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Report On

FCC Testing of the
The Boeing Company Black Smartphone
In accordance with FCC CFR 47 Part 2 and FCC CFR 47 Part 24
(WCDMA)

COMMERCIAL-IN-CONFIDENCE

FCC ID: H8V-BLK1

Document 75923267 Report 05 Issue 2

December 2013



Product Service

TÜV SÜD Product Service, Octagon House, Concorde Way, Segensworth North,
Fareham, Hampshire, United Kingdom, PO15 5RL
Tel: +44 (0) 1489 558100. Website: www.tuv-sud.co.uk

COMMERCIAL-IN-CONFIDENCE

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The Boeing Company Black Smartphone
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Document 75923267 Report 05 Issue 2

December 2013

PREPARED FOR

The Boeing Company
7700 Boston Blvd
Springfield
VA 22153

PREPARED BY

Natalie Bennett
Senior Administrator (Technical)

APPROVED BY

Mark Jenkins
Authorised Signatory

DATED

19 December 2013

**This report has been up issued to Issue 2 to amend
the Applicant Name and Address and Product Name.**

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47 Part 2 and FCC CFR 47 Part 24. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

A Galpin

G Lawler





CONTENTS

Section	Page No
1	REPORT SUMMARY 3
1.1	Introduction 4
1.2	Brief Summary of Results 5
1.3	Application Form 6
1.4	Product Information 7
1.5	Test Conditions 7
1.6	Deviations from the Standard 7
1.7	Modification Record 7
2	TEST DETAILS 8
2.1	Frequency Stability 9
2.2	Spurious Emissions at Band Edge 11
2.3	Effective Isotropic Radiated Power 14
2.4	Maximum Peak Output Power - Conducted 18
2.5	Modulation Characteristics 20
2.6	Emission Limitations for Broadband PCS Equipment 21
2.7	Conducted Spurious Emissions 31
2.8	Occupied Bandwidth 37
3	TEST EQUIPMENT USED 41
3.1	Test Equipment Used 42
3.2	Measurement Uncertainty 45
4	ACCREDITATION, DISCLAIMERS AND COPYRIGHT 46
4.1	Accreditation, Disclaimers and Copyright 47



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SECTION 1

REPORT SUMMARY

FCC Testing of the
The Boeing Company Black Smartphone
In accordance with FCC CFR 47 Part 2 and FCC CFR 47 Part 24 (WCDMA)



Product Service

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC Testing of the The Boeing Company Black Smartphone to the requirements of FCC CFR 47 Part 2 and FCC CFR 47 Part 24.

Objective	To perform FCC Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	The Boeing Company
Model Number(s)	Black Smartphone
Serial Number(s)	XCV23200852 XCV23200791
Number of Samples Tested	2
Test Specification/Issue/Date	FCC CFR 47 Part 2 (2012) FCC CFR 47 Part 24 (2012)
Incoming Release Date	Application Form 13 December 2013
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	48774 01 July 2013
Start of Test	21 July 2013
Finish of Test	29 August 2013
Name of Engineer(s)	A Galpin G Lawler
Related Document(s)	ANSI C63.4: 2003



1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 2 and FCC CFR 47 Part 24 is shown below.

Section	Spec Clause		Test Description	Result	Comments/Base Standard
	Pt 2	Pt 24			
WCDMA FDD II - QPSK Modulation					
2.1	2.1055	24.135(a)	Frequency Stability	Pass	
2.2	2.1051	24.229	Spurious Emissions at Band Edge	Pass	
2.3	-	24.232(c)	Effective Isotropic Radiated Power	Pass	
2.4	2.1046	24.232	Maximum Peak Output Power - Conducted	Pass	
2.5	2.1047(d)	-	Modulation Characteristics	-	Customer Declaration
2.6	2.1051	24.238	Emission Limitations for Broadband PCS Equipment	Pass	
2.7	2.1051	24.238(a)	Conducted Spurious Emissions	Pass	
2.8	2.1049(h)	24.238(b)	Occupied Bandwidth	Pass	



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1.3 APPLICATION FORM

APPLICANT'S DETAILS			
COMPANY NAME :The Boeing Company ADDRESS : 7700 Boston Blvd. Springfield, VA 22153			
NAME FOR CONTACT PURPOSES : Brian Chapman			
TELEPHONE NO: 703.270.6714		FAX NO:	
		E-MAIL: brian.s.chapman@boeing.com	

EQUIPMENT INFORMATION			
<u>Equipment designator:</u>			
Model name/number	Identification number		
<u>Supply Voltage:</u>			
☐	AC mains	State AC voltage V	and AC frequency Hz
☐	DC (external)	State DC voltage V	and DC current A
☒	DC (internal)	State DC voltage ...3.8 V	and Battery type...Li-Polymer
<u>Frequency characteristics:</u>			
Frequency range	1852.5 MHz to 1907.6 MHz		Channel spacing 200kHz (if channelized)
Designated test frequencies:			
Bottom: 1852.5 MHz	Middle: 1880.05 MHz	Top: 1907.60 MHz	
<u>Power characteristics:</u>			
Maximum transmitter power 0.25W (24dBm)		Minimum transmitter power W (if variable)	
☒	Continuous transmission		
☐	Intermittent transmission		
If intermittent, can transmitter be set to continuous transmit test mode?		Y/N	
<u>Antenna characteristics:</u>			
☐	Antenna connector	State impedance ohm	
☒	Temporary antenna connector	State impedance 50 ohm	
☒	Integral antenna	State gain (peak) 2dBi	
<u>Modulation characteristics:</u>			
☐	Amplitude	☐ Other	
☐	Frequency	Details:	
☒	Phase		
Can the transmitter operate un-modulated?		Y/N	
ITU Class of emission:			
<u>Extreme conditions:</u>			
Maximum temperature	55 °C		Minimum temperature -10 °C
Maximum supply voltage	4.2 V		Minimum supply voltage 3.6 V

I hereby declare that I am entitled to sign on behalf of the applicant and that the information supplied is correct and complete.

Signature :

Name :

Position held :

Date :


 Brian Chapman
 Program Manager
 12/13/13



Product Service

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a The Boeing Company Black Smartphone. A full technical description can be found in the manufacturer's documentation.

1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure.

The EUT was powered from a 3.8 V DC supply.

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standard were made during testing.

1.7 MODIFICATION RECORD

Modification 0 - No modifications were made to the test sample during testing.



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SECTION 2

TEST DETAILS

FCC Testing of the
The Boeing Company Black Smartphone
In accordance with FCC CFR 47 Part 2 and FCC CFR 47 Part 24 (WCDMA)



Product Service

2.1 FREQUENCY STABILITY

2.1.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1055
FCC CFR 47 Part 24, Clause 24.135(a)

2.1.2 Equipment Under Test and Modification State

Black Smartphone S/N: XCV23200852 - Modification State 0

2.1.3 Date of Test

29 August 2013

2.1.4 Test Equipment Used

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

2.1.5 Test Procedure

The EUT was set to transmit on maximum power with modulation. A CMU200 Communications Analyser, was used to measure the frequency error. The maximum result was taken over 200 bursts. The temperature was adjusted between -30°C and +50°C in 10° steps as per 2.1055 and the frequency error was measured at each temperature interval.

In addition, the frequency error was measured at voltage extremes at 20°C.

2.1.6 Environmental Conditions

Ambient Temperature	23.6°C
Relative Humidity	56.6%



2.1.7 Test Results

3.8 V DC Supply

Under Temperature Variations

1880 MHz

Temperature Interval (°C)	Mode	Deviation (ppm)
-30	WCDMA	0.013829787
-20	WCDMA	-0.009574468
-10	WCDMA	-0.010638298
0	WCDMA	-0.007978723
+10	WCDMA	-0.011702128
+20	WCDMA	0.008510638
+30	WCDMA	0.009042553
+40	WCDMA	0.007446808
+50	WCDMA	0.009042553

Limit Clause

The frequency stability of the transmitter shall be maintained within $\pm 0.0001\%$ (± 1 ppm).

Under Voltage Variations

1880 MHz

DC Voltage (V)	Mode	Deviation (ppm)
3.8	WCDMA	0.008510638
3.6	WCDMA	0.009042553
4.2	WCDMA	-0.006382979

Limit Clause

The frequency stability of the transmitter shall be maintained within $\pm 0.0001\%$ (± 1 ppm).



Product Service

2.2 SPURIOUS EMISSIONS AT BAND EDGE

2.2.1 Specification Reference

FCC CFR 47 Part 2 and FCC CFR 47 Part 24, Clause 2.1051 and 24.229

2.2.2 Equipment Under Test and Modification State

Black Smartphone S/N: XCV23200852 - Modification State 0

2.2.3 Date of Test

29 August 2013

2.2.4 Test Equipment Used

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

2.2.5 Test Procedure

In accordance with 24.238, any emissions outside of the block edges shall be attenuated by at least $43 + 10 \log(P)$. The measurements are shown to ± 1 MHz from the block edges. The plots shown under the Spurious Emissions section covers the required range of 9 kHz to 20 GHz.

The reference power and path losses of all channels used for testing in each frequency block were measured. Having entered the reference level offset, a limit line was displayed, showing the $-13 \text{ dBm} (43 + 10 \log(P))$, limit. A measurement RBW of at least 1% of the Occupied Bandwidth is specified. In this instance, a smaller RBW was used and the Reference Level Offset was corrected by $10 \log(1\% \text{ of Occupied Bandwidth/RBW})$. The EUT was operated at maximum power with QPSK modulation schemes.

