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Report On

Application for Grant of Equipment Authorization of the
Nextivity Inc.

QUATRA 4000 Cellphone Signal Booster

FCC CFR 47 Part 20
RSS-131

Report No. 72146075C

December 2019

FCC ID: NU: YETQ44-1234CNU
CU: YETQ41-5ECU
IC: NU: 9298A-Q441234CNU
CU: 9298A-Q415ECU
Report No. 72146075C



REPORT ON	Radio Testing of the Nextivity Inc. QUATRA 4000 Cellphone Signal Booster
TEST REPORT NUMBER	72146075C
PREPARED FOR	Nextivity Inc. 16550 West Bernardo Drive, Bldg 5, Suite 550, San Diego, CA 92127, USA
CONTACT PERSON	CK Li Sr. Principal Engineer, Regulatory (858) 485-9442 CLi@NextivityInc.com
PREPARED BY	 Xiaoying Zhang Name Authorized Signatory Title: EMC/Wireless Test Engineer
APPROVED BY	 Ferdinand S. Custodio Name Authorized Signatory Title: EMC Test Engineer/Wireless Team Lead
DATED	December 09, 2019

FCC ID: NU: YETQ44-1234CNU
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Revision History

72146075C Nextivity Inc. QUATRA 4000 Cellphone Signal Booster					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
12/09/19	-	Initial Release			Ferdinand S. Custodio

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SECTION 1

REPORT SUMMARY

Radio Testing of the
Nextivity Inc.
QUATRA 4000 Cellphone Signal Booster



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Nextivity Inc. QUATRA 4000 Cellphone Signal Booster to the requirements of the following:

- FCC CFR 47 Part 20
- RSS-131

Objective	To perform Radio Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Nextivity Inc.
Trade Name	Cel-Fi™
Model Name	QUATRA 4000
Model Number(s)	NU: Q44-1234CNU CU: Q41-5ECU
FCC ID	NU: YETQ44-1234CNU CU: YETQ41-5ECU
IC Number	NU: 9298A-Q441234CNU CU: 9298A-Q415ECU
Serial Number(s)	370920000139 (NU) and 371929000156 (CU)
Number of Samples Tested	2
Test Specification/Issue/Date	• FCC CRF 47 Part 20 (October 1, 2018). • RSS-131 – Zone Enhancers (Issue 3, May 2017)
Start of Test	September 04, 2019
Finish of Test	November 06, 2019
Name of Engineer(s)	Xiaoying Zhang
Related Document(s)	• KDB935210 (D04 Provider Specific Booster Measurements v02r03) Provider-Specific Consumer Signal Booster Compliance Measurements Guidance. • Supporting documents for EUT certification are separate exhibits.

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 20 with cross-reference to the corresponding KDB935210 D04 is shown below.

Section	Spec Clause			Test Description	Result
	FCC Part 20	KDB935210 D04	RSS-131		
2.1	20.21 (e)(3) Frequency Bands	7.1.1	-	Authorized Frequency Band Verification	Compliant
2.2	20.21 (e)(3) Frequency Bands 20.21 (e)(4) Self-Monitoring	7.1.2	-	Test Authorized CMRS provider test	Compliant
2.3	20.21(e)(9)(i)(D) Power Limits	7.2	5.1.4.2	Maximum Power measurement procedure	Compliant
	20.21(e)(9)(i)(B) Bidirectional Capability	7.3	5.1.4.3	Maximum Booster Gain Computer	
	20.21(e)(9)(i)(C)(2) Booster Gain Limits				
2.4	20.21(e)(9)(i)(G) Intermodulation Limit	7.4	5.1.4.6	Intermodulation Product	Compliant
2.5	20.21(e)(9)(i)(F) Out of Band Emission Limit	7.5	5.1.4.5	Out-of-Band Emissions	Compliant
-	2.1051	7.6		Conducted Spurious Emissions	Note*
2.6	20.21(e)(9)(i)(A) Noise Limits	7.7	5.1.4.1	Noise Limits	Compliant
	20.21(e)(9)(i)(I) Transmit Power Off Mode		5.1.4.7		
2.7	20.21(e)(9)(i)(J) Uplink Inactivity	7.8	5.1.4.8	Uplink inactivity	Compliant
2.8	20.21(e)(9)(i)(C)(1) Booster Gain Limits	7.9	5.1.4.2	Variable Booster Gain	Compliant
	20.21(e)(9)(i)(I) Transmit Power Off Mode		5.1.4.7		
-	2.1049	7.10	-	Occupied Bandwidth	Note*
2.9	20.21(e)(9)(ii)(A) Anti-Oscillation	7.11	-	Oscillation Detection	Compliant
-	20.21(e)(9)(i)(C)(2)(iii) Automatic Feedback Cancellation	7.12	-	Mobile Booster Automatic Feedback Cancellation	N/A; Applicable to Mobile Booster
-	2.1053	7.13	-	Radiated Spurious Emissions	Note*
-	20.21(e)(9)(i)(B) Bidirectional Capability	7.14	-	Spectrum Block Filtering	N/A**
	20.21(e)(3) Frequency Band				
2.10	20.21(e)(9)(i)(E) Out of Band Gain Limit	7.15	5.1.4.4	Out of Band Gain	Compliant
-	2.1055	7.16	-	Frequency Stability	Note*

N/A* *Not Applicable. Different Standard Applies; Refer to test report 72146075A Test Report for WCDMA Band 5 and LTE Band 5, 25 and 72146075B for LTE Band 4, 12, 13, 30 and 71.*

N/A** *Not Applicable. The EUT does not utilize spectrum block filtering.*

1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment Under Test (EUT) is a Nextivity Inc. QUATRA 4000 Cellphone Signal Booster. The EUT is a WCDMA/LTE Signal Booster to improve voice and data cellular performance in large enterprise environments. Quatra 4000 is capable to support up to four carriers (via separate donor antenna ports). Quatra 4000 consists of two separate units: the Network Unit (NU), and the Coverage Unit (CU). The NU comprises a transmitter and receiver which communicate with the cell tower and the CU. CU comprises a transmitter and receiver which communicate with the User Equipment (e.g. Cell Phone) and the NU.

Users place the NU in an area with the strongest signal from the carrier networks. The CUs are then either placed in the center of the home or office, or in the area where the best signal quality is most needed. The NU and CU are placed at varying distance apart and are communicated via Ethernet cables.

One NU can connect up to six CUs via Ethernet Cat 5 cables. The NU transmits and receives Cellular signals from the base station and operates similar to a cellular handset. The CU transmits and receives signals with the cellular handset and operates on frequencies similar to the cellular base station.

One NU can connect up to six CUs via Ethernet Cat 5 cables. The NU transmits and receives Cellular signals from the base station and operates similar to a cellular handset. The CU transmits and receives signals with the cellular handset and operates on frequencies similar to the cellular base station.

NU has four antenna ports. Each antenna port is assigned to support one operator, separated donor antennas. Up to two bands can be transmitted simultaneously at each antenna port from yellow group to another colored group (eg. Carrier B: LTE Band 71 + Band 4, Band 71 + Band 25, Band 12 + Band 4, Band 12 + Band 25).

Up to two bands on each antenna port														
Ant Port	1					2				3			4	
Operator #	A					B				C			D	
Max Support BW	30 MHz					40 MHz				30 MHz			40 MHz	
Band	LB12	LB30	W5	L25	L4	L71	L12	L4	L25	L13	L25	L4	L5	L25
Band Combination	✓		✓			✓		✓		✓	✓		✓	✓
	✓			✓		✓			✓	✓		✓	-	-
	✓				✓		✓	✓		-	-	-	-	-
		✓	✓				✓		✓	-	-	-	-	-
		✓		✓				✓	✓	-	-	-	-	-
		✓			✓	-	-	-	-	-	-	-	-	-

The WCDMA Band 5, LTE Band 4, 5, 12, 13, 25, 30 and 71 function of the EUT were verified in this test report.



1.3.2 EUT General Description

EUT Description	Cellphone Signal Booster
Trade Name	Cel-Fi™
Model Name	QUATRA 4000
Model Number(s)	NU: Q44-1234CNU CU: Q41-5ECU
Rated Voltage	NU: 120 VAC 60Hz CU: 54V DC (powered from NU via Ethernet cables)
Mode Verified	WCDMA Band 5 and LTE Band 4, 5, 12, 13, 25, 30 and 71 <i>(Note: LTE Band 30 and 71 Test Data are for reference only. These two bands are disabled by software on the final product)</i>
Frequency Bands	WCDMA/LTE Band 5: UL: 824 - 849MHz DL: 869 - 894MHz LTE Band 4: UL: 1710 - 1755MHz DL: 2110 - 2155MHz LTE Band 12: UL: 699 - 716MHz DL: 729 - 746MHz LTE Band 13: UL: 777 - 787MHz DL: 746 - 756MHz LTE Band 25: UL: 1850 - 1915MHz DL: 1930 - 1995MHz LTE Band 30: UL: 2305 - 2315MHz DL: 2350 - 2360MHz LTE Band 71: UL: 663 - 698MHz DL: 617 - 652MHz



Channel Bandwidth

WCDMA/LTE Band 5: 5MHz, 10MHz and 15MHz
 LTE Band 4, 25 and 71: 5MHz, 10MHz, 15MHz and 20MHz
 LTE Band 12, 13 and 30: 5MHz and 10MHz

Rated Power

Signal Bandwidth (MHz)	WCDMA/LTE Band 5		LTE Band 4, 25, 71		LTE Band 12, 13, 30	
	DL (dBm)	UL (dBm)	DL (dBm)	UL (dBm)	DL (dBm)	UL (dBm)
5	(WCDMA) 13 (LTE) 16	(WCDMA) 22 (LTE) 20	Max. 16	22	Max. 16	22 (B12, 13) 19 (B30)
10						
15					N/A	
20	N/A				N/A	

Capability

WCDMA (Band 5), LTE (Band 4, 5, 12, 13 and 25)

Primary Unit (EUT)

- ☐ Production
☒ Pre-Production
☐ Engineering

Manufacturer Declared Temperature Range

0°C to 40°C

Antenna Type

External Antenna

Manufacturer

Refer to the Antenna information supplied by the manufacturer

Antenna Model

Refer to the Antenna information supplied by the manufacturer

Maximum Antenna System (Antenna + Cable) Gain

Radio	Uplink (Donor)	Downlink (Server)
WCDMA Band 5	6.07 dBi	0.4 dBi
LTE Band 5	7.55 dBi	0.4 dBi
LTE Band 4	5.72 dBi	2.6 dBi
LTE Band 12	6.77 dBi	0.4 dBi
LTE Band 13	6.48 dBi	0.4 dBi
LTE Band 25	7.26 dBi	2.6 dBi
LTE Band 30	3.91 dBi	2.3 dBi
LTE Band 71	6.91 dBi	0.4 dBi

1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

Test Configuration	Description
A	Test Mode - Downlink (CU TX). Input signal is applied to antenna port of NU. Output is monitored from antenna port of CU. (refer to 1.4.4 Figure 3)
B	Test Mode - Uplink (NU TX). Input signal is applied to antenna port of CU. Output is monitored from antenna port of NU. (refer to 1.4.4 Figure 2)
C	Normal Mode - Downlink (CU TX). Base Station Simulator is employed to send a modulated signal to antenna port of NU. Antenna port of CU is terminated with a 50Ω load. (refer to 1.4.4 Figure 1)
D	Normal Mode - Uplink (NU TX). Base Station Simulator is employed to send a modulated signal to antenna port of NU. Input signal is applied to antenna port of CU. (refer to 1.4.4 Figure 1)
E	Inter-modulation. Test setup identical to Test Configuration A and B above with the addition of another signal applied to the input of the EUT. A coupler was used in the setup to ensure that the additional signal is directed to the EUT input port. (refer to 1.4.4 Figure 5)
F	Max Downlink noise limit testing - A 50 Ohm Termination is connected to the NU antenna port and Measure the Noise Limit at the CU antenna port. (refer to 1.4.4 Figure 6)
G	Max Uplink RSSI-dependent noise limit testing - A 50 Ohm Termination is connected to the CU antenna port. A signal is connected to a step attenuator and then applied to the NU antenna port. Output is monitored from antenna port of NU. (refer to 1.4.4 Figure 7)
H	Max Downlink RSSI-dependent noise limit testing - A 50 Ohm Termination is connected to the CU antenna port. A signal is connected to a step attenuator and then applied to the NU antenna port. Output is monitored from antenna port of CU. (refer to 1.4.4 Figure 8)

1.4.2 EUT Exercise Software

Manufacturer provided a Nextivity Chart Interface v2.0.0.16 running from a support laptop where both EUT are connected via USB.

1.4.3 Support Equipment and I/O cables

Manufacturer	Equipment/Cable	Description
Dell	Support Laptop	M/N Latitude D630 PP18L S/N 5SBJBG1
Dell	Support Laptop AC Adapter	M/N PA-1900-02D S/N 5SBJBG1
Nextivity	Support USB cable x 2	Custom 1.0 meter shielded USB Type A to Type A cable
Nextivity	Support USB cable x 2	Custom 1.0 meter shielded USB Type A to Micro B cable
Nextivity	USB / Interface Box x 2	Unshielded with "Tag-Connect" interface
Rhode & Schwarz	Support Wideband Radio Communication Tester	M/N: CMW500, S/N: 1201.0002K50/103829
Agilent	ESG Vector Signal Generator	M/N: E4438C, S/N: MY49071335
Ramsey	Support Shielded Test Enclosure	With custom USB cable
Agilent	110 dB Step Attenuator	M/N: 8496B S/N: MY42143874
Agilent	11 dB Step Attenuator	M/N: 8494B S/N: 2812A17193
Rhode & Schwarz	Step Attenuator	M/N: RSP S/N: 834500/009
Mini-Circuits	Power Splitter	M/N ZN2PD-63-S+ S/N UU74001429
RF Precision Cables, Inc.	Power Splitter	M/N: PDX2103
Weinschel	Power Splitter	M/N: 1506A S/N: RR002

1.4.4 Simplified Test Configuration Diagram

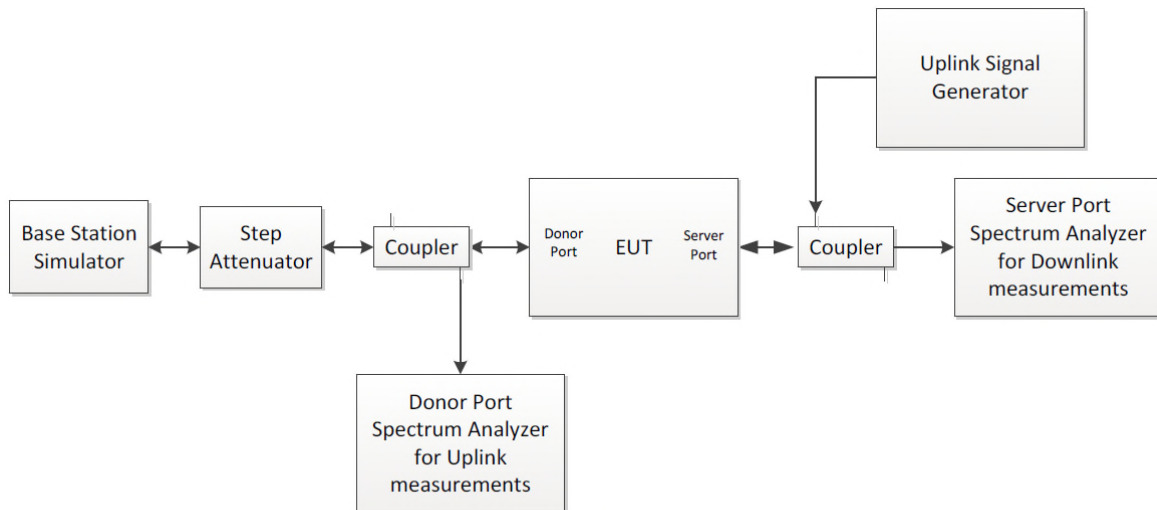


Figure 1 – Test configuration in EUT normal operational mode

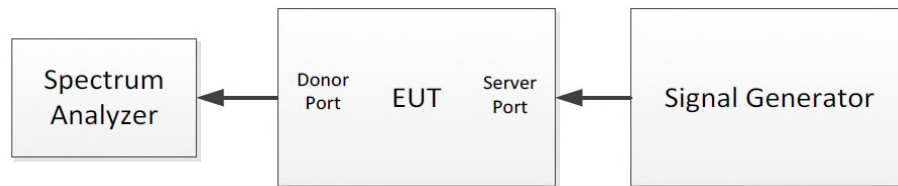


Figure 2 – Uplink test configuration in EUT test mode

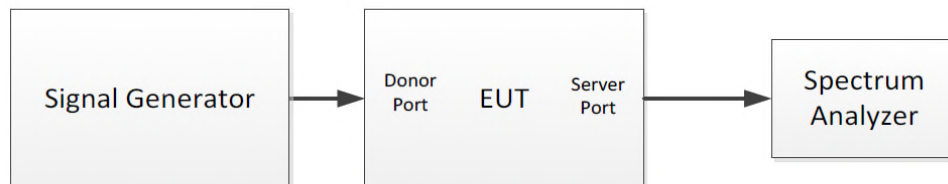


Figure 3 – Downlink test configuration in EUT test mode

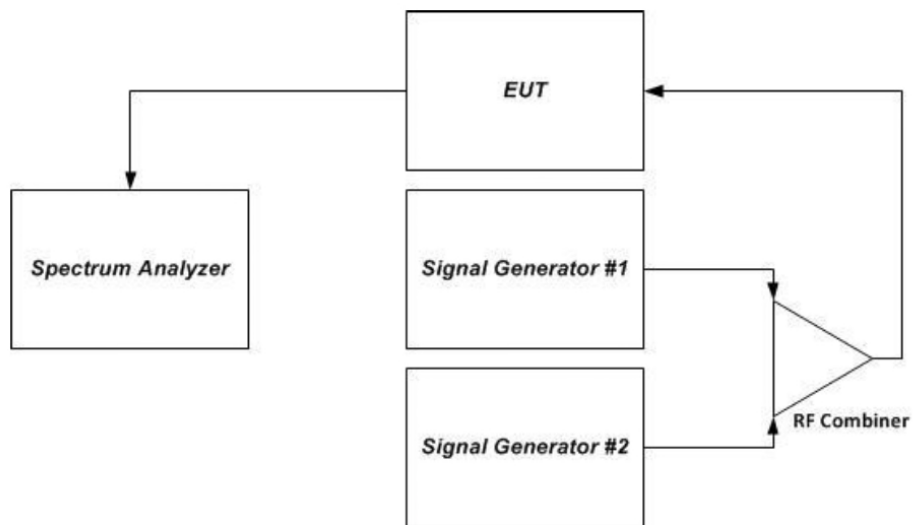


Figure 5 – Intermodulation product instrumentation test setup

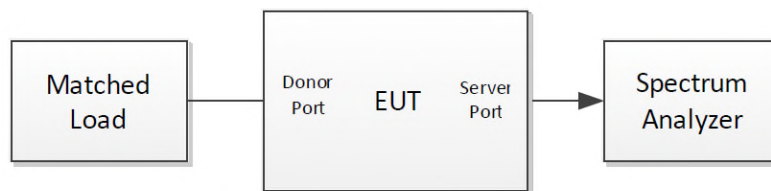


Figure 6 – Maximum downlink noise limit test configuration

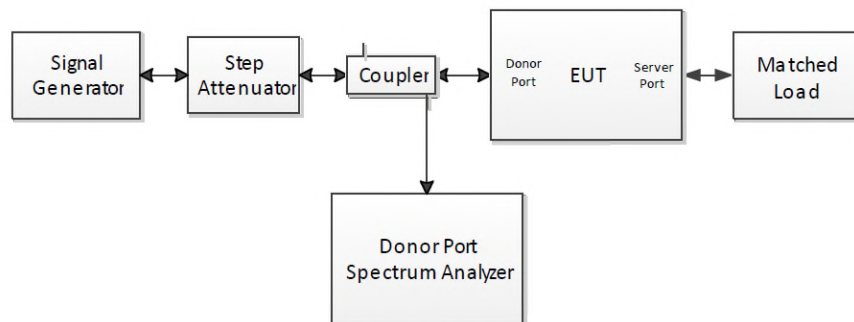


Figure 7 – Uplink RSSI-dependent noise limit test configuration

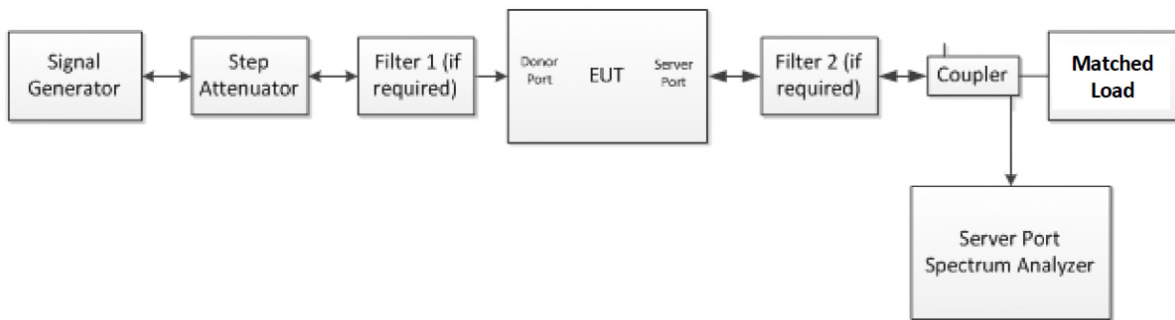


Figure 8 – Downlink RSSI-dependent noise limit test configuration

1.5 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.6 MODIFICATION RECORD

Description of Modification	Modification Fitted By	Date Modification Fitted
Serial Number: 370920000139 (NU) and 371929000156 (CU)		
N/A		

The table above details modifications made to the EUT during the test programme. The modifications incorporated during each test (if relevant) are recorded on the appropriate test pages.

