

TEST REPORT FROM RFI GLOBAL SERVICES LTD



Test of: D-MINI-2108-2019

FCC ID: NEO-DMINI21082019

To: FCC Parts 2.1046; 2.1049; 22.913(a); 22.917; 24.232; 24.238 & 15.107
3GPP TS 36.143 V10.3.0

Test Report Serial No.:
RFI-RPT-RP87376JD01A V4.0

Version 4.0 Supersedes All Previous Versions

This Test Report Is Issued Under The Authority Of John Newell, Group Quality Manager:		
Checked By:	Ian Watch	
Signature:		
Date of Issue:	05 November 2012	

This report is issued in Adobe Acrobat portable document format (PDF). It is only a valid copy of the report if it is being viewed in PDF format with the following security options not allowed: Changing the document, Selecting text and graphics, Adding or changing notes and form fields.

This report may not be reproduced other than in full, except with the prior written approval of RFI Global Services Ltd. The results in this report apply only to the sample(s) tested.

RFI Global Services Ltd

Pavilion A, Ashwood Park, Ashwood Way, Basingstoke, Hampshire RG23 8BG
Telephone: +44 (0)1256 312000 Facsimile: +44 (0)1256 312001
Email: info@rfi-global.com Website: www.rfi-global.com

Registered in England and Wales. Company number:2117901

This page has been left intentionally blank.

Table of Contents

1. Customer Information	4
2. Summary of Testing	5
2.1. General Information	5
2.2. Summary of Test Results	6
2.3. Methods and Procedures	7
2.4. Deviations from the Test Specification	7
3. Equipment Under Test (EUT)	8
3.1. Identification of Equipment Under Test (EUT)	8
3.2. Description of EUT	8
3.3. Modifications Incorporated in the EUT	8
3.4. Additional Information Related to Testing	9
3.5. Support Equipment	13
4. Operation and Monitoring of the EUT during Testing	14
4.1. Operating Modes	14
4.2. Configuration and Peripherals	14
5. Measurements, Examinations and Derived Results	15
5.1. General Comments	15
5.2. Test Results Part 22	16
5.2.1. AC Conducted Spurious Emissions	16
5.2.2. Transmitter Conducted Output Power	20
5.2.3. Transmitter Frequency Stability (Temperature Variation)	25
5.2.4. Transmitter Frequency Stability (Voltage Variation)	26
5.2.5. Transmitter Occupied Bandwidth	27
5.2.6. Transmitter Conducted Emissions	40
5.2.7. Transmitter Out of Band Radiated Emissions	43
5.2.8. Transmitter Band Edge Conducted Emissions	50
5.3. Test Results Part 24	83
5.3.1. AC Conducted Spurious Emissions	83
5.3.2. Transmitter Conducted Output Power	86
5.3.3. Transmitter Frequency Stability (Temperature Variation)	93
5.3.4. Transmitter Frequency Stability (Voltage Variation)	94
5.3.5. Transmitter Occupied Bandwidth	95
5.3.6. Transmitter Conducted Emissions	113
5.3.7. Transmitter Out of Band Radiated Emissions	116
5.3.8. Transmitter Band Edge Conducted Emissions	123
5.4. Test Results: 3GPP TS 36.143 V10.3.0 Clause 11	168
5.4.1. Input Intermodulation	168
6. Measurement Uncertainty	171
Appendix 1. Test Equipment Used	172

1. Customer Information


















Company Name:	Axell Wireless
Address:	Aerial House Asheridge Road Chesham Buckinghamshire HP5 2QD United Kingdom

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR22
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 22.913(a), Part 22.917 Subpart H (Public Mobile Services)
Specification Reference:	47CFR24
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 24.232, Part 24.238 Subpart E (Personal Communication Services)
Specification Reference:	47CFR15.107
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 15 Subpart B (Unintentional Radiators) - Sections 15.107
Site Registration:	FCC: 209735
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH
Test Dates:	21 May 2012 to 01 November 2012

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 22		
15.107(a)	AC Conducted Spurious Emissions	
Part 2.1046(a)/22.913(a)	Transmitter Conducted Output Power	
Part 2.1049	Transmitter Occupied Bandwidth	
Part 2.1051/22.917	Transmitter Conducted Emissions	
Part 2.1053/22.917	Transmitter Out of Band Radiated Emissions	
Part 2.1051/22.917	Transmitter Band Edge Conducted Emissions	
Part 2.1055/22.355	Transmitter Frequency Stability (Temperature and Voltage Variation)	
Part 24		
15.107(a)	AC Conducted Spurious Emissions	
Part 2.1046(a)/24.232	Transmitter Conducted Output Power	
Part 2.1049	Transmitter Occupied Bandwidth	
Part 2.1051/24.238	Transmitter Conducted Emissions	
Part 2.1053/24.238	Transmitter Out of Band Radiated Emissions	
Part 2.1051/24.238	Transmitter Band Edge Conducted Emissions	
Part 2.1055/24.235	Transmitter Frequency Stability (Temperature and Voltage Variation)	
3GPP Reference (TS 36.143 V10.3.0)		
Measurement		
Clause 11	Input Intermodulation	
Key to Results		
 = Complied  = Did not comply		

2.3. Methods and Procedures

Reference:	ANSI/TIA-603-C-2004
Title:	Land Mobile Communications Equipment, Measurements and performance Standards
Reference:	ANSI C63.4 (2009)
Title:	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
Reference:	3GPP TS 36.143 V10.3.0 (2012-03)
Title:	3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); FDD repeater conformance testing (Release 10)
Reference:	FCC KDB 971168
Title:	Procedures for Compliance Measurement of the Fundamental Emission Power of Licensed Wideband (> 1 MHz) Digital Transmission Systems
Reference:	FCC KDB 935210
Title:	Amplifier, Booster, and Repeater – Basic Items
Reference Date:	11 October 2012
Title:	FCC Response to Enquiry 792557

2.4. Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	D-MINI-2108-2019
Model Name or Number:	400AC41000
Serial Number:	11120002
Hardware Version Number:	4.5.7.4.A
Software Version Number:	B010007.AAEE0009.4020000.0
FCC ID:	NEO-DMINI21082019

3.2. Description of EUT

The equipment under test was a DIGI mini repeater that provides additional cellular coverage for GSM, CDMA, WCDMA and LTE. It has 73 dB of gain for both uplink and downlink.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Type of Radio Device:	Cellular Base Station Repeater		
Power Supply Requirement(s):	Nominal	120 VAC 60 Hz	
Technology Tested:	GSM850		
Channel Spacing:	200 kHz		
Uplink Frequency Range:	824 to 849 MHz		
Uplink Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	128	824.2
	Middle	190	836.6
	Top	251	848.8
Downlink Frequency Range:	869 to 894 MHz		
Downlink Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	128	869.2
	Middle	190	881.6
	Top	251	893.8
Technology Tested:	PCS1900		
Channel Spacing:	200 kHz		
Uplink Frequency Range:	1850 to 1910 MHz		
Uplink Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	512	1850.2
	Middle	660	1880.0
	Top	810	1909.8
Downlink Frequency Range:	1930 to 1990 MHz		
Downlink Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	512	1930.2
	Middle	660	1960.0
	Top	810	1989.8

Additional Information Related to Testing (continued)

Technology Tested:	CDMA Cellular Band		
Channel Spacing:	1.25 MHz		
Uplink Frequency Range:	824 to 849 MHz		
Uplink Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	1013	824.70
	Middle	384	836.51
	Top	777	848.31
Downlink Frequency Range:	869 to 894 MHz		
Downlink Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	1013	869.70
	Middle	384	881.51
	Top	777	893.31
Technology Tested:	CDMA PCS Band		
Channel Spacing:	1.25 MHz		
Uplink Frequency Range:	1850 to 1910 MHz		
Uplink Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	25	1851.25
	Middle	600	1880.00
	Top	1175	1908.75
Downlink Frequency Range:	1930 to 1990 MHz		
Downlink Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	25	1931.25
	Middle	600	1960.00
	Top	1175	1988.75

Additional Information Related to Testing (continued)

Technology Tested:	WCDMA Band V		
Channel Spacing:	5 MHz		
Uplink Frequency Range:	824 to 849 MHz		
Uplink Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	4132	826.4
	Middle	4183	836.6
	Top	4233	846.6
Downlink Frequency Range:	869 to 894 MHz		
Downlink Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	4357	871.4
	Middle	4407	881.6
	Top	4458	891.6
Technology Tested:	WCDMA Band II		
Channel Spacing:	5 MHz		
Uplink Frequency Range:	1850 to 1910 MHz		
Uplink Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	9262	1852.4
	Middle	9400	1880.0
	Top	9538	1907.6
Downlink Frequency Range:	1930 to 1990 MHz		
Downlink Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	9662	1932.4
	Middle	9800	1960.0
	Top	9938	1987.6

Additional Information Related to Testing (continued)

Technology Tested:	LTE Band V			
Channel Spacing:	1.4, 3.0, 5.0, 10.0 MHz			
Uplink Frequency Range:	824 to 849 MHz			
Uplink Channels Tested:	Channel Bandwidth (MHz)	Channel Frequency (MHz)		
		Bottom	Middle	Top
	1.4	824.7	836.5	848.3
	3.0	825.5	836.5	847.5
	5.0	826.5	836.5	846.5
10.0	829.0	836.5	844.0	
Downlink Frequency Range:	869 to 894 MHz			
Downlink Channels Tested:	Channel Bandwidth (MHz)	Channel Frequency (MHz)		
		Bottom	Middle	Top
	1.4	869.7	881.5	893.3
	3.0	870.5	881.5	892.5
	5.0	871.5	881.5	891.5
10.0	874.0	881.5	889.0	

Additional Information Related to Testing (continued)

Technology Tested:	LTE Band II			
Channel Spacing:	1.4, 3.0, 5.0, 10.0, 15.0, 20.0 MHz			
Uplink Frequency Range:	1850 to 1910 MHz			
Uplink Channels Tested:	Channel Bandwidth (MHz)	Channel Frequency (MHz)		
		Bottom	Middle	Top
	1.4	1850.7	1880.0	1909.3
	3.0	1851.5	1880.0	1908.5
	5.0	1852.5	1880.0	1907.5
	10.0	1855.0	1880.0	1905.0
	15.0	1857.5	1880.0	1902.5
20.0	1860.0	1880.0	1900.0	
Downlink Frequency Range:	1930 to 1990 MHz			
Downlink Channels Tested:	Channel Bandwidth (MHz)	Channel Frequency (MHz)		
		Bottom	Middle	Top
	1.4	1930.7	1960.0	1989.3
	3.0	1931.5	1960.0	1988.5
	5.0	1932.5	1960.0	1987.5
	10.0	1935.0	1960.0	1985.0
	15.0	1937.5	1960.0	1982.5
20.0	1940.0	1960.0	1980.0	

3.5. Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	Switch Mode Power Supply
Brand Name:	MEAN WELL
Model Name or Number:	GS90A12
Serial Number:	EB17223692

Description:	Laptop PC
Brand Name:	Dell D610
Model Name or Number:	PC480NT
Serial Number:	CN-0C4708-48643-625-3186
Software Version Number:	Windows XP

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

The EUT was tested in the following operating mode(s):

- The Customer declared that the EUT would be constantly transmitting in its' normal operational environment and therefore there is no receive/idle mode.
- Downlink and Uplink transmitting at power levels as specified in each test case.

4.2. Configuration and Peripherals

The EUT was tested in the following configuration(s):

- The EUT was powered throughout testing by a 120 VAC 60 Hz switched mode power supply.
- A laptop PC was connected through Ethernet to the EUT for monitoring purposes and to set the correct filter configuration as per each test case.
- The EUT was operating at maximum gain throughout testing.
- When testing different channels, the corresponding filter was activated using the laptop PC.
- For Uplink, the input signal was fed into the mobile port on the repeater and the base port connected to a spectrum analyser.
- For Downlink, the input signal was fed into the base port on the repeater and the mobile port connected to a spectrum analyser.
- Radiated spurious emissions and AC conducted emissions: the output port (either mobile or base depending on the direction) was terminated with a 50 Ω load.
- Radiated spurious emissions and AC conducted emissions: all unused ports were terminated with loads or were connected to a suitable peripheral device, e.g. a laptop computer.

5. Measurements, Examinations and Derived Results

5.1. General Comments

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to *Section 6. Measurement Uncertainty* for details.

5.2. Test Results Part 22**5.2.1. AC Conducted Spurious Emissions****Test Summary:**

Test Engineer:	Patrick Jones	Test Date:	25 June 2012
Test Sample Serial Number:	11120002		

FCC Reference:	Part 15.107(a)
Test Method Used:	As detailed in ANSI C63.4 Section 7

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	42

Note(s):

1. For the duration of this test all ports on the EUT were terminated with suitable 50 Ω loads or connected to a laptop computer providing suitable termination e.g. Ethernet port.
2. No RF signal was input into the EUT for this test.

Results: Live / Quasi Peak

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.199500	Live	52.9	63.6	10.7	Complied
0.199500	Live	53.1	63.6	10.5	Complied
3.592500	Live	45.2	56.0	10.8	Complied
4.992000	Live	50.5	56.0	5.5	Complied
5.982000	Live	53.8	60.0	6.2	Complied
6.454500	Live	53.7	60.0	6.3	Complied
17.632500	Live	43.8	60.0	16.2	Complied
17.965500	Live	44.7	60.0	15.3	Complied

AC Conducted Spurious Emissions (continued)**Results: Live / Average**

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.199500	Live	51.8	53.6	1.8	Complied
0.334500	Live	47.8	49.3	1.5	Complied
3.637500	Live	37.9	46.0	8.1	Complied
5.023500	Live	44.2	50.0	5.8	Complied
6.306000	Live	47.0	50.0	3.0	Complied
17.610000	Live	38.9	50.0	11.1	Complied
18.033000	Live	38.8	50.0	11.2	Complied

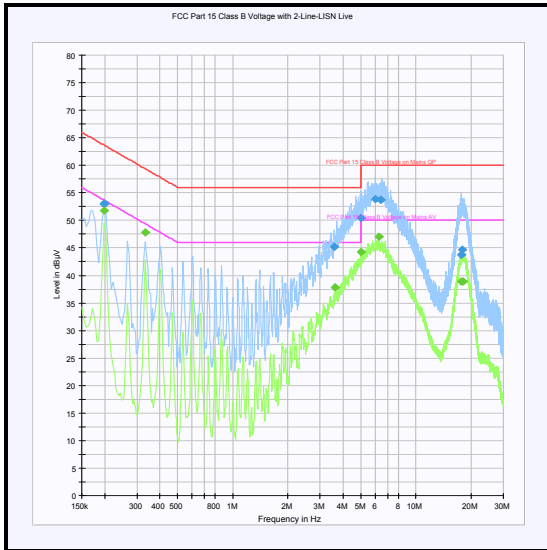
AC Conducted Spurious Emissions (continued)**Results: Neutral / Quasi Peak**

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
1.401	Neutral	40.8	56.0	15.2	Complied
1.599	Neutral	39.8	56.0	16.2	Complied
1.671	Neutral	40.5	56.0	15.5	Complied
1.869	Neutral	39.9	56.0	16.1	Complied
1.941	Neutral	38.6	56.0	17.4	Complied
3.426	Neutral	39.2	56.0	16.8	Complied
4.969	Neutral	42.0	56.0	14.0	Complied
10.194	Neutral	53.5	60.0	6.5	Complied
10.756	Neutral	53.4	60.0	6.6	Complied
18.933	Neutral	40.0	60.0	20.0	Complied

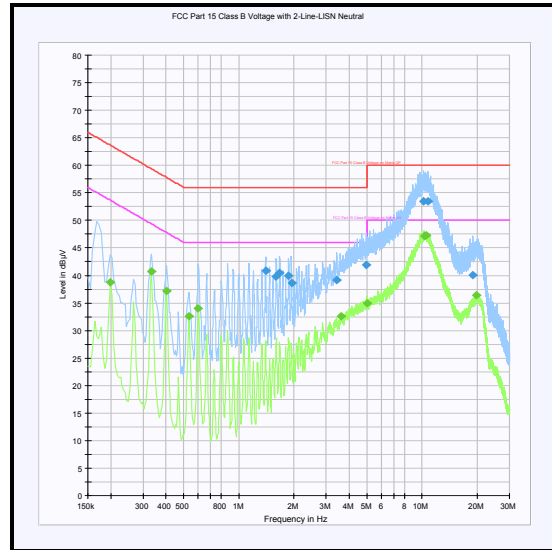
Results: Neutral / Average

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.199	Neutral	38.7	53.6	14.9	Complied
0.334	Neutral	40.7	49.3	8.6	Complied
0.402	Neutral	37.2	47.8	10.6	Complied
0.532	Neutral	32.5	46.0	13.5	Complied
0.600	Neutral	34.0	46.0	12.0	Complied
3.610	Neutral	32.6	46.0	13.4	Complied
5.014	Neutral	35.0	50.0	15.0	Complied
10.266	Neutral	47.2	50.0	2.8	Complied
10.509	Neutral	47.3	50.0	2.7	Complied
19.824	Neutral	36.4	50.0	13.6	Complied

AC Conducted Spurious Emissions (continued)



Live



Neutral

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

5.2.2. Transmitter Conducted Output Power**Test Summary:**

Test Engineer:	Patrick Jones	Test Dates:	22 June 2012 to 30 July 2012
Test Sample Serial Number:	11120002		

FCC Reference:	Part 2.1046(a) & 22.913(a)
Test Method Used:	referencing FCC CFR Part 2.1046(a)

Environmental Conditions:

Temperature (°C):	21 & 26
Relative Humidity (%):	48 & 50

Note(s):

1. The output port of the EUT was connected directly to a spectrum analyser via suitable attenuation. The cable and attenuator was calibrated prior to use and the loss incorporated into the measurement as an RF level offset.
2. The channel power function of the spectrum analyser was used with an average detector. The channel bandwidth was set accordingly for each modulation scheme e.g. WCDMA has a 5 MHz bandwidth.
3. For each channel tested, a corresponding filter was activated using the EUT's Graphical User Interface on a laptop PC.
4. In order to measure the maximum gain, the input signal was increased in steps of 1 dB from -60 dBm to find the minimum input level at which maximum output power is achieved for that modulation scheme. For each case the input level is recorded.
5. For each channel and modulation scheme, the input signal was increased by 10 dB and the power was re-measured. In each case, this did not increase the output power; therefore, the worst case was recorded.

Transmitter Conducted Output Power (continued)**Results: GSM GMSK / Uplink**

Channel	Frequency (MHz)	Input Power (dBm)	Conducted Output Power (dBm)	Amplifier Gain (dB)
Bottom	824.2	-52.0	21.5	73.5
Middle	836.6	-52.0	21.9	73.9
Top	848.8	-52.0	21.2	73.2

Results: GSM 8-PSK / Uplink

Channel	Frequency (MHz)	Input Power (dBm)	Conducted Output Power (dBm)	Amplifier Gain (dB)
Bottom	824.2	-52.0	21.5	73.5
Middle	836.6	-52.0	21.7	73.7
Top	848.8	-52.0	21.0	73.0

Results: CDMA / Uplink

Channel	Frequency (MHz)	Input Power (dBm)	Conducted Output Power (dBm)	Amplifier Gain (dB)
Bottom	824.70	-52.0	19.4	71.4
Middle	836.51	-52.0	20.5	72.5
Top	848.31	-52.0	19.8	71.8

Results: WCDMA / Uplink

Channel	Frequency (MHz)	Input Power (dBm)	Conducted Output Power (dBm)	Amplifier Gain (dB)
Bottom	826.4	-52.0	19.3	71.3
Middle	836.6	-52.0	20.0	72.0
Top	846.6	-52.0	19.8	71.8

Transmitter Conducted Output Power (continued)**Results: LTE / Uplink**

Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Input Power (dBm)	Conducted Output Power (dBm)	Amplifier Gain (dB)
QPSK	1.4	Bottom	824.7	-52.0	20.3	72.3
		Middle	836.5	-52.0	20.2	72.2
		Top	848.3	-52.0	19.6	71.6
	3.0	Bottom	825.5	-52.0	20.3	72.3
		Middle	836.5	-52.0	20.1	72.1
		Top	847.5	-52.0	19.7	71.7
	5.0	Bottom	826.5	-52.0	20.1	72.1
		Middle	836.5	-52.0	20.1	72.1
		Top	846.5	-52.0	19.5	71.5
	10.0	Bottom	829.0	-52.0	20.6	72.6
		Middle	836.5	-52.0	20.2	72.2
		Top	844.0	-52.0	20.7	72.7
16QAM	1.4	Bottom	824.7	-52.0	20.3	72.3
		Middle	836.5	-52.0	20.3	72.3
		Top	848.3	-52.0	19.8	71.8
	3.0	Bottom	825.5	-52.0	20.2	72.2
		Middle	836.5	-52.0	20.2	72.2
		Top	847.5	-52.0	19.7	71.7
	5.0	Bottom	826.5	-52.0	20.1	72.1
		Middle	836.5	-52.0	20.1	72.1
		Top	846.5	-52.0	19.6	71.6
	10.0	Bottom	829.0	-52.0	20.6	72.6
		Middle	836.5	-52.0	20.3	72.3
		Top	844.0	-52.0	20.6	72.6
64QAM	1.4	Bottom	824.7	-52.0	20.2	72.2
		Middle	836.5	-52.0	20.4	72.4
		Top	848.3	-52.0	19.8	71.8
	3.0	Bottom	825.5	-52.0	20.1	72.1
		Middle	836.5	-52.0	20.3	72.3
		Top	847.5	-52.0	19.6	71.6
	5.0	Bottom	826.5	-52.0	20.1	72.1
		Middle	836.5	-52.0	19.2	71.2
		Top	846.5	-52.0	19.6	71.6
	10.0	Bottom	829.0	-52.0	20.5	72.5
		Middle	836.5	-52.0	20.3	72.3
		Top	844.0	-52.0	20.6	72.6

Transmitter Conducted Output Power (continued)**Results: GSM GMSK / Downlink**

Channel	Frequency (MHz)	Input Power (dBm)	Conducted Output Power (dBm)	Amplifier Gain (dB)
Bottom	869.2	-52.0	21.6	73.6
Middle	881.6	-52.0	21.7	73.7
Top	893.8	-52.0	21.2	73.2

Results: GSM 8-PSK / Downlink

Channel	Frequency (MHz)	Input Power (dBm)	Conducted Output Power (dBm)	Amplifier Gain (dB)
Bottom	869.2	-52.0	20.5	72.5
Middle	881.6	-52.0	20.6	72.6
Top	893.8	-52.0	21.4	73.4

Results: CDMA / Downlink

Channel	Frequency (MHz)	Input Power (dBm)	Conducted Output Power (dBm)	Amplifier Gain (dB)
Bottom	869.70	-52.0	20.6	72.6
Middle	881.51	-52.0	20.3	72.3
Top	893.31	-52.0	20.0	72.0

Results: WCDMA / Downlink

Channel	Frequency (MHz)	Input Power (dBm)	Conducted Output Power (dBm)	Amplifier Gain (dB)
Bottom	871.4	-52.0	20.0	72.0
Middle	881.6	-52.0	19.8	71.8
Top	891.6	-52.0	20.2	72.2

Transmitter Conducted Output Power (continued)**Results: LTE / Downlink**

Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Input Power (dBm)	Conducted Output Power (dBm)	Amplifier Gain (dB)
QPSK	1.4	Bottom	869.7	-52.0	20.1	72.1
		Middle	881.5	-52.0	20.8	72.8
		Top	893.3	-52.0	20.6	72.6
	3.0	Bottom	870.5	-52.0	19.6	71.6
		Middle	881.5	-52.0	19.9	71.9
		Top	892.5	-52.0	20.3	72.3
	5.0	Bottom	871.5	-52.0	19.5	71.5
		Middle	881.5	-52.0	20.0	72.0
		Top	891.5	-52.0	20.3	72.3
	10.0	Bottom	874.0	-52.0	19.4	71.4
		Middle	881.5	-52.0	19.9	71.9
		Top	889.0	-52.0	19.9	71.9
16QAM	1.4	Bottom	869.7	-52.0	19.7	71.7
		Middle	881.5	-52.0	20.2	72.2
		Top	893.3	-52.0	20.4	72.4
	3.0	Bottom	870.5	-52.0	19.7	71.7
		Middle	881.5	-52.0	20.0	72.0
		Top	892.5	-52.0	20.3	72.3
	5.0	Bottom	871.5	-52.0	19.7	71.7
		Middle	881.5	-52.0	20.0	72.0
		Top	891.5	-52.0	20.4	72.4
	10.0	Bottom	874.0	-52.0	19.5	71.5
		Middle	881.5	-52.0	20.1	72.1
		Top	889.0	-52.0	20.4	72.4
64QAM	1.4	Bottom	869.7	-52.0	19.7	71.7
		Middle	881.5	-52.0	20.2	72.2
		Top	893.3	-52.0	20.3	72.3
	3.0	Bottom	870.5	-52.0	19.6	71.6
		Middle	881.5	-52.0	19.8	71.8
		Top	892.5	-52.0	20.4	72.4
	5.0	Bottom	871.5	-52.0	19.7	71.7
		Middle	881.5	-52.0	19.9	71.9
		Top	891.5	-52.0	20.2	72.2
	10.0	Bottom	874.0	-52.0	19.5	71.5
		Middle	881.5	-52.0	20.0	72.0
		Top	889.0	-52.0	20.3	72.3

5.2.3. Transmitter Frequency Stability (Temperature Variation)**Test Summary:**

Test Engineer:	Nick Steele	Test Date:	07 August 2012
Test Sample Serial Number:	11120002		

FCC Part:	2.1055 & 22.355
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.2 referencing FCC CFR Part 2.1055

Environmental Conditions:

Ambient Temperature (°C):	25
Relative Humidity (%):	35

Results: Middle Channel (881.5 MHz)

Temperature (°C)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
-30	881.500000	0	0	1.5	1.5	Complied
-20	881.500000	0	0	1.5	1.5	Complied
-10	881.500000	0	0	1.5	1.5	Complied
0	881.500000	0	0	1.5	1.5	Complied
10	881.500000	0	0	1.5	1.5	Complied
20	881.500000	0	0	1.5	1.5	Complied
30	881.500000	0	0	1.5	1.5	Complied
40	881.500000	0	0	1.5	1.5	Complied
50	881.500000	0	0	1.5	1.5	Complied

Note(s):

1. A signal generator was set to produce a CW signal at maximum input level on the centre channel of the downlink pass band. The accuracy of the signal generator was verified by using the frequency count function of a calibrated spectrum analyser prior to performing any measurements. A calibrated Rohde & Schwarz ESU test receiver with the same measurement settings as the spectrum analyser was used to monitor the CW output of the EUT. To ensure the accuracy and stability of all measurements, the reference 10 MHz clock from the test receiver was utilized to provide a reference clock for the other test equipment. The signal generator, spectrum analyser and EUT RF connectors were connected using suitable RF cables and an RF power divider. The measured frequency of the signal generator at the EUT input was then compared to the measured frequency of the output of the EUT and the difference was recorded in the table above as Frequency Error in Hz and ppm. This was compared to the limit to obtain the margin.
2. Temperature was monitored throughout the test with a calibrated digital thermometer.
3. No difference in the frequencies measured at the input and outputs of the EUT were recorded. Therefore the EUT is compliant.

5.2.4. Transmitter Frequency Stability (Voltage Variation)**Test Summary:**

Test Engineer:	Nick Steele	Test Date:	07 August 2012
Test Sample IMEI:	11120002		

FCC Part:	2.1055 & 22.355
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.2 referencing FCC CFR Part 2.1055

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	35

Results: Middle Channel (881.5 MHz)

Supply Voltage (VAC)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)	Margin (ppm)	Result
102	881.500000	0	0	1.5	1.5	Complied
138	881.500000	0	0	1.5	1.5	Complied

Note(s):

1. A signal generator was set to produce a CW signal at maximum input level on the centre channel of the downlink pass band. The accuracy of the signal generator was verified by using the frequency count function of a calibrated spectrum analyser prior to performing any measurements. A calibrated Rohde & Schwarz ESU test receiver with the same measurement settings as the spectrum analyser was used to monitor the CW output of the EUT. To ensure the accuracy and stability of all measurements, the reference 10 MHz clock from the test receiver was utilized to provide a reference clock for the other test equipment. The signal generator, spectrum analyser and EUT RF connectors were connected using suitable RF cables and an RF power divider. The measured frequency of the signal generator at the EUT input was then compared to the measured frequency of the output of the EUT and the difference was recorded in the table above as Frequency Error in Hz and ppm. This was compared to the limit to obtain the margin.
2. Voltage was monitored throughout the test with a calibrated digital voltmeter.
3. No difference in the frequencies measured at the input and outputs of the EUT were recorded. Therefore the EUT is compliant.

5.2.5. Transmitter Occupied Bandwidth**Test Summary:**

Test Engineer:	Patrick Jones	Test Dates:	21 May 2012 to 10 August 2012
Test Sample Serial Number:	11120002		

FCC Reference:	Part 2.1049
Test Method Used:	As detailed in ANSI C63.4 Section 13.7 referencing FCC CFR Part 2.1049

Environmental Conditions:

Temperature (°C):	21 to 26
Relative Humidity (%):	47 to 61

Note(s):

1. The 99% occupied bandwidth was measured using the Occupied Bandwidth function of a spectrum analyser. A signal generator was connected to the repeater input and the output signal was measured using a spectrum analyser connected to the EUT via suitable RF cables and attenuators.
2. Plots of CDMA and 8-PSK input and output signals are shown at the beginning of the plots section to prove that the signal is not being degraded or altered in any way. There was no distortion of either output signal compared with the respective input signal. The input signal is from the signal generator. The output signal is the output from the EUT (input signal after it has been amplified).
3. For the duration of this test, the input signal to the EUT was set at a level which resulted in maximum rated output power. In all cases, the input signal was increased by 10 dB and re-measured. For each channel and modulation scheme tested, the occupied bandwidth was not altered.

Transmitter Occupied Bandwidth (continued)**Results: Uplink**

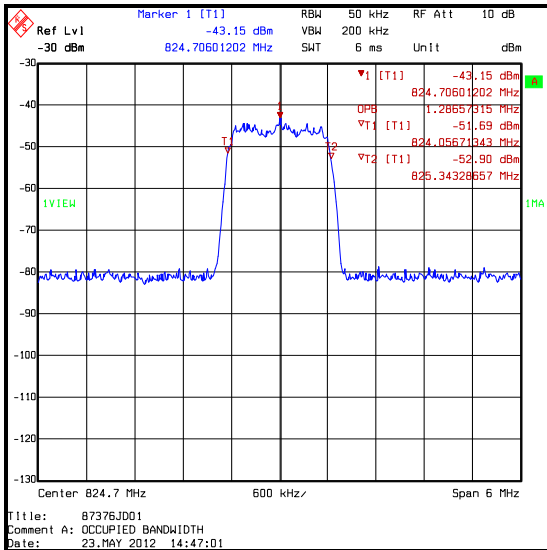
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
GSM GMSK	0.2	Middle	836.6	244.088
GSM 8-PSK	0.2	Middle	836.6	240.481
CDMA	1.25	Middle	836.51	1286.573
WCDMA	5.0	Middle	836.6	4058.116
LTE QPSK	1.4	Middle	836.5	1094.188
	3.0	Middle	836.5	2759.519
	5.0	Middle	836.5	4509.018
	10.0	Middle	836.5	9198.397
LTE 16QAM	1.4	Middle	836.5	1102.605
	3.0	Middle	836.5	2741.483
	5.0	Middle	836.5	4509.018
	10.0	Middle	836.5	9198.397
LTE 64QAM	1.4	Middle	836.5	1102.605
	3.0	Middle	836.5	2759.519
	5.0	Middle	836.5	4509.018
	10.0	Middle	836.5	9198.397

Transmitter Occupied Bandwidth (continued)**Results: Downlink**

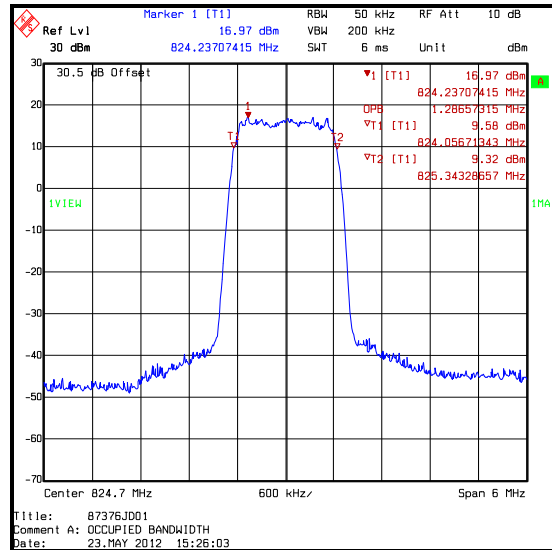
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
GSM GMSK	0.2	Middle	881.6	245.291
GSM 8-PSK	0.2	Middle	881.6	240.481
CDMA	1.25	Middle	881.51	1286.573
WCDMA	5.0	Middle	881.6	4088.176
LTE QPSK	1.4	Middle	881.5	1085.772
	3.0	Middle	881.5	2723.447
	5.0	Middle	881.5	4478.958
	10.0	Middle	881.5	9078.156
LTE 16QAM	1.4	Middle	881.5	1102.605
	3.0	Middle	881.5	2759.519
	5.0	Middle	881.5	4509.018
	10.0	Middle	881.5	9138.277
LTE 64QAM	1.4	Middle	881.5	1102.605
	3.0	Middle	881.5	2759.519
	5.0	Middle	881.5	4509.018
	10.0	Middle	881.5	9198.397

Transmitter Occupied Bandwidth (continued)

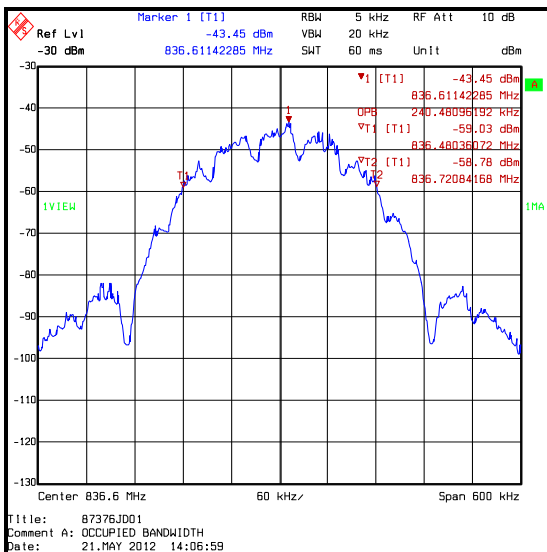
Results: Input Signal versus Output Signal examples



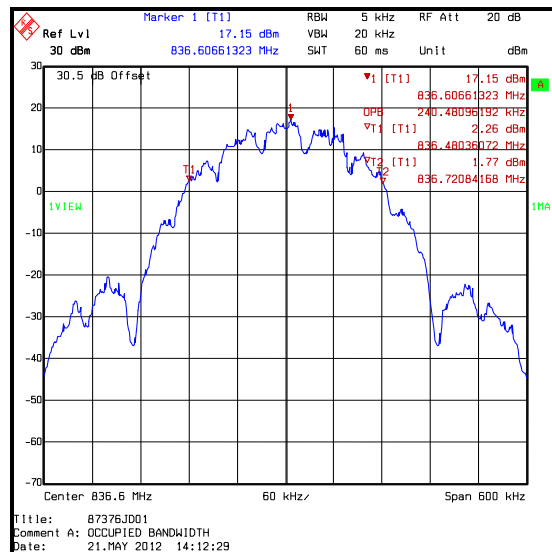
CDMA Input Signal



CDMA Output Signal



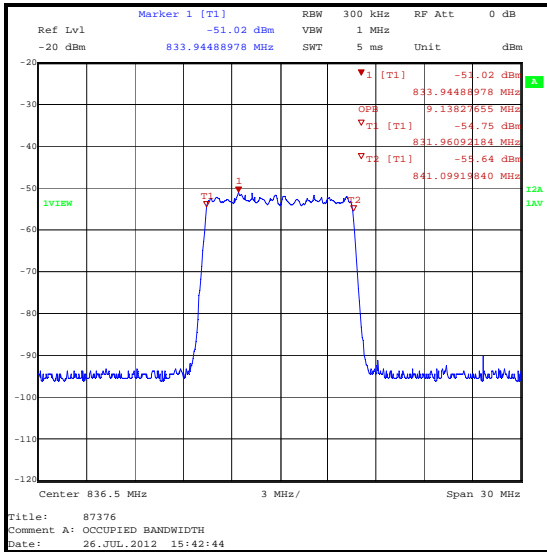
8-PSK Input Signal



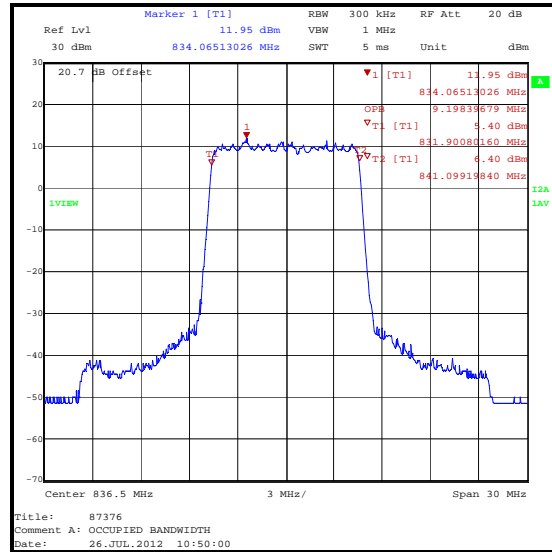
8-PSK Output Signal

Transmitter Occupied Bandwidth (continued)

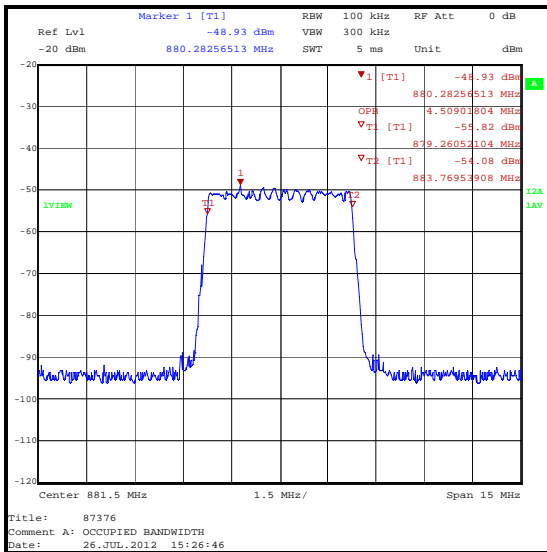
Results: Input Signal versus Output Signal examples



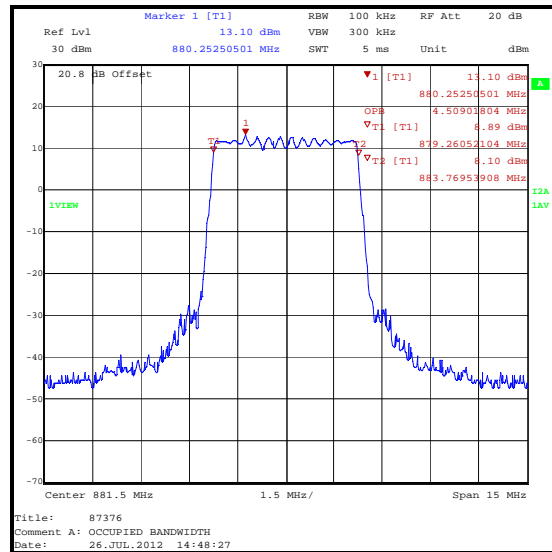
LTE 16QAM (10 MHz BW) Input Signal



LTE 16QAM (10 MHz BW) Output Signal



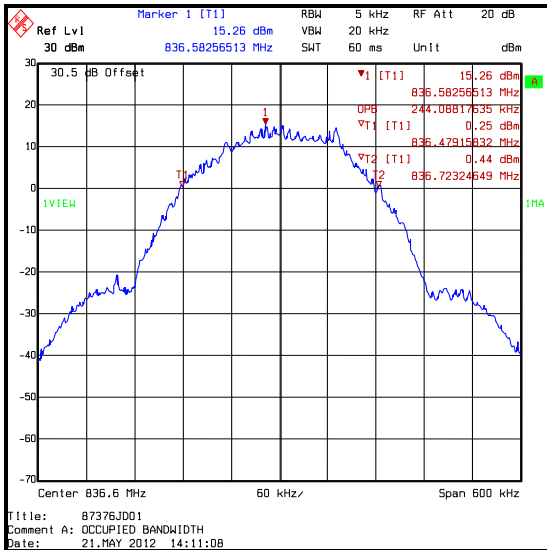
LTE 16QAM (5 MHz BW) Input Signal



LTE 16QAM (5 MHz BW) Output Signal

Transmitter Occupied Bandwidth (continued)

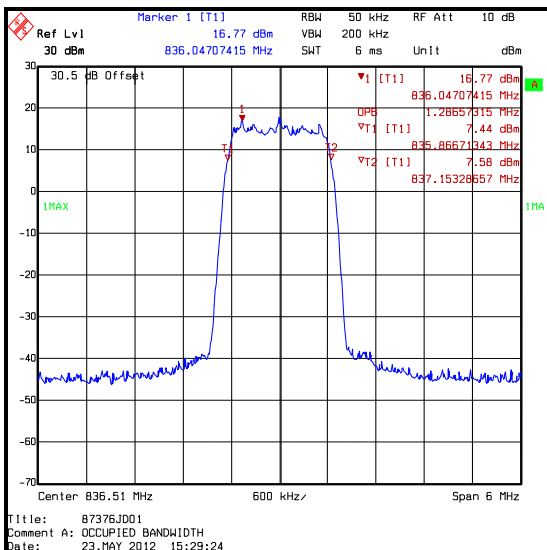
Results: Uplink



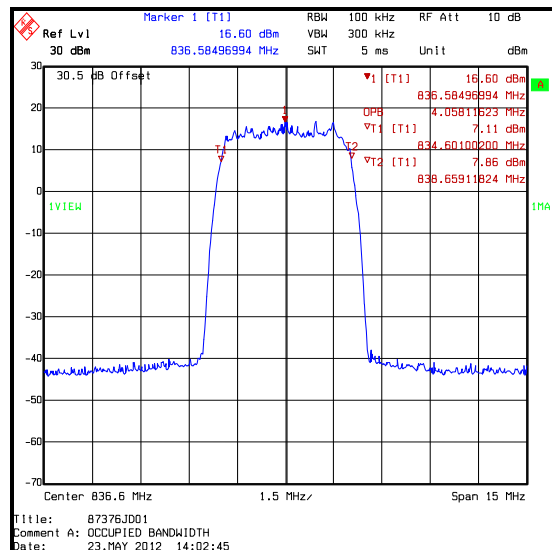
GSM GMSK



GSM 8-PSK



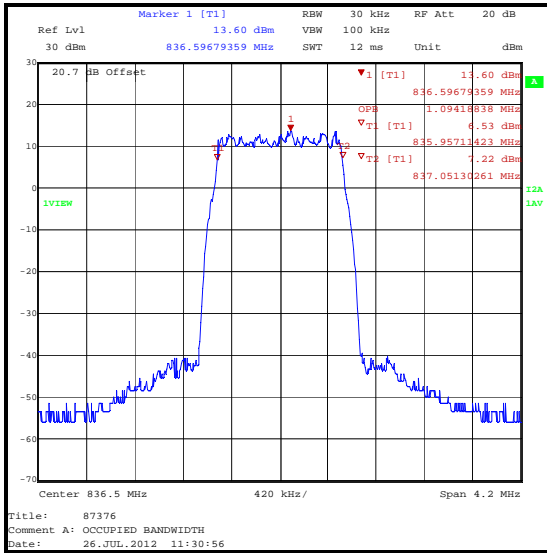
CDMA



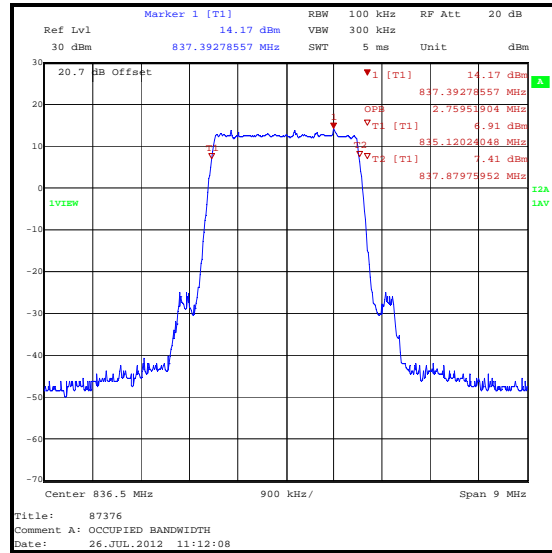
WCDMA

Transmitter Occupied Bandwidth (continued)

