TEST REPORT
FROM
RFI GLOBAL SERVICES LTD

Test of: Panasonic EB-3901

FCC ID: UCE211048A

To: FCC Part 15.247: 2011 Subpart C

Test Report Serial No.:
RFI-RPT-RP85011JD01G

This Test Report Is Issued Under The Authority Of Chris Guy, Head of Global Approvals:	
Checked By:	Ian Watch
Signature:	
Date of Issue:	27 January 2012

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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:	05 January 2012 to 18 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

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:	Panasonic
Model Name or Number:	EB-3901
IMEI:	004401221200252 *(Radiated sample 1)* 004401221200245 *(Radiated sample 2)* 004401221200260 *(Radiated sample 3)* 004401221200021 *(Conducted RF port sample 1)*
Hardware Version Number:	Rev C
Software Version Number:	ACPU: eu-07-0181 CCPU: R1B_1_EC02_01_E02
FCC ID:	UCE211048A

Brand Name:	Panasonic
Description:	AC Charger
Model Name or Number:	VSK0775

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

Brand Name:	Panasonic
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*, 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:	21.3 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, middle 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 004401221200021 was used for maximum output power, occupied bandwidth and power spectral density tests.
- The radiated sample with IMEI 004401221200252 was used for transmitter band edge, idle mode radiated spurious emissions and transmitter radiated spurious emissions > 1 GHz tests.
- The radiated sample with IMEI 004401221200260 was used for AC conducted emissions tests.
- The radiated sample with IMEI 004401221200245 was used for the transmitter radiated spurious emissions < 1 GHz test.

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:	Sarah Williams	**Test Date:**	16 January 2012
Test Sample IMEI:	004401221200260		

FCC Part:	15.107(a)
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
2.067	Live	34.5	56.0	21.5	Complied
2.792	Live	35.6	56.0	20.4	Complied
3.588	Live	34.5	56.0	21.5	Complied
8.826	Live	37.4	60.0	22.6	Complied
9.119	Live	37.9	60.0	22.1	Complied
9.915	Live	38.1	60.0	21.9	Complied

Results: Live / Average

Frequency (MHz)	Line	Level (dBμV)	Limit (dBμV)	Margin (dB)	Result
0.407	Live	28.2	47.7	19.5	Complied
0.461	Live	26.2	46.7	20.5	Complied
2.094	Live	25.9	46.0	20.1	Complied
3.147	Live	25.9	46.0	20.1	Complied
3.921	Live	25.2	46.0	20.8	Complied
8.781	Live	28.4	50.0	21.6	Complied

Receiver/Idle Mode AC Conducted Spurious Emissions (continued)

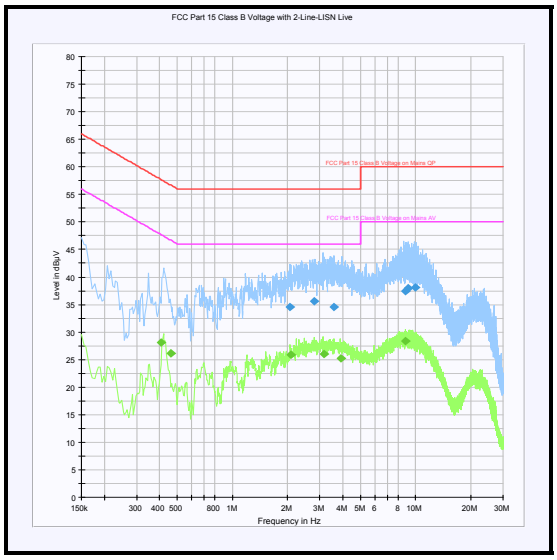
Results: Neutral / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.420	Neutral	30.5	57.4	26.9	Complied
2.153	Neutral	25.8	56.0	30.2	Complied
2.945	Neutral	27.4	56.0	28.6	Complied
7.238	Neutral	32.6	60.0	27.4	Complied
7.737	Neutral	32.2	60.0	27.8	Complied
8.453	Neutral	32.9	60.0	27.1	Complied

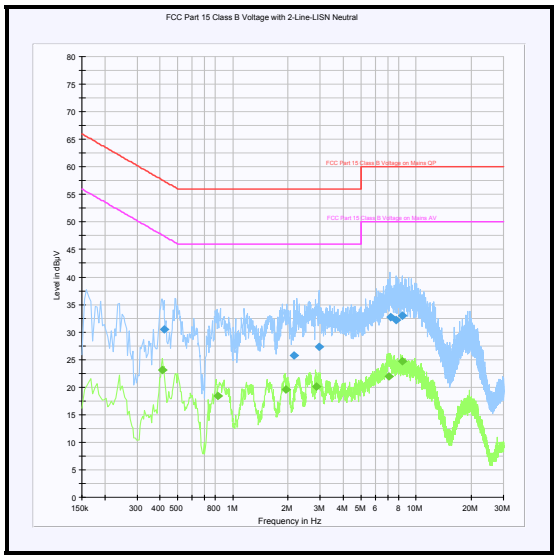
Results: Neutral / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.411	Neutral	23.1	47.6	24.5	Complied
0.830	Neutral	18.4	46.0	27.6	Complied
1.950	Neutral	19.6	46.0	26.4	Complied
2.850	Neutral	20.1	46.0	25.9	Complied
7.121	Neutral	21.9	50.0	28.1	Complied
8.376	Neutral	24.7	50.0	25.3	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:**	16 January 2012
Test Sample Serial No:	004401221200252		

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):	25
Relative Humidity (%):	28

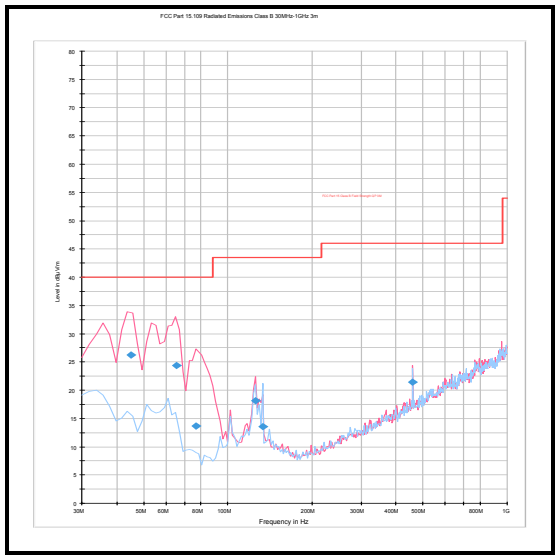
Results: Quasi Peak

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
44.843	Vertical	26.2	40.0	13.8	Complied
65.523	Vertical	24.4	40.0	15.6	Complied
76.802	Vertical	13.7	40.0	26.3	Complied
125.264	Vertical	18.1	43.5	25.4	Complied
133.223	Horizontal	13.5	43.5	30.0	Complied
458.777	Vertical	21.4	46.0	24.6	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:	Mark Percival	**Test Date:**	05 January 2012
Test Sample IMEI:	004401221200252		

FCC Part:	15.109
Test Method Used:	As detailed in ANSI C63.4 Section 8
Frequency Range:	1 GHz to 12.75 GHz

Environmental Conditions:

Temperature (°C):	21
Relative Humidity (%):	35

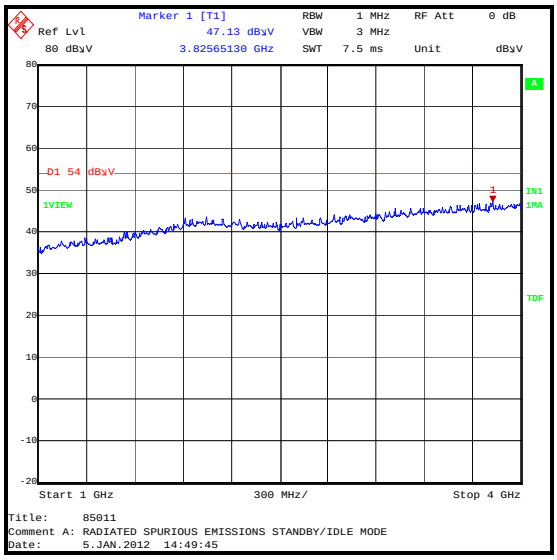
Results:

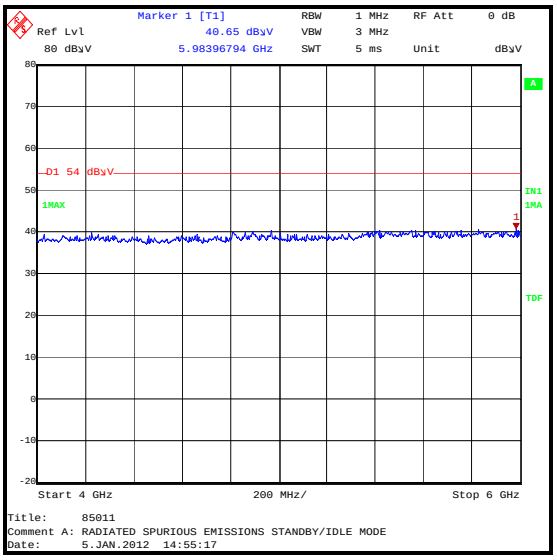
Frequency (MHz)	Antenna Polarity	Peak Level (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
3825.651	Horizontal	47.1	54.0	6.9	Complied

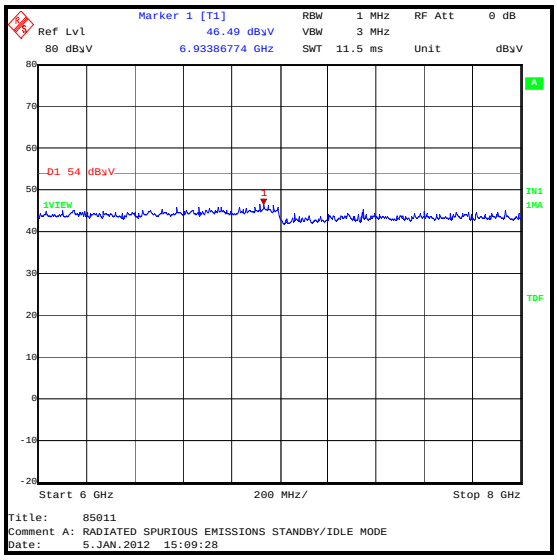
Note(s):

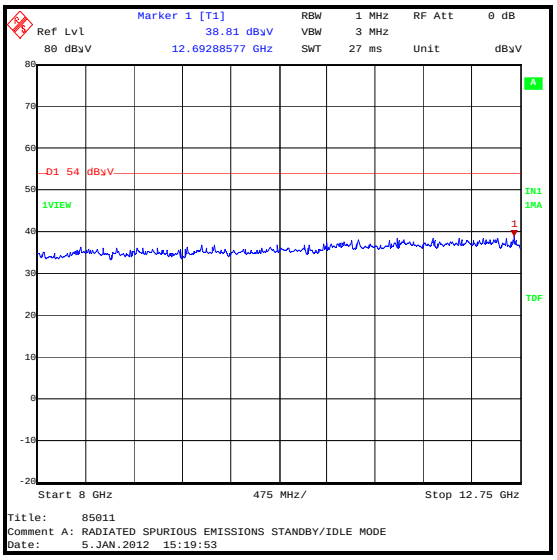
1. The final measured value, for the given emission, in the table above incorporates the calibrated antenna factor and cable loss.
2. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded 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:	Sarah Williams	**Test Date:**	16 January 2012
Test Sample IMEI:	004401221200260		

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
0.488	Live	28.9	56.2	27.3	Complied
3.066	Live	29.5	56.0	26.5	Complied
7.593	Live	34.2	60.0	25.8	Complied
9.092	Live	35.2	60.0	24.8	Complied
9.744	Live	34.5	60.0	25.5	Complied
10.167	Live	34.5	60.0	25.5	Complied

Results: Live / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.429	Live	18.9	47.3	28.4	Complied
0.911	Live	16.7	46.0	29.3	Complied
2.337	Live	18.0	46.0	28.0	Complied
5.798	Live	18.9	50.0	31.1	Complied
8.012	Live	22.8	50.0	27.2	Complied
9.425	Live	22.9	50.0	27.1	Complied

Transmitter AC Conducted Spurious Emissions (continued)

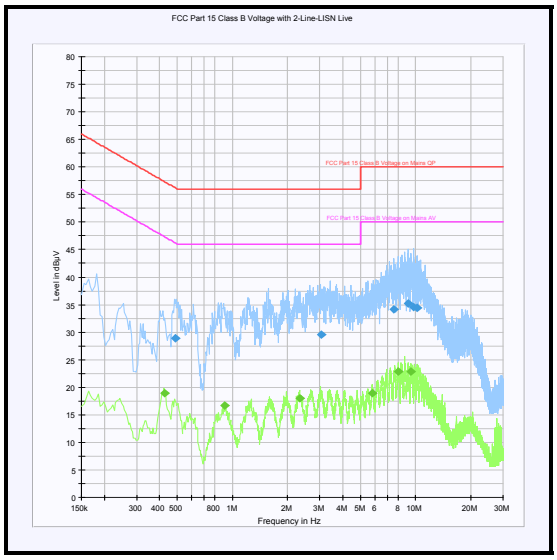
Results: Neutral / Quasi Peak

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.488	Neutral	25.4	56.2	30.8	Complied
1.923	Neutral	23.2	56.0	32.8	Complied
3.399	Neutral	23.6	56.0	32.4	Complied
7.665	Neutral	28.5	60.0	31.5	Complied
8.052	Neutral	28.0	60.0	32.0	Complied
9.173	Neutral	29.1	60.0	30.9	Complied

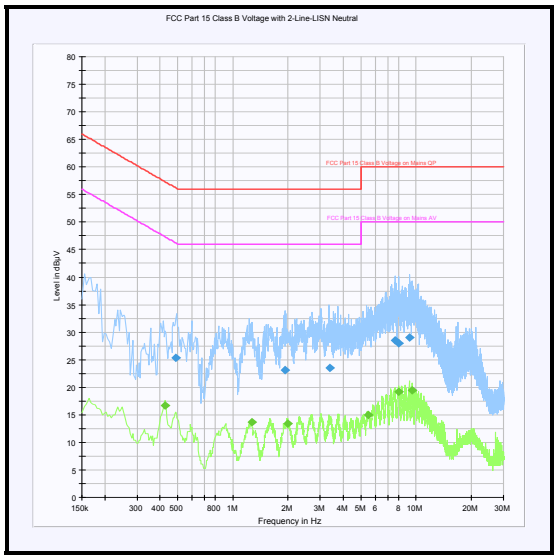
Results: Neutral / Average

Frequency (MHz)	Line	Level (dBµV)	Limit (dBµV)	Margin (dB)	Result
0.429	Neutral	16.6	47.3	30.7	Complied
1.266	Neutral	13.7	46.0	32.3	Complied
1.991	Neutral	13.4	46.0	32.6	Complied
5.496	Neutral	14.9	50.0	35.1	Complied
8.016	Neutral	19.2	50.0	30.8	Complied
9.506	Neutral	19.4	50.0	30.6	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:**	13 January 2012 & 16 January 2012
Test Sample IMEI:	004401221200021		

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

Environmental Conditions:

Temperature (°C):	24
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	9.780	≥0.5	9.280	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	10.581	≥0.5	10.081	Complied
Middle	10.421	≥0.5	9.921	Complied
Top	10.581	≥0.5	10.081	Complied

Transmitter 6 dB Bandwidth (continued)

Results: 11 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	10.902	≥0.5	10.402	Complied
Middle	10.822	≥0.5	10.322	Complied
Top	10.822	≥0.5	10.322	Complied

Results: 6 Mbps

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

Results: 12 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	16.353	≥0.5	15.853	Complied
Middle	16.353	≥0.5	15.853	Complied
Top	16.353	≥0.5	15.853	Complied

Results: 18 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	16.192	≥0.5	15.692	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	16.683	≥0.5	16.183	Complied

Transmitter 6 dB Bandwidth (continued)

Results: 36 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: 48 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: 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	17.315	≥0.5	16.815	Complied
Middle	17.315	≥0.5	16.815	Complied
Top	17.315	≥0.5	16.815	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	17.315	≥0.5	16.815	Complied

Results: 19.5 Mbps

Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.475	≥0.5	16.975	Complied
Middle	17.715	≥0.5	17.215	Complied
Top	17.635	≥0.5	17.135	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	17.074	≥0.5	16.574	Complied
Middle	17.315	≥0.5	16.815	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	17.475	≥0.5	16.975	Complied
Middle	17.475	≥0.5	16.975	Complied
Top	17.475	≥0.5	16.975	Complied

Results: 21.7 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	17.475	≥0.5	16.975	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	18.036	≥0.5	17.536	Complied

Results: 43.3 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: 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	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

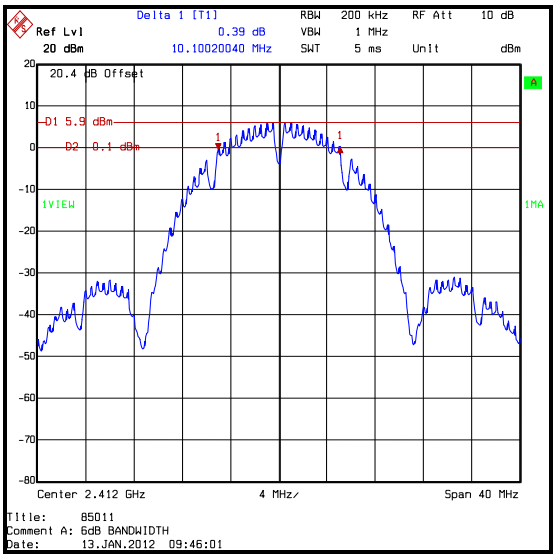
Transmitter 6 dB Bandwidth (continued)

