TEST REPORT
FROM
RFI GLOBAL SERVICES LTD

Test of: NTT DoCoMo EB-4054

FCC ID: UCE211046A

To: FCC Part 15.247: 2011 Subpart C

Test Report Serial No.:
RFI-RPT-RP85051JD01H

This Test Report Is Issued Under The Authority Of Chris Guy, Head of Global Approvals:	
Checked By:	Ian Watch
Signature:	
Date of Issue:	07 February 2012

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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

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1. Customer Information

Company Name:	Panasonic Mobile Communications Development of Europe Ltd.
Address:	Panasonic House Willoughby Road Bracknell Berkshire RG12 8FP United Kingdom

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR15.247
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 15 Subpart C (Intentional Radiators) - Section 15.247
Specification Reference:	47CFR15.107 and 47CFR15.109
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 15 Subpart B (Unintentional Radiators) - Sections 15.107 and 15.109
Specification Reference:	47CFR15.207 and 47CFR15.209
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 15 Subpart C (Intentional Radiators) - Sections 15.207 and 15.209
Site Registration:	209735
Location of Testing:	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
Test Dates:	17 January 2012 to 25 January 2012

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 15.107(a)	Receiver/Idle Mode AC Conducted Emissions	✓
Part 15.109	Receiver/Idle Mode Radiated Spurious Emissions	✓
Part 15.207	Transmitter AC Conducted Emissions	✓
Part 15.247(a)(2)	Transmitter Minimum 6 dB Bandwidth	✓
Part 15.247(e)	Transmitter Power Spectral Density	✓
Part 15.247(b)(3)	Transmitter Maximum Peak Output Power	✓
Part 15.247(d) & 15.209(a)	Transmitter Radiated Emissions	✓
Part 15.247(d) & 15.209(a)	Transmitter Band Edge Radiated Emissions	✓

Key to Results

✓ = Complied ✗ = Did not comply

Note 1: The measurement was performed to support SAR tests.

2.3. Methods and Procedures

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:	ANSI C63.10 (2009)
Title:	American National Standard for Testing Unlicensed Wireless Devices

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:	NTT DoCoMo
Model Name or Number:	EB-4054
IMEI:	359569040021561 *(Radiated sample #1)* 359569040021579 *(Radiated sample #2)* 359569040021280 *(Conducted RF port sample #1)*
Hardware Version Number:	Rev C
Software Version Number:	ACPU: dcm-07-0215 CCPU: R1B_1_EC02_01_DOO
FCC ID:	UCE211046A

Brand Name:	NTT DoCoMo
Description:	AC Charger
Model Name or Number:	P01
Hardware Version Number:	N0JZZY000008

Brand Name:	NTT DoCoMo
Description:	Charge/USB Data cable
Model Name or Number:	Not marked or stated

Brand Name:	NTT DoCoMo
Description:	Personal Hands-Free
Model Name or Number:	Not marked or stated

3.2. Description of EUT

The equipment under test was a dual mode UMTS/GSM Mobile Phone with *Bluetooth* and WLAN and RFID.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Technology Tested:	WLAN (IEEE 802.11)		
Type of Unit:	Transceiver		
Modulation Type:	BPSK, QPSK, 16 QAM and 64QAM		
Data Rate:	1, 2, 5.5, 11, 6, 9, 12, 18, 24, 36, 48, 54,6.5,13,19.5, 26, 39, 52, 58.5, 65, 7.2,14.4, 21.7, 28.9, 43.3, 57.8, 65 & 72.2 Mbps		
Declared Antenna Gain	-1.6 dBi		
Power Supply Requirement(s):	Nominal	3.8 V	
Maximum Conducted Output Power:	20.7 dBm		
Transmit Frequency Range:	2412 MHz to 2462 MHz		
Transmit Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	1	2412
	Middle	6	2437
	Top	11	2462
Receive Frequency Range:	2412 MHz to 2462 MHz		
Receive Channels Tested:	**Channel ID**	**Channel Number**	**Channel Frequency (MHz)**
	Bottom	1	2412
	Middle	6	2437
	Top	11	2462

3.5. Support Equipment

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

Brand Name:	Panasonic
Description:	Laptop PC
Model Name or Number:	Toughbook CF-74

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

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

- Receiver/Idle mode.
- Continuously transmitting at maximum power on the bottom, centre and top channels as required using the supported data rates.

4.2. Configuration and Peripherals

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

- Controlled using a bespoke application on the laptop PC supplied by the Customer. The application was used to enable continuous transmission and receive mode and to select the test channels, data rates and modulation schemes as required.
- Receive/Idle tests: The 802.11 mode was active but not transmitting.
- Transmitter spurious emissions were performed with the EUT transmitting with a data rate of 11 Mbps, as this was found to have the highest power level and therefore deemed to be worst case.
- Idle and transmitter radiated spurious emissions tests were performed with the AC charger and Personal Hands-Free connected to the EUT.
- The conducted sample with IMEI 359569040021280 was used for 6 dB Bandwidth, maximum output power and power spectral density tests.
- The radiated sample with IMEI 359369040021561 was used for AC conducted emissions, transmitter band edge and idle mode radiated spurious emission tests.
- The radiated sample with IMEI 359569040021579 was used for transmitter radiated spurious emission tests.

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

5.2.1. Receiver/Idle Mode AC Conducted Spurious Emissions

Test Summary:

Test Engineer:	Mark Percival	**Test Date:**	24 January 2012
Test Sample IMEI:	359369040021561		

FCC Part:	15.107
Test Method Used:	As detailed in ANSI C63.10 Section 6.2 referencing ANSI C63.4

Environmental Conditions:

Temperature (°C):	20
Relative Humidity (%):	23

Results: Live / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.357	Live	43.0	58.8	15.8	Complied
0.645	Live	35.3	56.0	20.7	Complied
0.758	Live	36.5	56.0	19.5	Complied
0.762	Live	39.7	56.0	16.3	Complied
0.762	Live	39.0	56.0	17.0	Complied
0.870	Live	37.2	56.0	18.8	Complied
0.992	Live	40.2	56.0	15.8	Complied
1.005	Live	39.5	56.0	16.5	Complied
1.509	Live	40.6	56.0	15.4	Complied

Results: Live / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.362	Live	35.3	48.7	13.4	Complied
0.735	Live	29.1	46.0	16.9	Complied
1.086	Live	26.6	46.0	19.4	Complied
1.185	Live	31.4	46.0	14.6	Complied
1.388	Live	27.9	46.0	18.1	Complied
1.442	Live	26.3	46.0	19.7	Complied
1.478	Live	28.8	46.0	17.2	Complied
1.559	Live	26.2	46.0	19.8	Complied
1.577	Live	25.6	46.0	20.4	Complied

Receiver/Idle Mode AC Conducted Spurious Emissions (continued)

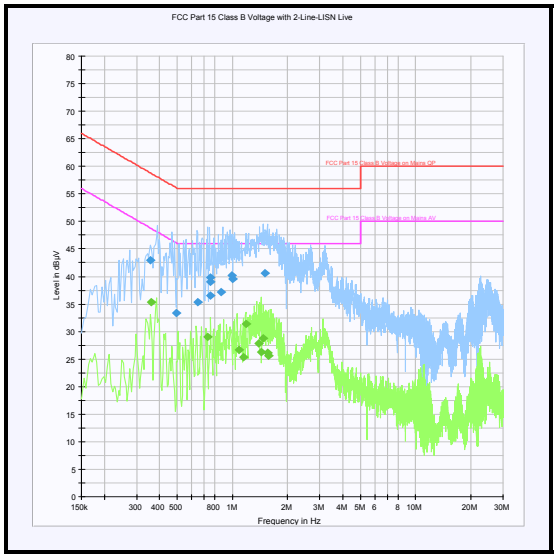
Results: Neutral / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
1.064	Neutral	30.8	56.0	25.2	Complied
1.113	Neutral	31.2	56.0	24.8	Complied
1.208	Neutral	32.4	56.0	23.6	Complied
1.275	Neutral	32.6	56.0	23.4	Complied
1.284	Neutral	31.9	56.0	24.1	Complied
1.410	Neutral	32.2	56.0	23.8	Complied
1.487	Neutral	33.1	56.0	23.0	Complied
1.842	Neutral	32.4	56.0	23.6	Complied
1.860	Neutral	32.7	56.0	23.3	Complied
2.112	Neutral	19.6	56.0	36.4	Complied

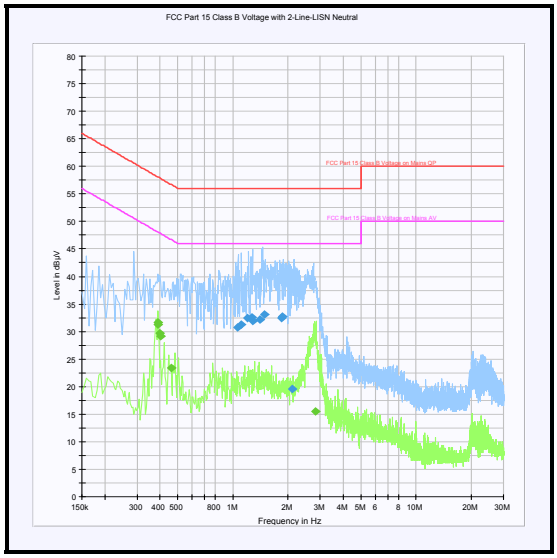
Results: Neutral / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.389	Neutral	31.2	48.1	16.9	Complied
0.389	Neutral	31.7	48.1	16.4	Complied
0.398	Neutral	29.7	47.9	18.2	Complied
0.402	Neutral	29.1	47.8	18.7	Complied
0.461	Neutral	23.4	46.7	23.3	Complied
2.832	Neutral	15.6	46.0	30.4	Complied

Receiver/Idle Mode 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. Receiver/Idle Mode Radiated Spurious Emissions

Test Summary:

Test Engineer:	Andrew Edwards	**Test Date:**	17 January 2012
Test Sample IMEI:	359569040021561		

FCC Part:	15.109
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.5 referencing ANSI C63.4
Frequency Range:	30 MHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	28

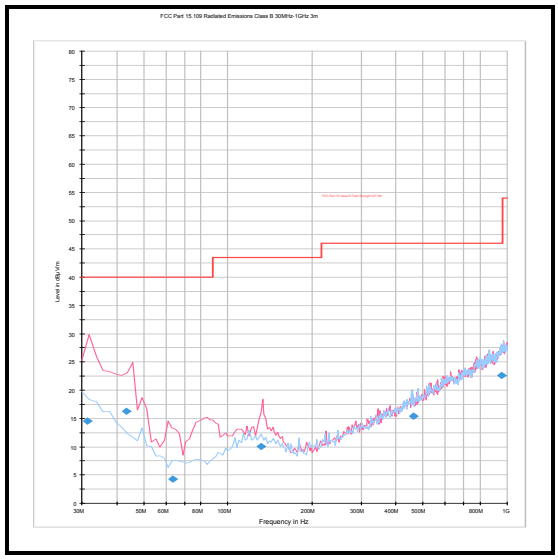
Results: Quasi Peak

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
31.393	Vertical	14.6	40.0	25.4	Complied
43.238	Vertical	16.3	40.0	23.7	Complied
63.416	Vertical	4.2	40.0	35.8	Complied
131.934	Vertical	10.0	43.5	33.5	Complied
460.556	Horizontal	15.4	46.0	30.6	Complied
957.191	Horizontal	22.6	46.0	23.4	Complied

Note(s):

1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.
2. All other emissions shown on the pre-scan plot were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor.
3. 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.

Receiver/Idle Mode Radiated Spurious Emissions (continued)



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

Receiver/Idle Mode Radiated Spurious Emissions (continued)

Test Summary:

Test Engineer:	Andrew Edwards	**Test Date:**	18 January 2012
Test Sample IMEI:	359569040021561		

FCC Part:	15.109
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.6 referencing ANSI C63.4
Frequency Range:	1 GHz to 12.5 GHz

Environmental Conditions:

Temperature (°C):	22
Relative Humidity (%):	22

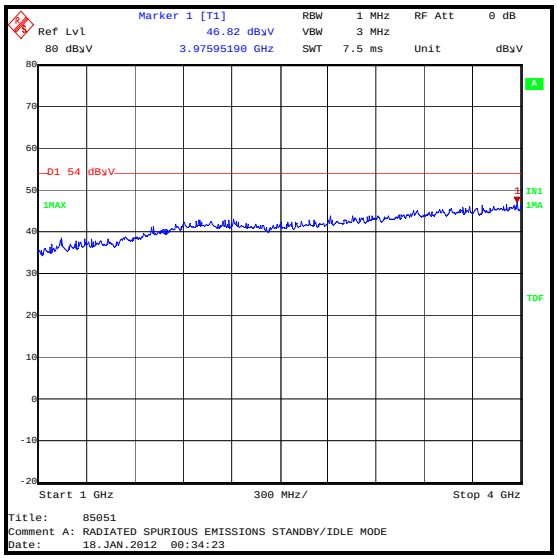
Results:

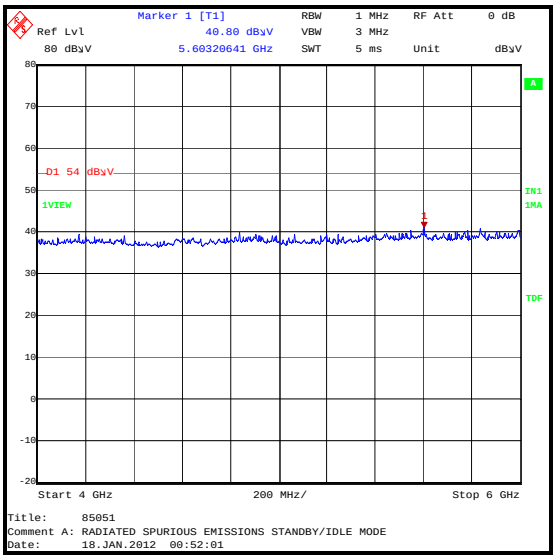
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
3975.952	Vertical	46.8	54.0	7.2	Complied

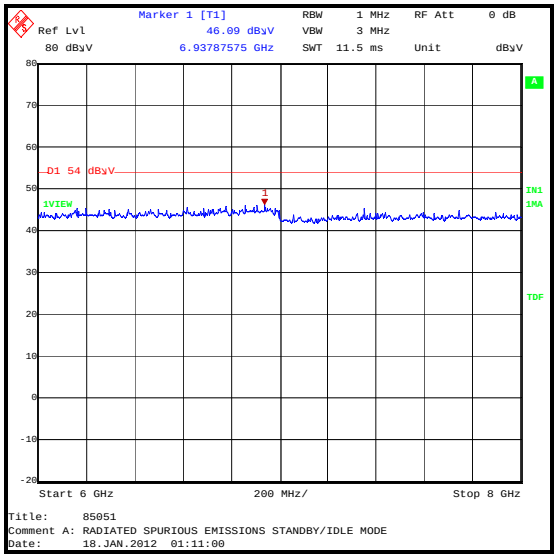
Note(s):

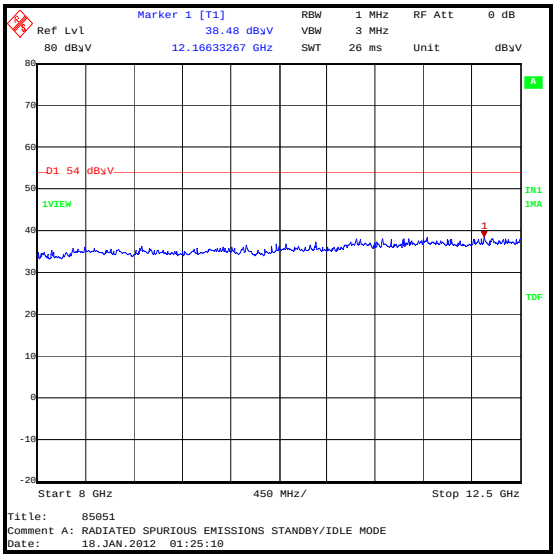
1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.
2. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above. The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.
3. 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.