1.7 TEST METHODOLOGY

All measurements contained in this report were conducted as per KDB935210 D04 Provider-Specific Consumer Signal Boosters Compliance Measurements Guidance (February 12, 2016).

1.8 TEST FACILITY LOCATION

1.8.1 TÜV SÜD America Inc. (Mira Mesa)

10040 Mesa Rim Road, San Diego, CA 92121-2912 (32.901268,-117.177681). Phone: 858 678 1400 FAX: 858-546 0364

1.8.2 TÜV SÜD America Inc. (Rancho Bernardo)

16936 Via Del Campo, San Diego, CA 92127-1708 (33.018644,-117.092409). Phone: 858 678-1400 Fax: 858 546 0364.

1.9 TEST FACILITY REGISTRATION

1.9.1 FCC – DESIGNATION NO.: US1146

TUV SUD America Inc. (San Diego), is an accredited test facility with the site description report on file and has met all the requirements specified in §2.948 of the FCC rules. The acceptance letter from the FCC is maintained in our files and the Registration is US1146.



1.9.2 Innovation, Science and Economic Development Canada (ISED) Registration No.: 3067A-1 & 22806-1

The 10m Semi-anechoic chamber of TUV SUD America Inc. (San Diego Rancho Bernardo) has been registered by Certification and Engineering Bureau of Innovation, Science and Economic Development Canada for radio equipment testing with Registration No. 3067A-1.

The 3m Semi-anechoic chamber of TUV SUD America Inc. (San Diego Mira Mesa) has been registered by Certification and Engineering Bureau of Innovation, Science and Economic Development Canada for radio equipment testing with Registration No. 22806-1.

1.9.3 BSMI – Laboratory Code: SL2-IN-E-028R (US0102)

TUV Product Service Inc. (San Diego) is a recognized EMC testing laboratory by the BSMI under the MRA (Mutual Recognition Arrangement) with the United States. Accreditation includes CNS 13438 up to 6GHz.

1.9.4 NCC (National Communications Commission - US0102)

TUV SUD America Inc. (San Diego) is listed as a Foreign Recognized Telecommunication Equipment Testing Laboratory and is accredited to ISO/IEC 17025 (A2LA Certificate No.2955.13) which under APEC TEL MRA Phase 1 was designated as a Conformity Assessment Body competent to perform testing of equipment subject to the Technical Regulations covered under its scope of accreditation including RTTE01, PLMN01 and PLMN08 for TTE type of testing and LP002 for Low-Power RF Device type of testing.

1.9.5 VCCI – Registration No. A-0280 and A-0281

TUV SUD America Inc. (San Diego) is a VCCI registered measurement facility which includes radiated field strength measurement, radiated field strength measurement above 1GHz, mains port interference measurement and telecommunication port interference measurement.

1.9.6 RRA – Identification No. US0102

TUV SUD America Inc. (San Diego) is National Radio Research Agency (RRA) recognized laboratory under Phase I of the APEC Tel MRA.

1.9.7 OFCA – U.S. Identification No. US0102

TUV SUD America Inc. (San Diego) is recognized by Office of the Communications Authority (OFCA) under Appendix B, Phase I of the APEC Tel MRA.

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SECTION 2

TEST DETAILS

Radio Testing of the
Nextivity Inc.
QUATRA 4000 Cellphone Signal Booster

2.1 AUTHORIZED FREQUENCY BAND VERIFICATION

2.1.1 Specification Reference

FCC 47 CFR Part 20, Clause 20.21 (e)(3)
KDB935210 D04, Clause 7.1

2.1.2 Standard Applicable

FCC 47 CFR Part 20, Clause 20.21 (e)(3) Frequency Bands:
Consumer Signal Boosters must be designed and manufactured such that they only operate on the frequencies used for the provision of subscriber-based services under parts 22 (Cellular), 24 (Broadband PCS), 27 (AWS-1, 700 MHz Lower A-E Blocks, and 700 MHz Upper C Block), and 90 (Specialized Mobile Radio) of this chapter. The Commission will not certificate any Consumer Signal Boosters for operation on part 90 of this chapter (Specialized Mobile Radio) frequencies until the Commission releases a public notice announcing the date Consumer Signal Boosters may be used in the band.

2.1.3 Equipment Under Test and Modification State

Serial No: 370920000139 (NU) and 371929000156 (CU) / Test Configuration A and B

2.1.4 Date of Test/Initial of test personnel who performed the test

September 04, 11 and October 16, 2019/XYZ

2.1.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.6 Environmental Conditions

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility.

Ambient Temperature	25.5 - 26.0°C
Relative Humidity	46.1 - 48.0%
ATM Pressure	98.6 - 99.1kPa

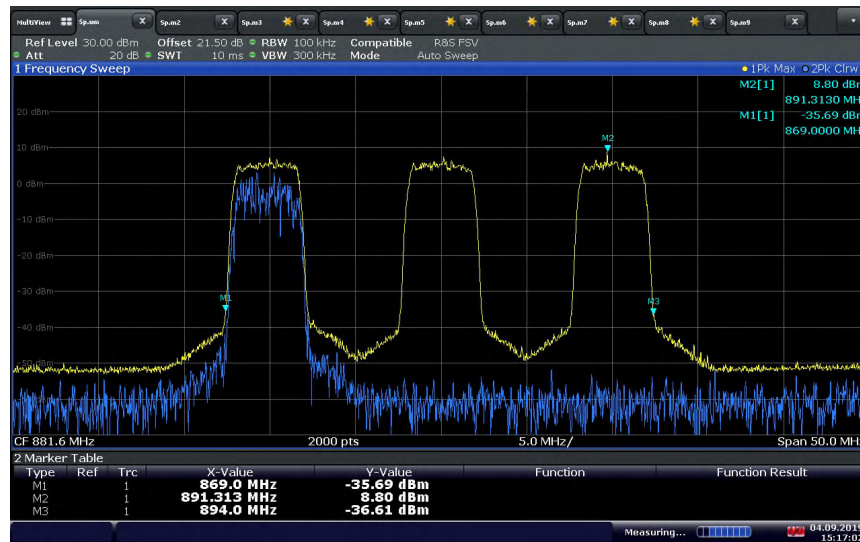
2.1.7 Additional Observations

- This is conducted Test. Test procedure is per Section 7.1.1 of KDB935210 (D04 Provider Specific Booster Measurements v02r03). Appropriate offset (line losses) applied.
- The EUT operated in Test Mode, with the gain set to the maximum gain and a minimum bandwidth setting (5MHz).
- Setup the EUT according to Figure 2 or 3 of Section 6.3.3 of KDB935210 as appropriate.
- Evaluations are conducted at CU and NU antenna ports.
- Both downlink and uplink bands for WCDMA Band 5 and LTE Band 4, 5, 12, 13, 25, 30, 71 on CU and NU all four antenna ports A, B, C, D were tested.
- The signal generator was set to transmit a 5MHz WCDMA or 5MHz LTE signal.
- Frequency Range:

Technology	Band	DL Frequency Range (MHz)	UL Frequency Range (MHz)
WCDMA	5	869 - 894	824 - 849
LTE	4	2110 - 2155	1710 - 1755
LTE	5	869 - 894	824 - 849
LTE	12	729 - 746	699 - 716
LTE	13	746 - 756	777 - 787
LTE	25	1930 - 1995	1850 - 1915
LTE	30	2350 - 2360	2305 - 2315
LTE	71	617 - 652	663 - 698

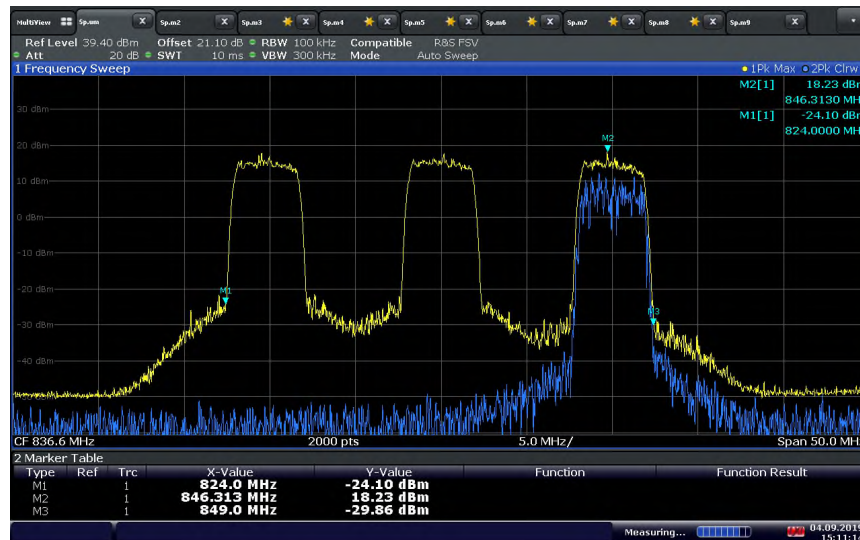
2.1.8 Test Results

WCDMA Band 5 Downlink Authorized Frequency Range (869 - 894MHz) – CU with NU Port A



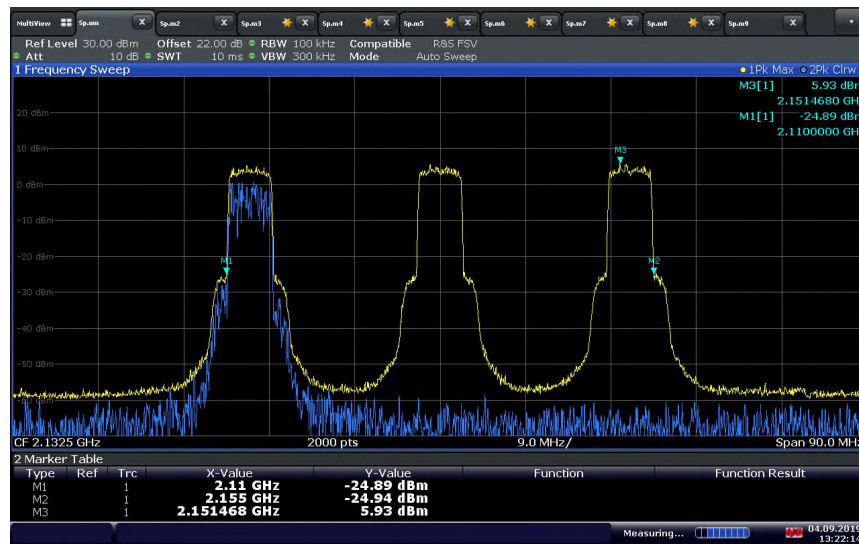
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WCDMA Band 5 Uplink Authorized Frequency Range (824 – 849 MHz) - NU Port A



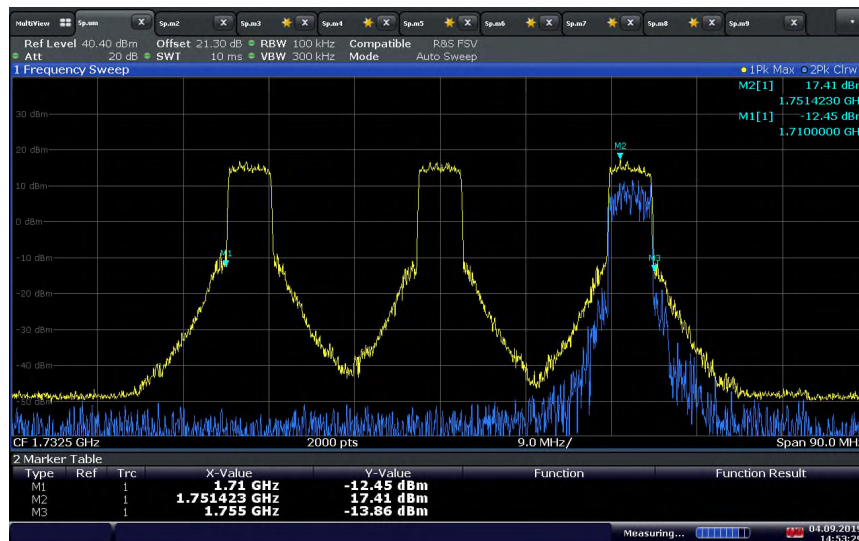
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LTE Band 4 Downlink Authorized Frequency Range (2110 – 2155 MHz) - CU with NU Port A



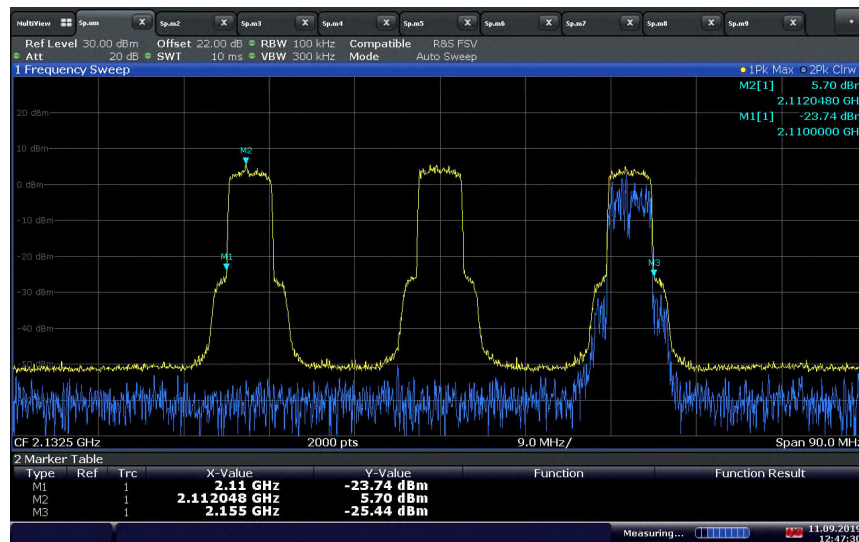
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LTE Band 4 Uplink Authorized Frequency Range (1710 – 1755 MHz) - NU Port A



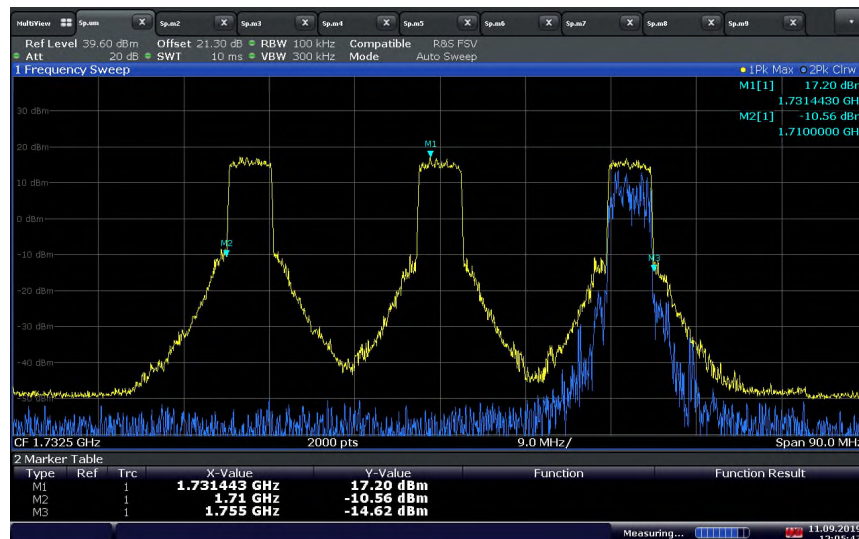
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LTE Band 4 Downlink Authorized Frequency Range (2110 – 2155 MHz) - CU with NU Port B



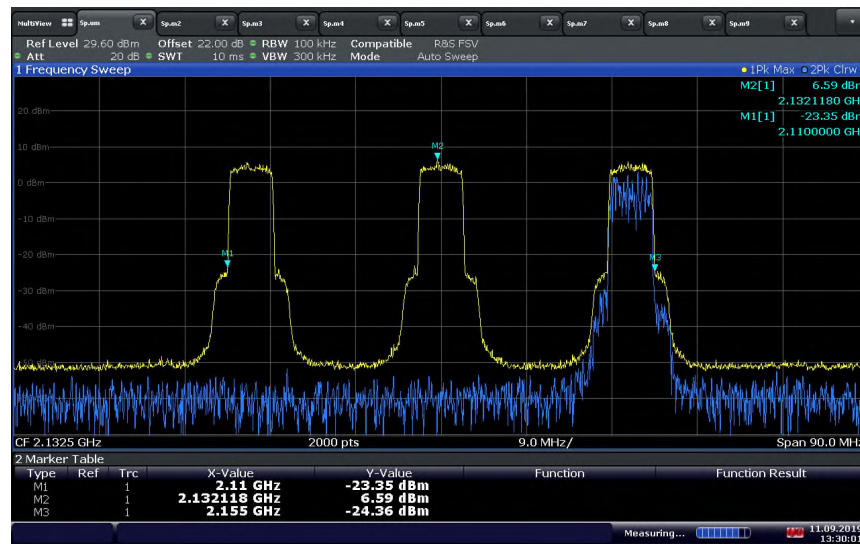
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LTE Band 4 Uplink Authorized Frequency Range (1710 – 1755 MHz) - NU Port B



