Report On

Application for Grant of Equipment Authorization of the
Nextivity Inc.
Cel-Fi Quatra Cellphone Signal Repeater

FCC CFR 47 Part 20

Report No. SD72121022-1016B **January 2017**

REPORT ON	Radio Testing of the Nextivity Inc. Cellphone Signal Repeater
TEST REPORT NUMBER	SD72121022-1016B
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	Juan M. Gonzalez **Name** Authorized Signatory Title: Commercial Wireless EMC Lab Manager
DATED	January 03, 2017

TÜV SÜD AMERICA INC 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone: 858 678 1400 FAX: 858 546 0364

Revision History

SD72121022-1016B Nextivity Inc. Cel-Fi Quatra Cellphone Signal Repeater					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
01/03/17	Initial Release				Juan M Gonzalez

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SECTION 1

REPORT SUMMARY

Radio Testing of the
Nextivity Inc.
Cel-Fi Quatra Cellphone Signal Repeater

1.1 INTRODUCTION

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

- FCC CFR 47 Part 20

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.
Model Name	Cel-Fi Quatra
Model Number(s)	NU: Q34-2/5/13/66NU CU: Q34-2/5/13/66CU
FCC ID Number	NU: YETQ34-251366NU CU: YETQ34-251366CU
IC Number	NU: 9298A-Q34251366NU CU: 9298A-Q34251366CU
Serial Number(s)	930629000238 (NU) and 920629000031 (CU) 930629000139 (NU) and 920629000048 (CU)
Number of Samples Tested	4
Test Specification/Issue/Date	• FCC CRF 47 Part 20 (October 1, 2016). • KDB935210 (D04 Provider Specific booster Measurements v01r01) Provider-Specific Consumer Signal Booster Compliance Measurements Guidance.
Start of Test	October 25, 2016
Finish of Test	November 06, 2016
Name of Engineer(s)	Xiaoying Zhang
Related Document(s)	• 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		
2.1 2.2	20.21 (e)(3) Frequency Bands 20.21 (a)(4)	7.1	Authorized Frequency Band Verification Test and authorized CMRS provider test	Compliant
2.3	20.21(e)(9)(i)(D) Power Limits 20.21(e)(9)(i)(B) Bidirectional Capability 20.21(e)(9)(i)(C)(1) and (2) Booster Gain Limits	7.2 7.3	Maximum Power measurement procedure Maximum Booster Gain Computer	Compliant
2.4	20.21(e)(9)(i)(G) Intermodulation Limit	7.4	Intermodulation Product	Compliant
2.5	20.21(e)(9)(i)(F) Out of Band Gain Limit	7.5	Out-of-Band Emissions	Compliant
-	2.1051	7.6	Conducted Spurious Emissions	N/A*
2.6	20.21(e)(9)(i)(A) Noise Limits 20.21(e)(9)(i)(I) Transmit Power Off Mode	7.7	Noise Limits	Compliant
2.7	20.21(e)(9)(i)(J) Uplink Inactivity	7.8	Uplink inactivity	Compliant
2.8	20.21(e)(9)(i)(C)(1) Booster Gain Limits 20.21(e)(9)(i)(I) Transmit Power Off Mode	7.9	Variable Booster Gain	Compliant
-	2.1049	7.10	Occupied Bandwidth	N/A*
2.9	20.21(e)(9)(ii)(A) Anti-Oscillation	7.11	Oscillation Detection	Compliant
-	2.1053	7.12	Radiated Spurious Emissions	N/A*
-	20.21(e)(9)(i)(B) Bidirectional Capability 20.21(e)(3) Frequency Band	7.13	Spectrum Block Filtering	N/A**
2.10	20.21(e)(9)(i)(E) Out of Band Gain Limit	7.14	Out of Band Gain	Compliant
-	2.1055	7.15	Frequency Stability	N/A*

N/A* Not Applicable. Different Standard Applies; Refer to test report SD72121022-1016A for LTE Band 13.

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) was a Nextivity Inc. Cel-Fi Quatra Cellphone Signal Repeater. The EUT is a WCDMA/LTE Signal Booster to improve voice and data cellular performance in large enterprise environments. The EUT 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. Users place the NU in an area with the strongest signal from the carrier network. The CU is then placed in the center of the home or office, or in the area where the best signal quality is best needed. The NU and CU are placed at varying distances apart and are communicated via Ethernet cables. The LTE Band 13 function of the EUT were verified in this test report.

1.3.2 EUT General Description

EUT Description	Cellphone Signal Repeater
Model Name	Cel-Fi Quatra
Model Number(s)	NU: Q34-2/5/13/66NU CU: Q34-2/5/13/66CU
Rated Voltage	12V DC via external AC/DC adapter.
Mode Verified	LTE Band 13
Frequency Bands	NU: 777 - 787MHz CU: 746 - 756MHz
Channel Bandwidth	5MHz, 10MHz
Capability	WCDMA (Band 2 and 5), LTE (Band 13 and 4) and BT LE
Primary Unit (EUT)	☐ Production ☐ Pre-Production ☒ Engineering
Manufacturer Declared Temperature Range	0°C to 40°C
Antenna Type	PCB PIFA
Manufacturer	Nextivity Inc.
Antenna Model	N/A

Antenna Gain

NU	CU
0 dBi	0 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 B13 antenna port of NU. Output is monitored from B13 Top antenna port of CU. (refer to 1.4.4 Figure 2)
B	Test Mode - Uplink (NU TX). Input signal is applied to B13 antenna port of CU. Output is monitored from B13 Top antenna port of NU. (refer to 1.4.4 Figure 3)
C	Normal Mode - Downlink (CU TX). Base Station Simulator is employed to send a modulated signal to B13 antenna port of NU. B13 Top 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 B13 antenna port of NU. Input signal is applied to B13 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 4)
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 5)
G	Max Uplink 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 B13 Top antenna port of NU. (refer to 1.4.4 Figure 6)
H	Max Downlink 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 B13 Top antenna port of CU. (refer to 1.4.4 Figure 6)
I	Uplink Oscillation Detection testing - Base Station Simulator is connected to a step attenuator and then applied to the NU antenna port and a signal generator is connected to the CU port. A Feedback Step Attenuator is connected between the NU and CU antenna ports. Output is monitored from antenna port of NU. (refer to 1.4.4 Figure 9)
J	Downlink Oscillation Detection testing - Base Station Simulator is connected to a step attenuator and then applied to the NU antenna port and a signal generator is connected to the CU port. A Feedback Step Attenuator is connected between the NU and CU antenna ports. Output is monitored from antenna port of CU. (refer to 1.4.4 Figure 10)

1.4.2 EUT Exercise Software

Manufacturer provided a configuration software (ConformanceTest.exe) 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
Nextivity	AC/DC Adapter (EUT)	M/N 290N029-001 S/N 161200002A0, 54VDC 2.22A
Netgear	Network patch Cable (1x NU to CU)	4.0m, unshielded, Cat5e 24AWG UTP
-	Support USB cable	1.75 meters, shielded Type A to Micro B connector
-	Support USB cable	Custom 1.0 meter shielded USB Type A to Type B for the Shielded Test Enclosure
Lenovo	Support Laptop	M/N: 2912-3VU, S/N: R9-92MH0 10/11
Lenovo	Support Laptop AC Adapter	M/N: 42T4430 S/N: 11S42T4430Z1ZGWE27AA9X
Rhode & Schwarz	Support Wideband Radio Communication Tester	M/N CMW500 S/N 1201.0002K50/103829
RF Power	10dB Step Attenuator	-
RF Power	90dB Step Attenuator	-
Ramsey	Support Shielded Test Enclosure	M/N STE3300 S/N 3042 with custom USB cable and AC/DC Adapter