Receiver/Idle Mode Radiated Spurious Emissions (continued)









5.2.3. Transmitter AC Conducted Spurious Emissions

Test Summary:

Test Engineer:	Mark Percival	**Test Date:**	24 January 2012
Test Sample IMEI:	359369040021561		

FCC Part:	15.207
Test Method Used:	As detailed in ANSI C63.10 Section 6.2 referencing ANSI C63.4

Environmental Conditions:

Temperature (°C):	20
Relative Humidity (%):	23

Results: Live / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.357	Live	42.8	58.8	16.0	Complied
0.362	Live	42.6	58.7	16.1	Complied
0.443	Live	39.8	57.0	17.2	Complied
0.533	Live	36.7	56.0	19.3	Complied
0.663	Live	38.9	56.0	17.1	Complied
0.789	Live	41.6	56.0	14.4	Complied
1.118	Live	43.9	56.0	12.1	Complied
1.491	Live	46.3	56.0	9.7	Complied
2.666	Live	41.2	56.0	14.8	Complied
3.282	Live	37.9	56.0	18.1	Complied

Results: Live / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.353	Live	33.8	48.9	15.1	Complied
0.434	Live	30.7	47.2	16.5	Complied
0.735	Live	28.2	46.0	17.8	Complied
0.776	Live	28.1	46.0	17.9	Complied
0.825	Live	29.5	46.0	16.5	Complied
1.032	Live	29.9	46.0	16.1	Complied
1.113	Live	31.1	46.0	14.9	Complied
1.239	Live	32.1	46.0	13.9	Complied
1.572	Live	32.5	46.0	13.5	Complied
3.188	Live	29.4	46.0	16.6	Complied

Transmitter AC Conducted Spurious Emissions (continued)

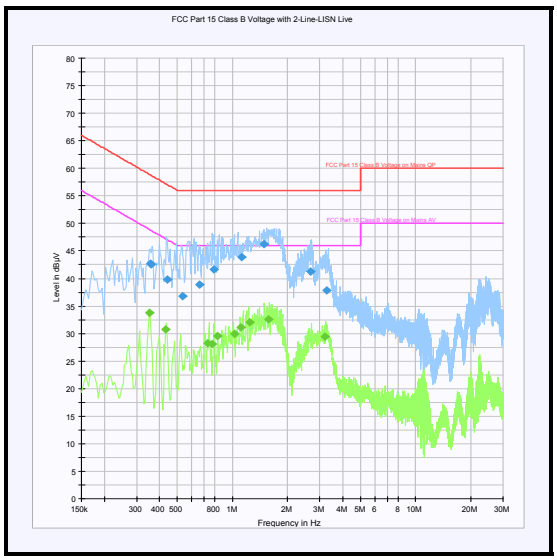
Results: Neutral / Quasi Peak

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.803	Neutral	41.8	56.0	14.2	Complied
1.437	Neutral	43.0	56.0	13.0	Complied
1.442	Neutral	42.6	56.0	13.4	Complied
1.482	Neutral	43.2	56.0	12.8	Complied
1.635	Neutral	39.4	56.0	16.6	Complied
1.653	Neutral	43.7	56.0	12.3	Complied
1.689	Neutral	42.3	56.0	13.7	Complied
1.824	Neutral	43.9	56.0	12.1	Complied
1.869	Neutral	43.1	56.0	12.9	Complied
1.950	Neutral	42.3	56.0	13.7	Complied

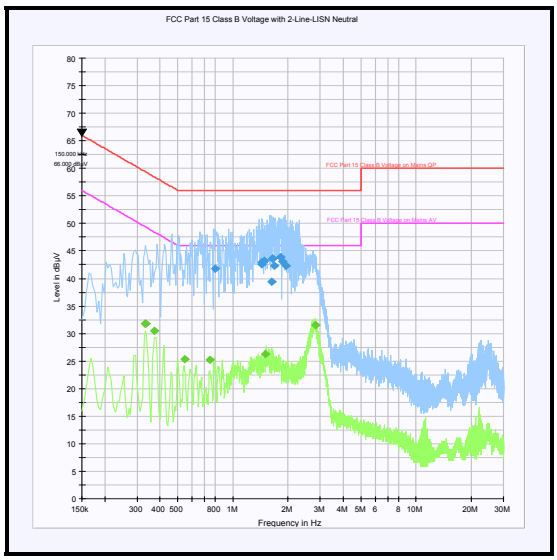
Results: Neutral / Average

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.335	Neutral	31.8	49.3	17.5	Complied
0.375	Neutral	30.4	48.4	18.0	Complied
0.546	Neutral	25.4	46.0	20.6	Complied
0.753	Neutral	25.2	46.0	20.8	Complied
1.509	Neutral	26.3	46.0	19.7	Complied
2.814	Neutral	31.6	46.0	14.4	Complied

Transmitter AC Conducted Spurious Emissions (continued)



Live



Neutral

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

5.2.4. Transmitter 6 dB Bandwidth

Test Summary:

Test Engineer:	Sarah Williams	**Test Dates:**	20 January 2012 & 23 January 2012
Test Sample IMEI:	359569040021280		

FCC Part:	15.247(a)(2)
Test Method Used:	As detailed in ANSI C63.10 Section 6.9.1

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	21

Results: 1 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	10.100	≥0.5	9.600	Complied
Middle	10.100	≥0.5	9.600	Complied
Top	10.100	≥0.5	9.600	Complied

Results: 2 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	9.860	≥0.5	9.360	Complied
Middle	9.780	≥0.5	9.280	Complied
Top	9.780	≥0.5	9.280	Complied

Results: 5.5 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	10.020	≥0.5	9.520	Complied
Middle	11.303	≥0.5	10.803	Complied
Top	9.780	≥0.5	9.280	Complied

Transmitter 6 dB Bandwidth (continued)

Results: 11 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	10.501	≥0.5	10.001	Complied
Middle	10.501	≥0.5	10.001	Complied
Top	10.100	≥0.5	9.600	Complied

Results: 6 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.192	≥0.5	15.692	Complied
Middle	16.032	≥0.5	15.532	Complied
Top	16.112	≥0.5	15.612	Complied

Results: 9 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.112	≥0.5	15.612	Complied
Middle	16.112	≥0.5	15.612	Complied
Top	16.112	≥0.5	15.612	Complied

Results: 12 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.273	≥0.5	15.773	Complied
Middle	16.273	≥0.5	15.773	Complied
Top	16.192	≥0.5	15.692	Complied

Results: 18 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.273	≥0.5	15.773	Complied
Middle	16.433	≥0.5	15.933	Complied
Top	16.513	≥0.5	16.013	Complied

Results: 24 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.673	≥0.5	16.173	Complied
Middle	16.754	≥0.5	16.254	Complied
Top	16.754	≥0.5	16.254	Complied

Transmitter 6 dB Bandwidth (continued)

Results: 36 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.754	≥0.5	16.254	Complied
Middle	16.754	≥0.5	16.254	Complied
Top	16.754	≥0.5	16.254	Complied

Results: 48 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.754	≥0.5	16.254	Complied
Middle	16.754	≥0.5	16.254	Complied
Top	16.673	≥0.5	16.173	Complied

Results: 54 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.673	≥0.5	16.173	Complied
Middle	16.673	≥0.5	16.173	Complied
Top	16.673	≥0.5	16.173	Complied

Results: 6.5 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.234	≥0.5	16.734	Complied
Middle	17.395	≥0.5	16.895	Complied
Top	17.234	≥0.5	16.734	Complied

Results: 13 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.475	≥0.5	16.975	Complied
Middle	17.475	≥0.5	16.975	Complied
Top	17.395	≥0.5	16.895	Complied

Results: 19.5 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.395	≥0.5	16.895	Complied
Middle	17.475	≥0.5	16.975	Complied
Top	17.475	≥0.5	16.975	Complied

Transmitter 6 dB Bandwidth (continued)

Results: 26 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.956	≥0.5	17.456	Complied
Middle	17.956	≥0.5	17.456	Complied
Top	17.956	≥0.5	17.456	Complied

Results: 39 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.956	≥0.5	17.456	Complied
Middle	17.956	≥0.5	17.456	Complied
Top	17.956	≥0.5	17.456	Complied

Results: 52 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.956	≥0.5	17.456	Complied
Middle	17.956	≥0.5	17.456	Complied
Top	17.956	≥0.5	17.456	Complied

Results: 58.5 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.956	≥0.5	17.456	Complied
Middle	17.956	≥0.5	17.456	Complied
Top	17.956	≥0.5	17.456	Complied

Results: 65 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.956	≥0.5	17.456	Complied
Middle	17.956	≥0.5	17.456	Complied
Top	17.956	≥0.5	17.456	Complied

Results: 7.2 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.234	≥0.5	16.734	Complied
Middle	17.234	≥0.5	16.734	Complied
Top	17.315	≥0.5	16.815	Complied

Transmitter 6 dB Bandwidth (continued)

Results: 14.4 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.315	≥0.5	16.815	Complied
Middle	17.555	≥0.5	17.055	Complied
Top	17.395	≥0.5	16.895	Complied

Results: 21.7 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.555	≥0.5	17.055	Complied
Middle	17.475	≥0.5	16.975	Complied
Top	17.555	≥0.5	17.055	Complied

Results: 28.9 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.956	≥0.5	17.456	Complied
Middle	17.956	≥0.5	17.456	Complied
Top	17.956	≥0.5	17.456	Complied

Results: 43.4 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.956	≥0.5	17.456	Complied
Middle	17.956	≥0.5	17.456	Complied
Top	18.036	≥0.5	17.536	Complied

Results: 57.8 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	18.036	≥0.5	17.536	Complied
Middle	18.036	≥0.5	17.536	Complied
Top	18.036	≥0.5	17.536	Complied

Results: 65 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.956	≥0.5	17.456	Complied
Middle	17.956	≥0.5	17.456	Complied
Top	17.956	≥0.5	17.456	Complied

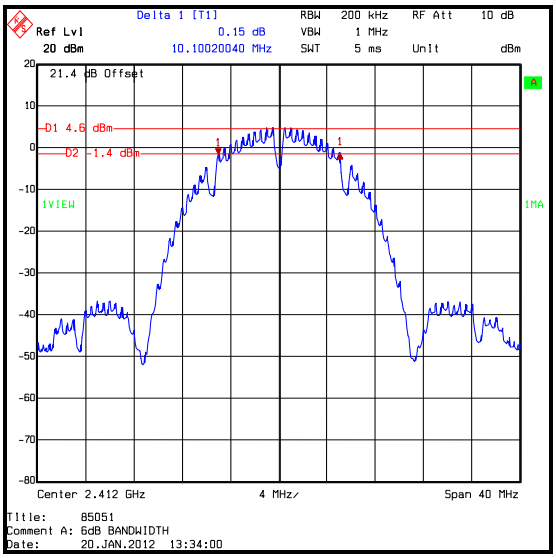
Transmitter 6 dB Bandwidth (continued)

Results: 72.2 Mbps

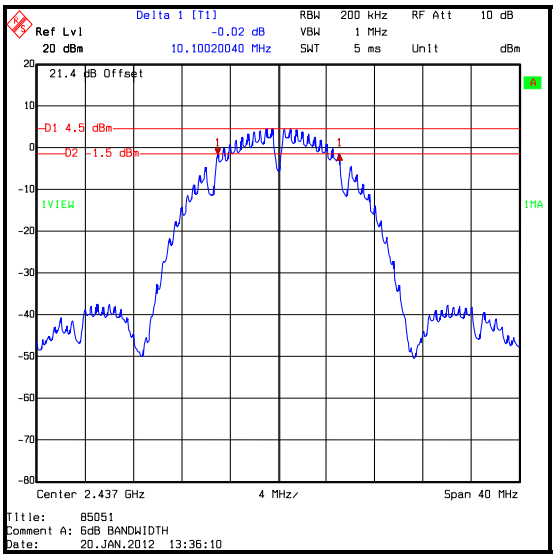
Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.956	≥0.5	17.456	Complied
Middle	17.956	≥0.5	17.456	Complied
Top	18.036	≥0.5	17.536	Complied

Transmitter 6 dB Bandwidth (continued)

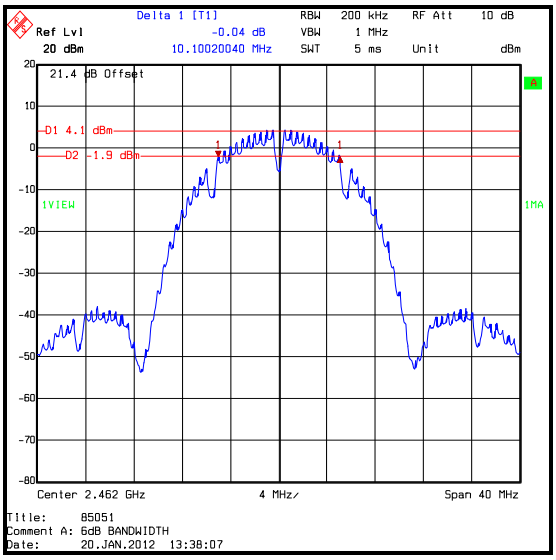
Results: 1 Mbps



Bottom channel



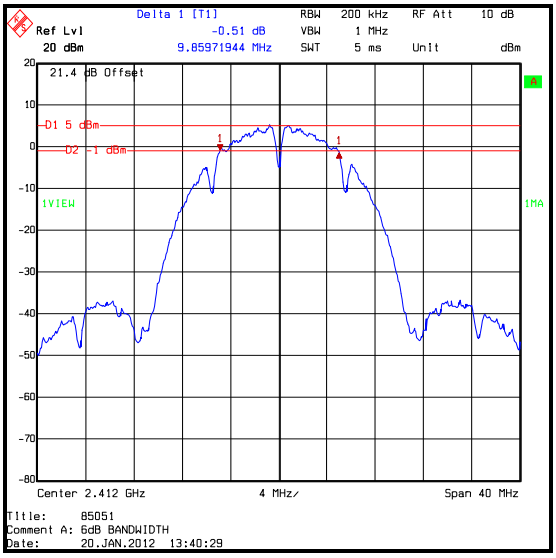
Middle channel



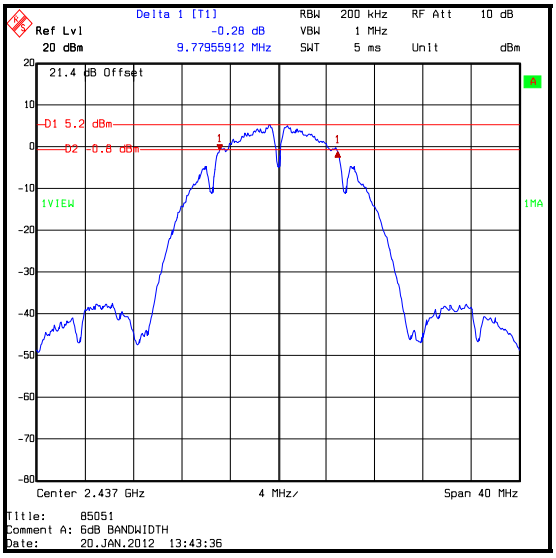
Top channel

Transmitter 6 dB Bandwidth (continued)

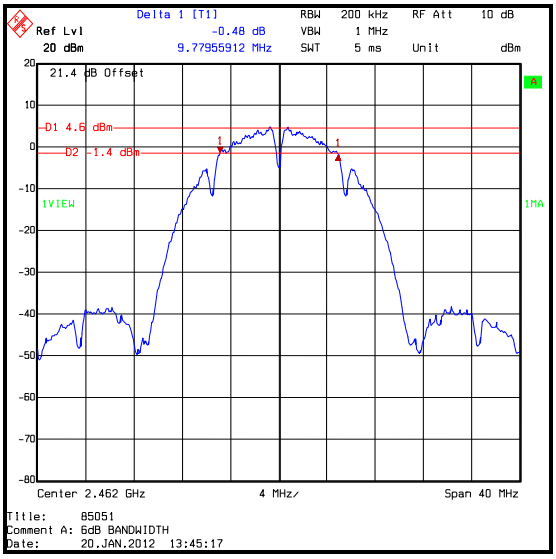
Results: 2 Mbps



Bottom channel



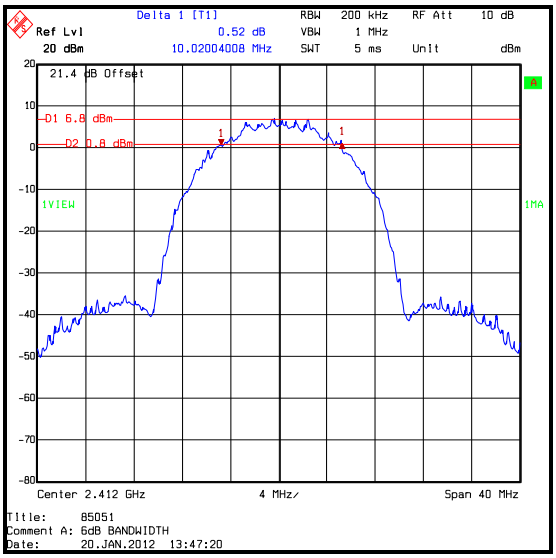
Middle channel



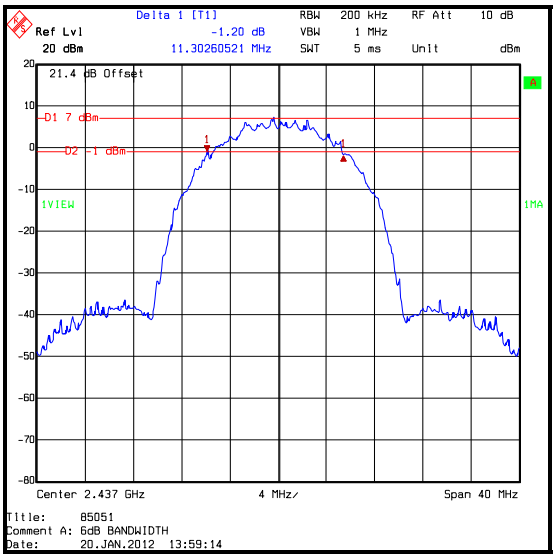
Top channel

Transmitter 6 dB Bandwidth (continued)

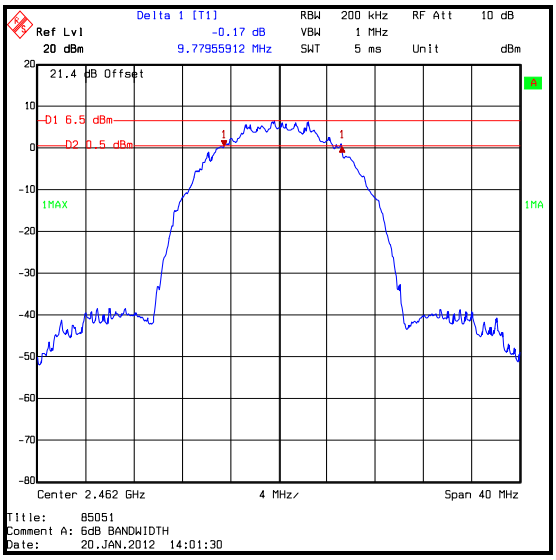
Results: 5.5 Mbps



Bottom channel



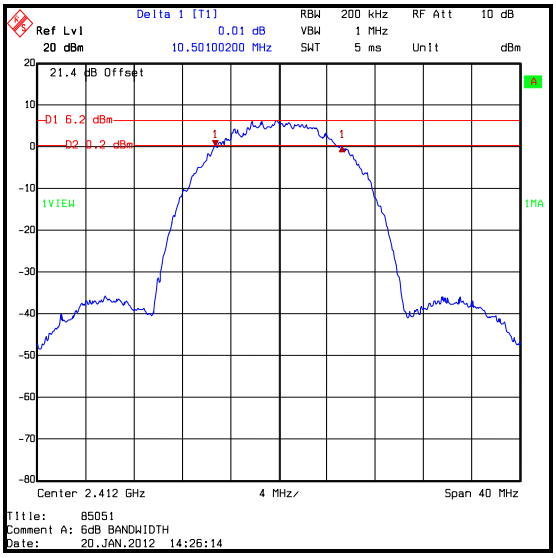
Middle channel



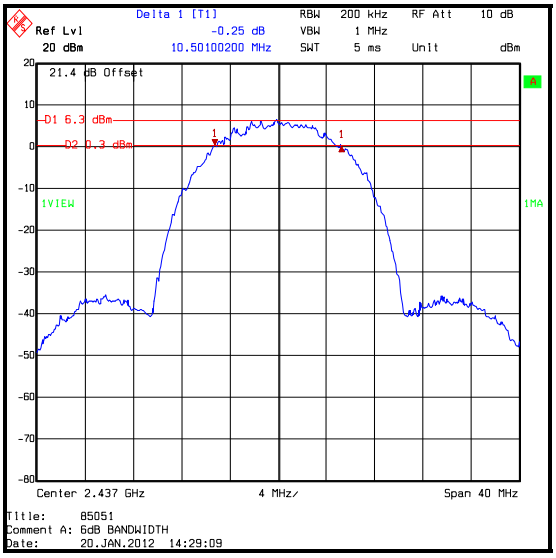
Top channel

Transmitter 6 dB Bandwidth (continued)