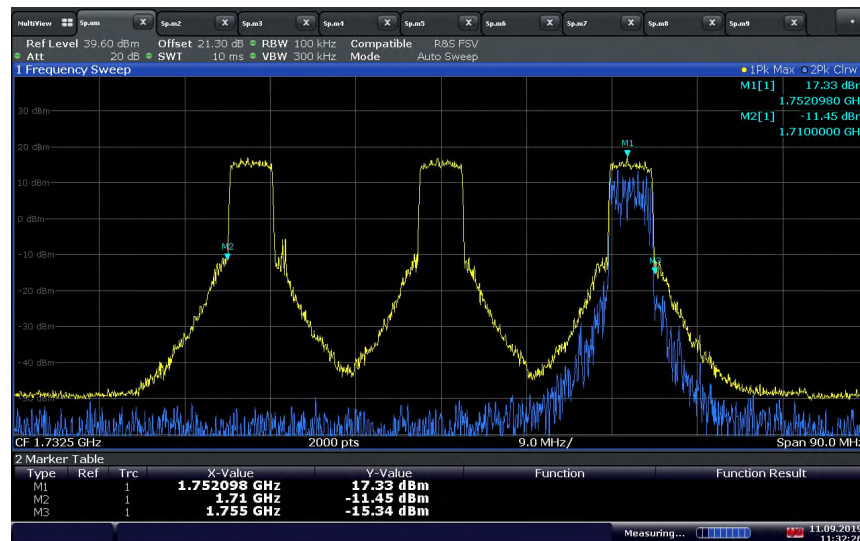
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LTE Band 4 Downlink Authorized Frequency Range (2110 – 2155 MHz) - CU with NU Port C



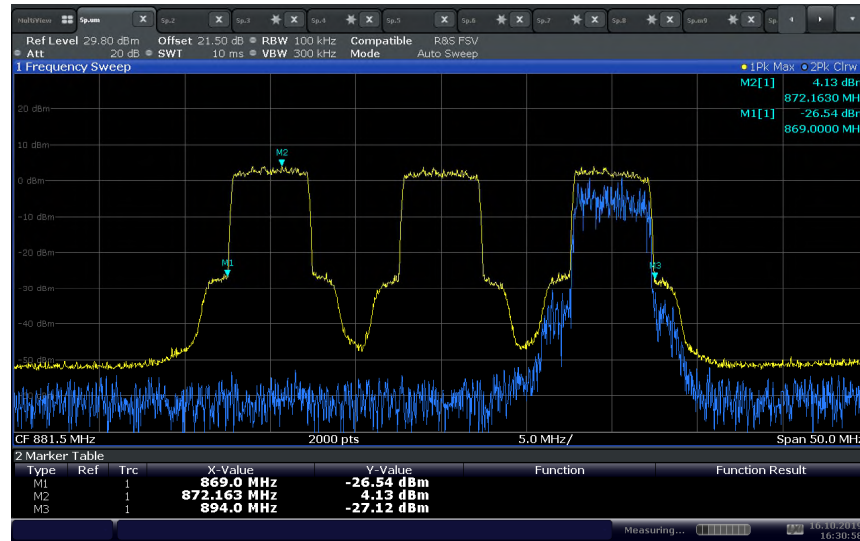
13:30:01 11.09.2019

LTE Band 4 Uplink Authorized Frequency Range (1710 – 1755 MHz) - NU Port C

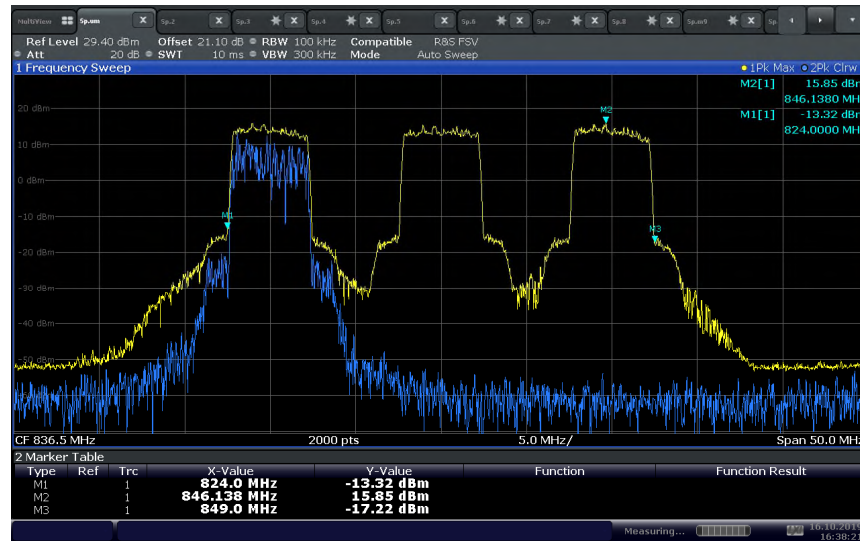


11:32:27 11.09.2019

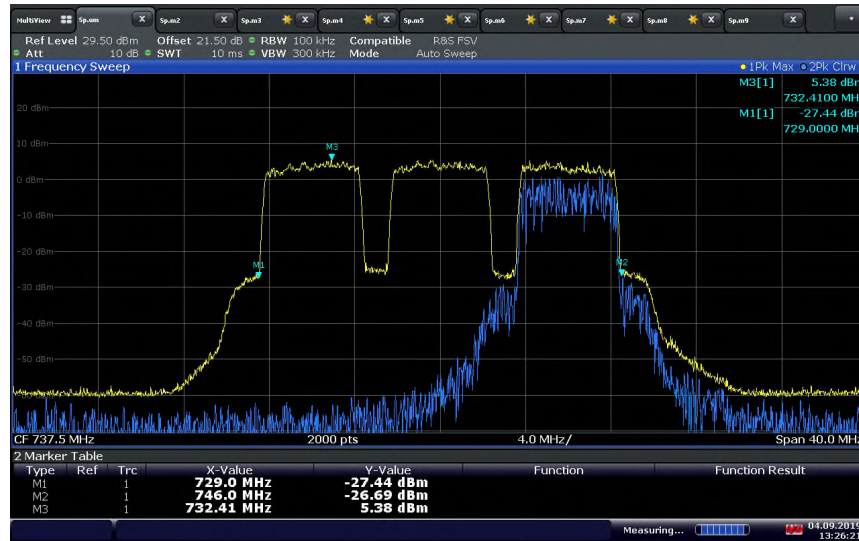
LTE Band 5 Downlink Authorized Frequency Range (869 – 894 MHz) - CU with NU Port D



LTE Band 5 Uplink Authorized Frequency Range (824 – 849 MHz) - NU Port D

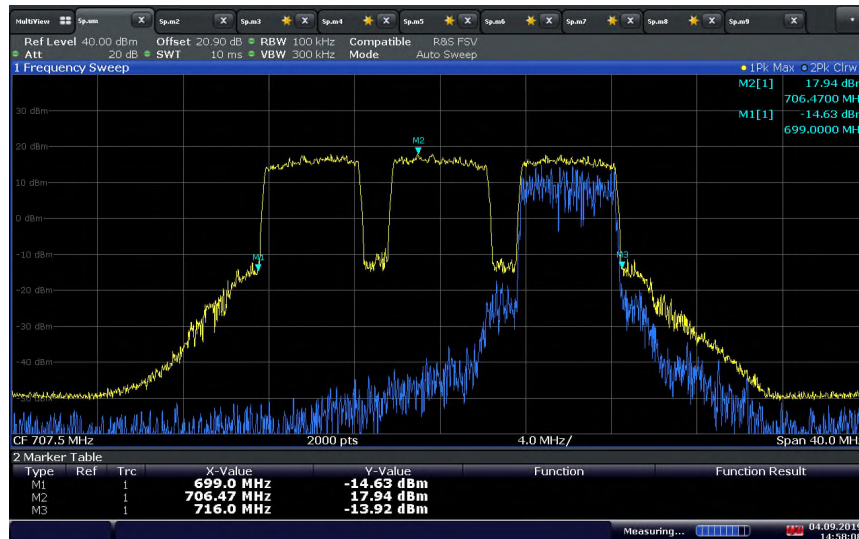


LTE Band 12 Downlink Authorized Frequency Range (729 – 746 MHz) - CU with NU Port A



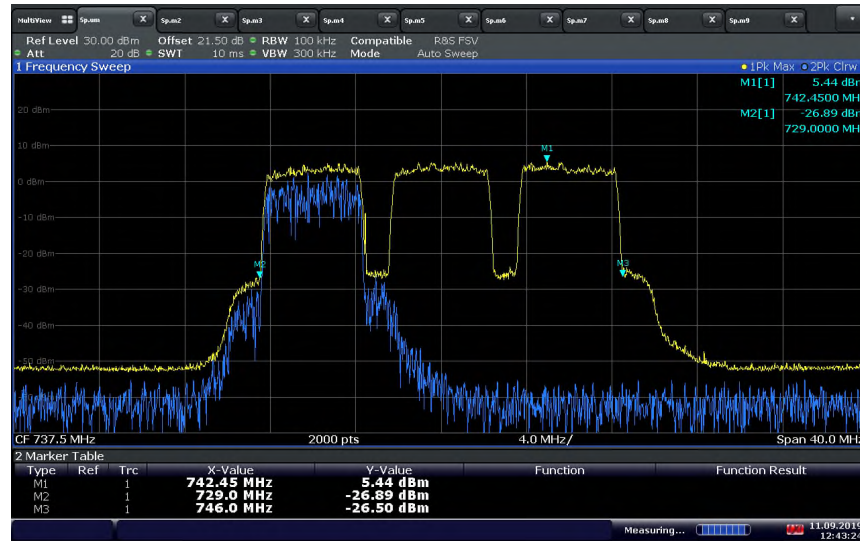
13:26:22 04.09.2019

LTE Band 12 Uplink Authorized Frequency Range (699 – 716 MHz) - NU Port A

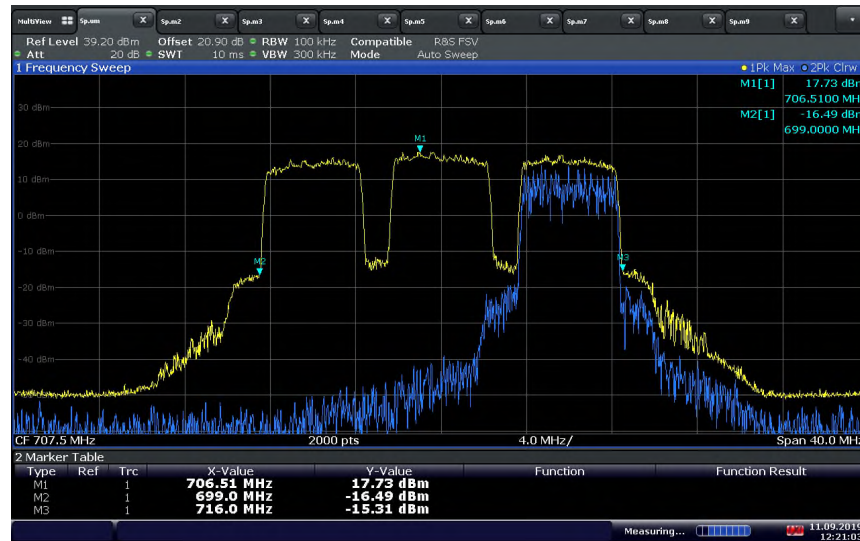


14:58:08 04.09.2019

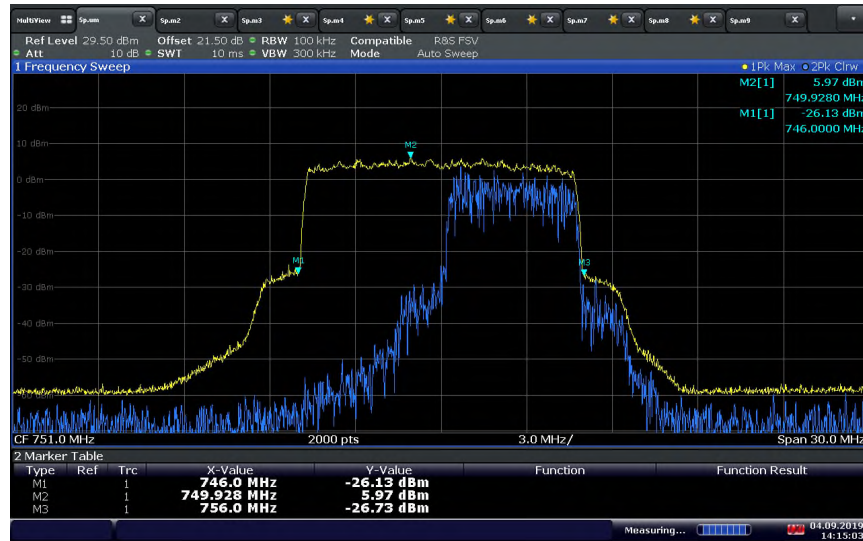
LTE Band 12 Downlink Authorized Frequency Range (729 – 746 MHz) - CU with NU Port B



LTE Band 12 Uplink Authorized Frequency Range (699 – 716 MHz) - NU Port B

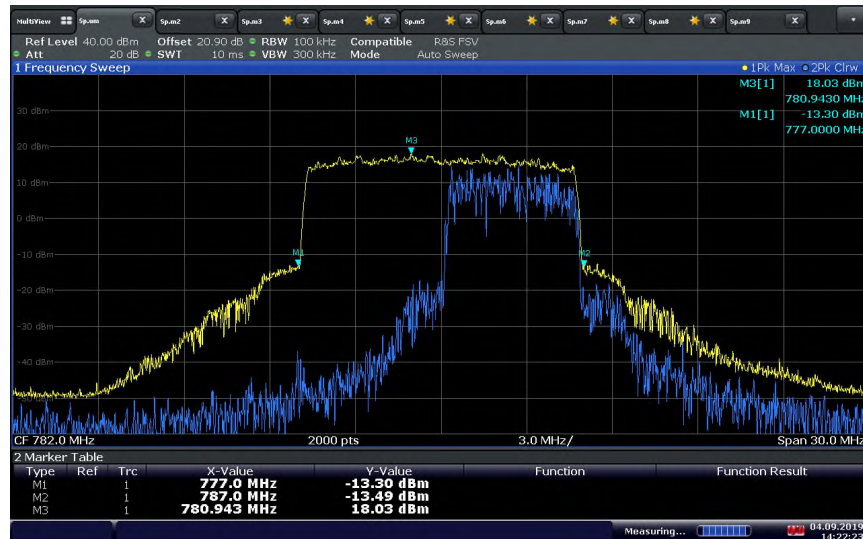


LTE Band 13 Downlink Authorized Frequency Range (746 – 756 MHz) - CU with NU Port C



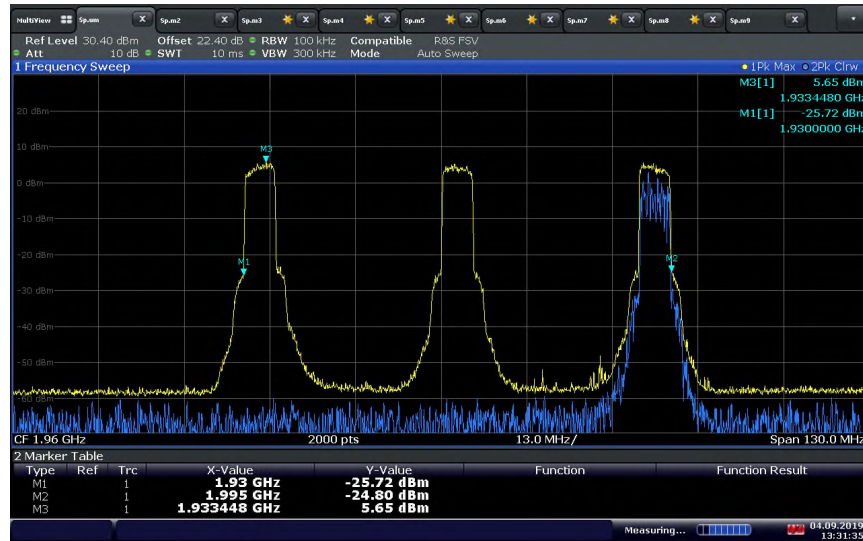
14:15:03 04.09.2019

LTE Band 13 Uplink Authorized Frequency Range (777 – 787 MHz) - NU Port C



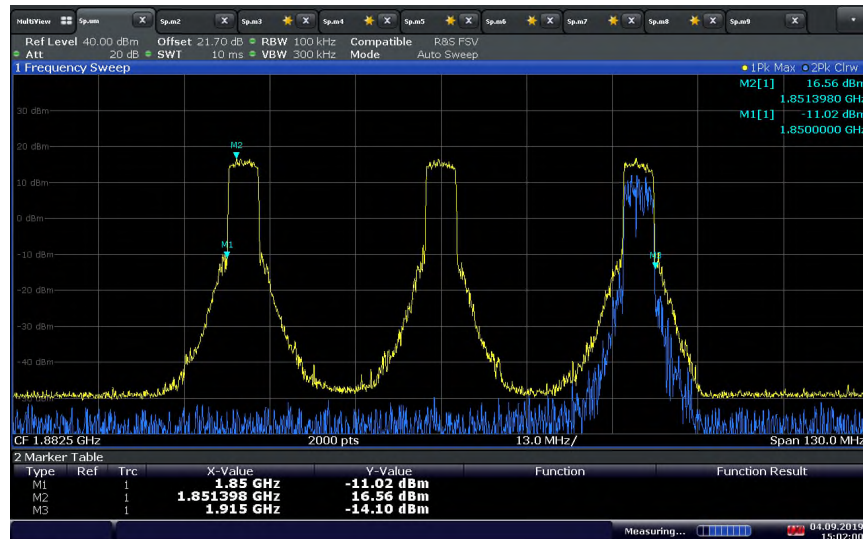
14:22:23 04.09.2019

LTE Band 25 Downlink Authorized Frequency Range (1930 – 1995 MHz) - CU with NU Port A



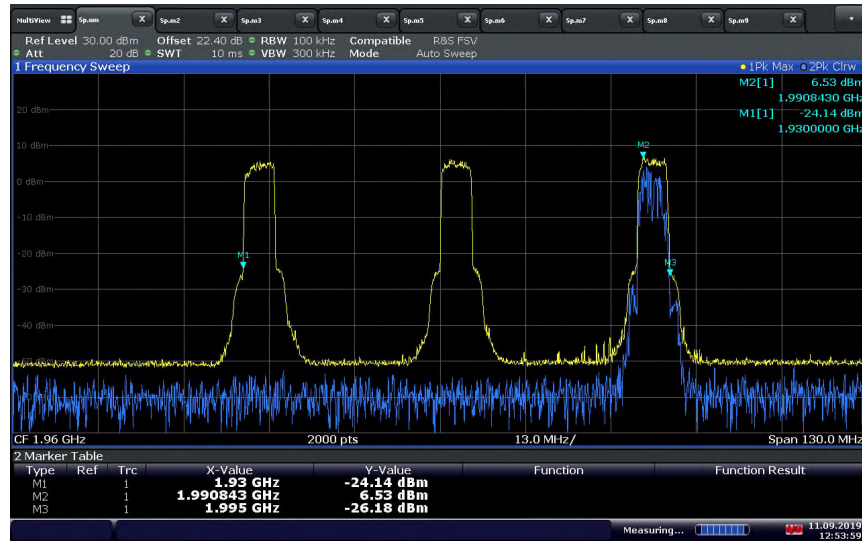
13:31:36 04.09.2019

LTE Band 25 Uplink Authorized Frequency Range (1850 – 1915 MHz) - NU Port A



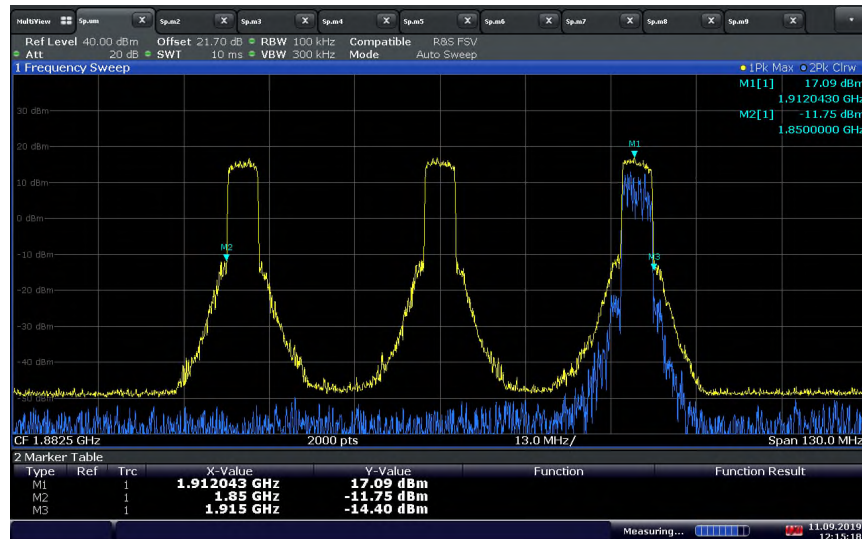
15:02:00 04.09.2019

LTE Band 25 Downlink Authorized Frequency Range (1930 – 1995 MHz) - CU with NU Port B