Results: 72.2 Mbps

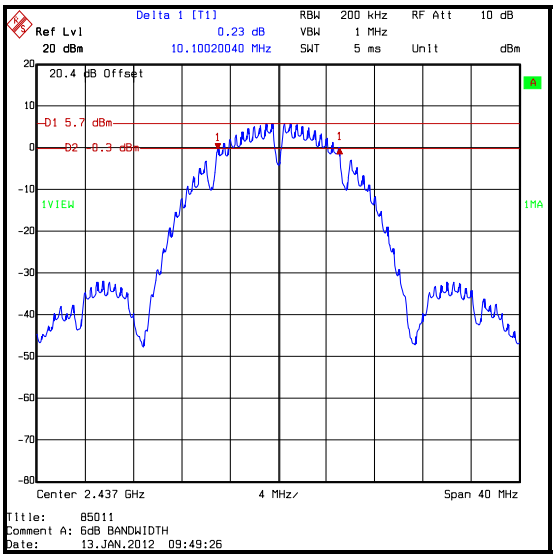
Channel	6 dB Bandwidth (MHz)	Limit (MHz)	Margin (MHz)	Result
Bottom	17.956	≥0.5	17.456	Complied
Middle	17.956	≥0.5	17.456	Complied
Top	18.036	≥0.5	17.536	Complied

Transmitter 6 dB Bandwidth (continued)

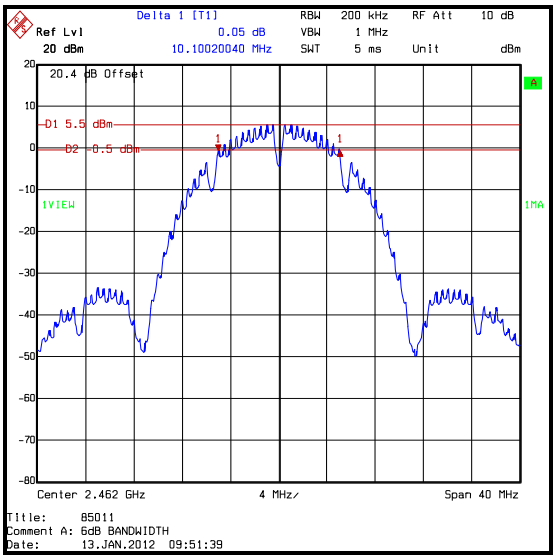
Results: 1 Mbps



Bottom channel



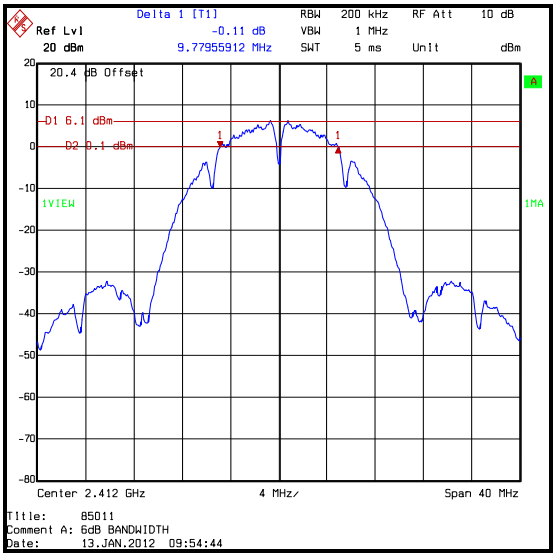
Middle channel



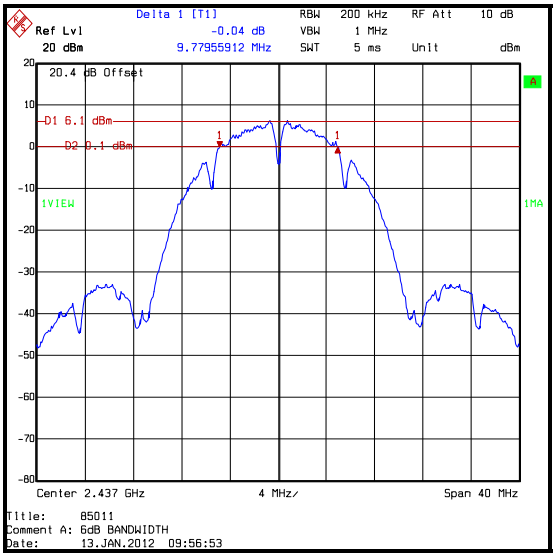
Top channel

Transmitter 6 dB Bandwidth (continued)

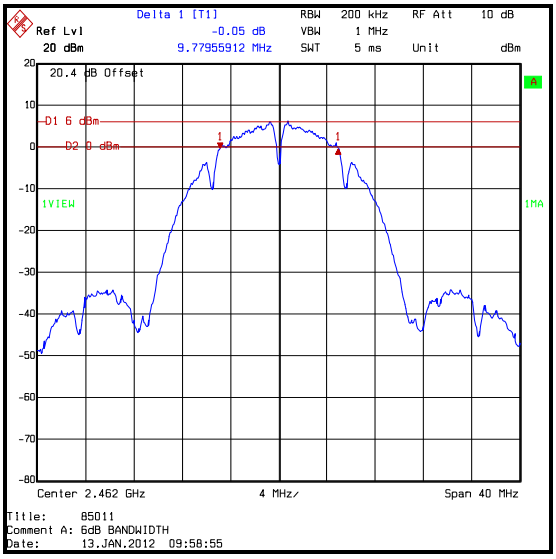
Results: 2 Mbps



Bottom channel



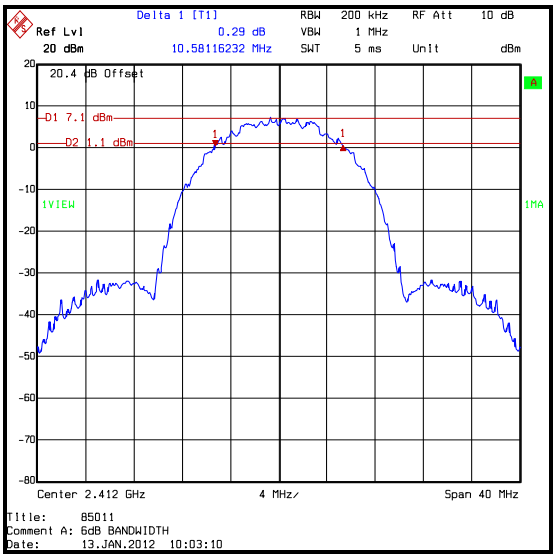
Middle channel



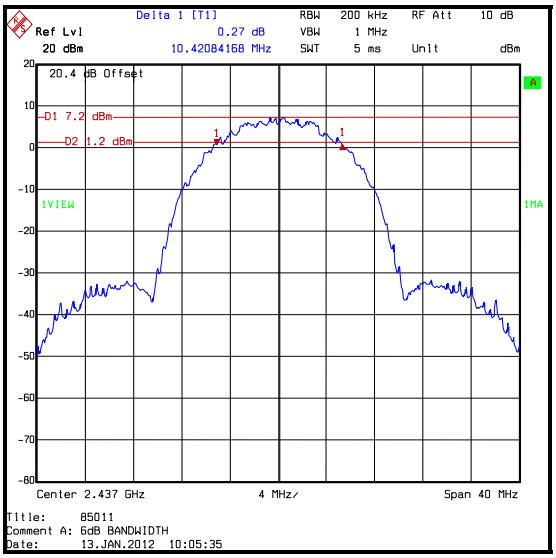
Top channel

Transmitter 6 dB Bandwidth (continued)

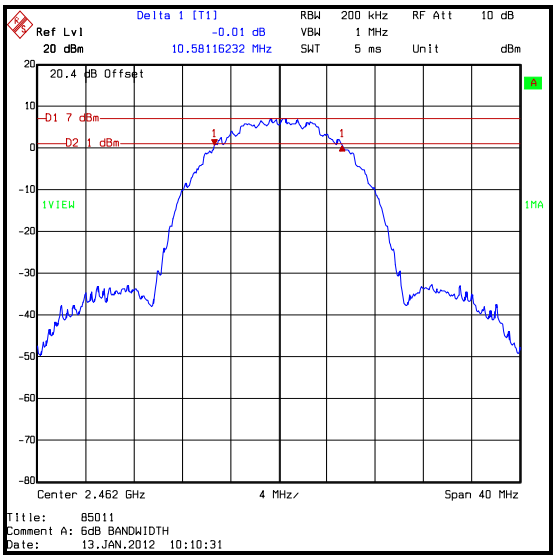
Results: 5.5 Mbps



Bottom channel



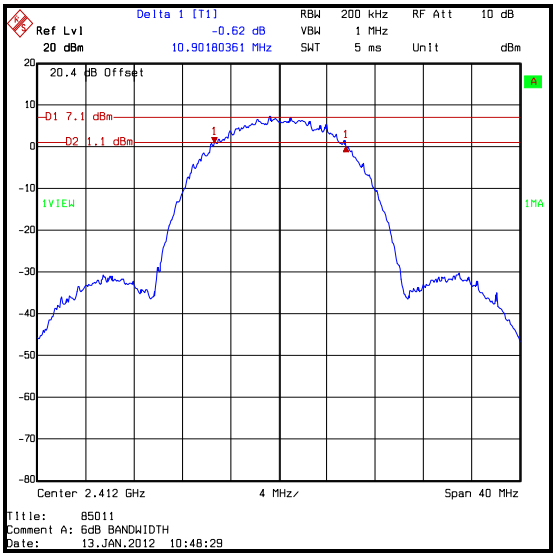
Middle channel



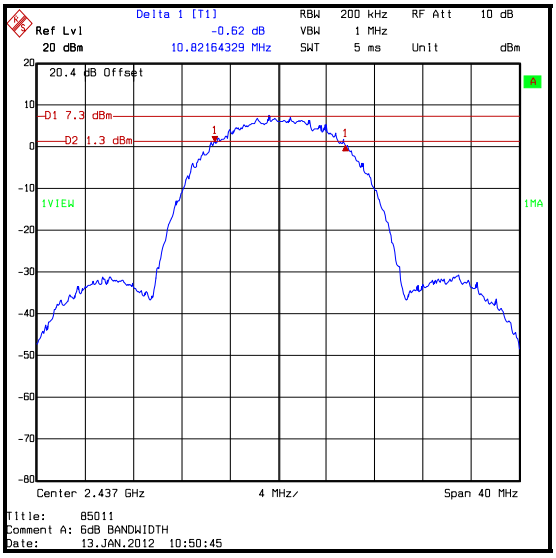
Top channel

Transmitter 6 dB Bandwidth (continued)

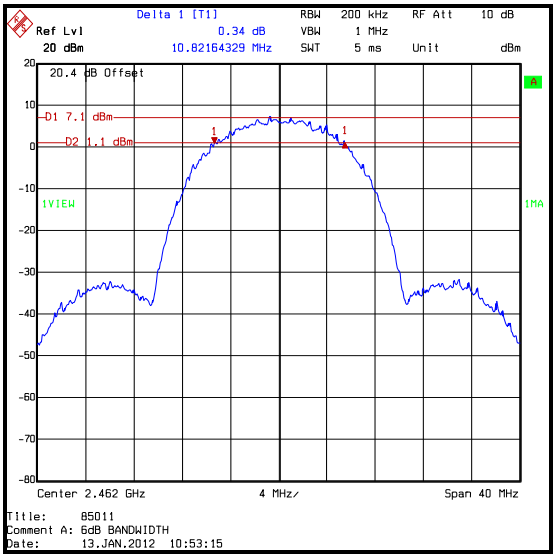
Results: 11 Mbps



Bottom channel



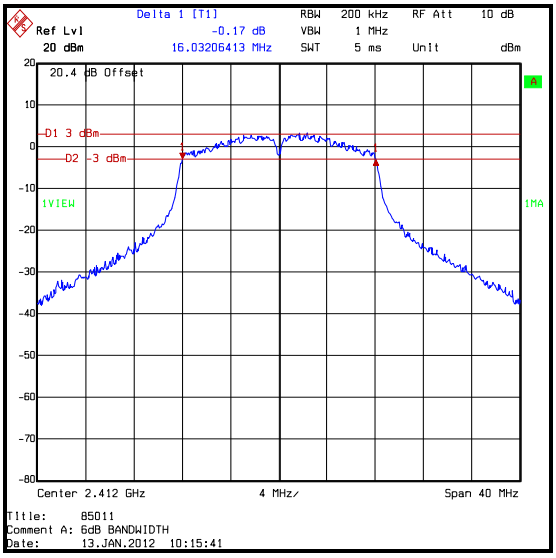
Middle channel



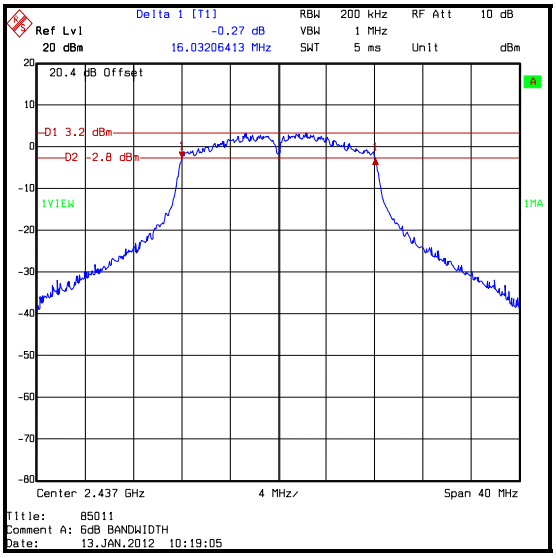
Top channel

Transmitter 6 dB Bandwidth (continued)

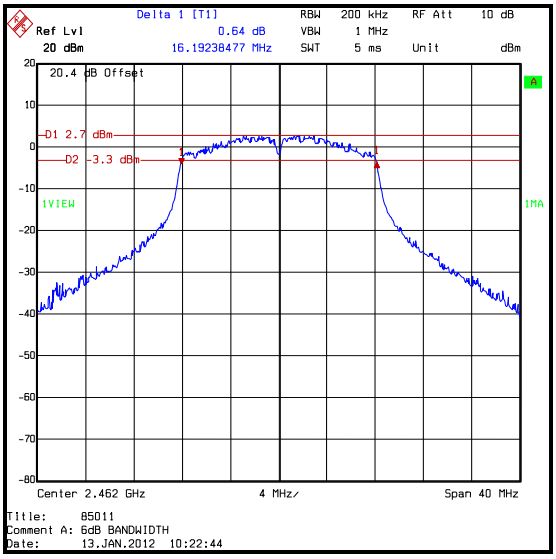
Results: 6 Mbps



Bottom channel



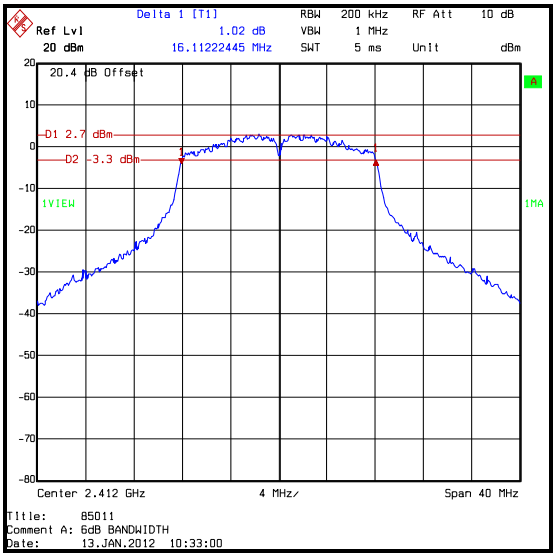
Middle channel



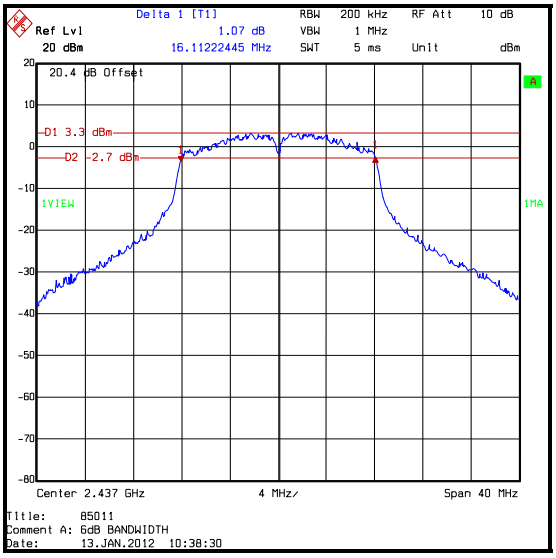
Top channel

Transmitter 6 dB Bandwidth (continued)