2.2.6 Environmental Conditions

Ambient Temperature	23.7°C
Relative Humidity	56.0%



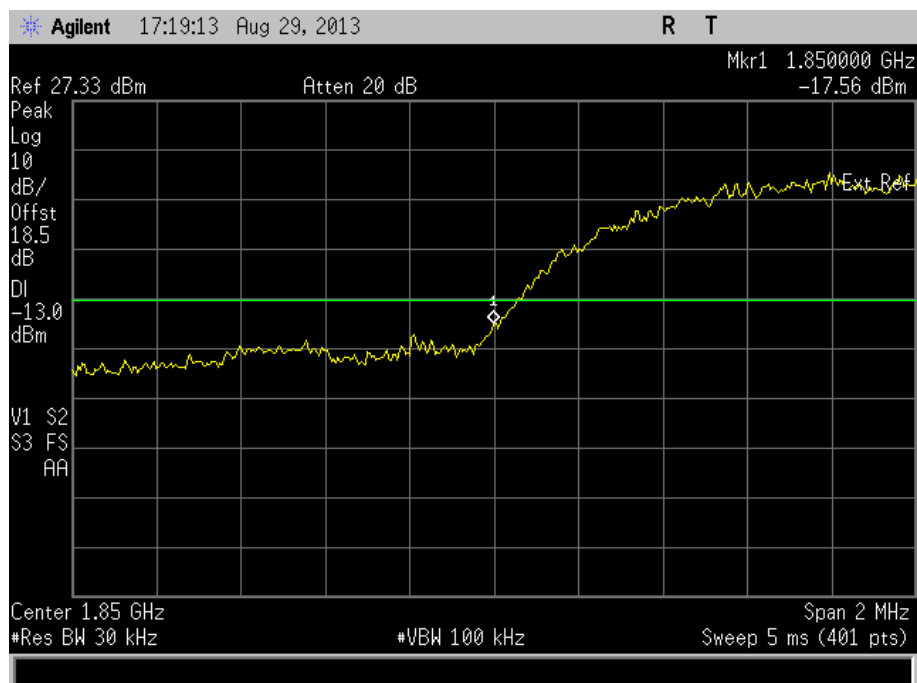
Product Service

2.2.7 Test Results

3.8 V DC Supply

Frequency Block (MHz)	Mode	Lower Block Edge Test Channels/Frequencies	Upper Block Edge Test Channels/Frequencies
A : (1930.0 – 1945.0)	WCDMA	Channel : 9262 Frequency : 1852.4 MHz	N/A
B : (1975.0 – 1990.0)	WCDMA	N/A	Channel : 9538 Frequency : 1907.6 MHz

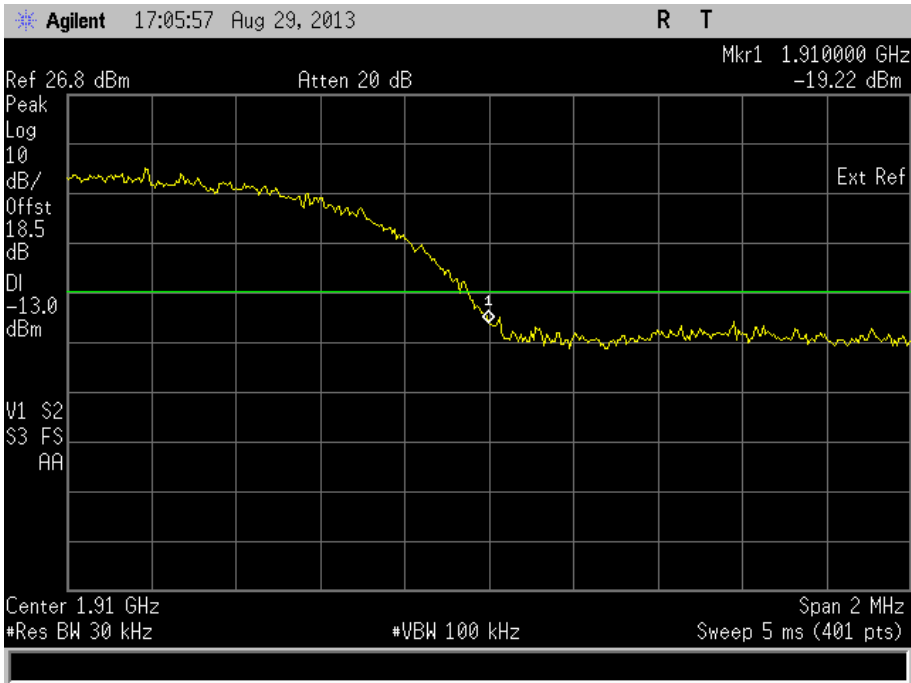
Frequency Block A





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Frequency Block B



Limit Clause

-13 dBm at block edge.



Product Service

2.3 EFFECTIVE ISOTROPIC RADIATED POWER

2.3.1 Specification Reference

FCC CFR 47 Part 24, Clause 24.232(c)

2.3.2 Equipment Under Test and Modification State

Black Smartphone S/N: XCV23200791 - Modification State 0

2.3.3 Date of Test

22 July 2013

2.3.4 Test Equipment Used

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

2.3.5 Test Procedure

Measurements of the fundamental from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The fundamental frequency was maximised by adjusting the antenna height, antenna polarisation and turntable azimuth. A peak detector was used with the trace set to max hold. The maximum result was recorded.

The EUT was then removed from the chamber and replaced with a substitution antenna. Using a signal generator the level was adjusted to achieve the same value on the measuring instrument as previously recorded with the EUT. The final result (ERP) was determined by a calculation using the signal generator level, antenna gain and cable loss.

The substitution result was corrected to account for the Spectrum Analyser measurement bandwidth using a Peak Power Analyser.

The measurements were performed at a 3m distance unless otherwise stated.

2.3.6 Environmental Conditions

Ambient Temperature	18.9 - 19.4°C
Relative Humidity	39.0 - 43.0%

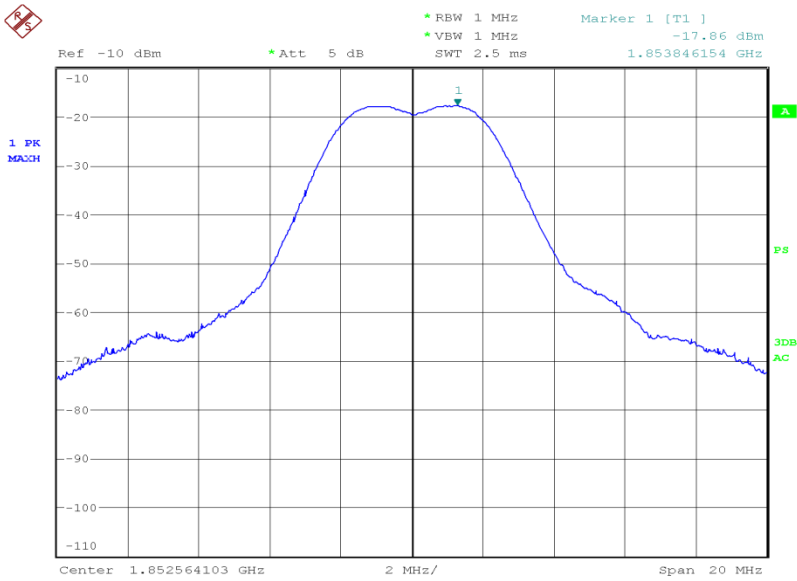


Product Service

2.3.7 Test Results

1852.4 MHz

Result (dBm)	Result (W)
23.31	0.214



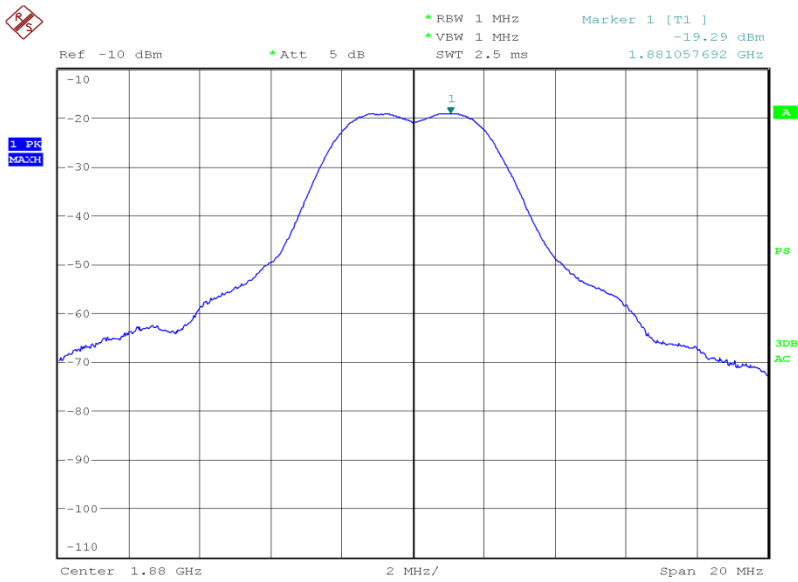
Date: 21.JUL.2013 10:58:53



Product Service

1880 MHz

Result (dBm)	Result (W)
22.51	0.178



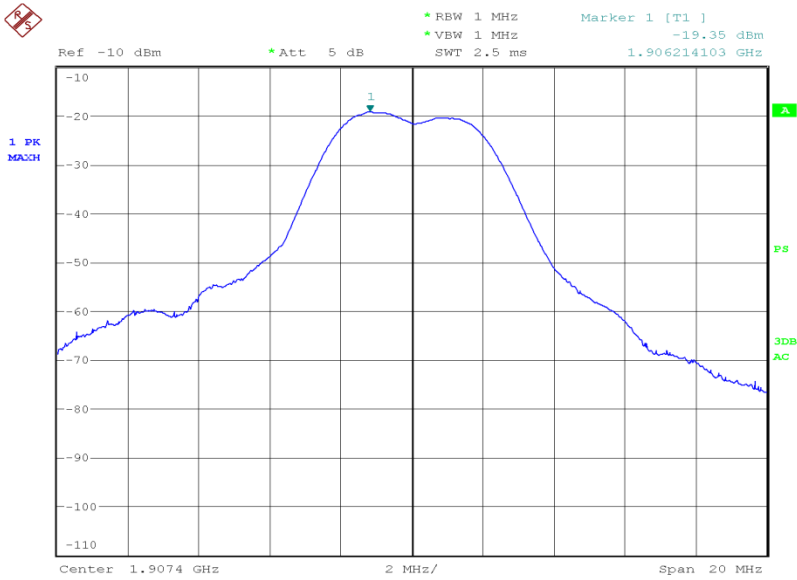
Date: 21.JUL.2013 11:15:52



Product Service

1907.6 MHz

Result (dBm)	Result (W)
23.02	0.200



Date: 21.JUL.2013 11:22:49

Limit Clause

Mobile – 7 W or 38.45 dBm



Product Service

2.4 MAXIMUM PEAK OUTPUT POWER - CONDUCTED

2.4.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1046
FCC CFR 47 Part 24, Clause 24.232

2.4.2 Equipment Under Test and Modification State

Black Smartphone S/N: XCV23200852 - Modification State 0

2.4.3 Date of Test

29 August 2013

2.4.4 Test Equipment Used

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

2.4.5 Test Procedure

Using a Peak Power Meter in conjunction with an attenuator, the output power of the EUT was measured at the antenna terminals on Bottom, Middle and Top channels on maximum output power.