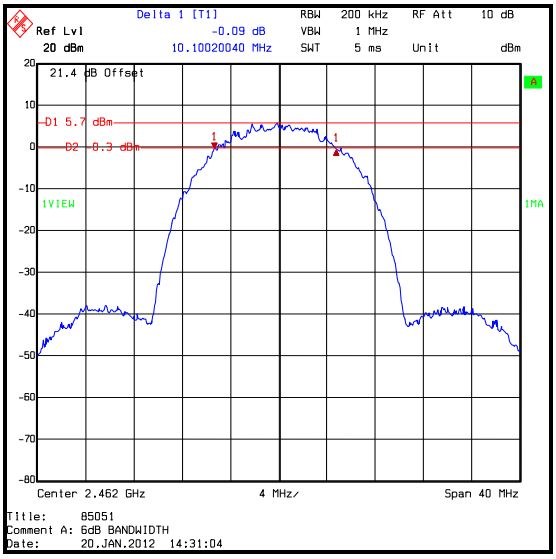
Results: 11 Mbps



Bottom channel



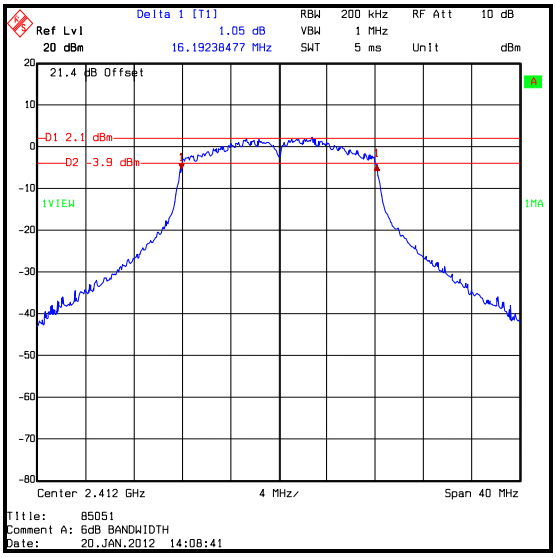
Middle channel



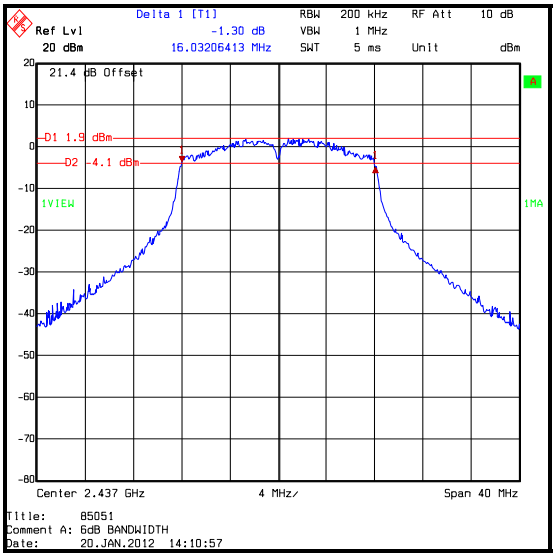
Top channel

Transmitter 6 dB Bandwidth (continued)

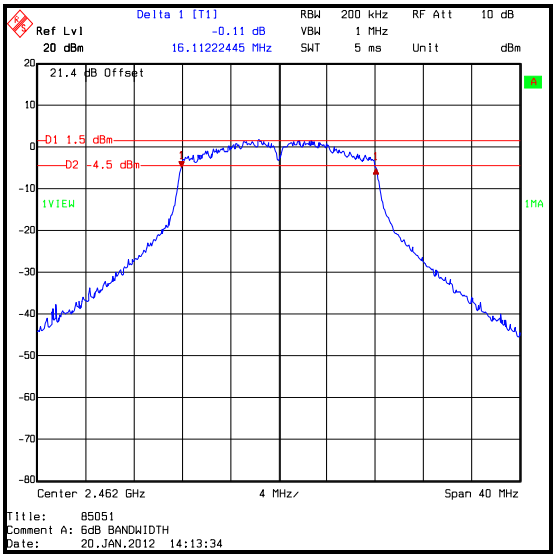
Results: 6 Mbps



Bottom channel



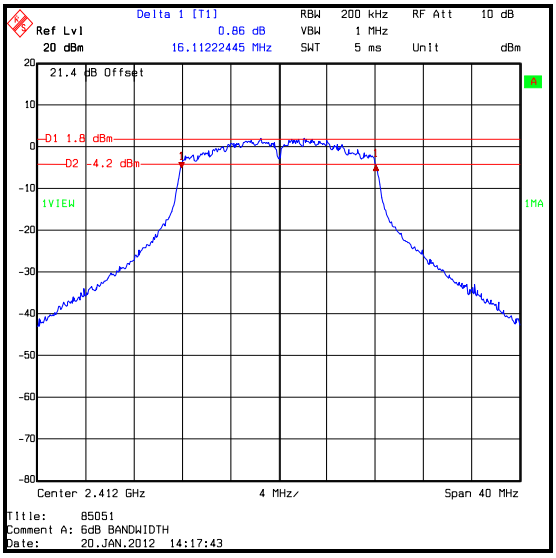
Middle channel



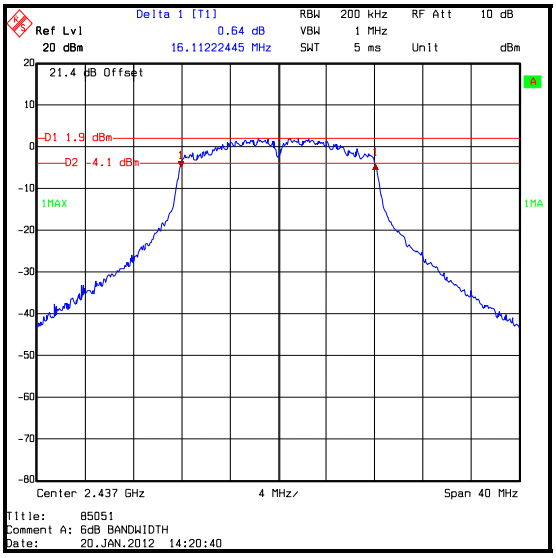
Top channel

Transmitter 6 dB Bandwidth (continued)

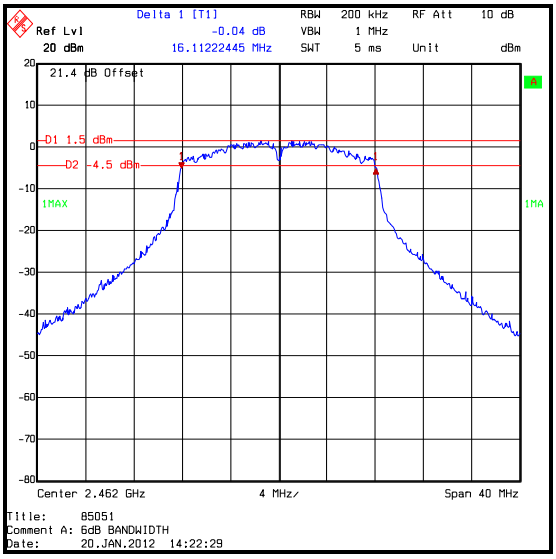
Results: 9 Mbps



Bottom channel



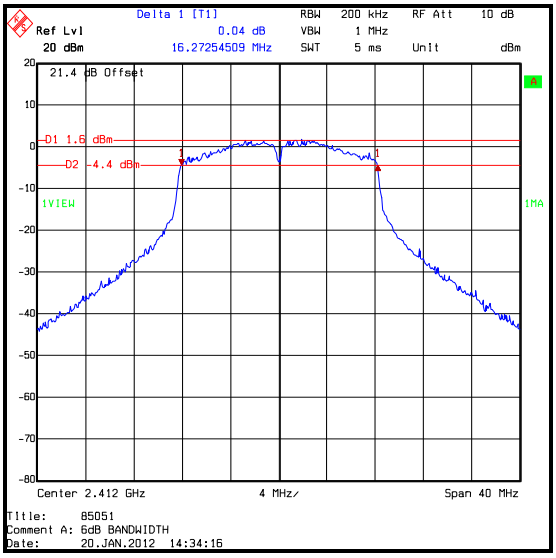
Middle channel



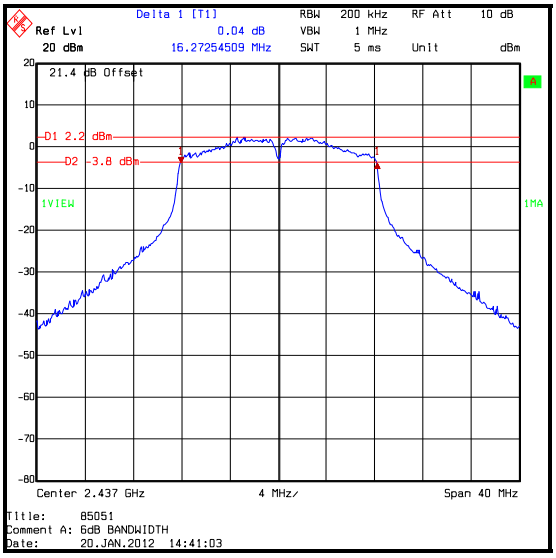
Top channel

Transmitter 6 dB Bandwidth (continued)

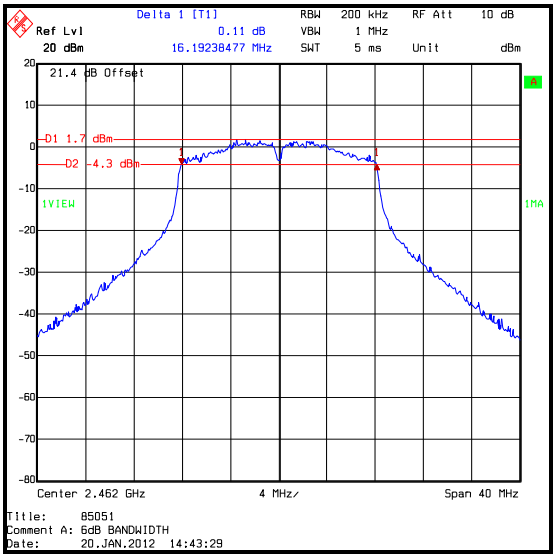
Results: 12 Mbps



Bottom channel



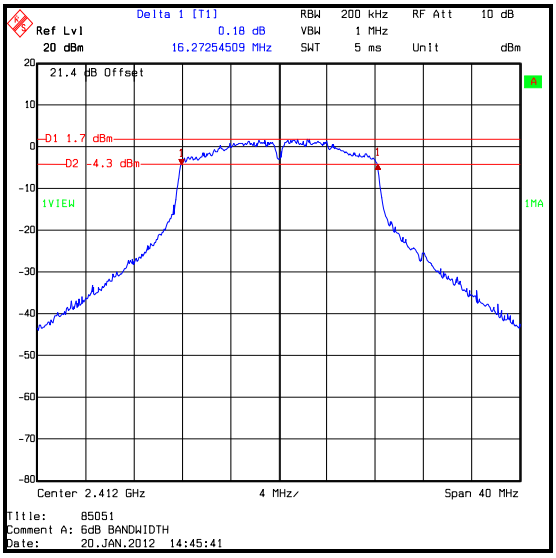
Middle channel



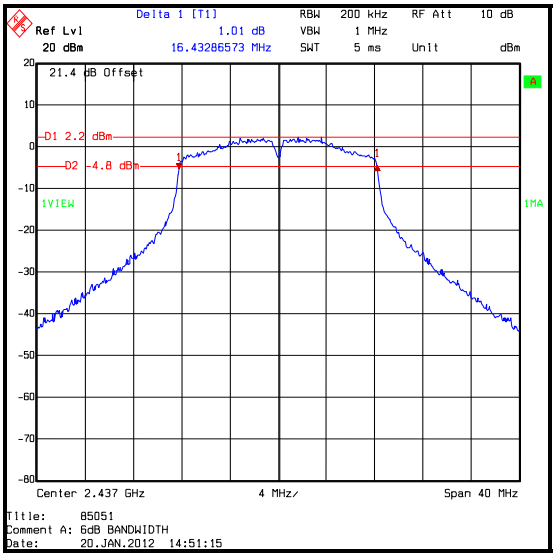
Top channel

Transmitter 6 dB Bandwidth (continued)

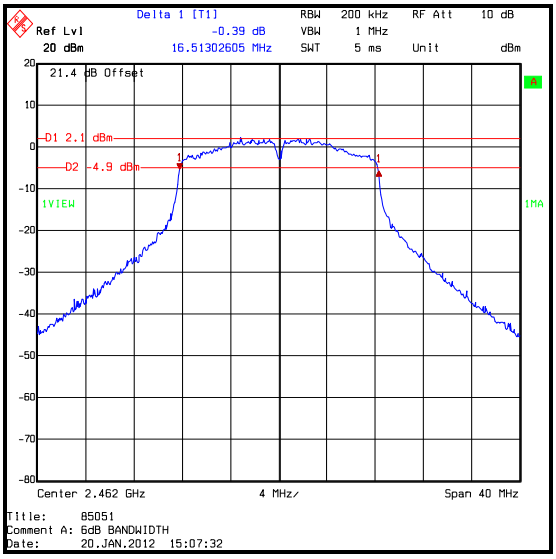
Results: 18 Mbps



Bottom channel



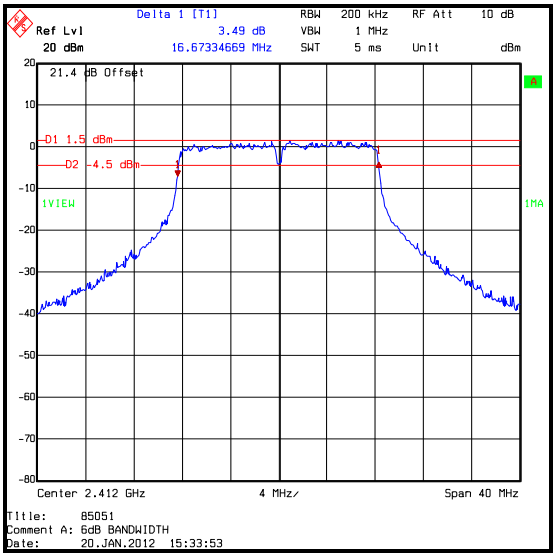
Middle channel



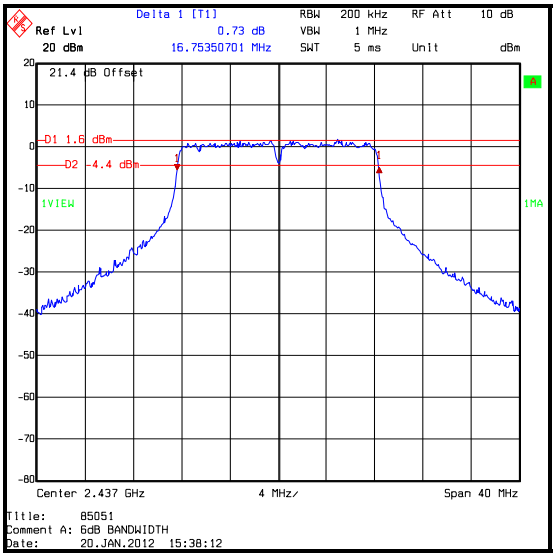
Top channel

Transmitter 6 dB Bandwidth (continued)

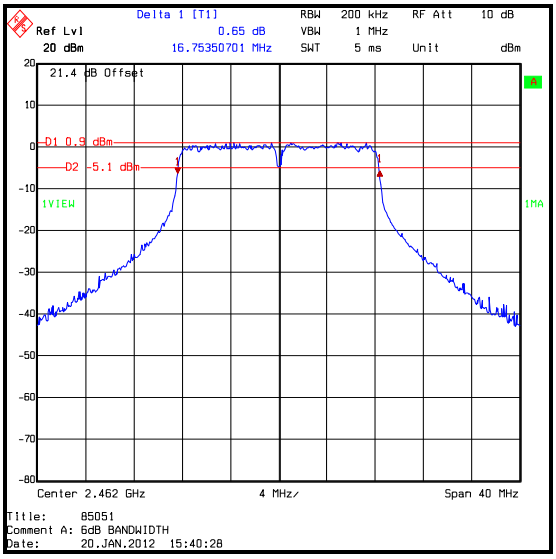
Results: 24 Mbps



Bottom channel



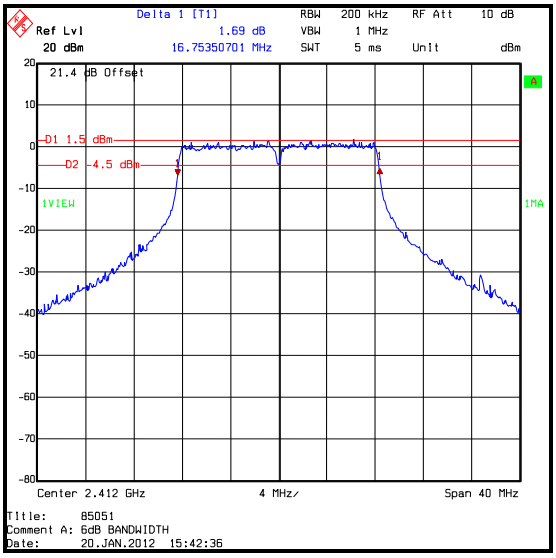
Middle channel



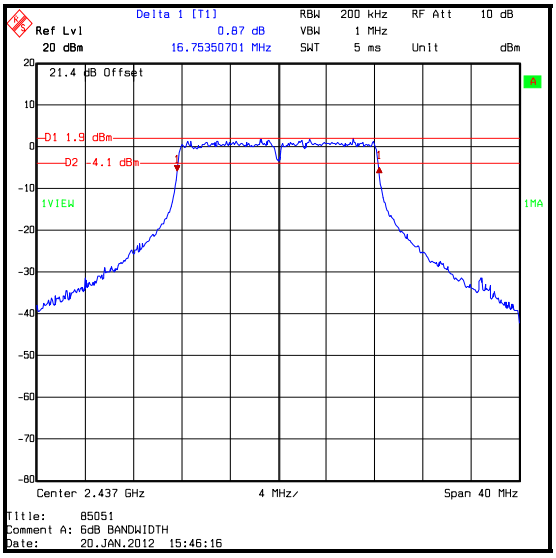
Top channel

Transmitter 6 dB Bandwidth (continued)