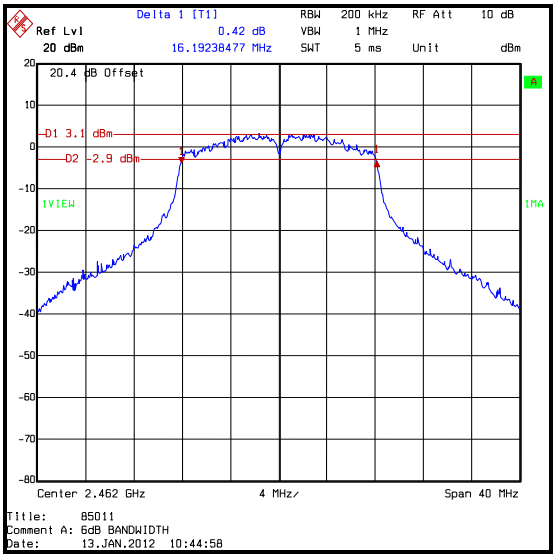
Results: 9 Mbps



Bottom channel



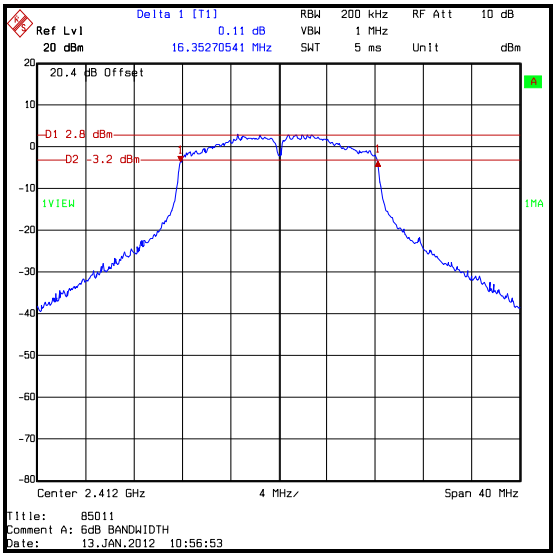
Middle channel



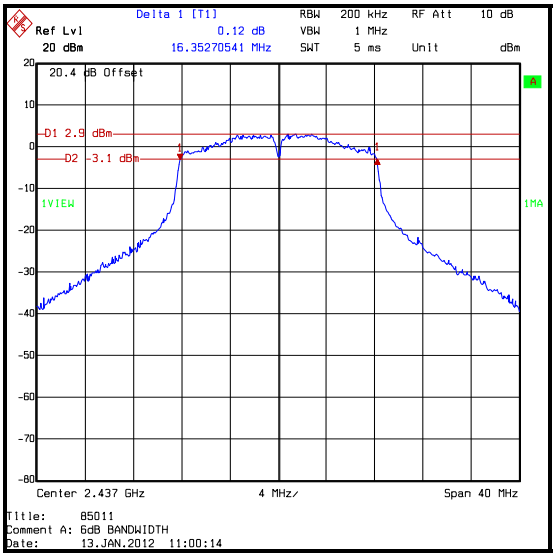
Top channel

Transmitter 6 dB Bandwidth (continued)

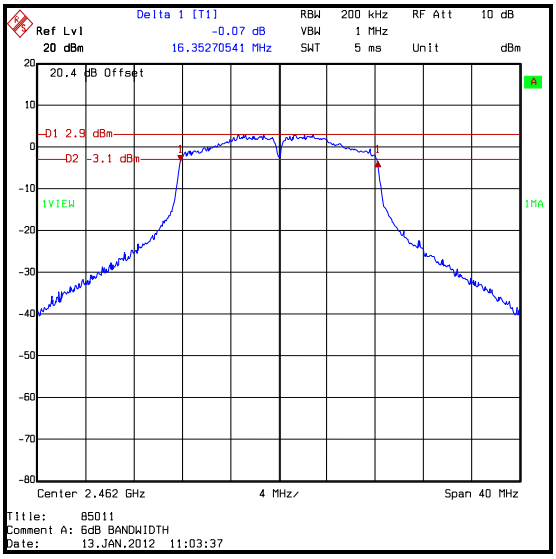
Results: 12 Mbps



Bottom channel



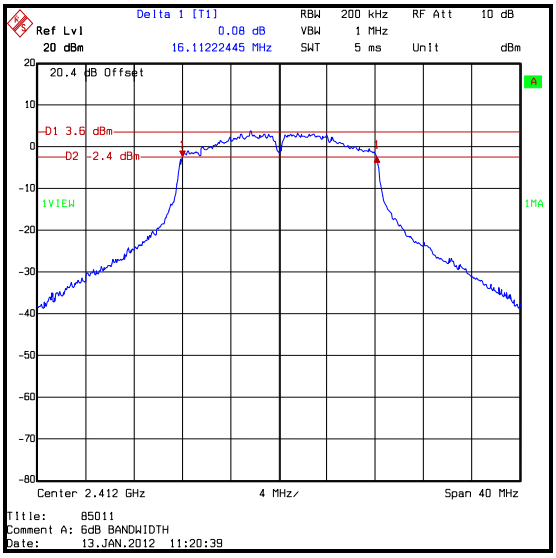
Middle channel



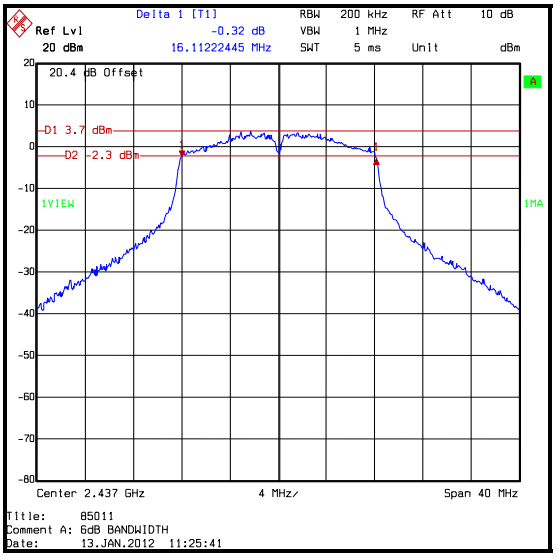
Top channel

Transmitter 6 dB Bandwidth (continued)

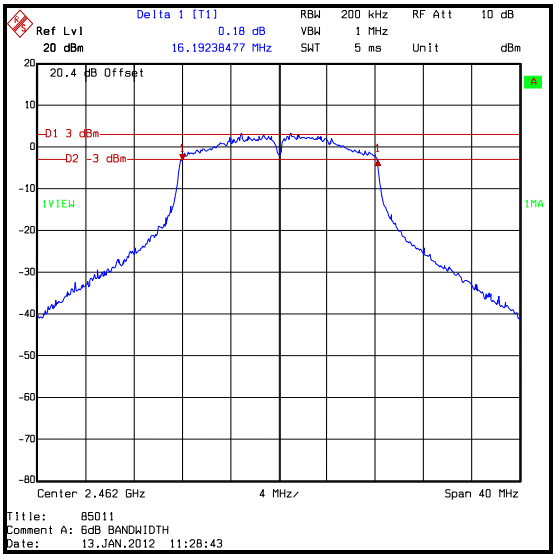
Results: 18 Mbps



Bottom channel



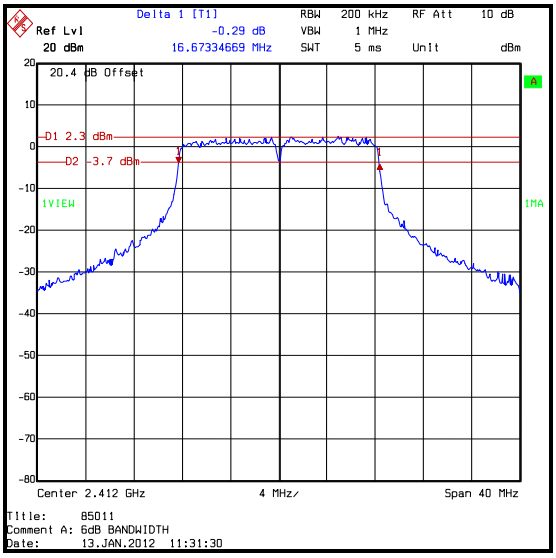
Middle channel



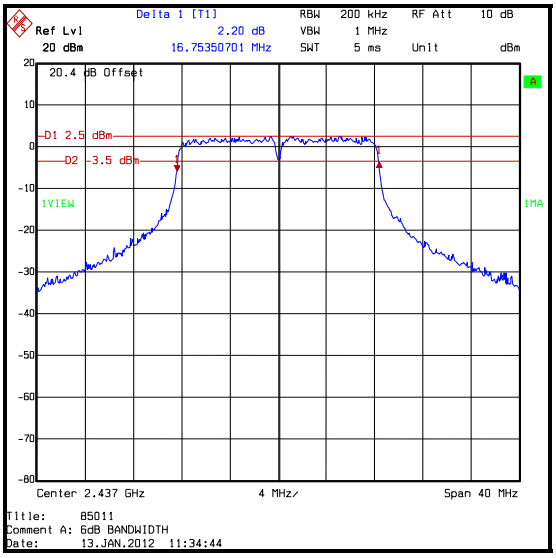
Top channel

Transmitter 6 dB Bandwidth (continued)

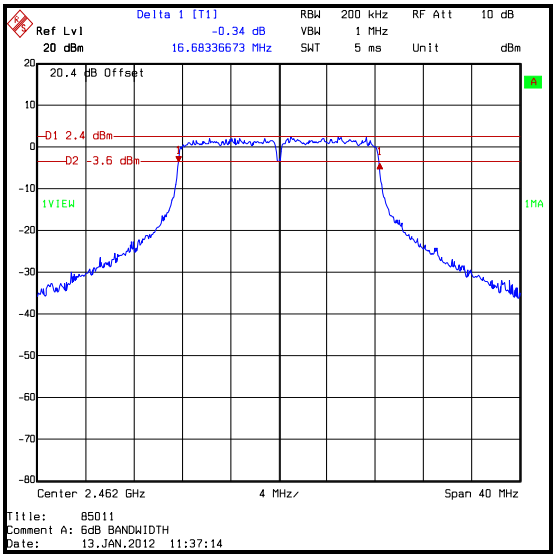
Results: 24 Mbps



Bottom channel



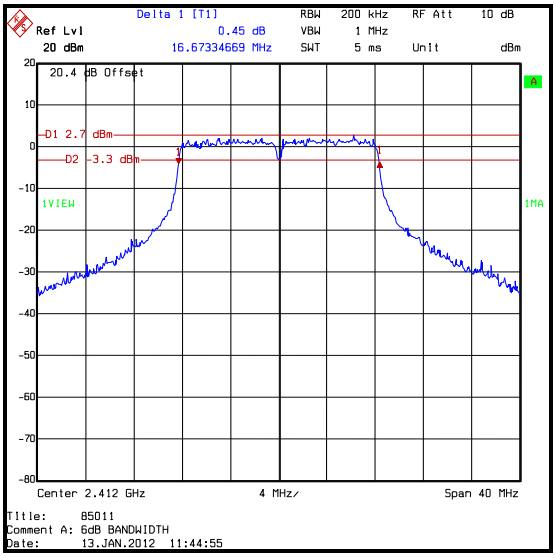
Middle channel



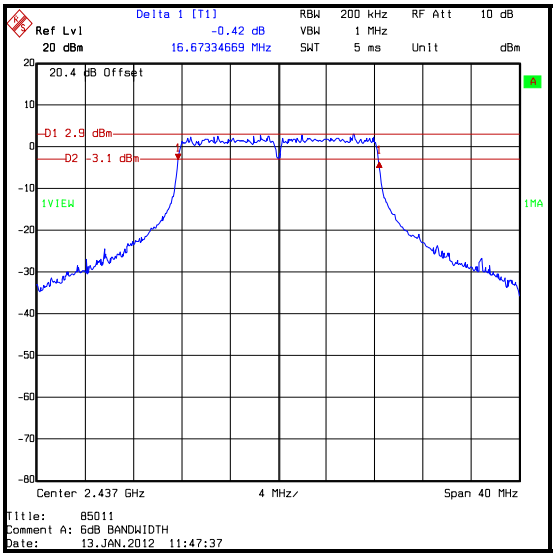
Top channel

Transmitter 6 dB Bandwidth (continued)

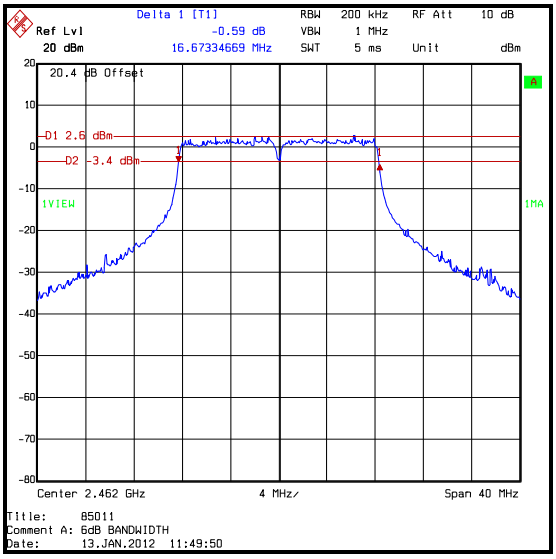
Results: 36 Mbps



Bottom channel



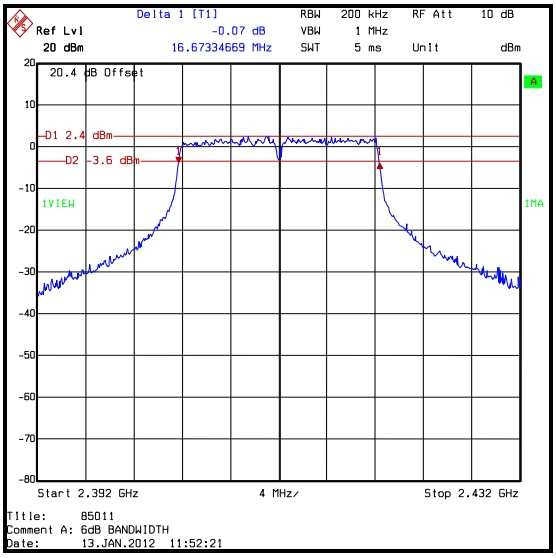
Middle channel



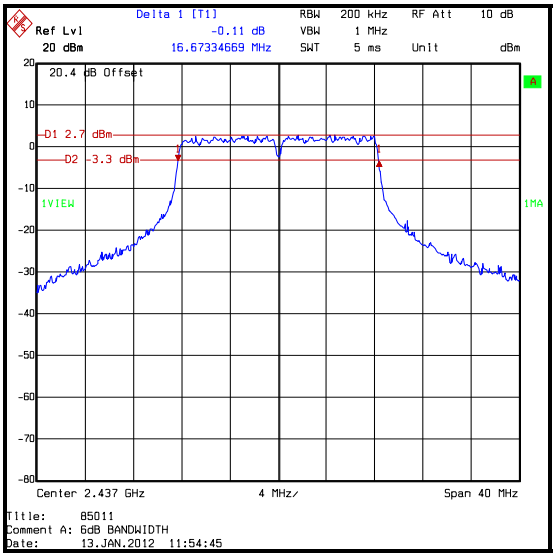
Top channel

Transmitter 6 dB Bandwidth (continued)

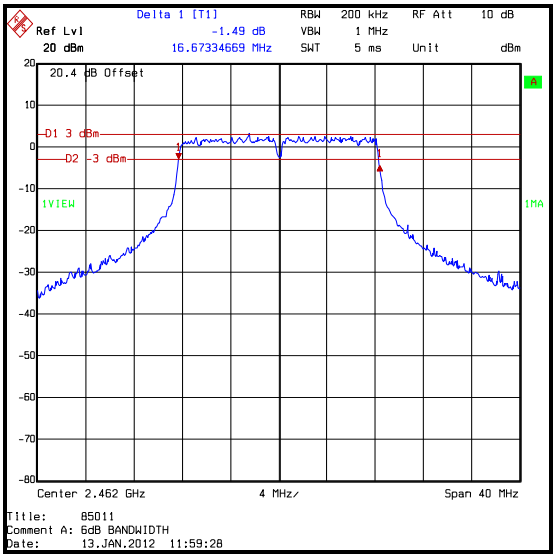
Results: 48 Mbps



Bottom channel



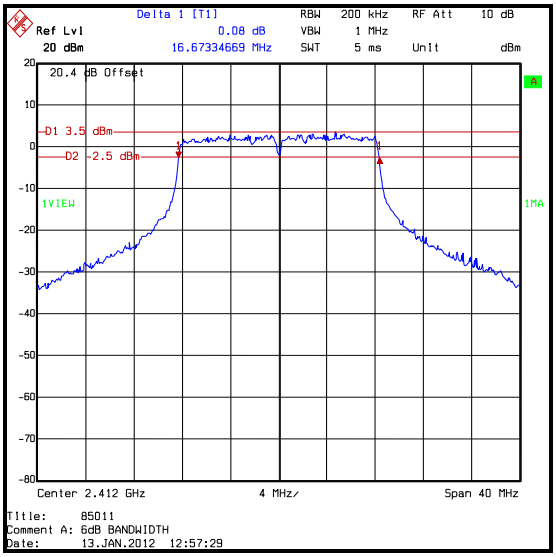
Middle channel



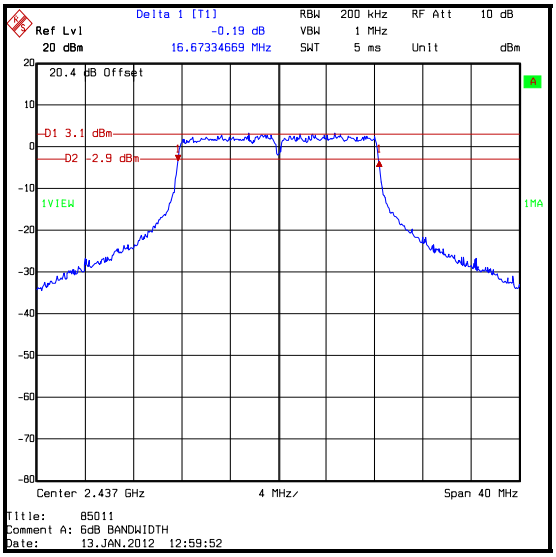
Top channel

Transmitter 6 dB Bandwidth (continued)