The EUT supports WCDMA with QPSK modulation in the uplink and was tested in this mode of operation.

2.4.6 Environmental Conditions

Ambient Temperature	23.7°C
Relative Humidity	56.0%



Product Service

2.4.7 Test Results

3.8 V DC Supply

1852.4 MHz

Mode	Result (dBm)	Result (W)
WCDMA	27.24	0.53

1880 MHz

Mode	Result (dBm)	Result (W)
WCDMA	26.33	0.429

1907.6 MHz

Mode	Result (dBm)	Result (W)
WCDMA	26.29	0.425

Limit Clause

Mobile – 7 W or 38.45 dBm



Product Service

2.5 MODULATION CHARACTERISTICS

2.5.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1047(d)

2.5.2 Equipment Under Test

Black Smartphone

2.5.3 Test Results

Customer Description



Product Service

2.6 EMISSION LIMITATIONS FOR BROADBAND PCS EQUIPMENT

2.6.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 24, Clause 24.238

2.6.2 Equipment Under Test and Modification State

Black Smartphone S/N: XCV23200791 - Modification State 0

2.6.3 Date of Test

21 July 2013, 22 July 2013 & 7 August 2013

2.6.4 Test Equipment Used

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

2.6.5 Test Procedure

A preliminary profile of the Spurious Radiated Emissions was obtained up to the 10th harmonic by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

Using the information from the preliminary profiling of the EUT, the list of emissions was then confirmed or updated under Alternative Open Site conditions. Emission levels were maximised by adjusting the antenna height, antenna polarisation and turntable azimuth.

The EUT was set to transmit on full power on WCDMA modulation. The EUT was tested on bottom, middle and top channels at maximum power.

For any emissions found the EUT was then removed from the chamber and replaced with a substitution antenna. Using a signal generator the level was adjusted to achieve the same value on the measuring instrument as previously recorded with the EUT. The final result was determined by a calculation using the signal generator level, antenna gain and cable loss. The measurements were performed at a 3m distance unless otherwise stated.

2.6.6 Environmental Conditions

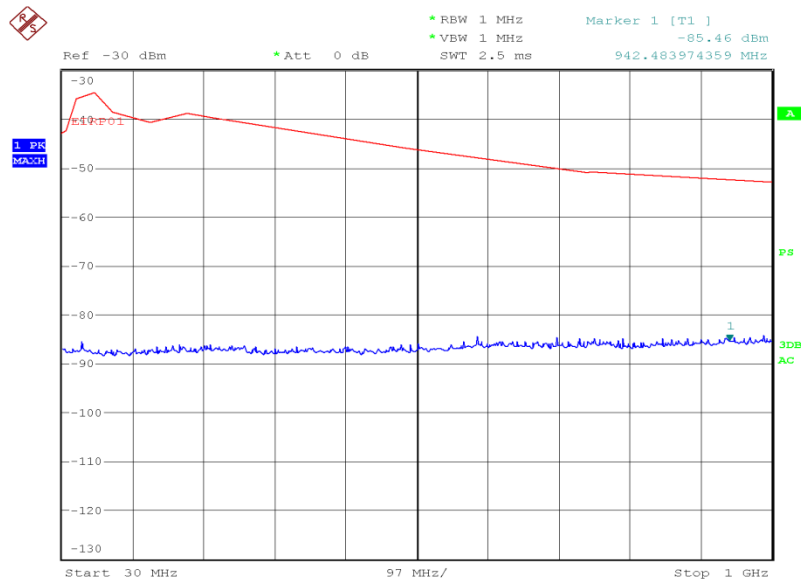
Ambient Temperature	18.9 - 20.2°C
Relative Humidity	39.0 - 46.0%



