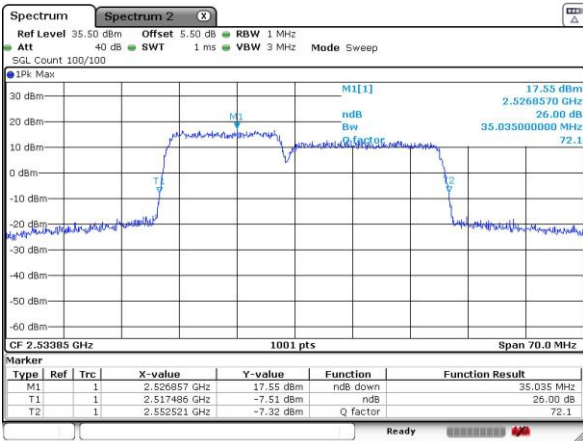
Date: 21 AUG 2018 15:09:36

Lowest Channel / 20MHz+10MHz



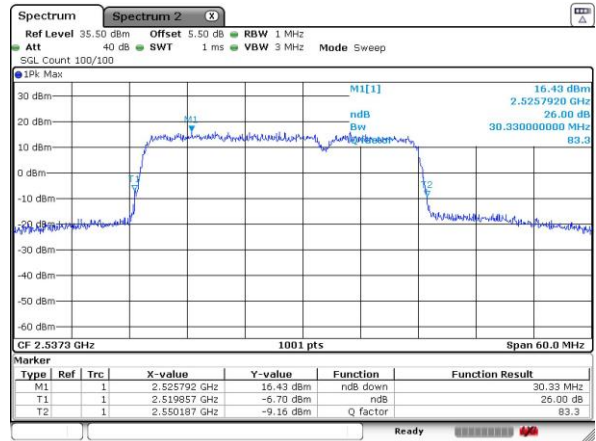
Date: 21 AUG 2018 14:24:12

Middle Channel / 15MHz+20MHz



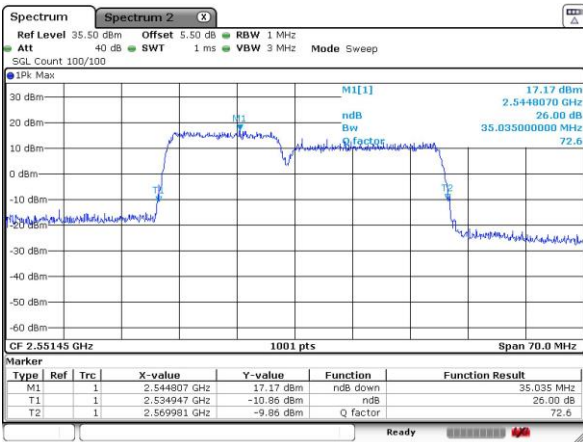
Date: 21 AUG 2018 15:18:14

Middle Channel / 20MHz+10MHz



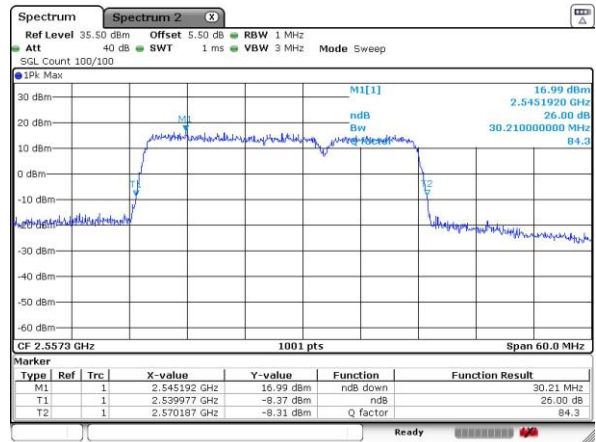
Date: 21 AUG 2018 14:31:34

Highest Channel / 15MHz+20MHz



Date: 21 AUG 2018 15:32:31

Highest Channel / 20MHz+10MHz



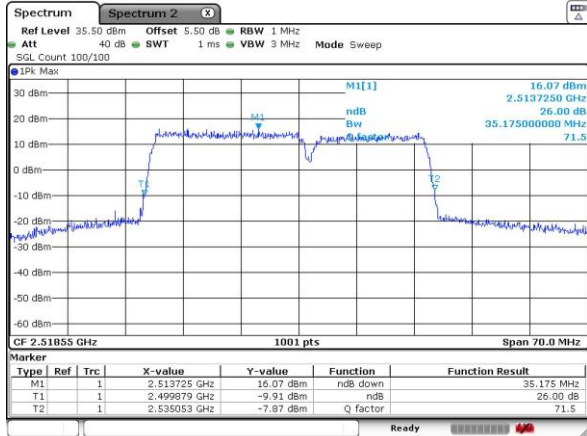
Date: 21 AUG 2018 14:36:56



LTE Band 7

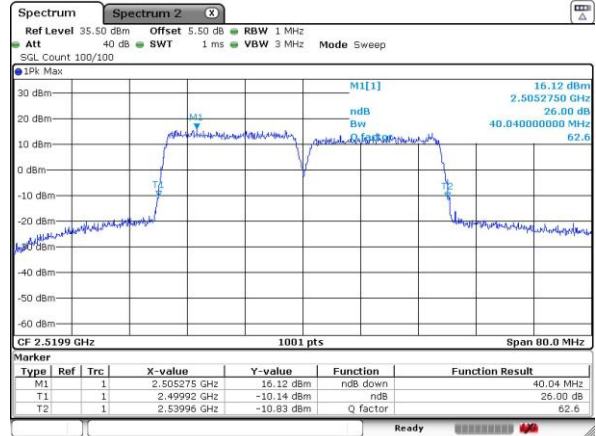
64QAM

Lowest Channel / 20MHz+15MHz



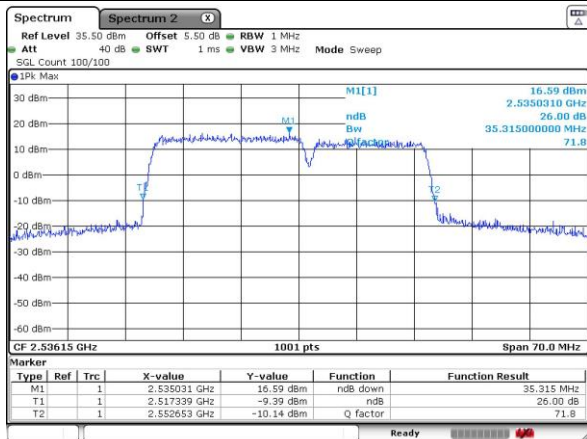
Date: 21 AUG 2018 15:35:23

Lowest Channel / 20MHz+20MHz