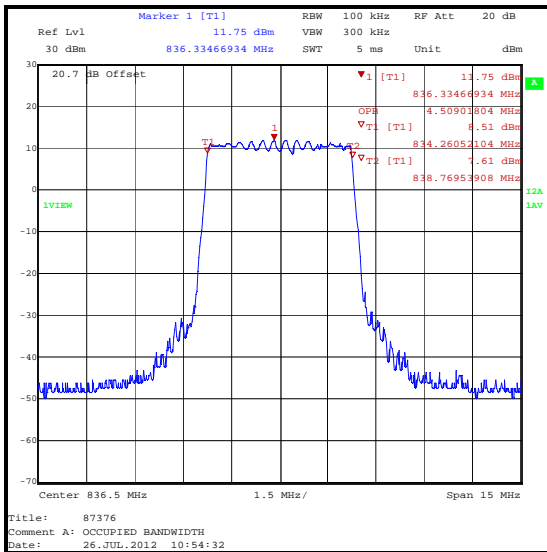
Results: LTE QPSK / Uplink



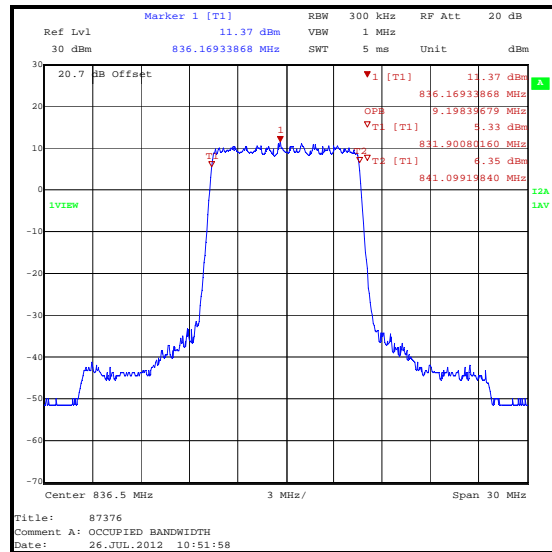
1.4 MHz Bandwidth



3 MHz Bandwidth



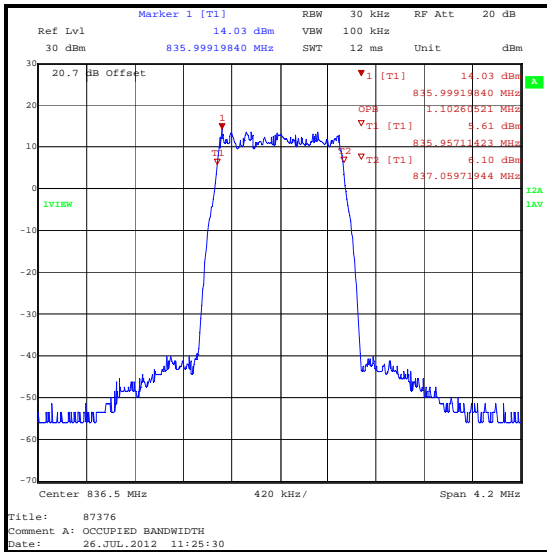
5 MHz Bandwidth



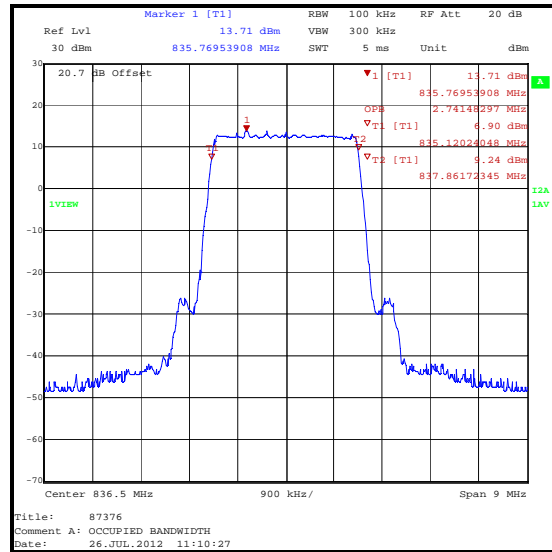
10 MHz Bandwidth

Transmitter Occupied Bandwidth (continued)

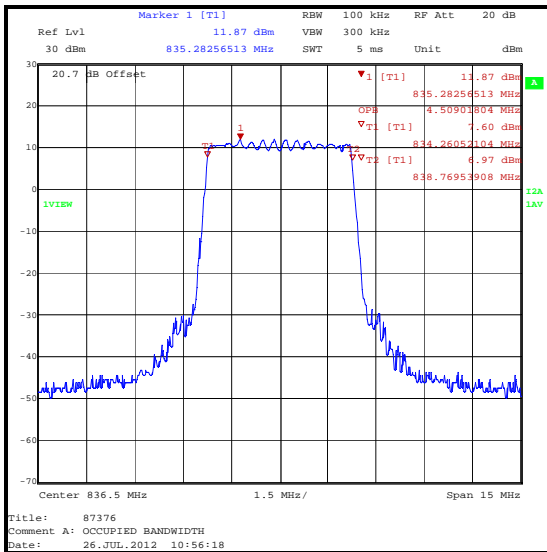
Results: LTE 16QAM / Uplink



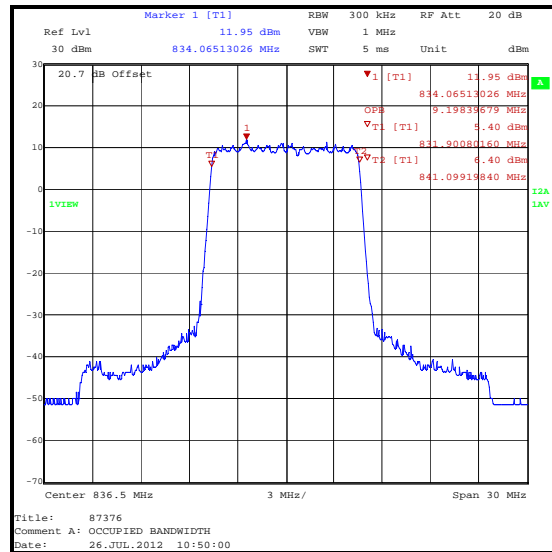
1.4 MHz Bandwidth



3 MHz Bandwidth



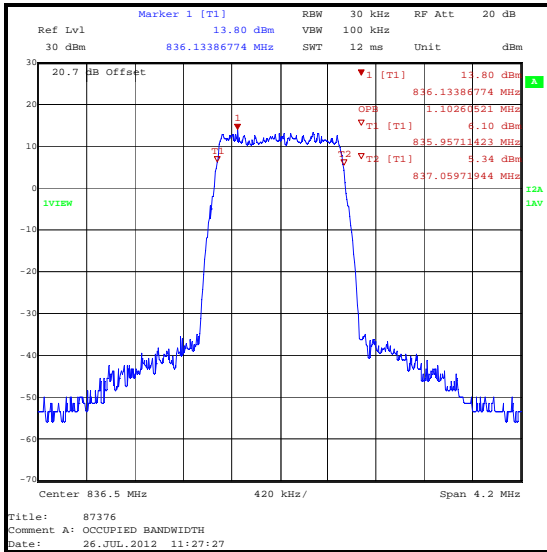
5 MHz Bandwidth



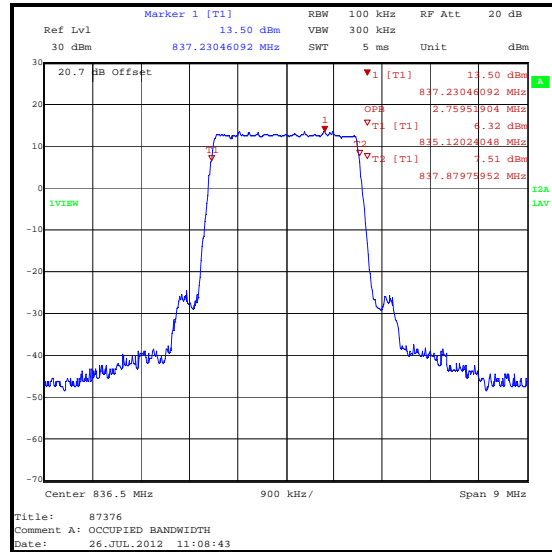
10 MHz Bandwidth

Transmitter Occupied Bandwidth (continued)

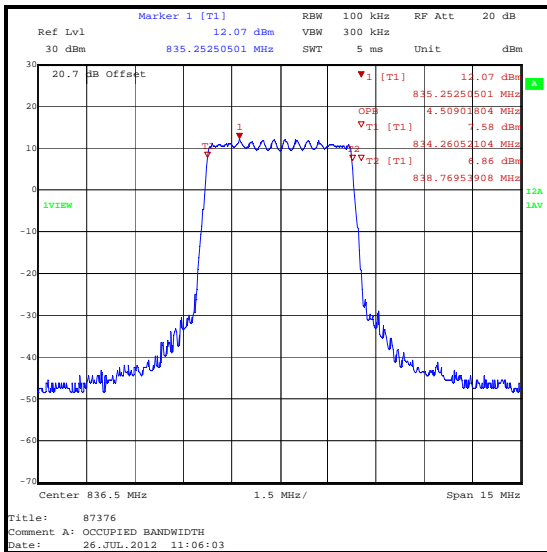
Results: LTE 64QAM / Uplink



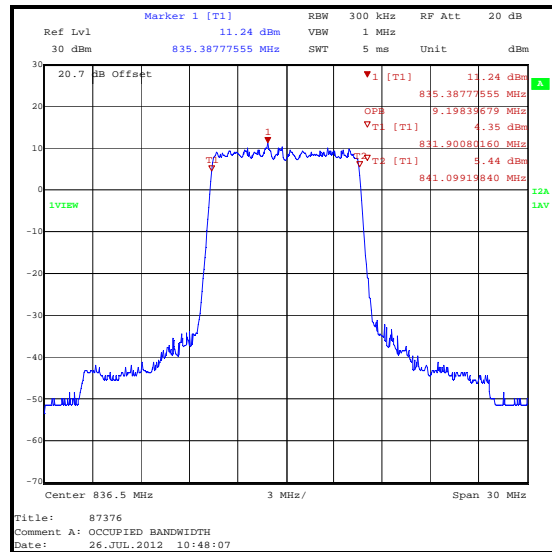
1.4 MHz Bandwidth



3 MHz Bandwidth



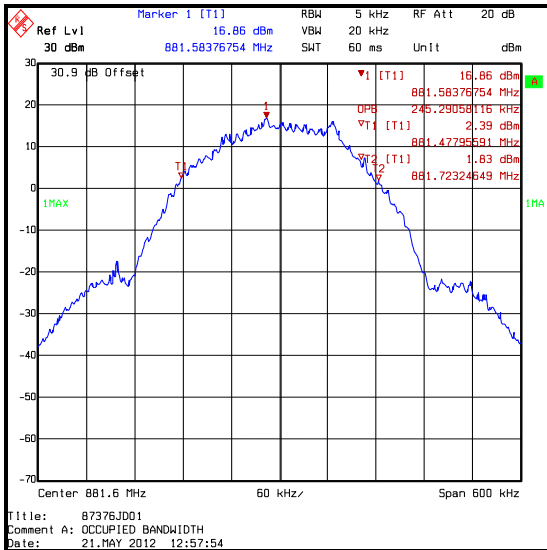
5 MHz Bandwidth



10 MHz Bandwidth

Transmitter Occupied Bandwidth (continued)

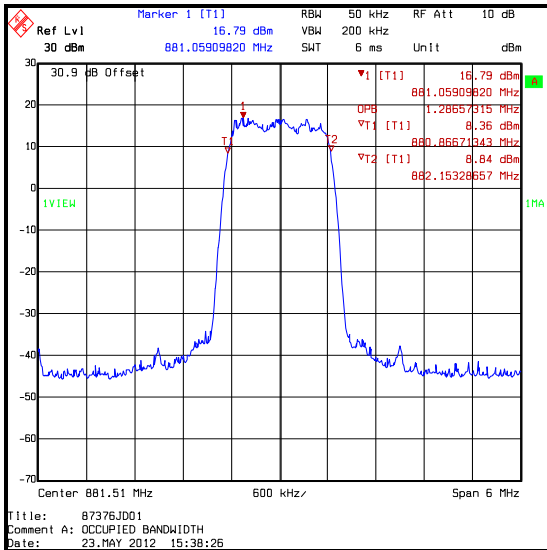
Results: Downlink



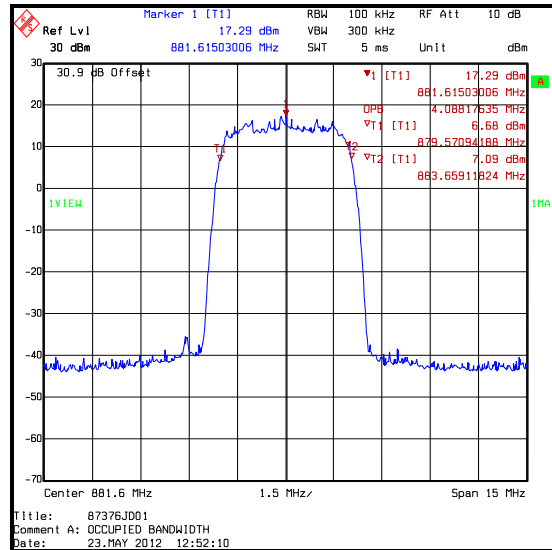
GSM GMSK



GSM 8-PSK



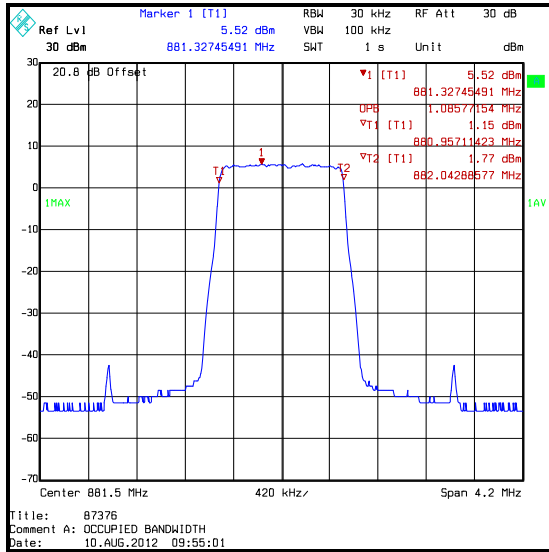
CDMA



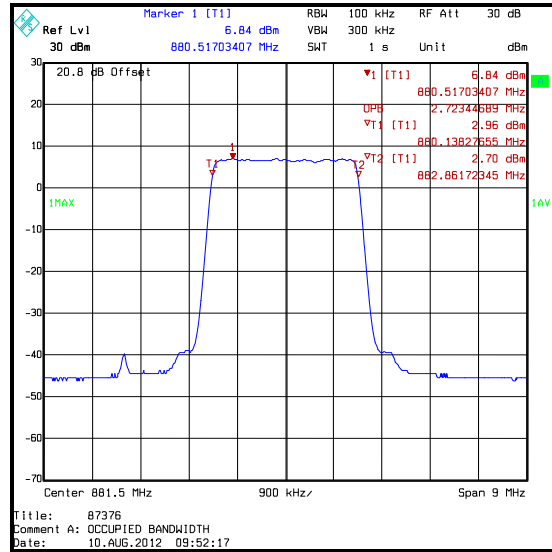
WCDMA

Transmitter Occupied Bandwidth (continued)

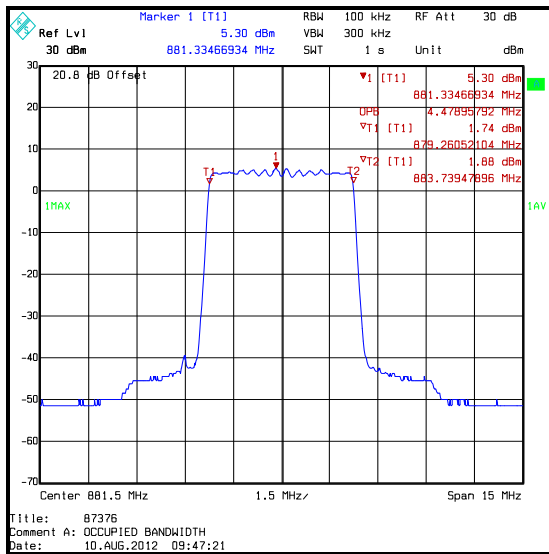
Results: LTE QPSK / Downlink



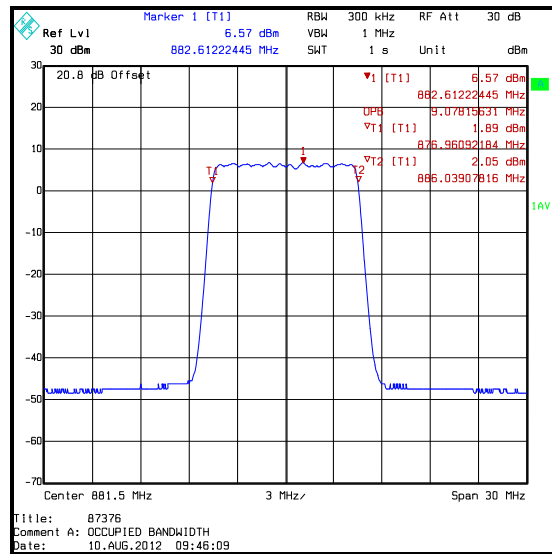
1.4 MHz Bandwidth



3 MHz Bandwidth



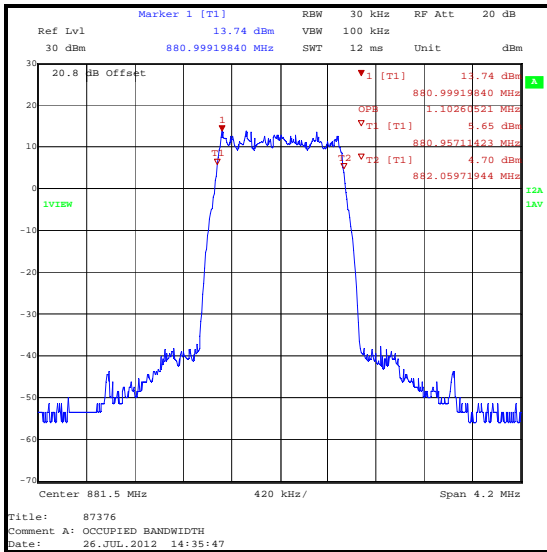
5 MHz Bandwidth



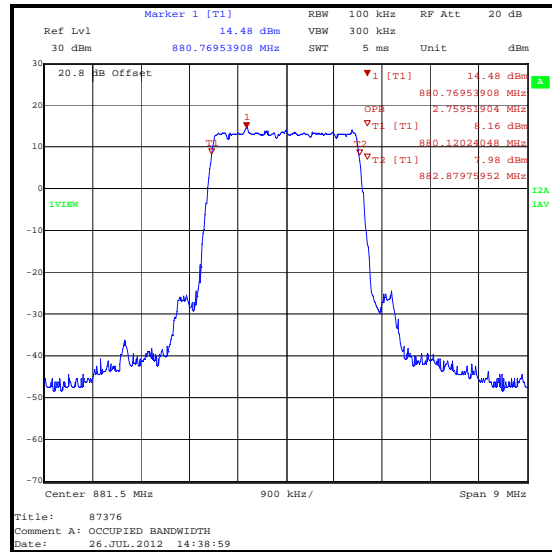
10 MHz Bandwidth

Transmitter Occupied Bandwidth (continued)

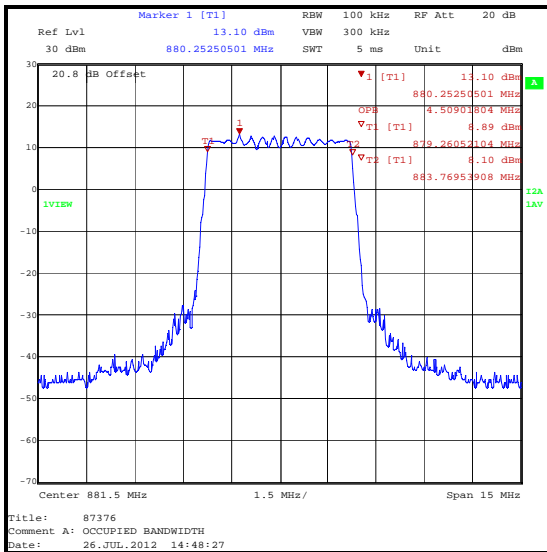
Results: LTE 16QAM / Downlink



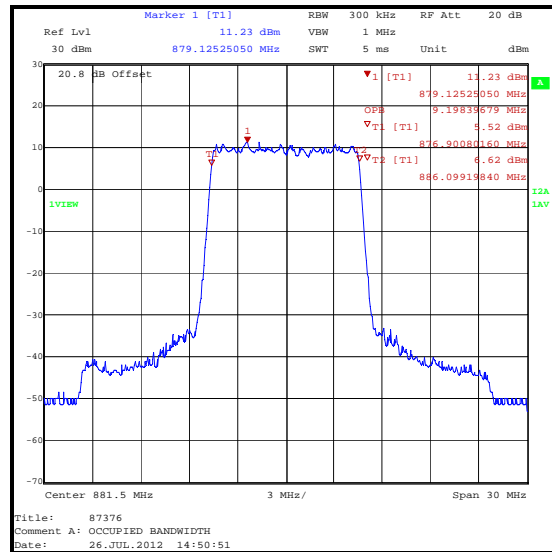
1.4 MHz Bandwidth



3 MHz Bandwidth



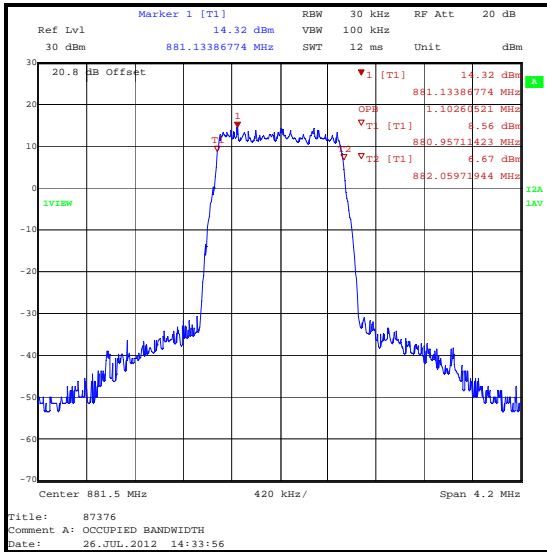
5 MHz Bandwidth



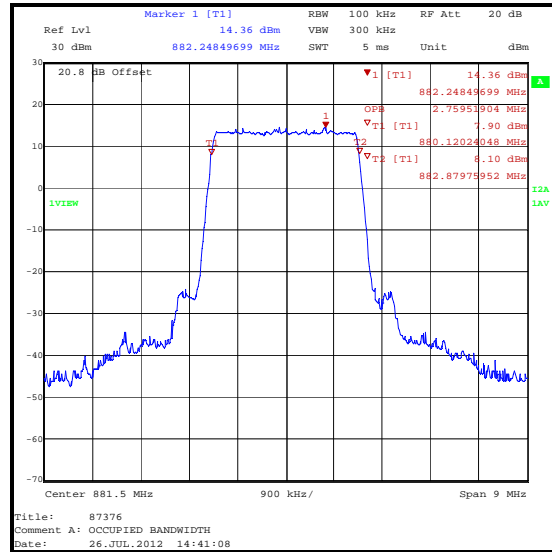
10 MHz Bandwidth

Transmitter Occupied Bandwidth (continued)

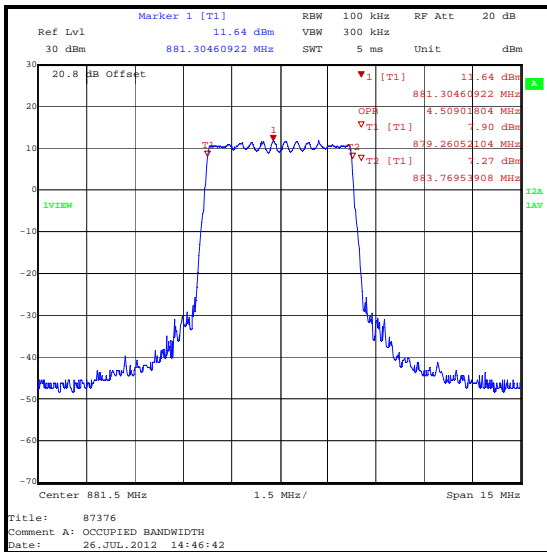
Results: LTE 64QAM / Downlink



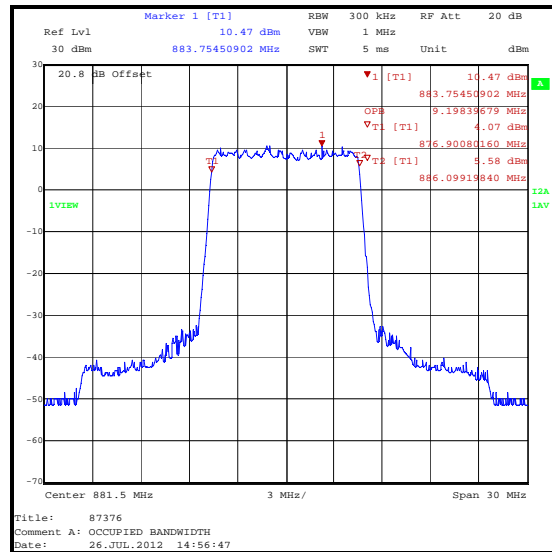
1.4 MHz Bandwidth



3 MHz Bandwidth



5 MHz Bandwidth



10 MHz Bandwidth

5.2.6. Transmitter Conducted Emissions**Test Summary:**

Test Engineer:	Patrick Jones	Test Dates:	22 October 2012 & 23 October 2012
Test Sample Serial Number:	11120002		

FCC Reference:	Part 2.1051 & 22.917
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.13 referencing FCC CFR Parts 2.1051, 22.917 and FCC Response to Enquiry 792557
Frequency Range:	9 kHz to 9 GHz

Environmental Conditions:

Temperature (°C):	22 to 24
Relative Humidity (%):	40 to 53

Note(s):

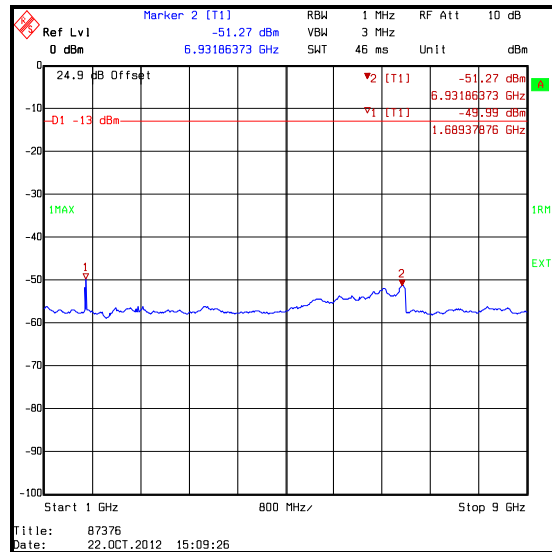
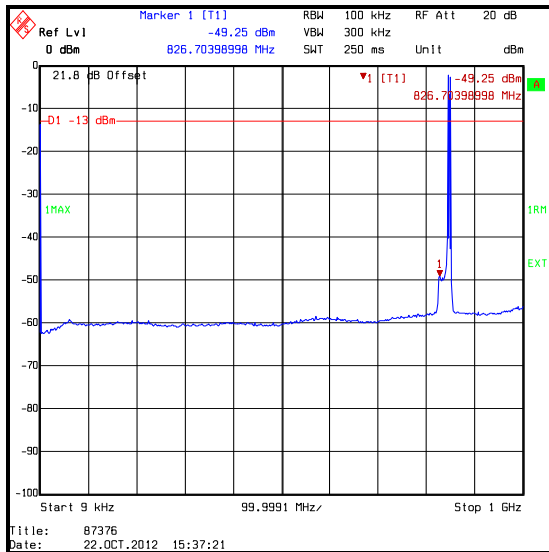
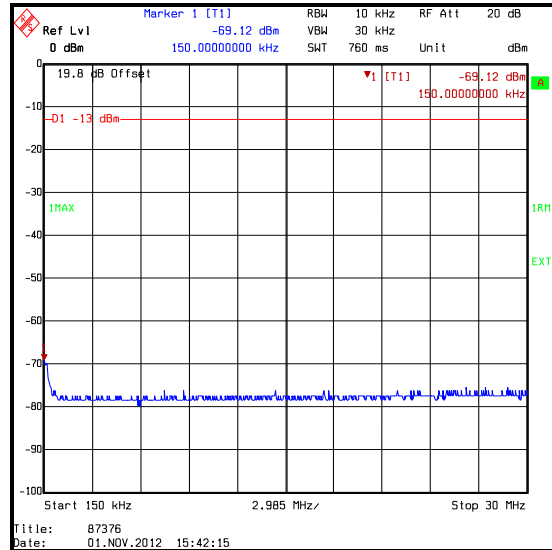
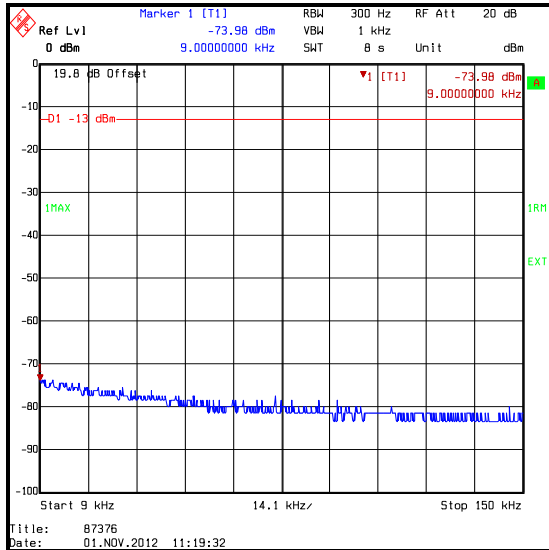
1. Three signal generators with appropriate modulation applied were connected to the input port of the EUT using suitable RF cables, circulators and a RF combiner. The RF output of the repeater was connected to a spectrum analyser via suitable cables and attenuators. The cables and attenuators were calibrated before use and the RF level offset was incorporated into the measurements. The signal generator was set to output a suitably modulated signal at the maximum input level for the EUT in accordance with FCC Response to Enquiry 792557.
2. Pre-scans for this test were carried out from 9 kHz to 9 GHz for all supported modulation types. The plots and results shown in the section below were deemed to have the worst case spurious emissions profile. All test results are archived on the company server and available for inspection if required. The worst case results were LTE with 64QAM modulation with the carriers on the top channels for Uplink. For Downlink the worst case was using CW signals representing GSM.
3. For GSM testing, three CW signals were used, one on the bottom GSM channel and two other signals at the top of the band 600 kHz apart.
4. For CDMA and WCDMA testing, three modulated carriers were used, one on the bottom channel and two at the top of the pass-band, at least one channel width apart.
5. For LTE testing, two modulated carriers were used in two different configurations: one test with the carriers at the bottom of the band, at least one channel width apart; one test with the carriers at the top of the band, at least one channel width apart. The carrier bandwidth used for all LTE tests was 1.4 MHz as this represents the highest dBm/MHz ratio for all applicable bandwidths as shown in the Conducted Output Power section of this test report.
6. The combined signal generator outputs were checked on a spectrum analyser prior to the test in order to determine that there were no intermodulation products coming from the combining network itself and to verify the correct amplitude and frequencies were present at the input to the EUT prior to performing the tests.
7. For any emissions found, the input signal was increased by a further 10 dB and the emissions re-measured. In all cases the emission level was not increased.
8. All emissions shown on the pre-scan plots were investigated and found to be ambient, in-band or >20 dB below the applicable limit and therefore not included in this report. The levels recorded in the results tables were the highest emissions found.

Transmitter Conducted Emissions (Continued)

Results: Uplink / LTE 64QAM Top Channels

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1689.379	-50.0	-13.0	37.0	Complied

Results: Uplink / LTE 64QAM Top Channels



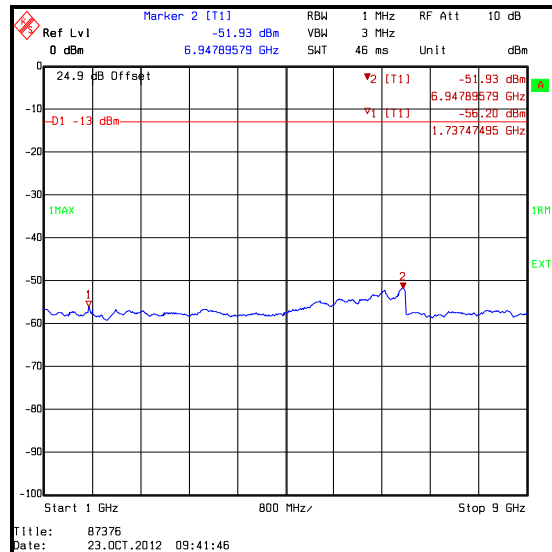
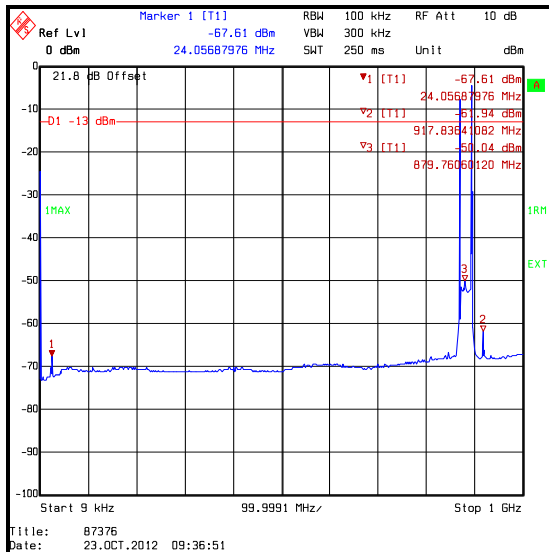
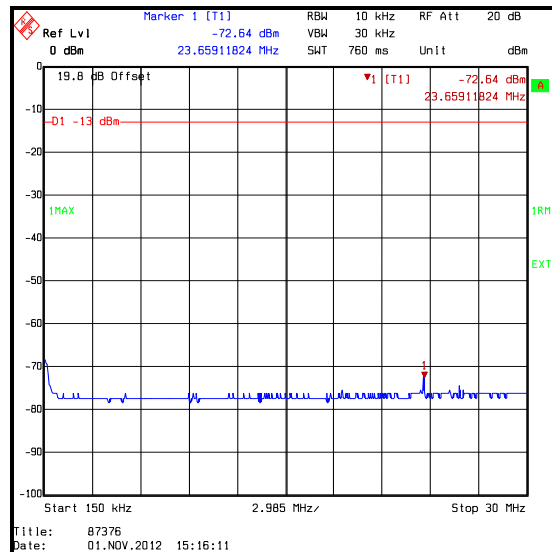
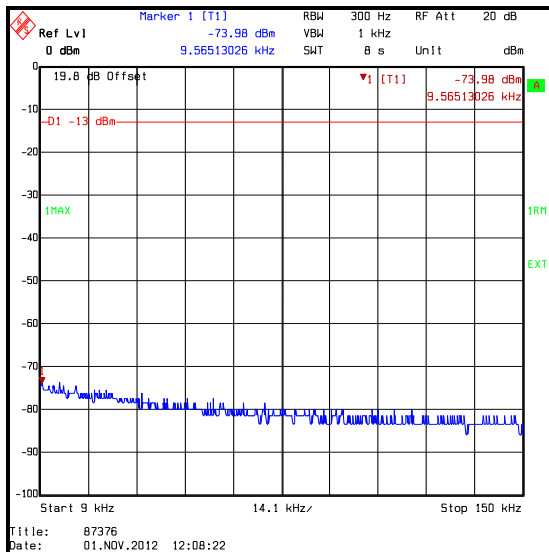
NOTE: This plot covers the 30 MHz to 1 GHz frequency range

Transmitter Conducted Emissions (Continued)

Results: Downlink / GSM CW

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
879.761	-50.0	-13.0	37.0	Complied

Results: Downlink / GSM CW



NOTE: This plot covers the 30 MHz to 1 GHz frequency range

5.2.7. Transmitter Out of Band Radiated Emissions**Test Summary:**

Test Engineers:	Patrick Jones & Nick Steele	Test Dates:	28 May 2012 & 29 May 2012
Test Sample Serial Number:	11120002		

FCC Reference:	Part 2.1053 & 22.917
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.12 referencing FCC CFR Part 2.1053
Frequency Range:	30 MHz to 9 GHz

Environmental Conditions:

Temperature (°C):	27 to 29
Relative Humidity (%):	39 to 35

Note(s):

1. A signal generator was connected to the input port of the EUT using a suitable RF cable. The signal generator was located outside the anechoic chamber. The RF output of the repeater was terminated into a suitable 50 Ohm load. The signal generator was set to output a CW signal at the maximum input level for the EUT in accordance with FCC KDB Tracking Number 164446. Pre-scans were performed with the signal generator frequency set to the top channel of the GSM 850 uplink (848.8 MHz) and GSM 850 downlink (893.8 MHz) bands.
2. For any emissions found, final measurements were performed on bottom, middle and top channels. The input signal was increased by a further 10 dB and the emissions re-measured. In all cases the emission level was not increased. The emission levels recorded in this report were verified by substitution.
3. The uplink and downlink amplifier pass-bands are shown on the 30 MHz to 1 GHz and 1 GHz to 4 GHz plots.
4. All other emissions shown on the pre-scan plots were investigated and found to be >20 dB below the limit or ambient.
5. Measurements below 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
6. Pre-scans above 1 GHz were performed in a fully anechoic chamber (RFI Asset Number K0002) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

Transmitter Out of Band Radiated Emissions (continued)**Results: Uplink / Bottom Channel (824.2 MHz)**

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
4279.995	-44.7	-13.0	31.7	Complied

Results: Uplink / Middle Channel (836.6 MHz)

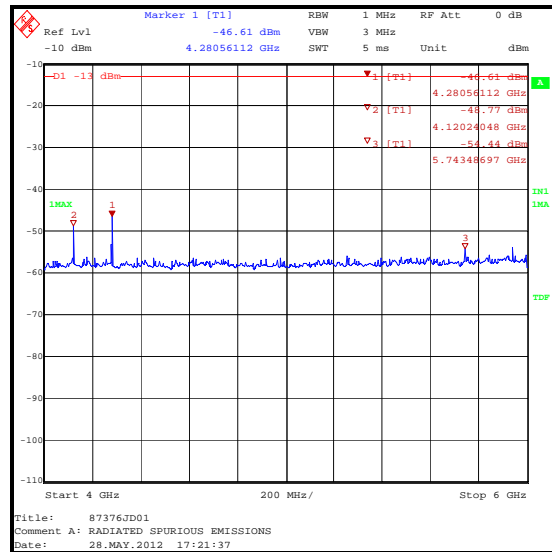
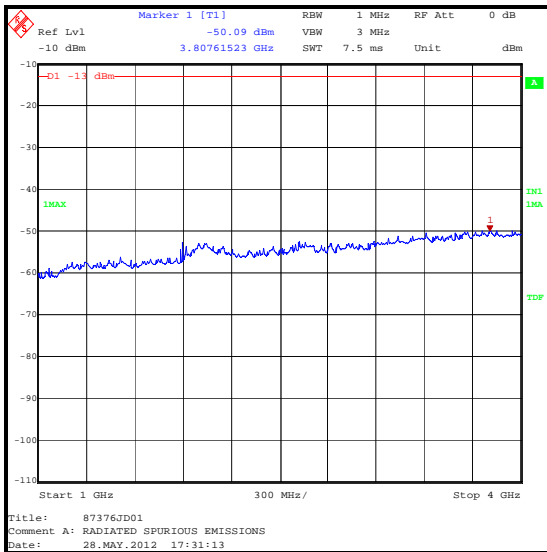
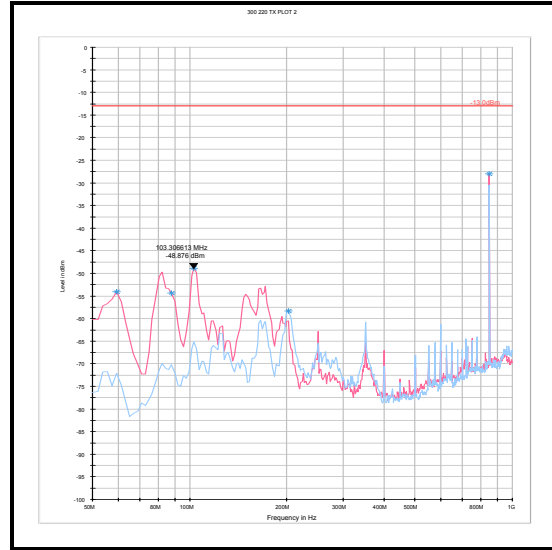
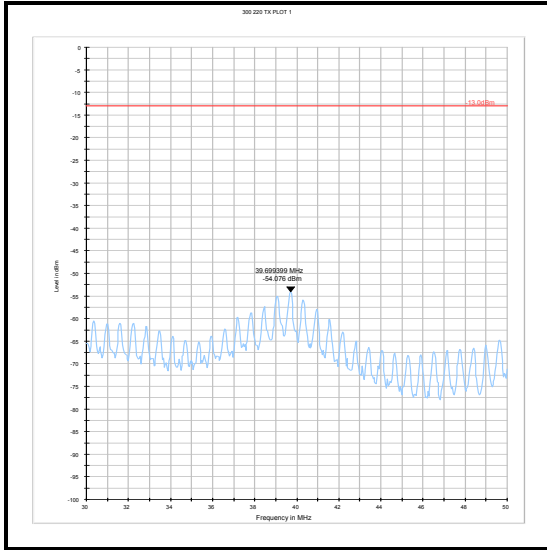
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
4279.995	-44.7	-13.0	31.7	Complied

Results: Uplink / Top Channel (848.8 MHz)

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
4279.995	-44.7	-13.0	31.7	Complied

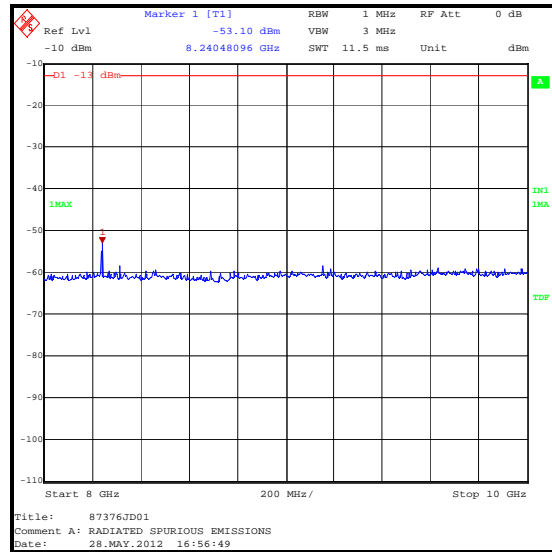
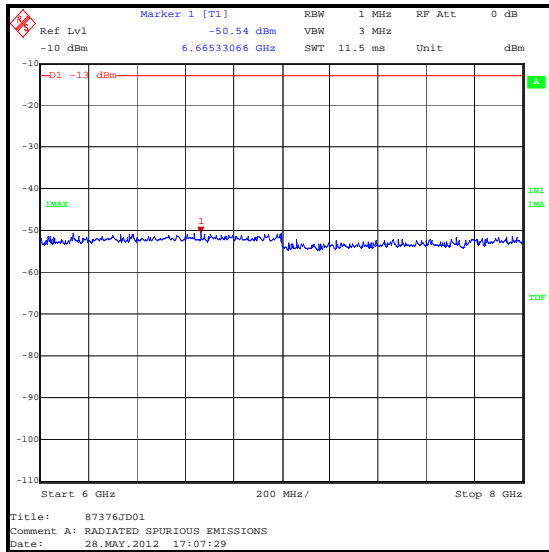
Transmitter Out of Band Radiated Emissions (continued)

Results: Uplink / Top Channel (848.8 MHz)



Transmitter Out of Band Radiated Emissions (continued)

Results: Uplink / Top Channel (848.8 MHz)



Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter Out of Band Radiated Emissions (continued)**Results: Downlink / Bottom Channel (869.2 MHz)**

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1738.310	-45.5	-13.0	32.5	Complied

Results: Downlink / Middle Channel (881.6 MHz)