2.6.7 Test Results

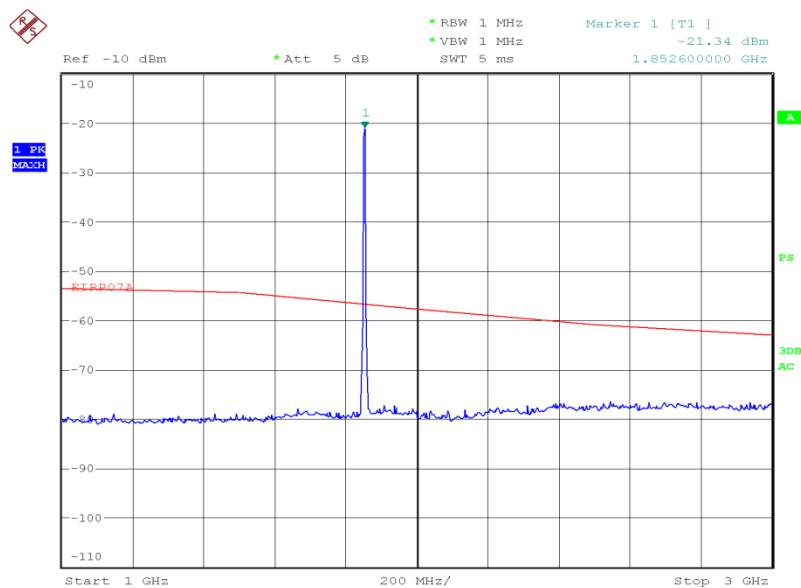
1852.4 MHz

30 MHz to 1 GHz



Date: 22.JUL.2013 20:04:32

1 GHz to 3 GHz

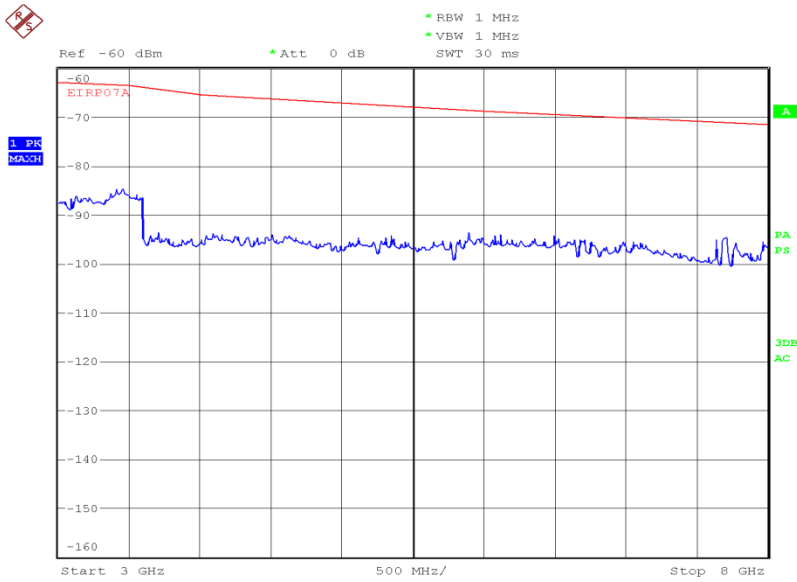


Date: 21.JUL.2013 11:05:08



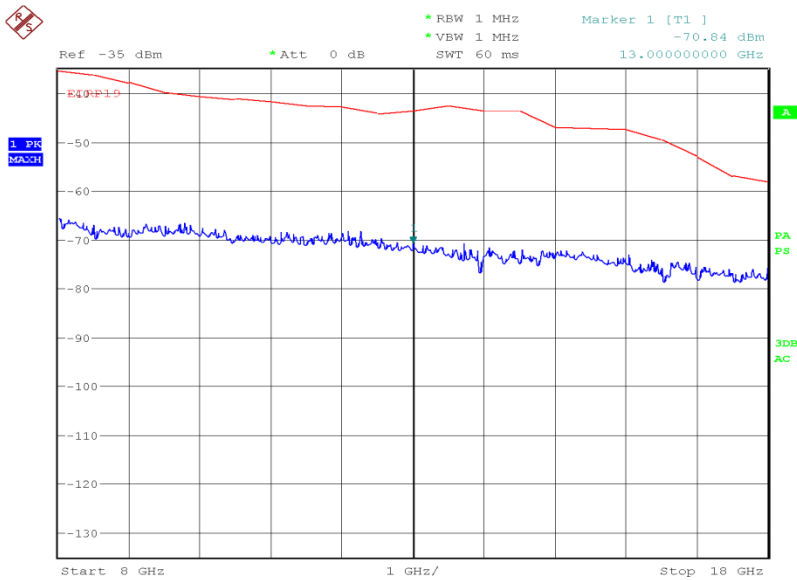
Product Service

3 GHz to 8 GHz



Date: 21.JUL.2013 13:35:06

8 GHz to 18 GHz

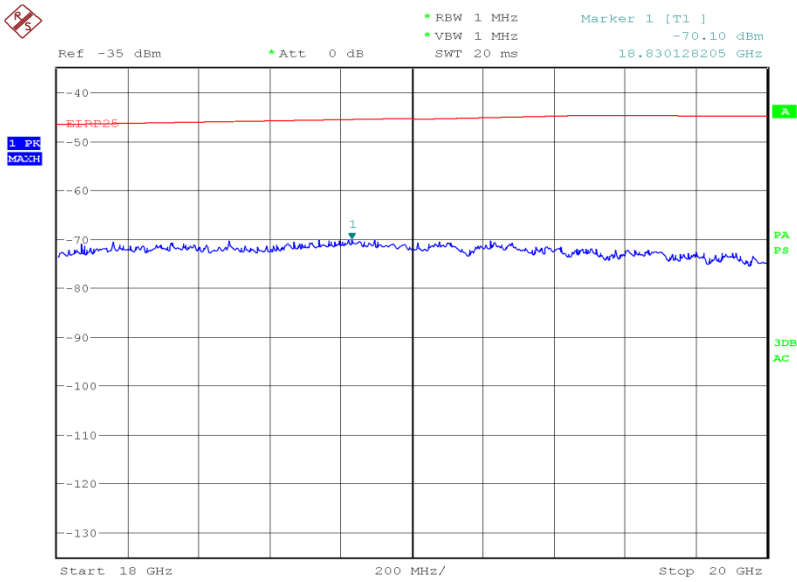


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Product Service

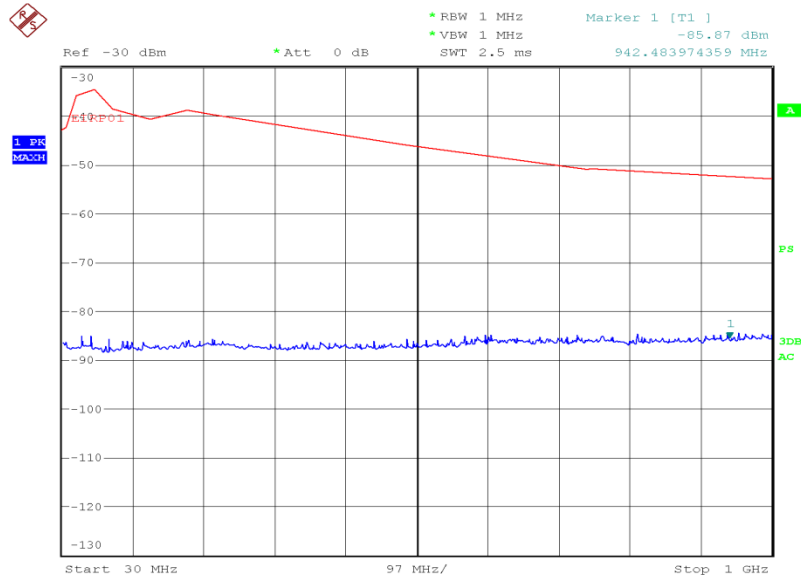
18 GHz to 20 GHz



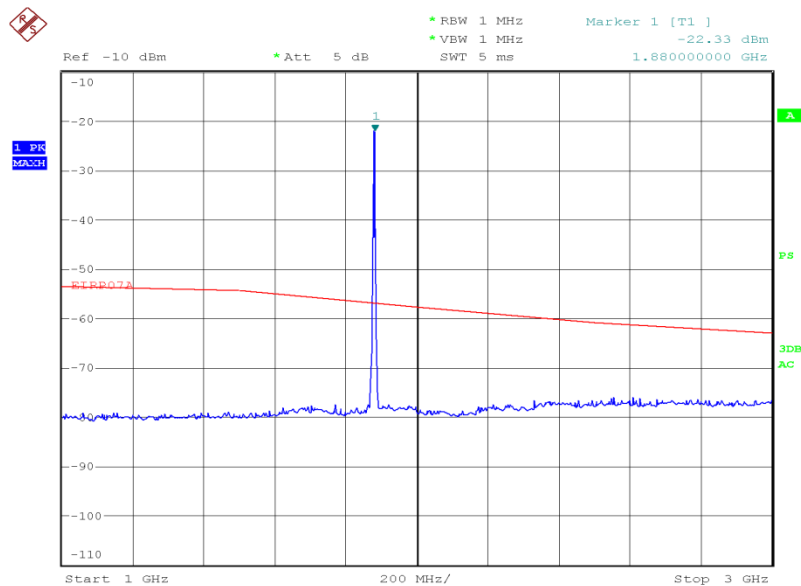
Date: 7.AUG.2013 21:25:21



Product Service

1880 MHz30 MHz to 1 GHz

Date: 22.JUL.2013 20:06:53

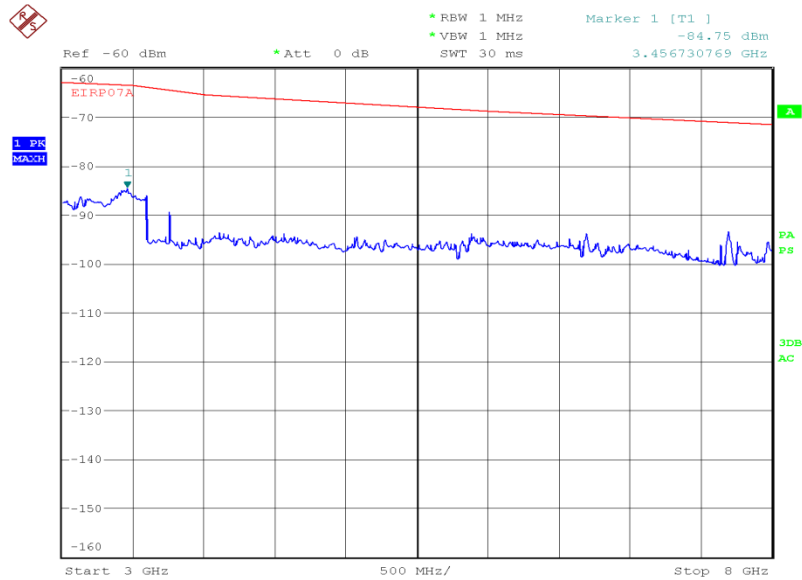
1 GHz to 3 GHz

Date: 21.JUL.2013 11:10:39



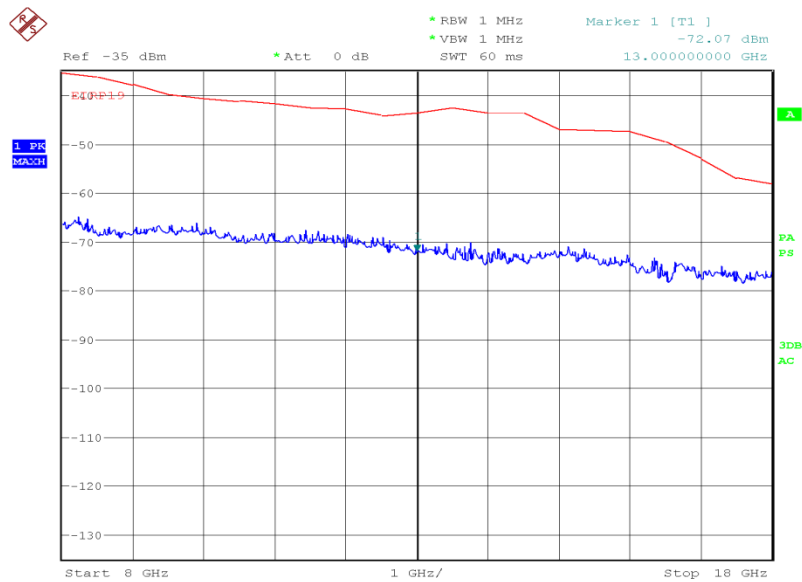
Product Service

3 GHz to 8 GHz



Date: 21.JUL.2013 13:40:00

8 GHz to 18 GHz

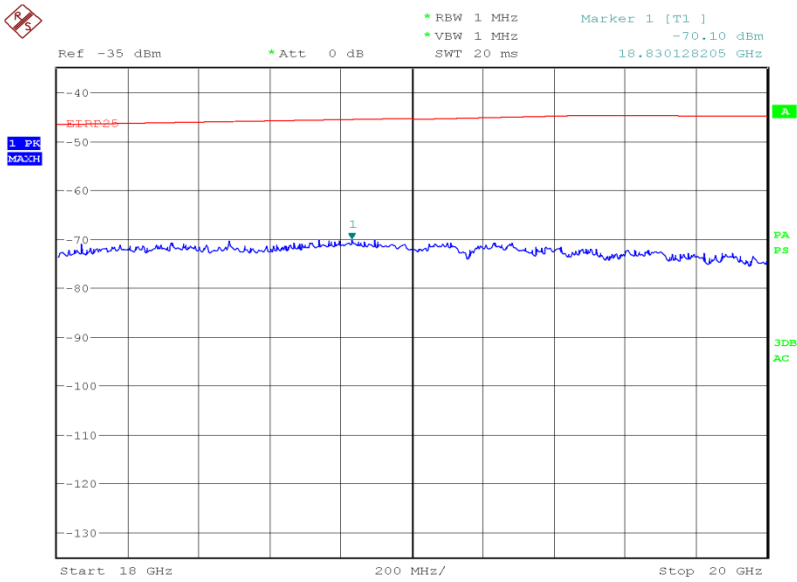


Date: 21.JUL.2013 14:26:05



Product Service

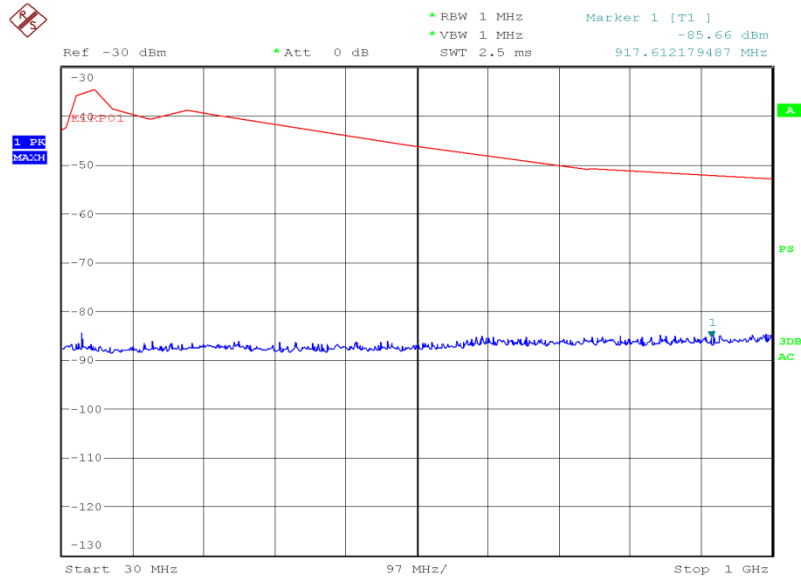
18 GHz to 20 GHz



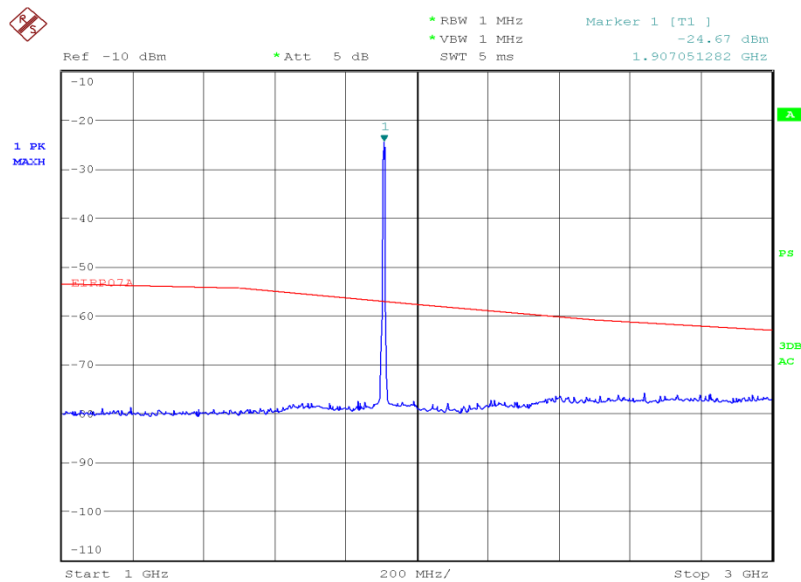
Date: 7.AUG.2013 21:24:26



Product Service

1907.6 MHz30 MHz to 1 GHz

Date: 22.JUL.2013 20:08:09

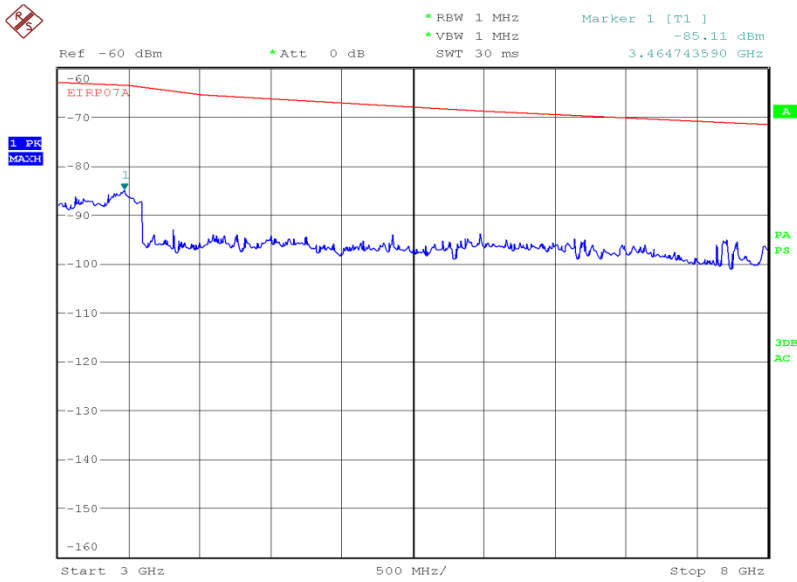
1 GHz to 3 GHz

Date: 21.JUL.2013 11:28:41



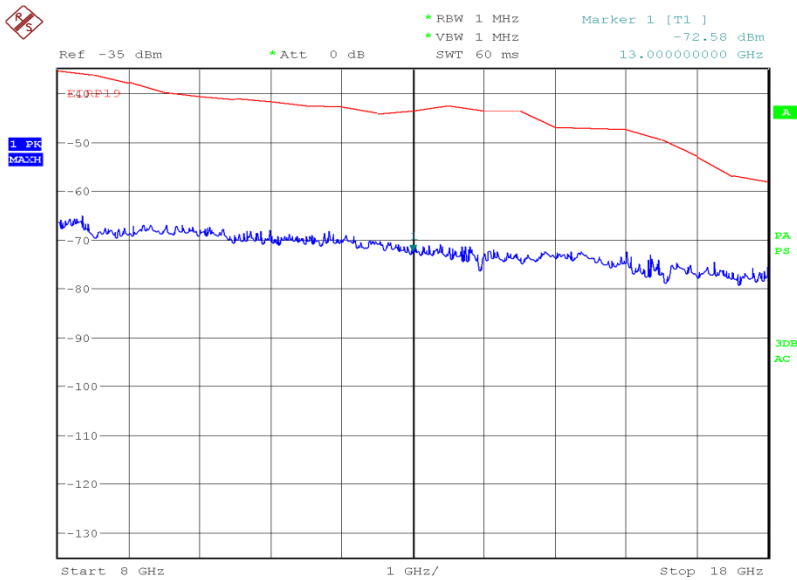
Product Service

3 GHz to 8 GHz



Date: 21.JUL.2013 13:41:39

8 GHz to 18 GHz

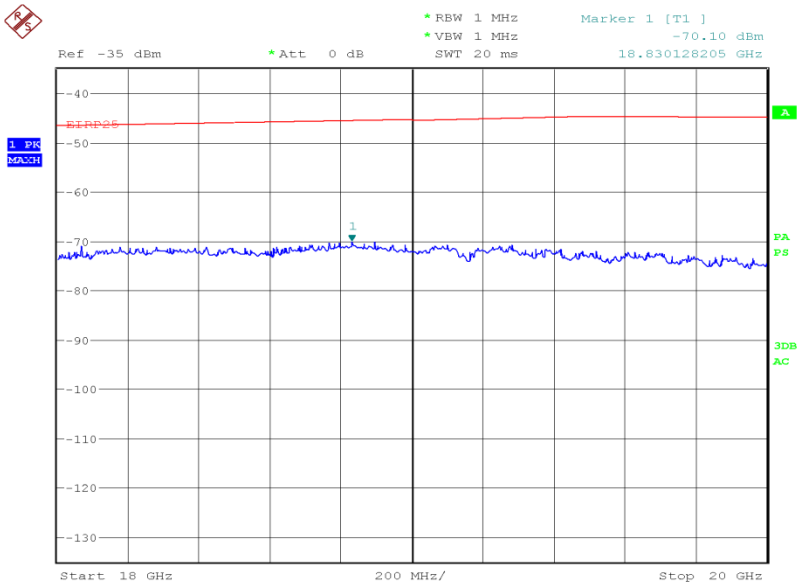