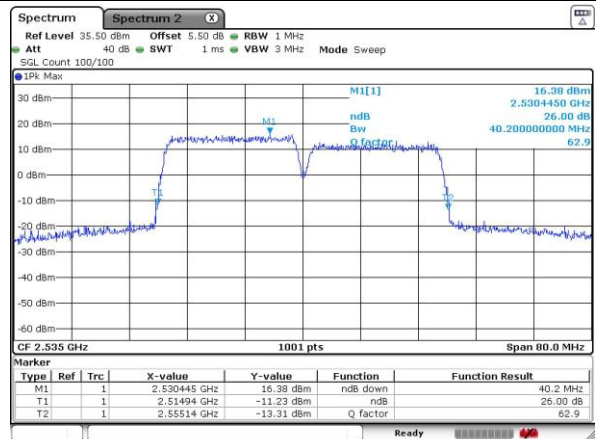
Date: 21 AUG 2018 13:57:58

Middle Channel / 20MHz+15MHz



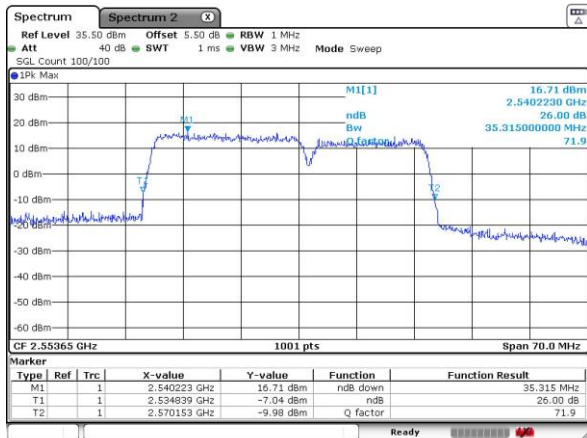
Date: 21 AUG 2018 15:40:43

Middle Channel / 20MHz+20MHz



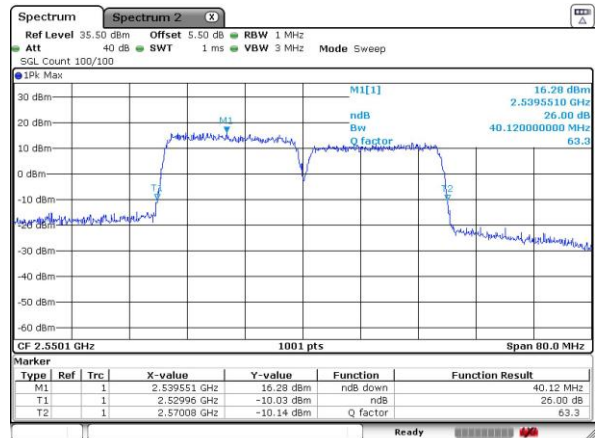
Date: 21 AUG 2018 13:56:16

Highest Channel / 20MHz+15MHz



Date: 21 AUG 2018 15:42:44

Highest Channel / 20MHz+20MHz



Date: 21 AUG 2018 13:45:08



**Occupied Bandwidth**

Mode	LTE Band 7 : 99%OBW(MHz)			
QPSK				
BW	10MHz+20MHz	15MHz+5MHz	15MHz+10MHz	15MHz+15MHz
Lowest CH	28.17		23.63	28.77
Middle CH	28.17		23.58	28.65
Highest CH	28.11		23.58	28.65
BW	15MHz+20MHz	20MHz+10MHz	20MHz+15MHz	20MHz+20MHz
Lowest CH	32.94	28.11	33.01	37.72
Middle CH	32.80	28.11	32.87	37.72
Highest CH	33.01	28.17	32.94	37.80

Mode	LTE Band 7 : 99%OBW(MHz)			
16QAM				
BW	10MHz+20MHz	15MHz+5MHz	15MHz+10MHz	15MHz+15MHz
Lowest CH	28.17		23.58	28.65
Middle CH	28.05		23.53	28.59
Highest CH	28.11		23.53	28.65
BW	15MHz+20MHz	20MHz+10MHz	20MHz+15MHz	20MHz+20MHz
Lowest CH	32.87	28.17	33.01	37.80
Middle CH	32.87	28.05	32.80	37.72
Highest CH	32.87	28.11	33.01	37.72

Mode	LTE Band 7 : 99%OBW(MHz)			
64QAM				
BW	10MHz+20MHz	15MHz+5MHz	15MHz+10MHz	15MHz+15MHz
Lowest CH	28.17		23.63	28.77
Middle CH	27.99		23.53	28.65
Highest CH	28.11		23.53	28.65
BW	15MHz+20MHz	20MHz+10MHz	20MHz+15MHz	20MHz+20MHz
Lowest CH	32.87	28.11	33.01	37.64
Middle CH	32.87	28.17	32.80	37.72
Highest CH	32.87	28.17	32.80	37.72