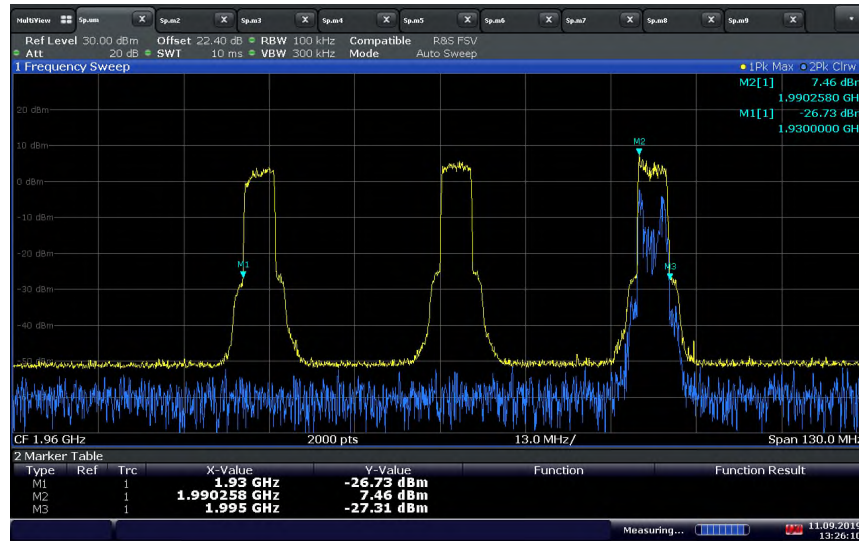
12:53:59 11.09.2019

LTE Band 25 Uplink Authorized Frequency Range (1850 – 1915 MHz) - NU Port B



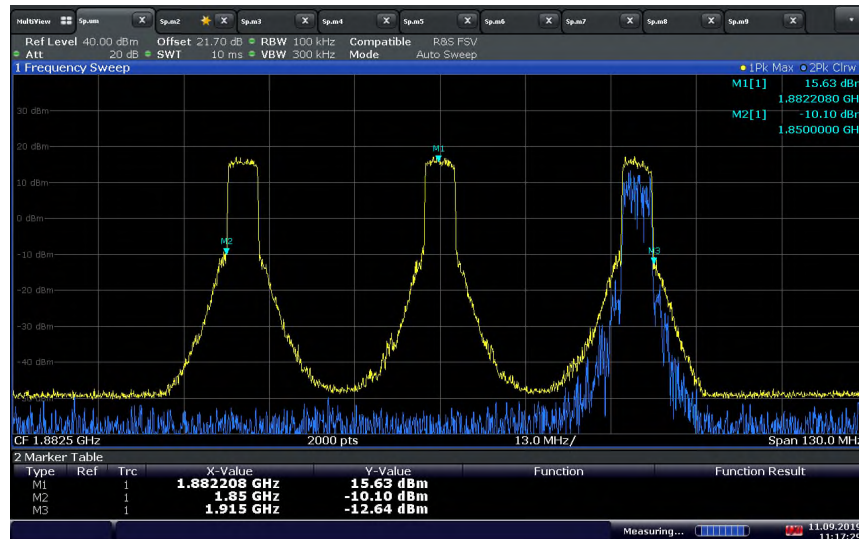
12:15:18 11.09.2019

LTE Band 25 Downlink Authorized Frequency Range (1930 – 1995 MHz) - CU with NU Port C



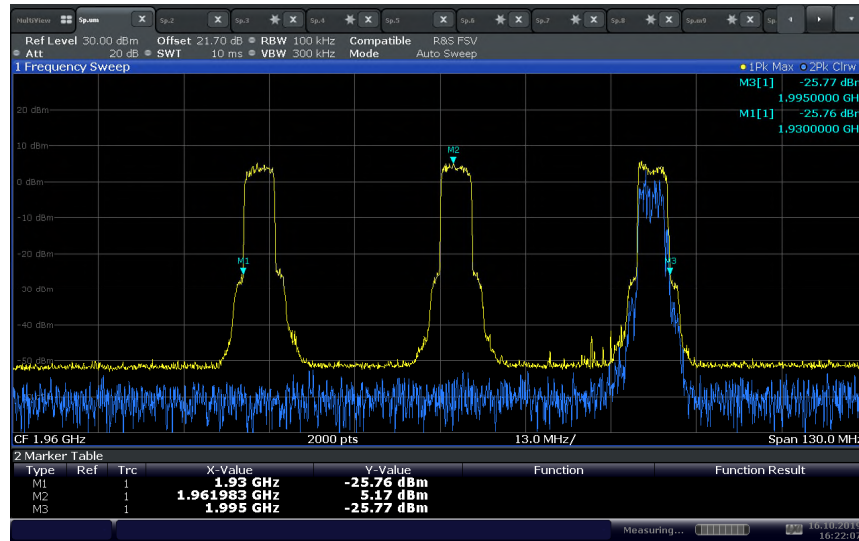
13:26:11 11.09.2019

LTE Band 25 Uplink Authorized Frequency Range (1850 – 1915 MHz) - NU Port C



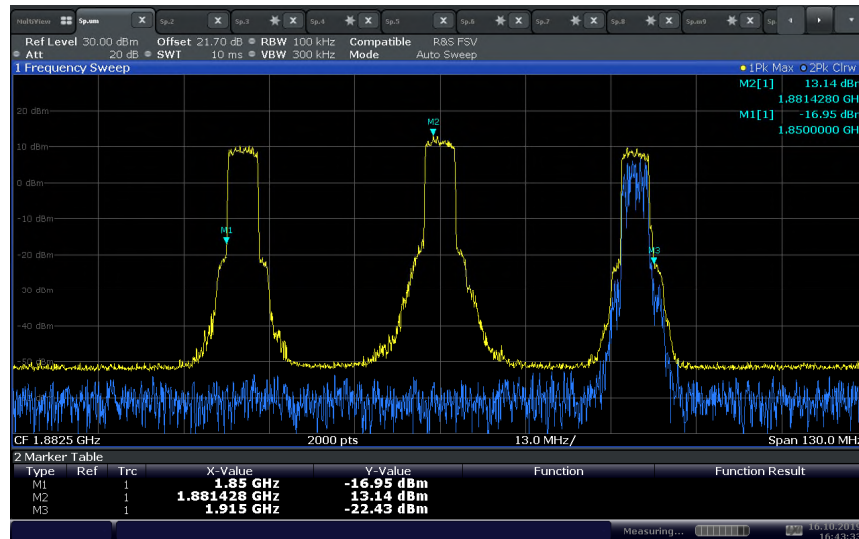
11:17:29 11.09.2019

LTE Band 25 Downlink Authorized Frequency Range (1930 – 1995 MHz) - CU with NU Port D



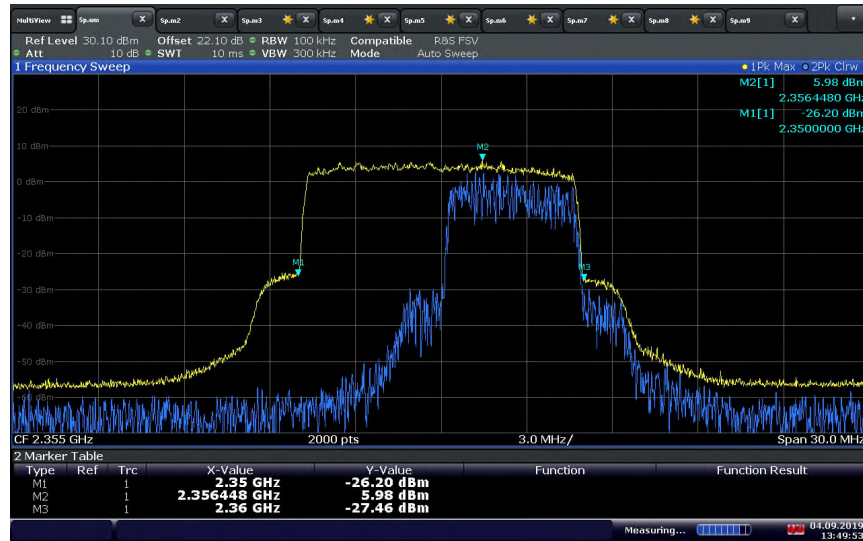
16:22:08 16.10.2019

LTE Band 25 Uplink Authorized Frequency Range (1850 – 1915 MHz) - NU Port D



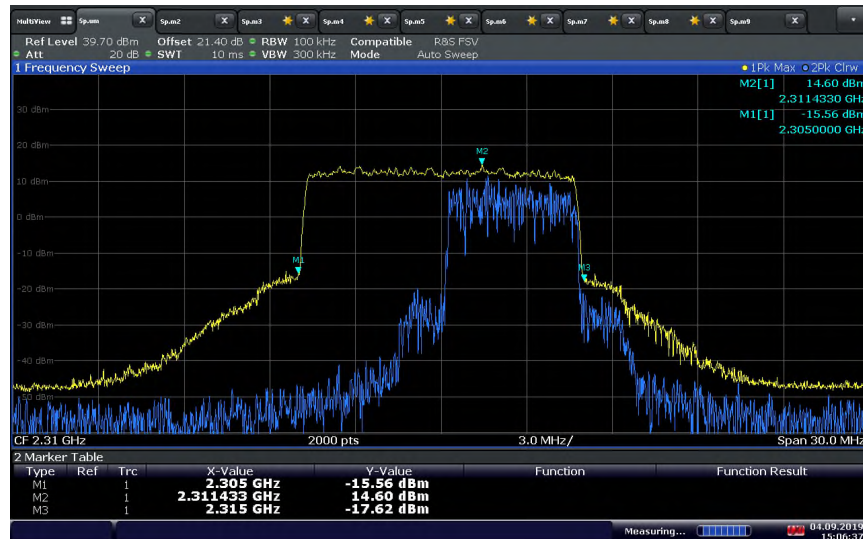
16:43:33 16.10.2019

LTE Band 30 Downlink Authorized Frequency Range (2350 – 2360 MHz) - CU with NU Port A



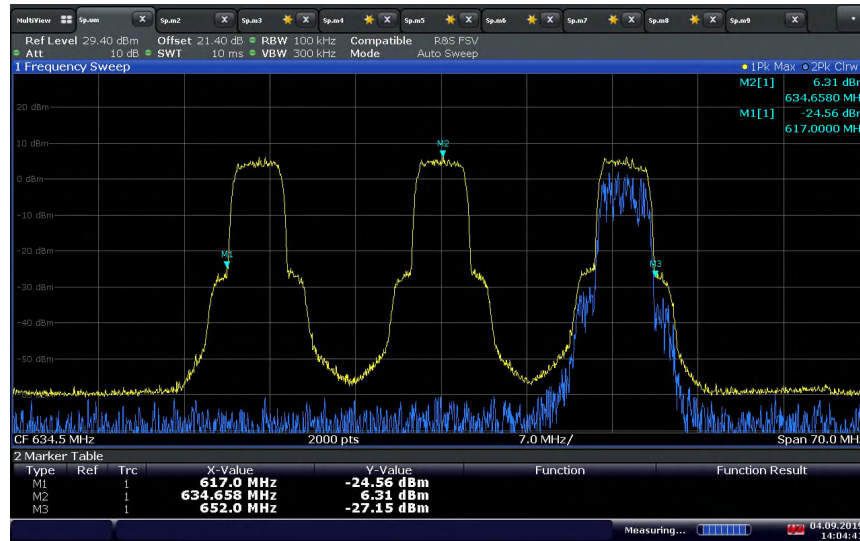
13:49:54 04.09.2019

LTE Band 30 Uplink Authorized Frequency Range (2305 – 2315 MHz) - NU Port A



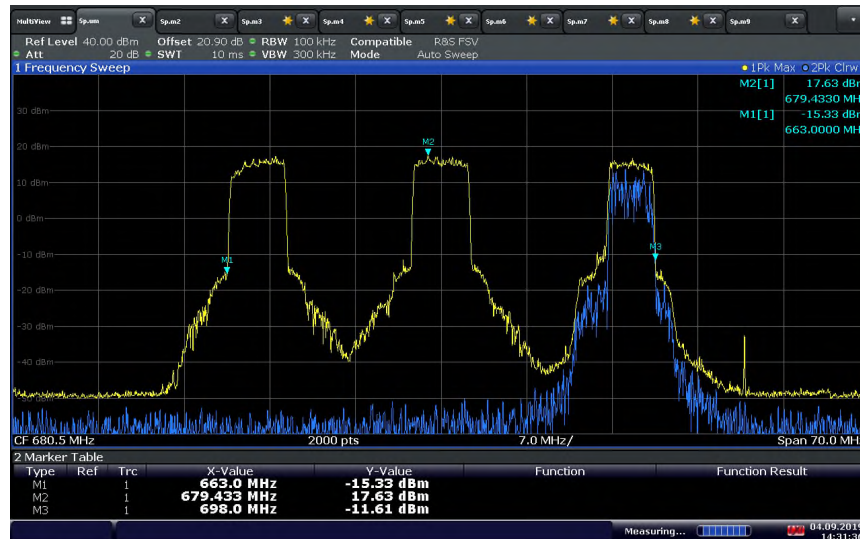
15:06:37 04.09.2019

LTE Band 71 Downlink Authorized Frequency Range (617 – 652 MHz) - CU with NU Port B



14:04:41 04.09.2019

LTE Band 71 Uplink Authorized Frequency Range (663 – 698 MHz) - NU Port B



14:31:37 04.09.2019

2.2 AUTHORIZED CMRS PROVIDER

2.2.1 Specification Reference

FCC 47 CFR Part 20, Clause 20.21 (e)(3)
FCC 47 CFR Part 20, Clause 20.21 (e)(4)
KDB935210 D04, Clause 7.1.2

2.2.2 Standard Applicable

FCC 47 CFR Part 20, Clause 20.21 (e)(3) Frequency Bands:
Consumer Signal Boosters must be designed and manufactured such that they only operate on the frequencies used for the provision of subscriber-based services under parts 22 (Cellular), 24 (Broadband PCS), 27 (AWS-1, 700 MHz Lower A-E Blocks, and 700 MHz Upper C Block), and 90 (Specialized Mobile Radio) of this chapter. The Commission will not certificate any Consumer Signal Boosters for operation on part 90 of this chapter (Specialized Mobile Radio) frequencies until the Commission releases a public notice announcing the date Consumer Signal Boosters may be used in the band.

FCC 47 CFR Part 20, Clause 20.21(e)(4) Self Monitoring:
Consumer Signal Boosters must automatically self-monitor their operation to ensure compliance with applicable noise and gain limits and either self-correct or shut down automatically if their operation exceeds those parameters.

2.2.3 Equipment Under Test and Modification State

Serial No: 370920000139 (NU) and 371929000156 (CU) / Test Configuration C and D

2.2.4 Date of Test/Initial of test personnel who performed the test

September 19 and October 25, 2019/XYZ

2.2.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.6 Environmental Conditions

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility.

Ambient Temperature	25.2 - 25.6 °C
Relative Humidity	21.5 - 49.4%
ATM Pressure	98.8 - 99.1kPa

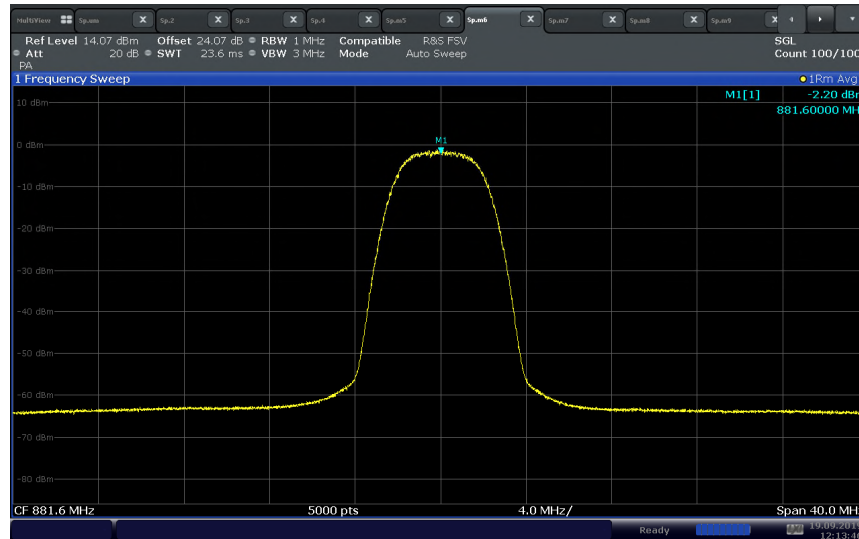
2.2.7 Additional Observations

- This is conducted Test. Test procedure is per Section 7.1.2 of KDB935210 (D04 Provider Specific Booster Measurements v02r03). Appropriate offset (line losses) applied.
- The Fix unit operated in Normal Mode, with the gain set to the maximum gain and a minimum bandwidth setting (5MHz).
- Setup the EUT according to Figure 1 of Section 6.3.2 of KDB935210 with the Base Station Simulator transmitting an authorized CMRS provider signal to the booster.
- Evaluations are conducted at NU and CU antenna ports.
- All operational uplink and downlink bands for WCDMA Band 5, and LTE Band 4, 5, 12, 13, 30, 71 on CU and NU all four antenna ports A, B, C, D were tested.
- The Base Station Simulator was set to transmit a 5MHz LTE or WCDMA signal.
- The authorized CMRS Provider IDs are:
 1. Port A: 310-410
 2. Port B: 310-260
 3. Port C: 311-480
 4. Port D: 311-490
- Two Non- authorized CMRS Provider signals for each band were verified.
- Frequency Range:

Technology	Band	DL Frequency Range (MHz)	UL Frequency Range (MHz)
WCDMA	5	869 - 894	824 - 849
LTE	4	2110 - 2155	1710 - 1755
LTE	5	869 - 894	824 - 849
LTE	12	729 – 746	699 – 716
LTE	13	746 - 756	777 - 787
LTE	25	1930 - 1995	1850 - 1915
LTE	30	2350 - 2360	2305 - 2315
LTE	71	617 - 652	663 - 698