1.4.4 Simplified Test Configuration Diagram

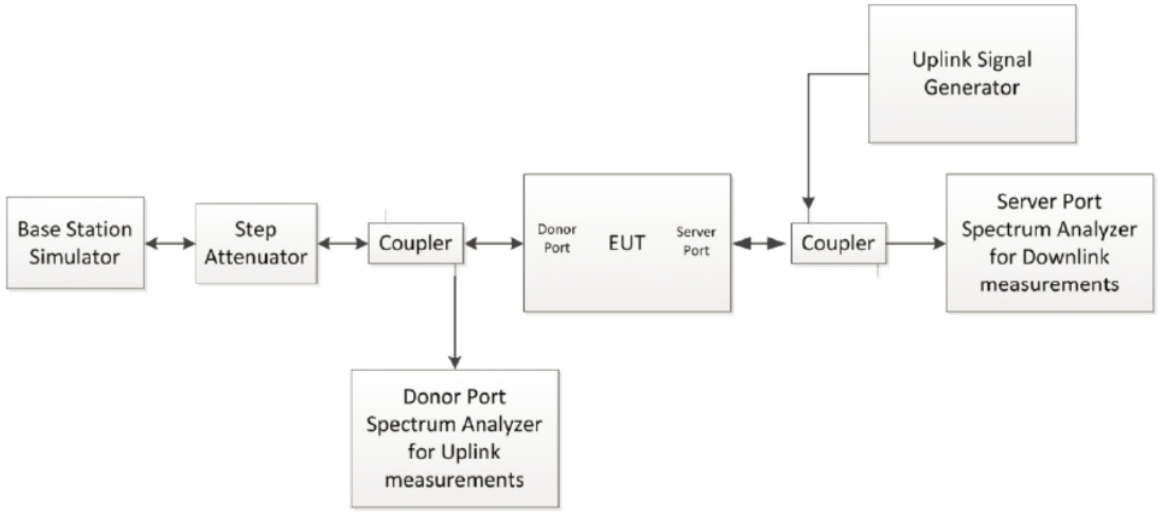


Figure 1: Test Configuration in Normal Mode

Figure 2: Uplink Test Configuration in Test Mode

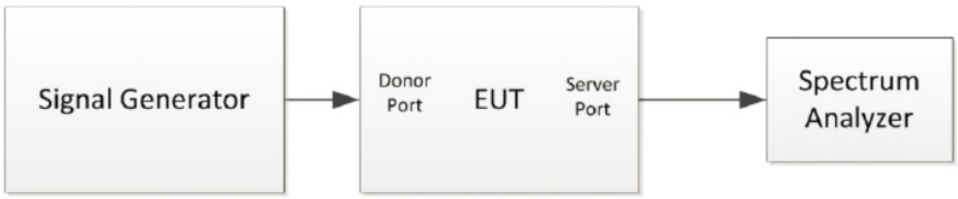


Figure 3: Downlink Test Configuration in Test Mode

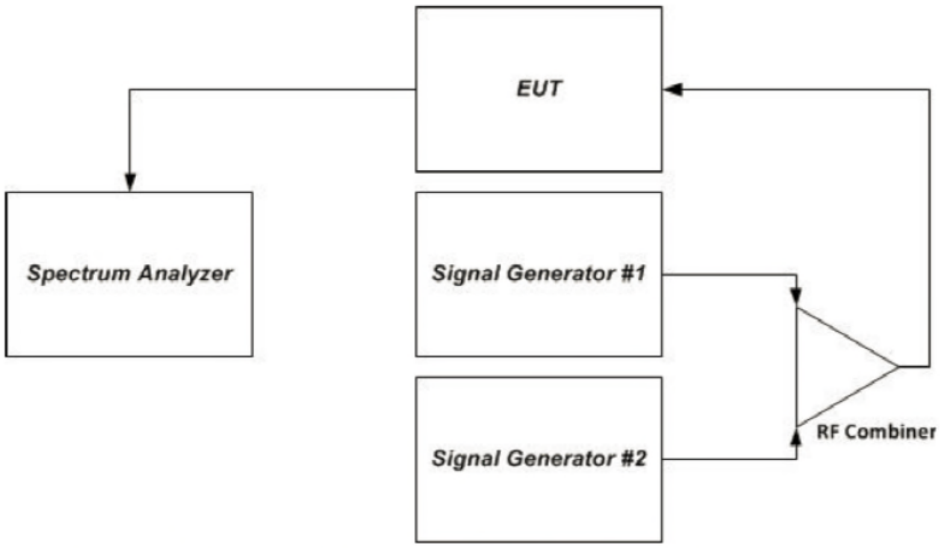


Figure 4 – Intermodulation product instrumentation test setup

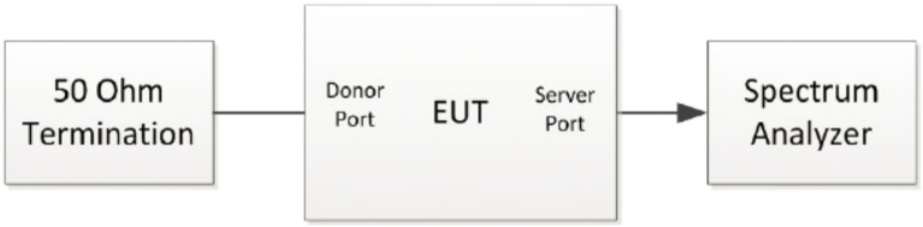


Figure 5: Maximum downlink noise limit test configuration

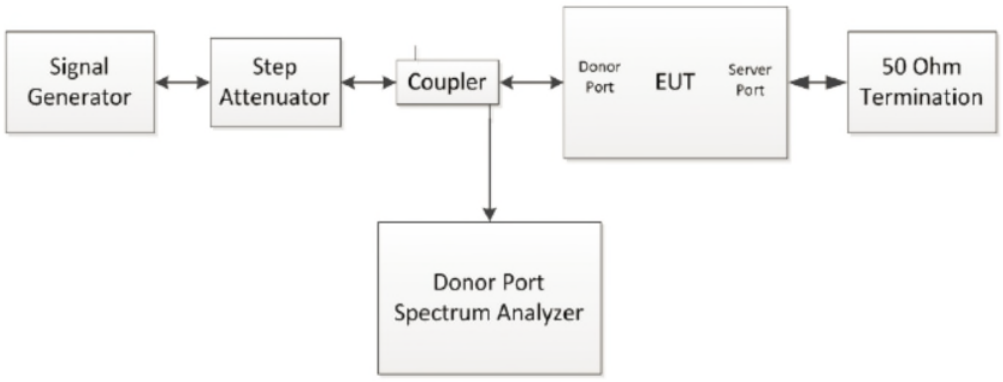


Figure 6: Uplink RSSI dependent noise limit test configuration

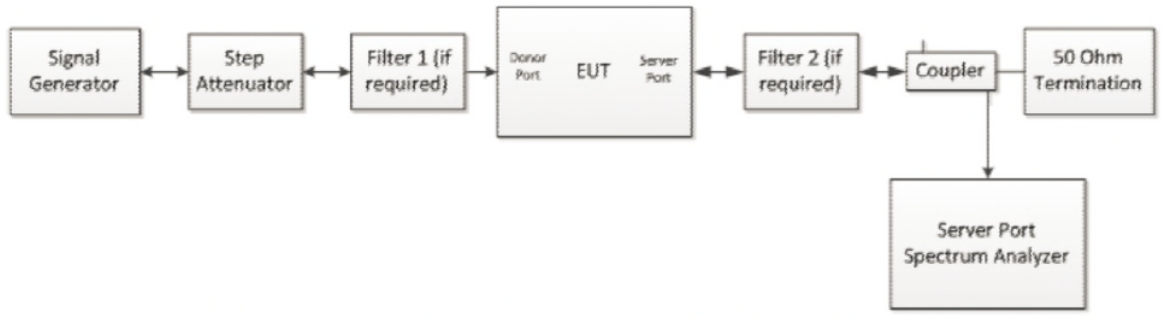


Figure 7: Downlink RSSI dependent noise limit test configuration

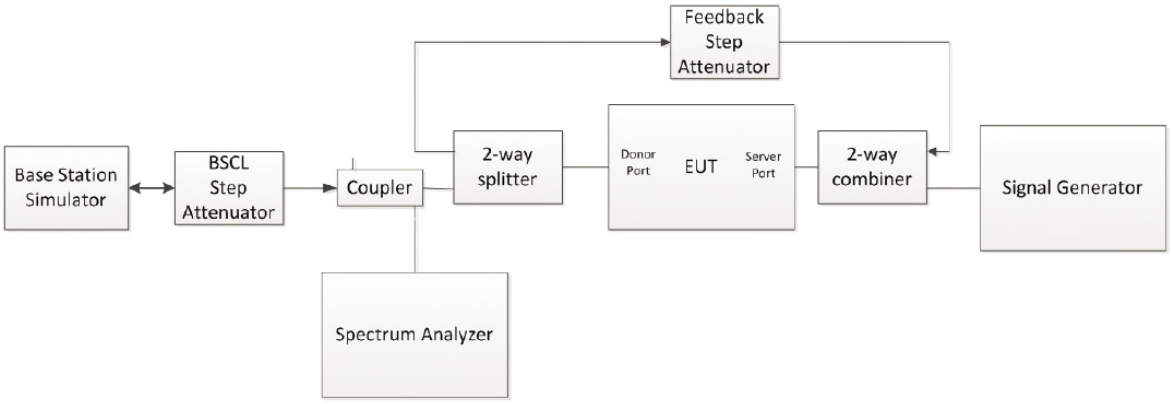


Figure 9: Uplink Oscillation Detection Test Setup

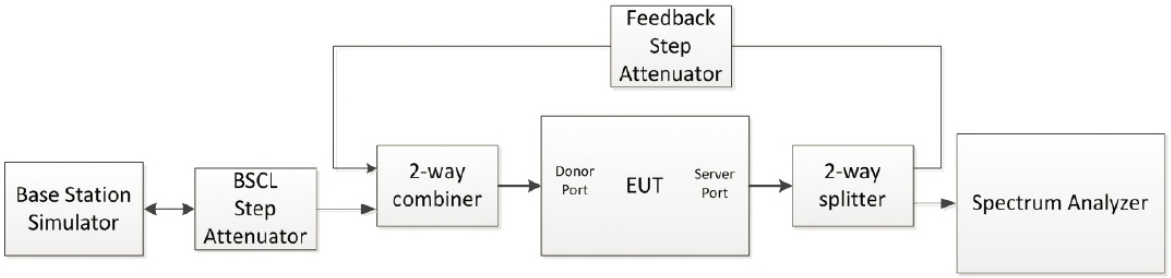


Figure 10: Downlink Oscillation Detection Test Setup

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 930629000238 (NU) and 920629000031 (CU), 930629000139 (NU) and 920629000048 (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 – Registration 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 Registration No.: 3067A

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

SECTION 2

TEST DETAILS

Radio Testing of the
Nextivity Inc.
Cel-Fi Quatra Cellphone Signal Repeater

2.1 AUTHORIZED FREQUENCY BAND VERIFICATION

2.1.1 Specification Reference

FCC 47 CFR Part 20, Clause 20.21 (e)(3)
FCC 47 CFR Part 20, Clause 20.21(a)(4)
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.

FCC 47 CFR Part 20, Clause 20.21(a)(4) Self Monitoring:
The subscriber operates the Consumer Signal Booster on frequencies used for the provision of subscriberbased 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. Operation on part 90 (Specialized Mobile Radio) frequencies is permitted upon the Commission's release of 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: 930629000238 (NU) and 920629000031 (CU) / Test Configuration A and B

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

October 25, 2016/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.

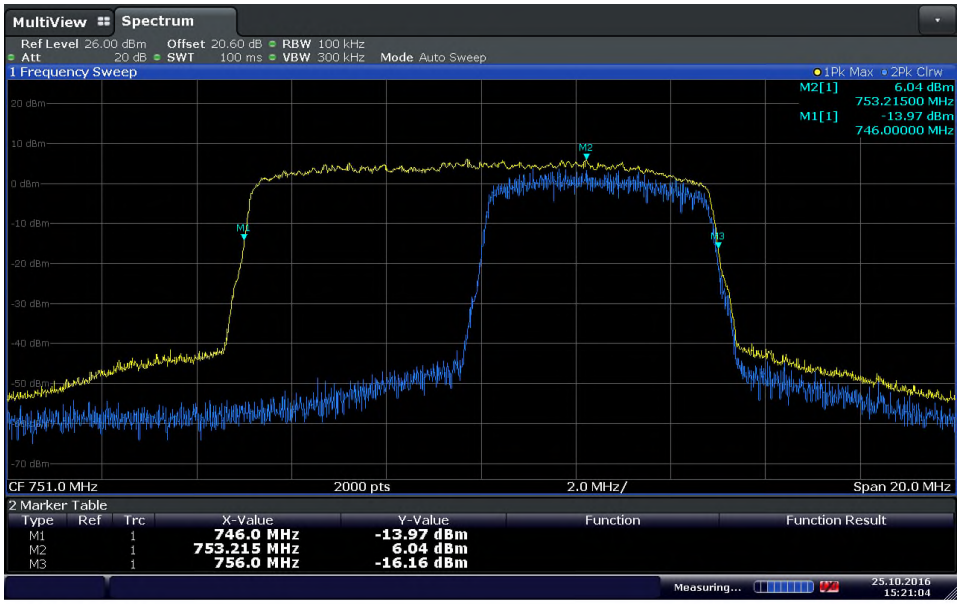
Ambient Temperature	25.5°C
Relative Humidity	48.1%
ATM Pressure	99.3kPa

2.1.7 Additional Observations

1) This is conducted Test. Test procedure is per Section 7.1.1 of KDB935210 (D04 Provider Specific Booster Measurements v01r01). Appropriate offset (line losses) applied.
2) The EUT operated in Test Mode, with the gain manually set to the maximum gain and a minimum bandwidth setting (5MHz).
3) Setup the EUT according to Figure 2 or 3 of Section 6.3.3 of KDB935210 (D04 Provider Specific Booster Measurements v01r01) as appropriate.
4) Evaluations are conducted at CU and NU antenna ports B13.
5) Operational uplink and downlink band for LTE Band 13 was tested.
6) The signal generator was set to transmit a 4.1MHz AWGN signal.
7) DL: B13:746 – 756MHz;
   UL: B13:777 – 787MHz;

2.1.8 Test Results

LTE Band 13 Downlink Authorized Frequency Range (746 – 756 MHz)



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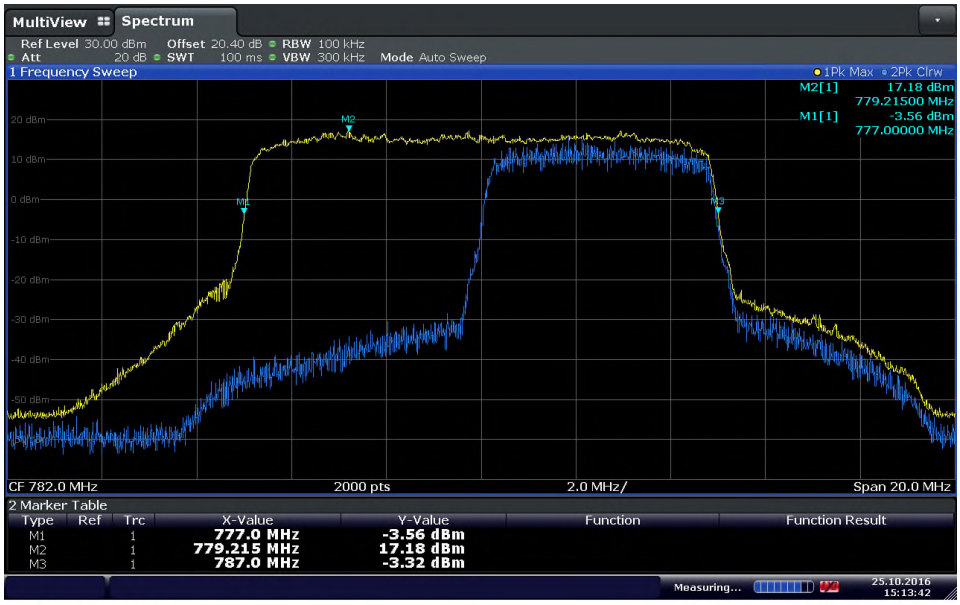
LTE Band 13 Uplink Authorized Frequency Range (777 – 787 MHz)



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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(a)(4)
KDB935210 D04, Clause 7.1

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(a)(4) Self Monitoring:
The subscriber operates the Consumer Signal Booster on frequencies used for the provision of subscriberbased 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. Operation on part 90 (Specialized Mobile Radio) frequencies is permitted upon the Commission's release of a public notice announcing the date Consumer Signal Boosters may be used in the band;

2.2.3 Equipment Under Test and Modification State

Serial No: 930629000139 (NU) and 920629000048 (CU) / Test Configuration C and D

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

November 14, 2016/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.