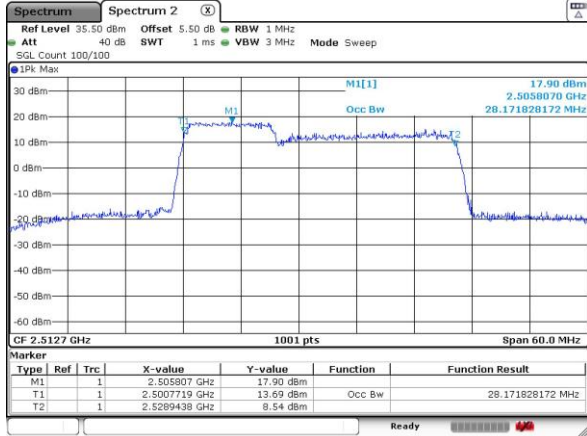


LTE Band 7

QPSK

Lowest Channel / 10MHz+20MHz

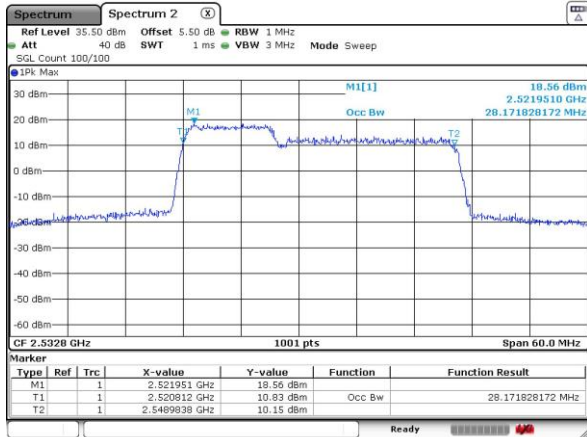
Lowest Channel / 15MHz+5MHz



Date: 21 AUG 2018 14:04:29

Middle Channel / 10MHz+20MHz

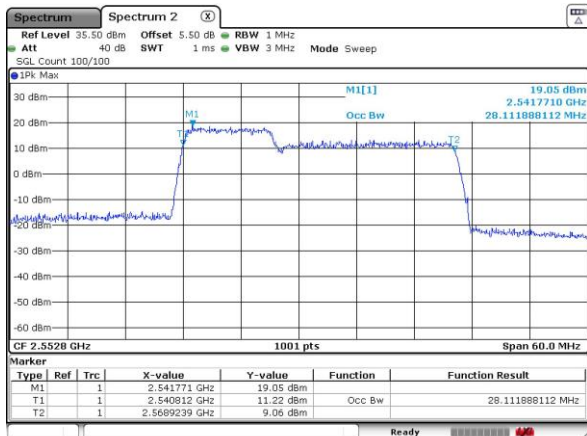
Middle Channel / 15MHz+5MHz



Date: 21 AUG 2018 14:16:45

Highest Channel / 10MHz+20MHz

Highest Channel / 15MHz+5MHz



Date: 21 AUG 2018 14:19:50

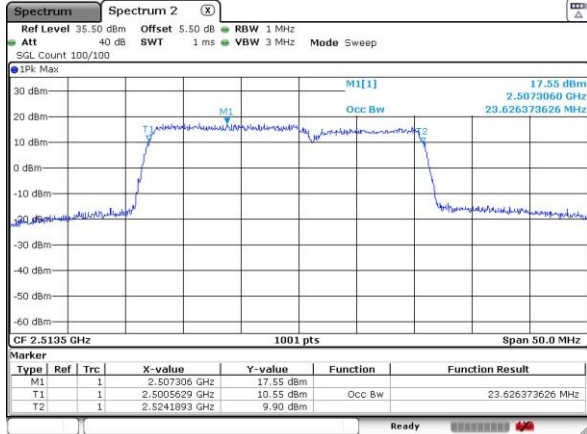




LTE Band 7

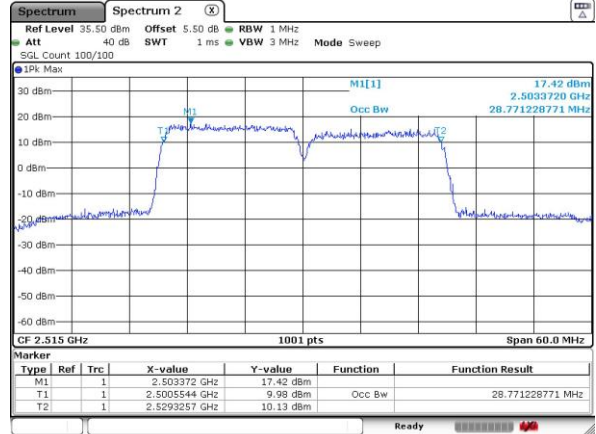
QPSK