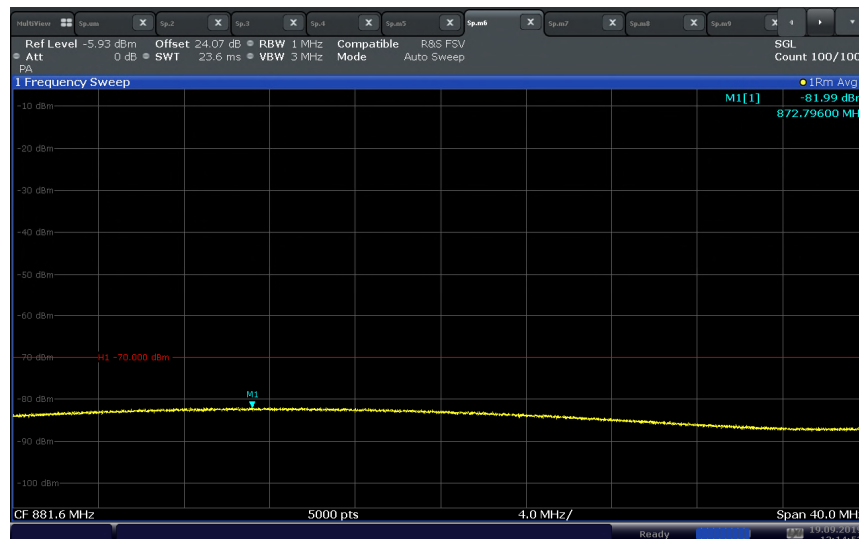
2.2.8 Test Results

WCDMA Band 5 Downlink Authorized Frequency Range (869 - 894MHz) – CU with NU Port A (MCC/MNC: 310-410)



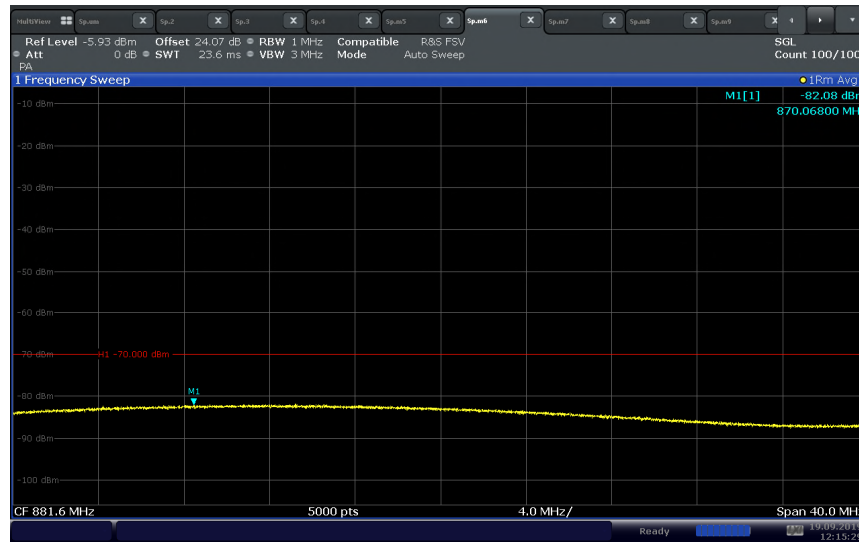
12:13:47 19.09.2019

WCDMA Band 5 Downlink Authorized Frequency Range (869 - 894MHz) – CU with NU Port A (MCC/MNC: 310-123)



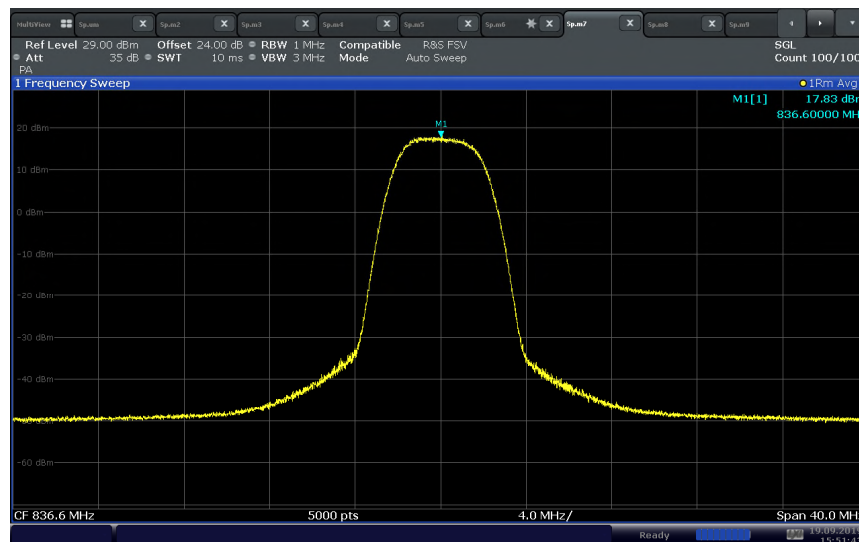
12:14:54 19.09.2019

**WCDMA Band 5 Downlink Authorized Frequency Range (869 - 894MHz) – CU with NU Port A
 (MCC/MNC: 310-321)**



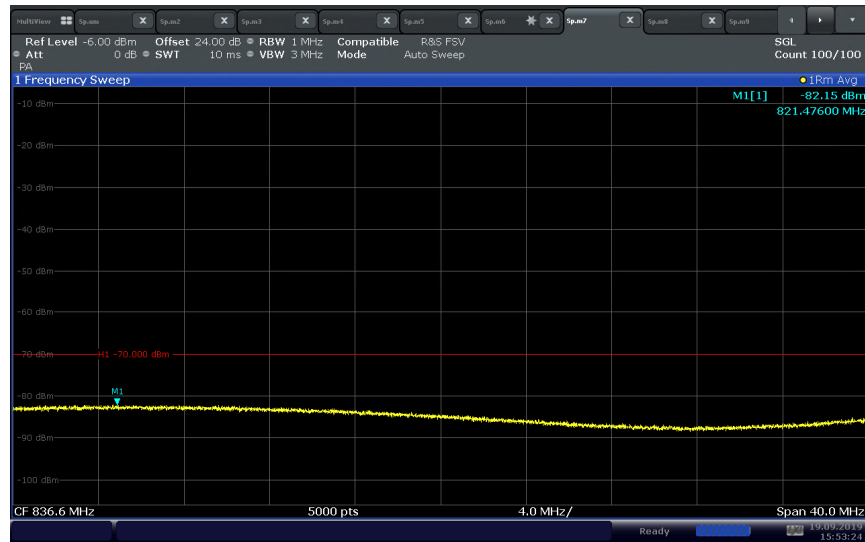
12:15:29 19.09.2019

**WCDMA Band 5 Uplink Authorized Frequency Range (824 – 849 MHz) – NU Port A
 (MCC/MNC: 310-410)**

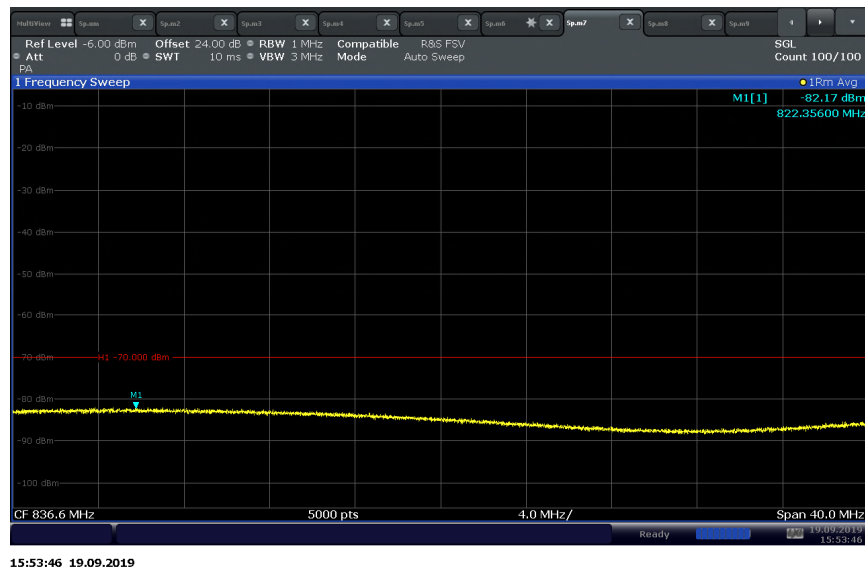


15:51:43 19.09.2019

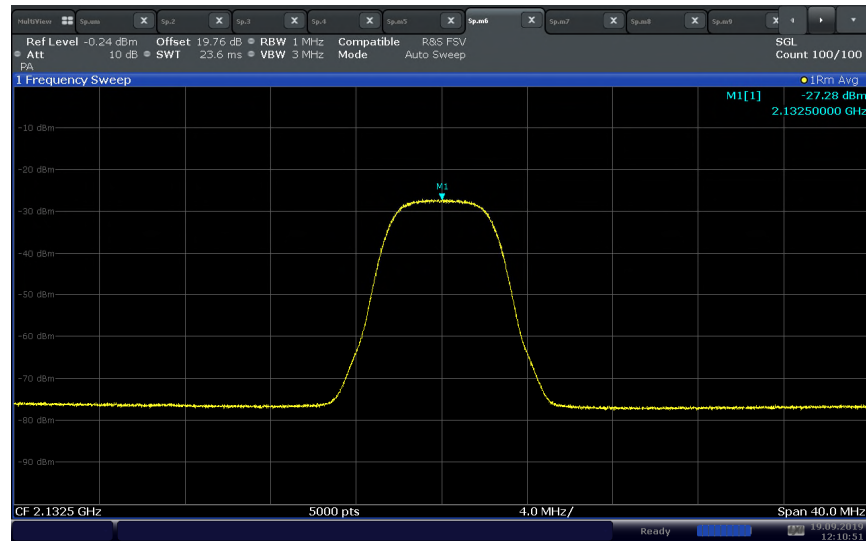
**WCMDA Band 5 Uplink Authorized Frequency Range (824 – 849 MHz) – NU Port A
(MCC/MNC: 310-123)**



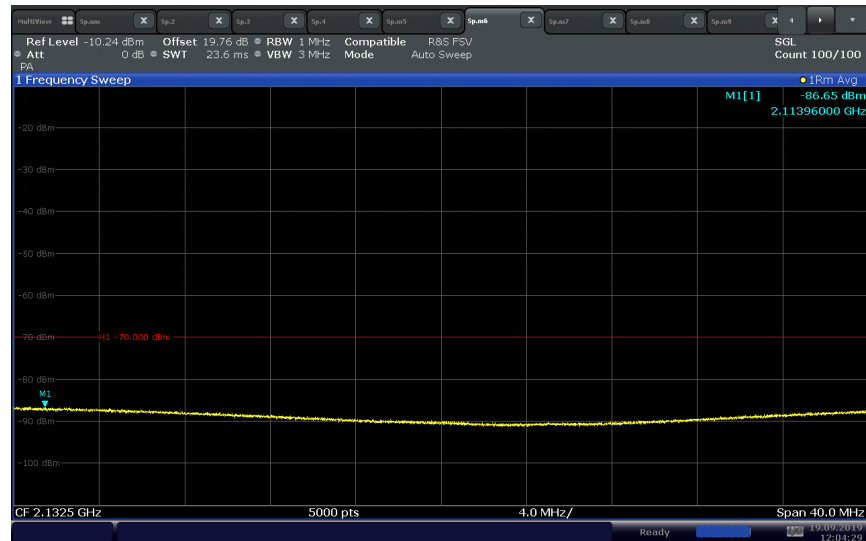
**WCMDA Band 5 Uplink Authorized Frequency Range (824 – 849 MHz) – NU Port A
(MCC/MNC: 310-321)**



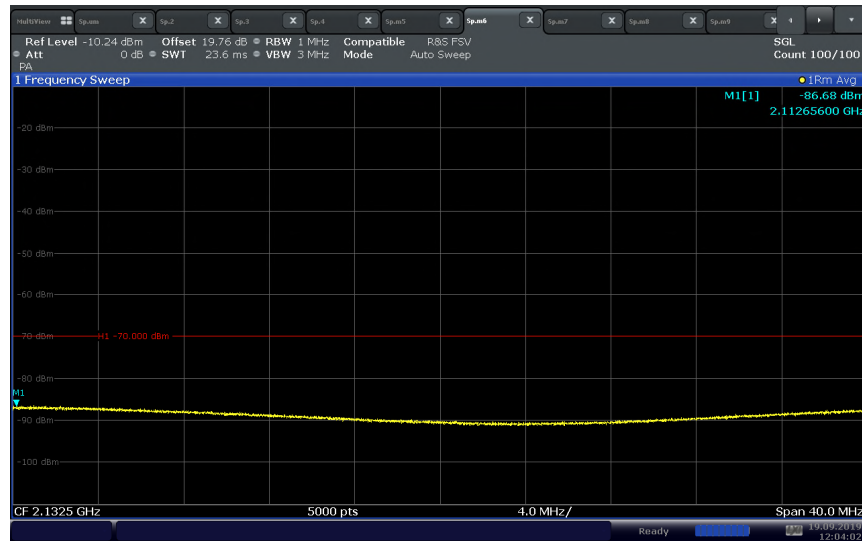
**LTE Band 4 Downlink Authorized Frequency Range (2110 – 2155 MHz) – CU with NU Port A
 (MCC/MNC: 310-410)**



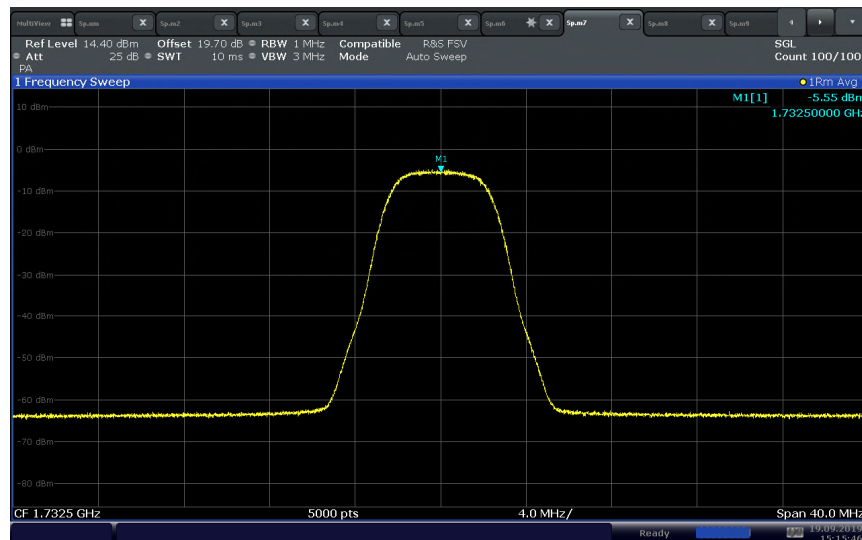
**LTE Band 4 Downlink Authorized Frequency Range (2110 – 2155 MHz) – CU with NU Port A
 (MCC/MNC: 310-123)**



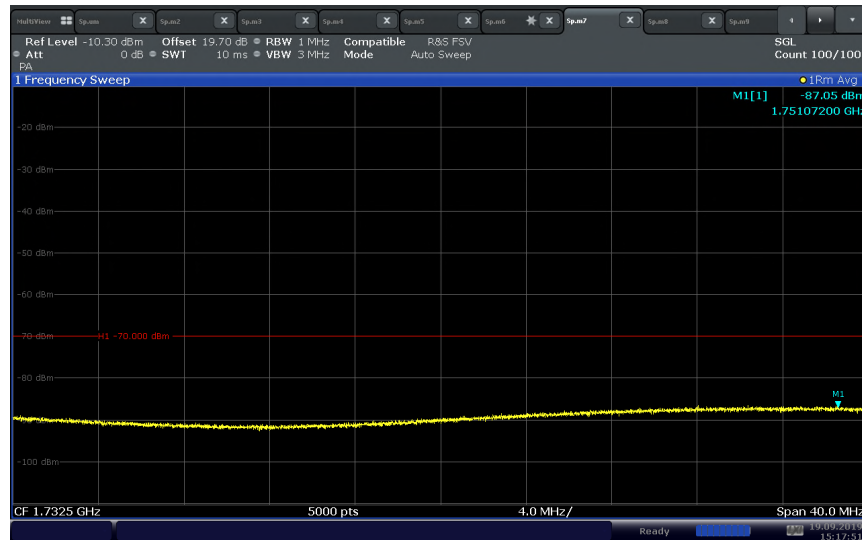
**LTE Band 4 Downlink Authorized Frequency Range (2110 – 2155 MHz) – CU with NU Port A
 (MCC/MNC: 310-321)**