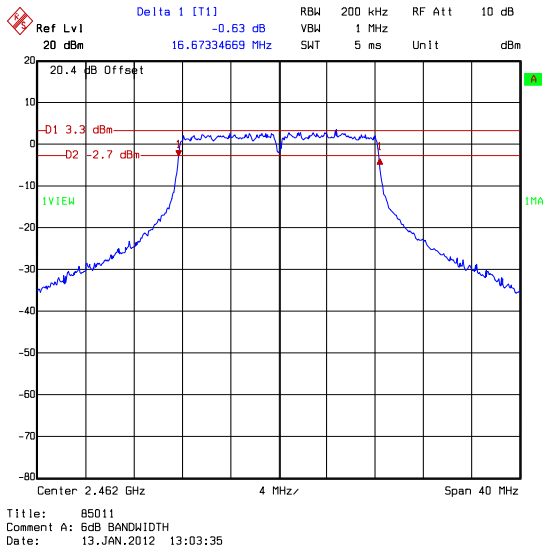
Results: 54 Mbps



Bottom channel



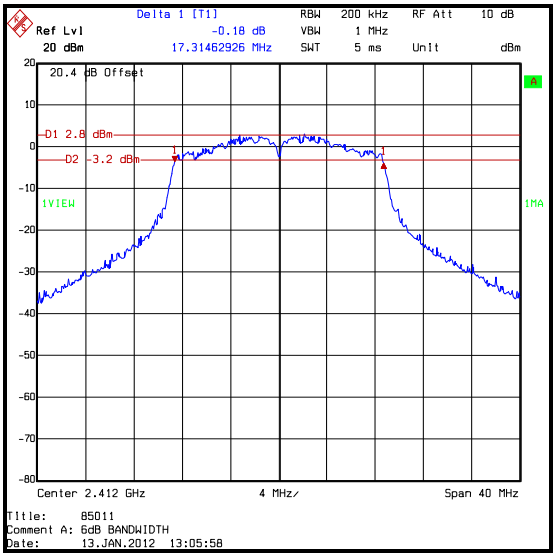
Middle channel



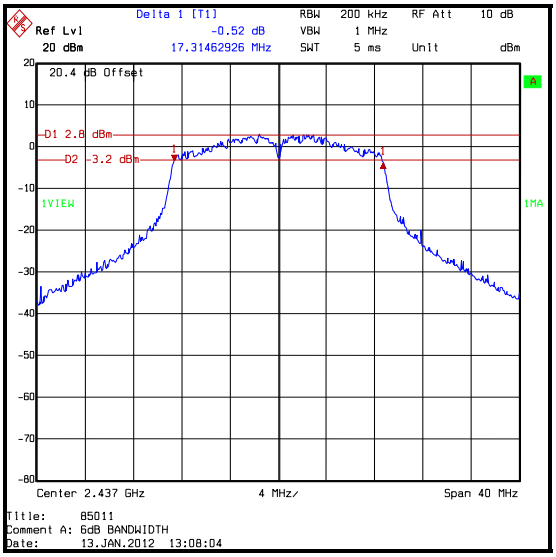
Top channel

Transmitter 6 dB Bandwidth (continued)

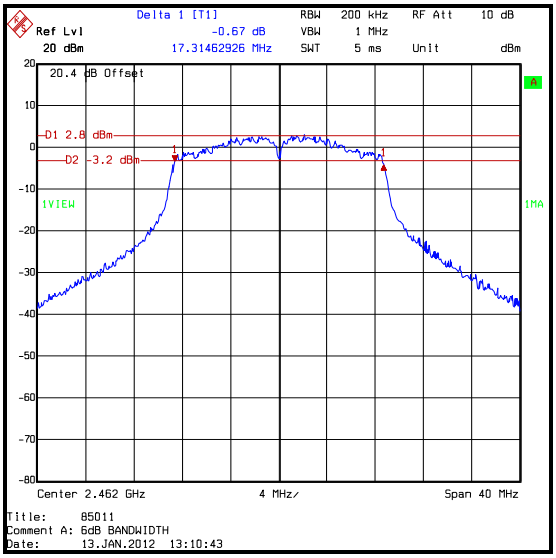
Results: 6.5 Mbps



Bottom channel



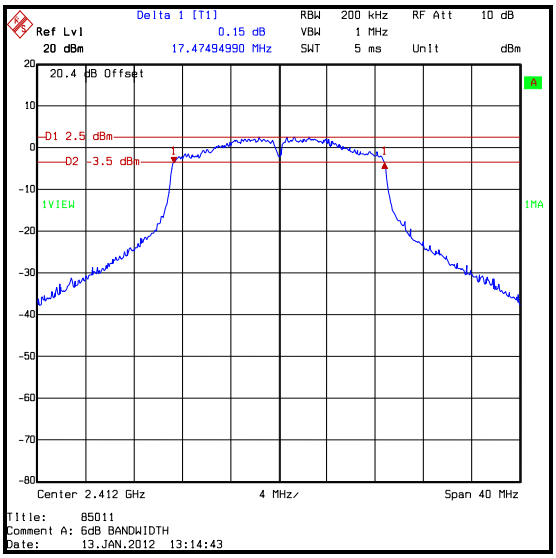
Middle channel



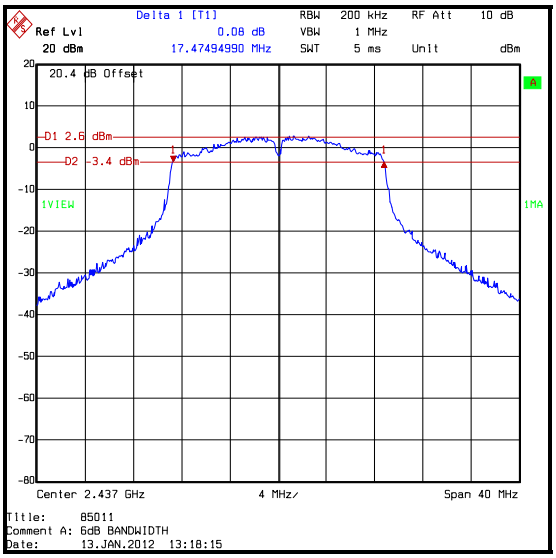
Top channel

Transmitter 6 dB Bandwidth (continued)

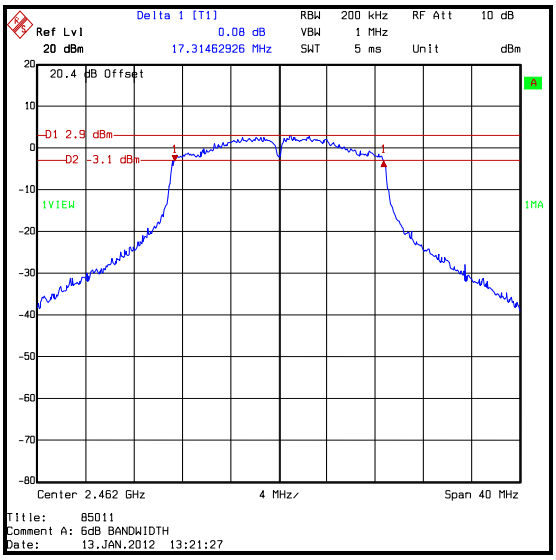
Results: 13 Mbps



Bottom channel



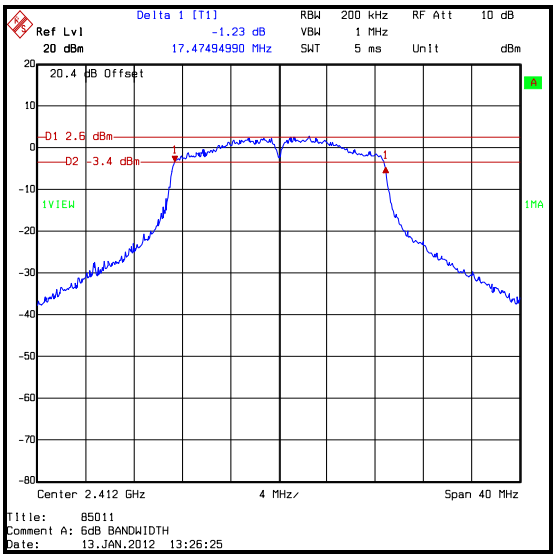
Middle channel



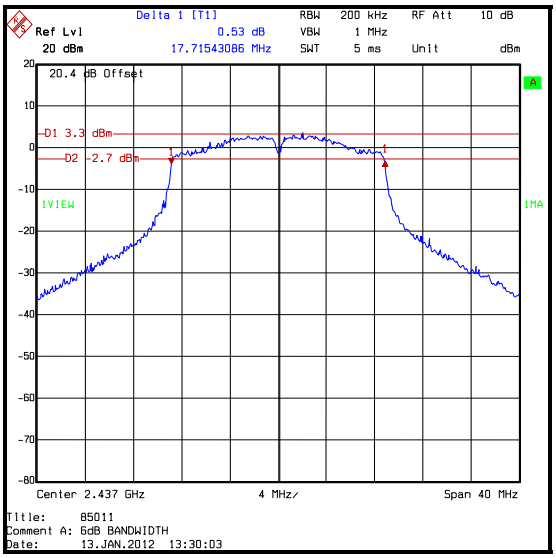
Top channel

Transmitter 6 dB Bandwidth (continued)

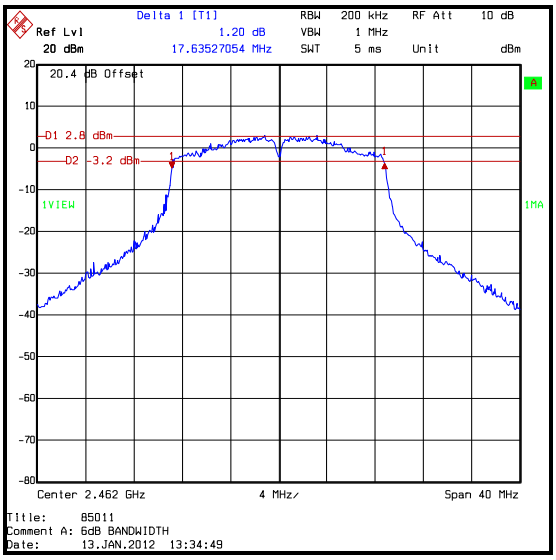
Results: 19.5 Mbps



Bottom channel



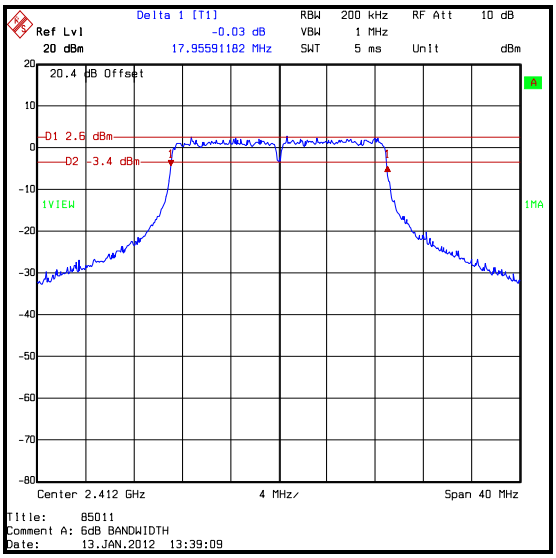
Middle channel



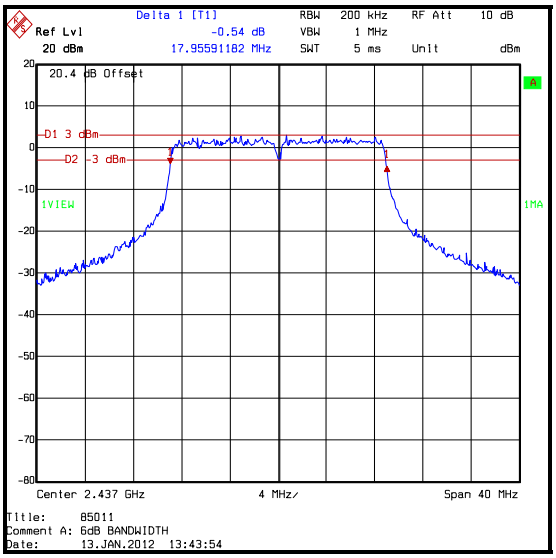
Top channel

Transmitter 6 dB Bandwidth (continued)

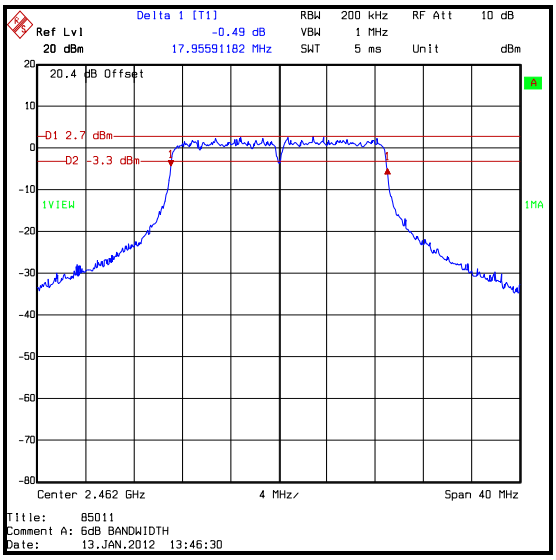
Results: 26 Mbps



Bottom channel



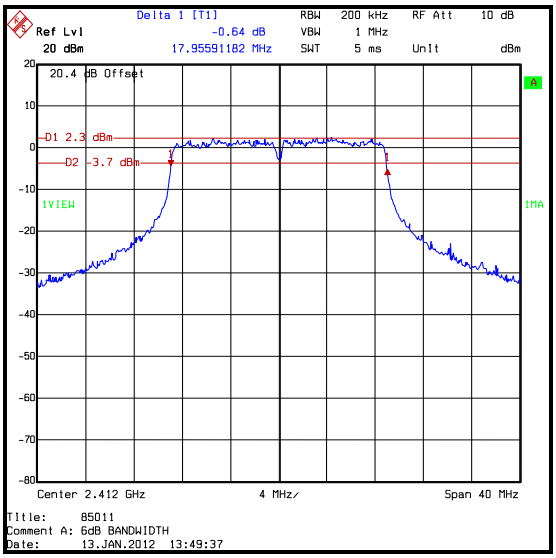
Middle channel



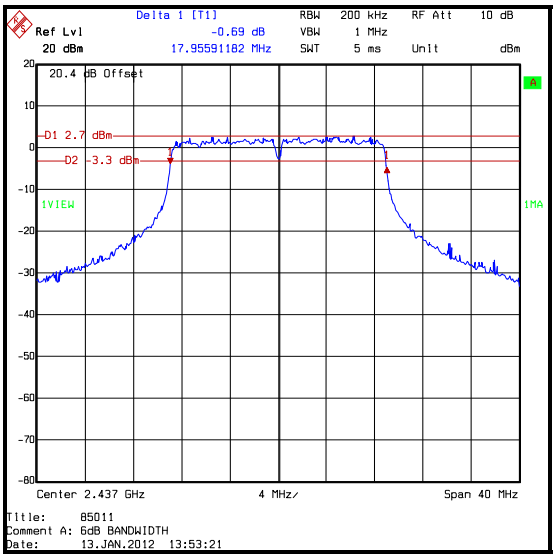
Top channel

Transmitter 6 dB Bandwidth (continued)