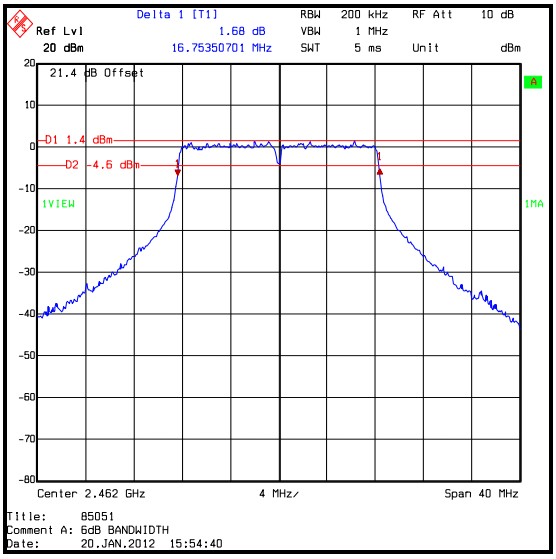
Results: 36 Mbps



Bottom channel



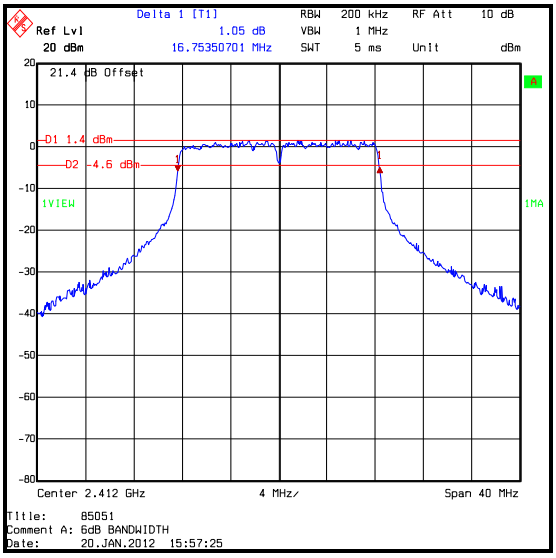
Middle channel



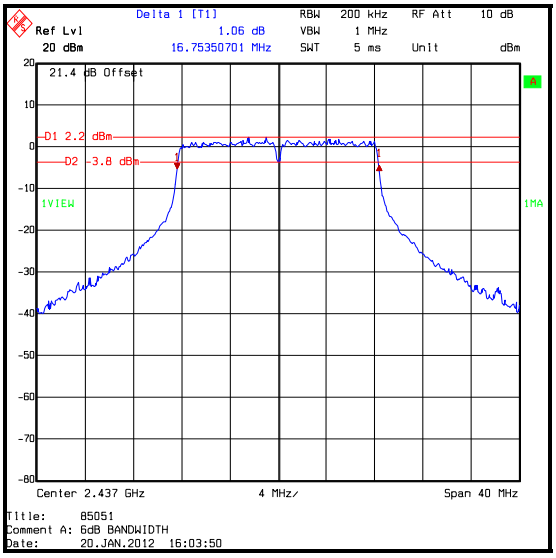
Top channel

Transmitter 6 dB Bandwidth (continued)

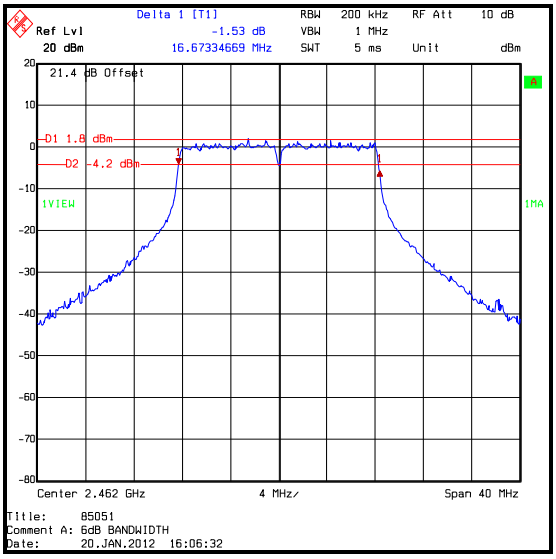
Results: 48 Mbps



Bottom channel



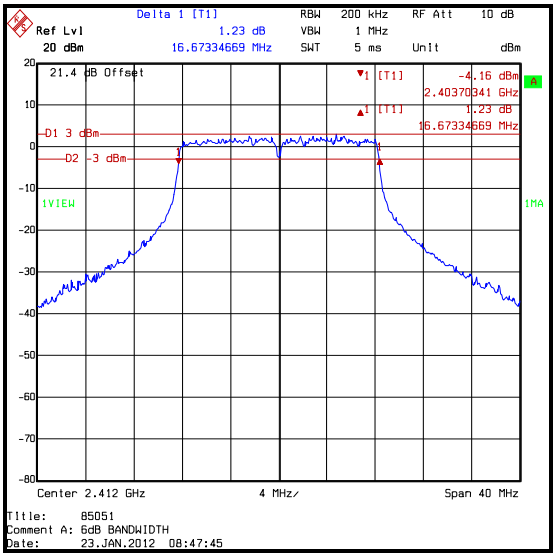
Middle channel



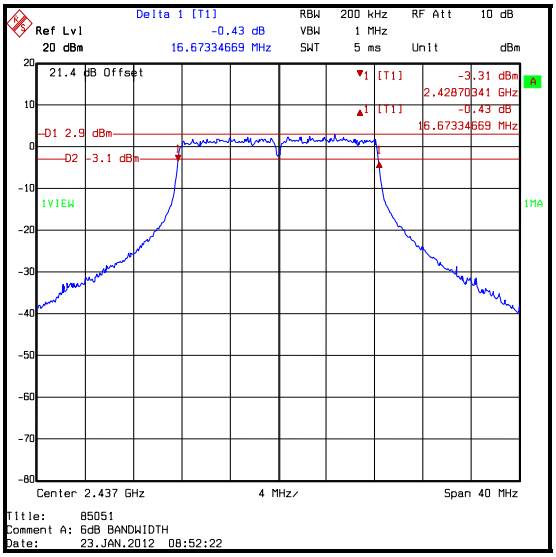
Top channel

Transmitter 6 dB Bandwidth (continued)

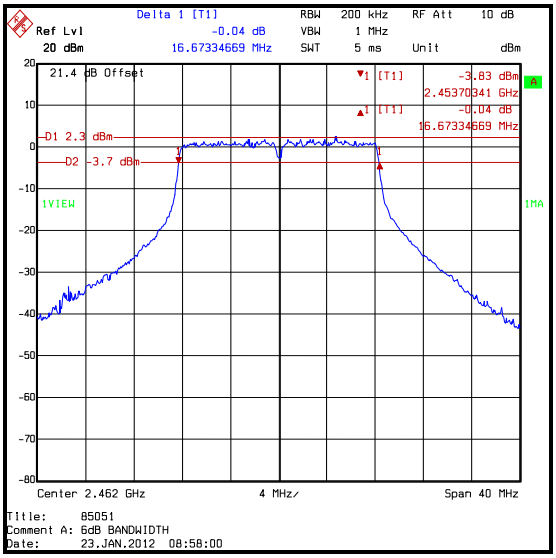
Results: 54 Mbps



Bottom channel



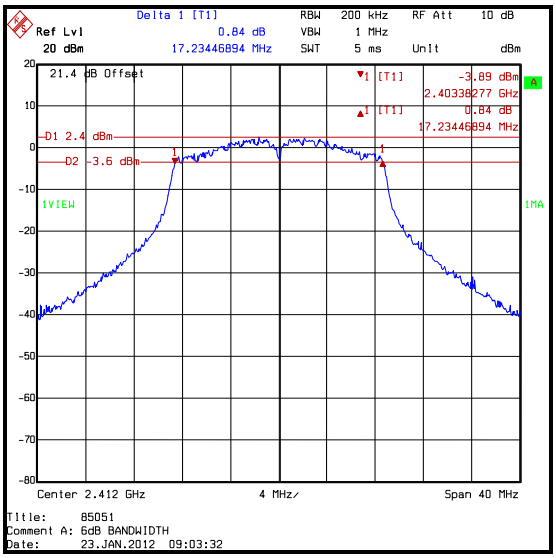
Middle channel

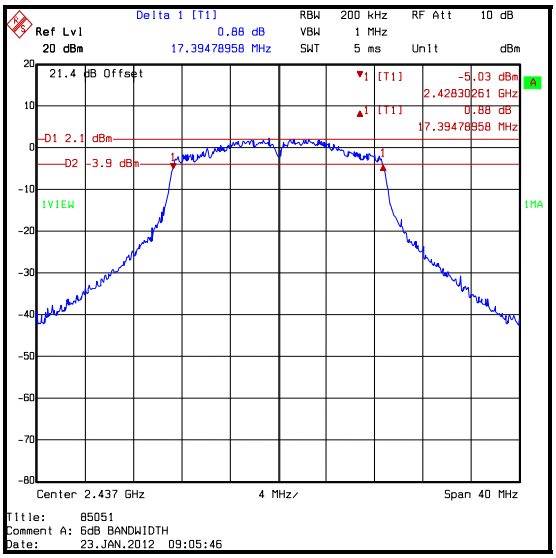


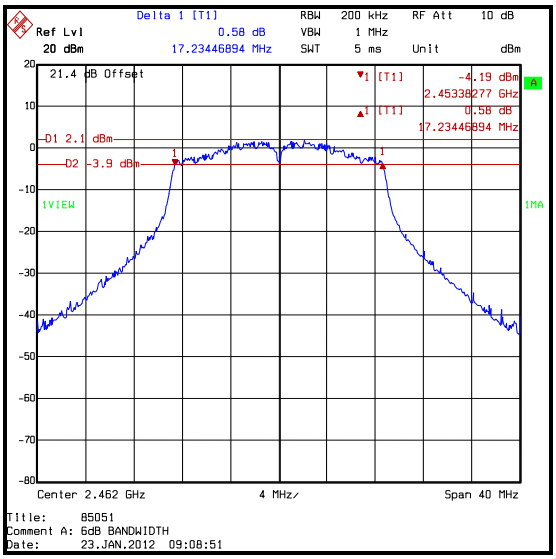
Top channel

Transmitter 6 dB Bandwidth (continued)

Results: 6.5 Mbps

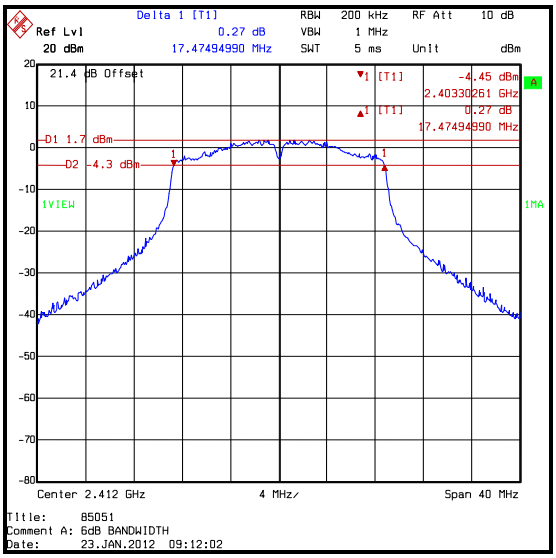


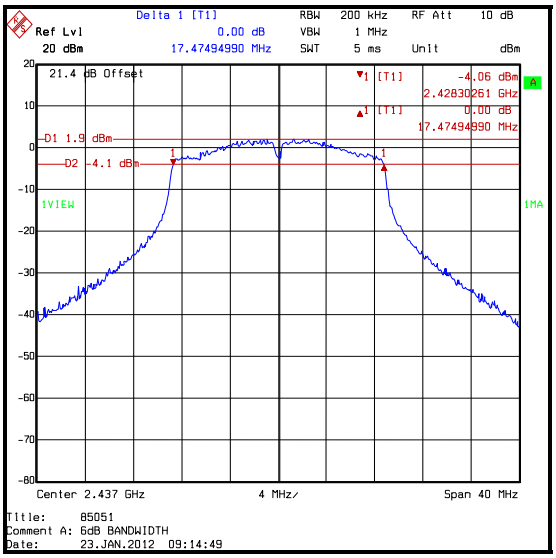


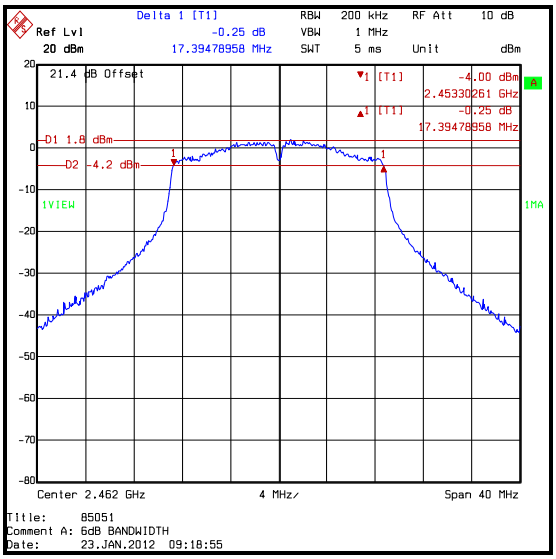


Transmitter 6 dB Bandwidth (continued)

Results: 13 Mbps

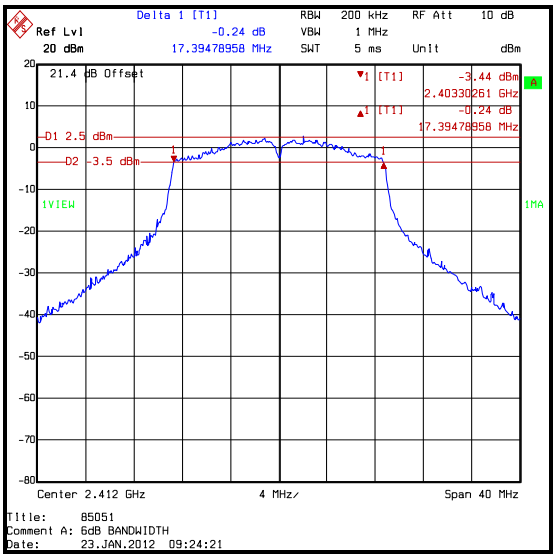


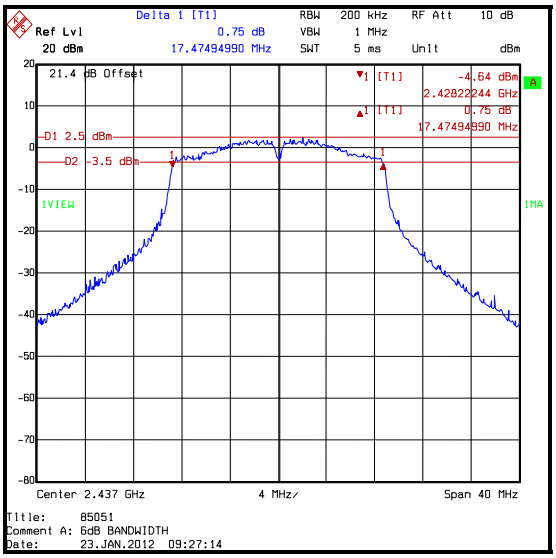


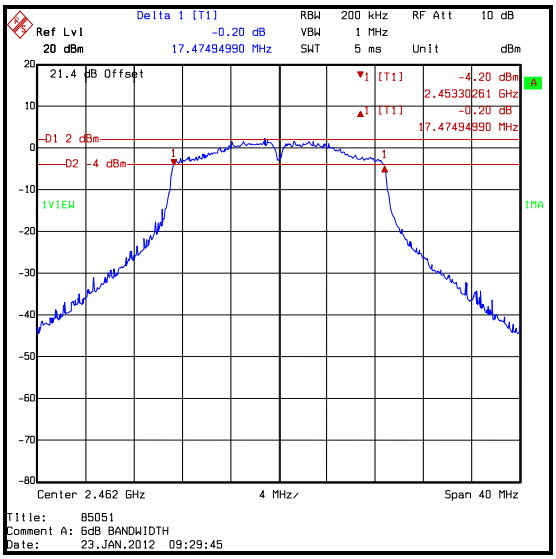


Transmitter 6 dB Bandwidth (continued)

Results: 19.5 Mbps

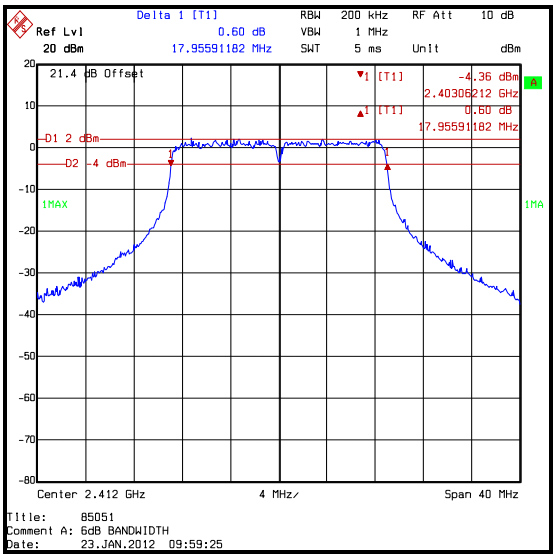


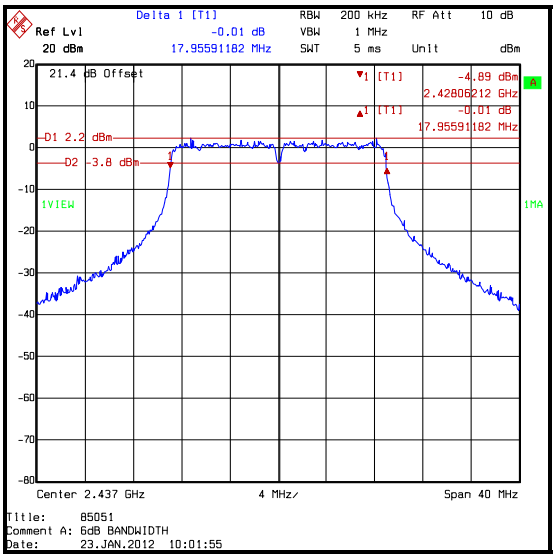


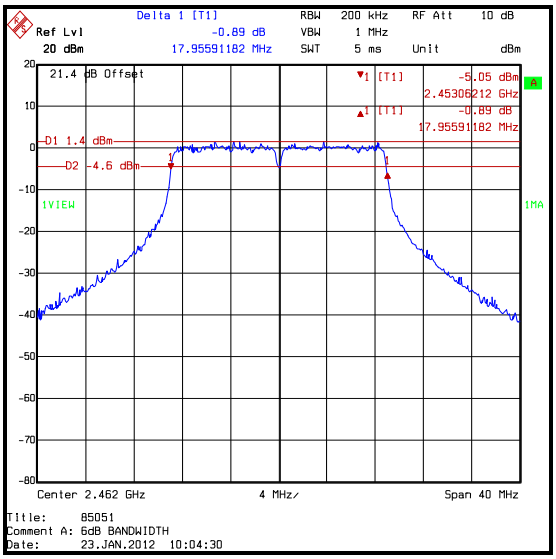


Transmitter 6 dB Bandwidth (continued)