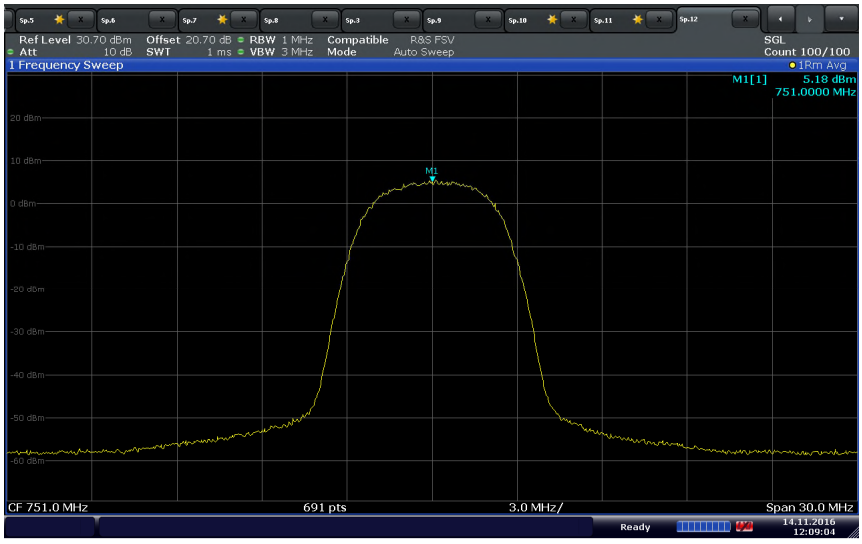
Ambient Temperature	23.4°C
Relative Humidity	33.6%
ATM Pressure	99.3kPa

2.2.7 Additional Observations

1) This is conducted Test. Test procedure is per Section 7.1.2 of KDB935210 (D04 Provider Specific Booster Measurements v01r01). Appropriate offset (line loses) applied.
2) The EUT operated in Normal Mode, with the gain manually set to the maximum gain and a minimum bandwidth setting (5MHz).
3) Setup the EUT according to Figure 1 of Section 6.3.2 of KDB935210 (D04 Provider Specific Booster Measurements v01r01) with the Base Station Simulator transmitting an authorized CMRS provider signal to the booster.
4) Evaluations are conducted at CU and NU antenna ports 13.
5) Operational uplink and downlink band for LTE Band 13 was tested.
6) The Base Station Simulator was set to transmit a 5MHz LTE signal.
7) The authorized CMRS Provider ID: 311/480
8) Two Non- authorized CMRS Provider signals were verified.
9) DL: B13:746 – 756MHz;
   UL: B13:777 – 787MHz;

2.2.8 Test Results

LTE Band 13 Downlink Authorized Frequency Range (746 – 756 MHz)
(MCC/MNC: 311/480)



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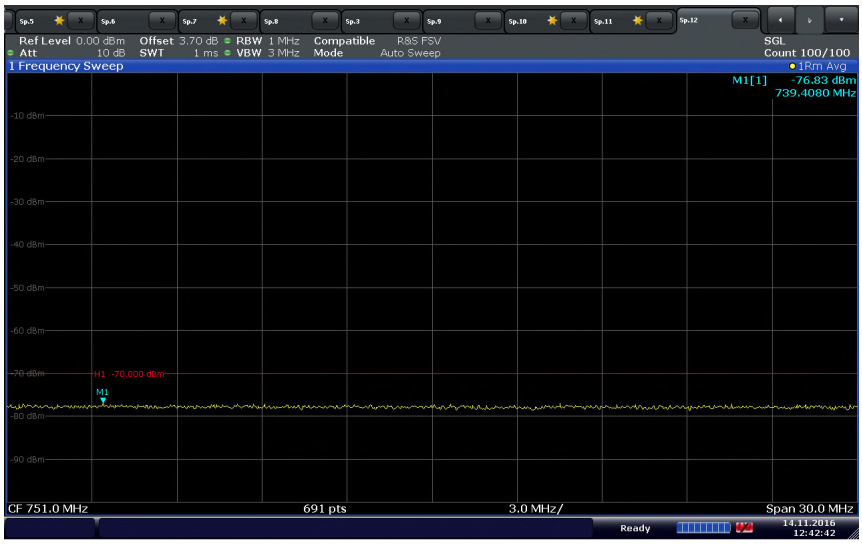 Date: 14.NOV.2016 12:42:42
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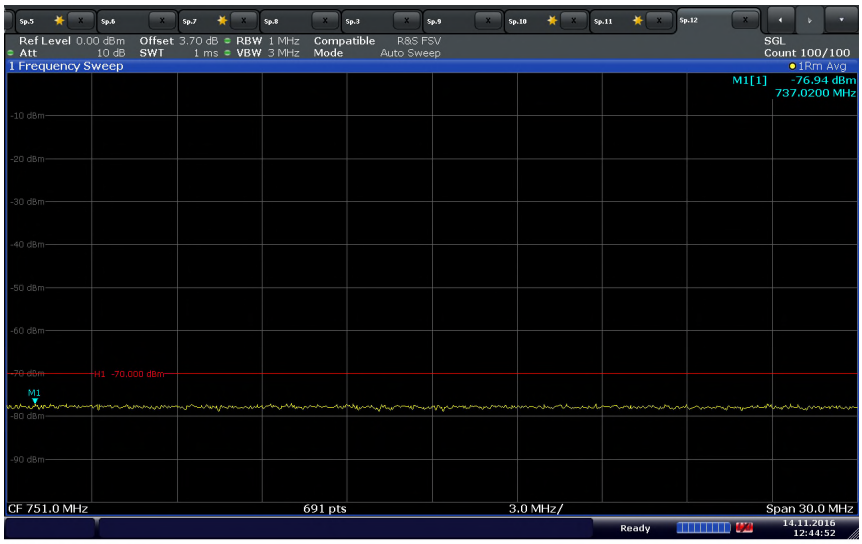
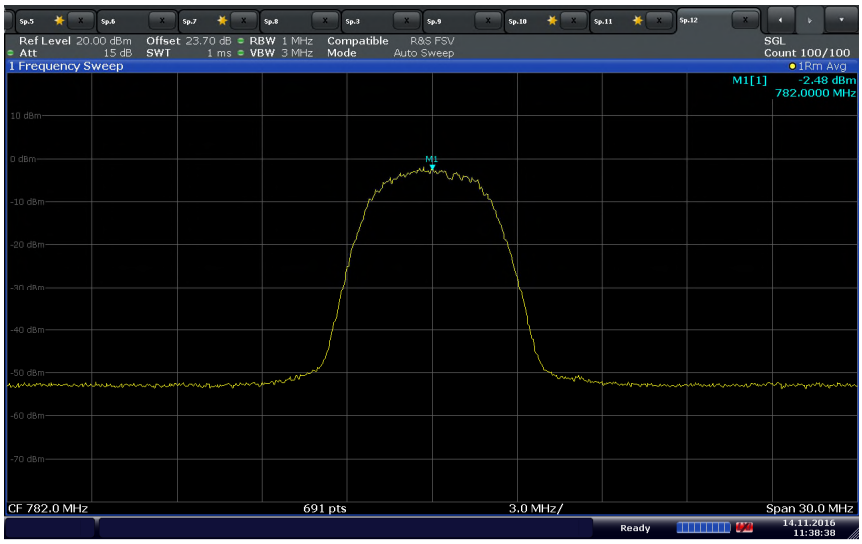
 Date: 14.NOV.2016 12:44:53

LTE Band 13 Uplink Authorized Frequency Range (777 – 787 MHz) (MCC/MNC: 311/480)
 Date: 14.NOV.2016 11:38:39

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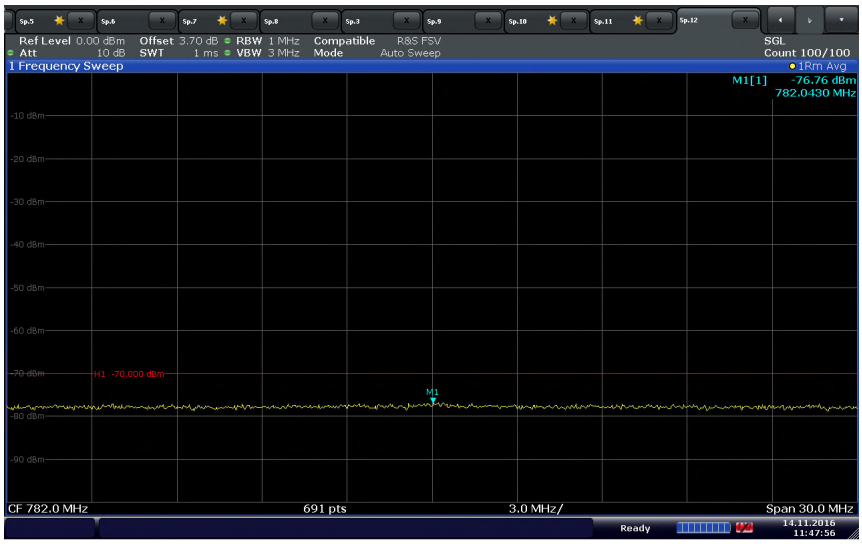 Date: 14.NOV.2016 11:47:56

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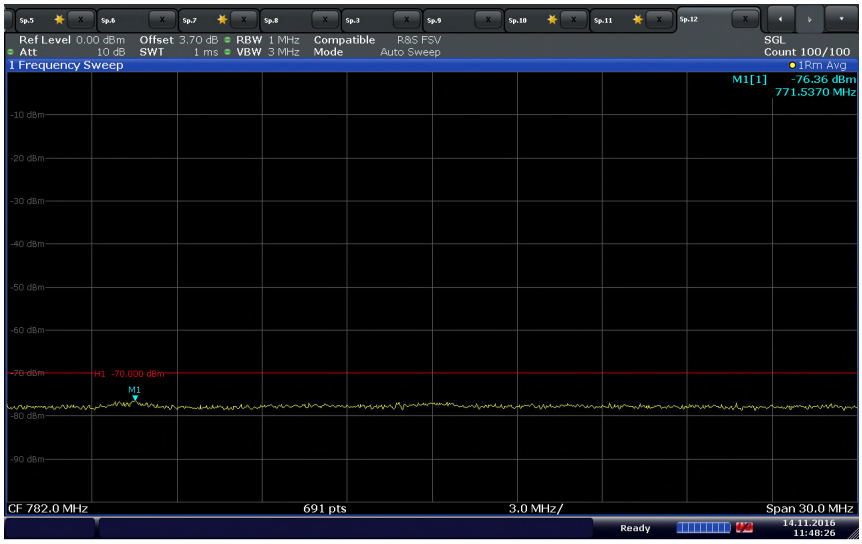
 Date: 14.NOV.2016 11:48:27
LTE Band 13 Downlink Inactive time after reset
 Date: 14.NOV.2016 12:41:02
LTE Band 13 Uplink Inactive time after reset


Ref Level 13.70 dBm Offset 3.70 dB RBW 1 MHz Compatible R&S FSV SGL
Att 10 dB SWT 70 s VBW 3 MHz
1 Zero Span 1Rm Avg
M1[1] -1.90 dBm
1 ms
10 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
H1 -70.000 dBm
CF 782.0 MHz
691 pts
7.0 s/
Ready
14.11.2016
11:45:30
Date: 14.NOV.2016 11:45:30

2.3 MAXIMUM POWER MEASUREMENT AND BOOSTER GAIN COMPUTATION

2.3.1 Specification Reference

FCC 47 CFR Part 20, Clause 20.21(e)(9)(i)(D)
FCC 47 CFR Part 20, Clause 20.21(e)(9)(i)(B)
FCC 47 CFR Part 20, Clause 20.21(e)(9)(i)(C)(1) and (2)
KDB935210 D04, Clause 7.2
KDB935210 D04, Clause 7.3

2.3.2 Standard Applicable

FCC 47 CFR Part 20, Clause 20.21(e)(9)(i)(B) Bidirectional Capability:
Consumer Boosters must be able to provide equivalent (within 9dB as per ANSI ASC C63) uplink and downlink gain and conducted uplink power output that is at least 0.05 watts. One-way consumer boosters (i.e., uplink only, downlink only, uplink impaired, downlink impaired) are prohibited. Spectrum block filtering used must provide uplink filter attenuation not less than the downlink filter attenuation, and where RSSI is measured after spectrum block filtering is applied referenced to the booster's input port for each band of operation.