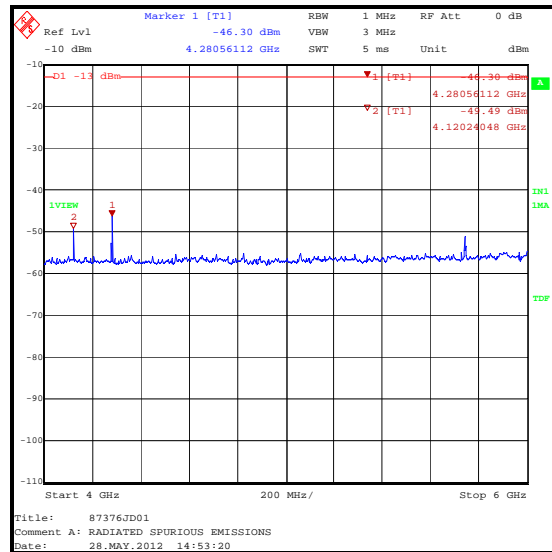
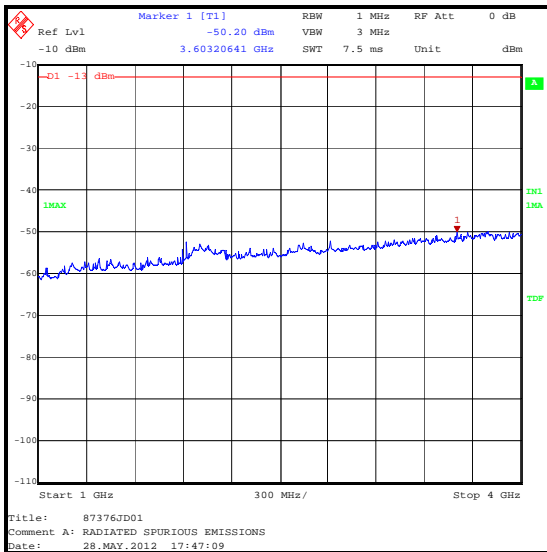
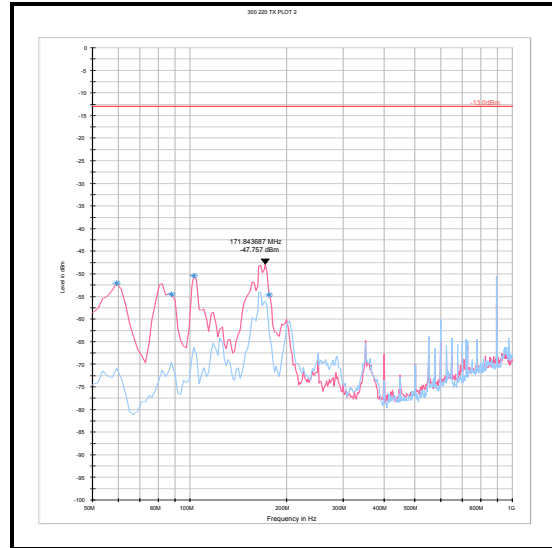
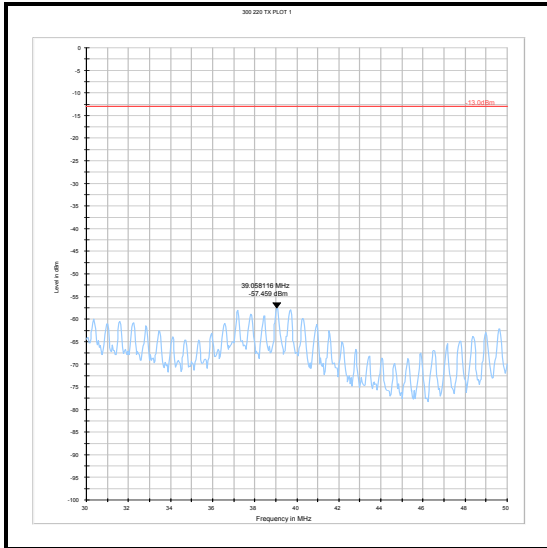
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1763.591	-45.5	-13.0	32.5	Complied

Results: Downlink / Top Channel (893.8 MHz)

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1787.770	-46.7	-13.0	33.7	Complied

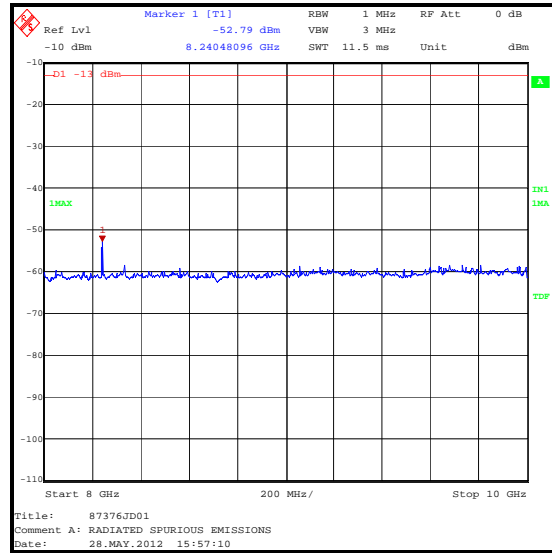
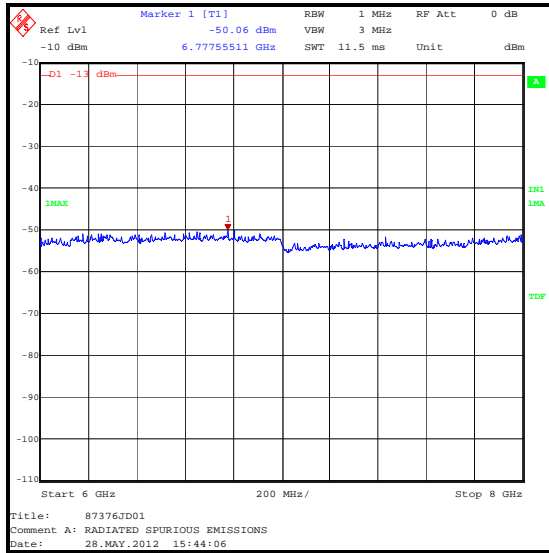
Transmitter Out of Band Radiated Emissions (continued)

Results: Downlink / Top Channel (893.8 MHz)



Transmitter Out of Band Radiated Emissions (continued)

Results: Downlink / Top Channel (893.8 MHz)



Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

5.2.8. Transmitter Band Edge Conducted Emissions**Test Summary:**

Test Engineer:	Patrick Jones	Test Dates:	26 June 2012 & 03 August 2012
Test Sample Serial Number:	11120002		

FCC Reference:	Part 2.1051 & 22.917
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.13 referencing FCC CFR Parts 2.1051 and 22.917

Environmental Conditions:

Temperature (°C):	25 to 28
Relative Humidity (%):	41 to 45

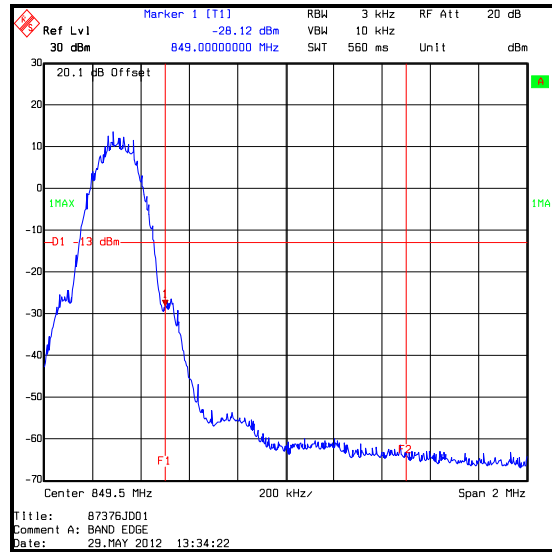
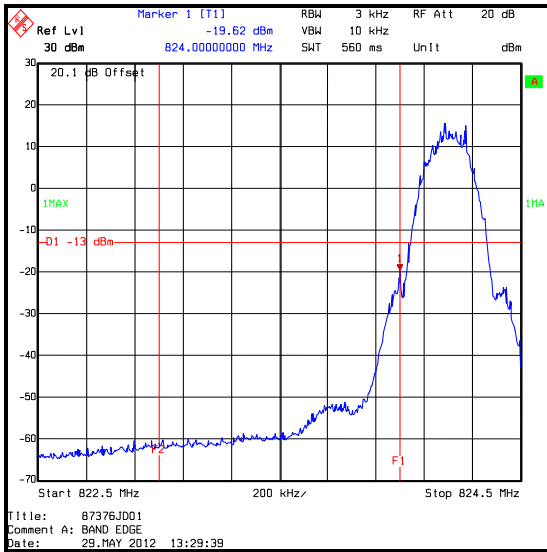
Note(s):

1. A signal generator was connected to the input port of the EUT using a suitable RF cable. The RF output of the repeater was connected to a spectrum analyser via suitable cables and attenuators. The cables and attenuators were calibrated before use and the RF level offset was incorporated into the measurements. The signal generator was set to output a modulated signal according to the technology under test on the bottom or top channel at the maximum input level for the EUT.
2. The filters corresponding to the top and bottom of the band were activated for this test.

Transmitter Band Edge Conducted Emissions (continued)

Results: GSM GMSK / Uplink

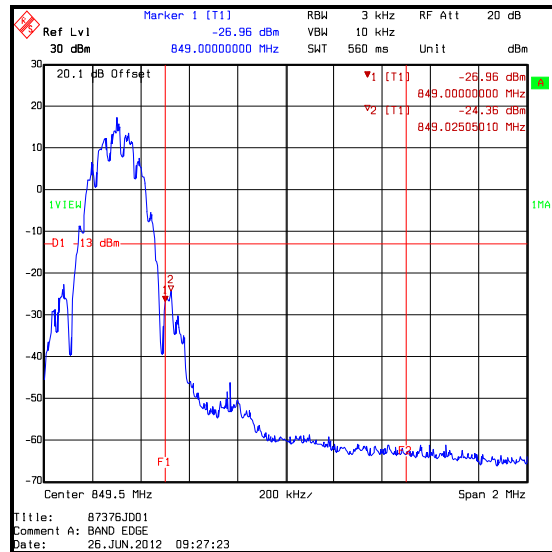
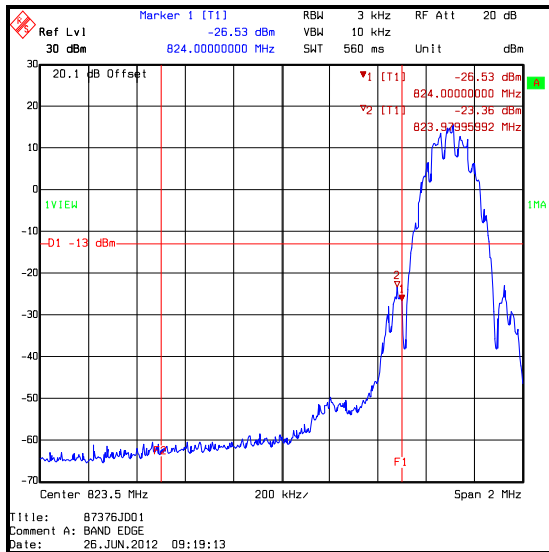
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824.0	-19.6	-13.0	6.6	Complied
849.0	-28.1	-13.0	15.1	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: GSM 8-PSK / Uplink

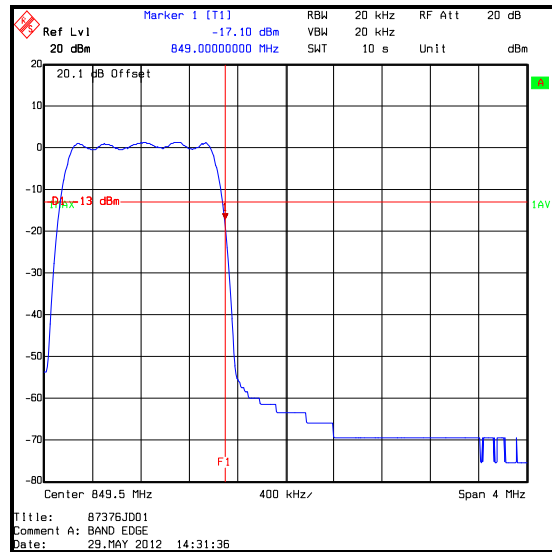
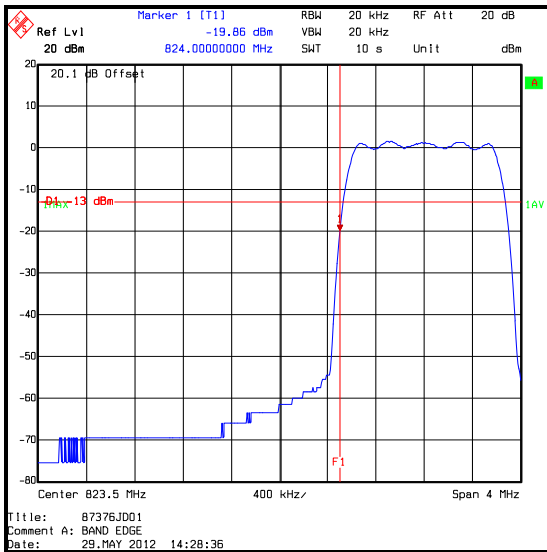
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
823.980	-23.4	-13.0	10.4	Complied
824.000	-26.5	-13.0	13.5	Complied
849.000	-27.0	-13.0	14.0	Complied
849.025	-24.4	-13.0	11.4	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: CDMA / Uplink

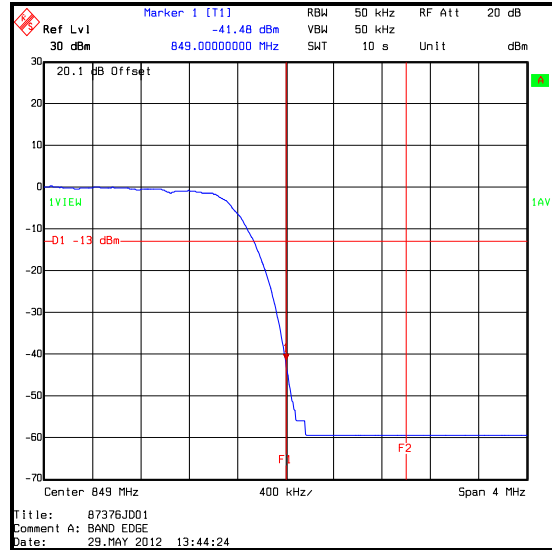
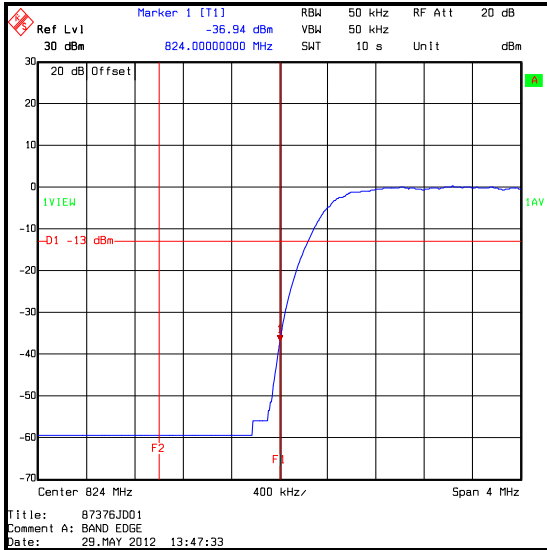
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824.0	-19.9	-13.0	6.9	Complied
849.0	-17.1	-13.0	4.1	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: WCDMA / Uplink

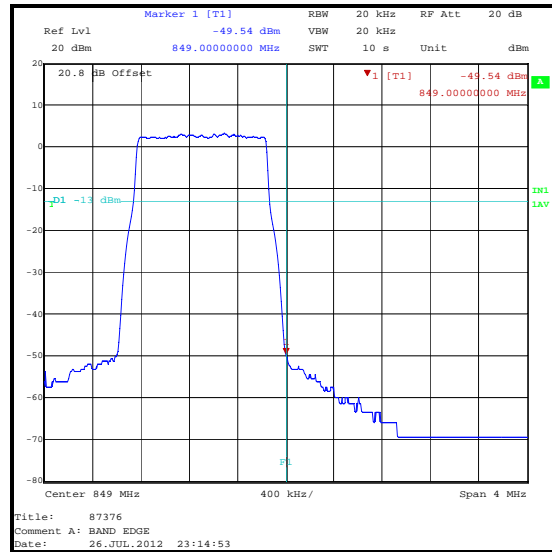
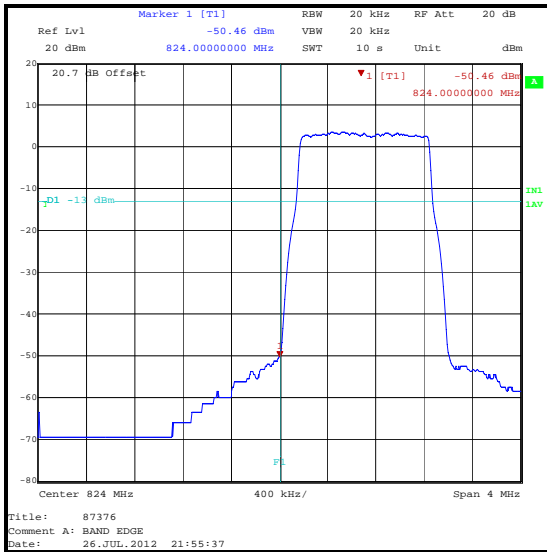
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824.0	-36.9	-13.0	23.9	Complied
849.0	-41.5	-13.0	28.5	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 1.4 MHz Bandwidth QPSK / Uplink

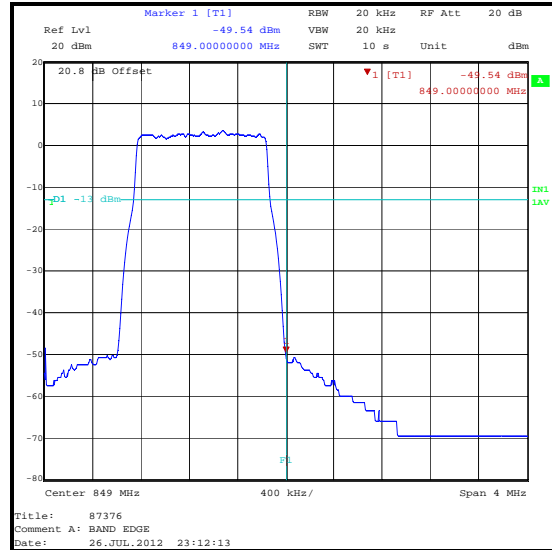
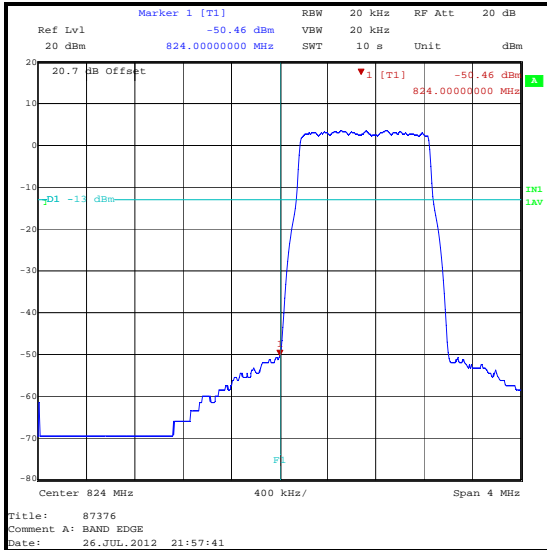
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824.0	-50.5	-13.0	37.5	Complied
849.0	-49.5	-13.0	36.5	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 1.4 MHz Bandwidth 16QAM / Uplink

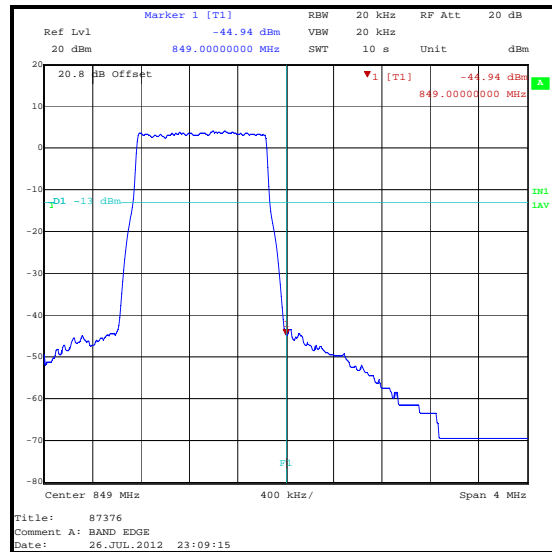
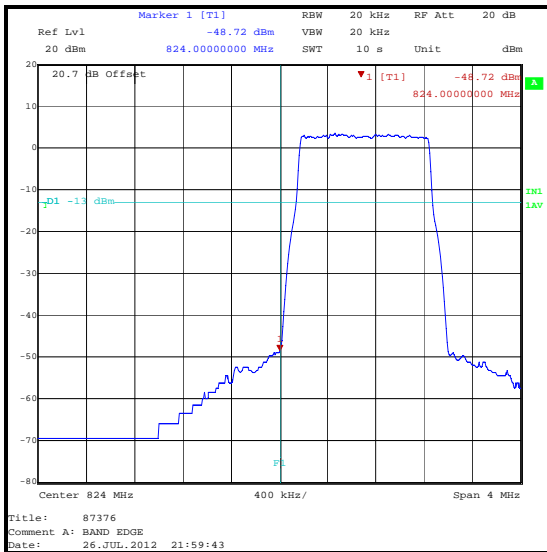
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824.0	-50.5	-13.0	37.5	Complied
849.0	-49.5	-13.0	36.5	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 1.4 MHz Bandwidth 64QAM / Uplink

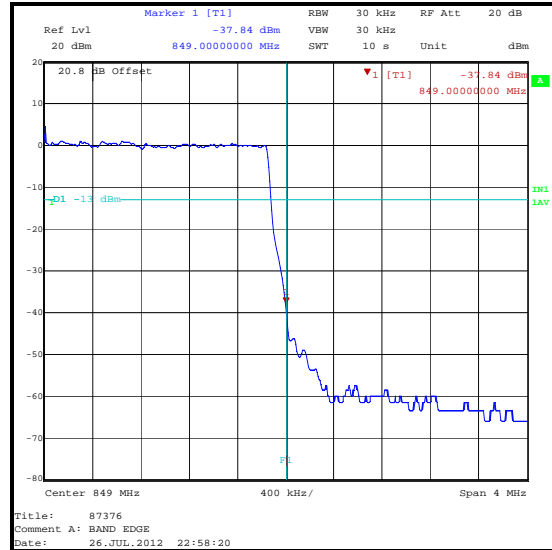
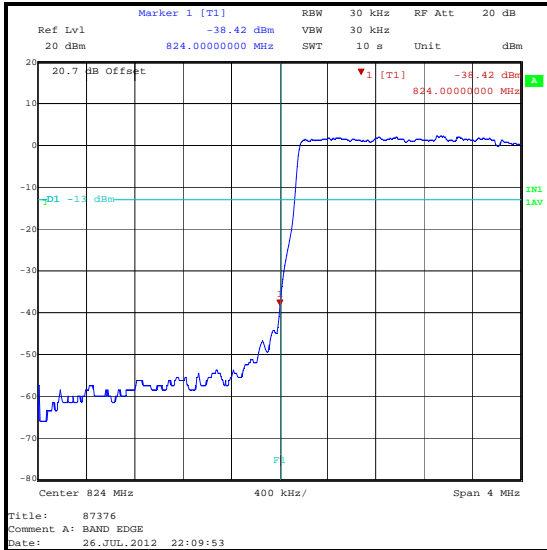
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824.0	-48.7	-13.0	35.7	Complied
849.0	-44.9	-13.0	31.9	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 3 MHz Bandwidth QPSK / Uplink

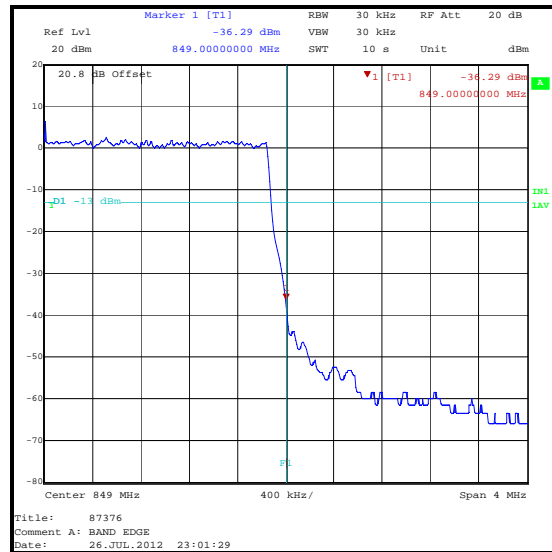
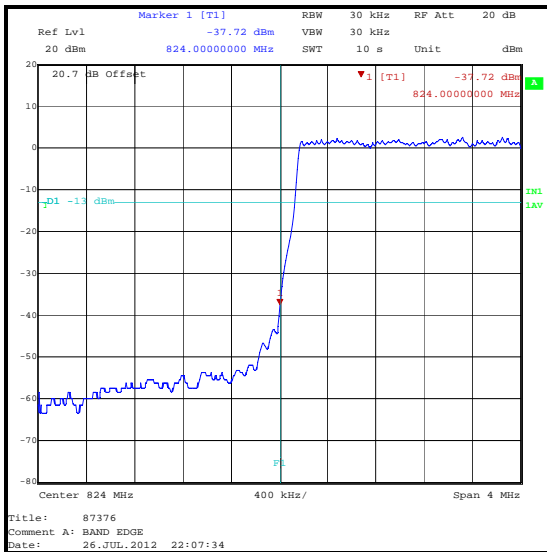
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824.0	-38.4	-13.0	25.4	Complied
849.0	-37.8	-13.0	24.8	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 3 MHz Bandwidth 16QAM / Uplink

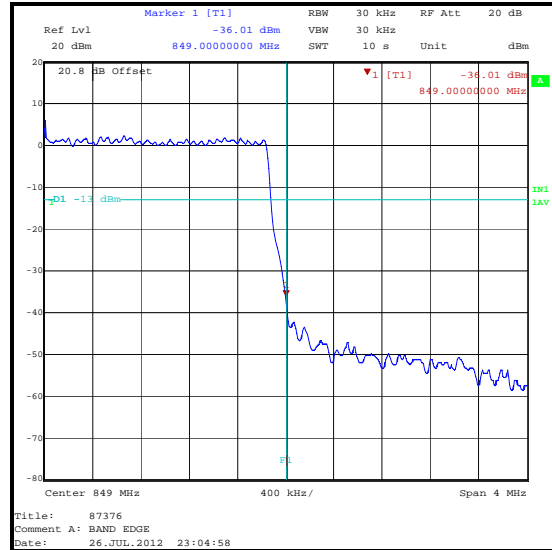
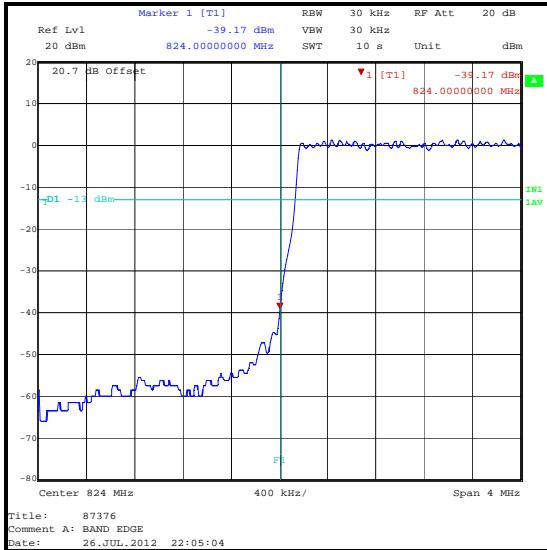
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824.0	-37.7	-13.0	24.7	Complied
849.0	-36.3	-13.0	23.3	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 3 MHz Bandwidth 64QAM / Uplink

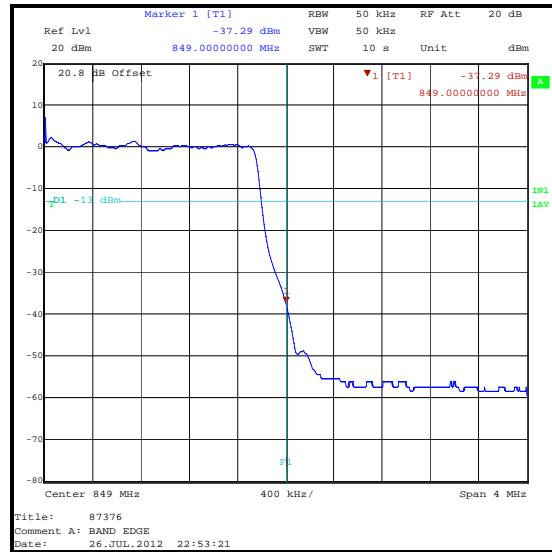
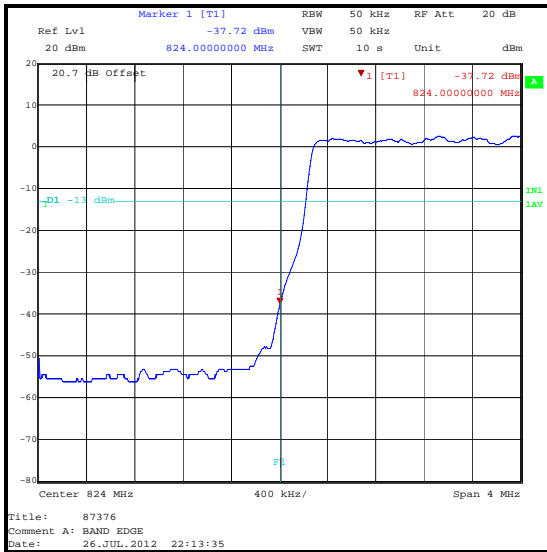
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824.0	-39.2	-13.0	26.2	Complied
849.0	-36.0	-13.0	23.0	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 5 MHz Bandwidth QPSK / Uplink

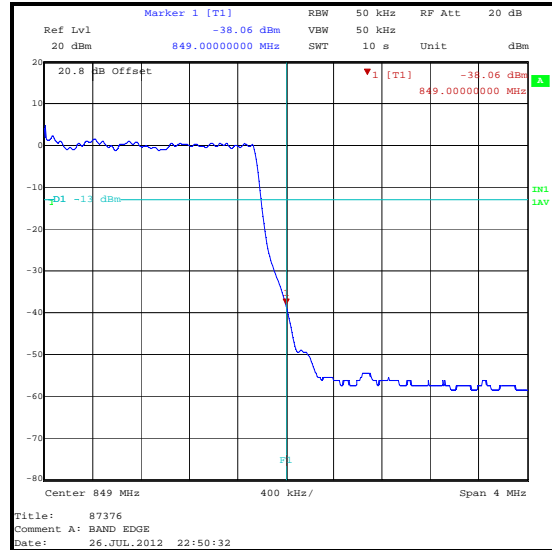
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824.0	-37.7	-13.0	24.7	Complied
849.0	-37.3	-13.0	24.3	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 5 MHz Bandwidth 16QAM / Uplink

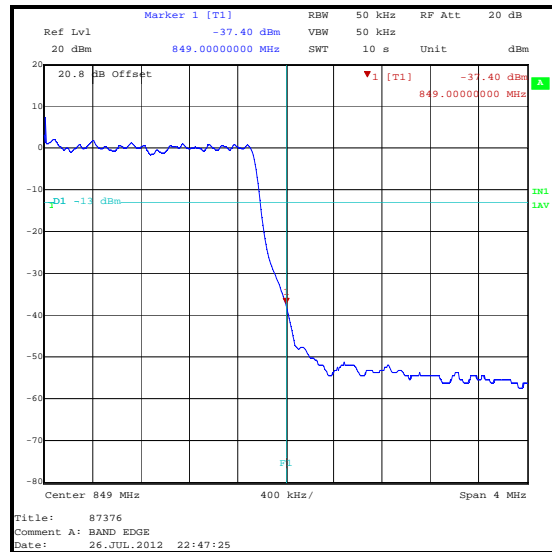
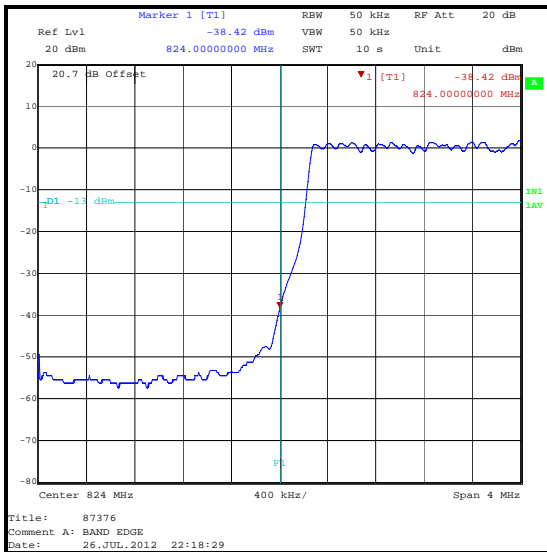
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824.0	-37.3	-13.0	24.3	Complied
849.0	-38.1	-13.0	25.1	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 5 MHz Bandwidth 64QAM / Uplink

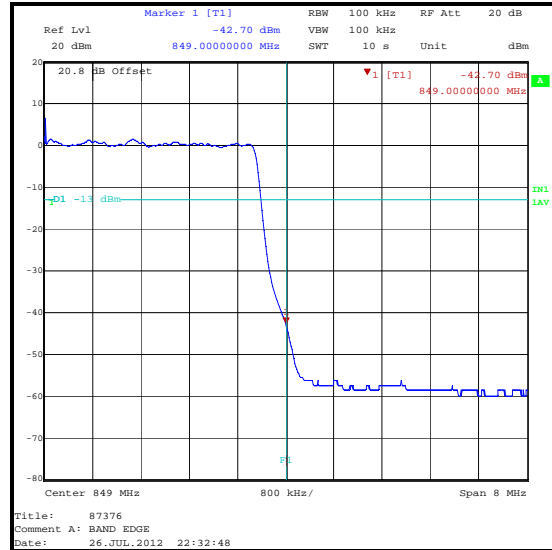
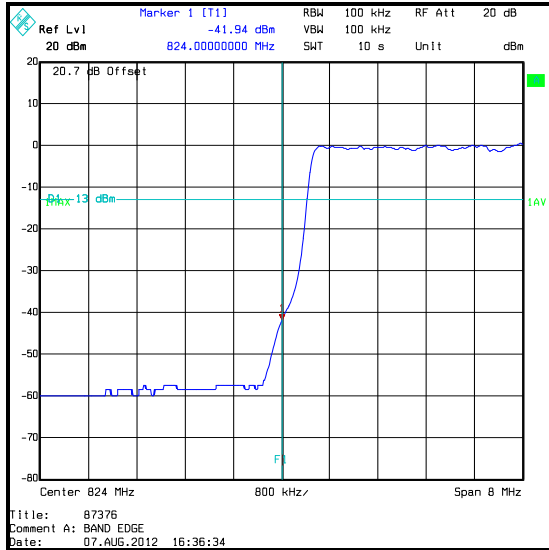
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824.0	-38.4	-13.0	25.4	Complied
849.0	-37.4	-13.0	24.4	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 10 MHz Bandwidth QPSK / Uplink

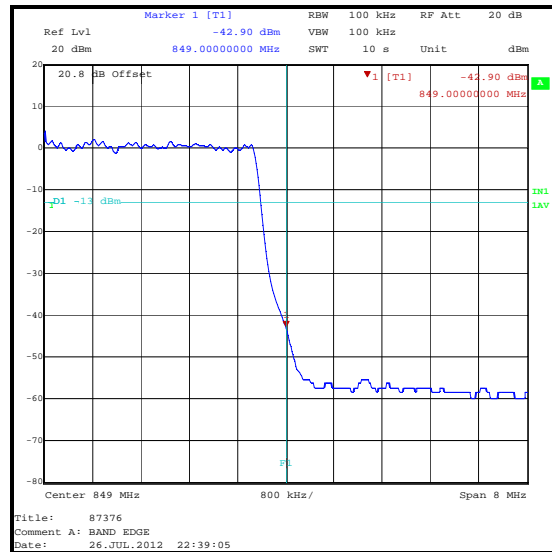
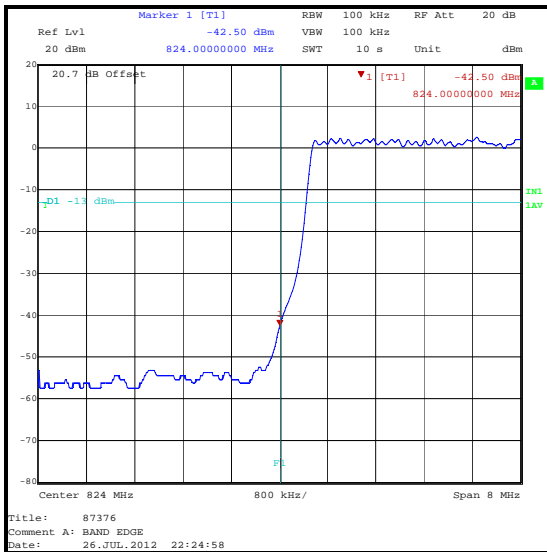
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824.0	-41.9	-13.0	28.9	Complied
849.0	-42.7	-13.0	29.7	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 10 MHz Bandwidth 16QAM / Uplink

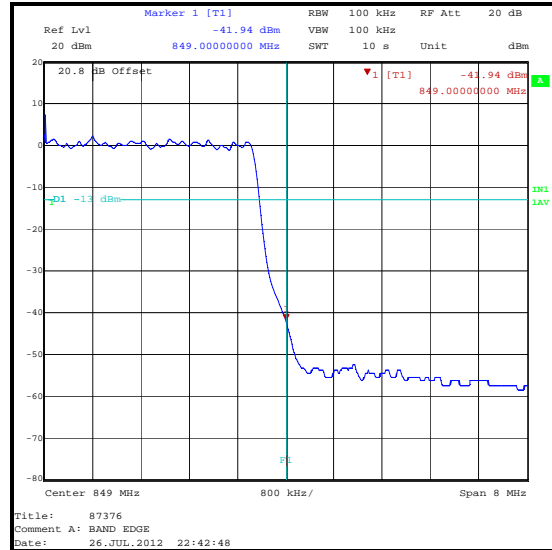
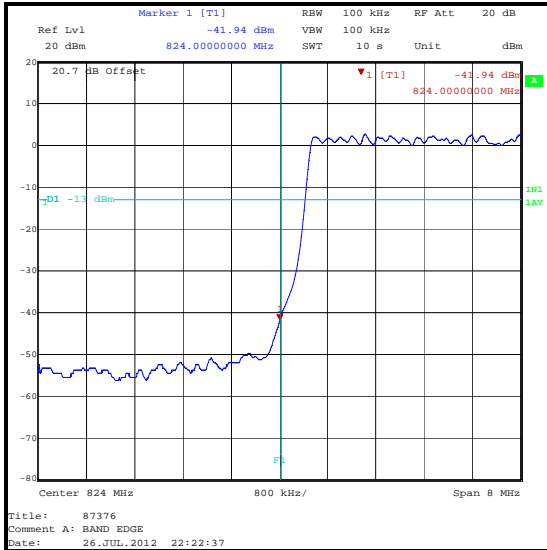
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824.0	-42.5	-13.0	29.5	Complied
849.0	-42.9	-13.0	29.9	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 10 MHz Bandwidth 64QAM / Uplink

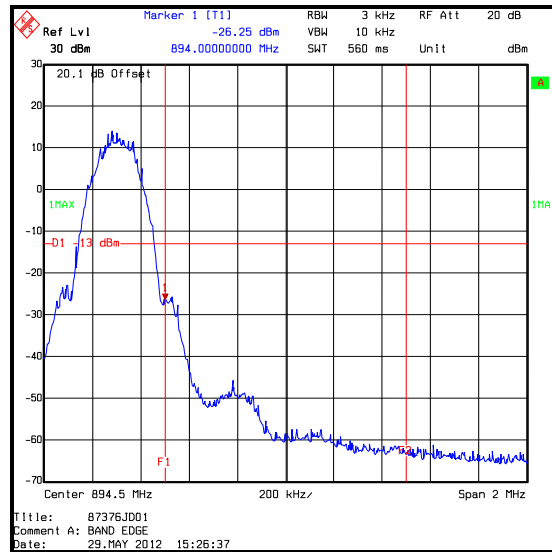
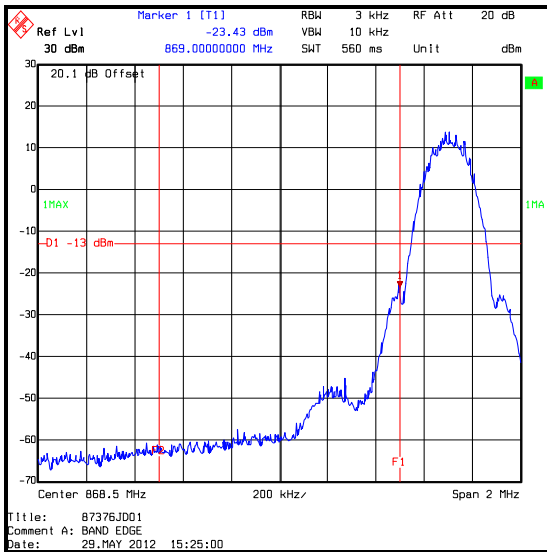
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
824.0	-41.9	-13.0	28.9	Complied
849.0	-41.9	-13.0	28.9	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: GSM GMSK / Downlink

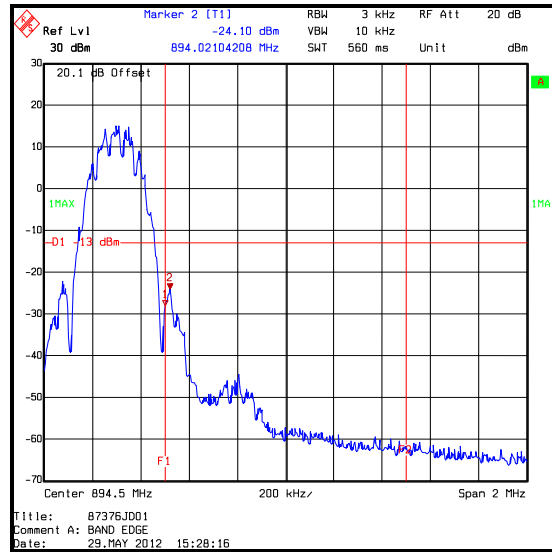
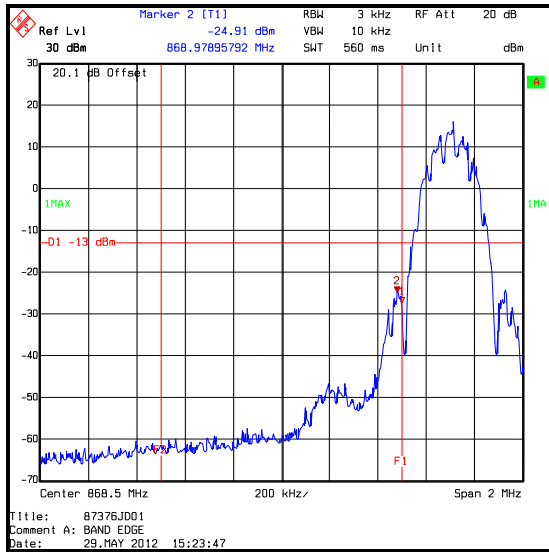
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
869.0	-23.4	-13.0	10.4	Complied
894.0	-26.3	-13.0	13.3	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: GSM 8-PSK / Downlink

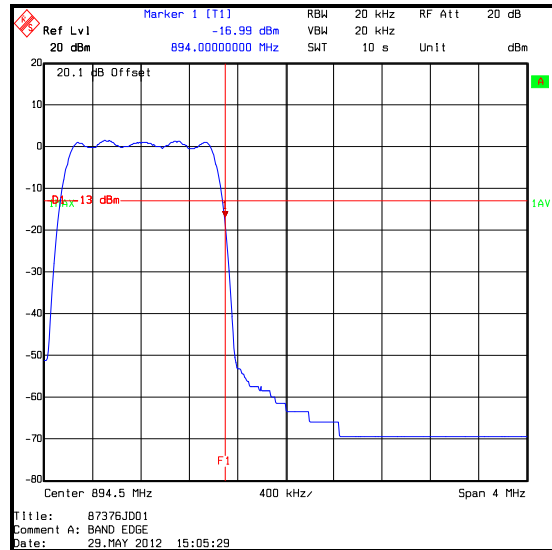
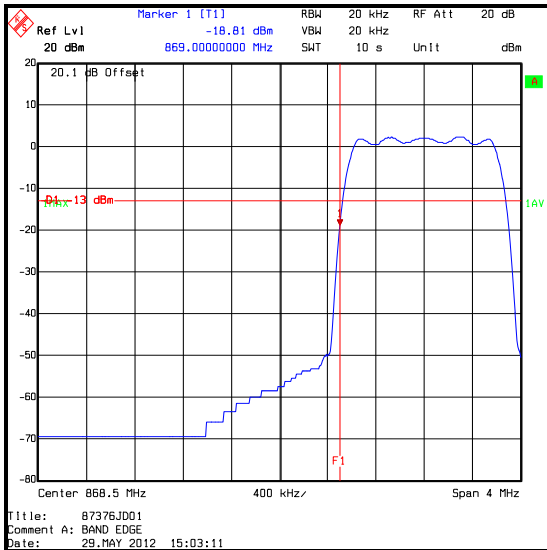
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
868.979	-24.9	-13.0	11.9	Complied
869.000	-27.1	-13.0	14.1	Complied
894.000	-28.0	-13.0	15.0	Complied
894.021	-24.1	-13.0	11.1	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: CDMA / Downlink