Results: 26 Mbps

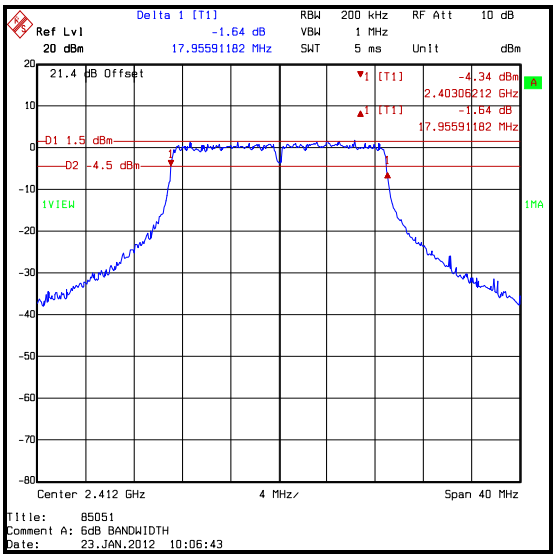


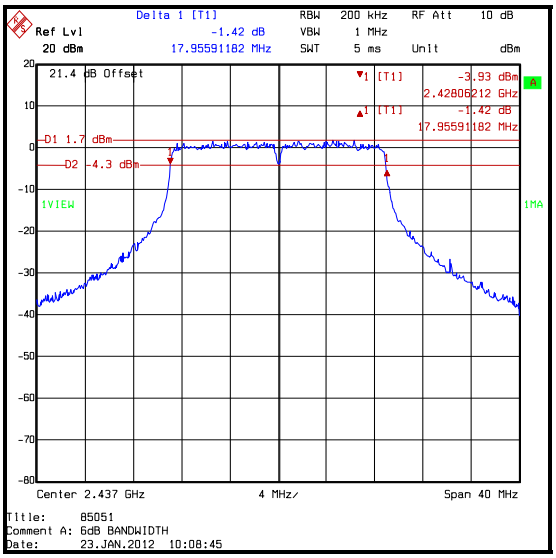


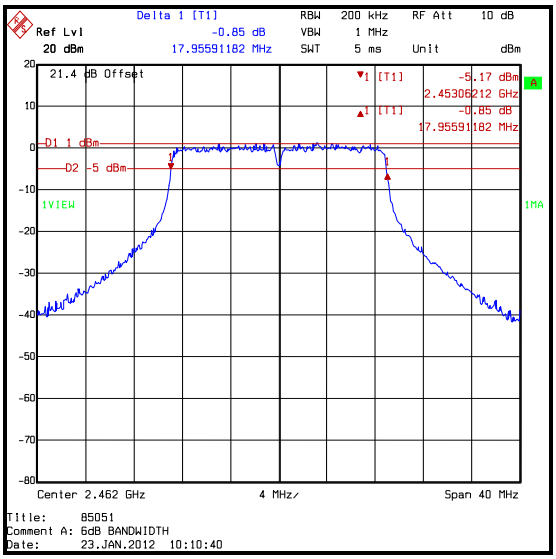


Transmitter 6 dB Bandwidth (continued)

Results: 39 Mbps

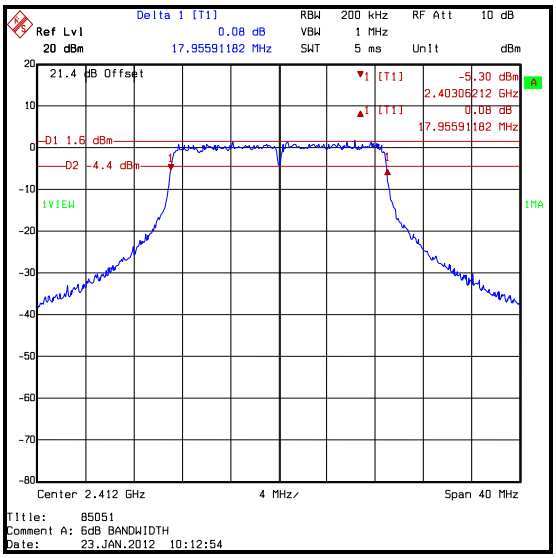


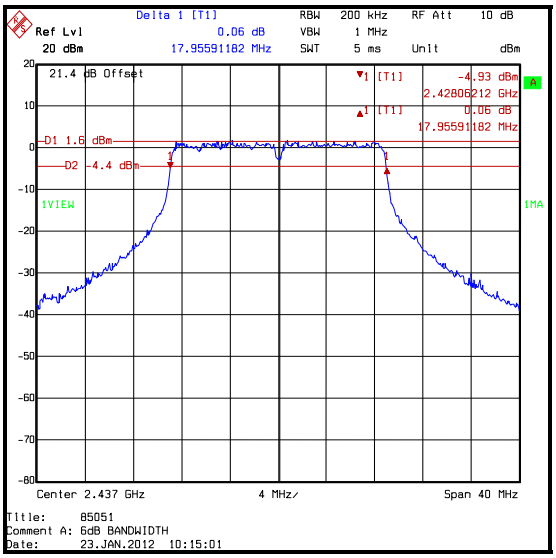


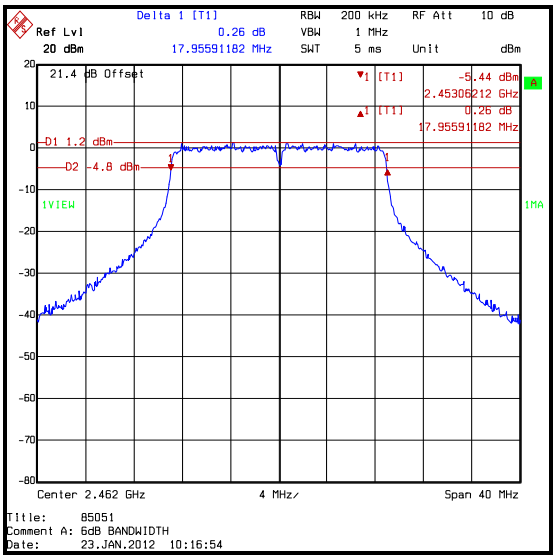


Transmitter 6 dB Bandwidth (continued)

Results: 52 Mbps

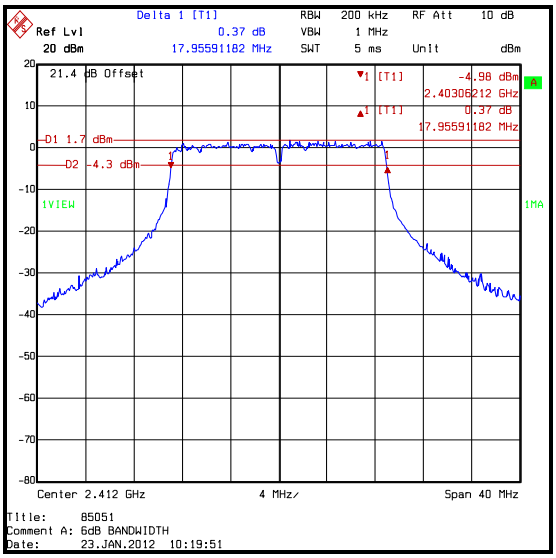


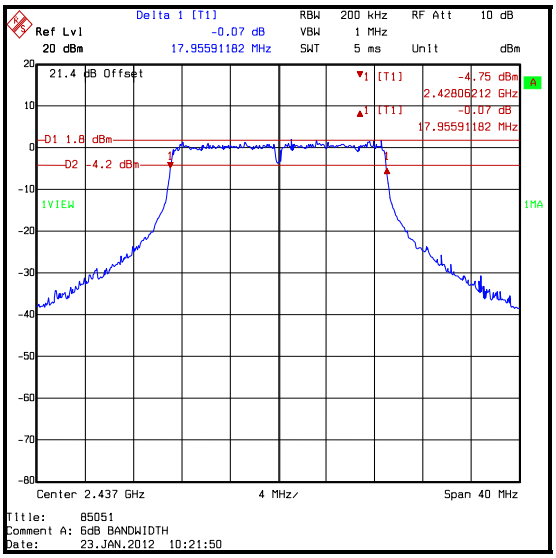


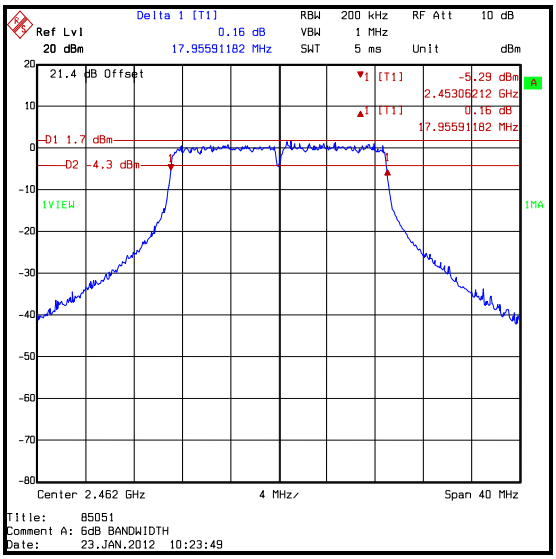


Transmitter 6 dB Bandwidth (continued)

Results: 58.5 Mbps

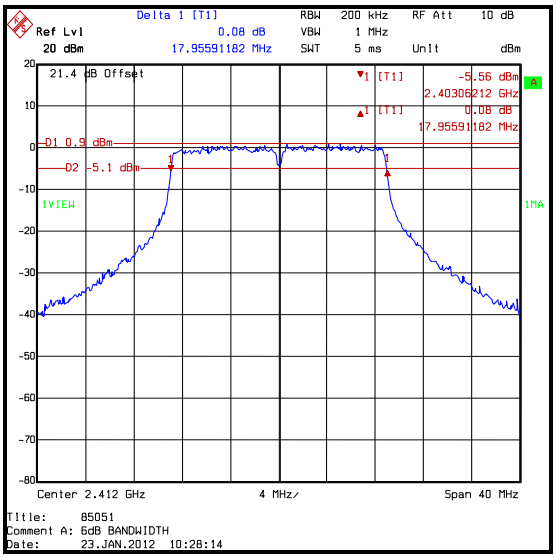


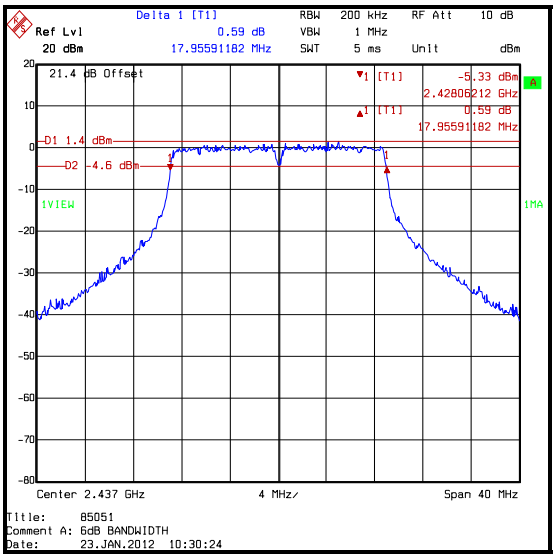


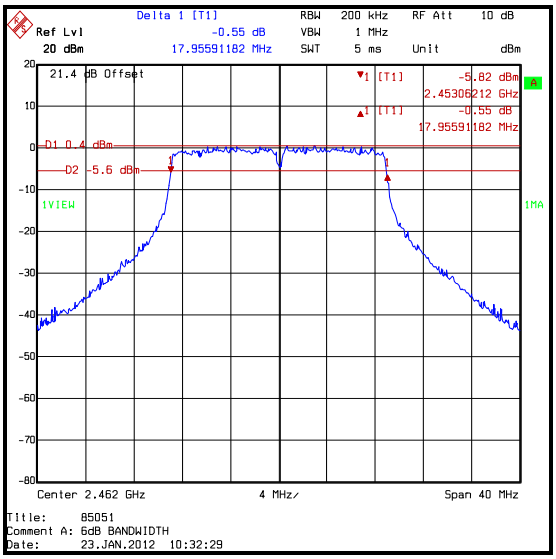


Transmitter 6 dB Bandwidth (continued)

Results: 65 Mbps

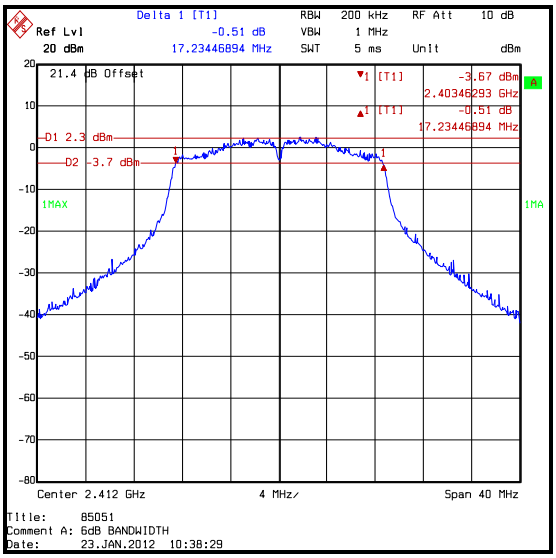


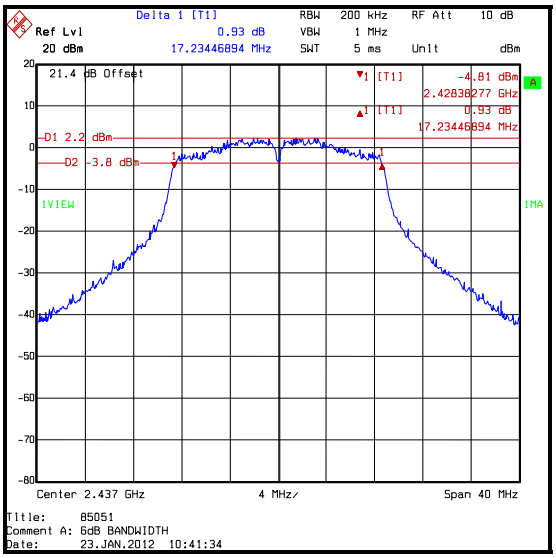


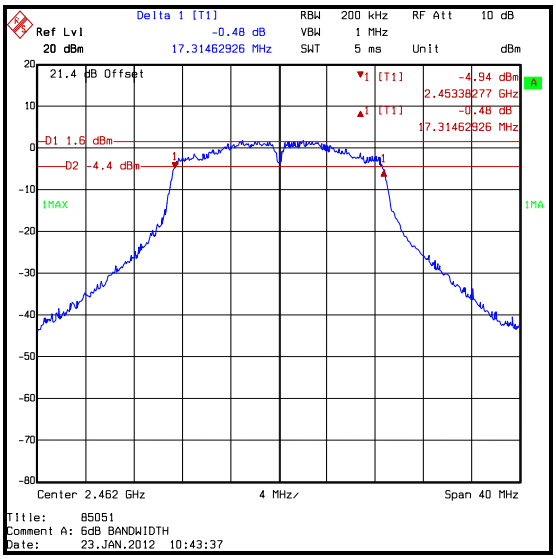


Transmitter 6 dB Bandwidth (continued)

Results: 7.2 Mbps

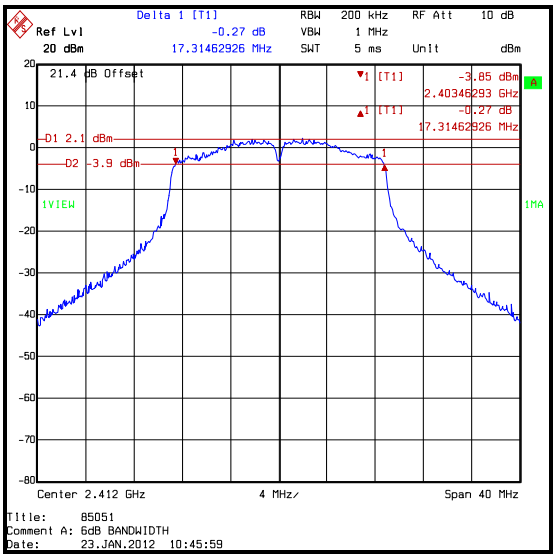


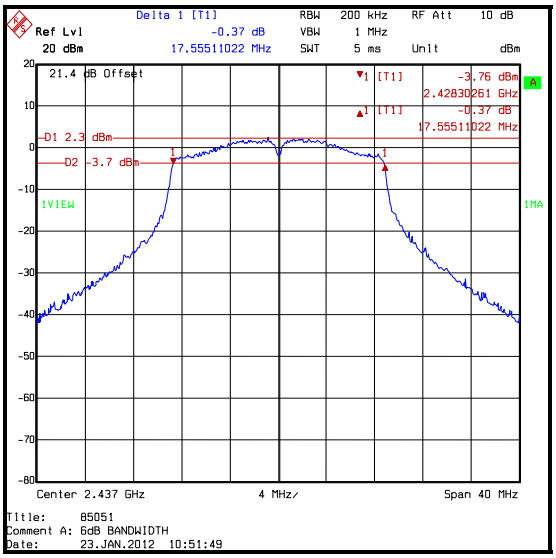


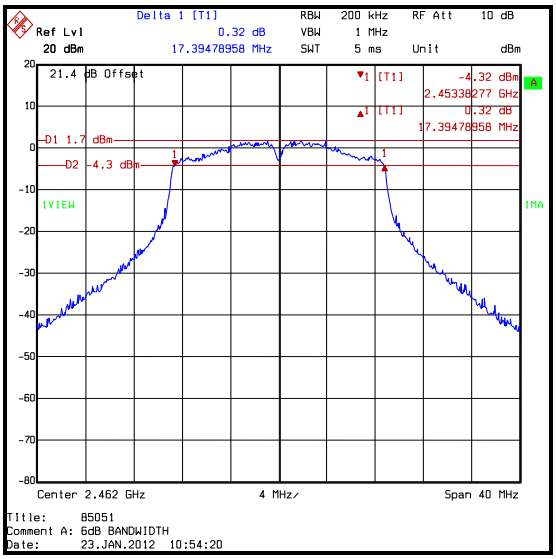


Transmitter 6 dB Bandwidth (continued)