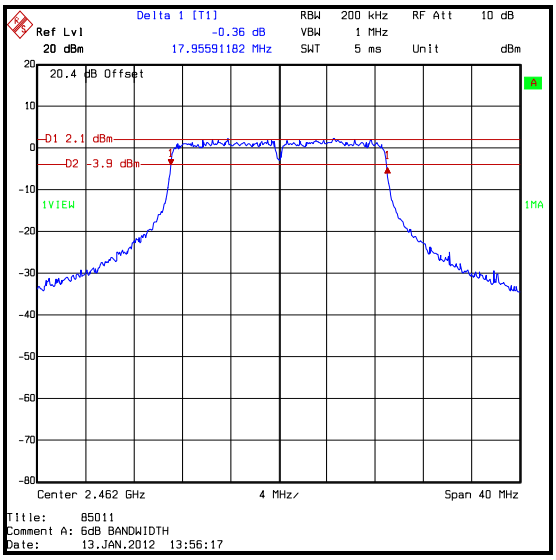
Results: 39 Mbps



Bottom channel



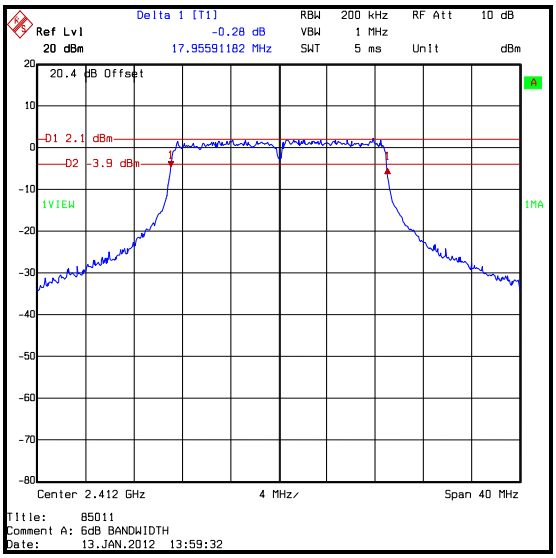
Middle channel



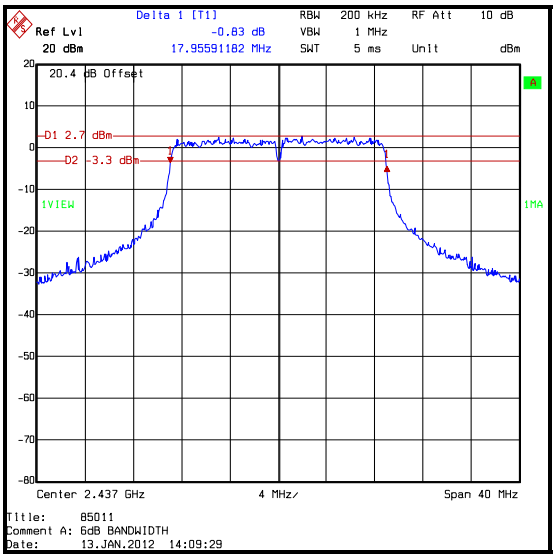
Top channel

Transmitter 6 dB Bandwidth (continued)

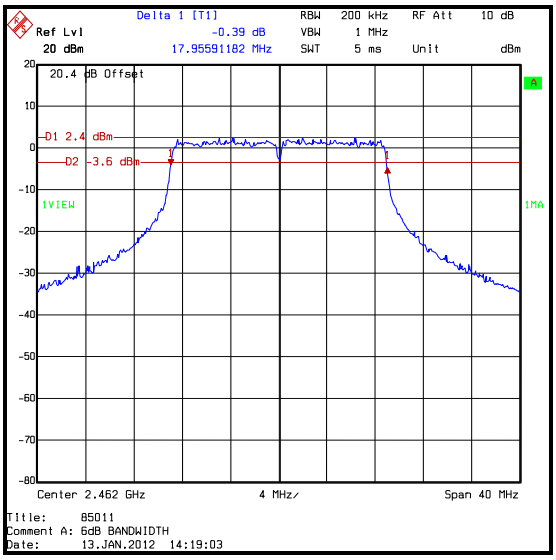
Results: 52 Mbps



Bottom channel



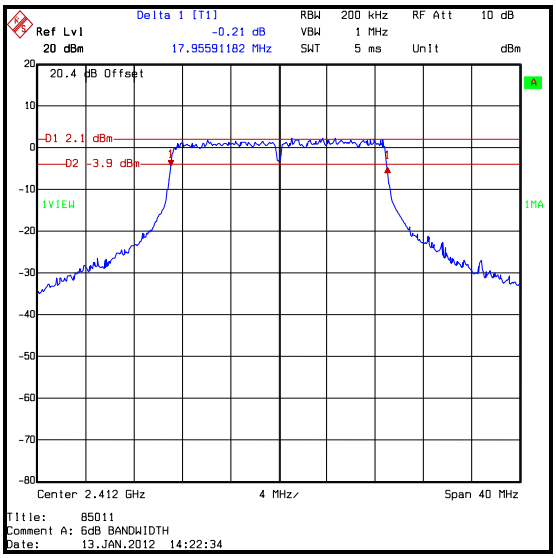
Middle channel



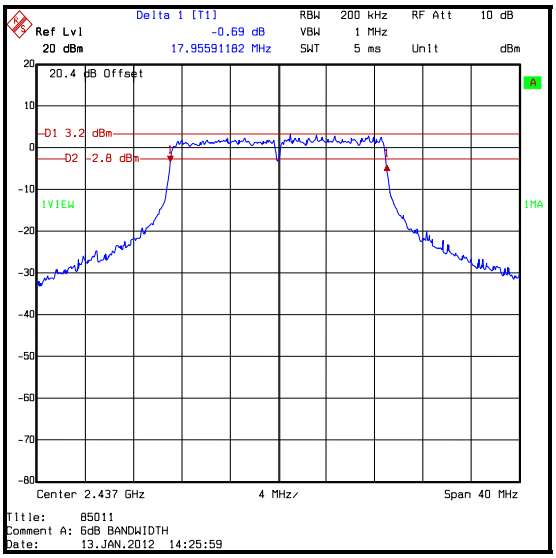
Top channel

Transmitter 6 dB Bandwidth (continued)

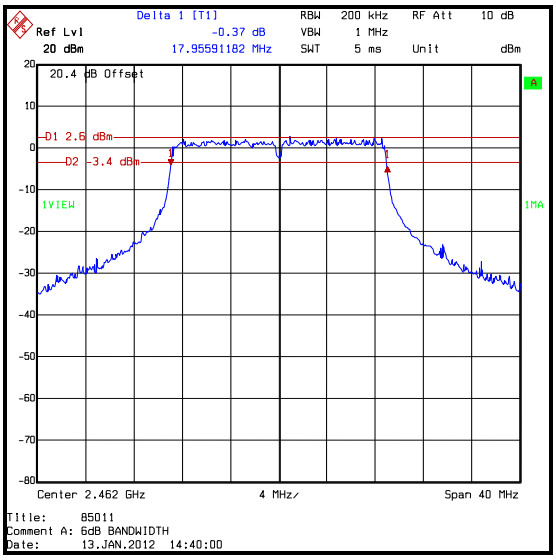
Results: 58.5 Mbps



Bottom channel



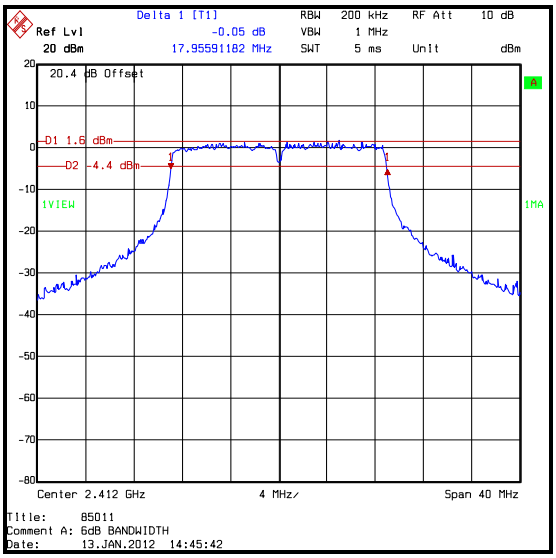
Middle channel



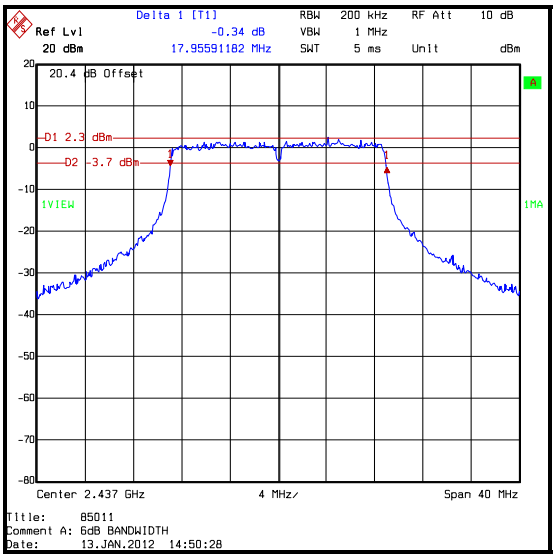
Top channel

Transmitter 6 dB Bandwidth (continued)

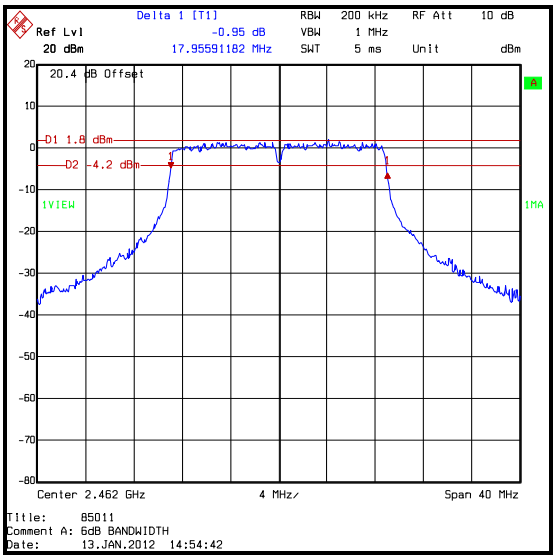
Results: 65 Mbps



Bottom channel



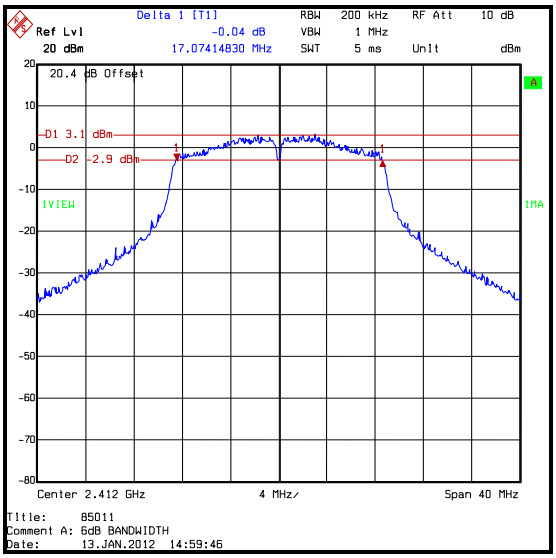
Middle channel



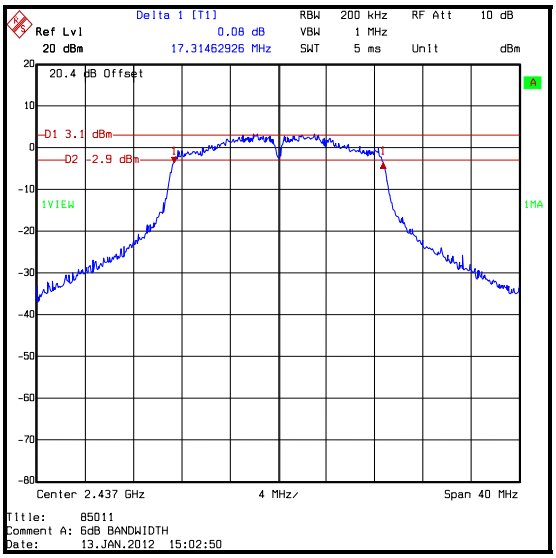
Top channel

Transmitter 6 dB Bandwidth (continued)

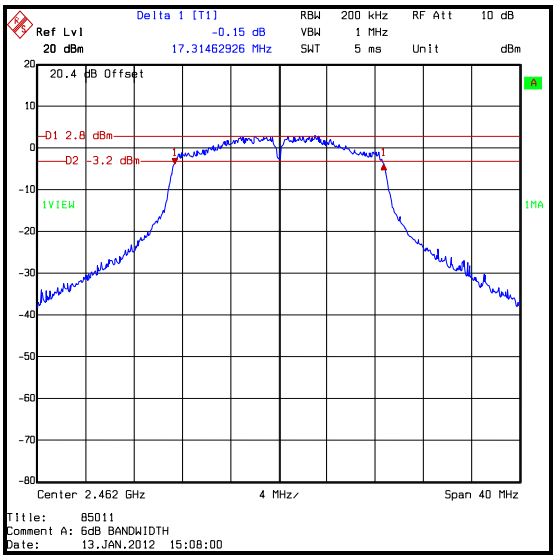
Results: 7.2 Mbps



Bottom channel



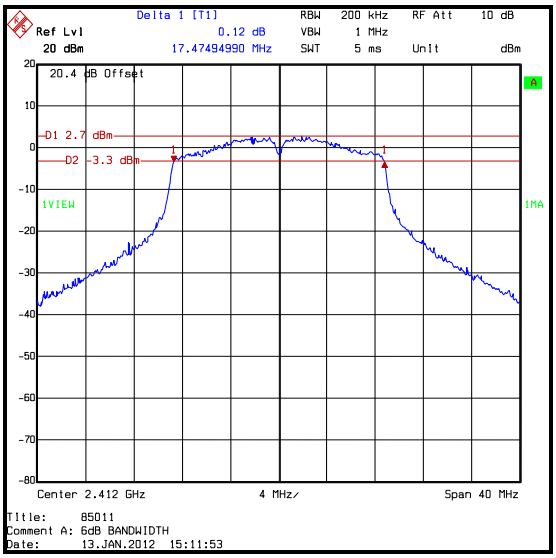
Middle channel



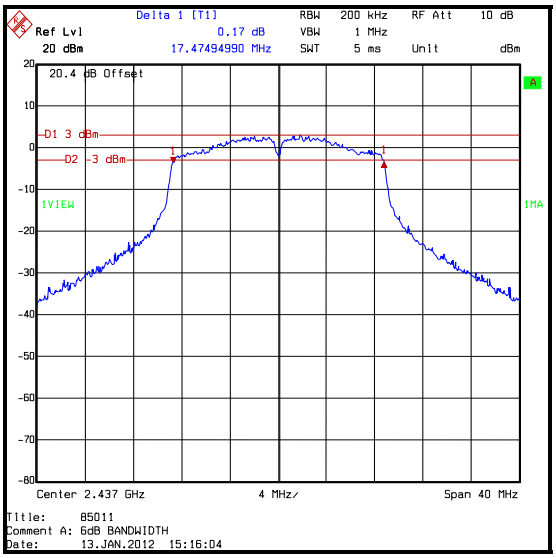
Top channel

Transmitter 6 dB Bandwidth (continued)

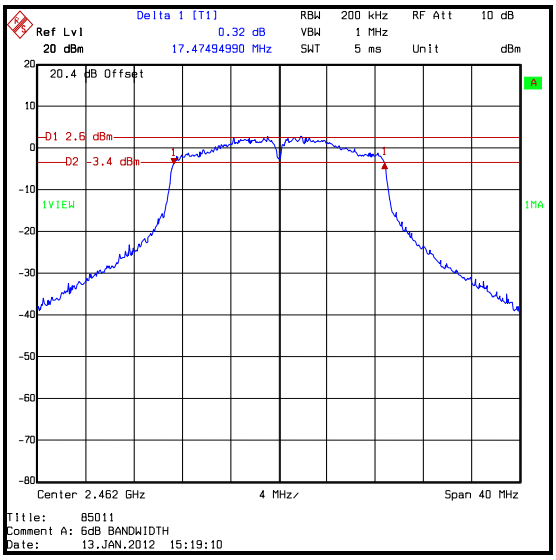
Results: 14.4 Mbps



Bottom channel



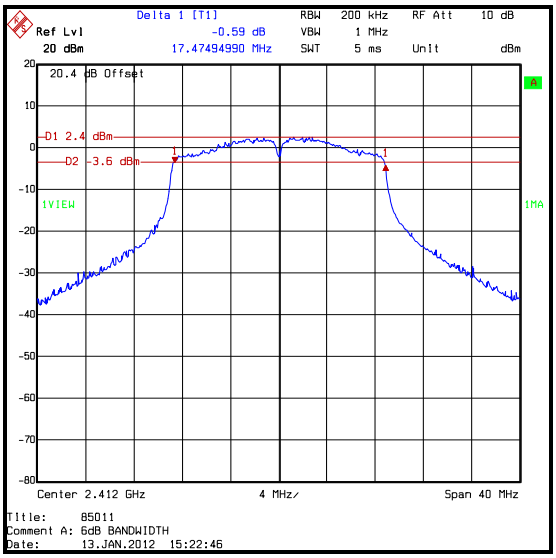
Middle channel



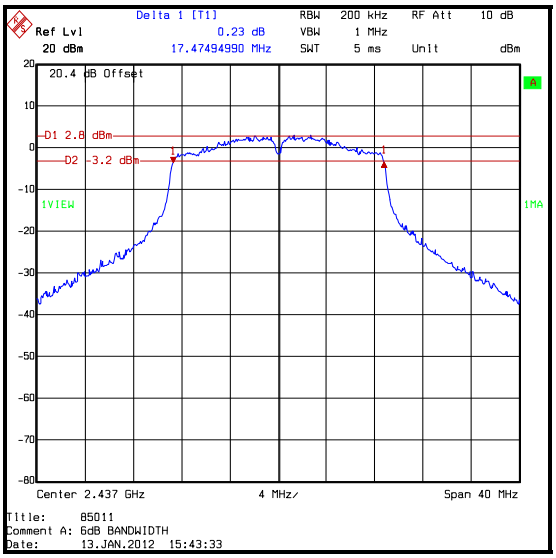
Top channel

Transmitter 6 dB Bandwidth (continued)