FCC 47 CFR Part 20, Clause 20.21(e)(9)(i)(D) Power Limits:
A booster's uplink power must not exceed 1 watt composite conducted power and equivalent isotropic radiated power (EIRP) for each band of operation. Downlink power shall not exceed 0.05 watt (17dBm) composite and 10 dBm per channel conducted and EIRP for each band of operation. Compliance with power limits will use instrumentation calibrated in terms of RMS equivalent voltage.

FCC 47 CFR Part 20, Clause 20.21(e)(9)(i)(C) Booster Gain Limits.
The gain of the frequency selective consumer booster shall meet the limits below.
(1) The uplink and downlink gain in dB of a frequency selective consumer booster referenced to its input and output ports shall not exceed BSCL - 28 dB - (40 dB - MSCL).
(2) The uplink and downlink maximum gain of a frequency selective consumer booster referenced to its input and output ports shall not exceed 19.5 dB + 20 Log (Frequency), or 100 dB for systems having automatic gain adjustment based on isolation measurements between booster donor and server antennas.
Where, Frequency is the uplink midband frequency of the supported spectrum bands in MHz.

2.3.3 Equipment Under Test and Modification State

Serial No: 930629000238 (NU) and 920629000031 (CU)/ Test Configuration A and B

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

October 25, 2016/XYZ

2.3.5 Test Equipment Used

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

2.3.6 Environmental Conditions

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

Ambient Temperature	25.5°C
Relative Humidity	48.1%
ATM Pressure	99.5 kPa

2.3.7 Additional Observations

1) This is conducted Test. Test procedure is per Section 7.2.2 of KDB935210 (D04 Provider Specific Booster Measurements v01r01). Appropriate offset (line losses) applied.
2) The EUT operated in Test Mode, with the gain manually set to the maximum gain and a minimum bandwidth setting (5MHz).
3) Setup the EUT according to Figure 2 or 3 of Section 6.3.3 of KDB935210 (D04 Provider Specific Booster Measurements v01r01) as appropriate.
4) Evaluations are conducted at CU and NU antenna ports B13.
5) Maximum Gain of the booster was calculated.
6) The Gain with Maximum Transmitter Input Level (-20dBm for Downlink and 0dBm for Uplink) injected was also calculated.
7) Operational uplink and downlink band for LTE Band 13 was tested.
8) The signal generator was set to transmit a 4.1MHz AWGN signal.

2.3.8 Test Results

Maximum Gain/Maximum Power										
Band	Frequency Range (MHz)	Input Power (dBm)	Output Power (dBm)	Antenna Gain (dB)	EIRP (dBm)	EIRP Limit (dBm)	Gain (dB)	Gain Limit (dB)	UL vs DL Gain	UL vs DL Gain Limit
Band 13 Downlink	746 - 756	-83.0	11.21	0	11.21	<17	94.21	100	4.82	9
Band 13 Uplink	777 - 787	-77.3	22.53	0	22.53	17-30	99.83	100		

Maximum Gain/Maximum Power with Maximum Transmitter Input Level								
Band	Frequency Range (MHz)	Input Power (dBm)	Output Power (dBm)	Antenna Gain (dB)	EIRP (dBm)	EIRP Limit (dBm)	Gain (dB)	Gain Limit (dB)
Band 13 Downlink	746 - 756	-20	11.48	0	11.48	<17	31.48	100
Band 13 Uplink	777 - 787	0	22.73	0	22.73	17-30	22.73	100

2.3.9 Test Setup Photo

The same as section 2.1.9.

2.4 INTERMODULATION PRODUCT

2.4.1 Specification Reference

FCC 47 CFR Part 20. Clause 20.21(e)(9)(i)(G)
KDB935210 D04, Clause 7.4

2.4.2 Standard Applicable

FCC 47 CFR Part 20. Clause 20.21(e)(9)(i)(G) Intermodulation Limits:
The transmitted intermodulation products of a consumer booster at its uplink and downlink ports shall not exceed the power level of -19 dBm for the supported bands of operation. Compliance with intermodulation limits will use boosters operating at maximum gain and maximum rated output power, with two continuous wave (CW) input signals spaced 600 kHz apart and centered in the pass band of the booster, and with a 3 kHz measurement bandwidth.

2.4.3 Equipment Under Test and Modification State

Serial No: 930629000238 (NU) and 920629000031 (CU) / Test Configuration E

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

October 26 and November 1, 2016/XYZ

2.4.5 Test Equipment Used

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

2.4.6 Environmental Conditions

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

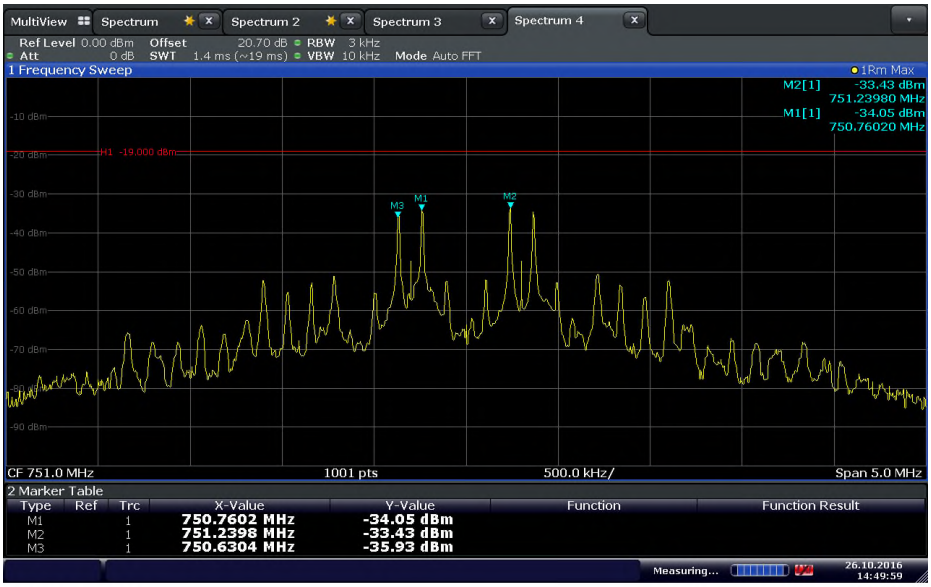
Ambient Temperature	25.2 - 256°C
Relative Humidity	45.8 - 49.1%
ATM Pressure	99.2 - 99.3kPa

2.4.7 Additional Observations

1) This is conducted Test. Test procedure is per Section 7.4 of KDB935210 (D04 Provider Specific Booster Measurements v01r01). Appropriate offset (line losses) applied.
2) The EUT operated in Test Mode with the gain manually set to the maximum gain and a minimum bandwidth setting (5MHz).
3) Setup the EUT according to Figure 4 of Section 7.4 of KDB935210 (D04 Provider Specific Booster Measurements v01r01).
4) Evaluations are conducted at CU and NU antenna ports B13.
5) Operational uplink and downlink band for LTE Band 13 was tested.

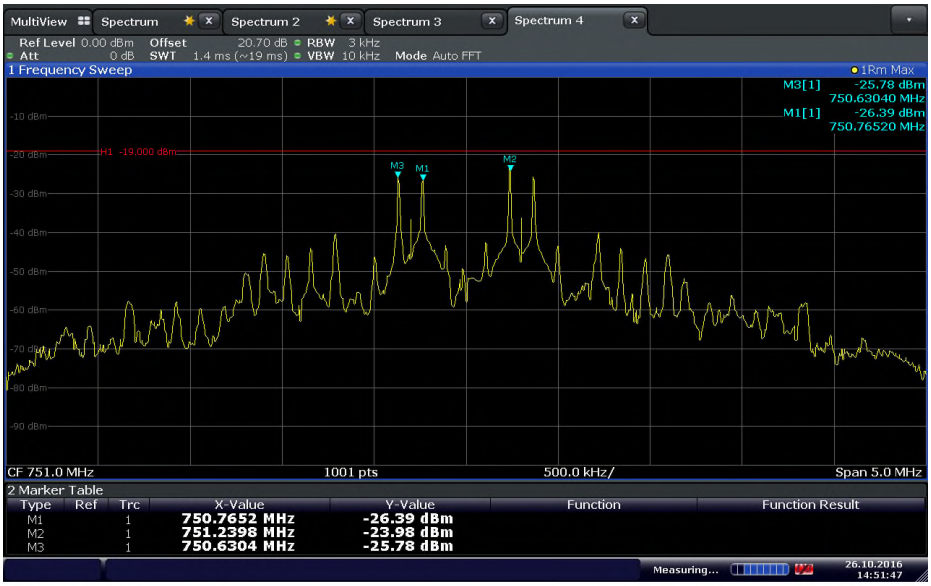
2.4.8 Test Results

LTE Band 13 Downlink (-83.0dBm)



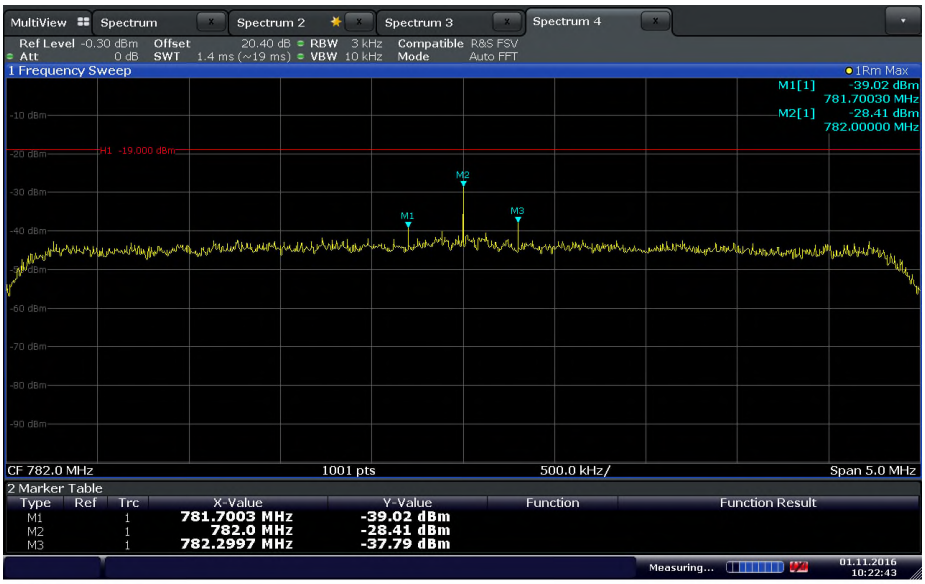
14:50:00 26.10.2016

LTE Band 13 Downlink (-73.0dBm)



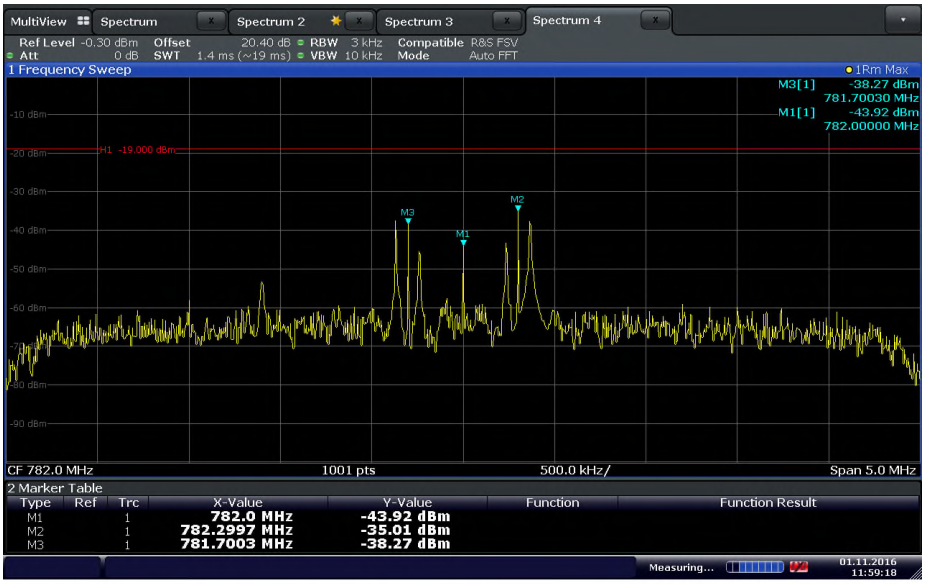
14:51:48 26.10.2016

LTE Band 13 Uplink (-82dBm)



Date: 1.NOV.2016 10:22:42

LTE Band 13 Uplink (-72dBm)



Date: 1.NOV.2016 11:59:19

2.5 OUT OF BAND EMISSIONS

2.5.1 Specification Reference

FCC 47 CFR Part 20. Clause 20.21(e)(9)(i)(F)
KDB935210 D04, Clause 7.5

2.5.2 Standard Applicable

FCC 47 CFR Part 20. Clause 20.21(e)(9)(i)(F) Out of Band Emissions Limits:
Booster out of band emissions (OOBE) shall meet the FCC's mobile emission limits for the supported bands of operation. Compliance to OOBE limits will utilize high peak-to-average CMRS signal types.