**LTE Band 4 Uplink Authorized Frequency Range (1710 – 1755 MHz) – NU Port A
 (MCC/MNC: 310-410)**

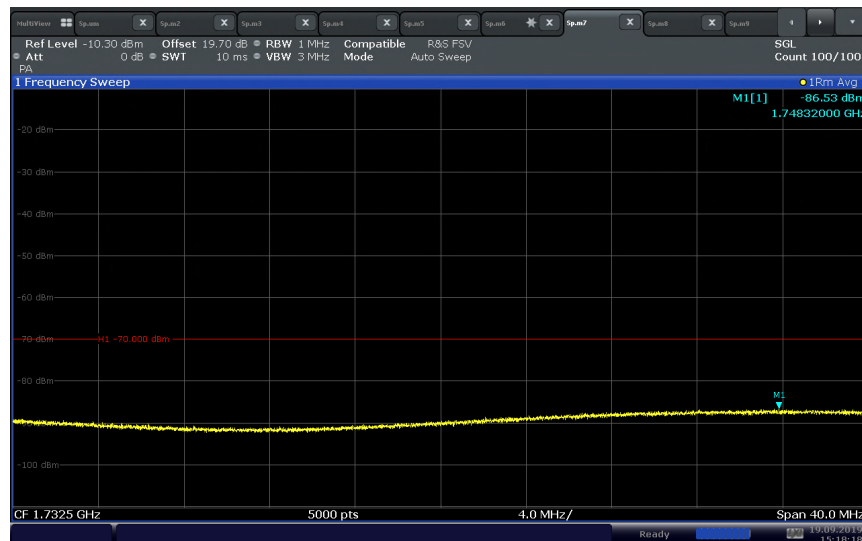


**LTE Band 4 Uplink Authorized Frequency Range (1710 – 1755 MHz) – NU Port A
 (MCC/MNC: 310-123)**



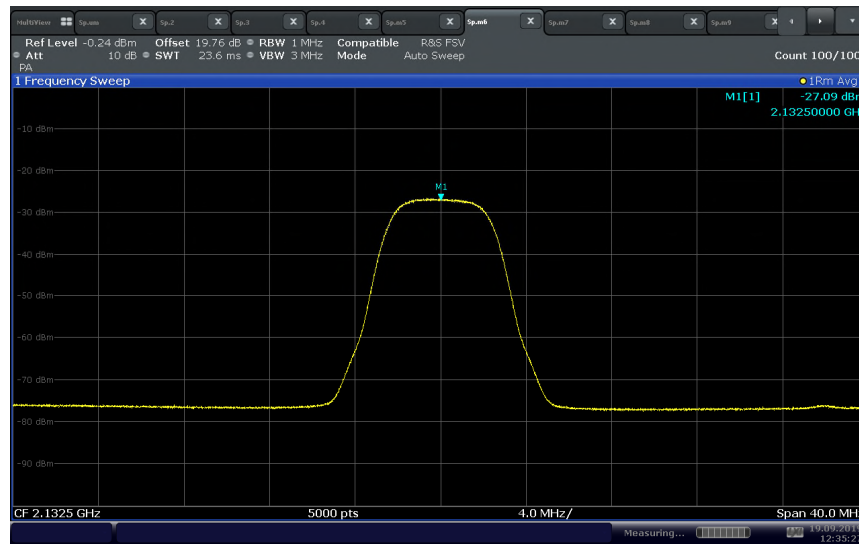
15:17:52 19.09.2019

**LTE Band 4 Uplink Authorized Frequency Range (1710 – 1755 MHz) – NU Port A
 (MCC/MNC: 310-321)**

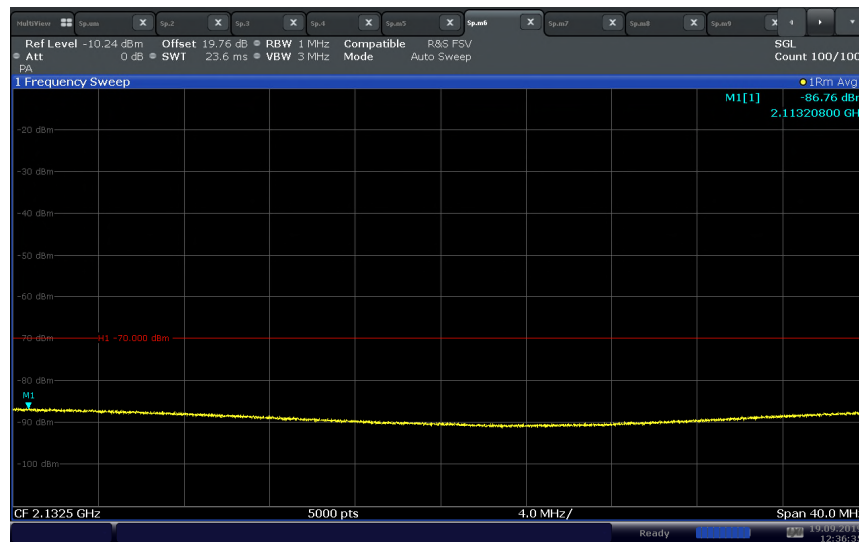


15:18:19 19.09.2019

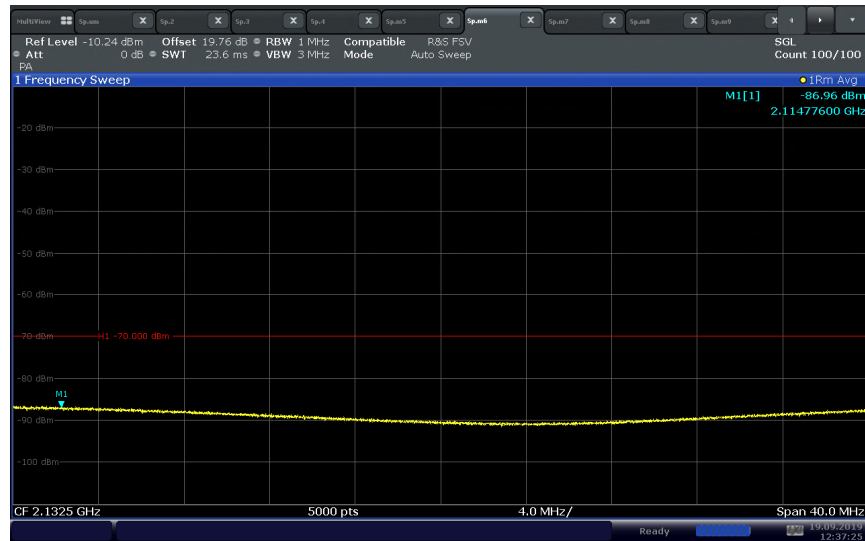
**LTE Band 4 Downlink Authorized Frequency Range (2110 – 2155 MHz) – CU with NU Port B
 (MCC/MNC: 310-260)**



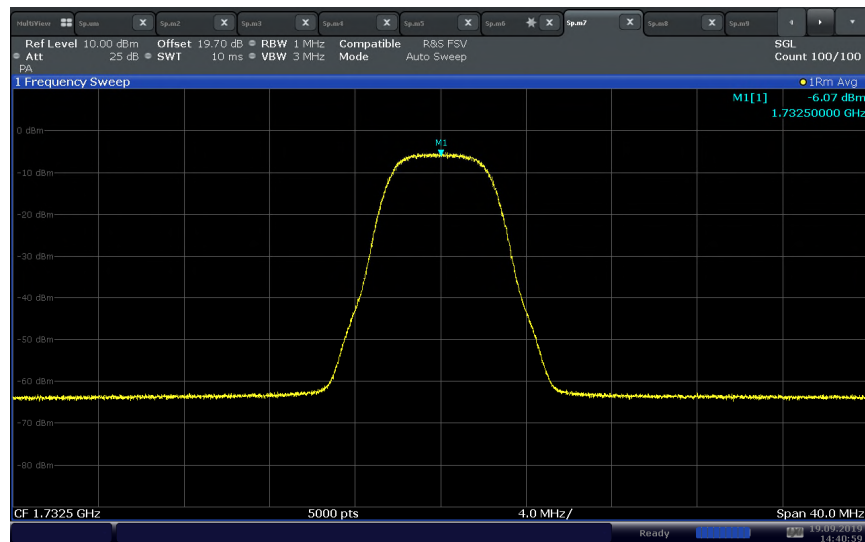
**LTE Band 4 Downlink Authorized Frequency Range (2110 – 2155 MHz) – CU with NU Port B
 (MCC/MNC: 310-123)**



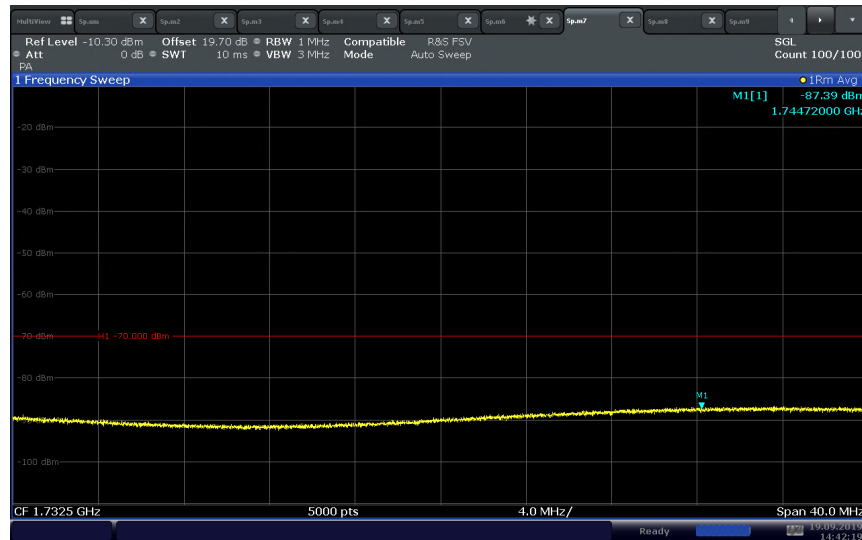
**LTE Band 4 Downlink Authorized Frequency Range (2110 – 2155 MHz) – CU with NU Port B
 (MCC/MNC: 310-321)**



**LTE Band 4 Uplink Authorized Frequency Range (1710 – 1755 MHz) – NU Port B
 (MCC/MNC: 310-260)**

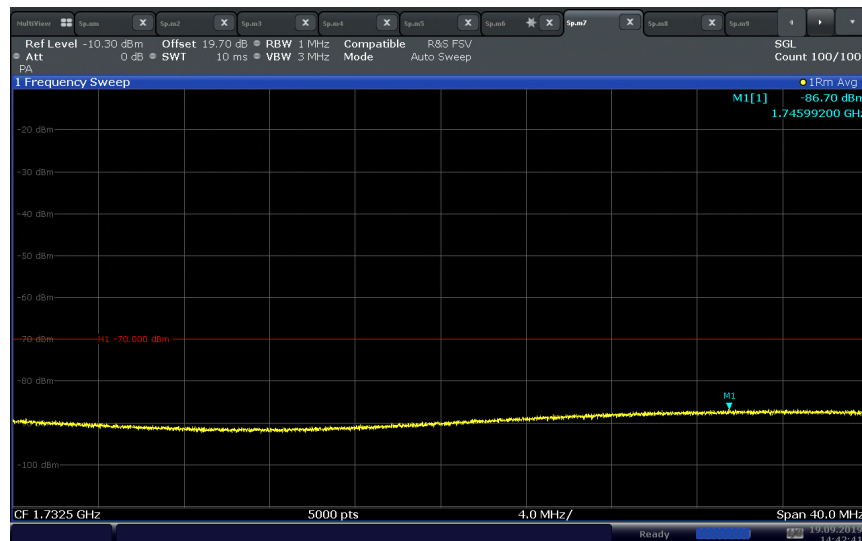


**LTE Band 4 Uplink Authorized Frequency Range (1710 – 1755 MHz) – NU Port B
 (MCC/MNC: 310-123)**



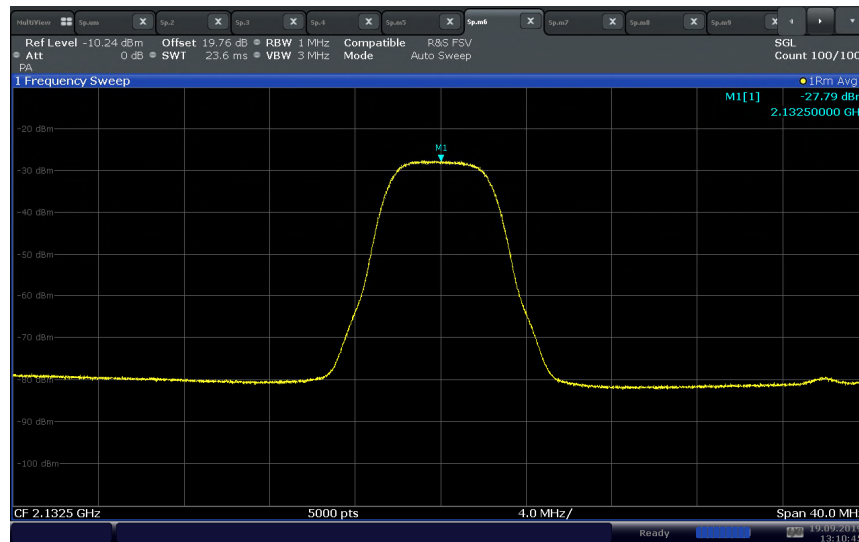
14:42:19 19.09.2019

**LTE Band 4 Uplink Authorized Frequency Range (1710 – 1755 MHz) – NU Port B
 (MCC/MNC: 310-321)**

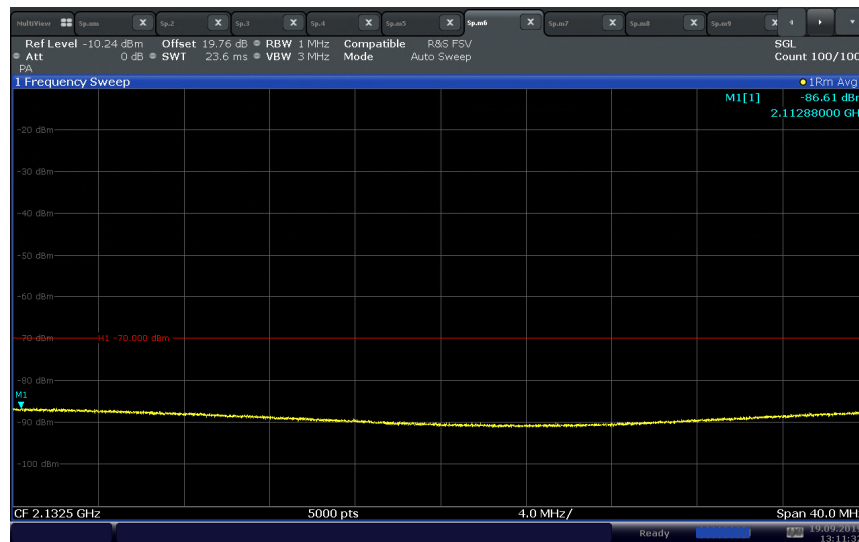


14:42:41 19.09.2019

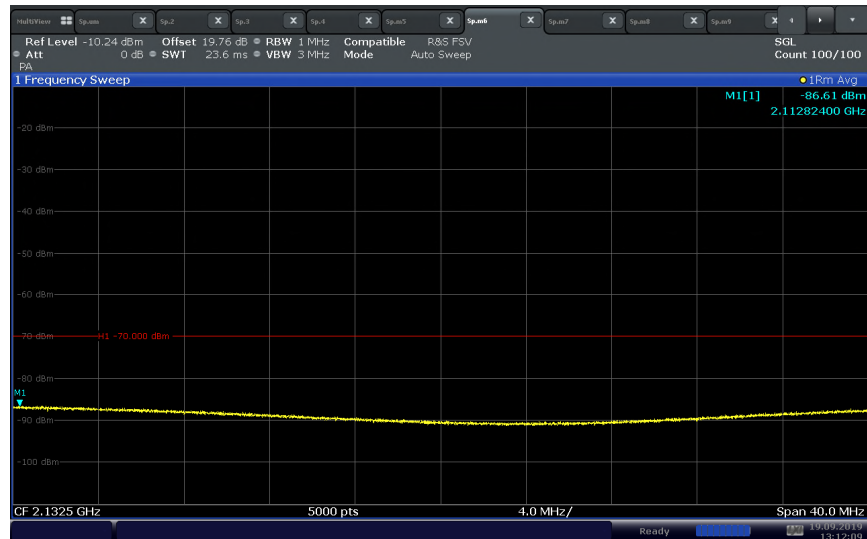
**LTE Band 4 Downlink Authorized Frequency Range (2110 – 2155 MHz) – CU with NU Port C
 (MCC/MNC: 311-480)**



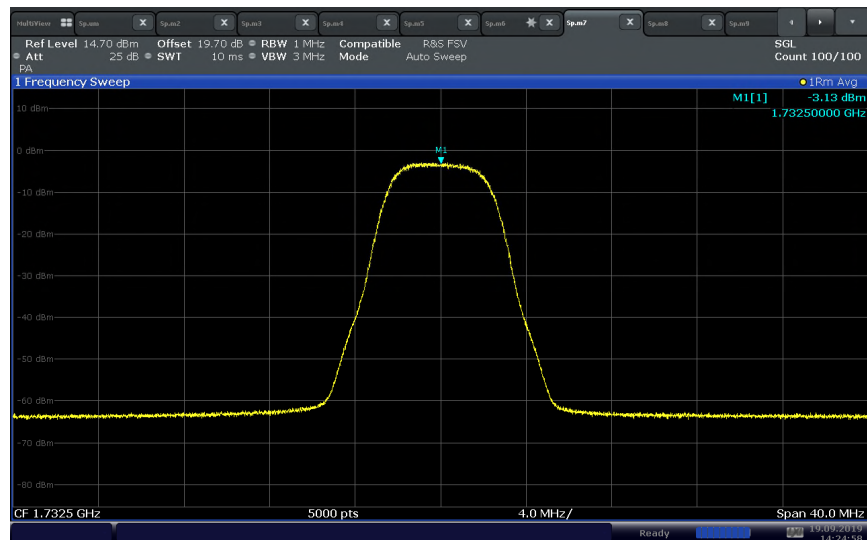
**LTE Band 4 Downlink Authorized Frequency Range (2110 – 2155 MHz) – CU with NU Port C
 (MCC/MNC: 311-123)**



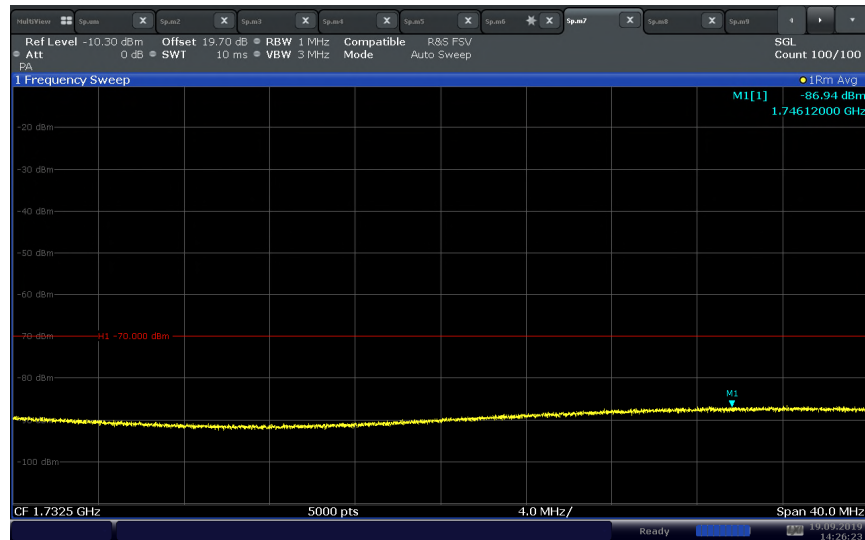
LTE Band 4 Downlink Authorized Frequency Range (2110 – 2155 MHz) – CU with NU Port C (MCC/MNC: 311-321)



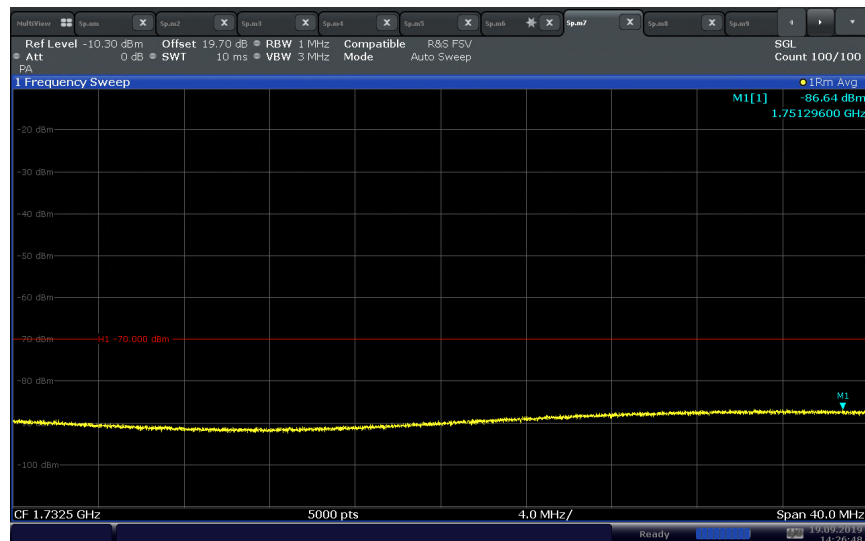
LTE Band 4 Uplink Authorized Frequency Range (1710 – 1755 MHz) – NU Port C (MCC/MNC: 311-480)



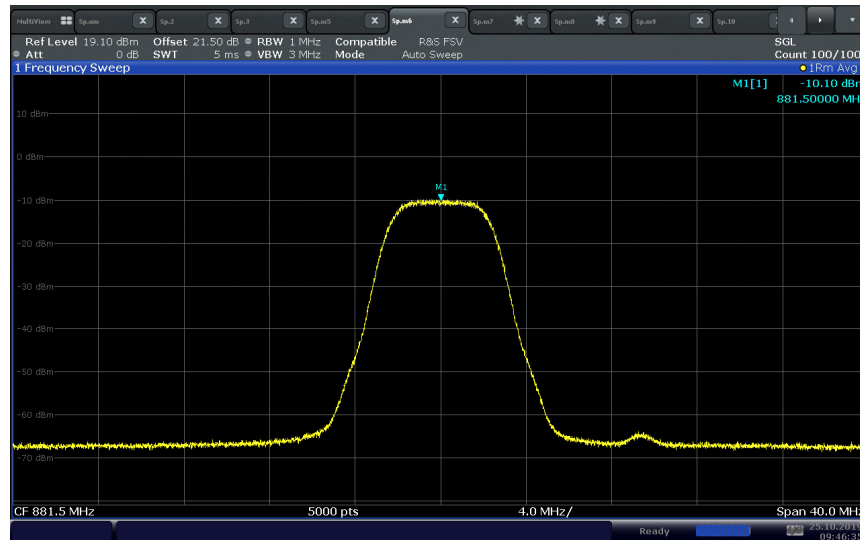
**LTE Band 4 Uplink Authorized Frequency Range (1710 – 1755 MHz) – NU Port C
 (MCC/MNC: 311-123)**