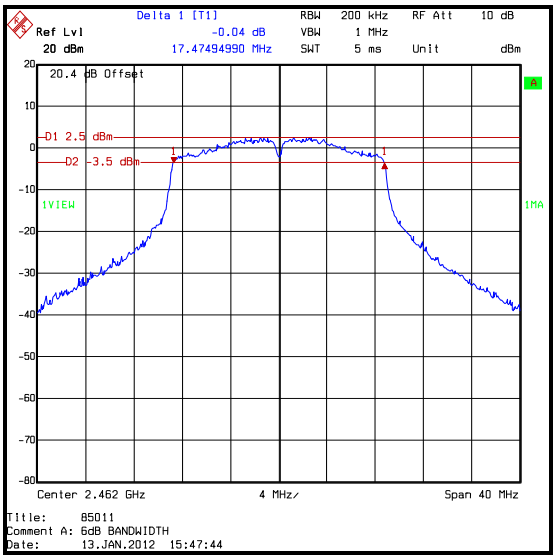
Results: 21.7 Mbps



Bottom channel



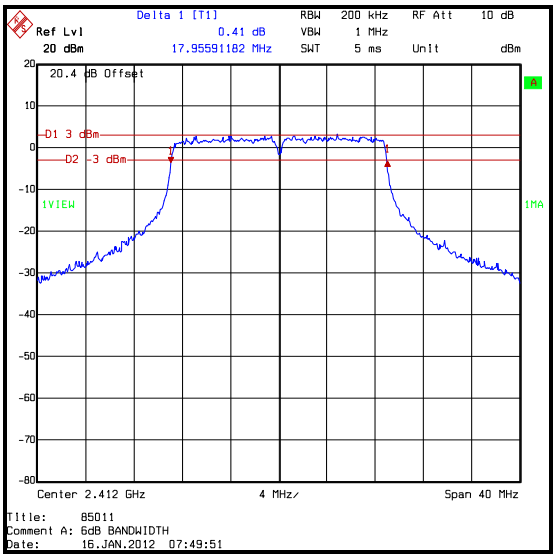
Middle channel



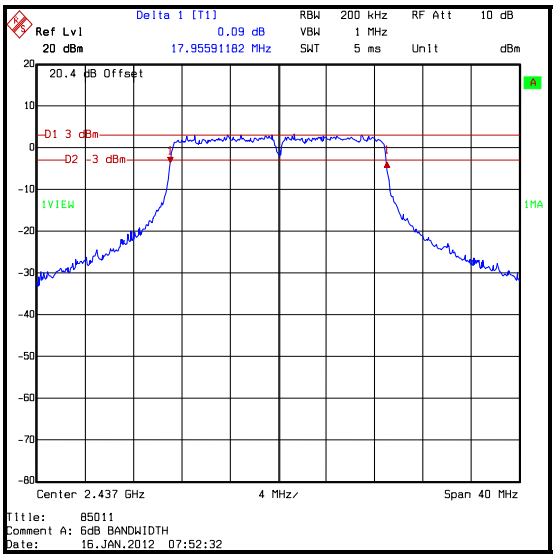
Top channel

Transmitter 6 dB Bandwidth (continued)

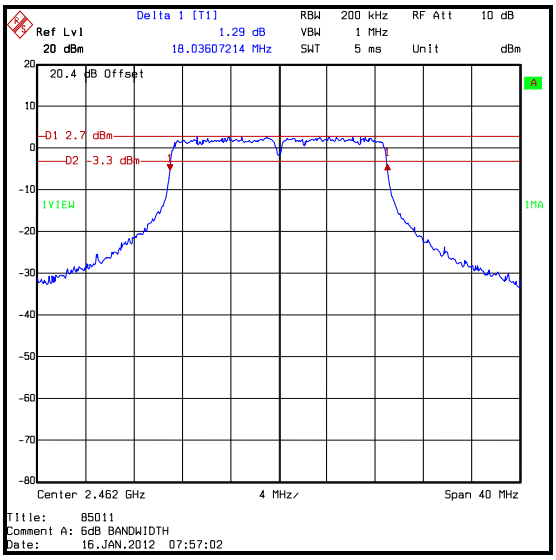
Results: 28.9 Mbps



Bottom channel



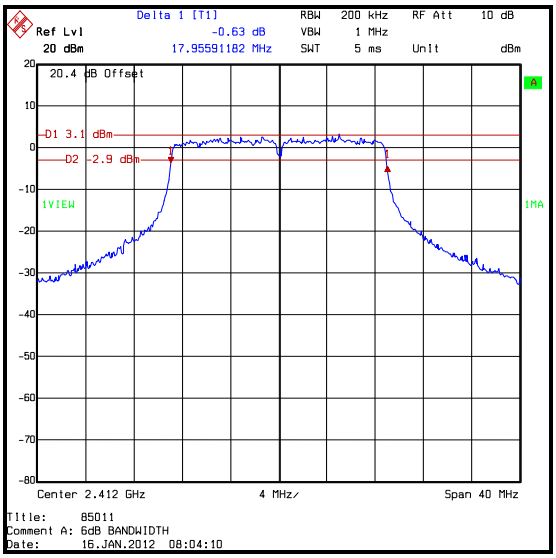
Middle channel



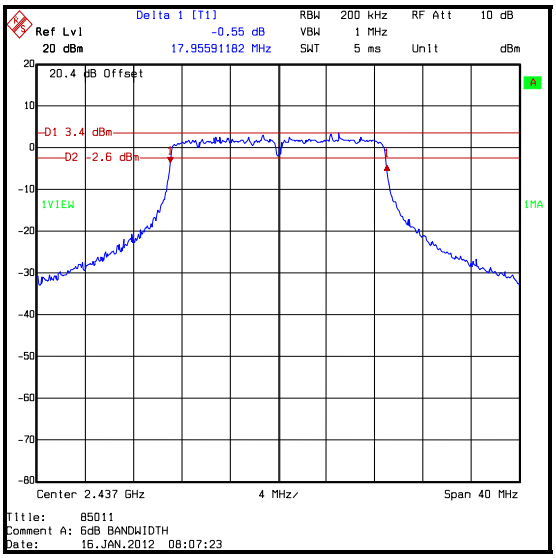
Top channel

Transmitter 6 dB Bandwidth (continued)

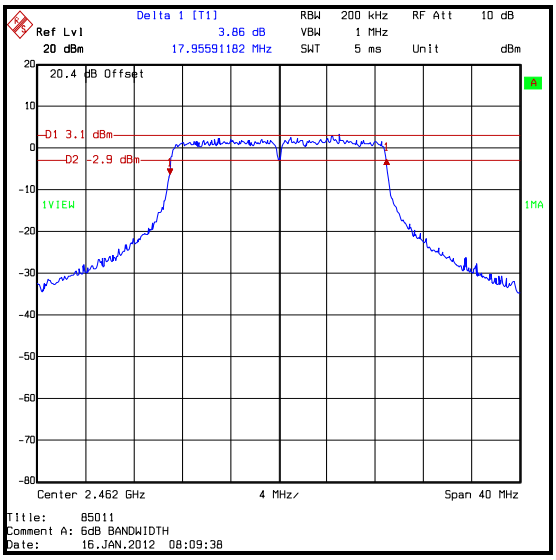
Results: 43.3 Mbps



Bottom channel



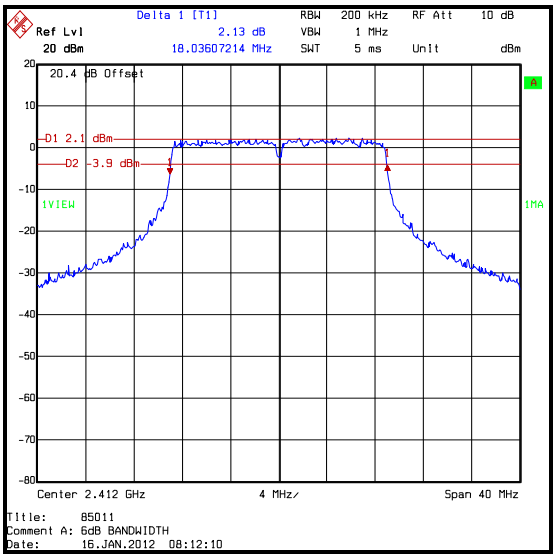
Middle channel



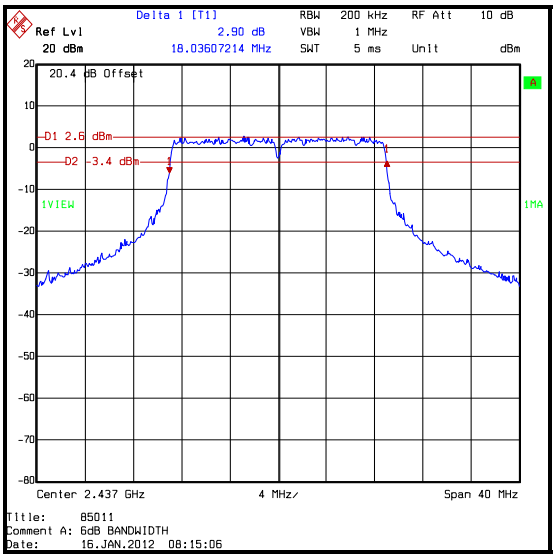
Top channel

Transmitter 6 dB Bandwidth (continued)

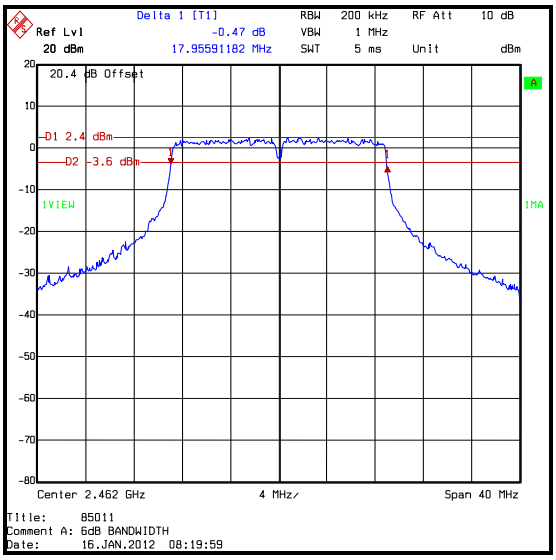
Results: 57.8 Mbps



Bottom channel



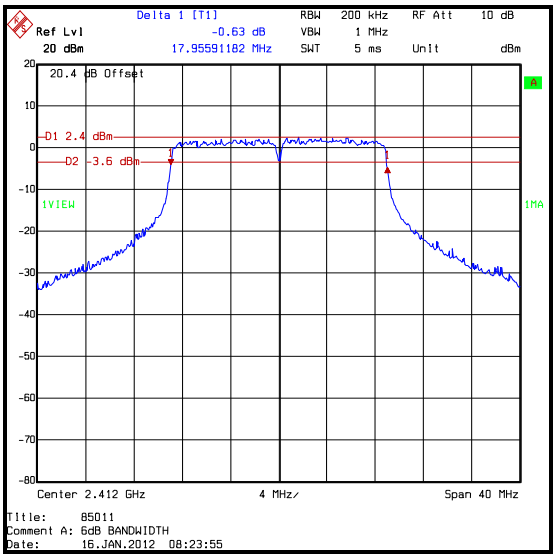
Middle channel



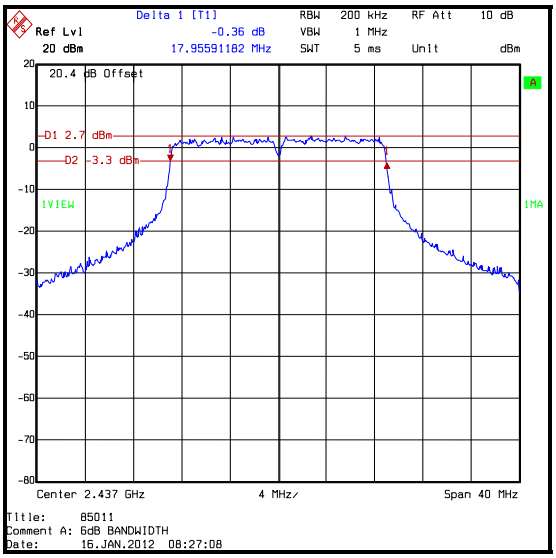
Top channel

Transmitter 6 dB Bandwidth (continued)

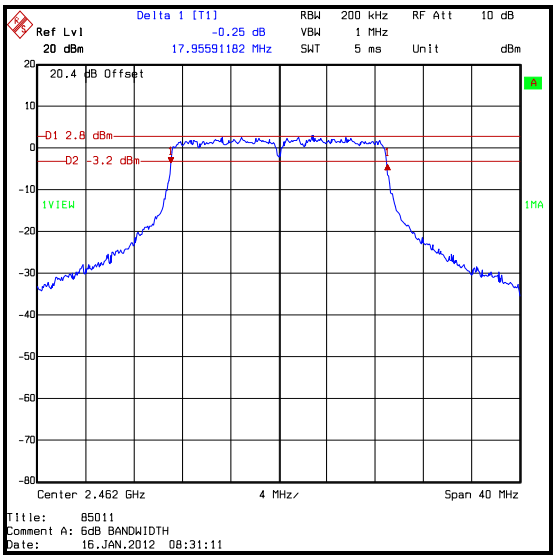
Results: 65 Mbps



Bottom channel



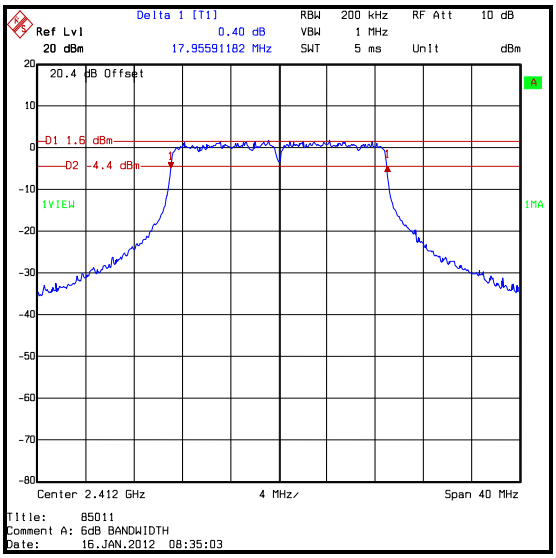
Middle channel



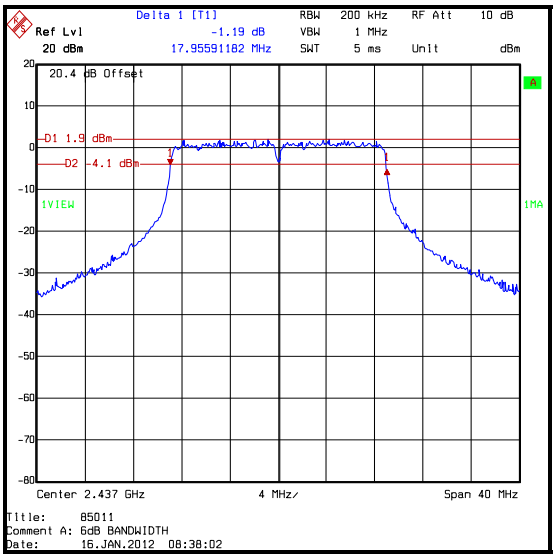
Top channel

Transmitter 6 dB Bandwidth (continued)

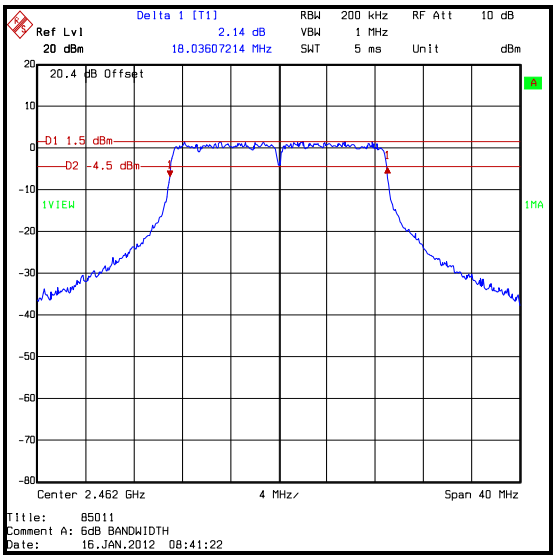
Results: 72.2 Mbps



Bottom channel



Middle channel



Top channel

5.2.5. Transmitter Power Spectral Density

Test Summary:

Test Engineer:	Sarah Williams	**Test Date:**	18 January 2012
Test Sample IMEI:	004401221200021		

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 (%):	30

Results: 2 Mbps

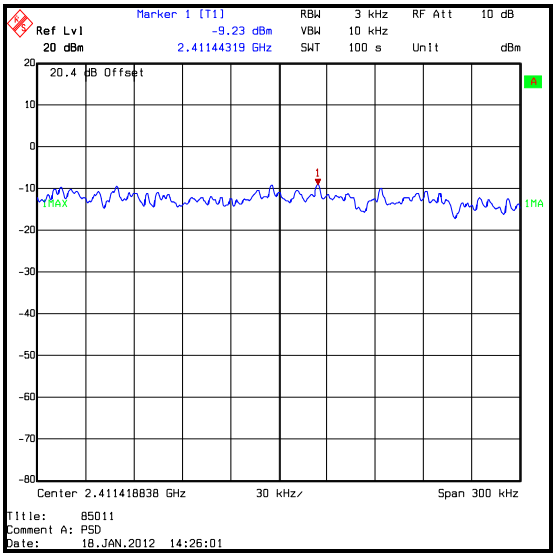
Channel	Output Power (dBm/3 kHz)	Limit (dBm/3 kHz)	Margin (dB)	Result
Bottom	-9.2	8.0	17.2	Complied
Middle	-8.9	8.0	16.9	Complied
Top	-9.1	8.0	17.1	Complied

Note(s):

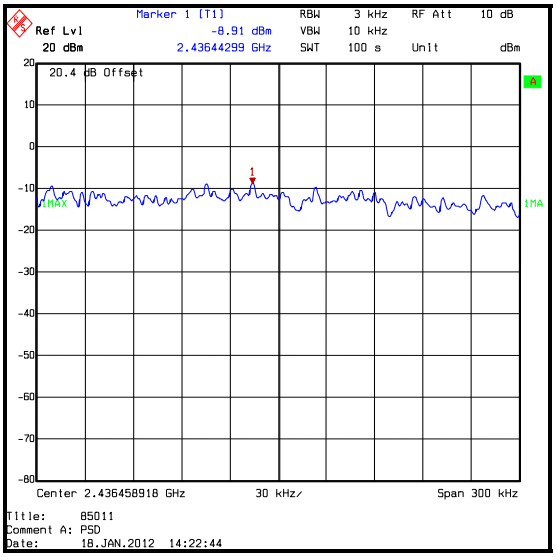
1. All supported modes were tested on the bottom, middle and top channels to determine the worst case configuration. The configuration that produced the highest levels is recorded in the table above.