Date: 21.JUL.2013 14:30:30



Product Service

18 GHz to 20 GHz



Date: 7.AUG.2013 21:22:31

Limit Clause

43+10log(P) or -13 dBm



Product Service

2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.1 Specification Reference

FCC CFR 47 Part 2, Clause 2.1051
FCC CFR 47 Part 24, Clause 24.238(a)

2.7.2 Equipment Under Test and Modification State

Black Smartphone S/N: XCV23200852 - Modification State 0

2.7.3 Date of Test

29 August 2013

2.7.4 Test Equipment Used

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

2.7.5 Test Procedure

In accordance with Part 2.1051 and 24.238, the spurious emissions from the antenna terminal were measured. The transmitter output power was attenuated using a combination of filters and attenuators and the frequency spectrum investigated from 9 kHz to 20 GHz. The EUT was set to transmit on full power with WCDMA modulation. The EUT was tested on Bottom, Middle and Top channels for maximum power. The resolution and video bandwidths were set to 1 MHz and 3 MHz thus meeting the requirements of Part 24.238(a). The spectrum analyser detector was set to max hold.

From 9 kHz to 4 GHz, an attenuator was used. For measuring the range 4 GHz to 20 GHz an attenuator and high pass filter were used. This was to reduce saturation effects in the spectrum analyser.

The maximum path loss across the measurement bands were used as reference level offsets to ensure worst case.