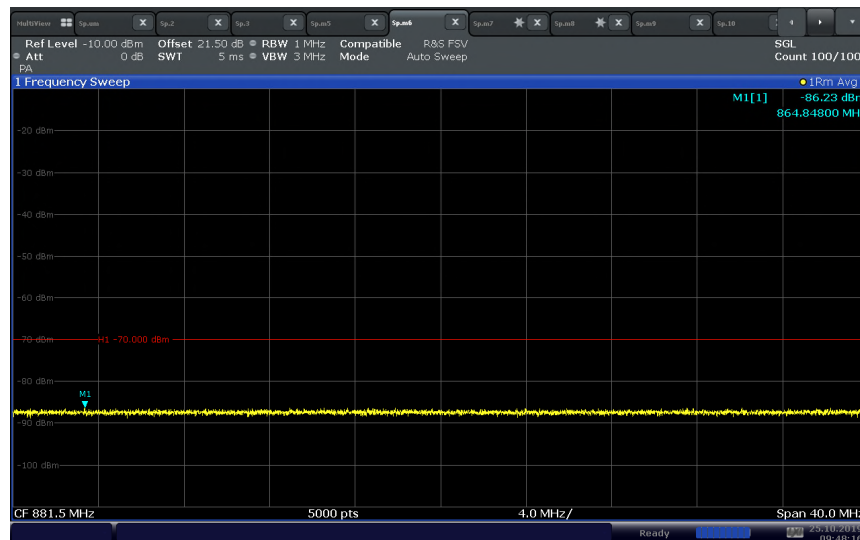
**LTE Band 4 Uplink Authorized Frequency Range (1710 – 1755 MHz) – NU Port C
 (MCC/MNC: 311-321)**



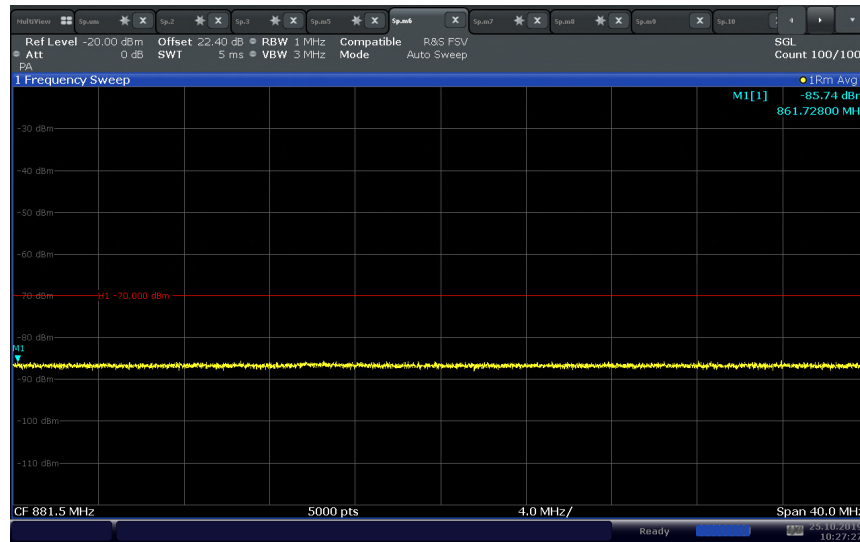
**LTE Band 5 Downlink Authorized Frequency Range (869 - 894MHz) – CU with NU Port D
 (MCC/MNC: 311-490)**



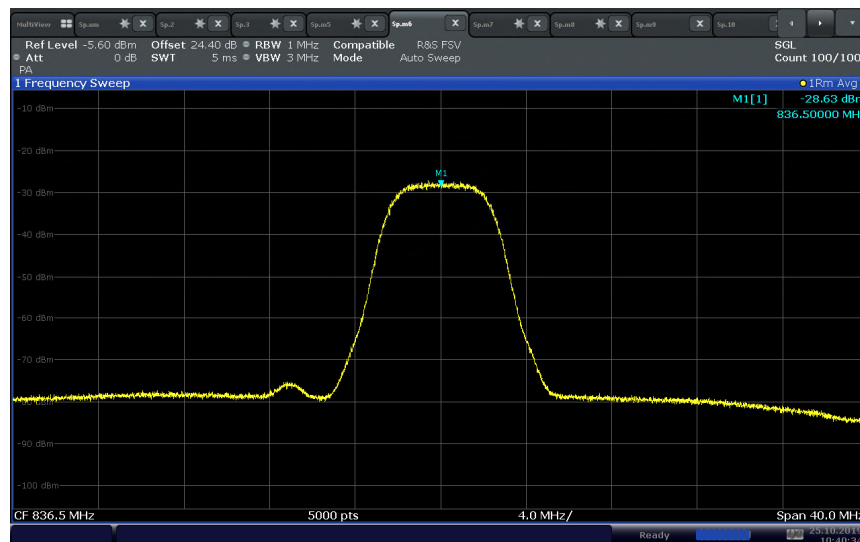
**LTE Band 5 Downlink Authorized Frequency Range (869 - 894MHz) – CU with NU Port D
 (MCC/MNC: 311-123)**



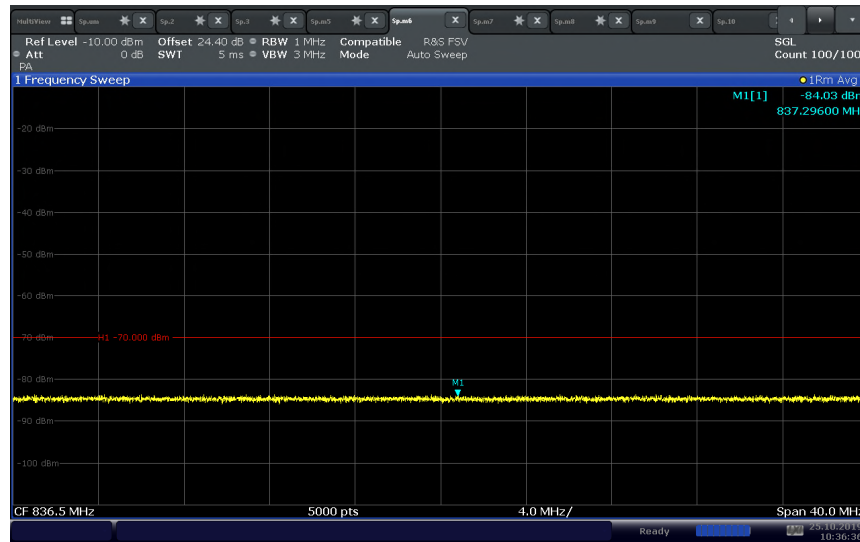
**LTE Band 5 Downlink Authorized Frequency Range (869 - 894MHz) – CU with NU Port D
 (MCC/MNC: 311-321)**