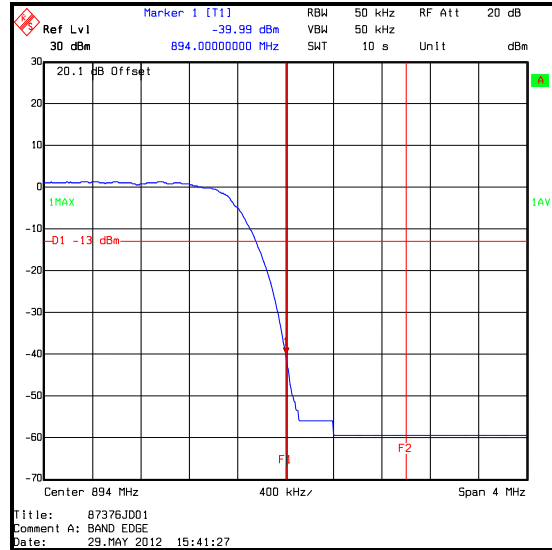
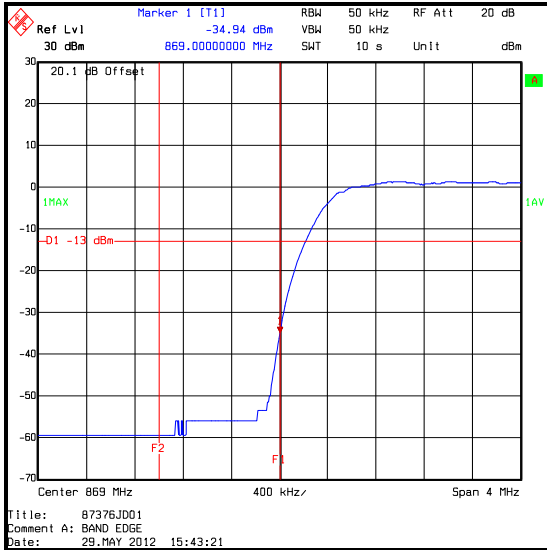
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
869.0	-18.8	-13.0	5.8	Complied
894.0	-17.0	-13.0	4.0	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: WCDMA / Downlink

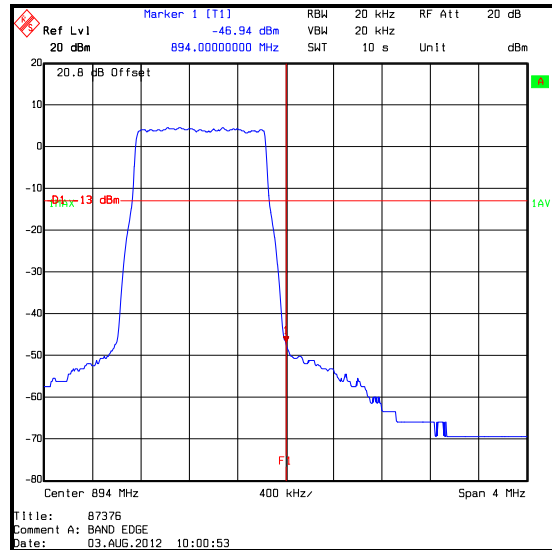
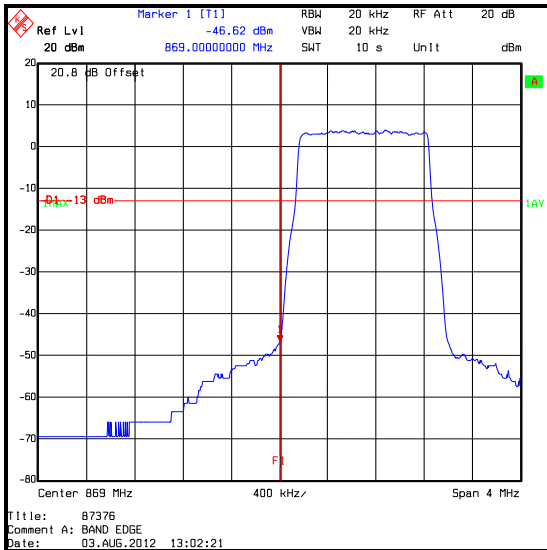
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
869.0	-34.9	-13.0	21.9	Complied
894.0	-40.0	-13.0	27.0	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 1.4 MHz Bandwidth QPSK / Downlink

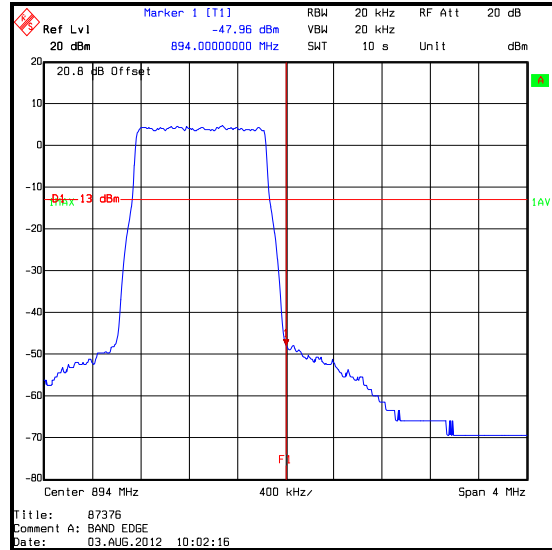
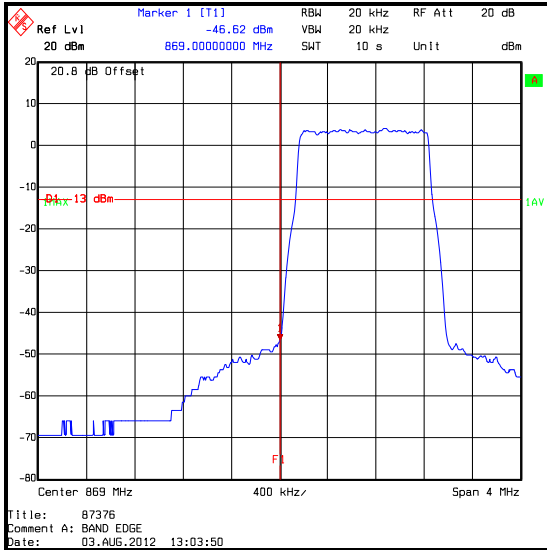
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
869.0	-46.6	-13.0	33.6	Complied
894.0	-46.9	-13.0	33.9	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 1.4 MHz Bandwidth 16QAM / Downlink

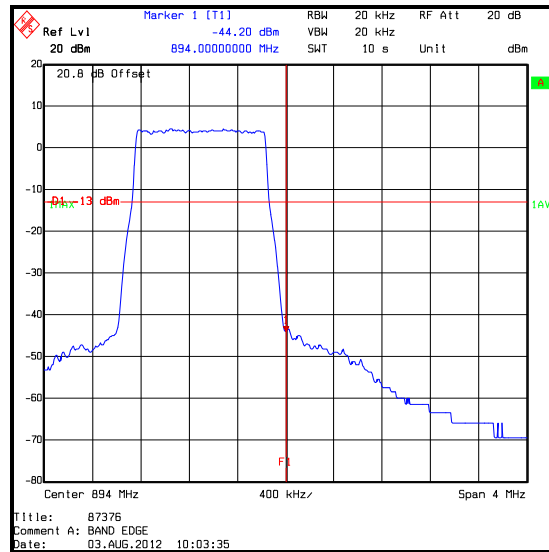
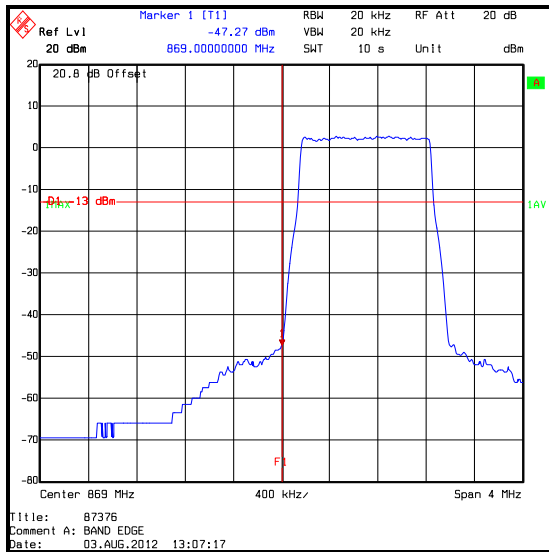
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
869.0	-46.6	-13.0	33.6	Complied
894.0	-48.0	-13.0	35.0	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 1.4 MHz Bandwidth 64QAM / Downlink

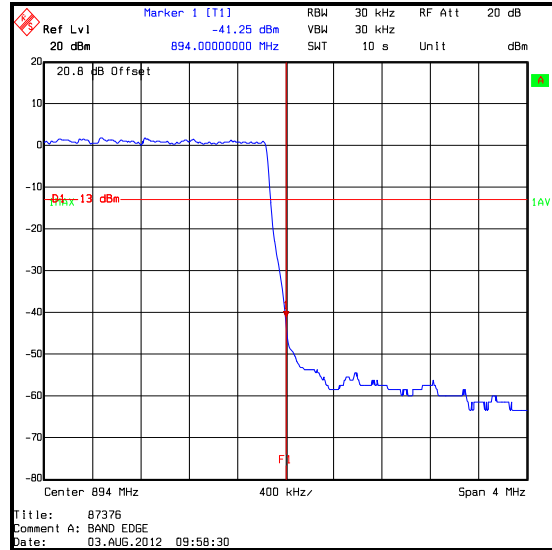
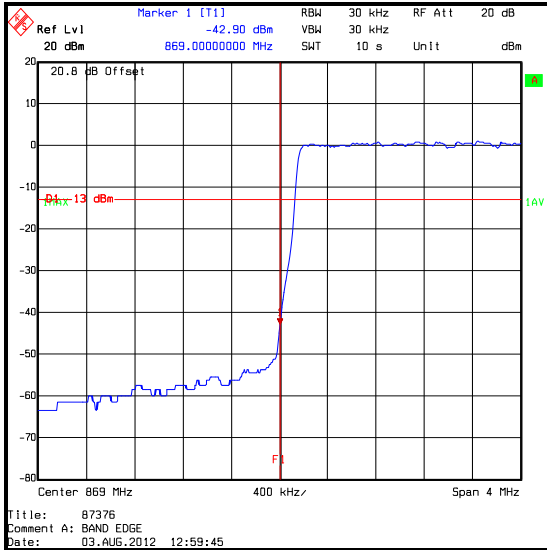
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
869.0	-47.3	-13.0	34.3	Complied
894.0	-44.2	-13.0	31.2	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 3 MHz Bandwidth QPSK / Downlink

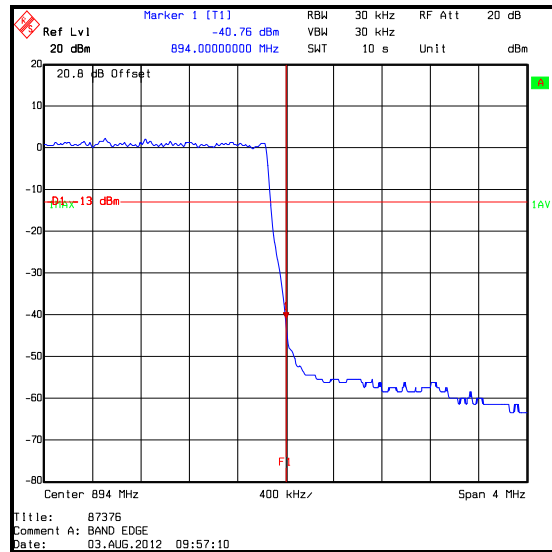
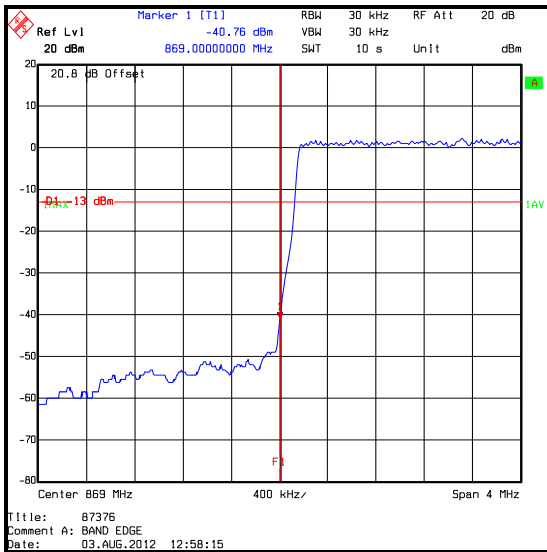
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
869.0	-42.9	-13.0	29.9	Complied
894.0	-41.3	-13.0	28.3	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 3 MHz Bandwidth 16QAM / Downlink

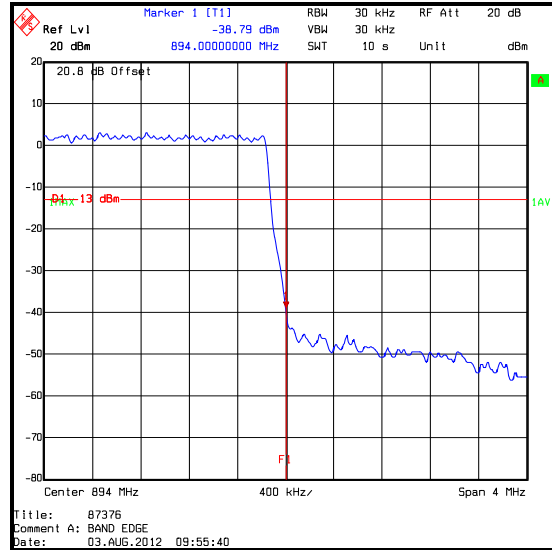
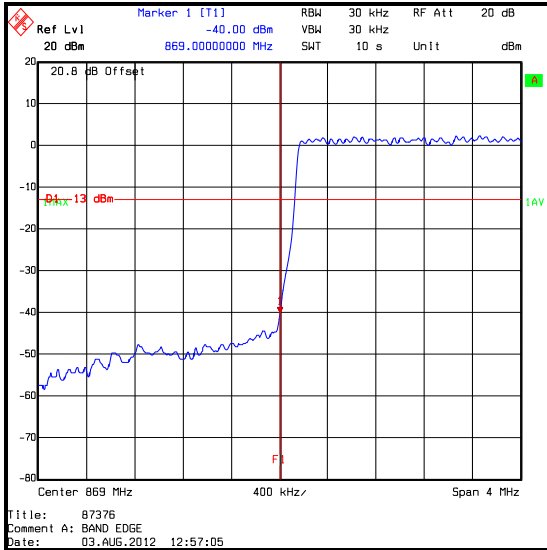
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
869.0	-40.8	-13.0	27.8	Complied
894.0	-40.8	-13.0	27.8	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 3 MHz Bandwidth 64QAM / Downlink

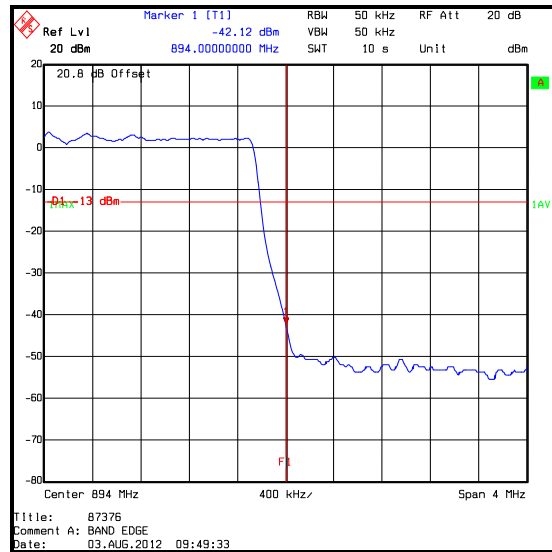
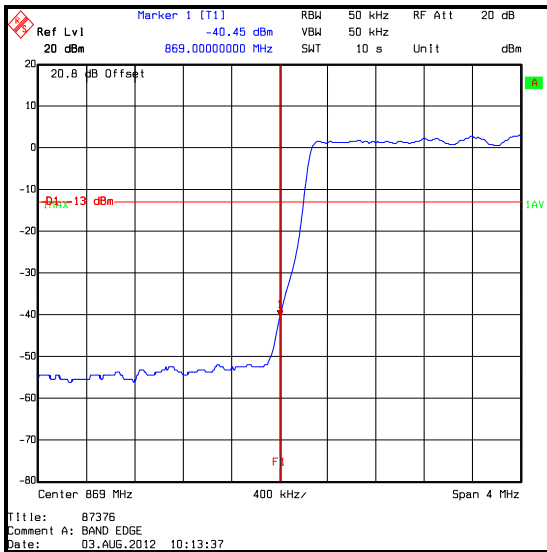
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
869.0	-40.0	-13.0	27.0	Complied
894.0	-38.8	-13.0	25.8	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 5 MHz Bandwidth QPSK / Downlink

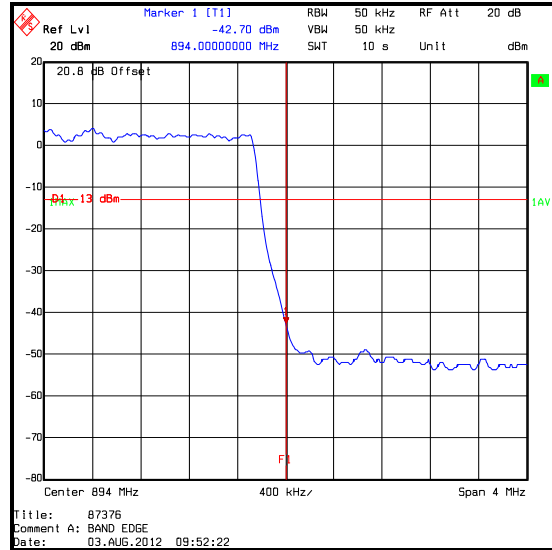
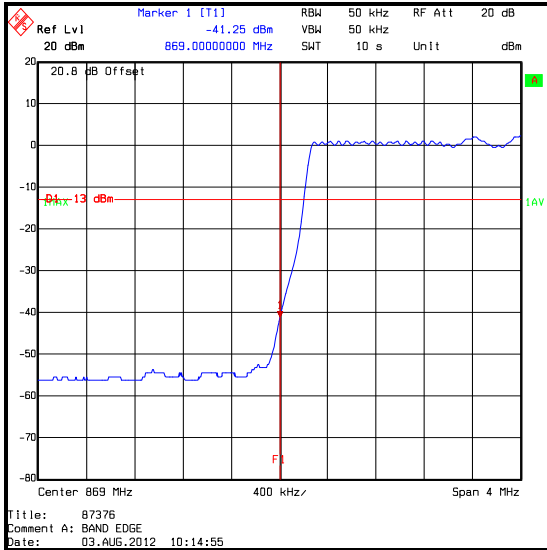
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
869.0	-40.5	-13.0	27.5	Complied
894.0	-42.1	-13.0	29.1	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 5 MHz Bandwidth 16QAM / Downlink

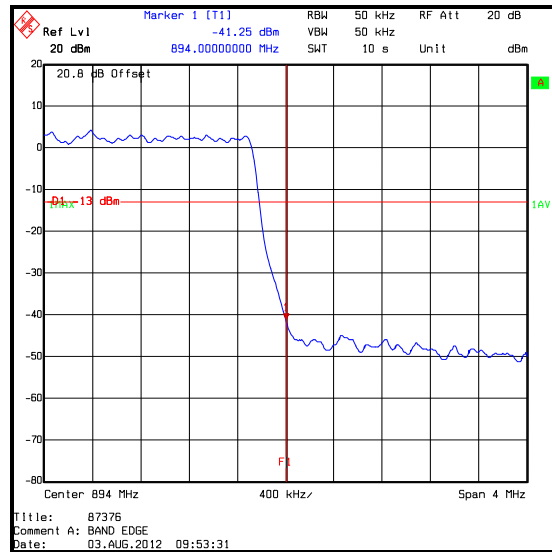
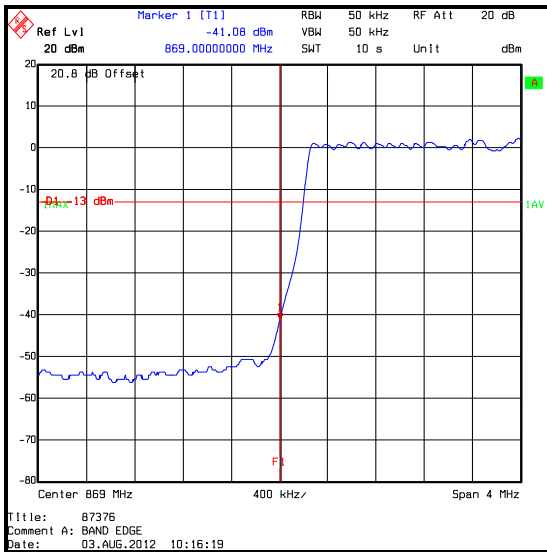
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
869.0	-41.3	-13.0	28.3	Complied
894.0	-42.7	-13.0	29.7	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 5 MHz Bandwidth 64QAM / Downlink

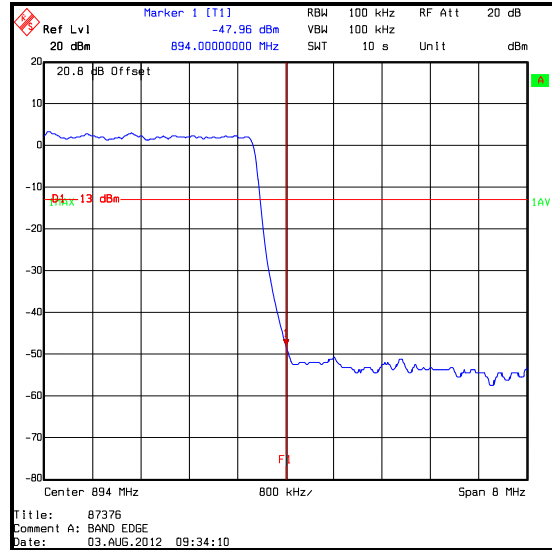
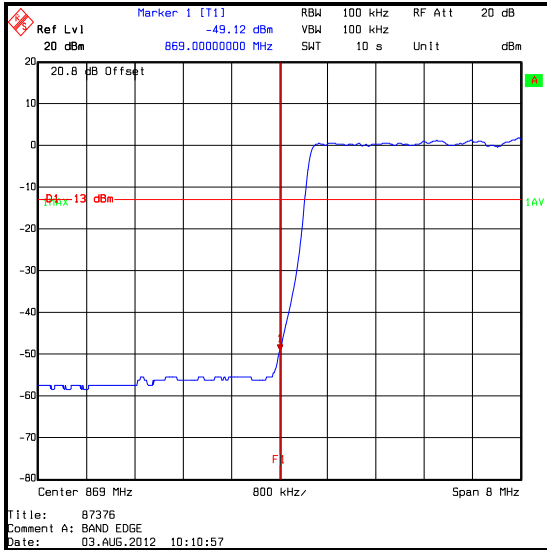
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
869.0	-41.1	-13.0	28.1	Complied
894.0	-41.3	-13.0	28.3	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 10 MHz Bandwidth QPSK / Downlink

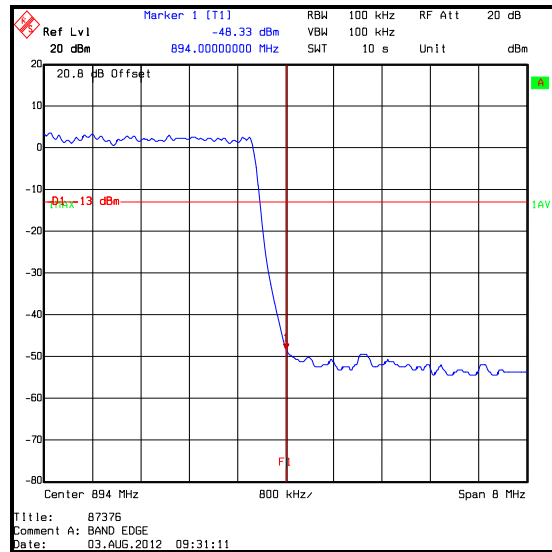
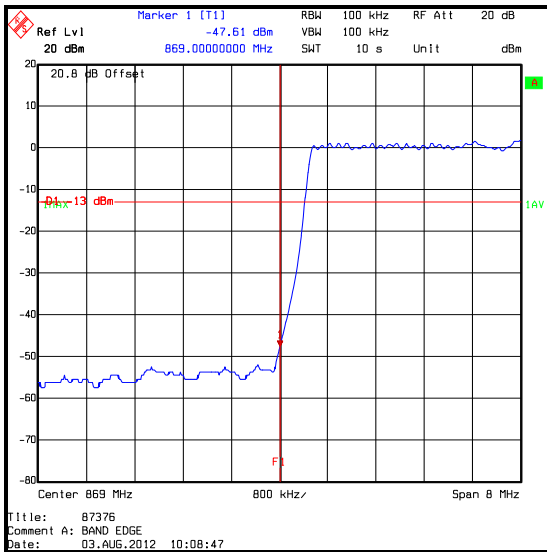
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
869.0	-49.1	-13.0	36.1	Complied
894.0	-48.0	-13.0	35.0	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 10 MHz Bandwidth 16QAM / Downlink

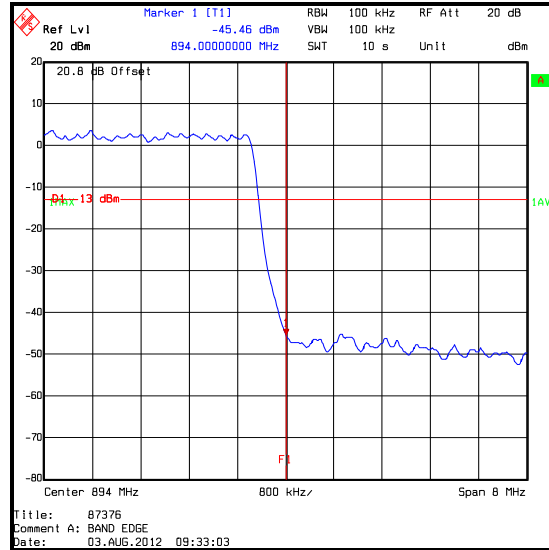
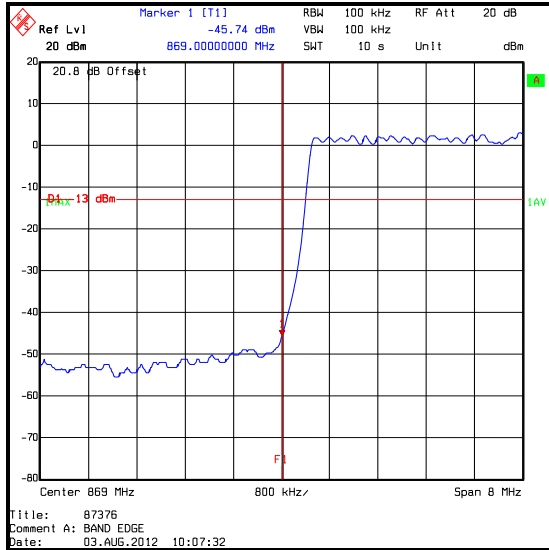
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
869.0	-47.6	-13.0	34.6	Complied
894.0	-48.3	-13.0	35.3	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 10 MHz Bandwidth 64QAM / Downlink

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
869.0	-45.7	-13.0	32.7	Complied
894.0	-45.5	-13.0	32.5	Complied



5.3. Test Results Part 24**5.3.1. AC Conducted Spurious Emissions****Test Summary:**

Test Engineer:	Patrick Jones	Test Date:	25 June 2012
Test Sample Serial Number:	11120002		

FCC Reference:	Part 15.107(a)
Test Method Used:	As detailed in ANSI C63.4 Section 7

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	42

Note(s):

1. For the duration of this test all ports on the EUT were terminated with suitable 50 Ω loads or connected to a laptop computer providing suitable termination e.g. Ethernet port.
2. No RF signal was input into the EUT for this test.

Results: Live / Quasi Peak

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.199	Live	52.9	63.6	10.7	Complied
0.199	Live	53.1	63.6	10.5	Complied
3.592	Live	45.2	56.0	10.8	Complied
4.992	Live	50.5	56.0	5.5	Complied
5.982	Live	53.8	60.0	6.2	Complied
6.454	Live	53.7	60.0	6.3	Complied
17.632	Live	43.8	60.0	16.2	Complied
17.965	Live	44.7	60.0	15.3	Complied

Results: Live / Average

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.199	Live	51.8	53.6	1.8	Complied
0.334	Live	47.8	49.3	1.5	Complied
3.637	Live	37.9	46.0	8.1	Complied
5.023	Live	44.2	50.0	5.8	Complied
6.306	Live	47.0	50.0	3.0	Complied
17.610	Live	38.9	50.0	11.1	Complied
18.033	Live	38.8	50.0	11.2	Complied

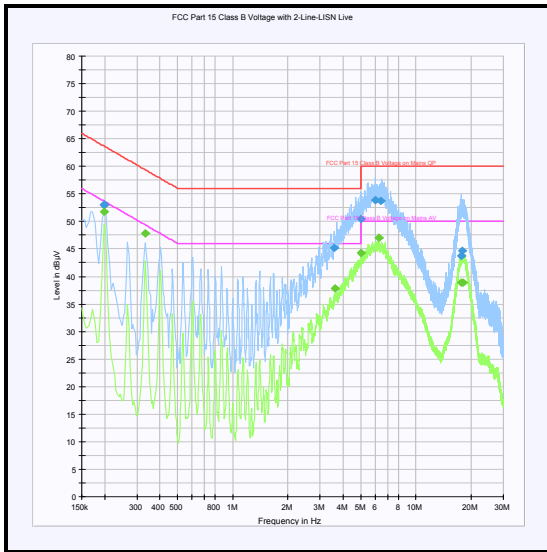
Results: Neutral / Quasi Peak

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
1.401	Neutral	40.8	56.0	15.2	Complied
1.599	Neutral	39.8	56.0	16.2	Complied
1.671	Neutral	40.5	56.0	15.5	Complied
1.869	Neutral	39.9	56.0	16.1	Complied
1.941	Neutral	38.6	56.0	17.4	Complied
3.426	Neutral	39.2	56.0	16.8	Complied
4.969	Neutral	42.0	56.0	14.0	Complied
10.194	Neutral	53.5	60.0	6.5	Complied
10.756	Neutral	53.4	60.0	6.6	Complied
18.933	Neutral	40.0	60.0	20.0	Complied

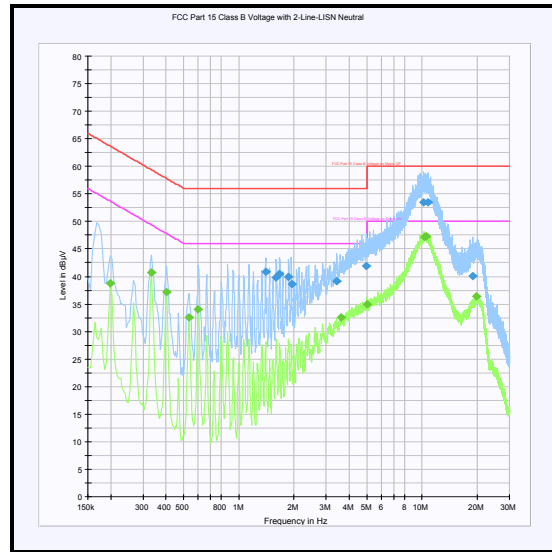
AC Conducted Spurious Emissions (continued)

Results: Neutral / Average

Frequency (MHz)	Line	Level (dB μ V)	Limit (dB μ V)	Margin (dB)	Result
0.199	Neutral	38.7	53.6	14.9	Complied
0.334	Neutral	40.7	49.3	8.6	Complied
0.402	Neutral	37.2	47.8	10.6	Complied
0.532	Neutral	32.5	46.0	13.5	Complied
0.600	Neutral	34.0	46.0	12.0	Complied
3.610	Neutral	32.6	46.0	13.4	Complied
5.014	Neutral	35.0	50.0	15.0	Complied
10.266	Neutral	47.2	50.0	2.8	Complied
10.509	Neutral	47.3	50.0	2.7	Complied
19.824	Neutral	36.4	50.0	13.6	Complied



Live



Neutral

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

5.3.2. Transmitter Conducted Output Power**Test Summary:**

Test Engineer:	Patrick Jones	Test Date:	25 June 2012 to 08 August 2012
Test Sample Serial Number:	11120002		

FCC Reference:	Part 2.1046(a) & 24.232
Test Method Used:	FCC CFR Part 2.1046(a)

Environmental Conditions:

Temperature (°C):	23 & 25
Relative Humidity (%):	40 & 51

Note(s):

1. The output port of the EUT was connected directly to a spectrum analyser via suitable attenuation. The cable and attenuator was calibrated prior to use and the loss incorporated into the measurement as an RF level offset.
2. The channel power function of the spectrum analyser was used with an average detector. The channel bandwidth was set accordingly for each modulation scheme e.g. WCDMA has a 5 MHz bandwidth.
3. For each channel tested, a corresponding filter was activated using the EUT's graphical user interface on a laptop PC.
4. In order to measure the maximum gain, the input signal was increased in steps of 1 dB from -60 dB to find the minimum input level at which maximum output power is achieved for that modulation scheme. For each case the input level is recorded.
5. For each channel and modulation scheme, the input signal was increased by 10 dB and the power was re-measured. In each case, this did not increase the output power; therefore, the worst case was recorded.

Transmitter Conducted Output Power (continued)**Results: GSM GMSK / Uplink**

Channel	Frequency (MHz)	Input Power (dBm)	Conducted Output Power (dBm)	Amplifier Gain (dB)
Bottom	1850.2	-51.0	21.0	72.0
Middle	1879.8	-51.0	21.1	72.1
Top	1909.8	-51.0	20.1	71.1

Results: GSM 8-PSK / Uplink

Channel	Frequency (MHz)	Input Power (dBm)	Conducted Output Power (dBm)	Amplifier Gain (dB)
Bottom	1850.2	-51.0	21.2	72.2
Middle	1879.8	-51.0	21.1	72.1
Top	1909.8	-51.0	20.6	71.6

Results: CDMA / Uplink

Channel	Frequency (MHz)	Input Power (dBm)	Conducted Output Power (dBm)	Amplifier Gain (dB)
Bottom	1851.25	-51.0	19.5	70.5
Middle	1880.00	-51.0	19.6	70.6
Top	1908.75	-51.0	19.0	70.0

Results: WCDMA / Uplink

Channel	Frequency (MHz)	Input Power (dBm)	Conducted Output Power (dBm)	Amplifier Gain (dB)
Bottom	1852.4	-51.0	19.2	70.2
Middle	1880.0	-51.0	19.6	70.6
Top	1907.6	-51.0	19.2	70.2

Transmitter Conducted Output Power (continued)**Results: LTE / Uplink**

Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Input Power (dBm)	Conducted Output Power (dBm)	Amplifier Gain (dB)
QPSK	1.4	Bottom	1850.7	-51.0	19.2	70.2
		Middle	1880.0	-51.0	19.4	70.4
		Top	1909.3	-51.0	18.2	69.2
	3.0	Bottom	1851.5	-51.0	18.8	69.8
		Middle	1880.0	-51.0	19.4	70.4
		Top	1908.5	-51.0	17.9	68.9
	5.0	Bottom	1852.5	-51.0	18.7	69.7
		Middle	1880.0	-51.0	19.4	70.4
		Top	1907.5	-51.0	18.1	69.1
	10.0	Bottom	1855.0	-51.0	18.7	69.7
		Middle	1880.0	-51.0	18.7	69.7
		Top	1905.0	-51.0	18.4	69.4
	15.0	Bottom	1857.5	-51.0	18.8	69.8
		Middle	1880.0	-51.0	18.6	69.6
		Top	1902.5	-51.0	18.7	69.7
	20.0	Bottom	1860.0	-51.0	18.9	69.9
		Middle	1880.0	-51.0	18.8	69.8
		Top	1900.0	-51.0	18.7	69.7
16QAM	1.4	Bottom	1850.7	-51.0	19.3	70.3
		Middle	1880.0	-51.0	18.7	69.7
		Top	1909.3	-51.0	18.3	69.3
	3.0	Bottom	1851.5	-51.0	18.9	69.9
		Middle	1880.0	-51.0	18.4	69.4
		Top	1908.5	-51.0	18.0	69.0
	5.0	Bottom	1852.5	-51.0	18.7	69.7
		Middle	1880.0	-51.0	18.3	69.3
		Top	1907.5	-51.0	18.1	69.1
	10.0	Bottom	1855.0	-51.0	18.8	69.8
		Middle	1880.0	-51.0	18.7	69.7
		Top	1905.0	-51.0	18.4	69.4
	15.0	Bottom	1857.5	-51.0	18.9	69.9
		Middle	1880.0	-51.0	18.7	69.7
		Top	1902.5	-51.0	18.6	69.6
	20.0	Bottom	1860.0	-51.0	17.9	68.9
		Middle	1880.0	-51.0	18.6	69.6
		Top	1900.0	-51.0	18.7	69.7

Transmitter Conducted Output Power (continued)**Results: LTE / Uplink**

64QAM	1.4	Bottom	1850.7	-51.0	19.2	70.2
		Middle	1880.0	-51.0	18.8	69.8
		Top	1909.3	-51.0	18.2	69.2
	3.0	Bottom	1851.5	-51.0	18.9	69.9
		Middle	1880.0	-51.0	19.3	70.3
		Top	1908.5	-51.0	17.9	68.9
	5.0	Bottom	1852.5	-51.0	18.7	69.7
		Middle	1880.0	-51.0	19.2	70.2
		Top	1907.5	-51.0	18.1	69.1
	10.0	Bottom	1855.0	-51.0	18.7	69.7
		Middle	1880.0	-51.0	18.7	69.7
		Top	1905.0	-51.0	18.4	69.4
	15.0	Bottom	1857.5	-51.0	18.8	69.8
		Middle	1880.0	-51.0	18.7	69.7
		Top	1902.5	-51.0	18.6	69.6
	20.0	Bottom	1860.0	-51.0	18.9	69.9
		Middle	1880.0	-51.0	18.7	69.7
		Top	1900.0	-51.0	18.8	69.8

Transmitter Conducted Output Power (continued)**Results: GMSK- Downlink**

Channel	Frequency (MHz)	Input Power (dBm)	Conducted Output Power (dBm)	Amplifier Gain (dB)
Bottom	1930.2	-51.0	21.0	72.0
Middle	1959.8	-51.0	20.7	71.7
Top	1989.8	-51.0	20.9	71.9

Results: 8-PSK- Downlink

Channel	Frequency (MHz)	Input Power (dBm)	Conducted Output Power (dBm)	Amplifier Gain (dB)
Bottom	1930.2	-51.0	20.7	71.7
Middle	1959.8	-51.0	21.5	72.5
Top	1989.8	-51.0	20.2	71.2

Results: CDMA- Downlink

Channel	Frequency (MHz)	Input Power (dBm)	Conducted Output Power (dBm)	Amplifier Gain (dB)
Bottom	1931.25	-51.0	19.4	70.4
Middle	1960.00	-51.0	19.3	70.3
Top	1988.75	-51.0	20.1	71.1

Results: WCDMA / Downlink

Channel	Frequency (MHz)	Input Power (dBm)	Conducted Output Power (dBm)	Amplifier Gain (dB)
Bottom	1932.4	-51.0	19.4	70.4
Middle	1960.0	-51.0	19.9	70.9
Top	1987.6	-51.0	19.9	70.9

Transmitter Conducted Output Power (continued)**Results: LTE / Downlink**

Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Input Power (dBm)	Conducted Output Power (dBm)	Amplifier Gain (dB)
QPSK	1.4	Bottom	1930.7	-51.0	18.5	69.5
		Middle	1960.0	-51.0	19.5	70.5
		Top	1989.3	-51.0	19.4	70.4
	3.0	Bottom	1931.5	-51.0	18.3	69.3
		Middle	1960.0	-51.0	19.2	70.2
		Top	1988.5	-51.0	19.3	70.3
	5.0	Bottom	1932.5	-51.0	18.5	69.5
		Middle	1960.0	-51.0	19.2	70.2
		Top	1987.5	-51.0	18.3	69.3
	10.0	Bottom	1935.0	-51.0	19.3	70.3
		Middle	1960.0	-51.0	19.0	70.0
		Top	1985.0	-51.0	19.3	70.3
	15.0	Bottom	1937.5	-51.0	19.1	70.1
		Middle	1960.0	-51.0	19.0	70.0
		Top	1982.5	-51.0	20.4	71.4
20.0	Bottom	1940.0	-51.0	19.2	70.2	
	Middle	1960.0	-51.0	19.1	70.1	
	Top	1980.0	-51.0	20.5	71.5	
16QAM	1.4	Bottom	1930.7	-51.0	18.1	69.1
		Middle	1960.0	-51.0	19.6	70.6
		Top	1989.3	-51.0	18.6	69.6
	3.0	Bottom	1931.5	-51.0	18.3	69.3
		Middle	1960.0	-51.0	19.2	70.2
		Top	1988.5	-51.0	19.3	70.3
	5.0	Bottom	1932.5	-51.0	18.5	69.5
		Middle	1960.0	-51.0	19.2	70.2
		Top	1987.5	-51.0	19.3	70.3
	10.0	Bottom	1935.0	-51.0	19.3	70.3
		Middle	1960.0	-51.0	19.0	70.0
		Top	1985.0	-51.0	19.3	70.3
	15.0	Bottom	1937.5	-51.0	19.2	70.2
		Middle	1960.0	-51.0	19.0	70.0
		Top	1982.5	-51.0	20.4	71.4
20.0	Bottom	1940.0	-51.0	19.1	70.1	
	Middle	1960.0	-51.0	19.0	70.0	
	Top	1980.0	-51.0	20.4	71.4	

Transmitter Conducted Output Power (continued)**Results: LTE / Downlink**

64QAM	1.4	Bottom	1930.7	-51.0	18.4	69.4
		Middle	1960.0	-51.0	19.4	70.4
		Top	1989.3	-51.0	19.5	70.5
	3.0	Bottom	1931.5	-51.0	18.3	69.3
		Middle	1960.0	-51.0	19.1	70.1
		Top	1988.5	-51.0	19.3	70.3
	5.0	Bottom	1932.5	-51.0	18.4	69.4
		Middle	1960.0	-51.0	19.2	70.2
		Top	1987.5	-51.0	19.3	70.3
	10.0	Bottom	1935.0	-51.0	19.2	70.2
		Middle	1960.0	-51.0	19.0	70.0
		Top	1985.0	-51.0	19.2	70.2
	15.0	Bottom	1937.5	-51.0	19.2	70.2
		Middle	1960.0	-51.0	20.0	71.0
		Top	1982.5	-51.0	20.4	71.4
	20.0	Bottom	1940.0	-51.0	19.1	70.1
		Middle	1960.0	-51.0	19.1	70.1
		Top	1980.0	-51.0	20.4	71.4

5.3.3. Transmitter Frequency Stability (Temperature Variation)**Test Summary:**

Test Engineer:	Nick Steele	Test Date:	07 August 2012
Test Sample Serial Number:	11120002		

FCC Part:	2.1055 & 24.235
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.2 referencing FCC CFR Part 2.1055

Environmental Conditions:

Ambient Temperature (°C):	25
Relative Humidity (%):	35

Results: Middle Channel (1960.0 MHz)

Temperature (°C)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit	Result
-30	1960.000000	0	0	Note 3	Complied
-20	1960.000000	0	0	Note 3	Complied
-10	1960.000000	0	0	Note 3	Complied
0	1960.000000	0	0	Note 3	Complied
10	1960.000000	0	0	Note 3	Complied
20	1960.000000	0	0	Note 3	Complied
30	1960.000000	0	0	Note 3	Complied
40	1960.000000	0	0	Note 3	Complied
50	1960.000000	0	0	Note 3	Complied

Note(s):

1. A signal generator was set to produce a CW signal at maximum input level on the centre channel of the downlink pass band. The accuracy of the signal generator was verified by using the frequency count function of a calibrated spectrum analyser prior to performing any measurements. A calibrated Rohde & Schwarz ESU test receiver with the same measurement settings as the spectrum analyser was used to monitor the CW output of the EUT. To ensure the accuracy and stability of all measurements, the reference 10 MHz clock from the test receiver was utilized to provide a reference clock for the other test equipment. The signal generator, spectrum analyser and EUT RF connectors were connected using suitable RF cables and an RF power divider. The measured frequency of the signal generator at the EUT input was then compared to the measured frequency of the output of the EUT and the difference was recorded in the table above as Frequency Error in Hz and ppm. This was compared to the limit to obtain the margin.
2. Temperature was monitored throughout the test with a calibrated digital thermometer.
3. No difference in the frequencies measured at the input and outputs of the EUT were recorded therefore the frequency stability is sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.4. Transmitter Frequency Stability (Voltage Variation)**Test Summary:**

Test Engineer:	Nick Steele	Test Date:	07 August 2012
Test Sample Serial Number:	11120002		

FCC Part:	2.1055 & 24.235
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.2 referencing FCC CFR Part 2.1055

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	35

Results: Middle Channel (1960.0 MHz)

Supply Voltage (VAC)	Measured Frequency (MHz)	Frequency Error (Hz)	Frequency Error (ppm)	Limit	Result
102	1960.000000	0	0	Note 3	Complied
138	1960.000000	0	0	Note 3	Complied

Note(s):

1. A signal generator was set to produce a CW signal at maximum input level on the centre channel of the downlink pass band. The accuracy of the signal generator was verified by using the frequency count function of a calibrated spectrum analyser prior to performing any measurements. A calibrated Rohde & Schwarz ESU test receiver with the same measurement settings as the spectrum analyser was used to monitor the CW output of the EUT. To ensure the accuracy and stability of all measurements, the reference 10 MHz clock from the test receiver was utilized to provide a reference clock for the other test equipment. The signal generator, spectrum analyser and EUT RF connectors were connected using suitable RF cables and an RF power divider. The measured frequency of the signal generator at the EUT input was then compared to the measured frequency of the output of the EUT and the difference was recorded in the table above as Frequency Error in Hz and ppm. This was compared to the limit to obtain the margin.
2. Voltage was monitored throughout the test with a calibrated digital voltmeter.
3. No difference in the frequencies measured at the input and outputs of the EUT were recorded therefore the frequency stability is sufficient to ensure that the fundamental emission stays within the authorized frequency block.