2.7.6 Environmental Conditions

Ambient Temperature	23.7°C
Relative Humidity	56.0%



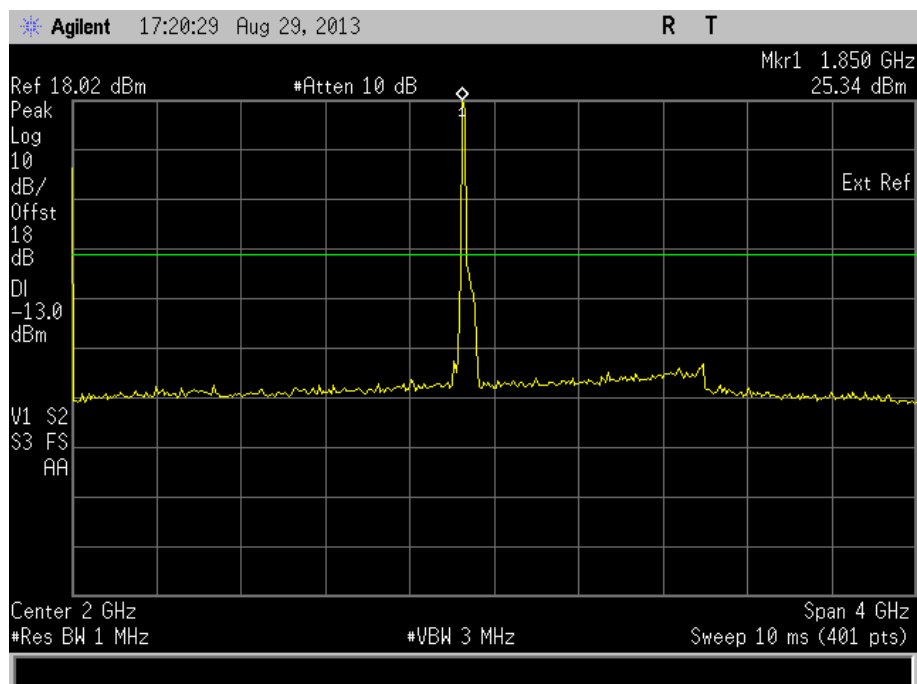
Product Service

2.7.7 Test Results

3.8 V DC Supply

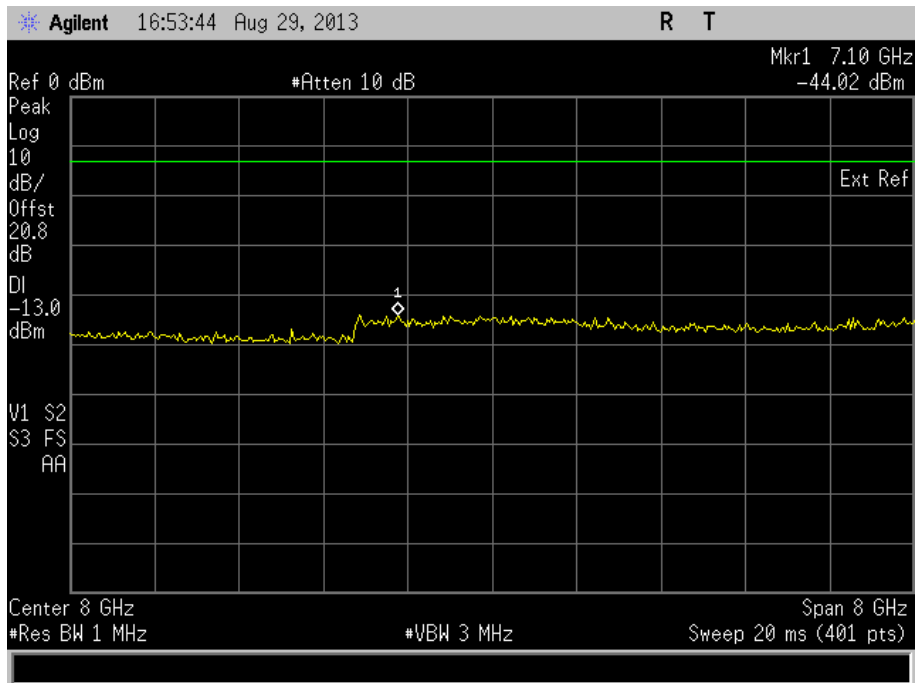
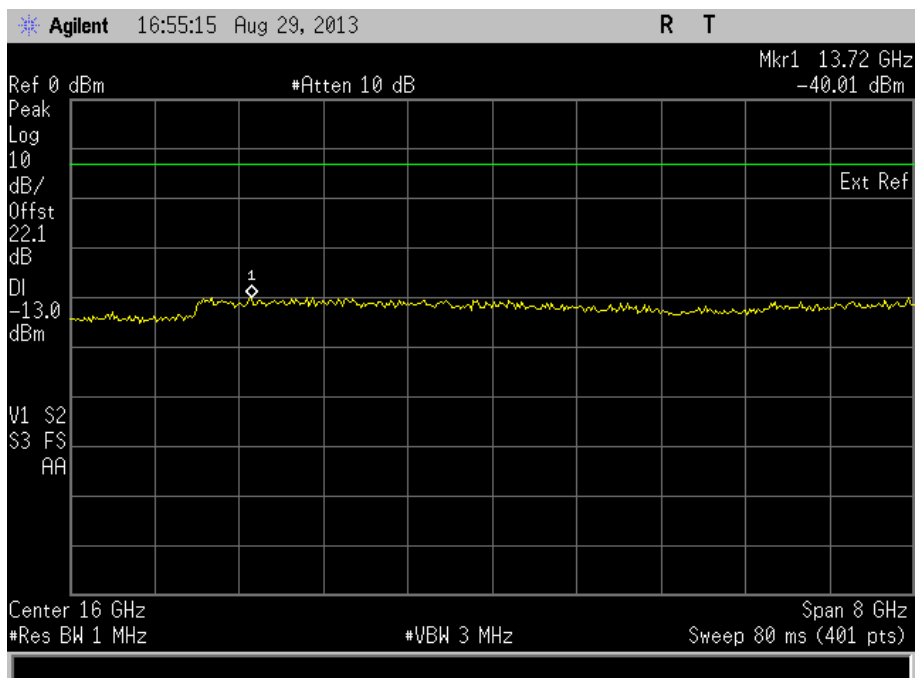
1852.4 MHz

9kHz to 4 GHz



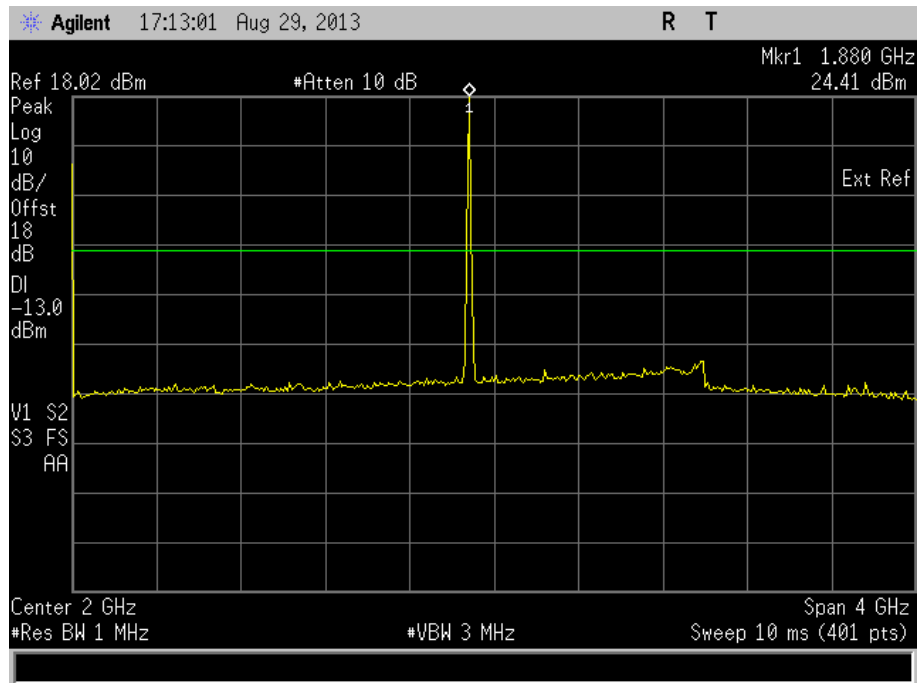
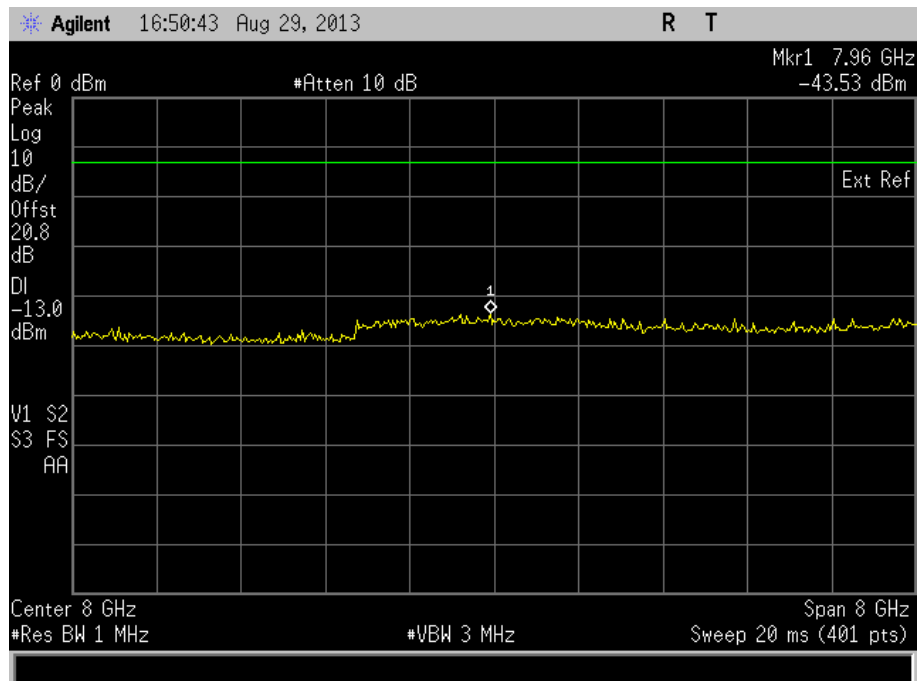