2.5.3 Equipment Under Test and Modification State

Serial No: 930629000238 (NU) and 920629000031 (CU) / Test Configuration A and B

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

October 26, 2016/XYZ

2.5.5 Test Equipment Used

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

2.5.6 Environmental Conditions

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

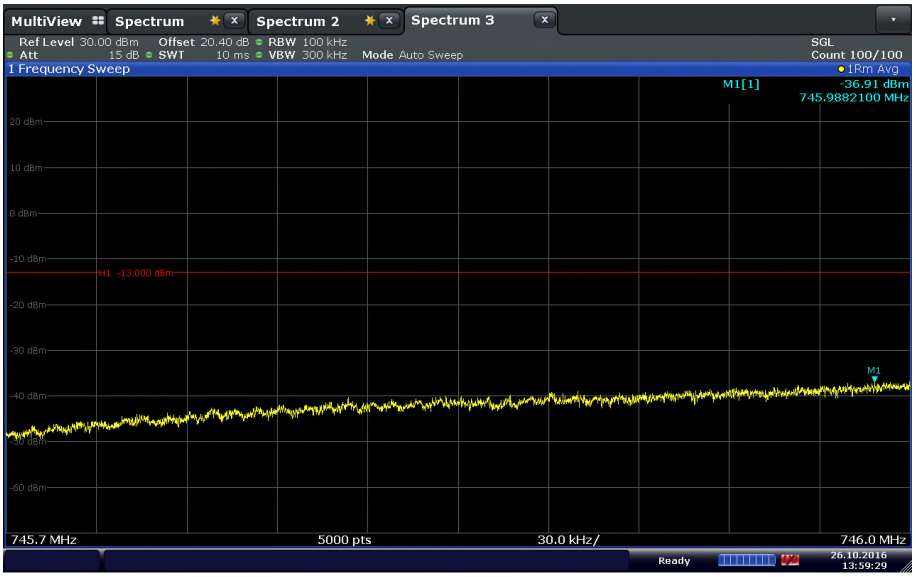
Ambient Temperature	25.6°C
Relative Humidity	49.1%
ATM Pressure	99.3kPa

2.5.7 Additional Observations

1) This is conducted Test. Test procedure is per Section 7.5 of KDB935210 (D04 Provider Specific Booster Measurements v01r01). Appropriate offset (line losses) applied.
2) The EUT operated in Test Mode, with the gain manually set to the maximum gain and a minimum bandwidth setting (5MHz).
3) Evaluations are conducted at CU and NU antenna ports B13.
4) Operational uplink and downlink band for LTE Band 13 was tested.
5) Signal: 4.1MHz AWGN.

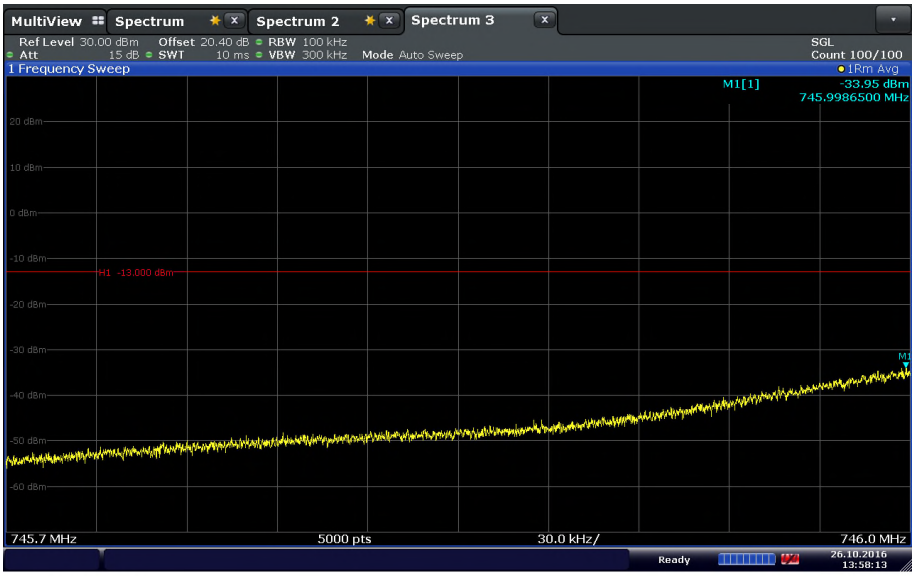
2.5.8 Test Results

LTE Band 13 Downlink 5MHz Bandwidth Low Channel (-83 dBm)



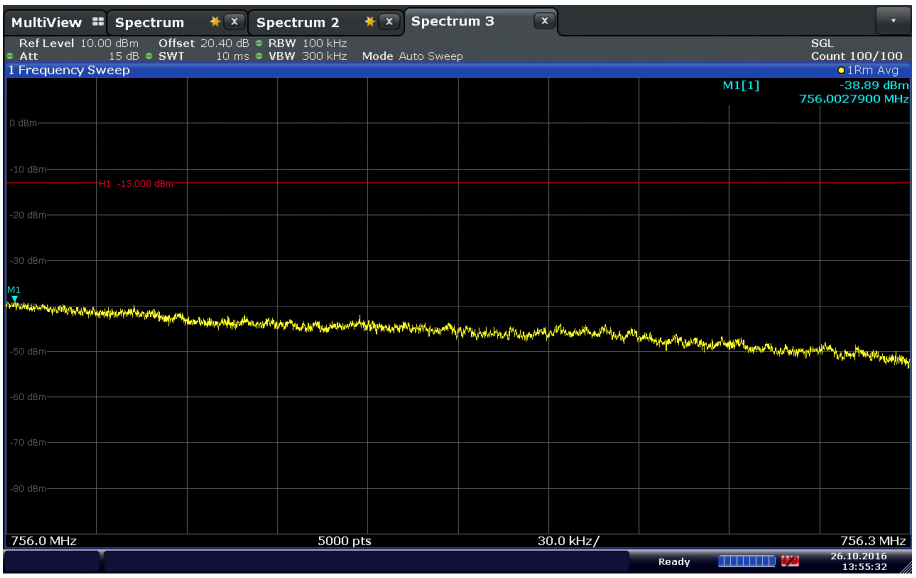
13:59:29 26.10.2016

LTE Band 13 Downlink 5MHz Bandwidth Low Channel (-20 dBm)



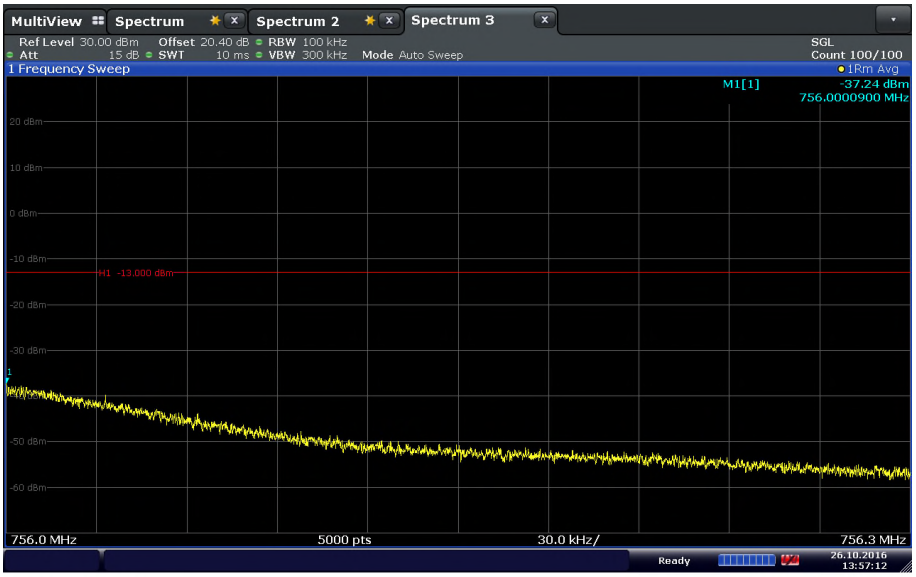
13:58:14 26.10.2016

LTE Band 13 Downlink 5MHz Bandwidth High Channel (-83 dBm)



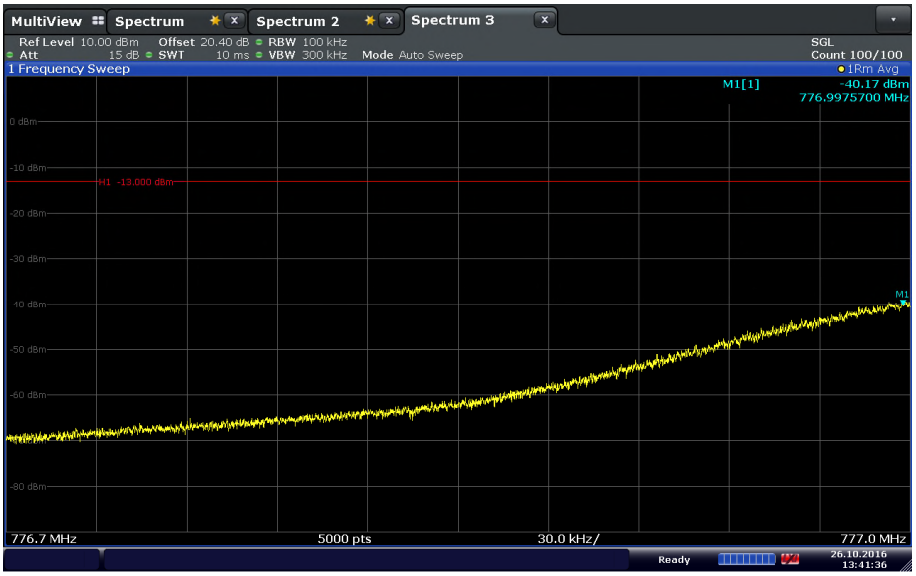
13:55:32 26.10.2016

LTE Band 13 Downlink 5MHz Bandwidth High Channel (-20 dBm)



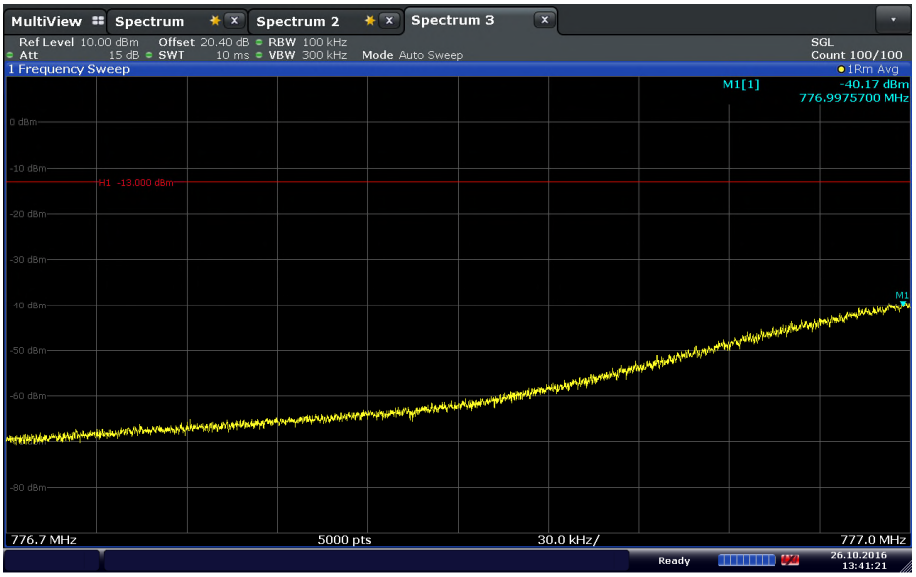
13:57:13 26.10.2016

LTE Band 13 Uplink 5MHz Bandwidth Low Channel (-77 dBm)