5.3.5. Transmitter Occupied Bandwidth**Test Summary:**

Test Engineer:	Patrick Jones	Test Dates:	21 May 2012 to 06 August 2012
Test Sample Serial Number:	11120002		

FCC Reference:	Part 2.1049
Test Method Used:	As detailed in ANSI C63.4 Section 13.7 referencing FCC CFR Part 2.1049

Environmental Conditions:

Temperature (°C):	23 to 25
Relative Humidity (%):	42 to 47

Note(s):

1. The 99% occupied bandwidth was measured using the Occupied Bandwidth function of a spectrum analyser. A signal generator was connected to the repeater input and the output signal was measured using a spectrum analyser connected to the EUT via suitable RF cables and attenuators.
2. Plots of CDMA and 8-PSK input and output signals are shown at the beginning of the plots section to prove that the signal is not being degraded or altered in any way. There was no distortion of either output signal compared with the respective input signal. The input signal is from the signal generator. The output signal is the output from the EUT (input signal after it has been amplified).
3. For the duration of this test, the input signal to the EUT was set at a level which resulted in maximum rated output power. In all cases, the input signal was increased by 10 dB and re-measured. For each channel and modulation scheme tested, the occupied bandwidth was not altered

Transmitter Occupied Bandwidth (continued)**Results: Uplink**

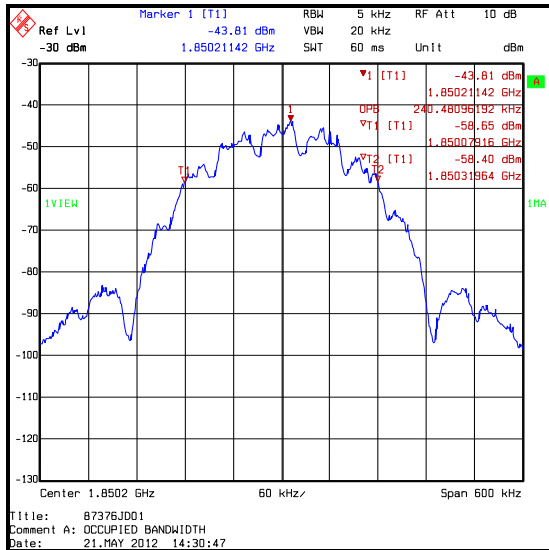
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
GSM GMSK	0.2	Middle	1879.8	244.088
GSM 8-PSK	0.2	Middle	1879.8	241.683
CDMA	1.25	Middle	1880.0	1286.573
WCDMA	5.0	Middle	1880.0	4028.056
LTE QPSK	1.4	Middle	1880.0	1085.772
	3.0	Middle	1880.0	2723.447
	5.0	Middle	1880.0	4509.018
	10.0	Middle	1880.0	9018.036
	15.0	Middle	1880.0	13256.513
	20.0	Middle	1880.0	17434.870
LTE 16QAM	1.4	Middle	1880.0	1085.772
	3.0	Middle	1880.0	2723.447
	5.0	Middle	1880.0	4509.018
	10.0	Middle	1880.0	9078.156
	15.0	Middle	1880.0	13256.513
	20.0	Middle	1880.0	17434.870
LTE 64QAM	1.4	Middle	1880.0	1085.772
	3.0	Middle	1880.0	2723.447
	5.0	Middle	1880.0	4478.958
	10.0	Middle	1880.0	9018.036
	15.0	Middle	1880.0	13256.513
	20.0	Middle	1880.0	17434.870

Transmitter Occupied Bandwidth (continued)**Results: Downlink**

Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Occupied Bandwidth (kHz)
GSM GMSK	0.2	Middle	1959.8	244.088
GSM 8-PSK	0.2	Middle	1959.8	241.683
CDMA	1.25	Middle	1960.0	1286.573
WCDMA	5.0	Middle	1960.0	4058.116
LTE QPSK	1.4	Middle	1960.0	1085.772
	3.0	Middle	1960.0	2741.483
	5.0	Middle	1960.0	4478.960
	10.0	Middle	1960.0	9078.156
	15.0	Middle	1960.0	13256.513
	20.0	Middle	1960.0	17434.870
LTE 16QAM	1.4	Middle	1960.0	1085.772
	3.0	Middle	1960.0	2741.483
	5.0	Middle	1960.0	4478.960
	10.0	Middle	1960.0	9078.156
	15.0	Middle	1960.0	13256.513
	20.0	Middle	1960.0	17555.110
LTE 64QAM	1.4	Middle	1960.0	1085.772
	3.0	Middle	1960.0	2741.483
	5.0	Middle	1960.0	4509.018
	10.0	Middle	1960.0	9138.277
	15.0	Middle	1960.0	13256.513
	20.0	Middle	1960.0	17434.870

Transmitter Occupied Bandwidth (continued)

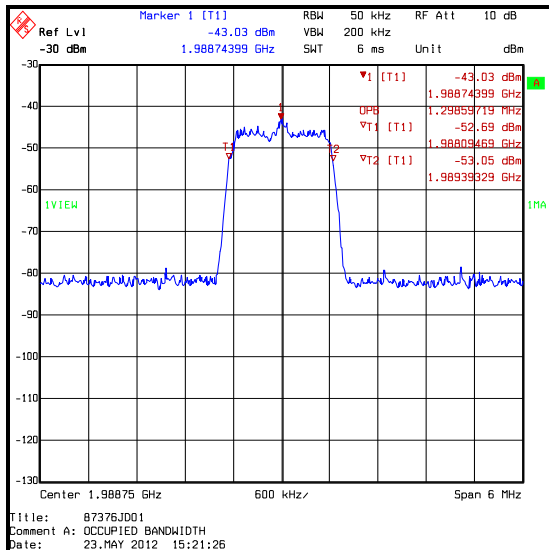
Results: Input Signal versus Output Signal examples



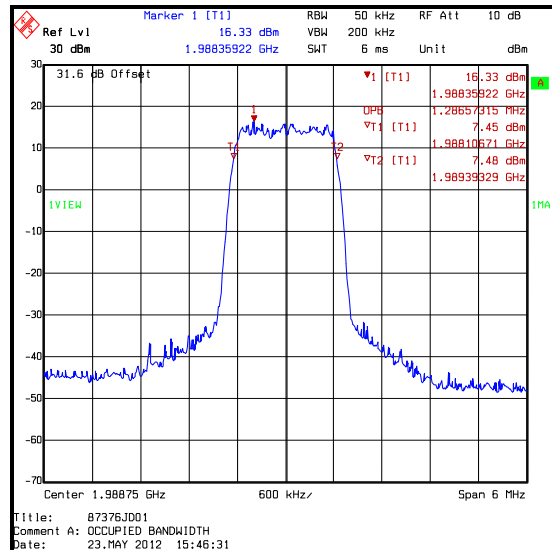
8-PSK Input Signal



8-PSK Output Signal



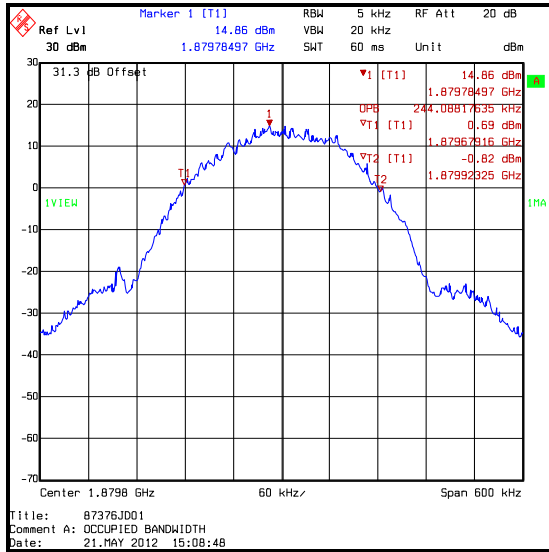
CDMA Input Signal



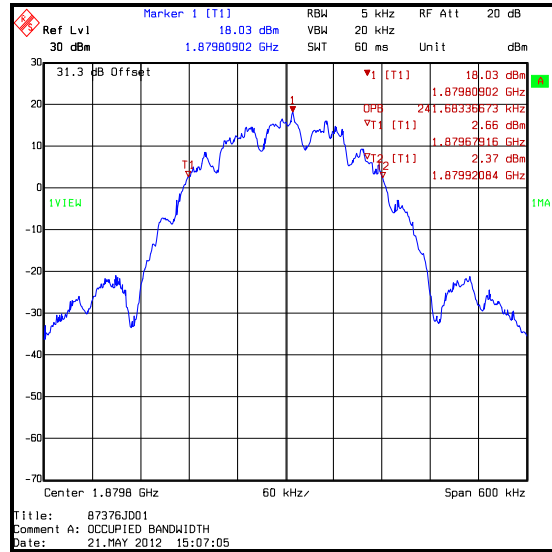
CDMA Output Signal

Transmitter Occupied Bandwidth (continued)

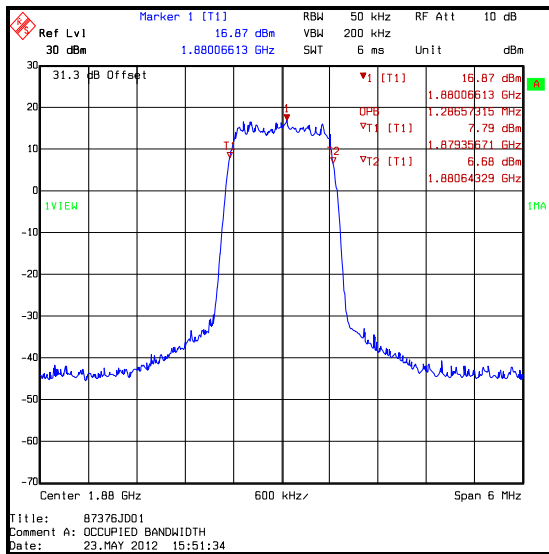
Results: Uplink



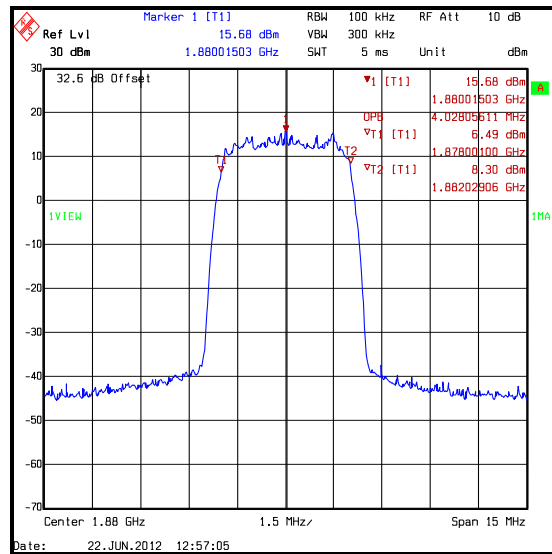
GSM GMSK



GSM 8-PSK



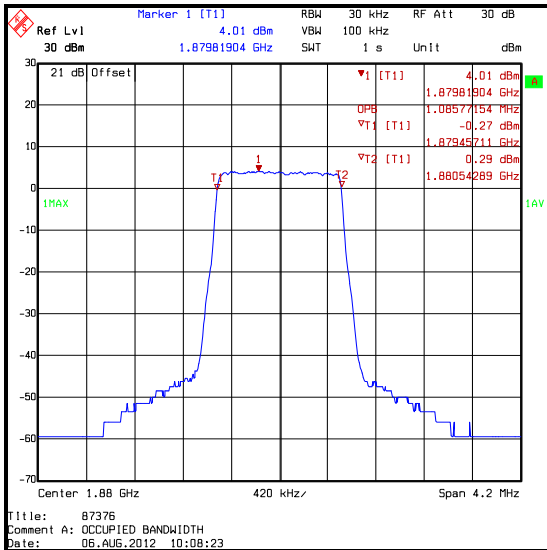
CDMA



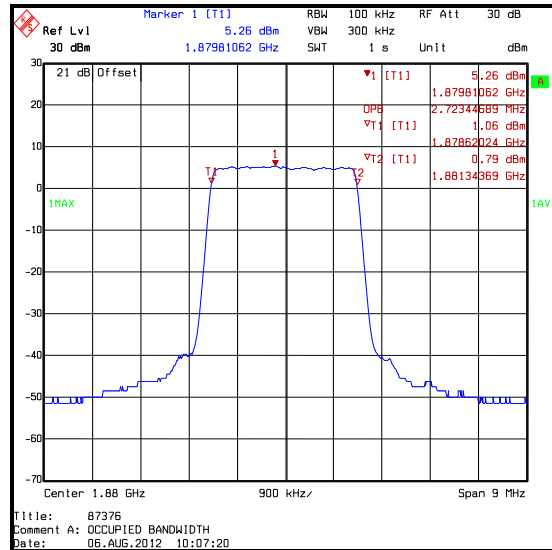
WCDMA

Transmitter Occupied Bandwidth (continued)

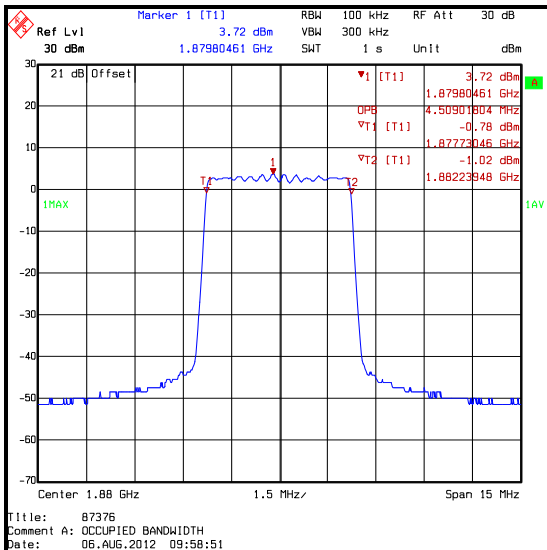
Results: LTE QPSK / Uplink



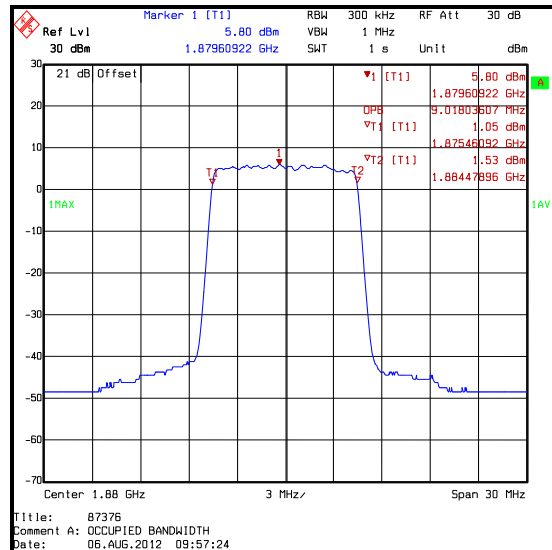
1.4 MHz Bandwidth



3 MHz Bandwidth



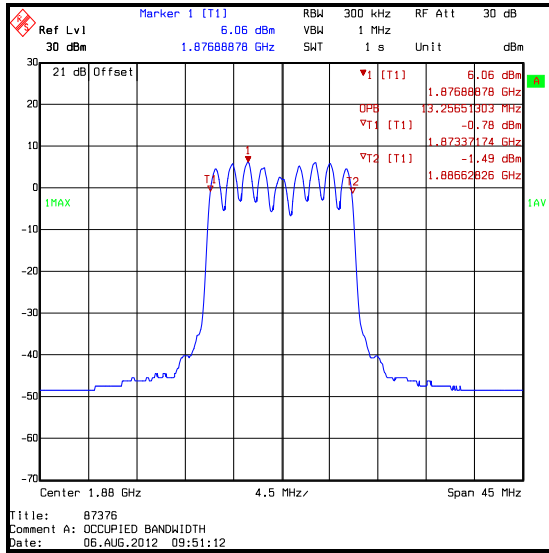
5 MHz Bandwidth



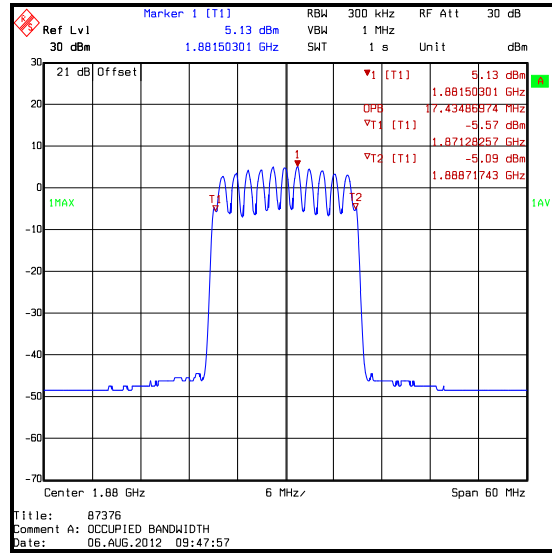
10 MHz Bandwidth

Transmitter Occupied Bandwidth (continued)

Results: LTE QPSK / Uplink



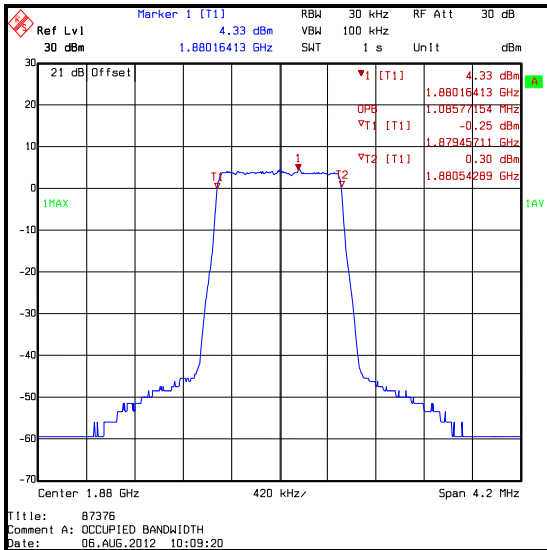
15 MHz Bandwidth



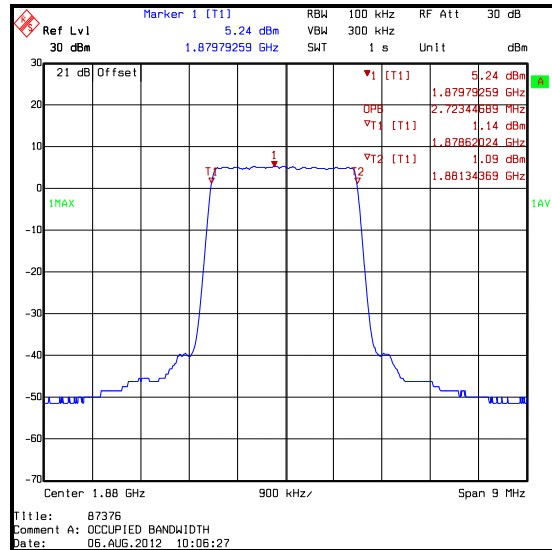
20 MHz Bandwidth

Transmitter Occupied Bandwidth (continued)

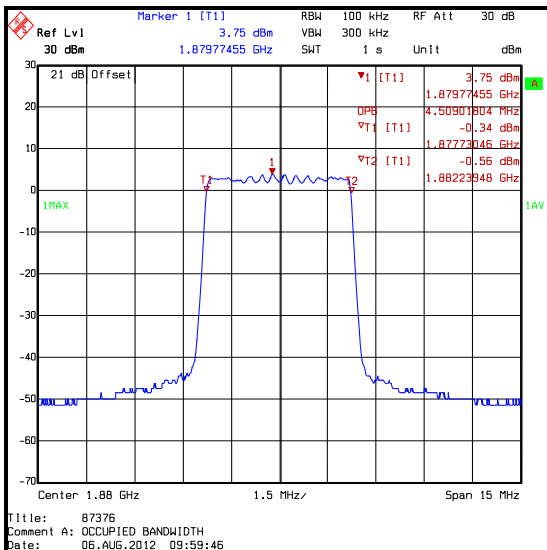
Results: LTE 16QAM / Uplink



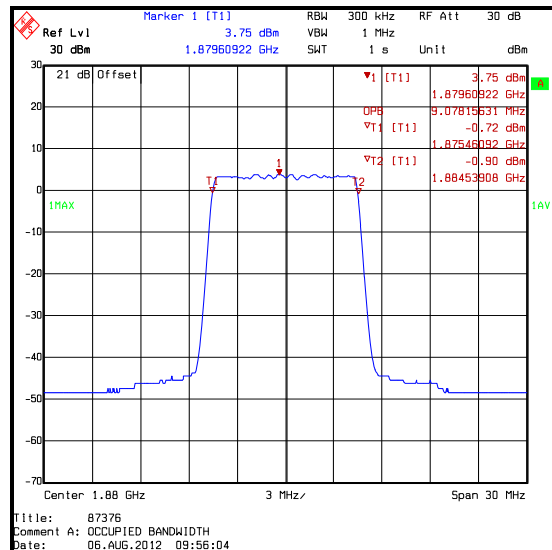
1.4 MHz Bandwidth



3 MHz Bandwidth



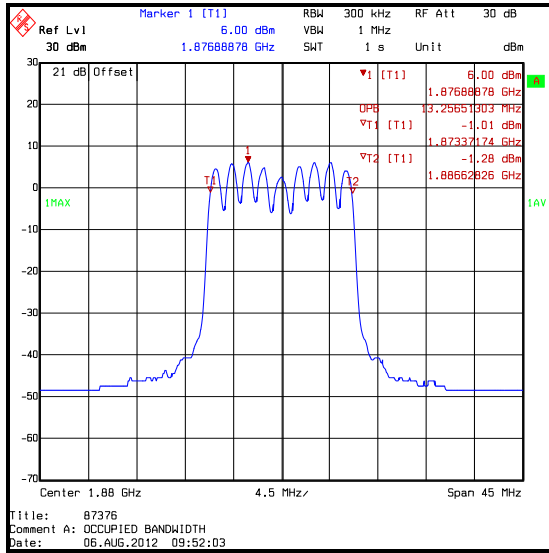
5 MHz Bandwidth



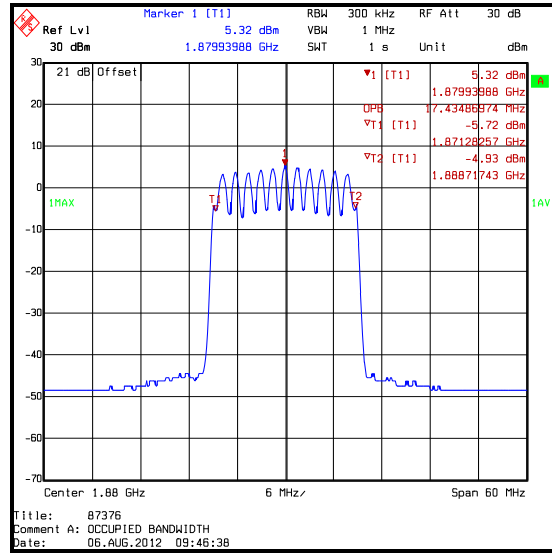
10 MHz Bandwidth

Transmitter Occupied Bandwidth (continued)

Results: LTE 16QAM / Uplink



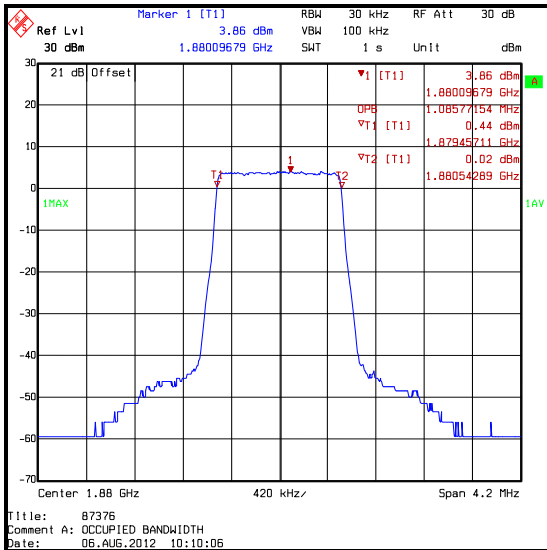
15 MHz Bandwidth



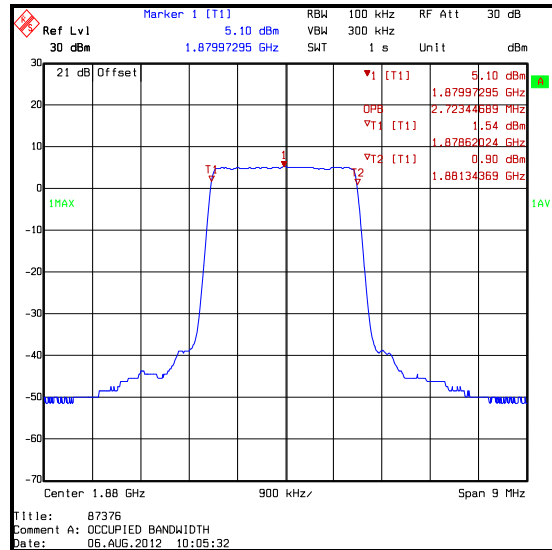
20 MHz Bandwidth

Transmitter Occupied Bandwidth (continued)

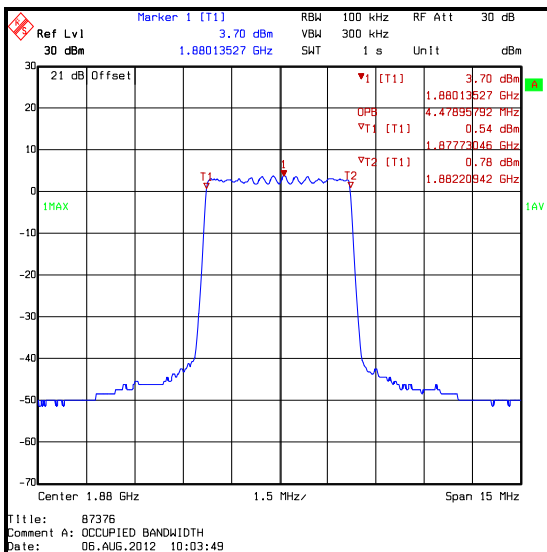
Results: LTE 64QAM / Uplink



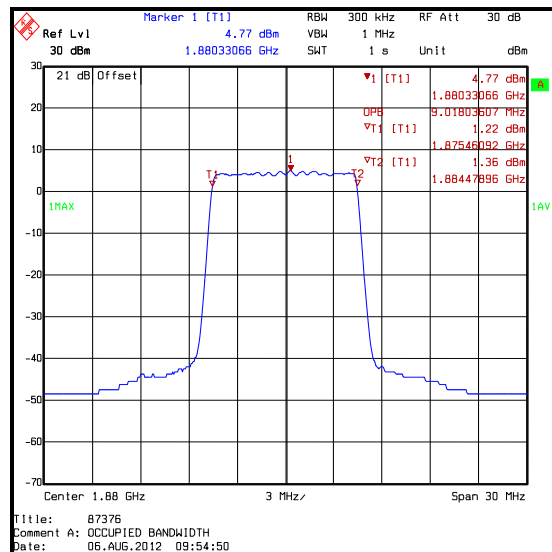
1.4 MHz Bandwidth



3 MHz Bandwidth



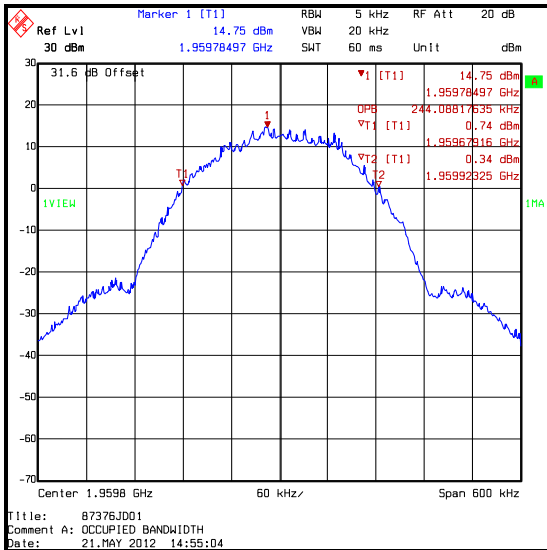
5 MHz Bandwidth



10 MHz Bandwidth

Transmitter Occupied Bandwidth (continued)

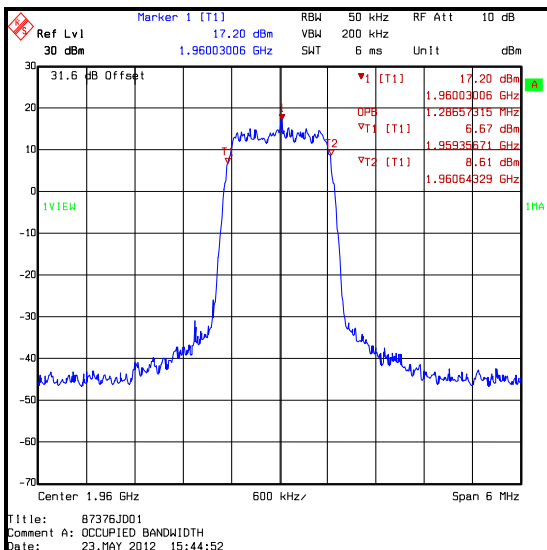
Results: Downlink



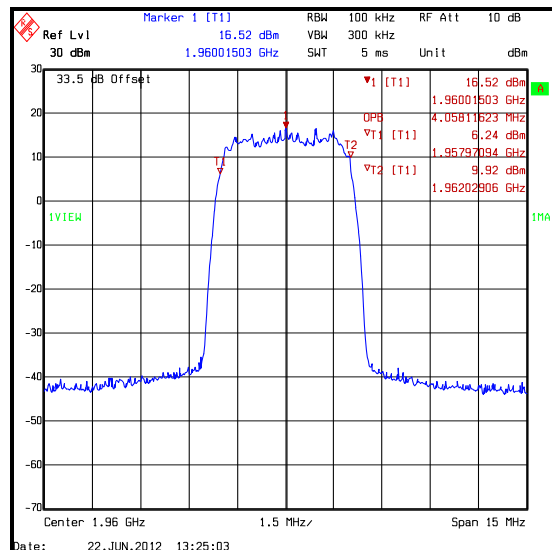
GSM GMSK



GSM 8-PSK



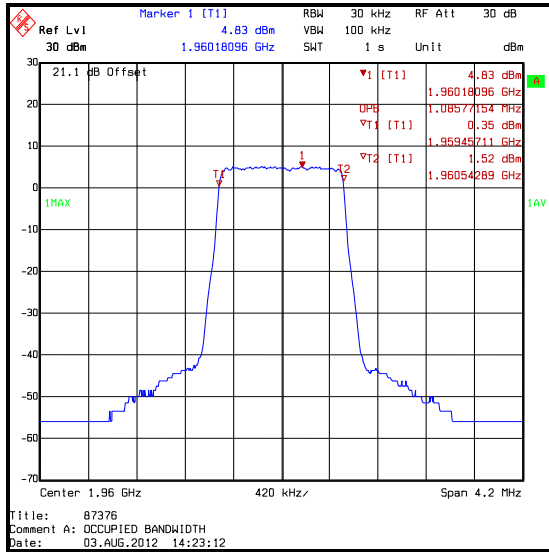
CDMA



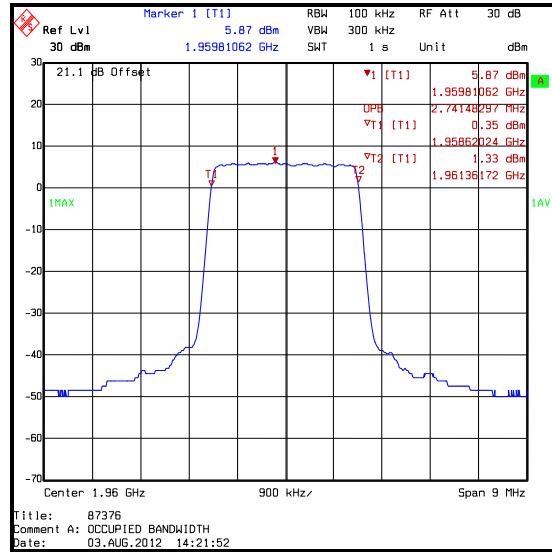
WCDMA

Transmitter Occupied Bandwidth (continued)

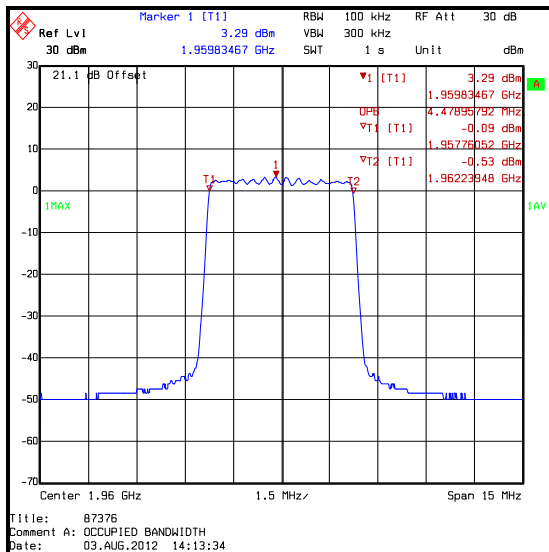
Results: LTE QPSK / Downlink



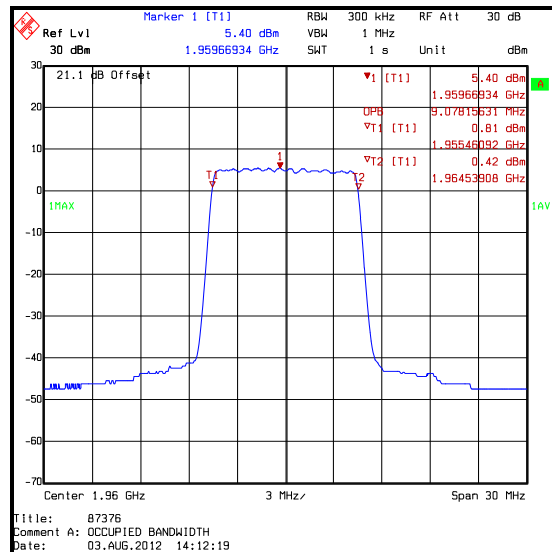
1.4 MHz Bandwidth



3 MHz Bandwidth



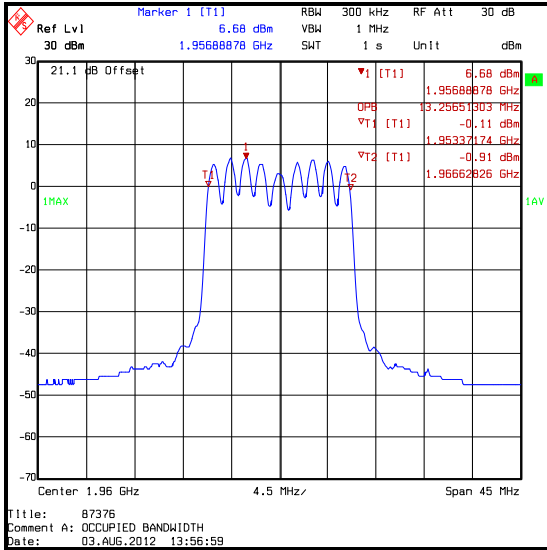
5 MHz Bandwidth



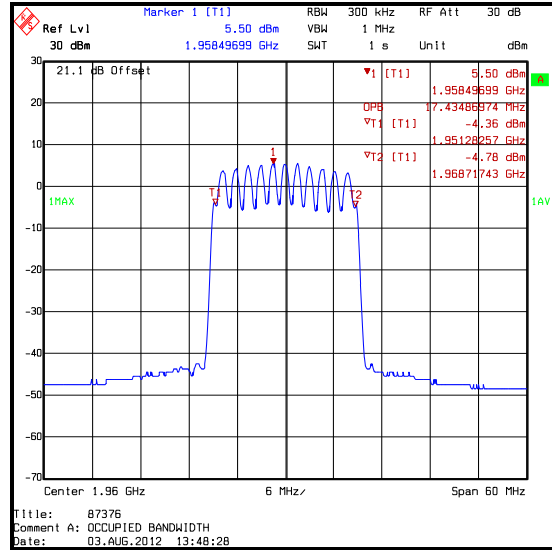
10 MHz Bandwidth

Transmitter Occupied Bandwidth (continued)

Results: LTE QPSK / Downlink



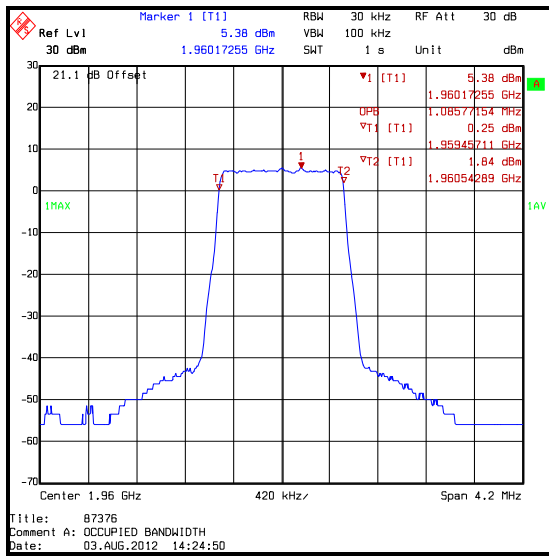
15 MHz Bandwidth



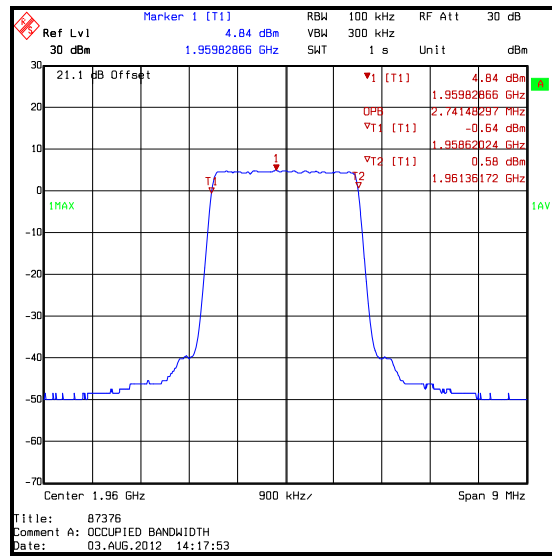
20 MHz Bandwidth

Transmitter Occupied Bandwidth (continued)

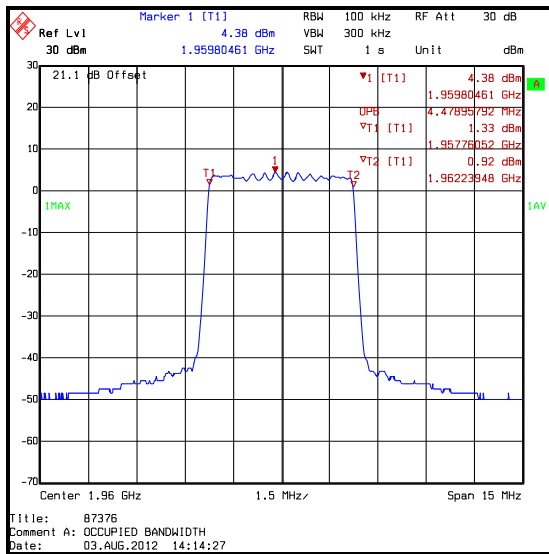
Results: LTE 16QAM / Downlink



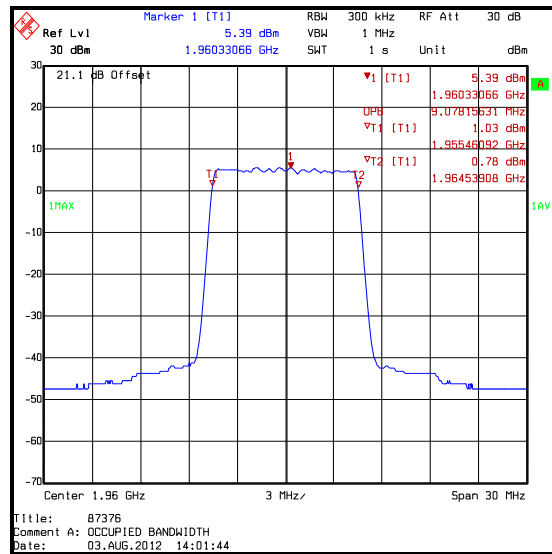
1.4 MHz Bandwidth



3 MHz Bandwidth



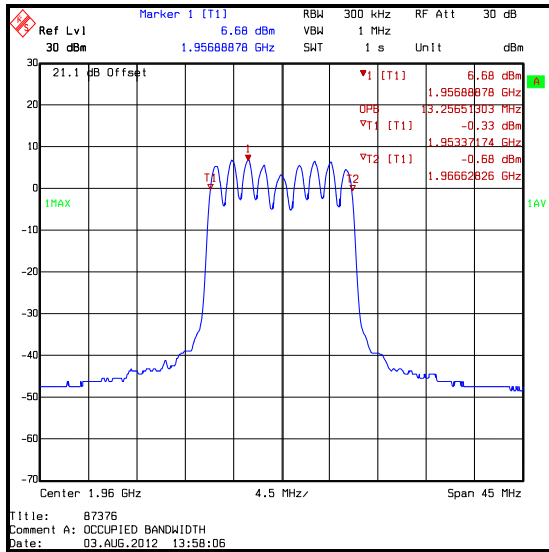
5 MHz Bandwidth



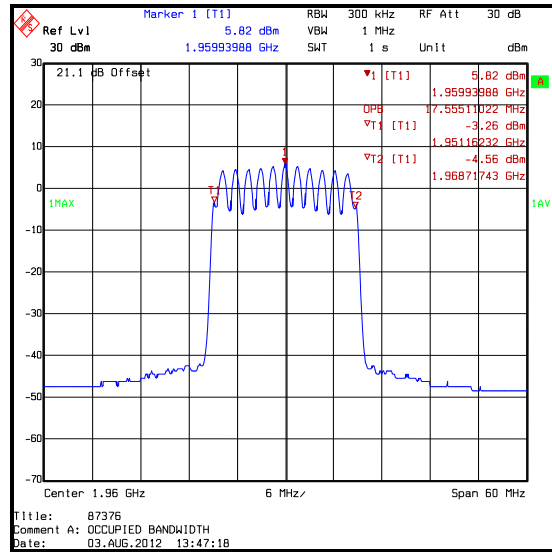
10 MHz Bandwidth

Transmitter Occupied Bandwidth (continued)

Results: LTE 16QAM / Downlink



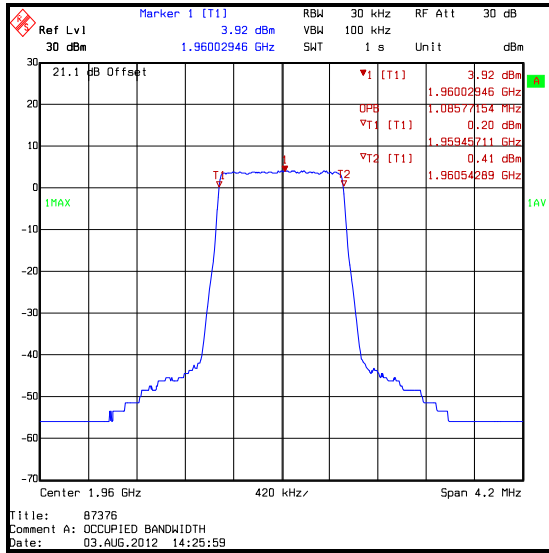
15 MHz Bandwidth



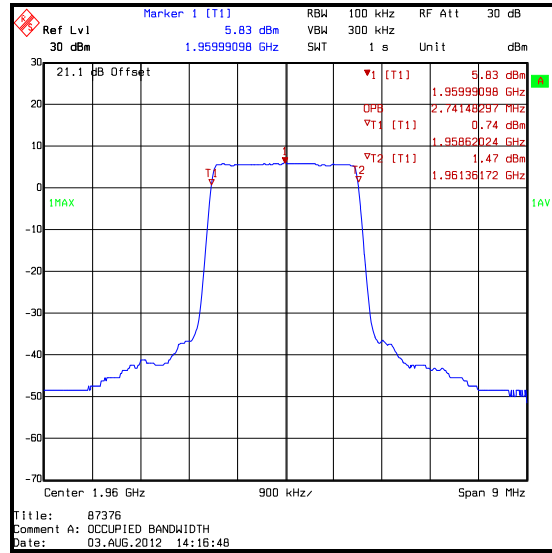
20 MHz Bandwidth

Transmitter Occupied Bandwidth (continued)

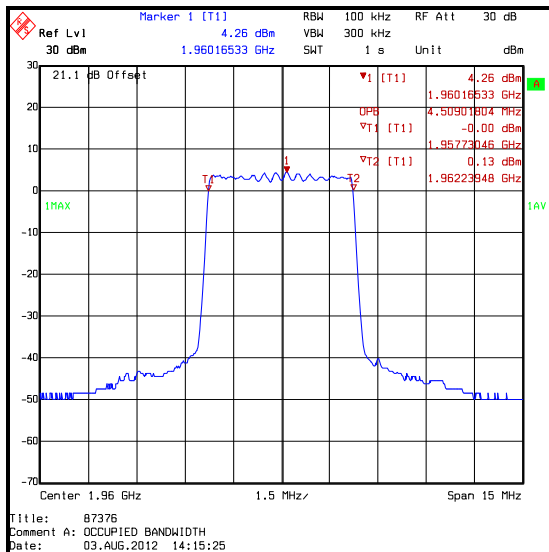
Results: LTE 64QAM / Downlink



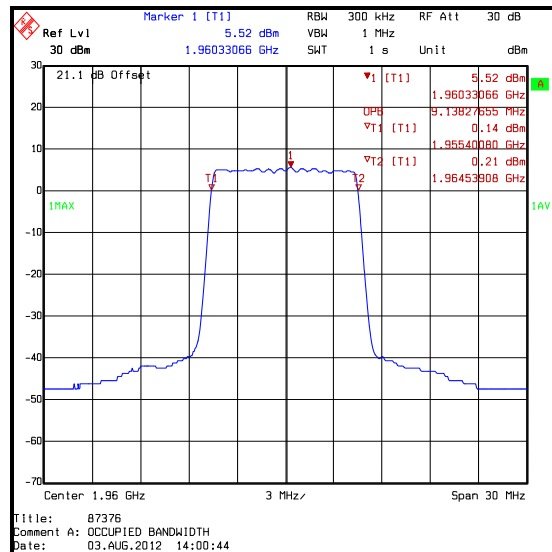
1.4 MHz Bandwidth



3 MHz Bandwidth



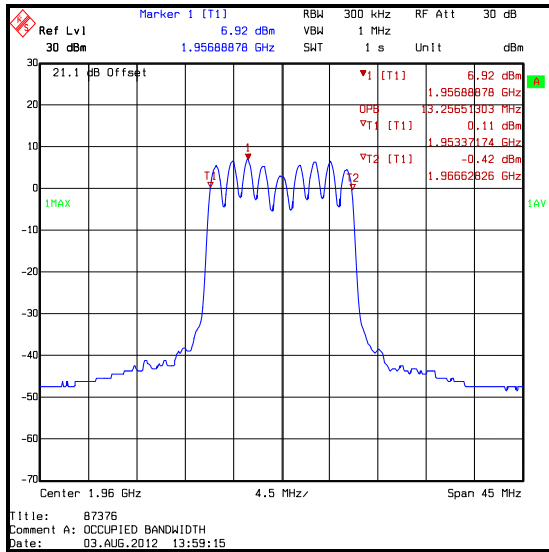
5 MHz Bandwidth



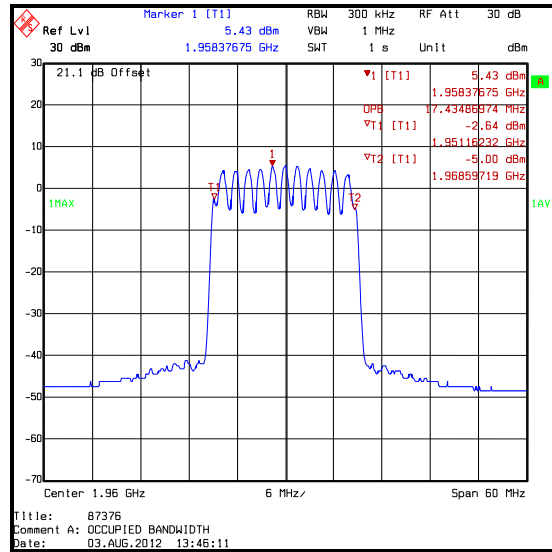
10 MHz Bandwidth

Transmitter Occupied Bandwidth (continued)

Results: LTE 64QAM / Downlink



15 MHz Bandwidth



20 MHz Bandwidth

5.3.6. Transmitter Conducted Emissions

Test Summary:

Test Engineer:	Patrick Jones	Test Dates:	23 October 2012
Test Sample Serial Number:	11120002		

FCC Reference:	Part 2.1051 & 24.238
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.13 referencing FCC CFR Parts 2.1051, 24.238 and FCC Response to Enquiry 792557
Frequency Range:	9 kHz to 20 GHz

Environmental Conditions:

Temperature (°C):	22 to 25
Relative Humidity (%):	40 to 55

Note(s):

1. Three signal generators with appropriate modulation applied were connected to the input port of the EUT using suitable RF cables, circulators and a RF combiner. The RF output of the repeater was connected to a spectrum analyser via suitable cables and attenuators. The cables and attenuators were calibrated before use and the RF level offset was incorporated into the measurements. The signal generator was set to output a suitably modulated signal at the maximum input level for the EUT in accordance with FCC Response to Enquiry 792557.
2. Pre-scans for this test were carried out from 9 kHz to 20 GHz for all supported modulation types. The plots and results shown in the section below were deemed to have the worst case spurious emissions profile. All test results are archived on the company server and available for inspection if required. The worst case results were LTE with 64QAM modulation with the carriers on the bottom channels for Uplink. For Downlink, there were no emissions >20 dB below the limit of above the system noise floor, therefore, the highest noise floor was recorded using GSM/CW.
3. For GSM testing, three CW signals were used, one on the bottom GSM channel and two other signals at the top of the band 600 kHz apart.
4. For CDMA and WCDMA testing, three modulated carriers were used- one on the bottom channel and two at the top of the pass-band, at least one channel width apart.
5. For LTE testing, two modulated carriers were used in two different configurations: one test with the carriers at the bottom of the band, at least one channel width apart; one test with the carriers at the top of the band, at least one channel width apart. The carrier bandwidth used for all LTE tests was 1.4 MHz as this represents the highest dBm/MHz ratio for all applicable bandwidths as shown in the Conducted Output Power section.
6. The combined signal generator output was checked on a spectrum analyser prior to the test in order to determine that there were no intermodulation products coming from the combining network itself and to verify the correct amplitude and frequencies were present at the input to the EUT prior to performing the tests.
7. For any emissions found, the input signal was increased by a further 10 dB and the emissions re-measured.