Results: 14.4 Mbps

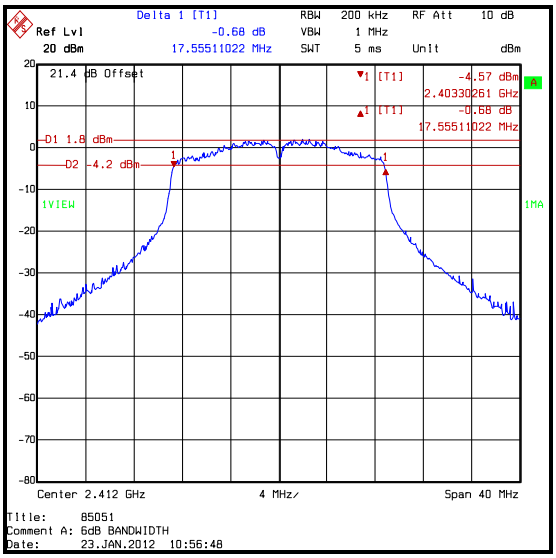


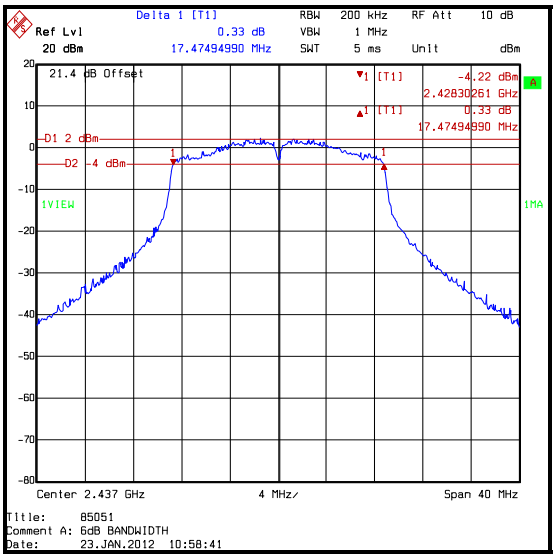


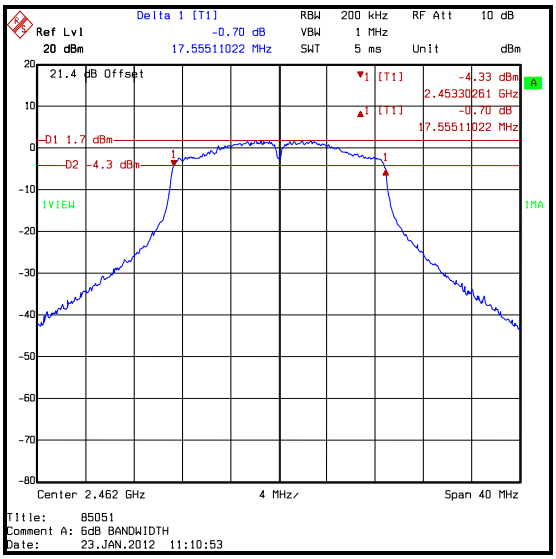


Transmitter 6 dB Bandwidth (continued)

Results: 21.7 Mbps

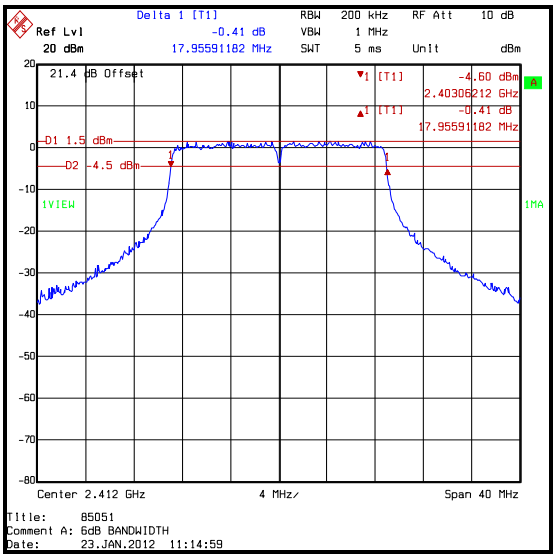


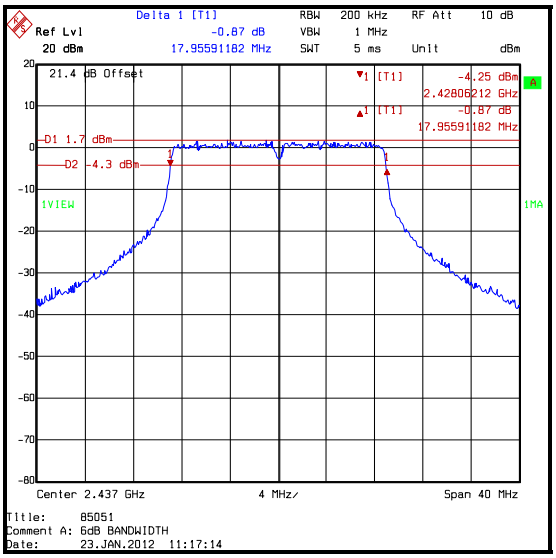


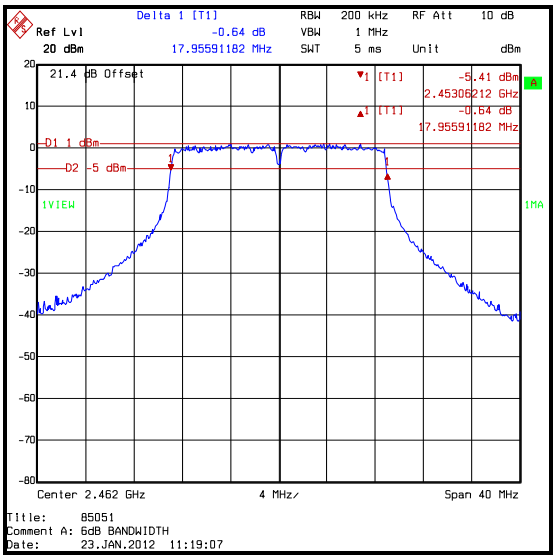


Transmitter 6 dB Bandwidth (continued)

Results: 28.9 Mbps

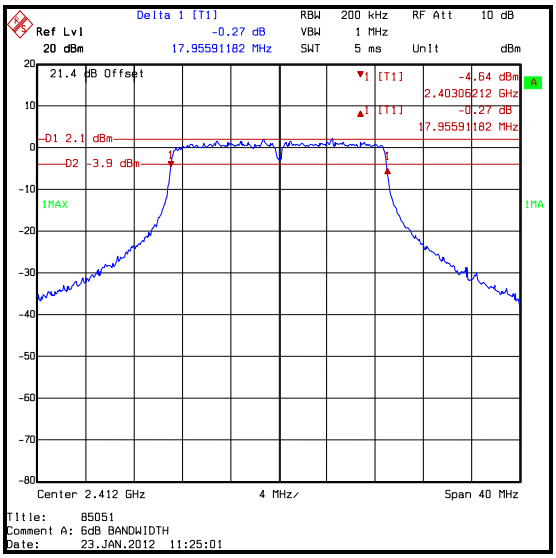


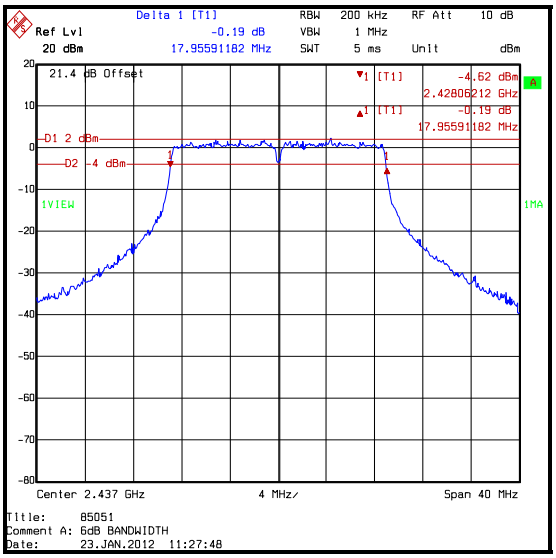


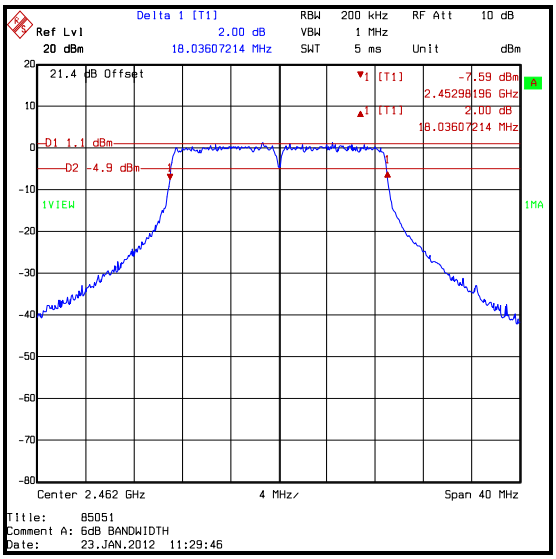


Transmitter 6 dB Bandwidth (continued)

Results: 43.4 Mbps

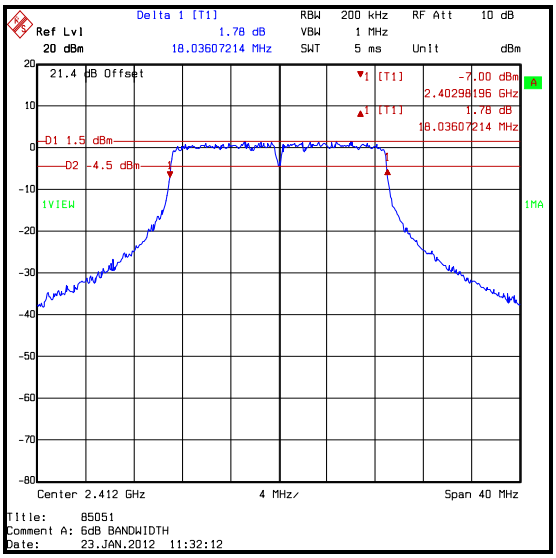


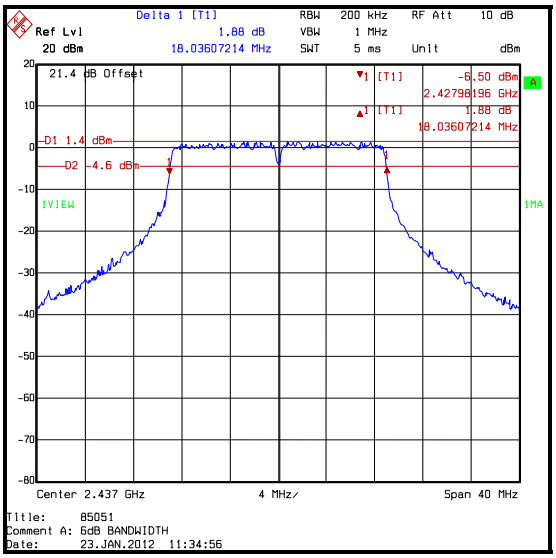


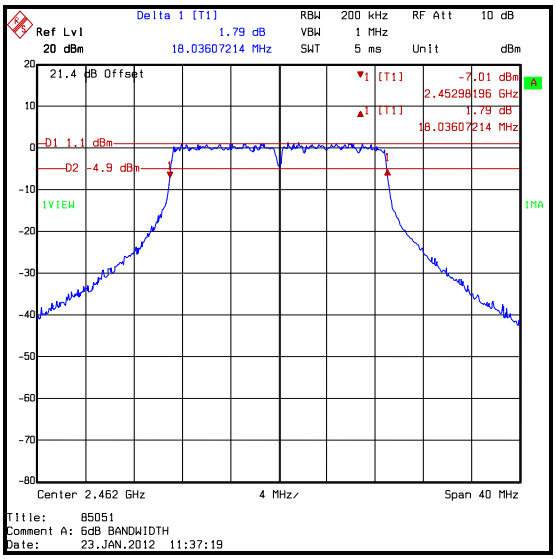


Transmitter 6 dB Bandwidth (continued)

Results: 57.8 Mbps

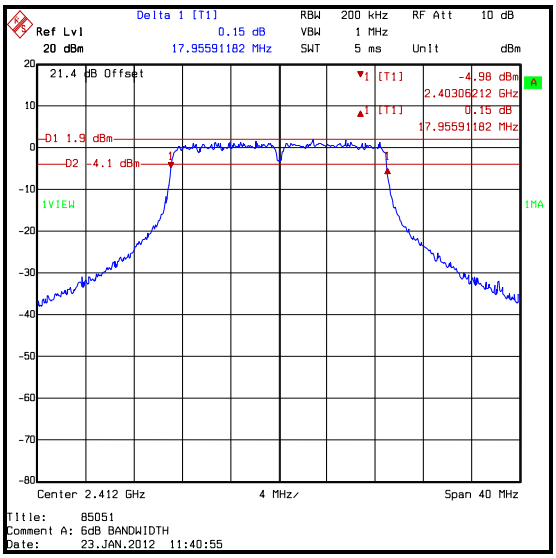


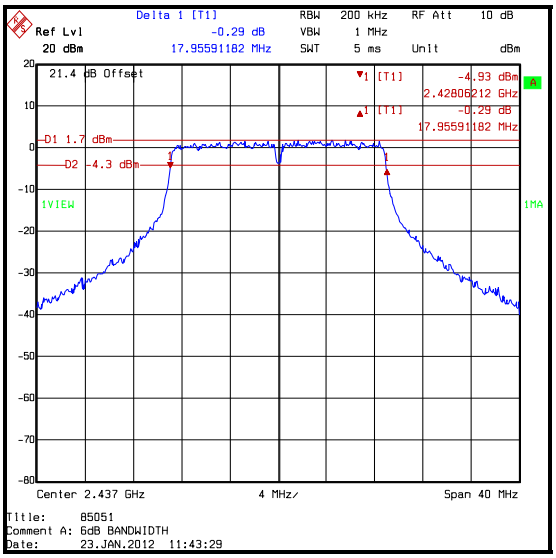


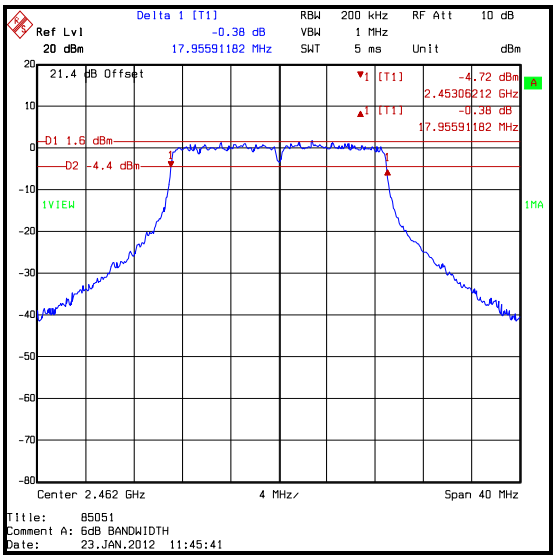


Transmitter 6 dB Bandwidth (continued)

Results: 65 Mbps

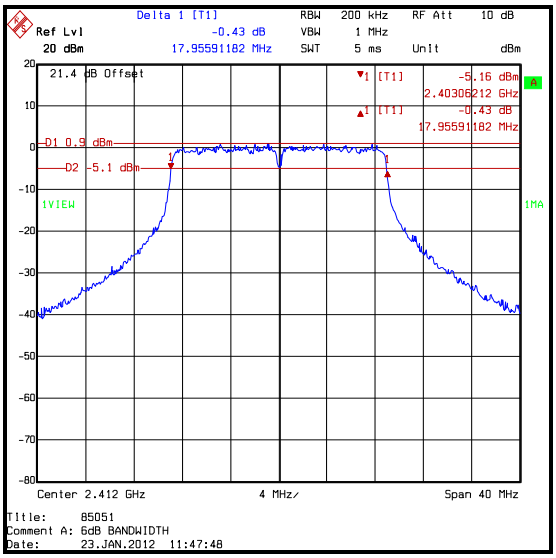


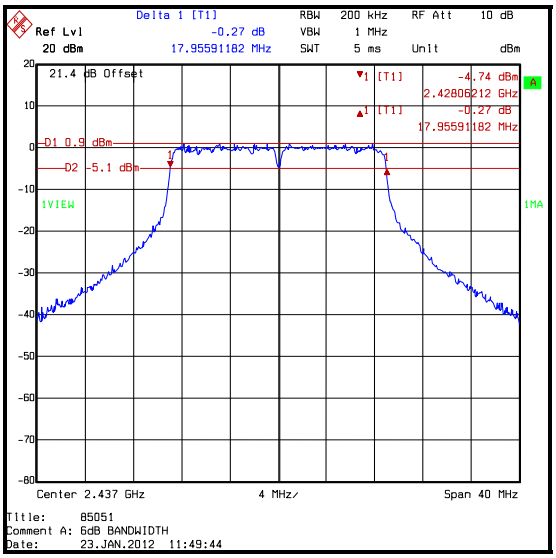


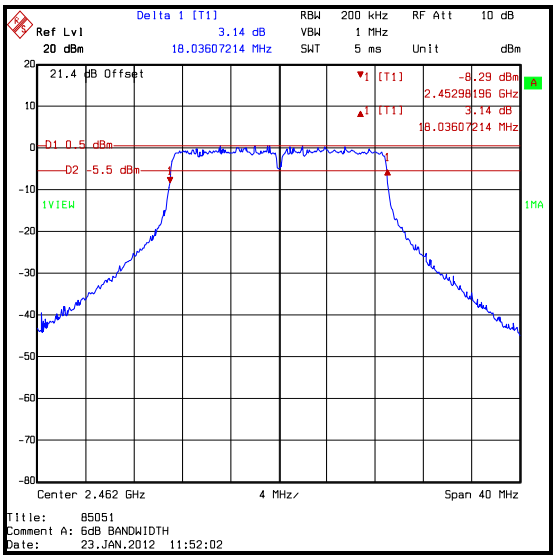


Transmitter 6 dB Bandwidth (continued)

Results: 72.2 Mbps







5.2.5. Transmitter Power Spectral Density

Test Summary:

Test Engineer:	Sarah Williams	**Test Date:**	24 January 2012
Test Sample IMEI:	359569040021280		

FCC Part:	15.247(e)
Test Method Used:	As detailed in ANSI C63.10 Section 6.11.2

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	28

Results: 2 Mbps

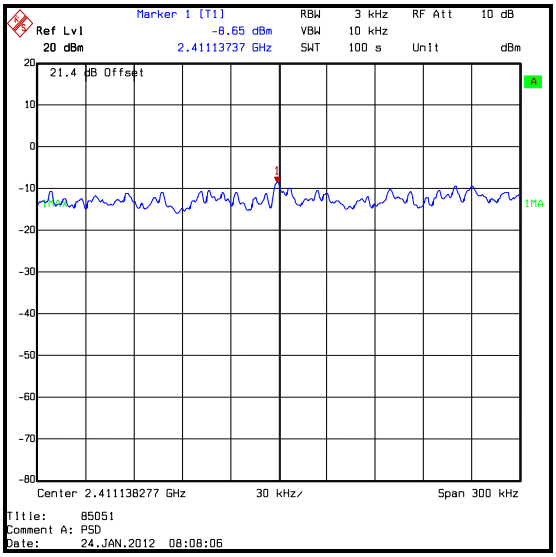
Channel	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	-8.7	8.0	16.7	Complied
Middle	-9.1	8.0	17.1	Complied
Top	-9.4	8.0	17.4	Complied

Note(s):

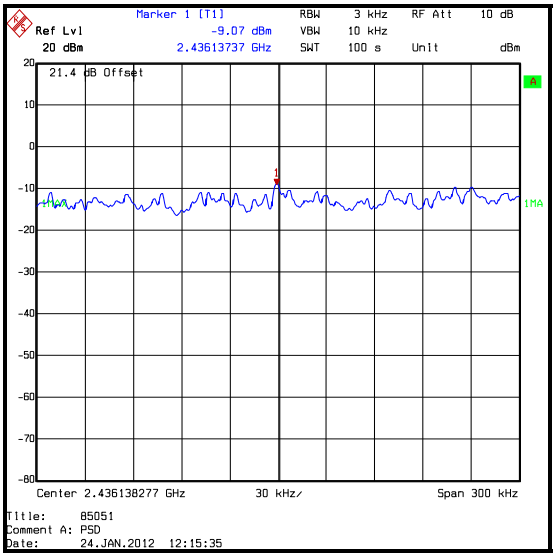
1. All supported modes were tested on the bottom, middle and top channels to determine the worst case configuration. The configuration that produced the highest levels is recorded in the table above.