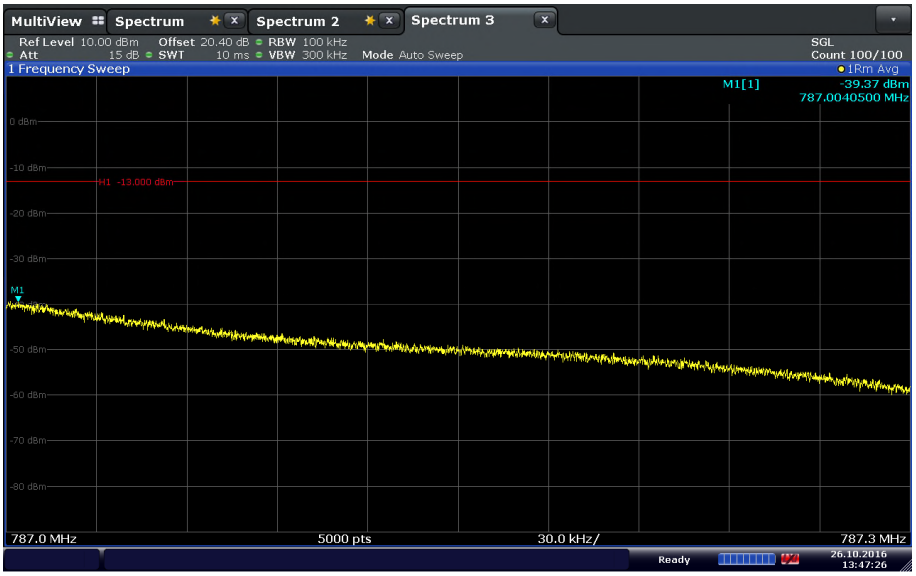
13:41:36 26.10.2016

LTE Band 13 Uplink 5MHz Bandwidth Low Channel (0 dBm)



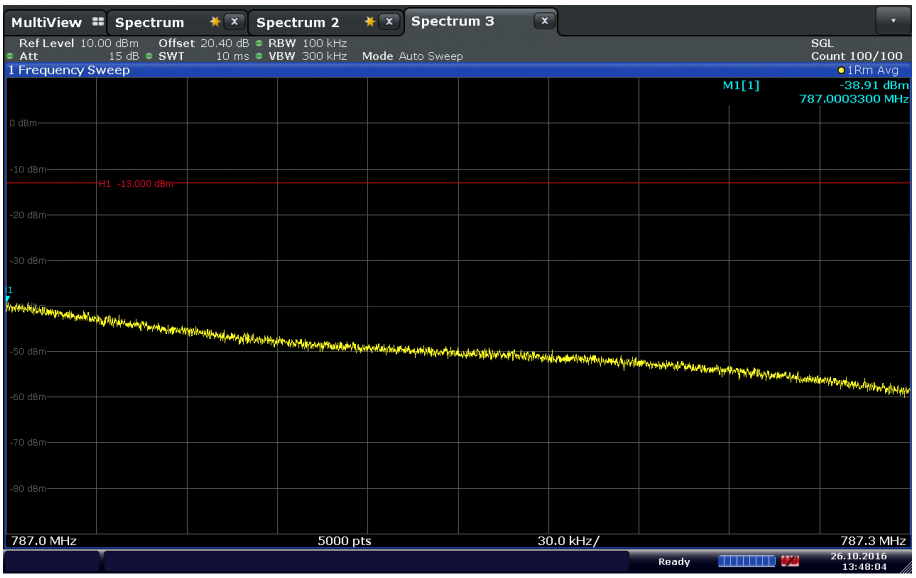
13:41:22 26.10.2016

LTE Band 13 Uplink 5MHz Bandwidth High Channel (-77 dBm)



13:47:26 26.10.2016

LTE Band 13 Uplink 5MHz Bandwidth High Channel (0 dBm)



13:48:05 26.10.2016

2.6 NOISE LIMIT

2.6.1 Specification Reference

FCC 47 CFR Part 20. Clause 20.21(e)(9)(i)(A)
FCC 47 CFR Part 20. Clause 20.21(e)(9)(i)(I)
KDB935210 D04, Clause 7.7

2.6.2 Standard Applicable

FCC 47 CFR Part 20. Clause 20.21(e)(9)(i)(A) Noise Limits.:
The transmitted noise power in dBm/MHz of frequency selective consumer boosters outside the licensee's spectrum blocks at their uplink and downlink ports shall not exceed the following limits:
(1) -103 dBm/MHz - RSSI
(i) Where RSSI is the downlink composite signal power received in dBm for frequencies in the band of operation outside the licensee's spectrum block as measured after spectrum block filtering is applied and is referenced to the booster's donor port for each band of operation. RSSI is expressed in negative dB units relative to 1 mW.
(ii) Boosters with MSCL less than 40 dB, shall reduce the Noise output in (A) by 40 dB - MSCL, where MSCL is the minimum coupling loss in dB between the wireless device and booster's server port. MSCL must be calculated or measured for each band of operation and provided in compliance test reports.

(2)(i) Maximum downlink noise power shall not exceed -102.5 dBm/MHz + 20 Log_{10}(Frequency), where Frequency is the uplink mid-band frequency of the supported spectrum bands in MHz.
(ii) Compliance with Noise limits will use instrumentation calibrated in terms of RMS equivalent voltage, and with booster input ports terminated or without input signals applied within the band of measurement.

FCC 47 CFR Part 20. Clause 20.21(e)(9)(i)(I) Transmit Power Off Mode.
When the consumer booster cannot otherwise meet the noise and gain limits defined herein it must operate in ''Transmit Power OFF Mode.'' In this mode of operation, the uplink and downlink noise power shall not exceed -70 dBm/MHz and uplink gain shall not exceed the lesser of 23 dB or MSCL.

2.6.3 Equipment Under Test and Modification State

Serial No: 930629000238 (NU) and 920629000031 (CU) / Test Configuration E, F and G

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

October 27 and December 06, 2016/XYZ

2.6.5 Test Equipment Used

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

2.6.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	22.3 - 25.3°C
Relative Humidity	40.3 - 49.3%
ATM Pressure	99.0 - 99.1kPa

2.6.7 Additional Observations

1) This is conducted Test. Test procedure is per Section 7.7 of KDB935210 (D04 Provider Specific Booster Measurements v01r01). Appropriate offset (line losses) applied.
2) The EUT operated in Test Mode with the gain manually set to the maximum gain and a minimum bandwidth setting (5MHz).
3) For Maximum Noise (frequency Dependent) testing, setup the EUT according to Figure 5 of Section 7.7 of KDB935210 (D04 Provider Specific Booster Measurements v01r01).
4) Maximum Noise (frequency Dependent) evaluations are conducted at CU antenna ports B13. Operational downlink band for LTE Band 13 was tested.
5) For Maximum Noise (RSSI Dependent and Transmit Power off mode) and Noise Response Time tests, setup the EUT according to Figure 5 of Figure 6 or 7 of Section 7.7 of KDB935210 (D04 Provider Specific Booster Measurements v01r01) as appropriate.
6) Maximum Noise (RSSI Dependent and Transmit Power off mode) and Noise Response Time evaluations are conducted at CU and NU antenna ports B13. Operational uplink and downlink band for LTE Band 13 was tested.
7) Signal generator was configured to transmit: 200 kHz AWGN.

2.6.8 Test Results

Maximum Noise (Frequency Dependent)				
Band	**Frequency Range (MHz)**	**Max Noise (dBm/MHz)**	**Limit* (dBm/MHz)**	**Margin (dB)**
Band 13 Downlink	746 - 756	-64.45	-44.6	-19.85

*: -102.5 dBm/MHz + 20 Log_{10}(Frequency), where Frequency is the uplink mid-band frequency of the supported spectrum bands in MHz. (Downlink only)

Maximum Noise (RSSI Dependent and Transmit Power off mode)					
Band	**Frequency (MHz)**	**Signal Generator Output Level (dBm)**	**Max Noise (dBm/MHz)**	**Limit (dBm/MHz)**	**Margin (dB)**
Band 13 Downlink	746 - 756	-70	-64.48	-38.0	-28.48
		-60	-64.27	-48.0	-16.27
		-50	-64.97	-58.0	-6.97
		-49*	-77.35	-59.0	-18.35
		-40	-77.57	-68.0	-9.57
		-25	-76.69	-70.0	-6.69
Band 13 Uplink	777 - 787	-76	-68.5	-32.0	-36.5
		-66	-68.05	-42.0	-26.05
		-56	-71.53	-52.0	-19.53
		-46*	-81.07	-62.0	-19.07
		-36	-80.52	-70.0	-10.52
		-26	-81.18	-70.0	-11.18

**: Transmit Power off mode

Noise Response Time				
Band	**Frequency (MHz)**	**Noise Response Time (Sec)**	**Limit (Sec)**	**Margin (Sec)**
Band 13 Downlink	746 - 756	0.623	3	-2.387
Band 13 Uplink	777 - 787	0.55	3	-2.45

2.7 UPLINK INACTIVITY

2.7.1 Specification Reference

FCC 47 CFR Part 20. Clause 20.21(e)(9)(i)(J)
KDB935210 D04, Clause 7.8

2.7.2 Standard Applicable

FCC 47 CFR Part 20. Clause 20.21(e)(9)(i)(J) Uplink Inactivity:
Uplink Inactivity. When a consumer booster is not serving an active device connection after 5 seconds the uplink noise power shall not exceed -70 dBm/MHz.

2.7.3 Equipment Under Test and Modification State

Serial No: 930629000139 (NU) and 920629000048 (CU) / Test Configuration C and D

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

November 15, 2016/XYZ

2.7.5 Test Equipment Used

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

2.7.6 Environmental Conditions

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

Ambient Temperature	23.6°C
Relative Humidity	36.6%
ATM Pressure	99.2kPa

2.7.7 Additional Observations

1) This is conducted Test.
2) Test procedure is per Section 7.8 of KDB935210 (D04 Provider Specific Booster Measurements v01r01). Appropriate offset (line losses) applied.
3) The EUT operated in Normal Mode with a minimum bandwidth setting (5MHz).
4) Setup the EUT according to Figure 1 of Section 6.3.2 of KDB935210 (D04 Provider Specific Booster Measurements v01r01).
5) Evaluations are conducted at NU antenna ports B13.
6) Operational uplink band for LTE Band 13 was tested.
7) Signal: 5MHz LTE.

2.7.8 Test Results

Uplink Inactivity				
Band	**Frequency (MHz)**	**UL Inactive Time (Sec)**	**Limit (Sec)**	**Margin (Sec)**
Band 13 Uplink	782	1.43	5.0	3.57

2.7.9 Test Setup Photo

The same as section 2.2.9.

LTE Band 13 Uplink 5MHz Bandwidth Mid Channel

Date: 15.NOV.2016 10:23:36

2.8 VARIABLE BOOSTER GAIN

2.8.1 Specification Reference

FCC 47 CFR Part 20. Clause 20.21(e)(9)(i)(C)(1)
FCC 47 CFR Part 20. Clause 20.21(e)(9)(i)(I)
KDB935210 D04, Clause 7.9

2.8.2 Standard Applicable

FCC 47 CFR Part 20. Clause 20.21(e)(9)(i)(C)(1) Booster Gain Limits:
The gain of the frequency selective consumer booster shall meet the limits below.

1) The uplink and downlink gain in dB of a frequency selective consumer booster referenced to its input and output ports shall not exceed BSCL - 28dB - (40 dB - MSCL).
(i) Where BSCL is the coupling loss between the booster's donor port and the base station's input port, and MSCL is the minimum coupling loss in dB between the wireless device and the booster's server port. MSCL must be calculated or measured for each band of operation and provided in compliance test reports.
(ii) In order of preference, BSCL is determined as follows: determine path loss between the base station and the booster; such measurement shall be based on measuring the received forward pilot/control channel power at the booster and reading the pilot/control channel transmit power from the base station as defined in the system information messages sent by the base station; estimate BSCL by assuming that the base station is transmitting at a level of +25 dBm per channel (assume a small, lightly loaded cell) and measuring the total received signal power level within the channel in dBm (RPCH) received at the booster input port. BSCL is then calculated as 25– RPCH; or assume that the BSCL is 70dB without performing any measurement.