Transmitter Conducted Emissions (Continued)

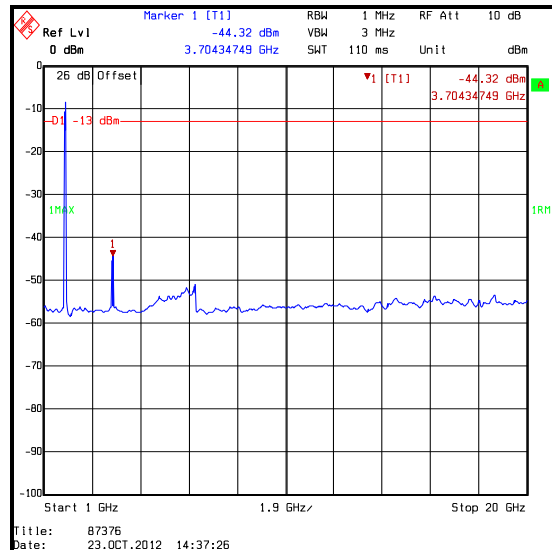
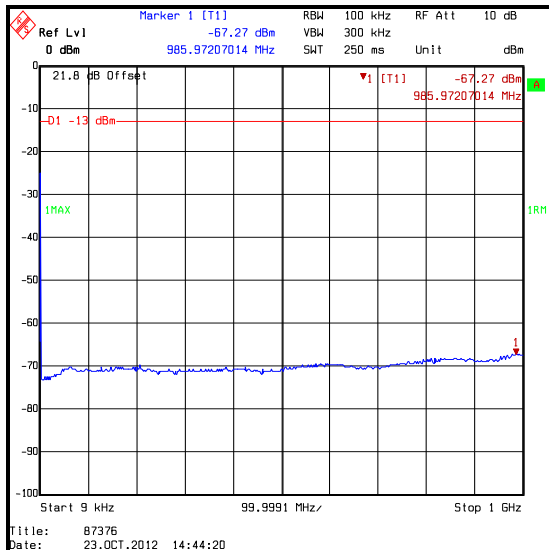
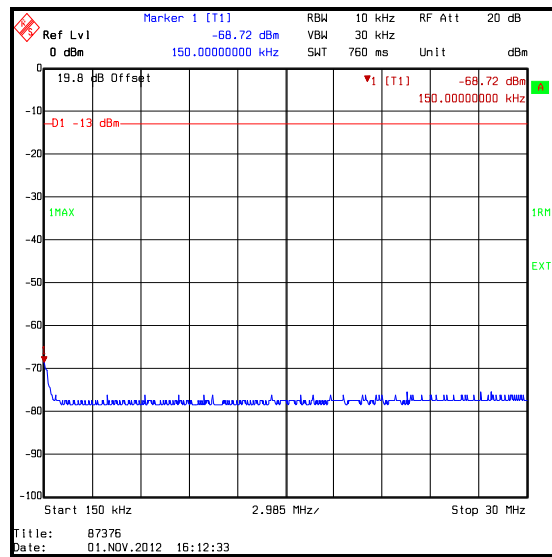
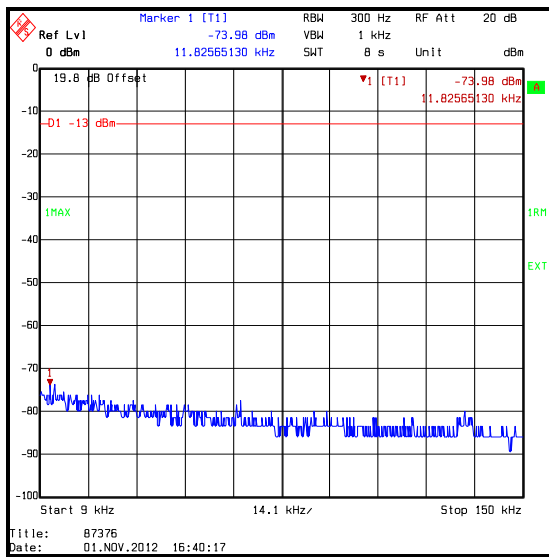
Results: Uplink / Nominal Input Power

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
3704.388	-29.2	-13.0	16.2	Complied

Results: Uplink / Nominal +10 dB Input Power

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
3704.347	-28.6	-13.0	15.6	Complied

Results: Uplink / LTE 64QAM Bottom Channels



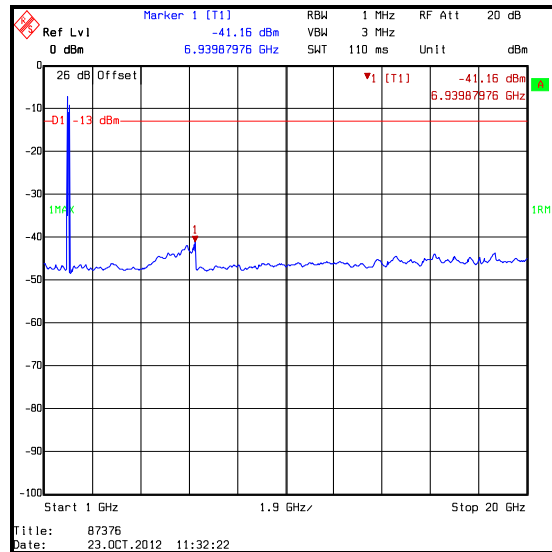
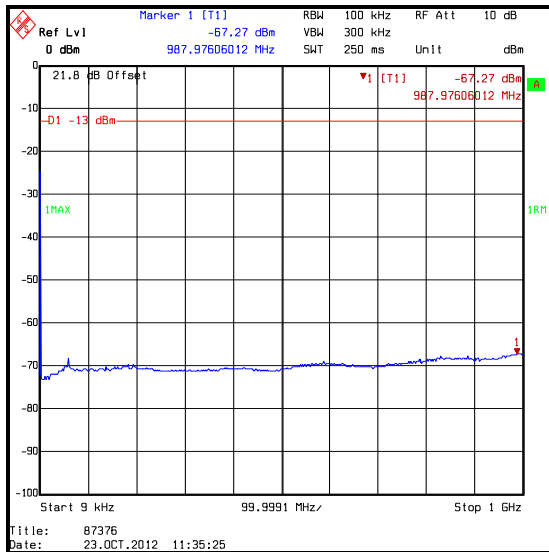
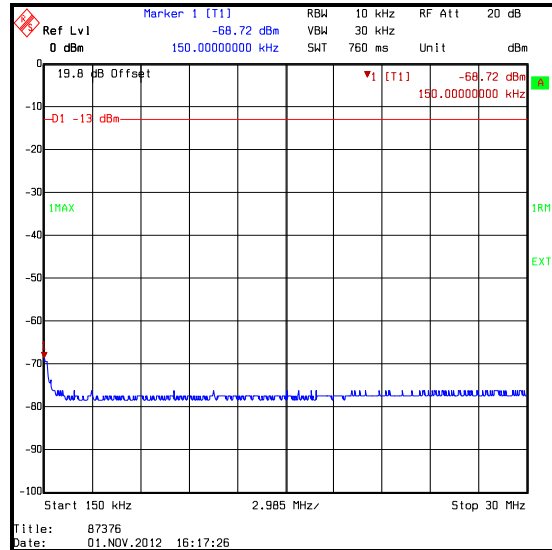
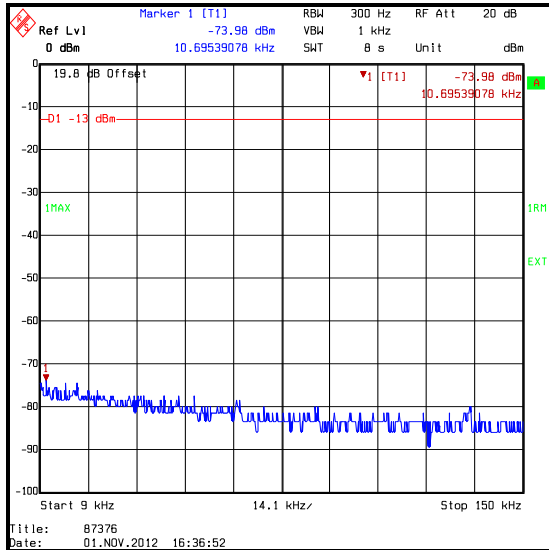
NOTE: This plot covers the 30 MHz to 1 GHz frequency range

Transmitter Conducted Emissions (Continued)

Results: Downlink / GSM CW

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
6939.880	-41.2	-13.0	28.2	Complied

Results: Downlink / GSM CW



NOTE: This plot covers the 30 MHz to 1 GHz frequency range

Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

5.3.7. Transmitter Out of Band Radiated Emissions**Test Summary:**

Test Engineers:	Patrick Jones & Nick Steele	Test Dates:	28 May 2012 & 29 May 2012
Test Sample Serial Number:	11120002		

FCC Reference:	Part 2.1053 & 24.238
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.12 referencing FCC CFR Parts 2.1053 and 24.238
Frequency Range:	30 MHz to 20 GHz

Environmental Conditions:

Temperature (°C):	27 to 29
Relative Humidity (%):	39 to 35

Note(s):

1. A signal generator was connected to the input port of the EUT using a suitable RF cable. The signal generator was located outside the anechoic chamber. The RF output of the repeater was terminated into a suitable 50 Ohm load. The signal generator was set to output a CW signal at the maximum input level for the EUT in accordance with FCC KDB Tracking Number 164446. Pre-scans were performed with the signal generator frequency set to the top channel of the GSM 1900 uplink (1909.8 MHz) and GSM 1900 downlink (1989.8 MHz) bands.
2. For any emissions found, final measurements were performed on bottom, middle and top channels. The input signal was increased by a further 10 dB and the emissions re-measured. In all cases the emission level was not increased. The emission levels recorded in this report were verified by substitution.
3. The uplink and downlink amplifier pass-bands are shown on the 30 MHz to 1 GHz and 1 GHz to 4 GHz plots.
4. All emissions shown on the pre-scan plots were investigated and found to be >20 dB below the limit or ambient. The emission shown was the highest recorded and was consistent for all channels.
5. Measurements below 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.
6. Pre-scans above 1 GHz were performed in a fully anechoic chamber (RFI Asset Number K0002) at a distance of 3 metres. The EUT was placed at a height of 1.5 metres above the test chamber floor in the centre of the chamber turntable. All measurement antennas were placed at a fixed height of 1.5 metres above the test chamber floor, in line with the EUT. Final measurements above 1 GHz were performed in a semi-anechoic chamber (RFI Asset Number K0001) at a distance of 3 metres. The EUT was placed at a height of 80 cm above the reference ground plane in the centre of the chamber turntable. Maximum emission levels were determined by height searching the measurement antenna over the range 1 metre to 4 metres.

Transmitter Out of Band Radiated Emissions (continued)**Results: Uplink / Bottom Channel (1850.2 MHz)**

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
4279.995	-44.7	-13.0	31.7	Complied

Results: Uplink / Middle Channel (1879.8 MHz)

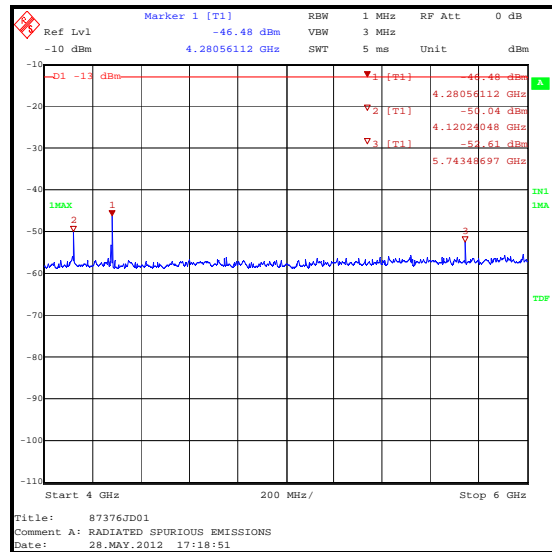
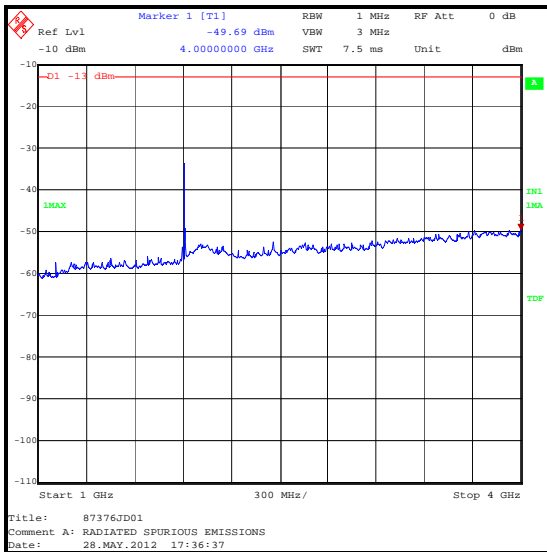
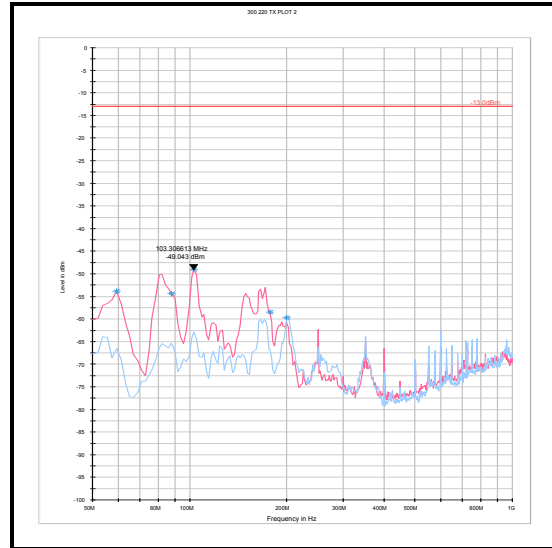
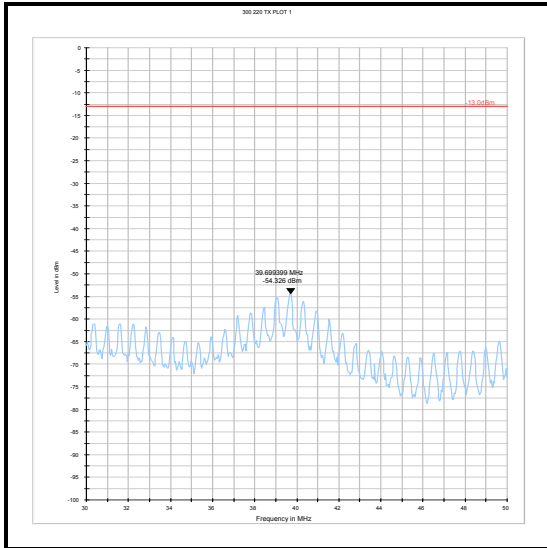
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
4279.995	-44.7	-13.0	31.7	Complied

Results: Uplink / Top Channel (1909.8 MHz)

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
4279.995	-44.7	-13.0	31.7	Complied

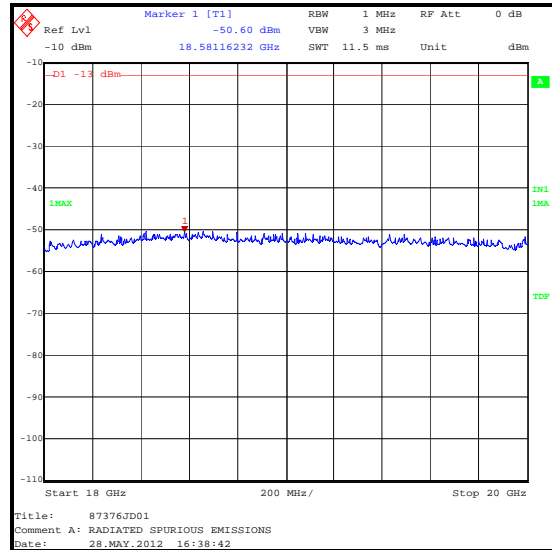
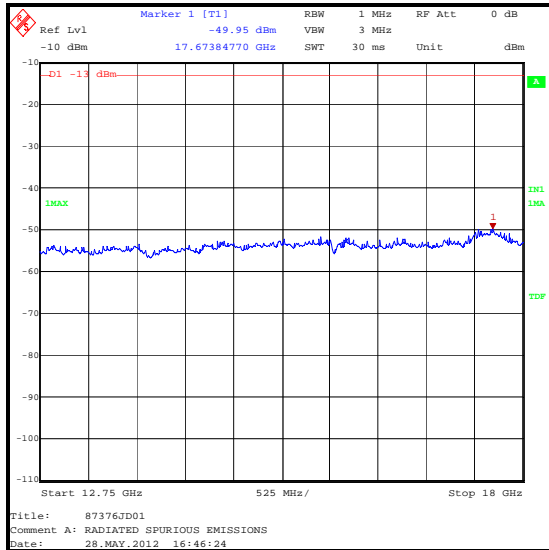
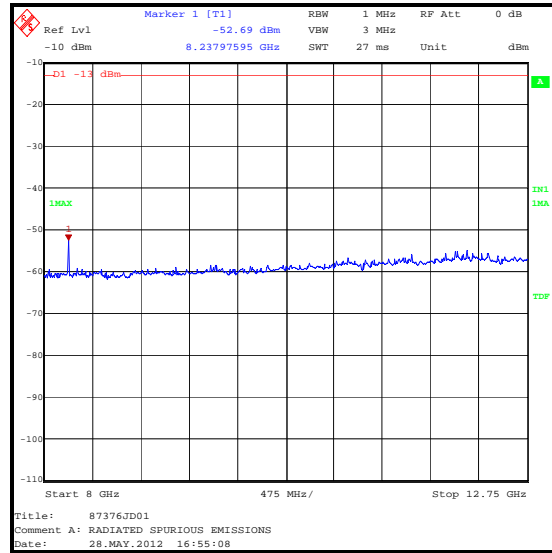
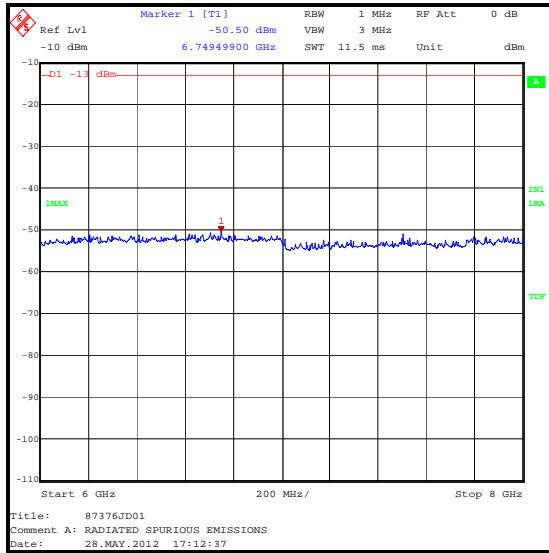
Transmitter Out of Band Radiated Emissions (continued)

Results: Uplink / Top Channel (1909.8 MHz)



Transmitter Out of Band Radiated Emissions (continued)

Results: Uplink / Top Channel (1909.8 MHz)



Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

Transmitter Out of Band Radiated Emissions (continued)**Results: Uplink / Bottom Channel (1930.2 MHz)**

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
4279.995	-44.7	-13.0	31.7	Complied

Results: Uplink / Middle Channel (1959.8 MHz)

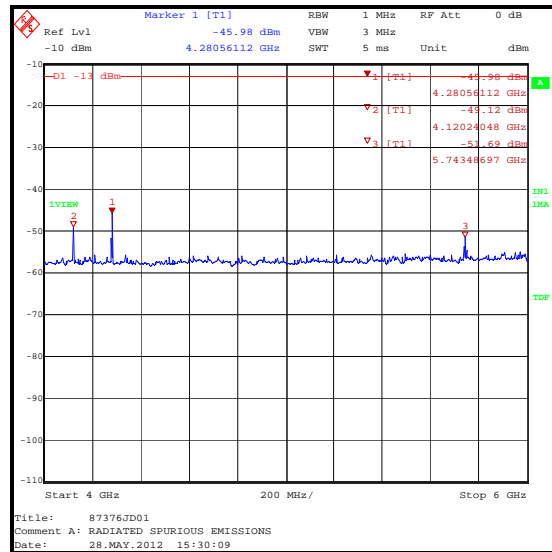
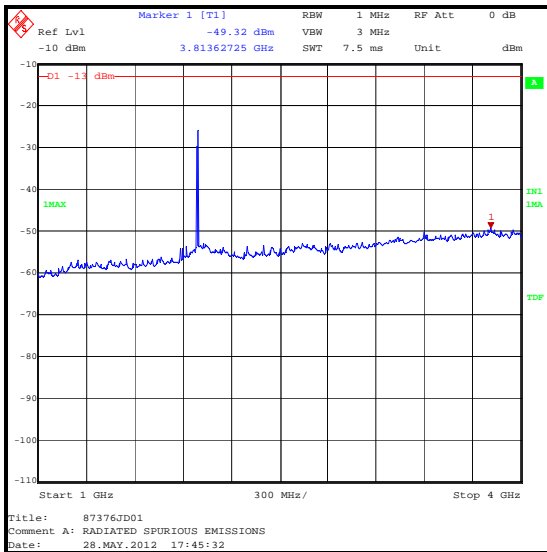
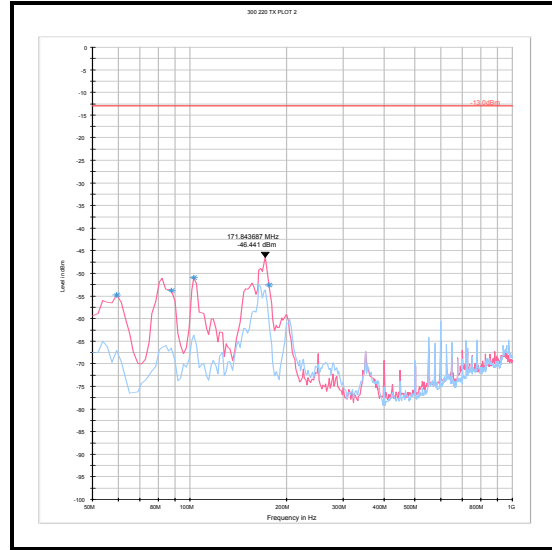
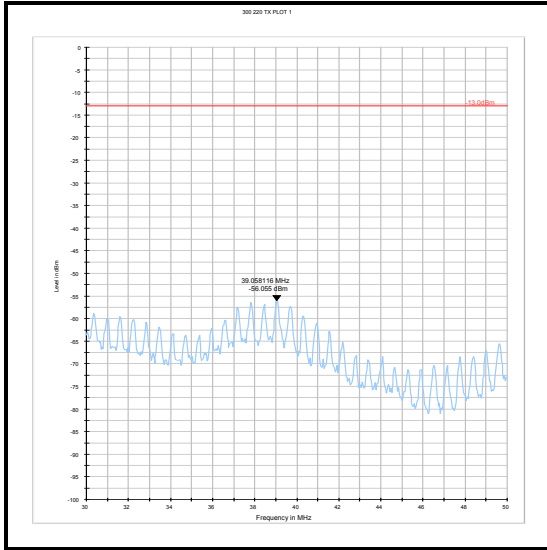
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
4279.995	-44.7	-13.0	31.7	Complied

Results: Uplink / Top Channel (1989.8 MHz)

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
4279.995	-44.7	-13.0	31.7	Complied

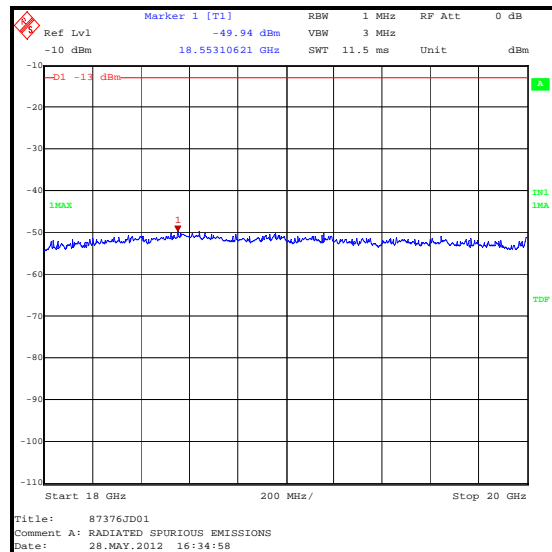
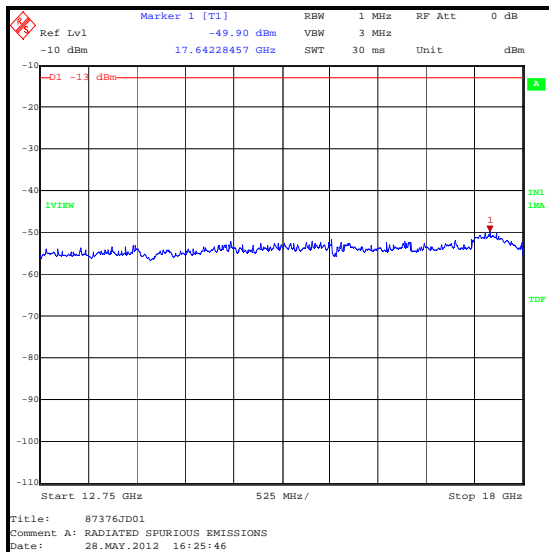
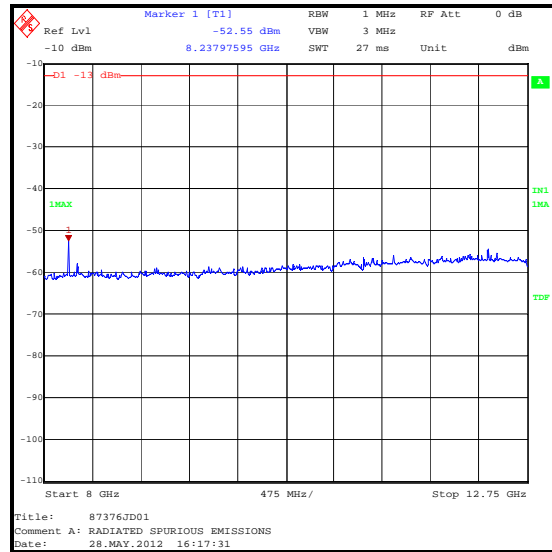
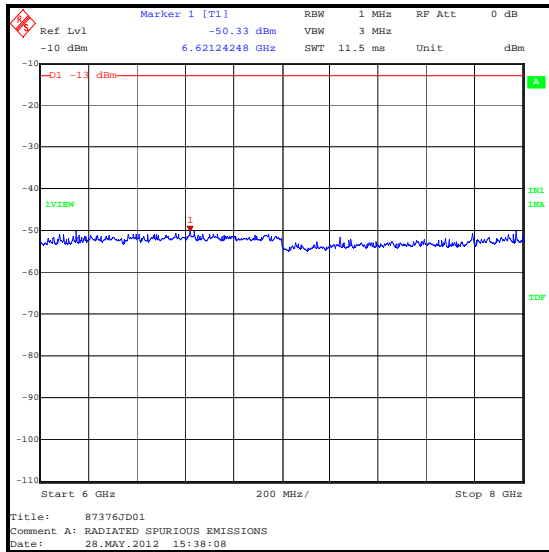
Transmitter Out of Band Radiated Emissions (continued)

Results: Downlink / Top Channel (1989.8 MHz)



Transmitter Out of Band Radiated Emissions (continued)

Results: Downlink / Top Channel (1989.8 MHz)



Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.

5.3.8. Transmitter Band Edge Conducted Emissions**Test Summary:**

Test Engineer:	Patrick Jones	Test Dates:	29 May 2012 to 02 August 2012
Test Sample Serial Number:	11120002		

FCC Reference:	Part 2.1051 & 24.238
Test Method Used:	As detailed in ANSI TIA-603-C-2004 Section 2.2.13 referencing FCC CFR Parts 2.1051 and 24.238

Environmental Conditions:

Temperature (°C):	25 to 28
Relative Humidity (%):	41 to 45

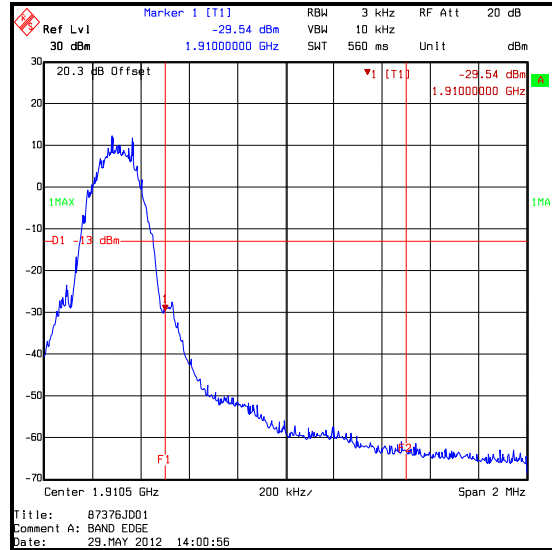
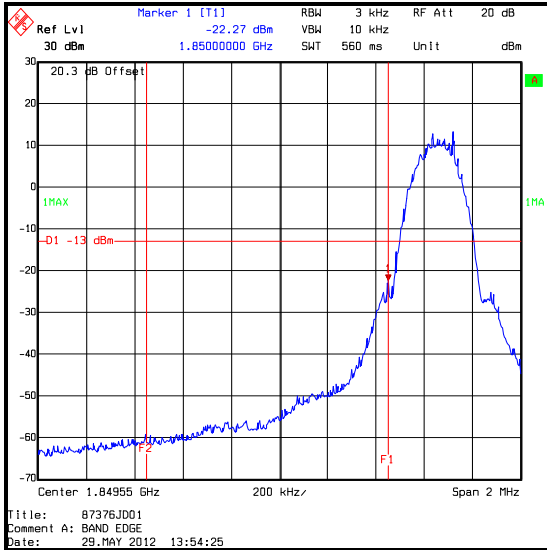
Note(s):

1. A signal generator was connected to the input port of the EUT using a suitable RF cable. The RF output of the repeater was connected to a spectrum analyser via suitable cables and attenuators. The cables and attenuators were calibrated before use and the RF level offset was incorporated into the measurements. The signal generator was set to output a modulated signal according to the technology under test on the bottom or top channel at the maximum input level for the EUT.
2. The filters corresponding to the top and bottom of the band were activated for this test.

Transmitter Band Edge Conducted Emissions (continued)

Results: GMSK / Uplink

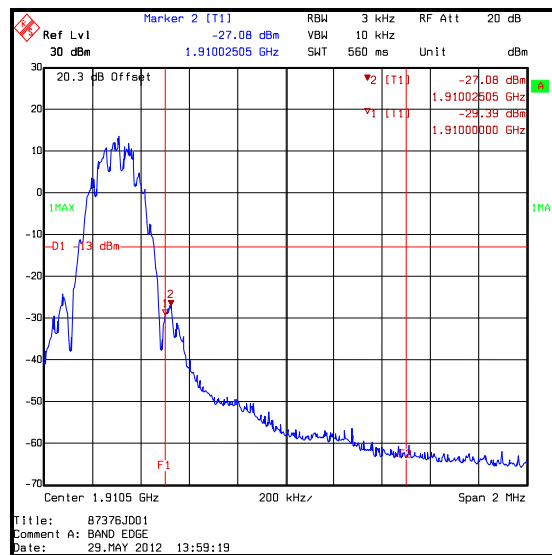
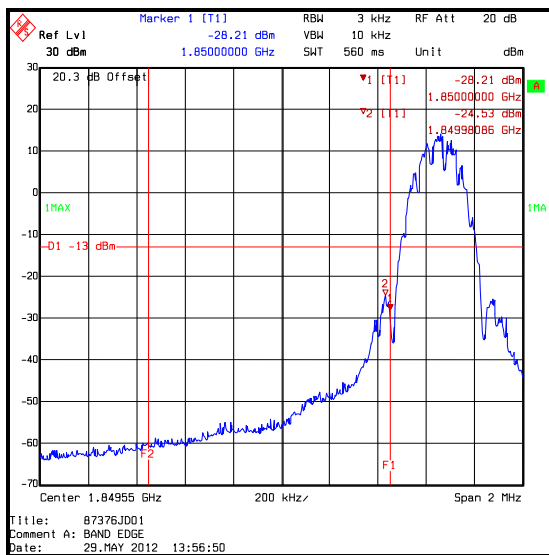
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-22.3	-13.0	9.3	Complied
1910	-29.5	-13.0	16.5	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: 8-PSK / Uplink

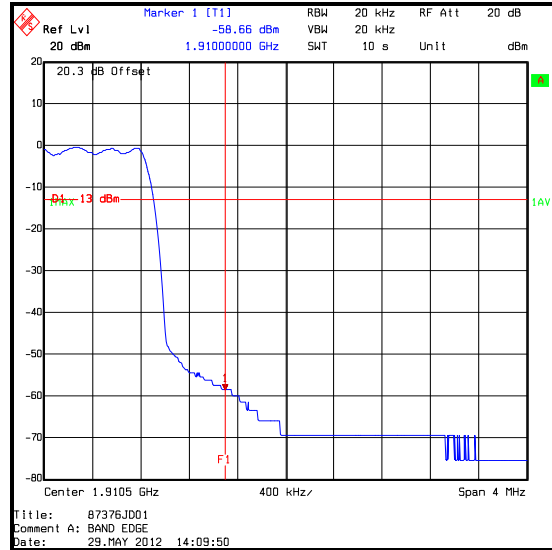
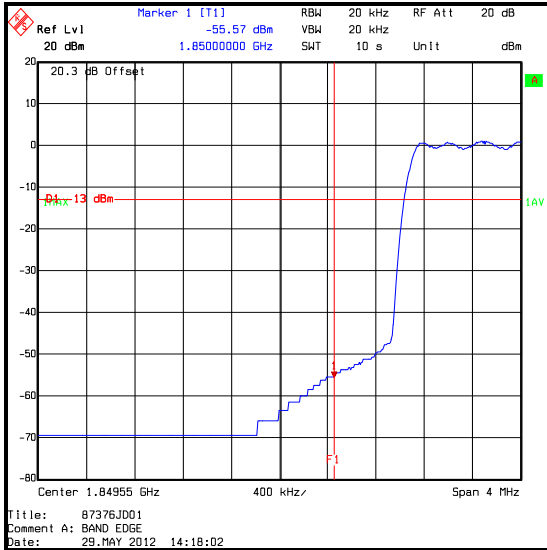
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1849.981	-24.5	-13.0	11.5	Complied
1850.000	-28.2	-13.0	15.2	Complied
1910.000	-29.4	-13.0	16.4	Complied
1910.025	-27.1	-13.0	14.1	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: CDMA / Uplink

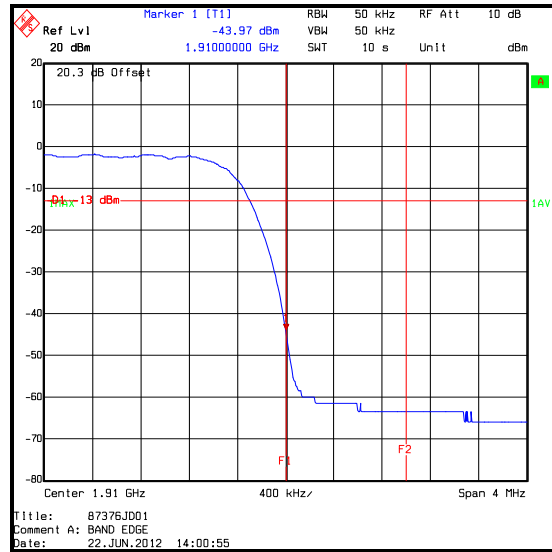
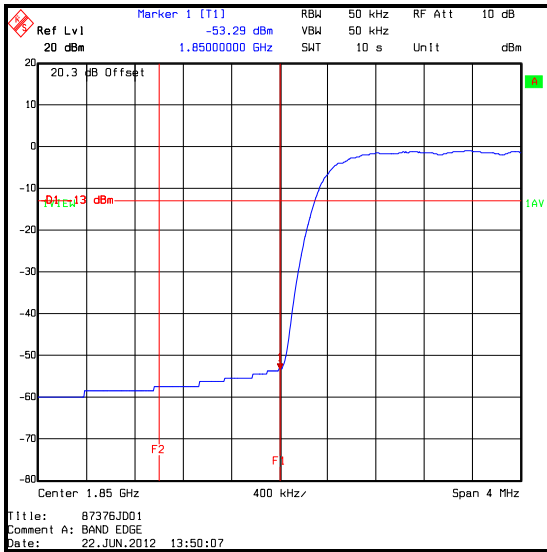
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-55.6	-13.0	42.6	Complied
1910	-58.7	-13.0	45.7	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: WCDMA / Uplink

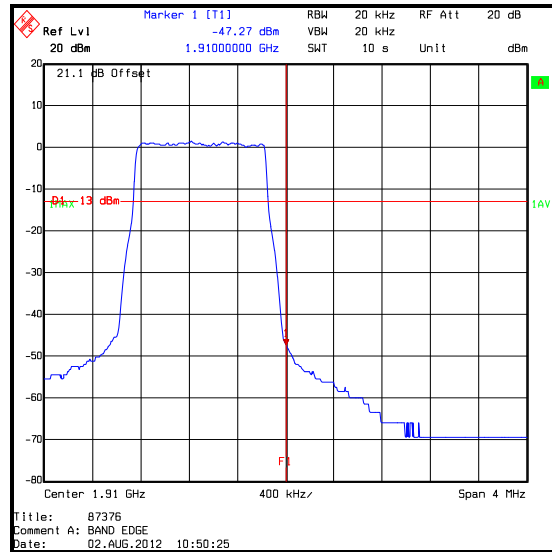
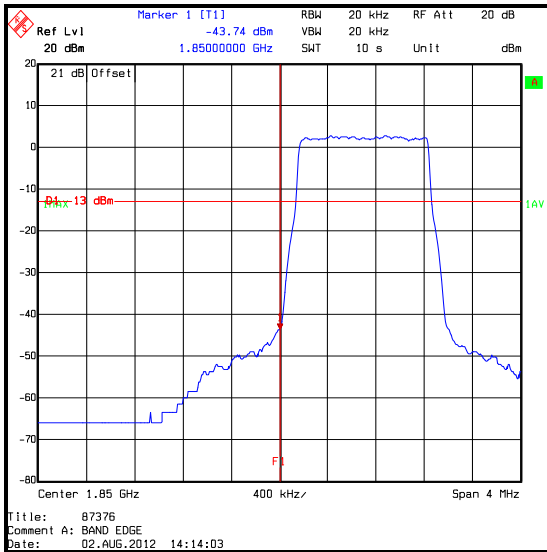
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-53.3	-13.0	40.3	Complied
1910	-44.0	-13.0	31.0	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 1.4 MHz Bandwidth QPSK / Uplink

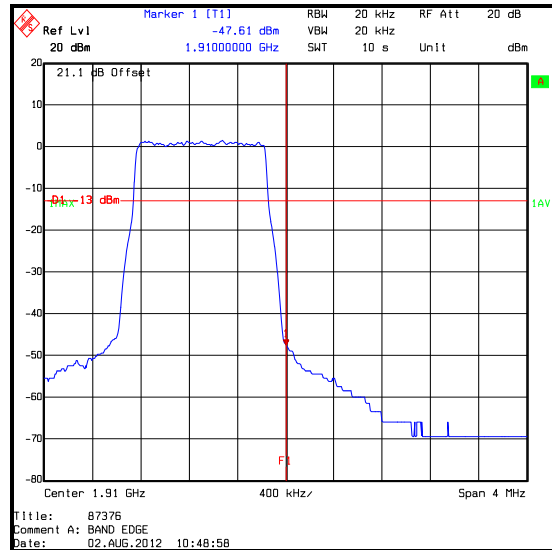
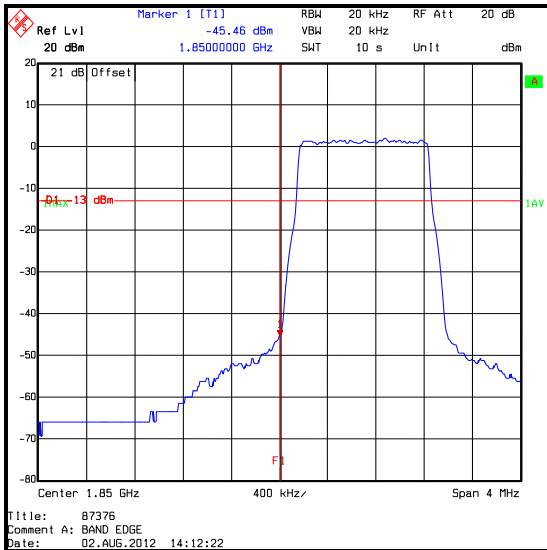
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-43.7	-13.0	30.7	Complied
1910	-47.3	-13.0	34.3	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 1.4 MHz Bandwidth 16QAM / Uplink