Lowest Channel / 15MHz+10MHz



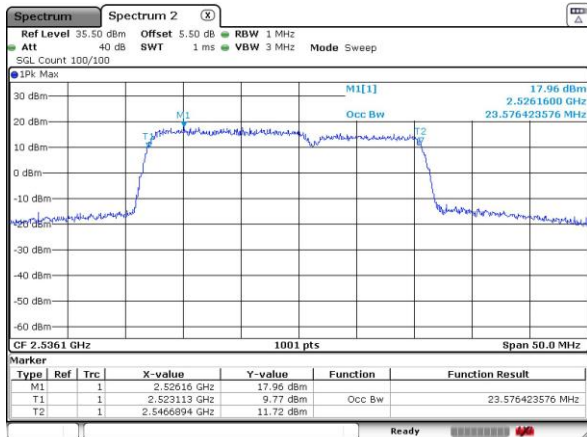
Date: 21 AUG 2018 15:47:47

Lowest Channel / 15MHz+15MHz



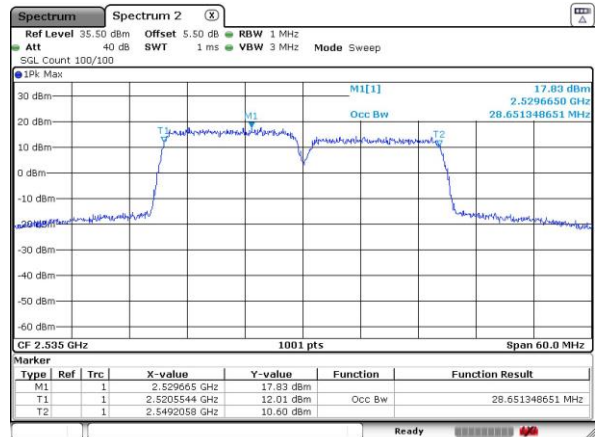
Date: 21 AUG 2018 14:42:48

Middle Channel / 15MHz+10MHz



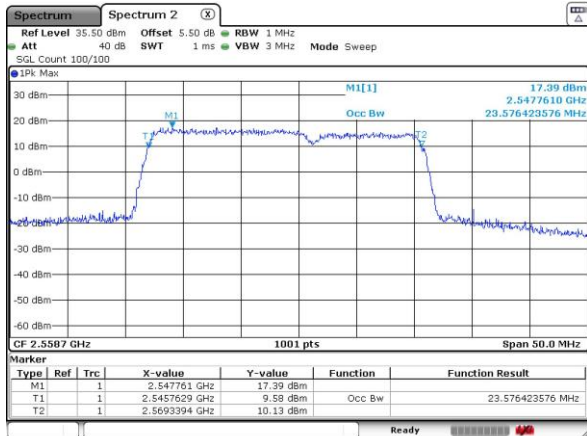
Date: 21 AUG 2018 15:53:46

Middle Channel / 15MHz+15MHz



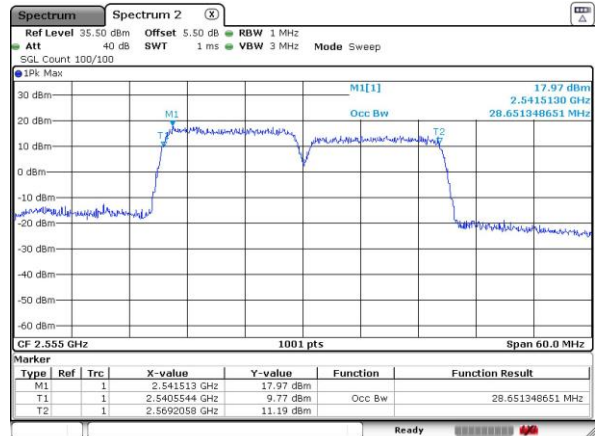
Date: 21 AUG 2018 14:48:23

Highest Channel / 15MHz+10MHz



Date: 21 AUG 2018 15:55:45

Highest Channel / 15MHz+15MHz