Product Service

4 GHz to 12 GHz12 GHz to 20 GHz

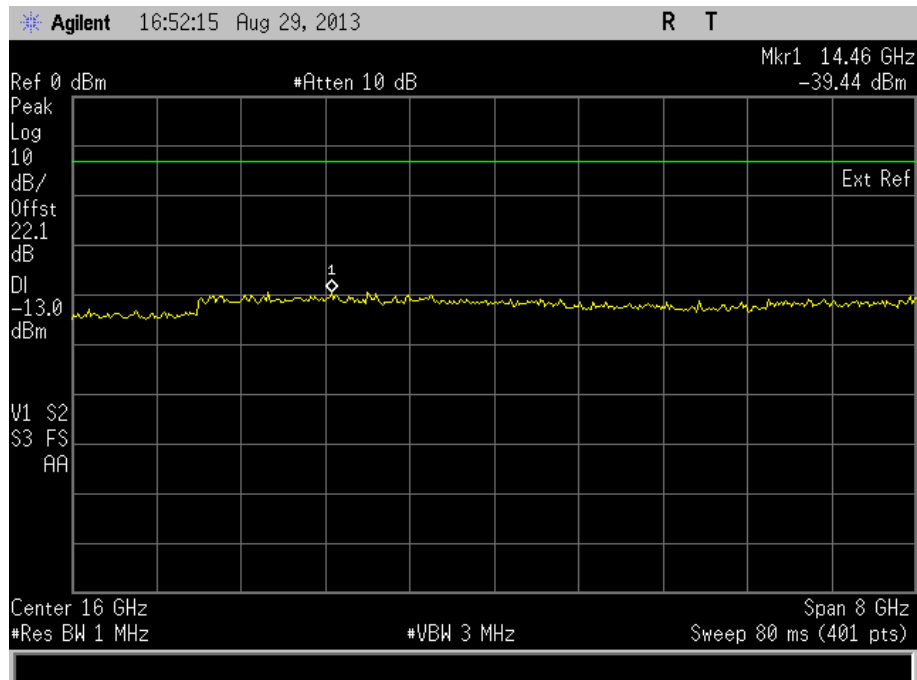
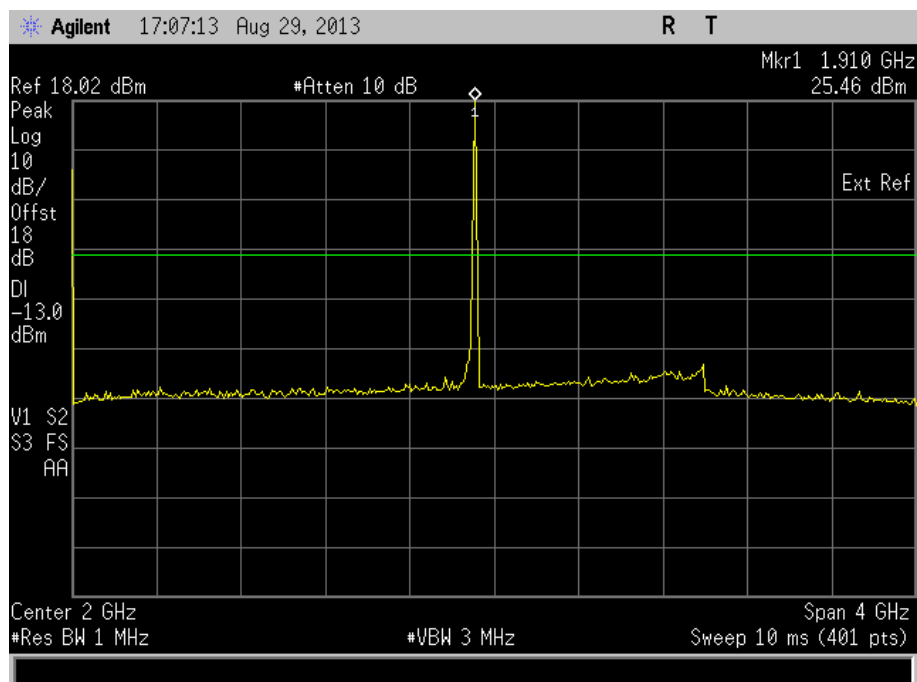


Product Service

1880 MHz9kHz to 4 GHz4 GHz to 12 GHz

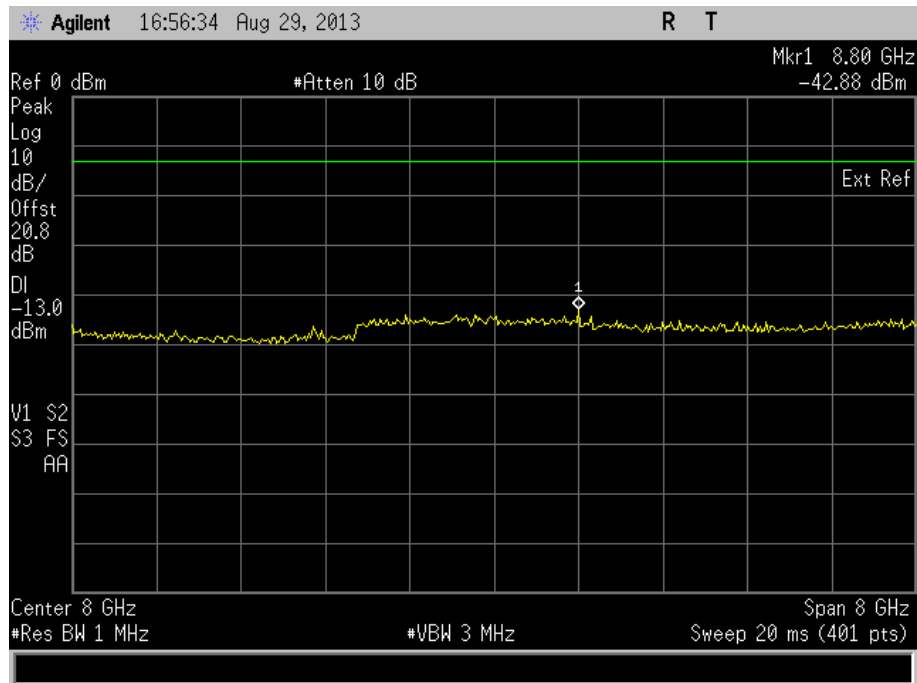
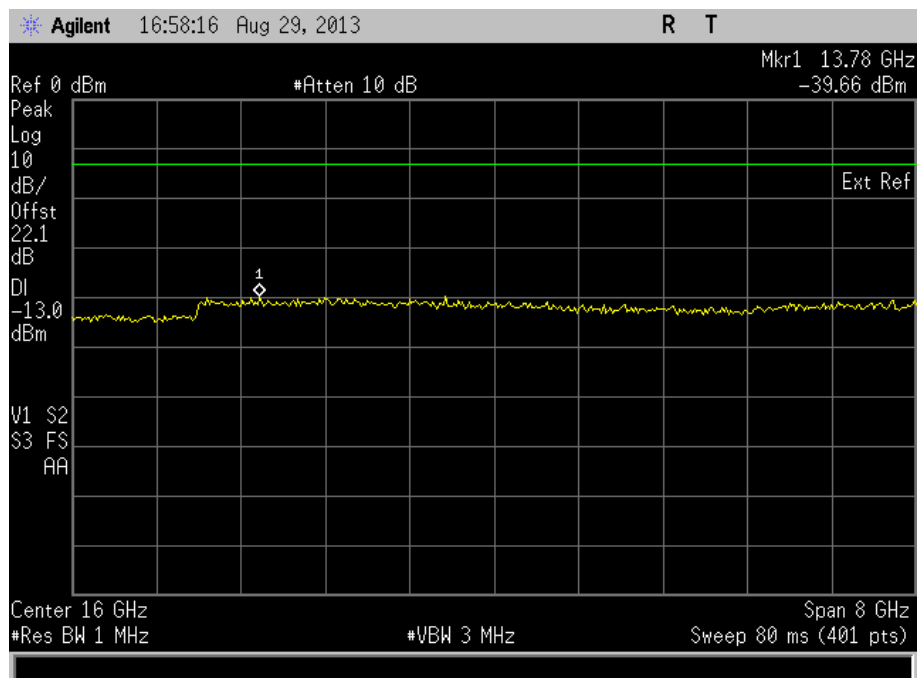


Product Service

12 GHz to 20 GHz1907.6 MHz9kHz to 4 GHz



Product Service

4 GHz to 12 GHz12 GHz to 20 GHzLimit Clause

43+10log(P) or -13 dBm



Product Service

2.8 OCCUPIED BANDWIDTH**2.8.1 Specification Reference**

FCC CFR 47 Part 2, Clause 2.1049(h)
FCC CFR 47 Part 24, Clause 24.238(b)

2.8.2 Equipment Under Test and Modification State

Black Smartphone S/N: XCV23200852 - Modification State 0

2.8.3 Date of Test

29 August 2013

2.8.4 Test Equipment Used

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

2.8.5 Test Procedure

The EUT was transmitting at maximum power, with WCDMA modulation. Using a resolution bandwidth of 10 kHz and a video bandwidth of 30 kHz, the -26 dBc points were established and the emission bandwidth determined.

The plot of the following pages shows the resultant display from the Spectrum Analyser.