FCC 47 CFR Part 20. Clause 20.21(e)(9)(i)(I) Transmit Power Off Mode.
When the consumer booster cannot otherwise meet the noise and gain limits defined herein it must operate in ''Transmit Power OFF Mode.'' In this mode of operation, the uplink and downlink noise power shall not exceed -70 dBm/MHz and uplink gain shall not exceed the lesser of 23 dB or MSCL.

2.8.3 Equipment Under Test and Modification State

Serial No: 930629000139 (NU) and 920629000048 (CU) / Test Configuration C and D

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

November 16, 2016/XYZ

2.8.5 Test Equipment Used

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

2.8.6 Environmental Conditions

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

Ambient Temperature 23.7°C

Relative Humidity	49.8%
ATM Pressure	98.7kPa

2.8.7 Additional Observations

1) This is conducted Test.
2) Test procedure is per Section 7.9 of KDB935210 (D04 Provider Specific Booster Measurements v01r01). Appropriate offset (line losses) applied.
3) The EUT operated in Normal Mode;
4) Setup the EUT according to Figure 1 of Section 6.3.2 of KDB935210 (D04 Provider Specific Booster Measurements v01r01).
5) Evaluations are conducted at CU and NU antenna ports 13.
6) Variable Gain: Operational uplink and downlink bands for LTE Band 13 were tested.
7) Uplink Gain Timing: Operational uplink bands for LTE Band 13 was tested.
8) Signal: 5MHz LTE.
9) MSCL:
   L_p = 20logf + 20logd - 27.5
   Lp = Basic free space path loss,
   f = frequency in MHz,
   d = separation distance in meters (2m)
   lowest MSCL value was utilized.
10) BSCL:
    The coupling loss (in dB) between the donor port (NU) of the Consumer Booster and the input port of the Base Station

2.8.8 Test Results

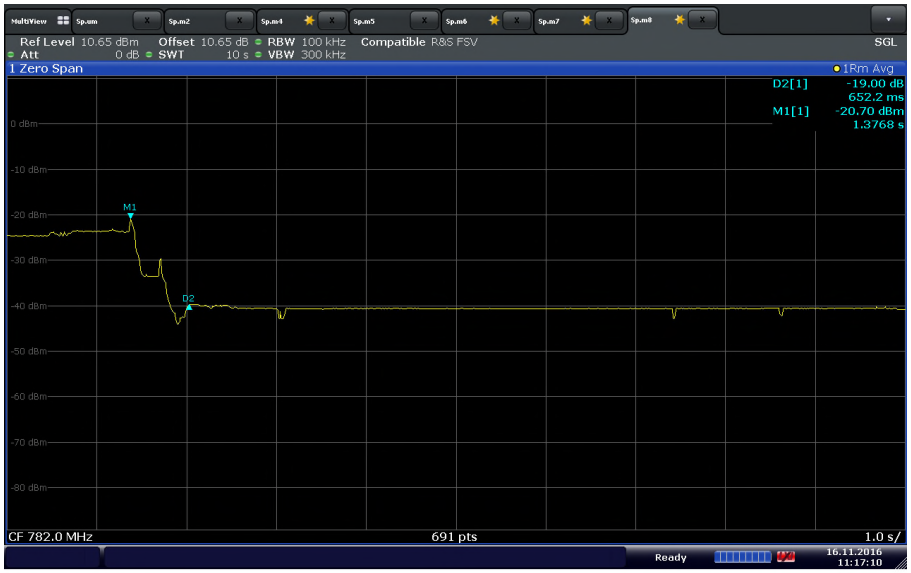
B13 Downlink Gain vs RPCH and BSCL - Middle Channel					
RPCH Power (dBm)	**BSCL (dB)**	**Measured Power (dBm)**	**Gain (dB)**	**Limit (dB)**	**Margin (dB)**
-87.23	112	-9.69	77.54	93.23	15.69
-80.86	105	-6.53	74.33	86.86	12.53
-72.51	97	4.03	76.54	78.51	1.97
-62.77	88	4.2	66.97	68.77	1.8
-53.69	78	4.09	57.78	59.69	1.91
-43.12	68	4.23	47.35	49.12	1.77
-32.62	57	4.15	36.77	38.62	1.85

B13 Uplink Gain vs RPCH and BSCL - Middle Channel					
RPCH Power (dBm)	**BSCL (dB)**	**Measured Power (dBm)**	**Gain (dB)**	**Limit (dB)**	**Margin (dB)**
-87.23	112	-9.94	72.06	81.23	9.17
-80.86	105	-17.32	64.68	74.86	10.18
-72.51	97	-25.91	56.09	66.51	10.42
-62.77	88	-35.91	46.09	56.77	10.68
-53.69	78	-37.75	44.25	47.69	3.44
-43.12	68	-47.36	34.64	37.12	2.48
-32.62	57	-57.48	24.52	26.62	2.1

Normal Mode				
Band	**Frequency (MHz)**	**Uplink Gain Time (Sec)**	**Limit (Sec)**	**Margin (Sec)**
Band 13 Uplink	782	0.65	3	-2.35

2.8.9 Test Plots

LTE Band 13 Uplink Gain Timing @ 5MHz Bandwidth Mid Channel



Date: 16.NOV.2016 11:17:10

2.9 OSCILLATION DETECTION

2.9.1 Specification Reference

FCC 47 CFR Part 20. Clause 20.21(e)(9)(ii)(A)
KDB935210 D04, Clause 7.11

2.9.2 Standard Applicable

FCC 47 CFR Part 20. Clause 20.21(e)(9)(ii)(A) Anti-Oscillation:
Consumer boosters must be able to detect and mitigate (i.e., by automatic gain reduction or shut down), any oscillations in uplink and downlink bands. Oscillation detection and mitigation must occur automatically within 0.3 seconds in the uplink band and within 1 second in the downlink band. In cases where oscillation is detected, the booster must continue mitigation for at least one minute before restarting. After five such restarts, the booster must not resume operation until manually reset.

2.9.3 Equipment Under Test and Modification State

Serial No: 930629000238 (NU) and 920629000031 (CU) and 930629000139 (NU) and 920629000048 (CU) / Test Configuration I and J

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

October 28 and November 15, 2016/XYZ

2.9.5 Test Equipment Used

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

2.9.6 Environmental Conditions

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

Ambient Temperature	23.6 - 25.5°C
Relative Humidity	36.6 - 49.5%
ATM Pressure	98.8 - 99.2kPa

2.9.7 Additional Observations

1) This is conducted Test.
2) Test procedure is per Section 7.11 of KDB935210 (D04 Provider Specific Booster Measurements v01r01). Appropriate offset (line losses) applied.
3) The EUT operated in Normal Mode when testing Oscillation Mitigation Time;
4) Setup the EUT according to Figure 1 of Section 6.3.2 of KDB935210 (D04 Provider Specific Booster Measurements v01r01) for Normal Mode.
5) The EUT operated in Test Mode when testing Re-Try event;
6) Setup the EUT according to Figure 2 and Figure 3 of Section 6.3.3 of KDB935210 (D04 Provider Specific Booster Measurements v01r01) for Test Mode.
7) Evaluations are conducted at CU and NU antenna ports B13.

8) Signal: 5MHz LTE.

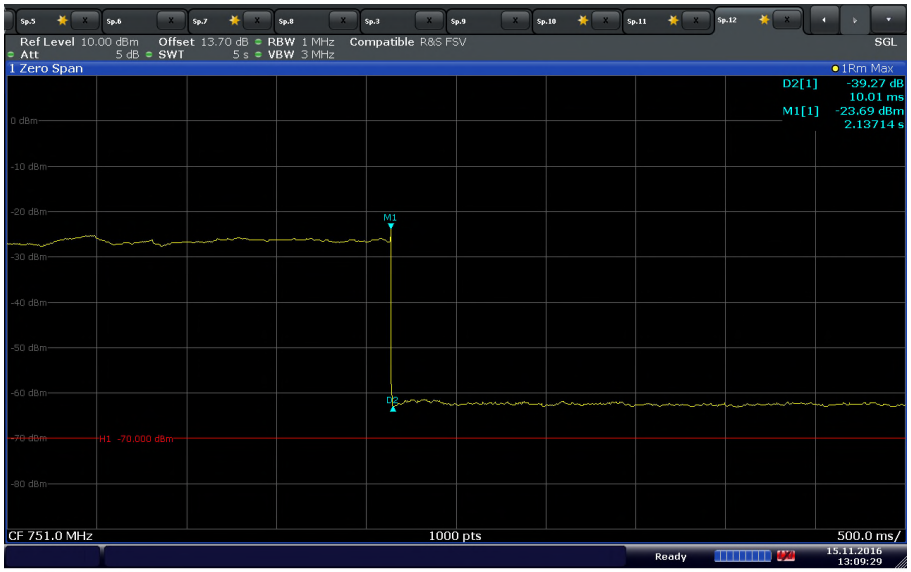
2.9.8 Test Results Summary

Normal Mode				
Band	**Frequency (MHz)**	**Mitigation Time (Sec)**	**Limit (Sec)**	**Margin (Sec)**
Band 13 Downlink	751	0.010	0.3	-0.290
Band 13 Uplink	782	0.014	0.3	-0.286

Test Mode				
Band	**Frequency (MHz)**	**Re-Try Event**	**Limit Event**	**Margin (dB)**
Band 13 Downlink	751	0	5	-5
Band 13 Uplink	782	0	5	-5

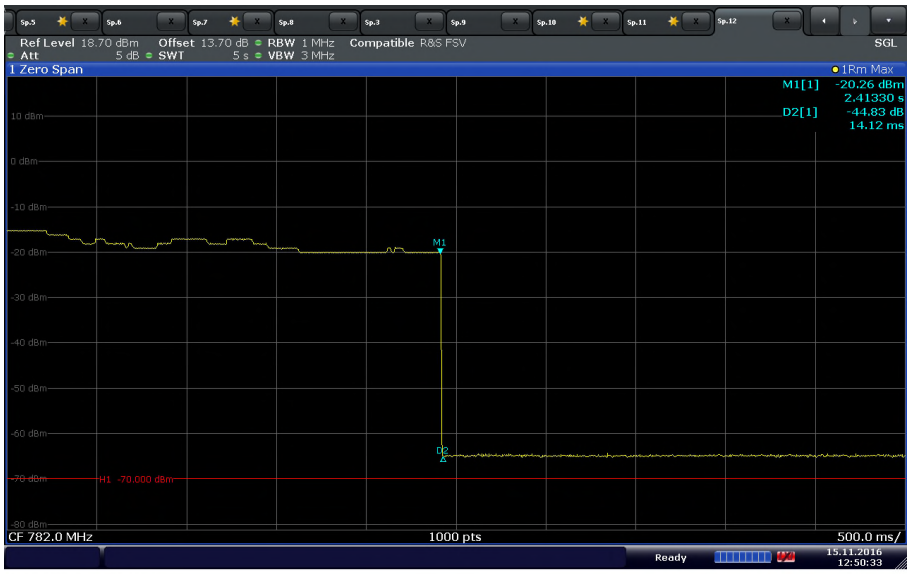
2.9.9 Test Plots

LTE Band 13 Downlink 5MHz Bandwidth Mid Channel - Mitigation Event



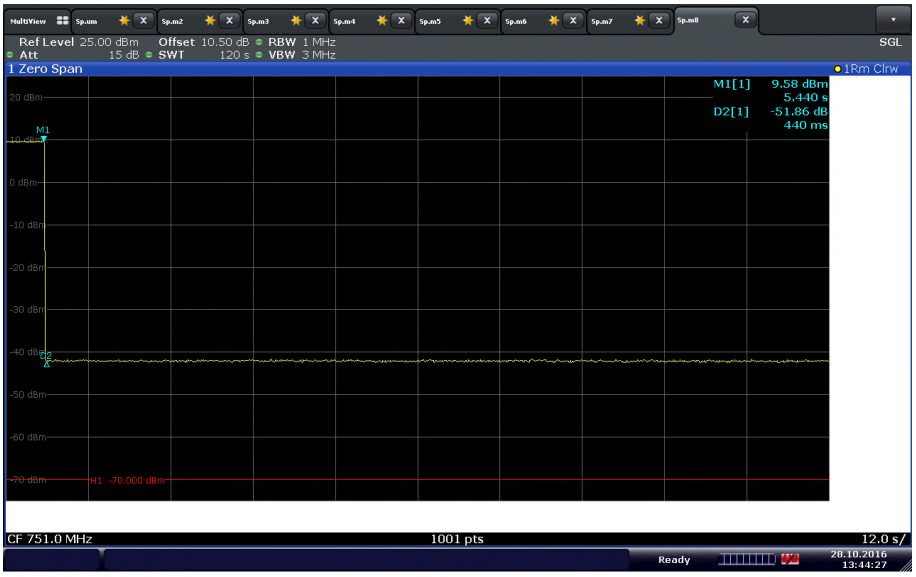
Date: 15.NOV.2016 13:09:29

LTE Band 13 Uplink 5MHz Bandwidth Mid Channel - Mitigation Time



Date: 15.NOV.2016 12:50:33

LTE Band 13 Downlink 5MHz Bandwidth Mid Channel – Retry Time



13:44:28 28.10.2016

LTE Band 13 Uplink 5MHz Bandwidth Mid Channel - – Retry Event

14:28:56 28.10.2016

2.10 OUT OF BAND GAIN LIMIT

2.10.1 Specification Reference

FCC 47 CFR Part 20. Clause 20.21(e)(9)(i)(E)
KDB935210 D04, Clause 7.14

2.10.2 Standard Applicable

FCC 47 CFR Part 20. Clause 20.21(e)(9)(i)(E) Out of Band Gain Limits.:
(1) A frequency selective booster shall have the following minimum attenuation referenced to the gain in the center of the pass band of the booster:
(i) -20 dB at the band edge, where band edge is the end of the licensee's allocated spectrum,
(ii) -30 dB at 1 MHz offset from band edge,
(iii) -40 dB at 5 MHz offset from band edge.
(2) A frequency selective booster having maximum gain greater than 80 dB (referenced to the center of the pass band) shall limit the out of band gain to 60 dB at 0.2 MHz offset from the band edge, and 45 dB at 1 MHz offset from the band edge, where band edge is the end of the licensee's allocated spectrum.