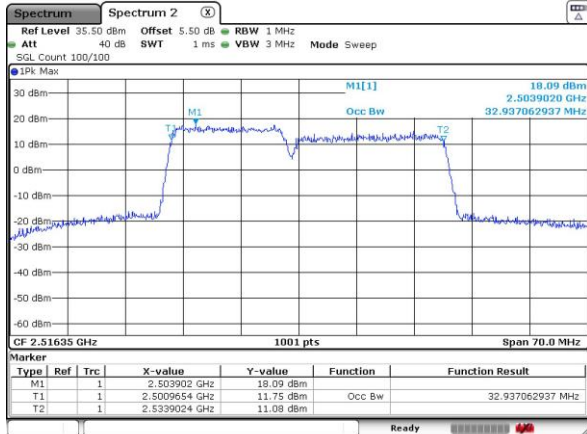
Date: 21 AUG 2018 14:49:35



LTE Band 7

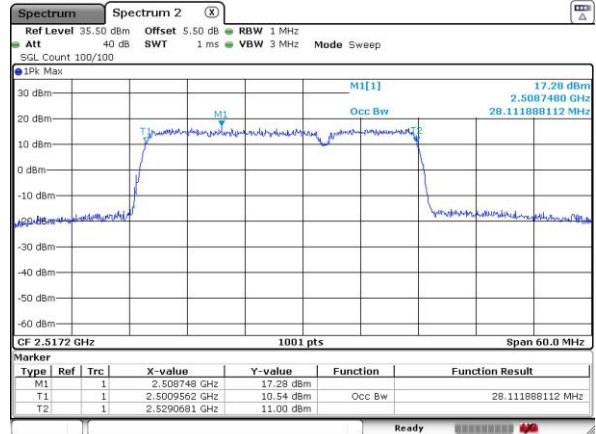
QPSK

Lowest Channel / 15MHz+20MHz



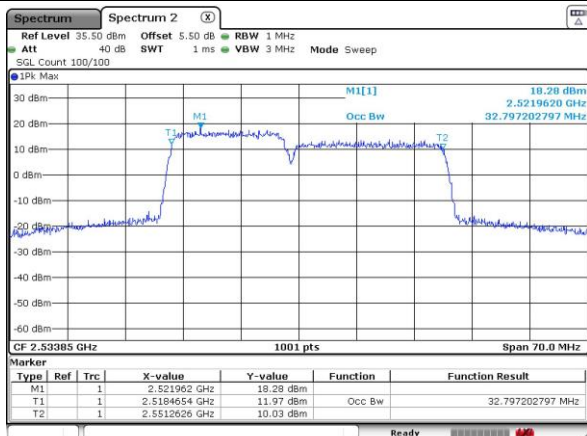
Date: 21 AUG 2018 15:14:38

Lowest Channel / 20MHz+10MHz



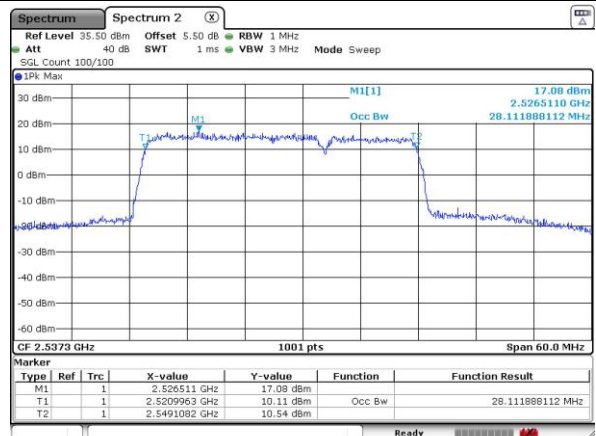
Date: 21 AUG 2018 14:28:45

Middle Channel / 15MHz+20MHz



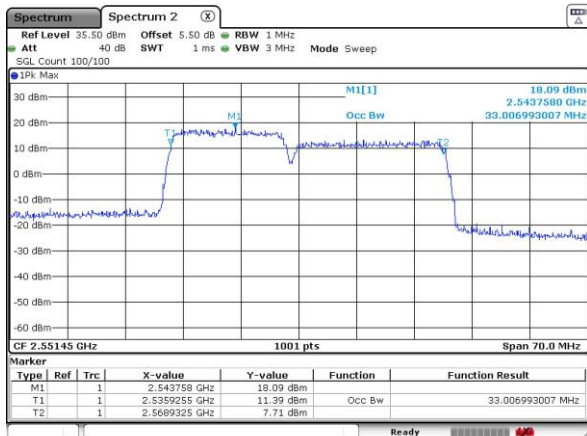
Date: 21 AUG 2018 15:19:38

Middle Channel / 20MHz+10MHz



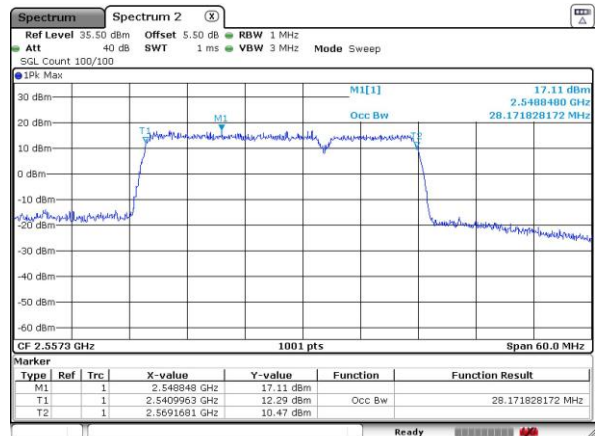
Date: 21 AUG 2018 14:28:31