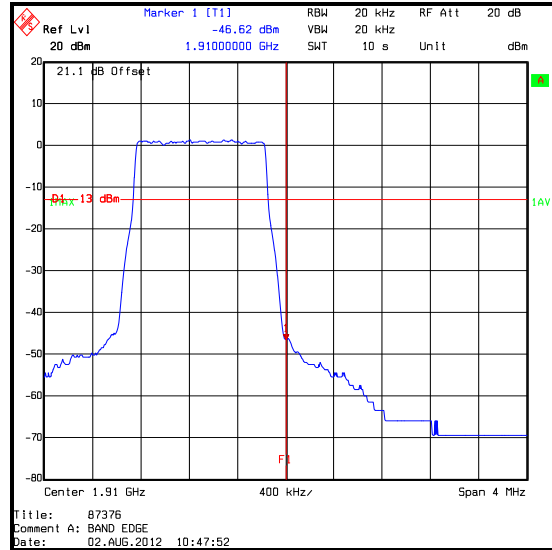
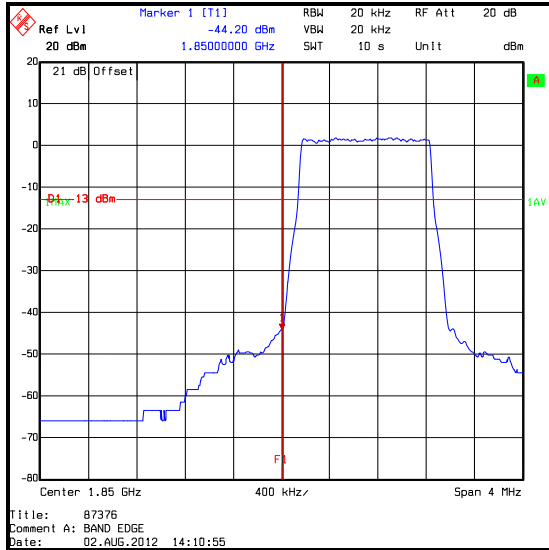
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-45.5	-13.0	32.5	Complied
1910	-47.6	-13.0	34.6	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 1.4 MHz Bandwidth 64QAM / Uplink

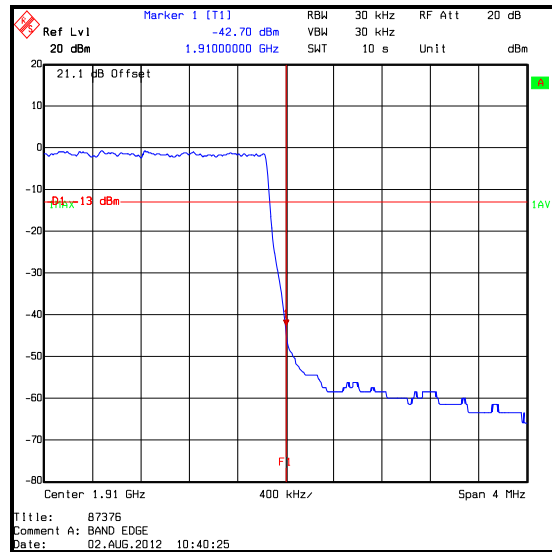
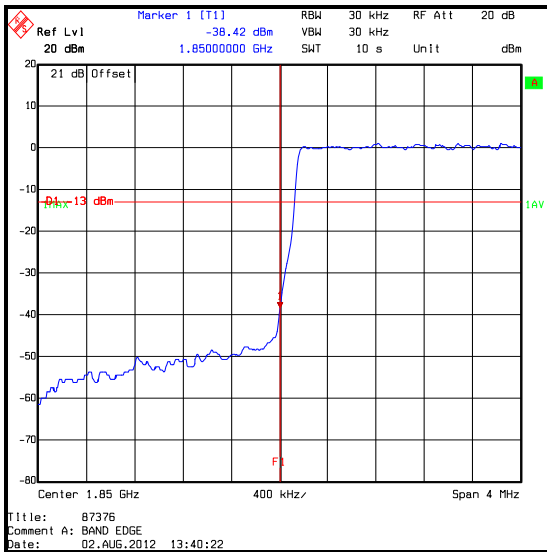
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-44.2	-13.0	31.2	Complied
1910	-46.6	-13.0	33.6	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 3 MHz Bandwidth QPSK / Uplink

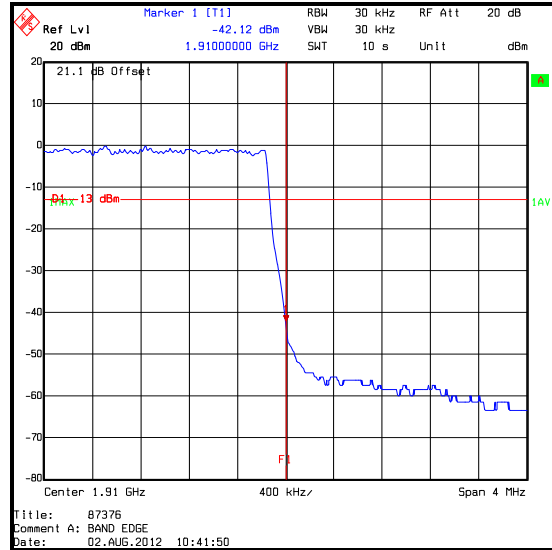
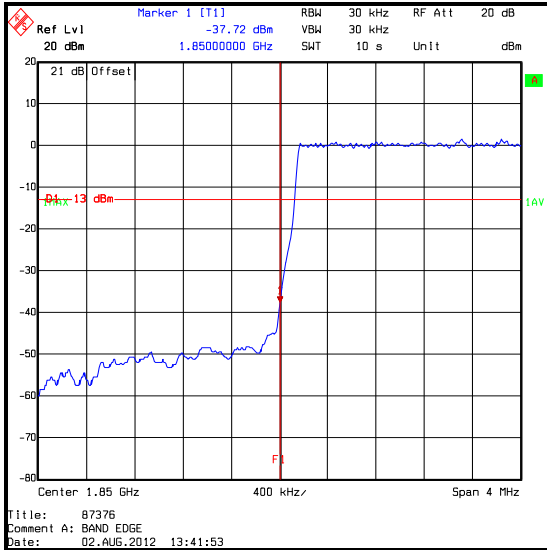
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-38.4	-13.0	25.4	Complied
1910	-42.7	-13.0	29.7	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 3 MHz Bandwidth 16QAM / Uplink

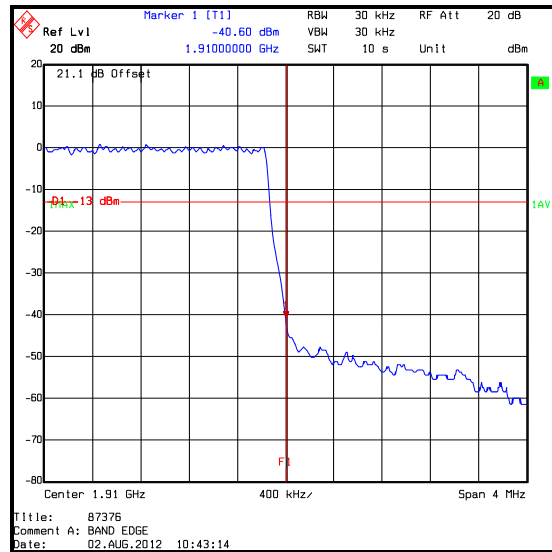
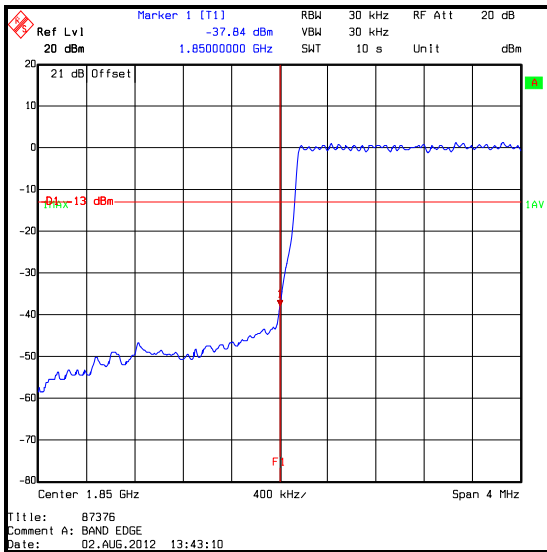
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-37.7	-13.0	24.7	Complied
1910	-42.1	-13.0	29.1	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 3 MHz Bandwidth 64QAM / Uplink

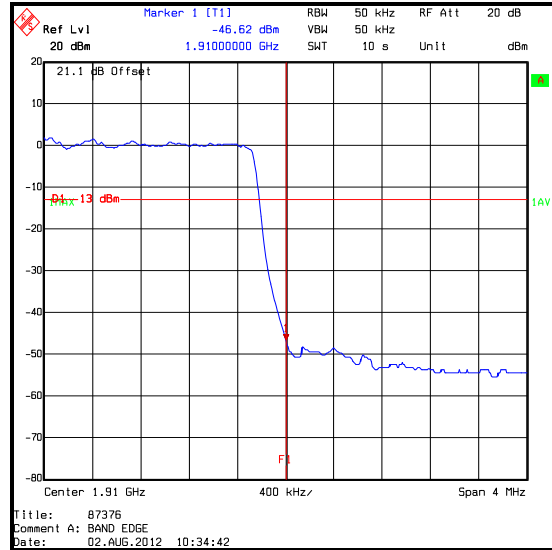
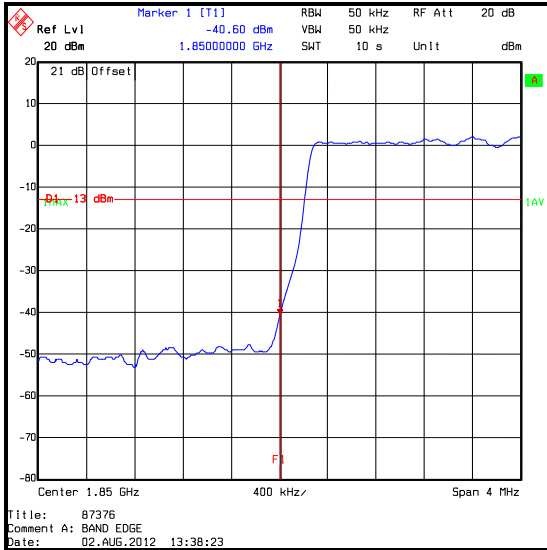
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-37.8	-13.0	24.8	Complied
1910	-40.6	-13.0	27.6	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 5 MHz Bandwidth QPSK / Uplink

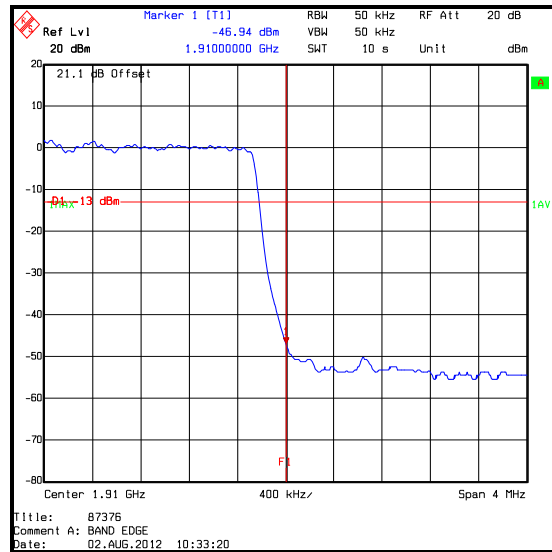
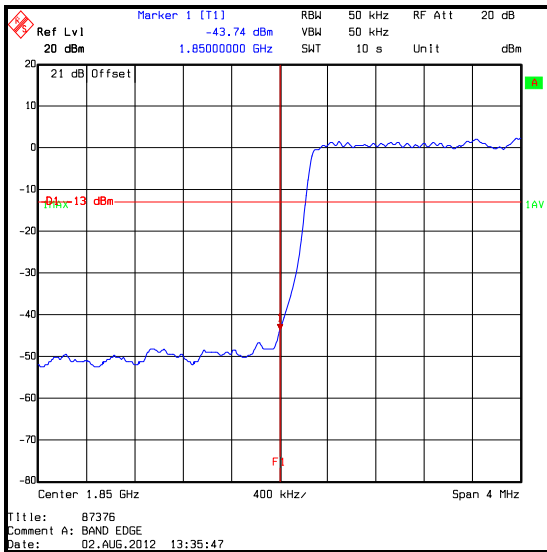
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-40.6	-13.0	27.6	Complied
1910	-46.6	-13.0	33.6	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 5 MHz Bandwidth 16QAM / Uplink

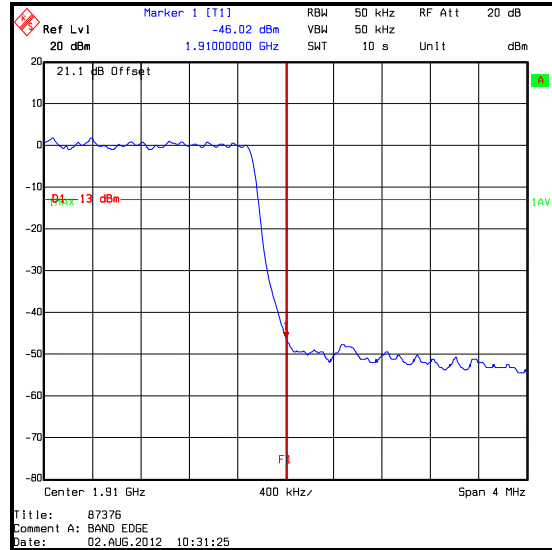
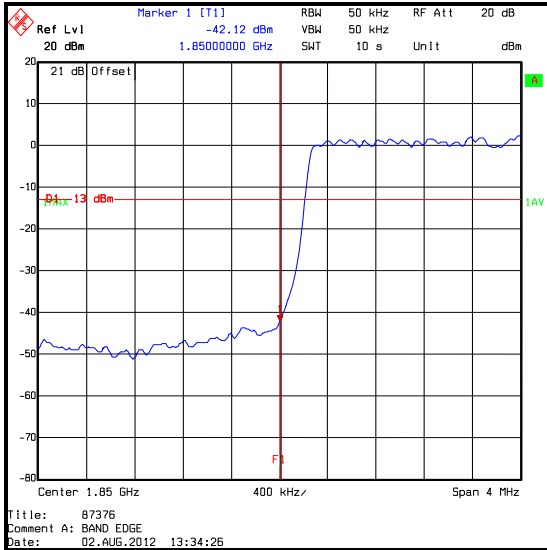
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-43.7	-13.0	30.7	Complied
1910	-46.9	-13.0	33.9	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 5 MHz Bandwidth 64QAM / Uplink

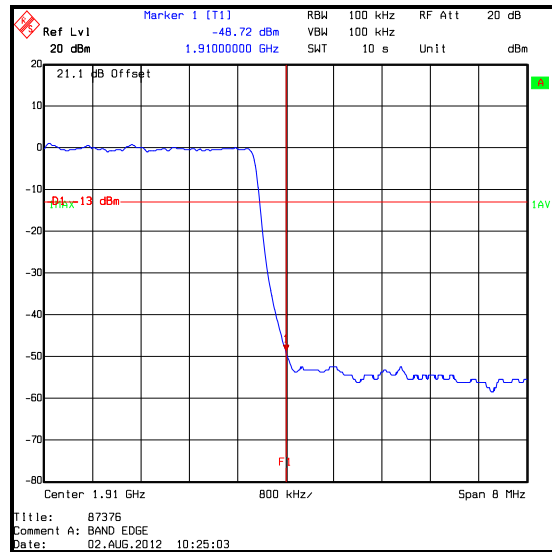
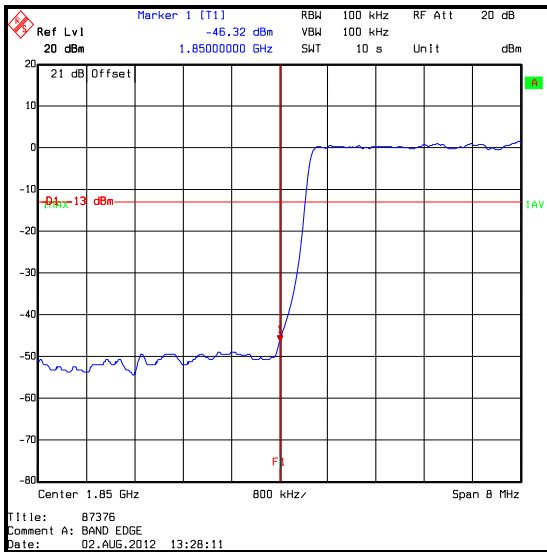
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-42.1	-13.0	29.1	Complied
1910	-46.0	-13.0	33.0	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 10 MHz Bandwidth QPSK / Uplink

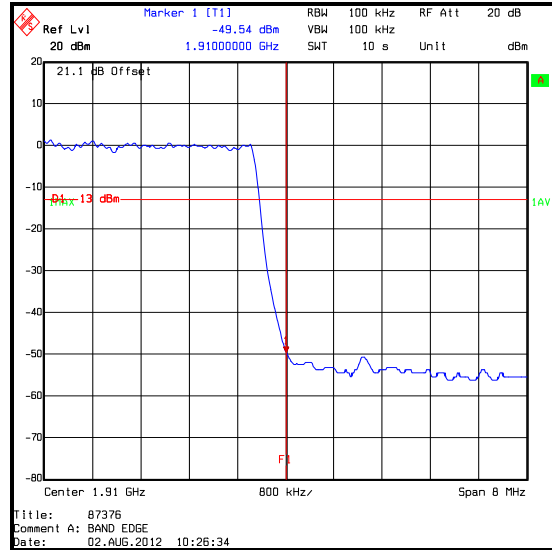
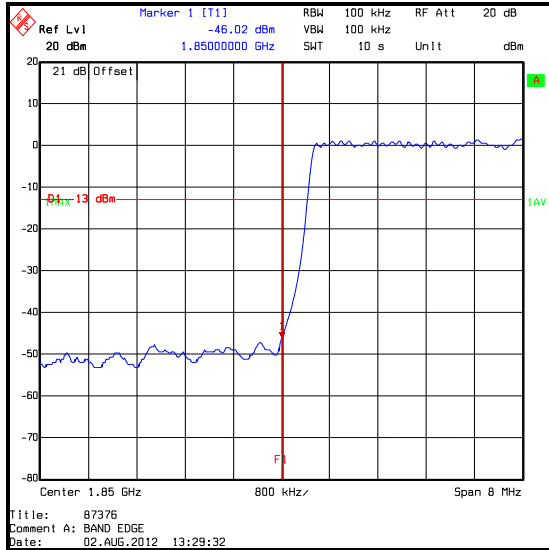
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-46.3	-13.0	33.3	Complied
1910	-48.7	-13.0	35.7	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 10 MHz Bandwidth 16QAM / Uplink

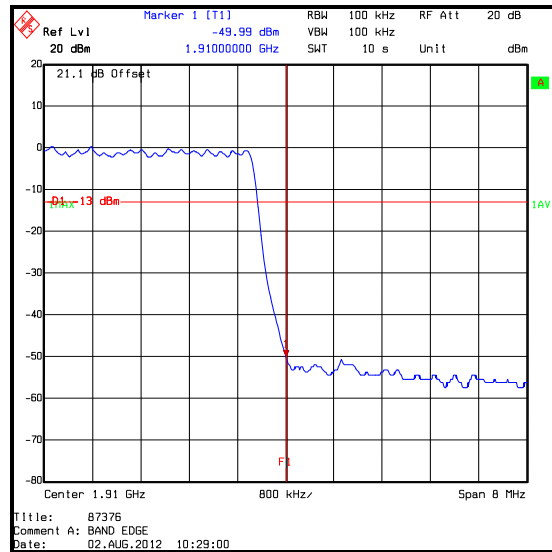
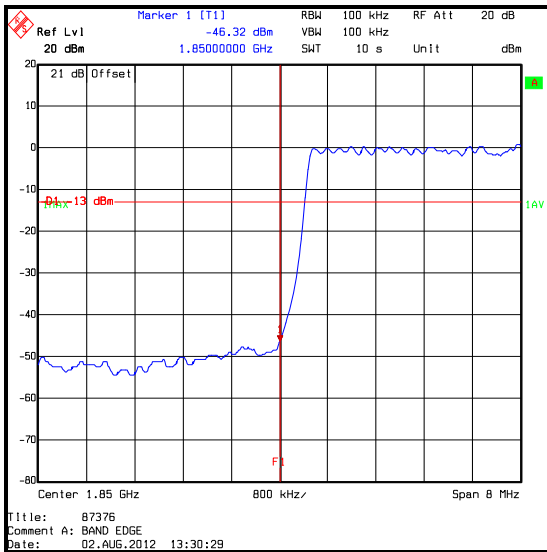
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-46.0	-13.0	33.0	Complied
1910	-49.5	-13.0	36.5	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 10 MHz Bandwidth 64QAM / Uplink

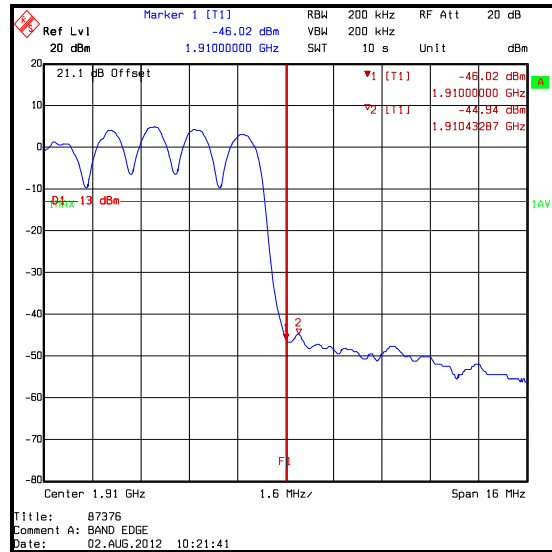
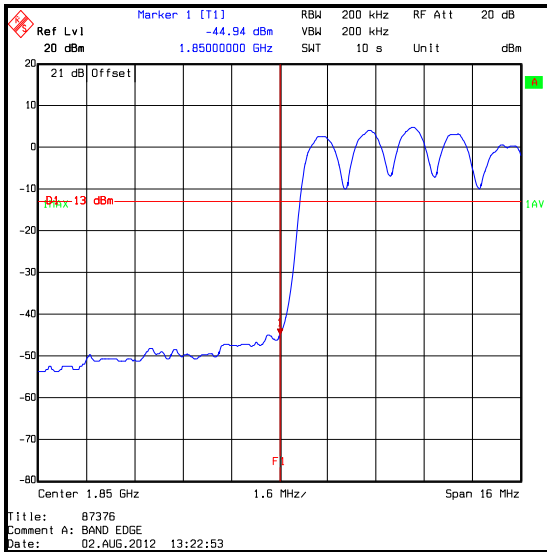
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-46.3	-13.0	33.3	Complied
1910	-50.0	-13.0	37.0	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 15 MHz Bandwidth QPSK / Uplink

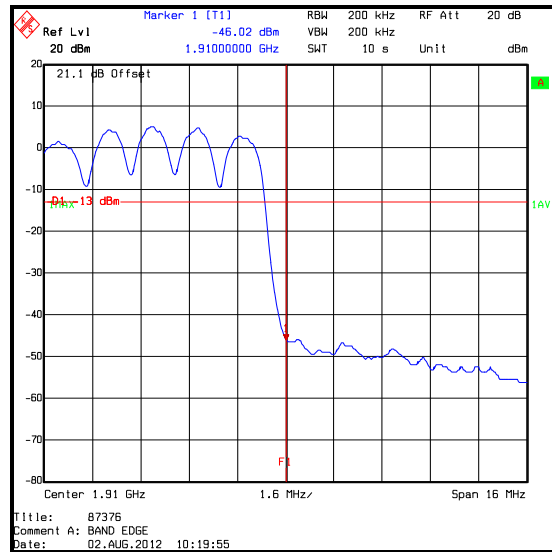
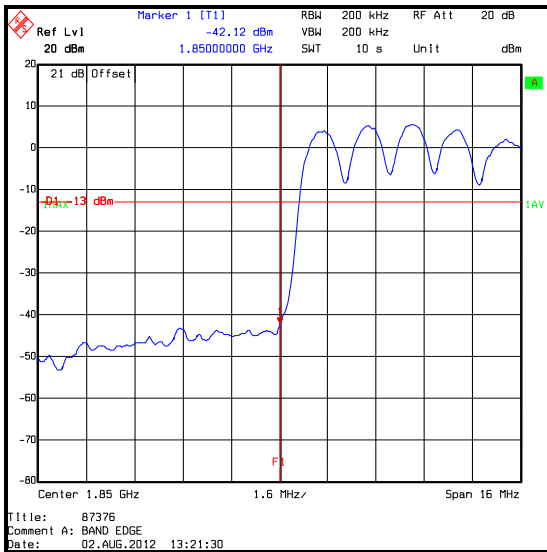
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-44.9	-13.0	31.9	Complied
1910	-46.0	-13.0	33.0	Complied
1910.433	-44.9	-13.0	31.9	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 15 MHz Bandwidth 16QAM / Uplink

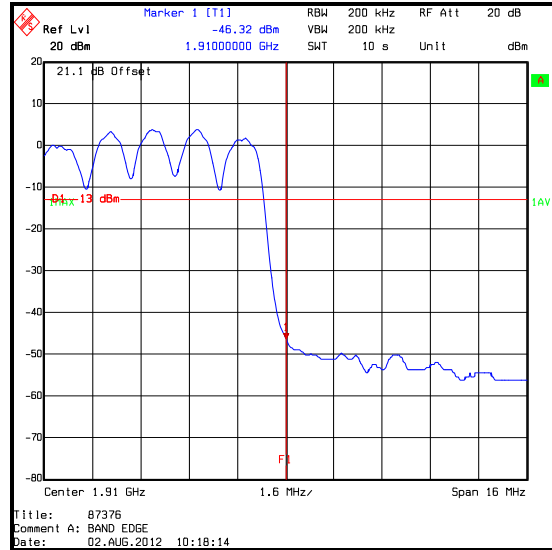
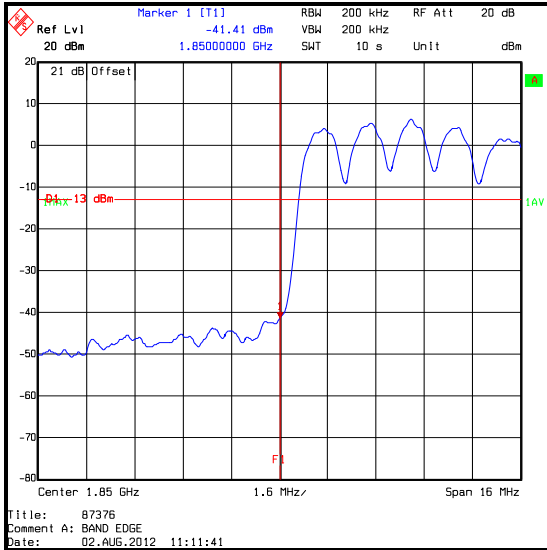
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-42.1	-13.0	29.1	Complied
1910	-46.0	-13.0	33.0	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 15 MHz Bandwidth 64QAM / Uplink

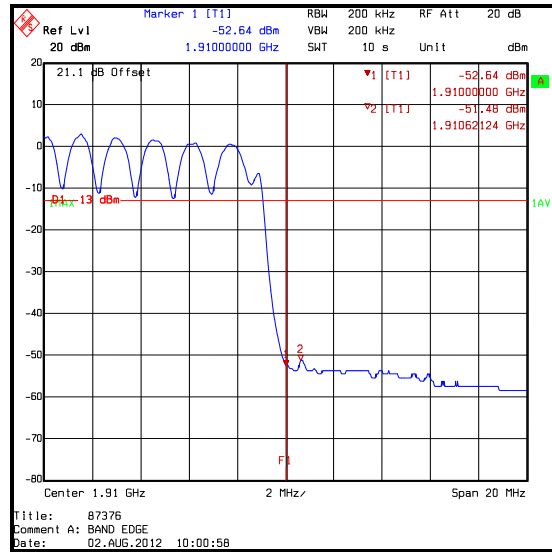
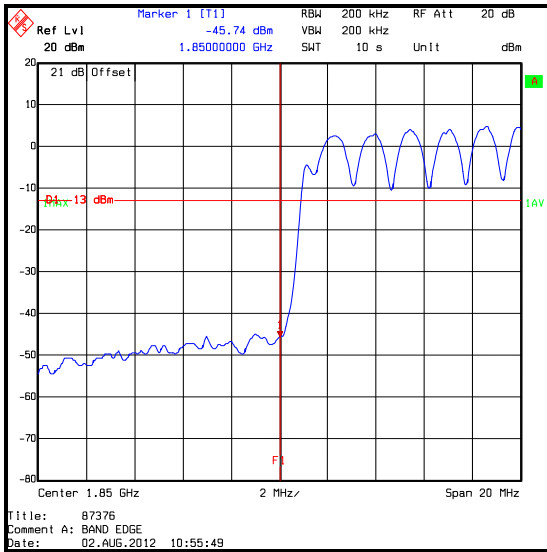
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-41.4	-13.0	28.4	Complied
1910	-46.3	-13.0	33.3	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 20 MHz Bandwidth QPSK / Uplink

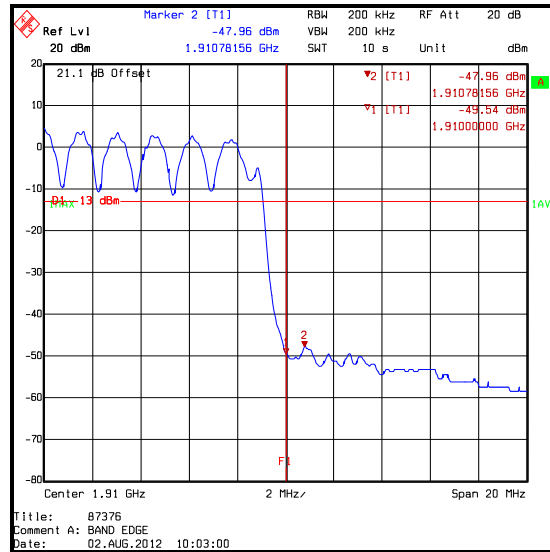
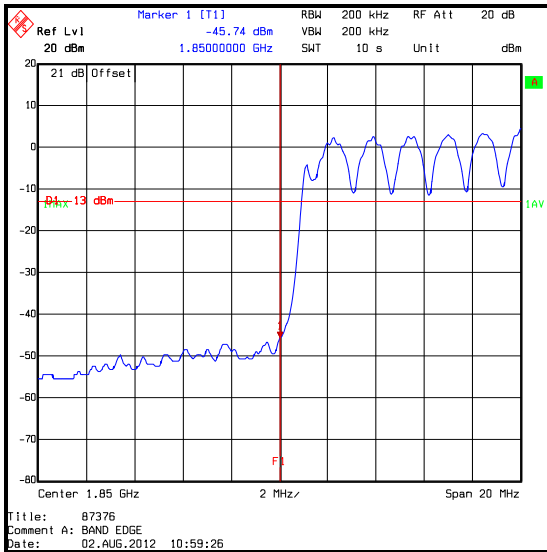
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-45.7	-13.0	32.7	Complied
1910	-52.6	-13.0	39.6	Complied
1910.621	-51.5	-13.0	38.5	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 20 MHz Bandwidth 16QAM / Uplink

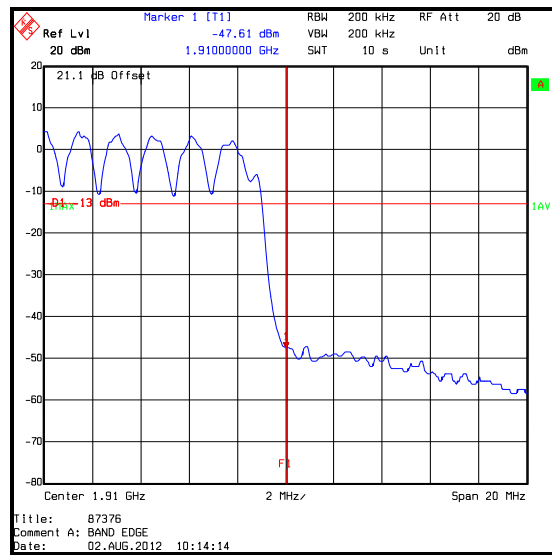
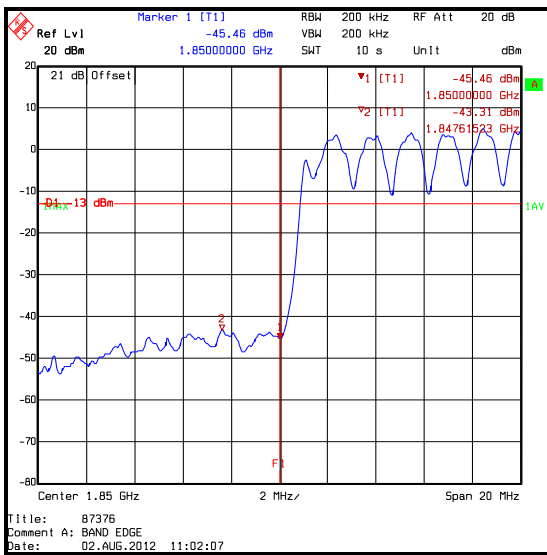
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1850	-45.7	-13.0	32.7	Complied
1910	-49.5	-13.0	36.5	Complied
1910.782	-48.0	-13.0	35.0	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 20 MHz Bandwidth 64QAM / Uplink

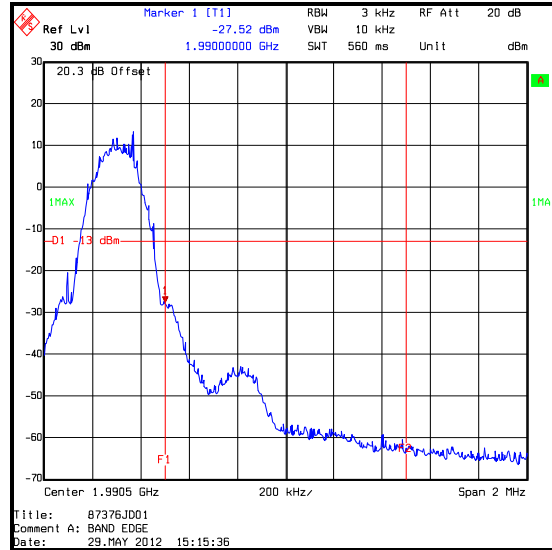
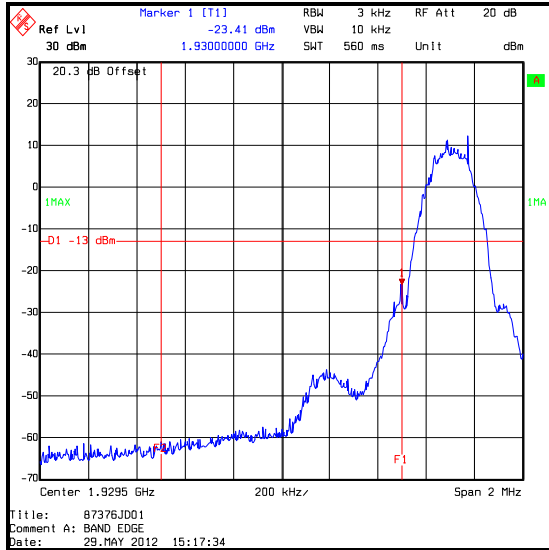
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1847.615	-43.3	-13.0	30.3	Complied
1850	-45.5	-13.0	32.5	Complied
1910	-47.6	-13.0	34.6	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: GMSK / Downlink

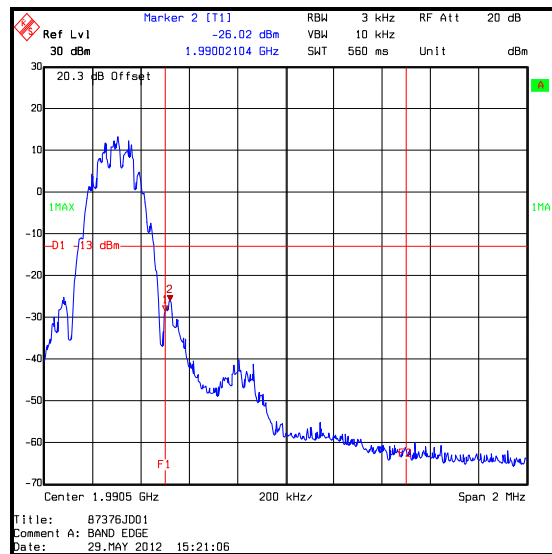
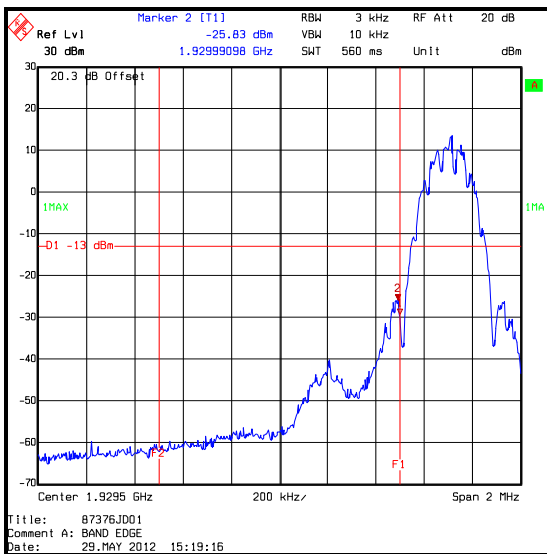
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1930	-23.4	-13.0	10.4	Complied
1990	-27.5	-13.0	14.5	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: 8-PSK / Downlink

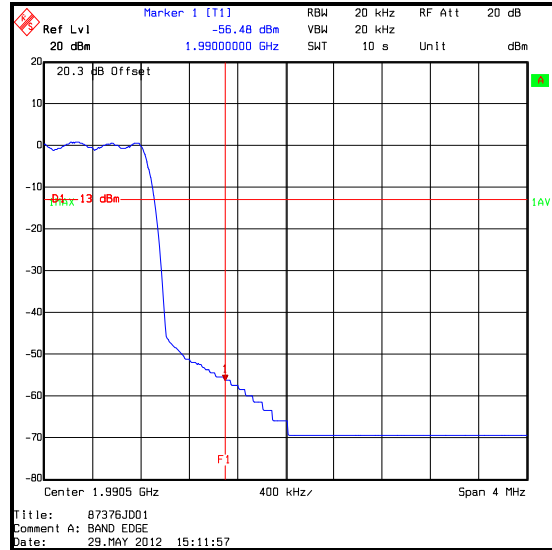
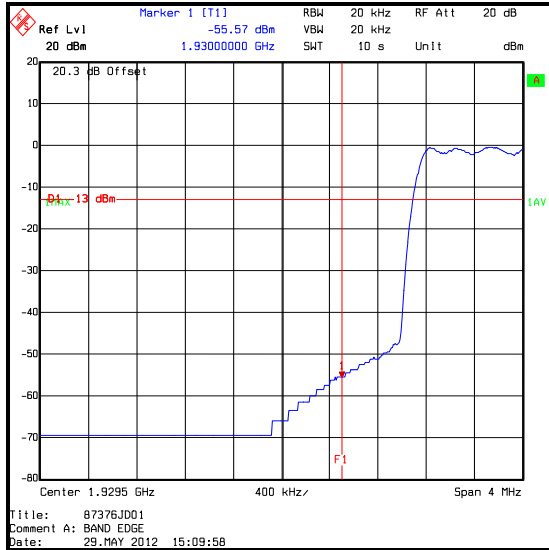
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1929.991	-25.8	-13.0	12.8	Complied
1930.000	-29.7	-13.0	16.7	Complied
1990.000	-28.5	-13.0	15.5	Complied
1990.021	-26.0	-13.0	13.0	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: CDMA / Downlink

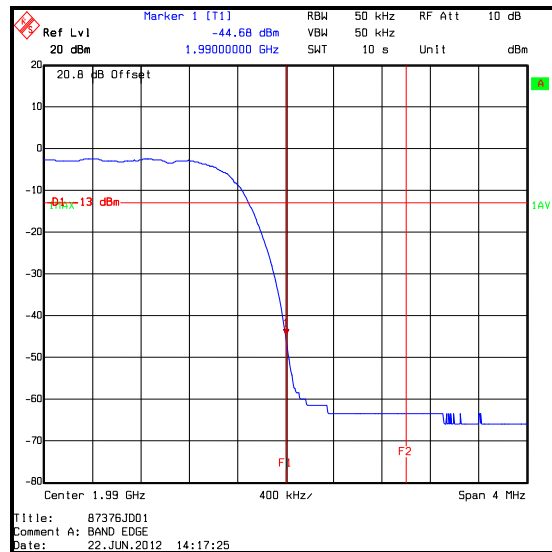
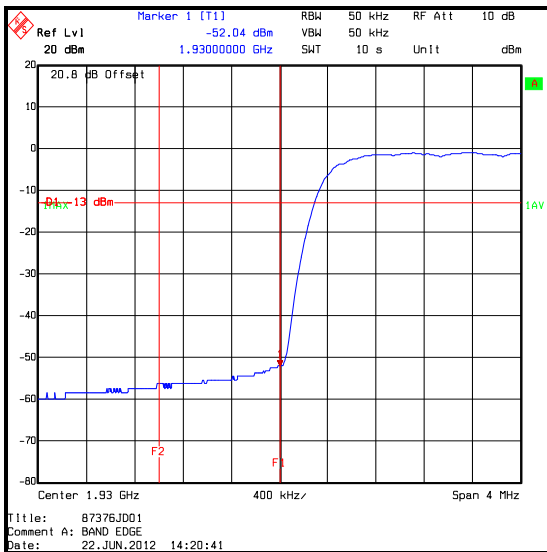
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1930	-55.6	-13.0	42.6	Complied
1990	-56.5	-13.0	43.5	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: WCDMA / Downlink

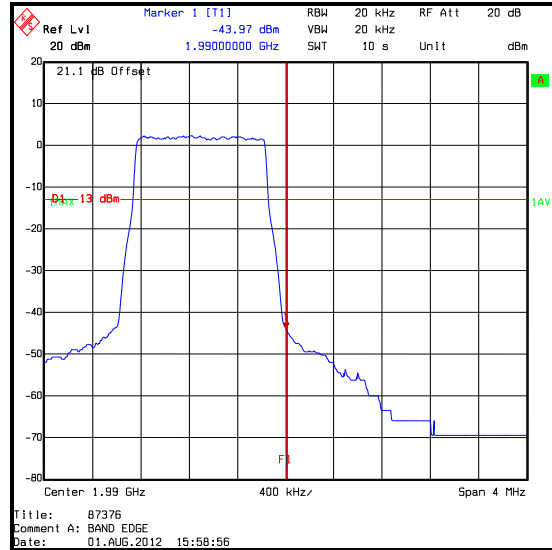
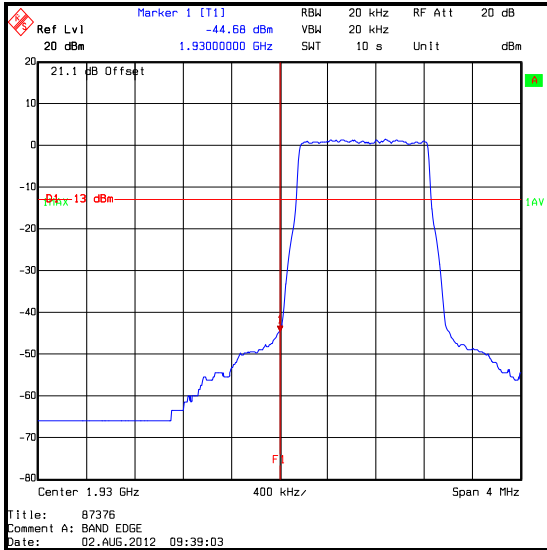
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1930	-52.0	-13.0	39.0	Complied
1990	-44.7	-13.0	31.7	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 1.4 MHz Bandwidth QPSK / Downlink