Transmitter Power Spectral Density (continued)

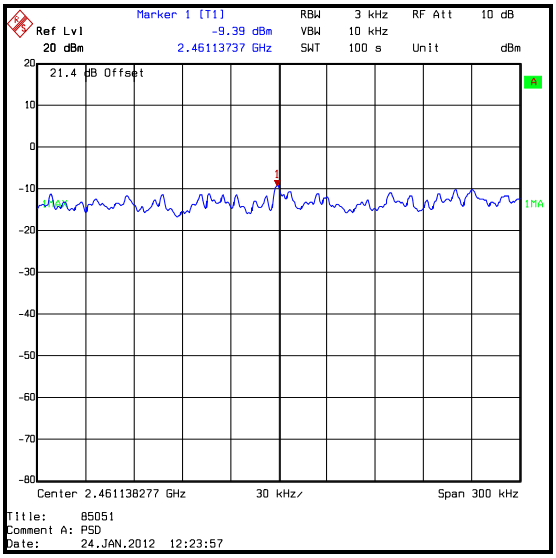
Results: 2 Mbps



Bottom channel



Middle channel



Top channel

5.2.6. Transmitter Maximum Peak Output Power

Test Summary:

Test Engineer:	Sarah Williams	**Test Date:**	23 January 2012
Test Sample IMEI:	359569040021280		

FCC Part:	15.247(b)(3)
Test Method Used:	As detailed in ANSI C63.10 Section 6.10.2

Environmental Conditions:

Temperature (°C):	24
Relative Humidity (%):	28

Results: 11 Mbps

Conducted Peak Limit Comparison

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	20.7	30.0	9.3	Complied
Middle	20.5	30.0	9.5	Complied
Top	20.1	30.0	9.9	Complied

De Facto EIRP Limit Comparison

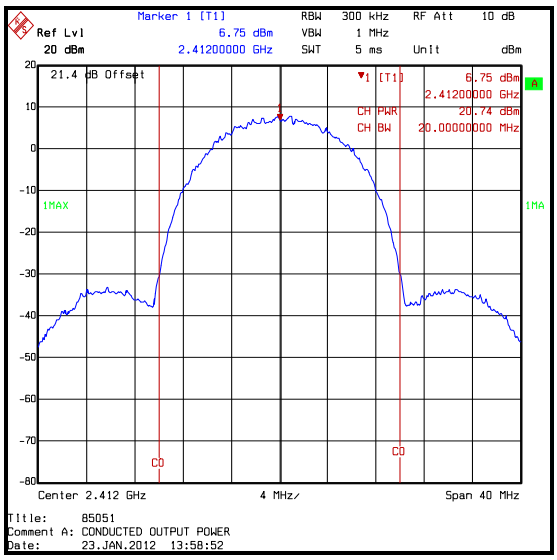
Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	20.7	-1.6	19.1	36.0	16.9	Complied
Middle	20.5	-1.6	18.9	36.0	17.1	Complied
Top	20.1	-1.6	18.5	36.0	17.5	Complied

Note(s):

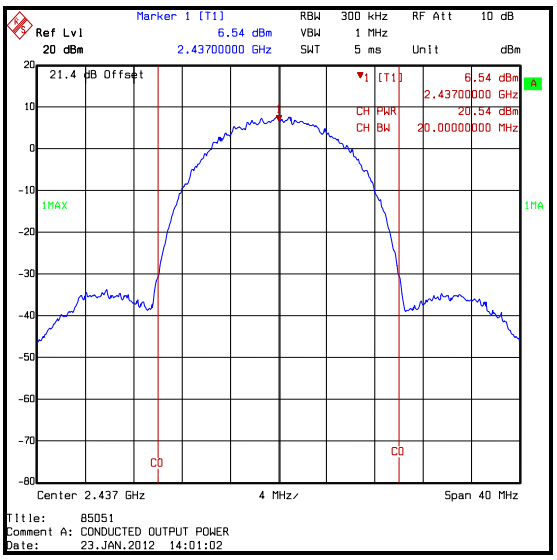
1. Power was measured using the channel power function on a spectrum analyser. The spectrum analyser was connected to the RF port on the EUT using suitable attenuation and RF cable.
2. All supported modes of operation were tested. The mode that produced the highest conducted output power is reported.

Transmitter Maximum Peak Output Power (continued)

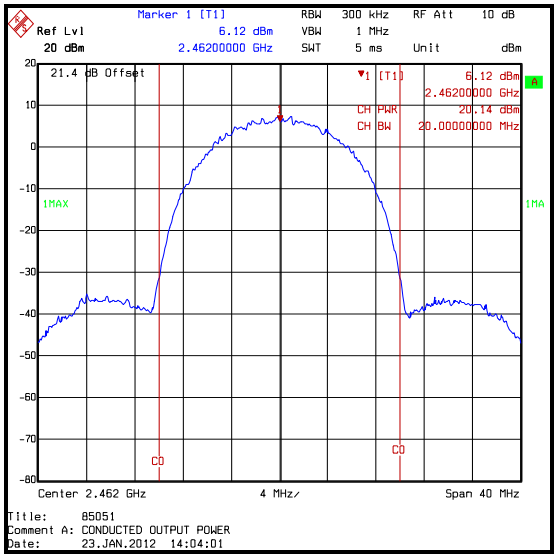
Results: 11 Mbps



Bottom channel



Middle channel



Top channel

5.2.7. Transmitter Radiated Emissions

Test Summary:

Test Engineer:	Andrew Edwards	**Test Date:**	18 January 2012
Test Sample IMEI:	359569040021579		

FCC Part:	15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.5 referencing ANSI C63.4
Frequency Range	30 MHz to 1000 MHz

Environmental Conditions:

Temperature (°C):	28
Relative Humidity (%):	23

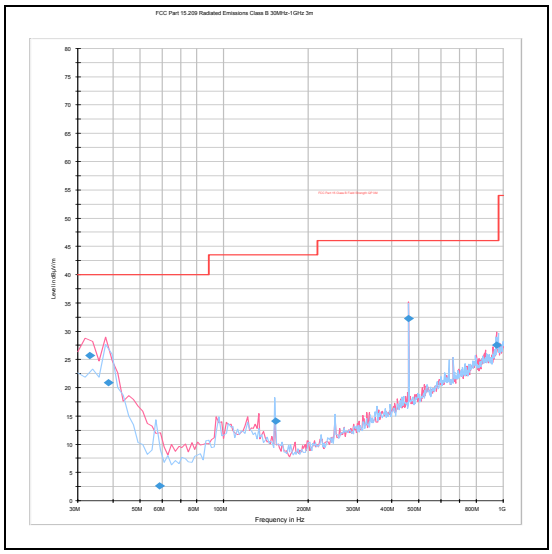
Results: Top Channel 11 Mbps

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
33.159	Vertical	25.7	40.0	14.3	Complied
38.636	Vertical	20.8	40.0	19.2	Complied
58.748	Horizontal	2.6	40.0	37.4	Complied
153.296	Horizontal	14.2	43.5	29.3	Complied
458.795	Vertical	32.3	46.0	13.7	Complied
945.634	Vertical	27.5	46.0	18.5	Complied

Note(s):

1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss
2. The preliminary scans showed similar emission levels below 1 GHz, for each channel of operation. Therefore final radiated emissions measurements were performed with the EUT set to the top channel only.
3. All other emissions were at least 20 dB below the appropriate limit or below the noise floor of the measurement system.
4. 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.

Transmitter Radiated Emissions (continued)



Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying table.

Transmitter Radiated Emissions (continued)

Test Summary:

Test Engineer:	Patrick Jones	**Test Date:**	25 January 2012
Test Sample IMEI:	359569040021579		

FCC Part:	15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.10 Sections 6.3 and 6.6 referencing ANSI C63.4
Frequency Range	1 GHz to 25 GHz

Environmental Conditions:

Temperature (°C):	23
Relative Humidity (%):	24

Results: Bottom Channel / Peak

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
4823.880	Vertical	44.7	54.0	9.3	Complied

Results: Middle Channel / Peak

Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
4873.960	Vertical	45.7	54.0	8.3	Complied

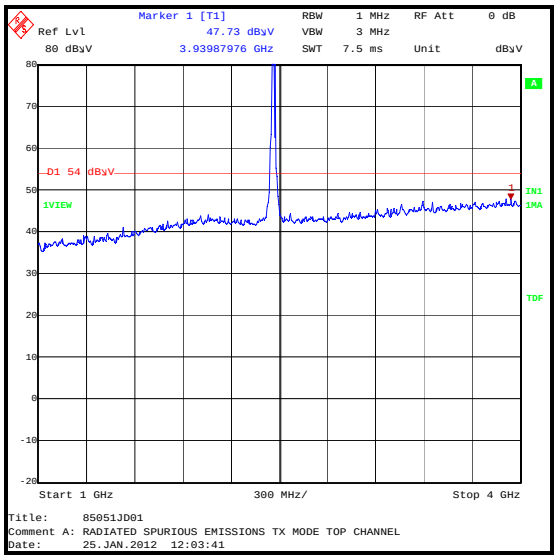
Results: Top Channel / Peak

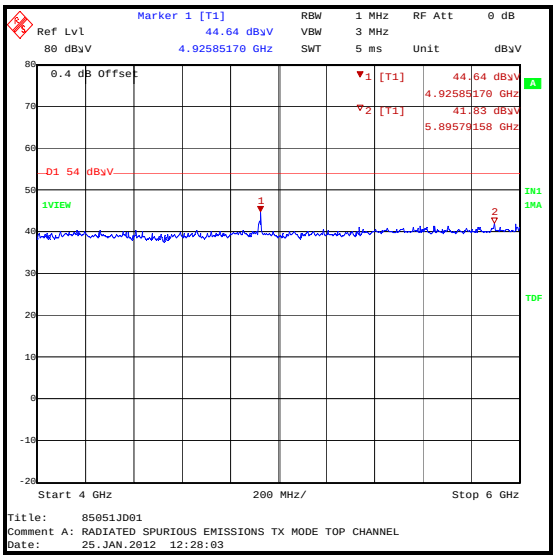
Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
4924.040	Vertical	46.0	54.0	8.0	Complied

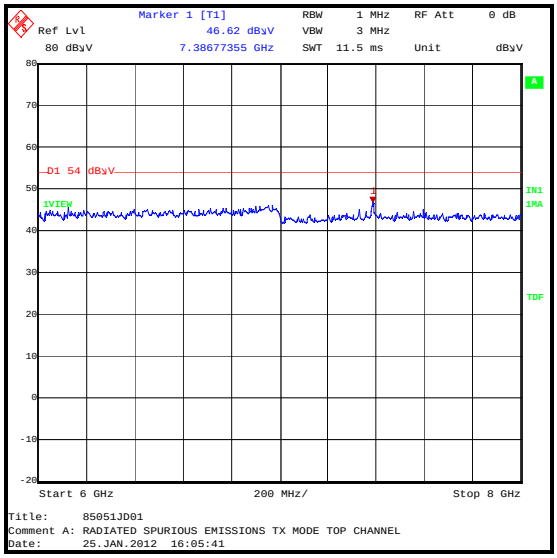
Note(s):

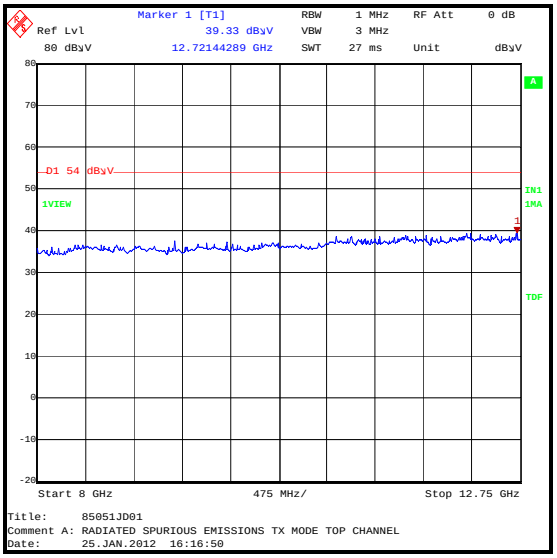
1. The final measured value, for the given emissions in the tables above, incorporates the calibrated antenna factor and cable loss.
2. In the tables above, the peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.
3. All other emissions shown on the pre-scan plots were investigated and found to be ambient or >20 dB below the applicable limit or below the measurement system noise floor.
4. The emission shown at 2462 MHz on the 1 GHz to 4 GHz plot is the EUT fundamental.
5. 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 Radiated Emissions (continued)

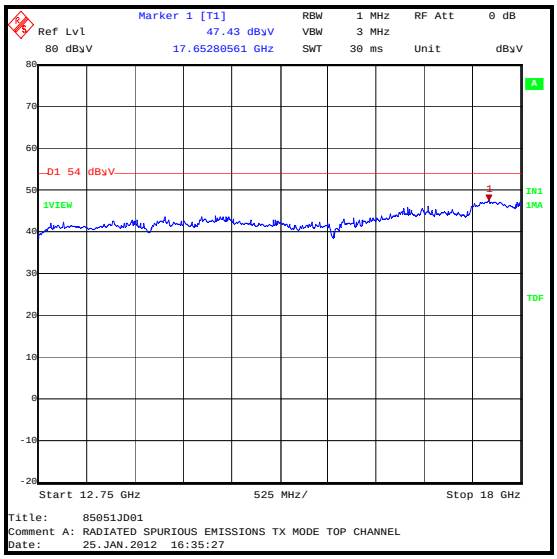


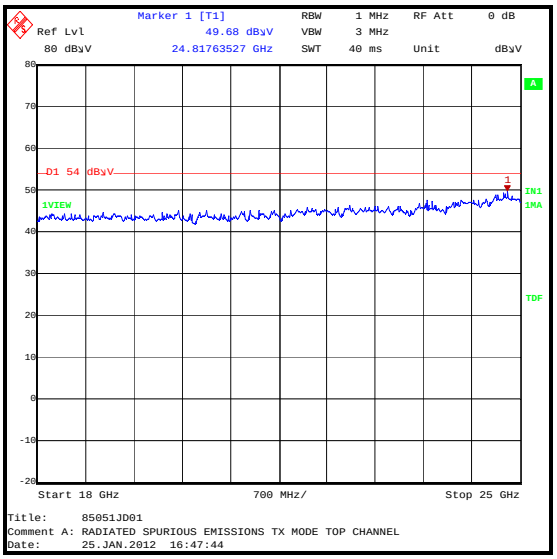






Transmitter Radiated Emissions (continued)





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

5.2.8. Transmitter Band Edge Radiated Emissions

Test Summary:

Test Engineer:	Nick Steele	**Test Date:**	25 January 2012
Test Sample IMEI:	359569040021561		

FCC Part:	15.247(d) & 15.209(a)
Test Method Used:	As detailed in ANSI C63.10 Section 6.9.2

Environmental Conditions:

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

Results: Peak / 1 Mbps

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2400	49.9	76.2*	26.3	Complied
2483.5	58.3	74.0	15.7	Complied

Results: Average / 1 Mbps

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2483.5	45.8	54.0	8.2	Complied

Results: Peak / 9 Mbps

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2400	64.1	72.7*	8.6	Complied
2483.5	61.7	74.0	12.3	Complied

Results – Average / 9 Mbps:

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2483.5	46.8	54.0	7.2	Complied

Transmitter Band Edge Radiated Emissions (continued)

Results: Peak / 11 Mbps

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2400	52.9	75.9*	23.0	Complied
2483.5	59.1	74.0	14.9	Complied

Results: Average / 11 Mbps

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2483.5	46.0	54.0	8.0	Complied

Results: Peak / 21.7 Mbps

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2400	63.9	72.7*	8.8	Complied
2483.5	61.8	74.0	12.2	Complied

Results: Average / 21.7 Mbps

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2483.5	46.8	54.0	7.2	Complied

Transmitter Band Edge Radiated Emissions (continued)

Results: Peak / 48 Mbps

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2400	64.4	72.6*	8.2	Complied
2483.5	65.6	74.0	8.4	Complied

Results: Average / 48 Mbps

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2483.5	46.6	54.0	7.4	Complied

Results: Peak / 72.2 Mbps

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2400	63.2	71.6*	8.4	Complied
2483.5	62.4	74.0	11.6	Complied

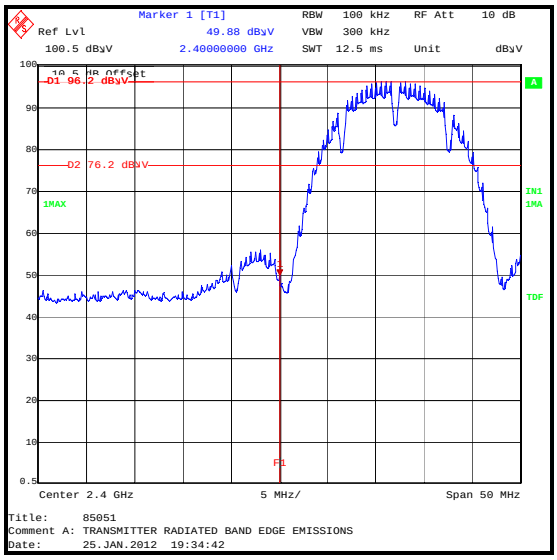
Results: Average / 72.2 Mbps

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2483.5	46.4	54.0	7.6	Complied