2.8.6 Environmental Conditions

Ambient Temperature	23.7°C
Relative Humidity	56.0%



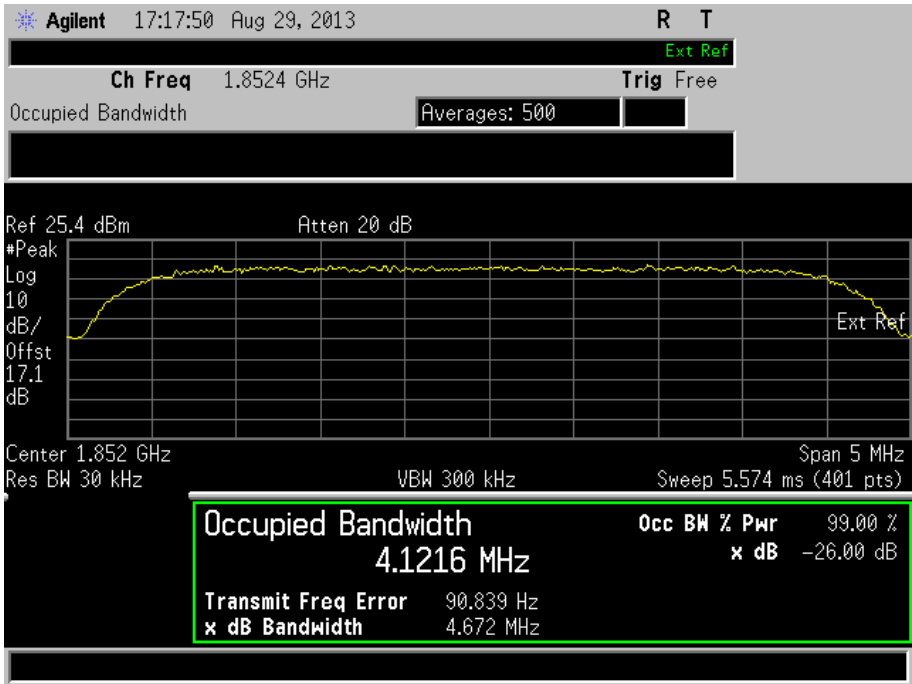
Product Service

2.8.7 Test Results

3.8 V DC Supply

1852.4 MHz

Mode	Occupied Bandwidth (kHz)
WCDMA	4121.588

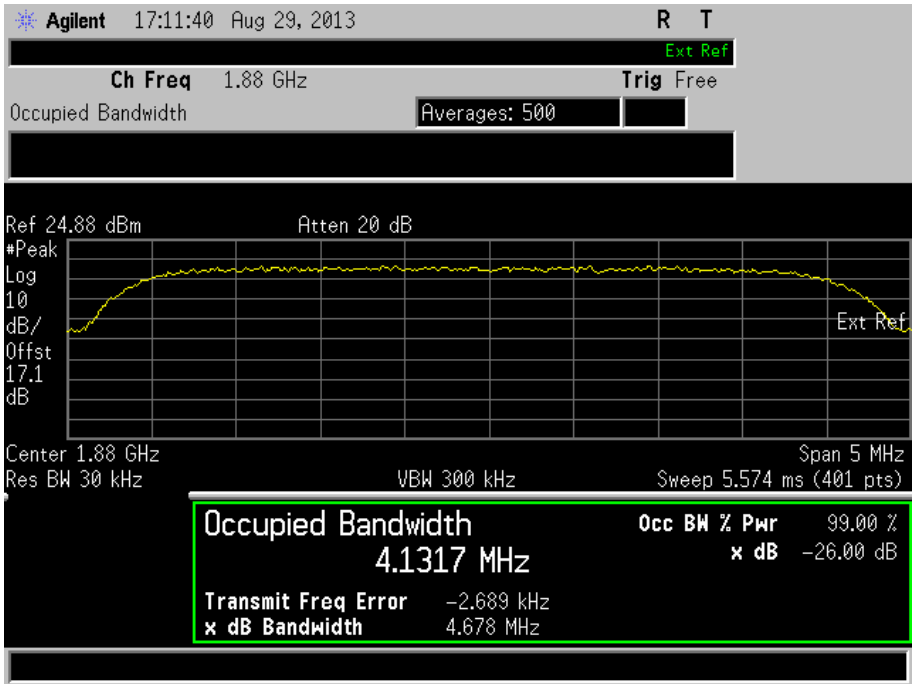




Product Service

1880 MHz

Mode	Occupied Bandwidth (kHz)
WCDMA	4131.698

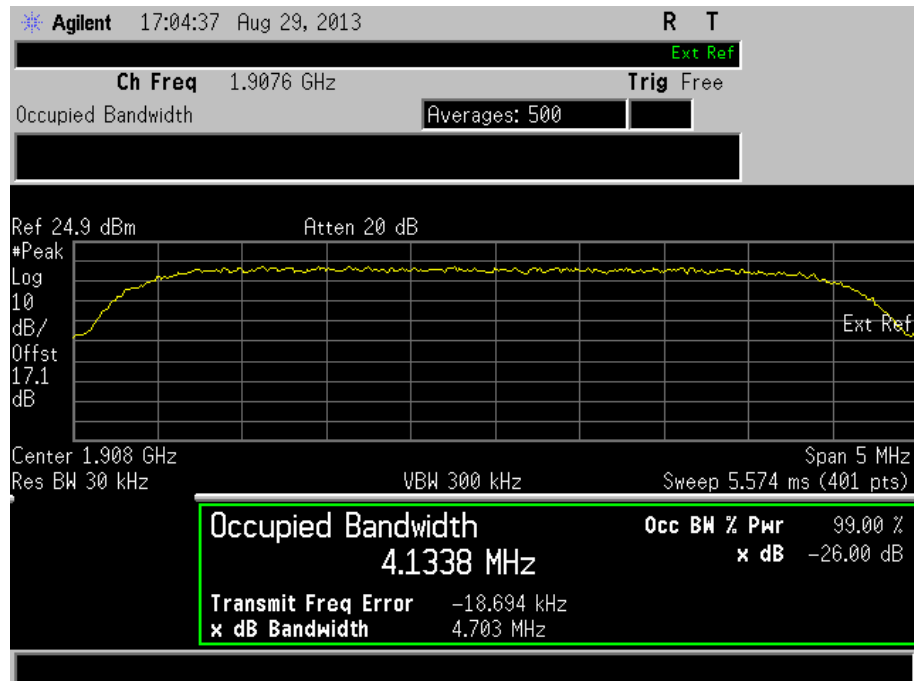




Product Service

1907.6 MHz

Mode	Occupied Bandwidth (kHz)
WCDMA	4133.815

Limit Clause

The occupied bandwidth, that is the frequency bandwidth such that, below is lower and above is upper frequency limits, the mean powers radiated are each equal to 0.5% of the total mean power radiated by a given emission.



Product Service

SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT USED

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

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1- Frequency Stability					
Multimeter	White Gold	WG022	190	12	30-Oct-2013
Temperature Chamber	Montford	2F3	467	-	O/P Mon
Power Supply Unit	Farnell	D302T	609	-	O/P Mon
Radio Communications Test Set	Rohde & Schwarz	CMU 200	3035	12	6-Dec-2013
Thermocouple Thermometer	Fluke	51	3173	12	23-Aug-2013
Attenuator (10dB, 20W)	Lucas Weinschel	1	3225	12	11-Dec-2013
1 Metre N Type Cable	Rhophase	NPS-1601A-1000-NPS	4103	12	11-Jun-2014
Section 2.2 - Spurious Emissions at Band Edge					
Antenna (Bilog)	Schaffner	CBL6143	287	24	18-Jan-2014
Attenuator (20dB/ 2W)	Pasternack	PE7004-20	489	12	18-Oct-2013
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	24-Jan-2014
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Power Supply	Hewlett Packard	6104A	1948	-	TU
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	30-Nov-2013
High Pass Filter (4GHz)	RLC Electronics	F-100-4000-5-R	2773	12	1-Feb-2014
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	11-Oct-2013
'2.92mm' - '2.92mm' RF Cable (2m)	Rhophase	KPS-1503-2000-KPS	3694	12	25-Oct-2013
'2.92mm' - '2.92mm' RF Cable (2m)	Rhophase	KPS-1503-2000-KPS	3695	12	15-Oct-2013
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	maturo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturo GmbH	NCD	3917	-	TU
Dc-40GHz Power Splitter	Aeroflex / Weinschel	1534	3986	-	O/P Mon
1 Metre SMA Cable	Rhophase	3PS-1801A-1000-3PS	4099	12	26-Oct-2013
Section 2.3 - Equivalent Isotropic Radiated Power					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	234	12	3-Apr-2014
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	9-Nov-2013
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	1002	12	6-Sep-2013
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	11-Oct-2013
Tilt Antenna Mast	maturo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturo GmbH	NCD	3917	-	TU



Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.4 - Maximum Peak Output Power - Conducted					
Attenuator (20dB/ 2W)	Pasternack	PE7004-20	489	12	18-Oct-2013
Power Supply	Hewlett Packard	6104A	1948	-	TU
Radio Communications Test Set	Rohde & Schwarz	CMU 200	3035	12	6-Dec-2013
ESA-E Series Spectrum Analyser	Agilent Technologies	E4402B	3348	12	13-Jun-2014
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	31-Aug-2013
Combiner/Splitter	Weinschel	1506A	3877	12	19-Mar-2014
1 Metre SMA Cable	Rhophase	3PS-1801A-1000-3PS	4099	12	26-Oct-2013
Section 2.6 – Emission Limitations for Cellular Equipment					
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	9-Nov-2013
Antenna (Bilog)	Schaffner	CBL6143	287	24	18-Jan-2014
Communications Tester	Rohde & Schwarz	CMU 200	442	12	1-Nov-2013
Pre-Amplifier	Phase One	PS04-0086	1533	12	27-Sep-2013
Screened Room (5)	Rainford	Rainford	1545	36	25-Dec-2013
Turntable Controller	Inn-Co GmbH	CO 1000	1606	-	TU
Amplifier (1 - 8GHz)	Phase One	PS06-0060	3175	-	O/P Mon
Amplifier (8 - 18GHz)	Phase One	PS06-0061	3176	-	O/P Mon
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	11-Oct-2013
3 GHz High Pass Filter	K&L Microwave	11SH10-3000/X18000-O/O	3552	12	1-Feb-2014
9m RF Cable (N Type)	Rhophase	NPS-2303-9000-NPS	3791	-	TU
Tilt Antenna Mast	maturo GmbH	TAM 4.0-P	3916	-	TU
Mast Controller	maturo GmbH	NCD	3917	-	TU
Section 2.7- Conducted Spurious Emissions					
Attenuator (20dB/ 2W)	Pasternack	PE7004-20	489	12	18-Oct-2013
Spectrum Analyser	Agilent Technologies	E7405A	1410	12	11-Sep-2013
Power Supply	Hewlett Packard	6104A	1948	-	TU
High Pass Filter (4GHz)	RLC Electronics	F-100-4000-5-R	2773	12	1-Feb-2014
Filter	Daden Anthony Ass	MH-1500-7SS	2778	-	O/P Mon
Radio Communications Test Set	Rohde & Schwarz	CMU 200	3035	12	6-Dec-2013
ESA-E Series Spectrum Analyser	Agilent Technologies	E4402B	3348	12	13-Jun-2014
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	31-Aug-2013
Combiner/Splitter	Weinschel	1506A	3877	12	19-Mar-2014
1 Metre SMA Cable	Rhophase	3PS-1801A-1000-3PS	4099	12	26-Oct-2013
1 Metre K Type Cable	Rhophase	KPS-1501A-1000-KPS	4106	12	25-Oct-2013



Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.8 - Occupied Bandwidth					
Attenuator (20dB/ 2W)	Pasternack	PE7004-20	489	12	18-Oct-2013
Power Supply	Hewlett Packard	6104A	1948	-	TU
Radio Communications Test Set	Rohde & Schwarz	CMU 200	3035	12	6-Dec-2013
ESA-E Series Spectrum Analyser	Agilent Technologies	E4402B	3348	12	13-Jun-2014
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	31-Aug-2013
Combiner/Splitter	Weinschel	1506A	3877	12	19-Mar-2014
1 Metre SMA Cable	Rhophase	3PS-1801A-1000-3PS	4099	12	26-Oct-2013

TU – Traceability Unscheduled

O/P MON – Output Monitored with Calibrated Equipment



3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	MU
Modulation Characteristics	-
Maximum Peak Output Power - Conducted	± 0.70 dB
Emission Limitations for Broadband PCS Equipment	± 3.08 dB
Conducted Spurious Emissions	± 3.454 dB
Spurious Emissions at Band Edge	± 2.20 dB
Occupied Bandwidth	± 10.14 kHz
Effective Isotropic Radiated Power	± 3.08 dB
Frequency Stability	± 99.54 Hz



Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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