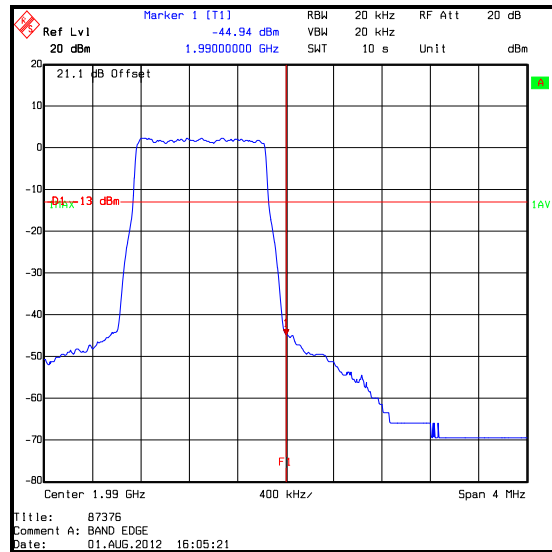
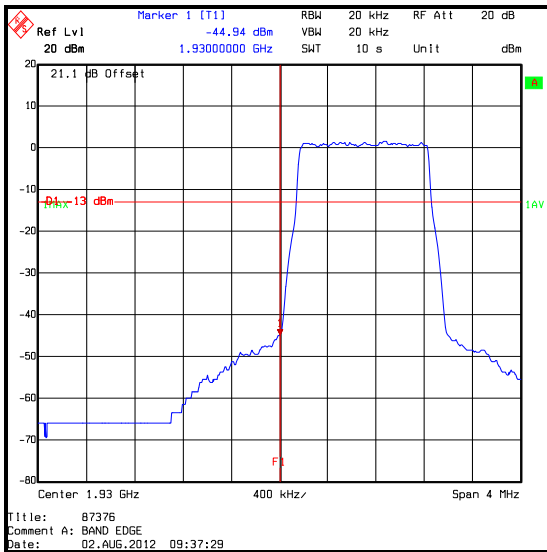
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1930	-44.7	-13.0	31.7	Complied
1990	-44.0	-13.0	31.0	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 1.4 MHz Bandwidth 16QAM / Downlink

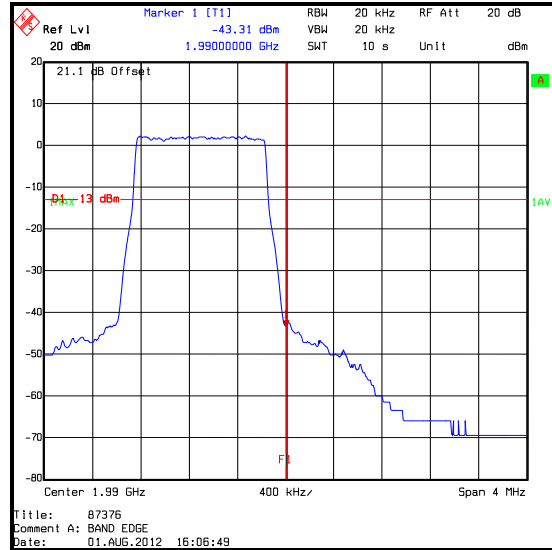
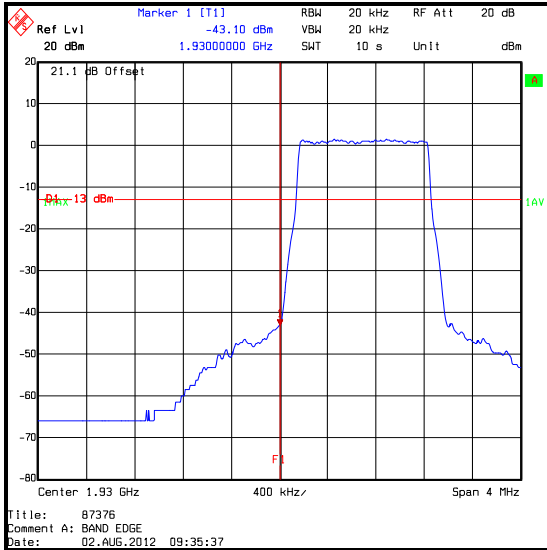
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1930	-44.9	-13.0	31.9	Complied
1990	-44.9	-13.0	31.9	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 1.4 MHz Bandwidth 64QAM / Downlink

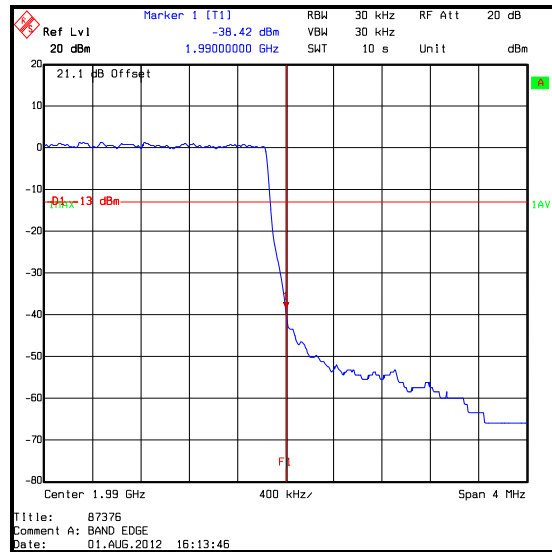
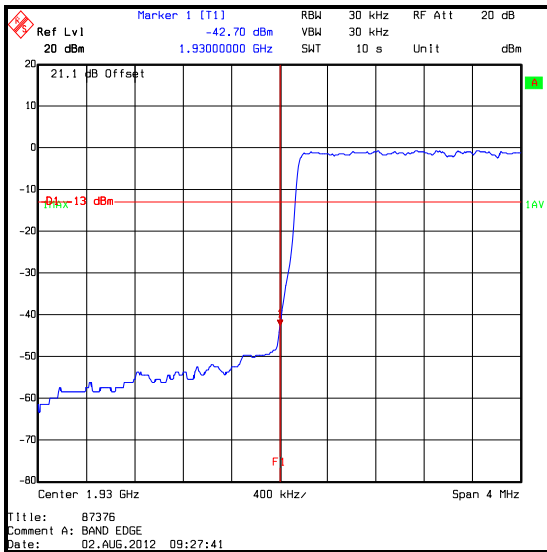
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1930	-43.1	-13.0	30.1	Complied
1990	-43.3	-13.0	30.3	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 3 MHz Bandwidth QPSK / Downlink

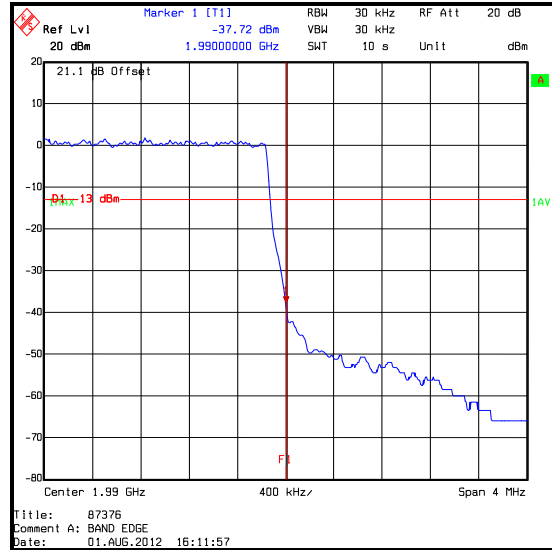
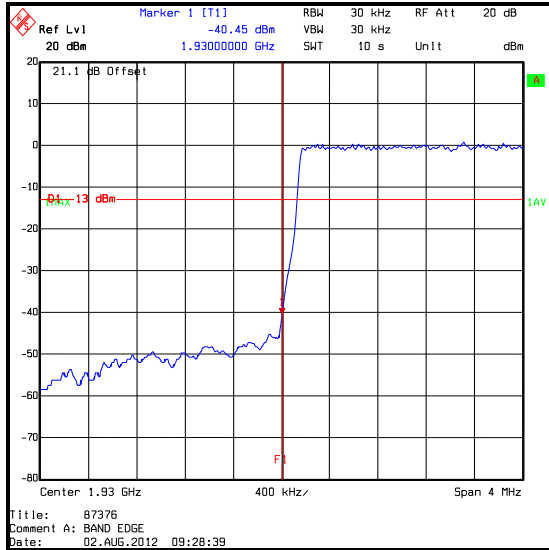
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1930	-42.7	-13.0	29.7	Complied
1990	-38.4	-13.0	25.4	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 3 MHz Bandwidth 16QAM / Downlink

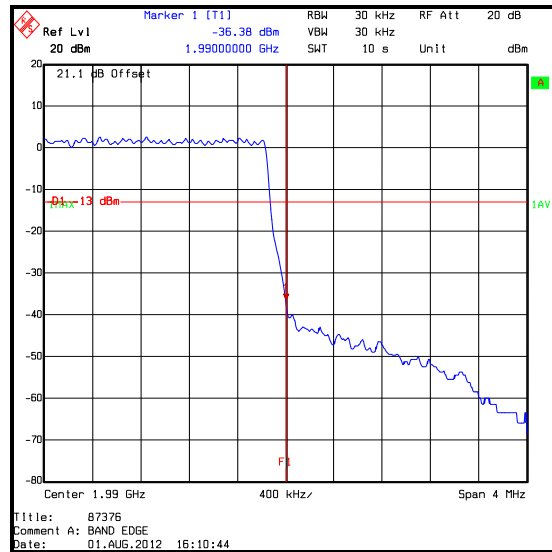
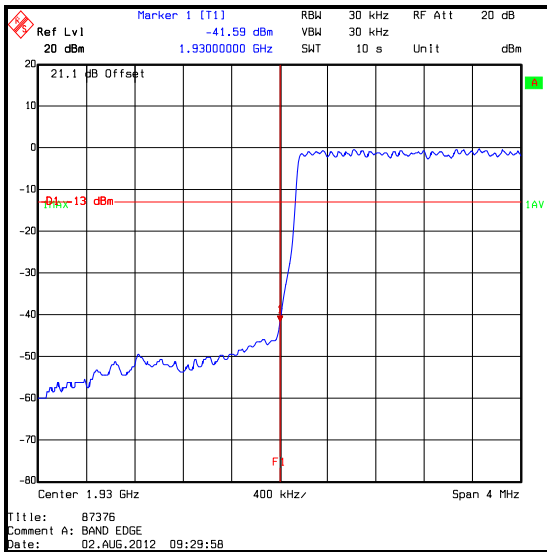
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1930	-40.5	-13.0	27.5	Complied
1990	-37.7	-13.0	24.7	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 3 MHz Bandwidth 64QAM / Downlink

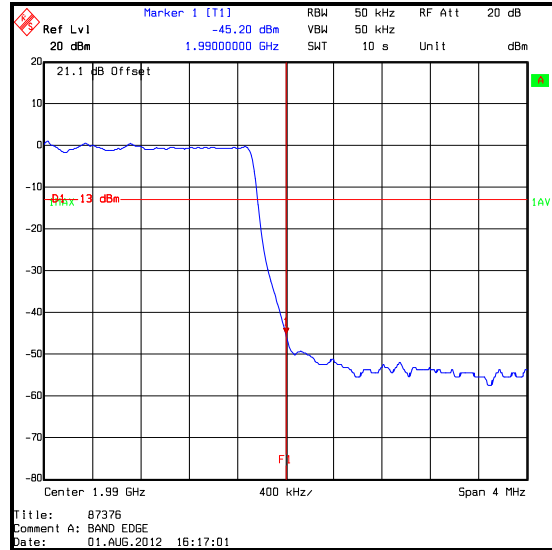
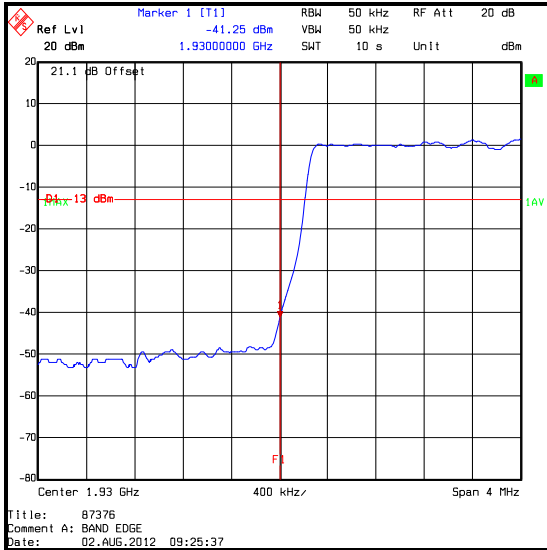
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1930	-41.6	-13.0	28.6	Complied
1990	-36.4	-13.0	23.4	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 5 MHz Bandwidth QPSK / Downlink

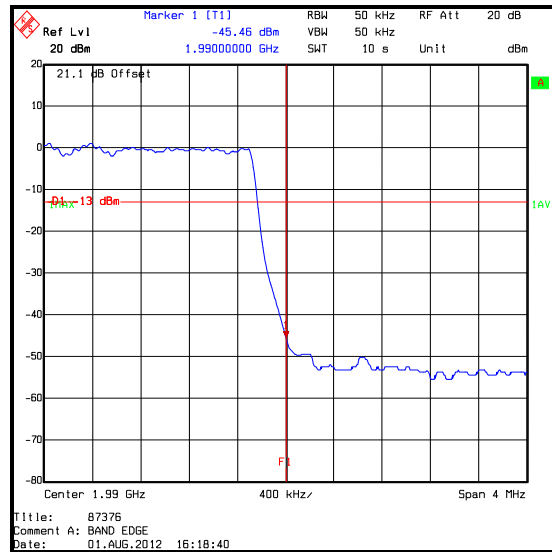
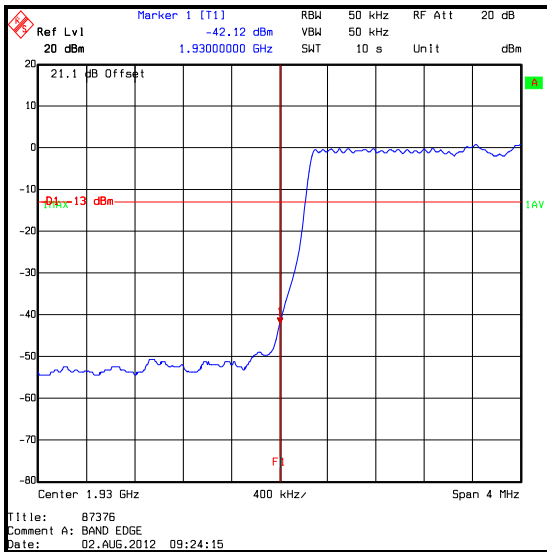
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1930	-41.3	-13.0	28.3	Complied
1990	-45.2	-13.0	32.2	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 5 MHz Bandwidth 16QAM / Downlink

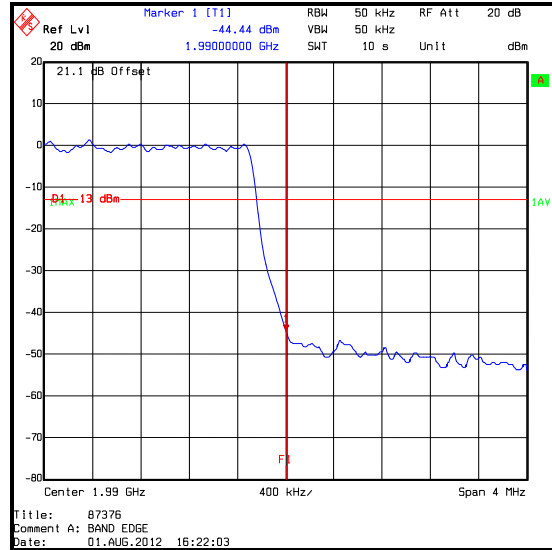
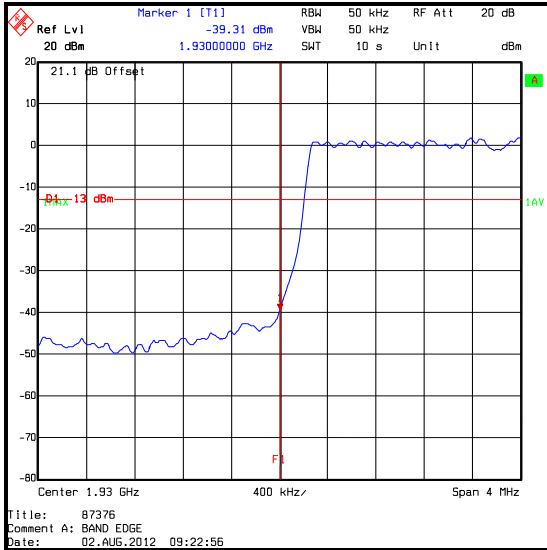
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1930	-42.1	-13.0	29.1	Complied
1990	-45.5	-13.0	32.5	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 5 MHz Bandwidth 64QAM / Downlink

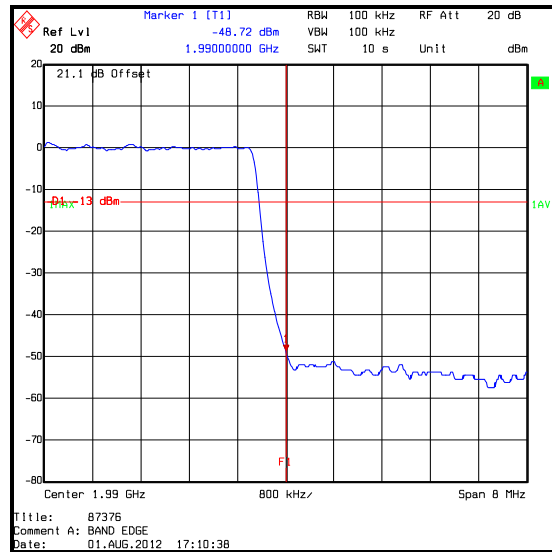
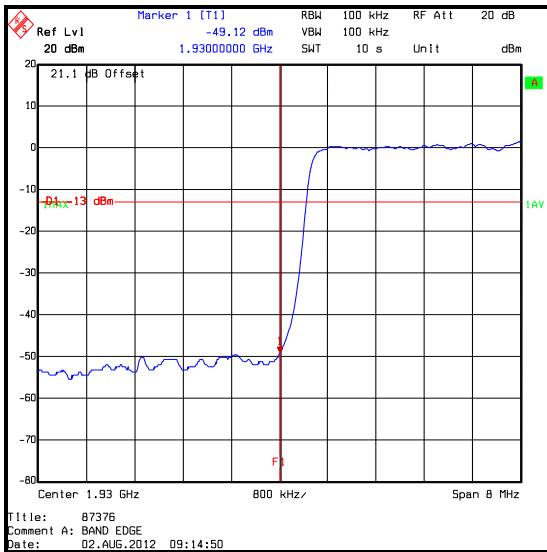
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1930	-39.3	-13.0	26.3	Complied
1990	-44.4	-13.0	31.4	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 10 MHz Bandwidth QPSK / Downlink

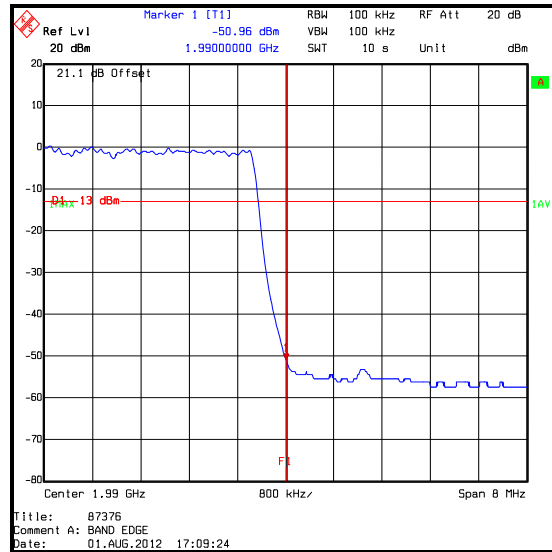
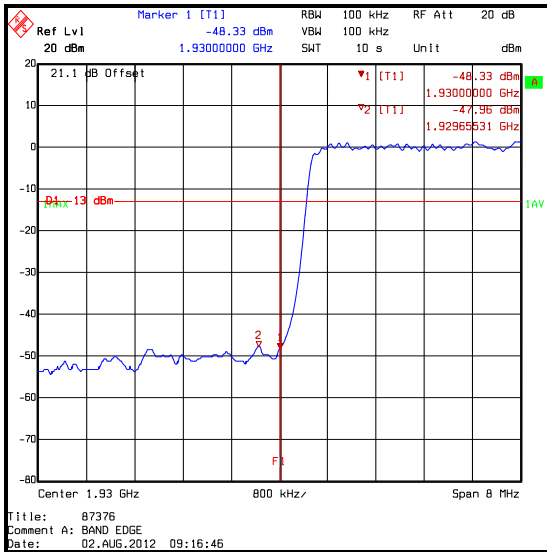
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1930	-49.1	-13.0	36.1	Complied
1990	-48.7	-13.0	35.7	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 10 MHz Bandwidth 16QAM / Downlink

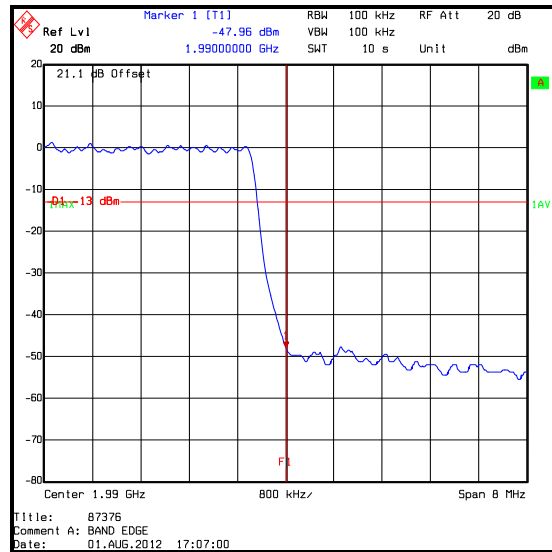
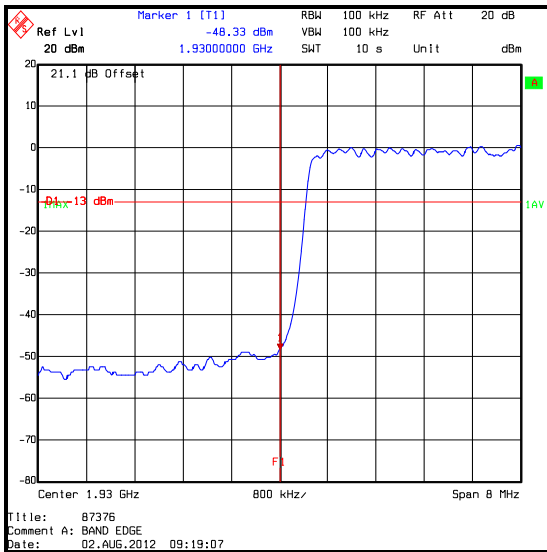
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1929.655	-48.0	-13.0	35.0	Complied
1930	-48.3	-13.0	35.3	Complied
1990	-51.0	-13.0	38.0	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 10 MHz Bandwidth 64QAM / Downlink

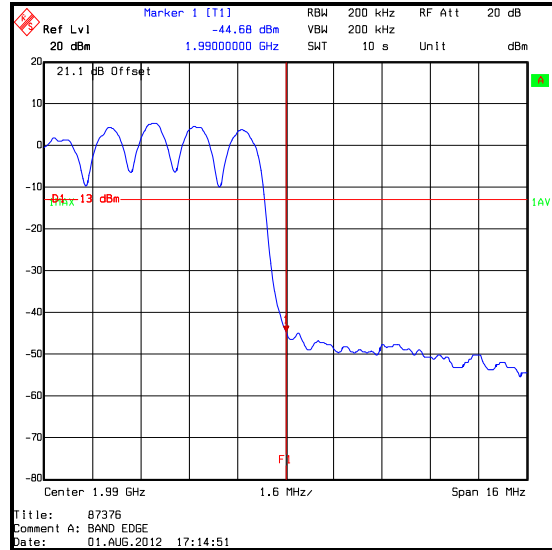
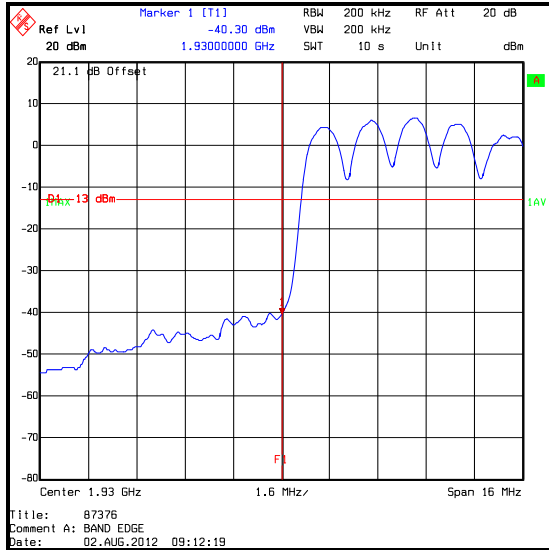
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1930	-48.3	-13.0	35.3	Complied
1990	-48.0	-13.0	35.0	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 15 MHz Bandwidth QPSK / Downlink

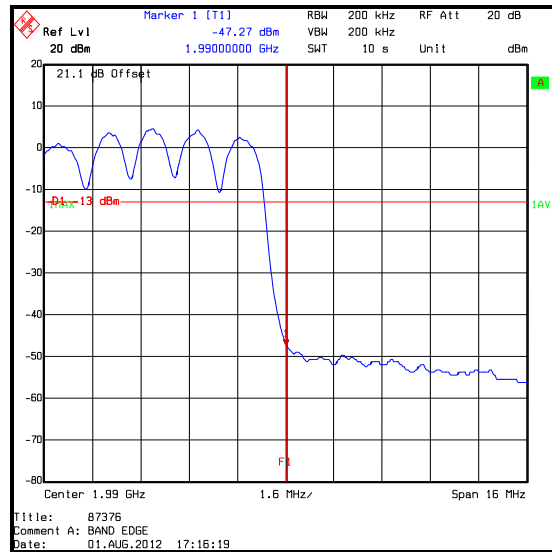
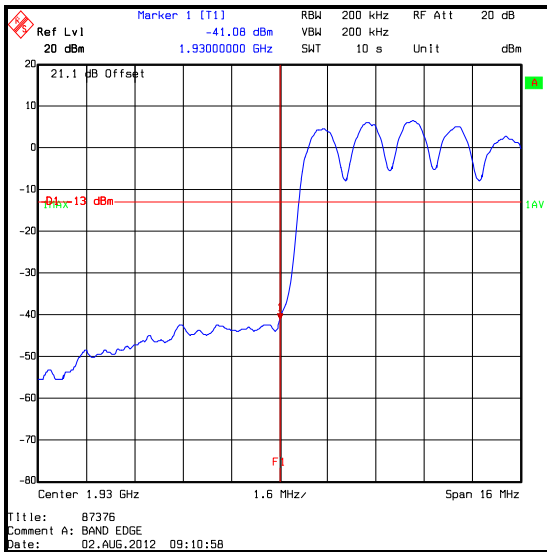
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1930	-40.3	-13.0	27.3	Complied
1990	-44.7	-13.0	31.7	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 15 MHz Bandwidth 16QAM / Downlink

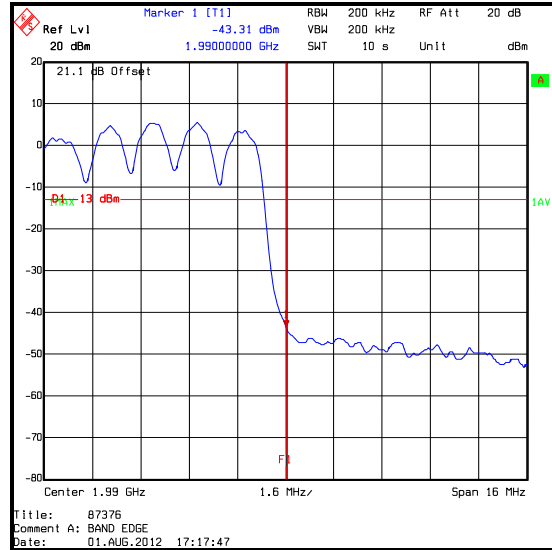
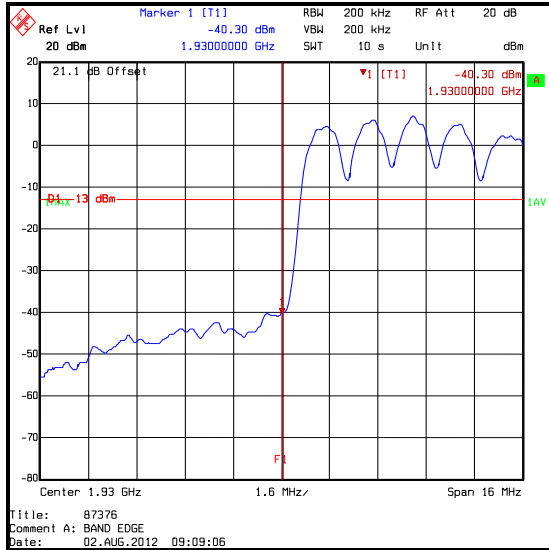
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1930	-41.1	-13.0	28.1	Complied
1990	-47.3	-13.0	34.3	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 15 MHz Bandwidth 64QAM / Downlink

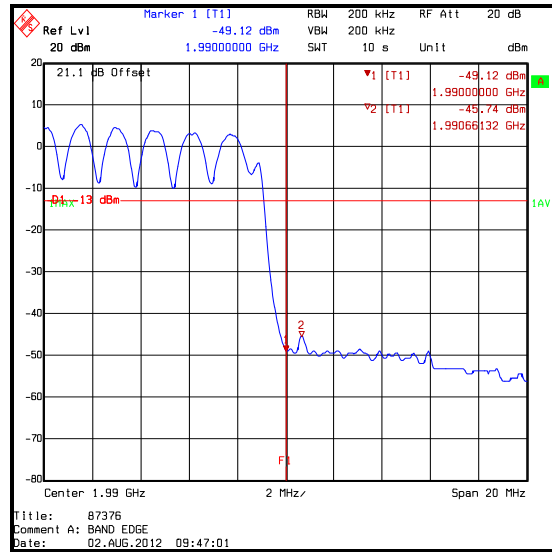
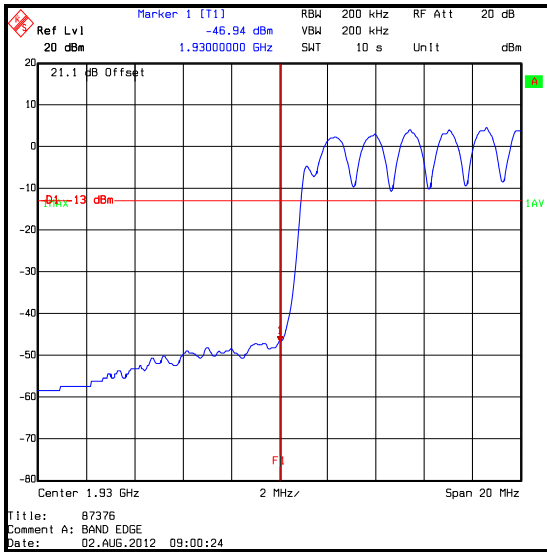
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1930	-40.3	-13.0	27.3	Complied
1990	-43.3	-13.0	30.3	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 20 MHz Bandwidth QPSK / Downlink

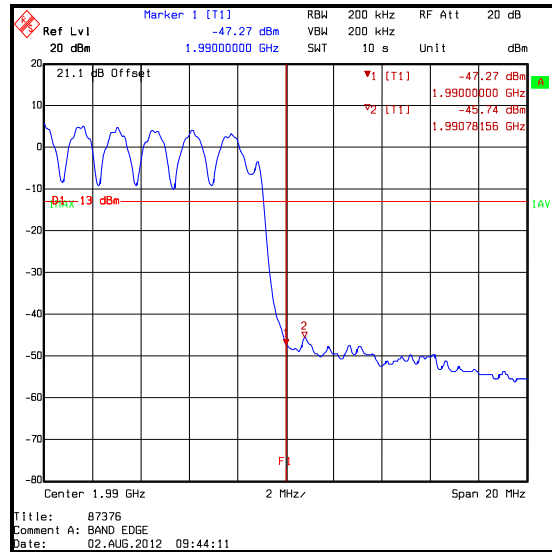
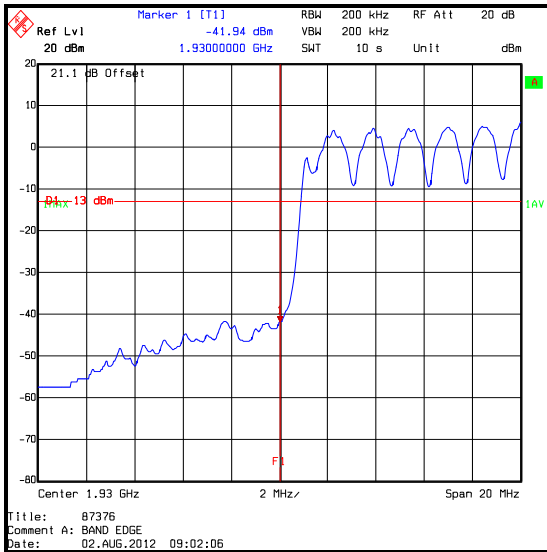
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1930	-46.9	-13.0	33.9	Complied
1990	-49.1	-13.0	36.1	Complied
1990.661	-45.7	-13.0	32.7	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 20 MHz Bandwidth 16QAM / Downlink

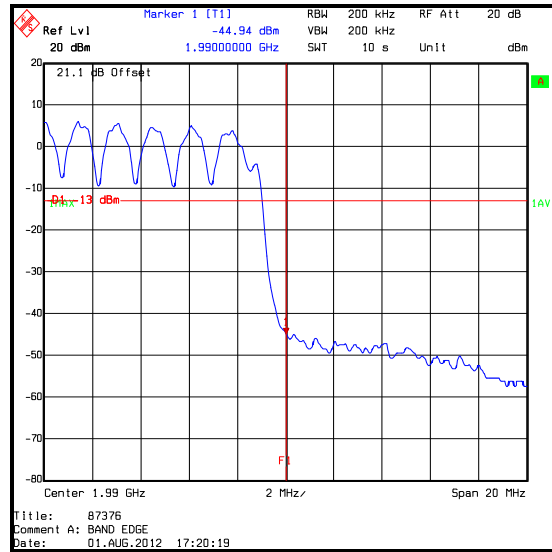
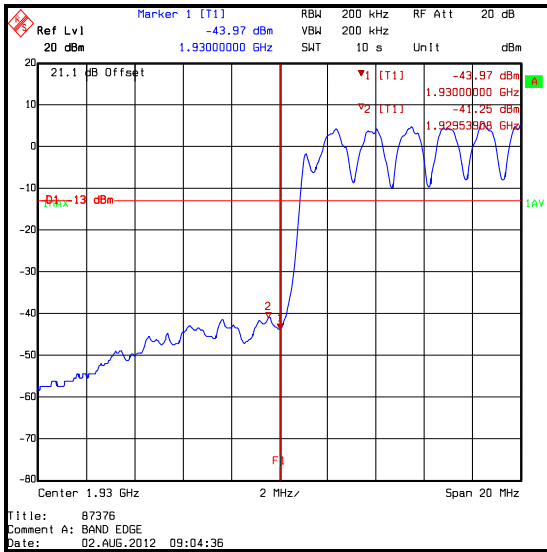
Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1930	-41.9	-13.0	28.9	Complied
1990	-47.3	-13.0	34.3	Complied
1990.782	-45.7	-13.0	32.7	Complied



Transmitter Band Edge Conducted Emissions (continued)

Results: LTE 20 MHz Bandwidth 64QAM / Downlink

Frequency (MHz)	Peak Level (dBm)	Limit (dBm)	Margin (dB)	Result
1929.538	-41.3	-13.0	28.3	Complied
1930	-44.0	-13.0	31.0	Complied
1990	-44.9	-13.0	31.9	Complied



5.4. Test Results: 3GPP TS 36.143 V10.3.0 Clause 11**5.4.1. Input Intermodulation****Test Summary:**

Test Engineer:	Patrick Jones	Test Date:	25 October 2012 to 26 October 2012
Test Sample Serial Number:	12050004		

3GPP Reference:	TS 36.143 V10.3.0, Clause 11.
Test Method Used:	As detailed in TS 36.143 V10.3.0, Clause 11, also referencing FCC Enquiry Response 792557

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	42

Note(s):

- Downlink tests: Two CW signals, one of which is at a varying offset from the first channel in the pass band depending on the technology being tested, were mixed through a suitable combining circuit. The 3rd order intermodulation product ($F_2 - (2 \times F_1)$) = 881.5 MHz or ($F_2 - (2 \times F_1)$) = 1960 MHz, which is the centre of the respective pass bands. The signal generator levels were adjusted to be -40.0 dBm at the repeater input.
- Uplink tests: Two CW signals, one of which is at a varying offset from the first channel in the pass band depending on the technology being tested, were mixed through a suitable combining circuit. The 3rd order intermodulation product ($F_2 - (2 \times F_1)$) = 836.6 MHz or ($F_2 - (2 \times F_1)$) = 1880 MHz, which is the centre of the respective pass bands. The signal generator levels were adjusted to be -40.0 dBm at the repeater input.
- TS 36.143 V10.3.0, Clause 11 states that the power in the centre of the pass band shall not increase by more than 11.2 dB. The highest power increase shown in the results tables below is 0.6 dB resulting in a worst case margin of 10.6 dB therefore the EUT was fully compliant.

Results: 850 Band / Downlink / WCDMA (offset 3.5 MHz)

Increase of Power in the Operating Band (dBm)				
Frequency 1 (MHz)	Frequency 2 (MHz)	Measurement Bandwidth (MHz)	Interferer Signal Levels (dBm)	Observed Increase in Power (dB)
867.9	2617.4	1.0	-40.0	0.3

Results: 850 Band / Downlink / CDMA (offset 1.25 MHz)

Increase of Power in the Operating Band (dBm)				
Frequency 1 (MHz)	Frequency 2 (MHz)	Measurement Bandwidth (MHz)	Interferer Signal Levels (dBm)	Observed Increase in Power (dB)
868.45	2618.41	1.0	-40.0	0.2

Input Intermodulation (continued)**Results: 850 Band / Downlink / LTE (offset 1.0 MHz)**

Increase of Power in the Operating Band (dBm)				
Frequency 1 (MHz)	Frequency 2 (MHz)	Measurement Bandwidth (MHz)	Interferer Signal Levels (dBm)	Observed Increase in Power (dB)
868.7	2618.9	1.0	-40.0	0.4

Results: 850 Band / Uplink / WCDMA (offset 3.5 MHz)

Increase of Power in the Operating Band (dBm)				
Frequency 1 (MHz)	Frequency 2 (MHz)	Measurement Bandwidth (MHz)	Interferer Signal Levels (dBm)	Observed Increase in Power (dB)
822.9	2482.4	1.0	-40.0	0.2

Results: 850 Band / Uplink / CDMA (offset 1.25 MHz)

Increase of Power in the Operating Band (dBm)				
Frequency 1 (MHz)	Frequency 2 (MHz)	Measurement Bandwidth (MHz)	Interferer Signal Levels (dBm)	Observed Increase in Power (dB)
823.45	2483.41	1.0	-40.0	0.6

Results: 850 Band / Uplink / LTE (offset 1.0 MHz)

Increase of Power in the Operating Band (dBm)				
Frequency 1 (MHz)	Frequency 2 (MHz)	Measurement Bandwidth (MHz)	Interferer Signal Levels (dBm)	Observed Increase in Power (dB)
823.7	2483.9	1.0	-40.0	0.5

Results: 1900 Band / Downlink / WCDMA (offset 3.5 MHz)

Increase of Power in the Operating Band (dBm)				
Frequency 1 (MHz)	Frequency 2 (MHz)	Measurement Bandwidth (MHz)	Interferer Signal Levels (dBm)	Observed Increase in Power (dB)
1928.9	5817.8	1.0	-40.0	0.2

Results: 1900 Band / Downlink / CDMA (offset 1.25 MHz)

Increase of Power in the Operating Band (dBm)				
Frequency 1 (MHz)	Frequency 2 (MHz)	Measurement Bandwidth (MHz)	Interferer Signal Levels (dBm)	Observed Increase in Power (dB)
1930.0	5820.0	1.0	-40.0	0.1

Input Intermodulation (continued)**Results: 1900 Band / Downlink / LTE (offset 1.0 MHz)**

Increase of Power in the Operating Band (dBm)				
Frequency 1 (MHz)	Frequency 2 (MHz)	Measurement Bandwidth (MHz)	Interferer Signal Levels (dBm)	Observed Increase in Power (dB)
1929.7	5819.4	1.0	-40.0	0.1

Results: 1900 Band / Uplink / WCDMA (offset 3.5 MHz)

Increase of Power in the Operating Band (dBm)				
Frequency 1 (MHz)	Frequency 2 (MHz)	Measurement Bandwidth (MHz)	Interferer Signal Levels (dBm)	Observed Increase in Power (dB)
1848.9	5577.8	1.0	-40.0	0.1

Results: 1900 Band / Uplink / CDMA (offset 1.25 MHz)

Increase of Power in the Operating Band (dBm)				
Frequency 1 (MHz)	Frequency 2 (MHz)	Measurement Bandwidth (MHz)	Interferer Signal Levels (dBm)	Observed Increase in Power (dB)
1850.0	5580.0	1.0	-40.0	0.0

Results: 1900 Band / Uplink / LTE (offset 1.0 MHz)

Increase of Power in the Operating Band (dBm)				
Frequency 1 (MHz)	Frequency 2 (MHz)	Measurement Bandwidth (MHz)	Interferer Signal Levels (dBm)	Observed Increase in Power (dB)
1849.7	5579.4	1.0	-40.0	0.1

6. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document "approximately" is interpreted as meaning "effectively" or "for most practical purposes".

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
Conducted Output Power	824 to 849 MHz / 1850 to 1910 MHz	95%	±0.27 dB
Frequency Stability	824 to 849 MHz / 1850 to 1910 MHz	95%	±0.92 ppm
Occupied Bandwidth	824 to 849 MHz / 1850 to 1910 MHz	95%	±0.92 ppm
Conducted Spurious Emissions	1 MHz to 20 GHz	95%	±2.64 dB
Radiated Spurious Emissions	30 MHz to 20 GHz	95%	±2.94 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

Appendix 1. Test Equipment Used

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (months)
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	09 Oct 2012	12
A1555	Attenuator	Weinschel	6	L8652	04 Apr 2013	12
A1818	Antenna	EMCO	3115	00075692	09 Oct 2012	12
A1830	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100668	25 Feb 2013	12
A1834	Attenuator	Hewlett Packard	8491B	10444	29 Jan 2013	12
A1998	Attenuator	Huber & Suhner	6820.17.B	07101	03 Apr 2013	12
A1999	Attenuator	Huber & Suhner	6820.17.B	07101	04 Apr 2013	12
A2064	Coaxial Circulator	Atlantic	ACC-20010-SF-SF-SF	110714728	Calibrated before use	-
A2065	Coaxial Circulator	Atlantic	ACC-20010-SF-SF-SF	110714729	Calibrated before use	-
A2068	Coaxial Circulator	Atlantic	ACC-20040-SF-SF-SF	110714732	Calibrated before use	-
A2069	Coaxial Circulator	Atlantic	ACC-20040-SF-SF-SF	80701482	Calibrated before use	-
A2070	Coaxial Circulator	Atlantic	ACC-20060-SF-SF-SF	80208454	Calibrated before use	-
A2181	Coaxial Circulator	Atlantic	ACC-20130-SF-SF-SF	120409229	Calibrated before use	-
A227	Power Divider	Suhner Electronics Ltd	4901/01/A	None	Calibrated before use	-
A253	Antenna	Flann Microwave	12240-20	128	09 Oct 2012	12
A254	Antenna	Flann Microwave	14240-20	139	09 Oct 2012	12
A255	Antenna	Flann Microwave	16240-20	519	09 Oct 2012	12
A256	Antenna	Flann Microwave	18240-20	400	09 Oct 2012	12
A436	Antenna	Flann	20240-20	330	09 Oct 2012	12
A553	Antenna	Chase	CBL6111A	1593	15 Feb 2013	12
A649	LISN	Rohde & Schwarz	ESH3-Z5	825562/008	19 Apr 2013	12
E013	Environmental Chamber	Sanyo	MTH-4200PR	None	10 Aug 2012	12
G017	Signal Generator	Rohde & Schwarz	SMH	863 771/023	13 Jun 2013	24
G0543	Amplifier	Sonoma	310N	230801	13 Jul 2012	3
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	31 Aug 2012	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	09 Oct 2012	12
L1070	Vector Signal	Rohde & Schwarz	SMBV100A	257568	27 Jan 2013	12

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (months)
	Generator					
M1124	Spectrum Analyser	Rohde & Schwarz	ESI26	100046K	29 Jun 2012	12
M1229	Digital Multimeter	Fluke	179	87640015	18 Jun 2013	12
M1242	Spectrum Analyser	Rohde & Schwarz	FSEM30	845986/022	12 Dec 2012	12
M1249	Thermocouple	Fluke	52II	88800049	30 Mar 2013	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	03 Feb 2013	12
M1379	Test Receiver	Rohde & Schwarz	ESIB 7	100330	20 Sep 2012	12
M1449	Signal Generator	Rohde & Schwarz	SMIQ03B	100176	07 Mar 2013	12
M1630	Test Receiver	Rohde & Schwarz	ESU40	100233	13 Jan 2013	12
M200	Power Divider	Narda	4313C-4	10019	Calibrated before use	-
M259	Signal Generator	Rohde & Schwarz	SME-03	827758/021	Calibrated before use	-
M260	Signal Generator	Rohde & Schwarz	SMP-02	829076/008	14 Jun 2013	12

NB In accordance with UKAS requirements all the measurement equipment is on a calibration schedule. All test equipment was within the previous or current calibration period on the date of testing.