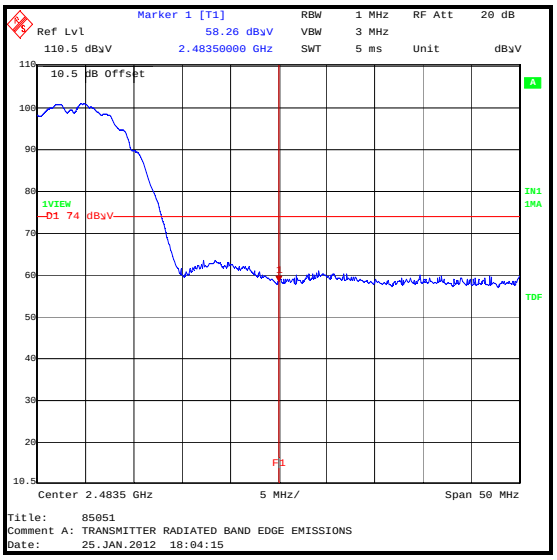
**-20 dBc limit*

Transmitter Band Edge Radiated Emissions (continued)

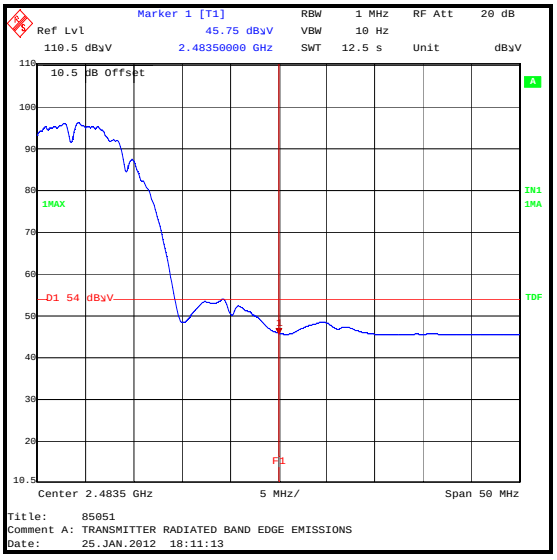
Results: 1 Mbps



Lower Band Edge Peak Measurement



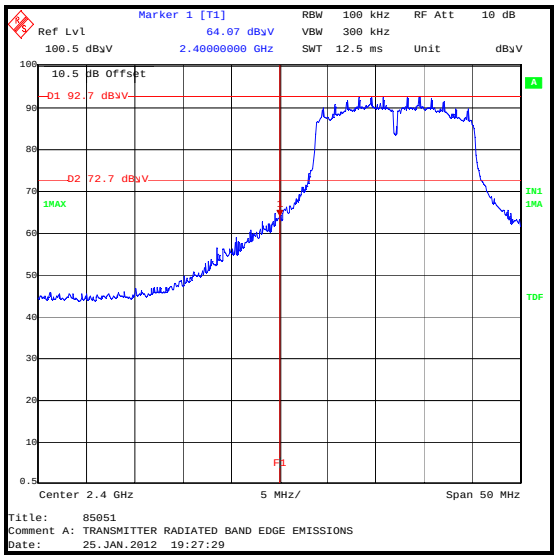
Upper Band Edge Peak Measurement



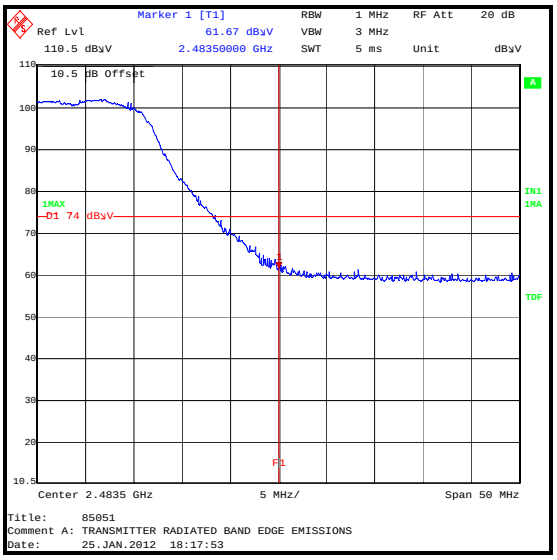
Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

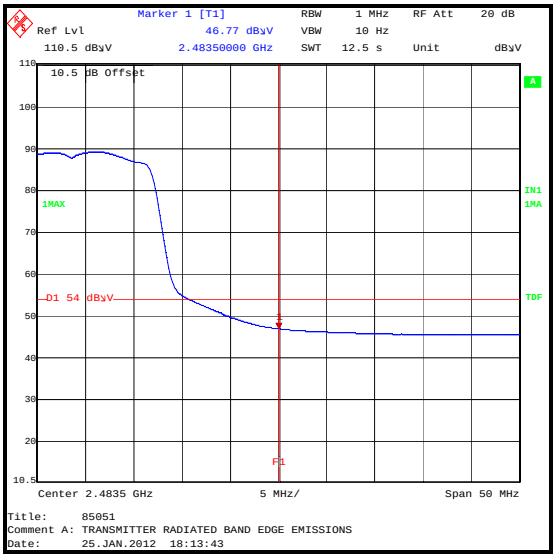
Results: 9 Mbps



Lower Band Edge Peak Measurement



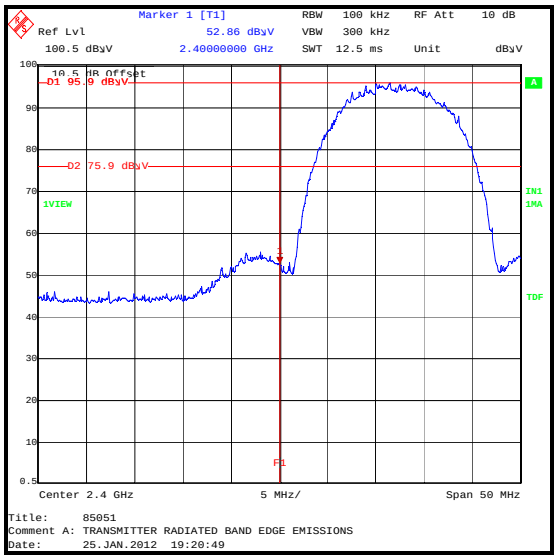
Upper Band Edge Peak Measurement



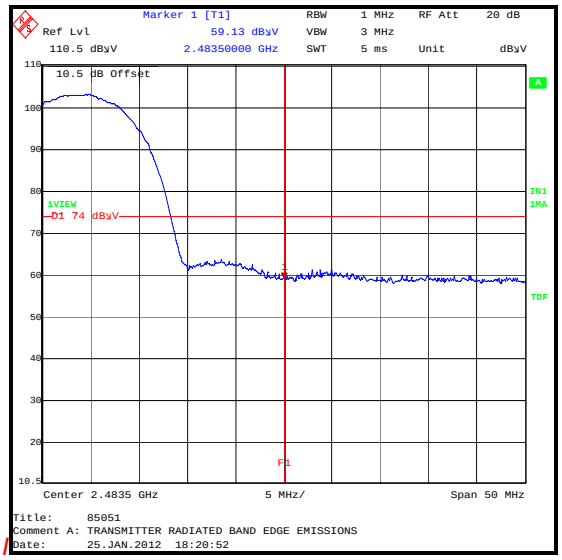
Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

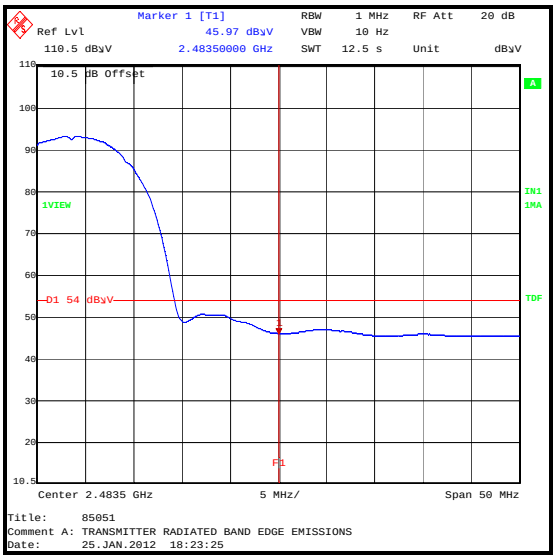
Results: 11 Mbps



Lower Band Edge Peak Measurement



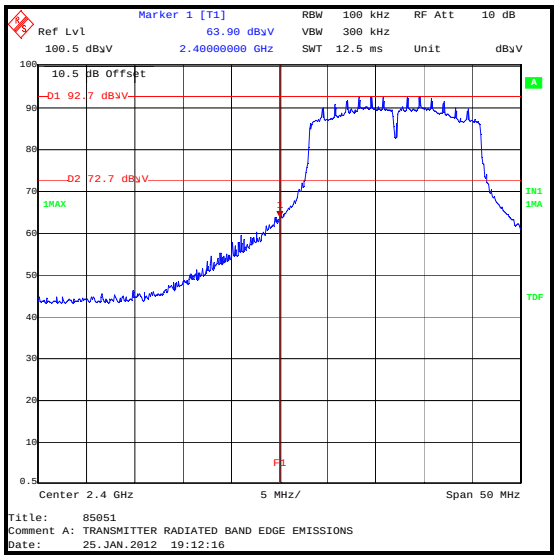
Upper Band Edge Peak Measurement



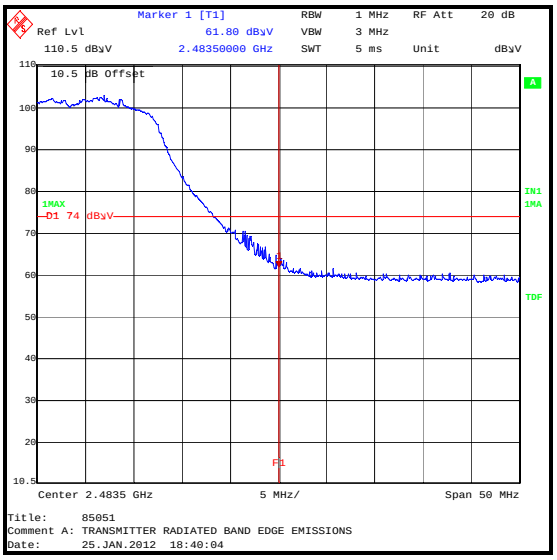
Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

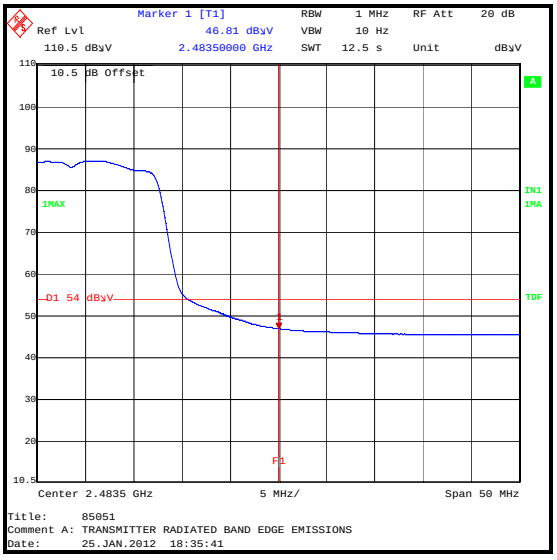
Results: 21.7 Mbps



Lower Band Edge Peak Measurement



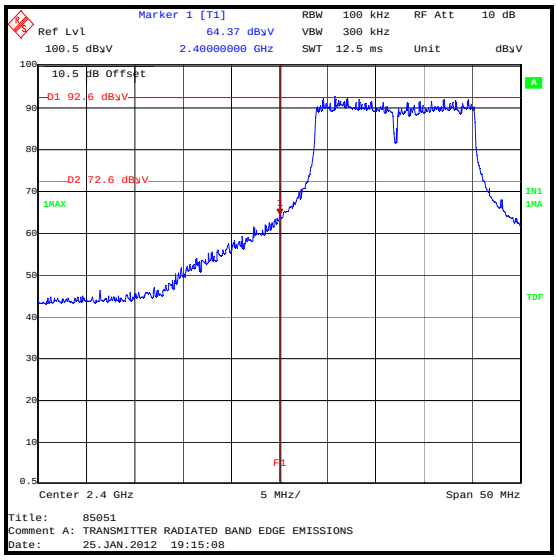
Upper Band Edge Peak Measurement



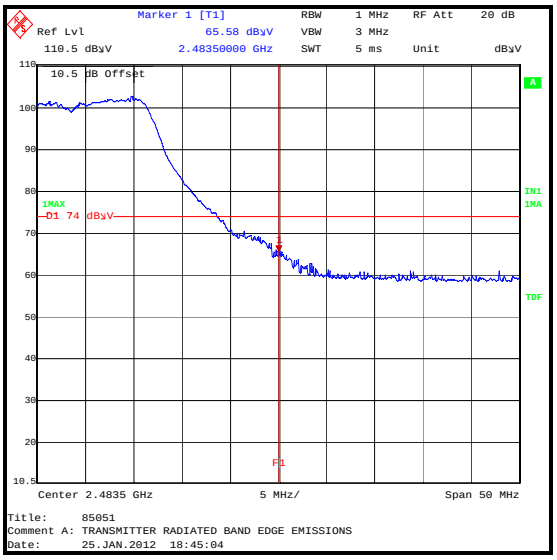
Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

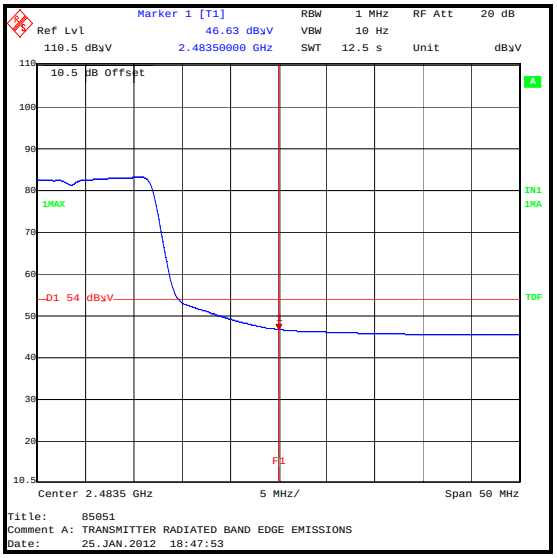
Results: 48 Mbps



Lower Band Edge Peak Measurement



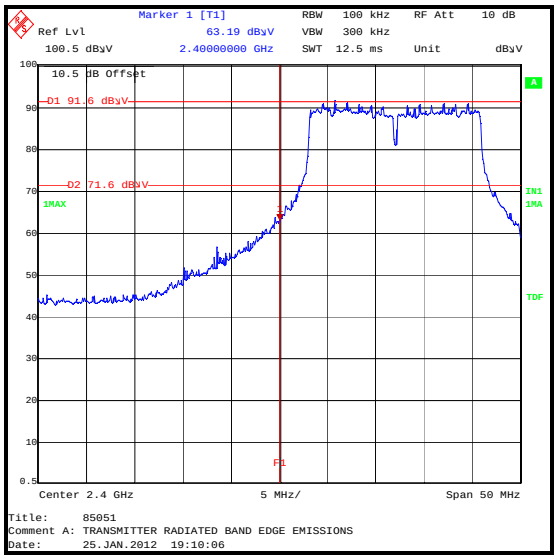
Upper Band Edge Peak Measurement



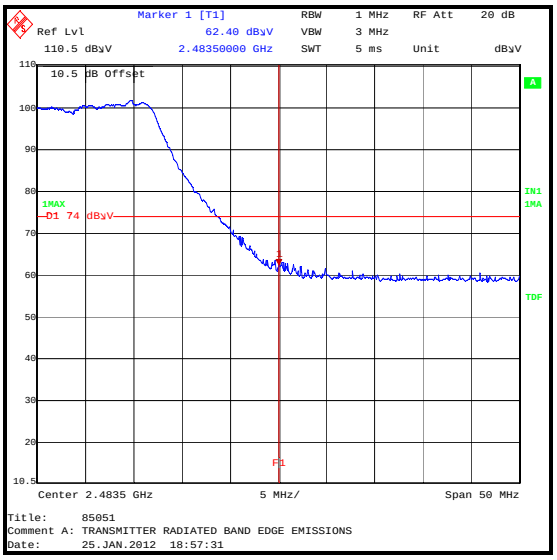
Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

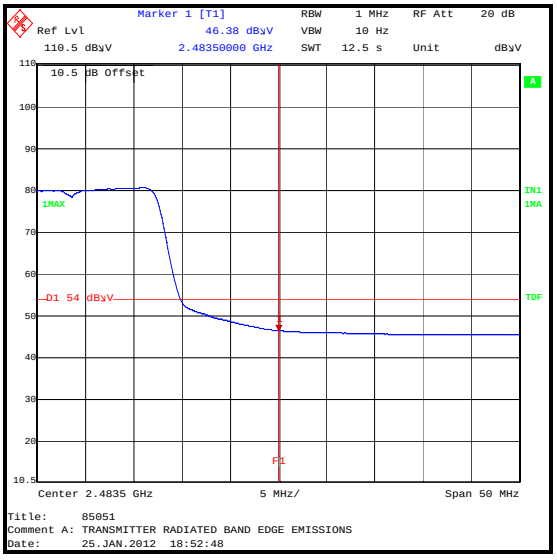
Results: 72.2 Mbps



Lower Band Edge Peak Measurement



Upper Band Edge Peak Measurement



Upper Band Edge Average Measurement

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
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±3.25 dB
Maximum Peak Output Power	2.4 GHz to 2.4835 GHz	95%	±2.94 dB
Spectral Power Density	2.4 GHz to 2.4835 GHz	95%	±2.94 dB
6 dB Bandwidth	2.4 GHz to 2.4835 GHz	95%	±0.92 ppm
Radiated Spurious Emissions	30 MHz to 25 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)
A067	LISN	Rohde & Schwarz	ESH3-Z5	890603/002	02 Jun 2012	12
A1393	Attenuator	Huber & Suhner	757456	6820.17.B	08 Jul 2012	12
A1396	Attenuator	Huber & Suhner	757987	6810.17.B	08 Jul 2012	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	09 Oct 2012	12
A1818	Antenna	EMCO	3115	00075692	09 Oct 2012	12
A1830	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100668	05 Mar 2012	12
A1834	Attenuator	Hewlett Packard	8491B	10444	26 Jul 2012	12
A1975	High Pass Filter	AtlanTecRF	AFH-03000	090424010	28 Feb 2012	12
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	26 Mar 2012	12
K0001	5m RSE Chamber	Rainford EMC	N/A	N/A	29 May 2012	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	09 Oct 2012	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESI26	100046K	29 Jun 2012	12
M1242	Spectrum Analyser	Rohde & Schwarz	FSEM30	845986/022	12 Dec 2012	12
M127	Spectrum Analyser	Rohde & Schwarz	FSEB 30	842 659/016	08 Nov 2012	12
M1273	Test Receiver	Rohde & Schwarz	ESIB 26	100275	04 Feb 2012	12
M1379	Test Receiver	Rohde & Schwarz	ESIB7	100330	20 Sep 2012	12

NB In accordance with UKAS requirements all the measurement equipment is on a calibration schedule.