Transmitter Power Spectral Density (continued)

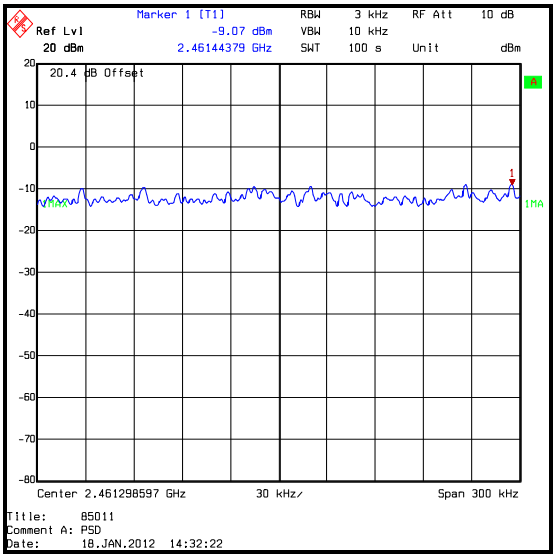
Results: 2 Mbps



Bottom channel



Middle channel



Top channel

5.2.6. Transmitter Maximum Peak Output Power

Test Summary:

Test Engineer:	Sarah Williams	**Test Date:**	12 January 2012
Test Sample IMEI:	004401221200021		

FCC Part:	15.247(b)(3)
Test Method Used:	As detailed in ANSI C63.10 Section 6.10.2 and Sections 6.3 and 6.6 referencing ANSI C63.4 (see note below)

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	23

Results: 11 Mbps

Conducted Peak Limit Comparison

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	21.3	30.0	8.7	Complied
Middle	21.1	30.0	8.9	Complied
Top	21.2	30.0	8.8	Complied

De Facto EIRP Limit Comparison

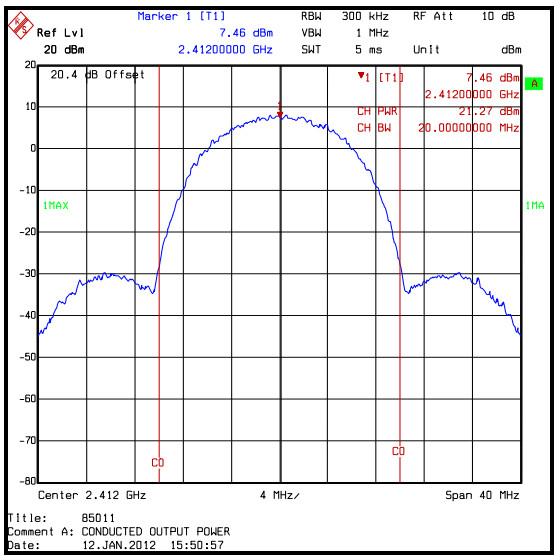
Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	21.3	-1.6	19.7	36.0	16.3	Complied
Middle	21.1	-1.6	19.5	36.0	16.5	Complied
Top	21.2	-1.6	19.6	36.0	16.4	Complied

Note(s):

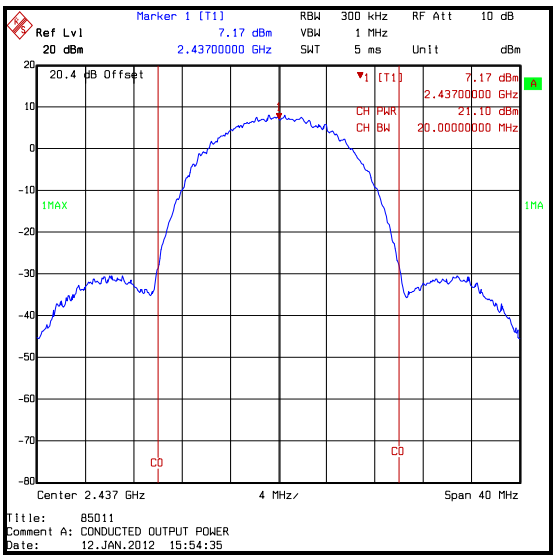
1. Power was measured using the channel power function on a spectrum analyser. The spectrum analyser was connected to the RF port on the EUT using suitable attenuation and RF cable.
2. All supported modes of operation were tested. The mode that produced the highest conducted output power is reported.

Transmitter Maximum Peak Output Power (continued)

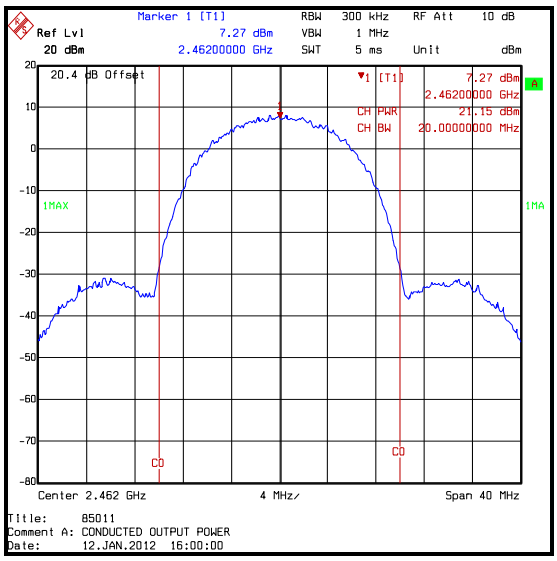
Results: 11 Mbps



Bottom channel



Middle channel



Top channel

5.2.7. Transmitter Radiated Emissions

Test Summary:

Test Engineer:	Andrew Edwards	**Test Date:**	16 January 2012
Test Sample IMEI:	004401221200245		

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):	24
Relative Humidity (%):	28

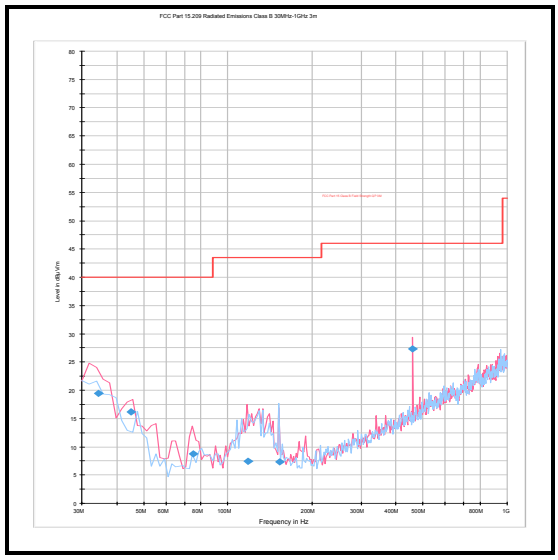
Results: Top Channel / 11 Mbps

Frequency (MHz)	Antenna Polarity	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
34.335	Vertical	19.4	40.0	20.6	Complied
45.085	Vertical	16.1	40.0	23.9	Complied
75.003	Vertical	8.7	40.0	31.3	Complied
117.951	Vertical	7.4	43.5	36.1	Complied
153.316	Horizontal	7.3	43.5	36.2	Complied
458.767	Vertical	27.3	46.0	18.7	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:	Mark Percival & Patrick Jones	**Test Date:**	12 January 2012, 13 January 2012 & 18 January 2012
Test Sample IMEI:	004401221200252		

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 (%):	23

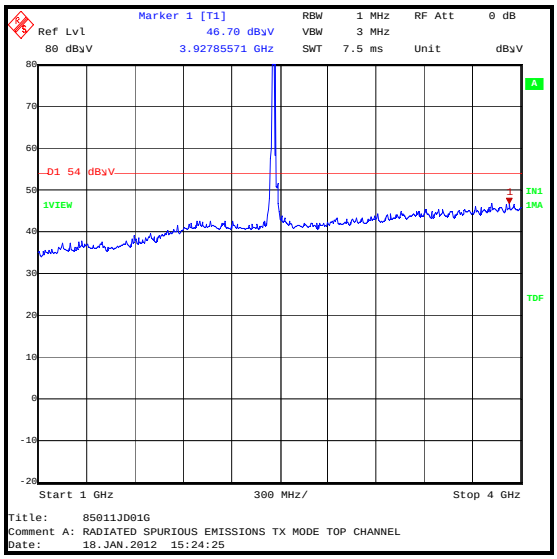
Results:

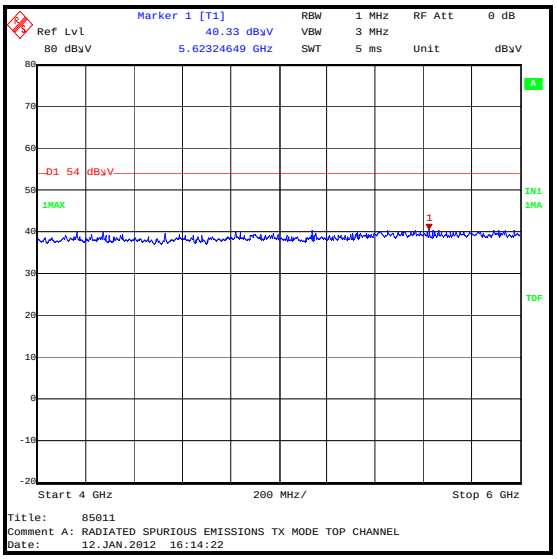
Frequency (MHz)	Antenna Polarity	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
24340.681	Vertical	49.4	54.0	4.6	Complied

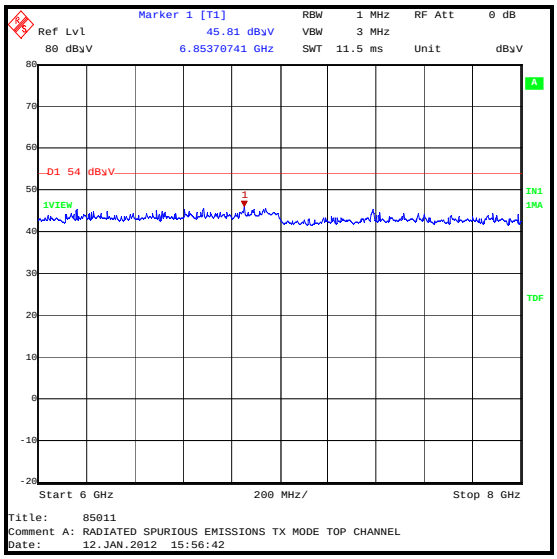
Note(s):

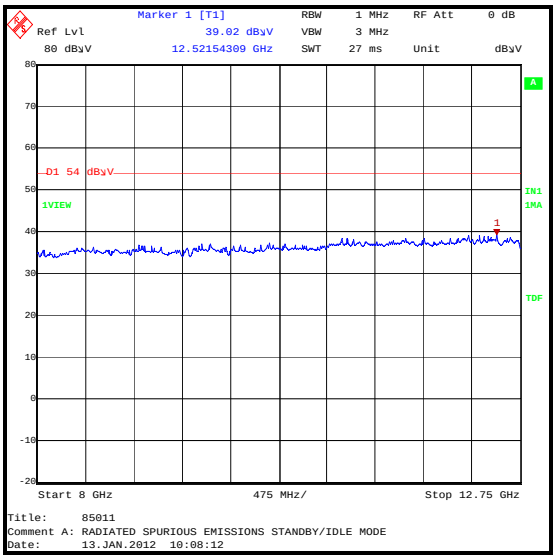
1. The final measured value, for the given emission in the table above, incorporates the calibrated antenna factor and cable loss
2. No spurious emissions were detected above the noise floor of the measuring receiver therefore the highest peak noise floor reading of the measuring receiver was recorded 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. The emission shown at 2462 MHz on the 1 GHz to 4 GHz plot is the EUT fundamental.
4. 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)

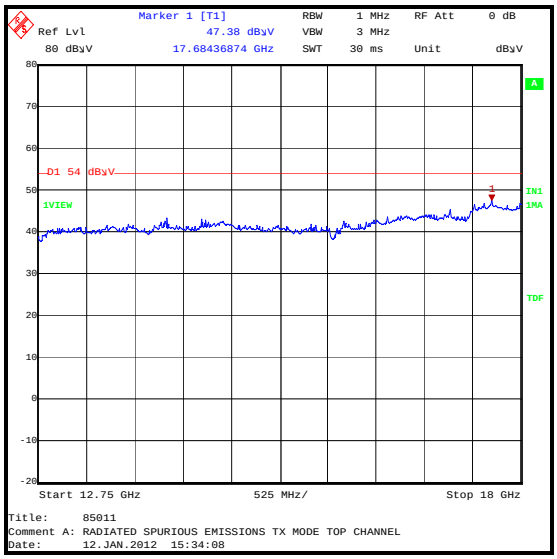


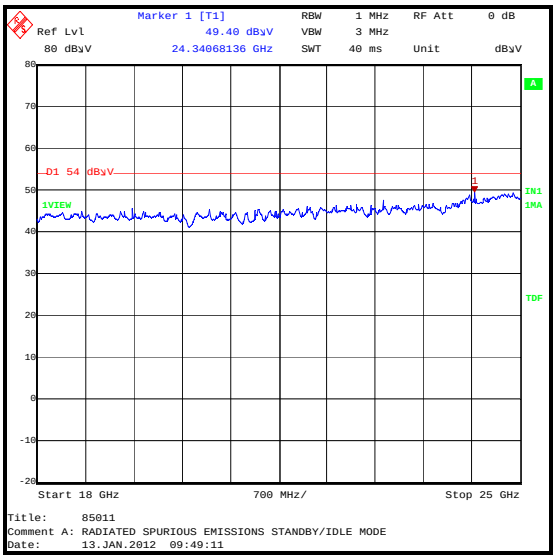






Transmitter Radiated Emissions (continued)





5.2.8. Transmitter Band Edge Radiated Emissions

Test Summary:

Test Engineer:	Mark Percival	**Test Date:**	13 January 2012
Test Sample IMEI:	004401221200252		

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 (%):	22

Results: Peak / 1 Mbps

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2400	51.2	75.4*	24.2	Complied
2483.5	60.4	74.0	13.6	Complied

Results: Average / 1 Mbps

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2483.5	47.0	54.0	7.0	Complied

Results: Peak / 9 Mbps

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2400	61.2	72.8*	11.6	Complied
2483.5	60.8	74.0	13.2	Complied

Results: Average / 9 Mbps

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result
2483.5	47.5	54.0	6.5	Complied

Transmitter Band Edge Radiated Emissions (continued)

Results: Peak / 11 Mbps

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2400	57.5	75.7*	18.2	Complied
2483.5	60.3	74.0	13.7	Complied

Results: Average / 11 Mbps

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2483.5	47.2	54.0	6.8	Complied

Results: Peak / 21.7 Mbps

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2400	61.9	72.8*	10.9	Complied
2483.5	59.9	74.0	14.1	Complied

Results: Average / 21.7 Mbps

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2483.5	47.5	54.0	6.5	Complied

Transmitter Band Edge Radiated Emissions (continued)

Results: Peak / 48 Mbps

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2400	61.0	72.0*	11.0	Complied
2483.5	62.0	74.0	12.0	Complied

Results: Average / 48 Mbps

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2483.5	47.2	54.0	6.8	Complied

Results: Peak / 72.2 Mbps

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2400	59.7	72.3*	12.6	Complied
2483.5	60.4	74.0	13.6	Complied

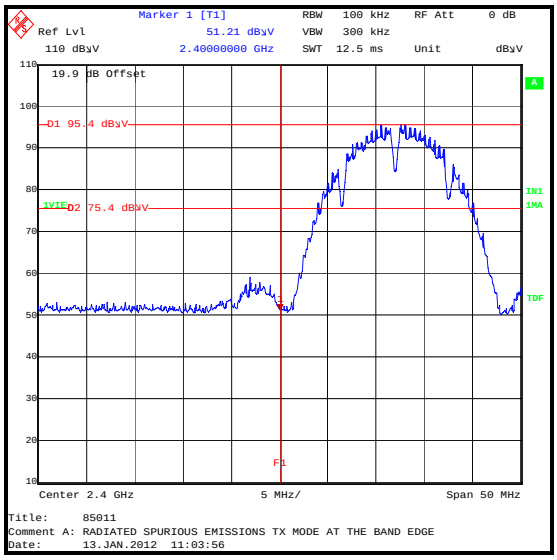
Results: Average / 72.2 Mbps

Frequency (MHz)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Result
2483.5	47.2	54.0	6.8	Complied