**LTE Band 5 Uplink Authorized Frequency Range (824 – 849 MHz) – NU Port D
 (MCC/MNC: 311-490)**

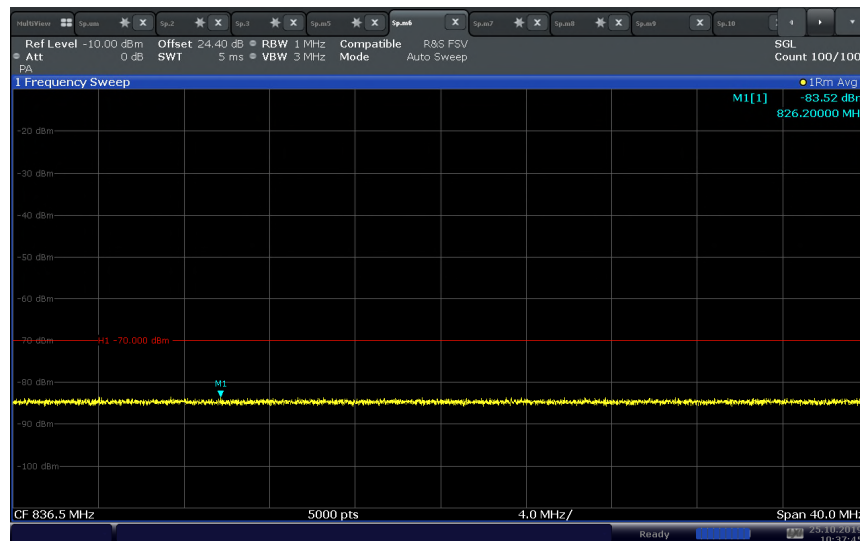


**LTE Band 5 Uplink Authorized Frequency Range (824 – 849 MHz) – NU Port D
 (MCC/MNC: 311-123)**



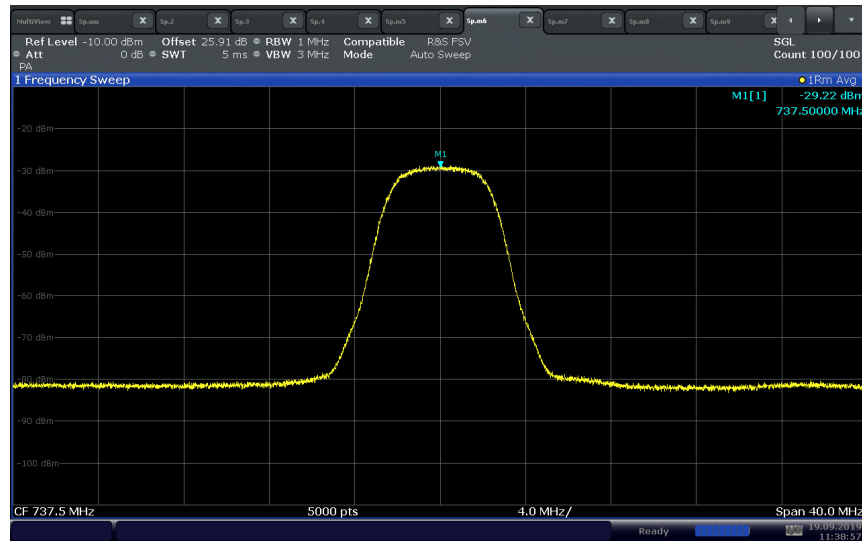
10:36:37 25.10.2019

**LTE Band 5 Uplink Authorized Frequency Range (824 – 849 MHz) – NU Port D
 (MCC/MNC: 311-321)**



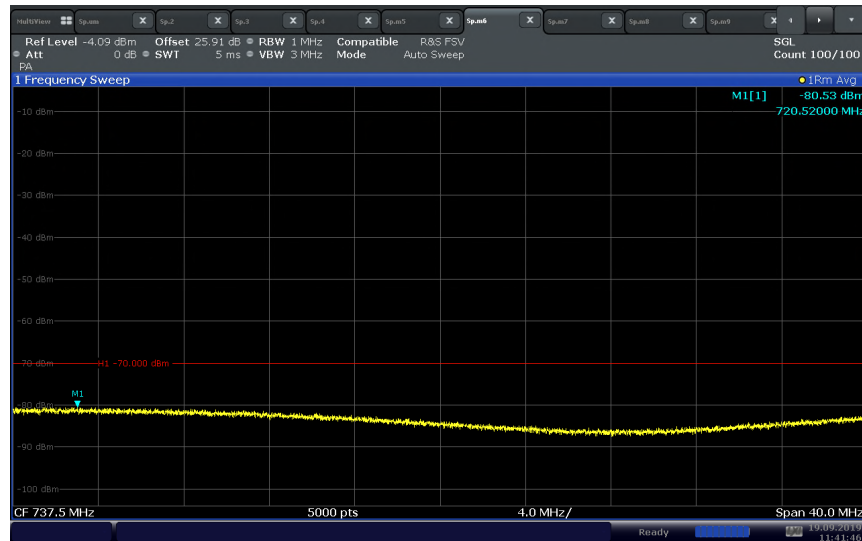
10:37:46 25.10.2019

**LTE Band 12 Downlink Authorized Frequency Range (729 – 746 MHz) – CU with NU Port A
 (MCC/MNC: 310-410)**



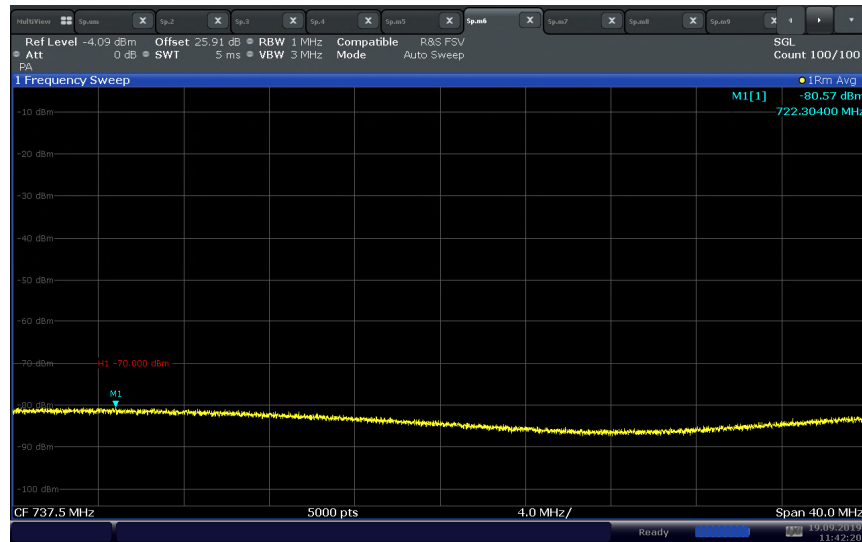
11:38:57 19.09.2019

**LTE Band 12 Downlink Authorized Frequency Range (729 – 746 MHz) – CU with NU Port A
 (MCC/MNC: 310-123)**



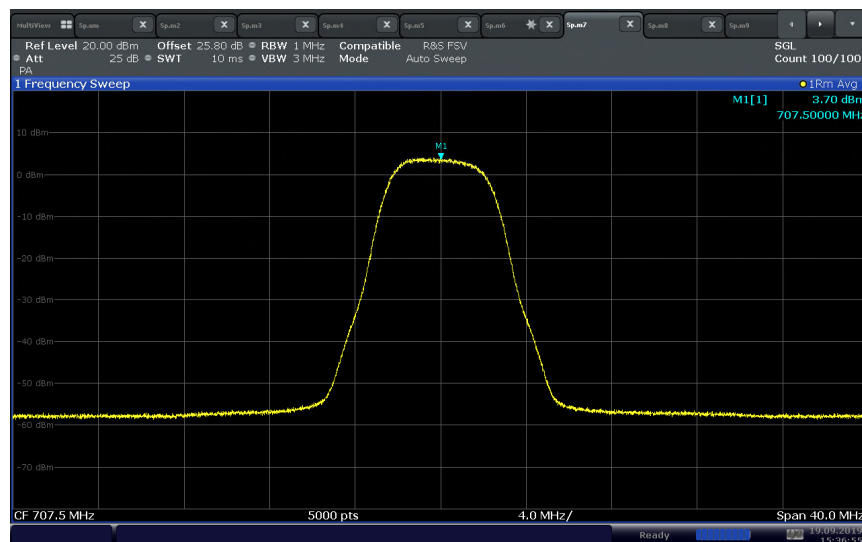
11:41:47 19.09.2019

**LTE Band 12 Downlink Authorized Frequency Range (729 – 746 MHz) – CU with NU Port A
 (MCC/MNC: 310-321)**



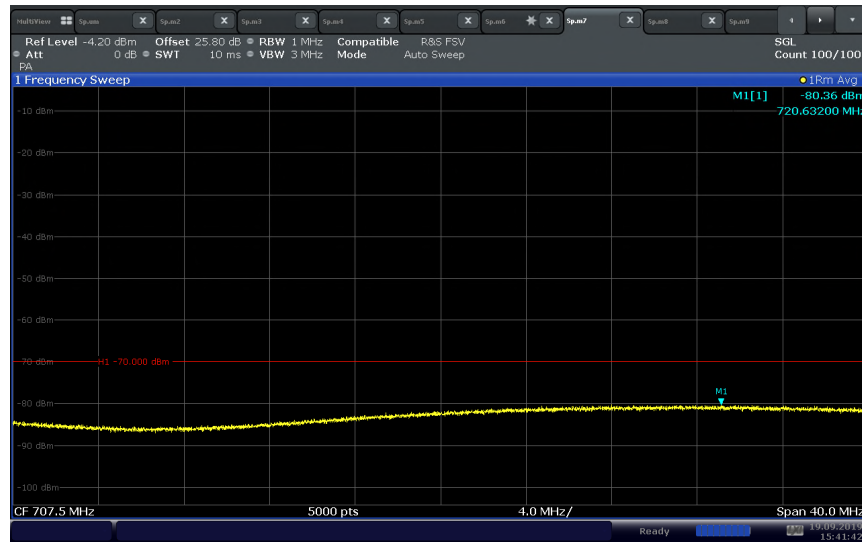
11:42:21 19.09.2019

**LTE Band 12 Uplink Authorized Frequency Range (699 – 716 MHz) – NU Port A
 (MCC/MNC: 310-410)**



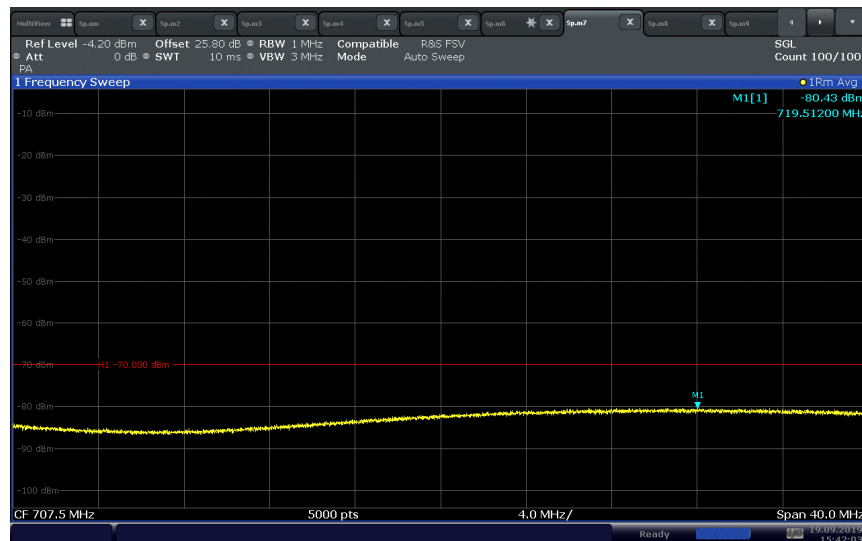
15:36:55 19.09.2019

**LTE Band 12 Uplink Authorized Frequency Range (699 – 716 MHz) – NU Port A
 (MCC/MNC: 310-123)**



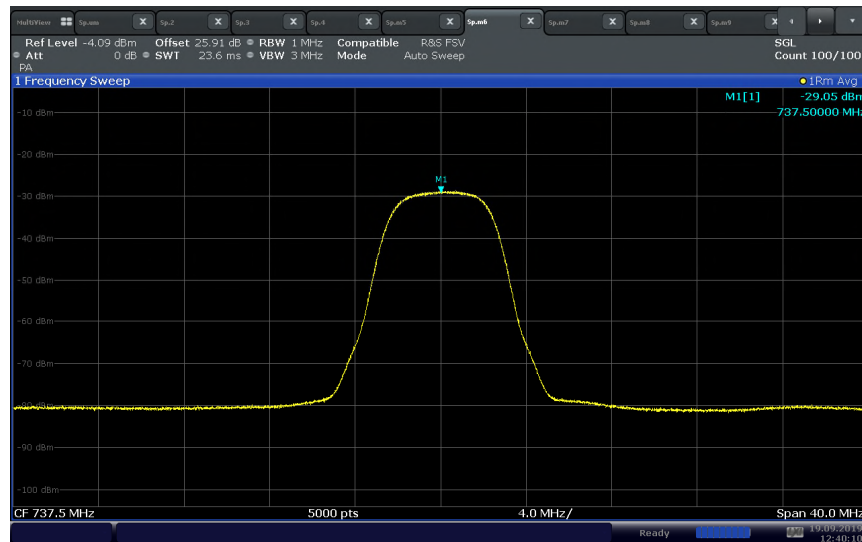
15:41:42 19.09.2019

**LTE Band 12 Uplink Authorized Frequency Range (699 – 716 MHz) – NU Port A
 (MCC/MNC: 310-321)**

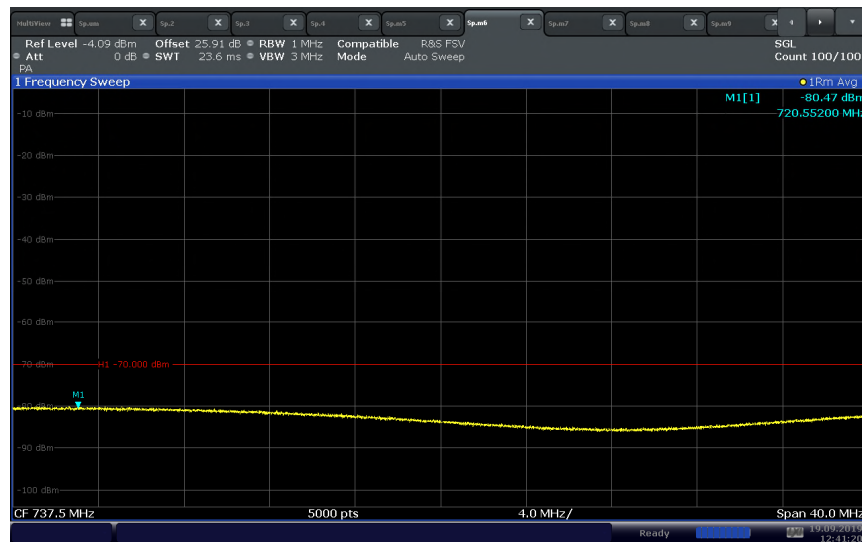


15:42:04 19.09.2019

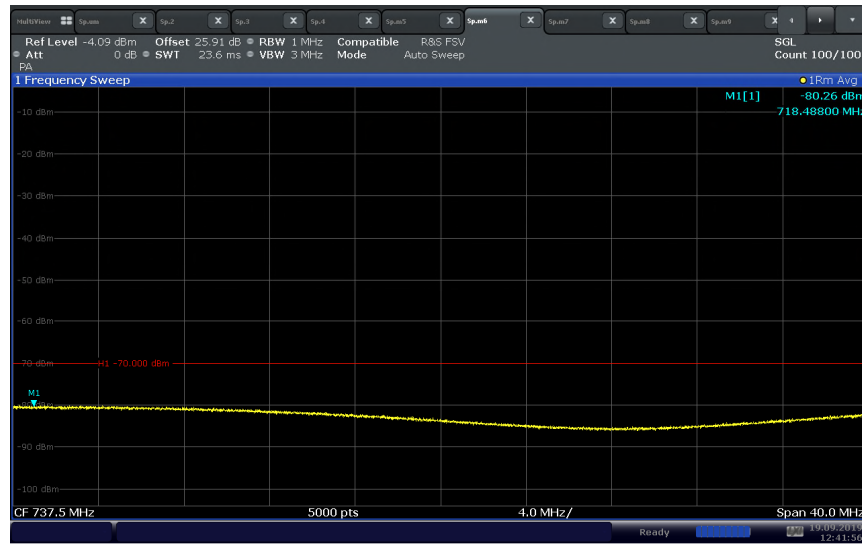
**LTE Band 12 Downlink Authorized Frequency Range (729 – 746 MHz) – CU with NU Port B
 (MCC/MNC: 310-260)**



**LTE Band 12 Downlink Authorized Frequency Range (729 – 746 MHz) – CU with NU Port B
 (MCC/MNC: 310-123)**

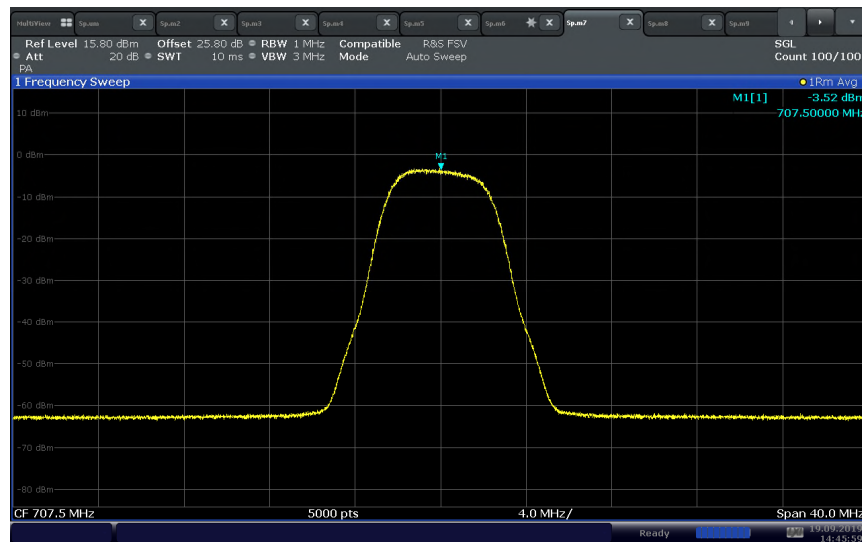


**LTE Band 12 Downlink Authorized Frequency Range (729 – 746 MHz) – CU with NU Port B
 (MCC/MNC: 310-321)**



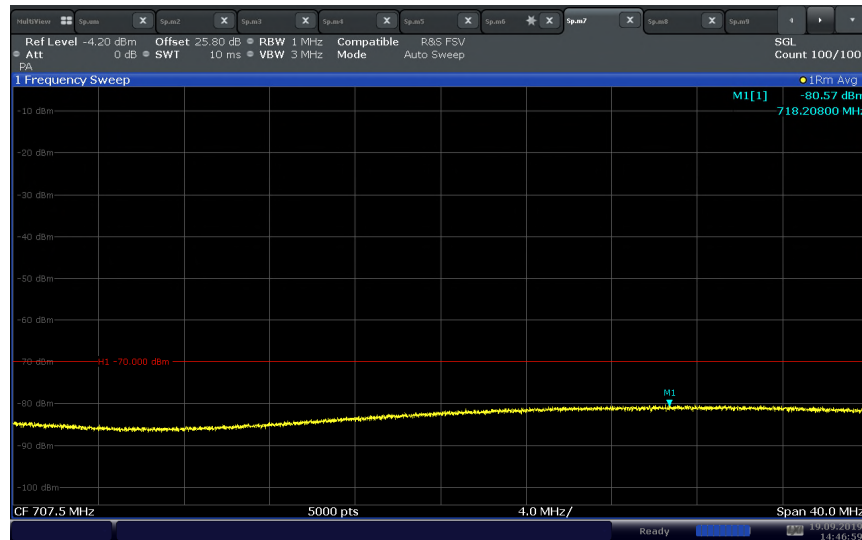
12:41:57 19.09.2019

**LTE Band 12 Uplink Authorized Frequency Range (699 – 716 MHz) – NU Port B
 (MCC/MNC: 310-260)**

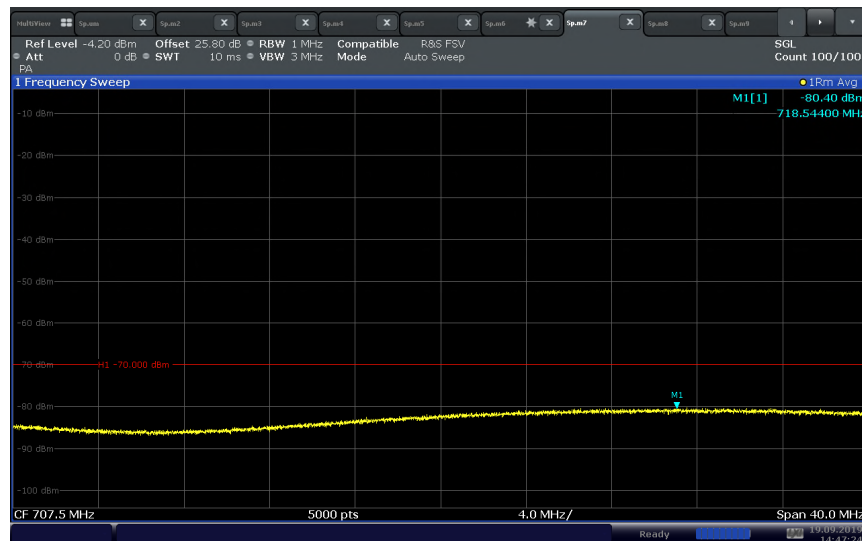


14:46:00 19.09.2019

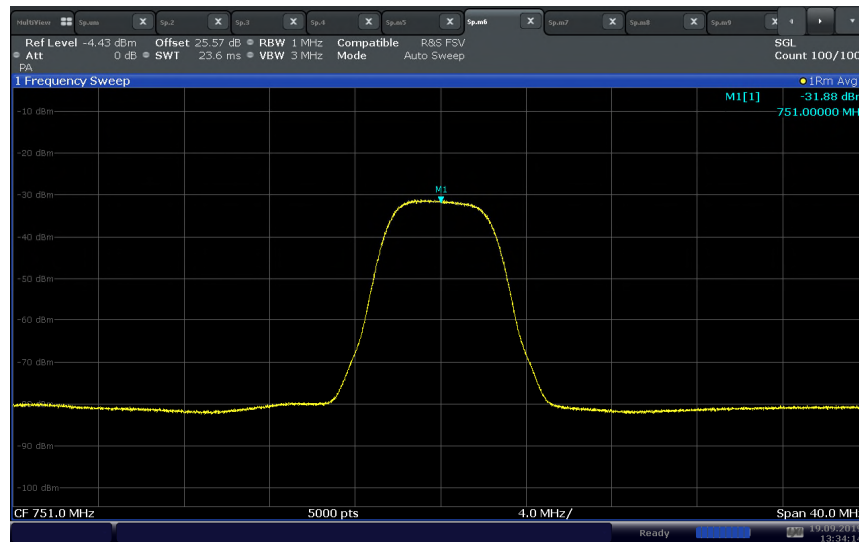
**LTE Band 12 Uplink Authorized Frequency Range (699 – 716 MHz) – NU Port B
 (MCC/MNC: 310-123)**



**LTE Band 12 Uplink Authorized Frequency Range (699 – 716 MHz) – NU Port B
 (MCC/MNC: 310-321)**

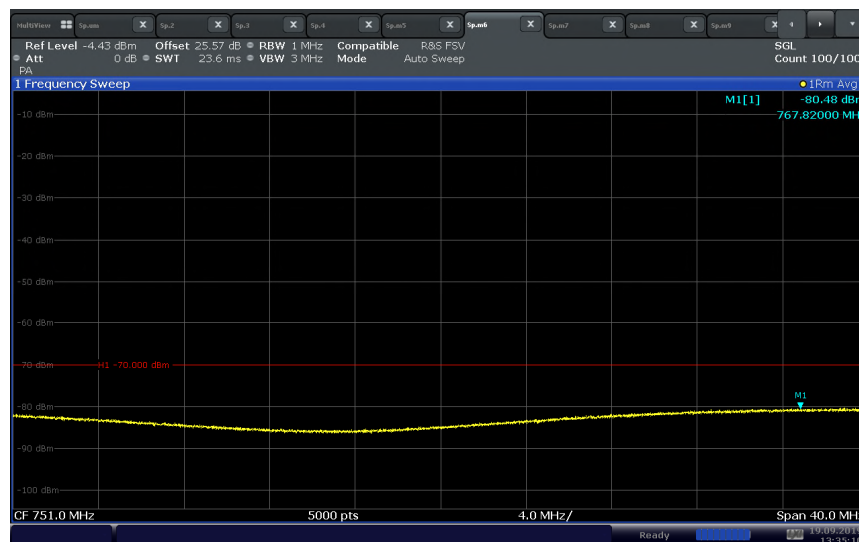


**LTE Band 13 Downlink Authorized Frequency Range (746 – 756 MHz) – CU with NU Port C
 (MCC/MNC: 311-480)**



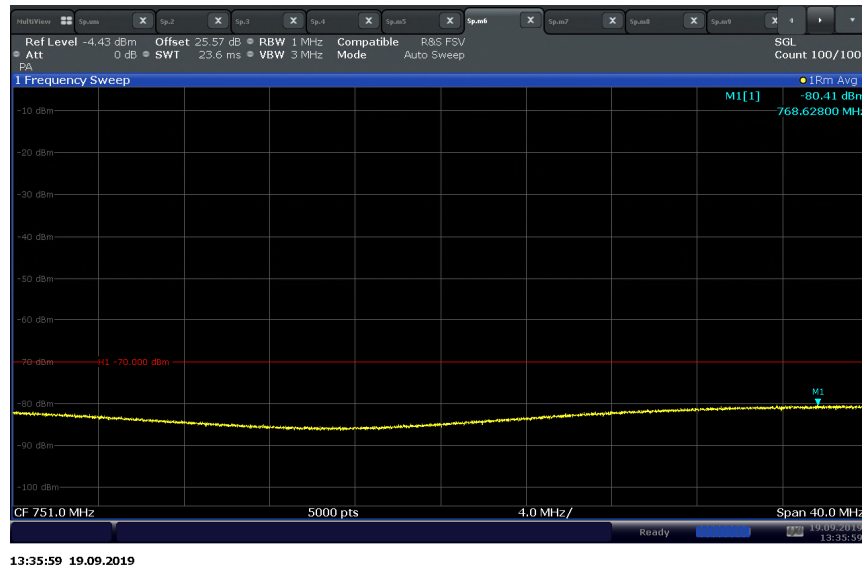
13:34:14 19.09.2019

**LTE Band 13 Downlink Authorized Frequency Range (746 – 756 MHz) – CU with NU Port C
 (MCC/MNC: 310-123)**

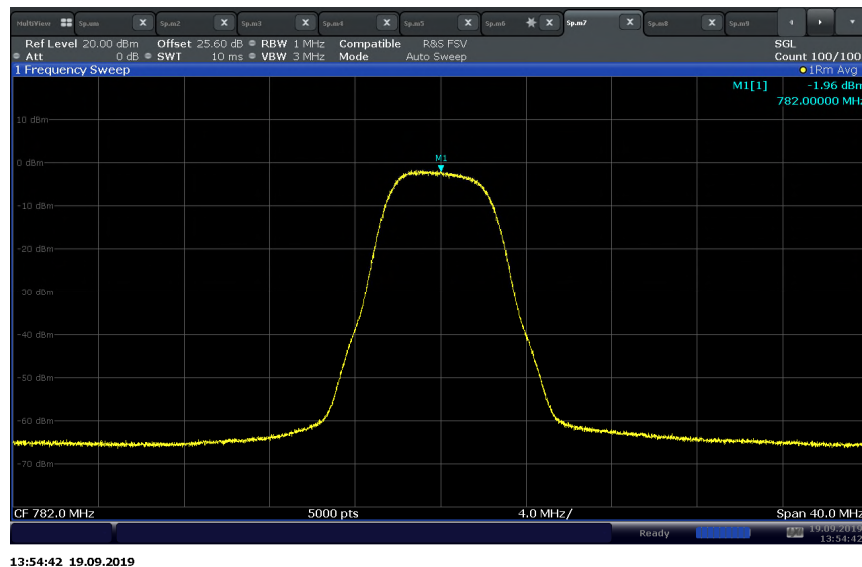


13:35:10 19.09.2019

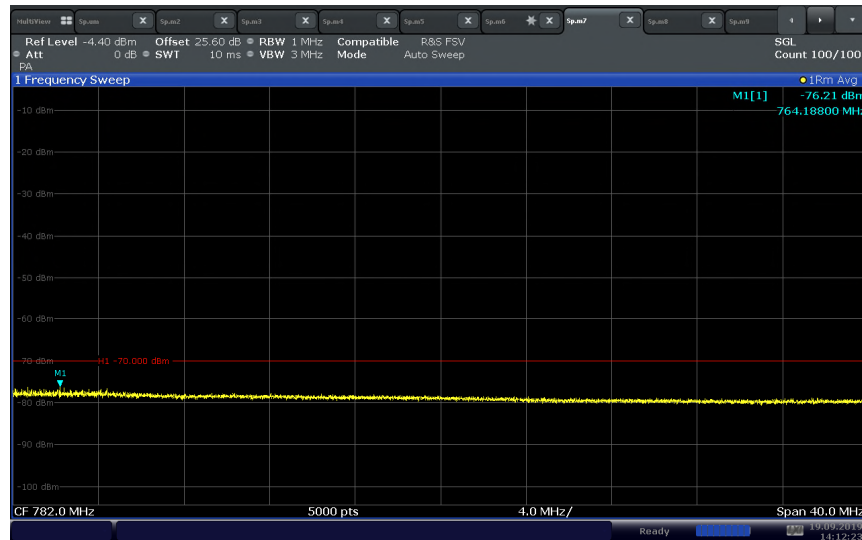
**LTE Band 13 Downlink Authorized Frequency Range (746 – 756 MHz) – CU with NU Port C
 (MCC/MNC: 310-321)**



**LTE Band 13 Uplink Authorized Frequency Range (777 – 787 MHz) – NU Port C
 (MCC/MNC: 311-480)**

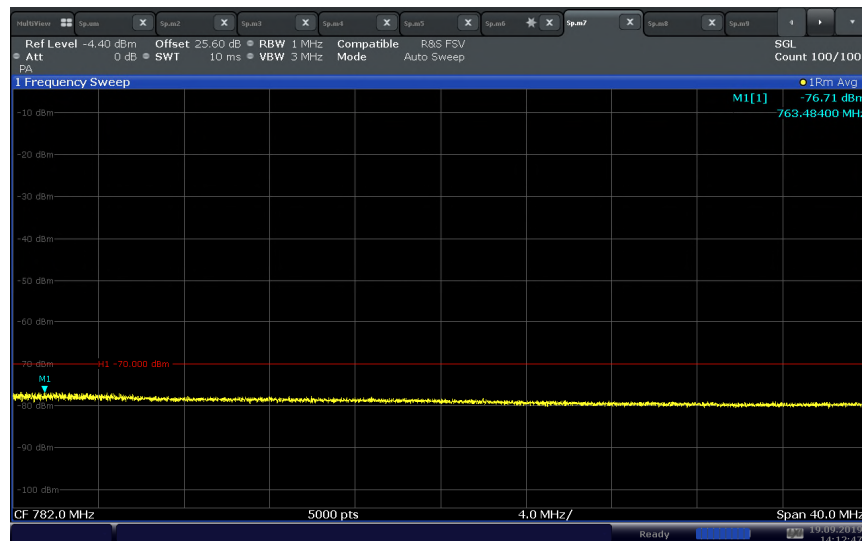


**LTE Band 13 Uplink Authorized Frequency Range (777 – 787 MHz) – NU Port C
 (MCC/MNC: 311-123)**



14:12:23 19.09.2019

**LTE Band 13 Uplink Authorized Frequency Range (777 – 787 MHz) – NU Port C
 (MCC/MNC: 311-321)**



14:12:48 19.09.2019