2.10.3 Equipment Under Test and Modification State

Serial No: 930629000238 (NU) and 920629000031 (CU) / Test Configuration A and B

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

October 26, 2016 /XYZ

2.10.5 Test Equipment Used

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

2.10.6 Environmental Conditions/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	25.6°C
Relative Humidity	49.1 %
ATM Pressure	99.3 kPa

2.10.7 Additional Observations

1) This is conducted Test. Test procedure is per Section 7.14 of KDB935210 (D04 Provider Specific Booster Measurements v01r01). Appropriate offset (line losses) applied.
2) The EUT operated in Test Mode with the gain manually set to the maximum gain and a minimum bandwidth setting (5MHz).
3) Setup the EUT according to Figure 2 or 3 of Section 6.3.3 of KDB935210 (D04 Provider Specific Booster Measurements v01r01) as appropriate.
4) Evaluations are conducted at CU and NU antenna ports B13.
5) Operational uplink and downlink bands for LTE Band 13 were tested.
6) The signal generator was set to transmit a CW signal with output power level set to that as determined in clause 7.1.2 of KDB935210 (D04 Provider Specific Booster Measurements v01r01).

2.10.8 Test Results

Out of Band Gain Limit Band 13 Downlink (746 – 756MHz)				
Offset (MHz)	**Input Power (dBm)**	**Output Power (dBm)**	**Gain (dB)**	**Gain Limit (dB)**
Centre Frequency	-82.97	10.28	93.25	-
0 (Low Band Edge)	-82.94	-52.52	30.42	73.25
-0.2	-82.95	-53.50	29.45	60
-1	-82.99	-55.95	27.04	45
-5	-82.67	-66.24	16.43	53.25
0 (High Band Edge)	-82.75	-57.58	25.17	73.25
+0.2	-82.69	-55.91	26.78	60
+1	-82.97	-60.16	22.81	45
+5	-83.0	-68.49	14.51	53.25

Out of Band Gain Limit Band 13 Uplink (777 – 787MHz)				
Offset (MHz)	**Input Power (dBm)**	**Output Power (dBm)**	**Gain (dB)**	**Gain Limit (dB)**
Centre Frequency	-77.34	-1.29	76.05	-
0 (Low Band Edge)	-77.26	-65.89	11.37	56.05
-0.2	-77.20	-67.46	9.74	60
-1	-77.19	-71.09	6.1	45
-5	-77.16	-73.04	4.12	36.05
0 (High Band Edge)	-77.0	-65.12	11.88	56.05
+0.2	-77.24	-65.10	12.14	60
+1	-77.11	-67.57	9.54	45
+5	-77.0	-73.38	3.62	36.05

2.10.9 Test Setup Photo

The same as section 2.1.9.

SECTION 3

TEST EQUIPMENT USED

3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

ID Number (SDGE/SDRB)	Test Equipment	Type	Serial Number	Manufacturer	Cal Date	Cal Due Date
Antenna Conducted Port Setup						
7604	P-Series Power Meter	N1912A	SG45100273	Agilent	07/27/16	07/27/17
7605	50MHz-18GHz Wideband Power Sensor	N1921A	MY51100054	Agilent	04/19/16	04/19/17
7611	Signal/Spectrum Analyzer	FSW26	102017	Rhode & Schwarz	06/29/16	06/29/17
7608	Vector Signal Generator	SMBV100A	259021	Rhode & Schwarz	09/02/16	09/02/17
7562	Wideband Radio Communication Tester	CMW 500	1201.0002k50 /103829	Rhode & Schwarz	For Signal Only	
-	10dB Step Attenuator	-	-	RF Powre	Verified by 7604 and 7608	
-	90 dB Step Attenuator	-	-	RF Power	Verified by 7604 and 7608	
8825	20dB Attenuator	46-20-34	BK5773	Weinschel Corp.	Verified by 7604 and 7608	
-	10dB Attenuator	PE7010-10	-	Pasternack	Verified by 7604 and 7608	
Miscellaneous						
6792	Multimeter	3478A	2911A70964	Hewlett Packard	08/29/16	08/29/17
11312	Mini Environmental Quality Meter	850027	CF099-56010-340	Sper Scientific	08/22/16	08/22/17

3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:

3.2.1 Conducted Antenna Port Measurement

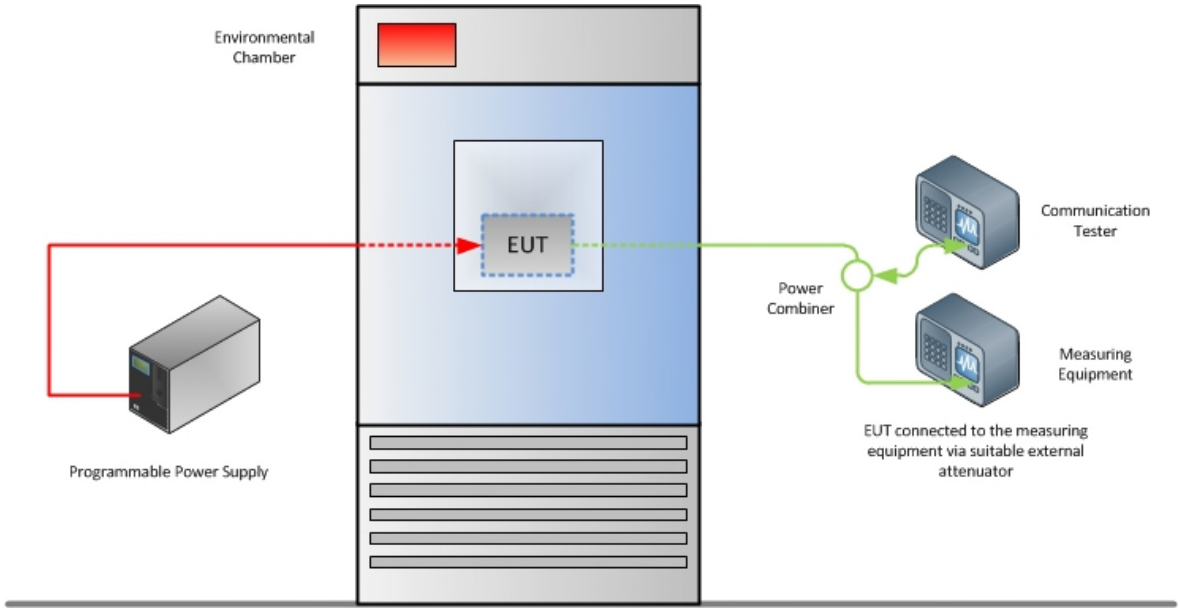
	Contribution	Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	Receiver/Spectrum Analyzer	Rectangular	0.57	0.33	0.11
2	Cables	Rectangular	0.50	0.29	0.08
3	EUT Setup	Rectangular	1.00	0.58	0.33
				Combined Uncertainty (u_c):	0.72
				Coverage Factor (k):	2
				Expanded Uncertainty:	1.45

SECTION 4

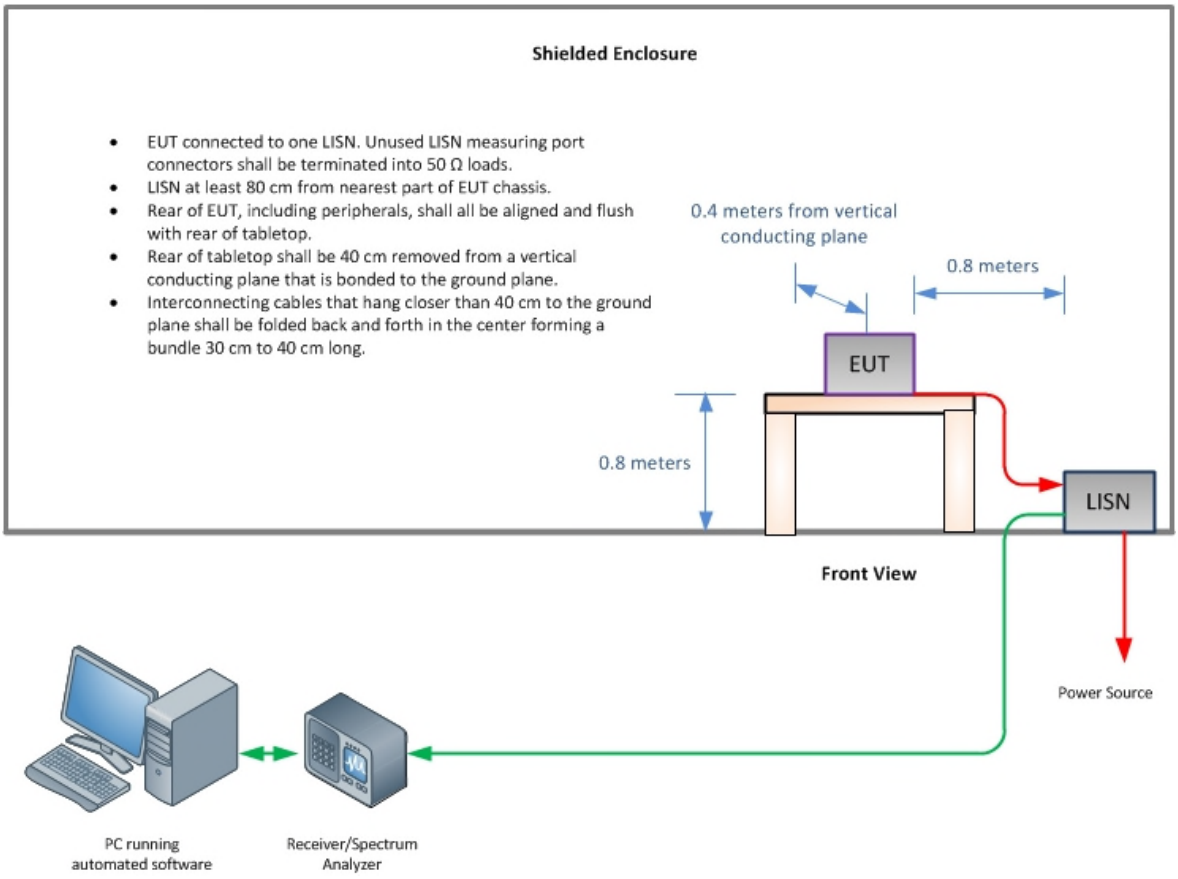
DIAGRAM OF TEST SETUP

4.1 TEST SETUP DIAGRAM

Notes: All tests were done on the bench (conducted). Please refer to Section 1.4.4 of this test report for more details.



Frequency Stability Test Comfiguration



Conducted Emissions Test Configuration (if applicable)

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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