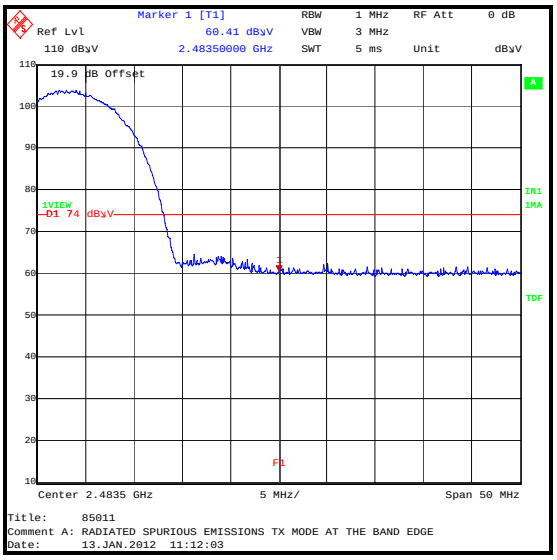
**-20 dBc limit*

Transmitter Band Edge Radiated Emissions (continued)

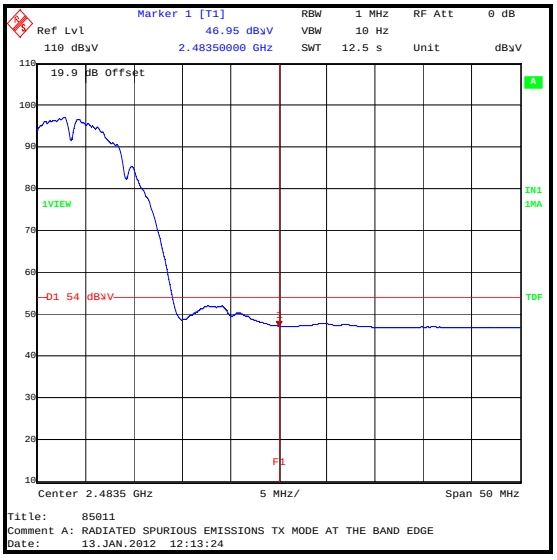
Results: 1 Mbps



Lower Band Edge Peak Measurement



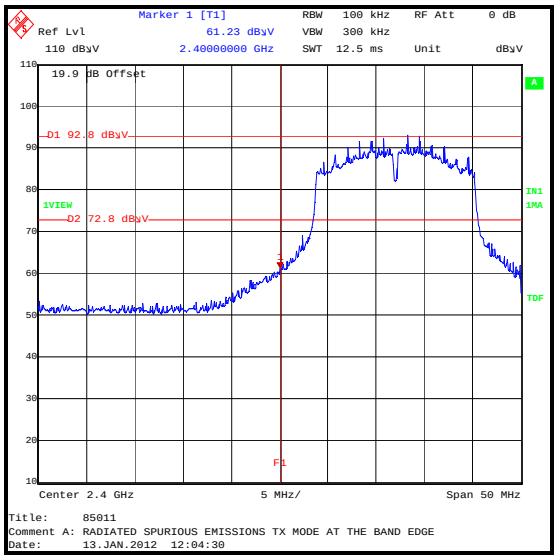
Upper Band Edge Peak Measurement



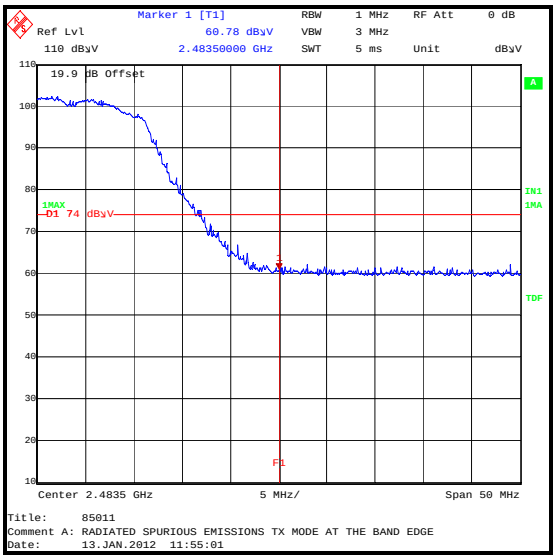
Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

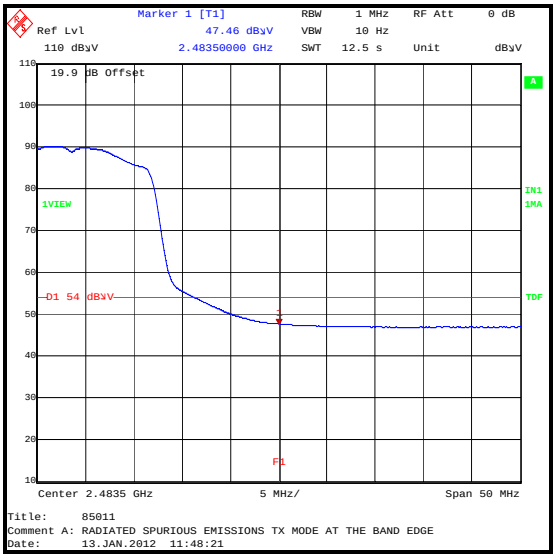
Results: 9 Mbps



Lower Band Edge Peak Measurement



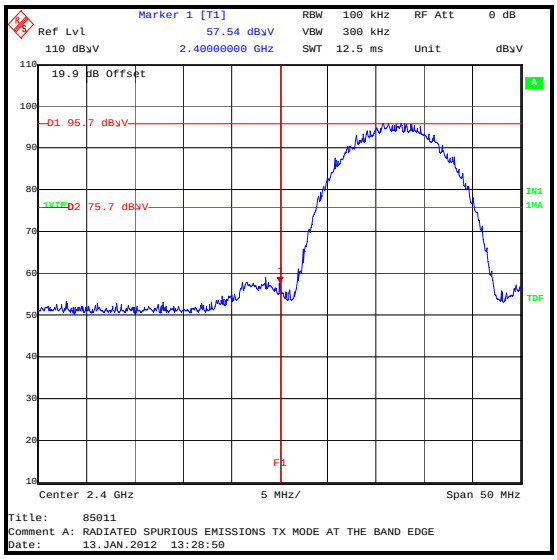
Upper Band Edge Peak Measurement



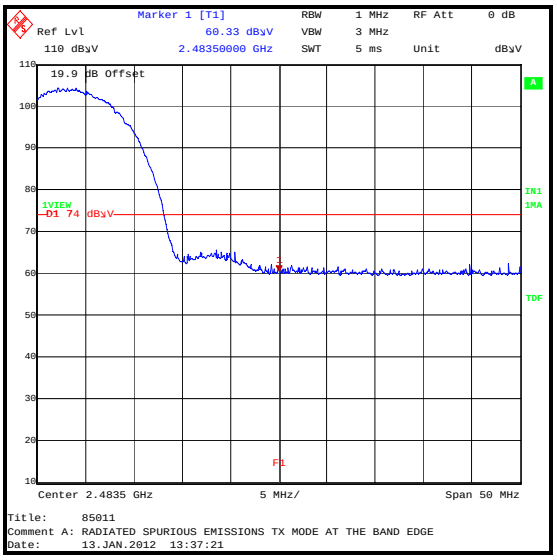
Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

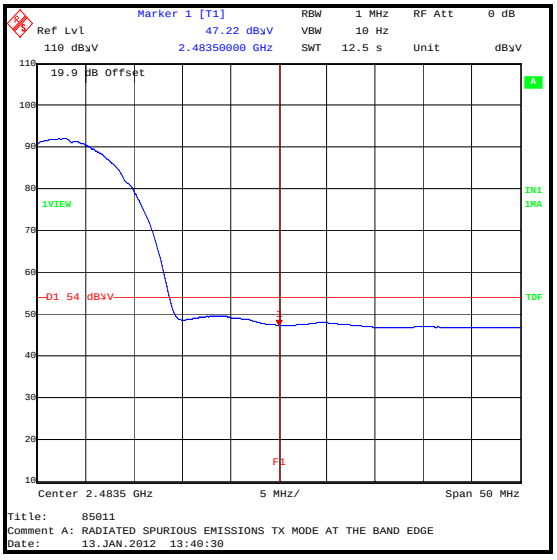
Results: 11 Mbps



Lower Band Edge Peak Measurement



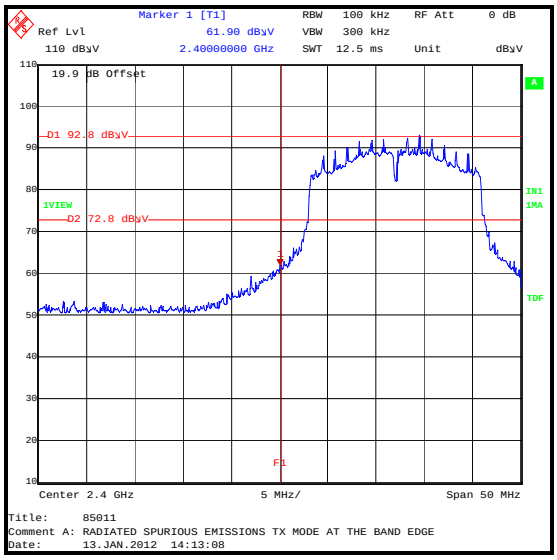
Upper Band Edge Peak Measurement



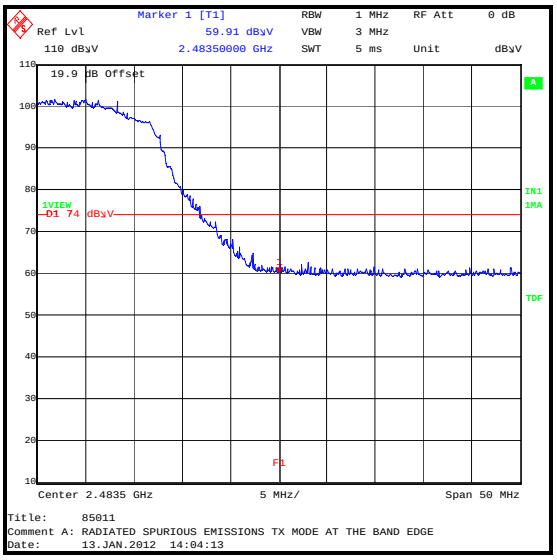
Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

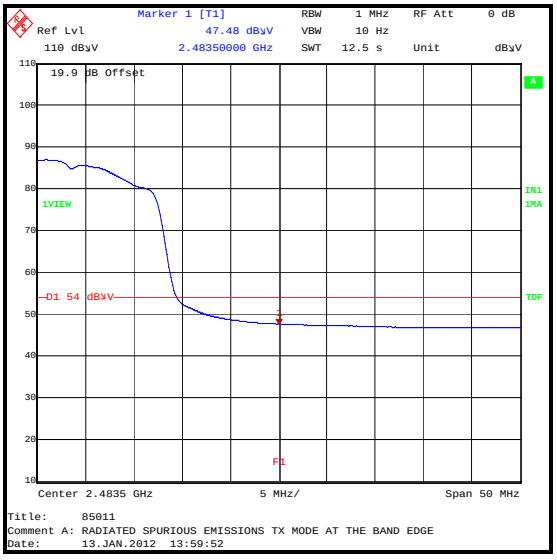
Results: 21.7 Mbps



Lower Band Edge Peak Measurement



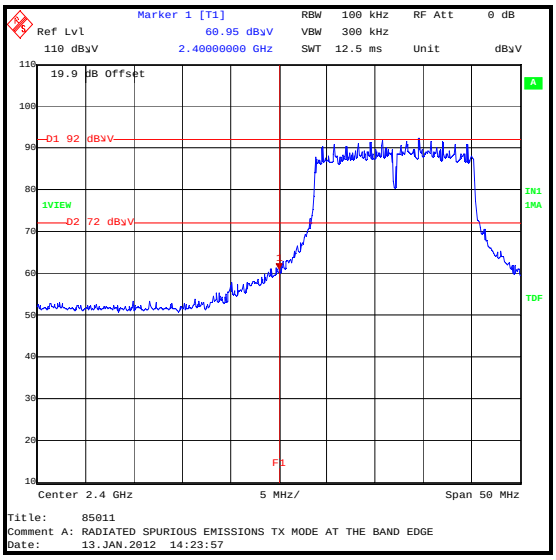
Upper Band Edge Peak Measurement



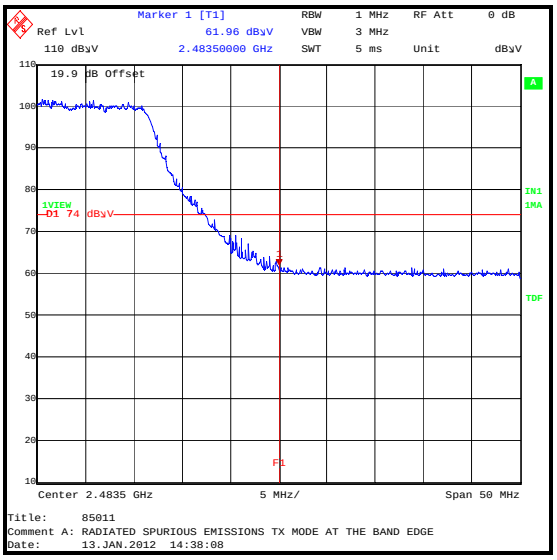
Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

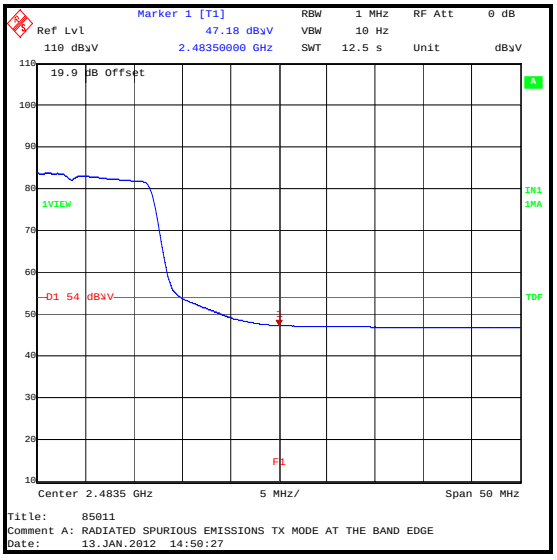
Results: 48 Mbps



Lower Band Edge Peak Measurement



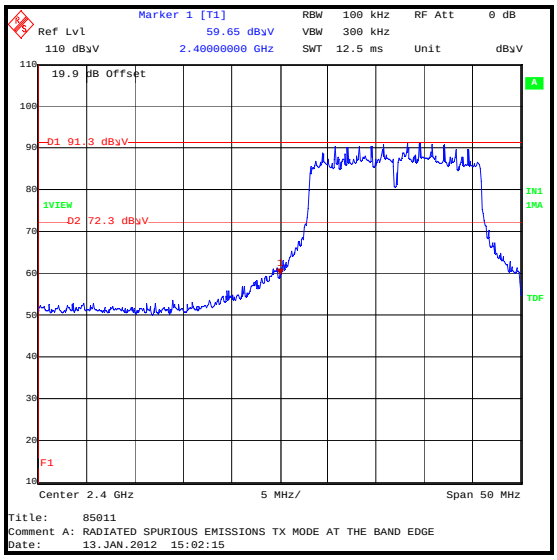
Upper Band Edge Peak Measurement



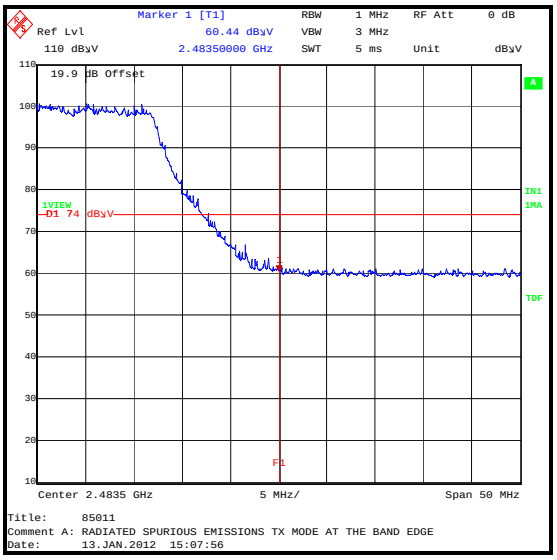
Upper Band Edge Average Measurement

Transmitter Band Edge Radiated Emissions (continued)

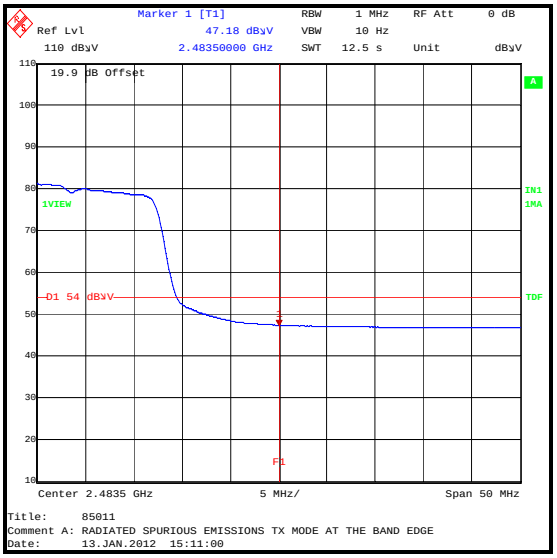
Results: 72.2 Mbps



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
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
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.