Highest Channel / 15MHz+20MHz



Date: 21 AUG 2018 15:30:57

Highest Channel / 20MHz+10MHz



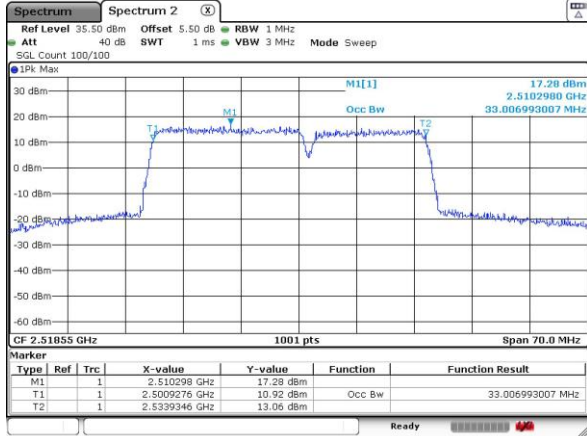
Date: 21 AUG 2018 14:39:33



LTE Band 7

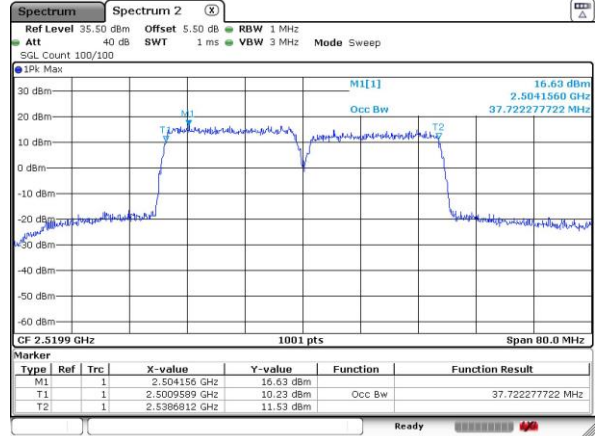
QPSK

Lowest Channel / 20MHz+15MHz



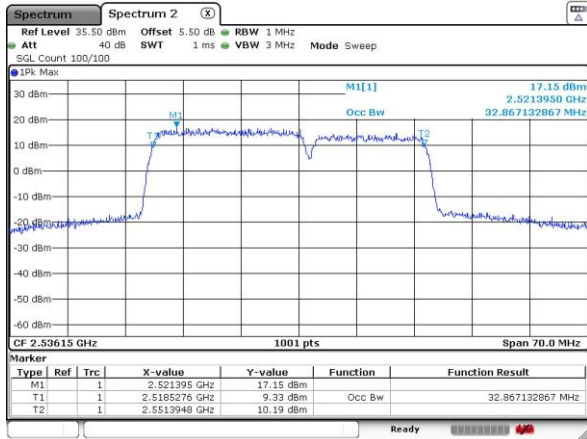
Date: 21 AUG 2018 15:36:56

Lowest Channel / 20MHz+20MHz



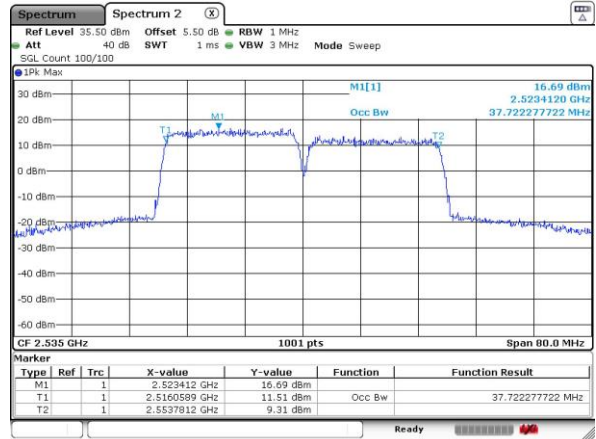
Date: 21 AUG 2018 14:01:36

Middle Channel / 20MHz+15MHz



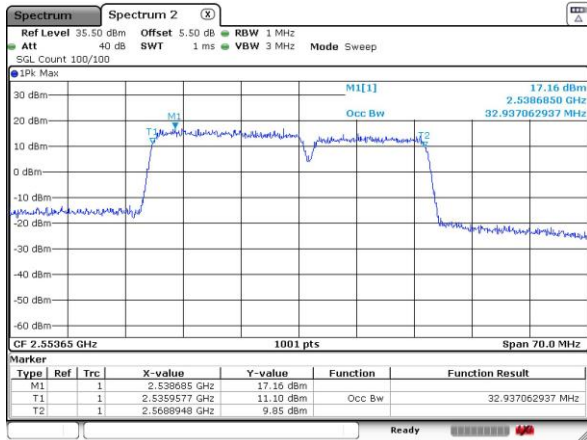
Date: 21 AUG 2018 15:38:56

Middle Channel / 20MHz+20MHz



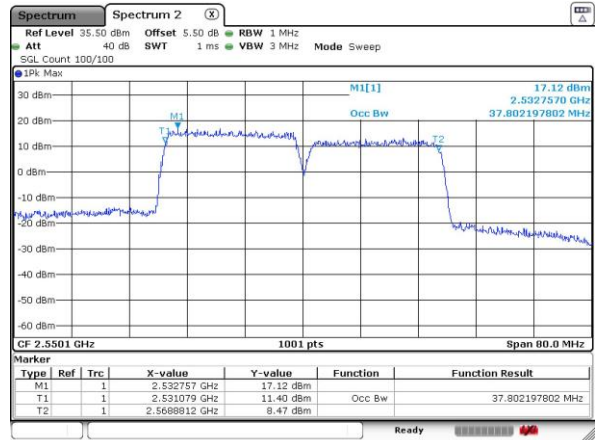
Date: 21 AUG 2018 13:49:17

Highest Channel / 20MHz+15MHz



Date: 21 AUG 2018 15:45:03

Highest Channel / 20MHz+20MHz



Date: 21 AUG 2018 13:47:25

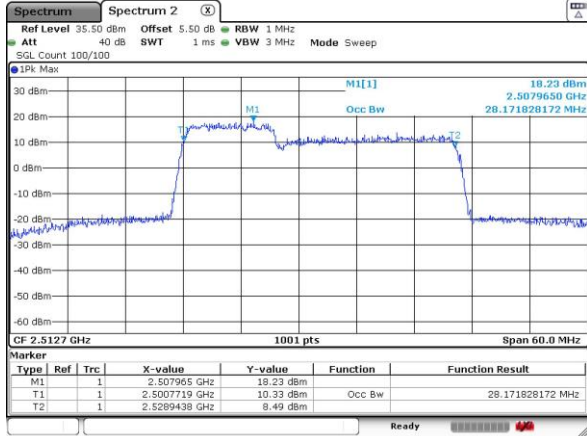


LTE Band 7

16QAM

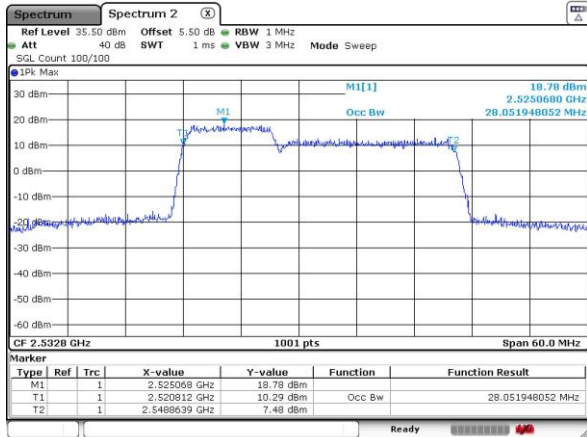
Lowest Channel / 10MHz+20MHz

Lowest Channel / 15MHz+5MHz



Middle Channel / 10MHz+20MHz

Middle Channel / 15MHz+5MHz



Highest Channel / 10MHz+20MHz

Highest Channel / 15MHz+5MHz

